Ventura Engineering Inland

PRELIMINARY WATER QUALITY MANAGEMENT PLAN
SANTA ANA REGION OF RIVERSIDE COUNTY

PROPOSED BOAT SHOWROOM & STORAGE

CUP220001
24803 HIGHWAY 74
PERRIS, CALIFORNIA 92530
APN: 342-120-052-7

PREPARED FOR:

INLAND BOAT SERVICES
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PREPARED BY:

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REVISION 4: *November 16, 2023*
REVISION 3: *July 12, 2023*
REVISION 2: *February 2, 2023*
REVISION 1: *August 28, 2022*
ORIGINAL DATE: *December 8, 2021*

I hereby declare that I am the engineer of work for this project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions code, and that the design is consistent with current standards.

WILFREDO VENTURA
R.C.E. NO. 66532
EXPIRES 6/30/24

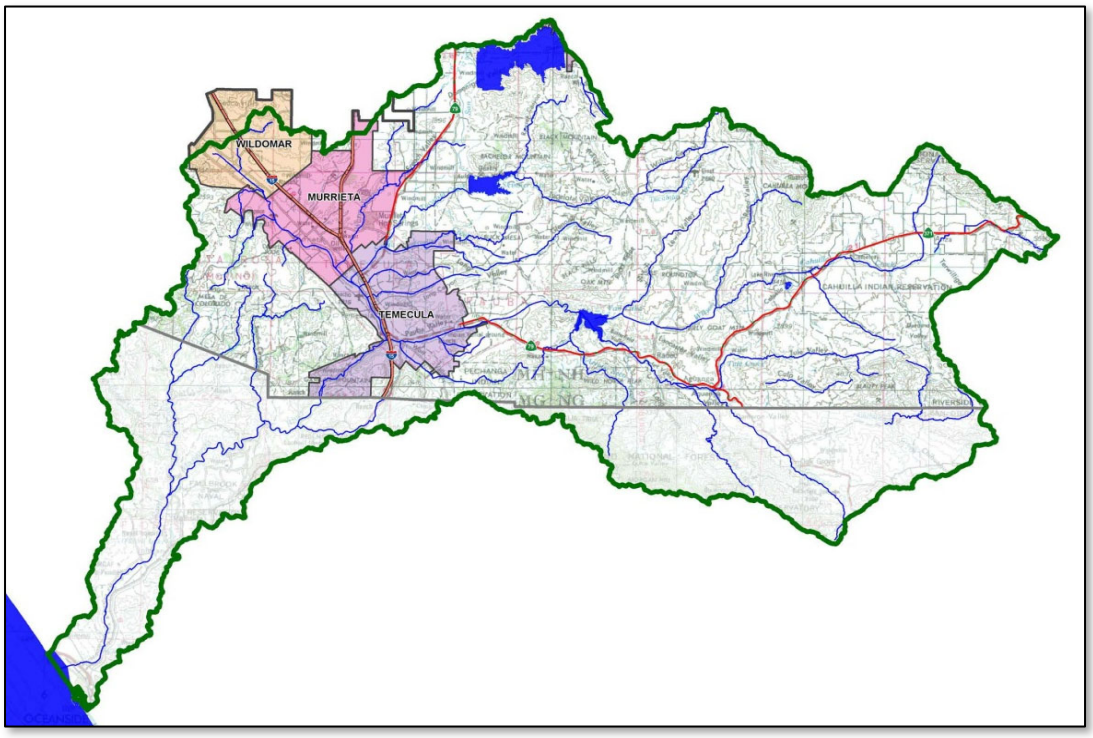
11/16/23

DATE

County Project Specific Water Quality Management Plan

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

Project Title: Inland Boat Services
Development No: APN: 342-120-052-7
Design Review/Case No: CUP220001
BMP$_i$ (Latitude, Longitude): 33°45'40.17"N, 117° 16' 7.99"W



☒ **Preliminary**
☐ **Final**

Original Date Prepared: 12/8/21

Revision Date(s): 8/28/22, 2/2/23, 7/12/23, 11/16/23

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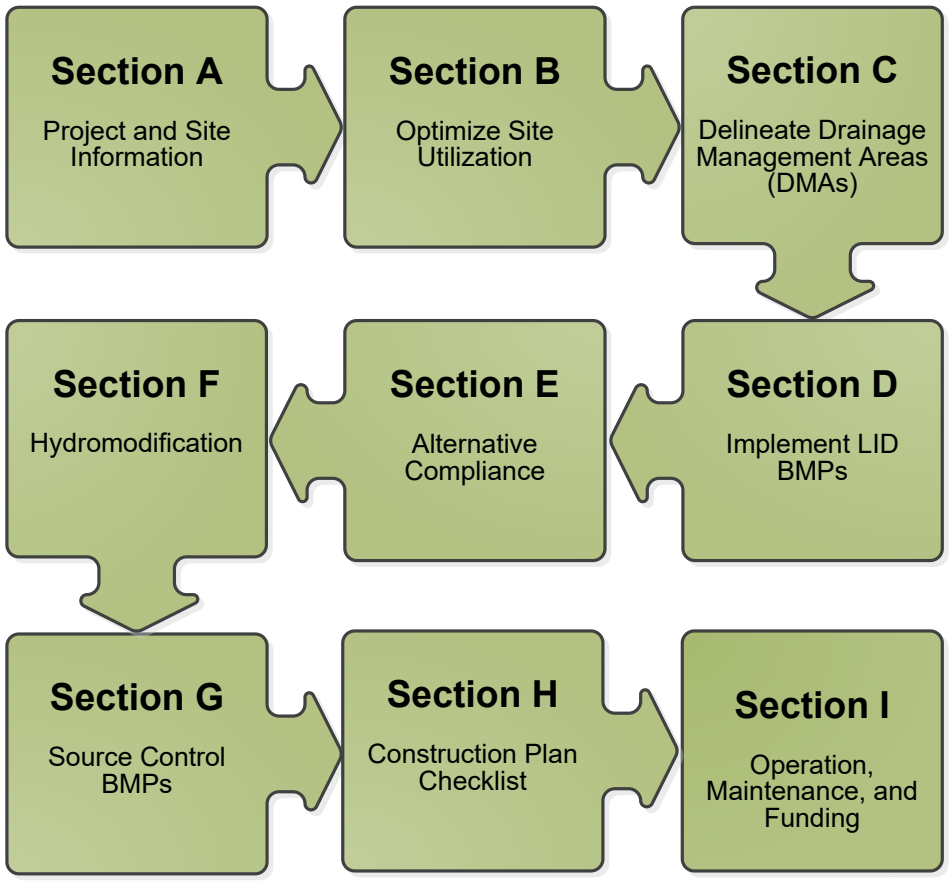
Based on 2018 WQMP, prepared for Compliance with Regional Board Order No. **R8-2010-0033**

A Brief Introduction

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



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Inland Boat Services by Ventura Engineering Inland, Inc. for the Inland Boat Show showroom and storage facility located at 24803 Highway 74 in Perris, California.

This WQMP is intended to comply with the requirements of Riverside County for Ordinance 857 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 Riverside County Water Quality Ordinance (Municipal Code Section 857).

"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 Best Management Practices in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033**."

Preparer's Signature	Date
Wilfredo S.D. Ventura Preparer's Printed Name	Principal Engineer Preparer's Title/Position

Preparer's Licensure:

Table of Contents

List of Tables

List of Appendices

Section A: Project and Site Information

Use the table below to compile and summarize basic site information that will be important for completing subsequent steps. Subsections A.1 through A.4 provide additional detail on documentation of additional project and site information. The Regional MS4 Permit has effectively removed the ability for a project to be grandfathered from WQMP requirements. Even if a project were able to meet all the requirements stated in Section 1.2 of the WQMP, the 2014 WQMP requirements would apply.

PROJECT INFORMATION		
Type of PDP:	Commercial Project, Disturbing > 1 Acre	
Type of Project:	Commercial Boat Showroom and Storage Facility	
Planning Case Number:	CUP220001	
Rough Grade Permit No.:		
Development Name:		
PROJECT LOCATION		
Latitude & Longitude (DMS):	33°45'40.17"N, 117° 16'7.99"W	
Project Watershed and Sub-Watershed:	Santa Ana River/ Sub-Watershed-San Jacinto Valley	
24-Hour 85th Percentile Storm Depth (inches):	0.56	
Is project subject to Hydromodification requirements?	☐ Y ☒ N (Select based on Section A.3)	
APN(s):	342-120-052-7	
Map Book and Page No.:	TB P807 Grid B6 and C6	
PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)		Commercial
Proposed or Potential SIC Code(s)		4226, 5551
Existing Impervious Area of Project Footprint (SF)		8,087 sq-ft
Total area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement		84,346 sq-ft
Total Project Area (ac)		4.990 acres
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
Has preparation of Project-Specific WQMP included coordination with other site plans?		☒ Y ☐ N
EXISTING SITE CHARACTERISTICS		
Is the project located within any Multi-Species Habitat Conservation Plan area (MSHCP Criteria Cell?)		☐ Y ☒ N
Is a Geotechnical Report attached?		☒ Y ☐ N
If no Geotech. Report, list the Natural Resources Conservation Service (NRCS) soils type(s) present on the site (A, B, C and/or D)		Type A, B, C Soils
Provide a brief description of the project:		
The project site redevelops an existing residential lot into a commercial boat showroom and unpaved boat storage area, impervious paving in the front of the property, landscaping, biofiltration areas, and dg areas for storage elements. The project also includes public improvements that include roadway widening with a new sidewalk and landscaping areas along Highway 74.		

Paver and dirt roads are considered pervious for determining WQMP applicability.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the Project 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:

- Vicinity and location maps
- Parcel Boundary and Project Footprint
- Existing and Proposed Topography
- Drainage Management Areas (DMAs)
- Proposed Structural Best Management Practices (BMPs)
- Drainage Paths
- Drainage infrastructure, inlets, overflows
- Source Control BMPs
- Site Design BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Pervious Surfaces (i.e. Landscaping)
- Standard Labeling
- Cross Section and Outlet details

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 Copermittee plan reviewer must be able to easily analyze your Project utilizing this template and its associated site plans and maps. Complete the checklists in Appendix 1 to verify that all exhibits and components are included.

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. This map should identify the path of the stormwater discharged from the site all the way to the outlet of the Santa Margarita River to the Pacific Ocean. Use the most recent 303(d) list available from the State Water Resources Control Board Website.
(http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/)

Table A-1 Identification of Receiving Waters

Receiving Waters	*USEPA Approved 303(d) List Impairments (2014-2016 303d SWRCB List)*	*Designated Beneficial Uses*	*Proximity to RARE Beneficial Use*
Local Drainage Conveyance	None	None	+/- 39 miles
San Jacinto River Reach 3 (HU 802.11)	N/A	GWR, AGR, WILD, WARM, REC1, REC2, MUN	N/A
San Jacinto River Reach 2 (HU 802.11)	N/A	GWR, AGR, WILD, WARM, REC1, REC2, MUN	N/A
Canyon Lake (Railroad Canyon Reservoir) (HU 802.11)	Pathogens, Nutrients	GWR, REC1, MUN, AGR, WARM, REC2, WILD	N/A
San Jacinto River Reach 1 (HU 802.11)	N/A	AGR, GWR, MUN, REC1, REC2, WARM, WILD	N/A
Lake Elsinore (HU 802.31)	PCBs, Nutrients, Organic enrichment/Low Dissolved Oxygen, Sediment Toxicity, Unknown Toxicity	MUN, REC1, REC2, WARM, WILD, AGR, PROC	N/A

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 Section 401 Water Quality Certification	☐ Y	☒ N
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage (WDID#_____)	☒ 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)*		
- County of Riverside Building Permit	☒ Y	☐ N
- County of Riverside Grading Permit	☒ Y	☐ N
- State General Construction Permit Coverage (WDID#)	☒ Y	☐ N

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

Section B: Optimize Site Utilization (LID Principles)

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

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

Site Optimization

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

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

The general pattern of west to east is preserved through the site. The flow then enters the existing basins that are being converted into bioretention areas before being allowed to overflow into the existing drainage channel adjacent to Highway 74.

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

The vegetation is not designated for preservation.

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

Natural infiltration will be preserved through the use of the storage area being all decomposed granite and the swales being unlined and vegetated.

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

The storage area is being proposed as dg to minimize imperviousness as much as feasible.

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

The side areas are vegetated swales to disperse the impervious areas before being discharged to the proposed bioretention basins.

Section C: Delineate Drainage Management Areas (DMAs) & Green Streets

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 Identification

Table C-1: DMA 1 Breakdown			
DMA Name/ ID	***Surface Type(s)[1]***	***Area (Sq. Ft.)***	***DMA Type***
DMA1 -R	ROOF	5,006	TYPE D – DRAINS TO BMP
DMA1-IMP	PCC PAVING	35,299	TYPE D – DRAINS TO BMP
DMA1-DG	DG PAVING	17,779	TYPE D – DRAINS TO BMP
DMA1-LS	LANDSCAPE	5,303	TYPE D – DRAINS TO BMP
DMA1-NT	NATURAL	3,321	TYPE D – DRAINS TO BMP
DMA1-BMP1	BIORETENTION BMP	1,659	BMP
DMA2 -R	ROOF	4,994	TYPE D – DRAINS TO BMP
DMA2-IMP	PCC PAVING	38,233	TYPE D – DRAINS TO BMP
DMA2-DG	DG PAVING	18,439	TYPE D – DRAINS TO BMP
DMA2-LS	LANDSCAPE	6,289	TYPE D – DRAINS TO BMP
DMA2-NT	NATURAL	1,516	TYPE D – DRAINS TO BMP
DMA2-BMP2	BIORETENTION BMP	1,831	BMP
SRA	R/W LANDSCAPING	591	TYPE B – SELF-RETAINING
DSRA-IMP	R/W PCC SIDEWALK	398	TYPE C – DRAINS TO SELF-RETAINING
DSRA-LS	R/W LANDSCAPING	648	TYPE C – DRAINS TO SELF-RETAINING
SRB	R/W LANDSCAPING	590	TYPE B – SELF-RETAINING
DSRB-IMP	R/W PCC SIDEWALK	415	TYPE C – DRAINS TO SELF-RETAINING
DSRB-LS	R/W LANDSCAPING	729	TYPE C – DRAINS TO SELF-RETAINING
SRC	SELF-RETAINING DG PAVING	53,624	TYPE B – SELF-RETAINING
STA	REVEGETATED NATURAL	4,608	TYPE A – SELF-TREATING
STB	REVEGETATED NATURAL	6,025	TYPE A – SELF-TREATING
STC	REVEGETATED NATURAL	10,059	TYPE A – SELF-TREATING
	TOTAL AREA:	217,357	

Step 3: DMA Classification

Determine how drainage from each DMA will be handled by using information from Steps 1 and 2 and by completing Steps 3.A to 3.C. Each DMA will be classified as one of the following four types:

- Type ‘A’: Self-Treating Areas:
- Type ‘B’: Self-Retaining Areas
- Type ‘C’: Areas Draining to Self-Retaining Areas
- Type ‘D’: Areas Draining to BMPs

Step 3.A – Identify Type 'A' Self-Treating Area

Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

☒ Yes ☐ No	Area is undisturbed from their natural condition OR restored with Native and/or California Friendly vegetative covers.
☒ Yes ☐ No	Area is irrigated, if at all, with appropriate low water use irrigation systems to prevent irrigation runoff.
☒ Yes ☐ No	Runoff from the area will not comingle with runoff from the developed portion of the site, or across other landscaped areas that do not meet the above criteria.

If all answers indicate "Yes," complete Table C-2 to document the DMAs that are classified as Self-Treating Areas.

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

Table C-2: Type 'A', Self-Treating DMAs			
DMA Name or Identification	***Area (Sq. Ft.)***	***Stabilization Type***	***Irrigation Type (if any)***
ST-A	4,608	LANDSCAPING	CONSERVATIVE UNTIL REVEGETATED
ST-B	6,025	LANDSCAPING	CONSERVATIVE UNTIL REVEGETATED
ST-C	10,059	LANDSCAPING	CONSERVATIVE UNTIL REVEGETATED

Step 3.B – Identify Type 'B' Self-Retaining Area and Type 'C' Areas Draining to Self-Retaining Areas

Type 'B' Self-Retaining Area: A Self-Retaining Area is shallowly depressed 'micro infiltration' areas designed to retain the Design Storm rainfall that reaches the area, without producing any Runoff.

Indicate if the DMAs meet the following criteria by answering "Yes," "No," or "N/A".

☒ Yes ☐ No ☐ N/A	Inlet elevations of area/overflow drains, if any, should be clearly specified to be three inches or more above the low point to promote ponding.
☒ Yes ☐ No ☐ N/A	Soils will be freely draining to not create vector or nuisance conditions.
☒ Yes ☐ No ☐ N/A	Pervious pavements (e.g., crushed stone, porous asphalt, pervious concrete, or permeable pavers) can be self-retaining when constructed with a gravel base course four or more inches deep below any underdrain discharge elevation.

If all answers indicate "Yes," DMAs may be categorized as Type 'B', proceed to identify Type 'C' Areas Draining to Self-Retaining Areas.

Type 'C' Areas Draining to Self-Retaining Areas: Runoff from impervious or partially pervious areas can be managed by routing it to Self-Retaining Areas consistent with the LID Principle discussed in SMR WQMP Section 3.2.5 for 'Dispersing Runoff to Adjacent Pervious Areas'.
Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

☐ Yes ☒ No The drainage from the tributary area must be directed to and dispersed within the Self-Retaining Area.

☐ Yes ☒ No The maximum ratio of Tributary Area to Self-Retaining area is (2 ÷ Impervious Fraction): 1

If all answers indicate "Yes," DMAs may be categorized as Type 'C'.

Complete Table C-3 and

Table C-4 to identify Type 'B' Self-Retaining Areas and Type 'C' Areas Draining to Self-Retaining Areas.

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

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)***	***Storm Depth (inches)***	***DMA Name / ID***	***[C] from*** Table C-4=	***Required Retention Depth (inches)***
		[A]	***[B]***		***[C]***	***[D] =*** $[B] + \frac{[B]\cdot[C]}{[A]}$

SRA	DG SURFACE	591	0.56	DSRA-IMP DSRA-LS	398 65 ∑ 463	1.0" REQUIRED 2.4" PROVIDED (6" DG @ 40% POROSITY)
SRB	DG SURFACE	590	0.56	DSRB-IMP DSRB-LS	415 73 ∑ 488	1.02" REQUIRED 2.4" PROVIDED (6" DG @ 40% POROSITY)
SRC	DG SURFACE	53,624	0.56	N/A	∑ 0	0.56" REQUIRED 2.4" PROVIDED (6" DG @ 40% POROSITY)

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

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

DMA					*Receiving Self-Retaining DMA*		
DMA Name/ ID	*Area (square feet)*	*Post-project surface type*	*Runoff factor*	*Product*	*DMA name /ID*	*Area (square feet)*	*Ratio*
	[A]		*[B]*	*[C] = [A] x [B]*		*[D]*	*[C]/[D]*
DSRA-IMP	398	PCC PAVING	1.0	398			
DSRA-LS	648	LANDSCAPE	0.1	65			
				∑463	SRA	591	0.78 < 2
DSRB-IMP	415	PCC PAVING	1.0	415			
DSRB-LS	729	LANDSCAPE	0.1	73			
				∑488	SRB	590	0.83 < 2

Note: (See Section 3.3 of SMR WQMP) Ensure that partially pervious areas draining to a Self-Retaining area do not exceed the following ratio:

$$\left(\frac{2}{Impervious\ Fraction}\right) : 1$$

(Tributary Area: Self-Retaining Area)

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

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

DMA Name or ID	*BMP Name or ID*
DMA1-R	BMP1 BIOFILTRATION BASIN
DMA1-IMP	
DMA1-DG	
DMA1-LS	
DMA1-NT	
DMA1-BMP1	
DMA2-R	BMP2 BIOFILTRATION BASIN
DMA2-IMP	
DMA2-DG	
DMA2-LS	
DMA2-NT	
DMA1-BMP2	
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

The Regional MS4 Permit requires the use of LID BMPs to provide retention or treatment of the DCV and includes a BMP hierarchy which requires Full Retention BMPs (Priority 1) to be considered before Biofiltration BMPs (Priority 2) and Flow-Through Treatment BMPs and Alternative Compliance BMPs (Priority 3). LID BMP selection must be based on technical feasibility and should be considered early in the site planning and design process. Use this section to document the selection of LID BMPs for each DMA. Note that feasibility is based on the DMA scale and may vary between DMAs based on site conditions.

D.1 Infiltration Applicability

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

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

Geotechnical Report

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

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

Infiltration Feasibility

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

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: Entire Site		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		*X*
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		*X*
Describe here:		

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

D.2 Harvest and Use Assessment

Please check what applies*:*

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

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

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

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

Irrigation Use Feasibility

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

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

Total Area of Irrigated Landscape: n/a

Type of Landscaping (Conservation Design or Active Turf): n/a

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for 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: n/a

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: n/a

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: n/a

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)**
n/a	n/a

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: n/a

Project Type: n/a

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for 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: n/a

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

Enter your TUTIA factor: n/a

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: n/a

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)
n/a	n/a

Other Non-Potable Use Feasibility

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

n/a

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

Average Daily Demand: n/a

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

Total Area of Impervious Surfaces: n/a

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

Enter the factor from Table 2-3: n/a

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

Minimum required use: n/a

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

Minimum required non-potable use (Step 4)	Projected average daily use (Step 1)
n/a	n/a

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

D.3 Bioretention and Biotreatment Assessment

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

Select one of the following:

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

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

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.1 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA1	☐	☐	☒	☐	☐
DMA2	☐	☐	☒	☐	☐

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.

Infiltration is less than 1.6 in/hr and requires a safety factor of 3 so infiltration cannot be used; however, partial infiltration with the use of bioretention elements is feasible and being used for LID.

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.2 DCV Calculations for LID BMPs

Table D.3 DCV Calculations for LID BMP1								
DMA Type/ID	***DMA Area (square feet)***	***Post-Project Surface Type***	***Effective Impervious Fraction, I_f***	***DMA Runoff Factor***	***DMA Areas x Runoff Factor***	*DMA1 – BMP1 BIORETENTION BASIN*		
	[A]		***[B]***	***[C]***	***[A] x [C]***			
DMA1-R	5,006	ROOF	1.0	0.892	4,465	**Design Storm Depth (in)**	**Design Capture Volume, V_{BMP} (cubic feet)**	**Proposed Volume on Plans (cubic feet)**
DMA1-IMP	35,299	PCC PAVING	1.0	0.892	31,487			
DMA1-DG	17,779	DG PAVING	0.4	0.280	4,973			
DMA1-LS	5,303	LANDSCAPE	0.1	0.110	586			
DMA1-NT	3,321	NATURAL	0.3	0.225	748			
DMA1-BMP1	1,659	BIORETENTION BMP	0.1	0.110	183			
	68,368				42,442	0.56	1,981	2,223

[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

Table D.3 DCV Calculations for LID BMP2								
DMA Type/ID	***DMA Area (square feet)***	***Post-Project Surface Type***	***Effective Impervious Fraction, I_f***	***DMA Runoff Factor***	***DMA Areas x Runoff Factor***	*DMA2 – BMP2 BIORETENTION BASIN*		
	[A]		***[B]***	***[C]***	***[A] x [C]***			
DMA2-R	4,994	ROOF	1.0	0.892	4,455	**Design Storm Depth (in)**	**Design Capture Volume, V_{BMP} (cubic feet)**	**Proposed Volume on Plans (cubic feet)**
DMA2-IMP	38,233	PCC PAVING	1.0	0.892	34,104			
DMA2-DG	18,439	DG PAVING	0.4	0.280	5,158			
DMA2-LS	6,289	LANDSCAPE	0.1	0.110	695			
DMA2-NT	1,516	NATURAL	0.3	0.225	341			
DMA2-BMP2	1,831	BIORETENTION BMP	0.1	0.110	202			
	71,303				44,955	0.56	2,098	2,453

[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.

N/A

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.

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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.1 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.2 Sizing Criteria

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

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
N/A									
	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 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.3 Treatment Control BMP Selection

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

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

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

Table E.4 Treatment Control BMP Selection

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

[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 (Minutes)	20.48	20.58	+ 1 %
Volume (acre-ft)	2-Year Not Checked 10-Year = 0.6561	2-Year Not Checked 10-Year = 0.8359 (no storage) 10-Year = 0.6454 (with storage)	2-Year Not Checked 10-Year = +0.1798 (no storage) = +27% 10-Year = - 0.0107 (with storage) = -2%
*Note: All values from the associated Preliminary Hydrology Report. Full report provided in Attachment 7 for reference.			

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

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

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

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

F.2 HCOC Mitigation

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

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

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

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

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

Section G: Source Control BMPs

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

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	*Permanent Structural Source Control BMPs*	*Operational Source Control BMPs*
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	State that final landscape plans will accomplish all of the following: Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.	Maintain landscaping using minimum or no pesticides
	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.	See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater/Error! Hyperlink reference not valid.
	Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.	Provide Integrated Pest Management information to new owners, lessees and operators
	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.	
G. Refuse areas	State how site refuse will be handled and provide supporting detail to what is shown on plans.	State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
	near dumpsters with the words â€œDo not dump hazardous materials hereâ€ or similar.	

Potential Sources of Runoff pollutants	***Permanent Structural Source Control BMPs***	***Operational Source Control BMPs***
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: Condensate Drain Lines	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.	
O. Miscellaneous Drain or Wash Water: Roof, gutters and trim	Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
P. Plazas, sidewalks, and parking lots.		Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

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)
BMP1	BIORETENTION BASIN	CONCEPTUAL GRADING PLAN
BMP2	BIORETENTION BASIN	CONCEPTUAL GRADING PLAN

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

Section I: Operation, Maintenance and Funding

Applicant is required to state the intended responsible party for BMP Operation, Maintenance and Funding at the Preliminary WQMP phase. The remaining requirements as outlined above are required for Final WQMP only.

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

1. A means to finance and implement maintenance of BMPs 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 Operations and Maintenance or inspections but will require typical landscape maintenance as noted in Chapter 5, in the SMR WQMP. Include a brief description of typical landscape maintenance for these areas.

The Copermittee with jurisdiction over the Project site will also require that you prepare and submit a detailed BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the 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 BMP Operation and Maintenance Plan are in Chapter 5 of the SMR WQMP.

Maintenance Mechanism: Property Owner

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

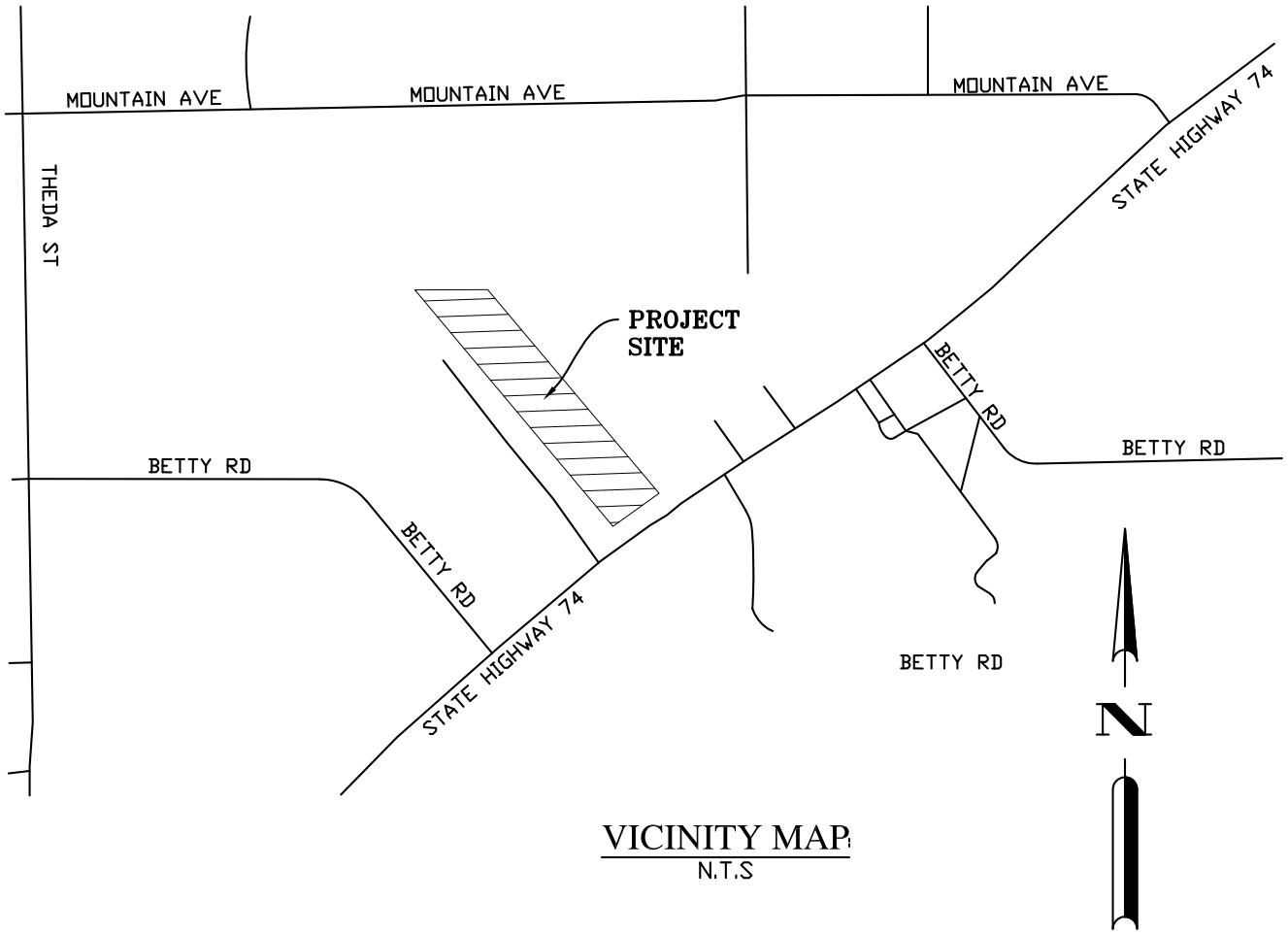
☒ Y ☐ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9, **see Appendix 9 for additional instructions.** 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

VICINITY MAP, LOCATION MAP, LEGAL



VICINITY MAP
N.T.S

SITE ADDRESS:

24803 HIGHWAY 74
PERRIS, CALIFORNIA 92530

APN:

342-120-052-7

THOMAS BROTHERS:

PAGE 807, GRID B6
PAGE 807, GRID C6

LOCATION:

T5S R4W SEC2 SW

COORDINATES:

33° 45' 40.17" N
-117° 16' 7.99" W

DMA LEGEND

- DMA BOUNDARY DRAINING TO SELF-RETAINING AREA
- SELF-TREATING DMA BOUNDARY
- SELF-RETAINING DMA
- BMP BOUNDARY
- DSR## — DMA DRAINING TO SELF-RETAINING AREA; DMA SUB-AREA ID
- ST ## — SELF-TREATING DMA ID; DMA SUB-AREA ID
- SR ## — SELF-RETAINING AREAS; DMA SUB-AREA ID
- DMA# ## — BEST MANAGEMENT PLAN AREAS; DMA SUB-AREA ID
- ON-SITE VEGETATED SWALE
- RIP RAP ENERGY DISSIPATER (NO. 2 BACKING ROCK)
- CURB CUTS TO ALLOW ENTRY TO SWALES AND BASINS
- RIVERSIDE COUNTY FLOOD PLAIN LIMITS
- RIVERSIDE COUNTY FLOOD PLAIN AREAS

SOURCE CONTROL BMP LEGEND

- A. STORM DRAIN INLET W/STENCELING (IF 12" OR LARGER DUE TO NOT ENOUGH SURFACE AREA IF SIZE IS <12") [NONE PROPOSED AT THIS TIME]
- D1. NEED FOR FUTURE INDOOR & STRUCTURAL OUTDOOR PEST CONTROL
- D2. LANDSCAPE/OUTDOOR PESTICIDE USE (WHILE BEING RE-VEGETATED)
- G. TRASH ENCLOSURE
- N. FIRE SPRINKLERS
- O. MISC. – CONDENSATE DRAIN LINES
- O. MISC. – ROOFING, GUTTERS, AND TRIM

SITE DEIGN BMP LEGEND

- NOT PLOTTABLE — IDENTIFY AND PRESERVE EXITING DRAINAGE PATTERNS
- NOT PLOTTABLE — IDENTIFY AND PROTECT EXISTING VEGETATION (OUTSIDE DISTURBED AREA)
- NOT PLOTTABLE — IDENTIFY AND PRESERVE NATURAL INFILTRATION CAPACITY
- MINIMIZE IMPERVIOUS AREA (WITH THE USE OF DG SURFACES)
- DISPERSE RUNOFF TO ADJACENT PERVIOUS AREAS
- UTILIZATION OF NATIVE OR DROUGHT TOLERANT SITE LANDSCAPING
- REVEGETATION WITH NATIVE SPECIES
- UTILIZATION OF NATIVE SPECIES IN BMP
- SELF-RETAINING NATIVE LANDSCAPING
- SELF-RETAINING NATIVE LANDSCAPING

WQMP DETAIL NOTE:

PLEASE SEE THE WQMP DETAIL SHEET FOR THE BMP AND OTHER NECESSARY WATER QUALITY RELATED DETAILS.

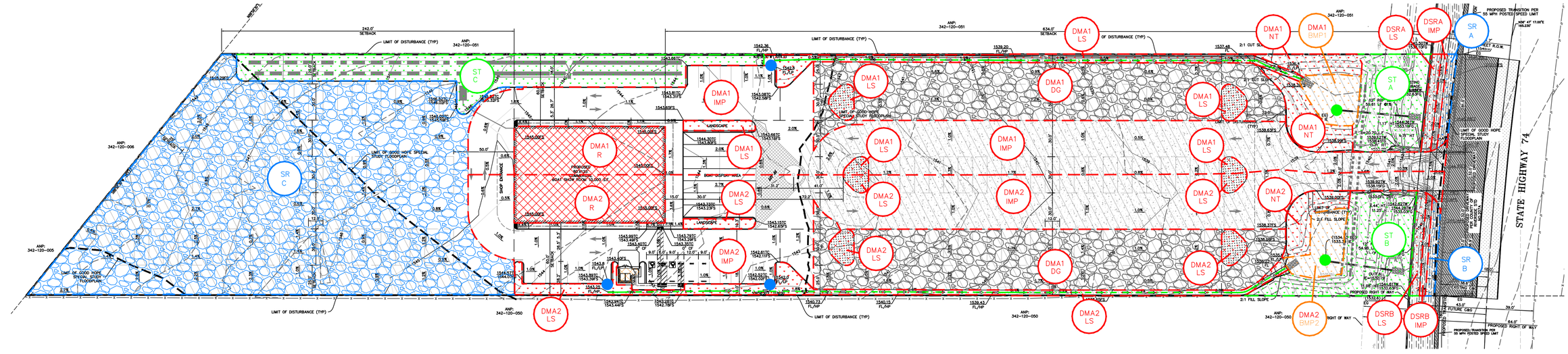


Table C-1: DMA 1 Breakdown

DMA Name/ ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA1 -R	ROOF	5,006	TYPE D – DRAINS TO BMP
DMA1-IMP	PCC PAVING	35,299	TYPE D – DRAINS TO BMP
DMA1-DG	DG PAVING	17,779	TYPE D – DRAINS TO BMP
DMA1-LS	LANDSCAPE	5,303	TYPE D – DRAINS TO BMP
DMA1-NT	NATURAL	3,321	TYPE D – DRAINS TO BMP
DMA1-BMP1	BIORETENTION BMP	1,659	BMP
DMA2 -R	ROOF	4,994	TYPE D – DRAINS TO BMP
DMA2-IMP	PCC PAVING	38,233	TYPE D – DRAINS TO BMP
DMA2-DG	DG PAVING	18,439	TYPE D – DRAINS TO BMP
DMA2-LS	LANDSCAPE	6,289	TYPE D – DRAINS TO BMP
DMA2-NT	NATURAL	1,516	TYPE D – DRAINS TO BMP
DMA2-BMP2	BIORETENTION BMP	1,831	BMP
SRA	R/W LANDSCAPING	591	TYPE B – SELF-RETAINING
DSRA-IMP	R/W PCC SIDEWALK	398	TYPE C – DRAINS TO SELF-RETAINING
DSRA-LS	R/W LANDSCAPING	648	TYPE C – DRAINS TO SELF-RETAINING
SRB	R/W LANDSCAPING	590	TYPE B – SELF-RETAINING
DSRB-IMP	R/W PCC SIDEWALK	415	TYPE C – DRAINS TO SELF-RETAINING
DSRB-LS	R/W LANDSCAPING	729	TYPE C – DRAINS TO SELF-RETAINING
SRC	SELF-RETAINING DG PAVING	53,624	TYPE B – SELF-RETAINING
STA	REVEGETATED NATURAL	4,608	TYPE A – SELF-TREATING
STB	REVEGETATED NATURAL	6,025	TYPE A – SELF-TREATING
STC	REVEGETATED NATURAL	10,059	TYPE A – SELF-TREATING
	TOTAL AREA:	217,357	

Table C-2: Type 'A', Self-Treating DMAs

DMA Name or Identification	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
ST-A	4,608	LANDSCAPING	CONSERVATIVE UNTIL REVEGGETATED
ST-B	6,025	LANDSCAPING	CONSERVATIVE UNTIL REVEGGETATED
ST-C	10,059	LANDSCAPING	CONSERVATIVE UNTIL REVEGGETATED

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 Error! Reference source not found.*	Required Retention Depth (inches) [D] = [B] × [C] / [A]
SRA	DG SURFACE	591	0.56	DSRA-IMP	398	1.0" REQUIRED
				DSRA-LS	65	2.4" PROVIDED
					∑ 463	(6" DG @ 40% POROSITY)
SRB	DG SURFACE	590	0.56	DSRB-IMP	415	1.02" REQUIRED
				DSRB-LS	73	2.4" PROVIDED
					∑ 488	(6" DG @ 40% POROSITY)
SRC	DG SURFACE	53,624	0.56	N/A	∑ 0	0.56" REQUIRED
						2.4" PROVIDED
						(6" DG @ 40% POROSITY)

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

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Runoff factor [B]	Product [C] = [A] × [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]
DSRA-IMP	398	PCC PAVING	1.0	398			
DSRA-LS	648	LANDSCAPE	0.1	65			
				∑ 463	SRA	591	0.78 < 2
DSRB-IMP	415	PCC PAVING	1.0	415			
DSRB-LS	729	LANDSCAPE	0.1	73			
				∑ 488	SRB	590	0.83 < 2

Table D.3 DCV Calculations for LID BMP1

DMA Type/ID	DMA Area (square feet) [A]	Post-Project Surface Type	Effective Impervious Fraction, i_f [B]	DMA Runoff Factor [C]	DMA Areax x Runoff Factor [A] x [C]	DMA1 – BMP1 BIORETENTION BASIN		
						Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA1-R	5,006	ROOF	1.0	0.892	4,465			
DMA1-IMP	35,299	PCC PAVING	1.0	0.892	31,487			
DMA1-DG	17,779	DG PAVING	0.4	0.280	4,973			
DMA1-LS	5,303	LANDSCAPE	0.1	0.110	586			
DMA1-NT	3,321	NATURAL	0.3	0.225	748			
DMA1-BMP1	1,659	BIORETENTION BMP	0.1	0.110	183			
	68,368				42,442	0.56	1,981	2,223

Table D.3 DCV Calculations for LID BMP2

DMA Type/ID	DMA Area (square feet) [A]	Post-Project Surface Type	Effective Impervious Fraction, i_f [B]	DMA Runoff Factor [C]	DMA Areax x Runoff Factor [A] x [C]	DMA2 – BMP2 BIORETENTION BASIN		
						Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA2-R	4,994	ROOF	1.0	0.892	4,455			
DMA2-IMP	38,233	PCC PAVING	1.0	0.892	34,104			
DMA2-DG	18,439	DG PAVING	0.4	0.280	5,158			
DMA2-LS	6,289	LANDSCAPE	0.1	0.110	695			
DMA2-NT	1,516	NATURAL	0.3	0.225	341			
DMA2-BMP2	1,831	BIORETENTION BMP	0.1	0.110	202			
	71,303				44,955	0.56	2,098	2,453

0 40 80 120

(IN FEET)
1 inch = 40 ft.
(ORIGINAL EXHIBIT IS 24X36, COLOR)

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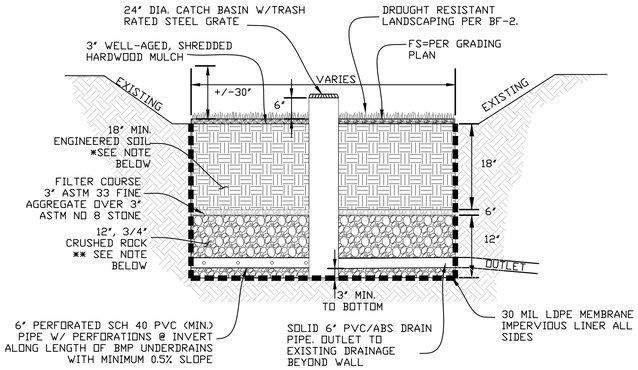
Ventura Engineering Inland

COUNTY OF RIVERSIDE

BOAT SHOWROOM & STORAGE
24803 HIGHWAY 74, PERRIS, CALIFORNIA 92530
APN: 342-120-052-7

WQMP – DMA EXHIBIT



*BIOFILTRATION "ENGINEERED SOIL" LAYER SHALL BE MINIMUM 18" DEEP "SANDY LOAM" SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50-60% SAND, 20-30% COMPOST OR HARDWOOD MULCH, AND 20-30% TOPSOIL, FREE OF STONES, STUMPS, ROOTS, OR SIMILAR OBJECTS, AND ALSO FREE OF NOXIOUS WEEDS. MIN. PERK RATE = 5 IN./HR.

**12" CRUSHED ROCK LAYER, CL. II PERMEABLE ROCK WITH MINIMUM 40% POROSITY.

NUTRIENT SENSITIVE MEDIA NOTE: ALL MEDIA SHALL COMPLY WITH THE NUTRIENT SENSITIVE CRITERIA.

CLEAN WASHED NOTE: ALL ROCK AND SAND USED IN THE BMPS MUST BE CLEAN WASHED.

BIORETENTION BASIN DETAILING

NOT TO SCALE

BIOFILTRATION SOIL MEDIA CRITERIA:

1. THE ENGINEER SHALL FURNISH TO THE COUNTY A COPY OF THE SOURCE TESTING AND A SIGNED CERTIFICATION THAT THE FULLY BLENDED BIORETENTION/BIOFILTRATION SOIL MEDIA (BSM) MATERIAL MEETS ALL OF THE WQMP REQUIREMENTS BEFORE MATERIAL IS IMPORTED OR IF THE MATERIAL IS MIXED ONSITE PRIOR TO INSTALLATION.

2. AS BSM MATERIAL IS BEING INSTALLED, QUALITY ASSURANCE (QA) TESTING SHALL BE CONDUCTED EVERY 1,200 TONS OR 800 CUBIC YARDS FROM A COMPLETELY MIXED STOCKPILE OR WINDROW.

3. THE ENGINEER OF RECORD OR GEOTECHNICAL ENGINEER CONDUCTING THE QUALITY CONTROL TESTING SHALL FURNISH TO THE COUNTY COPY OF THE QA TESTING AND A CERTIFICATION THAT THE BSM FOR THE PROJECT MEETS ALL OF THE FOLLOWING REQUIREMENTS.

A. BSM SHALL CONSIST OF 60-80% CLEAN SAND, UP TO 20% CLEAN TOPSOIL, AND 20% OF A NUTRIENT-STABILIZED ORGANIC AMENDMENT. ORGANIC AMENDMENT MAY CONSIST OF EITHER LOW-NUTRIENT, STABLE, AND MATURE COMPOST; WASHED AND AGED COCONUT COIR PITH; AND/OR SPHAGNUM PEAT. BSM SHALL BE PLACED ON TOP OF 3-INCHES OF CHOKER SAND PLACED ON TOP OF 3-INCHES OF ASTM NO. 8 STONE (1/4 TO 1/2-INCH PEA GRAVEL), AND PLACED ON TOP OF 12 TO 24-INCHES OF A CLEAN, OPEN-GRADED DRAIN ROCK LAYER.

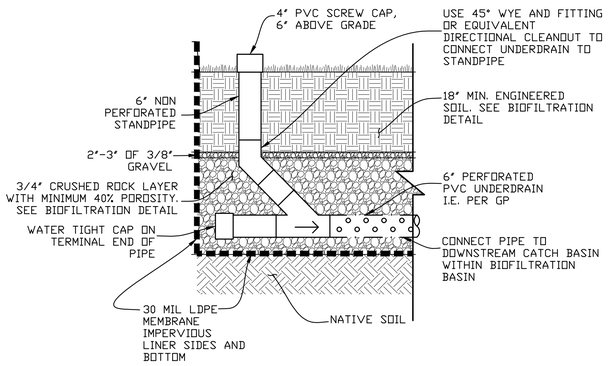
B. BSM SHALL BE TESTED TO ENSURE THAT IT MEETS WQMP REQUIREMENTS FOR HYDRAULIC CONDUCTIVITY. SUCH TESTING SHALL COMPLY WITH ASTM METHOD D2434, USDA HANDBOOK 30 METHOD 34B, OR A SIMILAR LABORATORY METHOD. THE INITIAL INFILTRATION RATE SHALL BE BETWEEN 8 AND 20 INCHES PER HOUR. HYDRAULIC CONDUCTIVITY MAY EXCEED 20 INCHES PER HOUR, IF THE SUBDRAIN IS DESIGNATED AS AN "OUTLET CONTROL SUBDRAIN" ON THE PLANS, WHERE THE SUBDRAIN IS SIZED TO CONVEY NO MORE THAN AN EQUIVALENT OF 5 INCHES PER HOUR. BSM SHALL NOT BE COMPACTED.

C. PH: 6.0 -8.5; SALINITY: 0.5 TO 3.0 MMHO/CM AS ELECTRICAL CONDUCTIVITY; SODIUM ABSORPTION RATIO: < 6.0; CHLORIDE: < 800 PPM IN SATURATED EXTRACT; CATION EXCHANGE CAPACITY (CEC): > 10 MEQ/100 G; ORGANIC MATTER: 2 TO 5-PERCENT ON A DRY WEIGHT BASIS; CARBON: NITROGEN RATIO: 12 TO 40, PREFERABLY 15 TO 40; GRAVEL LARGER THAN 2MM: 0 TO 25-PERCENT OF THE TOTAL SAMPLE; CLAY SMALLER THAN 0.005MM: 0 TO 5 PERCENT OF THE NON-GRAVEL FRACTION.

D. BSM SHALL BE TESTED TO LIMIT THE LEACHING OF POTENTIAL INHERENT POLLUTANTS. BSM USED IN BIOFILTRATION BMPS SHALL CONFORM TO THE FOLLOWING LIMITS FOR POLLUTANT CONCENTRATIONS IN SATURATED EXTRACT: PHOSPHORUS: < 1 MG/L; NITRATE < 3 MG/L, COPPER < 0.025 MG/L. TESTING MAY BE PERFORMED AFTER LABORATORY RINSING OF MEDIA WITH UP TO 15 PORE VOLUMES OF WATER.

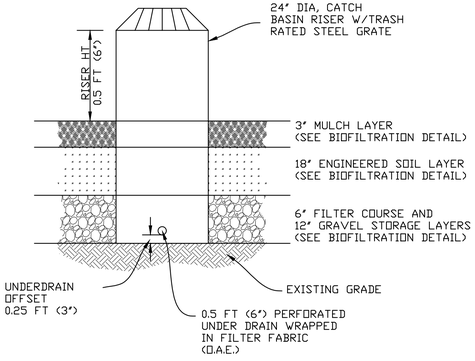
E. LOW NUTRIENT COMPOST USED IN BSM SHALL BE SOURCED FROM A FACILITY PERMITTED THROUGH CALRECYCLE, PREFERABLY THROUGH USCC STA PROGRAM. COMPOST SHALL CONFORM TO THE FOLLOWING REQUIREMENTS: PHYSICAL CONTAMINANTS <1% BY DRY WEIGHT; CARBON: NITROGEN RATIO: 12:1 TO 40:1; MATURITY/STABILITY SHALL CONFORM TO EITHER: SOLVITA MATURITY INDEX: ≥5.5, CO2 EVOLUTION: < 2.5 MG CO2-C PER G COMPOST ORGANIC MATTER PER DAY, OR < 5 MG CO2-C PER G COMPOST C PER DAY; SELECT PATHOGENS AND TRACE METALS SHALL PASS US EPA CLASS A STANDARD. TESTING SHALL BE NO MORE THAN 6 MONTHS OLD AND REPRESENTATIVE OF CURRENT STOCKPILES.

F. COCONUT COIR PITH USED IN BSM SHALL BE THOROUGHLY RINSED WITH FRESHWATER AND SCREENED TO REMOVE COARSE FIBERS AS PART OF PRODUCTION AND AGED > 6 MONTHS. PEAT USED IN BSM SHALL BE SPHAGNUM PEAT.



