STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

The Summit at Forts Ferry

33& 45 Forts Ferry Road – Colonie, NY

PREPARED FOR

Nigro Group, LLC
18 Computer Drive East, Suite 201
Albany, NY 12205

PREPARED BY

vhb

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Sept. 21, 2018

STATE OF NEW YORK
MICHAEL B. TUCKER
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LICENSED PROFESSIONAL ENGINEER

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Introduction

SWPPP Report Description

The Stormwater Pollution Prevention Plan was prepared for The Summit at Forts Ferry mixed use project in accordance with the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-15-002) and the NYSDEC Stormwater Management Design Manual. The General Permit authorizes stormwater discharge to surface waters of the state for construction projects involving soil disturbance of one or more acres. The design parameters outlined herein and on the project site plans describe the measures necessary to control runoff and pollutants from the site during and after construction.

This SWPPP document provides the following information (where applicable), as required by the SPDES Permit:

- Site Description
- Development Description
- Drainage Characteristics
- Soil Characteristics
- Rare and Endangered Species Data
- Construction Phasing Information
- Pollution Prevention Practices
- Erosion and Sedimentation Control BMPs
- Grading, Drainage and Erosion Control Plans
- SPDES Permit and Fact Sheet
- Notice of Intent (NOI) Form
- MS4 Acceptance Form
- Notice of Termination (NOT) Form
- Inspection Forms, Monitoring and Reporting Requirements
- Contractor Certification Form

Existing Site Description

The overall property consists of two parcels totaling 13.06 acres located at 33 & 45 Forts Ferry Road in the Town of Colonie, Albany County, New York. The overall property is identified by Tax Map numbers 19.1-1-27.2 & 19.1-1-28.1.

The project coordinates obtained from the NYSDEC Environmental Resource Mapper are:

Longitude and Latitude: E -73.775 N 42.761

The property is currently undeveloped and mostly forested. The general area surrounding the property is a mix of residential and commercial businesses.

Proposed Project Description

The project currently proposes to construct two buildings containing a 62 unit multi-family residential building with garages and a maintenance shed and an office building. The apartment unit is three stories with a footprint of 29,859 S.F.. The office is a two-story +/- 30,000 SF building with 15,000 S.F. per floor. Approximately 261 new standard parking stalls and 14 new ADA-compliant parking stalls will be constructed for a total of 275 new parking stalls.

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Existing Site Conditions

Existing Watershed Descriptions

The proposed project encompasses the lands of 33 & 45 Forts Ferry Road in the Town of Colonie, Albany County, New York. The project site totals ±13.06 acres. The site is bounded by Forts Ferry Road on the west, with residential properties on the other three sides. The site consists of a single family home and wooded undeveloped lands.

Public water and sanitary sewer are available on site.

Sensitive Resource Areas

The project site is not within a sensitive resource area.

Surface Waters and Wetlands

This site does not contain ACOE wetlands, so no impacts are proposed as a result of this project.

Rare, Threatened or Endangered Species

Based on the database search of the NYS Natural Heritage Program (NYSNHP), no Rare, Threatened or Endangered Species are believed to utilize the project site.

Flood Plain

Based on the historic Flood Insurance Rate Map (FIRM), map number 36001C0069D, effective March 16, 2015, the site is within an area of minimal flood hazard.

Historical Places

The construction of the project will not have an effect on cultural resources or properties listed on the State or National Registers of Historic Places. The project site has undergone a Phase 1A archeological review and construction avoids the area identified to be avoided.

SEQR

The project is going through the SEQR review as part of the site plan approval process.

Soils

According to the NRCS Web Soil Survey for Albany County, the soils found on the project site are generally loamy, moderately well-draining soils. A summary of the soils found on the site follows in Table 1:

Table 1 NRCS Soil Data

Soil Symbol	Description	Hydrologic Soil Group	Drainage Class
HuB	Hudson Silt Loam	C/D	Moderately Well Drained
RhA	Rhinebeck Silt Clay	C/D	Moderately Well Drained
UnB	Unadilla Silt Loam	B	Moderately Well Drained
RkB	Riverhead fine sand	A	Well Drained

Source: NRCS Web Soil Survey

Rainfall Data

The rainfall amounts for the 24-hour rainfall event were obtained from the Town of Colonie and are summarized below:

- WQ 90% rainfall = 1.2 in.
- 1-year rainfall = 2.5 in.
- 2-year rainfall = 2.8 in.
- 10-year rainfall = 4.5 in.
- 25-year rainfall = 5.0 in.
- 50-year rainfall = 5.8 in.
- 100-year rainfall = 7.0 in.

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Post Development Conditions

Proposed Site Development

The SWPPP has been developed to ensure water quality and quantity is maintained during the construction and operation of all of the proposed project's components. This project falls under the guidelines of the "New Construction" criteria set forth in the NYSDEC SWMDM. A description of the site components is provided below:

Building Pad Site

A level area will be graded around the proposed building pad areas to construct the foundations. Once foundations and general layout of the parking areas are complete, the remainder of the disturbed area will be graded to tie into the existing ground using sloped lawns and pavement. A grading plan for the site is included in the Site Plan Submission set.

Access and Parking

The access to the project site will be via two private drives both on Forts Ferry Road. Parking will be provided by garages and uncovered surface spaces dispersed around the proposed building and accessed off of the entry drives.

Construction Staging Area

A temporary staging area for the construction of the project will be provided on the site. The area will be used for storage of equipment, materials and contractor parking.

This area will become part of the parking and landscaped area at the end of the project.

Spoil Area

The potential spoil area for the project is identified on the construction drawings. This area will be used for wasting excess cut material and temporary stockpiling of material during earthwork operations.

Project Impacts

The property developed and occupied by the applicant is operated as a commercial shopping center. This project is classified as new construction. The following is a summary of the impacts associated with the construction of the proposed project:

Table 2 Impact Summary

Existing Impervious Area (Ac.)	Limit of Tree Clearing (Ac.)	Area of Disturbance (Ac.)	Proposed Impervious Area (Ac.)
0.00	7.7	8.1	4.3

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Stormwater Management Assessment

General Permit Requirements

A stormwater management assessment of the project has been conducted pursuant to the 2015 NYS DEC Stormwater Management Design Manual and the NYSDEC General Permit No. GP-0-15-002. A Stormwater Pollution Prevention Plan (SWPPP) has been prepared based on the project involving the disturbance of more than one (1) acre of land as part of the large common plan of development.

Stormwater Management Design Objectives

The following design objectives were the basis of the Stormwater Management System for the proposed project:

- Provide temporary and permanent erosion control measures
- Develop an adequate drainage system to convey stormwater runoff and prevent flooding on and off site.
- Provide for the water quality treatment of the stormwater runoff and control flows to the pre-development 10 and 100-year rates, based on the NYSDEC Stormwater Management Design Manual.
- Provide Runoff Reduction Volume

The following section outlines the steps taken in the development of the proposed stormwater management system with regard to Runoff Reduction values for the added impervious areas:

Step1 – Evaluation of Green Infrastructure Planning

As part of the stormwater management design planning process, the following practices were evaluated:

Conservation of Natural Areas:

The added development is kept as close to the existing commercially developed areas as possible thereby reducing impacts to Natural Areas.

Sheetflow to Riparian Buffers and Filter Strips

Sheetflow is not used as there is too much sheet length to meet the criteria, while all low areas would not meet the Riparian and/or Filter Strip requirement.

Vegetated Swales

The developed site does not have sufficient room for vegetated swales.

Tree Planting/Tree Pits

New landscaping will complement the existing environment. No credit has been applied for proposed tree planting.

Disconnection of Rooftop Runoff

Rooftop disconnect was not considered for this project, as the buildings are located within large paved areas.

Stream Daylighting

Stream daylighting is not available for the proposed project.

Rain Gardens/BioRetention

Bioretention and stormwater planters are proposed to obtain RRv.

Green Roofs

Green roofs were not considered to be feasible for this project.

Stormwater Planter

The stormwater planter practice is proposed for this project.

Rain Barrels and Cisterns

Rain barrels and cisterns were not considered for this project, due to the commercial nature of the use.

Porous Pavement

Porous pavement was not considered due to the poor soils.

Infiltration System

An infiltration system was not considered due to the poor soils not meeting the minimum infiltration rate.

Step 2 – Water Quality Treatment

The project has been evaluated with regard to water quality and water quantity control. Based on the existing site characteristics, runoff leaves the site under the existing conditions.

The **required** water quality treatment volume is calculated below, based on the equation **WQv=[(P) (Rv) (A)] / 12**

- Site Area (Ac.) = 9.266
- Impervious Area (Ac.) = 4.297
- Percent Impervious = 46.4%
- Rv = 0.47
- Rainfall (in) = 1.20
- **WQv (ac-ft) = 0.433**
- **Provided WQv= 0.433 ac-ft**

The calculations in the appendix provide a breakdown of the treatment requirements.

Step 3 – Runoff Reduction by Applying Green Infrastructure Techniques and SMPs with RRv Capacity

This project requires a minimum of 0.139 ac-ft of RRv for the 9.266 acre drainage area with 4.297 acres of impervious. The project provides 0.203 ac-ft of RRv through the use of a Bio-retention and stormwater planters and is detailed in the RRv Calculations provided in the Appendix.

Step 4 – Apply SMP to Address Remaining Water Quality Volume

The Water Quality Volume for the project site are managed through the use of a pocket pond, bio-retention and stormwater planters utilizing a gravel diaphragm for pretreatment.

Step 5 – Apply Volume and Peak Rate Control Practices to Meet Requirements

The volume and rate control is addressed in a pocket pond and in an underground storage system. This analysis was performed using HydroCAD version 10.0 utilizing the Dynamic Storage Indicator calculation method. The resulting data is presented in the following tables, and the calculations are included in Appendix D of this report.

Existing Analysis

The existing site was divided into four watersheds with four analysis points. Based on the forested condition, the topography of the site, and the small amount of impervious area, there is currently a small portion of runoff which leaves the site. The proposed design was developed to match the existing runoff pattern from the site.

The Existing Conditions Drainage Area figures and associated HydroCAD calculations are included in Appendix D.

Proposed Conditions Analysis

The proposed site was divided into 15 watersheds with four analysis point. The treated watershed is the entire construction site including the building and parking areas, and flows to the proposed Bio-Retention or pocket pond prior to discharging into the existing adjacent drainage structure in Erin Street. The runoff rates are summarized in the table below.

The Proposed Conditions Drainage Area figures and associated HydroCAD calculations are also included in Appendix D.

PRE AND POST CONSTRUCTION RUNOFF RATES (CFS)

	Design Point	1-yr	10-yr	100-yr
EXISTING	AP-1	0.00	0.05	4.69
PROPOSED	AP-1	0.00	0.05	0.60
DIFFERENCE		-0.00	-0.00	-1.38
	Design Point	1-yr	10-yr	100-yr
EXISTING	AP-2	0.23	4.68	15.16
PROPOSED	AP-2	0.79	4.43	14.15
DIFFERENCE		+0.56	-0.25	-0.99
	Design Point	1-yr	10-yr	100-yr
EXISTING	AP-3	0.67	4.34	10.60
PROPOSED	AP-3	0.19	2.15	6.39
DIFFERENCE		-0.48	-2.19	-4.21
	Design Point	1-yr	10-yr	100-yr
EXISTING	AP-4	0.01	0.65	3.54
PROPOSED	AP-4	0.07	0.64	1.66
DIFFERENCE		-0.06	-0.01	-1.88

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Erosion and Sediment Control

Erosion and Sediment Control Practices

During construction, the following procedures and practices will be followed:

- Cleared brush, debris, and soils will be stockpiled up slope from erosion and sediment controls.
- Equipment cleaning, maintenance, and repair will be conducted in designated areas protected by berms or other acceptable means.
- The contractor will ensure that the project site is litter free at the close of each working day. The contractor will dispose of construction debris as decided upon with the owner and in accordance with all applicable regulations.
- Portable sanitary facilities will be made available to construction personnel, if permanent facilities are unavailable, and will be serviced regularly.
- The contractor will provide the owner with a description of controls to manage waste, reduce pollutants (including storage practices), spill prevention, and response to spills.
- Any construction chemicals will be disposed of in accordance with applicable regulations and will not be disposed of into the stormwater system.
- The vehicle washout and concrete washout area designated on the plans should be cleaned whenever sediment is deposited.
- The construction drive will be maintained immediately if any sediment is dropped, spilled or washed on the drive.

Temporary Erosion Control Practices

During construction the contractor is required to install and maintain temporary erosion and sediment control measures to prevent sediment and debris from washing into the drainage systems and/or leaving the site. At such time that all the restoration of the construction area is completed and the areas of disturbance are permanently stabilized, the contractor will then be permitted to remove the temporary erosion and sediment control devices.

The temporary erosion and sediment control devices will be installed prior to the start of any disturbance of the existing ground surface and will remain in place until all disturbed areas are properly stabilized. In addition to the temporary erosion and sediment control devices indicated on the Erosion and Sediment Control Details plan, the contractor shall be responsible to install any additional measures that may be needed. These additional erosion preventative measures will be installed in accordance with the "New York State Standards and Specifications for Erosion and Sediment Control" (Bluebook), latest edition. Weekly SWPPP inspections will be the responsibility of the owner as per the NYSDEC General permit GP-0-15-002.

Stabilization Practices (Vegetative Measures)

Stabilization practices to be used on this site include mulching and temporary seeding. Stabilization practices will be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased. The project has been designed to preserve existing vegetation where possible.

Mulching

Straw mulching will be employed on all inactive and disturbed areas that will remain un-stabilized for more than fourteen (14) days. Mulch materials will be spread uniformly by hand or machine at a rate of approximately 100 pounds per 1,000 square feet. Mulch will be spread such that at least 75 percent of the ground surface is covered. Mulching may be used with temporary or permanent seeding, or with slope stabilization techniques. Hydro mulch may also be used for temporary soil stabilization

Erosion Control Slope Blankets

Upon completion of final grading, any areas not covered by pavement, other forms of stabilization or landscaping and which are on slopes of 4:1 and greater will be protected with erosion control slope blankets and seeded with an erosion control seed mix. The blanket will be installed from the top of the slope, with the upper edge of the blanket secured in a trench. Blankets shall be unrolled down the slope or swale in the direction of the water flow. Edges of blanket shall be stapled with approximately four inches of overlap where two or more strip widths are required. The end of an upper blanket shall overlap the end of a lower blanket by at least six inches and both ends shall be stapled in place. The blankets will be staked and/or stapled into place as per manufacturer's recommendations.

Temporary Seeding

A temporary vegetative cover will be established on areas of exposed soils (including stockpiles) that remain inactive and un-stabilized for a period of more than fourteen (14) days for slopes. The seeded surfaces will be covered with a layer of straw mulch or hydro mulch as described above.

Structural Practices

Structural erosion and sedimentation controls are to be used throughout the project site during construction. They include the following:

Silt Fence Barriers

Prior to any ground disturbance, the silt fence is to be put in place at the down gradient limit of work in accordance with the Erosion and Sediment Control Plans and Details. When necessary, additional check dams and silt fence barriers will be installed immediately down gradient of erosion-prone areas, such as the base of steep exposed slopes and around the base of stockpiles, throughout the construction phase of the project. The barriers will be entrenched into the substrate to prevent underflow.

The erosion control barriers will be inspected weekly and after every storm event. Any sediment that collects behind the barriers will be removed and will be either reused at the site or disposed of at a suitable offsite location. Any damaged sections of silt fence or straw bales will be repaired or replaced.

Stabilized Construction Exits

Stone anti-tracking pads will be installed at each access point to the work area to prevent the off-site transport of sediment by construction vehicles. The stabilized construction exits will be at least fifty feet long and will consist of a 4-inch thick layer of crushed stone (1.5 to 2.5 inches in diameter). The stone will be placed over a layer of non-woven filter fabric. The anti-tracking pads will remain in place until a binder coat of pavement has been established in areas to be paved.

Dewatering Haybale Basins and Filter Bags

Dewatering basins will be established in the event that dewatering activities are required on the site. The dewatering basin will consist of a ring of staked haybales overlain by non-woven geotextile filter fabric and crushed stone established on a well vegetated and stable surface. Discharge water will be pumped into the basin and allowed to drain through the fabric onto stabilized surfaces. Dewatering filter bags may be used in place of straw bale basins. To ensure proper installation, filter bags will be placed on relatively flat terrain free of brush and stumps to avoid ruptures and punctures. Proper installation requires cutting a small hole in the corner of the bag, inserting the pump discharge hose, and securing the discharge hose to the bag with a hose clamp. Filter bags are to be constructed of non-woven geotextile fabric. A maximum of one six-inch discharge hose will be allowed per filter bag. To help prevent punctures, geotextile fabric will be placed beneath the filter bag when used in wooded locations. Unattended filter bags will be encircled with a straw bale or silt fence barrier. The Owner/Operator, under the supervision of a Licensed Engineer/ Landscape Architect, will be responsible to implement all the necessary procedures of discharging the pumped water in compliance with the dewatering permit.

Where dewatering operations require the installation of temporary dewatering wells with a total capacity of 45 gallons per minute or more, and/or require discharge off-site, the contractor will be responsible for obtaining the necessary NYSDEC permits.

Additional Erosion Control Measures

The following controls will be implemented as directed by the Licensed Engineer/Landscape Architect, or NYSDEC Certified Inspector.

Resource Protection

- Evaluate, mark and protect important trees and associated rooting zones, wetlands, on-site septic systems absorption fields, etc.
- Temporary construction fencing will be placed around trees to remain and will be at a minimum at the drip line of the longest branch.

- Protect existing vegetated areas by fencing off, especially in perimeter areas.

Stabilized Construction Exit

- Establish a temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway.
- Stabilize bare areas (entrances, construction routes, equipment parking areas) immediately as work takes place. Top these areas with gravel or maintain vegetative cover.
- Provide wash down facilities where necessary.
- Remove sediment tracked onto public streets on a daily basis.

Perimeter Sediment Controls

- Silt fence material and installation must comply with the NYSDEC standard drawings and specifications. They shall also comply with the Erosion and Sedimentation Control Plan.
- Silt fencing and straw bale barriers will be entrenched to eliminate sediment underflow.
- Silt fences will be installed based on appropriate spacing intervals. This interval will decrease as the slope increases. Silt fence should be placed on or parallel to contours where there is no concentration of water flowing to the silt fence and where erosion occurs in the form of sheet erosion. On sloped areas, the area below the final silt fence shall be undisturbed ground.
- Principal sediment basins, if utilized, will be installed after the construction site is assessed.
- Additional sediment traps and barriers will be installed as needed during grading.
- Erosion control blankets will be stapled and/or staked into place on slopes 5:1 or greater after disturbing area.
- The erosion control barriers will be inspected and maintained routinely throughout the duration of the project.

Runoff Control

- Install runoff control after sediment traps are installed and before land grading starts.
- Control the runoff in each small drainage area before flow reaches runoff from entire site.
- Divert offsite or clean runoff from disturbed areas.
- Convey surface flows from highly erodible soil and steep slopes to more suitable stable areas.

- Redirect runoff from existing or proposed cut and fill slopes to reduce water velocity without causing erosion.
- Design final site drainage to prevent erosion, concentrated flows to adjacent properties, uncontrolled overflow and ponding.

Construction Sequence

This project is planned to be constructed in one phase.

The site improvements will need to proceed in an organized manner so that the site remains stabilized during construction.

Although the final sequence of construction will be determined by the contractor and owner, the anticipated sequencing of construction events will be:

1. Hold pre-construction meeting with engineer, inspector, and town.
2. Install silt fence/wattles, stabilized construction entrances, temporary diversions, and temporary sediment traps.
3. Contractor to demolish existing structures, clear and grub the site, and perform rough grading including installing additional erosion control measures if required.
4. Stockpile erosion sediment control material in case of large storm events during construction. Materials shall include at a minimum: mulch, stone, silt fence and erosion control fabric.
5. Install drainage system beginning at the downstream area, provide temporary diversion of stormwater in temporary swales and sediment basins.
6. Install utilities, storm sewer structures, and piping. Protect structures from sedimentation using approved methods. Install outlet protection and check dams.
7. Temporary seed disturbed areas.
8. Install electrical and communication components, process piping and conduits.
9. Install base course of access drive.
10. Excavate and install foundations, providing approved concrete wash-out areas as required.
11. Install equipment, mechanical and electrical expansion.
12. Construct building. Maintain clean site by managing construction debris.
13. Conduct deep ripping and de-compaction on areas that have received heavy vehicle traffic.
14. Fine grade site and stabilize vegetated areas.
15. Install permanent stormwater control facilities.
16. Remove silt from temporary storage areas, structures, sumps, and pipes.
17. Exercise winter shutdown procedures, if applicable. Sequencing may vary.
18. Pave asphalt areas.

19. Remove temporary sediment control measures, de-compact as required, reseed and mulch disturbed areas.
20. Obtain substantially stable verification from SWPPP inspector.
21. Remove silt fence and inlet protection upon site stabilization.
22. File notice of termination.

The utilities and drive will be sequenced in a manner that will facilitate the construction of the building with as little impact on the neighboring lands as possible.

If site disturbance discontinues and building construction continues into the winter months then winter shut down procedures; including but not limited to site stabilization, monthly inspections, installation of temporary check dams and overflow piping are required.

At no time shall disturbance be greater than 5 acres. Refer to the Erosion & Sediment Control Plan in the Construction Documents.

Inspections

The site contractor shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described in the Stormwater Management Report and required by the local law have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction. Following the commencement of construction, site inspections shall be conducted by the qualified professional at least every 7 calendar days. Since there are a limited number of professionals registered as CPESC, the qualified professional will have practical and applied construction experience and possess familiarity with BMPs and erosion and sediment control techniques.

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Construction Housekeeping Practices

During construction, the following procedures and practices will be followed:

- Cleared brush, debris, and soils will be stockpiled up slope from erosion and sediment controls.
- Equipment cleaning, maintenance, and repair will be conducted in designated areas protected by berms or other acceptable means.
- The contractor will ensure that the project site is litter free at the close of each working day. The contractor will dispose of construction debris as decided upon with the owner and in accordance with all applicable regulations.
- Portable sanitary facilities will be made available to construction personnel, if permanent facilities are unavailable, and will be serviced regularly.
- The contractor will provide the owner with a description of controls to manage waste, reduce pollutants (including storage practices), spill prevention, and response to spills.
- Any construction chemicals will be disposed of in accordance with applicable regulations and will not be disposed of into the stormwater system.
- The vehicle washout area designated on the plans should be cleaned whenever sediment is deposited.
- The construction drive will be maintained immediately if any sediment is dropped, spilled or washed on the drive.

Appendix A

NOI Form, MS4 Acceptance Form, NOT Form

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges From Construction Activity (GP-0-15-002)

Project Site Information

Project/Site Name

Summit at Forts Ferry

Owner/Operator Information

Owner/Operator (Company Name/Private Owner/Municipality Name)

Nigro Group, LLC

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First name	MI	Last Name
Patrick	A	Mitchell

Signature

Date

Owner/Operator Certification Form

SPDES General Permit For Stormwater Discharges From Construction Activity (GP-0-15-002)

Project/Site Name: Summit at Forts Ferry

eNOI Submission Number: 394-C08T-HNB6

eNOI Submitted by: ☐ **Owner/Operator** ☑ **SWPPP Preparer** ☐ **Other**

Certification Statement - Owner/Operator

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Owner/Operator First Name M.I. Last Name

Signature

Date

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Owner or Operator Information

1. Owner/Operator Name: Nigro Group, LLC
2. Street Address: 18 Computer Drive East, Suite 107
3. City/State/Zip: Albany, NY 12205
4. Contact Person: Adam Desantis | 4a.Telephone:

4b. Contact Person E-Mail: adesantis@nigrogrp.com

II. Project Site Information

5. Project/Site Name: Summit at Forts Ferry
6. Street Address: 33 & 45 Forts Ferry Road
7. City/Zip: Latham, NY 12110
8. County: Albany

III. Reason for Termination

9a. □ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP. ***Date final stabilization completed** (month/year): ______________________

9b. □ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ___ ___ ___ ___ ___ ___
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? □ yes □ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? □ yes □ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? □ yes □ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

□ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.

□ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).

□ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.

□ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? ______________________________ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? □ yes □ no

(If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:

(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:	
Title/Position:	
Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

VII. Qualified Inspector Certification - Final Stabilization:	
I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):	
I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
IX. Owner or Operator Certification	
I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2015)

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information	
1. Owner/Operator Name:	Nigro Group. LLC
2. Contact Person:	Adam Desantis
3. Street Address:	18 Computer Drive East, Suite 107
4. City/State/Zip:	Albany, NY 12205
II. Project Site Information	
5. Project/Site Name:	Summit at Forts Ferry
6. Street Address:	33 & 45 Forts Ferry Road
7. City/State/Zip:	Colonie, NY 12110
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information	
8. SWPPP Reviewed by:	
9. Title/Position:	
10. Date Final SWPPP Reviewed and Accepted:	
IV. Regulated MS4 Information	
11. Name of MS4:	
12. MS4 SPDES Permit Identification Number: NYR20A	
13. Contact Person:	
14. Street Address:	
15. City/State/Zip:	
16. Telephone Number:	

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

NOI for coverage under Stormwater General Permit for Construction Activity

version 1.18

(Submission #: 394-C08T-HNB6, version 1)

PRINTED ON 9/21/2018

Summary

Submission #:	394-C08T-HNB6	**Date Submitted:**	Not Submitted
Form:	NOI for coverage under Stormwater General Permit for Construction Activity	**Status:**	Draft
Applicant:	Patrick Mitchell	**Active Steps:**	Form Submitted
Reference #:			
Description:	NOI for coverage under Stormwater General Permit for Construction Activity		

Notes
There are currently no Submission Notes.

Details

Owner/Operator Information

Owner/Operator Name (Company/Private Owner/Municipality/Agency/Institution, etc.)
Nigro Group, LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Nigro

Owner/Operator Contact Person First Name
Frank

Owner/Operator Mailing Address
18 Computer Drive East, Suite 107

City
Albany

State
NY

Zip
12205

Phone
5183893600

Email
fjn3@nigrogrp.com

Federal Tax ID
NONE PROVIDED

Project Location

Project/Site Name
The Summit at Forts Ferry

Street Address (Not P.O. Box)
35 Forts Ferry Road

Side of Street
East

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Colonie

State
NY - New York

Zip
12210

County
ALBANY

DEC Region
4

Name of Nearest Cross Street
Omega Terrace

Distance to Nearest Cross Street (Feet)
200

Project In Relation to Cross Street
South

Tax Map Numbers Section-Block-Parcel
19.1

Tax Map Numbers
1-28.1, 1.27.2

1. Coordinates

Provide the Geographic Coordinates for the project site. The two methods are: - Navigate to the project location on the map (below) and click to place a marker and obtain the XY coordinates. - The "Find Me" button will provide the lat/long for the person filling out this form. Then pan the map to the correct location and click the map to place a marker and obtain the XY coordinates.

Navigate to your location and click on the map to get the X,Y coordinates
42.7602519121146,-73.77400812779695

Project Details

2. What is the nature of this project?
New Construction

3. Select the predominant land use for both pre and post development conditions.

Pre-Development Existing Landuse
Forest

Post-Development Future Land Use
Other
Other
Mixed Use Residential & Commercial

3a. If Single Family Subdivision was selected in question 3, enter the number of subdivision lots.
NONE PROVIDED

---

4. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area. *** ROUND TO THE NEAREST TENTH OF AN ACRE. ***

Total Site Area (acres)
13.1

Total Area to be Disturbed (acres)
8.1

Existing Impervious Area to be Disturbed (acres)
0

Future Impervious Area Within Disturbed Area (acres)
4.3

5. Do you plan to disturb more than 5 acres of soil at any one time?
No

6. Indicate the percentage (%) of each Hydrologic Soil Group(HSG) at the site.

A (%)
21

B (%)
18

C (%)
0

D (%)
61

7. Is this a phased project?
No

8. Enter the planned start and end dates of the disturbance activities.

Start Date
03/01/2019

End Date
03/30/2020

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.
Delphi Creek

9a. Type of waterbody identified in question 9?
Stream/Creek Off Site

Other Waterbody Type Off Site Description
NONE PROVIDED

9b. If "wetland" was selected in 9A, how was the wetland identified?
Regulatory Map

10. Has the surface waterbody(ies in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002?
No

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002?
No

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters?
No

If No, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey?
No

If Yes, what is the acreage to be disturbed?
NONE PROVIDED

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area?
No

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?
Yes

16. What is the name of the municipality/entity that owns the separate storm sewer system?
Town of Colonie

17. Does any runoff from the site enter a sewer classified as a Combined Sewer?
No

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law?
No

19. Is this property owned by a state authority, state agency, federal government or local government?
No

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.)
No

Required SWPPP Components

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)?
Yes

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)?
Yes

If you answered No in question 22, skip question 23 and the Post-construction Criteria and Post-construction SMP Identification sections.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual?
Yes

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:
Certified Professional in Erosion and Sediment Control (CPESC)

SWPPP Preparer
VHB Engineering, Surveying Landscaping Architecture & Geology, P.C.

Contact Name (Last, Space, First)
Mitchell, , Patrick

Mailing Address
100 Great Oaks Blvd. Suite 118

City
Albany

State
NY

Zip
12203

Phone
518-389-3600

Email
pmitchell@vhb.com

Download SWPPP Preparer Certification Form

Please take the following steps to prepare and upload your preparer certification form: 1) Click on the link below to download a blank certification form 2) The certified SWPPP preparer should sign this form 3) Scan the signed form 4) Upload the scanned document

Download SWPPP Preparer Certification Form

Please upload the SWPPP Preparer Certification - Attachment
NONE PROVIDED
Comment: NONE PROVIDED

Erosion & Sediment Control Criteria

25. Has a construction sequence schedule for the planned management practices been prepared?
Yes

26. Select all of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural
Check Dams
Construction Road Stabilization
Dust Control
Sediment Traps
Silt Fence
Stabilized Construction Entrance
Storm Drain Inlet Protection
Temporary Swale

Biotechnical
None

Vegetative Measures
Mulching
Protecting Vegetation
Seeding
Topsoiling

Permanent Structural
Land Grading
Retaining Wall
Rock Outlet Protection

Other
NONE PROVIDED

Post-Construction Criteria

* IMPORTANT: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.
Preservation of Buffers

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout). (Acre-feet)

0.433

29. Post-construction SMP Identification

Use the Post-construction SMP Identification section to identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity that were used to reduce the Total WQv Required (#28). Identify the SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice. Note: Redevelopment projects shall use the Post-Construction SMP Identification section to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29. (acre-feet)

0.203

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28)?

No

If Yes, go to question 36. If No, go to question 32.

32. Provide the Minimum RRv required based on HSG. [Minimum RRv Required = (P) (0.95) (Ai) / 12, Ai=(s) (Aic)] (acre-feet)

0.139

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

Yes

If Yes, go to question 33.

Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP. If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. SMPs

Use the Post-construction SMP Identification section to identify the Standard SMPs and, if applicable, the Alternative SMPs to be used to treat the remaining total WQv (=Total WQv Required in #28 - Total RRv Provided in #30). Also, provide the total impervious area that contributes runoff to each practice selected. NOTE: Use the Post-construction SMP Identification section to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question #29. (acre-feet)

0.23

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a).

0.433

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)?

Yes

If Yes, go to question 36. If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv required and provided or select waiver (#36a), if applicable.

CPv Required (acre-feet)
NONE PROVIDED

CPv Provided (acre-feet)
NONE PROVIDED

36a. The need to provide channel protection has been waived because:
Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (#37a), if applicable.

Overbank Flood Control Criteria (Qp)

Pre-Development (CFS)
8.7

Post-Development (CFS)
6.29

Total Extreme Flood Control Criteria (Qf)

Pre-Development (CFS)
26.16

Post-Development (CFS)
19.39

37a. The need to meet the Qp and Qf criteria has been waived because:

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?
Yes

If Yes, Identify the entity responsible for the long term Operation and Maintenance
Nigro Group, LLC

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). (See question #32a) This space can also be used for other pertinent project information.
RRv cannot be used to achieve 100% of WQv due to D soils, so standard practices are also used.

Post-Construction SMP Identification

Runoff Reduction (RR) Techniques, Standard Stormwater Management Practices (SMPs) and Alternative SMPs

Identify the Post-construction SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

RR Techniques (Area Reduction)

Round to the nearest tenth

Total Contributing Acres for Conservation of Natural Area (RR-1)
0

Total Contributing Impervious Acres for Conservation of Natural Area (RR-1)

0

Total Contributing Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
0

Total Contributing Impervious Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
0

Total Contributing Acres for Tree Planting/Tree Pit (RR-3)
NONE PROVIDED

Total Contributing Impervious Acres for Tree Planting/Tree Pit (RR-3)
0

Total Contributing Acres for Disconnection of Rooftop Runoff (RR-4)
0

RR Techniques (Volume Reduction)

Total Contributing Impervious Acres for Disconnection of Rooftop Runoff (RR-4)
0

Total Contributing Impervious Acres for Vegetated Swale (RR-5)
0

Total Contributing Impervious Acres for Rain Garden (RR-6)
0

Total Contributing Impervious Acres for Stormwater Planter (RR-7)
.317

Total Contributing Impervious Acres for Rain Barrel/Cistern (RR-8)
0

Total Contributing Impervious Acres for Porous Pavement (RR-9)
0

Total Contributing Impervious Acres for Green Roof (RR-10)
0

Standard SMPs with RRv Capacity

Total Contributing Impervious Acres for Infiltration Trench (I-1)
0

Total Contributing Impervious Acres for Infiltration Basin (I-2)
0

Total Contributing Impervious Acres for Dry Well (I-3)
0

Total Contributing Impervious Acres for Underground Infiltration System (I-4)
0

Total Contributing Impervious Acres for Bioretention (F-5)
1.88

Total Contributing Impervious Acres for Dry Swale (O-1)
0

Standard SMPs

Total Contributing Impervious Acres for Micropool Extended Detention (P-1)
0

Total Contributing Impervious Acres for Wet Pond (P-2)
0

Total Contributing Impervious Acres for Wet Extended Detention (P-3)
0

Total Contributing Impervious Acres for Multiple Pond System (P-4)
0

Total Contributing Impervious Acres for Pocket Pond (P-5)
2.101

Total Contributing Impervious Acres for Surface Sand Filter (F-1)
0

Total Contributing Impervious Acres for Underground Sand Filter (F-2)
0

Total Contributing Impervious Acres for Perimeter Sand Filter (F-3)
0

Total Contributing Impervious Acres for Organic Filter (F-4)
0

Total Contributing Impervious Acres for Shallow Wetland (W-1)
0

Total Contributing Impervious Acres for Extended Detention Wetland (W-2)
0

Total Contributing Impervious Acres for Pond/Wetland System (W-3)
0

Total Contributing Impervious Acres for Pocket Wetland (W-4)
0

Total Contributing Impervious Acres for Wet Swale (O-2)
0

Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Total Contributing Impervious Area for Hydrodynamic
0

Total Contributing Impervious Area for Wet Vault
0

Total Contributing Impervious Area for Media Filter
0

"Other" Alternative SMP?
0

Total Contributing Impervious Area for "Other"
0

Provide the name and manufacturer of the alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

Manufacturer of Alternative SMP
NONE PROVIDED

Name of Alternative SMP
NONE PROVIDED

Other Permits

40. Identify other DEC permits, existing and new, that are required for this project/facility.
None

If SPDES Multi-Sector GP, then give permit ID
NONE PROVIDED

If Other, then identify
NONE PROVIDED

41. Does this project require a US Army Corps of Engineers Wetland Permit?
No

If "Yes," then indicate Size of Impact, in acres, to the nearest tenth
NONE PROVIDED

42. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned.
NONE PROVIDED

MS4 SWPPP Acceptance

43. Is this project subject to the requirements of a regulated, traditional land use control MS4?
Yes - Please attach the MS4 Acceptance form below

If No, skip question 44

44. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI?
No

MS4 SWPPP Acceptance Form Download

Download form from the link below. Complete, sign, and upload.

MS4 SWPPP Acceptance Form

MS4 Acceptance Form Upload - Attachment
NONE PROVIDED
Comment: NONE PROVIDED

Owner/Operator Certification

Owner/Operator Certification Form Download

Download the certification form by clicking the link below. Complete, sign, scan, and upload the form.

Owner/Operator Certification Form (PDF, 45KB)

Upload Owner/Operator Certification Form * - Attachment
NONE PROVIDED
Comment: NONE PROVIDED

Attachments

Date	Attachment Name	Context

Status History

Date	User	Processing Status
None		

Processing Steps

Step Name	Assigned To/Completed By	Date Completed
Form Submitted		
Deemed Complete	Toni Cioffi	

Appendix B

Grading, Drainage and Erosion Control Plans

UNDER SEPARATE COVER

Appendix C

NYSDEC SPDES General Permit

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2015 Expiration Date: January 28, 2020

Modification Date:

July 14, 2015 – Correction of typographical error in definition of "New Development", Appendix A

November 23, 2016 – Updated to require the use of the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. The use of this standard will be required as of February 1, 2017.

John J. Ferguson
Chief Permit Administrator

Authorized Signature 11-14-16
Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York's *State Pollutant Discharge Elimination System ("SPDES")* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law ("ECL").*

This general permit ("permit") is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation ("the Department") regional office (see Appendix G).They are also available on the Department's website at:
http://www.dec.ny.gov/

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES
FROM CONSTRUCTION ACTIVITIES

Part I. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the Stormwater Pollution Prevention Plan ("SWPPP") the reason(s) for the deviation or alternative design and provide information

which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

(i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharges*;

(ii) Control stormwater *discharge*s to *minimize* channel and streambank erosion and scour in the immediate vicinity of the *discharge* points;

(iii) *Minimize* the amount of soil exposed during *construction activity*;

(iv) *Minimize* the disturbance of *steep slopes*;

(v) *Minimize* sediment *discharge*s from the site;

(vi) Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

(vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted; and

(viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from dewatering activities, including *discharge*s from dewatering of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharge*s.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

   a. ***Sizing Criteria* for *New Development***

      (i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

      (ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

      In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (“Cpv”): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria (“Qp”): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria (“Qf”): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

b. ***Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed**

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

c. ***Sizing Criteria* for *Redevelopment Activity***

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or
(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or
(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or
(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) Overbank Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

d. ***Sizing Criteria* for Combination of *Redevelopment Activity* and *New Development***

Construction projects that include both *New Development* and *Redevelopment Activity* shall provide post-construction stormwater management controls that meet the *sizing criteria* calculated as an aggregate of the *Sizing Criteria* in Part I.C.2.a. or b. of this permit for the *New Development* portion of the project and Part I.C.2.c of this permit for *Redevelopment Activity* portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater *discharges* may be authorized by this permit: *discharge*s from firefighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated *groundwater* or spring water; uncontaminated *discharge*s from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who *discharge* as noted in this paragraph, and with the exception of flows from firefighting activities, these *discharge*s must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **<u>not</u>** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an endangered or threatened species unless the *owner or operator* has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.C.2 of this permit.

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb one or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture (“USDA”) Soil Survey for the County where the disturbance will occur.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb two or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the USDA Soil Survey for the County where the disturbance will occur.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.C.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the construction site within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the construction site within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:
      (i) No Affect
      (ii) No Adverse Affect

(Part I.F.8.c.iii)

(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. OBTAINING PERMIT COVERAGE

A.Notice of Intent (NOI) Submittal

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the Department in order to be authorized to *discharge* under this permit. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address.

NOTICE OF INTENT
NYS DEC, Bureau of Water Permits
625 Broadway, 4th Floor
Albany, New York 12233-3505

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI.

   The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the address in Part II.A.1.

The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4*.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

B. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

   c. the final SWPPP has been prepared, and

   d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above

will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

a. For *construction activities* that are not subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

(ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

(iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. The Department may suspend or deny an *owner's or operator's* coverage

under this permit if the Department determines that the SWPPP does not meet the permit requirements. In accordance with statute, regulation, and the terms and conditions of this permit, the Department may deny coverage under this permit and require submittal of an application for an individual SPDES permit based on a review of the NOI or other information pursuant to Part II.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.B. of this permit.

C. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-15-002), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, and all documentation necessary to demonstrate eligibility with this permit at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:
   a. The *owner or operator* shall

have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

5. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the *regulated, traditional land use control MS4* in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice

D. Permit Coverage for Discharges Authorized Under GP-0-10-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-10-001), an *owner or operator* of *a construction activity* with coverage under GP-0-10-001, as of the effective date of GP-0-15-002, shall be authorized to *discharge* in accordance with GP-0-15-002, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-15-002.

E. Change of *Owner or Operator*

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, <u>in writing,</u> of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:

   a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

   b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the *discharge* of *pollutants*; and

   c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority.

5. The Department may notify the *owner or operator* at any time that the

SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.C.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

> "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

   a. Background information about the scope of the project, including the location, type and size of project;

   b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

   c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

   d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

   b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

   c. A Stormwater Modeling and Analysis Report that includes:

      (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

      (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

      (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

      (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

   d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

   a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* <u>and</u> all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.A.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of *discharge* from the construction site.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

   a. Date and time of inspection;

   b. Name and title of person(s) performing inspection;

   c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

   d. A description of the condition of the runoff at all points of *discharge* from the construction site. This shall include identification of any *discharges* of sediment from the construction site. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

   e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

   f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

   g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

   h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

(Part IV.C.4.i)

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.C.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; <u>and</u> all areas of disturbance have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

   b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; <u>and</u> all areas disturbed as of the project shutdown date have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

   c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E. of this permit.

   d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

   a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

   b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

   c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

   d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

   a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

      (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any *discharge*r authorized by a general permit to apply for an individual SPDES permit, it shall notify the *discharge*r in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to

discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a construction site which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A

Definitions

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both “sewage” and “stormwater”.

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for “*Construction Activity(ies)*” also.

***Construction Activity*(ies) -** means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or point source.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State
or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term “plan” in “larger common plan of development or sale” is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters,

ditches, man-made
channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer <u>licensed to practice in the State of New York..</u>

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Stream bank restoration projects (does not include the placement of spoil material),
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), Overbank Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture ("USDA") Soil Survey for the County where the disturbance will occur.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part

621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B

Required SWPPP Components by Project Type

Table 1
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres: • Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E • Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E • Construction of a barn or other agricultural building, silo, stock yard or pen.
The following construction activities that involve soil disturbances of one (1) or more acres of land: • Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains • Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects • Bike paths and trails • Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project • Slope stabilization projects • Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics • Spoil areas that will be covered with vegetation • Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions • Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions • Demolition project where vegetation will be established and no redevelopment is planned • Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover* • Structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State”, excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area
The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land: • All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project , wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River **-** Figure 1
- Onondaga Lake Watershed **-** Figure 2
- Greenwood Lake Watershed **-**Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

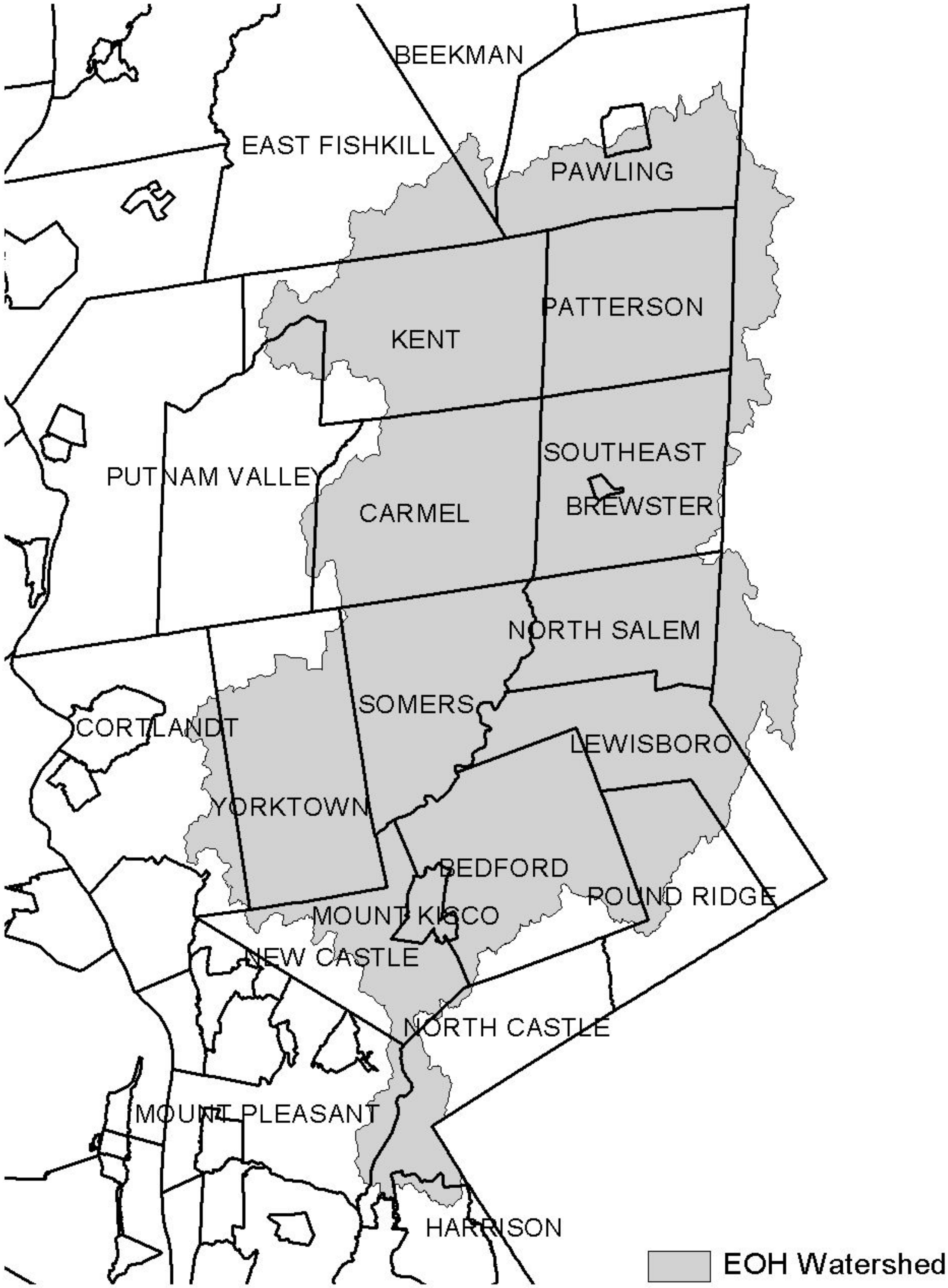


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

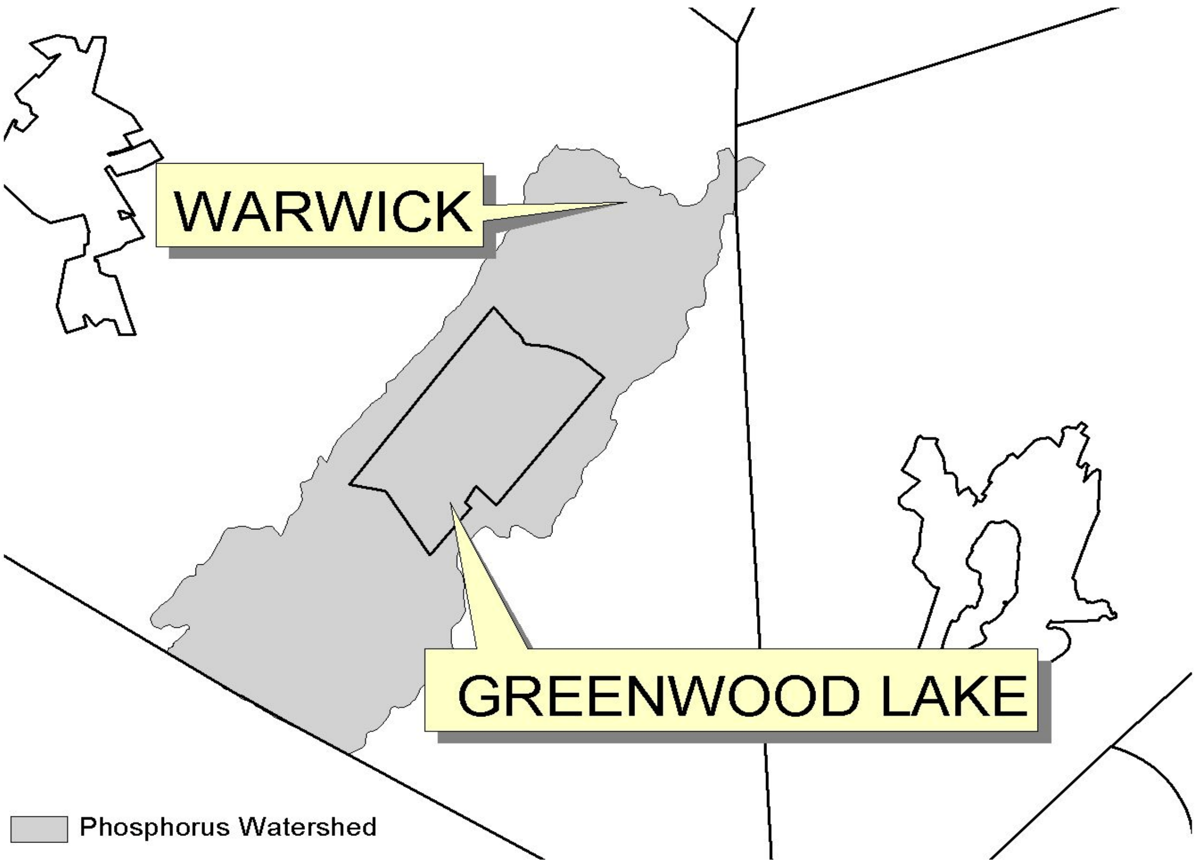


Figure 4 - Oscawana Lake Watershed

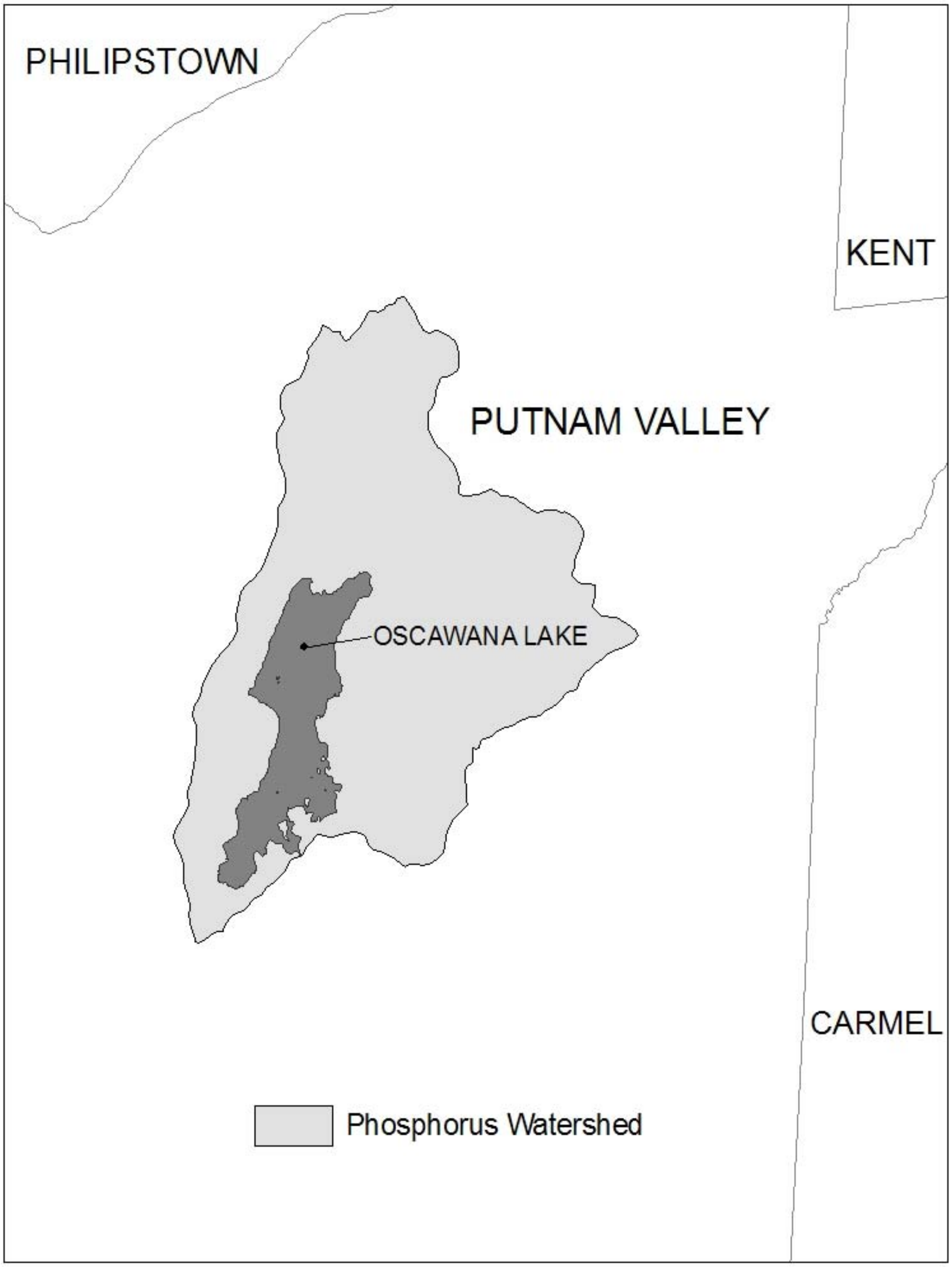
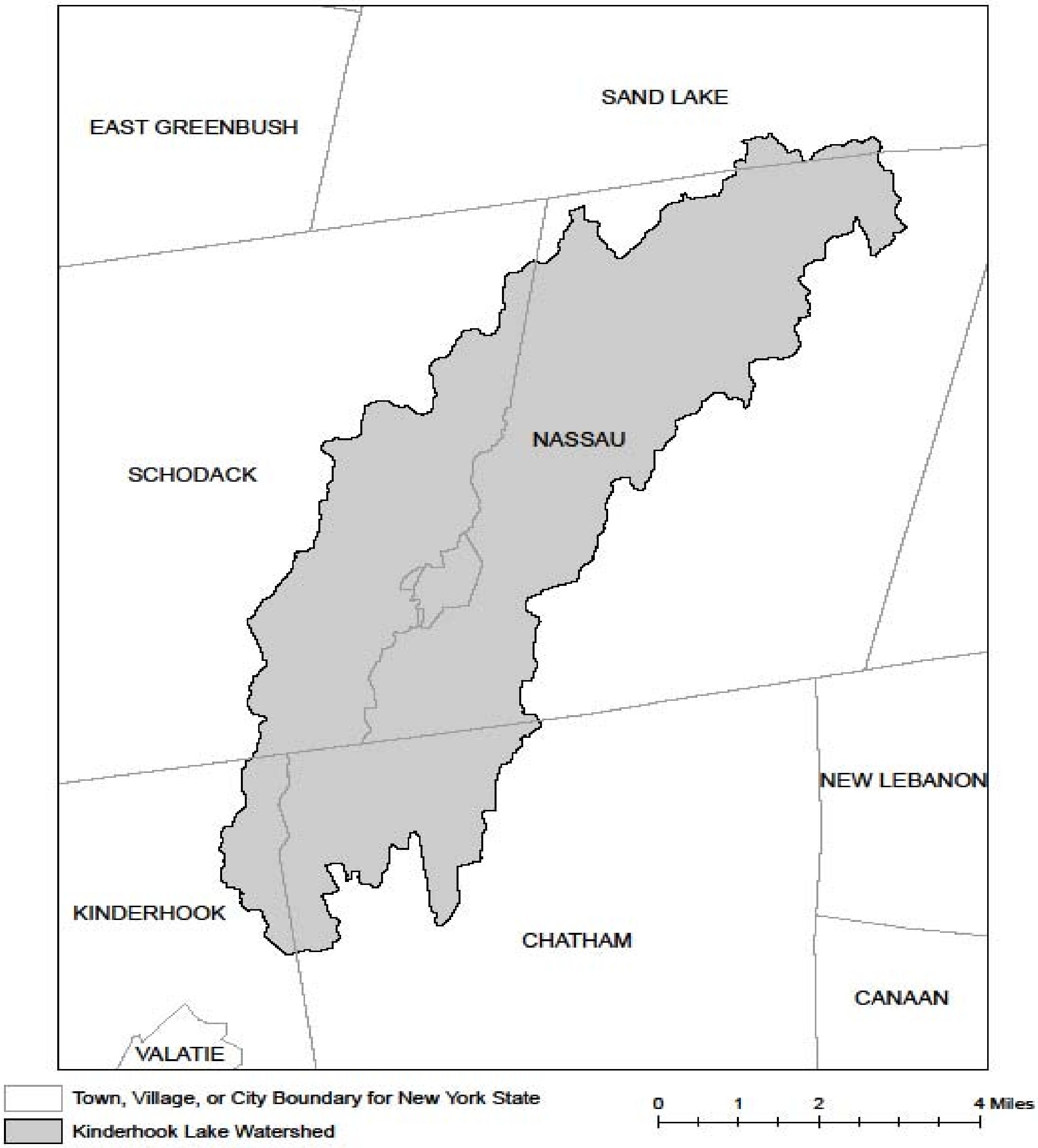


Figure 5: Kinderhook Lake Watershed



APPENDIX D

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C

APPENDIX E

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual (“Design Manual”), dated January 2015.

COUNTY	WATERBODY
Albany	Ann Lee (Shakers) Pond, Stump Pond
Albany	Basic Creek Reservoir
Allegheny	Amity Lake, Saunders Pond
Bronx	Van Cortlandt Lake
Broome	Whitney Point Lake/Reservoir
Broome	Fly Pond, Deer Lake
Broome	Minor Tribs to Lower Susquehanna (north)
Cattaraugus	Allegheny River/Reservoir
Cattaraugus	Case Lake
Cattaraugus	Linlyco/Club Pond
Cayuga	Duck Lake
Chautauqua	Chautauqua Lake, North
Chautauqua	Chautauqua Lake, South
Chautauqua	Bear Lake
Chautauqua	Chadakoin River and tribs
Chautauqua	Lower Cassadaga Lake
Chautauqua	Middle Cassadaga Lake
Chautauqua	Findley Lake
Clinton	Great Chazy River, Lower, Main Stem
Columbia	Kinderhook Lake
Columbia	Robinson Pond
Dutchess	Hillside Lake
Dutchess	Wappinger Lakes
Dutchess	Fall Kill and tribs
Erie	Green Lake
Erie	Scajaquada Creek, Lower, and tribs
Erie	Scajaquada Creek, Middle, and tribs
Erie	Scajaquada Creek, Upper, and tribs
Erie	Rush Creek and tribs
Erie	Ellicott Creek, Lower, and tribs
Erie	Beeman Creek and tribs
Erie	Murder Creek, Lower, and tribs
Erie	South Branch Smoke Cr, Lower, and tribs
Erie	Little Sister Creek, Lower, and tribs
Essex	Lake George (primary county: Warren)
Genesee	Black Creek, Upper, and minor tribs
Genesee	Tonawanda Creek, Middle, Main Stem
Genesee	Oak Orchard Creek, Upper, and tribs
Genesee	Bowen Brook and tribs
Genesee	Bigelow Creek and tribs
Genesee	Black Creek, Middle, and minor tribs
Genesee	LeRoy Reservoir
Greene	Schoharie Reservoir
Greene	Sleepy Hollow Lake
Herkimer	Steele Creek tribs
Kings	Hendrix Creek
Lewis	Mill Creek/South Branch and tribs
Livingston	Conesus Lake
Livingston	Jaycox Creek and tribs
Livingston	Mill Creek and minor tribs
Livingston	Bradner Creek and tribs
Livingston	Christie Creek and tribs
Monroe	Lake Ontario Shoreline, Western
Monroe	Mill Creek/Blue Pond Outlet and tribs
Monroe	Rochester Embayment - East
Monroe	Rochester Embayment - West
Monroe	Unnamed Trib to Honeoye Creek
Monroe	Genesee River, Lower, Main Stem
Monroe	Genesee River, Middle, Main Stem
Monroe	Black Creek, Lower, and minor tribs
Monroe	Buck Pond
Monroe	Long Pond
Monroe	Cranberry Pond
Monroe	Mill Creek and tribs
Monroe	Shipbuilders Creek and tribs
Monroe	Minor tribs to Irondequoit Bay
Monroe	Thomas Creek/White Brook and tribs
Nassau	Glen Cove Creek, Lower, and tribs
Nassau	LI Tribs (fresh) to East Bay
Nassau	East Meadow Brook, Upper, and tribs
Nassau	Hempstead Bay
Nassau	Hempstead Lake
Nassau	Grant Park Pond
Nassau	Beaver Lake
Nassau	Camaans Pond
Nassau	Halls Pond
Nassau	LI Tidal Tribs to Hempstead Bay
Nassau	Massapequa Creek and tribs
Nassau	Reynolds Channel, east
Nassau	Reynolds Channel, west
Nassau	Silver Lake, Lofts Pond
Nassau	Woodmere Channel
Niagara	Hyde Park Lake
Niagara	Lake Ontario Shoreline, Western
Niagara	Bergholtz Creek and tribs
Oneida	Ballou, Nail Creeks
Onondaga	Ley Creek and tribs
Onondaga	Onondaga Creek, Lower and tribs

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity, cont'd.

COUNTY	WATERBODY	COUNTY	WATERBODY
Onondaga	Onondaga Creek, Middle and tribs	Suffolk	Great South Bay, West
Onondaga	Onondaga Creek, Upp, and minor tribs	Suffolk	Mill and Seven Ponds
Onondaga	Harbor Brook, Lower, and tribs	Suffolk	Moriches Bay, East
Onondaga	Ninemile Creek, Lower, and tribs	Suffolk	Moriches Bay, West
Onondaga	Minor tribs to Onondaga Lake	Suffolk	Quantuck Bay
Onondaga	Onondaga Creek, Lower, and tribs	Suffolk	Shinnecock Bay (and Inlet)
Ontario	Honeoye Lake	Sullivan	Bodine, Montgomery Lakes
Ontario	Hemlock Lake Outlet and minor tribs	Sullivan	Davies Lake
Ontario	Great Brook and minor tribs	Sullivan	Pleasure Lake
Orange	Monhagen Brook and tribs	Sullivan	Swan Lake
Orange	Orange Lake	Tompkins	Cayuga Lake, Southern End
Orleans	Lake Ontario Shoreline, Western	Tompkins	Owasco Inlet, Upper, and tribs
Oswego	Pleasant Lake	Ulster	Ashokan Reservoir
Oswego	Lake Neatahwanta	Ulster	Esopus Creek, Upper, and minor tribs
Putnam	Oscawana Lake		
Putnam	Palmer Lake	Ulster	Esopus Creek, Lower, Main Stem
Putnam	Lake Carmel	Ulster	Esopus Creek, Middle, and minor tribs
Queens	Jamaica Bay, Eastern, and tribs (Queens)		
Queens	Bergen Basin	Warren	Lake George
Queens	Shellbank Basin	Warren	Tribs to L.George, Village of L George
Rensselaer	Nassau Lake		
Rensselaer	Snyders Lake	Warren	Huddle/Finkle Brooks and tribs
Richmond	Grasmere, Arbutus and Wolfes Lakes	Warren	Indian Brook and tribs
Rockland	Congers Lake, Swartout Lake	Warren	Hague Brook and tribs
Rockland	Rockland Lake	Washington	Tribs to L.George, East Shr Lk George
Saratoga	Ballston Lake		
Saratoga	Round Lake	Washington	Cossayuna Lake
Saratoga	Dwaas Kill and tribs	Washington	Wood Cr/Champlain Canal, minor tribs
Saratoga	Tribs to Lake Lonely		
Saratoga	Lake Lonely	Wayne	Port Bay
Schenectady	Collins Lake	Wayne	Marbletown Creek and tribs
Schenectady	Duane Lake	Westchester	Lake Katonah
Schenectady	Mariaville Lake	Westchester	Lake Mohegan
Schoharie	Engleville Pond	Westchester	Lake Shenorock
Schoharie	Summit Lake	Westchester	Reservoir No.1 (Lake Isle)
Schuyler	Cayuta Lake	Westchester	Saw Mill River, Middle, and tribs
St. Lawrence	Fish Creek and minor tribs	Westchester	Silver Lake
St. Lawrence	Black Lake Outlet/Black Lake	Westchester	Teatown Lake
Steuben	Lake Salubria	Westchester	Truesdale Lake
Steuben	Smith Pond	Westchester	Wallace Pond
Suffolk	Millers Pond	Westchester	Peach Lake
Suffolk	Mattituck (Marratooka) Pond	Westchester	Mamaroneck River, Lower
Suffolk	Tidal tribs to West Moriches Bay	Westchester	Mamaroneck River, Upp, and tribs
Suffolk	Canaan Lake	Westchester	Sheldrake River and tribs
Suffolk	Lake Ronkonkoma	Westchester	Blind Brook, Lower
Suffolk	Beaverdam Creek and tribs	Westchester	Blind Brook, Upper, and tribs
Suffolk	Big/Little Fresh Ponds	Westchester	Lake Lincolndale
Suffolk	Fresh Pond	Westchester	Lake Meahaugh
Suffolk	Great South Bay, East	Wyoming	Java Lake
Suffolk	Great South Bay, Middle	Wyoming	Silver Lake

Note: The list above identifies those waters from the final New York State "2014 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated January 2015, that are impaired by silt, sediment or nutrients.

APPENDIX F

LIST OF NYS DEC REGIONAL OFFICES

Region	COVERING THE FOLLOWING COUNTIES:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS	DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, PO BOX 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD WARRENSBURG, NY 12885-1172 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

Appendix D

Stormwater Calculations

Initial Water Quality Volume

WQv = [(P)(Rv)(A)]/12

Where:

Rv = 0.05 + 0.009(I)

I = impervious cover in percent

P = 90% rainfall (see Figure 4.1)

A = site area in acres

Location	Site Area (ac)	New Impervious Area (ac)	Replaced Impervious Area (ac)	% Impervious	Rv	Rainfall (P) (inches)	WQv (ac-ft)	Target WQv (ac-ft)	cf
2B	5.732	2.101		36.7%	0.38	1.20	0.218	0.218	9485.19
2C	0.863	0.467		54.1%	0.54	1.20	0.046	0.046	2018.79
2D	0.921	0.468		50.8%	0.51	1.20	0.047	0.047	2035.34
2E	0.061	0.061		100.0%	0.95	1.20	0.006	0.006	252.43
2F	0.061	0.061		100.0%	0.95	1.20	0.006	0.006	252.43
2H	1.161	0.770		66.3%	0.65	1.20	0.075	0.075	3271.57
2J	0.272	0.174		64.0%	0.63	1.20	0.017	0.017	741.391
3B	0.065	0.065		100.0%	0.95	1.20	0.006	0.006	268.983
3C	0.065	0.065		100.0%	0.95	1.20	0.006	0.006	268.983
3D	0.065	0.065		100.0%	0.95	1.20	0.006	0.006	268.983
	9.266	4.297	0.000	46.4%	0.47	1.20	0.433	0.433	

RRv	3.53	2.20		62.1%	0.61	1.20	0.215	0.215	9378.9
BIO A	1.16	0.77		66.3%	0.65	1.20	0.075	0.075	3271.57
BIO D	2.06	0.94		45.5%	0.46	1.20	0.094	0.094	4113.37
PLANTERS	0.317	0.317		100.0%	0.95	1.20	0.030	0.030	1311.81

Flow-Through Stormwater Planter Simple Sizing Example

1) Calculate water quality volume using the following equation:

P =	1.2	90% rainfall number (inches)
I =	100	percent of impervious area draining to site
A =	2,800	area draining to practice (square feet)
Rv =	0.95	
WQv =	266.00	cubic feet

df = soil media depth	1.5
k = hydraulic conductivity (ft/day)	8.7
Hf = average height of the water above the planter bed	0.5
tf design time (days) to filter (assume 4 hours)	0.17

AF = WQv x Df/[k x (hf+df)(tf)

Af= required sq ft area do not exceed 15,000 sf contributing roof

Af= 134.89

Provided area= 140 s.f.

JOB	Forts Ferry		
SHEET NO.	1	OF	1
CALCULATE	P Mitchell	DATE	9/4/2018
CHECKED B	M. Tucker	DATE	
SCALE	Bioretention Sizing		

Using Darcy's Law for sizing the bioretention areas
hf=average depth of water over filter during WQv
tf=2 day dewatering time
k=coefficient of permeability (ft/day)
df=filter bed depth

SUB	WQv	df	k	hf	tf	Af	Actual
2C	2019.00	3	0.5	0.5	2	1731	3600
2D	2035.00	3	0.5	0.5	2	1744	3600
2H	3272.00	3	0.5	0.5	2	2805	6615
2J	742.00	3	0.5	0.5	2	636	1628

JOB	Forts Ferry RRV
SHEET NO.	1 OF 4
CALCULATED B	PM DATE 9/21/2018
CHECKED BY	DATE
SCALE	Runoff Reduction Volume

Runoff Reduction Volume-For added impervious area

DA 9.266 acres **HSG** C **90% RAIN** 1.2 inch

1. **Planning (check all that apply)**

	Preserve undisturbed areas, natural buffer, and critical environmental areas
	Employ open space, conservation, clustering site design techniques
x	Avoid developing in environmentally sensitive areas
x	Minimize impervious surfaces, building footprints, parking, roads, walks and drives
x	Minimize clearing and grading

2. **Water Quality Volume (before runoff reduction)** WQv=P*A*Rv/12 **WQv=** 0.433 af

18864.094 cf

DA 9.266 acres **Impervious Area** 4.297 **Rv=** 0.467

3. **Minimum RRv Requirements** RRV=P*.95*S*AI/12

P= 1.2 inch **S=** 0.34 **AI=** 4.297 **RRv=** 0.139 af

6045.83 cf

4. **Area Reduction Practices (check all that apply)**

	Conservation of natural areas	contributing AI=		Area=	ac
	Riparian Buffers/filter strips	contributing AI=		Area=	ac
	Tree Planting/Tree preservation	contributing AI=		Area=	ac
	Total Area Reduction			0	ac
	Total Impervious area within area reduction			0	ac

5. **Subtract total area reduction from DA**

Remaining drainage area: (#2-#4) 9.266 ac

Remaining impervious area: (#2 AI-#4 AI) 4.297 ac

6. **Recalculate WQv for site area remaining after area reductions:**

Remaining DA= 9.266

Remaining AI= 4.297

Rv= 0.467 Area reduced WQv= 0.433 af

7. **Runoff reduction volume (RRv) from #2: (#2 WQv-#6 WQv)=** **RRv=** 0.000 af

JOB	Forts Ferry RRV
SHEET NO.	2 OF 4
CALCULATED B	PM DATE 9/21/2018
CHECKED BY	DATE
SCALE	Runoff Reduction Volume

Rooftop Disconnect

8. **Incorporate rooftop area disconnection:**

Total disconnected rooftop area (now considered pervious for Rv calculation — Area= 0.000 ac

9. **Recalculate WQv with Rv modified for impervious disconnect:**

DA from (#5) 9.266 **Remaining AI=** 4.297 **Rv=** 0.467 Rv reduced WQv= 0.433 af

10. **Runoff reduction volume: #6 (area reduced WQv) - #9 (Rv reduced WQv)=** RRv= 0.000 af
0 cf

Source Control WQv Treatment Practices (from attached worksheet)

11a. **Subtotal DA tributary to Source Control treatment practices=** 3.847 acres
11b. **Subtotal Source Control WQv Treatment Volume=** 0.203 af
11c. **Subtotal Runoff Reduction Volume (RRv)=** 0.203 af

TOTAL Runoff Reduction Volume (RRv)

12. **Total RRv provided (#7 + #10 + 11c) =** Total RRv= 0.203 af

13. **Is RRv (#12) ≥ original WQv (#2)** YES X NO ___ If yes, skip to #18

14. **Is RRv (#12) ≥ minimum WQv (#3)** YES X NO ___ If no, provide add'l RRV and recalculate

15. **Total drainage area treated with runoff reduction/source control practices=** 3.847 ac
(Area reduction from #4 + total DA tributary to source control #11a.)

16. **Is all of the watershed DA treated by either area reduction or source control practices?**
YES ___ NO X If yes, skip to #18

Standard WQv Treatment

17. **Provide treatment for any remaining untreated watershed DA with standard practices**

Remaining untreated DA=DA (#2)	9.266	ac	- treated DA (#15)	3.847	ac =	5.419	ac
Remaining impervious=AI (#2)	4.297	ac	- treated AI (#11, #8, #4)	2.517	ac =	1.780	ac
Remaining DA =	5.419	ac					
Remaining AI=	1.780	ac					
Rv=	0.223						
WQv=	0.207	af					

Standard WQv Treatment (Continued)

Ponds	WQv Provided	________	af	*Minimum Rv= 0.20
Wetlands	WQv Provided	________	af	
Infiltration	WQv Provided	________	af	
Filters	WQv Provided	________	af	
Open Channels	WQv Provided	________	af	

Peak Flow Attenuation

18. **Calculate peak runoff rates for pre-development site conditions**

DA= 0 ac RCN= 74 Tc (hours) 0.20

Q1= 0.00
Q10= 0.00
Q100= 0.00

19. **Calculate peak runoff rates for post-development site conditions with RRv (method used "HydroCAD")**

DA= 0 ac RCN= 81 Tc (hours) 0.130

Q1= 0.00
Q10= 0.00
Q100= 0.00

20. **Provide necessary stormwater volume detention for channel protection, overbank and extreme storm runoff to mitigate any increase in post-developed runoff from pre-developed conditions using:**

Ponds	CP vol	________	cf	OB vol	________	cf	ES vol	________	cf
Wetlands	CP vol	________	cf	OB vol	________	cf	ES vol	________	cf
Dry Detention	CP vol		cf	OB vol		cf	ES vol		cf
Underground storage	CP vol	________	cf	OB vol	________	cf	ES vol	________	cf
Blue roofs	CP vol	________	cf	OB vol	________	cf	ES vol	________	cf

11. SOURCE CONTROL WQv TREATMENT PRACTICES WORKSHEET

[ ] Infiltration — **Allowable Reduction**

DA(ac)=	0	Rv=	0.000		100% of WQv=	0.000
AI (ac)=	0	WQv=	0.000			

[x] Bioretention — **Allowable Reduction**

DA(ac)=	3.53	Rv=	0.611	A/B soils	80% of WQv=	0.173
AI (ac)=	2.2	WQv=	0.216	C/D soils	40% of WQv=	

[ ] Dry Swale — **Allowable Reduction**

DA(ac)=	0	Rv=	0.000	A/B soils	40% of WQv=	0.000
AI (ac)=	0	WQv=	0.000	C/D soils	20% of WQv=	0.000

[ ] Vegetated Swale — **Allowable Reduction**

DA(ac)=	0	Rv=	0.000	A/B soils	20% of WQv=	0.000
AI (ac)=	0	WQv=	0.000	C/D soils	10% of WQv=	0.000

[ ] Green Roof — **Allowable Reduction**

Roof=	0	Rv=	0.000		100% of WQv=	0.000
		WQv=	0.000			

[ ] Rain Garden — **Allowable Reduction**

Roof=	0	Rv=	0.000	A/B soils	100% of WQv=	0.000
		WQv=	0.000	C/D soils	40% of WQv=	0.000

[ ] Cisterns/Rain Barrels — **Allowable Reduction**

Roof=	0	Rv=	0.000	A/B soils	100% of WQv=	0.000
		WQv=	0.000	C/D soils	40% of WQv=	0.000

[ ] Stormwater Planters — **Allowable Reduction**

DA(ac)=	0.317	Rv=	0.950		100% of WQv=	0.030
AI (ac)=	0.317	WQv=	0.030			

[ ] Porous Pavement — **Allowable Reduction**

DA(ac)=	0	Rv=	0.000		100% of WQv=	0.000
AI (ac)=	0	WQv=	0.000			

11a.	**Subtotal DA tributary to Source Control WQv Treatment=**	3.847	ac		
11b.	**Subtotal Source Control WQv Treatment Volume=**	0.203	af		
11c.	**Subtotal of All Runoff Reduction Volume (RRv)=**			Subtotal RRv=	**0.203**

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vhb.com

Engineering, Surveying & Landscape Architecture, PC
100 Great Oaks Boulevard
Suite 118
Albany, NY 12203
518.389.3600

0 25 50 100Feet

The Summit at Forts Ferry

33 & 45 Forts Ferry Road
Colonie, New York

No.	Revision	Date	Appvd.

Designed by: PM
Checked by: MT
Issued for
Date: May 30, 2018

Not Approved for Construction

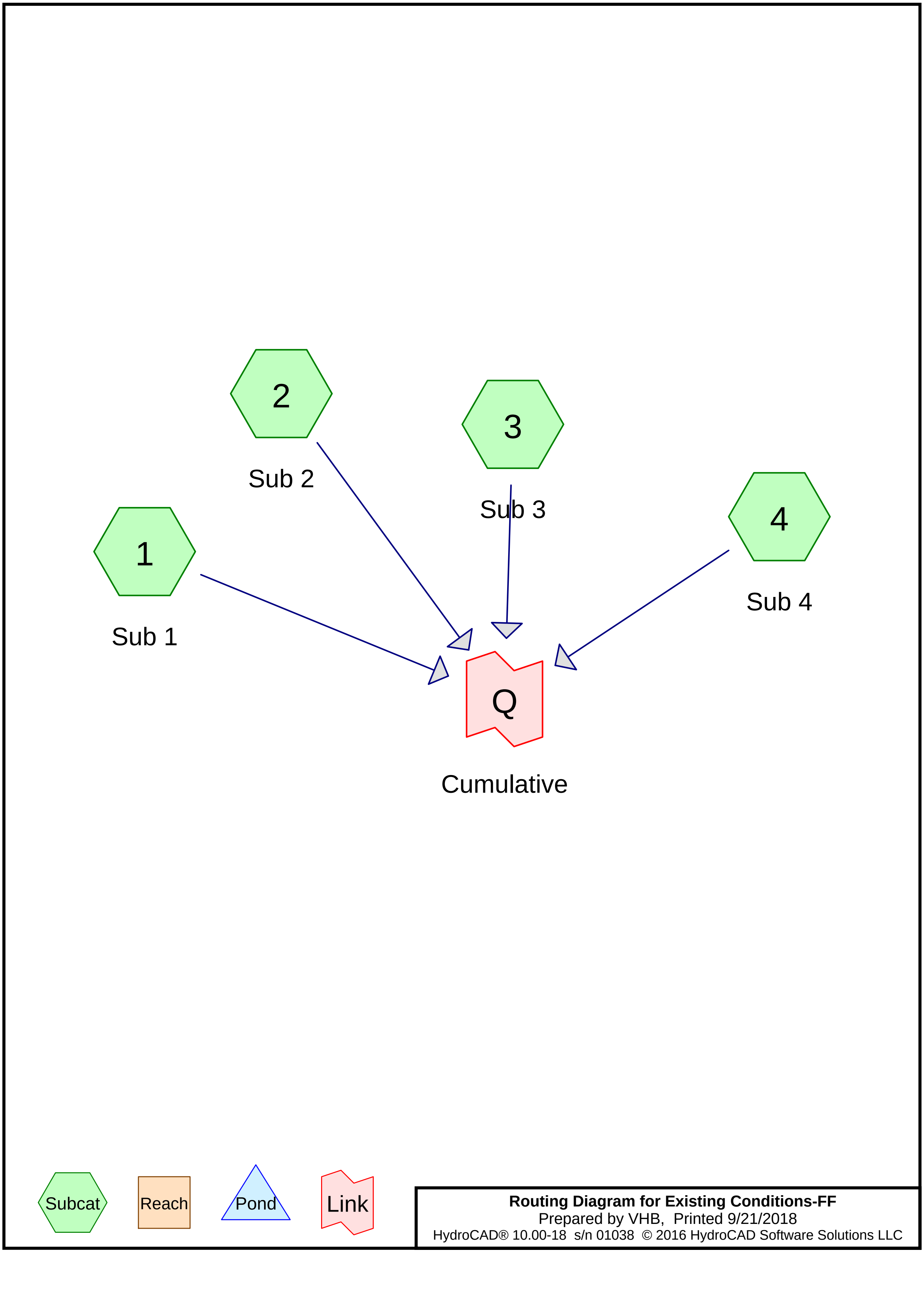
Drawing Title
Existing Conditions Drainage Plan

Drawing Number
ECD

Sheet 1 of 1

Project Number
29466.00

Saved Thursday, September 20, 2018 8:14:09 PM PMITCHELL Plotted Friday, September 21, 2018 10:17:29 AM Mitchell, Pat



Routing Diagram for Existing Conditions-FF
Prepared by VHB, Printed 9/21/2018

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.183	98	Paved parking, HSG A (1, 2)
4.250	30	Woods, Good, HSG A (1, 2, 3)
2.890	55	Woods, Good, HSG B (1, 2, 3, 4)
6.990	77	Woods, Good, HSG D (2, 3)
14.313	**59**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.433	HSG A	1, 2, 3
2.890	HSG B	1, 2, 3, 4
0.000	HSG C	
6.990	HSG D	2, 3
0.000	Other	
14.313		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.183	0.000	0.000	0.000	0.000	0.183	Paved parking	1, 2
4.250	2.890	0.000	6.990	0.000	14.130	Woods, Good	1, 2, 3, 4
4.433	**2.890**	**0.000**	**6.990**	**0.000**	**14.313**	**TOTAL AREA**	

Time span=2.00-40.00 hrs, dt=0.01 hrs, 3801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Sub 1 Runoff Area=47,611 sf 13.08% Impervious Runoff Depth=0.00"
Flow Length=331' Tc=19.8 min CN=43 Runoff=0.00 cfs 0.000 af

Subcatchment 2: Sub 2 Runoff Area=8.764 ac 0.46% Impervious Runoff Depth=0.13"
Flow Length=1,185' Tc=36.8 min CN=58 Runoff=0.23 cfs 0.097 af

Subcatchment 3: Sub 3 Runoff Area=150,718 sf 0.00% Impervious Runoff Depth=0.33"
Flow Length=681' Tc=25.3 min CN=66 Runoff=0.67 cfs 0.094 af

Subcatchment 4: Sub 4 Runoff Area=43,380 sf 0.00% Impervious Runoff Depth=0.08"
Flow Length=262' Tc=17.9 min CN=55 Runoff=0.01 cfs 0.007 af

Link Q: Cumulative Inflow=0.77 cfs 0.198 af
Primary=0.77 cfs 0.198 af

Total Runoff Area = 14.313 ac Runoff Volume = 0.198 af Average Runoff Depth = 0.17"
98.72% Pervious = 14.130 ac 1.28% Impervious = 0.183 ac

Summary for Subcatchment 1: Sub 1

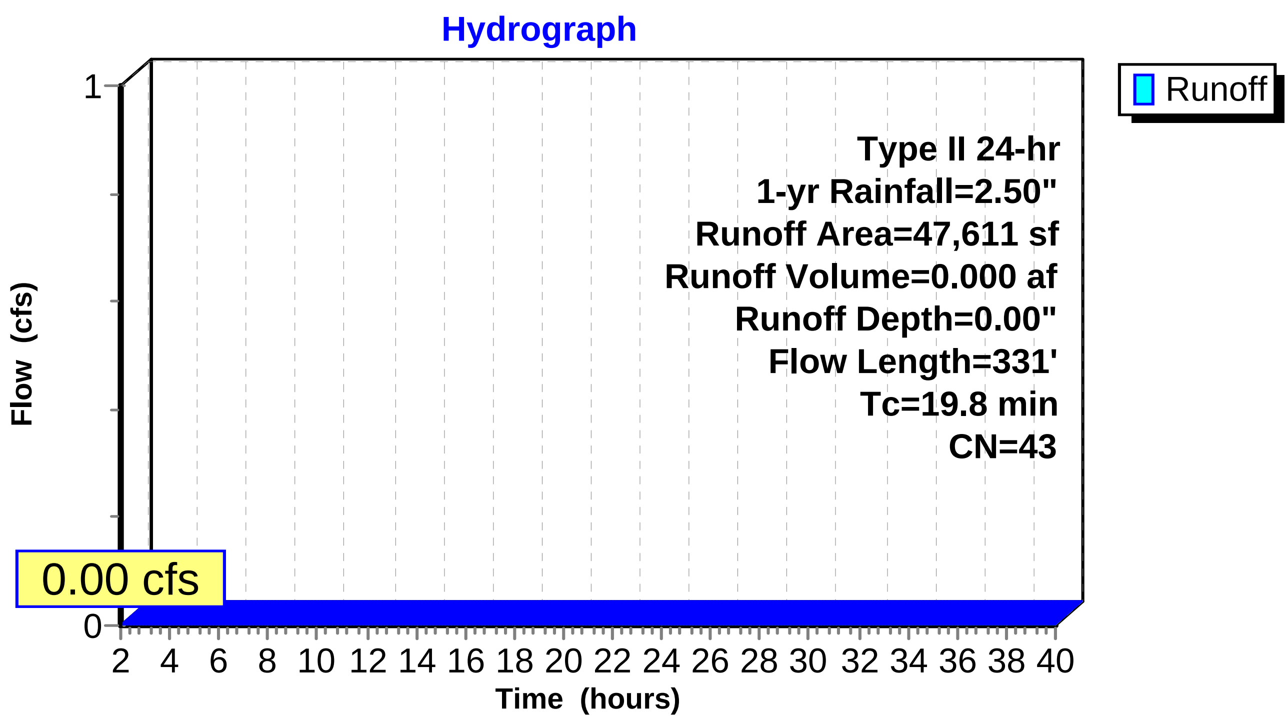
Runoff = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (sf)	CN	Description
29,621	30	Woods, Good, HSG A
3,485	30	Woods, Good, HSG A
8,276	55	Woods, Good, HSG B
6,229	98	Paved parking, HSG A
47,611	43	Weighted Average
41,382		86.92% Pervious Area
6,229		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
5.0	231	0.0240	0.77		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
19.8	331	Total			

Subcatchment 1: Sub 1



Summary for Subcatchment 2: Sub 2

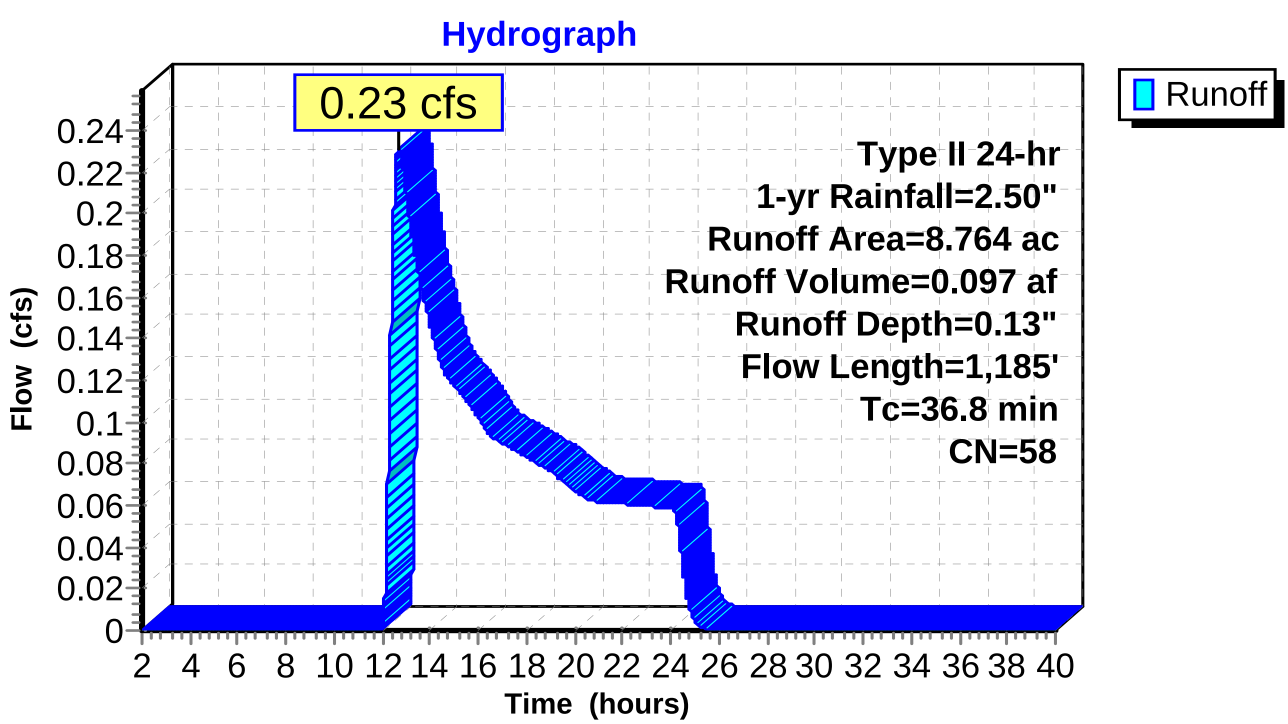
Runoff = 0.23 cfs @ 12.64 hrs, Volume= 0.097 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
4.440	77	Woods, Good, HSG D
2.810	30	Woods, Good, HSG A
1.474	55	Woods, Good, HSG B
0.040	98	Paved parking, HSG A
8.764	58	Weighted Average
8.724		99.54% Pervious Area
0.040		0.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
22.0	1,085	0.0270	0.82		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
36.8	1,185	Total			

Subcatchment 2: Sub 2



Summary for Subcatchment 3: Sub 3

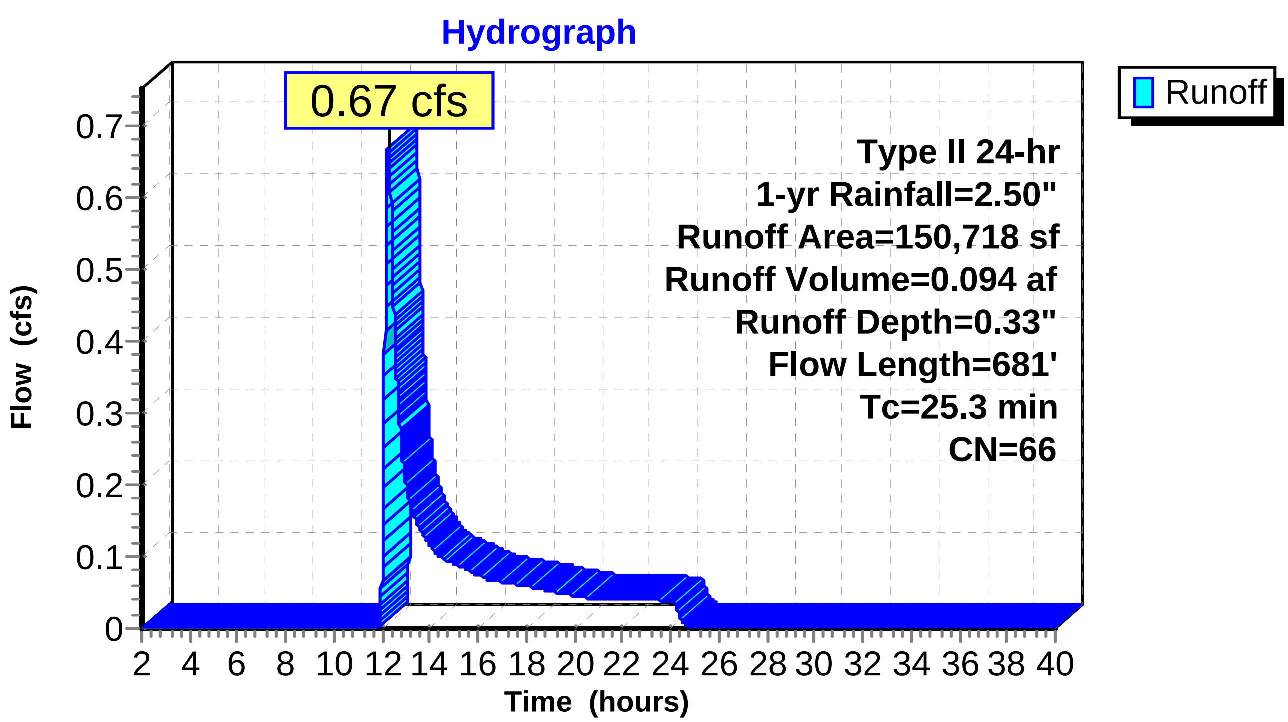
Runoff = 0.67 cfs @ 12.26 hrs, Volume= 0.094 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (sf)	CN	Description
111,078	77	Woods, Good, HSG D
29,621	30	Woods, Good, HSG A
10,019	55	Woods, Good, HSG B
150,718	66	Weighted Average
150,718		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0700	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
11.4	581	0.0290	0.85		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
25.3	681	Total			

Subcatchment 3: Sub 3



Summary for Subcatchment 4: Sub 4

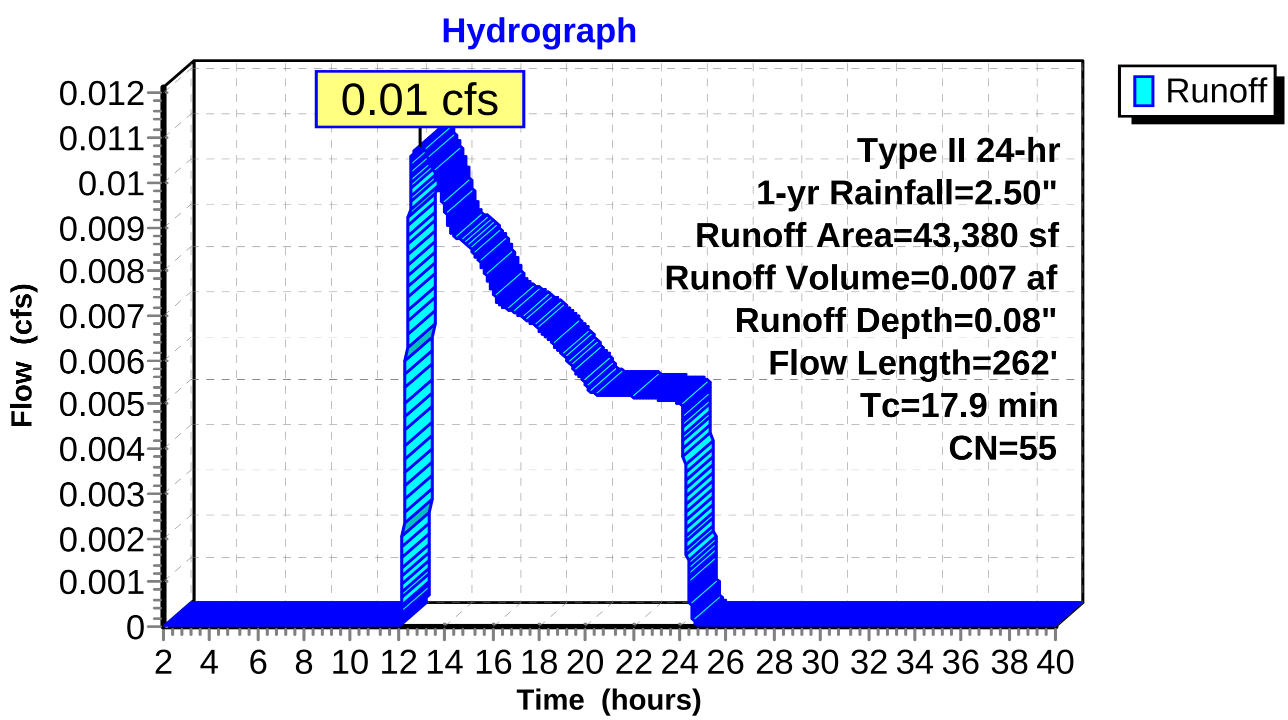
Runoff = 0.01 cfs @ 12.99 hrs, Volume= 0.007 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (sf)	CN	Description
43,380	55	Woods, Good, HSG B
43,380		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0520	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
2.2	162	0.0620	1.24		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
17.9	262	Total			

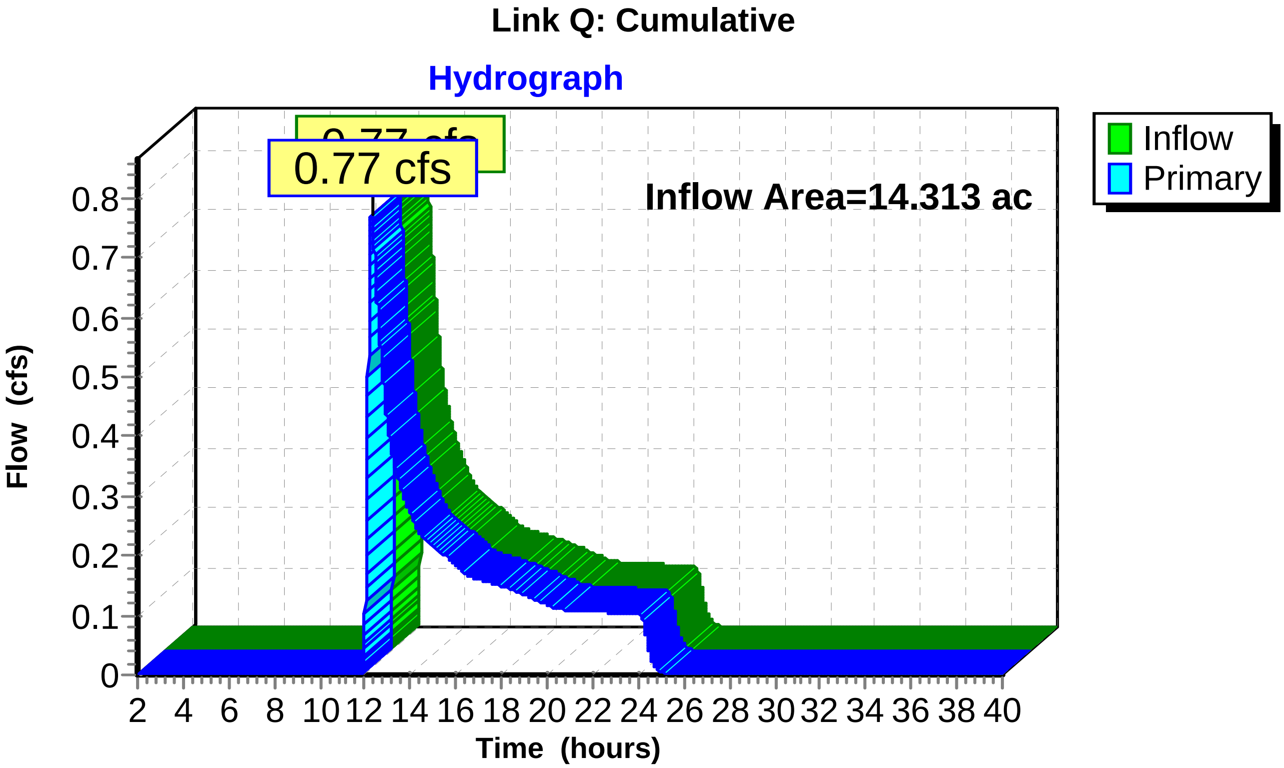
Subcatchment 4: Sub 4



Summary for Link Q: Cumulative

Inflow Area = 14.313 ac, 1.28% Impervious, Inflow Depth = 0.17" for 1-yr event
Inflow = 0.77 cfs @ 12.29 hrs, Volume= 0.198 af
Primary = 0.77 cfs @ 12.29 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs



Time span=2.00-40.00 hrs, dt=0.01 hrs, 3801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Sub 1 Runoff Area=47,611 sf 13.08% Impervious Runoff Depth=0.23"
Flow Length=331' Tc=19.8 min CN=43 Runoff=0.05 cfs 0.021 af

Subcatchment 2: Sub 2 Runoff Area=8.764 ac 0.46% Impervious Runoff Depth=0.90"
Flow Length=1,185' Tc=36.8 min CN=58 Runoff=4.68 cfs 0.661 af

Subcatchment 3: Sub 3 Runoff Area=150,718 sf 0.00% Impervious Runoff Depth=1.40"
Flow Length=681' Tc=25.3 min CN=66 Runoff=4.34 cfs 0.403 af

Subcatchment 4: Sub 4 Runoff Area=43,380 sf 0.00% Impervious Runoff Depth=0.74"
Flow Length=262' Tc=17.9 min CN=55 Runoff=0.65 cfs 0.062 af

Link Q: Cumulative Inflow=8.70 cfs 1.146 af
Primary=8.70 cfs 1.146 af

Total Runoff Area = 14.313 ac Runoff Volume = 1.146 af Average Runoff Depth = 0.96"
98.72% Pervious = 14.130 ac 1.28% Impervious = 0.183 ac

Summary for Subcatchment 1: Sub 1

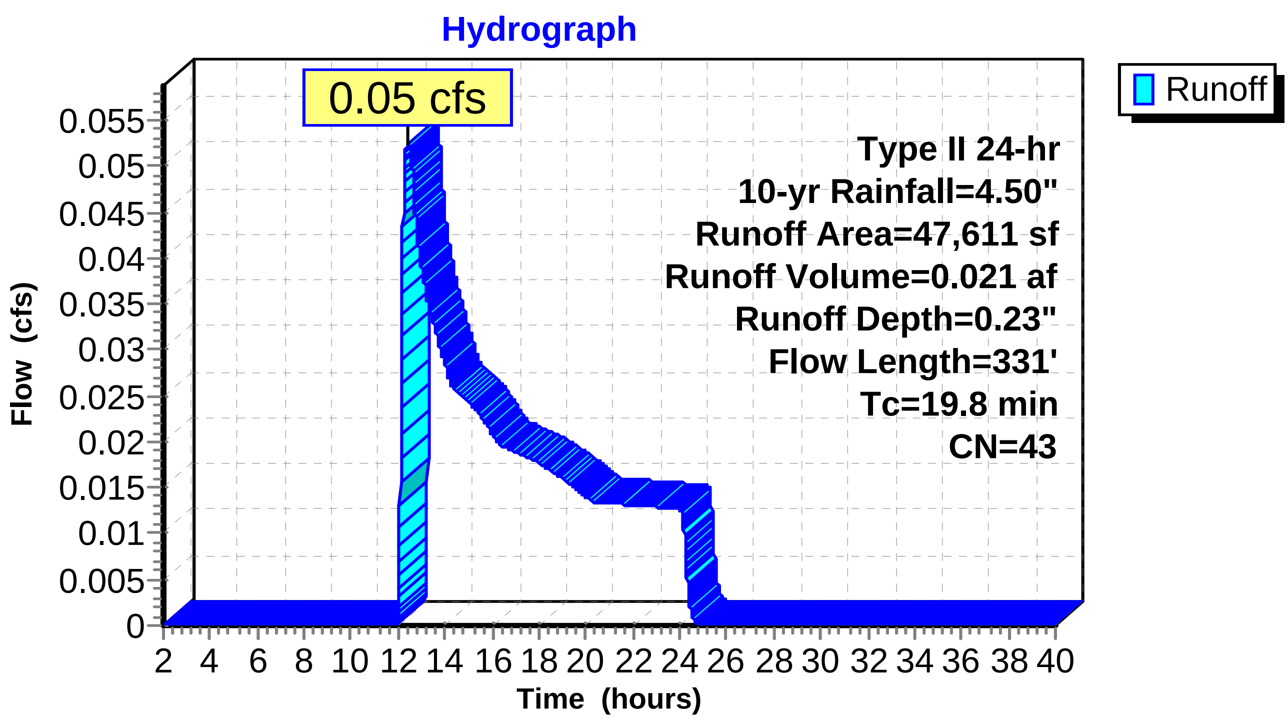
Runoff = 0.05 cfs @ 12.43 hrs, Volume= 0.021 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (sf)	CN	Description
29,621	30	Woods, Good, HSG A
3,485	30	Woods, Good, HSG A
8,276	55	Woods, Good, HSG B
6,229	98	Paved parking, HSG A
47,611	43	Weighted Average
41,382		86.92% Pervious Area
6,229		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
5.0	231	0.0240	0.77		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
19.8	331	Total			

Subcatchment 1: Sub 1



Summary for Subcatchment 2: Sub 2

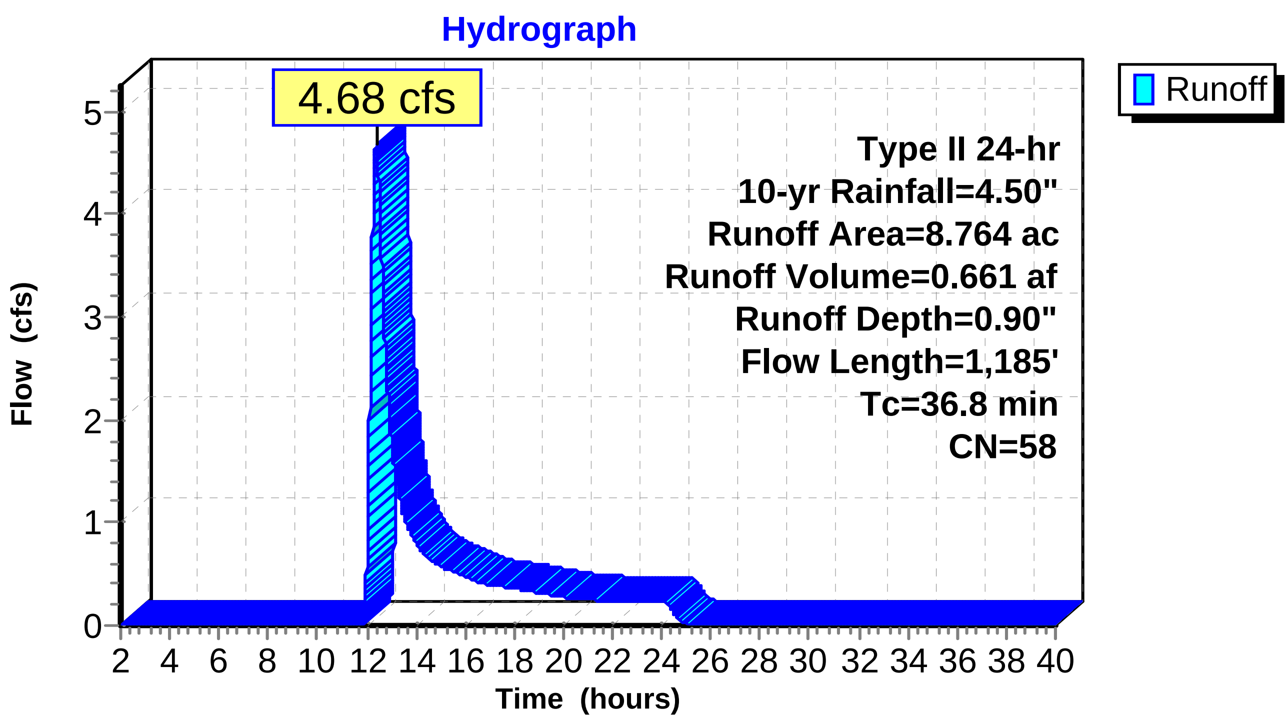
Runoff = 4.68 cfs @ 12.39 hrs, Volume= 0.661 af, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
4.440	77	Woods, Good, HSG D
2.810	30	Woods, Good, HSG A
1.474	55	Woods, Good, HSG B
0.040	98	Paved parking, HSG A
8.764	58	Weighted Average
8.724		99.54% Pervious Area
0.040		0.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
22.0	1,085	0.0270	0.82		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
36.8	1,185	Total			

Subcatchment 2: Sub 2



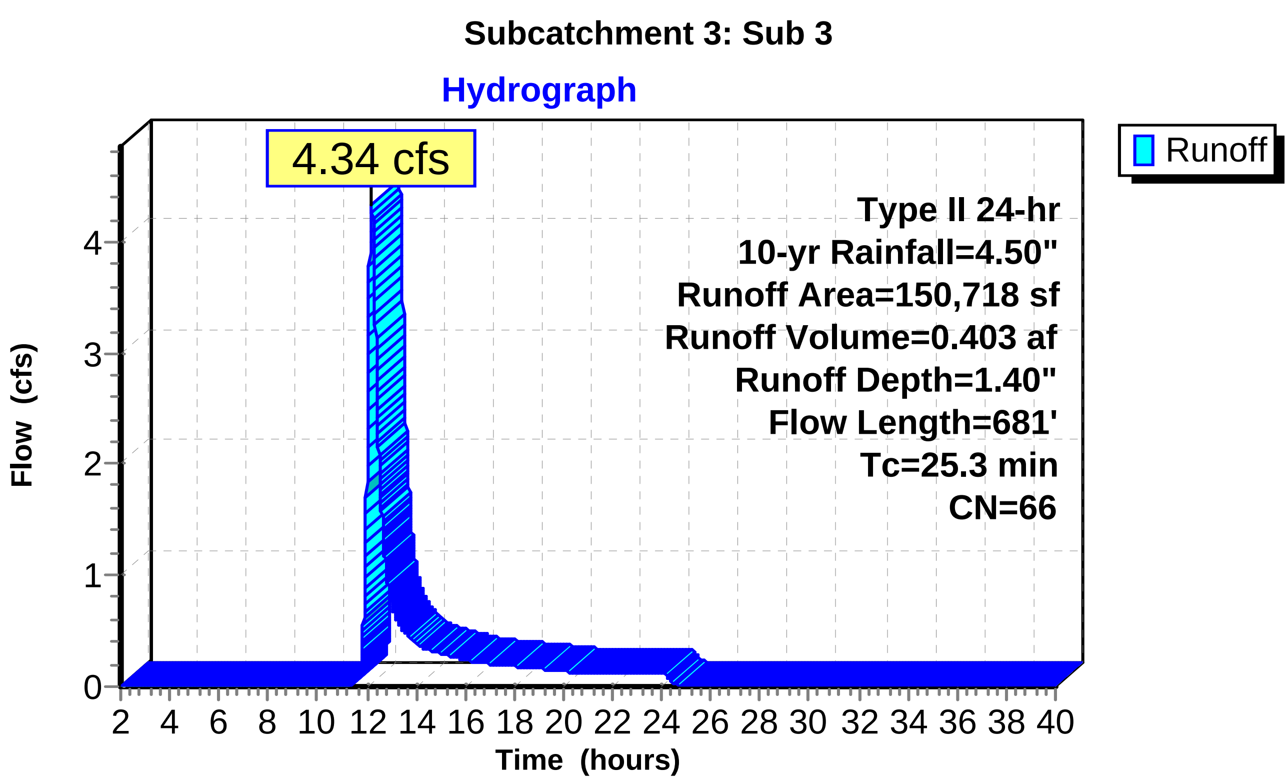
Summary for Subcatchment 3: Sub 3

Runoff = 4.34 cfs @ 12.20 hrs, Volume= 0.403 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (sf)	CN	Description
111,078	77	Woods, Good, HSG D
29,621	30	Woods, Good, HSG A
10,019	55	Woods, Good, HSG B
150,718	66	Weighted Average
150,718		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0700	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
11.4	581	0.0290	0.85		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
25.3	681	Total			



Summary for Subcatchment 4: Sub 4

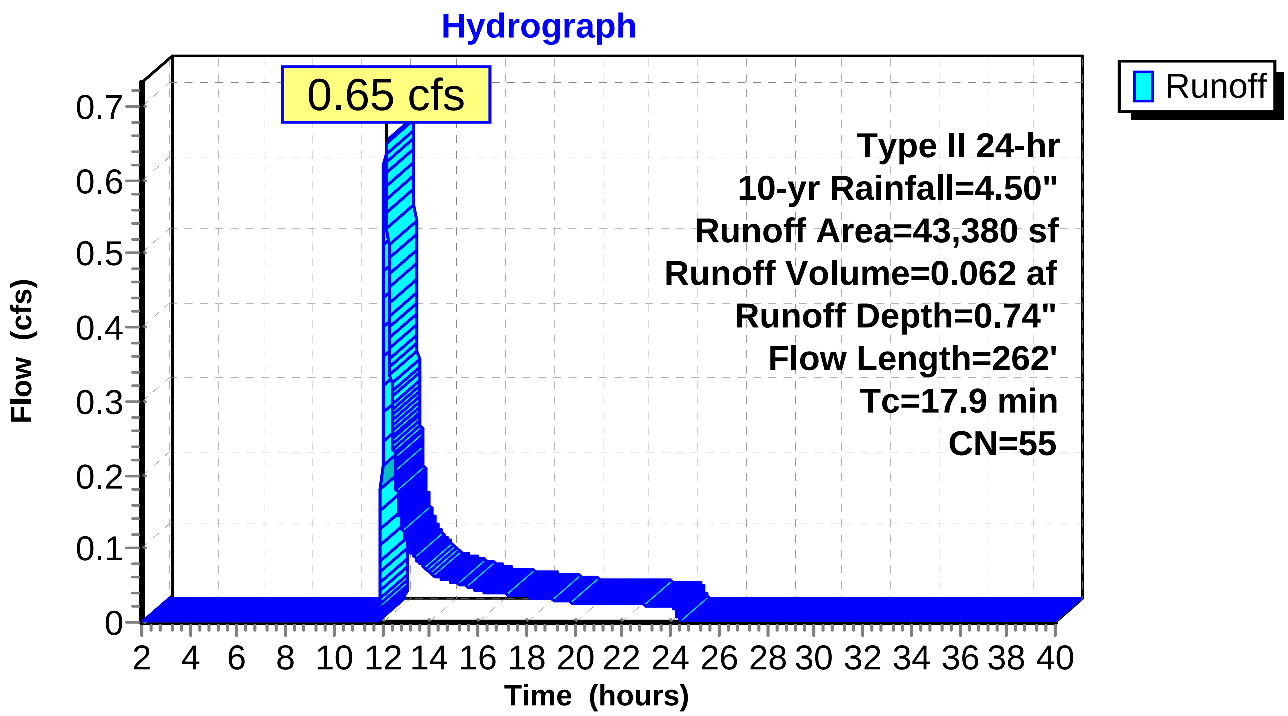
Runoff = 0.65 cfs @ 12.14 hrs, Volume= 0.062 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (sf)	CN	Description
43,380	55	Woods, Good, HSG B
43,380		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0520	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
2.2	162	0.0620	1.24		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
17.9	262	Total			

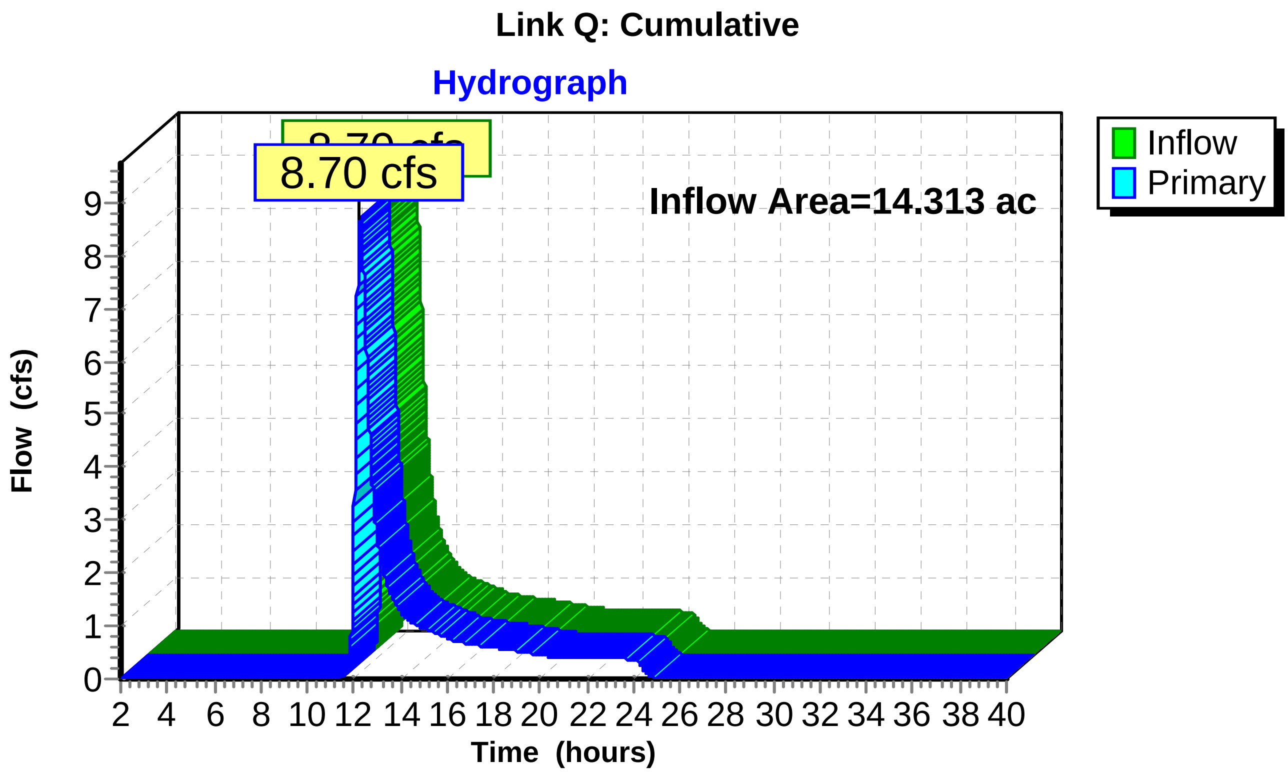
Subcatchment 4: Sub 4



Summary for Link Q: Cumulative

Inflow Area = 14.313 ac, 1.28% Impervious, Inflow Depth = 0.96" for 10-yr event
Inflow = 8.70 cfs @ 12.28 hrs, Volume= 1.146 af
Primary = 8.70 cfs @ 12.28 hrs, Volume= 1.146 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs



Time span=2.00-40.00 hrs, dt=0.01 hrs, 3801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Sub 1 Runoff Area=47,611 sf 13.08% Impervious Runoff Depth=1.07"
Flow Length=331' Tc=19.8 min CN=43 Runoff=0.93 cfs 0.098 af

Subcatchment 2: Sub 2 Runoff Area=8.764 ac 0.46% Impervious Runoff Depth=2.41"
Flow Length=1,185' Tc=36.8 min CN=58 Runoff=14.96 cfs 1.760 af

Subcatchment 3: Sub 3 Runoff Area=150,718 sf 0.00% Impervious Runoff Depth=3.20"
Flow Length=681' Tc=25.3 min CN=66 Runoff=10.60 cfs 0.924 af

Subcatchment 4: Sub 4 Runoff Area=43,380 sf 0.00% Impervious Runoff Depth=2.12"
Flow Length=262' Tc=17.9 min CN=55 Runoff=2.36 cfs 0.176 af

Link Q: Cumulative Inflow=26.16 cfs 2.958 af
Primary=26.16 cfs 2.958 af

Total Runoff Area = 14.313 ac Runoff Volume = 2.958 af Average Runoff Depth = 2.48"
98.72% Pervious = 14.130 ac 1.28% Impervious = 0.183 ac

Summary for Subcatchment 1: Sub 1

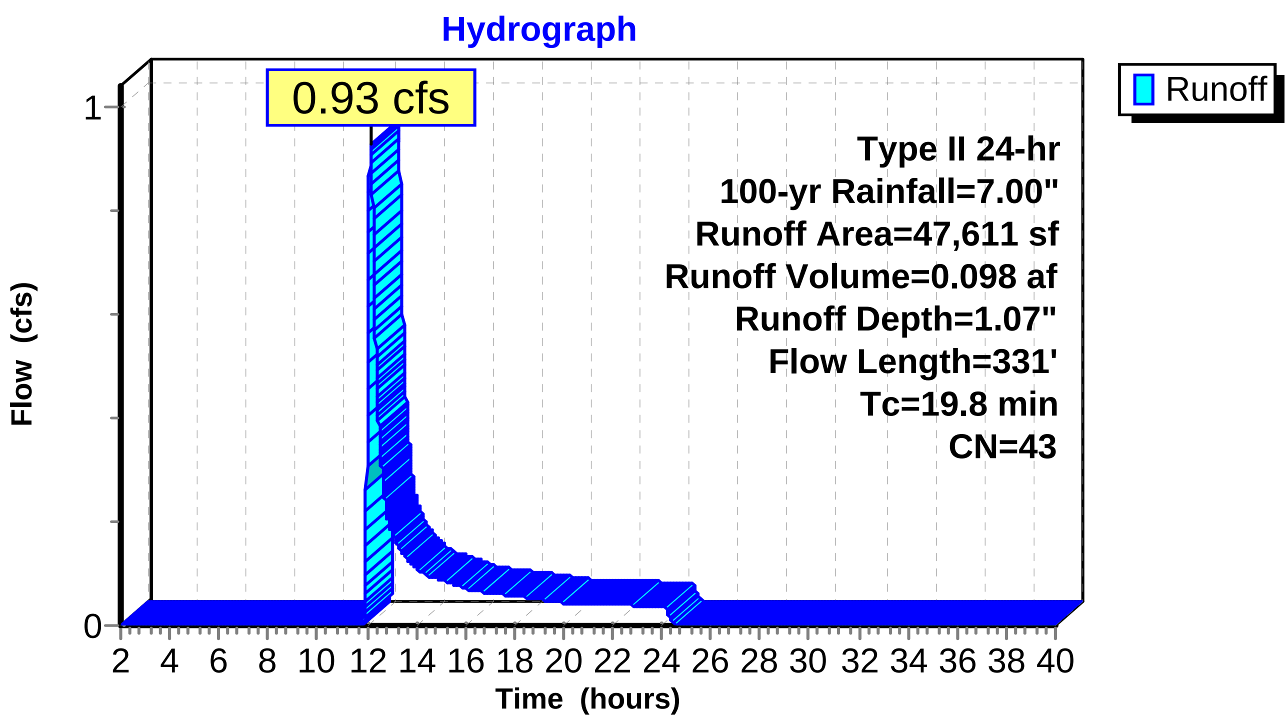
Runoff = 0.93 cfs @ 12.17 hrs, Volume= 0.098 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
29,621	30	Woods, Good, HSG A
3,485	30	Woods, Good, HSG A
8,276	55	Woods, Good, HSG B
6,229	98	Paved parking, HSG A
47,611	43	Weighted Average
41,382		86.92% Pervious Area
6,229		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
5.0	231	0.0240	0.77		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
19.8	331	Total			

