

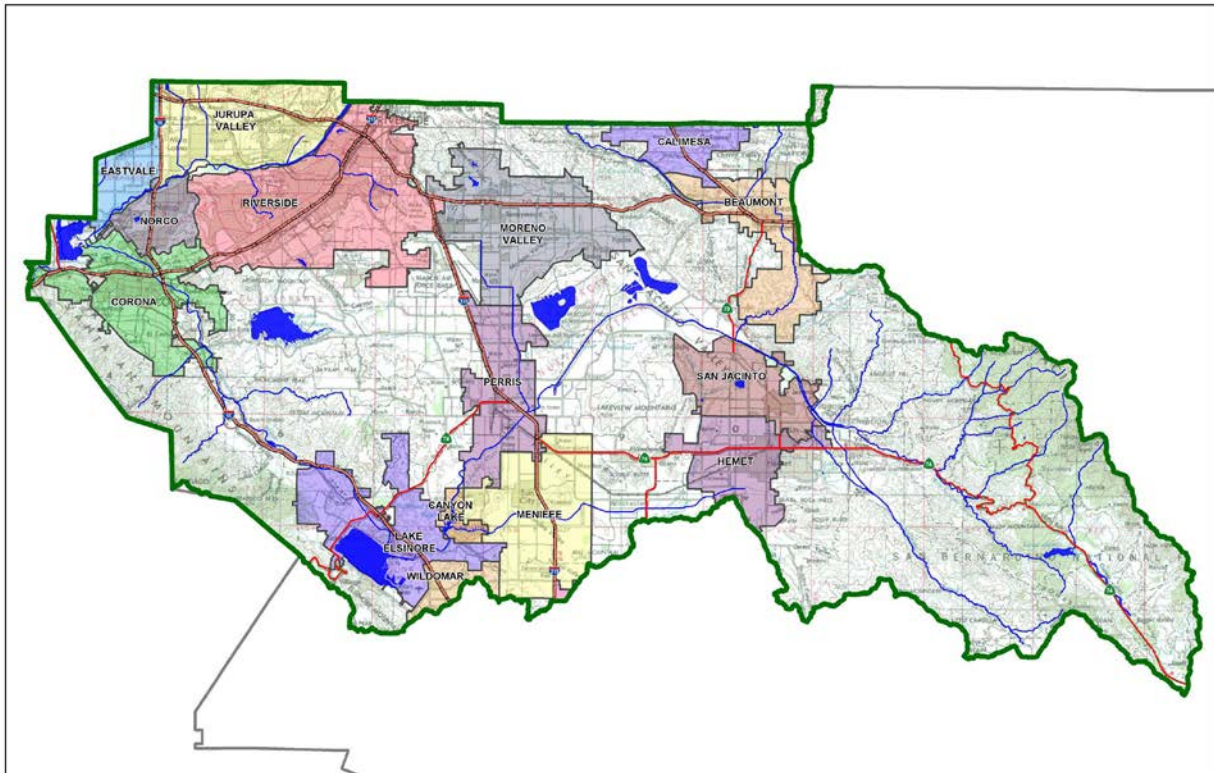
# Preliminary Project Specific Water Quality Management Plan

For Alpine Project PM 38174 located within the **Santa Ana Watershed** Region of Riverside County

**Project Title: FOUR LOT SUBDIVISION – 841 ALPINE MEADOWS LANE**

**Development No: GP-2022-04952**

**Design Review/Case No: PLANNING CASE PR-2021-001078**



- Preliminary
- Final

**Original Date Prepared:** 03-01-2022

**Revision Date(s):** 2/19/23

*Prepared for Compliance with*

*Regional Board Order No. **R8-2010-0033***

## **Contact Information:**

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## OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Ryan Williams and Jerardo R Reyes by Ackerman Associates 2000, Inc. for the PM 38174 4-unit subdivision project.

This WQMP is intended to comply with the requirements of the City of Riverside for Design Review and Certificate of Appropriateness, Planning Case No. PR-2021-001078 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Riverside Water Quality Ordinance (Municipal Code Section 14.12.315).

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

  
\_\_\_\_\_  
Owners' Signature

Ryan Williams and Jerardo R Reyes  
\_\_\_\_\_  
Owners' Printed Name

03-01-2023  
\_\_\_\_\_  
Date

Owner  
\_\_\_\_\_  
Owners' 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

Michael Ackerman  
\_\_\_\_\_  
Preparer's Printed Name

03-01-2023  
\_\_\_\_\_  
Date

Engineer  
\_\_\_\_\_  
Preparer's Title/Position

Preparer's Licensure: C64663 Exp. 6-30-2023



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## Section A: Project and Site Information

The existing single family residential site will be subdivided into 4 lots. Stormwater will drain to landscaped self retaining areas.

PROJECT INFORMATION	
Type of Project:	Residential
Ward Area:	Ward 4
Community Name:	Alpine
Development Name:	Alpine PM 38174
PROJECT LOCATION	
<b>Latitude &amp; Longitude (DMS):</b> 33°54'37.5"N 117°21'48.1"W	
Project Watershed and Sub-Watershed: Santa Ana River, Reach 3	
APN(s): 243-600-025	
Map Book and Page No.: 57/31	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Residential
Proposed or Potential SIC Code(s)	1522
Area of Impervious Project Footprint (SF)	12,200
Total Area of <u>proposed</u> Impervious Surfaces within the Project Footprint (SF)/or Replacement	30,500
Does the project consist of offsite road improvements?	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Does the project propose to construct unpaved roads?	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
Is the project part of a larger common plan of development (phased project)?	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
EXISTING SITE CHARACTERISTICS	
Total area of <u>existing</u> Impervious Surfaces within the Project limits Footprint (SF)	0
Is the project located within any MSHCP Criteria Cell?	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
If so, identify the Cell number:	
Are there any natural hydrologic features on the project site?	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Is a Geotechnical Report attached?	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	C
What is the Water Quality Design Storm Depth for the project?	0.6 in

### A.1 Maps and Site Plans

Appendix 1 includes a map of the local vicinity and existing site. In addition, WQMP Site Plan, located in Appendix 1, includes the following:

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

## A.2 Identify Receiving Waters

In order of upstream to downstream, the receiving waters that the project site is tributary to are as follows. A map of the receiving waters is included in Appendix 1.

Receiving Waters	Hydrologic Unit	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Santa Ana River, Reach 3	801.21	Pathogens	AGR, GWR, REC1, REC2, WARM, WILD, RARE, SPWN	20 miles

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

Table A.1 Other Applicable Permits

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

## Section B: Optimize Site Utilization (LID Principles)

### Site Optimization

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

Yes. Integrating existing drainage patterns into the site plan helped maintain the site's predevelopment hydrologic function. Drainage patterns were inferred from topographic data. Analysis of the existing site drainage patterns during the site assessment phase of the project helped to identify the best locations for stormwater BMPs. Mild gradients are utilized to extend the time of concentration which reduces peak flows and increases the potential for additional infiltration.

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

Yes. Project protected existing vegetation where practicable and avoidance of disturbance to these areas was incorporated into design. Natural vegetation was preserved where practicable.

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

Yes. A key component of LID is taking advantage of a site's natural infiltration and storage capacity. Planting areas and surface infiltration were added to the project.

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

Yes. Minimization of impervious cover was considered during design. The overall coverage of paving was limited. Site layout and circulation patterns where landscaping could be adjacent to impervious pavement were identified.

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

Yes. Runoff is directed from impervious areas to adjacent landscaping minimizing directly connecting impervious areas. Runoff is detained and retained throughout the site where practicable.

# Section C: Delineate Drainage Management Areas (DMAs)

**Table C.1 DMA Classifications**

DMA Name or ID	Surface Type(s) <sup>12</sup>	Area (Sq. Ft.)	DMA Type
DMA 1	LANDSCAPE	79,984	SELF TREATING
DMA 5, 8	LANDSCAPE	25,300; 26,600	SELF TREATING
DMA 3, 6, 9	RESIDENTIAL	13,900; 19,250; 18,000	DRAINS TO SELF RETAINING
DMA 4, 7, 10	LANDSCAPE	3200; 3200; 3200	SELF RETAINING

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

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
DMA 1	49,000	LANDSCAPE	DRIP/NONE
DMA 5	25,300	LANDSCAPE	DRIP/NONE
DMA 8	26,600	LANDSCAPE	DRIP/NONE

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

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 [C]	Required Retention Depth (inches) [D]
DMA 4	LANDSCAPED	3200	0.6	DMA 3	6100	1.74
DMA 7	LANDSCAPED	3200	0.6	DMA 6	6100	1.74
DMA 10	LANDSCAPED	3200	0.6	DMA 9	6100	1.74

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

**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	Impervious fraction	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]
DMA 3	13,900	RESIDENTIAL	0.44	6100	DMA 4	3200	1.9
DMA 6	19,250	RESIDENTIAL	0.31	6100	DMA 7	3200	1.9
DMA 9	18,000	RESIDENTIAL	0.33	6100	DMA 10	3200	1.9

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

DMA Name or ID	BMP Name or ID
NA	NA

## Section D: Implement LID BMPs

### D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (ref: Chapter 2.4.4 of the WQMP Guidance Document)?  Y  N

#### Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermitttee to confirm present and past site characteristics that may affect the use of Infiltration BMPs.

Is this project classified as a small project?  Y  N

#### Infiltration Feasibility

Table D.1 Infiltration Feasibility

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

## D.2 Harvest and Use Assessment

Please check what applies:

- Reclaimed water will be used for the non-potable water demands for the project.
- Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).
- The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.
- None of the above.

Harvest and Use BMPs need not be assessed for the site.



### **D.3 Bioretention and Biotreatment Assessment**

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

*Select one of the following:*

- LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4.
- 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.
- None of the above.

## D.4 Feasibility Assessment Summaries

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
NA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## D.5 LID BMP Sizing

Table D.3 DCV Calculations for LID BMPs

DMA Type/I D	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I <sub>f</sub>	DMA Runoff Factor	DMA Areas x Runoff Factor	BMP 1		
	[A]		[B]	[C]	$\frac{[A]}{[C]}$ x			
<b>NA</b>						<i>Design Storm Depth (in)</i>	<i>Design Capture Volume, V<sub>BMP</sub> (cubic feet)</i>	<i>Proposed Volume on Plans (cubic feet)</i>
	A <sub>T</sub> =			$\Sigma = [D]$ =	[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

## Section E: Alternative Compliance (LID Waiver Program)

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

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

- Or -

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

# Section F: Hydromodification

## F.1 Hydrologic Conditions of Concern (HCOC) Analysis

The project does not create a Hydrologic Condition of Concern, meeting the criteria for HCOC Exemption as shown below:

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

Does the project qualify for this HCOC Exemption?       Y     N

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

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

Does the project qualify for this HCOC Exemption?       Y     N

Results included in Table F.1 below and hydrologic analysis included in Appendix 7.

**Table F.1** Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	Post-condition	% Difference
<b>Time of Concentration</b>	INSERT VALUE	INSERT VALUE	INSERT VALUE
<b>Flow (CFS)</b>	INSERT VALUE	INSERT VALUE	INSERT VALUE
<b>Volume (Cubic Feet)</b>	INSERT VALUE	INSERT VALUE	INSERT VALUE

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

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

Does the project qualify for this HCOC Exemption?     Y     N

## F.2 HCOC Mitigation

As an alternative to the HCOC Exemption Criteria above, HCOC criteria is considered mitigated if the project meets one of the following conditions, as indicated:

- a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.
- b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.
- c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.
- d. None of the above.

## Section G: Source Control BMPs

The following table identifies the potential sources of runoff pollutants for this project and specifies how they are addressed through permanent controls and operational BMPs:

**Table G.1** Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Driveways and sidewalks		Sweep driveways and sidewalks regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.
Landscape, Irrigation and Outdoor Pesticide Use		Maintain landscaping using minimal or no pesticides.
Refuse Area		Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Inspect and pick up litter daily and clean up spills immediately.



# Section H: Construction Plan Checklist

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Plan Sheet Number(s)	Latitude / Longitude
DMA 4	SELF RETAINING AREA	2	33.910594, 117.363849
DMA 7	SELF RETAINING AREA	2	33.910629, 117.363444
DMA 10	SELF RETAINING AREA	2	33.910620, 117.362941

## Section I: Operation, Maintenance and Funding

As required by the City of Riverside, the following Operation, Maintenance and Funding details are provided as summarized:

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.
3. An outline of general maintenance requirements for the Stormwater BMPs 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.
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.

See Appendix 9 for a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on site, and an agreement assigning responsibility for maintenance and providing for inspections and certification.

**Maintenance Mechanism:** Owner maintained. Covenant & Agreement

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

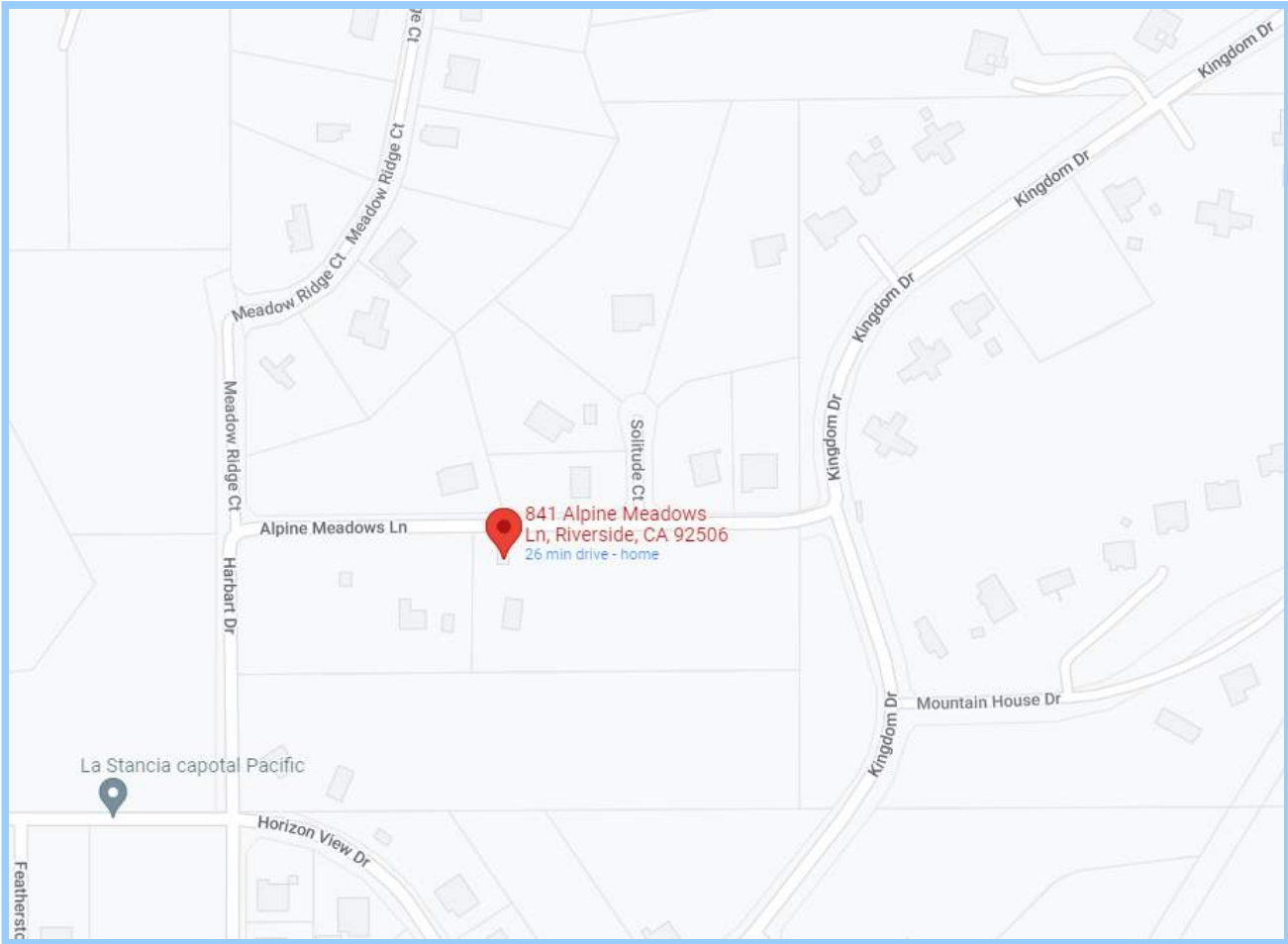
Y       N

Operation and Maintenance Plan and Maintenance Mechanism is included in Appendix 9. Educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP are included in Appendix 10.

# Appendix 1: Maps and Site Plans

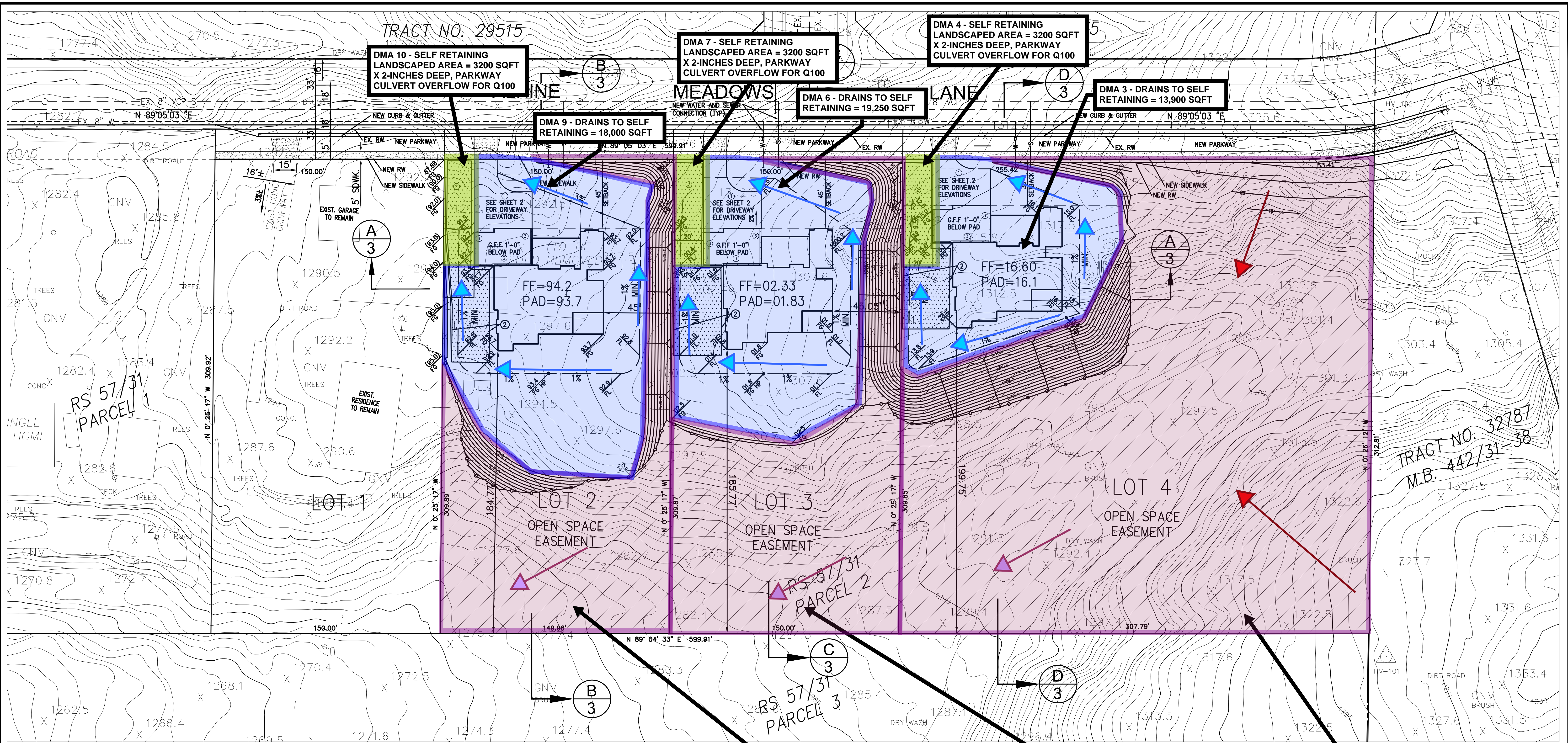
Location Map, WQMP Site Plan and Receiving Waters Map

