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: KHR Associates — Date: 8/4/2025

Designed by: James H. Kawamura — Case No:

Company Project Number/Name: Independence at Canyon Springs

BMP Identification

BMP NAME / ID: 2

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	*2*	*110,758*	*Mixed Surface Types*	*1*	*0.89*	*98796.1*			
		110758	***Total***			**98796.1**	**0.20**	***0.5***	***0.5***

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: KHR Associates — Date: 8/4/2025

Designed by: James H. Kawamura — Case No:

Company Project Number/Name: Independence at Canyon Springs

BMP Identification

BMP NAME / ID: 3

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

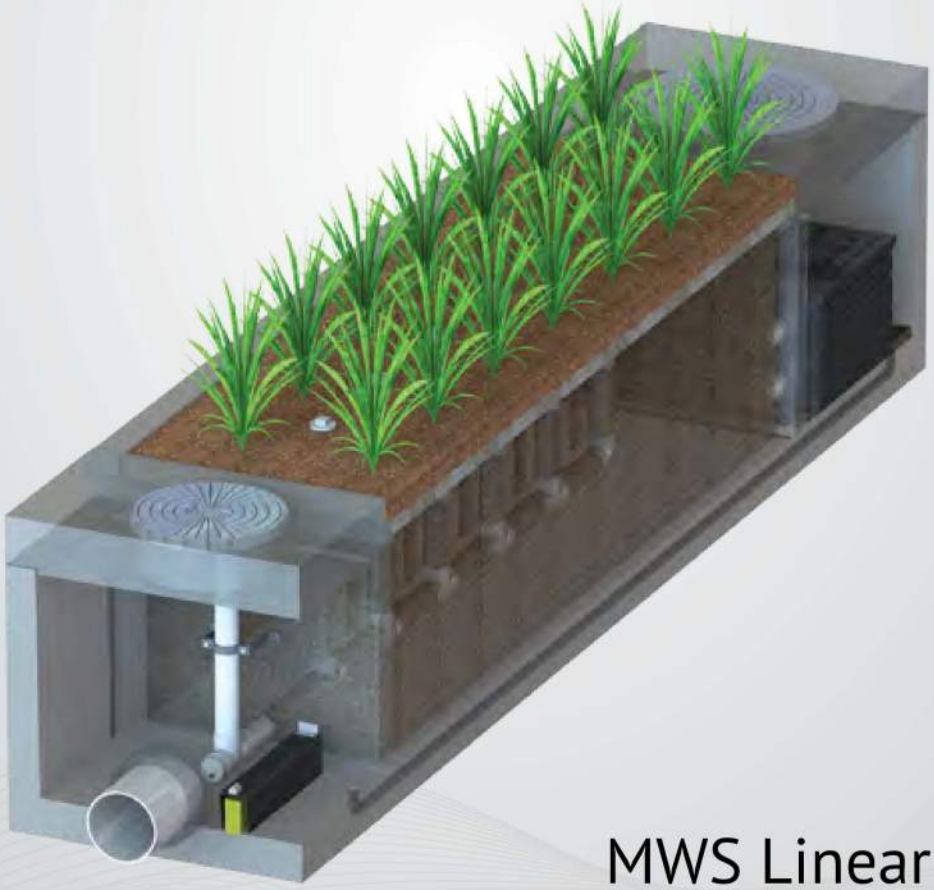
DMAs

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)
3	125,341	Mixed Surface Types	1	0.89	111804.2			
	125341		Total		111804.2	0.20	0.5	0.577

Notes:

MODULAR WETLANDS™

*Advanced **Stormwater** Biofiltration*



MWS Linear



Contents

1 Introduction

2 Applications

3 Configurations

4 Advantages

5 Operation

6 Orientations | Bypass

7 Performance | Approvals

8 Sizing

9 Installation | Maintenance | Plants

The Urban Impact

For hundreds of years natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as our cities grow and develop, these natural wetlands have perished under countless roads, rooftops, and parking lots.



Plant A Wetland

Without natural wetlands our cities are deprived of water purification, flood control, and land stability. Modular Wetlands and the MWS Linear re-establish nature's presence and rejuvenate water ways in urban areas.





MWS Linear

The Modular Wetland System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint and higher treatment capacity. While most biofilters use little or no pre-treatment, the MWS Linear incorporates an advanced pre-treatment chamber that includes separation and pre-filter cartridges. In this chamber sediment and hydrocarbons are removed from runoff before it enters the biofiltration chamber, in turn reducing maintenance costs and improving performance.

Applications

The MWS Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.



Industrial

Many states enforce strict regulations for discharges from industrial sites. The MWS Linear has helped various sites meet difficult EPA mandated effluent limits for dissolved metals and other pollutants.



Residential

Low to high density developments can benefit from the versatile design of the MWS Linear. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.



Streets

Street applications can be challenging due to limited space. The MWS Linear is very adaptable, and offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.



Parking Lots

Parking lots are designed to maximize space and the MWS Linear's 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.



Commercial

Compared to bioretention systems, the MWS Linear can treat far more area in less space - meeting treatment and volume control requirements.



Mixed Use

The MWS Linear can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications are available on our website: www.ModularWetlands.com/Applications

- Agriculture
- Reuse
- Low Impact Development
- Waste Water





Configurations

The MWS Linear is the preferred biofiltration system of Civil Engineers across the country due to its versatile design. 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 stormdrain design.



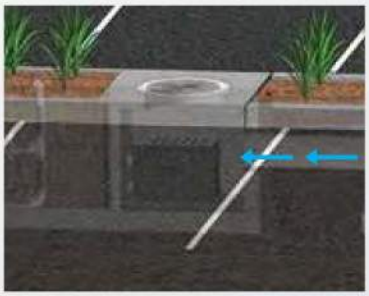
Curb Type

The *Curb Type* configuration accepts sheet flow through a curb opening and is commonly used along road ways and parking lots. It can be used in sump or flow by conditions. Length of curb opening varies based on model and size.



Grate Type

The *Grate Type* configuration offers the same features and benefits as the *Curb Type* but with a grated/drop inlet above the systems pre-treatment chamber. It has the added benefit of allowing for pedestrian access over the inlet. ADA compliant grates are available to assure easy and safe access. The *Grate Type* can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



Vault Type

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pre-treatment chamber, meaning the MWS Linear can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/bioretention systems. 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.



Downspout Type

The *Downspout Type* is a variation of the *Vault Type* and is designed to accept a vertical downspout pipe from roof top 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.

Advantages & Operation

The MWS Linear is the most efficient and versatile biofiltration system on the market, and the only system with horizontal flow which improves performance, reduces footprint, and minimizes maintenance. Figure-1 and Figure-2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.

Featured Advantages

- Horizontal Flow Biofiltration
- Greater Filter Surface Area
- Pre-Treatment Chamber
- Patented Perimeter Void Area
- Flow Control
- No Depressed Planter Area

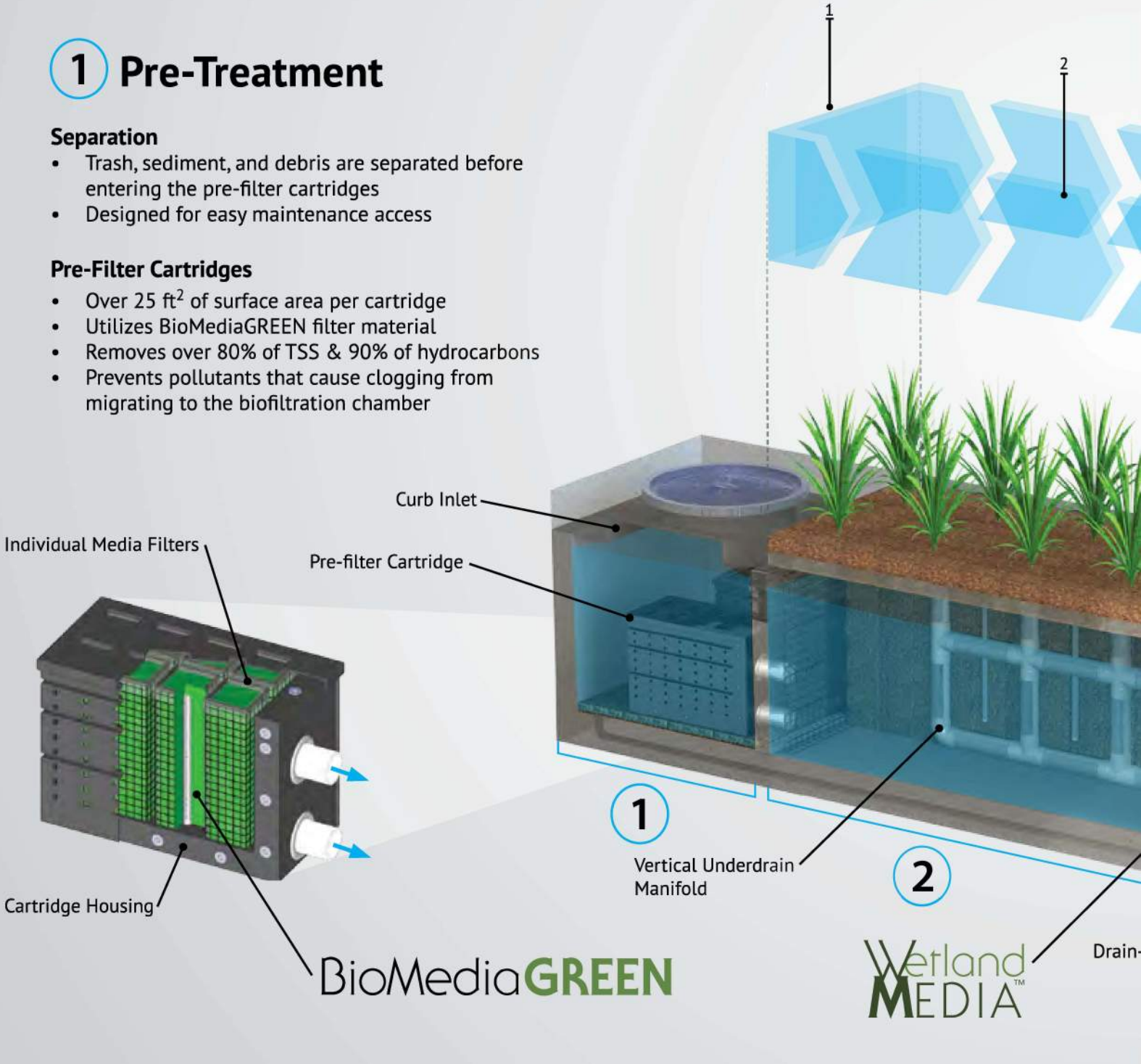
1 Pre-Treatment

Separation

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

Pre-Filter Cartridges

- Over 25 ft^2 of surface area per cartridge
- Utilizes BioMediaGREEN filter material
- Removes over 80% of TSS & 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber



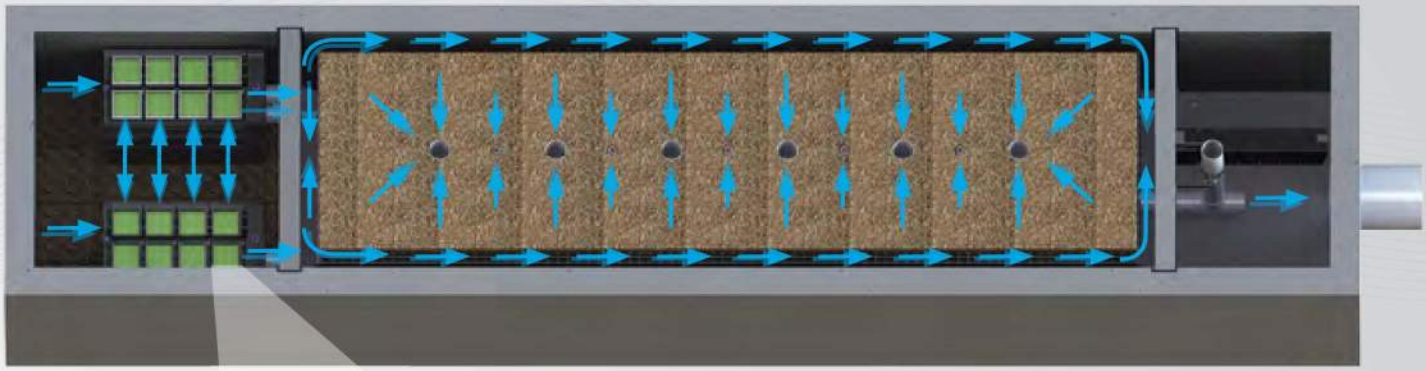


Fig. 2 - Top View

2x to 3x More Surface Area Than Traditional Downward Flow Bioretention Systems.



