

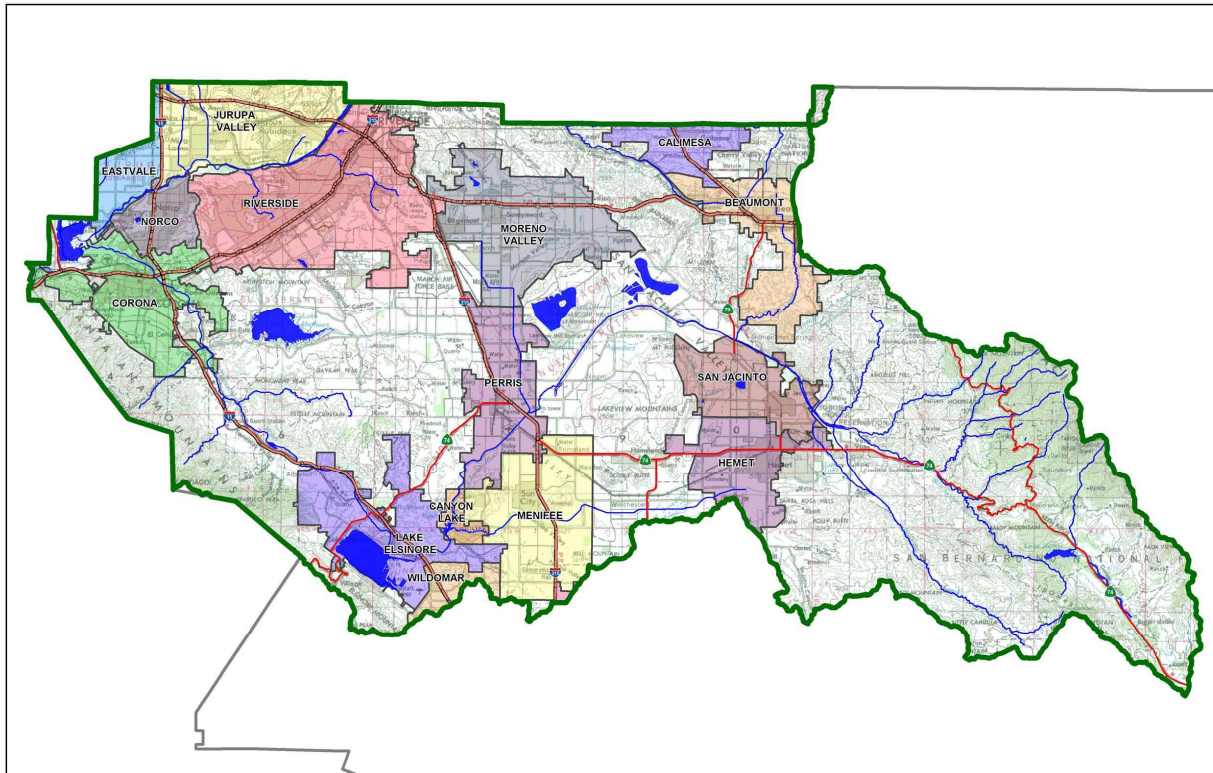
Preliminary Project Specific Water Quality Management Plan

Projects located within the Santa Ana Watershed Region of Riverside County

Project Title: **South Shore II**

Development No: **TTM No. 36567 – City of Lake Elsinore**

Design Review/Case No:



Contact Information:

Prepared for: South Shore II, LLC
Prepared by:

☒ Preliminary

☐ Final

Original Date Prepared: April 2013

Revision Date(s):

JN: 284-378

Prepared for Compliance with

Regional Board Order No. R8-2010-0033



Engineering, Inc.

357 N. Sheridan Street, Suite 117

Corona, CA 92880

Phone: (951) 279-1800

Fax: (951) 279-4380

OWNER'S CERTIFICATION

This Preliminary Project-Specific Water Quality Management Plan (PWQMP) has been prepared for South Shore II, LLC by K&A Engineering, Inc. for the Tentative Tract Map No. 36567, South Shore II Development project.

This PWQMP is intended to comply with the requirements of City of Lake Elsinore per County of Riverside for Ordinance No. 754.2 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 PWQMP and will ensure that this PWQMP 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 PWQMP 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 PWQMP. At least one copy of this PWQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under City of Lake Elsinore, County of Riverside Water Quality Ordinance (Municipal Code Section 754.2).

"I, the undersigned, certify under penalty of law that the provisions of this PWQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature

Date

Owner's Printed Name

Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0033 and any subsequent amendments thereto."

Preparer's Signature

Date

Farris N. Haddad, P.E.
Preparer's Printed Name

Project Manager
Preparer's Title/Position

Preparer's Licensure:

Table of Contents

Section A: Project and Site Information	- 1 -
A.1 Maps and Site Plans.....	- 2 -
A.2 Identify Receiving Waters	- 2 -
A.3 Additional Permits/Approvals required for the Project:.....	- 9 -
Section B: Optimize Site Utilization (LID Principles).....	- 10 -
Section C: Delineate Drainage Management Areas (DMAs).....	- 12 -
Section D: Implement LID BMPs	- 17 -
D.1 Infiltration Applicability	- 17 -
D.2 Harvest and Use Assessment	- 19 -
D.3 Bioretention and Biotreatment Assessment.....	- 20 -
D.4 Feasibility Assessment Summaries.....	- 21 -
D.5 LID BMP Sizing	- 22 -
Section E: Alternative Compliance (LID Waiver Program).....	- 23 -
Section F: Hydromodification	- 24 -
F.1 Hydrologic Conditions of Concern (HCOC) Analysis.....	- 24 -
Section G: Source Control BMPs	- 29 -
Section H: Construction Plan Checklist.....	- 31 -
Section I: Operation, Maintenance and Funding	- 32 -

List of Tables

Table A.1 Identification of Receiving Waters.....	- 2 -
Table A.2 Other Applicable Permits	- 9 -
Table C.1 DMA Classifications	- 12 -
Table C.2 Type 'A', Self-Treating Areas.....	- 12 -
Table C.3 Type 'B', Self-Retaining Areas	- 13 -
Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas.....	- 13 -
Table C.5 Type 'D', Areas Draining to BMPs	- 14 -
Table D.1 Infiltration Feasibility	- 17 -
Table D.2 LID Prioritization Summary Matrix.....	- 21 -
Table D.3 DCV Calculations for LID BMPs	- 22 -
Table F.1 Hydrologic Conditions of Concern Summary	- 24 -
Table G.1 Permanent and Operational Source Control Measures.....	- 29 -
Table H.1 Construction Plan Cross-reference	- 31 -

List of Appendices

Appendix 1: Maps and Site Plans	1-1
Appendix 2: Construction Plans	2-1
Appendix 3: Soils Information.....	3-1
Appendix 4: Historical Site Conditions	4-1
Appendix 5: LID Infeasibility	5-1
Appendix 6: BMP Design Details	6-1
Appendix 7: Hydromodification	7-4
Appendix 8: Source Control	8-1
Appendix 9: O&M.....	9-1
Appendix 10: Educational Materials	10-1

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Residential Development
Planning Area:	South Shore II, City of Lake Elsinore
Community Name:	South Shore II
Development Name:	TTM 36567
PROJECT LOCATION	
Latitude & Longitude (DMS): 33.6806° & -117.3069°	
Project Watershed and Sub-Watershed: Santa Ana River Watershed, San Jacinto River Basin Sub-Watershed.	
APN(s): 363-020-012, 363-020-013, 363-020-014, 363-020-015, 363-020-018, 363-020-002 and 363-020-003	
Map Book and Page No.:	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	R-1 (One Family Dwelling)
Proposed or Potential SIC Code(s)	N/A
Area of Impervious Project Footprint (SF)	<u>Total Project: 68 ac</u> Residential: 44 ac Open Spaces; Basin: 24 ac
Total Area of <u>proposed</u> Impervious Surfaces within the Project Limits (SF)/or Replacement	Streets: 600,000 sf (14 ac) Residential Lots: Roof & driveway areas are unknown at this time.
Does the project consist of offsite road improvements?	☐ Y ☒ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of <u>existing</u> Impervious Surfaces within the project limits (SF)	
Is the project located within any MSHCP Criteria Cell?	☒ Y ☐ N
If so, identify the Cell number:	4459
Are there any natural hydrologic features on the project site?	☒ Y ☐ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or	Majority Soil Type D
What is the Water Quality Design Storm Depth for the project?	D85 = 0.68 inches

A.1 Maps and Site Plans

Appendix 1 of this Project-Specific PWQMP, includes a map of the local vicinity and existing site.

Also in addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans (will be included in Final WQMP) in Appendix 2.

The WQMP Site Plan included as part of Appendix 1 depicts the following project features:

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

A.2 Identify Receiving Waters

Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. 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.

See the receiving waters map in Appendix 1 and below this following table:

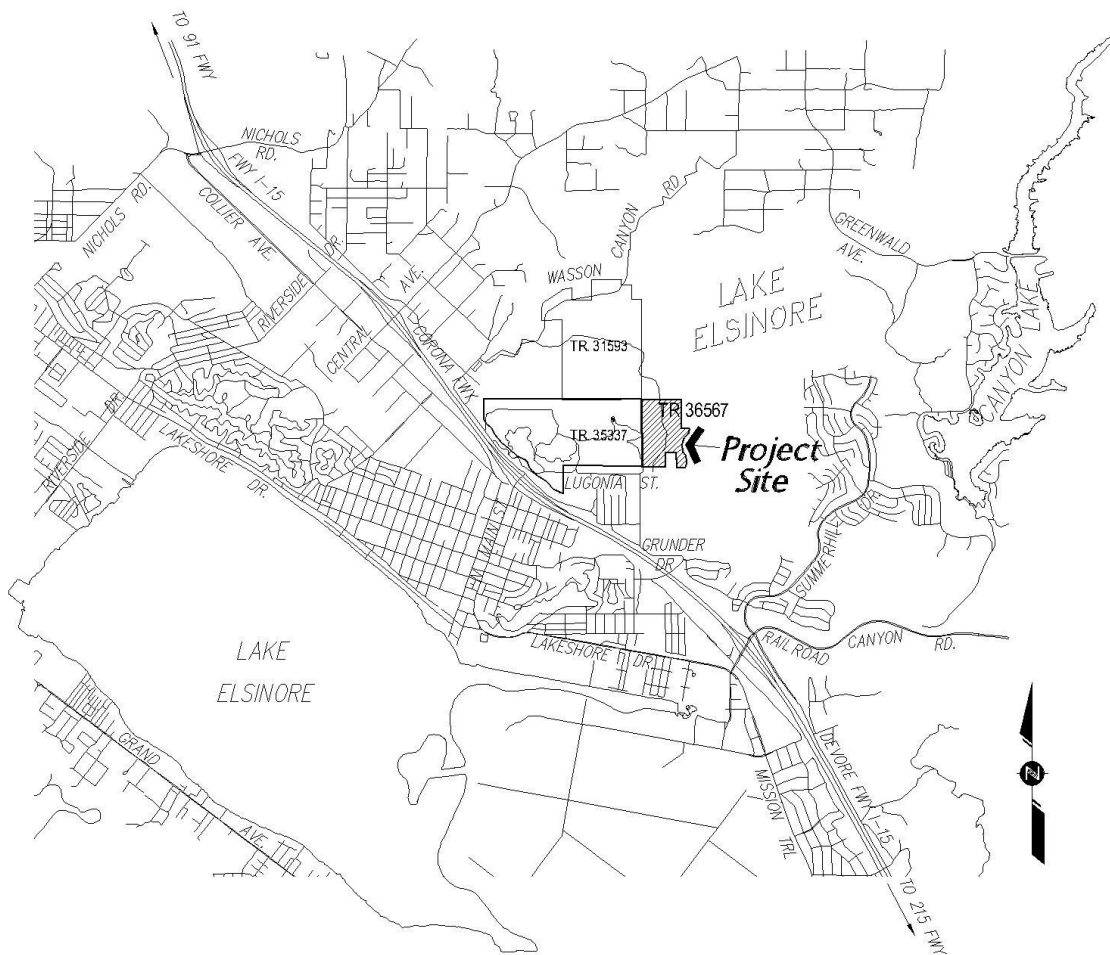
Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Lake Elsinore	Nutrients, Unknown Toxicity, PCBs	REC1, REC2, WARM, WILD	Not a RARE water body
San Jacinto River Reaches 1-4	None	Intermittent-MUN, AGR, GWR, REC1, REC2, WARM, WILD	Not a RARE water body
Temescal Creek	None	REC1, REC2, WARM, WILD, Intermittent-AGR, RARE, GWR, LWARM	17 miles
Santa Ana River Reach 3	Pathogens	AGR, GWR, REC1, REC2, WARM, WILD, RARE, SPWN	18 miles
Pacific Ocean			

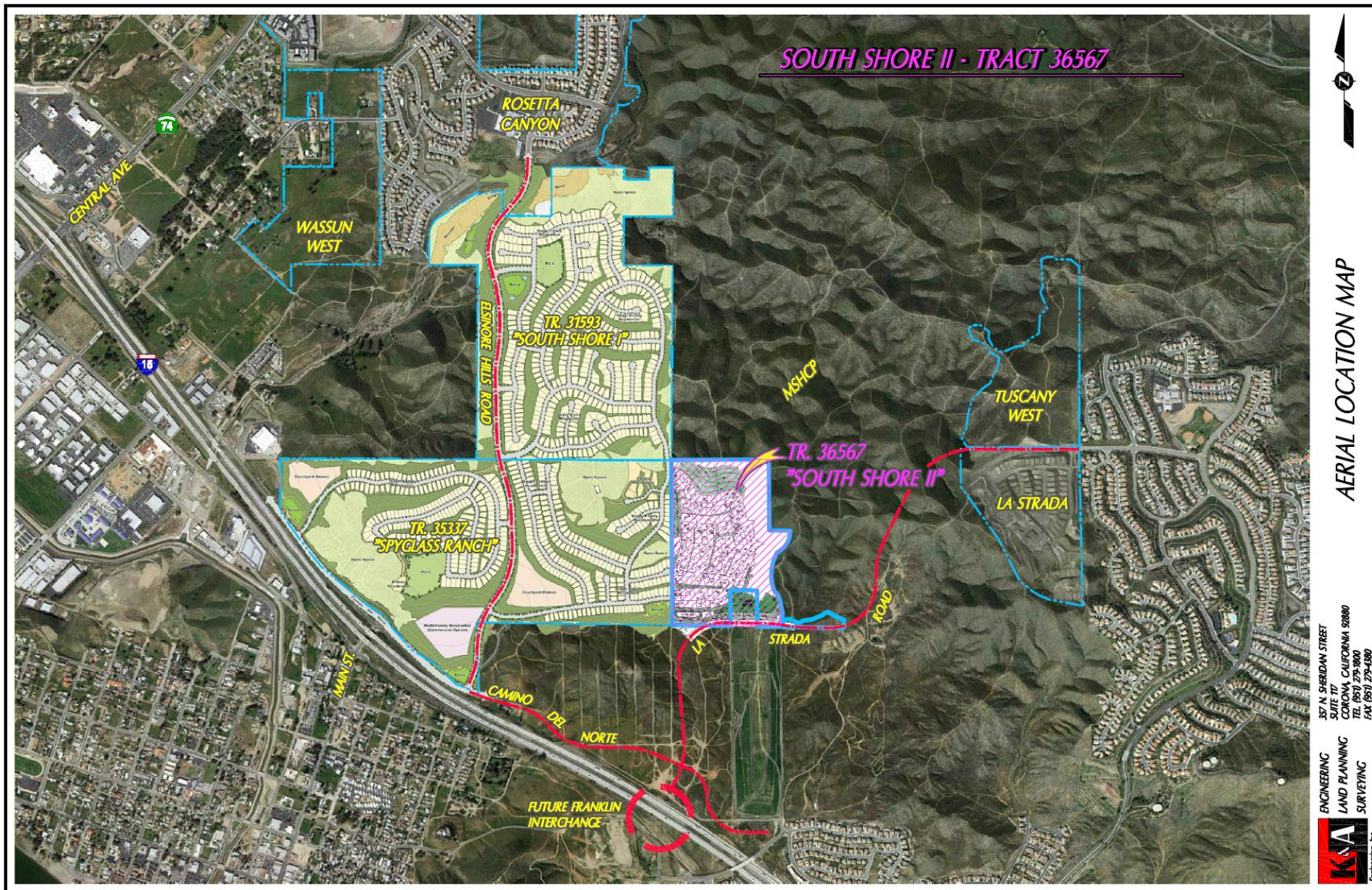
The Canyon Lake and Lake Elsinore Nutrient TMDL Task Force (also referred to as the San Jacinto Watershed Urban Dischargers) members are tabulated below:

