Appendix L.2

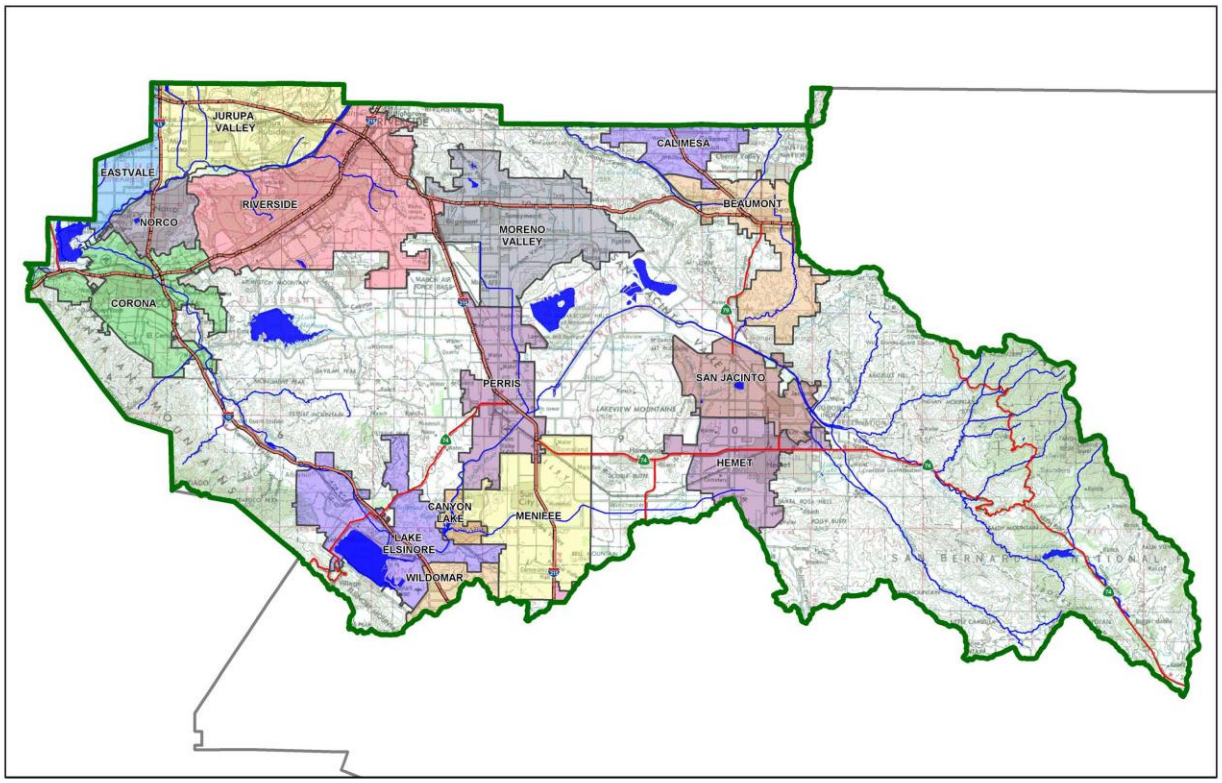
Project Specific Water Quality Management Plan

Project Specific Water Quality Management Plan

Project Title: McCrometer Parking Lot

Development No: Tentative Parcel Map 37421

Design Review/Case No: CUP 17-004



☐ **Preliminary**
☒ **Final**

Original Date Prepared: April 3, 2018

Revision Date(s): _____

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

Contact Information:

Prepared for:
Rob Collier, President
McCrometer, Inc.
3145 W. Stetson Avenue
Hemet, CA 92545
(951) 652-6811

Prepared by:
Blaine A. Womer, P.E.
Blaine Womer Civil Engineering
41555 E. Florida Avenue, Suite G
Hemet, CA 92544
(951) 658-1727

OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for McCrometer, Inc. by Blaine A. Womer Civil Engineering for the McCrometer parking lot project.

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

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

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

Robert Collier — Owner's Signature

08/21/2018 — Date

ROBERT COLLIER — Owner's Printed Name

PRESIDENT — Owner's Title/Position

SEE ATTACHED CALIFORNIA ACKNOWLEDGMENT

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."

Blaine Womer — Preparer's Signature

10/1/18 — Date

Blaine Womer — Preparer's Printed Name

President — Preparer's Title/Position

Preparer's Licensure: 46354

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Riverside)

On August 21st, 2018 before me, Stephanie Pujol Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Robert Collier
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

STEPHANIE PUJOL
COMM. #2175618
Notary Public - California
Riverside County
My Comm. Expires Dec. 15, 2020

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature
Signature of Notary Public

Place Notary Seal Above

OPTIONAL

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: _____
Document Date: _____ Number of Pages: _____
Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name:	Signer's Name:
☐ Corporate Officer — Title(s):	☐ Corporate Officer — Title(s):
☐ Partner — ☐ Limited ☐ General	☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other:	☐ Other:
Signer Is Representing:	Signer Is Representing:

Table of Contents

List of Tables

List of Appendices

Section A: Project and Site Information

PROJECT INFORMATION		
Type of Project:	Industrial Parking Lot	
Planning Area:		
Community Name:	Hemet	
Development Name:	McCrometer Facility	
PROJECT LOCATION		
Latitude & Longitude (DMS): 33°43'43"N; -117°00'18"W		
Project Watershed and Sub-Watershed:	Watershed – Santa Ana River Sub-Watershed – San Jacinto Valley	
APN(s): 460-150-015		
Map Book and Page No.: Portion of Lot 1 of Gibbels Subdivision, MB 15/735		
PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)	Industrial Parking Lot	
Proposed or Potential SIC Code(s)	3490	
Area of Impervious Project Footprint (SF)	69,195 sf	
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	69,195 sf	
Does the project consist of offsite road improvements?	☐ Y	☒ N
Does the project propose to construct unpaved roads?	☐ Y	☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y	☒ N
EXISTING SITE CHARACTERISTICS		
Total area of existing Impervious Surfaces within the project limits (SF)	0 sf	
Is the project located within any MSHCP Criteria Cell?	☐ Y	☒ N
If so, identify the Cell number:	N/A	
Are there any natural hydrologic features on the project site?	☐ Y	☒ N
Is a Geotechnical Report attached?	☒ Y	☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	N/A	
What is the Water Quality Design Storm Depth for the project?	0.69	

Narrative: The McCrometer parking lot project is a proposed parking lot on the existing vacant parcel east of the McCrometer flow systems facility. The property is located at 3145 W. Stetson Avenue and includes approximately 2.3 acres. The parking lot will be used exclusively by McCrometer employees. Water quality mitigation for the parking lot will be accomplished using an infiltration trench due to the acceptable infiltration rate.

A.1 Maps and Site Plans

Appendix 1 includes the following exhibits:

- Vicinity Map, A-1
- Regional Waters Map, A-2
- WQMP Site Plan, A-3

A.2 Identify Receiving Waters

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
City of Hemet Storm Drain system	None	None	None
Salt Creek HU# 802.12	None	REC1-REC2-WARM-WILD	Not designated as RARE
Canyon Lake HU# 802.11 & 802.12	Pathogens, Nutrients	MUN-AGR-GWR-REC1-REC-2-WARM-WILD	Not designated as RARE
San Jacinto River, Reach 1 HU# 802.32 & 802.31	None	MUN-AGR-GWR-REC1-REC-2-WARM-WILD	Not designated as RARE
Lake Elsinore HU# 802.31	Nutrients, Organic Enrichment/ Low Dissolved Oxygen, Sedimentation/Siltation, Unknown Toxicity, PCBs	REC1-REC2-WARM-WILD	Not designated as RARE

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

Table A.2 Other Applicable Permits

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

Section B: Optimize Site Utilization (LID Principles)

Site Optimization

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

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

Existing drainage patters were honored through grading design as shown on the conceptual grading plan.

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

No existing vegetation to protect.

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

Infiltration BMP will be used for the parking lot, infiltration capacity was preserved at the downgrade portion of the site adjacent to Stetson Avenue.

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

To the greatest extent possible for a parking lot development.

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

The parking lot was designed to drain to the proposed infiltration trench.

Section C: Delineate Drainage Management Areas (DMAs)

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
B/1	Landscape	3,317	Self-Retaining
D/1	Asphalt	68,054	Drains to BMP
D/2	Concrete	1,141	Drains to BMP
D/3	Landscape	10,855	Drains to BMP

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

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

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

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]
B/1	Landscaping	3,317	0.69			

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

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

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

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

DMA Name or ID	BMP Name or ID
D/1	Infiltration Trench
D/2	Infiltration Trench
D/3	Infiltration Trench

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

Geotechnical Report

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

Infiltration Feasibility

Table D.1 Infiltration Feasibility

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

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

D.2 Harvest and Use Assessment

Please check what applies*:*

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

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

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

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

Irrigation Use Feasibility

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

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

Total Area of Irrigated Landscape:

Type of Landscaping (Conservation Design or Active Turf):

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

Total Area of Impervious Surfaces:

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

Enter your EIATIA factor:

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

Minimum required irrigated area:

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

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)

Toilet Use Feasibility

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

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

Projected Number of Daily Toilet Users:

Project Type:

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

Total Area of Impervious Surfaces:

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

Enter your TUTIA factor:

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

Minimum number of toilet users:

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

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

Other Non-Potable Use Feasibility

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

N/A

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

Average Daily Demand: Projected Average Daily Use (gpd)

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

Total Area of Impervious Surfaces: Insert Area (Acres)

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

Enter the factor from Table 2-3: Enter Value

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

Minimum required use: Minimum use required (gpd)

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

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

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

D.3 Bioretention and Biotreatment Assessment

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

Select one of the following:

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

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

D.4 Feasibility Assessment Summaries

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	
D/1	☒	☐	☐	☐	☐
D/2	☒	☐	☐	☐	☐
D/3	☒	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

D.5 LID BMP Sizing

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Areas x Runoff Factor**	***Infiltration Trench***		
	[A]		[B]	[C]	[A] x [C]			
D/1	*68,054*	*Asphalt*	*1*	*.89*	*60,704.2*			
D/2	*1,141*	*Concrete*	*1*	*.89*	*1,017.8*			
D/3	*10,855*	*Landscape*	*0.1*	*0.11*	*1,199*			
						Design Storm Depth (in)	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	80,050				62,921	.69	3,618	***4032***

[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.

E.1 Identify Pollutants of Concern

Table E.1 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

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

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Table E.2 Water Quality Credits

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

[1]Cannot Exceed 50%

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

E.3 Sizing Criteria

Table E.3 Treatment Control BMP Sizing

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

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

E.4 Treatment Control BMP Selection

Table E.4 Treatment Control BMP Selection

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

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

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

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

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

If Yes, HCOC criteria do not apply.

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

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

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

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

Table F.1 Hydrologic Conditions of Concern Summary

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

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

* See Appendix 7 for hydromodification method.

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

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

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

F.2 HCOC Mitigation

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

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

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

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

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

*HCOC Exempt per WAP HCOC Applicability Map, See Appendix 7.

Section G: Source Control BMPs

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Landscape/Outdoor Pesticide Use	Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency and plant interactions.	Maintain landscaping using minimum or no pesticides. Provide IPM information to new owners, lessees and operators.
Plazas, sidewalks and parking lots		Sweep plazas, sidewalks and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer, not to a storm drain.