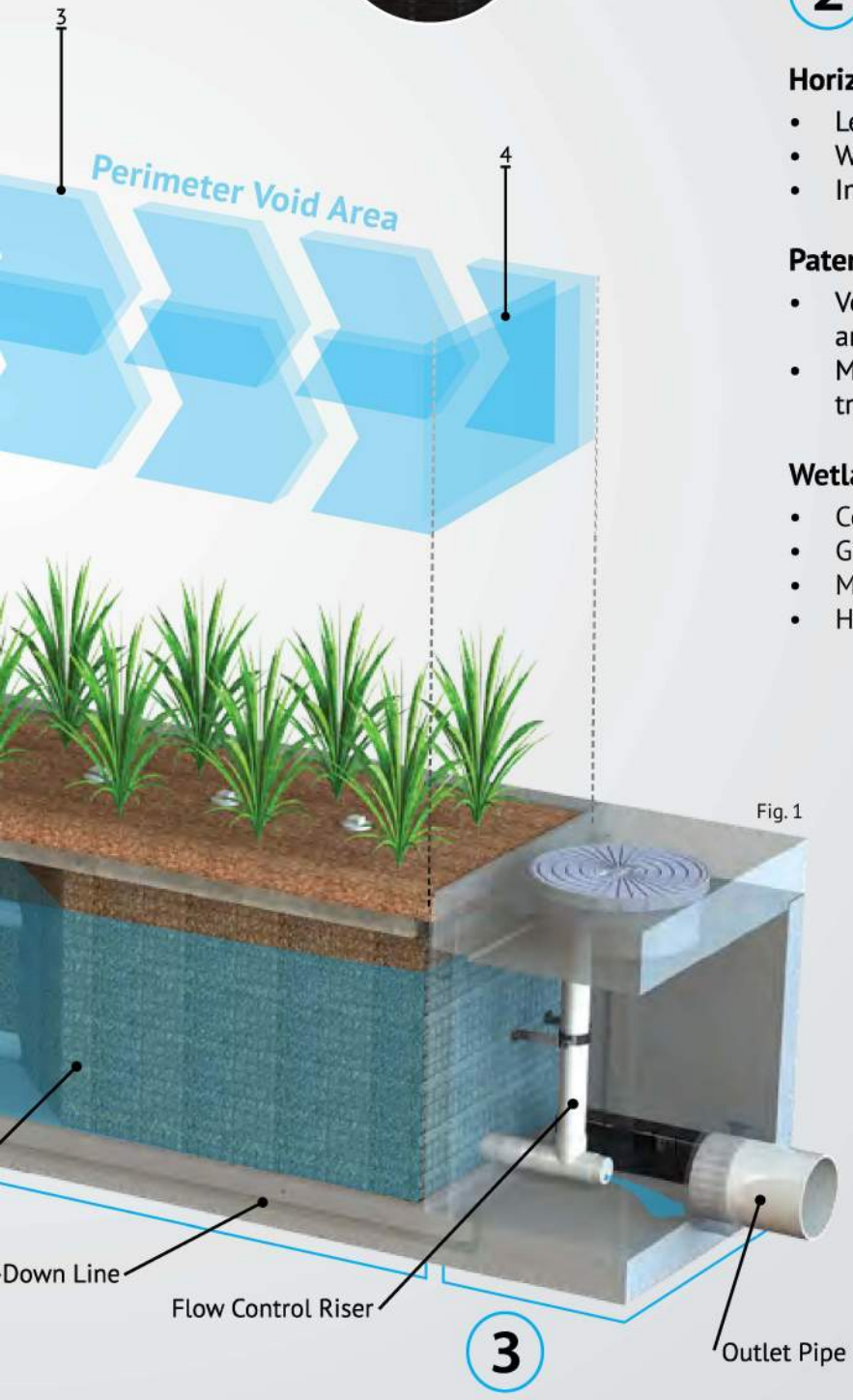


Fig. 1

2 Biofiltration

Horizontal Flow

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

Patented Perimeter Void Area

- Vertically extends void area between the walls and the WetlandMEDIA on all four sides.
- Maximizes surface area of the media for higher treatment capacity

WetlandMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and light weight

3 Discharge

Flow Control

- Orifice plate controls flow of water through WetlandMEDIA to a level lower than the media's capacity.
- Extends the life of the media and improves performance

Drain-Down Filter

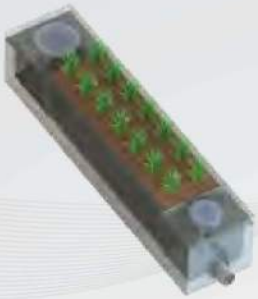
- The Drain-Down is an optional feature that completely drains the pre-treatment chamber
- Water that drains from the pre-treatment chamber between storm events will be treated

Orientations



Side-By-Side

The *Side-By-Side* orientation places the pre-treatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.



End-To-End

The *End-To-End* orientation places the pre-treatment and discharge chambers on opposite ends of the biofiltration chamber therefore minimizing the width of the system to 5 ft (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is bypass must be external.

Bypass

Internal Bypass Weir (Side-by-Side Only)

The *Side-By-Side* orientation places the pre-treatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pre-treatment chamber directly to the discharge chamber.

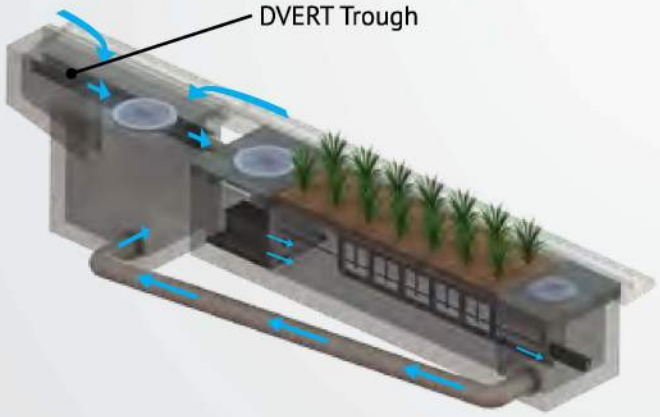
External Diversion Weir Structure

This traditional offline diversion method can be used with the MWS Linear in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the MWS Linear for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

Flow By Design

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the MWS Linear and into the standard inlet downstream.

DVERT Low Flow Diversion



This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the MWS Linear via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allows the MWS Linear to be installed anywhere space is available.





Performance

The MWS Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons and bacteria. Since 2007 the MWS Linear has been field tested on numerous sites across the country. With it's advanced pre-treatment chamber and innovative horizontal flow biofilter, the system is able to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. With the same biological processes found in natural wetlands, the MWS Linear harnesses natures ability to process, transform, and remove even the most harmful pollutants.

Approvals

The MWS Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation, and perhaps the world.



Washington State DOE Approved

The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft^2 loading rate. The highest performing BMP on the market for all main pollutant categories.

TSS	Total Phosphorus	Ortho Phosphorus	Nitrogen	Dissolved Zinc	Dissolved Copper	Total Zinc	Total Copper	Motor Oil
85%	64%	67%	45%	66%	38%	69%	50%	95%



DEQ Assignment

The Virginia Department of Environmental Quality assigned the MWS Linear, the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) Technical Criteria.



MASTEP Evaluation

The University of Massachusetts at Amherst – Water Resources Research Center, issued a technical evaluation report noting removal rates up to 84% TSS, 70% Total Phosphorus, 68.5% Total Zinc, and more.



Rhode Island DEM Approved

Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% Pathogens, 30% Total Phosphorus for discharges to freshwater systems, and 30% Total Nitrogen for discharges to saltwater or tidal systems.

Flow Based Sizing

The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.



Treatment Flow Sizing Table

Model #	Dimensions	WetlandMedia Surface Area	Treatment Flow Rate (cfs)
MWS-L-4-4	4' x 4'	23 ft^2	0.052
MWS-L-4-6	4' x 6'	32 ft^2	0.073
MWS-L-4-8	4' x 8'	50 ft^2	0.115
MWS-L-4-13	4' x 13'	63 ft^2	0.144
MWS-L-4-15	4' x 15'	76 ft^2	0.175
MWS-L-4-17	4' x 17'	90 ft^2	0.206
MWS-L-4-19	4' x 19'	103 ft^2	0.237
MWS-L-4-21	4' x 21'	117 ft^2	0.268
MWS-L-8-8	8' x 8'	100 ft^2	0.230
MWS-L-8-12	8' x 12'	151 ft^2	0.346
MWS-L-8-16	8' x 16'	201 ft^2	0.462

Volume Based Sizing

Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.



Treatment Volume Sizing Table

Model #	Treatment Capacity (cu. ft.) @ 24-Hour Drain Down	Treatment Capacity (cu. ft.) @ 48-Hour Drain Down
MWS-L-4-4	1140	2280
MWS-L-4-6	1600	3200
MWS-L-4-8	2518	5036
MWS-L-4-13	3131	6261
MWS-L-4-15	3811	7623
MWS-L-4-17	4492	8984
MWS-L-4-19	5172	10345
MWS-L-4-21	5853	11706
MWS-L-8-8	5036	10072
MWS-L-8-12	7554	15109
MWS-L-8-16	10073	20145

Installation

The MWS Linear is simple, easy to install, and has a space efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles pre-cast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians are available to supervise installations and provide technical support.



Maintenance

Reduce your maintenance costs, man hours, and materials with the MWS Linear. Unlike other biofiltration systems that provide no pre-treatment, the MWS Linear is a self-contained treatment train which incorporates simple and effective pre-treatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pre-treatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pre-treatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long term operation and there is absolutely no need to replace expensive biofiltration media.



Plant Selection

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the MWS Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the MWS Linear, giving the plants more "contact time" so that pollutants are more successfully decomposed, volatilized and incorporated into the biomass of The MWS Linear's micro/macro flora and fauna.

A wide range of plants are suitable for use in the MWS Linear, but selections vary by location and climate. View suitable plants by selecting the list relative to your project location's hardy zone.

Please visit www.ModularWetlands.com/Plants for more information and various plant lists.



SPECIFICATIONS

FLOW-BASED

The MWS Linear can be used in stand-alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface, it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

MODEL #	DIMENSIONS	WETLANDMEDIA SURFACE AREA (sq.ft.)	TREATMENT FLOW RATE (cfs)
MWS-L-4-4	4′ x 4′	23	0.052
MWS-L-4-6	4′ x 6′	32	0.073
MWS-L-4-8	4′ x 8′	50	0.115
MWS-L-4-13	4′ x 13′	63	0.144
MWS-L-4-15	4′ x 15′	76	0.175
MWS-L-4-17	4′ x 17′	90	0.206
MWS-L-4-19	4′ x 19′	103	0.237
MWS-L-4-21	4′ x 21′	117	0.268
MWS-L-6-8	7′ x 9′	64	0.147
MWS-L-8-8	8′ x 8′	100	0.230
MWS-L-8-12	8′ x 12′	151	0.346
MWS-L-8-16	8′ x 16′	201	0.462
MWS-L-8-20	9′ x 21′	252	0.577
MWS-L-8-24	9′ x 25′	302	0.693

Table 17. BMP Performance – Influent/Effluent Water Quality.

BMP	Sediment (mg/L)	Nitrogen (mg/L)	Phosphorus (mg/L)	Metals – Zn (µg/L)	Oil and Grease (mg/L)	Bacteria (#/100mL)	Temp	Notes
Bioretention without underdrain	0	0	0	0	0	0	Excellent	Infiltration practices are assumed to have zero discharge
Bioretention with underdrain	34/15.5*	1.68/1.14†	0.61/0.16*	107/46*	30.8/2.5‡	641.5/86.5§	Moderate**	
Permeable Pavement without underdrain	0	0	0	0	0	0	Excellent	Infiltration practices are assumed to have zero discharge
Permeable Pavement with underdrain	xx/17.0††	xx/1.23††	xx/0.09††	xx/17††	xx/0.018‡‡	No data	Moderate	
Capture and Reuse	0	0	0	0	0	0	Excellent	Infiltration practices are assumed to have zero discharge
Vegetated Roofs	No data	1.3/1.63***	0.012/0.057***	No data	N/A	xx/22§	Moderate	
Downspout Disconnection	0	0	0	0	0	0	Excellent	Infiltration practices are assumed to have zero discharge
Soil Amendments	0	0	0	0	0	0	Excellent	Infiltration practices are assumed to have zero discharge
Vegetated Filter Strips	114/27.6§§	1.12/0.66‡‡	0.38/0.86§§	355/79§§	No data	No data	Low	
Vegetated Swales	114/58.9§§	No data	0.38/0.62§§	355/96§§	No data	13,492/5,947§	Low	
Infiltration Basins	0	0	0	0	0	0	Excellent	Infiltration practices are assumed to have zero discharge
Infiltration Trenches	0	0	0	0	0	0	Excellent	Infiltration practices are assumed to have zero discharge

Source: Data assembled by the Low Impact Development Center, Inc.

Table 17 (Cont.): BMP Performance – Influent/Effluent Water Quality.

BMP	Sediment (mg/L)	Nitrogen (mg/L)	Phosphorus (mg/L)	Metals – Zn (µg/L)	Oil and Grease (mg/L)	Bacteria (#/100mL)	Temp	Notes
Dry Wells	0	0	0	0	0	0	Excellent	Infiltration practices are assumed to have zero discharge
Dry Ponds	114/46.6§§	0.96/0.98‡‡	0.38/0.28§§	355/136§§	2.72/2.54‡‡	2,218/1,741§	Poor	
Constructed Wetlands	37.8/17.8††	2.12/1.15††	0.27/0.14††	47/31††	No data	2,097/257§	Poor**	
Wet Ponds	114/11.8§§	2.29/1.46‡‡	0.38/0.54§§	355/37§§	0.82/0.88‡‡	2,693/446.4§	Poor**	
Media Filters / Filter Basins	114/11.3§§	No data	0.38/0.25§§	355/36§§	No data	1,820/541.3§	Poor	Includes Austin sand filter, Delaware sand filter, Multi-chambered treatment trains
Proprietary Devices	varies	varies	varies	varies	varies	varies	Poor	Performance is device-specific

Key: *Davis, 2007 §Clary et al, 2008 †Hunt et al, 2008 ‡Hong et al, 2006 ***Teemusk and Mander, 2007
**Jones and Hunt, 2008 §§Caltrans, 2004 ††Geosyntec, 2008 ‡‡International Stormwater BMP Database, 2009

Source: Data assembled by the Low Impact Development Center, Inc.