Subcatchment 1: Sub 1



Summary for Subcatchment 2: Sub 2

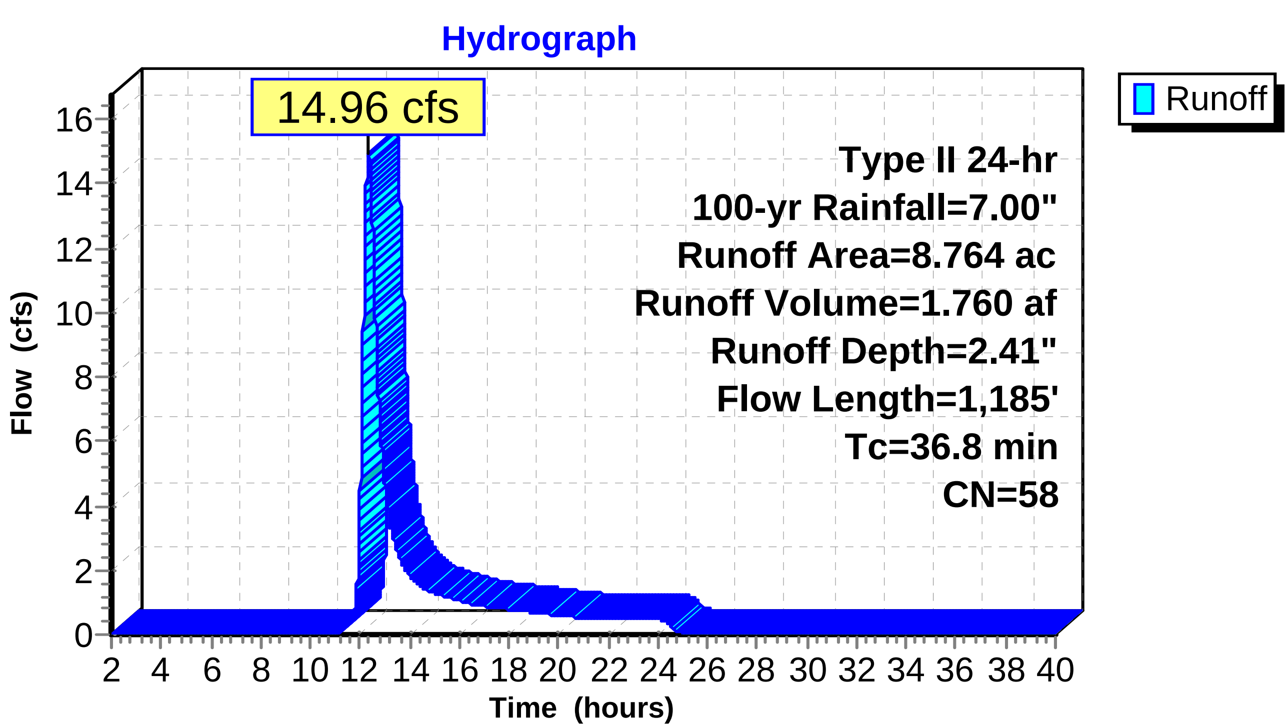
Runoff = 14.96 cfs @ 12.35 hrs, Volume= 1.760 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
4.440	77	Woods, Good, HSG D
2.810	30	Woods, Good, HSG A
1.474	55	Woods, Good, HSG B
0.040	98	Paved parking, HSG A
8.764	58	Weighted Average
8.724		99.54% Pervious Area
0.040		0.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
22.0	1,085	0.0270	0.82		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
36.8	1,185	Total			

Subcatchment 2: Sub 2



Summary for Subcatchment 3: Sub 3

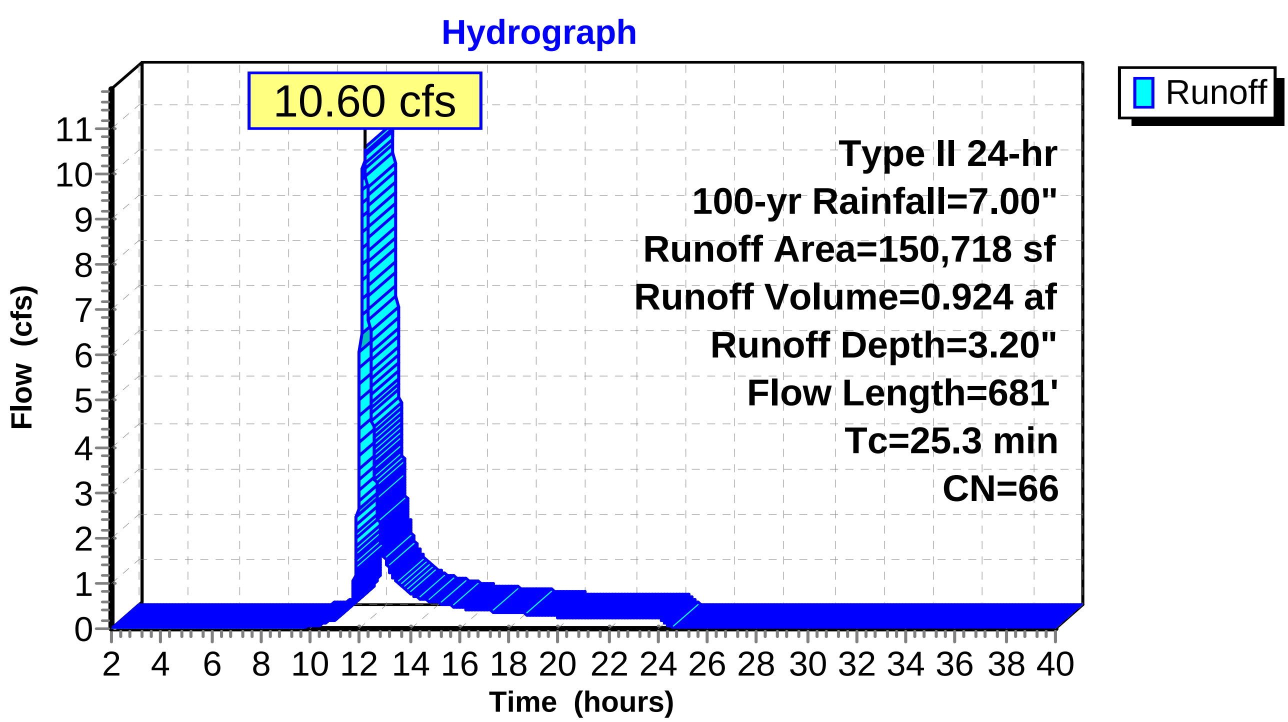
Runoff = 10.60 cfs @ 12.20 hrs, Volume= 0.924 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
111,078	77	Woods, Good, HSG D
29,621	30	Woods, Good, HSG A
10,019	55	Woods, Good, HSG B
150,718	66	Weighted Average
150,718		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0700	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
11.4	581	0.0290	0.85		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
25.3	681	Total			

Subcatchment 3: Sub 3



Summary for Subcatchment 4: Sub 4

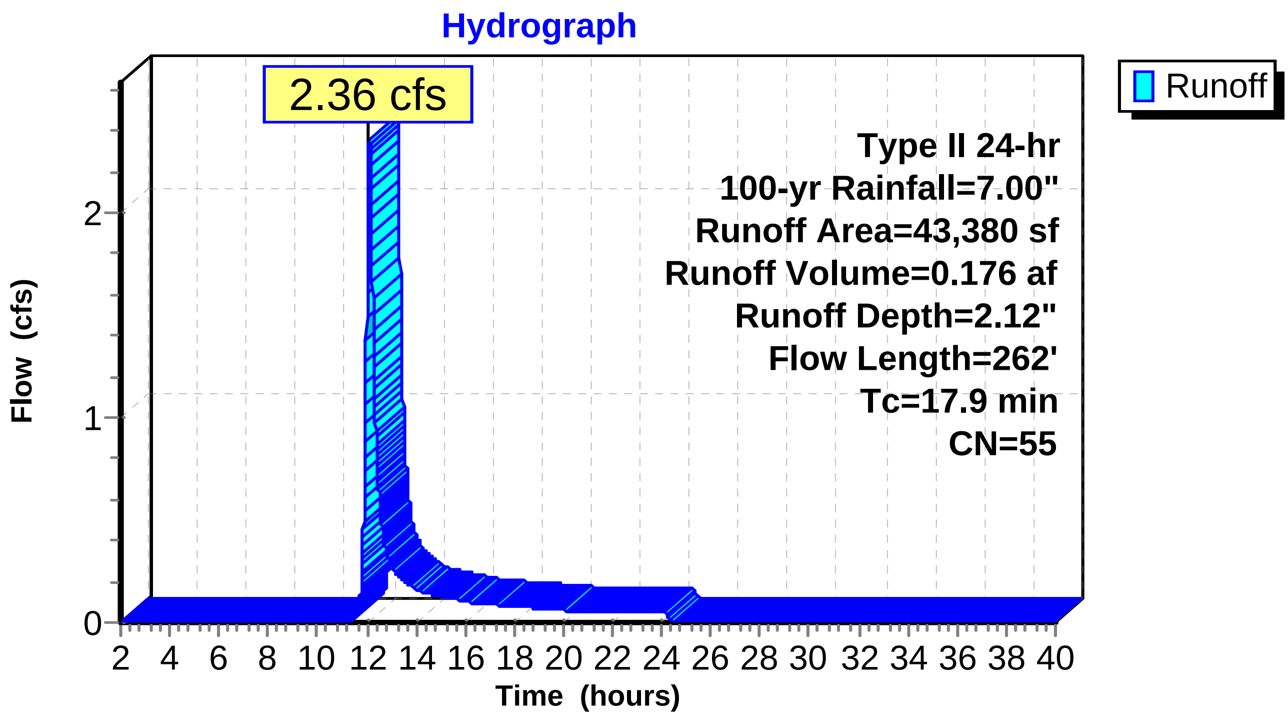
Runoff = 2.36 cfs @ 12.11 hrs, Volume= 0.176 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
43,380	55	Woods, Good, HSG B
43,380		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0520	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
2.2	162	0.0620	1.24		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
17.9	262	Total			

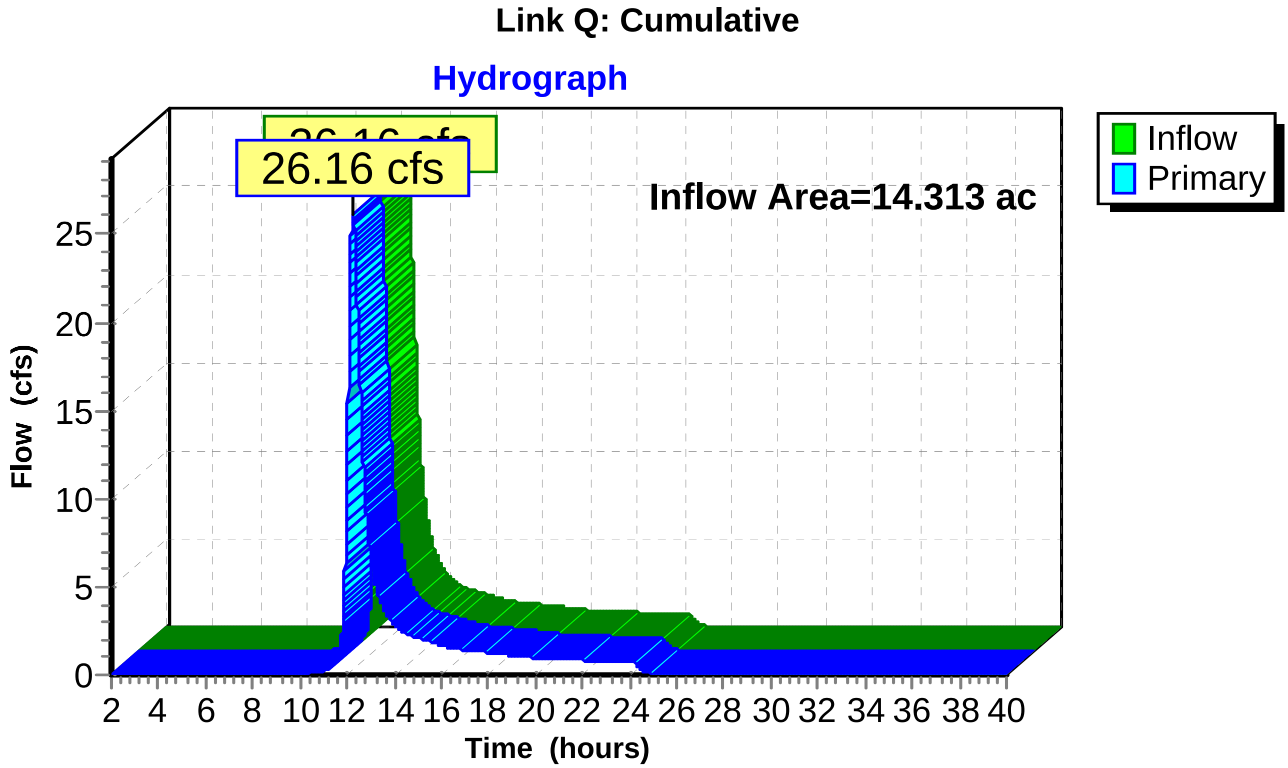
Subcatchment 4: Sub 4



Summary for Link Q: Cumulative

Inflow Area = 14.313 ac, 1.28% Impervious, Inflow Depth = 2.48" for 100-yr event
Inflow = 26.16 cfs @ 12.26 hrs, Volume= 2.958 af
Primary = 26.16 cfs @ 12.26 hrs, Volume= 2.958 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs



Time span=2.00-40.00 hrs, dt=0.01 hrs, 3801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Sub 1 Runoff Area=47,611 sf 13.08% Impervious Runoff Depth=0.00"
Flow Length=331' Tc=19.8 min CN=43 Runoff=0.00 cfs 0.000 af

Subcatchment 2: Sub 2 Runoff Area=8.764 ac 0.46% Impervious Runoff Depth=0.00"
Flow Length=1,185' Tc=36.8 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 3: Sub 3 Runoff Area=150,718 sf 0.00% Impervious Runoff Depth=0.01"
Flow Length=681' Tc=25.3 min CN=66 Runoff=0.00 cfs 0.002 af

Subcatchment 4: Sub 4 Runoff Area=43,380 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=262' Tc=17.9 min CN=55 Runoff=0.00 cfs 0.000 af

Link Q: Cumulative Inflow=0.00 cfs 0.002 af
Primary=0.00 cfs 0.002 af

Total Runoff Area = 14.313 ac Runoff Volume = 0.002 af Average Runoff Depth = 0.00"
98.72% Pervious = 14.130 ac 1.28% Impervious = 0.183 ac

Summary for Subcatchment 1: Sub 1

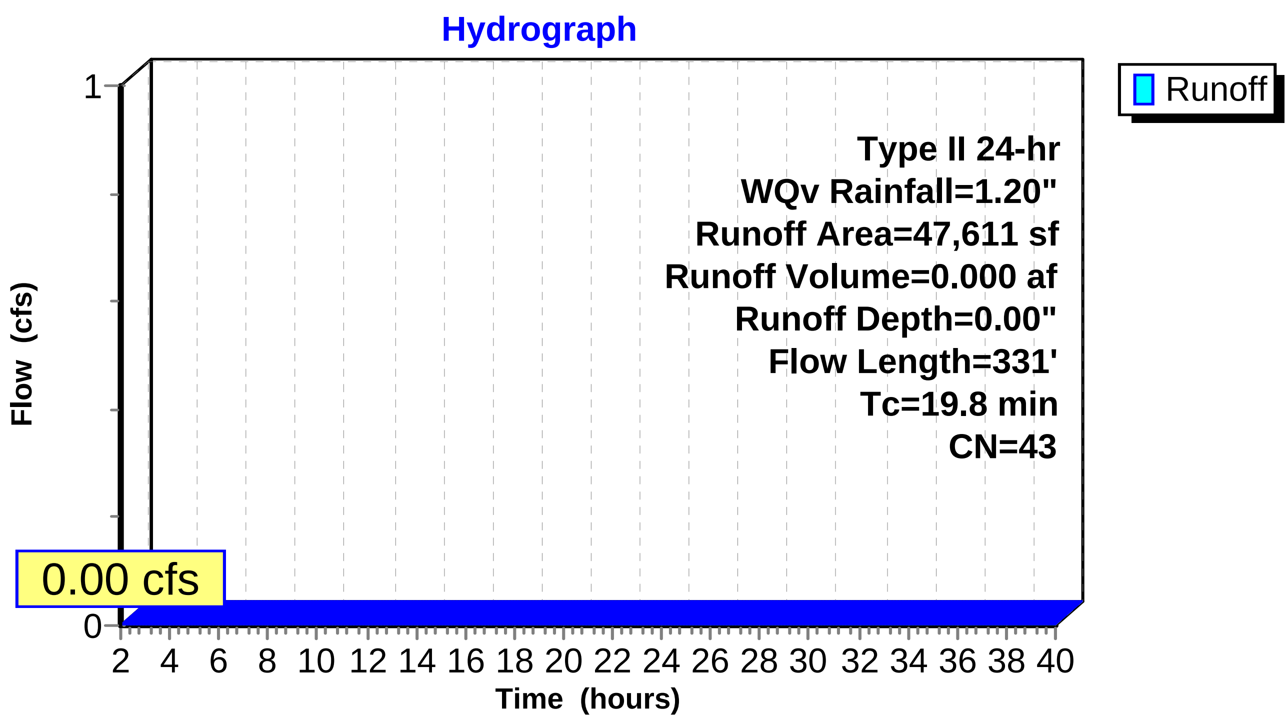
Runoff = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
29,621	30	Woods, Good, HSG A
3,485	30	Woods, Good, HSG A
8,276	55	Woods, Good, HSG B
6,229	98	Paved parking, HSG A
47,611	43	Weighted Average
41,382		86.92% Pervious Area
6,229		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
5.0	231	0.0240	0.77		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
19.8	331	Total			

Subcatchment 1: Sub 1



Summary for Subcatchment 2: Sub 2

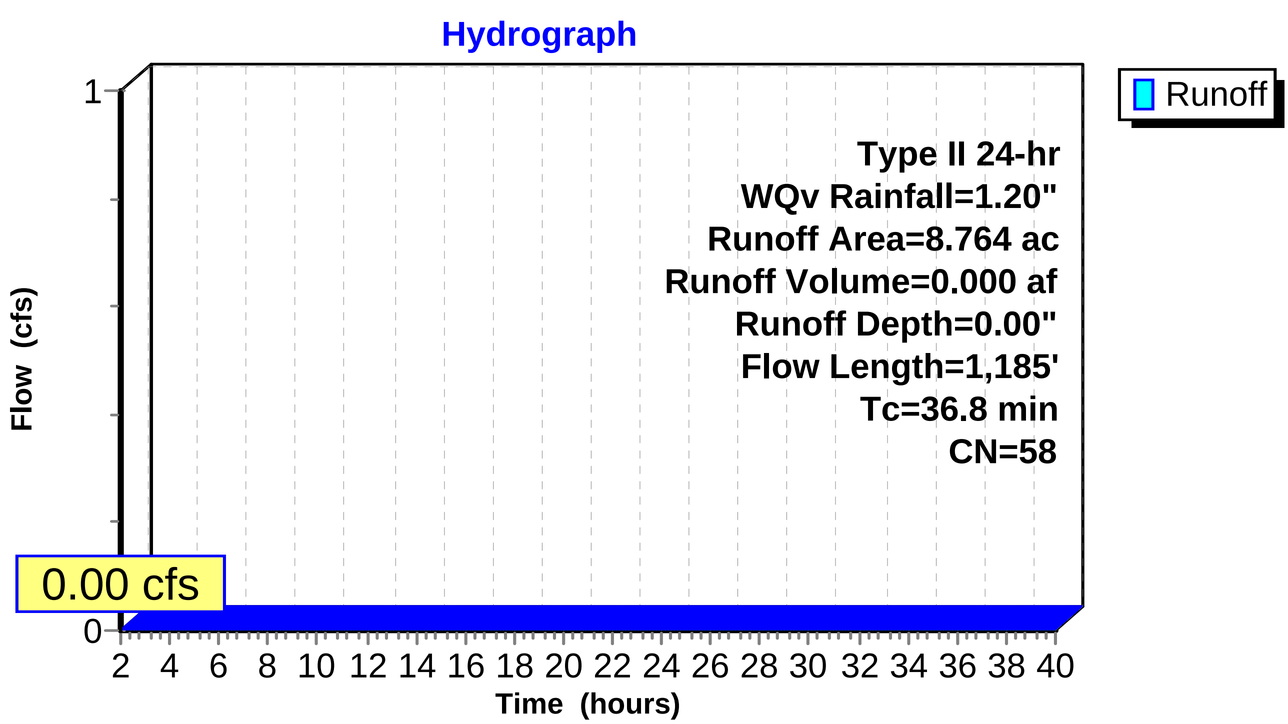
Runoff = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
4.440	77	Woods, Good, HSG D
2.810	30	Woods, Good, HSG A
1.474	55	Woods, Good, HSG B
0.040	98	Paved parking, HSG A
8.764	58	Weighted Average
8.724		99.54% Pervious Area
0.040		0.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
22.0	1,085	0.0270	0.82		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
36.8	1,185	Total			

Subcatchment 2: Sub 2



Summary for Subcatchment 3: Sub 3

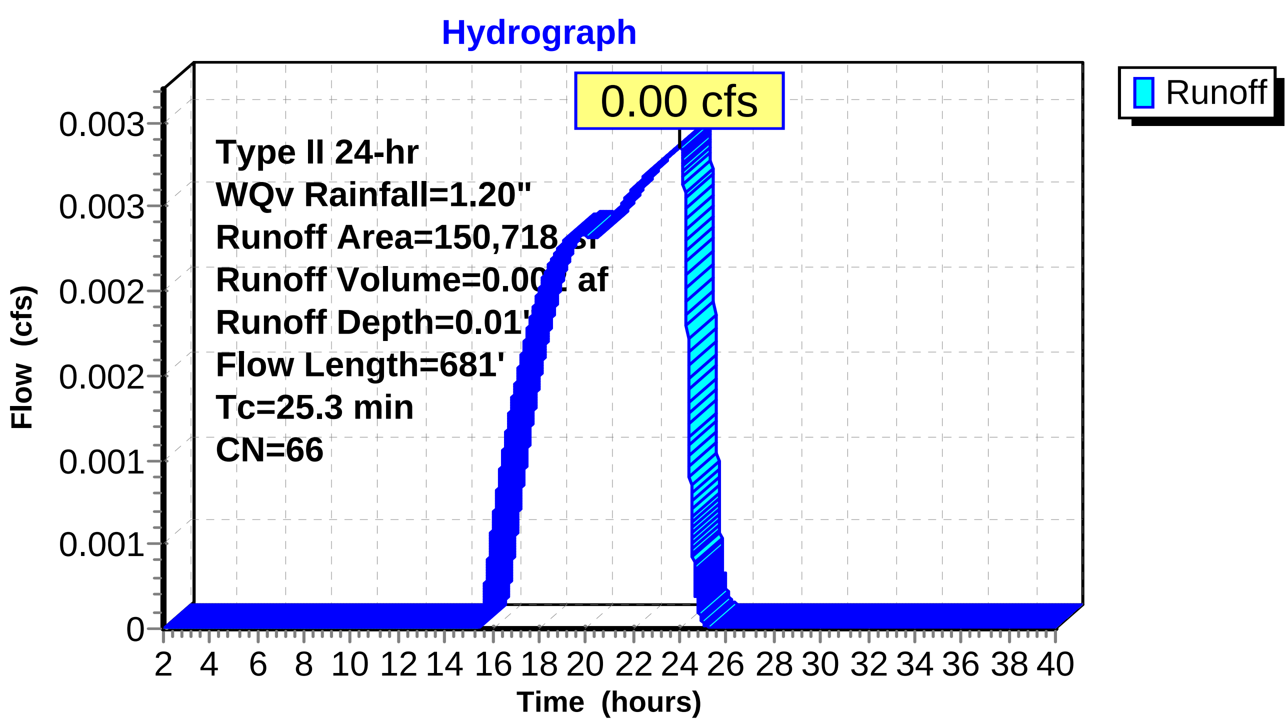
Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.002 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
111,078	77	Woods, Good, HSG D
29,621	30	Woods, Good, HSG A
10,019	55	Woods, Good, HSG B
150,718	66	Weighted Average
150,718		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0700	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
11.4	581	0.0290	0.85		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
25.3	681	Total			

Subcatchment 3: Sub 3



Summary for Subcatchment 4: Sub 4

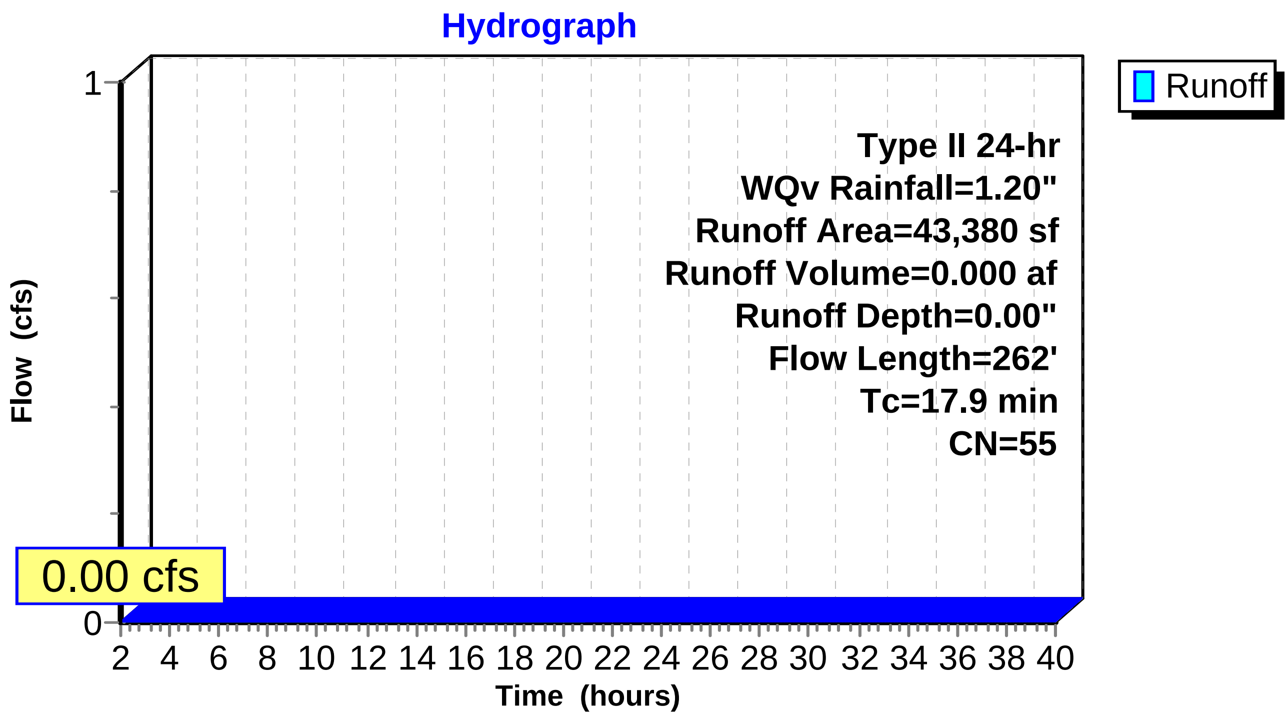
Runoff = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
43,380	55	Woods, Good, HSG B
43,380		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0520	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
2.2	162	0.0620	1.24		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
17.9	262	Total			

Subcatchment 4: Sub 4

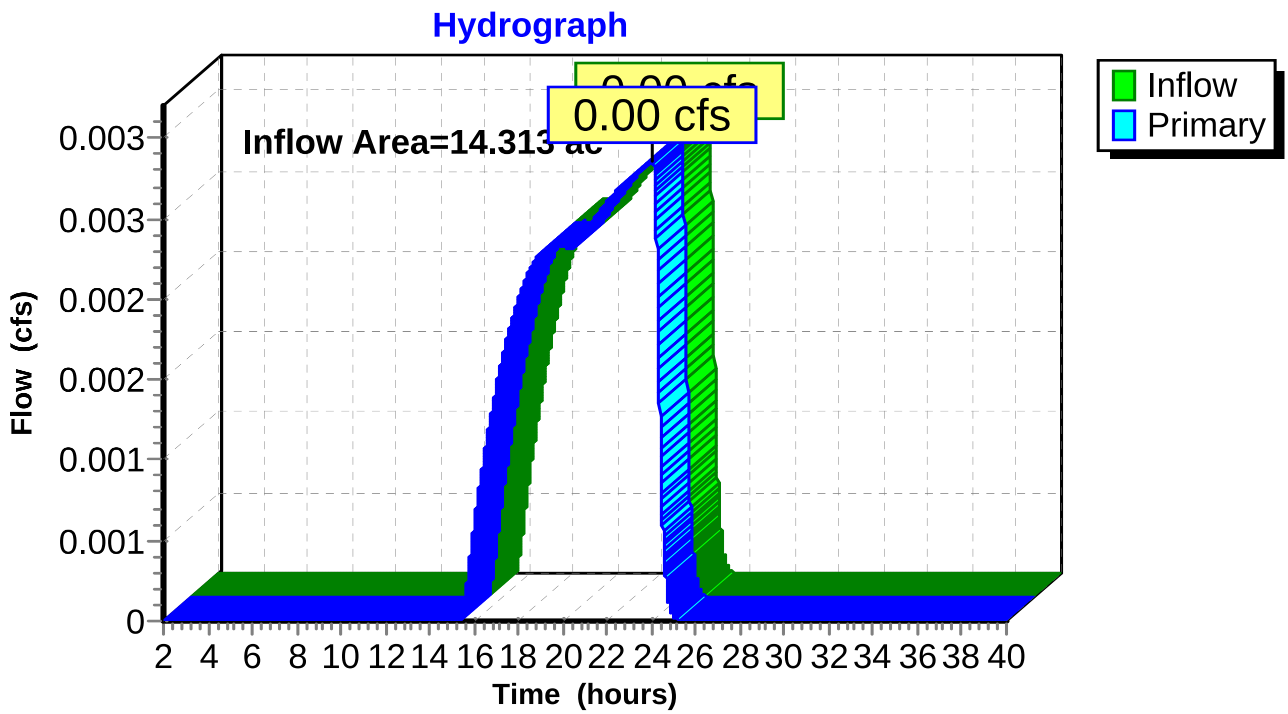


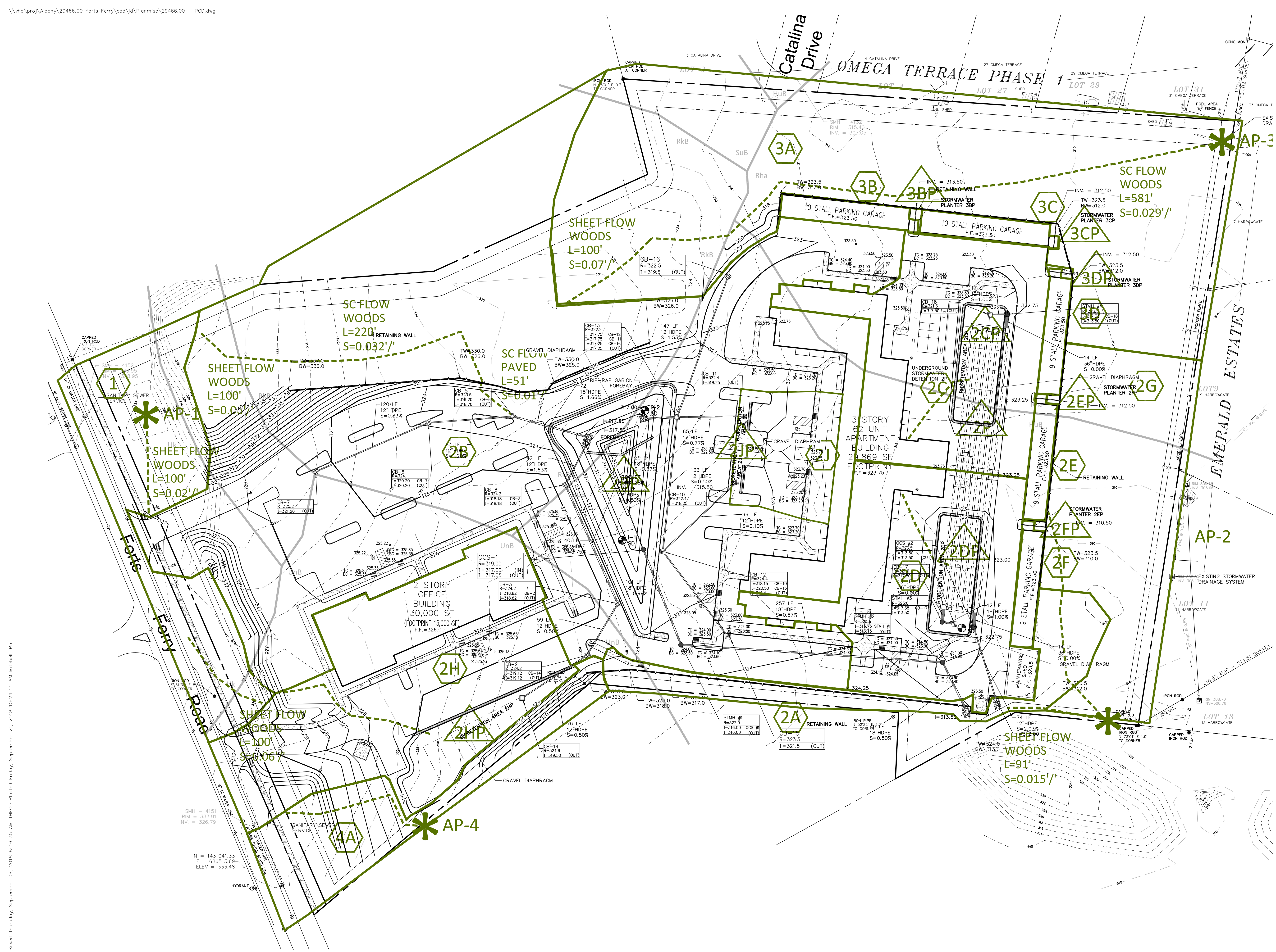
Summary for Link Q: Cumulative

Inflow Area = 14.313 ac, 1.28% Impervious, Inflow Depth = 0.00" for WQv event
Inflow = 0.00 cfs @ 24.03 hrs, Volume= 0.002 af
Primary = 0.00 cfs @ 24.03 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-40.00 hrs, dt= 0.01 hrs

Link Q: Cumulative





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The Summit at Forts Ferry

33 & 45 Forts Ferry Road
Colonie, New York

No.	Revision	Date	Appvd.

Designed by PM | Checked by MT

Issued for | Date May 30, 2018

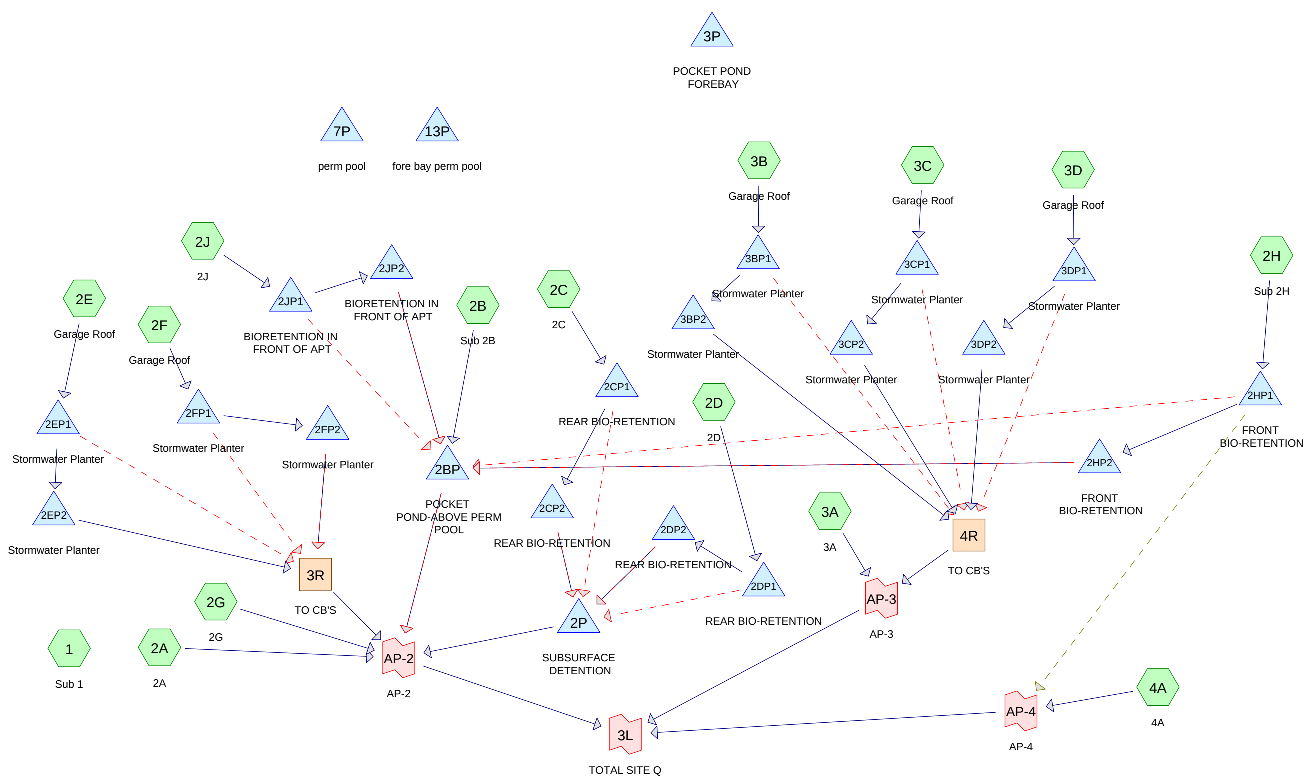
Not Approved for Construction

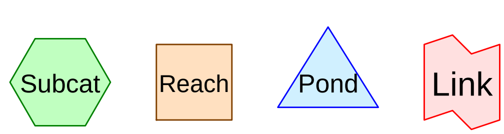
Drawing Title
Proposed Conditions Drainage Plan

Drawing Number
PCD

Sheet 1 of 1

Project Number 29466.00





Routing Diagram for Proposed Conditions- bio update-FF
Prepared by VHB, Printed 9/21/2018
HydroCAD® 10.00-18 s/n 01038 © 2016 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.373	39	>75% Grass cover, Good, HSG A (2B)
1.878	61	>75% Grass cover, Good, HSG B (2B, 2C, 2D, 2H, 2J, 4A)
0.950	74	>75% Grass cover, Good, HSG C (2B, 3A)
0.307	80	>75% Grass cover, Good, HSG D (2A, 2B)
4.539	98	Paved parking, HSG A (1, 2B, 2C, 2D, 2E, 2F, 2H, 2J, 3B, 3C, 3D, 4A)
2.929	30	Woods, Good, HSG A (1, 2B, 3A)
0.482	55	Woods, Good, HSG B (2B, 2H, 3A, 4A)
1.618	70	Woods, Good, HSG C (3A)
1.238	77	Woods, Good, HSG D (2A, 2G)
14.314	**69**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
7.841	HSG A	1, 2B, 2C, 2D, 2E, 2F, 2H, 2J, 3A, 3B, 3C, 3D, 4A
2.360	HSG B	2B, 2C, 2D, 2H, 2J, 3A, 4A
2.568	HSG C	2B, 3A
1.545	HSG D	2A, 2B, 2G
0.000	Other	
14.314		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.373	1.878	0.950	0.307	0.000	3.508	>75% Grass cover, Good	2A, 2B, 2C, 2D, 2H, 2J, 3A, 4A
4.539	0.000	0.000	0.000	0.000	4.539	Paved parking	1, 2B, 2C, 2D, 2E, 2F, 2H, 2J, 3B, 3C, 3D, 4A
2.929	0.482	1.618	1.238	0.000	6.267	Woods, Good	1, 2A, 2B, 2G, 2H, 3A, 4A
7.841	**2.360**	**2.568**	**1.545**	**0.000**	**14.314**	**TOTAL AREA**	

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Sub 1 Runoff Area=30,321 sf 20.54% Impervious Runoff Depth=0.00"
Flow Length=100' Slope=0.0200 '/' Tc=23.0 min CN=44 Runoff=0.00 cfs 0.000 af

Subcatchment 2A: 2A Runoff Area=14,963 sf 0.00% Impervious Runoff Depth=0.74"
Flow Length=91' Slope=0.0150 '/' Tc=23.9 min CN=77 Runoff=0.23 cfs 0.021 af

Subcatchment 2B: Sub 2B Runoff Area=5.732 ac 36.65% Impervious Runoff Depth=0.36"
Flow Length=371' Tc=19.3 min CN=67 Runoff=1.57 cfs 0.170 af

Subcatchment 2C: 2C Runoff Area=0.863 ac 54.11% Impervious Runoff Depth=0.94"
Flow Length=87' Slope=0.0080 '/' Tc=13.5 min CN=81 Runoff=1.09 cfs 0.068 af

Subcatchment 2D: 2D Runoff Area=0.921 ac 50.81% Impervious Runoff Depth=0.89"
Flow Length=87' Slope=0.0080 '/' Tc=13.5 min CN=80 Runoff=1.09 cfs 0.068 af

Subcatchment 2E: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.012 af

Subcatchment 2F: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.012 af

Subcatchment 2G: 2G Runoff Area=40,156 sf 0.00% Impervious Runoff Depth=0.74"
Flow Length=232' Slope=0.0080 '/' Tc=67.5 min CN=77 Runoff=0.30 cfs 0.057 af

Subcatchment 2H: Sub 2H Runoff Area=1.161 ac 66.32% Impervious Runoff Depth=1.24"
Flow Length=163' Tc=14.0 min CN=86 Runoff=1.94 cfs 0.120 af

Subcatchment 2J: 2J Runoff Area=14,289 sf 70.12% Impervious Runoff Depth=1.31"
Tc=6.0 min CN=87 Runoff=0.77 cfs 0.036 af

Subcatchment 3A: 3A Runoff Area=2.605 ac 0.00% Impervious Runoff Depth=0.13"
Flow Length=692' Tc=25.5 min CN=58 Runoff=0.08 cfs 0.029 af

Subcatchment 3B: Garage Roof Runoff Area=0.065 ac 100.00% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.012 af

Subcatchment 3C: Garage Roof Runoff Area=0.065 ac 100.00% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.012 af

Subcatchment 3D: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.012 af

Subcatchment 4A: 4A Runoff Area=18,715 sf 10.94% Impervious Runoff Depth=0.24"
Flow Length=155' Tc=14.0 min CN=63 Runoff=0.07 cfs 0.009 af

Reach 3R: TO CB'S Avg. Flow Depth=0.04' Max Vel=0.04 fps Inflow=0.42 cfs 0.023 af
n=0.400 L=180.0' S=0.0083 '/' Capacity=1.76 cfs Outflow=0.07 cfs 0.023 af

Reach 4R: TO CB'S Avg. Flow Depth=0.06' Max Vel=0.05 fps Inflow=0.66 cfs 0.036 af
n=0.400 L=180.0' S=0.0083 '/' Capacity=2.52 cfs Outflow=0.12 cfs 0.036 af

Pond 2BP: POCKET POND-ABOVE PERM Peak Elev=317.93' Storage=11,160 cf Inflow=3.00 cfs 0.326 af
Outflow=0.38 cfs 0.320 af

Pond 2CP1: REAR BIO-RETENTION Peak Elev=321.66' Storage=393 cf Inflow=1.09 cfs 0.068 af
Primary=0.03 cfs 0.029 af Secondary=0.93 cfs 0.038 af Outflow=0.96 cfs 0.068 af

Pond 2CP2: REAR BIO-RETENTION Peak Elev=317.60' Storage=96 cf Inflow=0.03 cfs 0.029 af
Outflow=0.03 cfs 0.029 af

Pond 2DP1: REAR BIO-RETENTION Peak Elev=321.70' Storage=549 cf Inflow=1.09 cfs 0.068 af
Primary=0.03 cfs 0.035 af Secondary=0.84 cfs 0.034 af Outflow=0.87 cfs 0.068 af

Pond 2DP2: REAR BIO-RETENTION Peak Elev=317.76' Storage=248 cf Inflow=0.03 cfs 0.035 af
Outflow=0.03 cfs 0.034 af

Pond 2EP1: Stormwater Planter Peak Elev=327.24' Storage=103 cf Inflow=0.21 cfs 0.012 af
Primary=0.01 cfs 0.008 af Secondary=0.20 cfs 0.004 af Outflow=0.21 cfs 0.012 af

Pond 2EP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.008 af
Outflow=0.01 cfs 0.008 af

Pond 2FP1: Stormwater Planter Peak Elev=327.24' Storage=103 cf Inflow=0.21 cfs 0.012 af
Primary=0.01 cfs 0.008 af Secondary=0.20 cfs 0.004 af Outflow=0.21 cfs 0.012 af

Pond 2FP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.008 af
Outflow=0.01 cfs 0.008 af

Pond 2HP1: FRONT BIO-RETENTION Peak Elev=323.69' Storage=1,159 cf Inflow=1.94 cfs 0.120 af
Primary=0.07 cfs 0.063 af Secondary=1.25 cfs 0.057 af Outflow=1.32 cfs 0.120 af

Pond 2HP2: FRONT BIO-RETENTION Peak Elev=319.63' Storage=316 cf Inflow=0.07 cfs 0.063 af
Outflow=0.07 cfs 0.063 af

Pond 2JP1: BIORETENTION IN FRONT OF APT Peak Elev=322.41' Storage=201 cf Inflow=0.77 cfs 0.036 af
Primary=0.06 cfs 0.025 af Secondary=0.68 cfs 0.011 af Outflow=0.74 cfs 0.036 af

Pond 2JP2: BIORETENTION IN FRONT OF APT Peak Elev=319.21' Storage=494 cf Inflow=0.06 cfs 0.025 af
Outflow=0.02 cfs 0.025 af

Pond 2P: SUBSURFACE DETENTION Peak Elev=313.80' Storage=3,200 cf Inflow=1.81 cfs 0.136 af
Outflow=0.07 cfs 0.083 af

Pond 3BP1: Stormwater Planter Peak Elev=327.27' Storage=108 cf Inflow=0.23 cfs 0.012 af
Primary=0.01 cfs 0.008 af Secondary=0.22 cfs 0.004 af Outflow=0.22 cfs 0.012 af

Pond 3BP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.008 af
Outflow=0.01 cfs 0.008 af

Pond 3CP1: Stormwater Planter Peak Elev=327.27' Storage=108 cf Inflow=0.23 cfs 0.012 af
Primary=0.01 cfs 0.008 af Secondary=0.22 cfs 0.004 af Outflow=0.22 cfs 0.012 af

Pond 3CP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.008 af
Outflow=0.01 cfs 0.008 af

Pond 3DP1: Stormwater Planter Peak Elev=327.24' Storage=103 cf Inflow=0.21 cfs 0.012 af
Primary=0.01 cfs 0.008 af Secondary=0.20 cfs 0.004 af Outflow=0.21 cfs 0.012 af

Pond 3DP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.008 af
Outflow=0.01 cfs 0.008 af

Pond 3P: POCKET POND FOREBAY Peak Elev=317.00' Storage=2,311 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 7P: perm pool Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Pond 13P: fore bay perm pool Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Link 3L: TOTAL SITE Q Inflow=0.97 cfs 0.578 af
Primary=0.97 cfs 0.578 af

Link AP-2: AP-2 Inflow=0.79 cfs 0.504 af
Primary=0.79 cfs 0.504 af

Link AP-3: AP-3 Inflow=0.19 cfs 0.065 af
Primary=0.19 cfs 0.065 af

Link AP-4: AP-4 Inflow=0.07 cfs 0.009 af
Primary=0.07 cfs 0.009 af

Total Runoff Area = 14.314 ac Runoff Volume = 0.637 af Average Runoff Depth = 0.53"
68.29% Pervious = 9.775 ac 31.71% Impervious = 4.539 ac

Summary for Subcatchment 1: Sub 1

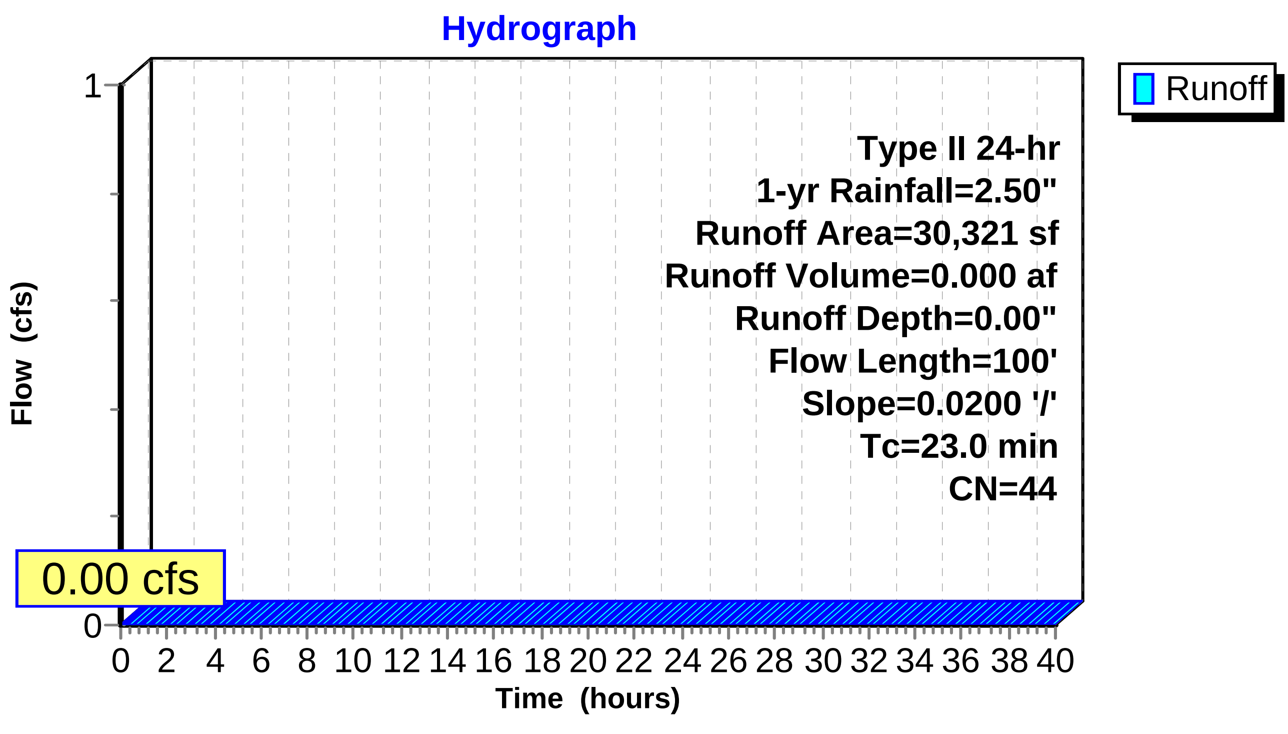
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (sf)	CN	Description
21,078	30	Woods, Good, HSG A
6,229	98	Paved parking, HSG A
3,014	30	Woods, Good, HSG A
30,321	44	Weighted Average
24,092		79.46% Pervious Area
6,229		20.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	100	0.0200	0.07		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"

Subcatchment 1: Sub 1



Summary for Subcatchment 2A: 2A

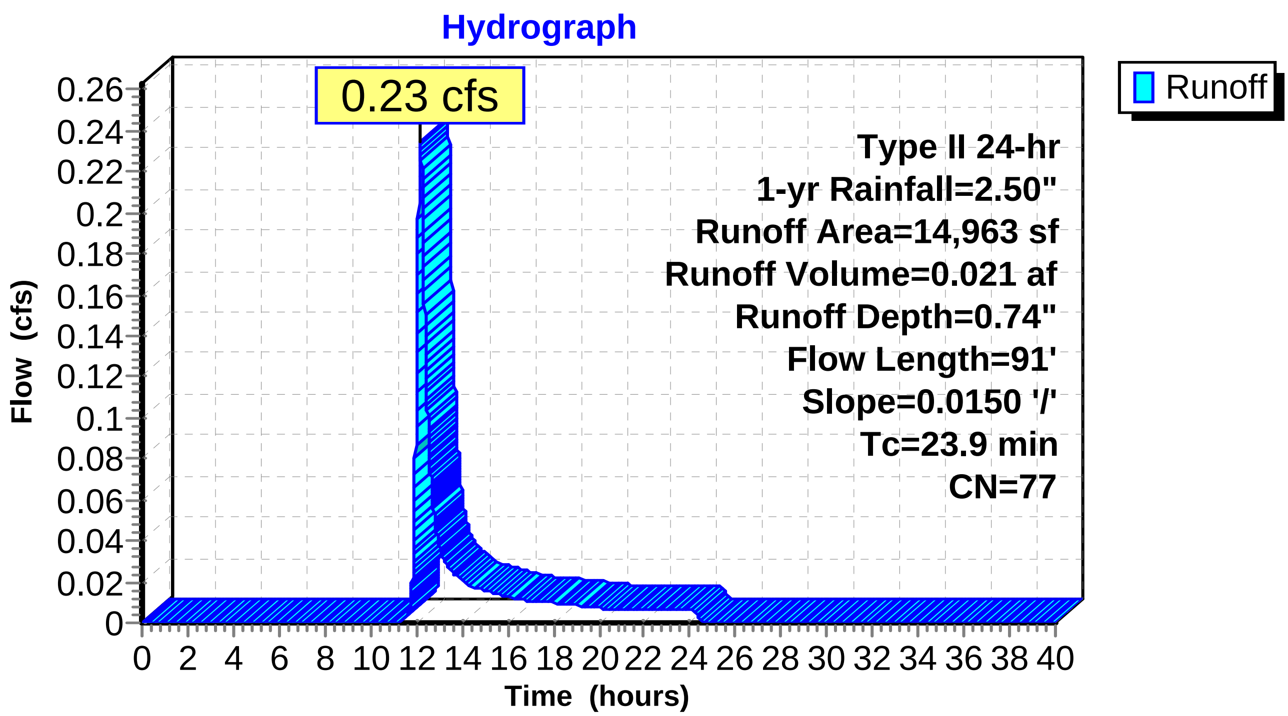
Runoff = 0.23 cfs @ 12.19 hrs, Volume= 0.021 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (sf)	CN	Description
13,787	77	Woods, Good, HSG D
1,176	80	>75% Grass cover, Good, HSG D
14,963	77	Weighted Average
14,963		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	91	0.0150	0.06		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"

Subcatchment 2A: 2A



Summary for Subcatchment 2B: Sub 2B

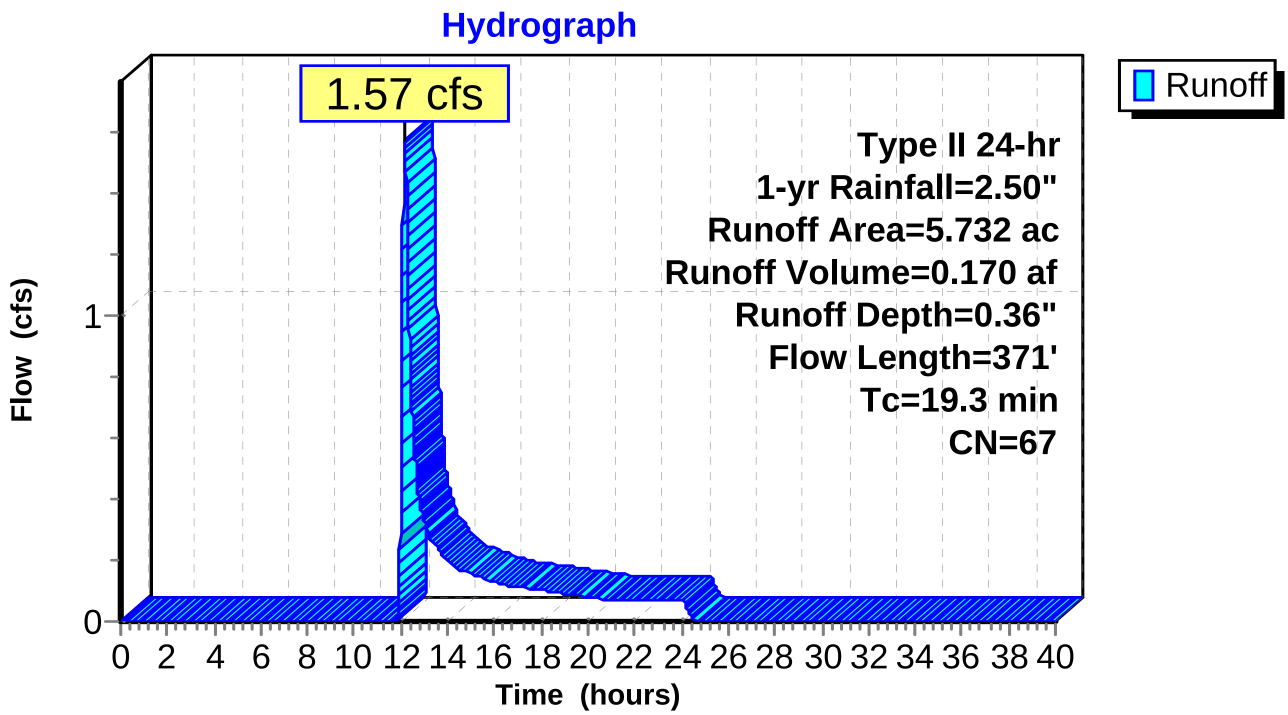
Runoff = 1.57 cfs @ 12.16 hrs, Volume= 0.170 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
0.373	39	>75% Grass cover, Good, HSG A
2.101	98	Paved parking, HSG A
1.709	30	Woods, Good, HSG A
0.077	55	Woods, Good, HSG B
0.313	61	>75% Grass cover, Good, HSG B
0.879	74	>75% Grass cover, Good, HSG C
0.280	80	>75% Grass cover, Good, HSG D
5.732	67	Weighted Average
3.631		63.35% Pervious Area
2.101		36.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
4.1	220	0.0320	0.89		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
0.4	51	0.0100	2.03		**Shallow Concentrated Flow, PAVED** Paved Kv= 20.3 fps
19.3	371	Total			

Subcatchment 2B: Sub 2B



Summary for Subcatchment 2C: 2C

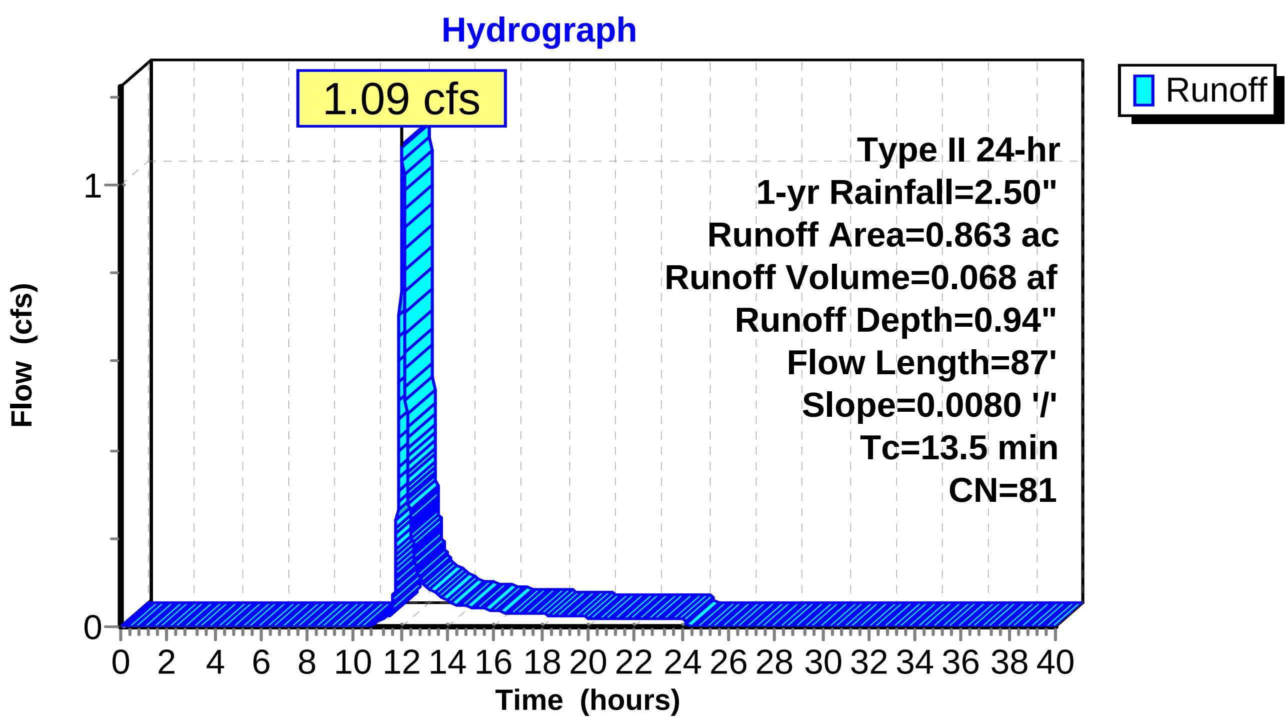
Runoff = 1.09 cfs @ 12.06 hrs, Volume= 0.068 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
0.396	61	>75% Grass cover, Good, HSG B
0.467	98	Paved parking, HSG A
0.863	81	Weighted Average
0.396		45.89% Pervious Area
0.467		54.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	87	0.0080	0.11		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 2.80"

Subcatchment 2C: 2C



Summary for Subcatchment 2D: 2D

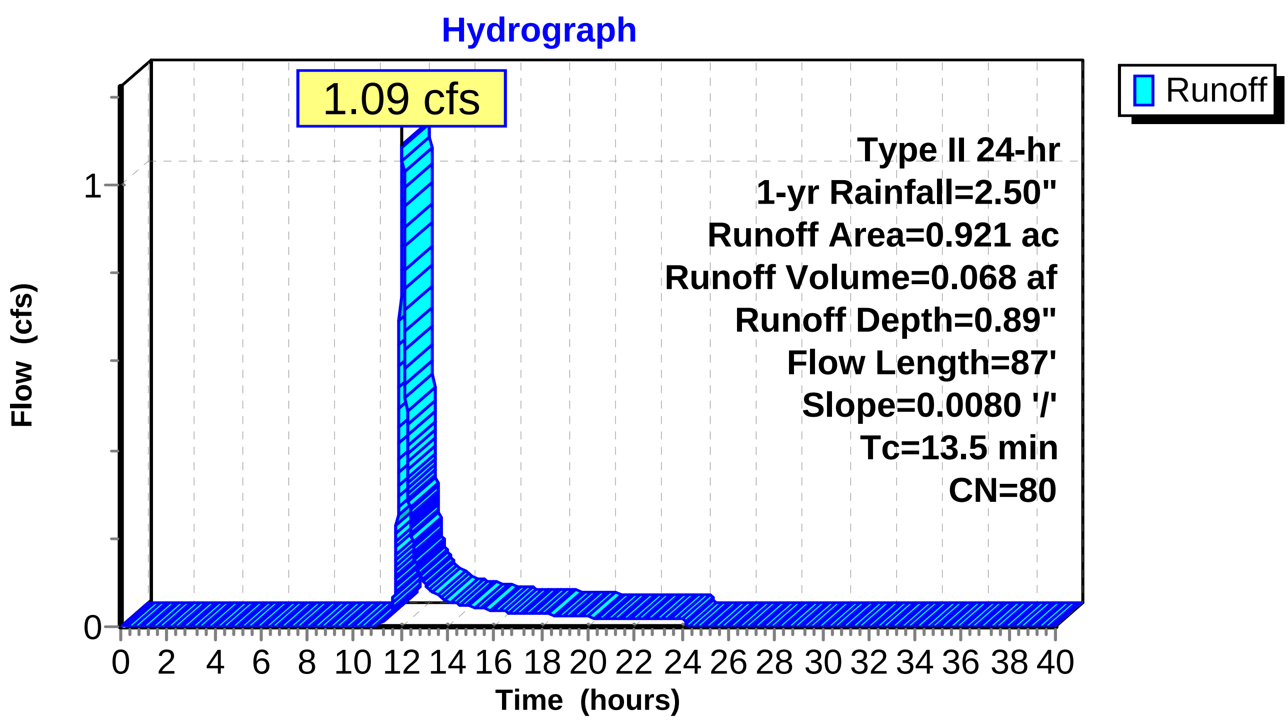
Runoff = 1.09 cfs @ 12.06 hrs, Volume= 0.068 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
0.453	61	>75% Grass cover, Good, HSG B
0.468	98	Paved parking, HSG A
0.921	80	Weighted Average
0.453		49.19% Pervious Area
0.468		50.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	87	0.0080	0.11		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 2.80"

Subcatchment 2D: 2D



Summary for Subcatchment 2E: Garage Roof

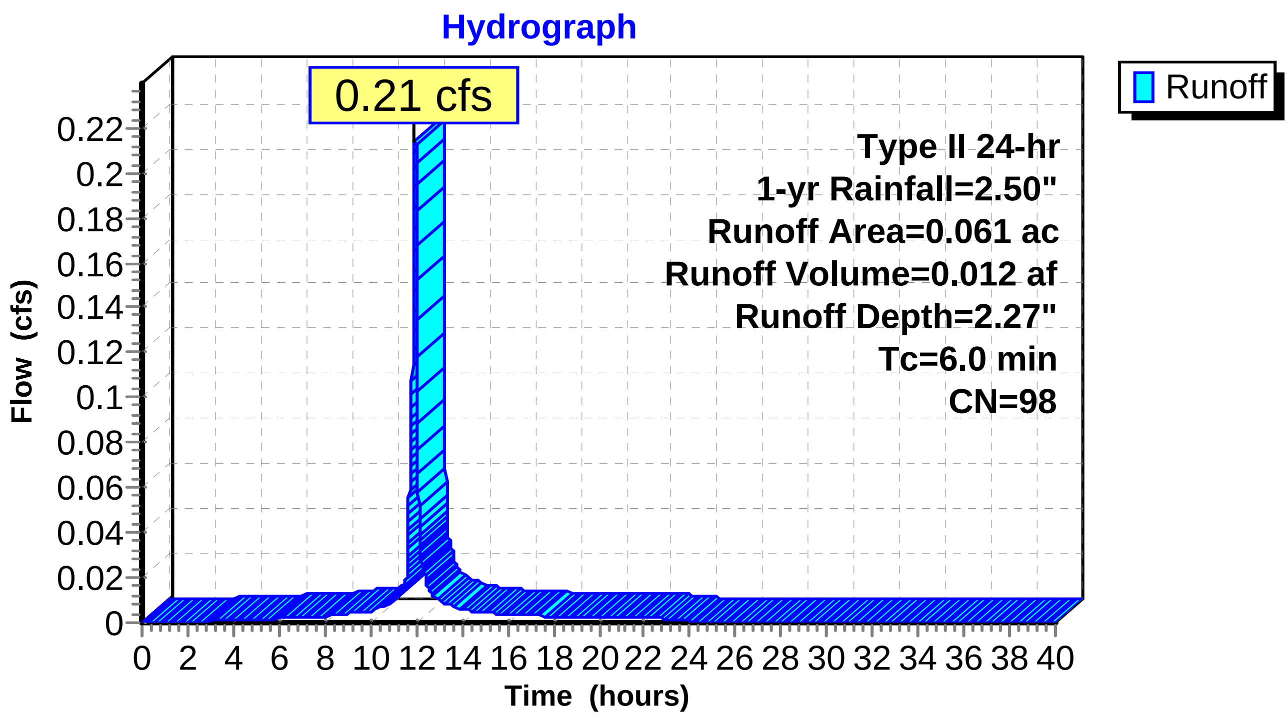
Runoff = 0.21 cfs @ 11.97 hrs, Volume= 0.012 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 2E: Garage Roof



Summary for Subcatchment 2F: Garage Roof

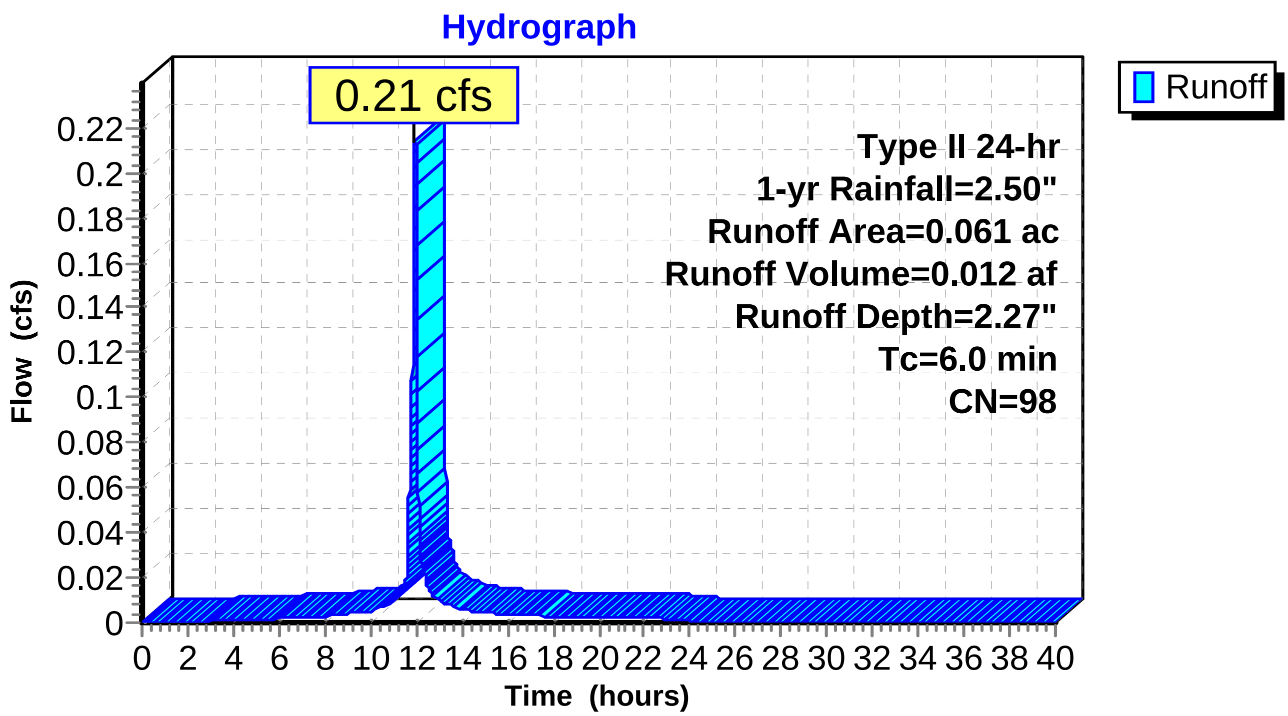
Runoff = 0.21 cfs @ 11.97 hrs, Volume= 0.012 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 2F: Garage Roof



Summary for Subcatchment 2G: 2G

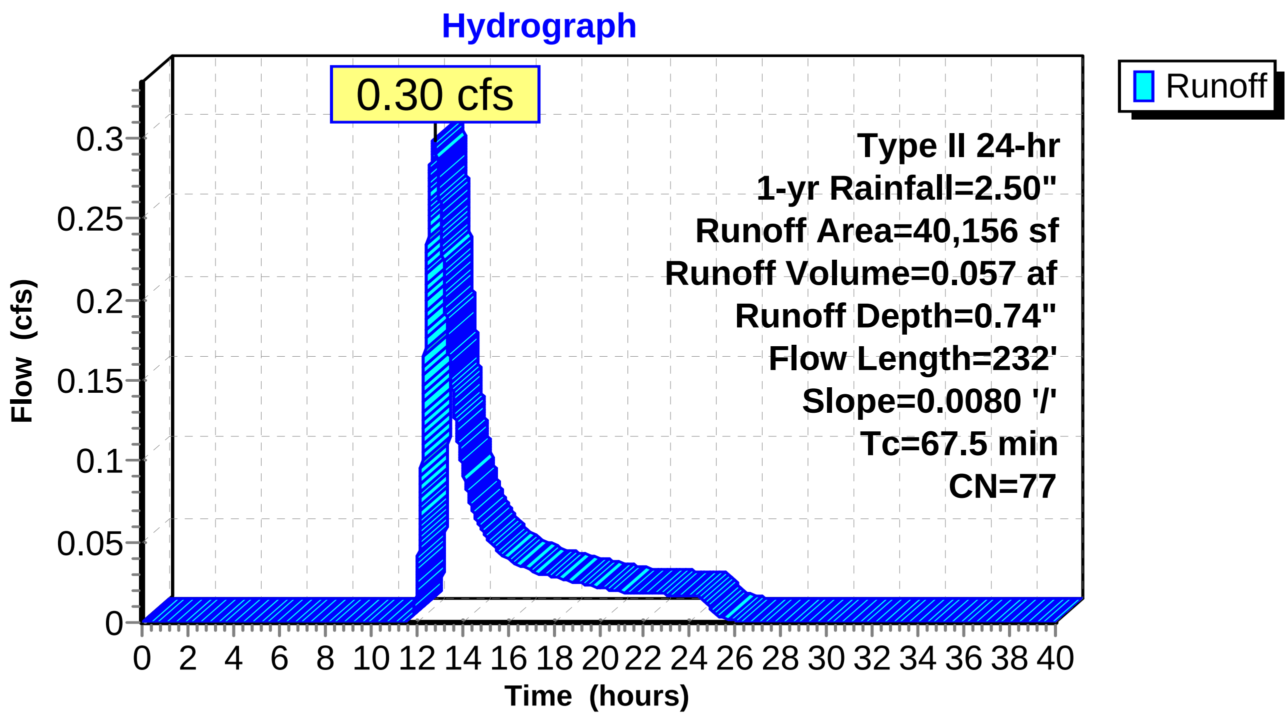
Runoff = 0.30 cfs @ 12.82 hrs, Volume= 0.057 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (sf)	CN	Description
40,156	77	Woods, Good, HSG D
40,156		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
57.7	100	0.0080	0.03		**Sheet Flow, WOODS** Woods: Dense underbrush n= 0.800 P2= 2.80"
9.8	132	0.0080	0.22		**Shallow Concentrated Flow, WOODS** Forest w/Heavy Litter Kv= 2.5 fps
67.5	232	Total			

Subcatchment 2G: 2G



Summary for Subcatchment 2H: Sub 2H

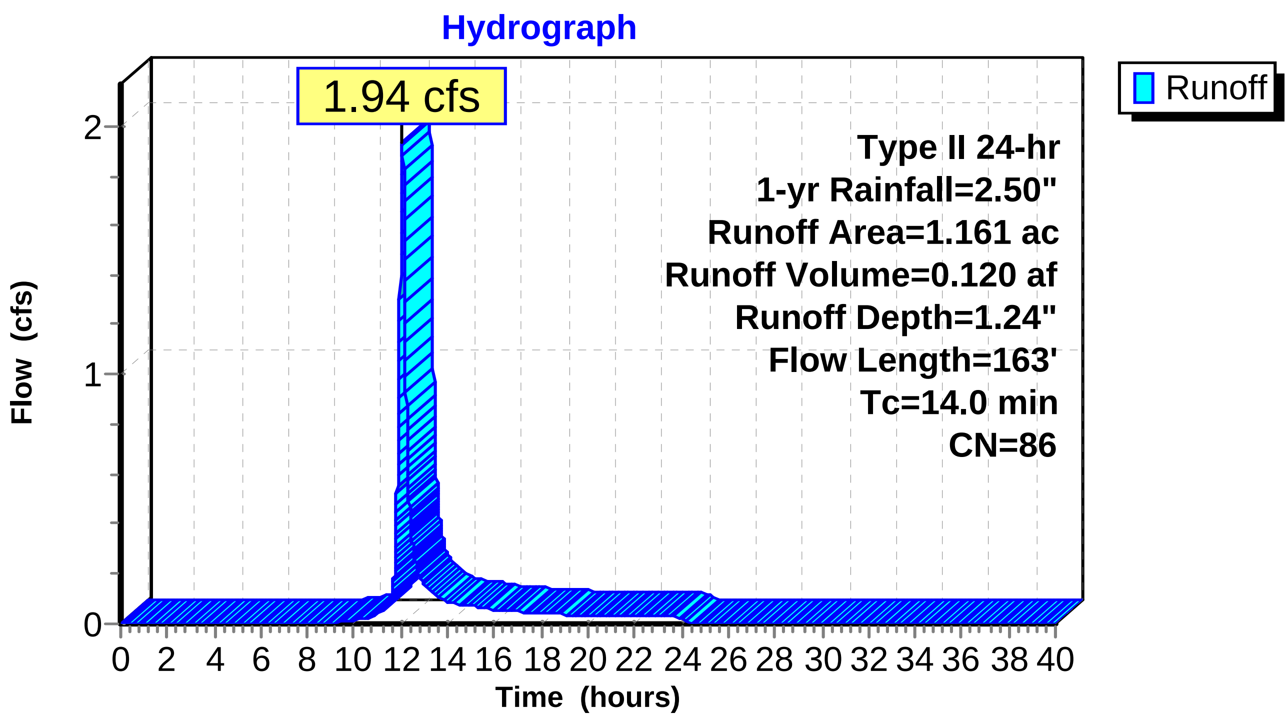
Runoff = 1.94 cfs @ 12.06 hrs, Volume= 0.120 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
0.770	98	Paved parking, HSG A
0.006	55	Woods, Good, HSG B
0.385	61	>75% Grass cover, Good, HSG B
1.161	86	Weighted Average
0.391		33.68% Pervious Area
0.770		66.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	36	0.0100	0.04		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
0.2	48	0.0950	4.96		**Shallow Concentrated Flow, LAWN** Unpaved Kv= 16.1 fps
0.4	79	0.0300	3.52		**Shallow Concentrated Flow, PAVED** Paved Kv= 20.3 fps
14.0	163	Total			

Subcatchment 2H: Sub 2H



Summary for Subcatchment 2J: 2J

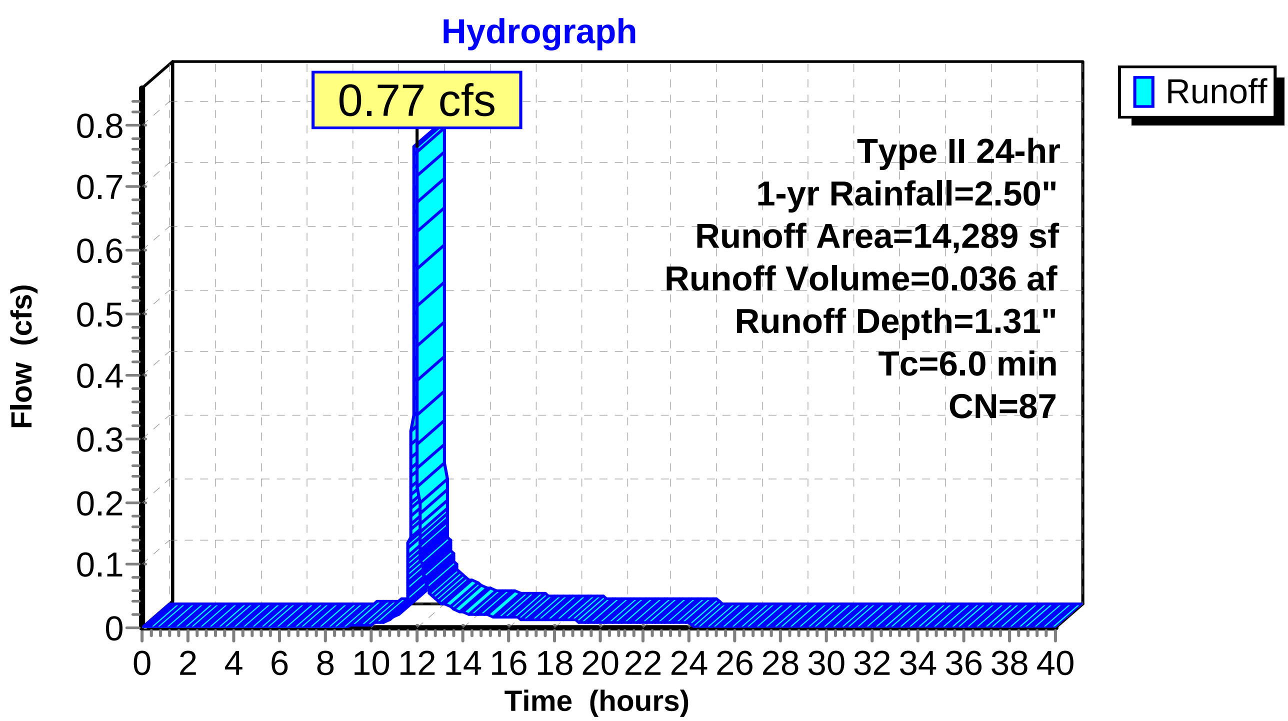
Runoff = 0.77 cfs @ 11.97 hrs, Volume= 0.036 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (sf)	CN	Description
4,269	61	>75% Grass cover, Good, HSG B
10,020	98	Paved parking, HSG A
14,289	87	Weighted Average
4,269		29.88% Pervious Area
10,020		70.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, MIN**

Subcatchment 2J: 2J



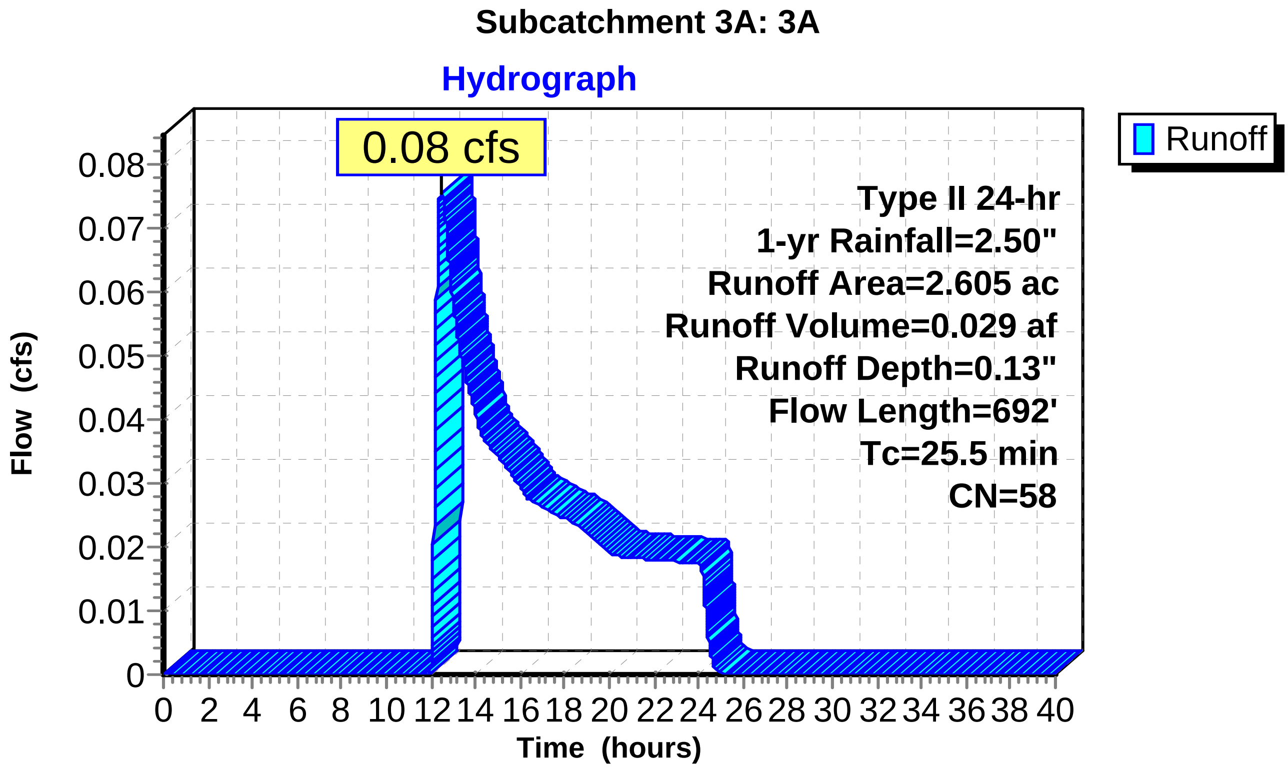
Summary for Subcatchment 3A: 3A

Runoff = 0.08 cfs @ 12.44 hrs, Volume= 0.029 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
1.618	70	Woods, Good, HSG C
0.667	30	Woods, Good, HSG A
0.249	55	Woods, Good, HSG B
0.071	74	>75% Grass cover, Good, HSG C
2.605	58	Weighted Average
2.605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0700	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
11.6	592	0.0290	0.85		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
25.5	692	Total			



Summary for Subcatchment 3B: Garage Roof

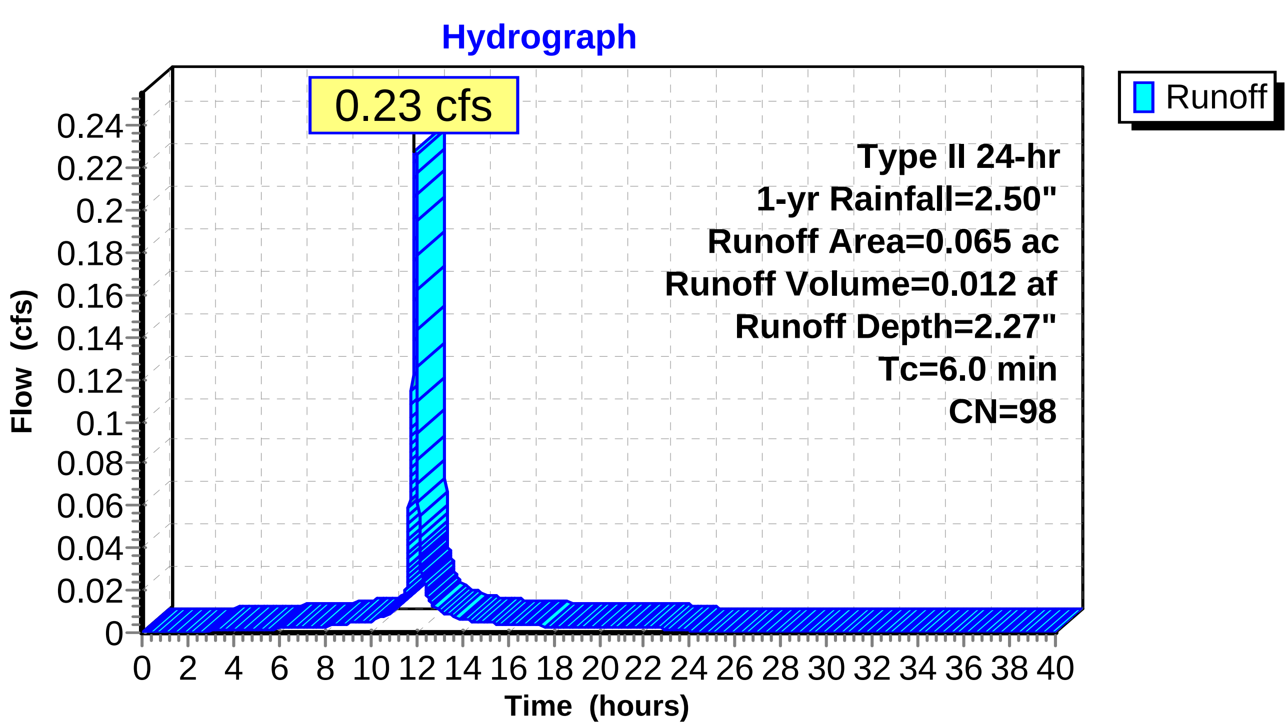
Runoff = 0.23 cfs @ 11.97 hrs, Volume= 0.012 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
0.065	98	Paved parking, HSG A
0.065		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3B: Garage Roof



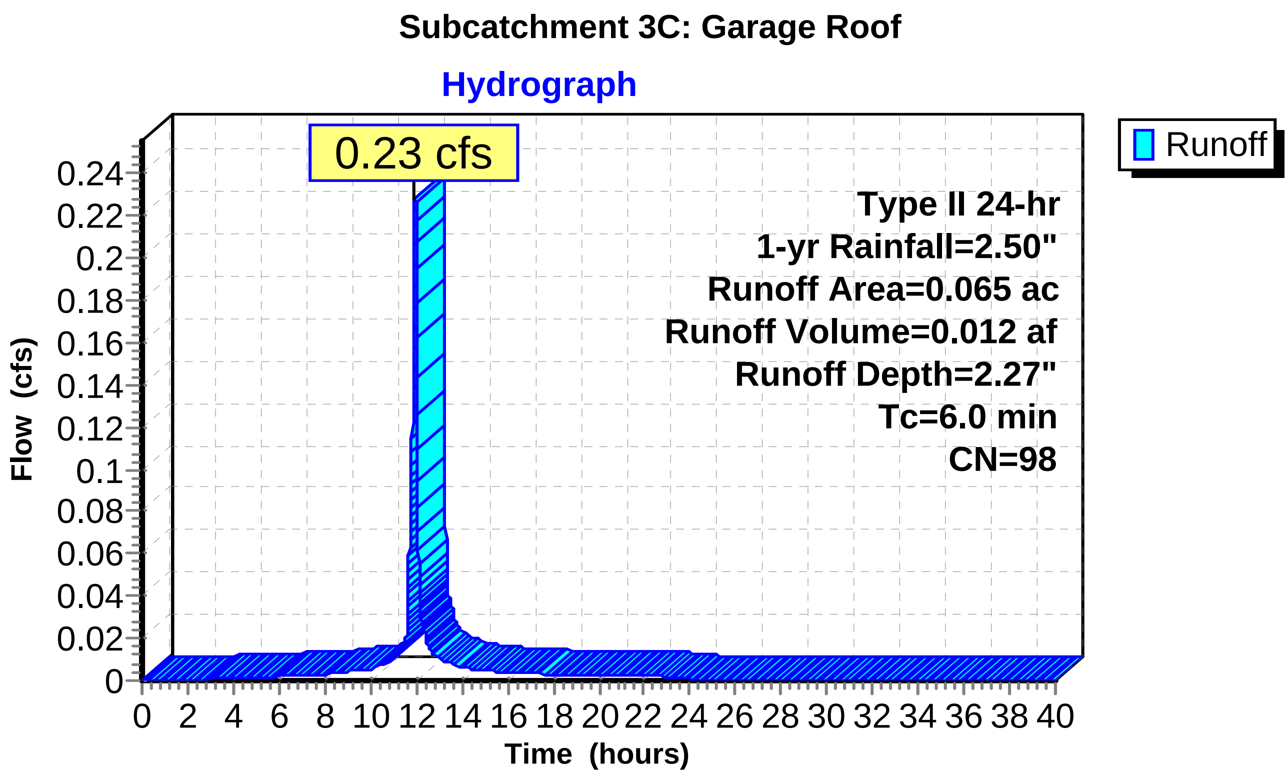
Summary for Subcatchment 3C: Garage Roof

Runoff = 0.23 cfs @ 11.97 hrs, Volume= 0.012 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
0.065	98	Paved parking, HSG A
0.065		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**



Summary for Subcatchment 3D: Garage Roof

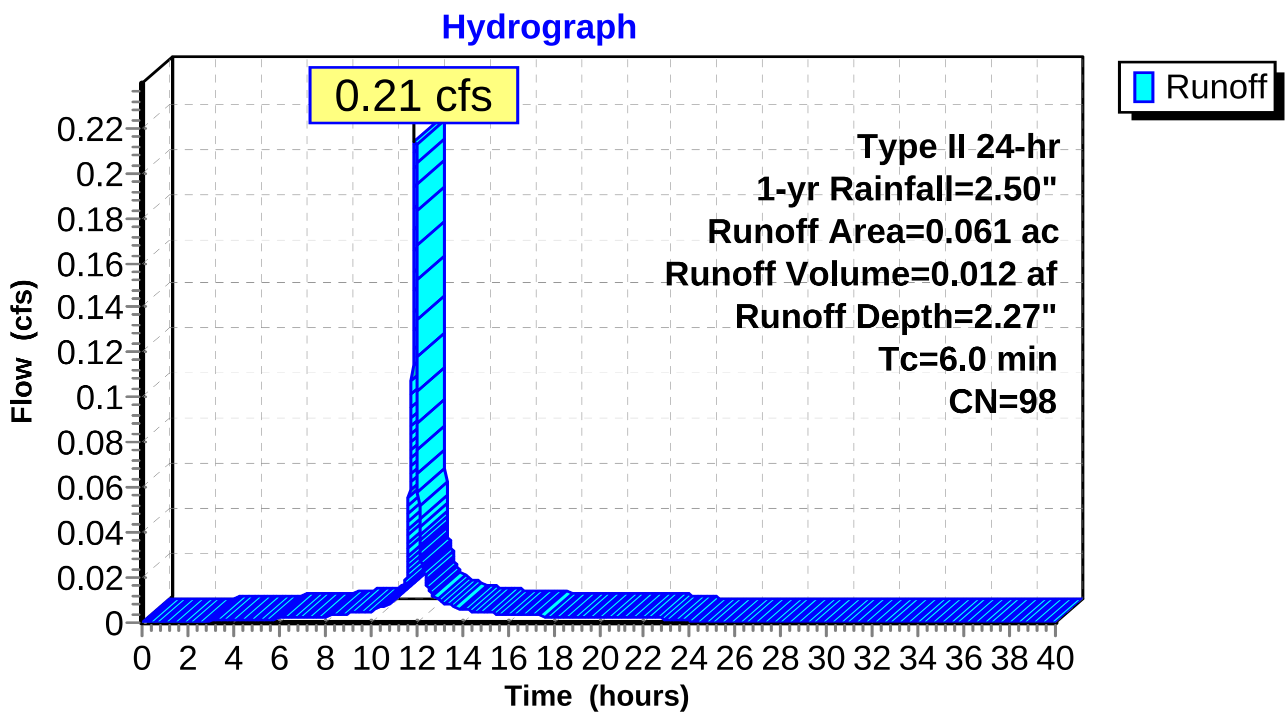
Runoff = 0.21 cfs @ 11.97 hrs, Volume= 0.012 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3D: Garage Roof



Summary for Subcatchment 4A: 4A

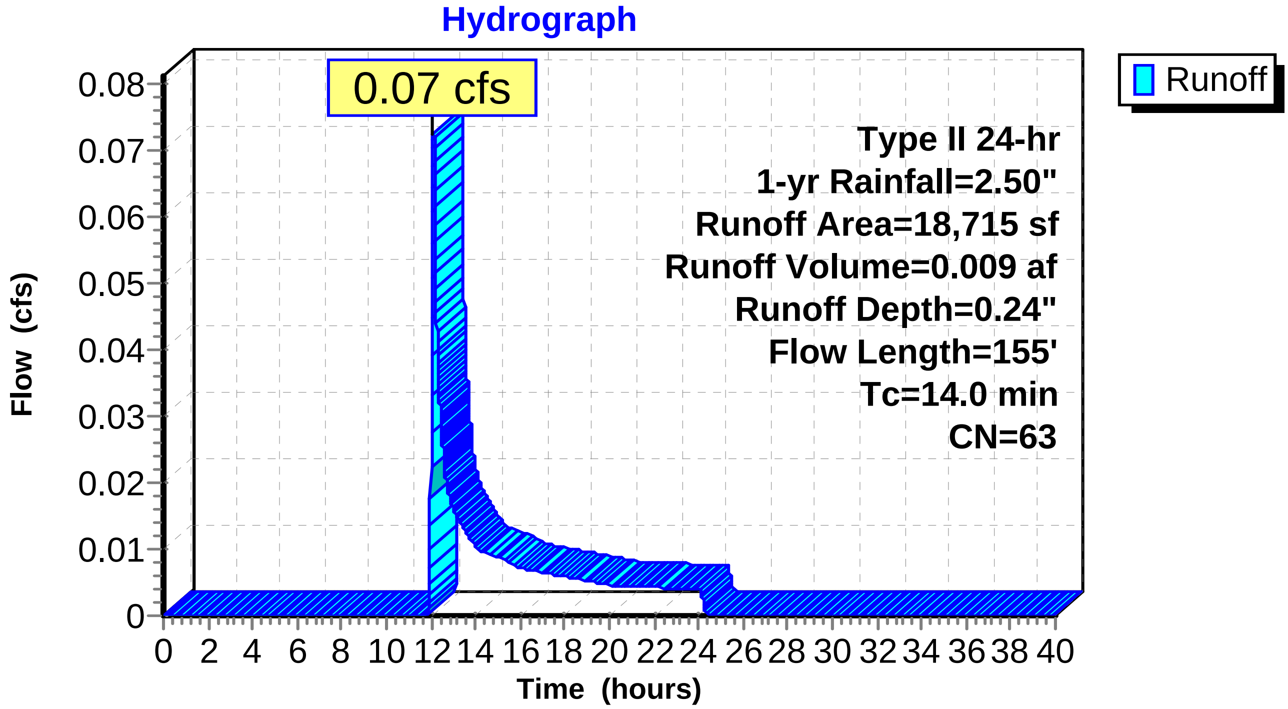
Runoff = 0.07 cfs @ 12.12 hrs, Volume= 0.009 af, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.50"

Area (sf)	CN	Description
10,149	61	>75% Grass cover, Good, HSG B
6,519	55	Woods, Good, HSG B
2,047	98	Paved parking, HSG A
18,715	63	Weighted Average
16,668		89.06% Pervious Area
2,047		10.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	30	0.0200	0.06		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
0.9	16	0.2500	0.30		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.80"
3.9	54	0.0700	0.23		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.80"
0.4	55	0.0200	2.28		**Shallow Concentrated Flow, grass** Unpaved Kv= 16.1 fps
14.0	155	Total			

Subcatchment 4A: 4A



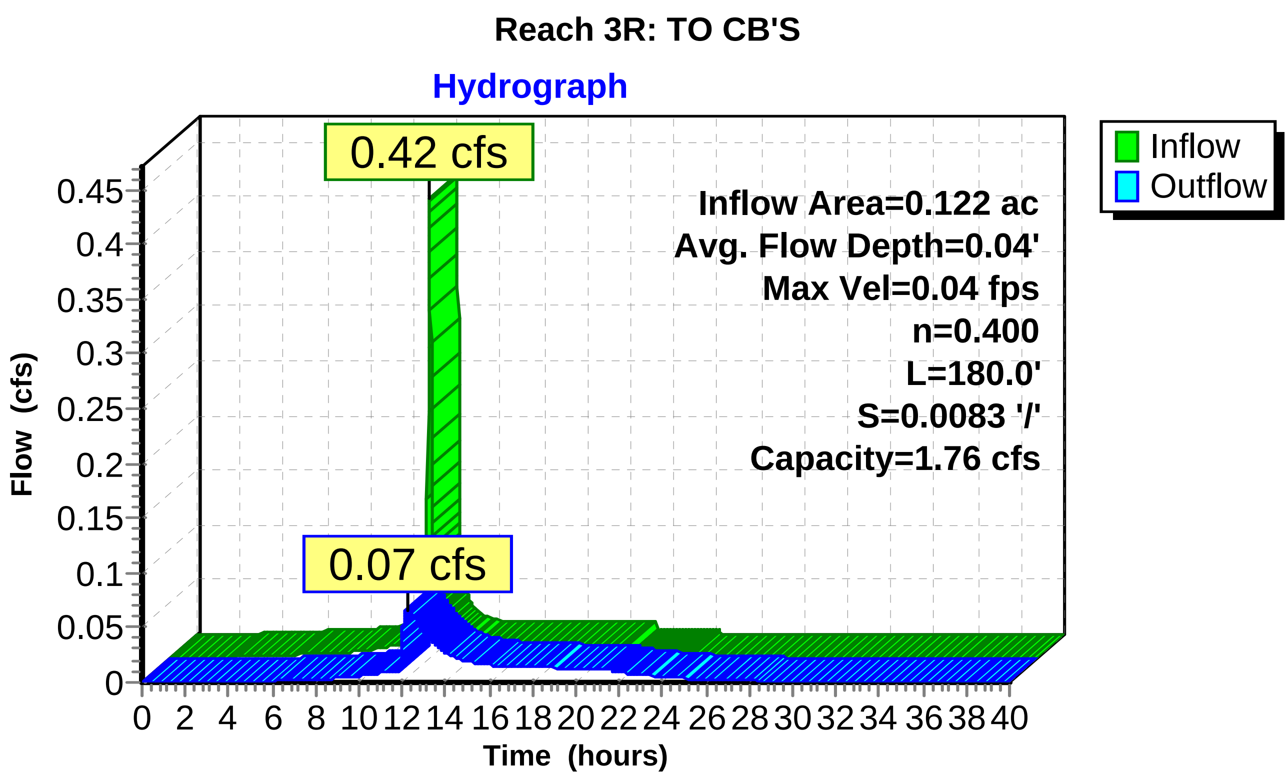
Summary for Reach 3R: TO CB'S

Inflow Area = 0.122 ac,100.00% Impervious, Inflow Depth = 2.27" for 1-yr event
Inflow = 0.42 cfs @ 11.98 hrs, Volume= 0.023 af
Outflow = 0.07 cfs @ 12.20 hrs, Volume= 0.023 af, Atten= 84%, Lag= 13.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.04 fps, Min. Travel Time= 79.8 min
Avg. Velocity = 0.01 fps, Avg. Travel Time= 228.9 min

Peak Storage= 319 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 0.25' Flow Area= 16.3 sf, Capacity= 1.76 cfs

40.00' x 0.25' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 100.0 '/' Top Width= 90.00'
Length= 180.0' Slope= 0.0083 '/'
Inlet Invert= 311.00', Outlet Invert= 309.50'



Summary for Reach 4R: TO CB'S

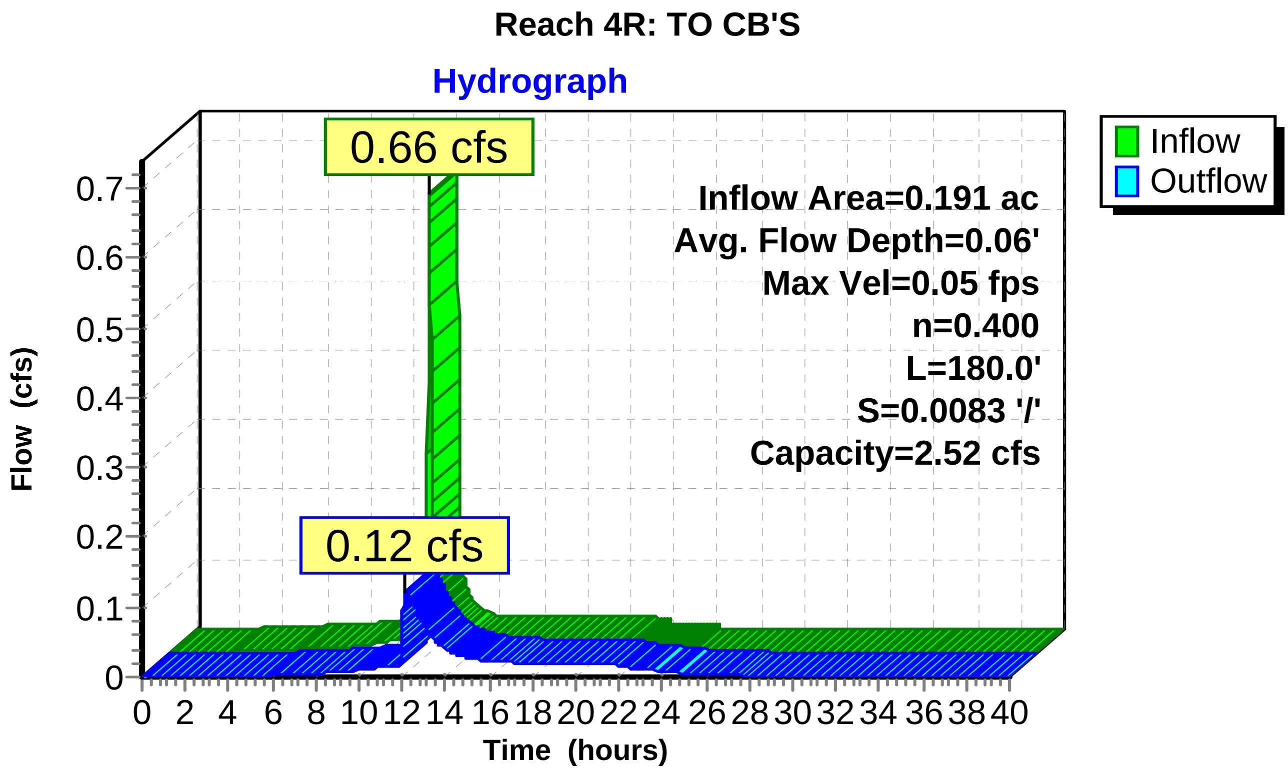
Inflow Area = 0.191 ac,100.00% Impervious, Inflow Depth = 2.27" for 1-yr event
Inflow = 0.66 cfs @ 11.98 hrs, Volume= 0.036 af
Outflow = 0.12 cfs @ 12.17 hrs, Volume= 0.036 af, Atten= 81%, Lag= 11.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.05 fps, Min. Travel Time= 64.4 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 195.3 min

Peak Storage= 471 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.30' Flow Area= 21.0 sf, Capacity= 2.52 cfs

40.00' x 0.30' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 100.0 '/' Top Width= 100.00'
Length= 180.0' Slope= 0.0083 '/'
Inlet Invert= 311.00', Outlet Invert= 309.50'

‡



Summary for Pond 2BP: POCKET POND-ABOVE PERM POOL

Inflow Area = 7.221 ac, 42.94% Impervious, Inflow Depth > 0.54" for 1-yr event
Inflow = 3.00 cfs @ 12.16 hrs, Volume= 0.326 af
Outflow = 0.38 cfs @ 13.59 hrs, Volume= 0.320 af, Atten= 87%, Lag= 85.6 min
Primary = 0.38 cfs @ 13.59 hrs, Volume= 0.320 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Starting Elev= 317.00' Surf.Area= 9,188 sf Storage= 6,201 cf
Peak Elev= 317.93' @ 13.59 hrs Surf.Area= 10,667 sf Storage= 11,160 cf (4,960 cf above start)

Plug-Flow detention time= 578.6 min calculated for 0.178 af (55% of inflow)
Center-of-Mass det. time= 191.8 min (1,129.7 - 937.9)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	6,201 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
#2	317.00'	52,519 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
		58,720 cf	Total Available Storage

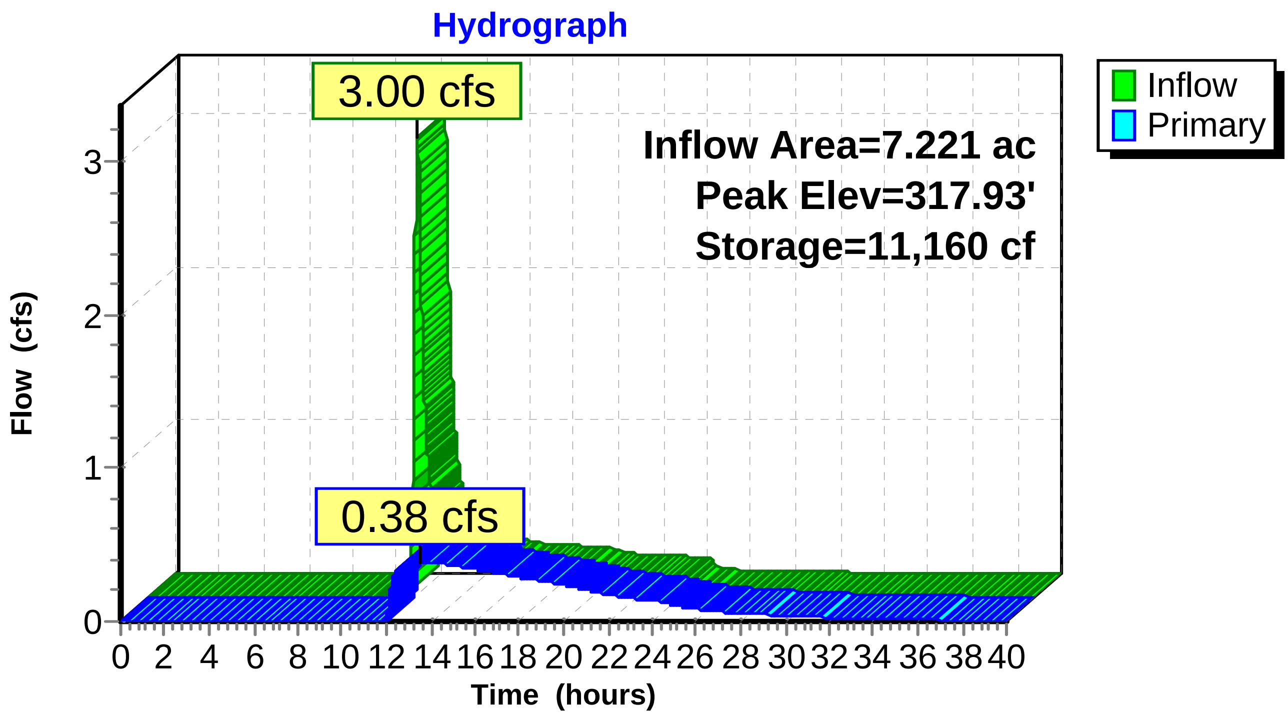
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
313.00	395	95.0	0	0	395
314.00	759	134.0	567	567	1,115
315.00	1,241	173.0	990	1,557	2,080
316.00	1,839	212.0	1,530	3,088	3,290
317.00	4,594	319.0	3,113	6,201	7,819

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.00	4,594	319.0	0	0	4,594
318.00	6,187	392.0	5,371	5,371	8,740
320.00	9,848	498.0	15,894	21,265	16,299
322.00	14,260	584.0	23,972	45,237	23,783
322.50	14,870	586.0	7,282	52,519	24,130

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**18.0" Round Culvert** L= 101.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.00' / 316.00' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.20'	**3.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	318.60'	**18.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	321.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.38 cfs @ 13.59 hrs HW=317.93' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.38 cfs of 3.80 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 4.38 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.23 cfs @ 3.75 fps)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 2BP: POCKET POND-ABOVE PERM POOL



Summary for Pond 2CP1: REAR BIO-RETENTION

Inflow Area = 0.863 ac, 54.11% Impervious, Inflow Depth = 0.94" for 1-yr event
Inflow = 1.09 cfs @ 12.06 hrs, Volume= 0.068 af
Outflow = 0.96 cfs @ 12.12 hrs, Volume= 0.068 af, Atten= 12%, Lag= 3.2 min
Primary = 0.03 cfs @ 12.12 hrs, Volume= 0.029 af
Secondary = 0.93 cfs @ 12.12 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 321.66' @ 12.12 hrs Surf.Area= 2,601 sf Storage= 393 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.1 min (883.4 - 856.3)

Volume	Invert	Avail.Storage	Storage Description
#1	321.50'	1,375 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

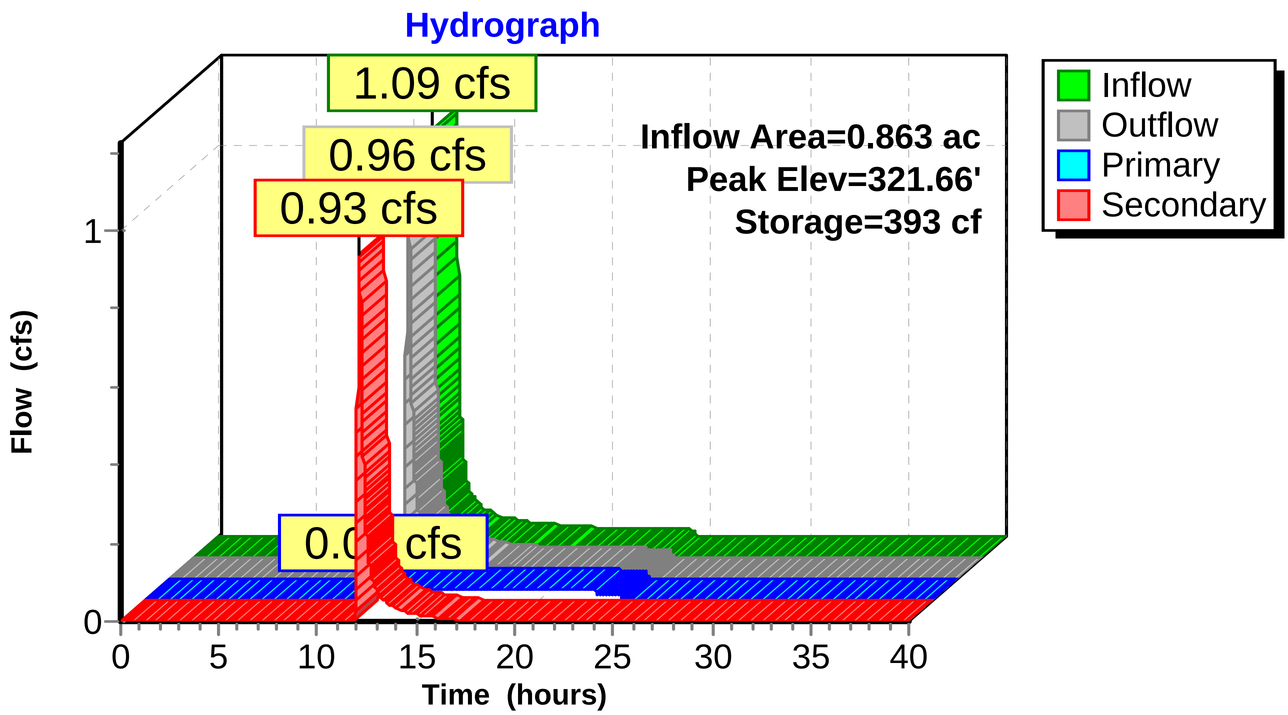
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.50	2,360	261.0	0	0	2,360
322.00	3,160	271.0	1,375	1,375	2,804

Device	Routing	Invert	Outlet Devices
#1	Primary	321.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	317.50'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	321.55'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 12.12 hrs HW=321.66' TW=317.57' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=0.93 cfs @ 12.12 hrs HW=321.66' TW=313.16' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.93 cfs of 7.23 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.93 cfs @ 1.08 fps)

Pond 2CP1: REAR BIO-RETENTION



Summary for Pond 2CP2: REAR BIO-RETENTION

Inflow Area = 0.863 ac, 54.11% Impervious, Inflow Depth = 0.41" for 1-yr event
Inflow = 0.03 cfs @ 12.12 hrs, Volume= 0.029 af
Outflow = 0.03 cfs @ 15.13 hrs, Volume= 0.029 af, Atten= 9%, Lag= 180.8 min
Primary = 0.03 cfs @ 15.13 hrs, Volume= 0.029 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 317.60' @ 22.92 hrs Surf.Area= 2,360 sf Storage= 96 cf

Plug-Flow detention time= 53.5 min calculated for 0.029 af (100% of inflow)
Center-of-Mass det. time= 52.7 min (1,095.8 - 1,043.1)

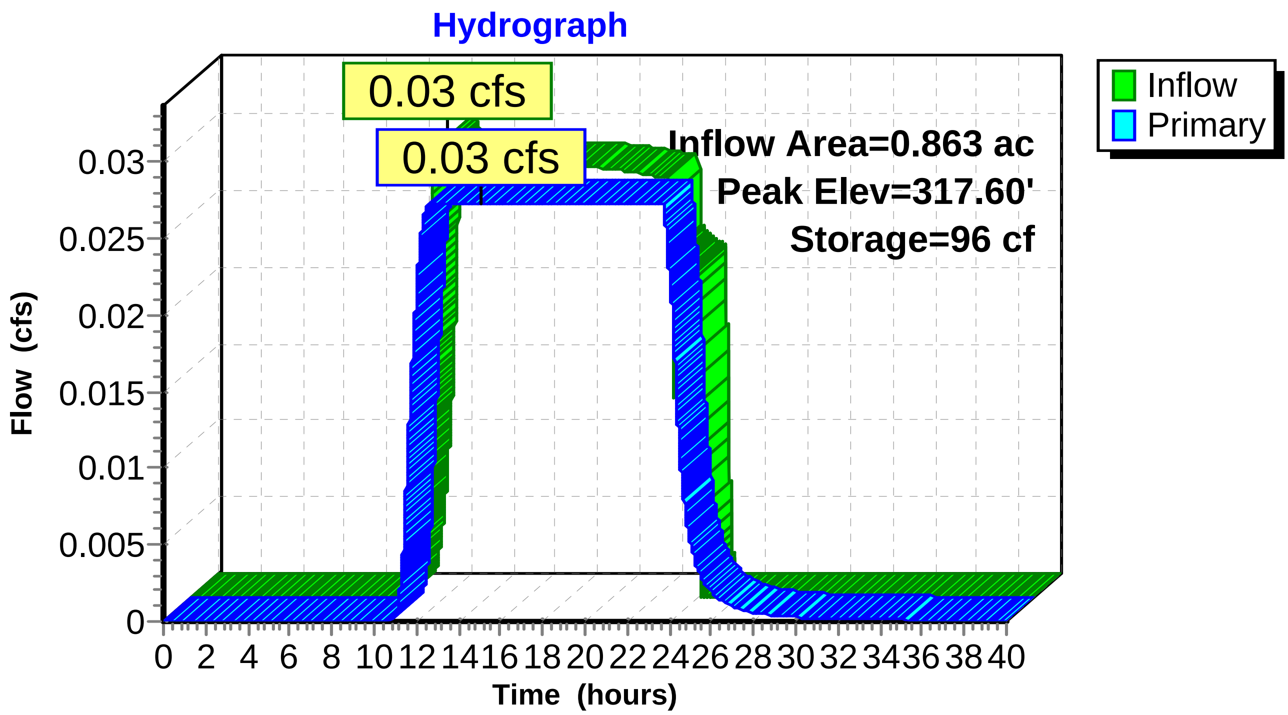
Volume	Invert	Avail.Storage	Storage Description
#1	317.50'	3,776 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 9,440 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.50	2,360	261.0	0	0	2,360
321.50	2,360	261.0	9,440	9,440	3,404

Device	Routing	Invert	Outlet Devices
#1	Primary	317.50'	**18.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.50'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	321.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 15.13 hrs HW=317.58' TW=313.79' (Dynamic Tailwater)
1=Culvert (Passes 0.03 cfs of 0.04 cfs potential flow)
2=Exfiltration (Exfiltration Controls 0.03 cfs)
3=Orifice/Grate (Controls 0.00 cfs)

Pond 2CP2: REAR BIO-RETENTION



Summary for Pond 2DP1: REAR BIO-RETENTION

Inflow Area = 0.921 ac, 50.81% Impervious, Inflow Depth = 0.89" for 1-yr event
Inflow = 1.09 cfs @ 12.06 hrs, Volume= 0.068 af
Outflow = 0.87 cfs @ 12.14 hrs, Volume= 0.068 af, Atten= 20%, Lag= 4.5 min
Primary = 0.03 cfs @ 12.14 hrs, Volume= 0.035 af
Secondary = 0.84 cfs @ 12.14 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 321.70' @ 12.14 hrs Surf.Area= 2,837 sf Storage= 549 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 58.8 min (918.8 - 860.0)

Volume	Invert	Avail.Storage	Storage Description
#1	321.50'	1,445 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