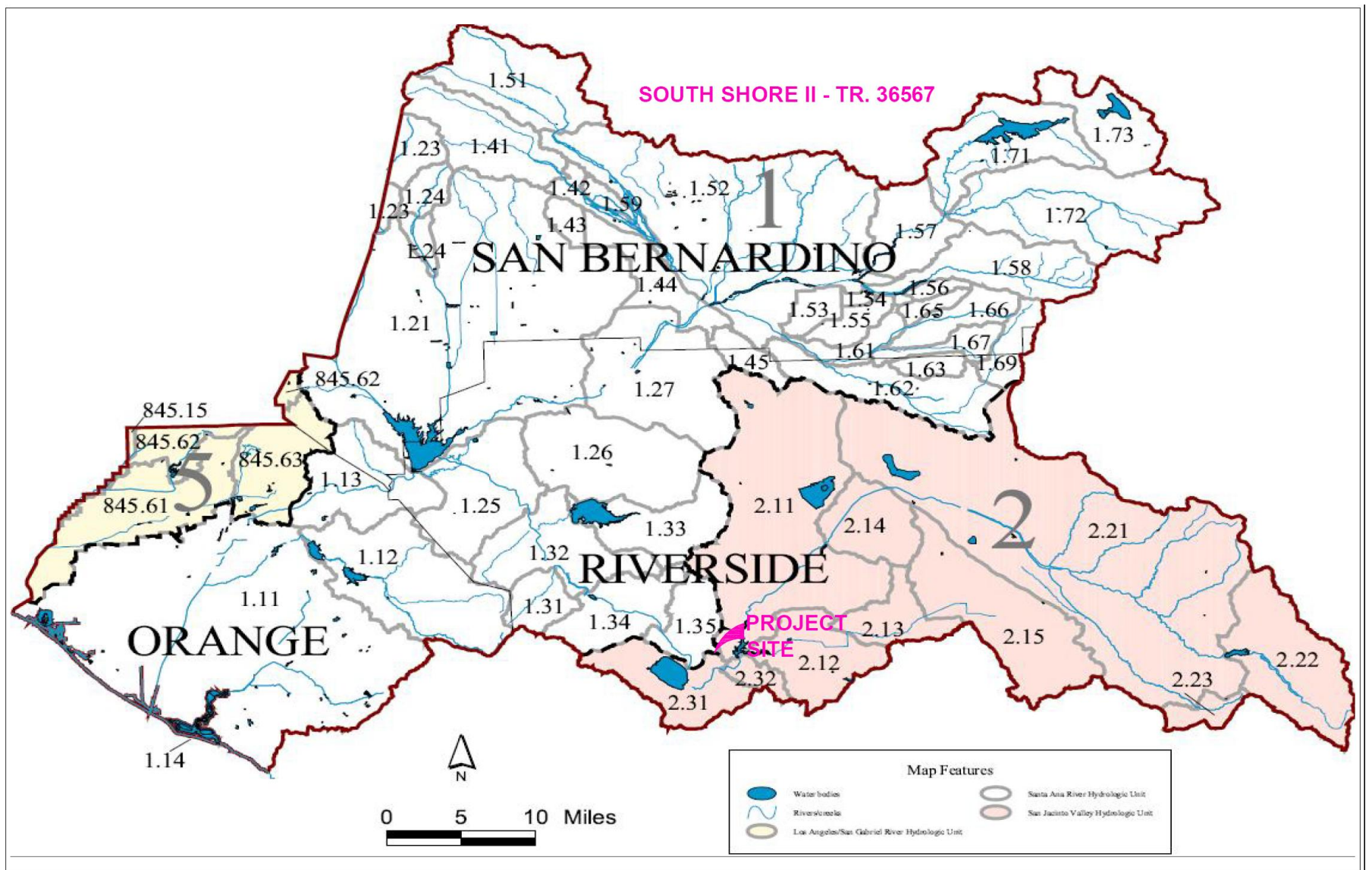
Canyon Lake and Lake Elsinore Nutrient TMDL Task Force

Riverside MS4 Permittees	Non-Permittees
Beaumont, City of	California Department of Fish and Game
Canyon Lake, City of	California Department of Transportation (Caltrans),
Hemet, City of	Eastern Municipal Water District
Lake Elsinore, City of	Elsinore Valley Municipal Water District
Moreno Valley, City of	U.S. Air Force (March Air Reserve Base), March Joint Powers Authority,
Murrieta, City of	U.S. Forest Service
Perris, City of	Western Riverside County Agricultural Coalition
San Jacinto, City of	
Riverside, City of	
Riverside, County of	
RCFC&WCD	



Vicinity Map





Receiving Water Map

REGION 8 INDEX

801.00	SANTA ANA RIVER HYDROLOGIC UNIT
801.10	Lower Santa Ana River HA
1.11	East Coastal Plain HSA
1.12	Santiago HSA
1.13	Santa Ana Narrows HSA
801.20	Middle Santa Ana River HA Split
801.21	Chino HSA Split
481.21	Chino HSA Split
481.22	Harrison HSA
801.23	Claremont Heights HSA Split
481.23	Claremont Heights HSA Split
801.24	Cucamonga HSA
1.25	Temescal HSA
1.26	Arlington HSA
1.27	Riverside HSA
801.30	Lake Matthews HA
1.31	Coldwater HSA
1.32	Bedford HSA
1.33	Cajalco HSA
1.34	Les Lake HSA
1.35	Terra Cota HSA
801.40	Colton-Rialto HA
1.41	Upper Lytle HSA
1.42	Lower Lytle HSA
1.43	Rialto HSA
1.44	Colton HSA
1.45	Reche HSA
801.50	Upper Santa Ana River HA
1.51	Cajon HSA
1.52	Bunker Hill HSA
1.53	Redlands HSA
1.54	Mentone HSA
1.55	Reservoir HSA
1.56	Crafton HSA
1.57	Santa Ana Canyon HSA
1.58	Mill Creek HSA
1.59	Sycamore HSA
801.60	San Timoteo HA
1.61	Yucaipa HSA
1.62	Beaumont HSA
1.63	Cherry Valley HSA
1.64	Chicken Hill HSA
1.65	Gateway HSA
1.66	Oak Glen HSA
1.67	South Mesa HSA
1.68	Triple Falls Creek HSA
1.69	Noble Creek HSA
801.70	San Bernardino Mountain HA
1.71	Bear Valley HA
1.72	Seven Oaks HSA
1.73	Baldwin HSA

802.00	SAN JACINTO VALLEY HYDROLOGIC UNIT
802.10	Perris HA
2.11	Perris Valley HSA
2.12	Menifee HSA
2.13	Winchester HSA
2.14	Lakeview HSA
2.15	Hemet HSA
802.20	San Jacinto HA
2.21	Gilman Hot Springs HSA
2.22	Hemet Lake HSA
2.23	Baileys HSA
802.30	Elsinore Valley HA
2.31	Elsinore HSA
2.32	Railroad HSA
805.00	LOS ANGELES-SAN GABRIEL RIVER HYDROLOGIC UNIT
805.10	Coastal Plain of Los Angeles County HA Split
845.15	Central HSA Split
845.60	Anaheim HA Split
845.61	Anaheim HSA Split
845.62	La Habra HSA Split
845.63	Yorba Linda HSA Split

NOTE:

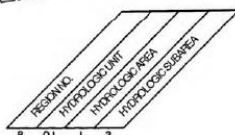
1. The names and areas shown on this map are the same as used by the Department of Water Resources (DWR) in their Bulletin 130 Series except as explained below.
2. The numbering system used on this map is an adaptation of the numbering system used in the 130 Series.

3. The boundary between Region 8 and Region 4 follows the boundary between Los Angeles County and Orange or San Bernardino Counties, not the Hydrologic Boundary. The San Bernardino County line splits Hydrologic Unit 1 (Santa Ana River HU) so that Sub-Areas 481.21, 481.22, and 481.23 are legally in Region 4 but drain into Region 8. The Orange County line splits Hydrologic Unit 5 (Los Angeles-San Gabriel River HU) so that Sub-Areas 845.15, 845.61, 845.62 and 845.63 are legally in Region 8 but drain into Region 4. Therefore, a 5 digit number on the map indicates that a regional boundary divides a hydrologic unit, area or subarea. In these cases the second digit is the number of the region from which the hydrologic area has been separated by the regional boundary. All other digits are as described in the legend.
4. The 1986 updated names shown on the map are in accordance with an agreement with DWR and US Geological Survey.



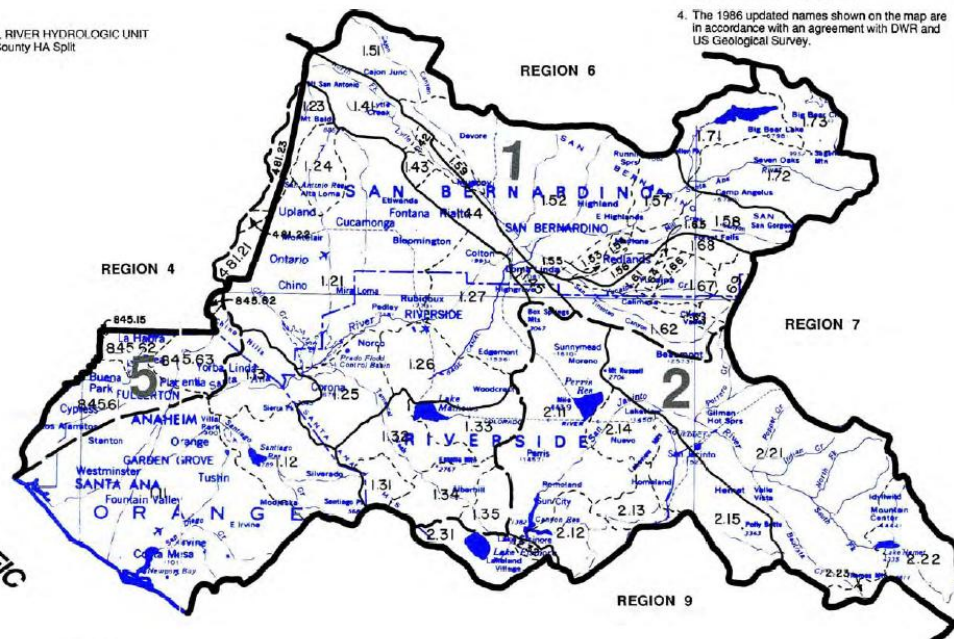
—	STREAM
—	REGIONAL BOUNDARY
—	HYDROLOGIC UNIT BOUNDARY (HU)
—	HYDROLOGIC AREA BOUNDARY (HA)
—	HYDROLOGIC SUBAREA BOUNDARY (SA)