Appendix 7: Hydromodification

Supporting Detoil Reloting to Hydrologic Conditions of Concern

6 ft CMP Detention Tank

Depth	Stage	Total Storage	2" Orifice Outflow	12" Orifice/Weir Outflow	Total Outflow
0	582.00	0	0	0	0.00
0.5	582.50	0.047	0.10	0.00	0.10
1	583.00	0.142	0.15	0.00	0.15
1.5	583.50	0.237	0.19	0.00	0.19
2	584.00	0.332	0.23	0.00	0.23
2.5	584.50	0.426	0.25	0.00	0.25
3	585.00	0.521	0.28	0.00	0.28
3.5	585.50	0.616	0.30	0.00	0.30
4	586.00	0.711	0.32	0.00	0.32
4.5	586.50	0.806	0.34	0.00	0.34
5	587.00	0.900	0.36	2.67	3.04
5.5	587.50	0.995	0.38	3.78	4.16
6	588.00	1.090	0.40	4.63	5.03

Q2: 2" Orifice

Project Description	
Solve For	Diameter

Input Data	
Discharge	0.31 cfs
Headwater Elevation	5.00 ft
Centroid Elevation	0.10 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600

Results	
Diameter	2.3 in
Headwater Height Above Centroid	4.90 ft
Tailwater Height Above Centroid	-0.10 ft
Flow Area	0.0 ft^2
Velocity	10.65 ft/s

Q100: 12" Orifice

Project Description	
Solve For	Diameter

Input Data	
Discharge	4.50 cfs
Headwater Elevation	6.00 ft
Centroid Elevation	4.50 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600

Results	
Diameter	11.8 in
Headwater Height Above Centroid	1.50 ft
Tailwater Height Above Centroid	-4.50 ft
Flow Area	0.8 ft^2
Velocity	5.89 ft/s

Thursday, May 29, 2025 3:56:33 PM

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 05/15/25 File: lmcr242.out

++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6619

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

INDEPENDENCE AT CANYON SPRINGS
PRE-DEVELOPMENT CONDITION
2-YR, 24-HR STORM
HYDROGRAPH

Drainage Area = 9.13(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.13(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 884.08(Ft.)
Length along longest watercourse measured to centroid = 442.04(Ft.)
Length along longest watercourse = 0.167 Mi.
Length along longest watercourse measured to centroid = 0.084 Mi.
Difference in elevation = 17.10(Ft.)
Slope along watercourse = 102.1265 Ft./Mi.
Average Manning's 'N' = 0.200
Lag time = 0.394 Hr.
Lag time = 23.63 Min.
25% of lag time = 5.91 Min.
40% of lag time = 9.45 Min.
Unit time = 15.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Thursday, May 29, 2025 3:56:33 PM

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.13	1.87	17.07

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.13	4.55	41.53

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.870(In)
Area Averaged 100-Year Rainfall = 4.550(In)

Point rain (area averaged) = 1.870(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.870(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.128	91.00	0.000

Total Area Entered = 9.13(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
91.0	79.8	0.246	0.000	0.246	1.000	0.246
					Sum (F) =	0.246

Area averaged mean soil loss (F) (In/Hr) = 0.246
Minimum soil loss rate ((In/Hr)) = 0.123
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

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

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.250	63.488	6.103	0.561
2	0.500	126.977	35.178	3.236
3	0.750	190.465	32.279	2.969
4	1.000	253.954	11.849	1.090
5	1.250	317.442	6.754	0.621
6	1.500	380.931	3.928	0.361
7	1.750	444.419	1.916	0.176
8	2.000	507.908	0.753	0.069
9	2.250	571.396	0.486	0.045
10	2.500	634.884	0.442	0.041

11	2.750	698.373	0.243	0.022
12	3.000	761.861	0.070	0.006
			Sum = 100.000 Sum=	9.199

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.25	0.20	0.015	(0.435)	0.013	0.001
2	0.50	0.30	0.022	(0.430)	0.020	0.002
3	0.75	0.30	0.022	(0.425)	0.020	0.002
4	1.00	0.40	0.030	(0.420)	0.027	0.003
5	1.25	0.30	0.022	(0.415)	0.020	0.002
6	1.50	0.30	0.022	(0.410)	0.020	0.002
7	1.75	0.30	0.022	(0.405)	0.020	0.002
8	2.00	0.40	0.030	(0.400)	0.027	0.003
9	2.25	0.40	0.030	(0.395)	0.027	0.003
10	2.50	0.40	0.030	(0.391)	0.027	0.003
11	2.75	0.50	0.037	(0.386)	0.034	0.004
12	3.00	0.50	0.037	(0.381)	0.034	0.004
13	3.25	0.50	0.037	(0.376)	0.034	0.004
14	3.50	0.50	0.037	(0.372)	0.034	0.004
15	3.75	0.50	0.037	(0.367)	0.034	0.004
16	4.00	0.60	0.045	(0.362)	0.040	0.004
17	4.25	0.60	0.045	(0.358)	0.040	0.004
18	4.50	0.70	0.052	(0.353)	0.047	0.005
19	4.75	0.70	0.052	(0.349)	0.047	0.005
20	5.00	0.80	0.060	(0.344)	0.054	0.006
21	5.25	0.60	0.045	(0.340)	0.040	0.004
22	5.50	0.70	0.052	(0.335)	0.047	0.005
23	5.75	0.80	0.060	(0.331)	0.054	0.006
24	6.00	0.80	0.060	(0.327)	0.054	0.006
25	6.25	0.90	0.067	(0.322)	0.061	0.007
26	6.50	0.90	0.067	(0.318)	0.061	0.007
27	6.75	1.00	0.075	(0.314)	0.067	0.007
28	7.00	1.00	0.075	(0.310)	0.067	0.007
29	7.25	1.00	0.075	(0.305)	0.067	0.007
30	7.50	1.10	0.082	(0.301)	0.074	0.008
31	7.75	1.20	0.090	(0.297)	0.081	0.009
32	8.00	1.30	0.097	(0.293)	0.088	0.010
33	8.25	1.50	0.112	(0.289)	0.101	0.011
34	8.50	1.50	0.112	(0.285)	0.101	0.011
35	8.75	1.60	0.120	(0.281)	0.108	0.012
36	9.00	1.70	0.127	(0.277)	0.114	0.013
37	9.25	1.90	0.142	(0.273)	0.128	0.014
38	9.50	2.00	0.150	(0.269)	0.135	0.015
39	9.75	2.10	0.157	(0.265)	0.141	0.016
40	10.00	2.20	0.165	(0.261)	0.148	0.016

41	10.25	1.50	0.112	(	0.258)	0.101		0.011
42	10.50	1.50	0.112	(	0.254)	0.101		0.011
43	10.75	2.00	0.150	(	0.250)	0.135		0.015
44	11.00	2.00	0.150	(	0.247)	0.135		0.015
45	11.25	1.90	0.142	(	0.243)	0.128		0.014
46	11.50	1.90	0.142	(	0.239)	0.128		0.014
47	11.75	1.70	0.127	(	0.236)	0.114		0.013
48	12.00	1.80	0.135	(	0.232)	0.121		0.013
49	12.25	2.50	0.187	(	0.229)	0.168		0.019
50	12.50	2.60	0.194	(	0.225)	0.175		0.019
51	12.75	2.80	0.209	(	0.222)	0.188		0.021
52	13.00	2.90	0.217	(	0.219)	0.195		0.022
53	13.25	3.40	0.254		0.215	(	0.229)	0.039
54	13.50	3.40	0.254		0.212	(	0.229)	0.042
55	13.75	2.30	0.172	(	0.209)	0.155		0.017
56	14.00	2.30	0.172	(	0.206)	0.155		0.017
57	14.25	2.70	0.202	(	0.203)	0.182		0.020
58	14.50	2.60	0.194	(	0.199)	0.175		0.019
59	14.75	2.60	0.194	(	0.196)	0.175		0.019
60	15.00	2.50	0.187	(	0.193)	0.168		0.019
61	15.25	2.40	0.180	(	0.190)	0.162		0.018
62	15.50	2.30	0.172	(	0.188)	0.155		0.017
63	15.75	1.90	0.142	(	0.185)	0.128		0.014
64	16.00	1.90	0.142	(	0.182)	0.128		0.014
65	16.25	0.40	0.030	(	0.179)	0.027		0.003
66	16.50	0.40	0.030	(	0.176)	0.027		0.003
67	16.75	0.30	0.022	(	0.174)	0.020		0.002
68	17.00	0.30	0.022	(	0.171)	0.020		0.002
69	17.25	0.50	0.037	(	0.168)	0.034		0.004
70	17.50	0.50	0.037	(	0.166)	0.034		0.004
71	17.75	0.50	0.037	(	0.163)	0.034		0.004
72	18.00	0.40	0.030	(	0.161)	0.027		0.003
73	18.25	0.40	0.030	(	0.159)	0.027		0.003
74	18.50	0.40	0.030	(	0.156)	0.027		0.003
75	18.75	0.30	0.022	(	0.154)	0.020		0.002
76	19.00	0.20	0.015	(	0.152)	0.013		0.001
77	19.25	0.30	0.022	(	0.150)	0.020		0.002
78	19.50	0.40	0.030	(	0.148)	0.027		0.003
79	19.75	0.30	0.022	(	0.146)	0.020		0.002
80	20.00	0.20	0.015	(	0.144)	0.013		0.001
81	20.25	0.30	0.022	(	0.142)	0.020		0.002
82	20.50	0.30	0.022	(	0.140)	0.020		0.002
83	20.75	0.30	0.022	(	0.138)	0.020		0.002
84	21.00	0.20	0.015	(	0.137)	0.013		0.001
85	21.25	0.30	0.022	(	0.135)	0.020		0.002
86	21.50	0.20	0.015	(	0.133)	0.013		0.001
87	21.75	0.30	0.022	(	0.132)	0.020		0.002
88	22.00	0.20	0.015	(	0.131)	0.013		0.001
89	22.25	0.30	0.022	(	0.129)	0.020		0.002
90	22.50	0.20	0.015	(	0.128)	0.013		0.001
91	22.75	0.20	0.015	(	0.127)	0.013		0.001

92	23.00	0.20	0.015	(0.126)	0.013	0.001
93	23.25	0.20	0.015	(0.125)	0.013	0.001
94	23.50	0.20	0.015	(0.124)	0.013	0.001
95	23.75	0.20	0.015	(0.124)	0.013	0.001
96	24.00	0.20	0.015	(0.123)	0.013	0.001

(Loss Rate Not Used)

Sum = 100.0 Sum = 0.8

Flood volume = Effective rainfall 0.19(In)
times area 9.1(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 1.68(In)
Total soil loss = 1.274(Ac.Ft)
Total rainfall = 1.87(In)
Flood volume = 6447.2 Cubic Feet
Total soil loss = 55513.4 Cubic Feet

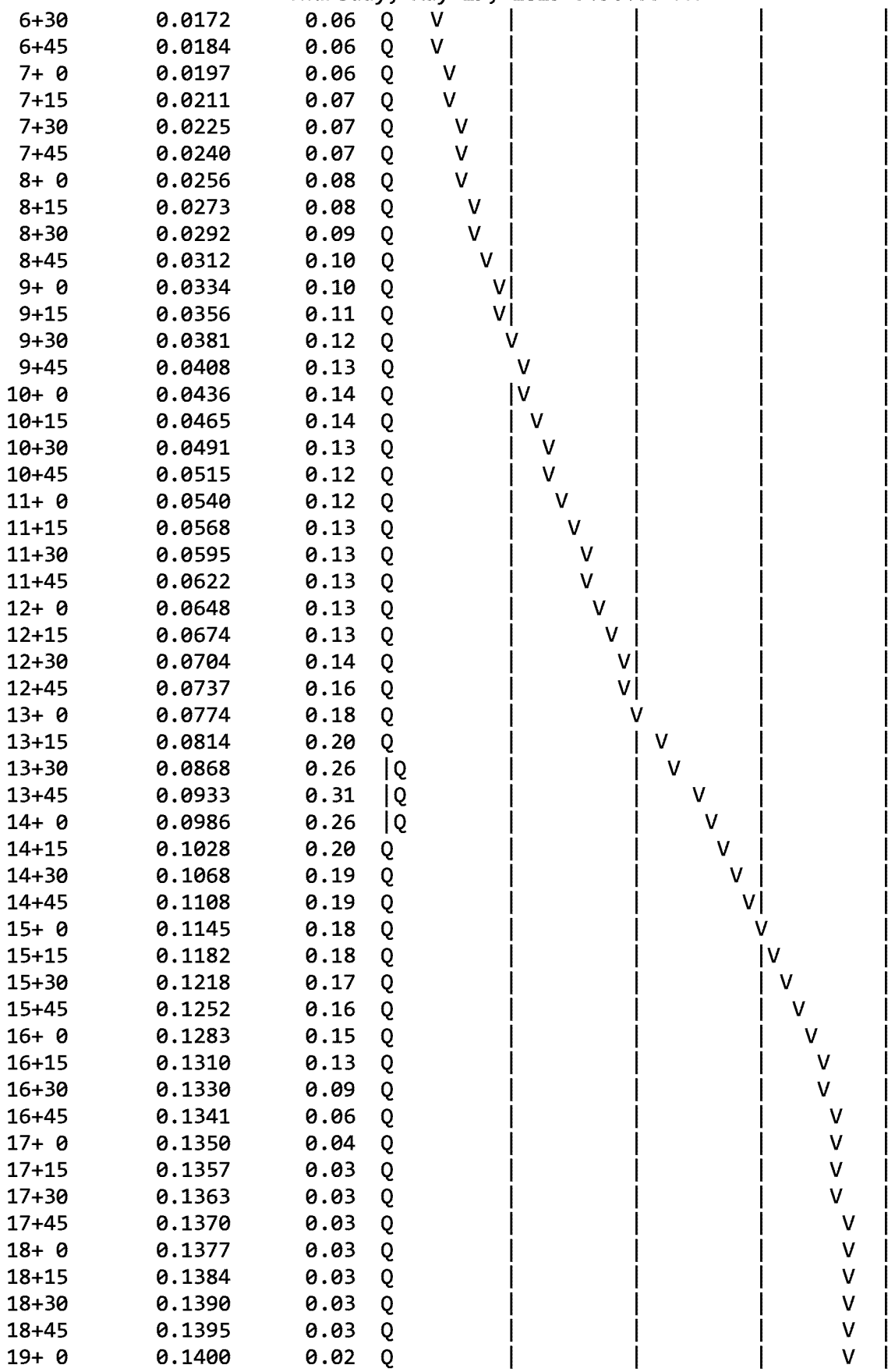
Peak flow rate of this hydrograph = 0.312(CFS)

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

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0000	0.00	Q	|	|	|	|
0+30	0.0001	0.01	Q	|	|	|	|
0+45	0.0004	0.01	Q	|	|	|	|
1+ 0	0.0008	0.02	Q	|	|	|	|
1+15	0.0012	0.02	Q	|	|	|	|
1+30	0.0017	0.02	Q	|	|	|	|
1+45	0.0021	0.02	Q	|	|	|	|
2+ 0	0.0025	0.02	Q	|	|	|	|
2+15	0.0030	0.02	Q	|	|	|	|
2+30	0.0035	0.03	Q	|	|	|	|
2+45	0.0041	0.03	QV	|	|	|	|
3+ 0	0.0047	0.03	QV	|	|	|	|
3+15	0.0054	0.03	QV	|	|	|	|
3+30	0.0061	0.03	QV	|	|	|	|
3+45	0.0068	0.03	QV	|	|	|	|
4+ 0	0.0075	0.03	Q V	|	|	|	|
4+15	0.0083	0.04	Q V	|	|	|	|
4+30	0.0091	0.04	Q V	|	|	|	|
4+45	0.0100	0.04	Q V	|	|	|	|
5+ 0	0.0109	0.05	Q V	|	|	|	|
5+15	0.0119	0.05	Q V	|	|	|	|
5+30	0.0129	0.05	Q V	|	|	|	|
5+45	0.0139	0.05	Q V	|	|	|	|
6+ 0	0.0149	0.05	Q V	|	|	|	|
6+15	0.0160	0.05	Q V	|	|	|	|