## LOCATION MAP



***WQMP SITE PLAN WITH DRAINAGE MANAGEMENT AREAS***





TRACT NO. 29515

DMA 10 - SELF RETAINING  
LANDSCAPED AREA = 3200 SQFT  
X 2-INCHES DEEP, PARKWAY  
CULVERT OVERFLOW FOR Q100

DMA 7 - SELF RETAINING  
LANDSCAPED AREA = 3200 SQFT  
X 2-INCHES DEEP, PARKWAY  
CULVERT OVERFLOW FOR Q100

DMA 4 - SELF RETAINING  
LANDSCAPED AREA = 3200 SQFT  
X 2-INCHES DEEP, PARKWAY  
CULVERT OVERFLOW FOR Q100

DMA 3 - DRAINS TO SELF  
RETAINING = 13,900 SQFT

DMA 6 - DRAINS TO SELF  
RETAINING = 19,250 SQFT

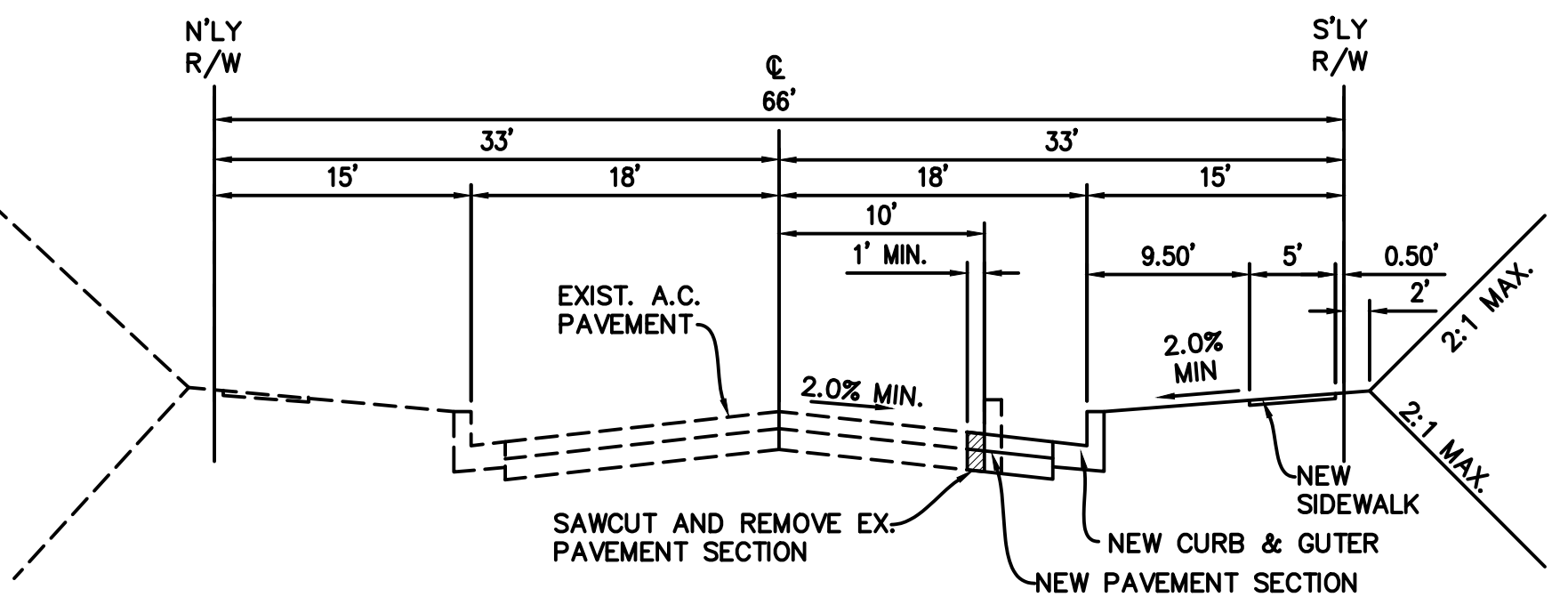
DMA 9 - DRAINS TO SELF  
RETAINING = 18,000 SQFT

TRACT NO. 32787  
M.B. 442/31-38

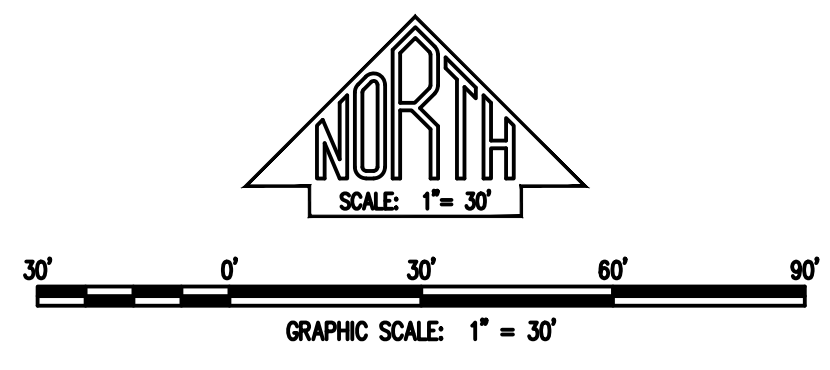
DMA 8 - SELF TREATING  
LANDSCAPED AREA = 26,600  
SQFT

DMA 5 - SELF TREATING  
LANDSCAPED AREA = 25,300  
SQFT

DMA 1 - SELF TREATING  
LANDSCAPED AREA = 82,384  
SQFT



ALPINE MEADOWS LANE  
TYPICAL SECTION  
SEE ON-SITE STREET IMPROVEMENT PLAN  
NO SCALE



- LEGEND**
- INDICATES OPEN SPACE EASEMENT
  - INDICATES WATER RETENTION AREA 3200 S.F. BY 0.17' DEEP
  - INDICATES SELF TREATING AREAS
  - INDICATES SELF RETAINING AREAS
  - INDICATES DRAINS TO SELF RETAINING AREAS

**811**  
Section 4216/4217 of the Government Code requires a DIG ALERT Identification Number be issued before a "Permit to Excavate" will be valid. For your Dig Alert I.D. Number Call Underground Service Alert TOLL FREE 811 Two working days before you dig. Call before you dig.

BENCH MARK: F7-K3  
CITY OF RIVERSIDE LL47/7.  
PK NAIL AND CITY ENGINEER TAG IN THE BASE OF A STREET LIGHT ALONG THE SOUTHERLY CURB OF OVERLOOK PARKWAY 175 FEET EAST OF CHATEAU RIDGE. TRANSFER FROM F7-C2 CITY SURVEY CREW 6/10/2002.  
ELEVATION : 1426.960

**Ackerman Associates**  
2288 MARFAC KATHORN STREET  
CORONA, CA 92882  
PH: 951 454-1869  
FAX: 951 736-8646

PLANS PREPARED UNDER SUPERVISION OF  
MICHAEL J. ACKERMAN RCE 64663 EXP. 6/30/23 DATE

MARK	REVISIONS	APPR.	DATE
DESIGNED BY	DRAWN BY	CHECKED BY	

WDID NO. GP-2022-04952

SITE PLAN  
PRELIMINARY WATER QUALITY MANAGEMENT PLAN  
(P-WQMP)  
841 ALPINE MEADOWS LANE  
RIVERSIDE, CALIFORNIA

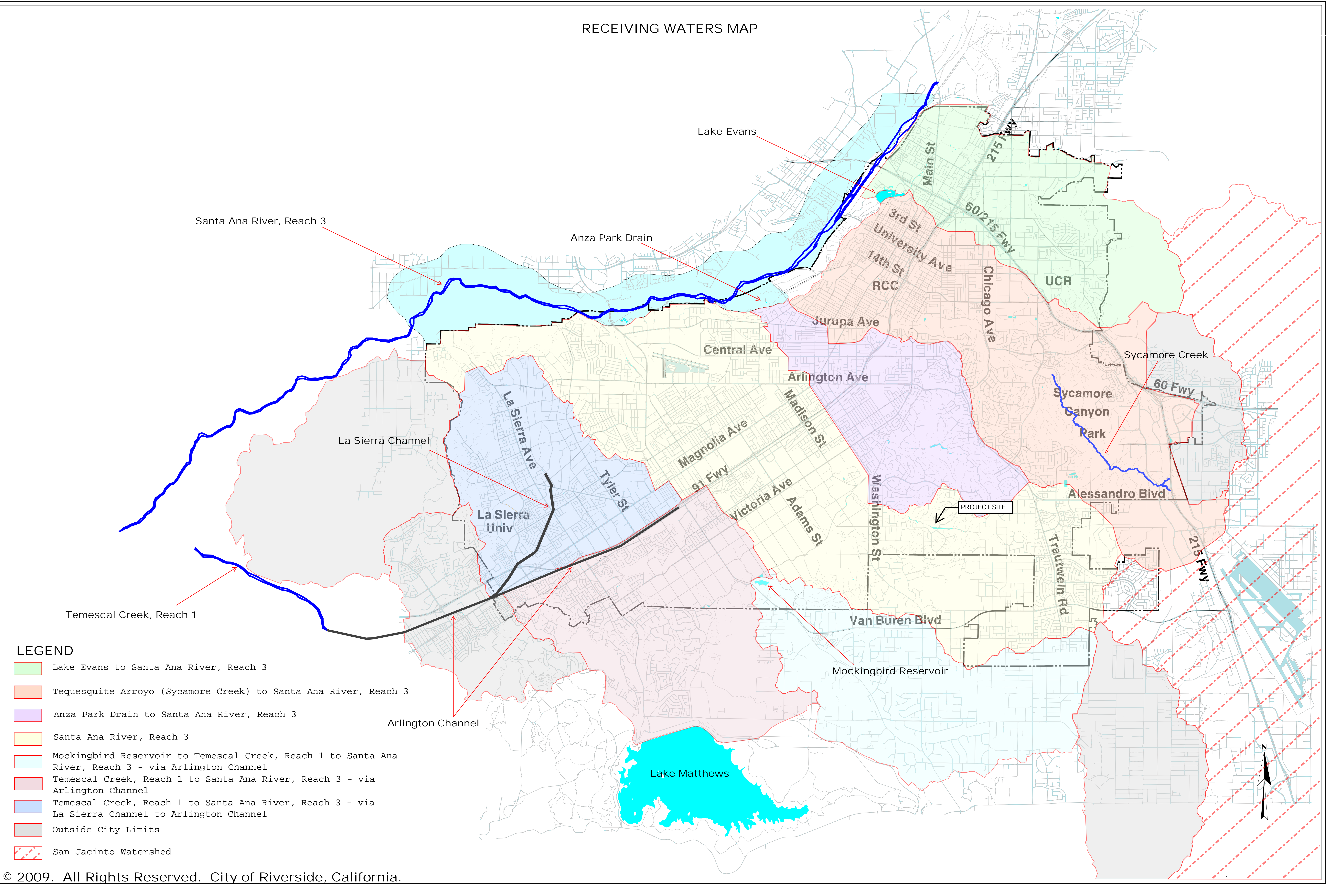
HORIZONTAL SCALE: 1" = 30' VERTICAL SCALE: N/A



***RECEIVING WATERS MAP***



# RECEIVING WATERS MAP



## LEGEND

- Lake Evans to Santa Ana River, Reach 3
- Tequesquite Arroyo (Sycamore Creek) to Santa Ana River, Reach 3
- Anza Park Drain to Santa Ana River, Reach 3
- Santa Ana River, Reach 3
- Mockingbird Reservoir to Temescal Creek, Reach 1 to Santa Ana River, Reach 3 - via Arlington Channel
- Temescal Creek, Reach 1 to Santa Ana River, Reach 3 - via Arlington Channel
- Temescal Creek, Reach 1 to Santa Ana River, Reach 3 - via La Sierra Channel to Arlington Channel
- Outside City Limits
- San Jacinto Watershed



# Appendix 2: Construction Plans

*Grading and Drainage Plans*

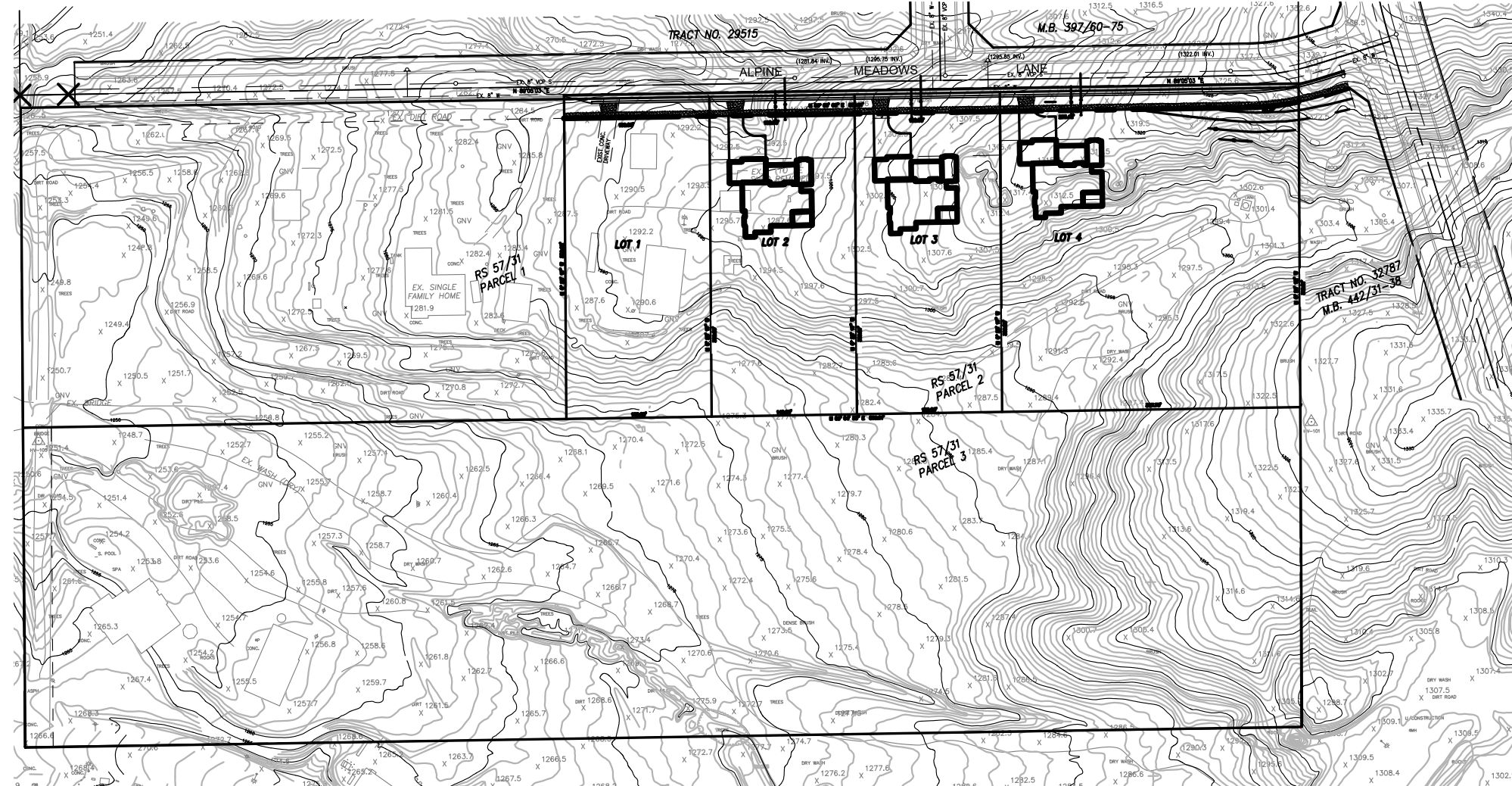


# PRELIMINARY GRADING PLAN

## MSHCP BMPS:

1. A CONDITION SHALL BE PLACED ON GRADING PERMITS REQUIRING A QUALIFIED BIOLOGIST TO CONDUCT A TRAINING SESSION FOR PROJECT PERSONNEL PRIOR TO GRADING. THE TRAINING SHALL INCLUDE A DESCRIPTION OF THE SPECIES OF CONCERN AND ITS HABITATS, THE GENERAL PROVISIONS OF THE ENDANGERED SPECIES ACT (ACT) AND THE MSHCP, THE NEED TO ADHERE TO THE PROVISIONS OF THE ACT AND THE MSHCP, THE PENALTIES ASSOCIATED WITH VIOLATING THE PROVISIONS OF THE ACT, THE GENERAL MEASURES THAT ARE BEING IMPLEMENTED TO CONSERVE THE SPECIES OF CONCERN AS THEY RELATE TO THE PROJECT, AND THE ACCESS ROUTES TO AND PROJECT SITE BOUNDARIES WITHIN WHICH THE PROJECT ACTIVITIES MUST BE ACCOMPLISHED.
2. WATER POLLUTION AND EROSION CONTROL PLANS SHALL BE DEVELOPED AND IMPLEMENTED IN ACCORDANCE WITH RWQCB [REGIONAL WATER QUALITY CONTROL BOARD] REQUIREMENTS.
3. THE FOOTPRINT OF DISTURBANCE SHALL BE MINIMIZED TO THE MAXIMUM EXTENT FEASIBLE. ACCESS TO SITES SHALL BE VIA PRE-EXISTING ACCESS ROUTES TO THE GREATEST EXTENT POSSIBLE.
4. THE UPSTREAM AND DOWNSTREAM LIMITS OF PROJECTS DISTURBANCE PLUS LATERAL LIMITS OF DISTURBANCE ON EITHER SIDE OF THE STREAM SHALL BE CLEARLY DEFINED AND MARKED IN THE FIELD AND REVIEWED BY THE BIOLOGIST PRIOR TO INITIATION OF WORK.
5. PROJECTS SHOULD BE DESIGNED TO AVOID THE PLACEMENT OF EQUIPMENT AND PERSONNEL WITHIN THE STREAM CHANNEL OR ON SAND AND GRAVEL BARS, BANKS, AND ADJACENT UPLAND HABITATS USED BY TARGET SPECIES OF CONCERN.
6. PROJECTS THAT CANNOT BE CONDUCTED WITHOUT PLACING EQUIPMENT OR PERSONNEL IN SENSITIVE HABITATS SHOULD BE TIMED TO AVOID THE BREEDING SEASON OF RIPARIAN [SPECIES] IDENTIFIED IN MSHCP GLOBAL SPECIES OBJECTIVE NO. 7.
7. WHEN STREAM FLOWS MUST BE DIVERTED, THE DIVERSIONS SHALL BE CONDUCTED USING SANDBAGS OR OTHER METHODS REQUIRING MINIMAL INSTREAM IMPACTS. SILT FENCING OF OTHER SEDIMENT TRAPPING MATERIALS SHALL BE INSTALLED AT THE DOWNSTREAM END OF CONSTRUCTION ACTIVITY TO MINIMIZE THE TRANSPORT OF SEDIMENTS OFFSITE. SETTLING PONDS WHERE SEDIMENT IS COLLECTED SHALL BE CLEANED OUT IN A MANNER THAT PREVENTS THE SEDIMENT FROM REENTERING THE STREAM. CARE SHALL BE EXERCISED WHEN REMOVING SILT FENCES, AS FEASIBLE, TO PREVENT DEBRIS OR SEDIMENT FROM RETURNING TO THE STREAM.
8. EQUIPMENT STORAGE, FUELING, AND STAGING AREAS SHALL BE LOCATED ON UPLAND SITES WITH MINIMAL RISKS OF DIRECT DRAINAGE INTO RIPARIAN AREAS OR OTHER SENSITIVE HABITATS. THESE DESIGNATED AREAS SHALL BE LOCATED IN SUCH A MANNER AS TO PREVENT ANY RUNOFF FROM ENTERING SENSITIVE HABITAT. NECESSARY PRECAUTIONS SHALL BE TAKEN TO PREVENT THE RELEASE OF CEMENT OR OTHER TOXIC SUBSTANCES INTO SURFACE WATERS. PROJECT RELATED SPILLS OF HAZARDOUS MATERIALS SHALL BE REPORTED TO APPROPRIATE ENTITIES INCLUDING BUT NOT LIMITED TO APPLICABLE JURISDICTIONAL CITY, FWS [U.S. FISH AND WILDLIFE SERVICE], AND CDFG [CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE], [AND] RWQCB AND SHALL BE CLEANED UP IMMEDIATELY AND CONTAMINATED SOILS REMOVED TO APPROVED DISPOSAL AREAS.
9. ERODIBLE FILL MATERIAL SHALL NOT BE DEPOSITED INTO WATER COURSES. BRUSH, LOOSE SOILS, OR OTHER SIMILAR DEBRIS MATERIAL SHALL NOT BE STOCKPILED WITHIN THE STREAM CHANNEL OR ON ITS BANKS.
10. THE QUALIFIED PROJECT BIOLOGIST SHALL MONITOR CONSTRUCTION ACTIVITIES FOR THE DURATION OF THE PROJECT TO ENSURE THAT PRACTICABLE MEASURES ARE BEING EMPLOYED TO AVOID INCIDENTAL DISTURBANCE OF HABITAT AND SPECIES OF CONCERN OUTSIDE THE PROJECT FOOTPRINT.
11. THE REMOVAL OF NATIVE VEGETATION SHALL BE AVOIDED AND MINIMIZED TO THE MAXIMUM EXTENT PRACTICABLE. TEMPORARY IMPACTS SHALL BE RETURNED TO PRE-EXISTING CONTOURS AND REVEGETATED WITH APPROPRIATE NATIVE SPECIES.
12. EXOTIC SPECIES THAT PREY UPON OR DISPLACE TARGET SPECIES OF CONCERN SHOULD BE PERMANENTLY REMOVED FROM THE SITE TO THE EXTENT FEASIBLE.
13. TO AVOID ATTRACTING PREDATORS OF THE SPECIES OF CONCERN, THE PROJECT SITE SHALL BE KEPT AS CLEAN OF DEBRIS AS POSSIBLE. ALL FOOD RELATED TRASH ITEMS SHALL BE ENCLOSED IN SEALED CONTAINERS AND REGULARLY REMOVED FROM THE SITE(S).
14. CONSTRUCTION EMPLOYEES SHALL STRICTLY LIMIT THEIR ACTIVITIES, VEHICLES, EQUIPMENT, AND CONSTRUCTION MATERIALS TO THE PROPOSED PROJECT FOOTPRINT AND DESIGNATED STAGING AREAS AND ROUTES OF TRAVEL. THE CONSTRUCTION AREA(S) SHALL BE THE MINIMAL AREA NECESSARY TO COMPLETE THE PROJECT AND SHALL BE SPECIFIED IN THE CONSTRUCTION PLANS. CONSTRUCTION LIMITS WILL BE FENCED WITH ORANGE SNOW SCREEN. EXCLUSION FENCING SHOULD BE MAINTAINED UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES. EMPLOYEES SHALL BE INSTRUCTED THAT THEIR ACTIVITIES ARE RESTRICTED TO THE CONSTRUCTION AREAS.
15. THE PERMITTEE SHALL HAVE THE RIGHT TO ACCESS AND INSPECT ANY SITES OF APPROVED PROJECTS INCLUDING ANY RESTORATION/ENHANCEMENT AREA FOR COMPLIANCE WITH PROJECT APPROVAL CONDITIONS INCLUDING THESE BMPS.

