WASHINGTON STATE DEPARTMENT OF ECOLOGY

February 2020

GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS), ENHANCED, PHOSPHORUS & OIL TREATMENT

For

CONTECH Engineered Solutions Filterra®

Ecology's Decision:

Based on Contech's submissions, including the Final Technical Evaluation Reports, dated August 2019, March 2014, December 2009, and additional information provided to Ecology dated October 9, 2009, Ecology hereby issues the following use level designations:

1. A General Use Level Designation for Basic, Enhanced, Phosphorus, and Oil Treatment for the Filterra® system constructed with a minimum media thickness of 21 inches (1.75 feet), at the following water quality design hydraulic loading rates:

Treatment	Infiltration Rate (in/hr) for use in Sizing
Basic	175
Phosphorus	100
Oil	50
Enhanced	175

2. The Filterra is not appropriate for oil spill-control purposes.
3. Ecology approves Filterra systems for treatment at the hydraulic loading rates listed above, and sized based on the water quality design flow rate for an off-line system. Calculate the water quality design flow rates using the following procedures:

- Western Washington: for treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
- Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three flow rate based methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
- Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.

4. This General Use Level Designation has no expiration date, but Ecology may revoke or amend the designation, and is subject to the conditions specified below.

Ecology's Conditions of Use:

Filterra systems shall comply with these conditions shall comply with the following conditions:

1. Design, assemble, install, operate, and maintain the Filterra systems in accordance with applicable Contech Filterra manuals and this Ecology Decision.
2. The minimum size filter surface-area for use in Washington is determined by using the design water quality flow rate (as determined in this Ecology Decision, Item 3, above) and the Infiltration Rate from the table above (use the lowest applicable Infiltration Rate depending on the level of treatment required). Calculate the required area by dividing the water quality design flow rate (cu-ft/sec) by the Infiltration Rate (converted to ft/sec) to obtain required surface area (sq-ft) of the Filterra unit.
3. Each site plan must undergo Contech Filterra review before Ecology can approve the unit for site installation. This will ensure that design parameters including site grading and slope are appropriate for use of a Filterra unit.
4. Filterra media shall conform to the specifications submitted to and approved by Ecology and shall be sourced from Contech Engineered Solutions, LLC with no substitutions.
5. Maintenance includes removing trash, degraded mulch, and accumulated debris from the filter surface and replacing the mulch layer. Use inspections to determine the site-specific maintenance schedules and requirements. Follow maintenance procedures given in the most recent version of the Filterra Operation and Maintenance Manual.
6. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured treatment device.

    - Contech designs Filterra systems for a target maintenance interval of 6 months in the Pacific Northwest. Maintenance includes removing and replacing the mulch layer above the media along with accumulated sediment, trash, and captured organic materials therein, evaluating plant health, and pruning the plant if deemed necessary.
    - Conduct maintenance following manufacturer's guidelines.

7. Filterra systems come in standard sizes.

8. Install the Filterra in such a manner that flows exceeding the maximum Filterra operating rate are conveyed around the Filterra mulch and media and will not resuspend captured sediment.
9. Discharges from the Filterra units shall not cause or contribute to water quality standards violations in receiving waters.

Approved Alternate Configurations

Filterra Internal Bypass - Pipe (FTIB-P)

1. The Filterra® Internal Bypass – Pipe allows for piped-in flow from area drains, grated inlets, trench drains, and/or roof drains. Design capture flows and peak flows enter the structure through an internal slotted pipe. Filterra® inverted the slotted pipe to allow design flows to drop through to a series of splash plates that then disperse the design flows over the top surface of the Filterra® planter area. Higher flows continue to bypass the slotted pipe and convey out the structure.
2. To select a FTIB-P unit, the designer must determine the size of the standard unit using the sizing guidance described above.

Filterra Internal Bypass – Curb (FTIB-C)

1. The Filterra® Internal Bypass –Curb model (FTIB-C) incorporates a curb inlet, biofiltration treatment chamber, and internal high flow bypass in one single structure. Filterra® designed the FTIB-C model for use in a "Sag" or "Sump" condition and will accept flows from both directions along a gutter line. An internal flume tray weir component directs treatment flows entering the unit through the curb inlet to the biofiltration treatment chamber. Flows in excess of the water quality treatment flow rise above the flume tray weir and discharge through a standpipe orifice; providing bypass of untreated peak flows. Americast manufactures the FTIB-C model in a variety of sizes and configurations and you may use the unit on a continuous grade when a single structure providing both treatment and high flow bypass is preferred. The FTIB-C model can also incorporate a separate junction box chamber to allow larger diameter discharge pipe connections to the structure.
2. To select a FTIB-C unit, the designer must determine the size of the standard unit using the sizing guidance described above.

Filterra® Shallow

1. The Filterra Shallow provides additional flexibility for design engineers and designers in situations where various elevation constraints prevent application of a standard Filterra configuration. Engineers can design this system up to six inches shallower than any of the previous Filterra unit configurations noted above.
2. Ecology requires that the Filterra Shallow provide a media contact time equivalent to that of the standard unit. This means that with a smaller depth of media, the surface area must increase.
3. To select a Filterra Shallow System unit, the designer must first identify the size of the standard unit using the modeling guidance described above.
4. Once the size of the standard Filterra unit is established using the sizing technique described above, use information from the following table to select the appropriate size Filterra Shallow System unit.

Shallow Unit Basic, Enhanced, and Oil Treatment Sizing

Standard Depth	Equivalent Shallow Depth
4x4	4x6 or 6x4
4x6 or 6x4	6x6
4x8 or 8x4	6x8 or 8x6
6x6	6x10 or 10x6
6x8 or 8x6	6x12 or 12x6
6x10 or 10x6	13x7

Notes:
1. Shallow Depth Boxes are less than the standard depth of 3.5 feet but no less than 3.0 feet deep (TC to INV).

Applicant: Contech Engineered Solutions, LLC.

Applicant's Address: 11815 NE Glenn Widing Drive
Portland, OR 97220

Application Documents:

- State of Washington Department of Ecology Application for Conditional Use Designation, Americast (September 2006)
- Quality Assurance Project Plan Filterra® Bioretention Filtration System Performance Monitoring, Americast (April 2008)
- Quality Assurance Project Plan Addendum Filterra® Bioretention Filtration System Performance Monitoring, Americast (June 2008)
- Draft Technical Evaluation Report Filterra® Bioretention Filtration System Performance Monitoring, Americast (August 2009)
- Final Technical Evaluation Report Filterra® Bioretention Filtration System Performance Monitoring, Americast (December 2009)
- Technical Evaluation Report Appendices Filterra® Bioretention Filtration System Performance Monitoring, Americast, (August 2009)
- Memorandum to Department of Ecology Dated October 9, 2009 from Americast, Inc. and Herrera Environmental Consultants
- Quality Assurance Project Plan Filterra® Bioretention System Phosphorus treatment and Supplemental Basic and Enhanced Treatment Performance Monitoring, Americast (November 2011)
- Filterra® letter August 24, 2012 regarding sizing for the Filterra® Shallow System.
- University of Virginia Engineering Department Memo by Joanna Crowe Curran, Ph. D dated March 16, 2013 concerning capacity analysis of Filterra® internal weir inlet tray.
- Terraphase Engineering letter to Jodi Mills, P.E. dated April 2, 2013 regarding Terraflume Hydraulic Test, Filterra® Bioretention System and attachments.
- Technical Evaluation Report, Filterra® System Phosphorus Treatment and Supplemental Basic Treatment Performance Monitoring. March 27th, 2014.
- State of Washington Department of Ecology Application for Conditional Use Level Designation, Contech Engineered Solutions (May 2015)

- Quality Assurance Project Plan Filterra® Bioretention System, Contech Engineered Solutions (May 2015)
- Filterra Bioretention System Armco Avenue General Use Level Designation Technical Evaluation Report, Contech Engineered Solutions (August 2019)

Applicant's Use Level Request:

General Level Use Designation for Basic (175 in/hr), Enhanced (175 in/hr), Phosphorus (100 in/hr), and Oil Treatment (50 in/hr).

Applicant's Performance Claims:

Field-testing and laboratory testing show that the Filterra® unit is promising as a stormwater treatment best management practice and can meet Ecology's performance goals for basic, enhanced, phosphorus, and oil treatment.

Findings of Fact:

Field Testing 2015-2019

1. Contech completed field testing of a 4 ft. x 4 ft. Filterra® unit at one site in Hillsboro, Oregon from September 2015 to July 2019. Throughout the monitoring period a total of 24 individual storm events were sampled, of which 23 qualified for TAPE sampling criteria.
2. Contech encountered several unanticipated events and challenges that prevented them from collecting continuous flow and rainfall data. An analysis of the flow data from the sampled events, including both the qualifying and non-qualifying events, demonstrated the system treated over 99 % of the influent flows. Peak flows during these events ranged from 25 % to 250 % of the design flow rate of 29 gallons per minute.
3. Of the 23 TAPE qualified sample events, 13 met requirements for TSS analysis. Influent concentrations ranged from 20.8 mg/L to 83 mg/L, with a mean concentration of 46.3 mg/L. The UCL95 mean effluent concentration was 15.9 mg/L, meeting the 20 mg/L performance goal for Basic Treatment.
4. All 23 TAPE qualified sample events met requirements for dissolved zinc analysis. Influent concentrations range from 0.0384 mg/L to 0.2680 mg/L, with a mean concentration of 0.0807 mg/L. The LCL 95 mean percent removal was 62.9 %, meeting the 60 % performance goal for Enhanced Treatment.
5. Thirteen of the 23 TAPE qualified sample events met requirements for dissolved copper analysis. Influent concentrations ranged from 0.00543 mg/L to 0.01660 mg/L, with a mean concentration of 0.0103 mg/L. The LCL 95 mean percent removal was 41.2 %, meeting the 30 % performance goal for Enhanced Treatment.
6. Total zinc concentrations were analyzed for all 24 sample events. Influent EMCs for total zinc ranged from 0.048 mg/L to 5.290 mg/L with a median of 0.162 mg/L. Corresponding effluent EMCs for total zinc ranged from 0.015 mg/L to 0.067 mg/L with a median of

0.029 mg/L. Total event loadings for the study for total zinc were 316.85 g at the influent and 12.92 g at the effluent sampling location, resulting in a summation of loads removal efficiency of 95.9 %.

7. Total copper concentrations were analyzed for all 24 sample events. Influent EMCs for total copper ranged from 0.003 mg/L to 35.600 mg/L with a median value of 0.043 mg/L. Corresponding effluent EMCs for total copper ranged from 0.002 mg/L to 0.015 mg/L with a median of 0.004 mg/L. Total event loadings for total copper for the study were 1,810.06 g at the influent and 1.90 g at the effluent sampling location, resulting in a summation of loads removal efficiency of 99.9 %.

Field Testing 2013

1. Filterra completed field-testing of a 6.5 ft x 4 ft. unit at one site in Bellingham, Washington. Continuous flow and rainfall data collected from January 1, 2013 through July 23, 2013 indicated that 59 storm events occurred. Water quality data was obtained from 22 storm events. Not all the sampled storms produced information that met TAPE criteria for storm and/or water quality data.
2. The system treated 98.9 % of the total 8-month runoff volume during the testing period. Consequently, the system achieved the goal of treating 91 % of the volume from the site. Stormwater runoff bypassed Filterra treatment during four of the 59 storm events.
3. Of the 22 sampled events, 18 qualified for TSS analysis (influent TSS concentrations ranged from 25 to 138 mg/L). The data were segregated into sample pairs with influent concentration greater than and less than 100 mg/L. The UCL95 mean effluent concentration for the data with influent less than 100 mg/L was 5.2 mg/L, below the 20-mg/L threshold. Although the TAPE guidelines do not require an evaluation of TSS removal efficiency for influent concentrations below 100 mg/L, the mean TSS removal for these samples was 90.1 %. Average removal of influent TSS concentrations greater than 100 mg/L (three events) was 85 %. In addition, the system consistently exhibited TSS removal greater than 80 % at flow rates equivalent to a 100 in/hr infiltration rate and was observed at 150 in/hr.
4. Ten of the 22 sampled events qualified for TP analysis. Americast augmented the dataset using two sample pairs from previous monitoring at the site. Influent TP concentrations ranged from 0.11 to 0.52 mg/L. The mean TP removal for these twelve events was 72.6 %. The LCL95 mean percent removal was 66.0, well above the TAPE requirement of 50 %. Treatment above 50 % was evident at 100 in/hr infiltration rate and as high as 150 in/hr. Consequently, the Filterra test system met the TAPE Phosphorus Treatment goal at 100 in/hr. Influent ortho-P concentrations ranged from 0.005 to 0.012 mg/L; effluent ortho-P concentrations ranged from 0.005 to 0.013 mg/L. The reporting limit/resolution for the ortho-P test method is 0.01 mg/L, therefore the influent and effluent ortho-P concentrations were both at and near non-detect concentrations.

Field Testing 2008-2009

1. Filterra completed field-testing at two sites at the Port of Tacoma. Continuous flow and rainfall data collected during the 2008-2009 monitoring period indicated that 89 storm events occurred. The monitoring obtained water quality data from 27 storm events. Not all the sampled storms produced information that met TAPE criteria for storm and/or water quality data.
2. During the testing at the Port of Tacoma, 98.96 to 99.89 % of the annual influent runoff volume passed through the POT1 and POT2 test systems respectively. Stormwater runoff bypassed the POT1 test system during nine storm events and bypassed the POT2 test system during one storm event. Bypass volumes ranged from 0.13 % to 15.3% of the influent storm volume. Both test systems achieved the 91 % water quality treatment-goal over the 1-year monitoring period.
3. Consultants observed infiltration rates as high as 133 in/hr during the various storms. Filterra did not provide any paired data that identified percent removal of TSS, metals, oil, or phosphorus at an instantaneous observed flow rate.
4. The maximum storm average hydraulic loading rate associated with water quality data is <40 in/hr, with the majority of flow rates < 25 in/hr. The average instantaneous hydraulic loading rate ranged from 8.6 to 53 in/hr.
5. The field data showed a removal rate greater than 80 % for TSS with an influent concentration greater than 20 mg/L at an average instantaneous hydraulic loading rate up to 53 in/hr (average influent concentration of 28.8 mg/L, average effluent concentration of 4.3 mg/L).
6. The field data showed a removal rate generally greater than 54 % for dissolved zinc at an average instantaneous hydraulic loading rate up to 60 in/hr and an average influent concentration of 0.266 mg/L (average effluent concentration of 0.115 mg/L).
7. The field data showed a removal rate generally greater than 40 % for dissolved copper at an average instantaneous hydraulic loading rate up to 35 in/hr and an average influent concentration of 0.0070 mg/L (average effluent concentration of 0.0036 mg/L).
8. The field data showed an average removal rate of 93 % for total petroleum hydrocarbon (TPH) at an average instantaneous hydraulic loading rate up to 53 in/hr and an average influent concentration of 52 mg/L (average effluent concentration of 2.3 mg/L). The data also shows achievement of less than 15 mg/L TPH for grab samples. Filterra provided limited visible sheen data due to access limitations at the outlet monitoring location.
9. The field data showed low percentage removals of total phosphorus at all storm flows at an average influent concentration of 0.189 mg/L (average effluent concentration of 0.171 mg/L). We may relate the relatively poor treatment performance of the Filterra system at this location to influent characteristics for total phosphorus that are unique to the Port of Tacoma site. It appears that the Filterra system will not meet the 50 % removal performance goal when the majority of phosphorus in the runoff is expected to be in the dissolved form.

Laboratory Testing

1. Filterra performed laboratory testing on a scaled down version of the Filterra unit. The lab data showed an average removal from 83-91 % for TSS with influents ranging from 21 to 320 mg/L, 82-84 % for total copper with influents ranging from 0.94 to 2.3 mg/L, and 50-61 % for orthophosphate with influents ranging from 2.46 to 14.37 mg/L.
2. Filterra conducted permeability tests on the soil media.
3. Lab scale testing using Sil-Co-Sil 106 showed removals ranging from 70.1 % to 95.5 % with a median removal of 90.7 %, for influent concentrations ranging from 8.3 to 260 mg/L. Filterra ran these laboratory tests at an infiltration rate of 50 in/hr.
4. Supplemental lab testing conducted in September 2009 using Sil-Co-Sil 106 showed an average removal of 90.6 %. These laboratory tests were run at infiltration rates ranging from 25 to 150 in/hr for influent concentrations ranging from 41.6 to 252.5 mg/L. Regression analysis results indicate that the Filterra system's TSS removal performance is independent of influent concentration in the concentration rage evaluated at hydraulic loading rates of up to 150 in/hr.

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Date	**Revision**
December 2009	GULD for Basic, Enhanced, and Oil granted, CULD for Phosphorus
September 2011	Extended CULD for Phosphorus Treatment
September 2012	Revised design storm discussion, added Shallow System.
January 2013	Revised format to match Ecology standards, changed Filterra contact information
February 2013	Added FTIB-P system
March 2013	Added FTIB-C system
April 2013	Modified requirements for identifying appropriate size of unit

June 2013	Modified description of FTIB-C alternate configuration
March 2014	GULD awarded for Phosphorus Treatment. GULD updated for a higher flow-rate for Basic Treatment.
June 2014	Revised sizing calculation methods
March 2015	Revised Contact Information
June 2015	CULD for Basic and Enhanced at 100 in/hr infiltration rate
September 2019	GULD for Basic and Enhanced at 175 in/hr infiltration rate
February 2020	Revised sizing language to note sizing based on off-line calculations.

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

HYDROMODIFICATION STUDY

FOR

SYCAMORE HILL BUSINESS CENTER

MARCH JOINT POWERS AUTHORITY
COUNTY OF RIVERSIDE, CA

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March 10, 2020

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HYDROMODIFICATION STUDY FOR SYCAMORE HILL BUSINESS CENTER

MARCH JOINT POWER AUTHORITY, RIVERSIDE COUNTY, CA.

1. OBJECTIVE

The purpose of this study is to prove that hydromodification conditions are met for the Sycamore Hill Business Center Project (also called JPA-Butler) when a system with multiple bio-retention basins and an underground system is designed to control the runoff discharge of the post-development conditions. Per the Water Quality Management Plan for the Santa Ana Region of Riverside County, hydromodification conditions are met when: the post-development peak flows for the 24-hour, 2-year storm event are less, equal or do not exceed by more than 10 percent, the peak flows for the pre-development conditions of the same storm.

2. INTRODUCTION

At this point, it is important to highlight the following: the overall Drainage Study prepared by REC for this project already includes the analysis of the 2-yr, 24-hr storm event in pre and post-development conditions. Therefore, all explanations, descriptions, assumptions, and results from this specific project are taken directly from the aforementioned report. The intent is that this report is self-sufficient to explain hydromodification compliance, but for any further details not included here, please refer to the REC Drainage Study for Sycamore Hills Business Center,

In regards to the project, the proposed JPA-Butler project is an industrial warehouse that will be constructed northeast of the Alessandro Avenue and Barton Street intersection. The project includes the construction of two (2) buildings, parking lots and associated landscaping. The two proposed buildings are separated by a natural channel.

To compare the pre and post-development runoff characteristics, methodologies outlined in the Riverside County Flood Control and Water Conservation District Hydrology Manual (Hydrology Manual) were used. The 2 year storm is the design return period for analyzing the hydromodification impacts of the proposed project. This storm event was analyzed for 24-hr duration for both pre-development and post-development conditions.

3. PRE AND POST DEVELOPED CONDITIONS AND OFFSITE RUNOFF

In existing conditions, the Sycamore Hills Business Center project site is a wetland containing sparse vegetation and various natural channels/discharge points. The existing site is comprised of five (5)

drainage management areas (DMAs) and two (2) sub areas which each drain to their respective points of discharge (POD).

The proposed development includes two (2) industrial buildings with associated driveways, walkways, and landscaping. In post-development condition, the Sycamore Hills Business Center project site will contain ten (10) drainage management areas (DMAs) and three (3) sub areas as in existing conditions. A detailed post-development conditions description of each DMA is provided in the following paragraphs.

DMA-1 remains undeveloped in post-development conditions. Runoff from DMA-1 overland flows to POD-1. POD-1 is a natural flow path located near the northwestern corner of the project site.POD-1 receives practically no offsite run-on, thus there is no need to preserve or divert any offsite flow.

DMA-2A, 2C, and 2D consist of the eastern, western and northern side of the proposed western building, parking lot/driveway, and landscape area. Runoff from these areas will first surface flow into Filterras for water quality treatment prior to discharging into an underground detention system. Runoff from the detention system will then discharge to POD-2.

DMA-2B will contain the southern portion of the proposed western building which will overland flow to Basin 2-1. Basin 2-1 is located upstream of Basin 2-2 and is configured such that detained flows shall be conveyed to POD-2 and overflows from Basin 2-1 will discharge to Basin 2-2 for additional detention. Detained outflows from the underground detention system and the basins will be confluenced at POD-2.

DMA-2E consists of the parking lot in Parcel C located at the North West corner of the site. Parcel C will be dedicated to the City to be used in conjunction with an adjacent trail. This DMA will have a separate Filterra BMP to treat runoff from this parcel. Runoff from the BMP will then discharge to POD-2.

DMA-2F is the self-treating area that will remain undisturbed along the north east side of building B. This area will flow overland to POD-2.

POD-2 is a natural flow path located near the northeast corner of the western development. POD-2 receives a significant and undetermined amount of run-on from the 48” pipe discharging into the property (see exhibits, point 2-1). This flow will be captured in a 48” pipe that will cross thru the proposed project along the northern parking lot of Building B and will discharge to POD-2. In regards to run-on from the south (see point 2-2 on the exhibits) run-on will be captured in a proposed brow-ditch/pipe system to be designed at a later phase of this project, and conveyed to POD-2.

DMA 3 will remain undeveloped in existing and proposed development conditions. There are two (2) sub-areas within DMA-3 which will be subject to development. These sub-areas are designated DMA-3A and DMA-3B and a description of these shall be subsequently provided. Runoff from DMA-3 flows to POD-3. Note that POD-3 receives offsite run-on, via stormdrain, from the residential/commercial developments to the south of Alessandro Boulevard and the surface flow run-on from the adjacent abandoned developed lot.

DMA-3A consists of the southern entrance and southern parking lot of the eastern building. Runoff from DMA-3A shall overland flow to a proposed basin, Basin-3A, for detention and storage. DMA-3B consists of the eastern portion and southwestern portion of the eastern building. Runoff from DMA-3B shall overland flow to a proposed basin, Basin-3B for detention and storage. Detained outflows from Basins 3A and 3B shall confluence at POD-3.

POD-3 is a natural flow path located near the northwestern corner of the eastern development. POD-3 receives run-on from point 3-1. Notice that in this case, the natural conveyance system will be preserved as the natural channel from 3-1 to POD-3 is an area of no development; consequently, any run-on coming to 3-1 can flow freely to POD-3. It should be mentioned that OFF-S1 represents the discharge of a pipe system into the natural channel, but such discharge and flow path occurs off-site the property until point 3-1 is reached. Note that PODs 3A and 3B are natural flow paths located upstream of POD-3.

DMA-4 consists of the remaining building and parking lot of the eastern development which does not drain to PODs 3A or 3B. Runoff from DMA-4 overland flows to Basin-4 for detention and treatment. Runoff from DMA-4 flows to POD-4. POD-4 is a natural flowpath located near the northeast corner of the eastern development.

DMA-4A contains a small area of pervious landscaping at the north east corner of the site that bypasses the BMPs and drains directly to POD-4.

POD-4 receives a small and undetermined amount of sheet-flow from the adjacent areas that enters to the property at 4-1, 4-2 and 4-3. The runoff from this area located to the east of the property line will be captured by a proposed brow-ditch / pipe system to be designed at a later phase of this project, and conveyed to POD-4.

DMA-5 remains undeveloped in post-development conditions. Runoff from DMA-5 flows to POD-5. POD-5 is a natural flowpath located near the southeastern corner of the eastern development.

POD-5 receives run-on from multiple sources. All run-on eventually reaching POD-5 will flow thru natural conveyance systems and areas to be preserved, and consequently the project will have no impact on how this run-on flows. The only exception is the entrance road that must include a culvert designed to convey the run-on from 5-1 and the little run-off produced by the property area west of the entrance. This culvert will be designed at a later phase of this project.

Please refer to the project WQMP for water quality analysis and results as water quality considerations are outside the scope of this report.

For the purpose of this study, only DMAs which are subject to development will be analyzed in both existing and proposed conditions, using the Synthetic Unit Hydrograph Methodology as explained in the Riverside County Flood Control and Water Conservation District Hydrology Manual (HM). Information about the method is included in the appendices. Hydrology maps can be seen in Appendix 7.1.

4. GENERAL HYDROLOGIC CONSIDERATIONS

- The 2 yr, 24 hr precipitation value has been obtained from NOAA website at the location of the project and it is equal to 1.83 inches.
- Soil types have been obtained from the USDA soil survey web site at the project area (Appendix 7.2). The project contains soils type B, C and D. Runoff Index values (RI) have been determined with this information and are also included in the appendices.
- Infiltration losses were calculated using the RI values in pre-development (69. 80 and 85 for a combination of open brush, grass and chaparral) and post-development (56, 69 and 75 for commercial landscaping). A different weighted average of the infiltration value was obtained for different sub-areas based on the percentage of soil B, C and D that each area possesses.

4.1 Short Cut Hydrograph Method

According to the longest waterpath characteristics, an average Manning's coefficient and the existing slope, a lag time was determined (see Appendix 4). Since such lag time is smaller than 5 min in both pre and post development conditions, the Short Cut Hydrograph Method is used (see Appendix 3 for explanation of the Method taken directly from the HM).

The application of the Short Cut Hydrograph Method in existing conditions (Appendix 4) and in post-development conditions (Appendix 5) allows the determination of the hydrographs (and consequently peak flows) for the storms indicated. The unit time is set to 5 minutes for the 3 and 6-hr storm and 15 minutes for the 24-hr event. The unit time step is set equal to the time of concentration (pre and post) for the 1-hr storm.

Table 1 provides a comparison of the tributary area for each POD

TABLE 1 – AREA COMPARISON PER POD

POD	Existing (ac)	Proposed (ac)	Difference (ac)
1	1.24	0.07	-1.17
2	9.97**	11.96**	1.99
3*	9.65	6.21	-3.44
3A	4.03	4.55	0.52
3B	1.61	3.46	1.85
4	12.12	13.82	1.7
5	9.59	7.96	-1.63
Total	**48.22**	**48.22**	**0.00**

*Does not include the area of 3A and 3B.

**This includes the proposed parking lot that will be dedicated to the City (DMA-E) and the area draining to POD-2 that will remain undisturbed. Hence why these areas do not match the area shown on the calculations for the routing portion (but it is reported in the table to verify total area).

As noted, the proposed conditions tributary area to PODs 1, 3, and 5 reduced compared to existing conditions. The land use (i.e. undeveloped) remains the same in both existing and proposed conditions Therefore the flows to the aforementioned PODs are going to be lower in proposed conditions compared to existing conditions. Thus no further analysis is necessary at PODs 1, 3, and 5. Furthermore, DMA-2E consists of a parking lot to be dedicated to the City which will not be analyzed in this study. Any detention or analysis required for this area to be performed by the City.

Table 2 provides a summary of the hydromodification flow rates for both existing and proposed-unmitigated conditions for the PODs that need to be analyzed: 2, 3A, 3B, and 4.

TABLE 2 – EXISTING AND PROPOSED CONDITIONS PEAK FLOWS (cfs) at PODs 2, 3A, 3B, and 4

Condition	2-YR, 24-HR Hydrographs Results			
	2	3A	3B	4
Existing	0.46	0.20	0.08	0.61
Proposed: Post-Unmitigated	2.16	0.98	0.63	2.87
Proposed: Post-Routed*	0.46	0.19	0.06	0.43
Difference: routed - existing	0.00	-0.01	-0.02	-0.18

*: result after Modified Puls and combination of hydrographs

Prior to discharging from the project site, first flush runoff will be treated via four (4) bioretention based BMPs and four (4) Filterra proprietary bioretention BMPs which drain to one (1) combination underground detention system in accordance with standards set forth by the Regional Water Quality Control Board and the County of Riverside's BMP Design Manual (see "Water Quality Management Plan for Butler").

The multi-purpose bioretention basins and combination underground detention plus proprietary bioretention BMPs are located within the project site and are responsible for addressing water quality (including HCOC) and flood control requirements for the project. The Filterra's will not be utilized for detention and all flows entering the Filterras will discharge into the underground detention system for attenuation with an exception for the Filterra of DMA-2E which will discharge directly to POD-2.

In developed conditions, the basins will have a surface depth and a riser spillway structure. Flows will infiltrate through the surface of the facility to the receiving amended soil and French Drain. The riser

structure will act as a spillway such that peak flows can be safely discharged to the receiving natural channel.

Beneath the basin's invert lays the proposed bioretention portion of the drainage facility. This portion of the basin is comprised of a 3-inch layer of mulch, a layer of amended soil (a highly sandy, organic rich composite with an infiltration capacity of at least 5 inches/hr) and a layer of gravel. The basins are to be lined to prevent infiltration into the native soil. Tables 3, 4 and 5 provide a summary of the BMPs and riser structure.

TABLE 3 – SUMMARY OF BMP BASIN DIMENSIONS

BMP	Tributary Area (Ac)	DIMENSIONS			
		BMP Area[(1)] (ft^2)	Gravel Depth (ft)	Amended Soils Depth[(2)] (ft)	Total Basin Depth[(3)] (ft)
2B-1	5.85[(4)]	1,829	1.00	3.00	3.00
2B-2	-	4,352	1.00	3.00	5.00
3A	4.55	6,757	1.00	3.00	4.50
3B	3.46	10,584	1.00	2.00	3.50
4	13.82	15,085	1.00	3.00	6.00

Notes: (1) Area at flat bottom of basin
(2) Includes 3-inch mulch layer
(3) Total surface depth of BMP from top crest elevation to top of mulch
(4) All runoff from DMA-2B is conveyed to Basin-1. Overflows from Basin-1 are conveyed to Basin-2 for additional detention

TABLE 4 – SUMMARY OF OUTLET DETAILS

BMP	Low Orifice		Middle Orifice		Lower Slot		Upper Slot		Top Riser	
	Diam. (in)	H[(1)] (ft)	Diam. (in)	H[(1)] (ft)	B x h (in)	H[(1)] (ft)	B x h (in)	H[(1)] (ft)	L[(2)] (ft)	H[(1)] (ft)
2A	2.125	0.00	0.825	3.00	9 x 3	4.50	N/A	N/A	3.50	7.25
2B-1	0.750	0.00	N/A	N/A	6 x 2	4.50	N/A	N/A	16	6.00
2B-2	1.625	0.00	1.00[(3)]	4.50	0.25 x 0.25	7.00	N/A	N/A	16	8.50
3A	1.67	0.00	0.875	4.50	N/A	N/A	11.5 x 2	6.25	16	8.25
3B	1.125	0.00	1.50	3.50	N/A	N/A	N/A	N/A	12	5.50
4	2.25	0.00	1.75	4.50	24 x 3	7.00	N/A	N/A	12	8.75

Notes: (1): H = Elevation Bottom of gravel layer assumed to be 0.00 ft elevation.
(2): Overflow length is the internal perimeter of the riser structure (3 ft x 3 ft or 4 ft x 4 ft internal dimensions)
(3): There are a total of three (3) orifices.

TABLE 5 – SUMMARY OF UNDERGROUND DETENTION DIMENSIONS

BMP	Tributary Area (Ac)	DIMENSIONS				
		Size	Area[(1)] (ft^2)	Total Depth (ft)	Total Volume (ft^3)	Upstream BMP
2ACD	4.657	4 x 225' Rows[(2)]	11,500	7.50	38,470	Filterra Units[(3)]

Notes:
(1) Area includes the storage tanks and the gravel storage layer below the tanks.
(2) Proposed underground system is Stormtech MC-4500.
(3) Proposed proprietary BMP is a Filterra (Appendix 8). Not used for detention. See WQMP for more information.

4.2 Routing Assumptions

A routing for the hydrographs discharged from the each DMA was applied. The following assumption was made:

- The flow rate below the first surface outlet in the riser structure is equal to the infiltration capacity of the amended soils layer (5in/hr)
- The outflow from the low flow orifice for DMA-2B basin one will be routed to POD-2. Flows through the riser of Basin-1 for DMA-2B became the inflows to Basin-2 for DMA-2B.
- The outflow hydrographs from the proposed underground detention system for DMA-2A and the basins for DMA-2B were all summed at POD-2.

5. POST-DEVELOPMENT RESULTS AND CONCLUSION

Table 2 in previous pages shows the mitigated outflows for the 2 yr-24 hr storm analyzed, including a comparison between the existing and mitigated-proposed conditions outflows. As seen in the table, the 2 yr-24 hr peak flow rate for all analyzed PODs have decreased compared to the pre-developed condition. The remaining three (3) PODs (1, 3 and 5) were not analyzed because the overall contributing area reduced (See Table 1) and no impervious areas were draining to those PODs, which implies a reduction of the peak of the 2yr-24hr storm. Therefore, The proposed BMPs satisfy the conditions needed for hydromodification compliance: all PODs have peaks smaller, or not in excess of 110% of the pre-development peak flow generated by the 2 year – 24 hour storm event.

6. REFERENCES

- Riverside County Hydrology Manual, 1979.

7. APPENDIX LIST

Appendix 7.1:	Maps
Appendix 7.2:	Precipitation and Soil Information:
	NOAA Precipitation; USDA Hydrologic Soil Type
Appendix 7.3:	RCFCWCD-Hydrology Manual:
	RI Tables; RI vs Infiltration Graphics; Short Cut Synthetic Hydrograph Method
Appendix 7.4:	Pre-Development Information:
	Areas, % Impervious; RI, Infiltration; Tlag; Pre-Dev. Hydrograph Results
Appendix 7.5:	Post-Development Information:
	Areas, % Impervious; RI, Infiltration; Tlag; Post-Dev. Hydrograph Results
Appendix 7.6:	Elevation – Volume – Discharge Tables for Modified Puls
Appendix 7.7:	Modified Puls Results

APPENDIX 7.1: MAPS

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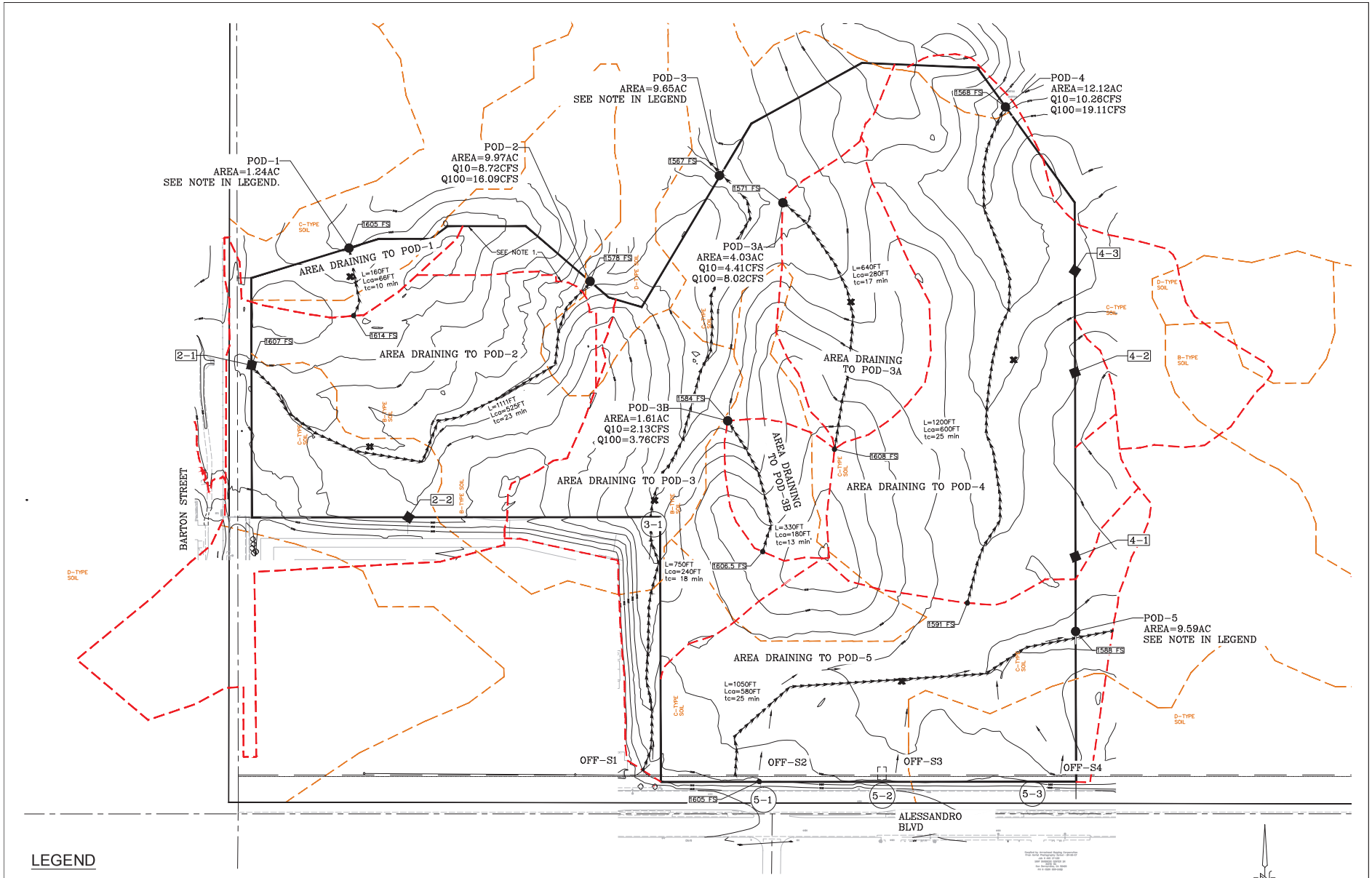


LEGEND

- DMA BOUNDARY
- PROPERTY BOUNDARY
- SOIL BOUNDARY
- FLOW PATH
- CENTROID OF DRAINAGE AREA

X-Y — POINTS WHERE OFF-SITE FLOW WILL DRAIN TO FUTURE DEVELOPMENT. BROW-DITCHES AND/OR PIPES WILL BE DESIGNED TO CONVEY FLOWS DIRECTLY TO POD-"X' BYPASSING RUNOFF FROM POST-DEV AREAS

(X-Y) — OFFSITE RUNOFF TO POD-"X" WILL GO THRU LAND NOT TO BE DEVELOPED. THEREFORE, NO ADDITIONAL CONVEYANCE SYSTEM REQUIRED.

NOTE:

1. THIS AREA DRAINS TO POD-2 BUT HAS NOT BEEN ANALYZED IN THE PRE-DEVELOPED AND POST-DEVELOPED CASES BECAUSE THIS WILL BE A PROPOSED PARKING LOT TO BE DEDICATED TO THE CITY. ANY REQUIRED ANALYSIS OR DETENTION TO BE PERFORMED BY THE CITY.
2. THE FLOWS TO PODS 1,3 AND 5 ARE REDUCED IN THE POST-DEVELOPMENT CONDITIONS, THUS NO FURTHER ANALYSIS IS NECESSARY.
3. THE FLOWS DISPLAYED CORRESPOND TO A RAINFALL OF 1 Hr, SEE REPORT FOR ADDITIONAL INFORMATION.

100 50 0 100 200 300
SCALE: 1" = 100'

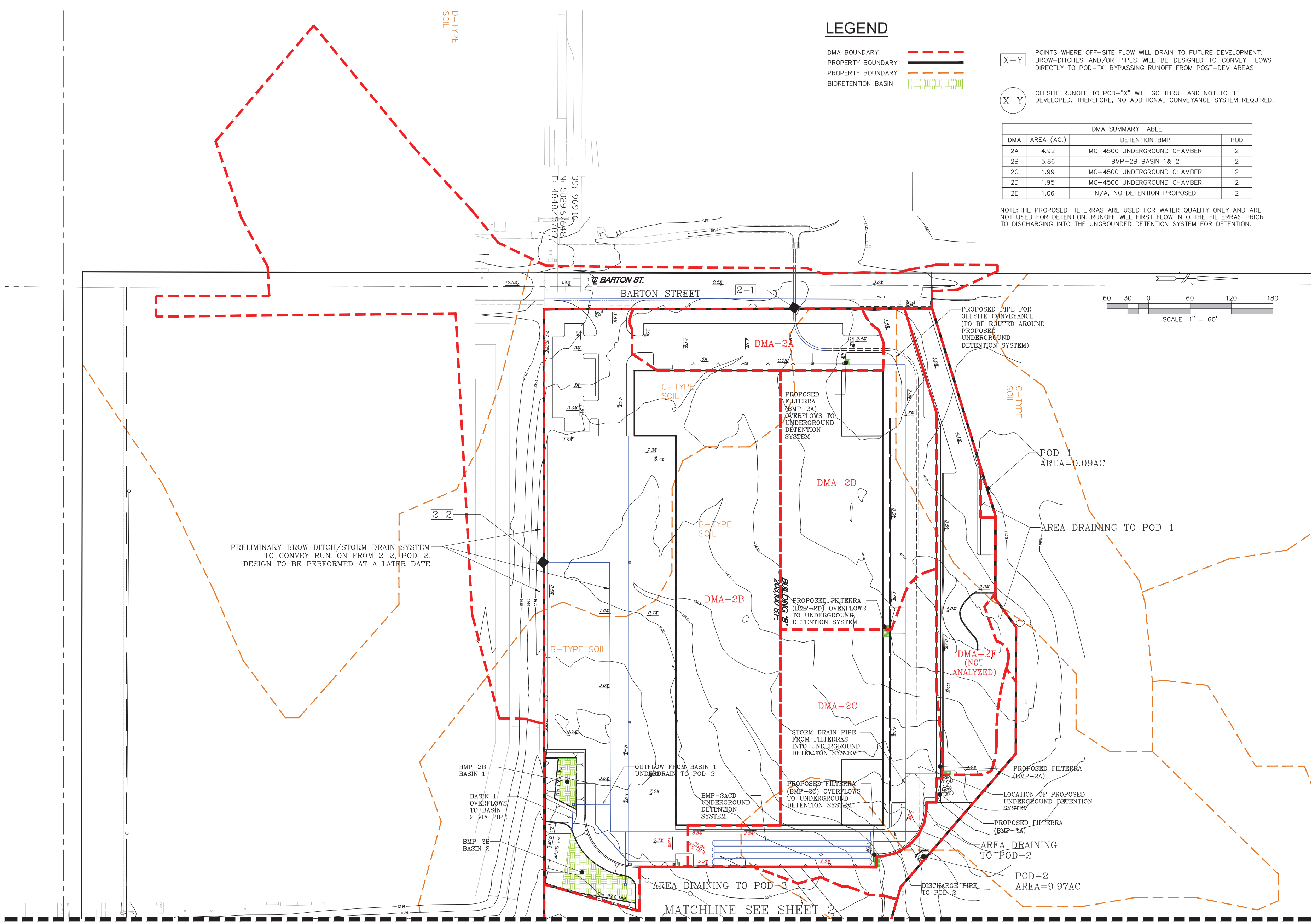
NO.	REVISIONS DESCRIPTION	DATE	APP'D

Civil Engineering • Environmental
Land Surveying
2442 Second Avenue
San Diego, CA 92101
(619)232-9200 (619)232-9210 Fax
RBC Consultants, Inc.

DATE: 10/25/19
SCALE: 1" = 100'
DRAWN:
CHECKED:

SHEET TITLE: Pre-Development Conditions Map
PROJECT: Sycamore Hills Business Center
RIVERSIDE, CA 91111

SHEET 1 OF 1 SHEETS



LEGEND

DMA BOUNDARY	
PROPERTY BOUNDARY	
PROPERTY BOUNDARY	
BIORETENTION BASIN	

X-Y POINTS WHERE OFF-SITE FLOW WILL DRAIN TO FUTURE DEVELOPMENT. BROW-DITCHES AND/OR PIPES WILL BE DESIGNED TO CONVEY FLOWS DIRECTLY TO POD-"X" BYPASSING RUNOFF FROM POST-DEV AREAS

(X-Y) OFFSITE RUNOFF TO POD-"X" WILL GO THRU LAND NOT TO BE DEVELOPED. THEREFORE, NO ADDITIONAL CONVEYANCE SYSTEM REQUIRED.

DMA SUMMARY TABLE

DMA	AREA (AC.)	DETENTION BMP	POD
2A	4.92	MC-4500 UNDERGROUND CHAMBER	2
2B	5.86	BMP-2B BASIN 1& 2	2
2C	1.99	MC-4500 UNDERGROUND CHAMBER	2
2D	1.95	MC-4500 UNDERGROUND CHAMBER	2
2E	1.06	N/A, NO DETENTION PROPOSED	2

NOTE: THE PROPOSED FILTERRAS ARE USED FOR WATER QUALITY ONLY AND ARE NOT USED FOR DETENTION. RUNOFF WILL FIRST FLOW INTO THE FILTERRAS PRIOR TO DISCHARGING INTO THE UNGROUNDED DETENTION SYSTEM FOR DETENTION.