6+30	0.0172	0.06	Q	
6+45	0.0184	0.06	Q	
7+ 0	0.0197	0.06	Q	
7+15	0.0211	0.07	Q	
7+30	0.0225	0.07	Q	
7+45	0.0240	0.07	Q	
8+ 0	0.0256	0.08	Q	
8+15	0.0273	0.08	Q	
8+30	0.0292	0.09	Q	
8+45	0.0312	0.10	Q	
9+ 0	0.0334	0.10	Q	
9+15	0.0356	0.11	Q	
9+30	0.0381	0.12	Q	
9+45	0.0408	0.13	Q	
10+ 0	0.0436	0.14	Q	
10+15	0.0465	0.14	Q	
10+30	0.0491	0.13	Q	
10+45	0.0515	0.12	Q	
11+ 0	0.0540	0.12	Q	
11+15	0.0568	0.13	Q	
11+30	0.0595	0.13	Q	
11+45	0.0622	0.13	Q	
12+ 0	0.0648	0.13	Q	
12+15	0.0674	0.13	Q	
12+30	0.0704	0.14	Q	
12+45	0.0737	0.16	Q	
13+ 0	0.0774	0.18	Q	
13+15	0.0814	0.20	Q	
13+30	0.0868	0.26	Q	
13+45	0.0933	0.31	Q	
14+ 0	0.0986	0.26	Q	
14+15	0.1028	0.20	Q	
14+30	0.1068	0.19	Q	
14+45	0.1108	0.19	Q	
15+ 0	0.1145	0.18	Q	
15+15	0.1182	0.18	Q	
15+30	0.1218	0.17	Q	
15+45	0.1252	0.16	Q	
16+ 0	0.1283	0.15	Q	
16+15	0.1310	0.13	Q	
16+30	0.1330	0.09	Q	
16+45	0.1341	0.06	Q	
17+ 0	0.1350	0.04	Q	
17+15	0.1357	0.03	Q	
17+30	0.1363	0.03	Q	
17+45	0.1370	0.03	Q	
18+ 0	0.1377	0.03	Q	
18+15	0.1384	0.03	Q	
18+30	0.1390	0.03	Q	
18+45	0.1395	0.03	Q	
19+ 0	0.1400	0.02	Q	

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   19+15       0.1405      0.02  Q          |           |           |       V   |
   19+30       0.1409      0.02  Q          |           |           |        V  |
   19+45       0.1413      0.02  Q          |           |           |        V  |
   20+ 0       0.1418      0.02  Q          |           |           |        V  |
   20+15       0.1422      0.02  Q          |           |           |        V  |
   20+30       0.1426      0.02  Q          |           |           |        V  |
   20+45       0.1430      0.02  Q          |           |           |        V  |
   21+ 0       0.1434      0.02  Q          |           |           |        V  |
   21+15       0.1438      0.02  Q          |           |           |        V  |
   21+30       0.1442      0.02  Q          |           |           |        V  |
   21+45       0.1445      0.02  Q          |           |           |         V |
   22+ 0       0.1449      0.02  Q          |           |           |         V |
   22+15       0.1452      0.02  Q          |           |           |         V |
   22+30       0.1456      0.02  Q          |           |           |         V |
   22+45       0.1459      0.02  Q          |           |           |         V |
   23+ 0       0.1462      0.01  Q          |           |           |         V |
   23+15       0.1465      0.01  Q          |           |           |         V |
   23+30       0.1468      0.01  Q          |           |           |         V |
   23+45       0.1471      0.01  Q          |           |           |         V |
   24+ 0       0.1474      0.01  Q          |           |           |         V |
   24+15       0.1477      0.01  Q          |           |           |         V |
   24+30       0.1478      0.01  Q          |           |           |         V |
   24+45       0.1479      0.00  Q          |           |           |         V |
   25+ 0       0.1480      0.00  Q          |           |           |         V |
   25+15       0.1480      0.00  Q          |           |           |         V |
   25+30       0.1480      0.00  Q          |           |           |         V |
   25+45       0.1480      0.00  Q          |           |           |         V |
   26+ 0       0.1480      0.00  Q          |           |           |         V |
   26+15       0.1480      0.00  Q          |           |           |         V |
   26+30       0.1480      0.00  Q          |           |           |         V |
   26+45       0.1480      0.00  Q          |           |           |          V
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Thursday, May 29, 2025 3:59:00 PM

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/15/25 File: lmcrp242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6619

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

INDEPENDENCE AT CANYON SPRINGS
POST-DEVELOPMENT CONDITION
2-YR, 24-HR STORM
HYDROGRAPH

Drainage Area = 9.13(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.13(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 974.40(Ft.)
Length along longest watercourse measured to centroid = 487.20(Ft.)
Length along longest watercourse = 0.185 Mi.
Length along longest watercourse measured to centroid = 0.092 Mi.
Difference in elevation = 12.66(Ft.)
Slope along watercourse = 68.6010 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.034 Hr.
Lag time = 2.06 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 15.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Thursday, May 29, 2025 3:59:00 PM

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.13	1.87	17.07

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.13	4.55	41.53

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.870(In)
Area Averaged 100-Year Rainfall = 4.550(In)

Point rain (area averaged) = 1.870(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.870(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.128	69.00	0.800

Total Area Entered = 9.13(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.800	0.161	1.000	0.161
					Sum (F) =	0.161

Area averaged mean soil loss (F) (In/Hr) = 0.161
Minimum soil loss rate ((In/Hr)) = 0.080
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.260

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.250	728.942	100.000	9.199
		Sum = 100.000	Sum=	9.199

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

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)

1	0.25	0.20	0.015	(0.284)	0.004	0.011
2	0.50	0.30	0.022	(0.280)	0.006	0.017
3	0.75	0.30	0.022	(0.277)	0.006	0.017
4	1.00	0.40	0.030	(0.274)	0.008	0.022
5	1.25	0.30	0.022	(0.271)	0.006	0.017
6	1.50	0.30	0.022	(0.268)	0.006	0.017
7	1.75	0.30	0.022	(0.264)	0.006	0.017
8	2.00	0.40	0.030	(0.261)	0.008	0.022
9	2.25	0.40	0.030	(0.258)	0.008	0.022
10	2.50	0.40	0.030	(0.255)	0.008	0.022
11	2.75	0.50	0.037	(0.252)	0.010	0.028
12	3.00	0.50	0.037	(0.249)	0.010	0.028
13	3.25	0.50	0.037	(0.246)	0.010	0.028
14	3.50	0.50	0.037	(0.243)	0.010	0.028
15	3.75	0.50	0.037	(0.239)	0.010	0.028
16	4.00	0.60	0.045	(0.236)	0.012	0.033
17	4.25	0.60	0.045	(0.233)	0.012	0.033
18	4.50	0.70	0.052	(0.230)	0.014	0.039
19	4.75	0.70	0.052	(0.228)	0.014	0.039
20	5.00	0.80	0.060	(0.225)	0.016	0.044
21	5.25	0.60	0.045	(0.222)	0.012	0.033
22	5.50	0.70	0.052	(0.219)	0.014	0.039
23	5.75	0.80	0.060	(0.216)	0.016	0.044
24	6.00	0.80	0.060	(0.213)	0.016	0.044
25	6.25	0.90	0.067	(0.210)	0.018	0.050
26	6.50	0.90	0.067	(0.207)	0.018	0.050
27	6.75	1.00	0.075	(0.205)	0.019	0.055
28	7.00	1.00	0.075	(0.202)	0.019	0.055
29	7.25	1.00	0.075	(0.199)	0.019	0.055
30	7.50	1.10	0.082	(0.196)	0.021	0.061
31	7.75	1.20	0.090	(0.194)	0.023	0.066
32	8.00	1.30	0.097	(0.191)	0.025	0.072
33	8.25	1.50	0.112	(0.188)	0.029	0.083
34	8.50	1.50	0.112	(0.186)	0.029	0.083
35	8.75	1.60	0.120	(0.183)	0.031	0.089
36	9.00	1.70	0.127	(0.181)	0.033	0.094
37	9.25	1.90	0.142	(0.178)	0.037	0.105
38	9.50	2.00	0.150	(0.176)	0.039	0.111
39	9.75	2.10	0.157	(0.173)	0.041	0.116
40	10.00	2.20	0.165	(0.171)	0.043	0.122
41	10.25	1.50	0.112	(0.168)	0.029	0.083
42	10.50	1.50	0.112	(0.166)	0.029	0.083
43	10.75	2.00	0.150	(0.163)	0.039	0.111
44	11.00	2.00	0.150	(0.161)	0.039	0.111
45	11.25	1.90	0.142	(0.158)	0.037	0.105
46	11.50	1.90	0.142	(0.156)	0.037	0.105
47	11.75	1.70	0.127	(0.154)	0.033	0.094
48	12.00	1.80	0.135	(0.152)	0.035	0.100
49	12.25	2.50	0.187	(0.149)	0.049	0.138
50	12.50	2.60	0.194	(0.147)	0.051	0.144
51	12.75	2.80	0.209	(0.145)	0.054	0.155

52	13.00	2.90	0.217	(0.143)	0.056	0.161
53	13.25	3.40	0.254	(0.140)	0.066	0.188
54	13.50	3.40	0.254	(0.138)	0.066	0.188
55	13.75	2.30	0.172	(0.136)	0.045	0.127
56	14.00	2.30	0.172	(0.134)	0.045	0.127
57	14.25	2.70	0.202	(0.132)	0.053	0.149
58	14.50	2.60	0.194	(0.130)	0.051	0.144
59	14.75	2.60	0.194	(0.128)	0.051	0.144
60	15.00	2.50	0.187	(0.126)	0.049	0.138
61	15.25	2.40	0.180	(0.124)	0.047	0.133
62	15.50	2.30	0.172	(0.122)	0.045	0.127
63	15.75	1.90	0.142	(0.120)	0.037	0.105
64	16.00	1.90	0.142	(0.119)	0.037	0.105
65	16.25	0.40	0.030	(0.117)	0.008	0.022
66	16.50	0.40	0.030	(0.115)	0.008	0.022
67	16.75	0.30	0.022	(0.113)	0.006	0.017
68	17.00	0.30	0.022	(0.112)	0.006	0.017
69	17.25	0.50	0.037	(0.110)	0.010	0.028
70	17.50	0.50	0.037	(0.108)	0.010	0.028
71	17.75	0.50	0.037	(0.107)	0.010	0.028
72	18.00	0.40	0.030	(0.105)	0.008	0.022
73	18.25	0.40	0.030	(0.104)	0.008	0.022
74	18.50	0.40	0.030	(0.102)	0.008	0.022
75	18.75	0.30	0.022	(0.101)	0.006	0.017
76	19.00	0.20	0.015	(0.099)	0.004	0.011
77	19.25	0.30	0.022	(0.098)	0.006	0.017
78	19.50	0.40	0.030	(0.096)	0.008	0.022
79	19.75	0.30	0.022	(0.095)	0.006	0.017
80	20.00	0.20	0.015	(0.094)	0.004	0.011
81	20.25	0.30	0.022	(0.093)	0.006	0.017
82	20.50	0.30	0.022	(0.091)	0.006	0.017
83	20.75	0.30	0.022	(0.090)	0.006	0.017
84	21.00	0.20	0.015	(0.089)	0.004	0.011
85	21.25	0.30	0.022	(0.088)	0.006	0.017
86	21.50	0.20	0.015	(0.087)	0.004	0.011
87	21.75	0.30	0.022	(0.086)	0.006	0.017
88	22.00	0.20	0.015	(0.085)	0.004	0.011
89	22.25	0.30	0.022	(0.084)	0.006	0.017
90	22.50	0.20	0.015	(0.084)	0.004	0.011
91	22.75	0.20	0.015	(0.083)	0.004	0.011
92	23.00	0.20	0.015	(0.082)	0.004	0.011
93	23.25	0.20	0.015	(0.082)	0.004	0.011
94	23.50	0.20	0.015	(0.081)	0.004	0.011
95	23.75	0.20	0.015	(0.081)	0.004	0.011
96	24.00	0.20	0.015	(0.080)	0.004	0.011

(Loss Rate Not Used)

Sum = 100.0 Sum = 5.5

Flood volume = Effective rainfall 1.38(In)
times area 9.1(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)
Total soil loss = 0.49(In)
Total soil loss = 0.370(Ac.Ft)

Thursday, May 29, 2025 3:59:00 PM

Total rainfall = 1.87(In)
Flood volume = 45850.9 Cubic Feet
Total soil loss = 16109.8 Cubic Feet