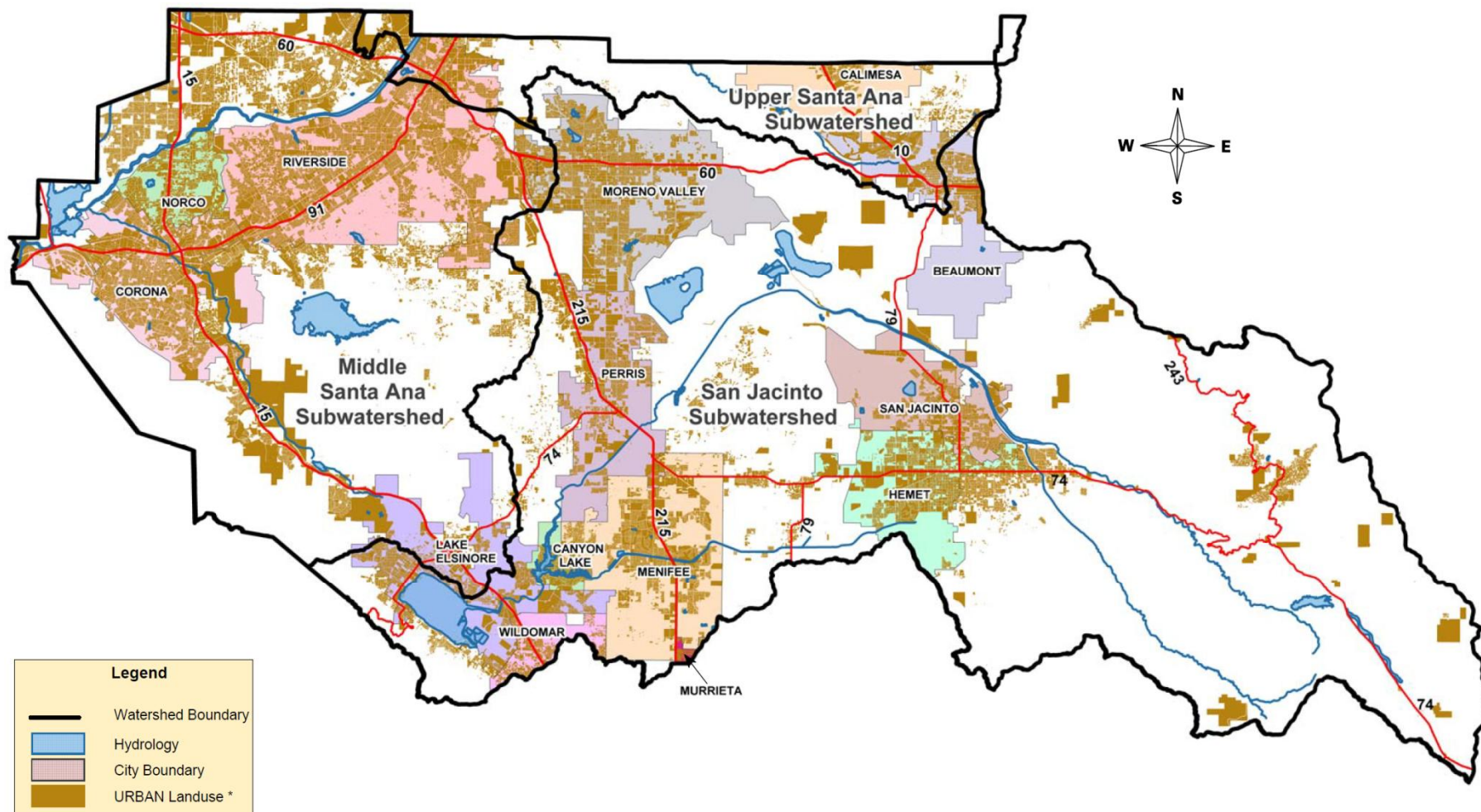
5
HYDROLOGIC UNIT NUMBER



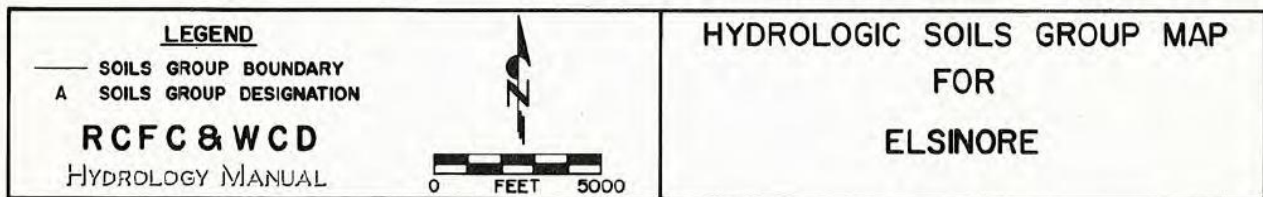
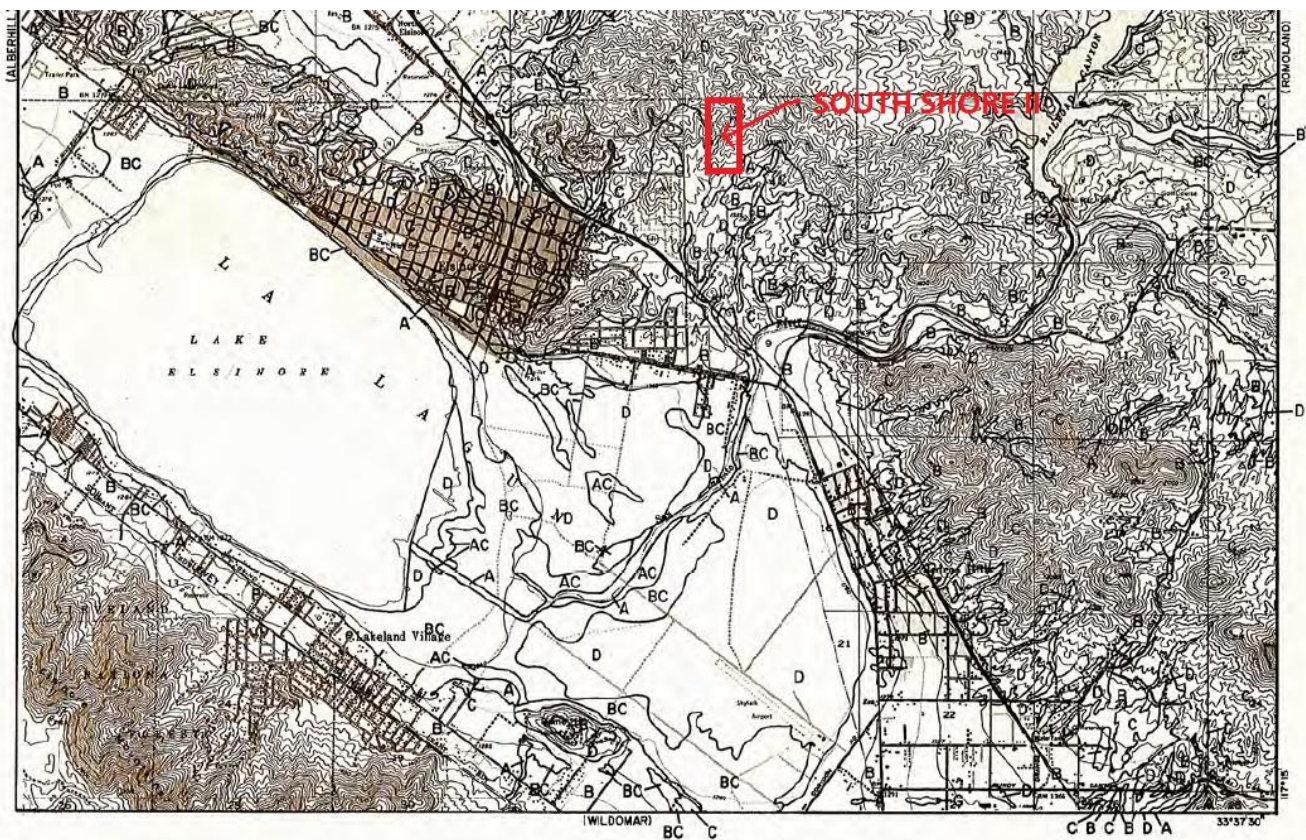
April 1973
Revised: July 1976
Revised: August 1986

State Water Resources Control Board
Surveillance and Monitoring Section
T.E. Lavenda, P.E. T.S. Ruckman





* Areas not in URBAN: Agricultural, State, Federal, Tribal, Preserves & Open Space, Rural-Residential, Highways/Freeways



Hydrologic Soils Group for the project site

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

Table A.2 Other Applicable Permits

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

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

For MSHCP Consistency approval, see MSHCP Cell No. 4459.

All applicable permits will be included in the Final WQMP.

Section B: Optimize Site Utilization (LID Principles)

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

In addition to requiring implementation of LID BMPs, the MS4s Permit also prioritizes which LID BMPs should be used first.

1. Infiltrate,
2. Harvest and Use,
3. Evapotranspire,
4. Bio-Treatment and/or Bio-Retention

Within the permits it is recognized that LID principles are not universally applicable throughout Riverside County and that they are dependent on factors such as:

1. Soil conditions including soil compaction and permeability,
2. Groundwater levels,
3. Soil contaminants (Brownfield development),
4. Space restrictions (in-fill projects, redevelopment projects, high density development),
5. Highest and best use of Urban Runoff (to support downstream uses)

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document.

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

Tentative Tract Map (TTM) 36567, also known as "South Shore II," is a proposed development located in the City of Lake Elsinore, Riverside County, California. The proposed project is a 68 acre subdivision for single family residents. The development includes about 150 single family lots of approximately 44 acres, and the remaining 24 acres for open spaces, an onsite drainage basin and a public park. The project takes its primary and secondary access from the adjacent development to the west, Tract 35337.

The grading and drainage design of TTM 36567 has been developed to maintain the natural discharge patterns as much as practical. The majority of 24 acres surrounding the family lots development will preserve as natural open spaces.

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

The hillside terrain and natural drainage patterns were carefully considered in developing the design for TTM 36567. Preservation of natural areas containing significant vegetation was considered; approximately one-third of project site will be maintained as natural open spaces. The project is in compliance with the MSHCP (Cell 4459) and this County's General Plan with respect to preservation of natural areas.

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

The project is in the majority of Type D soil, yielding a relatively high soil runoff potential and poor infiltration rate.

Based on LID BMP Prioritization, for alternate BMPs situated in poor infiltration rate; Extended Detention Basin was selected as the most appropriate treatment BMP. Also the project site is within the "Highest and Best Use" policy for urban runoff into Lake Elsinore.

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

The project is proposed as a subdivision per City of Lake Elsinore and Riverside County ordinances resulting in narrower streets and the option to minimize or eliminate sidewalks through most of the project.

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

The grading and drainage design of TTM 36567 has been developed to maintain the natural discharge patterns as much as practical. The proposed drainage plan will provide for construction of drainage with Extended Detention Basin at downstream end of the drainage system as structural BMPs.

Section C: Delineate Drainage Management Areas (DMAs)

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

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s) ¹	Area (Sq. Ft.)	DMA Type
DMA – Area-1	1/4 Ac - Residential	1489752 (34.2 Ac)	“D”, to BMP-1
DMA – Area-2	Landscape & slope areas	315194 (7.2 Ac)	“A”, to BMP-1
DMA – Area-3	Natural (existing)	17424 (0.4 Ac)	“A”, to BMP-1
DMA – Area-4	Extended Detention Basin	50710 (1.2 Ac)	“A”, EDB
DMA – Area-5	Natural (existing)	866844 (19.9 Ac)	“A”, self-treating area
DMA – Area-6	Landscape & slope areas	387684 (8.9 Ac)	“A”, self-treating area
DMA – Area-7	Natural (existing), drain to the north	196020 (4.5 Ac)	“A”, self-treating area

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

Table C.2 Type ‘A’, Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
DMA – Area-2	315194 (7.2 Ac)	Landscape, erosion control	Sprinkler
DMA – Area-3	17424 (0.4 Ac)	Natural (existing)	
DMA – Area-4	50710 (1.2 Ac)	Extended Detention Basin	
DMA – Area-5	866844 (19.9 Ac)	Natural (existing)	
DMA – Area-6	387684 (8.9 Ac)	Landscape, erosion control	Sprinkler
DMA – Area-7	196020 (4.5 Ac)	Natural (existing)	

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]
N/A						

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

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

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]
N/A							

Composite Runoff Factor

The sizing of both Volume-Based BMPs and Flow-Based BMPs is based on determination of a composite runoff factor, which varies depending on the land use covers tributary to the BMP. This composite runoff factor, C , is determined using the following equation

$$C = 0.858 \cdot I_f^3 - 0.78 \cdot I_f^2 + 0.774 \cdot I_f + 0.04$$

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

DMA Name or ID	BMP Name or ID
DMA – Areas 1,2 and 3	BMP-1: Extended Detention Basin #1

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.

Table 2-1: Impervious Fraction Based on Various Land Use Covers

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

Effective Impervious Fraction for mixed surfaces Tracts 36567:

Use average Effective Impervious Fraction, EIF = **0.55** for 7 Lots or ¼ Ac Residential areas, consistent with Impervious Fraction for hydrology calculations.

See Impervious Cover table from Hydrology Manual below:

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. ($\frac{1}{2}$ 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.		
RCFC & WCD HYDROLOGY MANUAL		IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE D-5.6

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

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

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

Infiltration Feasibility

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

Table D.1 Infiltration Feasibility

Does the project site...	YES	NO
...have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
...have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
...have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
...have measured in-situ infiltration rates of less than 1.6 inches / hour?		X
If Yes, list affected DMAs:		
...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.
- X 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

South Shore II project is within "Highest and best use" policy area for stormwater runoff to Lake Elsinore, therefore Harvest and Use BMPs need not be assessed.

Toilet Use Feasibility

South Shore II project is within "Highest and best use" policy area for stormwater runoff to Lake Elsinore, therefore Harvest and Use BMPs need not be assessed.

Other Non-Potable Use Feasibility

South Shore II project is within "Highest and best use" policy area for stormwater runoff to Lake Elsinore, therefore Harvest and Use BMPs need not be assessed.

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:

- X LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).
- A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

The 2010 SAR MS4 Permit further requires that LID Retention BMPs (Infiltration or Harvest and Use) be used unless it can be shown that those BMPs are infeasible.

For Hydromodification, proposed Detention Basin will satisfy the requirement of post-development volume and time of concentration 2-year 24-hour storm DOES NOT exceed the pre-development peak runoff by more than 5 percent.

South Shore II project is within "Highest and best use" policy area for stormwater runoff to Lake Elsinore, therefore Infiltration, Harvest and Use BMPs need not be assessed.

The total project Design Capture Volume will be addressed using Extended Detention Basin.

Since project proposed BMPs, Extended Detention Basin to satisfy LID performance criteria, therefore Bio-treatment control performance criteria is also fully satisfied as well.

D.4 Feasibility Assessment Summaries

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

Table D.2 LID Prioritization Summary Matrix

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

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.

DMA Area-1, 34.2 acres – Type D, 1/4 Ac Residential areas drain to proposed BMP-1, Extended Detention Basin #1.

DMA Area-2, 7.2 acres – Type A, Landscape & slope areas drain to proposed BMP-1, Extended Detention Basin #1.

DMA Area-3, 0.4 acres – Type A, Natural (existing) preserved open space areas drain to proposed BMP-1, Extended Detention Basin #1.

DMA Area-4, 1.2 acres – Type A, proposed Extended Detention Basin.

DMA Area-5, 19.9 acres – Type A, self-treating area, Natural (existing) – preserve open spaces

DMA Area-5, 19.9 acres – Type A, self-treating area, Landscape & slope areas

DMA Area-5, 19.9 acres – Type A, self-treating area, Natural (existing) – preserve open spaces

D.5 LID BMP Sizing

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

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Enter BMP Name / Identifier Here		
	[A]		[B]	[C]	[A] x [C]			
						Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	$A_T = \sum [A]$			$\Sigma = [D]$		[E]	$[F] = \frac{[D] \times [E]}{12}$	[G]

[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

See complete calculations 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).

- ✓ 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.

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 concentration¹ 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

Drainage Area 1 = 66.3 Ac (Pre-condition) compare to Drainage Areas A+B = 63.8 Ac (Post-condition)

	2 year – 24 hour		
	Pre-condition	Post-condition	% Difference
Time of Concentration	5.95 minutes	5.73 minutes	- 3.7%
Volume (Acre Feet)	2.68	4.26 – 2.2 = 2.06	- 23%

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.

In this study, Lag time for Unit Hydrograph 2-year 24-hour storm is used for comparison.

² Volume: for Post-condition, the runoff volume from drainage areas A+B is subtracted by Detention Basin Storage Volume of 96,000 cf (2.2 Ac-ft).

See Appendix 7 for complete calculations.

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:

Table 3a – Receiving Waterbodies and Municipal Dischargers:

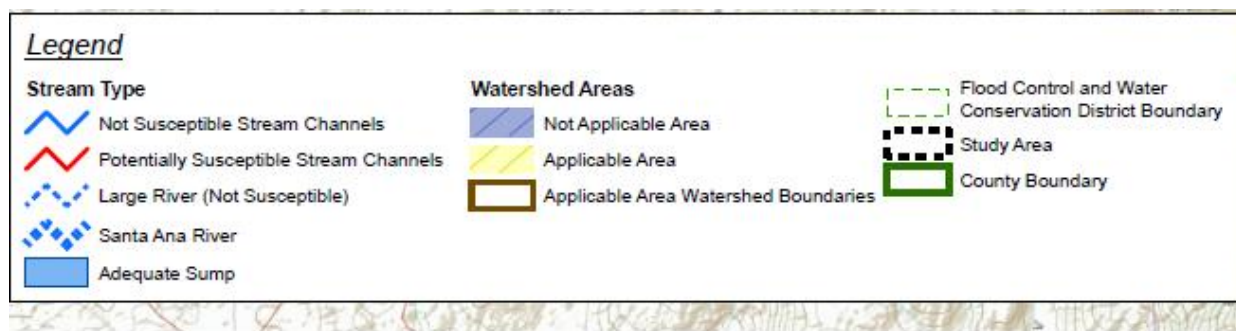
		Upper Santa Ana									San Jacinto								
Municipality		Mill Creek Prado Area	Chino Creek, Reach 1A	Chino Creek, Reach 1B	Temescal Creek	San Timoteo Wash	Little San Geronio	Santa Ana River, Reach 3	Santa Ana River, Reach 4	Cucamonga Creek	San Jacinto River reaches 1-4	Lake Elsinore	Canyon Lake	Strawberry Creek	Lake Hemet	Salt Creek	Poppet Creek	Indian Creek	Bautista Creek
RCFC&WCD					◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Beaumont						◆	◆	⌘	⌘		◆	⌘		◆					
Calimesa						◆	⌘	⌘	⌘		◆	⌘	◆	◆					
Canyon Lake					⌘			⌘			⌘	⌘	◆						
Corona					◆			⌘											
County of Riverside (County)	◆	◆	◆		◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Hemet					⌘			⌘			⌘	⌘	⌘			⌘			
Lake Elsinore					◆			⌘			⌘	◆							
Menifee					⌘			⌘			⌘	⌘	⌘			⌘			
Moreno Valley					⌘			⌘			⌘	⌘	⌘						
Murrieta					⌘			⌘				⌘							
Norco					⌘			◆											
Perris					⌘			⌘			◆	⌘	⌘			⌘			
Riverside					⌘			◆	◆			⌘							
San Jacinto											◆	⌘	⌘						
Wildomar					⌘			⌘				⌘							

◆ Direct Discharge of MS4 to Receiving Water

⌘ Tributary to Receiving Water

Generally, the San Bernardino County drainage areas drain to the Riverside County drainage areas, and Riverside County drainage areas discharge to Orange County through Prado Dam on the Santa Ana River. Most of the flow in the Santa Ana River is recharged into the groundwater in San Bernardino, Riverside, and Orange counties but infrequently some of the flow may be discharged to the Pacific Ocean as a result of heavy storm events.