PERFORATED DRAIN PIPE CLEANOUT DETAIL

NOT TO SCALE



RISER DETAIL

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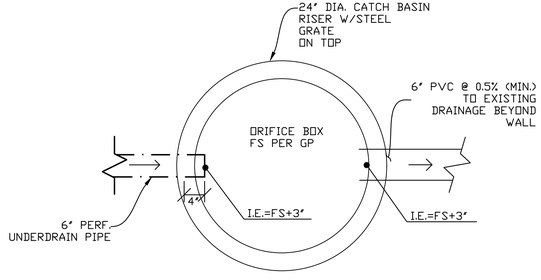
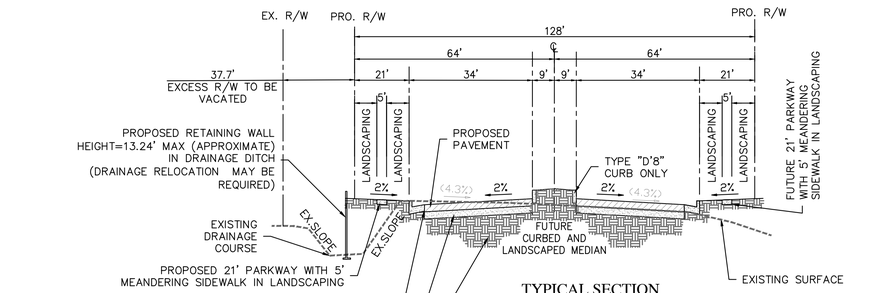


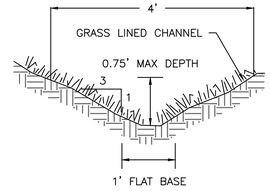
24" DIA. RISER

NOT TO SCALE



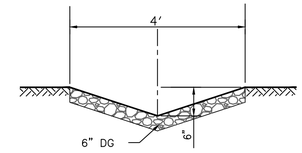
TYPICAL SECTION

FOR STATE HIGHWAY 74 (128' R/W)
PER COUTY OF RIVERSIDE STD NO. 92 (128' R/W)
NOTE TO SCALE



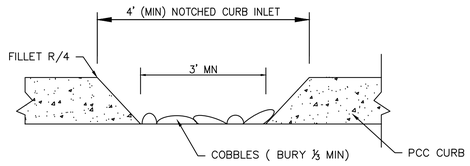
PROPOSED CONDITIONS VEGETATED SWALE DETAIL:

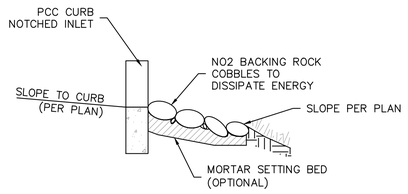
NOT TO SCALE



PROPOSED 4' DG SWALE DETAIL:

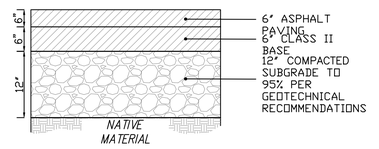
NOT TO SCALE





PROPOSED CUT CURB DETAIL:

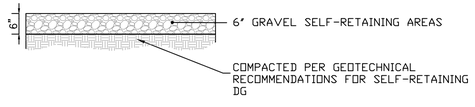
NOT TO SCALE



PROPOSED 4" AC HEAVY DUTY PAVING DETAIL:

NOT TO SCALE

NOTE: DETAIL PER GEOTECHNICAL RECOMMENDATIONS



TYPICAL SELF-RETAINING GRAVEL AREA:

NOT TO SCALE

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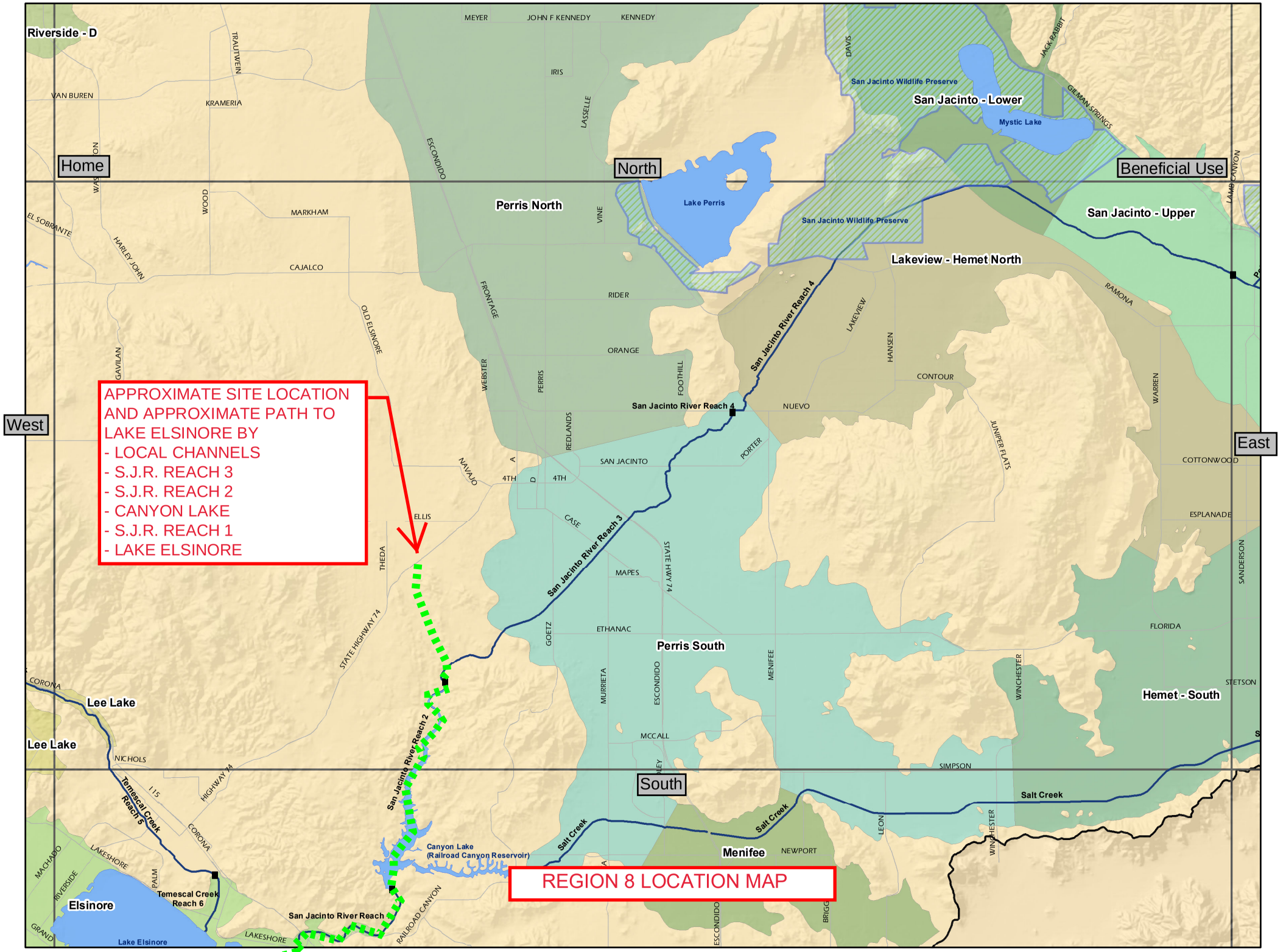
Ventura Engineering Inland

COUNTY OF RIVERSIDE

BOAT SHOWROOM & STORAGE
24803 HIGHWAY 74, PERRIS, CALIFORNIA 92530
APN: 342-120-052-7

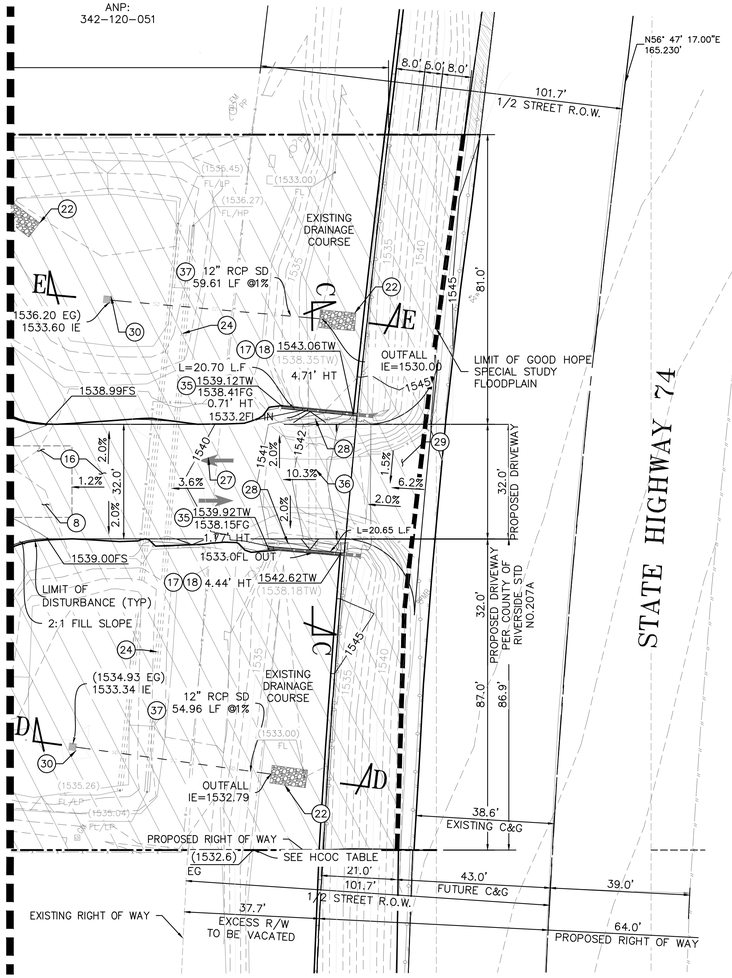
WQMP DETAILS


Riverside - D
Home
North
Beneficial Use
West
East
South
APPROXIMATE SITE LOCATION AND APPROXIMATE PATH TO LAKE ELSINORE BY
- LOCAL CHANNELS
- S.J.R. REACH 3
- S.J.R. REACH 2
- CANYON LAKE
- S.J.R. REACH 1
- LAKE ELSINORE
REGION 8 LOCATION MAP
Perris North
Perris South
Lake Perris
San Jacinto - Lower
San Jacinto - Upper
San Jacinto Wildlife Preserve
Mystic Lake
Lakeview - Hemet North
Hemet - South
Menifee
Elsinore
Lake Elsinore
Lee Lake
Canyon Lake (Railroad Canyon Reservoir)
San Jacinto River Reach 4
San Jacinto River Reach 3
San Jacinto River Reach 2
San Jacinto River Reach 1
Temescal Creek Reach 5
Temescal Creek Reach 6
Salt Creek
MEYER
JOHN F KENNEDY
KENNEDY
IRIS
VAN BUREN
KRAMERIA
TRAUTWEIN
LASSELLE
ESCONDIDO
DAVIS
JACK RABBIT
GILMAN SPRINGS
WASHINGTON
WOOD
MARKHAM
EL SOBRANTE
HARLEY JOHN
CAJALCO
VINE
FRONTAGE
RIDER
ORANGE
OLD ELSINORE
GAVILAN
WEBSTER
PERRIS
FOOTHILL
REDLANDS
LAKEVIEW
HANSEN
RAMONA
CONTOUR
NUEVO
WARREN
JUNIPER FLATS
PORTER
SAN JACINTO
NAVAJO
4TH
D
CASE
ELLIS
THEDA
STATE HWY 74
MAPES
GOETZ
ETHANAC
MURRIETA
MENIFEE
WINCHESTER
FLORIDA
STETSON
ESPLANADE
COTTONWOOD
SANDERSON
LAMB CANYON
CORONA
NICHOLS
HIGHWAY 74
115
MCCALL
SIMPSON
LEON
NEWPORT
MACHADO
RIVERSIDE
LAKESHORE
PALM
GRAND
RAILROAD CANYON
BRIGGS

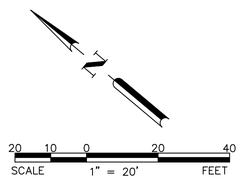
Appendix 2: Construction Plans

Grading and Drainage Plans

CONCEPTUAL GRADING PLAN FOR
CUP220001 BOAT SHOWROOM & STORAGE
APN: 342-120-052



PROPOSED IMPROVEMENTS



CONSTRUCTION NOTES:

(8) PROPOSED 24' WIDE FIRE TURN AROUND.
(16) PROPOSED 4" IMPERVIOUS AC PAVING PER DETAIL 5 ON SHEET 4.
(17) EXISTING HEAD WALL TO REMAIN AND PROTECTED IN PLACE.
(18) PROPOSED EXTENSION USING 8" CMU BLOCK (O.A.E.).
(22) PROPOSED 5'x10' RIPRAP.
(24) EXISTING STORM DRAIN PIPE TO BE REMAIN AND BE PROTECTED IN PLACE.
(27) PROPOSED PAINTED TRAFFIC ARROWS.
(28) PROPOSED GUARD RAIL (BY OTHERS).
(29) PROPOSED COMMERCIAL DRIVEWAY PER COUNTY OF RIVERSIDE STD NO.207A.
(30) INSTALL 24" CATCH BASIN PER DETAIL 1 ON SHEET 4.
(38) PROPOSED RETAINING WALL.
(36) EXISTING 60" DOUBLE BOX CULVERT.
(37) INSTALL 12" RCP PRIVATE STORM DRAIN.

DIG ALERT
DIAL TOLL FREE
1-800-227-2600
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

OWNER INFORMATION:

INLAND BOAT SERVICES
681 E. SAN JACINTO AVENUE
PERRIS, CALIFORNIA 92574
(951) 928-4180

APN:

342-120-052

SITE ADDRESS:

24803 HIGHWAY 74
PERRIS, CALIFORNIA 92530

CGP EARTHWORK		
CUT	573	CY
FILL	787	CY
IMPORT	214	CY
AREA OF DISTURBANCE	194,411 S.F	4.46 ACRES

CGP AND FUTURE STREET IMPROVEMENT EARTHWORK		
CUT	576	CY
FILL	1,755	CY
IMPORT	1,179	CY
AREA OF DISTURBANCE	199,927 S.F	4.59 ACRES

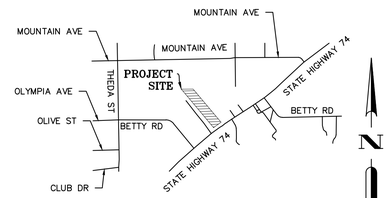
NOTE: EARTHWORK QUANTITIES DO NOT REFLECT ANY SPECIAL CONDITIONS THAT MAY BE SPECIFIED IN THE PRELIMINARY SOILS REPORT AND ARE FOR REFERENCE ONLY. SINCE THE ENGINEER CANNOT CONTROL THE EXACT METHOD OR MEANS USED BY THE CONTRACTOR DURING GRADING OPERATIONS, NOR CAN THE ENGINEER GUARANTEE THE EXACT SOIL CONDITION OVER THE ENTIRE SITE, THE ENGINEER ASSUMES NO RESPONSIBILITY FOR FINAL EARTHWORK QUANTITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING HIS OWN EARTHWORK QUANTITIES FOR BIDDING, CONTRACT, AND CONSTRUCTION PURPOSES.

DRIVEWAY LENGTH:

+/- 400 LF TO STORAGE FENCE

SECTION NOTE:

PLEASE SEE SHEET 4 FOR SECTIONS. SECTION LINES FOR SECTIONS D-D AND E-E SPAN SHEETS 1 AND 2.



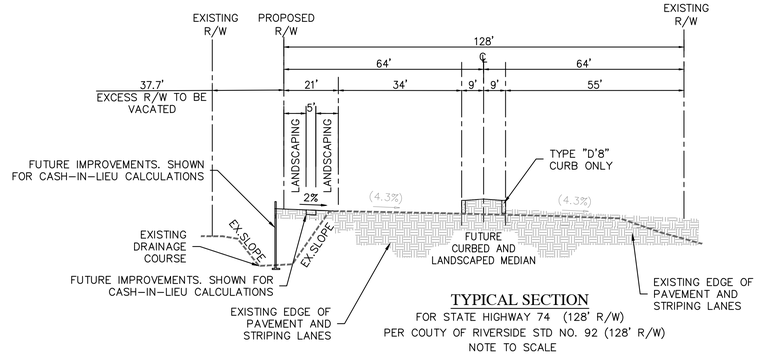
VICINITY MAP:
N.T.S

SHEET INDEX:

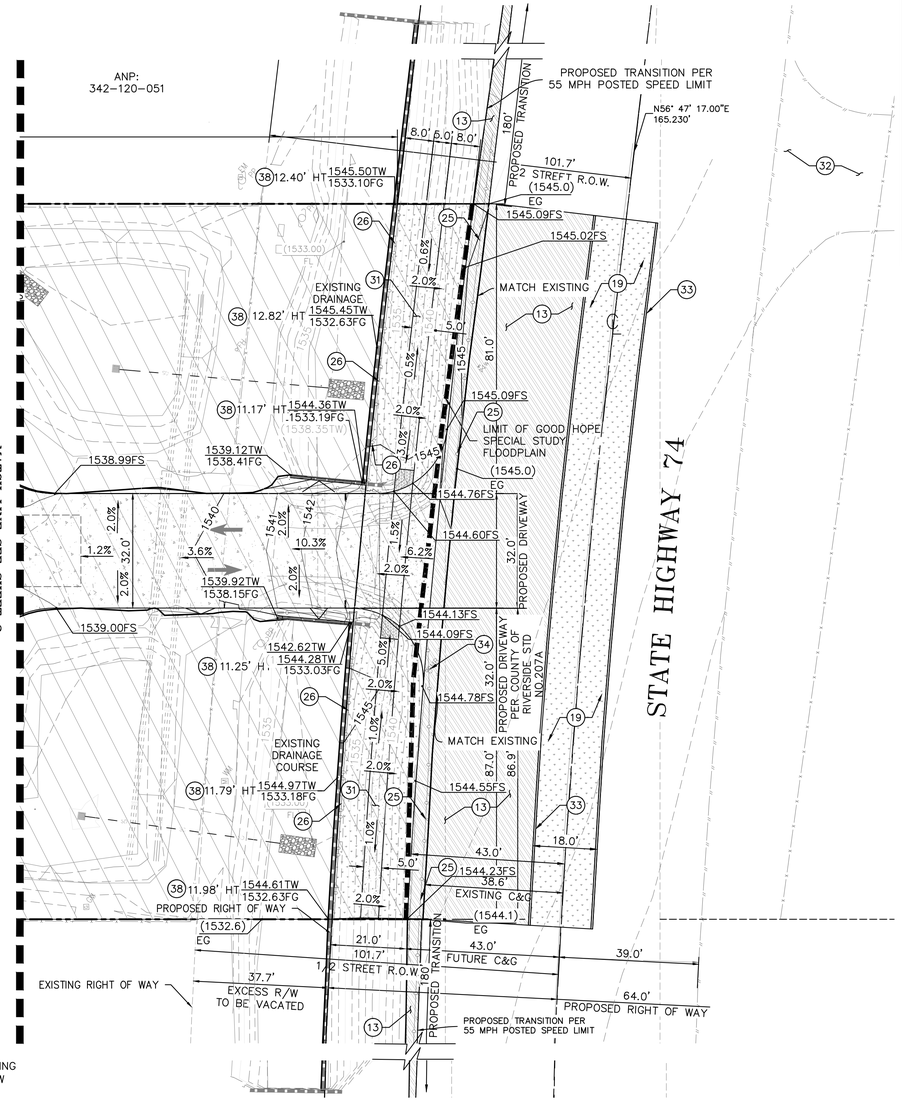
LEGEND:

SYMBOL	ELEMENT
	GOOD HOPE SPECIAL STUDY FLOODPLAIN
	BOUNDARY
	PROPOSED STORM DRAIN
	CENTERLINE
	PROPOSED VEGETATED SWALE
1540	PROPOSED ELEVATION.
1540	EXISTING ELEVATION.
	PROPOSED 5'x10' RIPRAP
	PROPOSED CATCH BASIN

HCOC DATA FOR PROJECT CONTRIBUTION		
CONDITION	EXISTING	PROPOSED
Q (CFS)	2.6	3.3
V (FPS)	1.2	1.4
24-HR U.H. (ACRE-FT)	5.2545	6.8636
STORAGE (ACRE-FT)	0.0000	1.3965



TYPICAL SECTION
FOR STATE HIGHWAY 74 (128' R/W)
PER COUTY OF RIVERSIDE STD NO. 92 (128' R/W)
NOTE TO SCALE



PROPOSED IMPROVEMENTS WITH FUTURE IMPROVEMENTS
(CASH-IN-LIEU CONDITION)

ADDITIONAL CONSTRUCTION NOTES FOR FUTURE IMPROVEMENTS:

NOTE: FUTURE ITEMS SHOWN FOR CASH-IN-LIEU FEE ANALYSIS. NOT TO BE CONSTRUCTED WITH THIS PROJECT.

(13) FUTURE 4.5" AC PAVING AREA.
(19) FUTURE CURBED AND LANDSCAPE MEDIAN PER COUNTY OF RIVERSIDE STD NO.92.
(25) EXISTING METAL BEAM GUARD RAIL TO BE RELOCATED BEHIND FUTURE NEW PAVING (BY OTHERS).
(26) FUTURE LOCATION OF METAL BEAM GUARD RAIL (BY OTHERS).
(31) FUTURE MEANDERING SIDEWALK PER COUNTY OF RIVERSIDE STD NO.404.
(32) EXISTING DRIVEWAY PER PPT180027 (NOT-A-PART).
(33) FUTURE 8" CONCRETE CURB PER COUNTY OF RIVERSIDE STD NO.204.
(34) RELOCATE EXISTING MAIL BOX 18" BEHIND FUTURE NEW PAVING PER POSTAL STANDARD.
(38) FUTURE RETAINING WALL.

WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

MARK	BY	DATE	REVISIONS	APPR.

ENGINEER | COUNTY

SEAL-COUNTY

SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER
WILFREDO S.D. VENTURA
No. 66532
Exp. 6-30-24
CIVIL
STATE OF CALIFORNIA

ENGINEER OF WORK:
VENTURA ENGINEERING INLAND, INC
27393 YNEZ ROAD, SUITE 159
TEMECULA, CALIFORNIA 92591
PHONE: (951) 252-7632
wilfredo@venturaengineeringinland.com

Ventura Engineering Inland

11/6/23
DATE

WILFREDO S.D. VENTURA
RCE 66532 EXP. 6/30/24

BENCHMARK:
HORIZONTAL CONTROL WAS PER RECORD MONUMENTS ON R.S. 133/32-52 AND BOUNDARY SHOULD NOT BE USED FOR MAPPING PURPOSES. VERTICAL DATUM WAS ESTABLISHED PER NGS OPUS NAVD 88 ORTHOMETRIC HEIGHTS.

DRAWN	EN
DESIGNED	EN
CHECKED	WV
SCALE	AS SHOWN
JOB NUMBER	VEI 2021-328

COUNTY OF RIVERSIDE
CUP220001 BOAT SHOWROOM & STORAGE
APN: 342-120-052
CONCEPTUAL GRADING PLAN

SHEET NO. 1 OF 4 SHEETS
FILE NO.

FOR: | W.O. | COUNTY FILE NO.

CONSTRUCTION NOTES:

(1) PROPOSED 6' HIGH HORIZONTAL SLIDING GATE WITH KEYPAD AND KNOX BOX, MINIMUM 24' CLEAR UNOBSTRUCTED WIDTH AND 13'–6" CLEAR UNOBSTRUCTED HEIGHT.

(5) PROPOSED LANDSCAPE AREA.

(7) PROPOSED WROUGHT IRON FENCE SURROUNDING PROPERTY YARD AREA PER ARCHITECTURAL PLANS (BY OTHERS).

(8) PROPOSED 24' WIDE FIRE TURN AROUND.

(9) PROPOSED IMPERVIOUS STAMPED CONCRETE DISPLAY AREA PATTERN BY ARCHITECTURE PLANS (BY OTHERS).

(10) PROPOSED 6" SELF–RETAINING DG PER DETAIL 3 ON SHEET 4.

(11) PROPOSED 16' HIGH BOAT STORAGE RACKS PER ARCHITECTURAL PLANS (BY OTHERS).

(15) PROPOSED 4' VEGETATED SWALE PER DETAIL 7 ON SHEET 4.

(16) PROPOSED 4" IMPERVIOUS AC PAVING PER DETAIL 5 ON SHEET 4.

(22) PROPOSED 5'x10' RIPRAP.

(23) PROPOSED 6" CONCRETE CURB TYPE A–6 PER COUNTY OF RIVERSIDE STD NO.200.

(24) EXISTING STORM DRAIN PIPE TO BE REMAIN AND BE PROTECTED IN PLACE.

(27) PROPOSED PAINTED TRAFFIC ARROWS.

(30) INSTALL 24" CATCH BASIN PER DETAIL 1 ON SHEET 4.

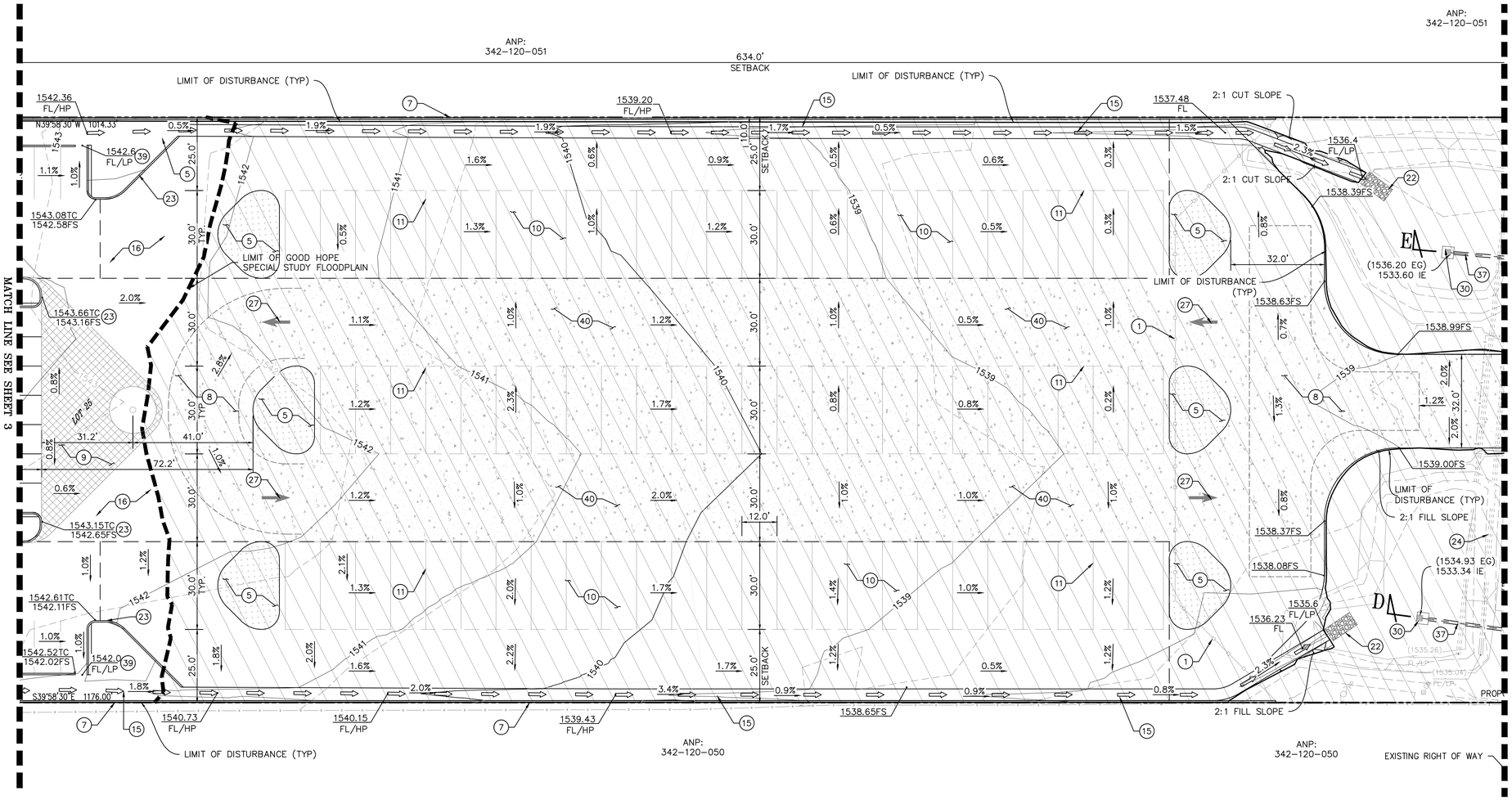
(37) INSTALL 12" RCP PRIVATE STORM DRAIN. MORE INFORMATION ON SHEET 1.

(39) PROPOSED CUT CURB PER DETAIL 6 ON SHEET 4.

(40) PROPOSED 4" IMPERVIOUS CONCRETE PAVING MAIN DRIVE ACCESS PER DETAIL 2 ON SHEET 4.

SECTION NOTE:

PLEASE SEE SHEET 4 FOR SECTIONS. SECTION LINES FOR SECTIONS D–D AND E–E SPAN SHEETS 1 AND 2.



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WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

MARK	BY	DATE	REVISIONS	APPR.
				ENGINEER / COUNTY

SEAL–COUNTY

SEAL–ENGINEER: REGISTERED PROFESSIONAL ENGINEER — WILFREDO S.D. VENTURA — No. 66532 — Exp. 6–30–24 — CIVIL — STATE OF CALIFORNIA

ENGINEER OF WORK:
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Ventura Engineering Inland

11/6/23
DATE

WILFREDO S.D. VENTURA
RCE 66532 EXP. 6/30/24

BENCHMARK:
SEE SHEET 1

DRAWN	EN
DESIGNED	EN
CHECKED	WV
SCALE	AS SHOWN
JOB NUMBER	VEI 2021–328

COUNTY OF RIVERSIDE

CUP220001 BOAT SHOWROOM & STORAGE

APN: 342–120–052

CONCEPTUAL GRADING PLAN

FOR: | W.O. | COUNTY FILE NO.

SHEET NO. 2 OF 4 SHEETS
FILE NO.

CONSTRUCTION NOTES:

(2) 4' MINIMUM WIDTH A.D.A. RAMP, NOT TO EXCEED 5% SLOPE IN DIRECTION OF RUN AND 2% MAXIMUM IN CROSS SLOPE.

(3) DASHED LINE OF ADA PATH OF TRAVEL FROM BUILDING ENTRANCE TO ADA STALLS AND TRASH ENCLOSURE, NO ACCESS TO PUBLIC RIGHT OF WAY PROPOSED.

(4) PROPOSED 1 EV CHARGER SERVICING 2 EVCS (BY OTHERS).

(5) PROPOSED LANDSCAPE AREA.

(6) PROPOSED 4" P.C.C PATH.

(7) PROPOSED WROUGHT IRON FENCE SURROUNDING PROPERTY YARD AREA PER ARCHITECTURAL PLANS (BY OTHERS).

(8) PROPOSED 24' WIDE FIRE TURN AROUND.

(9) PROPOSED IMPERVIOUS STAMPED CONCRETE DISPLAY AREA PATTERN BY ARCHITECTURE PLANS (BY OTHERS).

(10) PROPOSED 6" SELF-RETAINING DG PER DETAIL 3 ON SHEET 4.

(11) PROPOSED 16' HIGH BOAT STORAGE RACKS PER ARCHITECTURAL PLANS (BY OTHERS).

(12) PROPOSED HANDRAIL PER ARCHITECTURAL PLANS (BY OTHERS).

(14) PROPOSED STRUCTURE PER ARCHITECTURAL PLANS.

(15) PROPOSED 4' VEGETATED SWALE PER DETAIL 7 ON SHEET 4.

(16) PROPOSED 4" IMPERVIOUS AC PAVING PER DETAIL 5 ON SHEET 4.

(20) PROPOSED SEPTIC SYSTEM (BY OTHERS).

(21) PROPOSED TRASH ENCLOSURE (BY OTHERS).

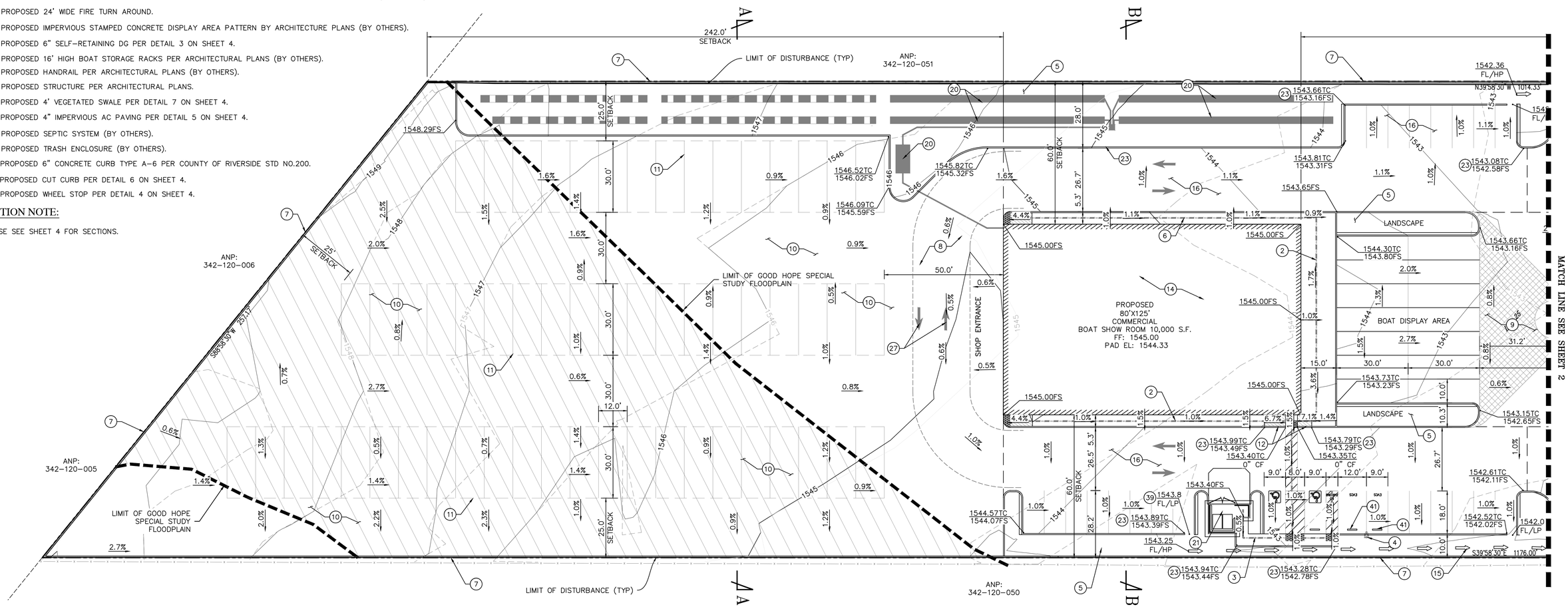
(23) PROPOSED 6" CONCRETE CURB TYPE A-6 PER COUNTY OF RIVERSIDE STD NO.200.

(39) PROPOSED CUT CURB PER DETAIL 6 ON SHEET 4.

(41) PROPOSED WHEEL STOP PER DETAIL 4 ON SHEET 4.

SECTION NOTE:

PLEASE SEE SHEET 4 FOR SECTIONS.

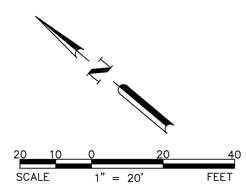


DISABLED ACCESS NOTES:

1. ALL GRADES SHOWN ON THIS PLAN WERE DESIGNED AT OR BELOW MAXIMUMS ALLOWED BY THE AMERICANS WITH DISABILITY ACT (A.D.A.) IT IS CONTRACTORS' RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE DISABILITY ACT GUIDELINES (A.D.A.A.G.) IN THE EVENT THAT A DESIGN QUESTION SHOULD ARISE, OR A FIELD CONDITION PRESENT ITSELF THAT IS DIFFERENT FROM THOSE SHOWN ON THESE PLANS, WORK SHOULD CEASE AND THE ENGINEER SHOULD BE NOTIFIED SO THAT AN ACCEPTABLE SOLUTION CAN BE DETERMINED.

2. THE CONTRACTOR IS ADVISED TO CAREFULLY CHECK ALL PHASES OF WORK RELATING TO A.D.A.A.G. ACCESS FOR THIS PROJECT. SINCE THE CODE DOES NOT ALLOW FOR CONSTRUCTION TOLERANCE, ANY CONSTRUCTION THAT EXCEEDS MAXIMUM OR MINIMUM DIMENSIONS AND SLOPES AS CALLED OUT BY A.D.A.A.G. ARE SUBJECT TO REJECTION AND MAY BE REQUIRED TO BE REMOVED AND REPLACED, AT THE CONTRACTORS' EXPENSE.

3. SINCE THE CIVIL ENGINEER OR SURVEYOR CANNOT CONTROL THE EXACT METHODS OR MEANS USED BY THE GENERAL CONTRACTOR OR THEIR SUBCONTRACTORS DURING GRADING AND CONSTRUCTION OF THE PROJECT, THE CIVIL ENGINEER OR SURVEYOR ASSUMES NO RESPONSIBILITY FOR THE FINAL ACCEPTANCE OF A.D.A.A.G. RELATED ITEMS BY THE CITY, ANY OTHER AUTHORITY, OR OTHER AFFECTED PARTIES.



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MARK	BY	DATE	REVISIONS	APPR.
ENGINEER				COUNTY

SEAL-COUNTY

SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER
WILFREDO S.D. VENTURA
No. 66532
Exp. 6-30-24
CIVIL
STATE OF CALIFORNIA

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Ventura Engineering Inland

11/6/23
DATE

WILFREDO S.D. VENTURA
RCE 66532 EXP. 6/30/24

BENCHMARK:
SEE SHEET 1

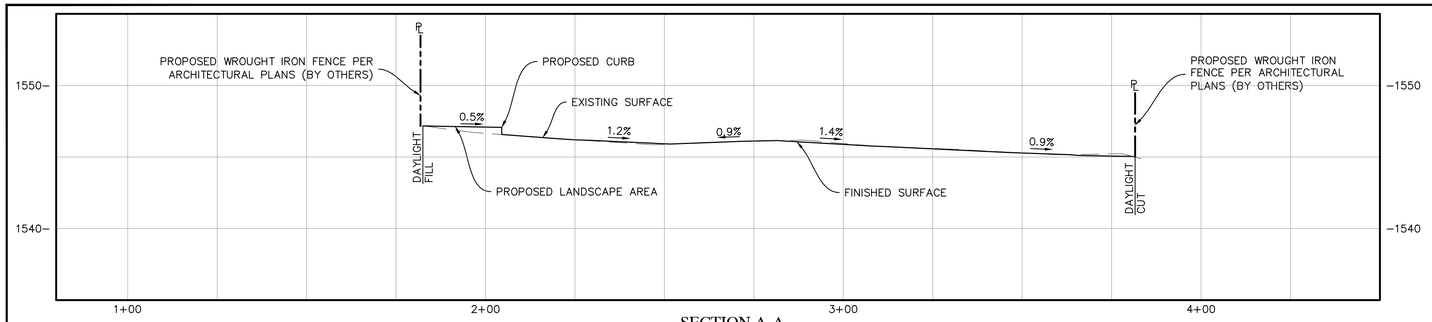
DRAWN	EN
DESIGNED	EN
CHECKED	WV
SCALE	AS SHOWN
JOB NUMBER	VEI 2021-328

COUNTY OF RIVERSIDE

CUP220001 BOAT SHOWROOM & STORAGE
APN: 342-120-052
CONCEPTUAL GRADING PLAN

FOR: | W.O. | COUNTY FILE NO.

SHEET NO. 3 OF 4 SHEETS
FILE NO.



SECTION A-A

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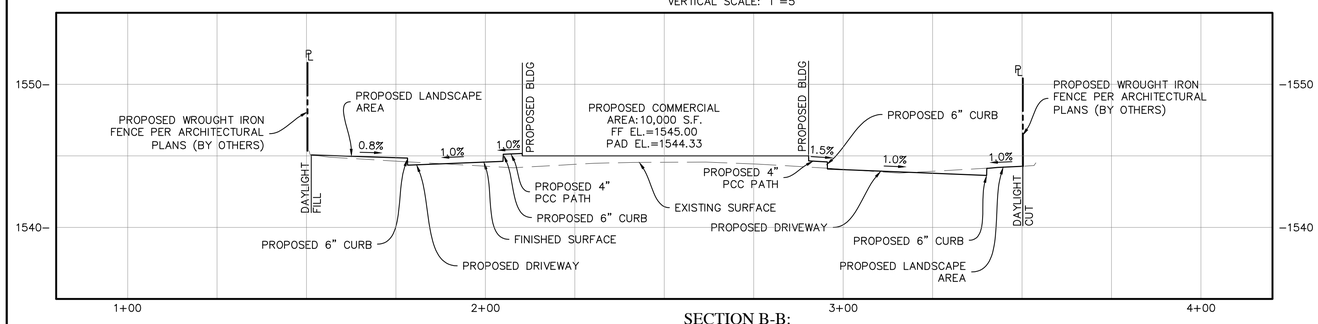
VERTICAL SCALE: 1"=5'



SECTION B-B:

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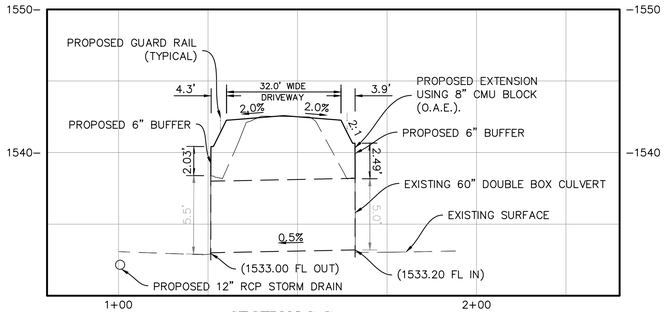
VERTICAL SCALE: 1"=5'



SECTION C-C:

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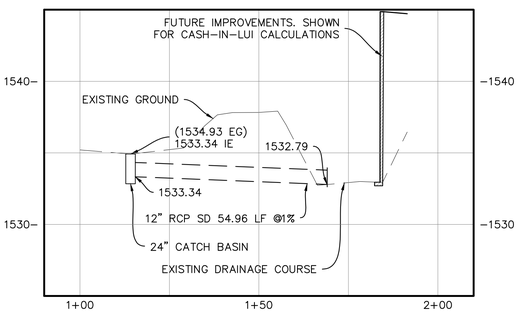
VERTICAL SCALE: 1"=5'



PROPOSED STORM DRAIN SECTION D-D

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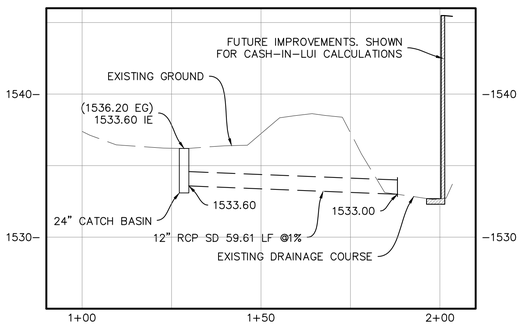
VERTICAL SCALE: 1"=5'



PROPOSED STORM DRAIN SECTION E-E

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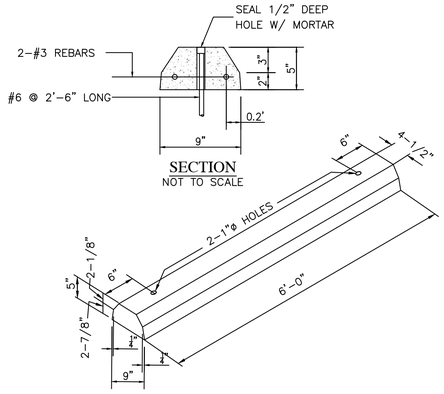
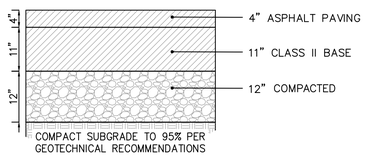
VERTICAL SCALE: 1"=5'



4 PRECAST CONCRETE WHEEL STOP:

NOT TO SCALE

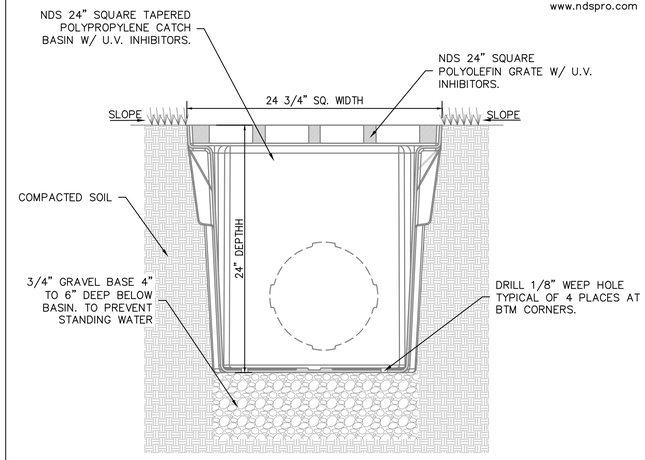


5 4"ASPHALT CONCRETE PAVING DETAIL:

NOT TO SCALE

NOTE: DETAIL PER GEOTECHNICAL RECOMMENDATIONS

NDS, INC.
851 NORTH HARVARD AVE.
LINDSAY, CALIFORNIA 93247
TOLL FREE: 1-800-726-1994
PHONE: (559) 562-9888
FAX: (559) 562-4488
www.ndspro.com



SECTION:

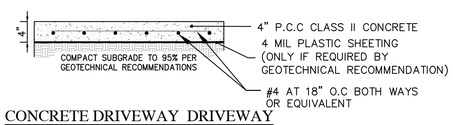
NOTES:
1. GRATE TO BE ATTACHED TO CATCH BASIN WITH SCREW PROVIDED AT TIME OF INSTALLATION.
2. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. DO NOT SCALE DRAWING.
4. THIS DRAWING IS INTENDED FOR USE BY ARCHITECTS, ENGINEERS, CONTRACTORS, CONSULTANTS AND DESIGN PROFESSIONALS FOR PLANNING PURPOSES ONLY.
5. ALL INFORMATION CONTAINED HEREIN WAS CURRENT AT THE TIME OF DEVELOPMENT BUT MUST BE REVIEWED AND APPROVED BY THE PRODUCT MANUFACTURER TO BE CONSIDERED ACCURATE.

1 CATCH BASIN

24" SQUARE CATCH BASIN – TYPICAL INSTALLATION FOR LANDSCAPE APPLICATIONS

KEY COMPONENT www.ndspro.com/a5

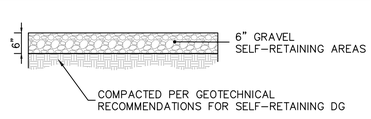
REVISION DATE 8-24-2015



2 CONCRETE DRIVEWAY DRIVEWAY

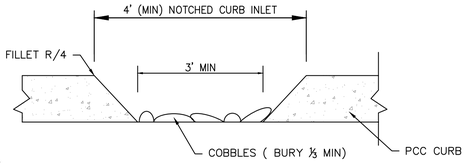
NOT TO SCALE

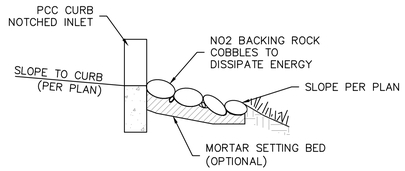
NOTE:
INSTALL AND FURTHER DETAIL PER GEOTECHNICAL RECOMMENDATIONS



3 TYPICAL SELF-RETAINING GRAVEL AREA:

NOT TO SCALE

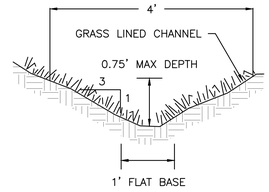




6 CURB CUT DETAIL:

NOT TO SCALE

NOTE: DETAIL PER GEOTECHNICAL RECOMMENDATIONS



7 PROPOSED CONDITIONS VEGETATED SWALE DETAIL:

NOT TO SCALE

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SEAL-ENGINEER

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DESIGNED	EN
CHECKED	WV
SCALE	AS SHOWN
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COUNTY OF RIVERSIDE

CUP220001 BOAT SHOWROOM & STORAGE
APN: 342-120-052
SECTIONS AND DETAILS

FOR: | W.O. | COUNTY FILE NO.

SHEET NO. 4 OF 4 SHEETS
FILE NO.

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Earth Strata Geotechnical Services, Inc.
Geotechnical, Environmental and Materials Testing Consultants

November 15, 2021 Project No. 213936-12A

Mr. Alex Hann
EMPIRE DESIGN GROUP, INC
P.O. Box 944
Murrieta, CA 92564

Subject: **Infiltration Testing for Water Quality Treatment Areas, Proposed Commercial Development, Assessor Parcel Number 342-120-052, Lot Number 25 of Parcel Map Number 12/4, Located at 24803 State Highway 74, City of Perris, Riverside County, California**

INTRODUCTION

Earth Strata Geotechnical Services is pleased to present this infiltration feasibility report for the proposed commercial development, located at 24803 State Highway 74, Assessor Parcel Number 342-120-052, in the City of Perris, Riverside County, California. The purpose of our study was to determine the infiltration rates and physical characteristics of the subsurface earth materials at the approximate depth of the proposed WQMP area within the proposed development. This feasibility report provides the infiltration rates to be used for the design and the development of the water quality management plan, where applicable.

PROPERTY DESCRIPTION

The subject property is located at 24803 State Highway 74 in the City of Perris, Riverside County, California. The approximate location of the site is shown on the Vicinity Map, Figure 1.

The subject property is comprised of approximately 4.75 acres of undeveloped land. The site has not been graded. Topographic relief at the subject property is relatively low with the terrain being generally flat. Elevations at the site range from approximately 1,545 to 1,550 feet above mean sea level (msl), for a difference of about 5± feet across the entire site. Drainage within the subject property generally flows to the southeast.

The site is currently bounded by commercial development to the east, State highway 74 to the south, residential development to the west and north. Most of the vegetation on the site consists of sparse amounts of annual weeds/grasses, along with small to large trees bordering the southwestern and southeastern portion of the subject site.

PROPOSED CONSTRUCTION

The proposed commercial development is expected to consist of concrete, wood or steel framed one- and/or two-story structures utilizing slab on grade construction with associated streets, landscape areas, and utilities. The current development plans include one (1) building pad positioned throughout the site. The plans provided by you were utilized in our exploration.

SUBSURFACE EXPLORATION

Subsurface Exploration

Subsurface exploration within the subject site was performed on November 2, 2021, for the exploratory excavations. A truck mounted hollow-stem-auger drill rig was utilized to drill three (3) borings throughout the site to a maximum depth of 26.5 feet. The exploratory holes were excavated for geotechnical evaluation purposes with respect to the proposed developments and to interpret whether groundwater or impermeable soil layers were present. An underground utilities clearance was obtained from Underground Service Alert of Southern California, prior to the subsurface exploration. The approximate locations of the exploratory excavations are shown on the attached Infiltration Location Map, Plate 1 and descriptive logs are presented in Appendix A.

Earth materials encountered during exploration were classified and logged in general accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) of ASTM D 2488. Upon completion of laboratory testing, exploratory logs and sample descriptions may have been reconciled to reflect laboratory test results with regard to ASTM D 2487.

Earth Materials

A general description of the earth materials observed on site is provided below.

Artificial Fill, Undocumented (map symbol Afu): Undocumented artificial fill materials were encountered throughout the site within the upper 1 to 3 feet during exploration. These materials are typically derived from the native materials and consist generally of reddish-brown clayey sand and sandy silt. These materials are generally inconsistent, poorly consolidated fills.

Quaternary Young Axial-Channel Deposits (map symbol Qya): Quaternary young alluvial deposits were encountered beneath the artificial fill to a maximum depth of our exploration. These alluvial deposits consist predominately of interlayered brown to medium brown to reddish brown, fine to medium grained silty sand with varying amounts of silt and clay. These deposits were generally noted to be in a slightly moist to saturated, loose to medium dene state.

INFILTRATION TESTING

The double ring infiltrometer test method was utilized to perform a total of two (2) infiltration tests on November 11, 2021, to evaluate near surface infiltration rates in order to estimate the amount of storm water runoff that can infiltrate into the onsite water quality treatment plan areas. The infiltration tests were performed in general accordance with the requirements of double ring infiltration testing, ASTM D 3385 and Appendix A of the Riverside County Flood Control and Water Conservation District.

The infiltration tests were performed using double ring infiltrometer and Mariotte tubes at a depth of 6 feet below existing grades. The locations of the infiltration tests are indicated on the attached infiltration Location Map, Plate 1. The double ring infiltrometer tests were located by property boundary measurement on the site plan and by using geographic features. Infiltration test data recorded in the field are summarized in the following table and is included within Appendix B including the graph of Infiltration Rate versus Elapsed Time.

Infiltration Test Summary

TEST NUMBER	INFILTRATION HOLE DEPTH (ft.)	INFILTRATION RATE (in/hr)	DESCRIPTION
DR-1	6	1.19	Silty SAND
DR-2	6	1.03	Silty SAND

The infiltration test rates ranged from 1.03 to 1.19 inches per hour (in/hr).

CONCLUSIONS AND RECOMMENDATIONS

General

From geotechnical and engineering geologic points of view, the proposed WQMP areas, where tested, is considered suitable for infiltration for the proposed development, provided the following conclusions and recommendations are incorporated into the plans and are implemented during construction.

Groundwater

Groundwater was observed during our subsurface exploration at a depth of 17 feet. Potential groundwater impact is considered relatively low. Local well data indicates regional groundwater highs approximately 200 feet below existing surface. The proposed water quality management areas should not exceed 7 feet in depth to maintain the minimum required separation of 10 feet to groundwater.

Geologic/ Geotechnical Screening

The proposed WQMP areas (see Plate 1) are located at a lower elevation than the proposed structures in competent native earth materials.