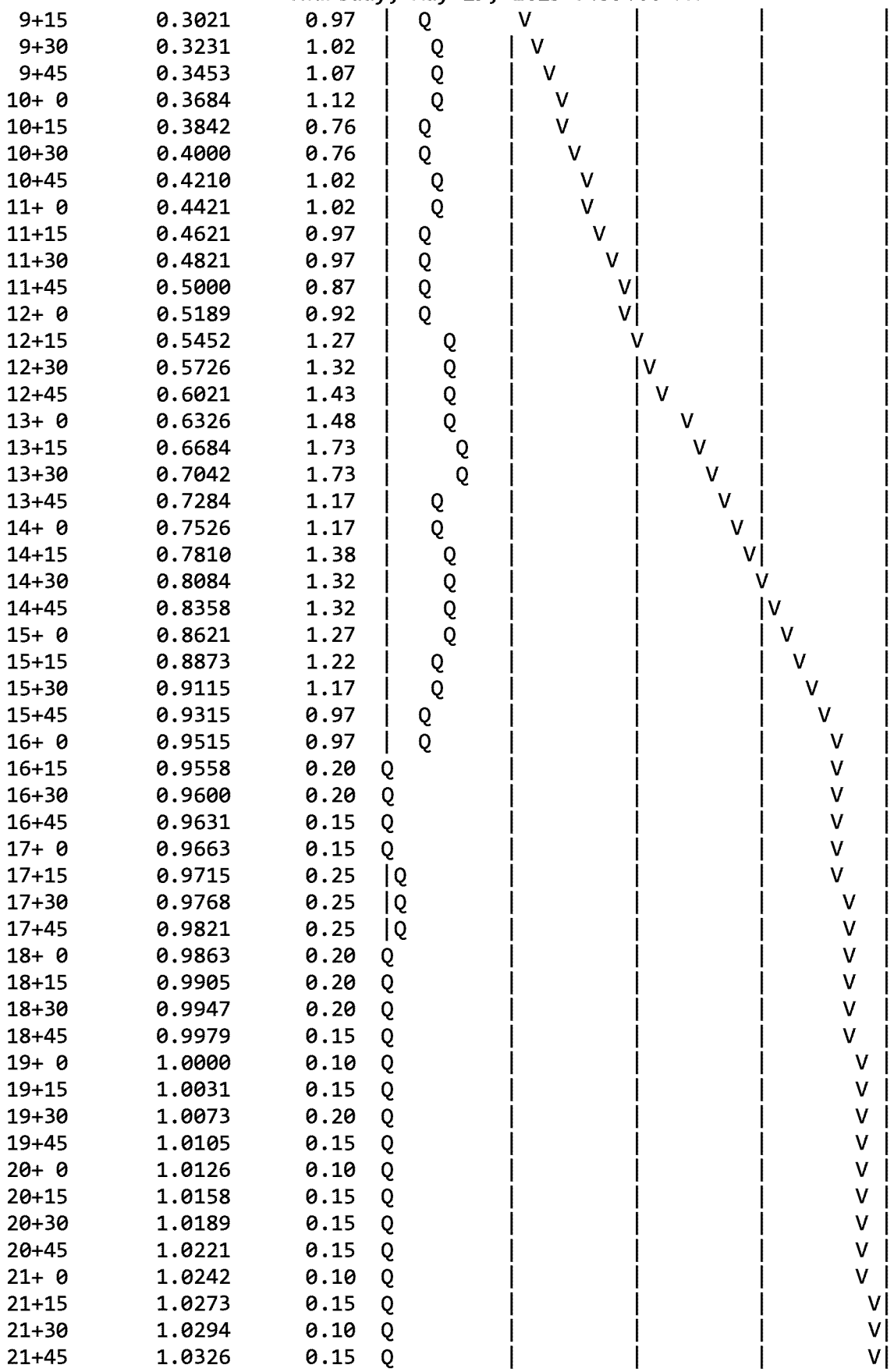
Peak flow rate of this hydrograph = 1.732(CFS)

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

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+15	0.0021	0.10	Q
0+30	0.0053	0.15	Q
0+45	0.0084	0.15	Q
1+ 0	0.0126	0.20	Q
1+15	0.0158	0.15	Q
1+30	0.0189	0.15	Q
1+45	0.0221	0.15	Q
2+ 0	0.0263	0.20	QV
2+15	0.0305	0.20	QV
2+30	0.0347	0.20	QV
2+45	0.0400	0.25	|Q
3+ 0	0.0453	0.25	|Q
3+15	0.0505	0.25	|Q
3+30	0.0558	0.25	|QV
3+45	0.0611	0.25	|QV
4+ 0	0.0674	0.31	|QV
4+15	0.0737	0.31	|QV
4+30	0.0810	0.36	|Q V
4+45	0.0884	0.36	|Q V
5+ 0	0.0968	0.41	|Q V
5+15	0.1032	0.31	|Q V
5+30	0.1105	0.36	|Q V
5+45	0.1189	0.41	|Q V
6+ 0	0.1274	0.41	|Q V
6+15	0.1368	0.46	|Q V
6+30	0.1463	0.46	|Q V
6+45	0.1568	0.51	| Q V
7+ 0	0.1674	0.51	| Q V
7+15	0.1779	0.51	| Q V
7+30	0.1895	0.56	| Q V
7+45	0.2021	0.61	| Q V
8+ 0	0.2158	0.66	| Q V
8+15	0.2316	0.76	| Q V
8+30	0.2474	0.76	| Q V
8+45	0.2642	0.82	| Q V
9+ 0	0.2821	0.87	| Q V



9+15	0.3021	0.97	
9+30	0.3231	1.02	
9+45	0.3453	1.07	
10+ 0	0.3684	1.12	
10+15	0.3842	0.76	
10+30	0.4000	0.76	
10+45	0.4210	1.02	
11+ 0	0.4421	1.02	
11+15	0.4621	0.97	
11+30	0.4821	0.97	
11+45	0.5000	0.87	
12+ 0	0.5189	0.92	
12+15	0.5452	1.27	
12+30	0.5726	1.32	
12+45	0.6021	1.43	
13+ 0	0.6326	1.48	
13+15	0.6684	1.73	
13+30	0.7042	1.73	
13+45	0.7284	1.17	
14+ 0	0.7526	1.17	
14+15	0.7810	1.38	
14+30	0.8084	1.32	
14+45	0.8358	1.32	
15+ 0	0.8621	1.27	
15+15	0.8873	1.22	
15+30	0.9115	1.17	
15+45	0.9315	0.97	
16+ 0	0.9515	0.97	
16+15	0.9558	0.20	
16+30	0.9600	0.20	
16+45	0.9631	0.15	
17+ 0	0.9663	0.15	
17+15	0.9715	0.25	
17+30	0.9768	0.25	
17+45	0.9821	0.25	
18+ 0	0.9863	0.20	
18+15	0.9905	0.20	
18+30	0.9947	0.20	
18+45	0.9979	0.15	
19+ 0	1.0000	0.10	
19+15	1.0031	0.15	
19+30	1.0073	0.20	
19+45	1.0105	0.15	
20+ 0	1.0126	0.10	
20+15	1.0158	0.15	
20+30	1.0189	0.15	
20+45	1.0221	0.15	
21+ 0	1.0242	0.10	
21+15	1.0273	0.15	
21+30	1.0294	0.10	
21+45	1.0326	0.15	

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22+ 0	1.0347	0.10	Q	|	|	|	V|
22+15	1.0379	0.15	Q	|	|	|	V|
22+30	1.0400	0.10	Q	|	|	|	V|
22+45	1.0421	0.10	Q	|	|	|	V|
23+ 0	1.0442	0.10	Q	|	|	|	V|
23+15	1.0463	0.10	Q	|	|	|	V|
23+30	1.0484	0.10	Q	|	|	|	V|
23+45	1.0505	0.10	Q	|	|	|	V|
24+ 0	1.0526	0.10	Q	|	|	|	V|

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2022
Study date: 01/05/26

INDEPENDENCE AT CANYON SPRINGS
ROUTING BASIN
POST-DEVELOPMENT CONDITION
2-YR, 24-HR STORM

Program License Serial Number 6619

********** HYDROGRAPH INFORMATION **********

From study/file name: lmcrp242.rte
**********HYDROGRAPH DATA**********
Number of intervals = 96
Time interval = 15.0 (Min.)
Maximum/Peak flow rate = 1.732 (CFS)
Total volume = 1.053 (Ac.Ft)
Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 96
Hydrograph time unit = 15.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.047	0.100	0.046	0.048
1.000	0.142	0.150	0.140	0.144
1.500	0.237	0.190	0.235	0.239
2.000	0.332	0.230	0.330	0.334
2.500	0.426	0.250	0.423	0.429
3.000	0.521	0.280	0.518	0.524
3.500	0.616	0.300	0.613	0.619
4.000	0.711	0.320	0.708	0.714
4.500	0.806	0.340	0.802	0.810
5.000	0.900	3.040	0.869	0.931
5.500	0.995	4.160	0.952	1.038
6.000	1.090	5.030	1.038	1.142

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	0.4	0.87	1.30	1.73	Depth (Ft.)
0.250	0.10	0.00	0.001	OI	|	|	|	|	0.01
0.500	0.15	0.01	0.004	O I	|	|	|	|	0.04
0.750	0.15	0.01	0.006	O I	|	|	|	|	0.07
1.000	0.20	0.02	0.010	O I	|	|	|	|	0.10
1.250	0.15	0.03	0.013	O I	|	|	|	|	0.14
1.500	0.15	0.03	0.016	O I	|	|	|	|	0.17
1.750	0.15	0.04	0.018	O I	|	|	|	|	0.19
2.000	0.20	0.04	0.021	O I	|	|	|	|	0.22
2.250	0.20	0.05	0.024	O I	|	|	|	|	0.26
2.500	0.20	0.06	0.027	|O I	|	|	|	|	0.29
2.750	0.25	0.07	0.031	|O I	|	|	|	|	0.33
3.000	0.25	0.07	0.034	|O I	|	|	|	|	0.37
3.250	0.25	0.08	0.038	|O I	|	|	|	|	0.41
3.500	0.25	0.09	0.042	|O I	|	|	|	|	0.44
3.750	0.25	0.10	0.045	|O I	|	|	|	|	0.48
4.000	0.31	0.10	0.049	|O I	|	|	|	|	0.51
4.250	0.31	0.10	0.053	|O I	|	|	|	|	0.53
4.500	0.36	0.11	0.058	|O I	|	|	|	|	0.56
4.750	0.36	0.11	0.063	| O I	|	|	|	|	0.58
5.000	0.41	0.11	0.068	| O I	|	|	|	|	0.61
5.250	0.31	0.11	0.073	| O I	|	|	|	|	0.64
5.500	0.36	0.12	0.078	| O I	|	|	|	|	0.66
5.750	0.41	0.12	0.083	| O I	|	|	|	|	0.69
6.000	0.41	0.12	0.089	| O I	|	|	|	|	0.72
6.250	0.46	0.13	0.096	| O I	|	|	|	|	0.76
6.500	0.46	0.13	0.103	| O I	|	|	|	|	0.79
6.750	0.51	0.13	0.110	| O |I	|	|	|	|	0.83
7.000	0.51	0.14	0.118	| O |I	|	|	|	|	0.87
7.250	0.51	0.14	0.125	| O |I	|	|	|	|	0.91

7.500	0.56	0.15	0.133	O	I			0.95
7.750	0.61	0.15	0.142	O	I			1.00
8.000	0.66	0.15	0.152	O	I			1.05
8.250	0.76	0.16	0.164	O	I			1.11
8.500	0.76	0.16	0.176	O	I			1.18
8.750	0.82	0.17	0.189	O	I			1.25
9.000	0.87	0.18	0.203	O	I			1.32
9.250	0.97	0.18	0.218	O	I			1.40
9.500	1.02	0.19	0.235	O	I			1.49
9.750	1.07	0.20	0.252	O	I			1.58
10.000	1.12	0.20	0.271	O	I			1.68
10.250	0.76	0.21	0.286	O	I			1.76
10.500	0.76	0.22	0.298	O	I			1.82
10.750	1.02	0.22	0.311	O	I			1.89
11.000	1.02	0.23	0.328	O	I			1.98
11.250	0.97	0.23	0.344	O	I			2.06
11.500	0.97	0.24	0.359	O	I			2.14
11.750	0.87	0.24	0.373	O	I			2.22
12.000	0.92	0.24	0.386	O	I			2.29
12.250	1.27	0.25	0.404	O	I			2.38
12.500	1.32	0.25	0.426	O	I			2.50
12.750	1.43	0.26	0.449	O	I			2.62
13.000	1.48	0.26	0.473	O	I			2.75
13.250	1.73	0.27	0.501	O	I			2.89
13.500	1.73	0.28	0.531	O	I			3.05
13.750	1.17	0.29	0.555	O	I			3.18
14.000	1.17	0.29	0.573	O	I			3.28
14.250	1.38	0.30	0.594	O	I			3.38
14.500	1.32	0.30	0.615	O	I			3.50
14.750	1.32	0.30	0.637	O	I			3.61
15.000	1.27	0.31	0.657	O	I			3.72
15.250	1.22	0.31	0.676	O	I			3.82
15.500	1.17	0.32	0.695	O	I			3.91
15.750	0.97	0.32	0.710	O	I			4.00
16.000	0.97	0.32	0.724	O	I			4.07
16.250	0.20	0.32	0.729	I O				4.09
16.500	0.20	0.32	0.726	I O				4.08
16.750	0.15	0.32	0.723	I O				4.07
17.000	0.15	0.32	0.720	I O				4.05
17.250	0.25	0.32	0.718	IO				4.03
17.500	0.25	0.32	0.716	IO				4.03
17.750	0.25	0.32	0.715	IO				4.02
18.000	0.20	0.32	0.713	I O				4.01
18.250	0.20	0.32	0.711	I O				4.00
18.500	0.20	0.32	0.708	I O				3.98
18.750	0.15	0.32	0.705	I O				3.97
19.000	0.10	0.32	0.701	I O				3.95
19.250	0.15	0.32	0.697	I O				3.93
19.500	0.20	0.32	0.694	I O				3.91
19.750	0.15	0.32	0.692	I O				3.90
20.000	0.10	0.32	0.688	I O				3.88
20.250	0.15	0.31	0.684	I O				3.86
20.500	0.15	0.31	0.681	I O				3.84

