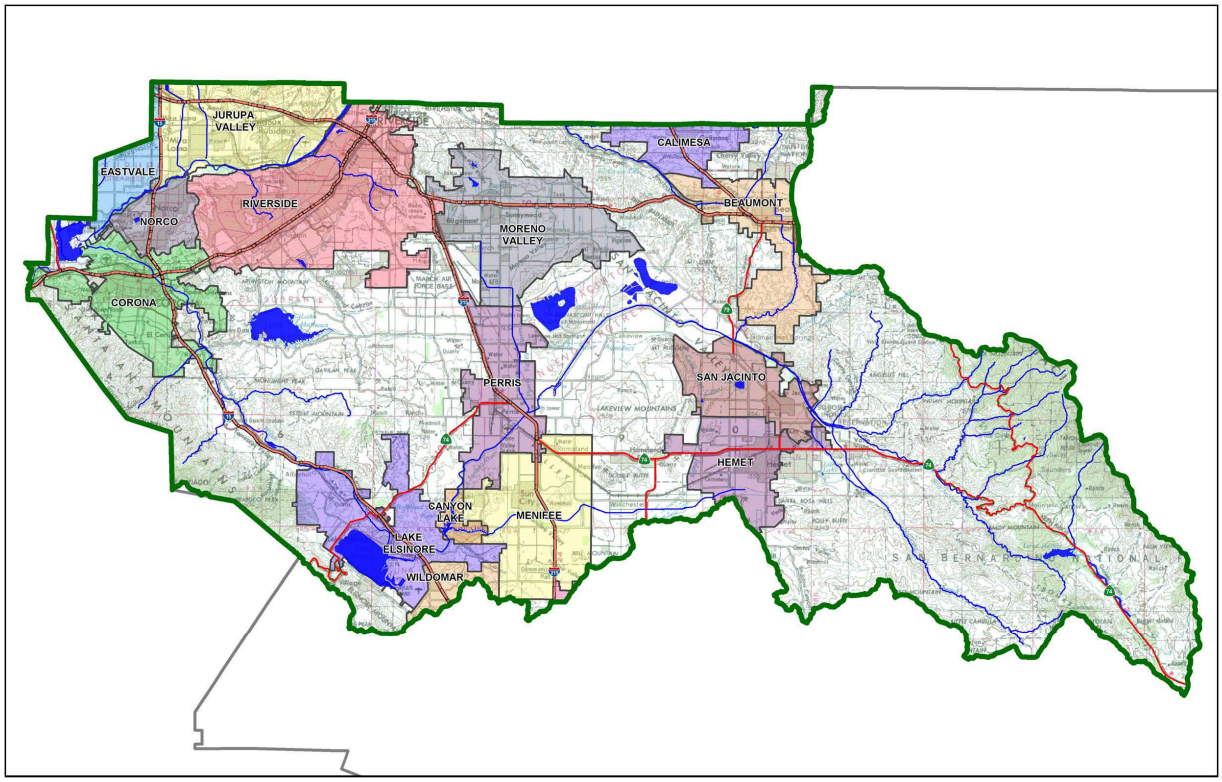
Master Project Specific Water Quality Management Plan

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

Project Title: Ramona Gateway Commerce Center

Development No: P21-00013

Design Review/Case No: P21-00013



☒ **Preliminary**
☐ **Final**

Original Date Prepared: Sept, 2021

Revision Date(s): Jan, 2022
Jul, 2022, Sept 2022

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

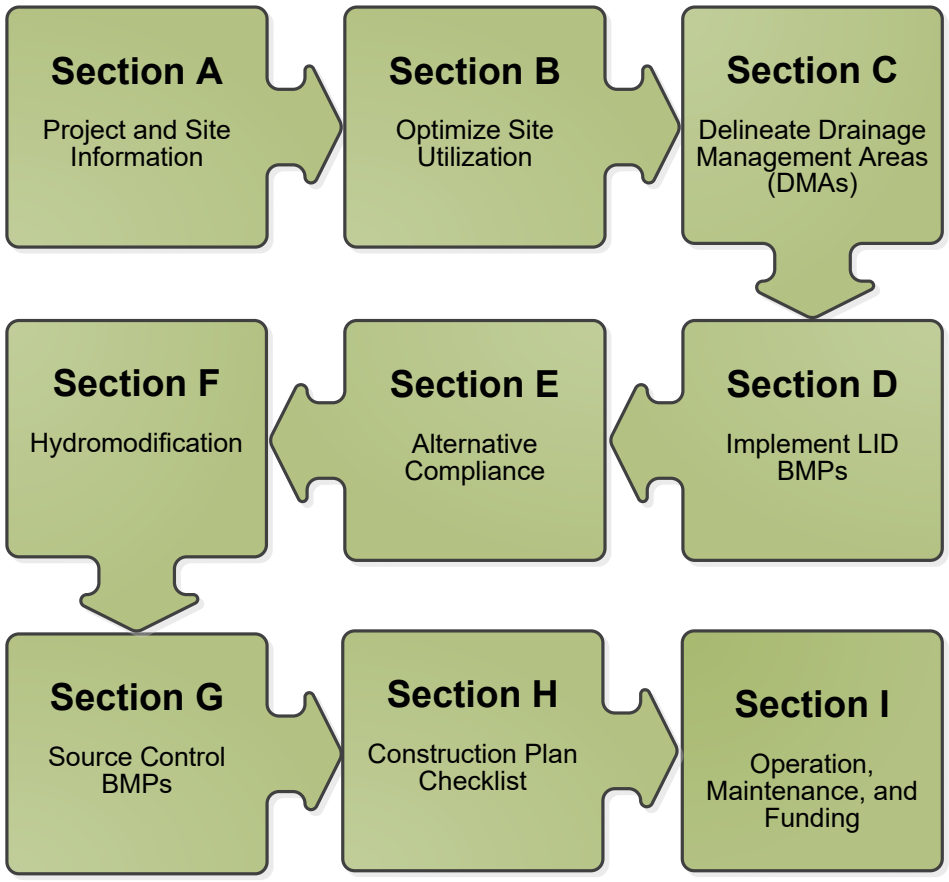
Contact Information:

Prepared for:
Perris Landco, LLC
201 Spear Street
Suite 1100
San Francisco, CA
312-576-4291

Prepared by:
PBLA Engineering, Inc.
1809 E. Dyer Rd., Ste 301
Santa Ana, CA 92705
888-714-9642

A Brief Introduction

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



OWNER'S CERTIFICATION

This Master Project-Specific Water Quality Management Plan (WQMP) has been prepared for Ramona Gateway Commerce Center, by PBLA Engineering, Inc. for the Ramona Gateway Commerce Center project (P21-00013).

This WQMP is intended to comply with the requirements of City of Perris for Municipal Code Section1194 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 Perris Water Quality Ordinance (Municipal Code Section1194).

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

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

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

Preparer's Signature	Date
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

Table of Contents

List of Tables

List of Appendices

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Light Industrial and Retail
Planning Area:	Mead Valley
Community Name:	Perris
Development Name:	Ramona Gateway Commerce Center

PROJECT LOCATION
Latitude & Longitude (DMS): 33º 50’ 34”, 117º 14’ 45”
Project Watershed and Sub-Watershed: San Jacinto, Perris Valley
Gross Acres: 50.0
APN(s): 317-120-021 317-130-017, 021, 025, 048
Map Book and Page No.: Pg 777, Grid E2

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Industrial & Retail
Proposed or Potential SIC Code(s)	4225, 4214, 5399
Area of Impervious Project Footprint (SF)	0
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	1,774,149
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 Footprint (SF)	0
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)	B
What is the Water Quality Design Storm Depth for the project?	0.58"

This is a Master PWQMP for the entire Site. Each Parcel or sub-site will be required to submit a final WQMP in concert with final grading & drainage plans for final development.

Perris Landco, LLC is proposing to develop a multi building commercial/retail and industrial project on approximately 50.0 acres of land in the City of Perris, CA. The property is located on the south side of the Ramona Expressway between Nevada Avenue and Webster Avenue 1/8 mile east of Interstate 215.

The property is vacant and unimproved. The natural drainage pattern flows generally from west to east as surface flows. The site was formerly used as agriculture but has been fallow for some time. The proposed development will consist of a retail component on the northerly 6.95 acres, and the remaining property to the south will be developed as a single industrial logistics 850,224 sf building.

Onsite drainage design will consist of various inlets at low points around the site and these inlets will connect to underground detention systems. The Industrial site will have one underground system on

each side of the building in the truck court areas, and the Retail site will have its own separate system and underground detention. The detention systems will capture the required Water Quality volume as well as attenuate peak storm flows to ensure that the developed condition does not exceed the existing condition peak runoff rate. See the Appendix 6 for the calculated treatment volumes for each area.

The site is not conducive to infiltration based on the results of infiltration testing provided by the Geotechnical Engineer. The Site is designed to store the required Water Quality Volume underground and then convey that volume via pumps to be treated with a Modular Wetlands Units located on the southeast area of the retail portion and the northwest and northeast areas of the industrial portion.

Modular Wetlands Systems (MWS) operate by gravity and incorporates pretreatment & biofiltration. Stormwater and other pollutants all enter the pretreatment chamber first. The larger material remains contained within the pretreatment stage as stormwater travels through the pre-filter boxes and on to the biofiltration chamber. This design enhances treatment, prevents clogging, and expedites the maintenance process. The sizing of the MWS for each DMA area will be based on a maximum 48 hour drawdown period. The exact sizing and details for these units will be provided with final construction documents.

As water leaves the pre-filter box and enters the biofiltration chamber, it initially fills the void space at the perimeter of the biofiltration chamber. The water's horizontal force grows, pushing it inward toward the centrally located vertical drain pipe, and out to discharge. A full description and details for efficiency are provided in Appendix 6.

The conceptual site plan includes up to 37,215 sf of retail space consisting of three drive-thru restaurant buildings; two multi-tenant buildings, one of which would include a drive-thru; one coffee shop with drive-thru; one convenience store with a gas station; and one drive-thru express carwash facility. Table 3-1, Retail Building Summary, provides a breakdown of the proposed retail use. The proposed buildings would comply with the commercial development standards outlined in Table 4.0-1, Development Standards by Land Use, of the PVCCSP, including, but not limited to floor-to-area ratio (FAR) (0.75 maximum), lot coverage (50% maximum), and height requirements (45 feet maximum).

DMA Summary Table:

LOCATION WITHIN PROJECT	DMA DESIGNATION	AREA TRIBUTARY TO TREATMENT	DCV/Qbmp	BMP ID
FUELING STATION RETAIL BLD 1	A	54,514	2,043 CF	“U/G-A” & “MW-A”
DRIVE-THRU RETAIL BLD 2	B	11,827 SF	0.1 CFS	“LWU – B”
DRIVE-THRU RETAIL BLD 3	C	13,693 SF	0.1 CFS	“LWU-C”
COMMON AREA & DRIVES	D	16,697	0.1 CFS	“LWU-D”
DRIVE-THRU RETAIL BLD 4	E	18,659 SF	0.1 CFS	“LWU-E”
DRIVE-THRU RETAIL BLD 5	F	19,674 SF	0.1 CFS	“LWU-F”

LOCATION WITHIN PROJECT	DMA DESIGNATION	AREA TRIBUTARY TO TREATMENT	DCV/Qbmp	BMP ID
DRIVE-THRU RETAIL BLD 6	G	14,875 SF	0.1 CFS	"LWU-G"
DRIVE-THRU RETAIL BLD 7	H	22,484 SF	0.1 CFS	"LWU-H"
COMMON AREA & DRIVES	I	97,543 SF	4,256 CF	"U/G-I" & "MW-I"
INDUSTRIAL BLD 1 - WEST	J	905,010 SF	35,220 CF	"U/G-J" & "MW-J"
INDUSTRIAL BLD 1 - EAST	K	766,867 SF	31,519 CF	"U/G-K" & "MW-K"
COMMON AREA & DRIVES	L	12,667 SF	0.1 CFS	"LWU-L"

Fueling Station/Convenience Store

This parcel is self-managing and has separate drainage and water quality treatment systems. Fueling area is also isolated from site drainage with a trench drain and isolated sump at the downstream edge of the fueling slab.

Regional Drainage

This project is also downstream of the Perris Valley Master Plan of Drainage (MPD) Line E culvert that daylights on the eastern side of Interstate 215. The ultimate flow rate of this line delivers 1000 cfs per the aforementioned MPD onto the existing ground and is returned to a surface drainage state after the flows exit the existing box culvert. The Master Plan indicates that there will be a detention basin at the location of the Line E outlet from the freeway. The Master Planned Detention Basin is slated to be located on the property to the west of Nevada om property that is owned by a different entity, and as of current, the status of the design and construction of that basin remains unknown.

Since the Ramona Gateway Commerce Center is east of Nevada Avenue, this ultimate Line E flow is directly tributary to this project as un-detained, bulk sheet flow crossing Nevada Avenue on the western edge of the Property. To mitigate this condition, the project proponent will install a 60" RCP Storm Drain that will eventually act as the ultimate outlet storm drain line from the future detention basin. This storm drain will be designed to RCFCD standards and be transferred to the City for operation and maintenance. The storm drain will be located in Nevada at its upstream end and run northerly to the retail parcels, turn easterly and ultimately connect to the existing 60" storm drain in Ramona Expressway.

In addition to the ultimate storm drain line being installed with this project, an emergency bypass channel is planned to pick-up any remaining sheet-flow runoff that does not enter the proposed 60" storm drain and crosses over Nevada toward the project. The Nevada Avenue crossing is proposed to be a full section concrete "Arizona Crossing" that will convey excess sheet flow from the west side of Nevada to the east, and the Bypass Channel. The channel is planned to be a trapezoidal channel with an 11-foot wide bottom and 1.75:1 side slopes and will be constructed of concrete. The size and slope of the channel will safely convey this remainder flow through the site and deliver it back to Webster Avenue. At the downstream terminus of the bypass channel, there will be a stilling basin that will be

about 7 feet deep and approximately 39 feet wide. This basin calms the flows exiting the trapezoidal channel and reduces velocities dramatically before the basin is overtopped and water sheet flows to Webster Ave. Please note that this condition will occur only in the design storm 100-year event. The majority of storms will not produce enough runoff to trigger the basin overflow condition. There will also be an inlet provided at the downstream end of the channel to drain low flows to the existing storm drain in Webster Ave.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

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

A.2 Identify Receiving Waters

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

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Perris Valley MPD Line "E"	None Listed	N/A	N/A
Perris Valley Storm Drain	None Listed	body contact recreation (REC1), non-body contact recreation (REC2), warm freshwater aquatic habitat (WARM), wildlife habitat (WILD), rare, threatened or endangered species habitat (RARE)	2.7 mi
San Jacinto River Reach 3	None Listed	agricultural water supply (AGR), groundwater recharge (GWR), body contact recreation (REC1), non-body contact recreation (REC2), warm freshwater aquatic habitat (WARM), wildlife habitat (WILD), rare, threatened or endangered species habitat (RARE)	5.5 mi
Railroad Canyon / Canyon Lake	Nutrients	Municipal Domestic supply (MUN), agricultural water supply (AGR), groundwater recharge (GWR), body contact recreation (REC1), non-body contact recreation (REC2), commercial and sport fishing (COMM), warm freshwater aquatic habitat (WARM), wildlife habitat (WILD), rare, threatened or endangered species habitat (RARE)	15.1 mi

San Jacinto River Reach 1	None Listed	body contact recreation (REC1), non-body contact recreation (REC2), commercial and sport fishing (COMM), warm freshwater aquatic habitat (WARM), wildlife habitat (WILD), rare, threatened or endangered species habitat (RARE)	12.3 mi
Lake Elsinore	PCBs, Nutrients, Low Dissolved Oxygen, Toxicity, DDT	Municipal Domestic supply (MUN), agricultural water supply (AGR), groundwater recharge (GWR), body contact recreation (REC1), non-body contact recreation (REC2), commercial and sport fishing (COMM), warm freshwater aquatic habitat (WARM), wildlife habitat (WILD), rare, threatened or endangered species habitat (RARE)	25.0 mi

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 (Dependent On Tenant)	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☒ Y	☐ N
Other *(please list in the space below as required)*	☐ Y	☒ N

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

Section B: Optimize Site Utilization (LID Principles)

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

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

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

Site Optimization

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

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

Current drainage pattern directs surface flows generally west to east to approximately 400 feet south of the intersection of Ramona Expressway & Webster Avenue. The proposed development will perpetuate the existing drainage pattern.

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

This site is a former agricultural site, and the proposed development will disturb the entire site.

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

No. Measured infiltration rates were no more that 0.5 in/hr due to low permeability soils and shallow bedrock. The site design incorporates underground detention and Water Quality treatment with Modular Wetlands Units.

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

Every effort was taken to minimize impervious area and comply with Riverside County minimum requirements for parking, access, circulation, and fire requirements.

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

Retail development will incorporate run-off dispersion, the Distribution / Logistical development is more difficult to employ this effectively, but entry areas will shed toward adjacent landscape. Every effort will be employed to incorporate this design consideration in the Retail Area.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.).

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
DMA - A	Roof	11,579	Type D
DMA - A	Paving	34,800	Type D
DMA - A	Landscape	8,135	Type D
DMA - B	Roof	2400	Type D
DMA - B	Paving	8,359	Type D
DMA - B	Landscape	1,068	Type D
DMA - C	Roof	6,000	Type D
DMA - C	Paving	5,778	Type D
DMA - C	Landscape	1,915	Type D
DMA - D	Roof	0	Type D
DMA - D	Paving	11,697	Type D
DMA - D	Landscape	5,182	Type D
DMA - E	Roof	4,500	Type D
DMA - E	Paving	11,540	Type D
DMA - E	Landscape	2,619	Type D
DMA – F	Roof	4500	Type D
DMA – F	Paving	11,607	Type D
DMA - F	Landscape	3,567	Type D
DMA – G	Roof	5,500	Type D
DMA – G	Paving	6,085	Type D
DMA - G	Landscape	3,290	Type D
DMA – H	Roof	4,500	Type D
DMA – H	Paving	8,904	Type D
DMA - H	Landscape	9,080	Type D
DMA – I	Roof	0	Type D
DMA – I	Paving	88,577	Type D
DMA - I	Landscape	8,966	Type D
DMA – J	Roof	438,446	Type D
DMA – J	Paving	365,944	Type D
DMA - J	Landscape	101,182	Type D
DMA – K	Roof	419,494	Type D
DMA – K	Paving	306,547	Type D
DMA - K	Landscape	40,615	Type D
DMA – L	Roof	0	Type D
DMA – L	Paving	8,441	Type D
DMA - L	Landscape	4,226	Type D
DMA - E	Landscape	126,129	Type A

[1] *Reference Table 2-1 in the WQMP Guidance Document to populate this column*
[2] *If multi-surface provide back-up*

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

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
DMA-E	126,129	Landscape	Heads & bubblers

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]

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

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

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

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

DMA Name or ID	BMP Name or ID
DMA – A	U/G STORAGE & MODULAR WETLANDS UNITS
DMA – B	LINEAR MODULAR WETLANDS UNITS
DMA – C	LINEAR MODULAR WETLANDS UNITS
DMA – D	LINEAR MODULAR WETLANDS UNITS
DMA – E	LINEAR MODULAR WETLANDS UNITS
DMA – F	LINEAR MODULAR WETLANDS UNITS
DMA – G	LINEAR MODULAR WETLANDS UNITS
DMA – H	LINEAR MODULAR WETLANDS UNITS
DMA – I	U/G STORAGE & MODULAR WETLANDS UNITS
DMA – J	U/G STORAGE & MODULAR WETLANDS UNITS
DMA – K	U/G STORAGE & MODULAR WETLANDS UNITS
DMA – L	LINEAR MODULAR WETLANDS UNITS

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

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

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

Geotechnical Report

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

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

Infiltration Feasibility

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

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: D-1 & D-2 ALL (Rates vary between 0.3-0.5 inches / hour)		
…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: Shallow Bedrock, low permeability/ dense soils		

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 none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

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

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

Total Area of Irrigated Landscape: 6.72

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

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: 38.11

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

Enter your EIATIA factor: 0.58

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

Minimum required irrigated area: 22.1

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

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
22.1	6.72

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: ***909***

Project Type: ***Industrial / Retail***

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: ***38.11***

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

Enter your TUTIA factor: ***0.58***

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: ***22***

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)
22	909

Note: County Health Department has not authorized storm water for toilet use and therefore will not be considered.

Other Non-Potable Use Feasibility

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

N/A

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

Average Daily Demand: Projected Average Daily Use (gpd)

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

Total Area of Impervious Surfaces: Insert Area (Acres)

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

Enter the factor from Table 2-4: Enter Value

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

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

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

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

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

Select one of the following:

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

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

D.4 Feasibility Assessment Summaries

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

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
A	☐	☐	☐	☐	☒
B	☐	☐	☐	☐	☒
C	☐	☐	☐	☐	☒
D	☐	☐	☐	☐	☒
E	☐	☐	☐	☐	☒
F	☐	☐	☐	☐	☒
G	☐	☐	☐	☐	☒
H	☐	☐	☐	☐	☒
I	☐	☐	☐	☐	☒
J	☐	☐	☐	☐	☒
K	☐	☐	☐	☐	☒
L	☐	☐	☐	☐	☒

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

Infiltration is not viable as the primary BMP. Storage & bio-treatment is proposed as alternative compliance.

D.5 LID BMP Sizing

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

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*UNDERGROUND STORAGE U/G - A*		
	[A]		[B]	[C]	[A] x [C]			
A		*Roof*	*1.0*	*0.89*		*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A		*Pavement*	*1.0*	*0.89*				
A		*Landscaping*	*0.10*	*0.11*				
	229,363				173,131	0.58	8,368	8,400

Table D.3 DCV Calculations for LID BMPs

	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*UNDERGROUND STORAGE U/G - I*		
	[A]		[B]	[C]	[A] x [C]			
I		*Roof*	*1.0*	*0.89*		*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
I		*Pavement*	*1.0*	*0.89*				
I		*Landscaping*	*0.10*	*0.11*				
	905,572				728,692	0.58	35,220	65,512

Table D.3 DCV Calculations for LID BMPs

	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*UNDERGROUND STORAGE U/G - J*		
	[A]		[B]	[C]	[A] x [C]			
J		*Roof*	*1.0*	*0.89*		*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
J		*Pavement*	*1.0*	*0.89*				
J		*Landscaping*	*0.10*	*0.11*				
	766,656				652,115	0.58	31,519	65,512

Table D.3 DCV Calculations for LID BMPs

	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*UNDERGROUND STORAGE U/G - K*		
	[A]		[B]	[C]	[A] x [C]			
K		*Roof*	*1.0*	*0.89*		*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
K		*Pavement*	*1.0*	*0.89*				
K		*Landscaping*	*0.10*	*0.11*				
	54,514				42,269	0.58	2,043	2,100

[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.

All areas A - L

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

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

[(4)] Specifically petroleum hydrocarbons

[(5)] Specifically solvents

[(6)] Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

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

N/A

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
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

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

Table E.3 Treatment Control BMP Sizing

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

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document

[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document

[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12

[H] is from the Total Credit Percentage as Calculated from Table E.2 above

[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

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

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

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

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
ADS Barracuda Hydrodynamic Separator	Trash, TSS	100% trash, 50% TSS
Bio-Clean Modular Wetlands Units	All	See Product literature in Appendix 6

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

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

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

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

If Yes, HCOC criteria do not apply.

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

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

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

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

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration			
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.

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

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

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

F.2 HCOC Mitigation

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

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

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

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

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

The project is located within the Riverside County WAP mapping tool as approved April 20, 2017.

Section G: Source Control BMPs

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

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	• Maintain and periodically repaint or replace inlet markings. • Provide stormwater pollution prevention information to new site owners, lessees, or operators. • See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA

		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."
Landscape/ Outdoor Pesticide Use	• Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. • Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. • Where 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 maintenance practices in the provided Educational Material Provide IPM information to new owners, lessees and operators.
Refuse areas	• 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	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

		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
Loading Docks	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
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.
Interior Floor Drains	Interior Floor Drains shall be plumbed to Sanitary Sewer system.	Inspect and maintain drains to be free of blockage and overflow
Food Service	Outdoor Dining may occur fast food restaurants depending on final site plan at	• See "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" brochure.
Car Wash Areas	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	• 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.

		•
Fuel Dispensing Areas	Fueling areas shall have impermeable pavement (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 area1.] 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
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

Section H: Construction Plan Checklist

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

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
UG-A / MW-A	U/G STORAGE & MOD. WETLANDS	Concept Grading 4 of 7	33-50-38.67 / 117-14-41.56
LMW-B	LINEAR MODULAR WETLANDS	Grading Plan 4 of 7	33-50-38.36 / 117-14-42.14
LMW-C	LINEAR MODULAR WETLANDS	Grading Plan 4 of 7	33-50-39.34 / 117-14-43.62
LMW-D	LINEAR MODULAR WETLANDS	Grading Plan 4 of 7	33-50-39.34 / 117-14-45.39
LMW-E	LINEAR MODULAR WETLANDS	Grading Plan 4 of 7	33-50-39.35 / 117-14-46.42
LMW-F	LINEAR MODULAR WETLANDS	Grading Plan 4 of 7	33-50-39.36 /117-14-48.04
LMW-G	LINEAR MODULAR WETLANDS	Grading Plan 4 of 7	33-50-38.77 / 117-14-49.56
LMW-H	LINEAR MODULAR WETLANDS	Grading Plan 4 of 7	33-50-39.06 / 117-14-51.52
UG-I / MW-I	U/G STORAGE & MOD. WETLANDS	Grading Plan 5 of 7	33-50-37.76 / 117-14-41.99
UG-J / MW-J	U/G STORAGE & MOD. WETLANDS	Grading Plan 5 of 7	33-50-35.24 / 117-14-52.01
UG-K / MW-K	U/G STORAGE & MOD. WETLANDS	Grading Plan 5 of 7	33-50-35.28 / 117-14-38.75
LMW-L	LINEAR MODULAR WETLANDS	Grading Plan 4 of 7	33-50-37.32 / 117-114-38.63

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

Section I: Operation, Maintenance and Funding

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

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

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

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

Maintenance Mechanism:

Perris Landco, LLC
201 Spear Street
Suite 1100
San Francisco, CA
312-576-4291
Stanley Zheng

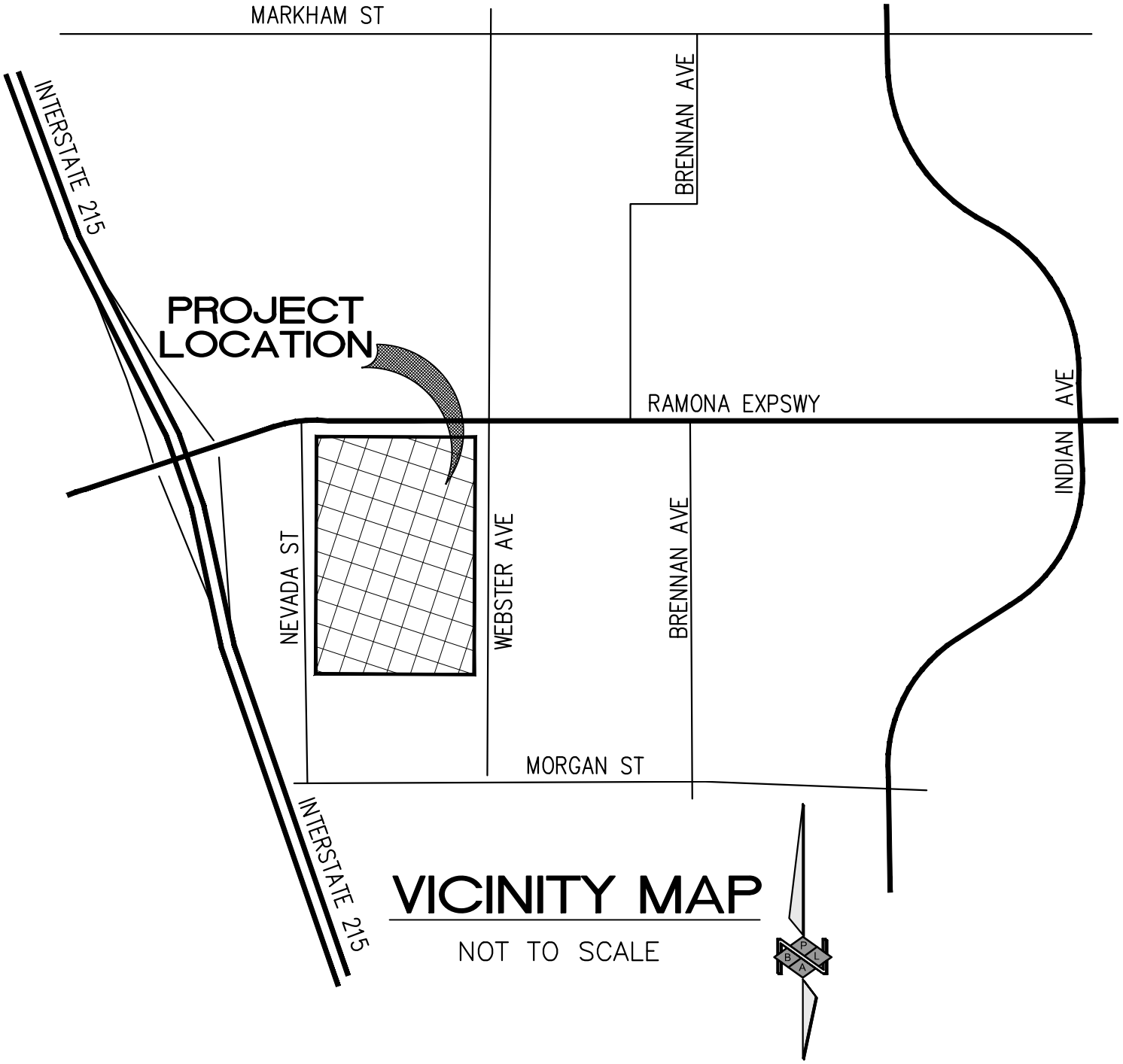
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

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

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

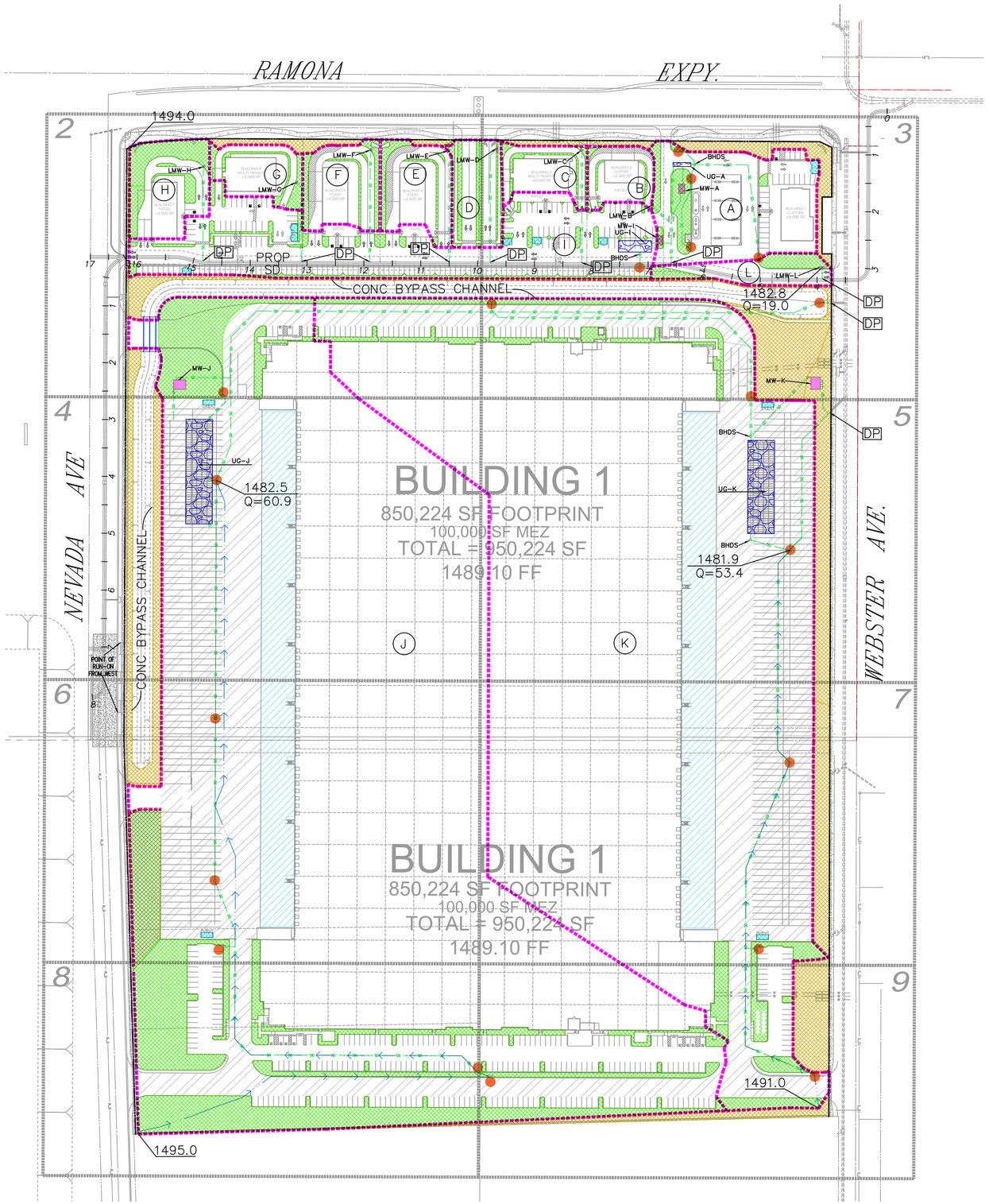


VICINITY MAP

NOT TO SCALE

RECEIVING WATERS MAP

NTS



DMA "A" DATA

RETAIL BLD 1 – FUEL/CONVENIENCE

TOTAL AREA TRIBUTARY TO TREATMENT = 54,514 SF (1.25 AC)

ROOF & CANOPY AREA: 11,579 SF
PAVED AREA: 34,800 SF
ONSITE LANDSCAPE: 8,135 SF

0.83 IMPERVIOUS RATIO

DESIGN CAPTURE VOLUME: = 2,043 CF

DMA "B" DATA

RETAIL BLD 2 – DRIVE THRU

TOTAL AREA TRIBUTARY TO TREATMENT = 11,827 SF (0.27 AC)

ROOF AREA: 2,400 SF
PAVED AREA: 8,359 SF
ONSITE LANDSCAPE: 1,068 SF

0.91 IMPERVIOUS RATIO

DESIGN Qbmp: = 0.1 CFS

DMA "C" DATA

RETAIL BLD 3 – DRIVE THRU

TOTAL AREA TRIBUTARY TO TREATMENT = 13,693 SF (0.31 AC)

ROOF AREA: 6,000 SF
PAVED AREA: 5,778 SF
ONSITE LANDSCAPE: 1,915 SF

0.86 IMPERVIOUS RATIO

DESIGN Qbmp: = 0.1 CFS

DMA "D" DATA

COMMON AREA / DRIVE AISLES

TOTAL AREA TRIBUTARY TO TREATMENT = 16,879 SF (0.39 AC)

ROOF AREA: 0 SF
PAVED AREA: 11,697 SF
ONSITE LANDSCAPE: 5,182 SF

0.69 IMPERVIOUS RATIO

DESIGN Qbmp: = 0.1 CFS

DMA "E" DATA

RETAIL BLD 4 – DRIVE THRU

TOTAL AREA TRIBUTARY TO TREATMENT = 18,659 SF (0.43 AC)

ROOF AREA: 4,500 SF
PAVED AREA: 11,540 SF
ONSITE LANDSCAPE: 2,619 SF

0.86 IMPERVIOUS RATIO

DESIGN Qbmp: = 0.1 CFS

DMA "F" DATA

RETAIL BLD 5 – DRIVE THRU

TOTAL AREA TRIBUTARY TO TREATMENT = 19,674 SF (0.45 AC)

ROOF AREA: 4,500 SF
PAVED AREA: 11,607 SF
ONSITE LANDSCAPE: 3,567 SF

0.81 IMPERVIOUS RATIO

DESIGN Qbmp: = 0.1 CFS

DMA "G" DATA

RETAIL BLD 6 – DRIVE THRU

TOTAL AREA TRIBUTARY TO TREATMENT = 14,875 SF (0.34 AC)

ROOF AREA: 5,500 SF
PAVED AREA: 6,085 SF
ONSITE LANDSCAPE: 3,290 SF

0.78 IMPERVIOUS RATIO

DESIGN Qbmp: = 0.1 CFS

DMA "H" DATA

RETAIL BLD 7 – DRIVE THRU

TOTAL AREA TRIBUTARY TO TREATMENT = 22,484 SF (0.52 AC)

ROOF AREA: 4,500 SF
PAVED AREA: 8,904 SF
ONSITE LANDSCAPE: 9,080 SF

0.60 IMPERVIOUS RATIO

DESIGN Qbmp: = 0.1 CFS

DMA "I" DATA

COMMON AREA / PARKING / DRIVE AISLES

TOTAL AREA TRIBUTARY TO TREATMENT = 97,543 SF (2.24 AC)

ROOF AREA: 0 SF
PAVED AREA: 88,577 SF
ONSITE LANDSCAPE: 8,966 SF

0.91 IMPERVIOUS RATIO

DESIGN CAPTURE VOLUME: = 3,867 CF

DMA "J" DATA

INDUSTRIAL BLD 1 – WEST SIDE

TOTAL AREA TRIBUTARY TO TREATMENT = 905,010 SF (20.78 AC)

ROOF AREA: 438,446 SF
PAVED AREA: 365,944 SF
ONSITE LANDSCAPE: 101,182 SF

0.89 IMPERVIOUS RATIO

DESIGN CAPTURE VOLUME: = 35,220 CF

DMA "K" DATA

INDUSTRIAL BLD 1 – EAST SIDE

TOTAL AREA TRIBUTARY TO TREATMENT = 766,867 SF (17.60 AC)

ROOF AREA: 419,494 SF
PAVED AREA: 306,547 SF
ONSITE LANDSCAPE: 40,615 SF

0.95 IMPERVIOUS RATIO

DESIGN CAPTURE VOLUME: = 31,519 CF

DMA "L" DATA

INDUSTRIAL BLD 1 – EAST SIDE

TOTAL AREA TRIBUTARY TO TREATMENT = 12,667 SF (0.29 AC)

ROOF AREA: 0 SF
PAVED AREA: 8,441 SF
ONSITE LANDSCAPE: 4,226 SF

0.67 IMPERVIOUS RATIO

DESIGN Qbmp: = 0.1 CFS

DMA "E" DATA

TOTAL AREA NOT TRIBUTARY TO TREATMENT = 126,129 SF (2.90 AC)

PROJECT DATA:

TOTAL NET AREA OF PROPOSED DEVELOPMENT: 2,141,645 Sq Ft (49.17 Ac)

TOTAL DISTURBED AREA: 2,141,645 Sq Ft (49.17 Ac)

CURRENT USE: VACANT WITH RUN-ON FROM RCFCD FACILITY WEST OF NEVADA
PROPOSED USE: INDUSTRIAL

WATERSHED:
RAMONA EXPRESSWAY STORM DRAIN/PERRIS VALLEY CHANNEL

SUB-WATERSHED:
CANYON LAKE/LAKE ELSINORE

NON-STRUCTURAL BMPS

- PROPERTY OWNER EDUCATION
- ACTIVITY RESTRICTIONS
- COMMON AREA LANDSCAPE MAINTENANCE
- BMP MAINTENANCE
- LOCAL INDUSTRIAL PERMIT COMPLIANCE
- SPILL CONTINGENCY PLAN
- UNIFORM FIRE CODE IMPLEMENTATION
- COMMON AREA LITTER CONTROL
- EMPLOYEE TRAINING
- ACTIVITY RESTRICTIONS
- HOUSEKEEPING OF LOADING DOCKS
- COMMON AREA CATCH BASIN INSPECTION
- PARKING LOT SWEEPING

LEGEND — STRUCTURAL / TREATMENT BMPS

- LANDSCAPE AREA EFFICIENT IRRIGATION / LANDSCAPE AREA RUNOFF-MINIMIZING DESIGN
- SELF TREATING LANDSCAPE AREAS NOT TRIBUTARY TO TREATMENT (DMA E)
- COVERED TRASH ENCLOSURE
- DOCK AREAS
- TRAILER AREAS
- CATCH BASIN STENCIL
- FLOW PATTERN
- DMA BOUNDARY
- SD — ONSITE STORM DRAIN
- MODULAR WETLANDS UNIT
- UG — UNDERGROUND STORAGE ARRAY STORMTECH CHAMBERS (OR EQUAL)
- C — DMA DESIGNATION
- MW- — MODULAR WETLANDS UNIT
- LMW- — LINEAR MODULAR WETLANDS UNIT
- BHDS — BARRACUDA HYDRODYNAMIC SEPARATOR(OR EQUAL)
- DP — DISCHARGE POINT TO PUBLIC SD

2
40 SCALE
DETAIL SHT

NOTE: ALL CATCH BASIN INLETS SHALL BE STENCILED WITH "NO DUMPING–DRAINS TO RIVER"

STENCIL
N.T.S.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

Sep 19 2022

PREPARED BY:

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE. 301
SANTA ANA, CA 92705
(888) 714-9642 • (714)389-9191 FAX

REVISIONS:

PRELIMINARY POST CONSTRUCTION MASTER BMP SITE PLAN
RAMONA GATEWAY COMMERCE CENTER
P21-00013 – PERRIS, CA

JOB NO. 139-1

SHEET 1 of 1

RAMONA EXPRESSWAY

1494.0

BUILDING 7
FOOD
±4,500 SF
1493.57–FF

BUILDING 6
MULTI-TENANT
±5,500 SF
1492.73–FF

BUILDING 5
FOOD
±4,500 SF
1491.12–FF

BUILDING 4
FOOD
±4,500 SF
1490.44–FF

LMW–H
LMW–G
LMW–F
LMW–E
LMW–D

PATIO
PATIO

DP
DP
DP

PROP SD

CONC BYPASS CHANNEL

MW–J

PUBLIC SD EASE

NEVADA AVE

SEE SHEET 3

SEE SHEET 4

LEGEND
STRUCTURAL / TREATMENT BMPS

- DMA BOUNDARY
- SD — ONSITE STORM DRAIN
- LANDSCAPE AREA EFFICIENT IRRIGATION LANDSCAPE AREA RUNOFF–MINIMIZING DESIGN
- SELF TREATING LANDSCAPE AREAS NOT TRIBUTARY TO TREATMENT (DMA E)
- COVERED TRASH ENCLOSURE
- DOCK AREAS
- TRAILER AREAS
- CATCH BASIN STENCIL
- FLOW PATTERN
- MODULAR WETLANDS UNIT
- UNDERGROUND STORAGE ARRAY STORMTECH CHAMBERS (OR EQUAL)
- (C) DMA DESIGNATION
- MW– MODULAR WETLANDS UNIT
- LMW– LINEAR MODULAR WETLANDS UNIT
- BHDS BARRACUDA HYDRODYNAMIC SEPARATOR(OR EQUAL)
- DP DISCHARGE POINT TO PUBLIC SD

RAMONA EXPSWY

2	3
4	5
6	7
8	9

NEVADA AVE — WEBSTER AVE

INDEX MAP
N.T.S.