## PARCEL MAP NO. 38174 ALPINE MEADOWS LANE



LOCATION MAP  
NO SCALE

### OWNER INFORMATION

WILLIAM M. MUSTIN  
841 BRADLEY STREET  
RIVERSIDE CA 92506  
(951) 776-2986

### SITE INFORMATION

ADDRESS: 841 ALPINE MEADOWS LANE, RIVERSIDE, CA 92506

APN: 243-600-025

#### LEGAL DESCRIPTION:

PARCEL 1:  
PARCEL 2 OF RECORD OF  
SURVEY, AS SHOWN BY MAP  
ON FILE IN BOOK 57, PAGE J1  
OF RECORDS OF SURVEY,  
RECORDS OF RIVERSIDE  
COUNTY, CALIFORNIA.

PARCEL 2:  
A NON-EXCLUSIVE EASEMENT  
OVER THE WESTERLY JO FEET  
OF PARCEL J OF RECORD OF  
SURVEY ON FILE IN BOOK 57,  
PAGE J1 OF RECORDS OF  
SURVEY, RECORDS OF  
RIVERSIDE COUNTY, CALIFORNIA.

#### SITE ACREAGE:

TOTAL ACRES NET 5.74 AC. TOTAL  
NUMBER OF LOTS -4  
MINIMUM LOT SIZE 46,476 SF

### CIVIL ENGINEER

ACKERMAN ASSOCIATES 2000, INC.  
2288 MARYSA KATHRIN STREET  
CORONA, CA. 92882 PH: 951  
454-1869 FAX: 951 736-8645

### SOILS ENGINEER

SOILS SOUTHWEST INC.  
897 VIA LATA  
COLTON, CA. 92324  
909 370-0474

#### EXISTING AVERAGE NATURAL SLOPE OF AREAS TO BE GRADED

LOT 2 = 7%  
LOT 3 = 8%  
LOT 4 = 4%

### ENGINEER'S NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THESE LOCATIONS ARE APPROXIMATE AND SHALL BE CONFIRMED IN THE FIELD BY THE CONTRACTOR, SO THAT ANY NECESSARY ADJUSTMENT CAN BE MADE IN ALIGNMENT AND/OR GRADE OF THE PROPOSED IMPROVEMENT. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT ANY UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

### DECLARATION OF ENGINEER OF RECORD:

I HEREBY DECLARE THAT THE DESIGN OF THE IMPROVEMENTS SHOWN ON THESE PLANS COMPLIES WITH ALL PROFESSIONAL ENGINEERING STANDARDS AND PRACTICES. AS THE ENGINEER OF RECORD FOR THE PLANS, I ASSUME FULL RESPONSIBILITY FOR THE DESIGN OF THE IMPROVEMENTS. WITH RESPECT TO THE PLAN CHECK PERFORMED BY THE CITY OF CORONA, I UNDERSTAND AND ACKNOWLEDGE THE FOLLOWING: (1) THE PLAN CHECK IS A REVIEW FOR THE LIMITED PURPOSE OF ENSURING THE PLANS COMPLY WITH THE CITY'S STANDARDS, PROCEDURES, POLICIES, AND ORDINANCES, (2) THE PLAN CHECK IS NOT A DETERMINATION OF THE TECHNICAL ADEQUACY OF THE DESIGN OF THE IMPROVEMENTS, AND (3) THE PLAN CHECK DOES NOT RELIEVE ME OF MY LEGAL AND PROFESSIONAL RESPONSIBILITY FOR THE DESIGN OF THE IMPROVEMENTS. AS THE ENGINEER OF RECORD, I AGREE TO DEFEND, INDEMNIFY, AND HOLD HARMLESS THE CITY, ITS ELECTED OFFICIALS, EMPLOYEES, AND AGENTS FROM ANY AND ALL ACTUAL OR ALLEGED CLAIMS, DEMANDS, CAUSES OF ACTION, LIABILITY, LOSS, DAMAGE, OR INJURY TO PROPERTY OR PERSONS, INCLUDING WRONGFUL DEATH, WHETHER IMPOSED BY A COURT OF LAW OR BY ADMINISTRATIVE ACTION OF ANY FEDERAL, STATE, OR LOCAL GOVERNMENTAL AGENCY, ARISING OUT OF OR INCIDENT TO ANY NEGLIGENT ACTS, OMISSIONS, OR ERRORS BY THE ENGINEER OF RECORD, ITS EMPLOYEES, CONSULTANTS, OR AGENTS.

MICHAEL J. ACKERMAN R.C.E. 64663 DATE

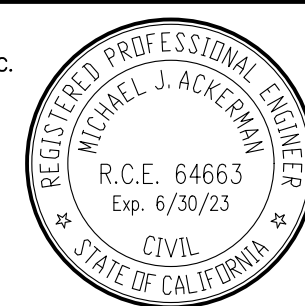
BENCH MARK: F7-K3

CITY OF RIVERSIDE LL47/7.  
PK NAIL AND CITY ENGINEER TAG IN THE BASE OF A  
STREET LIGHT ALONG THE SOUTHERLY CURB OF OVERLOOK  
PARKWAY 175 FEET EAST OF CHATEAU RIDGE. TRANSFER  
FROM F7-C2 CITY SURVEY CREW 6/10/2002

ELEVATION : 1426.960



ACKERMAN ASSOCIATES 2000, INC.  
2288 MARYSA KATHRIN STREET  
CORONA, CA. 92882  
PH: 951 454-1869  
FAX: 951 736-8645



PLANS PREPARED UNDER SUPERVISION OF

MICHAEL J. ACKERMAN RCE 64663 EXP. 6/30/23 DATE

MARK	REVISIONS	APPR.	DATE

DESIGNED BY \_\_\_\_\_ DRAWN BY \_\_\_\_\_ CHECKED BY \_\_\_\_\_

PRELIMINARY GRADING PLAN  
PARCEL MAP NO. 38174

SHEET 1 OF 4

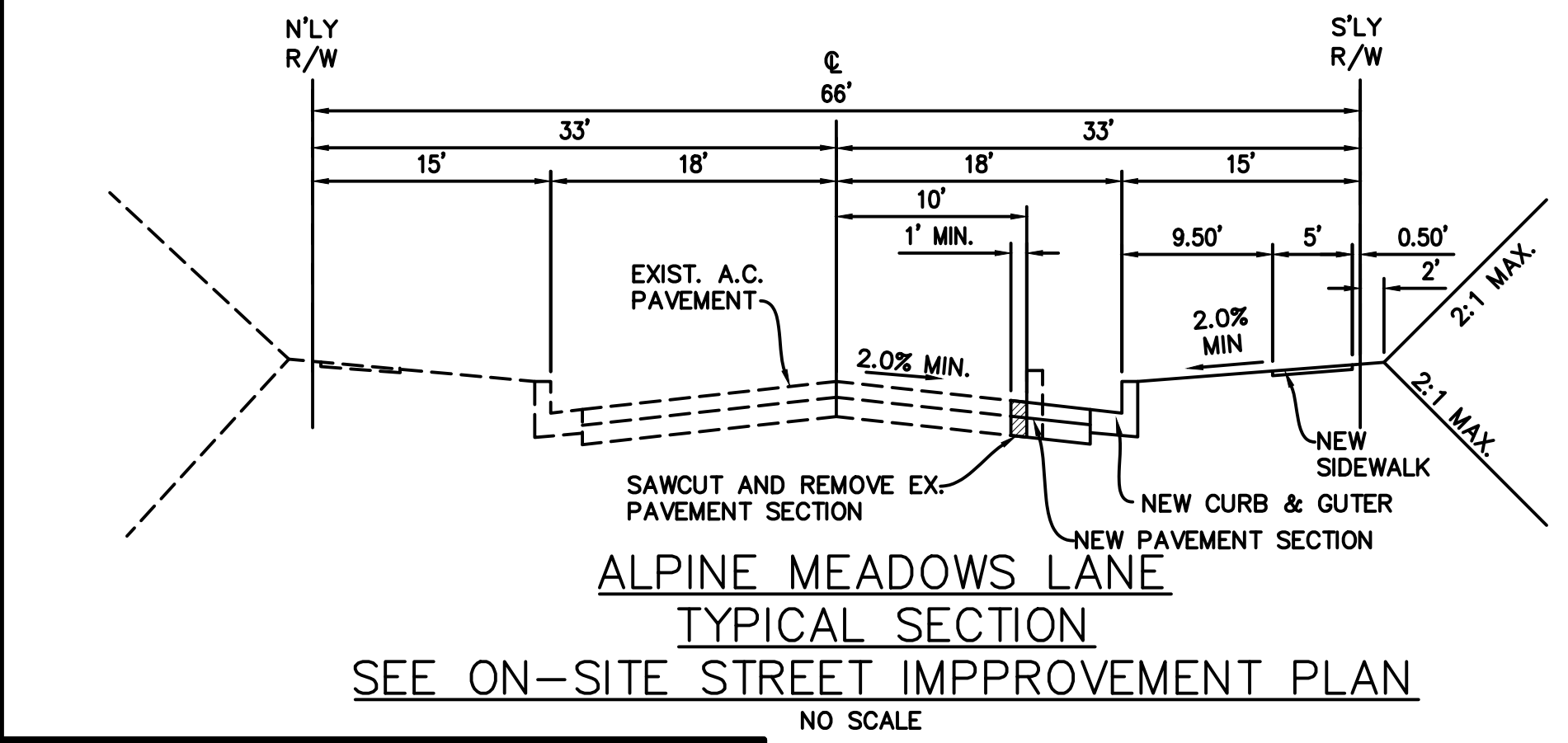
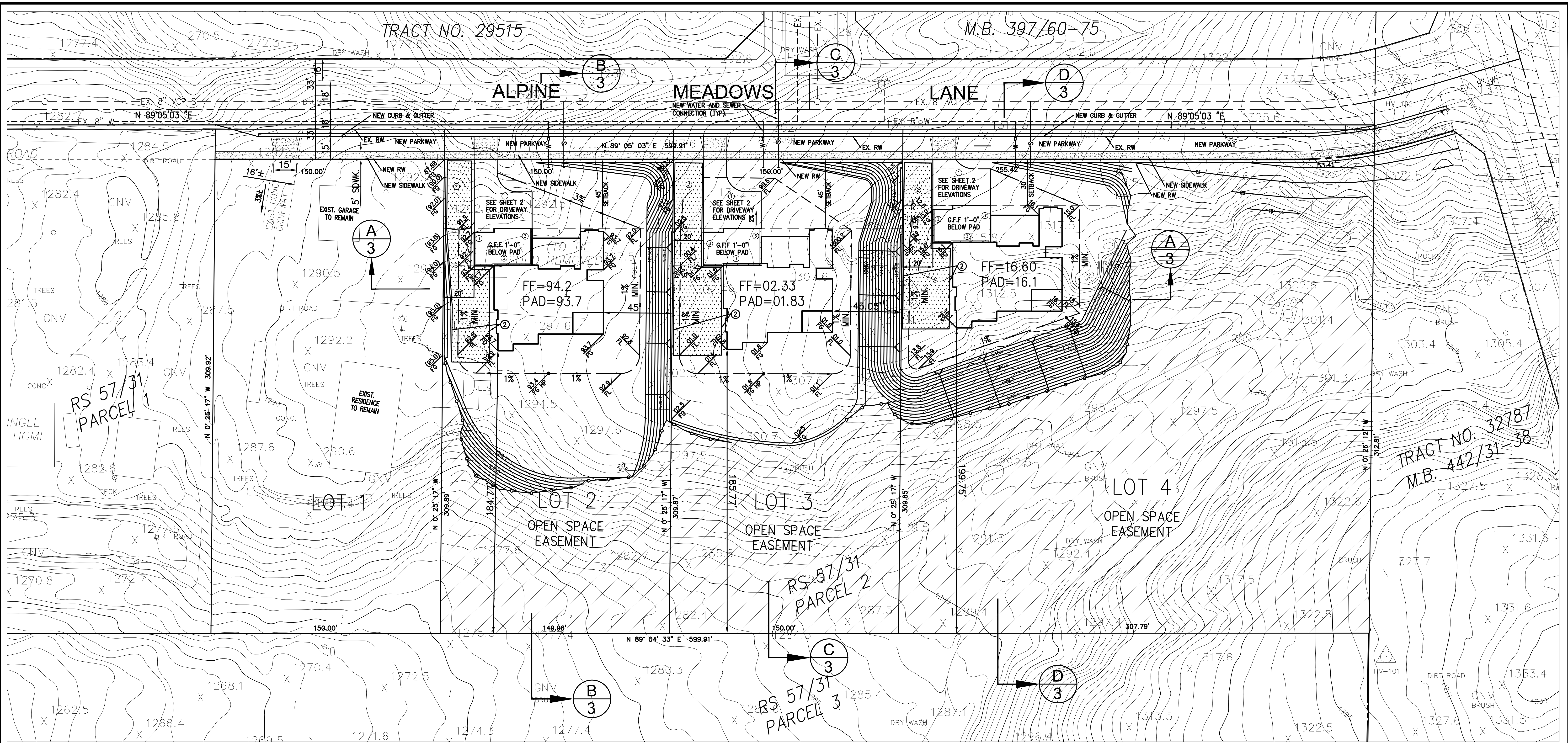
HORIZONTAL SCALE: N/A VERTICAL SCALE: N/A



Section 4216/4217 of the Government  
Code requires a DIG ALERT  
Identification Number be issued before a  
"Permit to Excavate" will be valid.  
For your Dig Alert I.D. Number Call  
Underground Service Alert TOLL FREE  
811  
Two working days before you dig

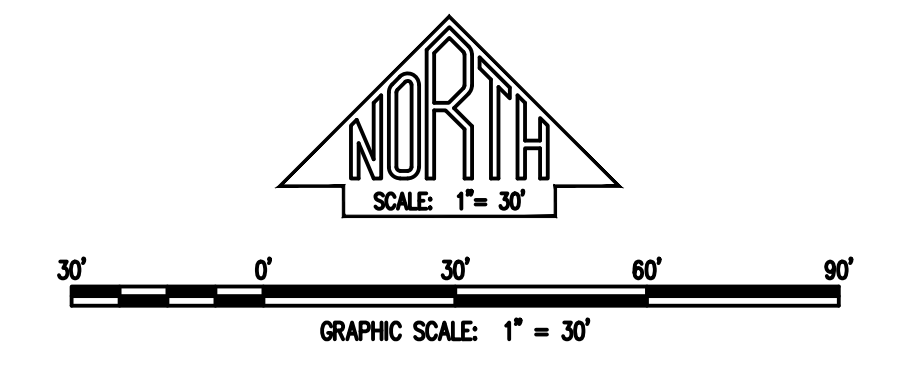
Know what's below.  
Call before you dig.





- CONSTRUCTION NOTES:**
- ① CONSTRUCT CONC. DWY WITH 4" PCC OVER COMPACTED NATIVE.
  - ② CONSTRUCT WOMP SELF RETAINING AREA 0.17' DEEP MIN.
  - ③ CONSTRUCT STEM WALL.