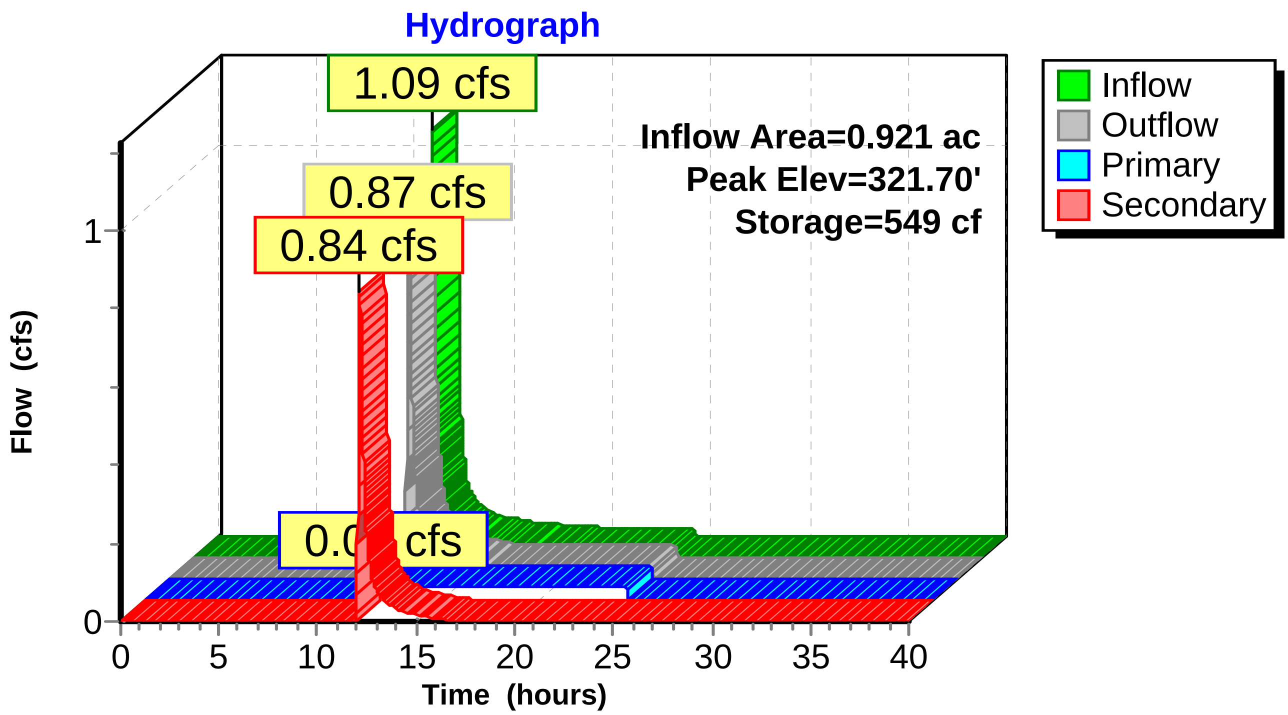
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.50	2,630	261.0	0	0	2,630
322.00	3,160	271.0	1,445	1,445	3,074

Device	Routing	Invert	Outlet Devices
#1	Primary	321.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	317.50'	**12.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	321.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 12.14 hrs HW=321.70' TW=317.57' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=0.84 cfs @ 12.14 hrs HW=321.70' TW=313.20' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.84 cfs of 7.28 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.84 cfs @ 1.04 fps)

Pond 2DP1: REAR BIO-RETENTION



Summary for Pond 2DP2: REAR BIO-RETENTION

Inflow Area = 0.921 ac, 50.81% Impervious, Inflow Depth = 0.45" for 1-yr event
Inflow = 0.03 cfs @ 12.14 hrs, Volume= 0.035 af
Outflow = 0.03 cfs @ 12.80 hrs, Volume= 0.034 af, Atten= 17%, Lag= 39.8 min
Primary = 0.03 cfs @ 12.80 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 317.76' @ 24.54 hrs Surf.Area= 2,360 sf Storage= 248 cf

Plug-Flow detention time= 96.3 min calculated for 0.034 af (100% of inflow)
Center-of-Mass det. time= 95.5 min (1,166.8 - 1,071.2)

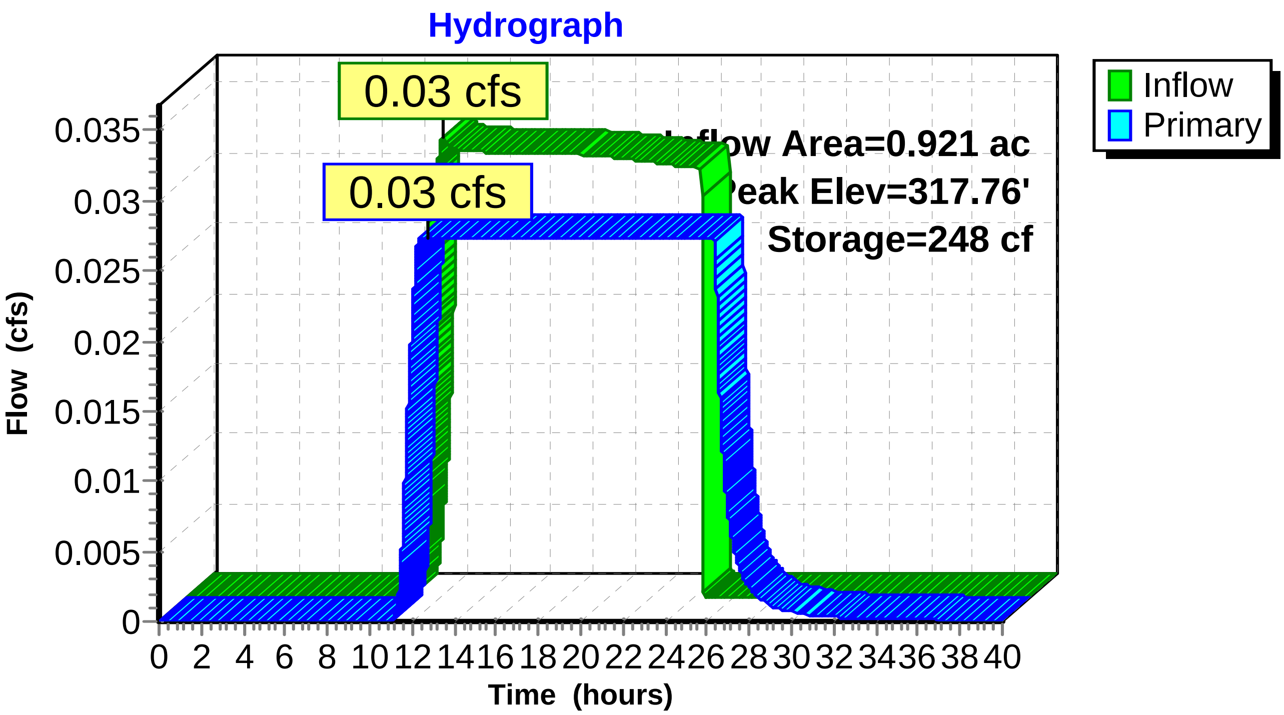
Volume	Invert	Avail.Storage	Storage Description
#1	317.50'	3,776 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 9,440 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.50	2,360	261.0	0	0	2,360
321.50	2,360	261.0	9,440	9,440	3,404

Device	Routing	Invert	Outlet Devices
#1	Primary	317.50'	**18.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.03 cfs @ 12.80 hrs HW=317.58' TW=313.60' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.03 cfs of 0.04 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Pond 2DP2: REAR BIO-RETENTION



Summary for Pond 2EP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 2.27" for 1-yr event
Inflow = 0.21 cfs @ 11.97 hrs, Volume= 0.012 af
Outflow = 0.21 cfs @ 11.98 hrs, Volume= 0.012 af, Atten= 2%, Lag= 0.9 min
Primary = 0.01 cfs @ 10.85 hrs, Volume= 0.008 af
Secondary = 0.20 cfs @ 11.98 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.24' @ 11.98 hrs Surf.Area= 140 sf Storage= 103 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 69.3 min (827.4 - 758.1)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

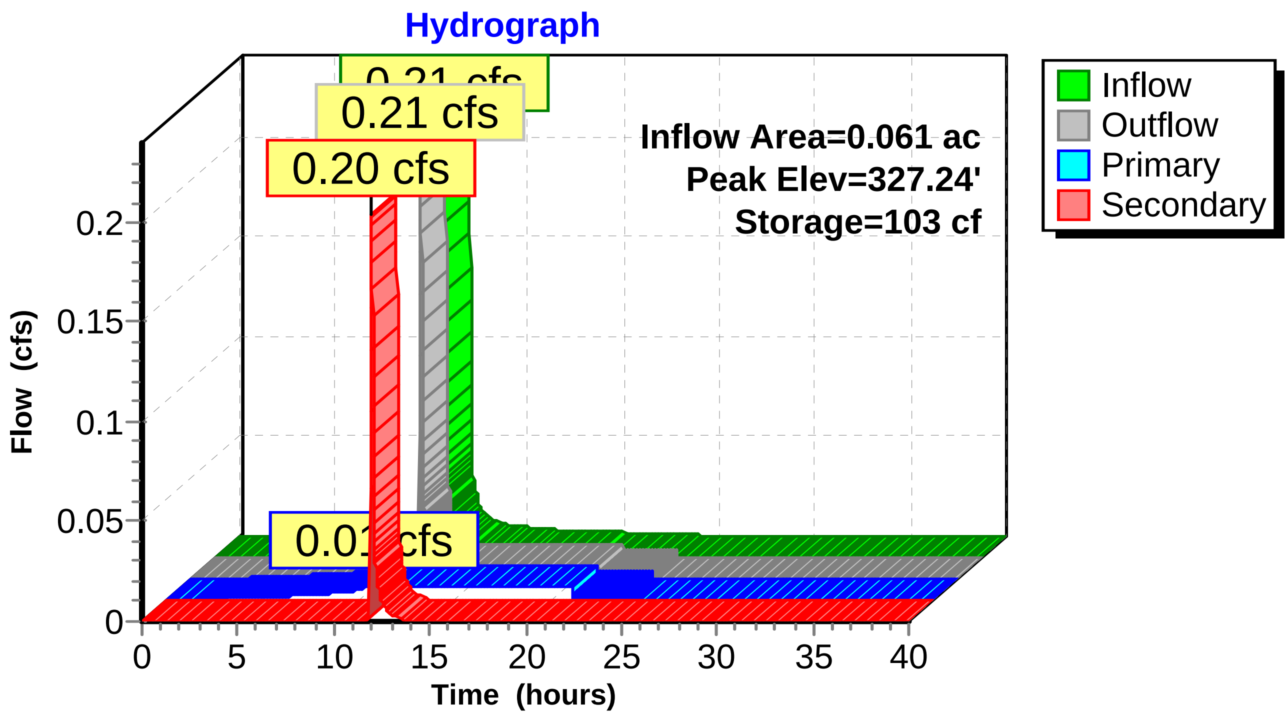
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3750 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 10.85 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.20 cfs @ 11.98 hrs HW=327.24' TW=311.03' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.20 cfs of 2.83 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.20 cfs @ 1.11 fps)

Pond 2EP1: Stormwater Planter



Summary for Pond 2EP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 1.53" for 1-yr event
Inflow = 0.01 cfs @ 10.85 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 21.25 hrs, Volume= 0.008 af, Atten= 0%, Lag= 624.0 min
Primary = 0.01 cfs @ 21.25 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 21.25 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (875.2 - 875.1)

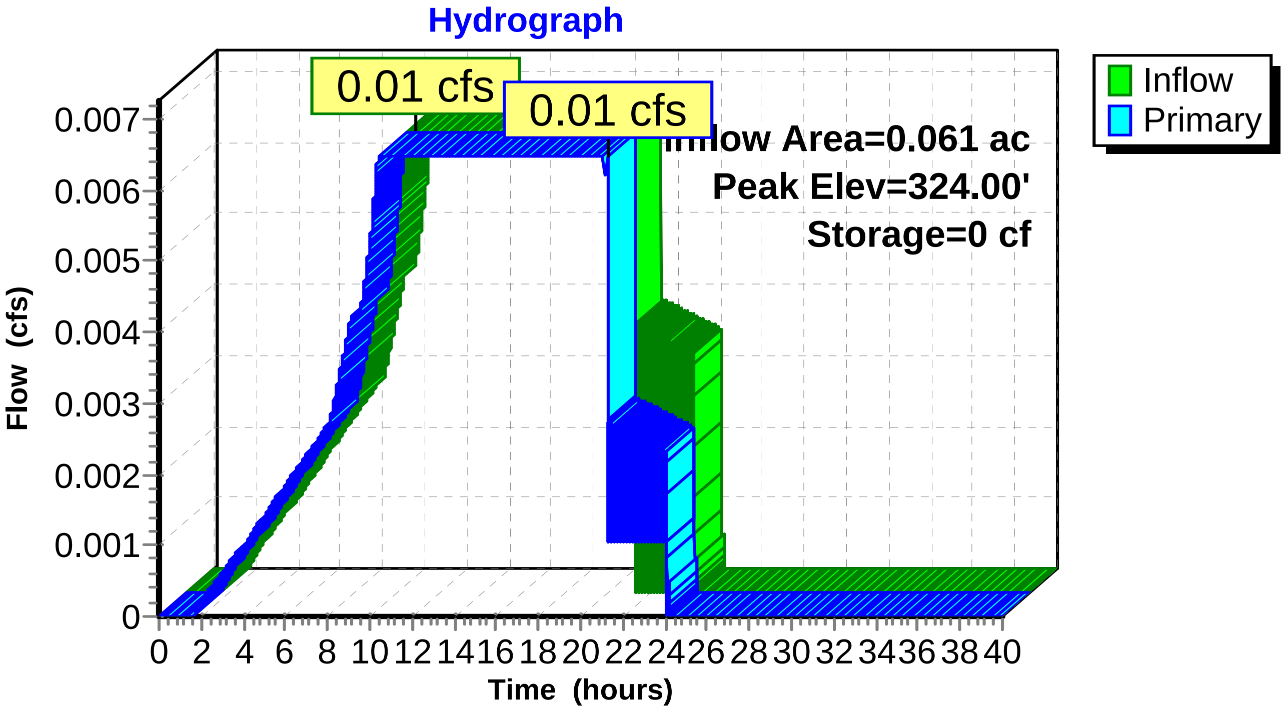
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 12.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.6250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 21.25 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 2EP2: Stormwater Planter



Summary for Pond 2FP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 2.27" for 1-yr event
Inflow = 0.21 cfs @ 11.97 hrs, Volume= 0.012 af
Outflow = 0.21 cfs @ 11.98 hrs, Volume= 0.012 af, Atten= 2%, Lag= 0.9 min
Primary = 0.01 cfs @ 10.85 hrs, Volume= 0.008 af
Secondary = 0.20 cfs @ 11.98 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.24' @ 11.98 hrs Surf.Area= 140 sf Storage= 103 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 69.3 min (827.4 - 758.1)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

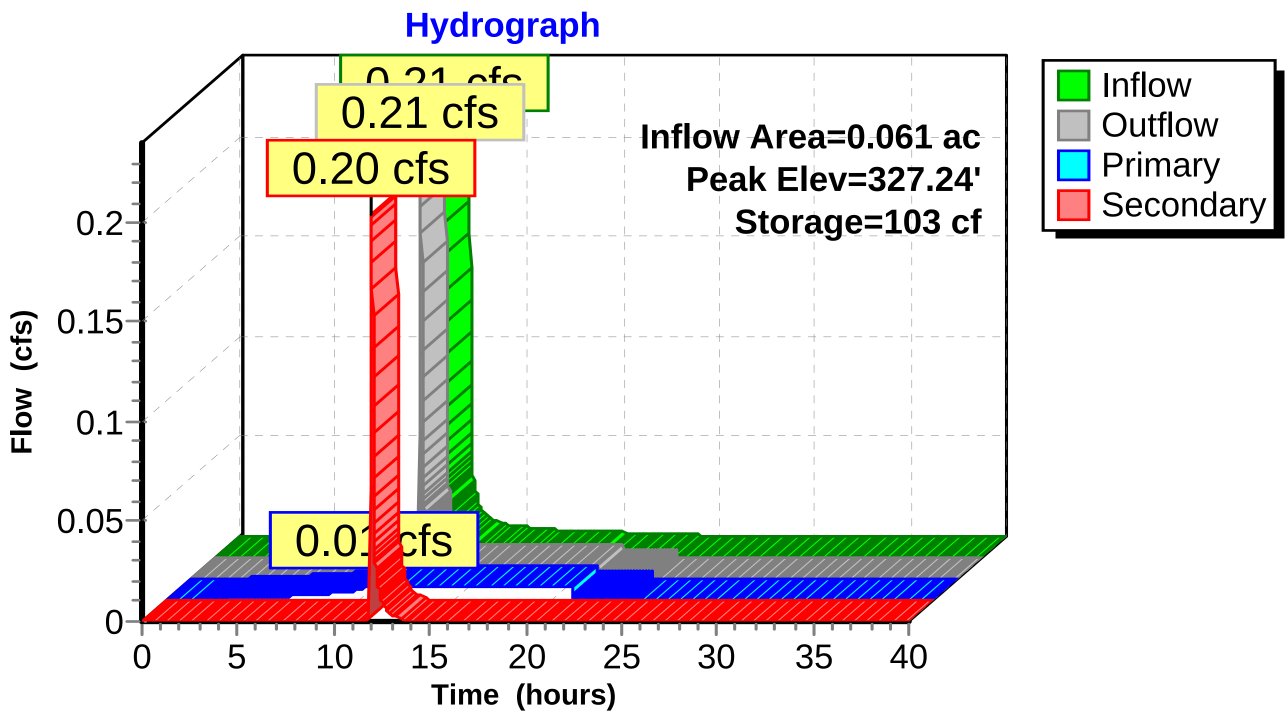
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 25.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 10.85 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.20 cfs @ 11.98 hrs HW=327.24' TW=311.03' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.20 cfs of 2.83 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.20 cfs @ 1.11 fps)

Pond 2FP1: Stormwater Planter



Summary for Pond 2FP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 1.53" for 1-yr event
Inflow = 0.01 cfs @ 10.85 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 21.25 hrs, Volume= 0.008 af, Atten= 0%, Lag= 624.0 min
Primary = 0.01 cfs @ 21.25 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 21.25 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (875.2 - 875.1)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids
#2	326.50'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
		280 cf	Total Available Storage

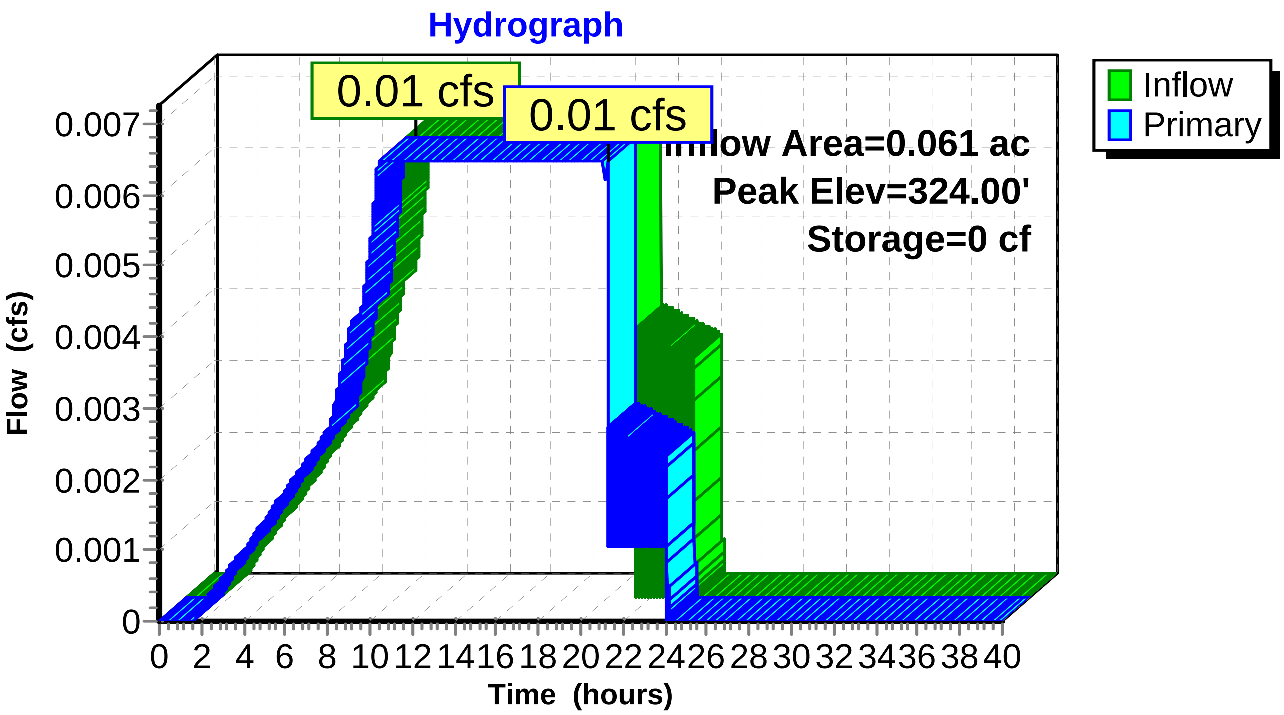
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.50	140	48.0	140	140	188

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3750 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 21.25 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
1=Culvert (Passes 0.01 cfs of 2.27 cfs potential flow)
2=Exfiltration (Exfiltration Controls 0.01 cfs)

Pond 2FP2: Stormwater Planter



Summary for Pond 2HP1: FRONT BIO-RETENTION

Inflow Area = 1.161 ac, 66.32% Impervious, Inflow Depth = 1.24" for 1-yr event
Inflow = 1.94 cfs @ 12.06 hrs, Volume= 0.120 af
Outflow = 1.32 cfs @ 12.17 hrs, Volume= 0.120 af, Atten= 32%, Lag= 6.3 min
Primary = 0.07 cfs @ 12.17 hrs, Volume= 0.063 af
Secondary = 1.25 cfs @ 12.17 hrs, Volume= 0.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 323.69' @ 12.17 hrs Surf.Area= 6,184 sf Storage= 1,159 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.7 min (871.7 - 838.0)

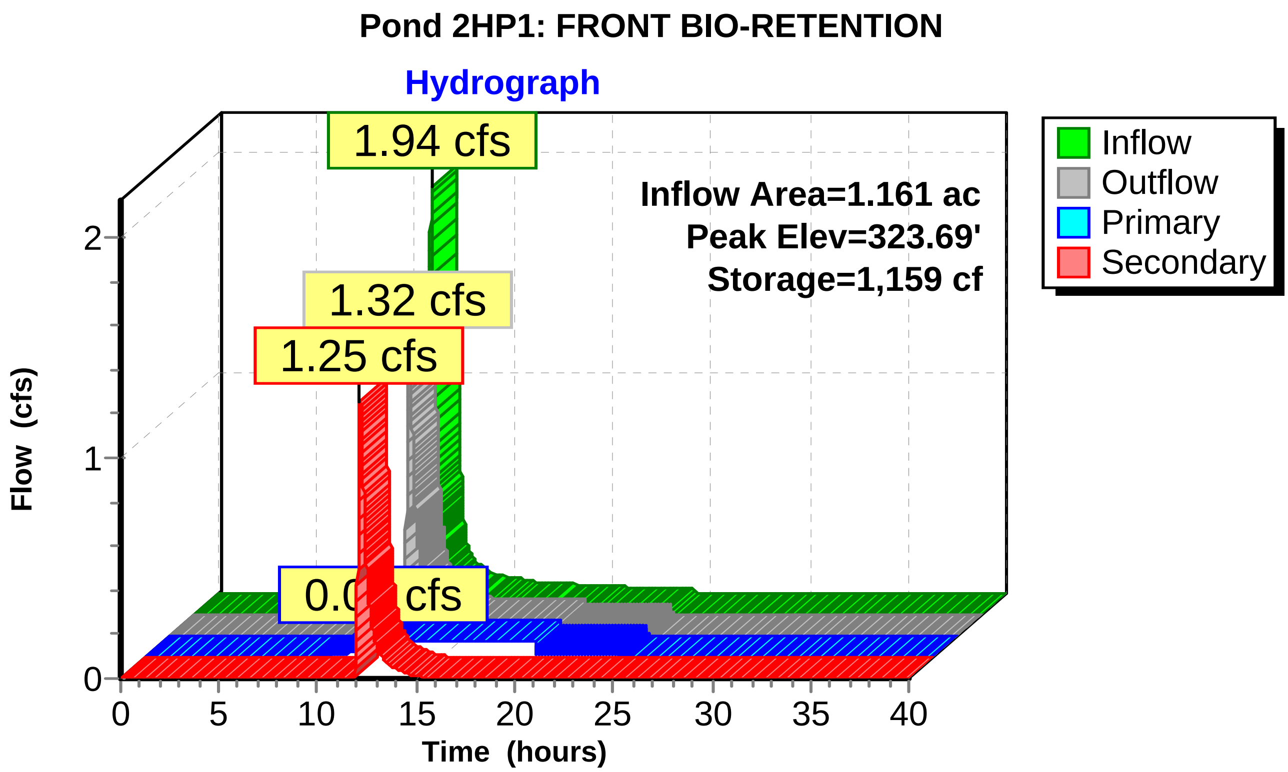
Volume	Invert	Avail.Storage	Storage Description
#1	323.50'	3,133 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
323.50	5,924	456.0	0	0	5,924
324.00	6,615	466.0	3,133	3,133	6,693

Device	Routing	Invert	Outlet Devices
#1	Primary	323.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	319.50'	**12.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 319.50' / 319.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	323.56'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.17 hrs HW=323.69' TW=319.61' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=1.25 cfs @ 12.17 hrs HW=323.69' TW=317.40' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.25 cfs of 7.17 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 1.25 cfs @ 1.19 fps)


Pond 2HP1: FRONT BIO-RETENTION
Hydrograph
1.94 cfs
1.32 cfs
1.25 cfs
cfs
Inflow Area=1.161 ac
Peak Elev=323.69'
Storage=1,159 cf
Inflow
Outflow
Primary
Secondary
Flow (cfs)
0
1
2
0
5
10
15
20
25
30
35
40
Time (hours)

Summary for Pond 2HP2: FRONT BIO-RETENTION

Inflow Area = 1.161 ac, 66.32% Impervious, Inflow Depth = 0.66" for 1-yr event
Inflow = 0.07 cfs @ 12.17 hrs, Volume= 0.063 af
Outflow = 0.07 cfs @ 19.85 hrs, Volume= 0.063 af, Atten= 4%, Lag= 461.0 min
Primary = 0.07 cfs @ 19.85 hrs, Volume= 0.063 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 319.63' @ 19.85 hrs Surf.Area= 5,924 sf Storage= 316 cf

Plug-Flow detention time= 89.5 min calculated for 0.063 af (99% of inflow)
Center-of-Mass det. time= 85.2 min (1,063.5 - 978.2)

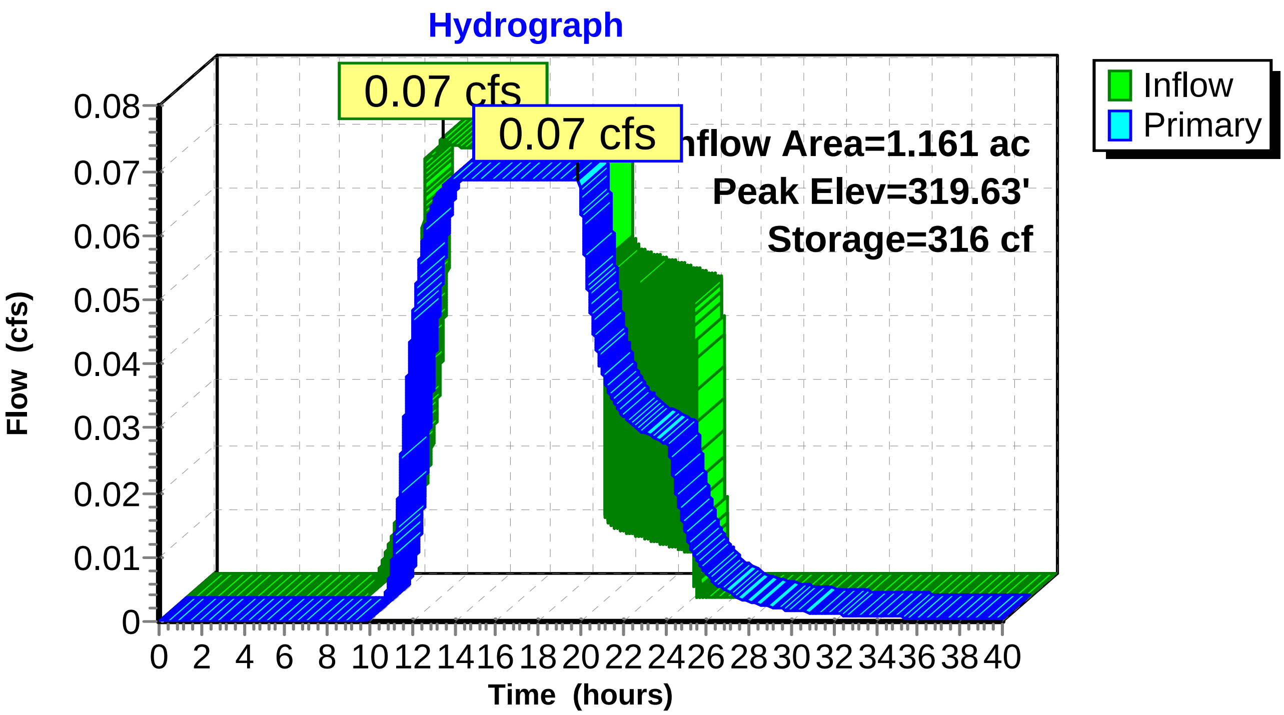
Volume	Invert	Avail.Storage	Storage Description
#1	319.50'	9,478 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 23,696 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
319.50	5,924	456.0	0	0	5,924
323.50	5,924	456.0	23,696	23,696	7,748

Device	Routing	Invert	Outlet Devices
#1	Primary	319.50'	**12.0" Round Culvert** L= 60.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 319.50' / 319.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	319.50'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	323.65'	**30.0" x 30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 19.85 hrs HW=319.63' TW=317.53' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.07 cfs of 0.08 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.07 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2HP2: FRONT BIO-RETENTION



Summary for Pond 2JP1: BIORETENTION IN FRONT OF APT

Inflow Area = 0.328 ac, 70.12% Impervious, Inflow Depth = 1.31" for 1-yr event
Inflow = 0.77 cfs @ 11.97 hrs, Volume= 0.036 af
Outflow = 0.74 cfs @ 11.99 hrs, Volume= 0.036 af, Atten= 4%, Lag= 1.2 min
Primary = 0.06 cfs @ 11.99 hrs, Volume= 0.025 af
Secondary = 0.68 cfs @ 11.99 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 322.41' @ 11.99 hrs Surf.Area= 1,352 sf Storage= 201 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.3 min (835.9 - 826.6)

Volume	Invert	Avail.Storage	Storage Description
#1	322.25'	714 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

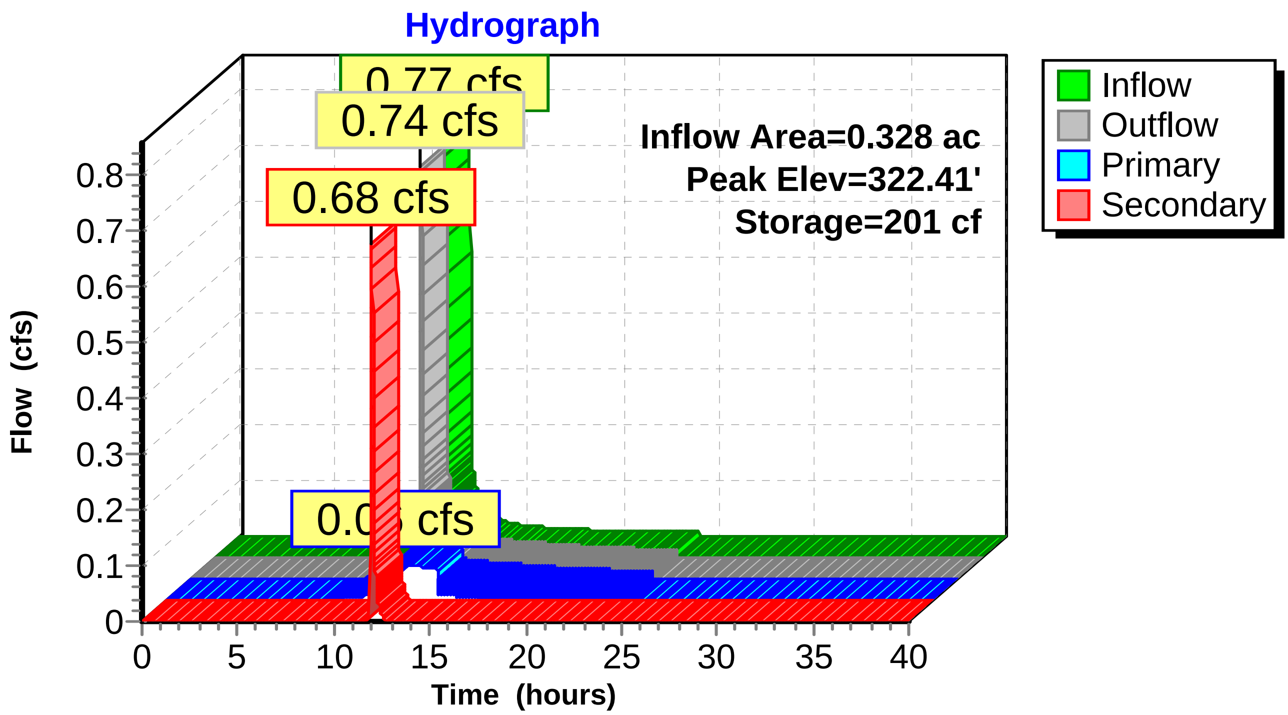
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
322.25	1,236	384.0	0	0	1,236
322.75	1,628	396.0	714	714	2,006

Device	Routing	Invert	Outlet Devices
#1	Primary	322.25'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.25'	**12.0" Round Culvert X 2.00** L= 65.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.25' / 317.75' S= 0.0077 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	322.35'	**24.0" x 24.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.06 cfs @ 11.99 hrs HW=322.41' TW=318.48' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=0.68 cfs @ 11.99 hrs HW=322.41' TW=317.10' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.68 cfs of 14.00 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.68 cfs @ 0.77 fps)

Pond 2JP1: BIORETENTION IN FRONT OF APT



Summary for Pond 2JP2: BIORETENTION IN FRONT OF APT

Inflow Area = 0.328 ac, 70.12% Impervious, Inflow Depth = 0.91" for 1-yr event
Inflow = 0.06 cfs @ 11.99 hrs, Volume= 0.025 af
Outflow = 0.02 cfs @ 16.11 hrs, Volume= 0.025 af, Atten= 75%, Lag= 247.0 min
Primary = 0.02 cfs @ 16.11 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 319.21' @ 16.11 hrs Surf.Area= 1,326 sf Storage= 494 cf

Plug-Flow detention time= 350.7 min calculated for 0.025 af (100% of inflow)
Center-of-Mass det. time= 349.7 min (1,235.4 - 885.6)

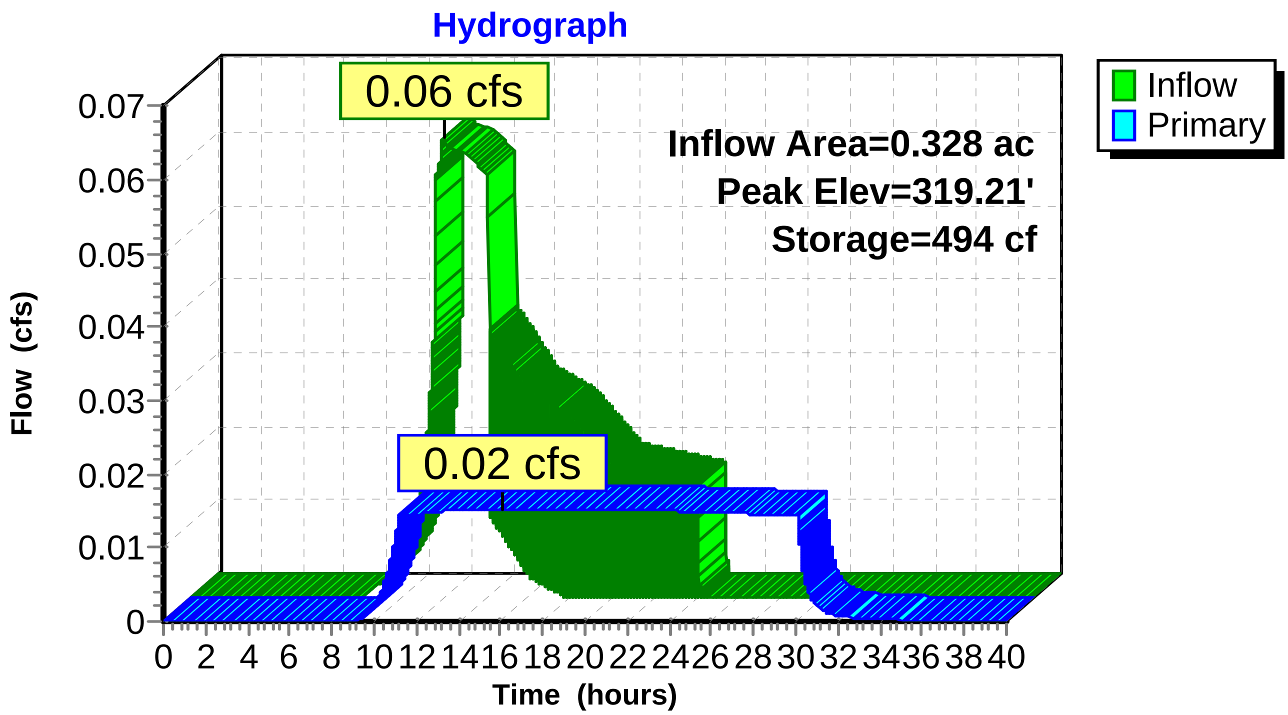
Volume	Invert	Avail.Storage	Storage Description
#1	318.25'	2,284 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 5,710 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
318.25	1,236	384.0	0	0	1,236
322.25	1,628	396.0	5,710	5,710	2,965

Device	Routing	Invert	Outlet Devices
#1	Primary	318.25'	**12.0" Round Culvert** L= 65.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.25' / 317.75' S= 0.0077 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	318.25'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.02 cfs @ 16.11 hrs HW=319.21' TW=317.78' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.02 cfs of 2.58 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond 2JP2: BIORETENTION IN FRONT OF APT



Summary for Pond 2P: SUBSURFACE DETENTION

Inflow Area = 1.784 ac, 52.41% Impervious, Inflow Depth = 0.91" for 1-yr event
Inflow = 1.81 cfs @ 12.13 hrs, Volume= 0.136 af
Outflow = 0.07 cfs @ 15.96 hrs, Volume= 0.083 af, Atten= 96%, Lag= 229.7 min
Primary = 0.07 cfs @ 15.96 hrs, Volume= 0.083 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 313.80' @ 15.96 hrs Surf.Area= 10,754 sf Storage= 3,200 cf

Plug-Flow detention time= 501.0 min calculated for 0.083 af (61% of inflow)
Center-of-Mass det. time= 325.6 min (1,262.2 - 936.6)

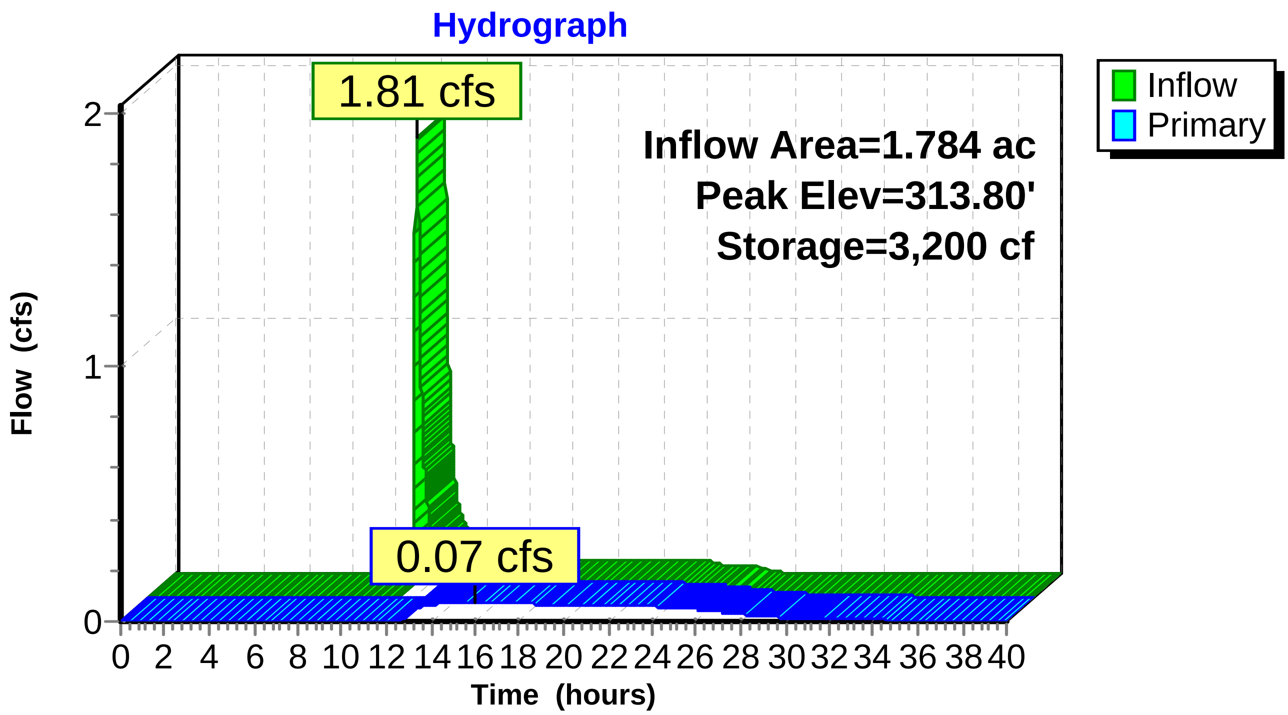
Volume	Invert	Avail.Storage	Storage Description
#1A	313.00'	12,410 cf	**38.00'W x 283.00'L x 4.50'H Field A** 48,393 cf Overall - 17,368 cf Embedded = 31,025 cf x 40.0% Voids
#2A	313.50'	13,916 cf	**ADS N-12 36** x 98 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.2 cf 7 Rows of 14 Chambers
		26,326 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	313.50'	**12.0" Round Culvert** L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 313.50' / 312.00' S= 0.0203 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	313.50'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.50'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.07 cfs @ 15.96 hrs HW=313.80' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.07 cfs of 0.37 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 2.12 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SUBSURFACE DETENTION



Summary for Pond 3BP1: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 2.27" for 1-yr event
Inflow = 0.23 cfs @ 11.97 hrs, Volume= 0.012 af
Outflow = 0.22 cfs @ 11.98 hrs, Volume= 0.012 af, Atten= 2%, Lag= 0.8 min
Primary = 0.01 cfs @ 10.75 hrs, Volume= 0.008 af
Secondary = 0.22 cfs @ 11.98 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.27' @ 11.98 hrs Surf.Area= 140 sf Storage= 108 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 72.9 min (831.0 - 758.1)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

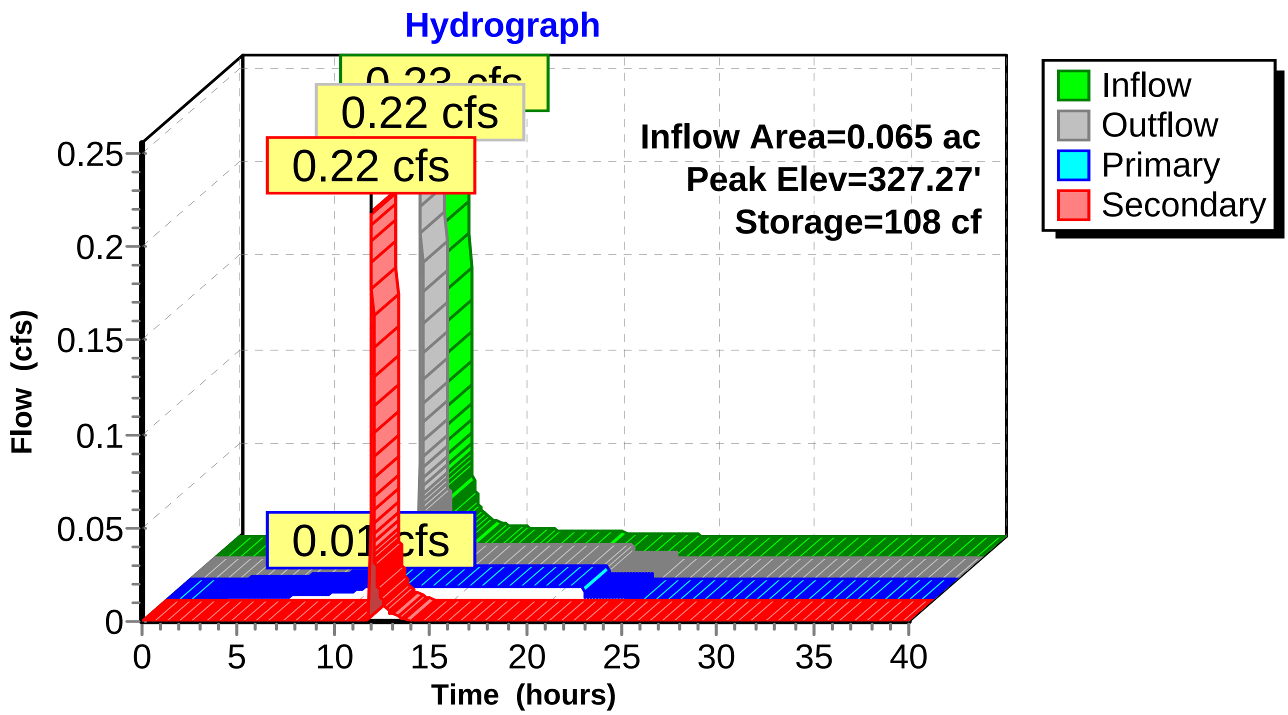
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.15'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 10.75 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.22 cfs @ 11.98 hrs HW=327.27' TW=311.04' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.22 cfs of 2.84 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.22 cfs @ 1.14 fps)

Pond 3BP1: Stormwater Planter



Summary for Pond 3BP2: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 1.50" for 1-yr event
Inflow = 0.01 cfs @ 10.75 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 21.86 hrs, Volume= 0.008 af, Atten= 0%, Lag= 666.6 min
Primary = 0.01 cfs @ 21.86 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 21.86 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (883.3 - 883.2)

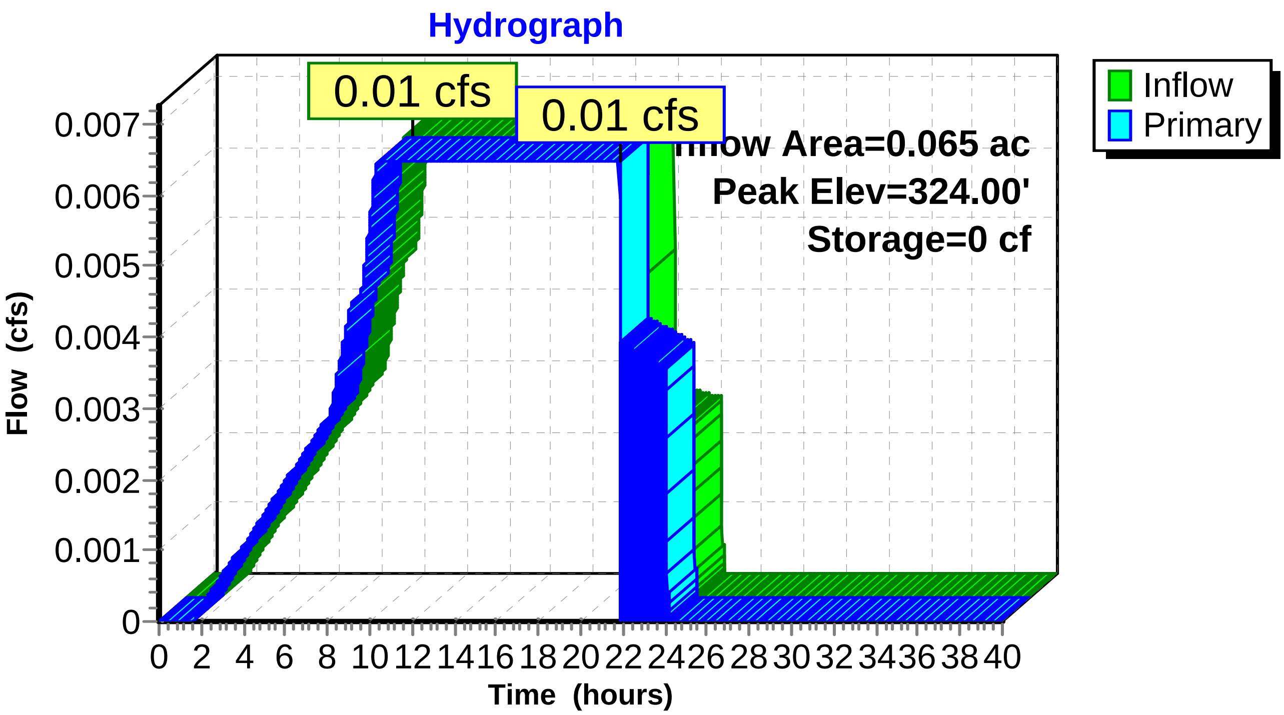
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 21.86 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 3BP2: Stormwater Planter



Summary for Pond 3CP1: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 2.27" for 1-yr event
Inflow = 0.23 cfs @ 11.97 hrs, Volume= 0.012 af
Outflow = 0.22 cfs @ 11.98 hrs, Volume= 0.012 af, Atten= 2%, Lag= 0.8 min
Primary = 0.01 cfs @ 10.75 hrs, Volume= 0.008 af
Secondary = 0.22 cfs @ 11.98 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.27' @ 11.98 hrs Surf.Area= 140 sf Storage= 108 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 72.9 min (831.0 - 758.1)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

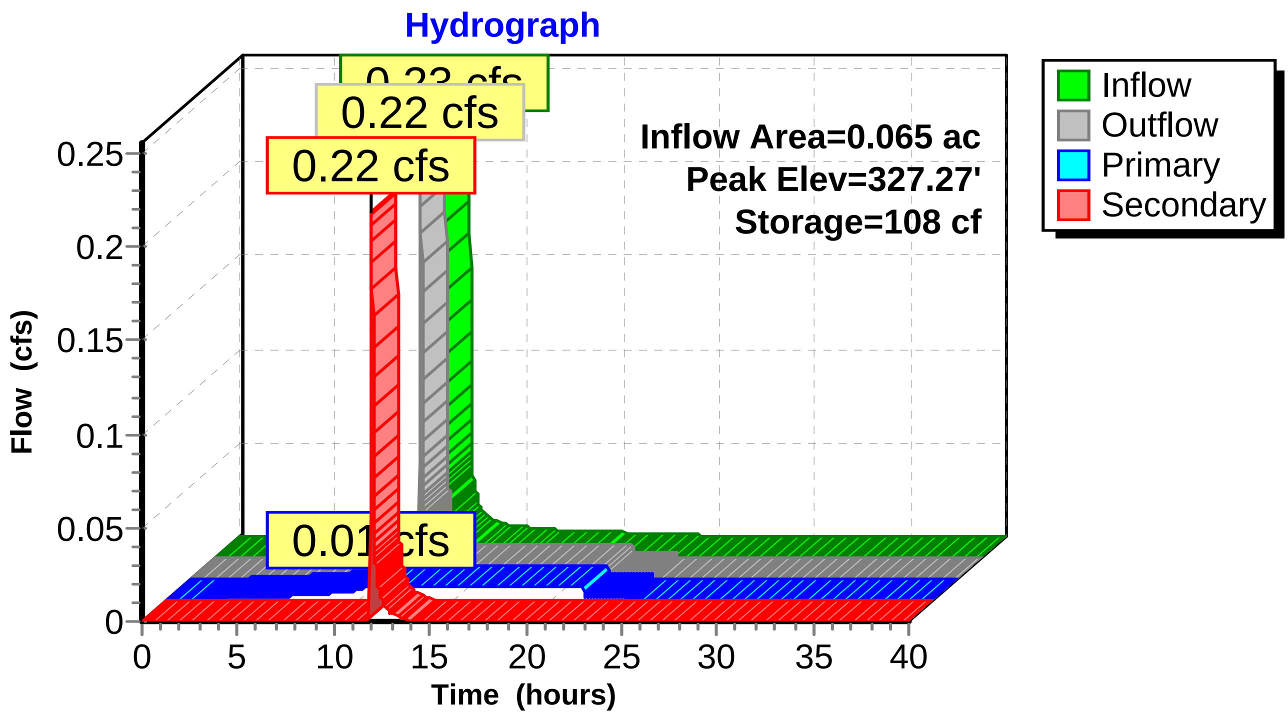
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.15'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 10.75 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.22 cfs @ 11.98 hrs HW=327.27' TW=311.04' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.22 cfs of 2.84 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.22 cfs @ 1.14 fps)

Pond 3CP1: Stormwater Planter



Summary for Pond 3CP2: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 1.50" for 1-yr event
Inflow = 0.01 cfs @ 10.75 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 21.86 hrs, Volume= 0.008 af, Atten= 0%, Lag= 666.6 min
Primary = 0.01 cfs @ 21.86 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 21.86 hrs Surf.Area= 140 sf Storage= 0 cf

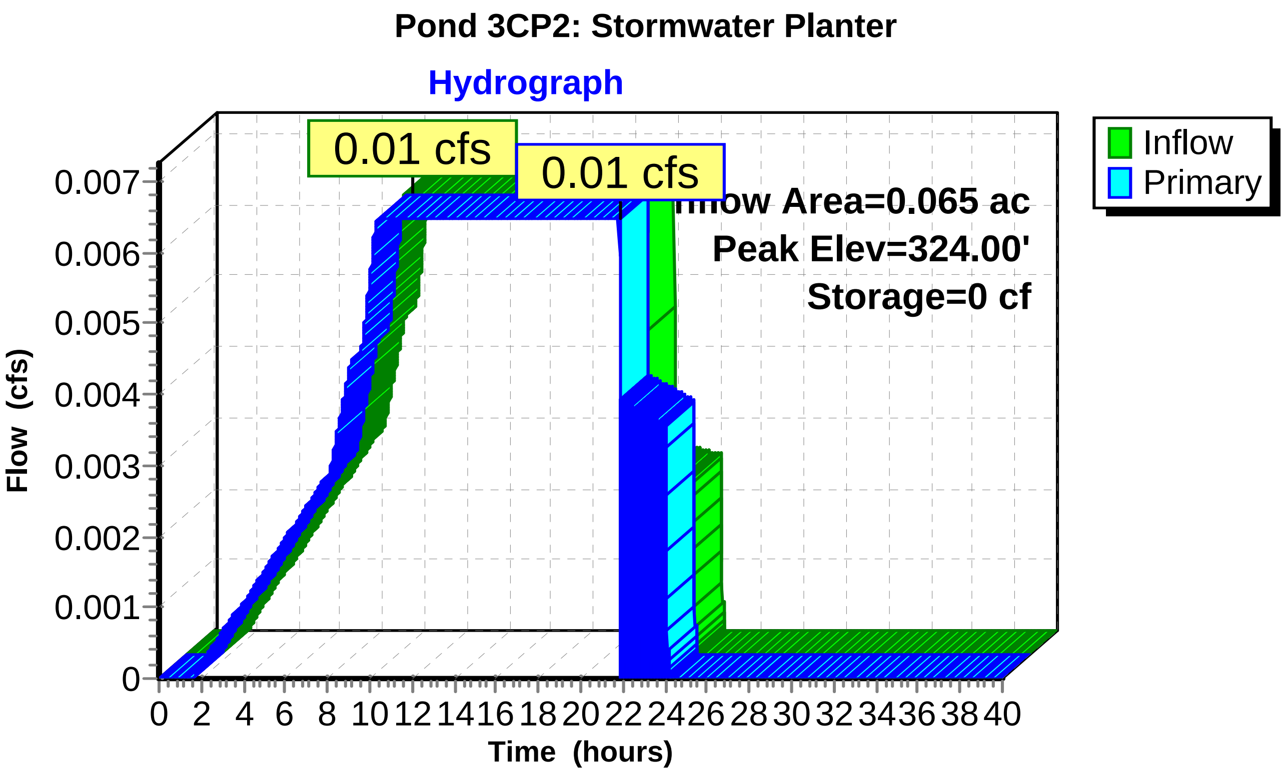
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (883.3 - 883.2)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 21.86 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)


Pond 3CP2: Stormwater Planter
Hydrograph
0.01 cfs
0.01 cfs
Inflow Area=0.065 ac
Peak Elev=324.00'
Storage=0 cf
Inflow
Primary
Flow (cfs)
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
Time (hours)

Summary for Pond 3DP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 2.27" for 1-yr event
Inflow = 0.21 cfs @ 11.97 hrs, Volume= 0.012 af
Outflow = 0.21 cfs @ 11.98 hrs, Volume= 0.012 af, Atten= 2%, Lag= 0.9 min
Primary = 0.01 cfs @ 10.85 hrs, Volume= 0.008 af
Secondary = 0.20 cfs @ 11.98 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.24' @ 11.98 hrs Surf.Area= 140 sf Storage= 103 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 69.3 min (827.4 - 758.1)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

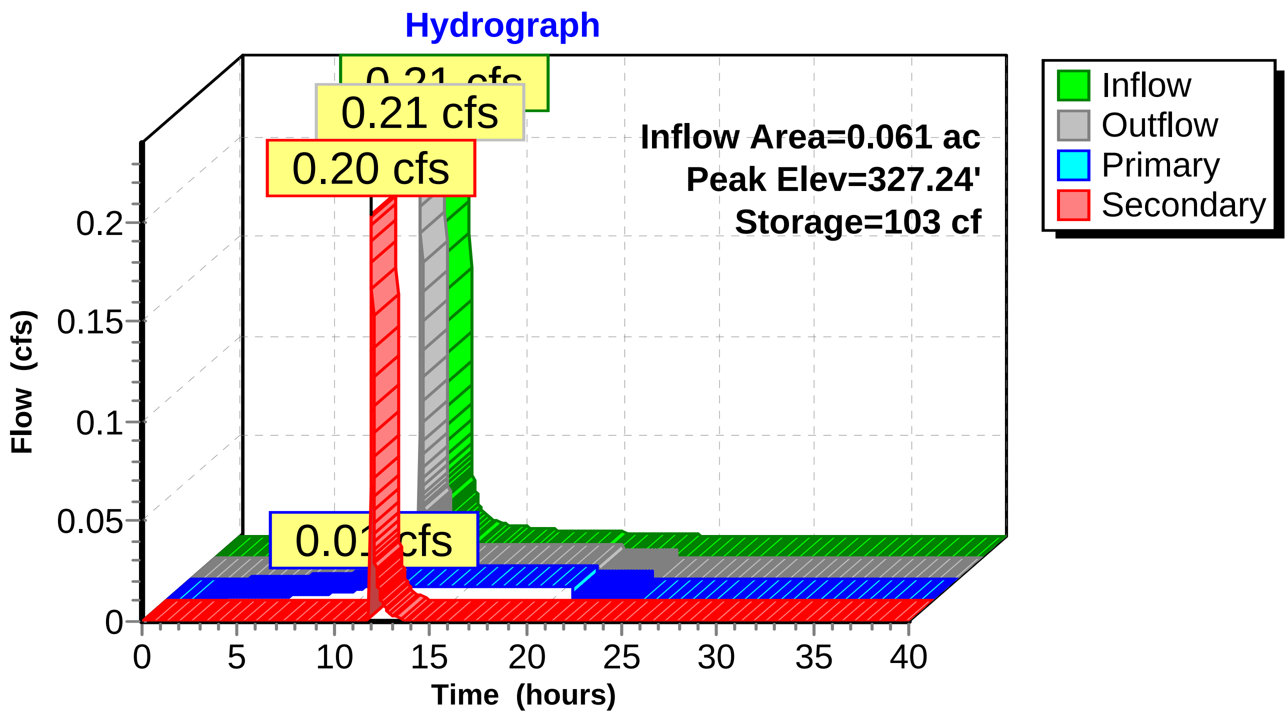
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 10.85 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.20 cfs @ 11.98 hrs HW=327.24' TW=311.04' (Dynamic Tailwater)
2=Culvert (Passes 0.20 cfs of 2.83 cfs potential flow)
3=Orifice/Grate (Weir Controls 0.20 cfs @ 1.11 fps)

Pond 3DP1: Stormwater Planter



Summary for Pond 3DP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 1.53" for 1-yr event
Inflow = 0.01 cfs @ 10.85 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 10.85 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min
Primary = 0.01 cfs @ 10.85 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 0.00 hrs Surf.Area= 140 sf Storage= 0 cf

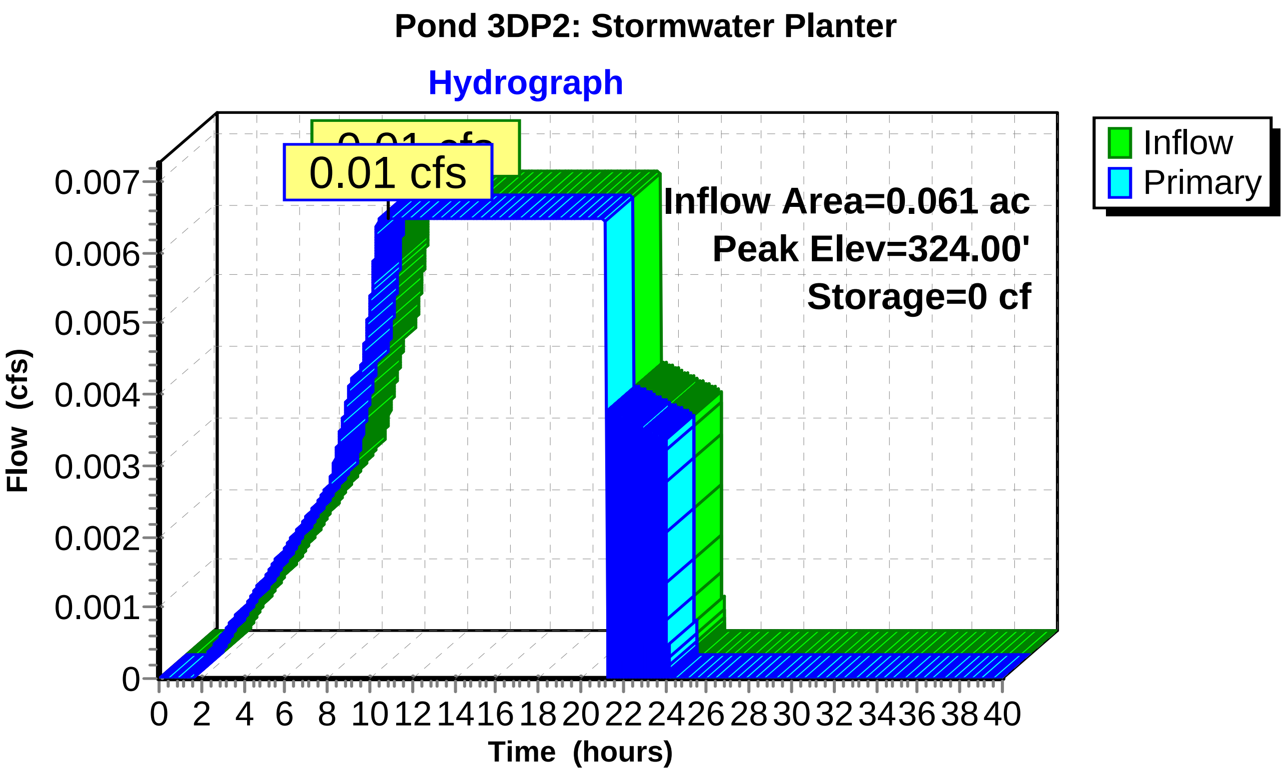
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (875.1 - 875.1)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**4.350 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.00 cfs @ 10.85 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)


Pond 3DP2: Stormwater Planter
Hydrograph
0.01 cfs
0.01 cfs
Inflow Area=0.061 ac
Peak Elev=324.00'
Storage=0 cf
Inflow
Primary
Flow (cfs)
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
Time (hours)

Summary for Pond 3P: POCKET POND FOREBAY

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Starting Elev= 317.00' Surf.Area= 1,586 sf Storage= 2,311 cf
Peak Elev= 317.00' @ 0.00 hrs Surf.Area= 1,586 sf Storage= 2,311 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	2,311 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

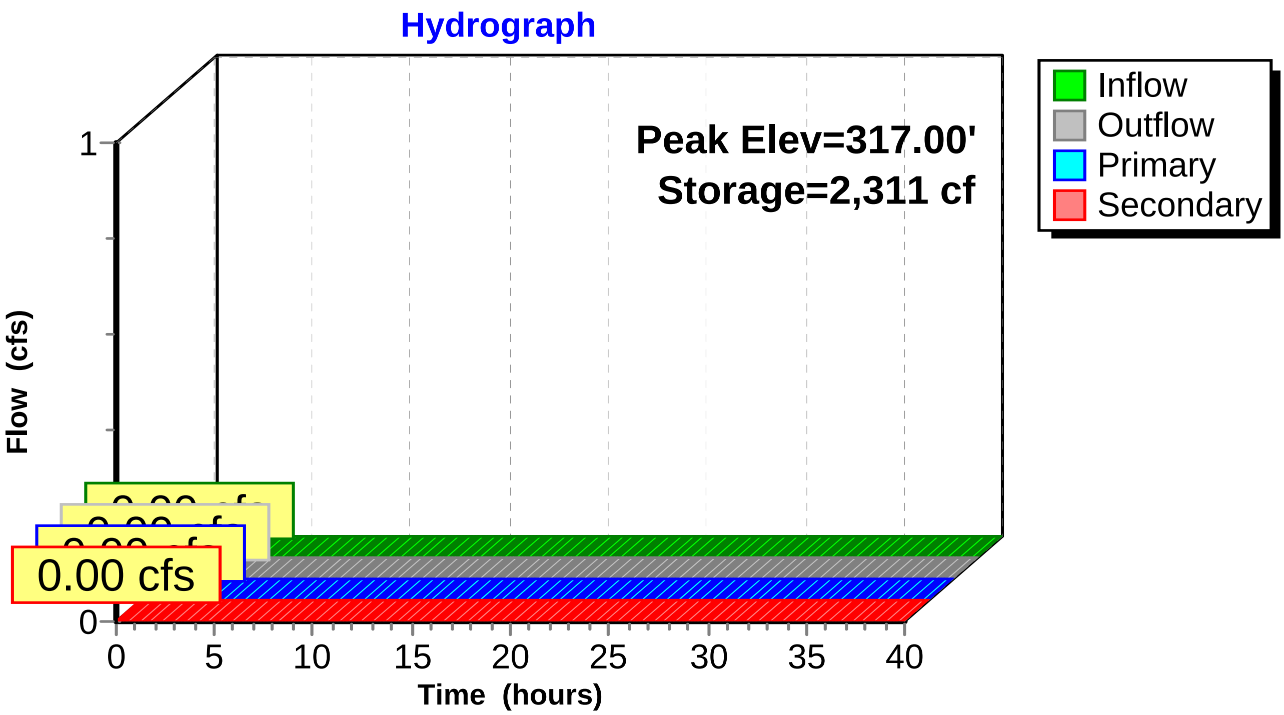
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
313.00	172	54.0	0	0	172
314.00	306	73.0	236	236	374
315.00	478	93.0	389	625	651
316.00	688	112.0	580	1,204	978
317.00	1,586	163.0	1,106	2,311	2,102

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.00' / 310.50' S= 0.0148 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.70'	**4.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	318.65'	**18.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	320.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	322.00'	**6.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=317.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=317.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: POCKET POND FOREBAY



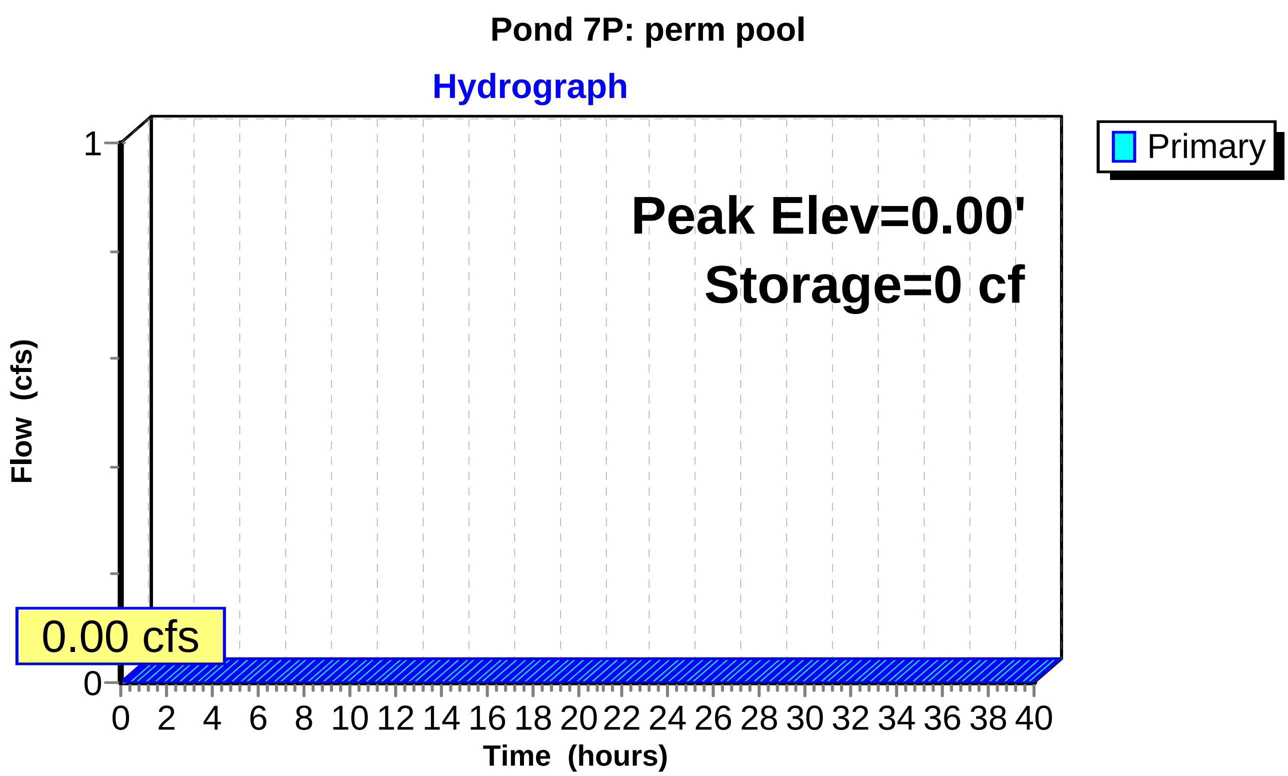
Summary for Pond 7P: perm pool

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	7,120 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
314.00	470	104.0	0	0	470
316.00	1,378	190.0	1,769	1,769	2,503
317.00	1,994	216.0	1,677	3,445	3,368
318.00	5,669	361.0	3,675	7,120	10,032

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	318.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)



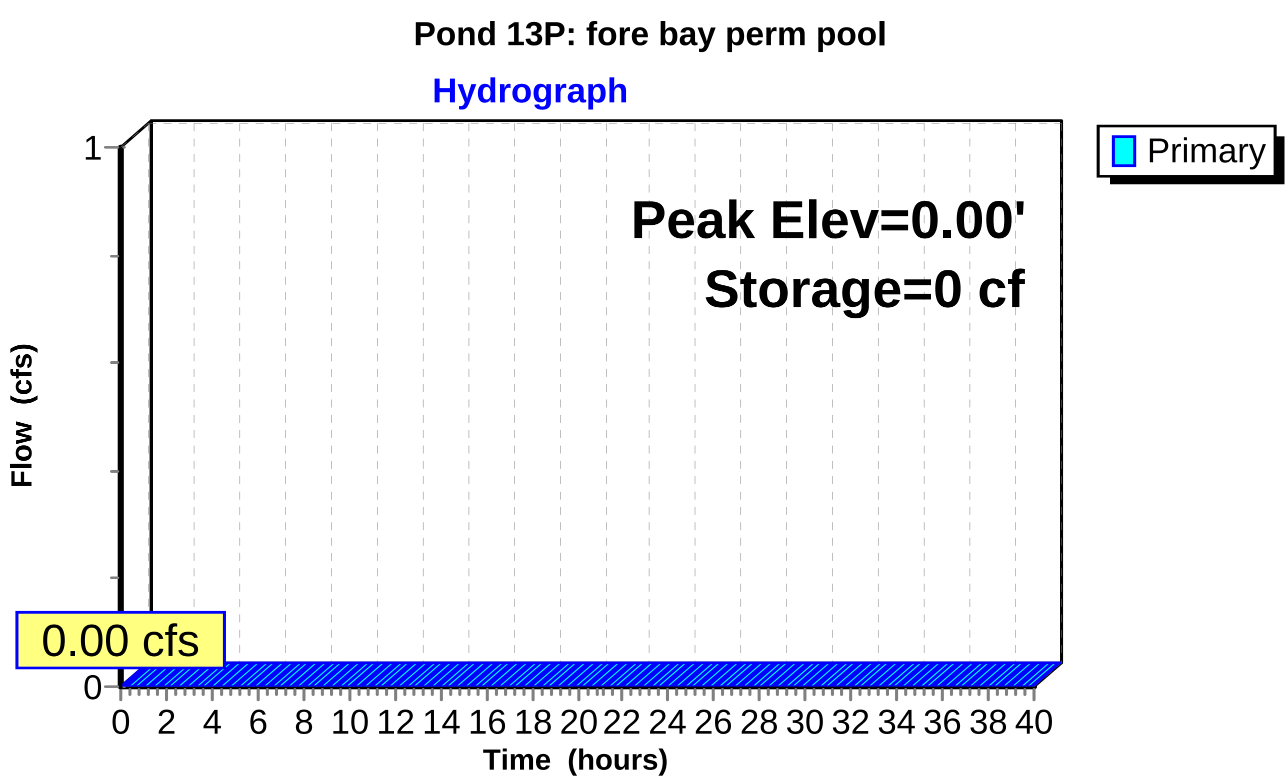
Summary for Pond 13P: fore bay perm pool

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	2,889 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
314.00	232	61.0	0	0	232
316.00	578	102.0	784	784	788
317.00	811	119.0	691	1,475	1,107
318.00	2,120	191.0	1,414	2,889	2,890

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	318.00'	**4.0" Vert. Orifice/Grate** C= 0.600

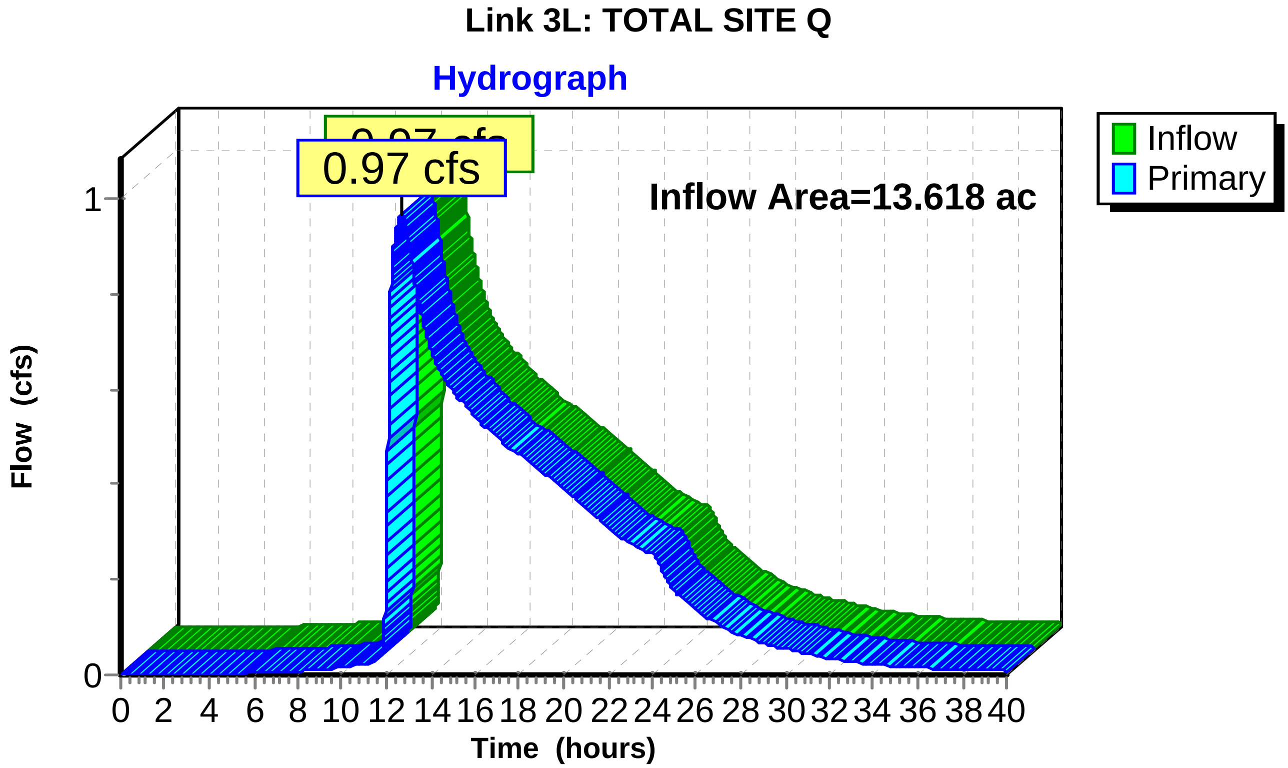
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)



Summary for Link 3L: TOTAL SITE Q

Inflow Area =	13.618 ac,	32.28% Impervious,	Inflow Depth > 0.51"	for 1-yr event
Inflow =	0.97 cfs @	12.67 hrs, Volume=	0.578 af	
Primary =	0.97 cfs @	12.67 hrs, Volume=	0.578 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

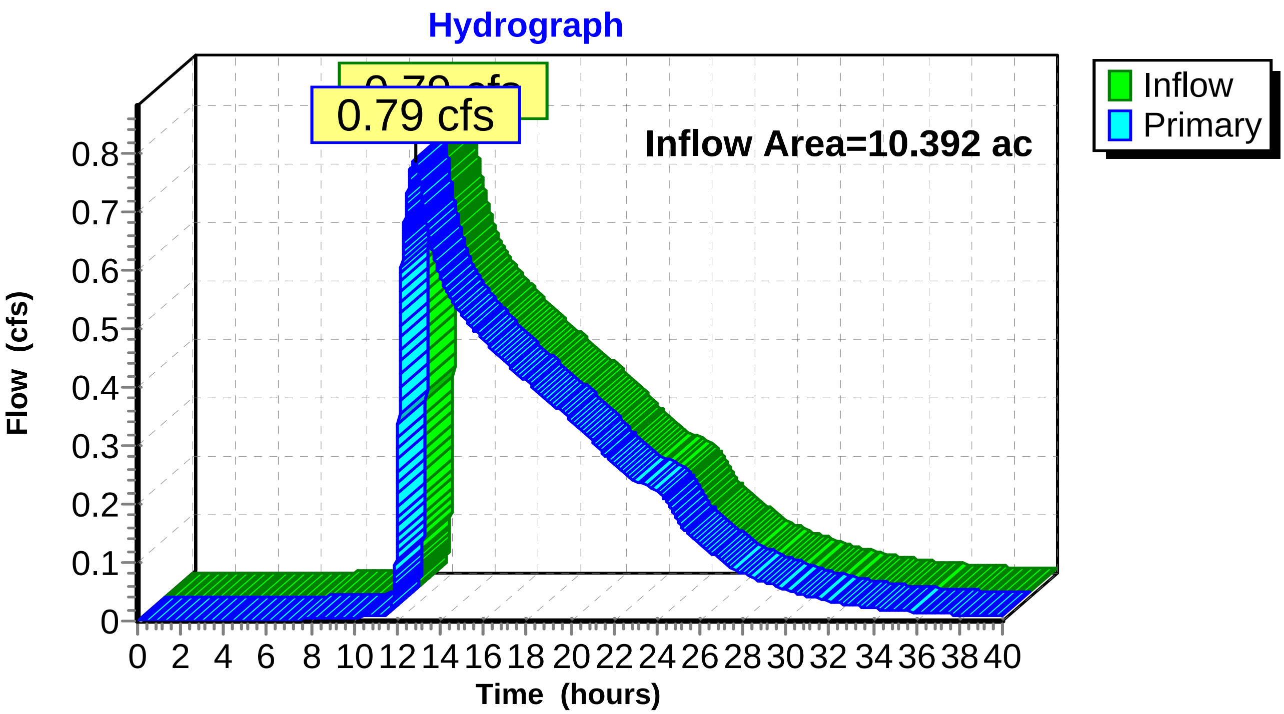


Summary for Link AP-2: AP-2

Inflow Area = 10.392 ac, 40.01% Impervious, Inflow Depth > 0.58" for 1-yr event
Inflow = 0.79 cfs @ 12.82 hrs, Volume= 0.504 af
Primary = 0.79 cfs @ 12.82 hrs, Volume= 0.504 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

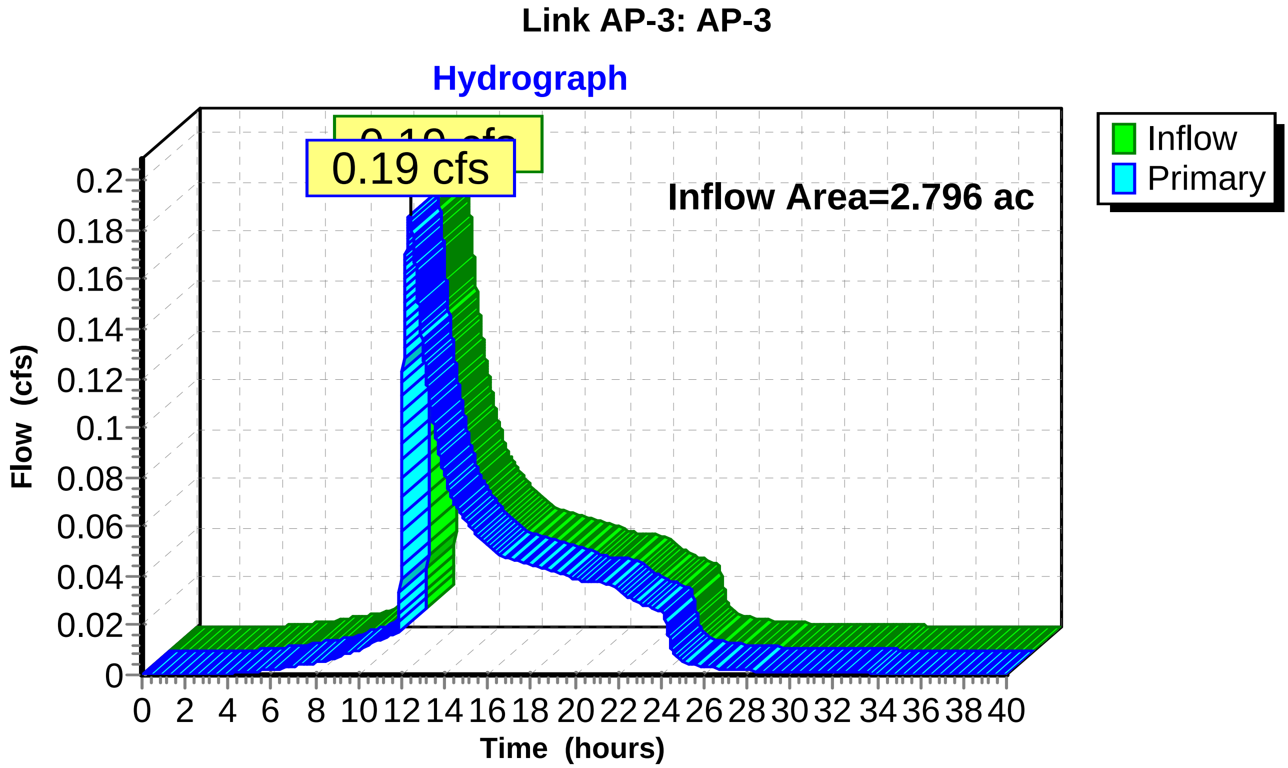
Link AP-2: AP-2



Summary for Link AP-3: AP-3

Inflow Area =	2.796 ac,	6.83% Impervious,	Inflow Depth > 0.28"	for 1-yr event	
Inflow =	0.19 cfs @	12.38 hrs,	Volume=	0.065 af	
Primary =	0.19 cfs @	12.38 hrs,	Volume=	0.065 af,	Atten= 0%, Lag= 0.0 min

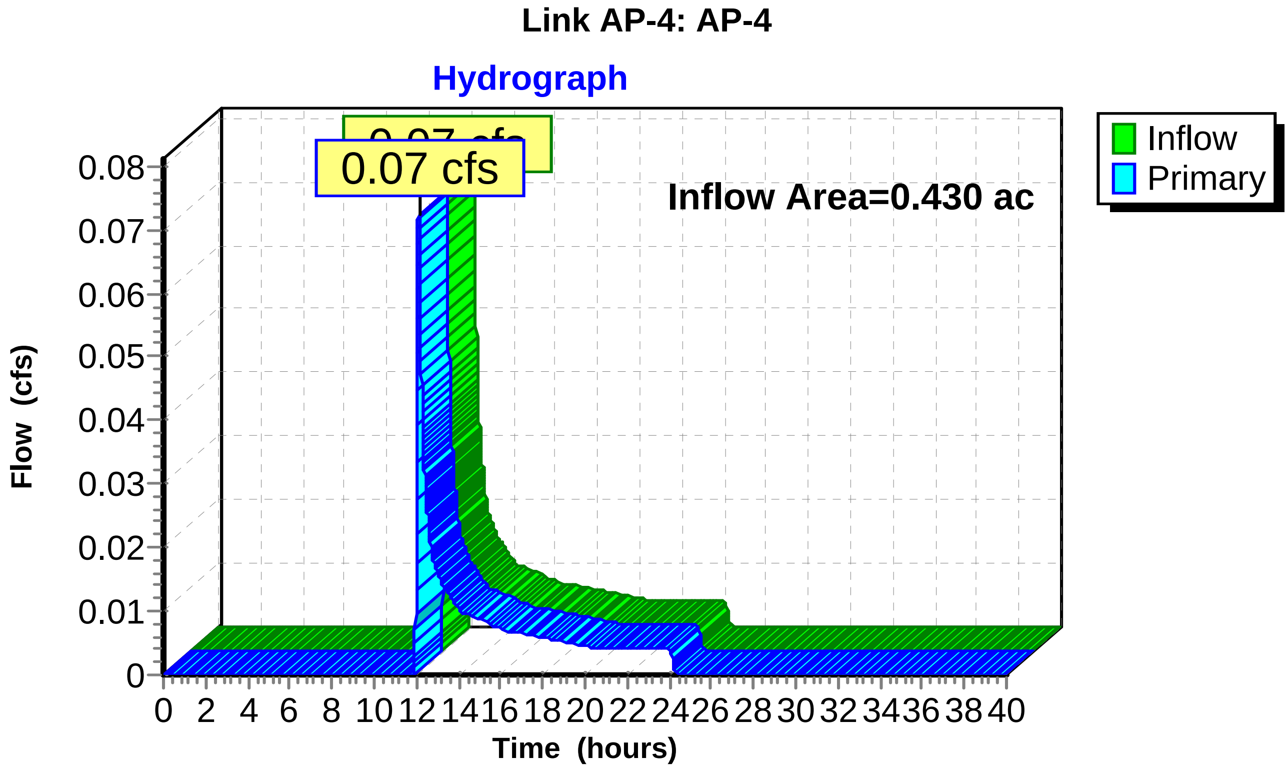
Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Summary for Link AP-4: AP-4

Inflow Area = 0.430 ac, 10.94% Impervious, Inflow Depth = 0.24" for 1-yr event
Inflow = 0.07 cfs @ 12.12 hrs, Volume= 0.009 af
Primary = 0.07 cfs @ 12.12 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Sub 1 Runoff Area=30,321 sf 20.54% Impervious Runoff Depth=0.26"
Flow Length=100' Slope=0.0200 '/' Tc=23.0 min CN=44 Runoff=0.05 cfs 0.015 af

Subcatchment 2A: 2A Runoff Area=14,963 sf 0.00% Impervious Runoff Depth=2.21"
Flow Length=91' Slope=0.0150 '/' Tc=23.9 min CN=77 Runoff=0.76 cfs 0.063 af

Subcatchment 2B: Sub 2B Runoff Area=5.732 ac 36.65% Impervious Runoff Depth=1.46"
Flow Length=371' Tc=19.3 min CN=67 Runoff=9.04 cfs 0.699 af

Subcatchment 2C: 2C Runoff Area=0.863 ac 54.11% Impervious Runoff Depth=2.55"
Flow Length=87' Slope=0.0080 '/' Tc=13.5 min CN=81 Runoff=2.99 cfs 0.183 af

Subcatchment 2D: 2D Runoff Area=0.921 ac 50.81% Impervious Runoff Depth=2.46"
Flow Length=87' Slope=0.0080 '/' Tc=13.5 min CN=80 Runoff=3.09 cfs 0.189 af

Subcatchment 2E: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.022 af

Subcatchment 2F: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.022 af

Subcatchment 2G: 2G Runoff Area=40,156 sf 0.00% Impervious Runoff Depth=2.21"
Flow Length=232' Slope=0.0080 '/' Tc=67.5 min CN=77 Runoff=0.98 cfs 0.170 af

Subcatchment 2H: Sub 2H Runoff Area=1.161 ac 66.32% Impervious Runoff Depth=3.00"
Flow Length=163' Tc=14.0 min CN=86 Runoff=4.61 cfs 0.291 af

Subcatchment 2J: 2J Runoff Area=14,289 sf 70.12% Impervious Runoff Depth=3.10"
Tc=6.0 min CN=87 Runoff=1.75 cfs 0.085 af

Subcatchment 3A: 3A Runoff Area=2.605 ac 0.00% Impervious Runoff Depth=0.90"
Flow Length=692' Tc=25.5 min CN=58 Runoff=1.80 cfs 0.196 af

Subcatchment 3B: Garage Roof Runoff Area=0.065 ac 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=0.42 cfs 0.023 af

Subcatchment 3C: Garage Roof Runoff Area=0.065 ac 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=0.42 cfs 0.023 af

Subcatchment 3D: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.022 af

Subcatchment 4A: 4A Runoff Area=18,715 sf 10.94% Impervious Runoff Depth=1.20"
Flow Length=155' Tc=14.0 min CN=63 Runoff=0.64 cfs 0.043 af

Reach 3R: TO CB'S Avg. Flow Depth=0.08' Max Vel=0.06 fps Inflow=0.77 cfs 0.043 af
n=0.400 L=180.0' S=0.0083 '/' Capacity=1.76 cfs Outflow=0.21 cfs 0.043 af

Reach 4R: TO CB'S Avg. Flow Depth=0.11' Max Vel=0.07 fps Inflow=1.21 cfs 0.068 af
n=0.400 L=180.0' S=0.0083 '/' Capacity=2.52 cfs Outflow=0.37 cfs 0.068 af

Pond 2BP: POCKET POND-ABOVE PERM Peak Elev=319.63' Storage=24,003 cf Inflow=13.36 cfs 1.069 af
Outflow=2.96 cfs 1.057 af

Pond 2CP1: REAR BIO-RETENTION Peak Elev=321.77' Storage=706 cf Inflow=2.99 cfs 0.183 af
Primary=0.03 cfs 0.039 af Secondary=2.79 cfs 0.144 af Outflow=2.82 cfs 0.183 af

Pond 2CP2: REAR BIO-RETENTION Peak Elev=317.64' Storage=128 cf Inflow=0.03 cfs 0.039 af
Outflow=0.03 cfs 0.039 af

Pond 2DP1: REAR BIO-RETENTION Peak Elev=321.83' Storage=919 cf Inflow=3.09 cfs 0.189 af
Primary=0.03 cfs 0.046 af Secondary=2.85 cfs 0.143 af Outflow=2.89 cfs 0.189 af

Pond 2DP2: REAR BIO-RETENTION Peak Elev=317.84' Storage=322 cf Inflow=0.03 cfs 0.046 af
Outflow=0.03 cfs 0.046 af

Pond 2EP1: Stormwater Planter Peak Elev=327.30' Storage=111 cf Inflow=0.39 cfs 0.022 af
Primary=0.01 cfs 0.011 af Secondary=0.38 cfs 0.011 af Outflow=0.39 cfs 0.022 af

Pond 2EP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.011 af
Outflow=0.01 cfs 0.011 af

Pond 2FP1: Stormwater Planter Peak Elev=327.30' Storage=111 cf Inflow=0.39 cfs 0.022 af
Primary=0.01 cfs 0.011 af Secondary=0.38 cfs 0.011 af Outflow=0.39 cfs 0.022 af

Pond 2FP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.011 af
Outflow=0.01 cfs 0.011 af

Pond 2HP1: FRONT BIO-RETENTION Peak Elev=323.84' Storage=2,065 cf Inflow=4.61 cfs 0.291 af
Primary=0.07 cfs 0.096 af Secondary=3.79 cfs 0.194 af Outflow=3.86 cfs 0.291 af

Pond 2HP2: FRONT BIO-RETENTION Peak Elev=319.69' Storage=443 cf Inflow=0.07 cfs 0.096 af
Outflow=0.07 cfs 0.095 af

Pond 2JP1: BIORETENTION IN FRONT OF APT Peak Elev=322.45' Storage=262 cf Inflow=1.75 cfs 0.085 af
Primary=0.06 cfs 0.045 af Secondary=1.65 cfs 0.040 af Outflow=1.72 cfs 0.085 af

Pond 2JP2: BIORETENTION IN FRONT OF Peak Elev=320.35' Storage=1,118 cf Inflow=0.06 cfs 0.045 af
Outflow=0.02 cfs 0.040 af

Pond 2P: SUBSURFACE DETENTION Peak Elev=314.83' Storage=9,948 cf Inflow=5.69 cfs 0.372 af
Outflow=0.18 cfs 0.312 af

Pond 3BP1: Stormwater Planter Peak Elev=327.33' Storage=117 cf Inflow=0.42 cfs 0.023 af
Primary=0.01 cfs 0.011 af Secondary=0.41 cfs 0.012 af Outflow=0.41 cfs 0.023 af

Pond 3BP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.011 af
Outflow=0.01 cfs 0.011 af

Pond 3CP1: Stormwater Planter Peak Elev=327.33' Storage=117 cf Inflow=0.42 cfs 0.023 af
Primary=0.01 cfs 0.011 af Secondary=0.41 cfs 0.012 af Outflow=0.41 cfs 0.023 af

Pond 3CP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.011 af
Outflow=0.01 cfs 0.011 af

Pond 3DP1: Stormwater Planter Peak Elev=327.30' Storage=111 cf Inflow=0.39 cfs 0.022 af
Primary=0.01 cfs 0.011 af Secondary=0.38 cfs 0.011 af Outflow=0.39 cfs 0.022 af

Pond 3DP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.011 af
Outflow=0.01 cfs 0.011 af

Pond 3P: POCKET POND FOREBAY Peak Elev=317.00' Storage=2,311 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 7P: perm pool Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Pond 13P: fore bay perm pool Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Link 3L: TOTAL SITE Q Inflow=6.29 cfs 1.953 af
Primary=6.29 cfs 1.953 af

Link AP-2: AP-2 Inflow=4.43 cfs 1.645 af
Primary=4.43 cfs 1.645 af

Link AP-3: AP-3 Inflow=2.15 cfs 0.264 af
Primary=2.15 cfs 0.264 af

Link AP-4: AP-4 Inflow=0.64 cfs 0.043 af
Primary=0.64 cfs 0.043 af

Total Runoff Area = 14.314 ac Runoff Volume = 2.046 af Average Runoff Depth = 1.71"
68.29% Pervious = 9.775 ac 31.71% Impervious = 4.539 ac

Summary for Subcatchment 1: Sub 1

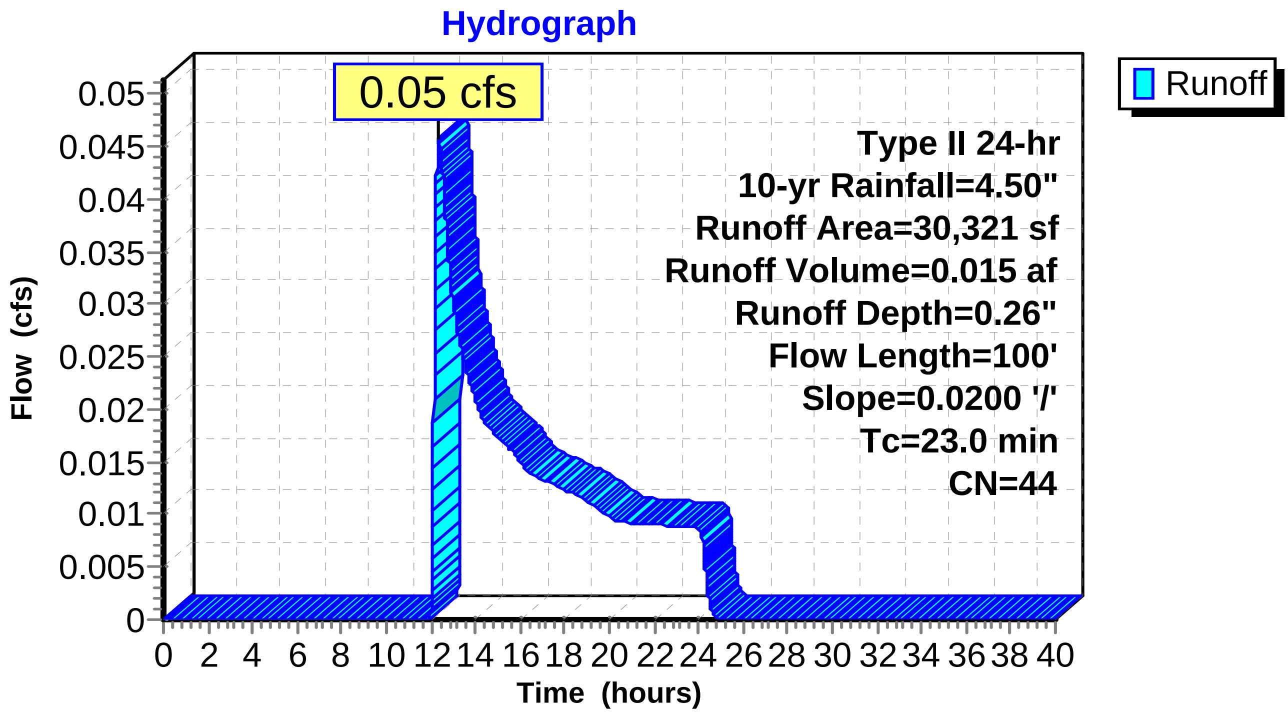
Runoff = 0.05 cfs @ 12.34 hrs, Volume= 0.015 af, Depth= 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (sf)	CN	Description
21,078	30	Woods, Good, HSG A
6,229	98	Paved parking, HSG A
3,014	30	Woods, Good, HSG A
30,321	44	Weighted Average
24,092		79.46% Pervious Area
6,229		20.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	100	0.0200	0.07		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"

Subcatchment 1: Sub 1



Summary for Subcatchment 2A: 2A

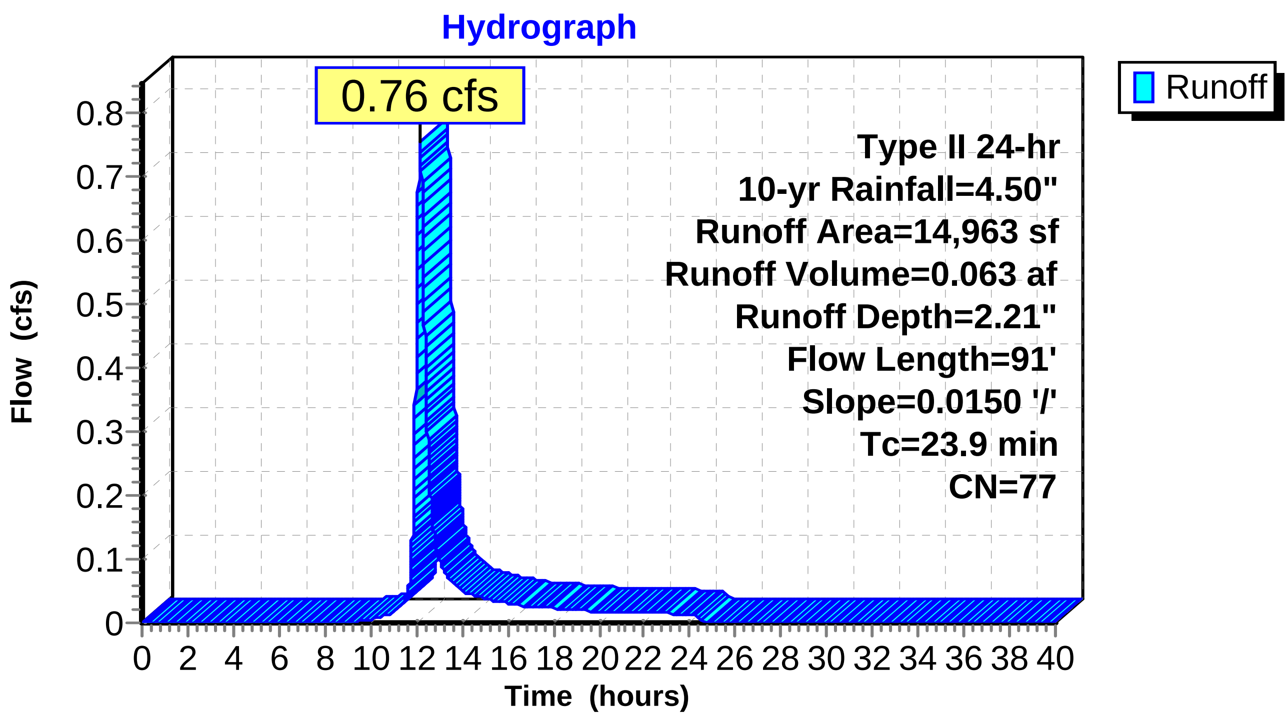
Runoff = 0.76 cfs @ 12.18 hrs, Volume= 0.063 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (sf)	CN	Description
13,787	77	Woods, Good, HSG D
1,176	80	>75% Grass cover, Good, HSG D
14,963	77	Weighted Average
14,963		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	91	0.0150	0.06		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"

Subcatchment 2A: 2A



Summary for Subcatchment 2B: Sub 2B

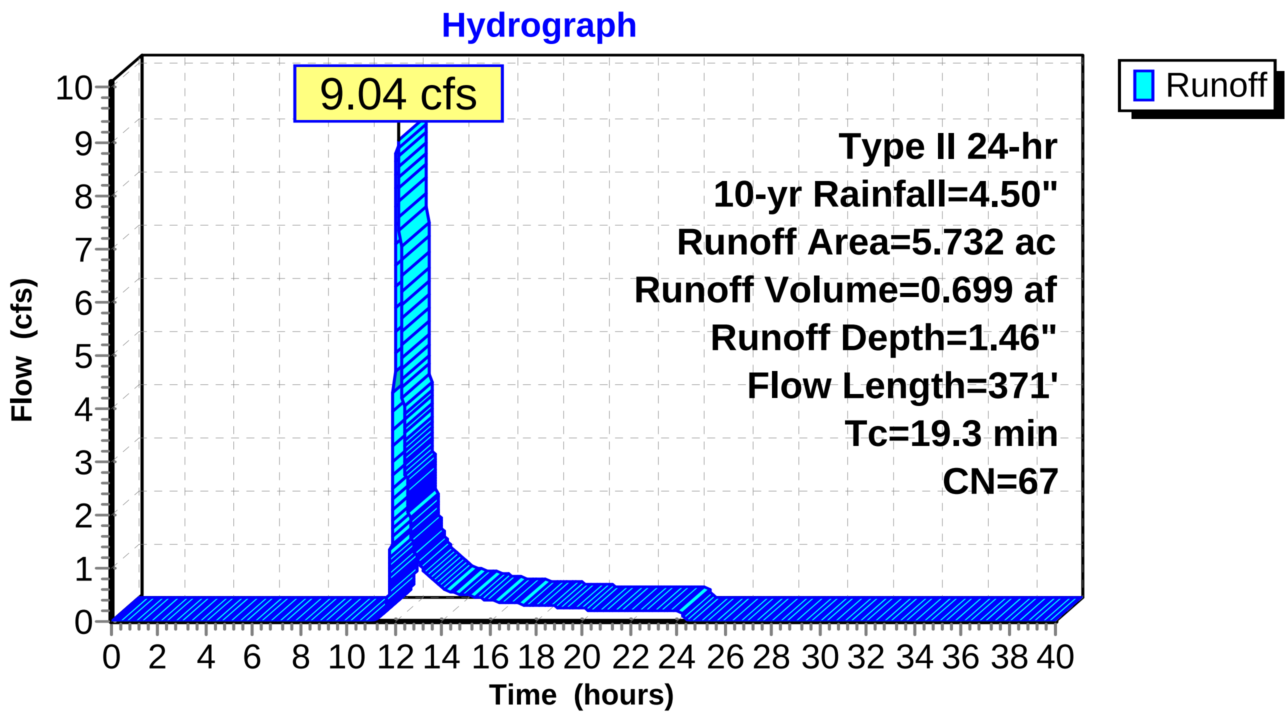
Runoff = 9.04 cfs @ 12.13 hrs, Volume= 0.699 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
0.373	39	>75% Grass cover, Good, HSG A
2.101	98	Paved parking, HSG A
1.709	30	Woods, Good, HSG A
0.077	55	Woods, Good, HSG B
0.313	61	>75% Grass cover, Good, HSG B
0.879	74	>75% Grass cover, Good, HSG C
0.280	80	>75% Grass cover, Good, HSG D
5.732	67	Weighted Average
3.631		63.35% Pervious Area
2.101		36.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
4.1	220	0.0320	0.89		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
0.4	51	0.0100	2.03		**Shallow Concentrated Flow, PAVED** Paved Kv= 20.3 fps
19.3	371	Total			

Subcatchment 2B: Sub 2B



Summary for Subcatchment 2C: 2C

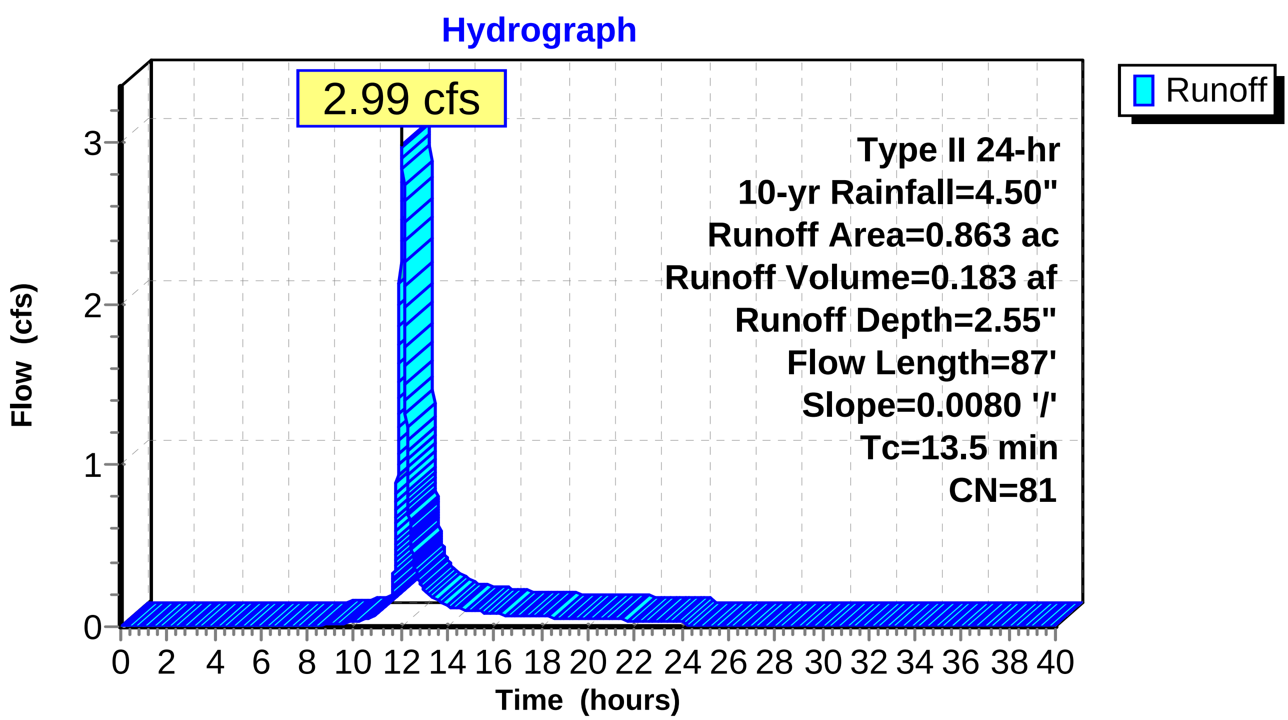
Runoff = 2.99 cfs @ 12.05 hrs, Volume= 0.183 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
0.396	61	>75% Grass cover, Good, HSG B
0.467	98	Paved parking, HSG A
0.863	81	Weighted Average
0.396		45.89% Pervious Area
0.467		54.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	87	0.0080	0.11		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 2.80"

Subcatchment 2C: 2C



Summary for Subcatchment 2D: 2D

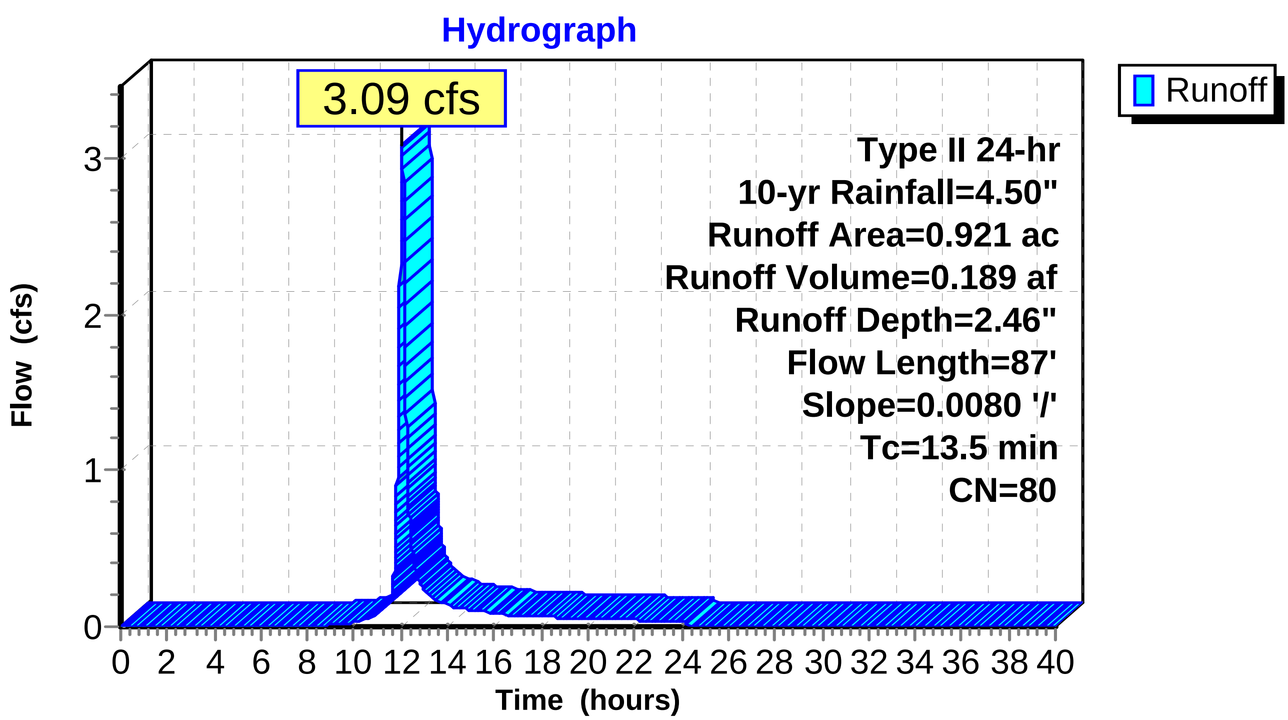
Runoff = 3.09 cfs @ 12.05 hrs, Volume= 0.189 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
0.453	61	>75% Grass cover, Good, HSG B
0.468	98	Paved parking, HSG A
0.921	80	Weighted Average
0.453		49.19% Pervious Area
0.468		50.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	87	0.0080	0.11		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 2.80"

Subcatchment 2D: 2D



Summary for Subcatchment 2E: Garage Roof

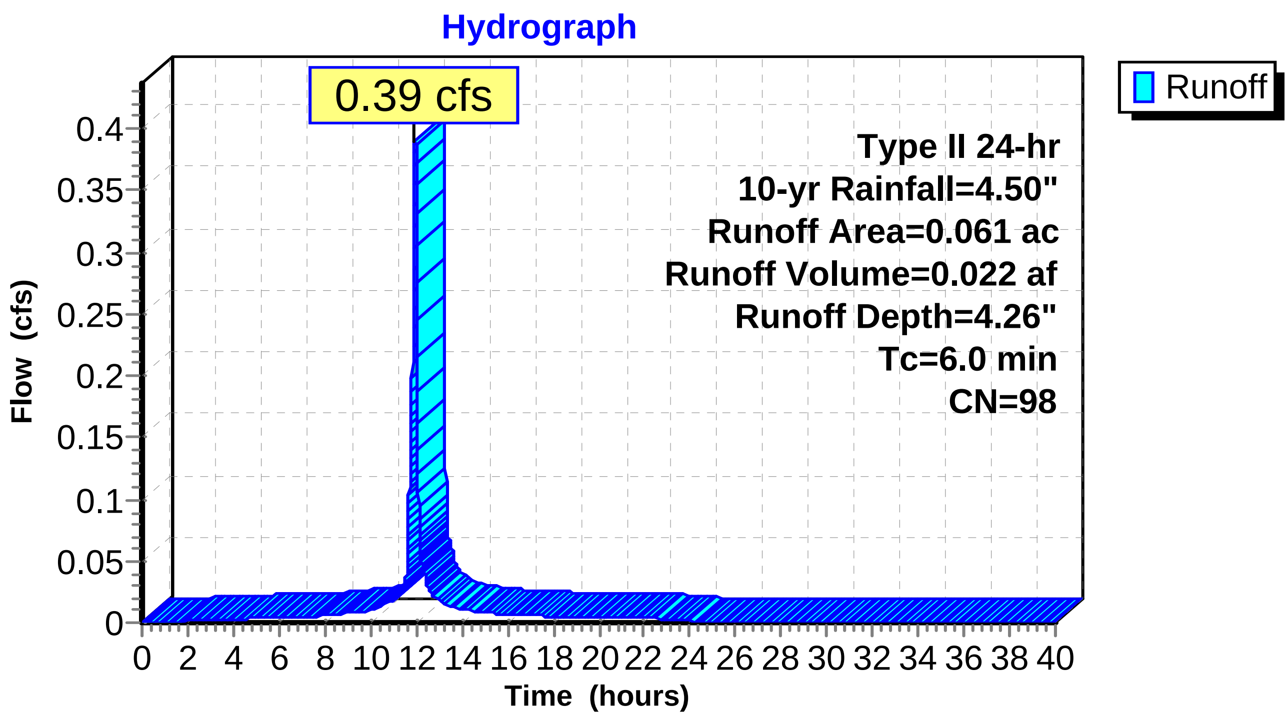
Runoff = 0.39 cfs @ 11.97 hrs, Volume= 0.022 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 2E: Garage Roof



Summary for Subcatchment 2F: Garage Roof

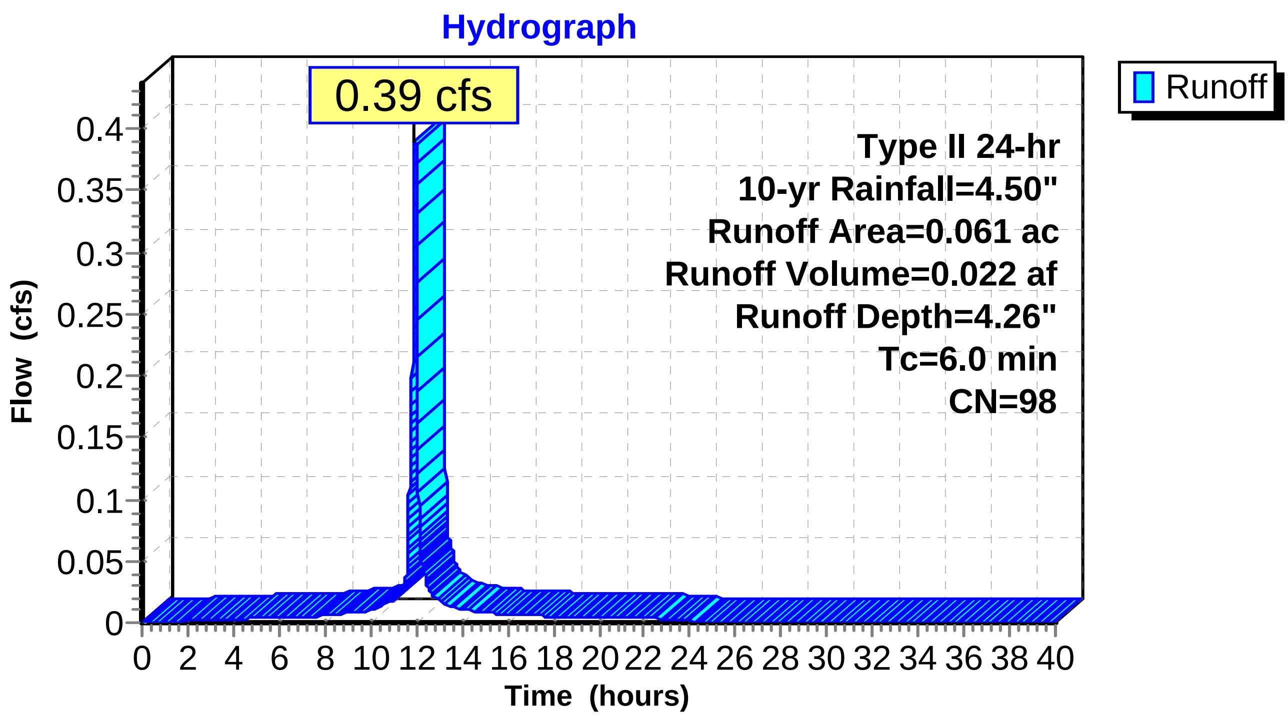
Runoff = 0.39 cfs @ 11.97 hrs, Volume= 0.022 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 2F: Garage Roof