20.750	0.15	0.31	0.677	| I O |	|	|	|	3.82
21.000	0.10	0.31	0.673	|I O |	|	|	|	3.80
21.250	0.15	0.31	0.670	| I O |	|	|	|	3.78
21.500	0.10	0.31	0.666	|I O |	|	|	|	3.76
21.750	0.15	0.31	0.662	| I O |	|	|	|	3.74
22.000	0.10	0.31	0.658	|I O |	|	|	|	3.72
22.250	0.15	0.31	0.655	| I O |	|	|	|	3.70
22.500	0.10	0.31	0.651	|I O |	|	|	|	3.68
22.750	0.10	0.31	0.647	|I O |	|	|	|	3.66
23.000	0.10	0.31	0.642	|I O |	|	|	|	3.64
23.250	0.10	0.30	0.638	|I O |	|	|	|	3.62
23.500	0.10	0.30	0.634	|I O |	|	|	|	3.59
23.750	0.10	0.30	0.630	|I O |	|	|	|	3.57
24.000	0.10	0.30	0.626	|I O |	|	|	|	3.55
24.250	0.00	0.30	0.620	I O |	|	|	|	3.52
24.500	0.00	0.30	0.614	I O |	|	|	|	3.49
24.750	0.00	0.30	0.608	I O |	|	|	|	3.46
25.000	0.00	0.30	0.602	I O |	|	|	|	3.43
25.250	0.00	0.30	0.596	I O |	|	|	|	3.39
25.500	0.00	0.29	0.590	I O |	|	|	|	3.36
25.750	0.00	0.29	0.584	I O |	|	|	|	3.33
26.000	0.00	0.29	0.578	I O |	|	|	|	3.30
26.250	0.00	0.29	0.572	I O |	|	|	|	3.27
26.500	0.00	0.29	0.566	I O |	|	|	|	3.23
26.750	0.00	0.29	0.560	I O |	|	|	|	3.20
27.000	0.00	0.29	0.554	I O |	|	|	|	3.17
27.250	0.00	0.29	0.548	I O |	|	|	|	3.14
27.500	0.00	0.28	0.542	I O |	|	|	|	3.11
27.750	0.00	0.28	0.536	I O |	|	|	|	3.08
28.000	0.00	0.28	0.530	I O |	|	|	|	3.05
28.250	0.00	0.28	0.524	I O |	|	|	|	3.02
28.500	0.00	0.28	0.519	I O |	|	|	|	2.99
28.750	0.00	0.28	0.513	I O |	|	|	|	2.96
29.000	0.00	0.28	0.507	I O |	|	|	|	2.93
29.250	0.00	0.27	0.501	I O |	|	|	|	2.90
29.500	0.00	0.27	0.496	I O |	|	|	|	2.87
29.750	0.00	0.27	0.490	I O |	|	|	|	2.84
30.000	0.00	0.27	0.485	I O |	|	|	|	2.81
30.250	0.00	0.27	0.479	I O |	|	|	|	2.78
30.500	0.00	0.27	0.474	I O |	|	|	|	2.75
30.750	0.00	0.26	0.468	I O |	|	|	|	2.72
31.000	0.00	0.26	0.463	I O |	|	|	|	2.69
31.250	0.00	0.26	0.457	I O |	|	|	|	2.67
31.500	0.00	0.26	0.452	I O |	|	|	|	2.64
31.750	0.00	0.26	0.447	I O |	|	|	|	2.61
32.000	0.00	0.25	0.441	I O |	|	|	|	2.58
32.250	0.00	0.25	0.436	I O |	|	|	|	2.55
32.500	0.00	0.25	0.431	I O |	|	|	|	2.53
32.750	0.00	0.25	0.426	I O |	|	|	|	2.50
33.000	0.00	0.25	0.421	I O |	|	|	|	2.47
33.250	0.00	0.25	0.415	I O |	|	|	|	2.44
33.500	0.00	0.25	0.410	I O |	|	|	|	2.42
33.750	0.00	0.25	0.405	I O |	|	|	|	2.39

34.000	0.00	0.24	0.400	I	O				2.36
34.250	0.00	0.24	0.395	I	O				2.34
34.500	0.00	0.24	0.390	I	O				2.31
34.750	0.00	0.24	0.385	I	O				2.28
35.000	0.00	0.24	0.380	I	O				2.26
35.250	0.00	0.24	0.375	I	O				2.23
35.500	0.00	0.24	0.370	I	O				2.20
35.750	0.00	0.24	0.365	I	O				2.18
36.000	0.00	0.24	0.361	I	O				2.15
36.250	0.00	0.24	0.356	I	O				2.13
36.500	0.00	0.23	0.351	I	O				2.10
36.750	0.00	0.23	0.346	I	O				2.07
37.000	0.00	0.23	0.341	I	O				2.05
37.250	0.00	0.23	0.336	I	O				2.02
37.500	0.00	0.23	0.332	I	O				2.00
37.750	0.00	0.23	0.327	I	O				1.97
38.000	0.00	0.23	0.322	I	O				1.95
38.250	0.00	0.22	0.318	I	O				1.92
38.500	0.00	0.22	0.313	I	O				1.90
38.750	0.00	0.22	0.308	I	O				1.88
39.000	0.00	0.22	0.304	I	O				1.85
39.250	0.00	0.22	0.299	I	O				1.83
39.500	0.00	0.21	0.295	I	O				1.80
39.750	0.00	0.21	0.291	I	O				1.78
40.000	0.00	0.21	0.286	I	O				1.76
40.250	0.00	0.21	0.282	I	O				1.74
40.500	0.00	0.21	0.278	I	O				1.71
40.750	0.00	0.21	0.273	I	O				1.69
41.000	0.00	0.20	0.269	I	O				1.67
41.250	0.00	0.20	0.265	I	O				1.65
41.500	0.00	0.20	0.261	I	O				1.62
41.750	0.00	0.20	0.257	I	O				1.60
42.000	0.00	0.20	0.253	I	O				1.58
42.250	0.00	0.19	0.248	I	O				1.56
42.500	0.00	0.19	0.244	I	O				1.54
42.750	0.00	0.19	0.240	I	O				1.52
43.000	0.00	0.19	0.237	I	O				1.50
43.250	0.00	0.19	0.233	I	O				1.48
43.500	0.00	0.19	0.229	I	O				1.46
43.750	0.00	0.18	0.225	I	O				1.44
44.000	0.00	0.18	0.221	I	O				1.42
44.250	0.00	0.18	0.217	I	O				1.40
44.500	0.00	0.18	0.214	I	O				1.38
44.750	0.00	0.18	0.210	I	O				1.36
45.000	0.00	0.18	0.206	I	O				1.34
45.250	0.00	0.18	0.203	I	O				1.32
45.500	0.00	0.17	0.199	I	O				1.30
45.750	0.00	0.17	0.195	I	O				1.28
46.000	0.00	0.17	0.192	I	O				1.26
46.250	0.00	0.17	0.188	I	O				1.24
46.500	0.00	0.17	0.185	I	O				1.23
46.750	0.00	0.17	0.181	I	O				1.21
47.000	0.00	0.17	0.178	I	O				1.19

47.250	0.00	0.16	0.175	I O	|	|	|	1.17
47.500	0.00	0.16	0.171	I O	|	|	|	1.15
47.750	0.00	0.16	0.168	I O	|	|	|	1.14
48.000	0.00	0.16	0.165	I O	|	|	|	1.12
48.250	0.00	0.16	0.161	I O	|	|	|	1.10
48.500	0.00	0.16	0.158	I O	|	|	|	1.08
48.750	0.00	0.16	0.155	I O	|	|	|	1.07
49.000	0.00	0.15	0.152	I O	|	|	|	1.05
49.250	0.00	0.15	0.148	I O	|	|	|	1.03
49.500	0.00	0.15	0.145	I O	|	|	|	1.02
49.750	0.00	0.15	0.142	I O	|	|	|	1.00
50.000	0.00	0.15	0.139	I O	|	|	|	0.98
50.250	0.00	0.15	0.136	I O	|	|	|	0.97
50.500	0.00	0.15	0.133	I O	|	|	|	0.95
50.750	0.00	0.14	0.130	I O	|	|	|	0.94
51.000	0.00	0.14	0.127	I O	|	|	|	0.92
51.250	0.00	0.14	0.124	I O	|	|	|	0.91
51.500	0.00	0.14	0.121	I O	|	|	|	0.89
51.750	0.00	0.14	0.118	I O	|	|	|	0.88
52.000	0.00	0.14	0.116	I O	|	|	|	0.86
52.250	0.00	0.13	0.113	I O	|	|	|	0.85
52.500	0.00	0.13	0.110	I O	|	|	|	0.83
52.750	0.00	0.13	0.107	I O	|	|	|	0.82
53.000	0.00	0.13	0.105	I O	|	|	|	0.80
53.250	0.00	0.13	0.102	I O	|	|	|	0.79
53.500	0.00	0.13	0.099	I O	|	|	|	0.78
53.750	0.00	0.13	0.097	I O	|	|	|	0.76
54.000	0.00	0.12	0.094	I O	|	|	|	0.75
54.250	0.00	0.12	0.091	I O	|	|	|	0.73
54.500	0.00	0.12	0.089	I O	|	|	|	0.72
54.750	0.00	0.12	0.086	I O	|	|	|	0.71
55.000	0.00	0.12	0.084	I O	|	|	|	0.69
55.250	0.00	0.12	0.081	I O	|	|	|	0.68
55.500	0.00	0.12	0.079	I O	|	|	|	0.67
55.750	0.00	0.12	0.077	I O	|	|	|	0.66
56.000	0.00	0.11	0.074	I O	|	|	|	0.64
56.250	0.00	0.11	0.072	I O	|	|	|	0.63
56.500	0.00	0.11	0.070	I O	|	|	|	0.62
56.750	0.00	0.11	0.067	I O	|	|	|	0.61
57.000	0.00	0.11	0.065	I O	|	|	|	0.59
57.250	0.00	0.11	0.063	I O	|	|	|	0.58
57.500	0.00	0.11	0.061	IO	|	|	|	0.57
57.750	0.00	0.11	0.058	IO	|	|	|	0.56
58.000	0.00	0.10	0.056	IO	|	|	|	0.55
58.250	0.00	0.10	0.054	IO	|	|	|	0.54
58.500	0.00	0.10	0.052	IO	|	|	|	0.53
58.750	0.00	0.10	0.050	IO	|	|	|	0.51
59.000	0.00	0.10	0.048	IO	|	|	|	0.50
59.250	0.00	0.10	0.046	IO	|	|	|	0.49
59.500	0.00	0.09	0.044	IO	|	|	|	0.46
59.750	0.00	0.09	0.042	IO	|	|	|	0.44
60.000	0.00	0.09	0.040	IO	|	|	|	0.43
60.250	0.00	0.08	0.038	IO	|	|	|	0.41

60.500	0.00	0.08	0.037	IO				0.39
60.750	0.00	0.07	0.035	IO				0.37
61.000	0.00	0.07	0.034	IO				0.36
61.250	0.00	0.07	0.032	IO				0.34
61.500	0.00	0.07	0.031	IO				0.33
61.750	0.00	0.06	0.029	IO				0.31
62.000	0.00	0.06	0.028	IO				0.30
62.250	0.00	0.06	0.027	IO				0.29
62.500	0.00	0.05	0.026	IO				0.27
62.750	0.00	0.05	0.025	O				0.26
63.000	0.00	0.05	0.024	O				0.25
63.250	0.00	0.05	0.023	O				0.24
63.500	0.00	0.05	0.022	O				0.23
63.750	0.00	0.04	0.021	O				0.22
64.000	0.00	0.04	0.020	O				0.21
64.250	0.00	0.04	0.019	O				0.20
64.500	0.00	0.04	0.018	O				0.19
64.750	0.00	0.04	0.017	O				0.18
65.000	0.00	0.04	0.017	O				0.18
65.250	0.00	0.03	0.016	O				0.17
65.500	0.00	0.03	0.015	O				0.16
65.750	0.00	0.03	0.015	O				0.15
66.000	0.00	0.03	0.014	O				0.15
66.250	0.00	0.03	0.013	O				0.14
66.500	0.00	0.03	0.013	O				0.14
66.750	0.00	0.03	0.012	O				0.13
67.000	0.00	0.02	0.012	O				0.12
67.250	0.00	0.02	0.011	O				0.12
67.500	0.00	0.02	0.011	O				0.11
67.750	0.00	0.02	0.010	O				0.11
68.000	0.00	0.02	0.010	O				0.10
68.250	0.00	0.02	0.009	O				0.10
68.500	0.00	0.02	0.009	O				0.10
68.750	0.00	0.02	0.009	O				0.09
69.000	0.00	0.02	0.008	O				0.09
69.250	0.00	0.02	0.008	O				0.08
69.500	0.00	0.02	0.008	O				0.08
69.750	0.00	0.02	0.007	O				0.08
70.000	0.00	0.01	0.007	O				0.07
70.250	0.00	0.01	0.007	O				0.07
70.500	0.00	0.01	0.006	O				0.07
70.750	0.00	0.01	0.006	O				0.06
71.000	0.00	0.01	0.006	O				0.06
71.250	0.00	0.01	0.006	O				0.06
71.500	0.00	0.01	0.005	O				0.06
71.750	0.00	0.01	0.005	O				0.05
72.000	0.00	0.01	0.005	O				0.05
72.250	0.00	0.01	0.005	O				0.05
72.500	0.00	0.01	0.004	O				0.05
72.750	0.00	0.01	0.004	O				0.05
73.000	0.00	0.01	0.004	O				0.04
73.250	0.00	0.01	0.004	O				0.04
73.500	0.00	0.01	0.004	O				0.04

73.750	0.00	0.01	0.004	O	|	|	|	|	0.04
74.000	0.00	0.01	0.003	O	|	|	|	|	0.04
74.250	0.00	0.01	0.003	O	|	|	|	|	0.03
74.500	0.00	0.01	0.003	O	|	|	|	|	0.03
74.750	0.00	0.01	0.003	O	|	|	|	|	0.03
75.000	0.00	0.01	0.003	O	|	|	|	|	0.03
75.250	0.00	0.01	0.003	O	|	|	|	|	0.03
75.500	0.00	0.01	0.003	O	|	|	|	|	0.03
75.750	0.00	0.01	0.003	O	|	|	|	|	0.03
76.000	0.00	0.01	0.002	O	|	|	|	|	0.03
76.250	0.00	0.00	0.002	O	|	|	|	|	0.02
76.500	0.00	0.00	0.002	O	|	|	|	|	0.02
76.750	0.00	0.00	0.002	O	|	|	|	|	0.02
77.000	0.00	0.00	0.002	O	|	|	|	|	0.02
77.250	0.00	0.00	0.002	O	|	|	|	|	0.02
77.500	0.00	0.00	0.002	O	|	|	|	|	0.02
77.750	0.00	0.00	0.002	O	|	|	|	|	0.02
78.000	0.00	0.00	0.002	O	|	|	|	|	0.02
78.250	0.00	0.00	0.002	O	|	|	|	|	0.02
78.500	0.00	0.00	0.002	O	|	|	|	|	0.02
78.750	0.00	0.00	0.001	O	|	|	|	|	0.02
79.000	0.00	0.00	0.001	O	|	|	|	|	0.02
79.250	0.00	0.00	0.001	O	|	|	|	|	0.01
79.500	0.00	0.00	0.001	O	|	|	|	|	0.01
79.750	0.00	0.00	0.001	O	|	|	|	|	0.01
80.000	0.00	0.00	0.001	O	|	|	|	|	0.01
80.250	0.00	0.00	0.001	O	|	|	|	|	0.01
80.500	0.00	0.00	0.001	O	|	|	|	|	0.01
80.750	0.00	0.00	0.001	O	|	|	|	|	0.01
81.000	0.00	0.00	0.001	O	|	|	|	|	0.01
81.250	0.00	0.00	0.001	O	|	|	|	|	0.01
81.500	0.00	0.00	0.001	O	|	|	|	|	0.01
81.750	0.00	0.00	0.001	O	|	|	|	|	0.01
82.000	0.00	0.00	0.001	O	|	|	|	|	0.01
82.250	0.00	0.00	0.001	O	|	|	|	|	0.01
82.500	0.00	0.00	0.001	O	|	|	|	|	0.01
82.750	0.00	0.00	0.001	O	|	|	|	|	0.01
83.000	0.00	0.00	0.001	O	|	|	|	|	0.01
83.250	0.00	0.00	0.001	O	|	|	|	|	0.01
83.500	0.00	0.00	0.001	O	|	|	|	|	0.01
83.750	0.00	0.00	0.001	O	|	|	|	|	0.01
84.000	0.00	0.00	0.001	O	|	|	|	|	0.01
84.250	0.00	0.00	0.001	O	|	|	|	|	0.01
84.500	0.00	0.00	0.001	O	|	|	|	|	0.01
84.750	0.00	0.00	0.001	O	|	|	|	|	0.01
85.000	0.00	0.00	0.000	O	|	|	|	|	0.01
85.250	0.00	0.00	0.000	O	|	|	|	|	0.01
85.500	0.00	0.00	0.000	O	|	|	|	|	0.00