- LEGEND**
- INDICATES OPEN SPACE EASEMENT
  - INDICATES WATER RETENTION AREA 3200 S.F. BY 0.17' DEEP



**811**  
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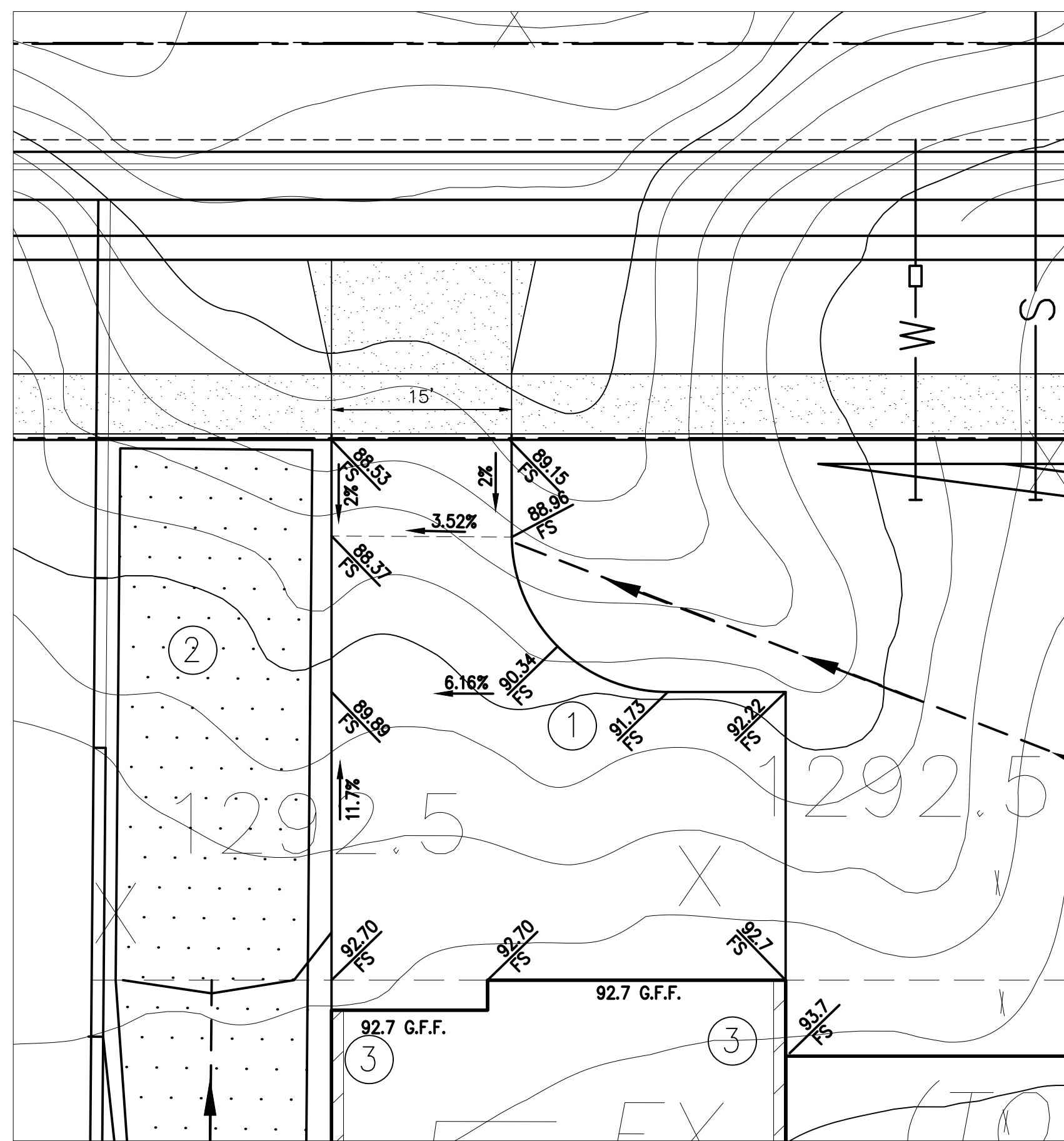
**BENCH MARK: F7-K3**  
CITY OF RIVERSIDE LL47/7. PK NAIL AND CITY ENGINEER TAG IN THE BASE OF A STREET LIGHT ALONG THE SOUTHERLY CURB OF OVERLOOK PARKWAY 175 FEET EAST OF CHATEAU RIDGE. TRANSFER FROM F7-C2 CITY SURVEY CREW 6/10/2002  
ELEVATION : 1426.960

**ACKERMAN ASSOCIATES 2000, INC.**  
2288 MARFAC KATHRIN STREET  
CORONA, CA 92682  
PH: 951 454-1869  
FAX: 951 736-8646  
PLANS PREPARED UNDER SUPERVISION OF  
**MICHAEL J. ACKERMAN RCE 64663 EXP. 6/30/23** DATE

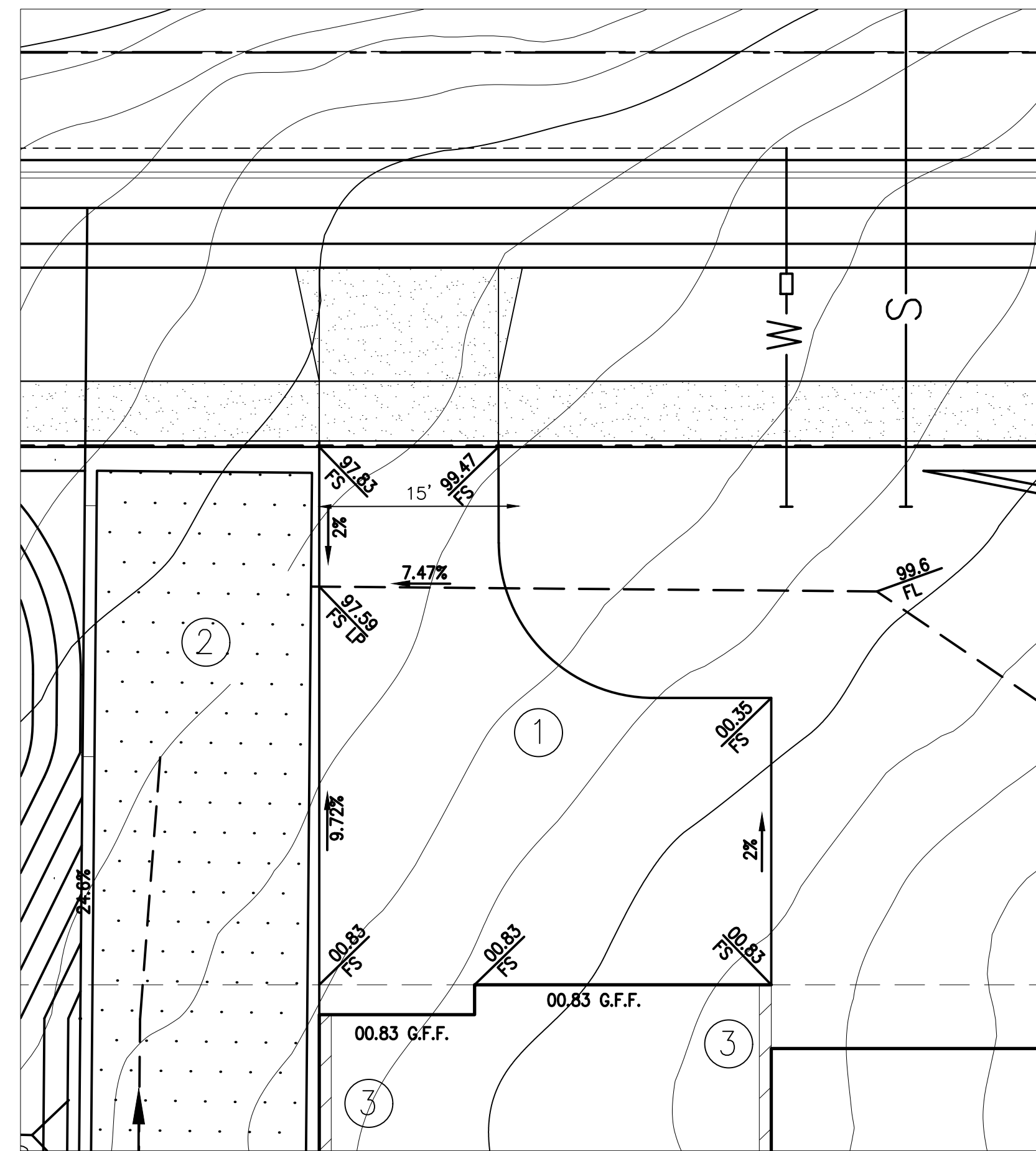
MARK	REVISIONS	APPR.	DATE
DESIGNED BY	DRAWN BY	CHECKED BY	

**PRELIMINARY GRADING PLAN**  
**PARCEL MAP NO. 38174**  
SHEET 2 OF 4  
HORIZONTAL SCALE: 1" = 30'  
VERTICAL SCALE: N/A

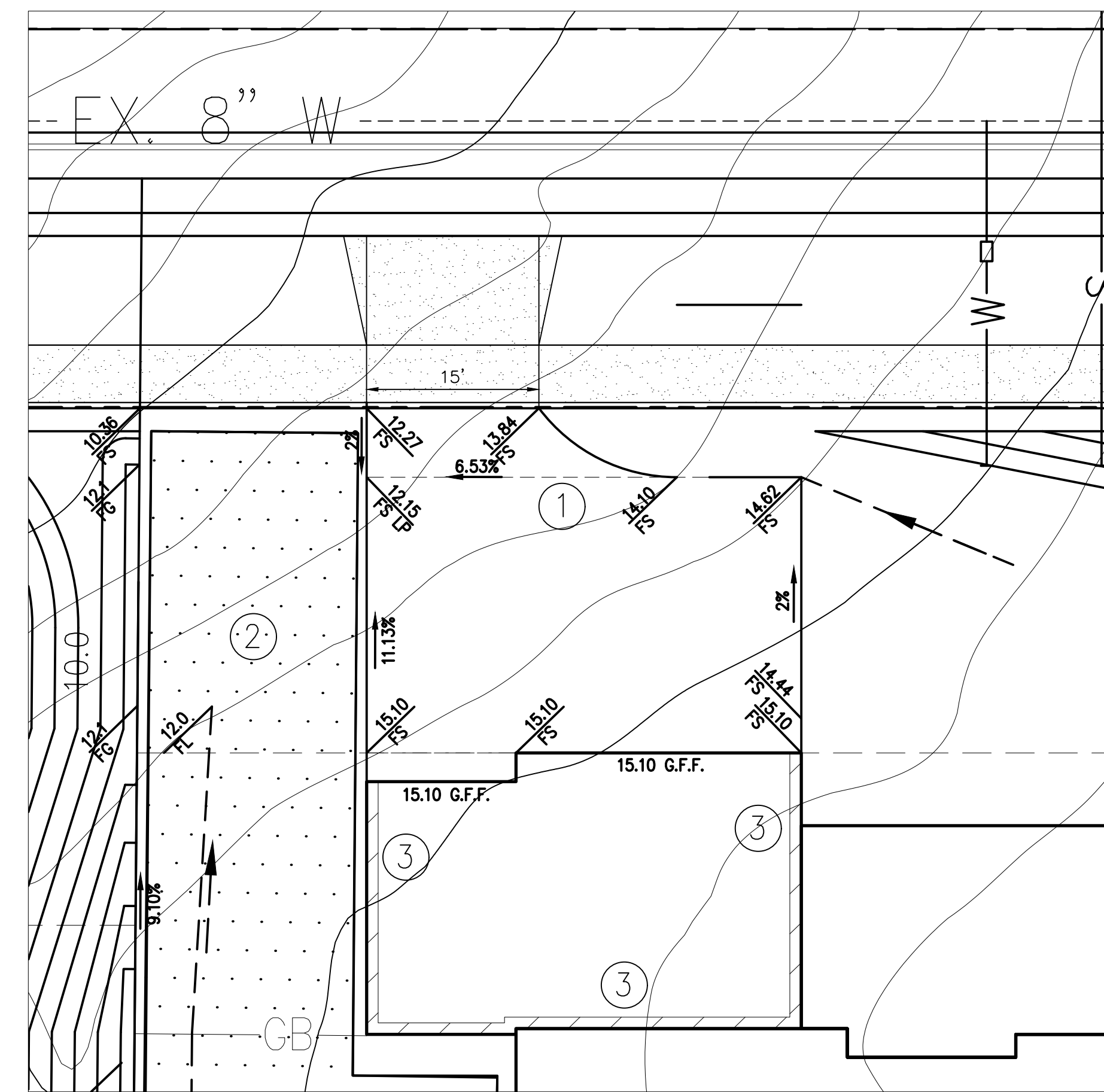




LOT 2 DRIVEWAY DETAIL  
SCALE 1" = 10'



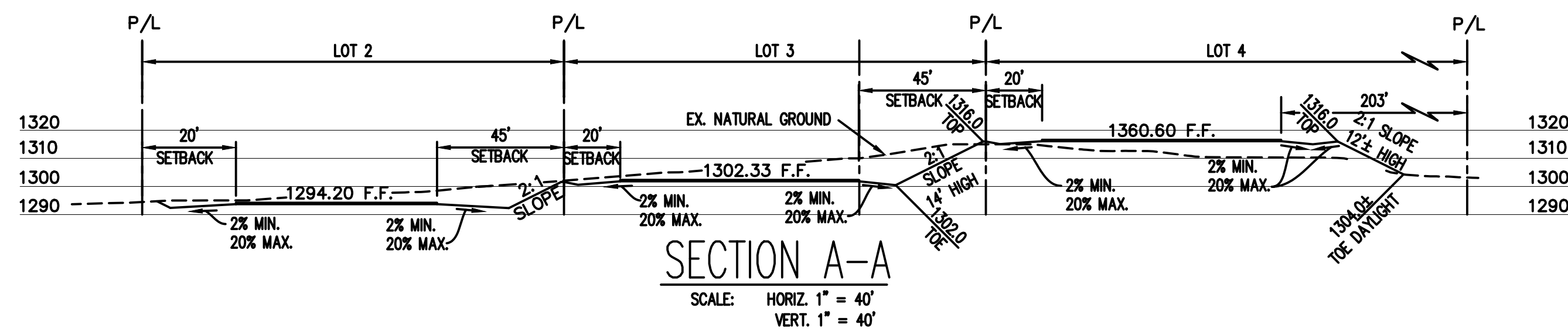
LOT 3 DRIVEWAY DETAIL  
SCALE 1" = 10'



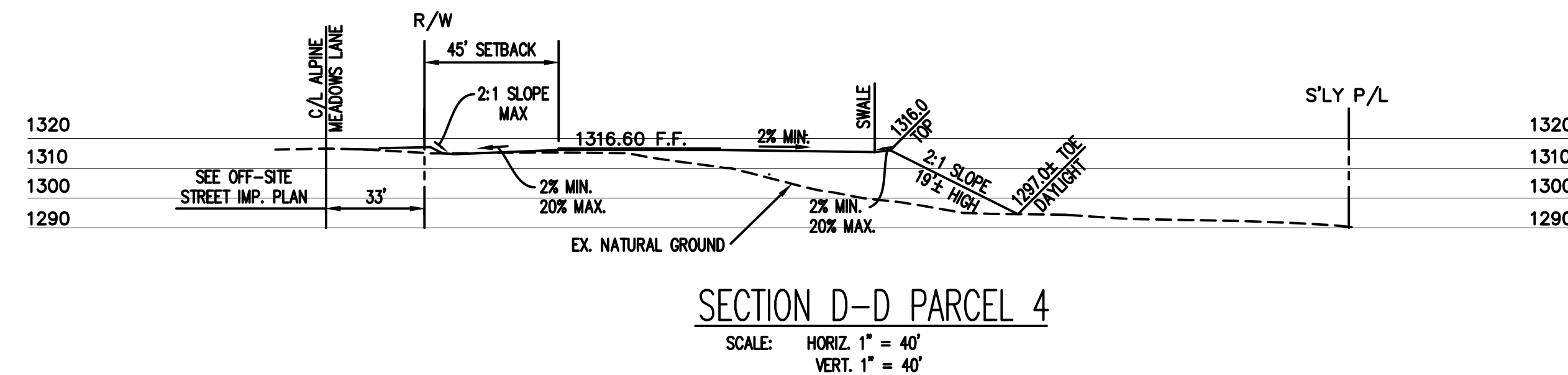
LOT 4 DRIVEWAY DETAIL  
SCALE 1" = 10'

CONSTRUCTION NOTES:

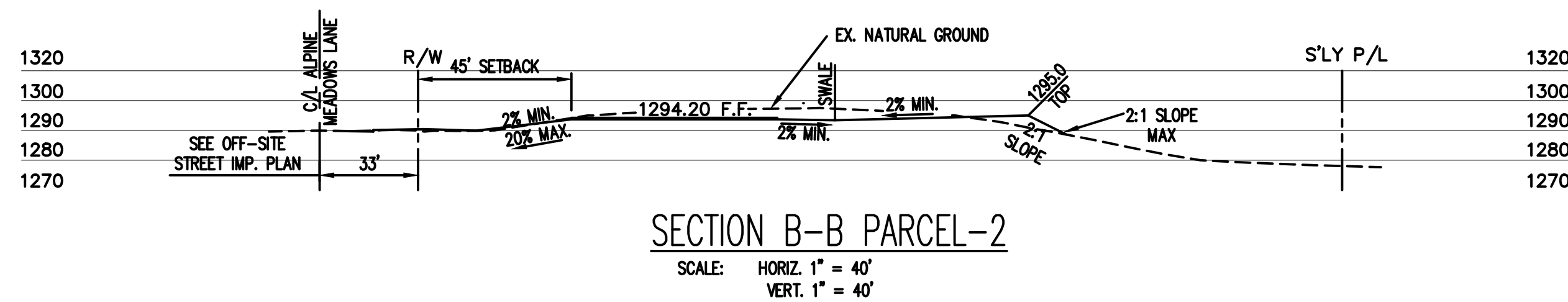
- ① CONSTRUCT CONC. DWY WITH 4" PCC OVER COMPACTED NATIVE.
- ② CONSTRUCT WQMP SELF RETAINING AREA 0.17' DEEP MIN.
- ③ CONSTRUCT STEM WALL



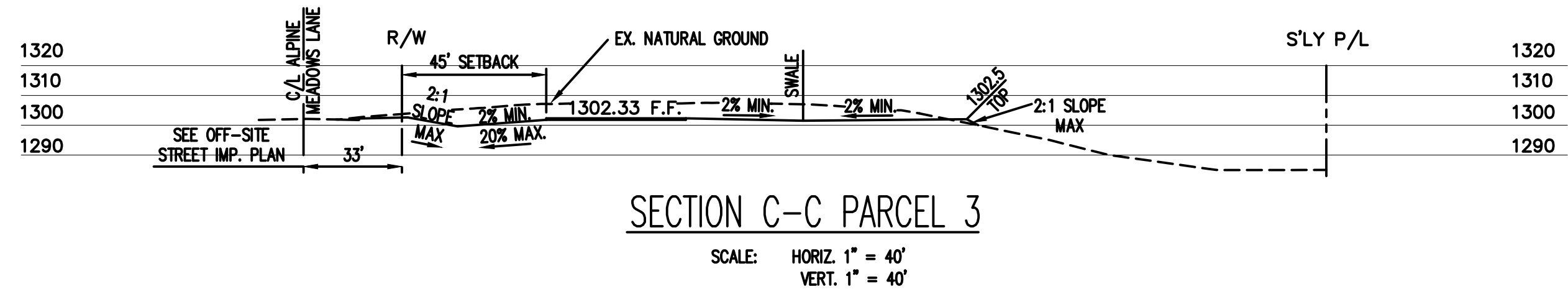
SECTION A-A  
SCALE: HORIZ. 1" = 40'  
VERT. 1" = 40'



