DRAINAGE ANALYSIS
&
EROSION AND SEDIMENT CONTROL PLAN

Prepared for:

John & Linda Svenson
&
1962 Real Estate LLC

Land of

John & Linda Svenson

Prepared by:

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825

Project Number:
DB 2018-005

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Table of Contents

DESIGN METHOD OBJECTIVES

The owner of Tax Map 235, Lot 1 John and Linda Svenson, in conjunction with the land owners of Tax Map 239, Lot 2, 1962 Real Estate LLC, are proposing to construction an access road to the rear section of the Christmas Dover parking Lot. The applicants have received a variance from the Barrington Zoning Board which contemplates a residential subdivision beyond the Christmas Dove. The owners in the meantime are looking to re-develop Christmas Lane to provide one, proper access to the Christmas Dove and the land owned by 1962 Real Estate LLC. A portion of the project is conceptual in nature at this time and contains the future branch location of Holy Rosary Credit Union. The project plans call out areas that are to be constructed on that project site at this time so as to ensure the proper drainage design is implemented as part of this project path.

Existing Topography was derived from the Existing Conditions Survey conducted, NHDES Watershed Report-cards, and USDA / NRCS Soils Mapping (WebSoil) which were used in developing the information utilized in the analysis and modeling of this project site. The watershed area involved in this analysis includes land area outside the locus parcel. NRCS "WebSoil" was used in determining all of the onsite soils types as well, and is generally confirmed by on site test pitting by Berry Surveying & Engineering (BS&E).

An Existing and Proposed Conditions analysis was conducted for the purpose of estimating the peak rate of stormwater run-off and to subsequently design adequate mitigation of drainage. There is one existing discharge point analyzed on the project site, noted as Final Reach 800. This is the existing pond located on the Svenson property. Designing two watershed models we have compared the differences in these rates of peak run-off and surface water volume. Sheets W-1 outlines the characteristics of the site in its existing or pre-construction conditions. The second analysis displays the proposed (post-construction) conditions (See Sheets W-2). The analysis was conducted using data for; 2 Yr – 24 Hr (3.08"), 10 Yr – 24 Hr (4.64"), 25 Yr -24 Hr (5.86"), 50 Yr – 24 Hr (7.00"), and 100 YR-24 Hr (8.37") storm events. Storm event analysis was accomplished using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment and rainfall quantities are based on the Extreme Precipitation Table for this location from the Northeast Regional Climate Center / Cornell University (http://precip.eas.cornell.edu), (Attached in Appendix 3).

1.0 Existing Analysis:

Reference: W-1 Sheets - Existing Conditions Watershed Plan (Enclosed)
Sheet 2 Existing Conditions Plan

The Existing parcel consists of large vacant land to the rear of the project site, which drains down through the proposed development site. The site contains the home of a large building known as the Christmas Dove, the associated parking area as well as a compact gravel driveway for access to NH Route 9. The site also contains the home of John and Linda Svenson, and the land owned by 1962 Real Estate LLC recently contained

the location of single family home. This is evidenced on the existing conditions plans completed in 2017. The existing driveway was still in place.

In addition to the locus parcel, as noted above, there are off site flows that migrate through the project site. When the project was originally built an simplistic closed drainage system was installed which carries much of the offsite flow through the developed site to the Svenson pond on site. The remaining offsite flow is routed to an agricultural swale on the project site and under the existing driveway. At the driveway crossing there is an existing basin which collects the closed drainage flow below the outlet grade. This crossing was modeled to the best of our ability in this model and it is our opinion that it most closely represents the existing characteristics.

The areas evaluated were modeled with hydrologic group "A" soils whereas the front of the site contains Windsor Soils and the rear of the site contains Charlton Soils. These were confirmed with a small sample of test pits on the project site. Wetlands areas were modeled as hydrologic soil group "D".

Final Reach #800:

There are eleven sub catchments that contribute runoff to Final Reach #800. Final Reach 800 is the pond which is located on Svenson land and is labeled on the Watershed Sheets as "Svenson Pond" the preceding flows are all channelized flow down to this point through a 24" CMP culvert under the existing driveways. This does not constitute the entire flow down to the pond, only contributing area from this specific project.

2.0 Proposed Analysis:

Reference: W-2 Sheets - Proposed Conditions Watershed Plan (Enclosed)
Proposed Site Plan
Proposed Grading & Drainage Overview Plan
Plan and Profile Sheets

The proposal consists of re-installing a roadway to the Town of Barrington Standards for approximately 550 linear feet. Through its development proper access is provided to the 1962 Real Estate LLC lot. As noted above, a future branch for Holy Rosary Credit Union is contemplated at this location. As such, this site has been conceptually designed with an adequate grading plan which includes the installation of rain garden #101 to handle and treat the flow from the future bank as well as the revised Christmas Lane. There are two proposed infiltration features also proposed on this project site as well as a cross culvert, which are proposed to be constructed as part of the current proposal. These areas are Subcatchments 20S, 22S, 23S and are routed to Pond 101P for treatment. The infiltration features are modeled as Ponds 20P & 22P. These ponds provide the adequate separation to the seasonal high water table (3') to provide treatment through the infiltrating process. Pond 101P is routed to the new cross culvert discussed below, 21P.

An updated crossing through the farm swale is proposed. This area has been re-evaluated by Stoney Ridge Environmental, which determined that only a specific section would be considered jurisdictional wetlands. The crossing is proposed as an 18" HDPE N-12 culvert which is oversized hydraulically. Though this area isn't a wetland, it provides a connection to a downstream wetlands, and in keeping with best management practices for migration, we have opted to oversize the device. This devise is modeled as Pond 21P and receives flow from the modified Subcatchments 2S & 3S. Flow from this crossing is routed to the downstream driveway crossing and then to the Svenson Pond.

There is a sidewalk proposed on the eastern side of the roadway with a 6" vertical granite curb. This curb and gutter system is routed to a series of basins along the roadway. These basins also provide for better drainage practices within the existing Christmas Dove project site. 15" HDPE N-12 pipe was chosen to flow from one basin to another so as to provide adequate capacity for future connections. Applicants moving forward would be expected to adequately mitigate flows and volumes prior to entering this closed system. These areas are modeled as Subcatchments 1S, 6S, 4S and 12S, and are routed to the respective ponds modeled as Pond 10P, 13P, 40P and 12P.

The closed systems and the Dove project site are routed to rain garden #102. This rain garden provides full treatment of the revised roadway as well as the existing project site which was untreated in the existing condition. Subcatchment 5S also contributes flow to this pond (102P). The pond is then routed to the existing driveway cross culvert, draining to Final Reach 800, Svenson Pond.

Final Reach #800:

Flow areas to this final reach remain the same, with a minor increase in the total project curve number. This increase in the curve number is offset by the installation of the Low Impact Development rain gardens #101 & 102, as well as the two infiltration areas. This mitigation allows for the peak rates from this site to be drastically reduced to the Svenson Pond and volumes to be reduced or equalized.

Summary:

The peak rates of run off from the analyzed areas are reduced at the 2,10, 25, 50, 100 Yr. 24Hr. storm events. Volumes are reduced during the 2, 10, 25 Yr.24Hr. storm events with minor increases at the 50 and 100Yr.24Hr. storm events.

Stormwater Treatment:

Surface water runoff from the development area is being treated by bio-detention rain gardens which are low impact development methods (LID) Storm flow is to sheet off from the proposed paved areas into pre-treatment forebay cells prior to entering either the pre-treatment bio cell or rain gardens. Water Quality Volume calculations based on the Alteration of Terrain model are included along with Pond Storage Tables are included in Appendix 3 for all *four* modeled rain gardens. This LID design allows for full treatment while maintaining flows and volumes.

The receiving waters for the project are known as Svenson Pond locally but as Unnamed Brook – Fire Pond (NHIMP600030607-05) which discharges into Green Hill Brook (NHRIV600030607-09). The pond is impaired by Mercury, as is the assumption with all New Hampshire waters, and covered by the NE Regional Mercury TMDL #33883. The brook is also impaired by pH which does not have a TMDL, is considered low priority and not considered an Outstanding Resource Water. Due to the lack of sediment or turbidity as an impairment, the pond and brook are considered Tier 2 Waters by NHDES and construction will be subject to E&SC inspections at an increased frequency, i.e. once every seven days and after a rain event of 0.25 inches or more.

Infiltration Practices:

Infiltration takes place in Ponds 22P & 20P. These ponds contain deep sands and provide for over 3' of separation between the seasonal high water table and the top of in grassed infiltration practice. The lowest rate provided by the NRCS was multiplied by 0.5 pursuant to the Alteration of Terrain rules and a rate of 0.71 was applied to the model.

3.0 FULL COMPARATIVE ANALYSIS Revised 7-31-18

ANALYSIS	COMPONENT	PEAK RATE DISCHARGE (Cubic Feet / Second)				
		2 Yr.	10 Yr.	25 Yr.	50 Yr.	100 Yr.
Final Reach #800	Existing	2.38	4.14	5.82	7.73	10.70
	Proposed	0.69	1.12	3.05	5.11	10.35

ANALYSIS	COMPONENT	VOLUME (ACRE FEET)				
		2 Yr.	10 Yr.	25 Yr.	50 Yr.	100 Yr.
Final Reach #800	Existing	0.203	0.455	0.947	1.688	2.884
	Proposed	0.119	0.395	0.918	1.697	2.934

4.0 EROSION & SEDIMENT CONTROL PLANS BEST MANAGEMENT PRACTICES (BMP's)

Reference: Proposed Site Plan and Grading Plan
Erosion & Sediment Control Plan
Erosion & Sediment Control Details, E-101 & E-102

The proposed site development is protected from erosion and the abutting properties are protected from sediment by the use of Best Management Practices as outlined in the New Hampshire Stormwater Manual, Volume 2, Post-Construction Best Management Practices Selection & Design (December 2008, NHDES & US EPA). Any area disturbed by construction will be re-stabilized within 30 days and abutting properties will not be adversely affected by this development. All swales and drainage structures will be constructed and stabilized prior to having run-off directed to them. Reference is also made to the Stormwater System Operation and Maintenance Plan / Inspection & Maintenance Manual which has been written specifically for this project and available to the owner.

Silt Fence / Perimeter Control

The plan set demonstrates the location of silt fence for sediment control. The Erosion and Sediment Control Details, Sheet E-101, has the specifications for installation and maintenance of the silt fence. Silt fence is rated to be effective for 100 linear feet of fence to capture runoff from one-quarter acre or basically 100 feet of land area sloping toward the fence. Filtrexx silt soxx have a variable area and depth, see Filtrexx supporting documents. The NHDES Stormwater Manual requires that the maximum spacing for support stakes is six-feet.

Filtrexx Silt Soxx, or approve equal, has been specified in numerous locations within the plan set and silt fence is not a substitution for silt soxx. Multiple sizes of this product have been specified for use.

EPA CGP 2012: "You must install sediment control along those perimeter areas of your site that will receive stormwater from earth disturbing activity."

In accordance with EPA CGP 2.1.2.1, Provide Natural Buffers or Equivalent Sediment Controls, and CGP Appendix G, Table G-3, and Table G-7, slopes between 3% and 6% with soils that are Fine Sandy Loams, there is a High Risk Factor and it is required to Double Perimeter Control and 7-Day Site Stabilization.

Erosion Control Mix Berm

As an alternative to the Silt Fence, an Erosion Control Mix Berm can be utilized as a perimeter control. The specifications can be found on Sheet E-101, Detail E6.

Bioretention System (Rain Garden)

Description: Rain Gardens, or bioretention areas are located close to the source of runoff. They are intended to integrate with the site landscaping and become an aesthetically attractive opportunity to provide highly effective stormwater treatment. The rain gardens associated with this proposed development contribute toward recharge of surface water run-off into the ground. It is important that sediment be removed from run-off prior to discharge into the bioretention area to preserve the mulch and soil mix ratio. During construction it is important that the ground surface not be exposed to traffic or construction equipment to preserve the infiltration capabilities of the existing soil. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 2, 4-3 Treatment Practices, 4c Bio-retention System.

Construction Considerations:

After the stone and bio-media has been installed, Filtrexx Silt Soxx or approved equal, will be installed at the toe of slope intersection between the berm and bio-media and will remain until the slopes of the berm are stable.

Maintenance Considerations:

Rain Gardens should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a twenty-four hour period. Maintenance rehabilitation will be conducted as warranted by each inspection. Trash and debris will be removed at each inspection.

On an annual basis the infiltration capabilities need to be confirmed by evaluation of the drawdown time. If the bioretention system does not drain within 72-hours following a rainfall event, a qualified professional will assess the condition of the rain garden to determine measures required to restore the infiltration function. This is normally the direct result of sediment accumulation which will be removed to restore the filter media ratio.

Also on an annual basis the vegetation should be inspected to ensure healthy condition. Invasive species need to be removed along with dead or diseased vegetation.

Rolled Erosion Control Blanket

Description: Rolled Erosion Control Blankets, such as American Excelsior Company Curlex II, Curlex III, (or equal) or turf reinforcement such as North American Green V-Max C-350 (or equal) consist of interlocking fiber mesh, bio-degradable or permanent, used to stabilize sloping earth while vegetation is being established. The product comes in rolls that are laid out over the earth, normally over-lapped, and secured to the soil by the use of anchors or staples. The RECB may be anchored in the earth at the top of the slope to prevent wash-out. Construction specifications are included in the

plan set and New Hampshire Stormwater Manual, Volume 3, 4-1 Erosion Control Practices, Temporary Erosion Control Blanket

Construction Considerations: It is recommended that the blanket be installed in the same direction as the water flow or perpendicular to the slope. The manufacturer will recommend the amount of over-lap from one row to the next and on longer slopes between sections. Care must be taken that the RECB is laid directly on the earth / topsoil and that any existing vegetation not cause tenting as this will cause an issue with the blanket not staying in place. The staples or stakes are to be placed according to the manufacturer based on the slope of the receiving soil and forces that may be encountered. Care must be taken to utilize the correct product as specified. The choice of product are all different and in most cases are not interchangeable. NHDES or NH F&G may specify that some RECBs not be used in some applications.

Maintenance Considerations: RECBs will be inspected during the regular inspection schedule and any construction corrections made if the blanket is compromised.

Vegetated Stabilization

All areas that are disturbed during construction will be stabilized with vegetated material within 30 days of breaking ground. Construction will be managed in such a manner that erosion is prevented and that no abutter's property will be subjected to any siltation, unless otherwise permitted. All areas to be planted with grass for long-term cover will follow the specification and on Sheet E-102 using seeding mixture C, as follows:

Mixture	Pounds per Acre	Pounds per 1,000 Sq. Ft.
Tall Fescue	24	0.55
Creeping Red Fescue	24	0.55
Total	48	1.10

Conservation Mix

Mixture	Pounds per Acre	Pounds per 1,000 Sq. Ft.
Tall Fescue	55	1.25
Creeping Red Fescue	75	1.75
Annual Ryegrass	33	0.75
Perennial Ryegrass	26	0.60
Kentucky Bluegrass	22	0.50
White Clover	7	0.15

Conservation Mix will used to stabilize all 2:1 slopes and all land area disturbed within the wetland buffer.

Stabilized Construction Entrance

A temporary gravel construction entrance provides an area where mud can be dislodged from tires before the vehicle leaves the construction site to reduce the amount of mud and sediment transported onto paved municipal and state roads. The stone size for the pad should be 3-inch coarse aggregate, and the pad itself constructed to a minimum length of 75' for the full width of the access road. The aggregate should be placed at least six inches thick. A plan view and profile are shown on Sheet E-102- Erosion and Sediment Control Detail Plan. Alternatives to the length and berm are demonstrated on the detail.

Environmental Dust Control

Dust will be controlled on the site by the use of multiple Best Management Practices. Mulching and temporary seeding will be the first line of protection to be utilized where problems occur. If dust problems are not solved by these applications, the use of water and calcium chloride can be applied. Calcium chloride will be applied at a rate that will keep the surface moist but not cause pollution.

Drainage Swales / Stormwater Conveyance Channels

Drainage swales will be stabilized with vegetation for long term cover as outlined below, and on Sheet E-102 using seed mixture C. As a general rule, velocities in the swale should not exceed 3.0 feet per second for a vegetated swale although velocities as high as 4.5 FPS are allowed under certain soil conditions.

Deep Sump Catch Basin

Deep Sump Catch Basins are used throughout the site as a pretreatment measure to remove sediment and debris from storm water runoff. Deep Sump Catch Basins will be designed with a sump that is four times the depth of the discharge culvert and a minimum of four feet. All pretreatment deep sump catch basins will have an outlet pipe hood which extends one-foot below the outlet invert and will include a hood vent. Sediment must be removed from Deep Sump Catch Basins on a regular basis, at least twice a year and more often if the sumps become half-full. Inspections should be conducted periodically. See Sheet D-101 for details.

Outlet Protection

Outlet Protection consists of a riprap apron or preformed scour hole that is designed to provide velocity reduction of the surface water run-off that is leaving a culvert. The design is dependent on the culvert size, soil conditions, velocity, and quantity of the run-off. There are to be no bend or curves at the intersection of the conduit and apron. See sheet E-102 for details.

Rip Rap Level Spreader / Stone Berm Level Spreader

The purpose of the level spreader is to convert concentrated flow into sheet flow, for example from a rip rap outlet protection at the end of a culvert discharge pipe prior to discharge overland through a filter strip or buffer. Each level spreader is specifically designed based on the amount of flow and specified on the grading plan. Details for the level spreader can be found on Sheet E-102, detail E12 and page 162 in the referenced NH Stormwater Manual, Volume 2. The level spreader should be inspected after it is installed and stabilized for the deposit of sediment. Any sediment build-up will be removed and transported to a suitable location.

Stockpiled Sediment or Soil

Stockpiled materials including topsoil, excavated materials, borrow materials imported onto the site, construction aggregates, and sediment removed from temporary sediment traps will be located in designated areas at least 50 feet away form concentrated flows. All stockpiles will have erosion protection in the form of silt fence and diversion swales will be applied to protect the material and surrounding areas. Inactive stockpiles will be seeded for temporary stabilization. Erosion control measures will be inspected in accordance with the schedule for all other activities on site.

At a minimum, you must comply with following (EPA 2012 CGP Part 2.1.2.4d) "Do no hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance (unless connected to a sediment basin, sediment trap, or similar effective control,) storm drain inlet, or surface water."

Dewatering Practices

Dewatering practices are not known to be required on this site. If during construction this becomes required, an addendum will be published specific for the requirements. As a general rule, ground water that needs to be removed from an excavation will be pumped to a sediment basin or a storm drain inlet prior to discharge from the site.

At a minimum, you must comply with following (EPA 2012 CGP Part 2.1.3.4) "With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications."

Regarding dewatering practices in the State of New Hampshire, specifically see Construction General Permit Section 9.1.1 NHR12000 State of New Hampshire and "Clarification of Section 9.1.1 … and other New Hampshire specific information for the U.S. EPA 2012 NPDES Construction General Permit (CGP), January 20, 2017"

Construction Sequence

1. Cut and remove trees in construction areas as directed or required.

2. Install Silt Fence and construct and/or install temporary and permanent sediment erosion and detention control facilities (Vegetated swales, level spreaders, and constructed filter strips), as required. Erosion, sediment and facilities shall be installed and stabilized prior to any earth moving operation, and prior to directing run-off to them.

3. Clear, grub, and dispose of debris in approved facilities.

4. Excavate and stockpile topsoil / loam. All disturbed areas shall be stabilized immediately after grading.

5. Construct the roadway and its associated drainage structures.

6. Begin permanent and temporary seeding and mulching. All cut and fill slopes and disturbed areas shall be seeded and mulched as required, or directed.

7. Daily, or as required, construct temporary berms, drainage ditches, sediment traps, etc. to prevent erosion on the site and prevent any siltation of abutting waters or property.

8. Inspect and maintain all erosion and sediment control measures during construction.

9. Complete permanent seeding and landscaping.

10. Remove temporary erosion control measures after seeding areas have established themselves and site improvements are complete. Smooth and re-vegetate all disturbed areas.

11. All swales and drainage structures will be constructed and stabilized prior to having run-off being directed to them.

12. Finish paving all roadways/parking.

Temporary Erosion Control Measures

1. The smallest practical area of land shall be exposed at any one time.

2. Erosion, sediment control measures shall be installed as shown on the plans and at locations as required, or directed by the engineer.

3. All disturbed areas shall be returned to original grades and elevations. Disturbed areas shall be loamed with a minimum of 4" of loam and seeded with not less than 1.10 pound of seed per 1,000 square feet (48 pounds per acre) of area.

4. Silt fences and other barriers shall be inspected periodically and after every rainstorm during the life of the project. All damaged areas shall be repaired, sediment deposits shall periodically be removed and properly disposed of.

5. After all disturbed areas have been stabilized, the temporary erosion control measures are to be removed and the area disturbed by the removal smoothed and re-vegetated.
6. Areas must be seeded and mulched within 5 days of final grading, permanently stabilized within 15 days of final grading, or temporarily stabilized within 30 days of initial disturbance of soil.

Inspection and Maintenance Schedule

Perimeter control will be inspected during and after storm events to ensure that the fence still has integrity and is not allowing sediment to pass. Depending on SWPPP criteria, all controls will be inspected once every 7 days and after storm events. Inspection reports must be submitted to Town of Barrington Planning Office. Sediment build-up in swales and level spreaders will be removed if it is deeper than six inches. See also Stormwater System Operation & Maintenance Plan and Inspection & Maintenance Manual published separately also by Berry Surveying & Engineering. See also Storm Water Pollution Prevention Plan (SWPPP) developed in accordance with EPA NPDES requirements.

Corrective Action measures will be made in accordance with SWPPP requirements and records maintained on site by the Contractor.

5.0 CONCLUSION

Peak rates of runoff is reduced in the model in the post-construction analysis / condition, as compared to the pre-construction peak rates of runoff flow at the final analysis point. The total volume of runoff is reduced at all events with the exception of the 50 and 100Yr.24Hr rain event.

A Site Specific, Terrain Alteration Permit (RSA 485: A-17) is not required for this site plan due to the area of disturbance being less than 100,000 SF. Due to the nature of the cuts and fills associated with this proposed development, the owner is proposing to complete the project in one single phase and will have an environmental monitor responsible for weekly inspections.