The proposed structures will be supported by compacted fill and competent earth materials, with groundwater at a depth of approximately 200 feet. According to the County of Riverside reports, the subject site is located in an area where liquefaction potential is considered moderate. As such, the potential for earthquake induced liquefaction and lateral spreading beneath the proposed structures is considered low due to the recommended compacted fill, relatively low groundwater level, and the dense nature of the deeper onsite earth materials.

Preliminary laboratory test results indicate onsite earth materials exhibit an expansion potential of **VERY LOW** as classified in accordance with 2019 CBC Section 1803.5.3 and ASTM D4829.

Therefore, infiltration within the proposed WQMP areas will not encroach on any proposed structures and will not increase the risk of geologic hazards.

Recommended Factor of Safety

The recommended factor of safety for the infiltration design is 3.

Based on the data presented in this report and the recommendations set forth herein, it is the opinion of Earth Strata Geotechnical Services that the WQMP area can be designed for an infiltration rate of 0.40 inches per hour in the vicinity of DR-1 and 0.34 inches per hour in the vicinity of DR-2.

GRADING PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **Mr. Alex Hann** and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Earth Strata should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Earth Strata not be accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

Earth Strata should be retained to provide observations during construction to validate this report. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Earth Strata should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property.

The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Earth Strata during construction. This report is considered valid for a period of one year from the time the report was issued.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

Respectfully submitted,

EARTH STRATA GEOTECHNICAL SERVICES

Stephen M. Poole, PE 40219
President
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
STEPHEN MICHAEL POOLE
No. 692
GEOTECHNICAL
STATE OF CALIFORNIA

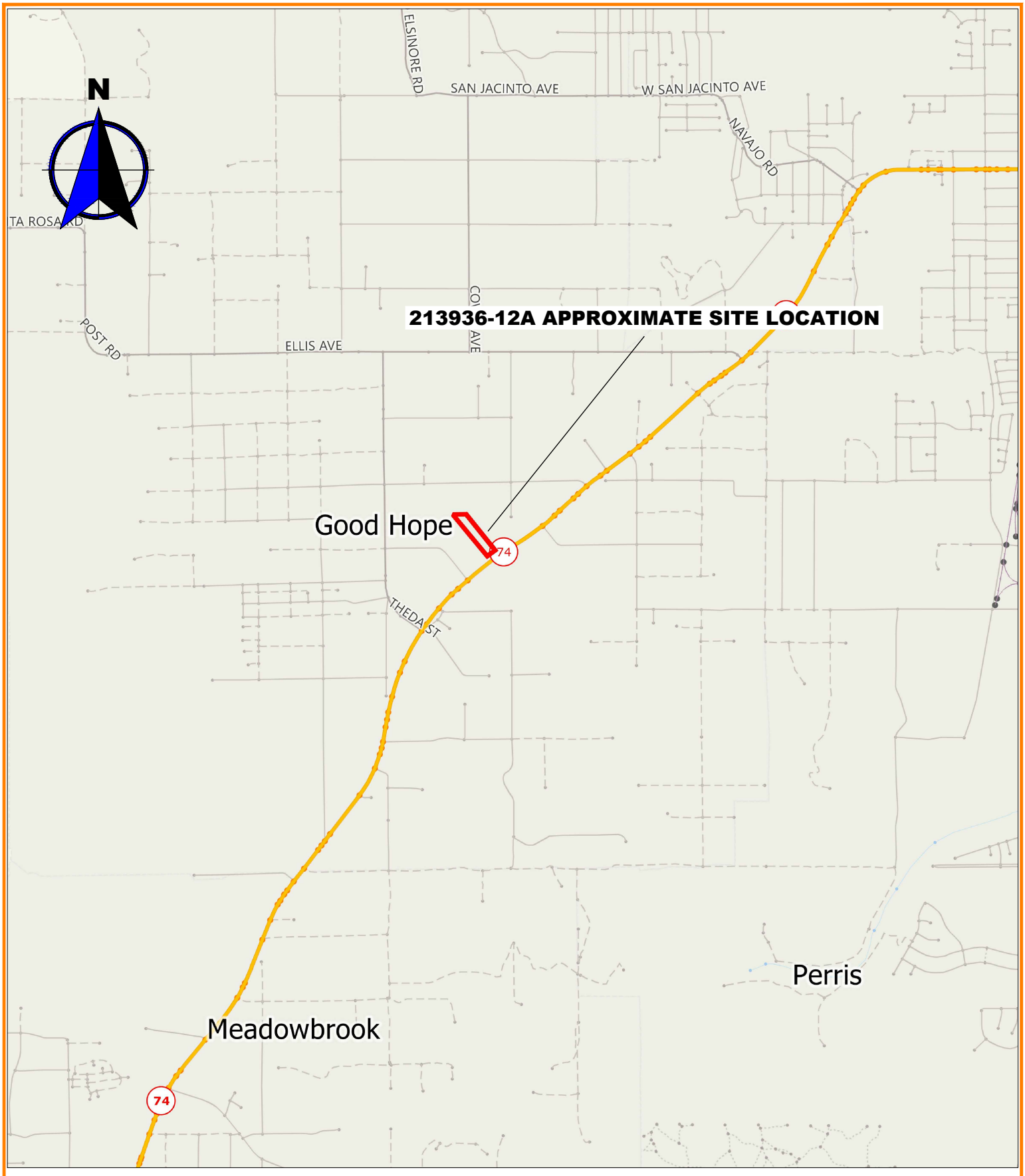
SMP/jmr

Distribution: (1) Addressee

Attachments: Figure 1 – Vicinity Map *(Rear of Text)*
Appendix A – Exploratory Logs *(Rear of Text)*
Appendix B – Infiltration Test Sheets *(Rear of Text)*
Plate 1 – Infiltration Location Map *(Rear of Text)*

FIGURE 1

VICINITY MAP



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PROPOSED COMMERCIAL DEVELOPMENT	213936-12A
VICINITY MAP	SEE BAR SCALE
NOV 2021	FIGURE 1

APPENDIX A

EXPLORATORY LOGS

Geotechnical Boring Log B-1

Date: November 2, 2021	**Project Name: Highway 74, Perris** **Page: 1 of 1**
Project Number: 213936-10	**Logged By: SNJ**
Drilling Company: Drilling It	**Type of Rig: AMS**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0		0-5'				**Artificial Fill, Undocumented (Afu)**
					SC	Clayey SAND: dark reddish brown, slightly moist, medium dense, fine to medium
	14	2.5'	104.0	8.4		sand
						Quaternary Young Axial-Channel Deposits (Qya)
					SM	Silty SAND; reddish brown, slightly moist, loose, fine to medium sand
5	9	5'	99.9	11.3		
	12	7.5'	100.7	9.0		
10	6	10'	100.8	22.3		
15	5	15'	-	-		No Recovery
						Becomes brown, saturated, very loose, fine sand 15 to 20 feet
						Groundwater at 17 feet
20	13	20'	98.0	24.0		Medium dense 20 to 25 feet
25	4	25'	105.0	26.9		
						Total Depth: 26.5 feet
						Groundwater at 17 feet
30						

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Geotechnical Boring Log B-2

Date: November 2, 2021	**Project Name: Highway 74, Perris** **Page: 1 of 1**
Project Number: 213936-10	**Logged By: SNJ**
Drilling Company: Drilling It	**Type of Rig: AMS**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu)**
					ML	Sandy SILT; reddish brown, slightly moist, medium dense, fine sand
	19	2.5'	85.6	14.3		**Quaternary Young Axial-Channel Deposits (Qya)**
					SM	Silty SAND; reddish brown, slightly moist, medium dense, fine sand
5	15	5'	107.9	8.7		
	18	7.5'	105.3	4.0		
10						Fine to medium sand
	13	10'	106.4	18.8		
15	5	15'	69.8	30.3		Loose and saturated at 15 feet
						Total Depth: 16.5 feet
						No Groundwater
20						
25						
30						

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Geotechnical Boring Log B-3

Date: November 2, 2021	**Project Name: Highway 74, Perris** **Page: 1 of 1**
Project Number: 213936-10	**Logged By: SNJ**
Drilling Company: Drilling It	**Type of Rig: AMS**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0		0-5'				**Artificial Fill, Undocumented (Afu)**
					ML	Sandy SILT; reddish brown, slightly moist, medium dense, fine sand
						Quaternary Young Axial-Channel Deposits (Qya)
					ML	Sandy SILT; reddish brown, moist, loose, fine to medium sand
5						Total Depth: 5 feet
						No Groundwater
10						
15						
20						
25						
30						

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APPENDIX B

INFILTRATION TEST SHEETS

Turf-Tec International - Record Chart for IN10-W - (12 & 24 Inch Infiltration Rings)

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Test No.	DR-1	Location	See Map					
Project Identification:	213936-12A		Constants	Area cm2	Depth of Liquid (cm)	Liquid Container Number		Marriotte Tube Volume
Test Location:	DR-1		Inner Ring	729	10.0	1		3000
Liquid Used:	TAP WATE	pH: 8.0	Annular Ring	2189	10.0	2		10000
Tested By:	JMR2	Date 11/11/2021	Liquid level maintained	(X) Flow Valve	( ) Float Valve	( ) Mariotte Tubes		
Depth to water table:		Depth of Test 6'	Penetration Depth of Outer Ring:	9 cm	Other			

Trial #	Start / End	Date MM/DD/YY	Time HR:MIN	Time Increment /(Total)	Elapsed Time (Min)	Flow Readings: Inner Ring Reading cm	Inner Maroitte Tube Flow (ml)	Annular Space Reading cm	Annular Space Marriotte Tube Flow (ml)	Liquid Temp ºF	Infiltration Rates: Inner Infiltration Rate cm/h	Inner Infiltration Rate In/h	Annular Infiltration Rate cm/h	Annular Infiltration Rate In/h	Ground Temperature: Ground Temp Depth (cm)	Temp at Depth (c)	Remarks: Weather conditions Etc...
	Start Test	11/11/2021	11:20	0:30													
1	End Test	11/11/2021	11:50	0:30	30	6.00	1400	6.00	3250		3.84	**1.51**	2.97	**1.17**			
	Start Test	11/11/2021	11:52	0:30													
2	End Test	11/11/2021	12:22	1:00	60	6.00	1250	6.00	3000		3.43	**1.35**	2.74	**1.08**			
	Start Test	11/11/2021	12:24	0:30													
3	End Test	11/11/2021	12:54	1:30	90	6.00	1400	6.00	3000		3.84	**1.51**	2.74	**1.08**			
	Start Test	11/11/2021	12:56	0:30													
4	End Test	11/11/2021	13:26	2:00	120	6.00	1250	6.00	2100		3.43	**1.35**	1.92	**0.76**			
	Start Test	11/11/2021	13:28	0:30													
5	End Test	11/11/2021	13:58	2:30	150	6.00	1250	6.00	2100		3.43	**1.35**	1.92	**0.76**			
	Start Test	11/11/2021	13:59	0:30													
6	End Test	11/11/2021	14:29	3:00	180	6.00	1100	6.00	2100		3.02	**1.19**	1.92	**0.76**			
	Start Test	11/11/2021	14:31	0:30													
7	End Test	11/11/2021	15:01	3:30	210	6.00	1100	6.00	2100		3.02	**1.19**	1.92	**0.76**			
	Start Test	11/11/2021	15:02	0:30													
8	End Test	11/11/2021	15:32	4:00	240	6.00	1100	6.00	2100		3.02	**1.19**	1.92	**0.76**			

Turf-Tec International

Project Identification:	213936-12A		
Test Location:	DR-1		
Liquid Used:	TAP WATE	**pH:**	8.0
Tested By:	JMR2		
Depth to water table:	0		

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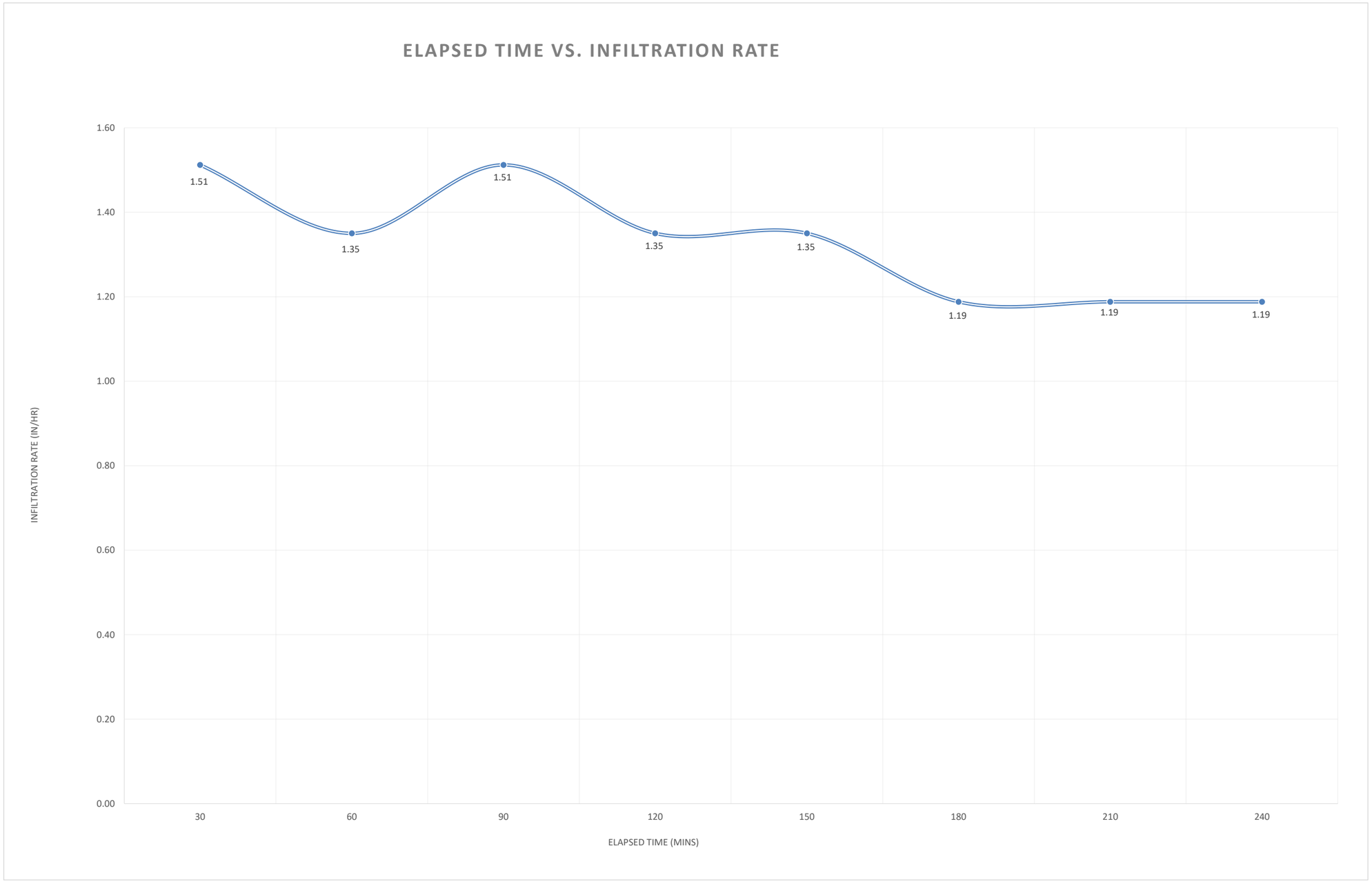

Turf-Tec International - Record Chart for IN10-W - (12 & 24 Inch Infiltration Rings)

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Test No.	DR-2	Location	See Map

Project Identification:	213936-12A	Constants	Area cm2	Depth of Liquid (cm)	Liquid Container Number
Test Location:	DR-2	Inner Ring	729	10.0	1
Liquid Used:	TAP WATE pH: 8.0	Annular Ring	2189	10.0	2

Marriotte Tube Volume	
Inner Ring	3000
Annular Ring	10000

Tested By:	JMR2	Date	11/11/2021	Liquid level maintained	(X) Flow Valve ( ) Float Valve ( ) Mariotte Tubes
Depth to water table:	> 30 Feet	Depth of Test	6'	Penetration Depth of Outer Ring:	9 cm Other

Trial #	Start / End	Date MM/DD/YY	Time HR:MIN	Time Increment /(Total)	Elapsed Time (Min)	Flow Readings: Inner Ring Reading cm	Flow Readings: Inner Maroitte Tube Flow (ml)	Flow Readings: Annular Space Reading cm	Flow Readings: Annular Space Marriotte Tube Flow (ml)	Liquid Temp ºF	Infiltration Rates: Inner Infiltration Rate cm/h	Infiltration Rates: Inner Infiltration Rate In/h	Infiltration Rates: Annular Infiltration Rate cm/h	Annular Infiltration Rate In/h	Ground Temperature: Ground Temp Depth (cm)	Ground Temperature: Temp at Depth (c)	Remarks: Weather conditions Etc...
	Start Test	11/11/2021	11:22	0:30	30	5.00		5.00									
1	End Test	11/11/2021	11:52	0:30		5.00	1400	5.00	5100		3.84	**1.51**	4.66	**1.83**			
	Start Test	11/11/2021	11:53	0:30	60	5.00		5.00									
2	End Test	11/11/2021	12:23	1:00		6.00	1400	5.00	3750		3.84	**1.51**	3.43	**1.35**			
	Start Test	11/11/2021	12:25	0:30	90	5.00		5.00									
3	End Test	11/11/2021	12:55	1:30		5.00	1400	5.00	3600		3.84	**1.51**	3.29	**1.29**			
	Start Test	11/11/2021	12:57	0:30	120	5.00		5.00									
4	End Test	11/11/2021	13:27	2:00		5.00	1150	5.00	3250		3.16	**1.24**	2.97	**1.17**			
	Start Test	11/11/2021	13:30	0:30	150	5.00		5.00									
5	End Test	11/11/2021	14:00	2:30		5.00	1150	5.00	2400		3.16	**1.24**	2.19	**0.86**			
	Start Test	11/11/2021	14:01	0:30	180	5.00		5.00									
6	End Test	11/11/2021	14:31	3:00		5.00	1100	5.00	2400		3.02	**1.19**	2.19	**0.86**			
	Start Test	11/11/2021	14:31	0:30	210	5.00		5.00									
7	End Test	11/11/2021	15:01	3:30		5.00	950	5.00	2400		2.61	**1.03**	2.19	**0.86**			
	Start Test	11/11/2021	15:02	0:30	240	5.00		5.00									
8	End Test	11/11/2021	15:32	4:00		5.00	950	5.00	2400		2.61	**1.03**	2.19	**0.86**			

Turf-Tec International

Project Identification:	213936-12A		
Test Location:	DR-2		
Liquid Used:	TAP WATE	**pH:**	8.0
Tested By:	JMR2		
Depth to water table:	> 30 Feet		

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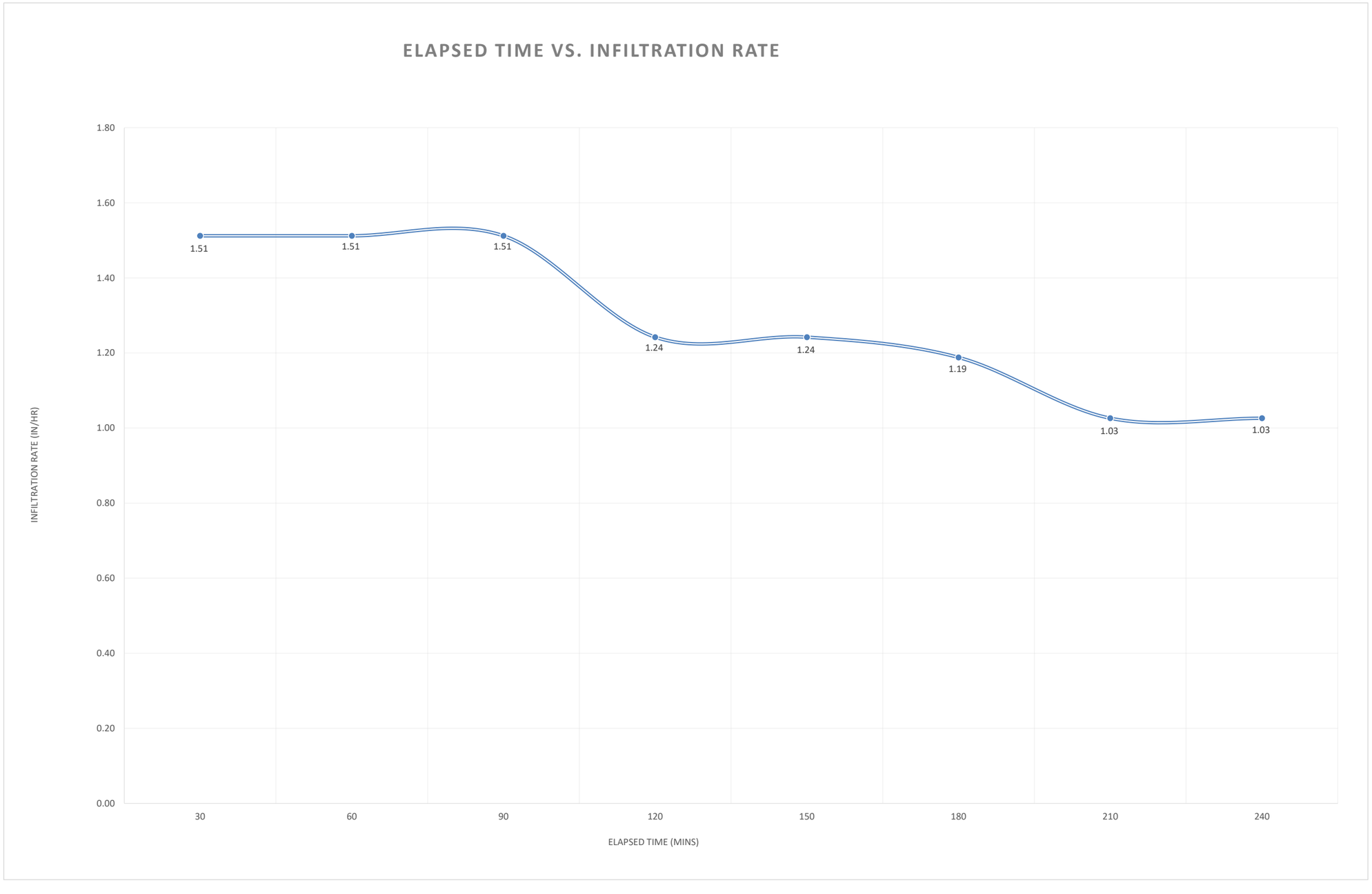

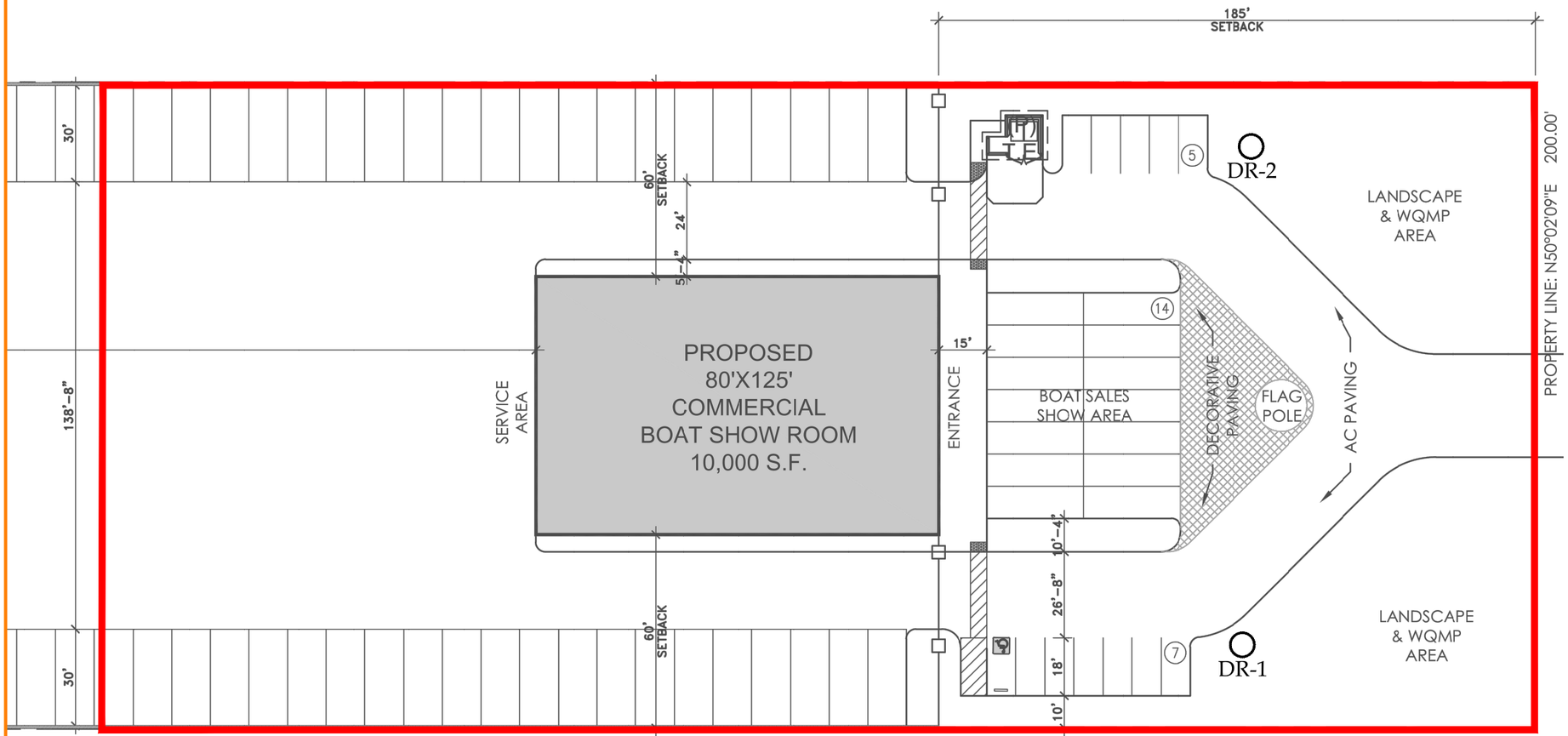

LEGEND

Locations are Approximate

Symbols

- Limits of Report
- DR-2 - Infiltration Test Location

NORTH

0 20 40 80

SCALE: 1" = 40'

INFILTRATION LOCATION MAP

LOCATED AT 24803 HIGHWAY 74

CITY OF PERRIS, RIVERSIDE COUNTY, CALIFORNIA

APN 342-120-052

PROJECT	***PROPOSED COMMERCIAL DEVELOPMENT***		
CLIENT	***MR. ALEX HANN***		
PROJECT NO.	***213936-12A***		
DATE	***NOVEMBER 2021***		
SCALE	***1" = 40'***		
DWG XREFS			
REVISION			
DRAWN BY	***JDG***	***PLATE***	***1 OF 1***

Earth Strata Geotechnical Services, Inc.

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Earth Strata Geotechnical Services, Inc.
Geotechnical, Environmental and Materials Testing Consultants

November 4, 2021

Project No. 213936-10A

Mr. Alex Hann
Empire Design Group, Inc.
P.O. Box 944
Murrieta, CA 92564

Subject: **Preliminary Geotechnical Interpretive Report, Proposed Commercial Development, Assessor's Parcel Number 342-120-052, Lot Number 25 of Parcel Map Number 12/4, Located at 24803 Highway 74, City of Perris, Riverside County, California**

Earth Strata Geotechnical Services is pleased to present our preliminary geotechnical interpretive report for the proposed commercial development, Assessor's Parcel Number 342-120-052, Lot Number 25 of Parcel Map Number 12/4, located at 24803 Highway 74 in the City of Perris, Riverside County, California. This work was performed in accordance with the scope of work described in our proposal, dated August 12, 2021. The purpose of this study is to evaluate the nature, distribution, engineering properties, and geologic strata underlying the site with respect to the proposed development.

Earth Strata Geotechnical Services appreciates the opportunity to offer our consultation and advice on this project. In the event that you have any questions, please do not hesitate to contact the undersigned at your earliest convenience.

Respectfully submitted,

EARTH STRATA GEOTECHNICAL SERVICES

Stephen M. Poole, PE, GE
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
STEPHEN MICHAEL POOLE
No. 692
GEOTECHNICAL
STATE OF CALIFORNIA

Stephanie N. Jones, G.I.T.
Senior Staff Geologist

SMP/snj

Distribution: (2) Addressee

TABLE OF CONTENTS

Section **Page**

Attachments:

INTRODUCTION

Earth Strata Geotechnical Services is pleased to present our preliminary geotechnical interpretive report for the proposed development. The purpose of this study was to evaluate the nature, distribution, engineering properties, and geologic strata underlying the site with respect to the proposed development, and then provide preliminary grading and foundation design recommendations based on the plans you provided. The general location of the subject property is indicated on the Vicinity Map, Figure 1. The plans you provided were used as the base map to show geologic conditions within the subject site, see Geotechnical Map, Plate 1.

SITE DESCRIPTION

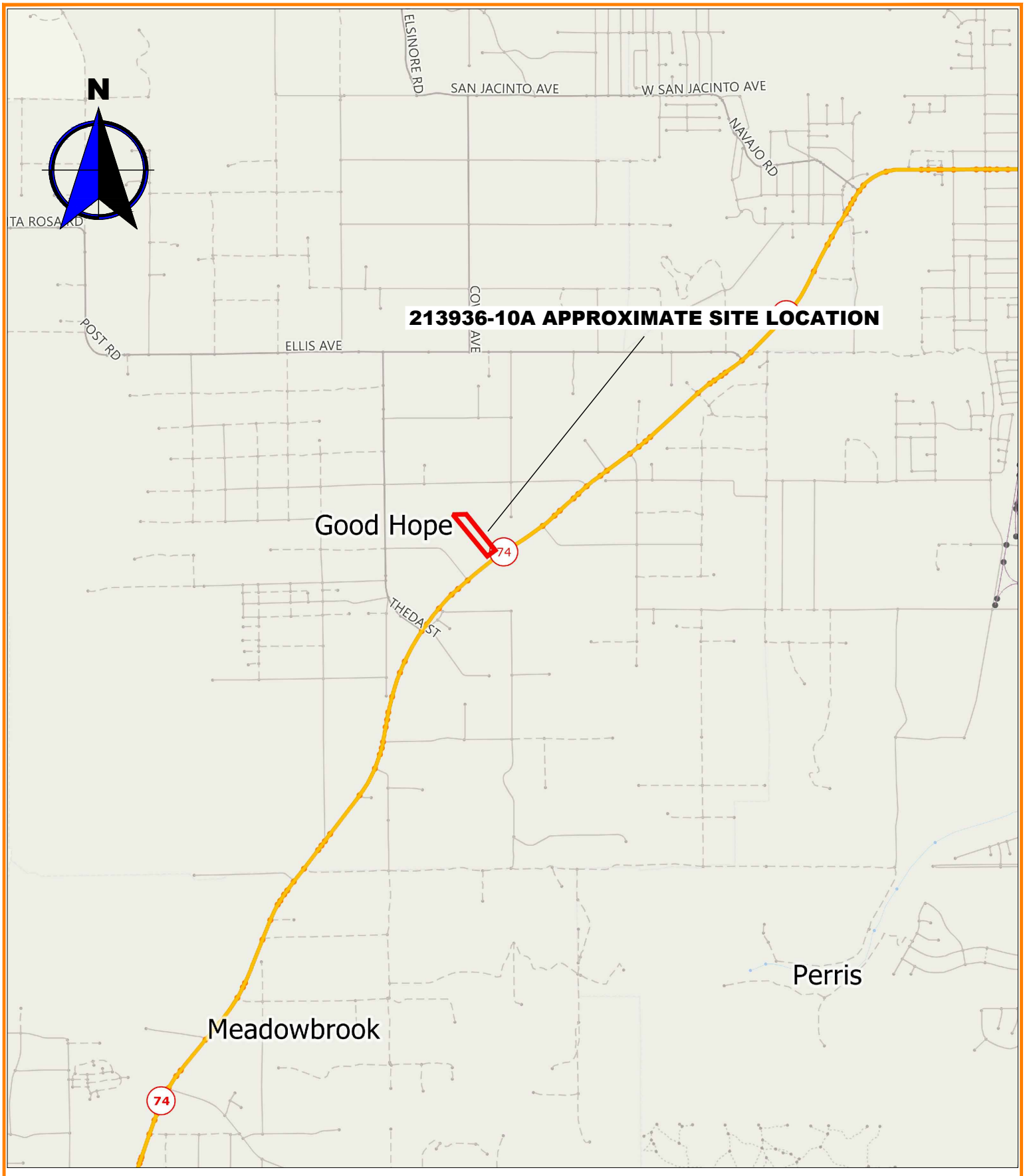
The subject property is located at 24803 Highway 74 in the City of Perris, Riverside County, California. The approximate location of the site is shown on the Vicinity Map, Figure 1.

The subject property is comprised of approximately 4.75-acres of undeveloped land. Topographic relief at the subject property is relatively low with the terrain being generally flat. Elevations at the site range from approximately 1,545 to 1,550 feet above mean sea level (msl), for a difference of about 5± feet across the entire site. Drainage within the subject property generally flows to the southeast.

The site is currently bordered by commercial development. Most of the vegetation on the site consists of sparse amounts of annual weeds/grasses, along with small to large trees bordering the southwestern and southeastern portion of the subject site.

PROPOSED DEVELOPMENT AND GRADING

The proposed commercial development is expected to consist of concrete, wood or steel framed one- and/or two-story structures utilizing slab on grade construction with associated streets, landscape areas, and utilities. The current development plans include one (1) building pad positioned throughout the site. The plans provided by you were utilized in our exploration and form the base for our Geotechnical Map, Plate 1.



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PROPOSED COMMERCIAL DEVELOPMENT	213936-10A
VICINITY MAP	SEE BAR SCALE
NOV 2021	FIGURE 1

FIELD EXPLORATION AND LABORATORY TESTING

Field Exploration

Subsurface exploration within the subject site was performed on November 2, 2021 for the exploratory excavations. A truck mounted hollow-stem-auger drill rig was utilized to drill three (3) borings throughout the site to a maximum depth of 26.5 feet. An underground utilities clearance was obtained from Underground Service Alert of Southern California, prior to the subsurface exploration.

Earth materials encountered during exploration were classified and logged in general accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) of ASTM D 2488. Upon completion of laboratory testing, exploratory logs and sample descriptions may have been reconciled to reflect laboratory test results with regard to ASTM D 2487.

Associated with the subsurface exploration was the collection of bulk (disturbed) samples and relatively undisturbed samples of earth materials for laboratory testing and analysis. The relatively undisturbed samples were obtained with a 3 inch outside diameter modified California split-spoon sampler lined with 1-inch-high brass rings. Samples obtained using a hollow stem auger drill rig, were mechanically driven with successive 30 inch drops of a 140-pound automatic trip safety hammer. The blow count per one-foot increment was recorded in the boring logs. The central portions of the driven samples were placed in sealed containers and transported to our laboratory for testing and analysis. The approximate exploratory locations are shown on Plate 1 and descriptive logs are presented in Appendix B.

Laboratory Testing

Maximum dry density/optimum moisture content, R-value, expansion potential, pH, resistivity, sulfate content, chloride content, sieve analysis, and in-situ density/moisture content were determined for selected undisturbed and bulk samples of earth materials, considered representative of those encountered. An evaluation of the test data is reflected throughout the Conclusions and Recommendations section of this report. A brief description of laboratory test criteria and summaries of test data are presented in Appendix C.

FINDINGS

Regional Geology

Regionally, the site is located in the Peninsular Ranges Geomorphic Province of California. The Peninsular Ranges are characterized by northwest trending steep mountain ranges separated by sediment filled elongated valleys. The dominant structural geologic features reflect the northwest trend of the province. Associated with and subparallel to the San Andreas Fault are the San Jacinto Fault, Newport-Inglewood, and the Whittier-Elsinore Fault. The Santa Ana Mountains abut the west side of the Elsinore Fault while the Perris Block forms the other side of the fault zone to the east. The Perris Block is bounded to the east by the San Jacinto Fault. The northern perimeter of the Los Angeles basin forms part of a northerly dipping blind thrust fault at the boundary between the Peninsular Ranges Province and the Transverse Range Province.

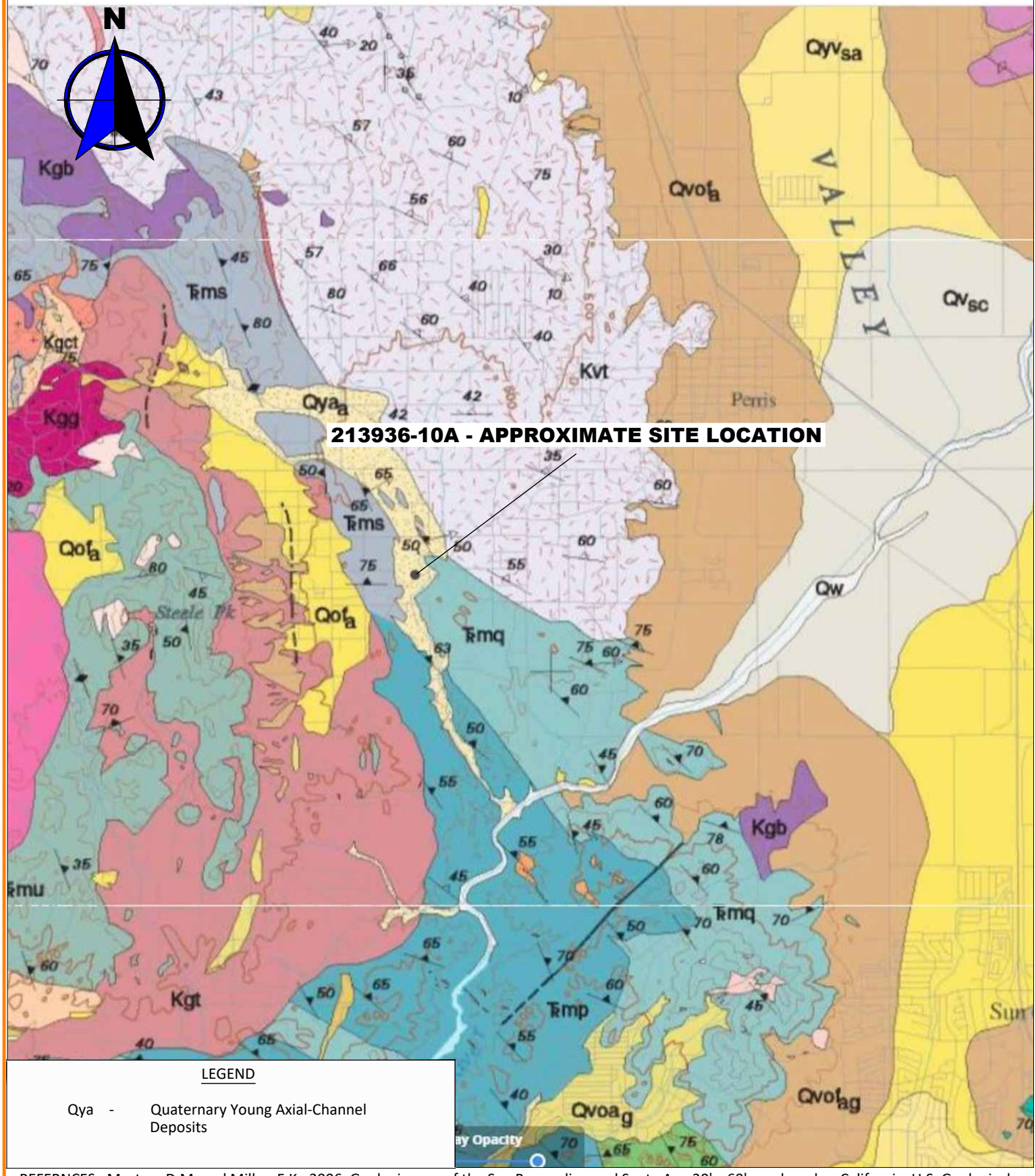
The mountainous regions within the Peninsular Ranges Province are comprised of Pre-Cretaceous, metasedimentary, and metavolcanic rocks along with Cretaceous plutonic rocks of the Southern California Batholith. The low lying areas are primarily comprised of Tertiary and Quaternary non-marine alluvial sediments consisting of alluvial deposits, sandstones, claystones, siltstones, conglomerates, and occasional volcanic units. A map illustrating the regional geology is presented on the Regional Geologic Map, Figure 2.

Local Geology

The earth materials on the site are primarily comprised of artificial fill and Quaternary alluvial materials. A general description of the dominant earth materials observed on the site is provided below:

- Artificial Fill, Undocumented (map symbol Afu): Undocumented artificial fill materials were encountered throughout the site within the upper 1 to 3 feet during exploration. These materials are typically locally derived from the native materials and consist generally of reddish brown clayey sand and sandy silt. These materials are generally inconsistent, poorly consolidated fills.

- Quaternary Young Axial-Channel Deposits (map symbol Qya): Quaternary young alluvial deposits were encountered beneath the artificial fill to a maximum depth of our exploration. These alluvial deposits consist predominately of interlayered brown to medium brown to reddish brown, fine to medium grained silty sand with varying amounts of silt and clay. These deposits were generally noted to be in a slightly moist to saturated, loose to medium dense state.



LEGEND

Qya - Quaternary Young Axial-Channel Deposits

REFERNCES: Morton, D.M. and Miller, F.K., 2006, Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California, U.S. Geological Survey, Open-File Report OF-2006-1217, 1:100,000.

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PROPOSED COMMERCIAL DEVELOPMENT		213936-10A
REGIONAL GEOLOGIC MAP	SCALE 1:72,224	
	NOV 2021	FIGURE 2

Faulting

The project is located in a seismically active region and as a result, significant ground shaking will likely impact the site within the design life of the proposed project. The geologic structure of the entire southern California area is dominated by northwest-trending faults associated with the San Andreas Fault system, which accommodates for most of the right lateral movement associated with the relative motion between the Pacific and North American tectonic plates. Known active faults within this system include the Newport-Inglewood, Whittier-Elsinore, San Jacinto and San Andreas Faults.

No active faults are known to project through the site and the site is not located within an Alquist-Priolo Earthquake Fault Zone, established by the State of California to restrict the construction of new habitable structures across identifiable traces of known active faults. An active fault is defined by the State of California as having surface displacement within the past 11,000 years or during the Holocene geologic time period. Based on our mapping of the subject site, review of current and historical aerial imagery, lack of lineaments indicative of active faulting, and the data compiled during the preparation of this report, it is our interpretation that the potential for surface rupture to adversely impact the proposed structures is very low to remote.

Based on our review of regional geologic maps and applicable computer programs (USGS Seismic Design Maps, Caltrans ARS online, and USGS Earthquake Hazard Programs), the Elsinore Fault with an approximate source to site distance of 12.48 kilometers is the closest known active fault anticipated to produce the highest ground accelerations, with an anticipated maximum modal magnitude of 7.64. A list of faults as well as a list of significant historical seismic events within a 100km radius of the subject site are included in Appendix D.

Landslides

Landslide debris was not observed during our subsurface exploration and no ancient landslides are known to exist on the site. No landslides are known to exist, or have been mapped, in the vicinity of the site. Geologic mapping of the site conducted during our investigation, and review of aerial imagery of the site, reveal no geomorphic expressions indicative of landsliding.

CONCLUSIONS AND RECOMMENDATIONS

General

From geotechnical and engineering geologic points of view, the subject property is considered suitable for the proposed development, provided the following conclusions and recommendations are incorporated into the plans and are implemented during construction.

Earthwork

Earthwork and Grading

The provisions of the 2019 California Building Code (CBC), including the General Earthwork and Grading Specifications in the last Appendix of this report, should be applied to all earthwork and grading operations, as well as in accordance with all applicable grading codes and requirements of

the appropriate reviewing agency. Unless specifically revised or amended herein, grading operations should also be performed in accordance with applicable provisions of our General Earthwork and Grading Specifications within the last appendix of this report.

Clearing and Grubbing

Vegetation including trees, grasses, weeds, brush, shrubs, or any other debris should be stripped from the areas to be graded and properly disposed of offsite. In addition, laborers should be utilized to remove any roots, branches, or other deleterious materials during grading operations.

Earth Strata Geotechnical Services should be notified at the appropriate times to provide observation and testing services during Clearing and Grubbing operations. Any buried structures or unanticipated conditions should be brought to our immediate attention.

Excavation Characteristics

Based on the results of our exploration and experience with similar projects in similar settings, the near surface earth materials, will be readily excavated with conventional earth moving equipment.

Groundwater

Groundwater was observed in Boring B-1 at a depth of approximately 17 feet below existing grade. It should be noted that localized groundwater could be encountered during grading due to the limited number of exploratory locations or other factors.

Ground Preparation for Fill Areas

For each area to receive compacted fill, the removal of low density, compressible earth materials, such as upper alluvial materials and undocumented artificial fill, should continue until firm competent alluvium is encountered. Removal excavations are subject to verification by the project engineer, geologist or their representative. Prior to placing compacted fills, the exposed bottom in each removal area should be scarified to a depth of 6 inches or more, watered or air dried as necessary to achieve near optimum moisture conditions and then compacted to a minimum of 90 percent of the maximum dry density determined by ASTM D 1557.

The intent of remedial grading is to diminish the potential for hydro-consolidation, slope instability, and/or settlement. Remedial grading should extend beyond the perimeter of the proposed structures a horizontal distance equal to the depth of excavation or a minimum of 5 feet, whichever is greater. For cursory purposes the anticipated removal depths are shown on the enclosed Geotechnical Map, Plate 1. In general, the anticipated removal depths should vary from 10 to 12 feet below existing grade. Layers of 5XT geogrid should be placed at the bottom of the excavation and three additional layers at 2 to 3 foot intervals above the bottom.

Wet Removals

Wet alluvial materials may be encountered within the low lying areas of the site and at the bottom of the over excavation. If removals of wet alluvial materials are required, special grading equipment

and procedures can greatly reduce overall costs. Careful planning by an experienced grading contractor can reduce the need for special equipment, such as swamp cats, draglines, excavators, pumps, and top loading earthmovers. Possible solutions may include the placement of imported angular rock and/or geotextile ground reinforcement. More specific recommendations can be provided based on the actual conditions encountered. Drying or mixing of wet materials with dry materials will be needed to bring the wet materials to near optimum moisture prior to placing wet materials into compacted fills.

Oversize Rock

Oversize rock is not expected to be encountered during grading. Oversize rock that is encountered (i.e., rock exceeding a maximum dimension of 12 inches) should be disposed of offsite or stockpiled onsite and crushed for future use. The disposal of oversize rock is discussed in greater detail in General Earthwork and Grading Specifications within the last appendix of this report.

Compacted Fill Placement

Compacted fill materials should be placed in 6 to 8 inch maximum (uncompacted) lifts, watered or air dried as necessary to achieve uniform near optimum moisture content and then compacted to a minimum of 90 percent of the maximum dry density determined by ASTM D 1557.

Import Earth Materials

Should import earth materials be needed to achieve final design grades, all potential import materials should be free of deleterious/oversize materials, non-expansive, and approved by the project geotechnical consultant prior to delivery onsite.

Temporary Backcuts

It is the responsibility of the grading contractor to follow all Cal-OSHA requirements with regard to excavation safety. Where existing developments are upslope, adequate slope stability to protect those developments must be maintained. Temporary backcuts will be required to accomplish removals of unsuitable materials and possibly, to perform canyon removals, stabilization fills, and/or keyways. Backcuts should be excavated at a gradient of 1:1 (h:v) or flatter. Flatter backcuts may be required where geologic structure or earth materials are unfavorable. It is imperative that grading schedules minimize the exposure time of the unsupported excavations. All excavations should be stabilized within 30 days of initial excavation.

Cut/Fill Transitions

Cut/fill transitions should be eliminated from all building areas where the depth of fill placed within the "fill" portion exceeds proposed footing depths. This is to diminish distress to structures resulting from excessive differential settlement. The entire foundation of each structure should be founded on a uniform bearing material. This should be accomplished by overexcavating the "cut" portion and replacing the excavated materials as properly compacted fill. Refer to the following table for recommended depths of overexcavation.

DEPTH OF FILL ("fill" portion)	DEPTH OF OVEREXCAVATION ("cut" portion)
Up to 5 feet	Equal Depth
5 to 10 feet	5 feet
Greater than 10 feet	One-half the thickness of fill placed on the "fill" portion (10 feet maximum)

Overexcavation of the "cut" portion should extend beyond the building perimeter a horizontal distance equal to the depth of overexcavation or a minimum of 5 feet, whichever is greater.

Cut Areas

In cut areas, an area a minimum of 5 feet beyond the footprint of the proposed structures should overexcavated until; competent bottoms are achieved; to a minimum 3 feet below the proposed foundations; or per the Overexcavation Table above; (whichever is greater) and replaced with compacted fill. Final determination of areas that require overexcavation should be determined in the field by a representative of Earth Strata Geotechnical Services.

Shrinkage, Bulking and Subsidence

Volumetric changes in earth material quantities will occur when poorly consolidated earth materials are replaced with properly compacted fill. Estimates of the percent shrinkage/bulking factors for the various geologic units observed on the subject property are based on in-place densities and on the estimated average percent of relative compaction achieved during grading.

GEOLOGIC UNIT	SHRINKAGE (%)
Artificial Fill, Undocumented	10 to 15
Alluvium	10 to 15

Subsidence from scarification and recompaction of exposed bottom surfaces is expected to be negligible to approximately 0.01 foot.

The estimates of shrinkage/bulking and subsidence are intended as an aid for project engineers in determining earthwork quantities. Since many variables can affect the accuracy of these estimates, they should be used with caution and contingency plans should be in place for balancing the project.

Geotechnical Observations

Clearing operations, removal of unsuitable materials, and general grading procedures should be observed by the project geotechnical consultant or his representative. No compacted fill should be placed without observations by the geotechnical consultant or his representative to verify the adequacy of the removals.

The project geotechnical consultant or his representative should be present to observe grading operations and to check that minimum compaction requirements and proper lift thicknesses are being met, as well as to verify compliance with the other recommendations presented herein.

Post Grading Considerations

Slope Landscaping and Maintenance

Adequate slope and building pad drainage is essential for the long term performance of the subject site. The gross stability of graded slopes should not be adversely affected, provided all drainage provisions are properly constructed and maintained. Engineered slopes should be landscaped with deep rooted, drought tolerant maintenance free plant species, as recommended by the project landscape architect.

Site Drainage

Control of site drainage is important for the performance of the proposed project. Roof gutters are recommended for the proposed structures. Pad and roof drainage should be collected and transferred to driveways, adjacent streets, storm-drain facilities, or other locations approved by the building official in non-erosive drainage devices. Drainage should not be allowed to pond on the pad or against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters located within retaining wall backfill should be sealed to prevent moisture intrusion into the backfill. Planters located next to structures should be sealed to the depth of the footings. Drainage control devices require periodic cleaning, testing and maintenance to remain effective.

At a minimum, pad drainage should be designed at the minimum gradients required by the CBC. To divert water away from foundations, the ground surface adjacent to foundations should also be graded at the minimum gradients required per the CBC.

Utility Trenches

All utility trench backfill should be compacted at near optimum moisture to a minimum of 90 percent of the maximum dry density determined by ASTM D 1557. For utility trench backfill within pavement areas the upper 6 inches of subgrade materials should be compacted to 95 percent of the maximum dry density determined by ASTM D 1557. This includes within the street right-of-ways, utility easements, under footings, sidewalks, driveways and building floor slabs, as well as within or adjacent to any slopes. Backfill should be placed in approximately 6 to 8 inch maximum loose lifts and then mechanically compacted with a hydro-hammer, rolling with a sheepsfoot, pneumatic tampers, or similar equipment. The utility trenches should be tested by the project geotechnical engineer or their representative to verify minimum compaction requirements are obtained.