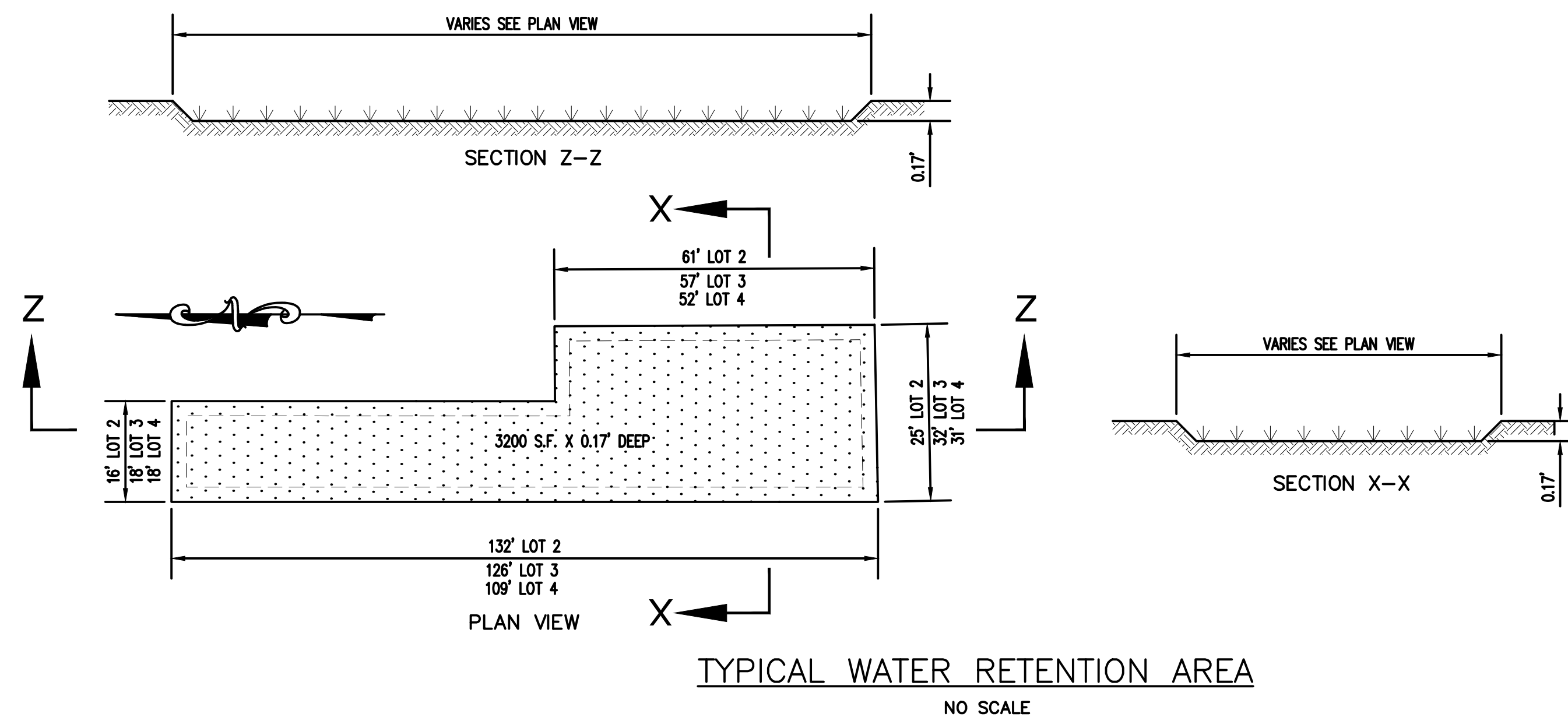
SECTION D-D PARCEL 4  
SCALE: HORIZ. 1" = 40'  
VERT. 1" = 40'



SECTION B-B PARCEL-2  
SCALE: HORIZ. 1" = 40'  
VERT. 1" = 40'



SECTION C-C PARCEL 3  
SCALE: HORIZ. 1" = 40'  
VERT. 1" = 40'



TYPICAL WATER RETENTION AREA  
NO SCALE

BENCH MARK: F7-K3

CITY OF RIVERSIDE LL47/7.  
PK NAIL AND CITY ENGINEER TAG IN THE BASE OF A  
STREET LIGHT ALONG THE SOUTHERLY CURB OF OVERLOOK  
PARKWAY 175 FEET EAST OF CHATEAU RIDGE. TRANSFER  
FROM F7-C2 CITY SURVEY CREW 6/10/2002  
ELEVATION : 1426.960

**Ackerman Associates**  
2000, Inc.  
PLANS PREPARED UNDER SUPERVISION OF  
MICHAEL J. ACKERMAN RCE 64663 EXP. 6/30/23 DATE



MARK	REVISIONS	APPR.	DATE

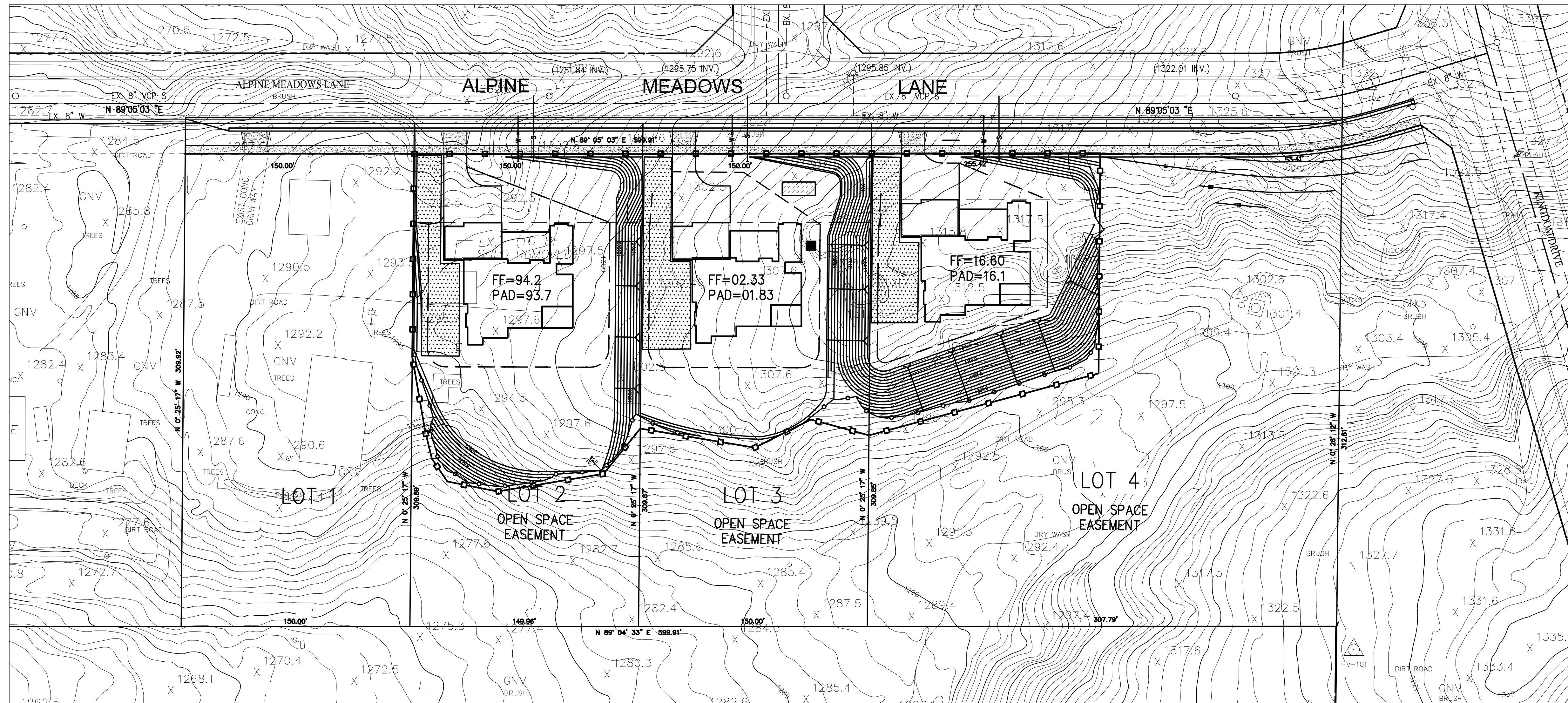
PRELIMINARY GRADING PLAN  
PARCEL MAP NO. 38174

HORIZONTAL SCALE: N/A VERTICAL SCALE: N/A

**811**  
Know what's below.  
Call before you dig.  
Section 4216/4217 of the Government Code requires a DIG ALERT Identification Number be issued before a "Permit to Excavate" will be valid. For your Dig Alert I.D. Number Call Underground Service Alert TOLL FREE 811 Two working days before you dig

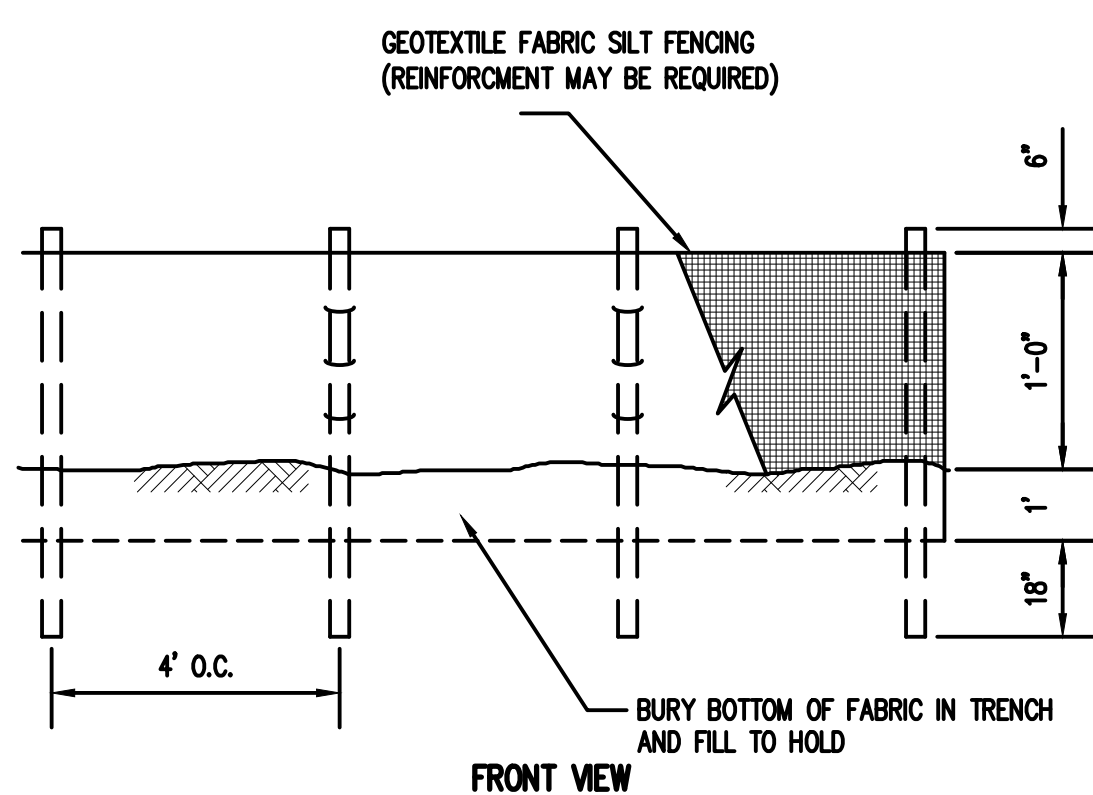
**EROSION CONTROL NOTES:**

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL ALL EROSION CONTROL FACILITIES AS SHOWN ON THE APPROVED EROSION CONTROL PLAN OR AS DIRECTED BY THE CITY ENGINEER AT THE END OF EACH WORKING DAY.
2. THE CONTACT PERSON RESPONSIBLE FOR EROSION CONTROL IS THE OWNER INDICATED HERE: \_\_\_\_\_ 24 HOUR CONTACT TELEPHONE NUMBER: \_\_\_\_\_
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN EMERGENCY WORK CREW AT ALL TIMES. THE CONTRACTOR SHALL STOCKPILE THE NECESSARY EROSION CONTROL MATERIALS ON SITE TO FACILITATE RAPID INSTALLATION OF EROSION CONTROL FACILITIES.
4. THE CONTRACTOR SHALL CONSTRUCT DE-SILTING FACILITIES AS NECESSARY FOR THE DURATION OF THE PROJECT.
5. THE CONTRACTOR SHALL TAKE MEASURES TO PREVENT RUNOFF OVER THE TOP SLOPES.
6. AFTER RAINSTORM:
  - a) THE CONTRACTOR SHALL REMOVE ALL SILT, STANDING WATER, AND DEBRIS FROM EROSION CONTROL FACILITIES;
  - b) THE CONTRACTOR SHALL BE RESPONSIBLE TO PREVENT PUBLIC ACCESS INTO AREAS WHERE STANDING WATER POSES A POTENTIAL HAZARD.
7. IN HIGH WIND AREA THE CONTRACTOR SHALL WATER SPRAY-GRADED AREAS ON A DAILY BASIS TO CONTROL DUST DURING WINDY PERIODS. WHEN NECESSARY, THE CONTRACTOR SHALL TAKE MEASURES TO CONTROL DUST OR WIND BLOWN DEBRIS BY INSTALLING DEBRIS FENCES, ADDITIONAL TRASH ENCLOSURE, CHEMICAL TREATMENT, GEO-MATS, ETC. THE CONTRACTOR SHALL IMPLEMENT LONG-TERM WIND EROSION CONTROL MEASURES FOR ANY AREA THAT IS NOT IMPROVED IN A TIMELY MANNER FOLLOWING GRADING. LONG-TERM WIND EROSION CONTROL MEASURES INCLUDE BUT NOT LIMITED TO: PERIMETER WALLS, WIND BARRIERS, SOILS DUST PALLIATIVES, SOIL MATS, HYDRO-SEEDING AND IRRIGATION SYSTEM.
8. THE CITY ENGINEER RESERVES THE RIGHT TO REQUIRE ALTERNATIVE OR ADDITIONAL EROSION CONTROL FACILITIES, AS HE DEEMS NECESSARY.

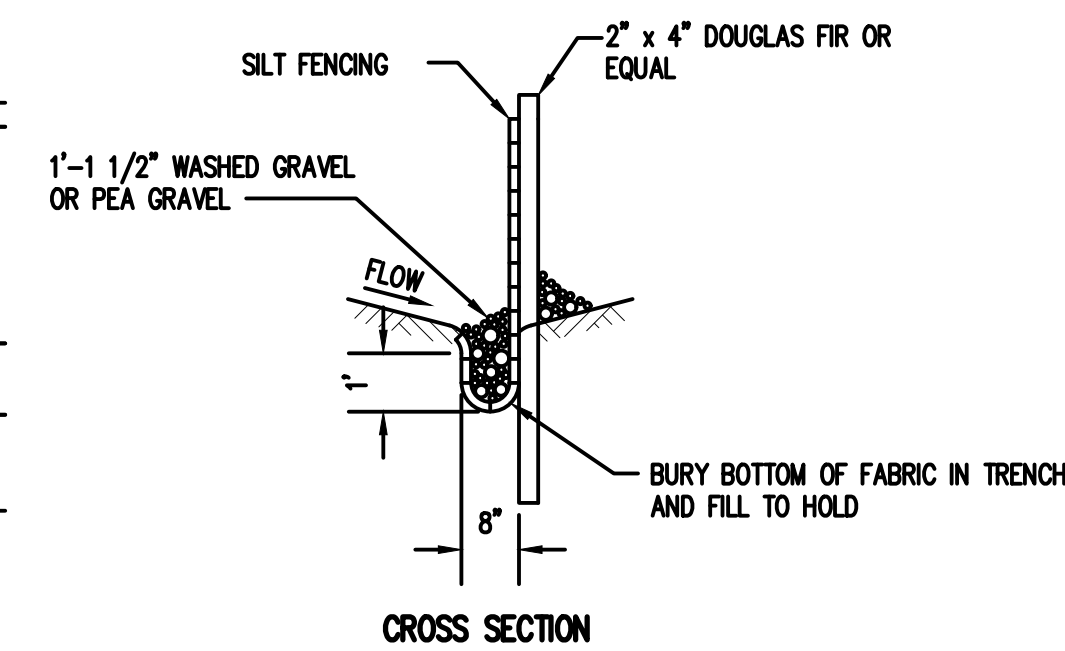


**LEGEND**

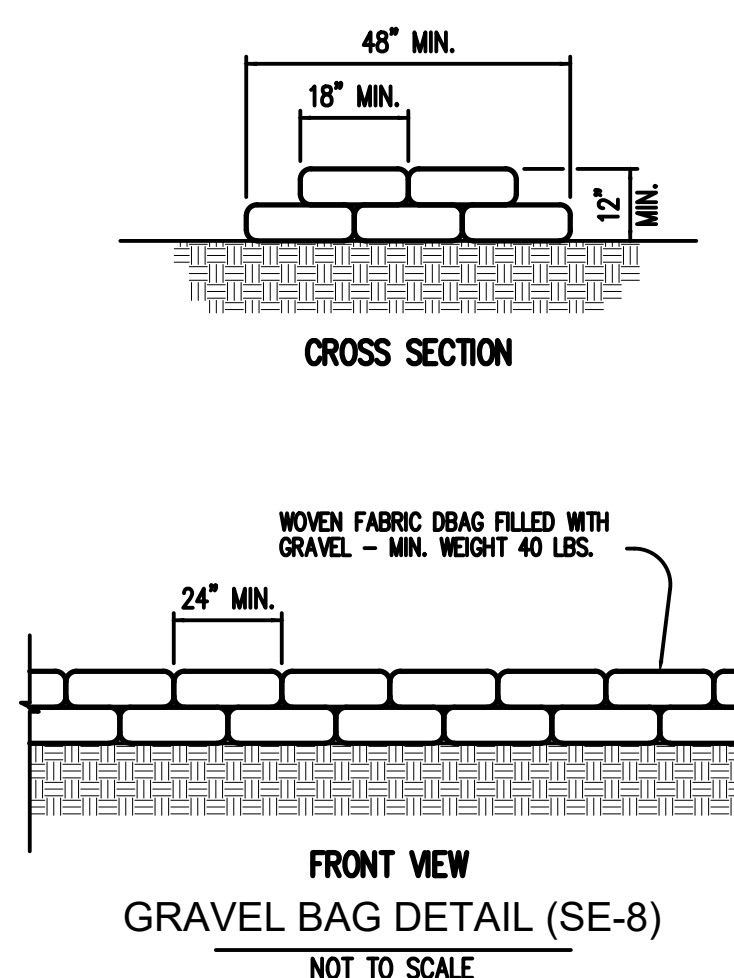
- ➔ DIRECTION OF FLOW
- SILT FENCE (SE-1) OR
- ⊞ GRAVEL BAGS (SEE GRAVEL BAG DETAIL HEREON)
- PORTABLE SANITARY UNIT
- ▨ CONCRETE WASH-OUT (WM-8)
- ▤ STABILIZED CONSTRUCTION ENTRANCE



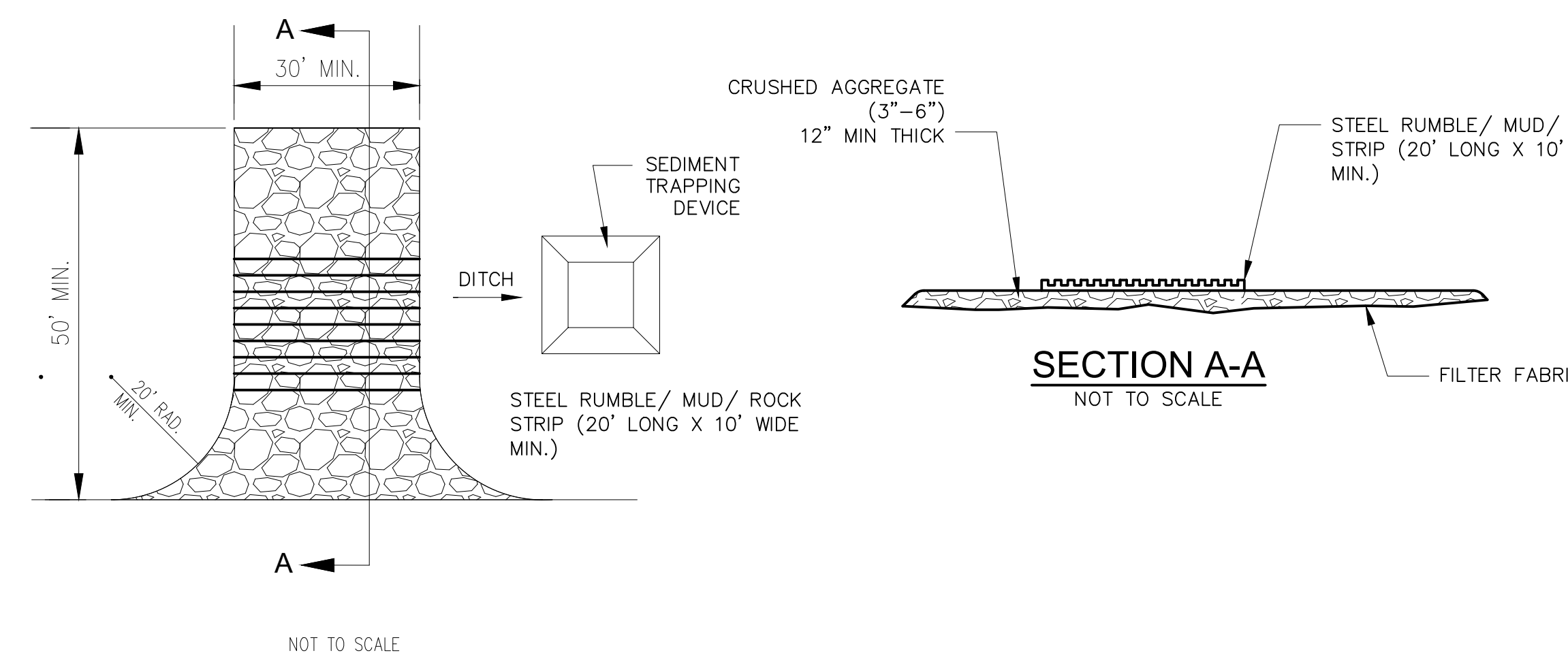
**SILT FENCE DETAIL (SE-1)**  
NOT TO SCALE