Water from rainfall and snow melt runoff, and surfacing ground water from various areas either discharge directly to the Santa Ana River or to watercourses tributary to the Santa Ana River. Other major rivers in the Permit Area include the San Jacinto River and Temescal Creek. The San Jacinto Mountain areas drain into the San Jacinto River, which discharges into Canyon Lake and then to Lake Elsinore. The San Jacinto River is ephemeral. Smaller storms tend to be fully captured by Canyon Lake, which the San Jacinto River drains into, with discharges from Canyon Lake to Lake Elsinore only occurring in larger events or wetter years. Any overflow from Lake Elsinore is tributary to Temescal Creek, which flows into the Santa Ana River at the Prado Flood Control Basin. Overflow from Lake Elsinore occurs infrequently, only once every 12 to 15 years.



HCOC Applicability Map

Hydromodification Susceptibility Documentation Report and Mapping
Riverside County Flood Control and Water Conservation District

This Project meets the following condition: HCOC EXEMPTION 2

The project will be consistent with approved Specific Plan of drainage or analogous plans or programs.

Therefore, this project is not potentially susceptible to hydromodification impacts, an HCOC does not exist and hydromodification does not need to be considered further.

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.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Roadways	Provide storm drain stenciling and signage (S1)	Education for property owners, tenants and occupants (N1)
Residential Lots	Roofs designed to runoff into adjoining landscaping. Driveways of minimal widths	Activity Restrictions (N2)
Man-made & irrigated slopes and landscaped areas	Protect slopes and channels (S5) Hillside Landscaping (S12)	Irrigation System and Landscape Management (N3)
		Common Area Litter Control (N4)
Park Site	Efficient Irrigation (S4)	Street Sweeping (N5)
		Drainage Facility Inspection and Maintenance (N6)

DESCRIPTIONS OF SOURCE CONTROL BMPs:

The routine structural source control BMPs shall be implemented as follows:

Provide Storm Drain Stenciling and Signage (S1) - All storm drain inlets and catch basins, constructed or modified, within the project area shall be stenciled or labeled. Sign which prohibit illegal dumping shall be posted at public access points along channels and creeks within the project area. Legibility of stencils and signs shall be maintained. As catch basins and BMP facilities are completed stenciling and signage will be installed and maintained in good condition until catch basins and facilities are accepted by HOA.

Efficient Irrigation (S4) - The timing and application methods of irrigation water in common areas shall prevent of excess irrigation water into the stormwater conveyance system.

Protect Slopes and Channels (S5) - Stormwater BMPs shall be included to decrease the potential for erosion of slopes and/or channel.

Hillside Landscaping (S12) - Hillside areas that are disturbed by project development shall be landscape with deep-rooted, drought tolerant plant species selected for erosion control.

Non-Structural Source Control BMPs:

Education for property owners, tenants and occupants (N1) - Education is a key element in the source control plan, as preventing pollutants from entering the storm drain system is the most cost effective of all BMPs. Education shall be keyed to the various practices that lead to pollutant generation, but which most homeowners and renters are unaware. Such practices on the surface appear mundane, but actually may have severe cumulative effects on water quality. These practices include car washing, littering, landscape maintenance, cleaning up after pets, etc. Environmental awareness education materials shall be provided to all members of the HOA periodically. See Appendix D for Educational Materials as follow:

- The Ocean Begins at Your Front Door
- Tips for Household Activities
- Tips for Automotive
- Tips for Pool Maintenance
- Tips for Landscaping and Gardening
- Tips for Trash
- Tips for Pet Care
- Did you know? Educational pamphlet
- Maintain your BMPs!

Activity Restrictions (N2) – Conditions, Covenants, and Restrictions (CC&Rs) shall be prepared for the purpose of surface water quality protection, or use restrictions will be developed through lease terms.

Irrigation System and Landscape Management (N3) - Ongoing maintenance shall be consistent with City of Lake Elsinore Landscape Irrigation Code and the County's integrated pest management policy.

Common Area Litter Control (N4) - Litter patrol, emptying of trash receptacles in common areas, and noting trash disposal violations by tenants/homeowners and reporting the violations to the owner/HOA for investigation shall be conducted.

Street Sweeping (N5) - Public streets shall be swept regularly in accordance with the agencies' administered street sweeping program at a minimum monthly basis.

Drainage Facility Inspection and Maintenance(N6) - Catch Basin and drainage facility shall be inspected, cleaned, and maintained each year and, if necessary, cleaned and maintained prior to the storm season, no later than October 15th each year. Agency maintenance crews or another designated entity shall be responsible for the inspection and maintenance of structural BMPs within their boundaries.

Section H: Construction Plan Checklist

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
BMP-1	Extended Detention Basin	BMP Site Plan (Construction Plan will be included in the Final WQMP)

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

Section I: Operation, Maintenance and Funding

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

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

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

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

Maintenance Mechanism:

With the project site being in the City of Lake Elsinore, both the City and HOA will have ongoing maintenance responsibilities. Site design and treatment BMPs have been designed to keep maintenance efforts in line with South Shore II project maintenance activities.

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

☒ Y ☐ N

TREATMENT CONTROL BMPs

Extended Detention Basin

- Construction and Initial Funding until acceptance will be provided by the project Developer or Builder.
- After acceptance of the Tract 36567 projects by City of Lake Elsinore it is anticipated that the Operation and Maintenance of the Extended Detention Basin will be the responsibility of the HOA. All landscape of common areas, community park areas will be maintained by the HOA.

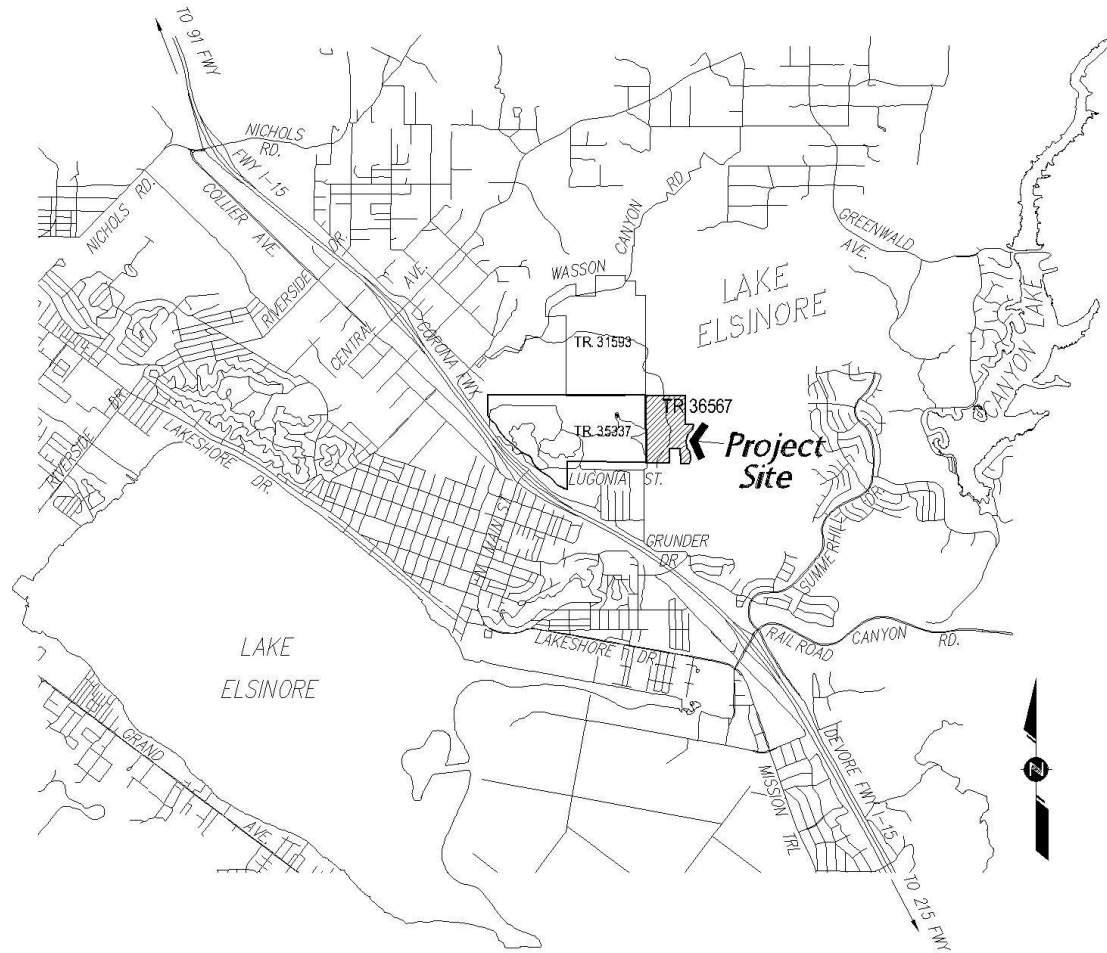
Project owner:

SOUTH SHORE II, LLC
515 Avocado Avenue
Corona Del Mar, CA 92625
Telephone: (714) xxx-xxxx

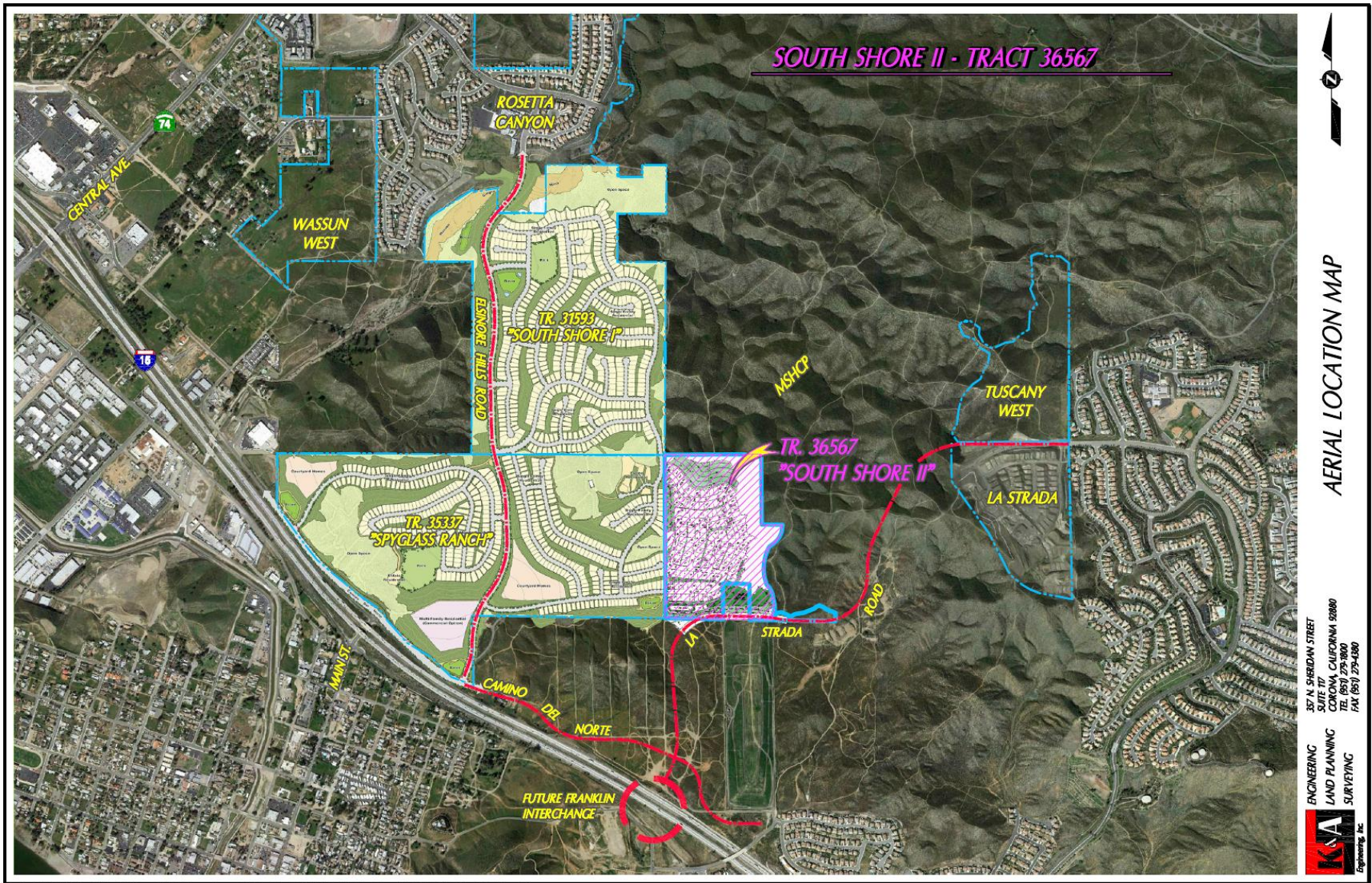
See Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9 and all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

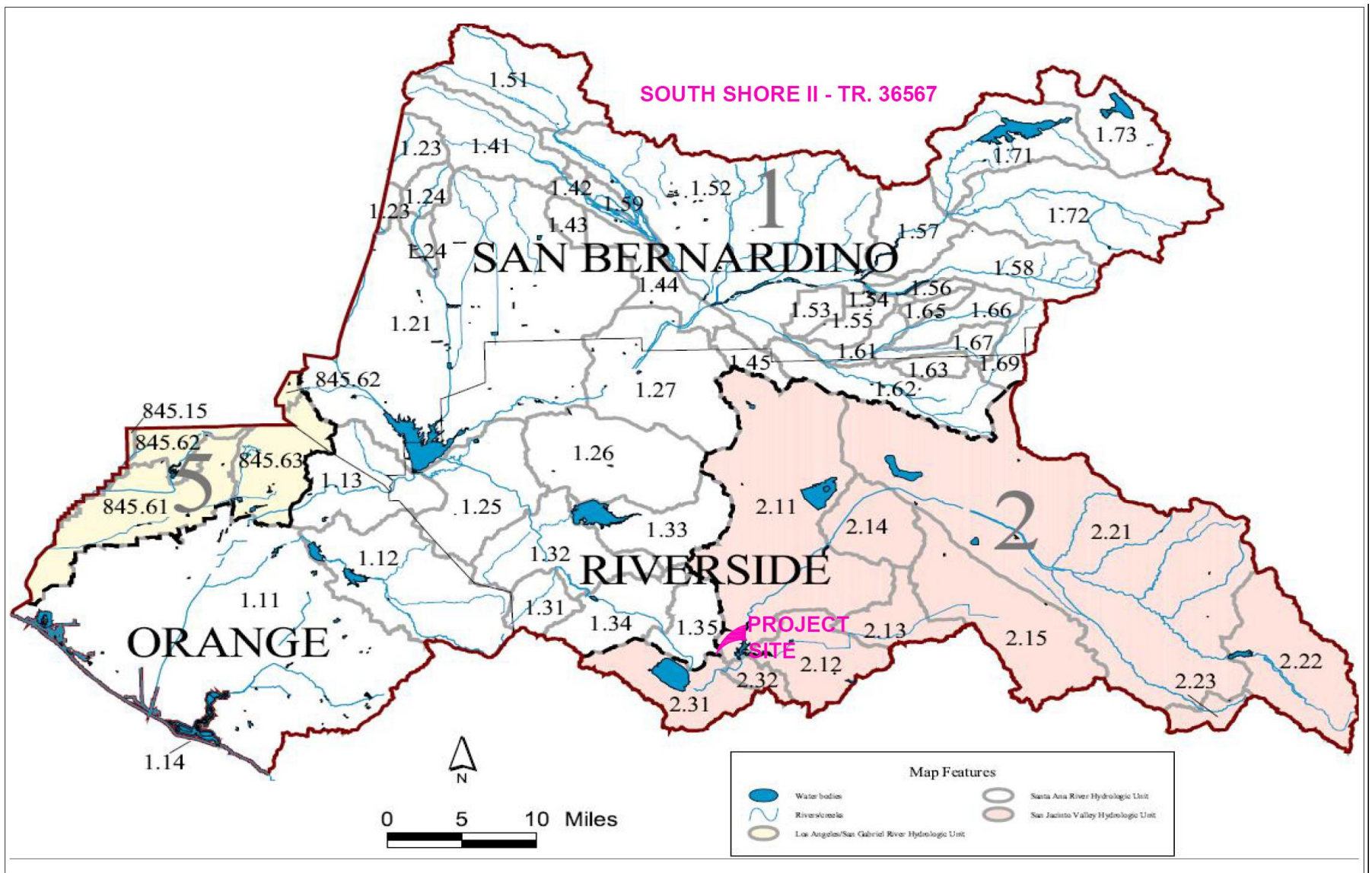
Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



Vicinity Map





Receiving Water Map

Appendix 2: Construction Plans

Grading and Drainage Plans

Will be included in FINAL WQMP

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

For complete report and update will be included in the Final WQMP

**GEOTECHNICAL EVALUATION
FOR
SOUTH SHORE II PROJECT, TRACT 36567
LAKE ELSINORE, RIVERSIDE COUNTY, CALIFORNIA**

PREPARED FOR

**SOUTH SHORE II, LLC
515 AVOCADO AVENUE
CORONA DEL MAR, CALIFORNIA 92625**

PREPARED BY

**GEOTEK, INC.
710 EAST PARKRIDGE AVENUE, SUITE 105
CORONA, CALIFORNIA 92879**

PROJECT NO. 0967-CR3

APRIL 8, 2013





GeoTek, Inc.