In order to minimize the penetration of moisture below building slabs, all utility trenches should be backfilled with compacted fill, lean concrete or concrete slurry where they undercut the perimeter foundation. Utility trenches that are proposed parallel to any building footings (interior and/or exterior trenches), should not be located within a 1:1 (h:v) plane projected downward from the outside bottom edge of the footing.

SEISMIC DESIGN CONSIDERATIONS

Ground Motions

Structures are required to be designed and constructed to resist the effects of seismic ground motions as provided in the 2019 California Building Code Section 1613. The design is dependent on the site class, occupancy category I, II, III, or IV, mapped spectral accelerations for short periods (S_s), and mapped spectral acceleration for a 1-second period (S_1).

In order for structural design to comply with the 2019 CBC, the USGS "US Seismic Design Maps" online tool was used to compile spectral accelerations for the subject property based on data and maps jointly compiled by the United States Geological Survey (USGS) and the California Geological Survey (CGS). The data found in the following table is based on the Maximum Considered Earthquake (MCE) with 5% damped ground motions having a 2% probability of being exceeded in 50 years (2,475 year return period).

The seismic design coefficients were determined by a combination of the site class, mapped spectral accelerations, and occupancy category. The following seismic design coefficients should be implemented during design of the proposed structures. Summaries of the Seismic Hazard Deaggregation graphs and test data are presented in Appendix D.

2019 CBC	FACTOR (ASCE 7-16)
Site Location	Latitude: 33.761042° (North) Longitude: -117.268714°(West)
Site Class	D - Default
Mapped Spectral Accelerations for short periods, S_s	1.5
Mapped Spectral Accelerations for 1-Second Period, S_1	0.547
Maximum Considered Earthquake Spectral Response Acceleration for Short Periods, S_{ms}	1.8
Maximum Considered Earthquake Spectral Response Acceleration for 1-Second Period, S_{m1}	* Null – See Section 11.4.8
Design Spectral Response Acceleration for Short Periods, S_{DS}	1.2
Design Spectral Response Acceleration for 1-Second Period, S_{D1}	* Null – See Section 11.4.8
Seismic Design Category	D
Importance Factor Based on Occupancy Category	II

* 2019 CBC

We performed the probabilistic seismic hazard assessment for the site in accordance with the 2019 CBC, Section 1803.5.11 and 1803.5.12. The probabilistic seismic hazard maps and data files were jointly prepared by the United States Geological Survey (USGS) and the California Geological Survey (CGS) and can be found at the CGS Probabilistic Seismic Hazards Mapping Ground Motion Page. Actual ground shaking intensities at the site may be substantially higher or lower based on complex variables such as the near source directivity effects, depth and consistency of earth materials, topography, geologic structure, direction of fault rupture, and seismic wave reflection, refraction, and attenuation rates. The mean peak ground acceleration was calculated to be 0.641g.

Secondary Seismic Hazards

Secondary effects of seismic shaking considered as potential hazards include several types of ground failure as well as induced flooding. Different types of ground failure, which could occur as a consequence of severe ground shaking at the site, include landslides, ground lurching, shallow ground rupture, and liquefaction/lateral spreading. The probability of occurrence of each type of ground failure depends on the severity of the earthquake, distance from faults, topography, the state of subsurface earth materials, groundwater conditions, and other factors. Based on our experience, subsurface exploration, and laboratory testing, all of the above secondary effects of seismic activity are considered unlikely.

Seismically induced flooding is normally a consequence of a tsunami (seismic sea wave), a seiche (i.e., a wave-like oscillation of surface water in an enclosed basin that may be initiated by a strong earthquake) or failure of a major reservoir or retention system up gradient of the site. Since the site is at an elevation of more than 1,500 feet above mean sea level and is located more than 20 miles inland from the nearest coastline of the Pacific Ocean, the potential for seismically induced flooding due to a tsunami is considered nonexistent. Since no enclosed bodies of water lie adjacent to or up gradient of the site, the likelihood for induced flooding due to a dam failure or a seiche overcoming the dam's freeboard is considered nonexistent.

Liquefaction and Lateral Spreading

Liquefaction occurs as a result of a substantial loss of shear strength or shearing resistance in loose, saturated, cohesionless earth materials subjected to earthquake induced ground shaking. Potential impacts from liquefaction include loss of bearing capacity, liquefaction related settlement, lateral movements, and surface manifestation such as sand boils. Seismically induced settlement occurs when loose sandy soils become denser when subjected to shaking during an earthquake. The three factors determining whether a site is likely to be subject to liquefaction include seismic shaking, type and consistency of earth materials, and groundwater level. The proposed structure will be supported by compacted fill and competent alluvium, with groundwater at a depth of approximately 17 feet. As such, the potential for earthquake induced liquefaction and lateral spreading beneath the proposed structure is considered very low to remote due to the recommended compacted fill with geogrid, relatively low groundwater level, and the dense nature of the deeper onsite earth materials.

Liquefaction analyses were performed for the existing un-graded and graded conditions, using a conservative groundwater level of 5 feet to represent the historic high groundwater level. The analyses of post graded conditions determined that potentially liquefiable earth materials were encountered in Boring B-1, from 2 to 27 feet. According to Fig. 10 of Ishihara (1995) liquefaction should not manifest itself at the surface, due to the recommended grading, the depth of the liquefiable earth materials, and the volume of overburden materials above the liquefiable zone. We estimate that dynamic settlement of sands due to liquefaction will be on the order of 10 inches. The liquefaction potential and dynamic settlement of sands analyses are included within the appendices of this report. With the recommended 10 to 12-foot removals, settlement is reduced to 5.5 inches. To further reduce the effects of settlement and minimize differential settlement we recommend geogrid be placed every 2 to 3 vertical feet throughout the compacted fill. The liquefaction potential and dynamic settlement of sands analyses are included within the appendices of this report.

TENTATIVE FOUNDATION DESIGN RECOMMENDATIONS

General

Provided grading is performed in accordance with the recommendations of this report, mat foundations are considered feasible for support of the proposed structure. Tentative foundation recommendations are provided herein and graphic presentations of relevant recommendations may also be included on the enclosed map.

Allowable Bearing Values

An allowable bearing value of 2,000 pounds per square foot (psf) is recommended for design of the mat foundation minimum depth of 18 inches below the lowest adjacent final grade. This value may be increased by 20 percent for each additional 1-foot of width and/or depth to a maximum value of 2,500 psf. Recommended allowable bearing values include both dead and frequently applied live loads and may be increased by one third when designing for short duration wind or seismic forces.

Settlement

Based on the settlement characteristics of the earth materials that underlie the building site and the anticipated loading, we estimate that the maximum total settlement of the mat will be less than approximately 2 inches due to the fill thickness and its geogrid reinforcement. Differential settlement is expected to be about 1 inch over a horizontal distance of approximately 20 feet, for an angular distortion ratio of 1:480. It is anticipated that the majority of the settlement will occur during construction or shortly after the initial application of loading.

The above settlement estimates are based on the assumption that the grading and construction are performed in accordance with the recommendations presented in this report and that the project geotechnical consultant will observe or test the earth material conditions in the footing excavations.

Lateral Resistance

Passive earth pressure of 250 psf per foot of depth to a maximum value of 2,500 psf may be used to establish lateral bearing resistance for footings. For areas coved with hardscape, passive earth pressure may be taken from the surface. For areas without hardscape, the first 3 feet of the soil profile must be neglected when calculating passive earth pressure. A coefficient of friction of 0.36 times the dead load forces may be used between concrete and the supporting earth materials to determine lateral sliding resistance. The above values may be increased by one-third when designing for short duration wind or seismic forces. When combining passive and friction for lateral resistance, the passive component should be reduced by one third. In no case shall the lateral sliding resistance exceed one-half the dead load for clay, sandy clay, sandy silty clay, silty clay, and clayey silt.

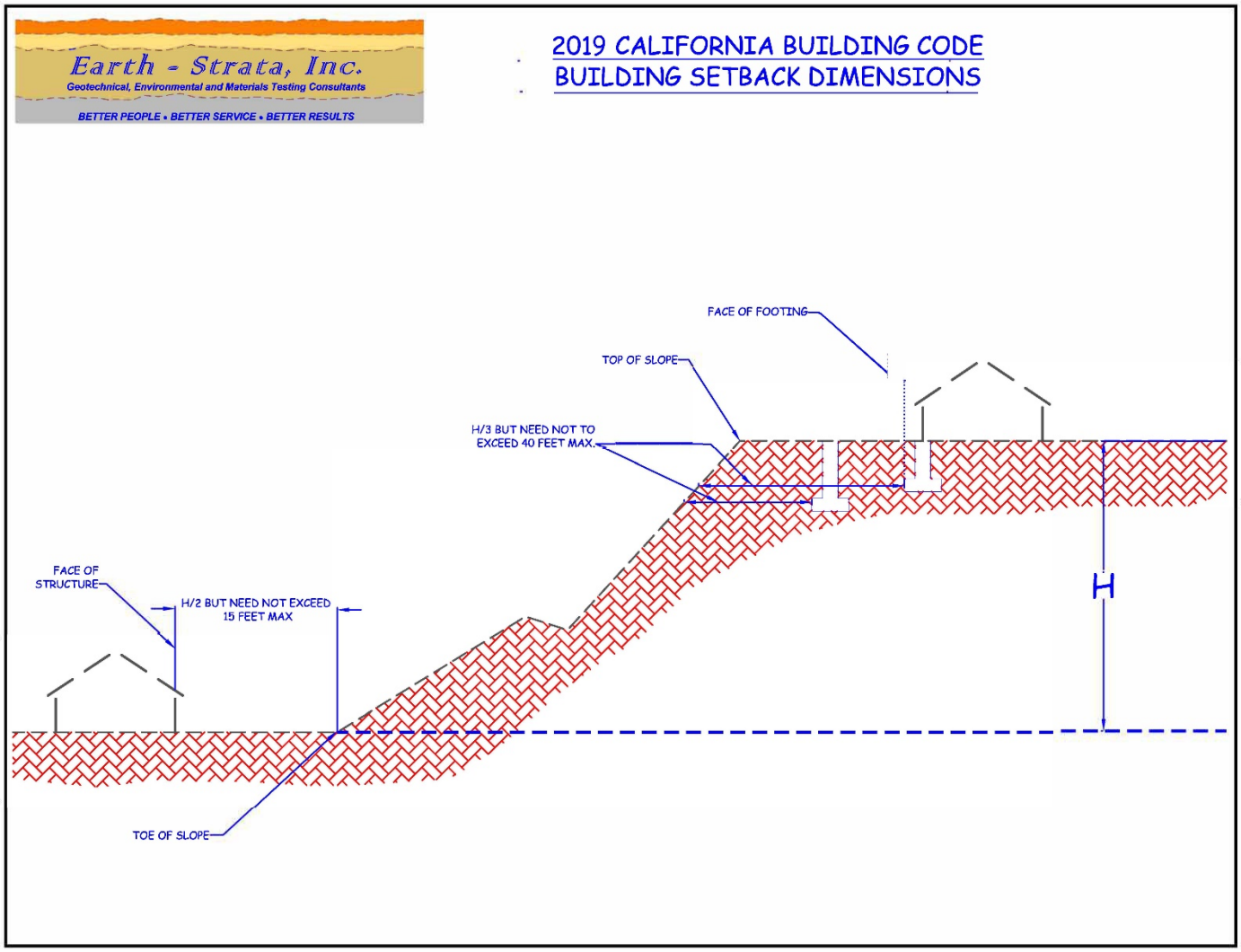
The above lateral resistance values are based on footings for an entire structure being placed directly against compacted fill.

Structural Setbacks and Building Clearance

Structural setbacks are required per the 2019 California Building Code (CBC). Additional structural setbacks are not required due to geologic or geotechnical conditions within the site. Improvements constructed in close proximity to natural or properly engineered and compacted slopes can, over time, be affected by natural processes including gravity forces, weathering, and long term secondary settlement. As a result, the CBC requires that buildings and structures be setback or footings deepened to resist the influence of these processes.

For structures that are planned near ascending and descending slopes, the footings should be embedded to satisfy the requirements presented in the CBC, Section 1808.7 as illustrated in the following Foundation Clearances from Slopes diagram.

FOUNDATION CLEARANCES FROM SLOPES



When determining the required clearance from ascending slopes with a retaining wall at the toe, the height of the slope shall be measured from the top of the wall to the top of the slope.

Foundation Observations

In accordance with the 2019 CBC and prior to the placement of forms, concrete, or steel, all foundation excavations should be observed by the geologist, engineer, or his representative to verify that they have been excavated into competent bearing materials. The excavations should be per the approved plans, moistened, cleaned of all loose materials, trimmed neat, level, and square. Any moisture softened earth materials should be removed prior to steel or concrete placement.

Earth materials from foundation excavations should not be placed in slab on grade areas unless the materials are tested for expansion potential and compacted to a minimum of 90 percent of the maximum dry density.

Expansive Soil Considerations

Preliminary laboratory test results indicate onsite earth materials exhibit an expansion potential of **VERY LOW** as classified in accordance with 2019 CBC Section 1803.5.3 and ASTM D 4829. Additional, testing for expansive soil conditions should be conducted upon completion of rough grading. The following recommendations should be considered the very minimum requirements, for the earth materials tested. It is common practice for the project architect or structural engineer to require additional slab thickness, footing sizes, and/or reinforcement.

Very Low Expansion Potential (Expansion Index of 20 or Less)

Our laboratory test results indicate that the earth materials onsite exhibit a **VERY LOW** expansion potential as classified in accordance with 2019 CBC Section 1803.5.3 and ASTM D 4829. Since the onsite earth materials exhibit expansion indices of 20 or less, the design of slab on ground foundations is exempt from the procedures outlined in Section 1808.6.1 or 1808.6.2.

Footings/ Building Floor Slabs

- Exterior continuous footings may be founded at the minimum depths of 18-inches below the lowest adjacent final grade. The mat foundation should be designed by a structural engineer using a Modulus of Subgrade Reaction, k, of 60 tens per cubic foot.

Corrosivity

Corrosion is defined by the National Association of Corrosion Engineers (NACE) as "a deterioration of a substance or its properties because of a reaction with its environment." From a geotechnical viewpoint, the "substances" are the reinforced concrete foundations or buried metallic elements (not surrounded by concrete) and the "environment" is the prevailing earth materials in contact with them. Many factors can contribute to corrosivity, including the presence of chlorides, sulfates, salts, organic materials, different oxygen levels, poor drainage, different soil types, and moisture content. It is not considered practical or realistic to test for all of the factors which may contribute to corrosivity.

The potential for concrete exposure to chlorides is based upon the recognized Caltrans reference standard "Bridge Design Specifications", under Subsection 8.22.1 of that document, Caltrans has determined that "Corrosive water or soil contains more than 500 parts per million (ppm) of chlorides". Based on limited

preliminary laboratory testing, the onsite earth materials have chloride contents *less* than 500 ppm. As such, specific requirements resulting from elevated chloride contents are not required.

Specific guidelines for concrete mix design are provided in 2019 CBC Section 1904.1 and ACI 318, Section 4.3 Table 4.3.1 when the soluble sulfate content of earth materials exceeds 0.1 percent by weight. Based on limited preliminary laboratory testing, the onsite earth materials are classified in accordance with Table 4.3.1 as having a *negligible* sulfate exposure condition. Therefore, structural concrete in contact with onsite earth materials should utilize Type I or II.

Based on our laboratory testing of resistivity, the onsite earth materials in contact with buried steel should be considered *moderately corrosive*. Additionally, pH values below 5.6 and above 9.1 are recognized as being corrosive to many common metallic components. The pH values for the earth materials tested were *lower* than 9.1 and *higher* than 5.6.

The preliminary test results for corrosivity are based on limited samples, and the initiation of grading may blend various earth materials together. This blending or imported material could alter and increase the detrimental properties of the onsite earth materials. Accordingly, additional testing for chlorides and sulfates along with testing for pH and resistivity should be performed upon completion of grading. Laboratory test results are presented in Appendix C.

RETAINING WALLS

Active and At-Rest Earth Pressures

Foundations may be designed in accordance with the recommendations provided in the Tentative Foundation Design Recommendation section of this report. The following table provides the minimum recommended equivalent fluid pressures for design of retaining walls a maximum of 8 feet high. The active earth pressure should be used for design of unrestrained retaining walls, which are free to tilt slightly. The at-rest earth pressure should be used for design of retaining walls that are restrained at the top, such as basement walls, curved walls with no joints, or walls restrained at corners. For curved walls, active pressure may be used if tilting is acceptable and construction joints are provided at each angle point and at a minimum of 15 foot intervals along the curved segments.

MINIMUM STATIC EQUIVALENT FLUID PRESSURES (pcf)		
PRESSURE TYPE	BACKSLOPE CONDITION	
	LEVEL	2:1 (h:v)
Active Earth Pressure	40	63
At-Rest Earth Pressure	60	95

The retaining wall parameters provided do not account for hydrostatic pressure behind the retaining walls. Therefore, the subdrain system is a very important part of the design. All retaining walls should be designed to resist surcharge loads imposed by other nearby walls, structures, or vehicles should be added to the above earth pressures, if the additional loads are being applied within a 1.5:1 (h:v) plane projected up from the heel of the retaining wall footing. As a way of minimizing surcharge loads and the settlement potential of nearby buildings, the footings for the building can be deepened below the 1.5:1 (h:v)plane projected up from the heel of the retaining wall footing.

Upon request and under a separate scope of work, more detailed analyses can be performed to address equivalent fluid pressures with regard to stepped retaining walls, actual retaining wall heights, actual backfill inclinations, specific backfill materials, higher retaining walls requiring earthquake design motions, etc.

Subdrain System

We recommend a perforated pipe and gravel subdrain system be provided behind all proposed retaining walls to prevent the buildup of hydrostatic pressure behind the proposed retaining walls. The perforated pipe should consist of 4-inch minimum diameter Schedule 40 PVC or ABS SDR-35, placed with the perforations facing down. The pipe should be surrounded by 1 cubic foot per foot of ¾- or 1½ inch open graded gravel wrapped in filter fabric. The filter fabric should consist of Mirafi 140N or equivalent to prevent infiltration of fines and subsequent clogging of the subdrain system.

In lieu of a perforated pipe and gravel subdrain system, weep holes or open vertical masonry joints may be provided in the lowest row of block exposed to the air to prevent the buildup of hydrostatic pressure behind the proposed retaining walls. Weep holes should be a minimum of 3 inches in diameter and provided at intervals at least every 6 feet along the wall. Open vertical masonry joints should be provided at a minimum of 32 inch intervals. A continuous gravel fill, a minimum of 1 cubic foot per foot, should be placed behind the weep holes or open masonry joints. The gravel should be wrapped in filter fabric consisting of Mirafi 140N or equivalent.

The retaining walls should be adequately coated on the backfilled side of the walls with a proven waterproofing compound by an experienced professional to inhibit infiltration of moisture through the walls.

Temporary Excavations

All excavations should be made in accordance with Cal-OSHA requirements. Earth Strata Geotechnical Services is not responsible for job site safety.

Retaining Wall Backfill

Retaining wall backfill materials should be approved by the geotechnical engineer or his representative prior to placement as compacted fill. Retaining wall backfill should be placed in lifts no greater than 6 to 8 inches, watered or air dried as necessary to achieve near optimum moisture contents. All retaining wall backfill should be compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D 1557. Retaining wall backfill should be capped with a paved surface drain.

CONCRETE FLATWORK

Thickness and Joint Spacing

Concrete sidewalks and patio type slabs should be at least 4 inches thick and provided with construction or expansion joints every 6 feet or less, to reduce the potential for excessive cracking. Concrete driveway

slabs should be at least 5 inches thick and provided with construction or expansion joints every 10 feet or less..

Subgrade Preparation

In order to reduce the potential for unsightly cracking, subgrade earth materials underlying concrete flatwork should be compacted at near optimum moisture to a minimum of 90 percent of the maximum dry density determined by ASTM D 1557 and then moistened to optimum or slightly above optimum moisture content. This moisture should extend to a depth of 12 inches below subgrade and be maintained prior to placement of concrete. Pre-watering of the earth materials prior to placing concrete will promote uniform curing of the concrete and minimize the development of shrinkage cracks. The project geotechnical engineer or his representative should verify the density and moisture content of the earth materials and the depth of moisture penetration prior to placing concrete.

Cracking within concrete flatwork is often a result of factors such as the use of too high a water to cement ratio and/or inadequate steps taken to prevent moisture loss during the curing of the concrete. Concrete distress can be reduced by proper concrete mix design and proper placement and curing of the concrete. Minor cracking within concrete flatwork is normal and should be expected.

GRADING PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **EMPIRE DESIGN GROUP, INC** and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Earth Strata Geotechnical Services should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Earth Strata Geotechnical Services not be accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

We recommend that Earth Strata Geotechnical Services be retained to provide geologic and geotechnical engineering services during grading and foundation excavation phases of the work. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Earth Strata Geotechnical Services should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property. The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Earth Strata Geotechnical Services based on the conditions revealed during grading and construction.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

APPENDIX A

REFERENCES

APPENDIX A

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APPENDIX B

EXPLORATORY LOGS

Geotechnical Boring Log B-1

Date: November 2, 2021	**Project Name: Highway 74, Perris** **Page: 1 of 1**
Project Number: 213936-10	**Logged By: SNJ**
Drilling Company: Drilling It	**Type of Rig: AMS**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0		0-5'				**Artificial Fill, Undocumented (Afu)**
					SC	Clayey SAND: dark reddish brown, slightly moist, medium dense, fine to medium
	14	2.5'	104.0	8.4		sand
						Quaternary Young Axial-Channel Deposits (Qya)
					SM	Silty SAND; reddish brown, slightly moist, loose, fine to medium sand
5	9	5'	99.9	11.3		
	12	7.5'	100.7	9.0		
10	6	10'	100.8	22.3		
15	5	15'	-	-		No Recovery
						Becomes brown, saturated, very loose, fine sand 15 to 20 feet
						Groundwater at 17 feet
20	13	20'	98.0	24.0		Medium dense 20 to 25 feet
25	4	25'	105.0	26.9		
						Total Depth: 26.5 feet
						Groundwater at 17 feet
30						

42184 Remington Avenue, Temecula, CA 92590

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Geotechnical, Environmental and Materials Testing Consultants
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Geotechnical Boring Log B-2

Date: November 2, 2021	**Project Name: Highway 74, Perris** **Page: 1 of 1**
Project Number: 213936-10	**Logged By: SNJ**
Drilling Company: Drilling It	**Type of Rig: AMS**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu)**
					ML	Sandy SILT; reddish brown, slightly moist, medium dense, fine sand
	19	2.5'	85.6	14.3		**Quaternary Young Axial-Channel Deposits (Qya)**
					SM	Silty SAND; reddish brown, slightly moist, medium dense, fine sand
5	15	5'	107.9	8.7		
	18	7.5'	105.3	4.0		
10						Fine to medium sand
	13	10'	106.4	18.8		
15	5	15'	69.8	30.3		Loose and saturated at 15 feet
						Total Depth: 16.5 feet
						No Groundwater
20						
25						
30						

42184 Remington Avenue, Temecula, CA 92590

Earth Strata Geotechnical Services, Inc.
Geotechnical, Environmental and Materials Testing Consultants
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Geotechnical Boring Log B-3

Date: November 2, 2021	**Project Name: Highway 74, Perris** **Page: 1 of 1**
Project Number: 213936-10	**Logged By: SNJ**
Drilling Company: Drilling It	**Type of Rig: AMS**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0		0-5'				**Artificial Fill, Undocumented (Afu)**
					ML	Sandy SILT; reddish brown, slightly moist, medium dense, fine sand
						Quaternary Young Axial-Channel Deposits (Qya)
					ML	Sandy SILT; reddish brown, moist, loose, fine to medium sand
5						Total Depth: 5 feet
						No Groundwater
10						
15						
20						
25						
30						

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APPENDIX C

LABORATORY PROCEDURES AND TEST RESULTS

APPENDIX C

Laboratory Procedures and Test Results

Laboratory testing provided quantitative and qualitative data involving the relevant engineering properties of the representative earth materials selected for testing. The representative samples were tested in general accordance with American Society for Testing and Materials (ASTM) procedures and/or California Test Methods (CTM).

Soil Classification: Earth materials encountered during exploration were classified and logged in general accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) of ASTM D 2488. Upon completion of laboratory testing, exploratory logs and sample descriptions were reconciled to reflect laboratory test results with regard to ASTM D 2487.

Grain Size Distribution: Select samples were tested using the guidelines of ASTM D 1140. The test results are presented in the table below.

SAMPLE LOCATION	MATERIAL DESCRIPTION	% PASSING # 200 SIEVE
B-1 @ 10 feet	Silty SAND	48
B-1 @ 20 feet	Silty SAND	35
B-1 @ 25 feet	Silty SAND	33

Moisture and Density Tests: For select samples moisture content was determined using the guidelines of ASTM D 2216 and dry density determinations were made using the guidelines of ASTM D 2937. These tests were performed on relatively undisturbed samples and the test results are presented on the exploratory logs.

Maximum Density Tests: The maximum dry density and optimum moisture content of representative samples were determined using the guidelines of ASTM D 1557. The test results are presented in the table below.

SAMPLE LOCATION	MATERIAL DESCRIPTION	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)
B-1 @ 0-5 feet	Silty SAND	129.5	10.0

Expansion Index: The expansion potential of representative samples was evaluated using the guidelines of ASTM D 4829. The test results are presented in the table below.

SAMPLE LOCATION	MATERIAL DESCRIPTION	EXPANSION INDEX	EXPANSION POTENTIAL
B-1 @ 0-5 feet	Silty SAND	11	Very Low

Minimum Resistivity and pH Tests: Minimum resistivity and pH Tests of select samples were performed using the guidelines of CTM 643. The test results are presented in the table below.

SAMPLE LOCATION	MATERIAL DESCRIPTION	pH	MINIMUM RESISTIVITY (ohm-cm)
B-1 @ 0-5 feet	Silty SAND	7.4	2,700

Soluble Sulfate: The soluble sulfate content of select samples was determined using the guidelines of CTM 417. The test results are presented in the table below.

SAMPLE LOCATION	MATERIAL DESCRIPTION	SULFATE CONTENT (% by weight)	SULFATE EXPOSURE
B-1 @ 0-5 feet	Silty SAND	0.001	Negligible

Chloride Content: Chloride content of select samples was determined using the guidelines of CTM 422. The test results are presented in the table below.

SAMPLE LOCATION	MATERIAL DESCRIPTION	CHLORIDE CONTENT (ppm)
B-1 @ 0-5 feet	Silty SAND	70

APPENDIX D

SEISMICITY

ARS Online V3.0.2

Using the tool: Specify latitude and longitude in decimal degrees in the input boxes below. Alternatively, **Google Maps** can be used to find the site location. Specify the time-averaged shear-wave velocity in the upper 30m (Vs30) in the input box. After submitting the data, the USGS 2014 hazard data for a 975-year return period will be reported along with adjustment factors required by Caltrans Seismic Design Criteria (SDC) V2.0.

Latitude: 33.761042 **Longitude:** -117.268714 **Vs30 (m/s):** 270 Submit

Caltrans Design Spectrum (5% damping)

Period(s)	Sa_{2008}(g)	Sa_{2014}(g)	$Basin_{2008}$	$Basin_{2014}$	Near Fault Amp	Design Sa_{2008}(g)	Design Sa_{2014}(g)
PGA	0.56	0.55	1	1	1	0.56	0.55
0.10	0.97	0.99	1	1	1	0.97	0.99
0.20	1.2	1.33	1	1	1	1.2	1.33
0.30	1.19	1.44	1	1	1	1.19	1.44
0.50	1.05	1.3	1	1	1	1.05	1.3
0.75	0.87	1.02	1	1	1.03	0.9	1.05
1.0	0.72	0.82	1	1	1.06	0.77	0.87
2.0	0.41	0.42	1	1	1.06	0.44	0.45
3.0	0.27	0.28	1	1	1.06	0.29	0.29
4.0	0.2	0.2	1	1	1.06	0.21	0.21
5.0	0.16	0.15	1	1	1.06	0.17	0.16

Copy table

Deaggregation (based on 2014 hazard)

mean magnitude (for PGA)	6.8
mean site-source distance (km, for Sa at 1s)	21.9

Option: recalculate Near Fault amplification with user specified distance

Site-source distance (km): 21.9 Update

2008 National Seismic Hazard Maps - Source Parameters

New Search

Distance in Kilometers	Name	State	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)
12.48	Elsinore;GI	CA	5	90	V	strike slip	0	13	37
12.48	Elsinore;W+GI	CA	n/a	81	NE	strike slip	0	14	83
12.79	Elsinore;GI+T+J+CM	CA	n/a	86	NE	strike slip	0	16	195
12.79	Elsinore;W+GI+T+J	CA	n/a	84	NE	strike slip	0	16	199
12.79	Elsinore;GI+T	CA	5	90	V	strike slip	0	14	78
12.79	Elsinore;W+GI+T	CA	n/a	84	NE	strike slip	0	14	124
12.79	Elsinore;W+GI+T+J+CM	CA	n/a	84	NE	strike slip	0	16	241
12.79	Elsinore;GI+T+J	CA	n/a	86	NE	strike slip	0	17	153
14.64	Elsinore;T+J	CA	n/a	86	NE	strike slip	0	17	127
14.64	Elsinore;T	CA	5	90	V	strike slip	0	14	52
14.64	Elsinore;T+J+CM	CA	n/a	85	NE	strike slip	0	16	169
20.62	San Jacinto;A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	178
20.62	San Jacinto;A+CC	CA	n/a	90	V	strike slip	0	16	118
20.62	San Jacinto;A+C	CA	n/a	90	V	strike slip	0	17	118
20.62	San Jacinto;A+CC+B	CA	n/a	90	V	strike slip	0.1	15	152
20.62	San Jacinto;A	CA	9	90	V	strike slip	0	17	71
22.89	San Jacinto;SJV	CA	18	90	V	strike slip	0	16	43

22.89	San Jacinto;SBV+SJV	CA	n/a	90	V	strike slip	0	16	88
22.90	San Jacinto;SBV+SJV+A	CA	n/a	90	V	strike slip	0	16	134
22.90	San Jacinto;SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	196
22.90	San Jacinto;SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15	170
22.90	San Jacinto;SJV+A+CC	CA	n/a	90	V	strike slip	0	16	136
22.90	San Jacinto;SJV+A+C	CA	n/a	90	V	strike slip	0	17	136
22.90	San Jacinto;SJV+A	CA	n/a	90	V	strike slip	0	17	89
22.90	San Jacinto;SBV+SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	241
22.90	San Jacinto;SBV+SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15	215
22.90	San Jacinto;SBV+SJV+A+CC	CA	n/a	90	V	strike slip	0	16	181
22.90	San Jacinto;SBV+SJV+A+C	CA	n/a	90	V	strike slip	0	17	181
28.46	Chino, alt 2	CA	1	65	SW	strike slip	0	14	29
28.55	San Jacinto;SBV	CA	6	90	V	strike slip	0	16	45
30.77	Elsinore;W	CA	2.5	75	NE	strike slip	0	14	46
32.10	Chino, alt 1	CA	1	50	SW	strike slip	0	9	24
41.16	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	384
41.16	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	512
41.16	S. San Andreas;SSB+BG	CA	n/a	71		strike slip	0	13	101
41.16	S. San Andreas;NSB+SSB+BG+CO	CA	n/a	79		strike slip	0.2	12	206
41.16	S. San Andreas;CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	322
41.16	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	85		strike slip	0	14	380

41.16	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	449
41.16	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0	14	442
41.16	S. San Andreas;NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13	213
41.16	S. San Andreas;NM+SM+NSB+SSB+BG	CA	n/a	83		strike slip	0	14	271
41.16	S. San Andreas;NM+SM+NSB+SSB+BG+CO	CA	n/a	84		strike slip	0.1	13	340
41.16	S. San Andreas;NSB+SSB	CA	n/a	90	V	strike slip	0	13	79
41.16	S. San Andreas;NSB+SSB+BG	CA	n/a	75		strike slip	0	14	136
41.16	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0.1	13	421
41.16	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0.1	13	479
41.16	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	548
41.16	S. San Andreas;SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13	176
41.16	S. San Andreas;SM+NSB+SSB+BG	CA	n/a	81		strike slip	0	13	234
41.16	S. San Andreas;SM+NSB+SSB+BG+CO	CA	n/a	83		strike slip	0.1	13	303
41.16	S. San Andreas;SSB	CA	16	90	V	strike slip	0	13	43
41.16	S. San Andreas;SSB+BG+CO	CA	n/a	77		strike slip	0.2	12	170
41.16	S. San Andreas;BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	263
41.16	S. San Andreas;BB+NM+SM+NSB+SSB+BG	CA	n/a	84		strike slip	0	14	321
41.16	S. San Andreas;BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	85		strike slip	0.1	13	390
41.82	San Joaquin Hills	CA	0.5	23	SW	thrust	2	13	27
43.36	S. San Andreas;CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14	279
43.36	S. San Andreas;CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14	341
43.36	S. San Andreas;BB+NM+SM+NSB	CA	n/a	90	V	strike	0	14	220

						slip			
43.36	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0.1	13	377
43.36	S. San Andreas;SM+NSB	CA	n/a	90	V	strike slip	0	13	133
43.36	S. San Andreas;NM+SM+NSB	CA	n/a	90	V	strike slip	0	13	170
43.36	S. San Andreas;NSB	CA	22	90	V	strike slip	0	13	35
48.15	S. San Andreas;BG+CO	CA	n/a	72		strike slip	0.3	12	125
48.15	S. San Andreas;BG	CA	n/a	58		strike slip	0	13	56
48.88	Cucamonga	CA	5	45	N	thrust	0	8	28
52.47	Elsinore;J	CA	3	84	NE	strike slip	0	19	75
52.47	Elsinore;J+CM	CA	3	84	NE	strike slip	0	17	118
55.29	San Jose	CA	0.5	74	NW	strike slip	0	15	20
55.55	Newport Inglewood Connected alt 1	CA	1.3	89		strike slip	0	11	208
55.55	Newport Inglewood Connected alt 2	CA	1.3	90	V	strike slip	0	11	208
55.55	Newport-Inglewood (Offshore)	CA	1.5	90	V	strike slip	0	10	66
56.96	Cleghorn	CA	3	90	V	strike slip	0	16	25
57.53	Puente Hills (Coyote Hills)	CA	0.7	26	N	thrust	2.8	15	17
59.32	Sierra Madre	CA	2	53	N	reverse	0	14	57
59.32	Sierra Madre Connected	CA	2	51		reverse	0	14	76
60.22	Pinto Mtn	CA	2.5	90	V	strike slip	0	16	74
61.68	North Frontal (West)	CA	1	49	S	reverse	0	16	50
63.91	Newport-Inglewood, alt 1	CA	1	88		strike slip	0	15	65
66.84	S. San Andreas;SM	CA	29	90	V	strike slip	0	13	98
66.84	S. San Andreas;BB+NM+SM	CA	n/a	90	V	strike slip	0	14	184
66.84	S. San Andreas;CC+BB+NM+SM	CA	n/a	90	V	strike	0	14	243

						slip			
66.84	S. San Andreas;NM+SM	CA	n/a	90	V	strike slip	0	14	134
66.84	S. San Andreas;CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0	14	306
66.84	S. San Andreas;PK+CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0.1	13	342
71.93	Puente Hills (Santa Fe Springs)	CA	0.7	29	N	thrust	2.8	15	11
72.26	Rose Canyon	CA	1.5	90	V	strike slip	0	8	70
74.66	San Jacinto;CC+B	CA	n/a	90	V	strike slip	0.2	14	77
74.66	San Jacinto;CC	CA	4	90	V	strike slip	0	16	43
74.66	San Jacinto;CC+B+SM	CA	n/a	90	V	strike slip	0.2	14	103
75.23	Helendale-So Lockhart	CA	0.6	90	V	strike slip	0	13	114
75.34	Clamshell-Sawpit	CA	0.5	50	NW	reverse	0	14	16
76.21	San Jacinto;C	CA	14	90	V	strike slip	0	17	47
77.12	North Frontal (East)	CA	0.5	41	S	thrust	0	16	27
79.63	Palos Verdes	CA	3	90	V	strike slip	0	14	99
79.63	Palos Verdes Connected	CA	3	90	V	strike slip	0	10	285
80.27	Raymond	CA	1.5	79	N	strike slip	0	16	22
80.52	Coronado Bank	CA	3	90	V	strike slip	0	9	186
82.69	Puente Hills (LA)	CA	0.7	27	N	thrust	2.1	15	22
83.46	Burnt Mtn	CA	0.6	67	W	strike slip	0	16	21
84.16	Elysian Park (Upper)	CA	1.3	50	NE	reverse	3	15	20
87.15	Lenwood-Lockhart-Old Woman Springs	CA	0.9	90	V	strike slip	0	13	145
88.49	Eureka Peak	CA	0.6	90	V	strike slip	0	15	19
90.36	Earthquake Valley	CA	2	90	V	strike slip	0	19	20
90.37	Landers	CA	0.6	90	V	strike	0	15	95

						slip			
91.60	Verdugo	CA	0.5	55	NE	reverse	0	15	29
94.68	S. San Andreas;CO	CA	20	90	V	strike slip	0.6	11	69
96.66	Johnson Valley (No)	CA	0.6	90	V	strike slip	0	16	35
97.44	Hollywood	CA	1	70	N	strike slip	0	17	17

6.3	7km SSE of Big Bear City, CA 1992-06-28 15:05:30 (UTC)	3.6 km
7.3	Landers, California Earthquake 1992-06-28 11:57:34 (UTC)	-0.1 km
6.1	17km NNE of Thousand Pal... 1992-04-23 04:50:23 (UTC)	11.6 km
6.0	6km SSW of Morongo Valley, ... 1986-07-08 09:20:44 (UTC)	9.5 km
6.0	16km E of Desert Hot Spring... 1948-12-04 23:43:16 (UTC)	6.0 km
6.4	Long Beach, California Earth... 1933-03-11 01:54:09 (UTC)	6.0 km
6.8	2 km W of Hemet, California 1918-04-21 22:32:25 (UTC)	
6.7	Near San Jacinto, California 1899-12-25 12:25:00 (UTC)	
6.4	Cajon Pass area, northwest o... 1899-07-22 20:32:00 (UTC)	
6.2	Northwest of San Bernardino... 1894-07-30 05:12:00 (UTC)	
6.8	Northeastern San Diego Cou... 1890-02-09 12:06:00 (UTC)	
6.0	Near San Bernardino, Califor... 1858-12-16 10:00:00 (UTC)	
6.0	Near San Gabriel, California 1855-07-11 04:15:00 (UTC)	
7.5	Northwest of San Bernardino... 1812-12-08 15:00:00 (UTC)	

Hazards by Location

Search Information

Coordinates: 33.761042, -117.268714

Elevation: 1540 ft

Timestamp: 2021-11-04T16:27:13.758Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D-default

Basic Parameters

Name	Value	Description
S_S	1.5	MCE_R ground motion (period=0.2s)
S_1	0.547	MCE_R ground motion (period=1.0s)
S_{MS}	1.8	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.2	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.934	Coefficient of risk (0.2s)
CR_1	0.919	Coefficient of risk (1.0s)
PGA	0.534	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.641	Site modified peak ground acceleration
T_L	8	Long-period transition period (s)
SsRT	1.502	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.608	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)

SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.547	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.595	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.534	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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APPENDIX E

LIQUEFACTION ANALYSIS

LIQUEFACTION & SETTLEMENT OF SANDS ANALYSIS

Project Name: Highway 74, Perris
Project Number: 213936-10A
Boring Number: B-1 (In-Situ)

Horizontal Ground Acceleration (% g)	0.641	Energy Ratio C_E (Auto-hammer)	1.50
Analyzed Groundwater Depth (feet)	5.0	Borehole Diameter C_B (6 - 8 inches)	1.00
Average Wet Unit Weight (pcf)	114.0	Groundwater Depth in Boring (feet)	17.0
Design Magnitude Earthquake	7.6		
Magnitude Scaling Factor (MSF)	1.0		

Depth (feet)	Blow Count SPT	Blow Count Cal. Mod.	SPT N_m	Total Stress (tons/ft2)	Effective Stress (tons/ft2)	Fines Content FC(%)	C_R	Overburden C_N	rd	Sampler Type C_S	$(N_1)_{60}$	$(N_1)_{60cs}$	NCEER 1998 CSR	NCEER 1998 CRR*MSF	Liquefaction Safety Factor	Layer Thickness t (ft)	Layer Thickness t (inches)	Percent Volumetric Strain	Settlement Per Sand Layer (inches)
2		14	10.584	0.114	0.114	30	0.75	1.67	1.00	1.00	20	28	0.41	0.3432	Above GW, Not Liquifiable	2.00	24.00	1.60	0.38
5		14	10.584	0.285	0.285	35	0.75	1.48	0.99	1.00	18	26	0.41	0.3023	0.74	3.00	36.00	1.80	0.65
7		9	6.804	0.399	0.337	35	0.75	1.38	0.98	1.00	11	18	0.49	0.1790	0.37	2.00	24.00	2.60	0.62
10		12	9.072	0.570	0.414	45	0.75	1.24	0.98	1.00	13	20	0.56	0.2080	0.37	3.00	36.00	2.30	0.83
14		6	4.536	0.798	0.517	48	0.85	1.10	0.97	1.00	6	13	0.62	0.1308	0.21	4.00	48.00	3.50	1.68
19		5	3.780	1.083	0.646	42	0.95	0.99	0.96	1.00	5	11	0.67	0.1199	0.18	5.00	60.00	4.00	2.40
24		13	9.828	1.368	0.775	35	0.95	0.94	0.94	1.00	13	21	0.69	0.2143	0.31	5.00	60.00	2.10	1.26
27		4	3.024	1.539	0.853	33	0.95	0.91	0.94	1.00	4	9	0.70	0.1036	0.15	3.00	36.00	5.00	1.80
															Total Settlement (inches):				9.6

Procedure established by T.L. Youd and I.M. Idriss, et. al., 1996 NCEER-96-0022 Workshop & S.C.E.C. SP117
Evaluation of settlements in sand due to earthquake shaking, Tokimatsu and Seed, 1987

3 Extension of rod above boring (feet)

* CRR 7.5 is not defined for $(N_1)60cs$ greater than 30. Soils with (N1)60cs > 30 are considered too dense to liquefy (NCEER Workshop)

$(N_1)_{60} = N_M C_N C_E C_B C_R C_S$ $(N_1)_{60CS} = K_S(N_1)_{60}$

LIQUEFACTION & SETTLEMENT OF SANDS ANALYSIS

Project Name: Highway 74, Perris
Project Number: 213936-10A
Boring Number: B-1 (12-Foot Removals)

Horizontal Ground Acceleration (% g)	0.641	Energy Ratio C_E (Auto-hammer)	1.50
Analyzed Groundwater Depth (feet)	5.0	Borehole Diameter C_B (6 - 8 inches)	1.00
Average Wet Unit Weight (pcf)	114.0	Groundwater Depth in Boring (feet)	17.0
Design Magnitude Earthquake	7.6		
Magnitude Scaling Factor (MSF)	1.0		

Depth (feet)	Blow Count SPT	Blow Count Cal. Mod.	SPT N_m	Total Stress (tons/ft2)	Effective Stress (tons/ft2)	Fines Content FC(%)	C_R	Overburden C_N	rd	Sampler Type C_S	$(N_1)_{60}$	$(N_1)_{60cs}$	NCEER 1998 CSR	NCEER 1998 CRR*MSF	Liquefaction Safety Factor	Layer Thickness t (ft)	Layer Thickness t (inches)	Percent Volumetric Strain	Settlement Per Sand Layer (inches)
2		50	37.800	0.114	0.114	30	0.75	1.67	1.00	1.00	71	87	0.41	---	Corrected SPT >30*	2.00	24.00	0.00	0.00
5		50	37.800	0.285	0.285	35	0.75	1.48	0.99	1.00	63	81	0.41	---	Corrected SPT >30*	3.00	36.00	0.00	0.00
7		50	37.800	0.399	0.337	35	0.75	1.38	0.98	1.00	59	75	0.49	---	Corrected SPT >30*	2.00	24.00	0.00	0.00
10		50	37.800	0.570	0.414	45	0.75	1.24	0.98	1.00	53	68	0.56	---	Corrected SPT >30*	3.00	36.00	0.00	0.00
14		35	26.460	0.798	0.517	48	0.85	1.10	0.97	1.00	37	50	0.62	---	Corrected SPT >30*	4.00	48.00	0.00	0.00
19		5	3.780	1.083	0.646	42	0.95	0.99	0.96	1.00	5	11	0.67	0.1199	0.18	5.00	60.00	4.00	2.40
24		13	9.828	1.368	0.775	35	0.95	0.94	0.94	1.00	13	21	0.69	0.2143	0.31	5.00	60.00	2.10	1.26
27		4	3.024	1.539	0.853	33	0.95	0.91	0.94	1.00	4	9	0.70	0.1036	0.15	3.00	36.00	5.00	1.80

Total Settlement (inches): 5.5

Procedure established by T.L. Youd and I.M. Idriss, et. al., 1996 NCEER-96-0022 Workshop & S.C.E.C. SP117
Evaluation of settlements in sand due to earthquake shaking, Tokimatsu and Seed, 1987

3 Extension of rod above boring (feet)

* CRR 7.5 is not defined for $(N_1)60cs$ greater than 30. Soils with (N1)60cs > 30 are considered too dense to liquefy (NCEER Workshop)

$(N_1)_{60} = N_M C_N C_E C_B C_R C_S$ $(N_1)_{60CS} = K_S(N_1)_{60}$

APPENDIX F

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

EARTH-STRATA

General Earthwork and Grading Specifications

General

Intent: These General Earthwork and Grading Specifications are intended to be the minimum requirements for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These General Earthwork and Grading Specifications should be considered a part of the recommendations contained in the geotechnical report(s) and if they are in conflict with the geotechnical report(s), the specific recommendations in the geotechnical report shall supersede these more general specifications. Observations made during earthwork operations by the project Geotechnical Consultant may result in new or revised recommendations that may supersede these specifications and/or the recommendations in the geotechnical report(s).

The Geotechnical Consultant of Record: The Owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant), prior to commencement of grading or construction. The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading or construction.

Prior to commencement of grading or construction, the Owner shall coordinate with the Geotechnical Consultant, and Earthwork Contractor (Contractor) to schedule sufficient personnel for the appropriate level of observation, mapping, and compaction testing.

During earthwork and grading operations, the Geotechnical Consultant shall observe, map, and document the subsurface conditions to confirm assumptions made during the geotechnical design phase of the project. Should the observed conditions differ significantly from the interpretive assumptions made during the design phase, the Geotechnical Consultant shall recommend appropriate changes to accommodate the observed conditions, and notify the reviewing agency where required.

The Geotechnical Consultant shall observe the moisture conditioning and processing of the excavations and fill materials. The Geotechnical Consultant should perform periodic relative density testing of fill materials to verify that the attained level of compaction is being accomplished as specified.

The Earthwork Contractor: The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of earth materials to receive compacted fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall be provided with the approved grading plans and geotechnical report(s) for his review and acceptance of responsibilities, prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the approved grading plans and geotechnical report(s). Prior to commencement of grading, the Contractor shall prepare and submit to the Owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "equipment" of work and the estimated quantities of daily earthwork contemplated for the site. The Contractor shall inform the Owner and the Geotechnical Consultant of work schedule changes and revisions to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. No assumptions shall be made by the Contractor with regard to whether the Geotechnical Consultant is aware of all grading operations.

It is the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the earthwork operations in accordance with the applicable grading codes and agency ordinances, these specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). At the sole discretion of the Geotechnical Consultant, any unsatisfactory conditions, such as unsuitable earth materials, improper moisture conditioning, inadequate compaction, insufficient buttress keyway size, adverse weather conditions, etc., resulting in a quality of work less than required in the approved grading plans and geotechnical report(s), the Geotechnical Consultant shall reject the work and may recommend to the Owner that grading be stopped until conditions are corrected.

Preparation of Areas for Compacted Fill

Clearing and Grubbing: Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed in a method acceptable to the Owner, Geotechnical Consultant, and governing agencies.

The Geotechnical Consultant shall evaluate the extent of these removals on a site by site basis. Earth materials to be placed as compacted fill shall not contain more than 1 percent organic materials (by volume). No compacted fill lift shall contain more than 10 percent organic matter.

Should potentially hazardous materials be encountered, the Contractor shall stop work in the affected area, and a hazardous materials specialist shall immediately be consulted to evaluate the potentially hazardous materials, prior to continuing to work in that area.

It is our understanding that the State of California defines most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) as hazardous waste. As such, indiscriminate dumping or spillage of these fluids may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall be prohibited. The contractor is responsible for all hazardous waste related to his operations. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Owner should contract the services of a qualified environmental assessor.

Processing: Exposed earth materials that have been observed to be satisfactory for support of compacted fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Exposed earth materials that are not observed to be satisfactory shall be removed or alternative recommendations may be provided by the Geotechnical Consultant. Scarification shall continue until the exposed earth materials are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction. The earth materials should be moistened or air dried to near optimum moisture content, prior to compaction.

Overexcavation: The Cut Lot Typical Detail and Cut/Fill Transition Lot Typical Detail, included herein provides a graphic illustration that depicts typical overexcavation recommendations made in the approved geotechnical report(s) and/or grading plan(s).

Keyways and Benching: Where fills are to be placed on slopes steeper than 5:1 (horizontal to vertical units), the ground shall be thoroughly benched as compacted fill is placed. Please see the three Keyway and Benching Typical Details with subtitles Cut Over Fill Slope, Fill Over Cut Slope, and Fill Slope for a graphic illustration. The lowest bench or smallest keyway shall be a minimum of 10 feet wide (or ½ the proposed slope height) and at least 2 feet into competent earth materials as advised by the Geotechnical Consultant. Typical benches shall be excavated a minimum height of 4 feet into competent earth materials or as recommended by the Geotechnical Consultant. Fill placed on slopes steeper than 5:1 should be thoroughly benched or otherwise excavated to provide a flat subgrade for the compacted fill.

Evaluation/Acceptance of Bottom Excavations: All areas to receive compacted fill (bottom excavations), including removal excavations, processed areas, keyways, and benching, shall be observed, mapped, general elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive compacted fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to placing compacted fill. A licensed surveyor shall provide the survey control for determining elevations of bottom excavations, processed areas, keyways, and

benching. The Geotechnical Consultant is not responsible for erroneously located, fills, subdrain systems, or excavations.

Fill Materials

General: Earth material to be used as compacted fill should to a large extent be free of organic matter and other deleterious substances as evaluated and accepted by the Geotechnical Consultant.

Oversize: Oversize material is rock that does not break down into smaller pieces and has a maximum diameter greater than 12 inches. Oversize rock shall not be included within compacted fill unless specific methods and guidelines acceptable to the Geotechnical Consultant are followed. For examples of methods and guidelines of oversize rock placement see the enclosed Oversize Rock Disposal Detail. The inclusion of oversize materials in the compacted fill shall only be acceptable if the oversize material is completely surrounded by compacted fill or thoroughly jetted granular materials. No oversize material shall be placed within 10 vertical feet of finish grade or within 2 feet of proposed utilities or underground improvements.