**CROSS SECTION**



**FRONT VIEW**  
**GRAVEL BAG DETAIL (SE-8)**  
NOT TO SCALE



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**BENCH MARK: F7-K3**  
CITY OF RIVERSIDE LL47/7.  
PK. NAIL AND CITY ENGINEER TAG IN THE BASE OF A STREET LIGHT ALONG THE SOUTHERLY CURB OF OVERLOOK PARKWAY 175 FEET EAST OF CHATEAU RIDGE. TRANSFER FROM F7-C2 CITY SURVEY CREW 6/10/2002  
ELEVATION : 1426.960

**Ackerman Associates**  
2000, INC.  
PLANS PREPARED UNDER SUPERVISION OF  
MICHAEL J. ACKERMAN RCE 64663 EXP. 6/30/23 DATE

**ACKERMAN ASSOCIATES 2000, INC.**  
2288 MARYSA KATHRON STREET  
CORONA, CA 92682  
PH: 951 454-1989  
FAX: 951 736-8845

**REGISTERED PROFESSIONAL ENGINEER**  
MICHAEL J. ACKERMAN  
R.C.E. 64663  
Exp. 6/30/23  
CIVIL  
STATE OF CALIFORNIA

MARK	REVISIONS	APPR.	DATE

DESIGNED BY \_\_\_\_\_ DRAWN BY \_\_\_\_\_ CHECKED BY \_\_\_\_\_

**PRELIMINARY**  
**EROSION CONTROL PLAN**  
**PARCEL MAP NO. 38174**

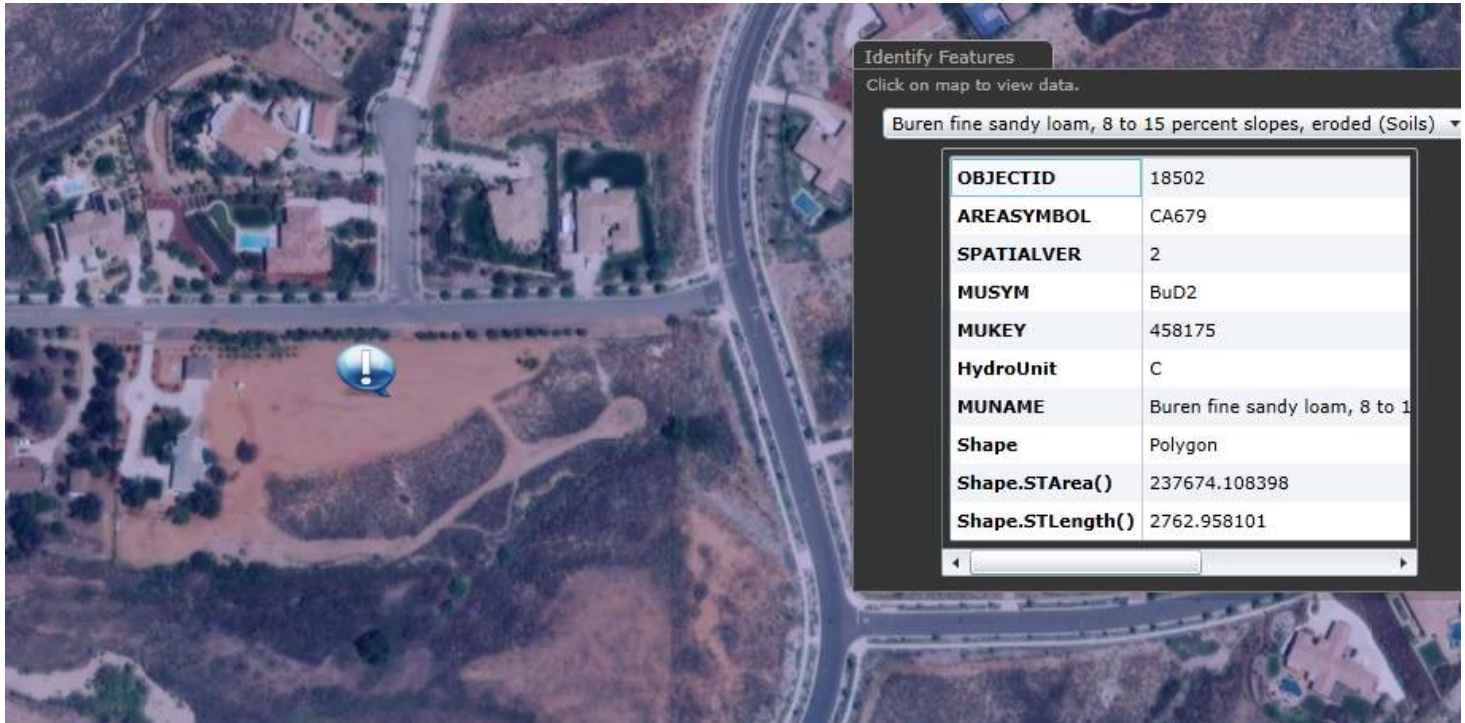
HORIZONTAL SCALE: N/A VERTICAL SCALE: N/A

SHEET 4 OF 4



# Appendix 3: Soils Information

*Geotechnical Study and Other Infiltration Testing Data*



# 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*

LID IS FEASIBLE AND UTILIZED.

# Appendix 6: BMP Design Details

*BMP Sizing, Design Details and other Supporting Documentation*

N/A

## Appendix 7: Hydromodification

*Supporting Detail Relating to Hydrologic Conditions of Concern*

DMA AREAS ARE SELF TREATING, DRAINS TO SELF RETAINING,  
AND SELF RETAINING WHICH FACILITATE INFILTRATION.

# Appendix 8: Source Control

*Pollutant Sources/Source Control Checklist*

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

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

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
<input type="checkbox"/> A. On-site storm drain inlets	<input type="checkbox"/> Locations of inlets.	<input type="checkbox"/> Mark all inlets with the words “Only Rain Down the Storm Drain” or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	<input type="checkbox"/> Maintain and periodically repaint or replace inlet markings. <input type="checkbox"/> Provide stormwater pollution prevention information to new site owners, lessees, or operators. <input type="checkbox"/> See applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a> <input type="checkbox"/> Include the following in lease agreements: “Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.”
<input type="checkbox"/> B. Interior floor drains and elevator shaft sump pumps		<input type="checkbox"/> State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	<input type="checkbox"/> Inspect and maintain drains to prevent blockages and overflow.
<input type="checkbox"/> C. Interior parking garages		<input type="checkbox"/> State that parking garage floor drains will be plumbed to the sanitary sewer.	<input type="checkbox"/> Inspect and maintain drains to prevent blockages and overflow.

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
<input type="checkbox"/> E. Pools, spas, ponds, decorative fountains, and other water features.	<input type="checkbox"/> Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)	If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	<input type="checkbox"/> See applicable operational BMPs in “Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain” at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a>
<input type="checkbox"/> F. Food service	<input type="checkbox"/> For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.  <input type="checkbox"/> On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	<input type="checkbox"/> Describe the location and features of the designated cleaning area.  <input type="checkbox"/> Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	<input type="checkbox"/> See the brochure, “The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries” at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a>  <b>Provide this brochure to new site owners, lessees, and operators.</b>
<input checked="" type="checkbox"/> G. Refuse areas	<input type="checkbox"/> Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.  <input type="checkbox"/> If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.  <input type="checkbox"/> Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	<input type="checkbox"/> State how site refuse will be handled and provide supporting detail to what is shown on plans.  <input type="checkbox"/> State that signs will be posted on or near dumpsters with the words “Do not dump hazardous materials here” or similar.	<input type="checkbox"/> State how the following will be implemented:  <b>Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post “no hazardous materials” signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, “Waste Handling and Disposal” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></b>

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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



STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
<p><input type="checkbox"/> I. Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)</p>	<p><input type="checkbox"/> Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.</p> <p><input type="checkbox"/> Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.</p> <p><input type="checkbox"/> Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.</p>	<p>Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.</p> <p>Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:</p> <ul style="list-style-type: none"> <li>▪ Hazardous Waste Generation</li> <li>▪ Hazardous Materials Release Response and Inventory</li> <li>▪ California Accidental Release (CalARP)</li> <li>▪ Aboveground Storage Tank</li> <li>▪ Uniform Fire Code Article 80 Section 103(b) &amp; (c) 1991</li> <li>▪ Underground Storage Tank</li> </ul> <p><a href="http://www.cchealth.org/groups/hazmat/">www.cchealth.org/groups/hazmat/</a></p>	<p><input type="checkbox"/> See the Fact Sheets SC-31, “Outdoor Liquid Container Storage” and SC-33, “Outdoor Storage of Raw Materials ” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a></p>

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>K. Vehicle/Equipment Repair and Maintenance</b></li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.</li> <li><input type="checkbox"/> Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.</li> <li><input type="checkbox"/> Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.</li> <li><input type="checkbox"/> State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.</li> <li><input type="checkbox"/> State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.</li> </ul>	<p>In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.</li> <li><input type="checkbox"/> No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.</li> <li><input type="checkbox"/> No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.</li> </ul> <p>Refer to "Automotive Maintenance &amp; Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a></p> <p>Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at <a href="http://rcflood.org/stormwater/">http://rcflood.org/stormwater/</a></p>

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
<input checked="" type="checkbox"/> P. Plazas, sidewalks, and parking lots.			<input checked="" type="checkbox"/> Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

## Appendix 9: O&M

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



# WQMP

## Operation & Maintenance (O&M) Plan

**Project Title: FOUR LOT SUBDIVISION – 841 ALPINE MEADOWS LANE – PLANNING CASE PR-2021-001078, PM 38174**

**Development No: PM 38174**

**Design Review/Case No: PLANNING CASE PR-2021-001078**

**Prepared for:**

Robert Quintero  
Land Build  
1299 Columbia Ave. Ste. E7  
Riverside, CA 9250

**Prepared on:**

3-1-2022

This O&M Plan describes the designated responsible party for implementation of this WQMP, including: operation and maintenance of all the structural BMP(s), conducting the training/educational program and duties, and any other necessary activities. The O&M Plan includes detailed inspection and maintenance requirements for all structural BMPs, including copies of any maintenance contract agreements, manufacturer's maintenance requirements, permits, etc.

### 8.1.1 Project Information

Project Title: FOUR LOT SUBDIVISION – 841 ALPINE MEADOWS LANE – PLANNING CASE PR-2021-001078, PM 38174

Development No: PM 38174

Design Review/Case No: PLANNING CASE PR-2021-001078

### 8.1.2 Responsible Party

The responsible party for implementation of this WQMP is:

Robert Quintero  
Land Build  
1299 Columbia Ave. Ste. E7  
Riverside, CA 9250

### 8.1.3 Record Keeping

Parties responsible for the O&M plan shall retain records for at least 5 years.

All training and educational activities and BMP operation and maintenance shall be documented to verify compliance with this O&M Plan. A sample Training Log and Inspection and Maintenance Log are included in Appendix C of this document.

The **WQMP Verification Form** (Appendix D) shall be completed accurately and submitted, with associated documentation, to the City of Dana Point by September 30 of each year, or as requested by the City. **Failure to complete and submit the verification form will result in a noncompliance and enforcement actions may be taken.**

### 8.1.4 Electronic Data Submittal

This document along with the Site Plan and Attachments shall be provided in PDF format. GIS coordinates of BMPs shall also be submitted to the City.

### 8.1.5 Vector Control

Standing water which exists for longer than 72 hours may contribute to mosquito breeding areas. Best Management Practices (BMPs) shall be inspected for standing water on a regular basis. Standing water may indicate that the BMP is not functioning properly and proper action to remedy the situation shall be taken in a timely manner.

Elimination of standing water and managing garbage, lawn clippings, and pet droppings, can help decrease the presence of mosquitoes and flies in the area.

The Riverside County Flood Control District may be contacted for more information and support at 951-955-1200

#### Required Permits

A grading permit is required from the City of Riverside.

### 8.1.6 Inspections

The City may conduct a site inspection to evaluate compliance with the Project WQMP, at any time, in accordance with Dana Point Municipal Code Chapter 15.10, Storm Water/Surface Runoff Water Quality.

### 8.1.7 Monitoring Plan

No monitoring is required.

### 8.1.8 Operation and Maintenance Requirements

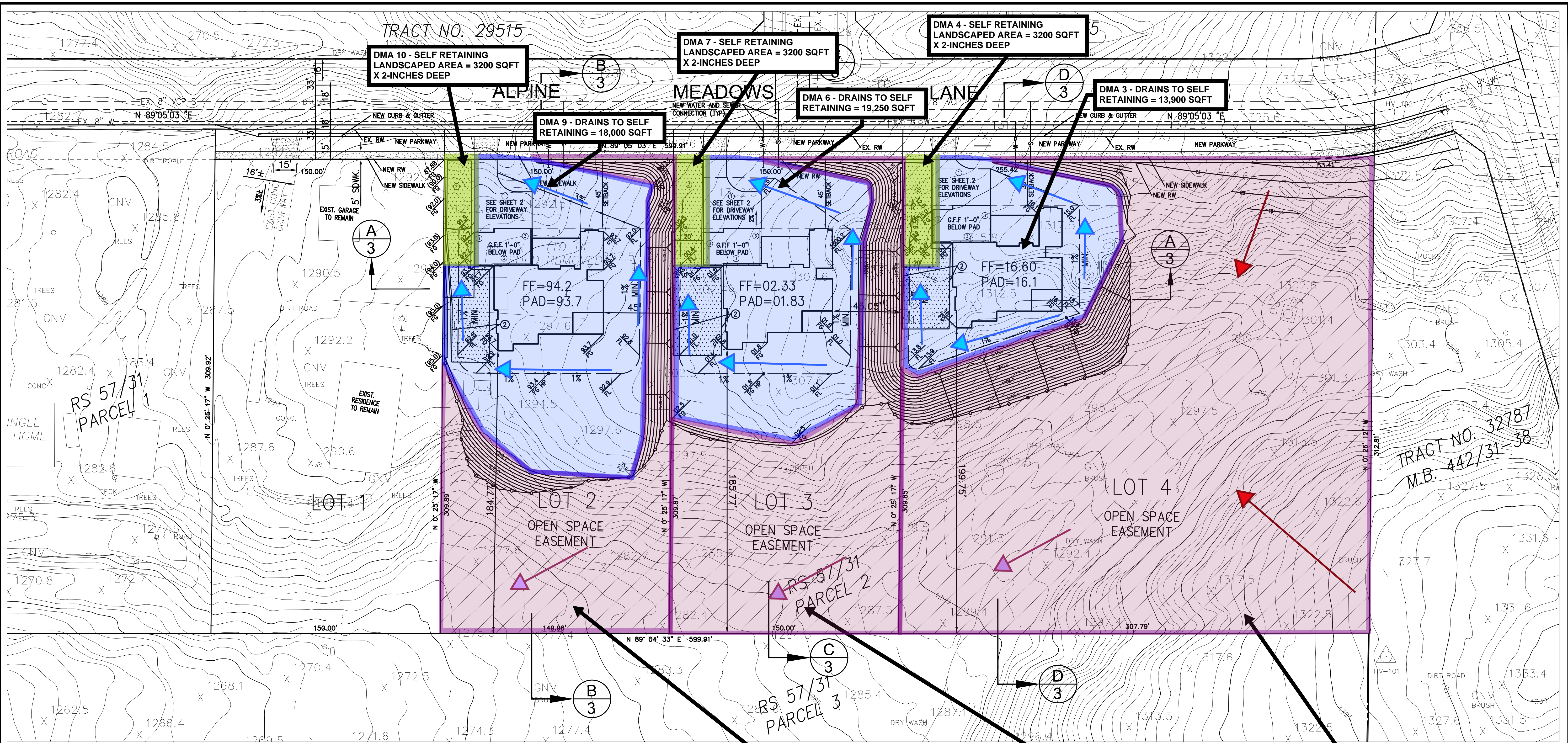
BMP	Implementation, Inspection and Maintenance Requirements	Frequency
N1. Education for Property Owners, Tenants and Occupants	RP shall distribute appropriate materials to owners, tenants and/or occupants via contract language, mailings, website or meeting. Brochures can be requested or downloaded from <a href="http://www.ocwatersheds.com">www.ocwatersheds.com</a> . Brochures and educational articles for RP distribution can also be requested from City Water Quality Engineer.	Information to be initially provided to owners & tenants upon sale or lease agreement. Educational materials will be provided to owners and/or tenants annually, thereafter.
N2. Activity Restriction	Within the lease agreement, the following activity restrictions shall be enforced:	Continuous
N3. Common Area Landscape Management & Efficient Landscape Design	Landscape Management Includes: <ul style="list-style-type: none"> <li>Mitigation of the potential dangers of fertilizer and pesticide usage through the incorporation of an Integrated Pest Management Program (IPM).</li> <li>Monitor for runoff and efficiency regularly.</li> <li>Implementation of a water budget.</li> <li>Irrigation systems shall be automatically controlled and designed, installed, and maintained so as to minimize overspray and runoff onto streets, sidewalks, driveways, structures, windows, walls, and fences.</li> <li>Use of native and drought tolerant species when replanting</li> </ul>	Inspected once a week

BMP	Implementation, Inspection and Maintenance Requirements	Frequency
<b>N11. Common Area Litter Control</b>	Weekly sweeping and trash pick up as necessary within all project areas and common landscape areas. Daily inspection of trash receptacles to ensure that lids are closed and pick up any excess trash on the ground, noting trash disposal violations by homeowners and reporting the violations to the HOA/RP for investigation.	Daily inspection and weekly sweeping and clean-up or as needed
<b>N12. Contractor/Employee Training</b>	All contractors shall be trained and made aware of this WQMP and operation and maintenance requirements of BMPs.	At first hire and annually thereafter for HOA personnel and employees, to include the educational materials contained in the approved Water Quality Management Plan.
<b>N13. Housekeeping of Loading Docks</b>		
<b>N14. Common Area Catch Basin Inspection</b>	Catch basins will be owned, inspected and maintained by the RP. Catch basins will be inspected at a minimum on a yearly basis, and prior to the storm season, no later than October 1 <sup>st</sup> of each year.	At a minimum, basins will be inspected and cleaned around October 1 <sup>st</sup> of each year, prior to "first flush" storm, or as necessary after large storm events to clear inlets of trash, debris and silt.
<b>N15. Street Sweeping Private Streets and Parking Lots</b>	Vacuum street sweeping will occur on a weekly basis.	Streets will be vacuum swept on a weekly basis.
<b>SD-13 Provide Storm Drain System Stenciling and Signage</b>	All catch basins where applicable in paved areas, will be marked or stenciled with "No Dumping - Drains to Ocean, No Descargue Basura" language. This will be done in a location that can be clearly seen by all and will be routinely inspected and re-labeled, as necessary. Thereafter, the owner/operator shall routinely inspect and re-label the catch basins, as necessary.	Catch basin labels will be inspected once annually and relabeled as necessary to maintain legibility.
<b>SD-34 Design and Construct Outdoor Material Storage Areas to Reduce Pollutant Introduction</b>		
<b>Sd-32 Design and Construct Trash and Waste Storage Areas to Reduce Pollutant Introduction</b>	Trash will be removed by the local private solid waste management contractor on a weekly basis for proper disposal of the trash to landfill; with recyclable materials and greenwastes to be processed offsite.	Trash dumpster shall be kept in a non-leaking condition.
<b>SD-31 Loading Docks</b>		

BMP	Implementation, Inspection and Maintenance Requirements	Frequency
BMP-1 AND BMP-2 INFILTRATION	<p>Per recommendations of CASQA BMP Handbook (<a href="http://www.caBMPHandbooks.com">www.caBMPHandbooks.com</a>) or manufacture's recommendations.</p> <p>Maintenance guideleines/fact sheets are included in this WQMP.</p>	As recommended.