NO.	DESCRIPTION	DATE	APP'D
	REVISIONS		

R·E·C Consultants, Inc.
Civil Engineering·Environmental
Land Surveying
2442 Second Avenue
San Diego, CA 92101
(619)232-9200 (619)232-9210 Fax

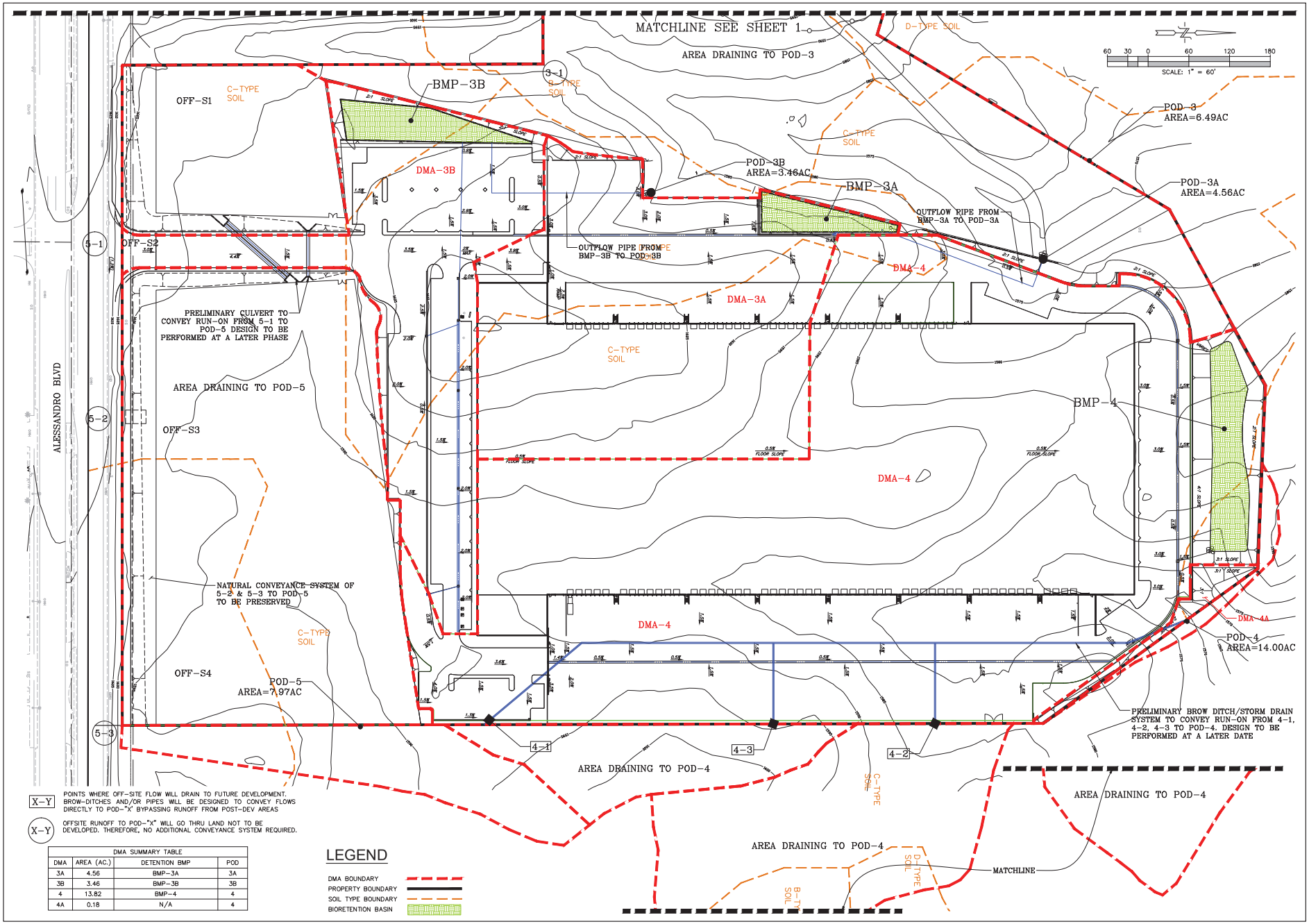
DATE: 11/06/18
SCALE: 1" = 100'
DRAWN:
CHECKED:

SHEET TITLE
PROPOSED HYDROLOGY

PROJECT
JPA-BUTLER
ALESSANDRO AVE. AND BARTON ST.
RIVERSIDE, CA 91111

SHEET 1 OF 2 SHEETS

SAVE DATE: 3/10/2020 ~ PLOT DATE: 3/11/2020 ~ FILE NAME: P:\Acad\1467 SDH-Butler\Reports\Drainage\190626_1467-Drainage.dwg



X-Y POINTS WHERE OFF-SITE FLOW WILL DRAIN TO FUTURE DEVELOPMENT. BROW-DITCHES AND/OR PIPES WILL BE DESIGNED TO CONVEY FLOWS DIRECTLY TO POD-"X" BYPASSING RUNOFF FROM POST-DEV AREAS

X-Y OFFSITE RUNOFF TO POD-"X" WILL GO THRU LAND NOT TO BE DEVELOPED. THEREFORE, NO ADDITIONAL CONVEYANCE SYSTEM REQUIRED.

DMA SUMMARY TABLE

DMA	AREA (AC.)	DETENTION BMP	POD
3A	4.56	BMP-3A	3A
3B	3.46	BMP-3B	3B
4	13.82	BMP-4	4
4A	0.18	N/A	4

LEGEND

DMA BOUNDARY
PROPERTY BOUNDARY
SOIL TYPE BOUNDARY
BIORETENTION BASIN

REVISIONS

NO.	DESCRIPTION	DATE	APP'D

Civil Engineering • Environmental
Land Surveying
2442 Second Avenue
San Diego, CA 92101
(619)232-9200 (619)232-9210 Fax
Consultants, Inc.

DATE: 11/06/18
SCALE: 1" = 60'
DRAWN:
CHECKED:

SHEET TITLE: PROPOSED HYDROLOGY

PROJECT: JPA-BUTLER
ALESSANDRO AVE. AND BARTON ST.
RIVERSIDE, CA 91111

SHEET 2 OF 2 SHEETS

SAVE DATE: 3/10/2020 ~ PLOT DATE: 3/10/2020 ~ FILE NAME: P:\Work\1467 SDH-Butler\Reports\Drainage\100606_1467-Drainage.dwg

APPENDIX 7.2: PRECIPITATION AND SOIL INFORMATION

- **NOAA PRECIPITATION**
- **USDA HYDROLOGIC SOIL TYPE**

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NOAA Atlas 14, Volume 6, Version 2
Location name: Riverside, California, USA*
Latitude: 33.921°, Longitude: -117.3051°
Elevation: 1585.04 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.089** (0.074-0.108)	**0.118** (0.099-0.143)	**0.158** (0.131-0.192)	**0.191** (0.158-0.235)	**0.239** (0.190-0.303)	**0.277** (0.216-0.359)	**0.317** (0.241-0.422)	**0.361** (0.266-0.494)	**0.422** (0.298-0.604)	**0.472** (0.322-0.700)
10-min	**0.128** (0.107-0.155)	**0.170** (0.141-0.205)	**0.226** (0.188-0.275)	**0.274** (0.226-0.336)	**0.343** (0.273-0.435)	**0.397** (0.309-0.515)	**0.455** (0.346-0.605)	**0.517** (0.381-0.708)	**0.605** (0.428-0.865)	**0.677** (0.462-1.00)
15-min	**0.155** (0.129-0.187)	**0.205** (0.171-0.248)	**0.274** (0.228-0.333)	**0.332** (0.274-0.407)	**0.414** (0.330-0.525)	**0.480** (0.374-0.623)	**0.550** (0.418-0.732)	**0.625** (0.461-0.856)	**0.732** (0.517-1.05)	**0.819** (0.558-1.21)
30-min	**0.234** (0.195-0.283)	**0.310** (0.258-0.375)	**0.414** (0.344-0.503)	**0.502** (0.414-0.615)	**0.626** (0.499-0.794)	**0.726** (0.566-0.942)	**0.832** (0.632-1.11)	**0.945** (0.697-1.29)	**1.11** (0.782-1.58)	**1.24** (0.844-1.84)
60-min	**0.336** (0.280-0.406)	**0.445** (0.371-0.539)	**0.594** (0.494-0.722)	**0.721** (0.594-0.883)	**0.900** (0.716-1.14)	**1.04** (0.813-1.35)	**1.20** (0.908-1.59)	**1.36** (1.00-1.86)	**1.59** (1.12-2.27)	**1.78** (1.21-2.64)
2-hr	**0.487** (0.406-0.589)	**0.631** (0.526-0.764)	**0.823** (0.684-1.00)	**0.983** (0.810-1.20)	**1.21** (0.959-1.53)	**1.38** (1.08-1.79)	**1.56** (1.19-2.08)	**1.75** (1.29-2.40)	**2.02** (1.42-2.88)	**2.23** (1.52-3.30)
3-hr	**0.594** (0.496-0.718)	**0.763** (0.637-0.925)	**0.989** (0.822-1.20)	**1.18** (0.969-1.44)	**1.43** (1.14-1.82)	**1.63** (1.27-2.12)	**1.84** (1.40-2.44)	**2.05** (1.51-2.81)	**2.35** (1.66-3.36)	**2.58** (1.76-3.83)
6-hr	**0.817** (0.682-0.988)	**1.05** (0.872-1.27)	**1.35** (1.12-1.64)	**1.60** (1.32-1.95)	**1.93** (1.54-2.45)	**2.19** (1.71-2.84)	**2.46** (1.87-3.27)	**2.73** (2.02-3.75)	**3.11** (2.20-4.45)	**3.41** (2.32-5.05)
12-hr	**1.06** (0.888-1.29)	**1.37** (1.15-1.66)	**1.78** (1.48-2.16)	**2.11** (1.74-2.59)	**2.56** (2.04-3.25)	**2.91** (2.27-3.77)	**3.26** (2.48-4.34)	**3.63** (2.68-4.97)	**4.13** (2.92-5.91)	**4.52** (3.08-6.70)
24-hr	**1.40** (1.24-1.62)	**1.84** (1.63-2.12)	**2.41** (2.12-2.79)	**2.88** (2.52-3.36)	**3.52** (2.98-4.24)	**4.01** (3.33-4.94)	**4.52** (3.66-5.69)	**5.04** (3.97-6.53)	**5.76** (4.36-7.76)	**6.31** (4.62-8.80)
2-day	**1.69** (1.50-1.95)	**2.25** (1.99-2.60)	**3.00** (2.64-3.47)	**3.60** (3.15-4.21)	**4.44** (3.76-5.35)	**5.09** (4.22-6.26)	**5.75** (4.66-7.24)	**6.44** (5.07-8.33)	**7.38** (5.58-9.94)	**8.11** (5.94-11.3)
3-day	**1.82** (1.61-2.10)	**2.45** (2.17-2.83)	**3.29** (2.90-3.81)	**3.98** (3.48-4.65)	**4.93** (4.18-5.95)	**5.67** (4.71-6.98)	**6.43** (5.21-8.10)	**7.22** (5.70-9.35)	**8.31** (6.29-11.2)	**9.16** (6.71-12.8)
4-day	**1.97** (1.74-2.27)	**2.67** (2.36-3.09)	**3.62** (3.19-4.18)	**4.39** (3.84-5.13)	**5.46** (4.63-6.58)	**6.30** (5.23-7.75)	**7.16** (5.80-9.02)	**8.05** (6.35-10.4)	**9.28** (7.03-12.5)	**10.3** (7.51-14.3)
7-day	**2.24** (1.98-2.58)	**3.09** (2.73-3.57)	**4.22** (3.72-4.89)	**5.16** (4.51-6.02)	**6.46** (5.47-7.78)	**7.47** (6.20-9.19)	**8.52** (6.91-10.7)	**9.62** (7.59-12.5)	**11.1** (8.43-15.0)	**12.3** (9.03-17.2)
10-day	**2.41** (2.13-2.78)	**3.35** (2.96-3.87)	**4.61** (4.06-5.33)	**5.65** (4.94-6.60)	**7.10** (6.02-8.56)	**8.25** (6.84-10.1)	**9.43** (7.64-11.9)	**10.7** (8.41-13.8)	**12.4** (9.38-16.7)	**13.8** (10.1-19.2)
20-day	**2.89** (2.56-3.34)	**4.06** (3.59-4.69)	**5.64** (4.97-6.53)	**6.97** (6.10-8.13)	**8.83** (7.48-10.6)	**10.3** (8.56-12.7)	**11.9** (9.61-14.9)	**13.5** (10.6-17.5)	**15.8** (12.0-21.3)	**17.6** (12.9-24.6)
30-day	**3.44** (3.04-3.97)	**4.82** (4.26-5.57)	**6.71** (5.92-7.77)	**8.31** (7.26-9.69)	**10.6** (8.95-12.7)	**12.4** (10.3-15.2)	**14.3** (11.6-18.0)	**16.3** (12.9-21.1)	**19.2** (14.5-25.9)	**21.5** (15.7-30.0)
45-day	**4.09** (3.62-4.72)	**5.69** (5.03-6.57)	**7.88** (6.95-9.12)	**9.75** (8.53-11.4)	**12.4** (10.5-15.0)	**14.6** (12.1-17.9)	**16.9** (13.7-21.3)	**19.4** (15.3-25.1)	**22.9** (17.3-30.8)	**25.7** (18.8-35.9)
60-day	**4.76** (4.21-5.49)	**6.54** (5.78-7.55)	**8.99** (7.93-10.4)	**11.1** (9.71-13.0)	**14.1** (12.0-17.0)	**16.6** (13.8-20.4)	**19.2** (15.6-24.2)	**22.1** (17.4-28.6)	**26.2** (19.8-35.3)	**29.5** (21.6-41.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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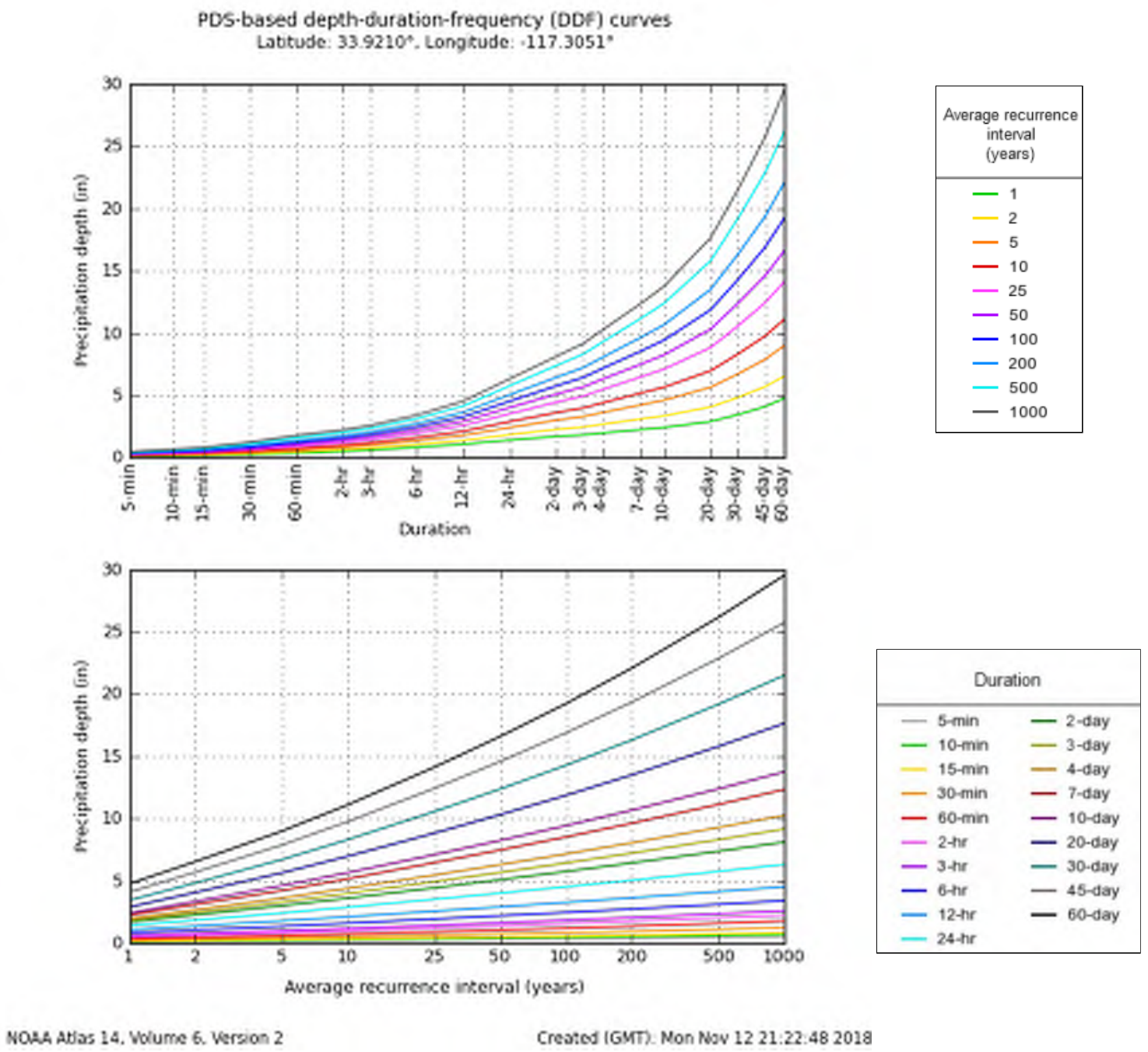
PF graphical



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Created (GMT): Mon Nov 12 21:22:48 2018

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Maps & aerials

Small scale terrain

Large scale terrain

Large scale map

Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

11/12/2018 Precipitation Frequency Data Server

NOAA Atlas 14, Volume 6, Version 2
Location name: Riverside, California, USA*
Latitude: 33.921°, Longitude: -117.3051°
Elevation: 1585.04 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.089 (0.074-0.108)	0.118 (0.099-0.143)	0.158 (0.131-0.192)	0.191 (0.158-0.235)	0.239 (0.190-0.303)	0.277 (0.216-0.359)	0.317 (0.241-0.422)	0.361 (0.266-0.494)	0.422 (0.298-0.604)	0.472 (0.322-0.700)
10-min	0.128 (0.107-0.155)	0.170 (0.141-0.205)	0.226 (0.188-0.275)	0.274 (0.226-0.338)	0.343 (0.273-0.435)	0.397 (0.309-0.515)	0.455 (0.346-0.605)	0.517 (0.381-0.708)	0.605 (0.428-0.865)	0.677 (0.462-1.00)
15-min	0.155 (0.129-0.187)	0.205 (0.171-0.248)	0.274 (0.228-0.333)	0.332 (0.274-0.407)	0.414 (0.330-0.525)	0.480 (0.374-0.623)	0.550 (0.418-0.732)	0.625 (0.461-0.856)	0.732 (0.517-1.05)	0.819 (0.558-1.21)
30-min	0.234 (0.195-0.283)	0.310 (0.258-0.375)	0.414 (0.344-0.503)	0.502 (0.414-0.615)	0.626 (0.499-0.794)	0.726 (0.566-0.942)	0.832 (0.632-1.11)	0.945 (0.697-1.29)	1.11 (0.782-1.58)	1.24 (0.844-1.84)
60-min	0.336 (0.280-0.406)	0.445 (0.371-0.539)	0.594 (0.494-0.722)	0.721 (0.594-0.883)	0.900 (0.716-1.14)	1.04 (0.813-1.35)	1.20 (0.908-1.59)	1.36 (1.00-1.86)	1.59 (1.12-2.27)	1.78 (1.21-2.64)
2-hr	0.487 (0.406-0.589)	0.631 (0.526-0.764)	0.823 (0.684-1.00)	0.983 (0.810-1.20)	1.21 (0.959-1.53)	1.38 (1.08-1.79)	1.56 (1.19-2.06)	1.75 (1.29-2.40)	2.02 (1.42-2.88)	2.23 (1.52-3.30)
3-hr	0.594 (0.496-0.718)	0.763 (0.637-0.925)	0.989 (0.822-1.20)	1.18 (0.969-1.44)	1.43 (1.14-1.82)	1.63 (1.27-2.12)	1.84 (1.40-2.44)	2.05 (1.51-2.81)	2.35 (1.66-3.36)	2.58 (1.76-3.83)
6-hr	0.817 (0.682-0.988)	1.05 (0.872-1.27)	1.35 (1.12-1.64)	1.60 (1.32-1.95)	1.93 (1.54-2.45)	2.19 (1.71-2.84)	2.46 (1.87-3.27)	2.73 (2.02-3.75)	3.11 (2.20-4.45)	3.41 (2.32-5.05)
12-hr	1.06 (0.888-1.29)	1.37 (1.15-1.66)	1.78 (1.48-2.16)	2.11 (1.74-2.59)	2.56 (2.04-3.25)	2.91 (2.27-3.77)	3.26 (2.48-4.34)	3.63 (2.68-4.97)	4.13 (2.92-5.91)	4.52 (3.08-6.70)
24-hr	1.40 (1.24-1.62)	1.84 (1.63-2.12)	2.41 (2.12-2.79)	2.88 (2.52-3.36)	3.52 (2.98-4.24)	4.01 (3.33-4.94)	4.52 (3.66-5.69)	5.04 (3.97-6.53)	5.76 (4.36-7.76)	6.31 (4.62-8.80)
2-day	1.69 (1.50-1.95)	2.25 (1.99-2.60)	3.00 (2.64-3.47)	3.60 (3.15-4.21)	4.44 (3.76-5.35)	5.09 (4.22-6.26)	5.75 (4.66-7.24)	6.44 (5.07-8.33)	7.38 (5.58-9.94)	8.11 (5.94-11.3)
3-day	1.82 (1.61-2.10)	2.45 (2.17-2.83)	3.29 (2.90-3.81)	3.98 (3.48-4.65)	4.93 (4.18-5.95)	5.67 (4.71-6.98)	6.43 (5.21-8.10)	7.22 (5.70-9.35)	8.31 (6.29-11.2)	9.16 (6.71-12.8)
4-day	1.97 (1.74-2.27)	2.67 (2.36-3.09)	3.62 (3.19-4.18)	4.39 (3.84-5.13)	5.46 (4.63-6.58)	6.30 (5.23-7.75)	7.16 (5.80-9.02)	8.05 (6.35-10.4)	9.28 (7.03-12.5)	10.3 (7.51-14.3)
7-day	2.24 (1.98-2.58)	3.09 (2.73-3.57)	4.22 (3.72-4.89)	5.16 (4.51-6.02)	6.46 (5.47-7.76)	7.47 (6.20-9.19)	8.52 (6.91-10.7)	9.62 (7.59-12.5)	11.1 (8.43-15.0)	12.3 (9.03-17.2)
10-day	2.41 (2.13-2.78)	3.35 (2.96-3.87)	4.61 (4.06-5.33)	5.65 (4.94-6.60)	7.10 (6.02-8.56)	8.25 (6.84-10.1)	9.43 (7.64-11.9)	10.7 (8.41-13.8)	12.4 (9.38-16.7)	13.8 (10.1-19.2)
20-day	2.89 (2.56-3.34)	4.06 (3.59-4.69)	5.64 (4.97-6.53)	6.97 (6.10-8.13)	8.83 (7.48-10.6)	10.3 (8.56-12.7)	11.9 (9.61-14.9)	13.5 (10.6-17.5)	15.8 (12.0-21.3)	17.6 (12.9-24.6)
30-day	3.44 (3.04-3.97)	4.82 (4.26-5.57)	6.71 (5.92-7.77)	8.31 (7.26-9.69)	10.6 (8.95-12.7)	12.4 (10.3-15.2)	14.3 (11.6-18.0)	16.3 (12.9-21.1)	19.2 (14.5-25.9)	21.5 (15.7-30.0)
45-day	4.09 (3.62-4.72)	5.69 (5.03-6.57)	7.88 (6.95-9.12)	9.75 (8.53-11.4)	12.4 (10.5-15.0)	14.6 (12.1-17.9)	16.9 (13.7-21.3)	19.4 (15.3-25.1)	22.9 (17.3-30.8)	25.7 (18.8-35.9)
60-day	4.76 (4.21-5.49)	6.54 (5.78-7.55)	8.99 (7.93-10.4)	11.1 (9.71-13.0)	14.1 (12.0-17.0)	16.6 (13.8-20.4)	19.2 (15.6-24.2)	22.1 (17.4-28.6)	26.2 (19.8-35.3)	29.5 (21.6-41.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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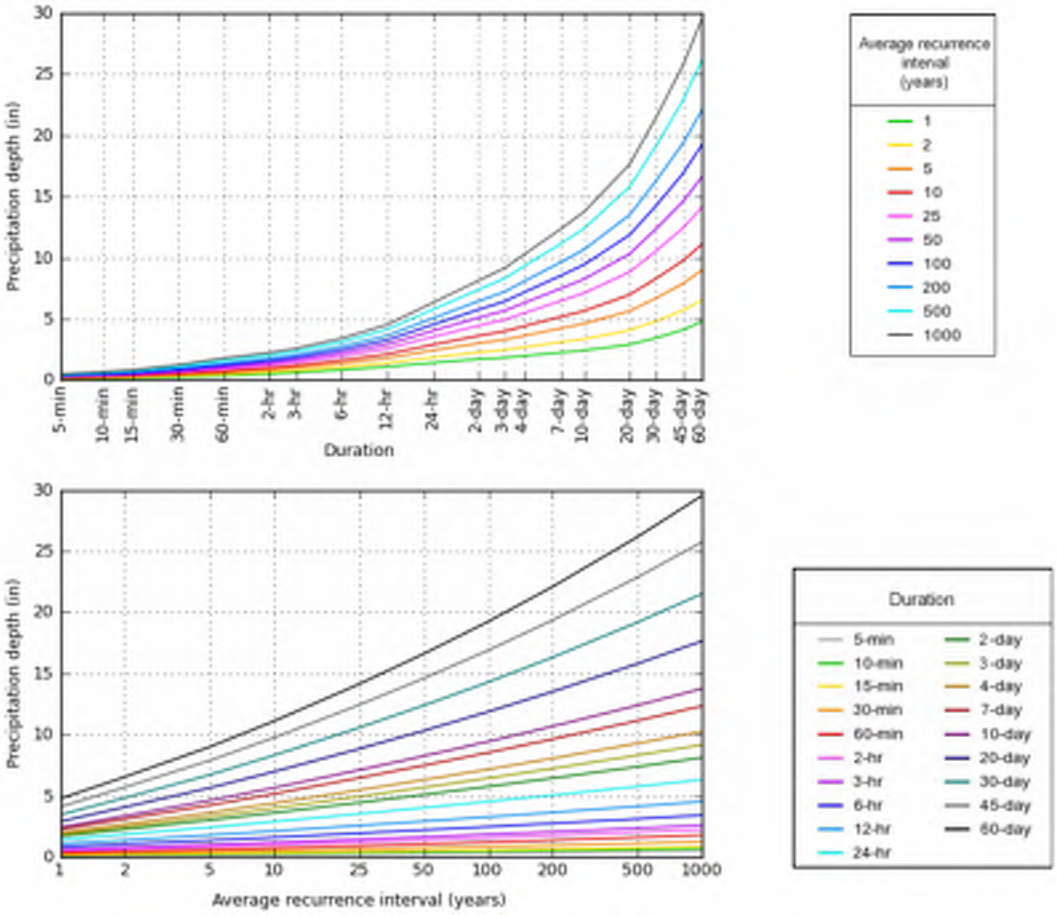
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.9210°, Longitude: -117.3051°



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Maps & aerials

Small scale terrain

Large scale terrain

Large scale map

Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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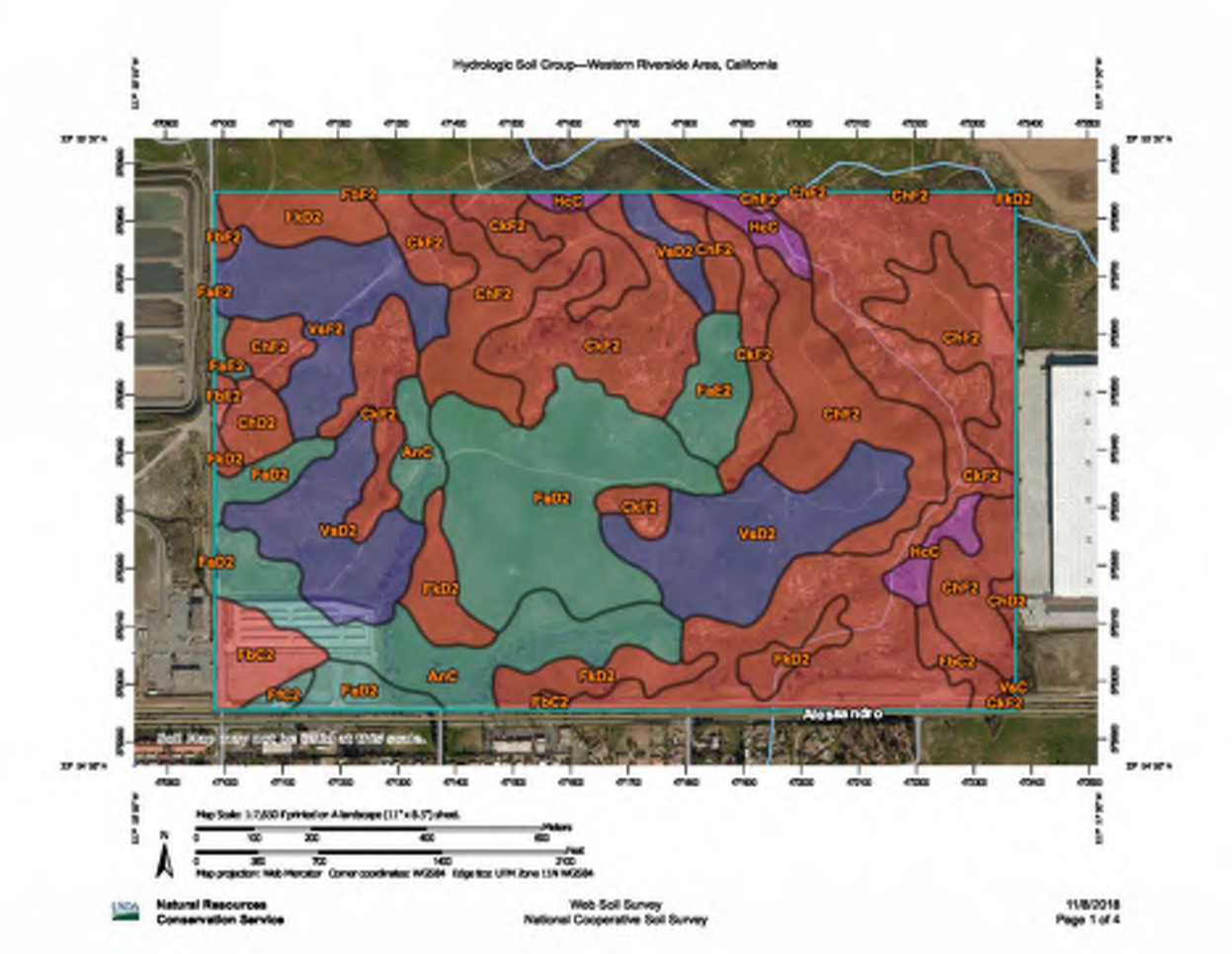
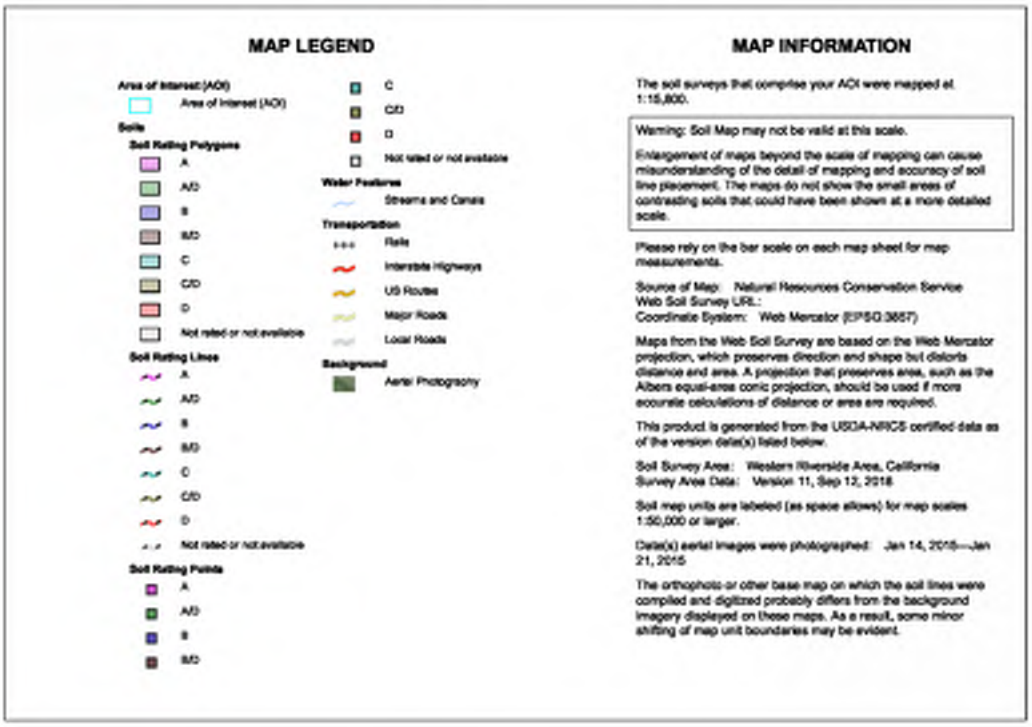

Hydrologic Soil Group—Western Riverside Area, California
Alessandro
Natural Resources Conservation Service
Web Soil Survey
National Cooperative Soil Survey
11/8/2018
Page 1 of 4

Hydrologic Soil Group—Western Riverside Area, California



Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AnC	Arlington fine sandy loam, 2 to 8 percent slopes	C	23.3	7.5%
ChD2	Cienebe sandy loam, 8 to 15 percent slopes, eroded	D	4.1	1.3%
ChF2	Cienebe sandy loam, 15 to 50 percent slopes, eroded	D	56.4	18.2%
CkF2	Cienebe rocky sandy loam, 15 to 50 percent slopes, eroded	D	89.0	28.8%
FaD2	Fallbrook sandy loam, 8 to 15 percent slopes, eroded	C	38.6	12.5%
FaE2	Fallbrook sandy loam, 15 to 25 percent slopes, eroded	C	7.1	2.3%
FbC2	Fallbrook sandy loam, shallow, 5 to 8 percent slopes, eroded	D	8.9	2.9%
FbF2	Fallbrook sandy loam, shallow, 15 to 35 percent slopes, eroded	D	1.3	0.4%
FfC2	Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded	C	1.1	0.3%
FkD2	Fallbrook fine sandy loam, shallow, 8 to 15 percent slopes, eroded	D	19.0	6.1%
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes	A	6.4	2.1%
VsC	Vista coarse sandy loam, 2 to 8 percent slopes	B	0.1	0.0%
VsD2	Vista coarse sandy loam, 8 to 15 percent slopes, eroded	B	37.3	12.1%
VsF2	Vista coarse sandy loam, 15 to 35 percent slopes, eroded	B	16.6	5.4%
Totals for Area of Interest			**309.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX 7.3: RCFCWCD-HYDROLOGY MANUAL

- **RUNOFF INDEX TABLES**
- **RI VS. INFILTRATION GRAPHIC**
- **SHORT CUT SYNTHETIC HYDROGRAPH METHOD**

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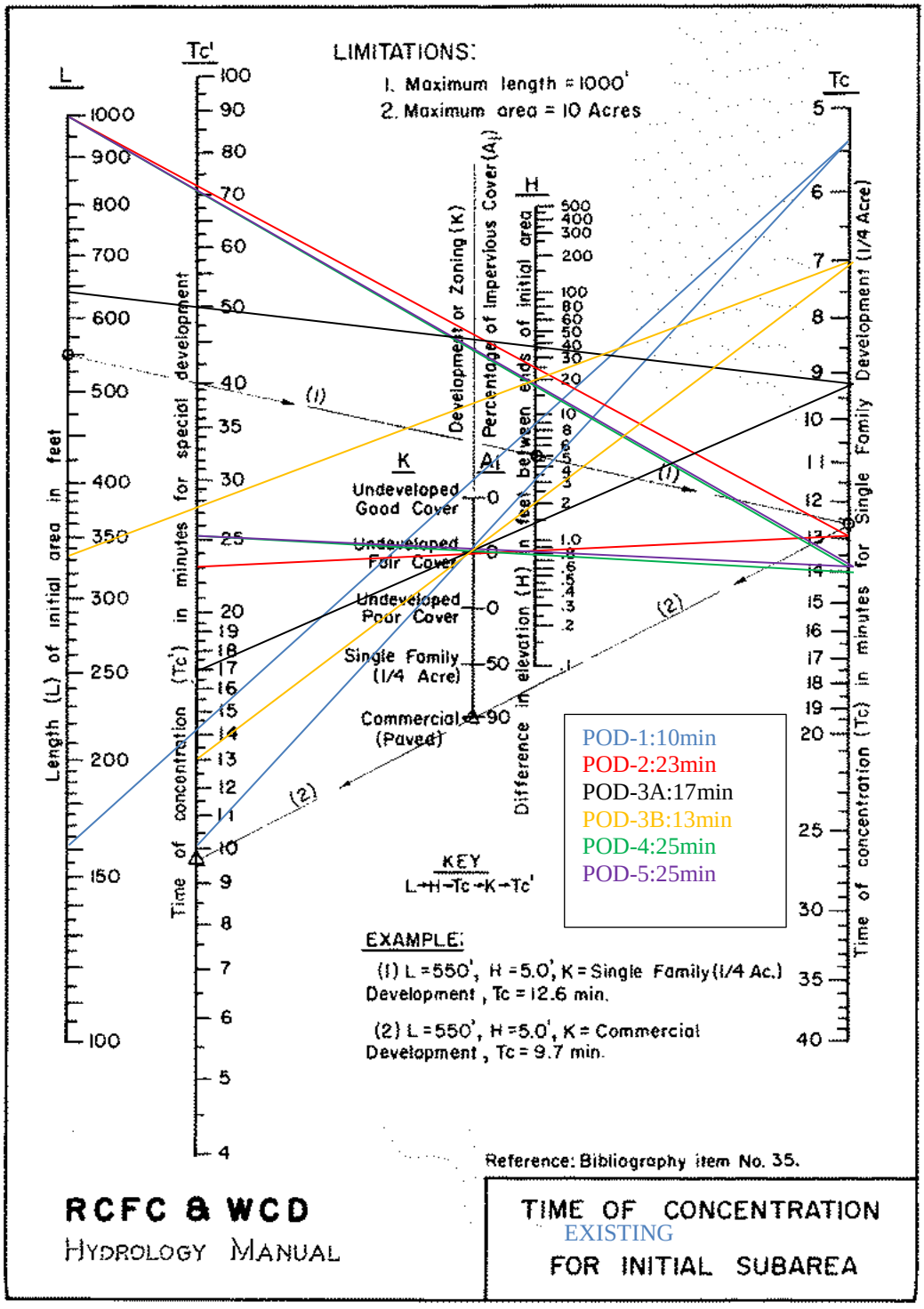
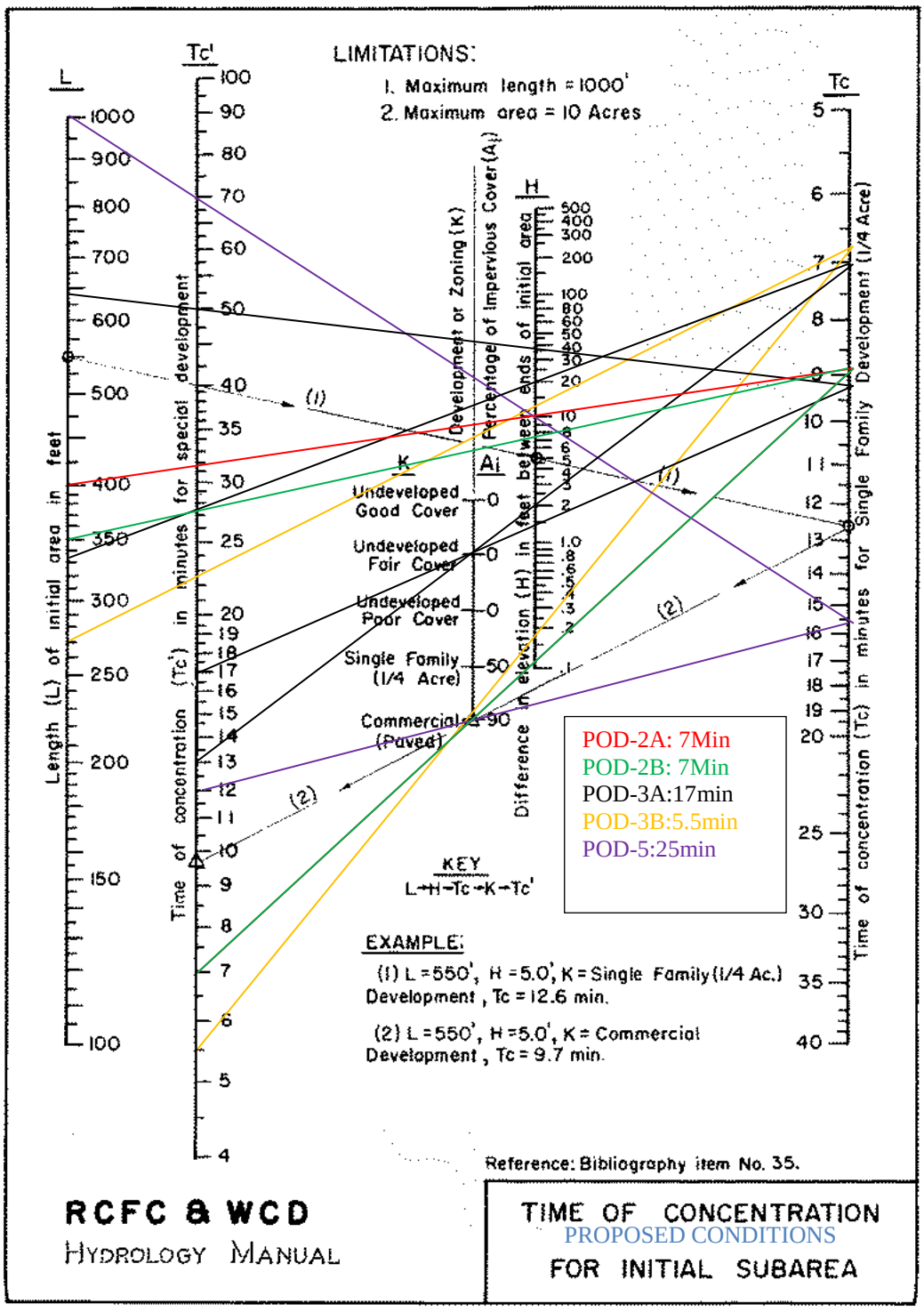

LIMITATIONS:
1. Maximum length = 1000'
2. Maximum area = 10 Acres
L
Tc'
Tc
H
K
Ai
Length (L) of initial area in feet
Time of concentration (Tc') in minutes for special development
Development or Zoning (K)
Percentage of Impervious Cover (Ai)
Difference in elevation (H) in feet between ends of initial area
Time of concentration (Tc) in minutes for Single Family Development (1/4 Acre)
Undeveloped Good Cover
Undeveloped Fair Cover
Undeveloped Poor Cover
Single Family (1/4 Acre)
Commercial (Paved)
(1)
(2)
KEY
L→H→Tc→K→Tc'
EXAMPLE:
(1) L = 550', H = 5.0', K = Single Family (1/4 Ac.) Development, Tc = 12.6 min.
(2) L = 550', H = 5.0', K = Commercial Development, Tc = 9.7 min.
POD-1:10min
POD-2:23min
POD-3A:17min
POD-3B:13min
POD-4:25min
POD-5:25min
Reference: Bibliography item No. 35.
RCFC & WCD
HYDROLOGY MANUAL
TIME OF CONCENTRATION
EXISTING
FOR INITIAL SUBAREA
PLATE D-3


LIMITATIONS:
1. Maximum length = 1000'
2. Maximum area = 10 Acres
L
Tc'
Tc
Length (L) of initial area in feet
Time of concentration (Tc') in minutes for special development
Time of concentration (Tc) in minutes for Single Family Development (1/4 Acre)
Development or Zoning (K)
Percentage of Impervious Cover (Ai)
H
Ai
K
Undeveloped Good Cover
Undeveloped Fair Cover
Undeveloped Poor Cover
Single Family (1/4 Acre)
Commercial (Paved)
Difference in elevation (H) in feet between ends of initial area
(1)
(2)
KEY
L-H-Tc-K-Tc'
EXAMPLE:
(1) L = 550', H = 5.0', K = Single Family (1/4 Ac.) Development, Tc = 12.6 min.
(2) L = 550', H = 5.0', K = Commercial Development, Tc = 9.7 min.
POD-2A: 7Min
POD-2B: 7Min
POD-3A:17min
POD-3B:5.5min
POD-5:25min
Reference: Bibliography item No. 35.
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HYDROLOGY MANUAL
TIME OF CONCENTRATION
PROPOSED CONDITIONS
FOR INITIAL SUBAREA

PLATE D-3

District analysis of all available recording rain gauge records in and near the District. This material is also discussed in Section B of this manual.