Section H: Construction Plan Checklist

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
Inf. Trench	Infiltration Trench	Sheet 3 of Grading Plan

Section I: Operation, Maintenance and Funding

Maintenance Mechanism: Property Owner

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

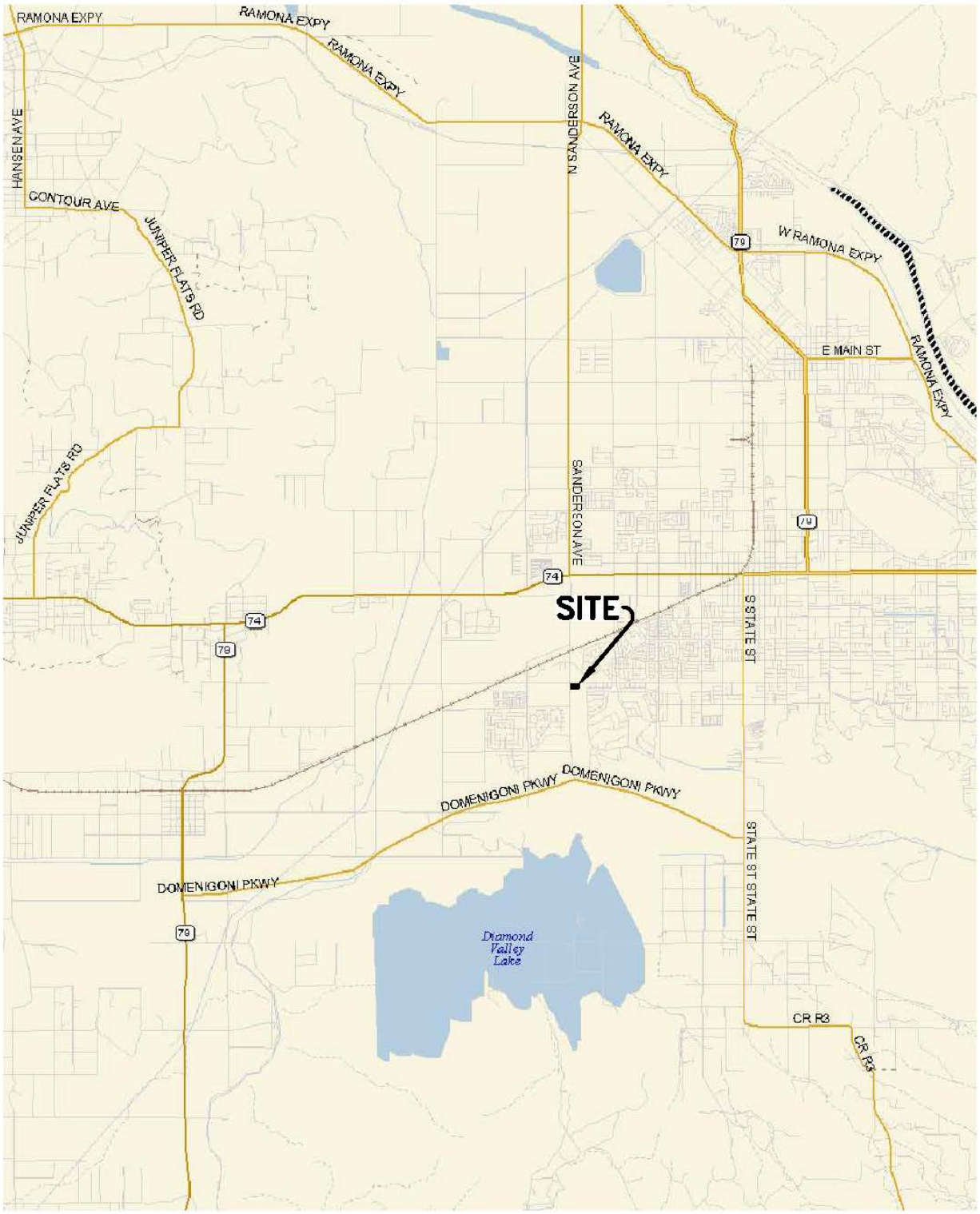
☐ Y ☒ N

See Appendix 9

Appendix 1: Maps and Site Plans

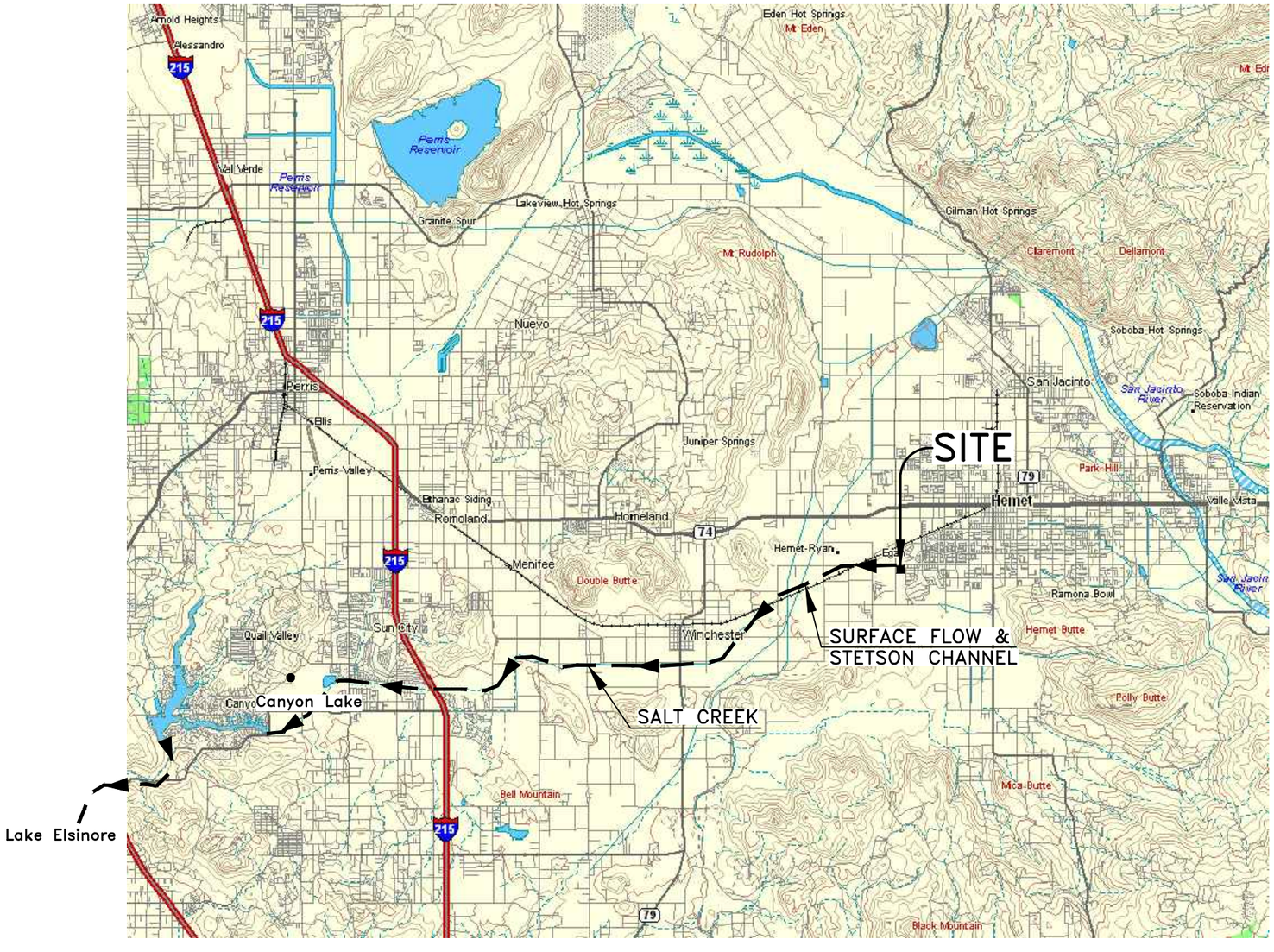
Vicinity Map, Regional Waters Map and WQMP Site Plan

McCrometer Parking Lot
WQMP – EXHIBIT A.1



N

VICINITY MAP



WQMP EXHIBIT A.2

REGIONAL WATERS MAP

McCrometer Parking Lot

CITY OF HEMET

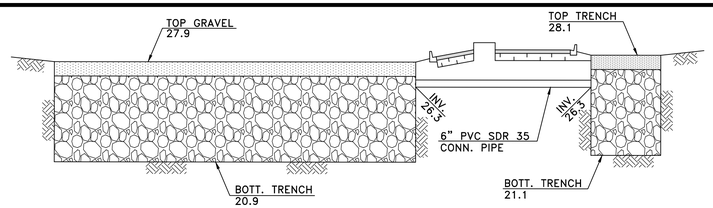
R40-17-001
2/5/2018

BLAINE A. WOMER
CIVIL ENGINEERING
●PLANNING
●SURVEYING
●CIVIL ENGINEERING
●PUBLIC WORKS
Hemet, CA 92544, 41555 E Florida Ave., Suite G, Phone (951)658-1727 Fax (951)658-9347
Park City, UT 84098, 5133 Cove Canyon Dr, #302, Phone (801)859-9755, Fax (801)261-2219

NORTH

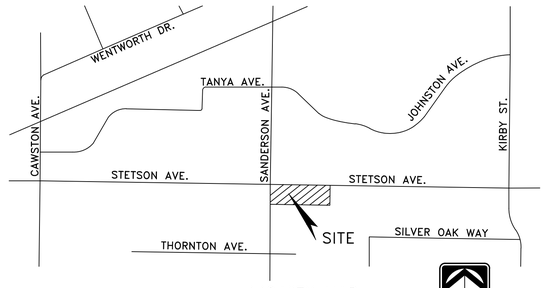
0 20 40 60

1" = 20'

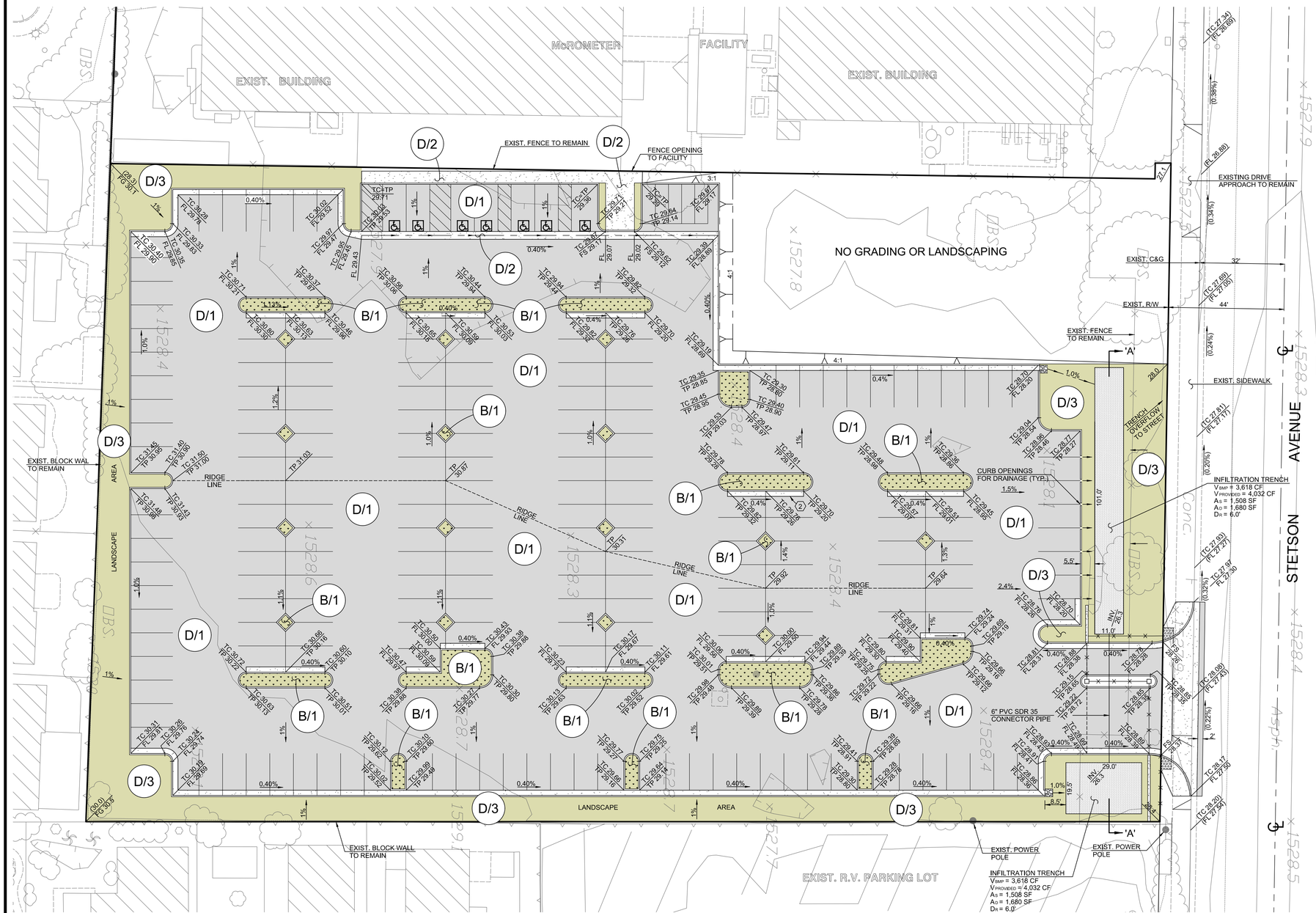


SECTION 'A–A'

NTS



VICINITY MAP

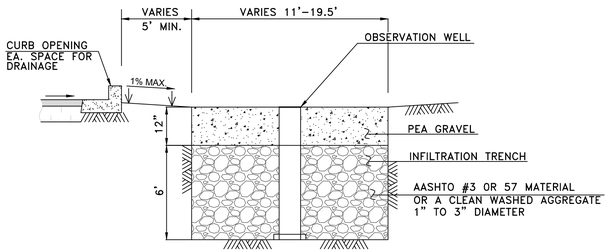


LEGEND

- INDICATES ASPHALT SURFACE
- INDICATES LANDSCAPE SURFACE-SELF RETAINING
- INDICATES LANDSCAPE SURFACE-DRAINS TO BMP
- INDICATES CONCRETE SURFACE - DRAINS TO BMP
- INDICATES INFILTRATION TRENCH

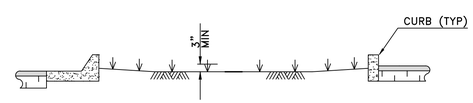
DMA SUMMARY

IDENTIFIER	AREA(SF)	PROPOSED SURFACE	TREATMENT
B/1	3,317	LANDSCAPE	SELF-RETAINING
D/1	68,054	ASPHALT	DRAINS TO INFILTRATION TRENCH
D/2	1,141	CONCRETE	DRAINS TO INFILTRATION TRENCH
D/3	10,855	LANDSCAPE	DRAINS TO INFILTRATION TRENCH



TYPICAL INFILTRATION TRENCH SECTION

N.T.S.