Respectfully Submitted,
BERRY SURVEYING & ENGINEERING

Christopher R. Berry, SIT 567
Principal, President

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CPSWQ, CPESC, CESSWI
Principal, VP - Technical Operations

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden #101 Pond 101**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
1.27	ac	A = Area draining to the practice	
0.59	ac	A_I = Impervious area draining to the practice	
0.46	decimal	I = percent impervious area draining to the practice, in decimal form	
0.47	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.59	ac-in	WQV= 1" x Rv x A	
2,151	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
538	cf	25% x WQV (check calc for sediment forebay volume)	
1,613	cf	75% x WQV (check calc for surface sand filter volume)	
Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
629	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
959	sf	A_{SA} = surface area of the practice	
10.00	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
2.7	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
199.50	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
198.50	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
199.00	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
190.00	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	← ≥ 1'
9.50	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	← ≥ 1'
0.50	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	← ≥ 1'
202.52	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
203.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes

If a surface sand filter or underground sand filter is proposed:

YES	ac	Drainage Area check.	← < 10 ac
	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ 75%WQV
	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:

YES	ac	Drainage Area no larger than 5 ac?	← **yes**
3,497	cf	V = volume of storage[3] (attach a stage-storage table)	← **≥ WQV**
18.0	inches	D_{FC} = filter course thickness	← **18", or 24" if within GPA**
Sheet	R101	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	← **≥3:1**
Sheet	R101	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
#DIV/0!	:1	ratio of the contributing area to the pervious surface area	← **5:1**
	inches	D_{FC} = filter course thickness	← **12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	← **304.1 sand**

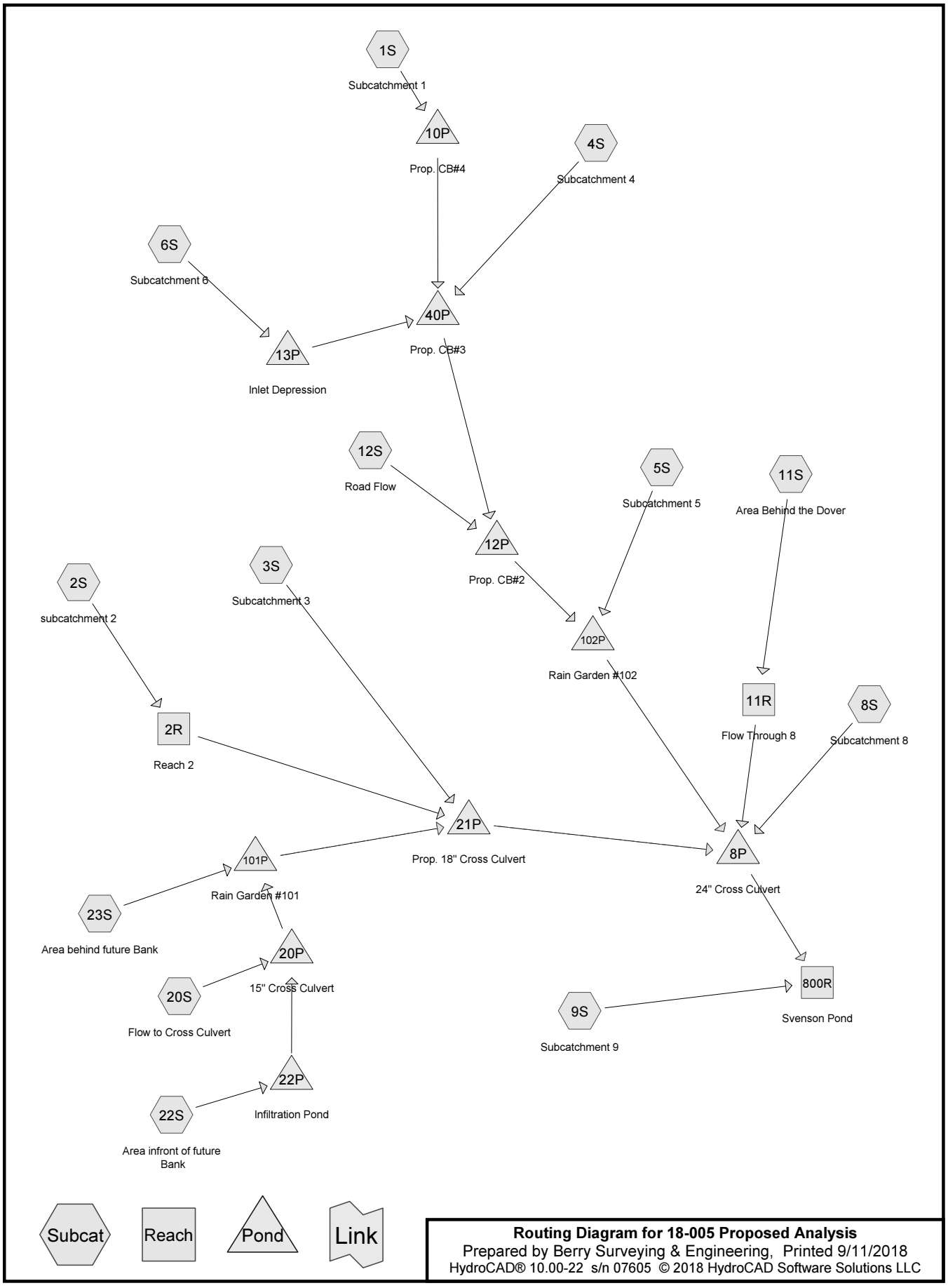
1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

This pond is designed with a filtration rate to the underdrain of 10 In/Hr. Per the Alateration of Terrain Recommendations. The infiltration rate was not used for groundwater re-infiltration



Routing Diagram for 18-005 Proposed Analysis
Prepared by Berry Surveying & Engineering, Printed 9/11/2018

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.952	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 5S, 6S, 8S, 9S, 11S, 20S, 22S, 23S)
1.113	98	Paved parking, HSG A (2S, 4S, 6S, 12S, 23S)
0.553	98	Unconnected pavement, HSG A (5S, 8S, 9S, 20S, 22S)
0.471	98	Unconnected roofs, HSG A (2S, 4S, 5S, 8S, 9S, 11S, 22S)
0.067	98	Water Surface, 0% imp, HSG A (2S)
25.413	30	Woods, Good, HSG A (1S, 2S, 3S, 6S, 11S)
0.518	77	Woods, Good, HSG D (1S)
34.086	**37**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
33.569	HSG A	1S, 2S, 3S, 4S, 5S, 6S, 8S, 9S, 11S, 12S, 20S, 22S, 23S
0.000	HSG B	
0.000	HSG C	
0.518	HSG D	1S
0.000	Other	
34.086		**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
5.952	0.000	0.000	0.000	0.000	5.952	>75% Grass cover, Good	1S, 2S, 3S, 5S, 6S, 8S, 9S, 11S, 20S, 22S, 23S
1.113	0.000	0.000	0.000	0.000	1.113	Paved parking	2S, 4S, 6S, 12S, 23S
0.553	0.000	0.000	0.000	0.000	0.553	Unconnected pavement	5S, 8S, 9S, 20S, 22S
0.471	0.000	0.000	0.000	0.000	0.471	Unconnected roofs	2S, 4S, 5S, 8S, 9S, 11S, 22S
0.067	0.000	0.000	0.000	0.000	0.067	Water Surface, 0% imp	2S
25.413	0.000	0.000	0.518	0.000	25.931	Woods, Good	1S, 2S, 3S, 6S, 11S
33.569	**0.000**	**0.000**	**0.518**	**0.000**	**34.086**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	8P	196.55	196.44	21.6	0.0051	0.012	24.0	0.0	0.0
2	10P	200.07	199.30	153.9	0.0050	0.012	15.0	0.0	0.0
3	12P	198.60	198.50	20.0	0.0050	0.012	15.0	0.0	0.0
4	13P	200.00	199.30	30.0	0.0233	0.012	15.0	0.0	0.0
5	20P	201.50	201.00	50.0	0.0100	0.012	15.0	0.0	0.0
6	21P	198.10	197.50	60.0	0.0100	0.012	18.0	0.0	0.0
7	40P	199.20	198.70	93.7	0.0053	0.012	15.0	0.0	0.0
8	101P	198.50	198.30	20.0	0.0100	0.012	6.0	0.0	0.0
9	102P	196.50	196.40	20.0	0.0050	0.012	6.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 2
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 1S: Subcatchment 1 Runoff Area=305,536 sf 0.00% Impervious Runoff Depth>0.18"
Flow Length=1,542' Tc=32.6 min CN=34 Runoff=0.17 cfs 0.104 af

Subcatchment 2S: subcatchment 2 Runoff Area=764,666 sf 0.65% Impervious Runoff Depth>0.08"
Flow Length=2,418' Tc=59.1 min CN=31 Runoff=0.18 cfs 0.115 af

Subcatchment 3S: Subcatchment 3 Runoff Area=100,973 sf 0.00% Impervious Runoff Depth>0.11"
Flow Length=993' Tc=20.7 min CN=32 Runoff=0.03 cfs 0.022 af

Subcatchment 4S: Subcatchment 4 Runoff Area=9,068 sf 100.00% Impervious Runoff Depth>5.62"
Flow Length=207' Tc=6.0 min CN=98 Runoff=1.18 cfs 0.097 af

Subcatchment 5S: Subcatchment 5 Runoff Area=22,497 sf 40.08% Impervious Runoff Depth>2.08"
Flow Length=212' Tc=7.0 min CN=63 Runoff=1.16 cfs 0.089 af

Subcatchment 6S: Subcatchment 6 Runoff Area=43,050 sf 50.19% Impervious Runoff Depth>2.32"
Flow Length=362' Tc=36.7 min CN=66 Runoff=1.36 cfs 0.191 af

Subcatchment 8S: Subcatchment 8 Runoff Area=25,776 sf 25.48% Impervious Runoff Depth>0.87"
Flow Length=152' Tc=10.4 min UI Adjusted CN=47 Runoff=0.34 cfs 0.043 af

Subcatchment 9S: Subcatchment 9 Runoff Area=45,641 sf 11.38% Impervious Runoff Depth>0.56"
Flow Length=259' Tc=13.4 min UI Adjusted CN=42 Runoff=0.26 cfs 0.049 af

Subcatchment 11S: Area Behind the Dover Runoff Area=107,916 sf 6.10% Impervious Runoff Depth>0.31"
Flow Length=802' Tc=22.0 min UI Adjusted CN=37 Runoff=0.17 cfs 0.063 af

Subcatchment 12S: Road Flow Runoff Area=4,388 sf 100.00% Impervious Runoff Depth>5.62"
Tc=6.0 min CN=98 Runoff=0.57 cfs 0.047 af

Subcatchment 20S: Flow to Cross Culvert Runoff Area=7,713 sf 59.39% Impervious Runoff Depth>3.06"
Tc=6.0 min CN=74 Runoff=0.63 cfs 0.045 af

Subcatchment 22S: Area infront of future Runoff Area=29,777 sf 30.66% Impervious Runoff Depth>1.59"
Flow Length=175' Tc=12.4 min CN=57 Runoff=0.93 cfs 0.090 af

Subcatchment 23S: Area behind future Runoff Area=17,796 sf 67.02% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=79 Runoff=1.68 cfs 0.121 af

Reach 2R: Reach 2 Avg. Flow Depth=0.06' Max Vel=0.96 fps Inflow=0.18 cfs 0.115 af
n=0.022 L=329.8' S=0.0091 '/' Capacity=24.64 cfs Outflow=0.18 cfs 0.114 af

Reach 11R: Flow Through 8 Avg. Flow Depth=0.09' Max Vel=0.72 fps Inflow=0.17 cfs 0.063 af
n=0.035 L=76.0' S=0.0132 '/' Capacity=7.77 cfs Outflow=0.17 cfs 0.063 af

Reach 800R: Svenson Pond Inflow=3.05 cfs 0.918 af
Outflow=3.05 cfs 0.918 af

Pond 8P: 24" Cross Culvert Peak Elev=197.39' Storage=152 cf Inflow=2.81 cfs 0.870 af
Primary=2.80 cfs 0.869 af Secondary=0.00 cfs 0.000 af Outflow=2.80 cfs 0.869 af

Pond 10P: Prop. CB#4 Peak Elev=200.34' Storage=3 cf Inflow=0.17 cfs 0.104 af
15.0" Round Culvert n=0.012 L=153.9' S=0.0050 '/' Outflow=0.17 cfs 0.104 af

Pond 12P: Prop. CB#2 Peak Elev=200.18' Storage=0.000 af Inflow=2.07 cfs 0.439 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=2.06 cfs 0.439 af

Pond 13P: Inlet Depression Peak Elev=200.65' Storage=141 cf Inflow=1.36 cfs 0.191 af
15.0" Round Culvert n=0.012 L=30.0' S=0.0233 '/' Outflow=1.36 cfs 0.190 af

Pond 20P: 15" Cross Culvert Peak Elev=202.12' Storage=652 cf Inflow=0.63 cfs 0.068 af
Discarded=0.02 cfs 0.015 af Primary=0.29 cfs 0.053 af Outflow=0.30 cfs 0.068 af

Pond 21P: Prop. 18" Cross Culvert Peak Elev=198.41' Storage=10 cf Inflow=0.50 cfs 0.290 af
18.0" Round Culvert n=0.012 L=60.0' S=0.0100 '/' Outflow=0.50 cfs 0.290 af

Pond 22P: Infiltration Pond Peak Elev=203.42' Storage=1,247 cf Inflow=0.93 cfs 0.090 af
Discarded=0.07 cfs 0.058 af Primary=0.24 cfs 0.023 af Outflow=0.31 cfs 0.081 af

Pond 40P: Prop. CB#3 Peak Elev=200.33' Storage=0.000 af Inflow=1.59 cfs 0.392 af
15.0" Round Culvert n=0.012 L=93.7' S=0.0053 '/' Outflow=1.59 cfs 0.392 af

Pond 101P: Rain Garden #101 Peak Elev=202.11' Storage=2,684 cf Inflow=1.96 cfs 0.174 af
Primary=0.39 cfs 0.155 af Secondary=0.00 cfs 0.000 af Outflow=0.39 cfs 0.155 af

Pond 102P: Rain Garden #102 Peak Elev=200.09' Storage=5,219 cf Inflow=3.21 cfs 0.529 af
Primary=0.78 cfs 0.410 af Secondary=1.35 cfs 0.063 af Outflow=2.13 cfs 0.474 af

Total Runoff Area = 34.086 ac Runoff Volume = 1.077 af Average Runoff Depth = 0.38"
93.73% Pervious = 31.950 ac 6.27% Impervious = 2.136 ac

Summary for Subcatchment 1S: Subcatchment 1

Runoff = 0.17 cfs @ 14.16 hrs, Volume= 0.104 af, Depth> 0.18"

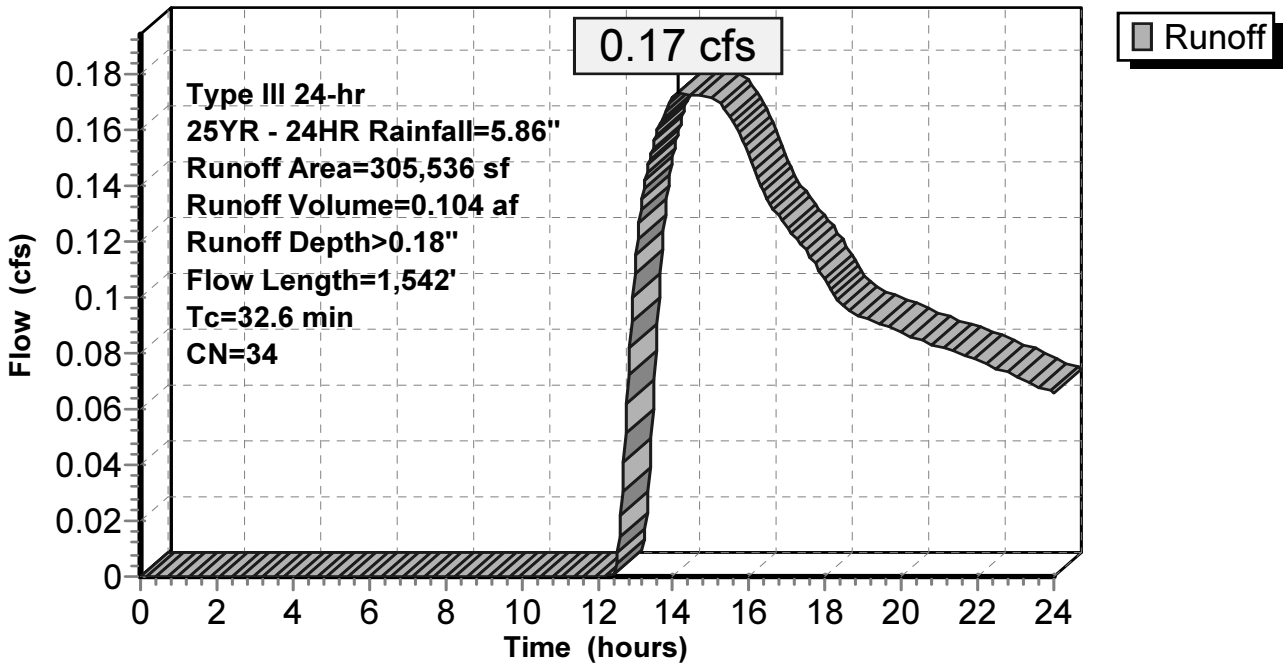
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
22,553	77	Woods, Good, HSG D
3,011	39	>75% Grass cover, Good, HSG A
279,972	30	Woods, Good, HSG A
305,536	34	Weighted Average
305,536		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.1500	0.17		**Sheet Flow, Segment 1** Woods: Light underbrush n= 0.400 P2= 3.08"
4.7	442	0.0973	1.56		**Shallow Concentrated Flow, Segment 2** Woodland Kv= 5.0 fps
0.5	65	0.2153	2.32		**Shallow Concentrated Flow, Segment 3** Woodland Kv= 5.0 fps
2.6	153	0.0395	0.99		**Shallow Concentrated Flow, Segment 4** Woodland Kv= 5.0 fps
2.6	153	0.0393	0.99		**Shallow Concentrated Flow, Segment 5** Woodland Kv= 5.0 fps
0.7	62	0.0806	1.42		**Shallow Concentrated Flow, Segment 6** Woodland Kv= 5.0 fps
5.0	190	0.0158	0.63		**Shallow Concentrated Flow, Segment 7** Woodland Kv= 5.0 fps
5.9	315	0.0317	0.89		**Shallow Concentrated Flow, Segment 8** Woodland Kv= 5.0 fps
0.8	62	0.0645	1.27		**Shallow Concentrated Flow, Segment 9** Woodland Kv= 5.0 fps
32.6	1,542	Total			

Subcatchment 1S: Subcatchment 1

Hydrograph



Summary for Subcatchment 2S: subcatchment 2

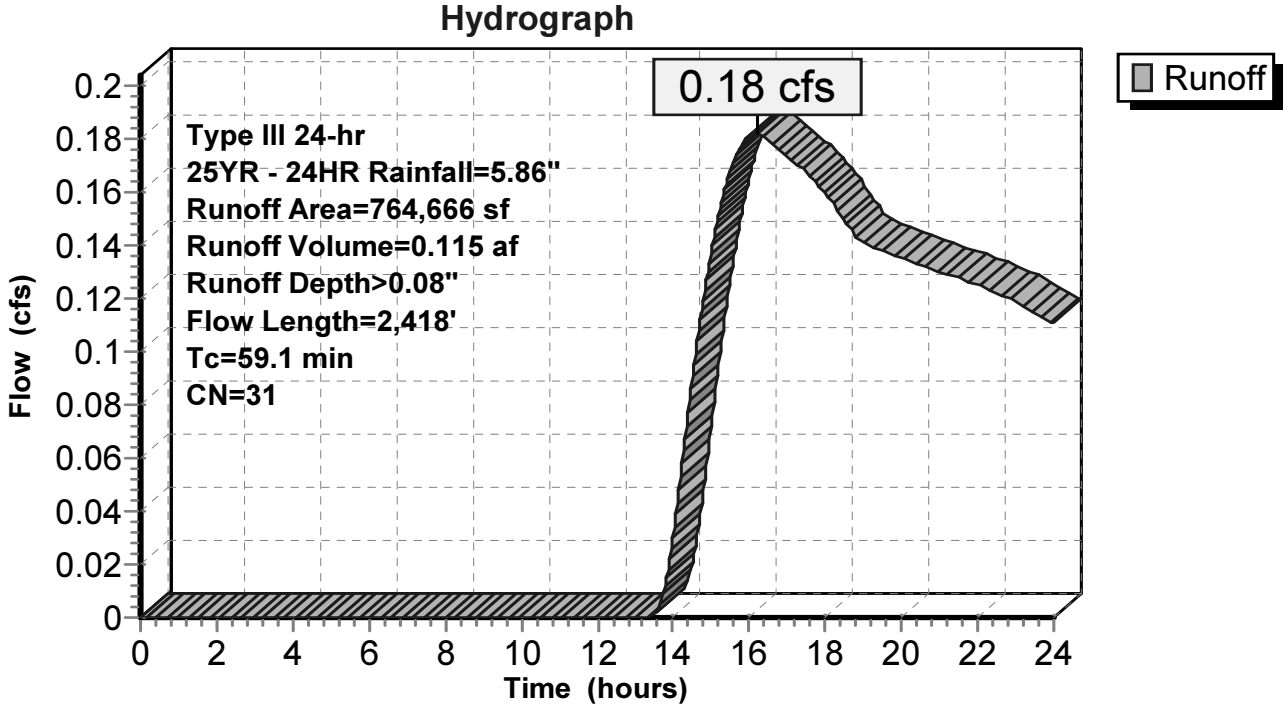
Runoff = 0.18 cfs @ 16.20 hrs, Volume= 0.115 af, Depth> 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
2,663	98	Unconnected roofs, HSG A
55,935	39	>75% Grass cover, Good, HSG A
2,337	98	Paved parking, HSG A
700,826	30	Woods, Good, HSG A
2,905	98	Water Surface, 0% imp, HSG A
764,666	31	Weighted Average
759,666		99.35% Pervious Area
5,000		0.65% Impervious Area
2,663		53.26% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0500	0.11		**Sheet Flow, Segment 1** Woods: Light underbrush n= 0.400 P2= 3.08"
9.8	940	0.1032	1.61		**Shallow Concentrated Flow, Segment 2** Woodland Kv= 5.0 fps
14.8	445	0.0101	0.50		**Shallow Concentrated Flow, Segment 3** Woodland Kv= 5.0 fps
2.1	59	0.0085	0.46		**Shallow Concentrated Flow, Segment 4** Woodland Kv= 5.0 fps
1.7	137	0.0728	1.35		**Shallow Concentrated Flow, Segment 5** Woodland Kv= 5.0 fps
12.7	418	0.0120	0.55		**Shallow Concentrated Flow, Segment 6** Woodland Kv= 5.0 fps
2.5	165	0.0242	1.09		**Shallow Concentrated Flow, Segment 7** Short Grass Pasture Kv= 7.0 fps
0.1	68		12.69		**Lake or Reservoir, Segment 8** Mean Depth= 5.00'
0.2	86	0.0174	6.81	23.84	**Trap/Vee/Rect Channel Flow, Segment 9** Bot.W=3.00' D=1.00' Z= 0.5 '/' Top.W=4.00' n= 0.022 Earth, clean & straight
59.1	2,418	Total			