Coefficient of Runoff Curves - The coefficient of runoff is intended to account for the many factors which influence peak flow rate. The co-efficient depends on the rainfall intensity, soil type and cover, percentage of impervious area, antecedent moisture condition, etc. To account for the difference between actual and effective impervious area it is assumed the maximum runoff rate which can occur from impervious surfaces is 90-percent of the rainfall rate. The runoff from pervious surfaces is further reduced by infiltration. Runoff coefficient curves can be developed using the relationship:

$$C = 0.9\left[A_i + \frac{I - F_p}{I} A_p\right]$$

where:

C = Runoff coefficient

I = Rainfall intensity - inches/hour

F_p = Infiltration rate for pervious areas - inches/hour

A_i = Impervious area (actual) - decimal percent

A_p = Pervious area (actual) - decimal percent

and $A_p = 1.00 - A_i$

The infiltration rate for pervious areas, "F_p", can be estimated using the methods discussed in Section C of this manual for various combinations of soil type, cover type and antecedent moisture condition (AMC). In practice it is not necessary for the engineer to make these computations, as runoff coefficient curve data has been tabulated by the District on Plate D-5.7 for the working range of runoff index (RI) numbers. Runoff coefficient curves can be developed for any combination of conditions by simply plotting the data from Plate D-5.7 on Plate D-5.8.

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

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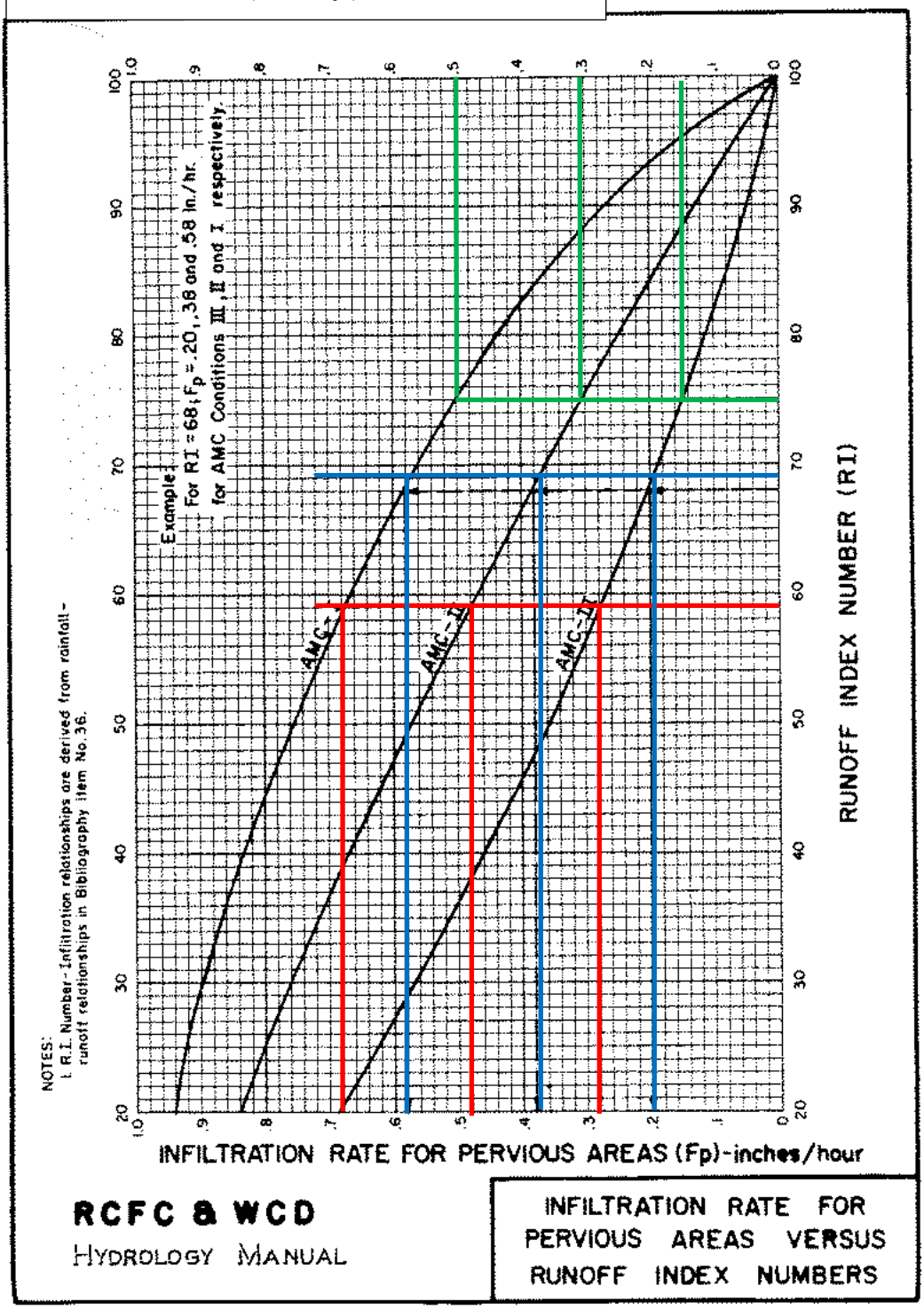
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

PLATE E-6.1 (1 of 2)

COMPOSITE AMC-I (2&5yr): 0.50
COMPOSITE AMC-II (10&100yr): 0.30



INSTRUCTIONS FOR SHORT CUT SYNTHETIC HYDROGRAPH HYDROLOGY CALCULATIONS

1. Determine drainage area and lag time. Use Steps A-1 through A-3 on Plate E-1.1.

2. Determine that the area is suitable for development of a Short Cut hydrograph, i.e., the area is no more than 100 to 200-acres in size, and lag time is less than 7 to 8-minutes.

3. Select a suitable unit time equal to from 100 to 200-percent of lag. Normally, 5 to 10-minutes for 3 and 6-hour storms, and 15-minutes for 24-hour storms will be adequate.

4. Compute effective rainfall rates using steps B-1 through B-6 on Plate E-1.1.

5. Compute flood hydrograph ordinates for each unit time period by multiplying the effective rainfall rate (inches per hour) times the drainage area in acres. The resultant values are discharge in cfs.

6. The three hour storm peak discharge should normally compare well with rational peaks. If adjustments are necessary, use a shorter unit time period to raise the peak, and a longer unit time period to lower them.

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HYDROLOGY MANUAL

SHORTCUT SYNTHETIC HYDROGRAPH METHOD INSTRUCTIONS

PLATE E-1.2

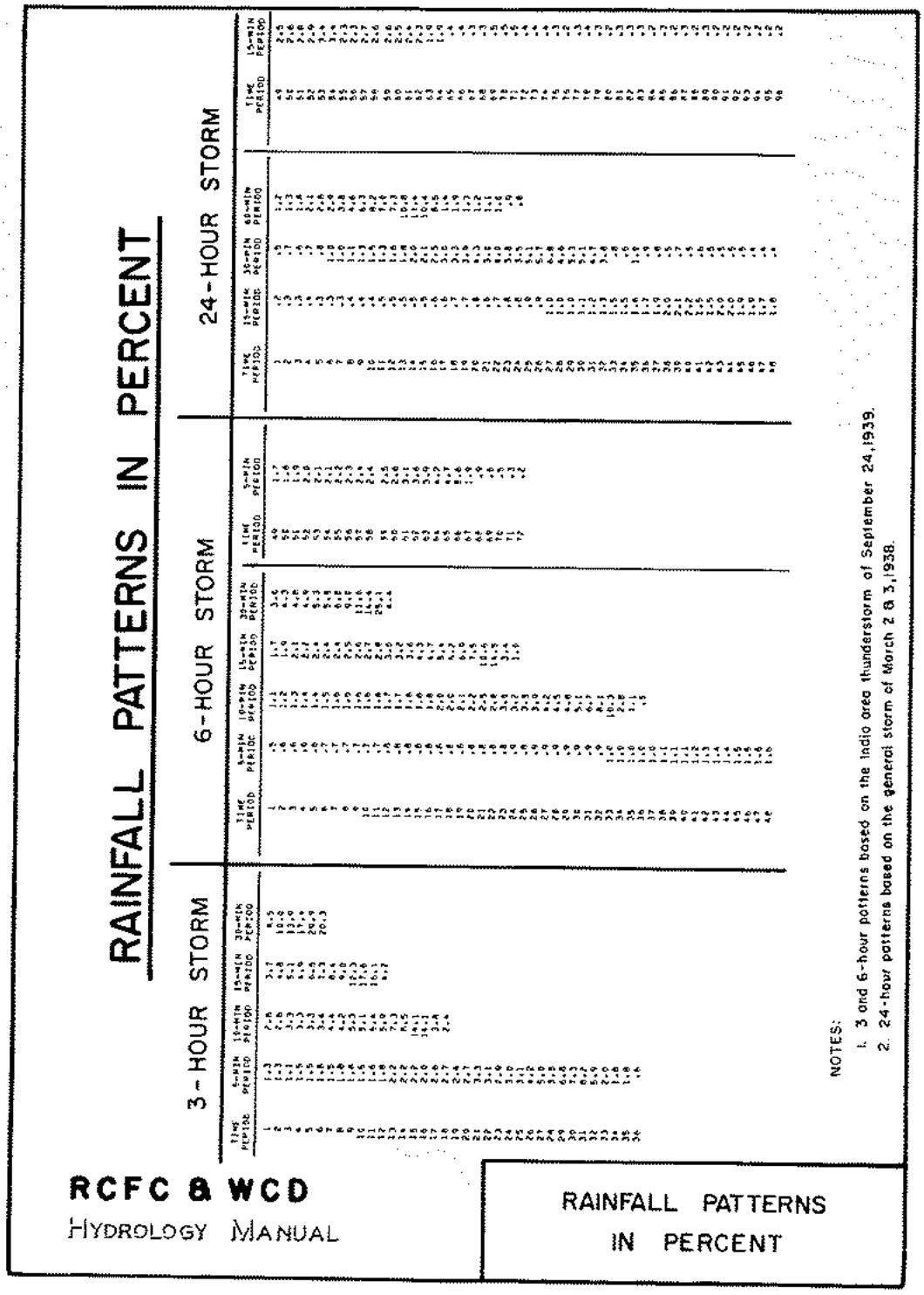
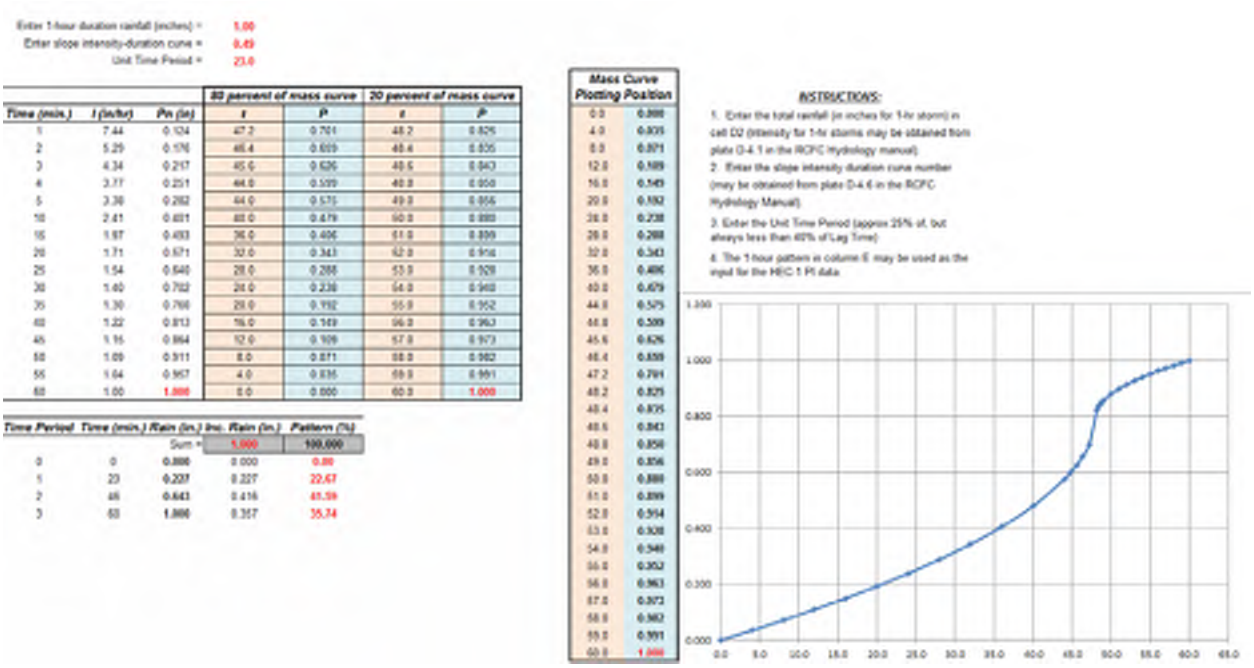
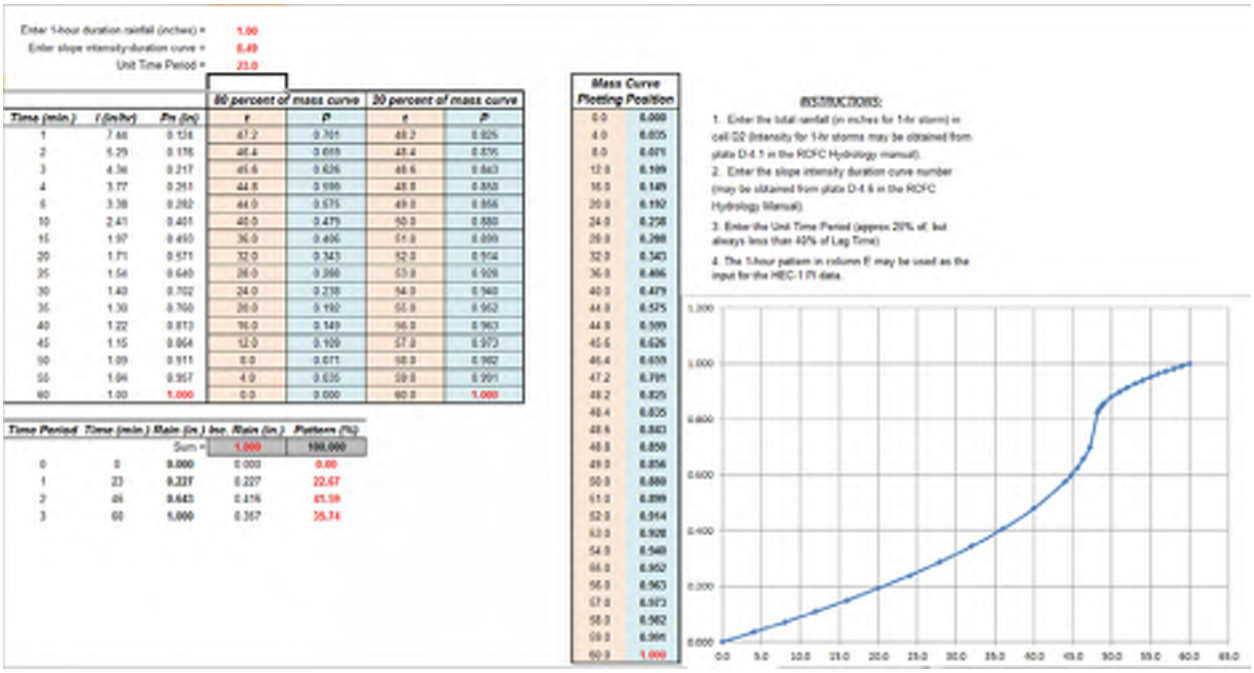

RAINFALL PATTERNS IN PERCENT
3-HOUR STORM
6-HOUR STORM
24-HOUR STORM
NOTES:
1. 3 and 6-hour patterns based on the Indio area thunderstorm of September 24, 1939.
2. 24-hour patterns based on the general storm of March 2 & 3, 1938.
RCFC & WCD
HYDROLOGY MANUAL
RAINFALL PATTERNS IN PERCENT

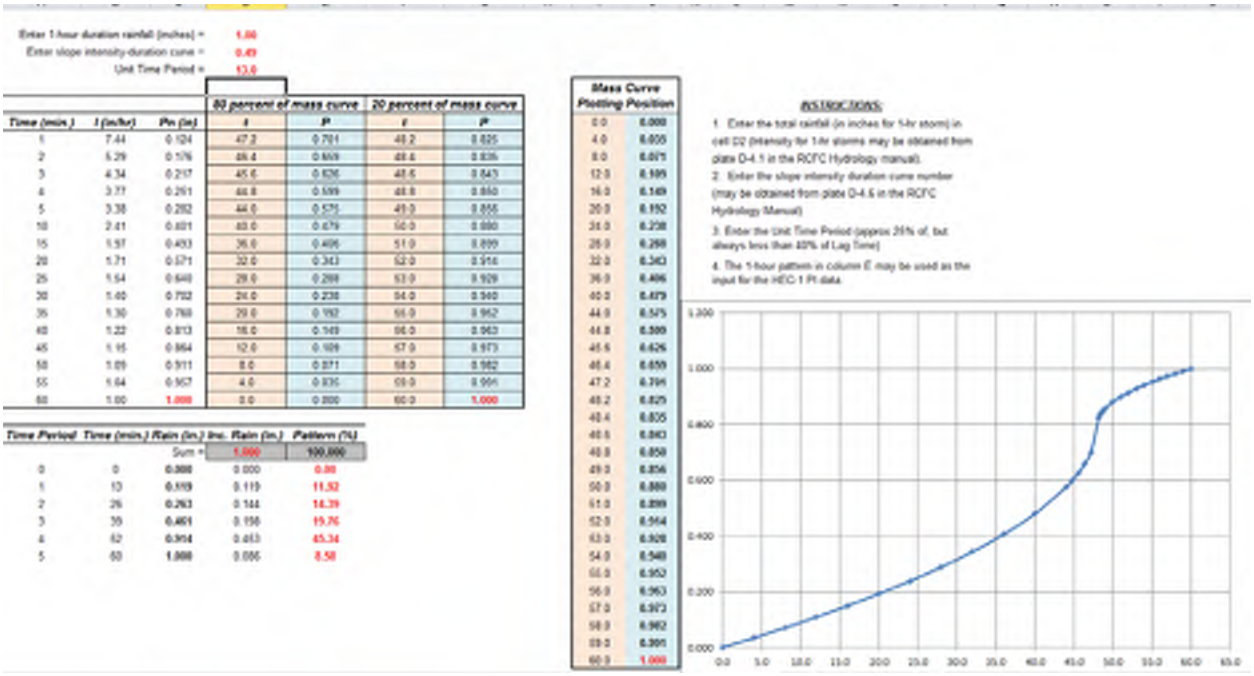
PLATE E-5.9



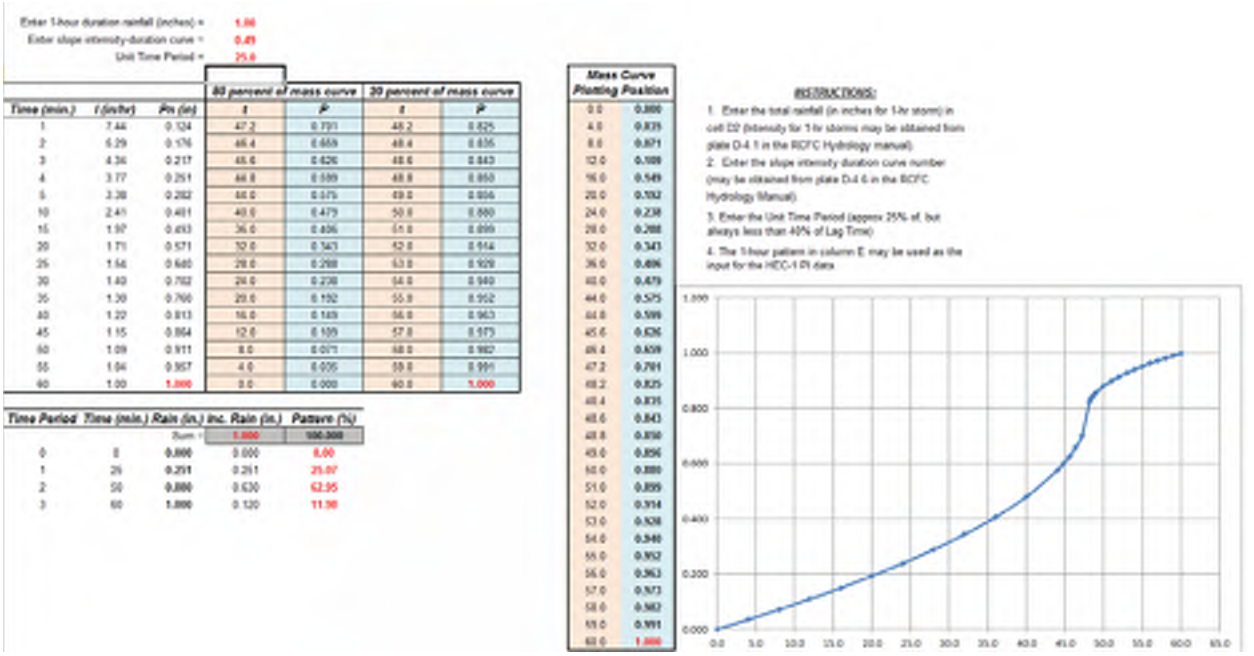
Credit: Riverside County Flood Control and Water Conservation District



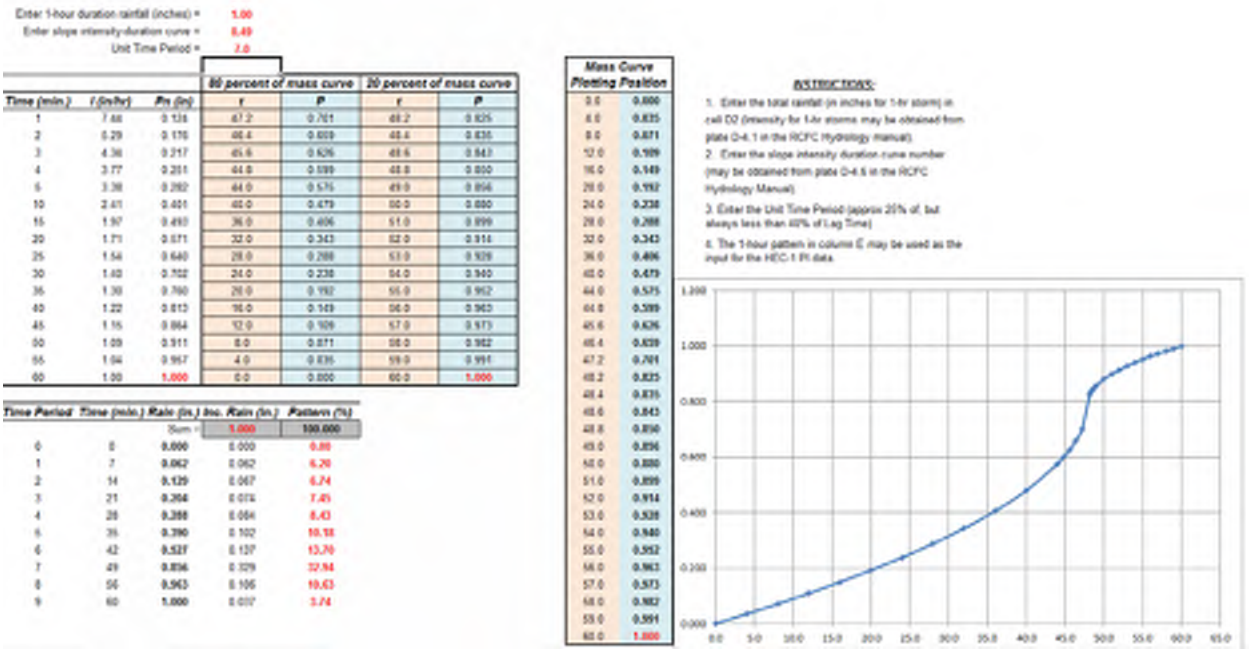
Credit: Riverside County Flood Control and Water Conservation District



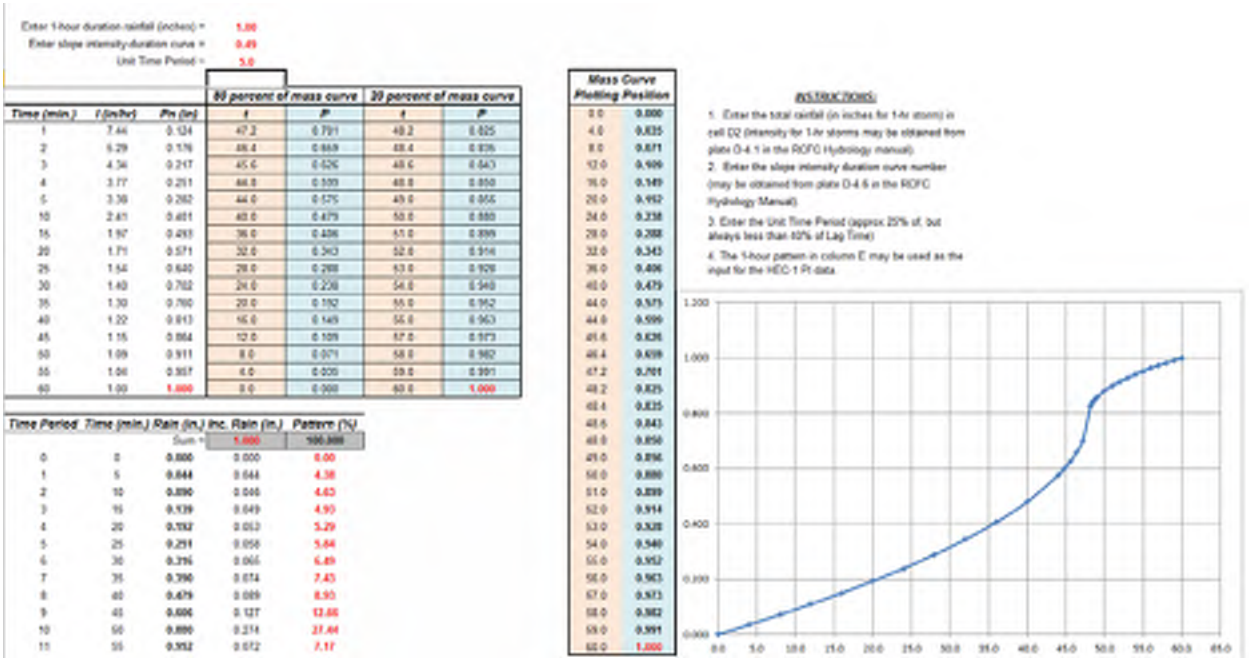
Credit: Riverside County Flood Control and Water Conservation District



Credit: Riverside County Flood Control and Water Conservation District



Credit: Riverside County Flood Control and Water Conservation District



Credit: Riverside County Flood Control and Water Conservation District

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APPENDIX 7.4: PRE-DEVELOPMENT INFORMATION

- **AREAS, % IMPERVIOUS**
- **RI, INFILTRATION**
- **TLAG**
- **PRE-DEV. SHORT CUT SYNTHETIC HYDROGRAPH RESULTS FOR ANALYZED STORMS AND PODs 2, 3A, 3B, and 4.**

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Pre-Development - POD-2

Area:	9.098	acres	Per Hydrology Map (to use in this report)
Pervious B:	5.970	acres	
Pervious C:	2.621	acres	
Pervious D:	0.507	acres	
% perv B:	65.6%		Soil Type: B/C/D
% perv C:	28.8%		
% perv D:	5.6%		
% imperv:	0.0%		RI (Plate D-5.5): 69/80/85 (Open Brush/Grass/Chapparal - Fair)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
69	0.57	0.375	0.195	(Plate E-6.2)
80	0.44	0.25	0.115	(Plate E-6.2)
85	0.36	0.185	0.080	(Plate E-6.2)
Weighted	0.42	0.24	0.11	

Synthetic Unit Hydrograph

Pre-Development Determination (Flowline of area)

n:	0.03		(interpretation of Plate E.3)	
L:	1111	ft	0.210	miles
Lca:	525	ft	0.099	miles
U/S:	1607	ft		
D/S:	1578	ft		
s:	0.0261	ft/ft	137.8	ft/mile
tlag:	3.90	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Pre-Development - POD-2

Return Period:	2 yr	Low Loss Rate %:	80%
Duration of Rain:	24 hr	% impervious:	0.0%
Rainfall:	1.83 inches	Fp (AMC-I):	0.42 in/hr
Area:	9.10 acres	Constant loss rate, F:	0.42 in/hr
		Fm (as a % of F):	0.500
Volume:	**12087 cu-ft**	**Peak:**	**0.46 cfs**

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.734	0.012	0.003	0.027	24
2	30	0.3	0.022	0.726	0.018	0.004	0.040	36
3	45	0.3	0.022	0.717	0.018	0.004	0.040	36
4	60	0.4	0.029	0.709	0.023	0.006	0.054	48
5	75	0.3	0.022	0.700	0.018	0.004	0.040	36
6	90	0.3	0.022	0.692	0.018	0.004	0.040	36
7	105	0.3	0.022	0.684	0.018	0.004	0.040	36
8	120	0.4	0.029	0.675	0.023	0.006	0.054	48
9	135	0.4	0.029	0.667	0.023	0.006	0.054	48
10	150	0.4	0.029	0.659	0.023	0.006	0.054	48
11	165	0.5	0.037	0.651	0.029	0.007	0.067	60
12	180	0.5	0.037	0.643	0.029	0.007	0.067	60
13	195	0.5	0.037	0.635	0.029	0.007	0.067	60
14	210	0.5	0.037	0.627	0.029	0.007	0.067	60
15	225	0.5	0.037	0.619	0.029	0.007	0.067	60
16	240	0.6	0.044	0.612	0.035	0.009	0.081	73
17	255	0.6	0.044	0.604	0.035	0.009	0.081	73
18	270	0.7	0.051	0.596	0.041	0.010	0.094	85
19	285	0.7	0.051	0.589	0.041	0.010	0.094	85
20	300	0.8	0.059	0.581	0.047	0.012	0.107	97
21	315	0.6	0.044	0.573	0.035	0.009	0.081	73
22	330	0.7	0.051	0.566	0.041	0.010	0.094	85
23	345	0.8	0.059	0.558	0.047	0.012	0.107	97
24	360	0.8	0.059	0.551	0.047	0.012	0.107	97
25	375	0.9	0.066	0.544	0.053	0.013	0.121	109
26	390	0.9	0.066	0.537	0.053	0.013	0.121	109
27	405	1	0.073	0.529	0.059	0.015	0.134	121
28	420	1	0.073	0.522	0.059	0.015	0.134	121
29	435	1	0.073	0.515	0.059	0.015	0.134	121
30	450	1.1	0.081	0.508	0.064	0.016	0.148	133
31	465	1.2	0.088	0.501	0.070	0.018	0.161	145
32	480	1.3	0.095	0.494	0.076	0.019	0.175	157
33	495	1.5	0.110	0.487	0.088	0.022	0.201	181
34	510	1.5	0.110	0.481	0.088	0.022	0.201	181
35	525	1.6	0.117	0.474	0.094	0.023	0.215	193
36	540	1.7	0.124	0.467	0.100	0.025	0.228	205
37	555	1.9	0.139	0.461	0.111	0.028	0.255	230
38	570	2	0.146	0.454	0.117	0.029	0.269	242
39	585	2.1	0.154	0.448	0.123	0.031	0.282	254
40	600	2.2	0.161	0.441	0.129	0.032	0.295	266
41	615	1.5	0.110	0.435	0.088	0.022	0.201	181
42	630	1.5	0.110	0.428	0.088	0.022	0.201	181
43	645	2	0.146	0.422	0.117	0.029	0.269	242

44	660	2	0.146	0.416	0.117	0.029	0.269	242
45	675	1.9	0.139	0.410	0.111	0.028	0.255	230
46	690	1.9	0.139	0.404	0.111	0.028	0.255	230
47	705	1.7	0.124	0.398	0.100	0.025	0.228	205
48	720	1.8	0.132	0.392	0.105	0.026	0.242	218
49	735	2.5	0.183	0.386	0.146	0.037	0.336	302
50	750	2.6	0.190	0.380	0.152	0.038	0.349	314
51	765	2.8	0.205	0.375	0.164	0.041	0.376	338
52	780	2.9	0.212	0.369	0.170	0.042	0.389	351
53	795	3.4	0.249	0.363	0.199	0.050	0.457	411
54	810	3.4	0.249	0.358	0.199	0.050	0.457	411
55	825	2.3	0.168	0.352	0.135	0.034	0.309	278
56	840	2.3	0.168	0.347	0.135	0.034	0.309	278
57	855	2.7	0.198	0.342	0.158	0.040	0.363	326
58	870	2.6	0.190	0.337	0.152	0.038	0.349	314
59	885	2.6	0.190	0.331	0.152	0.038	0.349	314
60	900	2.5	0.183	0.326	0.146	0.037	0.336	302
61	915	2.4	0.176	0.321	0.141	0.035	0.322	290
62	930	2.3	0.168	0.316	0.135	0.034	0.309	278
63	945	1.9	0.139	0.312	0.111	0.028	0.255	230
64	960	1.9	0.139	0.307	0.111	0.028	0.255	230
65	975	0.4	0.029	0.302	0.023	0.006	0.054	48
66	990	0.4	0.029	0.298	0.023	0.006	0.054	48
67	1005	0.3	0.022	0.293	0.018	0.004	0.040	36
68	1020	0.3	0.022	0.289	0.018	0.004	0.040	36
69	1035	0.5	0.037	0.284	0.029	0.007	0.067	60
70	1050	0.5	0.037	0.280	0.029	0.007	0.067	60
71	1065	0.5	0.037	0.276	0.029	0.007	0.067	60
72	1080	0.4	0.029	0.272	0.023	0.006	0.054	48
73	1095	0.4	0.029	0.268	0.023	0.006	0.054	48
74	1110	0.4	0.029	0.264	0.023	0.006	0.054	48
75	1125	0.3	0.022	0.260	0.018	0.004	0.040	36
76	1140	0.2	0.015	0.256	0.012	0.003	0.027	24
77	1155	0.3	0.022	0.253	0.018	0.004	0.040	36
78	1170	0.4	0.029	0.249	0.023	0.006	0.054	48
79	1185	0.3	0.022	0.246	0.018	0.004	0.040	36
80	1200	0.2	0.015	0.242	0.012	0.003	0.027	24
81	1215	0.3	0.022	0.239	0.018	0.004	0.040	36
82	1230	0.3	0.022	0.236	0.018	0.004	0.040	36
83	1245	0.3	0.022	0.233	0.018	0.004	0.040	36
84	1260	0.2	0.015	0.230	0.012	0.003	0.027	24
85	1275	0.3	0.022	0.228	0.018	0.004	0.040	36
86	1290	0.2	0.015	0.225	0.012	0.003	0.027	24
87	1305	0.3	0.022	0.223	0.018	0.004	0.040	36
88	1320	0.2	0.015	0.220	0.012	0.003	0.027	24
89	1335	0.3	0.022	0.218	0.018	0.004	0.040	36
90	1350	0.2	0.015	0.216	0.012	0.003	0.027	24
91	1365	0.2	0.015	0.214	0.012	0.003	0.027	24
92	1380	0.2	0.015	0.212	0.012	0.003	0.027	24
93	1395	0.2	0.015	0.211	0.012	0.003	0.027	24
94	1410	0.2	0.015	0.210	0.012	0.003	0.027	24
95	1425	0.2	0.015	0.209	0.012	0.003	0.027	24
96	1440	0.2	0.015	0.208	0.012	0.003	0.027	24
97	1455						0.000	0

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Pre-Development - POD-3A

Area:	4.033	acres	Per Hydrology Map (to use in this report)
Pervious B:	0.000	acres	
Pervious C:	3.979	acres	
Pervious D:	0.054	acres	
% perv B:	0.0%		Soil Type: B/C/D
% perv C:	98.7%		
% perv D:	1.3%		
% imperv:	0.0%		RI (Plate D-5.5): 69/80/85 (Open Brush/Grass/Chapparal - Fair)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
69	0.57	0.375	0.190	(Plate E-6.2)
80	0.44	0.25	0.115	(Plate E-6.2)
85	0.36	0.185	0.080	
Weighted	0.44	0.25	0.11	

Synthetic Unit Hydrograph

Pre-Development Determination (Flowline of area)

n:	0.03		(interpretation of Plate E.3)	
L:	640	ft	0.121	miles
Lca:	278	ft	0.053	miles
U/S:	1608	ft		
D/S:	1572	ft		
s:	0.0563	ft/ft	297.0	ft/mile
tlag:	2.15	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Pre-Development - POD-3A

Return Period:	2	yr	Low Loss Rate %:	80%	
Duration of Rain:	24	hr	% impervious:	0.0%	
Rainfall:	1.83	inches	Fp (AMC-I):	0.44	in/hr
Area:	4.03	acres	Constant loss rate, F:	0.439	in/hr
			Fm (as a % of F):	0.500	
Volume:	**5359**	**cu-ft**	**Peak:**	**0.20**	**cfs**

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.775	0.012	0.003	0.012	11
2	30	0.3	0.022	0.766	0.018	0.004	0.018	16
3	45	0.3	0.022	0.757	0.018	0.004	0.018	16
4	60	0.4	0.029	0.748	0.023	0.006	0.024	21
5	75	0.3	0.022	0.739	0.018	0.004	0.018	16
6	90	0.3	0.022	0.731	0.018	0.004	0.018	16
7	105	0.3	0.022	0.722	0.018	0.004	0.018	16
8	120	0.4	0.029	0.713	0.023	0.006	0.024	21
9	135	0.4	0.029	0.705	0.023	0.006	0.024	21
10	150	0.4	0.029	0.696	0.023	0.006	0.024	21
11	165	0.5	0.037	0.688	0.029	0.007	0.030	27
12	180	0.5	0.037	0.679	0.029	0.007	0.030	27
13	195	0.5	0.037	0.671	0.029	0.007	0.030	27
14	210	0.5	0.037	0.662	0.029	0.007	0.030	27
15	225	0.5	0.037	0.654	0.029	0.007	0.030	27
16	240	0.6	0.044	0.646	0.035	0.009	0.036	32
17	255	0.6	0.044	0.638	0.035	0.009	0.036	32
18	270	0.7	0.051	0.629	0.041	0.010	0.042	38
19	285	0.7	0.051	0.621	0.041	0.010	0.042	38
20	300	0.8	0.059	0.613	0.047	0.012	0.048	43
21	315	0.6	0.044	0.605	0.035	0.009	0.036	32
22	330	0.7	0.051	0.598	0.041	0.010	0.042	38
23	345	0.8	0.059	0.590	0.047	0.012	0.048	43
24	360	0.8	0.059	0.582	0.047	0.012	0.048	43
25	375	0.9	0.066	0.574	0.053	0.013	0.054	48
26	390	0.9	0.066	0.567	0.053	0.013	0.054	48
27	405	1	0.073	0.559	0.059	0.015	0.060	54
28	420	1	0.073	0.551	0.059	0.015	0.060	54
29	435	1	0.073	0.544	0.059	0.015	0.060	54
30	450	1.1	0.081	0.537	0.064	0.016	0.065	59
31	465	1.2	0.088	0.529	0.070	0.018	0.071	64
32	480	1.3	0.095	0.522	0.076	0.019	0.077	70
33	495	1.5	0.110	0.515	0.088	0.022	0.089	80
34	510	1.5	0.110	0.507	0.088	0.022	0.089	80
35	525	1.6	0.117	0.500	0.094	0.023	0.095	86
36	540	1.7	0.124	0.493	0.100	0.025	0.101	91
37	555	1.9	0.139	0.486	0.111	0.028	0.113	102
38	570	2	0.146	0.479	0.117	0.029	0.119	107
39	585	2.1	0.154	0.473	0.123	0.031	0.125	113
40	600	2.2	0.161	0.466	0.129	0.032	0.131	118
41	615	1.5	0.110	0.459	0.088	0.022	0.089	80
42	630	1.5	0.110	0.452	0.088	0.022	0.089	80
43	645	2	0.146	0.446	0.117	0.029	0.119	107

44	660	2	0.146	0.439	0.117	0.029	0.119	107
45	675	1.9	0.139	0.433	0.111	0.028	0.113	102
46	690	1.9	0.139	0.426	0.111	0.028	0.113	102
47	705	1.7	0.124	0.420	0.100	0.025	0.101	91
48	720	1.8	0.132	0.414	0.105	0.026	0.107	96
49	735	2.5	0.183	0.408	0.146	0.037	0.149	134
50	750	2.6	0.190	0.402	0.152	0.038	0.155	139
51	765	2.8	0.205	0.396	0.164	0.041	0.167	150
52	780	2.9	0.212	0.390	0.170	0.042	0.173	155
53	795	3.4	0.249	0.384	0.199	0.050	0.202	182
54	810	3.4	0.249	0.378	0.199	0.050	0.202	182
55	825	2.3	0.168	0.372	0.135	0.034	0.137	123
56	840	2.3	0.168	0.366	0.135	0.034	0.137	123
57	855	2.7	0.198	0.361	0.158	0.040	0.161	145
58	870	2.6	0.190	0.355	0.152	0.038	0.155	139
59	885	2.6	0.190	0.350	0.152	0.038	0.155	139
60	900	2.5	0.183	0.345	0.146	0.037	0.149	134
61	915	2.4	0.176	0.339	0.141	0.035	0.143	129
62	930	2.3	0.168	0.334	0.135	0.034	0.137	123
63	945	1.9	0.139	0.329	0.111	0.028	0.113	102
64	960	1.9	0.139	0.324	0.111	0.028	0.113	102
65	975	0.4	0.029	0.319	0.023	0.006	0.024	21
66	990	0.4	0.029	0.314	0.023	0.006	0.024	21
67	1005	0.3	0.022	0.309	0.018	0.004	0.018	16
68	1020	0.3	0.022	0.305	0.018	0.004	0.018	16
69	1035	0.5	0.037	0.300	0.029	0.007	0.030	27
70	1050	0.5	0.037	0.296	0.029	0.007	0.030	27
71	1065	0.5	0.037	0.291	0.029	0.007	0.030	27
72	1080	0.4	0.029	0.287	0.023	0.006	0.024	21
73	1095	0.4	0.029	0.283	0.023	0.006	0.024	21
74	1110	0.4	0.029	0.279	0.023	0.006	0.024	21
75	1125	0.3	0.022	0.275	0.018	0.004	0.018	16
76	1140	0.2	0.015	0.271	0.012	0.003	0.012	11
77	1155	0.3	0.022	0.267	0.018	0.004	0.018	16
78	1170	0.4	0.029	0.263	0.023	0.006	0.024	21
79	1185	0.3	0.022	0.260	0.018	0.004	0.018	16
80	1200	0.2	0.015	0.256	0.012	0.003	0.012	11
81	1215	0.3	0.022	0.253	0.018	0.004	0.018	16
82	1230	0.3	0.022	0.249	0.018	0.004	0.018	16
83	1245	0.3	0.022	0.246	0.018	0.004	0.018	16
84	1260	0.2	0.015	0.243	0.012	0.003	0.012	11
85	1275	0.3	0.022	0.240	0.018	0.004	0.018	16
86	1290	0.2	0.015	0.238	0.012	0.003	0.012	11
87	1305	0.3	0.022	0.235	0.018	0.004	0.018	16
88	1320	0.2	0.015	0.233	0.012	0.003	0.012	11
89	1335	0.3	0.022	0.230	0.018	0.004	0.018	16
90	1350	0.2	0.015	0.228	0.012	0.003	0.012	11
91	1365	0.2	0.015	0.226	0.012	0.003	0.012	11
92	1380	0.2	0.015	0.224	0.012	0.003	0.012	11
93	1395	0.2	0.015	0.223	0.012	0.003	0.012	11
94	1410	0.2	0.015	0.221	0.012	0.003	0.012	11
95	1425	0.2	0.015	0.220	0.012	0.003	0.012	11
96	1440	0.2	0.015	0.220	0.012	0.003	0.012	11
97	1455						0.000	0

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Pre-Development - POD-3B

Area:	1.609	acres	Per Hydrology Map (to use in this report)
Pervious B:	0.000	acres	
Pervious C:	0.207	acres	
Pervious D:	1.402	acres	
% perv B:	0.0%		Soil Type: B/C/D
% perv C:	12.9%		
% perv D:	87.1%		
% imperv:	0.0%		RI (Plate D-5.5): 69/80/85 (Open Brush/Grass/Chapparal - Fair)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
69	0.57	0.375	0.190	(Plate E-6.2)
80	0.44	0.25	0.115	(Plate E-6.2)
85	0.36	0.185	0.080	
Weighted	0.37	0.19	0.08	