TYPICAL SELF RETAINING LANDSCAPE SECTION

N.T.S.

Underground Service Alert
Call: TOLL FREE
811
TWO WORKING DAYS BEFORE YOU DIG

REVISIONS:

NO:	DATE:	BY:	APPROVED:

DESIGNED BY: | DRAWN BY: | CHECKED BY:

REGISTERED PROFESSIONAL ENGINEER — BLAINE A. WOMER — No. 46354 — CIVIL — STATE OF CALIFORNIA

W.D.

BLAINE A. WOMER
CIVIL ENGINEERING
•PLANNING •SURVEYING •CIVIL ENGINEERING •PUBLIC WORKS
Hemet, CA. 92544, 41555 E Florida Ave., Suite G, Phone (951)658-7727 Fax (951)658-9347
Palm City, UT 84060, 5133 Cove Canyon Dr., 302, Phone/Fax (435)615-1489

PREPARED UNDER THE SUPERVISION OF:

RCE NO. 46354 DATE:

SCALE: 1" = 20'

BENCHMARK: SEE SHEET 1

DATE: SEPTEMBER, 2017

RECOMMENDED BY:

CITY ENGINEER

DATE:

City of Hemet
ENGINEERING DEPARTMENT
510 E. Florida Ave.
HEMET, CA 92543
(951) 765-2360

City of Hemet
PARCEL 4, PARCEL MAP No. 37421
McCROMETER PARKING LOT
WQMP SITE PLAN

W.O. F.N.

1 OF 1 SHEETS

FILE NO.

Appendix 2: Construction Plans

Grading and Drainage Plans

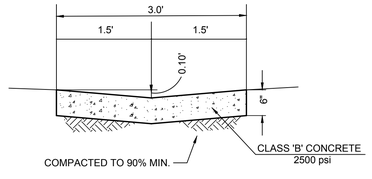
NORTH

0 20 40 60

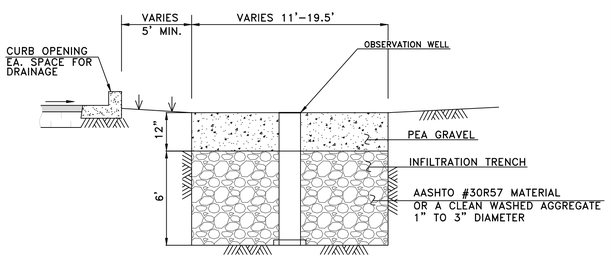
1" = 20'

CONSTRUCTION NOTES

1. INSTALL MINIMUM 3" AC OVER 4" CLASS II AGGREGATE BASE. SECTION TO BE VERIFIED BY THE PROJECT GEOTECHNICAL ENGINEER.
2. CONSTRUCT 6" TYPE A CURB AND GUTTER PER C.O.H. STD. NO. C-200.
3. CONSTRUCT 6" TYPE D CURB PER C.O.H. STD. NO. C-203.
4. INSTALL 6" WIDE CURB OPENING AT 9' SPACING ADJACENT TO INFILTRATION TRENCHES.
5. TRANSITION CURB FACE, 0" TO 6".
6. CONSTRUCT COMMERCIAL DRIVEWAY PER C.O.H. STD. NO. C-210A.
7. SAWCUT AND REMOVE MIN. 2' EXIST. AC PAVEMENT, REPLACE WITH MIN. 3" AC OVER 8" CLASS II AGG. BASE
8. REMOVE EXISTING AC PAVEMENT.
9. REMOVE EXISTING CONCRETE CURB AND CURB □ GUTTER.
10. INSTALL INFILTRATION TRENCH PER DETAIL SHEET 3.
11. REMOVE EXISTING SIDEWALK.
12. REMOVE EXISTING TREE.
13. PROPOSED ROLLING GATE AND FENCING PER ARCHITECT PLANS.
14. INSTALL 3'x3' PAD OF 6" ROCK, 12" THICK.
16. INSTALL TRUNCATED DOME MAT PER CBC SEC. 11B705.1.
17. INSTALL ROOT BARRIER PANNEL PER NDS RP SERIES OR EQUAL
18. INSTALL UNAUTHORIZED VEHICLE PARKING SIGNAGE PER 2016 CBC, SEC. 11B-502.8.
19. REMOVE EXISTING POWER POLE.
20. ABANDON EXISTING WELL PER RIV. CO. DEPARTMENT OF ENVIRONMENTAL HEALTH GUIDLINES.
21. RELOCATE FENCE TO RIGHT-OF-WAY PER LANDSCAPE ARCHITECT PLANS
22. CONSTRUCT CONCRETE SIDEWALK PER C.O.H. STD. No. C-215
23. CONSTRUCT CONCRETE RIBBON GUTTER PER DETAIL
24. ADA PARKING LEGEND PER 2016 CBC SEC. 1109A.8.8.2.
25. ADA PARKING SIGNAGE PER 2016 CBC SEC. 1109A.8.8.1.
26. INSTALL CONCRETE WHEEL STOP.



3' WIDE RIBBON GUTTER SECTION
NTS



INFILTRATION TRENCH SECTION
NTS

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
811
TWO WORKING DAYS BEFORE YOU DIG

REVISIONS:

NO:	DATE:	BY:	APPROVED:

DESIGNED BY: | DRAWN BY: | CHECKED BY:

REGISTERED PROFESSIONAL ENGINEER — BLAINE A. WOMER — No. 46354 — CIVIL — STATE OF CALIFORNIA

BLAINE A. WOMER
CIVIL ENGINEERING
•PLANNING •SURVEYING •CIVIL ENGINEERING •PUBLIC WORKS
Hemet, CA. 92544, #1355 E Florida Ave., Suite G. Phone (951)658-1727 Fax (951)658-5547
Park City, UT 84098, 5133 Cove Canyon Dr. ; 302. Phone/Fax (435)615-1489

W.D.

PREPARED UNDER THE SUPERVISION OF:

RCE NO. 46354 DATE:

SCALE: 1" = 20'

BENCHMARK: SEE SHEET 1

DATE: SEPTEMBER, 2017

RECOMMENDED BY:

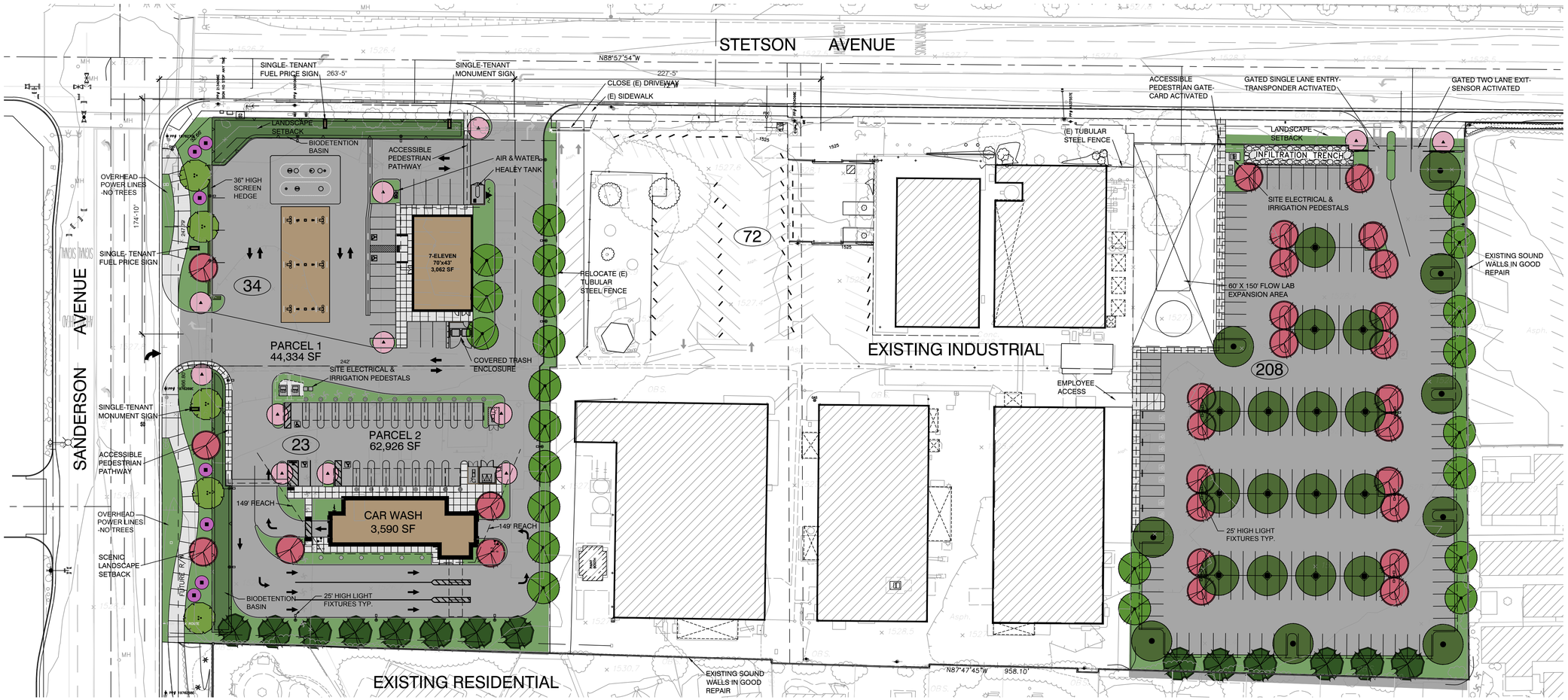
DATE:

City of Hemet
ENGINEERING DEPARTMENT
510 E. Florida Ave.
HEMET, CA 92543
(951) 765-2360

City of Hemet
PARCEL 4, PARCEL MAP No. 37421
McCROMETER PARKING LOT
PRECISE GRADING PLAN
EA 1804-009 E
W.O. F.N.

3 OF 3 SHEETS

FILE NO.