Subcatchment 2S: subcatchment 2



Summary for Subcatchment 3S: Subcatchment 3

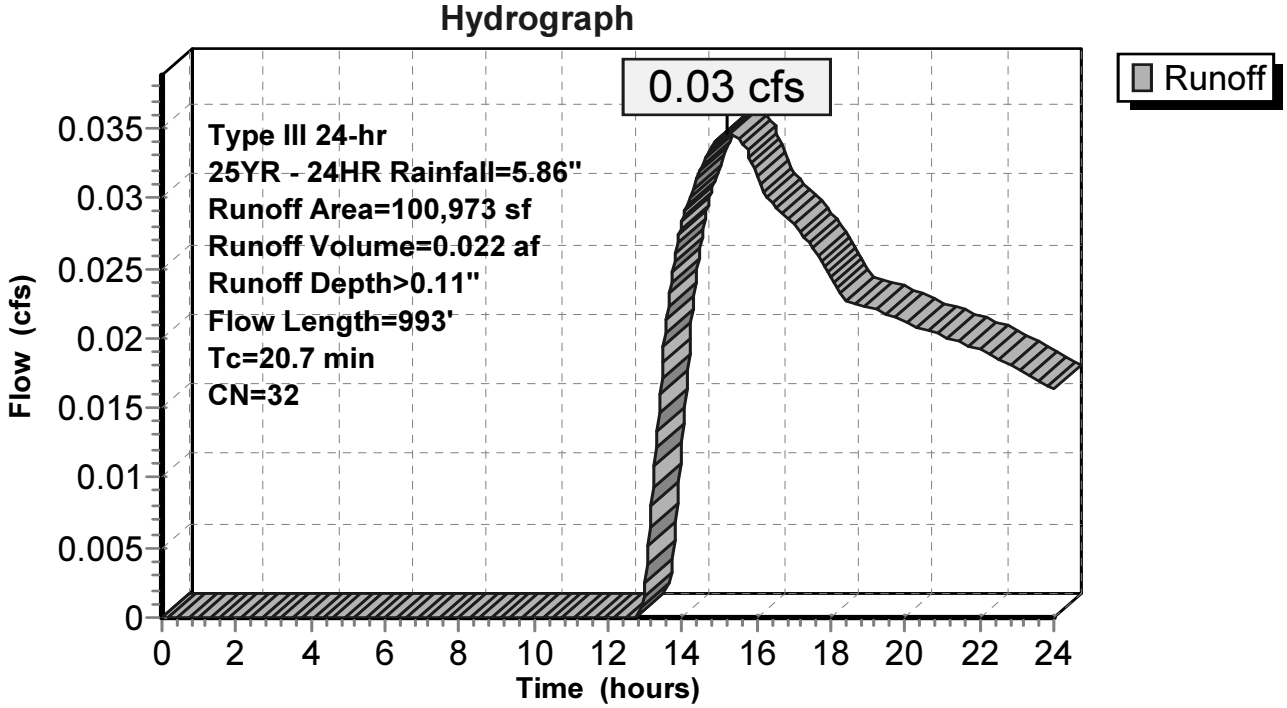
Runoff = 0.03 cfs @ 15.21 hrs, Volume= 0.022 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
27,534	39	>75% Grass cover, Good, HSG A
73,439	30	Woods, Good, HSG A
100,973	32	Weighted Average
100,973		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	97	0.1334	0.16		**Sheet Flow, Segment 1** Woods: Light underbrush n= 0.400 P2= 3.08"
2.7	155	0.0355	0.94		**Shallow Concentrated Flow, Segment 2** Woodland Kv= 5.0 fps
5.3	290	0.0328	0.91		**Shallow Concentrated Flow, Segment 3** Woodland Kv= 5.0 fps
1.6	132	0.0379	1.36		**Shallow Concentrated Flow, Segment 4** Short Grass Pasture Kv= 7.0 fps
1.1	319	0.0094	5.01	17.52	**Trap/Vee/Rect Channel Flow, Segment 5** Bot.W=3.00' D=1.00' Z= 0.5 '/' Top.W=4.00' n= 0.022 Earth, clean & straight
20.7	993	Total			

Subcatchment 3S: Subcatchment 3



Summary for Subcatchment 4S: Subcatchment 4

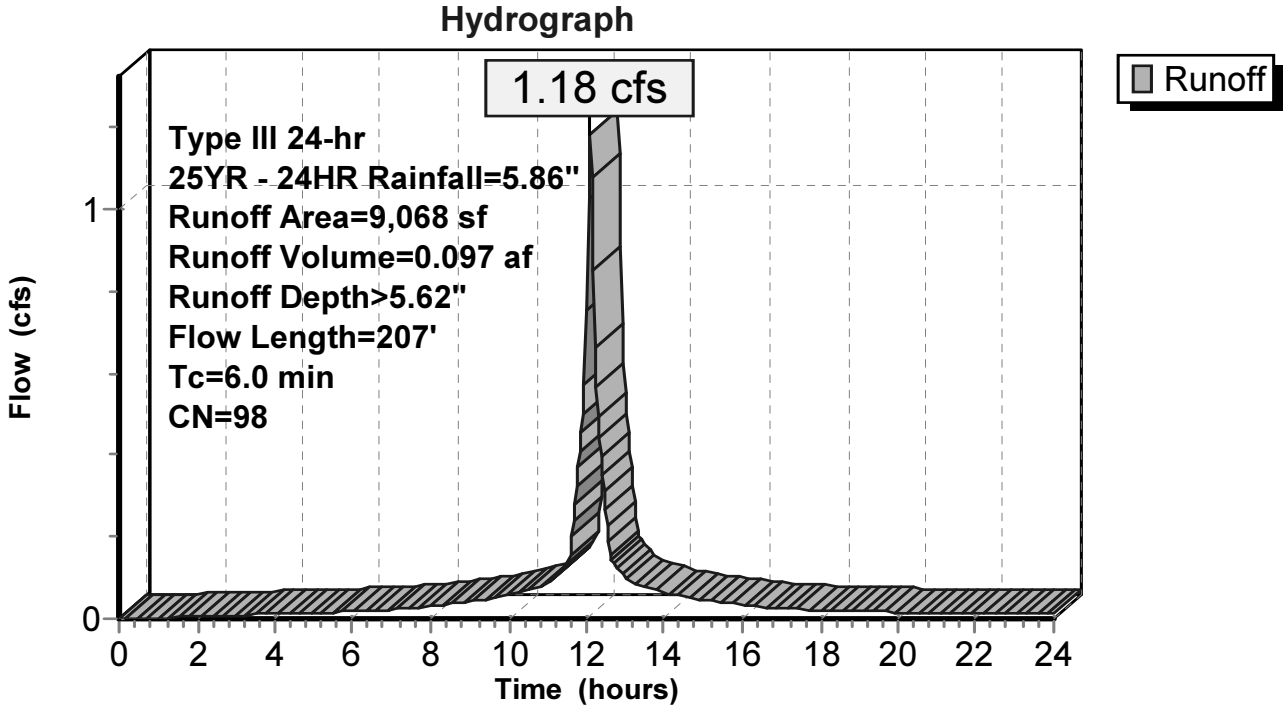
Runoff = 1.18 cfs @ 12.08 hrs, Volume= 0.097 af, Depth> 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
859	98	Unconnected roofs, HSG A
8,209	98	Paved parking, HSG A
9,068	98	Weighted Average
9,068		100.00% Impervious Area
859		9.47% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	71	0.0472	1.78		**Sheet Flow, Segment 1** Smooth surfaces n= 0.011 P2= 3.08"
1.1	136	0.0100	2.03		**Shallow Concentrated Flow, 2** Paved Kv= 20.3 fps
1.8	207	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: Subcatchment 4



Summary for Subcatchment 5S: Subcatchment 5

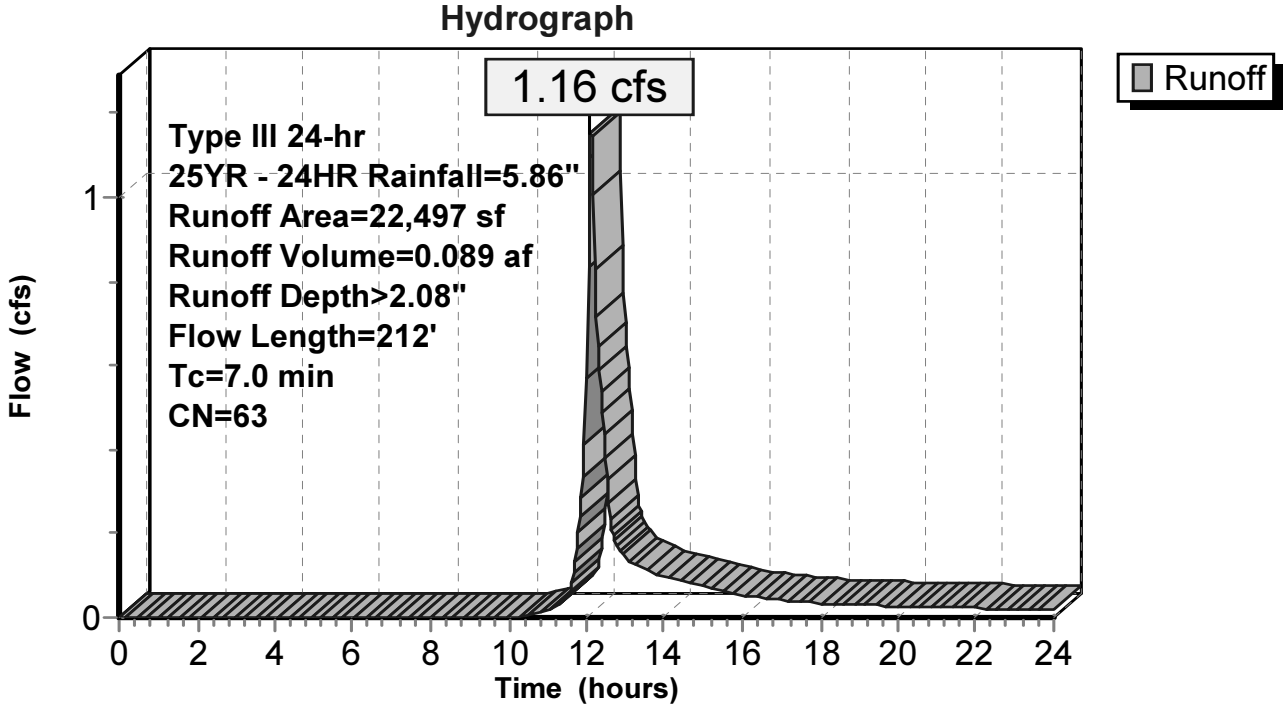
Runoff = 1.16 cfs @ 12.11 hrs, Volume= 0.089 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
6,050	98	Unconnected roofs, HSG A
13,481	39	>75% Grass cover, Good, HSG A
2,966	98	Unconnected pavement, HSG A
22,497	63	Weighted Average
13,481		59.92% Pervious Area
9,016		40.08% Impervious Area
9,016		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	65	0.0553	0.23		**Sheet Flow, Segment 1** Grass: Short n= 0.150 P2= 3.08"
0.0	8	0.0200	2.87		**Shallow Concentrated Flow, Segment 2** Paved Kv= 20.3 fps
1.0	40	0.0100	0.70		**Shallow Concentrated Flow, 3** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0200	2.87		**Shallow Concentrated Flow, 4** Paved Kv= 20.3 fps
1.0	43	0.0100	0.70		**Shallow Concentrated Flow, 4** Short Grass Pasture Kv= 7.0 fps
7.0	212	Total			

Subcatchment 5S: Subcatchment 5



Summary for Subcatchment 6S: Subcatchment 6

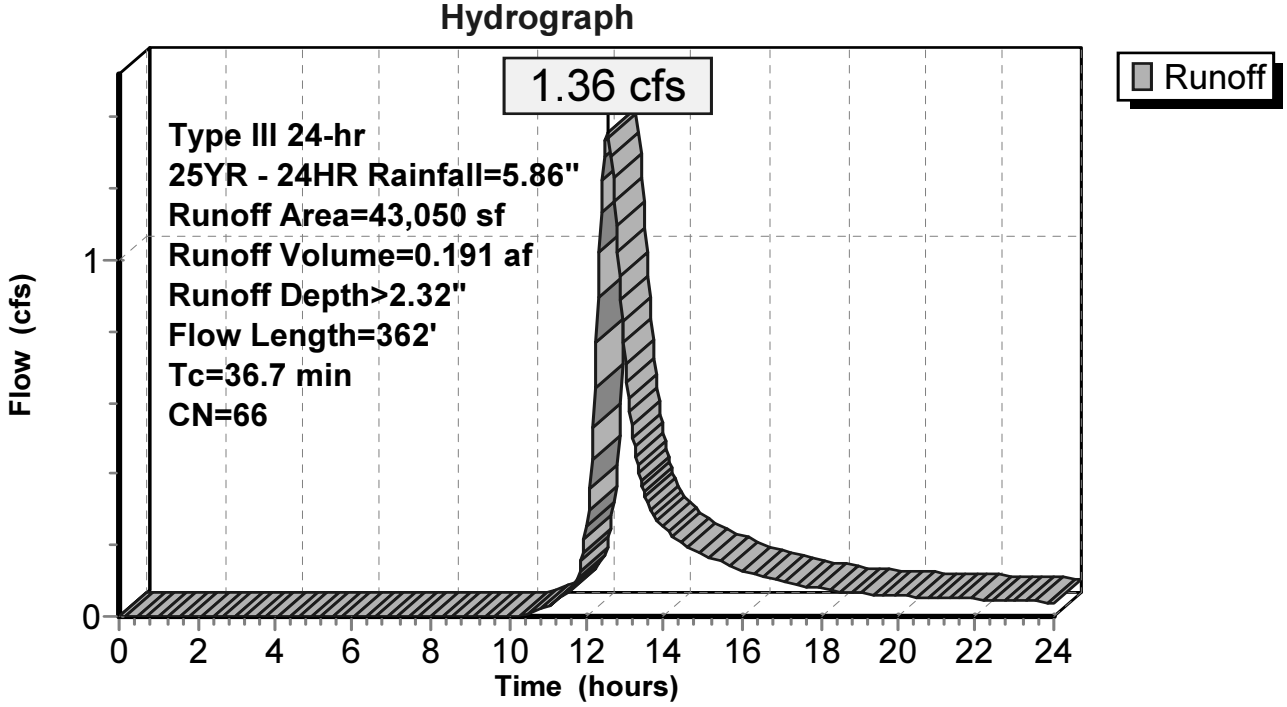
Runoff = 1.36 cfs @ 12.53 hrs, Volume= 0.191 af, Depth> 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
9,640	39	>75% Grass cover, Good, HSG A
21,608	98	Paved parking, HSG A
11,802	30	Woods, Good, HSG A
43,050	66	Weighted Average
21,442		49.81% Pervious Area
21,608		50.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	50	0.1100	0.13		**Sheet Flow, Segment 1** Woods: Light underbrush n= 0.400 P2= 3.08"
9.8	49	0.0357	0.08		**Sheet Flow, 2** Woods: Light underbrush n= 0.400 P2= 3.08"
20.5	263	0.0230	0.21		**Sheet Flow, 3** Grass: Short n= 0.150 P2= 3.08"
36.7	362	Total			

Subcatchment 6S: Subcatchment 6



Summary for Subcatchment 8S: Subcatchment 8

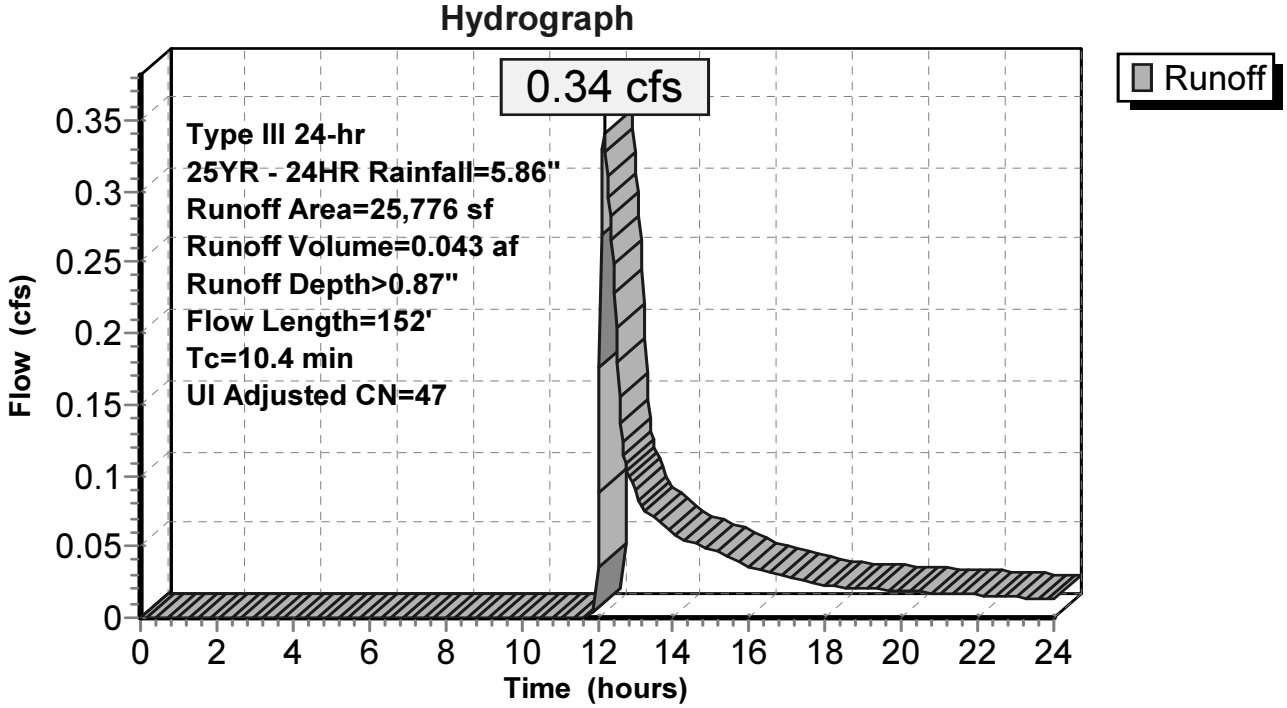
Runoff = 0.34 cfs @ 12.20 hrs, Volume= 0.043 af, Depth> 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Adj	Description
2,022	98		Unconnected roofs, HSG A
19,207	39		>75% Grass cover, Good, HSG A
4,547	98		Unconnected pavement, HSG A
25,776	54	47	Weighted Average, UI Adjusted
19,207			74.52% Pervious Area
6,569			25.48% Impervious Area
6,569			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	87	0.0172	0.15		**Sheet Flow, Segment 1** Grass: Short n= 0.150 P2= 3.08"
0.9	65	0.0309	1.23		**Shallow Concentrated Flow, Segment 2** Short Grass Pasture Kv= 7.0 fps
10.4	152	Total			