Synthetic Unit Hydrograph

Pre-Development Determination (Flowline of lot)

n:	0.03		(interpretation of Plate E.3)	
L:	333	ft	0.063	miles
Lca:	180	ft	0.034	miles
U/S:	1607	ft		
D/S:	1584	ft		
s:	0.0691	ft/ft	364.7	ft/mile
tlag:	1.36	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Pre-Development - POD-3B

Return Period:	2 yr	Low Loss Rate %:	80%
Duration of Rain:	24 hr	% impervious:	0.0%
Rainfall:	1.83 inches	Fp (AMC-I):	0.37 in/hr
Area:	1.61 acres	Constant loss rate, F:	0.370 in/hr
		Fm (as a % of F):	0.500
Volume:	**2137 cu-ft**	**Peak:**	**0.08 cfs**

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.654	0.012	0.003	0.005	4
2	30	0.3	0.022	0.646	0.018	0.004	0.007	6
3	45	0.3	0.022	0.639	0.018	0.004	0.007	6
4	60	0.4	0.029	0.631	0.023	0.006	0.009	9
5	75	0.3	0.022	0.624	0.018	0.004	0.007	6
6	90	0.3	0.022	0.616	0.018	0.004	0.007	6
7	105	0.3	0.022	0.609	0.018	0.004	0.007	6
8	120	0.4	0.029	0.602	0.023	0.006	0.009	9
9	135	0.4	0.029	0.594	0.023	0.006	0.009	9
10	150	0.4	0.029	0.587	0.023	0.006	0.009	9
11	165	0.5	0.037	0.580	0.029	0.007	0.012	11
12	180	0.5	0.037	0.573	0.029	0.007	0.012	11
13	195	0.5	0.037	0.566	0.029	0.007	0.012	11
14	210	0.5	0.037	0.559	0.029	0.007	0.012	11
15	225	0.5	0.037	0.552	0.029	0.007	0.012	11
16	240	0.6	0.044	0.545	0.035	0.009	0.014	13
17	255	0.6	0.044	0.538	0.035	0.009	0.014	13
18	270	0.7	0.051	0.531	0.041	0.010	0.017	15
19	285	0.7	0.051	0.524	0.041	0.010	0.017	15
20	300	0.8	0.059	0.517	0.047	0.012	0.019	17
21	315	0.6	0.044	0.511	0.035	0.009	0.014	13
22	330	0.7	0.051	0.504	0.041	0.010	0.017	15
23	345	0.8	0.059	0.498	0.047	0.012	0.019	17
24	360	0.8	0.059	0.491	0.047	0.012	0.019	17
25	375	0.9	0.066	0.484	0.053	0.013	0.021	19
26	390	0.9	0.066	0.478	0.053	0.013	0.021	19
27	405	1	0.073	0.472	0.059	0.015	0.024	21
28	420	1	0.073	0.465	0.059	0.015	0.024	21
29	435	1	0.073	0.459	0.059	0.015	0.024	21
30	450	1.1	0.081	0.453	0.064	0.016	0.026	24
31	465	1.2	0.088	0.446	0.070	0.018	0.028	26
32	480	1.3	0.095	0.440	0.076	0.019	0.031	28
33	495	1.5	0.110	0.434	0.088	0.022	0.036	32
34	510	1.5	0.110	0.428	0.088	0.022	0.036	32
35	525	1.6	0.117	0.422	0.094	0.023	0.038	34
36	540	1.7	0.124	0.416	0.100	0.025	0.040	36
37	555	1.9	0.139	0.410	0.111	0.028	0.045	41
38	570	2	0.146	0.404	0.117	0.029	0.047	43
39	585	2.1	0.154	0.399	0.123	0.031	0.050	45
40	600	2.2	0.161	0.393	0.129	0.032	0.052	47
41	615	1.5	0.110	0.387	0.088	0.022	0.036	32
42	630	1.5	0.110	0.382	0.088	0.022	0.036	32
43	645	2	0.146	0.376	0.117	0.029	0.047	43

44	660	2	0.146	0.371	0.117	0.029	0.047	43
45	675	1.9	0.139	0.365	0.111	0.028	0.045	41
46	690	1.9	0.139	0.360	0.111	0.028	0.045	41
47	705	1.7	0.124	0.354	0.100	0.025	0.040	36
48	720	1.8	0.132	0.349	0.105	0.026	0.043	38
49	735	2.5	0.183	0.344	0.146	0.037	0.059	53
50	750	2.6	0.190	0.339	0.152	0.038	0.062	56
51	765	2.8	0.205	0.334	0.164	0.041	0.066	60
52	780	2.9	0.212	0.329	0.170	0.042	0.069	62
53	795	3.4	0.249	0.324	0.199	0.050	0.081	73
54	810	3.4	0.249	0.319	0.199	0.050	0.081	73
55	825	2.3	0.168	0.314	0.135	0.034	0.055	49
56	840	2.3	0.168	0.309	0.135	0.034	0.055	49
57	855	2.7	0.198	0.304	0.158	0.040	0.064	58
58	870	2.6	0.190	0.300	0.152	0.038	0.062	56
59	885	2.6	0.190	0.295	0.152	0.038	0.062	56
60	900	2.5	0.183	0.291	0.146	0.037	0.059	53
61	915	2.4	0.176	0.286	0.141	0.035	0.057	51
62	930	2.3	0.168	0.282	0.135	0.034	0.055	49
63	945	1.9	0.139	0.278	0.111	0.028	0.045	41
64	960	1.9	0.139	0.273	0.111	0.028	0.045	41
65	975	0.4	0.029	0.269	0.023	0.006	0.009	9
66	990	0.4	0.029	0.265	0.023	0.006	0.009	9
67	1005	0.3	0.022	0.261	0.018	0.004	0.007	6
68	1020	0.3	0.022	0.257	0.018	0.004	0.007	6
69	1035	0.5	0.037	0.253	0.029	0.007	0.012	11
70	1050	0.5	0.037	0.249	0.029	0.007	0.012	11
71	1065	0.5	0.037	0.246	0.029	0.007	0.012	11
72	1080	0.4	0.029	0.242	0.023	0.006	0.009	9
73	1095	0.4	0.029	0.238	0.023	0.006	0.009	9
74	1110	0.4	0.029	0.235	0.023	0.006	0.009	9
75	1125	0.3	0.022	0.232	0.018	0.004	0.007	6
76	1140	0.2	0.015	0.228	0.012	0.003	0.005	4
77	1155	0.3	0.022	0.225	0.018	0.004	0.007	6
78	1170	0.4	0.029	0.222	0.023	0.006	0.009	9
79	1185	0.3	0.022	0.219	0.018	0.004	0.007	6
80	1200	0.2	0.015	0.216	0.012	0.003	0.005	4
81	1215	0.3	0.022	0.213	0.018	0.004	0.007	6
82	1230	0.3	0.022	0.210	0.018	0.004	0.007	6
83	1245	0.3	0.022	0.208	0.018	0.004	0.007	6
84	1260	0.2	0.015	0.205	0.012	0.003	0.005	4
85	1275	0.3	0.022	0.203	0.018	0.004	0.007	6
86	1290	0.2	0.015	0.200	0.012	0.003	0.005	4
87	1305	0.3	0.022	0.198	0.018	0.004	0.007	6
88	1320	0.2	0.015	0.196	0.012	0.003	0.005	4
89	1335	0.3	0.022	0.194	0.018	0.004	0.007	6
90	1350	0.2	0.015	0.192	0.012	0.003	0.005	4
91	1365	0.2	0.015	0.191	0.012	0.003	0.005	4
92	1380	0.2	0.015	0.189	0.012	0.003	0.005	4
93	1395	0.2	0.015	0.188	0.012	0.003	0.005	4
94	1410	0.2	0.015	0.187	0.012	0.003	0.005	4
95	1425	0.2	0.015	0.186	0.012	0.003	0.005	4
96	1440	0.2	0.015	0.185	0.012	0.003	0.005	4
97	1455						0.000	0

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Pre-Development - POD-4

Area:	12.122	acres	Per Hydrology Map (to use in this report)
Pervious B:	0.000	acres	
Pervious C:	12.070	acres	
Pervious D:	0.051	acres	
% perv B:	0.0%		Soil Type: B/C
% perv C:	99.6%		
% perv D:	0.4%		
% imperv:	0.0%		RI (Plate D-5.5): 69/80 (Open Brush/Grass/Chapparal - Fair)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
69	0.57	0.375	0.190	(Plate E-6.2)
80	0.44	0.25	0.115	(Plate E-6.2)
85	0.36	0.185	0.080	(Plate E-6.2)
Weighted	0.44	0.25	0.11	

Synthetic Unit Hydrograph

Pre-Development Determination (Flowline of area)

n:	0.03		(interpretation of Plate E.3)	
L:	1213	ft	0.230	miles
Lca:	604	ft	0.114	miles
U/S:	1591	ft		
D/S:	1568	ft		
s:	0.0190	ft/ft	100.1	ft/mile
tlag:	4.52	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Pre-Development - POD-4

Return Period:	2 yr	Low Loss Rate %:	80%
Duration of Rain:	24 hr	% impervious:	0.0%
Rainfall:	1.83 inches	Fp (AMC-I):	0.44 in/hr
Area:	12.12 acres	Constant loss rate, F:	0.440 in/hr
		Fm (as a % of F):	0.500
Volume:	**16104 cu-ft**	**Peak:**	**0.61 cfs**

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.776	0.012	0.003	0.036	32
2	30	0.3	0.022	0.767	0.018	0.004	0.054	48
3	45	0.3	0.022	0.758	0.018	0.004	0.054	48
4	60	0.4	0.029	0.750	0.023	0.006	0.072	64
5	75	0.3	0.022	0.741	0.018	0.004	0.054	48
6	90	0.3	0.022	0.732	0.018	0.004	0.054	48
7	105	0.3	0.022	0.723	0.018	0.004	0.054	48
8	120	0.4	0.029	0.714	0.023	0.006	0.072	64
9	135	0.4	0.029	0.706	0.023	0.006	0.072	64
10	150	0.4	0.029	0.697	0.023	0.006	0.072	64
11	165	0.5	0.037	0.689	0.029	0.007	0.089	81
12	180	0.5	0.037	0.680	0.029	0.007	0.089	81
13	195	0.5	0.037	0.672	0.029	0.007	0.089	81
14	210	0.5	0.037	0.663	0.029	0.007	0.089	81
15	225	0.5	0.037	0.655	0.029	0.007	0.089	81
16	240	0.6	0.044	0.647	0.035	0.009	0.107	97
17	255	0.6	0.044	0.639	0.035	0.009	0.107	97
18	270	0.7	0.051	0.631	0.041	0.010	0.125	113
19	285	0.7	0.051	0.622	0.041	0.010	0.125	113
20	300	0.8	0.059	0.614	0.047	0.012	0.143	129
21	315	0.6	0.044	0.606	0.035	0.009	0.107	97
22	330	0.7	0.051	0.599	0.041	0.010	0.125	113
23	345	0.8	0.059	0.591	0.047	0.012	0.143	129
24	360	0.8	0.059	0.583	0.047	0.012	0.143	129
25	375	0.9	0.066	0.575	0.053	0.013	0.161	145
26	390	0.9	0.066	0.568	0.053	0.013	0.161	145
27	405	1	0.073	0.560	0.059	0.015	0.179	161
28	420	1	0.073	0.552	0.059	0.015	0.179	161
29	435	1	0.073	0.545	0.059	0.015	0.179	161
30	450	1.1	0.081	0.537	0.064	0.016	0.197	177
31	465	1.2	0.088	0.530	0.070	0.018	0.215	193
32	480	1.3	0.095	0.523	0.076	0.019	0.233	209
33	495	1.5	0.110	0.515	0.088	0.022	0.268	242
34	510	1.5	0.110	0.508	0.088	0.022	0.268	242
35	525	1.6	0.117	0.501	0.094	0.023	0.286	258
36	540	1.7	0.124	0.494	0.100	0.025	0.304	274
37	555	1.9	0.139	0.487	0.111	0.028	0.340	306
38	570	2	0.146	0.480	0.117	0.029	0.358	322
39	585	2.1	0.154	0.473	0.123	0.031	0.376	338
40	600	2.2	0.161	0.467	0.129	0.032	0.394	354
41	615	1.5	0.110	0.460	0.088	0.022	0.268	242
42	630	1.5	0.110	0.453	0.088	0.022	0.268	242
43	645	2	0.146	0.447	0.117	0.029	0.358	322

44	660	2	0.146	0.440	0.117	0.029	0.358	322
45	675	1.9	0.139	0.434	0.111	0.028	0.340	306
46	690	1.9	0.139	0.427	0.111	0.028	0.340	306
47	705	1.7	0.124	0.421	0.100	0.025	0.304	274
48	720	1.8	0.132	0.415	0.105	0.026	0.322	290
49	735	2.5	0.183	0.408	0.146	0.037	0.447	403
50	750	2.6	0.190	0.402	0.152	0.038	0.465	419
51	765	2.8	0.205	0.396	0.164	0.041	0.501	451
52	780	2.9	0.212	0.390	0.170	0.042	0.519	467
53	795	3.4	0.249	0.384	0.199	0.050	0.608	548
54	810	3.4	0.249	0.379	0.199	0.050	0.608	548
55	825	2.3	0.168	0.373	0.135	0.034	0.412	370
56	840	2.3	0.168	0.367	0.135	0.034	0.412	370
57	855	2.7	0.198	0.361	0.158	0.040	0.483	435
58	870	2.6	0.190	0.356	0.152	0.038	0.465	419
59	885	2.6	0.190	0.351	0.152	0.038	0.465	419
60	900	2.5	0.183	0.345	0.146	0.037	0.447	403
61	915	2.4	0.176	0.340	0.141	0.035	0.429	387
62	930	2.3	0.168	0.335	0.135	0.034	0.412	370
63	945	1.9	0.139	0.330	0.111	0.028	0.340	306
64	960	1.9	0.139	0.325	0.111	0.028	0.340	306
65	975	0.4	0.029	0.320	0.023	0.006	0.072	64
66	990	0.4	0.029	0.315	0.023	0.006	0.072	64
67	1005	0.3	0.022	0.310	0.018	0.004	0.054	48
68	1020	0.3	0.022	0.305	0.018	0.004	0.054	48
69	1035	0.5	0.037	0.301	0.029	0.007	0.089	81
70	1050	0.5	0.037	0.296	0.029	0.007	0.089	81
71	1065	0.5	0.037	0.292	0.029	0.007	0.089	81
72	1080	0.4	0.029	0.287	0.023	0.006	0.072	64
73	1095	0.4	0.029	0.283	0.023	0.006	0.072	64
74	1110	0.4	0.029	0.279	0.023	0.006	0.072	64
75	1125	0.3	0.022	0.275	0.018	0.004	0.054	48
76	1140	0.2	0.015	0.271	0.012	0.003	0.036	32
77	1155	0.3	0.022	0.267	0.018	0.004	0.054	48
78	1170	0.4	0.029	0.264	0.023	0.006	0.072	64
79	1185	0.3	0.022	0.260	0.018	0.004	0.054	48
80	1200	0.2	0.015	0.256	0.012	0.003	0.036	32
81	1215	0.3	0.022	0.253	0.018	0.004	0.054	48
82	1230	0.3	0.022	0.250	0.018	0.004	0.054	48
83	1245	0.3	0.022	0.247	0.018	0.004	0.054	48
84	1260	0.2	0.015	0.244	0.012	0.003	0.036	32
85	1275	0.3	0.022	0.241	0.018	0.004	0.054	48
86	1290	0.2	0.015	0.238	0.012	0.003	0.036	32
87	1305	0.3	0.022	0.235	0.018	0.004	0.054	48
88	1320	0.2	0.015	0.233	0.012	0.003	0.036	32
89	1335	0.3	0.022	0.231	0.018	0.004	0.054	48
90	1350	0.2	0.015	0.228	0.012	0.003	0.036	32
91	1365	0.2	0.015	0.227	0.012	0.003	0.036	32
92	1380	0.2	0.015	0.225	0.012	0.003	0.036	32
93	1395	0.2	0.015	0.223	0.012	0.003	0.036	32
94	1410	0.2	0.015	0.222	0.012	0.003	0.036	32
95	1425	0.2	0.015	0.221	0.012	0.003	0.036	32
96	1440	0.2	0.015	0.220	0.012	0.003	0.036	32
97	1455						0.000	0

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APPENDIX 7.5: POST-DEVELOPMENT INFORMATION

- **AREAS, % IMPERVIOUS**
- **RI, INFILTRATION**
- **TLAG**
- **POST-DEV. SHORT CUT SYNTHETIC HYDROGRAPH RESULTS FOR ANALYZED STORMS AND PODs 2, 3A, 3B, and 4.**

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Post-Development - DMA-2ACD (POD-2)

Area:	4.657	acres	Per Hydrology Map (to use in this report)
Pervious B:	0.319	acres	
Pervious C:	0.215	acres	
Pervious D:	0.039	acres	
% perv B:	6.8%		Soil Type: B/C/D
% perv C:	4.6%		
% perv D:	0.8%		
% imperv:	87.7%		RI (Plate D-5.5): 56/69/75 (Commercial Landscaping)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
56	0.68	0.48	0.28	(Plate E-6.2)
69	0.58	0.37	0.19	(Plate E-6.2)
75	0.50	0.30	0.15	(Plate E-6.2)
Weighted	0.63	0.43	0.24	

Synthetic Unit Hydrograph

Post-Development Determination (Centerline of Parking lot)

n:	0.013		(interpretation of Plate E.3)	
L:	270	ft	0.051	miles
Lca:	100	ft	0.019	miles
U/S:	1612	ft		
D/S:	1600	ft		
s:	0.0444	ft/ft	234.7	ft/mile
tlag:	0.47	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Post-Development - DMA-2ACD (POD-2)

Return Period:	2 yr	Low Loss Rate %:	19%
Duration of Rain:	24 hr	% impervious:	87.7%
Rainfall:	1.83 inches	Fp (AMC-I):	0.63 in/hr
Area:	4.66 acres	Constant loss rate, F:	0.133 in/hr
		Fm (as a % of F):	0.500
Volume:	**25183** cu-ft	**Peak:**	**0.95** cfs

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.234	0.003	0.012	0.056	50
2	30	0.3	0.022	0.232	0.004	0.018	0.084	76
3	45	0.3	0.022	0.229	0.004	0.018	0.084	76
4	60	0.4	0.029	0.226	0.005	0.024	0.112	101
5	75	0.3	0.022	0.224	0.004	0.018	0.084	76
6	90	0.3	0.022	0.221	0.004	0.018	0.084	76
7	105	0.3	0.022	0.218	0.004	0.018	0.084	76
8	120	0.4	0.029	0.216	0.005	0.024	0.112	101
9	135	0.4	0.029	0.213	0.005	0.024	0.112	101
10	150	0.4	0.029	0.210	0.005	0.024	0.112	101
11	165	0.5	0.037	0.208	0.007	0.030	0.140	126
12	180	0.5	0.037	0.205	0.007	0.030	0.140	126
13	195	0.5	0.037	0.203	0.007	0.030	0.140	126
14	210	0.5	0.037	0.200	0.007	0.030	0.140	126
15	225	0.5	0.037	0.198	0.007	0.030	0.140	126
16	240	0.6	0.044	0.195	0.008	0.036	0.168	151
17	255	0.6	0.044	0.193	0.008	0.036	0.168	151
18	270	0.7	0.051	0.190	0.010	0.042	0.196	176
19	285	0.7	0.051	0.188	0.010	0.042	0.196	176
20	300	0.8	0.059	0.185	0.011	0.048	0.224	201
21	315	0.6	0.044	0.183	0.008	0.036	0.168	151
22	330	0.7	0.051	0.181	0.010	0.042	0.196	176
23	345	0.8	0.059	0.178	0.011	0.048	0.224	201
24	360	0.8	0.059	0.176	0.011	0.048	0.224	201
25	375	0.9	0.066	0.174	0.012	0.054	0.252	227
26	390	0.9	0.066	0.171	0.012	0.054	0.252	227
27	405	1	0.073	0.169	0.014	0.060	0.280	252
28	420	1	0.073	0.167	0.014	0.060	0.280	252
29	435	1	0.073	0.164	0.014	0.060	0.280	252
30	450	1.1	0.081	0.162	0.015	0.066	0.308	277
31	465	1.2	0.088	0.160	0.016	0.071	0.336	302
32	480	1.3	0.095	0.158	0.018	0.077	0.364	327
33	495	1.5	0.110	0.156	0.020	0.089	0.420	378
34	510	1.5	0.110	0.153	0.020	0.089	0.420	378
35	525	1.6	0.117	0.151	0.022	0.095	0.448	403
36	540	1.7	0.124	0.149	0.023	0.101	0.476	428
37	555	1.9	0.139	0.147	0.026	0.113	0.532	478
38	570	2	0.146	0.145	0.027	0.119	0.560	504
39	585	2.1	0.154	0.143	0.029	0.125	0.588	529
40	600	2.2	0.161	0.141	0.030	0.131	0.616	554
41	615	1.5	0.110	0.139	0.020	0.089	0.420	378
42	630	1.5	0.110	0.137	0.020	0.089	0.420	378
43	645	2	0.146	0.135	0.027	0.119	0.560	504

44	660	2	0.146	0.133	0.027	0.119	0.560	504
45	675	1.9	0.139	0.131	0.026	0.113	0.532	478
46	690	1.9	0.139	0.129	0.026	0.113	0.532	478
47	705	1.7	0.124	0.127	0.023	0.101	0.476	428
48	720	1.8	0.132	0.125	0.025	0.107	0.504	453
49	735	2.5	0.183	0.123	0.034	0.149	0.700	630
50	750	2.6	0.190	0.121	0.035	0.155	0.728	655
51	765	2.8	0.205	0.120	0.038	0.167	0.783	705
52	780	2.9	0.212	0.118	0.039	0.173	0.811	730
53	795	3.4	0.249	0.116	0.046	0.203	0.951	856
54	810	3.4	0.249	0.114	0.046	0.203	0.951	856
55	825	2.3	0.168	0.113	0.031	0.137	0.644	579
56	840	2.3	0.168	0.111	0.031	0.137	0.644	579
57	855	2.7	0.198	0.109	0.037	0.161	0.755	680
58	870	2.6	0.190	0.107	0.035	0.155	0.728	655
59	885	2.6	0.190	0.106	0.035	0.155	0.728	655
60	900	2.5	0.183	0.104	0.034	0.149	0.700	630
61	915	2.4	0.176	0.103	0.033	0.143	0.672	604
62	930	2.3	0.168	0.101	0.031	0.137	0.644	579
63	945	1.9	0.139	0.099	0.026	0.113	0.532	478
64	960	1.9	0.139	0.098	0.026	0.113	0.532	478
65	975	0.4	0.029	0.096	0.005	0.024	0.112	101
66	990	0.4	0.029	0.095	0.005	0.024	0.112	101
67	1005	0.3	0.022	0.094	0.004	0.018	0.084	76
68	1020	0.3	0.022	0.092	0.004	0.018	0.084	76
69	1035	0.5	0.037	0.091	0.007	0.030	0.140	126
70	1050	0.5	0.037	0.089	0.007	0.030	0.140	126
71	1065	0.5	0.037	0.088	0.007	0.030	0.140	126
72	1080	0.4	0.029	0.087	0.005	0.024	0.112	101
73	1095	0.4	0.029	0.085	0.005	0.024	0.112	101
74	1110	0.4	0.029	0.084	0.005	0.024	0.112	101
75	1125	0.3	0.022	0.083	0.004	0.018	0.084	76
76	1140	0.2	0.015	0.082	0.003	0.012	0.056	50
77	1155	0.3	0.022	0.081	0.004	0.018	0.084	76
78	1170	0.4	0.029	0.080	0.005	0.024	0.112	101
79	1185	0.3	0.022	0.078	0.004	0.018	0.084	76
80	1200	0.2	0.015	0.077	0.003	0.012	0.056	50
81	1215	0.3	0.022	0.076	0.004	0.018	0.084	76
82	1230	0.3	0.022	0.075	0.004	0.018	0.084	76
83	1245	0.3	0.022	0.074	0.004	0.018	0.084	76
84	1260	0.2	0.015	0.074	0.003	0.012	0.056	50
85	1275	0.3	0.022	0.073	0.004	0.018	0.084	76
86	1290	0.2	0.015	0.072	0.003	0.012	0.056	50
87	1305	0.3	0.022	0.071	0.004	0.018	0.084	76
88	1320	0.2	0.015	0.070	0.003	0.012	0.056	50
89	1335	0.3	0.022	0.070	0.004	0.018	0.084	76
90	1350	0.2	0.015	0.069	0.003	0.012	0.056	50
91	1365	0.2	0.015	0.068	0.003	0.012	0.056	50
92	1380	0.2	0.015	0.068	0.003	0.012	0.056	50
93	1395	0.2	0.015	0.067	0.003	0.012	0.056	50
94	1410	0.2	0.015	0.067	0.003	0.012	0.056	50
95	1425	0.2	0.015	0.067	0.003	0.012	0.056	50
96	1440	0.2	0.015	0.066	0.003	0.012	0.056	50
97	1455						0.000	0

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Post-Development - DMA-2B (POD-2)

Area:	5.848	acres	Per Hydrology Map (to use in this report)
Pervious B:	0.434	acres	
Pervious C:	0.177	acres	
Pervious D:	0.000	acres	
% perv B:	7.4%		Soil Type: B/C/D
% perv C:	3.0%		
% perv D:	0.0%		
% imperv:	89.6%		RI (Plate D-5.5): 56/69/75 (Commercial Landscaping)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
56	0.68	0.48	0.28	(Plate E-6.2)
69	0.58	0.37	0.19	(Plate E-6.2)
75	0.50	0.30	0.15	(Plate E-6.2)
Weighted	0.65	0.45	0.25	

Synthetic Unit Hydrograph

Post-Development Determination (Centerline of Parking lot)

n:	0.013		(interpretation of Plate E.3)	
L:	270	ft	0.051	miles
Lca:	100	ft	0.019	miles
U/S:	1612	ft		
D/S:	1600	ft		
s:	0.0444	ft/ft	234.7	ft/mile
tlag:	0.47	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Post-Development - DMA-2B (POD-2)

Return Period:	2	yr	Low Loss Rate %:	17%	
Duration of Rain:	24	hr	% impervious:	89.6%	
Rainfall:	1.83	inches	Fp (AMC-I):	0.65	in/hr
Area:	5.85	acres	Constant loss rate, F:	0.126	in/hr
			Fm (as a % of F):	0.500	
Volume:	**32122**	**cu-ft**	**Peak:**	**1.21**	**cfs**

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.223	0.003	0.012	0.071	64
2	30	0.3	0.022	0.220	0.004	0.018	0.107	96
3	45	0.3	0.022	0.218	0.004	0.018	0.107	96
4	60	0.4	0.029	0.215	0.005	0.024	0.143	128
5	75	0.3	0.022	0.213	0.004	0.018	0.107	96
6	90	0.3	0.022	0.210	0.004	0.018	0.107	96
7	105	0.3	0.022	0.208	0.004	0.018	0.107	96
8	120	0.4	0.029	0.205	0.005	0.024	0.143	128
9	135	0.4	0.029	0.203	0.005	0.024	0.143	128
10	150	0.4	0.029	0.200	0.005	0.024	0.143	128
11	165	0.5	0.037	0.198	0.006	0.030	0.178	161
12	180	0.5	0.037	0.195	0.006	0.030	0.178	161
13	195	0.5	0.037	0.193	0.006	0.030	0.178	161
14	210	0.5	0.037	0.191	0.006	0.030	0.178	161
15	225	0.5	0.037	0.188	0.006	0.030	0.178	161
16	240	0.6	0.044	0.186	0.008	0.036	0.214	193
17	255	0.6	0.044	0.184	0.008	0.036	0.214	193
18	270	0.7	0.051	0.181	0.009	0.042	0.250	225
19	285	0.7	0.051	0.179	0.009	0.042	0.250	225
20	300	0.8	0.059	0.177	0.010	0.048	0.286	257
21	315	0.6	0.044	0.174	0.008	0.036	0.214	193
22	330	0.7	0.051	0.172	0.009	0.042	0.250	225
23	345	0.8	0.059	0.170	0.010	0.048	0.286	257
24	360	0.8	0.059	0.167	0.010	0.048	0.286	257
25	375	0.9	0.066	0.165	0.011	0.054	0.321	289
26	390	0.9	0.066	0.163	0.011	0.054	0.321	289
27	405	1	0.073	0.161	0.013	0.061	0.357	321
28	420	1	0.073	0.159	0.013	0.061	0.357	321
29	435	1	0.073	0.157	0.013	0.061	0.357	321
30	450	1.1	0.081	0.154	0.014	0.067	0.393	353
31	465	1.2	0.088	0.152	0.015	0.073	0.428	385
32	480	1.3	0.095	0.150	0.016	0.079	0.464	418
33	495	1.5	0.110	0.148	0.019	0.091	0.535	482
34	510	1.5	0.110	0.146	0.019	0.091	0.535	482
35	525	1.6	0.117	0.144	0.020	0.097	0.571	514
36	540	1.7	0.124	0.142	0.022	0.103	0.607	546
37	555	1.9	0.139	0.140	0.024	0.115	0.678	610
38	570	2	0.146	0.138	0.025	0.121	0.714	642
39	585	2.1	0.154	0.136	0.027	0.127	0.750	675
40	600	2.2	0.161	0.134	0.028	0.133	0.785	707
41	615	1.5	0.110	0.132	0.019	0.091	0.535	482
42	630	1.5	0.110	0.130	0.019	0.091	0.535	482
43	645	2	0.146	0.128	0.025	0.121	0.714	642

44	660	2	0.146	0.126	0.025	0.121	0.714	642
45	675	1.9	0.139	0.125	0.024	0.115	0.678	610
46	690	1.9	0.139	0.123	0.024	0.115	0.678	610
47	705	1.7	0.124	0.121	0.022	0.103	0.607	546
48	720	1.8	0.132	0.119	0.023	0.109	0.642	578
49	735	2.5	0.183	0.117	0.032	0.151	0.892	803
50	750	2.6	0.190	0.116	0.033	0.157	0.928	835
51	765	2.8	0.205	0.114	0.035	0.169	0.999	899
52	780	2.9	0.212	0.112	0.037	0.176	1.035	932
53	795	3.4	0.249	0.110	0.043	0.206	1.213	1092
54	810	3.4	0.249	0.109	0.043	0.206	1.213	1092
55	825	2.3	0.168	0.107	0.029	0.139	0.821	739
56	840	2.3	0.168	0.105	0.029	0.139	0.821	739
57	855	2.7	0.198	0.104	0.034	0.163	0.964	867
58	870	2.6	0.190	0.102	0.033	0.157	0.928	835
59	885	2.6	0.190	0.101	0.033	0.157	0.928	835
60	900	2.5	0.183	0.099	0.032	0.151	0.892	803
61	915	2.4	0.176	0.098	0.030	0.145	0.857	771
62	930	2.3	0.168	0.096	0.029	0.139	0.821	739
63	945	1.9	0.139	0.095	0.024	0.115	0.678	610
64	960	1.9	0.139	0.093	0.024	0.115	0.678	610
65	975	0.4	0.029	0.092	0.005	0.024	0.143	128
66	990	0.4	0.029	0.090	0.005	0.024	0.143	128
67	1005	0.3	0.022	0.089	0.004	0.018	0.107	96
68	1020	0.3	0.022	0.088	0.004	0.018	0.107	96
69	1035	0.5	0.037	0.086	0.006	0.030	0.178	161
70	1050	0.5	0.037	0.085	0.006	0.030	0.178	161
71	1065	0.5	0.037	0.084	0.006	0.030	0.178	161
72	1080	0.4	0.029	0.083	0.005	0.024	0.143	128
73	1095	0.4	0.029	0.081	0.005	0.024	0.143	128
74	1110	0.4	0.029	0.080	0.005	0.024	0.143	128
75	1125	0.3	0.022	0.079	0.004	0.018	0.107	96
76	1140	0.2	0.015	0.078	0.003	0.012	0.071	64
77	1155	0.3	0.022	0.077	0.004	0.018	0.107	96
78	1170	0.4	0.029	0.076	0.005	0.024	0.143	128
79	1185	0.3	0.022	0.075	0.004	0.018	0.107	96
80	1200	0.2	0.015	0.074	0.003	0.012	0.071	64
81	1215	0.3	0.022	0.073	0.004	0.018	0.107	96
82	1230	0.3	0.022	0.072	0.004	0.018	0.107	96
83	1245	0.3	0.022	0.071	0.004	0.018	0.107	96
84	1260	0.2	0.015	0.070	0.003	0.012	0.071	64
85	1275	0.3	0.022	0.069	0.004	0.018	0.107	96
86	1290	0.2	0.015	0.068	0.003	0.012	0.071	64
87	1305	0.3	0.022	0.068	0.004	0.018	0.107	96
88	1320	0.2	0.015	0.067	0.003	0.012	0.071	64
89	1335	0.3	0.022	0.066	0.004	0.018	0.107	96
90	1350	0.2	0.015	0.066	0.003	0.012	0.071	64
91	1365	0.2	0.015	0.065	0.003	0.012	0.071	64
92	1380	0.2	0.015	0.065	0.003	0.012	0.071	64
93	1395	0.2	0.015	0.064	0.003	0.012	0.071	64
94	1410	0.2	0.015	0.064	0.003	0.012	0.071	64
95	1425	0.2	0.015	0.063	0.003	0.012	0.071	64
96	1440	0.2	0.015	0.063	0.003	0.012	0.071	64
97	1455						0.000	0

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Post-Development - POD-3A

Area:	4.565	acres	Per Hydrology Map (to use in this report)
Pervious B:	0.000	acres	
Pervious C:	0.000	acres	
Pervious D:	0.269	acres	
% perv B:	0.0%		Soil Type: B/C/D
% perv C:	0.0%		
% perv D:	5.9%		
% imperv:	94.1%		RI (Plate D-5.5): 56/69/75 (Commercial Landscaping)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
56	0.68	0.48	0.28	(Plate E-6.2)
69	0.58	0.37	0.19	(Plate E-6.2)
75	0.50	0.30	0.15	(Plate E-6.2)
Weighted	0.50	0.30	0.15	

Synthetic Unit Hydrograph

Post-Development Determination (Centerline of Parking lot)

n:	0.013		(interpretation of Plate E.3)	
L:	270	ft	0.051	miles
Lca:	100	ft	0.019	miles
U/S:	1612	ft		
D/S:	1600	ft		
s:	0.0444	ft/ft	234.7	ft/mile
tlag:	0.47	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Post-Development - POD-3A

Return Period:	2	yr	Low Loss Rate %:	14%	
Duration of Rain:	24	hr	% impervious:	94.1%	
Rainfall:	1.83	inches	Fp (AMC-I):	0.50	in/hr
Area:	4.56	acres	Constant loss rate, F:	0.077	in/hr
			Fm (as a % of F):	0.500	
Volume:	**26040**	**cu-ft**	**Peak:**	**0.98**	**cfs**

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.135	0.002	0.013	0.058	52
2	30	0.3	0.022	0.134	0.003	0.019	0.087	78
3	45	0.3	0.022	0.132	0.003	0.019	0.087	78
4	60	0.4	0.029	0.130	0.004	0.025	0.116	104
5	75	0.3	0.022	0.129	0.003	0.019	0.087	78
6	90	0.3	0.022	0.127	0.003	0.019	0.087	78
7	105	0.3	0.022	0.126	0.003	0.019	0.087	78
8	120	0.4	0.029	0.124	0.004	0.025	0.116	104
9	135	0.4	0.029	0.123	0.004	0.025	0.116	104
10	150	0.4	0.029	0.121	0.004	0.025	0.116	104
11	165	0.5	0.037	0.120	0.005	0.031	0.145	130
12	180	0.5	0.037	0.118	0.005	0.031	0.145	130
13	195	0.5	0.037	0.117	0.005	0.031	0.145	130
14	210	0.5	0.037	0.115	0.005	0.031	0.145	130
15	225	0.5	0.037	0.114	0.005	0.031	0.145	130
16	240	0.6	0.044	0.113	0.006	0.038	0.174	156
17	255	0.6	0.044	0.111	0.006	0.038	0.174	156
18	270	0.7	0.051	0.110	0.007	0.044	0.203	182
19	285	0.7	0.051	0.108	0.007	0.044	0.203	182
20	300	0.8	0.059	0.107	0.008	0.050	0.231	208
21	315	0.6	0.044	0.106	0.006	0.038	0.174	156
22	330	0.7	0.051	0.104	0.007	0.044	0.203	182
23	345	0.8	0.059	0.103	0.008	0.050	0.231	208
24	360	0.8	0.059	0.101	0.008	0.050	0.231	208
25	375	0.9	0.066	0.100	0.009	0.057	0.260	234
26	390	0.9	0.066	0.099	0.009	0.057	0.260	234
27	405	1	0.073	0.097	0.010	0.063	0.289	260
28	420	1	0.073	0.096	0.010	0.063	0.289	260
29	435	1	0.073	0.095	0.010	0.063	0.289	260
30	450	1.1	0.081	0.094	0.011	0.069	0.318	286
31	465	1.2	0.088	0.092	0.012	0.075	0.347	312
32	480	1.3	0.095	0.091	0.013	0.082	0.376	339
33	495	1.5	0.110	0.090	0.016	0.094	0.434	391
34	510	1.5	0.110	0.088	0.016	0.094	0.434	391
35	525	1.6	0.117	0.087	0.017	0.101	0.463	417
36	540	1.7	0.124	0.086	0.018	0.107	0.492	443
37	555	1.9	0.139	0.085	0.020	0.119	0.550	495
38	570	2	0.146	0.084	0.021	0.126	0.579	521
39	585	2.1	0.154	0.082	0.022	0.132	0.608	547
40	600	2.2	0.161	0.081	0.023	0.138	0.637	573
41	615	1.5	0.110	0.080	0.016	0.094	0.434	391
42	630	1.5	0.110	0.079	0.016	0.094	0.434	391
43	645	2	0.146	0.078	0.021	0.126	0.579	521

44	660	2	0.146	0.077	0.021	0.126	0.579	521
45	675	1.9	0.139	0.075	0.020	0.119	0.550	495
46	690	1.9	0.139	0.074	0.020	0.119	0.550	495
47	705	1.7	0.124	0.073	0.018	0.107	0.492	443
48	720	1.8	0.132	0.072	0.019	0.113	0.521	469
49	735	2.5	0.183	0.071	0.026	0.157	0.723	651
50	750	2.6	0.190	0.070	0.027	0.163	0.752	677
51	765	2.8	0.205	0.069	0.029	0.176	0.810	729
52	780	2.9	0.212	0.068	0.030	0.182	0.839	755
53	795	3.4	0.249	0.067	0.035	0.214	0.984	885
54	810	3.4	0.249	0.066	0.035	0.214	0.984	885
55	825	2.3	0.168	0.065	0.024	0.145	0.665	599
56	840	2.3	0.168	0.064	0.024	0.145	0.665	599
57	855	2.7	0.198	0.063	0.028	0.170	0.781	703
58	870	2.6	0.190	0.062	0.027	0.163	0.752	677
59	885	2.6	0.190	0.061	0.027	0.163	0.752	677
60	900	2.5	0.183	0.060	0.026	0.157	0.723	651
61	915	2.4	0.176	0.059	0.025	0.151	0.694	625
62	930	2.3	0.168	0.058	0.024	0.145	0.665	599
63	945	1.9	0.139	0.057	0.020	0.119	0.550	495
64	960	1.9	0.139	0.056	0.020	0.119	0.550	495
65	975	0.4	0.029	0.056	0.004	0.025	0.116	104
66	990	0.4	0.029	0.055	0.004	0.025	0.116	104
67	1005	0.3	0.022	0.054	0.003	0.019	0.087	78
68	1020	0.3	0.022	0.053	0.003	0.019	0.087	78
69	1035	0.5	0.037	0.052	0.005	0.031	0.145	130
70	1050	0.5	0.037	0.052	0.005	0.031	0.145	130
71	1065	0.5	0.037	0.051	0.005	0.031	0.145	130
72	1080	0.4	0.029	0.050	0.004	0.025	0.116	104
73	1095	0.4	0.029	0.049	0.004	0.025	0.116	104
74	1110	0.4	0.029	0.049	0.004	0.025	0.116	104
75	1125	0.3	0.022	0.048	0.003	0.019	0.087	78
76	1140	0.2	0.015	0.047	0.002	0.013	0.058	52
77	1155	0.3	0.022	0.047	0.003	0.019	0.087	78
78	1170	0.4	0.029	0.046	0.004	0.025	0.116	104
79	1185	0.3	0.022	0.045	0.003	0.019	0.087	78
80	1200	0.2	0.015	0.045	0.002	0.013	0.058	52
81	1215	0.3	0.022	0.044	0.003	0.019	0.087	78
82	1230	0.3	0.022	0.043	0.003	0.019	0.087	78
83	1245	0.3	0.022	0.043	0.003	0.019	0.087	78
84	1260	0.2	0.015	0.042	0.002	0.013	0.058	52
85	1275	0.3	0.022	0.042	0.003	0.019	0.087	78
86	1290	0.2	0.015	0.041	0.002	0.013	0.058	52
87	1305	0.3	0.022	0.041	0.003	0.019	0.087	78
88	1320	0.2	0.015	0.041	0.002	0.013	0.058	52
89	1335	0.3	0.022	0.040	0.003	0.019	0.087	78
90	1350	0.2	0.015	0.040	0.002	0.013	0.058	52
91	1365	0.2	0.015	0.039	0.002	0.013	0.058	52
92	1380	0.2	0.015	0.039	0.002	0.013	0.058	52
93	1395	0.2	0.015	0.039	0.002	0.013	0.058	52
94	1410	0.2	0.015	0.039	0.002	0.013	0.058	52
95	1425	0.2	0.015	0.038	0.002	0.013	0.058	52
96	1440	0.2	0.015	0.038	0.002	0.013	0.058	52
97	1455						0.000	0

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Post-Development - POD-3B

Area:	3.459	acres	Per Hydrology Map (to use in this report)
Pervious B:	0.000	acres	
Pervious C:	0.487	acres	
Pervious D:	0.359	acres	
% perv B:	0.0%		Soil Type: B/C/D
% perv C:	14.1%		
% perv D:	10.4%		
% imperv:	75.5%		RI (Plate D-5.5): 56/69/75 (Commercial Landscaping)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
56	0.68	0.48	0.28	(Plate E-6.2)
69	0.58	0.37	0.19	(Plate E-6.2)
75	0.50	0.30	0.15	(Plate E-6.2)
Weighted	0.55	0.34	0.17	

Synthetic Unit Hydrograph

Post-Development Determination (Centerline of Parking lot)

n:	0.013		(interpretation of Plate E.3)	
L:	270	ft	0.051	miles
Lca:	100	ft	0.019	miles
U/S:	1612	ft		
D/S:	1600	ft		
s:	0.0444	ft/ft	234.7	ft/mile
tlag:	0.47	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Post-Development - POD-3B

Return Period:	2	yr	Low Loss Rate %:	27%	
Duration of Rain:	24	hr	% impervious:	75.5%	
Rainfall:	1.83	inches	Fp (AMC-I):	0.55	in/hr
Area:	3.46	acres	Constant loss rate, F:	0.175	in/hr
			Fm (as a % of F):	0.500	
Volume:	**16741**	**cu-ft**	**Peak:**	**0.63**	**cfs**