PLANT PALETTE

TREES

100% OF TREES SHALL BE PLANTED AT 24" BOX SIZE MINIMUM

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	HEIGHT	WUCOLS
	Lophostemon confertus	Brisbane Box	24" Box	45'	M
	Magnolia grandiflora 'DD Blanchard'	Magnolia Tree	24" Box	50'	M
	Ulmus parvifolia 'Drake'	Evergreen Elm	24" Box	50'	M
	Lagerstroemia indica	Crape Myrtle	24" Box	25'	M
	Arbutus x 'Marina'	Arbutus	24" Box	30'	L
	Pyrus calleryana 'Autumn Blaze'	Callery Pear	24" Box	30'	M
	Cercis occidentalis	Western Redbud	24" Box	15'	L

SHRUBS

100% OF SHRUBS SHALL BE INSTALLED AT 5 GALLON SIZE UNLESS THE SHRUB'S MATURE SIZE IS SUCH THAT NURSERIES DO NOT SELL STOCK LARGER THAN 1 GALLON SIZE. SHRUBS SHALL BE PLACED AT A MAXIMUM OF 36" APART ON AVERAGE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	HEIGHT	WUCOLS
	Baccharis pilularis 'Twin Peaks'	Coyote Brush	1 Gal	2'	L
	Bougainvillea 'Oo-La-La'	Groundcover Bougainvillea	5 Gal	2'	L
	Carex pansa	California Meadow Sedge	1 Gal	1'	M
	Ceanothus spp	California Lilac	1 Gal	1'-3'	L
	Cistus x purpureus	Orchid Rockrose	5 Gal	4'	L
	Coprosma repens 'Marble Queen'	NCN	1 Gal	3'	M
	Dietes vegeta	Fortnight Lily	5 Gal	3'	M
	Lavandula spp	Lavender	1 Gal	3'	L
	Leucophyllum frutescens	Texas Ranger	5 Gal	4'	L
	Ligustrum japonicum 'Texanum'	Texas Privet	5 Gal	3'	M
	Myoporum parvifolium 'Pink'	Myoporum	1 Gal	18"	L
	Myrtus communis 'Compacta'	Dwarf Myrtle	5 Gal	3'	L
	Nerium oleander	Oleander	5 Gal	3'	L
	Phormium tenax cvr	New Zealand Flax	5 Gal	3'	M
	Rhaphiolepis indica cvr.	Indian Hawthorne	5 Gal	4'	M
	Rosa 'White Meidland'	Groundcover Rose	5 Gal	3'	M
	Salvia spp.	Salvia	1 Gal	2'-4'	L
	Verbena lilacina	Lilac Verbena	1 Gal	18"	L
	Westringia fruticosa cvr	Coast Rosemary	5 Gal	4'	L

VINES

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	HEIGHT	WUCOLS
	Parthenocissus tricuspidata	Boston Ivy	5 Gal	Vine	M

HARDSCAPE LEGEND

SYMBOL	MATERIAL
	NATURAL GREY CONCRETE MEDIUM BROOM FINISH

LANDSCAPE NOTES

1. LANDSCAPE PLANS AND INSTALLATIONS SHALL COMPLY WITH CITY OF HEMET MUNICIPAL CODE, THE SPECIFIC PLAN, AND CITY OF HEMET LANDSCAPE DESIGN GUIDELINES.
2. VINES OR OTHER LANDSCAPE SCREENING SHALL BE PLANTED AROUND TRASH ENCLOSURES.
3. LANDSCAPE SCREENING SHALL BE PROVIDED FOR ABOVE GROUND UTILITY EQUIPMENT INCLUDING BACKFLOW PREVENTERS, DOUBLE CHECK DETECTOR ASSEMBLIES, AND OTHER UTILITY STRUCTURES.
4. PLANT MATERIAL MAY BE ADDED OR REMOVED DURING THE CONSTRUCTION DOCUMENT PHASE SUBJECT TO APPROVAL BY THE CITY OF HEMET.

LANDSCAPE CALCULATIONS:

PROJECT SITE AREA (GROSS): 209,845 SF
LANDSCAPE AREA: 44,800 SF
LANDSCAPE PERCENTAGE: 21.3%

IRRIGATION SYSTEM DESIGN STATEMENT

A PERMANENT AUTOMATIC IRRIGATION SYSTEM SHALL BE DESIGNED AND INSTALLED TO IRRIGATE ALL PLANTING AREAS. THE IRRIGATION CONTROLLER(S) SHALL BE EQUIPPED FROM THE MANUFACTURER WITH WEATHER/EVAPOTRANSPIRATION (ET) SENSING CAPABILITIES TO AUTOMATICALLY ADJUST WATERING SCHEDULES AND AMOUNTS. THE DESIGN OF THE IRRIGATIONS SYSTEMS SHALL EMPHASIZE WATER CONSERVATION AND PROVIDE EFFICIENT AND UNIFORM DISTRIBUTIONS OF IRRIGATION WATER.

DRIP AND/OR BUBBLER IRRIGATION, OR OTHER LOW-VOLUME, LOW-PRESSURE, MICRO-IRRIGATION SYSTEM, AS APPROVED BY THE CITY OF HEMET, SHALL BE INSTALLED IN PLANTER AREAS TO PROVIDE WATER DIRECTLY TO THE ROOT ZONE OF PLANTS. THE IRRIGATION SYSTEM MAY UTILIZE EFFICIENT ROTATOR NOZZLES IN LARGE PLANTING AREAS, SUBJECT TO THE APPROVAL OF THE CITY. THE AUTOMATIC IRRIGATION SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH THE CITY OF HEMET ORDINANCE AND LANDSCAPE STANDARDS.

FOR SITES UTILIZING POTABLE WATER FOR LANDSCAPE IRRIGATION, A REDUCED PRESSURE BACKFLOW PREVENTOR SHALL BE INSTALLED AFTER THE WATER METER TO PROTECT THE POTABLE WATER SUPPLY IN ACCORDANCE WITH STATE OF CALIFORNIA AND CITY OF HEMET STANDARDS AND REQUIREMENTS.

MAXIMUM ANNUAL WATER ALLOWANCE

MAWA = (Eto) (0.62) ((0.45) (LA) + (0.55) (SLA)) = GAL/YR

MAWA = (57.33) (0.62) ((0.45) (44,800 SF) + (0.55) (0)) = 716,579 GAL/YR

ESTIMATED ANNUAL WATER USE

EAWU = (Eto) (0.62) (PF) (LA) = GAL/YR

EAWU = (57.33) (0.62) (0.4) (44,800 SF) = 636,959 GAL/YR

Pacific Landscape Studio
LANDSCAPE ARCHITECTURE
SITE PLANNING

2523 ANTLERS WAY, SAN MARCOS, CA 92078
P: 805.440.8047

PLS PROJECT #17014

PRELIMINARY
LANDSCAPE PLAN
SCHEME Mv10

MCHOLLAND RETAIL
HEMET, CA

GKPA PROJECT #16124.01
05 FEBRUARY 2018

0 20' 40' 80'
SCALE: 1" = 40.00'

NORTH

McHOLLAND RETAIL
HEMET, CALIFORNIA

RANCHO EMPIRE, LLC

38011 STONE MEADOW DRIVE
MURRIETA, CA 92562
951.643.4709

GK PIERCE ARCHITECTS
3 OVERTURE
ALISO VIEJO, CA 92656
T 949.344.2710
F 949.344.2720

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA. 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA. 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA. 92223 (951) 845-7743 Fax (951) 845-8863
800 E. Florida Avenue, Hemet, CA. 92543 (951) 766-8777 Fax (951) 766-8778

October 16, 2017

Project No. 644-17062
17-10-093

Rancho McHolland, LLC
38011 Stone Meadow Drive
Murrieta, California 92562

Attn: Mr. Mark Cooper

Project: Proposed Commercial Development
APN 460-150-015
Hemet, California

Subject: Infiltration Testing for On-Site Storm Water Management

As requested, we have performed infiltration testing on the subject site to evaluate the infiltration potential of the near surface soil to assist in storm water retention system design. It is our understanding that on-site storm water retention infiltration may be required for the subject project. The infiltration rates determined should be useful in the assessment of on-site storm water retention needs. The approximate test locations are indicated on the attached Test Location Plan (Figure 1).

Infiltration testing was performed on October 4, 2017 utilizing double ring infiltrometers. Testing was performed at depths of approximately three (3) feet below the existing ground surface. Testing was performed in general accordance with the *Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer* (ASTM D-3385).

Testing indicated infiltration rates of approximately 2.0 and 2.2 inches per hour (in/hour) for test locations DR-1 and DR-2, respectively.

The rates determined represent the ultimate field rates and an appropriate safety factor should be incorporated into design to account for long-term saturation and potential "silting" of the surface soil. The safety factor should be determined with consideration to other factors considered in the storm water retention system design (specifically storm water volume estimates) and the safety factors associated with the related design components.

If you have any questions regarding this memo or the testing summarized herein, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist

CERTIFIED ENGINEERING GEOLOGIST
MATTHEW J. COHRT
2634
STATE OF CALIFORNIA

Brett L. Anderson
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
BRETT L. ANDERSON
No. C45389
Exp. 9/30/18
CIVIL
ENGINEERING
STATE OF CALIFORNIA

Copies: 4 / Addressee

Sladden Engineering

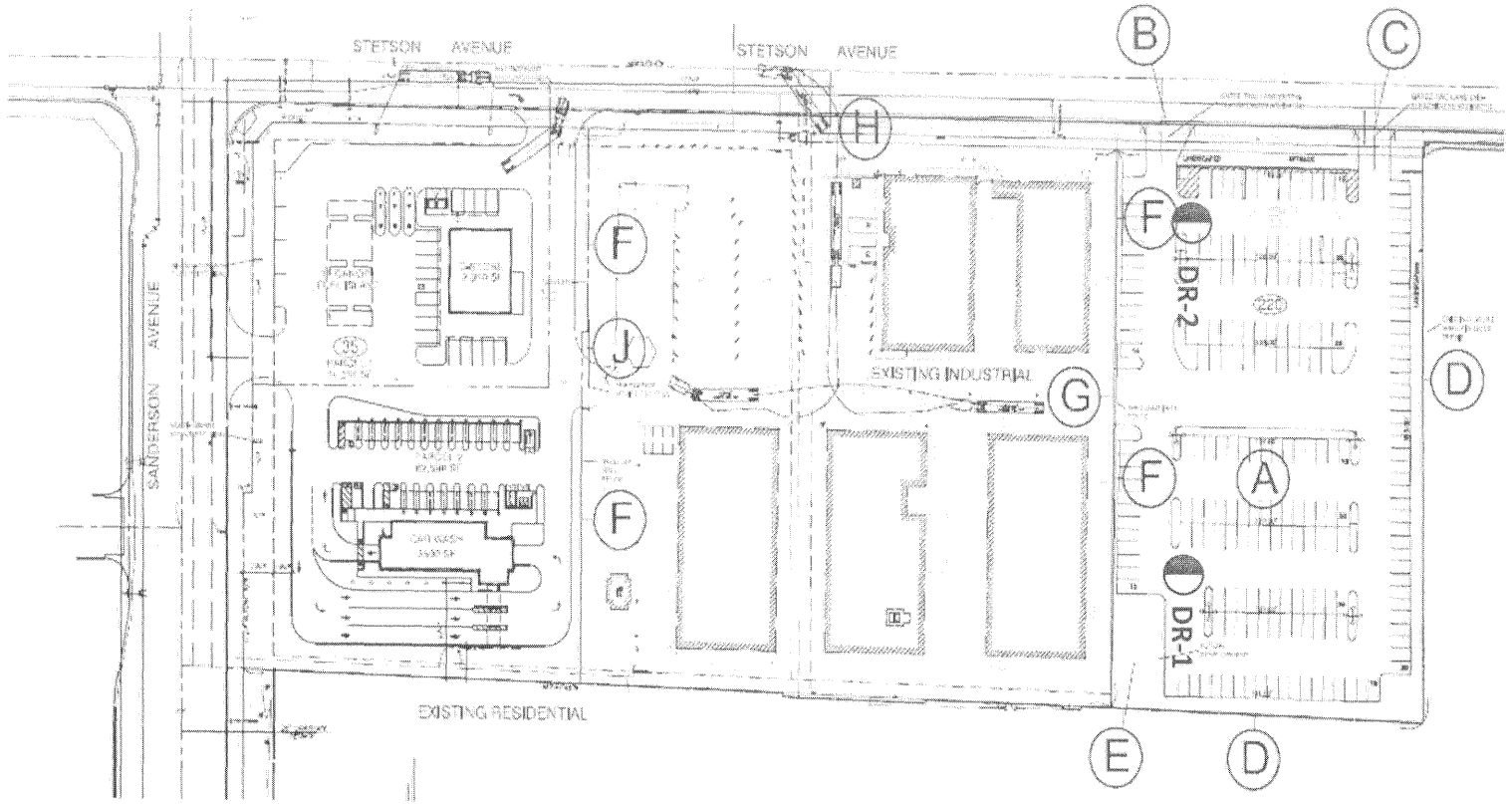
TEST LOCATION PLAN

Project Number: 644-17062

Report Number: 17-10-093

Date: October 16, 2017

FIGURE 1



KEY NOTES

(A) 220 STALL, PAVED & STRIPED PARKING LOT

(B) GATED, 2 LANE ENTRY- TRANSPONDER ACTIVATED

(C) GATED, 2 LANE EXIT- ELECTRIC EYE ACTIVATED

(D) EXISTING SOUND WALL IN GOOD REPAIR

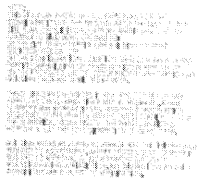
(E) FUTURE DEVELOPMENT AREA

(F) SOLID BAR, STEEL FENCING

(G) PEDESTRIAN GATE

(H) EXISTING McCROMETER TRUCK INGRESS/ EGRESS TO REMAIN

(J) TUBULAR STEEL GATE- EMERGENCY VEHICLE ACCESS ONLY



CONCEPTUAL SITE PLAN
SCHEME M-4

0 20' 40' 80'
SCALE: 1" = 40.00'
NORTH

McHOLLAND RETAIL
HEMET, CALIFORNIA

PAGE PLAZA PARTNERS, LLC
[illegible]
MURRIETA, CA 92562
[illegible]