Subcatchment 8S: Subcatchment 8



Summary for Subcatchment 9S: Subcatchment 9

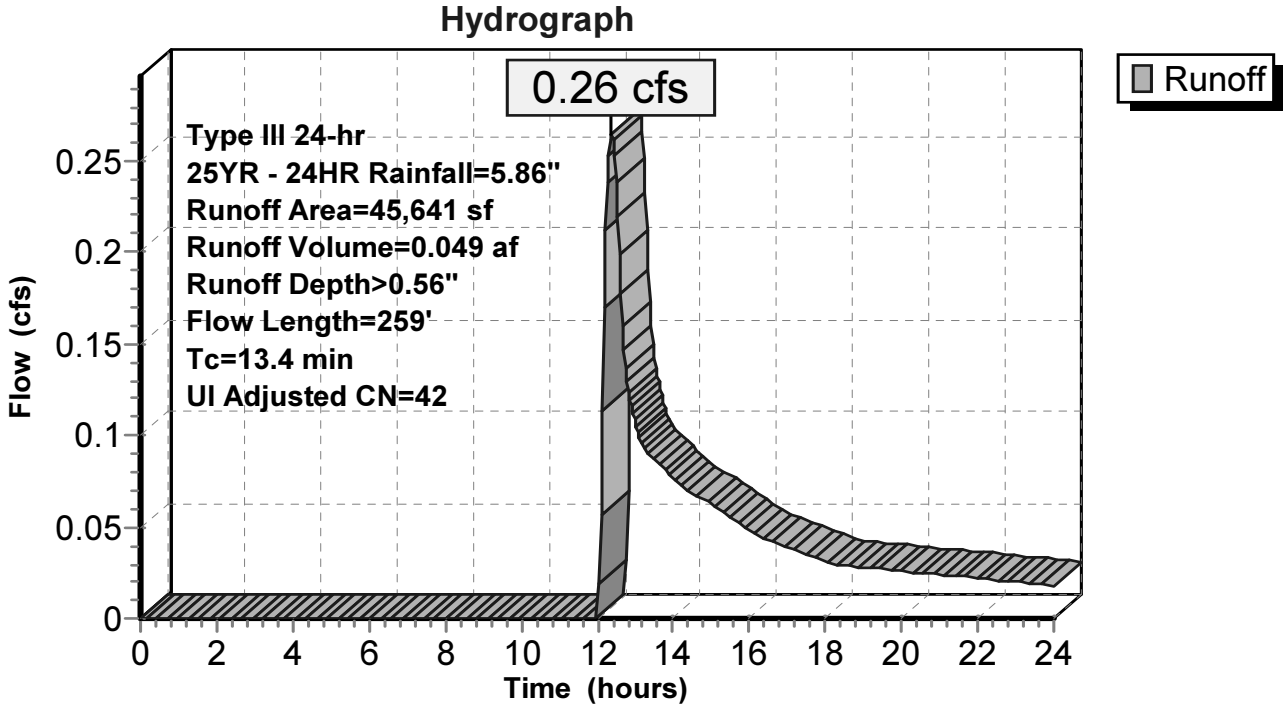
Runoff = 0.26 cfs @ 12.40 hrs, Volume= 0.049 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Adj	Description
606	98		Unconnected roofs, HSG A
40,448	39		>75% Grass cover, Good, HSG A
4,587	98		Unconnected pavement, HSG A
45,641	46	42	Weighted Average, UI Adjusted
40,448			88.62% Pervious Area
5,193			11.38% Impervious Area
5,193			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0150	0.15		**Sheet Flow, Segment 1** Grass: Short n= 0.150 P2= 3.08"
1.0	58	0.0200	0.99		**Shallow Concentrated Flow, Segment 2** Short Grass Pasture Kv= 7.0 fps
1.2	101	0.0397	1.39		**Shallow Concentrated Flow, Segment 4** Short Grass Pasture Kv= 7.0 fps
13.4	259	Total			

Subcatchment 9S: Subcatchment 9



Summary for Subcatchment 11S: Area Behind the Dover

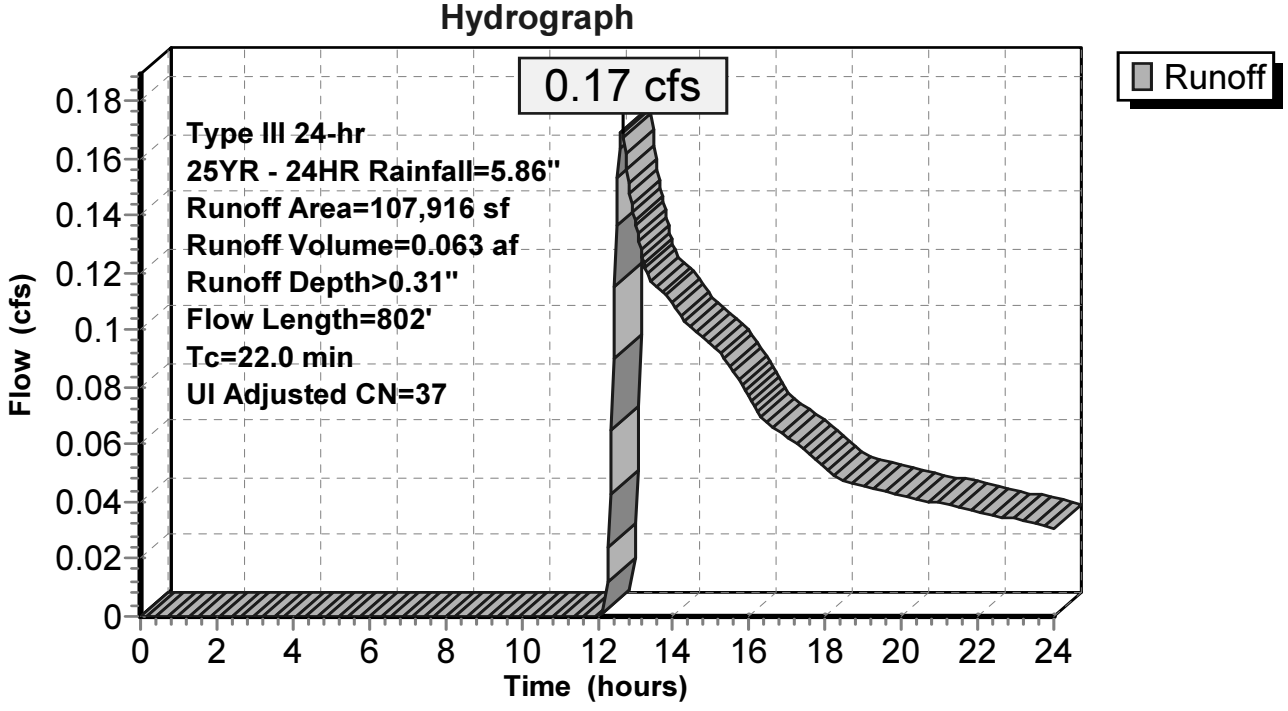
Runoff = 0.17 cfs @ 12.66 hrs, Volume= 0.063 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Adj	Description
6,579	98		Unconnected roofs, HSG A
60,379	39		>75% Grass cover, Good, HSG A
40,958	30		Woods, Good, HSG A
107,916	39	37	Weighted Average, UI Adjusted
101,337			93.90% Pervious Area
6,579			6.10% Impervious Area
6,579			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0850	0.14		**Sheet Flow, 1** Woods: Light underbrush n= 0.400 P2= 3.08"
3.6	314	0.0830	1.44		**Shallow Concentrated Flow, 2** Woodland Kv= 5.0 fps
6.1	388	0.0230	1.06		**Shallow Concentrated Flow, 3** Short Grass Pasture Kv= 7.0 fps
22.0	802	Total			

Subcatchment 11S: Area Behind the Dover



Summary for Subcatchment 12S: Road Flow

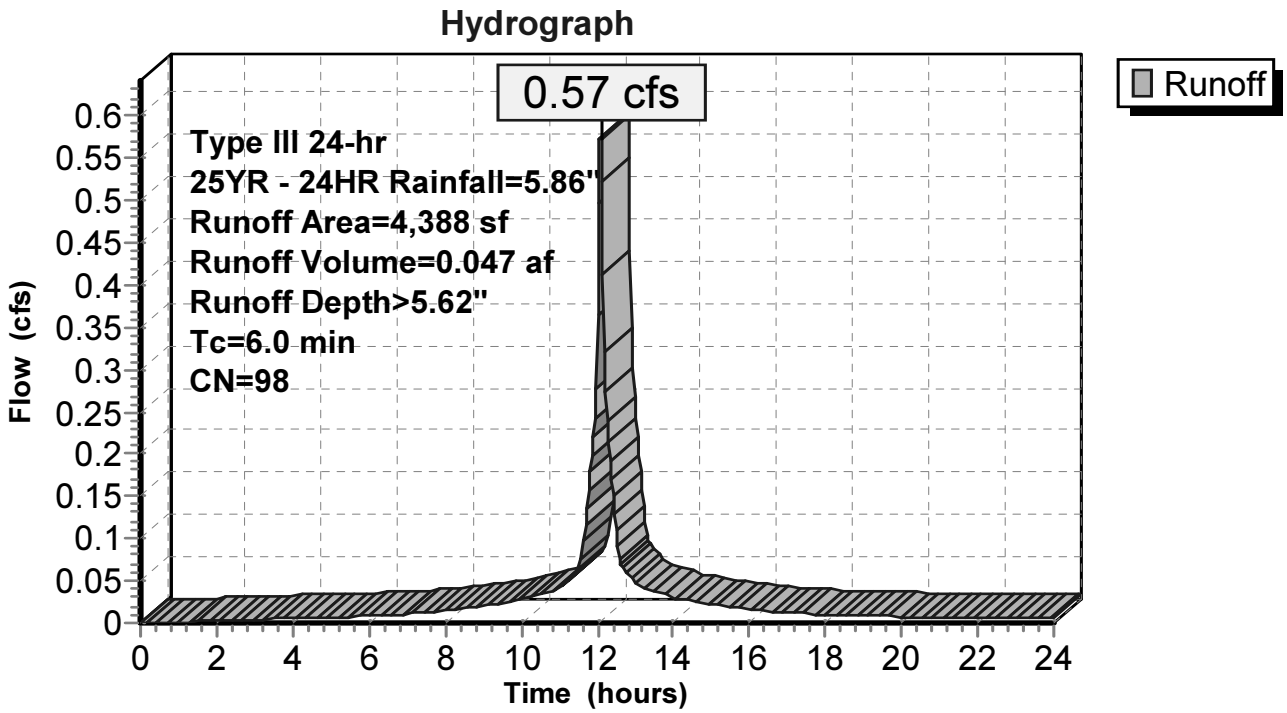
Runoff = 0.57 cfs @ 12.08 hrs, Volume= 0.047 af, Depth> 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
4,388	98	Paved parking, HSG A
4,388		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 12S: Road Flow



Summary for Subcatchment 20S: Flow to Cross Culvert

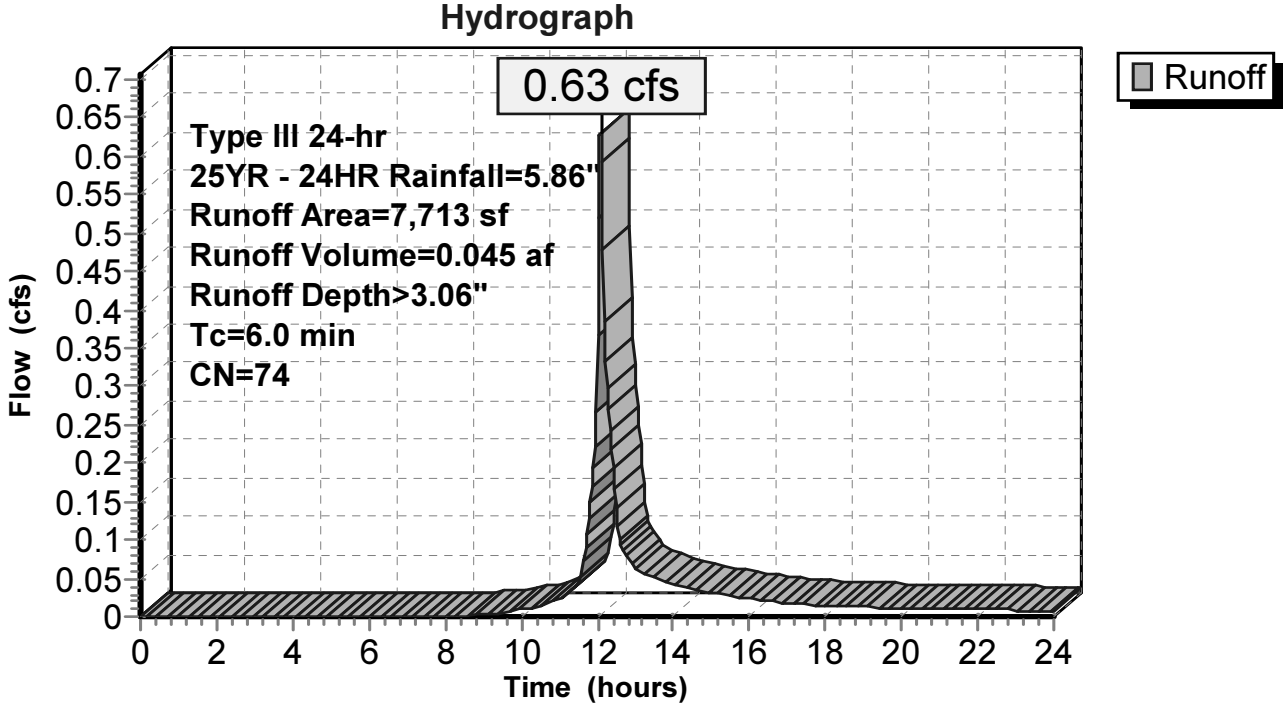
Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.045 af, Depth> 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
4,581	98	Unconnected pavement, HSG A
3,132	39	>75% Grass cover, Good, HSG A
7,713	74	Weighted Average
3,132		40.61% Pervious Area
4,581		59.39% Impervious Area
4,581		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Subcatchment 20S: Flow to Cross Culvert



Summary for Subcatchment 22S: Area infront of future Bank

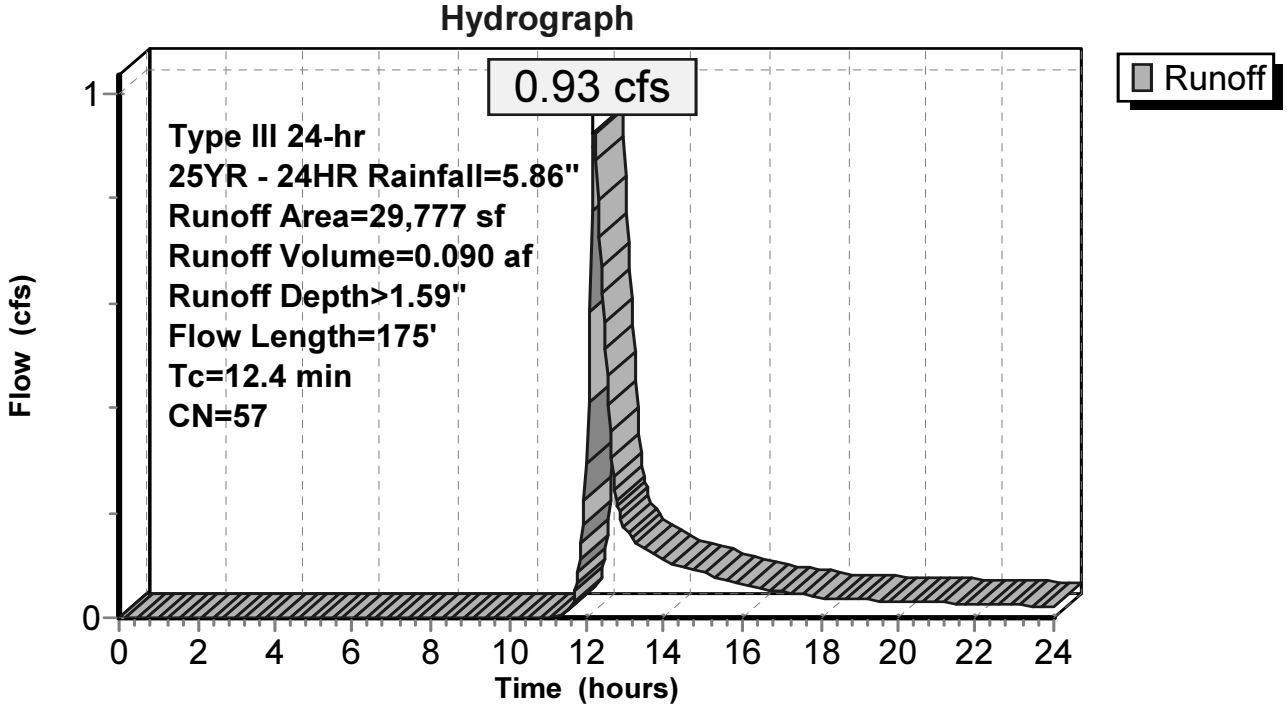
Runoff = 0.93 cfs @ 12.19 hrs, Volume= 0.090 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
1,730	98	Unconnected roofs, HSG A
20,647	39	>75% Grass cover, Good, HSG A
7,400	98	Unconnected pavement, HSG A
29,777	57	Weighted Average
20,647		69.34% Pervious Area
9,130		30.66% Impervious Area
9,130		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	99	0.0151	0.15		**Sheet Flow, Segment 1** Grass: Short n= 0.150 P2= 3.08"
1.3	76	0.0200	0.99		**Shallow Concentrated Flow, Segment 2** Short Grass Pasture Kv= 7.0 fps
12.4	175	Total			

Subcatchment 22S: Area infront of future Bank



Summary for Subcatchment 23S: Area behind future Bank

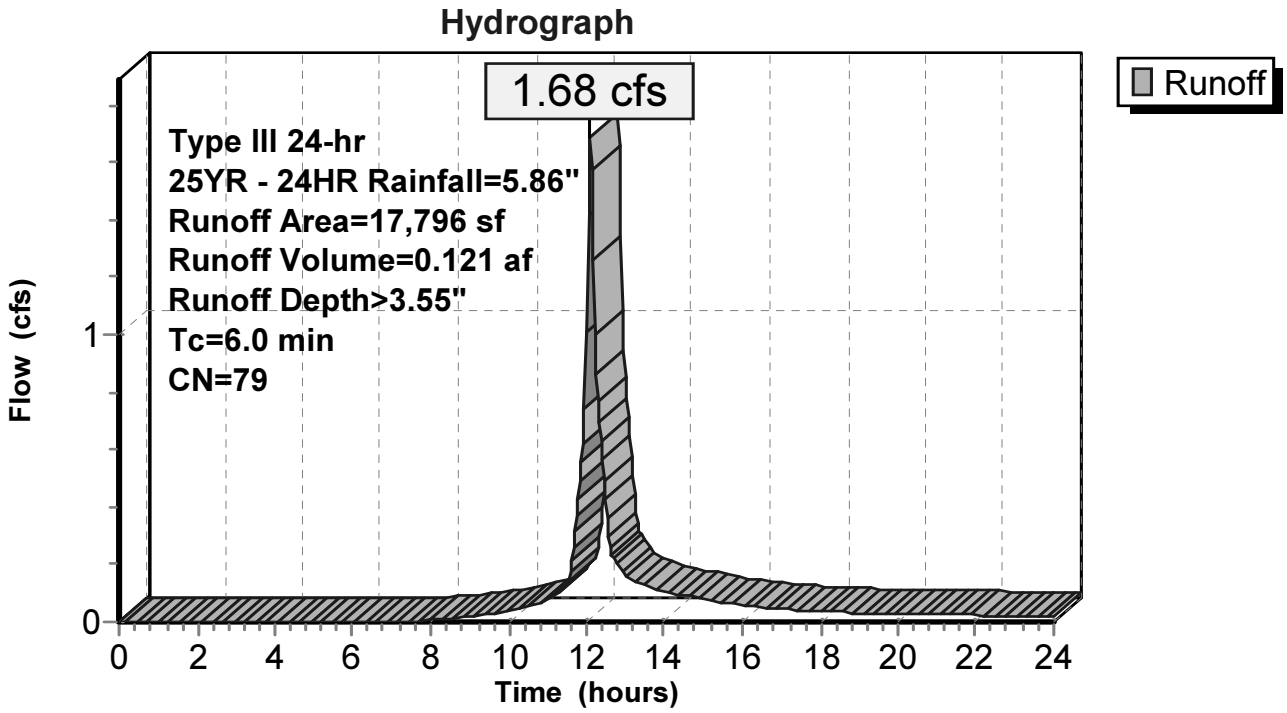
Runoff = 1.68 cfs @ 12.09 hrs, Volume= 0.121 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25YR - 24HR Rainfall=5.86"

Area (sf)	CN	Description
5,870	39	>75% Grass cover, Good, HSG A
11,926	98	Paved parking, HSG A
17,796	79	Weighted Average
5,870		32.98% Pervious Area
11,926		67.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Entry**

Subcatchment 23S: Area behind future Bank



Summary for Reach 2R: Reach 2

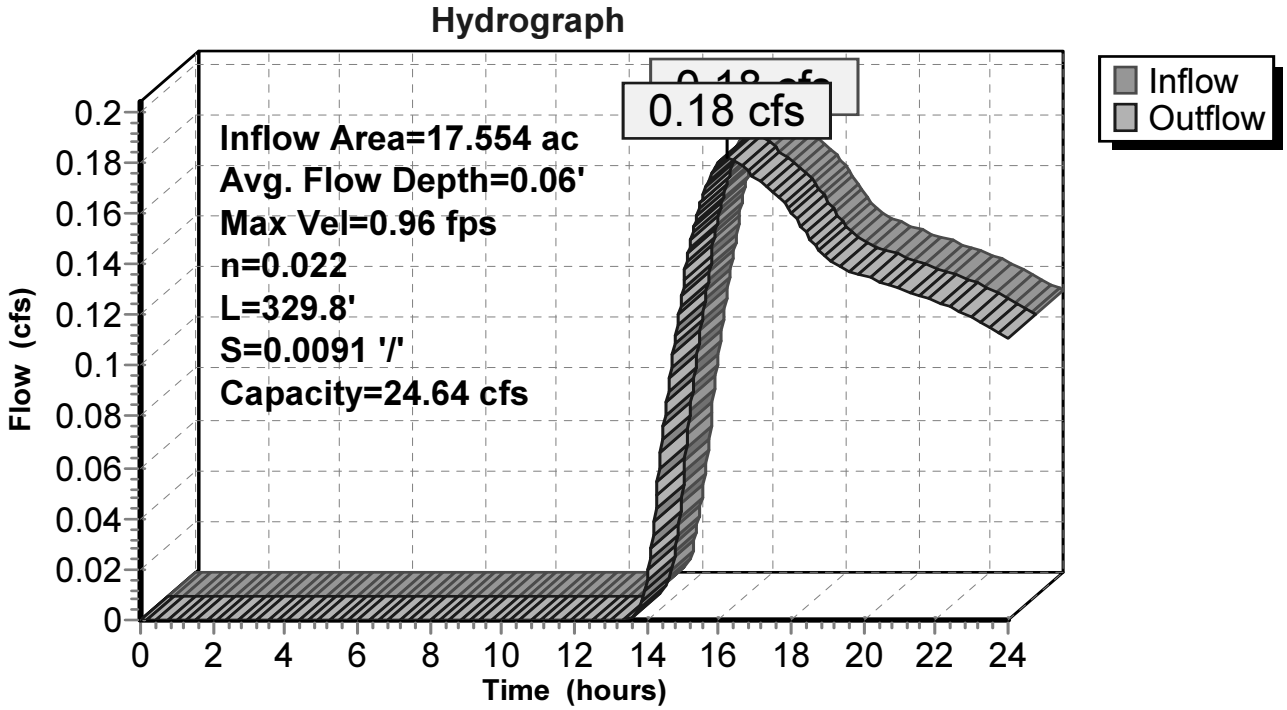
Inflow Area = 17.554 ac, 0.65% Impervious, Inflow Depth > 0.08" for 25YR - 24HR event
Inflow = 0.18 cfs @ 16.20 hrs, Volume= 0.115 af
Outflow = 0.18 cfs @ 16.23 hrs, Volume= 0.114 af, Atten= 0%, Lag= 2.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Max. Velocity= 0.96 fps, Min. Travel Time= 5.7 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 6.7 min