GRAPHIC SCALE
20 0 20 20 20 20
(IN FEET)
1 inch = 40 ft.

Sep 15 2022

PREPARED BY:
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CA 92705
(888) 714-9642 • (714)389-9191 FAX

REVISIONS:

PRELIMINARY POST CONSTRUCTION MASTER BMP SITE PLAN
RAMONA GATEWAY COMMERCE CENTER
P21-00013 – PERRIS, CA

JOB NO. 139-1
SHEET 2 of 10


RAMONA EXPRESSWAY
WEBSTER AVE
SEE SHEET 2
SEE SHEET 5
BUILDING 3
MULTI-TENANT
±6,000 SF
1490.15-FF
BUILDING 2
COFFEE
±2,400 SF
1489.68-FF
BUILDING 1
C-STORE
±5,000 SF
1486.63-FF
PATIO
LMW-C
LMW-B
LMW-L
MW-A
MW-I
MW-K
UG-A
UG-I
BHDS
DP
1482.8
Q=19.0
LEGEND
STRUCTURAL / TREATMENT BMPS
DMA BOUNDARY
ONSITE STORM DRAIN
LANDSCAPE AREA EFFICIENT IRRIGATION
LANDSCAPE AREA RUNOFF-MINIMIZING DESIGN
SELF TREATING LANDSCAPE AREAS NOT TRIBUTARY TO TREATMENT (DMA E)
COVERED TRASH ENCLOSURE
DOCK AREAS
TRAILER AREAS
CATCH BASIN STENCIL
FLOW PATTERN
MODULAR WETLANDS UNIT
UNDERGROUND STORAGE ARRAY STORMTECH CHAMBERS (OR EQUAL)
DMA DESIGNATION
MW- MODULAR WETLANDS UNIT
LMW- LINEAR MODULAR WETLANDS UNIT
BHDS BARRACUDA HYDRODYNAMIC SEPARATOR(OR EQUAL)
DP DISCHARGE POINT TO PUBLIC SD
RAMONA EXPSWY
NEVADA AVE
WEBSTER AVE
INDEX MAP
N.T.S.
GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

Sep 15 2022

PREPARED BY:

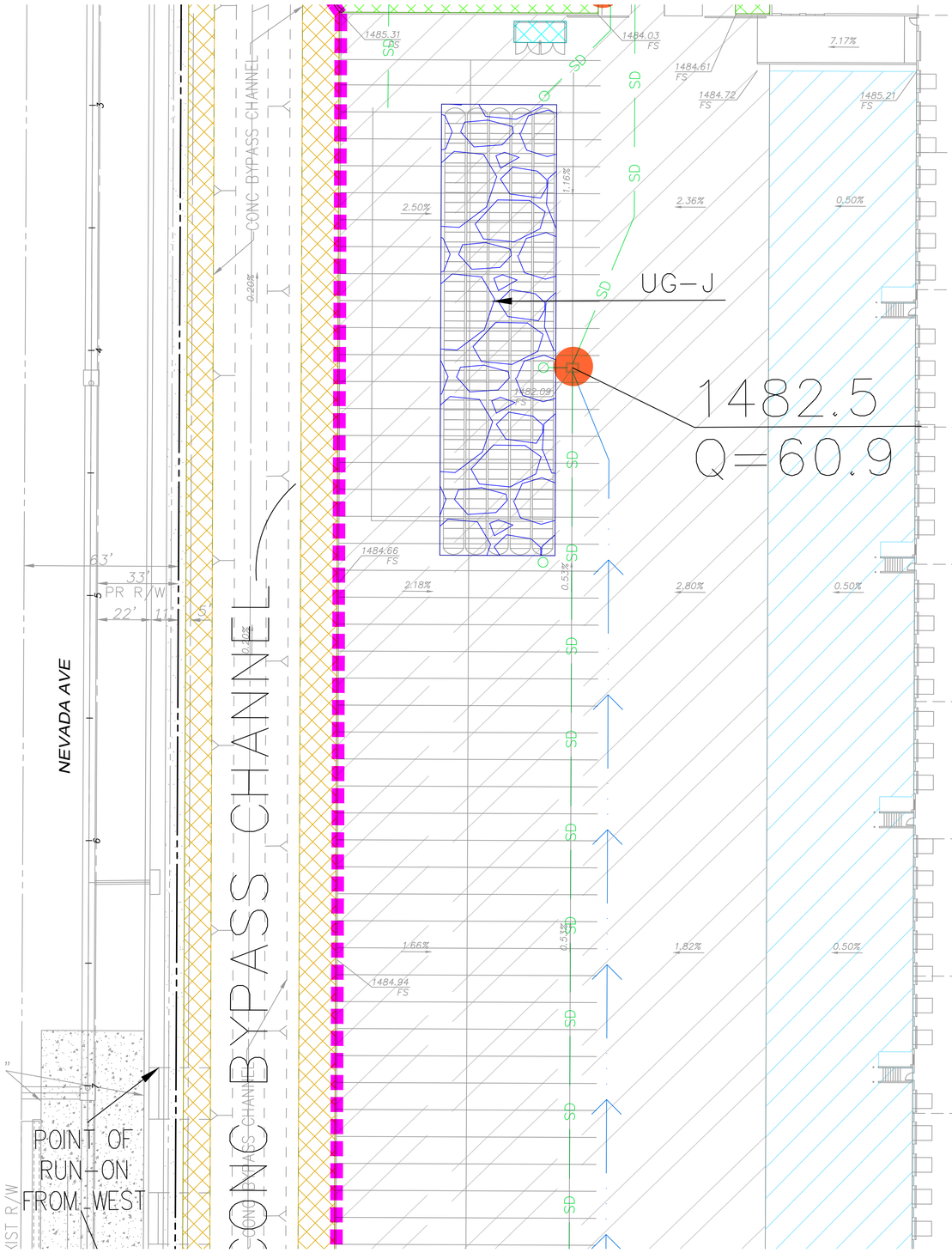
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CA 92705
(888) 714-9642 • (714)389-9191 FAX

REVISIONS:

PRELIMINARY POST CONSTRUCTION MASTER BMP SITE PLAN
RAMONA GATEWAY COMMERCE CENTER
P21-00013 - PERRIS, CA

JOB NO. 139-1
SHEET 3 of 9

SEE SHEET 2



SEE SHEET 5

BUIL

850,224 SF

100,000

TOTAL =

1489

J

LEGEND
STRUCTURAL / TREATMENT BMPS

- DMA BOUNDARY
- SD — ONSITE STORM DRAIN
- LANDSCAPE AREA EFFICIENT IRRIGATION LANDSCAPE AREA RUNOFF-MINIMIZING DESIGN
- SELF TREATING LANDSCAPE AREAS NOT TRIBUTARY TO TREATMENT (DMA E)
- COVERED TRASH ENCLOSURE
- DOCK AREAS
- TRAILER AREAS
- CATCH BASIN STENCIL
- FLOW PATTERN
- MODULAR WETLANDS UNIT
- UNDERGROUND STORAGE ARRAY STORMTECH CHAMBERS (OR EQUAL)
- (C) — DMA DESIGNATION
- MW- — MODULAR WETLANDS UNIT
- LMW- — LINEAR MODULAR WETLANDS UNIT
- BHDS — BARRACUDA HYDRODYNAMIC SEPARATOR(OR EQUAL)
- DP — DISCHARGE POINT TO PUBLIC SD

RAMONA EXPSWY

NEVADA AVE	2	3
	4	5
	6	7
	8	9

WEBSTER AVE

INDEX MAP
N.T.S.

GRAPHIC SCALE
20 0 20 20 20 20
(IN FEET)
1 inch = 40 ft.

Sep 15 2022

PREPARED BY:
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CA 92705
(888) 714-9642 • (714)389-9191 FAX

REVISIONS:

PRELIMINARY POST CONSTRUCTION MASTER BMP SITE PLAN
RAMONA GATEWAY COMMERCE CENTER
P21-00013 – PERRIS, CA

JOB NO. 139-1
SHEET 4 of 1

SEE SHEET 3

DING 1

F FOOTPRINT

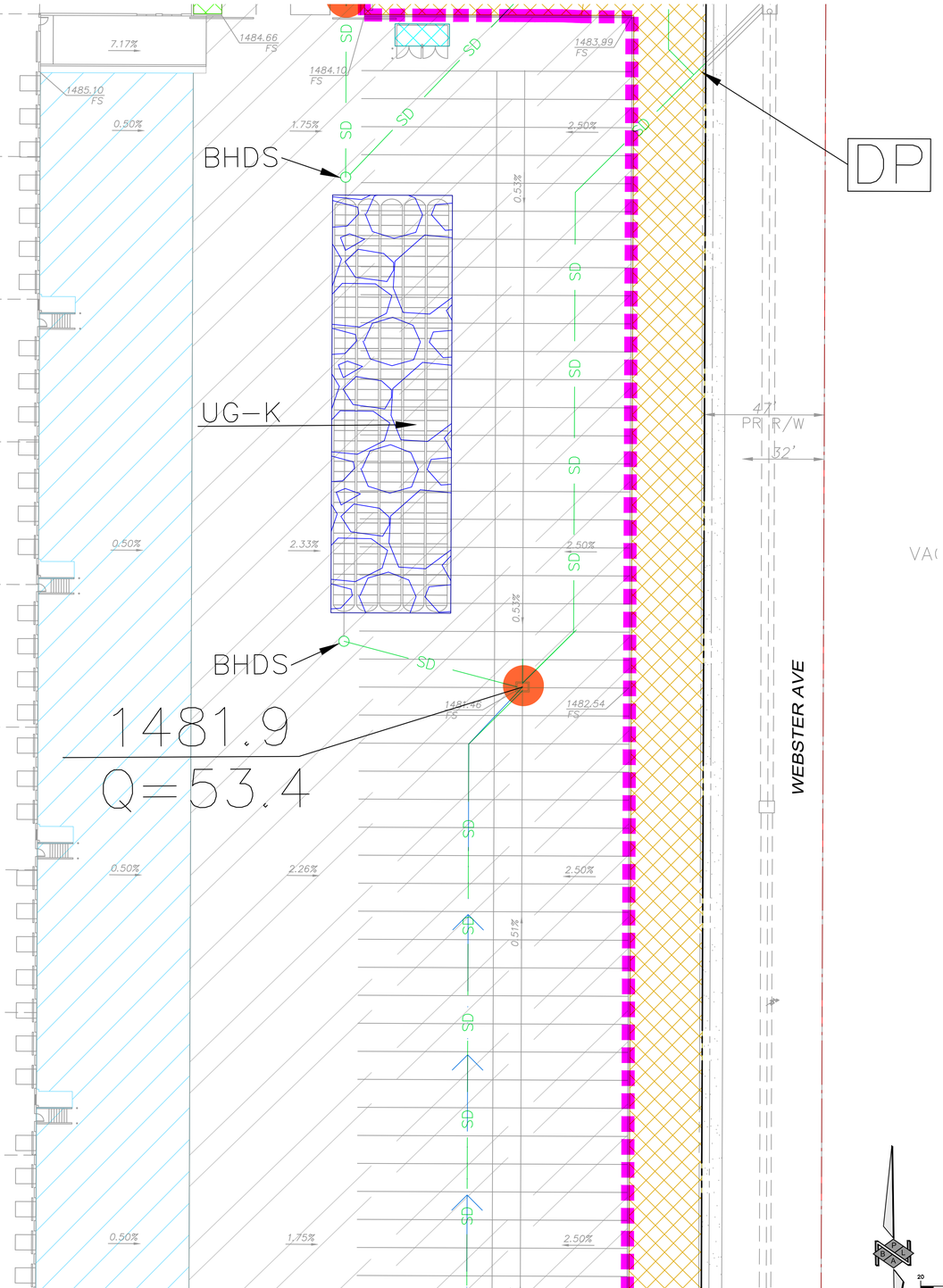
00 SF MEZ

= 950,224 SF

39.10 FF

SEE SHEET 4

K



SEE SHEET 7

LEGEND

STRUCTURAL / TREATMENT BMPS

- DMA BOUNDARY
- SD — ONSITE STORM DRAIN
- LANDSCAPE AREA EFFICIENT IRRIGATION LANDSCAPE AREA RUNOFF-MINIMIZING DESIGN
- SELF TREATING LANDSCAPE AREAS NOT TRIBUTARY TO TREATMENT (DMA E)
- COVERED TRASH ENCLOSURE
- DOCK AREAS
- TRAILER AREAS
- CATCH BASIN STENCIL
- FLOW PATTERN
- MODULAR WETLANDS UNIT
- UNDERGROUND STORAGE ARRAY STORMTECH CHAMBERS (OR EQUAL)
- C — DMA DESIGNATION
- MW- — MODULAR WETLANDS UNIT
- LMW- — LINEAR MODULAR WETLANDS UNIT
- BHDS — BARRACUDA HYDRODYNAMIC SEPARATOR(OR EQUAL)
- DP — DISCHARGE POINT TO PUBLIC SD

RAMONA EXPSWY

NEVADA AVE	2 3 / 4 5 / 6 7 / 8 9	WEBSTER AVE

INDEX MAP

N.T.S.

GRAPHIC SCALE

20 0 20 20 20 20

(IN FEET)

1 inch = 40 ft.

Sep 15 2022

PREPARED BY:

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CA 92705
(888) 714-9642 • (714)389-9191 FAX

REVISIONS:

PRELIMINARY POST CONSTRUCTION MASTER BMP SITE PLAN

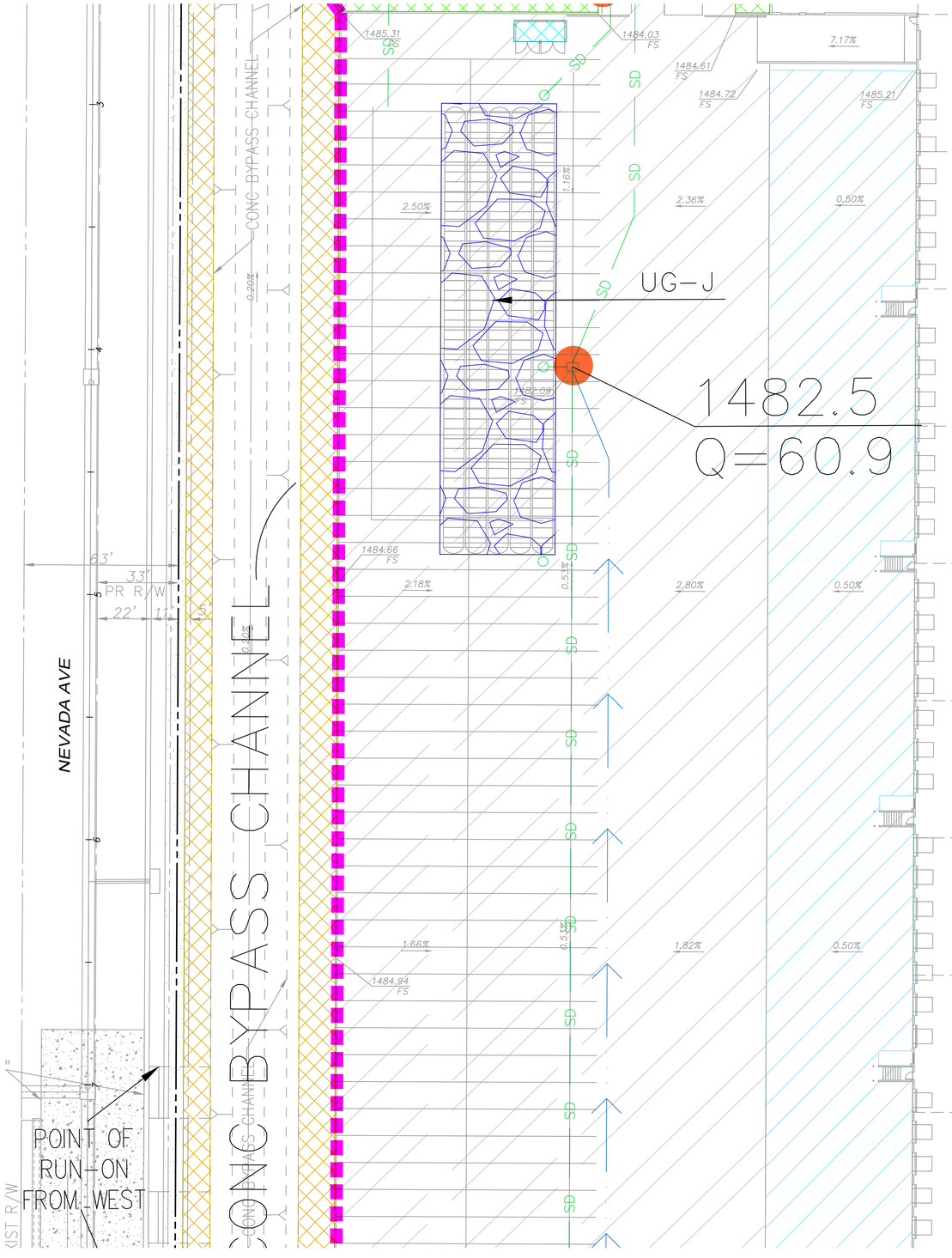
RAMONA GATEWAY COMMERCE CENTER

P21-00013 – PERRIS, CA

JOB NO. 139-1

SHEET 5 of 1

SEE SHEET 4



SEE SHEET 8

LEGEND

STRUCTURAL / TREATMENT BMPS

- DMA BOUNDARY
- SD — ONSITE STORM DRAIN
- LANDSCAPE AREA EFFICIENT IRRIGATION LANDSCAPE AREA RUNOFF-MINIMIZING DESIGN
- SELF TREATING LANDSCAPE AREAS NOT TRIBUTARY TO TREATMENT (DMA E)
- COVERED TRASH ENCLOSURE
- DOCK AREAS
- TRAILER AREAS
- CATCH BASIN STENCIL
- FLOW PATTERN
- MODULAR WETLANDS UNIT
- UNDERGROUND STORAGE ARRAY STORMTECH CHAMBERS (OR EQUAL)
- (C) — DMA DESIGNATION
- MW- — MODULAR WETLANDS UNIT
- LMW- — LINEAR MODULAR WETLANDS UNIT
- BHDS — BARRACUDA HYDRODYNAMIC SEPARATOR(OR EQUAL)
- DP — DISCHARGE POINT TO PUBLIC SD

BUIL

850,224 SF

100,000

TOTAL =

1489

SEE SHEET 7

J

RAMONA EXPSWY

NEVADA AVE

WEBSTER AVE

2	3	
4	5	
6	7	
8	9	

INDEX MAP

N.T.S.

GRAPHIC SCALE

20 0 20 20 20 20

(IN FEET)

1 inch = 40 ft.

Sep 15 2022

PREPARED BY:

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CA 92705
(888) 714-9642 • (714)389-9191 FAX

REVISIONS:

PRELIMINARY POST CONSTRUCTION MASTER BMP SITE PLAN

RAMONA GATEWAY COMMERCE CENTER

P21-00013 – PERRIS, CA

JOB NO. 139-1

SHEET 6 of 1

SEE SHEET 5

SEE SHEET 6

DING 1

F FOOTPRINT

00 SF MEZ

= 950,224 SF

39.10 FF

K

BHDS

UG-K

BHDS

1481.9

Q=53.4

DP

7.17%

1484.66 FS

1485.10 FS

0.50%

1484.10 FS

1.75%

1483.99 FS

2.50%

0.53%

2.33%

1481.46 FS

1482.54 FS

2.26%

0.51%

47' PR R/W

32'

VACA

WEBSTER AVE

SD

LEGEND

STRUCTURAL / TREATMENT BMPS

- DMA BOUNDARY
- SD — ONSITE STORM DRAIN
- LANDSCAPE AREA EFFICIENT IRRIGATION LANDSCAPE AREA RUNOFF-MINIMIZING DESIGN
- SELF TREATING LANDSCAPE AREAS NOT TRIBUTARY TO TREATMENT (DMA E)
- COVERED TRASH ENCLOSURE
- DOCK AREAS
- TRAILER AREAS
- CATCH BASIN STENCIL
- FLOW PATTERN
- MODULAR WETLANDS UNIT
- UNDERGROUND STORAGE ARRAY STORMTECH CHAMBERS (OR EQUAL)
- (C) — DMA DESIGNATION
- MW- — MODULAR WETLANDS UNIT
- LMW- — LINEAR MODULAR WETLANDS UNIT
- BHDS — BARRACUDA HYDRODYNAMIC SEPARATOR(OR EQUAL)
- DP — DISCHARGE POINT TO PUBLIC SD

SEE SHEET 9

RAMONA EXPSWY

2	3
4	5
6	7
8	9

NEVADA AVE

WEBSTER AVE

INDEX MAP

N.T.S.

GRAPHIC SCALE

20 0 20 20 20 20

(IN FEET)

1 inch = 40 ft.

Sep 15 2022

PREPARED BY:

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CA 92705
(888) 714-9642 • (714)389-9191 FAX

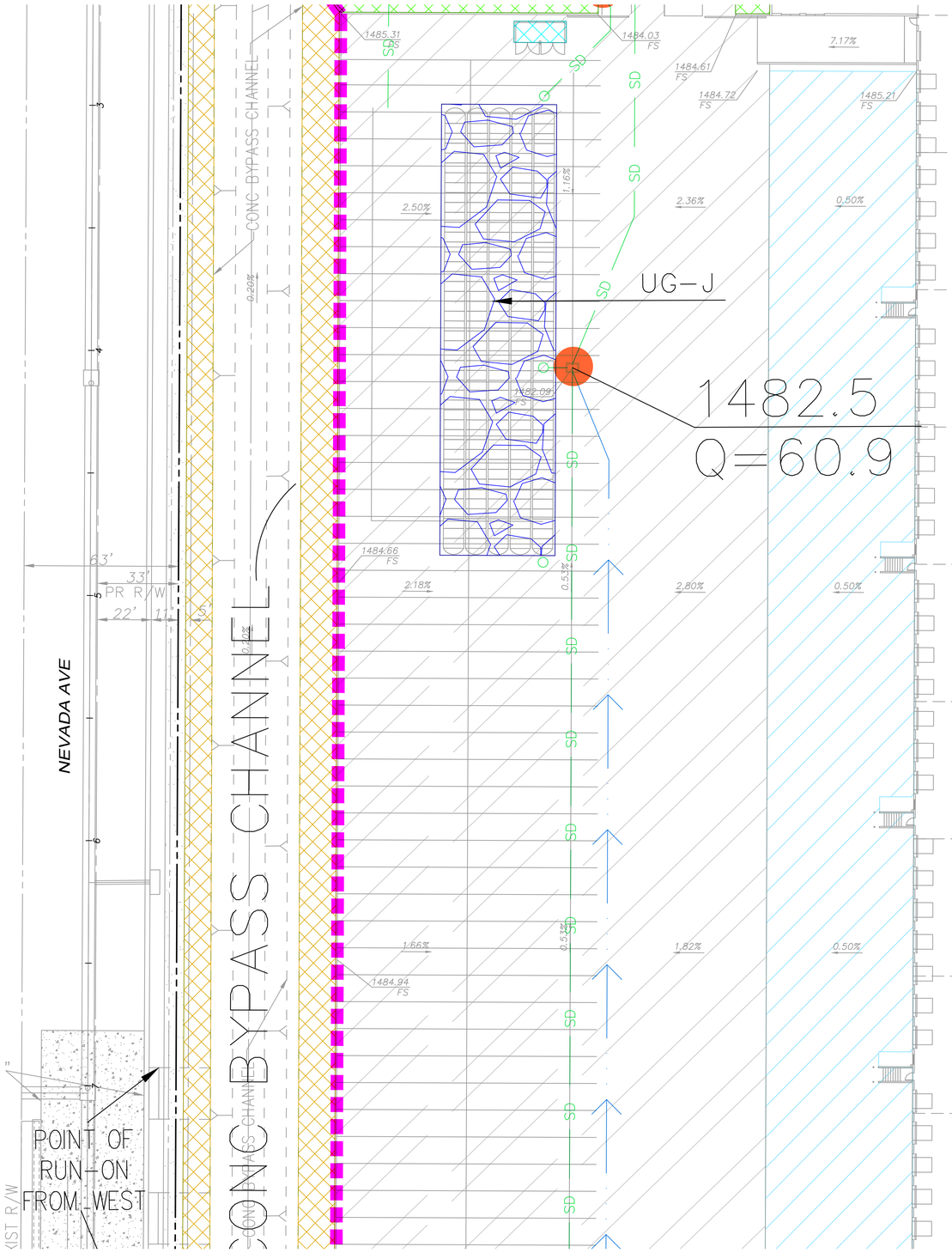
REVISIONS:

PRELIMINARY POST CONSTRUCTION
MASTER BMP SITE PLAN
RAMONA GATEWAY COMMERCE CENTER
P21-00013 – PERRIS, CA

JOB NO. 139-1

SHEET 7 of 9

SEE SHEET 6



LEGEND

STRUCTURAL / TREATMENT BMPS

- DMA BOUNDARY
- SD — ONSITE STORM DRAIN
- LANDSCAPE AREA EFFICIENT IRRIGATION LANDSCAPE AREA RUNOFF-MINIMIZING DESIGN
- SELF TREATING LANDSCAPE AREAS NOT TRIBUTARY TO TREATMENT (DMA E)
- COVERED TRASH ENCLOSURE
- DOCK AREAS
- TRAILER AREAS
- CATCH BASIN STENCIL
- FLOW PATTERN
- MODULAR WETLANDS UNIT
- UNDERGROUND STORAGE ARRAY STORMTECH CHAMBERS (OR EQUAL)
- (C) DMA DESIGNATION
- MW- MODULAR WETLANDS UNIT
- LMW- LINEAR MODULAR WETLANDS UNIT
- BHDS BARRACUDA HYDRODYNAMIC SEPARATOR(OR EQUAL)
- DP DISCHARGE POINT TO PUBLIC SD

BUIL

850,224 SF

100,000

TOTAL =

1489

SEE SHEET 9

J

RAMONA EXPSWY

2	3
4	5
6	7
8	9

NEVADA AVE — WEBSTER AVE

INDEX MAP

N.T.S.

GRAPHIC SCALE

20 0 20 20 20 20

(IN FEET)
1 inch = 40 ft.

Sep 15 2022

PREPARED BY:

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CA 92705
(888) 714-9642 • (714)389-9191 FAX

REVISIONS:

PRELIMINARY POST CONSTRUCTION MASTER BMP SITE PLAN

RAMONA GATEWAY COMMERCE CENTER

P21-00013 – PERRIS, CA

JOB NO. 139-1

SHEET 8 of 1

SEE SHEET 7

SEE SHEET 8

DING 1

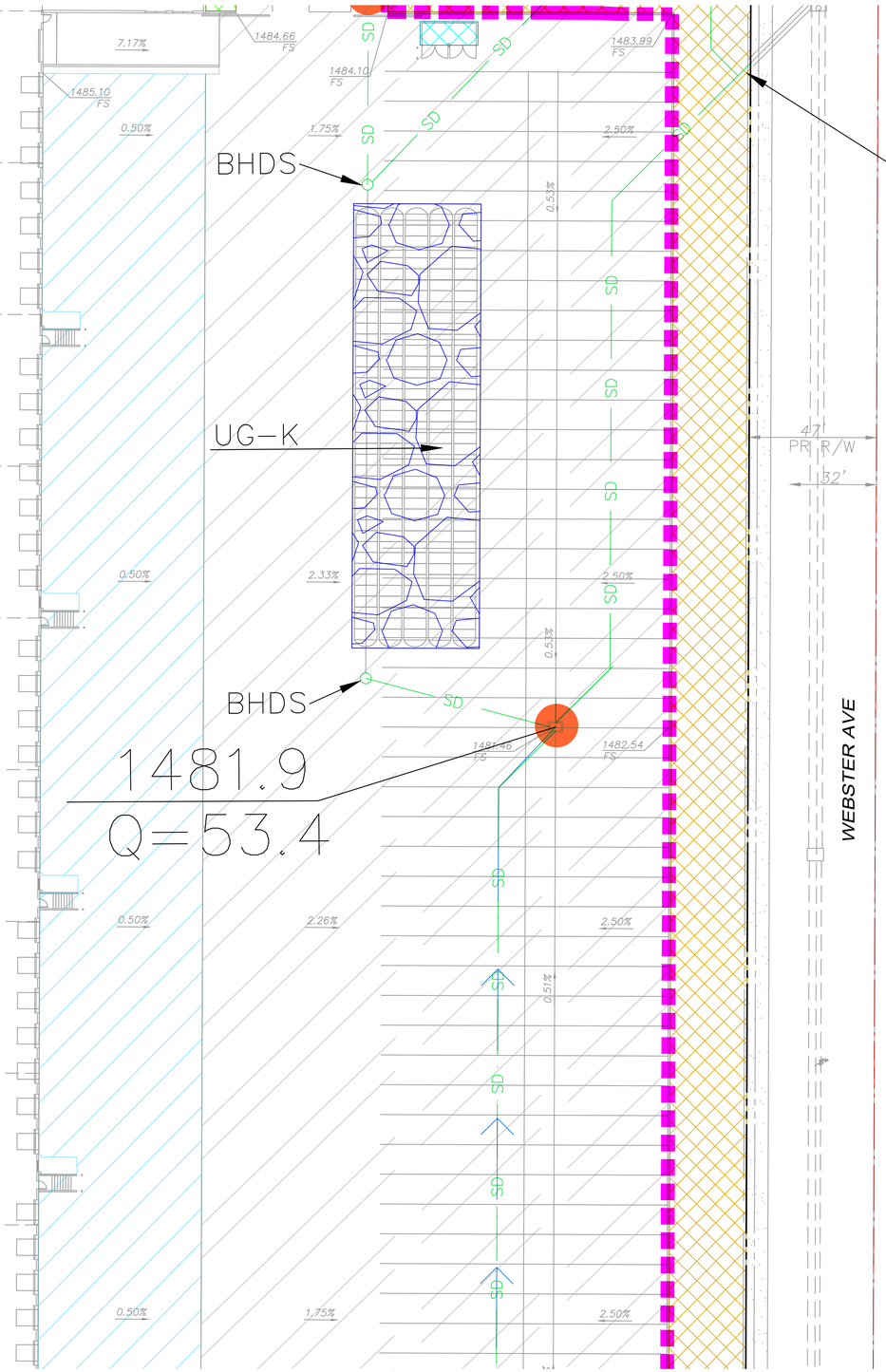
F FOOTPRINT

00 SF MEZ

= 950,224 SF

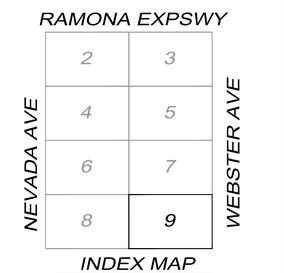
39.10 FF

K



LEGEND
STRUCTURAL / TREATMENT BMPS

- DMA BOUNDARY
- SD — ONSITE STORM DRAIN
- LANDSCAPE AREA EFFICIENT IRRIGATION LANDSCAPE AREA RUNOFF-MINIMIZING DESIGN
- SELF TREATING LANDSCAPE AREAS NOT TRIBUTARY TO TREATMENT (DMA E)
- COVERED TRASH ENCLOSURE
- DOCK AREAS
- TRAILER AREAS
- CATCH BASIN STENCIL
- FLOW PATTERN
- MODULAR WETLANDS UNIT
- UNDERGROUND STORAGE ARRAY STORMTECH CHAMBERS (OR EQUAL)
- (C) — DMA DESIGNATION
- MW- — MODULAR WETLANDS UNIT
- LMW- — LINEAR MODULAR WETLANDS UNIT
- BHDS — BARRACUDA HYDRODYNAMIC SEPARATOR(OR EQUAL)
- DP — DISCHARGE POINT TO PUBLIC SD



INDEX MAP
N.T.S.

GRAPHIC SCALE
20 0 20 20 20 20
(IN FEET)
1 inch = 40 ft.