PIERCE

DOUBLE [illegible] INFILTRATION RATE CALCULATIONS

Job No. 6[illegible]-17062

Test Hole DR-1

Depth (Ft.) 3.0

Project: Holland Property

AVERAGE RATE* = 2.0 (in/hr)

INNER RING

Interval Number	Initial Water(cm)	Final Water(cm)	Con. Factor (cm to in)	Water (in)	Area Mar. (in2)	Volume (in3)	Area IR (in2)	Time (min)	Time (hr)	Vir (in/hr)
1	46.8	12.6	0.39	13.5	8.9	120.4	113.1	30	0.50	2.1
2	46.8	12.9	0.39	13.3	8.9	119.3	113.1	30	0.50	2.1
3	47.0	13.2	0.39	13.3	8.9	119.0	113.1	30	0.50	2.1
4	46.9	13.8	0.39	13.0	8.9	116.5	113.1	30	0.50	2.1
5	46.8	14.0	0.39	12.9	8.9	115.5	113.1	30	0.50	2.0
6	47.1	14.3	0.39	12.9	8.9	115.5	113.1	30	0.50	2.0
7	47.5	15.2	0.39	12.7	8.9	113.7	113.1	30	0.50	2.0
8	47.1	14.9	0.39	12.7	8.9	113.4	113.1	30	0.50	2.0
9	45.6	13.5	0.39	12.6	8.9	113.0	113.1	30	0.50	2.0
10	45.0	13.2	0.39	12.5	8.9	112.0	113.1	30	0.50	2.0
11	47.5	15.3	0.39	12.7	8.9	113.4	113.1	30	0.50	2.0
12	47.4	15.6	0.39	12.5	8.9	112.0	113.1	30	0.50	2.0
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

DOUBL[illegible] INFILTRATION RATE CALCULATIONS

Job No. 6[illegible]-17062

Test Hole DR-2

Depth (Ft.) 3.0

Project: Holland Property

INNER RING

Interval Number	Initial Water(cm)	Final Water(cm)	Con. Factor (cm to in)	Water (in)	Area Mar. (in2)	Volume (in3)	Area IR (in2)	Time (min)	Time (hr)	Vir (in/hr)
1	49.7	11.9	0.39	14.9	8.9	133.1	113.1	30	0.50	2.4
2	49.8	12.5	0.39	14.7	8.9	131.3	113.1	30	0.50	2.3
3	49.9	13.3	0.39	14.4	8.9	128.9	113.1	30	0.50	2.3
4	49.9	13.9	0.39	14.2	8.9	126.7	113.1	30	0.50	2.2
5	50.1	14.0	0.39	14.2	8.9	127.1	113.1	30	0.50	2.2
6	49.6	14.4	0.39	13.9	8.9	123.9	113.1	30	0.50	2.2
7	49.5	15.0	0.39	13.6	8.9	121.5	113.1	30	0.50	2.1
8	48.2	16	0.39	12.6	8.9	112.7	113.1	30	0.50	2.0
9	48.0	13.2	0.39	13.7	8.9	122.5	113.1	30	0.50	2.2
10	48.5	13.6	0.39	13.7	8.9	122.9	113.1	30	0.50	2.2
11	49.0	13.7	0.39	13.9	8.9	124.3	113.1	30	0.50	2.2
12	49.5	14	0.39	14.2	8.9	126.7	113.1	30	0.50	2.2
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

AVERAGE RATE* = 2.2 (in/hr)

Appendix 4: Historical Site Conditions

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

Not Available At This Time

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Not Applicable

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: WOMER ENGINEERING — Date: 4\3\18

Designed by: B. WOMER — Case No: PAR 4, PM 37421

Company Project Number/Name: MC CROMETER PARKING LOT

BMP Identification

BMP NAME / ID: INFILTRATION TRENCH

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.69 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
D\1	*68054*	*Concrete or Asphalt*	*1*	*0.89*	*60704.2*			
D\2	*1141*	*Concrete or Asphalt*	*1*	*0.89*	*1017.8*			
D\3	*10855*	*Ornamental Landscaping*	*0.1*	*0.11*	*1199*			
	80050	*Total*			*62921*	*0.69*	*3618*	*4032*

Notes:

Infiltration Trench - Design Procedure	BMP ID IT NO. 1	Legend:	Required Entries Calculated Cells

Company Name:	WOMER ENGINEERING	Date:	4\3\18
Designed by:	B. WOMER	County/City Case No.:	PM 37421

Design Volume

Enter the area tributary to this feature, Max = 10 acres	A_t = 2	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} = 3,618	ft^3

Calculate Maximium Depth of the Reservoir Layer

Enter Infiltration rate	I = 2.0	in/hr
Enter Factor of Safety, FS (unitless)	FS = 3	

Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook

n = 40 %

Calculate D_1. $D_1 = \dfrac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$ D_1 = 10.00 ft

Enter depth to historic high groundwater mark (measured from finished grade)	100	ft
Enter depth to top of bedrock or impermeable layer (measured from finished grade)	200	ft

D_2 is the smaller of:

Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft D_2 = 89.0 ft

D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet. D_{MAX} = 8.0 ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be ≤ D_{MAX} D_R = 6.00 ft

Calculate the design depth of water, d_W

Design $d_W = (D_R) \times (n/100)$ Design d_W = 2.40 ft

Minimum Surface Area, A_S $A_S = \dfrac{V_{BMP}}{d_W}$ A_S = 1,508 ft^2

Proposed Design Surface Area A_D = 1,680 ft^2

Minimum Width = D_R + 1 foot pea gravel 7.00 ft

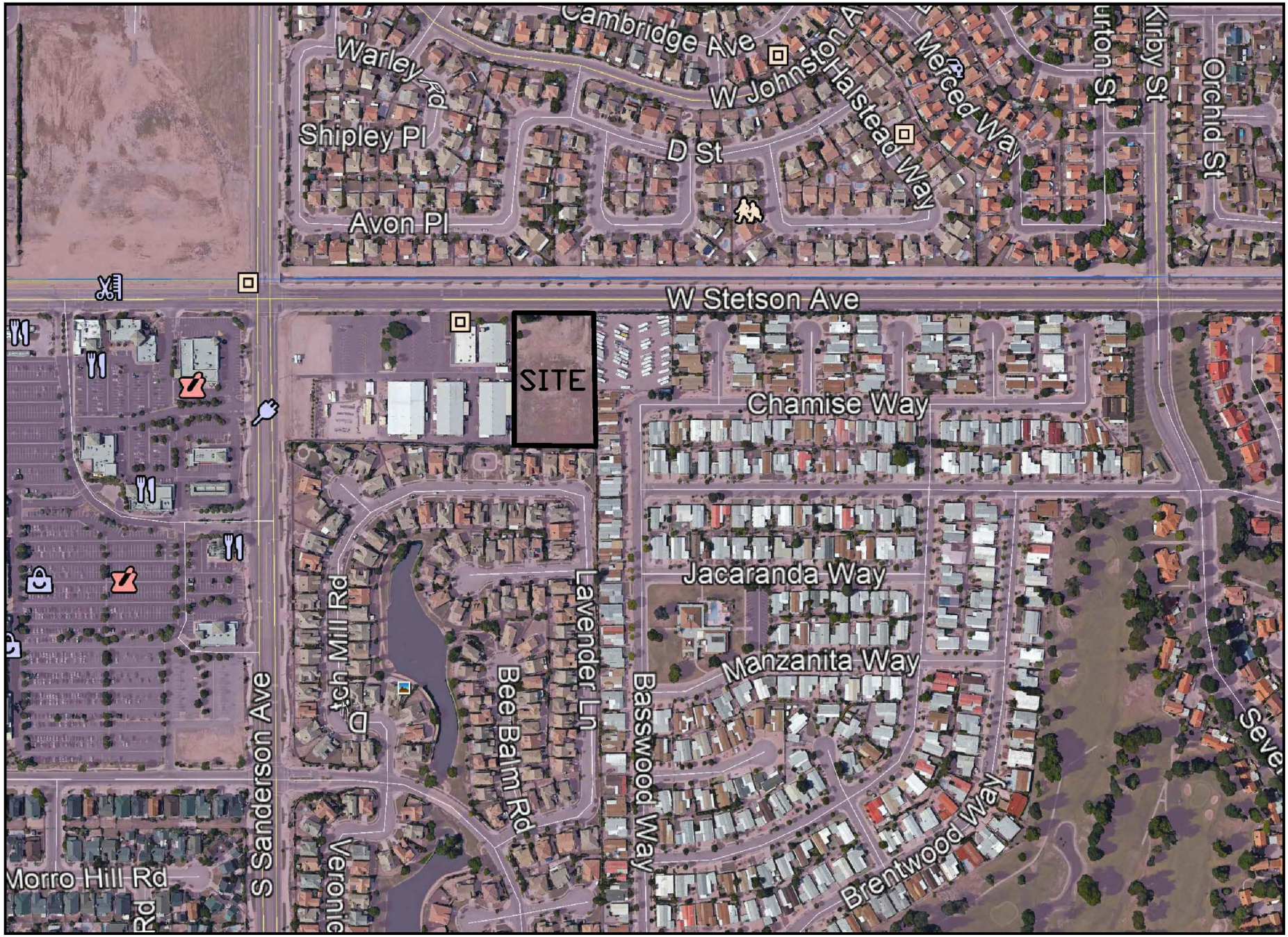
Sediment Control Provided? (Use pulldown) Yes

Geotechnical report attached? (Use pulldown) Yes

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern


Cambridge Ave
Warley Rd
W Johnston Ave
Halstead Way
Merced Way
Kirby St
Orchid St
Shipley Pl
D St
Avon Pl
W Stetson Ave
SITE
Chamise Way
Jacaranda Way
Manzanita Way
Lavender Ln
Basswood Way
Bee Balm Rd
Brentwood Way
S Sanderson Ave
Morro Hill Rd

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCE / SOURCE CONTROL CHECKLIST

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix 9: O&M

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

OPERATION AND MAINTENANCE PLAN

I. Introduction

The McCrometer Parking Lot project is a proposal to develop approximately 2.3 acres located at 3145 West Stetson Avenue into an employee parking lot. The proposed project is largely impervious with small landscape areas, some of which will be self-retaining. Water quality mitigation for the impervious surfaces will be accomplished utilizing an infiltration trench due to the acceptable natural infiltration rate of the soil. Stormwater runoff will be routed through the infiltration trench and, in larger intensity storms, discharge to Stetson Avenue where the flows are intercepted by a City maintained catch basin and storm drain system.

II. Responsibility for Maintenance

Initial and ultimate responsibility for maintenance of the infiltration trench BMP will rest with the property owner. Owner information is as follows:

McCrometer, Inc.
3145 W. Stetson Avenue
Hemet, CA 92545
(951) 652-6811
Attn: Rob Collier

Funding for maintenance will be provided by the owner.

III. Summary of Drainage Management Areas and Stormwater BMPs

1. Drainage Areas: The WQMP site map (Exhibit A.3) shows the site areas tributary to the infiltration trench BMP. Pervious and impervious areas are color coded by DMA designation.