710 E. Parkridge Avenue, Suite 105, Corona, California 92879-1097
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

April 8, 2013
Project No. 0967-CR3

South Shore II, LLC

515 Avocado Avenue
Corona Del Mar, California 92625

Attention: Mr. Erik Lunde

Subject: Geotechnical Evaluation
South Shore II Project, Tract 36567
Proposed Residential Development
Lake Elsinore, Riverside County, California

Dear Mr. Lunde:

GeoTek, Inc. (GeoTek) is pleased to provide herein the results of our geotechnical evaluation for the subject project, located in the City of Lake Elsinore, Riverside County, California. This report presents the results of our evaluation, discussion of our findings, and provides geotechnical information for the site and preliminary recommendations for foundation design and construction. In our opinion, site development appears feasible from a geotechnical viewpoint provided that the recommendations included herein are incorporated into the design and construction phases of site development. The recommendations in this report are subject to further review/evaluation and potential modification once more complete grading plans become available.

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

Respectfully submitted,
GeoTek, Inc.



Edward H. LaMont
Edward H. LaMont
CEG 1892, Exp. 7/31/14
Principal Geologist

(2) Addressee

(4) K&A Engineering; Attention: Mr. Farris Haddad

G:\Projects\0951 to 1000\0967CR3 South Shore II, LLC Lake Elsinore\0967CR3 Geo Report.doc



Ronald A. Reed
Ronald A. Reed
GE 2524, Exp. 6/30/13
Senior Project Engineer

GEOTECHNICAL | ENVIRONMENTAL | MATERIALS

I. EXECUTIVE SUMMARY

Based on the results of this evaluation, the major geotechnical findings or design and construction considerations are summarized as follows:

- The site is primarily underlain by metasedimentary and granitic bedrock units, which are mantled with a variable thickness layer of colluvial and/or alluvial materials. Alluvial deposits are identified and expected in the main drainage areas dissecting the site (see Plate 1). Localized undocumented fill materials are also noted on the site, mostly associated with existing access trails and roadways, and additional areas of undocumented fill will also likely be encountered during grading. These undocumented fills appear limited and surficial in nature, and are not identified on the Geotechnical Map (Plate 1).
- For planning purposes, complete removal and recompaction of all undocumented fill materials, colluvium, alluvium and highly weathered bedrock materials should be anticipated.
- The majority of the onsite materials appear to be suitable for foundation support or re-use as fill provided they are prepared in accordance with the grading requirements included in this report. Site soils generally appear to have a "very low" expansion potential ($El < 21$), based on preliminary test results and experience in the area.
- For planning purposes, a shrinkage factor of 10% to 15% may be applied for the surficial materials (colluvium and alluvium) requiring removal and recompaction. However, bulking of up to 10 to 15% should be anticipated for granitic bedrock, and 15 to 25% for metasedimentary bedrock. Actual bulking and shrinkage percentages will vary depending on location, depth of material, material type (i.e. geologic units), level of compaction attained during rough grading, and other factors.
- Strong ground shaking is expected at this site due to the known earthquake faults in the vicinity. However, the risks of seismic densification and liquefaction are considered low due to the dense nature of the underlying soils, absence of a shallow groundwater table and the recommended remedial earthwork provided herein.
- Deep fills anticipated for the site (up to 100± feet) will likely necessitate settlement monitoring subsequent to rough grading. Fills in excess of 40± feet in thickness will likely be recommended to be monitored for settlement prior to construction of structural improvements. Increased compaction standards, including attaining a minimum of 93% relative compaction for all fills greater than 40 feet from finish grade, are recommended.



- Canyon subdrains and stabilization slope backdrains are recommended for the site. General recommendations for subdrain and backdrain construction are included in Appendix D.
- The onsite alluvial, colluvial, weathered granitic bedrock and metasedimentary bedrock materials are anticipated to be largely excavatable with conventional heavy-duty grading equipment. Excavation(s) in the less-weathered bedrock materials (i.e., granitic and metasedimentary materials) may locally require special excavation techniques. Oversize rocks (>8 inches) should be anticipated and hard corestones (i.e., floaters) may be encountered at a shallow depth and may also require special handling and placement. Localized more indurated metasedimentary beds (quartzite units) may also require special handling and placement.
- Deep cuts anticipated for the site (up to 100± feet) may locally expose materials necessitating special excavation techniques and rock placement methods.
- In general, cut and fill slopes constructed to the heights currently proposed at 2:1 (h:v) gradients and shallower are considered grossly stable on this site.
- Although considered grossly stable, cut slopes exposing metasedimentary bedrock materials are anticipated to locally be very blocky and difficult to establish landscaping upon. Consideration should be given to replacing some cut slope areas with engineered fill for this reason. This will also likely be a factor for some cut slope areas exposing granitic bedrock. Finish cut slopes should be mapped an engineering geologist to evaluate the exposed surface for obvious surficial slope stability or rock fall concerns.
- Conventionally reinforced spread and/or continuous wall footings are considered a suitable foundation system for the proposed buildings, provided further verification and review of settlement characteristics and soil expansion potential are performed at the completion of final site grading. Consideration should be given to the use of post-tensioned foundation systems in deeper fill areas (i.e., fills in excess of 40 feet in depth).

Appendix 4: Historical Site Conditions

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

N/A

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

The 2010 SAR MS4 Permit further requires that LID Retention BMPs (Infiltration or Harvest and Use) be used unless it can be shown that those BMPs are infeasible.

For Hydromodification, proposed Detention Basin will satisfy the requirement of post-development volume and time of concentration 2-year 24-hour storm DOES NOT exceed the pre-development peak runoff by more than 5 percent.

South Shore II project is within "Highest and best use" policy area for stormwater runoff to Lake Elsinore, therefore Infiltration, Harvest and Use BMPs need not be assessed.

Based on LID BMP Prioritization, for alternate BMPs situated in poor infiltration rate; the Extended Detention Basin was selected as the most appropriate treatment BMP along and at downstream ends of drainage system.

The total project Design Capture Volume will be addressed using Extended Detention Basin.

Since project proposed BMPs, Extended Detention Basin to satisfy LID performance criteria, therefore Bio-treatment control performance criteria is also fully satisfied as well.

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

PROJECT DESCRIPTION

The South Shore II project is a 68 acres Residential Development, located in the City of Lake Elsinore, Riverside County, California. The project is a master-planned community that consists of mixed land uses in accordance with the master plan. The community consists of 144 residential lots, public parks, open spaces and detention basin area. The project takes its primary and secondary access from the adjacent development to the west, Tract 35337.

With the City of Lake Elsinore being a co-permittee on Riverside Counties' MS4 permit, certain post development water quality features need to be designed into the project for water quality treatment of daily nuisance flows and first flush storm flows after the project is constructed and homes are occupied.

For alternate BMPs situated in poor infiltration rate; Extended Detention Basin was selected as the most appropriate treatment BMP at downstream ends of the proposed drainage system.

Within the basins, there is a detention component that addresses the water quality portion of the volume based BMP. The proposed extended detention basins will provide load reduction benefits within the project site by detaining and removing pollutants of concern. The EPA defines dry detention basins (also known as extended detention basins (EDBs)) as "basins whose outlets have been designed to detain the storm water runoff from a water quality design storm for some minimum time (48 hours) to allow particles and associated pollutants to settle." It should be noted, that some of the storm water will also evaporate.

Tabulation and Sizing Calculations

BMPs Sizing Calculation:

These calculations are based on approved methodologies within the currently active Municipal Separate Storm Sewer System (MS4) permits for Santa Ana River Watershed regions of Riverside County. All BMP designs are sized based on the design capture volume, V_{BMP} . However, there may be circumstances when flow based Treatment Control BMPs are utilized and therefore this section also includes method for calculating the design flow rate, Q_{BMP} .

Calculating V_{BMP} :

Volume based BMPs, including all of the BMPs in this report, are sized to capture and treat the design capture volume, V_{BMP} . As the method for calculating and documenting the design capture volume varies by watershed, the designer must first know which watershed the proposed project is within, and then follow the corresponding guidelines below. The watershed a particular project is within can be determined from the 'Locate my Watershed' tool available at: www.rcflood.org/npdes/

In order to meet Regional Water Quality Control Board (RWQCB) requirements, in the Santa Ana River Watershed the design capture volume (V_{BMP}) is based on capturing the volume of runoff generated from an 85th percentile, 24-hour storm event. Follow the steps using worksheet provided in the Handbook to calculate V_{BMP} in the Santa Ana River Watershed.

The Design Storm Depth (D_{85}) by locating the project site on the Isohyetal Map for the 85th Percentile 24-hour Storm Event is 0.68 inches.
See below Isohyetal Map.

Santa Ana Watershed

V_{BMP} and Q_{BMP} worksheets

These worksheets are to be used to determine the required

Design Capture Volume (V_{BMP})

or the

Design Flow Rate (Q_{BMP})

for BMPs in the Santa Ana Watershed

To verify which watershed your project is located within, visit

www.rcflood.org/npdes

and use the "Locate my Watershed" tool

If your project is not located in the Santa Ana Watershed,

Do not use these worksheets! Instead visit

www.rcflood.org/npdes/developers.aspx

To access worksheets applicable to your watershed

Use the **tabs across the bottom
to access the worksheets for the Santa Ana Watershed**

Table 2-1: Impervious Fraction Based on Various Land Use Covers

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

Effective Impervious Fraction for mixed surfaces Tentative Tract Map 36567:

Use average Effective Impervious Fraction, EIF = **0.55** for 7 Lots or $\frac{1}{4}$ Ac Residential areas, consistent with Impervious Fraction for hydrology calculations.

See below Impervious cover table from Hydrology Manual:

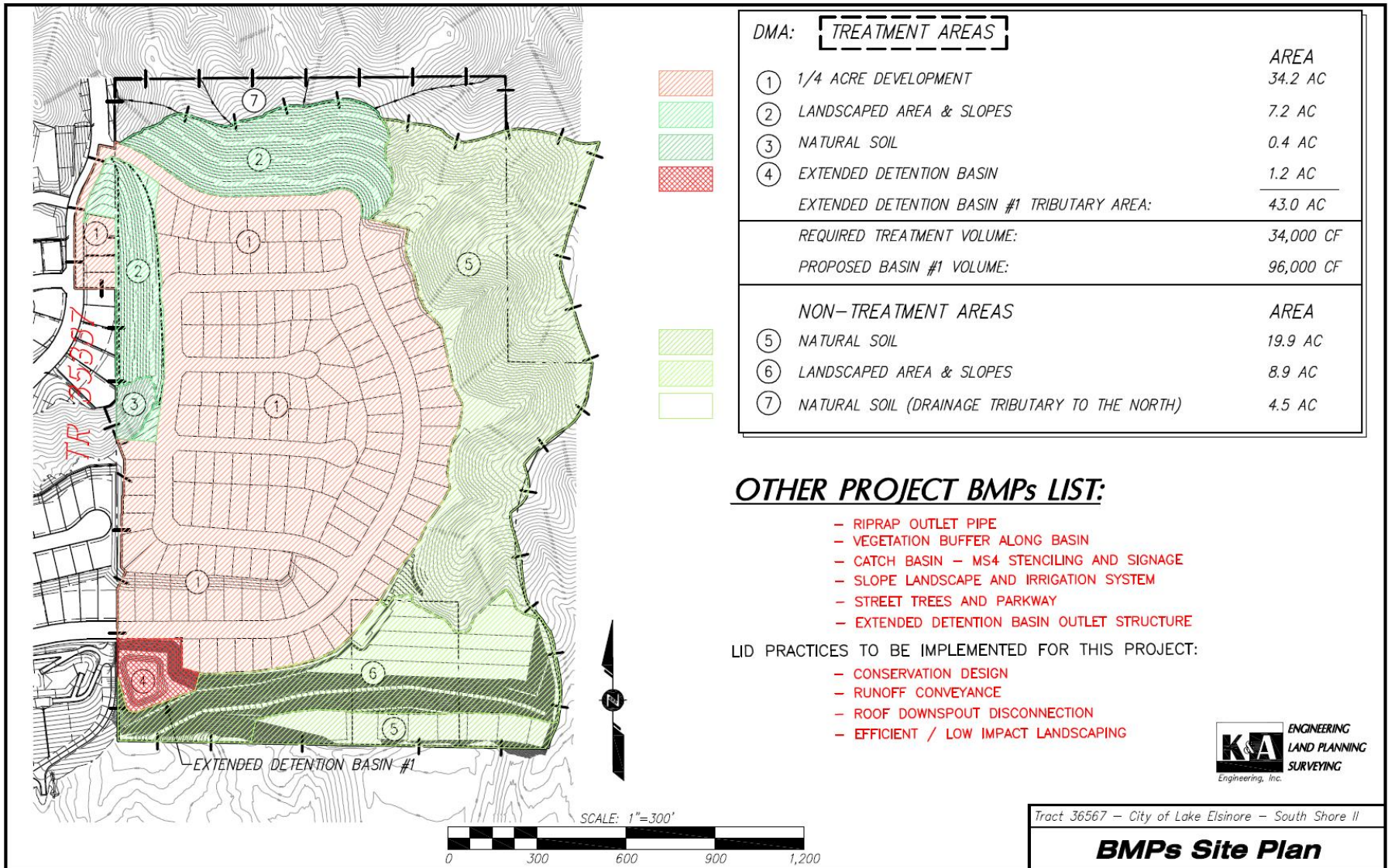
ACTUAL IMPERVIOUS COVER		
Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. ($\frac{1}{2}$ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple 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.		
RCFC & WCD HYDROLOGY MANUAL		IMPERVIOUS COVER FOR DEVELOPED AREAS