Import: Should imported earth materials be required, the proposed import materials shall meet the requirements of the Geotechnical Consultant. Well graded, very low expansion potential earth materials free of organic matter and other deleterious substances are usually sought after as import materials. However, it is generally in the Owners best interest that potential import earth materials are provided to the Geotechnical Consultant to determine their suitability for the intended purpose. At least 48 hours should be allotted for the appropriate laboratory testing to be performed, prior to starting the import operations.

Fill Placement and Compaction Procedures

Fill Layers: Fill materials shall be placed in areas prepared to receive fill in nearly horizontal layers not exceeding 8 inches in loose thickness. Thicker layers may be accepted by the Geotechnical Consultant, provided field density testing indicates that the grading procedures can adequately compact the thicker layers. Each layer of fill shall be spread evenly and thoroughly mixed to obtain uniformity within the earth materials and consistent moisture throughout the fill.

Moisture Conditioning of Fill: Earth materials to be placed as compacted fill shall be watered, dried, blended, and/or mixed, as needed to obtain relatively uniform moisture contents that are at or slightly above optimum. The maximum density and optimum moisture content tests should be performed in accordance with the American Society of Testing and Materials (ASTM test method D1557-00).

Compaction of Fill: After each layer has been moisture-conditioned, mixed, and evenly spread, it should be uniformly compacted to a minimum of 90 percent of maximum dry density as determined by ASTM test method D1557-00. Compaction equipment shall be adequately sized and be either specifically designed for compaction of earth materials or be proven to consistently achieve the required level of compaction.

Compaction of Fill Slopes: In addition to normal compaction procedures specified above, additional effort to obtain compaction on slopes is needed. This may be accomplished by backrolling of slopes with sheepsfoot rollers as the fill is being placed, by overbuilding the fill slopes, or by other methods producing results that are satisfactory to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill and the slope face shall be a minimum of 90 percent of maximum density per ASTM test method D1557-00.

Compaction Testing of Fill: Field tests for moisture content and relative density of the compacted fill earth materials shall be periodically performed by the Geotechnical Consultant. The location and frequency of tests shall be at the Geotechnical Consultant's discretion based on field observations. Compaction test locations will not necessarily be random. The test locations may or may not be selected to verify minimum compaction requirements in areas that are typically prone to inadequate compaction, such as close to slope faces and near benching.

Frequency of Compaction Testing: Compaction tests shall be taken at minimum intervals of every 2 vertical feet and/or per 1,000 cubic yards of compacted materials placed. Additionally, as a guideline, at least one (1) test shall be taken on slope faces for each 5,000 square feet of slope face and/or for each 10 vertical feet of slope. The Contractor shall assure that fill placement is such that the testing schedule described herein can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork operations to a safe level so that these minimum standards can be obtained.

Compaction Test Locations: The approximate elevation and horizontal coordinates of each test location shall be documented by the Geotechnical Consultant. The Contractor shall coordinate with the Surveyor to assure that sufficient grade stakes are established. This will provide the Geotechnical Consultant with sufficient accuracy to determine the approximate test locations and elevations. The Geotechnical Consultant can not be responsible for staking erroneously located by the Surveyor or Contractor. A minimum of two grade stakes should be provided at a maximum horizontal distance of 100 feet and vertical difference of less than 5 feet.

Subdrain System Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the approved grading plan, and the typical details provided herein. The Geotechnical Consultant may recommend additional subdrain systems and/or changes to the subdrain systems described herein, with regard to the extent, location, grade, or material depending on conditions encountered during grading or other factors. All subdrain systems shall be surveyed by a licensed land surveyor (except for retaining wall subdrain systems) to verify line and grade after installation and prior to burial. Adequate time should be allowed by the Contractor to complete these surveys.

Excavation

All excavations and over-excavations for remedial purposes shall be evaluated by the Geotechnical Consultant during grading operations. Remedial removal depths indicated on the geotechnical plans are estimates only. The actual removal depths and extent shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading operations. Where fill over cut slopes are planned, the cut portion of the slope shall be excavated, evaluated, and accepted by the Geotechnical Consultant prior to placement of the fill portion of the proposed slope, unless specifically addressed by the Geotechnical Consultant. Typical details for cut over fill slopes and fill over cut slopes are provided herein.

Trench Backfill

1) The Contractor shall follow all OHSA and Cal/OSHA requirements for trench excavation safety.

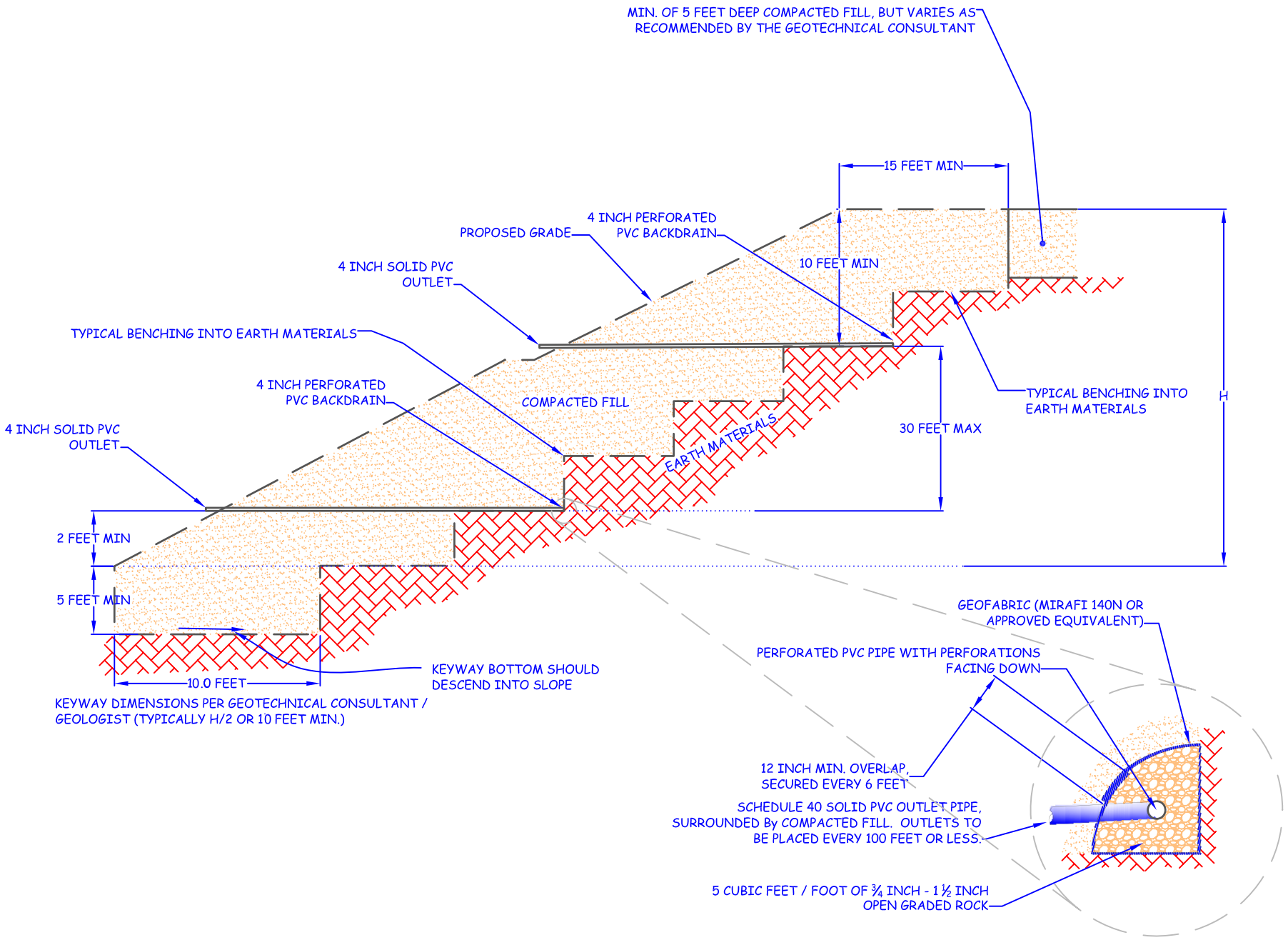
2) Bedding and backfill of utility trenches shall be done in accordance with the applicable provisions in the Standard Specifications of Public Works Construction. Bedding materials shall have a Sand Equivalency more than 30 (SE>30). The bedding shall be placed to 1 foot over the conduit and thoroughly jetting to provide densification. Backfill should be compacted to a minimum of 90 percent of maximum dry density, from 1 foot above the top of the conduit to the surface.

3) Jetting of the bedding materials around the conduits shall be observed by the Geotechnical Consultant.

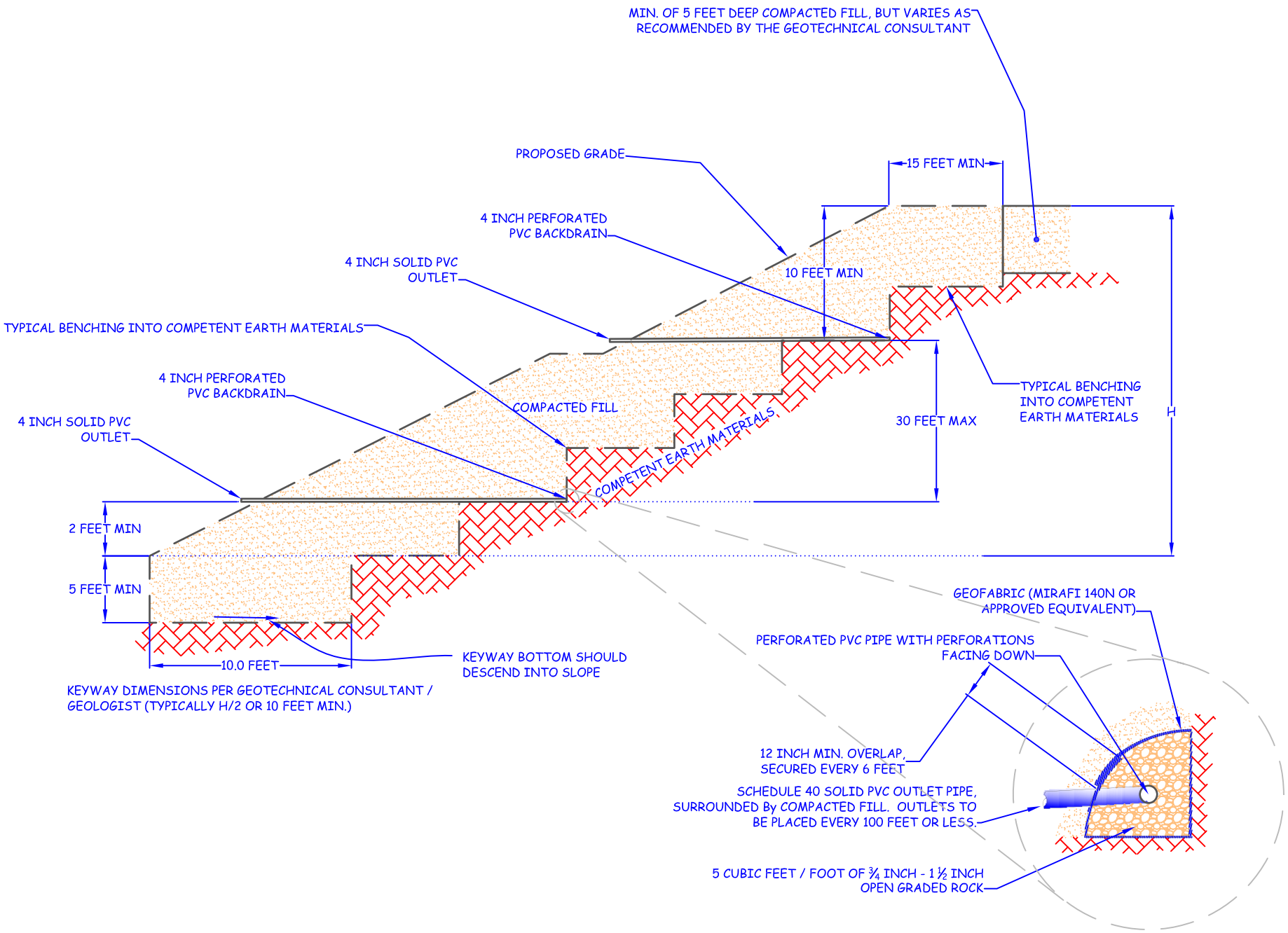
4) The Geotechnical Consultant shall test trench backfill for the minimum compaction requirements recommended herein. At least one test should be conducted for every 300 linear feet of trench and for each 2 vertical feet of backfill.

5) For trench backfill the lift thicknesses shall not exceed those allowed in the Standard Specifications of Public Works Construction, unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment or method.

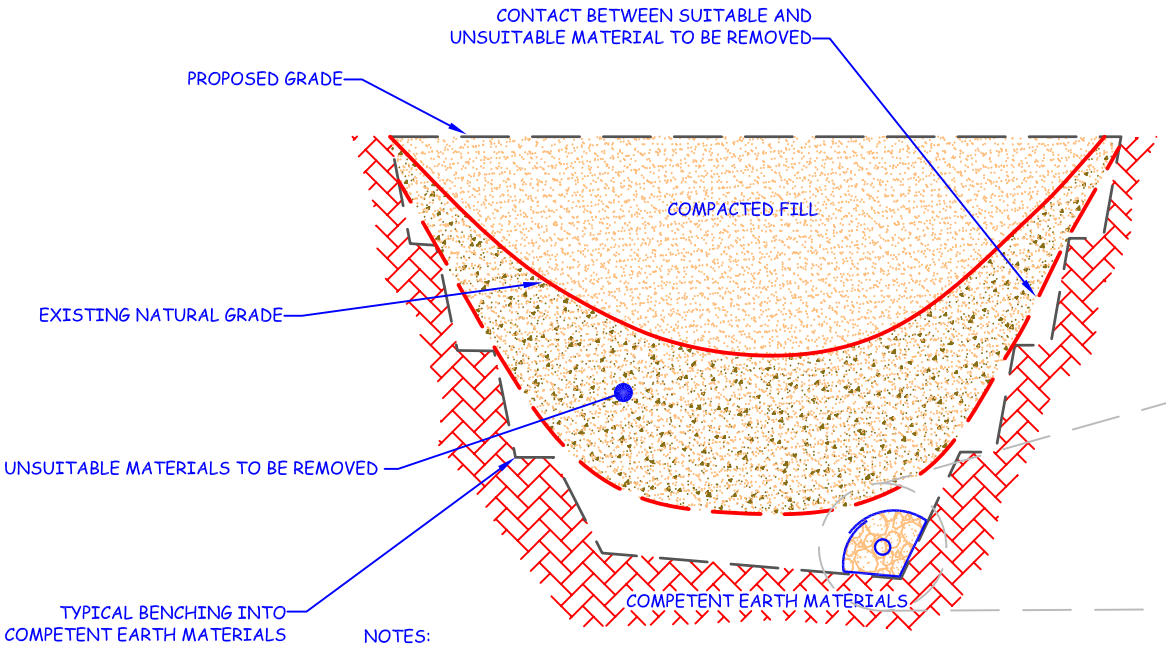
STABILIZATION FILL TYPICAL DETAIL

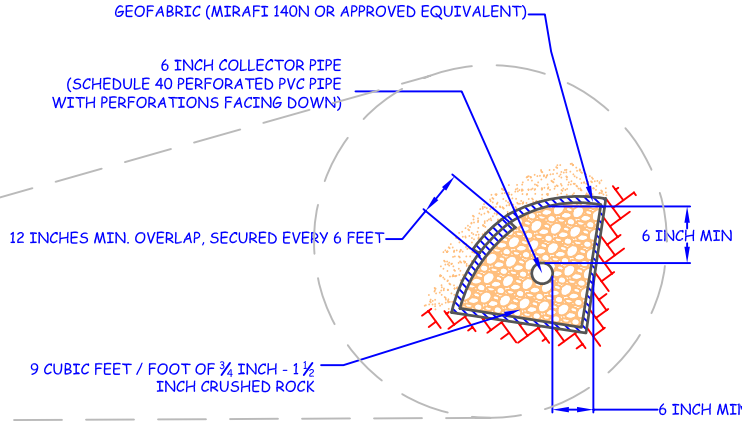


BUTTRESS TYPICAL DETAIL



CANYON SUBDRAIN SYSTEM TYPICAL DETAIL

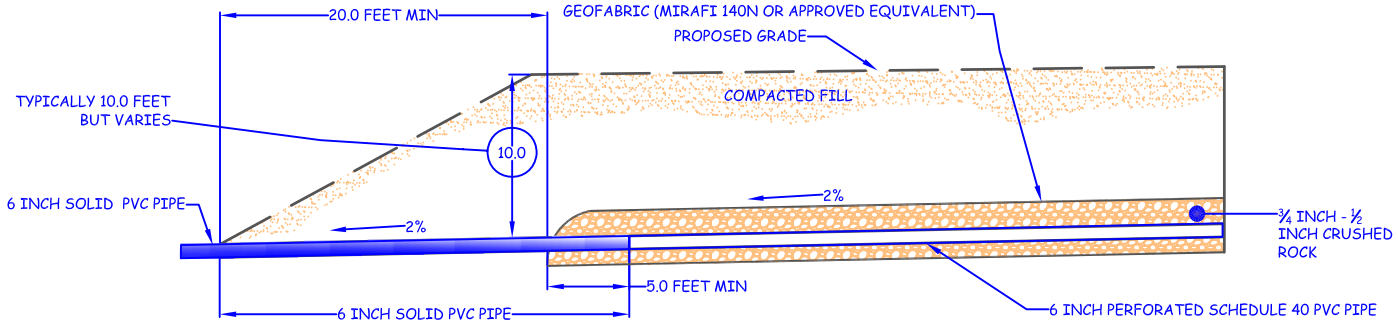




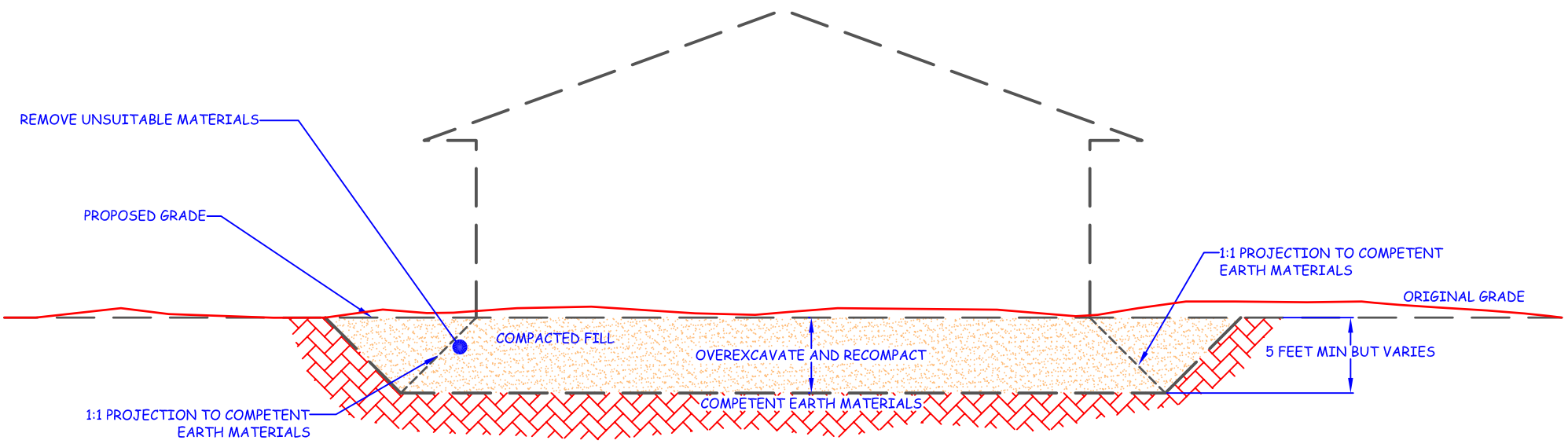
NOTES:
1 - CONTINUOUS RUNS IN EXCESS OF 500 FEET LONG WILL REQUIRE AN 8 INCH DIAMETER PIPE.

2 - FINAL 20 FEET OF PIPE AT OUTLET WILL BE SOLID AND BACKFILLED WITH COMPACTED FINE-GRAINED EARTH MATERIALS.

CANYON SUBDRAIN TYPICAL OUTLET



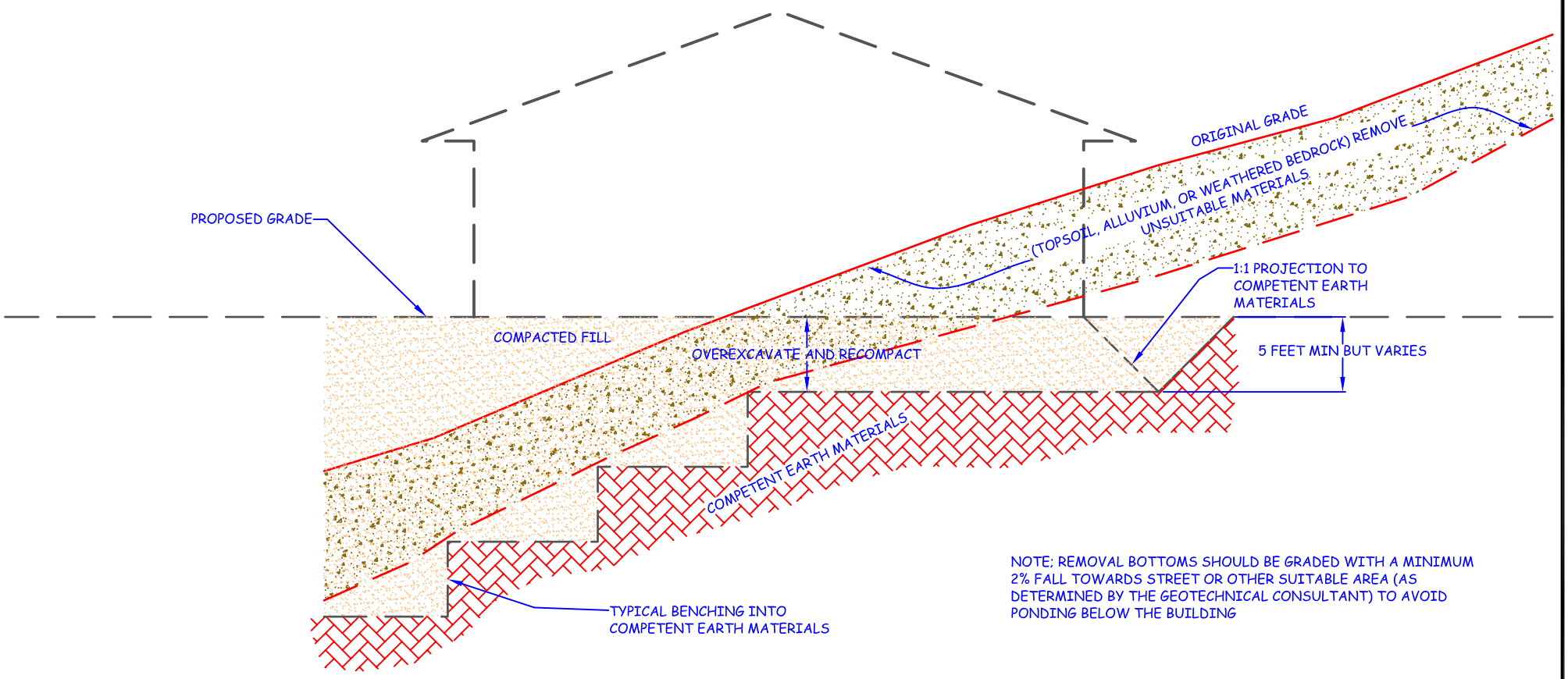
CUT LOT TYPICAL DETAIL



NOTE: REMOVAL BOTTOMS SHOULD BE GRADED WITH A MINIMUM 2% FALL TOWARDS STREET OR OTHER SUITABLE AREA (AS DETERMINED BY THE GEOTECHNICAL CONSULTANT) TO AVOID PONDING BELOW THE BUILDING

NOTE: WHERE DESIGN CUT LOTS ARE EXCAVATED ENTIRELY INTO COMPETENT EARTH MATERIALS, OVEREXCAVATION MAY STILL BY NEEDED FOR HARD-ROCK CONDITIONS OR MATERIALS WITH VARIABLE EXPANSION POTENTIALS

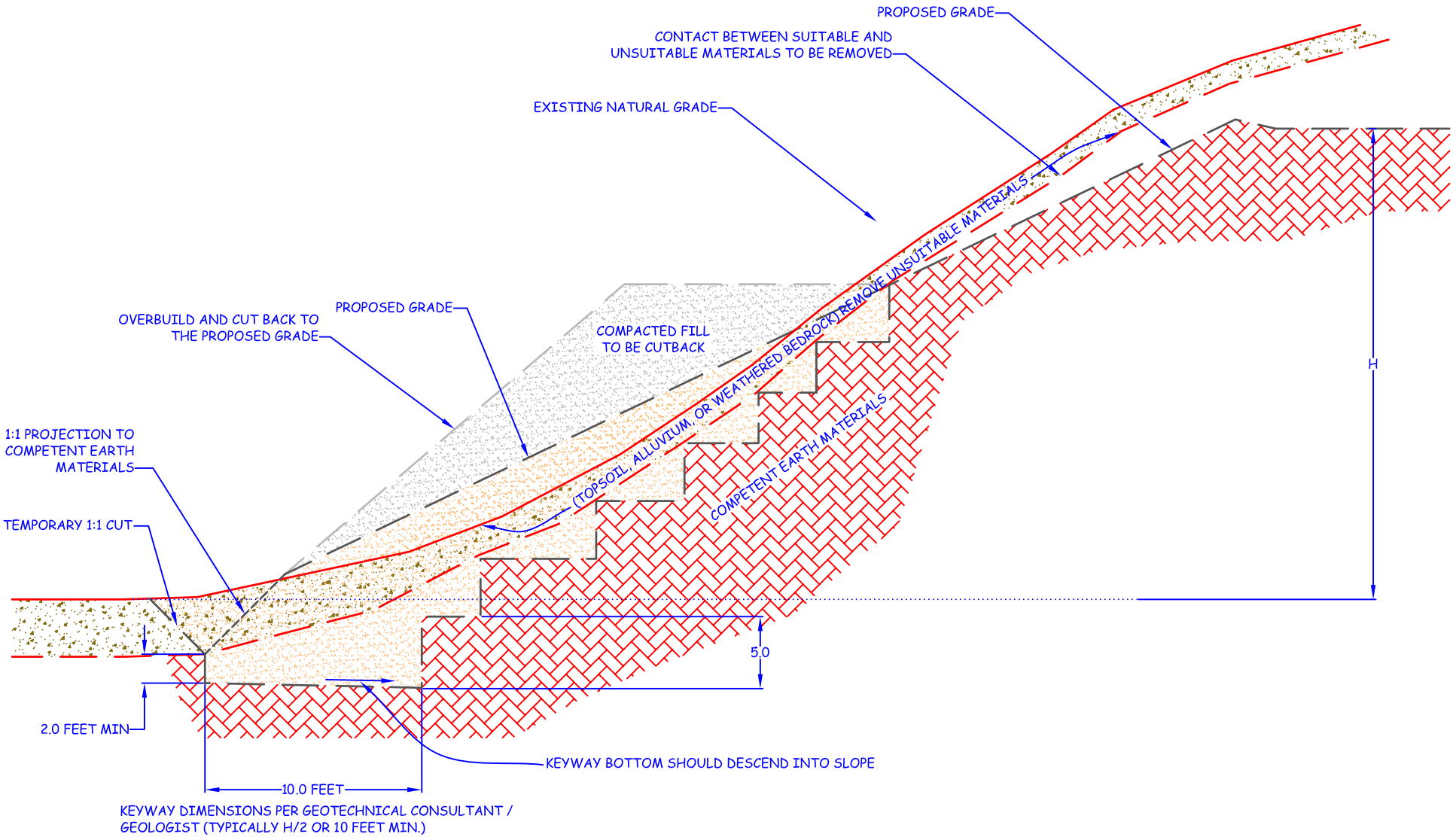
CUT / FILL TRANSITION LOT TYPICAL DETAIL



NOTE; REMOVAL BOTTOMS SHOULD BE GRADED WITH A MINIMUM 2% FALL TOWARDS STREET OR OTHER SUITABLE AREA (AS DETERMINED BY THE GEOTECHNICAL CONSULTANT) TO AVOID PONDING BELOW THE BUILDING

NOTE: WHERE DESIGN CUT LOTS ARE EXCAVATED ENTIRELY INTO COMPETENT EARTH MATERIALS, OVEREXCAVATION MAY STILL BY NEEDED FOR HARD-ROCK CONDITIONS OR MATERIALS WITH VARIABLE EXPANSION POTENTIALS

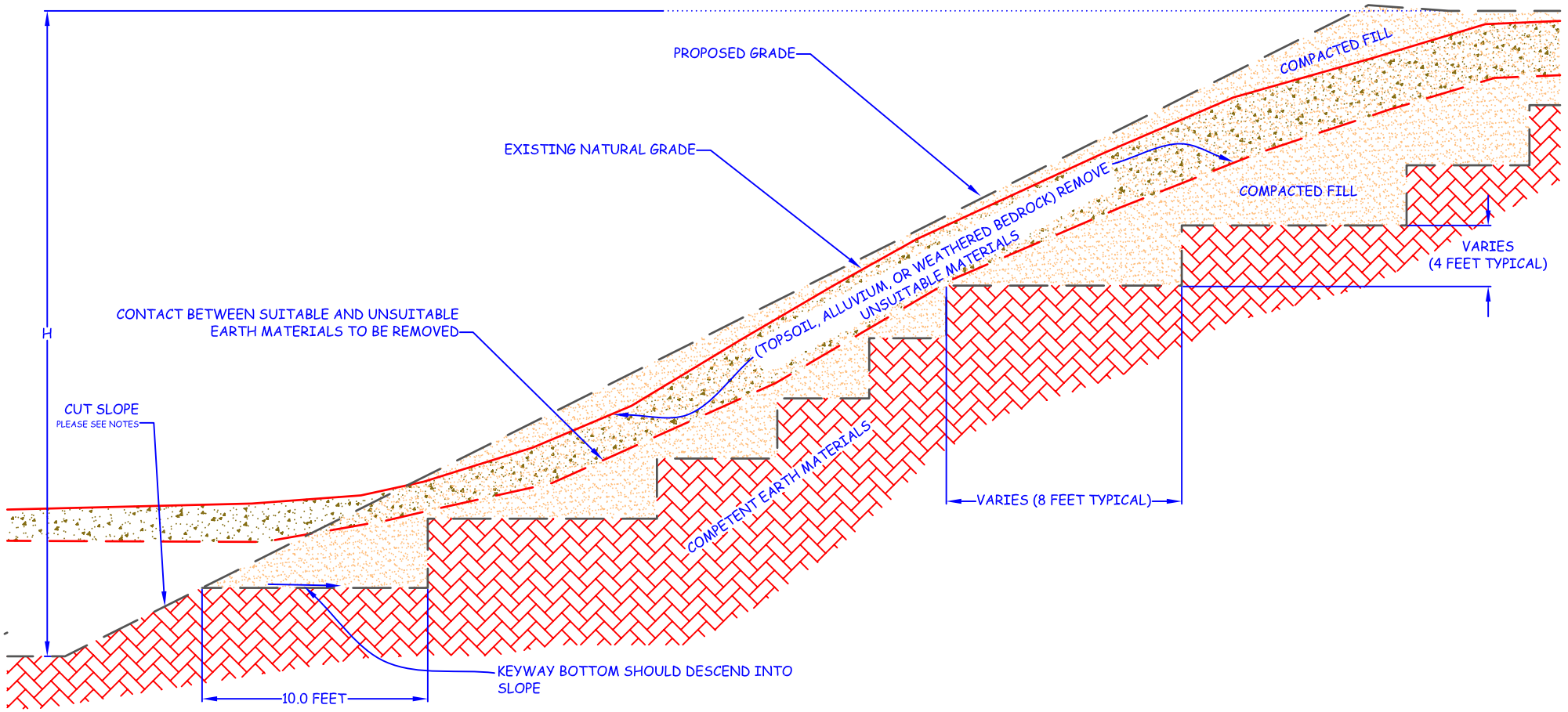
KEYWAY & BENCHING TYPICAL DETAILS
CUT OVER FILL SLOPE



NOTE:

NATURAL SLOPES STEEPER THAN 5:1 (H:V) MUST BE BENCHED INTO COMPETENT EARTH MATERIALS

KEYWAY & BENCHING TYPICAL DETAILS
FILL OVER CUT SLOPE



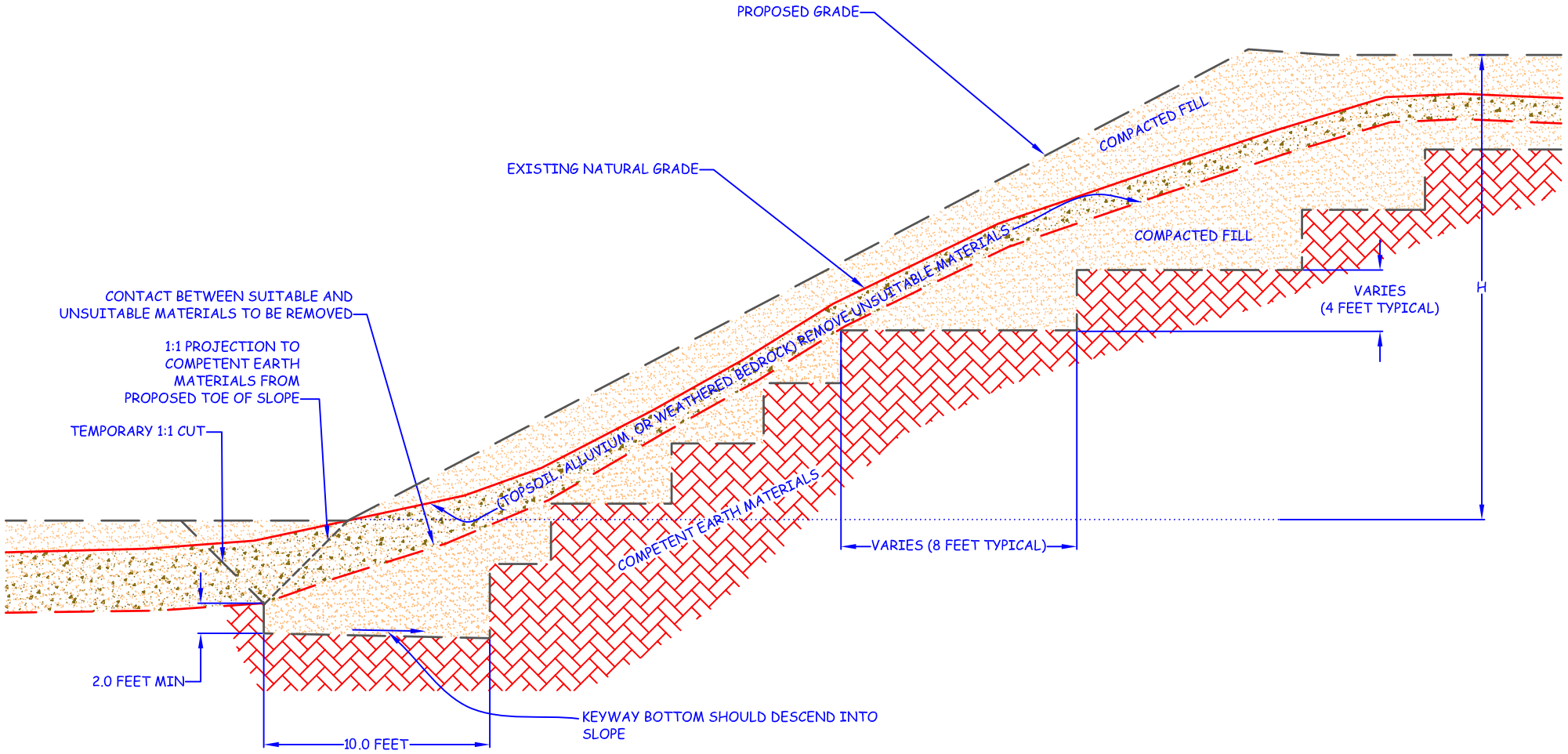
KEYWAY DIMENSIONS PER GEOTECHNICAL CONSULTANT / GEOLOGIST (TYPICALLY H/2 OR 10 FEET MIN.)

NOTES:

NATURAL SLOPES STEEPER THAN 5:1 (H:V) MUST BE BENCHED INTO COMPETENT EARTH MATERIALS

THE CUT SLOPE MUST BE CONSTRUCTED FIRST

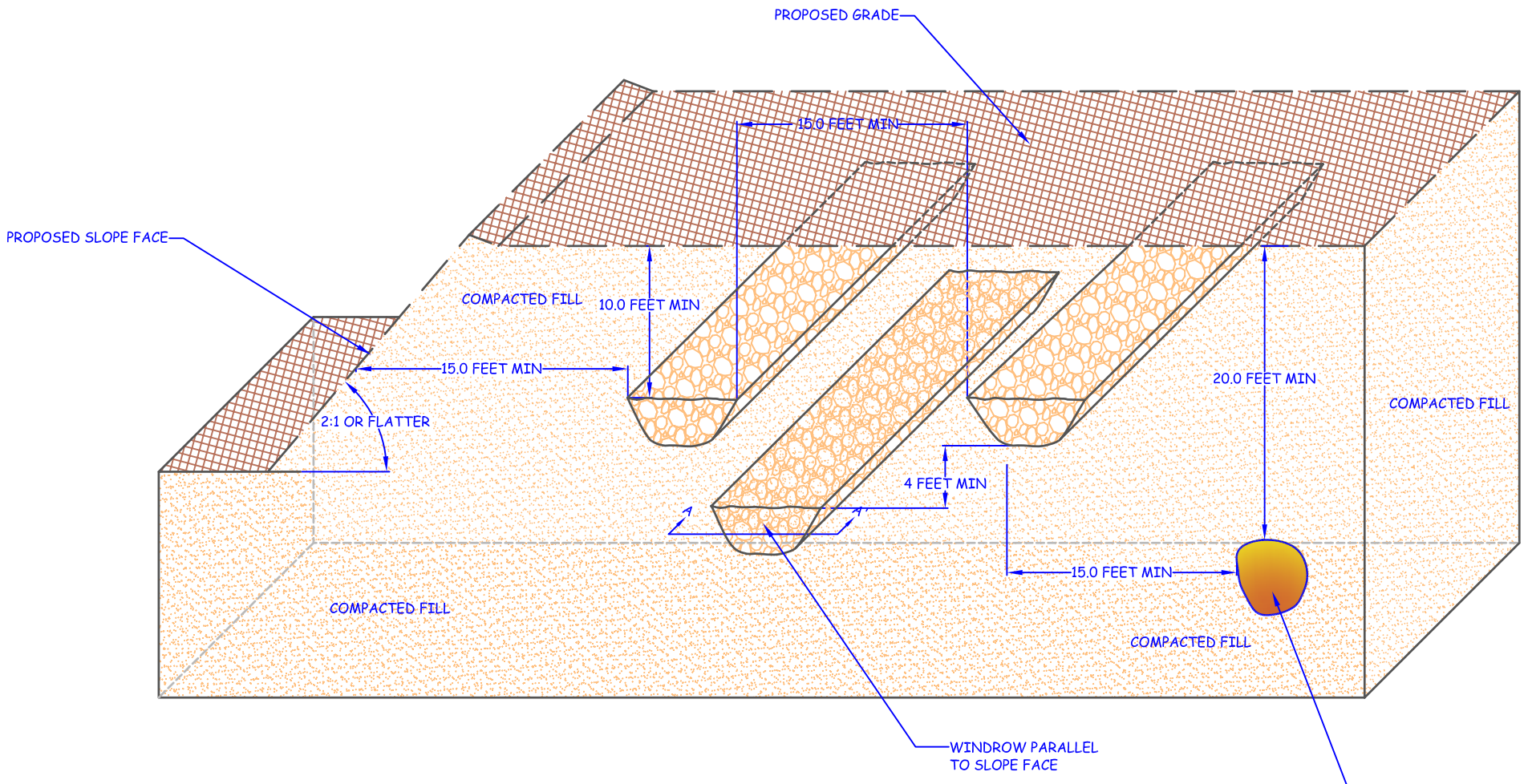
KEYWAY & BENCHING TYPICAL DETAILS
FILL SLOPE



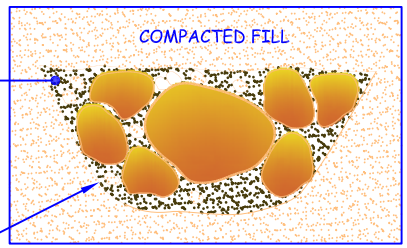
NOTES:

NATURAL SLOPES STEEPER THAN 5:1 (H:V) MUST BE BENCHED INTO COMPETENT EARTH MATERIALS

OVERSIZE ROCK TYPICAL DETAIL

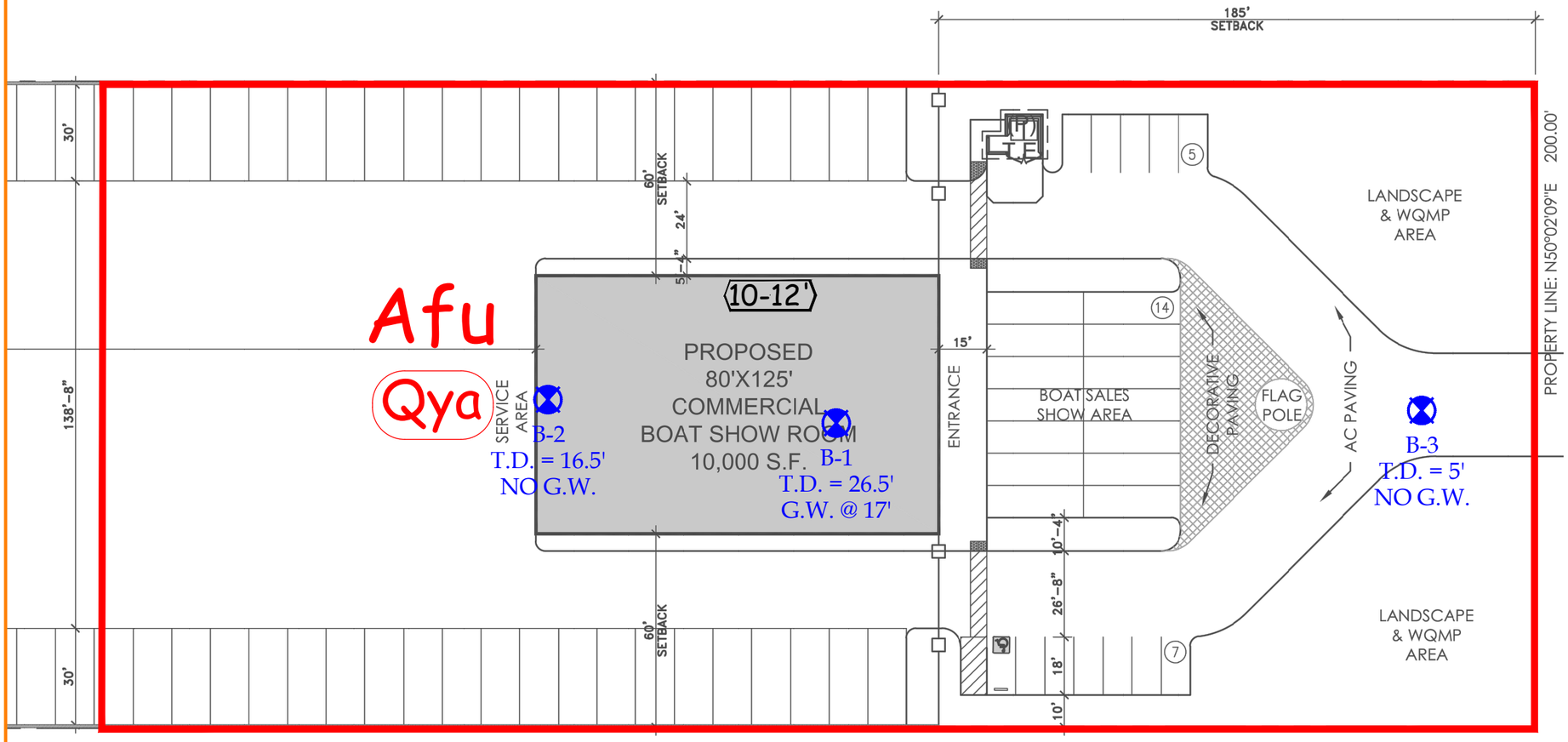


CROSS SECTION A-A'



NOTES:

OVERSIZE ROCK IS LARGER THAN
8 INCHES IN MAX DIAMETER



LEGEND

Locations are Approximate

Geologic Units

Afu	-	Artificial Fill, Undocumented
Qya	-	Quaternary Young Axial-Channel Deposits (Circled Where Buried)

Symbols

	-	Limits of Report
B-3 T.D. = 5' NO G.W.	-	Boring Location Including Total Depth and Depth to Groundwater
10-12'	-	Recommended Removal Depths

NORTH

0 20 40 80

SCALE: 1" = 40'

GEOTECHNICAL MAP

LOCATED AT 24803 HIGHWAY 74

CITY OF PERRIS, RIVERSIDE COUNTY, CALIFORNIA

APN 342-120-052

PROJECT	***PROPOSED COMMERCIAL DEVELOPMENT***		
CLIENT	***MR. ALEX HANN***		
PROJECT NO.	***213936-10A***		
DATE	***NOVEMBER 2021***		
SCALE	***1" = 40'***		
DWG XREFS			
REVISION			
DRAWN BY	***JDG***	***PLATE***	***1 OF 1***

Earth Strata Geotechnical Services, Inc.

Geotechnical, Environmental and Materials Testing Consultants

www.ESGSINC.com (951) 397-8315

Appendix 4: Historical Site Conditions

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

WQMP Project Report

County of Riverside Stormwater Program

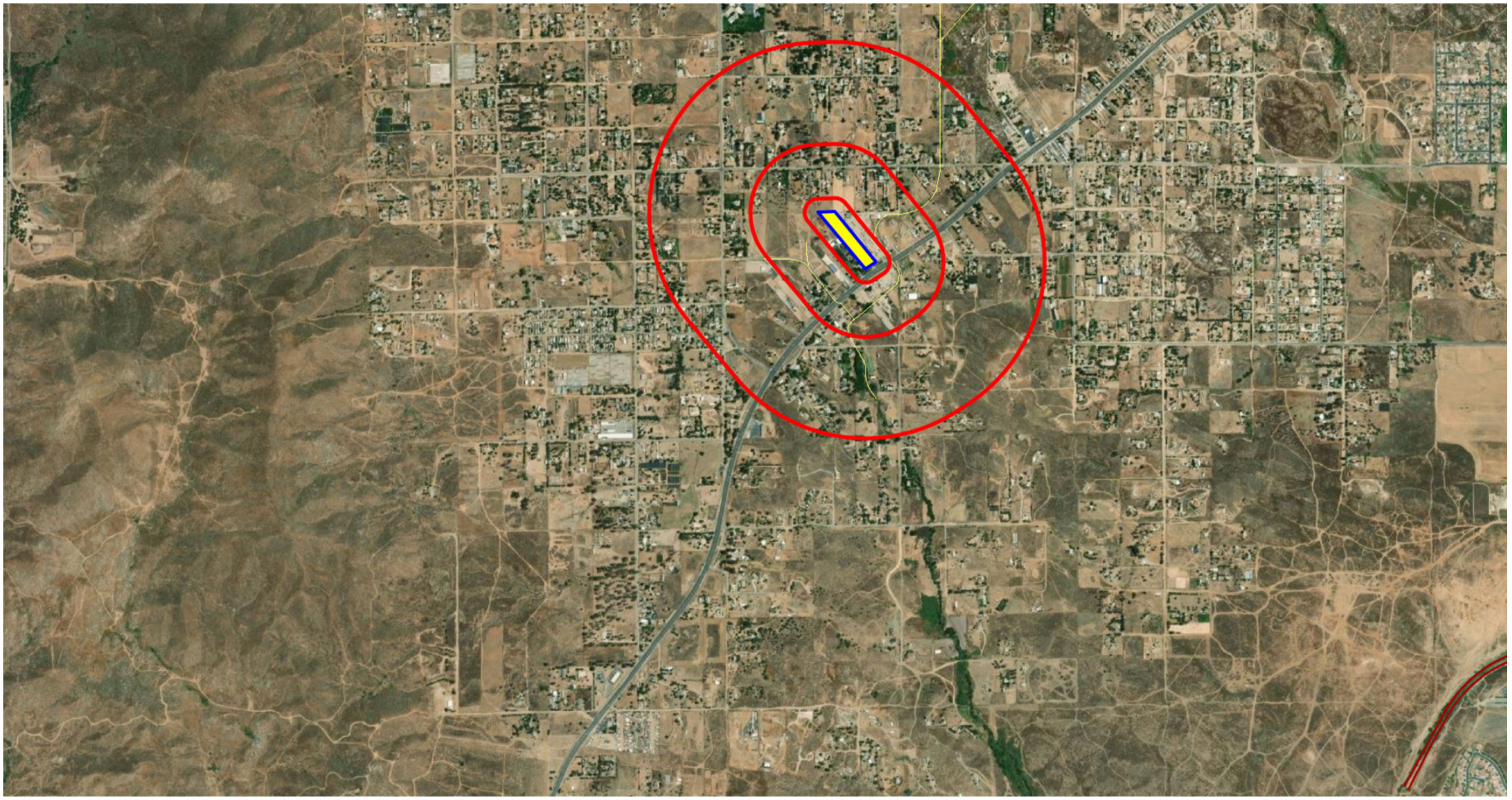
Santa Ana River Watershed Geodatabase

Sunday, December 5, 2021

Note: The information provided in this report and on the Stormwater Geodatabase for the County of Riverside Stormwater Program is intended to provide basic guidance in the preparation of the applicantï¿½s Water Quality Management Plan (WQMP) and should not be relied upon without independent verification.