2. Structural Post Construction BMPs: An Infiltration trench has been designed to provide for Vbmp for the impervious surfaces. See the project grading plan in Appendix 2. Runoff enters the trench through surface flow. Flows in excess of the capacity of the trench will discharge to the adjacent street.

3. Self-retaining Areas: Planter areas designed throughout the site, are considered self-retaining. Self-retaining areas require weekly landscape maintenance performed and funded by the owner.

IV. Stormwater BMP Design Documentation

An infiltration trench was designed to provide for Vbmp as specified in the WQMP. The construction drawing for the grading is included in Appendix 2.

V. Maintenance Schedule

MAINTENANCE SCHEDULE

BMP/Source Control	Inspection Interval/Activity	Maintenance Activity/Reference
Landscape (Self-Retaining)	Weekly	Weekly Clean area of debris, mow or trim as applicable. Remove all clippings or trimmings from the planter areas. Replace bark if applicable. See SC-73 in Appendix 10 for detailed protocols.
Parking Lot/Sidewalks	Site Walk Daily	Weekly, or as dictated by the daily visual inspections. Pick up debris and litter. Capture debris before it enters the infiltration trenches during washing. See SC-71 in Appendix 10.
Infiltration Trench	Weekly: Look for erosion, standing water and dead vegetation After storm event: Inspect areas for ponding Annually: Inspect inlets to basins, connector pipes and outlets to the street	Weekly: Remove trash and debris. Maintain vegetation (see SC-73, Appendix 10) and remove clippings. Replace damaged grass and/or plants. Repair trench cover as necessary. Clean observation pipe and outlets to restore functionality in each infiltration trench. Clean vegetation from, in and around the storm drain overflows.

If drainage in the trench is not achieved within 72 hours, gravel shall be removed and washed or replaced. A minimum 5.0' filter strip of landscaping shall be maintained between the trench and hardscape discharge throughout the life of the project.

The employee charged with inspection and the landscape contractor retained to provide maintenance services shall be made familiar with the project specific WQMP. Inspection and maintenance of the source control/BMPs shall start upon completion of the project.

VI. Source Control

1. Landscaping: Landscaping shall be designed to minimize irrigation and runoff. Depressed landscape areas shall include plants that are tolerant of saturated soil conditions. Maintain landscaping using minimum or no pesticides. See CASQA Fact Sheet SC-73 in Appendix 10.

2. Parking Lots/Sidewalks: Sweep parking lots and sidewalks weekly to prevent accumulation of litter and debris. Collect debris from washing/power washing before it discharges to the infiltration trench. See CASQA Fact Sheet SC-71 in Appendix 10.

Appendix 10: Educational Materials

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

3.2 INFILTRATION TRENCH

Type of BMP	LID - Infiltration
Treatment Mechanisms	Infiltration, Evapotranspiration (when vegetated), Evaporation
Maximum Drainage Area	10-acres
Other Names	None

Description

Infiltration trenches are shallow excavated areas that are filled with rock material to create a subsurface reservoir layer. The trench is sized to store the design capture volume, V_{BMP}, in the void space between the rocks. Over a period of 72 hours, the stormwater infiltrates through the bottom of the trench into the surrounding soil. Infiltration basins are highly effective in removing all targeted pollutants from stormwater runoff.

Figure 1 shows the components of an infiltration trench. The section shows the reservoir layer and observation well, which is used to monitor water depth. An overflow pipe that is used to bypass flows once the trench fills with stormwater is also shown.

Site Considerations

Location

The use of infiltration trenches may be restricted by concerns over groundwater contamination, soil permeability, and clogging at the site. See the applicable WQMP for any specific feasibility considerations for using infiltration BMPs. Where this BMP is being used, the soil beneath the basin must be thoroughly evaluated in a geotechnical report since the underlying soils are critical to the basin's long term performance. These basins may not be appropriate for the following site conditions:

- Industrial sites or locations where spills of toxic materials may occur.
- Sites with very low soil infiltration rates.
- Sites with high groundwater tables or excessively high soil infiltration rates, where pollutants can affect groundwater quality.
- Sites with unstabilized soil or construction activity upstream.
- On steeply sloping terrain.
- Infiltration trenches located in a fill condition should refer to Appendix A of this Handbook for details on special requirements/restrictions.

This BMP has a flat surface area, so it may be challenging to incorporate into steeply sloping terrain.

Setbacks

Always consult your geotechnical engineer for site specific recommendations regarding setbacks for infiltration trenches. Recommended setbacks are needed to protect buildings, walls, onsite or nearby wells, streams, and tanks. Setbacks should be considered early in the design process as they affect where infiltration facilities may be placed and how deep they are allowed to be. For instance, depth setbacks can dictate fairly shallow facilities that will have a larger footprint and, in some cases, may make an infiltration trench infeasible. In that instance, another BMP must be selected.

In addition to setbacks recommended by the geotechnical engineer, infiltration trenches must be set back:

- 10 feet from the historic high groundwater mark (measured vertically from the bottom of the trench, as shown in Figure 1)
- 5 feet from bedrock or impermeable surface layer (measured vertically from the bottom of the trench, as shown in Figure 1)
- From all mature tree drip lines as indicated in Figure 1
- 100 feet horizontally from wells, tanks or springs

Setbacks to walls and foundations must be included as part of the Geotechnical Report.

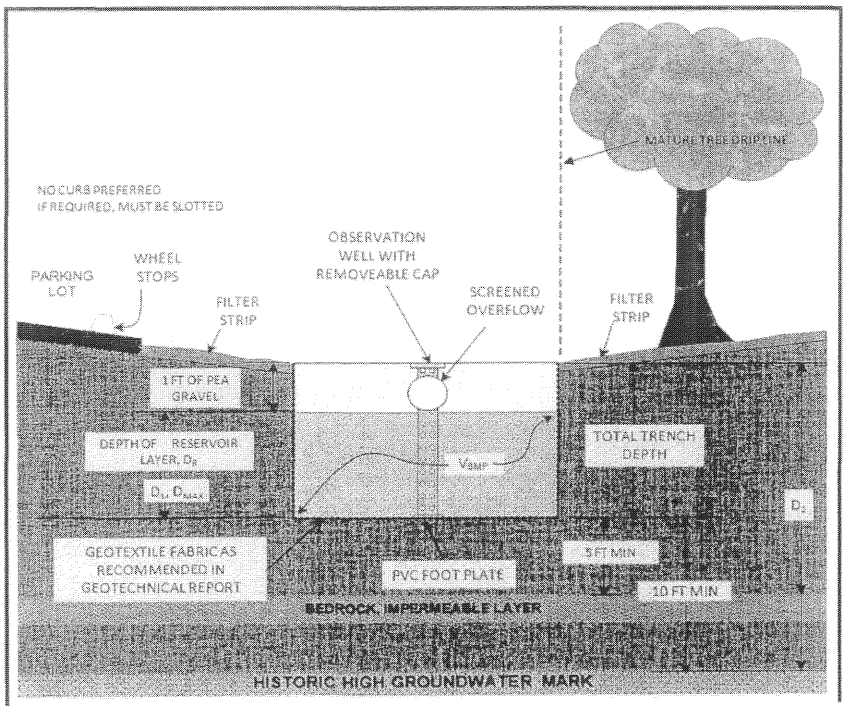


Figure 1 Section View of an Infiltration Trench

Sediment Control

Infiltration BMPs have the risk of becoming plugged over time. To prevent this, sediment must be removed before stormwater enters the trench. Both sheet and concentrated flow types have requirements that should be considered in the design of an infiltration trench.

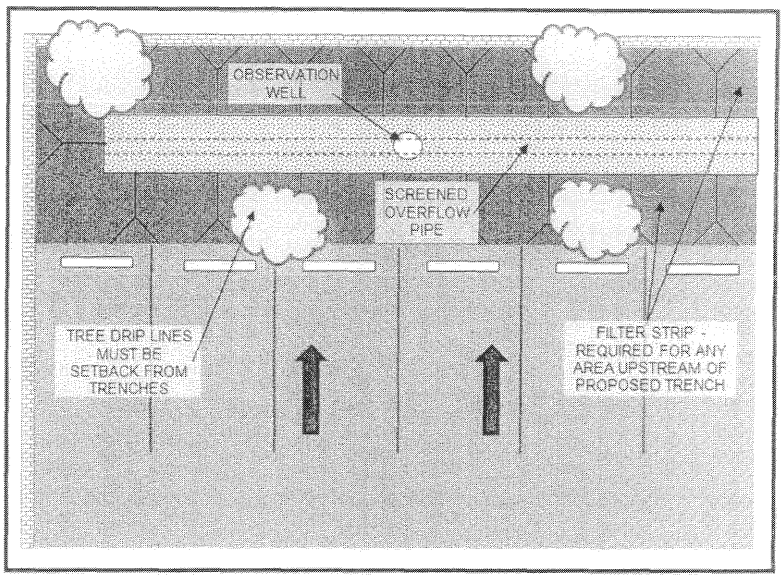


Figure 2 Plan View, Sheet Type Flows

When sheet type flows approach the trench along its length (as illustrated in Figure 2), a vegetated filter strip should be placed between the trench and the upstream drainage area. The filter strip must be a minimum of 5 feet wide and planted with grasses (preferably native) or covered with mulch.

Concentrated flows require a different approach. A 2004 Caltrans BMP Retrofit Report found that flow spreaders recommended in many water quality manuals are ineffective in distributing concentrated flows. As such, concentrated flows should either be directed toward a traditional vegetated swale (as shown on the right side of Figure 3) or to catch basin filters that can remove litter and sediment. Catch basins must discharge runoff as surface flow above the trench; they cannot outlet directly into the reservoir layer of the infiltration trench. If catch basins are used, the short and long term costs of the catch basin filters should be considered.

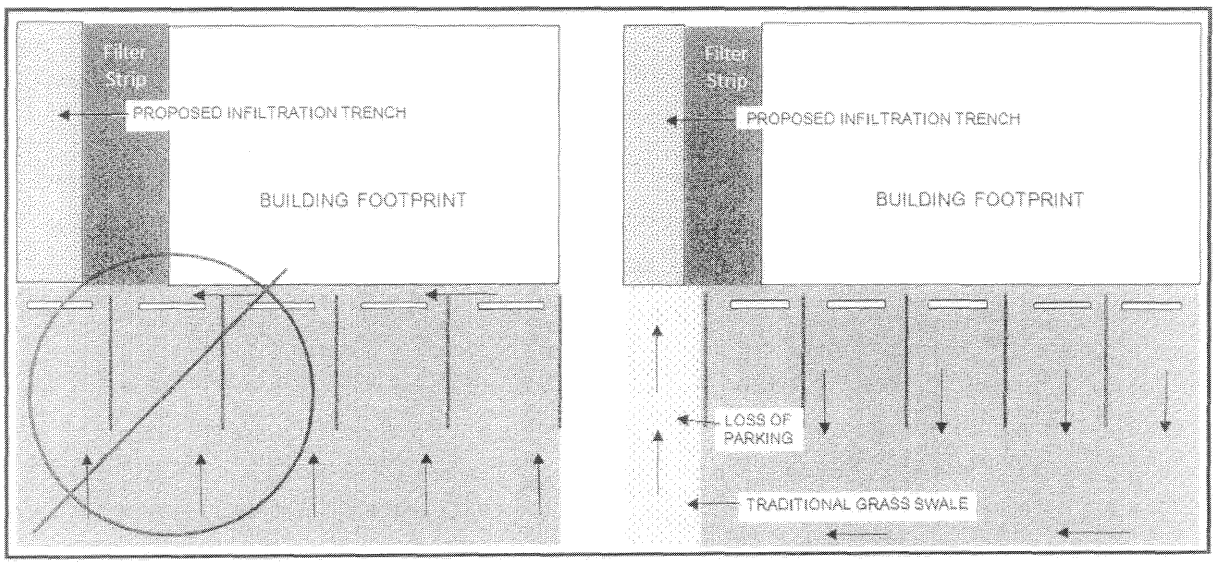


Figure 3 Plan View, Concentrated Flows

Additional Considerations

Class V Status

In certain circumstances, for example, if an infiltration trench is "deeper than its widest surface dimension," or includes an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground, it would probably be considered by the EPA to be a Class V injection well. Class V injection wells are subject to regulations and reporting requirements via the Underground Injection Control (UIC) Program. To ensure that infiltration trenches are not considered Class V wells, the design procedure in this manual requires that the trench not be deeper than it is wide.