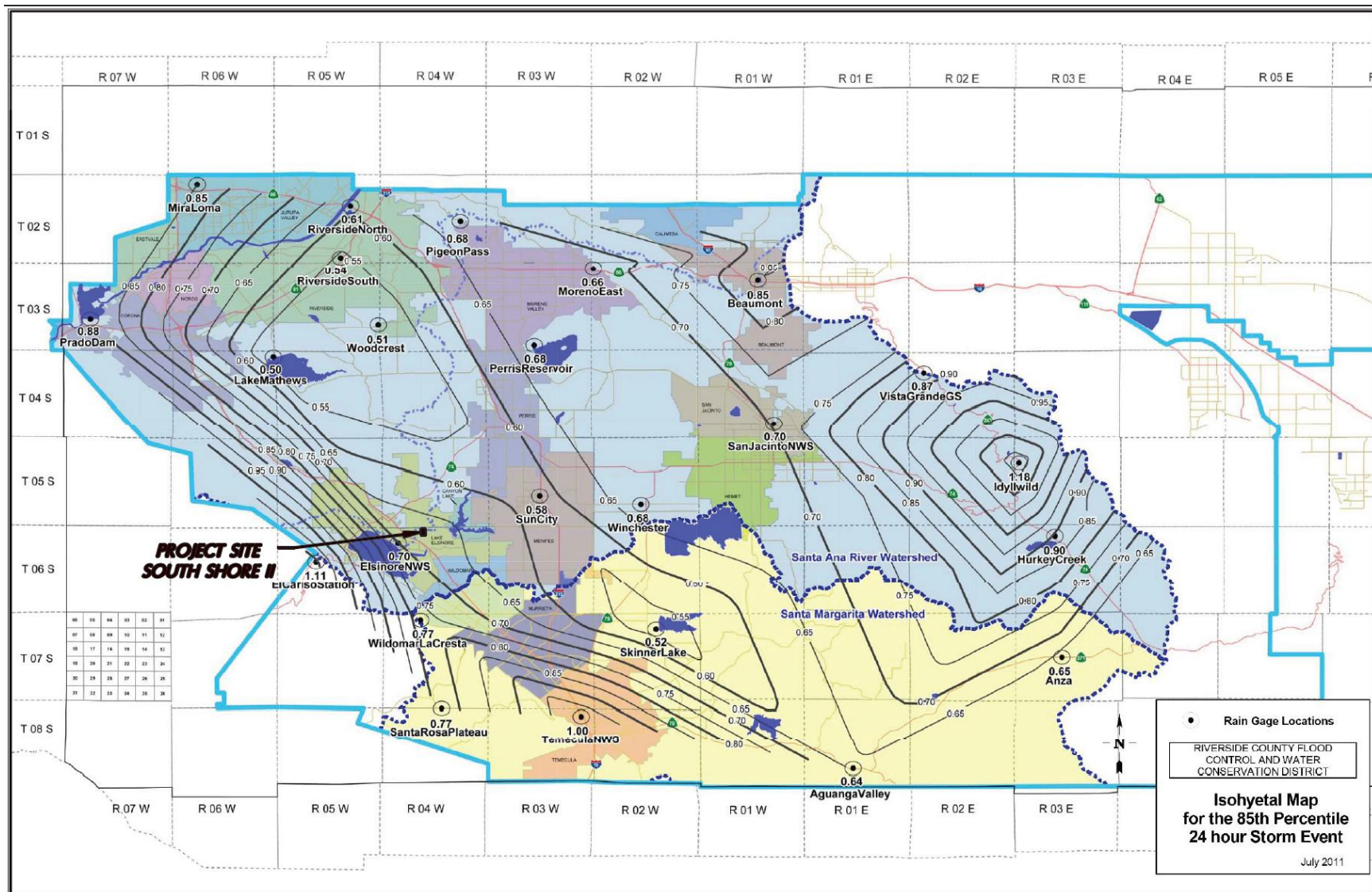
PLATE D-5.6

DMA Classifications

DMA Name or ID	Surface Type(s) ¹	Area (Sq. Ft.)	DMA Type
DMA – Area-1	1/4 Ac - Residential	1489752 (34.2 Ac)	“D”, to BMP-1
DMA – Area-2	Landscape & slope areas	315194 (7.2 Ac)	“A”, to BMP-1
DMA – Area-3	Natural (existing)	17424 (0.4 Ac)	“A”, to BMP-1
DMA – Area-4	Extended Detention Basin	50710 (1.2 Ac)	“A”, EDB
DMA – Area-5	Natural (existing)	866844 (19.9 Ac)	“A”, self-treating area
DMA – Area-6	Landscape & slope areas	387684 (8.9 Ac)	“A”, self-treating area
DMA – Area-7	Natural (existing), drain to the north	196020 (4.5 Ac)	“A”, self-treating area

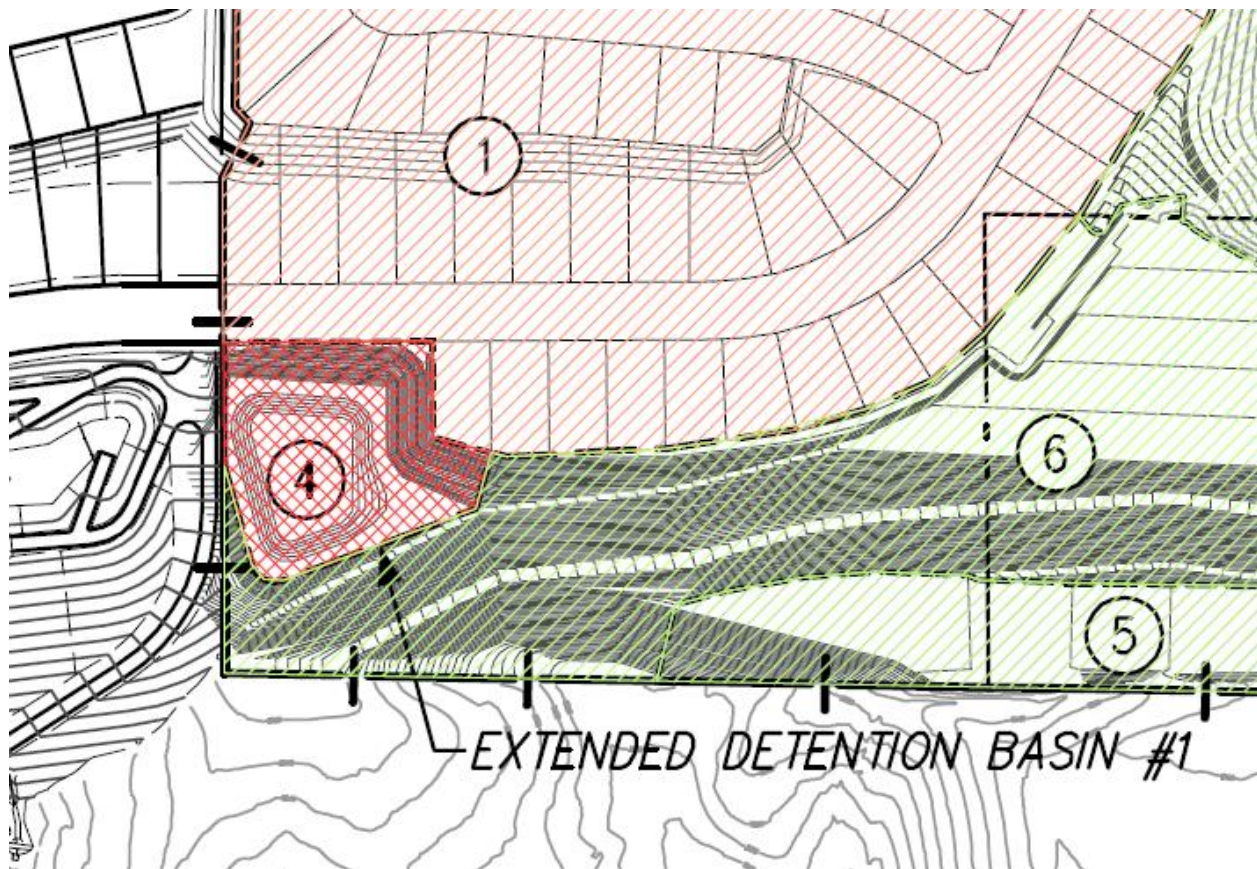
Santa Ana Watershed - BMP Design Volume, V_{BMP} (Rev. 10-2011)					Legend: Required Entries Calculated Cells			
<i>(Note this worksheet shall only be used in conjunction with BMP designs from the LID BMP Design Handbook.)</i>								
Company Name K&A Engineering, Inc.					Date 4/9/2013			
Designed by 					Case No 			
Company Project Number/Name 284.378 - Tract 36567 South Shore II								
BMP Identification								
BMP NAME / II Extended Detention Basin #1								
<i>Must match Name/ID used on BMP Design Calculation Sheet</i>								
Design Rainfall Depth								
85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E					$D_{85} = $ 0.68 inches			
Drainage Management Area Tabulation								
<i>Insert additional rows if needed to accommodate all DMAs draining to the BMP</i>								
DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Imperious Fraction, I_p	DMA Runoff Factor	DMA Areas $\times$ Runoff Factor	Design Storm Depth (in.)	Capture Volume, V_{BMP} (cubic feet)	Volume on Plans (cubic feet)
Area-1	1489752	Mixed Surface Types	0.55	0.37	554932.2			
Area-2	315194	Ornamental Landscaping	0.1	0.11	34815.7			
Area-3	17424	Natural/D Soil	0.4	0.28	4873.7			
1822370		Total		594621.6				





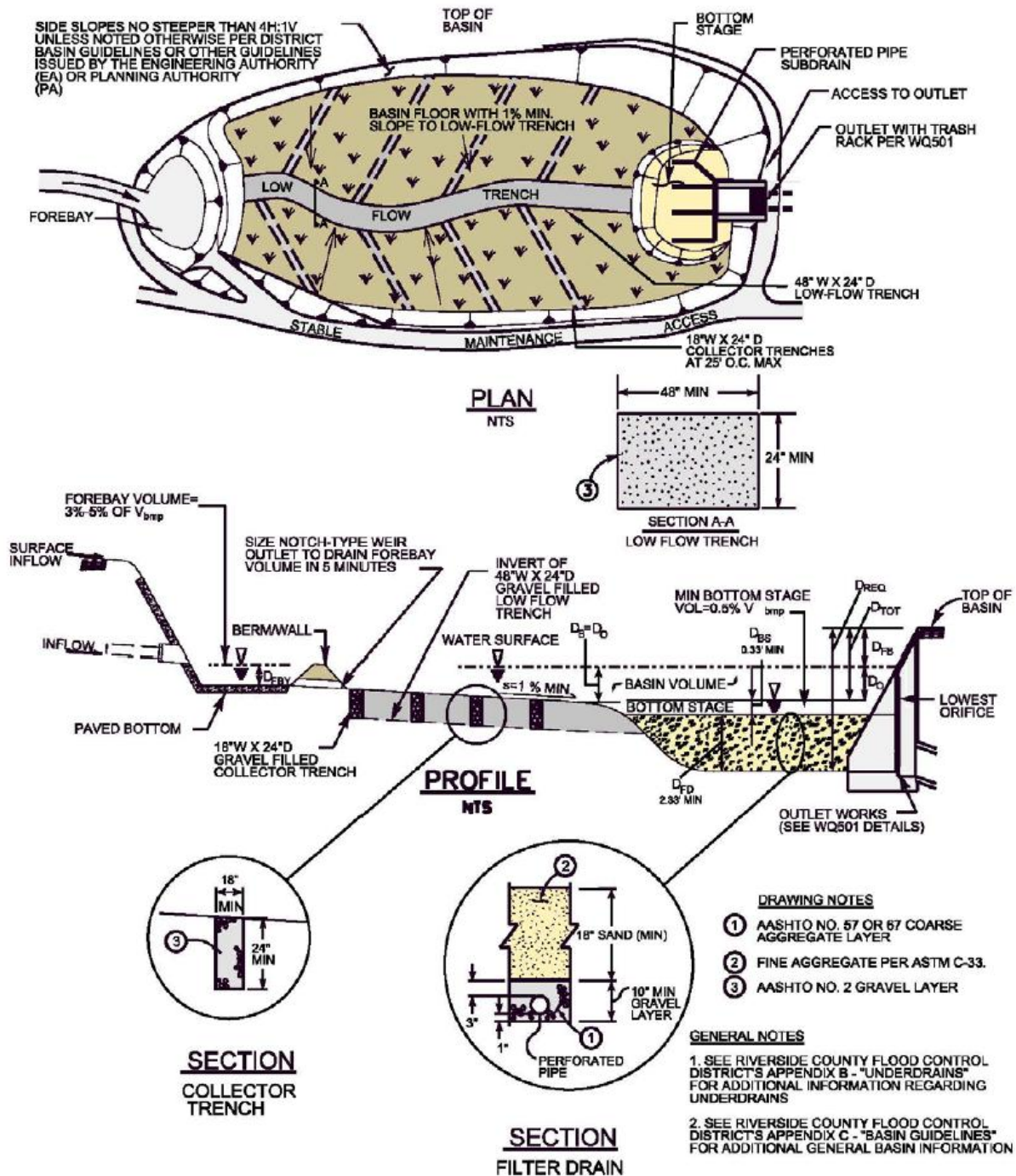
Proposed Extended Detention Basin, BMP-1:

The Extended Detention Basin (EDB) is designed to detain the design volume of stormwater, V_{BMP} , and maximize opportunities for volume losses through infiltration, evaporation, evapotranspiration and surface wetting. Additional pollutant removal is provided through sedimentation, in which pollutants can attach to sediment accumulated in the basin through the process of settling. Stormwater enters the EDB through a *forebay* where any trash, debris, and sediment accumulate for easy removal. Flows from the forebay enter the basin which is vegetated with native grasses that enhance infiltration and evapotranspiration, and which is interspersed with gravel-filled trenches that help further enhance infiltration. Water that does not get infiltrated or evapotranspired is conveyed to the *bottom stage* of the basin. At the bottom stage of the basin, low or incidental dry weather flows will be treated through a sand filter and collected in a subdrain structure. Any additional flows will be detained in the basin for an extended period by incorporating an outlet structure that is more restrictive than a traditional detention basin outlet. The restrictive outlet structure extends the drawdown time of the basin which further allows particles and associated pollutants to settle out before exiting the basin, while maximizing opportunities for additional incidental volume losses.



Extended Detention Basin will be designed to follow LID BMP Design Handbook fact sheet.

EXTENDED DETENTION BASIN BMP FACT SHEET



EXTENDED DETENTION BASIN BMP FACT SHEET

Design Summary

Design Parameter	Extended Detention Basin
Drawdown time (total)	72 hours ^{2,5}
Minimum drawdown time for 50% V _{BMP}	24 hours ²
Minimum tributary area	5 acres ²
Outlet erosion control	Energy dissipaters to reduce velocities ¹
Forebay volume	3 to 5 % of V _{BMP} ³
Basin Invert Longitudinal Slope (min.)	1%
Basin Invert Transverse (cross) Slope (min)	1%
Low-flow trench width (min.)	48 inches
Low-flow trench depth (min.)	24 inches
Slope of low-flow trench along bottom excavated Surface (max.)	1%
Slope of gravel collector trenches along bottom excavated surface (max.)	1 %
Length to width ratio (min.)	1.5:1
Basin depth (min.)	1 foot ³
Bottom stage volume	0.5 % of V _{BMP} ³
Bottom stage depth (min)	0.33 feet ³
Filter drain depth (min)	2.33 feet ³
1. Ventura County's Technical Guidance Manual for Stormwater Quality Control Measures 2. CA Stormwater BMP Handbook for New Development and Significant Redevelopment 3. Denver, Colorado's UDFCD Drainage Criteria Manual, Volume 3	

Note: The information contained in this BMP Factsheet is intended to be a summary of design considerations and requirements. Additional information which applies to all detention basins may be found in the "Basin Guidelines" (Appendix C). In addition, information herein may be superseded by other guidelines issued by the Engineering Authority.

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

This Project meets the following condition: HCOC EXEMPTION 2

The volume and time of concentration¹ 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:

- X 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

Hydrologic Conditions of Concern Summary

Drainage Area 1 = 66.3 Ac (Pre-condition) compare to Drainage Areas A+B = 63.8 Ac (Post-condition)

	2 year – 24 hour		
	Pre-condition	Post-condition	% Difference
Time of Concentration	5.95 minutes	5.73 minutes	- 3.7%
Volume (Acre Feet)	2.68	4.26 – 2.2 = 2.06	- 23%

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.

In this study, Lag time for Unit Hydrograph 2-year 24-hour storm is used for comparison.

² Volume: for Post-condition, the runoff volume from drainage areas A+B is subtracted by Detention Basin Storage Volume of 96,000 cf (2.2 Ac-ft).