Project Site Parcel Number(s):	342120028, 342120006, 342120051, 342120052
Latitude/Longitude:	33.7618, -117.2694
Thomas Brothers Page:	
Project Site Acreage:	4.53
Watershed(s):	SANTA ANA
This Project Site Resides in the following Hydrologic Unit(s) (HUC):	**HUC Name** - HUC Number **Railroad Canyon Reservoir-San Jacinto River** - 180702020307
The HUCs Contribute stormwater to the following 303d listed water bodies and TMDLs which may include drainage from your proposed Project Site:	**WBID Name** - WBID Number **Canyon Lake (Railroad Canyon Reservoir)** - CAL8021100019990208151525 **Elsinore, Lake** - CAL8023100019990208151100
These 303d listed Water bodies and TMDLs have the following Pollutants of Concern (POC):	**Bacterial Indicators** - Pathogens **Nutrients** - Nutrients, Organic Enrichment/Low Dissolved Oxygen **Other Organics** - PCBs (Polychlorinated biphenyls) **Toxicity** - Sediment Toxicity, Unknown Toxicity
Is the Site subject to Hydromodification:	Yes
Limitations on Infiltration:	**Project Site Onsite Soils Group(s)** - A, B, C **Known Groundwater Contamination Plumes within 1000'** - No **Adjacent Water Supply Wells(s)** - No information available please contact your local water agency for more information. Your local contact agency is EASTERN MUNICIPAL W.D.. Your local wholesaler contact agency is METROPOLITAN WATER DISTRICT.
Environmentally Sensitive Areas within 200'(Fish and Wildlife Habitat/Species):	None
	None

Environmentally Sensitive Areas within 200'(CVMSHCP):	
Environmentally Sensitive Areas within 200'(WRMSHCP):	Burrowing Owl Survey Required Area
Groundwater elevation from Mean Sea Level:	No Data
85th Percentile Design Storm Depth (in):	0.565
Groundwater Basin:	No Data
MSHCP/CVMSHCP Criteria Cell (s):	No Data
Retention Ordinance Information:	No Data
Studies and Reports Related to Project Site:	Comprehensive Nutrient Reduction Plan IBI Scores - Southern Cal bulletin118_4-sc water_fact_3_7.11 8039-SAR-Hydromodification Good Hope MDP West San Jacinto GW Basin Management Plan



Riverside County
SWCTT

Stormwater Map

Site Address: rivco.permitrack.com

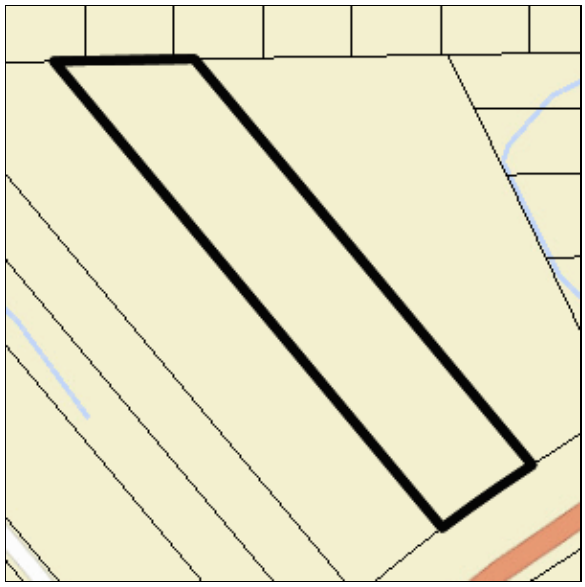
Riverside County Parcel Report

APN(s):342120052

DISCLAIMER

Maps, permit information and data are to be used for reference purposes only. Map features are approximate, and are not necessarily accurate to surveying or engineering standards. The County of Riverside makes no warranty or guarantee as to the content (the source is often third party), accuracy, timeliness, or completeness of any of the data provided, and assumes no legal responsibility for the information contained on this map. Any use of this product with respect to accuracy and precision shall be the sole responsibility of the user.

MAPS/IMAGES



PARCEL

APN	342-120-052-7	Supervisorial District	KEVIN JEFFRIES, DISTRICT 1
Previous APN	342120052 342120013	Township/Range	T5SR4W SEC 2 SW
Owner Name	NOT AVAILABLE ONLINE	Elevation	1546 ft
Address	342120052 24803 HIGHWAY 74 PERRIS CA 92570	Thomas Bros. Map Page/Grid	PAGE: 807, GRID: B6 PAGE: 807, GRID: C6
Mailing Address	342120052 3190 AIRPORT LOOP DR # F COSTA MESA CA 92626	Indian Tribal Land	NOT IN A TRIBAL LAND
Legal Description	342120052 Recorded Book/Page: MB 12/4 Subdivsion Name: GOOD HOPE ACRES ADD 2 Lot/Parcel: 25 Block: B Tract Number:	City Boundary	NOT IN A CITY
		City Spheres of influence	PERRIS
Lot Size	342120052 Recorded lot size is 4.75 acres	March Joint Powers Authority	NOT IN THE JURISDICTION OF THE MARCH JOINT POWERS AUTHORITY

Property Characteristcs	342120052 Year Constructed: Baths: Bedrooms: Construction Type: Garage Type: Property Area (sq ft): Roof Type: Stories: Pool: NO Central Cool: NO Central Heat: NO	County Service Area	NOT IN A COUNTY SERVICE AREA
Annexation Date	N/A	LAFCO Case	N/A
Proposals	N/A		

PLANNING more...

Specific Plans	NOT IN A SPECIFIC PLAN	Historic Preservation Districts	NOT IN A HISTORIC PRESERVATION DISTRICT
Land Use Designations	RC-VLDR	Agricultural Preserve	NOT IN AN AGRICULTRAL PRESERVE
General Plan Policy Overlays	RVLUO		
Area Plan (RCIP)	Mead Valley	Airport Influence Areas	MARCH AIR RESERVE BASE
General Plan Policy Areas	NOT IN A GENERAL PLAN POLICY AREA	Airport Compatibility Zones	MARCH AIR RESERVE BASE, ZONE E
Zoning Classifications (ORD. 348)	R-R	Zoning Districts and Zoning Areas	GOOD HOPE AREA
Zoning Overlays	NOT IN A ZONING OVERLAY	Community Advisory Councils	PERRIS VALLEY MAC
Residential Permit Stats			
N/A			

ENVIRONMENTAL more...

CVMSHCP (Coachella Valley Multi-Species Habitat Conservation Plan) Plan Area	NOT IN A COACHELLA VALLEY MSHCP FEE AREA	WRMSHCP (Western Riverside County Multi-Species Habitat Conservation Plan) Cell Group	NOT IN A CELL GROUP
CVMSHCP (Coachella Valley Multi-Species Habitat Conservation Plan) Conservation Area	NOT COACHELLA VALLEY CONSERVATION AREA	WRMSHCP Cell Number	NOT IN A CELL NUMBER
CVMSHCP Fluvial Sand Transport Special Provision Areas	NOT IN A FLUVIAL SAND TRANSPORT SPECIAL PROVISION AREA	HANS/ERP (Habitat Acquisition and Negotiation Strategy/Expedited Review Process)	NOT IN A HANS/ERP PROJECT
WRMSHCP (Western Riverside County Multi-Species Habitat Conservation Plan) Plan Area	WESTERN RIVERSIDE COUNTY	Vegetation (2005)	AGRICULTURE MAPPING UNIT URBAN OR DEVELOPMENT MAPPING UNIT

Fire

Fire Hazard Classification (Ord. 787)	HIGH	Fire Responsibility Area	SRA

DEVELOPMENT FEES

CVMSHCP (Coachella Valley Multi-Species Habitat Conservation Plan) Fee Area (Ord 875)	NOT IN A COACHELLA VALLEY MSHCP FEE AREA	RBBD (Road & Bridge Benefit District)	NOT IN A ROAD BRIDGE BENEFIT DISTRICT
WRMSHCP (Western Riverside County Multi-Species Habitat Conservation Plan) Fee Area (Ord. 810)	WESTERN RIVERSIDE COUNTY	DIF (Development Impact Fee Area Ord. 659)	MEAD VALLEY, AREA 13
Western TUMF (Transportation Uniform Mitigation Fee	IN OR PARTIALLY WITHIN A	SKR Fee Area (Stephenâ€™s	IN OR PARTIALLY WITHIN

Ord. 824)	TUMF FEE AREA	Kagaroo Rat Ord. 663.10)	THE SKR FEE AREA
Eastern TUMF (Transportation Uniform Mitigation Fee Ord. 673)	NOT IN THE EASTERN TUMF FEE AREA	DA (Development Agreements)	NOT IN A DEVELOPMENT AGREEMENT

TRANSPORTATION more...

Circulation Element Ultimate Right-of-Way	NOT IN A CIRCULATION ELEMENT RIGHT-OF-WAY	Road Book Page	63
		Transportation Agreements	NOT IN A TRANS AGREEMENT
		CETAP (Community and Environmental Transportation Acceptability Process) Corridors	NOT IN A CETAP CORRIDOR

HYDROLOGY

Flood Plan Review	*MAYBE REQUIRED, CONTACT RIVERSIDE COUNTY FLOOD CONTROL TO VERIFY	Watershed	SAN JACINTO VALLEY
Water District	EASTERN MUNICIPAL WATER DISTRICT		
Flood Control District	RIVERSIDE COUNTY FLOOD CONTROL DISTRICT		

GEOLOGIC

Fault Zone	NOT IN A FAULT ZONE	Paleontological Sensitivity	UNDETERMINED POTENTIAL (U): AREAS UNDERLAIN BY SEDIMENTARY ROCKS FOR WHICH LITERATURE AND UNPUBLISHED STUDIES ARE NOT AVAILABLE HAVE UNDETERMINED POTENTIAL FOR CONTAINING SIGNIFICANT PALEONTOLOGICAL RESOURCES. THESE AREAS MUST BE INSPECTED BY A FIELD SURVEY CONDUCTED BY A QUALIFIED VERTEBRATE PALEONTOLOGIST.
Faults	NOT IN A FAULT LINE		
Liquefaction Potential	MODERATE		
Subsidence	SUSCEPTIBLE		

MISCELLANEOUS

School District	PERRIS ELEMENTARY & PERRIS UNION HIGH
Communities	GOOD HOPE
Lighting (Ord. 655)	ZONE: B
2010 Census Tract	429.02
Farmland	OTHER LANDS URBAN-BUILT UP LAND
Special Notes	NO SPECIAL NOTES
Tax Rate Areas	087049 - CO FREE LIBRARY 087049 - CO STRUCTURE FIRE PROTECTION 087049 - CO WASTE RESOURCE MGMT DIST 087049 - CSA 152 087049 - EMWD 087049 - EMWD IMP DIST 8 087049 - FLOOD CONTROL ADMIN 087049 - FLOOD CONTROL ZN 4 087049 - GENERAL 087049 - GENERAL PURPOSE 087049 - MT SAN JACINTO JR COLLEGE 087049 - MWD EAST 1301999 087049 - PERRIS AREA ELEM SCHOOL FUND 087049 - PERRIS JR HIGH AREA FUND 087049 - PERRIS SCHOOL 087049 - PERRIS UNION HS 087049 - PERRIS VALLEY CEMETERY 087049 - RDV I-215 CORRIDOR AMD#2 AB1290 087049 - RIV CO REGIONAL PARK & OPEN SP 087049 - RIVERSIDE CO OFC OF EDUCATION 087049 - SAN JACINTO BASIN RESOURCE CONS

Department of Enviromental Health Permits

Septic Permits

Record Id	Application Date	Plan Check Approved Date	Final Inspection Date	Approved Date
N/A	N/A	N/A	N/A	N/A

Well Water Permits

Record Id	PE	Permit Paid Date	Permit Approved Date	Well Finaled Date
N/A	N/A	N/A	N/A	N/A

PLUS PERMITS & CASES

Administrative Cases

Case	Case Description	Status
N/A	N/A	N/A

Building and Safety Cases

Case	Case Description	Status
BDE140066	DEMO SFR	EXPIRED
BEL040856	CABLE PEDESTAL IN RROW (ADELPHIA)	FINAL
BPL040649	RELOCATE LEACH LINES DUE TO HWY 74 REALIGN	VOID
BRI2000879	REQUEST FOR RECORDS	APPLIED
BXX1800329	CHAIN LINK FENCE 8' TALL ALONG FRONT P/L OF BOTH PROPERTIES AND 120' ALONG EASTERLY P/L	EXPIRED
BZ173762	S.E. CHANGE - DWELLING	FINAL
BZ231918	ADD TO DWLG	FINAL
BZ243120	FIREPLACE TO DWELLING	FINAL
BZ247224	DEMOLISH CHICKEN HOUSE	FINAL
BZ288928	BARN REGISTRATION	CANCELED
BZ299360	DEMOLITION	FINAL
BZ334251	GAS LINE CONVERSION	FINAL

Code Cases

Case	Case Description	Status
N/A	N/A	N/A

Fire Cases

Case	Case Description	Status
N/A	N/A	N/A

Planning Cases

Case	Case Description	Status
CFG04593	CALIFORNIA FISH AND GAME FOR EA41201	PAID
CFG06299	CFG FOR EA42930	APPLIED

CUP03541	CONSTRUCT TRAILER AND BOAT STORAGE FACILITY	APPROVED
EA41201	CUP03541 CFG04593	APPROVED
EA42930	EA FOR GPA01205	APPLIED
GEO01917	GEOLOGIC REVIEW FOR CUP03541	APPROVED
GPA01205	COUNTY INITIATED FOUNDATION COMPONENT GPA-HWY 74 GOODHOPE	ASSIGNED
PAR00842	RV & BOAT STORAGE FACILITY	APPROVED
PAR210030	REQUEST FOR PRE APPLICATION REVIEW PROPOSED 10,000 SF COMMERICAL BOAT SHOW ROOM WITH OPEN STORAGE YARD PROPOSED BOAT STORAGE FACILITY	ASSIGNED
PDA04497	PHASE I	APPLIED
PDB04758	HABITAT ASSSESSMENT FOR BURROWING OWL DATE OF SURVEY: SEPTEMBER 14, 2006 DATE OF REPORT: SEPTEMBER 15, 2006 CONSULTANT: JEFF W. KIIDD BIOLOGICAL CONSULTING	APPROVED

Survey Cases

Case		Case Description	Status
N/A	N/A		N/A

Transportation Cases

Case		Case Description	Status
N/A	N/A		N/A

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

<u>Please Note:</u> This appendix is empty because LID is feasible on the project site.

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

APPROX SITE LOCATION 0.56

Santa Ana River Watershed
Santa Margarita Watershed

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

N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Ventura Engineering, Inland	Date	11/9/2023
Designed by	Robert	Case No	CUP220001
Company Project Number/Name	24803 Highway 74 Boat Showroom and Storage		

BMP Identification

BMP NAME / ID: DMA1 - BMP1

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}= 0.56 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)
R	5006	Roofs	1	0.89	4465.4			
IMP	35299	Concrete or Asphalt	1	0.89	31486.7			
DG	17779	Gravel or Class 2 Permeable Base	0.4	0.28	4973			
LS	5303	Ornamental Landscaping	0.1	0.11	585.8			
BMP1	1659	Ornamental Landscaping	0.1	0.11	183.2			
NT	3321	Natural (C Soil)	0.3	0.23	747.8			
	68367	Total			42441.9	0.56	1980.6	2223

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Ventura Engineering, Inland	Date	11/9/2023
Designed by	Robert	Case No	CUP220001
Company Project Number/Name	24803 Highway 74 Boat Showroom and Storage		

BMP Identification

BMP NAME / ID: DMA2 - BMP2

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}= 0.56 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)*
R	*4994*	*Roofs*	*1*	*0.89*	*4454.6*			
IMP	*38233*	*Concrete or Asphalt*	*1*	*0.89*	*34103.8*			
DG	*18439*	*Gravel or Class 2 Permeable Base*	*0.4*	*0.28*	*5157.6*			
LS	*6289*	*Ornamental Landscaping*	*0.1*	*0.11*	*694.7*			
BMP2	*1831*	*Ornamental Landscaping*	*0.1*	*0.11*	*202.2*			
NT	*1516*	*Natural (C Soil)*	*0.3*	*0.23*	*341.4*			
	71302	*Total*			*44954.3*	*0.56*	*2097.9*	*2453*

Notes:

Bioretention Facility - Design Procedure	BMP ID: BMP1	Legend:	Required Entries / Calculated Cells

Company Name: Ventura Engineering Inland, Inc. Date: 11/9/2023

Designed by: Robert County/City Case No.: CUP20001

Design Volume

Enter the area tributary to this feature A_T = 1.57 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 1,981 ft^3

Type of Bioretention Facility Design

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

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

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 1.5 ft

Top Width of Bioretention Facility, excluding curb w_T = 60.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.34 ft

Minimum Surface Area, A_m

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

A_M = 1,481 ft^2

Proposed Surface Area A= 1,659 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: BMP2	Legend:	Required Entries / Calculated Cells

Company Name: Ventura Engineering Inland, Inc. Date: 11/9/2023

Designed by: Robert County/City Case No.: CUP220001

Design Volume

Enter the area tributary to this feature A_T = 1.637 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 2,098 ft^3

Type of Bioretention Facility Design

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

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

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 1.5 ft

Top Width of Bioretention Facility, excluding curb w_T = 50.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.34 ft

Minimum Surface Area, A_m

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

A_M = 1,571 ft^2

Proposed Surface Area A= 1,831 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

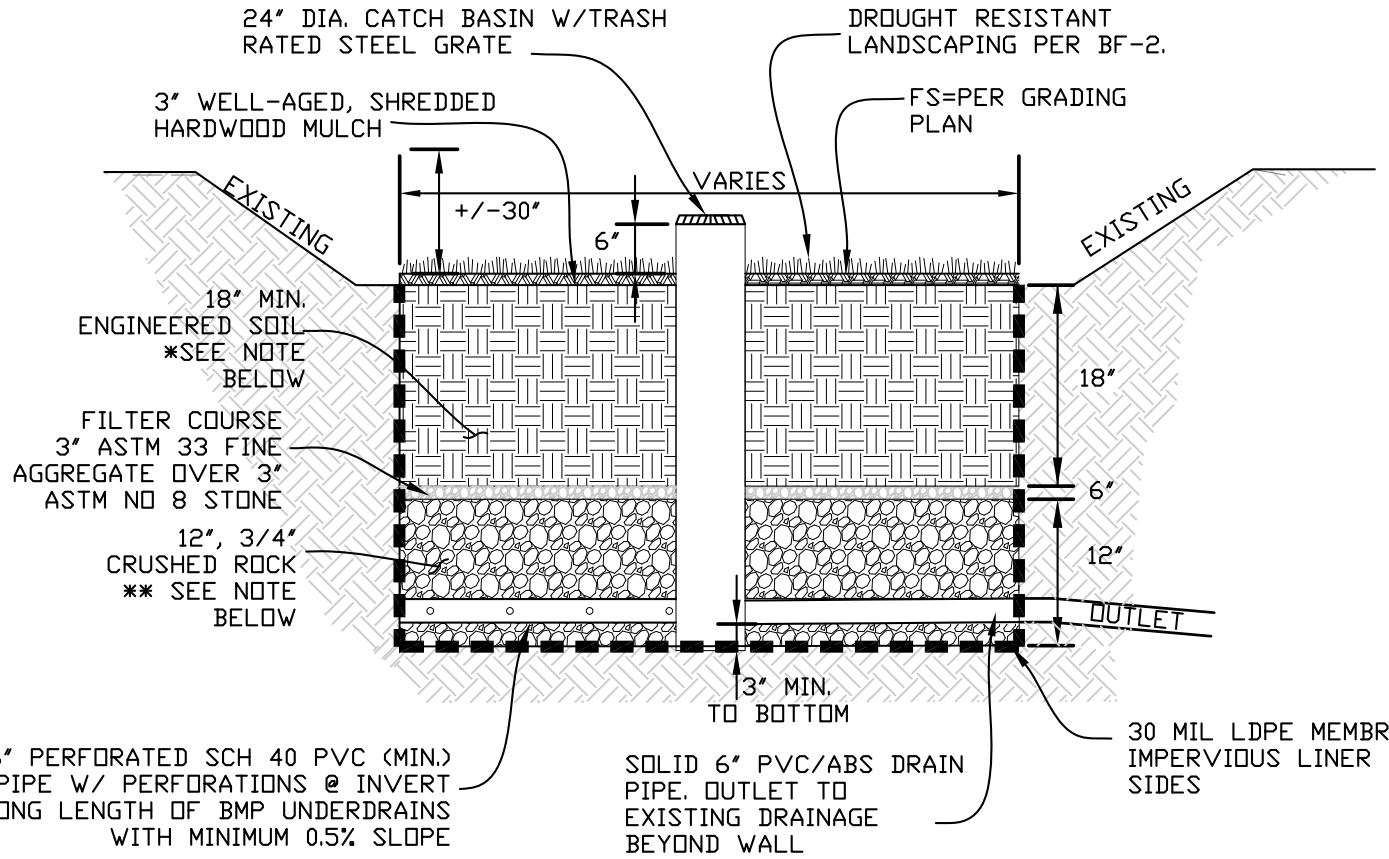
Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

APPENDIX C – BMP DETAILS – SHEET 1 OF 4



*BIOFILTRATION "ENGINEERED SOIL" LAYER SHALL BE MINIMUM 18" DEEP "SANDY LOAM" SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50-60% SAND, 20-30% COMPOST OR HARDWOOD MULCH, AND 20-30% TOPSOIL, FREE OF STONES, STUMPS, ROOTS, OR SIMILAR OBJECTS, AND ALSO FREE OF NOXIOUS WEEDS. MIN. PERK RATE = 5 IN./HR.

**12" CRUSHED ROCK LAYER, CL. II PERMEABLE ROCK WITH MINIMUM 40% POROSITY.

NUTRIENT SENSITIVE MEDIA NOTE: ALL MEDIA SHALL COMPLY WITH THE NUTRIENT SENSITIVE MEDIA PER BF-2.

CLEAN WASHED NOTE: ALL ROCK AND SAND USED IN THE BMPS MUST BE CLEAN WASHED.

BIORETENTION BASIN DETAILING

NOT TO SCALE

APPENDIX C – BMP DETAILS – SHEET 2 OF 4

BIOFILTRATION SOIL MEDIA CRITERIA:

1. THE ENGINEER SHALL FURNISH TO THE COUNTY A COPY OF THE SOURCE TESTING AND A SIGNED CERTIFICATION THAT THE FULLY BLENDED BIORETENTION/BIOFILTRATION SOIL MEDIA (BSM) MATERIAL MEETS ALL OF THE WQMP REQUIREMENTS BEFORE MATERIAL IS IMPORTED OR IF THE MATERIAL IS MIXED ONSITE PRIOR TO INSTALLATION.

2. AS BSM MATERIAL IS BEING INSTALLED, QUALITY ASSURANCE (QA) TESTING SHALL BE CONDUCTED EVERY 1,200 TONS OR 800 CUBIC YARDS FROM A COMPLETELY MIXED STOCKPILE OR WINDROW.

3. THE ENGINEER OF RECORD OR GEOTECHNICAL ENGINEER CONDUCTING THE QUALITY CONTROL TESTING SHALL FURNISH TO THE COUNTY COPY OF THE QA TESTING AND A CERTIFICATION THAT THE BSM FOR THE PROJECT MEETS ALL OF THE FOLLOWING REQUIREMENTS.

A. BSM SHALL CONSIST OF 60–80% CLEAN SAND, UP TO 20% CLEAN TOPSOIL, AND 20% OF A NUTRIENT–STABILIZED ORGANIC AMENDMENT. ORGANIC AMENDMENT MAY CONSIST OF EITHER LOW–NUTRIENT, STABLE, AND MATURE COMPOST; WASHED AND AGED COCONUT COIR PITH; AND/OR SPHAGNUM PEAT. BSM SHALL BE PLACED ON TOP OF 3–INCHES OF CHOKER SAND PLACED ON TOP OF 3–INCHES OF ASTM NO. 8 STONE (1/4 TO 1/2–INCH PEA GRAVEL), AND PLACED ON TOP OF 12 TO 24–INCHES OF A CLEAN, OPEN–GRADED DRAIN ROCK LAYER.

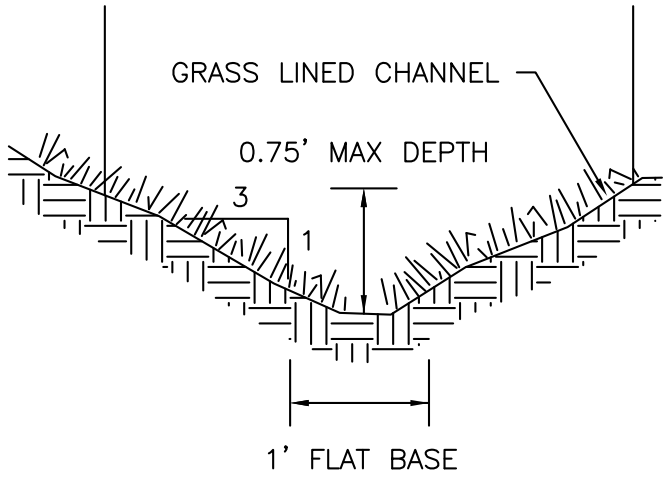
B. BSM SHALL BE TESTED TO ENSURE THAT IT MEETS WQMP REQUIREMENTS FOR HYDRAULIC CONDUCTIVITY. SUCH TESTING SHALL COMPLY WITH ASTM METHOD D2434, USDA HANDBOOK 30 METHOD 34B, OR A SIMILAR LABORATORY METHOD. THE INITIAL INFILTRATION RATE SHALL BE BETWEEN 8 AND 20 INCHES PER HOUR. HYDRAULIC CONDUCTIVITY MAY EXCEED 20 INCHES PER HOUR, IF THE SUBDRAIN IS DESIGNATED AS AN "OUTLET CONTROL SUBDRAIN" ON THE PLANS, WHERE THE SUBDRAIN IS SIZED TO CONVEY NO MORE THAN AN EQUIVALENT OF 5 INCHES PER HOUR. BSM SHALL NOT BE COMPACTED.

C. PH: 6.0 –8.5; SALINITY: 0.5 TO 3.0 MMHO/CM AS ELECTRICAL CONDUCTIVITY; SODIUM ABSORPTION RATIO: < 6.0; CHLORIDE: < 800 PPM IN SATURATED EXTRACT; CATION EXCHANGE CAPACITY (CEC): > 10 MEQ/100 G; ORGANIC MATTER: 2 TO 5–PERCENT ON A DRY WEIGHT BASIS; CARBON: NITROGEN RATIO: 12 TO 40, PREFERABLY 15 TO 40; GRAVEL LARGER THAN 2MM: 0 TO 25–PERCENT OF THE TOTAL SAMPLE; CLAY SMALLER THAN 0.005MM: 0 TO 5 PERCENT OF THE NON–GRAVEL FRACTION.

D. BSM SHALL BE TESTED TO LIMIT THE LEACHING OF POTENTIAL INHERENT POLLUTANTS. BSM USED IN BIOFILTRATION BMPS SHALL CONFORM TO THE FOLLOWING LIMITS FOR POLLUTANT CONCENTRATIONS IN SATURATED EXTRACT: PHOSPHORUS: < 1 MG/L; NITRATE < 3 MG/L, COPPER < 0.025 MG/L. TESTING MAY BE PERFORMED AFTER LABORATORY RINSING OF MEDIA WITH UP TO 15 PORE VOLUMES OF WATER.

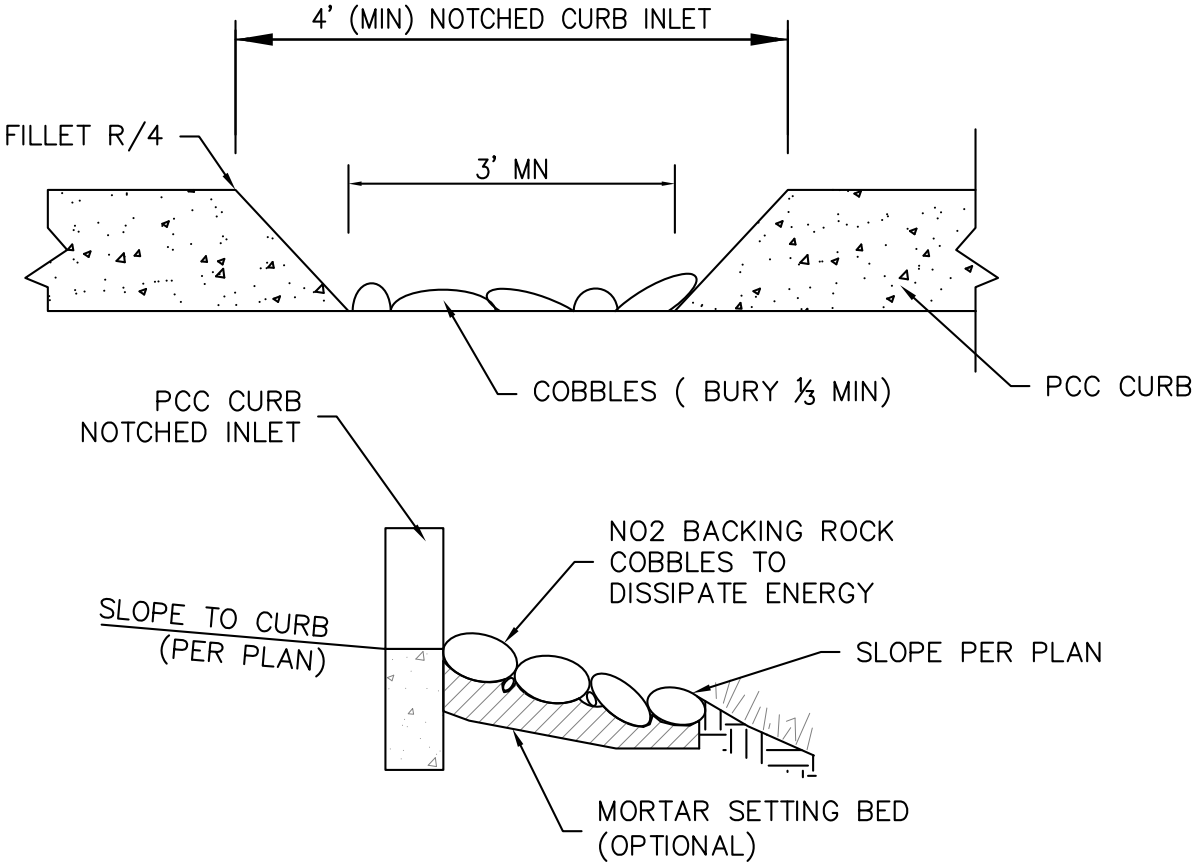
E. LOW NUTRIENT COMPOST USED IN BSM SHALL BE SOURCED FROM A FACILITY PERMITTED THROUGH CALRECYCLE, PREFERABLY THROUGH USCC STA PROGRAM. COMPOST SHALL CONFORM TO THE FOLLOWING REQUIREMENTS: PHYSICAL CONTAMINANTS <1% BY DRY WEIGHT; CARBON: NITROGEN RATIO: 12:1 TO 40:1; MATURITY/STABILITY SHALL CONFORM TO EITHER: SOLVITA MATURITY INDEX: ≥5.5, CO_2 EVOLUTION: < 2.5 MG CO_2–C PER G COMPOST ORGANIC MATTER PER DAY, OR < 5 MG CO_2–C PER G COMPOST C PER DAY; SELECT PATHOGENS AND TRACE METALS SHALL PASS US EPA CLASS A STANDARD. TESTING SHALL BE NO MORE THAN 6 MONTHS OLD AND REPRESENTATIVE OF CURRENT STOCKPILES.

F. COCONUT COIR PITH USED IN BSM SHALL BE THOROUGHLY RINSED WITH FRESHWATER AND SCREENED TO REMOVE COARSE FIBERS AS PART OF PRODUCTION AND AGED > 6 MONTHS. PEAT USED IN BSM SHALL BE SPHAGNUM PEAT.



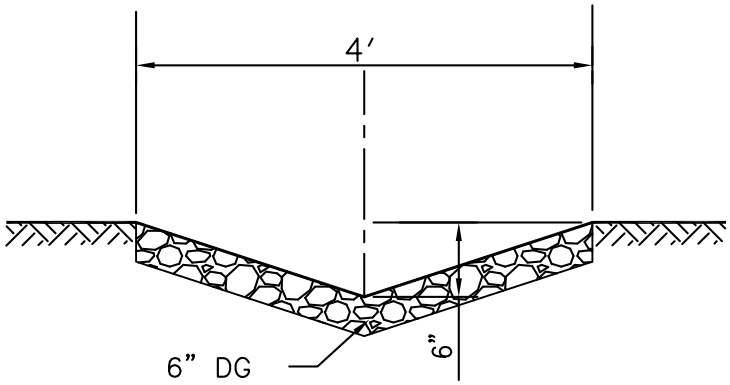
PROPOSED CONDITIONS VEGETATED SWALE DETAIL:

NOT TO SCALE



PROPOSED CUT CURB DETAIL:

NOT TO SCALE



PROPOSED 4" DG SWALE DETAIL

NOT TO SCALE

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

This attachment contains a copy of the project site's fully hydrology report that provides the discussed 2-Year and 10-Year hydrology calculations.

Ventura Engineering Inland

PRELIMINARY HYDROLOGY REPORT

PROPOSED BOAT SHOWROOM & STORAGE

CUP220001
24803 HIGHWAY 74
PERRIS, CALIFORNIA 92530
APN: 342-120-052-7

PREPARED FOR:
INLAND BOAT SERVICES
ATTN: MARK DAKAN
681 E. SAN JACINTO AVENUE
PERRIS, CALIFORNIA 92571
(951) 928-4180

PREPARED BY:
VENTURA ENGINEERING INLAND
27393 YNEZ ROAD, SUITE 159
TEMECULA, CALIFORNIA 92591
(951) 252-7632

ORIGINAL DATE: *November 16, 2023*

I hereby declare that I am the engineer of work for this project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions code, and that the design is consistent with current standards.

WILFREDO VENTURA
R.C.E. NO. 66532
EXPIRES 6/30/24

11/16/23
DATE

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this report is to calculate the pre-development and post development hydrology conditions for the proposed new retail boat showroom and storage facility being proposed for the vacant lot at 24803 Highway 74 in Perris, California. This report has been created using the Riverside County Flood Control and Water Conservation District Hydrology Manual (April 1978). These calculations present the preliminary 2 and 10-year rational methodologies and will also compare the 10-Year Design Storm Event unit hydrograph volumes to determine how the proposed project will affect the differential in the pre- and post-conditions and how it will be mitigated for flow control purposes to eliminate downstream risks to adjacent properties.

The project site is currently vacant residential that is being rezoned by the CUP to commercial/retail. The project site proposes to maintain existing grading as much as feasible in the flood plain and then to minimally grade over the rest of the site. In addition, the project site will be using self-treating and self-retaining areas for water quality design where feasible and then two small biofiltration basins that will all aid in flood control management as well.

2.0 LOCATION

The project site is located at 24803 Highway 74 in Perris, California, 92530. A vicinity map is provided for reference in Attachment 4.

3.0 METHODOLOGY

This report calculates the 2-Year and 10-Year Peak Discharge Rates AMC I (2-Year) and II (10-Year) based on the Riverside County Flood Control and Water Conservation District Hydrology Manual (April 1978) rational methodology. In addition, this manual will be referred to as the 'Standards' throughout this report. Clean copies of the excerpts from the standards have been included in Attachment 1: Standards Excerpts for reference. The hydrology calculations will be divided into existing conditions and proposed conditions. The existing conditions calculations are provided in Attachments 2. The proposed calculations are provided for reference in Attachments 3. Hydrology maps have also been created for the project site and are included in Attachment 4: Exhibits. The FEMA determination for flooding factors is provided for reference in Attachment 5: FEMA Determination. In addition, the NRCS soils report for the project site is provided for reference in Attachment 6: NRCS Soils Report.

4.0 EXISTING CONDITIONS CALCULATIONS

The existing conditions have been evaluated using the Rational Method and this method has been used to create the existing conditions 2-Year and 10-Year Peak Discharge Rates and 10-Year Unit Hydrograph from the Riverside County Flood Control and Water Conservation District Hydrology Manual (April 1978). Certain tables and figures from the Standards are referenced in this report and have been included in Attachment 1: Standards Excerpts. The existing conditions calculations are provided in Attachments 2 and the existing conditions exhibit is provided for reference in Attachment 4. A summary of the existing conditions calculations is as follows:

COMPLIANCE POINT A – EXISTING CONDITIONS SUMMARY		
DATA	***2-YEAR***	***10-YEAR***
AMC	I	II
TOTAL DISCHARGE (CFS)	2.8	5.7
TIME OF CONCENTRATION (MIN)	20.48	18.28
AREA (ACRES)	5.044	5.044
2-YEAR, 24-HOUR UH VOLUME(ACRE-FT)	N/A	0.6561
STORAGE VOLUME (ACRE-FT)	0.0000	0.0000

5.0 PROPOSED CONDITIONS CALCULATIONS

The project site has two Riverside County Flood Control regulated flood plains that run through the property and the site is listed as Zone D per FEMA. With this in mind, as little modification as possible to the finished grades and permeability of the surfaces is being proposed in these areas. The proposed conditions will utilize DG paving in the flood plain areas except for the main drive that fire requires to be impervious paving with all grades being as close to existing as feasible.

The FEMA mapping is provided for reference in Attachment 5. The site is listed as Zone D per FEMA Panel 06065C1420G effective 8/28/2008 and is flooded per Riverside County Flood Control Mapping. County Flood limits are shown on the existing and proposed maps in Attachment 4.

The proposed conditions have been evaluated using the Rational Method and this method has been used to create the proposed conditions 2-Year and 10-Year Peak Discharge Rates and 10-Year Unit Hydrograph from the Riverside County Flood Control and Water Conservation District Hydrology Manual (April 1978). Certain tables and figures from the Standards are referenced in this report and have been included in Attachment 1: Standards Excerpts. The proposed conditions calculations are provided in Attachments 3 and the proposed conditions exhibit is provided for reference in Attachment 4. A summary of the proposed conditions calculations is as follows:

COMPLIANCE POINT A – PROPOSED CONDITIONS SUMMARY		
DATA	***2-YEAR***	***10-YEAR***
AMC	I	II
TOTAL DISCHARGE (CFS)	3.7	6.3
TIME OF CONCENTRATION (MIN)	20.58	19.04
AREA (ACRES)	4.917	4.917
10-YEAR, 24-HOUR UH VOLUME(ACRE-FT)	N/A	0.8359
STORAGE VOLUME (ACRE-FT)	0.3175	0.3175

6.0 STORAGE ANALYSIS

The project site will be required to mitigate, store, or reduce any increase in the 10-Year Design Storm Event Unit Hydrograph volumetrics. The self-retaining permeable paving areas are being discounted for preliminary analysis and will be further defined and included in the final hydrology report during the final engineering phase that creates the construction documents. The project site proposes (2) biofiltration basins that will also act to facilitate storage and infiltration of storm water while maintaining as close a condition to the existing conditions as possible. With this in mind, the following characteristics apply to the water quality basins:

Total Basin Area: DMA1-BMP1: 0.038 acres
DMA2-BMP2: 0.089 acres
Total Area = 0.038 acres + 0.089 acres = 0.127 acres

Basin Depths: Total = 30” however, Water Quality = 6 inches
Freeboard = 6 inches
Flood Storage = 1.5 feet

Total Basin Storage: Area x depth = 0.127 acres x 1.5 ft = 0.1905 acre-ft

The basins are providing 0.1905 acre-ft, excluding water quality and freeboard, and this is larger than the differential in the pre- and post- 10-Year Unit Hydrograph volume differential of 0.1798 acre-ft so the project site’s BMPs will be sufficient to mitigate the increase in imperviousness proposed by the project site.

7.0 COMPARISON

Through the use of permeable paving and dispersion of all impervious surfaces, the project site has been able to mimic the pre- conditions in the post- conditions as much as feasible. A comparison of the data is summarized below for Compliance Point A as follows:

COMPLIANCE POINT A – 2-YEAR DATA COMPARISON			
DATA	***EXISTING***	***PROPOSED***	***Δ***
AMC	I	I	NO CHANGE
TOTAL DISCHARGE (CFS)	2.8	3.7	+ 0.9
TIME OF CONCENTRATION (MIN)	20.48	20.58	0 .10
AREA (ACRES)	5.044	4.917	- 0.127
2-YEAR, 24-HOUR UH VOLUME(ACRE-FT)	N/A	N/A	N/A
STORAGE VOLUME (ACRE-FT)	0.0000	0.1905	+ 0.1905

COMPLIANCE POINT A – 10-YEAR DATA COMPARISON			
DATA	***EXISTING***	***PROPOSED***	***Δ***
AMC	II	II	NO CHANGE
TOTAL DISCHARGE (CFS)	5.7	6.3	+ 0.6
TIME OF CONCENTRATION (MIN)	18.028	19.04	+ 0.76
AREA (ACRES)	5.044	4.917	- 0.127
10-YEAR, 24-HOUR UH VOLUME(ACRE-FT)	0.6561	0.8359	+ 0.1798
STORAGE VOLUME (ACRE-FT)	0.0000	0.1905	+ 0.1905

8.0 CONCLUSION

The proposed project site will construct new structures and various other design elements that will add slightly to the overall imperviousness of the existing vacant lots but this increase will be mitigate through the use of dispersion of all the impervious surfaces to permeable surfaces. The proposed development will utilize low impact development solutions to handle water quality treatment and hydromodification as much as feasible. The project site increases the imperviousness of the site, but the proposed LID elements are more than adequate to mitigate this increase using the includes dg paving, landscaping to mimic the natural permeability for the project site and new biofiltration basins while maintaining the natural grades as much as feasible to limit the impacts to the County Flood Control defined flood plain.

In addition, it should be noted that the proposed project does not substantially alter the existing drainage patterns and off-site adjacent features to the project site. Neither is the existing drainage pattern of the site and local area altered, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion, siltation, or flooding on- or off-site because the stream alignment is not affected by the proposed improvements.

The project site will continue to sheet flow to the same existing culverts under the driveway way and in the channel along Highway 74.

9.0 REFERENCES

The following references were utilized in the creation of this hydrology report:

Brater & King, *Handbook of Hydraulics*, 6th ed.

Design Handbook for Low Impact Development Best Management Practices, Riverside County Flood Control & Water Conservation District, September 2011.

Hydrology Manual, Riverside County Flood Control & Water Conservation District, April 1978

10.0 DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the engineer of work for this project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions code, and that the design is consistent with current standards.

I understand that the check of project drawings and specifications by the agency is confined to a review only and does not relieve me, as engineer of work, of my responsibilities for project design.

Wilfredo Ventura

Wilfredo Ventura

11/16/23

Date

11.0 ATTACHMENTS

The following attachment sections are provided for reference:

11.1 ATTACHMENT 1: STANDARD EXCERPTS

This attachment contains excerpts from the standards. Please refer to the attached references.

11.2 ATTACHMENTS 2: EXISTING CONDITIONS CALCULATIONS

This attachment contains the existing conditions calculations.

11.3 ATTACHMENTS 3: PROPOSED CONDITIONS CALCULATIONS

This attachment contains the proposed conditions calculations.

11.4 ATTACHMENT 4: EXHIBITS

This attachment contains a vicinity map, hydrology exhibit and details.

11.5 ATTACHMENT 5: FEMA DETERMINATION

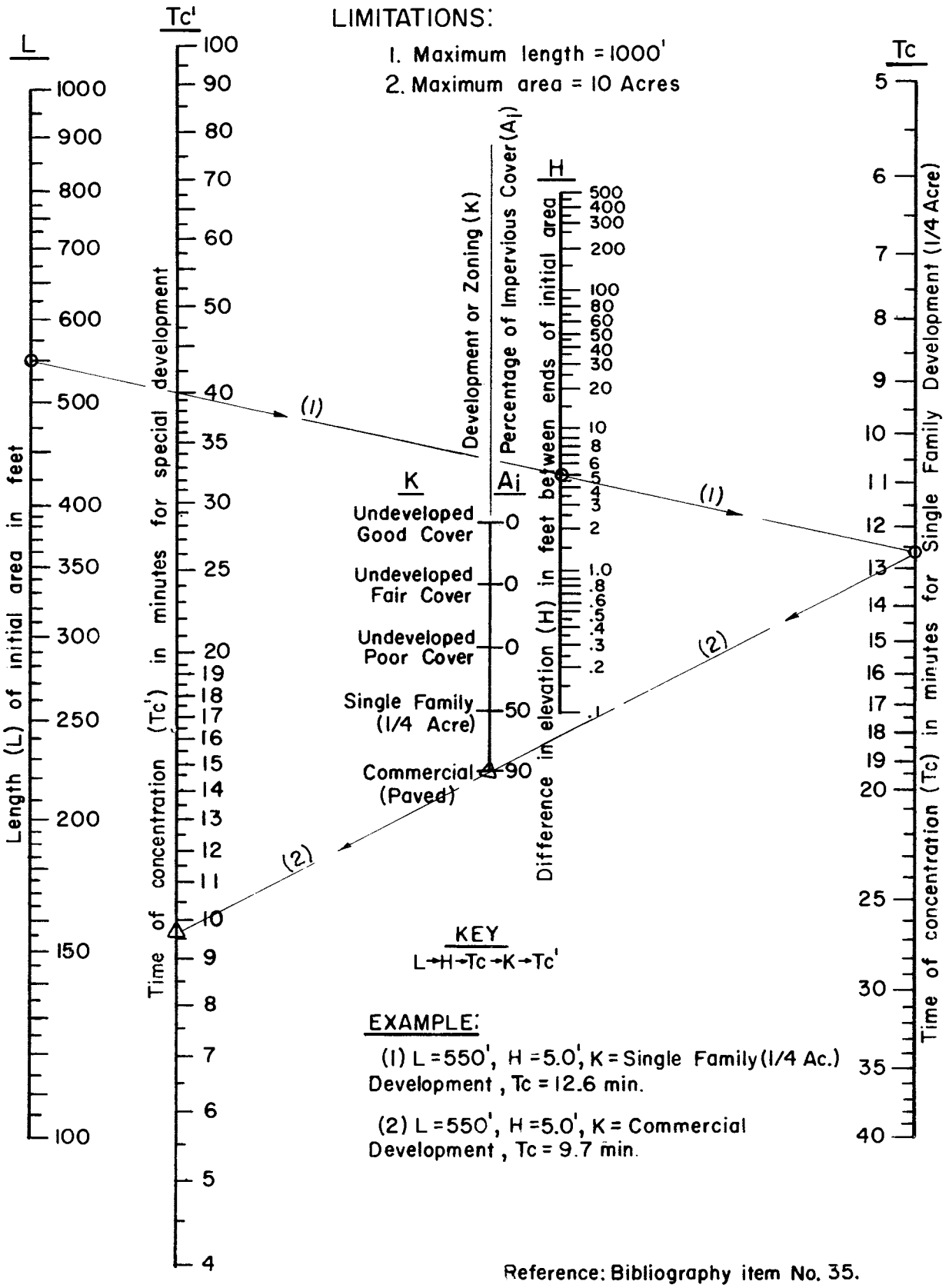
This attachment contains the project site's FEMA Mapping exhibit.

11.6 ATTACHMENT 6: NRCS SOILS REPORT

This attachment contains the project site's NRCS Soils Report for reference.

ATTACHMENT 1: STANDARD EXCERPTS

This attachment contains various excerpts from the Riverside County Flood Control & Water Conservation District Hydrology Manual (April 1978 edition). Please see the attached excerpts from the standards.



Reference: Bibliography item No. 35.

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TIME OF CONCENTRATION
FOR INITIAL SUBAREA

PLATE D-3

RAINFALL INTENSITY—INCHES PER HOUR

MIRA LOMA			MURRIETA - TEMECULA & RANCHO CALIFORNIA			NORCO			PALM SPRINGS			PERRIS VALLEY		
DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY	
	10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR
5	2.84	4.48	5	3.45	5.10	5	2.77	4.16	5	4.23	6.75	5	2.64	3.78
6	2.58	4.07	6	3.12	4.61	6	2.53	3.79	6	3.80	6.08	6	2.41	3.46
7	2.37	3.75	7	2.87	4.24	7	2.34	3.51	7	3.48	5.56	7	2.24	3.21
8	2.21	3.49	8	2.67	3.94	8	2.19	3.29	8	3.22	5.15	8	2.09	3.01
9	2.08	3.28	9	2.50	3.69	9	2.07	3.10	9	3.01	4.81	9	1.98	2.84
10	1.96	3.10	10	2.36	3.48	10	1.96	2.94	10	2.83	4.52	10	1.88	2.69
11	1.87	2.95	11	2.24	3.30	11	1.87	2.80	11	2.67	4.26	11	1.79	2.57
12	1.78	2.82	12	2.13	3.15	12	1.79	2.68	12	2.54	4.07	12	1.72	2.46
13	1.71	2.70	13	2.04	3.01	13	1.72	2.58	13	2.43	3.88	13	1.65	2.37
14	1.64	2.60	14	1.96	2.89	14	1.66	2.48	14	2.33	3.72	14	1.59	2.29
15	1.58	2.50	15	1.89	2.79	15	1.60	2.40	15	2.23	3.58	15	1.54	2.21
16	1.53	2.42	16	1.82	2.69	16	1.55	2.32	16	2.15	3.44	16	1.49	2.14
17	1.48	2.34	17	1.76	2.60	17	1.50	2.25	17	2.08	3.32	17	1.45	2.08
18	1.44	2.27	18	1.71	2.52	18	1.46	2.19	18	2.01	3.22	18	1.41	2.02
19	1.40	2.21	19	1.66	2.45	19	1.42	2.13	19	1.95	3.12	19	1.37	1.97
20	1.36	2.15	20	1.61	2.38	20	1.39	2.08	20	1.89	3.03	20	1.34	1.92
22	1.29	2.04	22	1.53	2.26	22	1.32	1.98	22	1.79	2.86	22	1.28	1.83
24	1.24	1.95	24	1.46	2.15	24	1.26	1.90	24	1.70	2.72	24	1.22	1.75
26	1.18	1.87	26	1.39	2.06	26	1.22	1.82	26	1.62	2.60	26	1.18	1.69
28	1.14	1.80	28	1.34	1.98	28	1.17	1.76	28	1.56	2.49	28	1.13	1.63
30	1.10	1.73	30	1.29	1.90	30	1.13	1.70	30	1.49	2.39	30	1.10	1.57
32	1.06	1.67	32	1.24	1.84	32	1.10	1.64	32	1.44	2.30	32	1.06	1.52
34	1.03	1.62	34	1.20	1.78	34	1.06	1.59	34	1.39	2.22	34	1.03	1.48
36	1.00	1.57	36	1.17	1.72	36	1.03	1.55	36	1.34	2.15	36	1.00	1.44
38	.97	1.53	38	1.13	1.67	38	1.01	1.51	38	1.30	2.09	38	.98	1.40
40	.94	1.49	40	1.10	1.62	40	.98	1.47	40	1.27	2.04	40	.95	1.37
45	.89	1.40	45	1.03	1.52	45	.92	1.39	45	1.18	1.89	45	.90	1.29
50	.84	1.32	50	.97	1.44	50	.88	1.31	50	1.11	1.78	50	.85	1.22
55	.80	1.26	55	.92	1.36	55	.84	1.25	55	1.05	1.68	55	.81	1.17
60	.76	1.20	60	.88	1.30	60	.80	1.20	60	1.00	1.60	60	.78	1.12
65	.73	1.15	65	.84	1.24	65	.77	1.15	65	.95	1.53	65	.75	1.08
70	.70	1.11	70	.81	1.19	70	.74	1.11	70	.91	1.46	70	.72	1.04
75	.68	1.07	75	.78	1.15	75	.72	1.07	75	.88	1.41	75	.70	1.00
80	.65	1.03	80	.75	1.11	80	.69	1.04	80	.85	1.35	80	.68	.97
85	.63	1.00	85	.73	1.07	85	.67	1.01	85	.82	1.31	85	.66	.94
SLOPE = .530			SLOPE = .550			SLOPE = .500			SLOPE = .580			SLOPE = .490		

STANDARD
INTENSITY-DURATION
CURVES DATA

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

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RUNOFF INDEX NUMBERS FOR PERVIOUS AREA

PLATE D-5.5 (1 of 2)

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

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IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE E-6.3

APPROXIMATE SITE LOCATION = 2.25

NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.