Sep 15 2022

PREPARED BY:

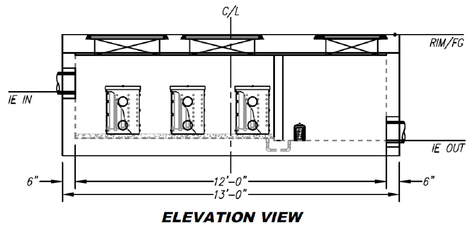
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CA 92705
(888) 714-9642 • (714)389-9191 FAX

REVISIONS:

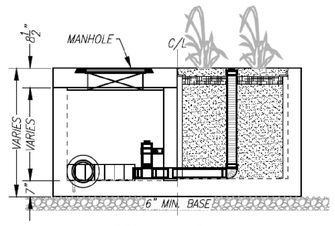
PRELIMINARY POST CONSTRUCTION MASTER BMP SITE PLAN

RAMONA GATEWAY COMMERCE CENTER
P21-00013 – PERRIS, CA

JOB NO. 139-1
SHEET 9 of 9

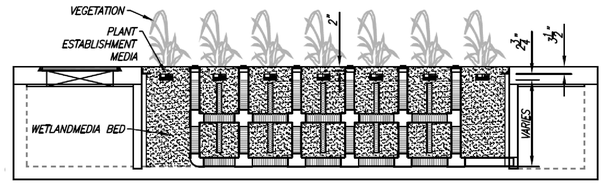


ELEVATION VIEW



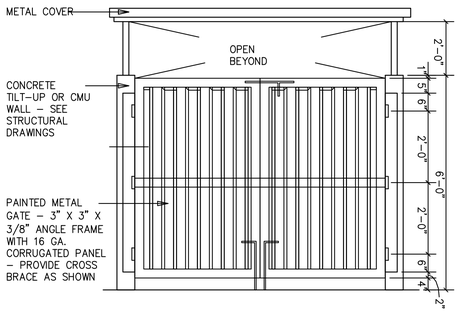
RIGHT END VIEW

TYPICAL MODULAR WETLANDS UNIT
NTS

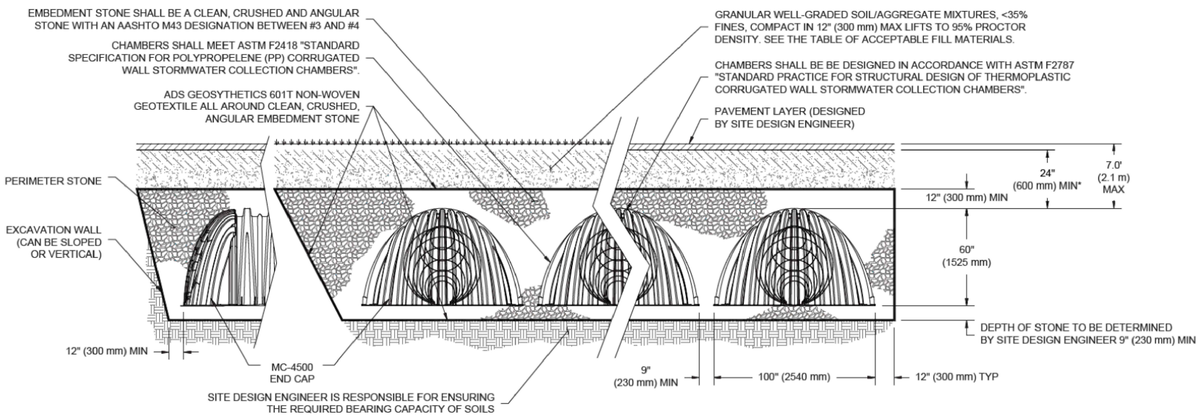


SECTION VIEW

TYPICAL LINEAR MODULAR WETLANDS UNIT
NTS

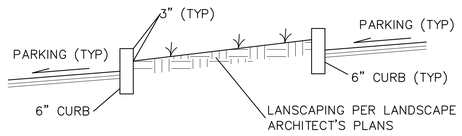


TYPICAL TRASH ENCLOSURE
NTS

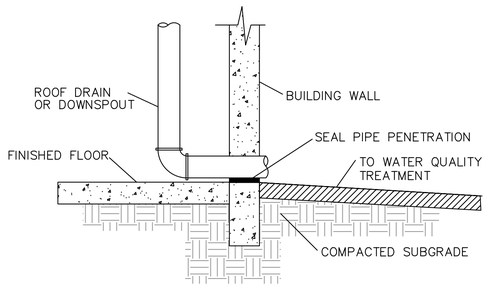


*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

TYPICAL UNDERGROUND STORAGE SYSTEM
NTS



TYPICAL PLANTER AREA
NTS



ROOF DRAIN DETAIL
NTS

Sep 15 2022

PREPARED BY:	REVISIONS:
PBLA ENGINEERING, INC. Planning • Engineering • Surveying 1809 E. DYER ROAD, STE. 301 SANTA ANA, CA 92705 (888) 714-9642 • (714)389-9191 FAX	

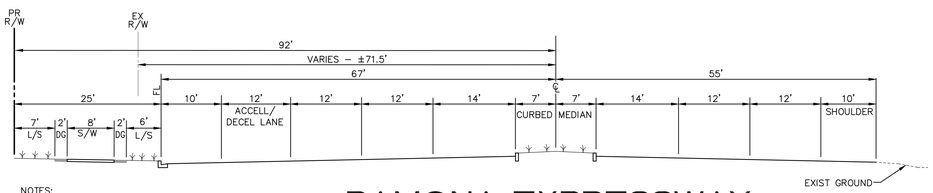
PRELIMINARY POST CONSTRUCTION MASTER BMP SITE PLAN
RAMONA GATEWAY COMMERCE CENTER
P21-00013 – PERRIS, CA

JOB NO. 139-1

SHEET 10 of 10

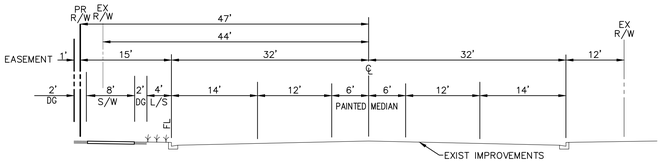
Appendix 2: Construction Plans

Grading and Drainage Plans

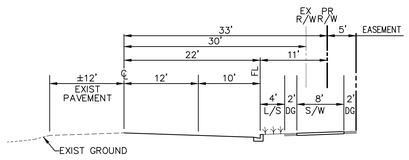


NOTES:
- L/S = LANDSCAPE
- G/C = GROUND COVER
- S/W = SIDEWALK
- R/W = RIGHT OF WAY
- DG = DECOMPOSED GRANITE
- AC = ASPHALT CONCRETE
- FL = FLOW LINE
- PR = PROPOSED

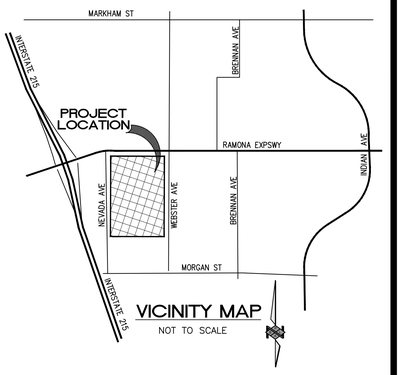
RAMONA EXPRESSWAY
(EXPRESSWAY)
LOOKING WEST – NTS



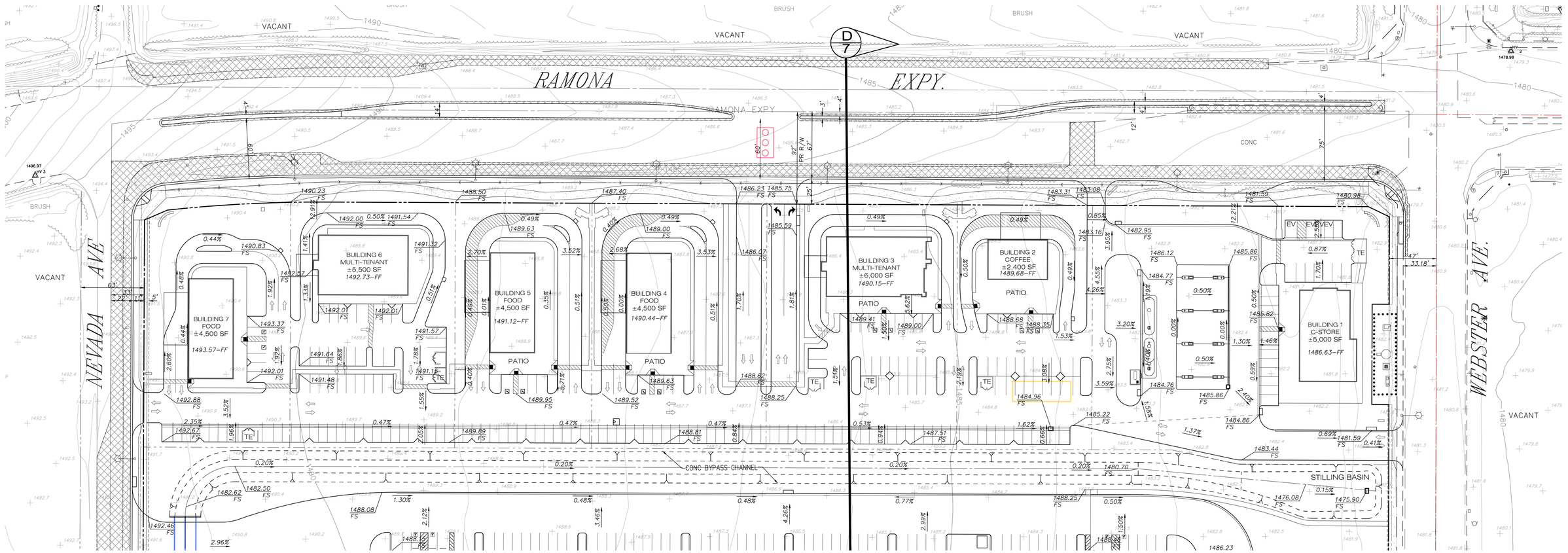
WEBSTER AVENUE
(SECONDARY ARTERIAL)
LOOKING NORTH – NTS



NEVADA AVENUE
(COLLECTOR)
LOOKING NORTH – NTS



VICINITY MAP
NOT TO SCALE



SEE SHT 2 FOR INDUSTRIAL SITE

OVERALL OFFSITE IMPROVEMENT QUANTITIES

DESCRIPTION	QUANTITY
8" CURB & GUTTER	2,762 LF
6" MEDIAN CURB	2,291 LF
4"/10" H.D. PAVEMENT	88,988 SF
6" PCC ARIZONA CROSSING	8,336 SF
ADA ACCESS RAMPS	2 EA
CLASS 1 CONC BIKE PATH	36,679 SF
BUS TURN–OUT	1 EA
CONC DRIVEWAY APPROACH	3,966 SF
REMOVE EX AC PAVEMENT	55,808 SF
REMOVE EX CONC PAVEMENT	1,595 SF
REMOVE EX CURB & GUTTER	107 LF
REMOVE EX CURB ONLY	593 LF
REMOVE EX 4" SIDEWALK	10,448 SF
LANDSCAPE	34,841 SF
MEDIAN LANDSCAPE	4,849 SF
MEDIAN PAVEMENT	2,909 SF

PR AC PAVEMENT

RETAIL SITE WORK QUANTITIES

DESCRIPTION	QUANTITY
6" CURB ONLY	8,717 LF
6" CURB & GUTTER	630 LF
4"/10" H.D. PAVEMENT	67,854 SF
3"/6" L.D. PAVEMENT	97,894 SF
6" CONC APRON	2,715 SF
3' RIBBON GUTTER	1,018 LF
ADA RAMPS	24 EA
SIDEWALK	42,588 EA
RETAINING WALL (RETAIL BLD 2)	800 SF

PRELIMINARY EARTHWORK QUANTITIES

NET VOLUMES	CUT	FILL
RETAIL SITE	14,600 CY	30,200 CY
INDUSTRIAL SITE	227,500 CY	211,900 CY
TOTALS	242,100 CY	242,100 CY

-- BALANCE --

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

TOPOGRAPHY DATE: 12-23-20

LEGAL DESCRIPTION / AP NUMBERS

A PTN OF LOT 20 PERRY'S SUBDIVISION, BK 7/PG 25 OF MAPS, TOGETHER WITH LOT 1, BLK 9 VAL VERDE TRACT, BK 1/PG 6 OF MAPS, TOGETHER WITH A PTNS OF LOT 22 PERRY'S RE–SUBDIVISION, BK 7/PG 45 OF MAPS, ALL OF OFFICIAL RECORDS, COUNTY OF RIVERSIDE. APN: 317–120–021 317–130–017, 021, 025, 048

SOILS ENGINEER

SOUTHERN CALIFORNIA GEOTECHNICAL
22885 SAVI RANCH PKWY, SUITE E
YORBA LINDA, CA 92887

BENCHMARK DESCRIPTION

A STANDARD 3–1/4 INCH ALUMINUM DISK SET FLUSH AT THE NORTHEAST CORNER OF CAJALCO RD AND SEATON AVE, 65 FEET NORTH OF CAJALCO RD AND 32 FEET EAST OF SEATON AVE, ON THE FOOTING OF A LARGE STEEL POWER POLE 705640/01 ON LOWER FOOTING. ELEV: 1557.17 – NAVD 88

Sep 23 2022

DATE	BY	REVISION

PREPARED FOR:

PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

PREPARED BY:

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

CITY OF PERRIS

CONCEPT GRADING PLAN
RETAIL SITE
RAMONA GATEWAY COMMERCE CENTER

WO 139-1

Sht. 1 of 7

SEE SHT 1 FOR RETAIL SITE

BUILDING 1

850,224 SF FOOTPRINT
100,000 SF MEZ
TOTAL = 950,224 SF
1489.10 FF

SEE SHT 3 FOR CONTINUATION

INDUSTRIAL SITE WORK QUANTITIES

DESCRIPTION	QUANTITY
6" CURB ONLY	7,787 LF
6" CURB & GUTTER	3,186 LF
5.5" CONC H.D. PAVEMENT	413,716 SF
3"/6" L.D. PAVEMENT	97,002 SF
5.5" CONC APRON	149,876 SF
ADA RAMPS	15 EA
SIDEWALK	9,557 EA
RETAINING WALL	0 SF

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

TOPOGRAPHY DATE: 12-23-20

Sep 23 2022

DATE	BY	REVISION

PREPARED FOR:
PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

PREPARED BY:
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD., STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

CITY OF PERRIS
CONCEPT GRADING PLAN
INDUSTRIAL SITE
RAMONA GATEWAY COMMERCE CENTER

WO 139-1

Sht. 2 of 7

SEE SHT 2 FOR CONTINUATION

BUILDING 1

850,224 SF FOOTPRINT

100,000 SF MEZ

TOTAL = 950,224 SF

1489.10 FF

PROPOSED CONCRETE "ARIZONA CROSSING"

PROPOSED CONCRETE "ARIZONA CROSSING"

EXIST R/W

CONC BYPASS CHANNEL

FUTURE REGIONAL DETENTION BASIN

FUTURE REGIONAL DETENTION BASIN

FUTURE REGIONAL DETENTION BASIN

NEVADA AVE.

WEBSTER AVE.

RECENTLY TILLED

VACANT

BRUSH

OBSCURED

CONC

DIRT

GRASS

VAL VERDE HIGH SCHOOL

PROP 8' CMU SCREEN WALL

RESTORE EXIST INLET TO FULL FUNCTION

A/7

B/7

C/7

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

TOPOGRAPHY DATE: 12-23-20

Sep 23 2022

DATE	BY	REVISION

PREPARED FOR:

PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

PREPARED BY:

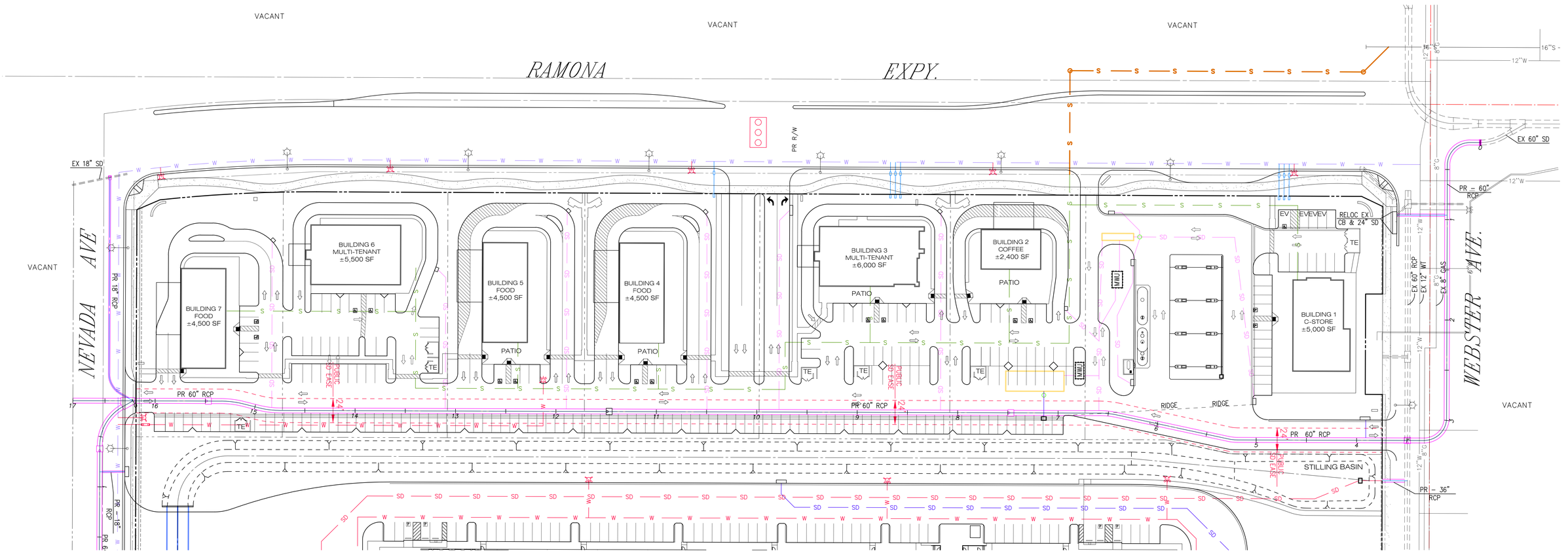
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD., STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

CITY OF PERRIS

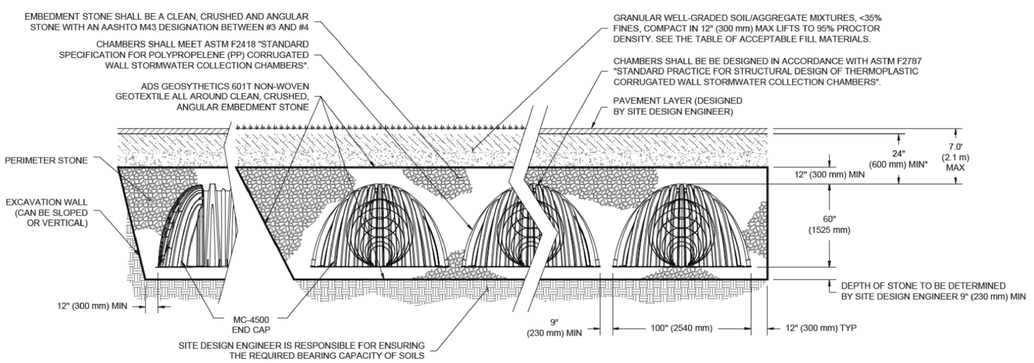
CONCEPT GRADING PLAN
INDUSTRIAL SITE
RAMONA GATEWAY COMMERCE CENTER

WO 139-1

Sht. 3 of 7



SEE SHT 5 FOR INDUSTRIAL SITE



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

TYPICAL UNDERGROUND STORAGE SYSTEM

NTS

RETAIL SITE UTILITY QUANTITIES

	DESCRIPTION	QUANTITY
SD	12" STORM DRAIN	2,135 LF
SD	18" STORM DRAIN	594 LF
	U/G STORAGE SYSTEM	333 LF
	CATCH BASINS	12 EA
MWU	MODULAR WETLANDS UNIT	2 EA
S	6" SEWER	1,696 LF
W	1-1/2" DOMESTIC WATER	933 LF
	1.5" DOMESTIC WATER METER & BF	4 EA
W	6" FIRE WATER LATERAL	449 LF
	FIRE HYDRANT	1 EA

OVERALL PUBLIC UTILITY QUANTITIES

	DESCRIPTION	QUANTITY
	18" STORM DRAIN	285 LF
	24" STORM DRAIN	8 LF
	36" STORM DRAIN	160 LF
	60" STORM DRAIN	2,414 LF
	MANHOLES	8 EA
	JUNCT STRUCTURE	1 EA
	CATCH BASIN/LOCAL DEPR	8 EA
	CUSTOM INLET STRUCTURE	1 EA
S	8" VCP SEWER	431 LF
	48" SEWER MANHOLE	2 EA
	WYE CONNECTION TO EX 16"	1 EA
W	8" CML&C WATER	962 LF
W	12" CML&C WATER	1,297 LF
	8" VALVES	3 LF
	12" VALVES	6 LF
W	6" HYDRANT LATERAL	127 LF
W	6" DETECTOR CHECK VALVE	1 EA
W	10" DETECTOR CHECK VALVE	2 EA
	FIRE HYDRANT	8 EA
	STREET LIGHT	24 EA

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

TOPOGRAPHY DATE: 12-23-20

Sep 23 2022

DATE	BY	REVISION

PREPARED FOR:
PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

PREPARED BY:
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD., STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

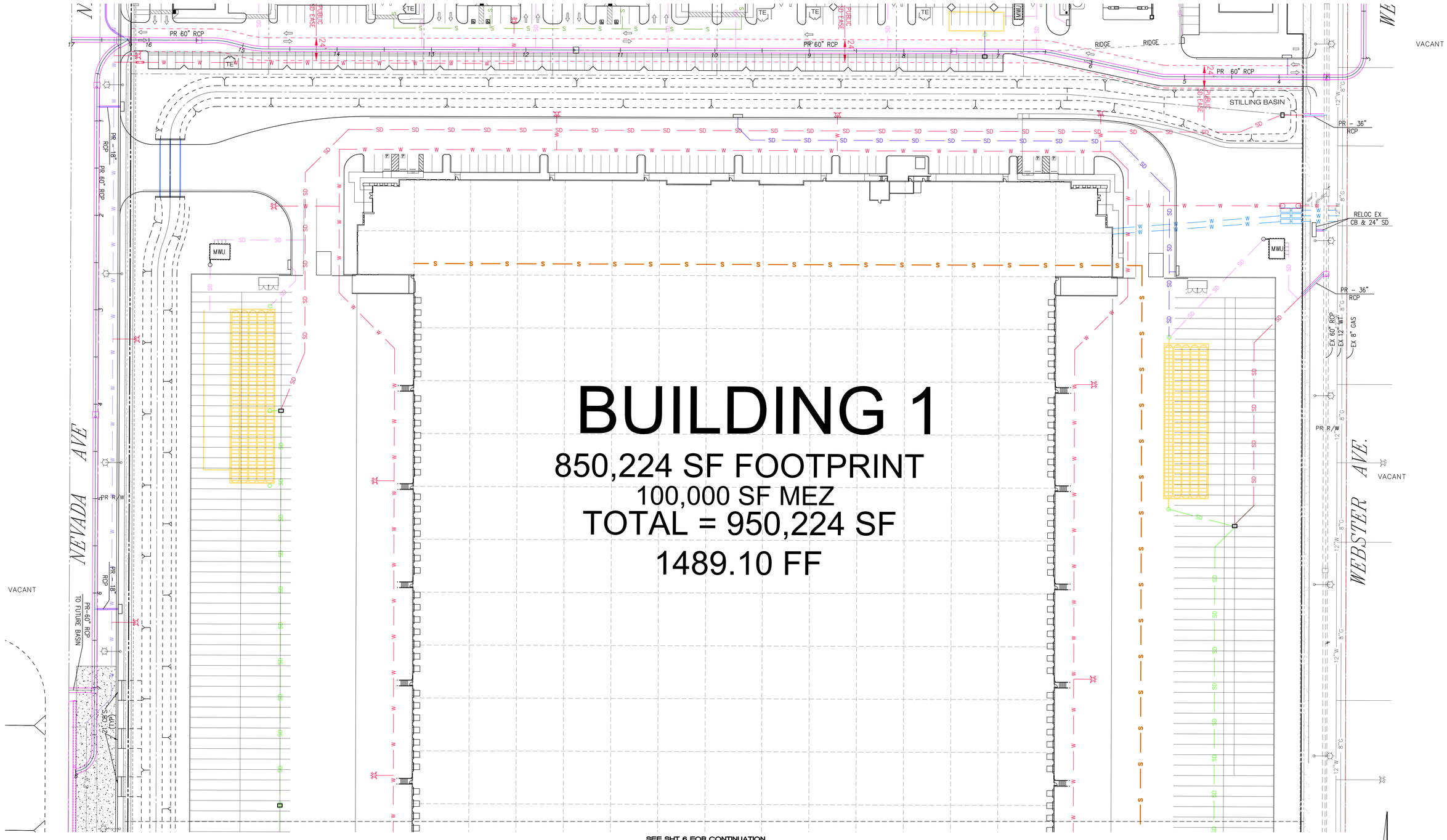
CITY OF PERRIS

CONCEPT UTILITY PLAN
RETAIL SITE
RAMONA GATEWAY COMMERCE CENTER

WO 139-1

Sht. 4 of 7

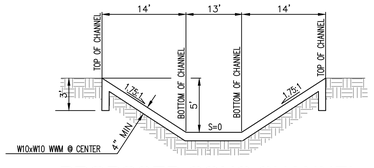
SEE SHT 4 FOR RETAIL SITE



SEE SHT 6 FOR CONTINUATION

INDUSTRIAL SITE UTILITY QUANTITIES

DESCRIPTION	QUANTITY
12" STORM DRAIN	1,199 LF
18" STORM DRAIN	1,584 LF
24" STORM DRAIN	964 LF
36" STORM DRAIN	1,640 LF
U/G STORAGE SYSTEM	4,000 LF
BYPASS CHANNEL PER DETAIL	1,943 LF
20'W X 4' H RCB	60 LF
RCB HEADWALL	2 EA
MODULAR WETLANDS UNIT	2 EA
WET WELL/1 HP SUMP PUMP	2 EA
6" SEWER	1,119 LF
8" SEWER	2,153 LF
3" DOMESTIC WATER	713 LF
1.5" DOMESTIC WATER METER & BF	6 EA
10" FIRE WATER MAIN	5,047 LF
8" FIRE RISER LATERAL	200 LF
6" FIRE WATER LATERAL	406 LF
FIRE HYDRANT	14 EA



PROPOSED CONC CHANNEL

N.T.S.

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

TOPOGRAPHY DATE: 12-23-20

Sep 23 2022

DATE	BY	REVISION

PREPARED FOR:
PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

PREPARED BY:
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

CITY OF PERRIS
CONCEPT UTILITY PLAN
INDUSTRIAL SITE
RAMONA GATEWAY COMMERCE CENTER

WO 139-1

Sht. 5 of 7

SEE SHT 5 FOR CONTINUATION

LEGEND

SD — 12" STORM DRAIN
SD — 18" STORM DRAIN
SD — 24" STORM DRAIN
SD — 36" STORM DRAIN
U/G STORAGE SYSTEM
BYPASS CHANNEL PER DETAIL
MWU MODULAR WETLANDS UNIT
WET WELL/1 HP SUMP PUMP

S — 6" SEWER
S — 8" SEWER

W — 3" DOMESTIC WATER
1.5" DOMESTIC WATER METER & BF
WT — 10" FIRE WATER MAIN
WT — 8" FIRE RISER LATERAL
WT — 6" FIRE WATER LATERAL
FIRE HYDRANT

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

TOPOGRAPHY DATE: 12-23-20

Sep 23 2022

DATE	BY	REVISION

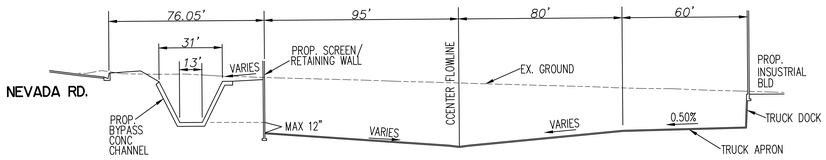
PREPARED FOR:
PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

PREPARED BY:
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD,. STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

CITY OF PERRIS
CONCEPT UTILITY PLAN
INDUSTRIAL SITE
RAMONA GATEWAY COMMERCE CENTER

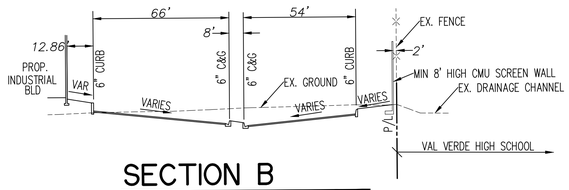
WO 139-1

Sht. 6 of 7



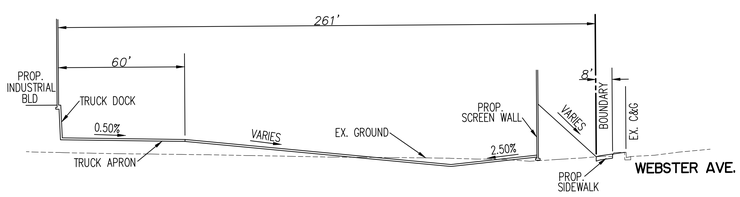
SECTION A

NTS SEE SHT 2



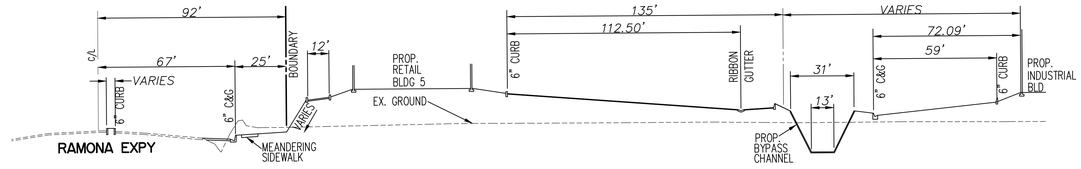
SECTION B

NTS SEE SHT 3



SECTION C

NTS SEE SHT 2



SECTION D

NTS SEE SHTS 1&2

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

TOPOGRAPHY DATE: 12-23-20

Sep 23 2022

DATE	BY	REVISION

PREPARED FOR:

PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

PREPARED BY:

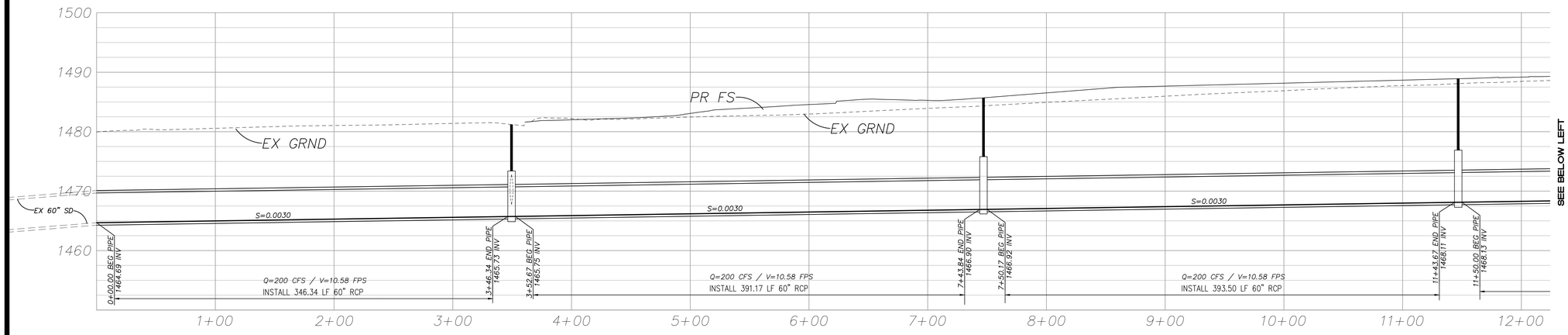
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD., STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

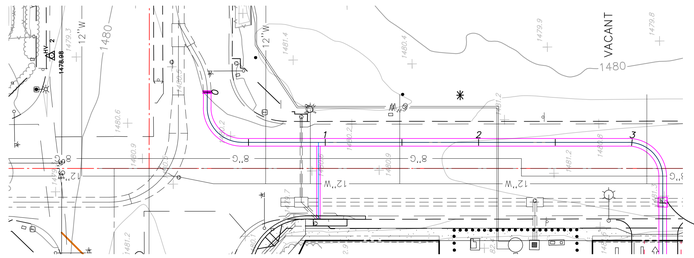
CITY OF PERRIS

CONCEPT UTILITY PLAN
CROSS SECTIONS
RAMONA GATEWAY COMMERCE CENTER

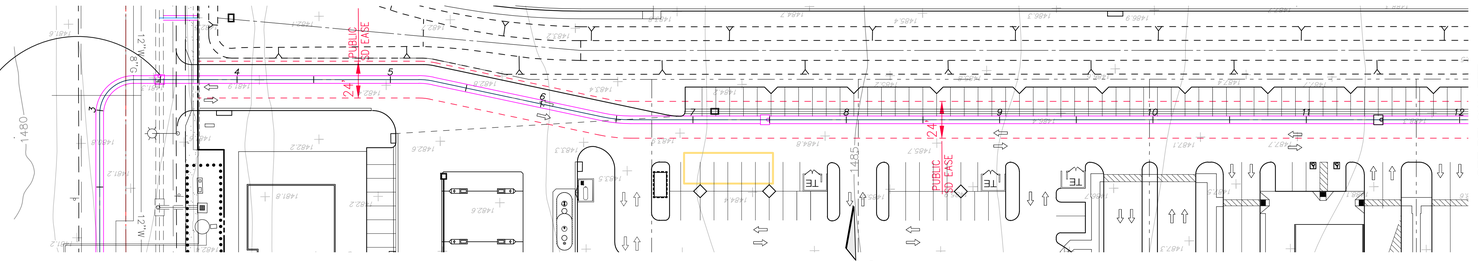
WO 139-1

Sht. 7 of 7



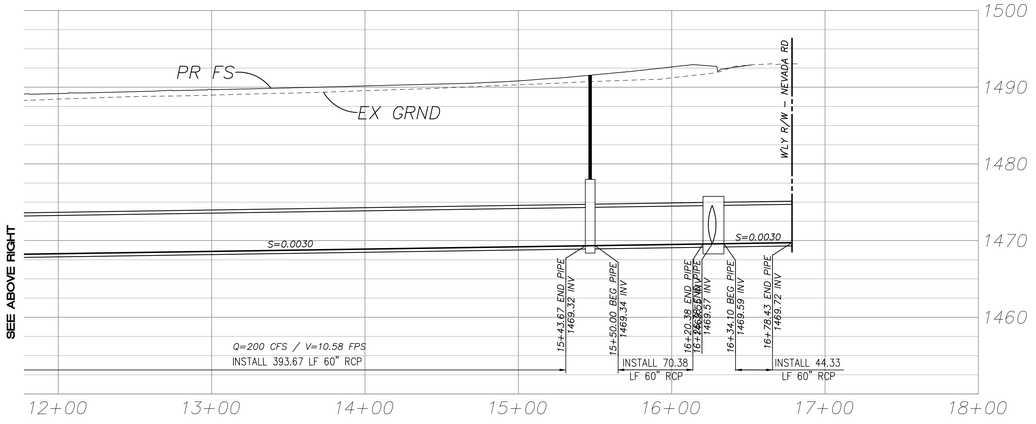


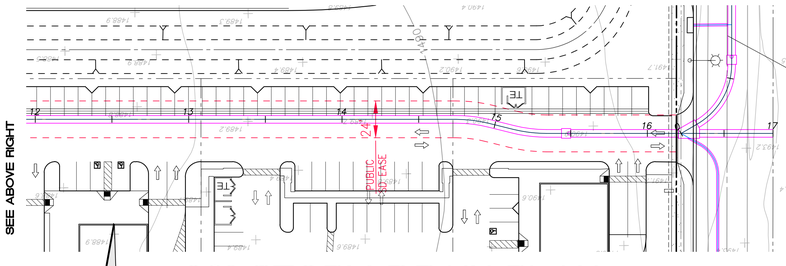
IDENTICAL



60" STORM DRAIN PLAN
LINE 1

60" STORM DRAIN PLAN
LINE 1





SEE SHEET 2 FOR LINE 2

60" STORM DRAIN PLAN
LINE 1

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

Sep 23 2022

TOPOGRAPHY DATE: 12-23-20

DATE	BY	REVISION
4-15-21	SDL	1st Release

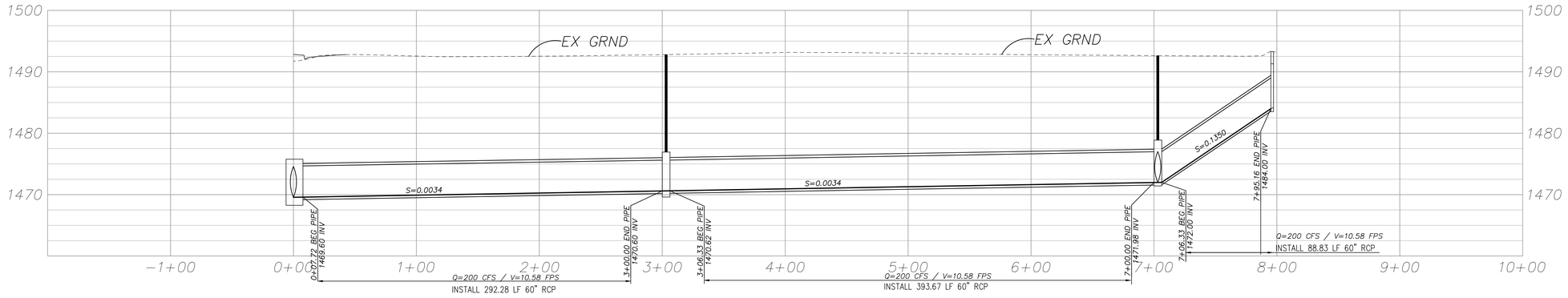
PREPARED FOR:
PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

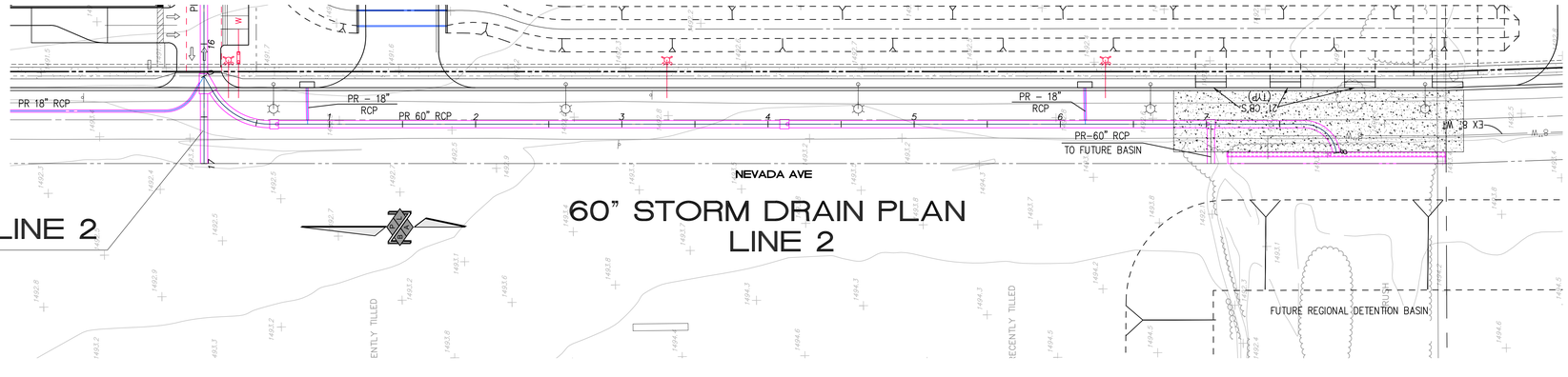
PREPARED BY:
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD., STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

CITY OF PERRIS

CONCEPT BYPASS PLAN
LINE 1
RAMONA GATEWAY COMMERCE CENTER

WO 139-1





SEE SHEET 2 FOR LINE 2

60" STORM DRAIN PLAN LINE 2

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

Sep 23 2022

TOPOGRAPHY DATE: 12-23-20

DATE	BY	REVISION
4-15-21	SDL	1st Release

PREPARED FOR:

PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

PREPARED BY:

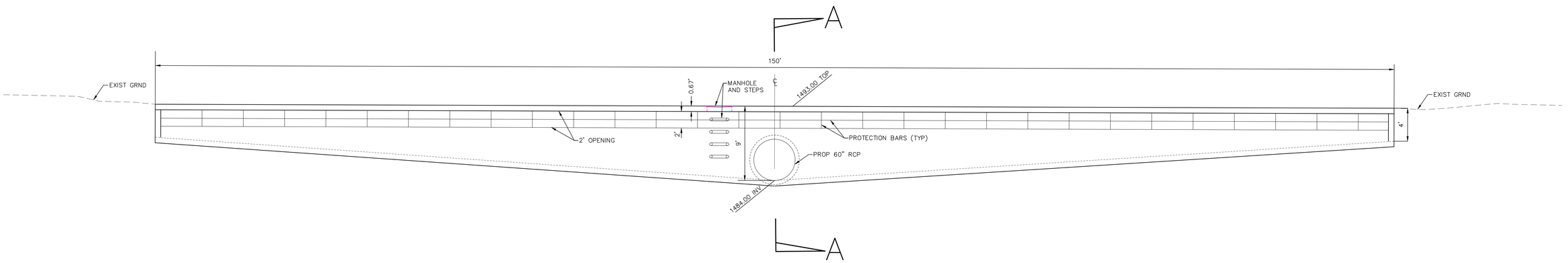
PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

CITY OF PERRIS

CONCEPT BYPASS PLAN
LINE 2
RAMONA GATEWAY COMMERCE CENTER

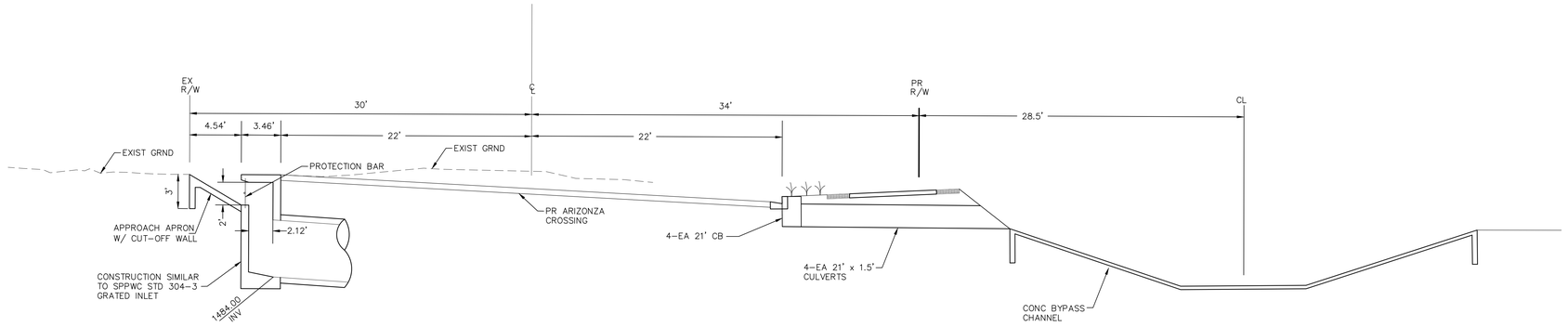
WO 139-1

Sht. 2 of 3



INLET STRUCTURE DETAIL

SCALE: 1" = 5'



SECTION A-A

SCALE: 1" = 5'

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

TOPOGRAPHY DATE: 12-23-20

Sep 23 2022

DATE	BY	REVISION
4-15-21	SDL	1st Release

PREPARED FOR:

PERRIS LANDCO, LLC
201 SPEAR STEET #100
SAN FRANCISCO, CA 94105

PREPARED BY:

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1809 E. DYER ROAD, STE 301
SANTA ANA, CALIF. 92705
(888) 714-9642 • (714)389-9191 FAX

CITY OF PERRIS

CONCEPT BYPASS PLAN

RAMONA GATEWAY COMMERCE CENTER

WO 139-1

Sht. 3 of 3

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

PROVIDED IN FINAL REPORT

Appendix 4: Historical Site Conditions

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

PROVIDED IN FINAL REPORT

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Alternative Compliance due to low infiltration potential

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Flow Rate, Q_{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 PBLA Engineering, Inc

Date 9/13/2022

Designed by SDL

Case No P21-00013

Company Project Number/Name RGCC - 139-1

BMP Identification

BMP NAME / ID DMA-B

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

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 (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*DMA B*	*2400*	*Roofs*	*1*	*0.89*	*2140.8*			
	DMA B	*8359*	*Concrete or Asphalt*	*1*	*0.892*	*7456.2*			
	DMA B	*1068*	*Ornamental Landscaping*	*0.1*	*0.110458*	*118*			
		11827	***Total***			**9715**	**0.20**	***0***	***0.1***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{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: PBLA Engineering, Inc — Date: 9/13/2022

Designed by: SDL — Case No: P21-00013

Company Project Number/Name: RGCC - 139-1

BMP Identification

BMP NAME / ID: DMA-C

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

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 (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*DMA C*	*6000*	*Roofs*	*1*	*0.89*	*5352*			
	DMA C	*5778*	*Concrete or Asphalt*	*1*	*0.892*	*5154*			
	DMA C	*1915*	*Ornamental Landscaping*	*0.1*	*0.110458*	*211.5*			
		13693		***Total***		**10717.5**	**0.20**	***0***	***0.1***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{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	PBLA Engineering, Inc	Date	9/13/2022
Designed by	SDL	Case No	P21-00013
Company Project Number/Name	RGCC - 139-1		

BMP Identification

BMP NAME / ID DMA-D

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA D	*0*	*Roofs*	*1*	*0.89*	*0*			
DMA D	*11697*	*Concrete or Asphalt*	*1*	*0.892*	*10433.7*			
DMA D	*5182*	*Ornamental Landscaping*	*0.1*	*0.110458*	*572.4*			
	16879	***Total***			**11006.1**	**0.20**	***0.1***	***0.1***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{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: PBLA Engineering, Inc — Date: 9/13/2022

Designed by: SDL — Case No: P21-00013

Company Project Number/Name: RGCC - 139-1

BMP Identification

BMP NAME / ID: DMA-E

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

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 (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*DMA E*	*4500*	*Roofs*	*1*	*0.89*	*4014*			
	DMA E	*11540*	*Concrete or Asphalt*	*1*	*0.892*	*10293.7*			
	DMA E	*2619*	*Ornamental Landscaping*	*0.1*	*0.110458*	*289.3*			
		18659	***Total***			**14597**	**0.20**	***0.1***	***0.1***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{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: PBLA Engineering, Inc — Date: 9/13/2022

Designed by: SDL — Case No: P21-00013

Company Project Number/Name: RGCC - 139-1

BMP Identification

BMP NAME / ID: DMA-F

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA F	*4500*	*Roofs*	*1*	*0.89*	*4014*			
DMA F	*11607*	*Concrete or Asphalt*	*1*	*0.892*	*10353.4*			
DMA F	*3567*	*Ornamental Landscaping*	*0.1*	*0.110458*	*394*			
	19674	***Total***			**14761.4**	**0.20**	***0.1***	***0.1***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{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: PBLA Engineering, Inc — Date: 9/13/2022

Designed by: SDL — Case No: P21-00013

Company Project Number/Name: RGCC - 139-1

BMP Identification

BMP NAME / ID: DMA-G

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

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 (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA G	*5500*	*Roofs*	*1*	*0.89*	*4906*			
DMA G	*6085*	*Concrete or Asphalt*	*1*	*0.892*	*5427.8*			
DMA G	*3290*	*Ornamental Landscaping*	*0.1*	*0.110458*	*363.4*			
	14875	***Total***			**10697.2**	**0.20**	***0***	***0.1***

DMAs

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{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: PBLA Engineering, Inc — Date: 9/13/2022

Designed by: SDL — Case No: P21-00013

Company Project Number/Name: RGCC - 139-1

BMP Identification

BMP NAME / ID: DMA-H

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA H	*4500*	*Roofs*	*1*	*0.89*	*4014*			
DMA H	*8904*	*Concrete or Asphalt*	*1*	*0.892*	*7942.4*			
DMA H	*9080*	*Ornamental Landscaping*	*0.1*	*0.110458*	*1003*			
	22484	***Total***			**12959.4**	**0.20**	***0.1***	***0.1***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{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: PBLA Engineering, Inc — Date: 9/13/2022

Designed by: SDL — Case No: P21-00013

Company Project Number/Name: RGCC - 139-1

BMP Identification

BMP NAME / ID: DMA-L

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA L	*0*	*Roofs*	*1*	*0.89*	*0*			
DMA L	*8441*	*Concrete or Asphalt*	*1*	*0.892*	*7529.4*			
DMA L	*4226*	*Ornamental Landscaping*	*0.1*	*0.110458*	*466.8*			
	12667	**Total**			**7996.2**	**0.20**	**0**	**0.1**

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	PBLA ENGINEERING, INC	Date	9/13/2022
Designed by	SDL	Case No	P21-00013
Company Project Number/Name	R & W - PERRIS		

BMP Identification

BMP NAME / ID: DMA - I - DRIVE AISLE & PARKING

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}= 0.58 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)*
I	*0*	*Roofs*	*1*	*0.89*	*0*			
I	*88,577*	*Concrete or Asphalt*	*1*	*0.89*	*79010.7*			
I	*8,966*	*Ornamental Landscaping*	*0.1*	*0.11*	*990.4*			
	97543	***Total***			**80001.1**	**0.58**	***3866.7***	***5,000***

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	PBLA ENGINEERING, INC	Date	9/13/2022
Designed by	SDL	Case No	P21-00013
Company Project Number/Name	R & W - PERRIS		

BMP Identification

BMP NAME / ID: DMA - J WEST SIDE INDUSTRIAL

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}= 0.58 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)*
J	*438,446*	*Roofs*	*1*	*0.89*	*391093.8*			
J	*88,577*	*Concrete or Asphalt*	*1*	*0.89*	*79010.7*			
J	*8,966*	*Ornamental Landscaping*	*0.1*	*0.11*	*990.4*			
	535989	***Total***			**471094.9**	**0.58**	***22769.6***	***37997***

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	PBLA ENGINEERING, INC	Date	9/13/2022
Designed by	SDL	Case No	P21-00013
Company Project Number/Name	R & W - PERRIS		

BMP Identification

BMP NAME / ID: DMA - K EAST SIDE INDUSTRIAL

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}= 0.58 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)*
K	*419,494*	*Roofs*	*1*	*0.89*	*374188.6*			
K	*88,577*	*Concrete or Asphalt*	*1*	*0.89*	*79010.7*			
K	*8,966*	*Ornamental Landscaping*	*0.1*	*0.11*	*990.4*			
	517037	***Total***			**454189.7**	**0.58**	***21952.5***	***37211***

#REF!