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.309	0.004	0.011	0.037	33
2	30	0.3	0.022	0.305	0.006	0.016	0.056	50
3	45	0.3	0.022	0.302	0.006	0.016	0.056	50
4	60	0.4	0.029	0.298	0.008	0.021	0.074	67
5	75	0.3	0.022	0.295	0.006	0.016	0.056	50
6	90	0.3	0.022	0.291	0.006	0.016	0.056	50
7	105	0.3	0.022	0.288	0.006	0.016	0.056	50
8	120	0.4	0.029	0.284	0.008	0.021	0.074	67
9	135	0.4	0.029	0.281	0.008	0.021	0.074	67
10	150	0.4	0.029	0.277	0.008	0.021	0.074	67
11	165	0.5	0.037	0.274	0.010	0.027	0.093	84
12	180	0.5	0.037	0.271	0.010	0.027	0.093	84
13	195	0.5	0.037	0.267	0.010	0.027	0.093	84
14	210	0.5	0.037	0.264	0.010	0.027	0.093	84
15	225	0.5	0.037	0.261	0.010	0.027	0.093	84
16	240	0.6	0.044	0.257	0.012	0.032	0.112	100
17	255	0.6	0.044	0.254	0.012	0.032	0.112	100
18	270	0.7	0.051	0.251	0.014	0.037	0.130	117
19	285	0.7	0.051	0.248	0.014	0.037	0.130	117
20	300	0.8	0.059	0.244	0.016	0.043	0.149	134
21	315	0.6	0.044	0.241	0.012	0.032	0.112	100
22	330	0.7	0.051	0.238	0.014	0.037	0.130	117
23	345	0.8	0.059	0.235	0.016	0.043	0.149	134
24	360	0.8	0.059	0.232	0.016	0.043	0.149	134
25	375	0.9	0.066	0.229	0.018	0.048	0.167	151
26	390	0.9	0.066	0.226	0.018	0.048	0.167	151
27	405	1	0.073	0.223	0.020	0.053	0.186	167
28	420	1	0.073	0.220	0.020	0.053	0.186	167
29	435	1	0.073	0.217	0.020	0.053	0.186	167
30	450	1.1	0.081	0.214	0.022	0.059	0.205	184
31	465	1.2	0.088	0.211	0.024	0.064	0.223	201
32	480	1.3	0.095	0.208	0.026	0.069	0.242	218
33	495	1.5	0.110	0.205	0.030	0.080	0.279	251
34	510	1.5	0.110	0.202	0.030	0.080	0.279	251
35	525	1.6	0.117	0.199	0.032	0.085	0.298	268
36	540	1.7	0.124	0.197	0.034	0.091	0.316	285
37	555	1.9	0.139	0.194	0.038	0.101	0.353	318
38	570	2	0.146	0.191	0.040	0.107	0.372	335
39	585	2.1	0.154	0.188	0.042	0.112	0.391	352
40	600	2.2	0.161	0.186	0.044	0.117	0.409	368
41	615	1.5	0.110	0.183	0.030	0.080	0.279	251
42	630	1.5	0.110	0.180	0.030	0.080	0.279	251
43	645	2	0.146	0.178	0.040	0.107	0.372	335

44	660	2	0.146	0.175	0.040	0.107	0.372	335
45	675	1.9	0.139	0.172	0.038	0.101	0.353	318
46	690	1.9	0.139	0.170	0.038	0.101	0.353	318
47	705	1.7	0.124	0.167	0.034	0.091	0.316	285
48	720	1.8	0.132	0.165	0.036	0.096	0.335	301
49	735	2.5	0.183	0.162	0.050	0.133	0.465	419
50	750	2.6	0.190	0.160	0.052	0.139	0.484	435
51	765	2.8	0.205	0.158	0.056	0.149	0.521	469
52	780	2.9	0.212	0.155	0.058	0.155	0.539	486
53	795	3.4	0.249	0.153	0.068	0.181	0.632	569
54	810	3.4	0.249	0.151	0.068	0.181	0.632	569
55	825	2.3	0.168	0.148	0.046	0.123	0.428	385
56	840	2.3	0.168	0.146	0.046	0.123	0.428	385
57	855	2.7	0.198	0.144	0.054	0.144	0.502	452
58	870	2.6	0.190	0.142	0.052	0.139	0.484	435
59	885	2.6	0.190	0.139	0.052	0.139	0.484	435
60	900	2.5	0.183	0.137	0.050	0.133	0.465	419
61	915	2.4	0.176	0.135	0.048	0.128	0.446	402
62	930	2.3	0.168	0.133	0.046	0.123	0.428	385
63	945	1.9	0.139	0.131	0.038	0.101	0.353	318
64	960	1.9	0.139	0.129	0.038	0.101	0.353	318
65	975	0.4	0.029	0.127	0.008	0.021	0.074	67
66	990	0.4	0.029	0.125	0.008	0.021	0.074	67
67	1005	0.3	0.022	0.123	0.006	0.016	0.056	50
68	1020	0.3	0.022	0.121	0.006	0.016	0.056	50
69	1035	0.5	0.037	0.120	0.010	0.027	0.093	84
70	1050	0.5	0.037	0.118	0.010	0.027	0.093	84
71	1065	0.5	0.037	0.116	0.010	0.027	0.093	84
72	1080	0.4	0.029	0.114	0.008	0.021	0.074	67
73	1095	0.4	0.029	0.113	0.008	0.021	0.074	67
74	1110	0.4	0.029	0.111	0.008	0.021	0.074	67
75	1125	0.3	0.022	0.109	0.006	0.016	0.056	50
76	1140	0.2	0.015	0.108	0.004	0.011	0.037	33
77	1155	0.3	0.022	0.106	0.006	0.016	0.056	50
78	1170	0.4	0.029	0.105	0.008	0.021	0.074	67
79	1185	0.3	0.022	0.103	0.006	0.016	0.056	50
80	1200	0.2	0.015	0.102	0.004	0.011	0.037	33
81	1215	0.3	0.022	0.101	0.006	0.016	0.056	50
82	1230	0.3	0.022	0.099	0.006	0.016	0.056	50
83	1245	0.3	0.022	0.098	0.006	0.016	0.056	50
84	1260	0.2	0.015	0.097	0.004	0.011	0.037	33
85	1275	0.3	0.022	0.096	0.006	0.016	0.056	50
86	1290	0.2	0.015	0.095	0.004	0.011	0.037	33
87	1305	0.3	0.022	0.094	0.006	0.016	0.056	50
88	1320	0.2	0.015	0.093	0.004	0.011	0.037	33
89	1335	0.3	0.022	0.092	0.006	0.016	0.056	50
90	1350	0.2	0.015	0.091	0.004	0.011	0.037	33
91	1365	0.2	0.015	0.090	0.004	0.011	0.037	33
92	1380	0.2	0.015	0.089	0.004	0.011	0.037	33
93	1395	0.2	0.015	0.089	0.004	0.011	0.037	33
94	1410	0.2	0.015	0.088	0.004	0.011	0.037	33
95	1425	0.2	0.015	0.088	0.004	0.011	0.037	33
96	1440	0.2	0.015	0.088	0.004	0.011	0.037	33
97	1455						0.000	0

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Post-Development - DMA-4

Area:	13.816	acres	Per Hydrology Map (to use in this report)
Pervious B:	0.000	acres	
Pervious C:	1.463	acres	
Pervious D:	0.039	acres	
% perv B:	0.0%		Soil Type: B/C/D
% perv C:	10.6%		
% perv D:	0.3%		
% imperv:	89.1%		RI (Plate D-5.5): 56/69/75 (Commercial Landscaping)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
56	0.68	0.48	0.28	(Plate E-6.2)
69	0.58	0.37	0.19	(Plate E-6.2)
75	0.50	0.30	0.15	(Plate E-6.2)
Weighted	0.58	0.37	0.19	

Synthetic Unit Hydrograph

Post-Development Determination (Centerline of Parking lot)

n:	0.013		(interpretation of Plate E.3)	
L:	1000	ft	0.189	miles
Lca:	500	ft	0.095	miles
U/S:	1695	ft		
D/S:	1685	ft		
s:	0.0100	ft/ft	52.8	ft/mile
tlag:	1.91	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Post-Development - DMA-4

Return Period:	2	yr	Low Loss Rate %:	18%	
Duration of Rain:	24	hr	% impervious:	89.1%	
Rainfall:	1.83	inches	Fp (AMC-I):	0.58	in/hr
Area:	13.82	acres	Constant loss rate, F:	0.114	in/hr
			Fm (as a % of F):	0.500	
Volume:	**75619**	**cu-ft**	**Peak:**	**2.86**	**cfs**

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.202	0.003	0.012	0.168	151
2	30	0.3	0.022	0.200	0.004	0.018	0.252	227
3	45	0.3	0.022	0.197	0.004	0.018	0.252	227
4	60	0.4	0.029	0.195	0.005	0.024	0.336	302
5	75	0.3	0.022	0.193	0.004	0.018	0.252	227
6	90	0.3	0.022	0.190	0.004	0.018	0.252	227
7	105	0.3	0.022	0.188	0.004	0.018	0.252	227
8	120	0.4	0.029	0.186	0.005	0.024	0.336	302
9	135	0.4	0.029	0.184	0.005	0.024	0.336	302
10	150	0.4	0.029	0.181	0.005	0.024	0.336	302
11	165	0.5	0.037	0.179	0.006	0.030	0.420	378
12	180	0.5	0.037	0.177	0.006	0.030	0.420	378
13	195	0.5	0.037	0.175	0.006	0.030	0.420	378
14	210	0.5	0.037	0.173	0.006	0.030	0.420	378
15	225	0.5	0.037	0.170	0.006	0.030	0.420	378
16	240	0.6	0.044	0.168	0.008	0.036	0.504	454
17	255	0.6	0.044	0.166	0.008	0.036	0.504	454
18	270	0.7	0.051	0.164	0.009	0.042	0.588	529
19	285	0.7	0.051	0.162	0.009	0.042	0.588	529
20	300	0.8	0.059	0.160	0.010	0.048	0.672	605
21	315	0.6	0.044	0.158	0.008	0.036	0.504	454
22	330	0.7	0.051	0.156	0.009	0.042	0.588	529
23	345	0.8	0.059	0.154	0.010	0.048	0.672	605
24	360	0.8	0.059	0.152	0.010	0.048	0.672	605
25	375	0.9	0.066	0.150	0.012	0.054	0.756	681
26	390	0.9	0.066	0.148	0.012	0.054	0.756	681
27	405	1	0.073	0.146	0.013	0.060	0.840	756
28	420	1	0.073	0.144	0.013	0.060	0.840	756
29	435	1	0.073	0.142	0.013	0.060	0.840	756
30	450	1.1	0.081	0.140	0.014	0.066	0.924	832
31	465	1.2	0.088	0.138	0.015	0.072	1.008	907
32	480	1.3	0.095	0.136	0.017	0.078	1.092	983
33	495	1.5	0.110	0.134	0.019	0.090	1.260	1134
34	510	1.5	0.110	0.132	0.019	0.090	1.260	1134
35	525	1.6	0.117	0.130	0.021	0.096	1.344	1210
36	540	1.7	0.124	0.129	0.022	0.103	1.428	1286
37	555	1.9	0.139	0.127	0.024	0.115	1.596	1437
38	570	2	0.146	0.125	0.026	0.121	1.680	1512
39	585	2.1	0.154	0.123	0.027	0.127	1.764	1588
40	600	2.2	0.161	0.121	0.028	0.133	1.848	1664
41	615	1.5	0.110	0.120	0.019	0.090	1.260	1134
42	630	1.5	0.110	0.118	0.019	0.090	1.260	1134
43	645	2	0.146	0.116	0.026	0.121	1.680	1512

44	660	2	0.146	0.114	0.026	0.121	1.680	1512
45	675	1.9	0.139	0.113	0.024	0.115	1.596	1437
46	690	1.9	0.139	0.111	0.024	0.115	1.596	1437
47	705	1.7	0.124	0.109	0.022	0.103	1.428	1286
48	720	1.8	0.132	0.108	0.023	0.109	1.512	1361
49	735	2.5	0.183	0.106	0.032	0.151	2.101	1890
50	750	2.6	0.190	0.105	0.034	0.157	2.185	1966
51	765	2.8	0.205	0.103	0.036	0.169	2.353	2117
52	780	2.9	0.212	0.101	0.037	0.175	2.437	2193
53	795	3.4	0.249	0.100	0.044	0.205	2.857	2571
54	810	3.4	0.249	0.098	0.044	0.205	2.857	2571
55	825	2.3	0.168	0.097	0.030	0.139	1.932	1739
56	840	2.3	0.168	0.095	0.030	0.139	1.932	1739
57	855	2.7	0.198	0.094	0.035	0.163	2.269	2042
58	870	2.6	0.190	0.093	0.034	0.157	2.185	1966
59	885	2.6	0.190	0.091	0.034	0.157	2.185	1966
60	900	2.5	0.183	0.090	0.032	0.151	2.101	1890
61	915	2.4	0.176	0.088	0.031	0.145	2.016	1815
62	930	2.3	0.168	0.087	0.030	0.139	1.932	1739
63	945	1.9	0.139	0.086	0.024	0.115	1.596	1437
64	960	1.9	0.139	0.084	0.024	0.115	1.596	1437
65	975	0.4	0.029	0.083	0.005	0.024	0.336	302
66	990	0.4	0.029	0.082	0.005	0.024	0.336	302
67	1005	0.3	0.022	0.081	0.004	0.018	0.252	227
68	1020	0.3	0.022	0.079	0.004	0.018	0.252	227
69	1035	0.5	0.037	0.078	0.006	0.030	0.420	378
70	1050	0.5	0.037	0.077	0.006	0.030	0.420	378
71	1065	0.5	0.037	0.076	0.006	0.030	0.420	378
72	1080	0.4	0.029	0.075	0.005	0.024	0.336	302
73	1095	0.4	0.029	0.074	0.005	0.024	0.336	302
74	1110	0.4	0.029	0.073	0.005	0.024	0.336	302
75	1125	0.3	0.022	0.072	0.004	0.018	0.252	227
76	1140	0.2	0.015	0.070	0.003	0.012	0.168	151
77	1155	0.3	0.022	0.070	0.004	0.018	0.252	227
78	1170	0.4	0.029	0.069	0.005	0.024	0.336	302
79	1185	0.3	0.022	0.068	0.004	0.018	0.252	227
80	1200	0.2	0.015	0.067	0.003	0.012	0.168	151
81	1215	0.3	0.022	0.066	0.004	0.018	0.252	227
82	1230	0.3	0.022	0.065	0.004	0.018	0.252	227
83	1245	0.3	0.022	0.064	0.004	0.018	0.252	227
84	1260	0.2	0.015	0.063	0.003	0.012	0.168	151
85	1275	0.3	0.022	0.063	0.004	0.018	0.252	227
86	1290	0.2	0.015	0.062	0.003	0.012	0.168	151
87	1305	0.3	0.022	0.061	0.004	0.018	0.252	227
88	1320	0.2	0.015	0.061	0.003	0.012	0.168	151
89	1335	0.3	0.022	0.060	0.004	0.018	0.252	227
90	1350	0.2	0.015	0.059	0.003	0.012	0.168	151
91	1365	0.2	0.015	0.059	0.003	0.012	0.168	151
92	1380	0.2	0.015	0.058	0.003	0.012	0.168	151
93	1395	0.2	0.015	0.058	0.003	0.012	0.168	151
94	1410	0.2	0.015	0.058	0.003	0.012	0.168	151
95	1425	0.2	0.015	0.057	0.003	0.012	0.168	151
96	1440	0.2	0.015	0.057	0.003	0.012	0.168	151
97	1455						0.000	0

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Post-Development - DMA-4A

Area:	0.189	acres	Per Hydrology Map (to use in this report)
Pervious B:	0.000	acres	
Pervious C:	0.101	acres	
Pervious D:	0.088	acres	
% perv B:	0.0%		Soil Type: C/D
% perv C:	53.6%		
% perv D:	46.4%		
% imperv:	0.0%		RI (Plate D-5.5): 56/69/75 (Commercial Landscaping)
			RI (Plate D-5.5): 90 (impervious)

RI:	AMC-I	AMC-II	AMC-III	
69	0.68	0.48	0.28	(Plate E-6.2)
80	0.58	0.37	0.19	(Plate E-6.2)
85	0.50	0.30	0.15	(Plate E-6.2)
Weighted	0.54	0.34	0.17	

Synthetic Unit Hydrograph

Post-Development Determination (Flowline of Area)

n:	0.03		(interpretation of Plate E.3)	
L:	100	ft	0.019	miles
Lca:	50	ft	0.009	miles
U/S:	1585	ft		
D/S:	1568	ft		
s:	0.1700	ft/ft	897.6	ft/mile
tlag:	0.45	min		
Δt (3hr, 6hr):	5	min		
Δt (24hr):	15	min		

As tlag < 5 - 7 min, Short Cut Hydrograph Method Used.

Post-Development - DMA-4A

Return Period:	2 yr	Low Loss Rate %:	80%
Duration of Rain:	24 hr	% impervious:	0.0%
Rainfall:	1.83 inches	Fp (AMC-I):	0.54 in/hr
Area:	0.19 acres	Constant loss rate, F:	0.543 in/hr
		Fm (as a % of F):	0.500
Volume:	**251 cu-ft**	**Peak:**	**0.01 cfs**

Period	Time (min)	Pattern %	Intensity (in/hr)	Max Loss (in/hr)	Low (in/hr)	Effective (in/hr)	**TOTAL (cfs)**	**Volume (cf)**
	0						0.000	0
1	15	0.2	0.015	0.959	0.012	0.003	0.001	1
2	30	0.3	0.022	0.948	0.018	0.004	0.001	1
3	45	0.3	0.022	0.936	0.018	0.004	0.001	1
4	60	0.4	0.029	0.925	0.023	0.006	0.001	1
5	75	0.3	0.022	0.915	0.018	0.004	0.001	1
6	90	0.3	0.022	0.904	0.018	0.004	0.001	1
7	105	0.3	0.022	0.893	0.018	0.004	0.001	1
8	120	0.4	0.029	0.882	0.023	0.006	0.001	1
9	135	0.4	0.029	0.871	0.023	0.006	0.001	1
10	150	0.4	0.029	0.861	0.023	0.006	0.001	1
11	165	0.5	0.037	0.850	0.029	0.007	0.001	1
12	180	0.5	0.037	0.840	0.029	0.007	0.001	1
13	195	0.5	0.037	0.830	0.029	0.007	0.001	1
14	210	0.5	0.037	0.819	0.029	0.007	0.001	1
15	225	0.5	0.037	0.809	0.029	0.007	0.001	1
16	240	0.6	0.044	0.799	0.035	0.009	0.002	2
17	255	0.6	0.044	0.789	0.035	0.009	0.002	2
18	270	0.7	0.051	0.779	0.041	0.010	0.002	2
19	285	0.7	0.051	0.769	0.041	0.010	0.002	2
20	300	0.8	0.059	0.759	0.047	0.012	0.002	2
21	315	0.6	0.044	0.749	0.035	0.009	0.002	2
22	330	0.7	0.051	0.739	0.041	0.010	0.002	2
23	345	0.8	0.059	0.729	0.047	0.012	0.002	2
24	360	0.8	0.059	0.720	0.047	0.012	0.002	2
25	375	0.9	0.066	0.710	0.053	0.013	0.003	2
26	390	0.9	0.066	0.701	0.053	0.013	0.003	2
27	405	1	0.073	0.691	0.059	0.015	0.003	3
28	420	1	0.073	0.682	0.059	0.015	0.003	3
29	435	1	0.073	0.673	0.059	0.015	0.003	3
30	450	1.1	0.081	0.664	0.064	0.016	0.003	3
31	465	1.2	0.088	0.654	0.070	0.018	0.003	3
32	480	1.3	0.095	0.645	0.076	0.019	0.004	3
33	495	1.5	0.110	0.637	0.088	0.022	0.004	4
34	510	1.5	0.110	0.628	0.088	0.022	0.004	4
35	525	1.6	0.117	0.619	0.094	0.023	0.004	4
36	540	1.7	0.124	0.610	0.100	0.025	0.005	4
37	555	1.9	0.139	0.601	0.111	0.028	0.005	5
38	570	2	0.146	0.593	0.117	0.029	0.006	5
39	585	2.1	0.154	0.584	0.123	0.031	0.006	5
40	600	2.2	0.161	0.576	0.129	0.032	0.006	6
41	615	1.5	0.110	0.568	0.088	0.022	0.004	4
42	630	1.5	0.110	0.559	0.088	0.022	0.004	4
43	645	2	0.146	0.551	0.117	0.029	0.006	5

44	660	2	0.146	0.543	0.117	0.029	0.006	5
45	675	1.9	0.139	0.535	0.111	0.028	0.005	5
46	690	1.9	0.139	0.527	0.111	0.028	0.005	5
47	705	1.7	0.124	0.520	0.100	0.025	0.005	4
48	720	1.8	0.132	0.512	0.105	0.026	0.005	5
49	735	2.5	0.183	0.504	0.146	0.037	0.007	6
50	750	2.6	0.190	0.497	0.152	0.038	0.007	7
51	765	2.8	0.205	0.489	0.164	0.041	0.008	7
52	780	2.9	0.212	0.482	0.170	0.042	0.008	7
53	795	3.4	0.249	0.475	0.199	0.050	0.009	9
54	810	3.4	0.249	0.467	0.199	0.050	0.009	9
55	825	2.3	0.168	0.460	0.135	0.034	0.006	6
56	840	2.3	0.168	0.453	0.135	0.034	0.006	6
57	855	2.7	0.198	0.446	0.158	0.040	0.008	7
58	870	2.6	0.190	0.440	0.152	0.038	0.007	7
59	885	2.6	0.190	0.433	0.152	0.038	0.007	7
60	900	2.5	0.183	0.426	0.146	0.037	0.007	6
61	915	2.4	0.176	0.420	0.141	0.035	0.007	6
62	930	2.3	0.168	0.413	0.135	0.034	0.006	6
63	945	1.9	0.139	0.407	0.111	0.028	0.005	5
64	960	1.9	0.139	0.401	0.111	0.028	0.005	5
65	975	0.4	0.029	0.395	0.023	0.006	0.001	1
66	990	0.4	0.029	0.389	0.023	0.006	0.001	1
67	1005	0.3	0.022	0.383	0.018	0.004	0.001	1
68	1020	0.3	0.022	0.377	0.018	0.004	0.001	1
69	1035	0.5	0.037	0.371	0.029	0.007	0.001	1
70	1050	0.5	0.037	0.366	0.029	0.007	0.001	1
71	1065	0.5	0.037	0.360	0.029	0.007	0.001	1
72	1080	0.4	0.029	0.355	0.023	0.006	0.001	1
73	1095	0.4	0.029	0.350	0.023	0.006	0.001	1
74	1110	0.4	0.029	0.345	0.023	0.006	0.001	1
75	1125	0.3	0.022	0.340	0.018	0.004	0.001	1
76	1140	0.2	0.015	0.335	0.012	0.003	0.001	1
77	1155	0.3	0.022	0.330	0.018	0.004	0.001	1
78	1170	0.4	0.029	0.325	0.023	0.006	0.001	1
79	1185	0.3	0.022	0.321	0.018	0.004	0.001	1
80	1200	0.2	0.015	0.317	0.012	0.003	0.001	1
81	1215	0.3	0.022	0.312	0.018	0.004	0.001	1
82	1230	0.3	0.022	0.308	0.018	0.004	0.001	1
83	1245	0.3	0.022	0.305	0.018	0.004	0.001	1
84	1260	0.2	0.015	0.301	0.012	0.003	0.001	1
85	1275	0.3	0.022	0.297	0.018	0.004	0.001	1
86	1290	0.2	0.015	0.294	0.012	0.003	0.001	1
87	1305	0.3	0.022	0.291	0.018	0.004	0.001	1
88	1320	0.2	0.015	0.288	0.012	0.003	0.001	1
89	1335	0.3	0.022	0.285	0.018	0.004	0.001	1
90	1350	0.2	0.015	0.282	0.012	0.003	0.001	1
91	1365	0.2	0.015	0.280	0.012	0.003	0.001	1
92	1380	0.2	0.015	0.277	0.012	0.003	0.001	1
93	1395	0.2	0.015	0.276	0.012	0.003	0.001	1
94	1410	0.2	0.015	0.274	0.012	0.003	0.001	1
95	1425	0.2	0.015	0.273	0.012	0.003	0.001	1
96	1440	0.2	0.015	0.272	0.012	0.003	0.001	1
97	1455						0.000	0

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APPENDIX 7.6: ELEVATION – VOLUME – DISCHARGE TABLES FOR MODIFIED PULS

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Project:

Chamber Model -	MC-4500	
Units -	**Imperial**	Click Here for Metric
Number of Chambers -	200	
Number of End Caps -	8	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	0.00	ft
Amount of Stone Above Chambers -	12	in
Amount of Stone Below Chambers -	18	in

☑ Include Perimeter Stone in Calculations

Area of system - 8500 sf Min. Area - 7583 sf min. area

StormTech MC-4500 Cumulative Storage Volumes

Height of System *(inches)*	Incremental Single Chamber *(cubic feet)*	Incremental Single End Cap *(cubic feet)*	Incremental Chambers *(cubic feet)*	Incremental End Cap *(cubic feet)*	Incremental Stone *(cubic feet)*	Incremental Ch, EC and Stone *(cubic feet)*	Cumulative System (cubic feet)	Elevation (feet)
90	0.00	0.00	0.00	0.00	283.33	283.33	38470.61	7.50
89	0.00	0.00	0.00	0.00	283.33	283.33	38187.27	7.42
88	0.00	0.00	0.00	0.00	283.33	283.33	37903.94	7.33
87	0.00	0.00	0.00	0.00	283.33	283.33	37620.61	7.25
86	0.00	0.00	0.00	0.00	283.33	283.33	37337.27	7.17
85	0.00	0.00	0.00	0.00	283.33	283.33	37053.94	7.08
84	0.00	0.00	0.00	0.00	283.33	283.33	36770.61	7.00
83	0.00	0.00	0.00	0.00	283.33	283.33	36487.27	6.92
82	0.00	0.00	0.00	0.00	283.33	283.33	36203.94	6.83
81	0.00	0.00	0.00	0.00	283.33	283.33	35920.61	6.75
80	0.00	0.00	0.00	0.00	283.33	283.33	35637.27	6.67
79	0.00	0.00	0.00	0.00	283.33	283.33	35353.94	6.58
78	0.04	0.01	8.19	0.10	280.01	288.31	35070.61	6.50
77	0.12	0.03	23.22	0.27	273.94	297.43	34782.29	6.42
76	0.16	0.05	32.95	0.41	269.99	303.35	34484.87	6.33
75	0.21	0.07	41.74	0.53	266.42	308.70	34181.52	6.25
74	0.27	0.08	53.67	0.66	261.60	315.93	33872.82	6.17
73	0.45	0.11	90.56	0.84	246.77	338.17	33556.89	6.08
72	0.67	0.13	133.05	1.06	229.69	363.80	33218.71	6.00
71	0.80	0.16	159.80	1.29	218.90	379.99	32854.91	5.92
70	0.91	0.19	181.63	1.51	210.08	393.21	32474.92	5.83
69	1.00	0.22	200.58	1.75	202.40	404.73	32081.71	5.75
68	1.09	0.25	217.47	1.98	195.56	415.00	31676.98	5.67
67	1.16	0.28	232.70	2.20	189.37	424.27	31261.98	5.58
66	1.23	0.30	246.80	2.41	183.65	432.86	30837.71	5.50
65	1.30	0.33	259.94	2.62	178.31	440.87	30404.84	5.42
64	1.36	0.35	272.21	2.84	173.32	448.36	29963.98	5.33
63	1.42	0.38	283.74	3.07	168.61	455.42	29515.62	5.25
62	1.47	0.41	294.67	3.27	164.16	462.10	29060.20	5.17
61	1.53	0.44	305.03	3.53	159.91	468.47	28598.10	5.08
60	1.57	0.47	314.90	3.75	155.87	474.52	28129.63	5.00
59	1.62	0.50	324.28	3.96	152.04	480.28	27655.11	4.92
58	1.67	0.52	333.25	4.17	148.37	485.78	27174.83	4.83
57	1.71	0.54	341.82	4.36	144.86	491.04	26689.05	4.75
56	1.75	0.57	350.02	4.53	141.51	496.06	26198.01	4.67
55	1.79	0.59	357.86	4.71	138.31	500.87	25701.95	4.58
54	1.83	0.61	365.44	4.88	135.21	505.52	25201.08	4.50
53	1.86	0.63	372.69	5.06	132.24	509.98	24695.55	4.42
52	1.90	0.64	379.66	5.14	129.41	514.22	24185.57	4.33
51	1.93	0.68	386.37	5.42	126.62	518.40	23671.35	4.25
50	1.96	0.70	392.82	5.60	123.97	522.38	23152.95	4.17
49	2.00	0.72	399.02	5.78	121.41	526.21	22630.57	4.08
48	2.03	0.74	405.00	5.95	118.95	529.90	22104.35	4.00
47	2.05	0.76	410.76	6.12	116.58	533.46	21574.45	3.92
46	2.08	0.79	416.30	6.28	114.30	536.88	21040.99	3.83
45	2.11	0.80	421.62	6.42	112.12	540.16	20504.11	3.75
44	2.13	0.82	426.77	6.56	110.00	543.33	19963.95	3.67
43	2.16	0.84	431.74	6.71	107.96	546.40	19420.62	3.58
42	2.18	0.85	436.51	6.81	106.01	549.32	18874.22	3.50
41	2.21	0.86	441.10	6.88	104.14	552.12	18324.90	3.42
40	2.23	0.89	445.53	7.12	102.27	554.92	17772.77	3.33
39	2.25	0.90	449.77	7.23	100.53	557.54	17217.85	3.25
38	2.27	0.92	453.87	7.34	98.85	560.06	16660.31	3.17
37	2.29	0.92	457.80	7.36	97.27	562.43	16100.26	3.08
36	2.31	0.94	461.57	7.55	95.69	564.80	15537.83	3.00
35	2.33	0.96	465.19	7.65	94.20	567.04	14973.03	2.92
34	2.34	0.97	468.66	7.75	92.77	569.18	14405.99	2.83
33	2.36	0.98	471.98	7.85	91.40	571.23	13836.81	2.75
32	2.38	0.97	475.16	7.77	90.16	573.09	13265.58	2.67
31	2.39	1.00	478.20	8.03	88.84	575.07	12692.49	2.58
30	2.41	1.01	481.09	8.09	87.66	576.84	12117.42	2.50
29	2.42	1.02	483.85	8.16	86.53	578.54	11540.58	2.42
28	2.43	1.03	486.48	8.24	85.45	580.16	10962.04	2.33
27	2.44	1.04	488.97	8.31	84.42	581.70	10381.87	2.25
26	2.46	1.05	491.33	8.37	83.45	583.15	9800.17	2.17
25	2.47	1.05	493.56	8.43	82.54	584.53	9217.02	2.08

Outlet structure for Discharge of BMP 2A

Discharge vs Elevation Table

Note: 0.00 is the invert of the French Drain

Low orifice	1.750 "	Lower slot		Lower Weir					
Number of orif:	1	Number of slots:	1	Number of weirs:	0				
Cg-low:	0.61	Invert:	4.50 ft	Invert:	0.000 ft				
		B	0.500 ft	B:	0.000 ft				
Middle orifice	1.375 "	hslot	0.250 ft						
Number of orif:	1.000								
Cg-middle:	0.61	Upper slot		Upper Weir			Emergency weir		
invert elev:	3.167 ft	Number of slots:	0	Number of weirs:	0		Invert:	7.250 ft	
		Invert:	0.00 ft	Invert:	0.000 ft		W:	3.50 ft	
*Note: h = head above the invert of the lowest surface discharge opening.		B:	0.000 ft	B:	0.00 ft				
		hslot	0.000 ft						

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.083	0.571	0.000	0.008	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
0.167	1.143	0.000	0.025	0.026	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025
0.250	1.714	0.000	0.034	0.044	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.034
0.333	2.286	0.000	0.042	0.055	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.042
0.417	2.857	0.000	0.048	0.057	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.048
0.500	3.429	0.000	0.053	0.062	0.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053
0.583	4.000	0.000	0.058	0.096	0.058	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058
0.667	4.571	0.000	0.063	0.208	0.063	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.063
0.750	5.143	0.000	0.067	0.472	0.067	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.067
0.833	5.714	0.000	0.071	0.713	0.071	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.071
0.917	6.286	0.000	0.075	0.751	0.075	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075
1.000	6.857	0.000	0.079	0.787	0.079	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.079
1.083	7.429	0.000	0.082	0.822	0.082	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.082
1.167	8.000	0.000	0.086	0.855	0.086	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.086
1.250	8.571	0.000	0.089	0.887	0.089	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.089
1.333	9.143	0.000	0.092	0.918	0.092	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.092
1.417	9.714	0.000	0.095	0.948	0.095	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.095
1.500	10.286	0.000	0.098	0.977	0.098	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.098
1.583	10.857	0.000	0.100	1.005	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100
1.667	11.429	0.000	0.103	1.032	0.103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.103
1.750	12.000	0.000	0.106	1.059	0.106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.106
1.833	12.571	0.000	0.108	1.085	0.108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.108
1.917	13.143	0.000	0.111	1.110	0.111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.111
2.000	13.714	0.000	0.114	1.135	0.114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.114
2.083	14.286	0.000	0.116	1.159	0.116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.116
2.167	14.857	0.000	0.118	1.183	0.118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.118
2.250	15.429	0.000	0.121	1.206	0.121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.121
2.333	16.000	0.000	0.123	1.229	0.123	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.123
2.417	16.571	0.000	0.125	1.252	0.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.125
2.500	17.143	0.000	0.127	1.274	0.127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.127
2.583	17.714	0.000	0.130	1.296	0.130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.130
2.667	18.286	0.000	0.132	1.317	0.132	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.132
2.750	18.857	0.000	0.134	1.338	0.134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.134
2.833	19.429	0.000	0.136	1.359	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.136
2.917	20.000	0.000	0.138	1.379	0.138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.138
3.000	20.571	0.000	0.140	1.399	0.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.140
3.083	21.143	0.000	0.142	1.419	0.142	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.142
3.167	21.714	0.000	0.144	1.438	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.144
3.250	22.286	0.727	0.146	1.457	0.146	0.008	0.007	0.007	0.000	0.000	0.000	0.000	0.000	0.152
3.333	22.857	1.455	0.148	1.476	0.148	0.017	0.020	0.017	0.000	0.000	0.000	0.000	0.000	0.164
3.417	23.429	2.182	0.150	1.495	0.150	0.022	0.029	0.022	0.000	0.000	0.000	0.000	0.000	0.172
3.500	24.000	2.909	0.151	1.514	0.151	0.027	0.031	0.027	0.000	0.000	0.000	0.000	0.000	0.178
3.583	24.571	3.636	0.153	1.532	0.153	0.030	0.038	0.030	0.000	0.000	0.000	0.000	0.000	0.183
3.667	25.143	4.364	0.155	1.550	0.155	0.034	0.084	0.034	0.000	0.000	0.000	0.000	0.000	0.189
3.750	25.714	5.091	0.157	1.568	0.157	0.037	0.240	0.037	0.000	0.000	0.000	0.000	0.000	0.193
3.833	26.286	5.818	0.159	1.586	0.159	0.039	0.616	0.039	0.000	0.000	0.000	0.000	0.000	0.198
3.917	26.857	6.545	0.160	1.603	0.160	0.042	1.372	0.042	0.000	0.000	0.000	0.000	0.000	0.202
4.000	27.429	7.273	0.162	1.620	0.162	0.044	2.729	0.044	0.000	0.000	0.000	0.000	0.000	0.207
4.083	28.000	8.000	0.164	1.637	0.164	0.047	4.972	0.047	0.000	0.000	0.000	0.000	0.000	0.211
4.167	28.571	8.727	0.165	1.654	0.165	0.049	8.467	0.049	0.000	0.000	0.000	0.000	0.000	0.214
4.250	29.143	9.455	0.167	1.671	0.167	0.051	13.660	0.051	0.000	0.000	0.000	0.000	0.000	0.218
4.333	29.714	10.182	0.169	1.688	0.169	0.053	21.095	0.053	0.000	0.000	0.000	0.000	0.000	0.222
4.417	30.286	10.909	0.170	1.704	0.170	0.055	31.416	0.055	0.000	0.000	0.000	0.000	0.000	0.226
4.500	30.857	11.636	0.172	1.720	0.172	0.057	45.379	0.057	0.000	0.000	0.000	0.000	0.000	0.229
4.583	31.429	12.364	0.174	1.737	0.174	0.059	63.858	0.059	0.037	0.000	0.000	0.000	0.000	0.270
4.667	32.000	13.091	0.175	1.753	0.175	0.061	87.858	0.061	0.105	0.000	0.000	0.000	0.000	0.341
4.750	32.571	13.818	0.177	1.768	0.177	0.062	118.519	0.062	0.194	0.000	0.000	0.000	0.000	0.433
4.833	33.143	14.545	0.178	1.784	0.178	0.064	157.129	0.064	0.279	0.000	0.000	0.000	0.000	0.522
4.917	33.714	15.273	0.180	1.800	0.180	0.066	205.128	0.066	0.330	0.000	0.000	0.000	0.000	0.576
5.000	34.286	16.000	0.181	1.815	0.181	0.067	264.120	0.067	0.375	0.000	0.000	0.000	0.000	0.623
5.083	34.857	16.727	0.183	1.830	0.183	0.069	335.882	0.069	0.414	0.000	0.000	0.000	0.000	0.666
5.167	35.429	17.455	0.185	1.845	0.185	0.070	422.371	0.070	0.450	0.000	0.000	0.000	0.000	0.705
5.250	36.000	18.182	0.186	1.860	0.186	0.072	525.732	0.072	0.484	0.000	0.000	0.000	0.000	0.742
5.333	36.571	18.909	0.188	1.875	0.188	0.073	648.310	0.073	0.515	0.000	0.000	0.000	0.000	0.776
5.417	37.143	19.636	0.189	1.890	0.189	0.075	792.655	0.075	0.544	0.000	0.000	0.000	0.000	0.808

5.500	37.714	20.364	0.190	1.905	0.190	0.076	961.533	0.076	0.572	0.000	0.000	0.000	0.000	0.839
5.583	38.286	21.091	0.192	1.919	0.192	0.078	1157.934	0.078	0.599	0.000	0.000	0.000	0.000	0.868
5.667	38.857	21.818	0.193	1.934	0.193	0.079	1385.080	0.079	0.625	0.000	0.000	0.000	0.000	0.897
5.750	39.429	22.545	0.195	1.948	0.195	0.080	1646.436	0.080	0.649	0.000	0.000	0.000	0.000	0.924
5.833	40.000	23.273	0.196	1.962	0.196	0.082	1945.714	0.082	0.673	0.000	0.000	0.000	0.000	0.950
5.917	40.571	24.000	0.198	1.977	0.198	0.083	2286.889	0.083	0.695	0.000	0.000	0.000	0.000	0.976
6.000	41.143	24.727	0.199	1.991	0.199	0.084	2674.200	0.084	0.718	0.000	0.000	0.000	0.000	1.001
6.083	41.714	25.455	0.200	2.005	0.200	0.085	3112.163	0.085	0.739	0.000	0.000	0.000	0.000	1.025
6.167	42.286	26.182	0.202	2.018	0.202	0.087	3605.579	0.087	0.760	0.000	0.000	0.000	0.000	1.048
6.250	42.857	26.909	0.203	2.032	0.203	0.088	4159.544	0.088	0.780	0.000	0.000	0.000	0.000	1.071
6.333	43.429	27.636	0.205	2.046	0.205	0.089	4779.454	0.089	0.800	0.000	0.000	0.000	0.000	1.093
6.417	44.000	28.364	0.206	2.059	0.206	0.090	5471.016	0.090	0.819	0.000	0.000	0.000	0.000	1.115
6.500	44.571	29.091	0.207	2.073	0.207	0.091	6240.259	0.091	0.838	0.000	0.000	0.000	0.000	1.137
6.583	45.143	29.818	0.209	2.086	0.209	0.093	7093.536	0.093	0.856	0.000	0.000	0.000	0.000	1.157
6.667	45.714	30.545	0.210	2.100	0.210	0.094	8037.541	0.094	0.874	0.000	0.000	0.000	0.000	1.178
6.750	46.286	31.273	0.211	2.113	0.211	0.095	9079.313	0.095	0.892	0.000	0.000	0.000	0.000	1.198
6.833	46.857	32.000	0.213	2.126	0.213	0.096	10226.242	0.096	0.909	0.000	0.000	0.000	0.000	1.218
6.917	47.429	32.727	0.214	2.139	0.214	0.097	11486.085	0.097	0.926	0.000	0.000	0.000	0.000	1.237
7.000	48.000	33.455	0.215	2.152	0.215	0.098	12866.969	0.098	0.943	0.000	0.000	0.000	0.000	1.256
7.083	48.571	34.182	0.216	2.165	0.216	0.099	14377.400	0.099	0.959	0.000	0.000	0.000	0.000	1.275
7.167	49.143	34.909	0.218	2.178	0.218	0.100	16026.277	0.100	0.976	0.000	0.000	0.000	0.000	1.294
7.250	49.714	35.636	0.219	2.191	0.219	0.101	17822.892	0.101	0.991	0.000	0.000	0.000	0.000	1.312
7.333	50.286	36.364	0.220	2.203	0.220	0.102	19776.948	0.102	1.007	0.000	0.000	0.000	0.261	1.591
7.417	50.857	37.091	0.222	2.216	0.222	0.103	21898.559	0.103	1.022	0.000	0.000	0.000	0.738	2.086
7.500	51.429	37.818	0.223	2.228	0.223	0.104	24198.265	0.104	1.038	0.000	0.000	0.000	1.356	2.721

Stage-Storage for BMP-2B - Basin 1

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	1829	0.000	**BOTTOM OF GRAVEL LAYER (0.4 Voids)**
0.08	1829	61	
0.17	1829	122	
0.25	1829	183	
0.33	1829	244	
0.42	1829	305	
0.50	1829	366	
0.58	1829	427	
0.67	1829	488	
0.75	1829	549	
0.83	1829	610	
0.92	1829	671	
1.00	1829	732	**TOP OF GRAVEL LAYER**
1.08	1829	777	
1.17	1829	823	
1.25	1829	869	
1.33	1829	915	
1.42	1829	960	
1.50	1829	1006	
1.58	1829	1052	
1.67	1829	1097	
1.75	1829	1143	
1.83	1829	1189	
1.92	1829	1235	
2.00	1829	1280	
2.08	1829	1326	
2.17	1829	1372	
2.25	1829	1417	
2.33	1829	1463	
2.42	1829	1509	
2.50	1829	1555	
2.58	1829	1600	
2.67	1829	1646	
2.75	1829	1692	
2.83	1829	1738	
2.92	1829	1783	
3.00	1829	1829	
3.08	1829	1875	
3.17	1829	1920	
3.25	1829	1966	
3.33	1829	2012	
3.42	1829	2058	
3.50	1829	2103	
3.58	1829	2149	
3.67	1829	2195	
3.75	1829	2241	**TOP OF AMMENDED SOILS LAYER(0.3Voids)**
3.83	1829	2286	
3.92	1829	2332	
4.00	1829	2378	**TOP OF MULCH[(1)]**

4.08	1829	2530	
4.17	1829	2683	
4.25	1829	2835	
4.33	1829	2987	
4.42	1829	3140	
4.50	1829	3292	
4.58	1829	3445	
4.67	1829	3597	
4.75	1829	3749	
4.83	1829	3902	
4.92	1829	4054	
5.00	1829	4207	
5.08	1829	4359	
5.17	1829	4512	
5.25	1829	4664	
5.33	1829	4816	
5.42	1829	4969	
5.50	1829	5121	**SURFACE DISCHARGE(2) (FIRST OUTLET)**
5.58	1829	5274	
5.67	1829	5426	
5.75	1829	5578	
5.83	1829	5731	
5.92	1829	5883	
6.00	1829	6036	
6.08	1829	6188	
6.17	1829	6341	
6.25	1829	6493	
6.33	1829	6645	
6.42	1829	6798	
6.50	1829	6950	
6.58	1829	7103	
6.67	1829	7255	
6.75	1829	7407	SURFACE DISCHARGE (TOP OF RISER)
6.83	1829	7560	
6.92	1829	7712	
7.00	1829	7865	
7.08	1829	8017	
7.17	1829	8170	
7.25	1829	8322	
7.33	1829	8474	
7.42	1829	8627	
7.50	1829	8779	
7.58	1829	8932	
7.67	1829	9084	
7.75	1829	9236	
7.83	1829	9389	
7.92	1829	9541	
8.00	1829	9694	

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (Bio-filtration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Outlet structure for Discharge of BMP 2B-Basin 1

Discharge vs Elevation Table

Note: 0.00 is the invert of the French Drain

Low orifice	0.750 "	Lower slot			Lower Weir				
Number of orif:	1	Number of slots:	1		Number of weirs:	0			
Cg-low:	0.61	Invert:	4.50	ft	Invert:	0.000	ft		
		B	0.500	ft	B:	0.000	ft		
Middle orifice	1.000 "	hslot	0.167	ft					
Number of orif:	0.000								
Cg-middle:	0.61	Upper slot			Upper Weir			Emergency weir	
invert elev:	0 ft	Number of slots:	0		Number of weirs:	0		Invert:	7.000 ft
		Invert:	0.00	ft	Invert:	0.000	ft	W:	16.00 ft
*Note: h = head above the invert of the lowest surface discharge opening.		B:	0.000	ft	B:	0.00	ft		
		hslot	0.000	ft					