Peak Storage= 62 cf @ 16.23 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 24.64 cfs

3.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 329.8' Slope= 0.0091 '/'
Inlet Invert= 202.00', Outlet Invert= 199.00'

Reach 2R: Reach 2



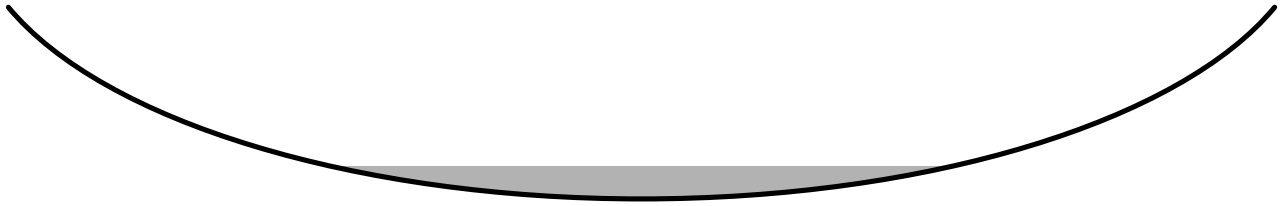
Summary for Reach 11R: Flow Through 8

Inflow Area = 2.477 ac, 6.10% Impervious, Inflow Depth > 0.31" for 25YR - 24HR event
Inflow = 0.17 cfs @ 12.66 hrs, Volume= 0.063 af
Outflow = 0.17 cfs @ 12.69 hrs, Volume= 0.063 af, Atten= 0%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Max. Velocity= 0.72 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 2.4 min

Peak Storage= 18 cf @ 12.69 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50' Flow Area= 3.3 sf, Capacity= 7.77 cfs

10.00' x 0.50' deep Parabolic Channel, n= 0.035
Length= 76.0' Slope= 0.0132 '/'
Inlet Invert= 199.00', Outlet Invert= 198.00'



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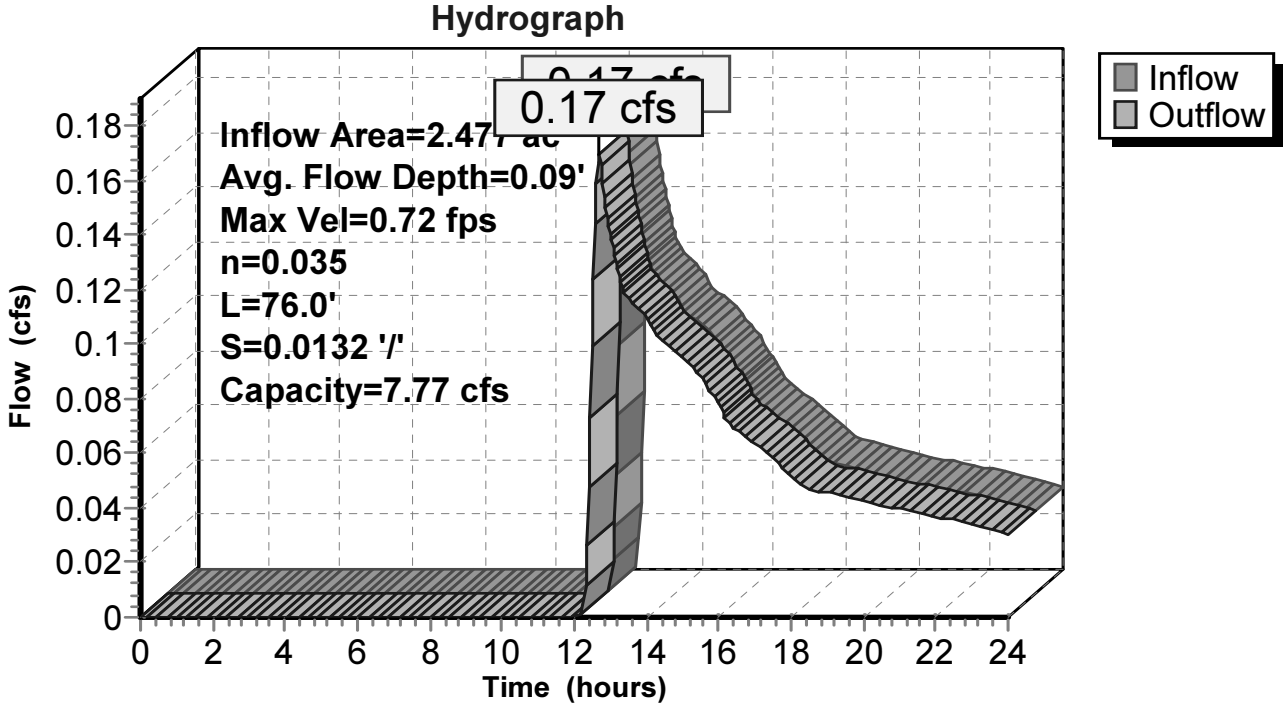
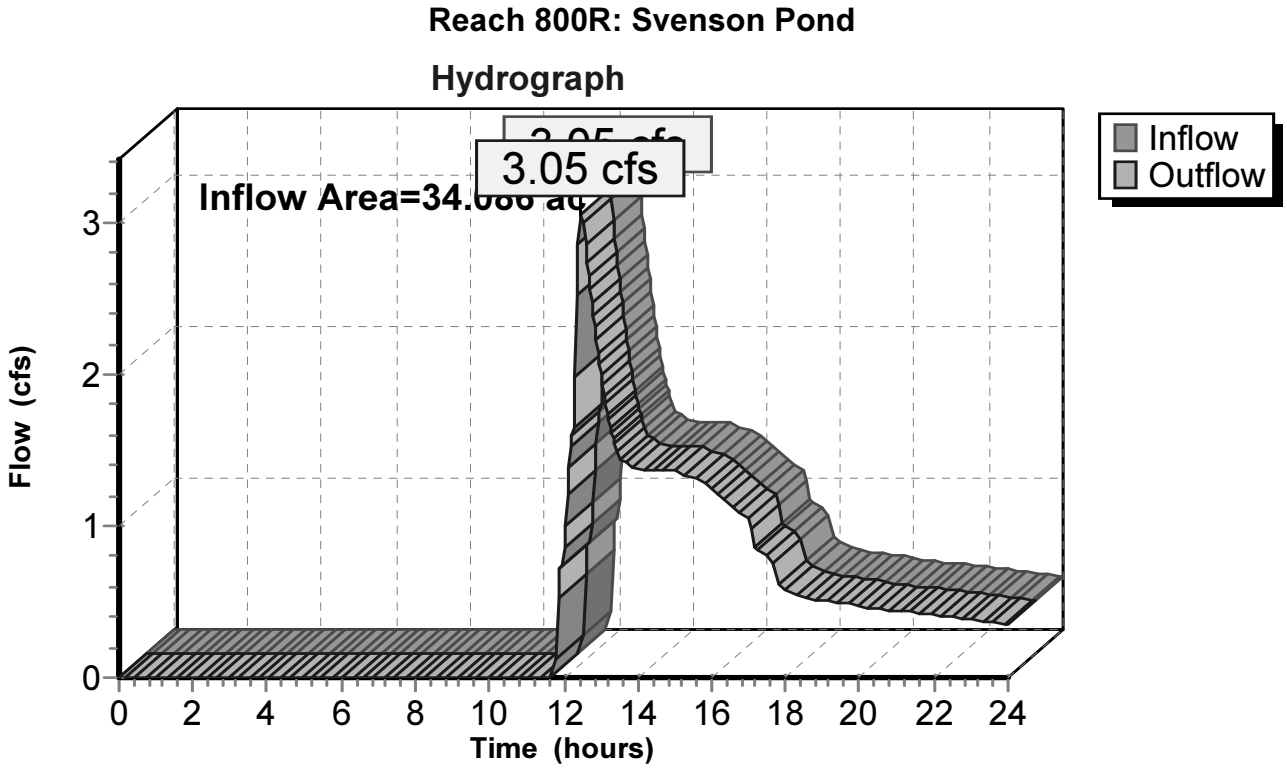


Summary for Reach 800R: Svenson Pond

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 34.086 ac, 6.27% Impervious, Inflow Depth > 0.32" for 25YR - 24HR event
Inflow = 3.05 cfs @ 12.49 hrs, Volume= 0.918 af
Outflow = 3.05 cfs @ 12.49 hrs, Volume= 0.918 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2



Summary for Pond 8P: 24" Cross Culvert

Inflow Area = 33.038 ac, 6.11% Impervious, Inflow Depth > 0.32" for 25YR - 24HR event
Inflow = 2.81 cfs @ 12.47 hrs, Volume= 0.870 af
Outflow = 2.80 cfs @ 12.49 hrs, Volume= 0.869 af, Atten= 0%, Lag= 1.3 min
Primary = 2.80 cfs @ 12.49 hrs, Volume= 0.869 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 197.39' @ 12.49 hrs Surf.Area= 434 sf Storage= 152 cf
Flood Elev= 199.55' Surf.Area= 3,482 sf Storage= 4,655 cf

Plug-Flow detention time= 0.7 min calculated for 0.869 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (960.0 - 959.4)

Volume	Invert	Avail.Storage	Storage Description
#1	196.55'	6,222 cf	**Open Storage (Irregular)** Listed below (Recalc)

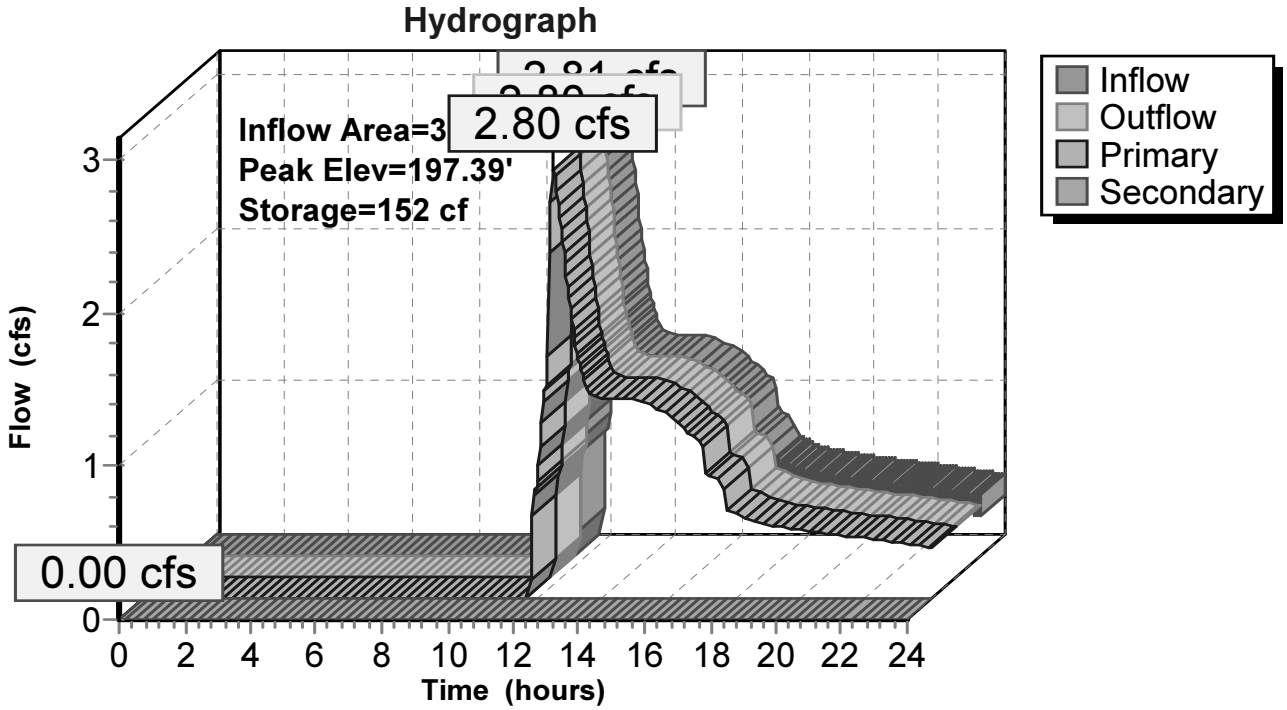
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
196.55	10	10.0	0	0	10
197.00	184	97.0	36	36	751
198.00	1,049	166.0	557	593	2,201
199.00	3,482	329.0	2,147	2,740	8,627
200.00	3,482	329.0	3,482	6,222	8,956

Device	Routing	Invert	Outlet Devices
#1	Primary	196.55'	**24.0" Round 24" HDPE N-12** L= 21.6' Ke= 0.500 Inlet / Outlet Invert= 196.55' / 196.44' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Secondary	199.55'	**100.0' long x 10.0' breadth Flow Over The Driveway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.79 cfs @ 12.49 hrs HW=197.39' TW=0.00' (Dynamic Tailwater)
↑—**1=24" HDPE N-12** (Barrel Controls 2.79 cfs @ 3.32 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=196.55' TW=0.00' (Dynamic Tailwater)
↑—**2=Flow Over The Driveway** (Controls 0.00 cfs)

Pond 8P: 24" Cross Culvert



Summary for Pond 10P: Prop. CB#4

Inflow Area = 7.014 ac, 0.00% Impervious, Inflow Depth > 0.18" for 25YR - 24HR event
Inflow = 0.17 cfs @ 14.16 hrs, Volume= 0.104 af
Outflow = 0.17 cfs @ 14.16 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.1 min
Primary = 0.17 cfs @ 14.16 hrs, Volume= 0.104 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 200.34' @ 13.80 hrs Surf.Area= 13 sf Storage= 3 cf
Flood Elev= 204.00' Surf.Area= 250 sf Storage= 73 cf

Plug-Flow detention time= 0.4 min calculated for 0.104 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (1,047.2 - 1,047.0)

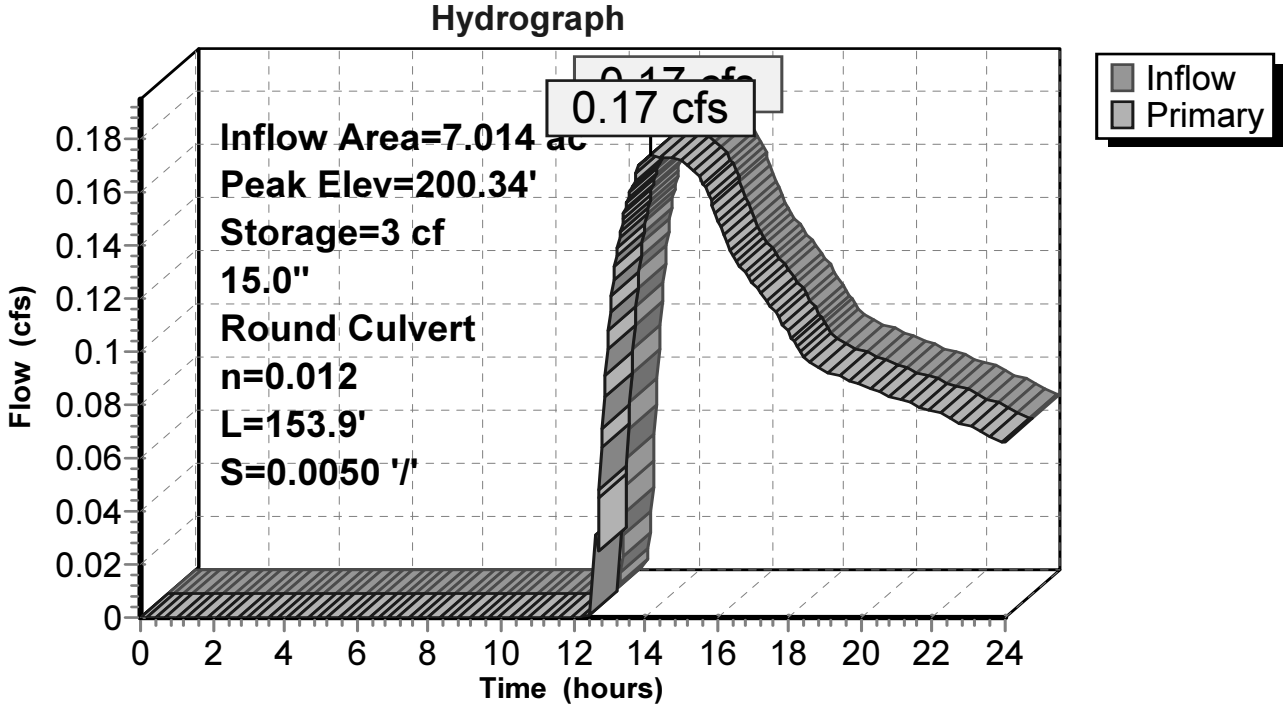
Volume	Invert	Avail.Storage	Storage Description
#1	200.07'	46 cf	**4.00'D x 3.68'H Basin**
#2	203.75'	264 cf	**Open Storage (Irregular)** Listed below (Recalc)
		310 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.75	20	20.0	0	0	20
204.00	237	94.0	27	27	691
205.00	237	94.0	237	264	785

Device	Routing	Invert	Outlet Devices
#1	Primary	200.07'	**15.0" Round 15" HDPE N-12** L= 153.9' Ke= 0.500 Inlet / Outlet Invert= 200.07' / 199.30' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.17 cfs @ 14.16 hrs HW=200.34' TW=199.98' (Dynamic Tailwater)
↑—**1=15" HDPE N-12** (Outlet Controls 0.17 cfs @ 1.38 fps)

Pond 10P: Prop. CB#4



Summary for Pond 12P: Prop. CB#2

Inflow Area = 8.311 ac, 9.69% Impervious, Inflow Depth > 0.63" for 25YR - 24HR event
Inflow = 2.07 cfs @ 12.09 hrs, Volume= 0.439 af
Outflow = 2.06 cfs @ 12.09 hrs, Volume= 0.439 af, Atten= 0%, Lag= 0.0 min
Primary = 2.06 cfs @ 12.09 hrs, Volume= 0.439 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 200.18' @ 12.46 hrs Surf.Area= 0.000 ac Storage= 0.000 af
Flood Elev= 203.38' Surf.Area= 0.000 ac Storage= 0.001 af

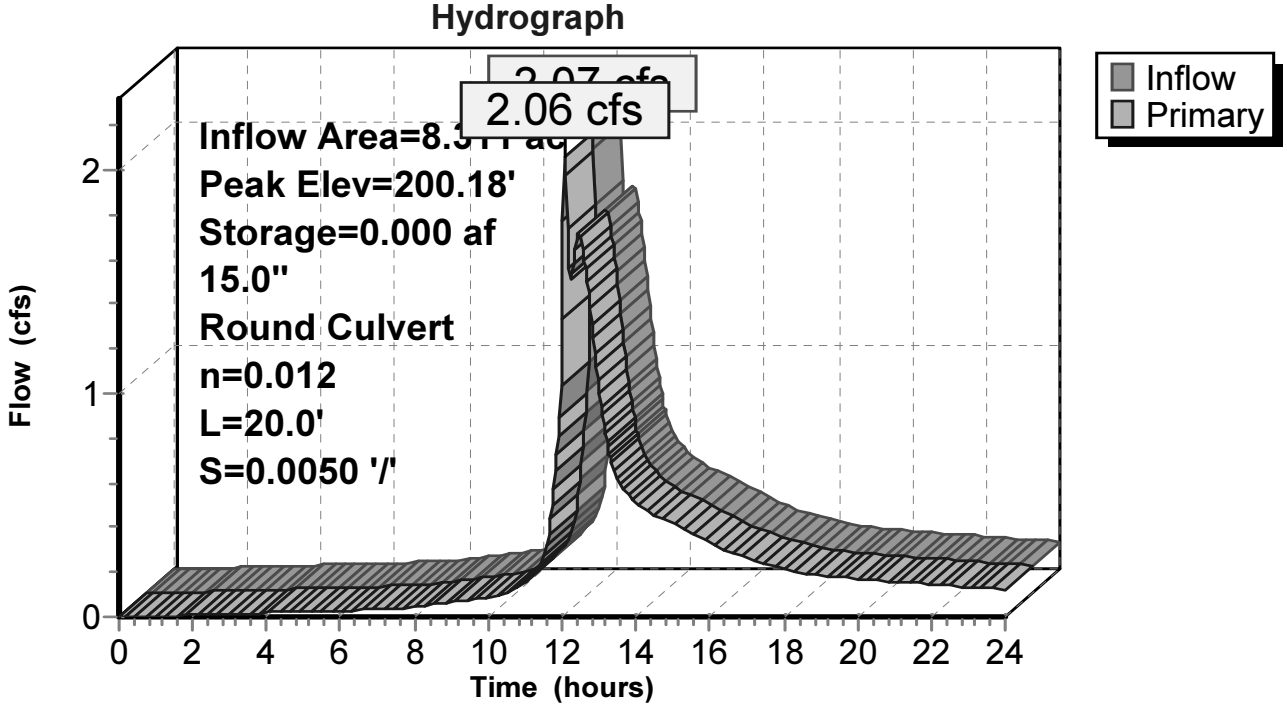
Plug-Flow detention time= 0.4 min calculated for 0.439 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (873.2 - 872.9)

Volume	Invert	Avail.Storage	Storage Description
#1	198.60'	0.001 af	**4.00'D x 4.78'H Basin**

Device	Routing	Invert	Outlet Devices
#1	Primary	198.60'	**15.0" Round 15" HDPE N-12** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 198.60' / 198.50' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.04 cfs @ 12.09 hrs HW=199.72' TW=199.57' (Dynamic Tailwater)
↑**1=15" HDPE N-12** (Outlet Controls 2.04 cfs @ 2.33 fps)