Summary for Subcatchment 2G: 2G

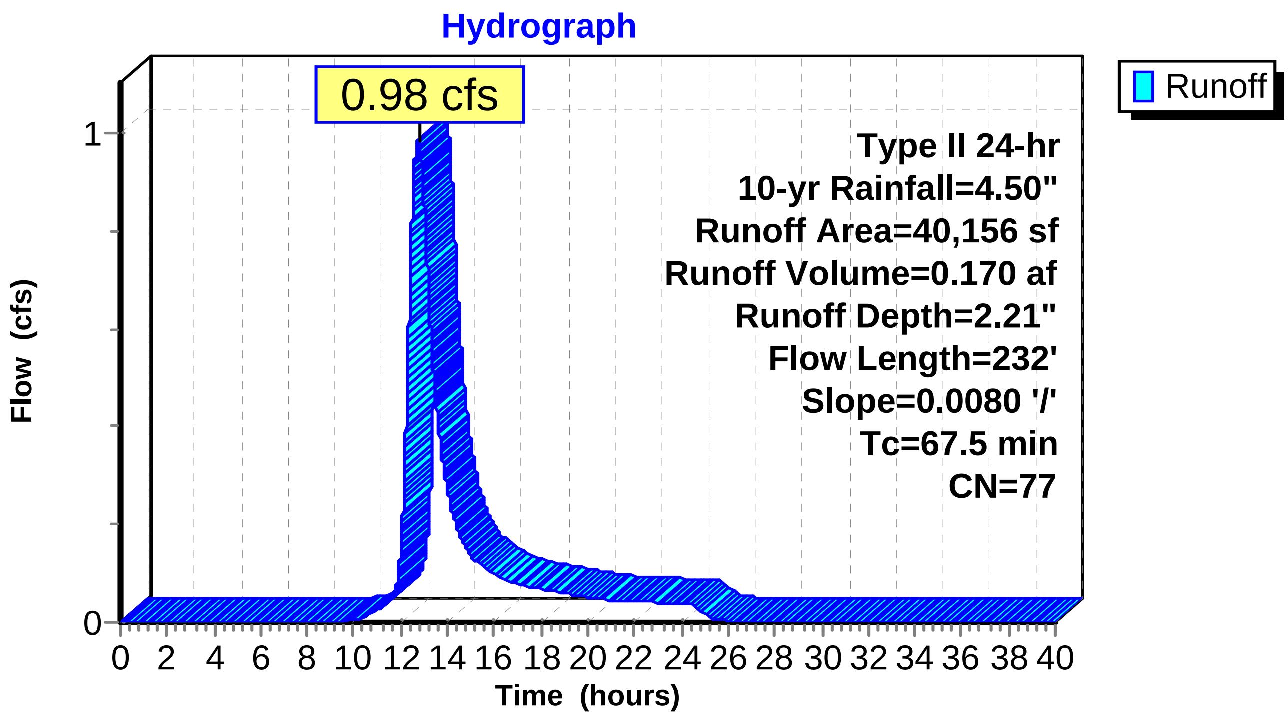
Runoff = 0.98 cfs @ 12.75 hrs, Volume= 0.170 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (sf)	CN	Description
40,156	77	Woods, Good, HSG D
40,156		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
57.7	100	0.0080	0.03		**Sheet Flow, WOODS** Woods: Dense underbrush n= 0.800 P2= 2.80"
9.8	132	0.0080	0.22		**Shallow Concentrated Flow, WOODS** Forest w/Heavy Litter Kv= 2.5 fps
67.5	232	Total			

Subcatchment 2G: 2G



Summary for Subcatchment 2H: Sub 2H

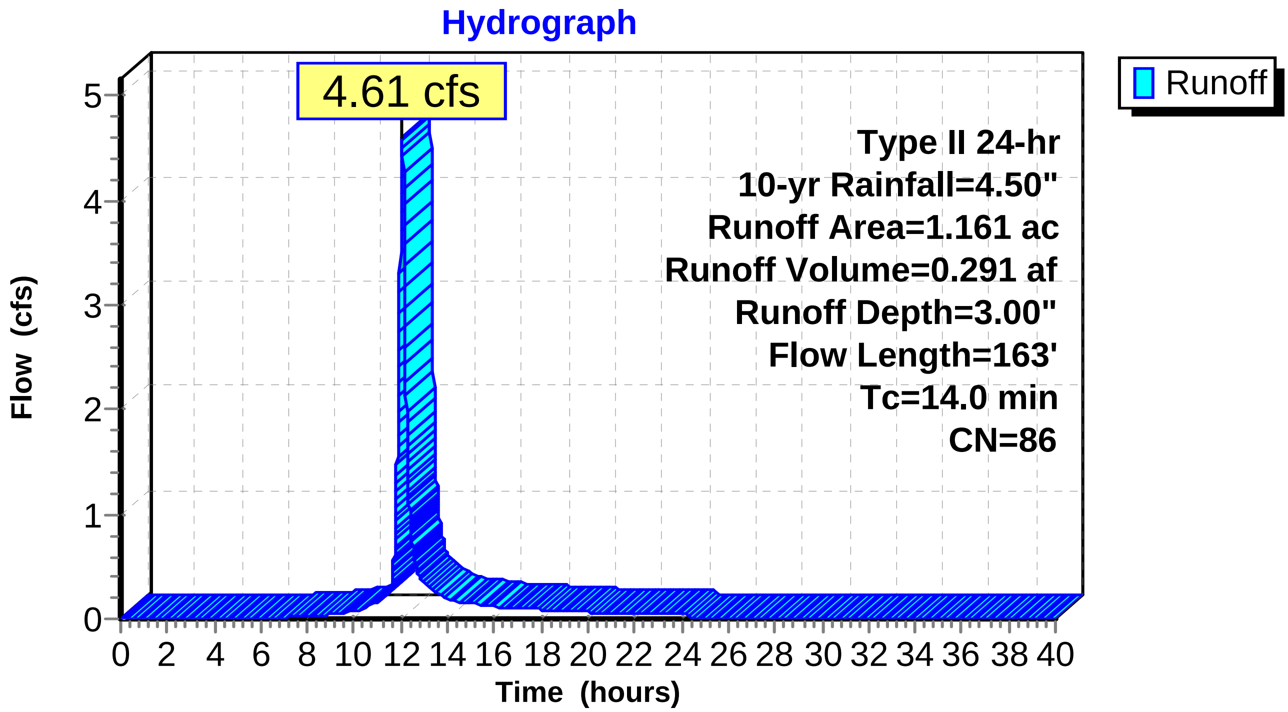
Runoff = 4.61 cfs @ 12.06 hrs, Volume= 0.291 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
0.770	98	Paved parking, HSG A
0.006	55	Woods, Good, HSG B
0.385	61	>75% Grass cover, Good, HSG B
1.161	86	Weighted Average
0.391		33.68% Pervious Area
0.770		66.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	36	0.0100	0.04		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
0.2	48	0.0950	4.96		**Shallow Concentrated Flow, LAWN** Unpaved Kv= 16.1 fps
0.4	79	0.0300	3.52		**Shallow Concentrated Flow, PAVED** Paved Kv= 20.3 fps
14.0	163	Total			

Subcatchment 2H: Sub 2H



Summary for Subcatchment 2J: 2J

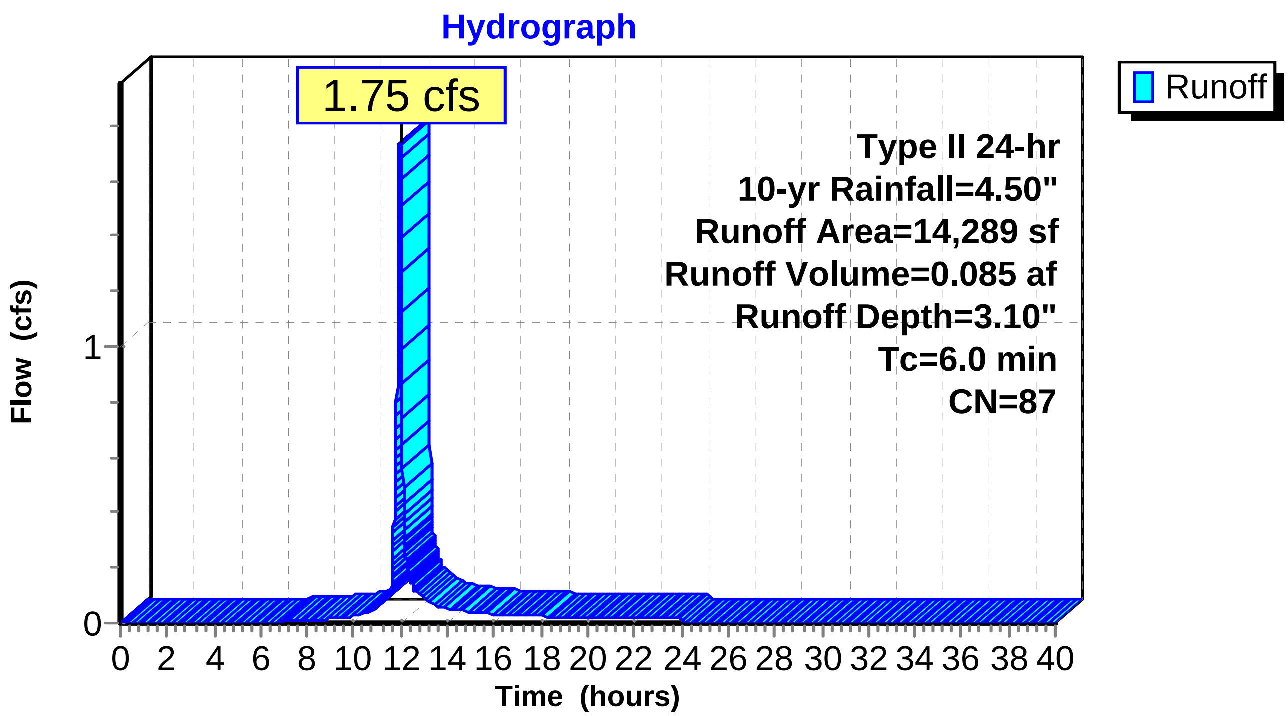
Runoff = 1.75 cfs @ 11.97 hrs, Volume= 0.085 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (sf)	CN	Description
4,269	61	>75% Grass cover, Good, HSG B
10,020	98	Paved parking, HSG A
14,289	87	Weighted Average
4,269		29.88% Pervious Area
10,020		70.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, MIN**

Subcatchment 2J: 2J



Summary for Subcatchment 3A: 3A

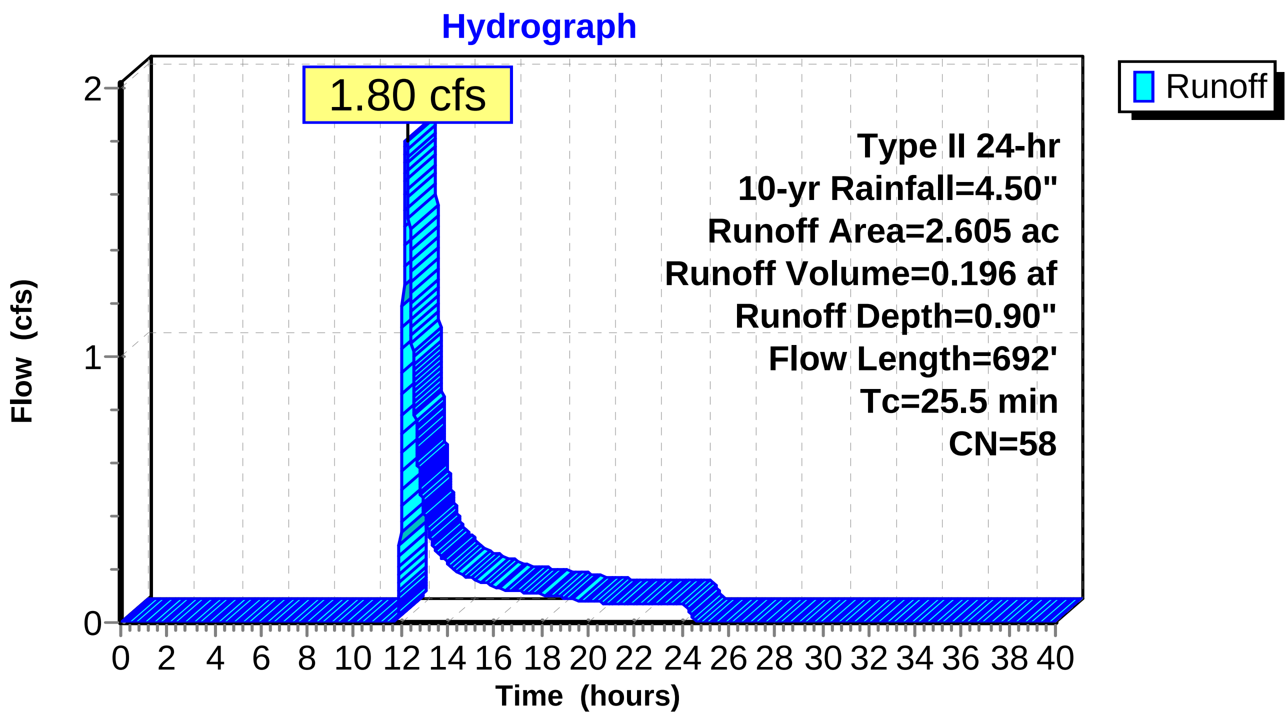
Runoff = 1.80 cfs @ 12.22 hrs, Volume= 0.196 af, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
1.618	70	Woods, Good, HSG C
0.667	30	Woods, Good, HSG A
0.249	55	Woods, Good, HSG B
0.071	74	>75% Grass cover, Good, HSG C
2.605	58	Weighted Average
2.605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0700	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
11.6	592	0.0290	0.85		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
25.5	692	Total			

Subcatchment 3A: 3A



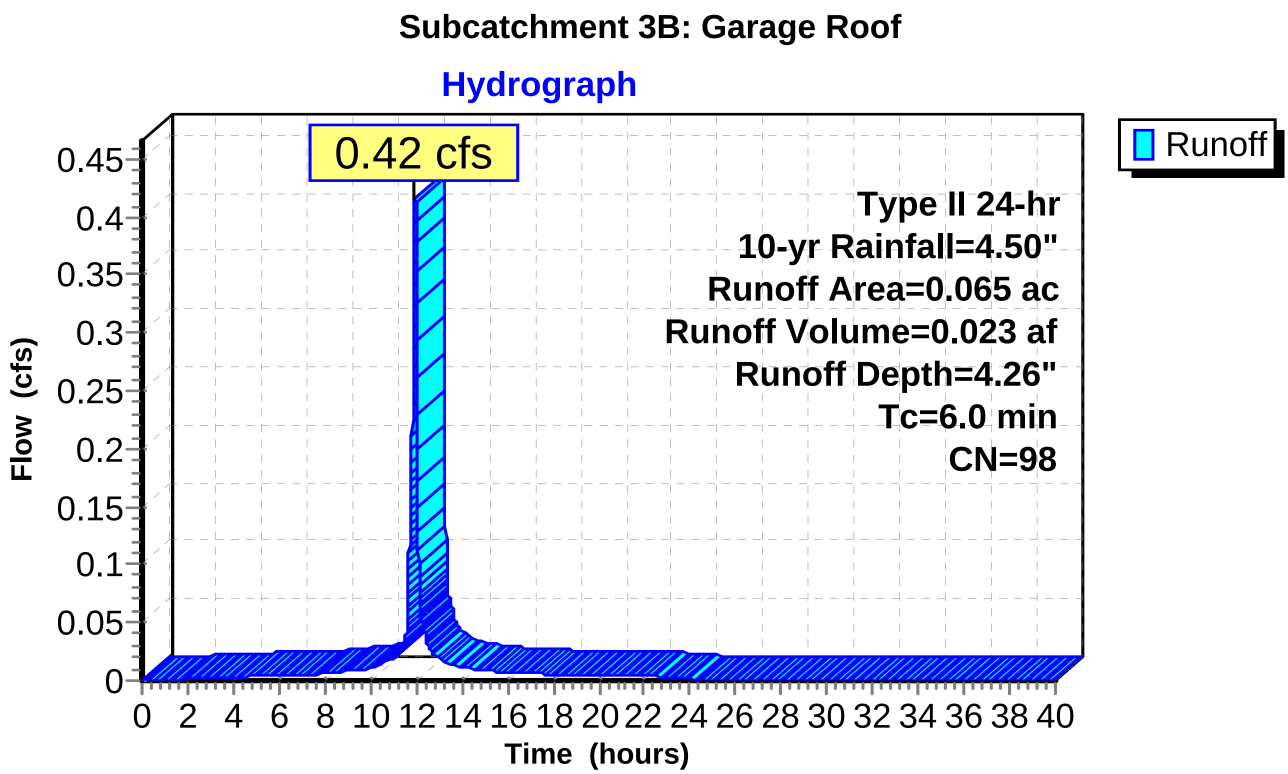
Summary for Subcatchment 3B: Garage Roof

Runoff = 0.42 cfs @ 11.97 hrs, Volume= 0.023 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
0.065	98	Paved parking, HSG A
0.065		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**



Summary for Subcatchment 3C: Garage Roof

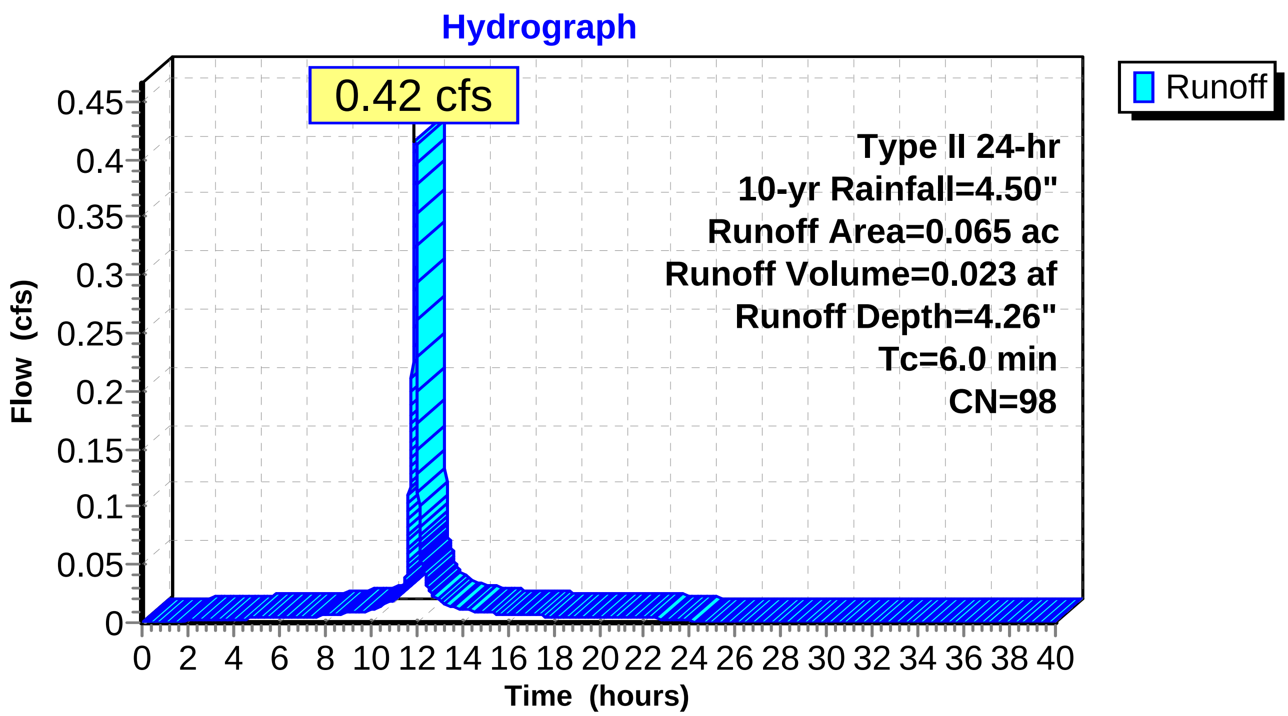
Runoff = 0.42 cfs @ 11.97 hrs, Volume= 0.023 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
0.065	98	Paved parking, HSG A
0.065		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3C: Garage Roof



Summary for Subcatchment 3D: Garage Roof

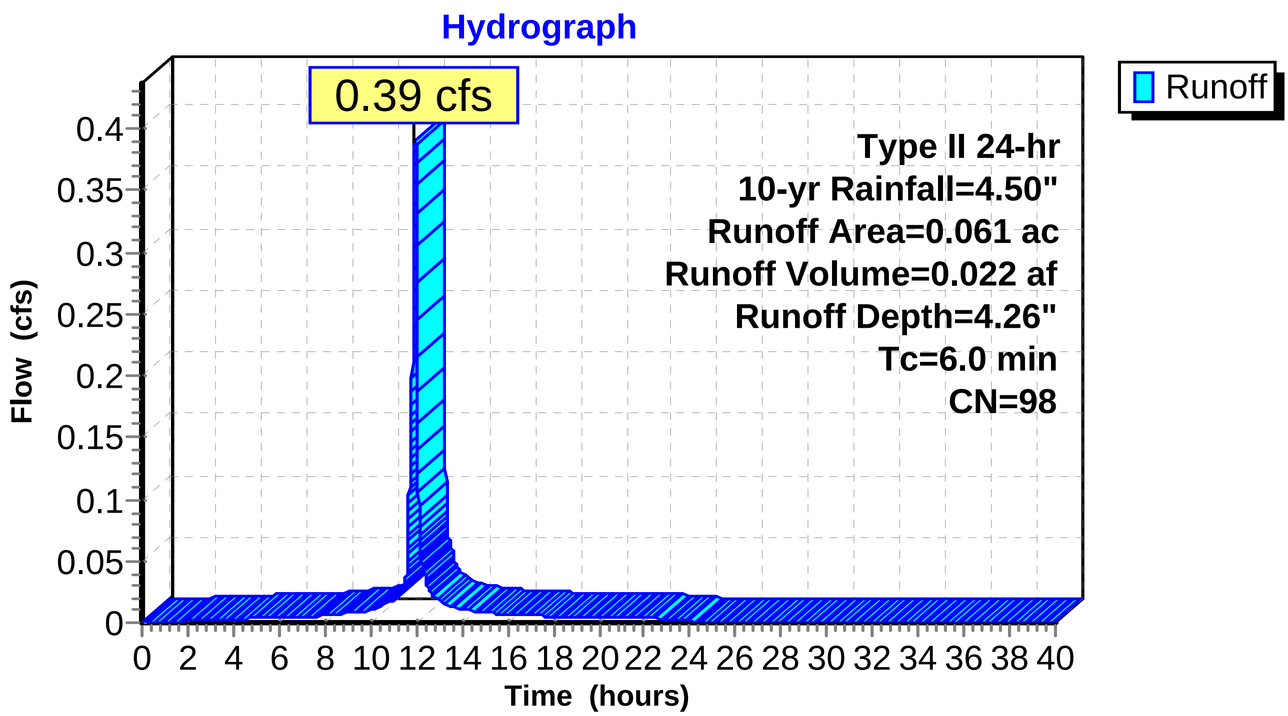
Runoff = 0.39 cfs @ 11.97 hrs, Volume= 0.022 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3D: Garage Roof



Summary for Subcatchment 4A: 4A

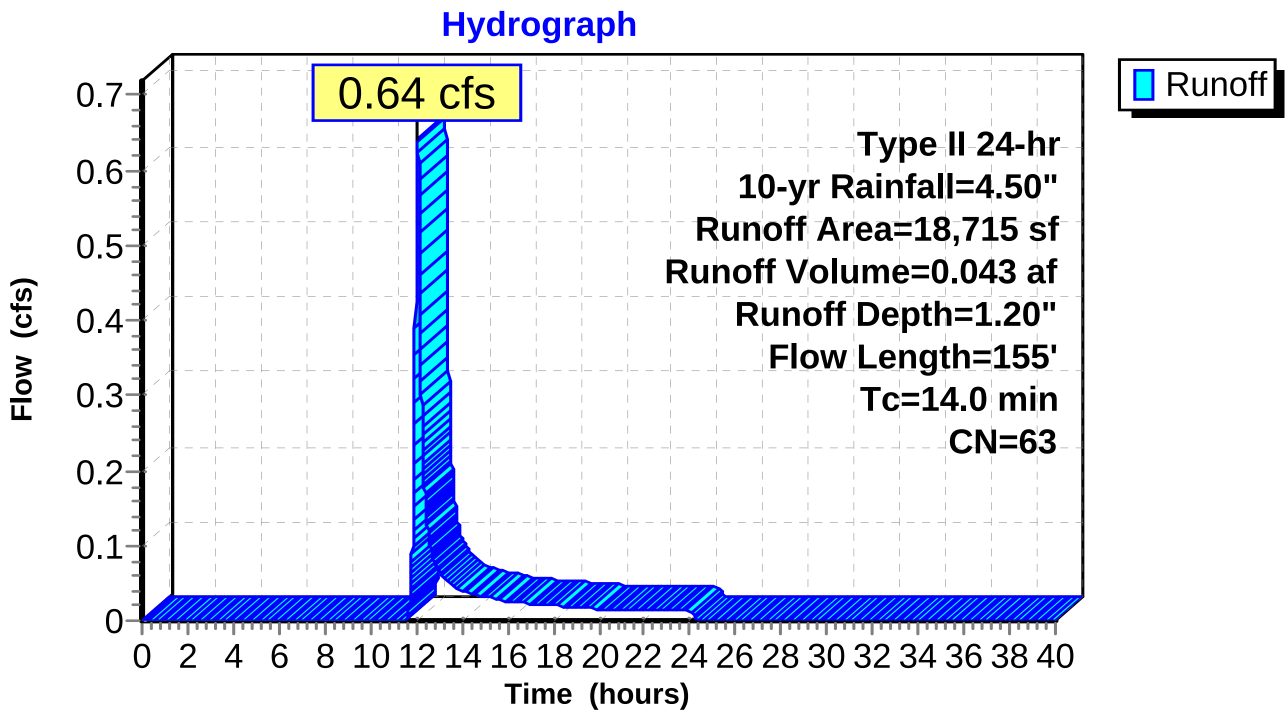
Runoff = 0.64 cfs @ 12.07 hrs, Volume= 0.043 af, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.50"

Area (sf)	CN	Description
10,149	61	>75% Grass cover, Good, HSG B
6,519	55	Woods, Good, HSG B
2,047	98	Paved parking, HSG A
18,715	63	Weighted Average
16,668		89.06% Pervious Area
2,047		10.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	30	0.0200	0.06		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
0.9	16	0.2500	0.30		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.80"
3.9	54	0.0700	0.23		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.80"
0.4	55	0.0200	2.28		**Shallow Concentrated Flow, grass** Unpaved Kv= 16.1 fps
14.0	155	Total			

Subcatchment 4A: 4A



Summary for Reach 3R: TO CB'S

Inflow Area = 0.122 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-yr event
Inflow = 0.77 cfs @ 11.98 hrs, Volume= 0.043 af
Outflow = 0.21 cfs @ 12.12 hrs, Volume= 0.043 af, Atten= 73%, Lag= 8.7 min

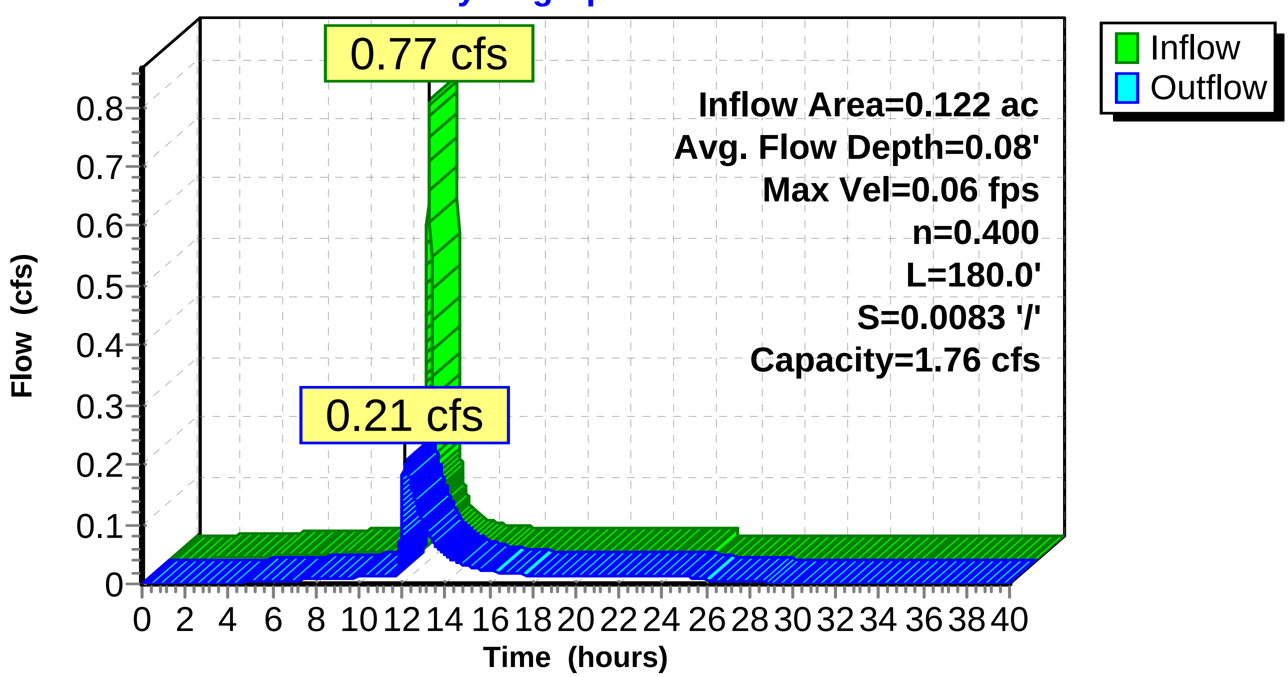
Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.06 fps, Min. Travel Time= 53.8 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 188.2 min

Peak Storage= 666 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.25' Flow Area= 16.3 sf, Capacity= 1.76 cfs

40.00' x 0.25' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 100.0 '/' Top Width= 90.00'
Length= 180.0' Slope= 0.0083 '/'
Inlet Invert= 311.00', Outlet Invert= 309.50'

Reach 3R: TO CB'S

Hydrograph



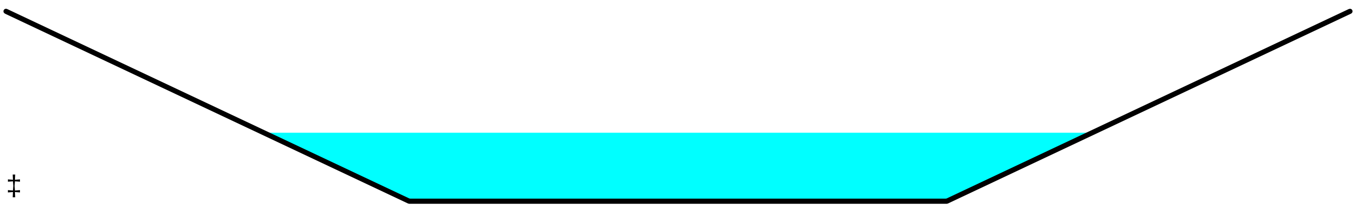
Summary for Reach 4R: TO CB'S

Inflow Area = 0.191 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-yr event
Inflow = 1.21 cfs @ 11.98 hrs, Volume= 0.068 af
Outflow = 0.37 cfs @ 12.11 hrs, Volume= 0.068 af, Atten= 69%, Lag= 8.0 min

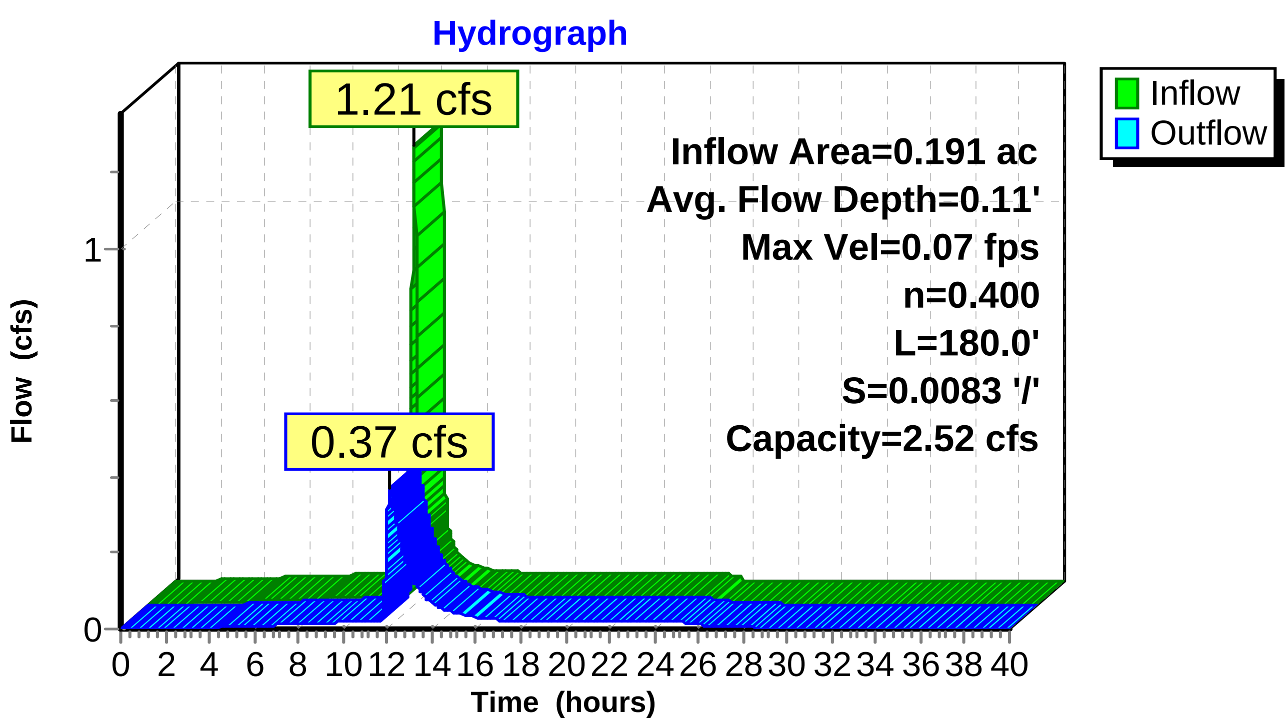
Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.07 fps, Min. Travel Time= 44.3 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 160.6 min

Peak Storage= 988 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.30' Flow Area= 21.0 sf, Capacity= 2.52 cfs

40.00' x 0.30' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 100.0 '/' Top Width= 100.00'
Length= 180.0' Slope= 0.0083 '/'
Inlet Invert= 311.00', Outlet Invert= 309.50'



Reach 4R: TO CB'S



Summary for Pond 2BP: POCKET POND-ABOVE PERM POOL

Inflow Area = 7.221 ac, 42.94% Impervious, Inflow Depth > 1.78" for 10-yr event
Inflow = 13.36 cfs @ 12.12 hrs, Volume= 1.069 af
Outflow = 2.96 cfs @ 12.60 hrs, Volume= 1.057 af, Atten= 78%, Lag= 28.7 min
Primary = 2.96 cfs @ 12.60 hrs, Volume= 1.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Starting Elev= 317.00' Surf.Area= 9,188 sf Storage= 6,201 cf
Peak Elev= 319.63' @ 12.60 hrs Surf.Area= 13,710 sf Storage= 24,003 cf (17,802 cf above start)

Plug-Flow detention time= 306.8 min calculated for 0.914 af (86% of inflow)
Center-of-Mass det. time= 170.0 min (1,059.1 - 889.2)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	6,201 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
#2	317.00'	52,519 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		58,720 cf	Total Available Storage

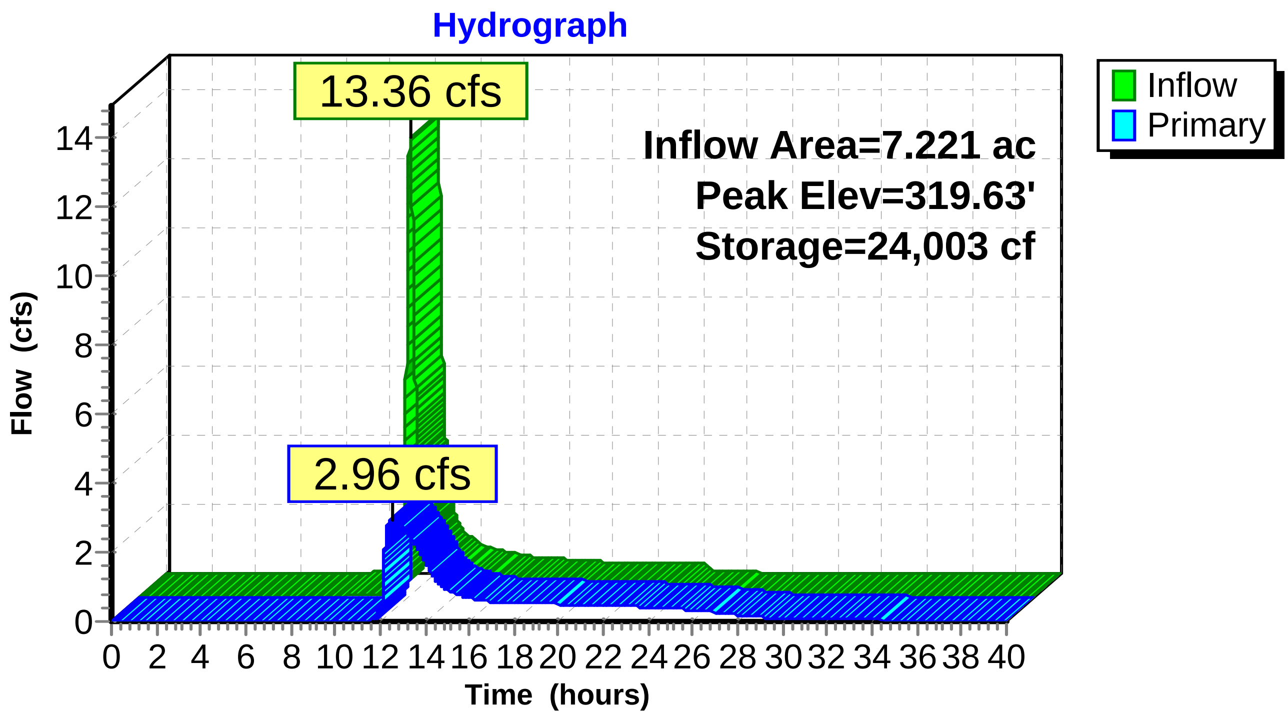
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
313.00	395	95.0	0	0	395
314.00	759	134.0	567	567	1,115
315.00	1,241	173.0	990	1,557	2,080
316.00	1,839	212.0	1,530	3,088	3,290
317.00	4,594	319.0	3,113	6,201	7,819

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.00	4,594	319.0	0	0	4,594
318.00	6,187	392.0	5,371	5,371	8,740
320.00	9,848	498.0	15,894	21,265	16,299
322.00	14,260	584.0	23,972	45,237	23,783
322.50	14,870	586.0	7,282	52,519	24,130

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**18.0" Round Culvert** L= 101.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.00' / 316.00' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.20'	**3.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	318.60'	**18.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	321.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.96 cfs @ 12.60 hrs HW=319.63' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.96 cfs of 11.68 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 7.66 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.46 cfs @ 7.32 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 2.24 cfs @ 4.48 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 2BP: POCKET POND-ABOVE PERM POOL



Summary for Pond 2CP1: REAR BIO-RETENTION

Inflow Area = 0.863 ac, 54.11% Impervious, Inflow Depth = 2.55" for 10-yr event
Inflow = 2.99 cfs @ 12.05 hrs, Volume= 0.183 af
Outflow = 2.82 cfs @ 12.09 hrs, Volume= 0.183 af, Atten= 6%, Lag= 2.3 min
Primary = 0.03 cfs @ 12.09 hrs, Volume= 0.039 af
Secondary = 2.79 cfs @ 12.09 hrs, Volume= 0.144 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 321.77' @ 12.09 hrs Surf.Area= 2,785 sf Storage= 706 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 18.2 min (845.6 - 827.5)

Volume	Invert	Avail.Storage	Storage Description
#1	321.50'	1,375 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

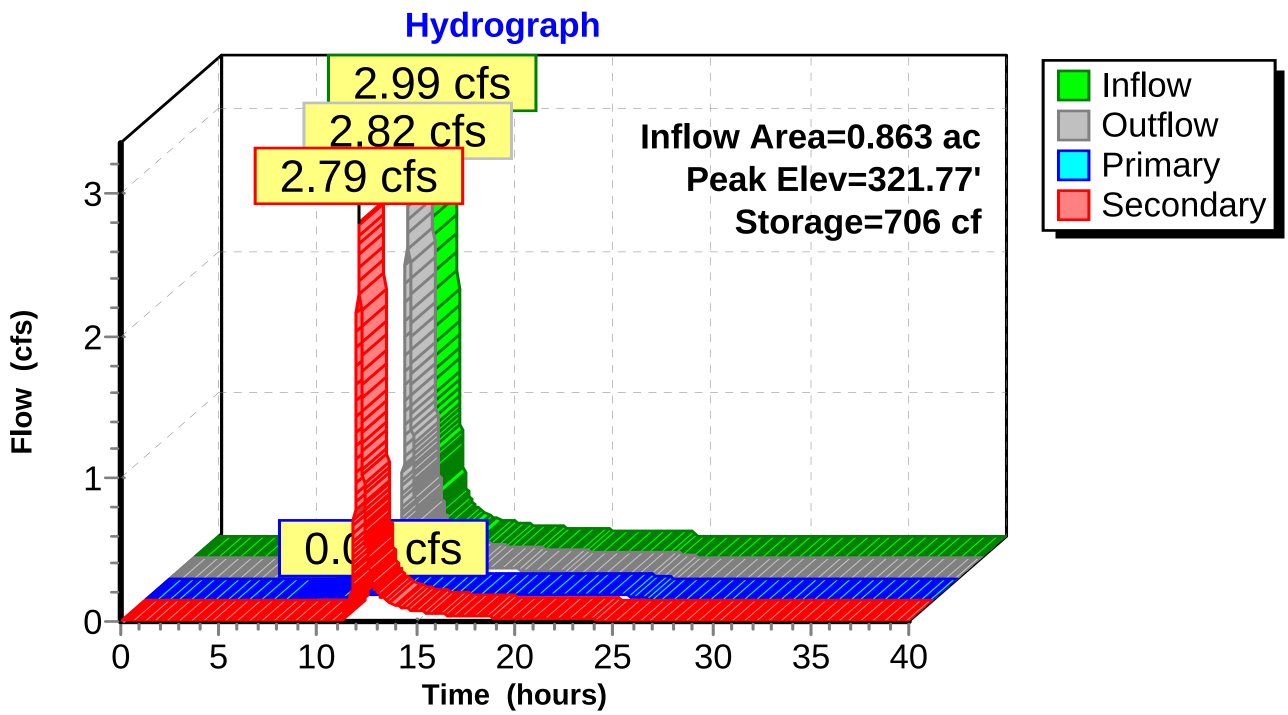
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.50	2,360	261.0	0	0	2,360
322.00	3,160	271.0	1,375	1,375	2,804

Device	Routing	Invert	Outlet Devices
#1	Primary	321.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	317.50'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	321.55'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 12.09 hrs HW=321.77' TW=317.58' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=2.78 cfs @ 12.09 hrs HW=321.77' TW=313.96' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.78 cfs of 7.35 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 2.78 cfs @ 1.55 fps)

Pond 2CP1: REAR BIO-RETENTION



Summary for Pond 2CP2: REAR BIO-RETENTION

Inflow Area = 0.863 ac, 54.11% Impervious, Inflow Depth = 0.54" for 10-yr event
Inflow = 0.03 cfs @ 12.09 hrs, Volume= 0.039 af
Outflow = 0.03 cfs @ 12.36 hrs, Volume= 0.039 af, Atten= 15%, Lag= 16.1 min
Primary = 0.03 cfs @ 12.36 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 317.64' @ 25.52 hrs Surf.Area= 2,360 sf Storage= 128 cf

Plug-Flow detention time= 62.7 min calculated for 0.039 af (100% of inflow)
Center-of-Mass det. time= 61.7 min (1,092.0 - 1,030.4)

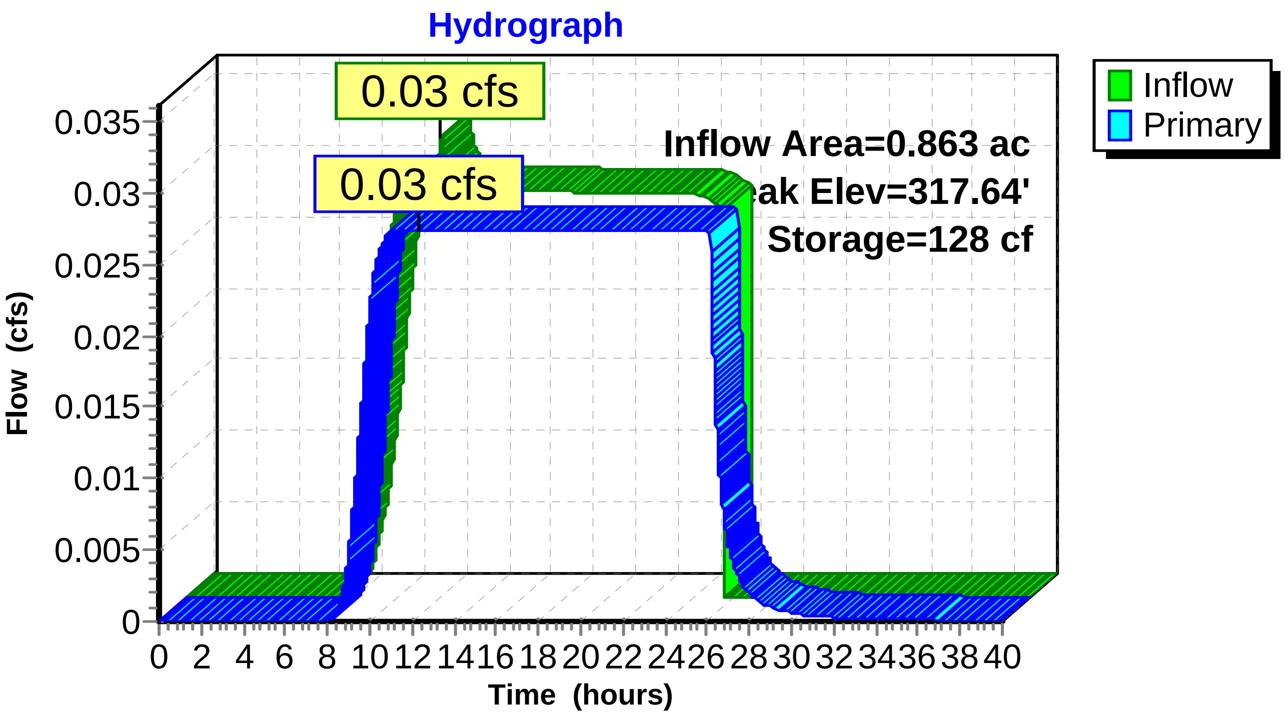
Volume	Invert	Avail.Storage	Storage Description
#1	317.50'	3,776 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 9,440 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.50	2,360	261.0	0	0	2,360
321.50	2,360	261.0	9,440	9,440	3,404

Device	Routing	Invert	Outlet Devices
#1	Primary	317.50'	**18.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.50'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	321.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 12.36 hrs HW=317.58' TW=314.49' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.03 cfs of 0.04 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2CP2: REAR BIO-RETENTION



Summary for Pond 2DP1: REAR BIO-RETENTION

Inflow Area = 0.921 ac, 50.81% Impervious, Inflow Depth = 2.46" for 10-yr event
Inflow = 3.09 cfs @ 12.05 hrs, Volume= 0.189 af
Outflow = 2.89 cfs @ 12.09 hrs, Volume= 0.189 af, Atten= 7%, Lag= 2.5 min
Primary = 0.03 cfs @ 12.09 hrs, Volume= 0.046 af
Secondary = 2.85 cfs @ 12.09 hrs, Volume= 0.143 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 321.83' @ 12.09 hrs Surf.Area= 2,972 sf Storage= 919 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.7 min (863.9 - 830.3)

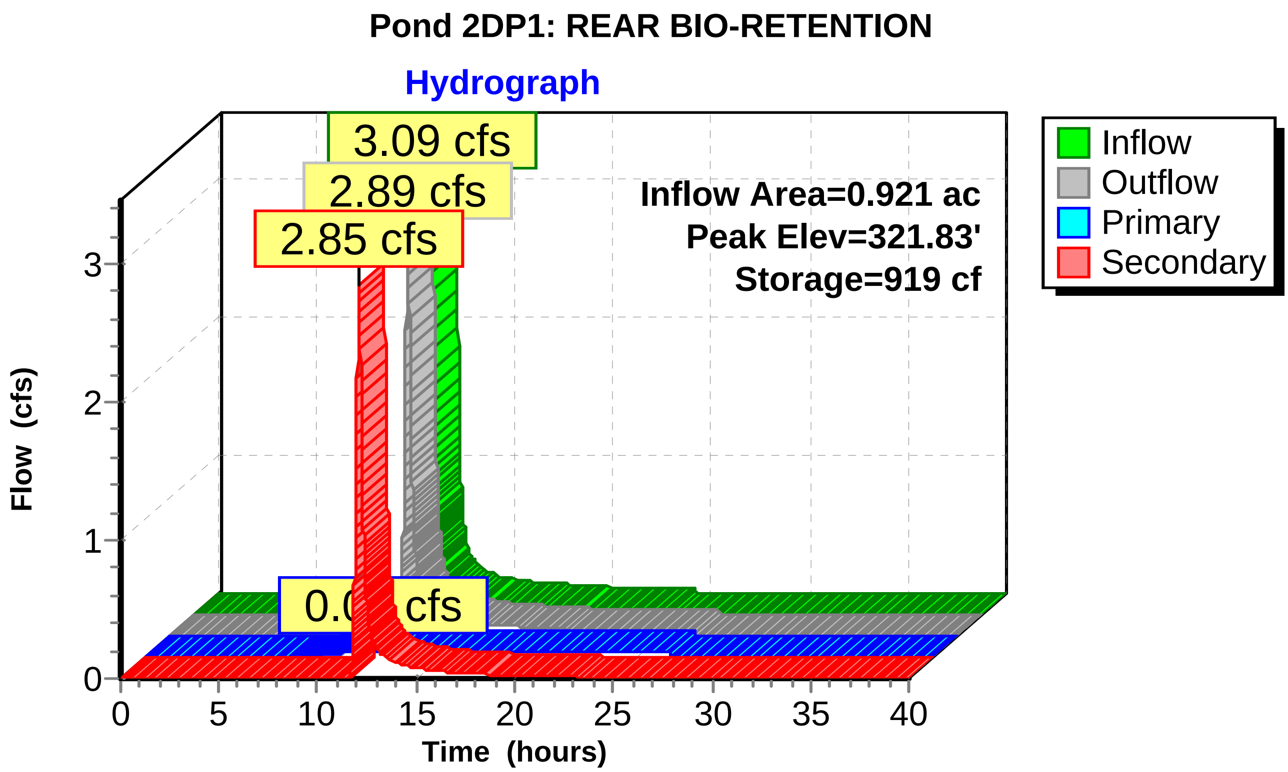
Volume	Invert	Avail.Storage	Storage Description
#1	321.50'	1,445 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.50	2,630	261.0	0	0	2,630
322.00	3,160	271.0	1,445	1,445	3,074

Device	Routing	Invert	Outlet Devices
#1	Primary	321.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	317.50'	**12.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	321.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 12.09 hrs HW=321.83' TW=317.60' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=2.85 cfs @ 12.09 hrs HW=321.83' TW=313.97' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.85 cfs of 7.40 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 2.85 cfs @ 1.56 fps)


Pond 2DP1: REAR BIO-RETENTION
Hydrograph
3.09 cfs
2.89 cfs
2.85 cfs
Inflow Area=0.921 ac
Peak Elev=321.83'
Storage=919 cf
0.0 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
0
1
2
3
0
5
10
15
20
25
30
35
40
Time (hours)

Summary for Pond 2DP2: REAR BIO-RETENTION

Inflow Area = 0.921 ac, 50.81% Impervious, Inflow Depth = 0.60" for 10-yr event
Inflow = 0.03 cfs @ 12.09 hrs, Volume= 0.046 af
Outflow = 0.03 cfs @ 11.20 hrs, Volume= 0.046 af, Atten= 21%, Lag= 0.0 min
Primary = 0.03 cfs @ 11.20 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 317.84' @ 26.71 hrs Surf.Area= 2,360 sf Storage= 322 cf

Plug-Flow detention time= 116.6 min calculated for 0.046 af (100% of inflow)
Center-of-Mass det. time= 115.6 min (1,190.5 - 1,074.9)

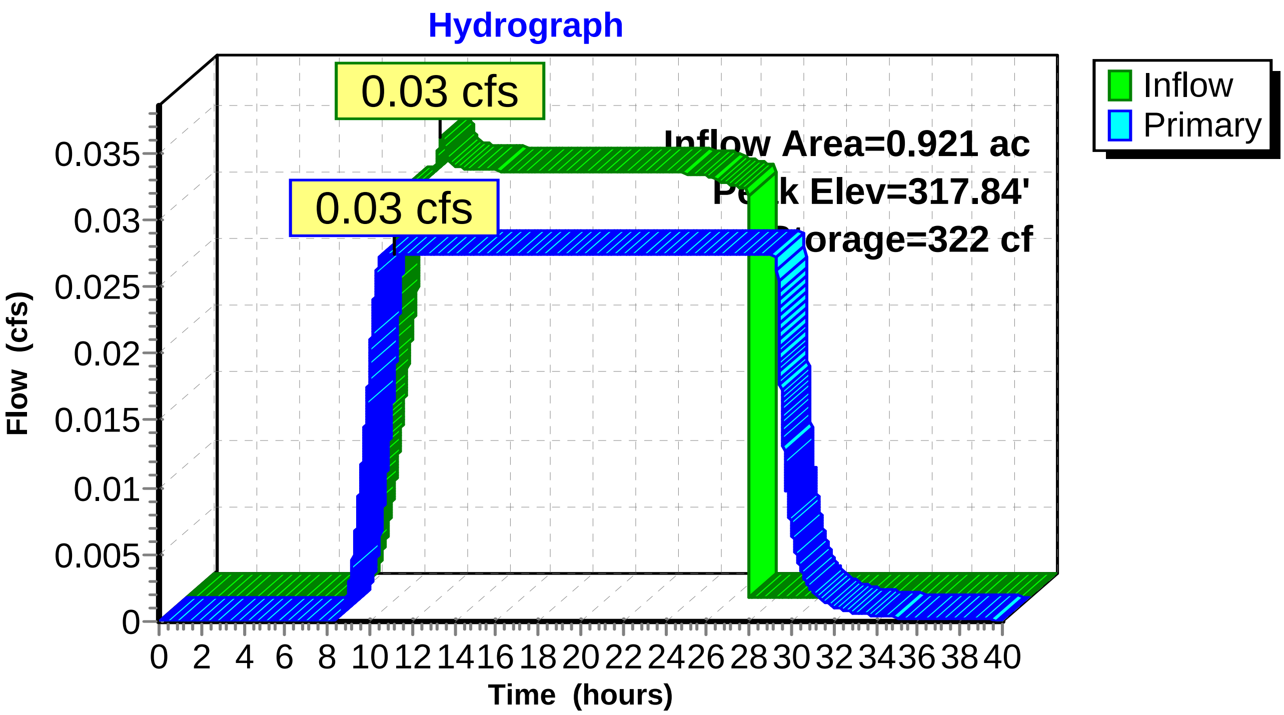
Volume	Invert	Avail.Storage	Storage Description
#1	317.50'	3,776 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 9,440 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.50	2,360	261.0	0	0	2,360
321.50	2,360	261.0	9,440	9,440	3,404

Device	Routing	Invert	Outlet Devices
#1	Primary	317.50'	**18.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.03 cfs @ 11.20 hrs HW=317.58' TW=313.07' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.03 cfs of 0.04 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Pond 2DP2: REAR BIO-RETENTION



Summary for Pond 2EP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-yr event
Inflow = 0.39 cfs @ 11.97 hrs, Volume= 0.022 af
Outflow = 0.39 cfs @ 11.98 hrs, Volume= 0.022 af, Atten= 1%, Lag= 0.7 min
Primary = 0.01 cfs @ 9.03 hrs, Volume= 0.011 af
Secondary = 0.38 cfs @ 11.98 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.30' @ 11.98 hrs Surf.Area= 140 sf Storage= 111 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 61.0 min (806.8 - 745.8)

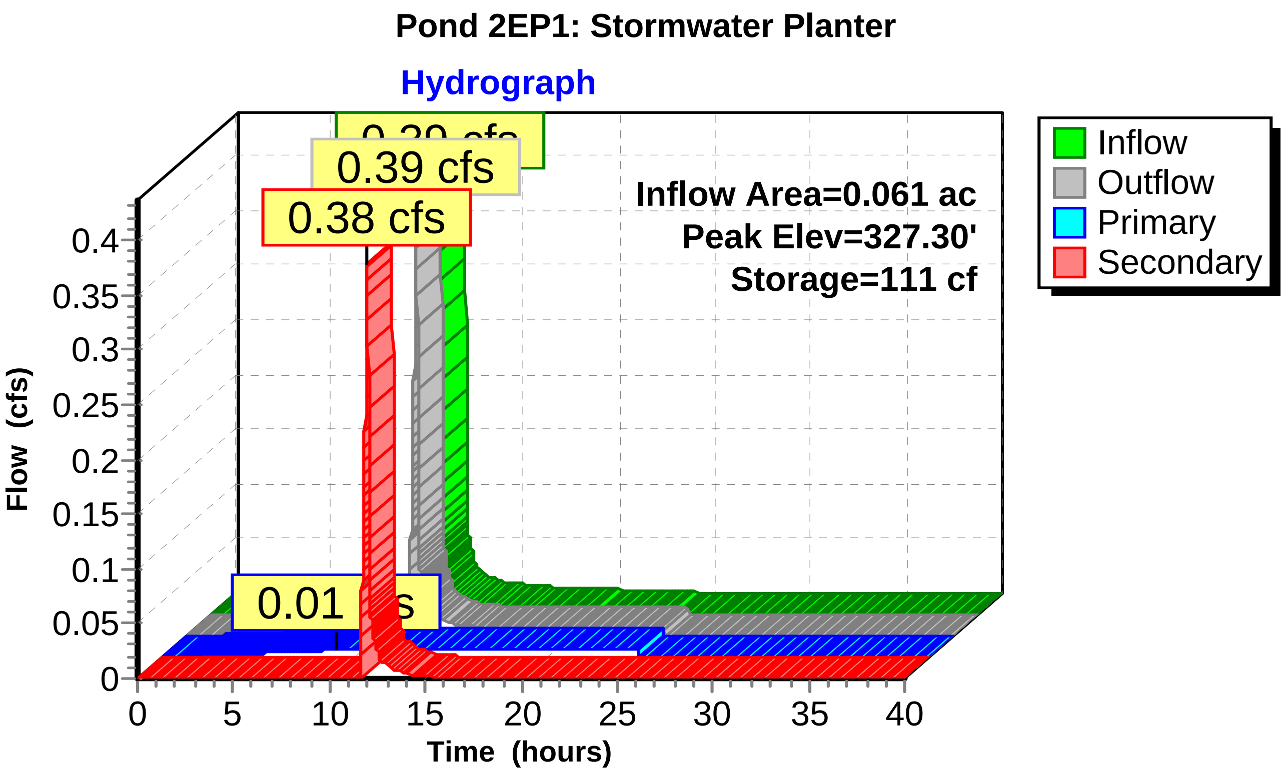
Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3750 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 9.03 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.38 cfs @ 11.98 hrs HW=327.30' TW=311.06' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.38 cfs of 2.84 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.38 cfs @ 1.37 fps)


Pond 2EP1: Stormwater Planter
Hydrograph
0.39 cfs
0.38 cfs
0.01 cfs
Inflow Area=0.061 ac
Peak Elev=327.30'
Storage=111 cf
Inflow
Outflow
Primary
Secondary
Flow (cfs)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5
10
15
20
25
30
35
40
Time (hours)

Summary for Pond 2EP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 2.13" for 10-yr event
Inflow = 0.01 cfs @ 9.03 hrs, Volume= 0.011 af
Outflow = 0.01 cfs @ 24.92 hrs, Volume= 0.011 af, Atten= 0%, Lag= 953.4 min
Primary = 0.01 cfs @ 24.92 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 24.92 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (882.0 - 881.8)

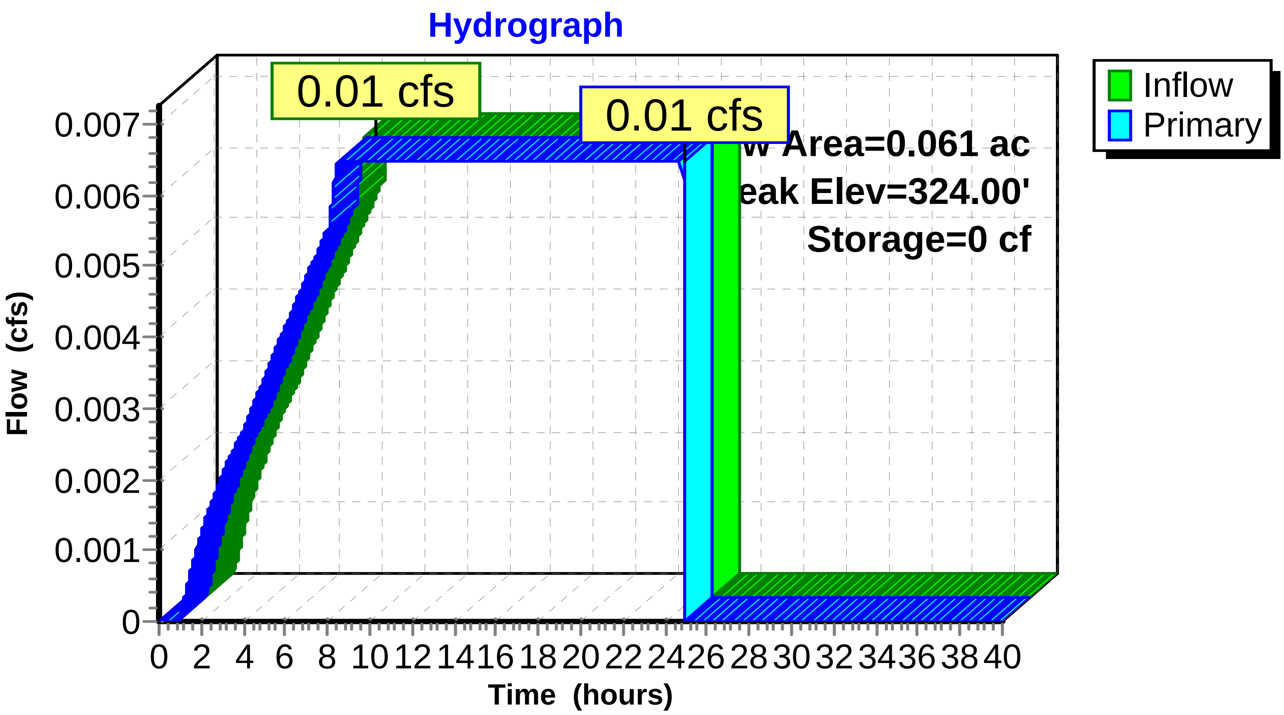
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 12.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.6250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 24.92 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 2EP2: Stormwater Planter



Summary for Pond 2FP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-yr event
Inflow = 0.39 cfs @ 11.97 hrs, Volume= 0.022 af
Outflow = 0.39 cfs @ 11.98 hrs, Volume= 0.022 af, Atten= 1%, Lag= 0.7 min
Primary = 0.01 cfs @ 9.03 hrs, Volume= 0.011 af
Secondary = 0.38 cfs @ 11.98 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.30' @ 11.98 hrs Surf.Area= 140 sf Storage= 111 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 61.0 min (806.8 - 745.8)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

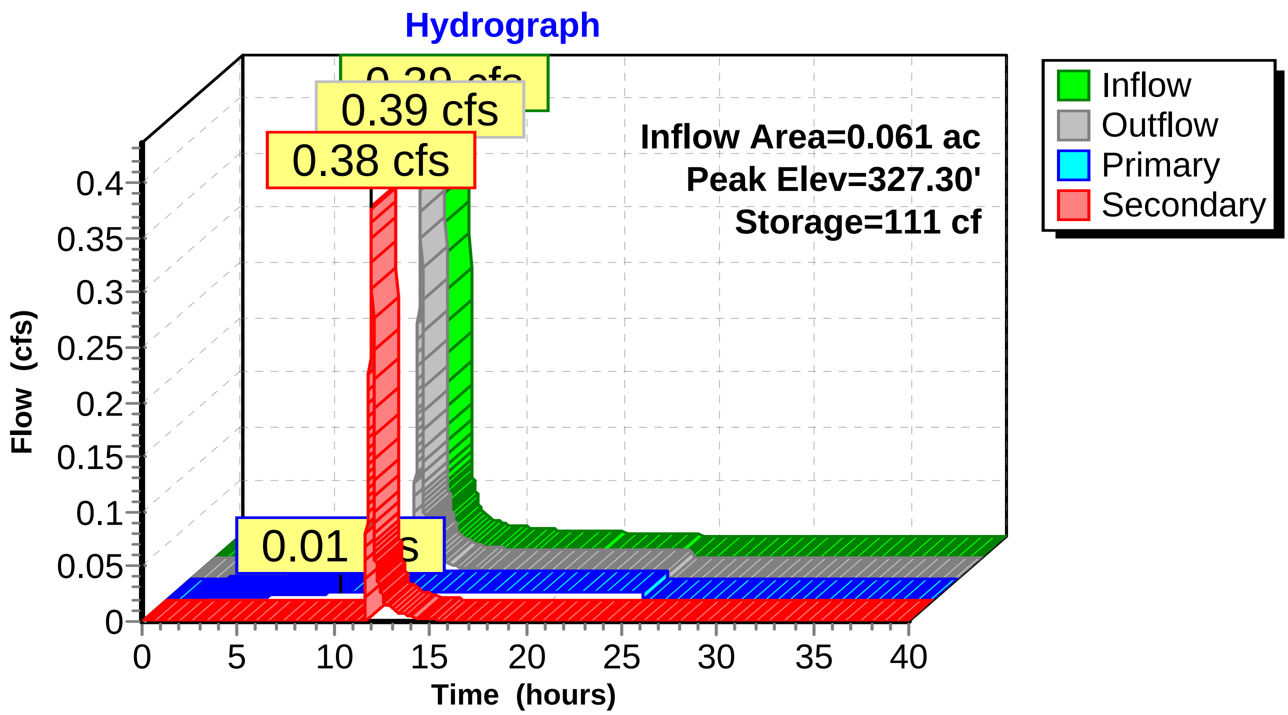
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 25.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 9.03 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.38 cfs @ 11.98 hrs HW=327.30' TW=311.06' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.38 cfs of 2.84 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.38 cfs @ 1.37 fps)

Pond 2FP1: Stormwater Planter



Summary for Pond 2FP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 2.13" for 10-yr event
Inflow = 0.01 cfs @ 9.03 hrs, Volume= 0.011 af
Outflow = 0.01 cfs @ 24.92 hrs, Volume= 0.011 af, Atten= 0%, Lag= 953.4 min
Primary = 0.01 cfs @ 24.92 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 24.92 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (882.0 - 881.8)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids
#2	326.50'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
		280 cf	Total Available Storage

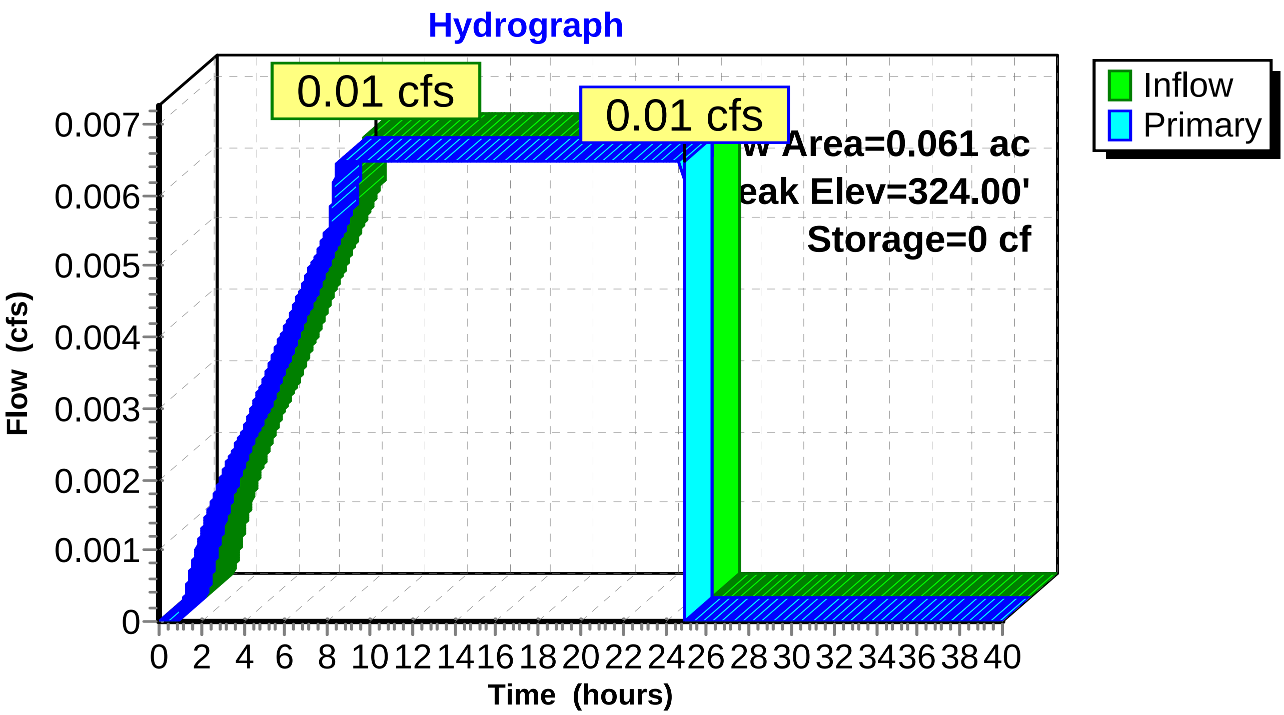
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.50	140	48.0	140	140	188

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3750 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 24.92 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 2FP2: Stormwater Planter



Summary for Pond 2HP1: FRONT BIO-RETENTION

Inflow Area = 1.161 ac, 66.32% Impervious, Inflow Depth = 3.00" for 10-yr event
Inflow = 4.61 cfs @ 12.06 hrs, Volume= 0.291 af
Outflow = 3.86 cfs @ 12.13 hrs, Volume= 0.291 af, Atten= 16%, Lag= 4.1 min
Primary = 0.07 cfs @ 12.13 hrs, Volume= 0.096 af
Secondary = 3.79 cfs @ 12.13 hrs, Volume= 0.194 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 323.84' @ 12.13 hrs Surf.Area= 6,384 sf Storage= 2,065 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 30.5 min (843.3 - 812.8)

Volume	Invert	Avail.Storage	Storage Description
#1	323.50'	3,133 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

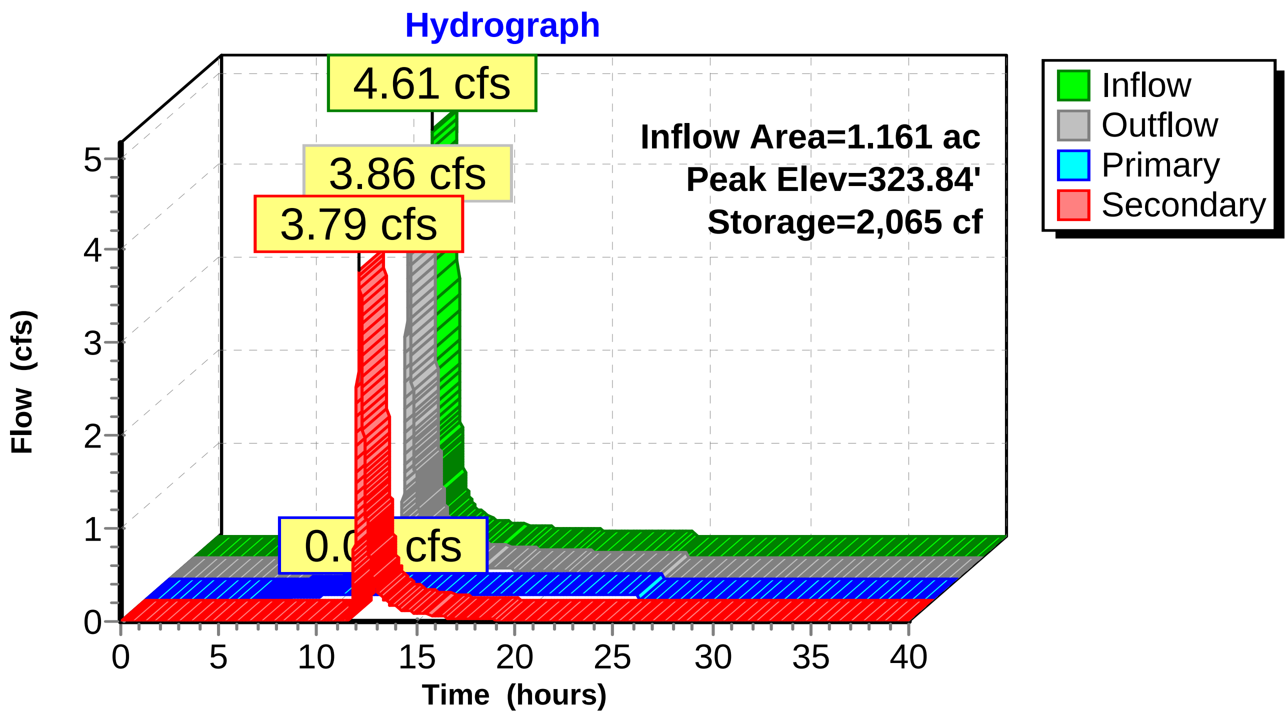
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
323.50	5,924	456.0	0	0	5,924
324.00	6,615	466.0	3,133	3,133	6,693

Device	Routing	Invert	Outlet Devices
#1	Primary	323.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	319.50'	**12.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 319.50' / 319.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	323.56'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.13 hrs HW=323.84' TW=319.63' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=3.78 cfs @ 12.13 hrs HW=323.84' TW=318.69' (Dynamic Tailwater)
└─**2=Culvert** (Passes 3.78 cfs of 7.31 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 3.78 cfs @ 1.72 fps)

Pond 2HP1: FRONT BIO-RETENTION



Summary for Pond 2HP2: FRONT BIO-RETENTION

Inflow Area = 1.161 ac, 66.32% Impervious, Inflow Depth = 0.99" for 10-yr event
Inflow = 0.07 cfs @ 12.13 hrs, Volume= 0.096 af
Outflow = 0.07 cfs @ 13.05 hrs, Volume= 0.095 af, Atten= 7%, Lag= 55.5 min
Primary = 0.07 cfs @ 13.05 hrs, Volume= 0.095 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 319.69' @ 25.03 hrs Surf.Area= 5,924 sf Storage= 443 cf

Plug-Flow detention time= 103.8 min calculated for 0.095 af (99% of inflow)
Center-of-Mass det. time= 100.7 min (1,099.1 - 998.5)

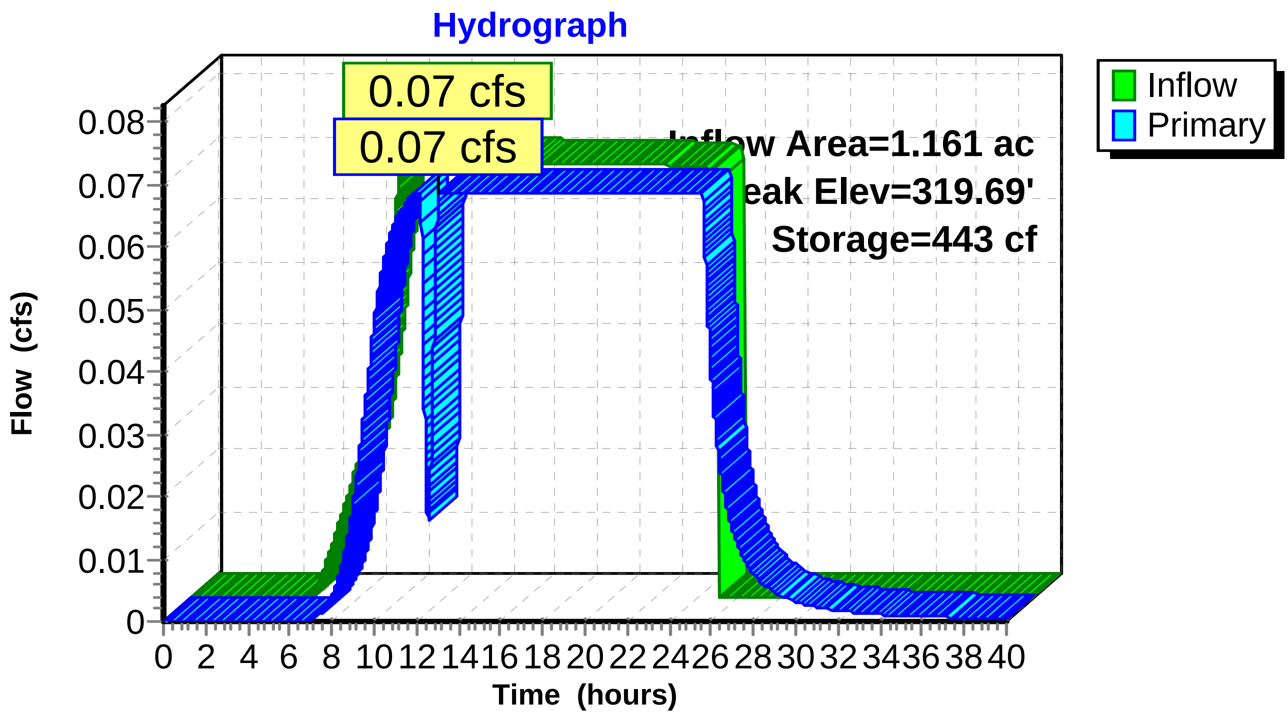
Volume	Invert	Avail.Storage	Storage Description
#1	319.50'	9,478 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 23,696 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
319.50	5,924	456.0	0	0	5,924
323.50	5,924	456.0	23,696	23,696	7,748

Device	Routing	Invert	Outlet Devices
#1	Primary	319.50'	**12.0" Round Culvert** L= 60.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 319.50' / 319.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	319.50'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	323.65'	**30.0" x 30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 13.05 hrs HW=319.67' TW=319.48' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.07 cfs of 0.07 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.07 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2HP2: FRONT BIO-RETENTION



Summary for Pond 2JP1: BIORETENTION IN FRONT OF APT

Inflow Area = 0.328 ac, 70.12% Impervious, Inflow Depth = 3.10" for 10-yr event
Inflow = 1.75 cfs @ 11.97 hrs, Volume= 0.085 af
Outflow = 1.72 cfs @ 11.98 hrs, Volume= 0.085 af, Atten= 2%, Lag= 0.9 min
Primary = 0.06 cfs @ 11.98 hrs, Volume= 0.045 af
Secondary = 1.65 cfs @ 11.98 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 322.45' @ 11.98 hrs Surf.Area= 1,386 sf Storage= 262 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 8.3 min (810.4 - 802.1)

Volume	Invert	Avail.Storage	Storage Description
#1	322.25'	714 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

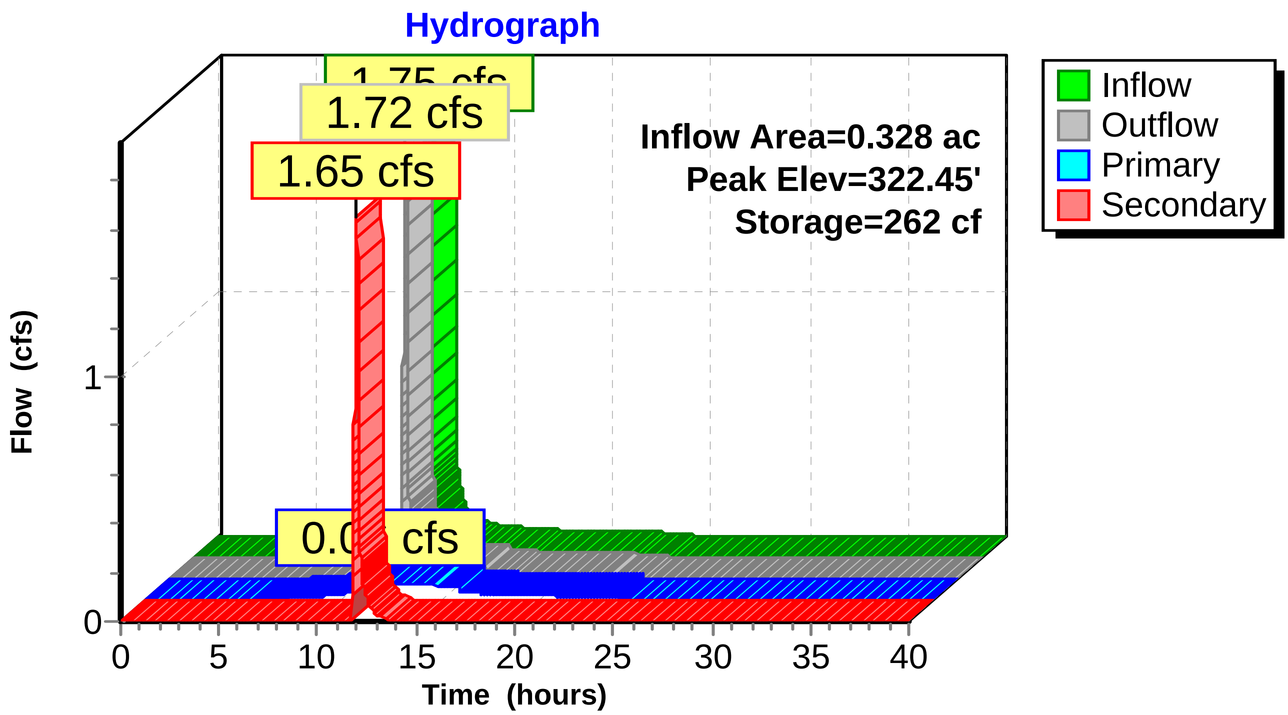
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
322.25	1,236	384.0	0	0	1,236
322.75	1,628	396.0	714	714	2,006

Device	Routing	Invert	Outlet Devices
#1	Primary	322.25'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.25'	**12.0" Round Culvert X 2.00** L= 65.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.25' / 317.75' S= 0.0077 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	322.35'	**24.0" x 24.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.06 cfs @ 11.98 hrs HW=322.45' TW=318.82' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=1.65 cfs @ 11.98 hrs HW=322.45' TW=317.83' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.65 cfs of 14.09 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 1.65 cfs @ 1.03 fps)

Pond 2JP1: BIORETENTION IN FRONT OF APT



Summary for Pond 2JP2: BIORETENTION IN FRONT OF APT

Inflow Area = 0.328 ac, 70.12% Impervious, Inflow Depth = 1.65" for 10-yr event
Inflow = 0.06 cfs @ 11.98 hrs, Volume= 0.045 af
Outflow = 0.02 cfs @ 22.07 hrs, Volume= 0.040 af, Atten= 74%, Lag= 604.9 min
Primary = 0.02 cfs @ 22.07 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 320.35' @ 22.07 hrs Surf.Area= 1,435 sf Storage= 1,118 cf

Plug-Flow detention time= 633.8 min calculated for 0.040 af (89% of inflow)
Center-of-Mass det. time= 578.6 min (1,464.8 - 886.2)

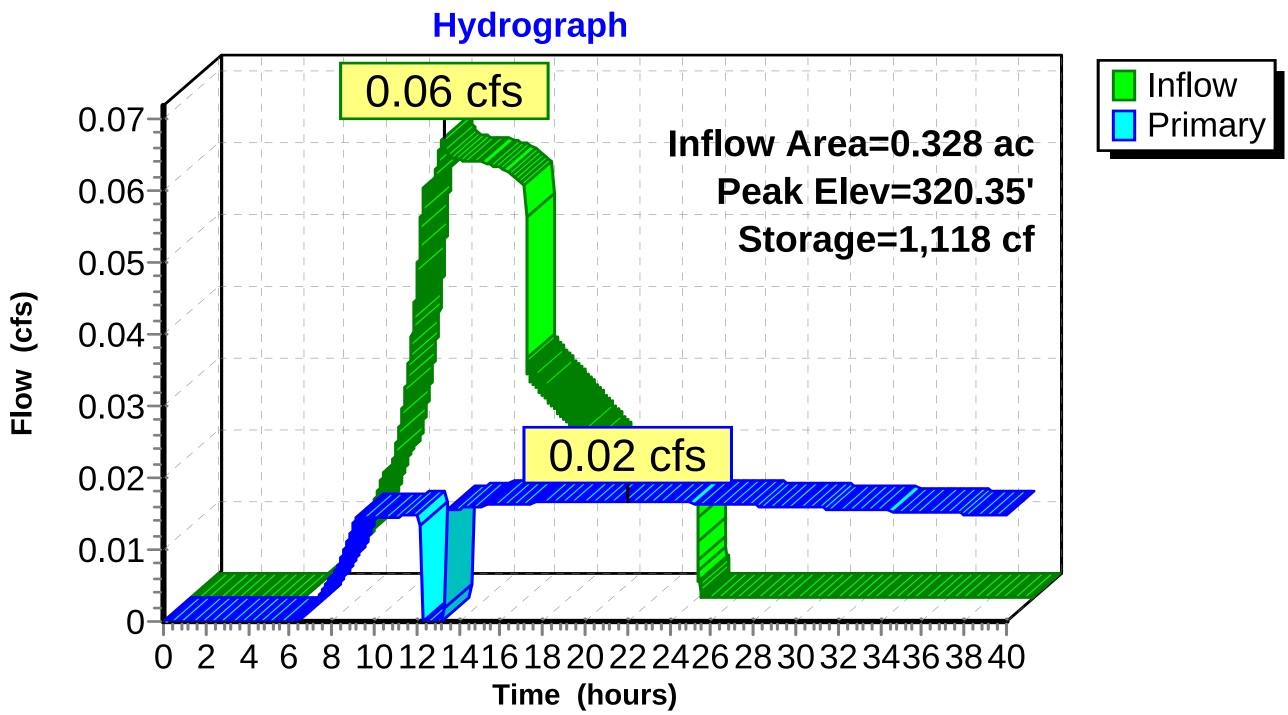
Volume	Invert	Avail.Storage	Storage Description
#1	318.25'	2,284 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 5,710 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
318.25	1,236	384.0	0	0	1,236
322.25	1,628	396.0	5,710	5,710	2,965

Device	Routing	Invert	Outlet Devices
#1	Primary	318.25'	**12.0" Round Culvert** L= 65.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.25' / 317.75' S= 0.0077 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	318.25'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.02 cfs @ 22.07 hrs HW=320.35' TW=318.21' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.02 cfs of 4.63 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond 2JP2: BIORETENTION IN FRONT OF APT



Summary for Pond 2P: SUBSURFACE DETENTION

Inflow Area = 1.784 ac, 52.41% Impervious, Inflow Depth = 2.50" for 10-yr event
Inflow = 5.69 cfs @ 12.09 hrs, Volume= 0.372 af
Outflow = 0.18 cfs @ 15.63 hrs, Volume= 0.312 af, Atten= 97%, Lag= 212.1 min
Primary = 0.18 cfs @ 15.63 hrs, Volume= 0.312 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 314.83' @ 15.63 hrs Surf.Area= 10,754 sf Storage= 9,948 cf

Plug-Flow detention time= 635.5 min calculated for 0.312 af (84% of inflow)
Center-of-Mass det. time= 540.2 min (1,415.8 - 875.5)

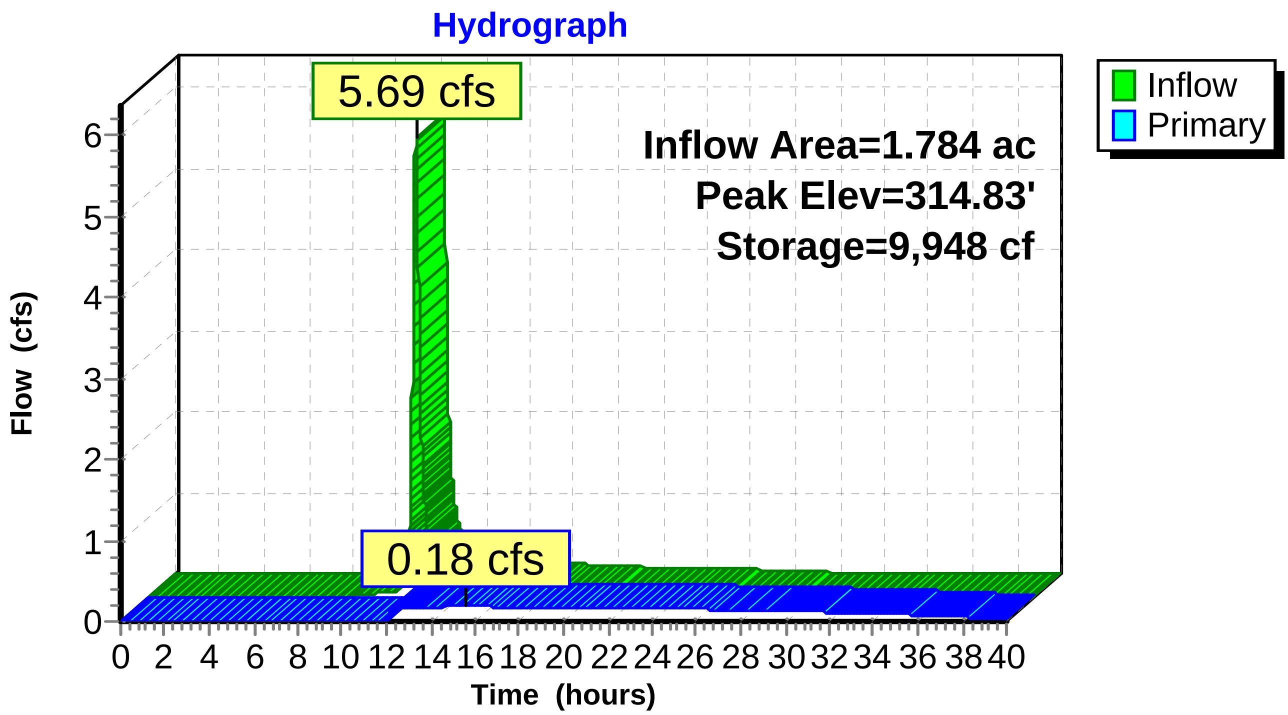
Volume	Invert	Avail.Storage	Storage Description
#1A	313.00'	12,410 cf	**38.00'W x 283.00'L x 4.50'H Field A** 48,393 cf Overall - 17,368 cf Embedded = 31,025 cf x 40.0% Voids
#2A	313.50'	13,916 cf	**ADS N-12 36** x 98 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.2 cf 7 Rows of 14 Chambers
		26,326 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	313.50'	**12.0" Round Culvert** L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 313.50' / 312.00' S= 0.0203 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	313.50'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.50'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.18 cfs @ 15.63 hrs HW=314.83' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.18 cfs of 3.44 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 5.33 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SUBSURFACE DETENTION



Summary for Pond 3BP1: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-yr event
Inflow = 0.42 cfs @ 11.97 hrs, Volume= 0.023 af
Outflow = 0.41 cfs @ 11.98 hrs, Volume= 0.023 af, Atten= 1%, Lag= 0.7 min
Primary = 0.01 cfs @ 8.86 hrs, Volume= 0.011 af
Secondary = 0.41 cfs @ 11.98 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.33' @ 11.98 hrs Surf.Area= 140 sf Storage= 117 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 63.9 min (809.7 - 745.8)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

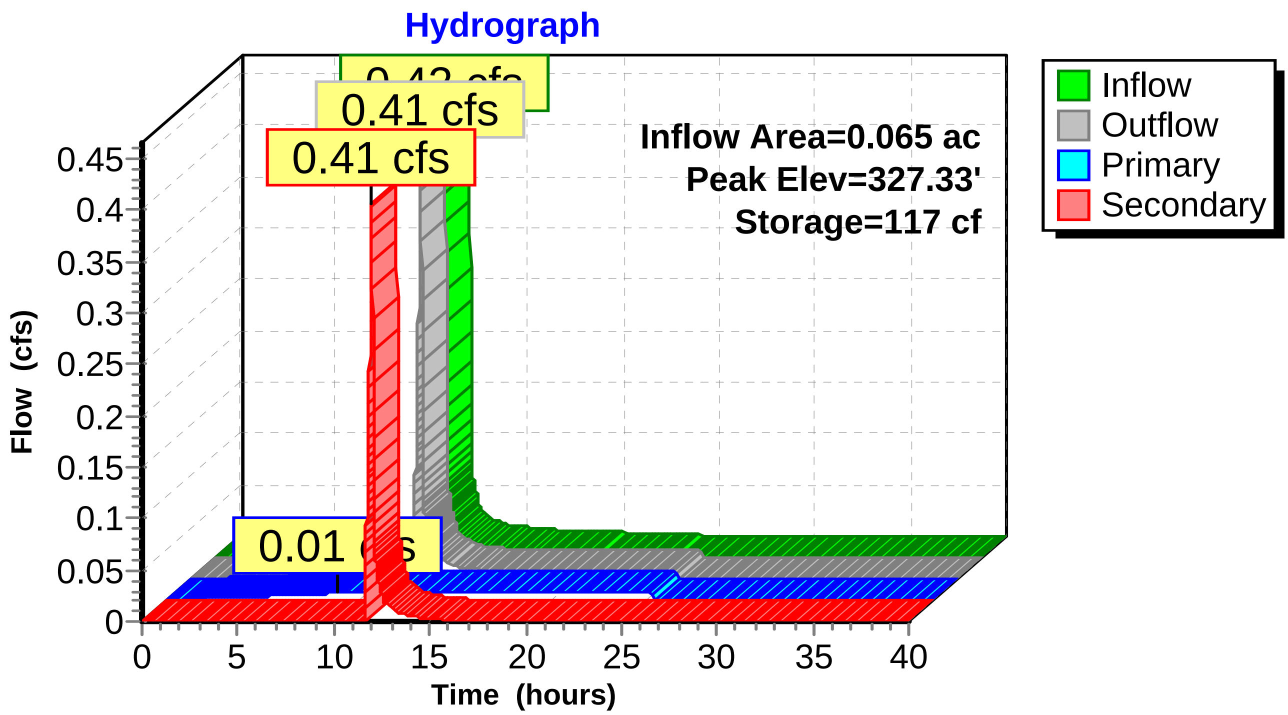
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.15'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.86 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.40 cfs @ 11.98 hrs HW=327.33' TW=311.09' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.40 cfs of 2.85 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.40 cfs @ 1.40 fps)

Pond 3BP1: Stormwater Planter



Summary for Pond 3BP2: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 2.07" for 10-yr event
Inflow = 0.01 cfs @ 8.86 hrs, Volume= 0.011 af
Outflow = 0.01 cfs @ 25.43 hrs, Volume= 0.011 af, Atten= 0%, Lag= 994.2 min
Primary = 0.01 cfs @ 25.43 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 25.43 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (891.0 - 890.9)

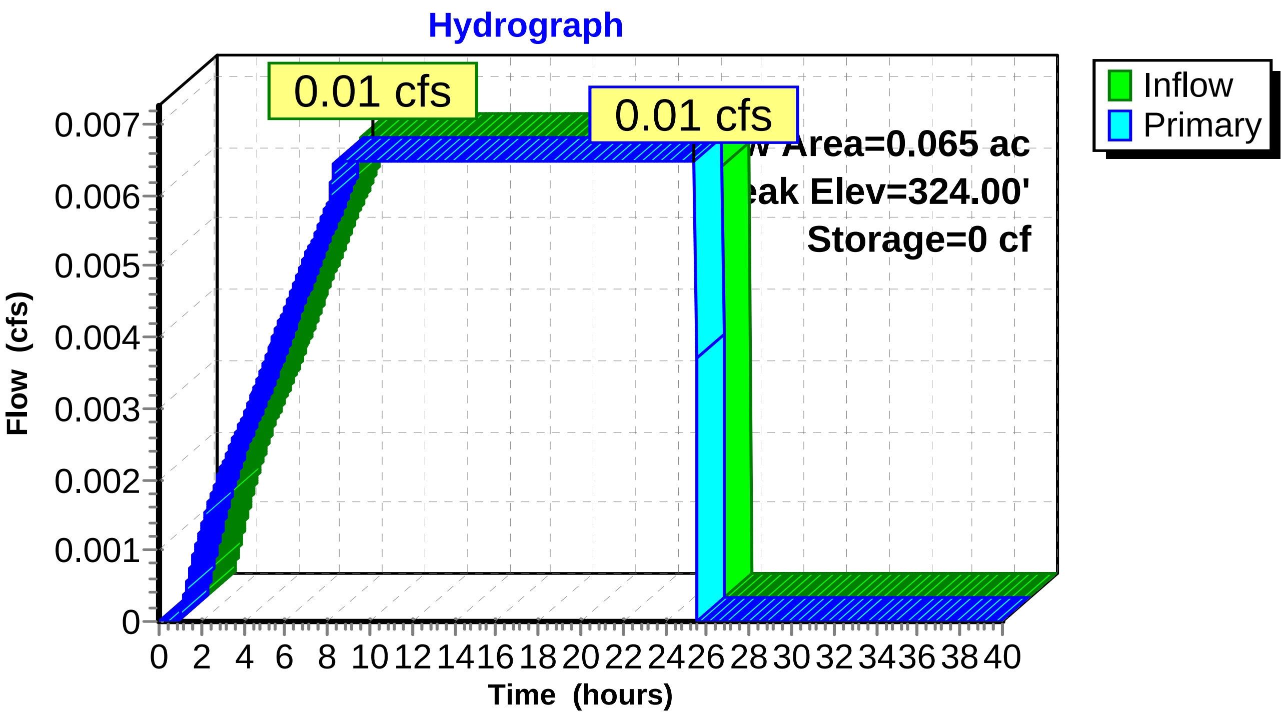
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 25.43 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 3BP2: Stormwater Planter



Summary for Pond 3CP1: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-yr event
Inflow = 0.42 cfs @ 11.97 hrs, Volume= 0.023 af
Outflow = 0.41 cfs @ 11.98 hrs, Volume= 0.023 af, Atten= 1%, Lag= 0.7 min
Primary = 0.01 cfs @ 8.86 hrs, Volume= 0.011 af
Secondary = 0.41 cfs @ 11.98 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.33' @ 11.98 hrs Surf.Area= 140 sf Storage= 117 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 63.9 min (809.7 - 745.8)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

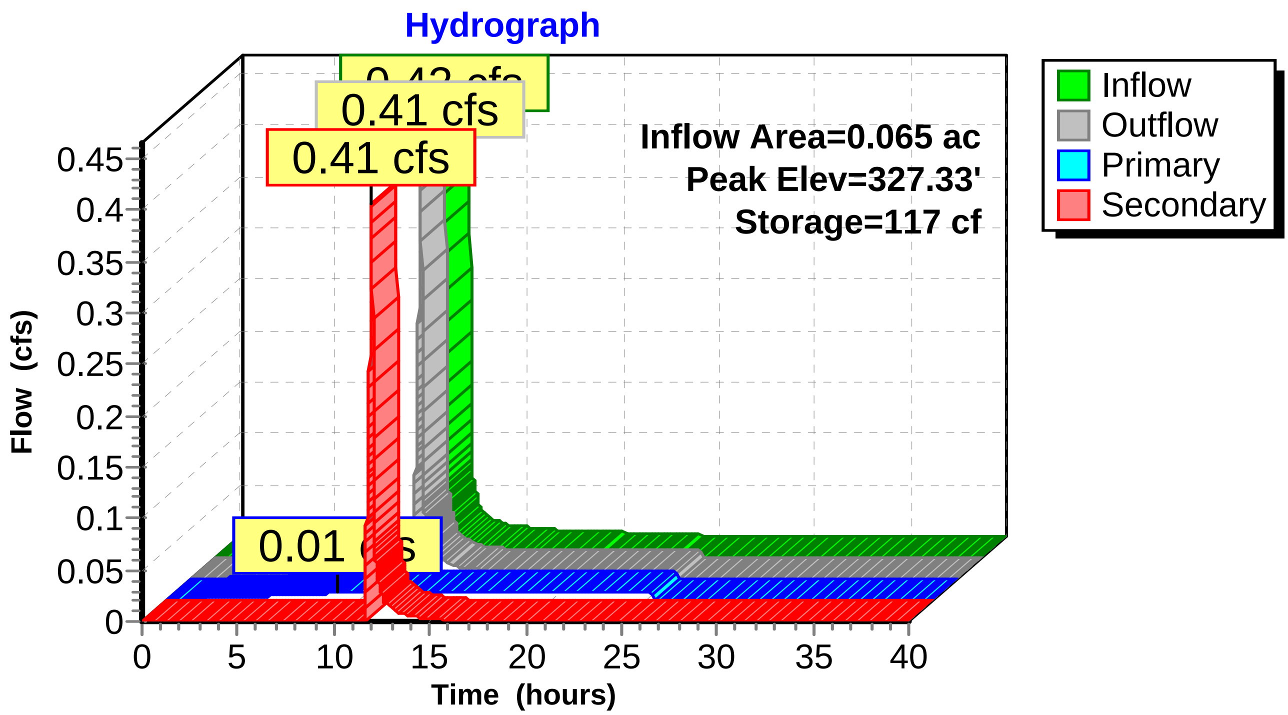
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.15'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 8.86 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.40 cfs @ 11.98 hrs HW=327.33' TW=311.09' (Dynamic Tailwater)
2=Culvert (Passes 0.40 cfs of 2.85 cfs potential flow)
3=Orifice/Grate (Weir Controls 0.40 cfs @ 1.40 fps)

Pond 3CP1: Stormwater Planter



Summary for Pond 3CP2: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 2.07" for 10-yr event
Inflow = 0.01 cfs @ 8.86 hrs, Volume= 0.011 af
Outflow = 0.01 cfs @ 25.43 hrs, Volume= 0.011 af, Atten= 0%, Lag= 994.2 min
Primary = 0.01 cfs @ 25.43 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 25.43 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (891.0 - 890.9)

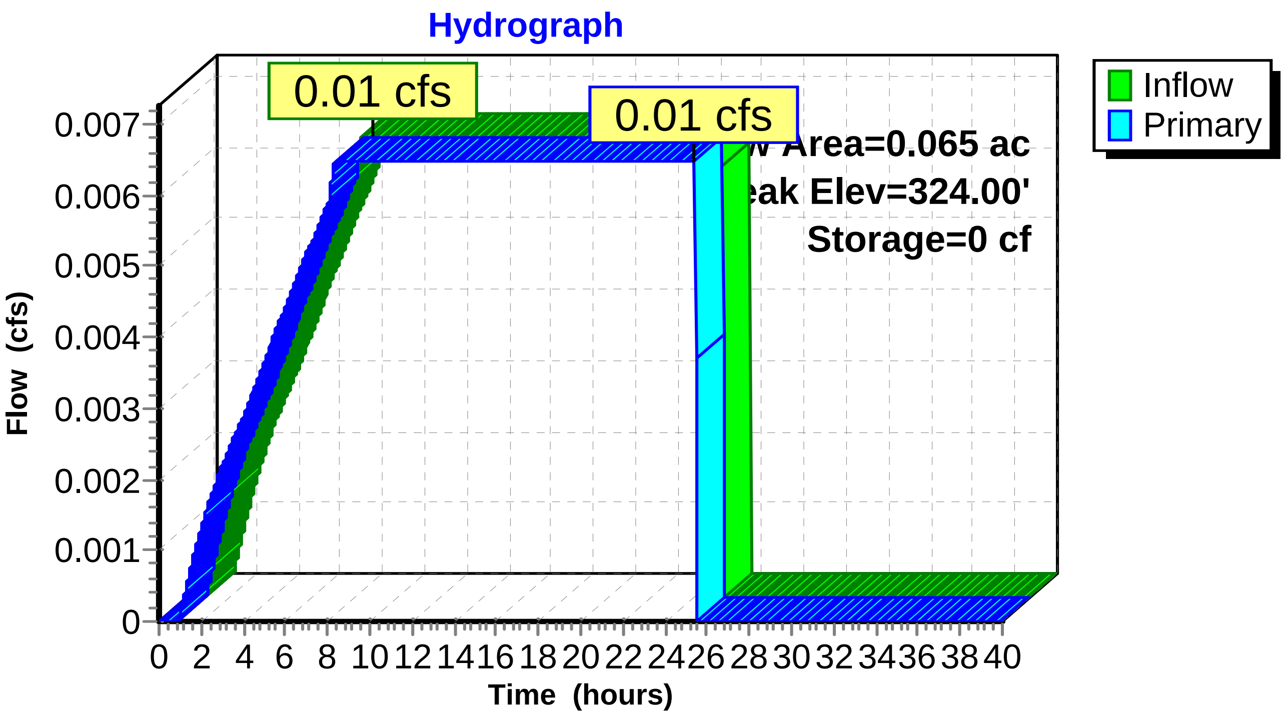
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 25.43 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 3CP2: Stormwater Planter



Summary for Pond 3DP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-yr event
Inflow = 0.39 cfs @ 11.97 hrs, Volume= 0.022 af
Outflow = 0.39 cfs @ 11.98 hrs, Volume= 0.022 af, Atten= 1%, Lag= 0.7 min
Primary = 0.01 cfs @ 9.03 hrs, Volume= 0.011 af
Secondary = 0.38 cfs @ 11.98 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.30' @ 11.98 hrs Surf.Area= 140 sf Storage= 111 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 61.0 min (806.8 - 745.8)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

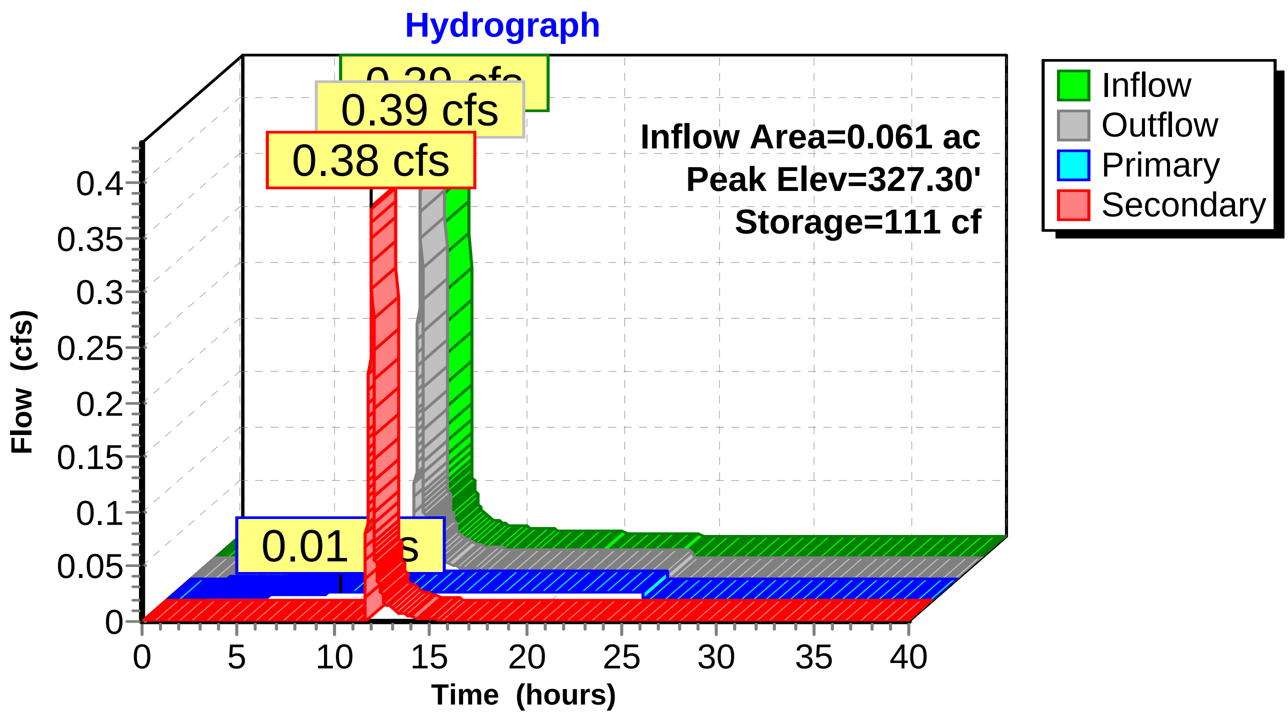
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 9.03 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.38 cfs @ 11.98 hrs HW=327.30' TW=311.09' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.38 cfs of 2.84 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.38 cfs @ 1.37 fps)

Pond 3DP1: Stormwater Planter



Summary for Pond 3DP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 2.13" for 10-yr event
Inflow = 0.01 cfs @ 9.03 hrs, Volume= 0.011 af
Outflow = 0.01 cfs @ 9.03 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.01 cfs @ 9.03 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 0.00 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (881.8 - 881.8)

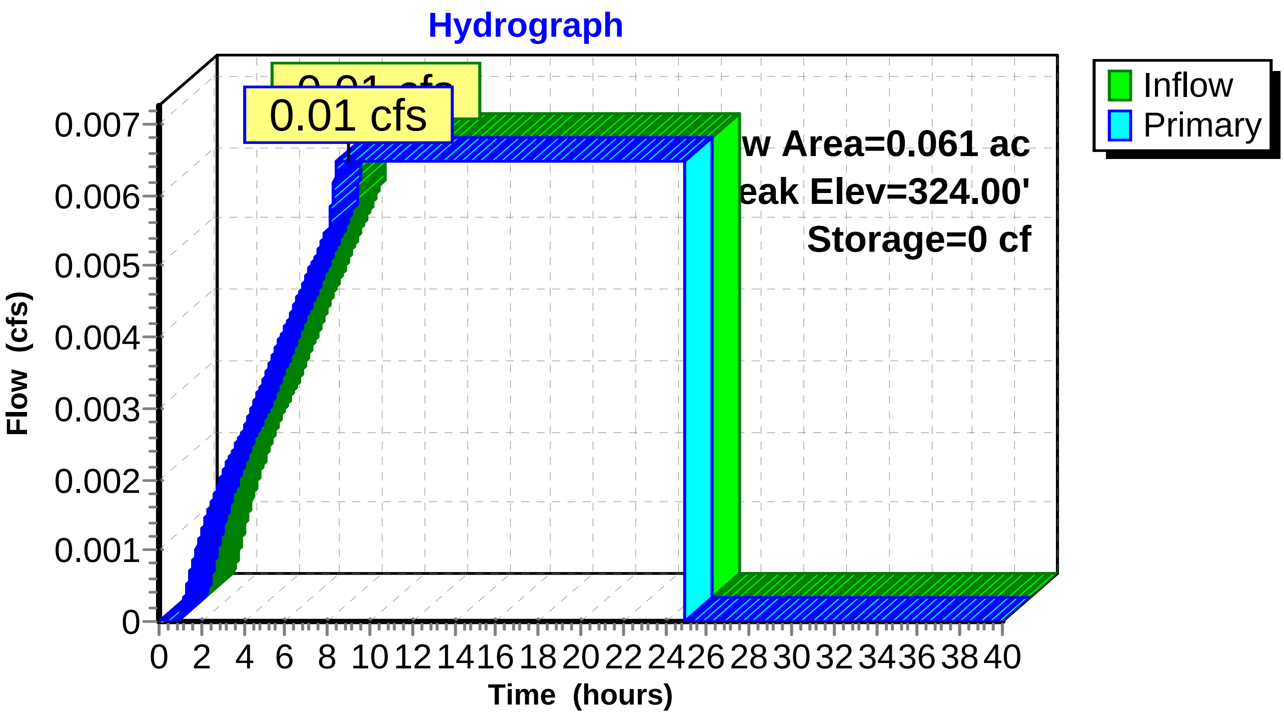
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**4.350 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.00 cfs @ 9.03 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

Pond 3DP2: Stormwater Planter



Summary for Pond 3P: POCKET POND FOREBAY

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Starting Elev= 317.00' Surf.Area= 1,586 sf Storage= 2,311 cf
Peak Elev= 317.00' @ 0.00 hrs Surf.Area= 1,586 sf Storage= 2,311 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	2,311 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

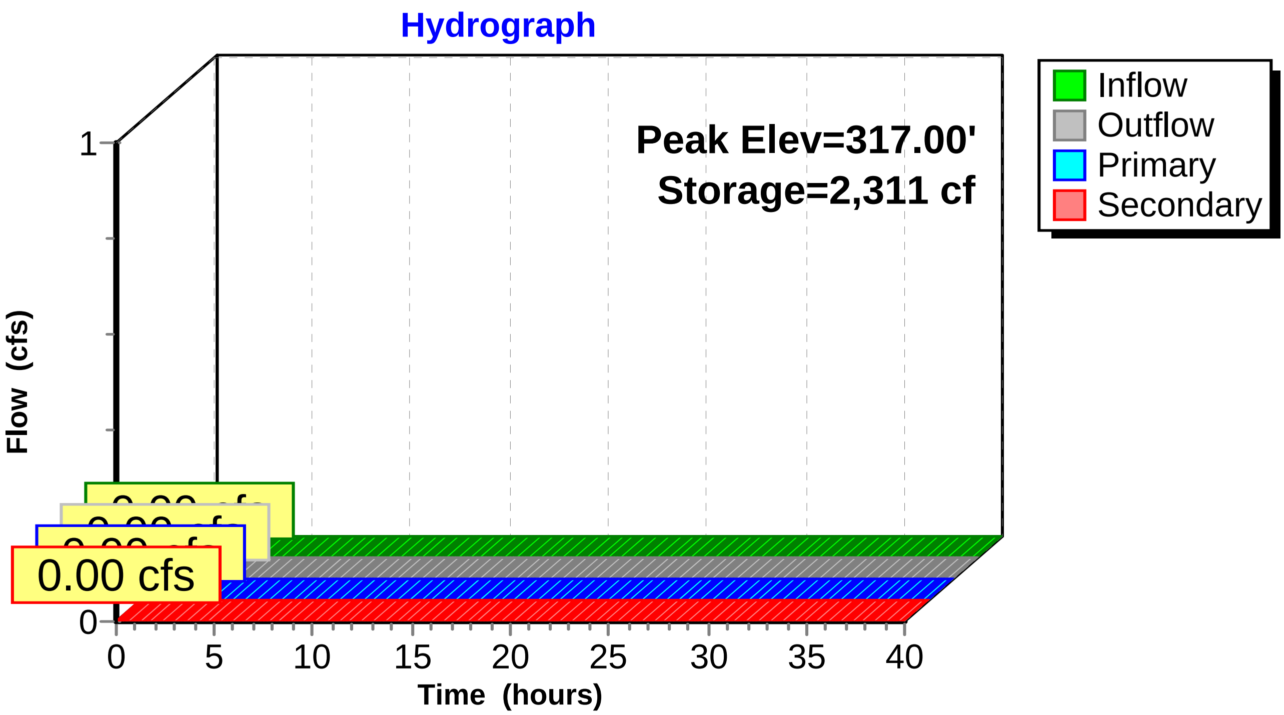
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
313.00	172	54.0	0	0	172
314.00	306	73.0	236	236	374
315.00	478	93.0	389	625	651
316.00	688	112.0	580	1,204	978
317.00	1,586	163.0	1,106	2,311	2,102

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.00' / 310.50' S= 0.0148 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.70'	**4.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	318.65'	**18.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	320.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	322.00'	**6.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=317.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=317.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: POCKET POND FOREBAY



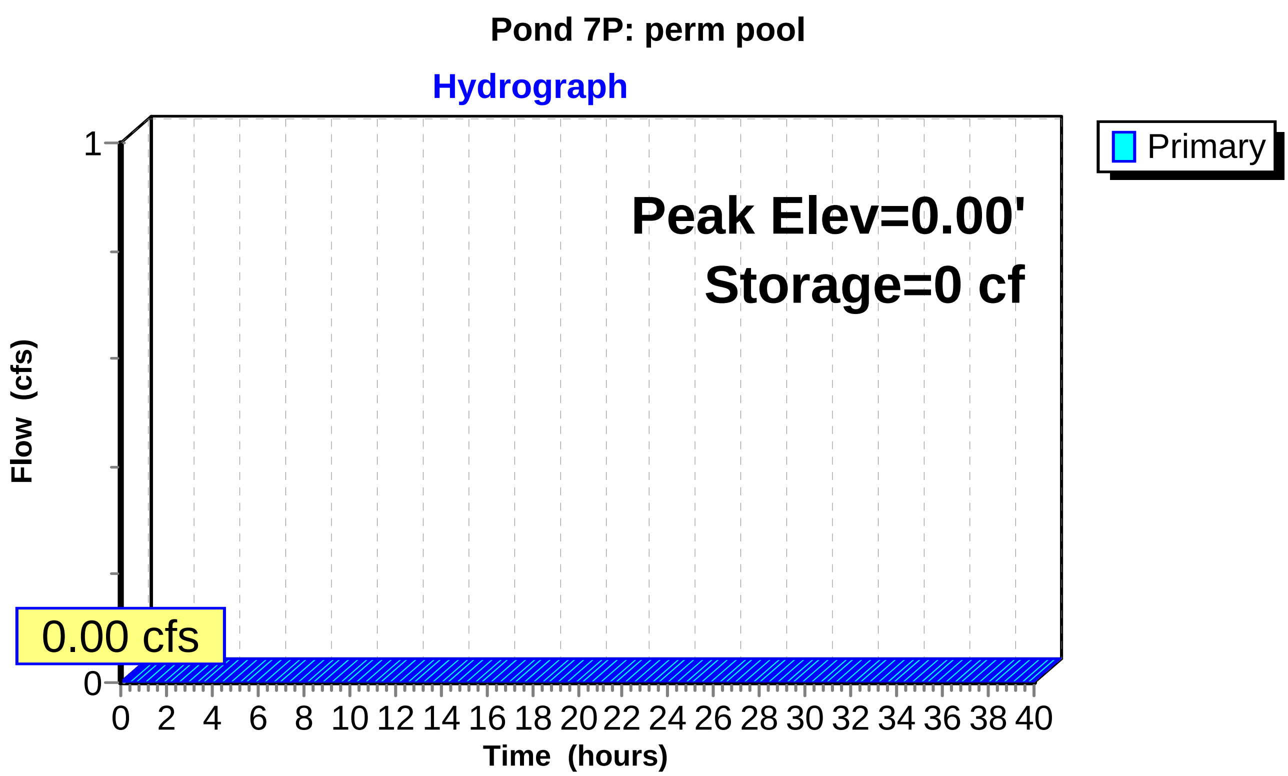
Summary for Pond 7P: perm pool

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	7,120 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
314.00	470	104.0	0	0	470
316.00	1,378	190.0	1,769	1,769	2,503
317.00	1,994	216.0	1,677	3,445	3,368
318.00	5,669	361.0	3,675	7,120	10,032

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	318.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)



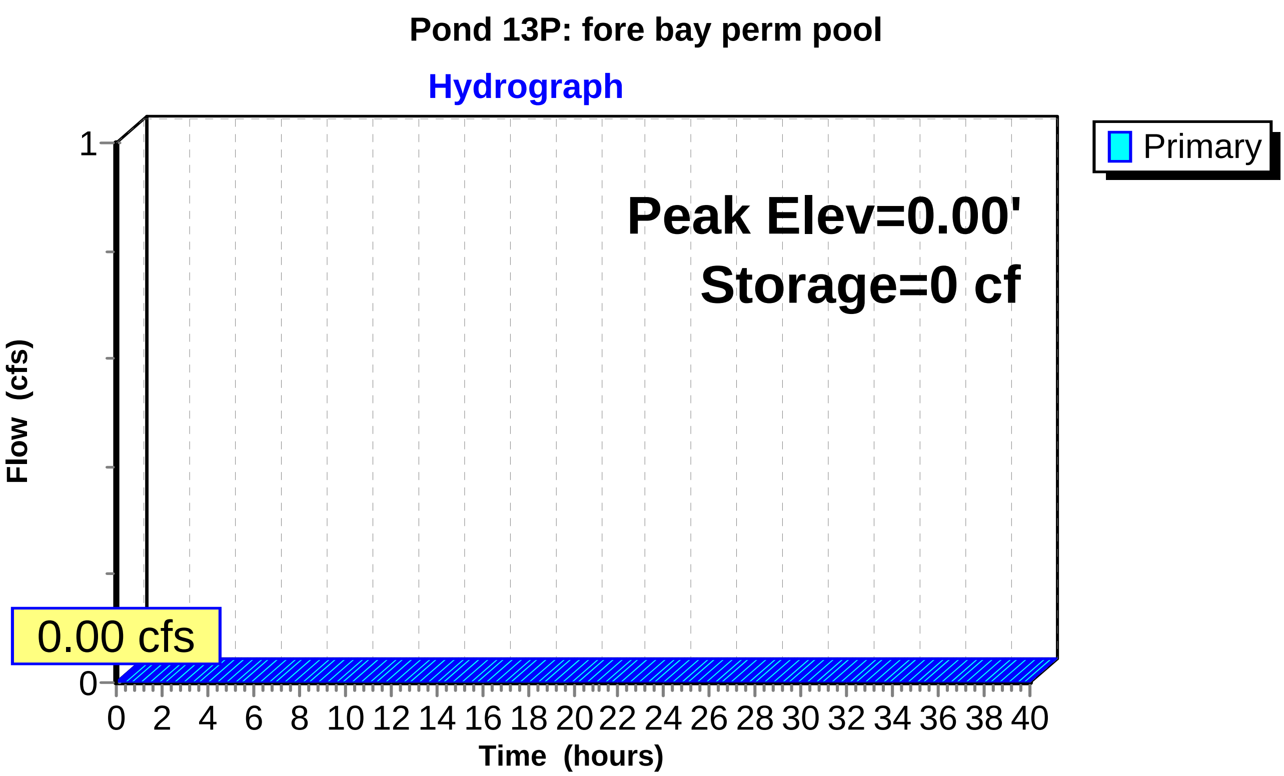
Summary for Pond 13P: fore bay perm pool