See Unit Hydrograph outputs: UH1242.out – Area 1, Pre-condition
Ssuha242.out – Area A, Post-condition
Ssuhb242.out – Area B, Post-condition
SSuhab.out – Confluence Areas A+B, Post-condition

Drainage Area 6 = 5 Ac (Pre-condition) compare to Drainage Area G = 4.4 Ac (Post-condition)

	2 year – 24 hour		
	Pre-condition	Post-condition	% Difference
Time of Concentration	1.99 minutes	1.57 minutes	
Volume (Acre Feet)	0.0993	0.1265	

See Unit Hydrograph outputs: UH6242.out – Area 6, Pre-condition
UH642.out – Area G, Post-condition

Drainage Area 7 = 4.3 Ac (Pre-condition) compare to Drainage Area H = 3.6 Ac (Post-condition)

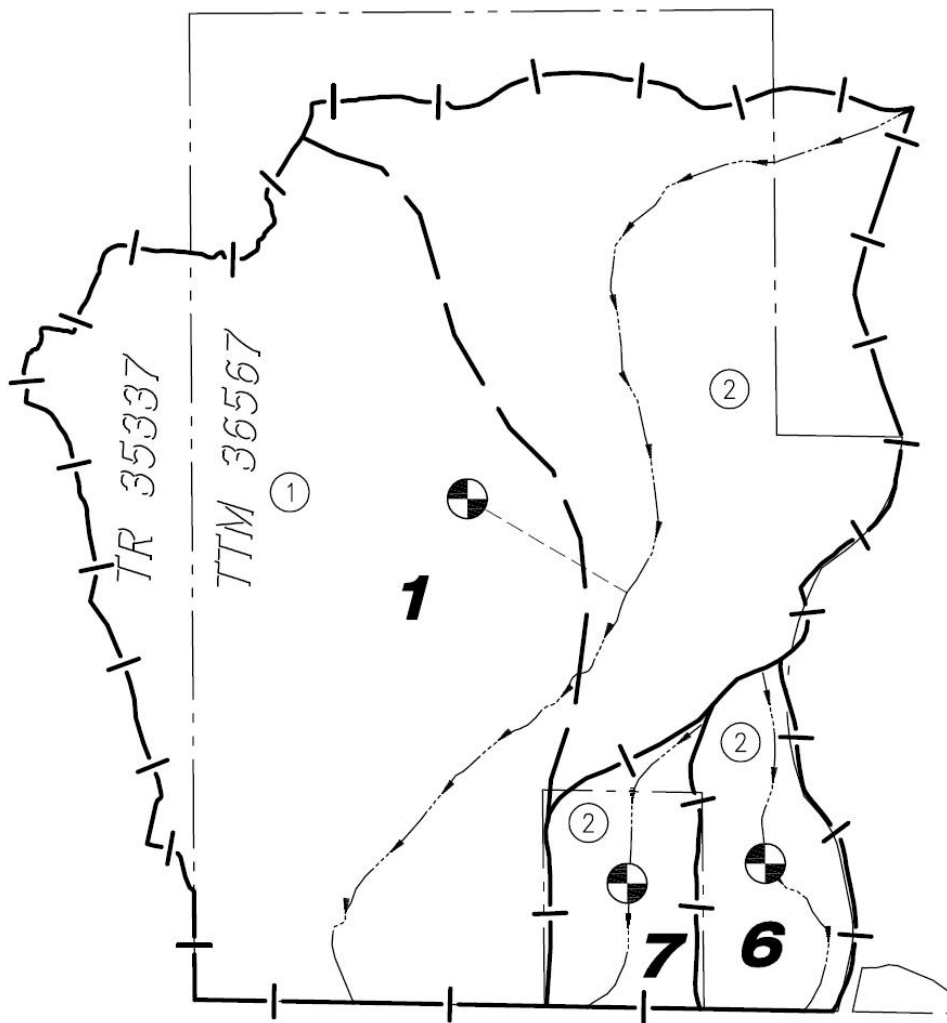
	2 year – 24 hour		
	Pre-condition	Post-condition	% Difference
Time of Concentration	2.07 minutes	1.47 minutes	
Volume (Acre Feet)	0.0854	0.0966	

See Unit Hydrograph outputs: UH7242.out – Area 7, Pre-condition
UHH42.out – Area H, Post-condition

Hydrologic Conditions of Concern Summary:						
Drainage Area						
Pre-condition	Acre	Q _{2-yr 24-hr} (cfs)	Post-condition	Acre	Q _{2-yr 24-hr} (cfs)	Diff.
1	66.3	10.5	A	43.2	7.0	-33%
			B	20.6		
6	5	0.2	G	4.4	0.2	0%
7	4.3	0.3	H	3.6	0.2	-33%
Total =	75.6		Total =	71.8		*)

*) The Drainage area reduction is about 4 acres will be treated and a part of Tract 35337 – Spyglass Ranch.

Therefore, this project is not potentially susceptible to hydromodification impacts, an HCOC does not exist and hydromodification does not need to be considered further.



HYDROGRAPH DATA

	AREA 1	AREA 6	AREA 7
U/S ELEV	1790.0	1694.0	1690.0
D/S ELEV	1517.0	1539.0	1546.0
ELEV. DROP	273'	155'	144'
STREAM LENGTH	2,810'	840'	745'

DIST. D/S TO  1,220' 315' 405'

TOTAL AREA (AC) 66.3 5.0 4.3

LAND USE AREA 1 AREA 6 AREA 7

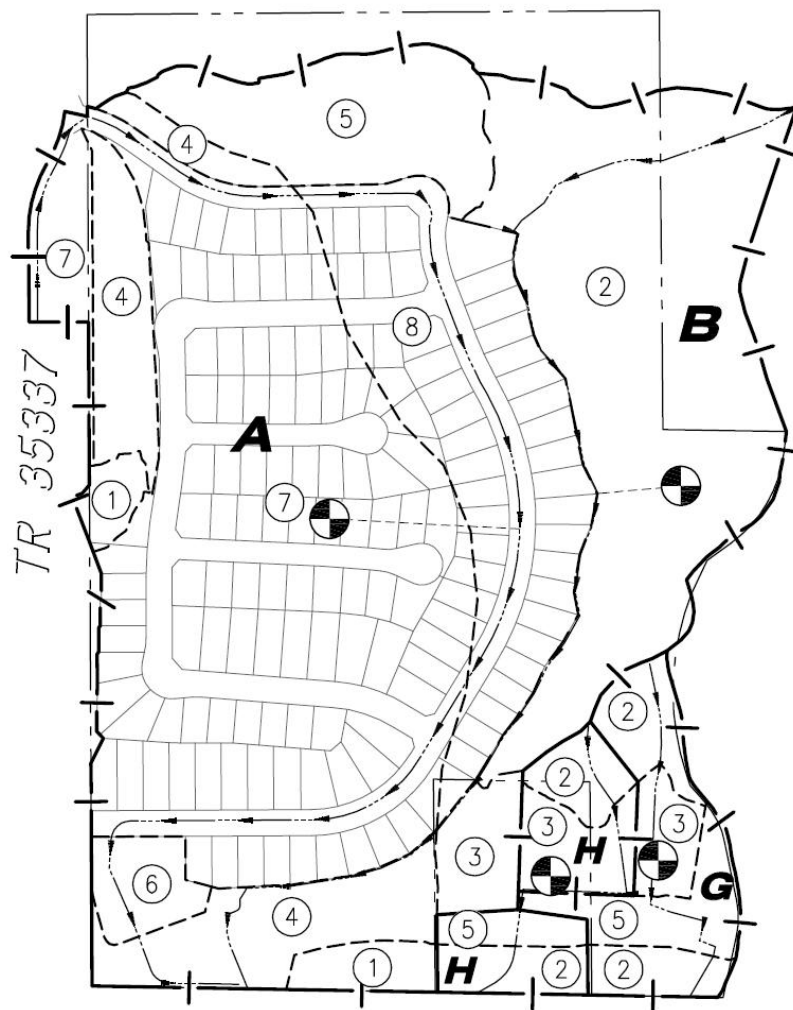
① OPEN BRUSH
R.I. = 84
IMP. AREA = 0%
AREA (AC) 38.6

② OPEN BRUSH
R.I. = 88
IMP. AREA = 0%
AREA (AC) 27.7



Tract 36567 – City of Lake Elsinore – South Shore II

Existing Condition Unit Hydrograph
Existing Drainage Area 1, 6, and 7



HYDROGRAPH DATA

	AREA A	AREA B	AREA G	AREA H
U/S ELEV	1717.2	1790.0	1694.0	1685.0
D/S ELEV	1517.0	1517.0	1539.0	1546.0
ELEV. DROP	200.2'	273'	155'	139'
STREAM LENGTH	4,040'	3,005'	900'	920'

DIST. D/S TO	1,900'	1,610'	445'	340'
TOTAL AREA (AC)	43.2	20.6	4.4	3.6

LAND USE

	AREA A	AREA B	AREA G	AREA H
① OPEN BRUSH R.I. = 84, IMP. AREA = 0% AREA (AC)	0.6	0.8	-	-
② OPEN BRUSH R.I. = 88, IMP. AREA = 0% AREA (AC)		15.4	1.9	1.7
③ PARK R.I. = 79, IMP. AREA = 10% AREA (AC)		1.2	0.9	1.3
④ LANDSCAPED IRRIGATED R.I. = 82, IMP. AREA = 10% AREA (AC)	2.8	3.2	-	-
⑤ LANDSCAPED IRRIGATED R.I. = 77, IMP. AREA = 10% AREA (AC)	4.4		1.6	0.6
⑥ BASIN SITE R.I. = 72, IMP. AREA = 5% AREA (AC)	1.2		-	-
⑦ RESIDENTIAL 1/4 ACRE R.I. = 69, IMP. AREA = 55% AREA (AC)	24.6		-	-
⑧ RESIDENTIAL 1/4 ACRE R.I. = 75, IMP. AREA = 55% AREA (AC)	9.6		-	-

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	☒	☐	
Activity Restrictions	☒	☐	
Irrigation System and Landscape Maintenance	☒	☐	
Common Area Litter Control	☒	☐	
Street Sweeping Private Streets and Parking Lots	☒	☐	
Drainage Facility Inspection and Maintenance	☒	☐	
Structural Source Control BMPs			
MS4 Stenciling and Signage	☒	☐	
Landscape and Irrigation System Design	☒	☐	
Protect Slopes and Channels	☒	☐	
Provide Community Car Wash Racks	☐	☒	Not in this project
Properly Design:	☐	☒	
Fueling Areas	☐	☒	There are no fueling areas within the project area
Air/Water Supply Area Drainage	☐	☒	Not in detached residential area
Trash Storage Areas	☐	☒	Not in detached residential area
Loading Docks	☐	☒	There are no loading docks within the project area
Maintenance Bays	☐	☒	There are no maintenance bays within the project area
Vehicle and Equipment Wash Areas	☐	☒	Not in project
Outdoor Material Storage Areas	☐	☒	Not in project
Outdoor Work Areas or Processing Areas	☐	☒	Not in project
Provide Wash Water Controls for Food Preparation Areas	☐	☒	Not in project

DESCRIPTIONS OF SOURCE CONTROL BMPs:

Non-Structural Source Control BMPs:

Education for property owners, tenants and occupants (N1) - Education is a key element in the source control plan, as preventing pollutants from entering the storm drain system is the most cost effective of all BMPs. Education shall be keyed to the various practices that lead to pollutant generation, but which most homeowners and renters are unaware. Such practices on the surface appear mundane, but

actually may have severe cumulative effects on water quality. These practices include car washing, littering, landscape maintenance, cleaning up after pets, etc. Environmental awareness education materials shall be provided to all members of the HOA periodically. See Appendix D for Educational Materials as follow:

- The Ocean Begins at Your Front Door
- Tips for Household Activities
- Tips for Automotive
- Tips for Pool Maintenance
- Tips for Landscaping and Gardening
- Tips for Trash
- Tips for Pet Care
- Did you know? Educational pamphlet
- Maintain your BMPs!

Activity Restrictions (N2) – Conditions, Covenants, and Restrictions (CC&Rs) shall be prepared for the purpose of surface water quality protection, or use restrictions will be developed through lease terms.

Irrigation System and Landscape Management (N3) - Ongoing maintenance shall be consistent with City of Lake Elsinore Landscape Irrigation Code and the County's integrated pest management policy.

Common Area Litter Control (N4) - Litter patrol, emptying of trash receptacles in common areas, and noting trash disposal violations by tenants/homeowners and reporting the violations to the owner/HOA for investigation shall be conducted.

Street Sweeping (N5) - Public streets shall be swept regularly in accordance with the agencies' administered street sweeping program at a minimum monthly basis.

Drainage Facility Inspection and Maintenance(N6) - Catch Basin and drainage facility shall be inspected, cleaned, and maintained each year and, if necessary, cleaned and maintained prior to the storm season, no later than October 15th each year. Agency maintenance crews or another designated entity shall be responsible for the inspection and maintenance of structural BMPs within their boundaries.

Structural Source Control BMPs:

Structural Source Control BMPs				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain systems stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	No outdoor hazardous material storage areas are included
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☐	☒	No trash and waste storage areas within the project site.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☒	☐	
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☒	☐	
S6	Dock areas	☐	☒	No Industrial/commercial uses are included that would have loading docks.
S7	Maintenance bays	☐	☒	No Maintenance bays are included.
S8	Vehicle wash areas	☐	☒	No Vehicle wash areas are included.
S9	Outdoor processing areas	☐	☒	No outdoor process areas are included.
S10	Equipment wash areas	☐	☒	No Industrial/commercial uses with equipment wash areas are included.
S11	Fueling areas	☐	☒	No Fueling areas are included.
S12	Hillside landscaping	☒	☐	
S13	Wash water control for food preparation areas	☐	☒	No food preparation areas are included.

S14	Community car wash racks	☐	☒	No Community car wash racks within the project site.
-----	--------------------------	--------------------------	-------------------------------------	--

The routine structural source control BMPs shall be implemented as follows:

Provide Storm Drain Stenciling and Signage - All storm drain inlets and catch basins, constructed or modified, within the project area shall be stenciled or labeled. Sign which prohibit illegal dumping shall be posted at public access points along channels and creeks within the project area. Legibility of stencils and signs shall be maintained. As catch basins and BMP facilities are completed stenciling and signage will be installed and maintained in good condition until catch basins and facilities are accepted by HOA.

Efficient Irrigation - The timing and application methods of irrigation water in common areas shall prevent of excess irrigation water into the stormwater conveyance system.

Protect Slopes and Channels - Stormwater BMPs shall be included to decrease the potential for erosion of slopes and/or channel.

Hillside Landscaping - Hillside areas that are disturbed by project development shall be landscape with deep-rooted, drought tolerant plant species selected for erosion control.

Appendix 9: O&M

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

Maintenance Responsibility

With the project site being in the City of Lake Elsinore limits, both the City and HOA will have ongoing maintenance responsibilities. Site design and treatment BMPs have been designed to keep maintenance efforts in line with South Shore II project maintenance activities.

City Maintenance Responsibilities: streets right-of-way common areas.

HOA Maintenance Responsibilities: Extended Detention Basin, Landscape maintenance of common areas, landscape and park areas within the project.

General Operation and Maintenance Activities

Operation and maintenance (O&M) activities are described below. The categories of O&M activities are "routine" and "major" where routine refer to activity conducted on a regular schedule, whereas major refers to infrequent activities triggered mainly by need. Each category and its respective activities are described in the following sections.

Routine Operation and Maintenance Activities

O&M responsibility, initially by Developer/Builder until the establishment of HOA. O&M, normally performed by HOA maintenance crews as part of normal/scheduled maintenance activities.

Site Inspection

The storm drain inlets will be inspected on a regular, scheduled basis to ensure that the facility is operating properly, to record observations, and to initiate any actions that may be required. While the frequency of site inspections may vary depending on the season, it will typically be on a monthly basis.

Trash & Debris Removal

Litter may be picked up at any time during site visits for other purposes. Regular, scheduled trash/debris removal will be performed at all sites on a quarterly basis and/or after storm events that result in heavy trash accumulations.