Pond 12P: Prop. CB#2



Summary for Pond 13P: Inlet Depression

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.988 ac, 50.19% Impervious, Inflow Depth > 2.32" for 25YR - 24HR event
Inflow = 1.36 cfs @ 12.53 hrs, Volume= 0.191 af
Outflow = 1.36 cfs @ 12.56 hrs, Volume= 0.190 af, Atten= 0%, Lag= 1.5 min
Primary = 1.36 cfs @ 12.56 hrs, Volume= 0.190 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 200.65' @ 12.53 hrs Surf.Area= 289 sf Storage= 141 cf

Plug-Flow detention time= 2.9 min calculated for 0.190 af (100% of inflow)
Center-of-Mass det. time= 1.9 min (874.2 - 872.2)

Volume	Invert	Avail.Storage	Storage Description
#1	200.00'	915 cf	**Open Storage (Irregular)** Listed below (Recalc)

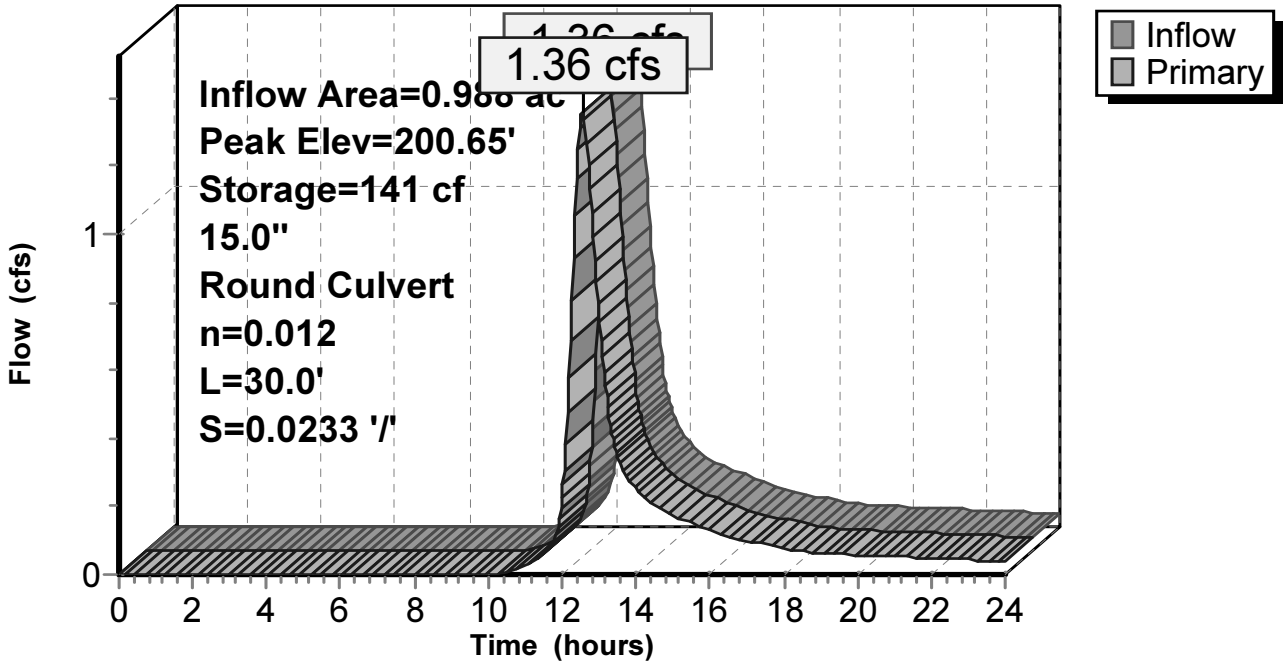
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
200.00	151	124.0	0	0	151
201.00	381	173.0	257	257	1,319
202.00	981	162.0	658	915	1,656

Device	Routing	Invert	Outlet Devices
#1	Primary	200.00'	**15.0" Round 15" HDPE N-12** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 200.00' / 199.30' S= 0.0233 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.37 cfs @ 12.56 hrs HW=200.65' TW=200.32' (Dynamic Tailwater)
1=15" HDPE N-12 (Outlet Controls 1.37 cfs @ 3.09 fps)

Pond 13P: Inlet Depression

Hydrograph



Summary for Pond 20P: 15" Cross Culvert

Inflow Area = 0.861 ac, 36.57% Impervious, Inflow Depth > 0.95" for 25YR - 24HR event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.068 af
Outflow = 0.30 cfs @ 12.12 hrs, Volume= 0.068 af, Atten= 52%, Lag= 1.5 min
Discarded = 0.02 cfs @ 12.93 hrs, Volume= 0.015 af
Primary = 0.29 cfs @ 12.11 hrs, Volume= 0.053 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 202.12' @ 12.93 hrs Surf.Area= 1,485 sf Storage= 652 cf
Flood Elev= 203.00' Surf.Area= 1,948 sf Storage= 2,162 cf

Plug-Flow detention time= 35.5 min calculated for 0.068 af (100% of inflow)
Center-of-Mass det. time= 35.5 min (857.5 - 821.9)

Volume	Invert	Avail.Storage	Storage Description
#1	201.50'	2,162 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

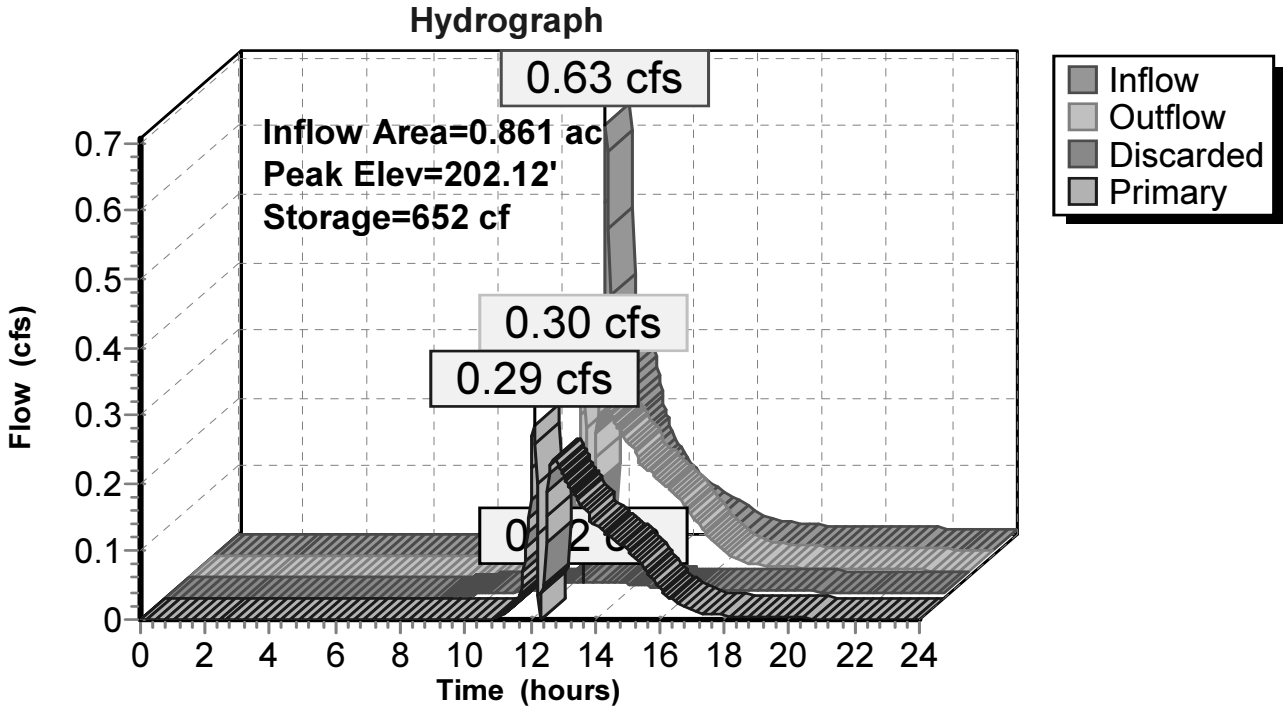
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.50	560	120.0	0	0	560
202.00	1,428	163.0	480	480	1,531
203.00	1,948	182.0	1,681	2,162	2,080

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**15.0" Round 15" HDPE N-12** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 201.50' / 201.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	201.50'	**0.710 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 12.93 hrs HW=202.12' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.29 cfs @ 12.11 hrs HW=201.82' TW=201.63' (Dynamic Tailwater)
↑—**1=15" HDPE N-12** (Outlet Controls 0.29 cfs @ 1.72 fps)

Pond 20P: 15" Cross Culvert



Summary for Pond 21P: Prop. 18" Cross Culvert

This Basin has an outlet culvert which is half in the basin, below the rim, and is mostly exposed above the rim. This structure also has incoming flow below the invert out. This model best represents the existing conditions.

Inflow Area = 21.142 ac, 3.33% Impervious, Inflow Depth > 0.16" for 25YR - 24HR event
Inflow = 0.50 cfs @ 15.58 hrs, Volume= 0.290 af
Outflow = 0.50 cfs @ 15.59 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.4 min
Primary = 0.50 cfs @ 15.59 hrs, Volume= 0.290 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 198.41' @ 15.59 hrs Surf.Area= 69 sf Storage= 10 cf
Flood Elev= 201.00' Surf.Area= 5,130 sf Storage= 7,383 cf

Plug-Flow detention time= 0.3 min calculated for 0.289 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (1,003.0 - 1,002.8)

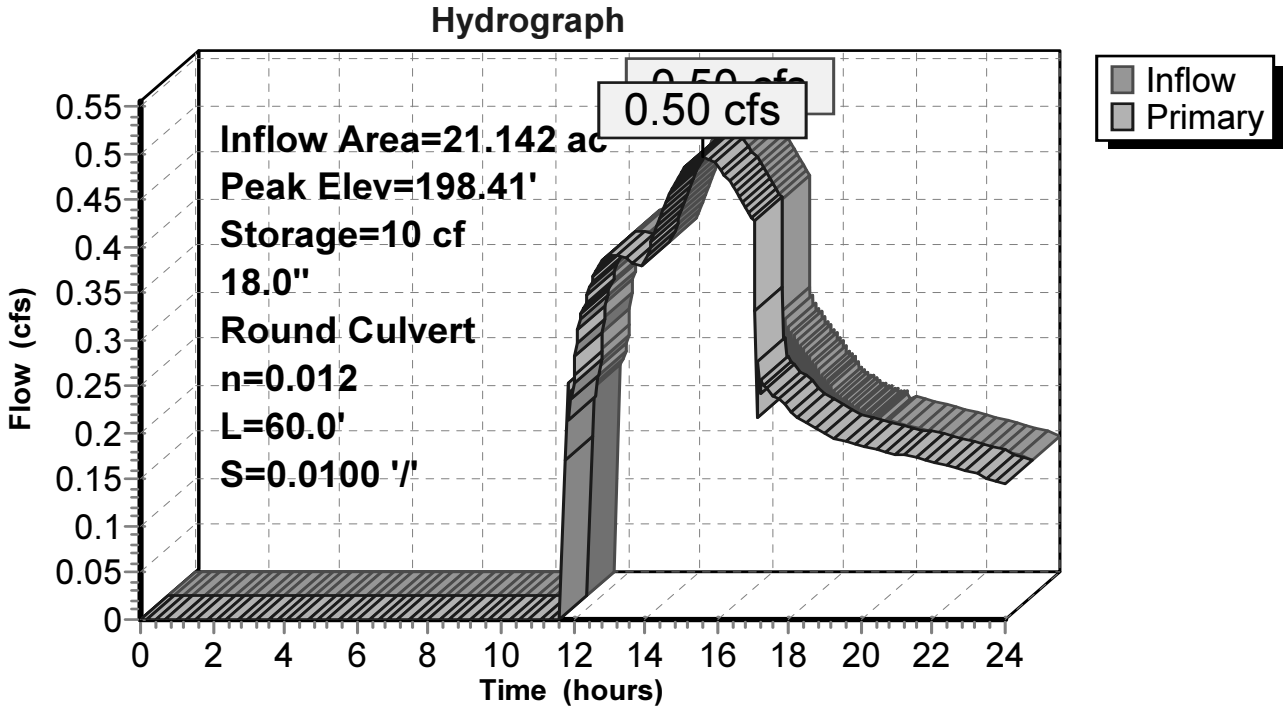
Volume	Invert	Avail.Storage	Storage Description
#1	198.10'	7,383 cf	**Open Water Storage (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.10	8	15.0	0	0	8
198.50	98	58.0	18	18	258
199.00	235	80.0	81	99	502
200.00	5,130	630.0	2,154	2,253	31,579
201.00	5,130	630.0	5,130	7,383	32,209

Device	Routing	Invert	Outlet Devices
#1	Primary	198.10'	**18.0" Round 18" HDPE N-12** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 198.10' / 197.50' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.50 cfs @ 15.59 hrs HW=198.41' TW=197.09' (Dynamic Tailwater)
↑—**1=18" HDPE N-12** (Inlet Controls 0.50 cfs @ 1.89 fps)

Pond 21P: Prop. 18" Cross Culvert



Summary for Pond 22P: Infiltration Pond

Inflow Area = 0.684 ac, 30.66% Impervious, Inflow Depth > 1.59" for 25YR - 24HR event
Inflow = 0.93 cfs @ 12.19 hrs, Volume= 0.090 af
Outflow = 0.31 cfs @ 12.64 hrs, Volume= 0.081 af, Atten= 66%, Lag= 26.8 min
Discarded = 0.07 cfs @ 12.64 hrs, Volume= 0.058 af
Primary = 0.24 cfs @ 12.64 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 203.42' @ 12.64 hrs Surf.Area= 4,162 sf Storage= 1,247 cf
Flood Elev= 203.50' Surf.Area= 4,691 sf Storage= 1,606 cf

Plug-Flow detention time= 155.0 min calculated for 0.081 af (90% of inflow)
Center-of-Mass det. time= 107.0 min (983.9 - 876.9)

Volume	Invert	Avail.Storage	Storage Description
#1	203.00'	3,001 cf	**Open Storage (Irregular)** Listed below (Recalc)

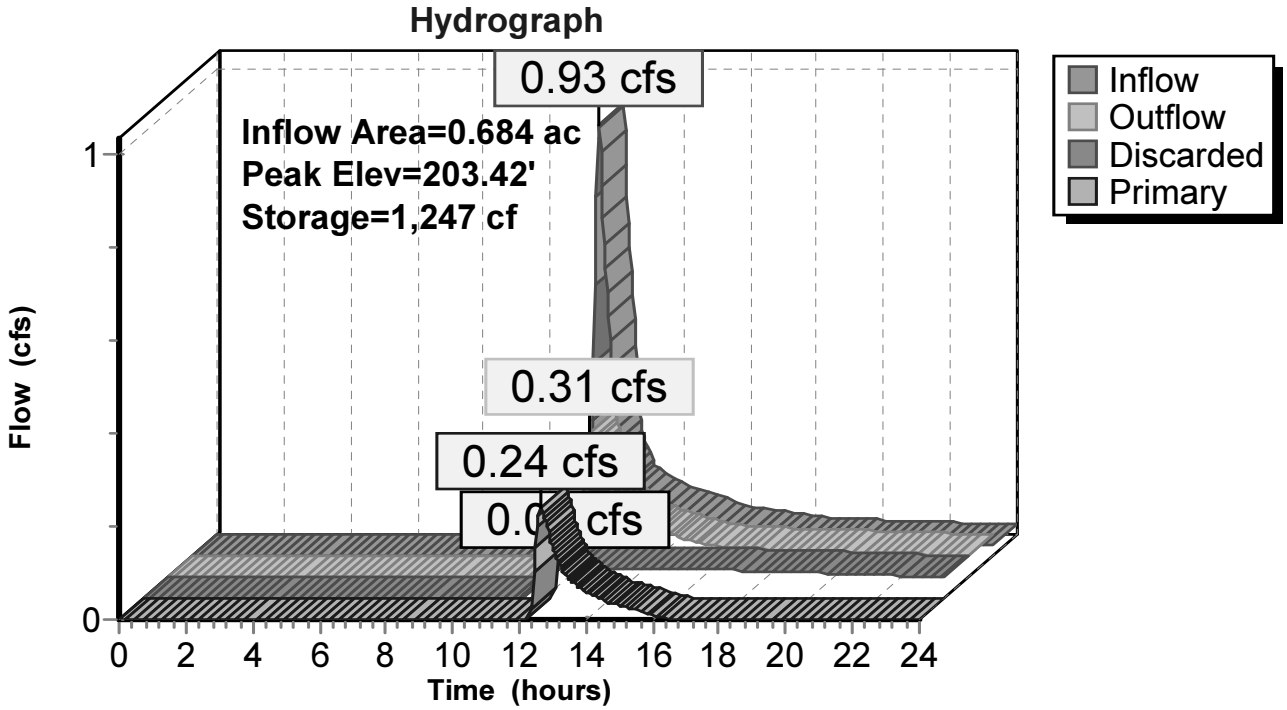
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.00	1,934	235.0	0	0	1,934
203.75	6,520	429.0	3,001	3,001	12,188

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**0.710 in/hr Exfiltration over Surface area**
#2	Primary	203.35'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.07 cfs @ 12.64 hrs HW=203.42' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.24 cfs @ 12.64 hrs HW=203.42' TW=202.09' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.24 cfs @ 0.71 fps)

Pond 22P: Infiltration Pond



Summary for Pond 40P: Prop. CB#3

[80] Warning: Exceeded Pond 10P by 0.25' @ 12.44 hrs (0.13 cfs 0.002 af)

Inflow Area = 8.211 ac, 8.58% Impervious, Inflow Depth > 0.57" for 25YR - 24HR event
Inflow = 1.59 cfs @ 12.49 hrs, Volume= 0.392 af
Outflow = 1.59 cfs @ 12.49 hrs, Volume= 0.392 af, Atten= 0%, Lag= 0.1 min
Primary = 1.59 cfs @ 12.49 hrs, Volume= 0.392 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 200.33' @ 12.48 hrs Surf.Area= 0.000 ac Storage= 0.000 af
Flood Elev= 202.53' Surf.Area= 0.000 ac Storage= 0.001 af

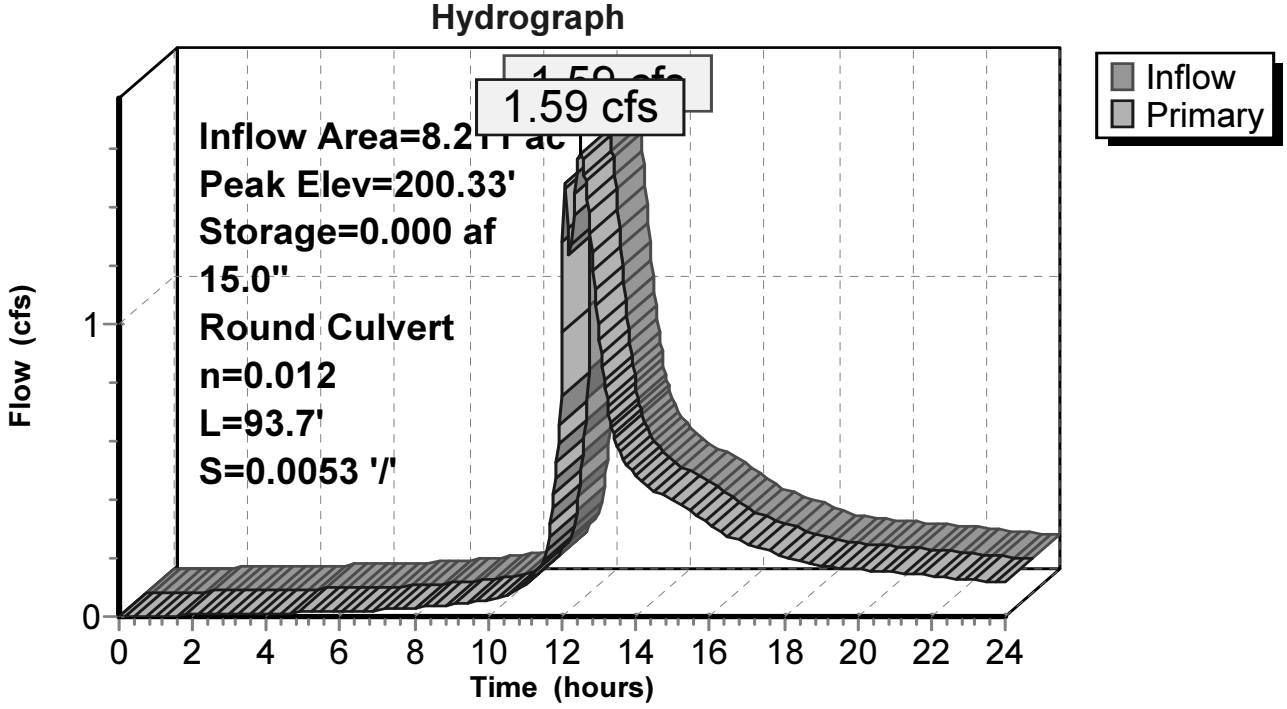
Plug-Flow detention time= 0.3 min calculated for 0.391 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (888.3 - 888.1)

Volume	Invert	Avail.Storage	Storage Description
#1	199.20'	0.001 af	**4.00'D x 3.33'H Basin**

Device	Routing	Invert	Outlet Devices
#1	Primary	199.20'	**15.0" Round 15" HDPE N-12** L= 93.7' Ke= 0.500 Inlet / Outlet Invert= 199.20' / 198.70' S= 0.0053 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.59 cfs @ 12.49 hrs HW=200.33' TW=200.18' (Dynamic Tailwater)
↑**1=15" HDPE N-12** (Outlet Controls 1.59 cfs @ 1.80 fps)

Pond 40P: Prop. CB#3



Summary for Pond 101P: Rain Garden #101

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=38)

Inflow Area = 1.269 ac, 46.37% Impervious, Inflow Depth > 1.64" for 25YR - 24HR event
Inflow = 1.96 cfs @ 12.09 hrs, Volume= 0.174 af
Outflow = 0.39 cfs @ 12.96 hrs, Volume= 0.155 af, Atten= 80%, Lag= 52.2 min
Primary = 0.39 cfs @ 12.96 hrs, Volume= 0.155 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 202.11' @ 12.96 hrs Surf.Area= 1,678 sf Storage= 2,684 cf
Flood Elev= 203.00' Surf.Area= 3,677 sf Storage= 5,022 cf