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.00000	0.000	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.083	1.333	1.000	0.00343	0.004	0.0034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0034
0.167	2.667	2.000	0.00553	0.007	0.0055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0055
0.250	4.000	3.000	0.00702	0.012	0.0070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0070
0.333	5.333	4.000	0.00825	0.073	0.0083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0083
0.417	6.667	5.000	0.00932	0.093	0.0093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0093
0.500	8.000	6.000	0.01028	0.103	0.0103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0103
0.583	9.333	7.000	0.01116	0.112	0.0112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0112
0.667	10.667	8.000	0.01197	0.120	0.0120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0120
0.750	12.000	9.000	0.01273	0.127	0.0127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0127
0.833	13.333	10.000	0.01345	0.135	0.0135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0135
0.917	14.667	11.000	0.01413	0.141	0.0141	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0141
1.000	16.000	12.000	0.01478	0.148	0.0148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0148
1.083	17.333	13.000	0.01540	0.154	0.0154	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0154
1.167	18.667	14.000	0.01600	0.160	0.0160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0160
1.250	20.000	15.000	0.01658	0.166	0.0166	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0166
1.333	21.333	16.000	0.01714	0.171	0.0171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0171
1.417	22.667	17.000	0.01768	0.177	0.0177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0177
1.500	24.000	18.000	0.01820	0.182	0.0182	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0182
1.583	25.333	19.000	0.01871	0.187	0.0187	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0187
1.667	26.667	20.000	0.01921	0.192	0.0192	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0192
1.750	28.000	21.000	0.01969	0.197	0.0197	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0197
1.833	29.333	22.000	0.02016	0.202	0.0202	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0202
1.917	30.667	23.000	0.02062	0.206	0.0206	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0206
2.000	32.000	24.000	0.02107	0.211	0.0211	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0211
2.083	33.333	25.000	0.02151	0.215	0.0215	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0215
2.167	34.667	26.000	0.02195	0.219	0.0219	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0219
2.250	36.000	27.000	0.02237	0.224	0.0224	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0224
2.333	37.333	28.000	0.02279	0.228	0.0228	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0228
2.417	38.667	29.000	0.02320	0.232	0.0232	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0232
2.500	40.000	30.000	0.02360	0.236	0.0236	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0236
2.583	41.333	31.000	0.02399	0.240	0.0240	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0240
2.667	42.667	32.000	0.02438	0.244	0.0244	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0244
2.750	44.000	33.000	0.02476	0.248	0.0248	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0248
2.833	45.333	34.000	0.02514	0.251	0.0251	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0251
2.917	46.667	35.000	0.02551	0.255	0.0255	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0255
3.000	48.000	36.000	0.02588	0.259	0.0259	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0259
3.083	49.333	37.000	0.02624	0.262	0.0262	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0262
3.167	50.667	38.000	0.02659	0.266	0.0266	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0266
3.250	52.000	39.000	0.02694	0.269	0.0269	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0269
3.333	53.333	40.000	0.02729	0.273	0.0273	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0273
3.417	54.667	41.000	0.02763	0.276	0.0276	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0276
3.500	56.000	42.000	0.02797	0.280	0.0280	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0280
3.583	57.333	43.000	0.02831	0.283	0.0283	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0283
3.667	58.667	44.000	0.02864	0.286	0.0286	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0286
3.750	60.000	45.000	0.02896	0.290	0.0290	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0290
3.833	61.333	46.000	0.02928	0.293	0.0293	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0293
3.917	62.667	47.000	0.02960	0.296	0.0296	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0296
4.000	64.000	48.000	0.02992	0.299	0.0299	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0299
4.083	65.333	49.000	0.03023	0.302	0.0302	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0302
4.167	66.667	50.000	0.03054	0.305	0.0305	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0305
4.250	68.000	51.000	0.03085	0.308	0.0308	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0308
4.333	69.333	52.000	0.03115	0.312	0.0312	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0312
4.417	70.667	53.000	0.03145	0.315	0.0315	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0315
4.500	72.000	54.000	0.03175	0.317	0.0317	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0317
4.583	73.333	55.000	0.03204	0.320	0.0320	0.000	0.000	0.000	0.037	0.000	0.000	0.000	0.000	0.0693
4.667	74.667	56.000	0.03233	0.323	0.0323	0.000	0.000	0.000	0.105	0.000	0.000	0.000	0.000	0.1378
4.750	76.000	57.000	0.03262	0.326	0.0326	0.000	0.000	0.000	0.167	0.000	0.000	0.000	0.000	0.1992
4.833	77.333	58.000	0.03291	0.329	0.0329	0.000	0.000	0.000	0.204	0.000	0.000	0.000	0.000	0.2369
4.917	78.667	59.000	0.03320	0.332	0.0332	0.000	0.000	0.000	0.236	0.000	0.000	0.000	0.000	0.2687
5.000	80.000	60.000	0.03348	0.335	0.0335	0.000	0.000	0.000	0.263	0.000	0.000	0.000	0.000	0.2968
5.083	81.333	61.000	0.03376	0.338	0.0338	0.000	0.000	0.000	0.288	0.000	0.000	0.000	0.000	0.3222
5.167	82.667	62.000	0.03403	0.340	0.0340	0.000	0.000	0.000	0.312	0.000	0.000	0.000	0.000	0.3456
5.250	84.000	63.000	0.03431	0.343	0.0343	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.000	0.3674
5.333	85.333	64.000	0.03458	0.346	0.0346	0.000	0.000	0.000	0.353	0.000	0.000	0.000	0.000	0.3879
5.417	86.667	65.000	0.03485	0.349	0.0349	0.000	0.000	0.000	0.372	0.000	0.000	0.000	0.000	0.4072
5.500	88.000	66.000	0.03512	0.351	0.0351	0.000	0.000	0.000	0.391	0.000	0.000	0.000	0.000	0.4257
5.583	89.333	67.000	0.03539	0.354	0.0354	0.000	0.000	0.000	0.408	0.000	0.000	0.000	0.000	0.4433
5.667	90.667	68.000	0.03565	0.357	0.0357	0.000	0.000	0.000	0.425	0.000	0.000	0.000	0.000	0.4602
5.750	92.000	69.000	0.03591	0.359	0.0359	0.000	0.000	0.000	0.441	0.000	0.000	0.000	0.000	0.4765
5.833	93.333	70.000	0.03618	0.362	0.0362	0.000	0.000	0.000	0.456	0.000	0.000	0.000	0.000	0.4923
5.917	94.667	71.000	0.03643	0.364	0.0364	0.000	0.000	0.000	0.471	0.000	0.000	0.000	0.000	0.5075

6.000	96.000	72.000	0.03669	0.367	0.037	0.000	0.000	0.000	0.486	0.000	0.000	0.000	0.000	0.5222
6.083	97.333	73.000	0.03695	0.369	0.037	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.5366
6.167	98.667	74.000	0.03720	0.372	0.037	0.000	0.000	0.000	0.513	0.000	0.000	0.000	0.000	0.5505
6.250	100.000	75.000	0.03745	0.375	0.037	0.000	0.000	0.000	0.527	0.000	0.000	0.000	0.000	0.5641
6.333	101.333	76.000	0.03770	0.377	0.038	0.000	0.000	0.000	0.540	0.000	0.000	0.000	0.000	0.5773
6.417	102.667	77.000	0.03795	0.380	0.038	0.000	0.000	0.000	0.552	0.000	0.000	0.000	0.000	0.5903
6.500	104.000	78.000	0.03820	0.382	0.038	0.000	0.000	0.000	0.565	0.000	0.000	0.000	0.000	0.6030
6.583	105.333	79.000	0.03844	0.384	0.038	0.000	0.000	0.000	0.577	0.000	0.000	0.000	0.000	0.6153
6.667	106.667	80.000	0.03869	0.387	0.039	0.000	0.000	0.000	0.589	0.000	0.000	0.000	0.000	0.6275
6.750	108.000	81.000	0.03893	0.389	0.039	0.000	0.000	0.000	0.600	0.000	0.000	0.000	0.000	0.6394
6.833	109.333	82.000	0.03917	0.392	0.039	0.000	0.000	0.000	0.612	0.000	0.000	0.000	0.000	0.6511
6.917	110.667	83.000	0.03941	0.394	0.039	0.000	0.000	0.000	0.623	0.000	0.000	0.000	0.000	0.6625
7.000	112.000	84.000	0.03965	0.396	0.040	0.000	0.000	0.000	0.634	0.000	0.000	0.000	0.000	0.6738

Stage-Storage for BMP-2B Basin 2

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	4352	**0**	**BOTTOM OF GRAVEL LAYER (0.4 Voids)**
1.00	4352	1741	**TOP OF GRAVEL LAYER**
3.00	4352	4352	
3.75	4352	5331	**TOP OF AMMENDED SOILS LAYER(0.3Voids)**
4.00	4352	5658	**TOP OF MULCH[1]**
4.08	5795	6080	
4.17	5825	6565	
4.25	5854	7051	
4.33	5884	7540	
4.42	5914	8032	
4.50	5943	8526	**SURFACE DISCHARGE[2] (FIRST OUTLET)**
4.58	5973	9022	
4.67	6002	9521	
4.75	6032	10023	
4.83	6061	10527	
4.92	6091	11033	
5.00	6120	11542	
5.08	6150	12053	
5.17	6179	12567	
5.25	6209	13083	
5.33	6239	13602	
5.42	6268	14123	
5.50	6298	14646	
5.58	6327	15172	
5.67	6357	15701	
5.75	6386	16232	
5.83	6416	16765	
5.92	6445	17301	
6.00	6475	17839	
6.08	6505	18380	
6.17	6534	18924	
6.25	6564	19469	
6.33	6593	20017	
6.42	6623	20568	
6.50	6652	21121	
6.58	6682	21677	**Surface Discharge (2nd Outlet)**
6.67	6712	22235	
6.75	6741	22795	
6.83	6771	23358	
6.92	6800	23924	
7.00	6830	24492	
7.08	6859	25062	

7.17	6889	25635	
7.25	6919	26210	
7.33	6948	26788	
7.42	6978	27368	
7.50	7007	27951	
7.58	7037	28536	
7.67	7067	29124	
7.75	7096	29714	SURFACE DISCHARGE (TOP OF RISER)
7.83	7126	30307	
7.92	7155	30902	
8.00	7185	31499	
8.08	7215	32099	
8.17	7244	32702	
8.25	7274	33307	
8.33	7303	33914	
8.42	7333	34524	
8.50	7363	35136	
8.58	7392	35751	
8.67	7422	36368	
8.75	7451	36988	
8.83	7481	37610	
8.92	7511	38235	
9.00	7540	38862	

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (Bio-filtration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Outlet structure for Discharge of BMP 2B-Basin 2

Discharge vs Elevation Table

Note: 0.00 is the invert of the French Drain

Low orifice	1.625 "	Lower slot		Lower Weir				
Number of orif:	1	Number of slots:	1	Number of weirs:	0			
Cg-low:	0.61	Invert:	7.00 ft	Invert:	0.000 ft			
		B	0.250 ft	B:	0.000 ft			
Middle orifice	1.000 "	hslot	0.250 ft					
Number of orif:	3.000							
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir		
invert elev:	4.50 ft	Number of slots:	0	Number of weirs:	0	Invert:	8.500 ft	
		Invert:	0.00 ft	Invert:	0.000 ft	W:	4.00 ft	
*Note: h = head above the invert of the lowest surface discharge opening.		B:	0.000 ft	B:	0.00 ft			
		hslot	0.000 ft					

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.00000	0.000	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
1.000	7.385	0.000	0.06807	0.681	0.0681	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0681
3.000	22.154	0.000	0.12073	1.207	0.1207	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.1207
3.750	27.692	0.000	0.13529	1.353	0.1353	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.1353
4.000	29.538	0.000	0.13981	1.398	0.1398	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.1398
4.083	30.154	0.000	0.14128	1.413	0.1413	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.1413
4.167	30.769	0.000	0.14274	1.427	0.1427	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.1427
4.250	31.385	0.000	0.14418	1.442	0.1442	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.1442
4.333	32.000	0.000	0.14561	1.456	0.1456	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.1456
4.417	32.615	0.000	0.14703	1.470	0.1470	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.1470
4.500	33.231	0.000	0.14843	1.484	0.1484	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.1484
4.583	33.846	0.999	0.14982	1.498	0.1498	0.016	0.016	0.016	0.000	0.000	0.000	0.000	0.000	0.1654
4.667	34.462	1.999	0.15119	1.512	0.1512	0.028	0.038	0.028	0.000	0.000	0.000	0.000	0.000	0.1795
4.750	35.077	2.999	0.15256	1.526	0.1526	0.037	0.042	0.037	0.000	0.000	0.000	0.000	0.000	0.1891
4.833	35.692	3.999	0.15391	1.539	0.1539	0.043	0.071	0.043	0.000	0.000	0.000	0.000	0.000	0.1972
4.917	36.308	4.999	0.15525	1.552	0.1552	0.049	0.286	0.049	0.000	0.000	0.000	0.000	0.000	0.2043
5.000	36.923	5.999	0.15658	1.566	0.1566	0.054	1.030	0.054	0.000	0.000	0.000	0.000	0.000	0.2108
5.083	37.538	6.999	0.15790	1.579	0.1579	0.059	2.883	0.059	0.000	0.000	0.000	0.000	0.000	0.2168
5.167	38.154	7.999	0.15920	1.592	0.1592	0.063	6.722	0.063	0.000	0.000	0.000	0.000	0.000	0.2225
5.250	38.769	8.999	0.16050	1.605	0.1605	0.067	13.776	0.067	0.000	0.000	0.000	0.000	0.000	0.2279
5.333	39.385	9.999	0.16178	1.618	0.1618	0.071	25.683	0.071	0.000	0.000	0.000	0.000	0.000	0.2330
5.417	40.000	10.999	0.16306	1.631	0.1631	0.075	44.554	0.075	0.000	0.000	0.000	0.000	0.000	0.2380
5.500	40.615	11.999	0.16432	1.643	0.1643	0.078	73.024	0.078	0.000	0.000	0.000	0.000	0.000	0.2427
5.583	41.231	12.999	0.16558	1.656	0.1656	0.082	114.312	0.082	0.000	0.000	0.000	0.000	0.000	0.2473
5.667	41.846	13.999	0.16682	1.668	0.1668	0.085	172.281	0.085	0.000	0.000	0.000	0.000	0.000	0.2518
5.750	42.462	14.999	0.16806	1.681	0.1681	0.088	251.491	0.088	0.000	0.000	0.000	0.000	0.000	0.2561
5.833	43.077	15.999	0.16929	1.693	0.1693	0.091	357.264	0.091	0.000	0.000	0.000	0.000	0.000	0.2603
5.917	43.692	16.999	0.17051	1.705	0.1705	0.094	495.733	0.094	0.000	0.000	0.000	0.000	0.000	0.2644
6.000	44.308	17.999	0.17172	1.717	0.1717	0.097	673.908	0.097	0.000	0.000	0.000	0.000	0.000	0.2684
6.083	44.923	18.999	0.17292	1.729	0.1729	0.099	899.727	0.099	0.000	0.000	0.000	0.000	0.000	0.2724
6.167	45.538	19.999	0.17411	1.741	0.1741	0.102	1182.119	0.102	0.000	0.000	0.000	0.000	0.000	0.2762
6.250	46.154	20.999	0.17530	1.753	0.1753	0.105	1531.058	0.105	0.000	0.000	0.000	0.000	0.000	0.2800
6.333	46.769	21.999	0.17648	1.765	0.1765	0.107	1957.625	0.107	0.000	0.000	0.000	0.000	0.000	0.2837
6.417	47.385	22.999	0.17765	1.776	0.1776	0.110	2474.060	0.110	0.000	0.000	0.000	0.000	0.000	0.2873
6.500	48.000	23.999	0.17881	1.788	0.1788	0.112	3093.824	0.112	0.000	0.000	0.000	0.000	0.000	0.2909
6.583	48.615	24.999	0.17996	1.800	0.1800	0.114	3831.658	0.114	0.000	0.000	0.000	0.000	0.000	0.2944
6.667	49.231	25.999	0.18111	1.811	0.1811	0.117	4703.636	0.117	0.000	0.000	0.000	0.000	0.000	0.2979
6.750	49.846	26.999	0.18225	1.823	0.1823	0.119	5727.225	0.119	0.000	0.000	0.000	0.000	0.000	0.3013
6.833	50.462	27.999	0.18338	1.834	0.1834	0.121	6921.346	0.121	0.000	0.000	0.000	0.000	0.000	0.3046
6.917	51.077	28.999	0.18451	1.845	0.1845	0.123	8306.425	0.123	0.000	0.000	0.000	0.000	0.000	0.3079
7.000	51.692	29.999	0.18563	1.856	0.1856	0.126	9904.459	0.126	0.000	0.000	0.000	0.000	0.000	0.3112
7.083	52.308	30.999	0.18674	1.867	0.1867	0.128	11739.066	0.128	0.019	0.000	0.000	0.000	0.000	0.3331
7.167	52.923	31.999	0.18785	1.878	0.1878	0.130	13835.547	0.130	0.053	0.000	0.000	0.000	0.000	0.3704
7.250	53.538	32.999	0.18895	1.889	0.1889	0.132	16220.945	0.132	0.097	0.000	0.000	0.000	0.000	0.4176
7.333	54.154	33.999	0.19004	1.900	0.1900	0.134	18924.098	0.134	0.140	0.000	0.000	0.000	0.000	0.4635
7.417	54.769	34.999	0.19113	1.911	0.1911	0.136	21975.702	0.136	0.165	0.000	0.000	0.000	0.000	0.4922
7.500	55.385	35.999	0.19221	1.922	0.1922	0.138	25408.364	0.138	0.187	0.000	0.000	0.000	0.000	0.5173
7.583	56.000	36.999	0.19328	1.933	0.1933	0.140	29256.665	0.140	0.207	0.000	0.000	0.000	0.000	0.5401
7.667	56.615	37.999	0.19435	1.943	0.1943	0.142	33557.213	0.142	0.225	0.000	0.000	0.000	0.000	0.5611
7.750	57.231	38.999	0.19541	1.954	0.1954	0.143	38348.702	0.143	0.242	0.000	0.000	0.000	0.000	0.5808
7.833	57.846	39.999	0.19647	1.965	0.1965	0.145	43671.973	0.145	0.257	0.000	0.000	0.000	0.000	0.5993
7.917	58.462	40.999	0.19752	1.975	0.1975	0.147	49570.067	0.147	0.272	0.000	0.000	0.000	0.000	0.6169
8.000	59.077	41.999	0.19857	1.986	0.1986	0.149	56088.287	0.149	0.286	0.000	0.000	0.000	0.000	0.6337
8.083	59.692	42.999	0.19961	1.996	0.1996	0.151	63274.252	0.151	0.300	0.000	0.000	0.000	0.000	0.6499
8.167	60.308	43.999	0.20064	2.006	0.2006	0.152	71177.958	0.152	0.312	0.000	0.000	0.000	0.000	0.6654
8.250	60.923	44.999	0.20167	2.017	0.2017	0.154	79851.834	0.154	0.325	0.000	0.000	0.000	0.000	0.6804
8.333	61.538	45.999	0.20270	2.027	0.2027	0.156	89350.801	0.156	0.336	0.000	0.000	0.000	0.000	0.6950
8.417	62.154	46.999	0.20372	2.037	0.2037	0.158	99732.327	0.158	0.348	0.000	0.000	0.000	0.000	0.7091
8.500	62.769	47.999	0.20473	2.047	0.2047	0.159	111056.489	0.159	0.359	0.000	0.000	0.000	0.000	0.7228
8.583	63.385	48.999	0.20574	2.057	0.2057	0.161	123386.026	0.161	0.369	0.000	0.000	0.000	0.298	1.0345
8.667	64.000	49.999	0.20674	2.067	0.2067	0.163	136786.403	0.163	0.380	0.000	0.000	0.000	0.844	1.5930
8.750	64.615	50.999	0.20774	2.077	0.2077	0.164	151325.862	0.164	0.390	0.000	0.000	0.000	1.550	2.3121
8.833	65.231	51.999	0.20874	2.087	0.2087	0.166	167075.483	0.166	0.400	0.000	0.000	0.000	2.386	3.1609
8.917	65.846	52.999	0.20973	2.097	0.2097	0.168	184109.245	0.168	0.410	0.000	0.000	0.000	3.335	4.1219
9.000	66.462	53.999	0.21071	2.107	0.2107	0.169	202504.076	0.169	0.419	0.000	0.000	0.000	4.384	5.1828

Stage-Storage for BMP-3A

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	6757	**0**	**BOTTOM OF GRAVEL LAYER (0.4 Voids)**
1.00	6757	2703	**TOP OF GRAVEL LAYER**
2.00	6757	4730	
3.75	6757	8277	**TOP OF AMMENDED SOILS LAYER(0.3Voids)**
4.00	6757	8784	**TOP OF MULCH[1]**
4.08	6757	9347	
4.17	6757	9910	
4.25	6757	10473	
4.33	6757	11036	
4.42	6757	11600	
4.50	6757	12163	**SURFACE DISCHARGE[2] (FIRST OUTLET)**
4.58	6757	12726	
4.67	6757	13289	
4.75	6757	13852	
4.83	6757	14415	
4.92	6757	14978	
5.00	6757	15541	
5.08	6757	16104	
5.17	6757	16667	
5.25	6757	17230	
5.33	6757	17793	
5.42	6757	18357	
5.50	6757	18920	
5.58	6757	19483	
5.67	6757	20046	
5.75	6757	20609	
5.83	6757	21172	
5.92	6757	21735	
6.00	6757	22298	
6.08	6757	22861	
6.17	6757	23424	
6.25	6757	23987	**Surface Discharge (2nd Outlet)**
6.33	6757	24550	
6.42	6757	25114	
6.50	6757	25677	
6.58	6757	26240	
6.67	6757	26803	
6.75	6757	27366	
6.83	6757	27929	
6.92	6757	28492	
7.00	6757	29055	
7.08	6757	29618	

7.17	6757	30181	
7.25	6757	30744	
7.33	6757	31307	
7.42	6757	31871	
7.50	6757	32434	
7.58	6757	32997	
7.67	6757	33560	
7.75	6757	34123	
7.83	6757	34686	
7.92	6757	35249	
8.00	6757	35812	
8.08	6757	36375	
8.17	6757	36938	
8.25	6757	37501	SURFACE DISCHARGE (TOP OF RISER)
8.33	6757	38064	
8.42	6757	38628	
8.50	6757	39191	

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (Bio-filtration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Outlet structure for Discharge of BMP 3A

Discharge vs Elevation Table

Note: 0.00 is the invert of the French Drain

Low orifice	1.667 "	Lower slot		Lower Weir				
Number of orif:	1	Number of slots:	0	Number of weirs:	0.000			
Cg-low:	0.61	Invert:	5.833 ft	Invert:	7.750 ft			
		B	0.146 ft	B:	0.500 ft			
Middle orifice	0.875 "	hslot	0.083 ft					
Number of orif:	1.000							
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir		
invert elev:	4.5 ft	Number of slots:	1	Number of weirs:	0	Invert:	8.250 ft	
		Invert:	6.25 ft	Invert:	7.500 ft	W:	16.00 ft	
*Note: h = head above the invert of the lowest surface discharge opening.		B:	0.96 ft	B:	1.00 ft			
		hslot	0.167 ft					

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.000	7.199	0.000	0.072	0.716	0.072	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072
2.000	14.397	0.000	0.103	1.031	0.103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.103
3.750	26.995	0.000	0.142	1.423	0.142	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.142
4.000	28.794	0.000	0.147	1.471	0.147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.147
4.083	29.394	0.000	0.149	1.486	0.149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.149
4.167	29.994	0.000	0.150	1.502	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150
4.250	30.594	0.000	0.152	1.517	0.152	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.152
4.333	31.194	0.000	0.153	1.532	0.153	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.153
4.417	31.794	0.000	0.155	1.547	0.155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.155
4.500	32.394	0.000	0.156	1.562	0.156	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.156
4.583	32.993	1.143	0.158	1.576	0.158	0.004	0.005	0.004	0.000	0.000	0.000	0.000	0.000	0.162
4.667	33.593	2.286	0.159	1.591	0.159	0.007	0.010	0.007	0.000	0.000	0.000	0.000	0.000	0.166
4.750	34.193	3.429	0.161	1.605	0.161	0.009	0.011	0.009	0.000	0.000	0.000	0.000	0.000	0.170
4.833	34.793	4.571	0.162	1.619	0.162	0.011	0.037	0.011	0.000	0.000	0.000	0.000	0.000	0.173
4.917	35.393	5.714	0.163	1.633	0.163	0.013	0.176	0.013	0.000	0.000	0.000	0.000	0.000	0.176
5.000	35.993	6.857	0.165	1.647	0.165	0.014	0.603	0.014	0.000	0.000	0.000	0.000	0.000	0.179
5.083	36.593	8.000	0.166	1.661	0.166	0.015	1.606	0.015	0.000	0.000	0.000	0.000	0.000	0.181
5.167	37.193	9.143	0.168	1.675	0.168	0.016	3.616	0.016	0.000	0.000	0.000	0.000	0.000	0.184
5.250	37.792	10.286	0.169	1.689	0.169	0.017	7.229	0.017	0.000	0.000	0.000	0.000	0.000	0.186
5.333	38.392	11.429	0.170	1.702	0.170	0.018	13.235	0.018	0.000	0.000	0.000	0.000	0.000	0.188
5.417	38.992	12.571	0.172	1.716	0.172	0.019	22.647	0.019	0.000	0.000	0.000	0.000	0.000	0.191
5.500	39.592	13.714	0.173	1.729	0.173	0.020	36.725	0.020	0.000	0.000	0.000	0.000	0.000	0.193
5.583	40.192	14.857	0.174	1.742	0.174	0.021	57.005	0.021	0.000	0.000	0.000	0.000	0.000	0.195
5.667	40.792	16.000	0.176	1.755	0.176	0.022	85.323	0.022	0.000	0.000	0.000	0.000	0.000	0.197
5.750	41.392	17.143	0.177	1.768	0.177	0.023	123.845	0.023	0.000	0.000	0.000	0.000	0.000	0.199
5.833	41.992	18.286	0.178	1.781	0.178	0.023	175.094	0.023	0.000	0.000	0.000	0.000	0.000	0.201
5.917	42.591	19.429	0.179	1.794	0.179	0.024	241.972	0.024	0.000	0.000	0.000	0.000	0.000	0.203
6.000	43.191	20.571	0.181	1.807	0.181	0.025	327.795	0.025	0.000	0.000	0.000	0.000	0.000	0.205
6.083	43.791	21.714	0.182	1.819	0.182	0.025	436.311	0.025	0.000	0.000	0.000	0.000	0.000	0.207
6.167	44.391	22.857	0.183	1.832	0.183	0.026	571.735	0.026	0.000	0.000	0.000	0.000	0.000	0.209
6.250	44.991	24.000	0.184	1.845	0.184	0.027	738.769	0.027	0.000	0.000	0.000	0.000	0.000	0.211
6.333	45.591	25.143	0.186	1.857	0.186	0.027	942.633	0.027	0.000	0.071	0.000	0.000	0.000	0.284
6.417	46.191	26.286	0.187	1.869	0.187	0.028	1189.093	0.028	0.000	0.202	0.000	0.000	0.000	0.417
6.500	46.791	27.429	0.188	1.881	0.188	0.029	1484.484	0.029	0.000	0.319	0.000	0.000	0.000	0.536
6.583	47.391	28.571	0.189	1.894	0.189	0.029	1835.738	0.029	0.000	0.391	0.000	0.000	0.000	0.609
6.667	47.990	29.714	0.191	1.906	0.191	0.030	2250.412	0.030	0.000	0.451	0.000	0.000	0.000	0.672
6.750	48.590	30.857	0.192	1.918	0.192	0.030	2736.717	0.030	0.000	0.504	0.000	0.000	0.000	0.727
6.833	49.190	32.000	0.193	1.930	0.193	0.031	3303.539	0.031	0.000	0.553	0.000	0.000	0.000	0.776
6.917	49.790	33.143	0.194	1.941	0.194	0.032	3960.471	0.032	0.000	0.597	0.000	0.000	0.000	0.823
7.000	50.390	34.286	0.195	1.953	0.195	0.032	4717.839	0.032	0.000	0.638	0.000	0.000	0.000	0.865
7.083	50.990	35.429	0.196	1.965	0.196	0.033	5586.726	0.033	0.000	0.677	0.000	0.000	0.000	0.906
7.167	51.590	36.571	0.198	1.977	0.198	0.033	6579.002	0.033	0.000	0.713	0.000	0.000	0.000	0.944
7.250	52.190	37.714	0.199	1.988	0.199	0.034	7707.350	0.034	0.000	0.748	0.000	0.000	0.000	0.981
7.333	52.789	38.857	0.200	2.000	0.200	0.034	8985.293	0.034	0.000	0.781	0.000	0.000	0.000	1.016
7.417	53.389	40.000	0.201	2.011	0.201	0.035	10427.220	0.035	0.000	0.813	0.000	0.000	0.000	1.049
7.500	53.989	41.143	0.202	2.022	0.202	0.035	12048.415	0.035	0.000	0.844	0.000	0.000	0.000	1.082
7.583	54.589	42.286	0.203	2.034	0.203	0.036	13865.080	0.036	0.000	0.874	0.000	0.000	0.000	1.113
7.667	55.189	43.429	0.205	2.045	0.205	0.036	15894.367	0.036	0.000	0.902	0.000	0.000	0.000	1.143
7.750	55.789	44.571	0.206	2.056	0.206	0.037	18154.400	0.037	0.000	0.930	0.000	0.000	0.000	1.172
7.833	56.389	45.714	0.207	2.067	0.207	0.037	20664.305	0.037	0.000	0.957	0.000	0.000	0.000	1.201
7.917	56.989	46.857	0.208	2.078	0.208	0.038	23444.237	0.038	0.000	0.983	0.000	0.000	0.000	1.229
8.000	57.588	48.000	0.209	2.089	0.209	0.038	26515.405	0.038	0.000	1.009	0.000	0.000	0.000	1.256

Stage-Storage for BMP-3B

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	10584	**0**	**BOTTOM OF GRAVEL LAYER (0.4 Voids)**
1.00	10584	4234	**TOP OF GRAVEL LAYER**
2.00	10584	7409	
2.75	10584	9790	**TOP OF AMMENDED SOILS LAYER(0.3Voids)**
3.00	10584	10584	**TOP OF MULCH[(1)]**
3.08	10584	11466	
3.17	10584	12348	
3.25	10584	13230	
3.33	10584	14112	
3.42	10584	14994	
3.50	10584	15876	**SURFACE DISCHARGE[(2)] FIRST OUTLET)**
3.58	10584	16758	
3.67	10584	17640	
3.75	10584	18522	
3.83	10584	19404	
3.92	10584	20286	
4.00	10584	21168	
4.08	10584	22050	
4.17	10584	22932	
4.25	10584	23814	
4.33	10584	24696	
4.42	10584	25578	
4.50	10584	26460	
4.58	10584	27342	
4.67	10584	28224	
4.75	10584	29106	
4.83	10584	29988	
4.92	10584	30870	
5.00	10584	31752	
5.08	10584	32634	
5.17	10584	33516	
5.25	10584	34398	
5.33	10584	35280	
5.42	10584	36162	
5.50	10584	37044	SURFACE DISCHARGE (TOP OF RISER)
5.58	10584	37926	
5.67	10584	38808	
5.75	10584	39690	
5.83	10584	40572	
5.92	10584	41454	
6.00	10584	42336	
6.08	10584	43218	
6.17	10584	44100	

6.25	10584	44982
6.33	10584	45864
6.42	10584	46746
6.50	10584	47628

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (Bio-filtration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Outlet structure for Discharge of BMP 3B

Discharge vs Elevation Table

Note: 0.00 is the invert of the French Drain

Low orifice	1.125 "	Lower slot		Lower Weir					
Number of orif:	1	Number of slots:	0	Number of we	0				
Cg-low:	0.61	Invert:	0.00 ft	Invert:	0.000 ft				
		B	0.00 ft	B:	0.000 ft				
Middle orifice	1.500 "	hslot	0.000 ft						
Number of orif:	1.000								
Cg-middle:	0.61	Upper slot		Upper Weir			Emergency weir		
invert elev:	3.5 ft	Number of slots:	0	Number of we	0		Invert:	5.500 ft	
		Invert:	0.00 ft	Invert:	0.000 ft		W:	12.00 ft	
*Note: h = head above the invert of the lowest surface discharge opening.		B:	0.00 ft	B:	0.00 ft				
		hslot	0.000 ft						

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.000	10.667	0.000	0.033	0.330	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033
2.000	21.333	0.000	0.047	0.472	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.047
2.750	29.333	0.000	0.056	0.556	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.056
3.000	32.000	0.000	0.058	0.581	0.058	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058
3.083	32.889	0.000	0.059	0.589	0.059	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.059
3.167	33.778	0.000	0.060	0.597	0.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.060
3.250	34.667	0.000	0.060	0.605	0.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.060
3.333	35.556	0.000	0.061	0.613	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.061
3.417	36.444	0.000	0.062	0.620	0.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.062
3.500	37.333	0.000	0.063	0.628	0.063	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.063
3.583	38.222	0.667	0.064	0.635	0.064	0.009	0.007	0.007	0.000	0.000	0.000	0.000	0.000	0.071
3.667	39.111	1.333	0.064	0.643	0.064	0.019	0.022	0.019	0.000	0.000	0.000	0.000	0.000	0.084
3.750	40.000	2.000	0.065	0.650	0.065	0.026	0.035	0.026	0.000	0.000	0.000	0.000	0.000	0.091
3.833	40.889	2.667	0.066	0.658	0.066	0.031	0.039	0.031	0.000	0.000	0.000	0.000	0.000	0.097
3.917	41.778	3.333	0.066	0.665	0.066	0.036	0.041	0.036	0.000	0.000	0.000	0.000	0.000	0.102
4.000	42.667	4.000	0.067	0.672	0.067	0.040	0.065	0.040	0.000	0.000	0.000	0.000	0.000	0.107
4.083	43.556	4.667	0.068	0.679	0.068	0.043	0.163	0.043	0.000	0.000	0.000	0.000	0.000	0.111
4.167	44.444	5.333	0.069	0.686	0.069	0.047	0.416	0.047	0.000	0.000	0.000	0.000	0.000	0.115
4.250	45.333	6.000	0.069	0.693	0.069	0.050	0.947	0.050	0.000	0.000	0.000	0.000	0.000	0.119
4.333	46.222	6.667	0.070	0.700	0.070	0.053	1.927	0.053	0.000	0.000	0.000	0.000	0.000	0.123
4.417	47.111	7.333	0.071	0.706	0.071	0.056	3.577	0.056	0.000	0.000	0.000	0.000	0.000	0.126
4.500	48.000	8.000	0.071	0.713	0.071	0.058	6.181	0.058	0.000	0.000	0.000	0.000	0.000	0.129
4.583	48.889	8.667	0.072	0.720	0.072	0.061	10.090	0.061	0.000	0.000	0.000	0.000	0.000	0.133
4.667	49.778	9.333	0.073	0.726	0.073	0.063	15.730	0.063	0.000	0.000	0.000	0.000	0.000	0.136
4.750	50.667	10.000	0.073	0.733	0.073	0.065	23.608	0.065	0.000	0.000	0.000	0.000	0.000	0.139
4.833	51.556	10.667	0.074	0.739	0.074	0.068	34.320	0.068	0.000	0.000	0.000	0.000	0.000	0.142
4.917	52.444	11.333	0.075	0.746	0.075	0.070	48.558	0.070	0.000	0.000	0.000	0.000	0.000	0.144
5.000	53.333	12.000	0.075	0.752	0.075	0.072	67.115	0.072	0.000	0.000	0.000	0.000	0.000	0.147
5.083	54.222	12.667	0.076	0.758	0.076	0.074	90.894	0.074	0.000	0.000	0.000	0.000	0.000	0.150
5.167	55.111	13.333	0.076	0.765	0.076	0.076	120.916	0.076	0.000	0.000	0.000	0.000	0.000	0.153
5.250	56.000	14.000	0.077	0.771	0.077	0.078	158.325	0.078	0.000	0.000	0.000	0.000	0.000	0.155
5.333	56.889	14.667	0.078	0.777	0.078	0.080	204.393	0.080	0.000	0.000	0.000	0.000	0.000	0.158
5.417	57.778	15.333	0.078	0.783	0.078	0.082	260.533	0.082	0.000	0.000	0.000	0.000	0.000	0.160
5.500	58.667	16.000	0.079	0.789	0.079	0.084	328.301	0.084	0.000	0.000	0.000	0.000	0.000	0.163
5.583	59.556	16.667	0.080	0.795	0.080	0.085	409.404	0.085	0.000	0.000	0.000	0.000	0.895	1.060
5.667	60.444	17.333	0.080	0.801	0.080	0.087	505.709	0.087	0.000	0.000	0.000	0.000	2.531	2.698
5.750	61.333	18.000	0.081	0.807	0.081	0.089	619.245	0.089	0.000	0.000	0.000	0.000	4.650	4.820
5.833	62.222	18.667	0.081	0.813	0.081	0.091	752.218	0.091	0.000	0.000	0.000	0.000	7.159	7.331
5.917	63.111	19.333	0.082	0.819	0.082	0.092	907.010	0.092	0.000	0.000	0.000	0.000	10.005	10.179
6.000	64.000	20.000	0.082	0.824	0.082	0.094	1086.192	0.094	0.000	0.000	0.000	0.000	13.152	13.328
6.083	64.889	20.667	0.083	0.830	0.083	0.095	1292.525	0.095	0.000	0.000	0.000	0.000	16.574	16.752
6.167	65.778	21.333	0.084	0.836	0.084	0.097	1528.975	0.097	0.000	0.000	0.000	0.000	20.249	20.430
6.250	66.667	22.000	0.084	0.842	0.084	0.098	1798.711	0.098	0.000	0.000	0.000	0.000	24.162	24.345
6.333	67.556	22.667	0.085	0.847	0.085	0.100	2105.119	0.100	0.000	0.000	0.000	0.000	28.299	28.484
6.417	68.444	23.333	0.085	0.853	0.085	0.101	2451.805	0.101	0.000	0.000	0.000	0.000	32.648	32.835
6.500	69.333	24.000	0.086	0.858	0.086	0.103	2842.605	0.103	0.000	0.000	0.000	0.000	37.200	37.389

Stage-Storage for BMP-4

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	15085	**0**	**BOTTOM OF GRAVEL LAYER (0.4 Voids)**
1.00	15085	6034	**TOP OF GRAVEL LAYER**
2.00	15085	10560	
3.75	15085	18479	**TOP OF AMMENDED SOILS LAYER(0.3Voids)**
4.00	15085	19611	**TOP OF MULCH[1]**
4.08	15368	20879	
4.17	15509	22166	
4.25	15652	23464	
4.33	15796	24775	
4.42	15942	26097	
4.50	16088	27432	**SURFACE DISCHARGE[2] (FIRST OUTLET)**
4.58	16236	28778	
4.67	16385	30138	
4.75	16535	31509	
4.83	16687	32894	
4.92	16840	34291	
5.00	16994	35700	
5.08	17149	37123	
5.17	17305	38558	
5.25	17463	40007	
5.33	17622	41469	
5.42	17782	42944	
5.50	17944	44433	
5.58	18106	45935	
5.67	18270	47451	
5.75	18436	48980	
5.83	18602	50523	
5.92	18770	52080	
6.00	18938	53652	
6.08	19109	55237	
6.17	19280	56836	
6.25	19453	58450	
6.33	19626	60079	
6.42	19801	61721	
6.50	19978	63379	
6.58	20155	65051	
6.67	20334	66738	
6.75	20514	68440	
6.83	20695	70157	
6.92	20878	71889	
7.00	21062	73637	**Surface Discharge (2nd Outlet)**
7.08	21247	75400	

7.17	21433	77178	
7.25	21620	78972	
7.33	21809	80782	
7.42	21999	82607	
7.50	22190	84448	
7.58	22383	86305	
7.67	22576	88179	
7.75	22771	90068	
7.83	22967	91974	
7.92	23165	93896	
8.00	23363	95835	
8.08	23563	97790	
8.17	23764	99762	
8.25	23967	101751	
8.33	24170	103756	
8.42	24375	105779	
8.50	24581	107819	
8.58	24788	109876	
8.67	24997	111950	
8.75	25207	114042	SURFACE DISCHARGE (TOP OF RISER)
8.83	25418	116152	
8.92	25630	118278	
9.00	25843	120423	
9.08	26058	122586	
9.17	26274	124766	
9.25	26491	126965	
9.33	26710	129182	
9.42	26929	131416	
9.50	27150	133670	
9.58	27372	135942	
9.67	27596	138232	
9.75	27820	140541	
9.83	28046	142869	
9.92	28273	145215	
10.00	28502	147581	

(1): The area at this surface elevation corresponds to the area of gravel and amended soil (Bio-filtration layer)

(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)

Outlet structure for Discharge of BMP 4

Discharge vs Elevation Table

Note: 0.00 is the invert of the French Drain

Low orifice	2.25 "	Lower slot		Lower Weir			
Number of orif:	1	Number of slots:	1	Number of weirs:	0		
Cg-low:	0.61	Invert:	7.00 ft	Invert:	0.000 ft		
		B	2.00 ft	B:	0.000 ft		
Middle orifice	1.750 "	hslot	0.250 ft				
Number of orif:	1.000						
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir	
invert elev:	4.50 ft	Number of slots:	0	Number of weirs:	0	Invert:	8.750 ft
		Invert:	0.00 ft	Invert:	0.000 ft	W:	12.00 ft
*Note: h = head above the invert of the lowest surface discharge opening.		B:	0.00 ft	B:	0.00 ft		
		hslot	0.000 ft				