Notes:

ADS® Barracuda™ Max

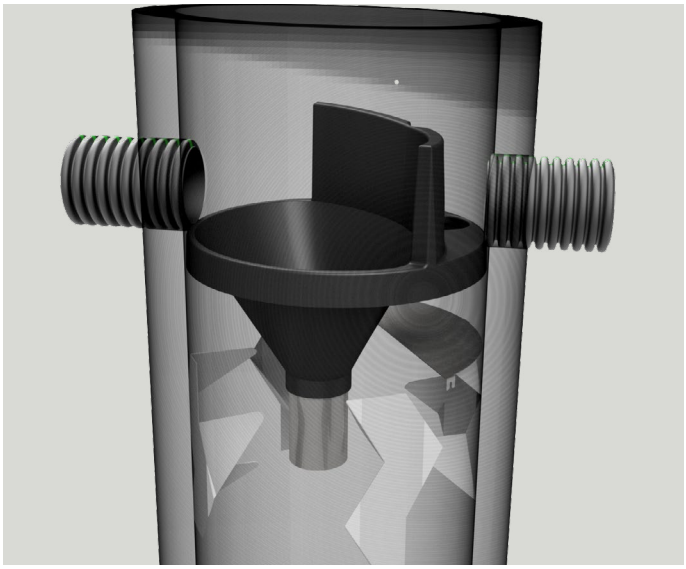
The Barracuda Max is market-changing stormwater quality technology. This high-performance vortex hydrodynamic separator is designed to remove total suspended solids in order to protect our precious receiving waters. The Barracuda Max is also an outstanding value that offers multiple pipe configurations, and quick installation. The “Max” version of the Barracuda is built on the base platform of the original ADS Barracuda with improved removal efficiencies and installation components.

Features

- Single manhole design
- No elevation loss between the inlet and outlet
- Variable inlet/outlet angle configurations (not just 180 degree orientation)
- Internal bypass for inline installation (where applicable)
- Revolutionary, patent-pending “teeth” mitigate turbulence in the sump area to prevent re-suspension of captured contaminants and an added deflector plate and bowl extension enhance the unit’s removal capabilities

Benefits

- Internal components are in stock for quick delivery
- The S3, S4, S6, and S8 can be installed in a standard 36” (900 mm), 48” (1200 m), 72” (1800 m), and 96” (2400 m) precast manhole, respectively
- The S3 & S4 can be provided factory installed within a 36” (900 mm) and 48” (1200 mm) ADS HP manhole and delivered to the jobsite
- The Barracuda Max “teeth” and deflector plate apparatus are fabricated and designed for quick and easy field assembly
- Designed for easy maintenance using a vacuum truck or similar equipment.
- Inspection and maintenance are performed from the surface with no confined space entry



ADS™

Barrucuda Specification

Materials and Design

- Concrete Structures: Designed for H-20 traffic loading and applicable soil loads or as otherwise determined by a Licensed Professional Engineer. The materials and structural design of the devices shall be per ASTM C857 and ASTM C858.
- 36” (900 mm) and 48” (1200 mm) HP Manhole Structures: Made from an impact modified copolymer polypropylene meeting the material requirements of ASTM F2764. The eccentric cone reducer shall be manufactured from polyethylene material meeting ASTM D3350 cell class 213320C. Gaskets shall be made of material meeting the requirements of ASTM F477.
- Separator internals shall be substantially constructed of stainless steel, polyethylene or other thermoplastic material approved by the manufacturer.

Performance

- The stormwater treatment unit shall be an inline unit capable of conveying 100% of the design peak flow. If peak flow rates exceed maximum hydraulic rate, the unit shall be installed offline.
- The Barracuda Max unit shall be designed to remove at least 80% of the suspended solids on an annual aggregate removal basis. Said removal shall be based on full-scale third party testing using OK-110 media gradation or equivalent and 300 mg/L influent concentration. Said full scale testing shall have included sediment capture based on actual total mass collected by the stormwater treatment unit.

  - OR -

  The Barracuda Max unit shall be designed to remove at least 50% of TSS using a media mix with d_{50}=75 micron and 200 mg/L influent concentration.

  - OR -

  The Barracuda Max unit shall be designed to remove at least 50% of TSS per current NJDEP/NJCAT HDS protocol.
- The stormwater treatment unit internals shall consist of (1) separator cone assembly, and (1) sump assembly, which includes the “teeth”.

Barracuda Max Model	Manhole Diameter	NJDEP (50% removal)	OK-110 (80% removal)
S3	36” (900 mm)	0.85 CFS (24.1 L/s)	0.86 CFS (24.1 L/s)
S4	48” (1200 mm)	1.52 CFS (43.0 L/s)	1.52 CFS (43.0 L/s)
S6	72” (1800 mm)	3.40 CFS (96.3 L/s)	3.42 CFS (96.8 L/s)
S8	96” (2400 mm)	6.08 CFS (172.2 L/s)	6.08 CFS (172.2 L/s)

* Peak bypass flows are dependent on final design

Installation

Installation of the stormwater treatment unit(s) shall be performed per manufacturer’s installation instructions. Such instructions can be obtained by calling Advanced Drainage Systems at 800-821-6710 or by logging on to www.adspipe.com.

adspipe.com
800-821-6710

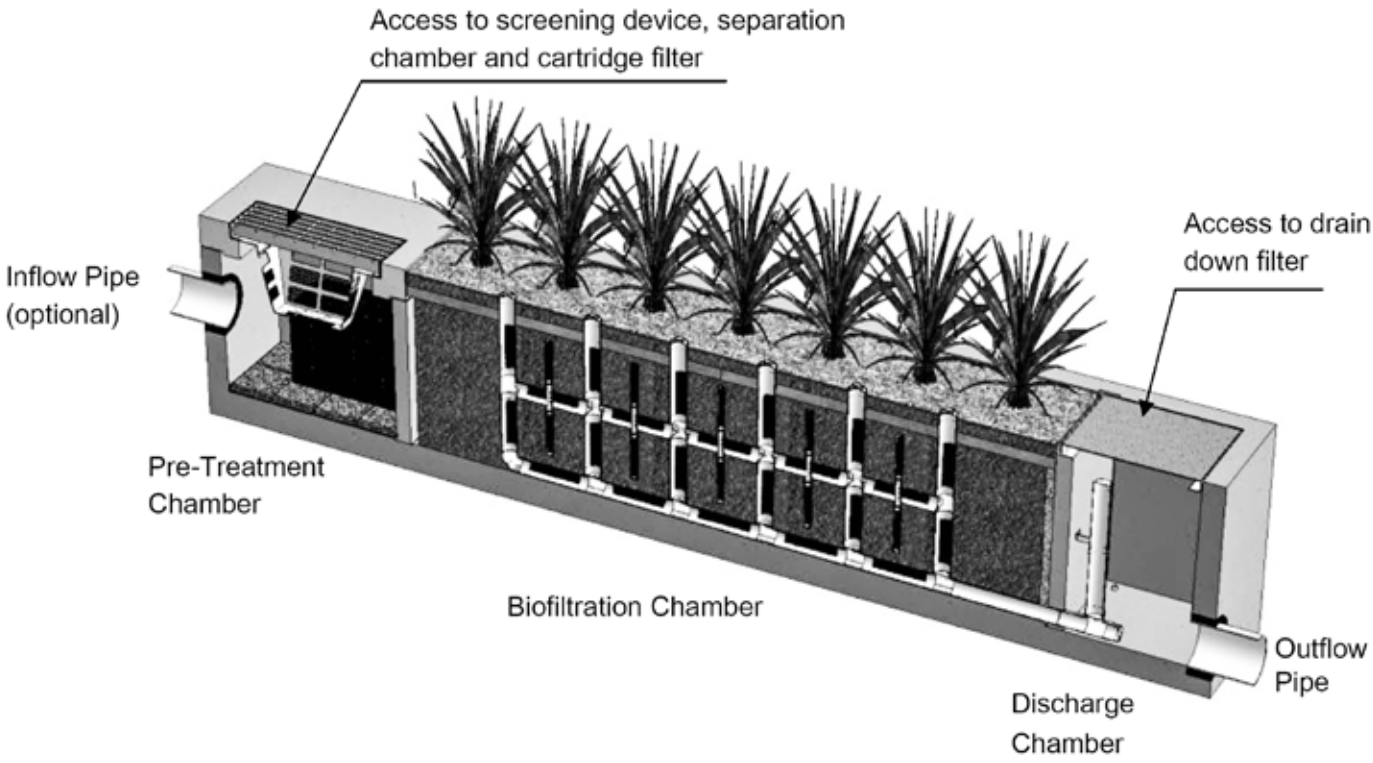
CONTECH®
ENGINEERED SOLUTIONS

Modular Wetlands® Linear
Operation & Maintenance Manual

MODULAR WETLANDS®

Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - *(5 minute average service time).*
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - *(10 minute average service time).*
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - *(10-15 minute per cartridge average service time).*
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - *(5 minute average service time).*
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - *(Service time varies).*



System Diagram

Maintenance Procedures

Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre- Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer, spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber. Entry into chambers may require confined space training based on state and local regulations.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/ inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the Biofiltration Chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

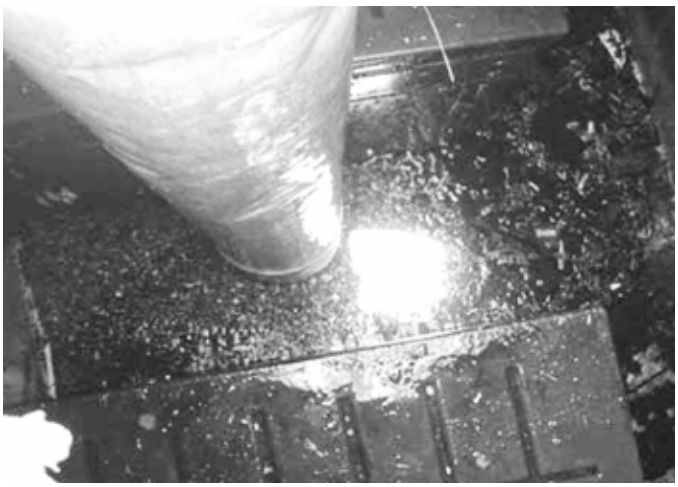
Maintenance Procedure Illustration

Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.

Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.



Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.

Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.

Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.

CONTECH® ENGINEERED SOLUTIONS

Inspection Report
Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	**Yes**	**No**	**Comments**
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	**Yes**	**No**
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: _____

CONTECH®
ENGINEERED SOLUTIONS

Cleaning and Maintenance Report
Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

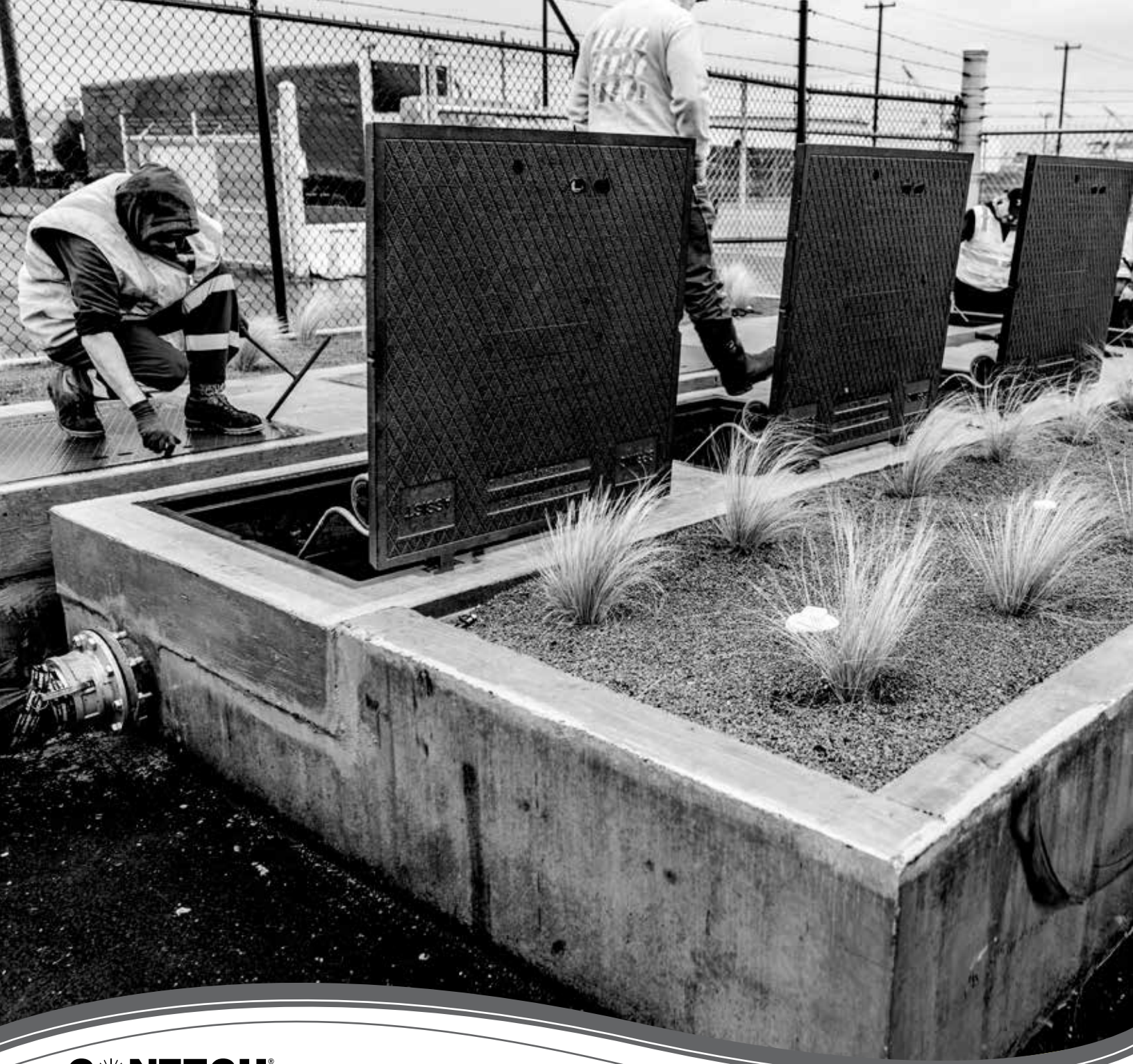
For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:



CONTECH®
ENGINEERED SOLUTIONS

800-338-1122

WWW.CONTECHES.COM

CONTECH ENGINEERED SOLUTIONS LLC PROVIDES SITE SOLUTIONS FOR THE CIVIL ENGINEERING INDUSTRY. CONTECH'S PORTFOLIO INCLUDES BRIDGES, DRAINAGE, SANITARY SEWER, STORMWATER AND EARTH STABILIZATION PRODUCTS. FOR INFORMATION ON OTHER CONTECH DIVISION OFFERINGS, VISIT CONTECHES.COM OR CALL 800-338-1122.

SUPPORT

DRAWINGS AND SPECIFICATIONS ARE AVAILABLE AT WWW.CONTECHES.COM

Modular Wetlands Maintenance Guide 08/22

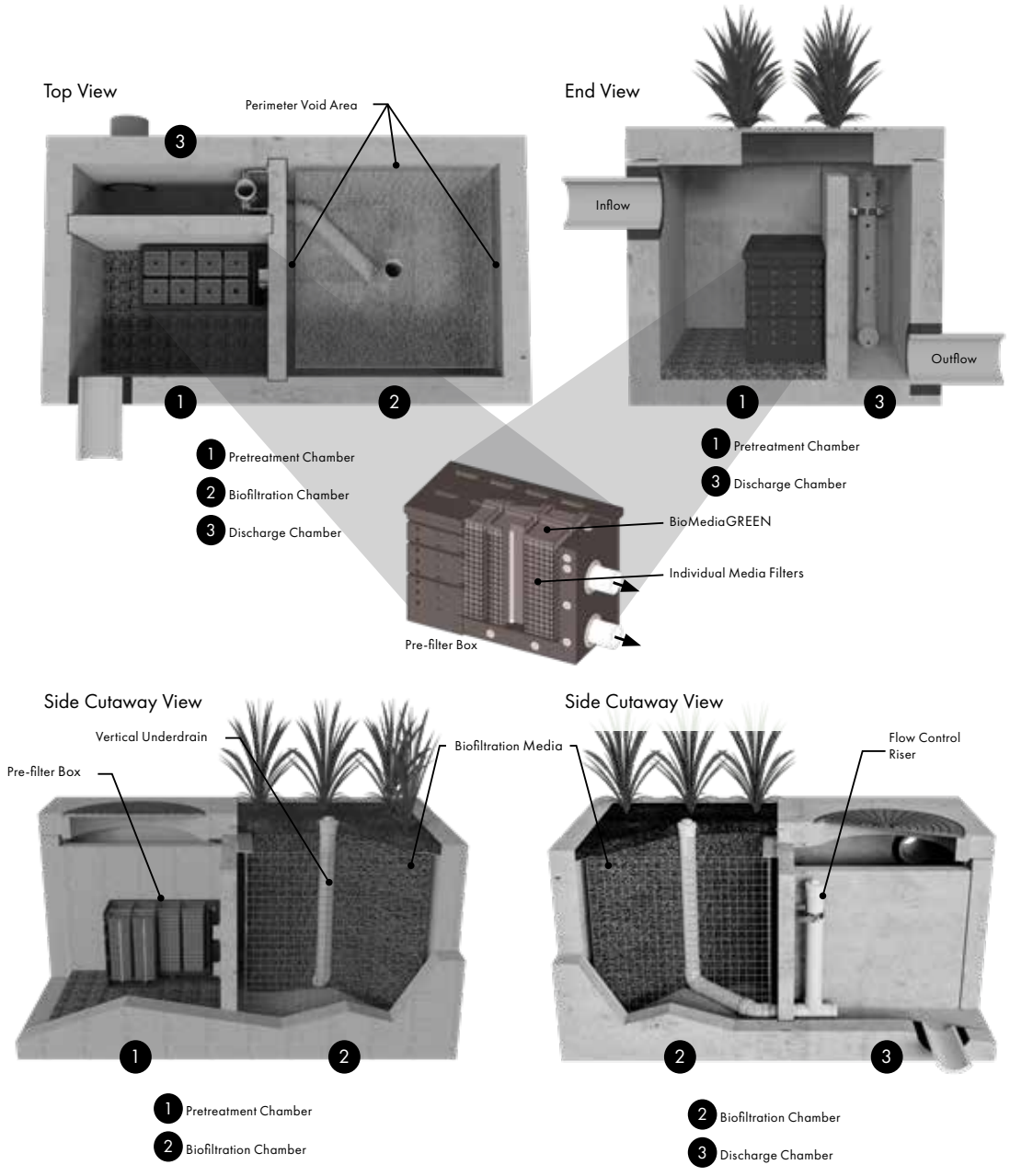
CONTECH®
ENGINEERED SOLUTIONS

Modular Wetlands® Linear Concrete Installation Manual

MODULAR WETLANDS®

Overview

The Modular Wetland® Linear Biofilter is designed to remove high levels of trash, debris, sediments, nutrients, metals, and hydrocarbons. Its simple design allows for quick and easy installation. The system is housed in a standard pre-cast structure and can be installed at various depths to meet site-specific conditions.



Introduction

This is the Modular Wetlands® Linear installation manual. Before starting, make sure there is enough room for installing and assembling the product. Inspect all materials for defects and gather the recommended tools listed on the following page. The contractor shall furnish all labor, equipment, materials, and incidentals required to conduct the installation in accordance with the contract documents.

Instructions

Delivery & Unloading / Lifting

- Contech shall deliver the unit(s) to the site in coordination with the Contractor.
- The Contractor may be required to provide spreader bars and chains/cables to safely and securely lift the base section, risers, and top section along with suitable lifting hooks, knuckles, shackles and eyebolts.
- Please see project specific drawings for weights and lifting details. Contact Contech for additional lifting details.

Inspection

Inspection of the Modular Wetlands® Linear and all parts contained in or shipped outside of the unit shall be inspected at time of delivery by the site Engineer/Inspector and the Contractor. Any nonconformance to approved drawings or damage to any part of the system shall be documented on the Contech shipping ticket.

- Damage to the unit during and after unloading shall be corrected at the expense of the Contractor. Any necessary repairs to the Modular Wetlands® Linear unit shall be made to the acceptance of the Engineer/ Inspector.

Site Preparation

- The Contractor is responsible for providing adequate and complete vault protection when the Modular Wetlands® Linear unit is installed prior to final site stabilization (full landscaping, grass cover, final paving, and street sweeping completed) to prevent construction debris or construction phase runoff from entering the unit.
- The Contractor shall adhere to all jurisdictional and/or OSHA safety rules in providing temporary shoring of the excavation.
- The Contractor or Owner is responsible for appropriately barricading the Modular Wetlands® Linear unit from traffic (in accordance with local codes).

- Each Modular Wetlands® Linear unit shall be constructed based on the locations and elevations according to the sizes shown on the approved drawings. Any modifications to the elevation or location shall be at the direction of and approved by the Engineer.
- The Modular Wetlands® Linear unit shall be placed on level compacted sub-grade with a minimum 6-inch gravel base. Compact undisturbed sub-grade materials to be per Geotechnical/Soils report. Unsuitable material below sub-grade shall be replaced to site engineer's approval. Place granular sub-base and compact to State and local standards as per the Engineers requirements.
- Once the base piece is set, the riser(s) and top section should be sealed onto the base section before backfilling, using a non-shrink grout, butyl rubber or similar waterproof seal.
- Pipe connections shall be aligned and sealed to meet the approved drawings with modifications necessary to meet site conditions and local regulations. The correct connection (inlet/outlet) will be marked on the Modular Wetlands® Linear unit.

- NOTE: The inlet and outlet pipe cannot protrude past the structures I.D. wall as it will interfere with the internal components.
- Once the Modular Wetlands® Linear unit is set, it should be protected from construction runoff entering it. Contractor will be responsible for cleaning if unit is contaminated by such construction runoff and associated pollutants and damaged (i.e. concrete wash water).
- Backfilling should be performed in a careful manner, bringing the appropriate fill material up in 6-inch lifts on all sides. Pre-cast sections shall be set in a manner that will result in a watertight joint. In all instances, installation of the Modular Wetlands® Linear unit shall conform to ASTM specification C891 "Standard Practice for Installation of Underground Precast Utility Structures" unless specified otherwise in contract documents.
- If applicable, it is the responsibility of the Contractor to provide curb and gutter and transition to the Modular Wetlands® Linear unit for proper stormwater flow into the system through the throat, pipe or grate opening. A standard drawing of the throat and gutter detail is available in the following section; however the plans and contract documents supersede all standard drawings. Several variations of the standard design are available. Effective bypass for an offline Modular Wetlands® Linear unit is essential for correct operation (i.e. bypass to an overflow at lower elevation).

Installation

1. Each Modular Wetlands® Linear unit shall be constructed based on the locations and elevations according to the sizes shown on the approved drawings. Any modifications to the elevation or location shall be at the direction of and approved by the Engineer.

Position crane in a safe and optimal position for unloading. Ensure that the crane operator has the proper weights and distance to install location to allow for proper setup. The crane operator will provide instructions to the delivery driver on where to position the truck for offload.

2. The Modular Wetlands® Linear unit shall be placed on level compacted sub-grade with a minimum 6-inch gravel base and mark the base. Compact undisturbed subgrade materials to be per Geotechnical/Soils report. Unsuitable material below sub-grade shall be replaced to site engineer's approval. Place granular sub-base and compact to State and local standards as per the Engineer's requirements.

3. Pipe material selection should be indicated on the Site Plan. Connect the pipe using a Kor-N-Seal, Press Seal, Fernco, or other approved watertight boot connection. In the case of concrete pipes, grout the connection watertight with non-shrink grout.

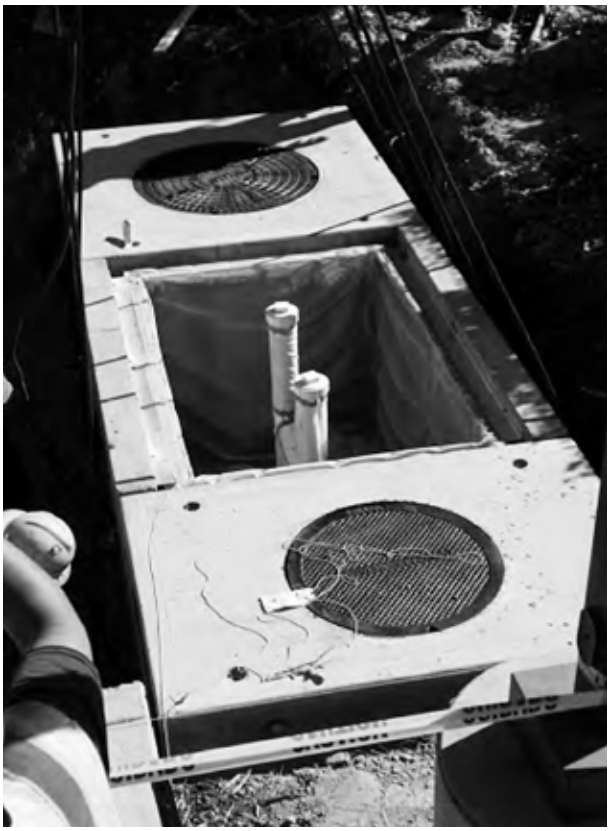
The contractor is responsible to provide the appropriate rigging and lifting connectors. Spreader bars are recommended to prevent damage to the concrete vault. All lifting points on the concrete vault must be used for safe offloading. Guide ropes can be used to stabilize the vault during offloading.

4. Lift the vault off of the delivery truck and safely move vault over the excavated area for installation. Before setting the vault ensure the hole is the right size, level, and properly sized.

5. Position the concrete vault over the excavated area and slowly lower into position. Ensure the inlet and outlet sides of the vault are in the correct position and the correct elevations are verified.

6. Once the vault is set in place, check all four corners are in the correct position. Take tension off of the rigging to ensure the vault is set properly and the compacted rock backfill below is holding the weight of the vault.

7. Use a string and or level to make sure the vault is level in both directions. The vault cannot be more than 0.5% slope off from level in any direction. If the vault slopes more than 0.5%, pick back up, move to a safe area, re-level the rock below and reset until properly level.



8. After pipe connections are completed, backfill in 12 inch increments and compact per local and state requirements. If curb type configurations, pour and connect curb and gutter system as shown in the picture to the right.

   The last step is to install the wetland media that can be delivered in super sacks or in bulk based on preference. Install the plant propagation blocks as shown in the drawings below. Install the vegetation and cover with decorative rock and mulch.

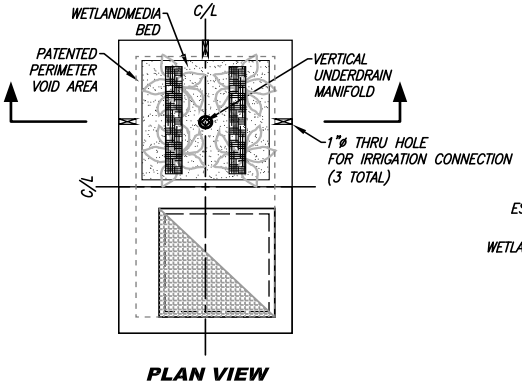
Pipe Connections

- Pipe material selection should be indicated on the Site Plan. Connect the pipe using a Kor-N-Seal, Press Seal, Fernco, or other approved watertight boot connection. In the case of concrete pipes, grout the connection watertight with non-shrink grout
- Inlet pipe(s) shall be stubbed in and connected to the precast manhole according to the Engineer's requirement or specifications. The Contractor is to grout all inlet pipes flush with the interior wall of the structure per plans and specifications.
- Outlet pipe shall be stubbed in and connected to the precast manhole according to the Engineer's requirement or specifications. The Contractor is to grout all inlet pipes flush with the interior wall of the structure per plans and specifications.
- For illustration a BAD example of a pipe installation is included below. The pipe is off-center, the pipe invert is not in the appropriate position, it is protruding beyond the inside wall, the grout is not clean and properly finished. This site was corrected by re-excavating and reconnecting the pipe properly.

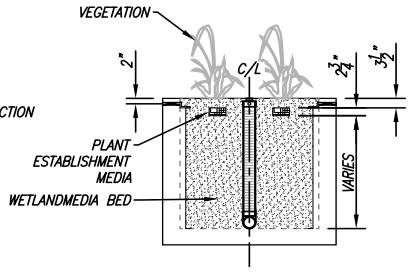
Example of a BAD pipe installation. Protruding past the internal wall of the structure, poor grouting, and wrong position.

Example of a GOOD pipe installation. Pipe flush with the internal wall of the structure, clean grouting, and proper position.

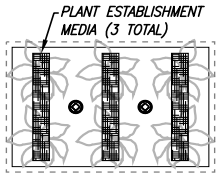
- Once the pipes are connected, carefully backfill around them, compacting in "lifts" that will not deflect, disturb or damage them.



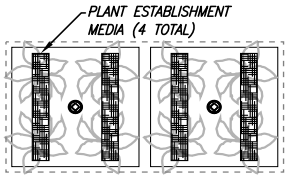
PLAN VIEW



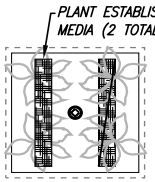
SECTION VIEW



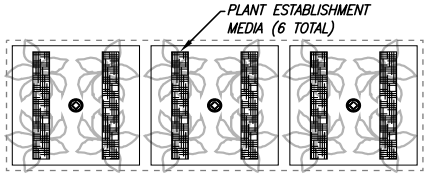
MWS-L-6-8



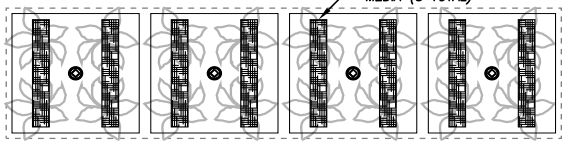
MWS-L-8-8



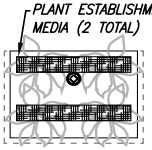
MWS-L-4-8



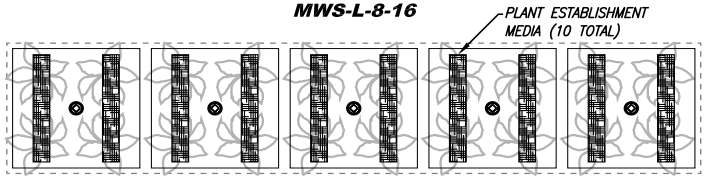
MWS-L-8-12



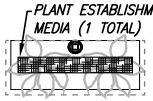
MWS-L-8-16



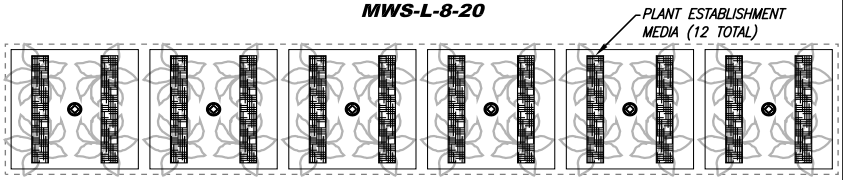
MWS-L-4-6



MWS-L-8-20



MWS-L-4-4



MWS-L-8-24

VEGETATION AND IRRIGATION NOTES:

1. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
2. BEFORE SELECTING VEGETATION SEE BIO CLEAN PLANT HARDY ZONE RECOMMENDATIONS.
3. IRRIGATION THRU HOLE IS 1"ø AND IS DESIGNED TO BE CONNECTED TO A ½"ø IRRIGATION LINE. IRRIGATION THRU HOLE IS LOCATED ON CENTER OF WETLAND CHAMBER 2" DOWN FROM THE TOP OF THE SYSTEM.
4. IRRIGATION SYSTEM FOR MODULAR WETLAND SYSTEM CAN BE PLACED ON SAME VALVE AS SURROUNDING PLANTING AREAS AND REQUIRES NO SPECIAL WATERING NEEDS.

INSTALLATION NOTES

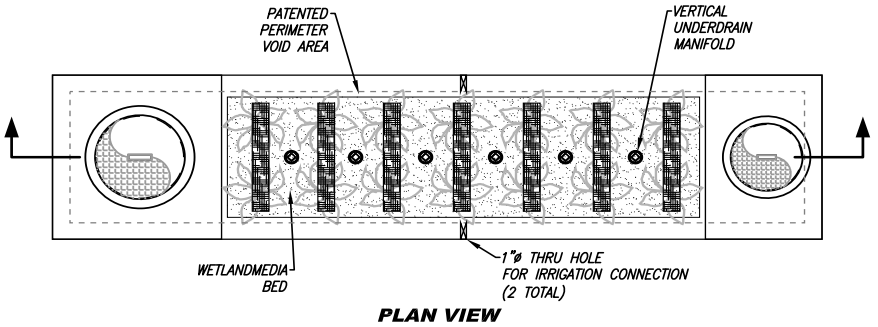
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

MODULAR WETLANDS

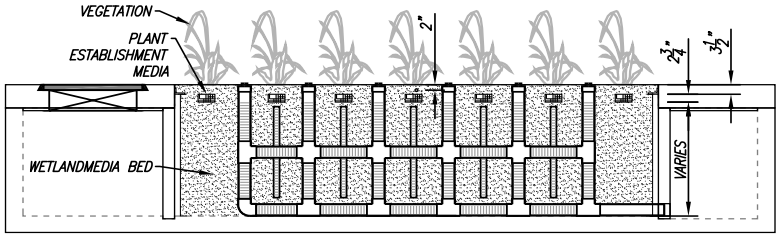
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,252; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

CONTECH® ENGINEERED SOLUTIONS

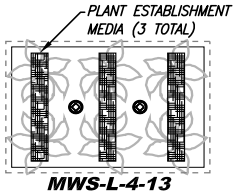
STORMWATER BIOFILTRATION SYSTEM PLANTER INSTALLATION



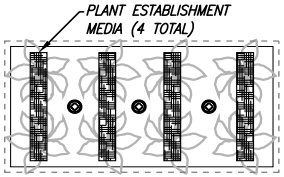
PLAN VIEW



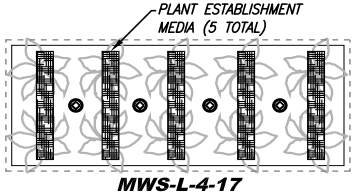
SECTION VIEW



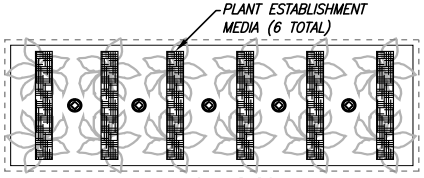
MWS-L-4-13



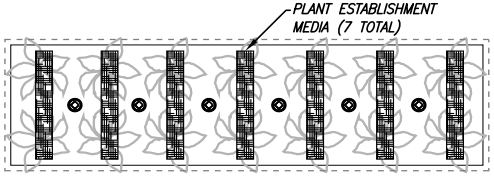
MWS-L-4-15



MWS-L-4-17



MWS-L-4-19



MWS-L-4-21

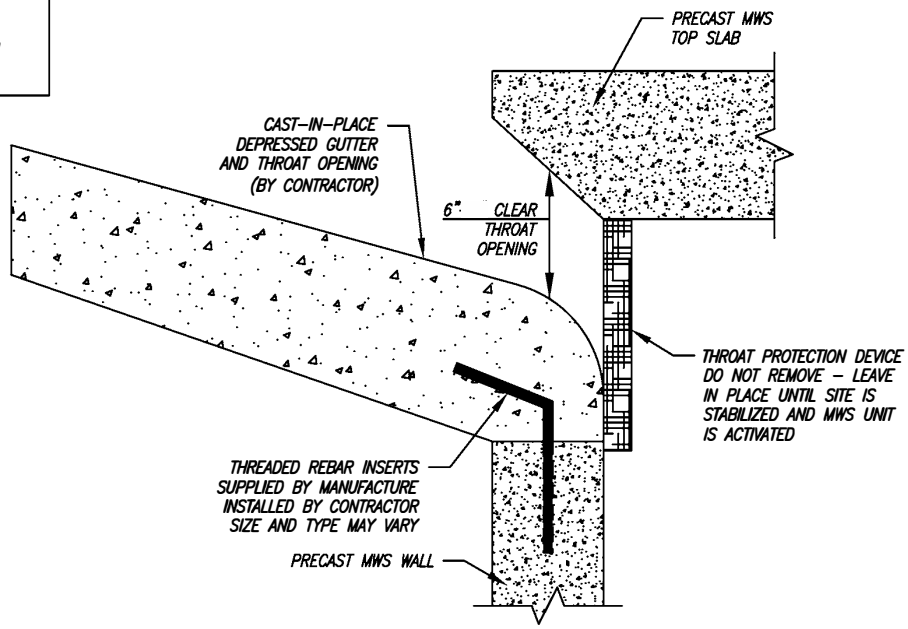
VEGETATION AND IRRIGATION NOTES:

1. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
2. BEFORE SELECTING VEGETATION SEE BIO CLEAN PLANT HARDY ZONE RECOMMENDATIONS.
3. IRRIGATION THRU HOLE IS 1"ø AND IS DESIGNED TO BE CONNECTED TO A ½"ø IRRIGATION LINE. IRRIGATION THRU HOLE IS LOCATED ON CENTER OF WETLAND CHAMBER 2" DOWN FROM THE TOP OF THE SYSTEM.
4. IRRIGATION SYSTEM FOR MODULAR WETLAND SYSTEM CAN BE PLACED ON SAME VALVE AS SURROUNDING PLANTING AREAS AND REQUIRES NO SPECIAL WATERING NEEDS.