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	2,889 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
314.00	232	61.0	0	0	232
316.00	578	102.0	784	784	788
317.00	811	119.0	691	1,475	1,107
318.00	2,120	191.0	1,414	2,889	2,890

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	318.00'	**4.0" Vert. Orifice/Grate** C= 0.600

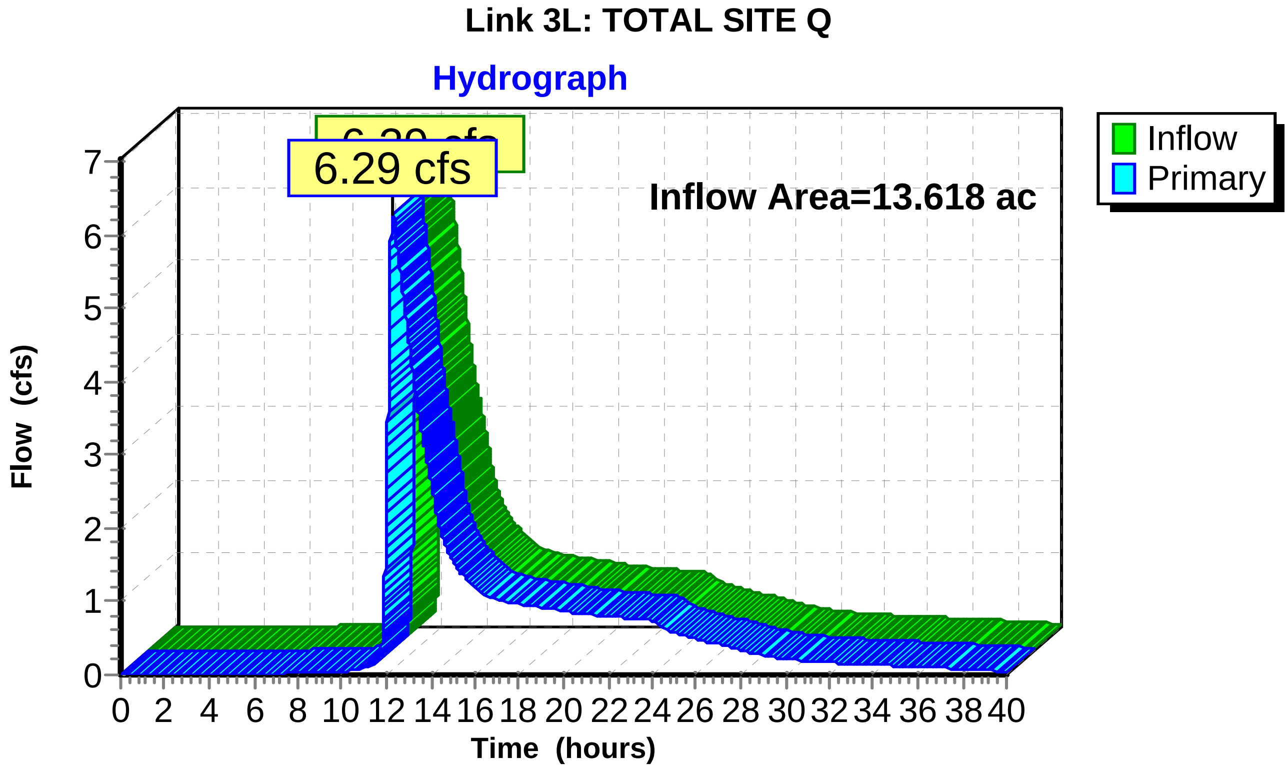
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  └**2=Orifice/Grate** (Controls 0.00 cfs)



Summary for Link 3L: TOTAL SITE Q

Inflow Area =	13.618 ac, 32.28% Impervious, Inflow Depth > 1.72"	for 10-yr event	
Inflow =	6.29 cfs @ 12.28 hrs, Volume=	1.953 af	
Primary =	6.29 cfs @ 12.28 hrs, Volume=	1.953 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

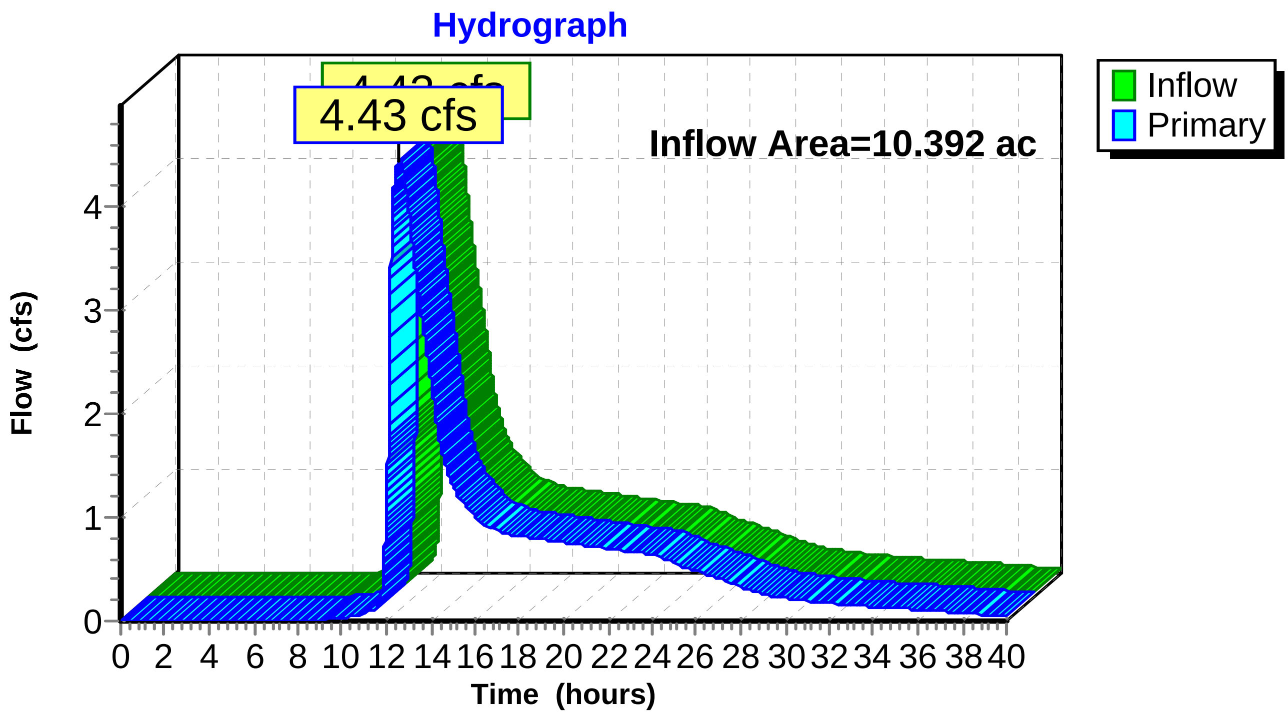


Summary for Link AP-2: AP-2

Inflow Area = 10.392 ac, 40.01% Impervious, Inflow Depth > 1.90" for 10-yr event
Inflow = 4.43 cfs @ 12.60 hrs, Volume= 1.645 af
Primary = 4.43 cfs @ 12.60 hrs, Volume= 1.645 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

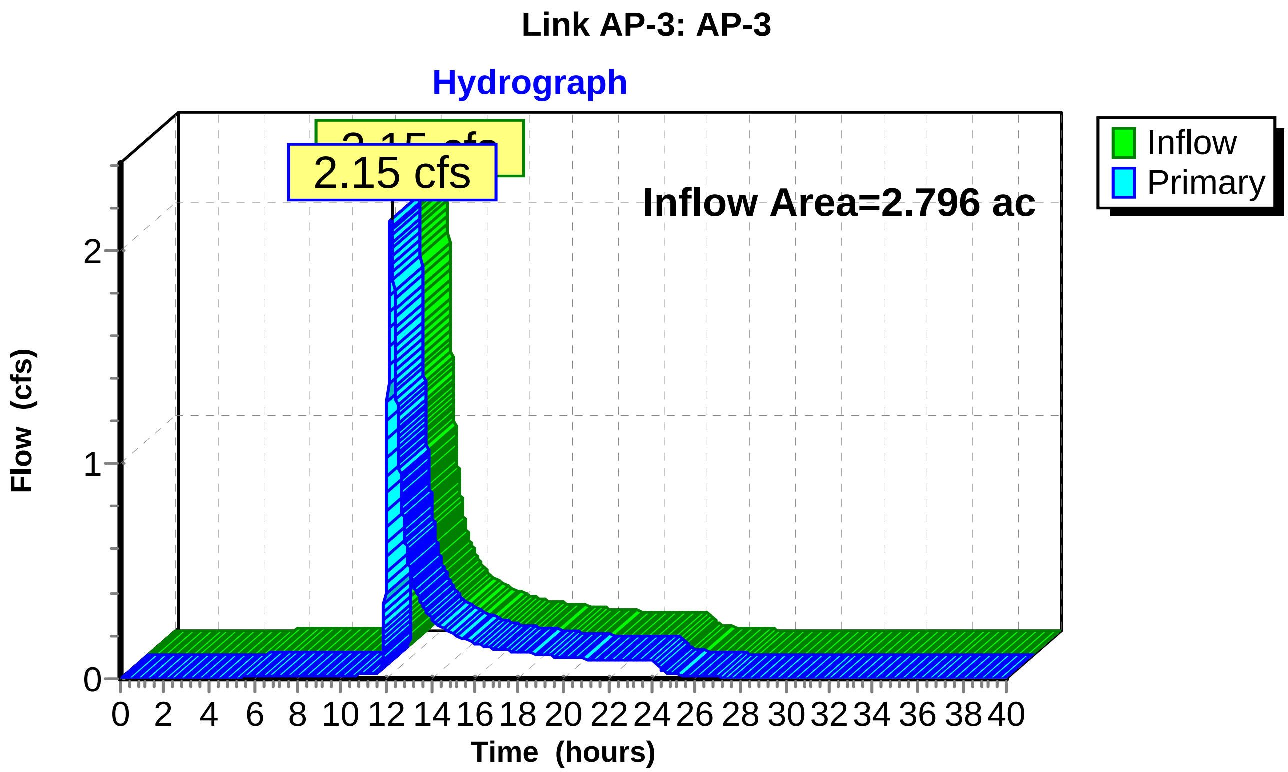
Link AP-2: AP-2



Summary for Link AP-3: AP-3

Inflow Area =	2.796 ac,	6.83% Impervious,	Inflow Depth > 1.13"	for 10-yr event	
Inflow =	2.15 cfs @	12.22 hrs,	Volume=	0.264 af	
Primary =	2.15 cfs @	12.22 hrs,	Volume=	0.264 af,	Atten= 0%, Lag= 0.0 min

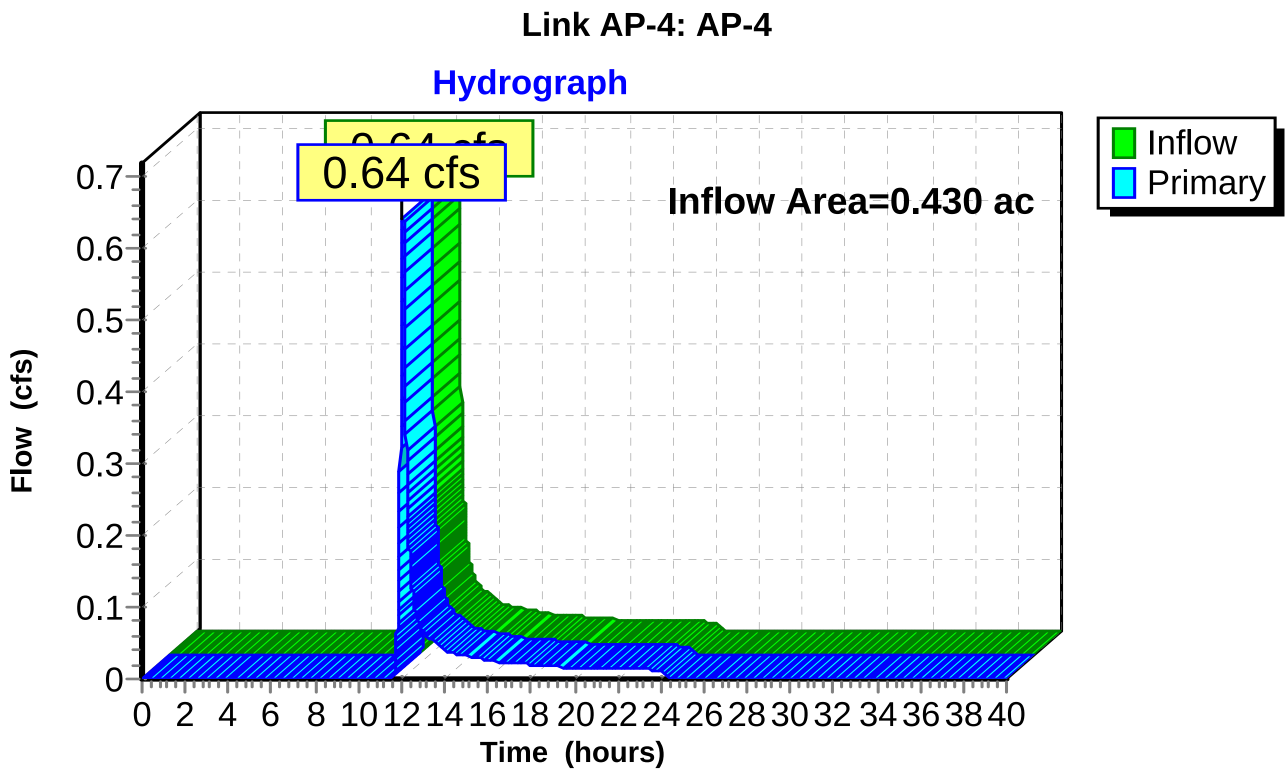
Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Summary for Link AP-4: AP-4

Inflow Area = 0.430 ac, 10.94% Impervious, Inflow Depth = 1.20" for 10-yr event
Inflow = 0.64 cfs @ 12.07 hrs, Volume= 0.043 af
Primary = 0.64 cfs @ 12.07 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Sub 1 Runoff Area=30,321 sf 20.54% Impervious Runoff Depth=1.15"
Flow Length=100' Slope=0.0200 '/' Tc=23.0 min CN=44 Runoff=0.60 cfs 0.067 af

Subcatchment 2A: 2A Runoff Area=14,963 sf 0.00% Impervious Runoff Depth=4.37"
Flow Length=91' Slope=0.0150 '/' Tc=23.9 min CN=77 Runoff=1.50 cfs 0.125 af

Subcatchment 2B: Sub 2B Runoff Area=5.732 ac 36.65% Impervious Runoff Depth=3.31"
Flow Length=371' Tc=19.3 min CN=67 Runoff=21.44 cfs 1.580 af

Subcatchment 2C: 2C Runoff Area=0.863 ac 54.11% Impervious Runoff Depth=4.81"
Flow Length=87' Slope=0.0080 '/' Tc=13.5 min CN=81 Runoff=5.54 cfs 0.346 af

Subcatchment 2D: 2D Runoff Area=0.921 ac 50.81% Impervious Runoff Depth=4.69"
Flow Length=87' Slope=0.0080 '/' Tc=13.5 min CN=80 Runoff=5.80 cfs 0.360 af

Subcatchment 2E: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=0.61 cfs 0.034 af

Subcatchment 2F: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=0.61 cfs 0.034 af

Subcatchment 2G: 2G Runoff Area=40,156 sf 0.00% Impervious Runoff Depth=4.37"
Flow Length=232' Slope=0.0080 '/' Tc=67.5 min CN=77 Runoff=1.98 cfs 0.335 af

Subcatchment 2H: Sub 2H Runoff Area=1.161 ac 66.32% Impervious Runoff Depth=5.37"
Flow Length=163' Tc=14.0 min CN=86 Runoff=8.02 cfs 0.519 af

Subcatchment 2J: 2J Runoff Area=14,289 sf 70.12% Impervious Runoff Depth=5.48"
Tc=6.0 min CN=87 Runoff=2.98 cfs 0.150 af

Subcatchment 3A: 3A Runoff Area=2.605 ac 0.00% Impervious Runoff Depth=2.41"
Flow Length=692' Tc=25.5 min CN=58 Runoff=5.74 cfs 0.523 af

Subcatchment 3B: Garage Roof Runoff Area=0.065 ac 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=0.65 cfs 0.037 af

Subcatchment 3C: Garage Roof Runoff Area=0.065 ac 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=0.65 cfs 0.037 af

Subcatchment 3D: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=0.61 cfs 0.034 af

Subcatchment 4A: 4A Runoff Area=18,715 sf 10.94% Impervious Runoff Depth=2.90"
Flow Length=155' Tc=14.0 min CN=63 Runoff=1.66 cfs 0.104 af

Reach 3R: TO CB'S Avg. Flow Depth=0.11' Max Vel=0.07 fps Inflow=1.13 cfs 0.069 af
n=0.400 L=180.0' S=0.0083 '/' Capacity=1.76 cfs Outflow=0.41 cfs 0.069 af

Reach 4R: TO CB'S Avg. Flow Depth=0.16' Max Vel=0.08 fps Inflow=1.76 cfs 0.108 af
n=0.400 L=180.0' S=0.0083 '/' Capacity=2.52 cfs Outflow=0.72 cfs 0.107 af

Pond 2BP: POCKET POND-ABOVE PERM Peak Elev=321.40' Storage=43,252 cf Inflow=29.19 cfs 2.227 af
Outflow=11.36 cfs 2.213 af

Pond 2CP1: REAR BIO-RETENTION Peak Elev=321.89' Storage=1,048 cf Inflow=5.54 cfs 0.346 af
Primary=0.03 cfs 0.045 af Secondary=5.27 cfs 0.301 af Outflow=5.30 cfs 0.346 af

Pond 2CP2: REAR BIO-RETENTION Peak Elev=317.66' Storage=149 cf Inflow=0.03 cfs 0.045 af
Outflow=0.03 cfs 0.045 af

Pond 2DP1: REAR BIO-RETENTION Peak Elev=321.95' Storage=1,299 cf Inflow=5.80 cfs 0.360 af
Primary=0.04 cfs 0.052 af Secondary=5.49 cfs 0.308 af Outflow=5.53 cfs 0.360 af

Pond 2DP2: REAR BIO-RETENTION Peak Elev=317.89' Storage=365 cf Inflow=0.04 cfs 0.052 af
Outflow=0.03 cfs 0.052 af

Pond 2EP1: Stormwater Planter Peak Elev=327.47' Storage=136 cf Inflow=0.61 cfs 0.034 af
Primary=0.01 cfs 0.013 af Secondary=0.56 cfs 0.021 af Outflow=0.57 cfs 0.034 af

Pond 2EP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.013 af
Outflow=0.01 cfs 0.013 af

Pond 2FP1: Stormwater Planter Peak Elev=327.47' Storage=136 cf Inflow=0.61 cfs 0.034 af
Primary=0.01 cfs 0.013 af Secondary=0.56 cfs 0.021 af Outflow=0.57 cfs 0.034 af

Pond 2FP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.013 af
Outflow=0.01 cfs 0.013 af

Pond 2HP1: FRONT BIO-RETENTION Peak Elev=323.97' Storage=2,958 cf Inflow=8.02 cfs 0.519 af
Primary=0.08 cfs 0.114 af Secondary=6.95 cfs 0.405 af Outflow=7.03 cfs 0.519 af

Pond 2HP2: FRONT BIO-RETENTION Peak Elev=319.93' Storage=1,014 cf Inflow=0.08 cfs 0.114 af
Outflow=0.07 cfs 0.113 af

Pond 2JP1: BIORETENTION IN FRONT OF APT Peak Elev=322.49' Storage=325 cf Inflow=2.98 cfs 0.150 af
Primary=0.07 cfs 0.065 af Secondary=2.88 cfs 0.084 af Outflow=2.94 cfs 0.150 af

Pond 2JP2: BIORETENTION IN FRONT OF Peak Elev=321.64' Storage=1,893 cf Inflow=0.07 cfs 0.065 af
Outflow=0.02 cfs 0.044 af

Pond 2P: SUBSURFACE DETENTION Peak Elev=316.31' Storage=20,901 cf Inflow=10.82 cfs 0.706 af
Outflow=0.27 cfs 0.533 af

Pond 3BP1: Stormwater Planter Peak Elev=327.54' Storage=146 cf Inflow=0.65 cfs 0.037 af
Primary=0.01 cfs 0.013 af Secondary=0.59 cfs 0.023 af Outflow=0.60 cfs 0.037 af

Pond 3BP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.013 af
Outflow=0.01 cfs 0.013 af

Pond 3CP1: Stormwater Planter Peak Elev=327.54' Storage=146 cf Inflow=0.65 cfs 0.037 af
Primary=0.01 cfs 0.013 af Secondary=0.59 cfs 0.023 af Outflow=0.60 cfs 0.037 af

Pond 3CP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.013 af
Outflow=0.01 cfs 0.013 af

Pond 3DP1: Stormwater Planter Peak Elev=327.47' Storage=136 cf Inflow=0.61 cfs 0.034 af
Primary=0.01 cfs 0.013 af Secondary=0.56 cfs 0.021 af Outflow=0.57 cfs 0.034 af

Pond 3DP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.013 af
Outflow=0.01 cfs 0.013 af

Pond 3P: POCKET POND FOREBAY Peak Elev=317.00' Storage=2,311 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 7P: perm pool Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Pond 13P: fore bay perm pool Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Link 3L: TOTAL SITE Q Inflow=19.39 cfs 4.009 af
Primary=19.39 cfs 4.009 af

Link AP-2: AP-2 Inflow=14.15 cfs 3.275 af
Primary=14.15 cfs 3.275 af

Link AP-3: AP-3 Inflow=6.39 cfs 0.630 af
Primary=6.39 cfs 0.630 af

Link AP-4: AP-4 Inflow=1.66 cfs 0.104 af
Primary=1.66 cfs 0.104 af

Total Runoff Area = 14.314 ac Runoff Volume = 4.285 af Average Runoff Depth = 3.59"
68.29% Pervious = 9.775 ac 31.71% Impervious = 4.539 ac

Summary for Subcatchment 1: Sub 1

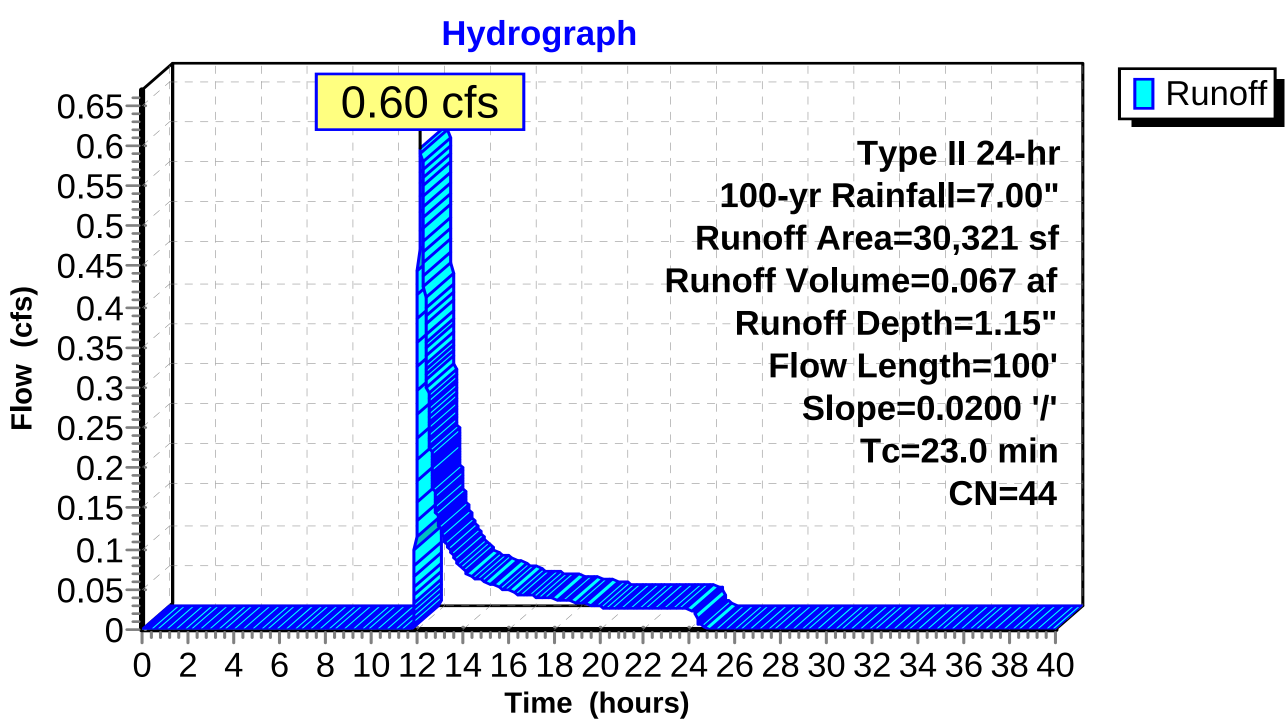
Runoff = 0.60 cfs @ 12.21 hrs, Volume= 0.067 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
21,078	30	Woods, Good, HSG A
6,229	98	Paved parking, HSG A
3,014	30	Woods, Good, HSG A
30,321	44	Weighted Average
24,092		79.46% Pervious Area
6,229		20.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	100	0.0200	0.07		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"

Subcatchment 1: Sub 1



Summary for Subcatchment 2A: 2A

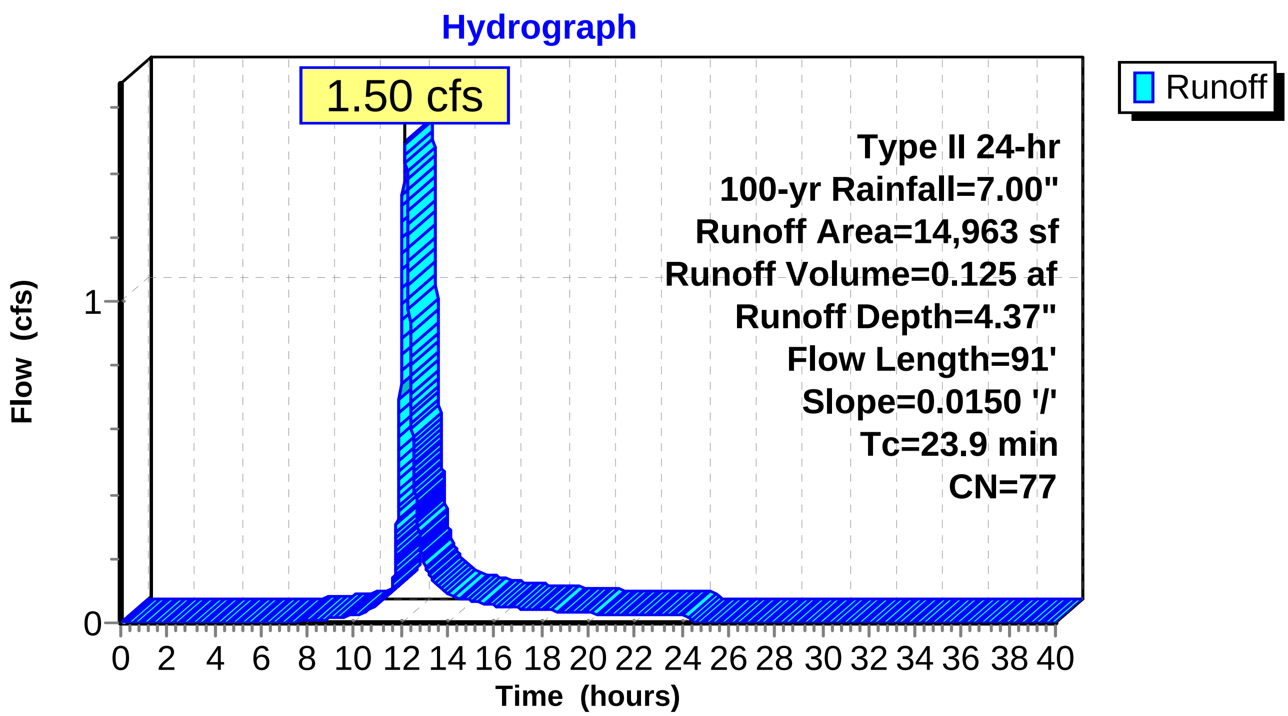
Runoff = 1.50 cfs @ 12.17 hrs, Volume= 0.125 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
13,787	77	Woods, Good, HSG D
1,176	80	>75% Grass cover, Good, HSG D
14,963	77	Weighted Average
14,963		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	91	0.0150	0.06		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"

Subcatchment 2A: 2A



Summary for Subcatchment 2B: Sub 2B

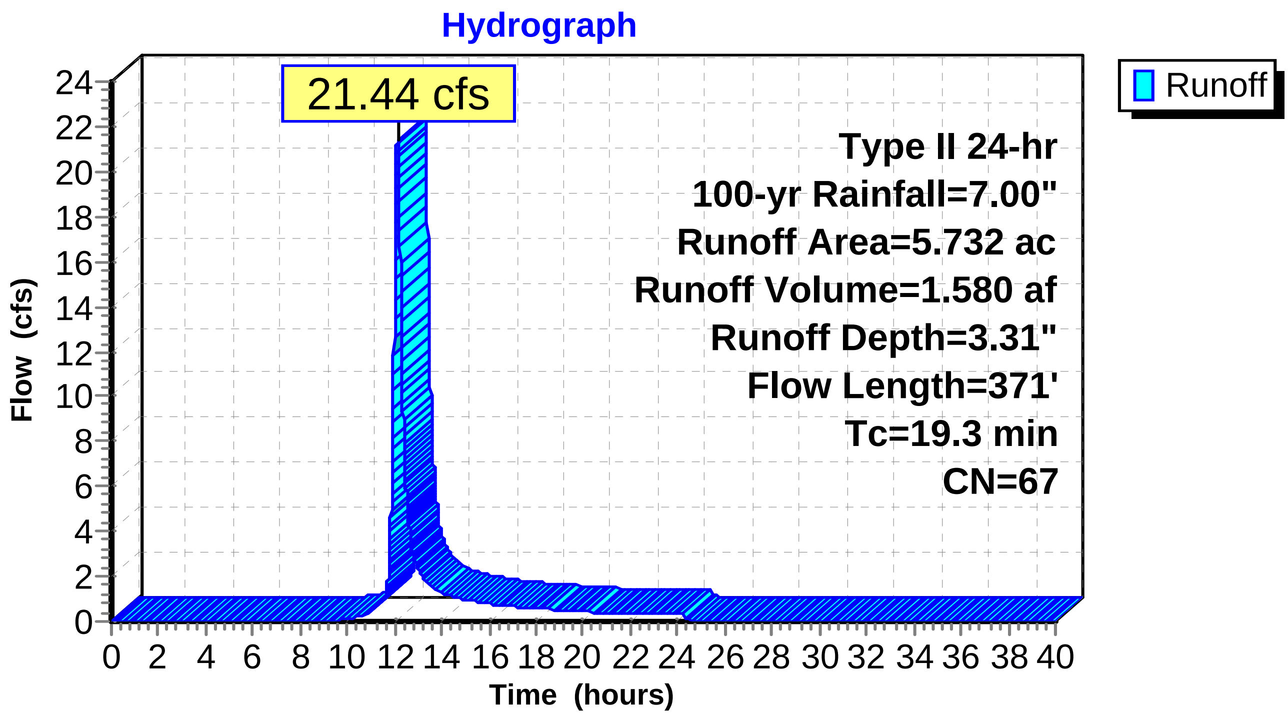
Runoff = 21.44 cfs @ 12.12 hrs, Volume= 1.580 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
0.373	39	>75% Grass cover, Good, HSG A
2.101	98	Paved parking, HSG A
1.709	30	Woods, Good, HSG A
0.077	55	Woods, Good, HSG B
0.313	61	>75% Grass cover, Good, HSG B
0.879	74	>75% Grass cover, Good, HSG C
0.280	80	>75% Grass cover, Good, HSG D
5.732	67	Weighted Average
3.631		63.35% Pervious Area
2.101		36.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
4.1	220	0.0320	0.89		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
0.4	51	0.0100	2.03		**Shallow Concentrated Flow, PAVED** Paved Kv= 20.3 fps
19.3	371	Total			

Subcatchment 2B: Sub 2B



Summary for Subcatchment 2C: 2C

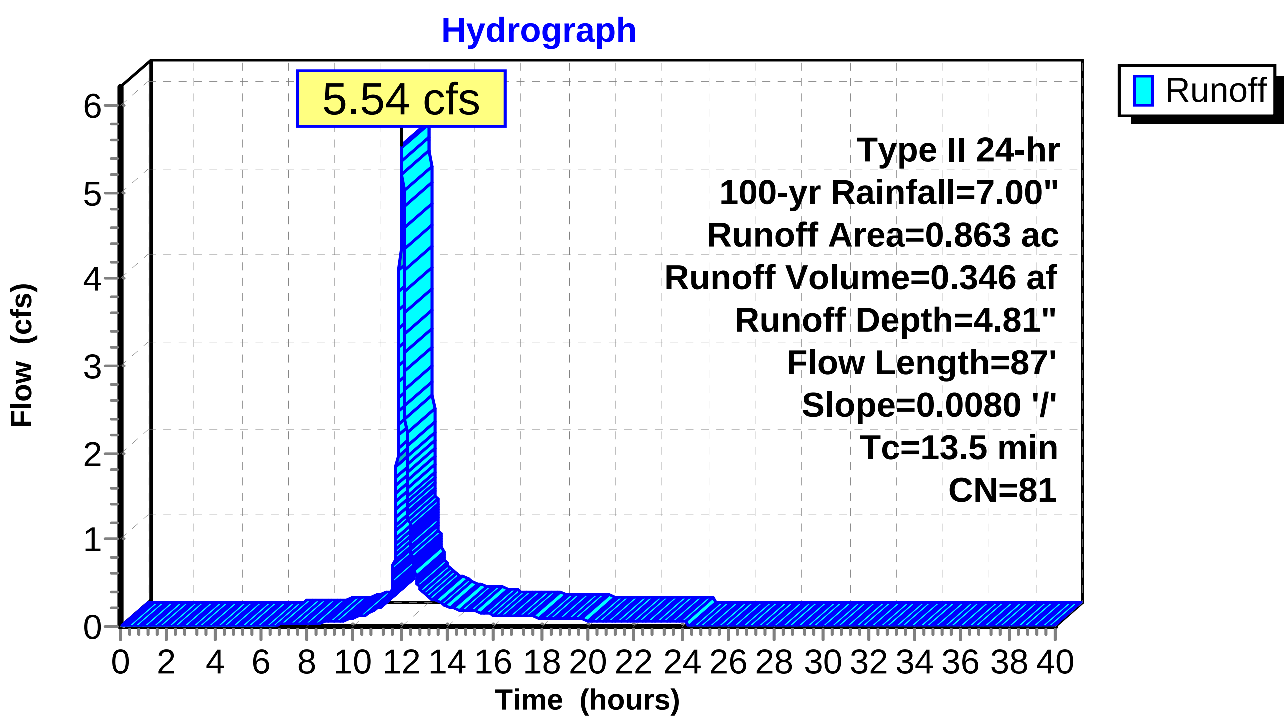
Runoff = 5.54 cfs @ 12.05 hrs, Volume= 0.346 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
0.396	61	>75% Grass cover, Good, HSG B
0.467	98	Paved parking, HSG A
0.863	81	Weighted Average
0.396		45.89% Pervious Area
0.467		54.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	87	0.0080	0.11		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 2.80"

Subcatchment 2C: 2C



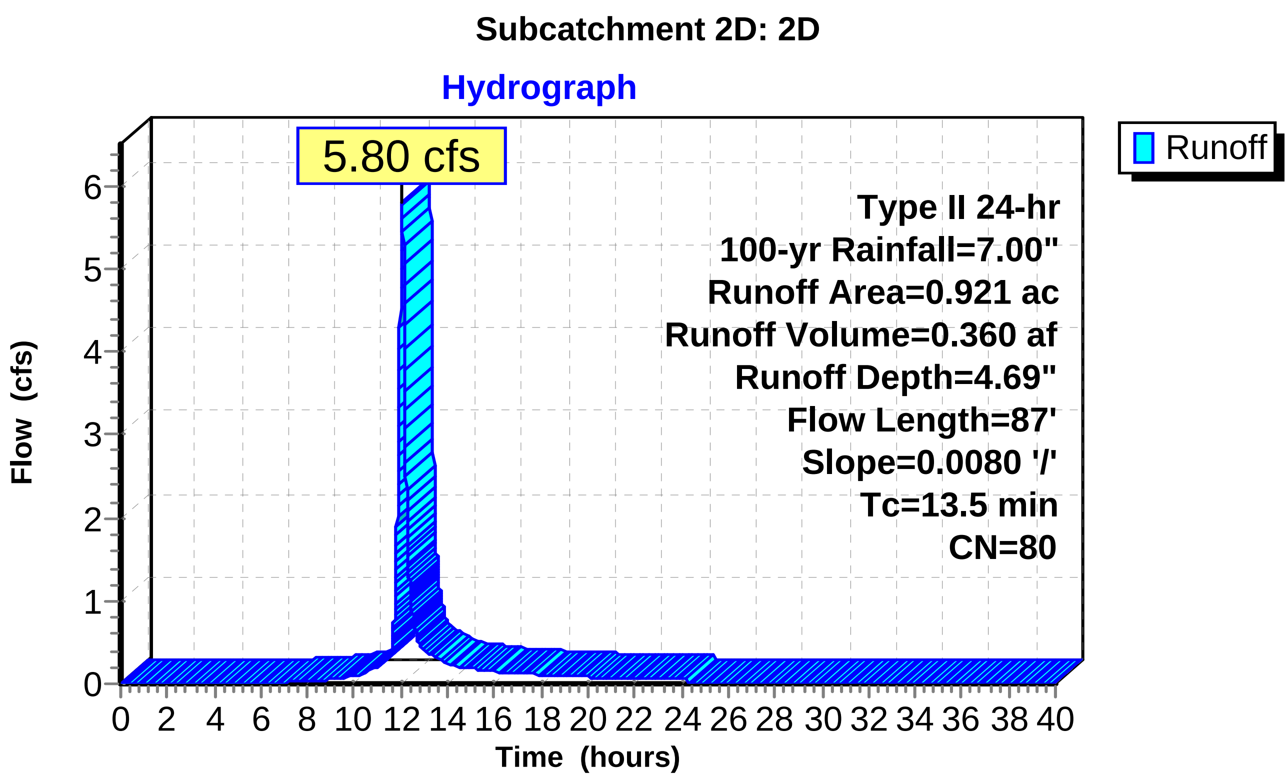
Summary for Subcatchment 2D: 2D

Runoff = 5.80 cfs @ 12.05 hrs, Volume= 0.360 af, Depth= 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
0.453	61	>75% Grass cover, Good, HSG B
0.468	98	Paved parking, HSG A
0.921	80	Weighted Average
0.453		49.19% Pervious Area
0.468		50.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	87	0.0080	0.11		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 2.80"



Summary for Subcatchment 2E: Garage Roof

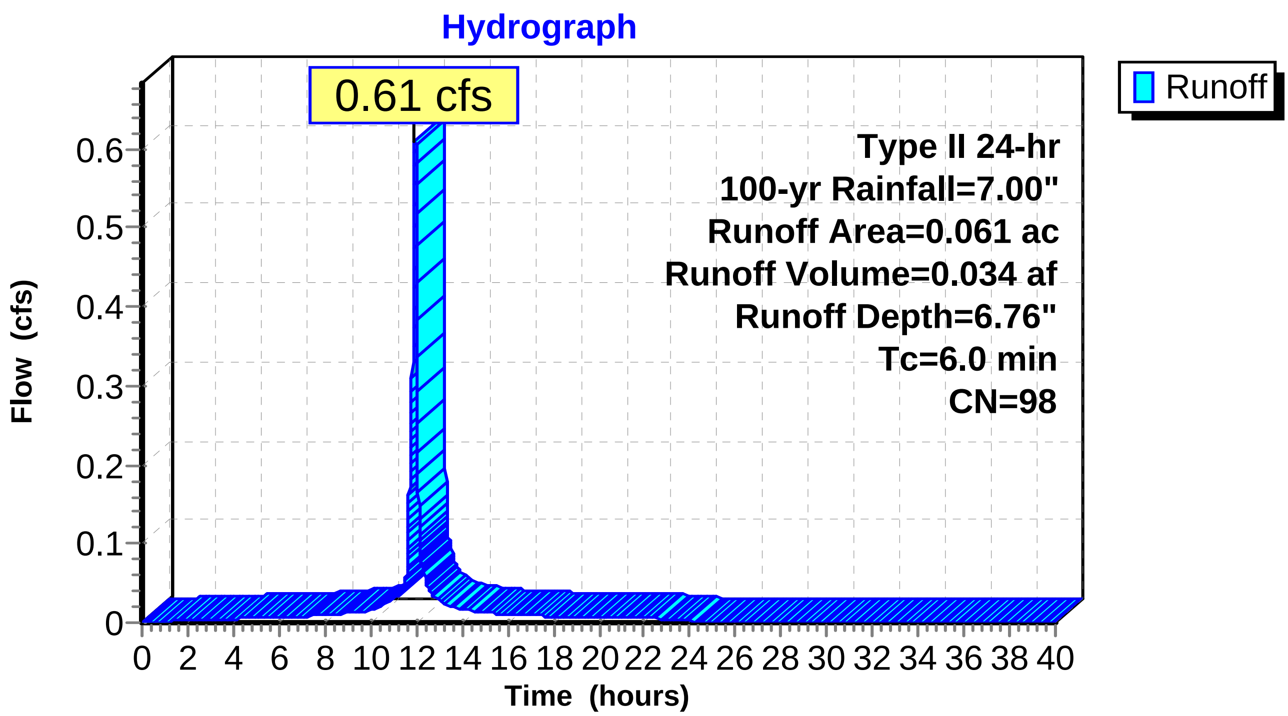
Runoff = 0.61 cfs @ 11.97 hrs, Volume= 0.034 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 2E: Garage Roof



Summary for Subcatchment 2F: Garage Roof

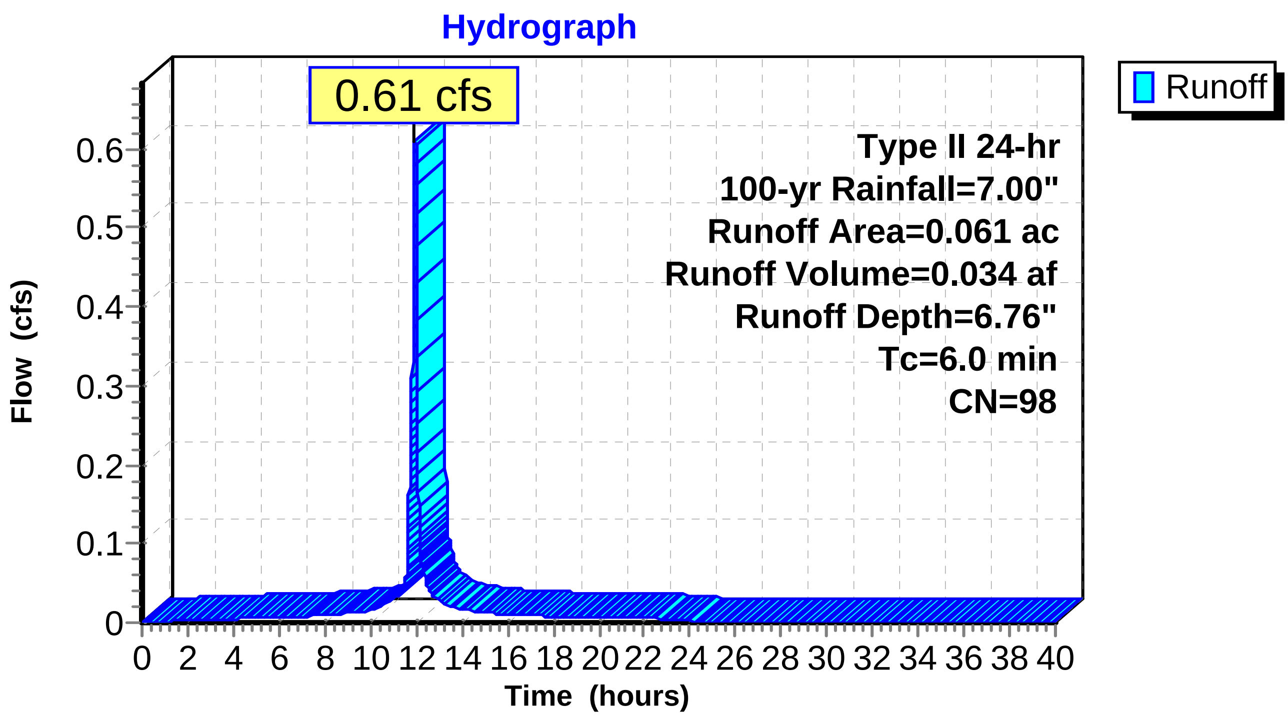
Runoff = 0.61 cfs @ 11.97 hrs, Volume= 0.034 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 2F: Garage Roof



Summary for Subcatchment 2G: 2G

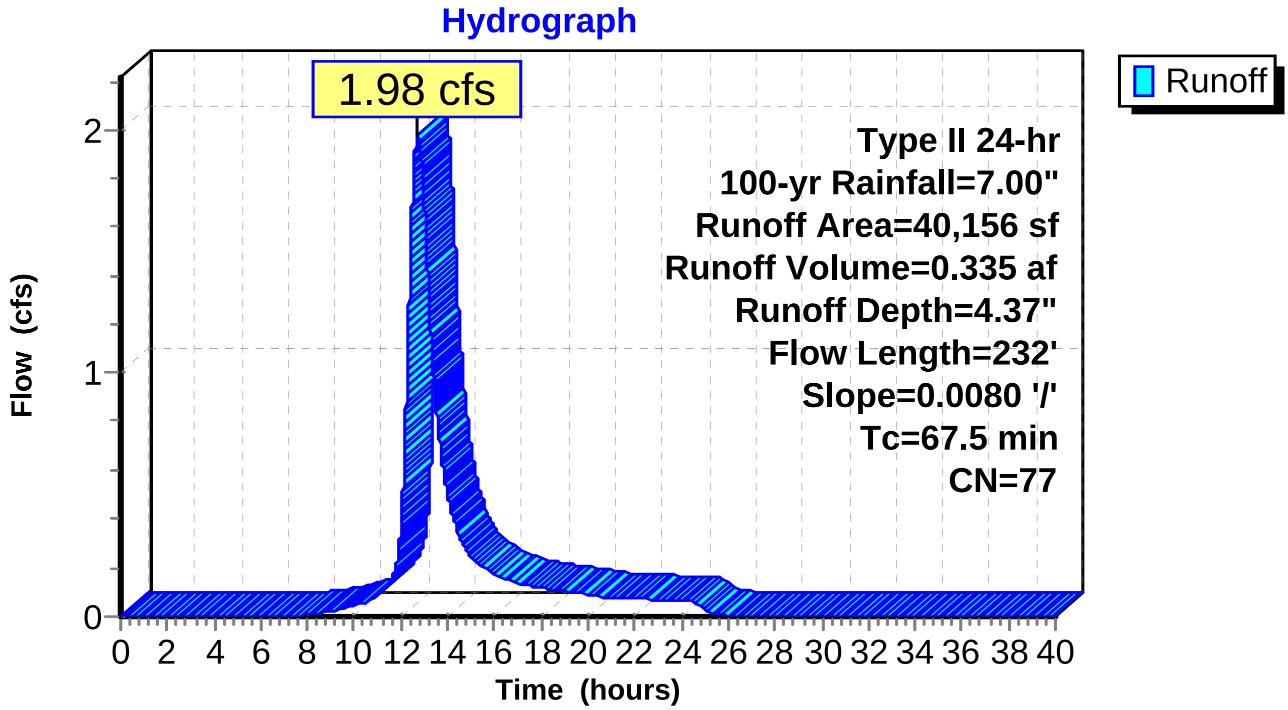
Runoff = 1.98 cfs @ 12.68 hrs, Volume= 0.335 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
40,156	77	Woods, Good, HSG D
40,156		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
57.7	100	0.0080	0.03		**Sheet Flow, WOODS** Woods: Dense underbrush n= 0.800 P2= 2.80"
9.8	132	0.0080	0.22		**Shallow Concentrated Flow, WOODS** Forest w/Heavy Litter Kv= 2.5 fps
67.5	232	Total			

Subcatchment 2G: 2G



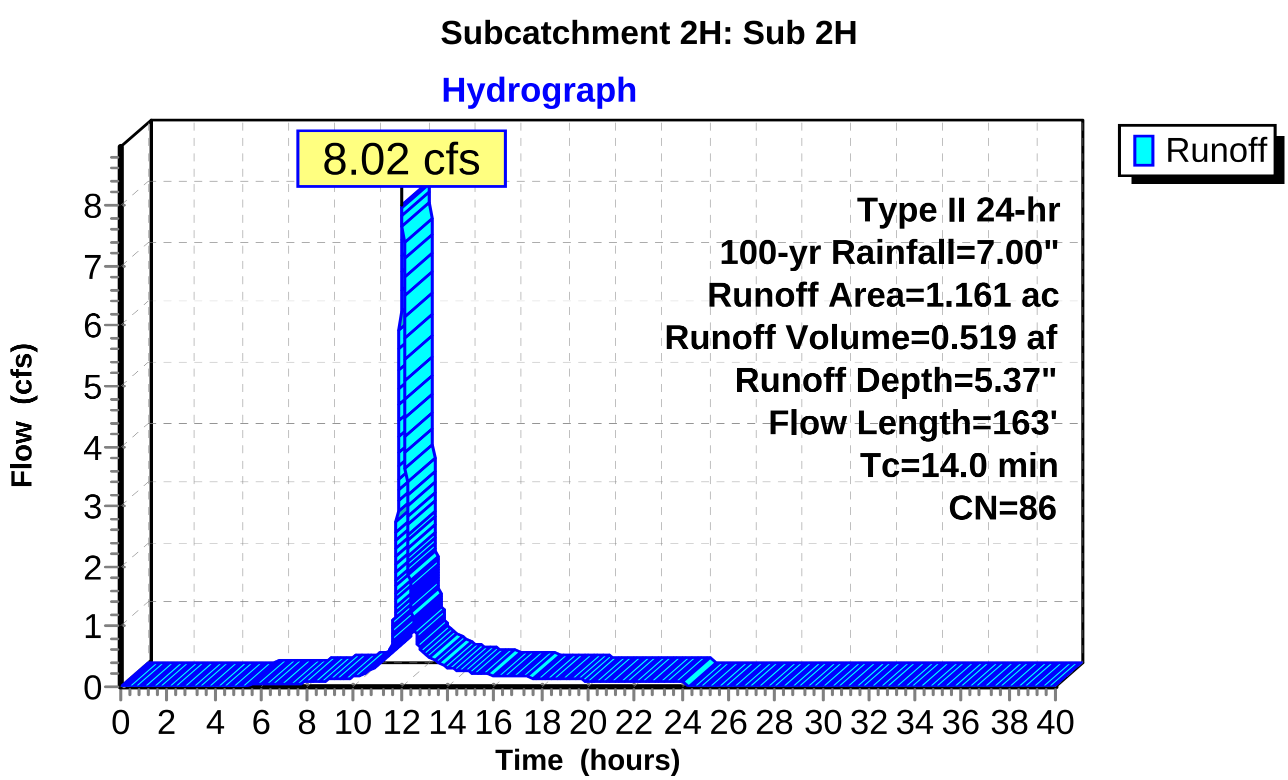
Summary for Subcatchment 2H: Sub 2H

Runoff = 8.02 cfs @ 12.05 hrs, Volume= 0.519 af, Depth= 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
0.770	98	Paved parking, HSG A
0.006	55	Woods, Good, HSG B
0.385	61	>75% Grass cover, Good, HSG B
1.161	86	Weighted Average
0.391		33.68% Pervious Area
0.770		66.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	36	0.0100	0.04		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
0.2	48	0.0950	4.96		**Shallow Concentrated Flow, LAWN** Unpaved Kv= 16.1 fps
0.4	79	0.0300	3.52		**Shallow Concentrated Flow, PAVED** Paved Kv= 20.3 fps
14.0	163	Total			



Summary for Subcatchment 2J: 2J

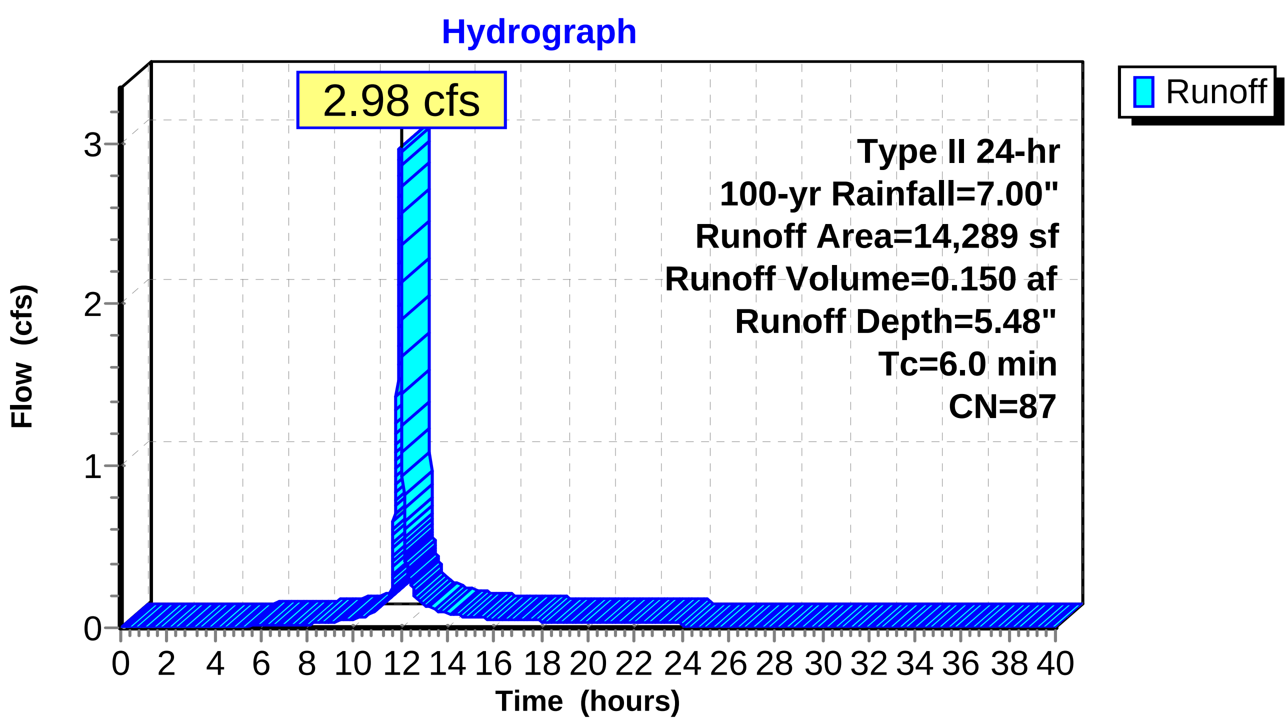
Runoff = 2.98 cfs @ 11.97 hrs, Volume= 0.150 af, Depth= 5.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
4,269	61	>75% Grass cover, Good, HSG B
10,020	98	Paved parking, HSG A
14,289	87	Weighted Average
4,269		29.88% Pervious Area
10,020		70.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, MIN**

Subcatchment 2J: 2J



Summary for Subcatchment 3A: 3A

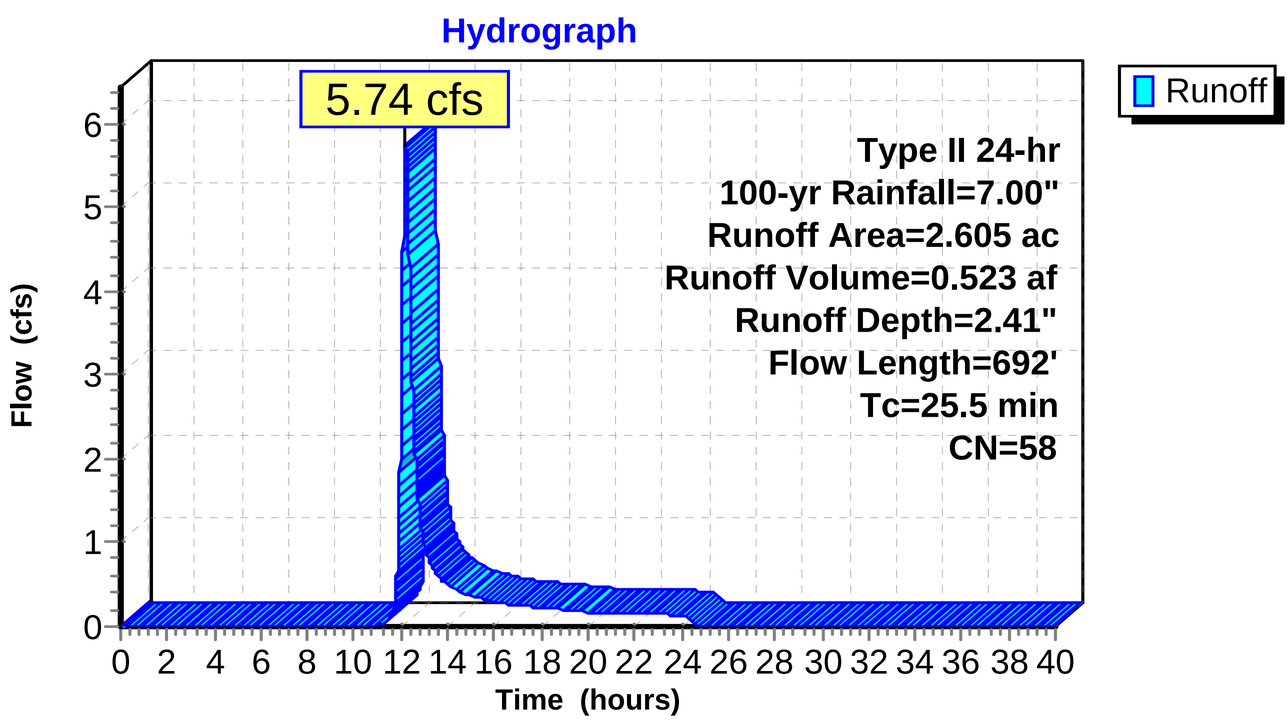
Runoff = 5.74 cfs @ 12.21 hrs, Volume= 0.523 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
1.618	70	Woods, Good, HSG C
0.667	30	Woods, Good, HSG A
0.249	55	Woods, Good, HSG B
0.071	74	>75% Grass cover, Good, HSG C
2.605	58	Weighted Average
2.605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0700	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
11.6	592	0.0290	0.85		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
25.5	692	Total			

Subcatchment 3A: 3A



Summary for Subcatchment 3B: Garage Roof

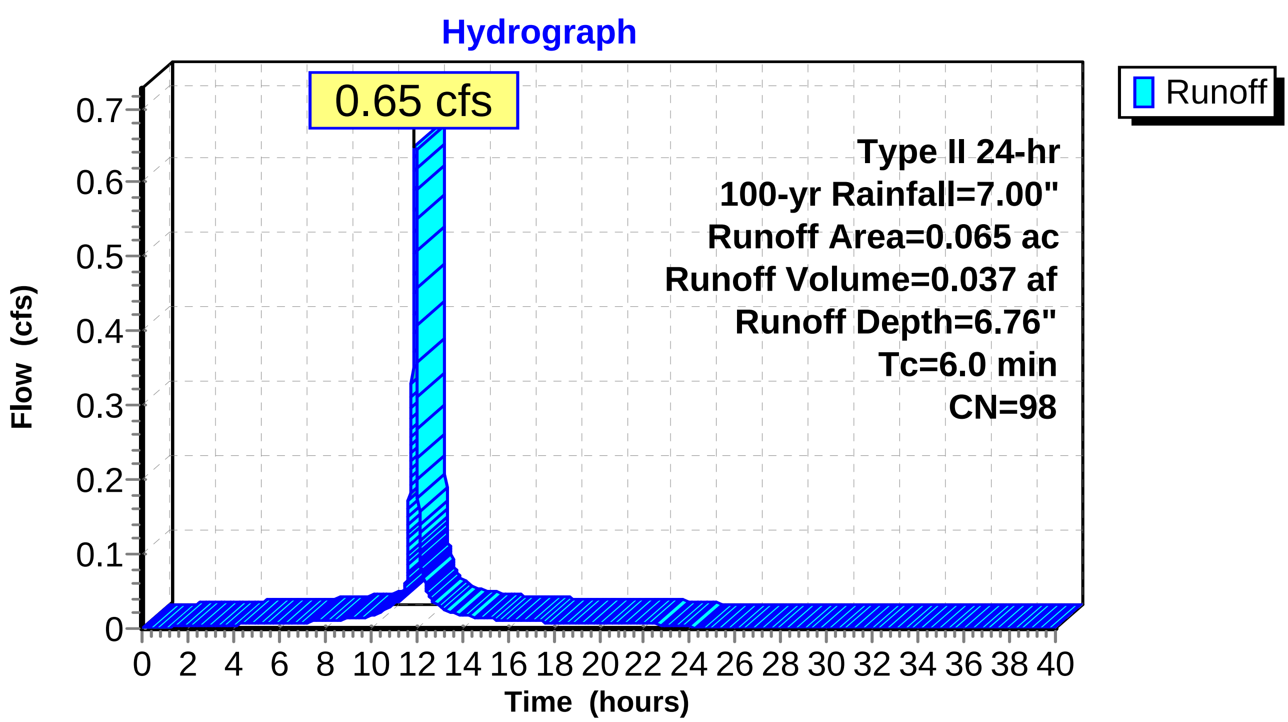
Runoff = 0.65 cfs @ 11.97 hrs, Volume= 0.037 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
0.065	98	Paved parking, HSG A
0.065		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3B: Garage Roof



Summary for Subcatchment 3C: Garage Roof

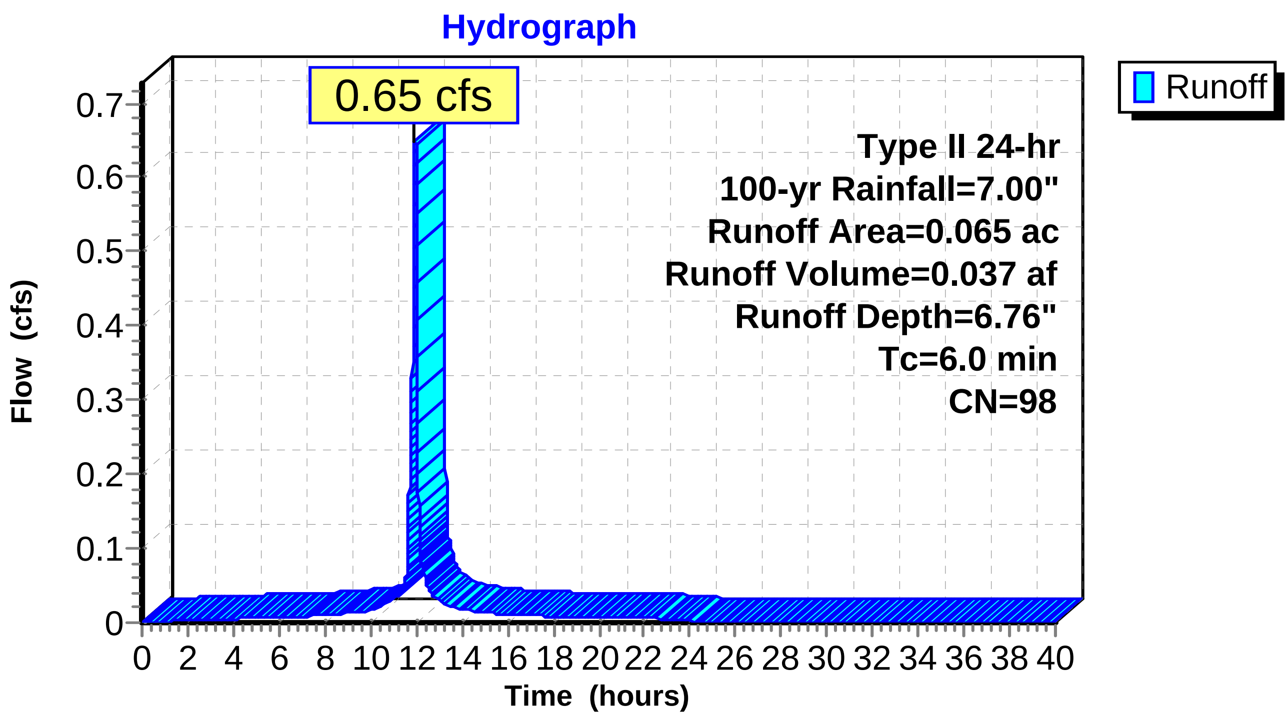
Runoff = 0.65 cfs @ 11.97 hrs, Volume= 0.037 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
0.065	98	Paved parking, HSG A
0.065		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3C: Garage Roof



Summary for Subcatchment 3D: Garage Roof

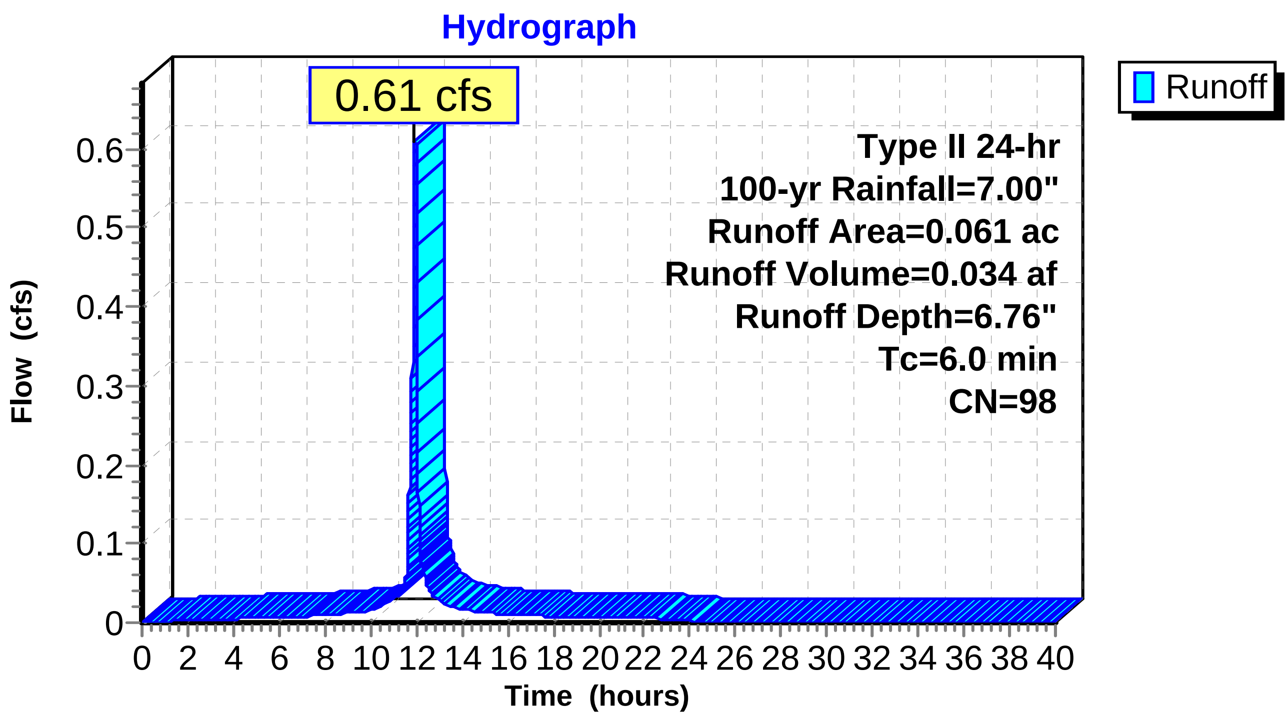
Runoff = 0.61 cfs @ 11.97 hrs, Volume= 0.034 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3D: Garage Roof



Summary for Subcatchment 4A: 4A

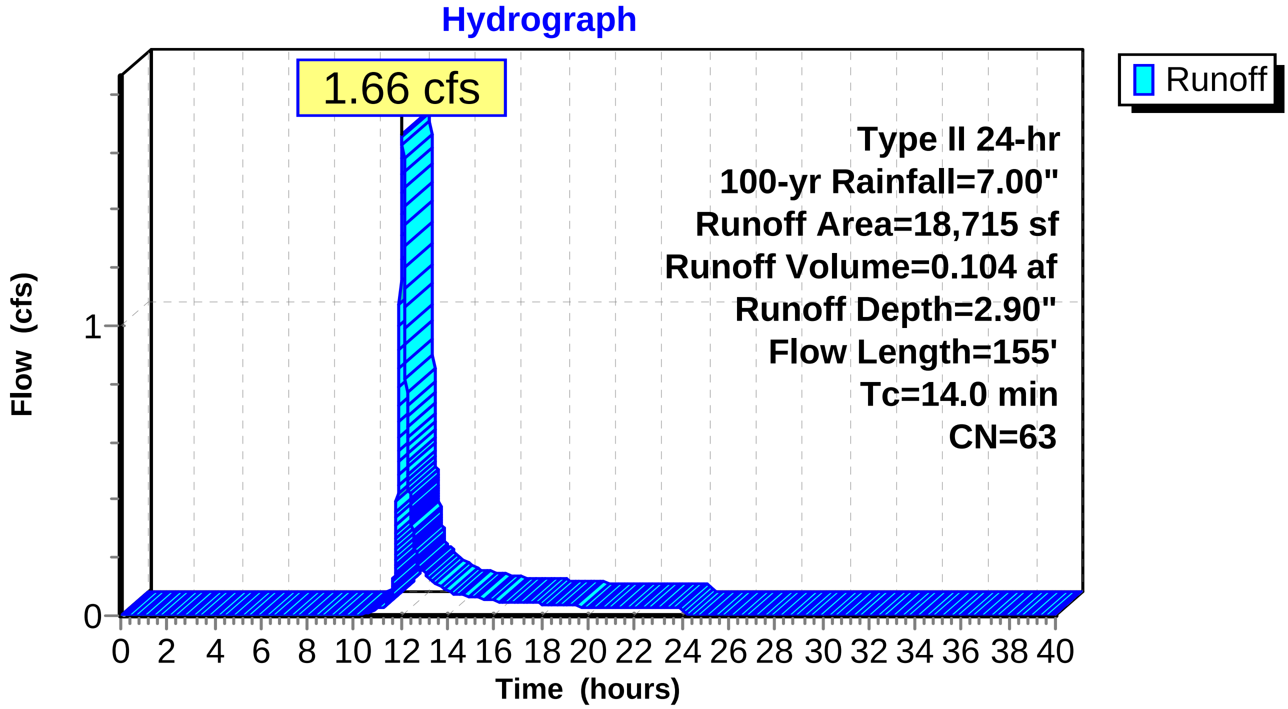
Runoff = 1.66 cfs @ 12.06 hrs, Volume= 0.104 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
10,149	61	>75% Grass cover, Good, HSG B
6,519	55	Woods, Good, HSG B
2,047	98	Paved parking, HSG A
18,715	63	Weighted Average
16,668		89.06% Pervious Area
2,047		10.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	30	0.0200	0.06		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
0.9	16	0.2500	0.30		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.80"
3.9	54	0.0700	0.23		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.80"
0.4	55	0.0200	2.28		**Shallow Concentrated Flow, grass** Unpaved Kv= 16.1 fps
14.0	155	Total			

Subcatchment 4A: 4A



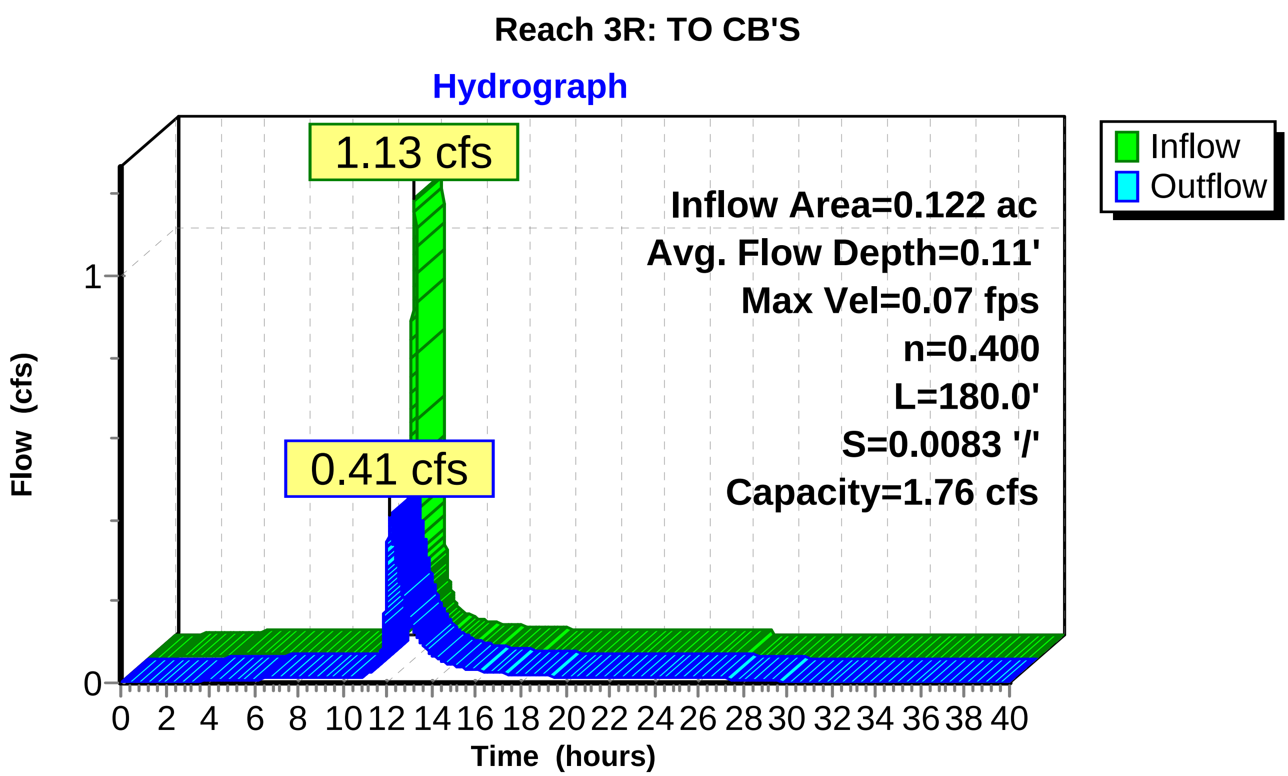
Summary for Reach 3R: TO CB'S

Inflow Area = 0.122 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 1.13 cfs @ 12.00 hrs, Volume= 0.069 af
Outflow = 0.41 cfs @ 12.10 hrs, Volume= 0.069 af, Atten= 64%, Lag= 6.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.07 fps, Min. Travel Time= 42.9 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 162.4 min

Peak Storage= 1,060 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.25' Flow Area= 16.3 sf, Capacity= 1.76 cfs

40.00' x 0.25' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 100.0 '/' Top Width= 90.00'
Length= 180.0' Slope= 0.0083 '/'
Inlet Invert= 311.00', Outlet Invert= 309.50'



Summary for Reach 4R: TO CB'S

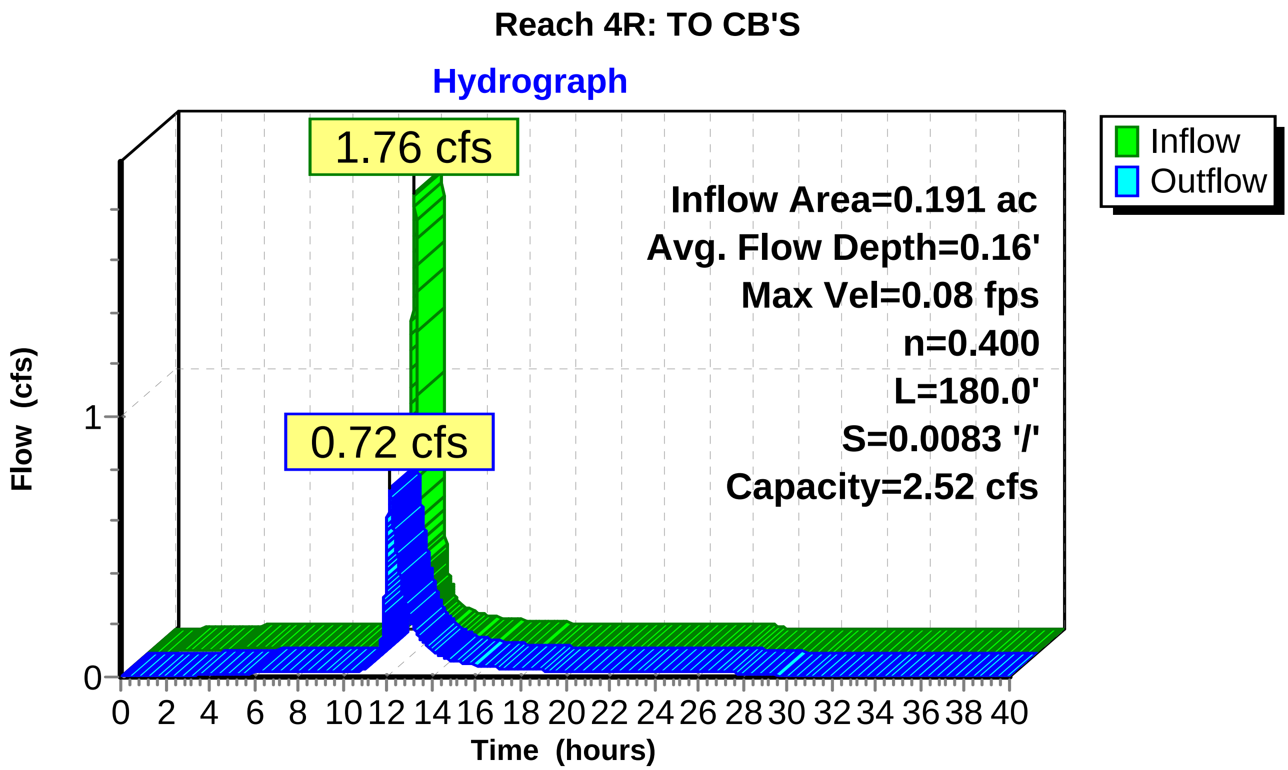
Inflow Area = 0.191 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 1.76 cfs @ 12.00 hrs, Volume= 0.108 af
Outflow = 0.72 cfs @ 12.10 hrs, Volume= 0.107 af, Atten= 59%, Lag= 5.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.08 fps, Min. Travel Time= 36.0 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 138.8 min

Peak Storage= 1,562 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.30' Flow Area= 21.0 sf, Capacity= 2.52 cfs

40.00' x 0.30' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 100.0 '/' Top Width= 100.00'
Length= 180.0' Slope= 0.0083 '/'
Inlet Invert= 311.00', Outlet Invert= 309.50'

‡



Summary for Pond 2BP: POCKET POND-ABOVE PERM POOL

Inflow Area = 7.221 ac, 42.94% Impervious, Inflow Depth > 3.70" for 100-yr event
Inflow = 29.19 cfs @ 12.11 hrs, Volume= 2.227 af
Outflow = 11.36 cfs @ 12.38 hrs, Volume= 2.213 af, Atten= 61%, Lag= 16.1 min
Primary = 11.36 cfs @ 12.38 hrs, Volume= 2.213 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Starting Elev= 317.00' Surf.Area= 9,188 sf Storage= 6,201 cf
Peak Elev= 321.40' @ 12.38 hrs Surf.Area= 17,435 sf Storage= 43,252 cf (37,051 cf above start)

Plug-Flow detention time= 202.0 min calculated for 2.071 af (93% of inflow)
Center-of-Mass det. time= 133.6 min (991.6 - 858.0)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	6,201 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
#2	317.00'	52,519 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		58,720 cf	Total Available Storage

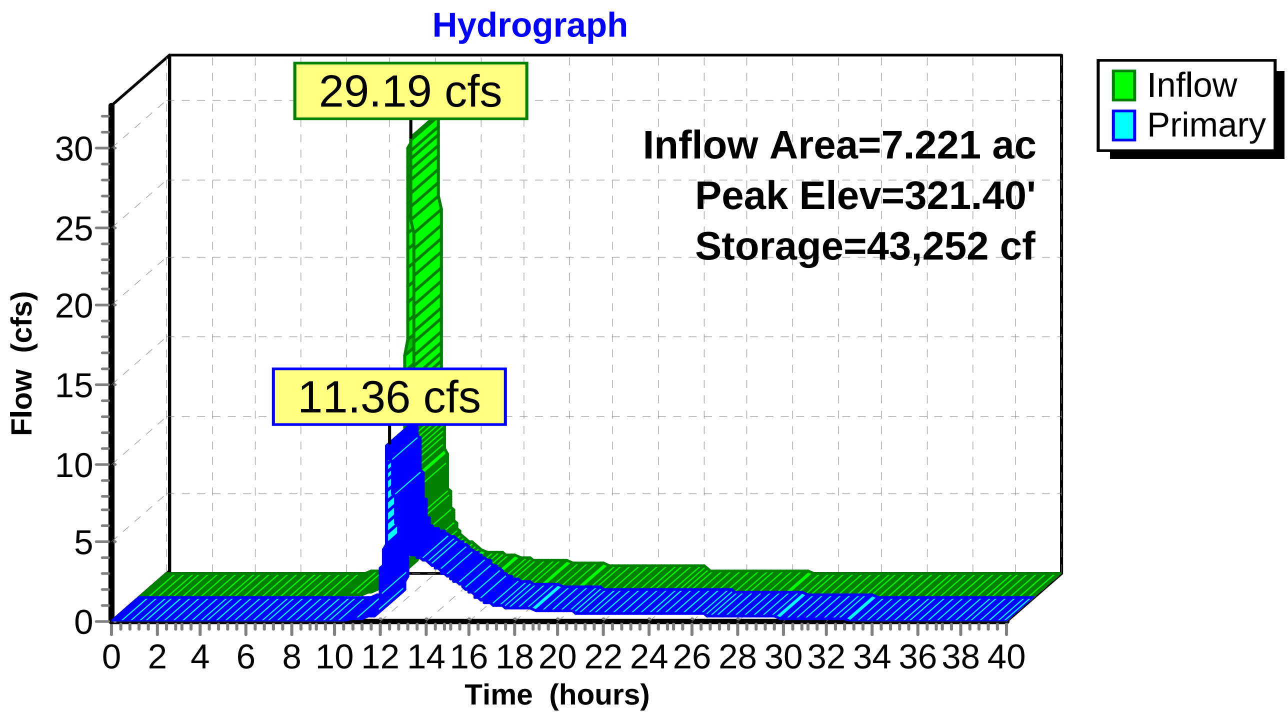
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
313.00	395	95.0	0	0	395
314.00	759	134.0	567	567	1,115
315.00	1,241	173.0	990	1,557	2,080
316.00	1,839	212.0	1,530	3,088	3,290
317.00	4,594	319.0	3,113	6,201	7,819

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.00	4,594	319.0	0	0	4,594
318.00	6,187	392.0	5,371	5,371	8,740
320.00	9,848	498.0	15,894	21,265	16,299
322.00	14,260	584.0	23,972	45,237	23,783
322.50	14,870	586.0	7,282	52,519	24,130

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**18.0" Round Culvert** L= 101.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.00' / 316.00' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.20'	**3.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	318.60'	**18.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	321.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=11.36 cfs @ 12.38 hrs HW=321.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 11.36 cfs of 16.25 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.34 cfs @ 9.97 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.61 cfs @ 9.71 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 3.90 cfs @ 7.81 fps)
  └─**5=Orifice/Grate** (Weir Controls 6.51 cfs @ 2.06 fps)

Pond 2BP: POCKET POND-ABOVE PERM POOL



Summary for Pond 2CP1: REAR BIO-RETENTION

Inflow Area = 0.863 ac, 54.11% Impervious, Inflow Depth = 4.81" for 100-yr event
Inflow = 5.54 cfs @ 12.05 hrs, Volume= 0.346 af
Outflow = 5.30 cfs @ 12.08 hrs, Volume= 0.346 af, Atten= 4%, Lag= 2.0 min
Primary = 0.03 cfs @ 12.08 hrs, Volume= 0.045 af
Secondary = 5.27 cfs @ 12.08 hrs, Volume= 0.301 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 321.89' @ 12.08 hrs Surf.Area= 2,980 sf Storage= 1,048 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 12.8 min (822.2 - 809.4)

Volume	Invert	Avail.Storage	Storage Description
#1	321.50'	1,375 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

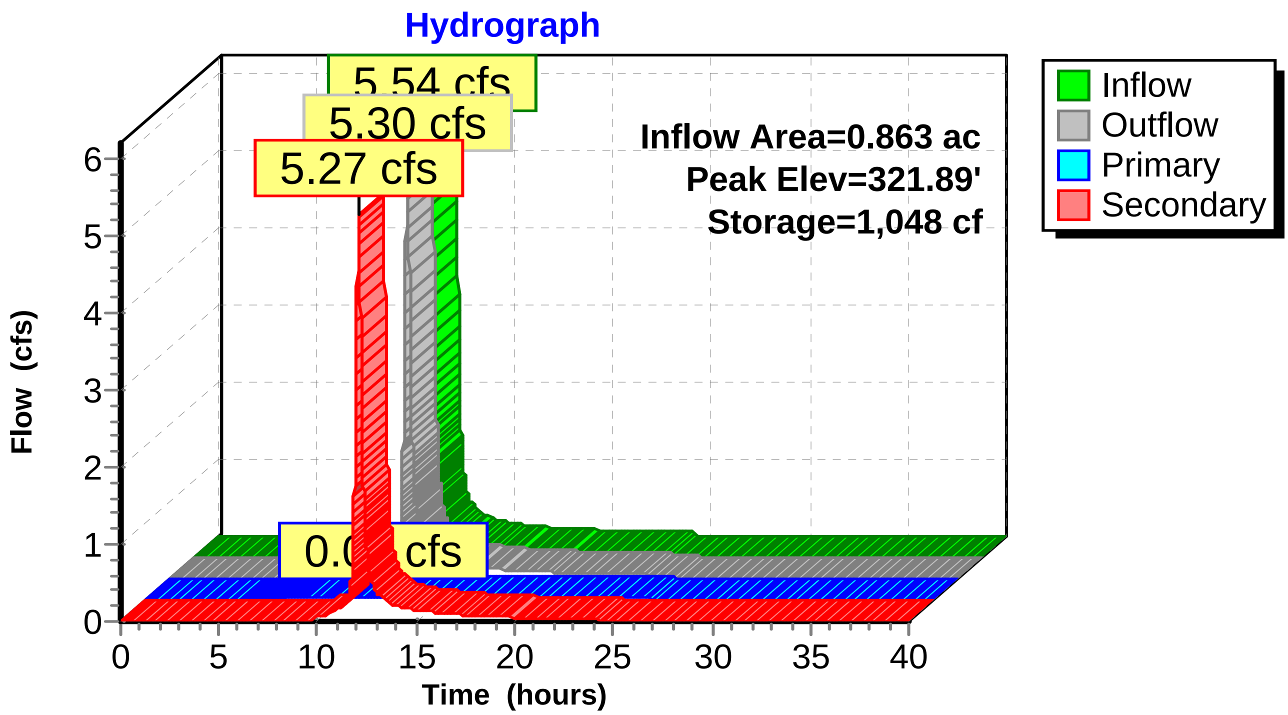
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.50	2,360	261.0	0	0	2,360
322.00	3,160	271.0	1,375	1,375	2,804

Device	Routing	Invert	Outlet Devices
#1	Primary	321.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	317.50'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	321.55'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 12.08 hrs HW=321.89' TW=317.59' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=5.26 cfs @ 12.08 hrs HW=321.89' TW=314.78' (Dynamic Tailwater)
└─**2=Culvert** (Passes 5.26 cfs of 7.46 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 5.26 cfs @ 1.92 fps)

Pond 2CP1: REAR BIO-RETENTION



Summary for Pond 2CP2: REAR BIO-RETENTION

Inflow Area = 0.863 ac, 54.11% Impervious, Inflow Depth = 0.62" for 100-yr event
Inflow = 0.03 cfs @ 12.08 hrs, Volume= 0.045 af
Outflow = 0.03 cfs @ 11.51 hrs, Volume= 0.045 af, Atten= 21%, Lag= 0.0 min
Primary = 0.03 cfs @ 11.51 hrs, Volume= 0.045 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 317.66' @ 25.64 hrs Surf.Area= 2,360 sf Storage= 149 cf

Plug-Flow detention time= 68.3 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 67.3 min (1,035.2 - 967.9)

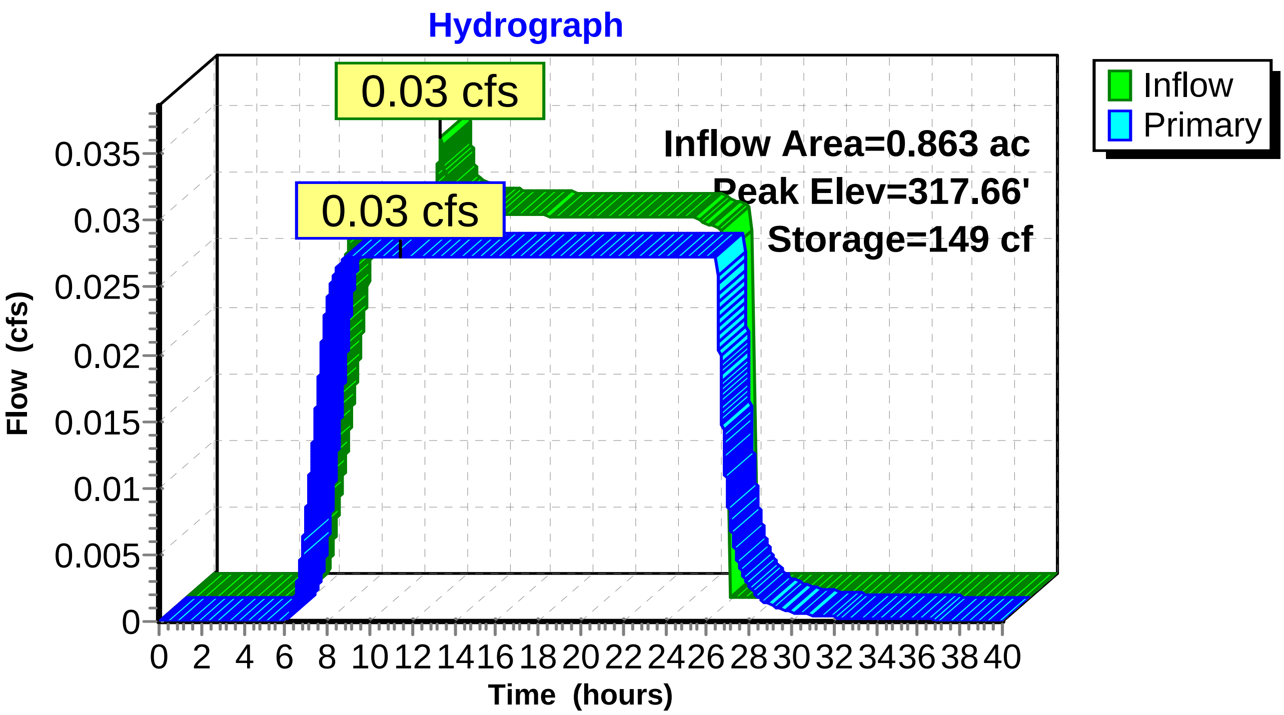
Volume	Invert	Avail.Storage	Storage Description
#1	317.50'	3,776 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 9,440 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.50	2,360	261.0	0	0	2,360
321.50	2,360	261.0	9,440	9,440	3,404

Device	Routing	Invert	Outlet Devices
#1	Primary	317.50'	**18.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.50'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	321.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 11.51 hrs HW=317.58' TW=313.53' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.03 cfs of 0.04 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2CP2: REAR BIO-RETENTION



Summary for Pond 2DP1: REAR BIO-RETENTION

Inflow Area = 0.921 ac, 50.81% Impervious, Inflow Depth = 4.69" for 100-yr event
Inflow = 5.80 cfs @ 12.05 hrs, Volume= 0.360 af
Outflow = 5.53 cfs @ 12.09 hrs, Volume= 0.360 af, Atten= 5%, Lag= 2.1 min
Primary = 0.04 cfs @ 12.09 hrs, Volume= 0.052 af
Secondary = 5.49 cfs @ 12.09 hrs, Volume= 0.308 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 321.95' @ 12.09 hrs Surf.Area= 3,108 sf Storage= 1,299 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 21.9 min (833.7 - 811.9)

Volume	Invert	Avail.Storage	Storage Description
#1	321.50'	1,445 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

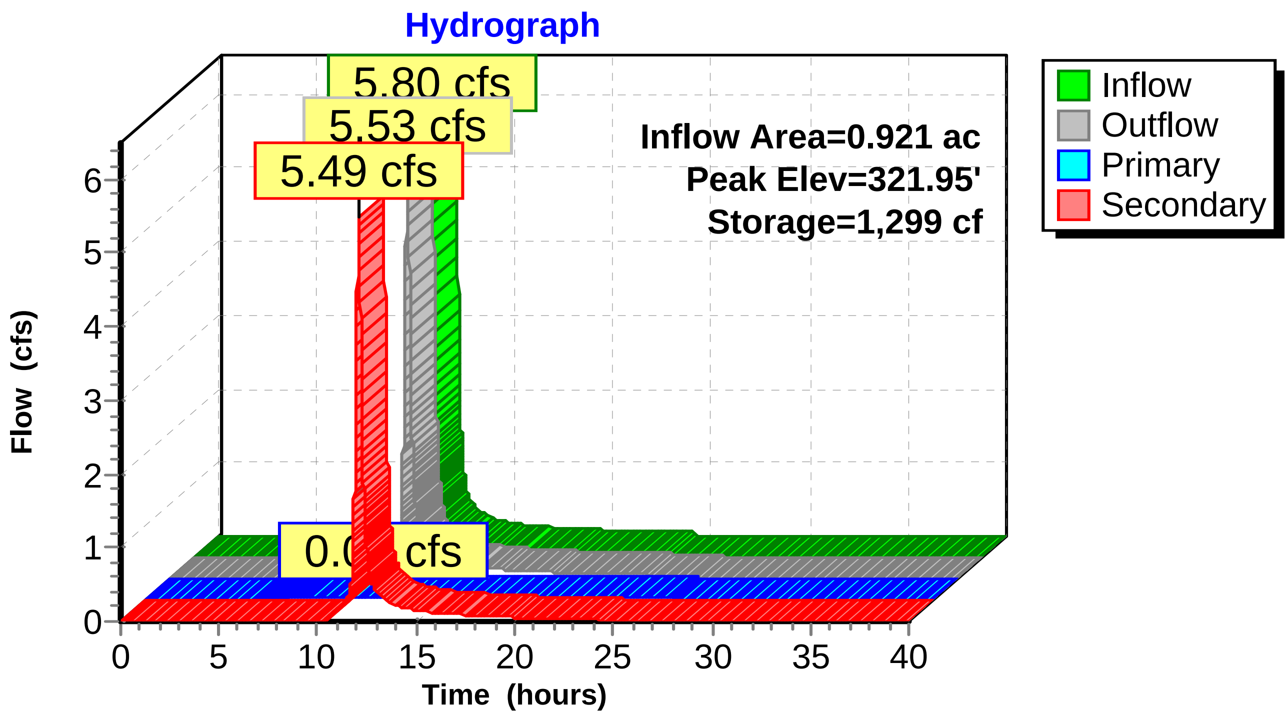
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.50	2,630	261.0	0	0	2,630
322.00	3,160	271.0	1,445	1,445	3,074

Device	Routing	Invert	Outlet Devices
#1	Primary	321.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	317.50'	**12.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	321.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.04 cfs @ 12.09 hrs HW=321.95' TW=317.63' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=5.49 cfs @ 12.09 hrs HW=321.95' TW=314.79' (Dynamic Tailwater)
└─**2=Culvert** (Passes 5.49 cfs of 7.52 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 5.49 cfs @ 1.94 fps)

Pond 2DP1: REAR BIO-RETENTION



Summary for Pond 2DP2: REAR BIO-RETENTION

Inflow Area = 0.921 ac, 50.81% Impervious, Inflow Depth = 0.68" for 100-yr event
Inflow = 0.04 cfs @ 12.09 hrs, Volume= 0.052 af
Outflow = 0.03 cfs @ 9.12 hrs, Volume= 0.052 af, Atten= 24%, Lag= 0.0 min
Primary = 0.03 cfs @ 9.12 hrs, Volume= 0.052 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 317.89' @ 26.84 hrs Surf.Area= 2,360 sf Storage= 365 cf

Plug-Flow detention time= 128.6 min calculated for 0.052 af (100% of inflow)
Center-of-Mass det. time= 127.6 min (1,141.3 - 1,013.7)

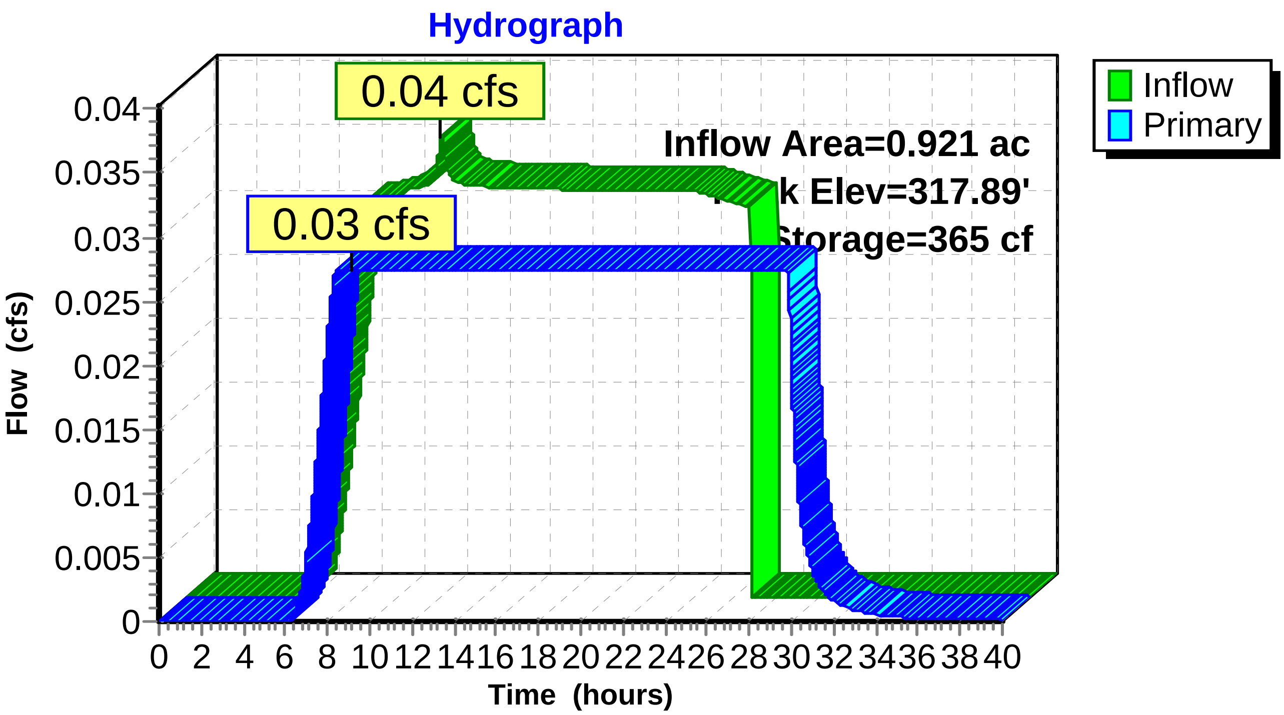
Volume	Invert	Avail.Storage	Storage Description
#1	317.50'	3,776 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 9,440 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.50	2,360	261.0	0	0	2,360
321.50	2,360	261.0	9,440	9,440	3,404

Device	Routing	Invert	Outlet Devices
#1	Primary	317.50'	**18.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.03 cfs @ 9.12 hrs HW=317.58' TW=313.08' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.03 cfs of 0.04 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Pond 2DP2: REAR BIO-RETENTION



Summary for Pond 2EP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 0.61 cfs @ 11.97 hrs, Volume= 0.034 af
Outflow = 0.57 cfs @ 12.00 hrs, Volume= 0.034 af, Atten= 7%, Lag= 1.8 min
Primary = 0.01 cfs @ 6.43 hrs, Volume= 0.013 af
Secondary = 0.56 cfs @ 12.00 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.47' @ 12.00 hrs Surf.Area= 140 sf Storage= 136 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 54.7 min (793.5 - 738.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

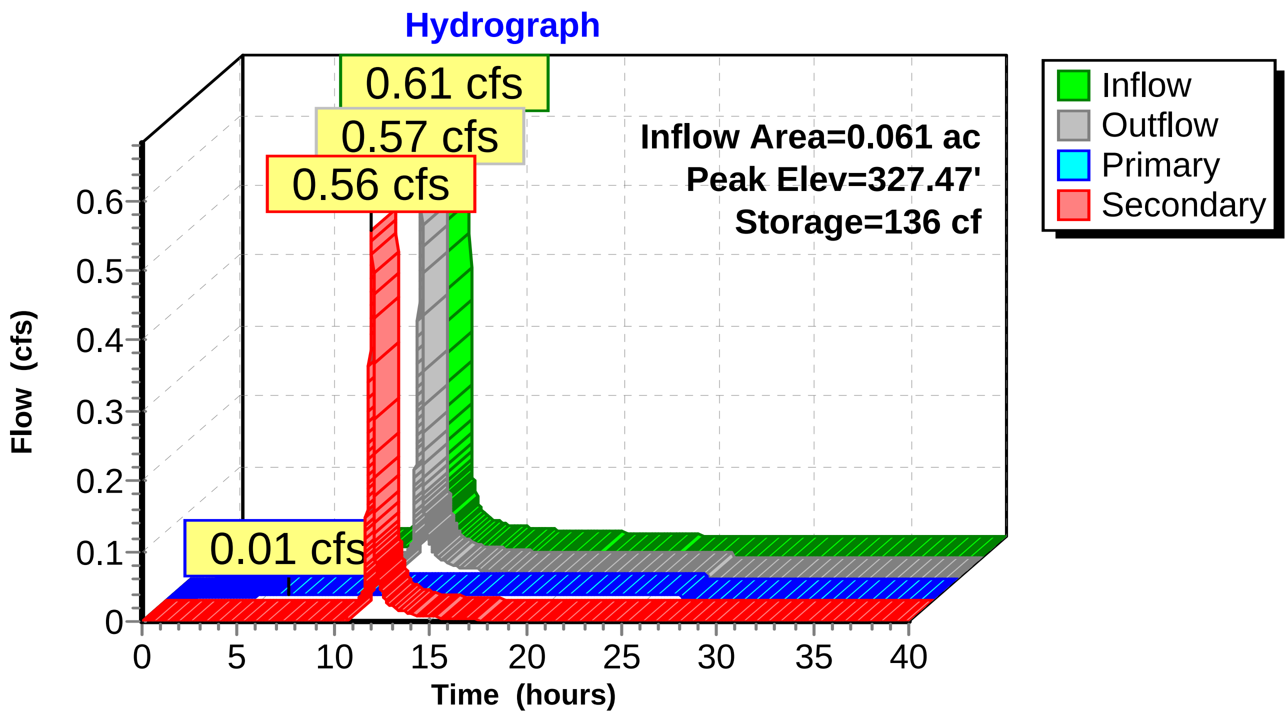
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3750 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 6.43 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.56 cfs @ 12.00 hrs HW=327.47' TW=311.10' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.56 cfs of 2.87 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 0.56 cfs @ 2.84 fps)

Pond 2EP1: Stormwater Planter



Summary for Pond 2EP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 2.57" for 100-yr event
Inflow = 0.01 cfs @ 6.43 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 26.94 hrs, Volume= 0.013 af, Atten= 0%, Lag= 1,230.6 min
Primary = 0.01 cfs @ 26.94 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 26.94 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (883.6 - 883.4)

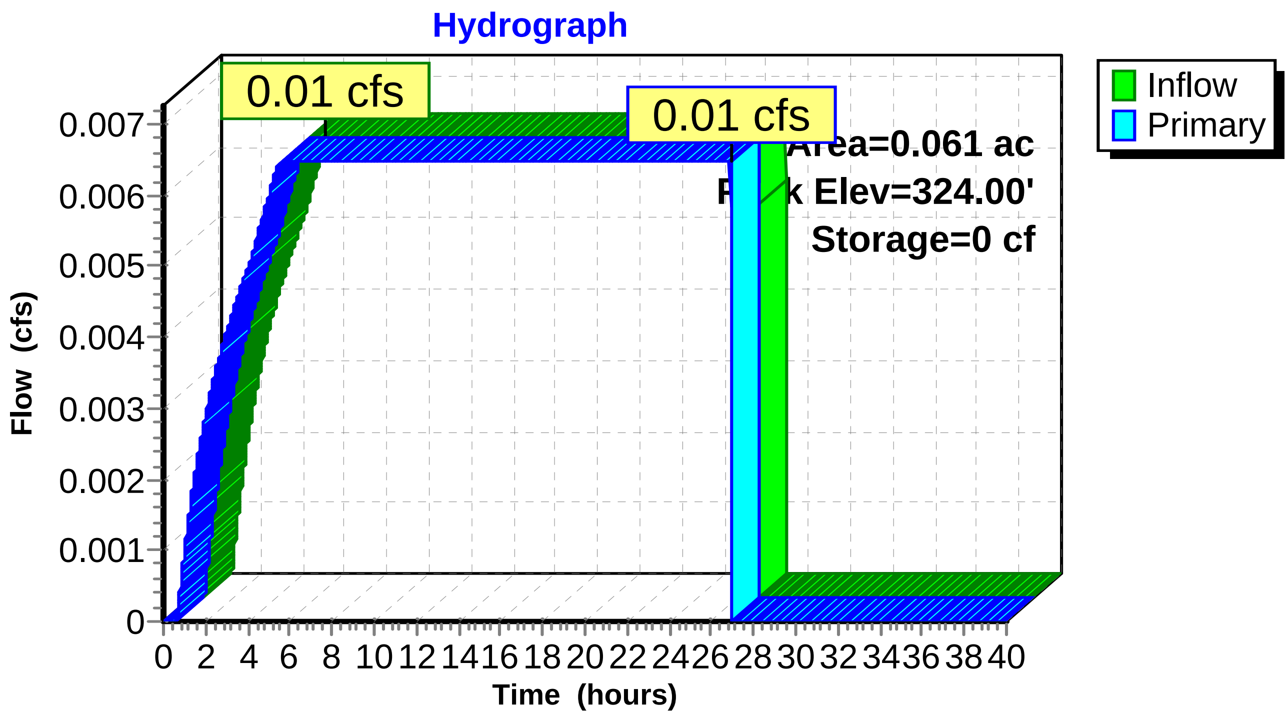
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 12.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.6250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 26.94 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 2EP2: Stormwater Planter



Summary for Pond 2FP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 0.61 cfs @ 11.97 hrs, Volume= 0.034 af
Outflow = 0.57 cfs @ 12.00 hrs, Volume= 0.034 af, Atten= 7%, Lag= 1.8 min
Primary = 0.01 cfs @ 6.43 hrs, Volume= 0.013 af
Secondary = 0.56 cfs @ 12.00 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.47' @ 12.00 hrs Surf.Area= 140 sf Storage= 136 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 54.7 min (793.5 - 738.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

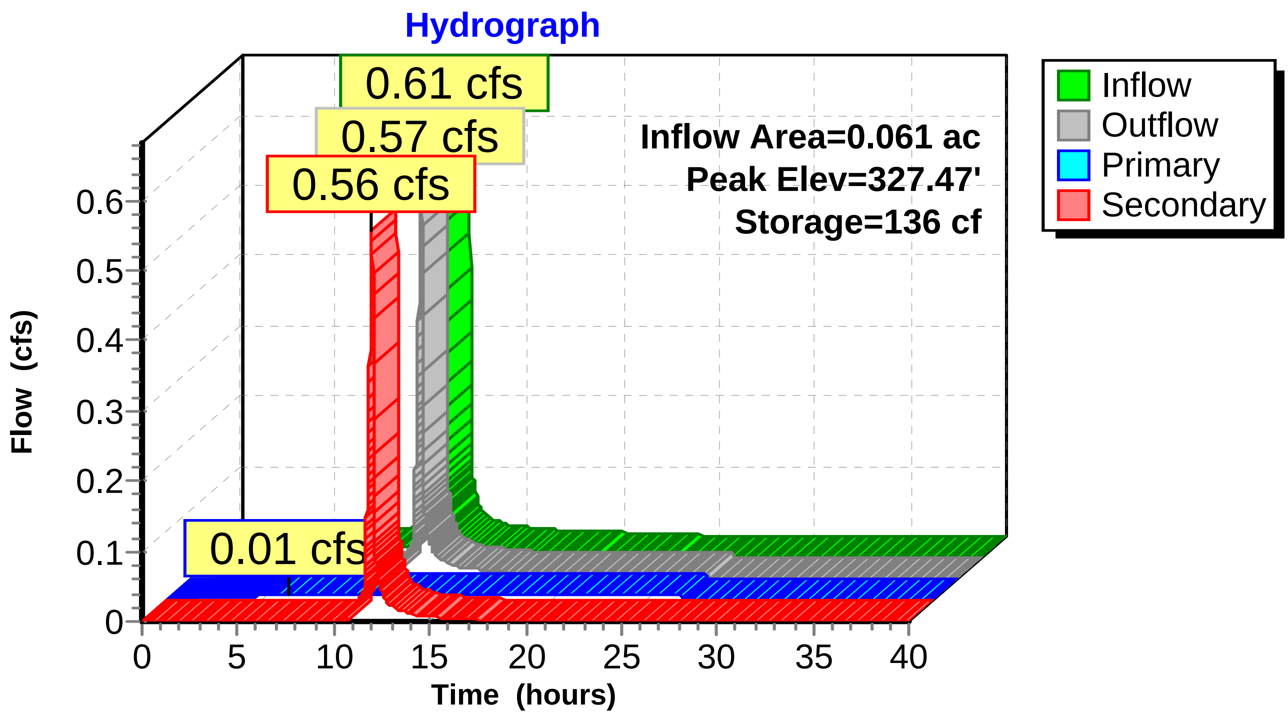
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 25.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 6.43 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.56 cfs @ 12.00 hrs HW=327.47' TW=311.10' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.56 cfs of 2.87 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 0.56 cfs @ 2.84 fps)

Pond 2FP1: Stormwater Planter



Summary for Pond 2FP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 2.57" for 100-yr event
Inflow = 0.01 cfs @ 6.43 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 26.94 hrs, Volume= 0.013 af, Atten= 0%, Lag= 1,230.6 min
Primary = 0.01 cfs @ 26.94 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 26.94 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (883.6 - 883.4)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids
#2	326.50'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
		280 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

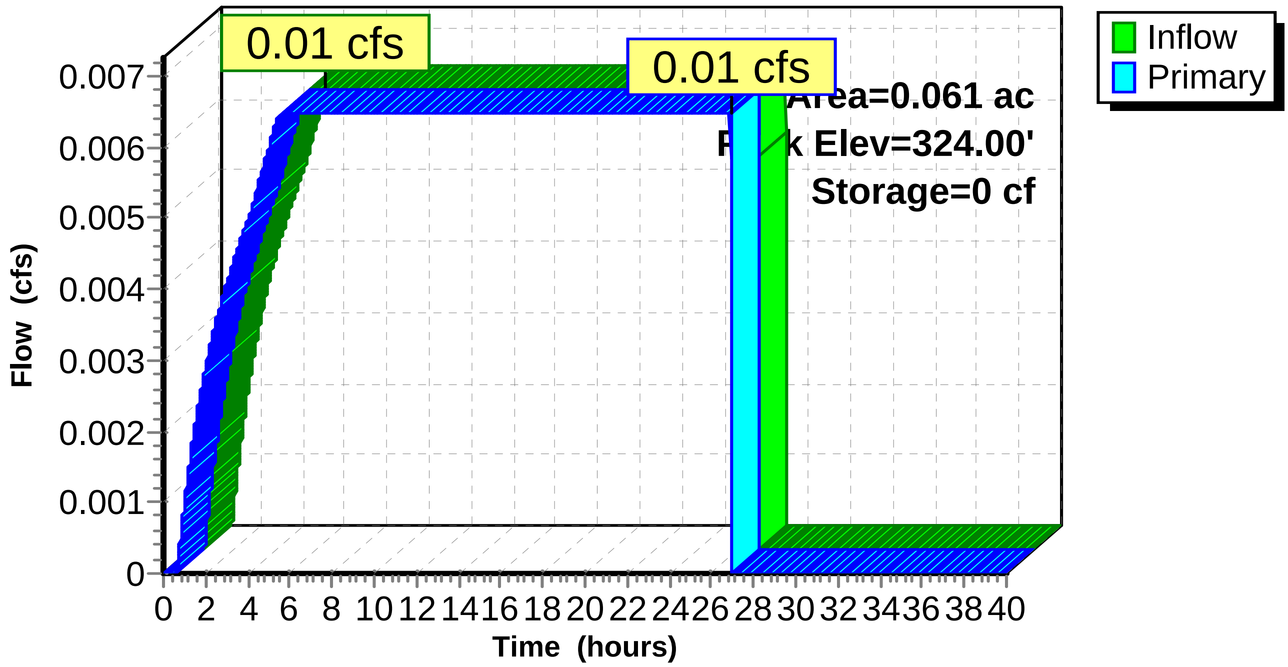
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.50	140	48.0	140	140	188

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3750 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 26.94 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
1=Culvert (Passes 0.01 cfs of 2.27 cfs potential flow)
2=Exfiltration (Exfiltration Controls 0.01 cfs)

Pond 2FP2: Stormwater Planter

Hydrograph



Summary for Pond 2HP1: FRONT BIO-RETENTION

Inflow Area = 1.161 ac, 66.32% Impervious, Inflow Depth = 5.37" for 100-yr event
Inflow = 8.02 cfs @ 12.05 hrs, Volume= 0.519 af
Outflow = 7.03 cfs @ 12.11 hrs, Volume= 0.519 af, Atten= 12%, Lag= 3.5 min
Primary = 0.08 cfs @ 12.11 hrs, Volume= 0.114 af
Secondary = 6.95 cfs @ 12.11 hrs, Volume= 0.405 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 323.97' @ 12.11 hrs Surf.Area= 6,577 sf Storage= 2,958 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 24.5 min (821.0 - 796.5)

Volume	Invert	Avail.Storage	Storage Description
#1	323.50'	3,133 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

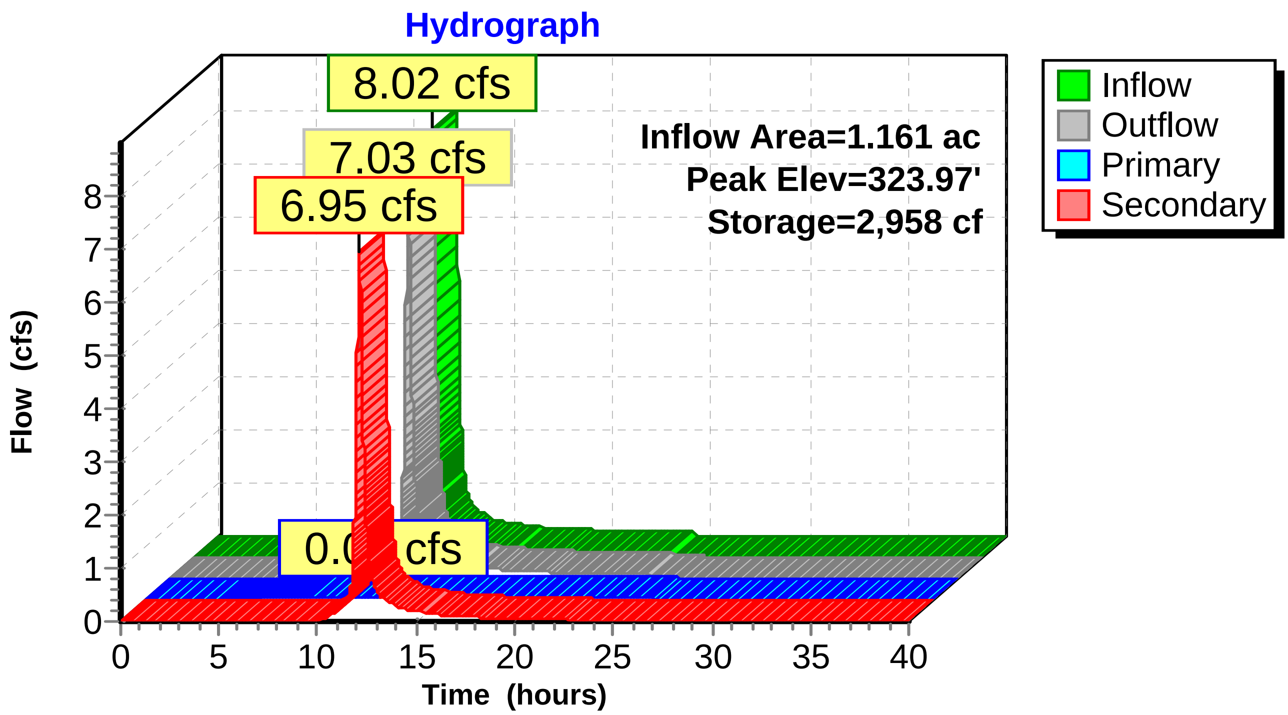
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
323.50	5,924	456.0	0	0	5,924
324.00	6,615	466.0	3,133	3,133	6,693

Device	Routing	Invert	Outlet Devices
#1	Primary	323.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	319.50'	**12.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 319.50' / 319.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	323.56'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.08 cfs @ 12.11 hrs HW=323.97' TW=319.64' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Secondary OutFlow Max=6.95 cfs @ 12.11 hrs HW=323.97' TW=320.28' (Dynamic Tailwater)
└─**2=Culvert** (Passes 6.95 cfs of 7.18 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 6.95 cfs @ 2.10 fps)

Pond 2HP1: FRONT BIO-RETENTION



Summary for Pond 2HP2: FRONT BIO-RETENTION

Inflow Area = 1.161 ac, 66.32% Impervious, Inflow Depth = 1.18" for 100-yr event
Inflow = 0.08 cfs @ 12.11 hrs, Volume= 0.114 af
Outflow = 0.07 cfs @ 14.65 hrs, Volume= 0.113 af, Atten= 10%, Lag= 152.2 min
Primary = 0.07 cfs @ 14.65 hrs, Volume= 0.113 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 319.93' @ 25.83 hrs Surf.Area= 5,924 sf Storage= 1,014 cf