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.000	5.333	0.000	0.129	1.145	0.129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.129
2.000	10.667	0.000	0.187	1.866	0.187	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.187
3.750	20.000	0.000	0.258	2.585	0.258	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.258
4.000	21.333	0.000	0.267	2.671	0.267	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.267
4.083	21.778	0.000	0.270	2.700	0.270	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.270
4.167	22.222	0.000	0.273	2.728	0.273	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.273
4.250	22.667	0.000	0.276	2.756	0.276	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.276
4.333	23.111	0.000	0.278	2.783	0.278	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.278
4.417	23.556	0.000	0.281	2.810	0.281	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.281
4.500	24.000	0.000	0.284	2.837	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.284
4.583	24.444	0.571	0.286	2.864	0.286	0.008	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.294
4.667	24.889	1.143	0.289	2.890	0.289	0.025	0.026	0.025	0.000	0.000	0.000	0.000	0.000	0.314
4.750	25.333	1.714	0.292	2.917	0.292	0.034	0.044	0.034	0.000	0.000	0.000	0.000	0.000	0.326
4.833	25.778	2.286	0.294	2.943	0.294	0.042	0.055	0.042	0.000	0.000	0.000	0.000	0.000	0.336
4.917	26.222	2.857	0.297	2.968	0.297	0.048	0.057	0.048	0.000	0.000	0.000	0.000	0.000	0.345
5.000	26.667	3.429	0.299	2.994	0.299	0.053	0.062	0.053	0.000	0.000	0.000	0.000	0.000	0.353
5.083	27.111	4.000	0.302	3.019	0.302	0.058	0.096	0.058	0.000	0.000	0.000	0.000	0.000	0.360
5.167	27.556	4.571	0.304	3.044	0.304	0.063	0.208	0.063	0.000	0.000	0.000	0.000	0.000	0.367
5.250	28.000	5.143	0.307	3.069	0.307	0.067	0.472	0.067	0.000	0.000	0.000	0.000	0.000	0.374
5.333	28.444	5.714	0.309	3.094	0.309	0.071	0.993	0.071	0.000	0.000	0.000	0.000	0.000	0.381
5.417	28.889	6.286	0.312	3.118	0.312	0.075	1.912	0.075	0.000	0.000	0.000	0.000	0.000	0.387
5.500	29.333	6.857	0.314	3.143	0.314	0.079	3.408	0.079	0.000	0.000	0.000	0.000	0.000	0.393
5.583	29.778	7.429	0.317	3.167	0.317	0.082	5.708	0.082	0.000	0.000	0.000	0.000	0.000	0.399
5.667	30.222	8.000	0.319	3.191	0.319	0.086	9.087	0.086	0.000	0.000	0.000	0.000	0.000	0.405
5.750	30.667	8.571	0.321	3.215	0.321	0.089	13.873	0.089	0.000	0.000	0.000	0.000	0.000	0.410
5.833	31.111	9.143	0.324	3.238	0.324	0.092	20.456	0.092	0.000	0.000	0.000	0.000	0.000	0.416
5.917	31.556	9.714	0.326	3.262	0.326	0.095	29.288	0.095	0.000	0.000	0.000	0.000	0.000	0.421
6.000	32.000	10.286	0.328	3.285	0.328	0.098	40.891	0.098	0.000	0.000	0.000	0.000	0.000	0.426
6.083	32.444	10.857	0.331	3.308	0.331	0.100	55.860	0.100	0.000	0.000	0.000	0.000	0.000	0.431
6.167	32.889	11.429	0.333	3.331	0.333	0.103	74.868	0.103	0.000	0.000	0.000	0.000	0.000	0.436
6.250	33.333	12.000	0.335	3.354	0.335	0.106	98.670	0.106	0.000	0.000	0.000	0.000	0.000	0.441
6.333	33.778	12.571	0.338	3.376	0.338	0.108	128.110	0.108	0.000	0.000	0.000	0.000	0.000	0.446
6.417	34.222	13.143	0.340	3.399	0.340	0.111	164.126	0.111	0.000	0.000	0.000	0.000	0.000	0.451
6.500	34.667	13.714	0.342	3.421	0.342	0.114	207.749	0.114	0.000	0.000	0.000	0.000	0.000	0.456
6.583	35.111	14.286	0.344	3.443	0.344	0.116	260.115	0.116	0.000	0.000	0.000	0.000	0.000	0.460
6.667	35.556	14.857	0.347	3.465	0.347	0.118	322.467	0.118	0.000	0.000	0.000	0.000	0.000	0.465
6.750	36.000	15.429	0.349	3.487	0.349	0.121	396.158	0.121	0.000	0.000	0.000	0.000	0.000	0.469
6.833	36.444	16.000	0.351	3.509	0.351	0.123	482.658	0.123	0.000	0.000	0.000	0.000	0.000	0.474
6.917	36.889	16.571	0.353	3.531	0.353	0.125	583.558	0.125	0.000	0.000	0.000	0.000	0.000	0.478
7.000	37.333	17.143	0.355	3.552	0.355	0.127	700.574	0.127	0.000	0.000	0.000	0.000	0.000	0.483
7.083	37.778	17.714	0.357	3.573	0.357	0.130	835.554	0.130	0.149	0.000	0.000	0.000	0.000	0.636
7.167	38.222	18.286	0.359	3.595	0.359	0.132	990.480	0.132	0.422	0.000	0.000	0.000	0.000	0.913
7.250	38.667	18.857	0.362	3.616	0.362	0.134	1167.474	0.134	0.775	0.000	0.000	0.000	0.000	1.270
7.333	39.111	19.429	0.364	3.637	0.364	0.136	1368.803	0.136	1.117	0.000	0.000	0.000	0.000	1.617
7.417	39.556	20.000	0.366	3.658	0.366	0.138	1596.884	0.138	1.322	0.000	0.000	0.000	0.000	1.826
7.500	40.000	20.571	0.368	3.678	0.368	0.140	1854.288	0.140	1.499	0.000	0.000	0.000	0.000	2.007
7.583	40.444	21.143	0.370	3.699	0.370	0.142	2143.746	0.142	1.657	0.000	0.000	0.000	0.000	2.169
7.667	40.889	21.714	0.372	3.720	0.372	0.144	2468.150	0.144	1.801	0.000	0.000	0.000	0.000	2.317
7.750	41.333	22.286	0.374	3.740	0.374	0.146	2830.563	0.146	1.935	0.000	0.000	0.000	0.000	2.455
7.833	41.778	22.857	0.376	3.760	0.376	0.148	3234.220	0.148	2.060	0.000	0.000	0.000	0.000	2.584
7.917	42.222	23.429	0.378	3.781	0.378	0.150	3682.536	0.150	2.178	0.000	0.000	0.000	0.000	2.705
8.000	42.667	24.000	0.380	3.801	0.380	0.151	4179.106	0.151	2.290	0.000	0.000	0.000	0.000	2.821
8.083	43.111	24.571	0.382	3.821	0.382	0.153	4727.716	0.153	2.396	0.000	0.000	0.000	0.000	2.931
8.167	43.556	25.143	0.384	3.840	0.384	0.155	5332.340	0.155	2.498	0.000	0.000	0.000	0.000	3.037
8.250	44.000	25.714	0.386	3.860	0.386	0.157	5997.152	0.157	2.596	0.000	0.000	0.000	0.000	3.139
8.333	44.444	26.286	0.388	3.880	0.388	0.159	6726.528	0.159	2.691	0.000	0.000	0.000	0.000	3.237
8.417	44.889	26.857	0.390	3.899	0.390	0.160	7525.049	0.160	2.782	0.000	0.000	0.000	0.000	3.332
8.500	45.333	27.429	0.392	3.919	0.392	0.162	8397.508	0.162	2.870	0.000	0.000	0.000	0.000	3.424
8.583	45.778	28.000	0.394	3.938	0.394	0.164	9348.915	0.164	2.956	0.000	0.000	0.000	0.000	3.513
8.667	46.222	28.571	0.396	3.958	0.396	0.165	10384.500	0.165	3.039	0.000	0.000	0.000	0.000	3.600
8.750	46.667	29.143	0.398	3.977	0.398	0.167	11509.718	0.167	3.120	0.000	0.000	0.000	0.000	3.685
8.833	47.111	29.714	0.400	3.996	0.400	0.169	12730.254	0.169	3.199	0.000	0.000	0.000	0.895	4.662
8.917	47.556	30.286	0.401	4.015	0.401	0.170	14052.031	0.170	3.276	0.000	0.000	0.000	2.531	6.379
9.000	48.000	30.857	0.403	4.034	0.403	0.172	15481.209	0.172	3.352	0.000	0.000	0.000	4.650	8.577
9.083	48.444	31.429	0.405	4.053	0.405	0.174	17024.193	0.174	3.425	0.000	0.000	0.000	7.159	11.163
9.167	48.889	32.000	0.407	4.071	0.407	0.175	18687.639	0.175	3.497	0.000	0.000	0.000	10.005	14.085
9.250	49.333	32.571	0.409	4.090	0.409	0.177	20478.455	0.177	3.568	0.000	0.000	0.000	13.152	17.306

9.333	49.778	33.143	0.411	4.109	0.411	0.178	22403.810	0.178	3.637	0.000	0.000	0.000	16.574	20.800	Page# 2
9.417	50.222	33.714	0.413	4.127	0.413	0.180	24471.134	0.180	3.705	0.000	0.000	0.000	20.249	24.547	
9.500	50.667	34.286	0.415	4.145	0.415	0.181	26688.127	0.181	3.772	0.000	0.000	0.000	24.162	28.530	
9.583	51.111	34.857	0.416	4.164	0.416	0.183	29062.763	0.183	3.838	0.000	0.000	0.000	28.299	32.736	
9.667	51.556	35.429	0.418	4.182	0.418	0.185	31603.293	0.185	3.902	0.000	0.000	0.000	32.648	37.153	
9.750	52.000	36.000	0.420	4.200	0.420	0.186	34318.249	0.186	3.966	0.000	0.000	0.000	37.200	41.772	
9.833	52.444	36.571	0.422	4.218	0.422	0.188	37216.453	0.188	4.028	0.000	0.000	0.000	41.946	46.583	
9.917	52.889	37.143	0.424	4.236	0.424	0.189	40307.019	0.189	4.090	0.000	0.000	0.000	46.877	51.580	
10.000	53.333	37.714	0.425	4.254	0.425	0.190	43599.355	0.190	4.150	0.000	0.000	0.000	51.989	56.755	

APPENDIX 7.7: MODIFIED-PULS RESULTS

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MODIFIED PULS-DMA-2A

RESULTS: Routing of 24 hr - 2 yr Total Hydrograph in Underground Storage

Max outflow:	0.168 cfs		initial elev:	0.0 ft	
Max elevation in pond:	3.369 ft	(from top of gravel)	Peak flow in:	0.95 cfs	
Vol-out:	15236 cu-ft		Vol in:	25183 cu-ft	

Pond Storm: 24 hr - 2 yr

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
0.00	0.000	0.06	0.00	0.0	0.00		0.000	0	0.00
0.25	0.056	0.14	0.000	0.0	0.05	0.06	0.001	25	0.01
0.50	0.084	0.17	0.000	0.0	0.19	0.19	0.002	86	0.03
0.75	0.084	0.20	0.000	0.0	0.35	0.36	0.004	159	0.05
1.00	0.112	0.20	0.000	0.0	0.53	0.54	0.007	242	0.07
1.25	0.084	0.17	0.000	0.0	0.71	0.73	0.010	322	0.09
1.50	0.084	0.17	0.000	0.0	0.85	0.87	0.014	387	0.11
1.75	0.084	0.20	0.000	0.0	0.98	1.01	0.018	448	0.13
2.00	0.112	0.22	0.000	0.0	1.13	1.17	0.022	518	0.15
2.25	0.112	0.22	0.000	0.0	1.30	1.35	0.026	597	0.18
2.50	0.112	0.25	0.000	0.0	1.47	1.52	0.029	673	0.20
2.75	0.140	0.28	0.000	0.0	1.66	1.72	0.031	760	0.22
3.00	0.140	0.28	0.000	0.0	1.87	1.94	0.035	856	0.25
3.25	0.140	0.28	0.000	0.0	2.07	2.15	0.037	950	0.28
3.50	0.140	0.28	0.000	0.0	2.27	2.35	0.039	1041	0.31
3.75	0.140	0.31	0.000	0.0	2.47	2.55	0.042	1131	0.33
4.00	0.168	0.34	0.000	0.0	2.69	2.78	0.044	1231	0.36
4.25	0.168	0.36	0.000	0.0	2.93	3.03	0.046	1341	0.39
4.50	0.196	0.39	0.000	0.0	3.20	3.30	0.049	1462	0.43
4.75	0.196	0.42	0.000	0.0	3.49	3.59	0.051	1593	0.47
5.00	0.224	0.39	0.000	0.0	3.80	3.91	0.054	1735	0.51
5.25	0.168	0.36	0.000	0.0	4.08	4.19	0.056	1861	0.55
5.50	0.196	0.42	0.000	0.0	4.33	4.44	0.058	1974	0.58
5.75	0.224	0.45	0.000	0.0	4.63	4.75	0.060	2109	0.62
6.00	0.224	0.48	0.000	0.0	4.95	5.07	0.063	2255	0.66
6.25	0.252	0.50	0.000	0.0	5.29	5.42	0.065	2411	0.71
6.50	0.252	0.53	0.000	0.0	5.66	5.80	0.068	2578	0.76
6.75	0.280	0.56	0.000	0.0	6.05	6.19	0.070	2755	0.81
7.00	0.280	0.56	0.000	0.0	6.47	6.61	0.073	2943	0.87
7.25	0.280	0.59	0.000	0.0	6.88	7.03	0.075	3128	0.92
7.50	0.308	0.64	0.000	0.0	7.31	7.46	0.078	3324	0.98
7.75	0.336	0.70	0.000	0.0	7.79	7.95	0.080	3542	1.04
8.00	0.364	0.78	0.000	0.0	8.32	8.49	0.083	3783	1.11
8.25	0.420	0.84	0.000	0.0	8.93	9.11	0.087	4059	1.19
8.50	0.420	0.87	0.000	0.0	9.59	9.77	0.090	4358	1.28
8.75	0.448	0.92	0.000	0.0	10.27	10.46	0.093	4666	1.37
9.00	0.476	1.01	0.000	0.0	11.00	11.20	0.097	4996	1.47
9.25	0.532	1.09	0.000	0.0	11.81	12.01	0.099	5361	1.54
9.50	0.560	1.15	0.000	0.0	12.70	12.91	0.101	5762	1.59
9.75	0.588	1.20	0.000	0.0	13.65	13.85	0.103	6187	1.65
10.00	0.616	1.04	0.000	0.0	14.64	14.85	0.105	6635	1.72
10.25	0.420	0.84	0.000	0.0	15.46	15.67	0.106	7006	1.77
10.50	0.420	0.98	0.000	0.0	16.09	16.30	0.108	7287	1.81
10.75	0.560	1.12	0.000	0.0	16.85	17.06	0.109	7630	1.86
11.00	0.560	1.09	0.000	0.0	17.74	17.97	0.111	8035	1.92
11.25	0.532	1.06	0.000	0.0	18.61	18.83	0.113	8425	1.97

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
11.50	0.532	1.01	0.000	0.0	19.44	19.67	0.114	8801	2.02
11.75	0.476	0.98	0.000	0.0	20.22	20.45	0.116	9151	2.07
12.00	0.504	1.20	0.000	0.0	20.97	21.20	0.117	9487	2.12
12.25	0.700	1.43	0.000	0.0	21.93	22.17	0.119	9923	2.18
12.50	0.728	1.51	0.000	0.0	23.12	23.36	0.121	10457	2.26
12.75	0.783	1.59	0.000	0.0	24.38	24.63	0.123	11027	2.34
13.00	0.811	1.76	0.000	0.0	25.73	25.98	0.126	11633	2.43
13.25	0.951	1.90	0.000	0.0	27.23	27.49	0.128	12312	2.53
13.50	0.951	1.59	0.000	0.0	28.87	29.13	0.131	13052	2.64
13.75	0.644	1.29	0.000	0.0	30.20	30.47	0.133	13650	2.72
14.00	0.644	1.40	0.000	0.0	31.22	31.49	0.135	14109	2.79
14.25	0.755	1.48	0.000	0.0	32.34	32.62	0.137	14617	2.86
14.50	0.728	1.46	0.000	0.0	33.55	33.83	0.139	15160	2.94
14.75	0.728	1.43	0.000	0.0	34.72	35.01	0.140	15689	3.02
15.00	0.700	1.37	0.000	0.0	35.87	36.15	0.142	16204	3.10
15.25	0.672	1.32	0.000	0.0	36.95	37.24	0.144	16692	3.17
15.50	0.644	1.18	0.000	0.0	37.96	38.26	0.151	17151	3.24
15.75	0.532	1.06	0.000	0.0	38.82	39.14	0.159	17540	3.30
16.00	0.532	0.64	0.000	0.0	39.55	39.88	0.166	17872	3.35
16.25	0.112	0.22	0.000	0.0	39.86	40.19	0.168	18012	3.37
16.50	0.112	0.20	0.000	0.0	39.75	40.08	0.167	17962	3.36
16.75	0.084	0.17	0.000	0.0	39.61	39.94	0.166	17900	3.35
17.00	0.084	0.22	0.000	0.0	39.45	39.78	0.165	17827	3.34
17.25	0.140	0.28	0.000	0.0	39.35	39.67	0.164	17780	3.33
17.50	0.140	0.28	0.000	0.0	39.30	39.63	0.164	17758	3.33
17.75	0.140	0.25	0.000	0.0	39.25	39.58	0.164	17736	3.33
18.00	0.112	0.22	0.000	0.0	39.18	39.50	0.163	17703	3.32
18.25	0.112	0.22	0.000	0.0	39.08	39.40	0.162	17657	3.32
18.50	0.112	0.20	0.000	0.0	38.98	39.30	0.161	17613	3.31
18.75	0.084	0.14	0.000	0.0	38.85	39.17	0.160	17557	3.30
19.00	0.056	0.14	0.000	0.0	38.68	38.99	0.158	17477	3.29
19.25	0.084	0.20	0.000	0.0	38.51	38.82	0.156	17398	3.28
19.50	0.112	0.20	0.000	0.0	38.39	38.70	0.155	17346	3.27
19.75	0.084	0.14	0.000	0.0	38.28	38.59	0.154	17295	3.26
20.00	0.056	0.14	0.000	0.0	38.11	38.42	0.153	17220	3.25
20.25	0.084	0.17	0.000	0.0	37.95	38.25	0.151	17146	3.24
20.50	0.084	0.17	0.000	0.0	37.82	38.12	0.150	17086	3.23
20.75	0.084	0.14	0.000	0.0	37.69	37.99	0.150	17026	3.22
21.00	0.056	0.14	0.000	0.0	37.53	37.83	0.148	16955	3.21
21.25	0.084	0.14	0.000	0.0	37.38	37.67	0.147	16885	3.20
21.50	0.056	0.14	0.000	0.0	37.22	37.52	0.146	16816	3.19
21.75	0.084	0.14	0.000	0.0	37.07	37.36	0.145	16748	3.18
22.00	0.056	0.14	0.000	0.0	36.92	37.21	0.144	16681	3.17
22.25	0.084	0.14	0.000	0.0	36.78	37.06	0.144	16614	3.16
22.50	0.056	0.11	0.000	0.0	36.63	36.92	0.143	16548	3.15
22.75	0.056	0.11	0.000	0.0	36.46	36.74	0.143	16469	3.14
23.00	0.056	0.11	0.000	0.0	36.28	36.57	0.143	16391	3.13
23.25	0.056	0.11	0.000	0.0	36.11	36.39	0.143	16313	3.11
23.50	0.056	0.11	0.000	0.0	35.94	36.22	0.142	16235	3.10
23.75	0.056	0.11	0.000	0.0	35.76	36.05	0.142	16157	3.09
24.00	0.056	0.06	0.000	0.0	35.59	35.88	0.142	16080	3.08
24.25	0.000	0.00	0.000	0.0	35.36	35.65	0.141	15978	3.06

time	Inflow, In	In+In+1	fn	Inf. Vol, F	2S1/At-O1	2S2/At+O2	Outflow, On	Volume, S	Elevation, h
(hr)	(cfs)	(cfs)	(cfs)	(ft3)	(cfs)	(cfs)	(cfs)	(ft3)	(ft-osl)
24.50	0.000	0.00	0.000	0.0	35.08	35.36	0.141	15851	3.05
24.75	0.000	0.00	0.000	0.0	34.80	35.08	0.141	15724	3.03
25.00	0.000	0.00	0.000	0.0	34.52	34.80	0.140	15598	3.01
25.25	0.000	0.00	0.000	0.0	34.24	34.52	0.140	15472	2.99
25.50	0.000	0.00	0.000	0.0	33.96	34.24	0.139	15346	2.97
25.75	0.000	0.00	0.000	0.0	33.69	33.96	0.139	15221	2.95
26.00	0.000	0.00	0.000	0.0	33.41	33.69	0.138	15096	2.94
26.25	0.000	0.00	0.000	0.0	33.13	33.41	0.138	14972	2.92
26.50	0.000	0.00	0.000	0.0	32.86	33.13	0.137	14848	2.90
26.75	0.000	0.00	0.000	0.0	32.58	32.86	0.137	14725	2.88
27.00	0.000	0.00	0.000	0.0	32.31	32.58	0.137	14602	2.86
27.25	0.000	0.00	0.000	0.0	32.04	32.31	0.136	14479	2.84
27.50	0.000	0.00	0.000	0.0	31.77	32.04	0.136	14357	2.83
27.75	0.000	0.00	0.000	0.0	31.50	31.77	0.135	14235	2.81
28.00	0.000	0.00	0.000	0.0	31.23	31.50	0.135	14113	2.79
28.25	0.000	0.00	0.000	0.0	30.96	31.23	0.134	13992	2.77
28.50	0.000	0.00	0.000	0.0	30.69	30.96	0.134	13871	2.76
28.75	0.000	0.00	0.000	0.0	30.42	30.69	0.133	13751	2.74
29.00	0.000	0.00	0.000	0.0	30.16	30.42	0.133	13631	2.72
29.25	0.000	0.00	0.000	0.0	29.89	30.16	0.133	13512	2.70
29.50	0.000	0.00	0.000	0.0	29.63	29.89	0.132	13393	2.69
29.75	0.000	0.00	0.000	0.0	29.37	29.63	0.132	13274	2.67
30.00	0.000	0.00	0.000	0.0	29.10	29.37	0.131	13155	2.65
30.25	0.000	0.00	0.000	0.0	28.84	29.10	0.131	13037	2.63
30.50	0.000	0.00	0.000	0.0	28.58	28.84	0.130	12920	2.62
30.75	0.000	0.00	0.000	0.0	28.32	28.58	0.130	12803	2.60
31.00	0.000	0.00	0.000	0.0	28.06	28.32	0.130	12686	2.58
31.25	0.000	0.00	0.000	0.0	27.80	28.06	0.129	12570	2.57
31.50	0.000	0.00	0.000	0.0	27.55	27.80	0.129	12454	2.55
31.75	0.000	0.00	0.000	0.0	27.29	27.55	0.128	12338	2.53
32.00	0.000	0.00	0.000	0.0	27.03	27.29	0.128	12223	2.52
32.25	0.000	0.00	0.000	0.0	26.78	27.03	0.127	12108	2.50
32.50	0.000	0.00	0.000	0.0	26.53	26.78	0.127	11994	2.48
32.75	0.000	0.00	0.000	0.0	26.27	26.53	0.126	11880	2.47
33.00	0.000	0.00	0.000	0.0	26.02	26.27	0.126	11766	2.45
33.25	0.000	0.00	0.000	0.0	25.77	26.02	0.126	11653	2.43
33.50	0.000	0.00	0.000	0.0	25.52	25.77	0.125	11540	2.42
33.75	0.000	0.00	0.000	0.0	25.27	25.52	0.125	11427	2.40
34.00	0.000	0.00	0.000	0.0	25.02	25.27	0.124	11315	2.38
34.25	0.000	0.00	0.000	0.0	24.77	25.02	0.124	11204	2.37
34.50	0.000	0.00	0.000	0.0	24.53	24.77	0.123	11092	2.35
34.75	0.000	0.00	0.000	0.0	24.28	24.53	0.123	10981	2.34
35.00	0.000	0.00	0.000	0.0	24.04	24.28	0.123	10871	2.32
35.25	0.000	0.00	0.000	0.0	23.79	24.04	0.122	10761	2.30
35.50	0.000	0.00	0.000	0.0	23.55	23.79	0.122	10651	2.29
35.75	0.000	0.00	0.000	0.0	23.30	23.55	0.121	10542	2.27
36.00	0.000	0.00	0.000	0.0	23.06	23.30	0.121	10433	2.26
36.25	0.000	0.00	0.000	0.0	22.82	23.06	0.120	10324	2.24
36.50	0.000	0.00	0.000	0.0	22.58	22.82	0.120	10216	2.23
36.75	0.000	0.00	0.000	0.0	22.34	22.58	0.120	10108	2.21
37.00	0.000	0.00	0.000	0.0	22.11	22.34	0.119	10001	2.20
37.25	0.000	0.00	0.000	0.0	22.11	22.11			

MODIFIED PULS-DMA-2B BASIN-1

RESULTS: Routing of 24 hr - 2 yr Total Hydrograph in Basin-1

Max outflow: 1.268 cfs — initial elev: 0.0 ft

Max elevation in pond: 7.041 ft (from bottom of gravel) — Peak flow in: 1.21 cfs

Vol-out: 30164 cu-ft — Vol in: 32122 cu-ft

Pond Storm: 24 hr - 2 yr

										Runoff	
time	Inflow, In	In+In+1	fn	Inf. Vol, F	2S1/At-O1	2S2/At+O2	Outflow, On	Volume, S	Elevation, h	TO POD-2	TO Basin 2
(hr)	(cfs)	(cfs)	(cfs)	(ft3)	(cfs)	(cfs)	(cfs)	(ft3)	(ft-osl)	(cfs)	(cfs)
0.00	0.000	0.07	0.00	0.0	0.00		0.000	0	0.00	0.000	0.000
0.25	0.071	0.18	0.000	0.0	0.07	0.07	0.002	31	0.04	0.002	0.000
0.50	0.107	0.21	0.000	0.0	0.24	0.25	0.005	109	0.15	0.005	0.000
0.75	0.107	0.25	0.000	0.0	0.44	0.45	0.007	199	0.27	0.007	0.000
1.00	0.143	0.25	0.000	0.0	0.67	0.69	0.009	304	0.42	0.009	0.000
1.25	0.107	0.21	0.000	0.0	0.89	0.92	0.011	408	0.55	0.011	0.000
1.50	0.107	0.21	0.000	0.0	1.08	1.11	0.012	494	0.68	0.012	0.000
1.75	0.107	0.25	0.000	0.0	1.27	1.30	0.013	579	0.79	0.013	0.000
2.00	0.143	0.29	0.000	0.0	1.49	1.52	0.014	679	0.93	0.014	0.000
2.25	0.143	0.29	0.000	0.0	1.75	1.78	0.016	794	1.11	0.016	0.000
2.50	0.143	0.32	0.000	0.0	2.00	2.03	0.017	908	1.32	0.017	0.000
2.75	0.178	0.36	0.000	0.0	2.28	2.32	0.019	1036	1.55	0.019	0.000
3.00	0.178	0.36	0.000	0.0	2.60	2.64	0.020	1179	1.81	0.020	0.000
3.25	0.178	0.36	0.000	0.0	2.91	2.96	0.021	1321	2.07	0.021	0.000
3.50	0.178	0.36	0.000	0.0	3.23	3.27	0.023	1462	2.33	0.023	0.000
3.75	0.178	0.39	0.000	0.0	3.54	3.58	0.024	1602	2.58	0.024	0.000
4.00	0.214	0.43	0.000	0.0	3.88	3.93	0.025	1756	2.87	0.025	0.000
4.25	0.214	0.46	0.000	0.0	4.25	4.31	0.027	1925	3.18	0.027	0.000
4.50	0.250	0.50	0.000	0.0	4.66	4.72	0.028	2110	3.51	0.028	0.000
4.75	0.250	0.54	0.000	0.0	5.10	5.16	0.029	2309	3.87	0.029	0.000
5.00	0.286	0.50	0.000	0.0	5.58	5.64	0.030	2523	4.08	0.030	0.000
5.25	0.214	0.46	0.000	0.0	6.01	6.08	0.031	2720	4.19	0.031	0.000
5.50	0.250	0.54	0.000	0.0	6.42	6.48	0.031	2901	4.28	0.031	0.000
5.75	0.286	0.57	0.000	0.0	6.89	6.95	0.031	3114	4.40	0.031	0.000
6.00	0.286	0.61	0.000	0.0	7.37	7.46	0.043	3338	4.52	0.032	0.011
6.25	0.321	0.64	0.000	0.0	7.76	7.98	0.113	3541	4.64	0.032	0.080
6.50	0.321	0.68	0.000	0.0	8.04	8.40	0.179	3699	4.72	0.033	0.146
6.75	0.357	0.71	0.000	0.0	8.28	8.72	0.218	3825	4.79	0.033	0.185
7.00	0.357	0.71	0.000	0.0	8.51	9.00	0.245	3939	4.85	0.033	0.212
7.25	0.357	0.75	0.000	0.0	8.69	9.22	0.264	4031	4.91	0.033	0.231
7.50	0.393	0.82	0.000	0.0	8.88	9.44	0.281	4123	4.96	0.033	0.248
7.75	0.428	0.89	0.000	0.0	9.10	9.70	0.301	4230	5.01	0.034	0.267
8.00	0.464	1.00	0.000	0.0	9.35	9.99	0.321	4352	5.08	0.034	0.287
8.25	0.535	1.07	0.000	0.0	9.66	10.35	0.344	4502	5.16	0.034	0.310
8.50	0.535	1.11	0.000	0.0	10.00	10.73	0.367	4664	5.25	0.034	0.333
8.75	0.571	1.18	0.000	0.0	10.33	11.10	0.389	4822	5.33	0.035	0.354
9.00	0.607	1.28	0.000	0.0	10.68	11.50	0.410	4992	5.43	0.035	0.375
9.25	0.678	1.39	0.000	0.0	11.10	11.97	0.434	5191	5.54	0.035	0.399
9.50	0.714	1.46	0.000	0.0	11.58	12.49	0.459	5415	5.66	0.036	0.423
9.75	0.750	1.53	0.000	0.0	12.07	13.04	0.484	5650	5.79	0.036	0.448
10.00	0.785	1.32	0.000	0.0	12.59	13.61	0.508	5894	5.93	0.036	0.472
10.25	0.535	1.07	0.000	0.0	12.87	13.91	0.521	6025	5.99	0.037	0.484
10.50	0.535	1.25	0.000	0.0	12.89	13.94	0.522	6037	6.00	0.037	0.486
10.75	0.714	1.43	0.000	0.0	13.08	14.14	0.531	6125	6.05	0.037	0.494
11.00	0.714	1.39	0.000	0.0	13.42	14.51	0.545	6283	6.14	0.037	0.508
11.25	0.678	1.36	0.000	0.0	13.70	14.81	0.557	6414	6.21	0.037	0.520

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)	TO POD-2 (cfs)	TO Basin 2 (cfs)
11.50	0.678	1.28	0.000	0.0	13.92	15.05	0.566	6519	6.26	0.037	0.529
11.75	0.607	1.25	0.000	0.0	14.06	15.20	0.572	6584	6.30	0.038	0.534
12.00	0.642	1.53	0.000	0.0	14.16	15.31	0.576	6630	6.32	0.038	0.538
12.25	0.892	1.82	0.000	0.0	14.51	15.69	0.590	6796	6.42	0.038	0.552
12.50	0.928	1.93	0.000	0.0	15.11	16.33	0.613	7074	6.56	0.038	0.575
12.75	0.999	2.03	0.000	0.0	15.76	17.03	0.637	7378	6.73	0.039	0.598
13.00	1.035	2.25	0.000	0.0	16.47	17.79	0.662	7709	6.92	0.039	0.623
13.25	1.213	2.43	0.000	0.0	16.49	18.72	1.116	7921	7.03	0.040	1.076
13.50	1.213	2.03	0.000	0.0	16.38	18.91	1.268	7940	7.04	0.040	1.228
13.75	0.821	1.64	0.000	0.0	16.66	18.41	0.876	7890	7.01	0.040	0.837
14.00	0.821	1.78	0.000	0.0	16.72	18.30	0.790	7879	7.01	0.040	0.750
14.25	0.964	1.89	0.000	0.0	16.60	18.50	0.950	7900	7.02	0.040	0.910
14.50	0.928	1.86	0.000	0.0	16.61	18.50	0.944	7899	7.02	0.040	0.904
14.75	0.928	1.82	0.000	0.0	16.63	18.47	0.919	7896	7.02	0.040	0.880
15.00	0.892	1.75	0.000	0.0	16.64	18.45	0.905	7894	7.02	0.040	0.865
15.25	0.857	1.68	0.000	0.0	16.67	18.39	0.857	7888	7.01	0.040	0.818
15.50	0.821	1.50	0.000	0.0	16.69	18.35	0.828	7884	7.01	0.040	0.789
15.75	0.678	1.36	0.000	0.0	16.78	18.19	0.705	7869	7.00	0.040	0.666
16.00	0.678	0.82	0.000	0.0	16.79	18.14	0.673	7859	7.00	0.040	0.634
16.25	0.143	0.29	0.000	0.0	16.30	17.61	0.656	7630	6.87	0.039	0.617
16.50	0.143	0.25	0.000	0.0	15.34	16.58	0.622	7183	6.63	0.039	0.583
16.75	0.107	0.21	0.000	0.0	14.42	15.59	0.586	6752	6.39	0.038	0.549
17.00	0.107	0.29	0.000	0.0	13.53	14.63	0.550	6337	6.17	0.037	0.513
17.25	0.178	0.36	0.000	0.0	12.78	13.82	0.517	5985	5.97	0.037	0.481
17.50	0.178	0.36	0.000	0.0	12.16	13.14	0.488	5693	5.81	0.036	0.452
17.75	0.178	0.32	0.000	0.0	11.60	12.52	0.460	5427	5.67	0.036	0.425
18.00	0.143	0.29	0.000	0.0	11.06	11.92	0.431	5170	5.53	0.035	0.396
18.25	0.143	0.29	0.000	0.0	10.54	11.34	0.402	4924	5.39	0.035	0.367
18.50	0.143	0.25	0.000	0.0	10.08	10.83	0.373	4704	5.27	0.034	0.338
18.75	0.107	0.18	0.000	0.0	9.64	10.33	0.343	4494	5.16	0.034	0.309
19.00	0.071	0.18	0.000	0.0	9.20	9.82	0.309	4281	5.04	0.034	0.276
19.25	0.107	0.25	0.000	0.0	8.83	9.38	0.277	4098	4.94	0.033	0.243
19.50	0.143	0.25	0.000	0.0	8.58	9.08	0.252	3972	4.87	0.033	0.219
19.75	0.107	0.18	0.000	0.0	8.37	8.83	0.229	3869	4.81	0.033	0.196
20.00	0.071	0.18	0.000	0.0	8.15	8.55	0.201	3756	4.75	0.033	0.168
20.25	0.107	0.21	0.000	0.0	7.99	8.32	0.167	3670	4.71	0.032	0.135
20.50	0.107	0.21	0.000	0.0	7.91	8.20	0.149	3624	4.68	0.032	0.116
20.75	0.107	0.18	0.000	0.0	7.85	8.12	0.136	3593	4.67	0.032	0.104
21.00	0.071	0.18	0.000	0.0	7.79	8.03	0.120	3558	4.65	0.032	0.088
21.25	0.107	0.18	0.000	0.0	7.75	7.96	0.110	3535	4.63	0.032	0.078
21.50	0.071	0.18	0.000	0.0	7.72	7.92	0.103	3519	4.62	0.032	0.071
21.75	0.107	0.18	0.000	0.0	7.70	7.90	0.098	3509	4.62	0.032	0.066
22.00	0.071	0.18	0.000	0.0	7.69	7.88	0.095	3502	4.61	0.032	0.063
22.25	0.107	0.18	0.000	0.0	7.68	7.87	0.093	3498	4.61	0.032	0.061
22.50	0.071	0.14	0.000	0.0	7.67	7.86	0.092	3495	4.61	0.032	0.060
22.75	0.071	0.14	0.000	0.0	7.65	7.82	0.085	3479	4.60	0.032	0.053
23.00	0.071	0.14	0.000	0.0	7.63	7.79	0.080	3469	4.59	0.032	0.048
23.25	0.071	0.14	0.000	0.0	7.62	7.77	0.077	3463	4.59	0.032	0.045
23.50	0.071	0.14	0.000	0.0	7.61	7.76	0.075	3458	4.59	0.032	0.043
23.75	0.071	0.14	0.000	0.0	7.60	7.75	0.074	3455	4.59	0.032	0.042
24.00	0.071	0.07	0.000	0.0	7.60	7.75	0.073	3453	4.59	0.032	0.041
24.25	0.000	0.00	0.000	0.0	7.54	7.67	0.064	3423	4.57	0.032	0.032

time	Inflow, In	In+In+1	fn	Inf. Vol, F	2S1/At-O1	2S2/At+O2	Outflow, On	Volume, S	Elevation, h	TO POD-2	TO Basin 2
(hr)	(cfs)	(cfs)	(cfs)	(ft3)	(cfs)	(cfs)	(cfs)	(ft3)	(ft-osl)	(cfs)	(cfs)
24.50	0.000	0.00	0.000	0.0	7.44	7.54	0.051	3372	4.54	0.032	0.019
24.75	0.000	0.00	0.000	0.0	7.36	7.44	0.041	3330	4.52	0.032	0.009
25.00	0.000	0.00	0.000	0.0	7.29	7.36	0.033	3297	4.50	0.032	0.001
25.25	0.000	0.00	0.000	0.0	7.23	7.29	0.032	3268	4.49	0.032	0.000
25.50	0.000	0.00	0.000	0.0	7.17	7.23	0.032	3239	4.47	0.032	0.000
25.75	0.000	0.00	0.000	0.0	7.10	7.17	0.032	3211	4.46	0.032	0.000
26.00	0.000	0.00	0.000	0.0	7.04	7.10	0.032	3182	4.44	0.032	0.000
26.25	0.000	0.00	0.000	0.0	6.98	7.04	0.031	3154	4.43	0.031	0.000
26.50	0.000	0.00	0.000	0.0	6.91	6.98	0.031	3126	4.41	0.031	0.000
26.75	0.000	0.00	0.000	0.0	6.85	6.91	0.031	3097	4.39	0.031	0.000
27.00	0.000	0.00	0.000	0.0	6.79	6.85	0.031	3069	4.38	0.031	0.000
27.25	0.000	0.00	0.000	0.0	6.73	6.79	0.031	3041	4.36	0.031	0.000
27.50	0.000	0.00	0.000	0.0	6.66	6.73	0.031	3013	4.35	0.031	0.000
27.75	0.000	0.00	0.000	0.0	6.60	6.66	0.031	2985	4.33	0.031	0.000
28.00	0.000	0.00	0.000	0.0	6.54	6.60	0.031	2957	4.31	0.031	0.000
28.25	0.000	0.00	0.000	0.0	6.48	6.54	0.031	2929	4.30	0.031	0.000
28.50	0.000	0.00	0.000	0.0	6.42	6.48	0.031	2901	4.28	0.031	0.000
28.75	0.000	0.00	0.000	0.0	6.35	6.42	0.031	2873	4.27	0.031	0.000
29.00	0.000	0.00	0.000	0.0	6.29	6.35	0.031	2845	4.26	0.031	0.000
29.25	0.000	0.00	0.000	0.0	6.23	6.29	0.031	2818	4.24	0.031	0.000
29.50	0.000	0.00	0.000	0.0	6.17	6.23	0.031	2790	4.23	0.031	0.000
29.75	0.000	0.00	0.000	0.0	6.11	6.17	0.031	2762	4.21	0.031	0.000
30.00	0.000	0.00	0.000	0.0	6.05	6.11	0.031	2735	4.20	0.031	0.000
30.25	0.000	0.00	0.000	0.0	5.99	6.05	0.031	2707	4.18	0.031	0.000
30.50	0.000	0.00	0.000	0.0	5.92	5.99	0.031	2680	4.17	0.031	0.000
30.75	0.000	0.00	0.000	0.0	5.86	5.92	0.030	2652	4.15	0.030	0.000
31.00	0.000	0.00	0.000	0.0	5.80	5.86	0.030	2625	4.14	0.030	0.000
31.25	0.000	0.00	0.000	0.0	5.74	5.80	0.030	2597	4.12	0.030	0.000
31.50	0.000	0.00	0.000	0.0	5.68	5.74	0.030	2570	4.10	0.030	0.000
31.75	0.000	0.00	0.000	0.0	5.62	5.68	0.030	2543	4.09	0.030	0.000
32.00	0.000	0.00	0.000	0.0	5.56	5.62	0.030	2516	4.07	0.030	0.000
32.25	0.000	0.00	0.000	0.0	5.50	5.56	0.030	2488	4.06	0.030	0.000
32.50	0.000	0.00	0.000	0.0	5.44	5.50	0.030	2461	4.04	0.030	0.000
32.75	0.000	0.00	0.000	0.0	5.38	5.44	0.030	2434	4.03	0.030	0.000
33.00	0.000	0.00	0.000	0.0	5.32	5.38	0.030	2407	4.02	0.030	0.000
33.25	0.000	0.00	0.000	0.0	5.26	5.32	0.030	2380	4.00	0.030	0.000
33.50	0.000	0.00	0.000	0.0	5.20	5.26	0.030	2353	3.96	0.030	0.000
33.75	0.000	0.00	0.000	0.0	5.14	5.20	0.030	2327	3.91	0.030	0.000
34.00	0.000	0.00	0.000	0.0	5.08	5.14	0.029	2300	3.86	0.029	0.000
34.25	0.000	0.00	0.000	0.0	5.02	5.08	0.029	2274	3.81	0.029	0.000
34.50	0.000	0.00	0.000	0.0	4.97	5.02	0.029	2248	3.76	0.029	0.000
34.75	0.000	0.00	0.000	0.0	4.91	4.97	0.029	2222	3.72	0.029	0.000
35.00	0.000	0.00	0.000	0.0	4.85	4.91	0.029	2196	3.67	0.029	0.000
35.25	0.000	0.00	0.000	0.0	4.79	4.85	0.028	2170	3.62	0.028	0.000
35.50	0.000	0.00	0.000	0.0	4.74	4.79	0.028	2145	3.57	0.028	0.000
35.75	0.000	0.00	0.000	0.0	4.68	4.74	0.028	2119	3.53	0.028	0.000
36.00	0.000	0.00	0.000	0.0	4.63	4.68	0.028	2094	3.48	0.028	0.000
36.25	0.000	0.00	0.000	0.0	4.57	4.63	0.028	2069	3.44	0.028	0.000
36.50	0.000	0.00	0.000	0.0	4.51	4.57	0.028	2044	3.39	0.028	0.000
36.75	0.000	0.00	0.000	0.0	4.46	4.51	0.027	2019	3.34	0.027	0.000
37.00	0.000	0.00	0.000	0.0	4.41	4.46	0.027	1995	3.30	0.027	0.000
37.25	0.000	0.00	0.000	0.0	4.35	4.41	0.027				

MODIFIED PULS-DMA-2B BASIN 2

RESULTS: Routing of 24 hr - 2 yr Total Hydrograph in Basin-2

Max outflow:	0.262	cfs		initial elev:	0.0 ft
Max elevation in pond:	5.864	ft	(from bottom of gravel)	Peak flow in:	1.23 cfs
Vol-out:	20267	cu-ft		Vol in:	25997 cu-ft

Pond Storm: 24 hr - 2 yr

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
0.00	0.000	0.00	0.00	0.0	0.00		0.0000	0	0.00
0.25	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
0.50	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
0.75	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
1.00	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
1.25	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
1.50	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
1.75	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
2.00	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
2.25	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
2.50	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
2.75	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
3.00	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
3.25	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
3.50	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
3.75	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
4.00	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
4.25	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
4.50	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
4.75	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
5.00	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
5.25	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
5.50	0.000	0.00	0.000	0.0	0.00	0.00	0.0000	0	0.00
5.75	0.000	0.01	0.000	0.0	0.00	0.00	0.0000	0	0.00
6.00	0.011	0.09	0.000	0.0	0.01	0.01	0.0002	5	0.00
6.25	0.080	0.23	0.000	0.0	0.10	0.10	0.0018	45	0.03
6.50	0.146	0.33	0.000	0.0	0.31	0.33	0.0056	144	0.08
6.75	0.185	0.40	0.000	0.0	0.62	0.65	0.0112	285	0.16
7.00	0.212	0.44	0.000	0.0	0.98	1.02	0.0176	451	0.26
7.25	0.231	0.48	0.000	0.0	1.38	1.43	0.0247	631	0.36
7.50	0.248	0.52	0.000	0.0	1.79	1.86	0.0321	821	0.47
7.75	0.267	0.55	0.000	0.0	2.23	2.31	0.0399	1020	0.59
8.00	0.287	0.60	0.000	0.0	2.69	2.78	0.0481	1230	0.71
8.25	0.310	0.64	0.000	0.0	3.17	3.28	0.0568	1452	0.83
8.50	0.333	0.69	0.000	0.0	3.68	3.81	0.0659	1686	0.97
8.75	0.354	0.73	0.000	0.0	4.22	4.37	0.0720	1933	1.15
9.00	0.375	0.77	0.000	0.0	4.80	4.95	0.0772	2194	1.35
9.25	0.399	0.82	0.000	0.0	5.41	5.57	0.0828	2470	1.56
9.50	0.423	0.87	0.000	0.0	6.05	6.23	0.0887	2763	1.78
9.75	0.448	0.92	0.000	0.0	6.73	6.92	0.0949	3073	2.02
10.00	0.472	0.96	0.000	0.0	7.45	7.65	0.1015	3398	2.27
10.25	0.484	0.97	0.000	0.0	8.19	8.41	0.1083	3734	2.53
10.50	0.486	0.98	0.000	0.0	8.93	9.16	0.1150	4070	2.78
10.75	0.494	1.00	0.000	0.0	9.67	9.91	0.1215	4404	3.04
11.00	0.508	1.03	0.000	0.0	10.42	10.67	0.1266	4744	3.30
11.25	0.520	1.05	0.000	0.0	11.18	11.44	0.1317	5090	3.57

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
11.50	0.529	1.06	0.000	0.0	11.95	12.23	0.1368	5441	3.83
11.75	0.534	1.07	0.000	0.0	12.74	13.02	0.1403	5795	4.03
12.00	0.538	1.09	0.000	0.0	13.53	13.81	0.1415	6151	4.09
12.25	0.552	1.13	0.000	0.0	14.33	14.62	0.1426	6514	4.16
12.50	0.575	1.17	0.000	0.0	15.17	15.46	0.1437	6892	4.22
12.75	0.598	1.22	0.000	0.0	16.05	16.34	0.1449	7290	4.29
13.00	0.623	1.70	0.000	0.0	16.98	17.28	0.1461	7708	4.36
13.25	1.076	2.30	0.000	0.0	18.39	18.68	0.1479	8341	4.47
13.50	1.228	2.07	0.000	0.0	20.35	20.69	0.1714	9234	4.62
13.75	0.837	1.59	0.000	0.0	22.04	22.41	0.1887	10001	4.75
14.00	0.750	1.66	0.000	0.0	23.23	23.62	0.1974	10542	4.83
14.25	0.910	1.81	0.000	0.0	24.48	24.89	0.2052	11108	4.93
14.50	0.904	1.78	0.000	0.0	25.87	26.29	0.2131	11736	5.03
14.75	0.880	1.74	0.000	0.0	27.21	27.65	0.2200	12343	5.13
15.00	0.865	1.68	0.000	0.0	28.50	28.95	0.2263	12928	5.23
15.25	0.818	1.61	0.000	0.0	29.72	30.18	0.2318	13479	5.31
15.50	0.789	1.45	0.000	0.0	30.85	31.33	0.2367	13991	5.40
15.75	0.666	1.30	0.000	0.0	31.83	32.31	0.2408	14430	5.47
16.00	0.634	1.25	0.000	0.0	32.64	33.13	0.2440	14797	5.52
16.25	0.617	1.20	0.000	0.0	33.39	33.89	0.2470	15139	5.57
16.50	0.583	1.13	0.000	0.0	34.10	34.59	0.2497	15455	5.63
16.75	0.549	1.06	0.000	0.0	34.72	35.23	0.2521	15739	5.68
17.00	0.513	0.99	0.000	0.0	35.28	35.78	0.2541	15989	5.71
17.25	0.481	0.93	0.000	0.0	35.76	36.27	0.2559	16206	5.75
17.50	0.452	0.88	0.000	0.0	36.18	36.69	0.2574	16395	5.77
17.75	0.425	0.82	0.000	0.0	36.54	37.05	0.2587	16557	5.80
18.00	0.396	0.76	0.000	0.0	36.84	37.36	0.2598	16693	5.82
18.25	0.367	0.71	0.000	0.0	37.08	37.60	0.2606	16803	5.84
18.50	0.338	0.65	0.000	0.0	37.26	37.78	0.2612	16885	5.85
18.75	0.309	0.58	0.000	0.0	37.39	37.91	0.2617	16941	5.86
19.00	0.276	0.52	0.000	0.0	37.45	37.97	0.2619	16968	5.86
19.25	0.243	0.46	0.000	0.0	37.44	37.96	0.2619	16966	5.86
19.50	0.219	0.41	0.000	0.0	37.38	37.90	0.2616	16939	5.86
19.75	0.196	0.36	0.000	0.0	37.27	37.79	0.2613	16890	5.85
20.00	0.168	0.30	0.000	0.0	37.11	37.64	0.2607	16819	5.84
20.25	0.135	0.25	0.000	0.0	36.90	37.42	0.2600	16721	5.82
20.50	0.116	0.22	0.000	0.0	36.63	37.15	0.2590	16600	5.81
20.75	0.104	0.19	0.000	0.0	36.33	36.85	0.2580	16467	5.79
21.00	0.088	0.17	0.000	0.0	36.01	36.53	0.2568	16321	5.76
21.25	0.078	0.15	0.000	0.0	35.67	36.18	0.2556	16165	5.74
21.50	0.071	0.14	0.000	0.0	35.31	35.81	0.2542	16002	5.72
21.75	0.066	0.13	0.000	0.0	34.94	35.44	0.2529	15836	5.69
22.00	0.063	0.12	0.000	0.0	34.56	35.07	0.2515	15667	5.66
22.25	0.061	0.12	0.000	0.0	34.19	34.69	0.2501	15497	5.64
22.50	0.060	0.11	0.000	0.0	33.81	34.31	0.2486	15327	5.61
22.75	0.053	0.10	0.000	0.0	33.43	33.92	0.2472	15154	5.58
23.00	0.048	0.09	0.000	0.0	33.04	33.53	0.2456	14978	5.55
23.25	0.045	0.09	0.000	0.0	32.64	33.13	0.2441	14800	5.52
23.50	0.043	0.09	0.000	0.0	32.25	32.73	0.2425	14621	5.50
23.75	0.042	0.08	0.000	0.0	31.85	32.33	0.2409	14442	5.47
24.00	0.041	0.07	0.000	0.0	31.46	31.93	0.2393	14263	5.44
24.25	0.032	0.03	0.000	0.0	31.05	31.53	0.2376	14081	5.41

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
24.50	0.019	0.03	0.000	0.0	30.62	31.09	0.2357	13883	5.38
24.75	0.009	0.01	0.000	0.0	30.18	30.64	0.2338	13684	5.34
25.00	0.001	0.00	0.000	0.0	29.72	30.19	0.2318	13480	5.31
25.25	0.000	0.00	0.000	0.0	29.26	29.72	0.2298	13272	5.28
25.50	0.000	0.00	0.000	0.0	28.81	29.26	0.2277	13066	5.25
25.75	0.000	0.00	0.000	0.0	28.36	28.81	0.2256	12862	5.22
26.00	0.000	0.00	0.000	0.0	27.91	28.36	0.2235	12660	5.18
26.25	0.000	0.00	0.000	0.0	27.47	27.91	0.2213	12460	5.15
26.50	0.000	0.00	0.000	0.0	27.03	27.47	0.2192	12262	5.12
26.75	0.000	0.00	0.000	0.0	26.60	27.03	0.2170	12066	5.08
27.00	0.000	0.00	0.000	0.0	26.17	26.60	0.2147	11871	5.05
27.25	0.000	0.00	0.000	0.0	25.74	26.17	0.2124	11679	5.02
27.50	0.000	0.00	0.000	0.0	25.32	25.74	0.2101	11489	4.99
27.75	0.000	0.00	0.000	0.0	24.91	25.32	0.2077	11301	4.96
28.00	0.000	0.00	0.000	0.0	24.50	24.91	0.2053	11115	4.93
28.25	0.000	0.00	0.000	0.0	24.09	24.50	0.2029	10932	4.90
28.50	0.000	0.00	0.000	0.0	23.69	24.09	0.2003	10750	4.87
28.75	0.000	0.00	0.000	0.0	23.29	23.69	0.1978	10571	4.84
29.00	0.000	0.00	0.000	0.0	22.90	23.29	0.1950	10394	4.81
29.25	0.000	0.00	0.000	0.0	22.52	22.90	0.1923	10220	4.78
29.50	0.000	0.00	0.000	0.0	22.14	22.52	0.1895	10048	4.75
29.75	0.000	0.00	0.000	0.0	21.77	22.14	0.1864	9879	4.73
30.00	0.000	0.00	0.000	0.0	21.40	21.77	0.1832	9713	4.70
30.25	0.000	0.00	0.000	0.0	21.04	21.40	0.1800	9549	4.67
30.50	0.000	0.00	0.000	0.0	20.69	21.04	0.1758	9389	4.65
30.75	0.000	0.00	0.000	0.0	20.35	20.69	0.1714	9233	4.62
31.00	0.000	0.00	0.000	0.0	20.01	20.35	0.1671	9081	4.59
31.25	0.000	0.00	0.000	0.0	19.69	20.01	0.1623	8932	4.57
31.50	0.000	0.00	0.000	0.0	19.37	19.69	0.1574	8789	4.54
31.75	0.000	0.00	0.000	0.0	19.07	19.37	0.1526	8649	4.52
32.00	0.000	0.00	0.000	0.0	18.77	19.07	0.1484	8514	4.50
32.25	0.000	0.00	0.000	0.0	18.47	18.77	0.1480	8380	4.48
32.50	0.000	0.00	0.000	0.0	18.18	18.47	0.1476	8247	4.45
32.75	0.000	0.00	0.000	0.0	17.88	18.18	0.1473	8114	4.43
33.00	0.000	0.00	0.000	0.0	17.59	17.88	0.1469	7982	4.41
33.25	0.000	0.00	0.000	0.0	17.30	17.59	0.1465	7850	4.39
33.50	0.000	0.00	0.000	0.0	17.01	17.30	0.1461	7718	4.36
33.75	0.000	0.00	0.000	0.0	16.71	17.01	0.1457	7587	4.34
34.00	0.000	0.00	0.000	0.0	16.42	16.71	0.1454	7456	4.32
34.25	0.000	0.00	0.000	0.0	16.13	16.42	0.1450	7325	4.29
34.50	0.000	0.00	0.000	0.0	15.84	16.13	0.1446	7195	4.27
34.75	0.000	0.00	0.000	0.0	15.56	15.84	0.1442	7065	4.25
35.00	0.000	0.00	0.000	0.0	15.27	15.56	0.1438	6935	4.23
35.25	0.000	0.00	0.000	0.0	14.98	15.27	0.1435	6806	4.21
35.50	0.000	0.00	0.000	0.0	14.70	14.98	0.1431	6677	4.19
35.75	0.000	0.00	0.000	0.0	14.41	14.70	0.1427	6549	4.17
36.00	0.000	0.00	0.000	0.0	14.13	14.41	0.1423	6420	4.14
36.25	0.000	0.00	0.000	0.0	13.84	14.13	0.1419	6292	4.12
36.50	0.000	0.00	0.000	0.0	13.56	13.84	0.1415	6165	4.10
36.75	0.000	0.00	0.000	0.0	13.28	13.56	0.1411	6038	4.07
37.00	0.000	0.00	0.000	0.0	12.99	13.28	0.1407	5911	4.05
37.25	0.000	0.00	0.000	0.0	12.71	12.99	0.1402		

MODIFIED PULS-DMA-3A

RESULTS: Routing of 24 hr - 2 yr Total Hydrograph in BMP-3A

Max outflow:	0.186	cfs		initial elev:	0.0 ft
Max elevation in pond:	5.259	ft	(from bottom of gravel)	Peak flow in:	0.98 cfs
Vol-out:	10502	cu-ft		Vol in:	26040 cu-ft

Pond Storm: 24 hr - 2 yr

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
0.00	0.000	0.06	0.00	0.0	0.00		0.000	0	0.00
0.25	0.058	0.14	0.002	0.9	0.05	0.06	0.001	25	0.01
0.50	0.087	0.17	0.030	15.2	0.16	0.17	0.002	74	0.03
0.75	0.087	0.20	0.007	31.8	0.29	0.30	0.004	134	0.05
1.00	0.116	0.20	0.006	37.9	0.47	0.48	0.006	214	0.08
1.25	0.087	0.17	0.008	44.4	0.64	0.66	0.008	293	0.11
1.50	0.087	0.17	0.009	52.1	0.78	0.80	0.009	356	0.13
1.75	0.087	0.20	0.009	60.2	0.91	0.94	0.011	416	0.15
2.00	0.116	0.23	0.009	68.6	1.07	1.10	0.013	488	0.18
2.25	0.116	0.23	0.010	77.0	1.25	1.29	0.015	572	0.21
2.50	0.116	0.26	0.010	85.7	1.43	1.47	0.017	652	0.24
2.75	0.145	0.29	0.010	94.7	1.63	1.67	0.020	744	0.28
3.00	0.145	0.29	0.010	103.8	1.86	1.90	0.022	846	0.31
3.25	0.145	0.29	0.011	113.2	2.08	2.13	0.025	946	0.35
3.50	0.145	0.29	0.011	122.8	2.29	2.34	0.028	1042	0.39
3.75	0.145	0.32	0.011	132.6	2.50	2.56	0.030	1137	0.42
4.00	0.174	0.35	0.011	142.5	2.73	2.79	0.033	1242	0.46
4.25	0.174	0.38	0.011	152.5	2.98	3.05	0.036	1357	0.50
4.50	0.203	0.41	0.011	162.6	3.26	3.33	0.039	1482	0.55
4.75	0.203	0.43	0.012	172.9	3.55	3.64	0.043	1617	0.60
5.00	0.231	0.41	0.012	183.5	3.87	3.96	0.047	1762	0.65
5.25	0.174	0.38	0.012	194.3	4.15	4.25	0.050	1890	0.70
5.50	0.203	0.43	0.012	205.2	4.40	4.50	0.053	2002	0.74
5.75	0.231	0.46	0.012	216.2	4.69	4.81	0.057	2137	0.79
6.00	0.231	0.49	0.012	227.3	5.01	5.13	0.060	2281	0.84
6.25	0.260	0.52	0.013	238.5	5.35	5.48	0.064	2435	0.90
6.50	0.260	0.55	0.013	249.9	5.71	5.84	0.069	2598	0.96
6.75	0.289	0.58	0.013	261.5	6.08	6.23	0.073	2771	1.03
7.00	0.289	0.58	0.013	273.2	6.49	6.64	0.075	2953	1.12
7.25	0.289	0.61	0.014	285.3	6.88	7.04	0.078	3132	1.21
7.50	0.318	0.67	0.014	297.8	7.30	7.46	0.081	3321	1.30
7.75	0.347	0.72	0.014	310.6	7.77	7.94	0.084	3533	1.41
8.00	0.376	0.81	0.015	323.8	8.28	8.46	0.088	3768	1.53
8.25	0.434	0.87	0.015	337.4	8.88	9.06	0.092	4037	1.66
8.50	0.434	0.90	0.016	351.5	9.52	9.72	0.097	4329	1.80
8.75	0.463	0.95	0.017	366.1	10.18	10.39	0.102	4628	1.95
9.00	0.492	1.04	0.017	381.3	10.89	11.11	0.106	4950	2.11
9.25	0.550	1.13	0.018	396.9	11.68	11.90	0.109	5306	2.28
9.50	0.579	1.19	0.018	413.1	12.55	12.77	0.114	5697	2.48
9.75	0.608	1.24	0.019	429.9	13.46	13.70	0.118	6110	2.68
10.00	0.637	1.07	0.020	447.3	14.42	14.66	0.123	6544	2.89
10.25	0.434	0.87	0.020	465.3	15.19	15.45	0.127	6895	3.07
10.50	0.434	1.01	0.021	483.7	15.76	16.02	0.130	7151	3.19
10.75	0.579	1.16	0.021	502.3	16.47	16.73	0.133	7470	3.35
11.00	0.579	1.13	0.021	521.0	17.31	17.58	0.138	7850	3.54
11.25	0.550	1.10	0.021	540.0	18.11	18.39	0.142	8213	3.72

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
11.50	0.550	1.04	0.021	559.2	18.88	19.17	0.145	8560	3.89
11.75	0.492	1.01	0.022	578.6	19.58	19.88	0.147	8877	4.01
12.00	0.521	1.24	0.022	598.1	20.25	20.55	0.148	9181	4.06
12.25	0.723	1.48	0.021	617.4	21.16	21.45	0.149	9587	4.12
12.50	0.752	1.56	0.021	636.4	22.29	22.59	0.151	10097	4.19
12.75	0.810	1.65	0.021	655.1	23.50	23.81	0.152	10646	4.28
13.00	0.839	1.82	0.020	673.6	24.81	25.11	0.154	11232	4.36
13.25	0.984	1.97	0.020	691.9	26.28	26.59	0.155	11894	4.46
13.50	0.984	1.65	0.020	710.2	27.88	28.20	0.161	12619	4.57
13.75	0.665	1.33	0.020	728.4	29.16	29.49	0.166	13196	4.65
14.00	0.665	1.45	0.020	746.6	30.11	30.45	0.169	13626	4.72
14.25	0.781	1.53	0.020	764.5	31.18	31.52	0.171	14106	4.79
14.50	0.752	1.50	0.020	782.4	32.32	32.67	0.174	14623	4.86
14.75	0.752	1.48	0.020	800.1	33.43	33.79	0.177	15125	4.94
15.00	0.723	1.42	0.019	817.7	34.51	34.87	0.179	15611	5.01
15.25	0.694	1.36	0.019	835.1	35.53	35.89	0.181	16069	5.08
15.50	0.665	1.22	0.019	852.5	36.48	36.85	0.183	16500	5.14
15.75	0.550	1.10	0.019	869.7	37.29	37.66	0.185	16864	5.20
16.00	0.550	0.67	0.019	886.8	37.98	38.35	0.186	17175	5.24
16.25	0.116	0.23	0.019	903.8	38.24	38.61	0.186	17290	5.26
16.50	0.116	0.20	0.018	920.5	38.06	38.43	0.186	17210	5.25
16.75	0.087	0.17	0.018	937.0	37.85	38.22	0.186	17117	5.23
17.00	0.087	0.23	0.018	953.2	37.62	37.99	0.185	17012	5.22
17.25	0.145	0.29	0.018	969.1	37.45	37.82	0.185	16934	5.21
17.50	0.145	0.29	0.017	984.8	37.33	37.70	0.185	16882	5.20
17.75	0.145	0.26	0.017	1000.1	37.22	37.59	0.184	16831	5.19
18.00	0.116	0.23	0.017	1015.3	37.08	37.44	0.184	16767	5.18
18.25	0.116	0.23	0.016	1030.2	36.91	37.27	0.184	16691	5.17
18.50	0.116	0.20	0.016	1044.9	36.74	37.11	0.184	16615	5.16
18.75	0.087	0.14	0.016	1059.4	36.54	36.91	0.183	16527	5.15
19.00	0.058	0.14	0.016	1073.7	36.29	36.66	0.183	16413	5.13
19.25	0.087	0.20	0.016	1087.8	36.04	36.40	0.182	16300	5.11
19.50	0.116	0.20	0.015	1101.7	35.85	36.21	0.182	16213	5.10
19.75	0.087	0.14	0.015	1115.4	35.66	36.02	0.181	16127	5.09
20.00	0.058	0.14	0.015	1129.0	35.41	35.77	0.181	16016	5.07
20.25	0.087	0.17	0.015	1142.3	35.16	35.53	0.180	15905	5.05
20.50	0.087	0.17	0.015	1155.5	34.95	35.31	0.180	15808	5.04
20.75	0.087	0.14	0.014	1168.5	34.73	35.09	0.179	15711	5.03
21.00	0.058	0.14	0.014	1181.4	34.49	34.85	0.179	15602	5.01
21.25	0.087	0.14	0.014	1194.1	34.25	34.61	0.178	15494	4.99
21.50	0.058	0.14	0.014	1206.7	34.01	34.37	0.178	15386	4.98
21.75	0.087	0.14	0.014	1219.1	33.78	34.13	0.177	15279	4.96
22.00	0.058	0.14	0.014	1231.3	33.54	33.89	0.177	15172	4.95
22.25	0.087	0.14	0.013	1243.5	33.30	33.66	0.176	15066	4.93
22.50	0.058	0.12	0.013	1255.5	33.07	33.42	0.176	14961	4.91
22.75	0.058	0.12	0.013	1267.3	32.81	33.16	0.175	14843	4.90
23.00	0.058	0.12	0.013	1279.1	32.55	32.90	0.175	14726	4.88
23.25	0.058	0.12	0.013	1290.7	32.29	32.64	0.174	14609	4.86
23.50	0.058	0.12	0.013	1302.2	32.03	32.38	0.173	14494	4.84
23.75	0.058	0.12	0.013	1313.6	31.78	32.13	0.173	14379	4.83
24.00	0.058	0.06	0.012	1324.8	31.53	31.87	0.172	14264	4.81
24.25	0.000	0.00	0.012	1336.0	31.56	31.56			

MODIFIED PULS-DMA-3B

RESULTS: Routing of 24 hr - 2 yr Total Hydrograph in BMP-3B

Max outflow:	0.060	cfs		initial elev:	0.0 ft
Max elevation in pond:	3.173	ft	(from bottom of gravel)	Peak flow in:	0.63 cfs
Vol-out:	3216	cu-ft		Vol in:	16741 cu-ft

Pond Storm: 24 hr - 2 yr

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
0.00	0.000	0.04	0.00	0.0	0.00		0.000	0	0.00
0.25	0.037	0.09	0.006	2.5	0.03	0.03	0.000	14	0.00
0.50	0.056	0.11	0.019	13.5	0.10	0.10	0.000	45	0.01
0.75	0.056	0.13	0.013	28.0	0.18	0.18	0.001	80	0.02
1.00	0.074	0.13	0.012	39.5	0.28	0.28	0.001	126	0.03
1.25	0.056	0.11	0.013	50.9	0.38	0.39	0.001	173	0.04
1.50	0.056	0.11	0.013	62.8	0.46	0.47	0.002	210	0.05
1.75	0.056	0.13	0.013	74.9	0.55	0.55	0.002	246	0.06
2.00	0.074	0.15	0.013	86.9	0.64	0.65	0.002	291	0.07
2.25	0.074	0.15	0.013	98.8	0.76	0.77	0.003	344	0.08
2.50	0.074	0.17	0.014	111.0	0.88	0.88	0.003	396	0.09
2.75	0.093	0.19	0.014	123.4	1.01	1.02	0.004	456	0.11
3.00	0.093	0.19	0.014	136.1	1.16	1.17	0.004	523	0.12
3.25	0.093	0.19	0.015	149.0	1.31	1.32	0.005	590	0.14
3.50	0.093	0.19	0.015	162.2	1.45	1.46	0.005	656	0.16
3.75	0.093	0.20	0.015	175.6	1.60	1.61	0.006	722	0.17
4.00	0.112	0.22	0.015	189.2	1.76	1.77	0.006	795	0.19
4.25	0.112	0.24	0.015	203.0	1.94	1.95	0.007	876	0.21
4.50	0.130	0.26	0.016	216.9	2.14	2.15	0.008	964	0.23
4.75	0.130	0.28	0.016	231.2	2.35	2.36	0.008	1060	0.25
5.00	0.149	0.26	0.016	245.7	2.58	2.59	0.009	1163	0.27
5.25	0.112	0.24	0.017	260.5	2.78	2.80	0.010	1257	0.30
5.50	0.130	0.28	0.017	275.5	2.97	2.99	0.010	1342	0.32
5.75	0.149	0.30	0.017	290.7	3.19	3.22	0.011	1443	0.34
6.00	0.149	0.32	0.017	306.1	3.43	3.46	0.012	1551	0.37
6.25	0.167	0.33	0.017	321.7	3.69	3.72	0.013	1666	0.39
6.50	0.167	0.35	0.018	337.4	3.96	3.99	0.014	1789	0.42
6.75	0.186	0.37	0.018	353.5	4.25	4.28	0.015	1919	0.45
7.00	0.186	0.37	0.018	369.8	4.55	4.59	0.016	2056	0.49
7.25	0.186	0.39	0.019	386.3	4.85	4.89	0.017	2192	0.52
7.50	0.205	0.43	0.019	403.2	5.17	5.21	0.018	2335	0.55
7.75	0.223	0.47	0.019	420.2	5.52	5.56	0.019	2494	0.59
8.00	0.242	0.52	0.019	437.6	5.91	5.95	0.021	2667	0.63
8.25	0.279	0.56	0.020	455.3	6.34	6.39	0.022	2865	0.68
8.50	0.279	0.58	0.020	473.3	6.81	6.86	0.024	3077	0.73
8.75	0.298	0.61	0.021	491.8	7.30	7.35	0.026	3296	0.78
9.00	0.316	0.67	0.021	510.7	7.81	7.87	0.027	3529	0.83
9.25	0.353	0.73	0.022	530.0	8.38	8.44	0.029	3785	0.89
9.50	0.372	0.76	0.022	549.8	9.00	9.06	0.032	4065	0.96
9.75	0.391	0.80	0.023	570.1	9.65	9.72	0.034	4358	1.04
10.00	0.409	0.69	0.024	591.0	10.33	10.40	0.035	4666	1.14
10.25	0.279	0.56	0.025	612.7	10.90	10.97	0.036	4922	1.22
10.50	0.279	0.65	0.025	635.2	11.34	11.41	0.037	5118	1.28
10.75	0.372	0.74	0.026	658.0	11.86	11.94	0.038	5355	1.35
11.00	0.372	0.73	0.026	681.2	12.48	12.55	0.039	5631	1.44
11.25	0.353	0.71	0.027	704.8	13.07	13.15	0.040	5898	1.52

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
11.50	0.353	0.67	0.027	728.8	13.64	13.72	0.042	6156	1.61
11.75	0.316	0.65	0.027	753.3	14.17	14.25	0.043	6394	1.68
12.00	0.335	0.80	0.028	778.1	14.68	14.76	0.044	6624	1.75
12.25	0.465	0.95	0.028	803.1	15.33	15.42	0.045	6919	1.85
12.50	0.484	1.00	0.028	828.4	16.13	16.22	0.047	7279	1.96
12.75	0.521	1.06	0.029	854.2	16.98	17.08	0.048	7663	2.08
13.00	0.539	1.17	0.030	880.6	17.88	17.98	0.050	8070	2.21
13.25	0.632	1.26	0.030	907.7	18.89	18.99	0.051	8525	2.35
13.50	0.632	1.06	0.031	935.4	19.99	20.10	0.053	9019	2.51
13.75	0.428	0.86	0.032	963.9	20.88	20.99	0.054	9420	2.63
14.00	0.428	0.93	0.033	993.1	21.56	21.67	0.055	9726	2.73
14.25	0.502	0.99	0.033	1022.5	22.31	22.42	0.056	10065	2.84
14.50	0.484	0.97	0.033	1052.2	23.12	23.23	0.058	10428	2.95
14.75	0.484	0.95	0.033	1082.0	23.90	24.02	0.058	10781	3.02
15.00	0.465	0.91	0.033	1112.0	24.66	24.78	0.059	11125	3.05
15.25	0.446	0.87	0.033	1141.7	25.39	25.51	0.059	11453	3.08
15.50	0.428	0.78	0.032	1170.9	26.08	26.20	0.059	11764	3.11
15.75	0.353	0.71	0.032	1199.8	26.68	26.80	0.059	12033	3.14
16.00	0.353	0.43	0.031	1228.3	27.21	27.32	0.060	12269	3.16
16.25	0.074	0.15	0.031	1256.5	27.45	27.57	0.060	12380	3.17
16.50	0.074	0.13	0.031	1284.2	27.42	27.54	0.060	12366	3.17
16.75	0.056	0.11	0.030	1311.5	27.37	27.49	0.060	12343	3.17
17.00	0.056	0.15	0.030	1338.3	27.30	27.42	0.060	12313	3.17
17.25	0.093	0.19	0.029	1364.7	27.27	27.39	0.060	12300	3.17
17.50	0.093	0.19	0.029	1390.6	27.28	27.40	0.060	12304	3.17
17.75	0.093	0.17	0.028	1416.1	27.29	27.41	0.060	12308	3.17
18.00	0.074	0.15	0.028	1441.2	27.28	27.40	0.060	12305	3.17
18.25	0.074	0.15	0.027	1466.0	27.26	27.38	0.060	12294	3.16
18.50	0.074	0.13	0.027	1490.4	27.23	27.35	0.060	12282	3.16
18.75	0.056	0.09	0.027	1514.5	27.19	27.31	0.060	12263	3.16
19.00	0.037	0.09	0.026	1538.3	27.11	27.23	0.060	12228	3.16
19.25	0.056	0.13	0.026	1561.7	27.03	27.15	0.060	12192	3.15
19.50	0.074	0.13	0.026	1584.9	26.99	27.11	0.060	12174	3.15
19.75	0.056	0.09	0.025	1607.8	26.95	27.07	0.060	12156	3.15
20.00	0.037	0.09	0.025	1630.4	26.88	27.00	0.059	12122	3.15
20.25	0.056	0.11	0.025	1652.7	26.80	26.92	0.059	12088	3.14
20.50	0.056	0.11	0.024	1674.8	26.75	26.87	0.059	12063	3.14
20.75	0.056	0.09	0.024	1696.7	26.69	26.81	0.059	12038	3.14
21.00	0.037	0.09	0.024	1718.3	26.62	26.74	0.059	12004	3.13
21.25	0.056	0.09	0.024	1739.7	26.54	26.66	0.059	11972	3.13
21.50	0.037	0.09	0.023	1760.8	26.47	26.59	0.059	11939	3.13
21.75	0.056	0.09	0.023	1781.8	26.40	26.52	0.059	11906	3.12
22.00	0.037	0.09	0.023	1802.5	26.33	26.45	0.059	11874	3.12
22.25	0.056	0.09	0.023	1823.1	26.26	26.37	0.059	11842	3.12
22.50	0.037	0.07	0.023	1843.4	26.19	26.30	0.059	11810	3.12
22.75	0.037	0.07	0.022	1863.6	26.10	26.22	0.059	11770	3.11
23.00	0.037	0.07	0.022	1883.6	26.01	26.13	0.059	11731	3.11
23.25	0.037	0.07	0.022	1903.4	25.92	26.04	0.059	11691	3.10
23.50	0.037	0.07	0.022	1923.0	25.83	25.95	0.059	11652	3.10
23.75	0.037	0.07	0.022	1942.4	25.75	25.87	0.059	11613	3.09
24.00	0.037	0.04	0.021	1961.7	25.66	25.78	0.059	11574	3.09
24.25	0.000	0.00	0.021	1980.9	25.66	25.66			

MODIFIED PULS-DMA-4

RESULTS: Routing of 24 hr - 2 yr Total Hydrograph in BMP-4

Max outflow:	0.419 cfs		initial elev:	0.0 ft
Max elevation in pond:	5.889 ft	(from bottom of gravel)	Peak flow in:	2.86 cfs
Vol-out:	23083 cu-ft		Vol in:	75619 cu-ft

Pond Storm: 24 hr - 2 yr

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
0.00	0.000	0.17	0.00	0.0	0.00		0.000	0	0.00
0.25	0.168	0.42	0.023	10.4	0.14	0.14	0.001	65	0.01
0.50	0.252	0.50	0.102	66.9	0.43	0.44	0.004	195	0.03
0.75	0.252	0.59	0.060	140.2	0.76	0.77	0.007	343	0.06
1.00	0.336	0.59	0.054	191.8	1.21	1.23	0.012	548	0.09
1.25	0.252	0.50	0.060	243.2	1.65	1.68	0.016	748	0.12
1.50	0.252	0.50	0.063	298.2	1.99	2.03	0.019	904	0.15
1.75	0.252	0.59	0.062	354.2	2.33	2.37	0.023	1056	0.18
2.00	0.336	0.67	0.061	409.6	2.74	2.79	0.027	1244	0.21
2.25	0.336	0.67	0.062	465.1	3.22	3.29	0.031	1465	0.24
2.50	0.336	0.76	0.063	521.5	3.70	3.77	0.036	1680	0.28
2.75	0.420	0.84	0.064	579.0	4.24	4.33	0.041	1929	0.32
3.00	0.420	0.84	0.066	637.6	4.86	4.95	0.047	2208	0.37
3.25	0.420	0.84	0.067	697.5	5.46	5.57	0.053	2482	0.41
3.50	0.420	0.84	0.069	758.8	6.05	6.17	0.059	2748	0.46
3.75	0.420	0.92	0.069	820.9	6.62	6.75	0.064	3009	0.50
4.00	0.504	1.01	0.070	883.7	7.27	7.41	0.070	3302	0.55
4.25	0.504	1.09	0.071	947.1	7.98	8.13	0.077	3625	0.60
4.50	0.588	1.18	0.072	1011.5	8.76	8.93	0.085	3980	0.66
4.75	0.588	1.26	0.073	1077.0	9.60	9.79	0.093	4363	0.72
5.00	0.672	1.18	0.075	1143.8	10.51	10.72	0.102	4776	0.79
5.25	0.504	1.09	0.077	1212.0	11.32	11.54	0.110	5142	0.85
5.50	0.588	1.26	0.077	1281.3	12.02	12.26	0.116	5462	0.91
5.75	0.672	1.34	0.078	1351.1	12.88	13.13	0.125	5851	0.97
6.00	0.672	1.43	0.079	1421.4	13.80	14.07	0.132	6270	1.05
6.25	0.756	1.51	0.080	1492.8	14.80	15.07	0.137	6721	1.15
6.50	0.756	1.60	0.083	1566.2	15.86	16.15	0.144	7201	1.26
6.75	0.840	1.68	0.085	1641.7	16.99	17.29	0.150	7712	1.37
7.00	0.840	1.68	0.088	1719.4	18.18	18.50	0.157	8252	1.49
7.25	0.840	1.76	0.090	1799.3	19.36	19.68	0.164	8784	1.61
7.50	0.924	1.93	0.092	1881.3	20.60	20.94	0.171	9345	1.73
7.75	1.008	2.10	0.094	1965.1	21.98	22.34	0.179	9974	1.87
8.00	1.092	2.35	0.097	2051.0	23.52	23.89	0.188	10668	2.02
8.25	1.260	2.52	0.099	2139.1	25.29	25.68	0.195	11466	2.20
8.50	1.260	2.60	0.103	2230.0	27.20	27.60	0.203	12331	2.39
8.75	1.344	2.77	0.106	2323.8	29.17	29.60	0.211	13223	2.59
9.00	1.428	3.02	0.109	2420.5	31.29	31.73	0.219	14180	2.80
9.25	1.596	3.28	0.112	2520.2	33.64	34.10	0.229	15240	3.03
9.50	1.680	3.44	0.116	2623.0	36.21	36.69	0.240	16401	3.29
9.75	1.764	3.61	0.120	2729.3	38.91	39.42	0.251	17624	3.56
10.00	1.848	3.11	0.124	2839.0	41.76	42.28	0.262	18910	3.85
10.25	1.260	2.52	0.128	2952.2	44.08	44.62	0.268	19957	4.02
10.50	1.260	2.94	0.128	3067.3	45.81	46.35	0.270	20734	4.07
10.75	1.680	3.36	0.126	3181.6	47.95	48.49	0.272	21700	4.14
11.00	1.680	3.28	0.124	3293.7	50.51	51.06	0.274	22854	4.21
11.25	1.596	3.19	0.122	3404.1	52.99	53.54	0.277	23971	4.28

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
11.50	1.596	3.02	0.120	3513.0	55.38	55.94	0.279	25048	4.35
11.75	1.428	2.94	0.119	3620.5	57.61	58.17	0.281	26050	4.42
12.00	1.512	3.61	0.117	3726.7	59.75	60.31	0.283	27014	4.47
12.25	2.101	4.29	0.116	3831.6	62.55	63.13	0.290	28276	4.55
12.50	2.185	4.54	0.115	3935.4	65.98	66.60	0.310	29831	4.65
12.75	2.353	4.79	0.114	4038.5	69.64	70.29	0.326	31484	4.75
13.00	2.437	5.29	0.114	4141.2	73.52	74.20	0.338	33237	4.85
13.25	2.857	5.71	0.114	4243.5	77.89	78.59	0.350	35207	4.97
13.50	2.857	4.79	0.114	4345.7	82.65	83.37	0.361	37356	5.09
13.75	1.932	3.86	0.114	4448.0	86.47	87.21	0.370	39080	5.20
14.00	1.932	4.20	0.113	4550.1	89.36	90.11	0.376	40381	5.27
14.25	2.269	4.45	0.113	4651.8	92.57	93.34	0.382	41829	5.35
14.50	2.185	4.37	0.112	4752.8	96.02	96.80	0.389	43385	5.44
14.75	2.185	4.29	0.112	4853.3	99.38	100.17	0.395	44898	5.52
15.00	2.101	4.12	0.111	4953.5	102.64	103.44	0.401	46368	5.61
15.25	2.016	3.95	0.110	5053.2	105.72	106.53	0.406	47758	5.69
15.50	1.932	3.53	0.110	5152.4	108.63	109.45	0.410	49069	5.75
15.75	1.596	3.19	0.109	5251.1	111.11	111.94	0.414	50187	5.81
16.00	1.596	1.93	0.109	5349.1	113.25	114.09	0.418	51151	5.87
16.25	0.336	0.67	0.108	5446.5	114.13	114.97	0.419	51546	5.89
16.50	0.336	0.59	0.107	5543.0	113.75	114.59	0.419	51376	5.88
16.75	0.252	0.50	0.105	5638.2	113.29	114.13	0.418	51169	5.87
17.00	0.252	0.67	0.103	5732.0	112.75	113.59	0.417	50926	5.85
17.25	0.420	0.84	0.102	5824.4	112.39	113.22	0.416	50761	5.84
17.50	0.420	0.84	0.101	5915.6	112.19	113.02	0.416	50673	5.84
17.75	0.420	0.76	0.099	6005.5	112.00	112.83	0.416	50587	5.83
18.00	0.336	0.67	0.098	6094.4	111.73	112.56	0.415	50464	5.83
18.25	0.336	0.67	0.097	6182.1	111.38	112.20	0.415	50306	5.82
18.50	0.336	0.59	0.096	6268.9	111.03	111.85	0.414	50148	5.81
18.75	0.252	0.42	0.095	6354.6	110.60	111.42	0.414	49955	5.80
19.00	0.168	0.42	0.094	6439.3	110.00	110.83	0.413	49687	5.79
19.25	0.252	0.59	0.093	6523.0	109.41	110.24	0.412	49421	5.77
19.50	0.336	0.59	0.091	6605.8	109.00	109.82	0.411	49233	5.76
19.75	0.252	0.42	0.090	6687.7	108.58	109.40	0.410	49046	5.75
20.00	0.168	0.42	0.090	6768.7	108.00	108.82	0.409	48785	5.74
20.25	0.252	0.50	0.089	6848.9	107.43	108.24	0.409	48526	5.73
20.50	0.252	0.50	0.088	6928.2	106.94	107.75	0.408	48306	5.71
20.75	0.252	0.42	0.087	7006.7	106.46	107.27	0.407	48088	5.70
21.00	0.168	0.42	0.086	7084.4	105.89	106.70	0.406	47833	5.69
21.25	0.252	0.42	0.085	7161.4	105.33	106.14	0.405	47581	5.68
21.50	0.168	0.42	0.084	7237.7	104.77	105.58	0.404	47329	5.66
21.75	0.252	0.42	0.084	7313.2	104.22	105.02	0.403	47079	5.65
22.00	0.168	0.42	0.083	7388.1	103.67	104.47	0.402	46831	5.63
22.25	0.252	0.42	0.082	7462.2	103.12	103.92	0.401	46584	5.62
22.50	0.168	0.34	0.081	7535.6	102.58	103.38	0.400	46339	5.60
22.75	0.168	0.34	0.081	7608.5	101.95	102.75	0.399	46058	5.59
23.00	0.168	0.34	0.080	7680.6	101.33	102.13	0.398	45778	5.57
23.25	0.168	0.34	0.079	7752.1	100.71	101.51	0.397	45500	5.56
23.50	0.168	0.34	0.078	7823.1	100.10	100.89	0.396	45223	5.54
23.75	0.168	0.34	0.078	7893.4	99.49	100.28	0.395	44948	5.53
24.00	0.168	0.17	0.077	7963.2	98.88	99.67	0.394	44674	5.51
24.25	0.000	0.00	0.077	8032.3	98.90	98.90			

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

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**

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

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

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

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

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

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
☑ N. **Fire Sprinkler Test Water**		☑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	☐ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ☐ **Boiler drain lines** ☐ **Condensate drain lines** ☐ **Rooftop equipment** ☐ **Drainage sumps** ☐ **Roofing, gutters, and trim.** ☐ **Other sources**		☐ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ☐ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ☐ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ☐ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ☐ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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

Appendix 9: O&M

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

TO BE PROVIDED IN FINAL ENGINEERING

Appendix 10: Educational Materials

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

For Information:

For more information on the General Industrial Storm Water Permit contact:

State Water Resources Control Board (SWRCB)
(916) 657-1146 or www.swrcb.ca.gov/ or, at your Regional Water Quality Control Board (RWQCB).

Santa Ana Region (8)
California Tower
3737 Main Street, Ste. 500
Riverside, CA 92501-3339
(909) 782-4130

San Diego Region (9)
9771 Clairemont Mesa Blvd., Ste. A
San Diego, CA 92124
(619) 467-2952

Colorado River Basin Region (7)
73-720 Fred Waring Dr., Ste. 100
Palm Desert, CA 92260
(760) 346-7491

SPILL RESPONSE AGENCY:
HAZ-MAT: (909) 358-5055
HAZARDOUS WASTE DISPOSAL: (909) 358-5055
RECYCLING INFORMATION: 1-800-366-SAVE
TO REPORT ILLEGAL DUMPING OR A CLOGGED STORM DRAIN: 1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, call:
(909) 955-1111.

StormWater CleanWater
PROTECTION PROGRAM

Riverside County gratefully acknowledges the State Water Quality Control Board and the American Public Works Association, Storm Water Quality Task Force for the information provided in this brochure.

DID YOU KNOW . . .

YOUR FACILITY MAY NEED A STORM WATER PERMIT?

Many industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit

FIND OUT
IF YOUR FACILITY MUST OBTAIN A PERMIT

StormWater Pollution . . . What you should know

Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to help prevent flooding by carrying excess rainwater away from streets. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our waterways.

Unlike sanitary sewers, storm drains are not connected to a treatment plant - they flow directly to our local streams, rivers and lakes.

In recent years, awareness of the need to protect water quality has increased. As a result, federal, state, and local programs have been established to reduce polluted stormwater discharges to our waterways. The emphasis of these programs is to prevent stormwater pollution since it's much easier, and less costly, than cleaning up "after the fact."

National Pollutant Discharge Elimination System (NPDES)

In 1987, the Federal Clean Water Act was amended to establish a framework for regulating industrial stormwater discharges under the NPDES permit program. In California, NPDES permits are issued by the State Water Resources Control Board (SWRCB) and the nine (9) Regional Water Quality Control Boards (RWQCB). In general, certain industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit if the type of facilities or operations falls into one of the several categories described in this brochure.

How Do I Know If I Need A Permit?

Following are ***general descriptions*** of the industry categories types that are regulated by the Industrial Activities Storm Water General Permit. Contact your local Region Water Quality Control Board to determine if your facility/operation requires coverage under the Permit.

➜ Facilities such as cement manufacturing; feedlots; fertilizer manufacturing; petroleum refining; phosphate manufacturing; steam electric power generation; coal mining; mineral mining and processing; ore mining and dressing; and asphalt emulsion;

➜ Facilities classified as lumber and wood products (except wood kitchen cabinets); pulp, paper, and paperboard mills; chemical producers (except some pharmaceutical and biological products); petroleum and coal products; leather production and products; stone, clay and glass products; primary metal industries; fabricated structural metal; ship and boat building and repairing;

➜ Active or inactive mining operations and oil and gas exploration, production, processing, or treatment operations;

➜ Hazardous waste treatment, storage, or disposal facilities;

➜ Landfills, land application sites and open dumps that receive or have received any industrial waste; unless there is a new overlying land use such as a golf course, park, etc., and there is no discharge associated with the landfill;

➜ Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards;

➜ Steam electric power generating facilities, facilities that generate steam for electric power by combustion;

➜ Transportation facilities that have vehicle maintenance shops, fueling facilities, equipment cleaning operations, or airport deicing operations. This includes school bus maintenance facilities operated by a school district;

➜ Sewage treatment facilities;

➜ Facilities that have areas where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water.

How do I obtain coverage under the Industrial Activities Storm Water General Permit?

Obtain a permit application package from your local Regional Water Quality Control Board listed on the back of this brochure or the State Water Resources Control Board (SWRCB). Submit a completed Notice of Intent (NOI) form, site map and the appropriate fee ($250 or $500) to the SWRCB. Facilities must submit an NOI thirty (30) days prior to beginning operation. Once you submit the NOI, the State Board will send you a letter acknowledging receipt of your NOI and will assign your facility a waste discharge identification number (WDID No.). You will also receive an annual fee billing. These billings should roughly coincide with the date the State Board processed your original NOI submittal.

What are the requirements of the Industrial Activities Storm Water General Permit?

The basic requirements of the Permit are:

1. The facility must eliminate any non-stormwater discharges or obtain a separate permit for such discharges.

2. The facility must develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must identify sources of pollutants that may be exposed to stormwater. Once the sources of pollutants have been identified, the facility operator must develop and implement Best Management Practices (BMPs) to minimize or prevent polluted runoff.

   Guidance in preparing a SWPPP is available from a document prepared by the California Storm Water Quality Task Force called the California Storm Water Best Management Practice Handbook.

3. The facility must develop and implement a Monitoring Program that includes conducting visual observations and collecting samples of the facility's storm water discharges associated with industrial activity. The General Permit requires that the analysis be conducted by a laboratory that is certified by the State of California.

4. The facility must submit to the Regional Board, every July 1, an annual report that includes the results of its monitoring program.

A Non-Storm Water Discharge is... *any discharge to a storm drain system that is not composed entirely of storm water. The following non-storm water discharges are authorized by the General Permit: fire hydrant flushing; potable water sources, including potable water related to the operation, maintenance, or testing of potable water systems; drinking fountain water; atmospheric condensates including refrigeration, air conditioning, and compressor condensate; irrigation drainage; landscape watering; springs; non-contaminated ground water; foundation or footing drainage; and sea water infiltration where the sea waters are discharged back into the sea water source.*

A BMP is . . . *a technique, process, activity, or structure used to reduce the pollutant content of a storm water discharge. BMPs may include simple, non-structural methods such as good housekeeping, staff training and preventive maintenance. Additionally, BMPs may include structural modifications such as the installation of berms, canopies or treatment control (e.g. setting basins, oil/water separators, etc.)*

WARNING*: There are significant penalties for non-compliance: a minimum fine of $5,000 for failing to obtain permit coverage, and, up to $10,000 per day, per violation plus $10 per gallon of discharge in excess of 1,000 gallons.*

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.

Stormwater Pollution

What you should know for...

Industrial & Commercial Facilities

Best Management Practices (BMPS) for:

- Industrial Facilities
- Commercial Facilities

Riverside County Stormwater Program Members

City of Banning
(951) 922-3105

City of Beaumont
(951) 769-8520

City of Calimesa
(909) 795-9801

City of Canyon Lake
(951) 244-2955

City of Cathedral City
(760) 770-0340

City of Coachella
(760) 398-3502

City of Corona
(951) 736-2447

City of Desert Hot Springs
(760) 329-6411

City of Eastvale
(951) 361-0900

City of Hemet
(951) 765-2300

City of Indian Wells
(760) 346-2489

City of Indio
(760) 391-4000

City of Jurupa Valley
(951) 332-6464

City of Lake Elsinore
(951) 674-3124

City of La Quinta
(760) 777-7000

City of Menifee
(951) 672-6777

City of Moreno Valley
(951) 413-3000

City of Murrieta
(951) 304-2489

City of Norco
(951) 270-5607

City of Palm Desert
(760) 346-0611

City of Palm Springs
(760) 323-8299

City of Perris
(951) 943-6100

City of Rancho Mirage
(760) 324-4511

City of Riverside
(951) 826-5311

City of San Jacinto
(951) 487-7330

City of Temecula
(951) 694-6444

City of Wildomar
(951) 677-7751

Coachella Valley Water District
(760) 398-2651

County of Riverside
(951) 955-1000

Riverside County Flood Control District
(951) 955-1200