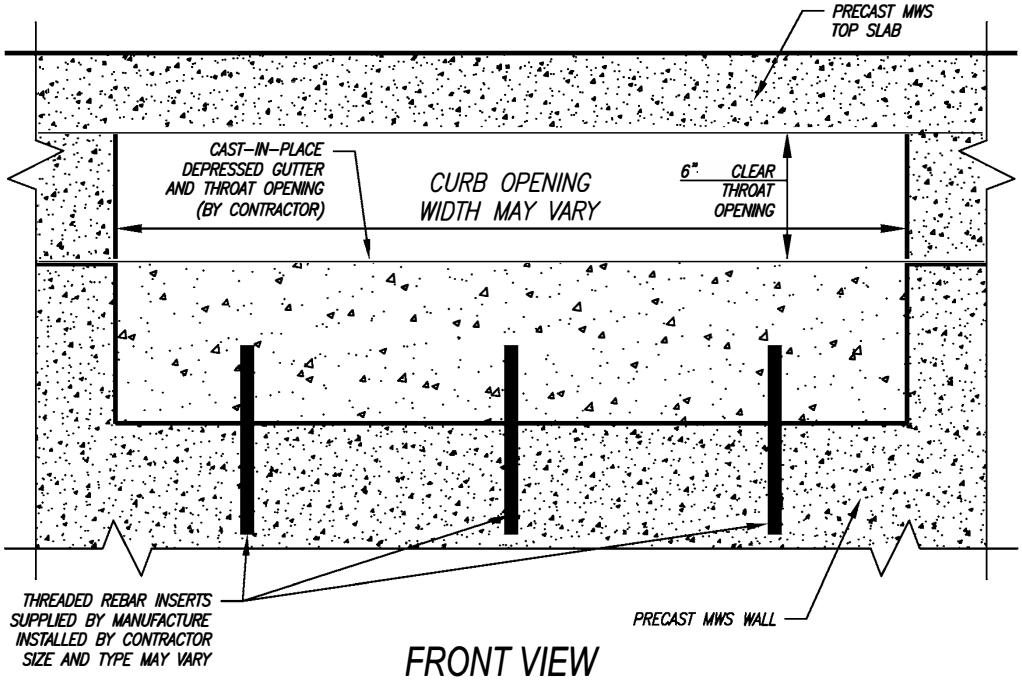
INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

STORMWATER BIOFILTRATION SYSTEM
PLANTER INSTALLATION



SECTION VIEW
STANDARD MODULAR WETLAND CURB OPENING



FRONT VIEW
STANDARD MODULAR WETLAND CURB OPENING

MODULAR WETLAND SYSTEMS INC.
P.O. BOX 869
OCEANSIDE, CA 92049
www.ModularWetlands.com

	NAME	DATE
DRWN	John	5/3/13
EDITED		

TITLE: MWS LINEAR 2.0 CURB INLET DETAILS

COMMENTS:

SIZE | DWG. NO. | REV

SCALE NTS UNITS INCHES SHEET 1 OF 1

CONTECH®
ENGINEERED SOLUTIONS

800-338-1122

WWW.CONTECHES.COM

CONTECH ENGINEERED SOLUTIONS LLC PROVIDES SITE SOLUTIONS FOR THE CIVIL ENGINEERING INDUSTRY. CONTECH'S PORTFOLIO INCLUDES BRIDGES, DRAINAGE, SANITARY SEWER, STORMWATER AND EARTH STABILIZATION PRODUCTS. FOR INFORMATION ON OTHER CONTECH DIVISION OFFERINGS, VISIT CONTECHES.COM OR CALL 800-338-1122.

SUPPORT

DRAWINGS AND SPECIFICATIONS ARE AVAILABLE AT WWW.CONTECHES.COM

Modular Wetland Linear Install Guide 08/22

CONTECH®
ENGINEERED SOLUTIONS

Modular Wetlands® Linear Stormwater Biofiltration

The experts you need to solve your stormwater challenges

Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team

STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.

STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.

REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.

SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions

Restoring Nature's Presence in Urban Areas – Modular Wetlands® Linear

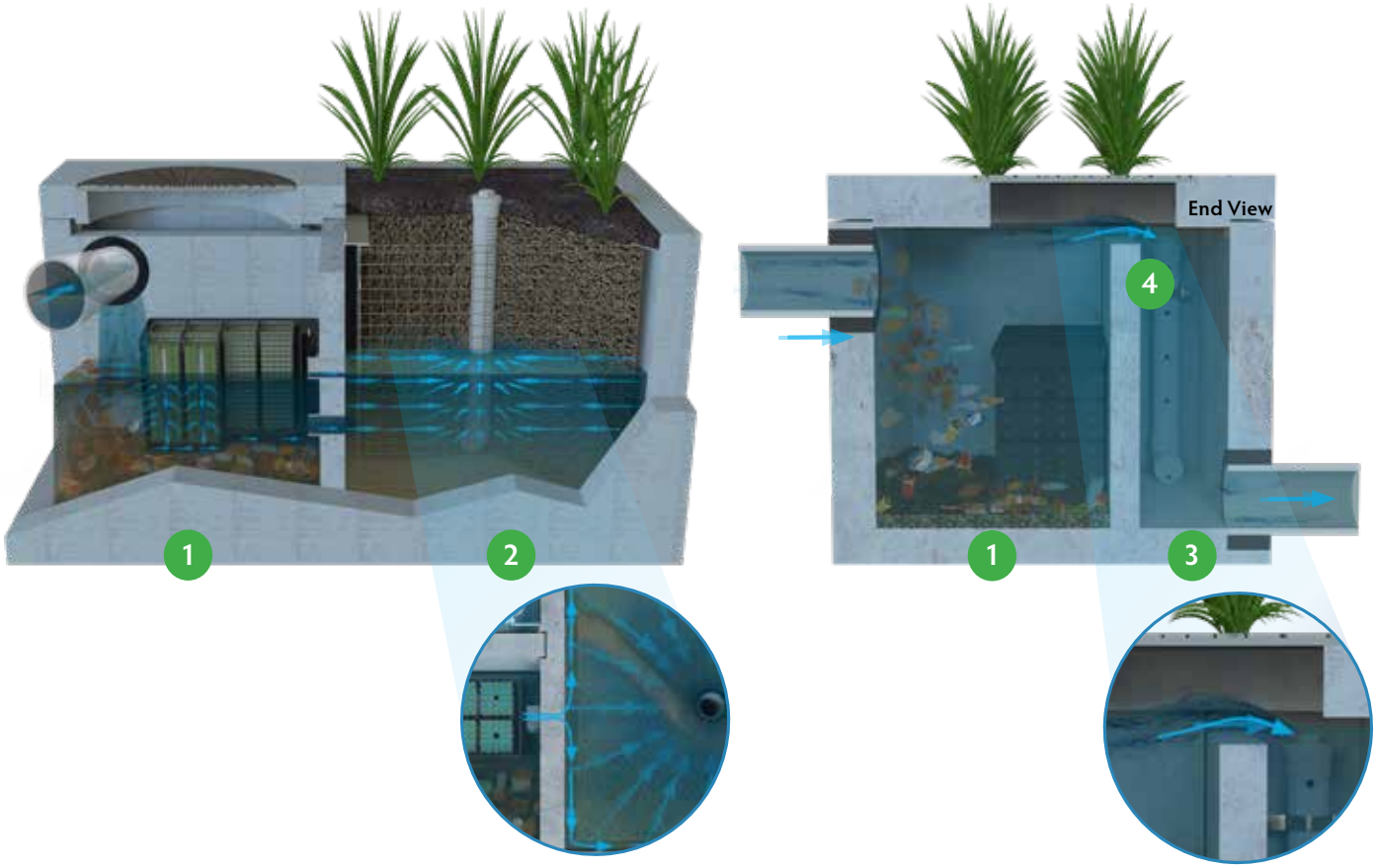
As cities grow, there is less space for natural solutions to treat stormwater. Contech understands this and is committed to providing compact, Low Impact Development (LID) solutions like the Modular Wetlands Linear to protect our nation's waterways.

The Modular Wetlands® Linear is the only biofiltration system to utilize patented horizontal flow, allowing for a small footprint, high treatment capacity, and design versatility. It is also the only biofiltration system that can be routinely installed downstream of storage for additional volume control and treatment.

With numerous regulatory approvals, the system's aesthetic appeal and superior pollutant removal make it the ideal solution for a wide range of stormwater applications, including urban development projects, commercial parking lots, residential streets, mixed-use developments, streetscapes, and more.

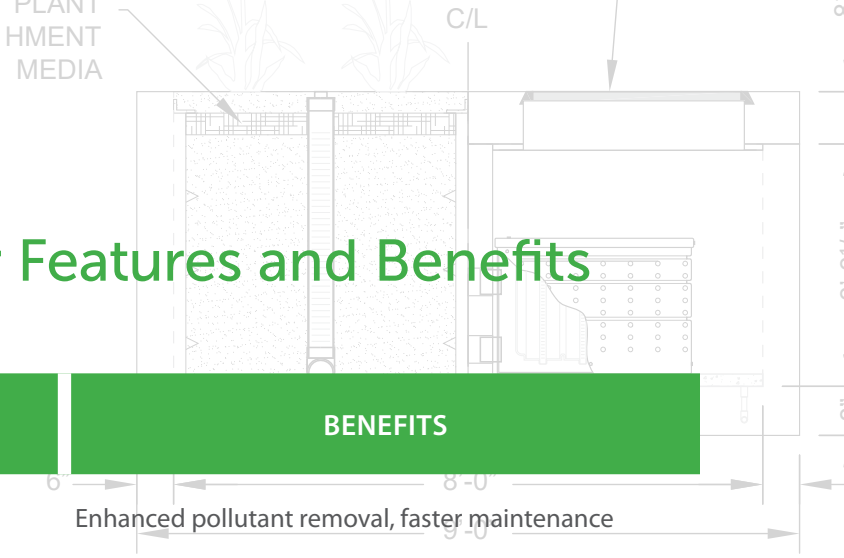
MODULAR WETLANDS®

How the Modular Wetlands® Linear Works



1. **PRETREATMENT** | Stormwater enters the pretreatment chamber where total suspended solids settle, and trash and debris are contained within the chamber. Stormwater then travels through the pretreatment filter boxes that provide additional treatment.
2. **BIOFILTRATION** | As water enters the biofiltration chamber, it fills the void space in the chamber's perimeter. Horizontal forces push the water inward through the biofiltration media, where nutrients and metals are captured. The water then enters the drain pipe to be discharged.
3. **DISCHARGE** | The specially designed vertical drain pipe and orifice control plate control the flow of water through the media to a level lower than the media's capacity, ensuring media effectiveness. The water then enters the horizontal drain pipe to be discharged.
4. **BYPASS** | During peak flows, an internal weir in the side-by-side configuration allows high flows to bypass treatment, eliminating flooding and the need for a separate bypass structure. Bypass is not provided in the end-to end configuration.

Using horizontal flow to improve performance



Modular Wetlands® Linear Features and Benefits

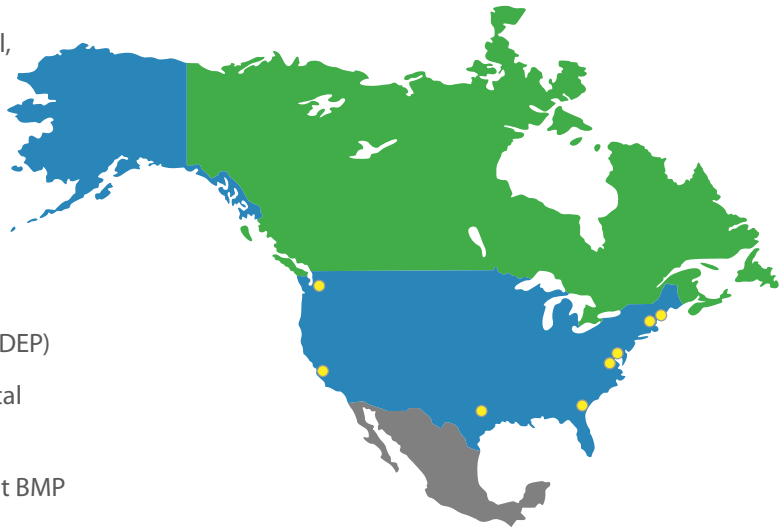
FEATURE	BENEFITS
Pretreatment chamber	Enhanced pollutant removal, faster maintenance
Horizontal flow biofiltration	Greater filter surface area
Performance verified by both the WA DOE and NJ DEP	Superior pollutant capture with confidence
Built-in high flow bypass	Eliminates flooding and the need for a separate bypass structure
Available in multiple configurations and sizes	Flexibility to meet site-specific needs

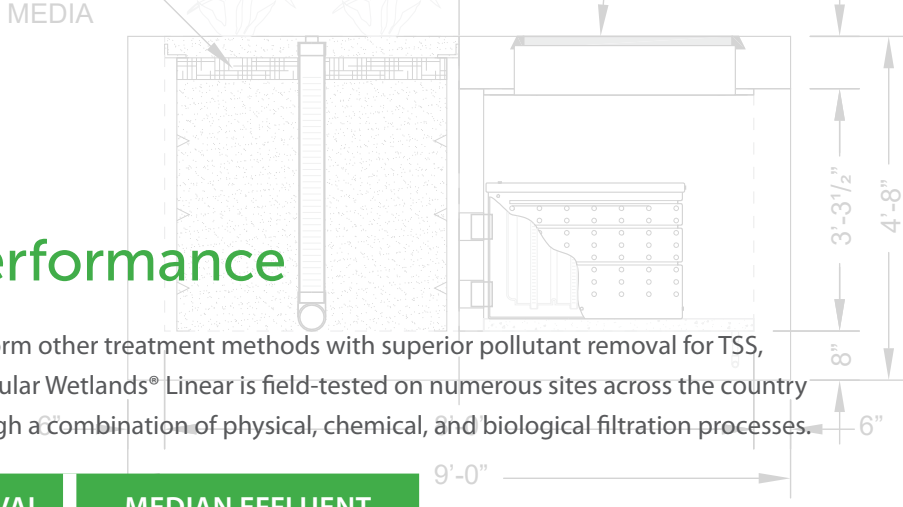
The Modular Wetlands system offers many different configurations.

Select Modular Wetlands® Linear Approvals

Modular Wetlands Linear is approved through numerous local, state and federal programs, including but not limited to:

- Washington State Department of Ecology TAPE
- California Water Resources Control Board, Full Capture Certification
- Virginia Department of Environmental Quality (VA DEQ)
- New Jersey Department of Environmental Protection (NJDEP)
- Maryland Department of the Environment - Environmental Site Design (ESD)
- Rhode Island Department of Environmental Management BMP
- Texas Commission on Environmental Quality (TCEQ)
- Atlanta Regional Commission Certification





Modular Wetlands® Performance

The Modular Wetlands® Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, and hydrocarbons. The Modular Wetlands® Linear is field-tested on numerous sites across the country and is proven to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes.

POLLUTANT OF CONCERN	MEDIAN REMOVAL EFFICIENCY	MEDIAN EFFLUENT CONCENTRATION (MG/L)
Total Suspended Solids (TSS)	89%	12
Total Phosphorus - TAPE (TP)	61%	0.041
Nitrogen (TN)	23%	1
Total Copper (TCu)	50%	0.006
Total Dissolved Copper	37%	0.006
Total Zinc (TZn)	66%	0.019
Dissolved Zinc	60%	0.0148
Motor Oil	79%	0.8

Sources:
TAPE Field Study - 2012
TAPE Field Study - 2013

Note: Some jurisdictions recognize higher removal rates. Contact your Contech Stormwater Consultant for performance expectations.

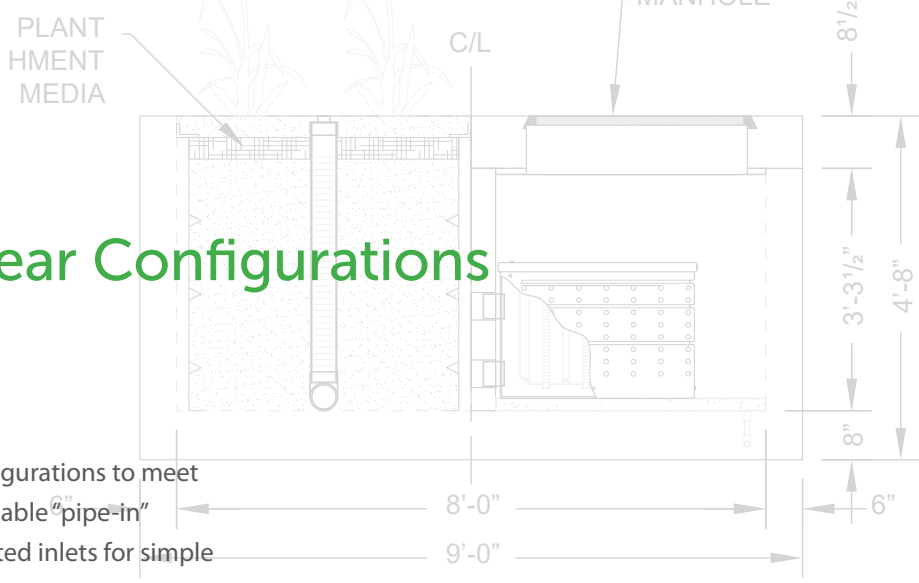
Modular Wetlands® Linear Maintenance

The Modular Wetlands® Linear is a self-contained treatment train. Maintenance requirements for the unit consist of five simple steps that can be completed using a vacuum truck. The system can also be cleaned by hand.

- Remove trash from the screening device
- Remove sediment from the separation chamber
- Periodically replace the pretreatment cartridge filter media
- Replace the drain down filter media
- Trim vegetation

Most Modular Wetland Linear systems can be cleaned in about thirty minutes.

Multiple configurations allow for easy site integration



Modular Wetlands® Linear Configurations

Multiple system configurations integrate with site hydraulic design and layout ...

The Modular Wetlands Linear is offered in multiple configurations to meet site specific needs. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your storm drain design.

Curb Inlet

The Curb Inlet configuration accepts sheet flow through a curb opening and is commonly used along roadways and parking lots. It can be used in sump or flow-by conditions.

Vault

The Vault configuration can be used in end-of-the-line installations. Another benefit of the "pipe-in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements, or for traffic-rated designs (no plants).

Downspout

The Downspout configuration is designed to accept a vertical downspout pipe from rooftop and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter, and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

For more information: www.ContechES.com

CONTECH® ENGINEERED SOLUTIONS

Get social with us:

800-338-1122 | www.ContechES.com

User Inputs

Chamber Model:	MC-7200
Outlet Control Structure:	No
Project Name:	139-1 - DMA-A
Engineer:	Steve Levisee
Project Location:	California
Measurement Type:	Imperial
Required Storage Volume:	2043 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	24 in.
Design Constraint Dimensions:	(20 ft. x 40 ft.)

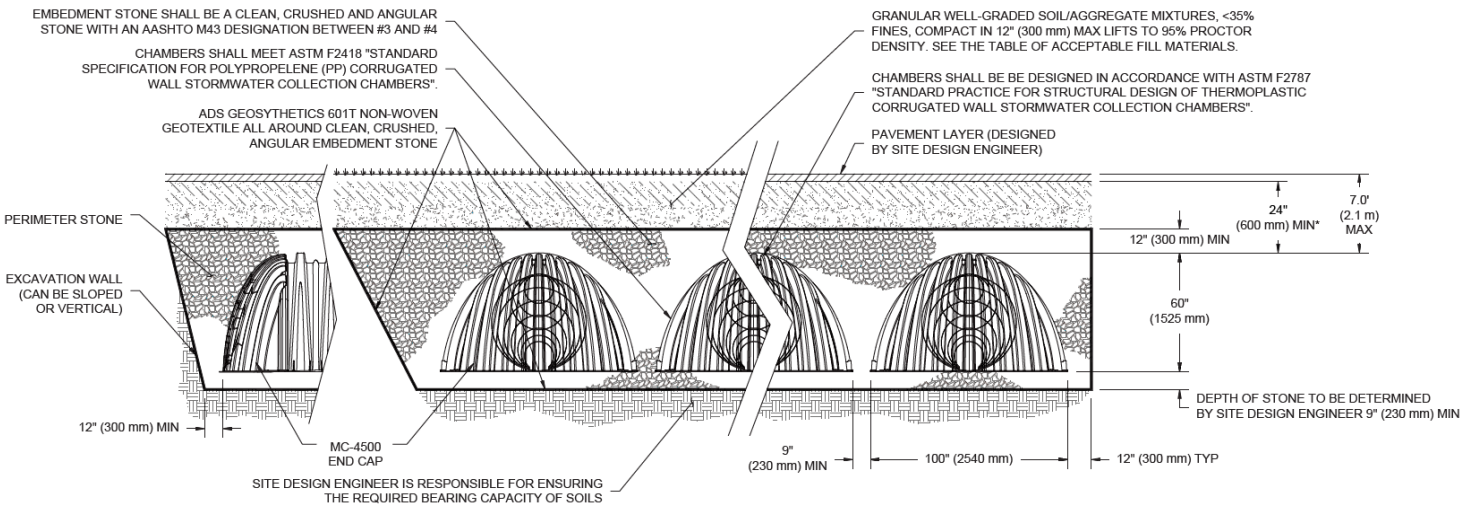
Results

System Volume and Bed Size

Installed Storage Volume:	2353.76 cubic ft.
Storage Volume Per Chamber:	175.90 cubic ft.
Number Of Chambers Required:	6
Number Of End Caps Required:	4
Chamber Rows:	2
Maximum Length:	31.01 ft.
Maximum Width:	19.42 ft.
Approx. Bed Size Required:	602.12 square ft.

System Components

Amount Of Stone Required:	106 cubic yards
Volume Of Excavation (Not Including Fill):	151 cubic yards
Total Non-woven Geotextile Required:	252 square yards
Woven Geotextile Required (excluding Isolator Row):	22 square yards
Woven Geotextile Required (Isolator Row):	59 square yards
Total Woven Geotextile Required:	81 square yards



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

User Inputs

Chamber Model:	MC-7200
Outlet Control Structure:	No
Project Name:	139-1 - DMA - I
Engineer:	Steve Levisee
Project Location:	California
Measurement Type:	Imperial
Required Storage Volume:	3867 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	24 in.
Design Constraint Dimensions:	(20 ft. x 60 ft.)

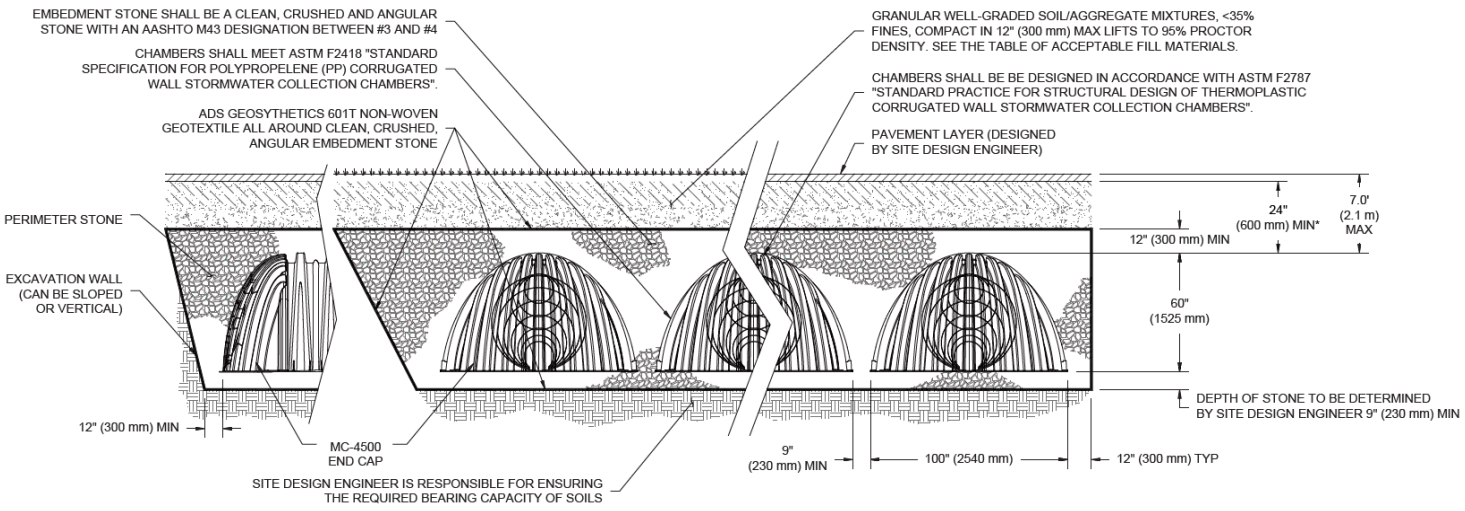
Results

System Volume and Bed Size

Installed Storage Volume:	4313.15 cubic ft.
Storage Volume Per Chamber:	175.90 cubic ft.
Number Of Chambers Required:	13
Number Of End Caps Required:	4
Chamber Rows:	2
Maximum Length:	57.38 ft.
Maximum Width:	19.42 ft.
Approx. Bed Size Required:	1054.20 square ft.

System Components

Amount Of Stone Required:	173 cubic yards
Volume Of Excavation (Not Including Fill):	264 cubic yards
Total Non-woven Geotextile Required:	420 square yards
Woven Geotextile Required (excluding Isolator Row):	22 square yards
Woven Geotextile Required (Isolator Row):	121 square yards
Total Woven Geotextile Required:	142 square yards



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

User Inputs

Chamber Model:	MC-7200
Outlet Control Structure:	Yes
Project Name:	139-1 - DMA J
Engineer:	Steve Levisee
Project Location:	California
Measurement Type:	Imperial
Required Storage Volume:	35220 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	24 in.
Design Constraint Dimensions:	(100 ft. x 160 ft.)

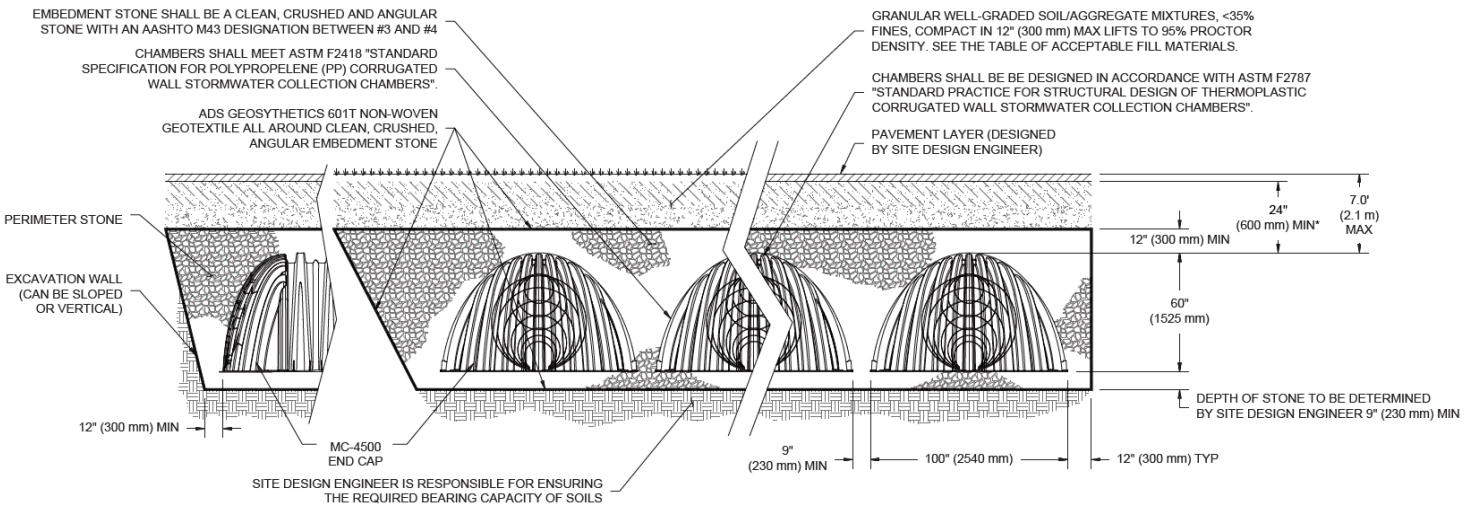
Results

System Volume and Bed Size

Installed Storage Volume:	36126.10 cubic ft.
Storage Volume Per Chamber:	175.90 cubic ft.
Number Of Chambers Required:	124
Number Of End Caps Required:	12
Chamber Rows:	6
Maximum Length:	150.38 ft.
Maximum Width:	56.35 ft.
Approx. Bed Size Required:	8427.68 square ft.

System Components

Amount Of Stone Required:	1282 cubic yards
Volume Of Excavation (Not Including Fill):	2107 cubic yards
Total Non-woven Geotextile Required:	2620 square yards
Woven Geotextile Required (excluding Isolator Row):	107 square yards
Woven Geotextile Required (Isolator Row):	336 square yards
Total Woven Geotextile Required:	442 square yards



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

User Inputs

Chamber Model:	MC-7200
Outlet Control Structure:	Yes
Project Name:	139-1 - DMA - K
Engineer:	Steve Levisee
Project Location:	California
Measurement Type:	Imperial
Required Storage Volume:	31519 cubic ft.
Stone Porosity:	40%
Stone Foundation Depth:	9 in.
Stone Above Chambers:	12 in.
Average Cover Over Chambers:	24 in.
Design Constraint Dimensions:	(100 ft. x 170 ft.)

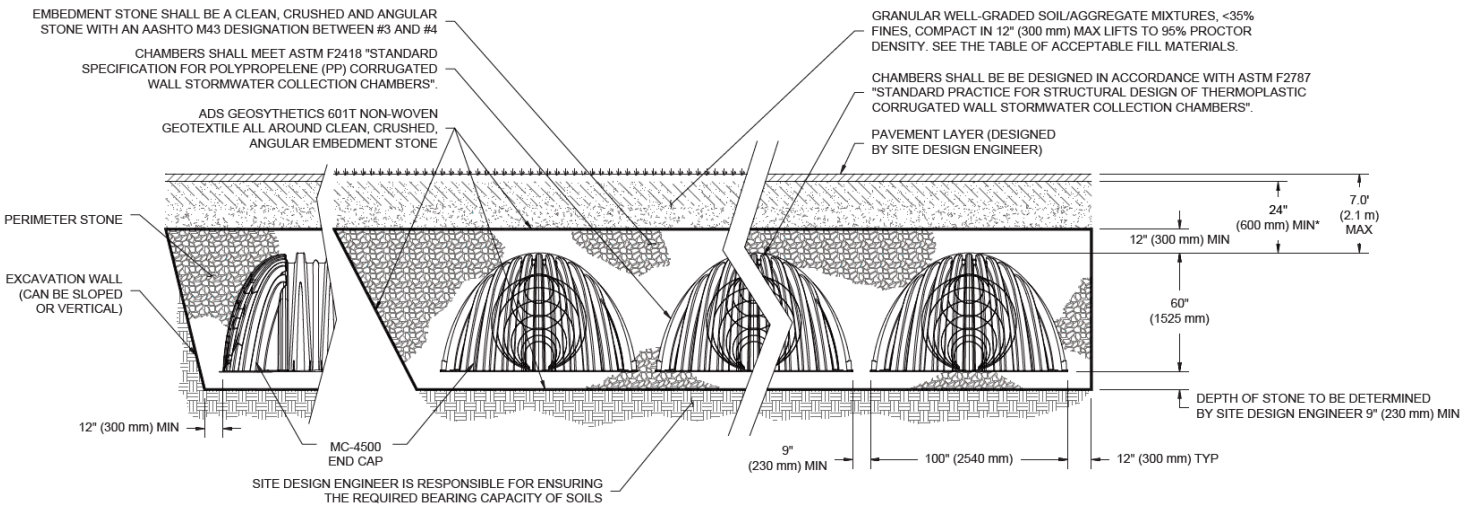
Results

System Volume and Bed Size

Installed Storage Volume:	32352.29 cubic ft.
Storage Volume Per Chamber:	175.90 cubic ft.
Number Of Chambers Required:	111
Number Of End Caps Required:	10
Chamber Rows:	5
Maximum Length:	163.56 ft.
Maximum Width:	47.27 ft.
Approx. Bed Size Required:	7555.69 square ft.

System Components

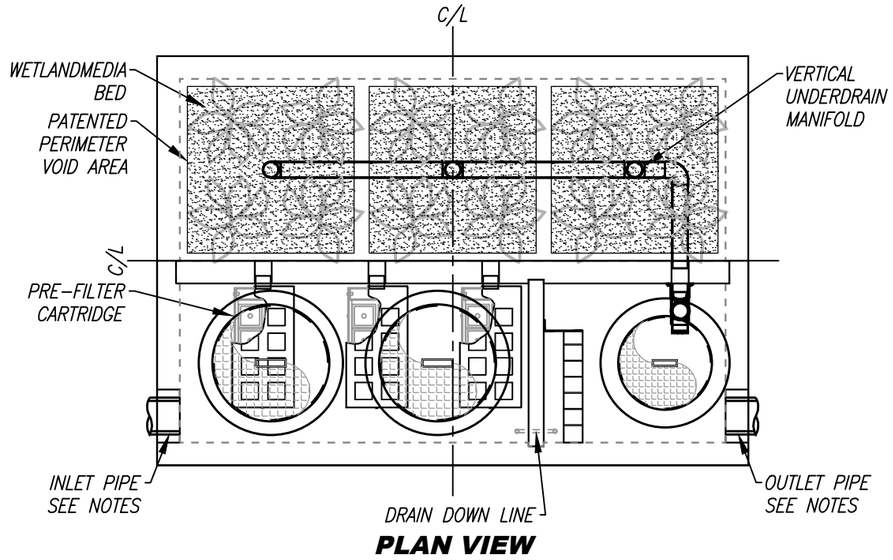
Amount Of Stone Required:	1152 cubic yards
Volume Of Excavation (Not Including Fill):	1889 cubic yards
Total Non-woven Geotextile Required:	2402 square yards
Woven Geotextile Required (excluding Isolator Row):	85 square yards
Woven Geotextile Required (Isolator Row):	367 square yards
Total Woven Geotextile Required:	452 square yards



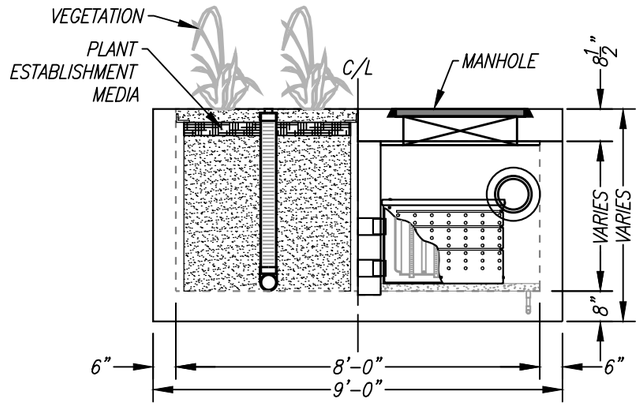
*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.693	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	2EA ø30"	OPEN PLANTER	ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



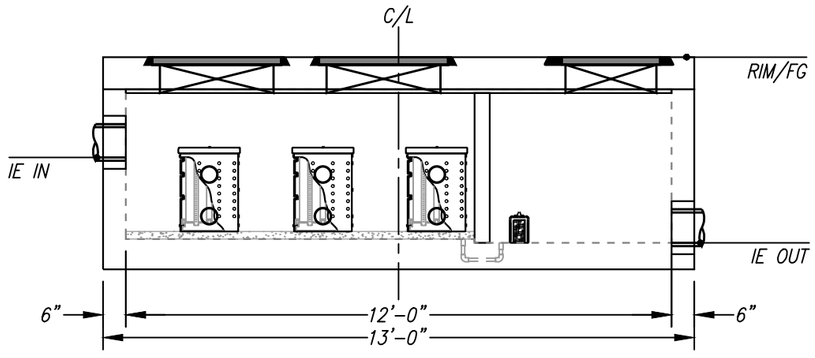
LEFT END VIEW

INSTALLATION NOTES

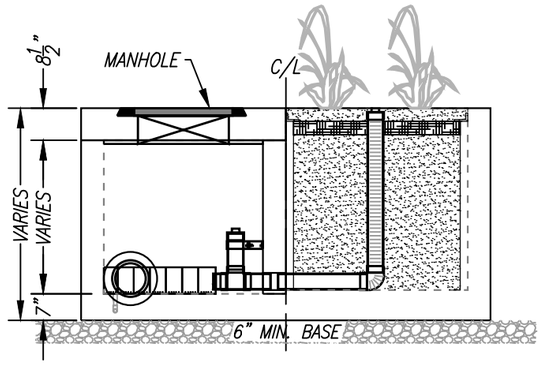
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



ELEVATION VIEW



RIGHT END VIEW

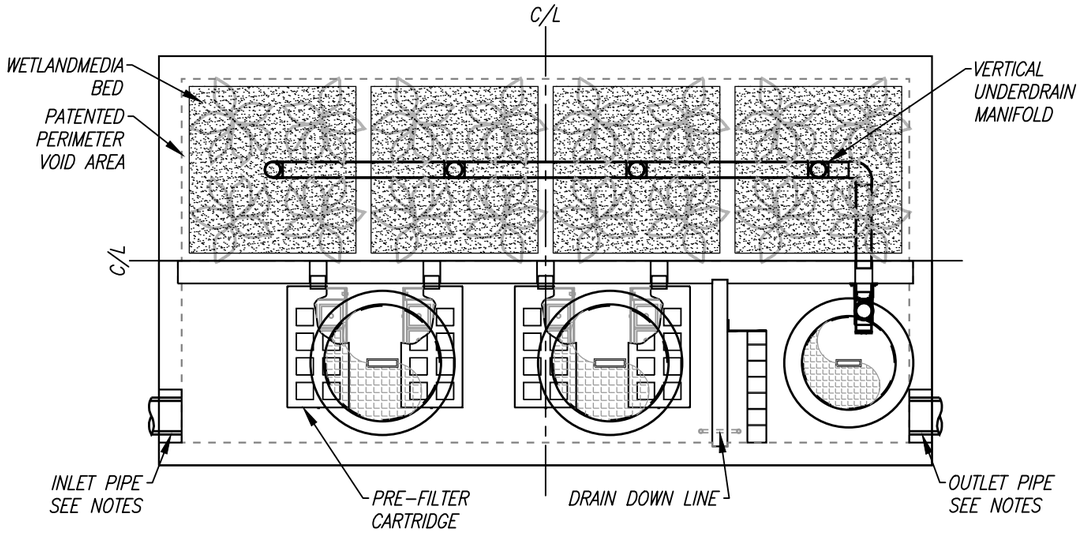
TREATMENT FLOW (CFS)	0.693
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MWS-L-8-12-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