**Appendix A**  
**BMP SITE PLAN**





TRACT NO. 29515

DMA 10 - SELF RETAINING  
LANDSCAPED AREA = 3200 SQFT  
X 2-INCHES DEEP

DMA 7 - SELF RETAINING  
LANDSCAPED AREA = 3200 SQFT  
X 2-INCHES DEEP

DMA 4 - SELF RETAINING  
LANDSCAPED AREA = 3200 SQFT  
X 2-INCHES DEEP

DMA 6 - DRAINS TO SELF  
RETAINING = 19,250 SQFT

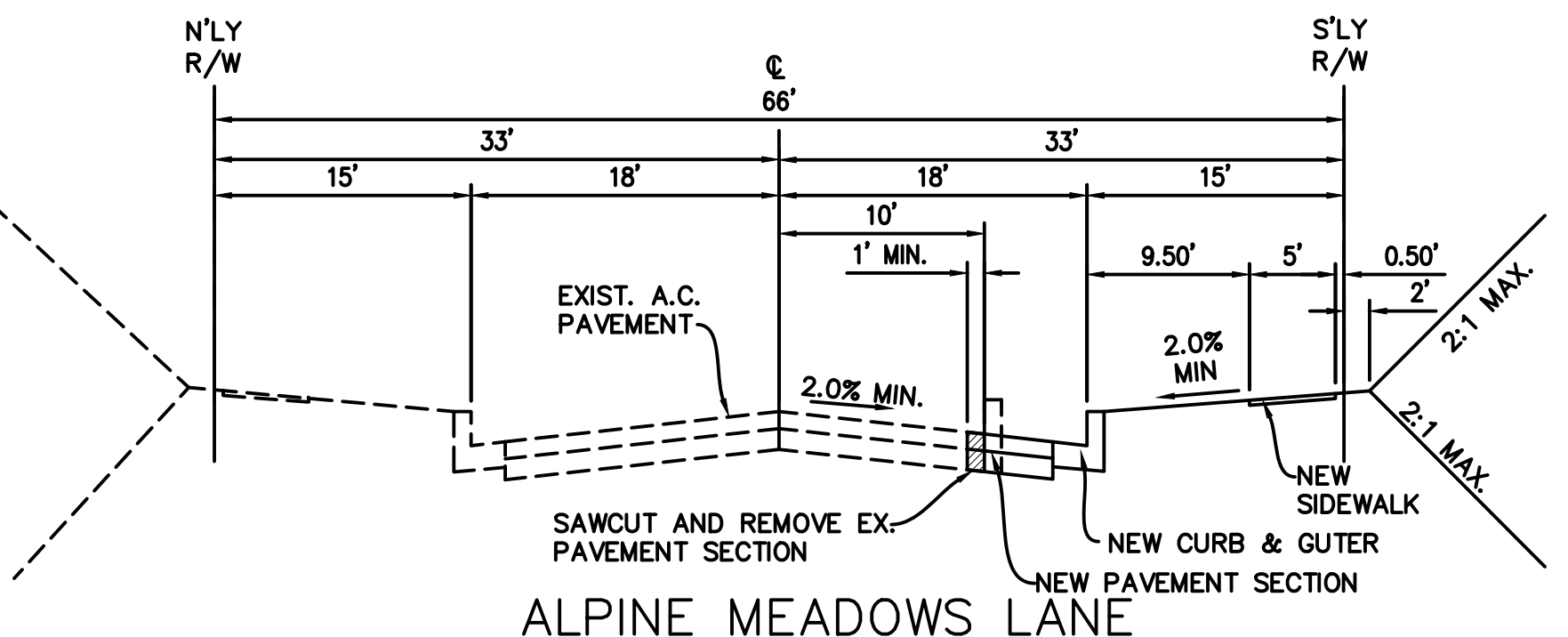
DMA 3 - DRAINS TO SELF  
RETAINING = 13,900 SQFT

DMA 9 - DRAINS TO SELF  
RETAINING = 18,000 SQFT

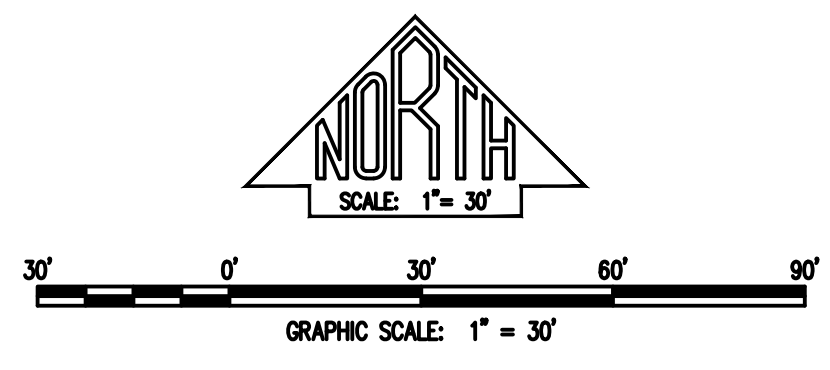
DMA 8 - SELF TREATING  
LANDSCAPED AREA = 26,600  
SQFT

DMA 5 - SELF TREATING  
LANDSCAPED AREA = 25,300  
SQFT

DMA 1 - SELF TREATING  
LANDSCAPED AREA = 82,384  
SQFT



ALPINE MEADOWS LANE  
TYPICAL SECTION  
SEE ON-SITE STREET IMPROVEMENT PLAN  
NO SCALE



- LEGEND**
- INDICATES OPEN SPACE EASEMENT
  - INDICATES WATER RETENTION AREA 3200 S.F. BY 0.17' DEEP
  - INDICATES SELF TREATING AREAS
  - INDICATES SELF RETAINING AREAS
  - INDICATES DRAINS TO SELF RETAINING AREAS

**811**  
Know what's below.  
Call before you dig.

Section 4216/4217 of the Government Code requires a DIG ALERT Identification Number be issued before a "Permit to Excavate" will be valid. For your Dig Alert I.D. Number Call Underground Service Alert TOLL FREE 811 Two working days before you dig

BENCH MARK: F7-K3  
CITY OF RIVERSIDE LL47/7.  
PK NAIL AND CITY ENGINEER TAG IN THE BASE OF A STREET LIGHT ALONG THE SOUTHERLY CURB OF OVERLOOK PARKWAY 175 FEET EAST OF CHATEAU RIDGE. TRANSFER FROM F7-C2 CITY SURVEY CREW 6/10/2002.  
ELEVATION : 1426.960

**ACKERMAN ASSOCIATES 2000, INC.**  
2288 MARFISA KATHRIN STREET  
CORONA, CA 92682  
PH: 951 454-1869  
FAX: 951 736-8646

PLANS PREPARED UNDER SUPERVISION OF  
MICHAEL J. ACKERMAN RCE 64663 EXP. 6/30/23 DATE

MARK	REVISIONS	APPR.	DATE
DESIGNED BY	DRAWN BY	CHECKED BY	

WDID NO. GP-2022-04952

SITE PLAN  
PRELIMINARY WATER QUALITY MANAGEMENT PLAN  
(P-WQMP)  
841 ALPINE MEADOWS LANE  
RIVERSIDE, CALIFORNIA

HORIZONTAL SCALE: 1" = 30'  
VERTICAL SCALE: N/A



## Appendix B

### EDUCATIONAL MATERIALS

**The following is a selection of Educational Materials for Homeowners, Contractors and employees that address BMPS and water quality issues. Many are available in English and Spanish.**

To meet the educational requirements of this O&M Plan, educational brochures can be downloaded or requested at no charge for inclusion on a website, in a newsletter or mailed to property owners, tenants and/or contractors. Property owners, tenants, staff and/or contractors must receive education/training at least once per year.

Brochure	Pollutant(s) Addressed	Activities Addressed
"The Ocean Begins At Your Front Door" - English, Spanish, Vietnamese	Household hazardous waste, trash, motor oil, chlorine, overwatering, green waste, dirt, pesticides/fertilizer, pet waste	Household maintenance and activities (i.e. hosing driveway), automotive maintenance and washing, pool maintenance, landscape and gardening, trash disposal, pet care
Homeowners Guide for Sustainable Water Use Pamphlet	Household hazardous waste, trash, motor oil, chlorine, overwatering, green waste, dirt, pesticides/fertilizer, pet waste	Preventing urban runoff through low impact development in residential properties, water conservation, use of IPM techniques and California-friendly landscaping, general water pollution prevention methods
"Help Prevent Ocean Pollution: Your Local Used Oil Collection Center" - South- English, Spanish, Vietnamese	Motor Oil	Automotive Maintenance, Disposal of Used Motor Oil
"Help Prevent Ocean Pollution: Tips for Pool Maintenance" - English, Spanish	Chlorine, runoff	Pool Drainage/Maintenance
"Help Prevent Ocean Pollution: Tips for Landscape and Gardening" - English, Spanish	Fertilizer, pesticide, dirt, overwatering, green waste	Landscape maintenance, pesticide/fertilizer application, proper disposal of household hazardous waste and green waste
"Help Prevent Ocean Pollution: Tips for Pet Care" - English, Spanish	Surfactants, chemicals, pet waste	Proper disposal of pet waste, proper pet bathing techniques
"Help Prevent Ocean Pollution: Household Tips" - English, Spanish	Household hazardous waste, pet waste, pesticides/fertilizers, overwatering, green waste, surfactants, motor oil, trash	Household maintenance and activities (i.e. hosing driveway), automotive maintenance and washing, pool maintenance, landscape and gardening, trash disposal, pet care
"Help Prevent Ocean Pollution: Proper Disposal of Household Hazardous Materials" - English, Spanish, Vietnamese	Household hazardous wastes	Proper identification and disposal of household hazardous wastes



<b>Brochure</b>	<b>Pollutant(s) Addressed</b>	<b>Activities Addressed</b>
“Help Prevent Ocean Pollution: Maintenance Practices for Your Business” - English, Spanish	Fertilizer, pesticides, green waste, overwatering, trash, toxic substances	Landscape maintenance, proper application of pesticides and fertilizers, trash management, proper storage of materials
“Help Prevent Ocean Pollution: Tips for Using Concrete and Mortar” - English, Spanish	Concrete and mortar, slurry	Proper preparation, use, clean up and disposal of concrete and mortar
“Responsible Pest Control”	Pesticides	Proper identification of pests, selection of least toxic chemical, proper pesticide application, spill prevention and proper storage and disposal of pesticides (use of Integrated Pest Management (IPM) techniques)
“Help Prevent Ocean Pollution: Residential Pool, Landscape and Hardscape Drains” - English, Spanish	Chlorine, chemicals, pet waste, green waste, overwatering, motor oil and vehicle fluids	Pool maintenance, spill prevention, proper disposal of household hazardous waste, proper disposal of pet waste, proper use of pesticides and fertilizers, proper vehicle maintenance
“Help Prevent Ocean Pollution: Proper Use and Disposal of Paint” - English, Spanish	Paint, chemicals	Proper use, storage and disposal of paint
“Help Prevent Ocean Pollution: Tips for Home Improvement Projects” - English, Spanish	Construction debris, concrete, paint, household hazardous waste, sediment	Proper storage of construction materials, recycling of construction materials, proper disposal of household hazardous waste, proper erosion and spill control
“Help Prevent Ocean Pollution: Children’s Coloring & Activity Book”	Trash, pet waste, motor oil, green waste	Litter control, proper disposal of pet waste, proper spill clean up (e.g. use of cat litter)
“Help Prevent Ocean Pollution: Tips for the Automotive Industry” - English, Spanish	Motor oil, metals, surfactants, toxic substances, dirt	Proper maintenance and washing practices for automobiles, proper storage and disposal of automotive liquids and materials
“Help Prevent Ocean Pollution: Tips for the Home Mechanic”	Motor oil, metals, surfactants, toxic substances	Proper maintenance and washing practices for automobiles and automotive detailing materials, proper storage and disposal of automotive liquids and materials, use of used oil collection centers
“Compliance Best Management Practices for Mobile Businesses”	Surfactants, toxic substances, dirt, metals	Mobile car washing and detailing, proper high pressure cleaning, proper storage and disposal of washwater from mobile automotive detailing, washing and carpet and fabric cleaning

Brochure	Pollutant(s) Addressed	Activities Addressed
"Help Prevent Ocean Pollution: A Guide for Food Service Facilities" - English, Spanish, Vietnamese	Grease, food waste, trash	Proper food waste disposal, proper grease and oil disposal, proper procedures for spill cleanup, proper maintenance of trash dumpsters, proper floor mat cleaning, proper wastewater disposal

**Regulatory Information**

1. City of Riverside Municipal Code Chapter 14.12 Storm Water/Surface Runoff Water Quality
2. City of Riverside Municipal Code Chapter 6.14 Landscaping Standards and Requirements

Both of the above Code Chapters are available on the City's website at:  
[https://library.municode.com/ca/riverside/codes/code\\_of\\_ordinances](https://library.municode.com/ca/riverside/codes/code_of_ordinances)

## Appendix C

### BMP OPERATION & MAINTENANCE AND TRAINING LOGS

**BMP OPERATION & MAINTENANCE LOG  
TACO STATION**

**Today's Date:** \_\_\_\_\_

**Name of Person Performing Activity  
(Printed):** \_\_\_\_\_

**Signature:** \_\_\_\_\_

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed

## TRAINING / EDUCATIONAL LOG

**Date of Training/Educational Activity:** \_\_\_\_\_

**Name of Person Performing Activity  
(Printed):** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Topic of Training/Educational Activity:** \_\_\_\_\_

\_\_\_\_\_

Name of Participant	Signature of Participant

**For newsletter or mailer educational activities, please include the following information:**

- **Date of mailing**
- **Number distributed**
- **Method of distribution**
- **Topics addressed**

If a newsletter article was distributed, please include a copy of it.

APPENDIX D

CITY OF RIVERSIDE  
WATER QUALITY MANAGEMENT PLAN (WQMP) VERIFICATION SURVEY

Project Name/Site Address: TACO STATION, 4088 MISSION INN AVENUE

Responsible Party : MARIO CORTEZ

Contact Phone: 951-544-1295 Contact Email: CORTEZMARIO@MSN.COM

1. **Have your contractors (landscape, maintenance, etc.) been educated regarding the applicable requirements to prevent pollution as outlined in the WQMP?**

Yes  No Name of Landscape/Maintenance Contractor:

\_\_\_\_\_

Method of education (contract language, Copy of O&M, educational brochures, etc.):

\_\_\_\_\_

2. **Have the storm drains and inlets been inspected and maintained, at a minimum, annually prior to Oct 1?**

Yes  No Date of Last Inspection/Maintenance:

\_\_\_\_\_

Maintenance conducted by:

\_\_\_\_\_

3. **Have you observed any runoff from the irrigation system?**

Yes  No If yes, how was the problem resolved?:

\_\_\_\_\_

\_\_\_\_\_

4. **What type of Integrated Pest Management (IPM) practices are used on site?**

\_\_\_\_\_

5. **Are native and/or drought tolerant plants established and considered for any new landscaping?**

Yes  No

6. **Have the storm drain stencils been inspected annually for legibility prior to Oct. 1?**

Yes  No Total number of stencils on site: \_\_\_\_\_

How many inlets required restenciling / date of restenciling? \_\_\_\_\_ / \_\_\_\_\_

7. **Have education materials been distributed to the residents/tenants/contractors within the past year?**

Yes     No    Topic / Date of Distribution: \_\_\_\_\_ / \_\_\_\_\_

Method of Distribution: newsletter, billing insert, etc.: \_\_\_\_\_

8. **Is street sweeping conducted weekly?**

Yes                       No    Contractor: \_\_\_\_\_

9. **Are trash areas in common area inspected daily?**

Yes                       No

10. **Have any vector concerns been observed (standing water, mosquito larvae, etc.). if yes, please contact Orange County Vector Control District at [www.ocvcd.org](http://www.ocvcd.org).**

Yes                       No

11. **Have the treatment BMPs been inspected and maintained per Manufacturer instructions? (attach invoices and inspection/maintenance forms).**

Yes                       No

12. **Have there been any issues with operation and maintenance of the treatment BMPs units?**

\_\_\_\_\_

I certify that the above information is correct and that the BMPs for this project have been implemented and operated and maintained in accordance with the Operation and Maintenance (O&M) Plan on site and on file at the City.

\_\_\_\_\_  
Print Name of Responsible Party

\_\_\_\_\_

\_\_\_\_\_  
Signature (required)

\_\_\_\_\_ Date

## **Maintenance Responsibility**

Maintenance Responsibilities: Infiltration Trenches and Grass Swale/Depressed Landscape maintenance of common areas and landscape 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

##### *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.

<b>O&amp;M MAINTENANCE/FREQUENCY MATRIX</b>		
<b>BEST MANAGEMENT PRACTICES (BMPs)</b>	<b>INSPECTION FREQUENCY</b>	<b>MAINTENANCE REPAIR PROGRAM</b>
<b>Source Control BMPs</b>		
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: <ul style="list-style-type: none"> <li>- Prohibit discharge of fertilizer, pesticide, or animal waste to street or storm drain.</li> <li>- Prohibit blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into street or storm drain.</li> <li>- Require dumpster lid to be closed at all times.</li> <li>- Prohibit discharge of paint or masonry waste to street or storm drain.</li> <li>- Prohibit vehicle washing, maintenance or repair on premises.</li> </ul>
3. Common Area Landscape Management	Quarterly, as seasonal changes.	The Owner shall direct maintenance staff to employ landscaping practices be consistent with the City of Corona requirements for use of fertilizer, pesticides, and County 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.
<b>Treatment Control BMPs</b>		
7. Infiltration Trenches and Grass Swale/Depressed Landscape.	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.