Geotechnical Report

A geotechnical report must be included for all infiltration trenches. Appendix A of this Handbook entitled "Infiltration Testing Guidelines", details which types of infiltration tests are acceptable and how many tests or boring logs must be performed. A Geotechnical Report must be submitted in support of all infiltration trenches. Setbacks to walls and foundations must be included in the Geotechnical Report.

Observation Wells

One or more observation wells should be provided. The observation well consists of a vertical section of perforated pipe, 4 to 6 inches in diameter, installed flush with top of trench on a foot plate and have a locking, removable cap.

Overflow

An overflow route is needed to bypass storm flows larger than the V_{BMP} or in the event of clogging. Overflow systems must connect to an acceptable discharge point such as a downstream conveyance system.

Maintenance Access

Normal maintenance of an infiltration trench includes maintenance of the filter strip as well as debris and trash removal from the surface of the trench and filter strip. More substantial maintenance requiring vehicle access may be required every 5 to 10 years. Vehicular access along the length of the swale should be provided to all infiltration trenches. It is preferred that trenches be placed longitudinally along a street or adjacent to a parking lot area. These conditions have high visibility which makes it more likely that the trench will be maintained on a regular basis.

Inspection and Maintenance

Schedule	Inspection and Maintenance Activity
Every two weeks, or as often as necessary to maintain a pleasant appearance	- Maintain adjacent landscaped areas. Remove clippings from landscape maintenance activities. - Remove trash & debris
3 days after Major Storm Events	- Check for surface ponding. If ponding is only above the trench, remove, wash and replace pea gravel. May be needed every 5-10 years. - 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.

Design and Sizing Criteria

Design Parameter	Design Criteria
Design Volume	V_{BMP}
Design Drawdown time	72 hrs
Maximum Tributary Drainage Area	10 acres
Maximum Trench Depth	8.0 ft
Width to Depth Ratio	Width must be greater than depth
Reservoir Rock Material	AASHTO #3 or 57 material or a clean, washed aggregate 1 to 3-in diameter equivalent
Filter Strip Width	Minimum of 5 feet in the direction of flow for all areas draining to trench
Filter Strip Slope	Max slope = 1%
Filter Strip Materials	Mulch or grasses (non-mowed variety preferred)
Historic High Groundwater Mark	10 ft or more below bottom of trench
Bedrock/Impermeable Layer Setback	5 ft or more below bottom of trench
Tree Setbacks	Mature tree drip line must not overhang the trench
Trench Lining Material	As recommended in Geotechnical Report

Infiltration Trench Design Procedure

1. Enter the area tributary to the trench, maximum drainage area is 10 acres.

2. Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

3. Enter the site infiltration rate, found in the geotechnical report.

4. Enter the factor of safety from Table 1 of Appendix A, Infiltration Testing.

5. Determine the maximum reservoir layer depth, D_{MAX}. The value is obtained by taking the smaller of two depth equations but may never exceed 8 feet. The first depth, D_1 is related to the infiltration rate of the soil. The second depth, D_2, is related to required setbacks to groundwater, bedrock/impermeable layer. These parameters are shown in Figure 1.

   Calculate D_1.

   $$D_1 = \frac{I \times FS \times 72}{12 \times n \times 100}$$

   Where:
   - I = site infiltration rate (in/hr), found in the geotechnical report
   - FS = factor of safety, refer to Appendix A - Infiltration Testing
   - n = porosity of the trench material, 40%

   Calculate D_2. Enter the depth to the seasonal high groundwater and bedrock/impermeable layer measured from the finished grade. The spreadsheet checks the minimum setbacks shown in Figure 1 and selects the smallest value. The equations are listed below for those doing hand calculations.

   Minimum Setbacks (includes 1 foot for pea gravel):
   - = Depth to historic high groundwater mark - 11 feet
   - = Depth to impermeable layer - 6 feet

   D_2 is the smaller of the two values.

   D_{MAX} is the smaller value of D_1 and D_2, and must be less than or equal to 8 feet.

6. Enter the proposed reservoir layer depth, D_R. The value must be no greater than D_{MAX}.

7. Find the required surface area of the trench, A_S. Once D_R is entered, the spreadsheet will calculate the corresponding depth of water and the minimum surface area of the trench.

$$\text{Minimum Area} = \text{Design } d_W \times \frac{\text{Design Infiltration Rate}}{100} \times \text{Tributary Area} = \frac{\text{Design Volume}}{\text{Minimum Area}}$$

Where:

A_S = minimum area required (ft^2)
V_{BMP} = BMP storage volume (ft^3)
Design d_W = Depth of water in reservoir layer (ft)

8. Enter the proposed design surface area; it must be greater than the minimum surface area.

9. Calculate the minimum trench width. This is to ensure that EPA's Class V Injection well status is not triggered. The total trench depth (shown in Figure 1) includes the upper foot where the overflow pipe is located. The minimum surface dimension is D_R + 1 foot.

Additional Items

The following items detailed in the preceding sections should also be addressed in the design.

- ☐ Sediment Control
- ☐ Geotechnical Report
- ☐ Observation well(s)
- ☐ Overflow

Reference Material

California Stormwater Quality Association. California Stormwater BMP Handbook New Development and Redevelopment. 2003.

County of Los Angeles Department of Public Works. Stormwater BMP Best Management Practice Design and Maintenance Manual for Publicly Maintained Storm Drain Systems. Los Angeles, CA, 2009.

LandSaver Stormwater Management System. Tech Sheet - Porosity of Structural Backfill. 2006.

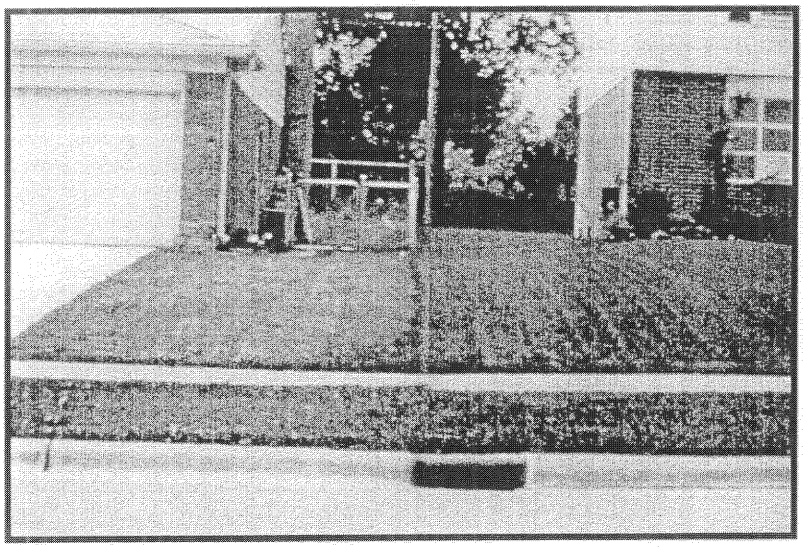
United States Environmental Protection Agency. Office of Water, Washington D.C. Storm Water Technology Fact Sheet Vegetated Swales. 1999.

United States Environmental Protection Agency. Office of Water. Memorandum on Clarification on Which Stormwater Infiltration Practices/technologies Have the Potential to Be Regulated as "Class V" Wells by Underground Injection Control Program. By Linda Boornazian and Steve Heare. Washington D.C., 2008.

Ventura Countywide Stormwater Quality Management Program. Land Development Guidelines Biofilter Fact Sheet. Ventura, CA, 2001.

Ventura Countywide Stormwater Quality Management Program. Technical Guidance Manual for Stormwater Quality Control Measures. Ventura, CA, 2002.

Efficient Irrigation SD-12



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- 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.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- 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.

Other Resources

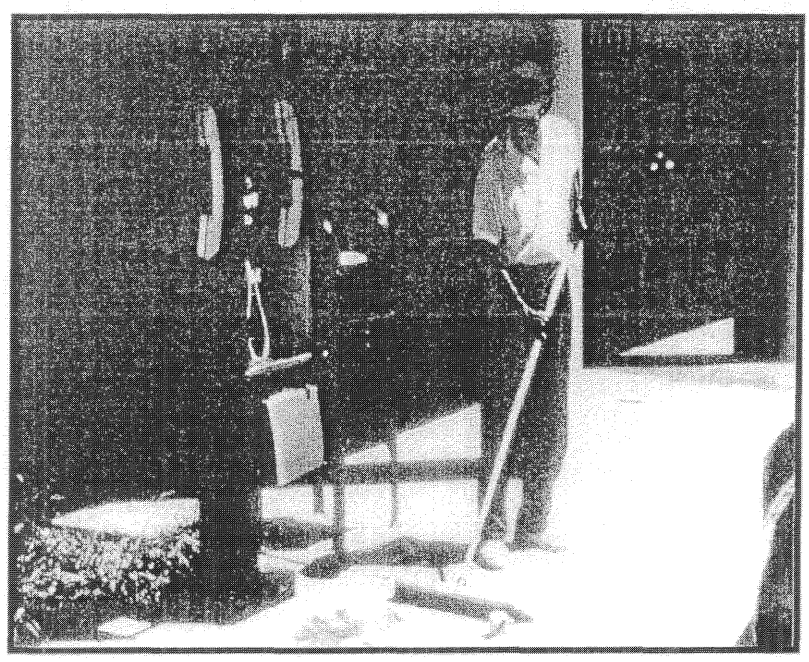
A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

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.

Plaza and Sidewalk Cleaning SC-71



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Pollutants on sidewalks and other pedestrian traffic areas and plazas are typically due to littering and vehicle use. This fact sheet describes good housekeeping practices that can be incorporated into the municipality's existing cleaning and maintenance program.

Approach

Pollution Prevention

- Use dry cleaning methods whenever practical for surface cleaning activities.
- Use the least toxic materials available (e.g. water based paints, gels or sprays for graffiti removal).

Suggested Protocols

Surface Cleaning

- Regularly broom (dry) sweep sidewalk, plaza and parking lot areas to minimize cleaning with water.
- Dry cleanup first (sweep, collect, and dispose of debris and trash) when cleaning sidewalks or plazas, then wash with or without soap.
- Block the storm drain or contain runoff when cleaning with water. Discharge wash water to landscaping or collect water and pump to a tank or discharge to sanitary sewer if allowed. (Permission may be required from local sanitation district.)

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Block the storm drain or contain runoff when washing parking areas, driveways or drive-throughs. Use absorbents to pick up oil; then dry sweep. Clean with or without soap. Collect water and pump to a tank or discharge to sanitary sewer if allowed. Street Repair and Maintenance.

Graffiti Removal

- Avoid graffiti abatement activities during rain events.
- Implement the procedures under Painting and Paint Removal in SC-70 Roads, Streets, and Highway Operation and Maintenance fact sheet when graffiti is removed by painting over.
- Direct runoff from sand blasting and high pressure washing (with no cleaning agents) into a dirt or landscaped area after treating with an appropriate filtering device.
- Plug nearby storm drain inlets and vacuum/pump wash water to the sanitary sewer if authorized to do so if a graffiti abatement method generates wash water containing a cleaning compound (such as high pressure washing with a cleaning compound). Ensure that a non-hazardous cleaning compound is used or dispose as hazardous waste, as appropriate.

Surface Removal and Repair

- Schedule surface removal activities for dry weather if possible.
- Avoid creating excess dust when breaking asphalt or concrete.
- Take measures to protect nearby storm drain inlets prior to breaking up asphalt or concrete (e.g. place hay bales or sand bags around inlets). Clean afterwards by sweeping up as much material as possible.
- Designate an area for clean up and proper disposal of excess materials.
- Remove and recycle as much of the broken pavement as possible to avoid contact with rainfall and stormwater runoff.
- When making saw cuts in pavement, use as little water as possible. Cover each storm drain inlet completely with filter fabric during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains or evaporates, shovel or vacuum the slurry residue from the pavement or gutter and remove from site.
- Always dry sweep first to clean up tracked dirt. Use a street sweeper or vacuum truck. Do not dump vacuumed liquid in storm drains. Once dry sweeping is complete, the area may be hosed down if needed. Wash water should be directed to landscaping or collected and pumped to the sanitary sewer if allowed.

Concrete Installation and Repair

- Schedule asphalt and concrete activities for dry weather.