Minor Vegetation Removal/Thinning

Vegetation growth will be inspected annually, and removed or thinned as necessary. Vegetation at inlets and outlets will be manually or mechanically removed if vegetation is found to be clogging or otherwise affecting the operation of the facility. Access roads will remain clear of vegetation and obstructions. Significant vegetation removal is covered under the major maintenance activities section below.

Snag Removal

This work typically includes the removal of sticks, dead branches, brush, and small trees that block water flow or otherwise interfere with the operations. This work may be performed as needed on a quarterly basis.

Minor Sediment Removal

It is expected that there will be a minor amount of sediment deposition at points within the storm drain inlet, primarily in forebay(s) near the inlet(s). When such deposits obstruct water flow, the deposits will be removed.

Major Operation and Maintenance Activities

Operation and maintenance (O&M) requirements for all Source Control and Treatment Control BMPs shall be identified within this report. The O&M shall include the following:

- Description and Schedule
- Inspection & Monitoring requirements
- Identification of Responsible Parties

The owner of the property, and its successors and assigns is responsible for implementation of this WQMP or BMPs for the project site.

O&M MAINTENANCE/FREQUENCY MATRIX		
BEST MANAGEMENT PRACTICES (BMPs)	INSPECTION FREQUENCY	MAINTENANCE REPAIR PROGRAM
Source Control BMPs		
1. Education For Property owner, tenants and occupants, Maintenance staffs, contracted maintenance crews.	Training and education program must be provided within 6 months of hire date and annually thereafter. Materials are included in the Project WQMP.	Educational materials and training will be provided to Property owner, tenants and occupants, Maintenance staff members, and contracted maintenance crews if any, including education materials and restrictions to reduce pollutants from reaching the storm drain system.
2. Activity Restriction	Daily activity of Operation	The project will establish the following policies prohibiting activities during operations: - Prohibit discharge of fertilizer, pesticide, or animal waste to street or storm drain. - Prohibit blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into street or storm drain. - Require dumpster lid to be closed at all times. - Prohibit discharge of paint or masonry waste to street or storm drain. - Prohibit vehicle washing, maintenance or repair on premises.
3. Common Area Landscape Management	Quarterly, as seasonal changes.	The HOA management shall direct maintenance staff to employ landscaping practices be consistent with the City of Lake Elsinore requirements for use of fertilizer, pesticides, and City ordinances for water conservation.

4. Drainage Facility Inspection and Maintenance	Inspect semiannually for beginning (October) and end of the wet season (April).	Maintenance personnel shall remove debris/sediments if necessary within the inlet area. .
5. MS4 Stenciling and Signage	As needed to clearly depict signage.	Replace or repaint as needed.
6. Protect Slopes and Channels	Inspect semiannually and before and after storm events.	Repair BMP and slopes as needed.
Treatment Control BMPs		
7. Extended Detention Basin	Inspect semiannually for beginning (October) and end of the wet season (April).	Maintenance personnel shall repair trench surface as needed and remove debris/sediments if necessary.

Appendix 10: Educational Materials

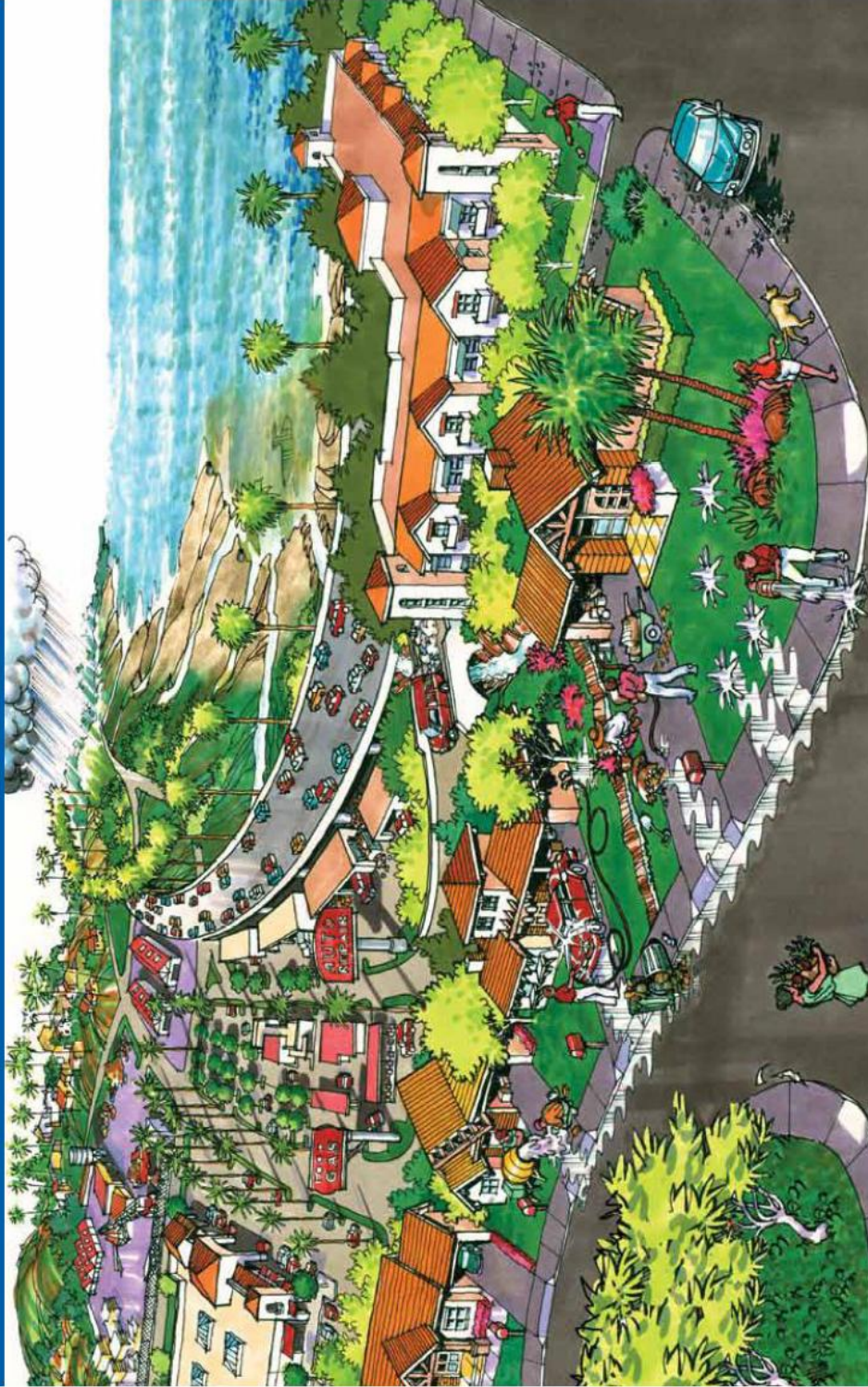
BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

EXTENDED DETENTION BASIN BMP FACT SHEET

Maintenance Guidelines

Schedule	Inspection and Maintenance Activity
During every scheduled maintenance check (per below), and <i>as needed</i> at other times	• Maintain vegetation as needed. Use of fertilizers, pesticides and herbicides should be strongly avoided to ensure they don't contribute to water pollution. If appropriate native plant selections and other IPM methods are used, such products shouldn't be needed. If such projects are used: ○ Care should be taken to avoid contact with the low-flow or other trenches, and the media filter in the bottom stage. ○ Products shall be applied in accordance with their labeling, especially in relation to application to water, and in areas subjected to flooding. ○ Fertilizers should not be applied within 15 days before, after, or during the rainy season. • No ponded water should be present for more than 72 hours to avoid nuisance or vector problems. No algae formation should be visible. Correct problems as needed.
Annually. If possible, schedule these inspections before the beginning of the rain season to allow for any repairs to occur before rains occur.	• Remove debris and litter from the entire basin • Inspect hydraulic and structural facilities. Examine the outlet for clogging, the embankment and spillway integrity, as well as damage to any structural element. • Check for erosion, slumping and overgrowth. Repair as needed. • Inspect sand media at the filter drain to verify it is allowing acceptable infiltration. Scarify top <u>3 inches</u> by raking the filter drain's sand surface annually. • Check the media filter underdrains (via the cleanout) for damage or clogging. Repair as needed. • Remove accumulated sediment and debris from the forebay, and ensure that the notch weir is clear and will allow proper drainage. • Check gravel filled low flow and collector trenches for sediment buildup and repair as needed.
Every 5 years or sooner (depending on whether observed drain times to empty the basin are less than 72 hours).	• Remove the top 3 inches of sand from the filter drain and backfill with 3 inches of new sand to return the sand layer to its original depth. When scarification or removal of the top 3 inches of sand is no longer effective, remove and replace sand filter layer.
Whenever substantial sediment accumulation has occurred.	• Remove accumulated sediment from the bottom of the basin. Removal should extend to original basin depth.

The Ocean Begins at Your Front Door



Never allow pollutants to enter the street, gutter or storm drain!

Follow these simple steps to help reduce water pollution:

Household Activities

- Do not rinse spills with water. Use dry cleanup methods such as applying cat litter or another absorbent material, sweep and dispose of in the trash. Take items such as used or excess batteries, oven cleaners, automotive fluids, painting products and cathode ray tubes, like TVs and computer monitors, to a Household Hazardous Waste Collection Center (HHWCC).
- For a HHWCC near you call (714) 834-6752 or visit www.oclandfills.com.
- Do not hose down your driveway, sidewalk or patio to the street, gutter or storm drain. Sweep up debris and dispose of it in the trash.

Automotive

- Take your vehicle to a commercial car wash whenever possible. If you wash your vehicle at home, choose soaps, cleaners, or detergents labeled non-toxic, phosphate-free or biodegradable. Vegetable and citrus-based products are typically safest for the environment.
- Do not allow wastewater from vehicle washing to drain into the street, gutter or storm drain. Excess wastewater should be disposed of in the sanitary sewer (through a sink or toilet) or onto an absorbent surface like your lawn.
- Monitor your vehicles for leaks and place a pan under leaks. Keep your vehicles well maintained to stop and prevent leaks.
- Never pour oil or antifreeze in the street, gutter or storm drain. Recycle these substances at a service station, a waste oil collection center or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.1800cleanup.org.

Pool Maintenance

- Pool and spa water must be dechlorinated and free of excess acid, alkali or color to be allowed in the street, gutter or storm drain.
- When it is not raining, drain dechlorinated pool and spa water directly into the sanitary sewer.
- Some cities may have ordinances that do not allow pool water to be disposed of in the storm drain. Check with your city.

Landscape and Gardening

- Do not over-water: Water your lawn and garden by hand to control the amount of water you use or set irrigation systems to reflect seasonal water needs. If water flows off your yard onto your driveway or sidewalk, your system is over-watering. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, dippings or pruning waste into the street, gutter or storm drain. Instead, dispose of waste by composting, hauling it to a permitted landfill, or as green waste through your city's recycling program.
- Follow directions on pesticides and fertilizer, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Take unwanted pesticides to a HHWCC to be recycled. For locations and hours of HHWCC, call (714) 834-6752 or visit www.oclandfills.com.

Trash

- Place trash and litter that cannot be recycled in securely covered trash cans.
- Whenever possible, buy recycled products.
- Remember: Reduce, Reuse, Recycle.

Pet Care

- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash. Pet waste, if left outdoors, can wash into the street, gutter or storm drain.
- If possible, bathe your pets indoors. If you must bathe your pet outside, wash it on your lawn or another absorbent/permeable surface to keep the wastewater from entering the street, gutter or storm drain.
- Follow directions for use of pet care products and dispose of any unused products at a HHWCC.

Common Pollutants

Home Maintenance

- Detergents, cleaners and solvents
- Oil and latex paint
- Swimming pool chemicals
- Outdoor trash and litter

Lawn and Garden

- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

Automobile

- Oil and grease
- Radiator fluids and antifreeze
- Cleaning chemicals
- Brake pad dust

Did You Know?

- Most people believe that the largest source of water pollution in urban areas comes from specific sources such as factories and sewage treatment plants. In fact, the largest source of water pollution comes from city streets, neighborhoods, construction sites and parking lots. This type of pollution is sometimes called "non-point source" pollution.
- There are two types of non-point source pollution: stormwater and urban runoff pollution.
- Stormwater runoff results from rainfall. When rainstorms cause large volumes of water to rinse the urban landscape, picking up pollutants along the way.
- Urban runoff can happen any time of the year when excessive water use from irrigation, vehicle washing and other sources carries trash, lawn clippings and other urban pollutants into storm drains.

Where Does It Go?

- Anything we use outside homes, vehicles and businesses – like motor oil, paint, pesticides, fertilizers and cleaners – can be blown or washed into storm drains.
- A little water from a garden hose or rain can also send materials into storm drains.
- Storm drains are separate from our sanitary sewer systems; unlike water in sanitary sewers (from sinks or toilets), water in storm drains is not treated before entering our waterways.

Sources of Non-Point Source Pollution

- Automotive leaks and spills.
- Improper disposal of used oil and other engine fluids.
- Metals found in vehicle exhaust, weathered paint, rust, metal plating and tires.
- Pesticides and fertilizers from lawns, gardens and farms.
- Improper disposal of cleaners, paint and paint removers.
- Soil erosion and dust debris from landscape and construction activities.
- Litter, lawn clippings, animal waste, and other organic matter.
- Oil stains on parking lots and paved surfaces.



The Effect on the Ocean



Non-point source pollution can have a serious impact on water quality in Orange County. Pollutants from the storm drain system can harm marine life as well as coastal and wetland habitats. They can also degrade recreation areas such as beaches, harbors and bays.

Stormwater quality management programs have been developed throughout Orange County to educate and encourage the public to protect water quality, monitor runoff in the storm drain system, investigate illegal dumping and maintain storm drains.

Support from Orange County residents and businesses is needed to improve water quality and reduce urban runoff pollution. Proper use and disposal of materials will help stop pollution before it reaches the storm drain and the ocean.



Stormwater and the Construction Industry



Protect Natural Features



- Minimize clearing.
- Minimize the amount of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, stream buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.

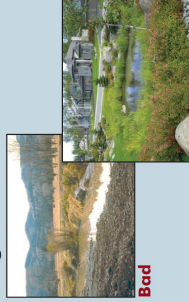
Good

Construction Phasing



- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities, such as landclearing, to be completed immediately after the land has been graded to its final contour.

Vegetative Buffers



- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff.
- Maintain buffers by mowing or replanting periodically to ensure their effectiveness.

Good

Silt Fencing



- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried in the ground.
- Securely attach the material to the stakes.
- Don't place silt fences in the middle of a roadway or use them as a check dam.
- Make sure stormwater is not flowing around the silt fence.

Good

Maintain your BMPs!

IN RIVERSIDE COUNTY ...Call 1-800-506-2555

TO REPORT ILLEGAL STORMDRAIN DISPOSAL

E-mail: Flood.fcnpdes@co.riverside.ca.us

Visit our website: www.floodcontrol.co.riverside.ca.us

Brought to you by the Storm Water/Clean Water Pollution Protection Program.....

REMEMBER, ONLY RAIN IN THE STORMDRAIN!

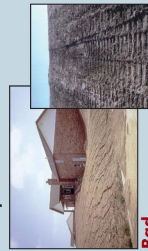
Construction Entrances



- Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.
- Properly size entrance BMPs for all anticipated vehicles.
- Make sure that the construction entrance does not become buried in soil.

Good

Slopes



- Rough grade or terrace slopes.
- Break up long slopes with sediment barriers, or under drain, or divert stormwater away from slopes.

Good

Dirt Stockpiles



- Cover or seed all dirt stockpiles.

Good

Site Stabilization



- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed.

Good

Storm Drain Inlet Protection



- Use rock or other appropriate material to cover the storm drain inlet to filter out trash and debris.
- Make sure the rock size is appropriate (usually 1 to 2 inches in diameter).
- If you use inlet filters, maintain them regularly.

Good

www.epa.gov/hnpdes/menueofbmps