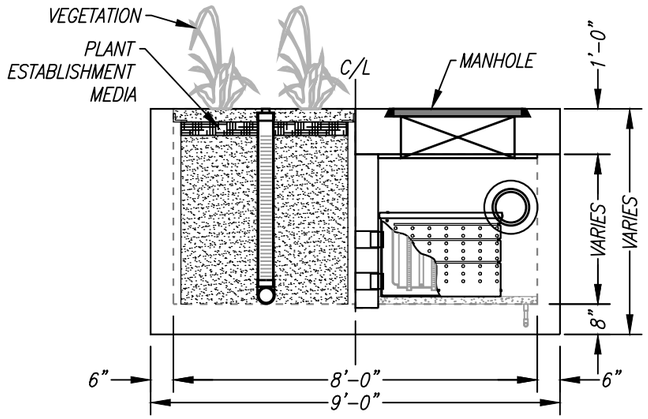
5/23/19 10:EF

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.693	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	2EA ø30"	OPEN PLANTER	ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



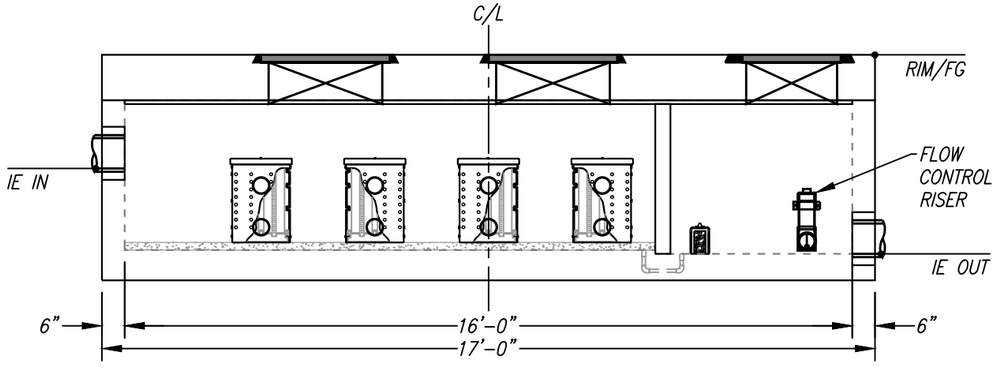
LEFT END VIEW

INSTALLATION NOTES

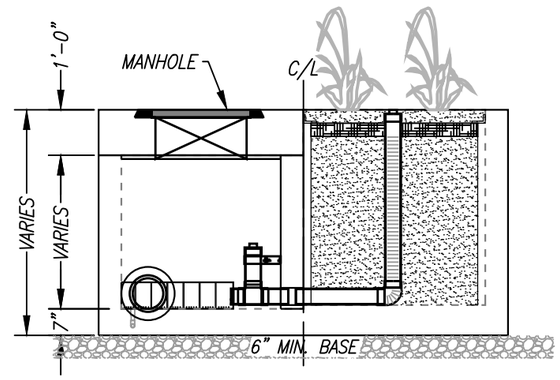
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



ELEVATION VIEW



RIGHT END VIEW

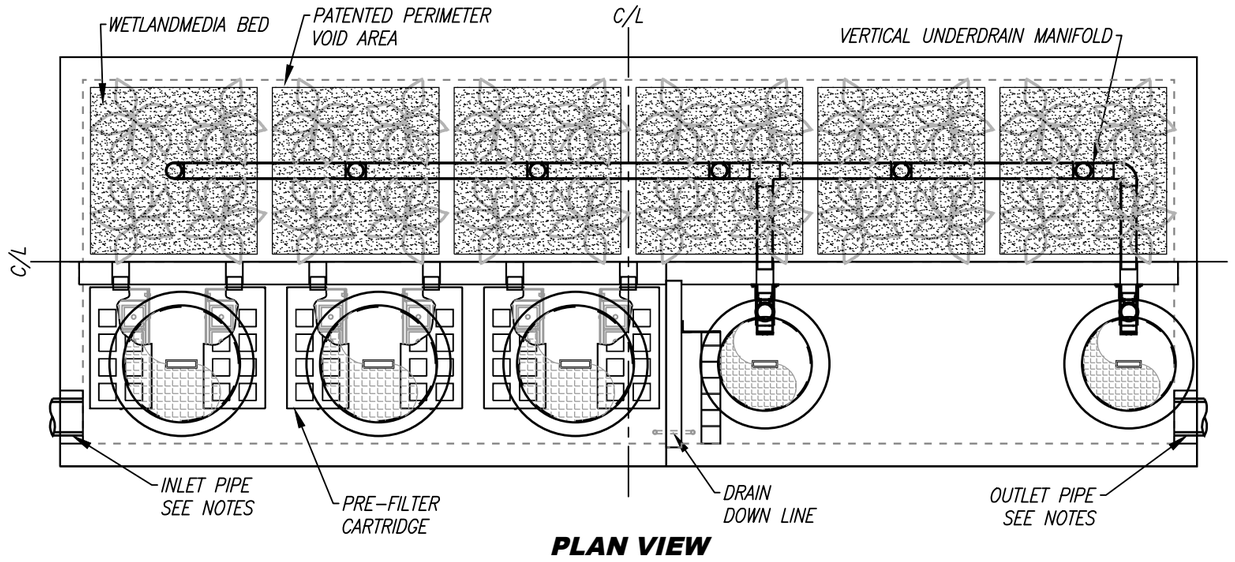
TREATMENT FLOW (CFS)	0.693
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MWS-L-8-16-V
STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

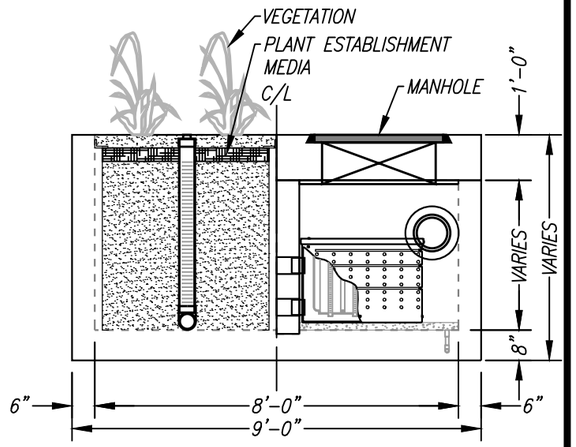
5/23/19 10:LEF

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.693	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	3EA ø30"	OPEN PLANTER	2EA ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



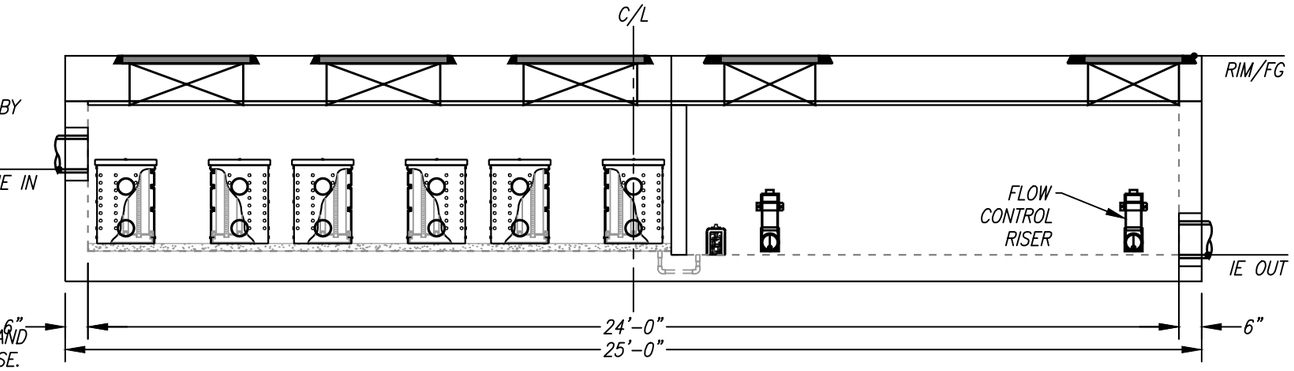
LEFT END VIEW

INSTALLATION NOTES

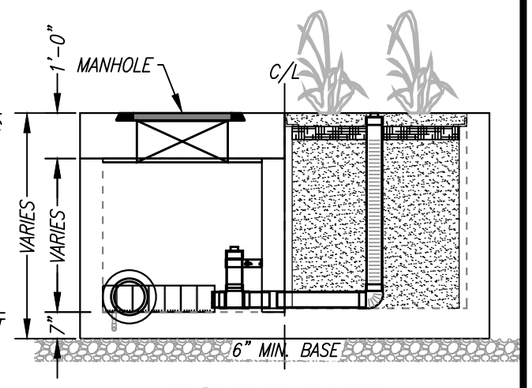
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.693
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

Bio Clean
A Forterra Company

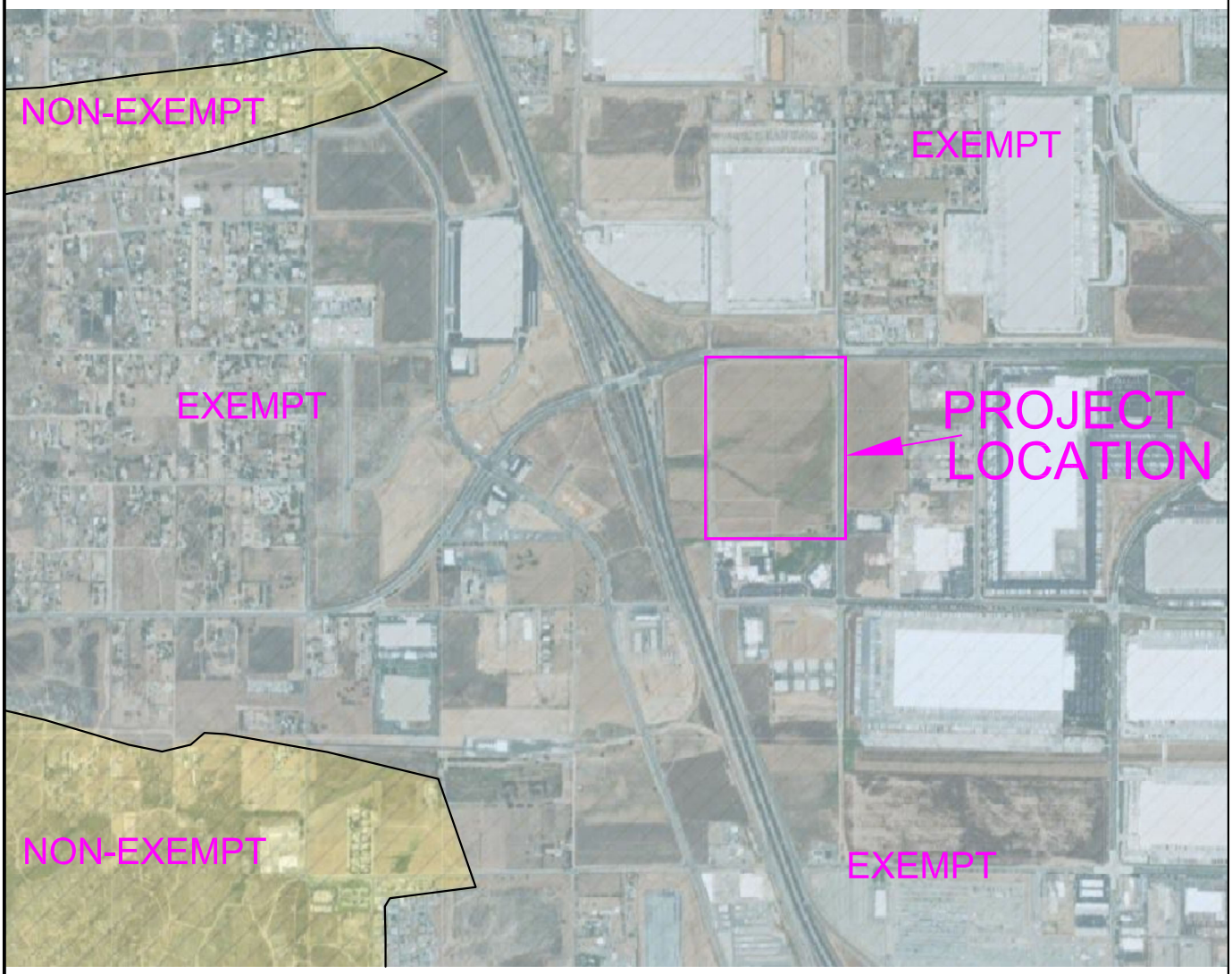
MWS-L-8-24-V
STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

5/23/19 10:LEF

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

EXEMPT



HCOC EXEMPTION AREA MAP

NTS

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

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

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

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

[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.

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☒ **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. ☒ Install door skirts (cowling) at each bay that enclose the end of the trailer.		❑ Move loaded and unloaded items indoors as soon as possible. ❑ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

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

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

Appendix 9: O&M

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

Operation and Maintenance

O&M DESCRIPTION AND SCHEDULE:

Based on the standard Source Control BMPs listed in the WQMP Guidelines, the following chart indicates which Source Control (Non-Structural) BMPs will be implemented at this site.

Note that "OWNER" refers to: *Perris Landco, LLC*

Description of BMP and Method of Implementation	BMP Responsibility	Maintenance Responsibility	Funding Source For O & M	Maintenance Schedule
Education for Property Owners, Tenants and Occupants: The owner shall provide practical information materials: Water Quality Management on general housekeeping practices that contribute to the protection of stormwater quality. The future tenant/occupants will be given educational materials upon move-in and annually thereafter. Educational materials shall be located in the attachments of the WQMP. The owner and future tenant/occupants will be required to familiarize themselves with the WQMP Booklet and agree to abide by and perform maintenance functions. Start up date: Occupancy	**Owner**	**Owner**	**Owner**	Owner shall provide tenant/occupants educational materials upon move-in and annually thereafter. In conformance to the Model WQMP, see Attachments for educational materials.

Description of BMP and Method of Implementation	BMP Responsibility	Maintenance Responsibility	Funding Source For O & M	Maintenance Schedule
Activity Restrictions: Use restrictions (Addendum to Lease Agreement) shall be prepared by owner for the tenant/occupants and for the purpose of surface water quality protection. Owner shall enforce prohibitions of conditions, covenants, and restrictions (CC&Rs) and/or Lease Agreement to future tenant/occupants and thereafter. Use restrictions shall be utilized by said tenant/occupants. Additionally, no litter, liquids, or solids of any kind will be allowed to enter the on-site surface water drainage systems. Identified restrictions that will be imposed are as follows: Prohibit hosing down any paved surfaces where the result would be the flow of non-storm water into the street or storm drains, Prohibit dumping of any waste into catch basins, Prohibit blowing or sweeping of debris (leaf litter, grass clippings, litter,) into catch basins or streets, Prohibit discharges of fertilizer, pesticides, to streets or storm drains, Keep dumpster lids closed at all times. Start-up date: At point in time Activity Restrictions are made part of Lease Agreement.	**Owner**	**Owner**	**Owner**	Owner shall provide Activity Restrictions to tenant/occupants upon move-in. Owner shall be responsible to enforce restrictions "indefinately."
Landscape Planning: The landscape maintenance contractor shall perform the following on a weekly basis: Mowing, trimming/weeding, pruning and/or planting, and removal of litter, maintenance shall include, but	**Owner**	**Owner**	**Owner**	Owner shall contract with a reputable landscape maintenance contractor. The landscape maintenance contractor shall provide landscape maintenance

Description of BMP and Method of Implementation	BMP Responsibility	Maintenance Responsibility	Funding Source For O & M	Maintenance Schedule
not limited to, support structures. There shall be periodic inspection of the landscape areas to ensure the replacement of dead or diseased dying vegatation, Unhealthy or dead trees shall be replaced within seventy-two (72) hours, and the irrigation system is functioning properly. The landscape maintenance contractor shall utilize properly timed fertilizing and pesticide, weeding, pest control, and pruning, to preserve the landscapes water efficiency. Furthermore, the landscape maintenace contractor shall utilize proper management and their usage on fertilizers and pesticides this includes scheduling and disposal. The landscape maintenance contractor shall utilize landscape waste management (i.e., waste handling and disposal). Erosion control management shall be enforced, the landscape maintenance contractor shall inspect for erodable barren soil, maintain vegetative cover to prevent soil erosion, apply mulch or applicable alternative to serve as additional cover for soil stabilization. The landscape maintenance contractor shall train employees on these BMPs, storm water discharge prohibitions, and wastewater discharge requirements. The landscape maintenance contractor shall educate and train employees on the use of pesticides and pesticide application techniques. Only employees properly trained to use pesticides can apply them. The contractor shall train employees on proper spill containment and cleanup.				experience/training in horticulture, fertilizer and pesticide usage, irrigation system knowledge, waste management, erosion control, storm water discharge prohibition, and wastewater discharge. Furthermore, have a spill contingency plan. Landscape Management shall be performed on a weekly basis.

Description of BMP and Method of Implementation	BMP Responsibility	Maintenance Responsibility	Funding Source For O & M	Maintenance Schedule
Establish a regular training schedule, train all new and future employees, and conduct annual refresher training; furthermore, use a training log or similar method to document training. Start-up date: at time of installation				
BMP Maintenance: Owner shall be responsible for implementation of each non-structural BMP and scheduled cleaning, maintenance and repair of all structural/treatment BMP facilities "indefinitely." Bioretention basin will require: Remove trash from facility. Remove sediment from forebay when estimated sediment accumulation exceeds 25% of the forebay volume. Scrape soil from top 3 to 6 inches of infiltration bed and reestablished vegetation; augment soil amendment if needed. Check energy dissipation function and add riprap as needed. Keep adjacent landscape areas maintained. Remove clippings from landscape maintenance activities. Replace any damaged or dead plants or grasses. Inspect areas for ponding after storm events. Start-up date: at time of installation	**Owner**	**Owner**	**Owner**	Owner shall be responsible for the inspection, operation, maintenance and repair of non-structural and structural/treatment facility BMPs, and shall document on the operation and maintenance schedule (log) for the life of the project. Frequency of maintenance shall be ongoing.
Litter Control: The owner shall provide trash enclosure to common area(s) to dispose of trash, additionally sidewalks and private parking lots shall be maintained for litter control. The owner shall schedule trash pick-up for disposal of dumpster(s) and free	**Owner**	**Owner**	**Owner**	Owner shall schedule trash pick-up on a weekly basis of each year for the disposal of trash dumpster(s). Owner shall be responsible for enforcing prohibitions on trash/debris (proper disposal) of trash

Description of BMP and Method of Implementation	BMP Responsibility	Maintenance Responsibility	Funding Source For O & M	Maintenance Schedule
standing trash receptacles weekly of each year (office entries). Pedestrian walks shall be inspected and maintained for trash/debris on a weekly basis of each year and properly disposed of. Start-up date: at time of installation				dumpster(s), and free standing trash receptacles. Additionally, ensure maintenance of common area litter control. Pedestrian walks shall be maintained of trash/debris weekly of each year. Furthermore, parking lots shall be maintained of trash/debris on a weekly basis of each year and properly disposed of.
Spill Contingency Plan: The owner (building operator), shall prepare a "Spill Contingency Plan" for use by specified types of building or suite occupancies (Specified Use of Buildings Awaiting Lease) and which mandates stockpiling of cleanup materials, notification of responsible agencies, disposal of cleanup materials, documentation, etc. Business Emergency/Contingency Plan Guidelines and Forms shall be provided in accordance with Seciton 6.95 of the California Health and Safety Code. The owner shall educate said tenant/occupants on the Spill Contingency Plan upon move-in and annually thereafter. The owner shall be responsible to enforce the Business Emergency/Contingency Plan Guidelines to subject property through the life of the project.	**Owner**	**Owner**	**Owner**	Owner shall prepare a spill cleanup plan that includes: procedures for different types of spills, schedule for initial & annual training of employees, cleanup kits in well-marked accessible areas, and designation of key employee who monitors cleanup, posting the plan in the work area. Spill Contingency Plan (Business Emergency/Contingency Plan) shall be enforced and utilized by said tenant/occupants and their employees. The Spill Contingency Plan runs with the property "indefinitely".

Description of BMP and Method of Implementation	BMP Responsibility	Maintenance Responsibility	Funding Source For O & M	Maintenance Schedule
Employee Training: The owner will be required to educate their contractor's and the contractor's employees, and shall provide them with Best Management Practices (BMPs) based on their tasks. (i.e. landscaping/irrigation personnel, street sweeping of parking lot, etc.). Start-up date: Upon indenture	**Owner**	**Owner**	**Owner**	Owner shall be responsible to provide educational materials to contractor's; (landscape maintenance, catch basin cleaning, landscape and irrigation maintenance, etc.). The owner shall provide a signed form from the contractor that he or she has been given educational materials based on their task and agree to abide by conditions set forth. Educational Materials shall be provided upon indenture and annually thereafter.
Catch Basin Inspection: The catch basin with fossil filter insert located south of site (traffic grate inlet) within the parking lot shall be maintained by the owner. The owner shall maintain visual observation of catch basin(s) as stated on the Operations and Maintenance/Stated Maintenance Form (See attachment S). Removal of trash/debris shall be removed by owner/developer and properly disposed of within one (1) day. Furthermore, the owner shall develop a maintenance/service contract with Drainage Protection Systems (DPS) a dba Kristar Enterprises, Inc. for structural maintenance. The contract maintenance shall include, but not limited to; sediment removal by vactor truck, replacement of Fossil Filter Inserts, and for the annual renewal of medium. Structural integrity of broken or otherwise damaged inserts shall be repaired/replaced by Drainage Protection Systems (DPS) at (800) 579-	**Owner**	**Owner**	**Owner**	Catch basin preventative maintenance and routine inspections shall be performed by the owner in accordance with the provisions of this Water Quality Management Plan. The owner shall inspect for debris/trash this shall be a visual observation before and once during each target storm event, weekly during the extended wet periods and monthly during the dry season. The debris/trash shall be removed and properly disposed of within 1 day. The oil and grease removal shall be a visual observation the maintenance indicator for removal are as follows: Absorbent granules are dark gray, or darker or unit is clogged with sediment. The visual observation shall be conducted at the end of each target storm event, weekly during extended

Description of BMP and Method of Implementation	BMP Responsibility	Maintenance Responsibility	Funding Source For O & M	Maintenance Schedule
8819 for the life of the project. Note: Inspections and Cleaning shall apply to all on-site catch basins with and without filter inserts Start-up date: at time of installation				wet periods and monthly during the dry season. Inspection for structural integrity shall be a visual observation of broken or otherwise damaged insert on a monthly basis. Replace media before November 1 of each year. As a guide to the operation and maintenance on how to collect and dispose of sediments: Sediments must be collected by use of a vactor truck which vacuums the sediments out of the drop inlets and other drainage structures. The sediments are then transported daily to designated sites. Registered transporters are used to ship any hazardous sediments from the sites to authorized hazardous wasted disposal facilities under standard California Uniform Hazardous Waste Manifests.
Street Sweeping Private Drive Aisle & Parking Lot: Sweeping provides two primary benefits. The more obvious benefit is the collection and removal of paper, leaves, and other visible debris that collect in the gutters. In addition to being unsightly, this debris can block the catch basins and other storm water facilities, causing localized flooding during heavy rains. An equally important, but less visible benefit is the removal of metal particles, and other hazardous waste products left by vehicles. Although they	**Owner**	**Owner**	**Owner**	Owner shall contract with a Street Sweeping Company for private drive isle and parking lot maintenance. The owner shall be responsible to provide educational materials upon indenture and annually thereafter. The maintenance service contract shall include street sweeping parking lot and drive Isle and inspected for trash/debris/grease and oil on a bi-weekly basis of each year.

Description of BMP and Method of Implementation	BMP Responsibility	Maintenance Responsibility	Funding Source For O & M	Maintenance Schedule
are virtually invisible, these particles can be extremely harmful to the fish and other wildlife. Street sweeping is an effective method of removing both the large and microscopic pollutants that collect on parking lots.				
Storm Drain System Stenciling and Signage: Phrase "No Dumping-Drains to River" to be stenciled on catch basin(s) to alert the public to the destination of pollutants discharged into stormwater. City approved stencil/signage. The owner may contact das Manufacturing, Inc. to purchase the catch basin stenciling/signage. Call "das Curb Maker" at (800) 549-6024. Start up date: Time of installation	**Owner**	**Owner**	**Owner**	Owner shall be responsible to maintain storm drain stenciling & signage: Annually, and/or replace as needed

Description of BMP and Method of Implementation	BMP Responsibility	Maintenance Responsibility	Funding Source For O & M	Maintenance Schedule
Efficient Irrigation: The irrigation system shall consist of both drip / bubbler, and highly efficient pressure regulating spray / rotor heads with check valves to prevent overspray and runoff. Sprinkler heads are spaced 24" away from non-permeable paving to prevent runoff. The irrigation system is separated into hydrozones considering plant species factor (according to WULCOL III), plant density, and microclimate. The irrigation system is managed by an ET Based Controller (ET Water Controller) with flow sensor, master valve, and rain shut-off sensor. Project site shall utilize drought tolerant plants, shrubs and trees. Owner shall contract with landscape contractor to maintain landscaped areas of debris, grass clippings, and litter. Owner shall include in contract with landscape contractor to inspect irrigation lines and spray heads for overall efficiency and performance. Start up date: Time of installation	**Owner**	**Owner**	**Owner**	Owner shall be responsible to provide educational material to landscape maintenance contractor for proper functioning of landscape irrigation and water conservation upon indenture and annually thereafter. Maintain: Weekly

Appendix 10: Educational Materials

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

Stormwater Pollution

What you should know for...

Industrial & Commercial Facilities

Riverside County Stormwater Program Members

City of Banning
(951) 922-3105

City of Beaumont
(951) 769-8520

City of Calimesa
(909) 795-9801

City of Canyon Lake
(951) 244-2955

City of Cathedral City
(760) 770-0340

City of Coachella
(760) 398-3502

City of Corona
(951) 736-2447

City of Desert Hot Springs
(760) 329-6411

City of Eastvale
(951) 361-0900

City of Hemet
(951) 765-2300

City of Indian Wells
(760) 346-2489

City of Indio
(760) 391-4000

City of Jurupa Valley
(951) 332-6464

City of Lake Elsinore
(951) 674-3124

City of La Quinta
(760) 777-7000

City of Menifee
(951) 672-6777

City of Moreno Valley
(951) 413-3000

City of Murrieta
(951) 304-2489

City of Norco
(951) 270-5607

City of Palm Desert
(760) 346-0611

City of Palm Springs
(760) 323-8299

City of Perris
(951) 943-6100

City of Rancho Mirage
(760) 324-4511

City of Riverside
(951) 826-5311

City of San Jacinto
(951) 487-7330

City of Temecula
(951) 694-6444

City of Wildomar
(951) 677-7751

Coachella Valley Water District
(760) 398-2651

County of Riverside
(951) 955-1000

Riverside County Flood Control District
(951) 955-1200

Best Management Practices (BMPS) for:

- Industrial Facilities
- Commercial Facilities

YOU can prevent Stormwater Pollution following these practices...

Industrial and Commercial Facilities

The Riverside County Stormwater Program has identified a number of Best Management Practices (BMPs) for Industrial and Commercial Facilities. These BMPs control and reduce stormwater pollutants from reaching our storm drain system and ultimately our local water bodies. City and County ordinances require businesses to use these BMPs to protect our water quality. Local cities and the County are required to verify implementation of these BMPs by performing regular facility inspections.

Prohibited Discharges

Discontinue all non-stormwater discharges to the storm drain system. It is *prohibited* to discharge any chemicals, paints, debris, wastes or wastewater into the gutter, street or storm drain.

Outdoor Storage BMPs

- Install covers and secondary containment areas for all hazardous materials and wastes stored outdoors in accordance with County and/or City standards.
- Keep all temporary waste containers covered, at all times when not in use.
- Sweep outdoor areas instead of using a hose or pressure washer.
- Move all process operations including vehicle/equipment maintenance inside of the building or under a covered and contained area.
- Wash equipment and vehicles in a contained and covered wash bay which is closed-loop or connected to a clarifier sized to local standards and discharged to a sanitary sewer or take them to a commercial car wash.

Spills and Clean Up BMPs

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep up the area.
- Clean up spills immediately when they occur, using dry clean up methods such as absorbent materials or sweep followed by proper disposal of materials.
- Always have a spill kit available near chemical loading dock doors and vehicle maintenance and fueling areas.
- Follow your Business Emergency Plan, as filed with the local Fire Department.
- Report all prohibited discharges and non-implementation of BMPs to your local Stormwater Coordinator as listed on the back of this pamphlet.
- Report hazardous materials spills to 951-358-5055 or call after hours to 951-782-2973 or, if an emergency, call the Fire Department's Haz Mat Team at 911.

Plastic Manufacturing Facilities BMPs

AB 258 requires plastic product manufacturers to use BMPs, such as safe storage and clean-up procedures to prevent plastic pellets (nurdles) from entering the waterway. The plastic pellets are released into the environment during transporting, packaging and processing and migrate to waterways through the storm drain system. AB 258 will help protect fish and wildlife from the hazards of plastic pollution.

Training BMPs

As prescribed by your City and County Stormwater Ordinance(s), train employees in spill procedures and prohibit non-stormwater discharges to the storm drain system. Applicable BMP examples can be found at www.cabmphandbooks.com.

Permitting

Stormwater discharges associated with specific categories for industrial facilities are regulated by the State Water Resources Control Board through an Industrial Stormwater General Permit. A copy of this General Permit and application forms are available at: www.waterboards.ca.gov, select stormwater then the industrial quick link.

To report illegal dumping or for more information on stormwater pollution prevention call: 1-800-506-2555 or e-mail us at: fcnpdes@rcflood.org.

IRRIGATION RUNOFF

STORMWATER FACT SHEET

Report Irrigation Runoff or Stormwater Pollution:
800.506.2555

RIVERSIDE COUNTY
WATERSHED PROTECTION

OVERWATERING

Overwatering causes irrigation runoff that may contain pollutants such as pesticides, herbicides, fertilizers, pet waste, yard waste, and sediments which can be hazardous to residents and harmful to our environment. Runoff can also serve as a transport mechanism for other pollutants already on the ground or in the curb gutter. Irrigation runoff entering the storm drain system is an illicit discharge.

BEST PRACTICES

Urban runoff begins when yards and landscaped areas are over-irrigated. Irrigation systems require regular maintenance and visual inspection of the system should be performed to prevent over-spray, leaks, and other problems that result in runoff to storm drains, curbs and gutters.

You can **prevent pollution** by conserving water on your property. Water during cooler times of the day (before 10am and after 6pm).

- Adjust sprinklers to stop overspray and runoff.
- Make needed repairs immediately.
- Use drip irrigation, soaker hoses, or micro-spray systems.
- Use an irrigation timer to pre-set watering times.
- Use a control nozzle or similar mechanism when watering by hand.
- Switch to a water-wise landscape - native plants need less fertilizers, herbicides, pesticides and water.

PROTECT OUR WATERSHED

Many people think that when water flows into a storm drain it is treated, but the storm drain system and the sanitary sewer system are not connected. Everything that enters storm drains flows untreated directly into our creeks, rivers, lakes, beaches and ultimately the ocean. Storm water often contains pollutants, including chemicals, trash, and automobile fluids, all of which pollute our watershed and harm fish and wildlife.

Whether at home or work, you can help reduce pollution and improve water quality by using the above Best Management Practices (BMP's) as part of your daily clean up and maintenance routine.

The Complete Guide to Residential Recycling

Northwest Riverside County

Banning, Calimesa, Corona, Eastvale, Jurupa Valley,
Moreno Valley, Norco, Riverside

Used Oil and Filters

RECYCLE USED OIL

Recycling used motor oil and filters is easy!
Simply take them to one of the certified collection centers below. **It's free!**

Banning

AutoZone
3453-A W. Ramsey St.
(951) 849-7626

Certified Tire & Service Center Goodyear
1820 W. Ramsey St.
(951) 849-5028

Diamond Hills Auto Group
4545 W. Ramsey St.
(951) 849-7861

Cruz Industrial Truck Inc.
313 South Gallaher Way
(951) 849-7861

Corona

AutoZone
501 North McKinley St.
(951) 278-2073

AutoZone
1280 East Ontario Ave.
(951) 273-1583

AutoZone
1014 W. 6th St.
(951) 371-4730

Corona Nissan
2575 Wardlow Rd.
(877) 322-6739

Firestone Store
522 N. Main St.
(951) 735-4101

Goodyear Mountain View Tire
1630 E. Ontario Ave.
(951) 808-0818

Hamner Towing & Service Center
2125 Railroad St.
(951) 734-9331

Heavy Equipment Rentals
13013 Temescal Cyn. Rd.
(951) 609-4623

Jiffy Lube
906 W. 6th St.
(951) 549-9060

Jiffy Lube
1600 E. Ontario Blvd.
(951) 284-0922

O'Reilly Autoparts
1220 Magnolia Ave.
Suite 102
(951) 273-9891

O'Reilly Autoparts
1142 W. 6th St.
(951) 735-0936

Pep Boys
581 N. Main St.
(951) 279-9230

Quality Toyota
1700 W. Sixth St.
(951) 734-6020

Ramona Tire
304 W. Sixth St.
(951) 734-1222

Certified Tire and Service
624 N. Main St.
(951) 284-3443

Certified Tire and Service
2189 Sampson Ave., # 111
(951) 547-2080

Team Dykstra Carwash & Lube Center
2315 California Ave.
(951) 898-6482

Eastvale

Mountain View Tire
6080 Hamner Ave., #105
(909) 484-9497

Autozone
14228 Schleisman Rd.
(951) 898-4712

Jurupa Valley

D & B Automotive and Transmission
4321 Campbell St., #C
(951) 681-6483

Firestone Complete Auto Care
8360 Limonite Ave.
(951) 934-7304

LKQ Pick A Part
3760 Pyrite St.
(800) 749-2720

O'Reilly Autoparts
8702 Limonite Ave.
(951) 685-0822

Used Oil and Filters

RECYCLE
USED OIL FILTERS

You can also find Certified Collection Centers on the Cal Recycle Website:
www.calrecycle.ca.gov/recycle

Scher Goodyear Tire #24
6072 Camino Real
(951) 685-1000

AutoZone
3782 Riverview Dr.
(951) 275-0301

Moreno Valley

Auto Express Moreno Valley
24035 Sunnymead Blvd., #G
(951) 924-6363

AutoZone
27660 Eucalyptus Ave.
(951) 242-5190

AutoZone
16210 Perris Blvd.
(951) 242-2026

AutoZone
24570 Alessandro Blvd.
(951) 242-8439

AutoZone
12601 Perris Blvd.
(951) 242-4353

AutoZone
23510 Sunnymead Blvd.
(951) 924-5460

Buds Moreno Valley Tire Pros
22510 Alessandro Blvd.
(951) 776-7211

Certified Tire & Service Center
16190 Perris Blvd.
(951) 243-5655

Certified Tire & Service Center
23920 Alessandro Blvd., #A
(951) 656-6466

Certified Tire & Service Center
23135 Hemlock Ave.
(951) 369-0025

Firestone
24673 Alessandro Blvd.
(951) 242-6631

Integrity Tire
24901 Sunnymead Blvd.
(951) 656-6466

Moss Bros. Chevrolet
12625 Auto Mall Dr.
(951) 658-3145

Moss Brothers Honda
27910 Eucalyptus Ave.
(951) 486-9366

Moss Brothers Buick, GMC
8146 Auto Drive
(951) 242-2223

Moss Brothers Chrysler Jeep Dodge
27810 Eucalyptus Ave.
(951) 486-9288

Moss Brothers Toyota
12630 Motor Way
(951) 247-8000

Moss Brothers Volkswagen
27750 Eucalyptus Ave.
(951) 485-4188

O'Reilly Autoparts #1304
24021 Alessandro Blvd., #C
(951) 242-0641

O'Reilly Autoparts #1704
12240 Perris Blvd.
(951) 247-5509

Pep Boys #724
23470 Sunnymead Blvd.
(951) 247-4564

Valvoline Instant Oil Change
23165 Hemlock Ave.
(951) 247-1873

Norco

AutoZone #3340
1404 Hamner Ave.
(951) 817-9432

Browning Dodge Chrysler Jeep Ram
1983 Hamner Ave.
(951) 272-3110

Jiffy Lube
2925 Hamner Ave.
(951) 284-0210

Goodyear Mountain View Tire
2935 Hamner Ave.
(877) 872-0133

O'Reilly Autoparts
1050 Hamner Ave.
Suite 1616
(951) 898-1283

Used Oil and Filters

RECYCLE USED OIL

Riverside

Auto Express Riverside
11850 Magnolia Ave.
(951) 351-8875

AutoZone
7315 Indiana Ave.
(951) 637-6701

AutoZone
1947 University Ave.
(951) 788-4013

AutoZone
4195 Van Buren Blvd.
(951) 359-7760

AutoZone
19486 Van Buren Blvd.
(951) 653-5585

AutoZone
10249 Arlington Ave.
(951) 688-0296

AutoZone
6047 Magnolia Ave.
(951) 784-9201

AutoZone
3400 La Sierra Ave.
(951) 354-0781

BMW Of Riverside
3060 Adams St.
(951) 785-4444

Bud's Tire and Wheel
8651 Indiana Ave.
(951) 776-7211

Bud's Tire and Wheel Orangecrest
15967 Wood Rd.
(951) 776-7211

Goodyear Certified Tire & Service Center
8994 Trautwein Rd.
(951) 653-6800

Goodyear Certified Tire & Service Center
7341 Indiana Ave.
(951) 343-8535

Dutton Motor Company
8201 Auto Dr.
(951) 687-2020

Firestone Store
4199 Market St.
(951) 289-7811

Firestone Store
10091 Magnolia Ave.
(951) 977-5863

George Fritts Auto Repair
91 Commercial Ave.
(951) 788-9043

Jiffy Lube
3693 La Sierra Ave.
(951) 359-8999

Malcolm Smith Motorsports
7599 Indiana Ave.
(951) 687-1300

Moss Motors Dodge
8151 Auto Center Dr.
(951) 688-6200

O'Reilly Autoparts
6160 Arlington Ave.
(951) 689-0944

O'Reilly Autoparts
3790 Jurupa Ave.
(951) 682-6082

O'Reilly Autoparts
1691 University Ave.
(951) 222-2900

O'Reilly Autoparts
9929 Magnolia Ave.
(951) 359-3041

O'Reilly Autoparts
18570 Van Buren Blvd.
(951) 780-8721

Pep Boys #690
10831 Magnolia Ave.
(951) 354-0100

Raceway Ford
5900 Sycamore Canyon Blvd.
(951) 784-1000

Raceway Nissan
6030 Sycamore Canyon Blvd.
(951) 571-9300

Riverside Mitsubishi and Kia
8100 Auto Dr.
(951) 509-1000

Used Oil and Filters

Riverside Nissan
8330 Indiana Ave.
(951) 509-6581

Singh Chevrolet
8200 Auto Center Dr.
(951) 688-8111

Spoiled
2634 E. Alessandro Blvd.
(951) 656-2300

Toyota of Riverside
7870 Indiana Ave.
(951) 687-1622

Valvoline Instant Oil Change
3504 Central Ave.
(951) 367-0411

Valvoline Instant Oil Change
7450 Mission Grove Pkwy. South
(951) 780-2500

Valvoline Instant Oil Change
7437 Arlington Ave.
(951) 689-7805

Valvoline Instant Oil Change
3417 Arlington Ave.
(951) 788-7725

Valvoline Instant Oil Change
18681 Van Buren Blvd.
(951) 789-2882

Valvoline Instant Oil Change
3335 Iowa Blvd.
(951) 367-0147

Walters Mercedes-Benz
3213 Adam's St.
(888) 656-3915

Walters Porsche/Audi
3210 Adams St.
(888) 656-3915

Curbside pickup of used oil is available in some cities in Riverside County. Contact your waste hauler for more information. Waste hauler contact information is provided on the back page of this guide.

CalRecycle

You may not need to change your oil every 3000 miles! Save time, money, and the environment by visiting **www.checkyournumber.org** to find out what your manufacturer recommended oil change interval is. Check your number is provided by CalRecycle.

Locations marked with a **also accept oil filters.**

Please DO NOT drop off oil when the location is closed. **For more information about used oil collection centers call 800-350-4OIL.**

Household Hazardous Waste

Examples of household waste that are considered hazardous include:

- Batteries (all types)
- Electronic Waste
- Paint
- Used Oil and Antifreeze
- Sharps/ Needles

Permanent Household Hazardous Waste Collection Centers

Lake Elsinore Area (Closed January and December)

Lake Elsinore Regional Permanent HHW Collection Facility
512 N. Langstaff Street, Lake Elsinore, 92530
Open first Saturday of the month*, 9:00 a.m. to 2:00 p.m.
*Except holiday weekends and during inclement weather.