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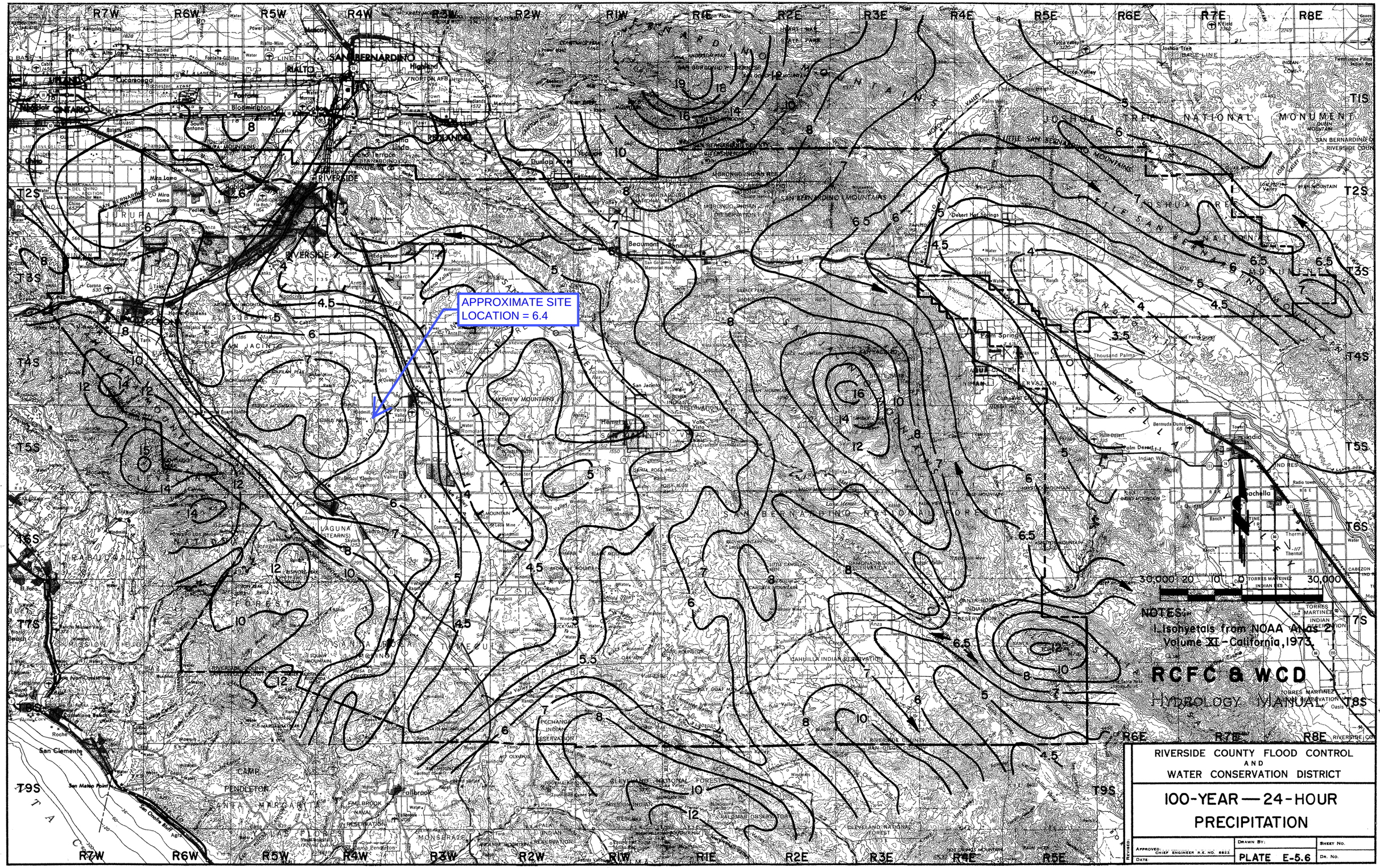
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 24-HOUR PRECIPITATION

APPROVED CHIEF ENGINEER R.E. NO. 8822	DRAWN BY: R.A.S.	SHEET NO.
DATE	PLATE E-5.5	DR. NO.
REVISED		


APPROXIMATE SITE LOCATION = 6.4
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
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HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
DRAWN BY:
SHEET No.
PLATE E-5.6
APPROVED CHIEF ENGINEER R.E. NO. 8822
DATE
REVISED
DR. No.

ATTACHMENT 2: EXISTING CONDITIONS CALCULATIONS

This attachment contains the existing conditions 2-Year and 10-Year Design Storm Event calculations. Please see the attached calculations.

EXISTING CONDITIONS – 2-YEAR DESIGN STORM EVENT

```
                    Riverside County Rational Hydrology Program
CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
                 Rational Hydrology Study        Date: 11/16/23  File:boatshowd1ex2yr.out
--------------------------------------------------------------------------
 *********  Hydrology Study Control Information **********
 English (in-lb) Units used in input data file
--------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [ Perris Valley ] area used.
10 year storm 10 minute intensity =  1.880(In/Hr)
10 year storm 60 minute intensity =  0.780(In/Hr)
100 year storm 10 minute intensity =  2.690(In/Hr)
100 year storm 60 minute intensity =  1.120(In/Hr)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.542(In/Hr)
Slope of intensity duration curve = 0.4900


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.110 to Point/Station        1.210
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   100.000(Ft.)
Top (of initial area) elevation =  1551.100(Ft.)
Bottom (of initial area) elevation =  1548.000(Ft.)
Difference in elevation =     3.100(Ft.)
Slope =    0.03100  s(percent)=       3.10
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.699 min.
Rainfall intensity =      1.588(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.675
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.271(CFS)
Total initial stream area =        0.253(Ac.)
Pervious area fraction = 1.000
```

++
Process from Point/Station 1.210 to Point/Station 1.220
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.558(CFS)
Depth of flow = 0.139(Ft.), Average velocity = 1.240(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	1.00
2	25.00	0.50
3	32.00	0.00
4	61.00	0.25
5	91.00	0.50
6	102.00	1.00

Manning's 'N' friction factor = 0.025

Sub-Channel flow = 1.558(CFS)
' ' flow top width = 18.075(Ft.)
' ' velocity= 1.240(Ft/s)
' ' area = 1.257(Sq.Ft)
' ' Froude number = 0.828

Upstream point elevation = 1548.000(Ft.)
Downstream point elevation = 1532.400(Ft.)
Flow length = 1025.000(Ft.)
Travel time = 13.78 min.
Time of concentration = 20.48 min.
Depth of flow = 0.139(Ft.)
Average velocity = 1.240(Ft/s)
Total irregular channel flow = 1.558(CFS)
Irregular channel normal depth above invert elev. = 0.139(Ft.)
Average velocity of channel(s) = 1.240(Ft/s)
Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.571
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 71.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 0.918(In/Hr) for a 2.0 year storm
Subarea runoff = 2.513(CFS) for 4.791(Ac.)
Total runoff = 2.784(CFS) Total area = 5.044(Ac.)
Depth of flow = 0.173(Ft.), Average velocity = 1.433(Ft/s)
End of computations, total study area = 5.04 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 86.0

EXISTING CONDITIONS – 10-YEAR DESIGN STORM EVENT

```
                    Riverside County Rational Hydrology Program
CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
                Rational Hydrology Study        Date: 11/16/23  File:boatshowd1ex10yr.out
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********
 English (in-lb) Units used in input data file
------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Perris Valley ] area used.
10 year storm 10 minute intensity =  1.880(In/Hr)
10 year storm 60 minute intensity =  0.780(In/Hr)
100 year storm 10 minute intensity =  2.690(In/Hr)
100 year storm 60 minute intensity =  1.120(In/Hr)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.780(In/Hr)
Slope of intensity duration curve = 0.4900


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.110 to Point/Station        1.210
**** INITIAL AREA EVALUATION ****

_____________________________________________________________________________
Initial area flow distance =   100.000(Ft.)
Top (of initial area) elevation =  1551.100(Ft.)
Bottom (of initial area) elevation =  1548.000(Ft.)
Difference in elevation =     3.100(Ft.)
Slope =    0.03100  s(percent)=       3.10
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.699 min.
Rainfall intensity =      2.284(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.822
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.475(CFS)
Total initial stream area =        0.253(Ac.)
Pervious area fraction = 1.000
```

++
Process from Point/Station 1.210 to Point/Station 1.220
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 3.121(CFS)
Depth of flow = 0.180(Ft.), Average velocity = 1.475(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	1.00
2	25.00	0.50
3	32.00	0.00
4	61.00	0.25
5	91.00	0.50
6	102.00	1.00

Manning's 'N' friction factor = 0.025

Sub-Channel flow = 3.121(CFS)
' ' flow top width = 23.457(Ft.)
' ' velocity= 1.475(Ft/s)
' ' area = 2.116(Sq.Ft)
' ' Froude number = 0.865

Upstream point elevation = 1548.000(Ft.)
Downstream point elevation = 1532.400(Ft.)
Flow length = 1025.000(Ft.)
Travel time = 11.58 min.
Time of concentration = 18.28 min.
Depth of flow = 0.180(Ft.)
Average velocity = 1.475(Ft/s)
Total irregular channel flow = 3.121(CFS)
Irregular channel normal depth above invert elev. = 0.180(Ft.)
Average velocity of channel(s) = 1.475(Ft/s)
Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.779
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 86.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.396(In/Hr) for a 10.0 year storm
Subarea runoff = 5.211(CFS) for 4.791(Ac.)
Total runoff = 5.686(CFS) Total area = 5.044(Ac.)
Depth of flow = 0.226(Ft.), Average velocity = 1.713(Ft/s)
End of computations, total study area = 5.04 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 86.0

EXISTING CONDITIONS – 10-YEAR, 24-HR STORM UNIT HYDROGRAPH

```
                U n i t   H y d r o g r a p h   A n a l y s i s
                Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
                  Study date  11/16/23 File: boatshowexd1uh2410.out
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------
Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978
------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format
------------------------------------------------------------------------
Drainage Area =       5.04(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       5.04(Ac.)  =      0.008 Sq. Mi.
Length along longest watercourse =    1125.00(Ft.)
Length along longest watercourse measured to centroid =     100.00(Ft.)
Length along longest watercourse =      0.213 Mi.
Length along longest watercourse measured to centroid =      0.019 Mi.
Difference in elevation =      18.70(Ft.)
Slope along watercourse =     87.7653 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.038 Hr.
Lag time =     2.27 Min.
25% of lag time =     0.57 Min.
40% of lag time =     0.91 Min.
Unit time =    30.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       5.04              2.25                 11.35

100 YEAR Area rainfall data:
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       5.04              6.40                 32.28

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =    2.250(In)
Area Averaged 100-Year Rainfall =    6.400(In)

Point rain (area averaged) =    3.957(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    3.957(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    5.044           86.00          0.000
 Total Area Entered =      5.04(Ac.)
```

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
86.0	86.0	0.176	0.000	0.176	1.000	0.176

Sum (F) = 0.176
Area averaged mean soil loss (F) (In/Hr) = 0.176
Minimum soil loss rate ((In/Hr)) = 0.088
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.500	1320.179	100.000	5.083

Sum = 100.000 Sum= 5.083

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.50	0.50	0.040	(0.308)	0.036	0.004
2	1.00	0.70	0.055	(0.301)	0.050	0.006
3	1.50	0.60	0.047	(0.294)	0.043	0.005
4	2.00	0.70	0.055	(0.287)	0.050	0.006
5	2.50	0.80	0.063	(0.280)	0.057	0.006
6	3.00	1.00	0.079	(0.273)	0.071	0.008
7	3.50	1.00	0.079	(0.267)	0.071	0.008
8	4.00	1.10	0.087	(0.260)	0.078	0.009
9	4.50	1.30	0.103	(0.253)	0.093	0.010
10	5.00	1.50	0.119	(0.247)	0.107	0.012
11	5.50	1.30	0.103	(0.241)	0.093	0.010
12	6.00	1.60	0.127	(0.234)	0.114	0.013
13	6.50	1.80	0.142	(0.228)	0.128	0.014
14	7.00	2.00	0.158	(0.222)	0.142	0.016
15	7.50	2.10	0.166	(0.216)	0.150	0.017
16	8.00	2.50	0.198	(0.210)	0.178	0.020
17	8.50	3.00	0.237	0.204	(0.214)	0.033
18	9.00	3.30	0.261	0.199	(0.235)	0.062
19	9.50	3.90	0.309	0.193	(0.278)	0.115
20	10.00	4.30	0.340	0.188	(0.306)	0.153
21	10.50	3.00	0.237	0.182	(0.214)	0.055
22	11.00	4.00	0.317	0.177	(0.285)	0.140
23	11.50	3.80	0.301	0.172	(0.271)	0.129
24	12.00	3.50	0.277	0.167	(0.249)	0.110
25	12.50	5.10	0.404	0.162	(0.363)	0.242
26	13.00	5.70	0.451	0.157	(0.406)	0.294
27	13.50	6.80	0.538	0.152	(0.484)	0.386
28	14.00	4.60	0.364	0.148	(0.328)	0.216
29	14.50	5.30	0.419	0.143	(0.378)	0.276

30	15.00	5.10	0.404	0.139	(0.363)	0.265
31	15.50	4.70	0.372	0.135	(0.335)	0.237
32	16.00	3.80	0.301	0.131	(0.271)	0.170
33	16.50	0.80	0.063	(0.127)	0.057	0.006
34	17.00	0.60	0.047	(0.123)	0.043	0.005
35	17.50	1.00	0.079	(0.119)	0.071	0.008
36	18.00	0.90	0.071	(0.116)	0.064	0.007
37	18.50	0.80	0.063	(0.112)	0.057	0.006
38	19.00	0.50	0.040	(0.109)	0.036	0.004
39	19.50	0.70	0.055	(0.106)	0.050	0.006
40	20.00	0.50	0.040	(0.103)	0.036	0.004
41	20.50	0.60	0.047	(0.100)	0.043	0.005
42	21.00	0.50	0.040	(0.098)	0.036	0.004
43	21.50	0.50	0.040	(0.096)	0.036	0.004
44	22.00	0.50	0.040	(0.094)	0.036	0.004
45	22.50	0.50	0.040	(0.092)	0.036	0.004
46	23.00	0.40	0.032	(0.090)	0.028	0.003
47	23.50	0.40	0.032	(0.089)	0.028	0.003
48	24.00	0.40	0.032	(0.088)	0.028	0.003

(Loss Rate Not Used)

Sum = 100.0 Sum = 3.1

Flood volume = Effective rainfall 1.56(In)
times area 5.0(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)
Total soil loss = 2.40(In)
Total soil loss = 1.007(Ac.Ft)
Total rainfall = 3.96(In)
Flood volume = 28580.9 Cubic Feet
Total soil loss = 43876.3 Cubic Feet

Peak flow rate of this hydrograph = 1.962(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 30 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+30	0.0008	0.02	Q	|	|	|	|
1+ 0	0.0020	0.03	Q	|	|	|	|
1+30	0.0030	0.02	Q	|	|	|	|
2+ 0	0.0042	0.03	Q	|	|	|	|
2+30	0.0055	0.03	Q	|	|	|	|
3+ 0	0.0072	0.04	Q	|	|	|	|
3+30	0.0088	0.04	Q	|	|	|	|
4+ 0	0.0106	0.04	Q	|	|	|	|
4+30	0.0128	0.05	Q	|	|	|	|
5+ 0	0.0153	0.06	Q	|	|	|	|
5+30	0.0175	0.05	QV	|	|	|	|
6+ 0	0.0201	0.06	QV	|	|	|	|
6+30	0.0231	0.07	QV	|	|	|	|
7+ 0	0.0264	0.08	QV	|	|	|	|
7+30	0.0299	0.08	QV	|	|	|	|

```
 8+ 0      0.0341     0.10  Q V      |       |       |       |
 8+30      0.0410     0.17  Q V      |       |       |       |
 9+ 0      0.0542     0.32  |Q V     |       |       |       |
 9+30      0.0784     0.59  | Q V    |       |       |       |
10+ 0      0.1105     0.78  |  Q  V  |       |       |       |
10+30      0.1221     0.28  |Q    V  |       |       |       |
11+ 0      0.1514     0.71  | Q     V|       |       |       |
11+30      0.1785     0.66  | Q      V       |       |       |
12+ 0      0.2017     0.56  | Q      | V      |       |       |
12+30      0.2525     1.23  |   Q    |   V    |       |       |
13+ 0      0.3143     1.50  |    Q   |      V|       |       |
13+30      0.3954     1.96  |     Q  |         V     |       |
14+ 0      0.4408     1.10  |   Q    |       |   V   |       |
14+30      0.4989     1.40  |    Q   |       |       V       |
15+ 0      0.5545     1.35  |    Q   |       |         V     |
15+30      0.6044     1.21  |   Q    |       |       |    V  |
16+ 0      0.6402     0.87  |  Q     |       |       |      V|
16+30      0.6415     0.03  Q        |       |       |      V|
17+ 0      0.6425     0.02  Q        |       |       |      V|
17+30      0.6442     0.04  Q        |       |       |      V|
18+ 0      0.6456     0.04  Q        |       |       |      V|
18+30      0.6470     0.03  Q        |       |       |      V|
19+ 0      0.6478     0.02  Q        |       |       |      V|
19+30      0.6490     0.03  Q        |       |       |      V|
20+ 0      0.6498     0.02  Q        |       |       |      V|
20+30      0.6508     0.02  Q        |       |       |      V|
21+ 0      0.6516     0.02  Q        |       |       |      V|
21+30      0.6525     0.02  Q        |       |       |      V|
22+ 0      0.6533     0.02  Q        |       |       |      V|
22+30      0.6541     0.02  Q        |       |       |      V|
23+ 0      0.6548     0.02  Q        |       |       |      V|
23+30      0.6555     0.02  Q        |       |       |      V|
24+ 0      0.6561     0.02  Q        |       |       |      V
-------------------------------------------------------------------------------
```

ATTACHMENT 3: PROPOSED CONDITIONS CALCULATIONS

This attachment contains the proposed conditions 2-Year and 10-Year Design Storm Event calculations. Please see the attached calculations.

PROPOSED CONDITIONS – 2-YEAR DESIGN STORM EVENT

```
                    Riverside County Rational Hydrology Program
CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
                 Rational Hydrology Study        Date: 11/16/23  File:boatshowd1pr2yr.out
--------------------------------------------------------------------------
 *********  Hydrology Study Control Information **********
 English (in-lb) Units used in input data file
--------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 1

Standard intensity-duration curves data (Plate D-4.1)
For the [ Perris Valley ] area used.
10 year storm 10 minute intensity =  1.880(In/Hr)
10 year storm 60 minute intensity =  0.780(In/Hr)
100 year storm 10 minute intensity =  2.690(In/Hr)
100 year storm 60 minute intensity =  1.120(In/Hr)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.542(In/Hr)
Slope of intensity duration curve = 0.4900


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.110 to Point/Station        1.210
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   250.000(Ft.)
Top (of initial area) elevation =  1551.100(Ft.)
Bottom (of initial area) elevation =  1545.400(Ft.)
Difference in elevation =     5.700(Ft.)
Slope =    0.02280  s(percent)=       2.28
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.277 min.
Rainfall intensity =      1.288(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.638
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  71.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.429(CFS)
Total initial stream area =        0.522(Ac.)
Pervious area fraction = 1.000
```

++
Process from Point/Station 1.210 to Point/Station 1.310
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.710(CFS)
Depth of flow = 0.096(Ft.), Average velocity = 1.549(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	0.00	0.00
3	20.00	0.20

Manning's 'N' friction factor = 0.013

Sub-Channel flow = 0.710(CFS)
' ' flow top width = 9.574(Ft.)
' ' velocity= 1.550(Ft/s)
' ' area = 0.458(Sq.Ft)
' ' Froude number = 1.248

Upstream point elevation = 1545.400(Ft.)
Downstream point elevation = 1542.400(Ft.)
Flow length = 280.000(Ft.)
Travel time = 3.01 min.
Time of concentration = 13.29 min.
Depth of flow = 0.096(Ft.)
Average velocity = 1.549(Ft/s)
Total irregular channel flow = 0.710(CFS)
Irregular channel normal depth above invert elev. = 0.096(Ft.)
Average velocity of channel(s) = 1.549(Ft/s)
Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Rainfall intensity = 1.135(In/Hr) for a 2.0 year storm
Subarea runoff = 0.662(CFS) for 0.685(Ac.)
Total runoff = 1.091(CFS) Total area = 1.207(Ac.)
Depth of flow = 0.112(Ft.), Average velocity = 1.725(Ft/s)

++
Process from Point/Station 1.310 to Point/Station 1.320
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.427(CFS)
Depth of flow = 0.405(Ft.), Average velocity = 1.944(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.75
2	1.50	0.00
3	2.50	0.00
4	4.00	0.75

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 1.427(CFS)
' ' flow top width = 2.622(Ft.)
' ' velocity= 1.944(Ft/s)
' ' area = 0.734(Sq.Ft)
' ' Froude number = 0.647

Upstream point elevation = 1542.400(Ft.)
Downstream point elevation = 1537.500(Ft.)
Flow length = 390.000(Ft.)
Travel time = 3.34 min.
Time of concentration = 16.63 min.
Depth of flow = 0.405(Ft.)
Average velocity = 1.944(Ft/s)
Total irregular channel flow = 1.427(CFS)
Irregular channel normal depth above invert elev. = 0.405(Ft.)
Average velocity of channel(s) = 1.944(Ft/s)
Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.644
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.500; Impervious fraction = 0.500
Rainfall intensity = 1.017(In/Hr) for a 2.0 year storm
Subarea runoff = 0.614(CFS) for 0.938(Ac.)
Total runoff = 1.705(CFS) Total area = 2.145(Ac.)
Depth of flow = 0.443(Ft.), Average velocity = 2.039(Ft/s)

++
Process from Point/Station 1.320 to Point/Station 1.330
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow = 0.375(Ft.), Average velocity = 2.599(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.75
2	1.50	0.00
3	2.50	0.00
4	4.00	0.75

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 1.705(CFS)
' ' flow top width = 2.499(Ft.)
' ' velocity= 2.599(Ft/s)
' ' area = 0.656(Sq.Ft)
' ' Froude number = 0.894

Upstream point elevation = 1537.500(Ft.)
Downstream point elevation = 1536.400(Ft.)
Flow length = 45.000(Ft.)
Travel time = 0.29 min.
Time of concentration = 16.92 min.
Depth of flow = 0.375(Ft.)
Average velocity = 2.599(Ft/s)
Total irregular channel flow = 1.705(CFS)
Irregular channel normal depth above invert elev. = 0.375(Ft.)
Average velocity of channel(s) = 2.599(Ft/s)

++
Process from Point/Station 1.330 to Point/Station 1.410
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1536.400(Ft.)
Downstream point elevation = 1536.300(Ft.)
Channel length thru subarea = 10.000(Ft.)
Channel base width = 2.500(Ft.)
Slope or 'Z' of left channel bank = 3.000
Slope or 'Z' of right channel bank = 3.000
Manning's 'N' = 0.037
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 1.705(CFS)
Depth of flow = 0.316(Ft.), Average velocity = 1.562(Ft/s)
Channel flow top width = 4.399(Ft.)
Flow Velocity = 1.56(Ft/s)
Travel time = 0.11 min.
Time of concentration = 17.03 min.

Sub-Channel No. 1 Critical depth = 0.223(Ft.)
' ' ' Critical flow top width = 3.836(Ft.)
' ' ' Critical flow velocity= 2.417(Ft/s)
' ' ' Critical flow area = 0.705(Sq.Ft)

++
Process from Point/Station 1.410 to Point/Station 1.420
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____
Estimated mean flow rate at midpoint of channel = 1.720(CFS)
Depth of flow = 0.115(Ft.), Average velocity = 0.499(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	2.50
2	0.00	0.00
3	30.00	0.00
4	30.00	2.50

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 1.720(CFS)
' ' flow top width = 30.000(Ft.)
' ' velocity= 0.499(Ft/s)
' ' area = 3.446(Sq.Ft)
' ' Froude number = 0.260

Upstream point elevation = 1536.300(Ft.)
Downstream point elevation = 1536.200(Ft.)
Flow length = 40.000(Ft.)
Travel time = 1.34 min.
Time of concentration = 18.36 min.
Depth of flow = 0.115(Ft.)
Average velocity = 0.499(Ft/s)
Total irregular channel flow = 1.720(CFS)
Irregular channel normal depth above invert elev. = 0.115(Ft.)
Average velocity of channel(s) = 0.499(Ft/s)
Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.431
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 0.969(In/Hr) for a 2.0 year storm
Subarea runoff = 0.016(CFS) for 0.038(Ac.)
Total runoff = 1.721(CFS) Total area = 2.183(Ac.)
Depth of flow = 0.115(Ft.), Average velocity = 0.499(Ft/s)

++
Process from Point/Station 1.420 to Point/Station 1.430
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 1533.600(Ft.)
Downstream point/station elevation = 1533.400(Ft.)
Pipe length = 60.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.721(CFS)
Given pipe size = 12.00(In.)
Calculated individual pipe flow = 1.721(CFS)
Normal flow depth in pipe = 8.39(In.)
Flow top width inside pipe = 11.01(In.)
Critical Depth = 6.69(In.)
Pipe flow velocity = 2.93(Ft/s)
Travel time through pipe = 0.34 min.
Time of concentration (TC) = 18.71 min.

++
Process from Point/Station 1.430 to Point/Station 1.440
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1533.400(Ft.)
Downstream point elevation = 1533.300(Ft.)
Channel length thru subarea = 10.000(Ft.)
Channel base width = 2.500(Ft.)
Slope or 'Z' of left channel bank = 3.000
Slope or 'Z' of right channel bank = 3.000
Manning's 'N' = 0.037
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 1.721(CFS)
Depth of flow = 0.318(Ft.), Average velocity = 1.566(Ft/s)
Channel flow top width = 4.408(Ft.)
Flow Velocity = 1.57(Ft/s)
Travel time = 0.11 min.
Time of concentration = 18.81 min.

Sub-Channel No. 1 Critical depth = 0.223(Ft.)
' ' ' Critical flow top width = 3.836(Ft.)
' ' ' Critical flow velocity= 2.439(Ft/s)
' ' ' Critical flow area = 0.705(Sq.Ft)

++
Process from Point/Station 1.440 to Point/Station 1.510
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.792(CFS)
Depth of flow = 0.125(Ft.), Average velocity = 1.295(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	6.00
2	2.20	5.00
3	4.80	4.00
4	6.80	3.00
5	8.90	2.00
6	11.10	1.00
7	15.70	0.00
8	26.50	0.00
9	26.50	6.00

Manning's 'N' friction factor = 0.025

Sub-Channel flow = 1.792(CFS)
' ' flow top width = 11.374(Ft.)
' ' velocity= 1.295(Ft/s)
' ' area = 1.384(Sq.Ft)
' ' Froude number = 0.654

Upstream point elevation = 1533.300(Ft.)
Downstream point elevation = 1533.100(Ft.)
Flow length = 25.000(Ft.)
Travel time = 0.32 min.
Time of concentration = 19.13 min.
Depth of flow = 0.125(Ft.)
Average velocity = 1.295(Ft/s)
Total irregular channel flow = 1.792(CFS)
Irregular channel normal depth above invert elev. = 0.125(Ft.)
Average velocity of channel(s) = 1.295(Ft/s)
Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.578
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 71.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 0.950(In/Hr) for a 2.0 year storm
Subarea runoff = 0.099(CFS) for 0.181(Ac.)
Total runoff = 1.820(CFS) Total area = 2.364(Ac.)
Depth of flow = 0.126(Ft.), Average velocity = 1.303(Ft/s)

++
Process from Point/Station 1.510 to Point/Station 1.520
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1533.100(Ft.)
Downstream point elevation = 1533.000(Ft.)
Channel length thru subarea = 45.000(Ft.)
Channel base width = 5.000(Ft.)
Slope or 'Z' of left channel bank = 0.000
Slope or 'Z' of right channel bank = 0.000
Manning's 'N' = 0.015
Maximum depth of channel = 5.000(Ft.)
Flow(q) thru subarea = 1.820(CFS)
Depth of flow = 0.224(Ft.), Average velocity = 1.626(Ft/s)
Channel flow top width = 5.000(Ft.)
Flow Velocity = 1.63(Ft/s)
Travel time = 0.46 min.
Time of concentration = 19.59 min.
Sub-Channel No. 1 Critical depth = 0.160(Ft.)
' ' ' Critical flow top width = 5.000(Ft.)
' ' ' Critical flow velocity= 2.273(Ft/s)
' ' ' Critical flow area = 0.801(Sq.Ft)

++
Process from Point/Station 1.520 to Point/Station 1.101
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.867(CFS)
Depth of flow = 0.135(Ft.), Average velocity = 1.244(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	6.00
2	2.20	5.00
3	4.80	4.00
4	6.80	3.00
5	8.90	2.00
6	11.10	1.00
7	15.70	0.00
8	26.50	0.00
9	26.50	6.00

Manning's 'N' friction factor = 0.025

Sub-Channel flow = 1.867(CFS)
' ' flow top width = 11.422(Ft.)
' ' velocity= 1.244(Ft/s)
' ' area = 1.501(Sq.Ft)
' ' Froude number = 0.605
Upstream point elevation = 1533.000(Ft.)
Downstream point elevation = 1532.600(Ft.)
Flow length = 60.000(Ft.)

Travel time = 0.80 min.
Time of concentration = 20.40 min.
Depth of flow = 0.135(Ft.)
Average velocity = 1.244(Ft/s)
Total irregular channel flow = 1.867(CFS)
Irregular channel normal depth above invert elev. = 0.135(Ft.)
Average velocity of channel(s) = 1.244(Ft/s)
Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.572
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 71.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 0.920(In/Hr) for a 2.0 year storm
Subarea runoff = 0.065(CFS) for 0.123(Ac.)
Total runoff = 1.885(CFS) Total area = 2.487(Ac.)
Depth of flow = 0.136(Ft.), Average velocity = 1.248(Ft/s)

++
Process from Point/Station 1.110 to Point/Station 1.101
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 2.487(Ac.)
Runoff from this stream = 1.885(CFS)
Time of concentration = 20.40 min.
Rainfall intensity = 0.920(In/Hr)

++
Process from Point/Station 1.610 to Point/Station 1.710
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 300.000(Ft.)
Top (of initial area) elevation = 1551.100(Ft.)
Bottom (of initial area) elevation = 1545.200(Ft.)
Difference in elevation = 5.900(Ft.)
Slope = 0.01967 s(percent)= 1.97
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.386 min.
Rainfall intensity = 1.224(In/Hr) for a 2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.629
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 71.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.596(CFS)
Total initial stream area = 0.774(Ac.)
Pervious area fraction = 1.000

++
Process from Point/Station 1.710 to Point/Station 1.720
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____
Estimated mean flow rate at midpoint of channel = 0.870(CFS)
Depth of flow = 0.127(Ft.), Average velocity = 2.022(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :
Point number 'X' coordinate 'Y' coordinate
1 0.00 0.50
2 0.00 0.00
3 26.70 0.50
Manning's 'N' friction factor = 0.013

Sub-Channel flow = 0.870(CFS)
' ' flow top width = 6.780(Ft.)
' ' velocity= 2.022(Ft/s)
' ' area = 0.430(Sq.Ft)
' ' Froude number = 1.414

Upstream point elevation = 1545.200(Ft.)
Downstream point elevation = 1543.300(Ft.)
Flow length = 150.000(Ft.)
Travel time = 1.24 min.
Time of concentration = 12.62 min.
Depth of flow = 0.127(Ft.)
Average velocity = 2.022(Ft/s)
Total irregular channel flow = 0.870(CFS)
Irregular channel normal depth above invert elev. = 0.127(Ft.)
Average velocity of channel(s) = 2.022(Ft/s)
Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Rainfall intensity = 1.164(In/Hr) for a 2.0 year storm
Subarea runoff = 0.619(CFS) for 0.624(Ac.)
Total runoff = 1.214(CFS) Total area = 1.398(Ac.)
Depth of flow = 0.144(Ft.), Average velocity = 2.198(Ft/s)

++
Process from Point/Station 1.720 to Point/Station 1.810
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow = 0.157(Ft.), Average velocity = 2.457(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	0.00	0.00
3	20.00	0.50

Manning's 'N' friction factor = 0.013

Sub-Channel flow = 1.214(CFS)
' ' flow top width = 6.288(Ft.)
' ' velocity= 2.457(Ft/s)
' ' area = 0.494(Sq.Ft)
' ' Froude number = 1.545

Upstream point elevation = 1543.300(Ft.)
Downstream point elevation = 1541.100(Ft.)
Flow length = 155.000(Ft.)
Travel time = 1.05 min.
Time of concentration = 13.67 min.
Depth of flow = 0.157(Ft.)
Average velocity = 2.457(Ft/s)
Total irregular channel flow = 1.214(CFS)
Irregular channel normal depth above invert elev. = 0.157(Ft.)
Average velocity of channel(s) = 2.457(Ft/s)

++
Process from Point/Station 1.810 to Point/Station 1.820
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.546(CFS)
Depth of flow = 0.450(Ft.), Average velocity = 1.808(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.75
2	1.50	0.00
3	2.50	0.00
4	4.00	0.75

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 1.546(CFS)
' ' flow top width = 2.800(Ft.)
' ' velocity= 1.808(Ft/s)
' ' area = 0.855(Sq.Ft)
' ' Froude number = 0.577

Upstream point elevation = 1541.100(Ft.)
Downstream point elevation = 1537.600(Ft.)
Flow length = 360.000(Ft.)
Travel time = 3.32 min.
Time of concentration = 16.99 min.
Depth of flow = 0.450(Ft.)
Average velocity = 1.808(Ft/s)
Total irregular channel flow = 1.546(CFS)
Irregular channel normal depth above invert elev. = 0.450(Ft.)
Average velocity of channel(s) = 1.808(Ft/s)
Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.643
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.500; Impervious fraction = 0.500
Rainfall intensity = 1.006(In/Hr) for a 2.0 year storm
Subarea runoff = 0.610(CFS) for 0.943(Ac.)
Total runoff = 1.824(CFS) Total area = 2.341(Ac.)
Depth of flow = 0.488(Ft.), Average velocity = 1.889(Ft/s)

++
Process from Point/Station 1.820 to Point/Station 1.830
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____
Depth of flow = 0.333(Ft.), Average velocity = 3.290(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.75
2	1.50	0.00
3	2.50	0.00
4	4.00	0.75

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 1.824(CFS)
' ' flow top width = 2.332(Ft.)
' ' velocity= 3.290(Ft/s)
' ' area = 0.555(Sq.Ft)
' ' Froude number = 1.189
Upstream point elevation = 1537.600(Ft.)
Downstream point elevation = 1535.600(Ft.)
Flow length = 45.000(Ft.)
Travel time = 0.23 min.
Time of concentration = 17.22 min.
Depth of flow = 0.333(Ft.)
Average velocity = 3.290(Ft/s)
Total irregular channel flow = 1.824(CFS)
Irregular channel normal depth above invert elev. = 0.333(Ft.)
Average velocity of channel(s) = 3.290(Ft/s)

++
Process from Point/Station 1.830 to Point/Station 1.910
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1535.600(Ft.)
Downstream point elevation = 1535.100(Ft.)
Channel length thru subarea = 10.000(Ft.)
Channel base width = 2.500(Ft.)
Slope or 'Z' of left channel bank = 3.000
Slope or 'Z' of right channel bank = 3.000
Manning's 'N' = 0.037
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 1.824(CFS)
Depth of flow = 0.210(Ft.), Average velocity = 2.775(Ft/s)
Channel flow top width = 3.760(Ft.)
Flow Velocity = 2.77(Ft/s)
Travel time = 0.06 min.
Time of concentration = 17.28 min.

Sub-Channel No. 1 Critical depth = 0.230(Ft.)
' ' ' Critical flow top width = 3.883(Ft.)
' ' ' Critical flow velocity= 2.480(Ft/s)
' ' ' Critical flow area = 0.736(Sq.Ft)

++
Process from Point/Station 1.910 to Point/Station 1.920
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.859(CFS)
Depth of flow = 0.101(Ft.), Average velocity = 0.612(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	2.50
2	0.00	0.00
3	30.00	0.00
4	30.00	2.50

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 1.859(CFS)
' ' flow top width = 30.000(Ft.)
' ' velocity= 0.612(Ft/s)
' ' area = 3.037(Sq.Ft)
' ' Froude number = 0.339

Upstream point elevation = 1535.100(Ft.)
Downstream point elevation = 1534.900(Ft.)
Flow length = 45.000(Ft.)
Travel time = 1.23 min.
Time of concentration = 18.51 min.
Depth of flow = 0.101(Ft.)
Average velocity = 0.612(Ft/s)
Total irregular channel flow = 1.859(CFS)

Irregular channel normal depth above invert elev. = 0.101(Ft.)
Average velocity of channel(s) = 0.612(Ft/s)
Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.430
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 0.965(In/Hr) for a 2.0 year storm
Subarea runoff = 0.037(CFS) for 0.089(Ac.)
Total runoff = 1.861(CFS) Total area = 2.430(Ac.)
Depth of flow = 0.101(Ft.), Average velocity = 0.612(Ft/s)

++
Process from Point/Station 1.920 to Point/Station 1.930
**** PIPEFLOW TRAVEL TIME (User specified size) ****
_____
Upstream point/station elevation = 1533.300(Ft.)
Downstream point/station elevation = 1532.800(Ft.)
Pipe length = 40.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.861(CFS)
Given pipe size = 12.00(In.)
Calculated individual pipe flow = 1.861(CFS)
Normal flow depth in pipe = 5.77(In.)
Flow top width inside pipe = 11.99(In.)
Critical Depth = 6.98(In.)
Pipe flow velocity = 4.99(Ft/s)
Travel time through pipe = 0.13 min.
Time of concentration (TC) = 18.64 min.

++
Process from Point/Station 1.930 to Point/Station 1.101
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 1532.800(Ft.)
Downstream point elevation = 1532.600(Ft.)
Channel length thru subarea = 10.000(Ft.)
Channel base width = 2.500(Ft.)
Slope or 'Z' of left channel bank = 3.000
Slope or 'Z' of right channel bank = 3.000
Manning's 'N' = 0.037
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 1.861(CFS)
Depth of flow = 0.274(Ft.), Average velocity = 2.041(Ft/s)
Channel flow top width = 4.147(Ft.)
Flow Velocity = 2.04(Ft/s)
Travel time = 0.08 min.
Time of concentration = 18.72 min.

```
Sub-Channel No. 1 Critical depth =      0.234(Ft.)
 '   '      '   Critical flow top width =      3.906(Ft.)
 '   '      '   Critical flow velocity=    2.479(Ft/s)
 '   '      '   Critical flow area =      0.751(Sq.Ft)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.610 to Point/Station        1.101
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.430(Ac.)
Runoff from this stream =      1.861(CFS)
Time of concentration =   18.72 min.
Rainfall intensity =     0.960(In/Hr)
Summary of stream data:

Stream   Flow rate      TC          Rainfall Intensity
 No.       (CFS)      (min)              (In/Hr)
1        1.885     20.40               0.920
2        1.861     18.72               0.960
Largest stream flow has longer time of concentration
Qp =      1.885 + sum of
                  Qb        Ia/Ib
                   1.861 *    0.959 =      1.785
Qp =      3.669

Total of 2 streams to confluence:
Flow rates before confluence point:
      1.885       1.861
Area of streams before confluence:
       2.487       2.430
Results of confluence:
Total flow rate =      3.669(CFS)
Time of concentration =    20.399 min.
Effective stream area after confluence =      4.917(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.101 to Point/Station        1.102
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Depth of flow =   0.179(Ft.), Average velocity =   1.825(Ft/s)
                ******* Irregular Channel Data ***********
---------------------------------------------------------------
Information entered for subchannel number 1 :
Point number     'X' coordinate     'Y' coordinate
                1          0.00           6.00
                2          2.50           5.00
                3          4.80           4.00
                4          6.80           3.00
                5          8.90           2.00
                6         11.10           1.00
                7         15.70           0.00
                8         26.50           0.00
                9         26.50           6.00
```

Manning's 'N' friction factor = 0.025

Sub-Channel flow = 3.669(CFS)
' ' flow top width = 11.625(Ft.)
' ' velocity= 1.825(Ft/s)
' ' area = 2.011(Sq.Ft)
' ' Froude number = 0.773

Upstream point elevation = 1532.600(Ft.)
Downstream point elevation = 1532.400(Ft.)
Flow length = 20.000(Ft.)
Travel time = 0.18 min.
Time of concentration = 20.58 min.
Depth of flow = 0.179(Ft.)
Average velocity = 1.825(Ft/s)
Total irregular channel flow = 3.669(CFS)
Irregular channel normal depth above invert elev. = 0.179(Ft.)
Average velocity of channel(s) = 1.825(Ft/s)
End of computations, total study area = 4.92 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.569
Area averaged RI index number = 74.7

PROPOSED CONDITIONS – 10-YEAR DESIGN STORM EVENT

```
                    Riverside County Rational Hydrology Program
CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
                 Rational Hydrology Study        Date: 11/16/23  File:boatshowd1pr10yr.out
--------------------------------------------------------------------------
 *********  Hydrology Study Control Information **********
Program License Serial Number 6374
--------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Perris Valley ] area used.
10 year storm 10 minute intensity =  1.880(In/Hr)
10 year storm 60 minute intensity =  0.780(In/Hr)
100 year storm 10 minute intensity =  2.690(In/Hr)
100 year storm 60 minute intensity =  1.120(In/Hr)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.780(In/Hr)
Slope of intensity duration curve = 0.4900


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.110 to Point/Station        1.210
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   250.000(Ft.)
Top (of initial area) elevation =  1551.100(Ft.)
Bottom (of initial area) elevation =  1545.400(Ft.)
Difference in elevation =     5.700(Ft.)
Slope =    0.02280  s(percent)=       2.28
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.277 min.
Rainfall intensity =      1.852(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.806
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  86.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.779(CFS)
Total initial stream area =        0.522(Ac.)
Pervious area fraction = 1.000
```

++
Process from Point/Station 1.210 to Point/Station 1.310
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____
Estimated mean flow rate at midpoint of channel = 1.290(CFS)
Depth of flow = 0.120(Ft.), Average velocity = 1.799(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :
Point number 'X' coordinate 'Y' coordinate
1 0.00 0.50
2 0.00 0.00
3 20.00 0.20
Manning's 'N' friction factor = 0.013

Sub-Channel flow = 1.290(CFS)
' ' flow top width = 11.974(Ft.)
' ' velocity= 1.799(Ft/s)
' ' area = 0.717(Sq.Ft)
' ' Froude number = 1.296

Upstream point elevation = 1545.400(Ft.)
Downstream point elevation = 1542.400(Ft.)
Flow length = 280.000(Ft.)
Travel time = 2.59 min.
Time of concentration = 12.87 min.
Depth of flow = 0.120(Ft.)
Average velocity = 1.799(Ft/s)
Total irregular channel flow = 1.290(CFS)
Irregular channel normal depth above invert elev. = 0.120(Ft.)
Average velocity of channel(s) = 1.799(Ft/s)
Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Rainfall intensity = 1.658(In/Hr) for a 10.0 year storm
Subarea runoff = 0.995(CFS) for 0.685(Ac.)
Total runoff = 1.774(CFS) Total area = 1.207(Ac.)
Depth of flow = 0.135(Ft.), Average velocity = 1.948(Ft/s)

++
Process from Point/Station 1.310 to Point/Station 1.320
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____
Estimated mean flow rate at midpoint of channel = 2.354(CFS)
Depth of flow = 0.520(Ft.), Average velocity = 2.221(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.75
2	1.50	0.00
3	2.50	0.00
4	4.00	0.75

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 2.354(CFS)
' ' flow top width = 3.079(Ft.)
' ' velocity= 2.221(Ft/s)
' ' area = 1.060(Sq.Ft)
' ' Froude number = 0.667

Upstream point elevation = 1542.400(Ft.)
Downstream point elevation = 1537.500(Ft.)
Flow length = 390.000(Ft.)
Travel time = 2.93 min.
Time of concentration = 15.80 min.
Depth of flow = 0.520(Ft.)
Average velocity = 2.221(Ft/s)
Total irregular channel flow = 2.354(CFS)
Irregular channel normal depth above invert elev. = 0.520(Ft.)
Average velocity of channel(s) = 2.221(Ft/s)
Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.772
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Rainfall intensity = 1.500(In/Hr) for a 10.0 year storm
Subarea runoff = 1.086(CFS) for 0.938(Ac.)
Total runoff = 2.859(CFS) Total area = 2.145(Ac.)
Depth of flow = 0.571(Ft.), Average velocity = 2.337(Ft/s)

++
Process from Point/Station 1.320 to Point/Station 1.330
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow = 0.486(Ft.), Average velocity = 2.987(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.75
2	1.50	0.00
3	2.50	0.00
4	4.00	0.75

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 2.859(CFS)
' ' flow top width = 2.943(Ft.)
' ' velocity= 2.987(Ft/s)
' ' area = 0.957(Sq.Ft)
' ' Froude number = 0.923
Upstream point elevation = 1537.500(Ft.)
Downstream point elevation = 1536.400(Ft.)
Flow length = 45.000(Ft.)
Travel time = 0.25 min.
Time of concentration = 16.05 min.
Depth of flow = 0.486(Ft.)
Average velocity = 2.987(Ft/s)
Total irregular channel flow = 2.859(CFS)
Irregular channel normal depth above invert elev. = 0.486(Ft.)
Average velocity of channel(s) = 2.987(Ft/s)

++
Process from Point/Station 1.330 to Point/Station 1.410
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1536.400(Ft.)
Downstream point elevation = 1536.300(Ft.)
Channel length thru subarea = 10.000(Ft.)
Channel base width = 2.500(Ft.)
Slope or 'Z' of left channel bank = 3.000
Slope or 'Z' of right channel bank = 3.000
Manning's 'N' = 0.037
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 2.859(CFS)
Depth of flow = 0.418(Ft.), Average velocity = 1.821(Ft/s)
Channel flow top width = 5.010(Ft.)
Flow Velocity = 1.82(Ft/s)
Travel time = 0.09 min.
Time of concentration = 16.14 min.
Sub-Channel No. 1 Critical depth = 0.301(Ft.)
' ' ' Critical flow top width = 4.305(Ft.)
' ' ' Critical flow velocity= 2.794(Ft/s)
' ' ' Critical flow area = 1.023(Sq.Ft)

++
Process from Point/Station 1.410 to Point/Station 1.420
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 2.885(CFS)
Depth of flow = 0.157(Ft.), Average velocity = 0.613(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	2.50
2	0.00	0.00
3	30.00	0.00
4	30.00	2.50

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 2.885(CFS)
' ' flow top width = 30.000(Ft.)
' ' velocity= 0.613(Ft/s)
' ' area = 4.705(Sq.Ft)
' ' Froude number = 0.273

Upstream point elevation = 1536.300(Ft.)
Downstream point elevation = 1536.200(Ft.)
Flow length = 40.000(Ft.)
Travel time = 1.09 min.
Time of concentration = 17.23 min.
Depth of flow = 0.157(Ft.)
Average velocity = 0.613(Ft/s)
Total irregular channel flow = 2.885(CFS)
Irregular channel normal depth above invert elev. = 0.157(Ft.)
Average velocity of channel(s) = 0.613(Ft/s)
Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.679
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.438(In/Hr) for a 10.0 year storm
Subarea runoff = 0.037(CFS) for 0.038(Ac.)
Total runoff = 2.897(CFS) Total area = 2.183(Ac.)
Depth of flow = 0.157(Ft.), Average velocity = 0.614(Ft/s)

++
Process from Point/Station 1.420 to Point/Station 1.430
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 1533.600(Ft.)
Downstream point/station elevation = 1533.400(Ft.)
Pipe length = 60.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.897(CFS)
Given pipe size = 12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
0.513(Ft.) at the headworks or inlet of the pipe(s)
Pipe friction loss = 0.396(Ft.)
Minor friction loss = 0.317(Ft.) K-factor = 1.50
Pipe flow velocity = 3.69(Ft/s)
Travel time through pipe = 0.27 min.
Time of concentration (TC) = 17.50 min.

++
Process from Point/Station 1.430 to Point/Station 1.440
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1533.400(Ft.)
Downstream point elevation = 1533.300(Ft.)
Channel length thru subarea = 10.000(Ft.)
Channel base width = 2.500(Ft.)
Slope or 'Z' of left channel bank = 3.000
Slope or 'Z' of right channel bank = 3.000
Manning's 'N' = 0.037
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 2.897(CFS)
Depth of flow = 0.421(Ft.), Average velocity = 1.828(Ft/s)
Channel flow top width = 5.027(Ft.)
Flow Velocity = 1.83(Ft/s)
Travel time = 0.09 min.
Time of concentration = 17.59 min.

Sub-Channel No. 1 Critical depth = 0.305(Ft.)
' ' ' Critical flow top width = 4.328(Ft.)
' ' ' Critical flow velocity= 2.785(Ft/s)
' ' ' Critical flow area = 1.040(Sq.Ft)

++
Process from Point/Station 1.440 to Point/Station 1.510
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 3.017(CFS)
Depth of flow = 0.171(Ft.), Average velocity = 1.581(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	6.00
2	2.20	5.00
3	4.80	4.00
4	6.80	3.00
5	8.90	2.00
6	11.10	1.00
7	15.70	0.00
8	26.50	0.00
9	26.50	6.00

Manning's 'N' friction factor = 0.025

Sub-Channel flow = 3.017(CFS)
' ' flow top width = 11.584(Ft.)
' ' velocity= 1.581(Ft/s)
' ' area = 1.909(Sq.Ft)
' ' Froude number = 0.686

Upstream point elevation = 1533.300(Ft.)
Downstream point elevation = 1533.100(Ft.)
Flow length = 25.000(Ft.)
Travel time = 0.26 min.
Time of concentration = 17.85 min.
Depth of flow = 0.171(Ft.)
Average velocity = 1.581(Ft/s)
Total irregular channel flow = 3.017(CFS)
Irregular channel normal depth above invert elev. = 0.171(Ft.)
Average velocity of channel(s) = 1.581(Ft/s)
Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.780
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 86.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.413(In/Hr) for a 10.0 year storm
Subarea runoff = 0.199(CFS) for 0.181(Ac.)
Total runoff = 3.096(CFS) Total area = 2.364(Ac.)
Depth of flow = 0.173(Ft.), Average velocity = 1.596(Ft/s)

++
Process from Point/Station 1.510 to Point/Station 1.520
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1533.100(Ft.)
Downstream point elevation = 1533.000(Ft.)
Channel length thru subarea = 45.000(Ft.)
Channel base width = 5.000(Ft.)
Slope or 'Z' of left channel bank = 0.000
Slope or 'Z' of right channel bank = 0.000
Manning's 'N' = 0.015
Maximum depth of channel = 5.000(Ft.)
Flow(q) thru subarea = 3.096(CFS)
Depth of flow = 0.312(Ft.), Average velocity = 1.986(Ft/s)
Channel flow top width = 5.000(Ft.)
Flow Velocity = 1.99(Ft/s)
Travel time = 0.38 min.
Time of concentration = 18.23 min.