- Take measures to protect any nearby storm drain inlets and adjacent watercourses, prior to breaking up asphalt or concrete (e.g. place san bags around inlets or work areas).
- Limit the amount of fresh concrete or cement mortar mixed, mix only what is needed for the job.
- Store concrete materials under cover, away from drainage areas. Secure bags of cement after they are open. Be sure to keep wind-blown cement powder away from streets, gutters, storm drains, rainfall, and runoff.
- Return leftover materials to the transit mixer. Dispose of small amounts of hardened excess concrete, grout, and mortar in the trash.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile, or dispose in the trash.
- Protect applications of fresh concrete from rainfall and runoff until the material has dried.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- Wash concrete trucks off site or in designated areas on site designed to preclude discharge of wash water to drainage system.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide litter receptacles in busy, high pedestrian traffic areas of the community, at recreational facilities, and at community events.
- Cover litter receptacles and clean out frequently to prevent leaking/spillage or overflow.
- Clean parking lots on a regular basis with a street sweeper.

Training

- Provide regular training to field employees and/or contractors regarding surface cleaning and proper operation of equipment.
- Train employee and contractors in proper techniques for spill containment and cleanup.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Limitations related to sweeping activities at large parking facilities may include current sweeper technology to remove oil and grease.
- Surface cleaning activities that require discharges to the local sewering agency will require coordination with the agency.
- Arrangements for disposal of the swept material collected must be made, as well as accurate tracking of the areas swept and the frequency of sweeping.

Requirements

Costs

- The largest expenditures for sweeping and cleaning of sidewalks, plazas, and parking lots are in staffing and equipment. Sweeping of these areas should be incorporated into street sweeping programs to reduce costs.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

Community education, such as informing residents about their options for recycling and waste disposal, as well as the consequences of littering, can instill a sense of citizen responsibility and potentially reduce the amount of maintenance required by the municipality.

Additional BMPs that should be considered for parking lot areas include:

- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low concentrations.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Structural BMPs such as storm drain inlet filters can be very effective in reducing the amount of pollutants discharged from parking facilities during periods of rain.

References and Resources

Bay Area Stormwater Management Agencies Association (BASMAA). 1996. Pollution From Surface Cleaning Folder http://www.basmaa.org

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

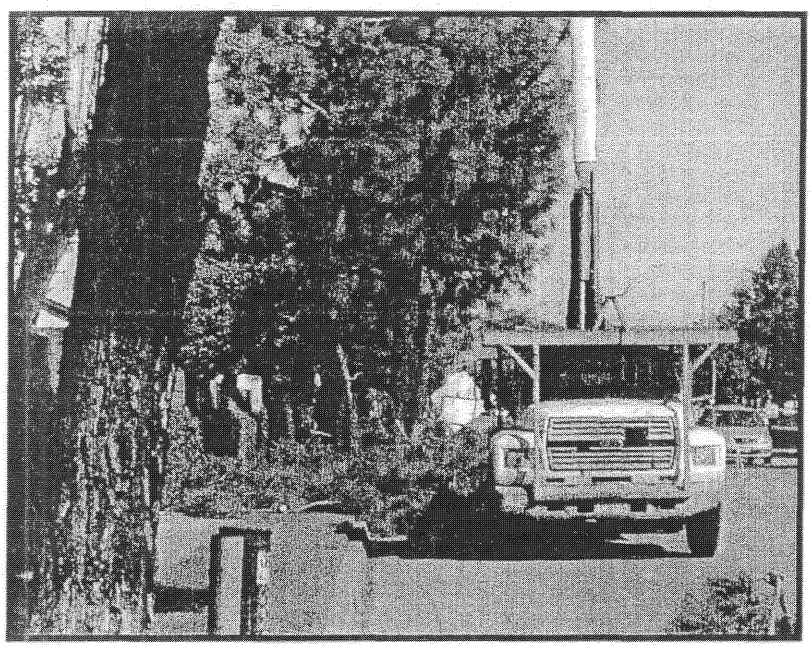
Orange County Stormwater Program
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

Santa Clara Valley Urban Runoff Pollution Prevention Program. Maintenance Best Management Practices for the Construction Industry. Brochures: Landscaping, Gardening, and Pool; Roadwork and Paving; and Fresh Concrete and Mortar Application. June 2001.

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Plan. 2001. Municipal Activities Model Program Guidance. November.

Landscape Maintenance SC-73



Objectives

- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	
Oxygen Demanding	☑

Description

Landscape maintenance activities include vegetation removal; herbicide and insecticide application; fertilizer application; watering; and other gardening and lawn care practices. Vegetation control typically involves a combination of chemical (herbicide) application and mechanical methods. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. The major objectives of this BMP are to minimize the discharge of pesticides, herbicides and fertilizers to the storm drain system and receiving waters; prevent the disposal of landscape waste into the storm drain system by collecting and properly disposing of clippings and cuttings, and educating employees and the public.

Approach

Pollution Prevention

- Implement an integrated pest management (IPM) program. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools.
- Choose low water using flowers, trees, shrubs, and groundcover.
- Consider alternative landscaping techniques such as naturescaping and xeriscaping.
- Conduct appropriate maintenance (i.e. properly timed fertilizing, weeding, pest control, and pruning) to help preserve the landscapes water efficiency.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Consider grass cycling (grass cycling is the natural recycling of grass by leaving the clippings on the lawn when mowing. Grass clippings decompose quickly and release valuable nutrients back into the lawn).

Suggested Protocols

Mowing, Trimming, and Weeding

- Whenever possible use mechanical methods of vegetation removal (e.g mowing with tractor-type or push mowers, hand cutting with gas or electric powered weed trimmers) rather than applying herbicides. Use hand weeding where practical.
- Avoid loosening the soil when conducting mechanical or manual weed control, this could lead to erosion. Use mulch or other erosion control measures when soils are exposed.
- Performing mowing at optimal times. Mowing should not be performed if significant rain events are predicted.
- Mulching mowers may be recommended for certain flat areas. Other techniques may be employed to minimize mowing such as selective vegetative planting using low maintenance grasses and shrubs.
- Collect lawn and garden clippings, pruning waste, tree trimmings, and weeds. Chip if necessary, and compost or dispose of at a landfill (see waste management section of this fact sheet).
- Place temporarily stockpiled material away from watercourses, and berm or cover stockpiles to prevent material releases to storm drains.

Planting

- Determine existing native vegetation features (location, species, size, function, importance) and consider the feasibility of protecting them. Consider elements such as their effect on drainage and erosion, hardiness, maintenance requirements, and possible conflicts between preserving vegetation and the resulting maintenance needs.
- Retain and/or plant selected native vegetation whose features are determined to be beneficial, where feasible. Native vegetation usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Consider using low water use groundcovers when planting or replanting.

Waste Management

- Compost leaves, sticks, or other collected vegetation or dispose of at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Place temporarily stockpiled material away from watercourses and storm drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.

- Avoid landscape wastes in and around storm drain inlets by either using bagging equipment or by manually picking up the material.

Irrigation

- Where practical, use automatic timers to minimize runoff.
- Use popup sprinkler heads in areas with a lot of activity or where there is a chance the pipes may be broken. Consider the use of mechanisms that reduce water flow to sprinkler heads if broken.
- Ensure that there is no runoff from the landscaped area(s) if re-claimed water is used for irrigation.
- If bailing of muddy water is required (e.g. when repairing a water line leak), do not put it in the storm drain; pour over landscaped areas.
- Irrigate slowly or pulse irrigate to prevent runoff and then only irrigate as much as is needed.
- Apply water at rates that do not exceed the infiltration rate of the soil.

Fertilizer and Pesticide Management

- Utilize a comprehensive management system that incorporates integrated pest management (IPM) techniques. There are many methods and types of IPM, including the following:
  - Mulching can be used to prevent weeds where turf is absent, fencing installed to keep rodents out, and netting used to keep birds and insects away from leaves and fruit.
  - Visible insects can be removed by hand (with gloves or tweezers) and placed in soapy water or vegetable oil. Alternatively, insects can be sprayed off the plant with water or in some cases vacuumed off of larger plants.
  - Store-bought traps, such as species-specific, pheromone-based traps or colored sticky cards, can be used.
  - Slugs can be trapped in small cups filled with beer that are set in the ground so the slugs can get in easily.
  - In cases where microscopic parasites, such as bacteria and fungi, are causing damage to plants, the affected plant material can be removed and disposed of (pruning equipment should be disinfected with bleach to prevent spreading the disease organism).
  - Small mammals and birds can be excluded using fences, netting, tree trunk guards.
  - Beneficial organisms, such as bats, birds, green lacewings, ladybugs, praying mantis, ground beetles, parasitic nematodes, trichogramma wasps, seed head weevils, and spiders that prey on detrimental pest species can be promoted.
- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.

- Use pesticides only if there is an actual pest problem (not on a regular preventative schedule).
- Do not use pesticides if rain is expected. Apply pesticides only when wind speeds are low (less than 5 mph).
- Do not mix or prepare pesticides for application near storm drains.
- Prepare the minimum amount of pesticide needed for the job and use the lowest rate that will effectively control the pest.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Calibrate fertilizer and pesticide application equipment to avoid excessive application.
- Periodically test soils for determining proper fertilizer use.
- Sweep pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Purchase only the amount of pesticide that you can reasonably use in a given time period (month or year depending on the product).
- Triple rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Dispose of empty pesticide containers according to the instructions on the container label.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- Inspect pesticide/fertilizer equipment and transportation vehicles daily.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution. Pesticide application must be under the supervision of a California qualified pesticide applicator.
- Train/encourage municipal maintenance crews to use IPM techniques for managing public green areas.
- Annually train employees within departments responsible for pesticide application on the appropriate portions of the agency's IPM Policy, SOPs, and BMPs, and the latest IPM techniques.

- Employees who are not authorized and trained to apply pesticides should be periodically (at least annually) informed that they cannot use over-the-counter pesticides in or around the workplace.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a know in location
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- The Federal Pesticide, Fungicide, and Rodenticide Act and California Title 3, Division 6, Pesticides and Pest Control Operations place strict controls over pesticide application and handling and specify training, annual refresher, and testing requirements. The regulations generally cover: a list of approved pesticides and selected uses, updated regularly; general application information; equipment use and maintenance procedures; and record keeping. The California Department of Pesticide Regulations and the County Agricultural Commission coordinate and maintain the licensing and certification programs. All public agency employees who apply pesticides and herbicides in "agricultural use" areas such as parks, golf courses, rights-of-way and recreation areas should be properly certified in accordance with state regulations. Contracts for landscape maintenance should include similar requirements.
- All employees who handle pesticides should be familiar with the most recent material safety data sheet (MSDS) files.
- Municipalities do not have the authority to regulate the use of pesticides by school districts, however the California Healthy Schools Act of 2000 (AB 2260) has imposed requirements on California school districts regarding pesticide use in schools. Posting of notification prior to the application of pesticides is now required, and IPM is stated as the preferred approach to pest management in schools.

Requirements

Costs

Additional training of municipal employees will be required to address IPM techniques and BMPs. IPM methods will likely increase labor cost for pest control which may be offset by lower chemical costs.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

Waste Management

Composting is one of the better disposal alternatives if locally available. Most municipalities either have or are planning yard waste composting facilities as a means of reducing the amount of waste going to the landfill. Lawn clippings from municipal maintenance programs as well as private sources would probably be compatible with most composting facilities

Contractors and Other Pesticide Users

Municipal agencies should develop and implement a process to ensure that any contractor employed to conduct pest control and pesticide application on municipal property engages in pest control methods consistent with the IPM Policy adopted by the agency. Specifically, municipalities should require contractors to follow the agency's IPM policy, SOPs, and BMPs; provide evidence to the agency of having received training on current IPM techniques when feasible; provide documentation of pesticide use on agency property to the agency in a timely manner.

References and Resources

King County Stormwater Pollution Control Manual. Best Management Practices for Businesses. 1995. King County Surface Water Management. July. On-line: http://dnr.metrokc.gov/wlr/dss/spcm.htm

Los Angeles County Stormwater Quality Model Programs. Public Agency Activities http://ladpw.org/wmd/npdes/model_links.cfm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Orange County Stormwater Program http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Landscaping and Lawn Care. Office of Water. Office of Wastewater Management. On-line: http://www.epa.gov/npdes/menuofbmps/poll_8.htm