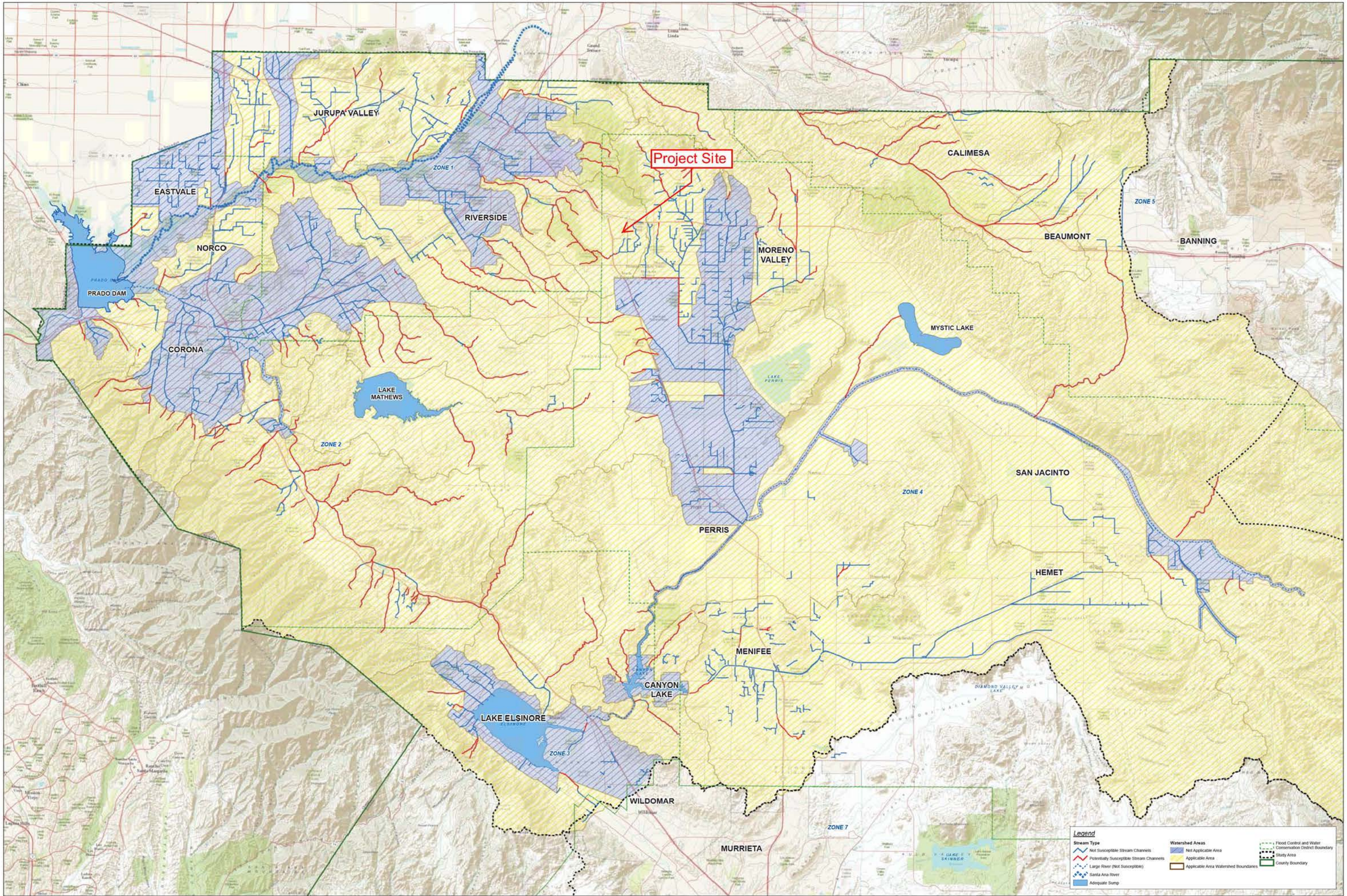
**********HYDROGRAPH DATA**********

Number of intervals = 342
Time interval = 15.0 (Min.)
Maximum/Peak flow rate = 0.324 (CFS)

```
                Total volume =       1.052 (Ac.Ft)
        Status of hydrographs being held in storage
                    Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
****************************************************************************

----------------------------------------------------------------------
```

HCOC Applicability Map



RBF GIS

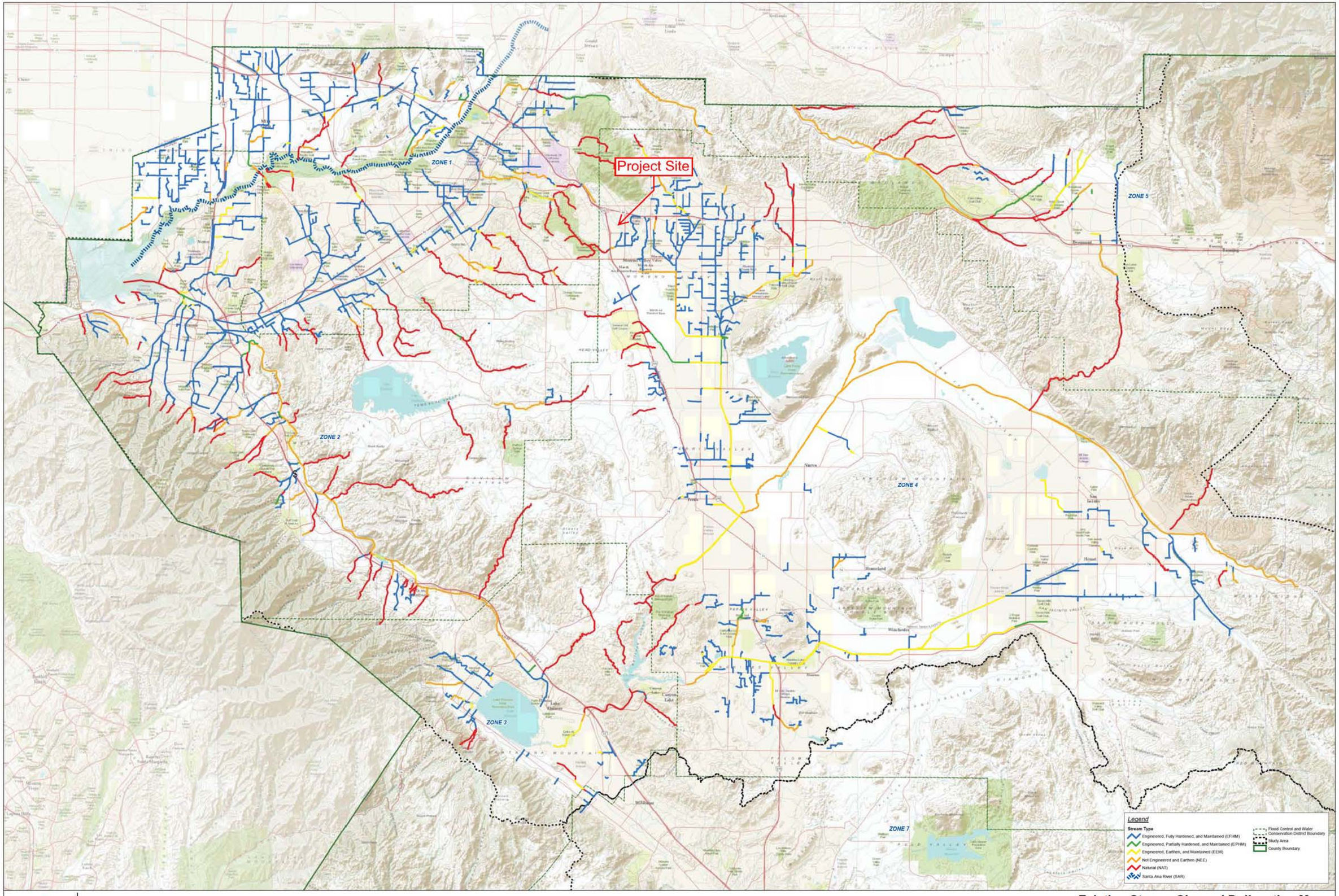
0 1 2 3 4 Miles

HCOC Applicability Map

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

Map 2

Existing Stream Channel Delineation Map



Existing Stream Channel Delineation Map

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

Map 1

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

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☐ **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

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❑ **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/

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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☐ 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

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❑ **M.** Loading Docks	❑ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer. ❑ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ❑ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		❑ Move loaded and unloaded items indoors as soon as possible. ❑ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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☒ **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		
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☒ **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

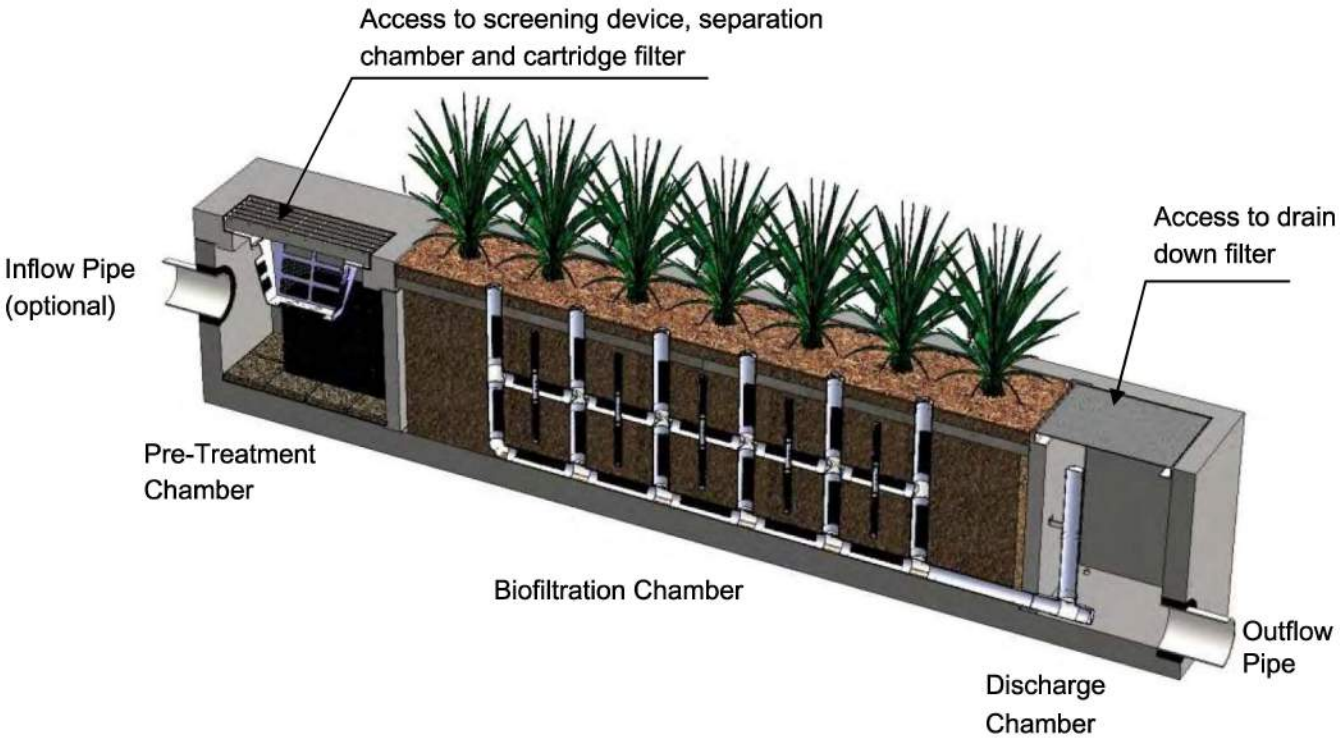
Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Maintenance Guidelines for Modular Wetland System - Linear

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. The hose of the vacuum truck will not damage the screening device.
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.
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.









Inspection Form



Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Inspection Report
Modular Wetlands System

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 _____

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: _____

2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

Maintenance Report



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P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

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 _____

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

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:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

Maintenance

Underground storm water detention and retention systems should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size or configuration of the system.

Inspection

Inspection is the key to effective maintenance and is easily performed. CONTECH recommends ongoing quarterly inspections of the accumulated sediment. Sediment deposition and transport may vary from year to year and quarterly inspections will help insure that systems are cleaned out at the appropriate time. Inspections should be performed more often in the winter months in climates where sanding operations may lead to rapid accumulations, or in equipment washdown areas. It is very useful to keep a record of each inspection. A sample inspection log is included for your use.

Systems should be cleaned when inspection reveals that accumulated sediment or trash is clogging the discharge orifice. CONTECH suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

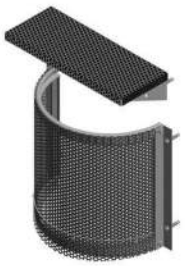
Cleaning

Maintaining an underground detention or retention system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities.