Riverside Area

Agua Mansa Regional Permanent HHW Collection Facility
1780 Agua Mansa Road, Riverside, 92509
Open non-holiday Saturdays*, 9:00 a.m. to 2:00 p.m.
*Except during inclement weather.

Regional ABOP Collection Centers (Antifreeze, Batteries, Oil and Oil Filters, and Latex Paint ONLY)

Murrieta Area

County Road Yard
25315 Jefferson Avenue, Murrieta, 92562
Open non-holiday Saturdays, 9:00 a.m. to 2:00 p.m.

Beaumont / Banning Area

Lamb Canyon Landfill
16411 Lamb Canyon Rd, Beaumont, 92223
Open non-holiday Saturdays, 9:00 a.m. to 2:00 p.m.

These sites accept residential waste only. For more information, contact the Riverside County Household Hazardous Waste Department Hotline at **800-304-2226 or 951-486-3200, or visit:**
www.rivcowm.org/opencms/hhw/index.html

Household Hazardous Waste

Below is a list of materials accepted at permanent HHW collection sites.*

Chemicals and Cleaners

Adhesives
Air Freshener
Aluminum Cleaners
Ammonia
Antifreeze
Brake Fluid
Carburetor Cleaner
Caulking
Chlorine Bleach
Chrome Polish
Disinfectant
Drain Cleaner
Engine Degreaser
Fertilizer
Fiberglass and Resins
Flea Powder
Floor / Surface Cleaners
Fungicides
Furniture Polish
Gas / Diesel Fuel
Glue
Gun Cleaner
Hair Dye
Hobby Chemicals
Insecticides / Pesticides
Kerosene / Lamp Oil
Lighter Fluid
Motor Oil
Mercury Devices
Oven Cleaner
Paint - Latex / Oil Based
Paint Stripper / Thinner
Photo Chemicals
Pool / Spa Chemicals
Rodent Bait / Poison
Roof Coating
Shoe Dye
Spot Remover
Transmission Fluid
Turpentine
Varnish
Weed Killer / Herbicide
Wood Preservative

Aerosols and Tanks

Aerosol Insecticides
Aerosol Cans
BBQ Propane Tanks
Camp Propane Tanks

E-Waste and Batteries

Batteries (all types)
Electronic Devices
Fluorescent Bulbs / Tubes
Old TVs and Computers

Medical Waste

Sharps / Needles

Please DO NOT bring the following types of materials (If you have any of these wastes please call (951) 486-3200):

Unacceptable Materials

Business, Non-Profit, or Out-of-County Waste
Explosives / Ammunition
Radioactive or Remediation Materials
Medical / Infectious Waste (Except Sharps)
Asbestos
Appliances
Tires
55 or 30 Gallon Drums
Compressed Gas Cylinders >40 lbs
Trash

*Maximum Chemical Load: 5 Gallons or 50lbs per trip. Residential waste only, no business waste accepted.

Recycling

What can go into your curbside recycling bins? Not sure what you can recycle? Check out the list below.

Paper and Cardboard

- Books and Coloring Books
- Cardboard
- Cardstock and Construction Paper
- Office Paper
- Egg Cartons
- Clean Food Boxes
- Junk Mail and Envelopes
- Magazines and Newspapers
- Notebook Paper
- Paper Bags
- Telephone Books

Metal

- Aluminum and Steel Cans
- Clean Aluminum Foil
- Scrap Metal

Glass Jars and Bottles

- Glass Jars
- Beverage Bottles

Plastic Bottles and Grocery Bags

- Plastic Milk Jugs
- Plastic Beverage Containers
- Plastic Grocery Bags

Recycling

Used Tires

Used tires are accepted at various locations in Riverside County. There is generally a fee to dispose of tires. The following locations accept tires:

Badlands Landfill

31125 Ironwood Ave., Moreno Valley, 92553

Lamb Canyon Landfill

16411 Lamb Canyon Rd., Beaumont, 92223

Visit www.rivcowm.org/opencms/landfill_info/landfill_fees.html for information on current landfill pricing.

BAS Recycling, Inc.

14050 Day St., Moreno Valley, 92553
(909) 383-7050
Call facility for pricing.

Electronic Waste Recyclers

Badlands, Lamb Canyon, and El Sobrante Landfills accept up to 2 CRT devices (e.g. computer monitors or TVs) per day for recycling at **no cost** during operating hours. The following recyclers also accept electronic waste:

Gold'n West Surplus, Corona - (951) 371-2020
Graebel Los Angeles Movers, Corona - (800) 373-6552
WM Recycle America, Jurupa Valley - (951) 681-4297
Waste Management, Inc., Moreno Valley - (951) 242-0421
Your Neighborhood Recycling, Moreno Valley - (951) 796-7673
1-800-GOT-JUNK, Riverside - (909) 425-9722

Other Recycling Facilities

For a complete list of recycling facilities visit www.calrecycle.ca.gov .

Earth911.com also provides valuable information and resources about recycling and recycling facilities.

Reycling Centers

What should you do with those empty cans and bottles? Below is a list of centers that accept beverage containers for recycling*.

Banning

Banning Recycling
284 S. 8th St.
(951) 922-9236

Ramsey Recyling
1243 E. Ramsey St.
(951) 849-5997

Calimesa

rePlanet
1155 Calimesa Blvd.
(877) 737-5263

Corona

NexCycle
535 N. McKinley St.
(800) 969-2020

rePlanet
260 W. Foothill Pkwy.
(951) 520-1700

rePlanet
1193 Magnolia Ave.
(877) 737-5263

rePlanet
1288 Border Ave.
(877) 737-5263

Sanchez Recycling Inc.
1130 W. 6th St.
(714) 793-9934

Six Pac Recycling
1430 E. 6th St.
(951) 734-2910

Eastvale

rePlanet
7070 Archibald Ave.
(951) 520-1700

rePlanet
12660 Limonite Ave.
(951) 520-1700

Jurupa Valley

Etiwanda Recycling
6102 Etiwanda Ave.
(951) 263-6173

Recycle Kingdom
4868 Etiwanda Ave.
(626) 617-1859

rePlanet
11070 Limonite Ave.
(877) 737-5263

Salazar's Recycler
5666 Etiwanda Ave.
(951) 966-6408

EarthWize Recycling
9075 Mission Blvd.
(909) 933-2773

Jurupa Valley Recycling Collection Center
6315 Pedley Rd.
(951) 681-0382

Pedley Recycling Center
7850 Limonite Ave.
(951) 823-1383

Pedley Vet Recycling
8980 Limonite Ave.
(909) 856-9053

Recycling Services Centers
6565 Mission Blvd.
(951) 685-4430

Renovate Recycling Center
8800 Limonite Ave.
(714) 453-7028

rePlanet
9155 Jurupa Rd.
(877) 737-5263

Rubidoux Recycling Center
5675 Mission Blvd.
(951) 823-1353

Moreno Valley

EarthWize Recycling
24525 Alessandro Blvd.
(909) 923-2773

Menlo Recycling Center
22405 Goldencrest Dr.
Bldg., A.
(951) 653-5565

Moreno Valley Recycling
22862 Alessandro Blvd.
(323) 732-9253

Moreno Valley Recycling 2
24135 Sunnymead Blvd.
(213) 625-8165

Moreno Valley Recycling 3
14940 Perris Blvd.
(323) 732-9253

Recycling Centers

rePlanet
23575 Sunnymead Ranch Pkwy.
(951) 520-1700

rePlanet
27100 Eucalyptus Ave.
(951) 520-1700

rePlanet
25900 Iris Ave.
(951) 520-1700

Smittys
25073 Sunnymead Blvd., #D-14
(951) 453-0806

Worasing Recycling
15928 Perris Blvd.
(951) 323-7532

Zuniga Recycling
21524 Dracea Ave.
(866) 718-7150

Norco

E&M Recycling
1943 River Rd.
(323) 732-9253

Norco Feed and Recycling
4409 California Ave.
(877) 247-6923

rePlanet
2790 Hamner Ave.
(877) 737-5263

Riverside

AAA Recycle
5490 26th St.
(951) 781-8046

ABC
10330 Hole Ave., #B-9
(909) 742-7129

Cash 4 Cans
7633 Cypress Ave.
(951) 352-5995

El Taray Recycling
12702 Magnolia Ave., #11
(714) 222-4047

rePlanet
4250 Van Buren Blvd.
(951) 520-1700

rePlanet
6155 Magnolia Ave.
(951) 520-1700

rePlanet
5225 Canyon Crest Dr.
(951) 520-1700

rePlanet
315 E. Alessandro Blvd.
(951) 520-1700

rePlanet
3900 Chicago Ave.
(951) 520-1700

rePlanet
2995 Iowa Ave.
(951) 520-1700

rePlanet
6160 Arlington Ave.
(951) 520-1700

rePlanet
9225 Magnolia Ave.
(951) 520-1700

rePlanet
17050 Van Buren Blvd.
(951) 520-1700

rePlanet
3420 La Sierra Ave.
(951) 520-1700

rePlanet
4680 La Sierra Ave.
(951) 520-1700

Riverside Scrap Iron and Metal Corp.
2993 6th St.
(951) 686-2129

Robert A. Nelson Transfer Station
1830 Agua Mansa Rd.
(951) 786-0639

rePlanet
4250 Van Buren Blvd.
(951) 520-1700

*Some recycling centers may accept other recyclable materials. It is advisable to call the center and confirm this, as well as operating hours, before visiting.

Fore more information about local recycling centers visit the **CalRecycle** website: **www.calrecycle.ca.gov.**

Types of Plastic

Confused about the types of plastic and if they can be recycled? Many plastic containers display an identification code that indicates what they are made from. Below are the 7 codes.

#1: Polyethylene Terephthalate (PETE or PET)
Used to create 2-liter soda bottles, water bottles, cooking oil bottles, peanut butter jars.
The most commonly accepted plastic for recycling.

#2: High Density Polyethylene
Used to create detergent bottles, milk and water jugs, grocery bags, yogurt cups.
Commonly accepted for recycling. Bags can be recycled at some large grocery stores.

#3: Polyvinyl Chloride
Used to create plastic pipes, outdoor furniture, shrink-wrap, liquid detergent containers, flooring, showercurtains.
Not currently accepted for recycling.

#4: Low Density Polyethylene
Used to create food storage containers, cellophane wrap, dry cleaning bags, produce bags, trash can liners.
Not commonly recycled, some large grocery stores accept LDPE bags.

#5: Polypropylene
Used to create ketchup bottles, aerosol caps, drinking straws, yogurt containers.
Not commonly accepted for recycling.

#6: Polystyrene
Also known as “Styrofoam.” Used to make coffee cups, take-out food packaging, egg cartons, and packaging “peanuts.”
Sometimes accepted for recycling and made into the same products.

#7: Other
All other plastic resins or a mixture of resins used to make reusable water bottles, Tupperware, biodegradable and compostable plastics.
Not commonly accepted for recycling.

Composting Basics

Got food scraps and yardwaste? Below is a quick guide to Backyard Composting.

1. Select a good spot for composting

- Sun or shade
- Convenient to kitchen or garden, and close to a source of water
- Keep away from structures and wood, as moisture can hasten decay
- Place only on bare ground, as organisms from soil are needed

2. Know the Ingredients

Nitrogen - Green materials - grass clippings, fresh leaves and twigs, vegetable and fruit trimmings, coffee grounds and filters, and non-meat eating animal manures.

Carbon - Brown materials that have released their nitrogen - dry and brittle leaves and grasses, straw, wood chips, corn stalks, shredded newspaper, paper towels, napkins, and cardboard.

Water - The correct moisture level should be about the same as a damp wrung out sponge. A few drops should fall when squeezed in your hand.

Air - Oxygen is very important to the bacteria, fungi, and microorganisms that are working in the pile to breakdown the organic material.

Do Not Add - Meat, dairy products, fats, oils, waste from meat eating animals (dogs and cats), thorny plant material, or diseased plant material.

2. Know the Methods

Aerobic - Pile equal parts green and brown material on ground or in a bin in a 3'x3'x3' heap, water well, and cover with a tarp, carpet or opaque plastic sheet. The pile will heat up (120 to 160 degrees), and needs to be turned after a few days, once it has cooled. Turn the pile weekly and continue composting until the pile has a dark rich look like chocolate cake and the things you put in don't look like their original form. After the compost is done, water well, cover, and let it rest for one to two weeks to make sure it is completely done and the nitrogen has a chance to stabilize. If the compost is used too soon it could rob nutrients from the surrounding plants. Remove large chunks and add them to the next compost pile.

Anerobic - Similar to the Aerobic method, but there is no need to actively turn the material. It may take longer (1-2 years), but is still beneficial to your garden. Just pile the stuff, water, cover, and wait.

For more detailed information on composting, free workshops, or other methods, such as **Vermicomposting,** visit www.rivcowm.org and search for composting.

Source Reduction

The best way to reduce waste is to prevent it!

Buy Responsibly

Reduce packaging waste - Look for products that reduce packaging, or purchase in bulk to reduce the amount of packaging needed.

Look for products containing recycled material - Recycled paper products, motor oil, and even pens and pencils are just a few examples of products that reduce waste.

Consider reusable products - Buy reusable water bottles and sturdy utensils and plates that can be washed and used again.

Get it "For Here," or bring your own - Many coffee shops will provide drinks to their customers in ceramic mugs rather than paper cups if requested. Just ask! Reusable tumblers are also a great alternative to paper cups, and many establishments will even give a small discount to those who bring their own!

Borrow, rent, or share - Why buy something if you are only going to use it once? Items such as tools, party decorations, and even newspapers and magazines can be shared with your friends, family, and/or community.

Purchase rebuilt, remanufactured, or refurbished - Many electronics such as cell phones, computers, and media players can be purchased "refurbished" at a sometimes substantial price reduction. This conserves the resources needed to manufacture a new product.

Choose Non-Toxic

Choose products that contain only non-toxic materials, or try one of these **homemade alternatives**:

- Instead of glass cleaner, dilute 1 cup of vinegar in 1 quart of water.
- To open clogged drains, flush with a mixture of boiling water, and equal parts baking soda and vinegar.

For more information on non-toxic alternatives, visit the California Coastal Commission website:
http://www.coastal.ca.gov/ccbn/lesstoxic.html

Source Reduction

Plastic bags and junk mail contribute to a significant amount of un-needed waste. You can lessen their impact by Reducing, Reusing, and Recycling.

Plastic Bags

Reduce: BYOB (Bring Your Own Bag) - Use reusable canvas or cloth bags rather than plastic bags, and keep them in your car. Not all items need a bag, just say "no, thank you."

Reuse - Plastic grocery bags can serve multiple purposes, such as trash can liners or for pet waste.

Recycle - If you find that you must use a plastic bag, recycle it when you are finished. Most large supermarkets and pharmacies offer free recycling of plastic bags.

Junk Mail Reduction

You can reduce the amount of unwanted junk mail in your mailbox by simply mailing a postcard to the following addresses, requesting your name be removed from their mailing list. Be sure to include your full name, your address(es), your signature, and the date.

Mail Preference Service
Attn.: Dept. 10088342
PO Box 282
Carmel, NY 10512

ADVO
Consumer Assistance
PO Box 249
Windsor, CT 06095

Harte-Hanks Circulation
C/O Pennysaver
2830 Orbiter St.
Brea, CA 92821

Valpak Direct Marketing Systems, Inc.
8605 Largo Lakes Dr.
Largo, FL 33773

Credit Card Junk Mail
Call (888)5-OPT OUT (888-567-8688)

City / County Resources

City of Banning - Recycling and Waste Hauling Information | (951) 922-3105
http://www.ci.banning.ca.us/index.aspx?NID=380

City of Calimesa - Public Works / Engineering Department | (909) 795-9801
http://www.cityofcalimesa.net/publicworks.htm

City of Corona - Trash and Recycling | (951) 736-2400
http://www.discovercorona.com/city-departments/public-works/refuse-and-recycling.aspx

City of Eastvale - Recycling / Solid Waste / Street Sweeping | (951) 361-0900
http://www.eastvalecity.org/index.aspx?page=140

City of Jurupa Valley - Local Resources | (951) 358-7387
http://www.jurupavalley.org/resources.php

City of Moreno Valley - Waste Disposal and Recycling | (951) 413-3100
http://www.moreno-valley.ca.us/resident_services/waste/index-waste.shtml

City of Norco - Trash / Recycling | (951) 270-5656
http://www.norco.ca.us/about/welcome_residents/trash_recycling.asp

City of Riverside - Trash & Recycling | (951) 826-5311
http://www.riversideca.gov/trash

County of Riverside - Riverside County Waste Management Department
http://www.rivcowm.org | (951) 486-3200

Western Riverside Council of Governments
http://www.wrcog.cog.ca.us | (800) 350-4645

Waste Haulers

Waste Management, Inc. - (951) 280-5400 - www.wm.com
Serves: All Cities

Burrtec - (951) 786-9660 - www.burrtec.com
Serves: Eastvale, Jurupa Valley, and Riverside

Athens - (888) 336-6100 - www.athensservices.com
Serves: Riverside

CR&R Disposal - (951) 943-1991 - www.crrwasteservices.com
Serves: Riverside

The Complete Guide to Residential Recyling is sponsored by:

Printed on recycled paper.

The Complete Guide to Residential Recycling

Southwest Riverside County

Canyon Lake, Hemet, Lake Elsinore, Menifee, Murrieta, Perris, San Jacinto, Temecula, Wildomar

Used Oil and Filters

Recycling used motor oil and filters is easy!
Simply take them to one of the certified collection centers below. **It's free!**

RECYCLE USED OIL

RECYCLE USED OIL FILTERS

Hemet

AutoZone #2820
1550 W. Florida Ave.
(951) 929-0807

AutoZone #5556
3100 E. Florida Ave.
(951) 652-1308

EZ Lube #112
532 W. Florida Ave.
(951) 766-1996

Firestone Store #2233
350 W. Florida St.
(951) 929-2424

Inland Chevrolet
350 Carriage Circle
(951) 658-4401

Integrity Tire
3223 W. Florida Ave.
(951) 658-3145

Jiffy Lube #3187
330 N Sanderson Ave.
(951) 487-2001

Masterlube #101
3615 W. Florida St.
(951) 766-7055

O'Reilly Autoparts #1332
849 W. Florida Ave.
(951) 929-2210

Pep Boys #866
2050 W. Florida Ave.
(951) 766-1477

Ramona Tire
2350 W. Menlo Ave.
(951) 925-6659

Synfast Oil Change
3615 W. Florida Ave.
(951) 766-7055

Valvoline Instant Oil Change
532 W. Florida Ave.
(951) 766-1996

Idyllwild

Idyllwild Garage
25015 Hwy. 243
(951) 659-2613

Lake Elsinore

AutoZone #5558
30870 Riverside Dr.
(951) 674-7806

AutoZone #5559
32231 Mission Trail
(951) 245-1012

Express Tire
300 Diamond Dr.
(951) 674-0794

EZ Lube #96
29285 Central Ave.
(951) 253-5200

Firestone Store #2238
31748 Mission Trail
(951) 674-0633

Jiffy Lube #2681
311 Summerhill Dr.
(951) 471-8445

O'Reilly Autoparts #1429
31660 Grape St.
(951) 245-8389

Valvoline Instant Oil Change
29285 Central Ave.
(951) 253-5200

Menifee

AutoZone #5561
30123 Antelope Rd.
(951) 301-7240

One Stop Lube & Oil Center
26825 Newport Rd.
(951) 301-7479

Murrieta

AutoZone #5566
40950 California Oaks Rd.
(951) 677-6206

Express Tire
40615 California Oaks Rd.
(951) 696-5200

EZ Lube #115
40430 California Oaks Rd.
(951) 696-2882

Mountain View Tire and Service
27584 Clinton Keith Rd.
(888) 860-0535

Murrieta Volkswagen
41300 Date St.
(951) 634-5434

O'Reilly Autoparts #1430
40951 California Oaks Rd.
(951) 696-2991

Valvoline Instant Oil Change
40430 California Oaks Rd.
(951) 696-2882

Perris

AutoZone #5570
401 E. 4th St.
(951) 657-0696

AutoZone #5571
1675 Perris Blvd.
(951) 943-5998

Jiffy Lube #3294
118 E. Ramona Expressway
(951) 943-2200

Jiffy Lube #3361
3150 Case Rd., Bldg. J.
(951) 284-0922

O'Reilly Autoparts #1046
119 W. Nuevo Rd.
(951) 657-1488

San Jacinto

AutoZone #5581
1540 San Jacinto Ave.
(951) 654-2216

Jiffy Lube #3186
635 S. State St.
(951) 487-2001

Ramona Auto Services, Inc.
2447 S. San Jacinto Ave.
(951) 925-5117

Temecula

AutoZone #5582
31837 US Hwy. 79
(951) 302-8334

AutoZone #5936
40345 Winchester Rd.
(951) 296-3973

DCH Acura of Temecula
26705 Ynez Rd.
(951) 491-2451

Used Oil and Filters

You can also find Certified Collection Centers on the Cal Recycle Website:
www.calrecycle.ca.gov/recycle

Used Oil and Filters

Used Oil and Filters

Temecula

DCH Chrysler Jeep Dodge of Temecula
26845 Ynez Rd.
(951) 491-2151

DCH Honda of Temecula
26755 Ynez Rd.
(951) 491-2351

Express Tire
40915 Winchester Rd.
(951) 296-6699

Express Tire
44092 Margarita Rd.
(951) 302-5033

Express Tire
29095 Front St.
(951) 695-0555

EZ Lube #85
30625 Highway 79 South
(951) 553-7399

Jiffy Lube #1878
30690 Rancho California Rd.
(951) 694-5460

John Hine Temecula Mazda
42050 DLR Dr.
(951) 553-2000

O'Reilly Autoparts #0483
41125 Winchester Rd., #C1
(951) 296-5530

O'Reilly Autoparts #4291
33417 Temecula Pkwy.
(951) 302-1351

Paradise Chevrolet Cadillac
27360 Ynez Rd.
(951) 506-0058

Pep Boys #800
40605 Winchester Rd.
(951) 695-2322

Precision Tune Auto Care
26673 Ynez Rd., #A
(951) 699-6969

Promethean Biofuels Cooperative
27635 Diaz Rd.
(626) 232-7608

Quality Nissan
41895 Motor Car Pkwy.
(951) 676-6601

Ramona Auto Services, Inc.
40385 Winchester Rd.
(951) 719-1600

Ramona Auto Services, Inc.
31955 Via Rio Rd.
(951) 303-3584

Ramona Tire
40385 Winchester Rd.
(951) 719-1600

Rancho Car Wash and Quick Lube
27378 Jefferson Ave.
(951) 296-5644

Temecula Hyundai
27430 Ynez Rd.
(951) 699-6807

Temecula Quick Lube
29764 Rancho California Rd.
(951) 587-6624

Valvoline Instant Oil Change
30625 Highway 79 South
(951) 553-7399

Wildomar

Grease Monkey
32120 Clinton Keith Rd.
(951) 609-3000

Jiffy Lube #3412
32374 Clinton Keith Rd.
(951) 678-5300

Winchester

Mountain View Tire/Goodyear
30664 Benton Rd.
(877) 872-1021

Curbside pickup of used oil is available in some cities in Riverside County. Contact your waste hauler for more information. Waste hauler contact information is provided on the back page of this guide.

You may not need to change your oil every 3000 miles! Save time, money, and the environment by visiting **www.checkyournumber.org** to find out what your manufacturer recommended oil change interval is.

Locations marked with a also accept oil filters.

Please DO NOT drop off oil when the location is closed. **For more information about used oil collection centers call 800-350-4OIL.**

Household Hazardous Waste

Examples of household waste that are considered hazardous include:

- Batteries (all types)
- Electronic Waste
- Paint
- Used Oil and Antifreeze
- Sharps/ Needles

Permanent Household Hazardous Waste Collection Centers

Lake Elsinore Area (Closed January and December)

Lake Elsinore Regional Permanent HHW Collection Facility
512 N. Langstaff Street, Lake Elsinore, 92530
Open first Saturday of the month*, 9:00 a.m. to 2:00 p.m.
*Except holiday weekends and during inclement weather.

Riverside Area

Agua Mansa Regional Permanent HHW Collection Facility
1780 Agua Mansa Road, Riverside, 92509
Open non-holiday Saturdays*, 9:00 a.m. to 2:00 p.m.
*Except during inclement weather.

Regional ABOP Collection Centers (Antifreeze, Batteries, Oil and Oil Filters, and Latex Paint ONLY)

Murrieta Area

County Road Yard
25315 Jefferson Avenue, Murrieta, 92562
Open Non-Holiday Saturdays, 9:00 a.m. to 2:00 p.m.

These sites accept residential waste only. For more information, contact the Riverside County Household Hazardous Waste Department Hotline at **800-304-2226 or 951-486-3200, or visit, www.rivcowm.org/opencms/hhw/index.html**

Household Hazardous Waste

Below is a list of materials accepted at permanent HHW collection sites.*

Chemicals and Cleaners

Adhesives
Air Freshener
Aluminum Cleaners
Ammonia
Antifreeze
Brake Fluid
Carburetor Cleaner
Caulking
Chlorine Bleach
Chrome Polish
Disinfectant
Drain Cleaner
Engine Degreaser
Fertilizer
Fiberglass and Resins
Flea Powder
Floor / Surface Cleaners
Fungicides
Furniture Polish
Gas / Diesel Fuel
Glue
Gun Cleaner
Hair Dye
Hobby Chemicals
Insecticides / Pesticides
Kerosene / Lamp Oil
Lighter Fluid
Motor Oil
Mercury Devices
Oven Cleaner
Paint - Latex / Oil Based
Paint Stripper / Thinner
Photo Chemicals
Pool / Spa Chemicals
Rodent Bait / Poison
Roof Coating
Shoe Dye
Spot Remover
Transmission Fluid
Turpentine
Varnish
Weed Killer / Herbicide
Wood Preservative

Aerosols and Tanks

Aerosol Insecticides
Aerosol Cans
BBQ Propane Tanks
Camp Propane Tanks

E-Waste and Batteries

Batteries (all types)
Electronic Devices
Fluorescent Bulbs / Tubes
Old TVs and Computers

Medical Waste

Sharps / Needles

Please DO NOT bring the following types of materials (If you have any of these wastes please call (951) 486-3200):

Unacceptable Materials

Business, Non-Profit, or Out-of-County Waste
Explosives / Ammunition
Radioactive or Remediation Materials
Medical / Infectious Waste (Except Sharps)
Asbestos
Appliances
Tires
55 or 30 Gallon Drums
Compressed Gas Cylinders >40 lbs
Trash

*Maximum Chemical Load: 5 Gallons or 50lbs per trip. Residential waste only, no business waste accepted.

Recycling

Recycling

What can go into your curbside recycling bins? Not sure what you can recycle? Check out the list below.

Paper and Cardboard

- Books and Coloring Books
- Cardboard
- Cardstock and Construction Paper
- Office Paper
- Egg Cartons
- Clean Food Boxes
- Junk Mail and Envelopes
- Magazines and Newspapers
- Notebook Paper
- Paper Bags
- Telephone Books

Metal

- Aluminum and Steel Cans
- Clean Aluminum Foil
- Scrap Metal

Glass Jars and Bottles

- Glass Jars
- Beverage Bottles

Plastic Bottles and Grocery Bags

- Plastic Milk Jugs
- Plastic Beverage Containers
- Plastic Grocery Bags

Used Tires

Used tires are accepted at various locations in Riverside County. There is generally a fee to dispose of tires. The following locations accept tires:

Badlands Landfill

31125 Ironwood Ave., Moreno Valley, 92553

Lamb Canyon Landfill

16411 Lamb Canyon Rd., Beaumont, 92223

Visit www.rivcowm.org/opencms/landfill_info/landfill_fees.html for information on current landfill pricing.

BAS Recycling, Inc.

14050 Day St., Moreno Valley, 92553
(909) 383-7050
Call facility for pricing.

Electronic Waste Recyclers

Badlands, Lamb Canyon, and El Sobrante Landfills accept up to 2 CRT devices (e.g. computer monitors or TVs) per day for recycling at **no cost** during operating hours. The following recyclers also accept electronic waste:

The Green Guys Recycling, Hemet - (951) 757-9156
Starsurplus.com, Murrieta - (951) 677-5696
XIT Communications, Murrieta - (951) 691-5138
CR&R, Perris - (800) 755-8112
Tire Stop & Recycling, Sun City - (951) 928-9600
GKAT, INC. dba Temecula Recycling, Temecula - (951) 693-1500
Heavy Metal Scrap & Recycling, Inc., Temecula - (951) 693-4677

Other Recycling Facilities

For a complete list of recycling facilities visit www.calrecycle.ca.gov and click on the “Recycle Tab.”
Earth911.com also provides valuable information and resources about recycling and recycling facilities.

Reycling Centers

What should you do with those empty cans and bottles? Below is a list of centers that accept beverage containers for recycling*.

Hemet

EarthWize Recycling
1231 S. Sanderson Ave.
(909) 933-2773

Menlo Recycle Center
445 E. Menlo Ave.
(951) 766-8520

NexCycle
1295 S. State St.
(800) 969-2020

NexCycle
3125 W. Florida Ave.
(800) 969-2020

rePlanet
43396 US Hwy 74
(877) 737-5263

The Green Guys Recycling
100 N. State St., #101
(951) 757-9156

Valley Metals
342 N. Juanita St.
(951) 925-8577

Lake Elsinore

Cans Plus Recycling
29170 Riverside Dr., #1
(951) 245-1178

Downtown Elsinore Recycling
217 N. Main St.
(323) 204-8308

Lake Elsinore Recycling Center
1315 W. Flint St.
(951) 579-4102

Love Earth Recycling
31949 Corydon Rd., #160
(951) 230-6580

NexCycle
31564 Grape St.
(909) 796-2210

rePlanet
32281 Mission Tr.
(951) 520-1700

rePlanet
16750 Lakeshore Dr.
(877) 737-5263

Menifee

rePlanet
30125 Antelope Rd.
(951) 520-1700

rePlanet
25904 Newport Rd.
(877) 737-5263

Neill's Recycling
26026 Sherman Rd.
(951) 514-8656

NexCycle
27220 Sun City Blvd.
(909) 796-2210

Tire Stop and Recycling
27491 Ethanac Rd.
(888) 515-1376

Murrieta

EarthWize Recycling
27826 Clinton Keith Rd.
(909) 933-2773

Go Green Murrieta Recycling
40645 Cal. Oaks Rd.
(818) 220-9540

Murrieta Recycling
38365 Innovation Ct., #1102-1105
(951) 894-3094

rePlanet
40473 Murrieta Hot Springs Rd.
(951) 520-1700

rePlanet
23801 Washington Ave.
(951) 520-1700

rePlanet
4100 Cal. Oaks Rd.
(951) 520-1700

rePlanet
39140 Winchester Ave.
(951) 520-1700

rePlanet
28047 Scott Rd.
(877) 737-5263

SA Recycling
41400 Date St.
(951) 677-8586

Recycling Centers

Perris

A-1
24440 Hwy 74
(951) 940-4224

Ecology Auto Parts
23332 Cajalco Rd.
(951) 657-7725

Go Green Recycling
164 Malbert St., #A-2
(951) 487-5875

Harb Family Market Recycling
22707 San Jacinto Ave.
(951) 657-7733

4th Street Recycling
510 W. 4th St.
(323) 204-8308

Menlo Recycle Center
151 W. 7th St.
(951) 657-8200

RecycleWise
200 Sinclair St. #4
(951) 443-1894

Recycling Depot
1320 W. Oleander Ave.
(951) 442-5221

rePlanet
47 W. Nuevo Rd.
(877) 737-5263

San Jacinto

CA Recycling
762 S. San Jacinto Ave.
(951) 651-0010

rePlanet
1271 N. State St.
(877) 737-5263

San Jacinto Recycling Center
658 W. Esplanade Ave.
(951) 654-1399

Temecula

Heavy Metal Scrap Reycling Inc.
43136 Rancho Way
(951) 693-4677

NexCycle
29530 Rancho California Rd.
(909) 796-2210

NexCycle
26419 Ynez Rd.
(909) 796-2210

rePlanet
30530 Rancho California Rd.
(951) 520-1700

rePlanet
33293 Temecula Pkwy.
(951) 520-1700

rePlanet
31813 Temecula Pkwy.
(877) 737-5263

Temecula Recycling
27635 Diaz Rd., #120
(951) 693-1500

Wildomar

rePlanet
23893 Clinton Keith Rd.
(951) 520-1700

rePlanet
30712 Benton Rd.
(877) 737-5263

*Some recycling centers may accept other recyclable materials. It is advisable to call the center and confirm this, as well as operating hours, before visiting.

Fore more information about local recycling centers visit the **CalRecycle** website: **www.calrecycle.ca.gov.**

Types of Plastic

Confused about the types of plastic and if they can be recycled? Many plastic containers display an identification code that indicates what they are made from. Below are the 7 codes.

#1: Polyethylene Terephthalate (PETE or PET)
Used to create 2-liter soda bottles, water bottles, cooking oil bottles, peanut butter jars.
The most commonly accepted plastic for recycling.

#2: High Density Polyethylene
Used to create detergent bottles, milk and water jugs, grocery bags, yogurt cups.
Commonly accepted for recycling. Bags can be recycled at some large grocery stores.

#3: Polyvinyl Chloride
Used to create plastic pipes, outdoor furniture, shrink-wrap, liquid detergent containers, flooring, showercurtains.
Not currently accepted for recycling.

#4: Low Density Polyethylene
Used to create food storage containers, cellophane wrap, dry cleaning bags, produce bags, trash can liners.
Not commonly recycled, some large grocery stores accept LDPE bags.

#5: Polypropylene
Used to create ketchup bottles, aerosol caps, drinking straws, yogurt containers.
Not commonly accepted for recycling.

#6: Polystyrene
Also known as "Styrofoam." Used to make coffee cups, take-out food packaging, egg cartons, and packaging "peanuts."
Sometimes accepted for recycling and made into the same products.

#7: Other
All other plastic resins or a mixture of resins used to make reusable water bottles, Tupperware, biodegradable and compostable plastics.
Not commonly accepted for recycling.

Composting Basics

Got food scraps and yardwaste? Below is a quick guide to Backyard Composting.

1. Select a good spot for composting

- Sun or shade
- Convenient to kitchen or garden, and close to a source of water
- Keep away from structures and wood, as moisture can hasten decay
- Place only on bare ground, as organisms from soil are needed

2. Know the Ingredients

Nitrogen - Green materials - grass clippings, fresh leaves and twigs, vegetable and fruit trimmings, coffee grounds and filters, and non-meat eating animal manures.

Carbon - Brown materials that have released their nitrogen - dry and brittle leaves and grasses, straw, wood chips, corn stalks, shredded newspaper, paper towels, napkins, and cardboard.

Water - The correct moisture level should be about the same as a damp wrung out sponge. A few drops should fall when squeezed in your hand.

Air - Oxygen is very important to the bacteria, fungi, and microorganisms that are working in the pile to breakdown the organic material.

Do Not Add - Meat, dairy products, fats, oils, waste from meat eating animals (dogs and cats), thorny plant material, or diseased plant material.

2. Know the Methods

Aerobic - Pile equal parts green and brown material on ground or in a bin in a 3'x3'x3' heap, water well, and cover with a tarp, carpet or opaque plastic sheet. The pile will heat up (120 to 160 degrees), and needs to be turned after a few days, once it has cooled. Turn the pile weekly and continue composting until the pile has a dark rich look like chocolate cake and the things you put in don't look like their original form. After the compost is done, water well, cover, and let it rest for one to two weeks to make sure it is completely done and the nitrogen has a chance to stabilize. If the compost is used too soon it could rob nutrients from the surrounding plants. Remove large chunks and add them to the next compost pile.

Anerobic - Similar to the Aerobic method, but there is no need to actively turn the material. It may take longer (1-2 years), but is still beneficial to your garden. Just pile the stuff, water, cover, and wait.

For more detailed information on composting, free workshops, or other methods, such as **Vermicomposting**, visit www.rivcowm.org and search for composting.

Source Reduction

The best way to reduce waste is to prevent it!

Buy Responsibly

Reduce packaging waste - Look for products that reduce packaging, or purchase in bulk to reduce the amount of packaging needed.

Look for products containing recycled material - Recycled paper products, motor oil, and even pens and pencils are just a few examples of products that reduce waste.

Consider reusable products - Buy reusable water bottles and sturdy utensils and plates that can be washed and used again.

Get it "For Here," or bring your own - Many coffee shops will provide drinks to their customers in ceramic mugs rather than paper cups if requested. Just ask! Reusable tumblers are also a great alternative to paper cups, and many establishments will even give a small discount to those who bring their own!

Borrow, rent, or share - Why buy something if you are only going to use it once? Items such as tools, party decorations, and even newspapers and magazines can be shared with your friends, family, and/or community.

Purchase rebuilt, remanufactured, or refurbished - Many electronics such as cell phones, computers, and media players can be purchased "refurbished" at a sometimes substantial price reduction. This conserves the resources needed to manufacture a new product.

Choose Non-Toxic

Choose products that contain only non-toxic materials, or try one of these **homemade alternatives**:

- Instead of glass cleaner, dilute 1 cup of vinegar in 1 quart of water.
- To open clogged drains, flush with a mixture of boiling water, and equal parts baking soda and vinegar.

For more information on non-toxic alternatives, visit the California Coastal Commission website:
http://www.coastal.ca.gov/ccbn/lesstoxic.html

Source Reduction

Plastic bags and junk mail contribute to a significant amount of un-needed waste. You can lessen their impact by Reducing, Reusing, and Recycling.

Plastic Bags

Reduce: BYOB (Bring Your Own Bag) - Use reusable canvas or cloth bags rather than plastic bags, and keep them in your car. Not all items need a bag, just say "no, thank you."

Reuse - Plastic grocery bags can serve multiple purposes, such as trash can liners or for pet waste.

Recycle - If you find that you must use a plastic bag, recycle it when you are finished. Most large supermarkets and pharmacies offer free recycling of plastic bags.

Junk Mail Reduction

You can reduce the amount of unwanted junk mail in your mailbox by simply mailing a postcard to the following addresses, requesting your name be removed from their mailing list. Be sure to include your full name, your address(es), your signature, and the date.

Mail Preference Service
Attn.: Dept. 10088342
PO Box 282
Carmel, NY 10512

ADVO
Consumer Assistance
PO Box 249
Windsor, CT 06095

Harte-Hanks Circulation
C/O Pennysaver
2830 Orbiter St.
Brea, CA 92821

Valpak Direct Marketing Systems, Inc.
8605 Largo Lakes Dr.
Largo, FL 33773

Credit Card Junk Mail
Call (888)5-OPT OUT (888-567-8688)

City / County Resources

City of Canyon Lake - Waste and Recycling | (800) 755-8112
http://www.cityofcanyonlake.com/recycling.asp

City of Hemet - Integrated Waste Management | (951) 765-3712
http://www.cityofhemet.org/index.aspx?nid=93

City of Lake Elsinore - Recycling | (951) 674-3124
http://www.lake-elsinore.org/index.aspx?page=751

City of Menifee - Public Works Department | (951) 672-6777
http://www.cityofmenifee.us/index.aspx?nid=99

City of Murrieta - Trash & Recycling | (951) 461-6007
http://www.murrieta.org/services/trash

City of Perris - Waste & Recycling | (951) 943-6100
http://www.cityofperris.org/residents/waste-recycle.html

City of San Jacinto - Waste & Recycling | (951) 487-7330
http://www.san-jacinto.ca.us/residents/waste.html

City of Temecula - Trash & Recycling | 951-694-6444
http://www.cityoftemecula.org/temecula/residents/trashrecycling/recycling.htm

City of Wildomar - Trash Hauling and Recycling | (951) 677-7751
http://www.cityofwildomar.org/trash-hauling-recycling.asp

County of Riverside - Riverside County Waste Management Department
http://www.rivcowm.org | (951) 486-3200

Western Riverside Council of Governments
http://www.wrcog.cog.ca.us | (800) 350-4645

Waste Haulers

Waste Management, Inc. - (951) 280-5400 - www.wm.com
Serves: Menifee, Murrieta, and Wildomar

CR&R Disposal - (951) 943-1991 - www.crrwasteservices.com
Serves: Canyon Lake, Hemet, Lake Elsinore, Perris, San Jacinto, and Temecula

The Complete Guide to Residential Recyling is sponsored by:

Why is stormwater runoff a problem?

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

What is stormwater runoff?