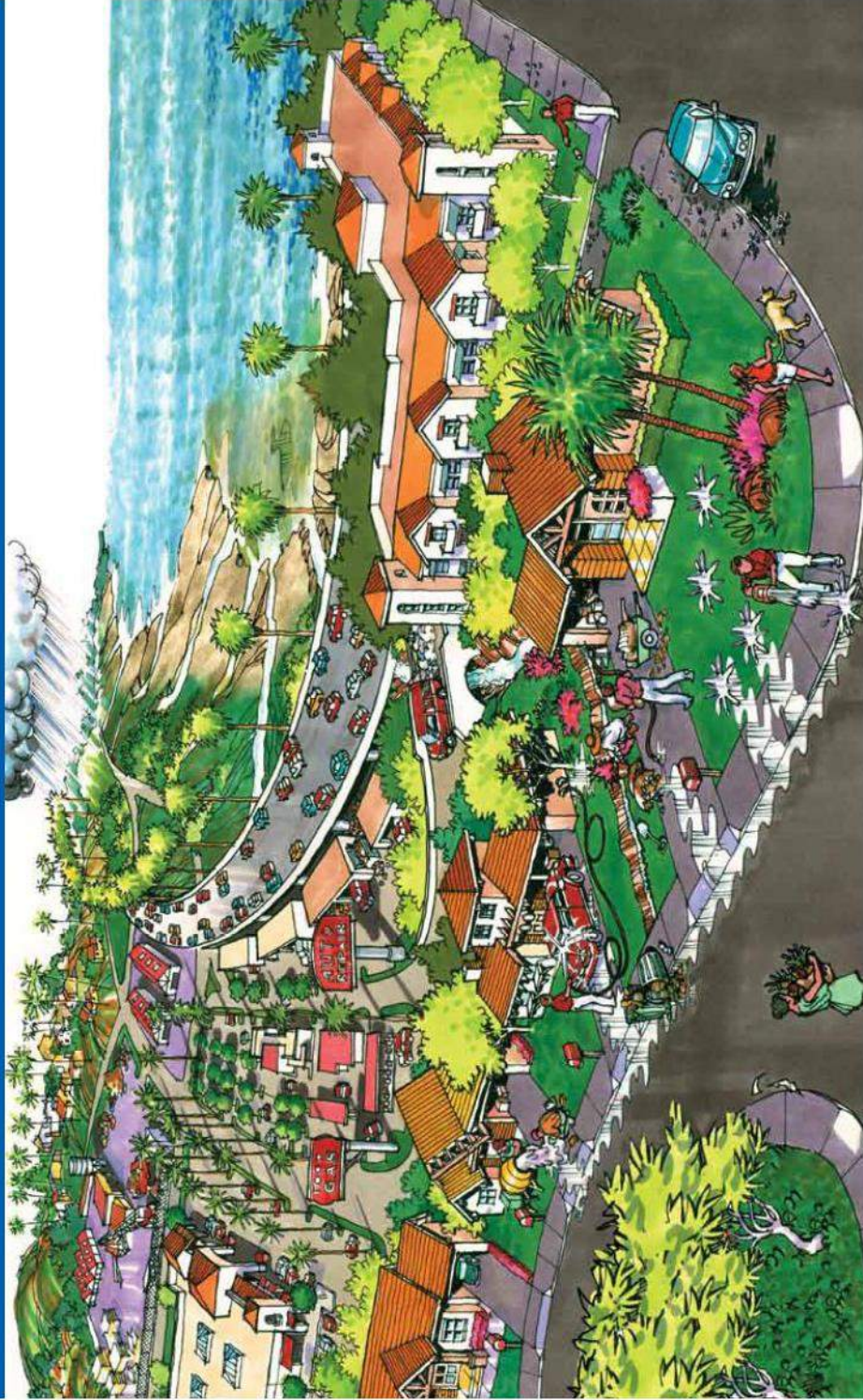
### **Inspection and Maintenance**

<b>Schedule</b>	<b>Inspection and Maintenance Activity</b>
Every two weeks, or as often as necessary to maintain a pleasant appearance	<ul style="list-style-type: none"> <li>- Maintain adjacent landscaped areas. Remove clippings from landscape maintenance activities.</li> <li>- Remove trash &amp; debris</li> </ul>
3 days after Major Storm Events	<ul style="list-style-type: none"> <li>- Check for surface ponding. If ponding is only above the trench, remove, wash and replace pea gravel. May be needed every 5-10 years.</li> <li>- Check observation well for ponding. If the trench becomes plugged, remove rock materials. Provide a fresh infiltration surface by excavating an additional 2-4 inches of soil. Replace the rock materials.</li> </ul>

# Appendix 10: Educational Materials

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

# 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.oilandfills.com](http://www.oilandfills.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 washwater from vehicle washing to drain into the street, gutter or storm drain. Excess washwater 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](http://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, clippings 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.oilandfills.com](http://www.oilandfills.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 washwater 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 run 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.



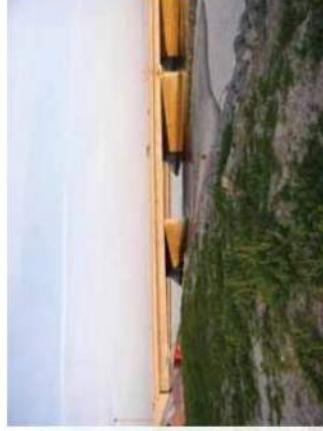
### The Effect on the Ocean



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.







# A Citizen's Guide to Understanding Stormwater



EPA United States Environmental Protection Agency

EPA 833-B-03-002

January 2003

Internet Address (URL): <http://www.epa.gov>  
Recycled/Recyclable • Printed With Vegetable Process Chlorine Free Recycled Paper



## After the Storm

For more information contact:  
[www.epa.gov/nps/stormwater](http://www.epa.gov/nps/stormwater)  
or visit  
[www.epa.gov/nps](http://www.epa.gov/nps)



### What is stormwater runoff?



Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

### Why is stormwater runoff a problem?



Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

### The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- ◆ Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- ◆ Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- ◆ Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- ◆ Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- ◆ Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.



- ◆ Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.





# Stormwater Pollution Solutions

## Residential

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

### Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.



- ◆ Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- ◆ Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- ◆ Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- ◆ Cover piles of dirt or mulch being used in landscaping projects.

### Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.



- ◆ Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- ◆ Don't dispose of household hazardous waste in sinks or toilets.

### Auto care

Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.



- ◆ Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- ◆ Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

### Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.



- ◆ When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

## Residential landscaping

**Permeable Pavement**—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

**Rain Barrels**—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.



**Rain Gardens and Grassy Swales**—Specially designed areas planted with native plants can provide natural places for



rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

**Vegetated Filter Strips**—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

## Commercial

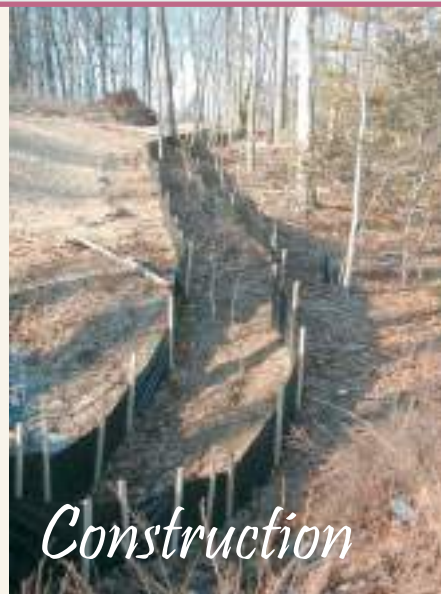
Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- ◆ Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- ◆ Cover grease storage and dumpsters and keep them clean to avoid leaks.
- ◆ Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- ◆ Divert stormwater away from disturbed or exposed areas of the construction site.
- ◆ Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- ◆ Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.

## Construction



## Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- ◆ Keep livestock away from streambanks and provide them a water source away from waterbodies.
- ◆ Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- ◆ Vegetate riparian areas along waterways.
- ◆ Rotate animal grazing to prevent soil erosion in fields.
- ◆ Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.



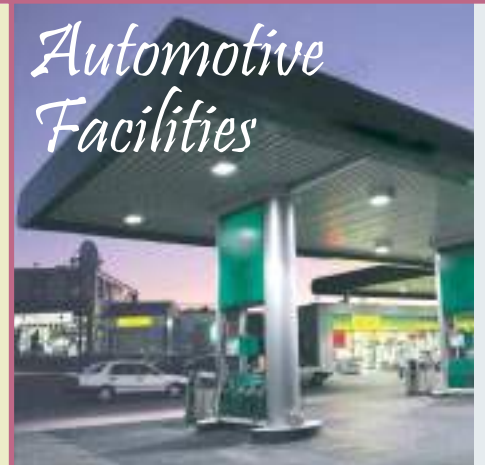
## Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- ◆ Conduct preharvest planning to prevent erosion and lower costs.
- ◆ Use logging methods and equipment that minimize soil disturbance.
- ◆ Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- ◆ Construct stream crossings so that they minimize erosion and physical changes to streams.
- ◆ Expedite revegetation of cleared areas.



## Automotive Facilities



Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- ◆ Clean up spills immediately and properly dispose of cleanup materials.
- ◆ Provide cover over fueling stations and design or retrofit facilities for spill containment.
- ◆ Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- ◆ Install and maintain oil/water separators.



Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.



CREATE A HEALTHY ENVIRONMENT in and around your home by following these simple pet practices. Your pet, family and neighbors will appreciate their clean comfortable surroundings.

## HOUSEHOLD PETS

We all love our pets, but pet waste is a subject everyone likes to avoid. Pet waste left on trails, sidewalks, streets and grassy areas can be washed into the nearest waterway when it rains. Even if you can't see streams or lakes near you, rainfall (stormwater) or sprinkler runoff can wash pet waste into the storm drains that carry runoff to the nearest streams or lakes untreated. The risk of stormwater contamination increases if pet waste is allowed to accumulate in outdoor animal pen areas or left on sidewalks, streets or driveways.



Pet waste contains nutrients and bacteria. Nutrients can promote the growth of algae in streams and lakes. Algae can cause fish kills and other environmental damage if it is fed too many nutrients. Pet Waste also contains e. Coli and fecal bacteria, which

can cause disease in other animals and humans that come in contact with it when swimming or splashing in streams and lakes. Dogs also carry salmonella and giardia, which can make people sick.

Pet waste that is not picked up and properly disposed can also increase vector problems. Flies and other insects are not only attracted to and feed on pet waste, but can also be infected with diseases and spread those diseases to humans and other animals.

## WHAT CAN YOU DO?

- **SCOOP** up pet waste and flush it down the toilet or place in trash can.
- **NEVER DUMP** pet waste into a storm drain or catch basin.
- **USE** the complimentary bags or mutt mitts offered in dispensers at local parks.
- **CARRY EXTRA BAGS** when walking your dog and make them available to other pet owners who are without.
- **TEACH CHILDREN** how to properly clean up after a pet.
- **TELL FRIENDS AND NEIGHBORS** about the ill effects of animal waste on the environment. Encourage them to clean up after pets.

Call 1-800-506-2555 TOLL FREE to report illegal dumping to the storm drain, find the dates and times of local Household Hazardous Waste Collection Events, obtain additional information on stormwater problems and solutions, request presentations about stormwater pollution in your child's classroom, or learn about free grasscycling and composting workshops.

# What's the Scoop?



## TIPS FOR A HEALTHY PET AND A HEALTHIER ENVIRONMENT

### RIVERSIDE COUNTY ANIMAL SERVICES LOCATIONS:

[www.rcdas.org](http://www.rcdas.org)

#### BLYTHE

16450 West Hobson Way  
Blythe, CA 92225  
760-921-7857

#### COACHELLA VALLEY ANIMAL CAMPUS

72-050 Petland Place  
Thousand Palms, CA 92276  
760-343-3644

#### RIVERSIDE COUNTY ANIMAL SERVICES

6851 Van Buren Blvd.  
Riverside, CA 92509  
951-688-4340

#### OTHER ANIMAL SHELTERS:

##### ANIMAL CARE CENTER OF INDIRIO

45-355 Van Buren  
Indio, CA 92201  
760-391-4138

##### ANIMAL FRIENDS OF THE VALLEYS

29001 Bastron Avenue  
Lake Elsinore, CA 92530  
951-674-0618

(Serving incorporated Temecula, Wildomar,  
Lake Elsinore, Murrieta and Canyon Lake)

##### MARY S. ROBERTS PET ADOPTION CENTER

6185 Industrial Avenue  
Riverside, CA 92504  
951-688-4340

##### RAMONA HUMANE SOCIETY

690 Humane Way  
San Jacinto 92586  
951-654-8002

(Serving Sun City, Menifee, Romoland and Homeland)

Looking to adopt a pet?

This website is linked to many animal shelters.  
[www.petfinder.com](http://www.petfinder.com)

To report illegal storm drain disposal, call  
1-800-506-2555

Or visit our website at [www.rcflood.org](http://www.rcflood.org)

E-mail [fcnpdes@rcflood.org](mailto:fcnpdes@rcflood.org)





## SCOOP THE POOP

Many communities have "Scoop the Poop" laws that govern pet waste cleanup.

Some of these laws specifically require anyone who walks an animal off their property to carry a bag, shovel, or scooper. Any waste left by the animal must be cleaned up immediately. **CALL YOUR LOCAL CODE ENFORCEMENT OFFICE** to find out more about pet waste regulations.



## OTHER WAYS TO PROTECT YOUR PETS AND THE ENVIRONMENT

Pets are only one of many sources that contribute to water pollution. However, these other sources of water pollution cannot only harm the environment but also harm your pet. Improperly used or stored lawn fertilizers, pesticides, soaps, grease and vehicle fluids cannot only be washed into local streams and lakes, these chemicals can also harm your pet if they ingest or touch these chemicals. Call 1-800-506-2555 for information regarding how to properly dispose of household hazardous wastes

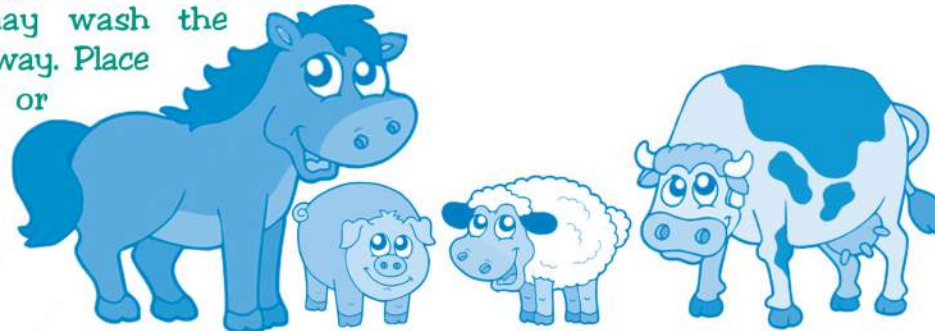
such as these. You can also keep your pets and our environment healthy by properly maintaining your vehicles, and limiting use of pesticides and fertilizers to only the amount that is absolutely needed.

Make sure to not only protect your pets, but to also protect your neighbors pets. **NEVER HOSE VEHICLE FLUIDS** into the street or gutter. **USE ABSORBENT MATERIALS** such as cat litter to clean-up spills. **SWEEP UP** used absorbent materials and place it in the trash.

## HORSES AND LIVESTOCK

Fortunate enough to own a horse or livestock? You, too, can play a part in protecting and cleaning up our water resources. The following are a few simple Best Management Practices (BMPs) specifically designed for horses and livestock.

- **STORE** your manure properly. Do not store unprotected piles of manure in places where stormwater runoff may wash the manure away. Place a cover or tarp over the pile to keep rainwater out.



- **BUILD** a manure storage facility to protect your pets, property and the environment. These structures usually consist of a concrete pad to protect groundwater and a short wall on one or two sides to make manure handling easier.
- **READ** the Only Rain Down the Storm Drain brochure titled "Tips for Horse Care" for additional guidance and recommendations. This brochure should be available from your local city office or for download at [www.rcflood.org/stormwater](http://www.rcflood.org/stormwater).
- **KEEP** animals out of streams - Horses and livestock can defecate in streams causing stormwater pollution. Livestock and horses in streams can also disturb sensitive habitat and vegetation, causing additional environmental damage. Keep livestock and horses away from streams and use designated stream crossings whenever possible.

- **MATERIAL STORAGE SAFETY TIPS** Many of the chemicals found in barns require careful handling and proper disposal. When using these chemicals, be certain to follow these common sense guidelines:

- ◆ Buy only what you need.
- ◆ Treat spills of hoof oils like a fuel spill. Use kitty litter to soak up the oil and dispose of it in a tightly sealed plastic bag.
- ◆ Store pesticides in a locked, dry, well-ventilated area.
- ◆ Protect stored fertilizer and pesticides from rain and surface water.

## RESOURCE CONSERVATION DISTRICTS CAN HELP

Call 1-800-506-2555 for assistance with locating a local conservation district that can help you properly manage your manure, re-establish healthy pastures, control weeds, or identify appropriate grasses for your soils.

Thank you for doing your part to protect your watershed, the environment, your pets and your community!







**L**andscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call  
1-800-506-2555  
"Only Rain Down the Storm Drain"

**Important Links:**

Riverside County Household Hazardous Waste Collection Information  
1-800-304-2226 or [www.rivcwm.org](http://www.rivcwm.org)

Riverside County Backyard Composting Program  
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions  
[www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu)

California Master Gardener Programs  
[www.mastergardeners.org](http://www.mastergardeners.org)  
[www.camastergardeners.ucdavis.edu](http://www.camastergardeners.ucdavis.edu)

California Native Plant Society  
[www.cnps.org](http://www.cnps.org)

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

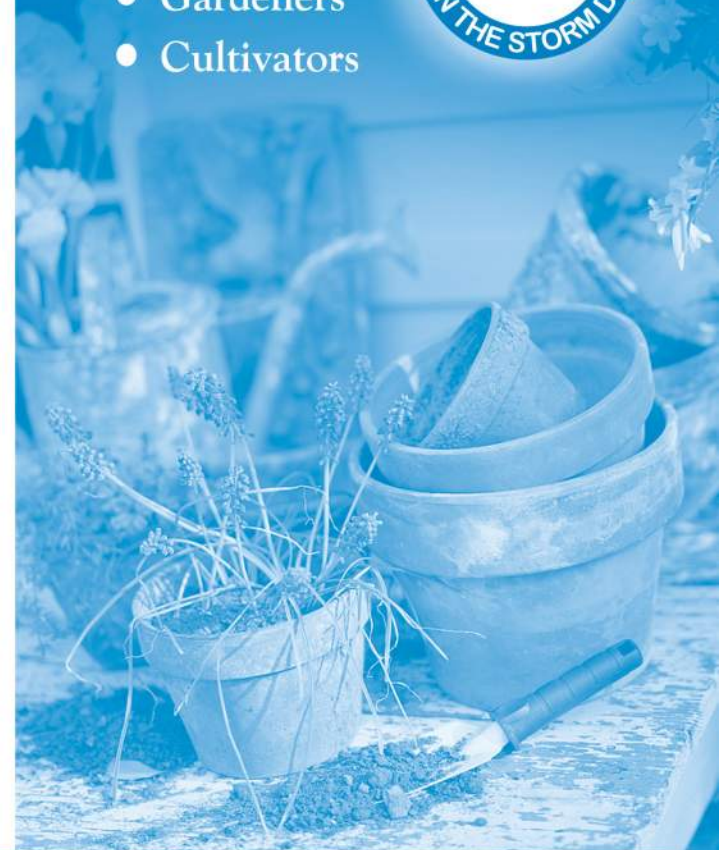


## ...Only Rain Down ...the Storm Drain

*What you should know for...  
Landscape and Gardening*

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators





# Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste water to enter the street, gutter or storm drain.

## General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.
- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.



## Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.

- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.



- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.

- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:

- ◆ **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
- ◆ **Biological Controls** - Use predatory insects to control harmful pests.
- ◆ **Chemical Controls** - Check out [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu) before using chemicals. Remember, all chemicals should be used cautiously and in moderation.

- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

[www.bewaterwise.com](http://www.bewaterwise.com) Great water conservation tips and drought tolerant garden designs.

[www.ourwaterourworld.com](http://www.ourwaterourworld.com) Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.



# Site Design & Landscape Planning SD-10



## Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

## Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

## Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

## Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

## Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.



# SD-10 Site Design & Landscape Planning

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## *Designing New Installations*

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

## *Conserve Natural Areas during Landscape Planning*

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

## *Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit*

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

# Site Design & Landscape Planning SD-10

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regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

## *Protection of Slopes and Channels during Landscape Design*

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

## ***Redeveloping Existing Installations***

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

# **SD-10 Site Design & Landscape Planning**

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Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

## **Other Resources**

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.





Rain Garden

## Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

## Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

## Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

## Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

## Design Considerations

### *Designing New Installations*

#### *Cisterns or Rain Barrels*

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain



barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say  $\frac{1}{4}$  to  $\frac{1}{2}$  inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

#### *Dry wells and Infiltration Trenches*

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

#### *Pop-up Drainage Emitter*

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

## *Foundation Planting*

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

## ***Redeveloping Existing Installations***

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

## **Supplemental Information**

### ***Examples***

- City of Ottawa’s Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

### **Other Resources**

Hager, Marty Catherine, Stormwater, “Low-Impact Development”, January/February 2003.  
[www.stormh2o.com](http://www.stormh2o.com)

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD.  
[www.lid-stormwater.net](http://www.lid-stormwater.net)

Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition



## Design Objectives

- Maximize Infiltration
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- Collect and Convey

## Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

## Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

## Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

## Design Considerations

### ***Designing New Installations***

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.



- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

### ***Redeveloping Existing Installations***

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

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