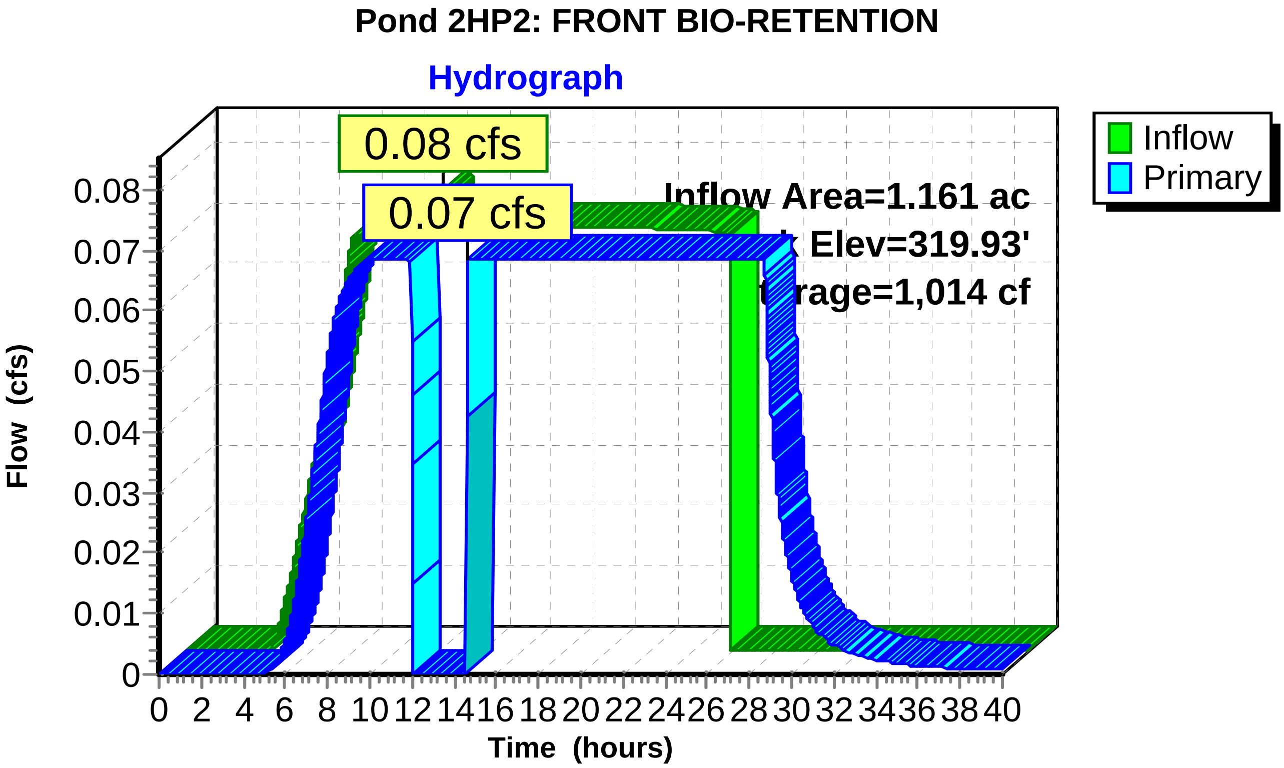
Plug-Flow detention time= 204.4 min calculated for 0.113 af (99% of inflow)
Center-of-Mass det. time= 200.5 min (1,158.0 - 957.5)

Volume	Invert	Avail.Storage	Storage Description
#1	319.50'	9,478 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 23,696 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
319.50	5,924	456.0	0	0	5,924
323.50	5,924	456.0	23,696	23,696	7,748

Device	Routing	Invert	Outlet Devices
#1	Primary	319.50'	**12.0" Round Culvert** L= 60.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 319.50' / 319.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	319.50'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	323.65'	**30.0" x 30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 14.65 hrs HW=319.91' TW=319.86' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.07 cfs of 0.20 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.07 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)


Pond 2HP2: FRONT BIO-RETENTION
Hydrograph
0.08 cfs
0.07 cfs
Inflow Area=1.161 ac
Elev=319.93'
rage=1,014 cf
Inflow
Primary
Flow (cfs)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
Time (hours)

Summary for Pond 2JP1: BIORETENTION IN FRONT OF APT

Inflow Area = 0.328 ac, 70.12% Impervious, Inflow Depth = 5.48" for 100-yr event
Inflow = 2.98 cfs @ 11.97 hrs, Volume= 0.150 af
Outflow = 2.94 cfs @ 11.98 hrs, Volume= 0.150 af, Atten= 1%, Lag= 0.7 min
Primary = 0.07 cfs @ 11.98 hrs, Volume= 0.065 af
Secondary = 2.88 cfs @ 11.98 hrs, Volume= 0.084 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 322.49' @ 11.98 hrs Surf.Area= 1,421 sf Storage= 325 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 8.6 min (794.7 - 786.1)

Volume	Invert	Avail.Storage	Storage Description
#1	322.25'	714 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

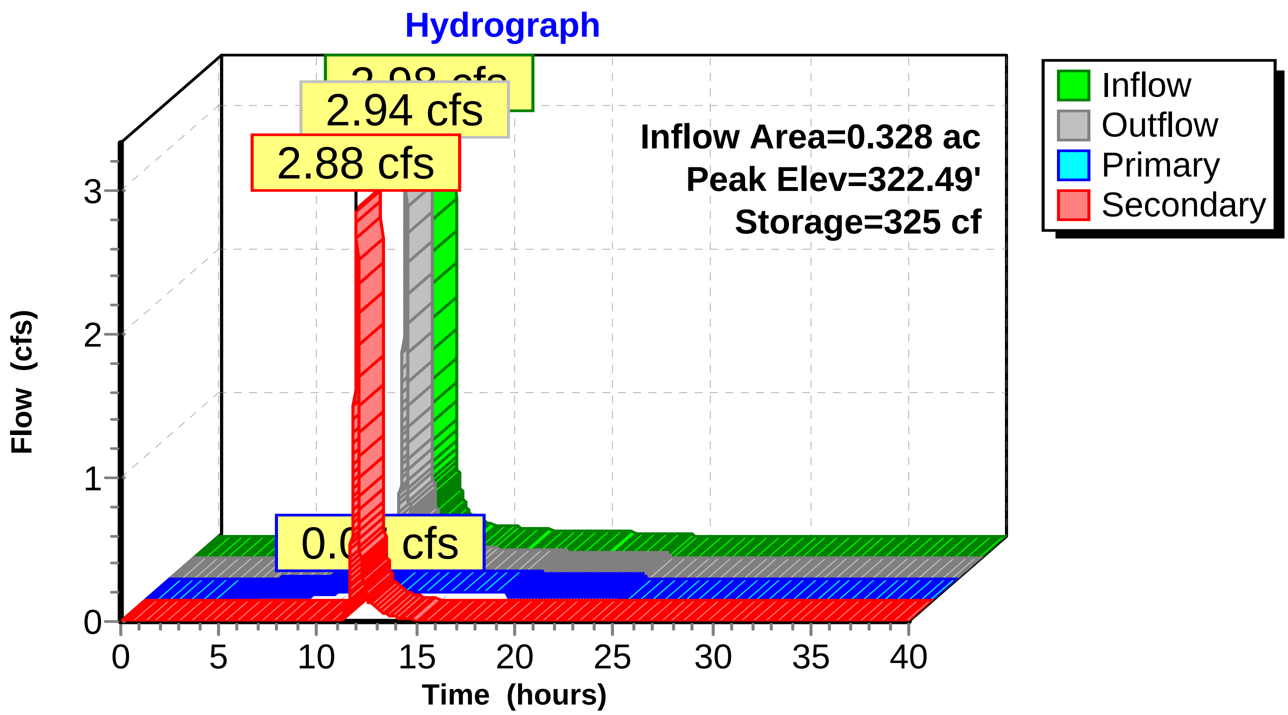
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
322.25	1,236	384.0	0	0	1,236
322.75	1,628	396.0	714	714	2,006

Device	Routing	Invert	Outlet Devices
#1	Primary	322.25'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.25'	**12.0" Round Culvert X 2.00** L= 65.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.25' / 317.75' S= 0.0077 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	322.35'	**24.0" x 24.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 11.98 hrs HW=322.49' TW=319.29' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=2.87 cfs @ 11.98 hrs HW=322.49' TW=319.11' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.87 cfs of 13.48 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 2.87 cfs @ 1.24 fps)

Pond 2JP1: BIORETENTION IN FRONT OF APT



Summary for Pond 2JP2: BIORETENTION IN FRONT OF APT

Inflow Area = 0.328 ac, 70.12% Impervious, Inflow Depth = 2.39" for 100-yr event
Inflow = 0.07 cfs @ 11.98 hrs, Volume= 0.065 af
Outflow = 0.02 cfs @ 24.06 hrs, Volume= 0.044 af, Atten= 72%, Lag= 724.9 min
Primary = 0.02 cfs @ 24.06 hrs, Volume= 0.044 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 321.64' @ 24.06 hrs Surf.Area= 1,564 sf Storage= 1,893 cf

Plug-Flow detention time= 699.1 min calculated for 0.044 af (68% of inflow)
Center-of-Mass det. time= 553.3 min (1,435.2 - 881.9)

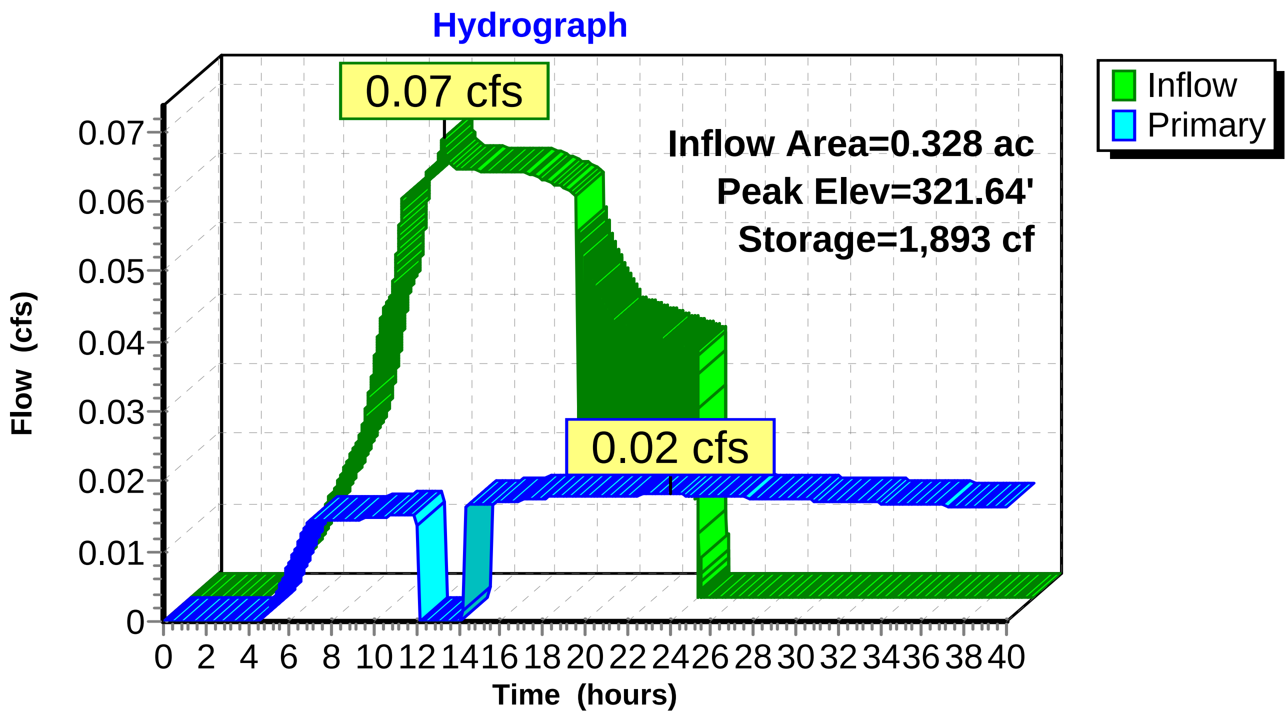
Volume	Invert	Avail.Storage	Storage Description
#1	318.25'	2,284 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 5,710 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
318.25	1,236	384.0	0	0	1,236
322.25	1,628	396.0	5,710	5,710	2,965

Device	Routing	Invert	Outlet Devices
#1	Primary	318.25'	**12.0" Round Culvert** L= 65.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.25' / 317.75' S= 0.0077 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	318.25'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.02 cfs @ 24.06 hrs HW=321.64' TW=318.55' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.02 cfs of 6.22 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond 2JP2: BIORETENTION IN FRONT OF APT



Summary for Pond 2P: SUBSURFACE DETENTION

Inflow Area = 1.784 ac, 52.41% Impervious, Inflow Depth = 4.75" for 100-yr event
Inflow = 10.82 cfs @ 12.08 hrs, Volume= 0.706 af
Outflow = 0.27 cfs @ 16.17 hrs, Volume= 0.533 af, Atten= 98%, Lag= 245.2 min
Primary = 0.27 cfs @ 16.17 hrs, Volume= 0.533 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 316.31' @ 16.17 hrs Surf.Area= 10,754 sf Storage= 20,901 cf

Plug-Flow detention time= 754.2 min calculated for 0.533 af (76% of inflow)
Center-of-Mass det. time= 646.3 min (1,488.0 - 841.7)

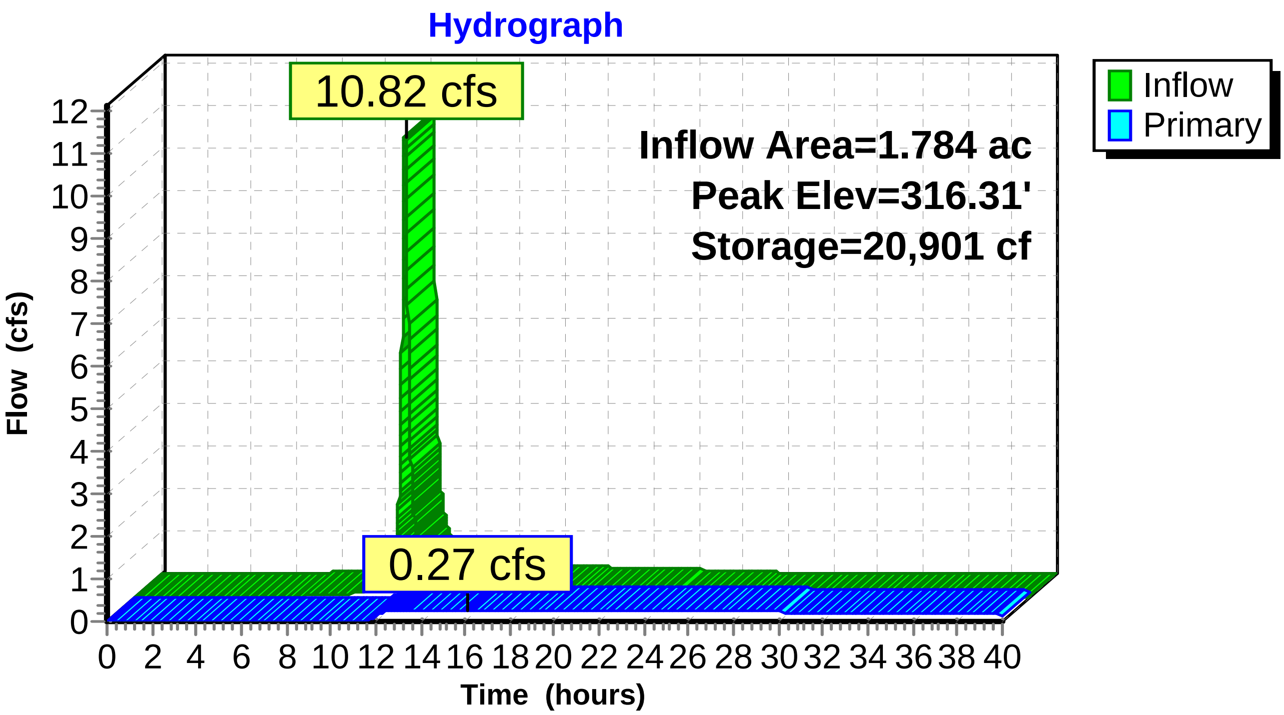
Volume	Invert	Avail.Storage	Storage Description
#1A	313.00'	12,410 cf	**38.00'W x 283.00'L x 4.50'H Field A** 48,393 cf Overall - 17,368 cf Embedded = 31,025 cf x 40.0% Voids
#2A	313.50'	13,916 cf	**ADS N-12 36** x 98 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.2 cf 7 Rows of 14 Chambers
		26,326 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	313.50'	**12.0" Round Culvert** L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 313.50' / 312.00' S= 0.0203 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	313.50'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.50'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.27 cfs @ 16.17 hrs HW=316.31' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.27 cfs of 5.75 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 7.92 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SUBSURFACE DETENTION



Summary for Pond 3BP1: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 0.65 cfs @ 11.97 hrs, Volume= 0.037 af
Outflow = 0.60 cfs @ 12.00 hrs, Volume= 0.037 af, Atten= 8%, Lag= 1.8 min
Primary = 0.01 cfs @ 6.01 hrs, Volume= 0.013 af
Secondary = 0.59 cfs @ 12.00 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.54' @ 12.00 hrs Surf.Area= 140 sf Storage= 146 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 56.4 min (795.1 - 738.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

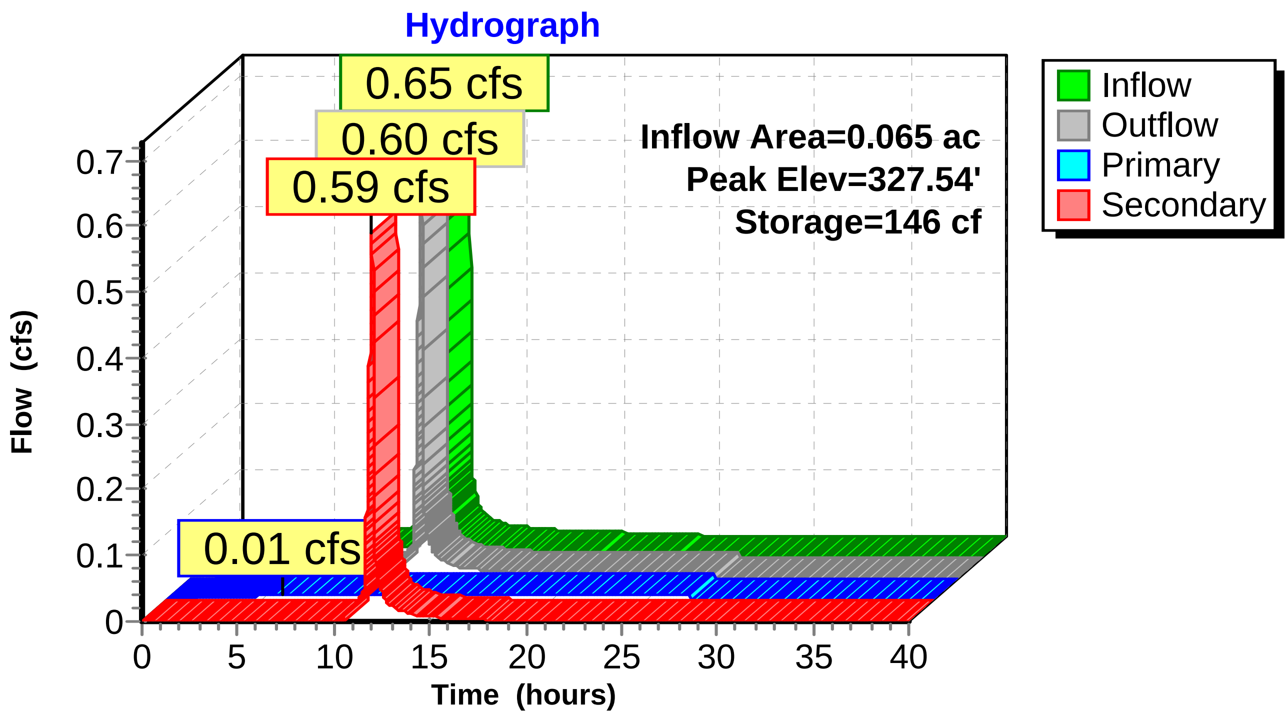
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.15'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 6.01 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.59 cfs @ 12.00 hrs HW=327.54' TW=311.13' (Dynamic Tailwater)
2=Culvert (Passes 0.59 cfs of 2.88 cfs potential flow)
3=Orifice/Grate (Orifice Controls 0.59 cfs @ 3.01 fps)

Pond 3BP1: Stormwater Planter



Summary for Pond 3BP2: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 2.47" for 100-yr event
Inflow = 0.01 cfs @ 6.01 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 27.37 hrs, Volume= 0.013 af, Atten= 0%, Lag= 1,281.6 min
Primary = 0.01 cfs @ 27.37 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 27.37 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (891.7 - 891.5)

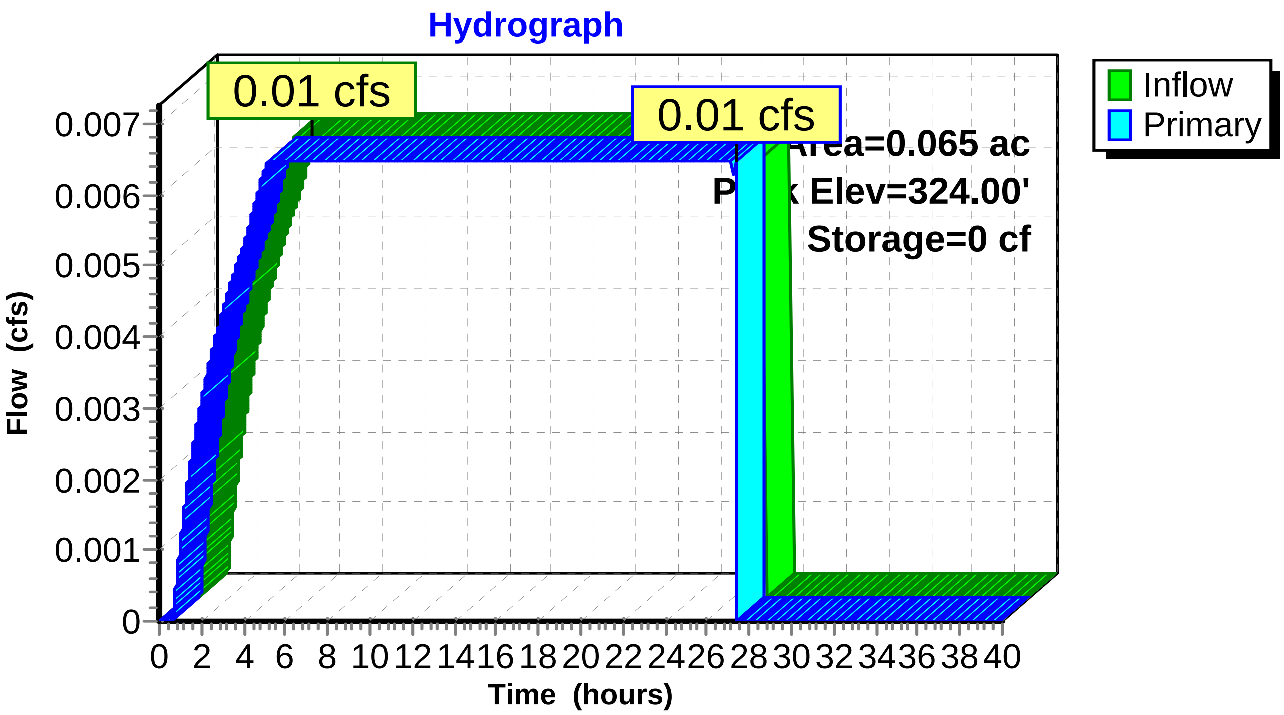
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 27.37 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 3BP2: Stormwater Planter



Summary for Pond 3CP1: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 0.65 cfs @ 11.97 hrs, Volume= 0.037 af
Outflow = 0.60 cfs @ 12.00 hrs, Volume= 0.037 af, Atten= 8%, Lag= 1.8 min
Primary = 0.01 cfs @ 6.01 hrs, Volume= 0.013 af
Secondary = 0.59 cfs @ 12.00 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.54' @ 12.00 hrs Surf.Area= 140 sf Storage= 146 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 56.4 min (795.1 - 738.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

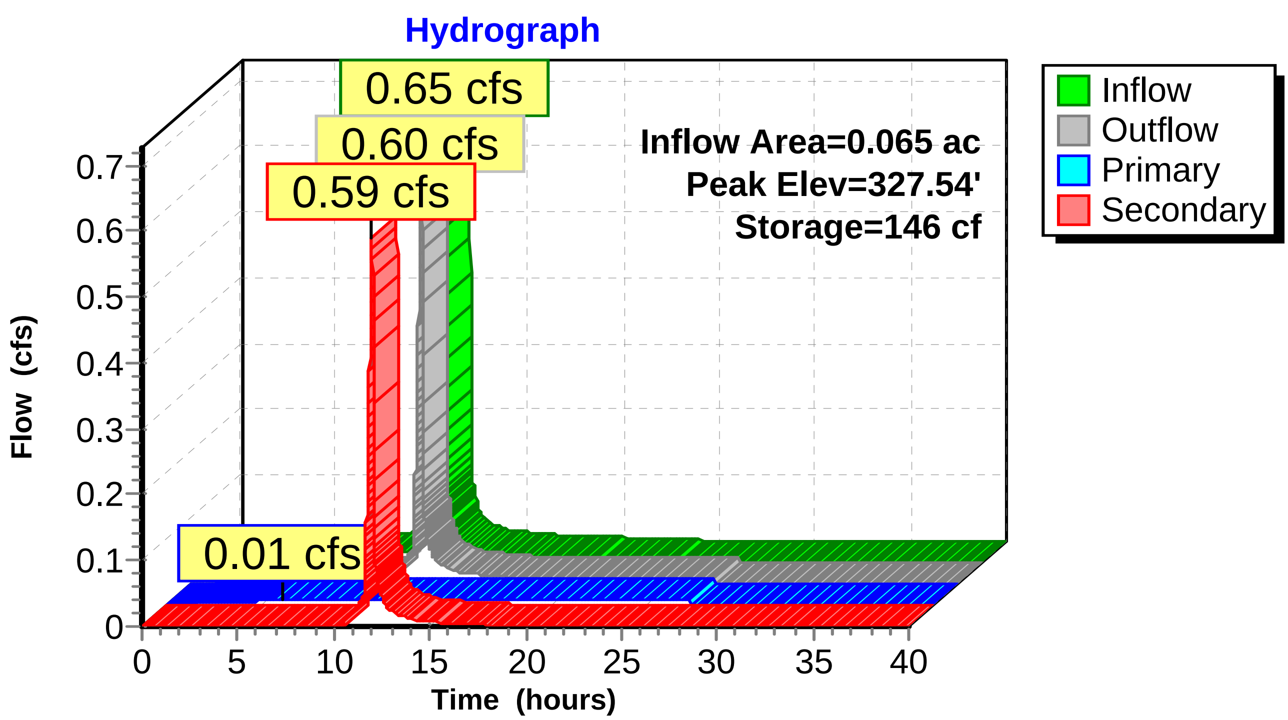
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.15'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 6.01 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.59 cfs @ 12.00 hrs HW=327.54' TW=311.13' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.59 cfs of 2.88 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 0.59 cfs @ 3.01 fps)

Pond 3CP1: Stormwater Planter



Summary for Pond 3CP2: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 2.47" for 100-yr event
Inflow = 0.01 cfs @ 6.01 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 27.37 hrs, Volume= 0.013 af, Atten= 0%, Lag= 1,281.6 min
Primary = 0.01 cfs @ 27.37 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 27.37 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (891.7 - 891.5)

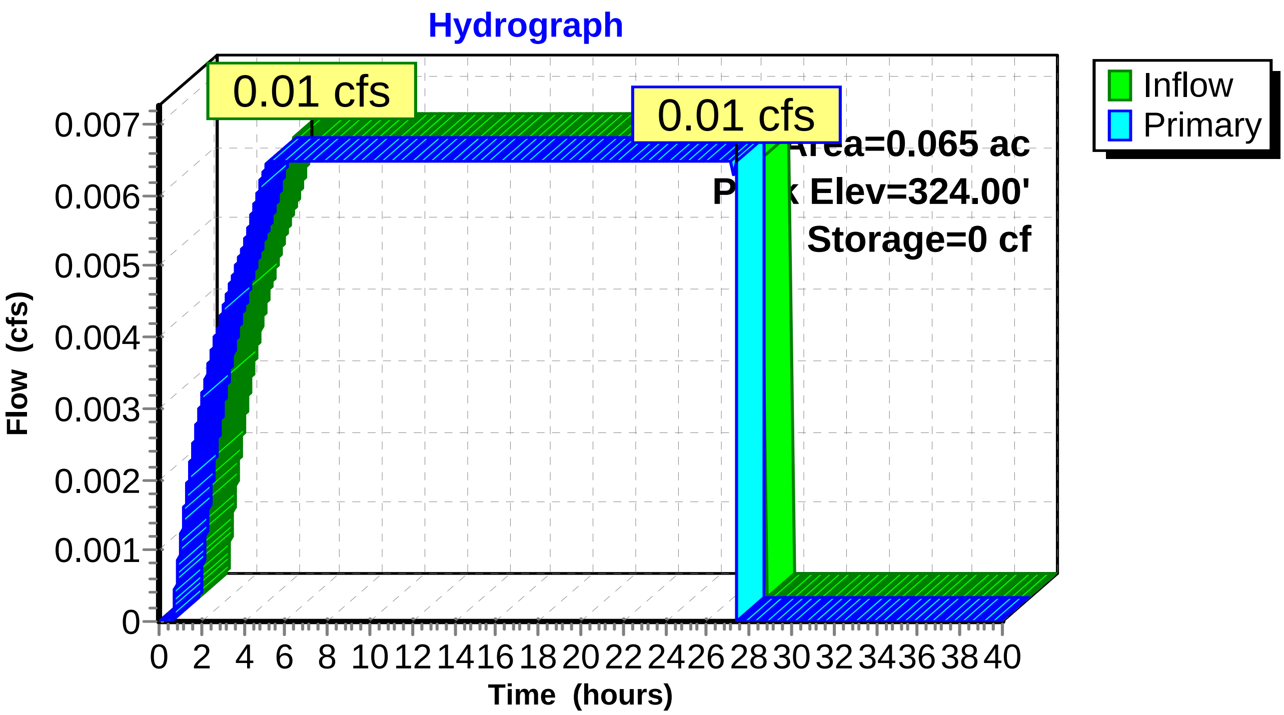
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 27.37 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 3CP2: Stormwater Planter



Summary for Pond 3DP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 0.61 cfs @ 11.97 hrs, Volume= 0.034 af
Outflow = 0.57 cfs @ 12.00 hrs, Volume= 0.034 af, Atten= 7%, Lag= 1.8 min
Primary = 0.01 cfs @ 6.43 hrs, Volume= 0.013 af
Secondary = 0.56 cfs @ 12.00 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.47' @ 12.00 hrs Surf.Area= 140 sf Storage= 136 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 54.7 min (793.5 - 738.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

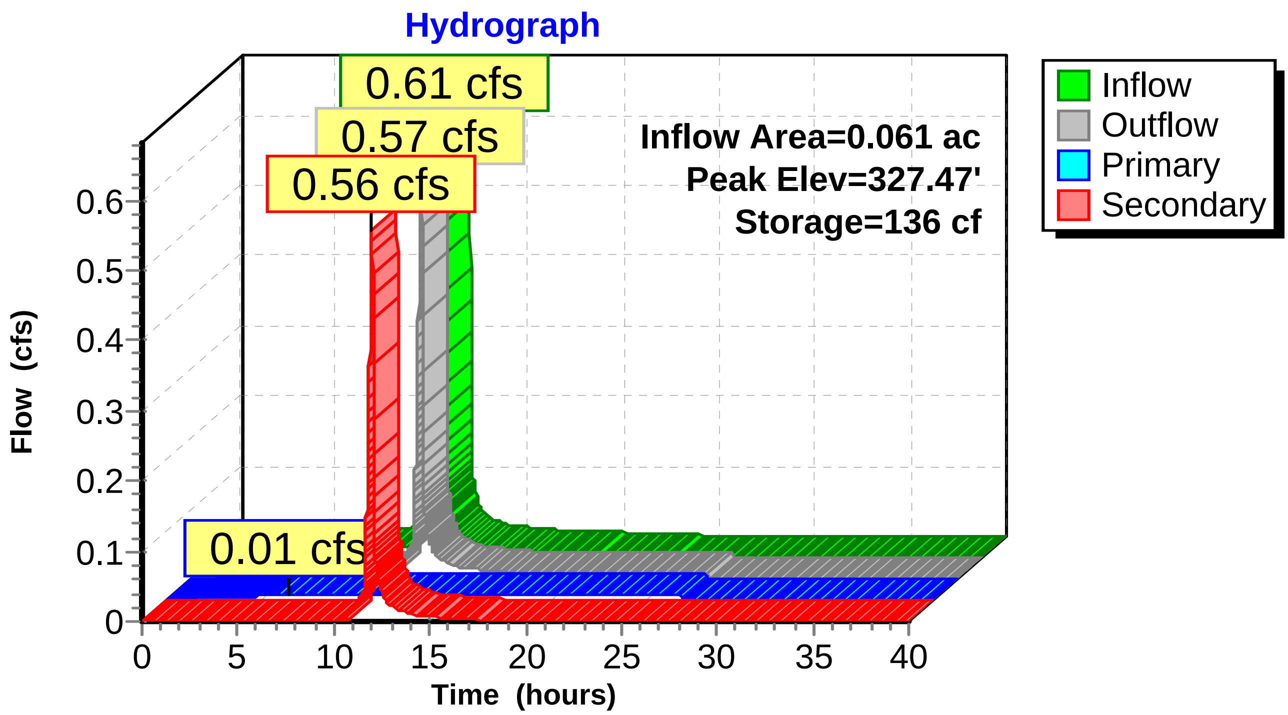
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 6.43 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.56 cfs @ 12.00 hrs HW=327.47' TW=311.13' (Dynamic Tailwater)
2=Culvert (Passes 0.56 cfs of 2.87 cfs potential flow)
3=Orifice/Grate (Orifice Controls 0.56 cfs @ 2.84 fps)

Pond 3DP1: Stormwater Planter



Summary for Pond 3DP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 2.57" for 100-yr event
Inflow = 0.01 cfs @ 6.43 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 6.44 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.6 min
Primary = 0.01 cfs @ 6.44 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 0.00 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

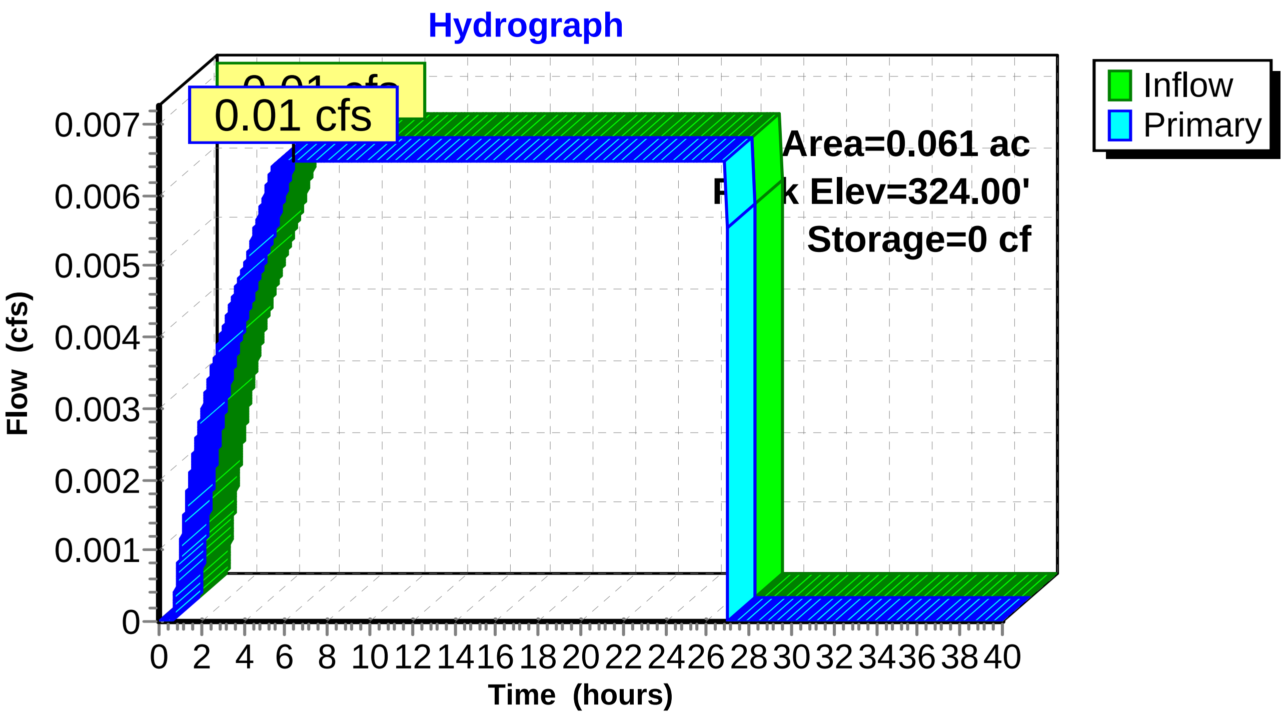
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**4.350 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.00 cfs @ 6.44 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

Pond 3DP2: Stormwater Planter



Summary for Pond 3P: POCKET POND FOREBAY

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Starting Elev= 317.00' Surf.Area= 1,586 sf Storage= 2,311 cf
Peak Elev= 317.00' @ 0.00 hrs Surf.Area= 1,586 sf Storage= 2,311 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	2,311 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

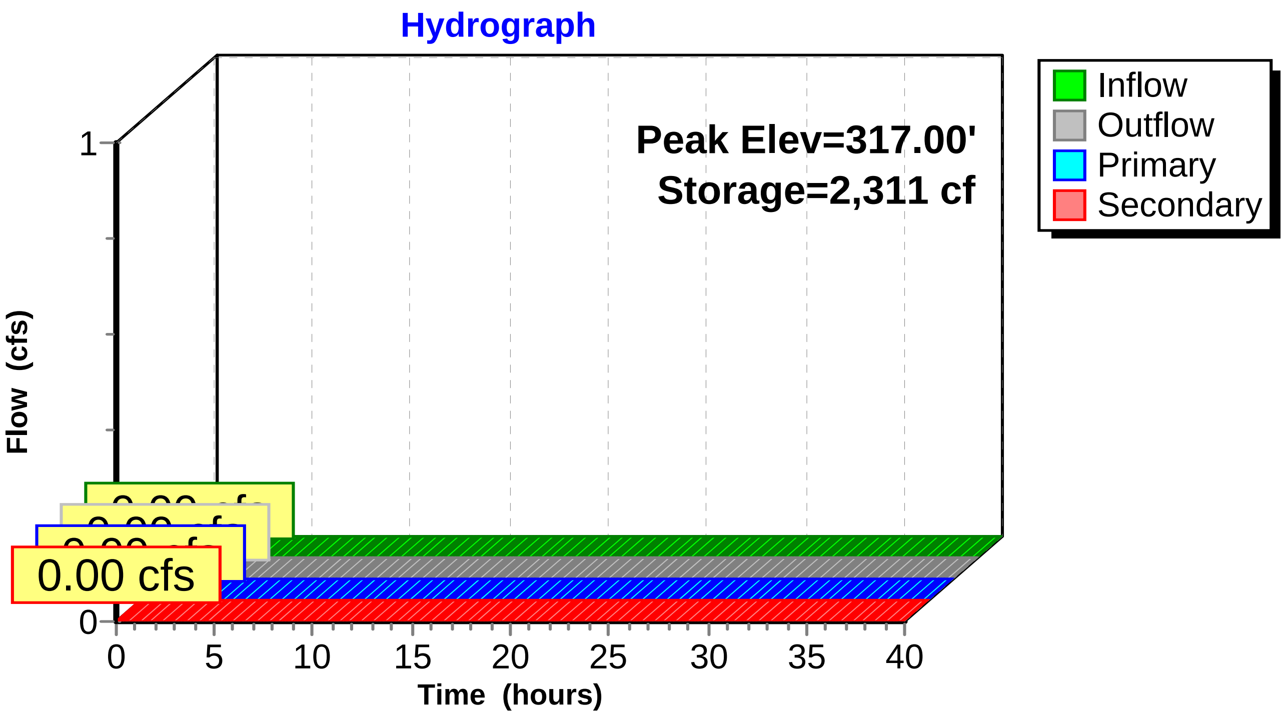
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
313.00	172	54.0	0	0	172
314.00	306	73.0	236	236	374
315.00	478	93.0	389	625	651
316.00	688	112.0	580	1,204	978
317.00	1,586	163.0	1,106	2,311	2,102

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.00' / 310.50' S= 0.0148 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.70'	**4.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	318.65'	**18.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	320.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	322.00'	**6.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=317.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=317.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: POCKET POND FOREBAY



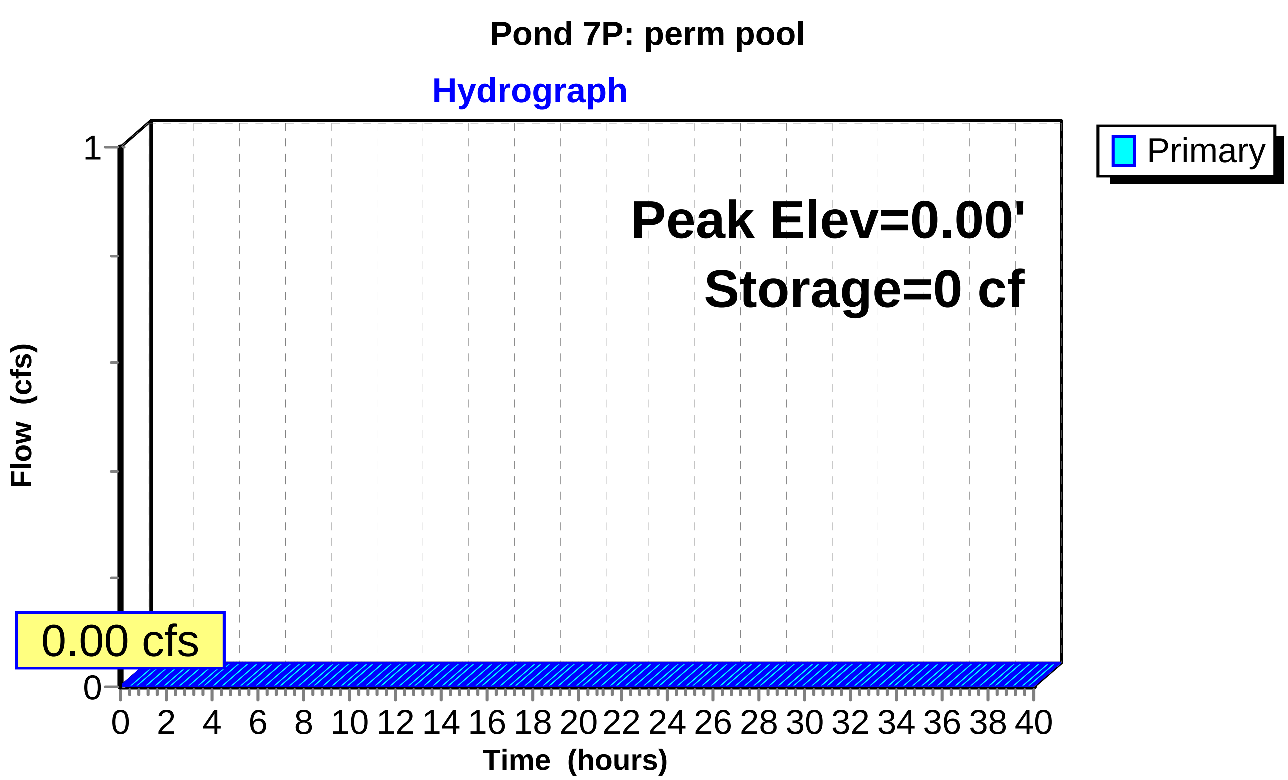
Summary for Pond 7P: perm pool

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	7,120 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
314.00	470	104.0	0	0	470
316.00	1,378	190.0	1,769	1,769	2,503
317.00	1,994	216.0	1,677	3,445	3,368
318.00	5,669	361.0	3,675	7,120	10,032

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	318.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  └**2=Orifice/Grate** (Controls 0.00 cfs)



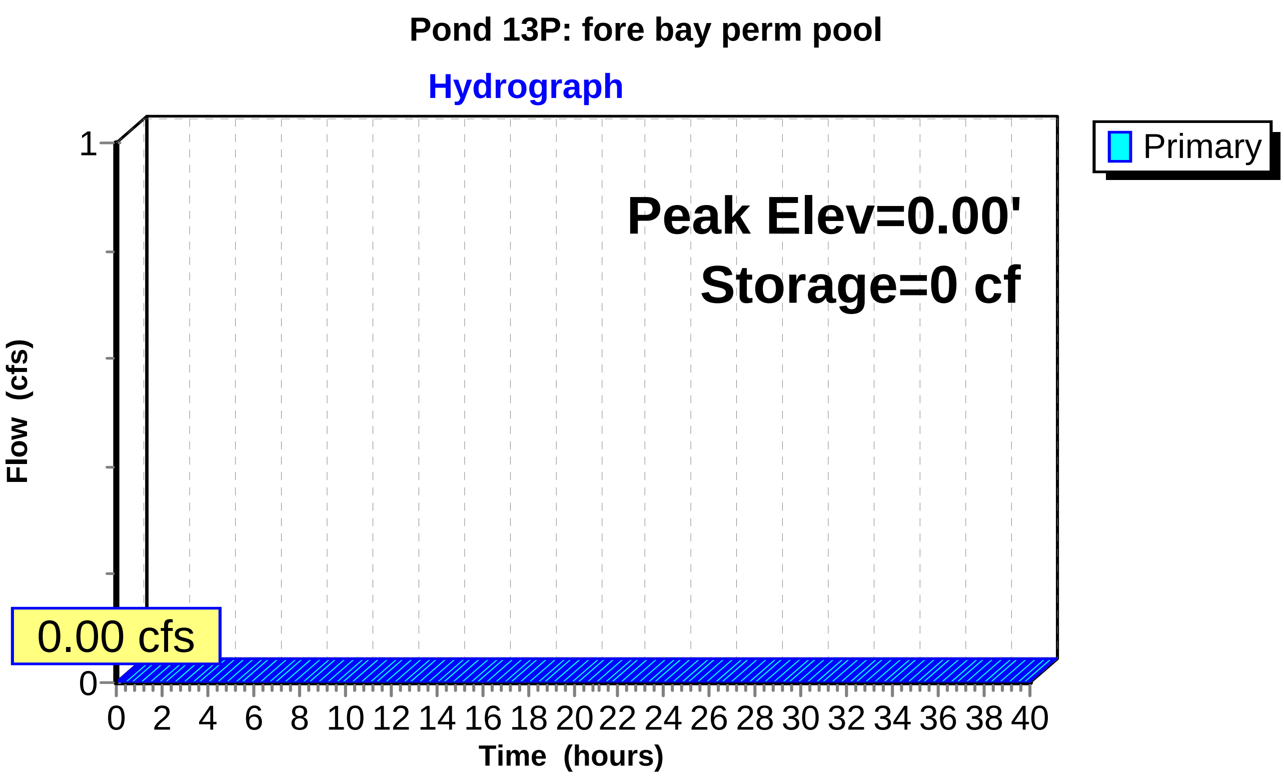
Summary for Pond 13P: fore bay perm pool

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	2,889 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
314.00	232	61.0	0	0	232
316.00	578	102.0	784	784	788
317.00	811	119.0	691	1,475	1,107
318.00	2,120	191.0	1,414	2,889	2,890

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	318.00'	**4.0" Vert. Orifice/Grate** C= 0.600

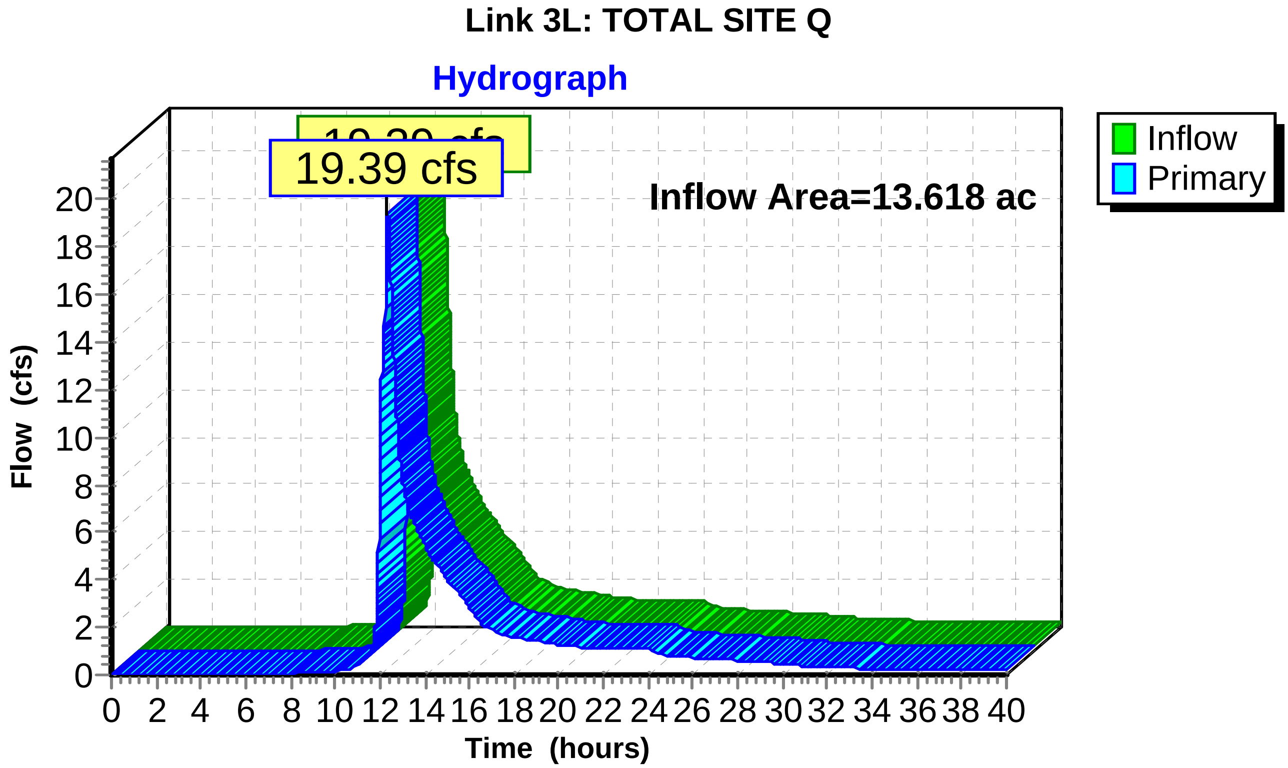
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)



Summary for Link 3L: TOTAL SITE Q

Inflow Area = 13.618 ac, 32.28% Impervious, Inflow Depth > 3.53" for 100-yr event
Inflow = 19.39 cfs @ 12.34 hrs, Volume= 4.009 af
Primary = 19.39 cfs @ 12.34 hrs, Volume= 4.009 af, Atten= 0%, Lag= 0.0 min

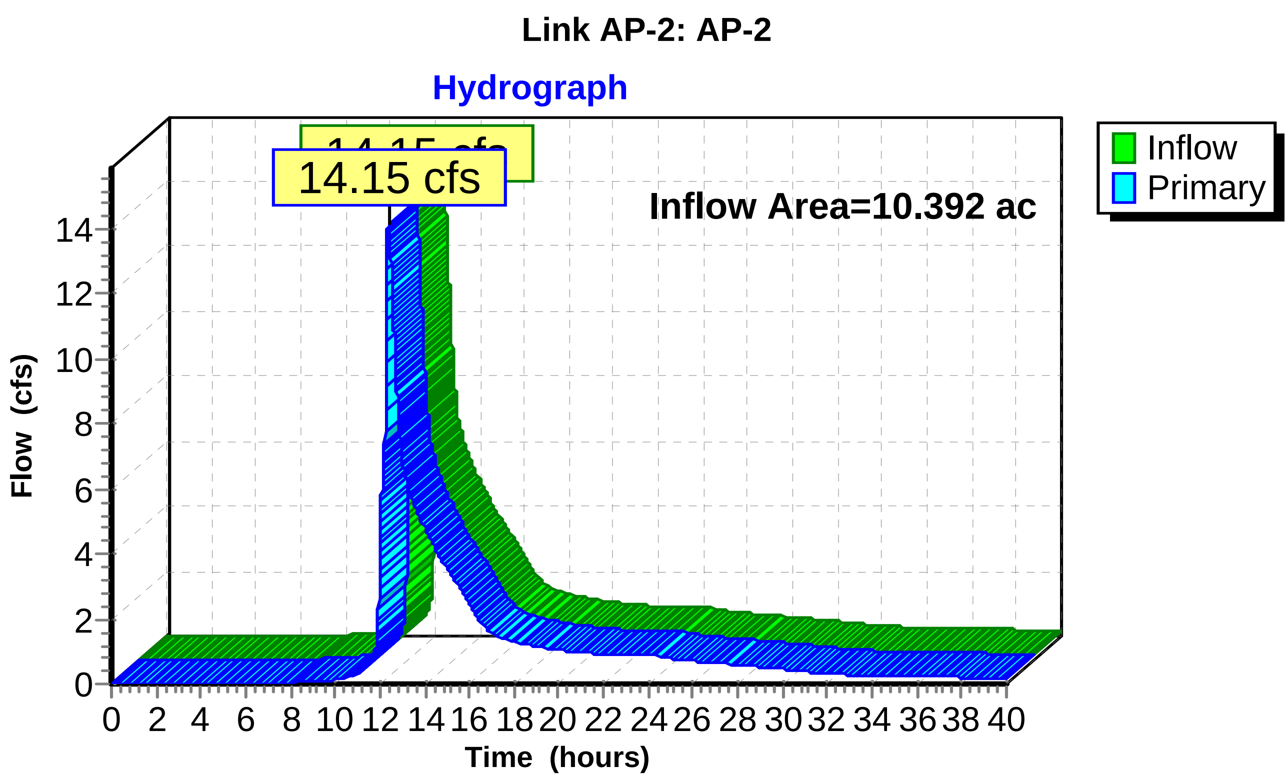
Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Summary for Link AP-2: AP-2

Inflow Area = 10.392 ac, 40.01% Impervious, Inflow Depth > 3.78" for 100-yr event
Inflow = 14.15 cfs @ 12.38 hrs, Volume= 3.275 af
Primary = 14.15 cfs @ 12.38 hrs, Volume= 3.275 af, Atten= 0%, Lag= 0.0 min

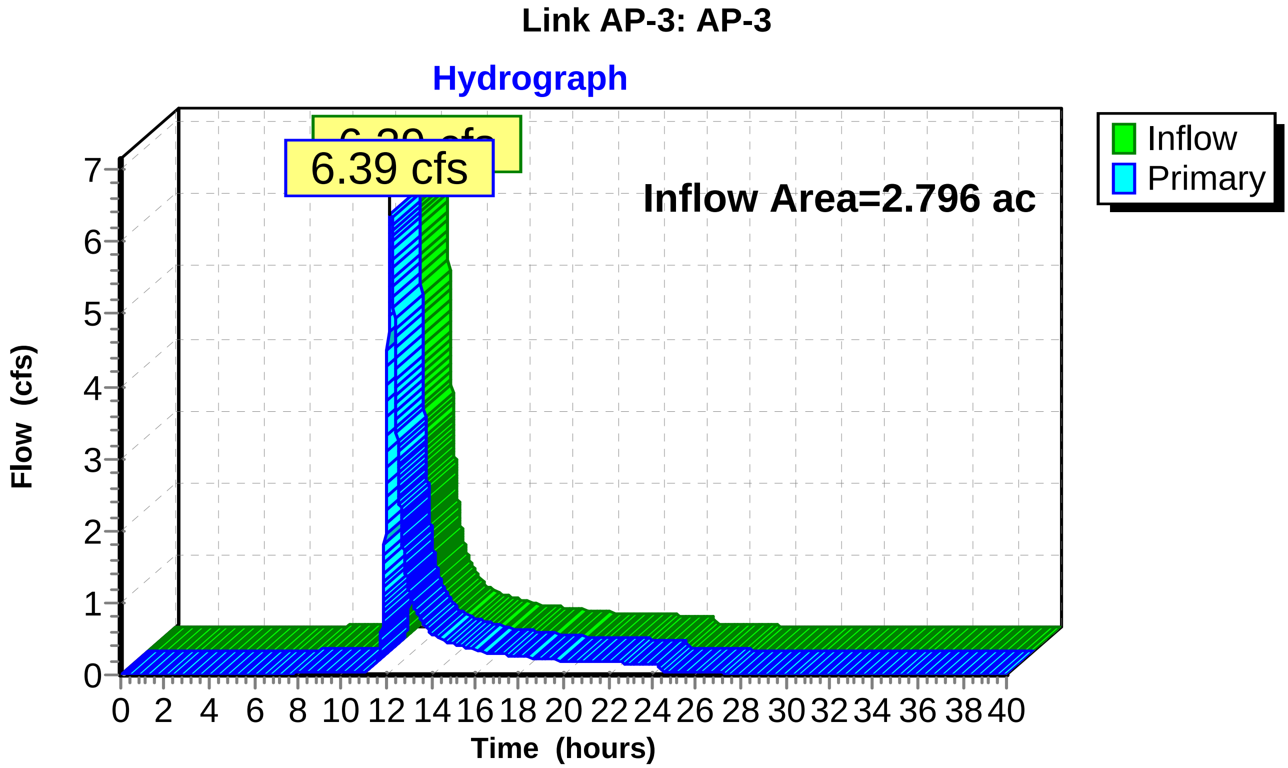
Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Summary for Link AP-3: AP-3

Inflow Area =	2.796 ac,	6.83% Impervious,	Inflow Depth = 2.71"	for 100-yr event	
Inflow =	6.39 cfs @	12.21 hrs,	Volume=	0.630 af	
Primary =	6.39 cfs @	12.21 hrs,	Volume=	0.630 af,	Atten= 0%, Lag= 0.0 min

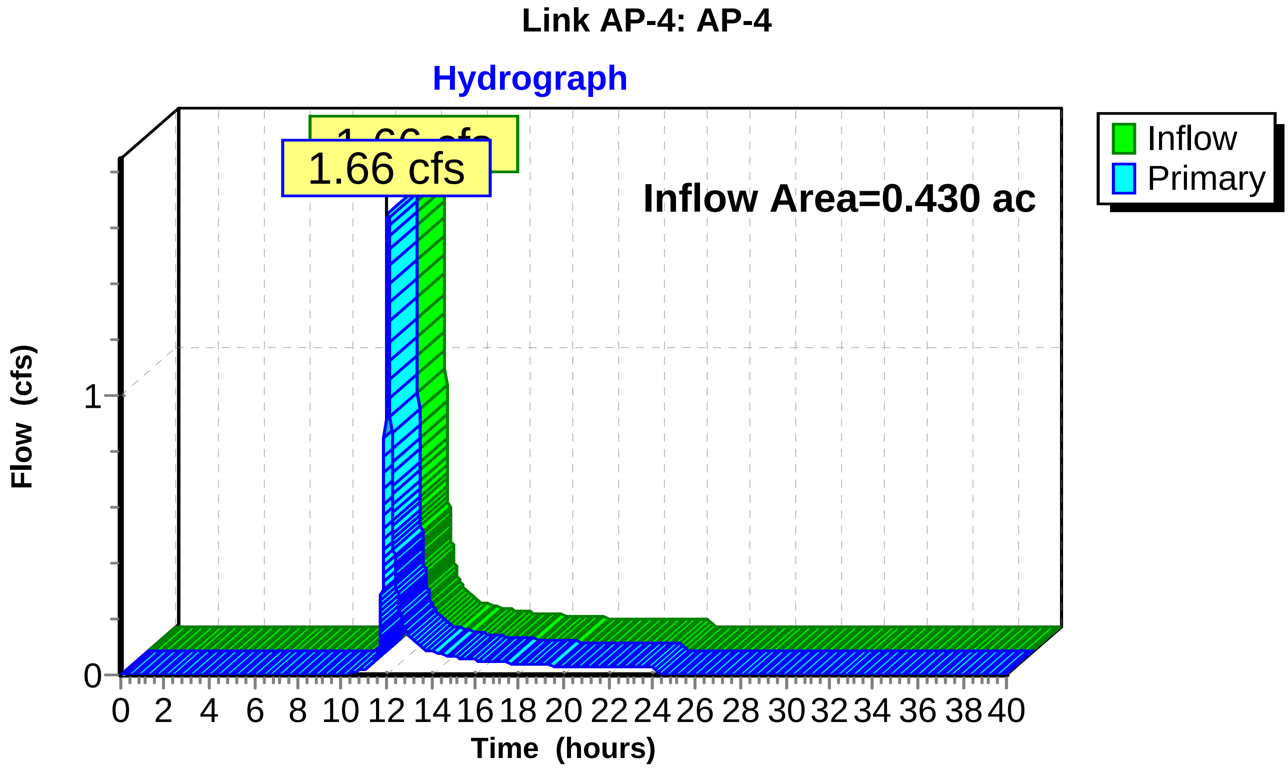
Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Summary for Link AP-4: AP-4

Inflow Area =	0.430 ac,	10.94% Impervious,	Inflow Depth = 2.90"	for 100-yr event
Inflow =	1.66 cfs @	12.06 hrs, Volume=	0.104 af	
Primary =	1.66 cfs @	12.06 hrs, Volume=	0.104 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Sub 1 Runoff Area=30,321 sf 20.54% Impervious Runoff Depth=0.00"
Flow Length=100' Slope=0.0200 '/' Tc=23.0 min CN=44 Runoff=0.00 cfs 0.000 af

Subcatchment 2A: 2A Runoff Area=14,963 sf 0.00% Impervious Runoff Depth=0.10"
Flow Length=91' Slope=0.0150 '/' Tc=23.9 min CN=77 Runoff=0.01 cfs 0.003 af

Subcatchment 2B: Sub 2B Runoff Area=5.732 ac 36.65% Impervious Runoff Depth=0.01"
Flow Length=371' Tc=19.3 min CN=67 Runoff=0.01 cfs 0.004 af

Subcatchment 2C: 2C Runoff Area=0.863 ac 54.11% Impervious Runoff Depth=0.17"
Flow Length=87' Slope=0.0080 '/' Tc=13.5 min CN=81 Runoff=0.15 cfs 0.012 af

Subcatchment 2D: 2D Runoff Area=0.921 ac 50.81% Impervious Runoff Depth=0.15"
Flow Length=87' Slope=0.0080 '/' Tc=13.5 min CN=80 Runoff=0.13 cfs 0.012 af

Subcatchment 2E: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.005 af

Subcatchment 2F: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.005 af

Subcatchment 2G: 2G Runoff Area=40,156 sf 0.00% Impervious Runoff Depth=0.10"
Flow Length=232' Slope=0.0080 '/' Tc=67.5 min CN=77 Runoff=0.02 cfs 0.008 af

Subcatchment 2H: Sub 2H Runoff Area=1.161 ac 66.32% Impervious Runoff Depth=0.31"
Flow Length=163' Tc=14.0 min CN=86 Runoff=0.44 cfs 0.030 af

Subcatchment 2J: 2J Runoff Area=14,289 sf 70.12% Impervious Runoff Depth=0.34"
Tc=6.0 min CN=87 Runoff=0.19 cfs 0.009 af

Subcatchment 3A: 3A Runoff Area=2.605 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=692' Tc=25.5 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 3B: Garage Roof Runoff Area=0.065 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.005 af

Subcatchment 3C: Garage Roof Runoff Area=0.065 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.005 af

Subcatchment 3D: Garage Roof Runoff Area=0.061 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.005 af

Subcatchment 4A: 4A Runoff Area=18,715 sf 10.94% Impervious Runoff Depth=0.00"
Flow Length=155' Tc=14.0 min CN=63 Runoff=0.00 cfs 0.000 af

Reach 3R: TO CB'S Avg. Flow Depth=0.02' Max Vel=0.02 fps Inflow=0.01 cfs 0.010 af
n=0.400 L=180.0' S=0.0083 '/' Capacity=1.76 cfs Outflow=0.01 cfs 0.010 af

Reach 4R: TO CB'S Avg. Flow Depth=0.02' Max Vel=0.02 fps Inflow=0.03 cfs 0.016 af
n=0.400 L=180.0' S=0.0083 '/' Capacity=2.52 cfs Outflow=0.02 cfs 0.016 af

Pond 2BP: POCKET POND-ABOVE PERM Peak Elev=317.17' Storage=6,982 cf Inflow=0.09 cfs 0.043 af
Outflow=0.04 cfs 0.039 af

Pond 2CP1: REAR BIO-RETENTION Peak Elev=321.55' Storage=112 cf Inflow=0.15 cfs 0.012 af
Primary=0.03 cfs 0.012 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.012 af

Pond 2CP2: REAR BIO-RETENTION Peak Elev=317.57' Storage=69 cf Inflow=0.03 cfs 0.012 af
Outflow=0.03 cfs 0.012 af

Pond 2DP1: REAR BIO-RETENTION Peak Elev=321.53' Storage=83 cf Inflow=0.13 cfs 0.012 af
Primary=0.03 cfs 0.012 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.012 af

Pond 2DP2: REAR BIO-RETENTION Peak Elev=317.59' Storage=82 cf Inflow=0.03 cfs 0.012 af
Outflow=0.03 cfs 0.012 af

Pond 2EP1: Stormwater Planter Peak Elev=327.12' Storage=87 cf Inflow=0.10 cfs 0.005 af
Primary=0.01 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

Pond 2EP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Pond 2FP1: Stormwater Planter Peak Elev=327.12' Storage=87 cf Inflow=0.10 cfs 0.005 af
Primary=0.01 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

Pond 2FP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Pond 2HP1: FRONT BIO-RETENTION Peak Elev=323.56' Storage=364 cf Inflow=0.44 cfs 0.030 af
Primary=0.07 cfs 0.030 af Secondary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.030 af

Pond 2HP2: FRONT BIO-RETENTION Peak Elev=319.63' Storage=299 cf Inflow=0.07 cfs 0.030 af
Outflow=0.07 cfs 0.029 af

Pond 2JP1: BIORETENTION IN FRONT OF APT Peak Elev=322.31' Storage=69 cf Inflow=0.19 cfs 0.009 af
Primary=0.06 cfs 0.009 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.009 af

Pond 2JP2: BIORETENTION IN FRONT OF APT Peak Elev=318.56' Storage=157 cf Inflow=0.06 cfs 0.009 af
Outflow=0.01 cfs 0.009 af

Pond 2P: SUBSURFACE DETENTION Peak Elev=313.24' Storage=1,050 cf Inflow=0.05 cfs 0.024 af
Outflow=0.00 cfs 0.000 af

Pond 3BP1: Stormwater Planter Peak Elev=327.16' Storage=92 cf Inflow=0.10 cfs 0.005 af
Primary=0.01 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

Pond 3BP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Pond 3CP1: Stormwater Planter Peak Elev=327.16' Storage=92 cf Inflow=0.10 cfs 0.005 af
Primary=0.01 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

Pond 3CP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Pond 3DP1: Stormwater Planter Peak Elev=327.12' Storage=87 cf Inflow=0.10 cfs 0.005 af
Primary=0.01 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

Pond 3DP2: Stormwater Planter Peak Elev=324.00' Storage=0 cf Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Pond 3P: POCKET POND FOREBAY Peak Elev=317.00' Storage=2,311 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 7P: perm pool Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Pond 13P: fore bay perm pool Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Link 3L: TOTAL SITE Q Inflow=0.08 cfs 0.075 af
Primary=0.08 cfs 0.075 af

Link AP-2: AP-2 Inflow=0.06 cfs 0.059 af
Primary=0.06 cfs 0.059 af

Link AP-3: AP-3 Inflow=0.02 cfs 0.016 af
Primary=0.02 cfs 0.016 af

Link AP-4: AP-4 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 14.314 ac Runoff Volume = 0.104 af Average Runoff Depth = 0.09"
68.29% Pervious = 9.775 ac 31.71% Impervious = 4.539 ac

Summary for Subcatchment 1: Sub 1

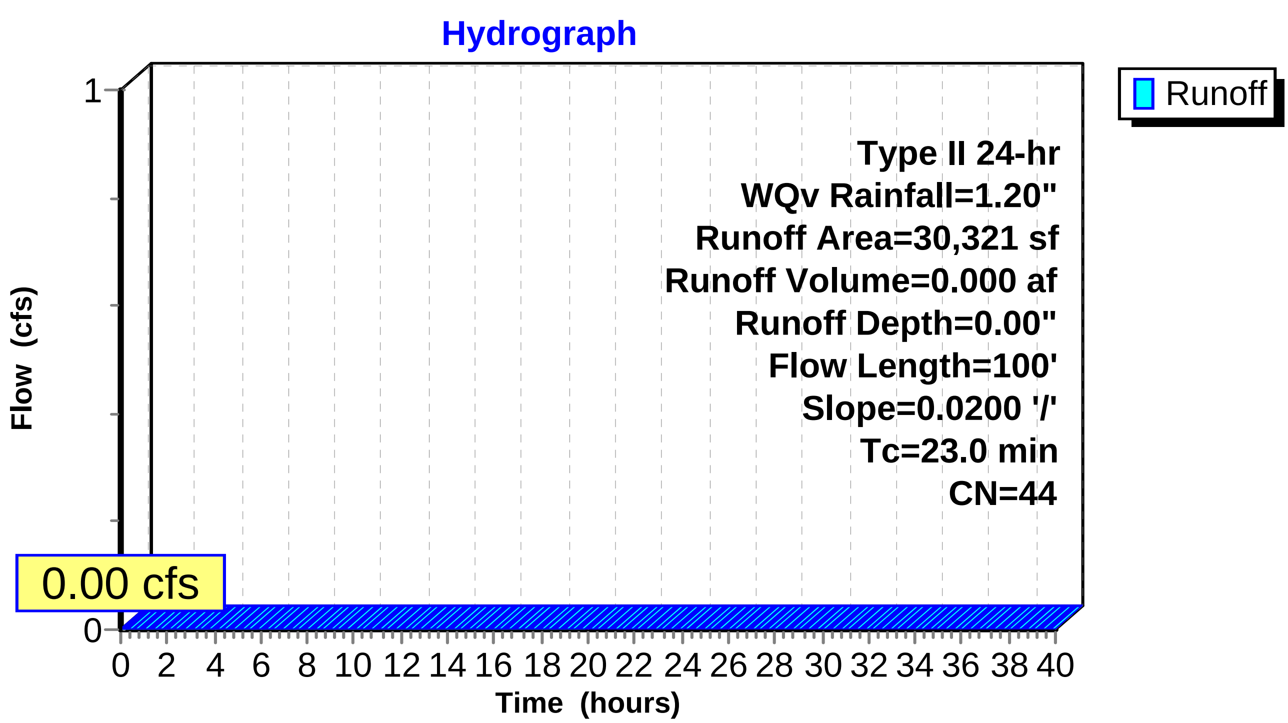
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
21,078	30	Woods, Good, HSG A
6,229	98	Paved parking, HSG A
3,014	30	Woods, Good, HSG A
30,321	44	Weighted Average
24,092		79.46% Pervious Area
6,229		20.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	100	0.0200	0.07		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"

Subcatchment 1: Sub 1



Summary for Subcatchment 2A: 2A

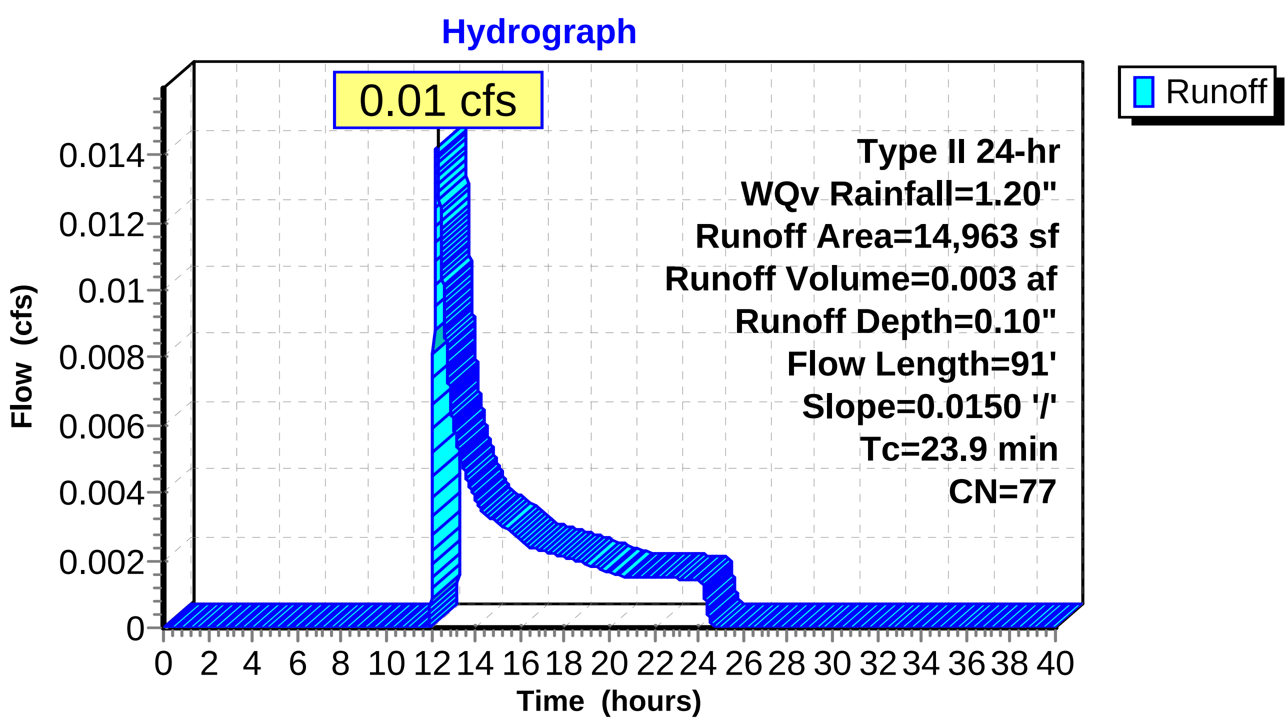
Runoff = 0.01 cfs @ 12.29 hrs, Volume= 0.003 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
13,787	77	Woods, Good, HSG D
1,176	80	>75% Grass cover, Good, HSG D
14,963	77	Weighted Average
14,963		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	91	0.0150	0.06		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"

Subcatchment 2A: 2A



Summary for Subcatchment 2B: Sub 2B

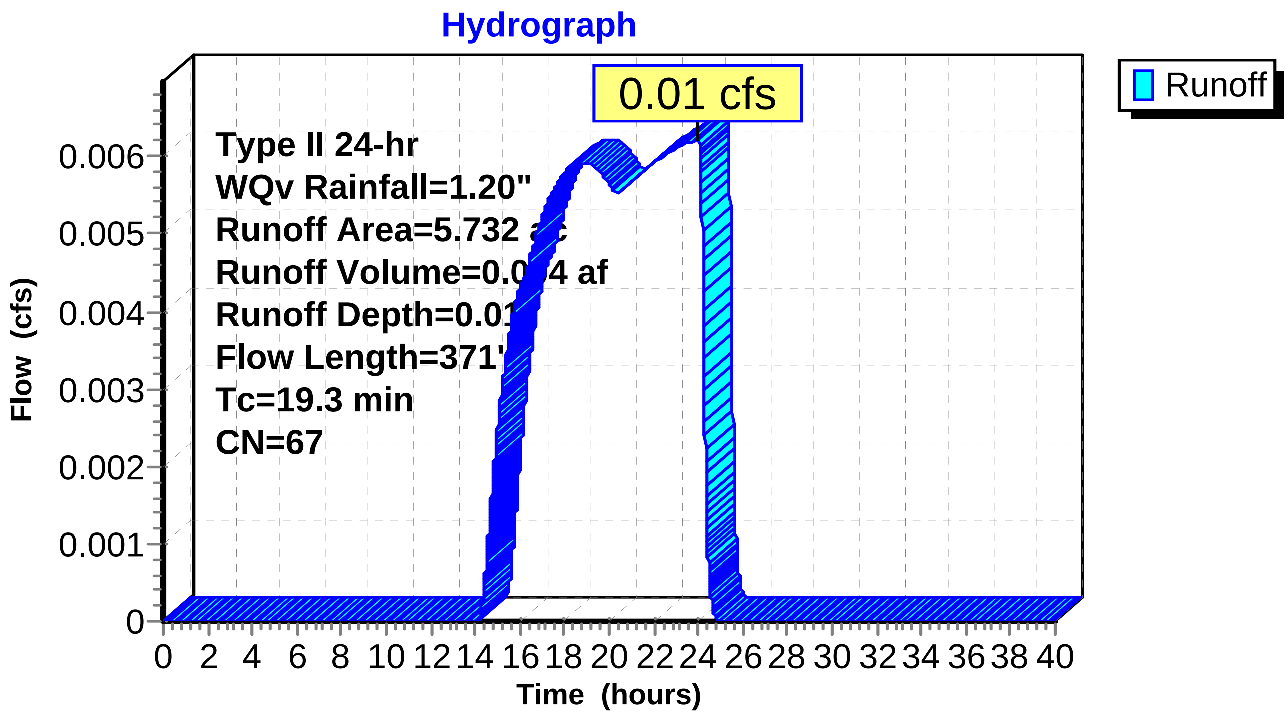
Runoff = 0.01 cfs @ 24.00 hrs, Volume= 0.004 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
0.373	39	>75% Grass cover, Good, HSG A
2.101	98	Paved parking, HSG A
1.709	30	Woods, Good, HSG A
0.077	55	Woods, Good, HSG B
0.313	61	>75% Grass cover, Good, HSG B
0.879	74	>75% Grass cover, Good, HSG C
0.280	80	>75% Grass cover, Good, HSG D
5.732	67	Weighted Average
3.631		63.35% Pervious Area
2.101		36.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
4.1	220	0.0320	0.89		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
0.4	51	0.0100	2.03		**Shallow Concentrated Flow, PAVED** Paved Kv= 20.3 fps
19.3	371	Total			

Subcatchment 2B: Sub 2B



Summary for Subcatchment 2C: 2C

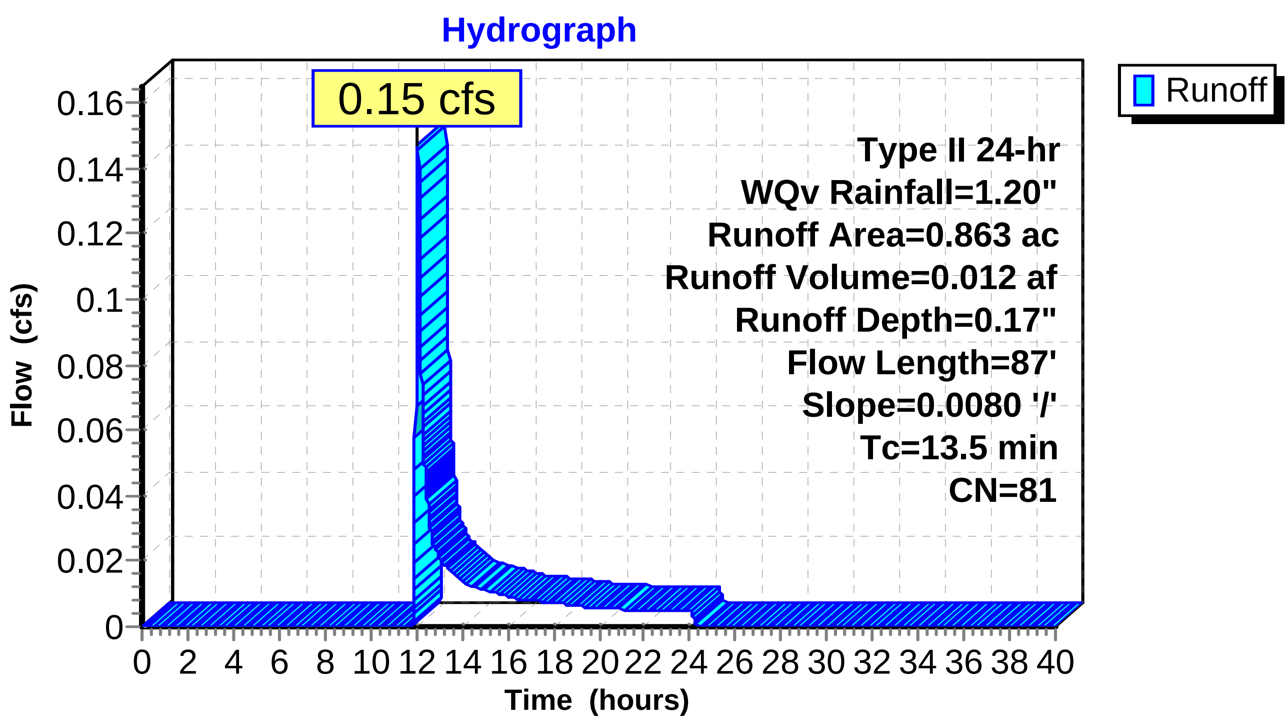
Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
0.396	61	>75% Grass cover, Good, HSG B
0.467	98	Paved parking, HSG A
0.863	81	Weighted Average
0.396		45.89% Pervious Area
0.467		54.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	87	0.0080	0.11		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 2.80"

Subcatchment 2C: 2C



Summary for Subcatchment 2D: 2D

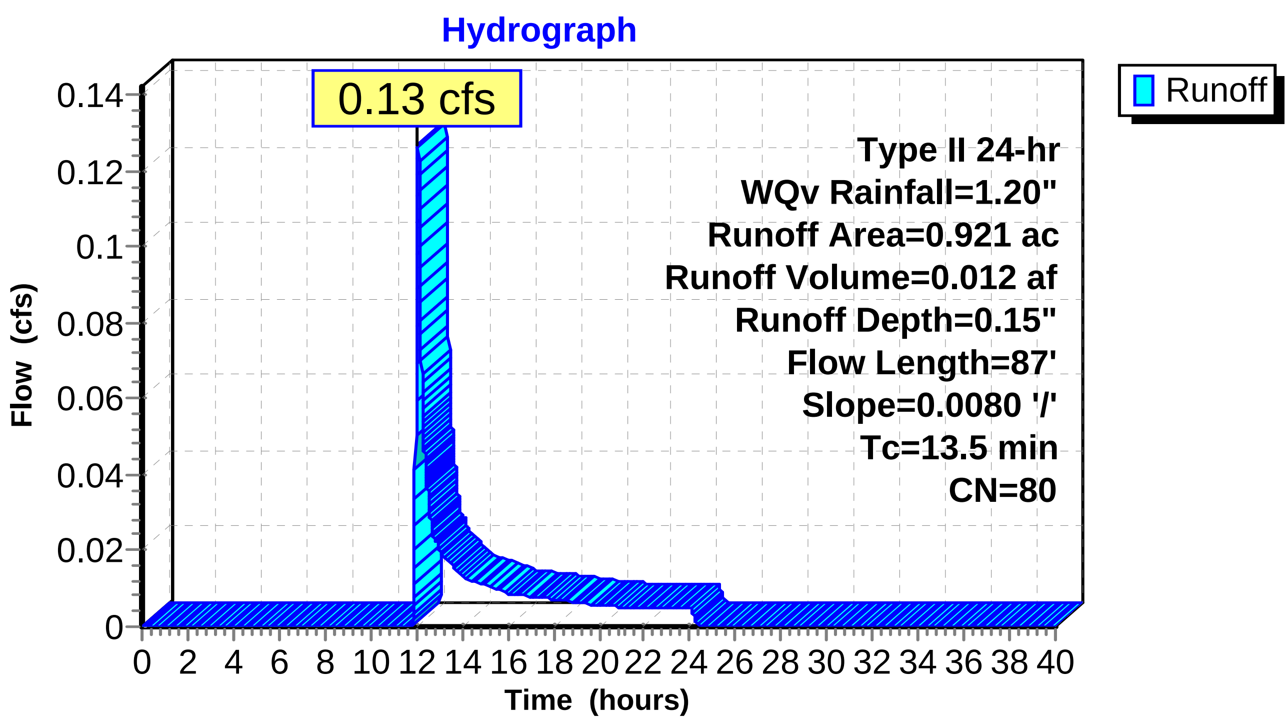
Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.012 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
0.453	61	>75% Grass cover, Good, HSG B
0.468	98	Paved parking, HSG A
0.921	80	Weighted Average
0.453		49.19% Pervious Area
0.468		50.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	87	0.0080	0.11		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 2.80"

Subcatchment 2D: 2D



Summary for Subcatchment 2E: Garage Roof

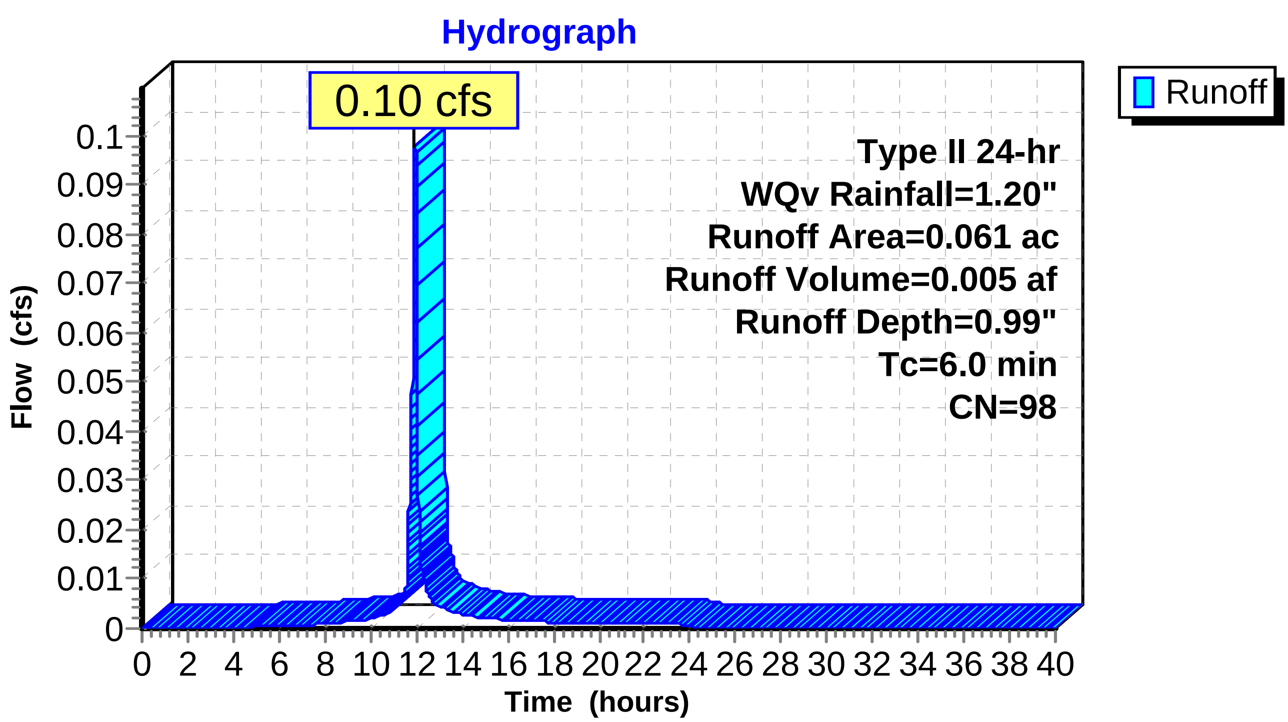
Runoff = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 2E: Garage Roof



Summary for Subcatchment 2F: Garage Roof

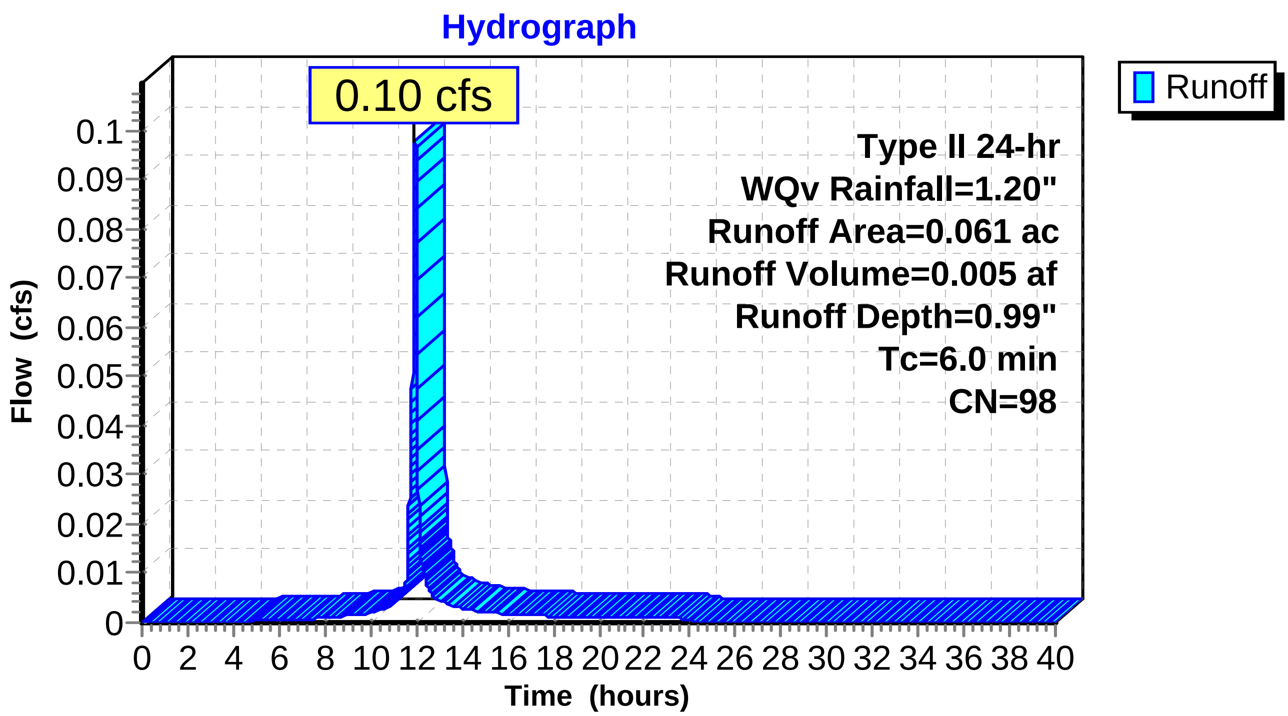
Runoff = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 2F: Garage Roof



Summary for Subcatchment 2G: 2G

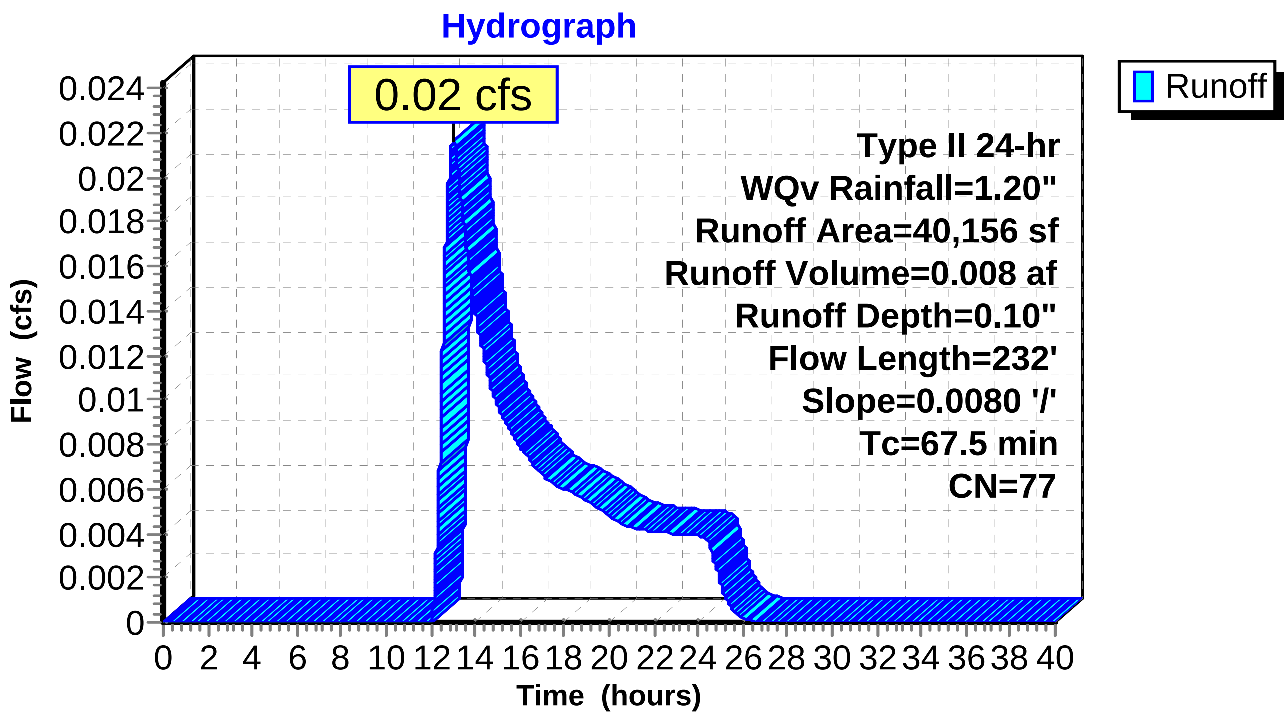
Runoff = 0.02 cfs @ 13.05 hrs, Volume= 0.008 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
40,156	77	Woods, Good, HSG D
40,156		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
57.7	100	0.0080	0.03		**Sheet Flow, WOODS** Woods: Dense underbrush n= 0.800 P2= 2.80"
9.8	132	0.0080	0.22		**Shallow Concentrated Flow, WOODS** Forest w/Heavy Litter Kv= 2.5 fps
67.5	232	Total			

Subcatchment 2G: 2G



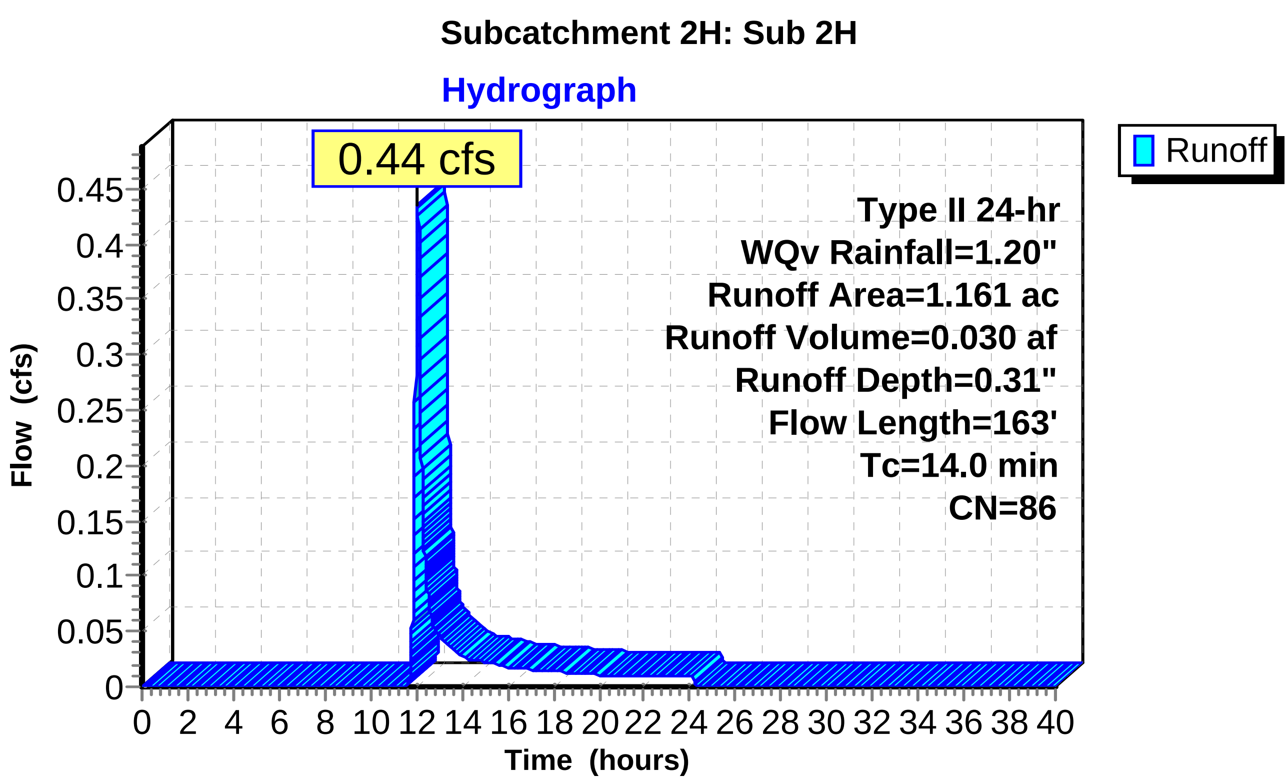
Summary for Subcatchment 2H: Sub 2H

Runoff = 0.44 cfs @ 12.08 hrs, Volume= 0.030 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
0.770	98	Paved parking, HSG A
0.006	55	Woods, Good, HSG B
0.385	61	>75% Grass cover, Good, HSG B
1.161	86	Weighted Average
0.391		33.68% Pervious Area
0.770		66.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	36	0.0100	0.04		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
0.2	48	0.0950	4.96		**Shallow Concentrated Flow, LAWN** Unpaved Kv= 16.1 fps
0.4	79	0.0300	3.52		**Shallow Concentrated Flow, PAVED** Paved Kv= 20.3 fps
14.0	163	Total			



Summary for Subcatchment 2J: 2J

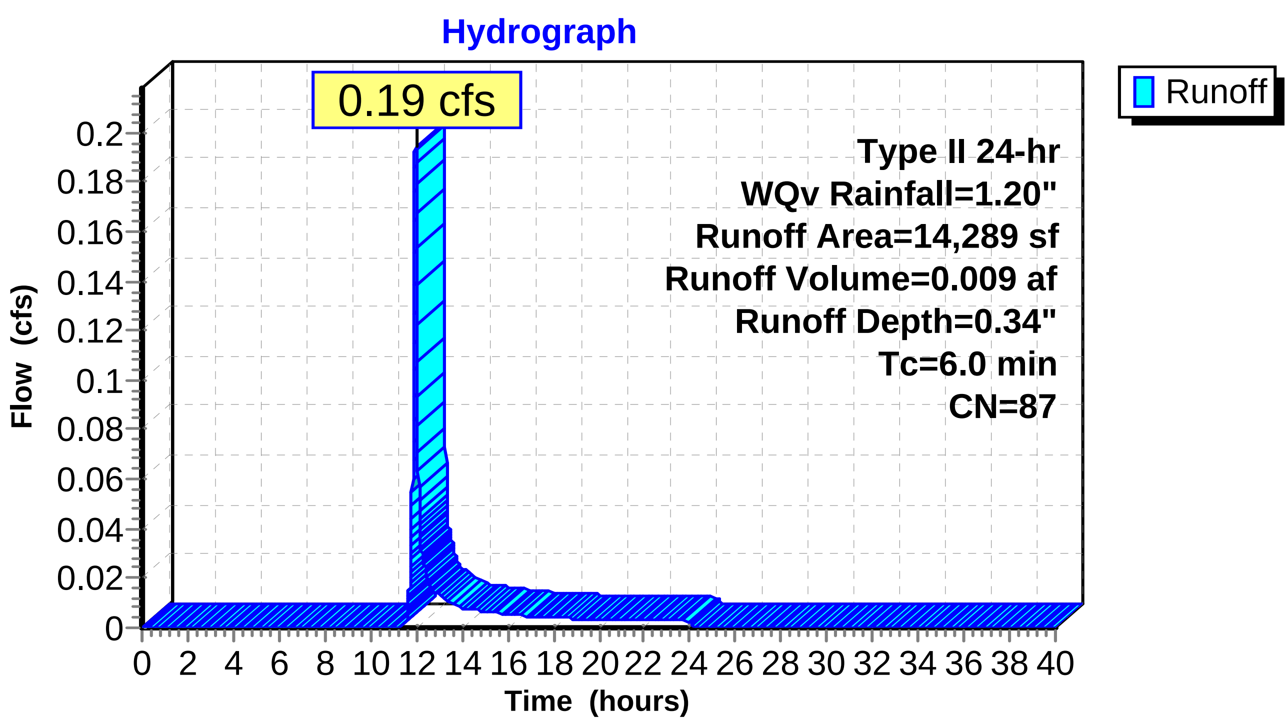
Runoff = 0.19 cfs @ 11.98 hrs, Volume= 0.009 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
4,269	61	>75% Grass cover, Good, HSG B
10,020	98	Paved parking, HSG A
14,289	87	Weighted Average
4,269		29.88% Pervious Area
10,020		70.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, MIN**

Subcatchment 2J: 2J



Summary for Subcatchment 3A: 3A

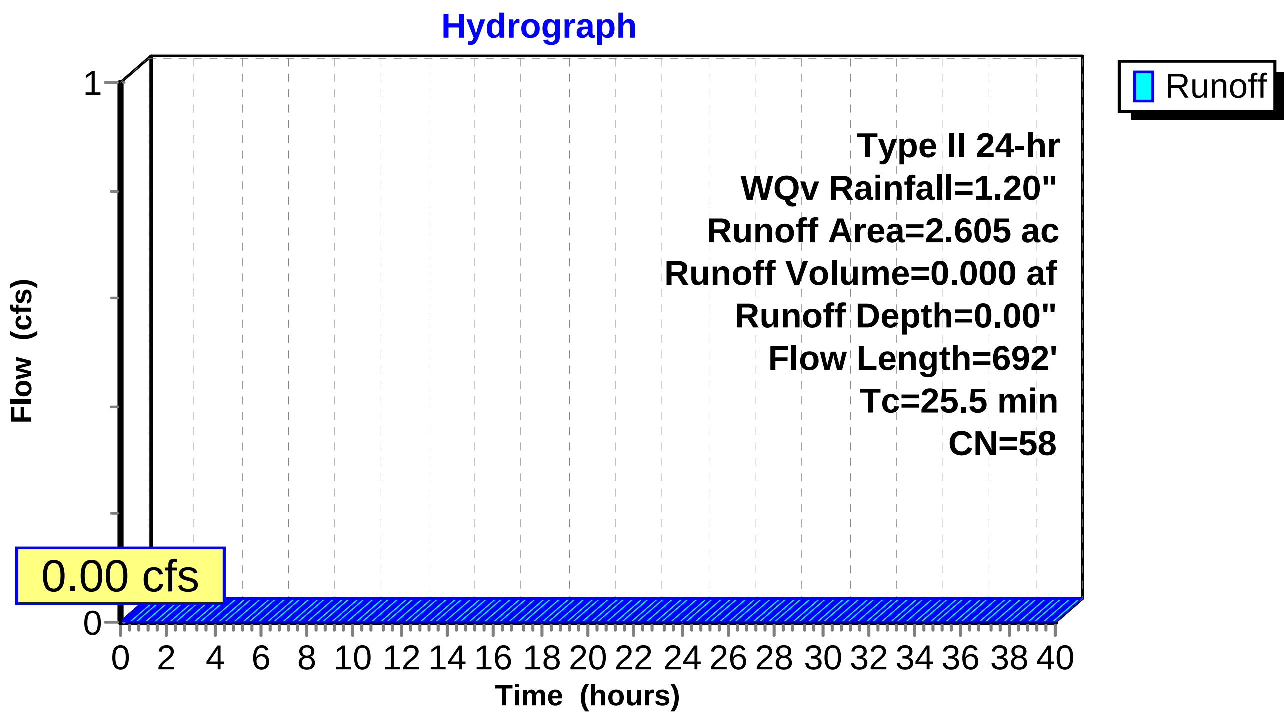
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
1.618	70	Woods, Good, HSG C
0.667	30	Woods, Good, HSG A
0.249	55	Woods, Good, HSG B
0.071	74	>75% Grass cover, Good, HSG C
2.605	58	Weighted Average
2.605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0700	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
11.6	592	0.0290	0.85		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
25.5	692	Total			

Subcatchment 3A: 3A



Summary for Subcatchment 3B: Garage Roof

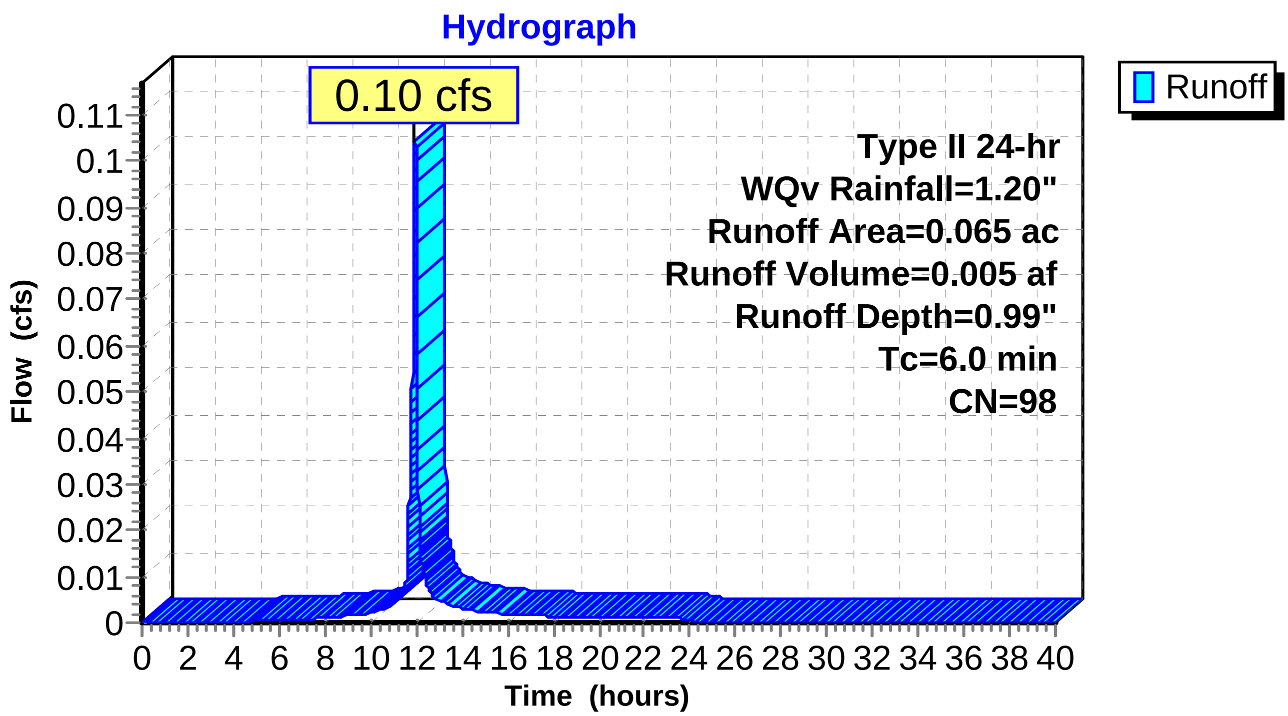
Runoff = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
0.065	98	Paved parking, HSG A
0.065		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3B: Garage Roof



Summary for Subcatchment 3C: Garage Roof

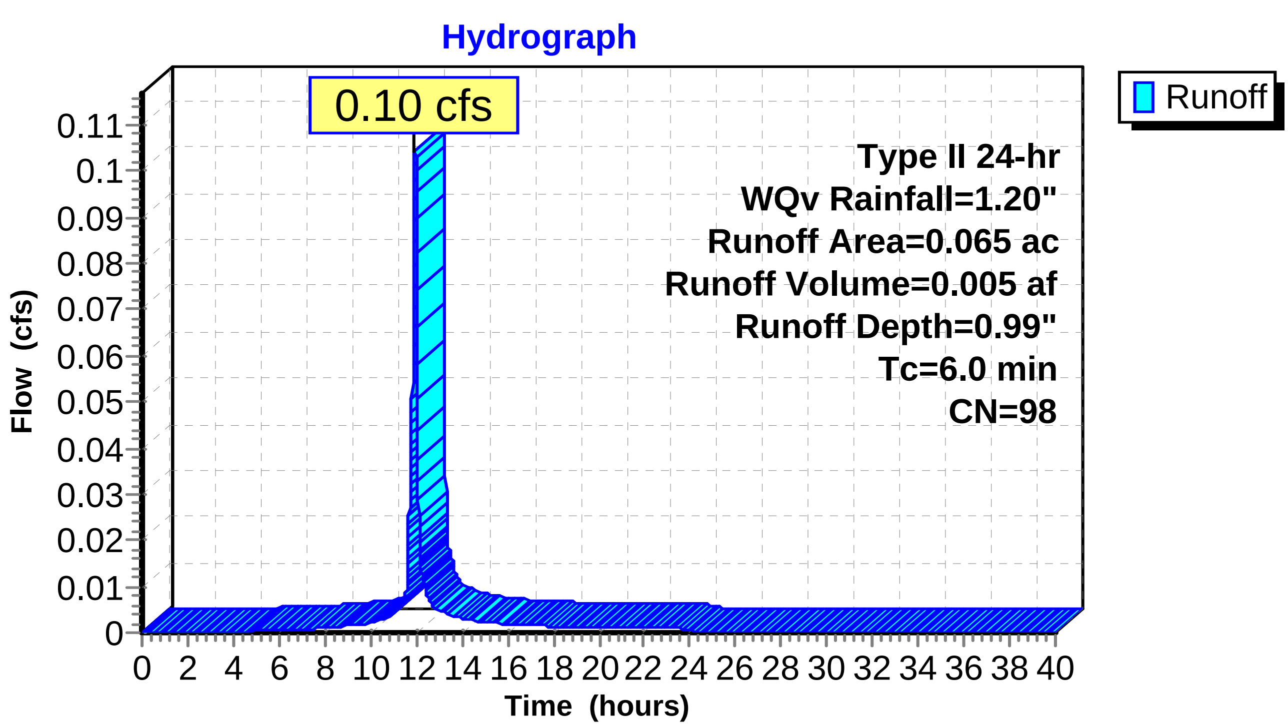
Runoff = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
0.065	98	Paved parking, HSG A
0.065		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3C: Garage Roof



Summary for Subcatchment 3D: Garage Roof

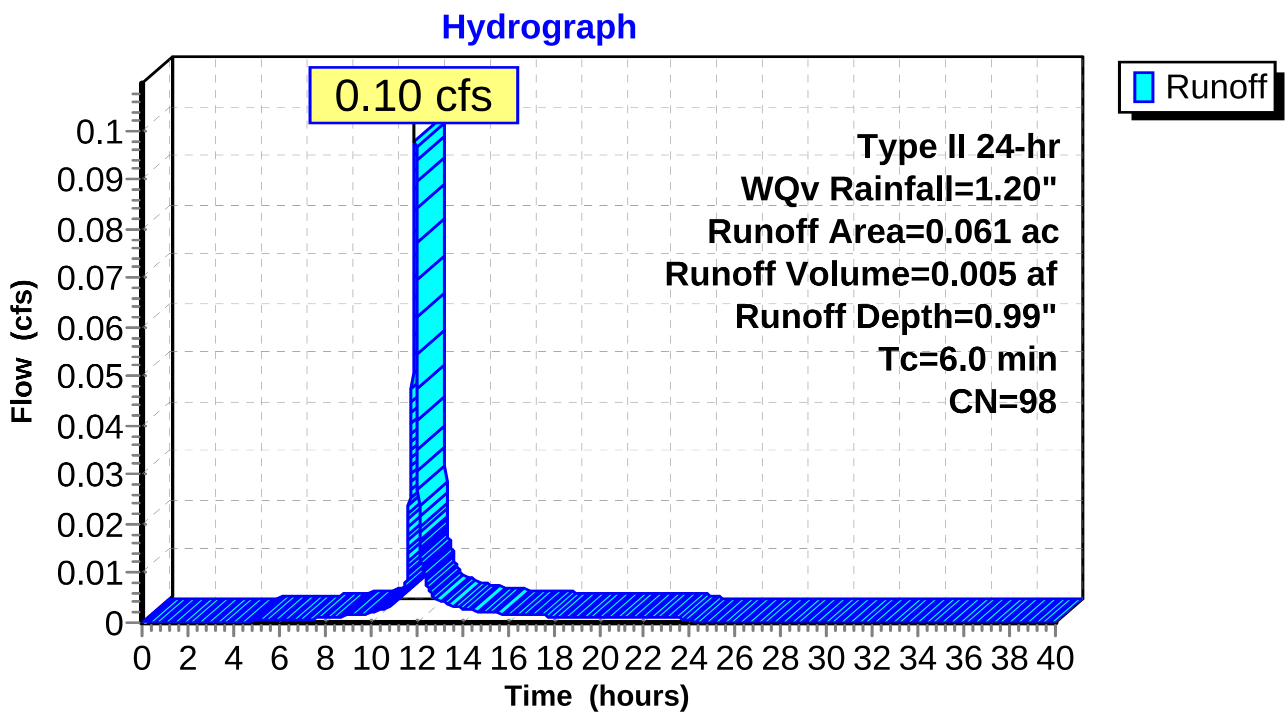
Runoff = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (ac)	CN	Description
0.061	98	Paved parking, HSG A
0.061		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, min**

Subcatchment 3D: Garage Roof



Summary for Subcatchment 4A: 4A

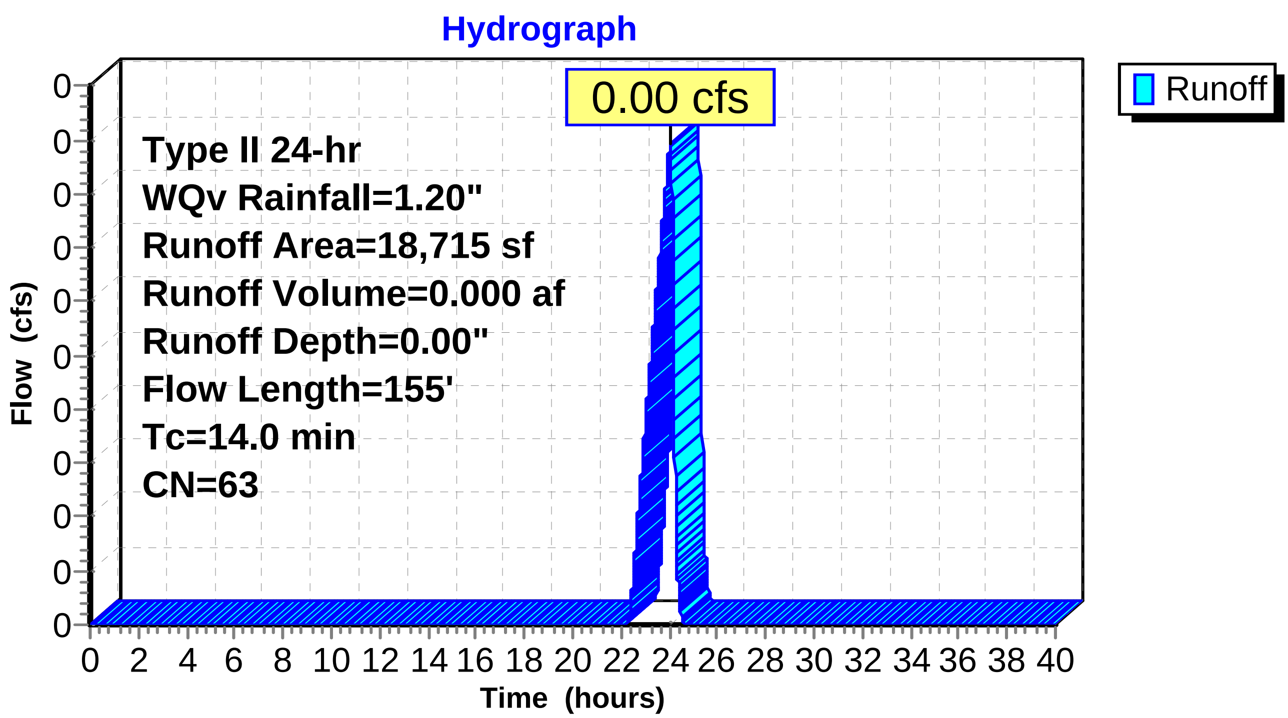
Runoff = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
10,149	61	>75% Grass cover, Good, HSG B
6,519	55	Woods, Good, HSG B
2,047	98	Paved parking, HSG A
18,715	63	Weighted Average
16,668		89.06% Pervious Area
2,047		10.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	30	0.0200	0.06		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 2.80"
0.9	16	0.2500	0.30		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.80"
3.9	54	0.0700	0.23		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.80"
0.4	55	0.0200	2.28		**Shallow Concentrated Flow, grass** Unpaved Kv= 16.1 fps
14.0	155	Total			

Subcatchment 4A: 4A



Summary for Reach 3R: TO CB'S

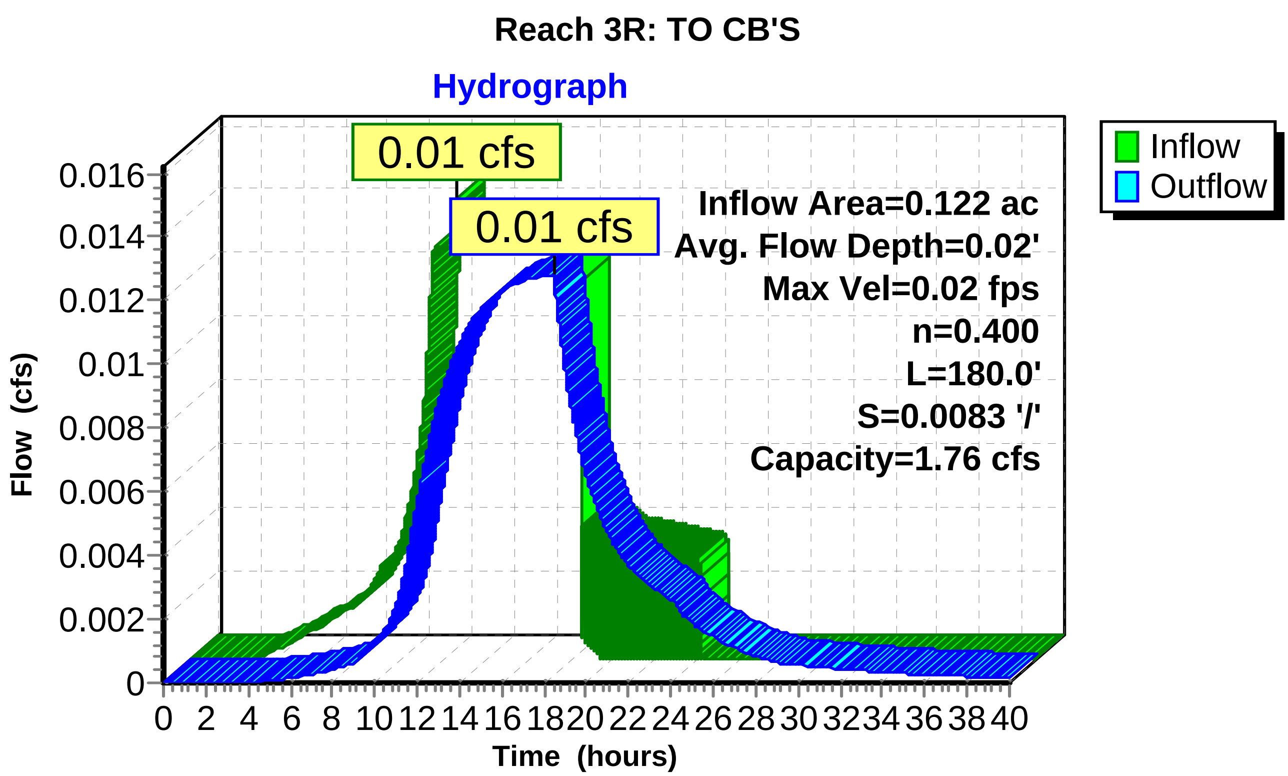
Inflow Area = 0.122 ac,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.01 cfs @ 12.53 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 18.44 hrs, Volume= 0.010 af, Atten= 11%, Lag= 354.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.02 fps, Min. Travel Time= 147.5 min
Avg. Velocity = 0.01 fps, Avg. Travel Time= 290.6 min

Peak Storage= 114 cf @ 18.44 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 0.25' Flow Area= 16.3 sf, Capacity= 1.76 cfs

40.00' x 0.25' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 100.0 '/' Top Width= 90.00'
Length= 180.0' Slope= 0.0083 '/'
Inlet Invert= 311.00', Outlet Invert= 309.50'

‡



Summary for Reach 4R: TO CB'S

Inflow Area = 0.191 ac,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.03 cfs @ 12.37 hrs, Volume= 0.016 af
Outflow = 0.02 cfs @ 18.44 hrs, Volume= 0.016 af, Atten= 29%, Lag= 364.1 min