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

The effects of pollution

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

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

After the Storm

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

EPA 833-B-03-002

January 2003

Internet Address (URL) • HTTP://www.epa.gov
Recycled/Recyclable • Printed With Vegetable Oil Based Inks on 100% Postconsumer, Process Chlorine Free Recycled Paper

A Citizen's Guide to Understanding Stormwater

Stormwater Pollution Solutions

Residential

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

Lawn care

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

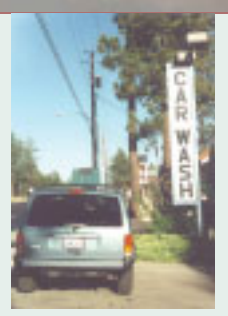
- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't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

Septic systems

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

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

Auto care



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

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

Pet waste

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

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

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

Residential landscaping

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

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

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

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

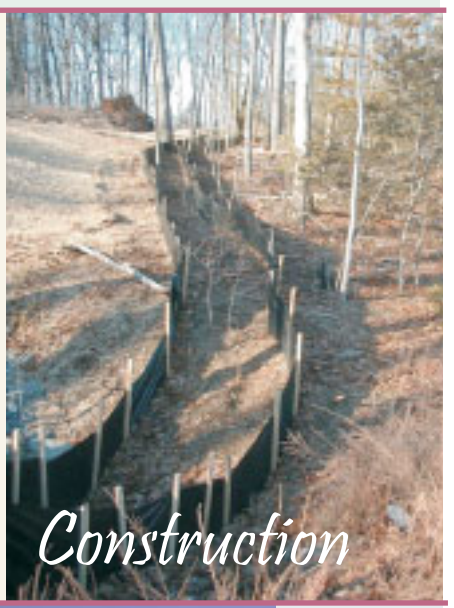
Commercial

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

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

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

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



Construction

Agriculture

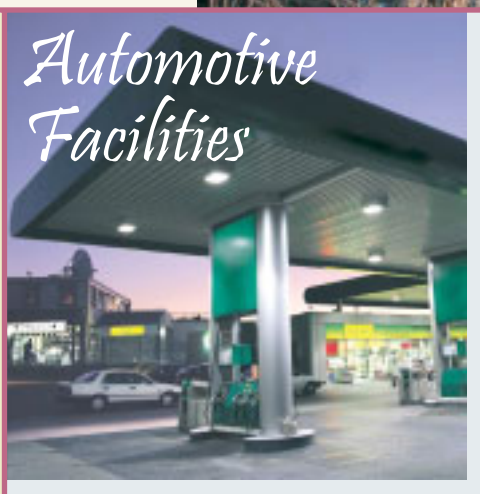
Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria,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

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

Forestry

Improperly managed logging operations can result in erosion and sedimentation.

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



Automotive Facilities

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

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

BIORETENTION BASIN CONSTRUCTION

1. The engineer shall furnish to the County a copy of the source testing and a signed certification that the fully blended Bioretention/Biofiltration Soil Media (BSM) material meets all of the WQMP requirements before material is imported or if the material is mixed onsite prior to installation.

2. As BSM material is being installed, Quality Assurance (QA) tests shall be conducted or for every 1,200 tons or 800 cubic yards mixed on-site from a completely mixed stockpile or windrow, with a minimum of three tests. For imported material from a supplier with a quality control program the QA tests shall be conducted 2,400 tons or 1,600 cubic yards from the supplier.

3. The Engineer conducting the Quality Control testing shall furnish to the County copy of the QA testing and a certification that the BSM for the project meets all of the following requirements. Certified mitigation plans can be used for exceedances, as long as all the requirements are designed to be met.

a. BSM shall not be compacted. BSM shall consist of 60-80% clean sand, up to 20% clean topsoil, and 20% of a nutrient-stabilized organic amendment. The initial infiltration rate shall be greater than 8 inches per hour per laboratory test.

b. pH: 6.0 – 8.8; Salinity: 0.5 to 3.0 mmh0/cm as electrical conductivity; Sodium absorption ratio: < 6.0; Chloride: < 800ppm in saturated extract; Cation Exchange Capacity (CEC): > 10meq/100g; Organic Matter: 2 to 5-percent on a dry weight basis; Carbon: Nitrogen Ratio: 12 to 40, preferably 15 to 40; Gravel larger than 2mm: 0 to 25-percent of the total sample; Clay smaller than 0.005mm: 0 to 5 percent of the non-gravel fraction.

c. BSM shall be tested to limit the leaching of potential inherent pollutants. BSM used in Biofiltration BMPs shall conform to the following limits for pollutant concentrations in saturated extract: Phosphorus: < 1mg/L; Nitrate < 3mg/L, Copper < 0.025mg/L. These pollutant limits are for the amount that is leached from the sample, not from the soil sample itself. Testing may be performed after laboratory rinsing of media with up to 15 pore volumes of water. Equivalent test results will be accepted if certified by a laboratory or appropriate testing facility.

d. Low nutrient compost used in BSM shall be sourced from a facility permitted through CalRecycle, preferably through USCC STA program. Compost shall conform to the following requirements: Physical contaminants < 1% by dry weight; Carbon: Nitrogen ratio 12:1 to 40:1; Maturity/Stability shall conform to either: Solvita Maturity Index: ≥ 5.5, CO2 Evolution: < 2.5 mg CO2-C per g compost organic matter per day, or < 5mg CO2-C per g compost C per day; Select Pathogens and trace metals shall pass US EPA Class A Standard. Testing shall be no more than 6 months old and representative of current stock piles.

e. Coconut coir pith used in BSM shall be thoroughly rinsed with freshwater and screened to remove coarse fibers as part of production and aged > 6 months. Peat used in BSM shall be sphagnum peat.

Vortex Separator MP-51

General Description

Vortex separators: (alternatively, swirl concentrators) are gravity separators, and in principle are essentially wet vaults. The difference from wet vaults, however, is that the vortex separator is round, rather than rectangular, and the water moves in a centrifugal fashion before exiting. By having the water move in a circular fashion, rather than a straight line as is the case with a standard wet vault, it is possible to obtain significant removal of suspended sediments and attached pollutants with less space. Vortex separators were originally developed for combined sewer overflows (CSOs), where it is used primarily to remove coarse inorganic solids. Vortex separation has been adapted to stormwater treatment by several manufacturers.

Inspection/Maintenance Considerations

As some of the systems have standing water that remains between storms, there is concern about mosquito breeding. Also, a loss of dissolved pollutants may occur as accumulated organic matter (e.g., leaves) decomposes in the units.

Inspection Activities	Suggested Frequency
■ Inspect for accumulated sediment/debris.	As needed
Maintenance Activities	**Suggested Frequency**
■ Remove of accumulated material with an eductor truck. It may be necessary to remove and dispose the floatables separately due to the presence of petroleum product.	Annual, or more frequent as needed

Maintenance Concerns, Objectives, and Goals

- ■ Sediment/Debris Removal
- ■ Vector Control

Targeted Constituents

✓	Sediment	▲
✓	Nutrients	●
✓	Trash	
✓	Metals	●
	Bacteria	
✓	Oil and Grease	
✓	Organics	

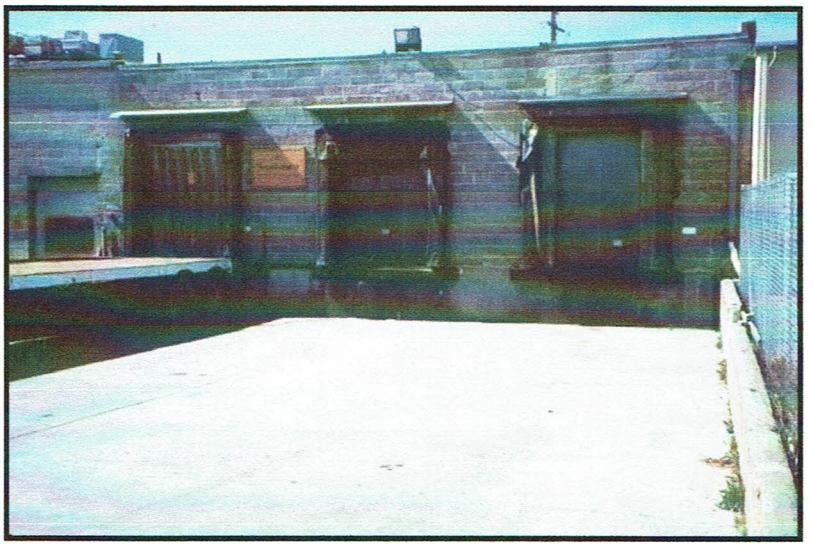
Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

CASQA California Stormwater Quality Association

Outdoor Loading/Unloading SC-30



Objectives

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

Description

The loading/unloading of materials usually takes place outside on docks or terminals; therefore, materials spilled, leaked, or lost during loading/unloading may collect in the soil or on other surfaces and have the potential to be carried away by stormwater runoff or when the area is cleaned. Additionally, rainfall may wash pollutants from machinery used to unload or move materials. Implementation of the following protocols will prevent or reduce the discharge of pollutants to stormwater from outdoor loading/unloading of materials.

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Park tank trucks or delivery vehicles in designated areas so that spills or leaks can be contained.
- Limit exposure of material to rainfall whenever possible.
- Prevent stormwater run-on.
- Check equipment regularly for leaks.

CASQA California Stormwater Quality Association

Suggested Protocols

Loading and Unloading – General Guidelines

- Develop an operations plan that describes procedures for loading and/or unloading.
- Conduct loading and unloading in dry weather if possible.
- Cover designated loading/unloading areas to reduce exposure of materials to rain.
- Consider placing a seal or door skirt between delivery vehicles and building to prevent exposure to rain.
- Design loading/unloading area to prevent stormwater run-on, which would include grading or berming the area, and position roof downspouts so they direct stormwater away from the loading/unloading areas.
- Have employees load and unload all materials and equipment in covered areas such as building overhangs at loading docks if feasible.
- Load/unload only at designated loading areas.
- Use drip pans underneath hose and pipe connections and other leak-prone spots during liquid transfer operations, and when making and breaking connections. Several drip pans should be stored in a covered location near the liquid transfer area so that they are always available, yet protected from precipitation when not in use. Drip pans can be made specifically for railroad tracks. Drip pans must be cleaned periodically, and drip collected materials must be disposed of properly.
- Pave loading areas with concrete instead of asphalt.
- Avoid placing storm drains in the area.
- Grade and/or berm the loading/unloading area to a drain that is connected to a deadend.

Inspection

- Check loading and unloading equipment regularly for leaks, including valves, pumps, flanges and connections.
- Look for dust or fumes during loading or unloading operations.

Training

- Train employees (e.g., fork lift operators) and contractors on proper spill containment and cleanup.
- Have employees trained in spill containment and cleanup present during loading/unloading.
- Train employees in proper handling techniques during liquid transfers to avoid spills.
- Make sure forklift operators are properly trained on loading and unloading procedures.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Contain leaks during transfer.
- Store and maintain appropriate spill cleanup materials in a location that is readily accessible and known to all and ensure that employees are familiar with the site's spill control plan and proper spill cleanup procedures.
- Have an emergency spill cleanup plan readily available.
- Use drip pans or comparable devices when transferring oils, solvents, and paints.

Other Considerations (Limitations and Regulations)

- Space and time limitations may preclude all transfers from being performed indoors or under cover.
- It may not be possible to conduct transfers only during dry weather.

Requirements

Costs

Costs should be low except when covering a large loading/unloading area.

Maintenance

- Conduct regular inspections and make repairs as necessary. The frequency of repairs will depend on the age of the facility.
- Check loading and unloading equipment regularly for leaks.
- Conduct regular broom dry-sweeping of area.

Supplemental Information

Further Detail of the BMP

Special Circumstances for Indoor Loading/Unloading of Materials

Loading or unloading of liquids should occur in the manufacturing building so that any spills that are not completely retained can be discharged to the sanitary sewer, treatment plant, or treated in a manner consistent with local sewer authorities and permit requirements.

- For loading and unloading tank trucks to above and below ground storage tanks, the following procedures should be used:
  - The area where the transfer takes place should be paved. If the liquid is reactive with the asphalt, Portland cement should be used to pave the area.
  - The transfer area should be designed to prevent run-on of stormwater from adjacent areas. Sloping the pad and using a curb, like a speed bump, around the uphill side of the transfer area should reduce run-on.

- The transfer area should be designed to prevent runoff of spilled liquids from the area. Sloping the area to a drain should prevent runoff. The drain should be connected to a dead-end sump or to the sanitary sewer. A positive control valve should be installed on the drain.

- For transfer from rail cars to storage tanks that must occur outside, use the following procedures:

  - Drip pans should be placed at locations where spillage may occur, such as hose connections, hose reels, and filler nozzles. Use drip pans when making and breaking connections.

  - Drip pan systems should be installed between the rails to collect spillage from tank cars.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Safer Alternative Products SC-35

Description

Promote the use of less harmful products and products that contain little or no TMDL pollutants. Alternatives exist for most product classes including chemical fertilizers, pesticides, cleaning solutions, janitorial chemicals, automotive and paint products, and consumables (batteries, fluorescent lamps).

Approach

Pattern a new program after the many established programs around the state and country. Integrate this best management practice as much as possible with existing programs at your facility.

Develop a comprehensive program based on:

- The "Precautionary Principle," which is an alternative to the "Risk Assessment" model that says it's acceptable to use a potentially harmful product until physical evidence of its harmful effects are established and deemed too costly from an environmental or public health perspective. For instance, a risk assessment approach might say it's acceptable to use a pesticide until there is direct proof of an environmental impact. The Precautionary Principle approach is used to evaluate whether a given product is safe, whether it is really necessary, and whether alternative products would perform just as well.
- Environmentally Preferable Purchasing Program to minimize the purchase of products containing hazardous ingredients used in the facility's custodial services, fleet maintenance, and facility maintenance in favor of using alternate products that pose less risk to employees and to the environment.
- Integrated Pest Management (IPM) or Less-Toxic Pesticide Program, which uses a pest management approach that minimizes the use of toxic chemicals and gets rid of pests by methods that pose a lower risk to employees, the public, and the environment.
- Energy Efficiency Program including no-cost and low-cost energy conservation and efficiency actions that can reduce both energy consumption and electricity bills, along with long-term energy efficiency investments.

Consider the following mechanisms for developing and implementing a comprehensive program:

- Policies

Objectives

- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

CASQA California Stormwater Quality Association

- Procedures
  - Standard operating procedures (SOPs)
  - Purchasing guidelines and procedures
  - Bid packages (services and supplies)
- Materials
  - Preferred or approved product and supplier lists
  - Product and supplier evaluation criteria
  - Training sessions and manuals
  - Fact sheets for employees

Implement this BMP in conjunction with the Vehicle and Equipment Management fact sheets (SC20 – SC22) and SC41, Building and Grounds Maintenance.

Training

- Employees who handle potentially harmful materials in the use of safer alternatives.
- Purchasing departments should be encouraged to procure less hazardous materials and products that contain little or no harmful substances or TMDL pollutants.

Regulations

This BMP has no regulatory requirements. Existing regulations already encourage facilities to reduce the use of hazardous materials through incentives such as reduced:

- Specialized equipment storage and handling requirements,
- Storm water runoff sampling requirements,
- Training and licensing requirements, and
- Record keeping and reporting requirements.

Equipment

- There are no major equipment requirements to this BMP.

Limitations

- Alternative products may not be available, suitable, or effective in every case.

Requirements

Cost Considerations

- The primary cost is for staff time to: 1) develop new policies and procedures and 2) educate purchasing departments and employees who handle potentially harmful materials about the availability, procurement, and use of safer alternatives.

- Some alternative products may be slightly more expensive than conventional products.

Supplemental Information

Employees and contractors / service providers can both be educated about safer alternatives by using information developed by a number of organizations including the references and resources listed below.

The following discussion provides some general information on safer alternatives. More specific information on particular hazardous materials and the available alternatives may be found in the references and resources listed below.

- Automotive products – Less toxic alternatives are not available for many automotive products, especially engine fluids. But there are alternatives to grease lubricants, car polishes, degreasers, and windshield washer solution. Rerefined motor oil is also available.
- Vehicle/Trailer lubrication – Fifth wheel bearings on trucks require routine lubrication. Adhesive lubricants are available to replace typical chassis grease.
- Cleaners – Vegetables-based or citrus-based soaps are available to replace petroleum-based soaps/detergents.
- Paint products – Water-based paints, wood preservatives, stains, and finishes are available.
- Pesticides – Specific alternative products or methods exist to control most insects, fungi, and weeds.
- Chemical Fertilizers – Compost and soil amendments are natural alternatives.
- Consumables – Manufacturers have either reduced or are in the process of reducing the amount of heavy metals in consumables such as batteries and fluorescent lamps. All fluorescent lamps contain mercury, however low-mercury containing lamps are now available from most hardware and lighting stores. Fluorescent lamps are also more energy efficient than the average incandescent lamp.
- Janitorial chemicals – Even biodegradable soap can harm fish and wildlife before it biodegrades. Biodegradable does not mean non-toxic. Safer products and procedures are available for floor stripping and cleaning, as well as carpet, glass, metal, and restroom cleaning and disinfecting.

Examples

There are a number of business and trade associations, and communities with effective programs. Some of the more prominent are listed below in the references and resources section.

References and Resources

Note: Many of these references provide alternative products for materials that typically are used inside and disposed to the sanitary sewer as well as alternatives to products that usually end up in the storm drain.

General Sustainable Practices and Pollution Prevention Including Pollutant-Specific Information

California Department of Toxic Substances Control (www.dtsc.ca.gov)

California Integrated Waste Management Board (www.ciwmb.ca.gov)

City of Santa Monica (www.santa-monica.org/environment)

City of Palo Alto (www.city.palo-alto.ca.us/cleanbay)

City and County of San Francisco, Department of the Environment (www.ci.sf.ca.us/sfenvironment)

Earth 911 (www.earth911.org/master.asp)

Environmental Finance Center Region IX (www.greenstart.org/efc9)

Flex Your Power (www.flexyourpower.ca.gov)

GreenBiz.com (www.greenbiz.com)

Green Business Program (www.abag.org/bayarea/enviro/gbus/gb.html)

Pacific Industrial and Business Association (www.piba.org)

Sacramento Clean Water Business Partners (www.sacstormwater.org)

USEPA BMP fact sheet – Alternative products (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/poll_2.cfm)

USEPA Region IX Pollution Prevention Program (www.epa.gov/region09/p2)

Western Regional Pollution Prevention Network (www.westp2net.org)

Metals (mercury, copper)

National Electrical Manufacturers Association - Environment, Health and Safety (www.nema.org)

Sustainable Conservation (www.suscon.org)

Auto Recycling Project

Brake Pad Partnership

Pesticides and Chemical Fertilizers

Bio-Integral Resource Center (www.birc.org)

California Department of Pesticide Regulation (www.cdpr.ca.gov)

University of California Statewide IPM Program (www.ipm.ucdavis.edu/default.html)

Dioxins

Bay Area Dioxins Project (http://dioxin.abag.ca.gov/)

Building & Grounds Maintenance SC-41

Objectives

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

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	
Organics	

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.

CASQA
California Stormwater Quality Association

- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.
- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

Fertilizer and Pesticide Management

- 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 less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.

- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

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.

Training

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

Other Considerations

Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Cost will vary depending on the type and size of facility.
- Overall costs should be low in comparison to other BMPs.

Maintenance

Sweep paved areas regularly to collect loose particles. Wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

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

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Parking/Storage Area Maintenance SC-43

Objectives

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

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)
- Keep accurate maintenance logs to evaluate BMP implementation.

CASQA California Stormwater Quality Association

SC-43 Parking/Storage Area Maintenance

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

Surface Cleaning

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.

- Do not allow discharges to the storm drain.
- Vacuum/pump discharges to a tank or discharge to sanitary sewer.
- Appropriately dispose of spilled materials and absorbents.

Surface Repair

- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.
- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

Other Considerations

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

SC-43 Parking/Storage Area Maintenance

Requirements

Costs

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Only use only as much water as is necessary for dust control to avoid runoff.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

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

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

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Drainage System Maintenance SC-44

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

CASQA California Stormwater Quality Association

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:
  - Purchase and installation of signs.
  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.
  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.
  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

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

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Site Design & Landscape Planning SD-10

Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

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

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Designing New Installations

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

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

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

Conserve Natural Areas during Landscape Planning

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

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

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

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

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

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

Protection of Slopes and Channels during Landscape Design

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

Redeveloping Existing Installations

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

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

Other Resources

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

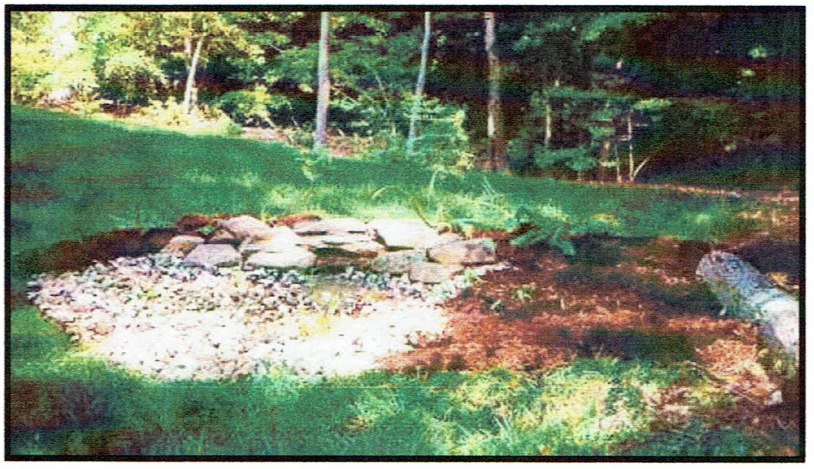
Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

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

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

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

Roof Runoff Controls SD-11



Rain Garden

Design Objectives

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

Description

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

Approach

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

Suitable Applications

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

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

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

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

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

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

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

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

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

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

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

Pop-up Drainage Emitter

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

Foundation Planting

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

Redeveloping Existing Installations

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

Supplemental Information

Examples

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

Other Resources

Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

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

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

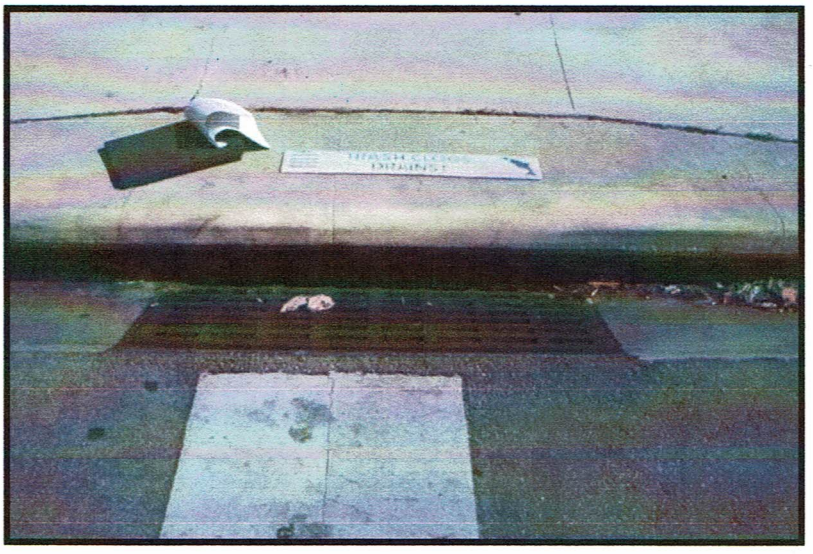
A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

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.

Storm Drain Signage SD-13



Design Objectives

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

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

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. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.
- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

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.

Fueling Areas SD-30

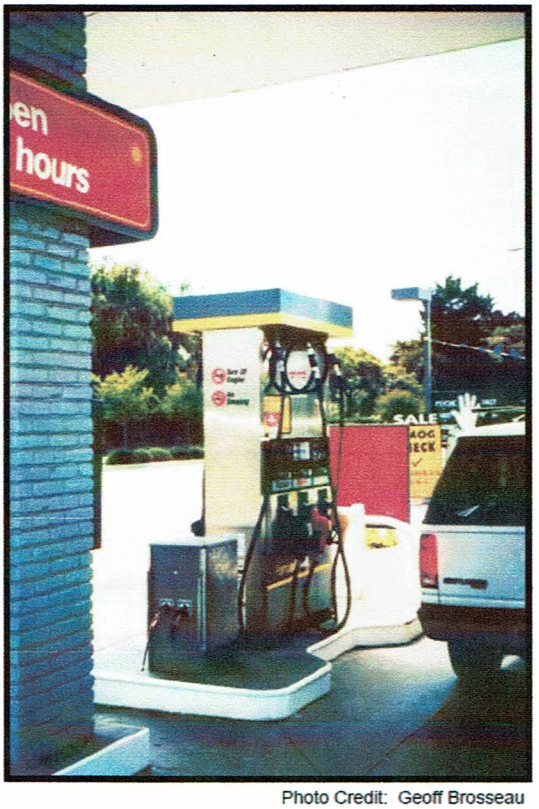


Photo Credit: Geoff Brosseau

Design Objectives

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

Description

Fueling areas have the potential to contribute oil and grease, solvents, car battery acid, coolant and gasoline to the stormwater conveyance system. Spills at vehicle and equipment fueling areas can be a significant source of pollution because fuels contain toxic materials and heavy metals that are not easily removed by stormwater treatment devices.

Approach

Project plans must be developed for cleaning near fuel dispensers, emergency spill cleanup, containment, and leak prevention.

Suitable Applications

Appropriate applications include commercial, industrial, and any other areas planned to have fuel dispensing equipment, including retail gasoline outlets, automotive repair shops, and major non-retail dispensing areas.

Design Considerations

Design requirements for fueling areas are governed by Building and Fire Codes and by current local agency ordinances and zoning requirements. Design requirements described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements.

Designing New Installations

Covering

Fuel dispensing areas should provide an overhanging roof structure or canopy. The cover's minimum dimensions must be equal to or greater than the area within the grade break. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. The fueling area should drain to the project's treatment control BMP(s) prior to discharging to the stormwater conveyance system. Note - If fueling large equipment or vehicles that would prohibit the use of covers or roofs, the fueling island should be designed to sufficiently accommodate the larger vehicles and equipment and to prevent stormwater run-on and runoff. Grade to direct stormwater to a dead-end sump.

Surfacing

Fuel dispensing areas should be paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete should be prohibited. Use asphalt sealant to protect asphalt paved areas surrounding the fueling area. This provision may be made to sites that have pre-existing asphalt surfaces.

The concrete fuel dispensing area should be extended a minimum of 6.5 ft from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 ft, whichever is less.

Grading/Contouring

Dispensing areas should have an appropriate slope to prevent ponding, and be separated from the rest of the site by a grade break that prevents run-on of urban runoff. (Slope is required to be 2 to 4% in some jurisdictions' stormwater management and mitigation plans.)

Fueling areas should be graded to drain toward a dead-end sump. Runoff from downspouts/roofs should be directed away from fueling areas. Do not locate storm drains in the immediate vicinity of the fueling area.

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.

Additional Information

- In the case of an emergency, provide storm drain seals, such as isolation valves, drain plugs, or drain covers, to prevent spills or contaminated stormwater from entering the stormwater conveyance system.

Other Resources

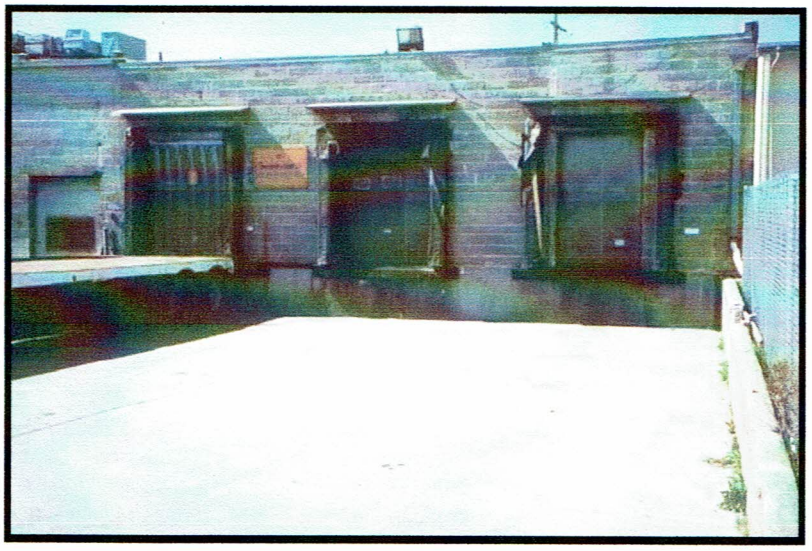
A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

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.

Maintenance Bays & Docks SD-31



Design Objectives

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

Description

Several measures can be taken to prevent operations at maintenance bays and loading docks from contributing a variety of toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to the stormwater conveyance system.

Approach

In designs for maintenance bays and loading docks, containment is encouraged. Preventative measures include overflow containment structures and dead-end sumps. However, in the case of loading docks from grocery stores and warehouse/distribution centers, engineered infiltration systems may be considered.

Suitable Applications

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

Design Considerations

Design requirements for vehicle maintenance and repair are governed by Building and Fire Codes, and by current local agency ordinances, and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code requirements.

Designing New Installations

Designs of maintenance bays should consider the following:

- Repair/maintenance bays and vehicle parts with fluids should be indoors; or designed to preclude urban run-on and runoff.
- Repair/maintenance floor areas should be paved with Portland cement concrete (or equivalent smooth impervious surface).

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Repair/maintenance bays should be designed to capture all wash water leaks and spills. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around repair bays to prevent spilled materials and wash-down waters form entering the storm drain system. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.
- Other features may be comparable and equally effective.

The following designs of loading/unloading dock areas should be considered:

- Loading dock areas should be covered, or drainage should be designed to preclude urban run-on and runoff.
- Direct connections into storm drains from depressed loading docks (truck wells) are prohibited.
- Below-grade loading docks from grocery stores and warehouse/distribution centers of fresh food items should drain through water quality inlets, or to an engineered infiltration system, or an equally effective alternative. Pre-treatment may also be required.
- Other features may be comparable and equally effective.

Redeveloping Existing Installations

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

Additional Information

Stormwater and non-stormwater will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit.

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.

Trash Storage Areas SD-32

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Design Objectives

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

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

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

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.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

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.

Bioretention

TC-32

Maintenance Concerns, Objectives, and Goals

- Clogged Soil or Outlet Structures
- Invasive Species
- Vegetation/Landscape Maintenance
- Erosion
- Channelization of Flow
- Aesthetics

General Description

The bioretention best management practice (BMP) functions as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. These facilities normally consist of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. The runoff's velocity is reduced by passing over or through a sand bed and is subsequently distributed evenly along a ponding area. Exfiltration of the stored water in the bioretention area planting soil into the underlying soils occurs over a period of days.

Targeted Constituents

✓	Sediment	■
✓	Nutrients	▲
✓	Trash	■
✓	Metals	■
✓	Bacteria	■
✓	Oil and Grease	■
✓	Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

Inspection/Maintenance Considerations

Bioretention requires frequent landscaping maintenance, including measures to ensure that the area is functioning properly, as well as maintenance of the landscaping on the practice. In many cases, bioretention areas initially require intense maintenance, but less maintenance is needed over time. In many cases, maintenance tasks can be completed by a landscaping contractor, who may already be hired at the site. In cold climates the soil may freeze, preventing runoff from infiltrating into the planting soil.

CASQA California Stormwater Quality Association

Inspection Activities	Suggested Frequency
■ Inspect soil and repair eroded areas.	Monthly
■ Inspect for erosion or damage to vegetation, preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the strips are ready for winter. However, additional inspection after periods of heavy runoff is desirable.	Semi-annual inspection
■ Inspect to ensure grass is well established. If not, either prepare soil and reseed or replace with alternative species. Install erosion control blanket.	
■ Check for debris and litter, and areas of sediment accumulation.	
■ Inspect health of trees and shrubs.	

Maintenance Activities	Suggested Frequency
■ Water plants daily for 2 weeks.	At project completion
■ Remove litter and debris.	Monthly
■ Remove sediment.	As needed
■ Remulch void areas.	
■ Treat diseased trees and shrubs.	
■ Mow turf areas.	
■ Repair erosion at inflow points.	
■ Repair outflow structures.	
■ Unclog underdrain.	
■ Regulate soil pH regulation.	
■ Remove and replace dead and diseased vegetation.	Semi-annual
■ Add mulch.	Annual
■ Replace tree stakes and wires.	
■ Mulch should be replaced every 2 to 3 years or when bare spots appear. Remulch prior to the wet season.	Every 2-3 years, or as needed

Additional Information

Landscaping is critical to the function and aesthetic value of bioretention areas. It is preferable to plant the area with native vegetation, or plants that provide habitat value, where possible. Another important design feature is to select species that can withstand the hydrologic regime they will experience. At the bottom of the bioretention facility, plants that tolerate both wet and dry conditions are preferable. At the edges, which will remain primarily dry, upland species will be the most resilient. It is best to select a combination of trees, shrubs, and herbaceous materials.

References

Metropolitan Council, Urban Small Sites Best Management Practices Manual. Available at: http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm

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, revised February, 2002.

U.S. Environmental Protection Agency, Post-Construction Stormwater Management in New Development & Redevelopment BMP Factsheets. Available at: cfpub.epa.gov/npdes/stormwater/menuofbmps/bmp_files.cfm

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

Water Quality Inlet TC-50

General Description

Water quality inlets (WQIs), also commonly called trapping catch basins, oil/grit separators or oil/water separators, consist of one or more chambers that promote sedimentation of coarse materials and separation of free oil (as opposed to emulsified or dissolved oil) from stormwater. Some WQIs also contain screens to help retain larger or floating debris, and many of the newer designs also include a coalescing unit that helps promote oil/water separation.

These devices are appropriate for capturing hydrocarbon spills, but provide very marginal sediment removal and are not very effective for treatment of stormwater runoff. WQIs typically capture only the first portion of runoff for treatment and are generally used for pretreatment before discharging to other best management practices (BMPs).

Inspection/Maintenance Considerations

High sediment loads can interfere with the ability of the WQI to effectively separate oil and grease from the runoff. During periods of high flow, sediment can be resuspended and released from the WQI into surface waters. Maintenance of WQIs can be easily neglected because they are underground. Establishment of a maintenance schedule is helpful for ensuring proper maintenance occurs. The required maintenance effort will be site-specific due to variations in sediment and hydrocarbon loading. Since WQI residuals contain hydrocarbon by-products, they may require disposal as hazardous waste. Many WQI owners coordinate with waste haulers to collect and dispose of these residuals.

Maintenance Concerns, Objectives, and Goals

- ■ High Sediment Loads
- ■ Hazardous Waste
- ■ Vector Control

Targeted Constituents

✓	Sediment	●
✓	Nutrients	●
✓	Trash	▲
✓	Metals	●
✓	Bacteria	●
✓	Oil and Grease	▲
✓	Organics	●

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

CASQA California Stormwater Quality Association

Inspection Activities	Suggested Frequency
■ Inspect after every storm event to determine if maintenance is required.	Monthly during the wet season, or after significant rain events

Maintenance Activities	Suggested Frequency
■ Clean out and dispose of accumulated oil, grease, and sediments. Remove accumulated trash and debris. The clean out and disposal techniques should be environmentally acceptable and in accordance with local regulations.	Annual, before the wet season, or more frequent as needed

Additional Information

Since WQIs can be relatively deep, they may be designated as confined spaces. Caution should be exercised to comply with confined space entry safety regulations if it is required.

References

http://www.co.pierce.wa.us/pc/services/home/environ/water/swm/sppman/bmpt1.htm

Isolator® Row Plus
O&M Manual

ADS StormTech™

The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS) and Total Phosphorus (TP) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-7200 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS geotextile fabric is placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the chamber's sidewall. The non-woven fabric is not required over the SC-160, DC-780, MC-3500 or MC-7200 models as these chambers do not have perforated side walls.

The Isolator Row Plus is designed to capture the "first flush" runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

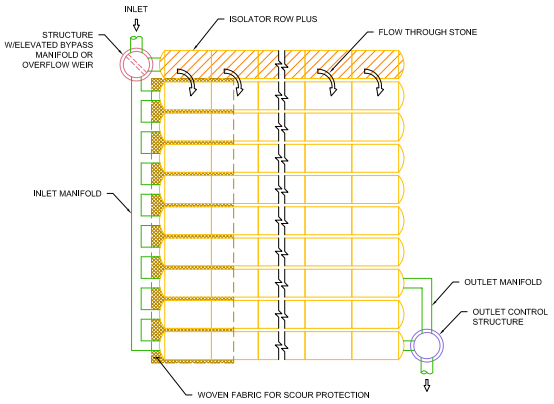
The Isolator Row FLAMP™ (patent pending) is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*

Looking down the Isolator Row PLUS from the manhole opening, ADS PLUS Fabric is shown between the chamber and stone base.

StormTech Isolator Row PLUS with Overflow Spillway (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

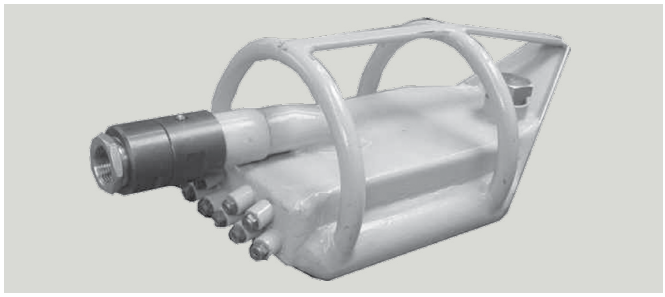
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row Plus, clean-out should be performed.

Maintenance

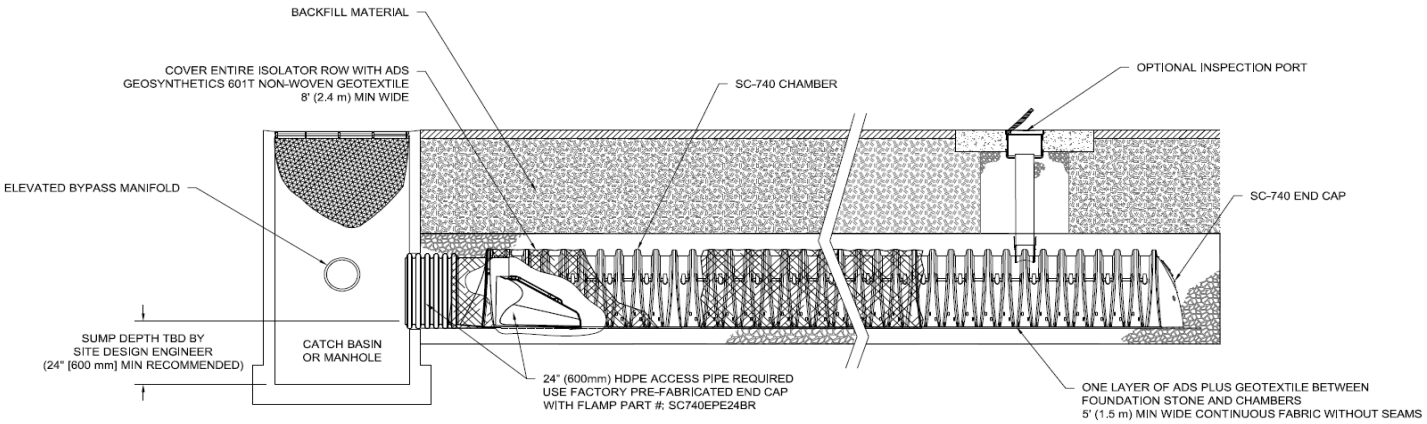
The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row PLUS (*not to scale*)

Note: *Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-7200 chamber models and is not required over the entire Isolator Row PLUS.*



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
- i. Remove lid from floor box frame
- ii. Remove cap from inspection riser
- iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
- iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
- i. Remove cover from manhole at upstream end of Isolator Row Plus
- ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
  1. Mirrors on poles or cameras may be used to avoid a confined space entry
  2. Follow OSHA regulations for confined space entry if entering manhole
- iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
  If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

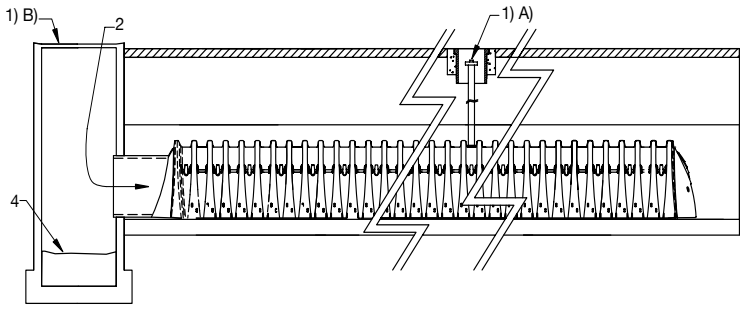
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sedi-ment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row PLUS, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

adspipe.com

800-821-6710