Plug-Flow detention time= 119.1 min calculated for 0.155 af (89% of inflow)
Center-of-Mass det. time= 74.8 min (895.3 - 820.5)

Volume	Invert	Avail.Storage	Storage Description
#1	198.50'	384 cf	**Stone Bed (Irregular)** Listed below (Recalc) -Impervious 959 cf Overall x 40.0% Voids
#2	199.50'	288 cf	**Bio Media (Irregular)** Listed below -Impervious 1,439 cf Overall x 20.0% Voids
#3	201.00'	3,722 cf	**Open Storage (Irregular)** Listed below (Recalc)
#4	200.00'	629 cf	**Forebay (Irregular)** Listed below (Recalc) -Impervious
		5,022 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.50	959	250.0	0	0	959
199.50	959	250.0	959	959	1,209

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
199.50	959	250.0	0	0	959
201.00	959	250.0	1,439	1,439	1,334

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	959	250.0	0	0	959
202.00	1,494	284.0	1,217	1,217	2,428
203.00	3,677	596.0	2,505	3,722	24,281

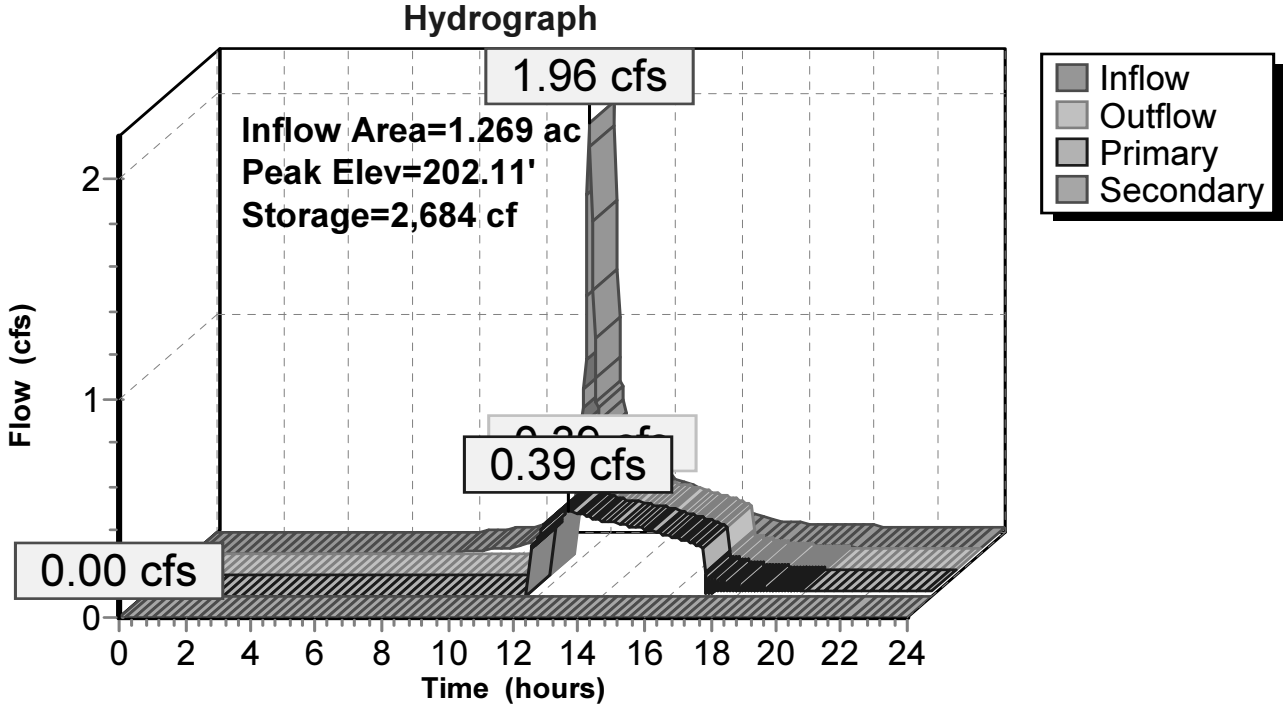
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
200.00	55	35.0	0	0	55
201.00	281	320.0	153	153	8,108
202.00	702	445.0	476	629	15,727

Device	Routing	Invert	Outlet Devices
#1	Secondary	202.50'	**20.0' long x 4.0' breadth E-Spillway** 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Primary	198.50'	**6.0" Round 6" U.D.** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 198.50' / 198.30' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#3	Device 2	201.00'	**10.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.39 cfs @ 12.96 hrs HW=202.11' TW=198.37' (Dynamic Tailwater)
└─**2=6" U.D.** (Passes 0.39 cfs of 1.70 cfs potential flow)
└─**3=Exfiltration** (Exfiltration Controls 0.39 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=198.50' TW=198.10' (Dynamic Tailwater)
└─**1=E-Spillway** (Controls 0.00 cfs)

Pond 101P: Rain Garden #101



Summary for Pond 102P: Rain Garden #102

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=76)

Inflow Area = 8.828 ac, 11.46% Impervious, Inflow Depth > 0.72" for 25YR - 24HR event
Inflow = 3.21 cfs @ 12.10 hrs, Volume= 0.529 af
Outflow = 2.13 cfs @ 12.46 hrs, Volume= 0.474 af, Atten= 34%, Lag= 21.8 min
Primary = 0.78 cfs @ 12.46 hrs, Volume= 0.410 af
Secondary = 1.35 cfs @ 12.46 hrs, Volume= 0.063 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 200.09' @ 12.46 hrs Surf.Area= 3,368 sf Storage= 5,219 cf
Flood Elev= 200.50' Surf.Area= 3,675 sf Storage= 6,653 cf

Plug-Flow detention time= 112.5 min calculated for 0.474 af (90% of inflow)
Center-of-Mass det. time= 61.7 min (932.0 - 870.4)

Volume	Invert	Avail.Storage	Storage Description
#1	196.50'	730 cf	**Stone Base (Irregular)** Listed below (Recalc) -Impervious 1,825 cf Overall x 40.0% Voids
#2	197.50'	548 cf	**Bio Media (Irregular)** Listed below (Recalc) -Impervious 2,738 cf Overall x 20.0% Voids
#3	199.00'	4,269 cf	**Open Storage (Irregular)** Listed below (Recalc)
#4	197.00'	1,106 cf	**Forebay (Irregular)** Listed below (Recalc) -Impervious
		6,653 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
196.50	1,825	180.0	0	0	1,825
197.50	1,825	180.0	1,825	1,825	2,005

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
197.50	1,825	180.0	0	0	1,825
199.00	1,825	180.0	2,738	2,738	2,095

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
199.00	1,825	180.0	0	0	1,825
200.00	3,300	270.0	2,526	2,526	5,056
200.50	3,675	275.0	1,743	4,269	5,312

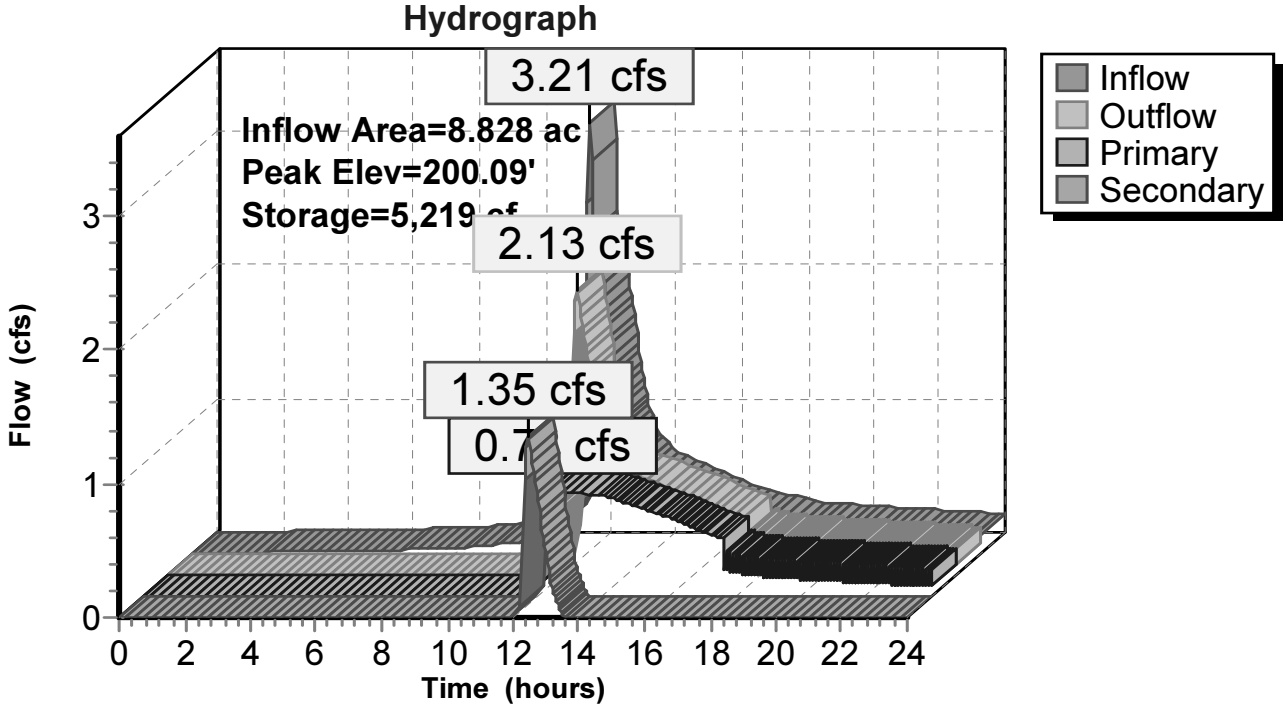
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
197.00	336	93.0	0	0	336
198.00	547	108.0	437	437	596
199.00	798	127.0	669	1,106	970

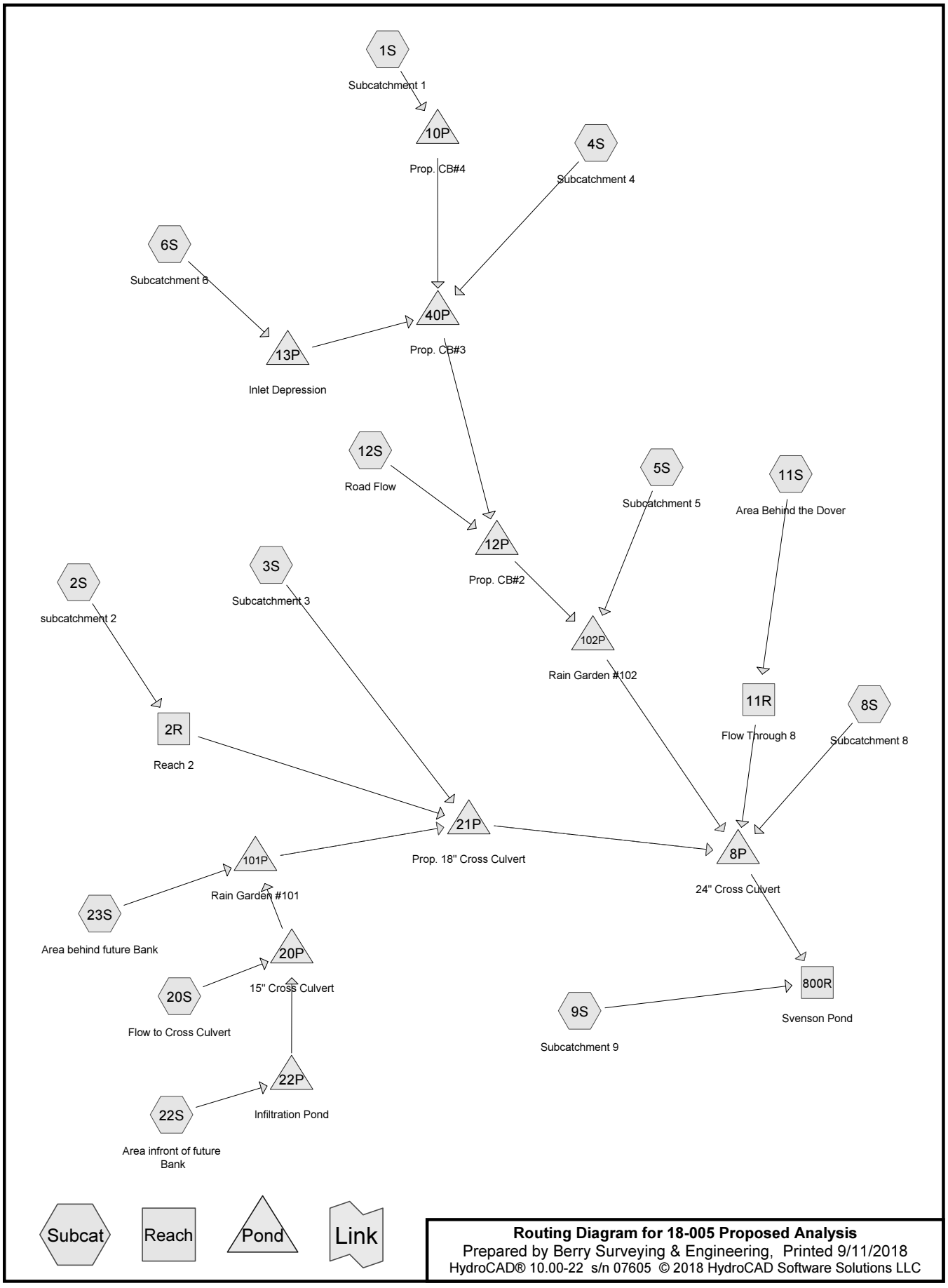
Device	Routing	Invert	Outlet Devices
#1	Primary	196.50'	**6.0" Round 6" U.D.** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 196.50' / 196.40' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Device 1	199.00'	**10.000 in/hr Exfil. To UD over Surface area**
#3	Secondary	200.00'	**20.0' long x 4.0' breadth E-Spillway** 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.78 cfs @ 12.46 hrs HW=200.09' TW=197.38' (Dynamic Tailwater)
└─**1=6" U.D.** (Passes 0.78 cfs of 1.54 cfs potential flow)
└─**2=Exfil. To UD** (Exfiltration Controls 0.78 cfs)

Secondary OutFlow Max=1.34 cfs @ 12.46 hrs HW=200.09' TW=197.38' (Dynamic Tailwater)
└─**3=E-Spillway** (Weir Controls 1.34 cfs @ 0.72 fps)

Pond 102P: Rain Garden #102





Routing Diagram for 18-005 Proposed Analysis
Prepared by Berry Surveying & Engineering, Printed 9/11/2018

Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 2
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 1S: Subcatchment 1 Runoff Area=305,536 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,542' Tc=32.6 min CN=34 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: subcatchment 2 Runoff Area=764,666 sf 0.65% Impervious Runoff Depth=0.00"
Flow Length=2,418' Tc=59.1 min CN=31 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: Subcatchment 3 Runoff Area=100,973 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=993' Tc=20.7 min CN=32 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Subcatchment 4 Runoff Area=9,068 sf 100.00% Impervious Runoff Depth>2.85"
Flow Length=207' Tc=6.0 min CN=98 Runoff=0.62 cfs 0.049 af

Subcatchment 5S: Subcatchment 5 Runoff Area=22,497 sf 40.08% Impervious Runoff Depth>0.47"
Flow Length=212' Tc=7.0 min CN=63 Runoff=0.18 cfs 0.020 af

Subcatchment 6S: Subcatchment 6 Runoff Area=43,050 sf 50.19% Impervious Runoff Depth>0.58"
Flow Length=362' Tc=36.7 min CN=66 Runoff=0.28 cfs 0.047 af

Subcatchment 8S: Subcatchment 8 Runoff Area=25,776 sf 25.48% Impervious Runoff Depth>0.06"
Flow Length=152' Tc=10.4 min UI Adjusted CN=47 Runoff=0.00 cfs 0.003 af

Subcatchment 9S: Subcatchment 9 Runoff Area=45,641 sf 11.38% Impervious Runoff Depth>0.01"
Flow Length=259' Tc=13.4 min UI Adjusted CN=42 Runoff=0.00 cfs 0.001 af

Subcatchment 11S: Area Behind the Dover Runoff Area=107,916 sf 6.10% Impervious Runoff Depth=0.00"
Flow Length=802' Tc=22.0 min UI Adjusted CN=37 Runoff=0.00 cfs 0.000 af

Subcatchment 12S: Road Flow Runoff Area=4,388 sf 100.00% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=98 Runoff=0.30 cfs 0.024 af

Subcatchment 20S: Flow to Cross Culvert Runoff Area=7,713 sf 59.39% Impervious Runoff Depth>0.96"
Tc=6.0 min CN=74 Runoff=0.19 cfs 0.014 af

Subcatchment 22S: Area infront of future Runoff Area=29,777 sf 30.66% Impervious Runoff Depth>0.27"
Flow Length=175' Tc=12.4 min CN=57 Runoff=0.08 cfs 0.015 af

Subcatchment 23S: Area behind future Runoff Area=17,796 sf 67.02% Impervious Runoff Depth>1.25"
Tc=6.0 min CN=79 Runoff=0.58 cfs 0.042 af

Reach 2R: Reach 2 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=329.8' S=0.0091 '/' Capacity=24.64 cfs Outflow=0.00 cfs 0.000 af

Reach 11R: Flow Through 8 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=76.0' S=0.0132 '/' Capacity=7.77 cfs Outflow=0.00 cfs 0.000 af

Reach 800R: Svenson Pond Inflow=0.69 cfs 0.119 af
Outflow=0.69 cfs 0.119 af

Pond 8P: 24" Cross Culvert Peak Elev=196.95' Storage=26 cf Inflow=0.66 cfs 0.119 af
Primary=0.69 cfs 0.119 af Secondary=0.00 cfs 0.000 af Outflow=0.69 cfs 0.119 af

Pond 10P: Prop. CB#4 Peak Elev=200.07' Storage=0 cf Inflow=0.00 cfs 0.000 af
15.0" Round Culvert n=0.012 L=153.9' S=0.0050 '/' Outflow=0.00 cfs 0.000 af

Pond 12P: Prop. CB#2 Peak Elev=199.14' Storage=0.000 af Inflow=0.92 cfs 0.120 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=0.92 cfs 0.120 af

Pond 13P: Inlet Depression Peak Elev=200.24' Storage=42 cf Inflow=0.28 cfs 0.047 af
15.0" Round Culvert n=0.012 L=30.0' S=0.0233 '/' Outflow=0.28 cfs 0.047 af

Pond 20P: 15" Cross Culvert Peak Elev=201.64' Storage=93 cf Inflow=0.19 cfs 0.014 af
Discarded=0.01 cfs 0.007 af Primary=0.10 cfs 0.007 af Outflow=0.11 cfs 0.014 af

Pond 21P: Prop. 18" Cross Culvert Peak Elev=198.32' Storage=5 cf Inflow=0.23 cfs 0.030 af
18.0" Round Culvert n=0.012 L=60.0' S=0.0100 '/' Outflow=0.25 cfs 0.030 af

Pond 22P: Infiltration Pond Peak Elev=203.03' Storage=64 cf Inflow=0.08 cfs 0.015 af
Discarded=0.03 cfs 0.015 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.015 af

Pond 40P: Prop. CB#3 Peak Elev=199.63' Storage=0.000 af Inflow=0.62 cfs 0.097 af
15.0" Round Culvert n=0.012 L=93.7' S=0.0053 '/' Outflow=0.62 cfs 0.097 af

Pond 101P: Rain Garden #101 Peak Elev=201.05' Storage=883 cf Inflow=0.63 cfs 0.049 af
Primary=0.23 cfs 0.030 af Secondary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.030 af

Pond 102P: Rain Garden #102 Peak Elev=199.04' Storage=2,455 cf Inflow=1.08 cfs 0.140 af
Primary=0.43 cfs 0.086 af Secondary=0.00 cfs 0.000 af Outflow=0.43 cfs 0.086 af

Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 2
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 1S: Subcatchment 1 Runoff Area=305,536 sf 0.00% Impervious Runoff Depth>0.03"
Flow Length=1,542' Tc=32.6 min CN=34 Runoff=0.02 cfs 0.016 af

Subcatchment 2S: subcatchment 2 Runoff Area=764,666 sf 0.65% Impervious Runoff Depth>0.00"
Flow Length=2,418' Tc=59.1 min CN=31 Runoff=0.01 cfs 0.002 af

Subcatchment 3S: Subcatchment 3 Runoff Area=100,973 sf 0.00% Impervious Runoff Depth>0.01"
Flow Length=993' Tc=20.7 min CN=32 Runoff=0.00 cfs 0.001 af

Subcatchment 4S: Subcatchment 4 Runoff Area=9,068 sf 100.00% Impervious Runoff Depth>4.40"
Flow Length=207' Tc=6.0 min CN=98 Runoff=0.94 cfs 0.076 af

Subcatchment 5S: Subcatchment 5 Runoff Area=22,497 sf 40.08% Impervious Runoff Depth>1.28"
Flow Length=212' Tc=7.0 min CN=63 Runoff=0.68 cfs 0.055 af

Subcatchment 6S: Subcatchment 6 Runoff Area=43,050 sf 50.19% Impervious Runoff Depth>1.47"
Flow Length=362' Tc=36.7 min CN=66 Runoff=0.83 cfs 0.121 af

Subcatchment 8S: Subcatchment 8 Runoff Area=25,776 sf 25.48% Impervious Runoff Depth>0.41"
Flow Length=152' Tc=10.4 min UI Adjusted CN=47 Runoff=0.11 cfs 0.020 af

Subcatchment 9S: Subcatchment 9 Runoff Area=45,641 sf 11.38% Impervious Runoff Depth>0.22"
Flow Length=259' Tc=13.4 min UI Adjusted CN=42 Runoff=0.05 cfs 0.019 af

Subcatchment 11S: Area Behind the Dover Runoff Area=107,916 sf 6.10% Impervious Runoff Depth>0.08"
Flow Length=802' Tc=22.0 min UI Adjusted CN=37 Runoff=0.03 cfs 0.017 af

Subcatchment 12S: Road Flow Runoff Area=4,388 sf 100.00% Impervious Runoff Depth>4.40"
Tc=6.0 min CN=98 Runoff=0.45 cfs 0.037 af