Sub-Channel No. 1 Critical depth = 0.229(Ft.)
' ' ' Critical flow top width = 5.000(Ft.)
' ' ' Critical flow velocity= 2.710(Ft/s)
' ' ' Critical flow area = 1.143(Sq.Ft)

++
Process from Point/Station 1.520 to Point/Station 1.101
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 3.177(CFS)
Depth of flow = 0.186(Ft.), Average velocity = 1.523(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	6.00
2	2.20	5.00
3	4.80	4.00
4	6.80	3.00
5	8.90	2.00
6	11.10	1.00
7	15.70	0.00
8	26.50	0.00
9	26.50	6.00

Manning's 'N' friction factor = 0.025

Sub-Channel flow = 3.177(CFS)
' ' flow top width = 11.654(Ft.)
' ' velocity= 1.523(Ft/s)
' ' area = 2.085(Sq.Ft)
' ' Froude number = 0.635

Upstream point elevation = 1533.000(Ft.)
Downstream point elevation = 1532.600(Ft.)
Flow length = 60.000(Ft.)
Travel time = 0.66 min.
Time of concentration = 18.89 min.
Depth of flow = 0.186(Ft.)
Average velocity = 1.523(Ft/s)
Total irregular channel flow = 3.177(CFS)
Irregular channel normal depth above invert elev. = 0.186(Ft.)
Average velocity of channel(s) = 1.523(Ft/s)
Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.777
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 86.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.374(In/Hr) for a 10.0 year storm
Subarea runoff = 0.131(CFS) for 0.123(Ac.)
Total runoff = 3.227(CFS) Total area = 2.487(Ac.)
Depth of flow = 0.188(Ft.), Average velocity = 1.532(Ft/s)

++
Process from Point/Station 1.110 to Point/Station 1.101
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 2.487(Ac.)
Runoff from this stream = 3.227(CFS)
Time of concentration = 18.89 min.
Rainfall intensity = 1.374(In/Hr)

++
Process from Point/Station 1.610 to Point/Station 1.710
**** INITIAL AREA EVALUATION ****
_____
Initial area flow distance = 300.000(Ft.)
Top (of initial area) elevation = 1551.100(Ft.)
Bottom (of initial area) elevation = 1545.200(Ft.)
Difference in elevation = 5.900(Ft.)
Slope = 0.01967 s(percent)= 1.97
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.386 min.
Rainfall intensity = 1.761(In/Hr) for a 10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.801
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000

RI index for soil(AMC 2) = 86.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.092(CFS)
Total initial stream area = 0.774(Ac.)
Pervious area fraction = 1.000

++
Process from Point/Station 1.710 to Point/Station 1.720
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____
Estimated mean flow rate at midpoint of channel = 1.532(CFS)
Depth of flow = 0.157(Ft.), Average velocity = 2.329(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :
Point number 'X' coordinate 'Y' coordinate
1 0.00 0.50
2 0.00 0.00
3 26.70 0.50
Manning's 'N' friction factor = 0.013

Sub-Channel flow = 1.532(CFS)
' ' flow top width = 8.382(Ft.)
' ' velocity= 2.329(Ft/s)
' ' area = 0.658(Sq.Ft)
' ' Froude number = 1.465

Upstream point elevation = 1545.200(Ft.)
Downstream point elevation = 1543.300(Ft.)
Flow length = 150.000(Ft.)
Travel time = 1.07 min.
Time of concentration = 12.46 min.
Depth of flow = 0.157(Ft.)
Average velocity = 2.329(Ft/s)
Total irregular channel flow = 1.532(CFS)
Irregular channel normal depth above invert elev. = 0.157(Ft.)
Average velocity of channel(s) = 2.329(Ft/s)
Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.876
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Rainfall intensity = 1.685(In/Hr) for a 10.0 year storm
Subarea runoff = 0.921(CFS) for 0.624(Ac.)
Total runoff = 2.014(CFS) Total area = 1.398(Ac.)
Depth of flow = 0.174(Ft.), Average velocity = 2.494(Ft/s)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       1.720 to Point/Station       1.810
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____________________________________________________________________________
Depth of flow =   0.190(Ft.), Average velocity =   2.789(Ft/s)
                ******* Irregular Channel Data ***********
-------------------------------------------------------------
Information entered for subchannel number 1 :
Point number     'X' coordinate     'Y' coordinate
                1            0.00            0.50
                2            0.00            0.00
                3           20.00            0.50
Manning's 'N' friction factor =   0.013
-------------------------------------------------------------
Sub-Channel flow  =     2.014(CFS)
 '    '           flow top width =     7.600(Ft.)
 '    '   velocity=    2.789(Ft/s)
 '    '           area =     0.722(Sq.Ft)
 '    '           Froude number =     1.594

Upstream point elevation =  1543.300(Ft.)
Downstream point elevation =  1541.100(Ft.)
Flow length =   155.000(Ft.)
Travel time  =    0.93 min.
Time of concentration =   13.39 min.
Depth of flow =   0.190(Ft.)
Average velocity =   2.789(Ft/s)
Total irregular channel flow =     2.014(CFS)
Irregular channel normal depth above invert elev. =   0.190(Ft.)
Average velocity of channel(s) =   2.789(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       1.810 to Point/Station       1.820
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      2.586(CFS)
Depth of flow =   0.579(Ft.), Average velocity =   2.071(Ft/s)
                ******* Irregular Channel Data ***********
-------------------------------------------------------------
Information entered for subchannel number 1 :
Point number     'X' coordinate     'Y' coordinate
                1            0.00            0.75
                2            1.50            0.00
                3            2.50            0.00
                4            4.00            0.75
Manning's 'N' friction factor =   0.035
-------------------------------------------------------------
Sub-Channel flow  =     2.586(CFS)
 '    '           flow top width =     3.315(Ft.)
 '    '   velocity=    2.071(Ft/s)
 '    '           area =     1.249(Sq.Ft)
 '    '           Froude number =     0.595
```

Upstream point elevation = 1541.100(Ft.)
Downstream point elevation = 1537.600(Ft.)
Flow length = 360.000(Ft.)
Travel time = 2.90 min.
Time of concentration = 16.28 min.
Depth of flow = 0.579(Ft.)
Average velocity = 2.071(Ft/s)
Total irregular channel flow = 2.586(CFS)
Irregular channel normal depth above invert elev. = 0.579(Ft.)
Average velocity of channel(s) = 2.071(Ft/s)
Adding area flow to channel
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.770
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Rainfall intensity = 1.478(In/Hr) for a 10.0 year storm
Subarea runoff = 1.073(CFS) for 0.943(Ac.)
Total runoff = 3.087(CFS) Total area = 2.341(Ac.)
Depth of flow = 0.630(Ft.), Average velocity = 2.169(Ft/s)

++
Process from Point/Station 1.820 to Point/Station 1.830
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____
Depth of flow = 0.435(Ft.), Average velocity = 3.796(Ft/s)
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.75
2	1.50	0.00
3	2.50	0.00
4	4.00	0.75

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 3.087(CFS)
' ' flow top width = 2.740(Ft.)
' ' velocity= 3.796(Ft/s)
' ' area = 0.813(Sq.Ft)
' ' Froude number = 1.228
Upstream pint elevation = 1537.600(Ft.)
Downstream point elevation = 1535.600(Ft.)
Flow length = 45.000(Ft.)
Travel time = 0.20 min.
Time of concentration = 16.48 min.
Depth of flow = 0.435(Ft.)
Average velocity = 3.796(Ft/s)
Total irregular channel flow = 3.087(CFS)
Irregular channel normal depth above invert elev. = 0.435(Ft.)
Average velocity of channel(s) = 3.796(Ft/s)

++
Process from Point/Station 1.830 to Point/Station 1.910
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 1535.600(Ft.)
Downstream point elevation = 1535.100(Ft.)
Channel length thru subarea = 10.000(Ft.)
Channel base width = 2.500(Ft.)
Slope or 'Z' of left channel bank = 3.000
Slope or 'Z' of right channel bank = 3.000
Manning's 'N' = 0.037
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 3.087(CFS)
Depth of flow = 0.282(Ft.), Average velocity = 3.274(Ft/s)
Channel flow top width = 4.191(Ft.)
Flow Velocity = 3.27(Ft/s)
Travel time = 0.05 min.
Time of concentration = 16.53 min.

Sub-Channel No. 1 Critical depth = 0.316(Ft.)
' ' ' Critical flow top width = 4.398(Ft.)
' ' ' Critical flow velocity= 2.829(Ft/s)
' ' ' Critical flow area = 1.091(Sq.Ft)

++
Process from Point/Station 1.910 to Point/Station 1.920
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 3.146(CFS)
Depth of flow = 0.139(Ft.), Average velocity = 0.755(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	2.50
2	0.00	0.00
3	30.00	0.00
4	30.00	2.50

Manning's 'N' friction factor = 0.035

Sub-Channel flow = 3.146(CFS)
' ' flow top width = 30.000(Ft.)
' ' velocity= 0.755(Ft/s)
' ' area = 4.168(Sq.Ft)
' ' Froude number = 0.357

Upstream point elevation = 1535.100(Ft.)
Downstream point elevation = 1534.900(Ft.)
Flow length = 45.000(Ft.)
Travel time = 0.99 min.
Time of concentration = 17.53 min.
Depth of flow = 0.139(Ft.)
Average velocity = 0.755(Ft/s)
Total irregular channel flow = 3.146(CFS)

Irregular channel normal depth above invert elev. = 0.139(Ft.)
Average velocity of channel(s) = 0.755(Ft/s)
Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.677
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.426(In/Hr) for a 10.0 year storm
Subarea runoff = 0.086(CFS) for 0.089(Ac.)
Total runoff = 3.173(CFS) Total area = 2.430(Ac.)
Depth of flow = 0.140(Ft.), Average velocity = 0.757(Ft/s)

++
Process from Point/Station 1.920 to Point/Station 1.930
**** PIPEFLOW TRAVEL TIME (User specified size) ****
_____
Upstream point/station elevation = 1533.300(Ft.)
Downstream point/station elevation = 1532.800(Ft.)
Pipe length = 40.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.173(CFS)
Given pipe size = 12.00(In.)
Calculated individual pipe flow = 3.173(CFS)
Normal flow depth in pipe = 8.10(In.)
Flow top width inside pipe = 11.24(In.)
Critical Depth = 9.16(In.)
Pipe flow velocity = 5.63(Ft/s)
Travel time through pipe = 0.12 min.
Time of concentration (TC) = 17.64 min.

++
Process from Point/Station 1.930 to Point/Station 1.101
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 1532.800(Ft.)
Downstream point elevation = 1532.600(Ft.)
Channel length thru subarea = 10.000(Ft.)
Channel base width = 2.500(Ft.)
Slope or 'Z' of left channel bank = 3.000
Slope or 'Z' of right channel bank = 3.000
Manning's 'N' = 0.037
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 3.173(CFS)
Depth of flow = 0.367(Ft.), Average velocity = 2.398(Ft/s)
Channel flow top width = 4.704(Ft.)
Flow Velocity = 2.40(Ft/s)
Travel time = 0.07 min.
Time of concentration = 17.71 min.

Sub-Channel No. 1 Critical depth = 0.320(Ft.)
' ' ' Critical flow top width = 4.422(Ft.)
' ' ' Critical flow velocity= 2.862(Ft/s)
' ' ' Critical flow area = 1.109(Sq.Ft)

++
Process from Point/Station 1.610 to Point/Station 1.101
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 2.430(Ac.)
Runoff from this stream = 3.173(CFS)
Time of concentration = 17.71 min.
Rainfall intensity = 1.418(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	3.227	18.89	1.374
2	3.173	17.71	1.418

Largest stream flow has longer time of concentration
Qp = 3.227 + sum of

Qb	Ia/Ib	
3.173 *	0.969 =	3.075

Qp = 6.302

Total of 2 streams to confluence:
Flow rates before confluence point:
3.227 3.173
Area of streams before confluence:
2.487 2.430
Results of confluence:
Total flow rate = 6.302(CFS)
Time of concentration = 18.888 min.
Effective stream area after confluence = 4.917(Ac.)

++
Process from Point/Station 1.101 to Point/Station 1.102
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow = 0.248(Ft.), Average velocity = 2.236(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	6.00
2	2.50	5.00
3	4.80	4.00
4	6.80	3.00
5	8.90	2.00
6	11.10	1.00
7	15.70	0.00
8	26.50	0.00
9	26.50	6.00

Manning's 'N' friction factor = 0.025

Sub-Channel flow = 6.302(CFS)
' ' flow top width = 11.940(Ft.)
' ' velocity= 2.236(Ft/s)
' ' area = 2.818(Sq.Ft)
' ' Froude number = 0.811

Upstream point elevation = 1532.600(Ft.)
Downstream point elevation = 1532.400(Ft.)
Flow length = 20.000(Ft.)
Travel time = 0.15 min.
Time of concentration = 19.04 min.
Depth of flow = 0.248(Ft.)
Average velocity = 2.236(Ft/s)
Total irregular channel flow = 6.302(CFS)
Irregular channel normal depth above invert elev. = 0.248(Ft.)
Average velocity of channel(s) = 2.236(Ft/s)
End of computations, total study area = 4.92 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.569
Area averaged RI index number = 74.7

PROPOSED CONDITIONS – 10-YEAR, 24-HR STORM UNIT HYDROGRAPH

```
                U n i t   H y d r o g r a p h   A n a l y s i s
                Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
                  Study date  11/16/23 File: BOATSHOWPRD1UH2410.out
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------
Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978
------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used
 English Units used in output format
------------------------------------------------------------------------
Drainage Area =       4.92(Ac.)  =      0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       4.92(Ac.)  =      0.008 Sq. Mi.
Length along longest watercourse =    1115.00(Ft.)
Length along longest watercourse measured to centroid =     100.00(Ft.)
Length along longest watercourse =      0.211 Mi.
Length along longest watercourse measured to centroid =      0.019 Mi.
Difference in elevation =      17.80(Ft.)
Slope along watercourse =     84.2906 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time =    0.032 Hr.
Lag time =     1.90 Min.
25% of lag time =     0.48 Min.
40% of lag time =     0.76 Min.
Unit time =    30.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       4.92             2.25                 11.06

100 YEAR Area rainfall data:
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       4.92             6.40                 31.47

STORM EVENT (YEAR) =   10.00
Area Averaged 2-Year Rainfall =    2.250(In)
Area Averaged 100-Year Rainfall =    6.400(In)

Point rain (area averaged) =    3.957(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    3.957(In)

Sub-Area Data:
Area(Ac.)        Runoff Index   Impervious %
    4.917          74.70         0.431
 Total Area Entered =      4.92(Ac.)
```

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
74.7	74.7	0.307	0.431	0.188	1.000	0.188

Sum (F) = 0.188

Area averaged mean soil loss (F) (In/Hr) = 0.188
Minimum soil loss rate ((In/Hr)) = 0.094
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.555

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.500	1577.445	100.000	4.955
		Sum = 100.000	Sum= 4.955

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low		Effective (In/Hr)
1	0.50	0.50	0.040	(0.329)	0.022	0.018
2	1.00	0.70	0.055	(0.322)	0.031	0.025
3	1.50	0.60	0.047	(0.314)	0.026	0.021
4	2.00	0.70	0.055	(0.307)	0.031	0.025
5	2.50	0.80	0.063	(0.299)	0.035	0.028
6	3.00	1.00	0.079	(0.292)	0.044	0.035
7	3.50	1.00	0.079	(0.285)	0.044	0.035
8	4.00	1.10	0.087	(0.278)	0.048	0.039
9	4.50	1.30	0.103	(0.271)	0.057	0.046
10	5.00	1.50	0.119	(0.264)	0.066	0.053
11	5.50	1.30	0.103	(0.257)	0.057	0.046
12	6.00	1.60	0.127	(0.250)	0.070	0.056
13	6.50	1.80	0.142	(0.244)	0.079	0.063
14	7.00	2.00	0.158	(0.237)	0.088	0.070
15	7.50	2.10	0.166	(0.231)	0.092	0.074
16	8.00	2.50	0.198	(0.225)	0.110	0.088
17	8.50	3.00	0.237	(0.218)	0.132	0.106
18	9.00	3.30	0.261	(0.212)	0.145	0.116
19	9.50	3.90	0.309	(0.206)	0.171	0.137
20	10.00	4.30	0.340	(0.201)	0.189	0.151
21	10.50	3.00	0.237	(0.195)	0.132	0.106
22	11.00	4.00	0.317	(0.189)	0.176	0.141
23	11.50	3.80	0.301	(0.184)	0.167	0.134
24	12.00	3.50	0.277	(0.178)	0.154	0.123
25	12.50	5.10	0.404	0.173	(0.224)	0.231
26	13.00	5.70	0.451	0.168	(0.250)	0.283
27	13.50	6.80	0.538	0.163	(0.299)	0.375
28	14.00	4.60	0.364	0.158	(0.202)	0.206
29	14.50	5.30	0.419	0.153	(0.233)	0.266
30	15.00	5.10	0.404	0.148	(0.224)	0.255

31	15.50	4.70	0.372	0.144	(0.207)	0.228
32	16.00	3.80	0.301	0.140	(0.167)	0.161
33	16.50	0.80	0.063	(0.135)	0.035	0.028
34	17.00	0.60	0.047	(0.131)	0.026	0.021
35	17.50	1.00	0.079	(0.127)	0.044	0.035
36	18.00	0.90	0.071	(0.124)	0.040	0.032
37	18.50	0.80	0.063	(0.120)	0.035	0.028
38	19.00	0.50	0.040	(0.117)	0.022	0.018
39	19.50	0.70	0.055	(0.113)	0.031	0.025
40	20.00	0.50	0.040	(0.110)	0.022	0.018
41	20.50	0.60	0.047	(0.107)	0.026	0.021
42	21.00	0.50	0.040	(0.105)	0.022	0.018
43	21.50	0.50	0.040	(0.102)	0.022	0.018
44	22.00	0.50	0.040	(0.100)	0.022	0.018
45	22.50	0.50	0.040	(0.098)	0.022	0.018
46	23.00	0.40	0.032	(0.096)	0.018	0.014
47	23.50	0.40	0.032	(0.095)	0.018	0.014
48	24.00	0.40	0.032	(0.094)	0.018	0.014

(Loss Rate Not Used)

Sum = 100.0 Sum = 4.1

Flood volume = Effective rainfall 2.04(In)
times area 4.9(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
Total soil loss = 1.92(In)
Total soil loss = 0.786(Ac.Ft)
Total rainfall = 3.96(In)
Flood volume = 36411.3 Cubic Feet
Total soil loss = 34221.5 Cubic Feet

Peak flow rate of this hydrograph = 1.861(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 30 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+30	0.0036	0.09	Q	|	|	|	|
1+ 0	0.0087	0.12	Q	|	|	|	|
1+30	0.0130	0.10	Q	|	|	|	|
2+ 0	0.0180	0.12	Q	|	|	|	|
2+30	0.0238	0.14	QV	|	|	|	|
3+ 0	0.0310	0.17	QV	|	|	|	|
3+30	0.0382	0.17	QV	|	|	|	|
4+ 0	0.0462	0.19	Q V	|	|	|	|
4+30	0.0555	0.23	Q V	|	|	|	|
5+ 0	0.0664	0.26	|Q V	|	|	|	|
5+30	0.0757	0.23	Q V	|	|	|	|
6+ 0	0.0873	0.28	|Q V	|	|	|	|
6+30	0.1003	0.31	|Q V	|	|	|	|
7+ 0	0.1147	0.35	|Q V	|	|	|	|
7+30	0.1298	0.37	|Q V	|	|	|	|
8+ 0	0.1479	0.44	|Q V	|	|	|	|

```
 8+30     0.1695     0.52  | Q     V |        |        |        |
 9+ 0     0.1933     0.58  | Q     V|        |        |        |
 9+30     0.2214     0.68  | Q      V        |        |        |
10+ 0     0.2524     0.75  |  Q       V      |        |        |
10+30     0.2741     0.52  | Q      |  V     |        |        |
11+ 0     0.3029     0.70  | Q      |   V    |        |        |
11+30     0.3303     0.66  | Q      |    V   |        |        |
12+ 0     0.3556     0.61  | Q      |     V  |        |        |
12+30     0.4028     1.14  |   Q    |      V|        |        |
13+ 0     0.4609     1.40  |   Q    |        V        |        |
13+30     0.5378     1.86  |     Q  |        |   V    |        |
14+ 0     0.5800     1.02  |   Q    |        |     V  |        |
14+30     0.6346     1.32  |    Q   |        |        V        |
15+ 0     0.6869     1.27  |    Q   |        |         V       |
15+30     0.7336     1.13  |   Q    |        |         |   V   |
16+ 0     0.7666     0.80  |  Q     |        |         |   V   |
16+30     0.7724     0.14  Q        |        |         |    V  |
17+ 0     0.7767     0.10  Q        |        |         |    V  |
17+30     0.7840     0.17  Q        |        |         |     V |
18+ 0     0.7904     0.16  Q        |        |         |     V |
18+30     0.7962     0.14  Q        |        |         |      V|
19+ 0     0.7998     0.09  Q        |        |         |      V|
19+30     0.8049     0.12  Q        |        |         |      V|
20+ 0     0.8085     0.09  Q        |        |         |      V|
20+30     0.8128     0.10  Q        |        |         |      V|
21+ 0     0.8164     0.09  Q        |        |         |      V|
21+30     0.8200     0.09  Q        |        |         |      V|
22+ 0     0.8236     0.09  Q        |        |         |      V|
22+30     0.8272     0.09  Q        |        |         |      V|
23+ 0     0.8301     0.07  Q        |        |         |      V|
23+30     0.8330     0.07  Q        |        |         |      V|
24+ 0     0.8359     0.07  Q        |        |         |      V
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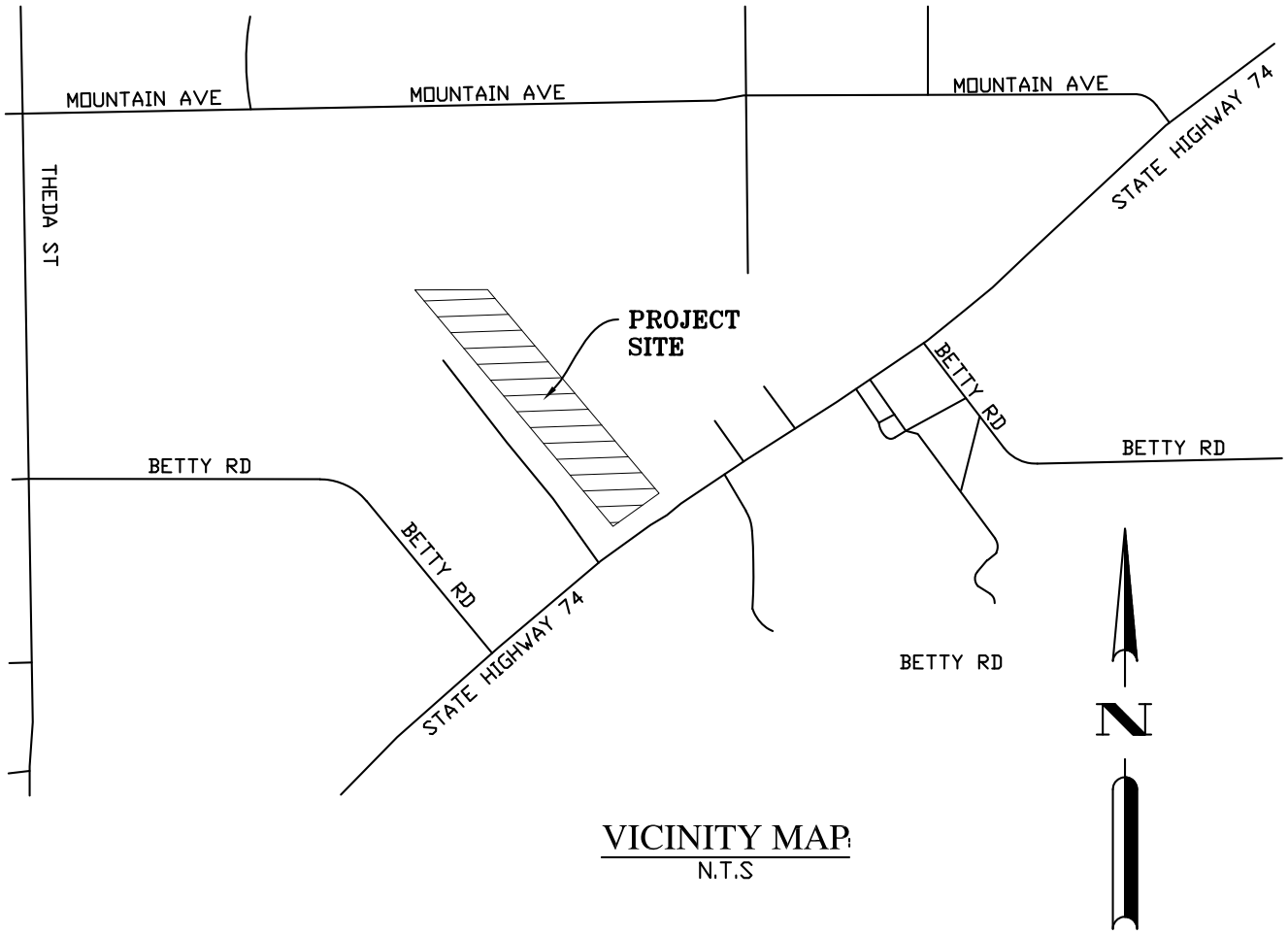
ATTACHMENT 4: EXHIBITS

This attachment contains the vicinity map, the existing condition exhibit, and the proposed condition exhibits. Please see the attached exhibits.

VICINITY MAP, LOCATION MAP, LEGAL



VICINITY MAP
N.T.S

SITE ADDRESS:

24803 HIGHWAY 74
PERRIS, CALIFORNIA 92530

APN:

342-120-052-7

THOMAS BROTHERS:

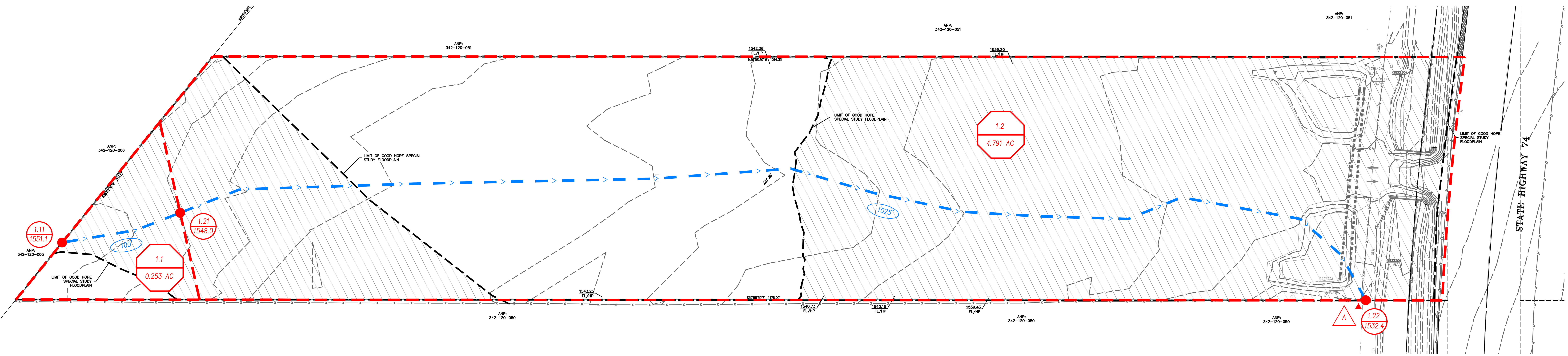
PAGE 807, GRID B6
PAGE 807, GRID C6

LOCATION:

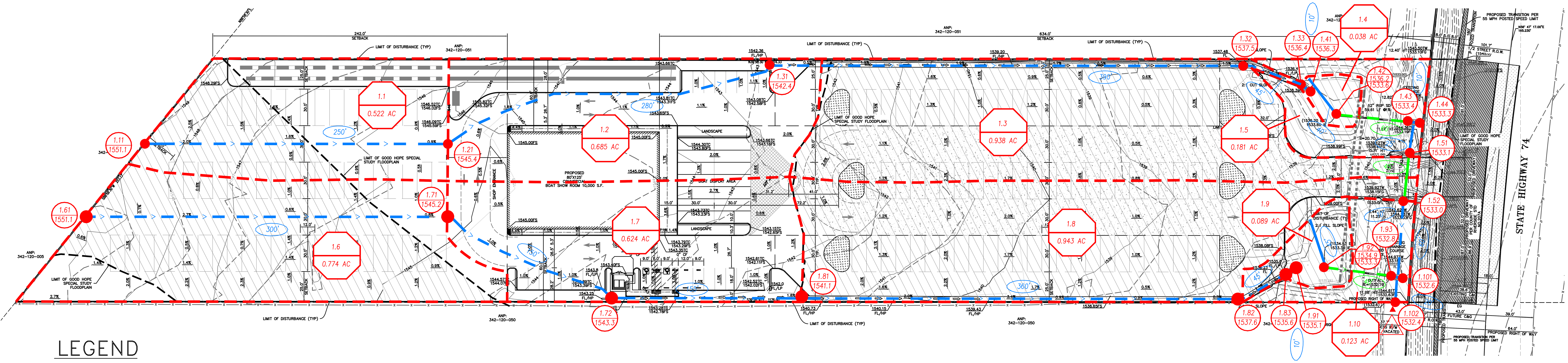
T5S R4W SEC2 SW

COORDINATES:

33° 45' 40.17" N
-117° 16' 7.99" W



EXISTING CONDITIONS



PROPOSED CONDITIONS

LEGEND

DRAINAGE AREA BOUNDARY

STUDY AREA (ACRES)

OVERLAND FLOW PATH, DIRECTION, LENGTH

PIPED, FLOW PATH, DIRECTION, LENGTH

STUDY ELEVATION (FEET)

CONFLUENCE POINT

RIVERSIDE COUNTY FLOOD PLAIN LIMITS

RIVERSIDE COUNTY FLOOD PLAIN AREAS

COMPLIANCE POINT A
EXISTING CONDITIONS SUMMARY

DATA	2-YEAR	10-YEAR
AMC	I	II
TOTAL DISCHARGE (CFS)	2.8	5.7
TIME OF CONCENTRATION (MIN)	20.48	18.28
AREA (ACRES)	5.044	5.044
2-YEAR, 24-HOUR UH VOLUME(ACRE-FT)	N/A	0.6561
STORAGE VOLUME (ACRE-FT)	0.0000	0.0000

COMPLIANCE POINT A
PROPOSED CONDITIONS SUMMARY

DATA	2-YEAR	10-YEAR
AMC	I	II
TOTAL DISCHARGE (CFS)	3.7	6.3
TIME OF CONCENTRATION (MIN)	20.58	19.04
AREA (ACRES)	4.917	4.917
10-YEAR, 24-HOUR UH VOLUME(ACRE-FT)	N/A	0.8359
STORAGE VOLUME (ACRE-FT)	0.3175	0.3175

COMPLIANCE POINT A
2-YEAR DATA COMPARISON

DATA	EXISTING	PROPOSED	Δ
AMC	I	I	NO CHANGE
TOTAL DISCHARGE (CFS)	2.8	3.7	+ 0.9
TIME OF CONCENTRATION (MIN)	20.48	20.58	0 .10
AREA (ACRES)	5.044	4.917	- 0.127
2-YEAR, 24-HOUR UH VOLUME(ACRE-FT)	N/A	N/A	N/A
STORAGE VOLUME (ACRE-FT)	0.0000	0.1905	+ 0.1905

COMPLIANCE POINT A
10-YEAR DATA COMPARISON

DATA	EXISTING	PROPOSED	Δ
AMC	II	II	NO CHANGE
TOTAL DISCHARGE (CFS)	5.7	6.3	+ 0.6
TIME OF CONCENTRATION (MIN)	18.028	19.04	+ 0.76
AREA (ACRES)	5.044	4.917	- 0.127
10-YEAR, 24-HOUR UH VOLUME(ACRE-FT)	0.6561	0.8359	+ 0.1798
STORAGE VOLUME (ACRE-FT)	0.0000	0.1905	+ 0.1905

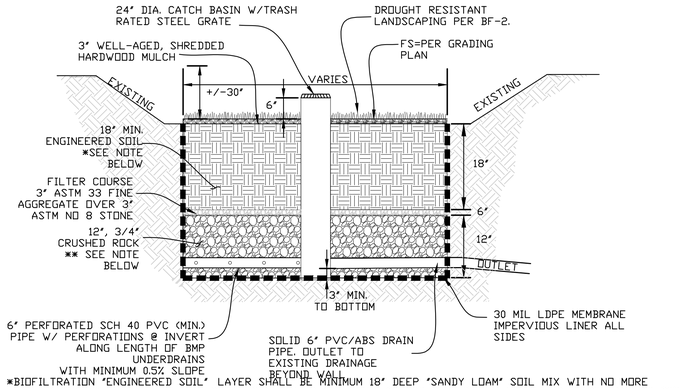
0 40 80 120
(IN FEET)
1 inch = 40 ft.
(ORIGINAL EXHIBIT IS 24X36, COLOR)

VENTURA ENGINEERING INLAND, INC
27393 YNEZ ROAD, SUITE 159
TEMECULA, CALIFORNIA 92591
PHONE: (951)252-7632
wilfredo@venturaengineeringinland.com
Ventura Engineering Inland

COUNTY OF RIVERSIDE

BOAT SHOWROOM & STORAGE
24803 HIGHWAY 74, PERRIS, CALIFORNIA 92530
APN: 342-120-052-7

HYDROLOGY EXHIBIT



*BIOFILTRATION 'ENGINEERED SOIL' LAYER SHALL BE MINIMUM 18' DEEP 'SANDY LOAM' SOIL MIX WITH NO MORE THAN 5% CLAY CONTENT. THE MIX SHALL CONTAIN 50-60% SAND, 20-30% COMPOST OR HARDWOOD MULCH, AND 20-30% TOPSOIL, FREE OF STONES, STUMPS, ROOTS, OR SIMILAR OBJECTS, AND ALSO FREE OF NOXIOUS WEEDS. MIN. PERK RATE = 5 IN./HR.

**12" CRUSHED ROCK LAYER, CL. II PERMEABLE ROCK WITH MINIMUM 40% POROSITY.

NUTRIENT SENSITIVE MEDIA NOTE: ALL MEDIA SHALL COMPLY WITH THE NUTRIENT SENSITIVE CRITERIA.

CLEAN WASHED NOTE: ALL ROCK AND SAND USED IN THE BMPS MUST BE CLEAN WASHED.

BIORETENTION BASIN DETAILING

NOT TO SCALE

BIOFILTRATION SOIL MEDIA CRITERIA:

1. THE ENGINEER SHALL FURNISH TO THE COUNTY A COPY OF THE SOURCE TESTING AND A SIGNED CERTIFICATION THAT THE FULLY BLENDED BIORETENTION/BIOFILTRATION SOIL MEDIA (BSM) MATERIAL MEETS ALL OF THE WQMP REQUIREMENTS BEFORE MATERIAL IS IMPORTED OR IF THE MATERIAL IS MIXED ONSITE PRIOR TO INSTALLATION.

2. AS BSM MATERIAL IS BEING INSTALLED, QUALITY ASSURANCE (QA) TESTING SHALL BE CONDUCTED EVERY 1,200 TONS OR 800 CUBIC YARDS FROM A COMPLETELY MIXED STOCKPILE OR WINDROW.

3. THE ENGINEER OF RECORD OR GEOTECHNICAL ENGINEER CONDUCTING THE QUALITY CONTROL TESTING SHALL FURNISH TO THE COUNTY COPY OF THE QA TESTING AND A CERTIFICATION THAT THE BSM FOR THE PROJECT MEETS ALL OF THE FOLLOWING REQUIREMENTS.

A. BSM SHALL CONSIST OF 60-80% CLEAN SAND, UP TO 20% CLEAN TOPSOIL, AND 20% OF A NUTRIENT-STABILIZED ORGANIC AMENDMENT. ORGANIC AMENDMENT MAY CONSIST OF EITHER LOW-NUTRIENT, STABLE, AND MATURE COMPOST; WASHED AND AGED COCONUT COIR PITH; AND/OR SPHAGNUM PEAT. BSM SHALL BE PLACED ON TOP OF 3-INCHES OF CHOKER SAND PLACED ON TOP OF 3-INCHES OF ASTM NO. 8 STONE (1/4 TO 1/2-INCH PEA GRAVEL), AND PLACED ON TOP OF 12 TO 24-INCHES OF A CLEAN, OPEN-GRADED DRAIN ROCK LAYER.

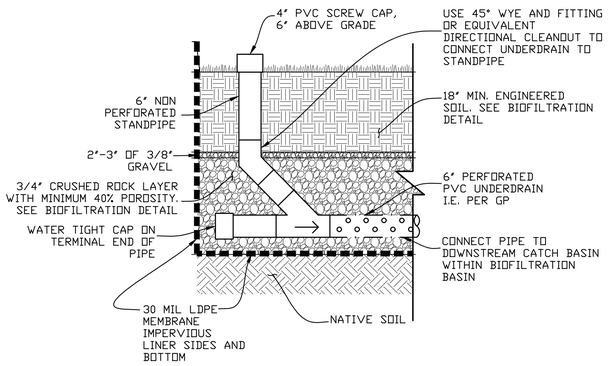
B. BSM SHALL BE TESTED TO ENSURE THAT IT MEETS WQMP REQUIREMENTS FOR HYDRAULIC CONDUCTIVITY. SUCH TESTING SHALL COMPLY WITH ASTM METHOD D2434, USDA HANDBOOK 30 METHOD 34B, OR A SIMILAR LABORATORY METHOD. THE INITIAL INFILTRATION RATE SHALL BE BETWEEN 8 AND 20 INCHES PER HOUR. HYDRAULIC CONDUCTIVITY MAY EXCEED 20 INCHES PER HOUR, IF THE SUBDRAIN IS DESIGNATED AS AN "OUTLET CONTROL SUBDRAIN" ON THE PLANS, WHERE THE SUBDRAIN IS SIZED TO CONVEY NO MORE THAN AN EQUIVALENT OF 5 INCHES PER HOUR. BSM SHALL NOT BE COMPACTED.

C. PH: 6.0 -8.5; SALINITY: 0.5 TO 3.0 MMHO/CM AS ELECTRICAL CONDUCTIVITY; SODIUM ABSORPTION RATIO: < 6.0; CHLORIDE: < 800 PPM IN SATURATED EXTRACT; CATION EXCHANGE CAPACITY (CEC): > 10 MEQ/100 G; ORGANIC MATTER: 2 TO 5-PERCENT ON A DRY WEIGHT BASIS; CARBON: NITROGEN RATIO: 12 TO 40, PREFERABLY 15 TO 40; GRAVEL LARGER THAN 2MM: 0 TO 25-PERCENT OF THE TOTAL SAMPLE; CLAY SMALLER THAN 0.005MM: 0 TO 5 PERCENT OF THE NON-GRAVEL FRACTION.

D. BSM SHALL BE TESTED TO LIMIT THE LEACHING OF POTENTIAL INHERENT POLLUTANTS. BSM USED IN BIOFILTRATION BMPS SHALL CONFORM TO THE FOLLOWING LIMITS FOR POLLUTANT CONCENTRATIONS IN SATURATED EXTRACT: PHOSPHORUS: < 1 MG/L; NITRATE < 3 MG/L, COPPER < 0.025 MG/L. TESTING MAY BE PERFORMED AFTER LABORATORY RINSING OF MEDIA WITH UP TO 15 PORE VOLUMES OF WATER.

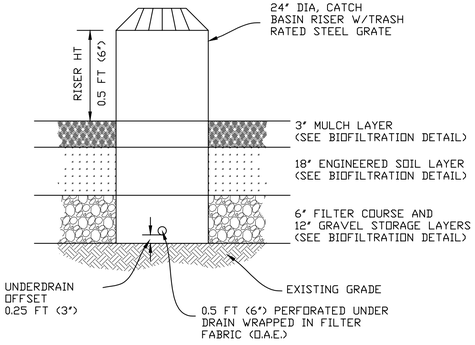
E. LOW NUTRIENT COMPOST USED IN BSM SHALL BE SOURCED FROM A FACILITY PERMITTED THROUGH CALRECYCLE, PREFERABLY THROUGH USCC STA PROGRAM. COMPOST SHALL CONFORM TO THE FOLLOWING REQUIREMENTS: PHYSICAL CONTAMINANTS <1% BY DRY WEIGHT; CARBON: NITROGEN RATIO: 12:1 TO 40:1; MATURITY/STABILITY SHALL CONFORM TO EITHER: SOLVITA MATURITY INDEX: ≥5.5, CO2 EVOLUTION: < 2.5 MG CO2-C PER G COMPOST ORGANIC MATTER PER DAY, OR < 5 MG CO2-C PER G COMPOST C PER DAY; SELECT PATHOGENS AND TRACE METALS SHALL PASS US EPA CLASS A STANDARD. TESTING SHALL BE NO MORE THAN 6 MONTHS OLD AND REPRESENTATIVE OF CURRENT STOCKPILES.

F. COCONUT COIR PITH USED IN BSM SHALL BE THOROUGHLY RINSED WITH FRESHWATER AND SCREENED TO REMOVE COARSE FIBERS AS PART OF PRODUCTION AND AGED > 6 MONTHS. PEAT USED IN BSM SHALL BE SPHAGNUM PEAT.



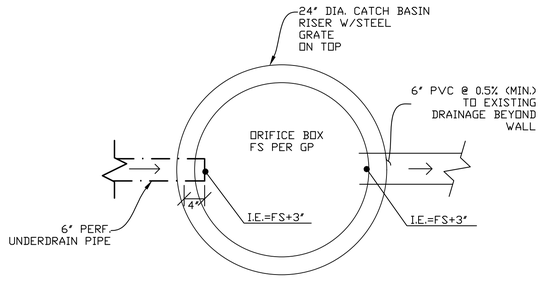
PERFORATED DRAIN PIPE CLEANOUT DETAIL

NOT TO SCALE



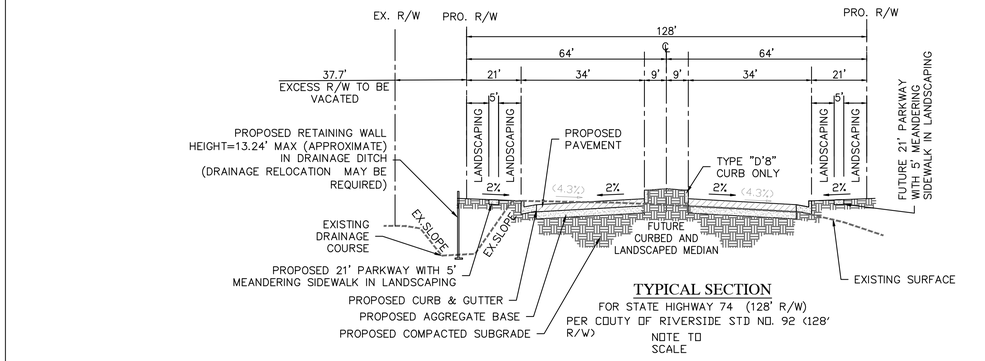
RISER DETAIL

NOT TO SCALE



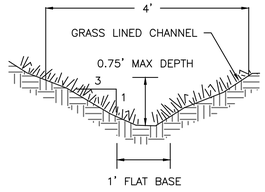
24" DIA. RISER

NOT TO SCALE



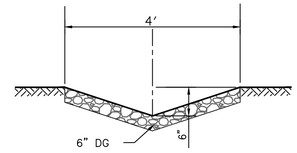
TYPICAL SECTION

FOR STATE HIGHWAY 74 (128' R/W)
PER COUTY OF RIVERSIDE STD NO. 92 (128' R/W)
NOTE TO SCALE



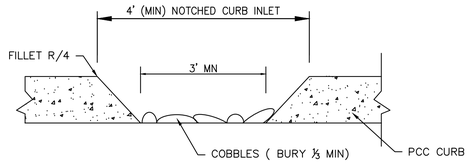
PROPOSED CONDITIONS VEGETATED SWALE DETAIL:

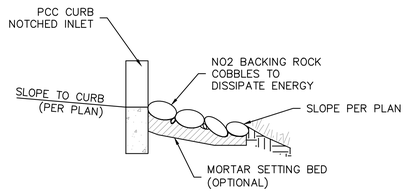
NOT TO SCALE



PROPOSED 4' DG SWALE DETAIL:

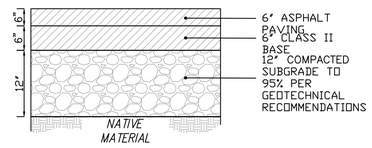
NOT TO SCALE





PROPOSED CUT CURB DETAIL:

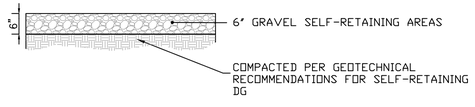
NOT TO SCALE



PROPOSED 4" AC HEAVY DUTY PAVING DETAIL:

NOT TO SCALE

NOTE: DETAIL PER GEOTECHNICAL RECOMMENDATIONS



TYPICAL SELF-RETAINING GRAVEL AREA:

NOT TO SCALE

VENTURA ENGINEERING INLAND, INC
27393 YNEZ ROAD, SUITE 159
TEMECULA, CALIFORNIA 92591
PHONE: (951)252-7632
wilfredo@venturaengineeringinland.com
Ventura Engineering Inland

COUNTY OF RIVERSIDE

BOAT SHOWROOM & STORAGE
24803 HIGHWAY 74, PERRIS, CALIFORNIA 92530
APN: 342-120-052-7

HYDROLOGY DETAILS

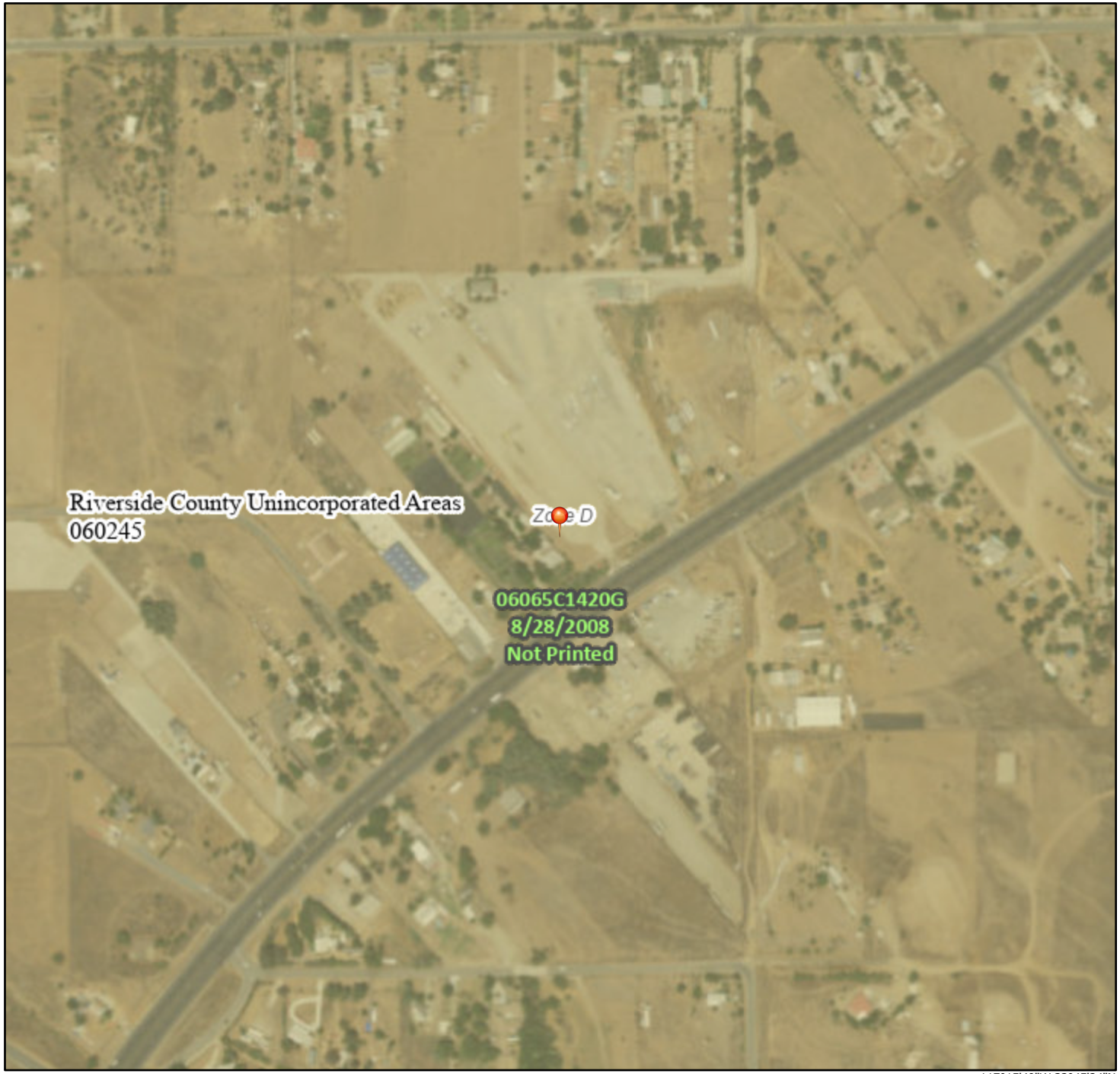
ATTACHMENT 5: FEMA DETERMINATION

This attachment contains the project site's FEMA determination. Please see the attached exhibits.

National Flood Hazard Layer FIRMette

FEMA

117°16'26"W 33°45'54"N



117°15'49"W 33°45'24"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/4/2021 at 3:10 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

ATTACHMENT 6: NRCS SOILS REPORT

This attachment contains the project site's NRCS Soils report. Please see the attached exhibits.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Western Riverside Area, California

Highway

December 5, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,050 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	0.3	7.3%
RaB2	Ramona sandy loam, 2 to 5 percent slopes, eroded	0.4	8.6%
ReC2	Ramona very fine sandy loam, 0 to 8 percent slopes, eroded	3.9	83.9%
VtF2	Vista rocky coarse sandy loam, 2 to 35 percent slopes, eroded	0.0	0.3%
Totals for Area of Interest		**4.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

GyC2—Greenfield sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcvw
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Greenfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenfield

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam
H4 - 60 to 72 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 3 percent

Hydric soil rating: No

Pachappa

Percent of map unit: 3 percent
Hydric soil rating: No

Arlington

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Ramona

Percent of map unit: 3 percent
Hydric soil rating: No

RaB2—Ramona sandy loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcy5
Elevation: 250 to 3,500 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ramona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 23 inches: fine sandy loam
H3 - 23 to 68 inches: sandy clay loam
H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford
Percent of map unit: 4 percent
Hydric soil rating: No

Arlington
Percent of map unit: 4 percent
Hydric soil rating: No

Greenfield
Percent of map unit: 4 percent
Hydric soil rating: No

Tujunga
Percent of map unit: 3 percent
Hydric soil rating: No

ReC2—Ramona very fine sandy loam, 0 to 8 percent slopes, eroded

Map Unit Setting
National map unit symbol: hcyg
Elevation: 250 to 3,500 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Ramona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear, convex
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 14 inches: very fine sandy loam
H2 - 14 to 23 inches: fine sandy loam
H3 - 23 to 68 inches: sandy clay loam
H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

Greenfield

Percent of map unit: 5 percent
Hydric soil rating: No

Tujunga

Percent of map unit: 5 percent
Hydric soil rating: No

VtF2—Vista rocky coarse sandy loam, 2 to 35 percent slopes, eroded

Map Unit Setting

National map unit symbol: hd00
Elevation: 400 to 3,900 feet
Mean annual precipitation: 10 to 18 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 210 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Vista and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vista

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from granodiorite and/or residuum weathered from granite

Typical profile

H1 - 0 to 15 inches: coarse sandy loam
H2 - 15 to 24 inches: coarse sandy loam
H3 - 24 to 28 inches: weathered bedrock

Properties and qualities

Slope: 2 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Cieneba

Percent of map unit: 5 percent
Hydric soil rating: No

Fallbrook

Percent of map unit: 5 percent
Hydric soil rating: No

Bonsall

Percent of map unit: 5 percent
Hydric soil rating: No

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Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

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

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ A. **On-site storm drain inlets**	☑ **Locations of inlets.**	☑ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☑ **Maintain and periodically repaint or replace inlet markings.** ☑ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☑ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☑ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
☐ B. **Interior floor drains and elevator shaft sump pumps**		☐ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

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

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ E. **Pools, spas, ponds, decorative fountains, and other water features.**	☐ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	☐ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
☐ F. **Food service**	☐ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ☐ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	☐ **Describe the location and features of the designated cleaning area.** ☐ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	☐ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
☑ G. **Refuse areas**	☑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ☑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ☑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	☑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ☑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	☑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

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

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

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

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

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

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

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

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

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. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

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

<u>Please Note:</u> This appendix is empty at this time because this is the preliminary review phase. This appendix will be completed and provided during final engineering.

Appendix 10: Educational Materials

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

<u>Please Note:</u> This appendix is empty at this time because this is the preliminary review phase. This appendix will be completed and provided during final engineering.