FlexStorm Connector Pipe Screen (CPS) Specifications

Product Selection



In general, a Connector Pipe Screen (CPS) must be sized appropriately to pass a one-year rain event through the perforated screen material and pass a 10-year rain event through the bypass area if a deflector lid is required. The shape of the screen depends on location of the outlet pipe. ADS will assist in the selection of the appropriate CPS design given the following information:

1. Catch basin length and depth
2. Location of the outlet pipe
3. A completed CPS dimensional form

Materials



Each CPS is comprised entirely of 304 stainless steel and brought to the field pre-configured for easy installation once product selection is confirmed. All models are supplied with vertical upright mounting brackets which accept four ⅜" x 3" (9 x 76 mm) stainless anchor bolts. All bypass lids require two ⅜" x 3" (9 x 76 mm) stainless anchor bolts. Mounting brackets are equipped with slotted holes to allow for varied contours on walls and sloped floors.

Installation



1. Lower the CPS through the manhole opening
2. Position the CPS evenly spaced around the connector pipe ensuring a minimum of 4" (100 mm) spacing away from the corners.
3. Loosen the bolts in the slotted holes which connect the screen to the upright mounting brackets until the bottom is flush with the floor
4. Tighten the bolts and mark the hole locations on the wall for the stainless anchor bolts
5. Drill holes, hammer the bolts in place and secure the connector pipe screen using provided stainless nuts
6. If the bottom of the base exposes more than a 0.197" (5 mm) gap, then an additional base face strip may be fastened to the base channel using stainless tek screws or rivets

Maintenance

ADS suggests the CPS be maintained per this modified set of conditions from the LA County CPS Standards. ADS advises that catch basins be cleaned out at least two (2) times per year and/or if debris has filled above a 40% level inside of the catch basin. Sites with large amounts of foliage, high sediment loads or smalled CPS devices might need to be cleaned more frequently.

Maintenance Conditions and Maintenance Standards: The following are deficiencies in maintenance conditions and their corresponding maintenance standards which shall apply to the CPS. The clean out of each catch basin shell meet the maintenance standards listed as follows:

1. Clear trash and debris located immediately in front of curb opening or side opening of catch basin and on top or between metal grates of grated catch basin
2. Remove vegetation growing across and/or blocking the basin opening
3. Remove all trash, debris and vegetation from inside the catch basin
4. Remove trash and debris in the connector pipe opening, upstream or downstream
5. Knock off/remove debris that covers the perforated openings of the CPS
6. Ensure there is no standing water inside of catch basin (indicates the device is not draining properly.

ADS "Terms and Conditions of Sale" are available on the ADS website, www.adspipe.com.
ADS™, and the Green Stripe are registered trademarks of Advanced Drainage Systems, Inc. FlexStorm® is a registered trademark of Inlet & Pipe Protection, Inc.
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adspipe.com
800-821-6710

BMP Name	BMP Location	Frequency
Structural Treatment		
Catch Basin Marker Inspection	As designated on WQMP Plot Plan	Bi-annually
Catch Basin Marker Maintenance	As designated on WQMP Plot Plan	Yearly
Trash Storage Areas	As designated on WQMP Plot Plan	Weekly basis
Irrigation and Landscape	As designated on WQMP Plot Plan	Monthly basis
Non-Structural Treatment		
Educational Material	Manager's Office	Upon hire and annually
Activity Restriction	Manager's Office	Daily basis
Common Landscape Management	Throughout project site	Monthly basis
BMP Maintenance	Manager's Office & staff	Daily basis
Common Area Litter Control	Throughout project site	Weekly basis
Employee Training	Manager's Office	Upon hire and annually
Common Area Catch Basin Inspection	As designated on WQMP Plot Plan	After and before rain storm
Sweeping of Parking Structure/Driveway	As designated on WQMP Plot Plan	Monthly basis
Fountain and Pool Maintenance	As designated on WQMP Plot Plan	As needed
Treatment Control		
Modular Wetlands Inspection	As designated on WQMP Plot Plan	Bi-annually
Modular Wetlands Maintenance	As designated on WQMP Plot Plan	Annually and as needed
CMP Inspection	As designated on WQMP Plot Plan	Bi-annually
CMP Maintenance	As designated on WQMP Plot Plan	Annually and as needed
5mm Trash Screen Filters Inspection	As designated on WQMP Plot Plan	Bi-annually
5mm Trash Screen Filters Maintenance	As designated on WQMP Plot Plan	Annually and as needed

Appendix 10: Educational Materials

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

After the Storm

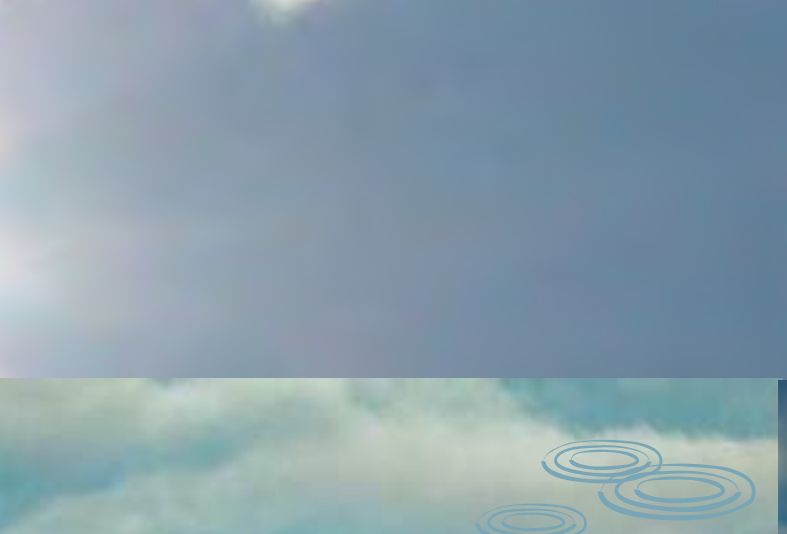


What is stormwater runoff?



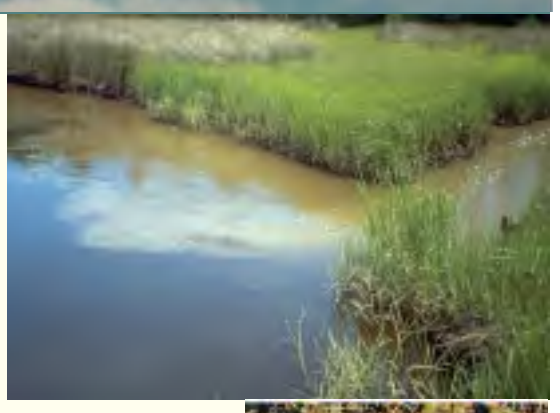
Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?



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

The effects of pollution



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

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.



- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.



For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

THE YEAR OF CLEAN WATER
Celebrating a Environment

EPA United States Environmental Protection Agency

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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.

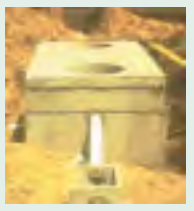
Lawn care



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.

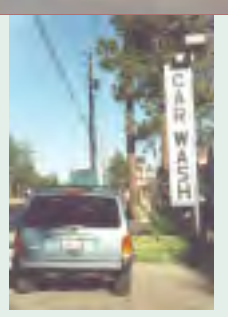
Septic systems



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.



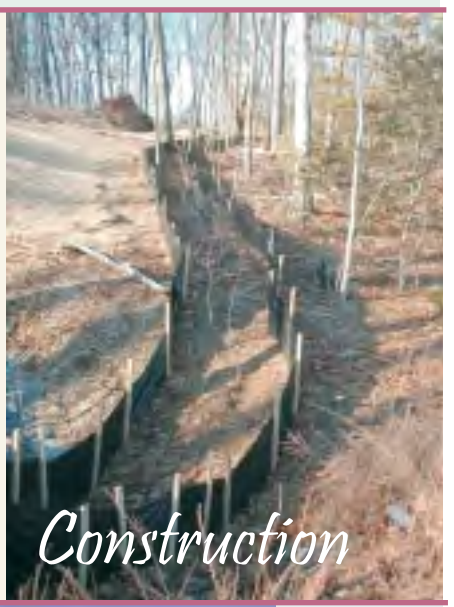
Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.



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.

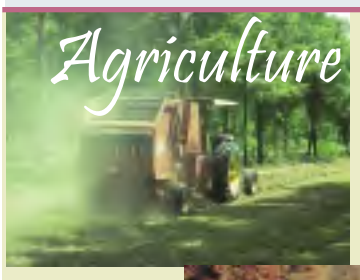
- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming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



Construction

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.



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.

For Information:

To report illegal dumping or a clogged storm drain
1-800-506-2555

Hazardous Materials Disposal,
Recycling/Disposal Vendors call:
951-486-3200 or 1-800-506-2555

County Code Enforcement Offices
(unincorporated area)

Lake Elsinore/Mead Valley	951-245-3186
Jurupa Valley	951-275-8739
Moreno Valley/Banning	951-485-5840
Murrieta So. County	951-600-6140
Thousand Palms District	760-343-4150

Environmental Crimes
1-800-304-6100

Spill Response Agency
1-800-304-2226 or 951-358-5172

Recycling and Hazardous Waste Disposal
1-800-366-SAVE

For pollution prevention brochures or to obtain information on other County Environmental Services, call 1-800-506-2555

Popular links:
www.rcflood.org
www.cabmphandbooks.com
www.cfpub.epa.gov/npdes

ONLY RAIN DOWN THE STORM DRAIN
POLLUTION PREVENTION PROGRAM
1-800-506-2555

Riverside County's "Only Rain Down the Storm Drain" Pollution Prevention Program members include:

Banning	Desert Hot Springs	Palm Desert
Beaumont	Hemet	Palm Springs
Calimesa	Indian Wells	Perris
Canyon Lake	Indio	Rancho Mirage
Cathedral City	Lake Elsinore	Riverside County
City of Riverside	La Quinta	San Jacinto
Corona	Menifee	Temecula
Coachella	Murrieta	Wildomar
Coachella Valley Water District	Moreno Valley	
	Norco	

- Auto Repair Shops
- Car Dealerships
- Gas Stations
- Fleet Service Operations



Stormwater Pollution...What You Should Know

Riverside County has three major river systems, or watersheds, that are important to our communities and the environment. Improper automotive maintenance, storage and washing activities can cause pollution that endangers the health of these rivers.

Pollutants that can collect on the ground from automotive repair, storage and washing areas such as antifreeze, oil, grease, gas, lubricants, soaps and dirt can be washed into the street by rain, over-irrigation or wash water runoff. Once these pollutants are in the streets they can be carried to these rivers by the storm drain system. Unlike the sewer system, the storm drain system carries water (and pollution) to our rivers without treatment. Pollution from storm drains is a form of storm water pollution.

A common storm water pollution problem associated with automotive shops and businesses is the activity of hosing down service bays without proper capture of runoff water, illegal dumping of fluids to the street or storm drain inlets and not properly storing hazardous materials. Examples of pollutants that can be mobilized by these activities include oil and grease from cars, copper and asbestos from worn break linings, zinc from tires and toxics from spilled fluids.

The Cities and County of Riverside have adopted ordinances, in accordance with state and federal law, which prohibit the discharge of pollutants into the storm drain system or local lakes, rivers or streams. This brochure provides common practices that can prevent storm water pollution and keep your shop in compliance with the law.

Best Management Practices for Auto Body & Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations

Changing Automotive Fluids

- Locate storm drains on or near your property. Do not allow material to flow to these drains.
- Collect, and separately recycle motor oil, antifreeze, transmission fluid and gear oil. Combining waste fluid prevents recycling.
- Drain brake fluid and other non-recyclables into a proper container and handle as a hazardous waste.
- Use a recyclable radiator flushing fluid and discard safely.

Only rain is allowed down the storm drain! Don't be an offender!! Violations of local ordinances are prosecuted to the fullest extent of the law.

Identify specific activities with the potential to cause spills or release pollutants such as oil, grease, fuel, etc. Post signs and train employees on how to prevent and clean up spills during activities.

YOU can prevent Stormwater Pollution following these practices...

Working on Transmissions, Engines and Miscellaneous Repairs

- Keep a drip pan or a wide low-rimmed container under vehicles to catch fluids whenever you unclip hoses, unscrew filters, or change parts, to contain unexpected leaks.
- Drain all fluids from wrecked vehicles into proper containers before disassembly or repair.
- Store batteries indoors, on an open rack.
- Return used batteries to a battery vendor.
- Contain cracked batteries to prevent hazardous spills.
- Catch metal filings in an enclosed unit or on a tarpaulin.
- Sweep filing areas to prevent washing metals into floor drains.

Cleaning Parts

- Clean parts in a self-contained unit, solvent sink, or parts washer to prevent solvents and grease from entering a storm drain.



Fueling Vehicles



- Clean-up minor spills with a dry absorbent, rather than allowing them to evaporate.
- Use a damp cloth and a damp mop to keep the area clean rather than a hose or a wet mop.

Keeping your shop or work area pollutant clean and environmentally safe

- Never hose down your work area, as pollutants could be washed into the storm drain.
- Sweep or vacuum the shop floor frequently.
- Routinely check equipment. Wipe up spills and repair leaks.
- Use large pans or an inflatable portable berm under wrecked cars.
- Avoid spills by emptying and wiping drip pans, when they are half-full.
- Keep dry absorbent materials and/or a wet/dry vacuum cleaner on hand for mid-sized spills.
- Train your employees to be familiar with hazardous spill response plans and emergency procedures.
- Immediately report hazardous material spills that have entered the street or storm drain to OES and local authorities.

Outdoor Parking and Auto Maintenance

- Use covered or controlled areas to prevent offsite spills.
- Sweep-up trash and dirt from outdoor parking and maintenance areas. Do not hose down areas. All non-stormwater discharges to the street of storm drain are prohibited.

Storing and Disposing of Waste

- Store recyclable and non-recyclable waste separately.
- Place liquid waste (hazardous or otherwise) in proper containers with secondary containment.
- Cover outdoor storage areas to prevent contact with rain water.
- Collect used parts for delivery to a scrap metal dealer.



Washing vehicles and steam cleaning equipment

- For car washing, minimize wash water used and use designated areas. Never discharge wash water to the street, gutters or storm drain.
- Be sure to keep waste water from engine parts cleaning or steam cleaning from being discharged to the street, gutter or storm drain.
- Wash vehicles and steam clean with environmentally friendly soaps and polishes.



Selecting and Controlling Inventory

- Purchase recyclable or non-toxic materials.
- Select "closed-loop" suppliers and purchase supplies in bulk.



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

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

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

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

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

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

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

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators



Tips for Landscape & Gardening

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

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.



- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.



- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

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