Subcatchment 20S: Flow to Cross Culvert Runoff Area=7,713 sf 59.39% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=74 Runoff=0.42 cfs 0.031 af

Subcatchment 22S: Area infront of future Runoff Area=29,777 sf 30.66% Impervious Runoff Depth>0.92"
Flow Length=175' Tc=12.4 min CN=57 Runoff=0.47 cfs 0.052 af

Subcatchment 23S: Area behind future Runoff Area=17,796 sf 67.02% Impervious Runoff Depth>2.49"
Tc=6.0 min CN=79 Runoff=1.18 cfs 0.085 af

Reach 2R: Reach 2 Avg. Flow Depth=0.01' Max Vel=0.31 fps Inflow=0.01 cfs 0.002 af
n=0.022 L=329.8' S=0.0091 '/' Capacity=24.64 cfs Outflow=0.01 cfs 0.001 af

Reach 11R: Flow Through 8 Avg. Flow Depth=0.04' Max Vel=0.41 fps Inflow=0.03 cfs 0.017 af
n=0.035 L=76.0' S=0.0132 '/' Capacity=7.77 cfs Outflow=0.03 cfs 0.017 af

Reach 800R: Svenson Pond Inflow=1.12 cfs 0.395 af
Outflow=1.12 cfs 0.395 af

Pond 8P: 24" Cross Culvert Peak Elev=197.05' Storage=45 cf Inflow=1.07 cfs 0.376 af
Primary=1.07 cfs 0.376 af Secondary=0.00 cfs 0.000 af Outflow=1.07 cfs 0.376 af

Pond 10P: Prop. CB#4 Peak Elev=200.15' Storage=1 cf Inflow=0.02 cfs 0.016 af
15.0" Round Culvert n=0.012 L=153.9' S=0.0050 '/' Outflow=0.02 cfs 0.016 af

Pond 12P: Prop. CB#2 Peak Elev=199.93' Storage=0.000 af Inflow=1.55 cfs 0.250 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=1.54 cfs 0.250 af

Pond 13P: Inlet Depression Peak Elev=200.43' Storage=83 cf Inflow=0.83 cfs 0.121 af
15.0" Round Culvert n=0.012 L=30.0' S=0.0233 '/' Outflow=0.83 cfs 0.121 af

Pond 20P: 15" Cross Culvert Peak Elev=201.76' Storage=195 cf Inflow=0.42 cfs 0.031 af
Discarded=0.02 cfs 0.011 af Primary=0.25 cfs 0.020 af Outflow=0.26 cfs 0.031 af

Pond 21P: Prop. 18" Cross Culvert Peak Elev=198.34' Storage=6 cf Inflow=0.30 cfs 0.088 af
18.0" Round Culvert n=0.012 L=60.0' S=0.0100 '/' Outflow=0.30 cfs 0.088 af

Pond 22P: Infiltration Pond Peak Elev=203.32' Storage=858 cf Inflow=0.47 cfs 0.052 af
Discarded=0.06 cfs 0.050 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.050 af

Pond 40P: Prop. CB#3 Peak Elev=200.00' Storage=0.000 af Inflow=1.10 cfs 0.213 af
15.0" Round Culvert n=0.012 L=93.7' S=0.0053 '/' Outflow=1.10 cfs 0.213 af

Pond 101P: Rain Garden #101 Peak Elev=201.68' Storage=1,876 cf Inflow=1.40 cfs 0.104 af
Primary=0.30 cfs 0.085 af Secondary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.085 af

Pond 102P: Rain Garden #102 Peak Elev=199.91' Storage=4,631 cf Inflow=2.20 cfs 0.305 af
Primary=0.73 cfs 0.250 af Secondary=0.00 cfs 0.000 af Outflow=0.73 cfs 0.250 af

Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 2
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 1S: Subcatchment 1 Runoff Area=305,536 sf 0.00% Impervious Runoff Depth>0.18"
Flow Length=1,542' Tc=32.6 min CN=34 Runoff=0.17 cfs 0.104 af

Subcatchment 2S: subcatchment 2 Runoff Area=764,666 sf 0.65% Impervious Runoff Depth>0.08"
Flow Length=2,418' Tc=59.1 min CN=31 Runoff=0.18 cfs 0.115 af

Subcatchment 3S: Subcatchment 3 Runoff Area=100,973 sf 0.00% Impervious Runoff Depth>0.11"
Flow Length=993' Tc=20.7 min CN=32 Runoff=0.03 cfs 0.022 af

Subcatchment 4S: Subcatchment 4 Runoff Area=9,068 sf 100.00% Impervious Runoff Depth>5.62"
Flow Length=207' Tc=6.0 min CN=98 Runoff=1.18 cfs 0.097 af

Subcatchment 5S: Subcatchment 5 Runoff Area=22,497 sf 40.08% Impervious Runoff Depth>2.08"
Flow Length=212' Tc=7.0 min CN=63 Runoff=1.16 cfs 0.089 af

Subcatchment 6S: Subcatchment 6 Runoff Area=43,050 sf 50.19% Impervious Runoff Depth>2.32"
Flow Length=362' Tc=36.7 min CN=66 Runoff=1.36 cfs 0.191 af

Subcatchment 8S: Subcatchment 8 Runoff Area=25,776 sf 25.48% Impervious Runoff Depth>0.87"
Flow Length=152' Tc=10.4 min UI Adjusted CN=47 Runoff=0.34 cfs 0.043 af

Subcatchment 9S: Subcatchment 9 Runoff Area=45,641 sf 11.38% Impervious Runoff Depth>0.56"
Flow Length=259' Tc=13.4 min UI Adjusted CN=42 Runoff=0.26 cfs 0.049 af

Subcatchment 11S: Area Behind the Dover Runoff Area=107,916 sf 6.10% Impervious Runoff Depth>0.31"
Flow Length=802' Tc=22.0 min UI Adjusted CN=37 Runoff=0.17 cfs 0.063 af

Subcatchment 12S: Road Flow Runoff Area=4,388 sf 100.00% Impervious Runoff Depth>5.62"
Tc=6.0 min CN=98 Runoff=0.57 cfs 0.047 af

Subcatchment 20S: Flow to Cross Culvert Runoff Area=7,713 sf 59.39% Impervious Runoff Depth>3.06"
Tc=6.0 min CN=74 Runoff=0.63 cfs 0.045 af

Subcatchment 22S: Area infront of future Runoff Area=29,777 sf 30.66% Impervious Runoff Depth>1.59"
Flow Length=175' Tc=12.4 min CN=57 Runoff=0.93 cfs 0.090 af

Subcatchment 23S: Area behind future Runoff Area=17,796 sf 67.02% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=79 Runoff=1.68 cfs 0.121 af

Reach 2R: Reach 2 Avg. Flow Depth=0.06' Max Vel=0.96 fps Inflow=0.18 cfs 0.115 af
n=0.022 L=329.8' S=0.0091 '/' Capacity=24.64 cfs Outflow=0.18 cfs 0.114 af

Reach 11R: Flow Through 8 Avg. Flow Depth=0.09' Max Vel=0.72 fps Inflow=0.17 cfs 0.063 af
n=0.035 L=76.0' S=0.0132 '/' Capacity=7.77 cfs Outflow=0.17 cfs 0.063 af

Reach 800R: Svenson Pond Inflow=3.05 cfs 0.918 af
Outflow=3.05 cfs 0.918 af

Pond 8P: 24" Cross Culvert Peak Elev=197.39' Storage=152 cf Inflow=2.81 cfs 0.870 af
Primary=2.80 cfs 0.869 af Secondary=0.00 cfs 0.000 af Outflow=2.80 cfs 0.869 af

Pond 10P: Prop. CB#4 Peak Elev=200.34' Storage=3 cf Inflow=0.17 cfs 0.104 af
15.0" Round Culvert n=0.012 L=153.9' S=0.0050 '/' Outflow=0.17 cfs 0.104 af

Pond 12P: Prop. CB#2 Peak Elev=200.18' Storage=0.000 af Inflow=2.07 cfs 0.439 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=2.06 cfs 0.439 af

Pond 13P: Inlet Depression Peak Elev=200.65' Storage=141 cf Inflow=1.36 cfs 0.191 af
15.0" Round Culvert n=0.012 L=30.0' S=0.0233 '/' Outflow=1.36 cfs 0.190 af

Pond 20P: 15" Cross Culvert Peak Elev=202.12' Storage=652 cf Inflow=0.63 cfs 0.068 af
Discarded=0.02 cfs 0.015 af Primary=0.29 cfs 0.053 af Outflow=0.30 cfs 0.068 af

Pond 21P: Prop. 18" Cross Culvert Peak Elev=198.41' Storage=10 cf Inflow=0.50 cfs 0.290 af
18.0" Round Culvert n=0.012 L=60.0' S=0.0100 '/' Outflow=0.50 cfs 0.290 af

Pond 22P: Infiltration Pond Peak Elev=203.42' Storage=1,247 cf Inflow=0.93 cfs 0.090 af
Discarded=0.07 cfs 0.058 af Primary=0.24 cfs 0.023 af Outflow=0.31 cfs 0.081 af

Pond 40P: Prop. CB#3 Peak Elev=200.33' Storage=0.000 af Inflow=1.59 cfs 0.392 af
15.0" Round Culvert n=0.012 L=93.7' S=0.0053 '/' Outflow=1.59 cfs 0.392 af

Pond 101P: Rain Garden #101 Peak Elev=202.11' Storage=2,684 cf Inflow=1.96 cfs 0.174 af
Primary=0.39 cfs 0.155 af Secondary=0.00 cfs 0.000 af Outflow=0.39 cfs 0.155 af

Pond 102P: Rain Garden #102 Peak Elev=200.09' Storage=5,219 cf Inflow=3.21 cfs 0.529 af
Primary=0.78 cfs 0.410 af Secondary=1.35 cfs 0.063 af Outflow=2.13 cfs 0.474 af

Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 2
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 1S: Subcatchment 1 Runoff Area=305,536 sf 0.00% Impervious Runoff Depth>0.42"
Flow Length=1,542' Tc=32.6 min CN=34 Runoff=0.70 cfs 0.248 af

Subcatchment 2S: subcatchment 2 Runoff Area=764,666 sf 0.65% Impervious Runoff Depth>0.25"
Flow Length=2,418' Tc=59.1 min CN=31 Runoff=0.63 cfs 0.367 af

Subcatchment 3S: Subcatchment 3 Runoff Area=100,973 sf 0.00% Impervious Runoff Depth>0.31"
Flow Length=993' Tc=20.7 min CN=32 Runoff=0.13 cfs 0.060 af

Subcatchment 4S: Subcatchment 4 Runoff Area=9,068 sf 100.00% Impervious Runoff Depth>6.76"
Flow Length=207' Tc=6.0 min CN=98 Runoff=1.42 cfs 0.117 af

Subcatchment 5S: Subcatchment 5 Runoff Area=22,497 sf 40.08% Impervious Runoff Depth>2.90"
Flow Length=212' Tc=7.0 min CN=63 Runoff=1.65 cfs 0.125 af

Subcatchment 6S: Subcatchment 6 Runoff Area=43,050 sf 50.19% Impervious Runoff Depth>3.18"
Flow Length=362' Tc=36.7 min CN=66 Runoff=1.89 cfs 0.262 af

Subcatchment 8S: Subcatchment 8 Runoff Area=25,776 sf 25.48% Impervious Runoff Depth>1.40"
Flow Length=152' Tc=10.4 min UI Adjusted CN=47 Runoff=0.67 cfs 0.069 af

Subcatchment 9S: Subcatchment 9 Runoff Area=45,641 sf 11.38% Impervious Runoff Depth>0.99"
Flow Length=259' Tc=13.4 min UI Adjusted CN=42 Runoff=0.62 cfs 0.086 af

Subcatchment 11S: Area Behind the Dover Runoff Area=107,916 sf 6.10% Impervious Runoff Depth>0.62"
Flow Length=802' Tc=22.0 min UI Adjusted CN=37 Runoff=0.58 cfs 0.128 af

Subcatchment 12S: Road Flow Runoff Area=4,388 sf 100.00% Impervious Runoff Depth>6.76"
Tc=6.0 min CN=98 Runoff=0.69 cfs 0.057 af

Subcatchment 20S: Flow to Cross Culvert Runoff Area=7,713 sf 59.39% Impervious Runoff Depth>4.04"
Tc=6.0 min CN=74 Runoff=0.83 cfs 0.060 af

Subcatchment 22S: Area infront of future Runoff Area=29,777 sf 30.66% Impervious Runoff Depth>2.31"
Flow Length=175' Tc=12.4 min CN=57 Runoff=1.41 cfs 0.131 af

Subcatchment 23S: Area behind future Runoff Area=17,796 sf 67.02% Impervious Runoff Depth>4.58"
Tc=6.0 min CN=79 Runoff=2.16 cfs 0.156 af

Reach 2R: Reach 2 Avg. Flow Depth=0.13' Max Vel=1.53 fps Inflow=0.63 cfs 0.367 af
n=0.022 L=329.8' S=0.0091 '/' Capacity=24.64 cfs Outflow=0.63 cfs 0.365 af

Reach 11R: Flow Through 8 Avg. Flow Depth=0.15' Max Vel=1.05 fps Inflow=0.58 cfs 0.128 af
n=0.035 L=76.0' S=0.0132 '/' Capacity=7.77 cfs Outflow=0.58 cfs 0.128 af

Reach 800R: Svenson Pond Inflow=5.11 cfs 1.697 af
Outflow=5.11 cfs 1.697 af

Pond 8P: 24" Cross Culvert Peak Elev=197.66' Storage=303 cf Inflow=4.66 cfs 1.611 af
Primary=4.65 cfs 1.610 af Secondary=0.00 cfs 0.000 af Outflow=4.65 cfs 1.610 af

Pond 10P: Prop. CB#4 Peak Elev=200.74' Storage=8 cf Inflow=0.70 cfs 0.248 af
15.0" Round Culvert n=0.012 L=153.9' S=0.0050 '/' Outflow=0.70 cfs 0.248 af

Pond 12P: Prop. CB#2 Peak Elev=200.34' Storage=0.001 af Inflow=2.68 cfs 0.683 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=2.68 cfs 0.683 af

Pond 13P: Inlet Depression Peak Elev=200.86' Storage=208 cf Inflow=1.89 cfs 0.262 af
15.0" Round Culvert n=0.012 L=30.0' S=0.0233 '/' Outflow=1.87 cfs 0.261 af

Pond 20P: 15" Cross Culvert Peak Elev=202.54' Storage=1,323 cf Inflow=0.90 cfs 0.115 af
Discarded=0.03 cfs 0.018 af Primary=0.53 cfs 0.099 af Outflow=0.56 cfs 0.115 af

Pond 21P: Prop. 18" Cross Culvert Peak Elev=198.59' Storage=28 cf Inflow=1.21 cfs 0.661 af
18.0" Round Culvert n=0.012 L=60.0' S=0.0100 '/' Outflow=1.21 cfs 0.661 af

Pond 22P: Infiltration Pond Peak Elev=203.48' Storage=1,532 cf Inflow=1.41 cfs 0.131 af
Discarded=0.08 cfs 0.063 af Primary=0.66 cfs 0.055 af Outflow=0.74 cfs 0.118 af

Pond 40P: Prop. CB#3 Peak Elev=200.59' Storage=0.000 af Inflow=2.59 cfs 0.626 af
15.0" Round Culvert n=0.012 L=93.7' S=0.0053 '/' Outflow=2.59 cfs 0.626 af

Pond 101P: Rain Garden #101 Peak Elev=202.52' Storage=3,557 cf Inflow=2.42 cfs 0.255 af
Primary=0.58 cfs 0.232 af Secondary=0.18 cfs 0.004 af Outflow=0.76 cfs 0.236 af

Pond 102P: Rain Garden #102 Peak Elev=200.13' Storage=5,359 cf Inflow=4.19 cfs 0.807 af
Primary=0.79 cfs 0.546 af Secondary=2.34 cfs 0.207 af Outflow=3.13 cfs 0.753 af

Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 2
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 1S: Subcatchment 1 Runoff Area=305,536 sf 0.00% Impervious Runoff Depth>0.83"
Flow Length=1,542' Tc=32.6 min CN=34 Runoff=2.09 cfs 0.485 af

Subcatchment 2S: subcatchment 2 Runoff Area=764,666 sf 0.65% Impervious Runoff Depth>0.57"
Flow Length=2,418' Tc=59.1 min CN=31 Runoff=2.09 cfs 0.831 af

Subcatchment 3S: Subcatchment 3 Runoff Area=100,973 sf 0.00% Impervious Runoff Depth>0.66"
Flow Length=993' Tc=20.7 min CN=32 Runoff=0.54 cfs 0.128 af

Subcatchment 4S: Subcatchment 4 Runoff Area=9,068 sf 100.00% Impervious Runoff Depth>8.12"
Flow Length=207' Tc=6.0 min CN=98 Runoff=1.70 cfs 0.141 af

Subcatchment 5S: Subcatchment 5 Runoff Area=22,497 sf 40.08% Impervious Runoff Depth>3.96"
Flow Length=212' Tc=7.0 min CN=63 Runoff=2.27 cfs 0.170 af

Subcatchment 6S: Subcatchment 6 Runoff Area=43,050 sf 50.19% Impervious Runoff Depth>4.28"
Flow Length=362' Tc=36.7 min CN=66 Runoff=2.56 cfs 0.352 af

Subcatchment 8S: Subcatchment 8 Runoff Area=25,776 sf 25.48% Impervious Runoff Depth>2.14"
Flow Length=152' Tc=10.4 min UI Adjusted CN=47 Runoff=1.13 cfs 0.106 af

Subcatchment 9S: Subcatchment 9 Runoff Area=45,641 sf 11.38% Impervious Runoff Depth>1.61"
Flow Length=259' Tc=13.4 min UI Adjusted CN=42 Runoff=1.22 cfs 0.141 af

Subcatchment 11S: Area Behind the Dover Runoff Area=107,916 sf 6.10% Impervious Runoff Depth>1.11"
Flow Length=802' Tc=22.0 min UI Adjusted CN=37 Runoff=1.37 cfs 0.229 af

Subcatchment 12S: Road Flow Runoff Area=4,388 sf 100.00% Impervious Runoff Depth>8.12"
Tc=6.0 min CN=98 Runoff=0.82 cfs 0.068 af

Subcatchment 20S: Flow to Cross Culvert Runoff Area=7,713 sf 59.39% Impervious Runoff Depth>5.25"
Tc=6.0 min CN=74 Runoff=1.08 cfs 0.078 af

Subcatchment 22S: Area infront of future Runoff Area=29,777 sf 30.66% Impervious Runoff Depth>3.26"
Flow Length=175' Tc=12.4 min CN=57 Runoff=2.06 cfs 0.186 af

Subcatchment 23S: Area behind future Runoff Area=17,796 sf 67.02% Impervious Runoff Depth>5.85"
Tc=6.0 min CN=79 Runoff=2.74 cfs 0.199 af

Reach 2R: Reach 2 Avg. Flow Depth=0.26' Max Vel=2.32 fps Inflow=2.09 cfs 0.831 af
n=0.022 L=329.8' S=0.0091 '/' Capacity=24.64 cfs Outflow=2.09 cfs 0.828 af

Reach 11R: Flow Through 8 Avg. Flow Depth=0.22' Max Vel=1.37 fps Inflow=1.37 cfs 0.229 af
n=0.035 L=76.0' S=0.0132 '/' Capacity=7.77 cfs Outflow=1.37 cfs 0.229 af

Reach 800R: Svenson Pond Inflow=10.35 cfs 2.934 af
Outflow=10.35 cfs 2.934 af

Pond 8P: 24" Cross Culvert Peak Elev=198.26' Storage=929 cf Inflow=9.71 cfs 2.794 af
Primary=9.63 cfs 2.793 af Secondary=0.00 cfs 0.000 af Outflow=9.63 cfs 2.793 af

Pond 10P: Prop. CB#4 Peak Elev=201.77' Storage=21 cf Inflow=2.09 cfs 0.485 af
15.0" Round Culvert n=0.012 L=153.9' S=0.0050 '/' Outflow=2.10 cfs 0.485 af

Pond 12P: Prop. CB#2 Peak Elev=200.88' Storage=0.001 af Inflow=4.88 cfs 1.046 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=4.88 cfs 1.046 af

Pond 13P: Inlet Depression Peak Elev=201.72' Storage=672 cf Inflow=2.56 cfs 0.352 af
15.0" Round Culvert n=0.012 L=30.0' S=0.0233 '/' Outflow=2.49 cfs 0.352 af

Pond 20P: 15" Cross Culvert Peak Elev=202.69' Storage=1,589 cf Inflow=1.64 cfs 0.178 af
Discarded=0.03 cfs 0.020 af Primary=1.48 cfs 0.160 af Outflow=1.51 cfs 0.178 af

Pond 21P: Prop. 18" Cross Culvert Peak Elev=198.94' Storage=85 cf Inflow=3.03 cfs 1.297 af
18.0" Round Culvert n=0.012 L=60.0' S=0.0100 '/' Outflow=3.03 cfs 1.297 af

Pond 22P: Infiltration Pond Peak Elev=203.55' Storage=1,869 cf Inflow=2.06 cfs 0.186 af
Discarded=0.08 cfs 0.067 af Primary=1.24 cfs 0.101 af Outflow=1.32 cfs 0.168 af

Pond 40P: Prop. CB#3 Peak Elev=201.60' Storage=0.001 af Inflow=4.76 cfs 0.978 af
15.0" Round Culvert n=0.012 L=93.7' S=0.0053 '/' Outflow=4.78 cfs 0.978 af

Pond 101P: Rain Garden #101 Peak Elev=202.61' Storage=3,769 cf Inflow=3.20 cfs 0.359 af
Primary=0.63 cfs 0.280 af Secondary=1.63 cfs 0.061 af Outflow=2.25 cfs 0.340 af

Pond 102P: Rain Garden #102 Peak Elev=200.20' Storage=5,597 cf Inflow=5.36 cfs 1.217 af
Primary=0.80 cfs 0.673 af Secondary=4.38 cfs 0.489 af Outflow=5.18 cfs 1.162 af