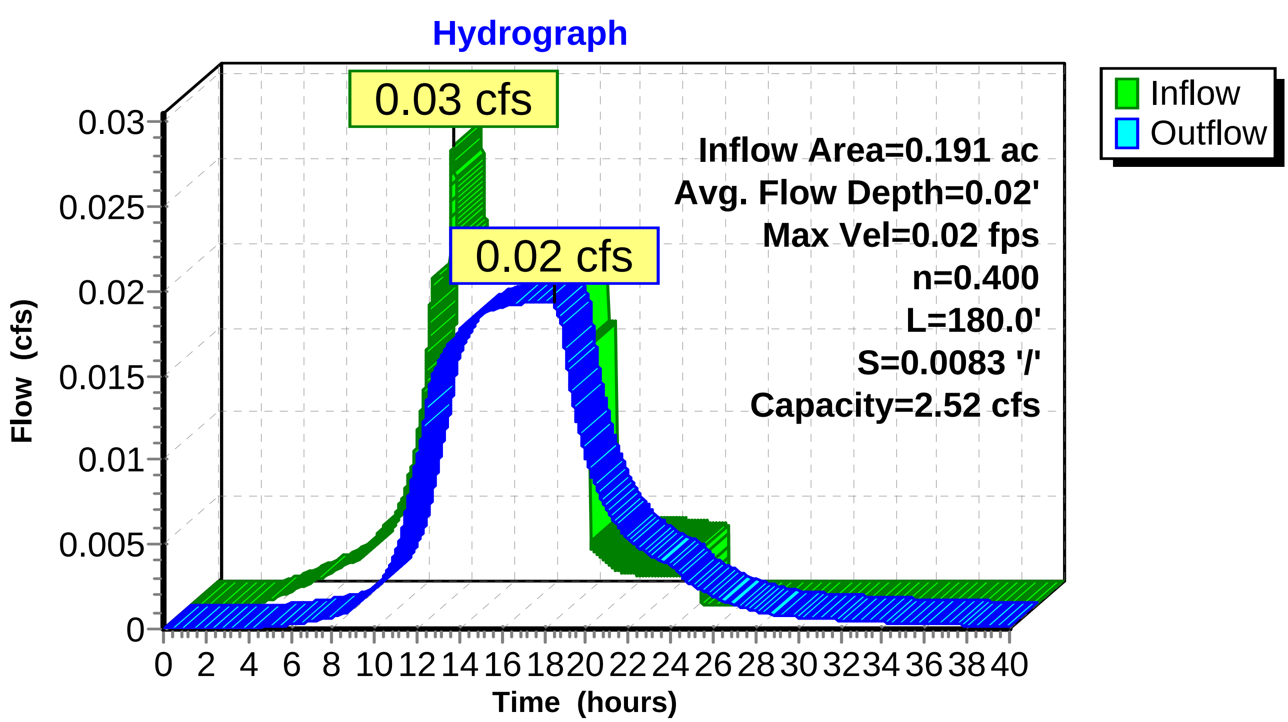
Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.02 fps, Min. Travel Time= 125.9 min
Avg. Velocity = 0.01 fps, Avg. Travel Time= 248.1 min

Peak Storage= 146 cf @ 18.44 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 0.30' Flow Area= 21.0 sf, Capacity= 2.52 cfs

40.00' x 0.30' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 100.0 '/' Top Width= 100.00'
Length= 180.0' Slope= 0.0083 '/'
Inlet Invert= 311.00', Outlet Invert= 309.50'

‡

Reach 4R: TO CB'S



Summary for Pond 2BP: POCKET POND-ABOVE PERM POOL

Inflow Area = 7.221 ac, 42.94% Impervious, Inflow Depth > 0.07" for WQv event
Inflow = 0.09 cfs @ 15.37 hrs, Volume= 0.043 af
Outflow = 0.04 cfs @ 17.55 hrs, Volume= 0.039 af, Atten= 53%, Lag= 130.7 min
Primary = 0.04 cfs @ 17.55 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Starting Elev= 317.00' Surf.Area= 9,188 sf Storage= 6,201 cf
Peak Elev= 317.17' @ 17.55 hrs Surf.Area= 9,436 sf Storage= 6,982 cf (781 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 286.3 min (1,319.3 - 1,033.1)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	6,201 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
#2	317.00'	52,519 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
		58,720 cf	Total Available Storage

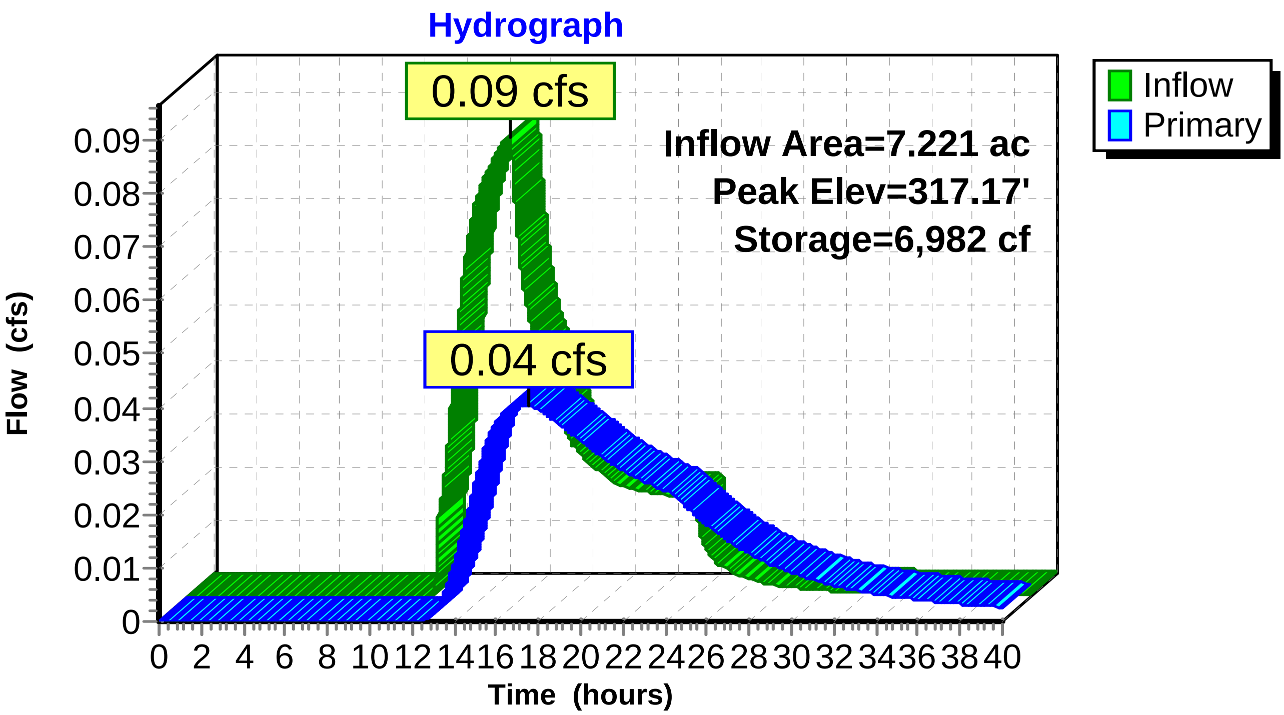
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
313.00	395	95.0	0	0	395
314.00	759	134.0	567	567	1,115
315.00	1,241	173.0	990	1,557	2,080
316.00	1,839	212.0	1,530	3,088	3,290
317.00	4,594	319.0	3,113	6,201	7,819

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.00	4,594	319.0	0	0	4,594
318.00	6,187	392.0	5,371	5,371	8,740
320.00	9,848	498.0	15,894	21,265	16,299
322.00	14,260	584.0	23,972	45,237	23,783
322.50	14,870	586.0	7,282	52,519	24,130

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**18.0" Round Culvert** L= 101.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.00' / 316.00' S= 0.0099 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.00'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.20'	**3.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	318.60'	**18.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	321.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.04 cfs @ 17.55 hrs HW=317.17' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.04 cfs of 0.15 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.39 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 2BP: POCKET POND-ABOVE PERM POOL



Summary for Pond 2CP1: REAR BIO-RETENTION

Inflow Area = 0.863 ac, 54.11% Impervious, Inflow Depth = 0.17" for WQv event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.03 cfs @ 12.68 hrs, Volume= 0.012 af, Atten= 81%, Lag= 35.3 min
Primary = 0.03 cfs @ 12.68 hrs, Volume= 0.012 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 321.55' @ 12.68 hrs Surf.Area= 2,430 sf Storage= 112 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 25.2 min (942.5 - 917.4)

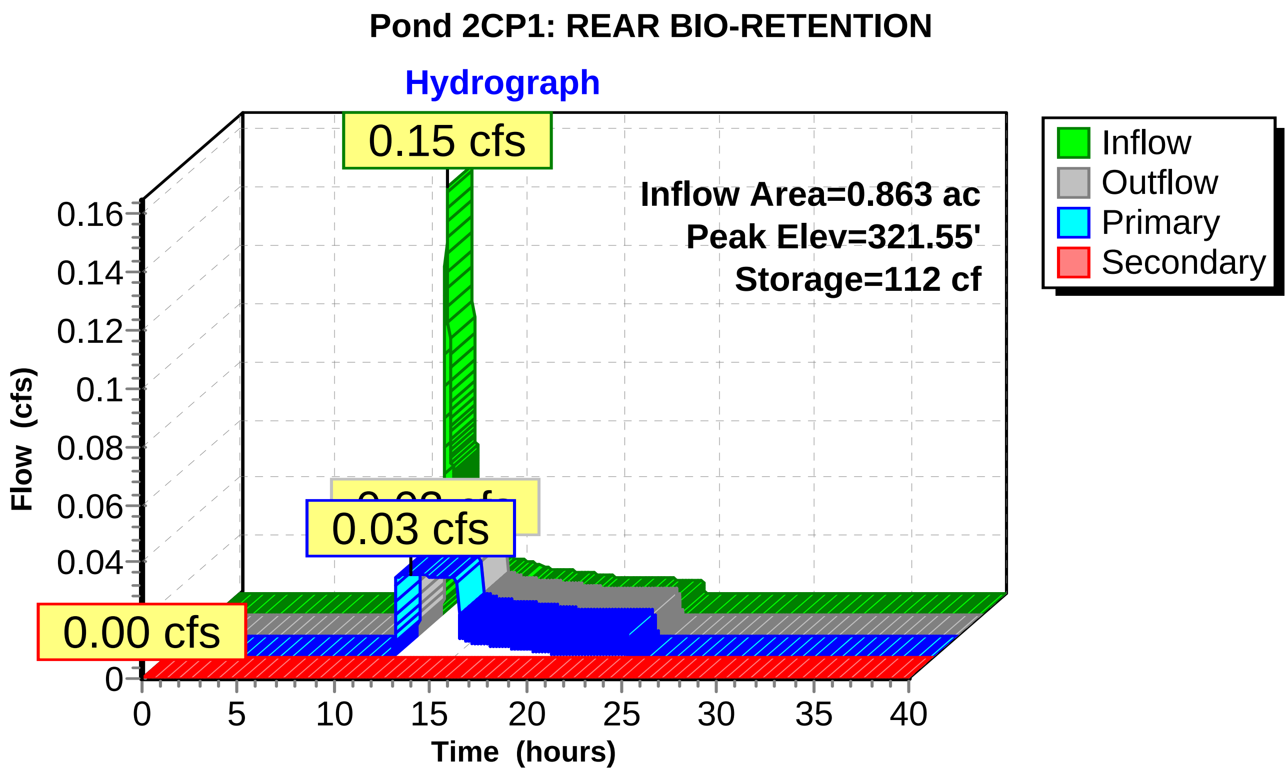
Volume	Invert	Avail.Storage	Storage Description
#1	321.50'	1,375 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.50	2,360	261.0	0	0	2,360
322.00	3,160	271.0	1,375	1,375	2,804

Device	Routing	Invert	Outlet Devices
#1	Primary	321.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	317.50'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	321.55'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 12.68 hrs HW=321.55' TW=317.56' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=321.50' TW=313.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 7.07 cfs potential flow)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)


Pond 2CP1: REAR BIO-RETENTION
Hydrograph
0.15 cfs
0.03 cfs
0.03 cfs
0.00 cfs
Inflow Area=0.863 ac
Peak Elev=321.55'
Storage=112 cf
Inflow
Outflow
Primary
Secondary
Flow (cfs)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0
0
5
10
15
20
25
30
35
40
Time (hours)

Summary for Pond 2CP2: REAR BIO-RETENTION

Inflow Area = 0.863 ac, 54.11% Impervious, Inflow Depth = 0.17" for WQv event
Inflow = 0.03 cfs @ 12.68 hrs, Volume= 0.012 af
Outflow = 0.03 cfs @ 15.23 hrs, Volume= 0.012 af, Atten= 3%, Lag= 153.2 min
Primary = 0.03 cfs @ 15.23 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 317.57' @ 15.23 hrs Surf.Area= 2,360 sf Storage= 69 cf

Plug-Flow detention time= 63.2 min calculated for 0.012 af (99% of inflow)
Center-of-Mass det. time= 60.5 min (1,003.0 - 942.5)

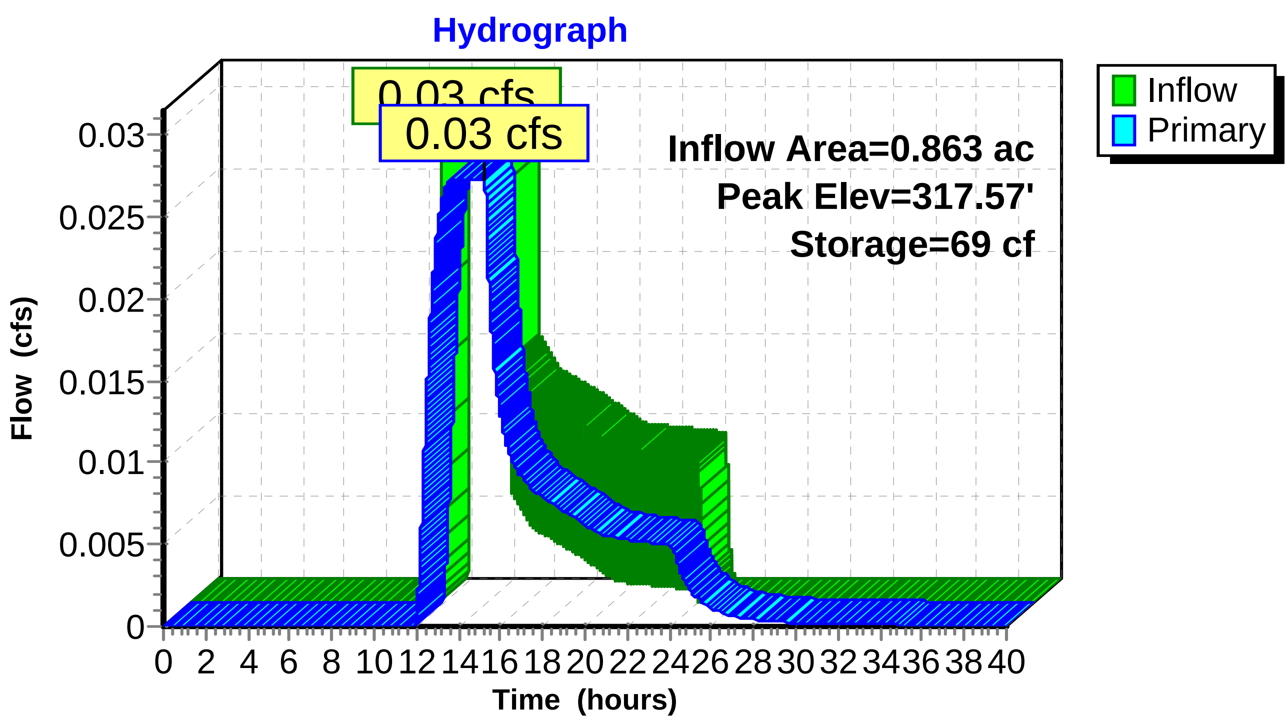
Volume	Invert	Avail.Storage	Storage Description
#1	317.50'	3,776 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 9,440 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.50	2,360	261.0	0	0	2,360
321.50	2,360	261.0	9,440	9,440	3,404

Device	Routing	Invert	Outlet Devices
#1	Primary	317.50'	**18.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.50'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	321.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 15.23 hrs HW=317.57' TW=313.12' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.03 cfs of 0.03 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2CP2: REAR BIO-RETENTION



Summary for Pond 2DP1: REAR BIO-RETENTION

Inflow Area = 0.921 ac, 50.81% Impervious, Inflow Depth = 0.15" for WQv event
Inflow = 0.13 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.03 cfs @ 12.59 hrs, Volume= 0.012 af, Atten= 76%, Lag= 29.8 min
Primary = 0.03 cfs @ 12.59 hrs, Volume= 0.012 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 321.53' @ 12.59 hrs Surf.Area= 2,662 sf Storage= 83 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 14.6 min (940.8 - 926.2)

Volume	Invert	Avail.Storage	Storage Description
#1	321.50'	1,445 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

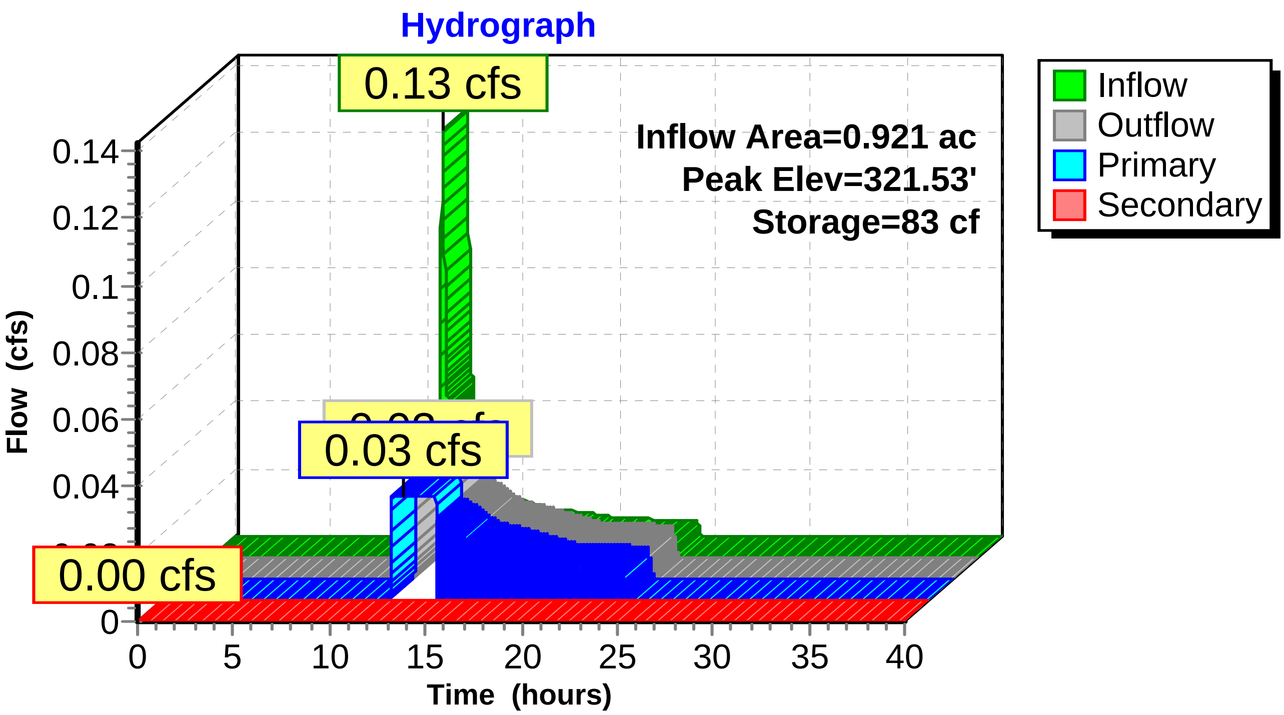
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.50	2,630	261.0	0	0	2,630
322.00	3,160	271.0	1,445	1,445	3,074

Device	Routing	Invert	Outlet Devices
#1	Primary	321.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	317.50'	**12.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	321.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 12.59 hrs HW=321.53' TW=317.56' (Dynamic Tailwater)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=321.50' TW=313.00' (Dynamic Tailwater)
2=Culvert (Passes 0.00 cfs of 7.07 cfs potential flow)
3=Orifice/Grate (Controls 0.00 cfs)

Pond 2DP1: REAR BIO-RETENTION



Summary for Pond 2DP2: REAR BIO-RETENTION

Inflow Area = 0.921 ac, 50.81% Impervious, Inflow Depth = 0.15" for WQv event
Inflow = 0.03 cfs @ 12.59 hrs, Volume= 0.012 af
Outflow = 0.03 cfs @ 13.79 hrs, Volume= 0.012 af, Atten= 11%, Lag= 71.9 min
Primary = 0.03 cfs @ 13.79 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 317.59' @ 14.36 hrs Surf.Area= 2,360 sf Storage= 82 cf

Plug-Flow detention time= 66.6 min calculated for 0.012 af (99% of inflow)
Center-of-Mass det. time= 63.8 min (1,004.6 - 940.8)

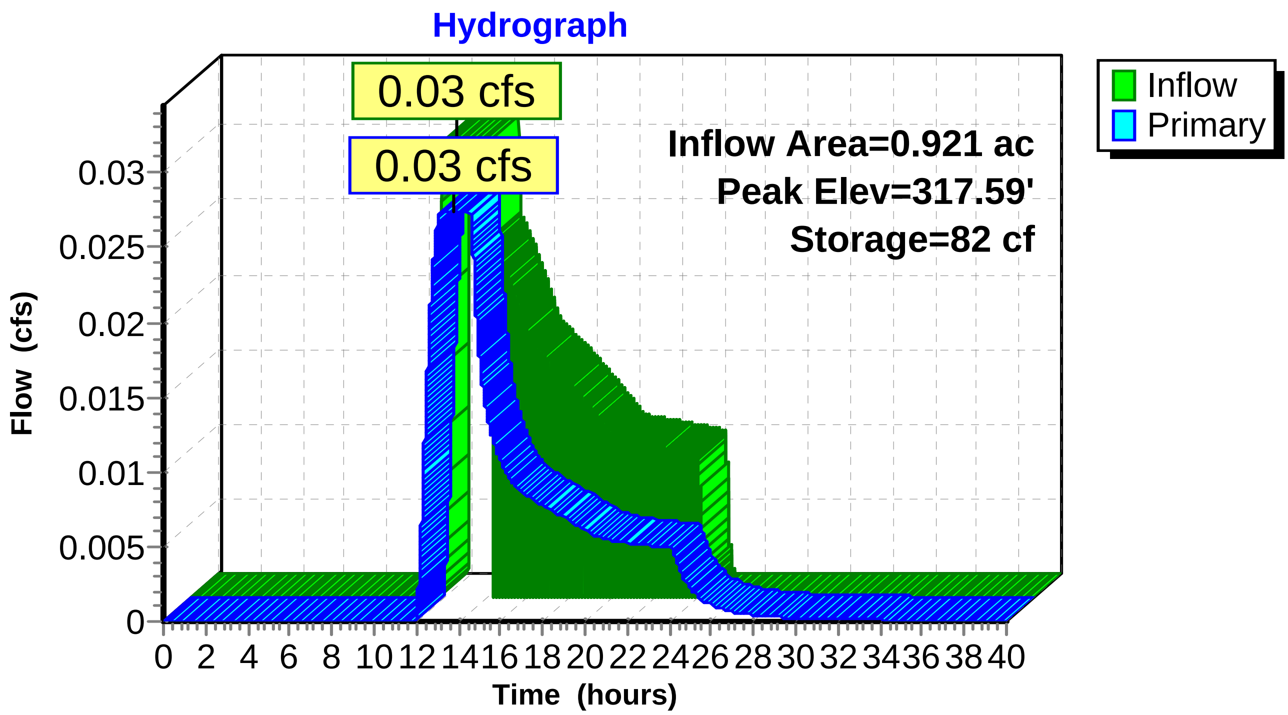
Volume	Invert	Avail.Storage	Storage Description
#1	317.50'	3,776 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 9,440 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
317.50	2,360	261.0	0	0	2,360
321.50	2,360	261.0	9,440	9,440	3,404

Device	Routing	Invert	Outlet Devices
#1	Primary	317.50'	**18.0" Round Culvert** L= 30.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.50' / 317.00' S= 0.0167 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.03 cfs @ 13.79 hrs HW=317.58' TW=313.06' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.03 cfs of 0.04 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Pond 2DP2: REAR BIO-RETENTION



Summary for Pond 2EP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 12.53 hrs, Volume= 0.005 af, Atten= 93%, Lag= 33.5 min
Primary = 0.01 cfs @ 11.66 hrs, Volume= 0.005 af
Secondary = 0.00 cfs @ 12.53 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.12' @ 12.53 hrs Surf.Area= 140 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 95.8 min (874.5 - 778.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

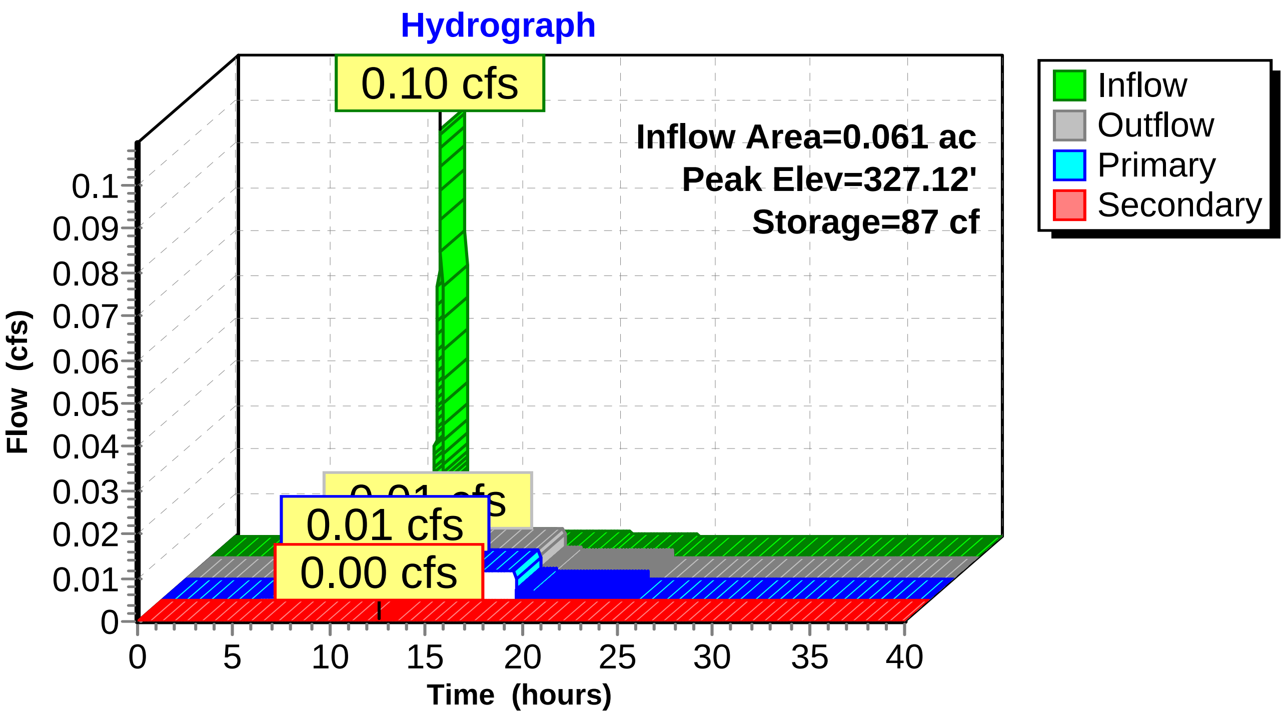
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3750 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 11.66 hrs HW=326.52' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.53 hrs HW=327.12' TW=311.01' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 2.82 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.17 fps)

Pond 2EP1: Stormwater Planter



Summary for Pond 2EP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 0.98" for WQv event
Inflow = 0.01 cfs @ 11.66 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 18.44 hrs, Volume= 0.005 af, Atten= 0%, Lag= 406.8 min
Primary = 0.01 cfs @ 18.44 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 18.44 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (874.9 - 874.7)

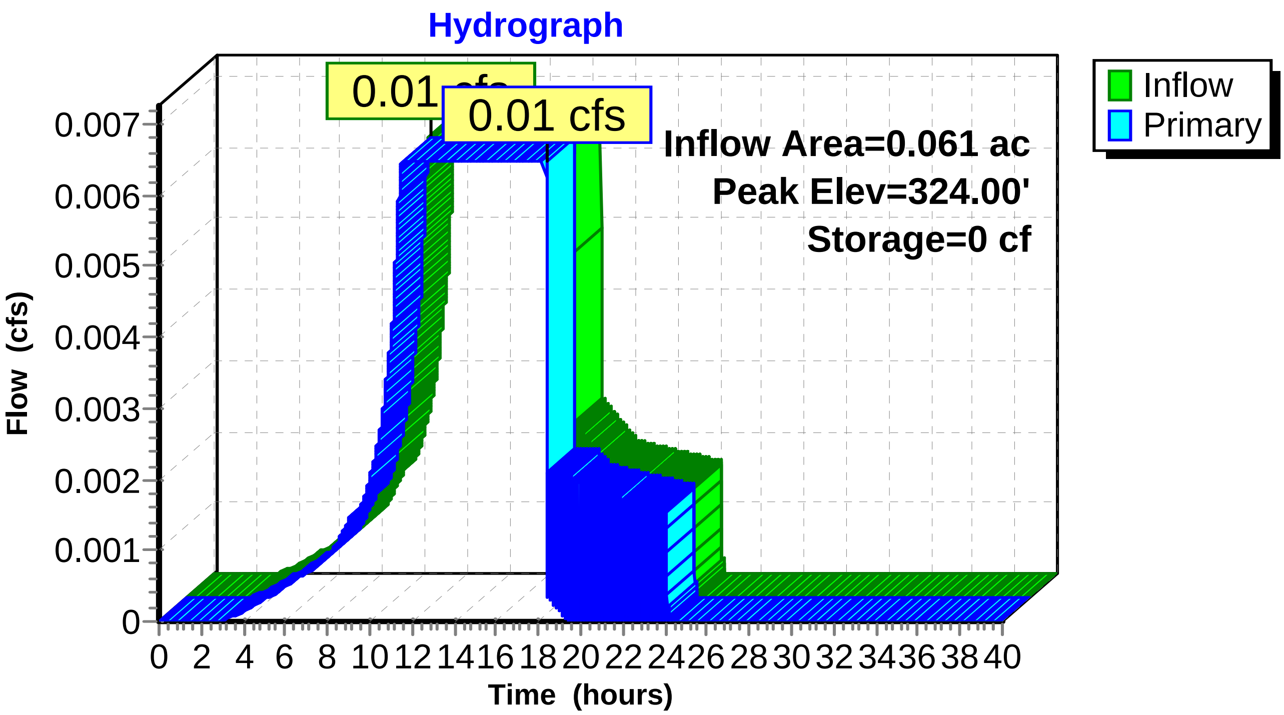
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 12.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.6250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 18.44 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 2EP2: Stormwater Planter



Summary for Pond 2FP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 12.53 hrs, Volume= 0.005 af, Atten= 93%, Lag= 33.5 min
Primary = 0.01 cfs @ 11.66 hrs, Volume= 0.005 af
Secondary = 0.00 cfs @ 12.53 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.12' @ 12.53 hrs Surf.Area= 140 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 95.8 min (874.5 - 778.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

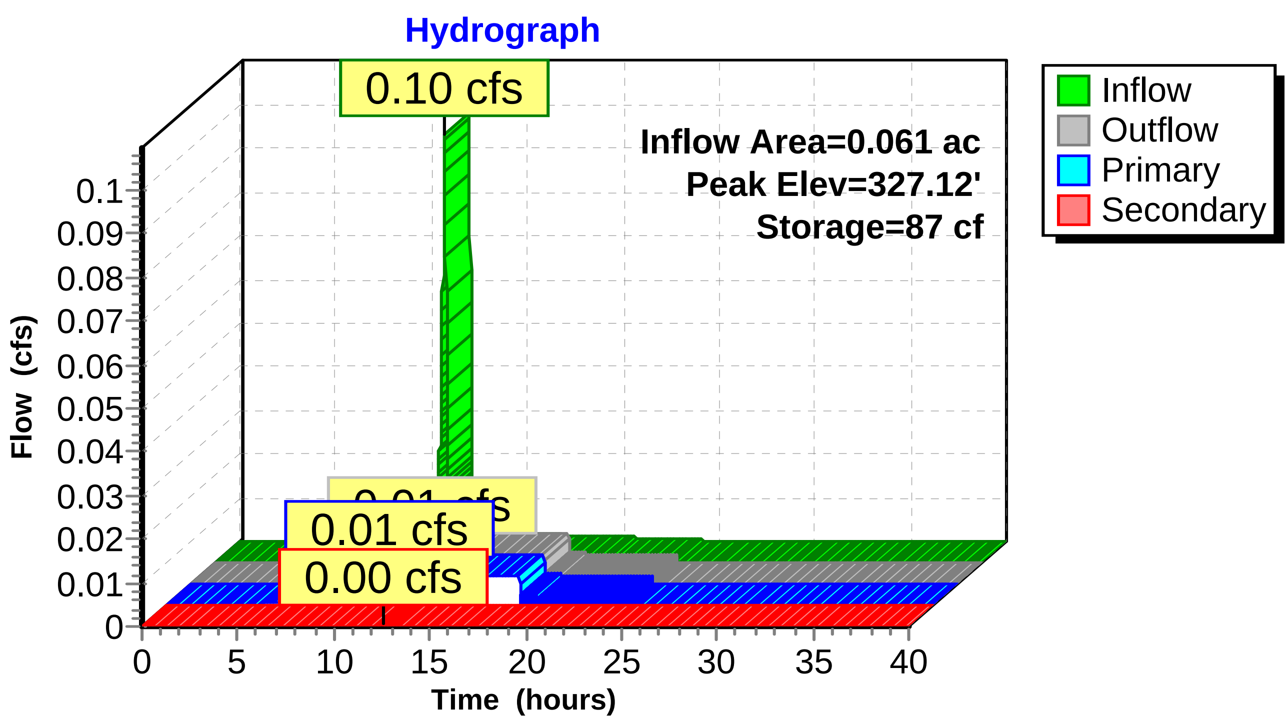
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 25.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 11.66 hrs HW=326.52' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.53 hrs HW=327.12' TW=311.01' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 2.82 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.17 fps)

Pond 2FP1: Stormwater Planter



Summary for Pond 2FP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 0.98" for WQv event
Inflow = 0.01 cfs @ 11.66 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 18.44 hrs, Volume= 0.005 af, Atten= 0%, Lag= 406.8 min
Primary = 0.01 cfs @ 18.44 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 18.44 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (874.9 - 874.7)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids
#2	326.50'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)
		280 cf	Total Available Storage

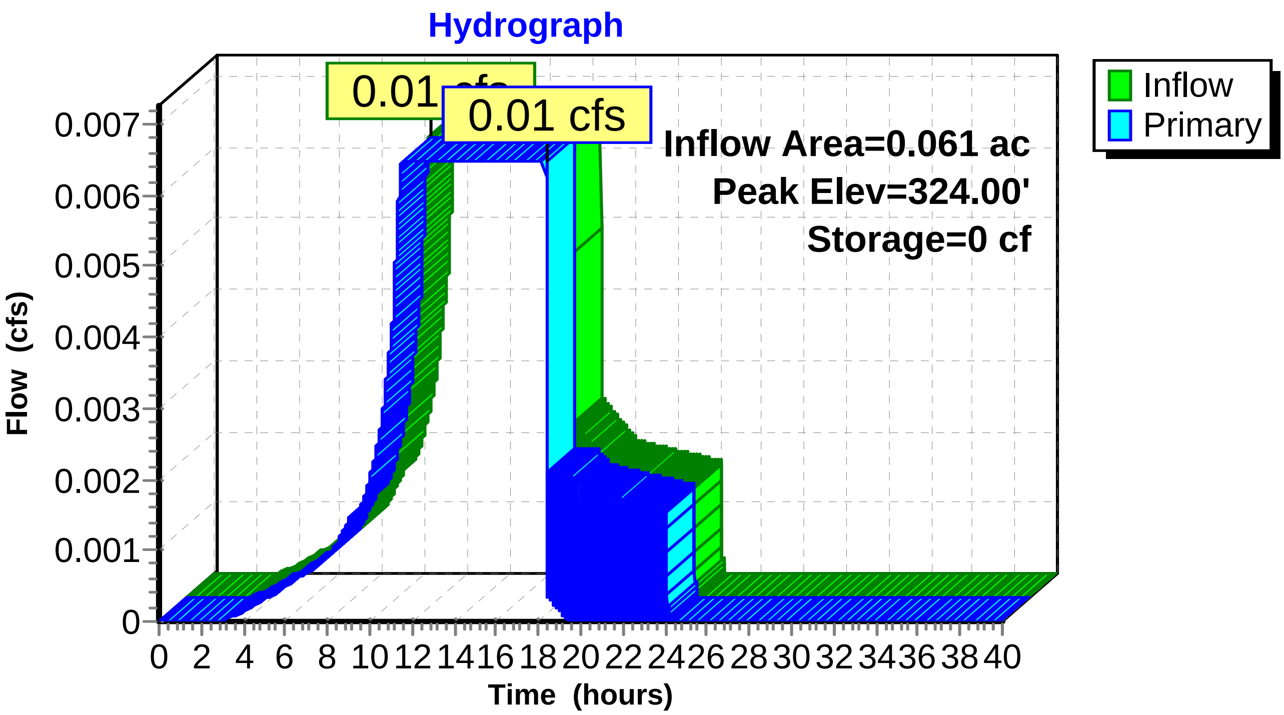
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.50	140	48.0	140	140	188

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 310.50' S= 0.3750 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 18.44 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 2FP2: Stormwater Planter



Summary for Pond 2HP1: FRONT BIO-RETENTION

Inflow Area = 1.161 ac, 66.32% Impervious, Inflow Depth = 0.31" for WQv event
Inflow = 0.44 cfs @ 12.08 hrs, Volume= 0.030 af
Outflow = 0.07 cfs @ 12.61 hrs, Volume= 0.030 af, Atten= 84%, Lag= 32.0 min
Primary = 0.07 cfs @ 12.61 hrs, Volume= 0.030 af
Secondary = 0.00 cfs @ 12.61 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 323.56' @ 12.61 hrs Surf.Area= 6,006 sf Storage= 364 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 35.6 min (916.6 - 881.0)

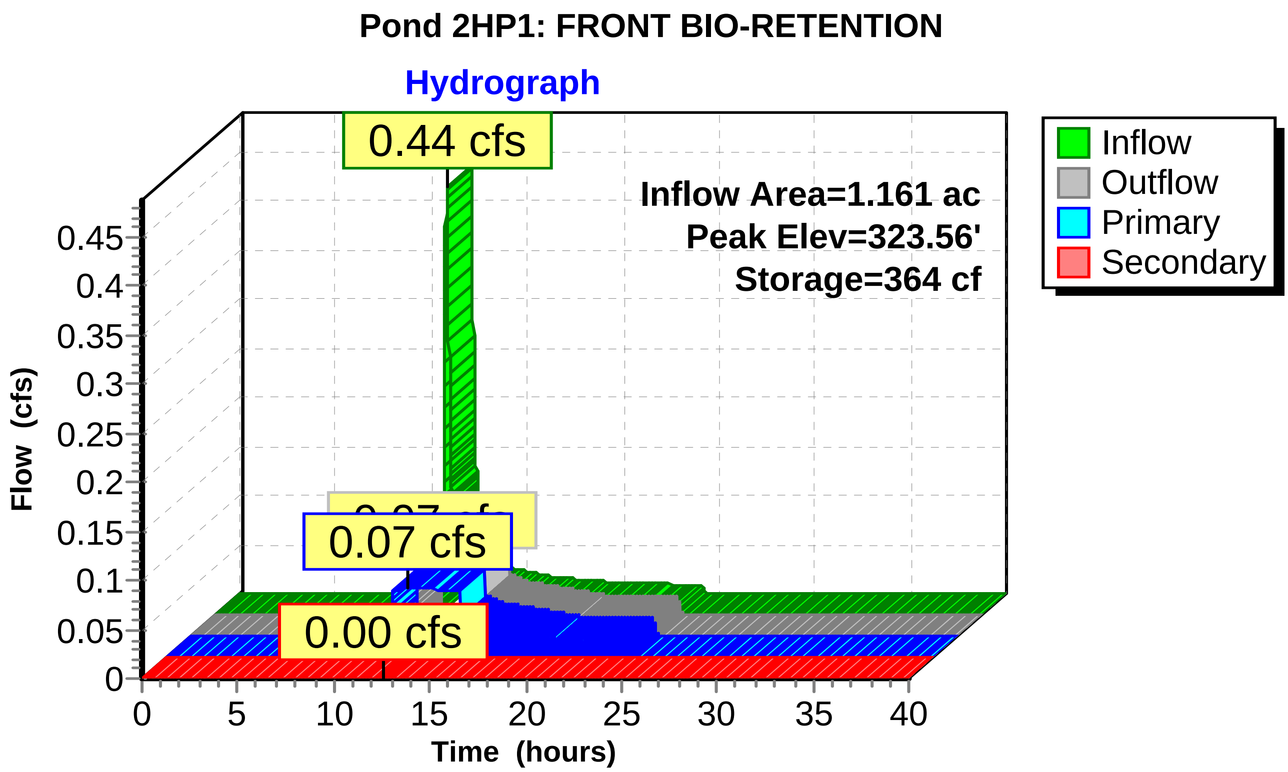
Volume	Invert	Avail.Storage	Storage Description
#1	323.50'	3,133 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
323.50	5,924	456.0	0	0	5,924
324.00	6,615	466.0	3,133	3,133	6,693

Device	Routing	Invert	Outlet Devices
#1	Primary	323.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	319.50'	**12.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 319.50' / 319.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	323.56'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 12.61 hrs HW=323.56' TW=319.58' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.61 hrs HW=323.56' TW=317.01' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 7.05 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.10 fps)


Pond 2HP1: FRONT BIO-RETENTION
Hydrograph
0.44 cfs
0.07 cfs
0.07 cfs
0.00 cfs
Inflow Area=1.161 ac
Peak Elev=323.56'
Storage=364 cf
Inflow
Outflow
Primary
Secondary
Flow (cfs)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5
10
15
20
25
30
35
40
Time (hours)

Summary for Pond 2HP2: FRONT BIO-RETENTION

Inflow Area = 1.161 ac, 66.32% Impervious, Inflow Depth = 0.31" for WQv event
Inflow = 0.07 cfs @ 12.61 hrs, Volume= 0.030 af
Outflow = 0.07 cfs @ 15.37 hrs, Volume= 0.029 af, Atten= 2%, Lag= 165.6 min
Primary = 0.07 cfs @ 15.37 hrs, Volume= 0.029 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 319.63' @ 15.37 hrs Surf.Area= 5,924 sf Storage= 299 cf

Plug-Flow detention time= 119.7 min calculated for 0.029 af (98% of inflow)
Center-of-Mass det. time= 110.4 min (1,027.1 - 916.7)

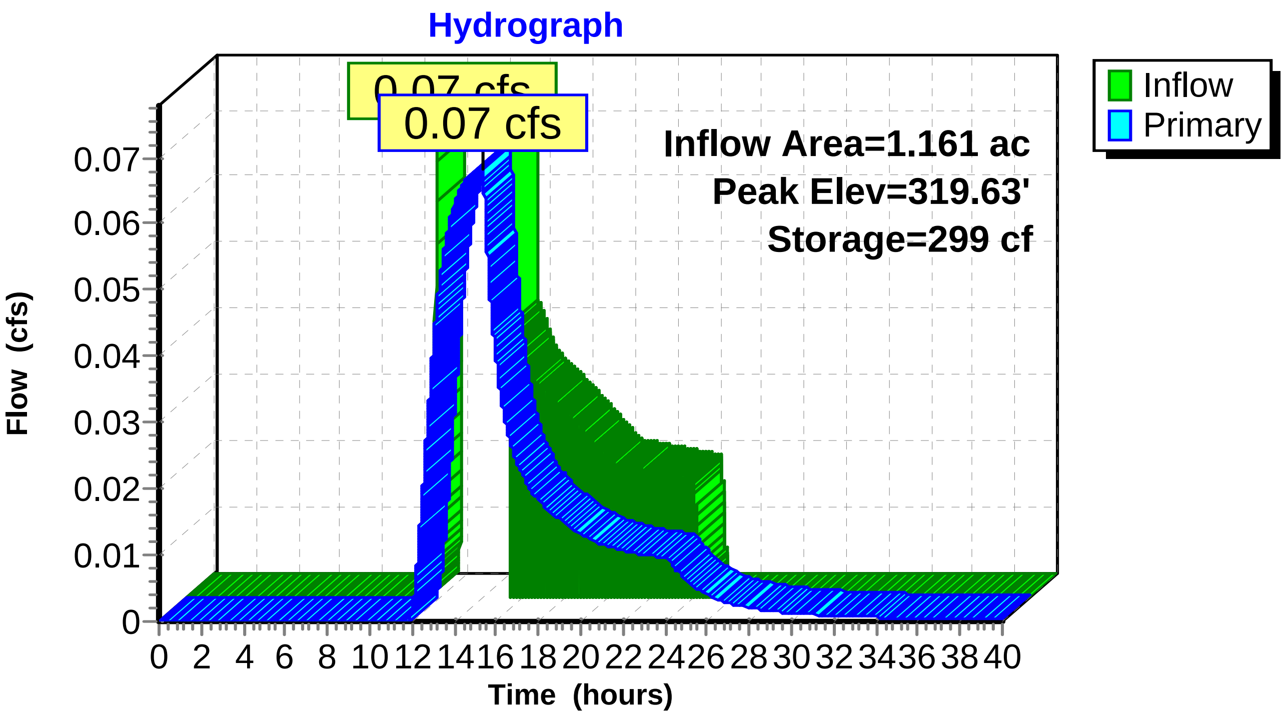
Volume	Invert	Avail.Storage	Storage Description
#1	319.50'	9,478 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 23,696 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
319.50	5,924	456.0	0	0	5,924
323.50	5,924	456.0	23,696	23,696	7,748

Device	Routing	Invert	Outlet Devices
#1	Primary	319.50'	**12.0" Round Culvert** L= 60.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 319.50' / 319.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	319.50'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	323.65'	**30.0" x 30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 15.37 hrs HW=319.63' TW=317.14' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.07 cfs @ 1.81 fps)
  ├─**2=Exfiltration** (Passes 0.07 cfs of 0.07 cfs potential flow)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2HP2: FRONT BIO-RETENTION



Summary for Pond 2JP1: BIORETENTION IN FRONT OF APT

Inflow Area = 0.328 ac, 70.12% Impervious, Inflow Depth = 0.34" for WQv event
Inflow = 0.19 cfs @ 11.98 hrs, Volume= 0.009 af
Outflow = 0.06 cfs @ 12.11 hrs, Volume= 0.009 af, Atten= 70%, Lag= 7.5 min
Primary = 0.06 cfs @ 12.11 hrs, Volume= 0.009 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 322.31' @ 12.11 hrs Surf.Area= 1,277 sf Storage= 69 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.8 min (872.0 - 867.2)

Volume	Invert	Avail.Storage	Storage Description
#1	322.25'	714 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

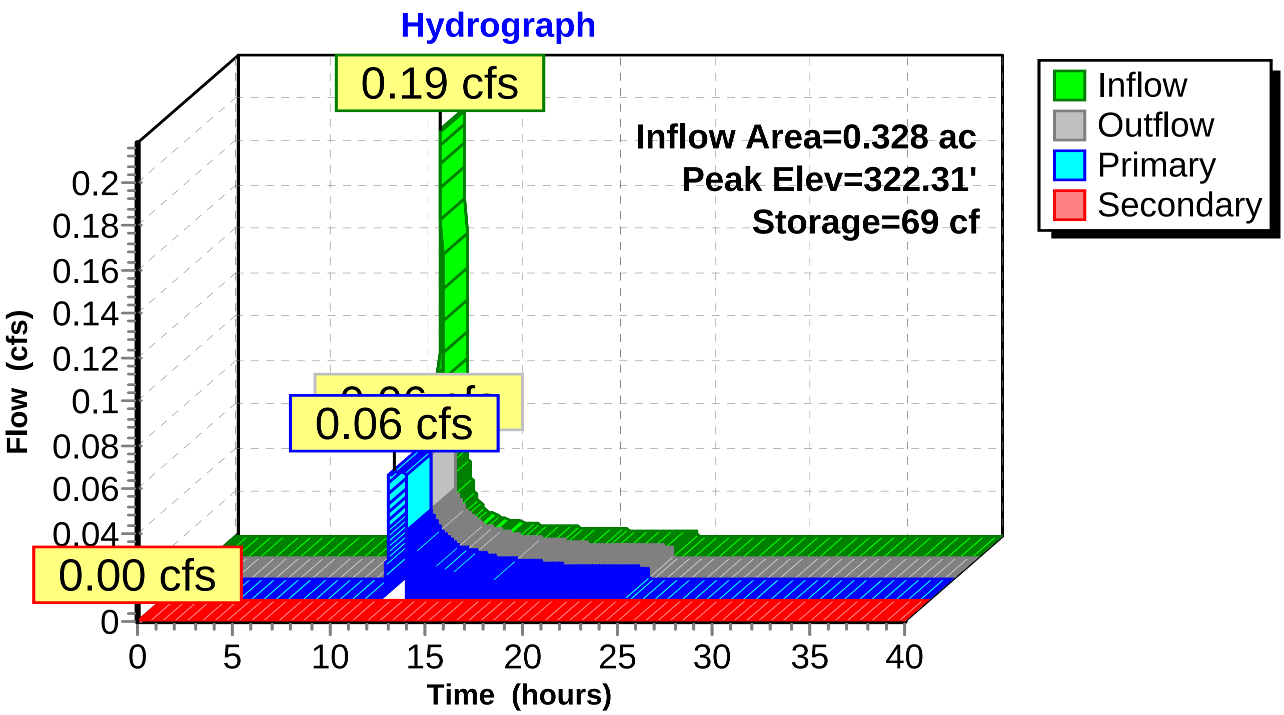
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
322.25	1,236	384.0	0	0	1,236
322.75	1,628	396.0	714	714	2,006

Device	Routing	Invert	Outlet Devices
#1	Primary	322.25'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.25'	**12.0" Round Culvert X 2.00** L= 65.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.25' / 317.75' S= 0.0077 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#3	Device 2	322.35'	**24.0" x 24.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.06 cfs @ 12.11 hrs HW=322.31' TW=318.38' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=322.25' TW=317.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 13.70 cfs potential flow)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2JP1: BIORETENTION IN FRONT OF APT



Summary for Pond 2JP2: BIORETENTION IN FRONT OF APT

Inflow Area = 0.328 ac, 70.12% Impervious, Inflow Depth = 0.34" for WQv event
Inflow = 0.06 cfs @ 12.11 hrs, Volume= 0.009 af
Outflow = 0.01 cfs @ 12.83 hrs, Volume= 0.009 af, Atten= 75%, Lag= 43.6 min
Primary = 0.01 cfs @ 12.83 hrs, Volume= 0.009 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 318.56' @ 12.83 hrs Surf.Area= 1,265 sf Storage= 157 cf

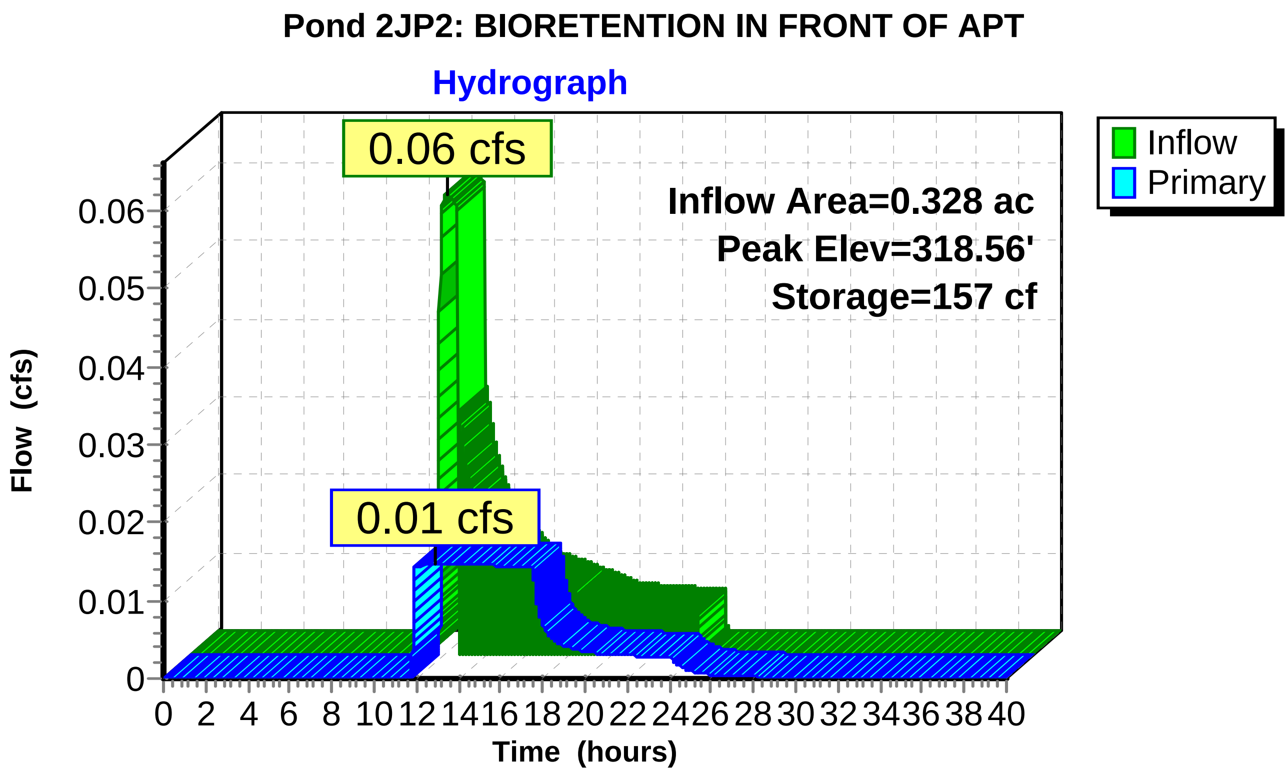
Plug-Flow detention time= 108.4 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 106.4 min (978.4 - 872.0)

Volume	Invert	Avail.Storage	Storage Description
#1	318.25'	2,284 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 5,710 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
318.25	1,236	384.0	0	0	1,236
322.25	1,628	396.0	5,710	5,710	2,965

Device	Routing	Invert	Outlet Devices
#1	Primary	318.25'	**12.0" Round Culvert** L= 65.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.25' / 317.75' S= 0.0077 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	318.25'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 12.83 hrs HW=318.56' TW=317.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 0.40 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)


Pond 2JP2: BIORETENTION IN FRONT OF APT
Hydrograph
0.06 cfs
0.01 cfs
Inflow Area=0.328 ac
Peak Elev=318.56'
Storage=157 cf
Inflow
Primary
Flow (cfs)
0.06
0.05
0.04
0.03
0.02
0.01
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
Time (hours)

Summary for Pond 2P: SUBSURFACE DETENTION

Inflow Area = 1.784 ac, 52.41% Impervious, Inflow Depth > 0.16" for WQv event
Inflow = 0.05 cfs @ 14.48 hrs, Volume= 0.024 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 313.24' @ 40.00 hrs Surf.Area= 10,754 sf Storage= 1,050 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

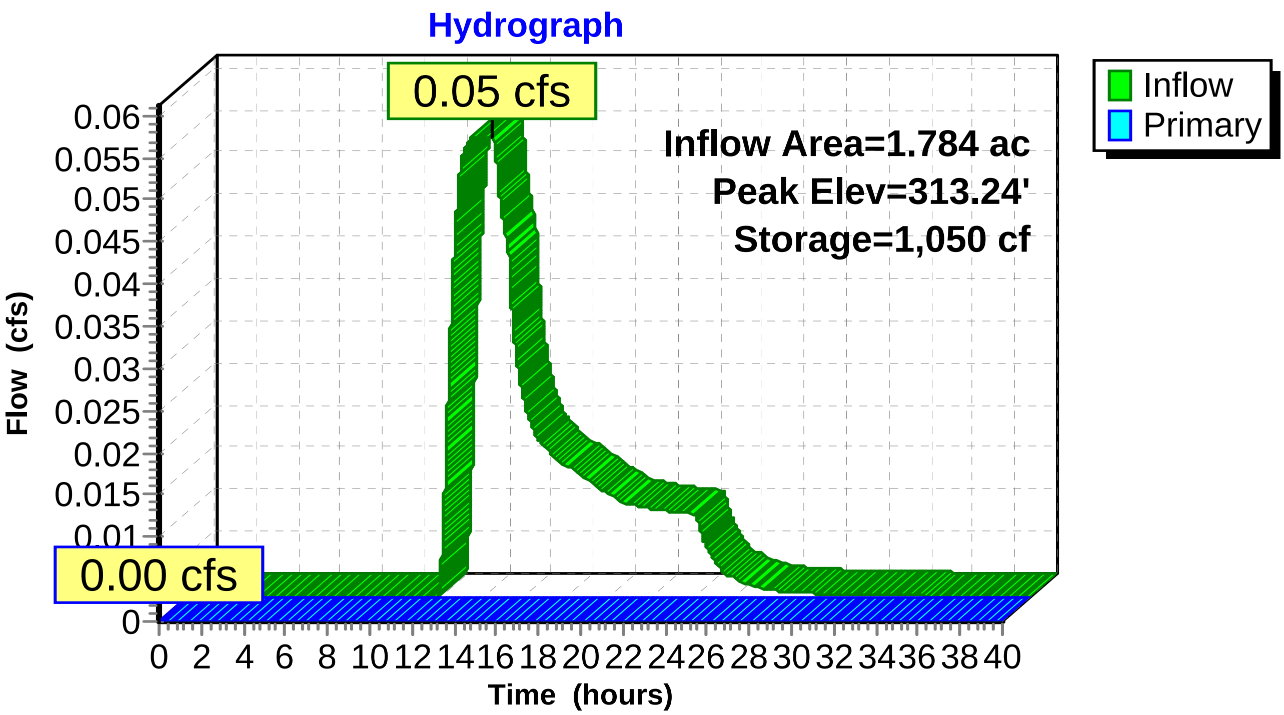
Volume	Invert	Avail.Storage	Storage Description
#1A	313.00'	12,410 cf	**38.00'W x 283.00'L x 4.50'H Field A** 48,393 cf Overall - 17,368 cf Embedded = 31,025 cf x 40.0% Voids
#2A	313.50'	13,916 cf	**ADS N-12 36** x 98 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.2 cf 7 Rows of 14 Chambers
		26,326 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	313.50'	**12.0" Round Culvert** L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 313.50' / 312.00' S= 0.0203 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	313.50'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.50'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=313.00' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SUBSURFACE DETENTION



Summary for Pond 3BP1: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 12.37 hrs, Volume= 0.005 af, Atten= 90%, Lag= 24.2 min
Primary = 0.01 cfs @ 11.64 hrs, Volume= 0.005 af
Secondary = 0.00 cfs @ 12.37 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.16' @ 12.37 hrs Surf.Area= 140 sf Storage= 92 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 100.9 min (879.5 - 778.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

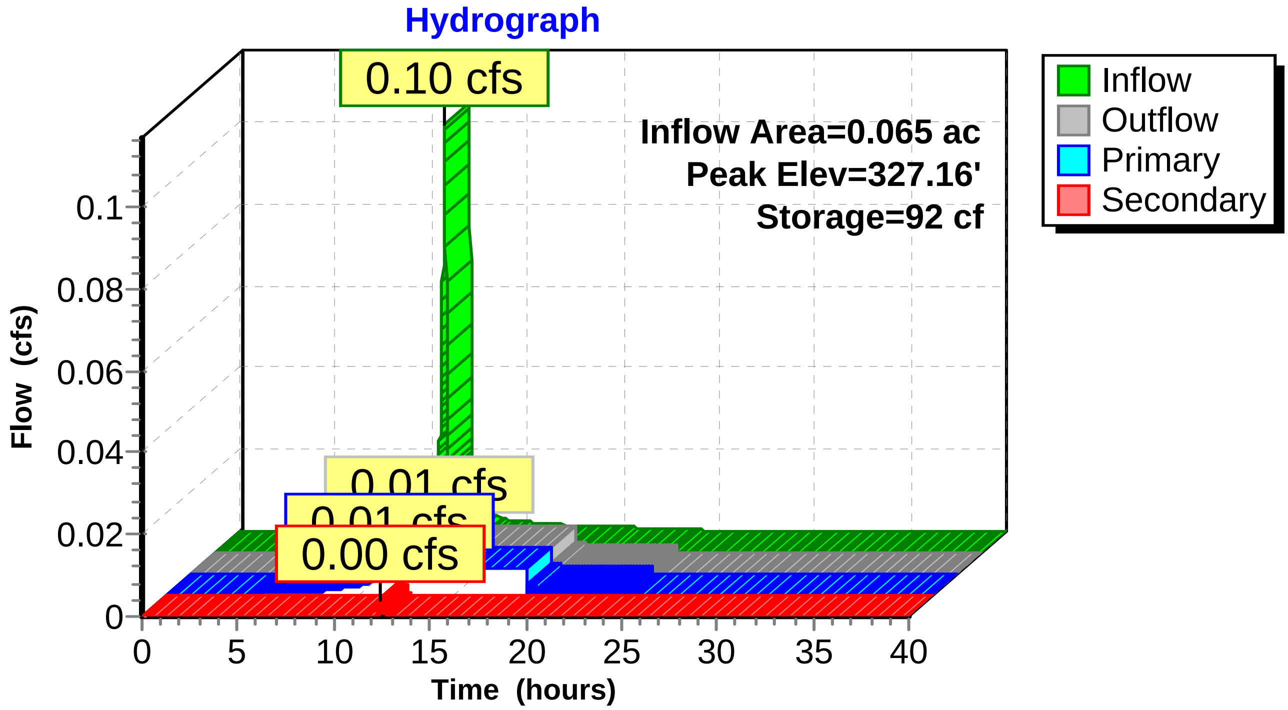
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.15'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 11.64 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.37 hrs HW=327.16' TW=311.01' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 2.82 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.30 fps)

Pond 3BP1: Stormwater Planter



Summary for Pond 3BP2: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 0.97" for WQv event
Inflow = 0.01 cfs @ 11.64 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 18.83 hrs, Volume= 0.005 af, Atten= 0%, Lag= 431.4 min
Primary = 0.01 cfs @ 18.83 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 18.83 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (881.9 - 881.7)

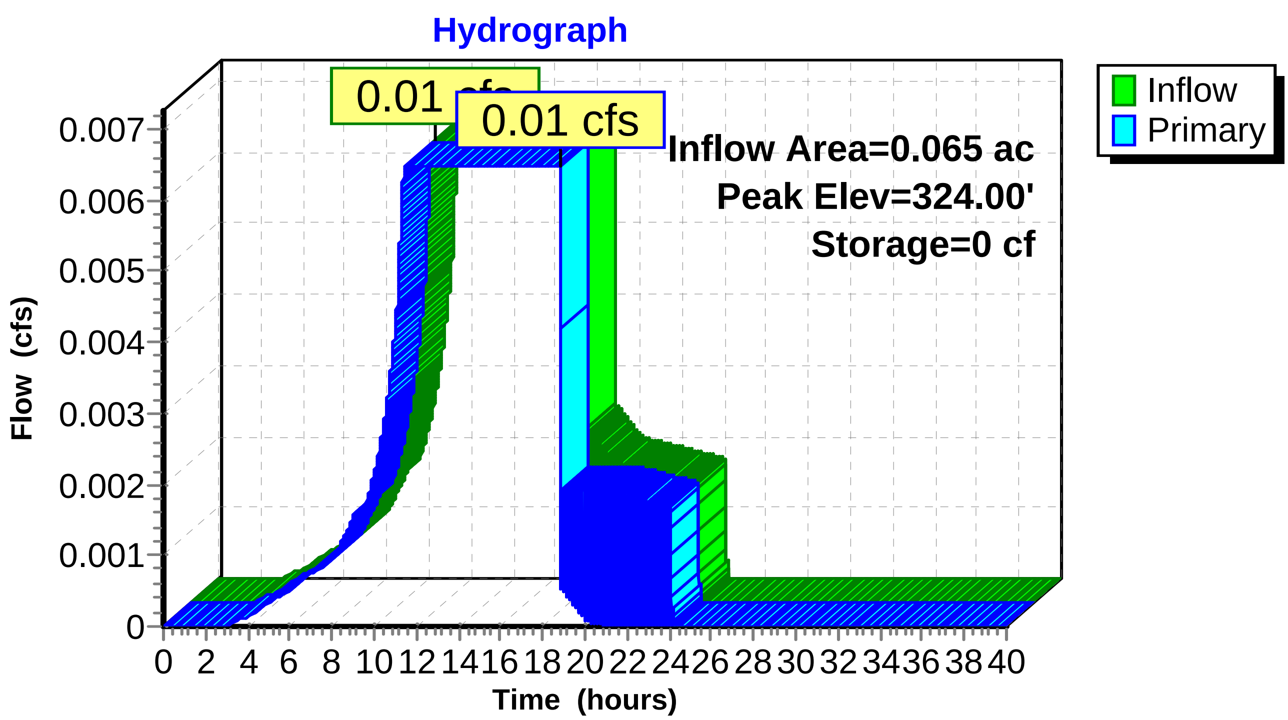
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 18.83 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 3BP2: Stormwater Planter



Summary for Pond 3CP1: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 12.37 hrs, Volume= 0.005 af, Atten= 90%, Lag= 24.2 min
Primary = 0.01 cfs @ 11.64 hrs, Volume= 0.005 af
Secondary = 0.00 cfs @ 12.37 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.16' @ 12.37 hrs Surf.Area= 140 sf Storage= 92 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 100.9 min (879.5 - 778.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

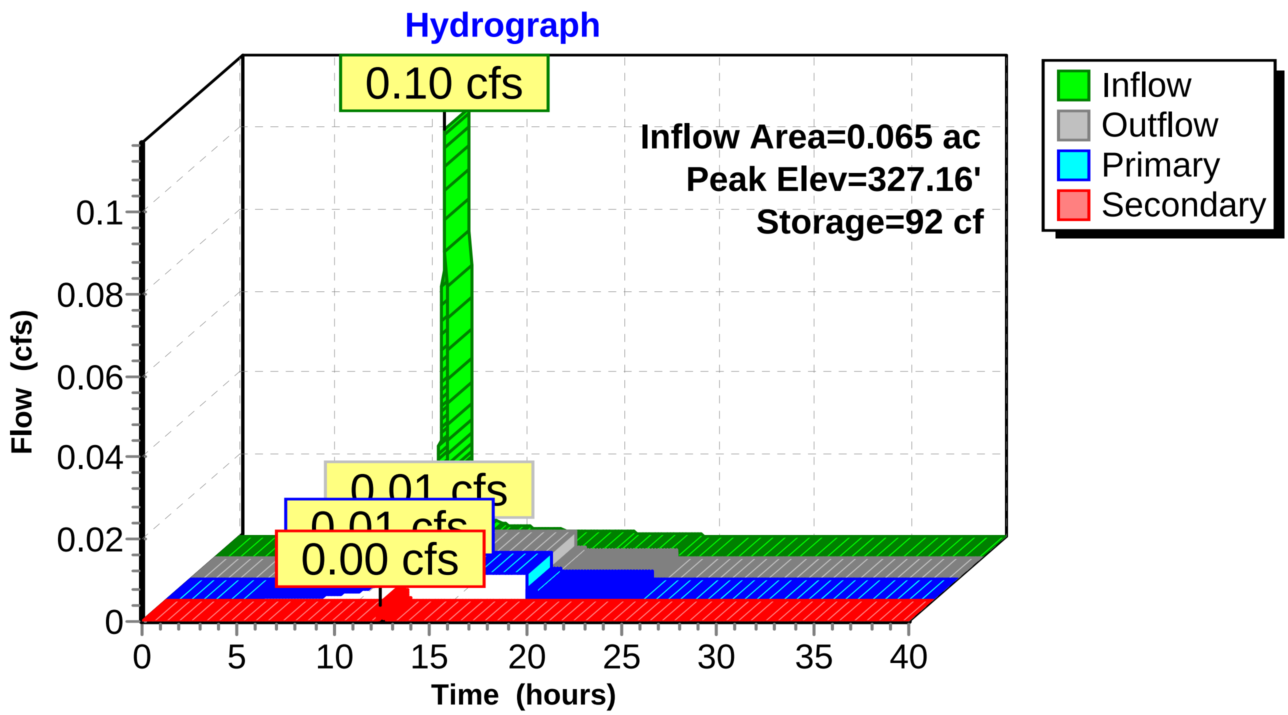
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.15'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 11.64 hrs HW=326.51' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.37 hrs HW=327.16' TW=311.01' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 2.82 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.30 fps)

Pond 3CP1: Stormwater Planter



Summary for Pond 3CP2: Stormwater Planter

Inflow Area = 0.065 ac,100.00% Impervious, Inflow Depth = 0.97" for WQv event
Inflow = 0.01 cfs @ 11.64 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 18.83 hrs, Volume= 0.005 af, Atten= 0%, Lag= 431.4 min
Primary = 0.01 cfs @ 18.83 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 18.83 hrs Surf.Area= 140 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (881.9 - 881.7)

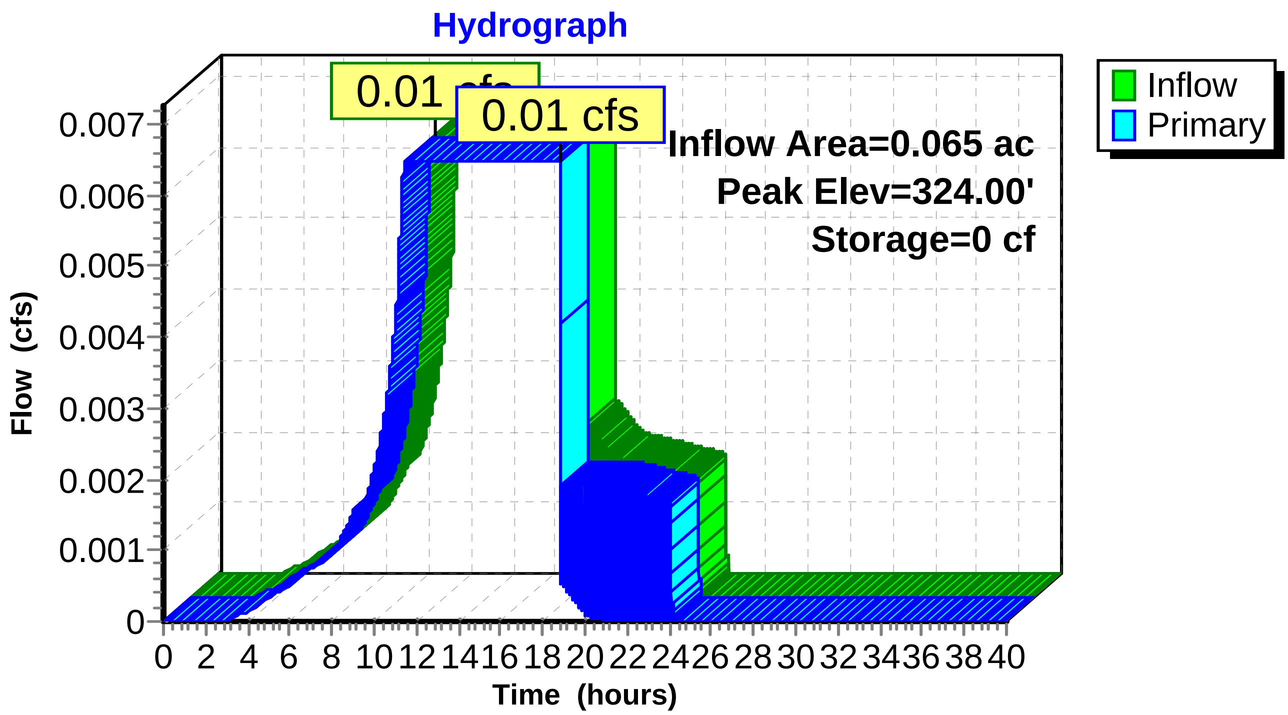
Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 311.00' S= 0.3500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 18.83 hrs HW=324.00' TW=311.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.01 cfs of 2.27 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 3CP2: Stormwater Planter



Summary for Pond 3DP1: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.10 cfs @ 11.97 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 12.53 hrs, Volume= 0.005 af, Atten= 93%, Lag= 33.5 min
Primary = 0.01 cfs @ 11.66 hrs, Volume= 0.005 af
Secondary = 0.00 cfs @ 12.53 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 327.12' @ 12.53 hrs Surf.Area= 140 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 95.8 min (874.5 - 778.7)

Volume	Invert	Avail.Storage	Storage Description
#1	326.50'	175 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

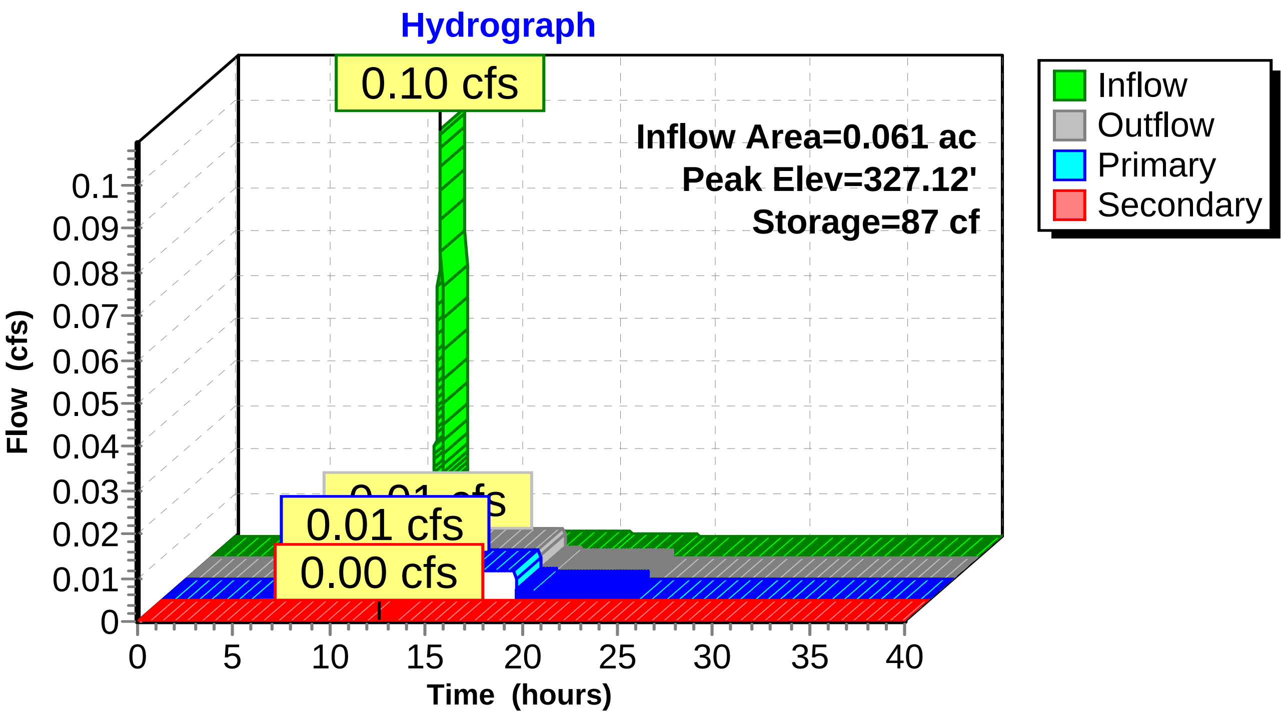
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
326.50	140	48.0	0	0	140
327.75	140	48.0	175	175	200

Device	Routing	Invert	Outlet Devices
#1	Primary	326.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Secondary	318.00'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#3	Device 2	327.12'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 11.66 hrs HW=326.52' TW=324.00' (Dynamic Tailwater)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.53 hrs HW=327.12' TW=311.02' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 2.82 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.17 fps)

Pond 3DP1: Stormwater Planter



Summary for Pond 3DP2: Stormwater Planter

Inflow Area = 0.061 ac,100.00% Impervious, Inflow Depth = 0.98" for WQv event
Inflow = 0.01 cfs @ 11.66 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 11.66 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Primary = 0.01 cfs @ 11.66 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 324.00' @ 0.00 hrs Surf.Area= 140 sf Storage= 0 cf

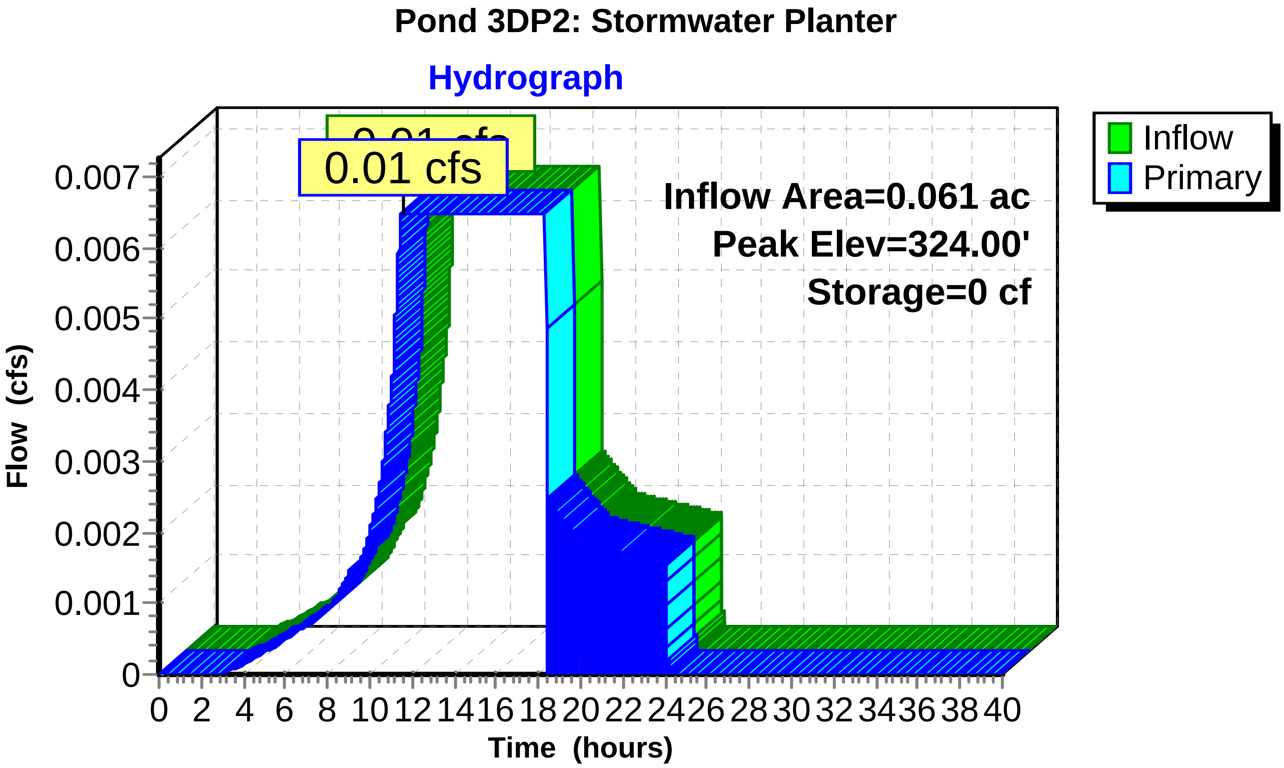
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (874.7 - 874.7)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	140 cf	**Custom Stage Data (Irregular)**Listed below (Recalc) 350 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
324.00	140	48.0	0	0	140
326.50	140	48.0	350	350	260

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**6.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.3000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	324.00'	**4.350 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.00 cfs @ 11.66 hrs HW=324.00' TW=311.01' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 2.27 cfs potential flow)
 └─**2=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)


Pond 3DP2: Stormwater Planter
Hydrograph
0.01 cfs
0.01 cfs
Inflow Area=0.061 ac
Peak Elev=324.00'
Storage=0 cf
Inflow
Primary
Flow (cfs)
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
Time (hours)

Summary for Pond 3P: POCKET POND FOREBAY

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Starting Elev= 317.00' Surf.Area= 1,586 sf Storage= 2,311 cf
Peak Elev= 317.00' @ 0.00 hrs Surf.Area= 1,586 sf Storage= 2,311 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	313.00'	2,311 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

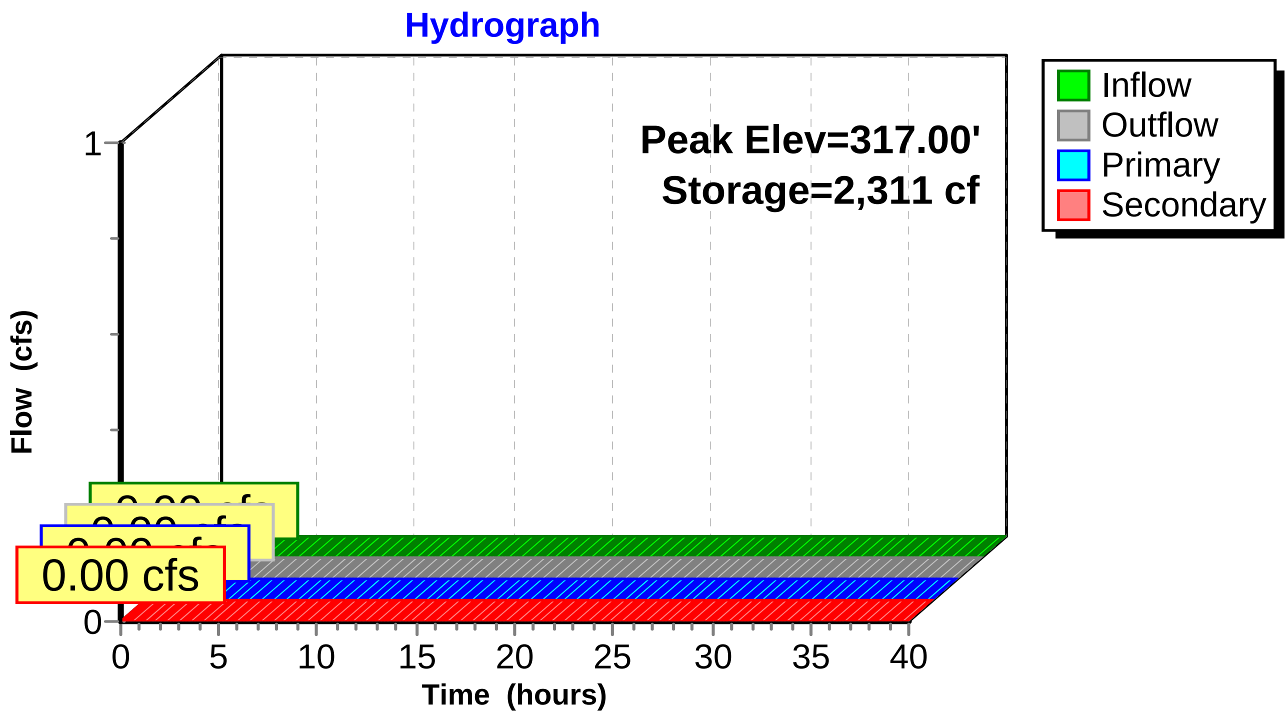
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
313.00	172	54.0	0	0	172
314.00	306	73.0	236	236	374
315.00	478	93.0	389	625	651
316.00	688	112.0	580	1,204	978
317.00	1,586	163.0	1,106	2,311	2,102

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 317.00' / 310.50' S= 0.0148 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	317.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	317.70'	**4.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	318.65'	**18.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	320.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	322.00'	**6.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=317.00' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=317.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: POCKET POND FOREBAY



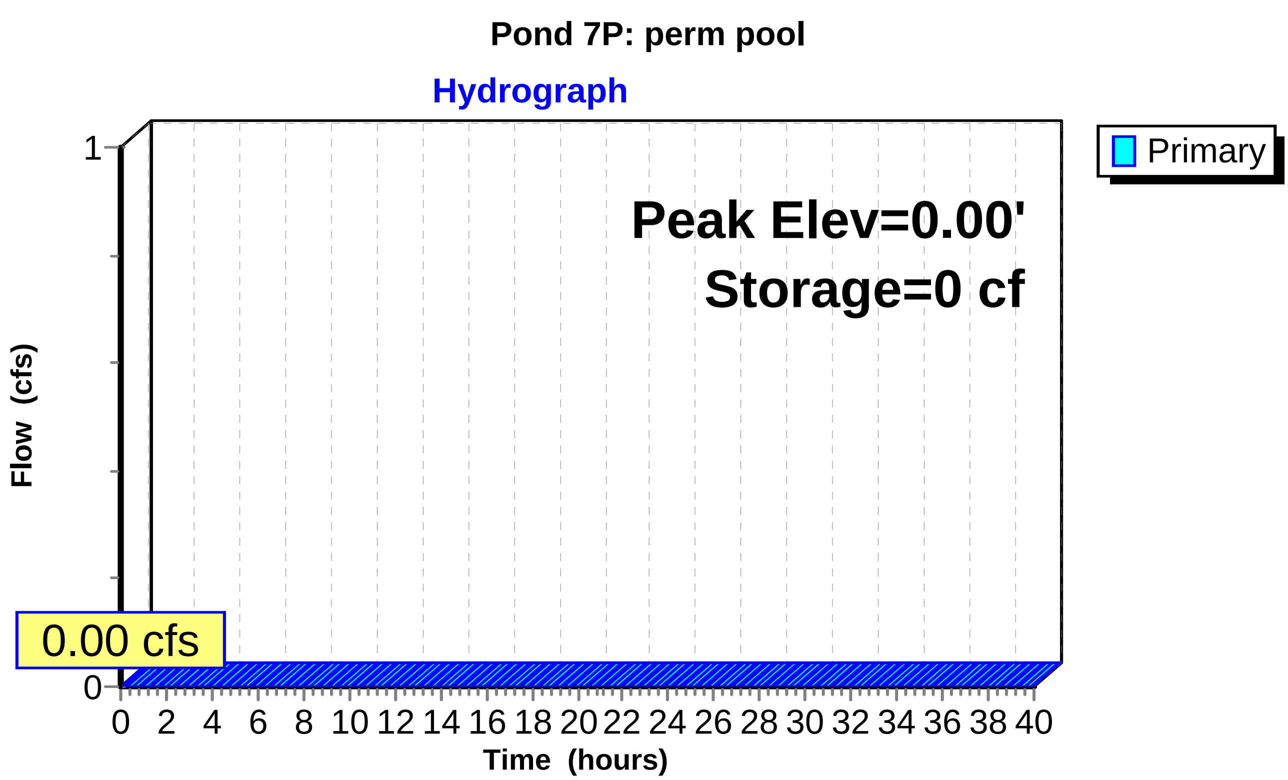
Summary for Pond 7P: perm pool

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	7,120 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
314.00	470	104.0	0	0	470
316.00	1,378	190.0	1,769	1,769	2,503
317.00	1,994	216.0	1,677	3,445	3,368
318.00	5,669	361.0	3,675	7,120	10,032

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	318.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑—**1=Culvert** (Controls 0.00 cfs)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)



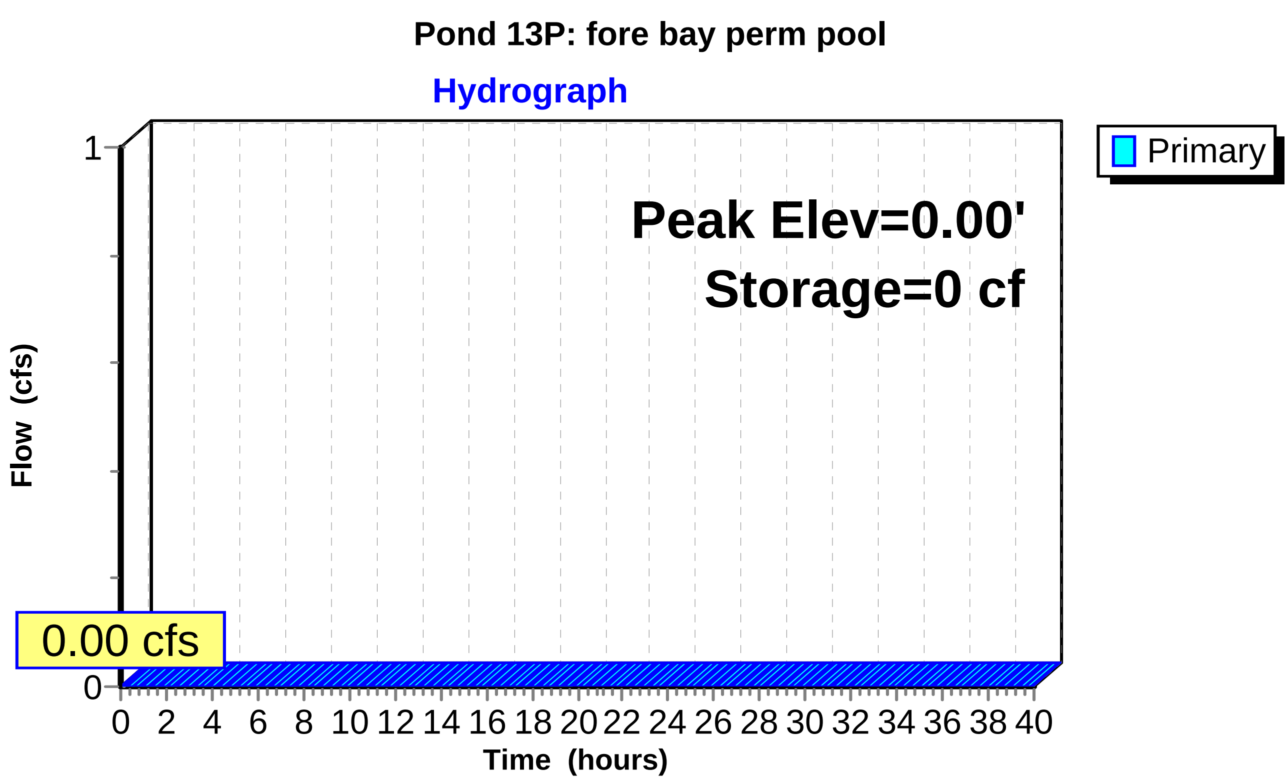
Summary for Pond 13P: fore bay perm pool

Volume	Invert	Avail.Storage	Storage Description
#1	314.00'	2,889 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
314.00	232	61.0	0	0	232
316.00	578	102.0	784	784	788
317.00	811	119.0	691	1,475	1,107
318.00	2,120	191.0	1,414	2,889	2,890

Device	Routing	Invert	Outlet Devices
#1	Primary	318.00'	**18.0" Round Culvert** L= 440.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 318.00' / 312.00' S= 0.0136 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	318.00'	**4.0" Vert. Orifice/Grate** C= 0.600

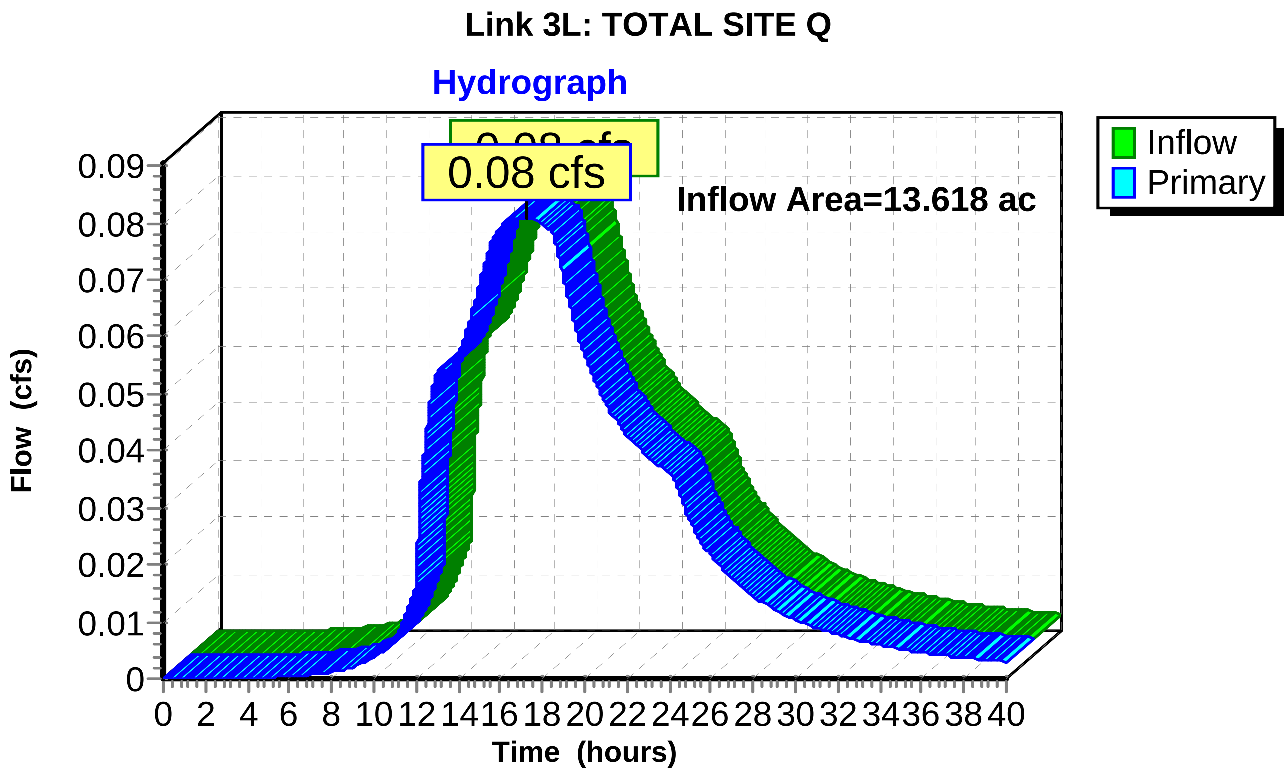
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
└**2=Orifice/Grate** (Controls 0.00 cfs)



Summary for Link 3L: TOTAL SITE Q

Inflow Area = 13.618 ac, 32.28% Impervious, Inflow Depth > 0.07" for WQv event
Inflow = 0.08 cfs @ 17.18 hrs, Volume= 0.075 af
Primary = 0.08 cfs @ 17.18 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

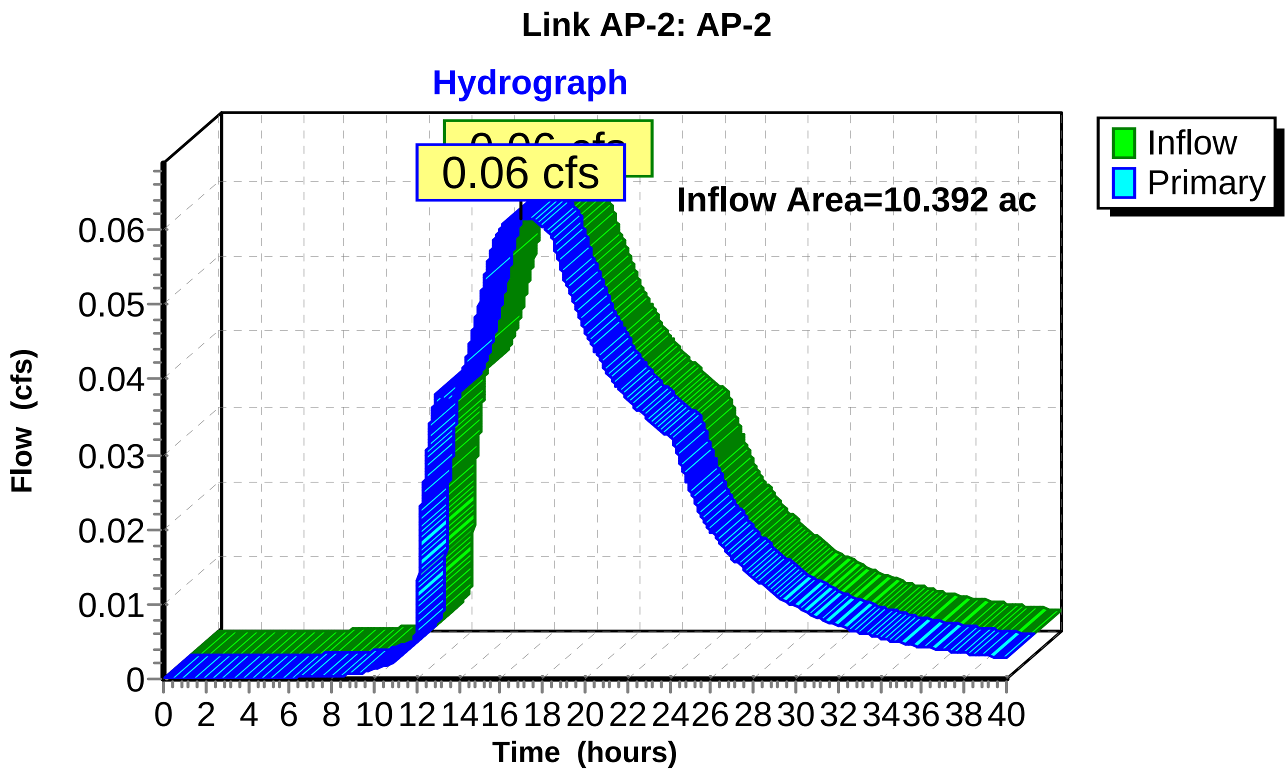
Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Summary for Link AP-2: AP-2

Inflow Area = 10.392 ac, 40.01% Impervious, Inflow Depth > 0.07" for WQv event
Inflow = 0.06 cfs @ 17.02 hrs, Volume= 0.059 af
Primary = 0.06 cfs @ 17.02 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min

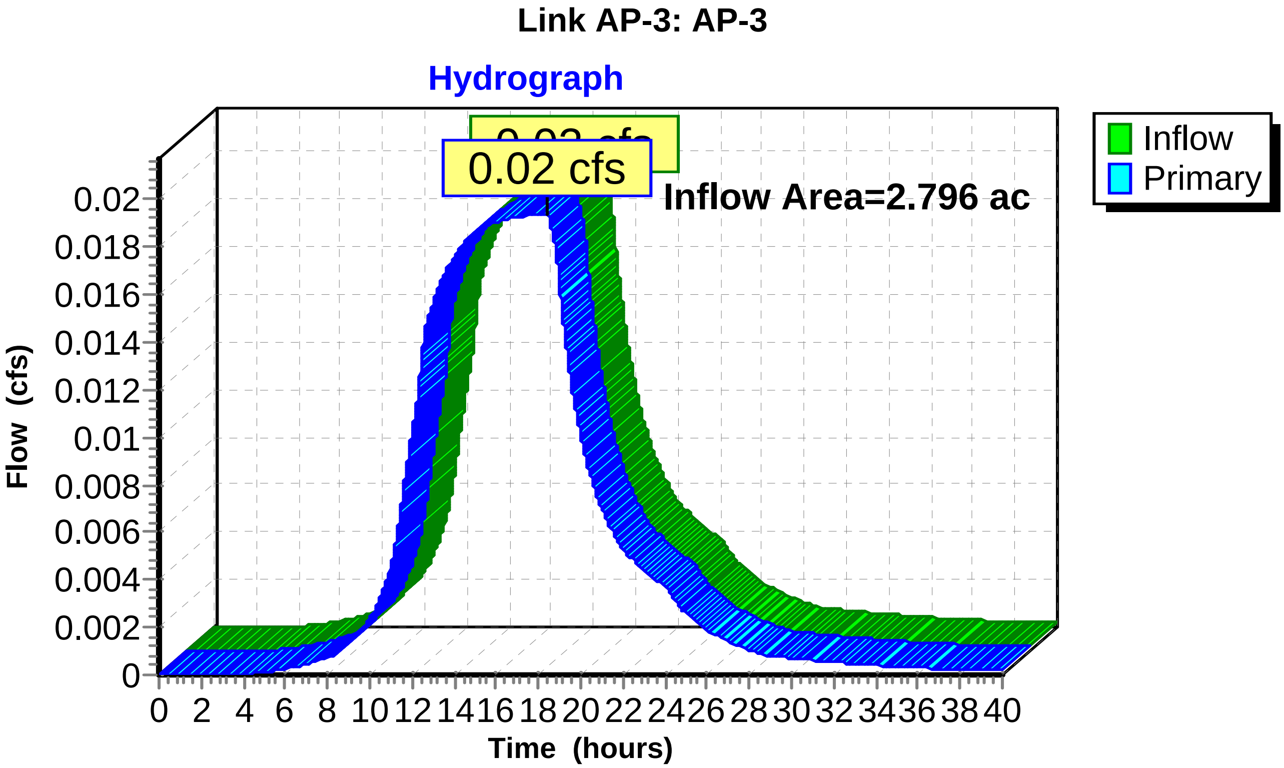
Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Summary for Link AP-3: AP-3

Inflow Area = 2.796 ac, 6.83% Impervious, Inflow Depth > 0.07" for WQv event
Inflow = 0.02 cfs @ 18.44 hrs, Volume= 0.016 af
Primary = 0.02 cfs @ 18.44 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

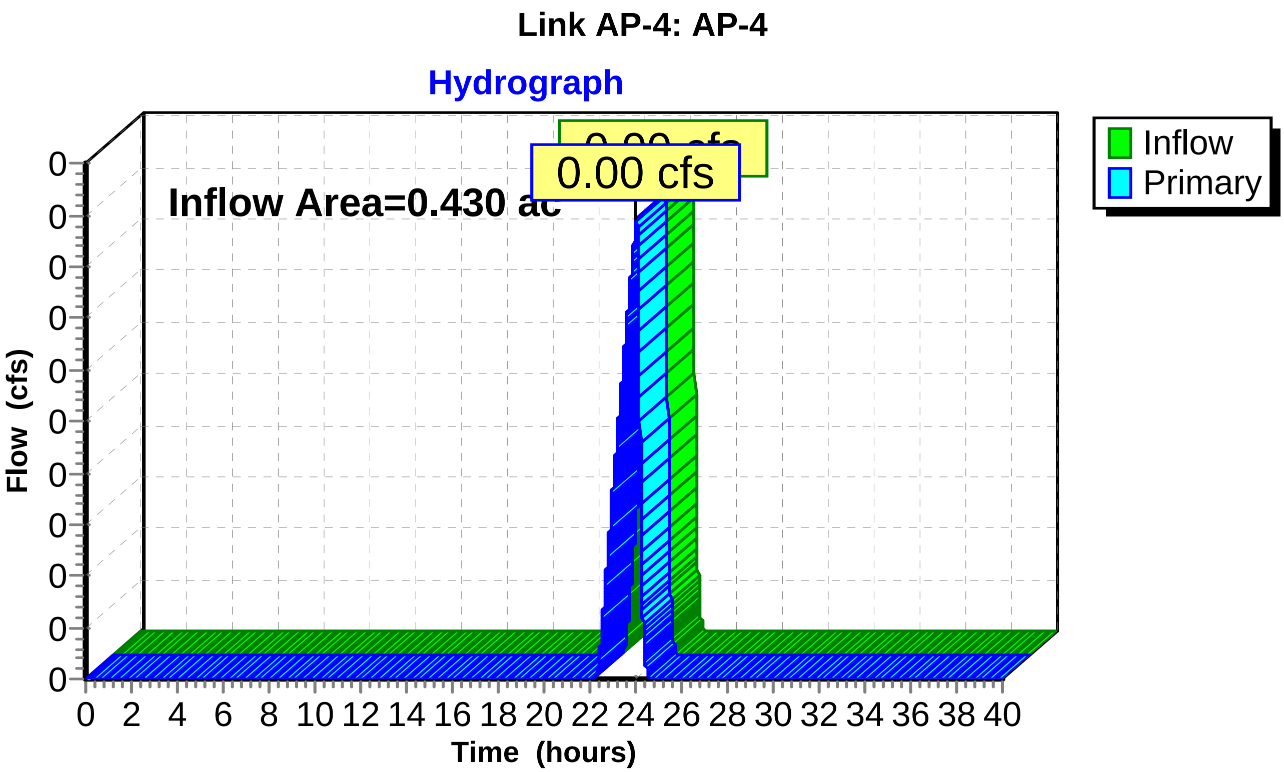
Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Summary for Link AP-4: AP-4

Inflow Area = 0.430 ac, 10.94% Impervious, Inflow Depth = 0.00" for WQv event
Inflow = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



Appendix E

BMP Specifications

STANDARD AND SPECIFICATIONS FOR DUST CONTROL

Definition

The control of dust resulting from land-disturbing activities.

Purpose

To prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the local permitting authority.

Construction Specifications

A. Non-driving Areas – These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. Driving Areas – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access routes.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geotextiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

All Stormwater Pollution Prevention Plans must contain the NYS DEC issued “Conditions for Use” and “Application Instructions” for any polymers used on the site. This information can be obtained from the NYS DEC website.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

STANDARD AND SPECIFICATIONS FOR LANDGRADING

Definition

Reshaping of the existing land surface in accordance with a plan as determined by engineering survey and layout.

Purpose

The purpose of a landgrading specification is to provide for erosion control and vegetative establishment on those areas where the existing land surface is to be reshaped by grading according to plan.

Design Criteria

The grading plan should be based upon the incorporation of building designs and street layouts that fit and utilize existing topography and desirable natural surrounding to avoid extreme grade modifications. Information submitted must provide sufficient topographic surveys and soil investigations to determine limitations that must be imposed on the grading operation related to slope stability, effect on adjacent properties and drainage patterns, measures for drainage and water removal, and vegetative treatment, etc.

Many counties have regulations and design procedures already established for land grading and cut and fill slopes. Where these requirements exist, they shall be followed.

The plan must show existing and proposed contours of the area(s) to be graded. The plan shall also include practices for erosion control, slope stabilization, safe disposal of runoff water and drainage, such as waterways, lined ditches, reverse slope benches (include grade and cross section), grade stabilization structures, retaining walls, and surface and subsurface drains. The plan shall also include phasing of these practices. The following shall be incorporated into the plan:

1. Provisions shall be made to safely conduct surface runoff to storm drains, protected outlets, or to stable water courses to ensure that surface runoff will not damage slopes or other graded areas; see standards and specifications for Grassed Waterway, Diversion, Grade Stabilization Structure.

2. Cut and fill slopes that are to be stabilized with grasses shall not be steeper than 2:1. When slopes exceed 2:1, special design and stabilization consideration are required and shall be adequately shown on the plans. (Note: Where the slope is to be mowed, the slope should be no steeper than 3:1, although 4:1 is preferred because of safety factors related to mowing steep slopes.)

3. Reverse slope benches or diversion shall be provided whenever the vertical interval (height) of any 2:1 slope exceeds 20 feet; for 3:1 slope it shall be increased to 30 feet and for 4:1 to 40 feet. Benches shall be located to divide the slope face as equally as possible and shall convey the water to a stable outlet. Soils, seeps, rock outcrops, etc., shall also be taken into consideration when designing benches.

   A. Benches shall be a minimum of six feet wide to provide for ease of maintenance.

   B. Benches shall be designed with a reverse slope of 6:1 or flatter to the toe of the upper slope and with a minimum of one foot in depth. Bench gradient to the outlet shall be between 2 percent and 3 percent, unless accompanied by appropriate design and computations.

   C. The flow length within a bench shall not exceed 800 feet unless accompanied by appropriate design and computations; see Standard and Specifications for Diversion on page 5B.1

4. Surface water shall be diverted from the face of all cut and/or fill slopes by the use of diversions, ditches and swales or conveyed downslope by the use of a designed structure, except where:

   A. The face of the slope is or shall be stabilized and the face of all graded slopes shall be protected from surface runoff until they are stabilized.

B. The face of the slope shall not be subject to any concentrated flows of surface water such as from natural drainage ways, graded swales, downspouts, etc.

C. The face of the slope will be protected by special erosion control materials, sod, gravel, riprap, or other stabilization method.

5. Cut slopes occurring in ripable rock shall be serrated as shown in Figure 5B.23 on page 5B.51. The serrations shall be made with conventional equipment as the excavation is made. Each step or serration shall be constructed on the contour and will have steps cut at nominal two-foot intervals with nominal three-foot horizontal shelves. These steps will vary depending on the slope ratio or the cut slope. The nominal slope line is 1 ½: 1. These steps will weather and act to hold moisture, lime, fertilizer, and seed thus producing a much quicker and longer-lived vegetative cover and better slope stabilization. Overland flow shall be diverted from the top of all serrated cut slopes and carried to a suitable outlet.

6. Subsurface drainage shall be provided where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet site conditions.

7. Slopes shall not be created so close to property lines as to endanger adjoining properties without adequately protecting such properties against sedimentation, erosion, slippage, settlement, subsidence, or other related damages.

8. Fill material shall be free of brush, rubbish, rocks, logs, stumps, building debris, and other objectionable material. It should be free of stones over two (2) inches in diameter where compacted by hand or mechanical tampers or over eight (8) inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill nor shall the fill material be placed on a frozen foundation.

9. Stockpiles, borrow areas, and spoil shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.

10. All disturbed areas shall be stabilized structurally or vegetatively in compliance with the Standard and Specifications for Critical Area Treatment in Section 3.

Construction Specifications

See Figures 5B.23 and 5B.24 for details.

1. All graded or disturbed areas, including slopes, shall be protected during clearing and construction in accordance with the erosion and sediment control plan until they are adequately stabilized.

2. All erosion and sediment control practices and measures shall be constructed, applied and maintained in accordance with the sediment control plan and the "New York Standards and Specifications for Erosion and Sediment Control."

3. Topsoil required for the establishment of vegetation shall be stockpiled in amount necessary to complete finished grading of all exposed areas.

4. Areas to be filled shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material.

5. Areas that are to be topsoiled shall be scarified to a minimum depth of four inches prior to placement of topsoil.

6. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence, or other related problems. Fill intended to support buildings, structures, and conduits, etc., shall be compacted in accordance with local requirements or codes.

7. All fill shall be placed and compacted in layers not to exceed 9 inches in thickness.

8. Except for approved landfills or nonstructural fills, fill material shall be free of frozen particles, brush, roots, sod, or other foreign objectionable materials that would interfere with, or prevent, construction of satisfactory fills.

9. Frozen material or soft, mucky or highly compressible materials shall not be incorporated into fill slopes or structural fills.

10. Fill shall not be placed on saturated or frozen surfaces.

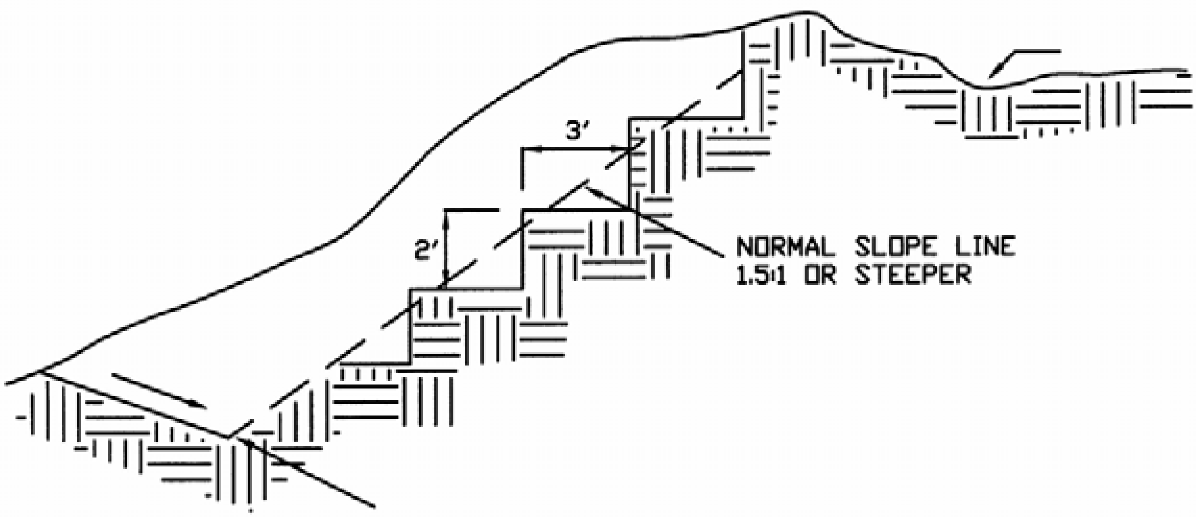
11. All benches shall be kept free of sediment during all phases of development.

12. Seeps or springs encountered during construction shall be handled in accordance with the Standard and Specification for Subsurface Drain on page 5B.44 or other approved methods.

13. All graded areas shall be permanently stabilized immediately following finished grading.

14. Stockpiles, borrow areas, and spoil areas shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.

Figure 5B.23
Typical Section of Serrated Cut Slope



ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

TYPICAL SECTION OF SERRATED CUT SLOPE

Figure 5B.24 (1)
Landgrading

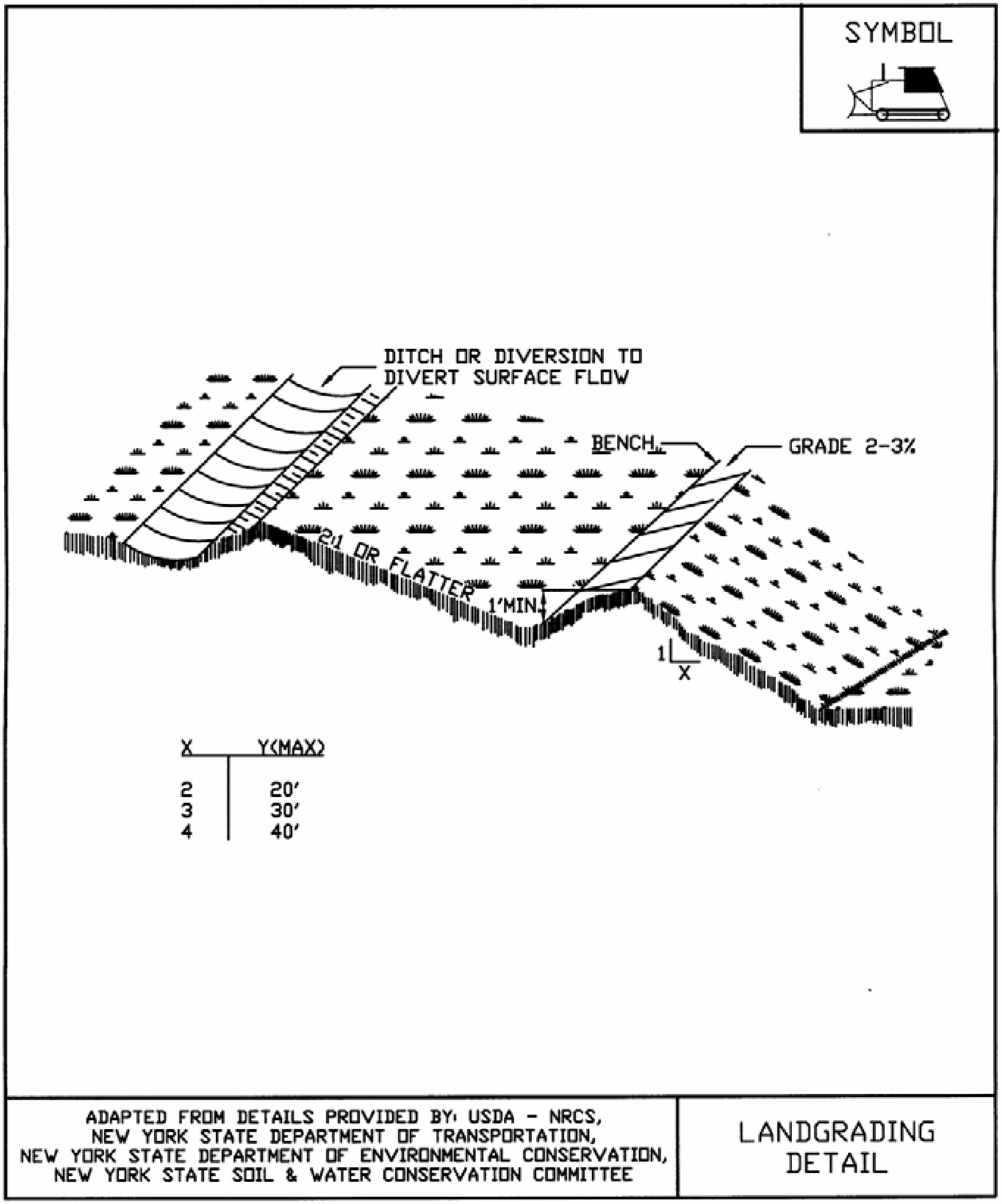


Figure 5B.24 (2)
Landgrading —Construction Specifications

CONSTRUCTION SPECIFICATIONS

1. ALL GRADED OR DISTURBED AREAS INC;UDING SLOPES SHALL BE PROTECTED DURING CLEARING AND CONSTRUCTION IN ACCORDANCE WITH THE APPROVED SEDIMENT CONTROL PLAN UNTIL THEY ARE PERMANENTLY STABILIZED.
2. ALL SEDIMENT CONTROL PRACTICES AND MEASURES SHALL BE CONSTRUCTED, APPLIED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED SEDIMENT CONTROL PLAN AND THE 'STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL IN DEVELOPING AREAS'.
3. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED IN AMOUNT NECESSARY TO COMPLETE FINISHED GRADING OF ALL EXPOSED AREAS.
4. AREAS TO BE FILLED SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL.
5. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF FOUR INCHES PRIOR TO PLACEMENT OF TOPSOIL.
6. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
7. ALL FILL TO BE PLACED AND COMPACTED IN LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
8. EXCEPT FOR APPROVED LANDFILLS, FILL MATERIAL SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OTHER OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
9. FROZEN MATERIALS OR SOFT, MUCKY OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED IN FILLS.
10. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
11. ALL BENCHES SHALL BE KEPT FREE OF SEDIMENT DURING ALL PHASES OF DEVELOPMENT.
12. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
13. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY FOLLOWING FINISHED GRADING.
14. STOCKPILES, BORROW AREAS AND SPOIL AREAS SHALL BE SHOWN ON THE PLANS AND SHALL BE SUBJECT TO THE PROVISIONS OF THIS STANDARD AND SPECIFICATION.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	LANDGRADING SPECIFICATIONS

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STANDARD AND SPECIFICATIONS FOR SURFACE ROUGHENING

Definition

Roughening a bare soil surface whether through creating horizontal grooves across a slope, stair-stepping, or tracking with construction equipment.

Purpose

To aid the establishment of vegetative cover from seed, to reduce runoff velocity and increase infiltration, and to reduce erosion and provide for trapping of sediment.

Conditions Where Practice Applies

All construction slopes require surface roughening to facilitate stabilization with vegetation, particularly slopes steeper than 3:1.

Design Criteria

There are many different methods to achieve a roughened soil surface on a slope. No specific design criteria is required. However, the selection of the appropriate method depends on the type of slope. Methods include tracking, grooving, and stair-stepping. Steepness, mowing requirements, and/or a cut or fill slope operation are all factors considered in choosing a roughening method.

Construction Specifications

A. Cut Slope, No mowing.

1. Stair-step grade or groove cut slopes with a gradient steeper than 3:1 (Figure 5B.25).
2. Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes of soft rock with some soil are particularly suited to stair-step grading.
3. Make the vertical cut distance less than the horizontal distance, and slightly slope the horizontal position of the "step" to the vertical wall.
4. Do not make vertical cuts more than 2 feet in soft materials or 3 feet in rocky materials.

Grooving uses machinery to create a series of ridges and depressions that run perpendicular to the slope following the contour. Groove using any appropriate implement that can be safely operated on the slope, such as disks, tillers, spring harrows, or the teeth of a front-end loader bucket. Do not make the grooves less than 3 inches deep or more than 15 inches apart.

B. Fill Slope, No mowing

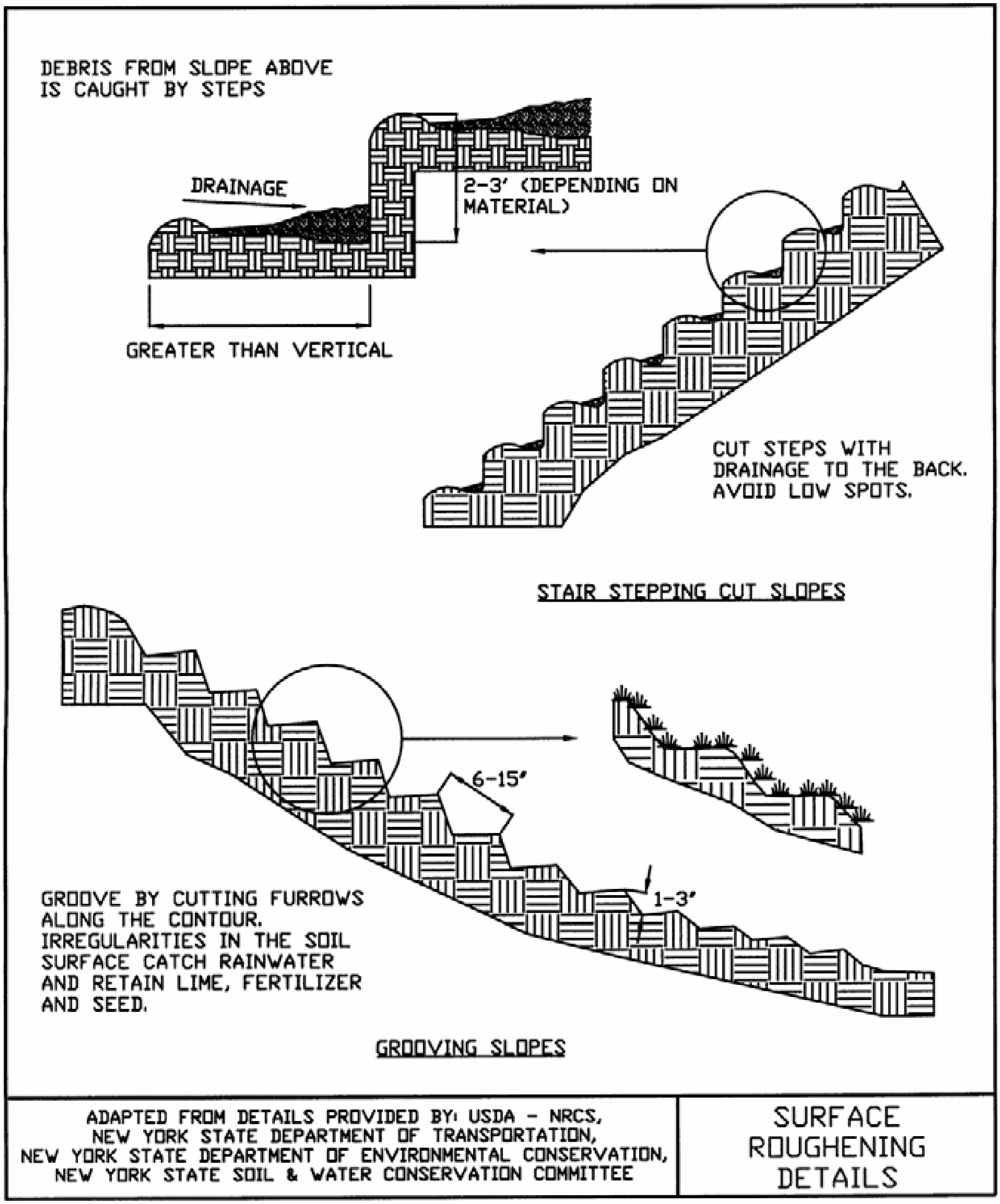
1. Place fill to create slopes with a gradient steeper than 3:1 in lifts 9 inches or less and properly compacted. Ensure the face of the slope consists of loose, uncompacted fill 4 to 6 inches deep. Use grooving as described above to roughen the slope, if necessary.
2. Do not blade or scrape the final slope face.

C. Cuts/Fills, Mowed Maintenance

1. Make mowed slopes no steeper than 3:1.
2. Roughen these areas to shallow grooves by normal tilling, disking, harrowing, or use of cultipacker-seeder. Make the final pass of such tillage equipment on the contour.
3. Make grooves at least 1 inch deep and a maximum of 10 inches apart.
4. Excessive roughness is undesirable where mowing is planned.

Tracking should be used primarily in sandy soils to avoid undue compaction of the soil surface. Tracking is generally not as effective as the other roughening methods described. (It has been used as a method to track down mulch.) Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.

Figure 5B.25
Surface Roughening



STANDARD AND SPECIFICATIONS FOR MULCHING

Definition

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface.

Purpose

The primary purpose is to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch is also used alone for temporary stabilization in non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 3.7
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/ yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	8” x 100” 2-sided plastic, 48” x 180” 1-sided plastic	—	—	Use without additional mulch. Excellent for seeding establishment. Tie down as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Compost	Up to 3” pieces, moderately to highly stable	3-9 cu. yds.	134-402 cu. yds.	1-3”	Coarser textured mulches may be more effective in reducing weed growth and wind erosion.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 3.8
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR PERMANENT CRITICAL AREA PLANTINGS

Definition

Establishing grasses with other forbs and/or shrubs to provide perennial vegetative cover on disturbed, denuded, slopes subject to erosion.

Purpose

To reduce erosion and sediment transport.

Conditions Where Practice Applies

This practice applies to all disturbed areas void of, or having insufficient, cover to prevent erosion and sediment transport. See additional standards for special situations such as sand dunes and sand and gravel pits.

Criteria

All water control measures will be installed as needed prior to final grading and seedbed preparation. Any severely compacted sections will require chiseling or disking to provide an adequate rooting zone, to a minimum depth of 12". The seedbed must be prepared to allow good soil to seed contact, with the soil not too soft and not too compact. Adequate soil moisture must be present to accomplish this. If surface is powder dry or sticky wet, postpone operations until moisture changes to a favorable condition. If seeding is accomplished within 24 hours of final grading, additional scarification is generally not needed, especially on ditch or stream banks. Remove all stones and other debris from the surface that are greater than 4 inches, or that will interfere with future mowing or maintenance.

Soil amendments should be incorporated into the upper 2 inches of soil when feasible. **The soil should be tested to determine the amounts of amendments needed.** Apply ground agricultural limestone to attain a pH of 6.0 in the upper 2 inches of soil. If soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 600 lbs. per acre of 5-10-10 or equivalent. If manure is used, apply a quantity to meet the nutrients of the above fertilizer. This requires an appropriate manure analysis prior to applying to the site. Do not use manure on sites to be planted with birdsfoot trefoil or in the path of concentrated water flow.

Seed mixtures may vary depending on location within the state and time of seeding. Generally, warm season grasses should only be seeded during early spring, April to May. These grasses are primarily used for vegetating excessively drained sands and gravels. See Standard and Specification for Sand and Gravel Mine Reclamation. Other grasses may be seeded any time of the year when the soil is not frozen and is workable. When legumes such as birdsfoot trefoil are included, spring seedings are preferred. See Table 3.1 "Permanent Critical Area Planting Mixture Recommendations" for additional seed mixtures.

General Seed Mix:
[1] add inoculant immediately prior to seeding

	Variety	lbs./acre	lbs/1000 sq. ft.
Birdsfoot trefoil[1] OR	Empire/Pardee	8[2]	0.20
Common white clover[1]	Common	8	0.20
PLUS			
Tall fescue	KY-31/Rebel	20	0.45
PLUS			
Redtop OR	Common	2	0.05
Ryegrass (perennial)	Pennfine/Linn	5	0.10

[2] Mix 4 lbs each of Empire and Pardee OR 4 lbs of Birdsfoot and 4 lbs white clover per acre.

Time of Seeding: The optimum timing for the general seed mixture is early spring. Permanent seedings may be made any time of year if properly mulched and adequate moisture is provided. Late June through early August is not a good time to seed, but may facilitate covering the land without additional disturbance if construction is completed. Portions of the seeding may fail due to drought and heat. These areas may need reseeding in late summer/fall or the following spring.

Method of seeding: Broadcasting, drilling, cultipack type seeding, or hydroseeding are acceptable methods. Proper soil to seed contact is key to successful seedings.

Mulching: Mulching is essential to obtain a uniform stand of seeded plants. Optimum benefits of mulching new seedings are obtained with the use of small grain straw applied at a rate of 2 tons per acre, and anchored with a netting or tackifier. See the mulch standard and specification for choices and requirements.

Irrigation: Watering may be essential to establish a new seeding when a drought condition occurs shortly after a new seeding emerges. Irrigation is a specialized practice and care must be taken not to exceed the application rate for the soil or subsoil. When disconnecting irrigation pipe, be sure pipes are drained in a safe manor, not creating an erosion concern.

Table 3.1
Permanent Critical Area Planting Mixture Recommendations

Seed mixture	Variety	Rate in lbs. per acre	Rate in lbs. Per 1000 sq. ft.
Mix #1			
Creeping red fescue	Ensylva, Pennlawn, Boreal	10	.25
Perennial ryegrass	Pennfine, Linn	10	.25

*This mix is used extensively for shaded areas.

Mix #2

Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	20	.5

*This rate is in pure live seed, this would be an excellent choice along the upland edge of a wetland to filter runoff and provide wildlife benefits. In areas where erosion may be a problem, a companion seeding of sand lovegrass should be added to provide quick cover at a rate of 2 lbs. per acre (0.05 lbs. per 1000 sq. ft.).

Mix #3

Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	4	.1
Big bluestem	Niagara	4	.1
Little bluestem	Aldous or Camper	2	.05
Indiangrass	Rumsey	4	.1
Coastal panicgrass	Atlantic	2	.05
Sideoats grama	El Reno or Trailway	2	.05
Wildflower mix		.5	.01

*This mix has been successful on sand and gravel plantings. It is very difficult to seed without a warm season grass seeder such as a Truax seed drill. Broadcasting this seed is very difficult due to the fluffy nature of some of the seed, such as bluestems and indiangrass.

Mix #4

Switchgrass	Shelter, Pathfinder Trailblazer, or Blackwell	10	.25
Coastal panicgrass	Atlantic	10	.25

*This mix is salt tolerant, a good choice along the upland edge of tidal areas and roadsides.

Mix #5

Saltmeadow cordgrass (Spartina patens)—This grass is used for tidal shoreline protection and tidal marsh restoration. It is planted by vegetative stem divisions.

'Cape' American beachgrass can be planted for sand dune stabilization above the saltmeadow cordgrass zone.

Mix #6

Creeping red fescue	Ensylva, Pennlawn, Boreal	20	.45
Tall fescue	KY 31, Rebel	20	.45
Perennial ryegrass	Pennfine, Linn	5	.10
Birdsfoot trefoil	Empire, Pardee	10	.45

*General purpose erosion control mix. Not to be used for a turf planting or play grounds.

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence placed on a slope are:

Slope Steepness	Maximum Length (ft.)
2:1	25
3:1	50
4:1	75
5:1 or flatter	100

2. Maximum drainage area for overland flow to a silt fence shall not exceed ¼ acre per 100 feet of fence, with maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff. All silt fences shall be placed as close to the areas as possible, but at least 10 feet from the toe of a slope to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

Sensitive areas to be protected by silt fence may need to be reinforced by using heavy wire fencing for added support to prevent collapse.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. A detail of the silt fence shall be shown on the plan.
See Figure 5A.8 on page 5A.21 for details.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682

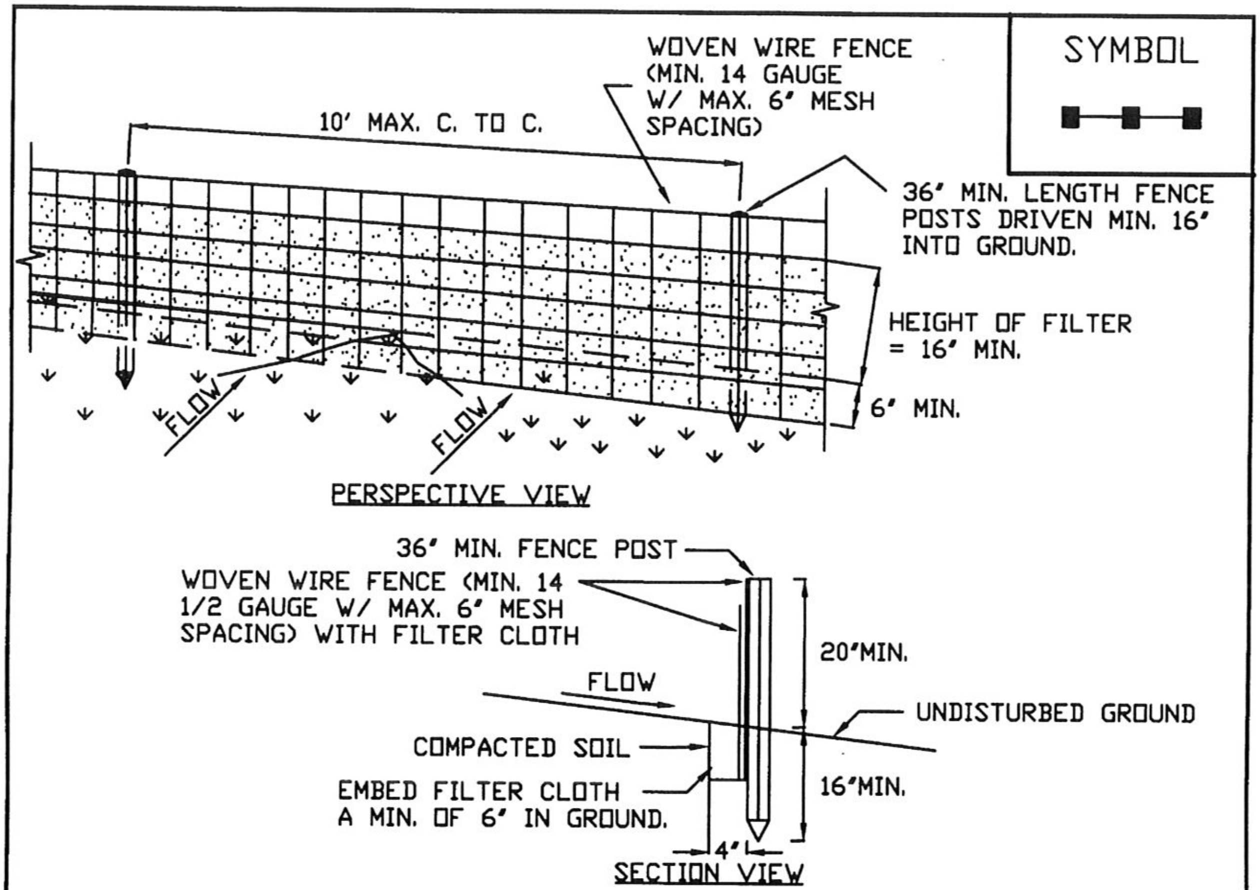
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated Units: Envirofence, Geofab, or approved equal, may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.8.

Figure 5A.8
Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	SILT FENCE

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ENTRANCE

Definition

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area.

Purpose

The purpose of stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction entrance shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 5A.35 on page 5A.76 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile

The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Brust Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 modified
Equivalent Opening Size	40-80	40-80	US Std Sieve CW-02215
Aggregate Depth	6	10	--

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

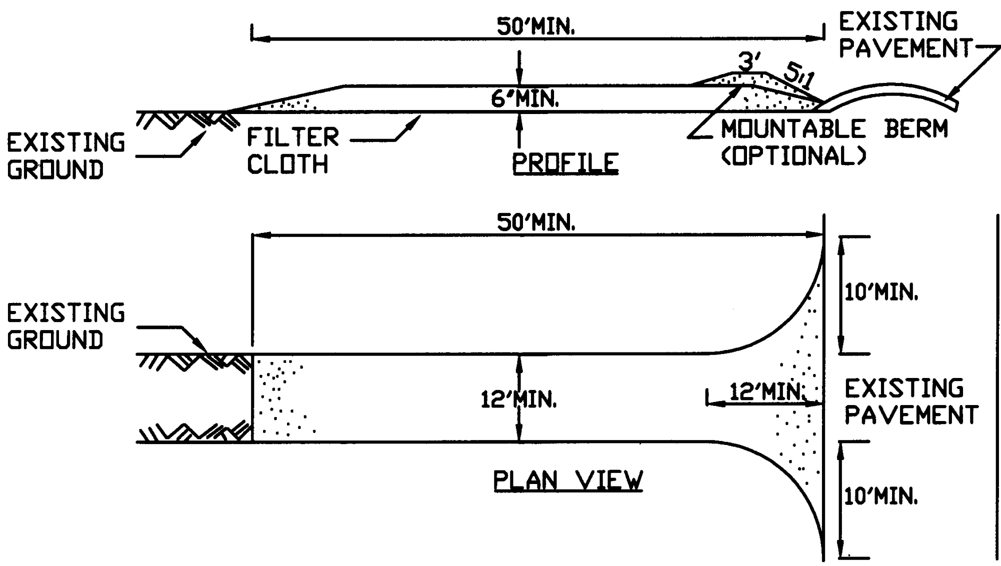
Maintenance

The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 5A.35
Stabilized Construction Entrance

SYMBOL



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACTED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STABILIZED CONSTRUCTION ENTRANCE

STANDARD AND SPECIFICATIONS FOR TOPSOILING

Definition

Spreading a specified quality and quantity of topsoil materials on graded or constructed subsoil areas.

Purpose

To provide acceptable plant cover growing conditions, thereby reducing erosion; to reduce irrigation water needs; and to reduce the need for nitrogen fertilizer application.

Conditions Where Practice Applies

Topsoil is applied to subsoils that are droughty (low available moisture for plants), stony, slowly permeable, salty or extremely acid. It is also used to backfill around shrub and tree transplants. This standard does not apply to wetland soils.

Design Criteria

1. Preserve existing topsoil in place where possible, thereby reducing the need for added topsoil.

2. Conserve by stockpiling topsoil and friable fine textured subsoils that must be stripped from the excavated site and applied after final grading where vegetation will be established.

3. Refer to USDA Soil Conservation Service (presently Natural Resource Conservation Service) soil surveys or soil interpretation record sheets for further soil texture information for selecting appropriate design topsoil depths.

Site Preparation

1. As needed, install erosion control practices such as diversions, channels, sediment traps, and stabilizing measures, or maintain if already installed.

2. Complete rough grading and final grade, allowing for depth of topsoil to be added.

3. Scarify all compact, slowly permeable, medium and fine textured subsoil areas. Scarify at approximately right angles to the slope direction in soil areas that are steeper than 5 percent. Areas that have been overly compacted shall be decompacted to a minimum depth of 12 inches with a deep ripper or chisel plow prior to topsoiling.

4. Remove refuse, woody plant parts, stones over 3 inches in diameter, and other litter.

Topsoil Materials

1. Topsoil shall have at least 6 percent by weight of fine textured stable organic material, and no greater than 20 percent. Muck soil shall not be considered topsoil.

2. Topsoil shall have not less than 20 percent fine textured material (passing the NO. 200 sieve) and not more than 15 percent clay.

3. Topsoil treated with soil sterilants or herbicides shall be so identified to the purchaser.

4. Topsoil shall be relatively free of stones over 1 1/2 inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and will have less than 10 percent gravel.

5. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

Application and Grading

1. Topsoil shall be distributed to a uniform depth over the area. It shall not be placed when it is partly frozen, muddy, or on frozen slopes or over ice, snow, or standing water puddles.

2. Topsoil placed and graded on slopes steeper than 5 percent shall be promptly fertilized, seeded, mulched, and stabilized by "tracking" with suitable equipment.

3. Apply topsoil in the following amounts:

Site Conditions	Intended Use	Minimum Topsoil Depth
1. Deep sand or loamy sand	Mowed lawn Tall legumes, unmowed Tall grass, unmowed	6 in. 2 in. 1 in.
2. Deep sandy loam	Mowed lawn Tall legumes, unmowed Tall grass, unmowed	5 in. 2 in. none
3. Six inches or more: silt loam, loam, or silt	Mowed lawn Tall legumes, unmowed Tall grass, unmowed	4 in. 1 in. 1 in.

STANDARD AND SPECIFICATIONS FOR WINTER STABILIZATION

Definition & Scope

A temporary site specific, enhanced erosion and sediment control plan to manage runoff and sediment at the site during construction activities in the winter months to protect off-site water resources.

Conditions Where Practice Applies

This standard applies to all construction activities involved with ongoing land disturbance and exposure between November 15th to the following April 1st.

Design Criteria

1. Prepare a snow management plan with adequate storage for snow and control of melt water, requiring cleared snow to be stored in a manner not affecting ongoing construction activities.

2. Enlarge and stabilize access points to provide for snow management and stockpiling. Snow management activities must not destroy or degrade installed erosion and sediment control practices.

3. A minimum 25 foot buffer shall be maintained from all perimeter controls such as silt fence. Mark silt fence with tall stakes that are visible above the snow pack.

4. Edges of disturbed areas that drain to a waterbody within 100 feet will have 2 rows of silt fence, 5 feet apart, installed on the contour.

5. Drainage structures must be kept open and free of snow and ice dams. All debris, ice dams, or debris from plowing operations, that restrict the flow of runoff and meltwater, shall be removed.

6. Sediment barriers must be installed at all appropriate perimeter and sensitive locations. Silt fence and other practices requiring earth disturbance must be installed before the ground freezes.

7. Soil stockpiles must be protected by the use of established vegetation, anchored straw mulch, rolled stabilization matting, or other durable covering. A barrier must be installed at least 15 feet from the toe of the stockpile to prevent soil migration and to capture loose soil.

8. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures should be initiated by the end of the next business day and completed within three (3) days. Rolled erosion control blankets must be used on all slopes 3 horizontal to 1 vertical or steeper.

9. If straw mulch alone is used for temporary stabilization, it shall be applied at double the standard rate of 2 tons per acre, making the application rate 4 tons per acre. Other manufactured mulches should be applied at double the manufacturer's recommended rate.

10. To ensure adequate stabilization of disturbed soil in advance of a melt event, areas of disturbed soil should be stabilized at the end of each work day unless:

    a. work will resume within 24 hours in the same area and no precipitation is forecast or;

    b. the work is in disturbed areas that collect and retain runoff, such as open utility trenches, foundation excavations, or water management areas.

11. Use stone paths to stabilize access perimeters of buildings under construction and areas where construction vehicle traffic is anticipated. Stone paths should be a minimum 10 feet in width but wider as necessary to accommodate equipment.

Maintenance

The site shall be inspected frequently to ensure that the erosion and sediment control plan is performing its winter stabilization function. If the site will not have earth disturbing activities ongoing during the "winter season", **all** bare exposed soil must be stabilized by established vegetation, straw or other acceptable mulch, matting, rock, or other approved material such as rolled erosion control products. Seeding of areas with mulch cover is preferred but seeding alone is not acceptable for proper stabilization.

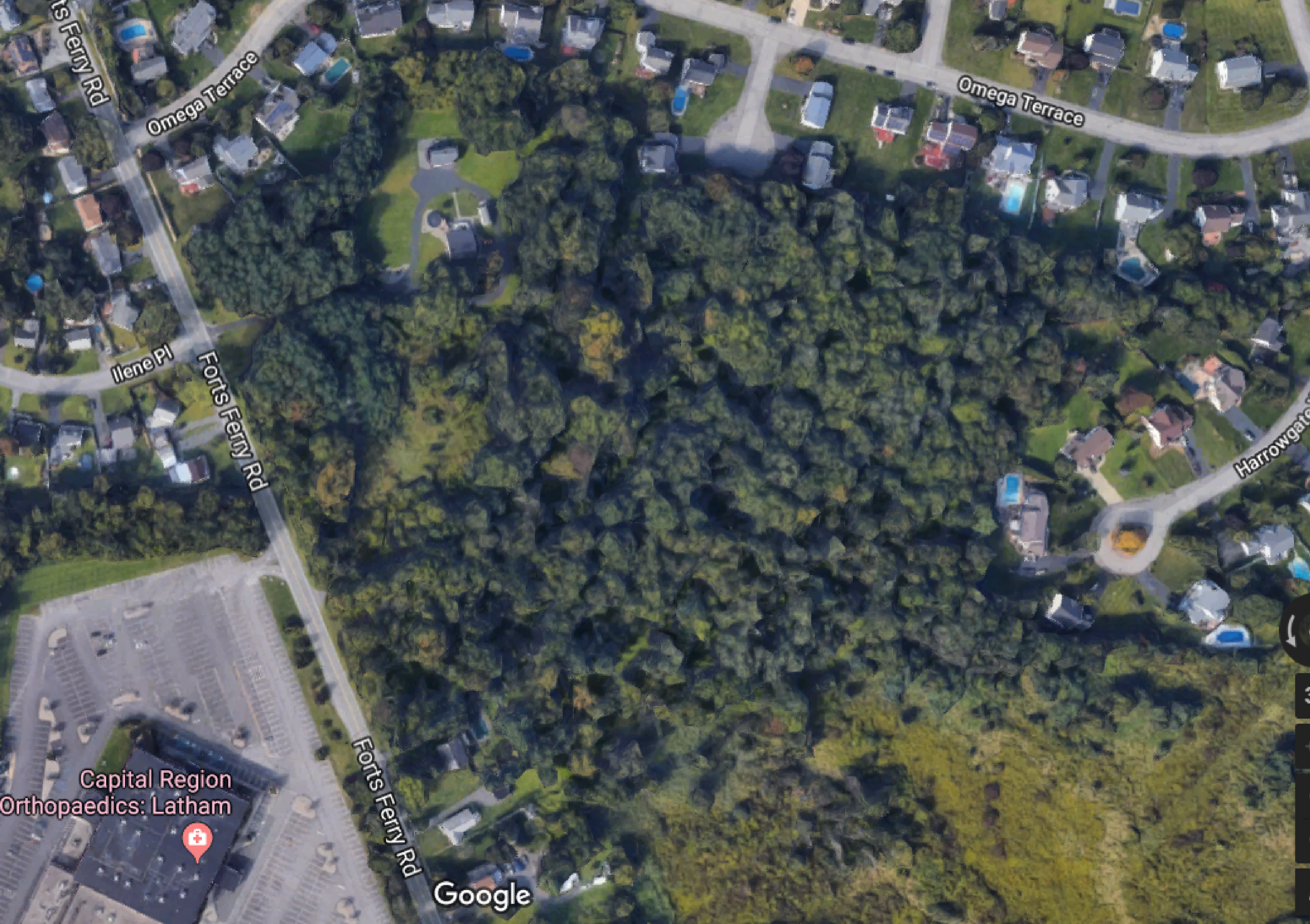
Compliance inspections must be performed and reports filed properly in accordance with the SWPPP for all sites under a winter shutdown.

References

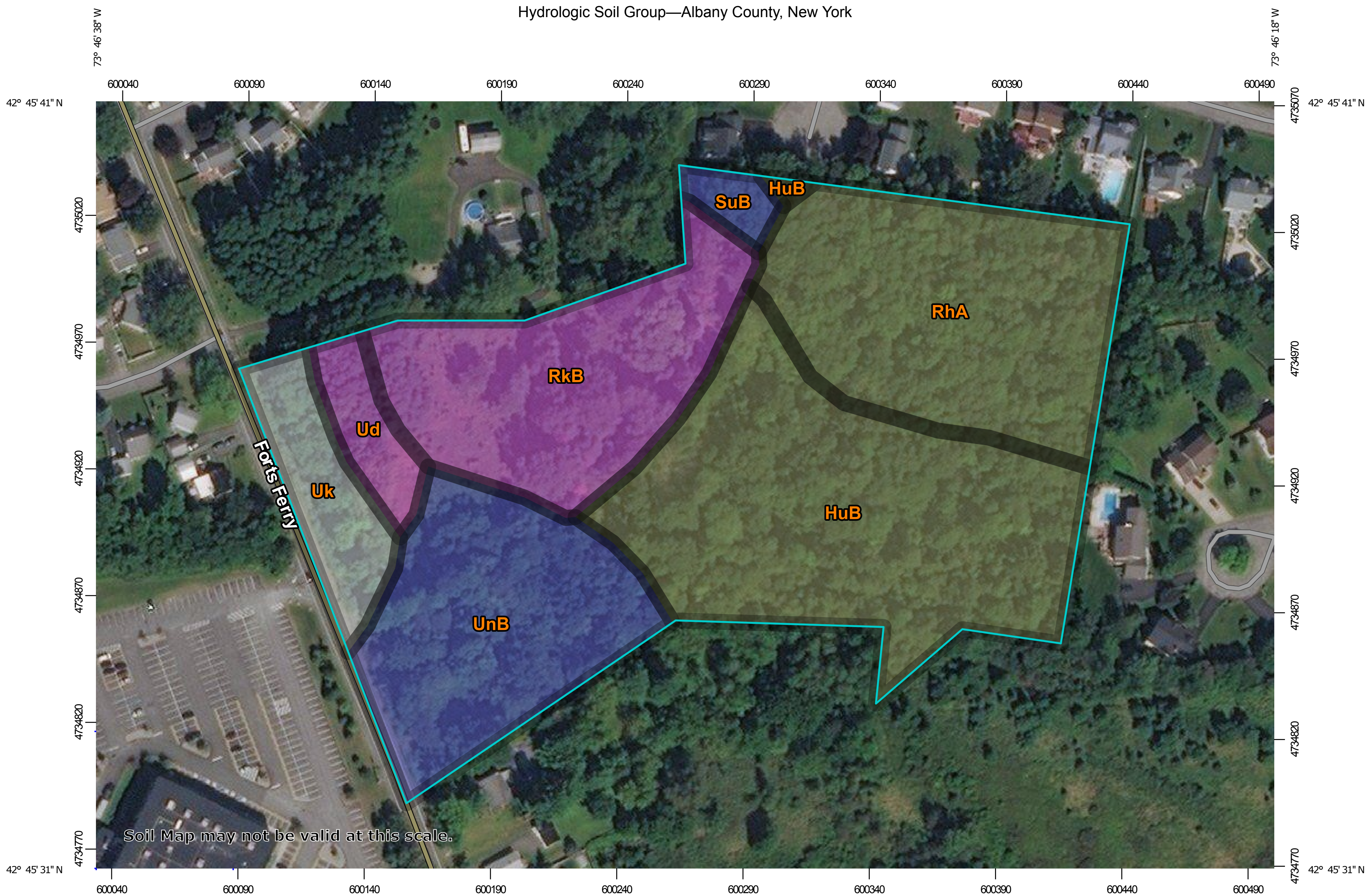
1. Northeastern Illinois Soil and Sedimentation Control Steering Committee. October 1981. Procedures and Standards for Urban Soil Erosion and Sediment Control in Illinois.
2. J.F. Rushing, V.M. Moore, J.S. Tingle, Q. Mason, and T. McCaffery, 2005. Dust Abatement Methods for Lines of Communication and Base Camps in Temperate Climates. ERDC/GSL TR-05-23, October 2005.

Appendix F

Correspondence and Documentation


Forts Ferry Rd
Omega Terrace
Omega Terrace
Ilene Pl
Forts Ferry Rd
Harrowgate
Capital Region
Orthopaedics: Latham
Forts Ferry Rd
Google

Hydrologic Soil Group—Albany County, New York



Map Scale: 1:2,130 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 30, 60, 120, 180

Feet: 0, 100, 200, 400, 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Albany County, New York
Survey Area Data: Version 15, Oct 8, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 10, 2015—Mar 29, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
HuB	Hudson silt loam, 3 to 8 percent slopes	C/D	4.0	30.9%
RhA	Rhinebeck silty clay loam, 0 to 3 percent slopes	C/D	2.9	22.5%
RkB	Riverhead fine sandy loam, 3 to 8 percent slopes	A	2.4	18.1%
SuB	Sudbury fine sandy loam, 3 to 8 percent slopes	B	0.2	1.5%
Ud	Udipsamments, smoothed	A	0.4	3.3%
Uk	Udorthents, loamy-Urban land complex		0.8	5.9%
UnB	Unadilla silt loam, 3 to 8 percent slopes	B	2.3	17.7%
Totals for Area of Interest			**13.0**	**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

DEPARTMENT OF THE ARMY
US Army Corps of Engineers, ATTN: CENAN-OP-RU
Upstate Regulatory Field Office
1 Buffington St., Building 10, 3rd Fl. North
Watervliet, New York 12189-4000

DEC 17 2015

Upstate New York Section

SUBJECT: Permit Application Number NAN-2015-00975-UDA
by the NIGRO Group
Town of Colonie, Albany County, New York

Frank Nigro
The NIGRO Group
18 Computer Drive East, Suite 201
Albany, New York 12205

Dear Mr. Nigro:

On August 4, 2015, the New York District of the U.S. Army Corps of Engineers received a request for a Department of the Army jurisdictional determination for a 13.1 acre site, currently owned by the Phyllis Mooney and Timothy Kellerher. This request was made by VHB as consultant for the NIGRO Group. The site is located in the Mohawk River watershed, along Forts Ferry Road, in the Town of Colonie, Albany County, New York.

The submittal received by this office on August 4, 2015, included a proposed delineation of the extent of potential waters of the United States within the project boundary. A site inspection was conducted by a representative of this office on August 23, 2015, in which it was agreed that additional information was necessary to continue the processing of the jurisdictional determination request. On September 14, 2015, and October 6, 2015, this office received the requested information.

Based on the material submitted, including the drawing entitled "The Summit at Forts Ferry, 33 and 45 Forts Ferry Road, Town of Colonie, Albany County, New York, Natural Resources Map", prepared by VHB, dated August 3, 2015, and last revised September 10, 2015, and the observations of the representative of this office during the site inspection, it has been determined that based on the U.S. Supreme Court decision (Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, No. 99-1178, January 9, 2001), the wetland shown on the above referenced drawing does not meet the current criteria of waters of the United States under Section 404 of the Clean Water Act. This area is identified as W1, and consists of a total of 0.78 acres of wetland. The Court ruled that isolated, intrastate waters can no longer be considered waters of the United States, based solely upon their use by migratory birds.

This determination regarding the delineation shall be considered valid for a period of five years from the date of this letter unless new information warrants revision of the determination before the expiration date.

This determination was documented using the Approved Jurisdictional Determination Form, promulgated by the Corps of Engineers in June 2007. A copy of that document is enclosed with this letter, and will be posted on the New York District website at:

http://www.nan.usace.army.mil/Missions/Regulatory/JurisdictionalDeterminations.aspx

This determination has been conducted to identify the limits of the Corps Clean Water Act jurisdiction for the particular site identified in this request. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed is a combined Notification of Appeal Process (NAP) and Request For Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the North Atlantic Division Office at the following address:

James W. Haggerty, Regulatory Program Manager
North Atlantic Division, U.S. Army Engineer Division
Fort Hamilton Military Community
General Lee Avenue, Building 301
Brooklyn, New York 11252-6700

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by _________________. It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

These determinations may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

It is strongly recommended that the development of the site be carried out in such a manner as to avoid as much as possible the discharge of dredged or fill material into the delineated waters of the United States. If the activities proposed for the site involve such discharges, authorization from this office may be necessary prior to the initiation of the proposed work. The extent of such discharge of fill will determine the level of authorization that would be required.

In order for us to better serve you, please complete our Customer Service Survey located at:

http://www.nan.usace.army.mil/Missions/Regulatory/CustomerSurvey.aspx

If any questions should arise concerning this matter, please contact Andrew Dangler, of my staff, at (518) 266-6355.

Sincerely,

Amy L. Gitchell
Chief, Upstate New York Section

Enclosures

cc: J. Eldred - NYSDEC, Region 4, Schenectady
Town of Colonie
E. Reeves – VHB
T. Kellerher
P. Mooney

Appendix G

Construction Log Book/Forms

Contractor/Subcontractor SPDES Permit Certification

Description: ____

Town, Village, City: ____

County: ____

Check Applicable Box: ☐ Prime Contractor ☐ Subcontractor

Name of Contractor/
Subcontractor: ____

Address: ____

City: ______________________________ State: __________ ZIP: __________

Phone: ____________________________ Fax: ____________________________

Mandatory Certification: The SPEDS General Permit for Stormwater Discharges from Construction Activities (Permit No. GP-0-10-001) requires the Prime Contractor (and subcontractors) to certify they understand the Stormwater Pollution Prevention Plan (SWPPP), the General Permit conditions, and their responsibilities for compliance. The certification must be signed prior to performing any contract work. The certification shall be signed by an Owner, Principal, President, Secretary or Treasurer of the Firm.

> "*I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System (SPDES) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.*"

Signature: ________________________________ Date: ________________________

Name: ________________________________ Title: ________________________

Effective April 30, 2010, the SPDES General Permit also requires the Prime Contractor to identify at least one trained individual who will be responsible for implementing the SWPPP and who shall be on-site on a daily basis when soil disturbance activities are being performed. (Prior training is not required if the trained individual is a licensed Professional Engineer, licensed Landscape Architect, or CPESC.) Provide the name and title of the trained individual who will be on-site and responsible for SWPPP implementation on this Contract:

Name/Title of Trained Individual: ____

Name of Training Course: ____

Training Provider: ____

Date of Training: ____

Contractor/Subcontractor SPDES Permit Certification

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County: ____

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Name/Title of Trained Individual: ____

Name of Training Course: ____

Training Provider: ____

Date of Training: ____

REVIEW AGENCY INSPECTION CHECKLIST

Refer to additional regulation in site specific SWPPP

GENERAL PROJECT INFORMATION

<table>
<tr><td>Date of Inspection</td><td colspan="3"></td></tr>
<tr><td>Name and Title of Person performing inspection</td><td colspan="3"></td></tr>
<tr><td>Signature of Inspector</td><td colspan="3"></td></tr>
<tr><td rowspan="4">Weather Condition</td><td>Temperature:</td><td colspan="2"></td></tr>
<tr><td rowspan="3">Weather Condition:</td><td></td><td>Clear</td></tr>
<tr><td></td><td>Rain</td></tr>
<tr><td></td><td>Snow</td></tr>
<tr><td rowspan="3">Soil Condition</td><td></td><td colspan="2">Saturated</td></tr>
<tr><td></td><td colspan="2">Wet</td></tr>
<tr><td></td><td colspan="2">Dry</td></tr>
</table>

Erosion Control Practice:	**Condition:**	**Remarks:**
Temporary Swale		
Tree and Vegetation Barrier		
Check Dams		
Dust Control		
Topsoiling		
Silt Fence		
Rock Outlet Protection		
Land Grading		
Surface Roughening		
Mulching		
Stabilized Construction Entrance		
Sediment Trap		
Stockpiles		
Stormwater Management Practice:	**Condition:**	**Remarks:**
Rock Outlet Protection		
Bio-retention basins		
Basins		
Basin outfalls		

SITE INSPECTION LOG

Qualified Inspector shall conduct a site inspection at least once every seven (7) calendar days.

Refer to additional regulation - SPDES General Permit

GENERAL PROJECT INFORMATION

Date of Inspection		
Name and Title of Person performing inspection		
Signature of Inspector		
Weather Condition	Temperature:	
	Weather Condition:	☐ Clear
		☐ Rain
		☐ Snow
Soil Condition	☐ Saturated	
	☐ Wet	
	☐ Dry	
Description of Runoff At Point of Discharge		

EROSION AND SEDIMENT CONTROL OBSERVATIONS: DATE________________

Part of Plan Y/N	Need Action	Photo	Control Practices in need of repair;	Comments	Number of Acres Disturbed:
			Silt Fence		
			Inlet Protection		
			Mulching		
			Permanent Seeding		
			Temporary Check Dam		
			Temporary Sediment Basin		
			Diversion Swales		

STORMWATER MANAGEMENT PRACTICES:
DATE________________

Part of Plan Y/N	Need Action	Photo	Control Practices in need of repair;	Comments
			Infiltration Basin 1	
			Inlet Structure	
			Infiltration Basin 2	
			Inlet Structure	
			Infiltration Basin 3	
			Inlet Structure	
			Plunge Pools	
			Swale (Dry or wet)	
			Rock Inlet Protection	
			Closed Drainage System	
			Final Grading and Seeding	

Notes:

Permit Compliance Forms

CORRECTIVE ACTION LOG

SWPPP Contact:________________________________

Inspection Date	Inspector Name(s), Title	Description of BMP Deficiency	Corrective Action Needed (including planned date/ responsible person)	Date Action Taken Responsible Party

Permit Compliance Forms

SWPPP Change / Update Log

SWPPP Contact:________________________________

Amendment No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Sample

Construction Stormwater Inspection Manual

Primarily for Government Inspectors Evaluating Compliance with Construction Stormwater Control Requirements

New York State
Department of Environmental Conservation

TABLE OF CONTENTS

Version 1.05 (8/27/07)

ATTACHMENTS

1.0 INTRODUCTION AND PURPOSE

The New York State Department of Environmental Conservation Division of Water (DOW) considers there to be two types of inspections germane to construction stormwater; compliance inspections and self-inspections.

This manual is for use by DOW and other regulatory oversight construction stormwater inspectors in performing compliance inspections, as well as for site operators in performing self inspections. The manual should be used in conjunction with the *New York State Standards and Specifications for Erosion and Sediment Control*, August 2005.

1.1 Compliance Inspections

Regulatory compliance inspections are performed by regulatory oversight authorities such as DOW staff, or representatives of DOW and local municipal construction stormwater inspectors. These inspections are intended to determine compliance with the state or local requirements for control of construction stormwater through erosion and sediment control and post construction practices. Compliance inspections focus on determinations of compliance with legal and water quality standards. Typically, compliance inspections can be further sub-categorized to include comprehensive inspections, and follow-up or reconnaissance inspections.

Compliance inspectors will focus on determining whether:

- the project is causing water quality standard violations;
- the required Stormwater Pollution Prevention Plan (SWPPP) includes appropriate erosion and sediment controls and, to some extent, post construction controls;
- the owner/operator is complying with the SWPPP;
- where required, self-inspections are being properly performed; and
- where self-inspections are required, the owner/operator responds appropriately to the self-inspector's reports.

1.1.1 Comprehensive Inspection

Comprehensive inspections are designed to verify permittee compliance with all applicable regulatory requirements, effluent controls, and compliance schedules. This inspection involves records reviews, visual observations, and evaluations of management practices, effluents, and receiving waters.

Comprehensive inspections should be conducted according to a neutral or random inspection scheme, or in accordance with established priorities. A neutral monitoring scheme provides some objective basis for scheduling inspections and sampling visits by establishing a system (whether complex factor-based, alphabetic, or geographic) for setting prioritiesto ensure that a particular facility is not unfairly selected for inspection or sampling. The selection of which facility to inspect must be made without bias to ensure that the regulatory oversight authority, if challenged for being arbitrary and capricious manner, can reasonably defend itself.

A neutral inspection scheme should set the criteria the inspector uses to choose which facilities to inspect, but the schedule for the actual inspection should remain confidential, and may be kept separate from the neutral plan.

A routine comprehensive compliance inspection is most effective when it is unannounced or conducted with very little advance warning.

1.1.2 Reconnaissance Inspection

A reconnaissance inspection is performed in lieu of, or following a comprehensive inspection to obtain a preliminary overview of an owner/operator's compliance program, to respond to a citizen complaint, or to assess a non-permitted site. The inspector performs a brief (generally about an hour) visual inspection of the site, discharges and receiving waters. A reconnaissance inspection uses the inspector's experience and judgement to summarize potential compliance problems, without conducting a full comprehensive inspection. The objective of a reconnaissance inspection is to expand inspection coverage without increasing inspection resource expenditures. The reconnaissance inspection is the shortest and least resource intensive of all inspections.

Reconnaissance inspections may be initiated in response to known or suspected violations, a public complaint, a violation of regulatory requirements, or as follow-up to verify that necessary actions were taken in response to a previous inspection.

1.2 Self-inspections

For some projects, the site owner/operator is required by their State Pollutant Discharge Elimination System (SPDES) Permit and/or local requirements to have a qualified professional[1] perform a "self-inspection" at the site. In self-inspections, the qualified professional determines whether the site is being managed in accordance with the SWPPP, and whether the SWPPP's recommended erosion and sediment controls are effective. If activities are not in accordance with the SWPPP, or if the SWPPP erosion and sediment controls are not effective, the qualified professional inspecting the site recommends corrections to the owner/operator.

[1] A "Qualified professional" is a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), licensed landscape architect or soil scientist.

2.0 PRE-INSPECTION ACTIVITIES

2.1 Regulatory Oversight Authorities

This section is intended for inspectors with regulatory oversight authority such as agents of the DOW or a local municipality, or others acting on their behalf, such as county Soil and Water Conservation District staff. Examples of other regulatory oversight authorities include: the United States Environmental Protection Agency (EPA); New York City Department of Environmental Protection (DEP), Adirondack Park Agency (APA); the Lake George Park Commission (LGPC), and the Skaneateles Lake Watershed Authority (SLWA). Before arriving on-site to conduct the inspection, considerations concerning communication, documentation and equipment must be made.

Regulatory oversight authority is granted by state or local law to government agencies or, depending upon the particular law, an authorized representative of state or local government. SPDES rules 6 NYCRR 750-2.3 and Environmental Conservation Law 17-0303(6) and 17-0829(a) all allow for authorized representatives of the (NYSDEC) commissioner to perform all the duties of an inspector.

2.1.1 Communication

Coordination with Other Entities
Where appropriate, prior to selecting sites for inspection, compliance inspectors should communicate with other regulatory oversight authorities to avoid unnecessary duplication or to coordinate follow-up to inspections performed by other regulatory oversight authorities.

Announced vs. Unannounced Inspection
Inspections may be announced or unannounced. Each method has its own advantages and disadvantages. Unannounced inspections are preferred, however many job sites are not continuously manned, or not always staffed by someone who is familiar with the SWPPP, thus necessitating an announced inspection. As an alternative, when an announced inspection is necessary, inspectors should try to give as little advanced warning as possible (24 hours is suggested).

Itinerary
For obvious safety reasons, inspectors should be sure to inform someone in their office which site or sites they will be visiting prior to leaving the to perform inspections.

2.1.2 Documentation

Data Review
The inspector should review any available information such as:

- Notice of Intent
- Stormwater Pollution Prevention Plan
- Past inspection records
- Phasing plan

- Construction sequence
- Inspection and Maintenance schedules
- Site specific issues
- Consent Orders
- Access agreements

Inspection Form

The inspector should have copies of, and be familiar with, the inspection form used by their regulatory oversight authority (example in Attachment 1) before leaving the office. Static information such as name, location and permit number can be entered onto the inspection form prior to arriving at the inspection site.

Credentials

Inspectors should always carry proper identification to prove that they are employed by an entity with jurisdictional authority. Failure to display proper credentials may be legal grounds for denial of entry to a site.

2.1.3 Equipment

Personal Protective Equipment

DOW employees must conform to the DOW Health and Safety policy as it relates to personal protective equipment. Other regulatory oversight authorities should have their own safety policies or, if not, may wish to consult the OSHA health and safety tool at: www.osha.gov/dep/etools/ehasp/ to develop a health and safety plan.

The following is a list of some of the most common health and safety gear that may be needed:

- Hard hat (Class G, Type1 or better)
- Safety toe shoes
- Reflective vest
- Hearing protection (to achieve 85 dBA - 8 hr TWA)
- Safety glasses with side shields

If the construction is on an industrial site or a hazardous waste site, special training may be required prior to entering the site. The inspector should consult with OSHA or NYSDEC prior to entering such a site.

Monitoring Equipment

The following is a list of some equipment that may be helpful to document facts and verify compliance:

- Digital Camera
- Measuring tape or wheel
- Hand level or clinometer
- Turbidity meter (in limited circumstances)

2.2 Permittee's Self-inspection

This section is intended for qualified professionals who conduct site self-inspections on behalf of owner/operators. Self-inspectors are responsible for performing inspections in accordance with permit requirements and reporting to site owners and operators the results and any recommendations resulting from the inspection.

Prior to conducting inspections, qualified professionals should ensure familiarity with the Stormwater Pollution Prevention Plan and previous inspection reports.

3.0 ON-SITE INSPECTION PROCESS

3.1 Compliance Inspections

3.1.1 Professionalism

Don't Pretend to Possess Knowledge

Unless the inspector has experience with a particular management practice, do not pretend to possess knowledge. Inspectors cannot be expert in all areas; their job is to collect information, not to demonstrate superior wisdom. Site operators are often willing to talk to someone who is inquisitive and interested. Within reason, asking questions to obtain new information about a management practice, construction technique or piece of equipment is one of the inspector's main roles in an inspection.

Don't Recommend Solutions

The inspector should not recommend solutions or endorse products. The solution to a compliance problem may appear obvious based on the inspector's experience. However, the responsibility should be placed on the site owner to implement a workable solution to a compliance problem that meets NYSDEC standards. The inspector should refer the site operator to the New York Standards and Specifications for Erosion and Sediment Control (the Blue Book) or the New York State Stormwater Management Design Manual (the Design Manual).

Key advice must be offered carefully. One experienced stormwater inspector suggests saying: "I can't direct you or make recommendations, but what we've seen work in other situations is ..."

The way inspectors present themselves is important to the effectiveness of the inspection. An inspector cannot be overly familiar, but will be more effective if able to establish a minimum level of communication.

3.1.2 Safety

DOW employees must conform to Division health and safety policies when on a construction site. Other regulatory oversight authorities should have their own safety policies or, if not, may wish to consult the OSHA health and safety tool at:

www.osha.gov/dep/etools/ehasp to develop a health and safety plan.

Some general protections for construction sites are:

- Beware of heavy equipment, avoid operator blind spots and make sure of operator eye contact around heavy equipment.
- Avoid walking on rock rip-rap if possible. Loose rock presents a slip hazard.
- Stay out of confined spaces like tanks, trenches and foundation holes.
- Avoid lightning danger. Monitor weather conditions, get out of water, avoid open areas and high points, do not huddle in groups or near trees.
- Protect yourself from sun and heat exposure. Use sun screen or shading clothing. Remain hydrated by drinking water, watching for signs of heat cramps, exhaustion (fatigue, nausea, dizziness, headache, cool or moist skin), or stroke (high body temperature; red, hot and dry skin)
- Protect yourself from cold weather. Wear multiple layers of thin clothing. Wear a warm hat. Drink warm fluids or eat hot foods, and keep dry.
- Avoid scaffolding in excess of 4 feet above grade.
- Beware of ticks, stinging insects, snakes and poison ivy or sumac.

3.1.3 Legal access

DOW has general powers, set forth under ECL 17-0303, subparagraph 6, to enter premises for inspections. In addition, ECL 3-0301.2 conveys general statutory authority granting the DOW the power to access private property to fulfill DOW obligations under the law.

ECL 15-0305 gives the DOW the authority to enter at all times in or upon any property, public or private, for the purpose of inspecting or investigating conditions affecting the construction of improvements to or developments of water resources for the public health, safety or welfare.

ECL 17-0829 allows an authorized DOW representative, upon presentation of their credentials, to enter upon any premises where any effluent source is located, or in which records are required to be maintained. The representative may at reasonable times have access to, and sample discharges/pollutants to the waters or to publicly owned treatment plants where the effluent source is located. This subparagraph provides DOW representatives performing their duties authority to enter a site to pursue administrative violations. Pursuing criminal violations may require a warrant or the owner’s permission to enter the site.

For sites that are permitted, DOW has authority under the permit to enter the site.

If the owner/operator’s representatives onsite deny access, the inspector *should not* physically force entry. Under these circumstances the attorney representing the inspector should be immediately notified and consideration should be given to soliciting the aid of a law officer to obtain entry.

DOW staff have the right to enter at any reasonable time. If no one is available, and the site is fenced or posted, DOW staff should make all reasonable efforts to identify, contact and notify the owner that the DOW is entering the site. If the inspector has made all reasonable efforts to contact site owners, but was unable to do so, the site can then be accessed. All efforts should be taken not to cause any damage to the facility.

Other regulatory oversight authorities should seek advice on their legal authorities to enter a job site. Municipalities that have adopted Article 6 of the New York State Sample Local Law for Stormwater Management and Erosion and Sediment Control (NYSDEC, 2004, updated 2006) will have legal authority to enter sites in accordance with that chapter and any other existing municipal authority .

Agents of DOW have authority similar DOW staff authority to enter sites. However, DOW staff enjoy significant personal liability protections as state employees. That liability protection may not be the same for authorized representatives of DOW. For authorized representatives of DOW (or other regulatory oversight authorities), it is prudent to obtain permission to enter the site. If such permission is denied, the authorized representatives should inform the appropriate DOW contact, usually the regional water manager.

3.1.4 Find the Legally Responsible Party (Construction Manager, Self-inspector)

The first action a compliance inspector should take upon entering a construction site is to find the construction trailer or the construction or project manager if they are available. The inspector should present appropriate identification to the site's responsible party and state the reason for the inspection; construction stormwater complaint response or neutral construction stormwater inspection. If the inspection is initiated as a response to a complaint, frequently the responsible party will ask who made the complaint. DOW keeps private individual complainants confidential. If the complainant is another regulatory oversight authority, DOW tends to make that known to the site's responsible party.

3.1.5 On-site records review (NOI, SWPPP, Self-inspection Reports, Permit)

Generally, the compliance inspector should next review the on-site records. Verify that a copy of the construction stormwater permit and NOI are on-site. Verify that the acreage, site conditions, and receiving water listed on the NOI are accurate. Compare the on-site documentation with documentation already submitted to, or obtained by the compliance inspector.

If the SWPPP has not been reviewed in the office, verify that it exists and contains the minimum required components (16 for a basic plan and 22 for a full plan). On-site review of the SWPPP should determine if: there is an appropriate phasing plan; the acreage disturbed in each phase, construction sequence for each phase; proposed implementation of erosion and sediment control measures; and, where required, post construction controls. For each of the erosion and sediment control practices, the SWPPP must show design details in accordance with the NYS Standards for Erosion and Sediment Controls. The SWPPP must also include provisions for maintenance of practices during construction. On-site review of post construction controls is generally limited to verification that the proposed stormwater management practices are shown on the site plan.

Where self-inspections are required, self-inspection reports are a significant tool for the compliance inspector to determine the performance history of the site. The self-inspection reports should be done with the required frequency . Self-inspection reports must include all the details required by the permit. Generally, it is desirable for permit information to be shown on a site plan. The compliance inspector should become familiar with the report and use that familiarity to judge whether the self-inspections are being performed correctly and that the site operator is correcting deficiencies noted in the report.

3.1.6 Walk the Site

During wet weather conditions, it may be advantageous to observe the receiving waters prior to walking the rest of the site. At some point during the inspection, the receiving water conditions must be observed and noted. It is critical to note if there is a substantial visible contrast to natural conditions, or evidence of deposition, streambank erosion, construction debris or waste materials (e.g. concrete washdown) in the receiving stream.

Each inspector should evaluate actual implementation and maintenance of practices on-site compared to how implementation and maintenance is detailed in the SWPPP. At a minimum, the compliance inspector should observe all areas of active construction. Observing equipment or materials storage, recently stabilized areas, or stockpile areas is also appropriate to evaluate the effectiveness of management practices.

3.1.7 Taking Photographs

Evidence of poor receiving water conditions and poor or ineffective practices should be documented with digital photographs. Those photographs should be logged date stamped and stored on media that cannot be edited (e.g. write only CDs). Photos should also be appended to the site inspector's report.

It is also beneficial to take photographs of good practices for educational and technology transfer reasons.

3.1.8 Exit Interview

Clearly communicate expectations and consequences. If it is clear from the inspection that the owner/operator must modify the SWPPP, or modify management practices within an assigned period (e.g. 24 hours, 48 hours, one week, two weeks), then that finding should be communicated at the time of the exit interview. The inspector should assign the period based on factors such as how long it would reasonably take to complete such modifications and the level of risk to water quality associated with failure to make such modifications.

The inspector should make clear that NYSDEC reserves rights to future enforcement actions. If the inspector's supervisor or enforcement coordinator determines additional enforcement actions are necessary, the inspector *should not* reassure the owner/operator that the current situation is acceptable.

3.2 Non-permitted Site Inspections

For sites not authorized in accordance with state or local laws, the process will be abbreviated. First verify the need for authorization and observe receiving waters to detect water quality standard violations. If there is a violation, notify the owner of the violation or other compliance actions in response to their illicit activity. For DOW staff, Attachment 2 or a similar notice can be used to notify the site owner/operator that stormwater authorization is required.

3.3 Self-inspections

The role of the self-inspector is to verify that the site is complying with stormwater requirements. In particular, the self-inspector verifies that the SWPPP is being properly implemented. The self-inspector also documents SWPPP implementation so regulatory agencies can review implementation activities.

It is <u>not</u> the role of the self-inspector to report directly to regulatory authorities.

Appendix H of *The New York Standards and Specifications for Erosion and Sediment Control* - August 2005 (the Blue Book) includes a Construction Duration Inspection checklist that can be used by the owner/operators qualified professional for self-inspections. The Blue Book is available on the NYSDEC website.

3.3.1 Purpose

The self inspector should ensure that the project's SWPPP is being properly implemented. This includes ensuring that the erosion and sediment control practices are properly installed and being maintained in accordance with the SWPPP/Blue Book.

The project must be properly phased to limit the disturbance to less than five acres, and the construction sequence for each phase must be followed. The SWPPP must also be modified to address evolving circumstances. Finally, and most importantly, receiving waters must be protected.

If a soil disturbance will be greater than five acres at any given time, the site operator must obtain written permission from the DOW regional office.

3.3.2 Pre-construction Conference

The parties responsible for various aspects of stormwater compliance should be identified at the pre-construction conference. Responsible parties may include, but are not limited to, owner's engineer, owner/operator/permittee, contractors, and subcontractors.

Typical responsibilities include: installation of erosion and sediment control (E & SC) practices; maintenance of E & SC practices, inspection of E&SC practices, installation of post construction stormwater management practices (SMPs), inspection of post construction SMPs, SWPPP revisions, and contractor direction.

All parties should clearly know what is expected of them. Responsible parties should complete the Pre-construction Site Assessment Checklist provided in Appendix H of the Blue Book.

3.3.3 Inspection Preparation

The inspector should review the project's SWPPP (including the phasing plan, construction sequence and site specific issues) and the last few inspection reports (if the inspector has them available).

3.3.4 Self-inspection Components

Inspect installation, performance and maintenance of all E&SC practices

The self inspector should inspect all areas that are under active construction or disturbance and areas that are vulnerable to erosion. The self-inspector should also inspect areas that will be disturbed prior to the next inspection for measures required prior to construction (e.g. silt barriers, stabilized construction entrance, diversions). Finally, self-inspectors should inspect post-construction controls during and after installation.

Identify site deficiencies and corrective measures

The self-inspector's reports must be maintained in a log book on site and the log book must be made available to the regulatory authorities. Although the legal responsibility for filing a Notice of Termination lies with the owner/operator, the self-inspector may also be called upon to perform a final site inspection, including post construction SMPs, prior to filing the Notice of Termination.

4.0 POST-INSPECTION ACTIVITIES

4.1 Regulatory Oversight Authorities

This section is intended for inspectors with regulatory oversight authority such as agents of the DOW or a local municipality, or others acting on their behalf (such as County Soil and Water Conservation District staff.) Upon completion of an inspection, inspection results should be documented for the record.

4.1.1 Written Notification

The inspector should inform the permittee or the on-site representative of their inspection results in writing by sending the permittee a complete, signed copy of the inspection report. The inspection report should be transmitted under a cover letter which elaborates on any deficiencies noted in the inspection report. It is not a good idea to commend exceptional efforts by the owner/operator in a letter, because such letters tend to undermine enforcement efforts when compliance status at a site degrades.

The inspector should consider providing a copy of the cover letter and inspection report to other parties with including:

- Permittee
- Contractor(s)
- Other regulatory oversight authorities
- Other parties present during the inspection (e.g. SWPPP preparer, permittee's self-inspector, etc.)

For DOW staff, an example of the inspection cover letter is included as Attachment 3.

4.1.2 Inspection Tracking

DOW staff must enter their inspection results into the electronic *Water Compliance System*.

Local municipalities and other regulatory oversight authorities are encouraged to develop an electronic tracking system in which to record their inspections.

4.2 Permittee's Self-inspections

This section is intended for qualified professionals who conduct site inspections for permittees in accordance with a SPDES permit or local requirements.

4.2.1 Written Records

<u>Inspection Reports</u>
The inspector shall prepare a written report summarizing inspection results. The inspection report is then provided to the permittee, or the permittee's duly authorized representative, and to the contractor responsible for implementing stormwater controls on-site in order to correct deficiencies noted in the inspection report. Finally, the inspection report must be added to the site log book that is required to be maintained on-site, and be available to regulatory oversight authorities for review.

4.2.2 Stormwater Pollution Prevention Plan Revisions

The inspector must inform the permittee of his/her duty to amend the Stormwater Pollution Prevention Plan (SWPPP) whenever an inspection proves the SWPPP to be ineffective in:

- Eliminating or significantly minimizing pollutants from on-site sources
- Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity
- Eliminating discharges that cause a substantial visible contrast to natural conditions

ATTACHMENT 1

Construction Stormwater Compliance Inspection Report

Project Name and Location:	Date:	Page 1 of 2
	Permit # (if any): **NYR**	
Municipality: County:	Entry Time:	Exit Time:
On-site Representative(s) and contact information:	Weather Conditions:	
Name and Address of SPDES Permittee/Title/Phone/Fax Numbers: Contacted: Yes ☐ No ☐		

INSPECTION CHECKLIST

SPDES Authority

	Yes	No	N/A		Law, rule or permit citation
1.	☐	☐	☐	Is a copy of the NOI posted at the construction site for public viewing?	
2.	☐	☐	☐	Is an up-to-date copy of the signed SWPPP retained at the construction site?	
3.	☐	☐	☐	Is a copy of the SPDES General Permit retained at the construction site?	

SWPPP Content

	Yes	No	N/A		Law, rule or permit citation
4.	☐	☐	☐	Does the SWPPP describe and identify the erosion & sediment control measures to be employed?	
5.	☐	☐	☐	Does the SWPPP provide a maintenance schedule for the erosion & sediment control measures?	
6.	☐	☐	☐	Does the SWPPP describe and identify the post-construction SW control measures to be employed?	
7.	☐	☐	☐	Does the SWPPP identify the contractor(s) and subcontractor(s) responsible for each measure?	
8.	☐	☐	☐	Does the SWPPP include all the necessary 'CONTRACTOR CERTIFICATION' statements?	
9.	☐	☐	☐	Is the SWPPP signed/certified by the permittee?	

Recordkeeping

	Yes	No	N/A		Law, rule or permit citation
10.	☐	☐	☐	Are inspections performed as required by the permit (every 7 days and after ½" rain event)?	
11.	☐	☐	☐	Are the site inspections performed by a qualified professional?	
12.	☐	☐	☐	Are all required reports properly signed/certified?	
13.	☐	☐	☐	Does the SWPPP include copies of the monthly/quarterly written summaries of compliance status?	

Visual Observations

	Yes	No	N/A		Law, rule or permit citation
14.	☐	☐	☐	Are all erosion and sediment control measures installed/constructed?	
15.	☐	☐	☐	Are all erosion and sediment control measures maintained properly?	
16.	☐	☐	☐	Have all disturbances of 5 acres or more been approved prior to the disturbance?	
17.	☐	☐	☐	Are stabilization measures initiated in inactive areas?	
18.	☐	☐	☐	Are permanent stormwater control measures implemented?	
19.	☐	☐	☐	Was there a discharge into the receiving water on the day of inspection?	
20.	☐	☐	☐	Are receiving waters free of there evidence of turbidity, sedimentation, or oil ? (If no , complete Page 2)	

Overall Inspection Rating: ❑ Satisfactory ❑ Marginal ❑ Unsatisfactory	
Name/Agency of Lead Inspector:	**Signature of Lead Inspector:**
Names/Agencies of Other Inspectors:	

Water Quality Observations

Describe the discharge(s) [source(s), impact on receiving water(s), etc.] ____

____

____

____

____

Describe the quality of the receiving water(s) both upstream and downstream of the discharge________________________________

____

____

____

____

Describe any other water quality standards or permit violations ____

____

____

Additional Comments:____

____

____

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☐ Photographs attached

ATTACHMENT 2

**** NOTICE ****

On March 10, 2003, provisions of the Federal Clean Water Act went into effect that apply to many construction operations.

If your construction operations result in the disturbance of one acre or greater and stormwater runoff from your site reaches surface waters (i.e., lake, stream, road side ditch, swale, storm sewer system, etc.), the stormwater runoff from your site must be covered by a State Pollutant Discharge Elimination System (SPDES) Permit issued by the New York State Department of Environmental Conservation (NYSDEC).

To facilitate your compliance with the law, NYSDEC has issued a General Permit which may be applicable to your project. To obtain coverage under this General Permit, you need to prepare a Stormwater Pollution Prevention Plan (SWPPP) and then file a Notice of Intent (NOI) to the NYSDEC headquarters in Albany. The NOI form is available on the DEC website. You may also obtain a copy of the NOI form at the nearest NYSDEC regional offices.

When you file your NOI you are certifying that you have developed a SWPPP and that it will be implemented prior to commencing construction. When you submit the NOI you need to indicate if your SWPPP is in conformance with published NYSDEC technical standards; if it is, your SPDES permit coverage will be effective in as few as five business days. If your SWPPP does not conform to the DEC technical standards, coverage will not be available for at least 60 business days.

Failure to have the required permit can result in legal actions which include Stop Work Orders and/or monetary penalties of up to $37,500/day

If your construction operations are already in progress and you are not covered by an appropriate NYSDEC permit contact the NYSDEC Regional Water Engineer as soon as possible. If your construction field operations have not yet commenced, review the NOI and the General Permit on the DEC's website or at the DEC regional office for your area. When you are comfortable that you understand and comply with the requirements, file your NOI.

The requirement to file an NOI does not replace any local requirements. Developers/Contractors are directed to contact the Local Code Enforcement Officer or Stormwater Management Officer for local requirements.

ATTACHMENT 3

<< Date >>

Mr. John Smith
123 Main Street
Ferracane, NY 12345

Re: Stormwater Inspection
SPDES Permit Identification No. NYR10Z000 (through SPDES No. GP-02-01)
Blowing Leaves Subdivision
Gasper (T), Eaton (Co.)

Dear Mr. Smith:

On the afternoon of << date >> I conducted an inspection of the construction activities associated with the Blowing Leaves Subdivision located on County Route 1 in the town of Gasper, Eaton County. The inspection was conducted in the presence of you and Mr. Samuel Siltfence of Acme Excavating Co., Inc. The purpose of the inspection was to verify compliance with the *State Pollutant Discharge Elimination System (SPDES) General Permit for Storm Water Discharges from Construction Activity* ("the general permit").

The overall rating for the project at the time of the inspection was ***unsatisfactory***. A copy of my inspection report is attached for your information. In addition to the report, I would like to elaborate on the following:

SPDES Authority

- In accordance with subdivision 750-2.1 (a) of Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York (6 NYCRR), a copy of your permit must be retained at the construction site. You did not have a copy of the general permit at the site. **Your failure to retain a copy of the general permit at the construction site is a violation of 6 NYCRR Part 750-2.1 (a).** Please retain a copy of the general permit at the site from this point forward.

SWPPP Content

- In accordance with Part III.E.2. of the general permit, contractors and subcontractors must certify that they understand the terms and conditions of the general permit and the SWPPP before undertaking any construction activity at the site. Your SWPPP does not include a certification statement from Acme Excavating Co., Inc. **The failure of your contractor to sign this certification before undertaking construction activity at the site is a violation of Part III.E.2. of the general permit.** Please obtain copies of all necessary certifications and provide copies of them to each party who holds a copy of your SWPPP.

- In accordance with Part V.H.2. of the general permit, SWPPP's must be certified by the permittee. Your SWPPP was not certified by you. **Your failure to certify your SWPPP is a**

violation of Part V.H.2. of the general permit. Please certify your SWPPP.

Recordkeeping

- In accordance with Parts III.D.3.a. and III.D.3.b. of the general permit, permittees must have a qualified professional conduct site inspections within 24 hours of the end of 0.5" or greater rain events and at least once per week. A review of your records revealed that your "self-inspections" are only being conducted about two or three times per month. **Your failure to have a qualified professional conduct inspections at the required frequency is a violation of Part III.D.3.b. of the general permit.** Please immediately direct your qualified professional to conduct your site inspections at the required frequency.

- Although the frequency of self-inspections does not meet rquirements, the quality of them is very good. Your qualified professional has accurately noted the same SWPPP deficiencies and necessary maintenance activities that I also observed, and prepared thorough sketches on the self-inspection site maps.

- In accordance with Part V.H.2. of the general permit, the permittee must certify all reports required by the permit. A review of your records showed that your self-inspection reports were not certified. **Your failure to certify your self-inspection reports is a violation of Part V.H.2. of the general permit.** Please sign and certify any and all existing and future self-inspection reports.

Visual Observations

- In accordance with Parts III.A.2. and III.A.3. of the general permit, all erosion and sediment controls (E&SC) measures must be installed (as detailed in the SWPPP) prior to the initiation of construction. During the inspection, I noted all of your E&SC measures have been correctly installed at the right times and locations.

- In accordance with Part V.L. of the general permit, all of the E&SC measures at your site must be maintained properly. While on site I observed that, among other things, the section of silt fence in place parallel to County Route 1 is in various stages of disrepair. **The failure of your contractor to adequately maintain the E&SC measures currently in place at your site is a violation of Part V.L of the general permit.** Please direct your contractor to repair this silt fence immediately and to diligently maintain all of the other required E&SC measures as they are brought to his attention by your qualified professional.

- This inspection was conducted during a rain event which resulted in a stormwater discharge to the municipal separate storm sewer system (MS4) being operated by the Eaton County Department of Public Works. Your discharge was visibly turbid whereas upstream water MS4 was clear. As a result, the discharge from the MS4 outfall into Karimipour Creek was causing slight turbidity. Please be advised that the narrative water quality standard for turbidity in Karimipour Creek is "no increase that will cause a substantial visible contrast to natural conditions." I attribute the lack of maintenance of your E&SC measures to be the primary cause of the turbid discharge. Please be reminded that the general permit does not authorize you cause or contribute to a condition in contravention of any water quality standards.

If you have any questions or comments, please feel free to contact me at (999) 456-5432.

Sincerely,

Hector D. Inspector, CPESC
Environmental Program Specialist 2

HDI:ms
Attachment

cc w/att.: Chester Checkdam, (T) Gasper Code Enforcement Officer
Samuel Siltfence, Acme Excavating Co., Inc.

APPENDIX H

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Table of Contents

Properly completing forms such as those contained in Appendix H meet the inspection requirement of NYS-DEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name ______________________________

Permit No. ____________________ **Date of Authorization** __________

Name of Operator ______________________________

Prime Contractor ______________________________

a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.

Name (please print): ______________________________

Title ______________________________ **Date:** ______________

Address: ______________________________

Phone: ______________ **Email:** ______________________________

Signature: ______________________________

c. Qualified Professional's Credentials & Certification

"I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print): ______________________________

Title ______________________________ **Date:**______________

Address: ______________________________

Phone: ______________ **Email:** ______________________________

Signature: ______________________________

d. Pre-construction Site Assessment Checklist
(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?________________________________
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?______________
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?______________
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page ______
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? __________________

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:
Inspection Forms will be filled out during the entire construction phase of the project.
Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

(4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

______________________________ ______________________________
Inspector (print name) **Date of Inspection**

______________________________ ______________________________
Qualified Professional (print name) **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA
[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions
Yes No NA
[ ] [ ] [ ] Is construction site litter and debris appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing
Yes No NA
[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering
Yes No NA
[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales
Yes No NA
[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Runoff Control Practices (continued)

4. Stone Check Dam

Yes No NA

[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)
Yes No NA
[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap
Yes No NA
[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.
Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin
Yes No NA
[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

III. Monthly Summary of Site Inspection Activities

Name of Permitted Facility:	Today's Date:	Reporting Month:
Location:	Permit Identification #:	
Name and Telephone Number of Site Inspector:		

Date of Inspection	Regular / Rainfall based Inspection	Name of Inspector	Items of Concern

Owner/Operator Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signature of Permittee or Duly Authorized Representative

Name of Permittee or Duly Authorized Representative

Date

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.

NYS DEC Spill Prevention and Response:

From the DEC Website: www.dec.ny.gov/chemical

Article 12 of the Navigation Law, the legislation which applies to Oil Spill Prevention, Control, and Compensation, defines a discharge as:

any intentional or unintentional action or omission resulting in the releasing, spilling, leaking, pumping, pouring, emitting, emptying or dumping of petroleum into the waters of the state or onto lands from which it might flow or drain into said waters, or into waters outside the jurisdiction of the state when damage may result to the lands, waters or natural resources within the jurisdiction of the state;

The terms **"release"**, **"spill"** and **"leak"** are commonly used in an interchangeable manner on this website, DEC documents, and by program staff to refer to discharges.

Remediation is the act or process of removing contamination from the soil, groundwater, or other medium. The term **"cleanup"** is commonly used in referring to remediation. Cleanup typically is used a in broader context and may refer to activities such as using speed-i-dry to recover oil from a roadway, or sorbent pads to collect oil from the water's surface.

All petroleum spills that occur within New York State (NYS) must be reported to the NYS Spill Hotline (1-800-457-7362) within 2 hours of discovery, except spills which meet **all of the following criteria:**

1. The quantity is known to be less than 5 gallons; and
2. The spill is contained and under the control of the spiller; and
3. The spill has not and will not reach the State's water or any land; and
4. The spill is cleaned up within 2 hours of discovery.

A spill is considered to have not impacted land if it occurs on a paved surface such as asphalt or concrete. A spill in a dirt or gravel parking lot is considered to have impacted land and is reportable.

More details on notification and reporting requirements can be found in the Spill Guidance Manual Section 1.1 - PDF 87 KB (34 pgs.)

Report Environmental Problems:

1-800-TIPP DEC (1-800-847-7332) - call the TIPPs hotline to report any environmental violations

1-800-457-7362 (within NY State) or **(518) 457-7362** (outside NY State) - call the Spill Hotline to report a chemical or oil spill

(518)-891-0235 - to report a wildland fire

All the numbers above may be called 24 hours a day. All callers names can be kept confidential

TECHNICAL

FIELD GUIDANCE

SPILL REPORTING AND INITIAL NOTIFICATION REQUIREMENTS

NOTES

Spill Reporting and Initial Notification Requirements

GUIDANCE SUMMARY AT-A-GLANCE

- Reporting spills is a crucial first step in the response process.
- You should understand the spill reporting requirements to be able to inform the spillers of their responsibilities.
- Several different state, local, and federal laws and regulations require spillers to report petroleum and hazardous materials spills.
- The state and federal reporting requirements are summarized in Exhibit 1.1-1.
- Petroleum spills must be reported to DEC unless they meet all of the following criteria:
  - The spill is known to be less than 5 gallons; and
  - The spill is contained and under the control of the spiller; and
  - The spill has not and will not reach the State’s water or any land; and
  - The spill is cleaned up within 2 hours of discovery.

  All reportable petroleum spills and most hazardous materials spills must be reported to DEC hotline (1-800-457-7362) within New York State; and (1-518 457-7362) from outside New York State. For spills not deemed reportable, it is strongly recommended that the facts concerning the incident be documented by the spiller and a record maintained for one year.
- Inform the spiller to report the spill to other federal or local authorities, if required.
- Report yourself those spills for which you are unable to locate the responsible spiller.
- Make note of other agencies' emergency response telephone numbers in case you require their on-scene assistance, or if the response is their responsibility and not BSPR's.

NOTES

1.1.1 Notification Requirements for Oil Spills and Hazardous Material Spills

Spillers are required under state law and under certain local and federal laws to report spills. These various requirements, summarized in Exhibit 1.1-1, often overlap; that is, a particular spill might be required to be reported under several laws or regulations and to several authorities. Under state law, all petroleum and most hazardous material spills must be reported to DEC Hotline (1-800-457-7362), within New York State, and to 1-518-457-7362 from outside New York State. Prompt reporting by spillers allows for a quick response, which may reduce the likelihood of any adverse impact to human health and the environment. Yo will often have to inform spillers of there responsibilities.

Although the spiller is responsible for reporting spills, other persons with knowledge of a spill, leak, or discharge is required to report the incident (see Appendices A and B). You will often have to inform spillers of their responsibilities. You may also have to report spills yourself in situations where the spiller is not known or cannot be located. However, it is the legal responsibility of the spiller to report spills to both state and other authorities.

BSPR personnel also are responsible for notifying other response agencies when the expertise or assistance of other agencies is needed. For example, the local fire department should be notified of spills that pose a potential explosion and/or fire hazard. If such a hazard is detected and the fire department has not been notified, call for their assistance immediately. Fire departments are trained and equipped to respond to these situations; you should not proceed with your response until the fire/safety hazard is eliminated. For more information on interagency coordination in emergency situations see Part 1, Section 3, Emergency Response.

Another important responsibility is notifying health department officials when a drinking water supply is found to be contaminated as a result of a spill. It will be the health department's responsibility to advise you on the health risk associated with any contamination.

Exhibits 1.1-1 and 1.1-2 list the state and federal requirements to report petroleum and hazardous substance spills, respectively. The charts describe the type of material covered, the applicable act or regulation, the agency that must be notified, what must be reported, and the person responsible for reporting. New York state also has a emergency notification network for spill situations (e.g., major chemical releases) that escalate beyond the capabilities of local and regional response agencies/authorities to provide adequate response. The New York State Emergency Management Office (SEMO) coordinates emergency response activities among local, state, and federal government organizations in these cases.

Exhibit 1.1-1

State and Federal Reporting Requirements for Petroleum Spills, Leaks, and Discharges

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Petroleum from any source	Navigation Law Article 12; 17 NYCRR 32.3 and 32.4	DEC Hotline 1-800-457-7362	The notification of a discharge must be immediate, but in no case later than two hours after discharge. 1. Name of person making report and his relationship to any person which might be responsible for causing the discharge. 2. Time and date of discharge. 3. Probable source of discharge. 4. The location of the discharge, both geographic and with respect to bodies of water. 5. Type of petroleum discharges. 6. Possible health or fire hazards resulting from the discharge. 7. Amount of petroleum discharged. 8. All actions that are being taken to clean up and remove the discharge. 9. The personnel presently on the scene. 10. Other government agencies that have been or will be notified.	Any person causing discharge of petroleum. Owner or person in actual or constructive control must notify DEC unless that person has adequate assurance that such notice has already been given.
All aboveground petroleum and underground storage facilities with a combined storage capacity of over 1100 gallons.	ECL §17-1007; 6 NYCRR §613.8	DEC Hotline 1-800-457-7362	1. Report spill incident within two hours of discovery. 2. Also when results of any inventory, record, test, or inspection shows a facility is leaking, that fact must be reported within two hours of discovery.	Any person with knowledge of a spill, leak, or discharge.
Petroleum contaminated with PCB.	Chemical Bulk Storage Act 6 NYCRR Parts 595, 596, 597	DEC Hotline 1-800-457-7362	Releases of a reportable quantity of PCB oil.	Owner or person in actual or constructive possession or control of the substance, or a person in contractual relationship, who inspects, tests, or repairs for owner.

Exhibit 1.1-1

State and Federal Reporting Requirements for Petroleum Spills, Leaks, and Discharges (continued)

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Any liquid (petroleum included) that if released would be likely to pollute lands or waters of the state.	ECL §17-1743	DEC Hotline 1-800-457-7362	Immediate notification that a spill, release, or discharge of any amount has occurred. Owner or person in actual or constructive possession or control of more than 1,100 gallons of the liquid.	
Petroleum Discharge in violation of §311(b)(3) of the Clean Water Act	40 CFR §110.10 (Clean Water Act)	1. National Response Center (NRC) 1-800-424-8802. 2. If not possible to notify NRC, notify Coast Guard or predesignated on-scene coordinator. 3. If not possible to notify either 1 or 2, reports may be made immediately to nearest Coast Guard units, provided NRC notified as soon as possible.	Immediate notification as soon as there is knowledge of an oil discharge that violates water quality standards or causes sheen on navigable waters. Procedures for notice are set forth in 33 CFR Part 153, Subpart B, and in the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300, Subpart E.	Person in charge of vessel or on-shore or off-shore facility.
Petroleum, petroleum by-products or other dangerous liquid commodities that may create a hazardous or toxic condition spilled into navigable waters.	33 CFR 126.29 (Ports and Waters Safety Act)	Captain of the Port or District Commander	As soon as discharge occurs, owner or master of vessel must immediately report that a discharge has occurred.	Owner or master of vessel or owner or operator of the facility at which the discharge occurred.

Exhibit 1.1-1

State and Federal Reporting Requirements for Petroleum Spills, Leaks, and Discharges (continued)

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Petroleum or hazardous substance from a vessel, on-shore or off-shore facility in violation of §311(b)(3) of the Clean Water Act.	33 CFR 153.203 (Clean Water Act)	1. NRC U.S. Coast Guard, 2100 Second Street, SW, Washington, DC 20593; 1-800-424-8802. 2. Where direct reporting not practicable, reports may be made to the Coast Guard (District Offices), the 3rd and 9th district of the EPA regional office at 26 Federal Plaza, NY, NY 10278; 1-201-548-8730. 3. Where none of the above is possible, may contact nearest Coast Guard unit, provided NRC notified as soon as possible.	Any discharger shall immediately notify the NRC of such discharge.	Person in charge of vessel or facility.

Exhibit 1.1-2

State and Federal Reporting Requirements for Hazardous Substance Spills, Leaks, and Discharges

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Any hazardous substance pursuant to Article 37. Does not include petroleum.	Chemical Bulk Storage Act 6 NYCRR Parts 595, 596, 597; ECL 40-0113(d)	DEC Hotline 1-800-457-7362	Releases of a reportable quantity of a hazardous substance.	Owner or person in actual or constructive possession or control of the substance, or a person in contractual relationship, who inspects, tests, or repairs for owner.
Hazardous materials or substances as defined in 49 CFR §171.8 that are transported. (See federal reporting requirements.)	Transportation Law 14(f); 17 NYCRR 507.4(b)	Local fire department or police department or local municipality	Immediate notification must be given of incident in which any of the following occurs as a direct result of a spill of hazardous materials: 1. Person is killed. 2. Person receives injuries requiring hospitalization. 3. Estimated damage to carrier or other property exceeds $50,000. 4. Fire, breakage, spillage, or suspected contamination due to radioactive materials. 5. Fire, breakage, spillage, or suspected contamination involving etiologic agents. 6. Situation is such that, in the judgment of the carrier, a continuing danger to life or property exists at the scene of the incident.	All persons and carriers engaged in the transportation of hazardous materials.

Exhibit 1.1-2
State and Federal Reporting Requirements for Hazardous Substance Spills, Leaks, and Discharges (continued)

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Hazardous materials (wastes included) that are transported, whose carrier is involved in an accident.	Department of Transportation Regulations 49 CFR 171.15; 17 NYCRR Part 924; 17 NYCRR Part 507	1. U.S. Department of Transportation 1-800-424-8802 2. DEC Hotline 1-800-457-7362 3. Rail Carrier On-Duty 518-457-1046 Off-Duty 518-457-6164 4. Notify local police or fire department.	Notice should be given by telephone at the earliest practicable moment and should include: 1. Name of reporter. 2. Name and address of carrier represented by reporter. 3. Phone number where reporter can be contacted. 4. Date, time, and location of incident. 5. The extent of injuries, if any. 6. Classification, name and quantity of hazardous materials involved, if available. 7. Type of incident and nature of hazardous material involved and whether a continuing danger to life exists at scene. 8. Each carrier making this report must also make the report required by §171.16.	Each carrier that transports hazardous materials involves in an accident that causes any of the following as a direct result: 1. A person is killed 2. A person receives injuries requiring hospitalization 3. Estimated damage to carrier or other property exceeds $50,000 4. Fire, breakage, spillage, suspected or otherwise involving radioactive material. 5. Fire, breakage, spillage, suspected contamination involving etiologic agents. 6. Situation is such that carrier thinks it should be reported in accordance with paragraph b.

Exhibit 1.1-2
State and Federal Reporting Requirements for Hazardous Substance Spills, Leaks, and Discharges
(continued)

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Reportable quantity of a hazardous substance into navigable waters or adjoining shorelines. Substances are listed in 40 CFR 302.4.	Department of Transportation Regulations 49 CFR §171.16 as authorized by the Hazardous Materials Transportation Act	U.S. Coast Guard National Response Center (NRC), 1-800-424-8802 or 1-202-267-2675	As soon as person in charge becomes aware of a spill incident, he must notify NRC and provide the following information: 1. The information required by 49 CFR §171.15 (see above). 2. Name of shipper of hazardous substance. 3. Quantity of hazardous substance discharged, if known. 4. If person in charge is incapacitated, carrier shall make the notification. 5. Estimate of quantity of hazardous substance removed from the scene and the manner of disposition of any unremoved hazardous substance shall be entered in Part (H) of the report required by 49 CFR 171.16 (see above).	Person in charge of aircraft, vessel, transport vehicle, or facility. Must inform NRC directly, or indirectly through carrier.
Reportable quantity of a hazardous substance from vessel, on-shore or off-shore facility. Substances and requirements specified in 40 CFR §117.3.	40 CFR §117.21 as authorized under the FWPCA	NRC 1-800-424-8802. If not practicable report may be made to the Coast Guard (3rd or 9th Districts) District Offices or to EPA, designated On-Scene Coordinator, Region II, 26 Federal Plaza, NY, NY 10278; 1-201-548-8730	Immediate notification is required.	Person in charge of vessel, or on-shore or off-shore facility

Exhibit 1.1-2
State and Federal Reporting Requirements for Hazardous Substance Spills, Leaks, and Discharges
(continued)

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Facilities where a hazardous chemical is produced, used, or stored, and there is a reportable quantity of any extremely hazardous substance as set out in Appendix A to 40 CFR 355 or a CERCLA hazardous substance as specified in 40 CFR 302.4. (This section does not apply to a release that does not go beyond the facility, that emanates from a facility that is federally permitted, is continuous as defined under §103(f) of CERCLA or to any release exempt from CERCLA §103(a) reporting under §101(22) of CERCLA.)	40 CFR 355.40 (SARA) Releases of CERCLA Hazardous Substances are subject to release reporting requirements of CERCLA §103, codified at 40 CFR Part 302, in addition to being subject to the requirements of this Part.	Community emergency coordinator for the local emergency planning committee of any area likely to be affected and the State Emergency Response Commission of any state likely to be affected by the release. If there is no local emergency planning commission notification shall be made to relevant local emergency response personnel.	Immediately notify agencies at left and provide the following information when available: 1. Chemical name or identity of any substance involved in the release. 2. Indication of whether the substance is an extremely hazardous substance. 3. An estimate of the quantity released. 4. Time and duration of release. 5. Medium or media into which the release occurred. 6. Known health risks associated with emergency and where appropriate advice regarding medical attention for those exposed. 7. Proper precautions/actions that should be taken, including evacuation. 8. Names and telephone numbers of person to be contacted for further information. As soon as practicable after release, followup notification by providing the following information: 1. Actions taken to respond to and contain the release. 2. Health risks. 3. Advice on medical attention for exposed individuals.	Owner or operator of facility

Exhibit 1.1-2
State and Federal Reporting Requirements for Hazardous Substance Spills, Leaks, and Discharges
(continued)

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Hazardous liquids transported in pipelines, a release of which results in any circumstances as set out in 195.50(a) through (f). Also any incident that results in circumstances listed in 195.52(g).	49 CFR 195.50, 195.52 and 195.54 (Hazardous Liquid Pipeline Safety Act).	NRC, 1-800-424-8802	Notice must be given at the earliest practicable moment and the following information provided: 1. Name and address of the operator. 2. Name and telephone number of the reporter. 3. Location of the failure. 4. The time of the failure. 5. The fatalities and personal injuries, if any. 6. All other significant facts known by the operator that are relevant to the cause of the failure or extent of the damages.	Operator of system.
Hazardous wastes in transport	40 CFR §263.30(a) (RCRA)	1. Local authorities 2. If required by 49 CFR 171.15, notify the NRC at 1-800-424-8802 or 1-202-426-2675 3. Report in writing to Director of Hazardous Materials Regulations, Materials Transportation Bureau, Department of Transportation, Washington, DC 20590	Notification must be immediate. For discharge of hazardous waste by air, rail, highway, or water, the transporter must: 1. Give notice as in 49 CFR 161.15 (if applicable). 2. Report in writing as in 49 CFR 171.16. Wastes transporter (bulk shipment) must give same notice as required by 33 CFR 153.20.	Transporter by air, rail, highway, or water.

Exhibit 1.1-2
State and Federal Reporting Requirements for Hazardous Substance Spills, Leaks, and Discharges
(continued)

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Vinyl Chloride from any manual vent valve, or polyvinyl chloride plants	Clean Air Act 40 CFR 61.64	Administrator of EPA	Within 10 days of any discharge from any manual vent valve, report must be made, in writing, and the following information provided: 1. Source, nature and cause of the discharge 2. Date and time of the discharge 3. Approximate total vinyl chloride loss during discharge 4. Method used for determining loss 5. Action taken to prevent the discharge 6. Measures adopted to prevent future discharges.	Owner or operator of plant.
Radioactive Materials	6 NYCRR §380.7	Commissioner of DEC	1. Notify immediately by telephone when concentration, averaged over a 24-hour period, exceeds or threatens to exceed 5000 times the limits set forth in Schedule 2 of 380.9 (in uncontrolled areas). 2. Notify within 24 hours by telephone when concentration, averaged over 24- hour period, exceeds or threatens to exceed 500 times the limits set forth in Schedule 2 above (in uncontrolled areas). 3. Report within 30 days the concentration and quantity of radioactive material involved, the cause of the discharge, and corrective steps taken or planned to ensure no recurrence of the discharge.	Operator of the radiation installation.

Exhibit 1.1-2
State and Federal Reporting Requirements for Hazardous Substance Spills, Leaks, and Discharges
(continued)

Materials Covered	Act or Regulation	Agency to Notify	What Must Be Reported and When	Who Must Report
Low Level radioactive wastes in transport. Any suspected or actual uncontrolled releases.	6 NYCRR 381.16 ECL §27-0305 Waste Transporter Permits	DEC and Department of Health	Immediate notification.	Transporter

TECHNICAL

FIELD GUIDANCE

SPILL REPORTING AND INITIAL NOTIFICATION ENFORCEMENT OF SPILLER RESPONSIBILITY

NOTES

Spill Reporting and Initial Notification -
Enforcement of Spiller Responsibility

GUIDANCE SUMMARY-AT-A-GLANCE

Use the "Notification Procedures Checklist" (Exhibit 1.1-3) to document conversations with the responsible party or potentially responsible party (PRP/RP) concerning his or her clean-up responsibilities.

The steps to follow when you inform the PRP/RP of his or her legal responsibility are:

-- Give your name and identify yourself as a DEC employee;

-- Inform them that they have been identified as the party responsible for the spill;

-- Inform PRP/Rps of their liability for all clean-up and removal costs. (If necessary, cite Section 181 of the Navigation Law);

-- Ask PRP/Rps "point blank" if they will accept responsibility for the cleanup; and

-- If the PRP/RP does not accept responsibility, or does not admit to being the PRP/RP, inform him or her that DEC will conduct the cleanup and send the bill to whoever is the PRP/RP. Also inform them that a DEC-conducted cleanup could be more costly than a PRP/RP-conducted cleanup, and that the PRP/RP could face interest charges and penalties for refusing to clean up the spill.

If the PRP/RP accepts responsibility for the cleanup:

(1) Send the PRP/RP a "Spiller Responsibility Letter" (Exhibit 1.1-5) and an "Acceptance of Financial Responsibility Form" (Exhibit 1.1-6) and

(2) Send the PRP/RP an "Option Letter," which should outline the options available to the PRP/RP to clean up the spill. See Exhibit 1.1-4 for a summary of how and when to use these forms and what they may include.

NOTES

1.1.2 Spill Reporting and Initial Notification - Enforcement of Spiller Responsibility

This section provides guidance on those steps you take to inform responsible parties or potentially responsible parties (PRP/Rps) or spillers of their responsibility under state law for cleaning up spills. This guidance applies to all contacts (by phone, by mail, or in person) you have with Rps throughout the response process concerning their fulfillment of this legal responsibility. The possible consequences of an RP's refusal or inability to conduct the spill response are also discussed.

1. State Law and Policy

Under Article 12 of the Navigation Law and Article 71 of the Environmental Conservation law (ECL), those parties responsible for a petroleum release are liable for all costs associated with cleaning up the spill as well as third party damages (see Introduction-A for more information). Section 181 of the Navigation Law states:

> *Any person who has discharged petroleum shall be strictly liable, without regard to fault, for all cleanup and removal costs and all direct damages, no matter by whom sustained as defined in this section.*

There are two ways by which PRP/RPs can pay for the costs associated with cleanups. First, the PRP/RP can reimburse the state for site investigation, clean-up, and remediation costs incurred by the State Oil Spill Fund or federal Leaking Underground Storage Tank (LUST) Trust Fund. Second, the PRP/RP can assume full responsibility for the cleanup from the beginning and bear all costs throughout the clean-up process. It is DEC's policy to make every effort to have PRP/RPs pay for cleanups from the outset.[1]

To achieve PRP/RP-directed and PRP/RP-financed cleanups, your responsibilities are to: (1) identify the PRP/RP(s), (2) inform them of their legal responsibilities for the spill, and (3) ensure that they carry out these responsibilities. All investigations of spills and PRP/RPs should be pursued vigorously and without prejudice. Use to your advantage the argument that having the PRP/RP assume responsibility for clean-up costs benefits both DEC and the spiller. It saves DEC the expense of cost-recovery procedures. It also allows the PRP/RP to be more involved in clean-up decisions (e.g., choosing their clean-up contractors) and, more significantly, it usually results in lower clean-up costs. Because the PRP/RP is responsible for all indirect costs incurred if DEC conducts the cleanup, the spiller will pay for the DEC contractor's clean-up work, as well as the supervision costs incurred by DEC, any third-party claims associated with the spill, and any punitive fines levied.

---

[1] Spillers are not only responsible for assuming the costs of a cleanup, but also can be subject to a $25,000 per day fine for not paying the clean-up costs (among other violations). The Navigation Law provides for these penalties in Section 192, which states:

> Any person who knowingly gives or causes to be given any false information as a part of, or in response to, any claim made pursuant to this article for cleanup and removal costs, direct or indirect damages resulting from a discharge, or who otherwise violates any of the provisions of this article or any rule promulgated thereunder or who fails to comply with any duty created by this article shall be liable to a penalty of not more than twenty-five thousand dollars for each offense in court of competent jurisdiction. If the violation is of a continuing nature each day during which it continues shall constitute an additional, separate, and distinct offense. (emphasis added)

NOTES

2. Notification Process

Part 1, Section 4, of this manual discusses the process of identifying the PRP/RP as part of the spill investigation for a particular site. Once you identify the PRP/RP, follow the guidance provided below for informing the PRP/RP of his or her responsibilities for spill cleanup. If you are uncertain about who the PRP/RP is, apply the procedures outlined below with all suspected RPs until the responsible party or parties are identified.

a. Informing RPs of Their Responsibility at the Spill Scene

It is important to inform PRP/RPs of their legal responsibility to clean up a spill as soon as possible. When you arrive at a spill site, you should immediately inform the representative of any PRP/RP of their liability under the Navigation Law and the Environmental Conservation Law. In doing so, follow the steps covered in the "Notification Procedures Checklist" (Exhibit 1.1-3).

Document completion of the notification steps, and identify your contact(s).

> Although you should be firm and direct in informing the PRP/RP of their responsibility, you should make every attempt to avoid an adversarial relationship with the RP. The full cooperation of the PRP/RP will result in a more efficient and effective cleanup.

b. Informing Spillers of Their Responsibility in Writing

You should send three different letters to the PRP/RP to inform them of their responsibility (see Exhibit 1.1-4, "Notification Forms Summary"). If a site response was initiated and you are able to confirm the spill visually, the "Spiller Responsibility Letter" (Exhibit 1.1-5) along with an "Acceptance of Financial Responsibility Form" (Exhibit 1.1-6) should be sent as soon as possible. In addition, an "Option Letter" that informs the PRP/RP of their possible options for addressing a spill should be sent. These letters should be kept as part of the Corrective Action Plan (CAP) (see Part 1, Section 5, "Corrective Action Plans.")

Exhibit 1.1-3
Notification Procedures Checklist

Completed	Step	Date	Contact(s)
____________	1. Give your name and identify yourself as a DEC employee.		
____________	2. Inform the PRP/RP that he/she has been identified as the party responsible for the spill.		
____________	3. Inform PRP/RPs of their responsibility to pay for all clean-up costs. (As necessary, cite Section 181 of the Navigation Law or Article 71 of the ECL.)		
____________	4. Ask PRP/RPs "point blank" if they will accept responsibility for the cleanup. Response: ______________________________ ______________________________ ______________________________ ______________________________ ________________________		
____________	5. If the PRP/RP does not accept responsibility, or does not admit to being the spiller, inform him/her that DEC will conduct the cleanup and send the bill to whoever is the spiller.		
____________	6. If the PRP/RP does not accept responsibility also inform him or her that a DEC-conducted cleanup could be more costly than a spiller-conducted cleanup, and that the spiller could face interest charges and a fine for refusing to pay for the billed clean-up costs.		

Exhibit 1-A-4

Notification Forms Summary
(Send Forms by Certified Mail)

Notification Form	When and How to Use	Information to be Included
Spiller Responsibility Letter	Send by certified mail to PRP/RP for confirmed spill.	# Spill location; # Spiller's responsibility under the Navigation Law; # Penalties that can be levied if the spiller does not cooperate; and # Deadline for spiller to begin containment and removal of the spill.
Acceptance of Spiller Responsibility Form	Send by certified mail to PRP/RP for confirmed spill.	# Request for spiller's signature acknowledging his or her acceptance of responsibility for the spill cleanup.
Option Letter	Send by certified mail to PRP/RP for confirmed or suspected release (e.g., failed tightness test).	# Spill number; # Date spill was discovered or reported; # Exact location of the spill; # Authority of Article 12 of the Navigation Act; and # Penalties for noncompliance.

Exhibit 1.1-5

Spiller Responsibility Letter

[Date]

[Addressee]
[Address]

Dear [   ]:

This is to inform you that as a result of investigation by our Department, we consider you responsible for Petroleum Spill Number __________, dated _______, at ____________________________. Under Article 12 of the Navigation Law, Section 192, any person who discharges petroleum without a permit and fails to promptly clean up such prohibited discharge may be subject to a penalty of up to $25,000 a day.

Containment and removal of this spill must be initiated within _____ hours.

Your failure to initiate timely spill cleanup and removal, in addition to the penalty stated above, will result in your being billed for all actual costs incurred by New York State as set forth in Section 181 of the Navigation Law. These costs include cleanup and removal, all direct and indirect damages, including damages incurred by third parties.

Sincerely,

Regional Spill Engineer
Region

Exhibit 1.1-6
Acceptance of Spiller Responsibility Letter

[Date]

SPILL #_________

ACCEPTANCE OF FINANCIAL RESPONSIBILITY

___________________________, hereby assumes responsibility for containment and
(Name of Company and Person)

cleanup of ______________ discharged from______________________
(Substance) (Source)

on _______, and recognizes that the determination of the adequacy and propriety of
(Date)

the containment and cleanup operation continues to rest with the New York State

Department of Environmental Conservation On-Scene Coordinator.

____
(Authorized Signature and Title)

____
(Name and Title Printed)

____
(Address of Company)

____
(Date and Time)

____
(Witness)

NOTES

The "Spiller Responsibility Letter" informs spillers of their responsibility under the Navigation Law and explains the penalties that can be levied if the spiller does not cooperate. It should be sent to the spiller or suspected spiller as soon as a petroleum spill has been confirmed. The letter notifies the spiller that he or she is required to initiate containment and removal of the spill within a period of time you specify.

There are at least three factors you should consider when specifying a deadline in this letter:

The size and nature of the spill;

The proximity of the spill to, or its possible effects on, water supplies (surface or ground water), nearby homes and other structures, and/or sensitive environmental areas; and The possible environmental, safety, and/or human health effects of delaying containment and removal.

The "Acceptance of Spiller Responsibility Form" requires the spiller's signature acknowledging his or her responsibility for containment and cleanup of the spill. This form and the "Spiller Responsibility Letter" should be sent by certified mail.

The "Option Letter" outlines the possible options available to the PRP/RP for cleanup of the spill. The contents of this letter can vary somewhat depending on how the release was discovered (e.g., through a complaint or a failed tightness test), the extent and type of spill, and the policies and procedures of your regional office. There is, however, some information that should appear in every "Option Letter." All "Option Letters" should contain the following: spill number, date the spill was discovered, and exact location of the spill. In addition, the letter should cite the response authority provided DEC by Article 12 of the Navigation Act and describe the penalties for noncompliance.

Each "Option Letter" should outline clearly the options open to the PRP/RP to address the spill and the information you wish submitted, and may also specify certain deadlines for taking action. However, it is up to you to determine the particular options, information requirements, and dates you include in the letter. Depending on the circumstances, you may list in your letter one or several options from which the PRP/RP can choose. For example, when an UST fails an initial tank test the following options could be included:

Conduct separate integrity tests on the piping and the tanks in order to verify the release source within the tank system.

Remove the "non-tight" tank and either remove and dispose of all contaminated soils, or install monitoring wells.

NOTES

Install monitoring wells and abandon the "non-tight" tank in-place.

Remove the tank within 30 days, according to the requirements for tank removal (outline these requirements in the letter).

The "Option Letter" should always be sent by certified mail. In addition, you should have the PRP/RP inform you as soon as possible about the option(s) he or she has chosen.

Several examples of possible "Option Letters" are included as Exhibits 1.1-7 through 1.1-12. These are provided as examples only; you should use "Option Letters" developed by your own office, or develop your own.

Exhibit 1.1-7 is a sample option letter to an PRP/RP for removal of contaminated soil from an UST release. Note that this option letter includes: (a) specific requirements for removal of the contaminated soil; (b) dates for when the removal must be completed, and (c) requirements for the PRP/RP to forward to DEC copies of the landfill disposal receipt and ample test results. The additional sample option letters apply to the following situations: when an UST has failed an initial tightness test (Exhibit 1.1-8), when an UST fails an isolation tank test (Exhibit 1.1-9), when an UST fails a Petro-tite Systems Test (Exhibit 1.1-10), and ground-water contamination cleanup (Exhibit 1.1-11).

3. Dealing with Uncooperative Spillers

There are generally two ways in which an PRP/RP may fail to fulfill his or her legal responsibilities for spill cleanup: (1) a PRP/RP may refuse from the beginning to accept responsibility, or (2) an PRP/RP may fail to conduct a cleanup in the manner, or in as timely a fashion, as agreed upon with the DEC. If a PRP/RP refuses to cooperate from the outset, try again to change the RP's mind. Send additional notices of spiller responsibility (Exhibit 1.1-12) and/or initiate phone conversations with PRP/RPs to inform them again of the consequences of not cooperating (i.e., higher clean-up costs and possible penalties). If a party claims not to be the PRP/RP, you should inform them of your reasons for believing they are the PRP/RP under the Navigation Law.

If a PRP/RP agrees to conduct and pay for the cleanup and then does not proceed in the manner agreed upon or as quickly as agreed upon, you should inform the PRP/RP immediately that you are dissatisfied with the progress of the cleanup and that DEC is considering taking it over. There are no hard-and-fast rules for deciding when you should take over a cleanup. If possible, you should always work toward having the PRP/RP continue the cleanup in the agreed-upon manner. Attempt to determine why the cleanup is not proceeding as planned and consider means of helping the PRP/RP-directed cleanup get back on track.

Exhibit 1.1-7

Sample Option Letter:
Soil Cleanup Spill

[Date]

[Addressee]
[Address]

Dear [ ]:

This letter is to confirm your - (site meeting) (telephone conversation) with ____________ of this Department on ________________________,
(Name) (day) (date) (year)
in regards to the above-mentioned spill site. This site involves _________________________
(explanation)

The following items were discussed and agreed upon:

1. All contaminated material must be removed and stored on site until it can be properly disposed of at a properly permitted landfill.

2. All contaminated material must be sampled for ________________________________ __________________________________. The results must be
(analyses)
negative for the material to be considered non-hazardous oily debris. You must contact your selected sanitary landfill to verify the sample analyses that they require for disposal.

3. A hauler with a Part 364 permit must be used to haul the contaminated soil to your selected landfill.

4. Please notify this Department after the work is completed but prior to any backfilling of the spill area so that an inspection of the excavation may be made.

5. Please forward to us a copy of the landfill disposal receipt and the sample results.

A schedule for this work is required by ___________________________.
(day) (date) (year)
Cleanup must be performed by no later than ___________________________.
(day) (date) (year)

If you have any questions, please feel free to contact ________________________________
(Name)
at 847-4590. Your cooperation will be appreciated.

Very truly yours,

Senior Sanitary Engineer

Exhibit 1.1-8

Sample Option Letter:
Initial Tank Failure

[Date]

[Addressee]
[Address]

Dear [ ]:

This Department received notification on ______________________that (a)
(day) (date) (year)
_______________________tank(s) failed its (their) tank test performed by
(gallons) (product stored)
_____________. On _________, Mr._____________of this Department
(contractor) (date) (name)
discussed with __________ that one of the following options must be done concerning this tank.
(person)

OPTION 1:
1. The tank is to be immediately isolated from the piping and is to be retested. If the tank tests tight, it may remain in service.
2. The lines are to be repaired, if necessary, and retested by a state-approved method. Exposed piping may be air tested.
3. A copy of any test results are to be sent to this office.

OPTION 2: If the tank fails the retest, or if you decide not to retest, the following must now be done:
1. All product must be immediately removed from the tank.
2. The tank itself must be removed within thirty days. A Petroleum Bulk Storage form must be submitted to this Department prior to tank removal.
3. The interior surface of the tank must be cleaned, and all sludge and residue generated by this process must be properly disposed. The tank must be cut open to allow for this work and to ensure proper ventilation of the tank interior.
4. All safety precautions regarding the opening, cleaning and entering of the tank must be followed. The interior atmosphere of the tank may be explosive and proper procedures must be followed.
5. Once the tank has been cleaned out, it may be disposed as scrap.

Mr._______must be notified when you have a firm date for retesting or removal. Please note, we must be present when this tank is removed to determine if any groundwater or soil contamination exists. If groundwater or soil contamination is found, further remedial work will be required.

If you have any questions, please contact________ at 847-4590. Your cooperation will be appreciated.

Sincerely,

[ ]

Exhibit 1.1-9

Sample Option Letter:
Retest Failure, Tank Removal

[Date]

[Addressee]
[Address]

Dear [ ]:

On____________________, a ______gallon _______________, underground store storage tank at the
(day) (date) (year) (#) (material)
above-mentioned address failed a system tank test. On____________________, this tank failed an isolation tank test.
(day) (date) (year)
Since the tank failed the retest, the following must now be done:

1. All product must be immediately removed from the tank.

2. The tank itself must be removed within thirty days. A Petroleum Bulk Storage form (enclosed) must be submitted to this Department prior to tank removal.

3. The interior surface of the tank must be cleaned, and all sludge and residue generated by this process must be properly disposed. The tank must be cut open to allow for this work and to ensure proper ventilation of the tank interior.

4. All safety precautions regarding the opening, cleaning and entering of the tank must be followed. The interior atmosphere of the tank may be explosive and proper procedures must be followed.

5. Once the tank has been cleaned out, it may be disposed as scrap.

____________________of this Department must be notified when you have a firm
(Name)
date for removal. We must be present when this tank is removed to determine if any groundwater or soil contamination exists. If groundwater or soil contamination is found, further remedial work will be required.

For your use, enclosed is a list of contractors that are known by this Department to do this type of work. This list is by no means complete. Any contractor may be used by you for this work.

If you have any questions, please feel free to call _______________________at 847-4590.
(Name)
Your cooperation will be appreciated.

Sincerely,

[ ]

Exhibit 1.1-10

Sample Option Letter:
Failed Tank Test

[Date]

CERTIFIED - RETURN RECEIPT REQUESTED

[Addressee]
[Address]

RE: Spill No.

Gentlemen:

This office has been informed by ______(Name)___ that __(tank)__ failed a Petrotite systems test. In accordance with Article 12 of the New York State Navigation Law, I must determine if there has been any harm to the lands or the groundwater of the State. In order for me to make this determination, you have three options:

1. Prove that it was not a leaking tank by removing all the piping from the tank and separately Petrotite test the tank. If the tank passes the Petrotite test, it is a piping leak. The tank may then be abandoned or the piping can be repaired, attached to the tank, and the system Petrotite tested.

2. Excavate and remove the tank in the presence of a representative from this office so that an inspection of the tank and the soil can be made. If the tank is sound, and there is no evidence of product loss, nothing further need be done. If there is a problem, proceed as in 3 below.

3. Abandon the tank in-place and install several four (4) inch diameter PVC site wells extending five (5) feet into the groundwater with a screen length of ten (10) feet, with slot size of .020 inches. The exact location and number of wells will be determined by a representative from this office. These wells will be checked for a period of twelve months by New York State, and if there is no evidence of product for that period, the spill will be removed from our listing. If free or dissolved product appears, cleanup must begin immediately.

If cleanup does not begin by __(Date)__ by the responsible party, the State will begin the cleanup and bill the responsible party.

Sincerely,

[ ]

Exhibit 1.1-11

Sample Option Letter:
Ground-water Cleanup

[Date]

[Addressee]
[Address]

Dear [ ]:

This letter is to confirm your (site meeting) (telephone conversation) with (Name) of this Department on (day) (date) (year). Groundwater at this spill site is contaminated with (free floating oil) (dissolved oil components). The following items were discussed and agreed upon:

1. (#) additional four-inch monitoring wells will be installed at the agreed upon locations. A sketch of a typical monitoring well is enclosed for your use.

2. One recovery well will be installed to recover oil product. Groundwater must be pumped to depress the groundwater table. The groundwater must be pumped to an oil-water separator tank. Accumulated oil may be recovered from the well by bailing or by a second pump. A second type of recovery well pumps both oil and water to a separator tank. Oil from the tank is then recovered. You should check with your contractor to determine the best method for the recovery well. Groundwater must be pumped to depress the groundwater table.

3. The discharge water must be sampled for (Contaminates). Dependent upon the sampling results, it may be discharged with a SPDES permit to (Name). The water must at all times be sheenless. An air stripper or a carbon filter may be necessary for the discharge water.

4. All collected oil must be properly disposed. Copies of receipts indicating the disposal site must be forwarded to this office.

It was also agreed that these actions be completed by (Date). Should you have any questions, please do not hesitate to contact (Name) at 847-4590. Your cooperation will be appreciated.

Sincerely,

[ ]

Exhibit 1.1-12

Sample Option Letter:
Soil Disposal, Soil Still On Site

[Date]

[Addressee]
[Address]

Dear [   ]:

A recent inspection by___(Name)_______of this office indicated that the contaminated soil at your facility still remains on site. We are requesting this oil be removed by__(day)__(date)__(year)_to an acceptable landfill. Please send a copy of the disposal receipt to this office.

If you cannot remove the soil by that date, please contact this office immediately. If you do not contact this office and the soil still remains on site past___(Date)_, DEC will have the soil removed from your site. You will then be billed for the costs of removal and disposal as well any relevant penalties.

If you have any questions, please feel free to contact__(Name)________at 847-4590. Your cooperation will be appreciated.

Very truly yours,

Senior Sanitary Engineer

NOTES

If all efforts to encourage a PRP/RP to continue the cleanup fail, send a certified letter (Exhibit 1.1-13) notifying them that their actions have been unsatisfactory and that DEC will assume responsibility for the cleanup. This letter again informs the PRP/RP of his or her liability for all costs incurred by DEC during its cleanup.

Exhibit 1.1-13

Unsatisfactory Cleanup Notice Letter

[Date]

CERTIFIED MAIL SPILL #

[Addressee]
[Address]

Dear Sir:

My letter of (Date) notified you of New York State's interest in a pollution incident for which you are presently considered responsible.

You are hereby given notice that your actions to remove the pollutant and mitigate its effects have been evaluated as unsatisfactory. Effective (Date) , the New York State Department of Environmental Conservation will conduct all cleanup activities under the authority of Article 12 of the Navigation Law. Removal will be effected in accordance with the regulations of the Department of Environmental Conservation. You will be billed for all actual costs incurred by New York State as set forth in Section 181 of the Navigation Law, as well as interest and penalties.

Should you require further information concerning this matter, contact: (Name)
.

Sincerely,

[ ]

Received and Acknowledged

______________________ ____________ ___________
Time Date

TECHNICAL

FIELD GUIDANCE

SPILL REPORTING AND INITIAL NOTIFICATIONS - ACCESS AND RIGHT-OF-ENTRY

NOTES

Spill Reporting and Initial Notifications -
Access and Right-of-Entry

GUIDANCE SUMMARY AT-A-GLANCE

Section 178 of the Navigation Law gives you the authority to enter private property to investigate or clean up a suspected spill.

In general, you should inform the property owner of your right to enter onto private property and obtain consent from the owner. This consent can be either written or verbal.

Detailed information and procedures for access and right-of-entry is considered confidential for spill responders. This information is contained in Appendix L, and is marked confidential.

NOTES

1.1.3 Access and Right-of-Entry

This section addresses the right of NYSDEC personnel to enter private property on which a spill has occurred or is suspected, for the purpose of investigating, containing, and/or cleaning up the spill. Detailed information and procedures of access and right-of-entry are considered confidential. Therefore, this information can be found in Appendix L, including your legal rights to enter property and the procedures to follow to ensure that no charges of trespassing are brought against the Department.

1. State Law and Policy

You have the authority, under the Navigation Law, to enter property to investigate or clean up a real or suspected spill. Specifically, Section 178 of the Navigation Law states:

> *The department is hereby authorized to enter and inspect any property or premises for the purpose of inspecting facilities and investigating either actual or suspected sources of discharges or violation of this article or any rule or regulations promulgated pursuant to this article. The department is further authorized to enter on property or premises in order to assist in the cleanup or removal of the discharge. Any information relating to secret processes or methods of manufacture shall be kept confidential.*

In any emergency or non-emergency, you must possess information supporting a reasonable belief to suspect that a spill has occurred or is occurring, or that the spill is impacting the premises for which access is sought. A reasonable belief may be based on a report of a spill or visual observation. For example, if a gasoline station operator reports an unexpected loss of product from his underground storage tanks that are located near private household wells, you might want to investigate those wells and check the water.

Although you have the authority to enter the premises, *it is always advisable to obtain the consent of the property owner or his or her agent before entering the property.* This consent can be either written or verbal. Obtaining this consent may help avoid civil or criminal charges for trespass being logged. In cases where the owner/agent is not available or not ascertainable, entry should be made.

Appendix H

Operations and Maintenance Plan

THE SUMMIT AT FORTS FERRY

STORMWATER MANAGEMENT SYSTEM
OPERATION AND MAINTENANCE PLAN

INTRODUCTION

This Post Construction Operations and Maintenance Manual was prepared for the project to address long-term control of runoff and pollutants from the site after construction. The plan was developed pursuant to the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit No. GP-0-15-002.

The Facility Owner is responsible for the construction and the post-development construction inspection and monitoring for this property. The Facility Owner shall designate a qualified inspector who will be responsible for the construction phase of the project and the implementation of the pollution prevention measures shown on the plan sheets and in the SWPPP. Requirements for the qualified inspector are set forth in the NYSDEC SPDES general permit GP-0-15-002 included in the SWPPP.

The responsibilities set forth in the SWPPP will continue for the life of the site and shall transfer with property ownership.

Responsible Party: The site owner is responsible for the operation and maintenance of the stormwater facilities outlined herein.

PREVENTATIVE MEASURES

The most effective way to maintain water quality within a facility is to prevent pollution at its onset.

A maintenance program should include education, trash collection, proper and legal disposal of hazardous wastes and chemicals, minimal use of chemicals and pesticides in lawn care, early detection and clean up of automotive leaks, removal of up stream sediment on a regular basis, and storing materials indoors to reduce runoff.

Pollution includes, but is not limited to:

- Sediment, trash, and debris
- Chemicals
- Animal Waste
- Runoff from Stored Materials
- Illicit discharge to storm drainage systems

1. **PROJECT SITE COVER**

a. **Inspections**

Site cover and associated structures and embankments should be inspected periodically for the first few months following construction and then on a biannual basis. Site Inspections should also be performed following all major (i.e., intense storms, thunder storms, cloud burst, etc.) storm events. Items to be inspected include (but are not limited to):

i. Differential settlement of embankments, cracking or erosion.
ii. Lack of vigor and density of grass turf or vegetation.
iii. Accumulation of sediments or litter on lawn areas, paved areas, or within catch basin sumps.
iv. Accumulation of pollutants, including oils or grease, in catch basin sumps.
v. Damage or fatigue of storm sewer structures or associated components.

b. **Mowing and Sweeping**

Vegetated areas and landscaping should be maintained to promote vigorous and dense growth. Lawn areas should be mowed a minimum of three times a year (more frequent mowing may be desired for aesthetic reasons). Resultant yard waste shall be collected and composted or disposed of off-site.

Paved areas should be swept at least twice per year. Additional sweeping may be appropriate in the early spring for removal of deicing materials.

c. **Debris and Litter Removal**

Accumulation of litter and debris should be removed during each mowing or sweep operation.

d. **Structural Repair or Replacement**

Components of the system which require repair or replacement should be addressed immediately following identification.

e. **Catch Basins**

The frequency for cleanout of catch basin sumps will depend on the efficiency of mowing, sweeping, and debris and litter removal. Sumps should be cleaned when accumulation of sediments are within six inches of the catch basin outlet pipe.

Disposal of material from catch basins sumps, drainage manholes, and pipes shall be in accordance with local, state, and federal guidelines.

f. **Detention Basins**

The underground system shall be inspected every six months for sediment buildup. Sediment shall be removed as necessary or whenever capacity falls to 95%. An Operation and Maintenance Inspection shall be performed and recorded. Sediment should be removed from piping where it connects to any structure using a jet to pull sediment into the structure sump and then removed and disposed of.

g. Winter Maintenance

To prevent impacts to storm water management facilities, the following winter maintenance limitations, restrictions or requirements are recommended:

i. Remove snow and ice from inlet structures, basin inlet and outlet structures, and away from culvert end sections.

ii. Snow removed from paved areas should not be piled at inlets/outlets of the storm water management basis.

iii. Use of deicing materials should be limited to environmentally-friendly chemical products. Use of salt mixtures should be kept to a minimum.

iv. Sand should not be used for deicing.

v. Materials used for deicing should be removed during the early spring by sweeping and/or vacuuming.

h. Bioretention Maintenance

A legally binding and enforceable maintenance agreement shall be executed between the facility owner and the local review authority to ensure the following:

- Sediment shall be cleaned out of the sedimentation chamber when it accumulates to a depth of more than six inches. Vegetation within the sedimentation chamber shall be limited to a height of 18 inches. The sediment chamber outlet devices shall be cleaned/repaired when drawdown times exceed 36 hours. Trash and debris shall be removed as necessary.

- Silt/sediment shall be removed from the filter bed when the accumulation exceeds one inch. When the filtering capacity of the filter diminishes substantially (i.e., when water ponds on the surface of the filter bed for more than 48 hours), the top few inches of discolored material shall be removed and shall be replaced with fresh material. The removed sediments shall be disposed in an acceptable manner (i.e., landfill).

A stone drop (pea gravel diaphragm) of at least six inches shall be provided at the inlet of bioretention facilities (F-6). Areas devoid of mulch shall be re-mulched on an annual basis. Dead or diseased plant material shall be replaced.

i. Stormwater Planters

A regular and thorough inspection regime is vital to the proper and efficient function of stormwater planters. Debris and trash removal should be conducted on a weekly or monthly basis, depending on likelihood of accumulation. Following construction, planters should be inspected after each storm event greater than 0.5 inches, and at least twice in the first six months. Subsequently, inspections should be conducted seasonally and after storm events equal to or greater than the 1-year storm event. Routine maintenance activities include pruning and replacing dead or dying vegetation, plant thinning, and erosion repair. Since stormwater planters are not typically preceded by pre-treatment practices, the soil surface should be inspected for evidence of sediment build-up from the connected impervious surface and for surface ponding. Attention should be paid to additional seasonal maintenance needs as well as the first growing season.

j. Stormwater Ponds

Maintenance responsibility for a pond and its buffer shall be vested with a responsible authority by means of a legally binding and enforceable maintenance agreement that is executed as a condition of plan approval. The principal spillway shall be equipped with a removable trash rack, and generally accessible from dry land. Sediment removal in the forebay shall occur every five to six years or after 50% of total forebay capacity has been lost. All required safety elements must be inspected and maintained on an annual basis, unless prior inspections indicate more frequent maintenance is required.

Soil Restoration Maintenance

A simple maintenance agreement should identify where Soil Restoration is applied, where newly restored areas are/cannot be cleared, who the responsible parties are to ensure that routine vegetation improvements are made (i.e., thinning, invasive plant removal, etc.). Soil compost amendments within a filter strip or grass channel should be located in public right of way, or within a dedicated stormwater or drainage easement.

First year maintenance operations includes:

- Initial inspections for the first six months (once after each storm greater than half- inch)
- Reseeding to repair bare or eroding areas to assure grass stabilization
- Water once every three days for first month, and then provide a half inch of water per week during the first year. Irrigation plan may be adjusted according to the rain event.
- Fertilization may be needed in the fall after the first growing season to increase plant vigor
- Ongoing Maintenance:

Two points help ensure lasting results of decompaction:

1) Planting the appropriate ground cover with deep roots to maintain the soil structure
2) Keeping the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths.

Bioretention Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Bioretention and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) have been removed		
2. Vegetation (Monthly)		
Plant height not less than design water depth		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 6 inches		
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Monthly)		
Dewaters between storms		
No evidence of standing water		
5. Sediment Deposition (Annual)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual)		
Filter bed has not been blocked or filled inappropriately		

Comments:

Actions to be Taken:

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project ______________________________
Location: ______________________________
Site Status: ______________________________

Date: ______________________________
Time: ______________________________

Inspector: ______________________________

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam “As-Built”		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete ______ Corrugated pipe ______ Masonry ______ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken: