



August 12, 2019

Pembroke Planning Board Town Hall 100 Center Street Pembroke, Massachusetts 02359

RE: Response to comments received as part of Site Plan Review Centrica Business Solutions – Herring Brook Solar Project Pembroke, MA ADE Project #3086.00

Dear Board Members:

This response letter, along with our revised Site Development Plans dated August 12, 2019, and supporting documentation for the Herring Brook Solar Project address the comments received from Merrill Engineers and Land Surveyors (Merrill) dated July 16, 2019. Merrill comments are *italicized* and our responses follow in **bold**.

ZONING BYLAWS

<u>Summary of Requested Waivers</u> The following waivers have been requested from the Zoning By-laws: Section V. 12. Solar Photovoltaic Installations D.1.f. Form of Financial Security

The Applicant is not requesting relief from the requirement to provide financial security. The Applicant is respectfully requesting that the financial security be required as part of the building permit submittal process and the amount determined at that time. The Applicant is amenable to funding additional peer review of the decommissioning bond amount if required.

Section V. 7. Site Plan Approval

All information required by this section of the Zoning Bylaws has been satisfactorily provided in the submittal material.

No response required

<u>Section V. 12. Solar Photovoltaic Installations</u> D.9. An Operation and Maintenance Plan for the proposed solar facility is included in the submittal.

No response required

P.O. Box 1051 Sandwich, MA 02563 (508) 888-9282 · FAX 888-5859 email: ade@atlanticcompanies.com www.atlanticcompanies.com



D.11.b. Screening 2b.

When a large scale ground mounted solar installation is directly about in existing residential uses screening shall be provided. "For a project site of greater than 5 acres: Minimum of one-hundred (100) feet of vegetation buffer with fifty (50) feet being undisturbed closest to the residential property and the other fifty (50) feet being allowed to be selectively cleared." This requirement has been met with the exception of the northerly end of the property. The proposed setback is 78 feet from the property line. The owner of the abutting property at this location is the Town of Pembroke; however it is zoned residential. The Planning Board should review this condition.

The plan has been revised to adhere to the above referenced setback.

RULES AND REGULATIONS GOVERNING SITE PLAN APPROVAL

Summary of Requested Waivers

The following waivers have been requested from the Planning Board Rules & Regulations Governing the Issuance of Site Plan Approval.

Section IV – Site Plan Content

4.7 Landscape Plan

4.10 Building Elevations

- 4.21 Photometric Plan
- 4.22 Traffic Impact Study

We recommend that all waivers that are granted by the Planning Board be specified on the cover sheet of the approved Site Plans.

The cover sheet has been revised to include the requested waivers.

Section IV. Site Plan Content

4.4 And existing easement is shown on the plans adjacent to Hobomock Street opposite Monroe Street. The purpose and owner of this easement should be shown on the plans.

The information has been added to the plans.

4.5 The Town Clerk signature block is not presented on the plan set as required. We recommend that it be shown on the Cover Sheet and that it follow the format specified under this item of the Regulations.

The information has been added to the plans.

4.6 *The location of the benchmark(s) should be presented on the plans.*

The information has been added to the plans.



4.7 A Landscaping Plan prepared by a Registered Landscape Architect has not been provided as required. The Planning Board should determine whether a Landscaping Plan for this project is necessary. The applicant has requested a waiver of this requirement.

The Applicant respectfully requests a waiver from this requirement.

4.16 The design plans have been stamped and signed by a registered Professional Engineer but not a registered Professional Land Surveyor as required. In addition, a Professional Land Surveyor's certification as to the accuracy of the location of the buildings, etc. has not been presented on the plans and should be added.

The certifications have been added to the plans.

4.20 The Development Impact Statement specifies that a project sign is proposed at the entrance; however, none is shown on the plans. The sign should be shown on the plans and additional information regarding, location, height, size, color, etc. should be submitted to the Planning Board for review.

The proposed site information sign, containing project and emergency contact information, is proposed at the entrance gate to the proposed array. The location is approximately 400 feet from Hobomock Street. The proposed signage will conform to Locate, State and Federal requirements. The Applicant requests that this information be provided as part of the building permit process.

4.21 No information on lighting including a photometric plan has not been submitted as required. The applicant has requested a waiver of this requirement.

Due to the fact there is no lighting being proposed, the Applicant requests a waiver from this requirement.

4.22 A Traffic Impact Study has not been submitted. The applicant has requested a waiver of this requirement.

Due to the fact traffic will be limited to maintenance activities, coupled with the innocuous nature of the proposed solar facility, the Applicant requests a waiver from this requirement.

Section V. Requirements

5.1 A Landscaping Plan prepared by a Registered Landscape Architect has not been provided. The Planning Board should determine whether a Landscaping Plan for this project is required. The applicant has requested a waiver of this requirement.



Due to the setbacks provided, the secluded location which is screened all around by areas of existing vegetation to remain in-tact, the Applicant respectfully requests a waiver from this requirement.

5.2 No information on lighting including a photometric plan has not been submitted as required. The applicant has requested a waiver of this requirement.

Due to the fact there is no lighting being proposed, the Applicant requests a waiver from this requirement.

5.3 The Stormwater Report indicates that the overall stormwater management system will attenuate the post development stormwater flows to a level not exceeding the existing conditions. We offer the following comments regarding the stormwater design and analysis:

• No soil testing has been performed at the location of the proposed forebay and rain garden. We recommend soil testing be performed to demonstrate that adequate soils are present for infiltration and to determine the Estimated Seasonal High Groundwater Elevation (ESHGW) as required by the DEP Stormwater Management Regulations.

The Applicant respectfully requests that this information be provided at the start of construction, prior to any earth moving activities. The basin location is generally inaccessible until the preliminary stages of tree clearing have commenced as required to construct the access road. Notes have been added to the Rain Garden Detail requiring test pits to be performed prior to the start of construction of the array by a licensed soil evaluator to determine estimated seasonal high groundwater (ESHGW) and confirm soil classification. Test pit results will be provided to the Engineer and the Town to confirm the results verify the basin will function as designed. The Applicant is amenable to making this a condition of approval if the Board requires.

• Design calculations should be provided for the proposed 3 - 12 inch diameter ADS culverts located beneath the access drive just north of the proposed rain garden. We also recommend that the minimum depth of cover be confirmed.

The plans have been revised and the pipe size has been increased to 15-inches. As a conservative approach, the flow considered as part of the calculations is 29.47 cfs (entire 1S area). Three (3) 15-inch pipes at 3% can handle 38.71 cfs. HydroCAD calculations demonstrating the proposed culverts are sized to handle the 100-year storm are attached. The plans have also been revised to show +/- 2 feet of cover at this location and specifies 15" ADS HP-Storm pipe which has a minimum manufacturer's recommended cover of 1-foot.



• A number of the sub-catchment areas presented in the HydroCAD computer calculations show a time of concentration (Tc) of 0 minutes. Since this is obviously not the case, we recommend that the engineer revise the calculations or provide additional information.

The Time of Concentration has been changed to the minimum 6 minutes. The revised HydroCAD calculations are attached demonstrating the CN will not change or will be reduced, thereby meeting or decreasing peak rate of run-off.

• A typical rain garden cross-section is presented on sheet 6 of the plans. We recommend that this cross-section be revised to show the proposed rain garden cross-section with outlet and berm elevations and depth of materials. In addition, the depth to the estimated seasonal high ground water and the elevations of the various storm events should be presented on the plans.

With exception to the depth to ESHGW, (which will be provided once test pits are performed - see response above), the requested information has been added to the plans.

• A planting plan for the rain garden should be included showing plantings as recommended by Mass DEP.

A Rain Garden Planting List with layout specifications has been added to the detail sheet.

• We recommend that a detail/cross section of the forebay outlet as well as weir/overflow for the rain garden be presented on the plan and should include the proposed size and depth of stone. The weir/overflow should also include a concrete weir at the control elevation.

The information has been added to the plans.

It is general practice to design sites to comply with Massachusetts DEP Stormwater Management Regulations. The following section describes the 10 Standards for compliance with Stormwater Management Regulations and the status of the submittal relative to each standard.

<u>Standard 1 – Untreated Stormwater</u>

As previously stated, we recommend soil testing be performed at the location of the proposed forebay and rain garden. Additional Information required.

Please see response above pertaining to the requirement for test pits.



<u>Standard 2 – Post Development Peak Discharge Rates</u> See Standard 1 above. Additional Information required.

Please see response above pertaining to the requirement for test pits.

<u>Standard 3 – Recharge to Groundwater</u> This Standard has been satisfactorily met.

No response required.

<u>Standard 4 – 80% Total Suspended Solids (TSS) Removal</u> This Standard has been satisfactorily met.

No response required.

<u>Standard 5 – Higher Potential Pollutant Loads</u> The project is not considered a source of higher pollutant loads, this standard is not applicable.

No response required.

<u>Standard 6 – Protection of Critical Areas</u> Based on information presented on MassGIS and the Town of Pembroke GIS web page, the project site is not in a Critical Area.

No response required.

<u>Standard 7 – Redevelopment Projects</u> This project is not considered a redevelopment project and consequently this standard is not applicable.

No response required.

<u>Standard 8 – Erosion/Sediment Control</u> This Standard has been satisfactorily met.

No response required.

<u>Standard 9 – Operation and Maintenance Plan</u> A construction period Operation and Maintenance Plan been provided as required. This Standard has been satisfactorily met.

No response required.



<u>Standard 10 – Illicit Discharges</u>

In order to meet this standard, an "Illicit Discharge Compliance Statement" meeting the requirements specified in the Mass DEP Stormwater Management Regulations is required. Additional information required.

No response required.

5.6.1. The Regulations state that "All access drives and parking areas shall be graded, paved and drained in accordance with the standards enumerated above." The project proposes a section of the proposed drive to be gravel and to utilize the existing gravel access drives in the lower portion of the site where the solar array is to be located. The plans specify a 12 foot width for the gravel portion of the access drive. The width of the access drive should be clarified and approved by the Pembroke Fire Department. This access drive terminates in a hammerhead cul-de-sac. The configuration of this cul-de-sac should be also reviewed by the Fire Department in as much as the ability to turn around may be limited. The surface treatment for the access drive is proposed as gravel and may be acceptable since this site will only be accessed for maintenance. The Planning Board should review this item.

The proposed access drive has been preliminarily reviewed by the Pembroke Fire Department and conforms to their requirements. Documentation of review/approval will be provided once it is received. The Applicant is amenable to making this a condition of approval if the Board requires.

5.6.3. The Regulations state that "All utility connections shall be underground …." The project proposes an overhead electric line from the connection at a utility pole on Hobomock Street to a proposed meter pole. From that point underground conduit is proposed. The Planning Board should determine if this is acceptable.

The requirement to provide overhead electric at the point of inter-connection is a utility requirement and consistent with the infrastructure associated with nearby projects. The Applicant respectfully requests that the Board deem the configuration depicted on the Site Plans as being acceptable.

<u>Section VI. Development Impact Statement</u> A Development Impact Statement has been submitted as required.

No response required.



ADDITIONAL COMMENTS

1. The plans should be reviewed by the Pembroke Fire Department relative to access and fire protection.

The proposed access drive has been preliminarily reviewed by the Pembroke Fire Department and conforms to their requirements. Documentation of review/approval will be provided once it is received. The Applicant is amenable to making this a condition of approval if the Board requires.

2. Due to the location of wetland resource areas both on and adjacent to the project, review and approval by the Pembroke Conservation Commission is required.

The project is currently being reviewed by the Pembroke Conservation Commission under a Notice of Intent filing. An approved Order of Conditions will be provided to the Planning Board once it is received. The Applicant is amenable to making this a condition of approval if the Board requires.

3. An existing rip-rap apron just to the west of the entrance driveway into the Hobomock Arena conveys stormwater runoff from Hobomock Street to an existing drainage easement. This riprap apron is proposed to be reconstructed as shown on the site plan. We recommend that additional grading and details be provided for this apron and that an easement be granted to the Town of Pembroke for maintenance of this apron. Capacity calculations should also be provided.

Additional grading details have been provided indicating bottom width, depth and side slope information. Capacity calculations have also been provided demonstrating the apron is sized appropriately (refer to attached HydroCAD calculations). The Applicant is amenable to creating an easement as recommended above. The Applicant respectfully requests that the creation/granting of the easement be required prior to the issuance of the Certificate of Occupancy and included as a condition of approval.

If you have any questions, please do not hesitate to call me at (508) 888-9282.

Sincerely,

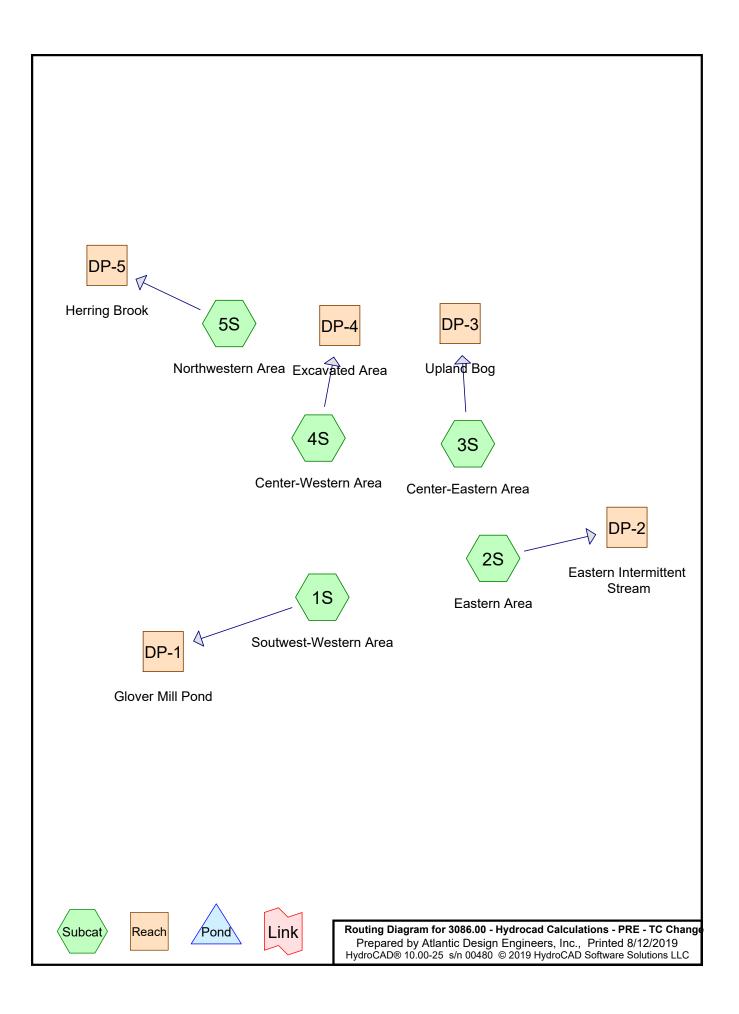
ATLANTIC DESIGN ENGINEERS, INC.

In

Richard J. Tabaczynski, P.E. Vice President

cc: P. Palmieri, Merrill Engineers and Land Surveyors

REVISED PRE-DEVELOPMENT HYDROCAD CALCULATIONS WITH CORRECTED TIME OF CONCENTRATION

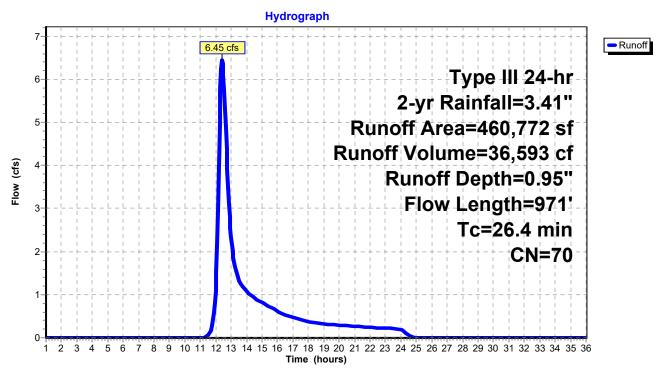


Summary for Subcatchment 1S: Soutwest-Western Area

Runoff = 6.45 cfs @ 12.41 hrs, Volume= 36,593 cf, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

	rea (sf)	CN E	escription				
	7,444	85 G	Gravel roads, HSG B				
	14,768	98 F	aved park	ing, HSG A			
	03,603			ing, HSG B			
	26,501		Roofs, HSG				
	96,435		,	od, HSG A			
	3,370		,	od, HSG B			
	25,348				loor, HSG B		
	83,303		rush, Poor	•			
	60,772		Veighted A				
	15,900	-		vious Area			
1	44,872	3	1.44% Imp	pervious Are	ea		
Тс	Length	Slope	Velocity	Capacity	Description		
10	Lengui	JUDE					
(min)	(feet)			• •	Beeenpaien		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
<u>(min)</u> 20.2	(feet) 50			• •	Sheet Flow,		
20.2	50	(ft/ft) 0.0050	(ft/sec) 0.04	• •	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"		
		(ft/ft)	(ft/sec)	• •	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow,		
20.2	50 150	(ft/ft) 0.0050 0.0050	(ft/sec) 0.04 1.14	• •	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps		
20.2	50	(ft/ft) 0.0050	(ft/sec) 0.04	• •	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps Shallow Concentrated Flow,		
20.2	50 150	(ft/ft) 0.0050 0.0050	(ft/sec) 0.04 1.14	• •	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps Shallow Concentrated Flow, Paved Kv= 20.3 fps		
20.2 2.2 2.2	50 150 400	(ft/ft) 0.0050 0.0050 0.0225	(ft/sec) 0.04 1.14 3.04	• •	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps Shallow Concentrated Flow,		
20.2 2.2 2.2	50 150 400	(ft/ft) 0.0050 0.0050 0.0225	(ft/sec) 0.04 1.14 3.04	• •	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps Shallow Concentrated Flow, Paved Kv= 20.3 fps Shallow Concentrated Flow,		



Subcatchment 1S: Soutwest-Western Area

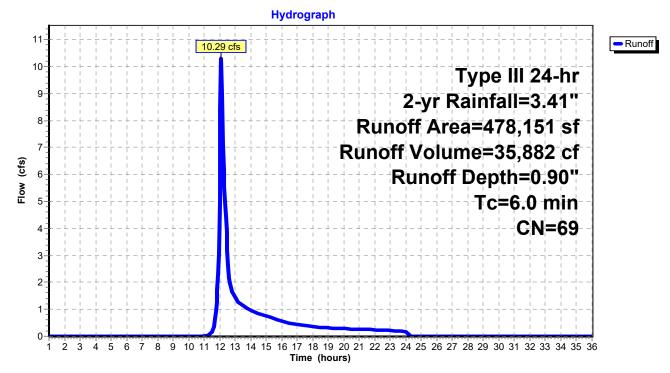
Summary for Subcatchment 2S: Eastern Area

Runoff = 10.29 cfs @ 12.10 hrs, Volume= 35,882 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description			
21,716	82	Dirt roads, H	ISG B		
28,164	85	Gravel road	s, HSG B		
14,392	98	Roofs, HSG	В		
871	30	Woods, Goo	od, HSG A		
30,185	55	Woods, Goo	od, HSG B		
382,823	67	Brush, Poor	, HSG B		
478,151	69	Weighted Av	verage		
463,759		96.99% Per	vious Area		
14,392		3.01% Impe	rvious Area	а	
Tc Length	Slop		Capacity	Description	
(min) (feet)	(ft/	ft) (ft/sec)	(cfs)		
6.0				Direct Entry,	

Subcatchment 2S: Eastern Area



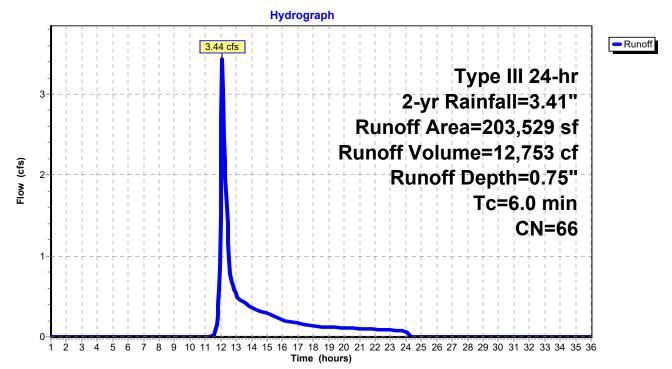
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 3.44 cfs @ 12.11 hrs, Volume= 12,753 cf, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

	A	rea (sf)	CN	D	Description				
*	1	78,530	65	U	pland Bog	Area			
		1,742	72	D	irt roads, I	ISG A			
		10,138	82	D	irt roads, I	ISG B			
		604	30	W	oods, Go	od, HSG A			
		12,515	67	B	rush, Poor	, HSG B			
	2	03,529	66	Weighted Average					
	2	03,529		1(0.00% Pe	ervious Are	a		
	Тс	Length	Slop		Velocity	Capacity	Description		
<u>(m</u>	in)	(feet)	(ft/1	ft)) (ft/sec) (cfs)				
6	5.0						Direct Entry,		

Subcatchment 3S: Center-Eastern Area



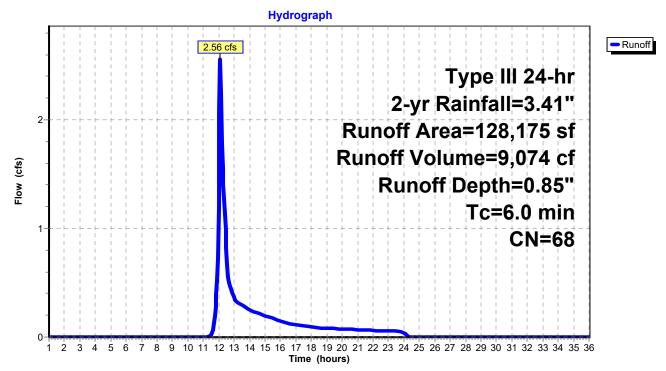
Summary for Subcatchment 4S: Center-Western Area

Runoff = 2.56 cfs @ 12.11 hrs, Volume= 9,074 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

Area	a (sf) – C	CN	Description		
10	,682	82	Dirt roads, H	ISG B	
	953	30	Woods, Goo	od, HSG A	N Contraction of the second
	465	55	Woods, Goo	od, HSG B	
116	6,075	67	Brush, Poor	, HSG B	
128	,175 (68	Weighted A	verage	
128	,175		100.00% Pe	ervious Area	ea
Tc Lo (min)	ength (feet)	Slope (ft/ft	,	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: Center-Western Area



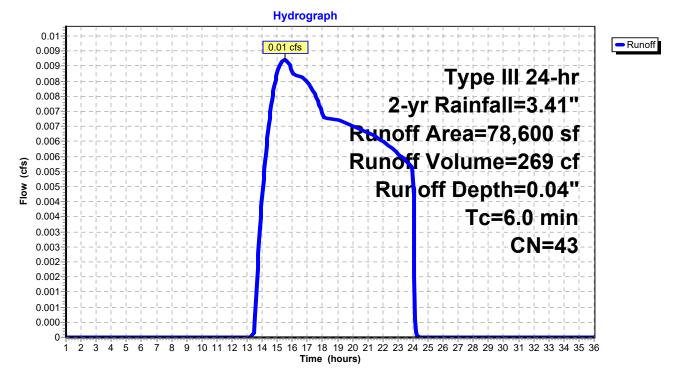
Summary for Subcatchment 5S: Northwestern Area

Runoff = 0.01 cfs @ 15.49 hrs, Volume= 269 cf, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

A	rea (sf)	CN	Description					
	51,381	30	Woods, Go	od, HSG A				
	821	55	Woods, Go	od, HSG B				
	26,398	67	Brush, Poor	Brush, Poor, HSG B				
	78,600	43	Weighted A	verage				
	78,600		100.00% Pervious Area					
т	1 41.	01		0	Description			
Tc	Length	Slop	,	Capacity	Description			
(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)				
6.0					Direct Entry,			

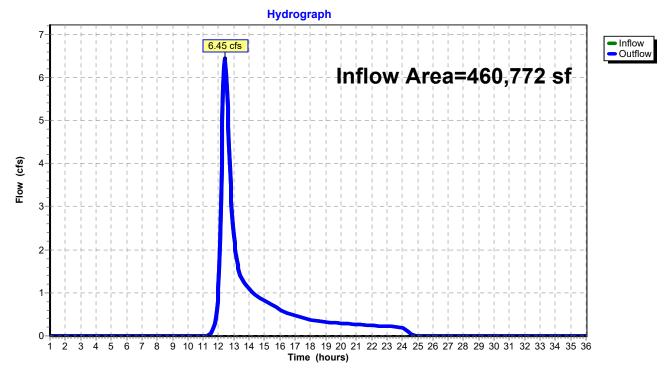
Subcatchment 5S: Northwestern Area



Summary for Reach DP-1: Glover Mill Pond

Inflow Area =	460,772 sf, 31.44% Impervious,	Inflow Depth = 0.95" for 2-yr event
Inflow =	6.45 cfs @ 12.41 hrs, Volume=	36,593 cf
Outflow =	6.45 cfs @ 12.41 hrs, Volume=	36,593 cf,Atten= 0%,Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

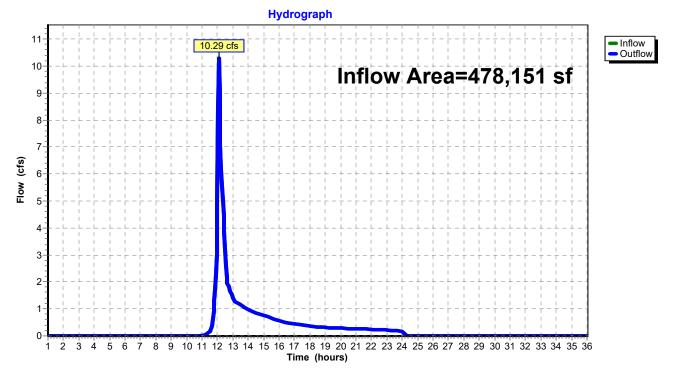


Reach DP-1: Glover Mill Pond

Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area	a =	478,151 sf,	3.01% Impervious,	Inflow Depth = 0.90"	for 2-yr event
Inflow	=	10.29 cfs @ 1	2.10 hrs, Volume=	35,882 cf	-
Outflow	=	10.29 cfs @ 1	2.10 hrs, Volume=	35,882 cf, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



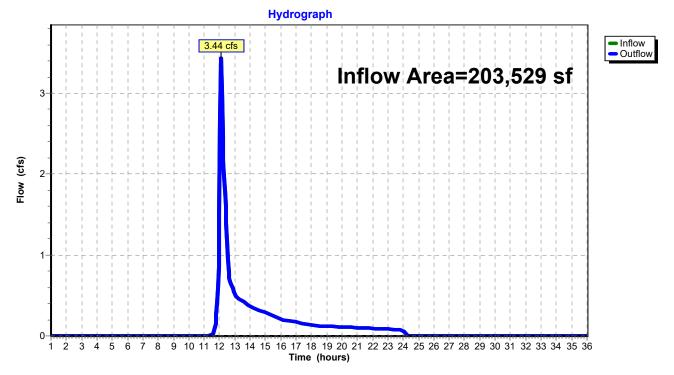
Reach DP-2: Eastern Intermittent Stream

Summary for Reach DP-3: Upland Bog

Inflow Area =	203,529 sf,	0.00% Impervious,	Inflow Depth = 0.75"	for 2-yr event
Inflow =	3.44 cfs @ 1	12.11 hrs, Volume=	12,753 cf	-
Outflow =	3.44 cfs @ 1	12.11 hrs, Volume=	12,753 cf, Atter	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog



Summary for Reach DP-4: Excavated Area

Inflow Area =	128,175 sf,	0.00% Impervious,	Inflow Depth = 0.85"	for 2-yr event
Inflow =	2.56 cfs @ 1	12.11 hrs, Volume=	9,074 cf	-
Outflow =	2.56 cfs @ 1	12.11 hrs, Volume=	9,074 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

Summary for Reach DP-5: Herring Brook

Inflow Area =	78,600 sf,	0.00% Impervious,	Inflow Depth = 0.04"	for 2-yr event
Inflow =	0.01 cfs @	15.49 hrs, Volume=	269 cf	
Outflow =	0.01 cfs @	15.49 hrs, Volume=	269 cf, Atter	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Hydrograph 0.01 Inflow Outflow 0.01 cfs 0.009 0.009 Inflow Area=78,600 sf 0.008 0.008-0.007 0.007 0.006 0.006 (cfs) 0.005 Flow 0.005 0.004 0.004 0.003 0.003 0.002 0.002 0.001 0.001 0.000 0 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 1 2 3 4 5 6 78 Time (hours)

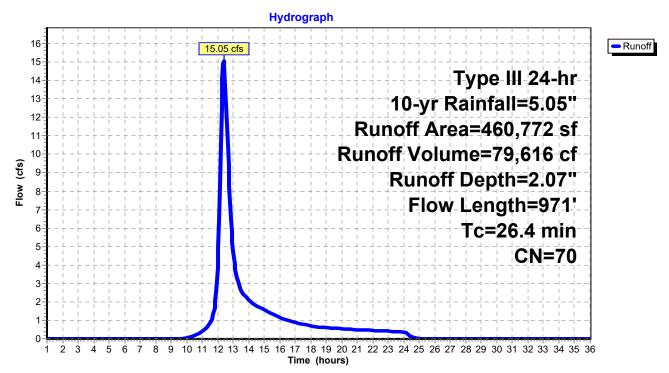
Reach DP-5: Herring Brook

Summary for Subcatchment 1S: Soutwest-Western Area

Runoff = 15.05 cfs @ 12.39 hrs, Volume= 79,616 cf, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

A	rea (sf)	CN D	escription				
	7,444	85 G	Gravel roads, HSG B				
	14,768	98 P	aved park	ing, HSG A			
1	03,603	98 P	aved park	ing, HSG B			
	26,501		Roofs, HSG				
	96,435		,	od, HSG A			
	3,370		,	od, HSG B			
	25,348		•		oor, HSG B		
-	83,303		rush, Poor				
	60,772		Veighted A	•			
	315,900	-		vious Area			
1	44,872	3	1.44% Imp	pervious Are	ea		
То	Longth	Slope	Valaaity	Conocity	Description		
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
(11111)	11661						
20.2			/	(015)	Sheet Flow		
20.2	50	0.0050	0.04	(015)	Sheet Flow, Weada: Light underbruch n= 0.400 P2= 3.60"		
	50	0.0050	0.04	(015)	Woods: Light underbrush n= 0.400 P2= 3.60"		
20.2 2.2			/	(013)	Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow,		
2.2	50 150	0.0050 0.0050	0.04 1.14	(013)	Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps		
	50	0.0050	0.04	(013)	Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps Shallow Concentrated Flow,		
2.2 2.2	50 150 400	0.0050 0.0050 0.0225	0.04 1.14 3.04	(013)	Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps Shallow Concentrated Flow, Paved Kv= 20.3 fps		
2.2	50 150	0.0050 0.0050	0.04 1.14	(013)	Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps Shallow Concentrated Flow, Paved Kv= 20.3 fps Shallow Concentrated Flow,		
2.2 2.2	50 150 400	0.0050 0.0050 0.0225	0.04 1.14 3.04	(013)	Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow, Unpaved Kv= 16.1 fps Shallow Concentrated Flow, Paved Kv= 20.3 fps		



Subcatchment 1S: Soutwest-Western Area

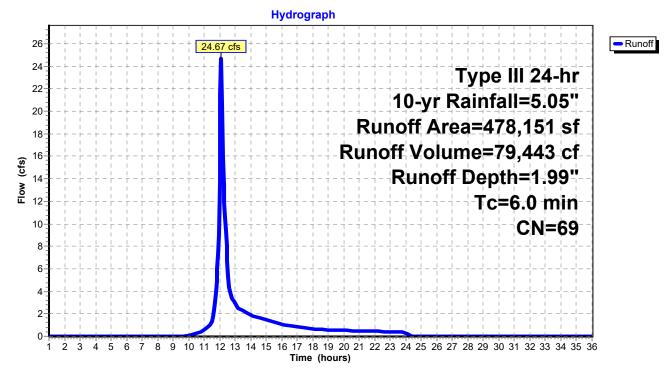
Summary for Subcatchment 2S: Eastern Area

Runoff = 24.67 cfs @ 12.10 hrs, Volume= 79,443 cf, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description			
21,716	82	Dirt roads, I	HSG B		
28,164	85	Gravel road	ls, HSG B		
14,392	98	Roofs, HSG	βB		
871	30	Woods, Go	od, HSG A		
30,185	55	Woods, Go	od, HSG B		
382,823	67	Brush, Poor	r, HSG B		
478,151	69	Weighted A	verage		
463,759		96.99% Per	vious Area		
14,392		3.01% Impe	ervious Area	a	
Tc Length	Slop		Capacity	Description	
(min) (feet)	(ft/	ft) (ft/sec)	(cfs)		
6.0				Direct Entry,	

Subcatchment 2S: Eastern Area



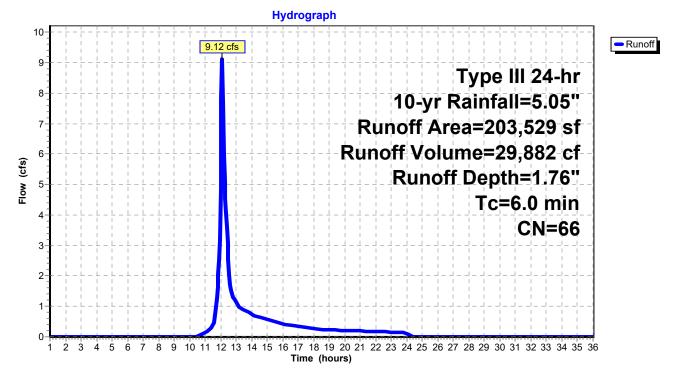
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 9.12 cfs @ 12.10 hrs, Volume= 29,882 cf, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

	Ar	ea (sf)	CN	Description				
*	17	78,530	65	Upland Bog	g Area			
		1,742	72	Dirt roads,	HSG A			
	1	0,138	82	Dirt roads,	HSG B			
		604	30	Woods, Go	od, HSG A	N Contraction of the second		
	1	2,515	67	Brush, Poor, HSG B				
	20)3,529	66	66 Weighted Average				
	20)3,529		100.00% Pervious Area				
	Тс	Length	Slop		Capacity	Description		
(m	nin)	(feet)	(ft/f	t) (ft/sec)	(cfs)			
	6.0					Direct Entry,		

Subcatchment 3S: Center-Eastern Area



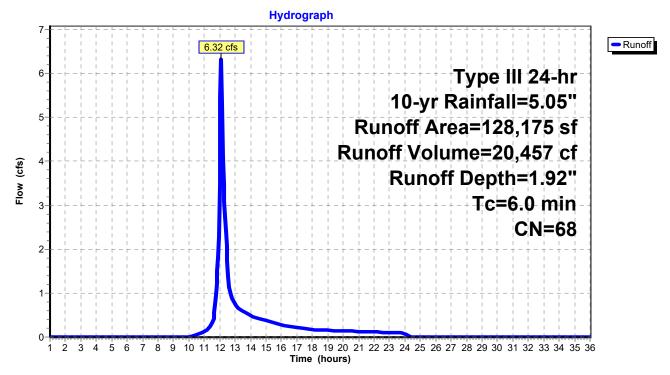
Summary for Subcatchment 4S: Center-Western Area

Runoff = 6.32 cfs @ 12.10 hrs, Volume= 20,457 cf, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description				
10,682	82	Dirt roads, H	ISG B			
953	30	Woods, Goo	od, HSG A			
465	55	Woods, Goo	od, HSG B			
116,075	67	Brush, Poor	, HSG B			
128,175	68	Weighted A	verage			
128,175	100.00% Pervious Area					
Tc Length (min) (feet)	Slop (ft/		Capacity (cfs)	Description		
6.0				Direct Entry,		

Subcatchment 4S: Center-Western Area



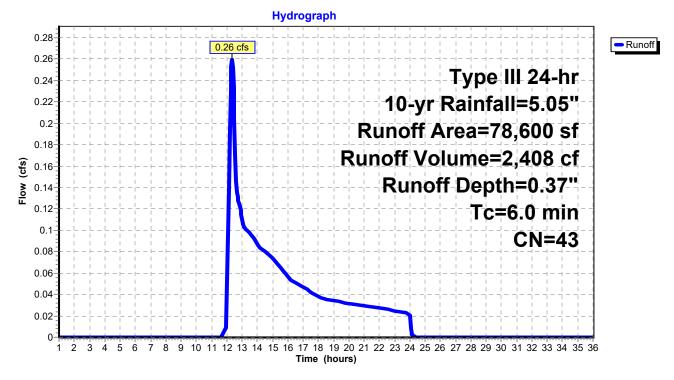
Summary for Subcatchment 5S: Northwestern Area

Runoff = 0.26 cfs @ 12.35 hrs, Volume= 2,408 cf, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

A	rea (sf)	CN	Description		
	51,381	30	Woods, Goo	od, HSG A	
	821	55	Woods, Goo	od, HSG B	
	26,398	67	Brush, Poor	, HSG B	
	78,600	43	Weighted A	verage	
	78,600		100.00% Pe	ervious Are	28
_					
Тс	Length	Slop		Capacity	Description
(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)	
6.0					Direct Entry,

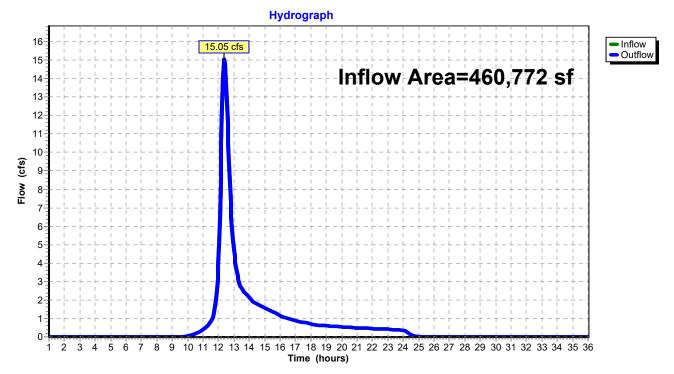
Subcatchment 5S: Northwestern Area



Summary for Reach DP-1: Glover Mill Pond

Inflow Area	a =	460,772 sf, 31.44% Impervious, Inflow Depth = 2.07" for 10-yr event	
Inflow	=	15.05 cfs @ 12.39 hrs, Volume= 79,616 cf	
Outflow	=	15.05 cfs @ 12.39 hrs, Volume= 79,616 cf, Atten= 0%, Lag= 0.0 i	min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

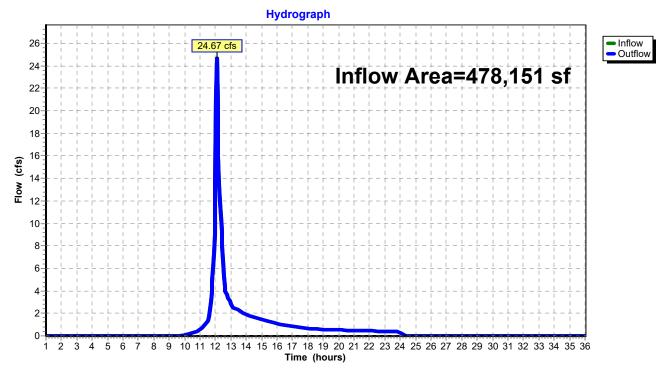


Reach DP-1: Glover Mill Pond

Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area	=	478,151 sf,	3.01% Impervious,	Inflow Depth = 1.99"	for 10-yr event
Inflow	=	24.67 cfs @ 1	2.10 hrs, Volume=	79,443 cf	•
Outflow	=	24.67 cfs @ 1	2.10 hrs, Volume=	79,443 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



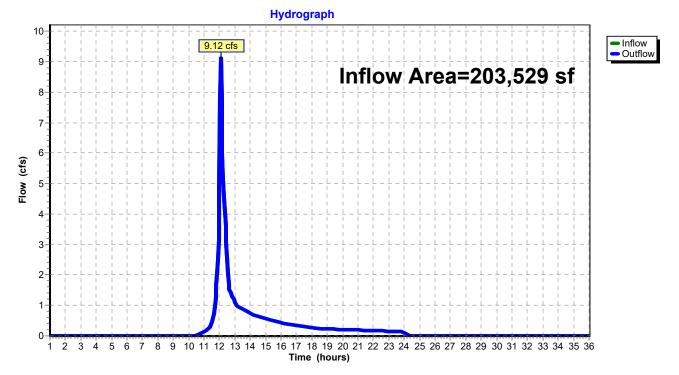
Reach DP-2: Eastern Intermittent Stream

Summary for Reach DP-3: Upland Bog

Inflow Area =	=	203,529 sf,	0.00% Impervious	, Inflow Depth = 1.76 "	for 10-yr event
Inflow =	:	9.12 cfs @	12.10 hrs, Volume=	29,882 cf	-
Outflow =	:	9.12 cfs @	12.10 hrs, Volume=	29,882 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog



Summary for Reach DP-4: Excavated Area

Inflow Area =	128,175 sf,	0.00% Impervious,	Inflow Depth = 1.92"	for 10-yr event
Inflow =	6.32 cfs @ 1	12.10 hrs, Volume=	20,457 cf	•
Outflow =	6.32 cfs @ 1	12.10 hrs, Volume=	20,457 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

Summary for Reach DP-5: Herring Brook

Inflow Area =	78,600 sf,	0.00% Impervious,	Inflow Depth = 0.37"	for 10-yr event
Inflow =	0.26 cfs @ 1	2.35 hrs, Volume=	2,408 cf	-
Outflow =	0.26 cfs @ 1	2.35 hrs, Volume=	2,408 cf, Atter	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Hydrograph 0.28 Inflow Outflow 0.26 cfs 0.26 Inflow Area=78,600 sf 0.24 0.22 0.2 0.18 (**s**) 0.16 Flow 0.14 0.12 0.1 0.08 0.06 0.04 0.02 0 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 1 Time (hours)

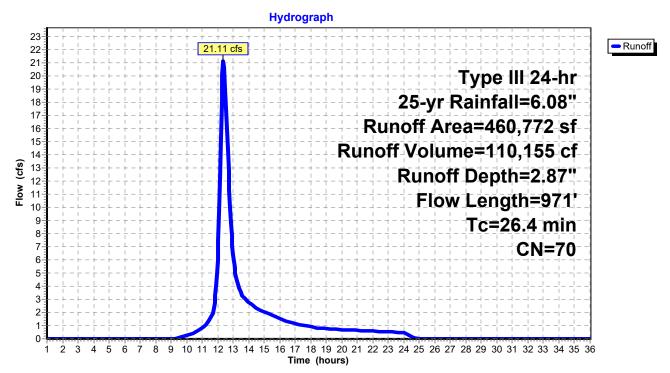
Reach DP-5: Herring Brook

Summary for Subcatchment 1S: Soutwest-Western Area

Runoff = 21.11 cfs @ 12.38 hrs, Volume= 110,155 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

Area (sf) CN Description	
7,444 85 Gravel roads, HSG B	
14,768 98 Paved parking, HSG A	
103,603 98 Paved parking, HSG B	
26,501 98 Roofs, HSG B	
96,435 30 Woods, Good, HSG A	
3,370 55 Woods, Good, HSG B	
25,348 73 Woods/grass comb., Poor, HSG B	
183,303 67 Brush, Poor, HSG B	
460,772 70 Weighted Average	
315,900 68.56% Pervious Area	
144,872 31.44% Impervious Area	
To Longth Slong Valacity Canacity Department	
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	
20.2 50 0.0050 0.04 Sheet Flow, Woods: Light underbrush n= 0.400 P2	2-3 60"
2.2 150 0.0050 1.14 Shallow Concentrated Flow,	- 3.00
Unpaved Kv= 16.1 fps	
2.2 400 0.0225 3.04 Shallow Concentrated Flow,	
Paved Kv= 20.3 fps	
1.8 371 0.0455 3.43 Shallow Concentrated Flow,	
Unpaved Kv= 16.1 fps	
26.4 971 Total	



Subcatchment 1S: Soutwest-Western Area

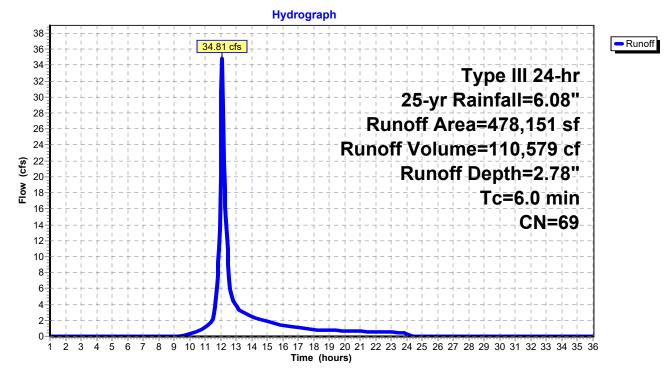
Summary for Subcatchment 2S: Eastern Area

Runoff = 34.81 cfs @ 12.10 hrs, Volume= 110,579 cf, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

Area	(sf) C	CN I	Description				
21,	716	82 I	Dirt roads, H	ISG B			
28,	164	85 (Gravel road	s, HSG B			
14,	392	98 I	Roofs, HSG	B			
	871 🗧	30 \	Noods, Goo	od, HSG A			
30,	185	55 \	Noods, Goo	od, HSG B			
382,	823	67 E	Brush, Poor	, HSG B			
478,	151	69 ۱	Neighted A	verage			
463,	759	ç	96.99% Per	vious Area			
14,	14,392 3.01% Impervious Area				a		
	0	Slope	Velocity	Capacity	Description		
<u>(min) (</u>	feet)	(ft/ft)	(ft/sec)	(cfs)			
6.0					Direct Entry,		

Subcatchment 2S: Eastern Area



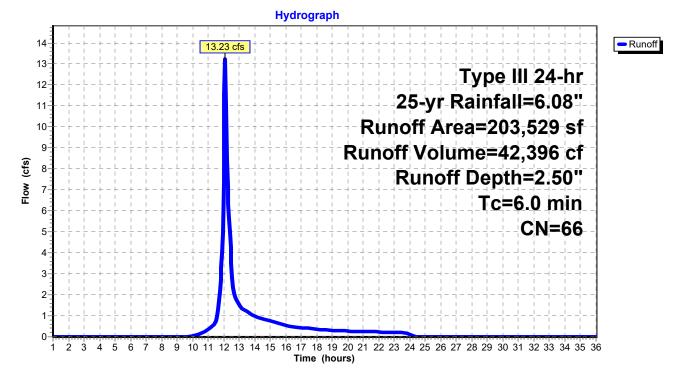
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 13.23 cfs @ 12.10 hrs, Volume= 42,396 cf, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

	Area (sf)	CN	Description				
*	178,530	65	Upland Bog	l Area			
	1,742	72	Dirt roads,	HSG A			
	10,138	82	Dirt roads, l	HSG B			
	604	30	Woods, Go	od, HSG A	N		
	12,515	67	Brush, Poor, HSG B				
	203,529	66	66 Weighted Average				
	203,529	100.00% Pervious Area					
-	c Length			Capacity			
(mi	<u>n) (feet</u>) (ft/	ft) (ft/sec)	(cfs)			
6	.0				Direct Entry,		

Subcatchment 3S: Center-Eastern Area



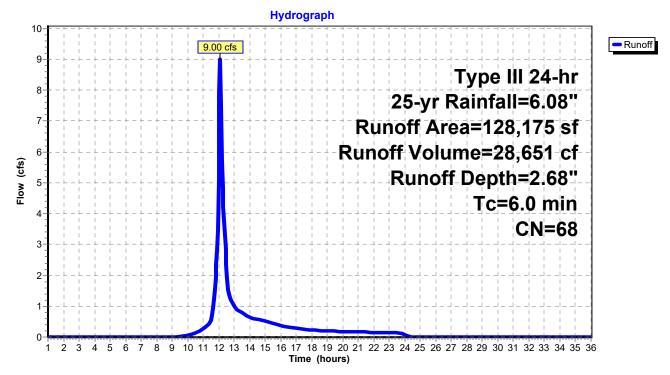
Summary for Subcatchment 4S: Center-Western Area

Runoff = 9.00 cfs @ 12.10 hrs, Volume= 28,651 cf, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description		
10,682	82	Dirt roads, I	HSG B	
953	30	Woods, Go	od, HSG A	
465	55	Woods, Go	od, HSG B	
116,075	67	Brush, Poor	, HSG B	
128,175	68	Weighted A	verage	
128,175		100.00% Pe	ervious Are	a
Tc Length (min) (feet)		· · · · ·	Capacity (cfs)	Description
6.0				Direct Entry,

Subcatchment 4S: Center-Western Area



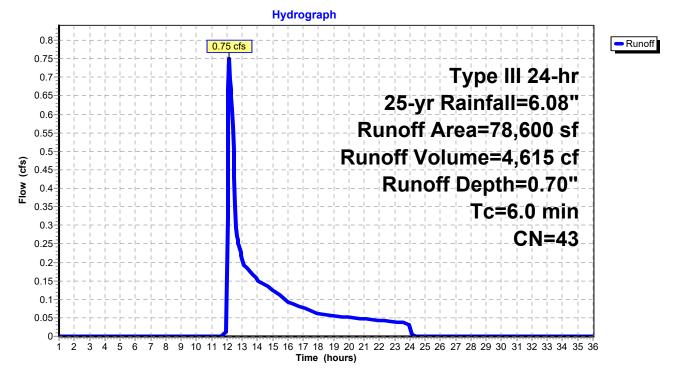
Summary for Subcatchment 5S: Northwestern Area

Runoff = 0.75 cfs @ 12.15 hrs, Volume= 4,615 cf, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

A	rea (sf)	CN	Description				
	51,381	30	Woods, Go	od, HSG A			
	821	55	Woods, Go	od, HSG B			
	26,398	67	Brush, Poor	r, HSG B			
	78,600	43	43 Weighted Average				
	78,600		100.00% Pe	ervious Are	a		
_							
Тс	Length	Slope		Capacity	Description		
<u>(min)</u>	(feet)	(ft/ft) (ft/sec)	(cfs)			
6.0					Direct Entry,		

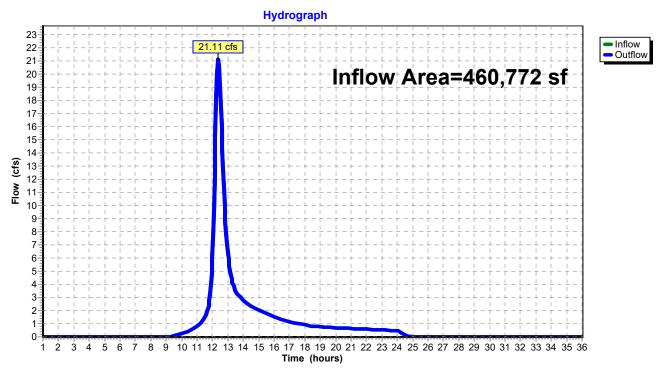
Subcatchment 5S: Northwestern Area



Summary for Reach DP-1: Glover Mill Pond

Inflow Area	a =	460,772 sf, 31.44% Impervious, Inflow Depth = 2.87" for 25-yr event	
Inflow	=	21.11 cfs @ 12.38 hrs, Volume= 110,155 cf	
Outflow	=	21.11 cfs @ 12.38 hrs, Volume= 110,155 cf, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

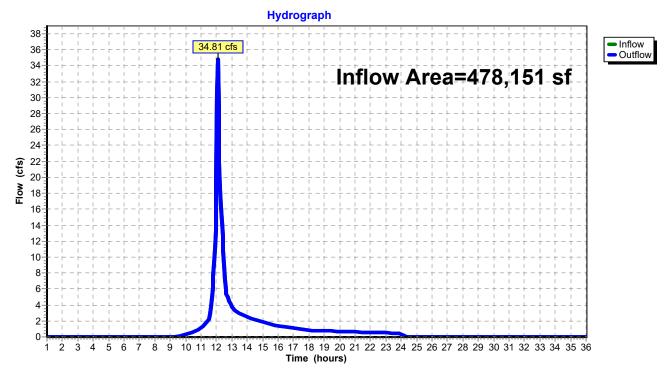


Reach DP-1: Glover Mill Pond

Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area	a =	478,151 sf,	3.01% Impervious,	Inflow Depth = 2.78 "	for 25-yr event
Inflow	=	34.81 cfs @ 1	2.10 hrs, Volume=	110,579 cf	-
Outflow	=	34.81 cfs @ 1	2.10 hrs, Volume=	110,579 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



Reach DP-2: Eastern Intermittent Stream

Summary for Reach DP-3: Upland Bog

Inflow Area	a =	203,529 sf,	0.00% Impervious,	Inflow Depth = 2.50"	for 25-yr event
Inflow	=	13.23 cfs @ 1	12.10 hrs, Volume=	42,396 cf	-
Outflow	=	13.23 cfs @ 1	12.10 hrs, Volume=	42,396 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Hydrograph Inflow Outflow 14 13.23 cfs 13 Inflow Area=203,529 sf 12 11 10 9 Flow (cfs) 8 7 6 5 4 3-2 1 0 2 567 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 ż 4 1 Time (hours)

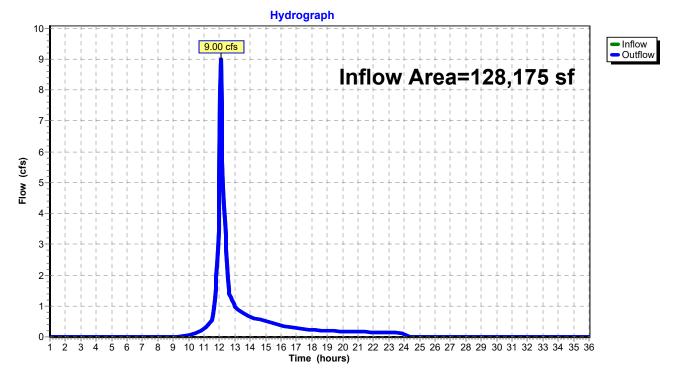
Reach DP-3: Upland Bog

Summary for Reach DP-4: Excavated Area

Inflow Area	a =	128,175 sf,	0.00% Impervious,	Inflow Depth = 2.68 "	for 25-yr event
Inflow	=	9.00 cfs @ 1	12.10 hrs, Volume=	28,651 cf	
Outflow	=	9.00 cfs @ 1	12.10 hrs, Volume=	28,651 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

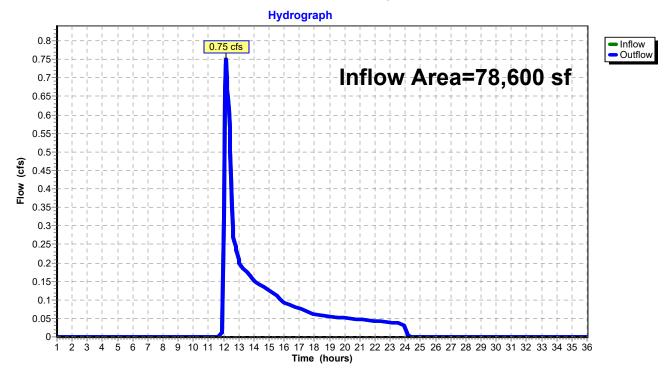
Reach DP-4: Excavated Area



Summary for Reach DP-5: Herring Brook

Inflow Area =	78,	,600 sf, 0.00)% Impervious	, Inflow Depth =	0.70"	for 25-yr event
Inflow =	0.75 0	cfs @ 12.15	hrs, Volume=	4,615 0	of	-
Outflow =	0.75 d	cfs @ 12.15	hrs, Volume=	4,615 d	of, Atter	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



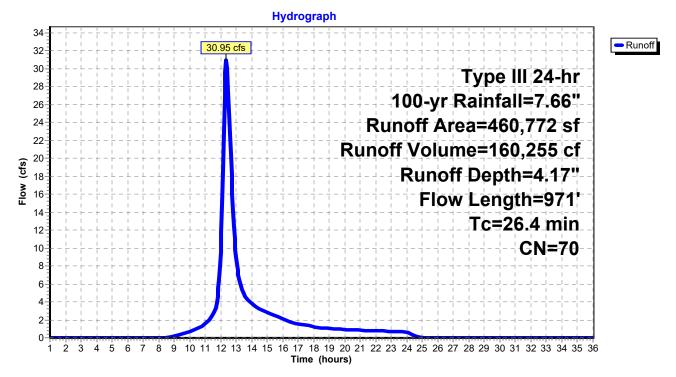
Reach DP-5: Herring Brook

Summary for Subcatchment 1S: Soutwest-Western Area

Runoff = 30.95 cfs @ 12.37 hrs, Volume= 160,255 cf, Depth= 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

А	rea (sf)	CN D	escription		
	7,444	85 G	Gravel road	ls. HSG B	
	14,768			ing, HSG A	
	03,603			ing, HSG E	
	26,501		koofs, HSG	•	
	96,435		,	od, HSG A	
	3,370			od, HSG B	
	25,348				Poor, HSG B
1	83,303	67 B	rush, Pool	r, HSG B	
4	60,772	70 V	Veighted A	verage	
	15,900			vious Area	
1	44,872	3	1.44% Imp	pervious Ar	ea
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
20.2	50	0.0050	0.04		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow,
					Unpaved Kv= 16.1 fps
2.2	400	0.0225	3.04		Shallow Concentrated Flow,
					Paved Kv= 20.3 fps
1.8	371	0.0455	3.43		Shallow Concentrated Flow,
					Unpaved Kv= 16.1 fps
26.4	971	Total			



Subcatchment 1S: Soutwest-Western Area

3086.00 - Hydrocad Calculations - PRE - TC ChangeType III 24-hr100-yr Rainfall=7.66"Prepared by Atlantic Design Engineers, Inc.Printed 8/12/2019HydroCAD® 10.00-25 s/n 00480 © 2019 HydroCAD Software Solutions LLCPage 37

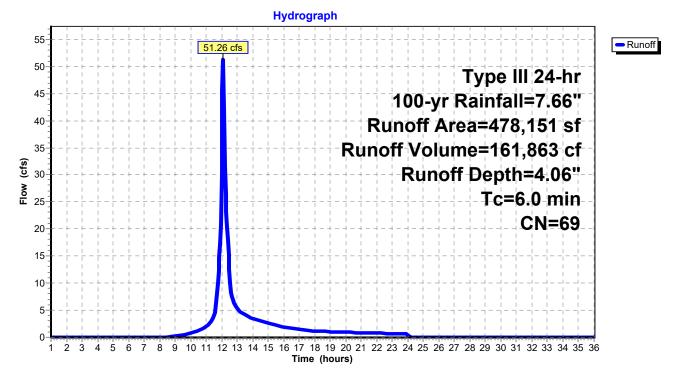
Summary for Subcatchment 2S: Eastern Area

Runoff = 51.26 cfs @ 12.09 hrs, Volume= 161,863 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description				
21,716	82	Dirt roads, I	HSG B			
28,164	85	Gravel road	ls, HSG B			
14,392	98	Roofs, HSG	βB			
871	30	Woods, Go	od, HSG A			
30,185	55	Woods, Go	od, HSG B			
382,823	67	Brush, Poor	r, HSG B			
478,151	69	Weighted A	verage			
463,759		96.99% Per	vious Area	l		
14,392		3.01% Impe	ervious Area	а		
Tc Length (min) (feet			Capacity (cfs)	Description		
6.0				Direct Entry,		

Subcatchment 2S: Eastern Area



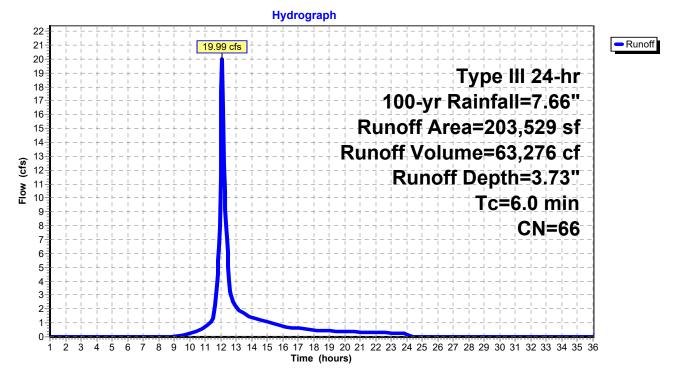
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 19.99 cfs @ 12.09 hrs, Volume= 63,276 cf, Depth= 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

	Area (s	f) CN	Description		
*	178,53	0 65	Upland Bog	, Area	
	1,74	2 72	Dirt roads,	HSG A	
	10,13	8 82	Dirt roads,	HSG B	
	60-	4 30	Woods, Go	od, HSG A	N Contraction of the second seco
	12,51	<u>5 67</u>	Brush, Poo	r, HSG B	
	203,52	9 66	Weighted A	verage	
	203,52	9	100.00% P	ervious Are	ea
	Tc Leng			Capacity	Description
(n	nin) (fee	et) (ft	/ft) (ft/sec)	(cfs)	
	6.0				Direct Entry,

Subcatchment 3S: Center-Eastern Area



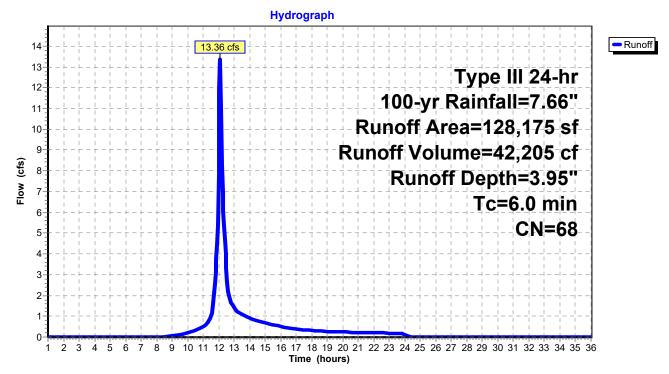
Summary for Subcatchment 4S: Center-Western Area

Runoff = 13.36 cfs @ 12.09 hrs, Volume= 42,205 cf, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description				
10,682	82	Dirt roads, I	ISG B			
953	30	Woods, Goo	od, HSG A			
465	55	Woods, Goo	od, HSG B			
116,075	67	Brush, Poor	, HSG B			
128,175	68	8 Weighted Average				
128,175		100.00% Pe	ervious Are	a		
Tc Lengtł (min) (feet			Capacity (cfs)	Description		
6.0				Direct Entry,		

Subcatchment 4S: Center-Western Area



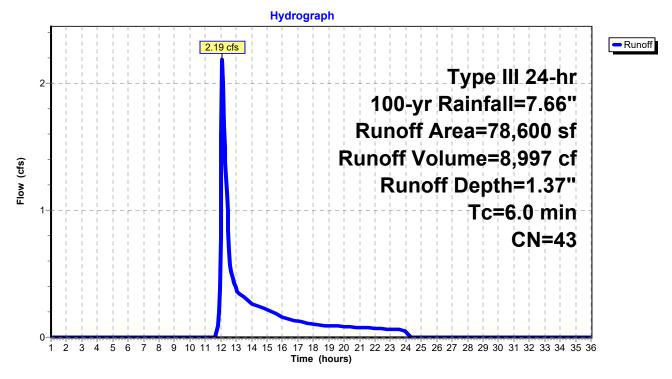
Summary for Subcatchment 5S: Northwestern Area

Runoff = 2.19 cfs @ 12.11 hrs, Volume= 8,997 cf, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

Area	(sf) CN	Description				
51,5	381 30	Woods, Go	od, HSG A			
	321 55	Woods, Go	od, HSG B			
26,3	<u>898 67</u>	Brush, Poor	r, HSG B			
78,	600 43	43 Weighted Average				
78,	600	100.00% Pe	ervious Are	a		
	ngth Slop	,	Capacity	Description		
<u>(min)</u> (feet) (ft/	ft) (ft/sec)	(cfs)			
6.0				Direct Entry,		

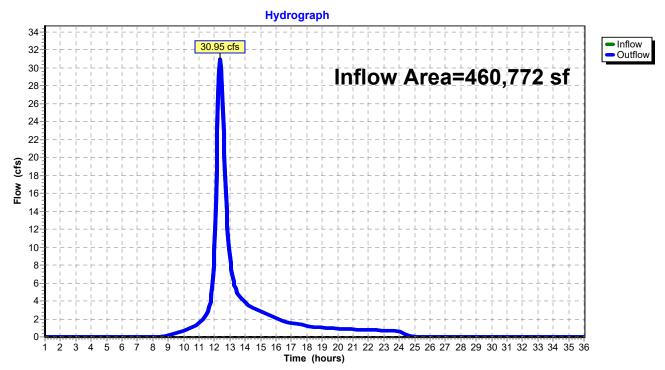
Subcatchment 5S: Northwestern Area



Summary for Reach DP-1: Glover Mill Pond

Inflow Area	a =	460,772 sf, 31.44% Impervious, In	nflow Depth = 4.17"	for 100-yr event
Inflow	=	30.95 cfs @ 12.37 hrs, Volume=	160,255 cf	
Outflow	=	30.95 cfs @ 12.37 hrs, Volume=	160,255 cf, Atter	i= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

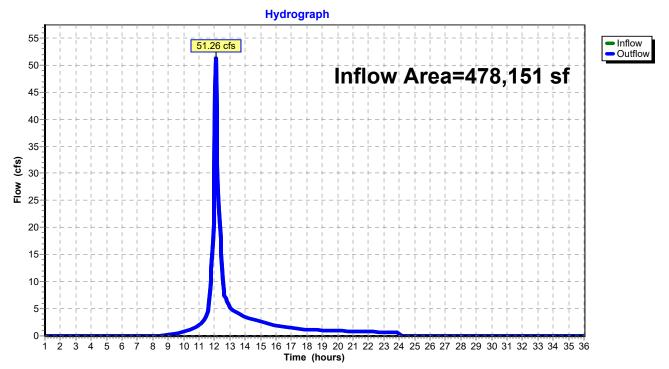


Reach DP-1: Glover Mill Pond

Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area	a =	478,151 sf,	3.01% Impervious,	Inflow Depth = 4.06 "	for 100-yr event
Inflow	=	51.26 cfs @ 1	2.09 hrs, Volume=	161,863 cf	-
Outflow	=	51.26 cfs @ 1	2.09 hrs, Volume=	161,863 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



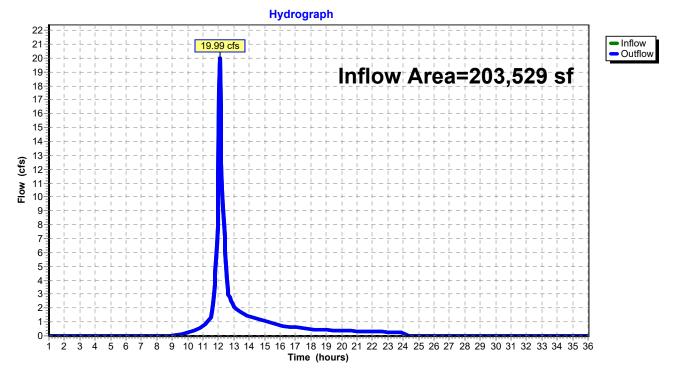
Reach DP-2: Eastern Intermittent Stream

Summary for Reach DP-3: Upland Bog

Inflow Area =		203,529 sf,	0.00% Impervious,	Inflow Depth = 3.73"	for 100-yr event
Inflow	=	19.99 cfs @ 1	12.09 hrs, Volume=	63,276 cf	-
Outflow	=	19.99 cfs @ 1	12.09 hrs, Volume=	63,276 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

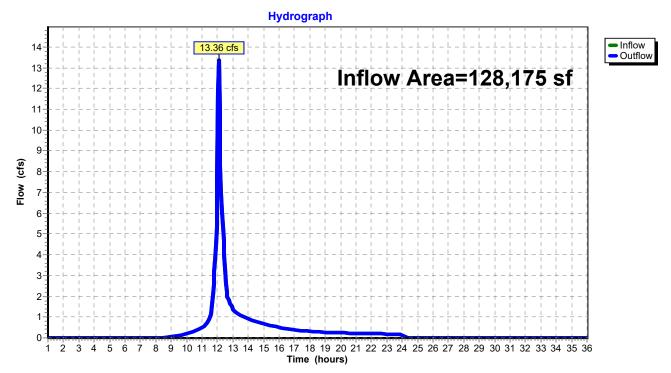
Reach DP-3: Upland Bog



Summary for Reach DP-4: Excavated Area

Inflow Are	a =	128,175 sf,	0.00% Impervious,	Inflow Depth = 3.95 "	for 100-yr event
Inflow	=	13.36 cfs @ 1	12.09 hrs, Volume=	42,205 cf	
Outflow	=	13.36 cfs @ 1	12.09 hrs, Volume=	42,205 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



Reach DP-4: Excavated Area

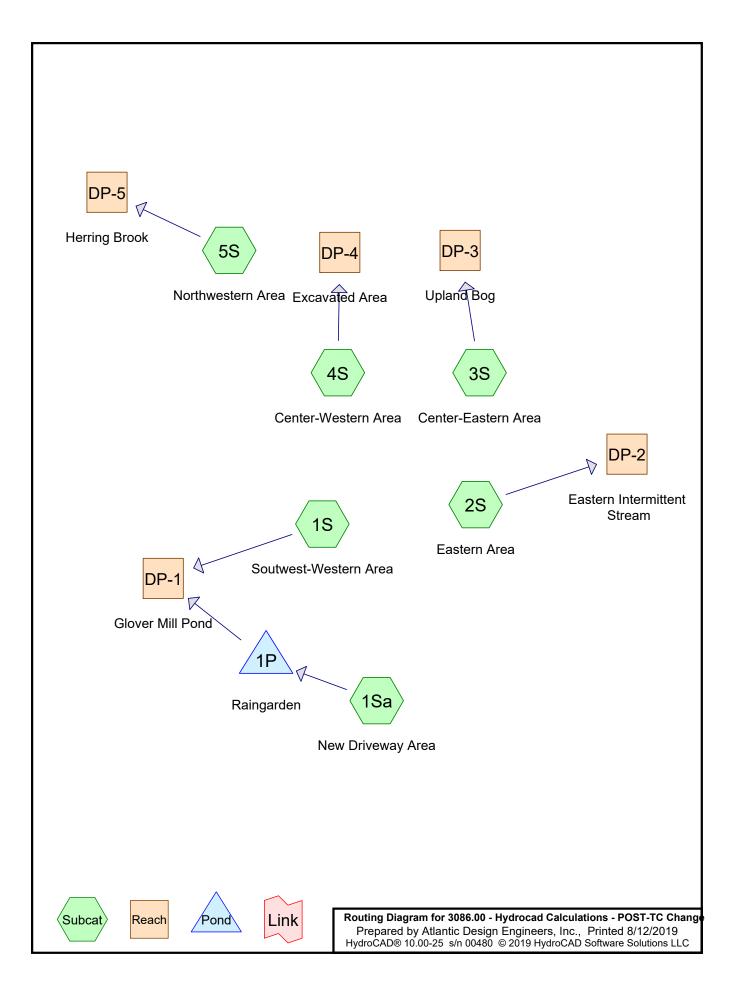
Summary for Reach DP-5: Herring Brook

Inflow Area =	78,600 sf,	0.00% Impervious,	Inflow Depth = 1.37"	for 100-yr event
Inflow =	2.19 cfs @ 1	12.11 hrs, Volume=	8,997 cf	-
Outflow =	2.19 cfs @ 1	12.11 hrs, Volume=	8,997 cf, Atter	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook

REVISED POST-DEVELOPMENT HYDROCAD CALCULATIONS WITH CORRECTED TIME OF CONCENTRATION

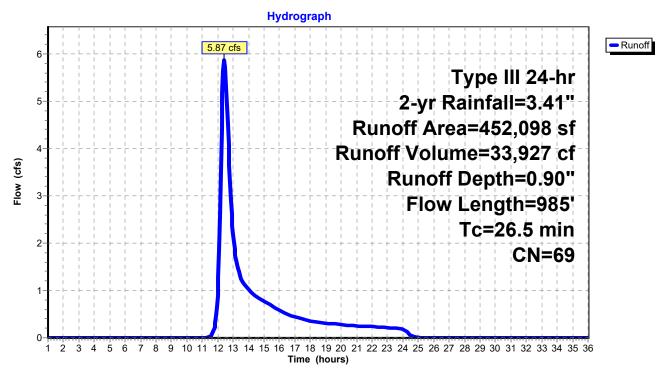


Summary for Subcatchment 1S: Soutwest-Western Area

Runoff = 5.87 cfs @ 12.42 hrs, Volume= 33,927 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

А	rea (sf)	CN E	Description		
	3,887		Gravel road	s. HSG A	
	9,914		Gravel road		
	4,046				ood, HSG A
1	39,352	61 >	75% Gras	s cover, Go	bod, HSG B
	14,765			ing, HSG A	
	03,603			ing, HSG B	
	26,501		Roofs, HSG		
	76,367			od, HSG A	
	175		Voods, Go	,	
	73,488		Brush, Poor	•	
	52,098		Veighted A	•	
	807,229			vious Area	
I	44,869	Ċ	2.04% IMp	ervious Are	ea
Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Decemption
20.2	50	0.0050	0.04		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow,
					Unpaved Kv= 16.1 fps
2.1	380	0.0230	3.08		Shallow Concentrated Flow,
					Paved Kv= 20.3 fps
2.0	405	0.0420	3.30		Shallow Concentrated Flow,
					Unpaved Kv= 16.1 fps
26.5	985	Total			



Subcatchment 1S: Soutwest-Western Area

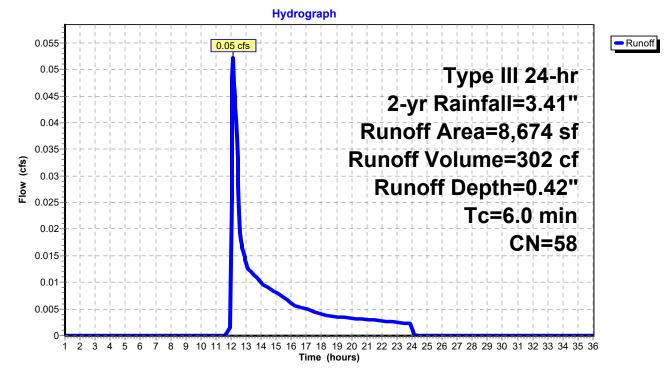
Summary for Subcatchment 1Sa: New Driveway Area

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 302 cf, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

	Area (sf)	CN	Description		
	239	76	Gravel road	s, HSG A	
*	1,954	98	New Drivew	/ay Area, H	ISG A
	2,628	30	Woods, Go	od, HSG A	
	1,067	98	Water Surfa	ace, HSG A	N .
	2,786	39	>75% Gras	s cover, Go	bod, HSG A
	8,674	58	Weighted A	verage	
	5,653		65.17% Per	vious Area	l
	3,021		34.83% Imp	ervious Ar	ea
-	Tc Length	•	,	Capacity	Description
(mi	n) (feet)	(ft/1	ft) (ft/sec)	(cfs)	
6	5.0				Direct Entry, Tc Direct Entry





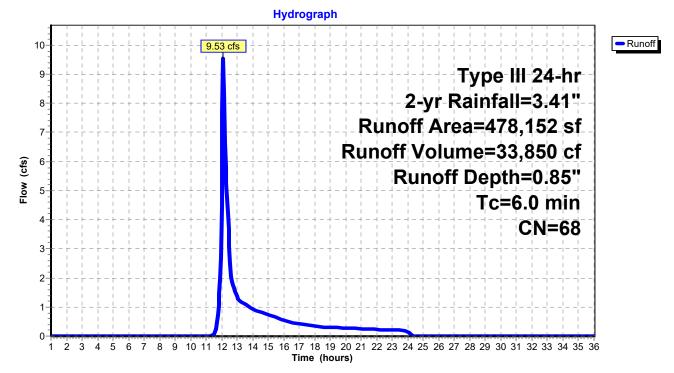
Summary for Subcatchment 2S: Eastern Area

Runoff = 9.53 cfs @ 12.11 hrs, Volume= 33,850 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

	Area (sf)	CN	Description	
	9,662	82	Dirt roads, HSG B	
*	960	98	Equipment Pads	
	50,553	85	Gravel roads, HSG	В
	166,878	61	>75% Grass cover,	Good, HSG B
	14,392	98	Roofs, HSG B	
	23,117	55	Woods, Good, HSC	В
	212,590	67	Brush, Poor, HSG	
	478,152	68	Weighted Average	
	462,800		96.79% Pervious A	ea
	15,352		3.21% Impervious /	vrea
	Tc Length	Slop	e Velocity Capac	ty Description
<u>(m</u>	in) (feet)	(ft/) (ft/sec) (c	s)
6	6.0			Direct Entry,

Subcatchment 2S: Eastern Area



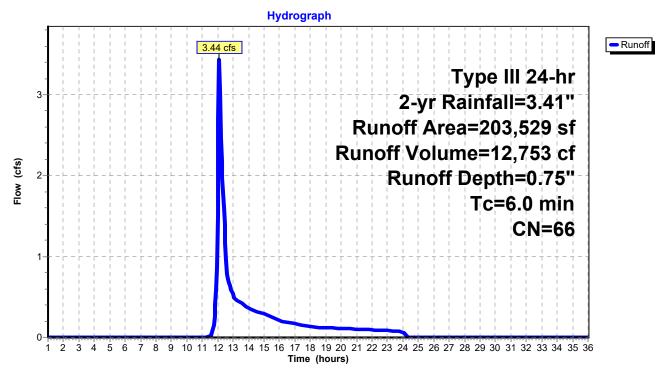
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 3.44 cfs @ 12.11 hrs, Volume= 12,753 cf, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

	Area (sf)	CN	Description	
*	172,845	65	Upland Bog Area	
	1,176	72	Dirt roads, HSG A	
	7,998	82	Dirt roads, HSG B	
	2,102	85	Gravel roads, HSG B	
	1,434	61	>75% Grass cover, Good, HSG B	
	604	30	Woods, Good, HSG A	
	17,370	67	Brush, Poor, HSG B	
	203,529	66	Weighted Average	
	203,529		100.00% Pervious Area	
	Tc Length	Slop	pe Velocity Capacity Description	
(mi	n) (feet)	(ft/	ft) (ft/sec) (cfs)	
6	5.0		Direct Entry,	

Subcatchment 3S: Center-Eastern Area



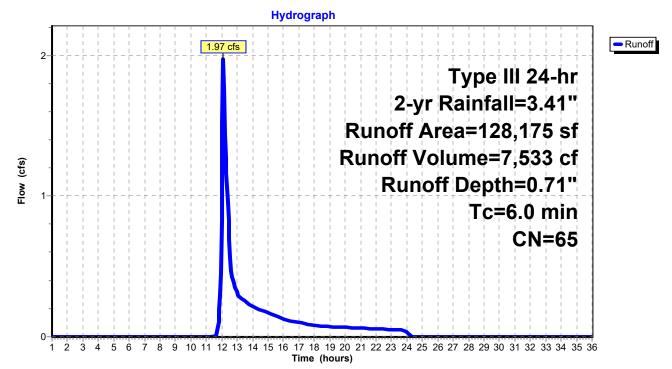
Summary for Subcatchment 4S: Center-Western Area

Runoff = 1.97 cfs @ 12.11 hrs, Volume= 7,533 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
227	39	>75% Grass cover, Good, HSG A
28,879	61	>75% Grass cover, Good, HSG B
954	30	Woods, Good, HSG A
465	55	Woods, Good, HSG B
97,650	67	Brush, Poor, HSG B
128,175	65	Weighted Average
128,175		100.00% Pervious Area
Tc Length	Slop	
(min) (feet)	(ft/	ft) (ft/sec) (cfs)
6.0		Direct Entry,



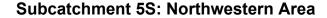


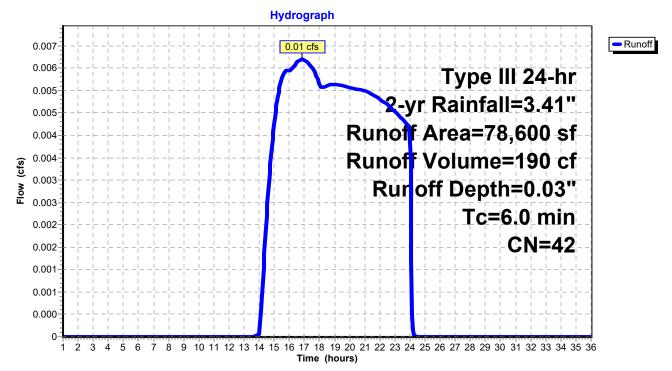
Summary for Subcatchment 5S: Northwestern Area

Runoff = 0.01 cfs @ 16.86 hrs, Volume= 190 cf, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 2-yr Rainfall=3.41"

Are	ea (sf)	CN	Description		
	778	39	>75% Grass	s cover, Go	ood, HSG A
1	0,099	61	>75% Grass	s cover, Go	ood, HSG B
5	50,691	30	Woods, Go	od, HSG A	A
	821	55	Woods, Go	od, HSG B	3
1	6,211	67	Brush, Poor	<u>, HSG B</u>	
7	78,600	42	Weighted A	verage	
7	78,600		100.00% Pe	ervious Are	ea
Тс	Length	Slope		Capacity	
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)	
6.0					Direct Entry,

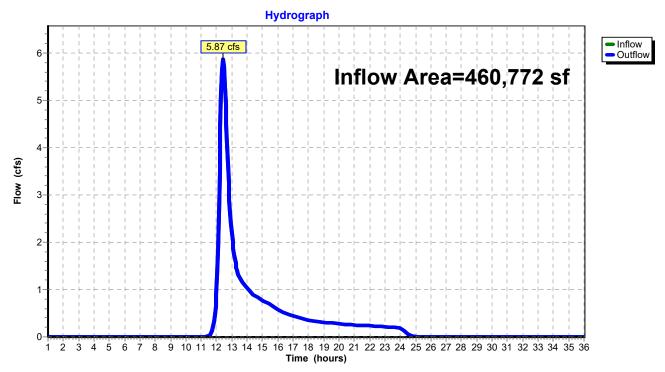




Summary for Reach DP-1: Glover Mill Pond

Inflow Area =	460,772 sf, 32.10% Impervious,	Inflow Depth = 0.88" for 2-yr event
Inflow =	5.87 cfs @ 12.42 hrs, Volume=	33,927 cf
Outflow =	5.87 cfs @ 12.42 hrs, Volume=	33,927 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

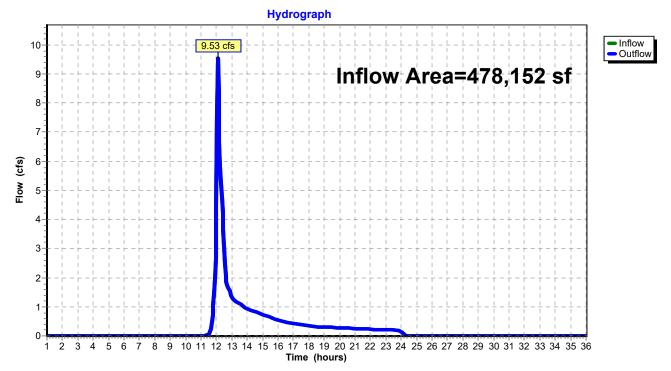


Reach DP-1: Glover Mill Pond

Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area	a =	478,152 sf,	3.21% Impervious,	Inflow Depth = 0.8	85" for 2-yr event
Inflow	=	9.53 cfs @ 1	2.11 hrs, Volume=	33,850 cf	-
Outflow	=	9.53 cfs @ 1	2.11 hrs, Volume=	33,850 cf, /	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



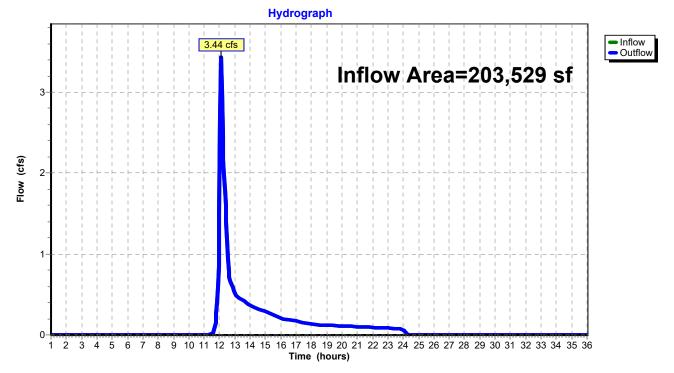
Reach DP-2: Eastern Intermittent Stream

Summary for Reach DP-3: Upland Bog

Inflow Area =	203,529 sf,	0.00% Impervious,	Inflow Depth = 0.75"	for 2-yr event
Inflow =	3.44 cfs @ 1	12.11 hrs, Volume=	12,753 cf	-
Outflow =	3.44 cfs @ 1	12.11 hrs, Volume=	12,753 cf, Atter	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog

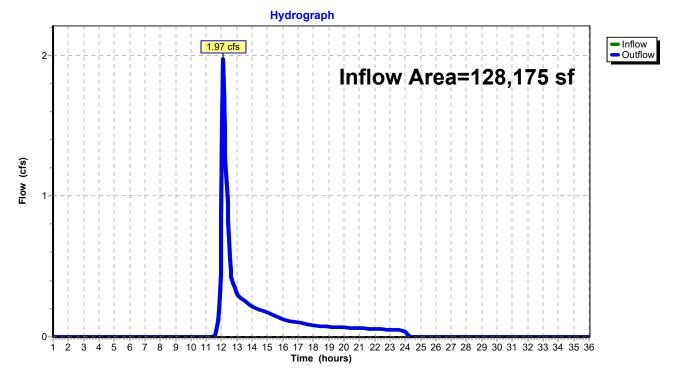


Summary for Reach DP-4: Excavated Area

Inflow Area =	128,175 sf,	0.00% Impervious,	Inflow Depth = 0.71"	for 2-yr event
Inflow =	1.97 cfs @ 1	12.11 hrs, Volume=	7,533 cf	
Outflow =	1.97 cfs @ 1	12.11 hrs, Volume=	7,533 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

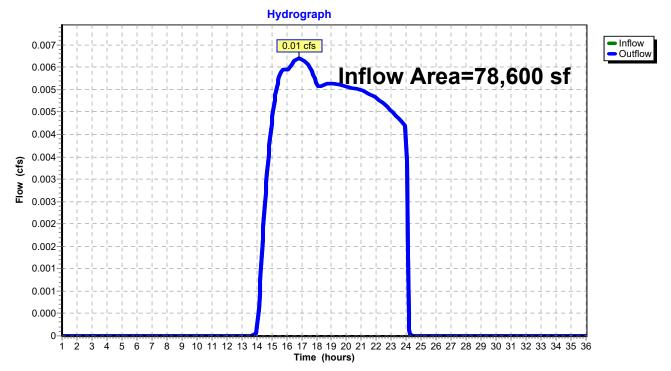
Reach DP-4: Excavated Area



Summary for Reach DP-5: Herring Brook

Inflow Area	a =	78,600 sf,	0.00% Impervious,	Inflow Depth = 0.03"	for 2-yr event
Inflow	=	0.01 cfs @ 1	16.86 hrs, Volume=	190 cf	-
Outflow	=	0.01 cfs @ 1	16.86 hrs, Volume=	190 cf, Atter	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



Reach DP-5: Herring Brook

Summary for Pond 1P: Raingarden

Inflow Area =	8,674 sf, 34.83% Impervious,	Inflow Depth = 0.42" for 2-yr event
Inflow =	0.05 cfs @ 12.15 hrs, Volume=	302 cf
Outflow =	0.03 cfs @ 12.46 hrs, Volume=	302 cf, Atten= 38%, Lag= 18.7 min
Discarded =	0.03 cfs @ 12.46 hrs, Volume=	302 cf
Primary =	0.00 cfs @ 1.00 hrs, Volume=	0 cf

Routing by Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Peak Elev= 65.04' @ 12.46 hrs Surf.Area= 571 sf Storage= 24 cf

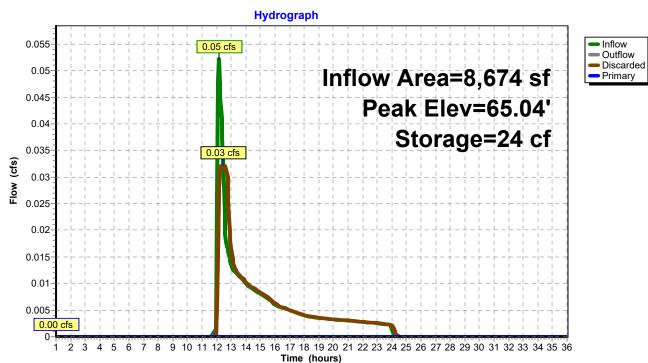
Plug-Flow detention time= 8.2 min calculated for 302 cf (100% of inflow) Center-of-Mass det. time= 8.1 min (931.1 - 923.1)

Volume	Invert	Avail.St	torage	e Storage Description			
#1	65.00'	65.00' 3,082 cf		Custom Stage Data (Irregular)Listed below (Recalc)			
Elevatio (fee		Surf.Area Per (sq-ft) (fe		Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
65.0 66.0 67.0	65.00 552 1 66.00 1,067 1 67.00 1,660 2		158.0 181.0 206.0 219.0	0 795 1,353 934	0 795 2,148 3,082	552 1,195 1,989 2,441	
Device	Routing	Inver	-	et Devices			
#1 #2	Discarded	65.00		0 in/hr Exfiltration Round Culvert	over Wetted area		
#2	Primary	,		L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.50' / 65.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf			
#3	Primary 66.80' 10.0 Hea 2.50 Coe			' long x 4.0' breadt d (feet) 0.20 0.40 (3.00 3.50 4.00 4.	Broad-Crested F 0.60 0.80 1.00 1.2 50 5.00 5.50 54 2.69 2.68 2.67	Rectangular Weir 0 1.40 1.60 1.80 2.00 2.67 2.65 2.66 2.66	
Discarded OutFlow Max=0.03 cfs @ 12.46 hrs HW=65.04' (Free Discharge)							

1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=65.00' (Free Discharge) 2=Culvert (Controls 0.00 cfs)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)



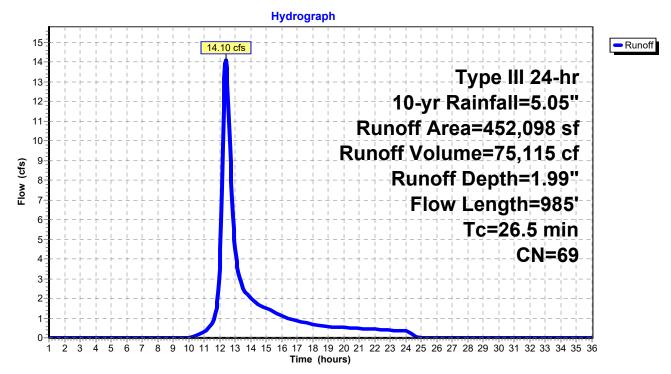
Pond 1P: Raingarden

Summary for Subcatchment 1S: Soutwest-Western Area

Runoff = 14.10 cfs @ 12.39 hrs, Volume= 75,115 cf, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

Area	(sf)	CN [Description				
	387	76 (Gravel roads, HSG A				
,	914		Gravel road				
4,0)46	39 >	>75% Grass	s cover, Go	bod, HSG A		
139,3	352	61 >	>75% Grass	s cover, Go	bod, HSG B		
14,7	765		Paved parki				
103,6			Paved parki	•			
26,5			Roofs, HSG				
76,3			Noods, Goo				
	175		Noods, Goo	,			
73,4			Brush, Poor	•			
452,0			Veighted A	•			
307,2			67.96% Per				
144,8	144,869 32.04% Impervious Area				ea		
Ta la	ما ا	Clana	Valacity	Consister	Description		
	ngth eet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
	/		. ,	(015)			
20.2	50	0.0050	0.04		Sheet Flow,		
2.2	150	0.0050	1.14		Woods: Light underbrush n= 0.400 P2= 3.60" Shallow Concentrated Flow,		
2.2	150	0.0050	1.14		Unpaved Kv= 16.1 fps		
2.1	380	0.0230	3.08		Shallow Concentrated Flow,		
2.1	000	0.0200	5.00		Paved Kv= 20.3 fps		
2.0	405	0.0420	3.30		Shallow Concentrated Flow,		
2.0		5.0.20	0.00		Unpaved Kv= 16.1 fps		
26.5	985	Total					



Subcatchment 1S: Soutwest-Western Area

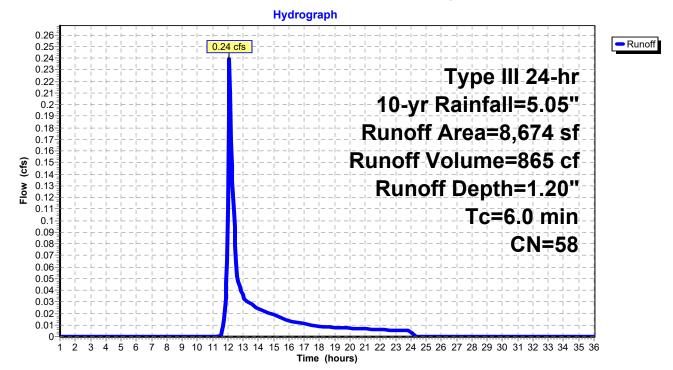
Summary for Subcatchment 1Sa: New Driveway Area

Runoff = 0.24 cfs @ 12.11 hrs, Volume= 865 cf, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

	A	rea (sf)	CN	Description		
		239	76	Gravel road	ls, HSG A	
*		1,954	98	New Drivew	vay Area, H	ISG A
		2,628	30	Woods, Go	od, HSG A	
		1,067	98	Water Surfa	ace, HSG A	A
		2,786	39	>75% Gras	s cover, Go	bod, HSG A
		8,674	58	Weighted A	verage	
		5,653		65.17% Per	vious Area	3
		3,021		34.83% Imp	pervious Ar	ea
	Тс	Length	Slop	e Velocity	Capacity	Description
(m	nin)	(feet)	(ft/f) (ft/sec)	(cfs)	
	6.0					Direct Entry, Tc Direct Entry

Subcatchment 1Sa: New Driveway Area



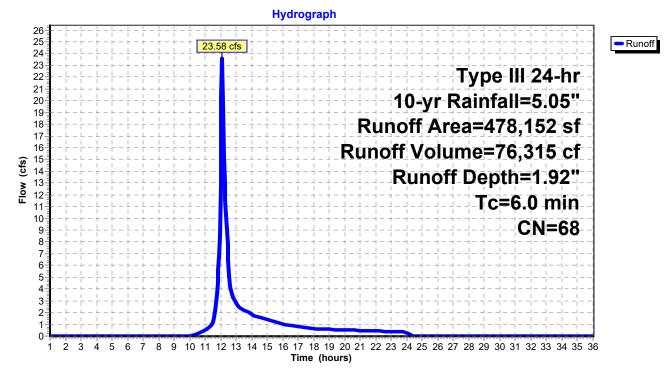
Summary for Subcatchment 2S: Eastern Area

Runoff = 23.58 cfs @ 12.10 hrs, Volume= 76,315 cf, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

	Area (sf)	CN	Description		
	9,662	82	Dirt roads, I	ISG B	
*	960	98	Equipment	Pads	
	50,553	85	Gravel road	s, HSG B	
	166,878	61	>75% Grass	s cover, Go	bod, HSG B
	14,392	98	Roofs, HSG	в	
	23,117	55	Woods, Goo	od, HSG B	
	212,590	67	Brush, Poor	, HSG B	
	478,152	68	Weighted A	verage	
	462,800		96.79% Per	vious Area	1
	15,352		3.21% Impe	rvious Are	a
	Tc Length	Slop		Capacity	Description
<u>(m</u>	in) (feet)	(ft/	ft) (ft/sec)	(cfs)	
(6.0				Direct Entry,

Subcatchment 2S: Eastern Area



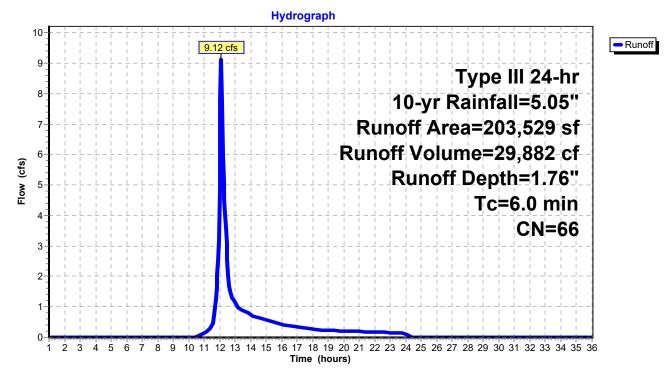
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 9.12 cfs @ 12.10 hrs, Volume= 29,882 cf, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

	Area (sf)	CN	Description		
*	172,845	65	Upland Bog	Area	
	1,176	72	Dirt roads, I	HSG A	
	7,998	82	Dirt roads, I	HSG B	
	2,102	85	Gravel road	ls, HSG B	
	1,434	61	>75% Gras	s cover, Go	ood, HSG B
	604	30	Woods, Go	od, HSG A	A
	17,370	67	Brush, Poor	r, HSG B	
	203,529	66	Weighted A	verage	
	203,529		100.00% Pe	ervious Are	ea
T	c Length	Slop	e Velocity	Capacity	Description
(min) (feet)	(ft/1	ft) (ft/sec)	(cfs)	
6.0	C				Direct Entry,

Subcatchment 3S: Center-Eastern Area



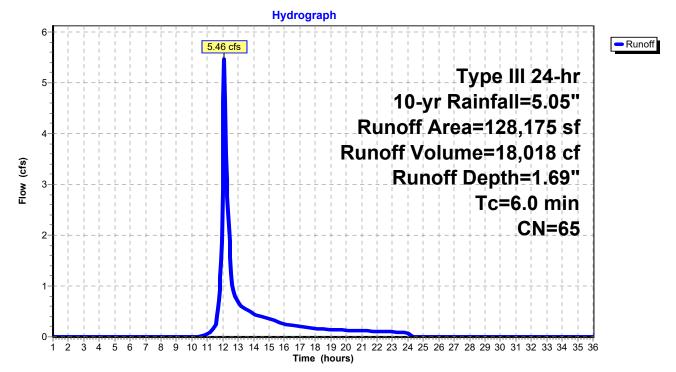
Summary for Subcatchment 4S: Center-Western Area

Runoff = 5.46 cfs @ 12.10 hrs, Volume= 18,018 cf, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

Area	a (sf)	CN	Description		
	227	39	>75% Grass	s cover, Go	lood, HSG A
28	8,879	61	>75% Grass	s cover, Go	lood, HSG B
	954	30	Woods, Goo	od, HSG A	A
	465	55	Woods, Goo	od, HSG B	3
97	,650	67	Brush, Poor	, HSG B	
128	3,175	65	Weighted A	verage	
128	3,175		100.00% Pe	ervious Are	ea
Tc L	ength	Slope	e Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft) (ft/sec)	(cfs)	
6.0					Direct Entry,

Subcatchment 4S: Center-Western Area



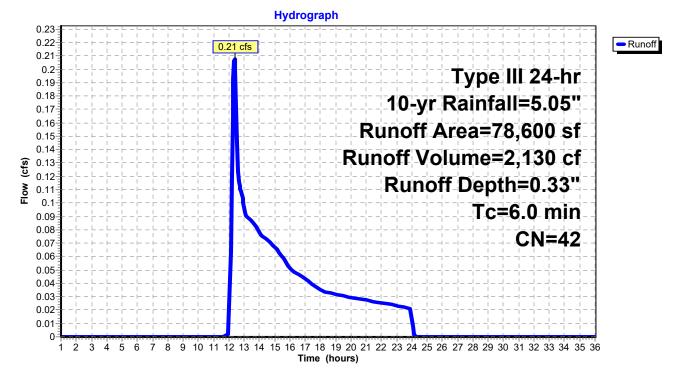
Summary for Subcatchment 5S: Northwestern Area

Runoff = 0.21 cfs @ 12.37 hrs, Volume= 2,130 cf, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
778	39	>75% Grass cover, Good, HSG A
10,099	61	>75% Grass cover, Good, HSG B
50,691	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
16,211	67	Brush, Poor, HSG B
78,600	42	Weighted Average
78,600		100.00% Pervious Area
Tc Length	n Slop	be Velocity Capacity Description
(min) (feet) (ft/	ft) (ft/sec) (cfs)
6.0		Direct Entry,

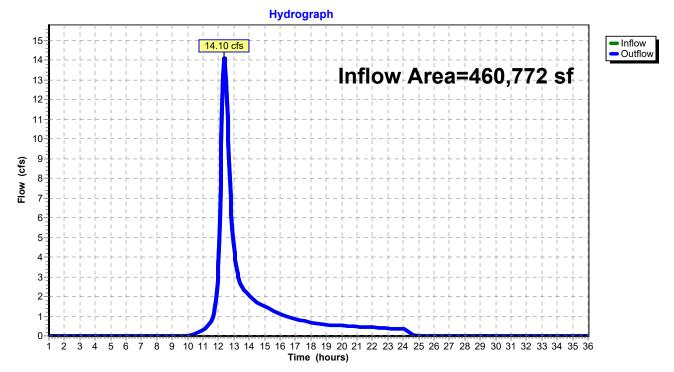
Subcatchment 5S: Northwestern Area



Summary for Reach DP-1: Glover Mill Pond

Inflow Area	=	460,772 sf, 32.10% Impervious, Inflow Depth = 1.96" for 10-yr event
Inflow	=	14.10 cfs @ 12.39 hrs, Volume= 75,115 cf
Outflow	=	14.10 cfs @ 12.39 hrs, Volume= 75,115 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

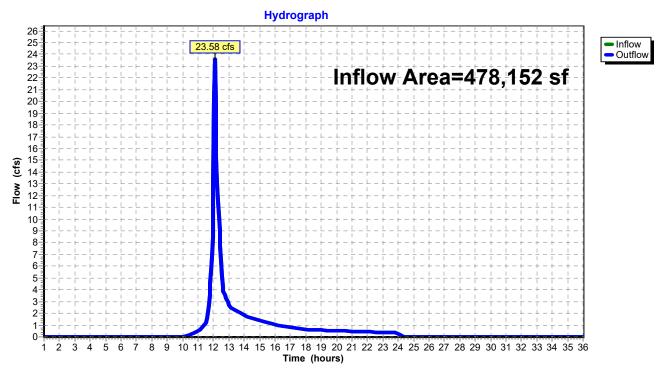


Reach DP-1: Glover Mill Pond

Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area =		478,152 sf,	3.21% Impervious,	Inflow Depth = 1.92"	for 10-yr event
Inflow	=	23.58 cfs @ 1	2.10 hrs, Volume=	76,315 cf	-
Outflow	=	23.58 cfs @ 1	2.10 hrs, Volume=	76,315 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



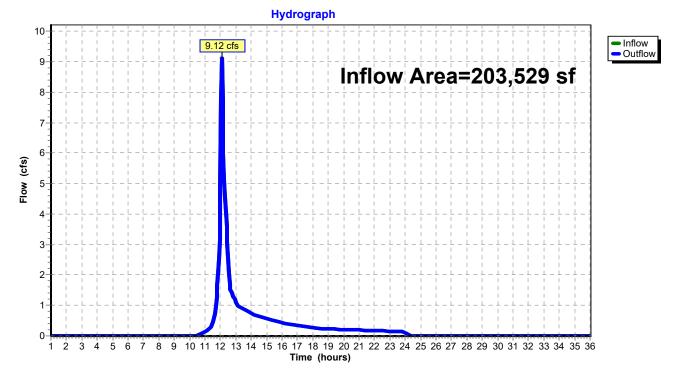
Reach DP-2: Eastern Intermittent Stream

Summary for Reach DP-3: Upland Bog

Inflow Area =	=	203,529 sf,	0.00% Impervious	, Inflow Depth = 1.76 "	for 10-yr event
Inflow =	:	9.12 cfs @	12.10 hrs, Volume=	29,882 cf	-
Outflow =	:	9.12 cfs @	12.10 hrs, Volume=	29,882 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog

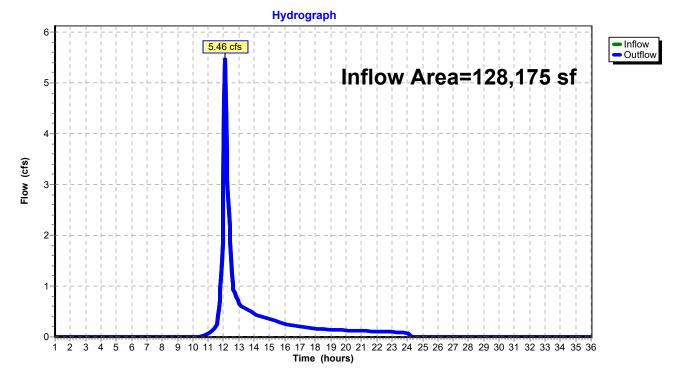


Summary for Reach DP-4: Excavated Area

Inflow Area =		128,175 sf,	0.00% Impervious,	Inflow Depth = 1.69	' for 10-yr event
Inflow	=	5.46 cfs @ 1	12.10 hrs, Volume=	18,018 cf	
Outflow	=	5.46 cfs @ 1	12.10 hrs, Volume=	18,018 cf, Att	en= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

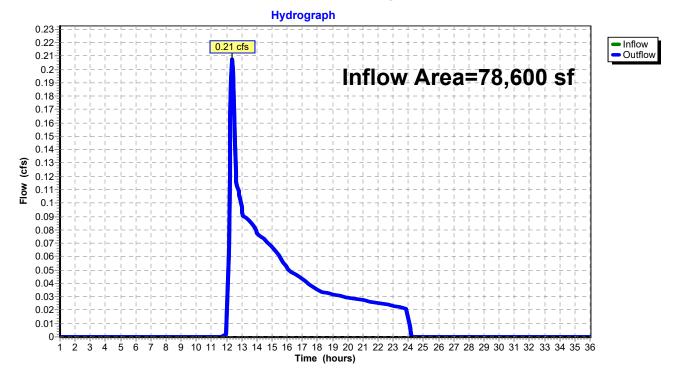


Summary for Reach DP-5: Herring Brook

Inflow Area =		78,600 sf,	0.00% Impervious,	Inflow Depth = 0.33 "	for 10-yr event
Inflow	=	0.21 cfs @ 1	12.37 hrs, Volume=	2,130 cf	
Outflow	=	0.21 cfs @ 1	12.37 hrs, Volume=	2,130 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook



Summary for Pond 1P: Raingarden

Inflow Area =	8,674 sf, 34.83% Impervious,	Inflow Depth = 1.20" for 10-yr event
Inflow =	0.24 cfs @ 12.11 hrs, Volume=	865 cf
Outflow =	0.04 cfs @ 12.75 hrs, Volume=	865 cf, Atten= 82%, Lag= 38.6 min
Discarded =	0.04 cfs @ 12.75 hrs, Volume=	865 cf
Primary =	0.00 cfs @ 1.00 hrs, Volume=	0 cf

Routing by Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Peak Elev= 65.37' @ 12.75 hrs Surf.Area= 724 sf Storage= 236 cf

Plug-Flow detention time= 47.4 min calculated for 864 cf (100% of inflow) Center-of-Mass det. time= 47.3 min (928.4 - 881.1)

Volume	Invert	Avail.St	torage	Storage Description	n		
#1	65.00'	3,	082 cf	Custom Stage Dat	ta (Irregular) Listed	below (Recalc)	
Elevatio (fee		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
65.0 66.0 67.0 67.5)0)0)0	552 1,067 1,660 2,084	158.0 181.0 206.0 219.0	0 795 1,353 934	0 795 2,148 3,082	552 1,195 1,989 2,441	
Device #1 #2	#1 Discarded 65.00' 2.410 in/hr Exfiltration over Wetted area						
π2	L= 2 Inle			4.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.50' / 65.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf			
#3	Primary	66.80				Rectangular Weir 20 1.40 1.60 1.80 2.00 2.67 2.65 2.66 2.66	
Discarded OutFlow Max=0.04 cfs @ 12.75 hrs HW=65.37' (Free Discharge)							

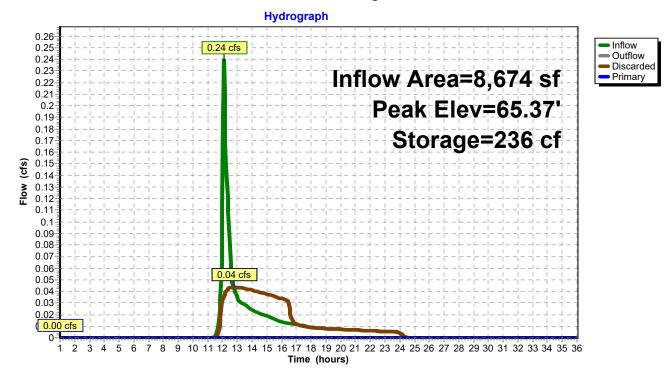
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=65.00' (Free Discharge) 2=Culvert (Controls 0.00 cfs)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

3086.00 - Hydrocad Calculations - POST-TC ChangeType III 24-hr10-yr Rainfall=5.05"Prepared by Atlantic Design Engineers, Inc.Printed 8/12/2019HydroCAD® 10.00-25 s/n 00480 © 2019 HydroCAD Software Solutions LLCPage 29

Pond 1P: Raingarden

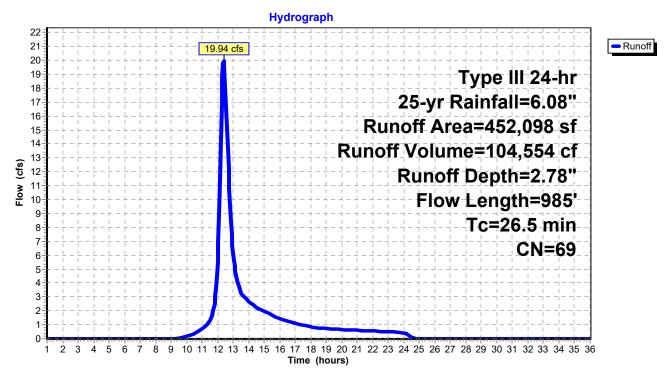


Summary for Subcatchment 1S: Soutwest-Western Area

Runoff = 19.94 cfs @ 12.38 hrs, Volume= 104,554 cf, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

A	rea (sf)	CN D	escription		
	3,887	76 G	Gravel road	s, HSG A	
	9,914		Gravel road		
	4,046	39 >	75% Grass	s cover, Go	ood, HSG A
1	39,352				ood, HSG B
	14,765			ing, HSG A	
	03,603			ing, HSG B	
	26,501		Roofs, HSG		
	76,367			od, HSG A	
	175		,	od, HSG B	
	73,488		Brush, Poor	•	
	52,098		Veighted A		
	07,229	-		vious Area	
1	44,869	3	2.04% Imp	ervious Are	ea
Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Description
20.2	50	0.0050	0.04	(0.0)	Sheet Flow,
20.2	00	0.0000	0.01		Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow,
					Unpaved Kv= 16.1 fps
2.1	380	0.0230	3.08		Shallow Concentrated Flow,
					Paved Kv= 20.3 fps
2.0	405	0.0420	3.30		Shallow Concentrated Flow,
					Unpaved Kv= 16.1 fps
26.5	985	Total			



Subcatchment 1S: Soutwest-Western Area

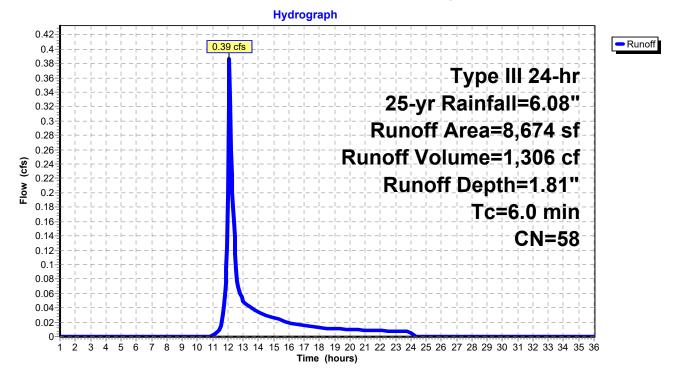
Summary for Subcatchment 1Sa: New Driveway Area

Runoff = 0.39 cfs @ 12.10 hrs, Volume= 1,306 cf, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

	Area (sf)	CN	Description		
	239	76	Gravel road	ls, HSG A	
*	1,954	98	New Drivew	/ay Area, H	ISG A
	2,628	30	Woods, Go	od, HSG A	
	1,067	98	Water Surfa	ace, HSG A	A
	2,786	39	>75% Gras	s cover, Go	bod, HSG A
	8,674	58	Weighted A	verage	
	5,653		65.17% Per	vious Area	1
	3,021		34.83% Imp	pervious Ar	ea
	Tc Length			Capacity	Description
<u>(m</u>	in) (feet)) (ft/	ft) (ft/sec)	(cfs)	
6	6.0				Direct Entry, Tc Direct Entry

Subcatchment 1Sa: New Driveway Area



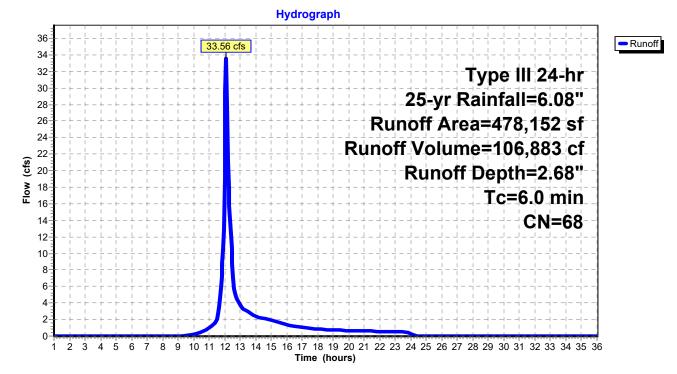
Summary for Subcatchment 2S: Eastern Area

Runoff = 33.56 cfs @ 12.10 hrs, Volume= 106,883 cf, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

	Area (sf)	CN	Description		
	9,662	82	Dirt roads, H	ISG B	
*	960	98	Equipment I	Pads	
	50,553	85	Gravel road	s, HSG B	
	166,878	61	>75% Grass	s cover, Go	bod, HSG B
	14,392	98	Roofs, HSG	В	
	23,117	55	Woods, Goo	od, HSG B	
	212,590	67	Brush, Poor	, HSG B	
	478,152	68	Weighted Av	verage	
	462,800		96.79% Per	vious Area	l
	15,352		3.21% Impe	rvious Are	а
	Tc Length	Slop	be Velocity	Capacity	Description
(m	in) (feet)	(ft/	ft) (ft/sec)	(cfs)	
(6.0				Direct Entry,

Subcatchment 2S: Eastern Area



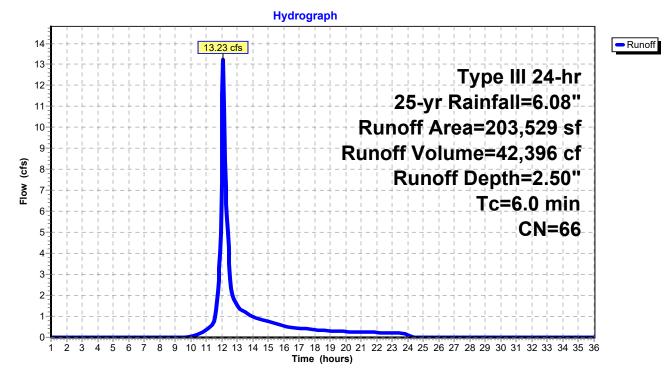
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 13.23 cfs @ 12.10 hrs, Volume= 42,396 cf, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

	Area (sf)	CN	Description		
*	172,845	65	Upland Bog	Area	
	1,176	72	Dirt roads,	HSG A	
	7,998	82	Dirt roads, l	HSG B	
	2,102	85	Gravel road	ls, HSG B	
	1,434	61	>75% Gras	s cover, Go	ood, HSG B
	604	30	Woods, Go	od, HSG A	N Contraction of the second
	17,370	67	Brush, Poo	r, HSG B	
	203,529	66	Weighted A	verage	
	203,529		100.00% P	ervious Are	ea
	C Length	Slop		Capacity	Description
(mi	n) (feet)	(ft/	ft) (ft/sec)	(cfs)	
6	.0				Direct Entry,

Subcatchment 3S: Center-Eastern Area



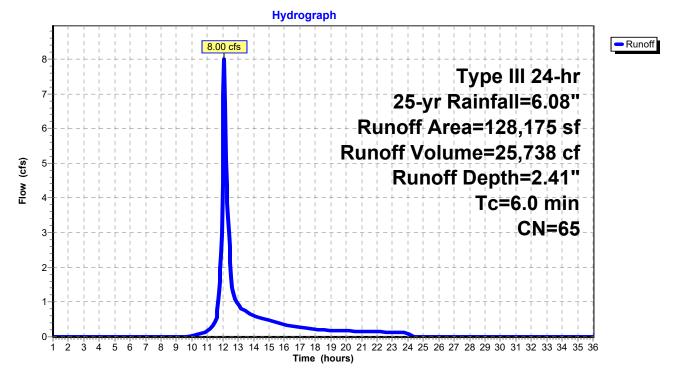
Summary for Subcatchment 4S: Center-Western Area

Runoff = 8.00 cfs @ 12.10 hrs, Volume= 25,738 cf, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

Area (sf) CN	Description	
22	7 39	>75% Grass cover, Good, HSG A	
28,879	9 61	>75% Grass cover, Good, HSG B	
954	4 30	Woods, Good, HSG A	
46	5 55	Woods, Good, HSG B	
97,650	0 67	Brush, Poor, HSG B	
128,17	5 65	Weighted Average	
128,17	5	100.00% Pervious Area	
Tc Leng			
(min) (fee	et) (ft/	/ft) (ft/sec) (cfs)	
6.0		Direct Entry,	

Subcatchment 4S: Center-Western Area



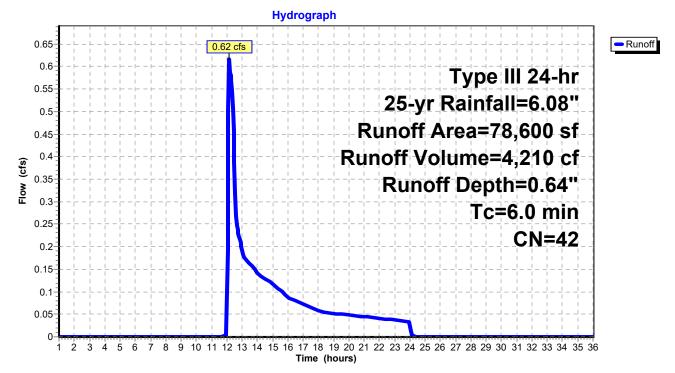
Summary for Subcatchment 5S: Northwestern Area

Runoff = 0.62 cfs @ 12.17 hrs, Volume= 4,210 cf, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 25-yr Rainfall=6.08"

Area (sf) CN	Description
778	3 39	>75% Grass cover, Good, HSG A
10,099	9 61	>75% Grass cover, Good, HSG B
50,691	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
16,211	67	Brush, Poor, HSG B
78,600) 42	Weighted Average
78,600)	100.00% Pervious Area
Tc Lengt	h Slo	pe Velocity Capacity Description
(min) (fee	t) (ft/	/ft) (ft/sec) (cfs)
6.0		Direct Entry,

Subcatchment 5S: Northwestern Area



Summary for Reach DP-1: Glover Mill Pond

Inflow Area =	460,772 sf, 32.10% Impervious,	Inflow Depth = 2.72" for	r 25-yr event
Inflow =	19.94 cfs @ 12.38 hrs, Volume=	104,612 cf	-
Outflow =	19.94 cfs @ 12.38 hrs, Volume=	104,612 cf, Atten= 0	0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

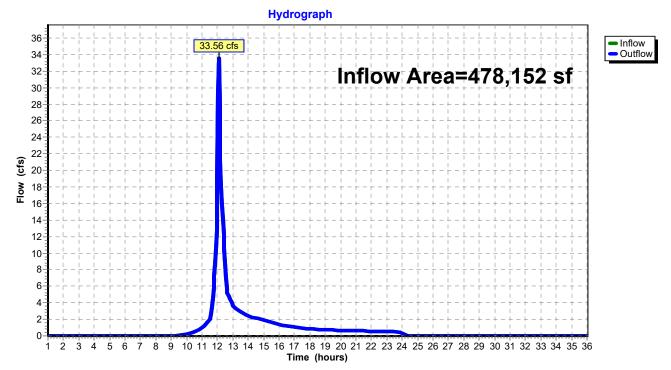
Hydrograph 22 Inflow Outflow 21 19.94 cfs 20 Inflow Area=460,772 sf 19 18-17 16-15 14 13 Flow (cfs) 12 11 10-9 8-7 6 5 4 3-2 1 0 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 ż 34 1 Time (hours)

Reach DP-1: Glover Mill Pond

Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area	a =	478,152 sf,	3.21% Impervious,	Inflow Depth = 2.68"	for 25-yr event
Inflow	=	33.56 cfs @ 1	2.10 hrs, Volume=	106,883 cf	-
Outflow	=	33.56 cfs @ 1	2.10 hrs, Volume=	106,883 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



Reach DP-2: Eastern Intermittent Stream

Summary for Reach DP-3: Upland Bog

Inflow Area	a =	203,529 sf,	0.00% Impervious,	Inflow Depth = 2.50 "	for 25-yr event
Inflow	=	13.23 cfs @ 1	2.10 hrs, Volume=	42,396 cf	-
Outflow	=	13.23 cfs @ 1	2.10 hrs, Volume=	42,396 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Hydrograph Inflow Outflow 14 13.23 cfs 13 Inflow Area=203,529 sf 12 11 10 9 Flow (cfs) 8 7 6 5 4 3-2 1 0 2 567 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 ż 4 1 Time (hours)

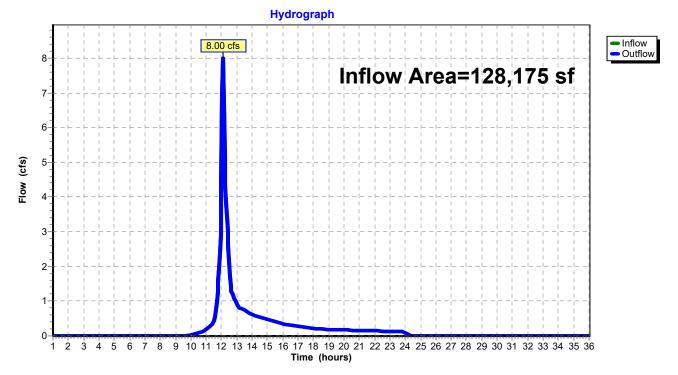
Reach DP-3: Upland Bog

Summary for Reach DP-4: Excavated Area

Inflow Area	a =	128,175 sf,	0.00% Impervious,	Inflow Depth = 2.41 "	for 25-yr event
Inflow	=	8.00 cfs @ 1	12.10 hrs, Volume=	25,738 cf	
Outflow	=	8.00 cfs @ 1	12.10 hrs, Volume=	25,738 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

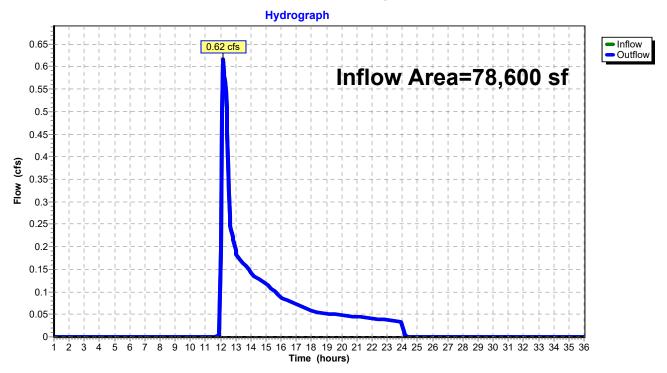
Reach DP-4: Excavated Area



Summary for Reach DP-5: Herring Brook

Inflow Area =	78,600 sf,	0.00% Impervious,	Inflow Depth = 0.64"	for 25-yr event
Inflow =	0.62 cfs @ 1	12.17 hrs, Volume=	4,210 cf	-
Outflow =	0.62 cfs @ 1	12.17 hrs, Volume=	4,210 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



Reach DP-5: Herring Brook

Summary for Pond 1P: Raingarden

Inflow Area =	8,674 sf, 34.83% Impervious,	Inflow Depth = 1.81" for 25-yr event
Inflow =	0.39 cfs @ 12.10 hrs, Volume=	1,306 cf
Outflow =	0.07 cfs @ 12.65 hrs, Volume=	1,306 cf, Atten= 82%, Lag= 32.8 min
Discarded =	0.05 cfs @ 12.65 hrs, Volume=	1,248 cf
Primary =	0.02 cfs @ 12.65 hrs, Volume=	58 cf

Routing by Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Peak Elev= 65.60' @ 12.65 hrs Surf.Area= 841 sf Storage= 415 cf

Plug-Flow detention time= 72.8 min calculated for 1,304 cf (100% of inflow) Center-of-Mass det. time= 72.7 min (940.1 - 867.4)

Volume	Invert	Avail.St	orage	Storage Description	า			
#1	65.00'	3,	082 cf	Custom Stage Dat	ta (Irregular)Listed	below (Recalc)		
Elevatio (fee		ırf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
65.0 66.0 67.0 67.5)0)0)0	552 1,067 1,660 2,084	158.0 181.0 206.0 219.0	0 795 1,353 934	0 795 2,148 3,082	552 1,195 1,989 2,441		
Device #1	Routing Discarded	Inver 65.00	-	et Devices 0 in/hr Exfiltration (over Wetted area			
#2	Primary	65.50	' 4.0'' L= 2	4.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900				
#3	Primary	66.80	Inlet n= 0 10.0 Head 2.50 Coet	Inlet / Outlet Invert= $65.50' / 65.30' = 0.0100' / Cc= 0.900$ n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf 10.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 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				
Discard	Discarded OutFlow Max=0.05 cfs @ 12.65 hrs HW=65.60' (Free Discharge)							

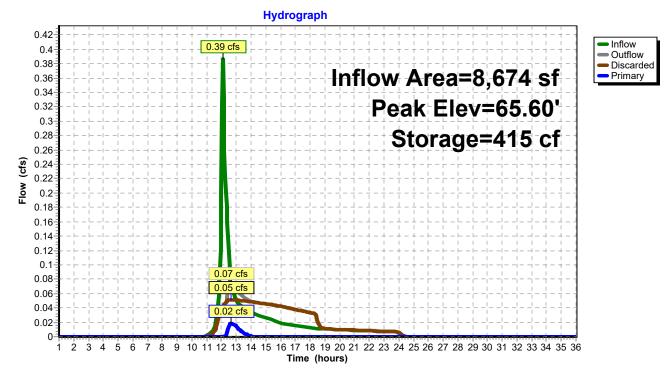
1=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.02 cfs @ 12.65 hrs HW=65.60' (Free Discharge) 2=Culvert (Inlet Controls 0.02 cfs @ 0.85 fps)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

3086.00 - Hydrocad Calculations - POST-TC ChangeType III 24-hr25-yr Rainfall=6.08"Prepared by Atlantic Design Engineers, Inc.Printed 8/12/2019HydroCAD® 10.00-25 s/n 00480 © 2019 HydroCAD Software Solutions LLCPage 43

Pond 1P: Raingarden

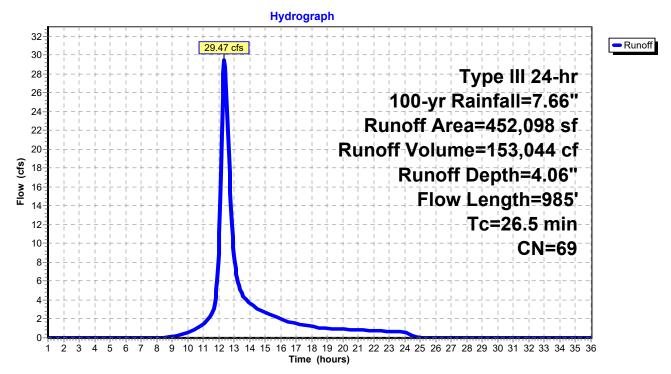


Summary for Subcatchment 1S: Soutwest-Western Area

Runoff = 29.47 cfs @ 12.37 hrs, Volume= 153,044 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

A	rea (sf)	CN D	escription					
	3,887	76 G	76 Gravel roads, HSG A					
	9,914	85 G	Gravel road	ls, HSG B				
	4,046	39 >	75% Gras	s cover, Go	ood, HSG A			
1	39,352	61 >	75% Gras	s cover, Go	ood, HSG B			
	14,765	98 P	aved park	ing, HSG A	N N N N N N N N N N N N N N N N N N N			
1	03,603	98 P	aved park	ing, HSG B				
	26,501	98 F	Roofs, HSC	βΒ				
	76,367	30 V	Voods, Go	od, HSG A				
	175	55 V	Voods, Go	od, HSG B				
	73,488	67 B	rush, Pooi	r, HSG B				
4	52,098	69 V	Veighted A	verage				
3	07,229	6	7.96% Per	vious Area				
1	44,869	3	2.04% Imp	pervious Are	ea			
Tc	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
20.2	50	0.0050	0.04		Sheet Flow,			
					Woods: Light underbrush n= 0.400 P2= 3.60"			
2.2	150	0.0050	1.14		Shallow Concentrated Flow,			
					Unpaved Kv= 16.1 fps			
2.1	380	0.0230	3.08		Shallow Concentrated Flow,			
					Paved Kv= 20.3 fps			
2.0	405	0.0420	3.30		Shallow Concentrated Flow,			
					Unpaved Kv= 16.1 fps			
26.5	985	Total						



Subcatchment 1S: Soutwest-Western Area

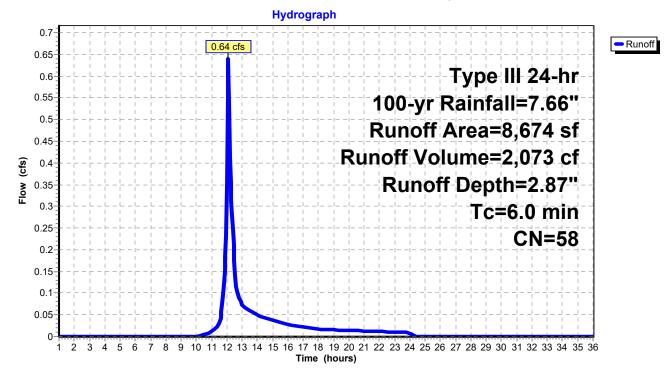
Summary for Subcatchment 1Sa: New Driveway Area

Runoff = 0.64 cfs @ 12.10 hrs, Volume= 2,073 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

	Area (sf)	CN	Description				
	239	76	Gravel roads, HSG A				
*	1,954	98	New Drivew	/ay Area, H	HSG A		
	2,628	30	Woods, Go	od, HSG A	N N N N N N N N N N N N N N N N N N N		
	1,067	98	Water Surfa	ace, HSG A	4		
	2,786	39	>75% Grass cover, Good, HSG A				
	8,674	58	Weighted Average				
	5,653		65.17% Pervious Area				
	3,021		34.83% Impervious Area				
_							
Т	c Length	Slop		Capacity	Description		
(mir	<u>1) (feet)</u>	(ft/f	:) (ft/sec)	(cfs)			
6.	0				Direct Entry, Tc Direct Entry		

Subcatchment 1Sa: New Driveway Area



3086.00 - Hydrocad Calculations - POST-TC ChangeType III 24-hr100-yr Rainfall=7.66"Prepared by Atlantic Design Engineers, Inc.Printed 8/12/2019HydroCAD® 10.00-25 s/n 00480 © 2019 HydroCAD Software Solutions LLCPage 47

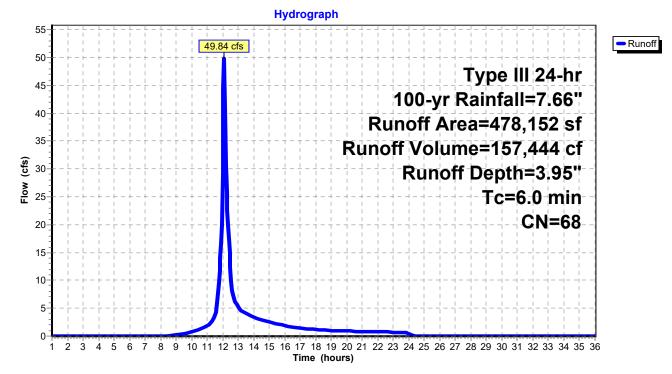
Summary for Subcatchment 2S: Eastern Area

Runoff = 49.84 cfs @ 12.09 hrs, Volume= 157,444 cf, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

	Ar	rea (sf)	CN	Description					
		9,662	82	Dirt roads, HSG B					
*		960	98	Equipment	Pads				
	ļ	50,553	85	Gravel road	ls, HSG B				
	10	66,878	61	>75% Gras	s cover, Go	bod, HSG B			
		14,392	98	Roofs, HSC	βB				
	2	23,117	55	Woods, Go	od, HSG B				
	2	12,590	67	Brush, Poo	r, HSG B				
	4	78,152	68	Weighted A	verage				
	40	62,800		96.79% Pe	rvious Area	1			
	15,352 3.21% Impervious Area								
	т.	l e e este	Clan	• Volesity	Conseitu	Description			
(Tc	Length	Slop	,	Capacity	Description			
<u> </u>	nin)	(feet)	(ft/f	t) (ft/sec)	(cfs)				
(6.0					Direct Entry,			

Subcatchment 2S: Eastern Area



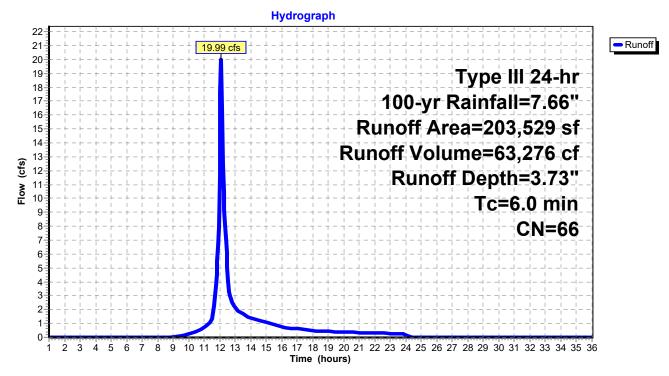
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 19.99 cfs @ 12.09 hrs, Volume= 63,276 cf, Depth= 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

	Area (sf)	CN	Description				
*	172,845	65	Upland Bog	Area			
	1,176	72	Dirt roads, I	HSG A			
	7,998	82	Dirt roads, I	HSG B			
	2,102	85	Gravel road	ls, HSG B			
	1,434	61	>75% Gras	s cover, Go	ood, HSG B		
	604	30	Woods, Go	od, HSG A	A		
	17,370	67	Brush, Pool	r, HSG B			
	203,529	66	Weighted A	verage			
	203,529 100.00% Pervious Area				ea		
Т	c Length	Slop	e Velocity	Capacity	Description		
(min) (feet)	(ft/1	ft) (ft/sec)	(cfs)			
6.	C				Direct Entry,		

Subcatchment 3S: Center-Eastern Area



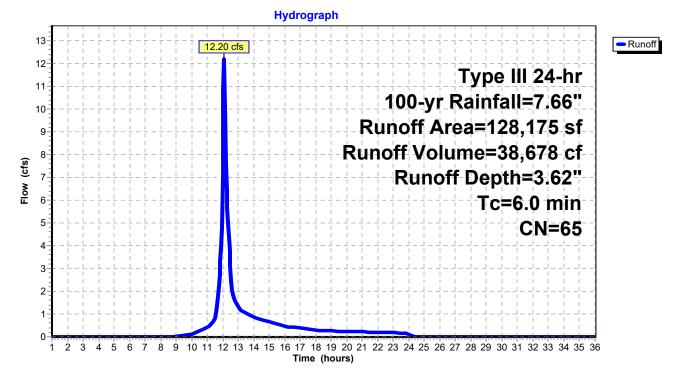
Summary for Subcatchment 4S: Center-Western Area

Runoff = 12.20 cfs @ 12.09 hrs, Volume= 38,678 cf, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

Are	ea (sf)	CN	Description		
	227	39	>75% Grass	s cover, Go	lood, HSG A
2	8,879	61	>75% Grass	s cover, Go	iood, HSG B
	954	30	Woods, Go	od, HSG A	A
	465	55	Woods, Go	od, HSG B	3
9	7,650	67	Brush, Poor	r, HSG B	
12	8,175	65	Weighted A	verage	
12	128,175 100.00% Pervious Area				ea
Tc I	Length	Slop	e Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/f	t) (ft/sec)	(cfs)	
6.0					Direct Entry,





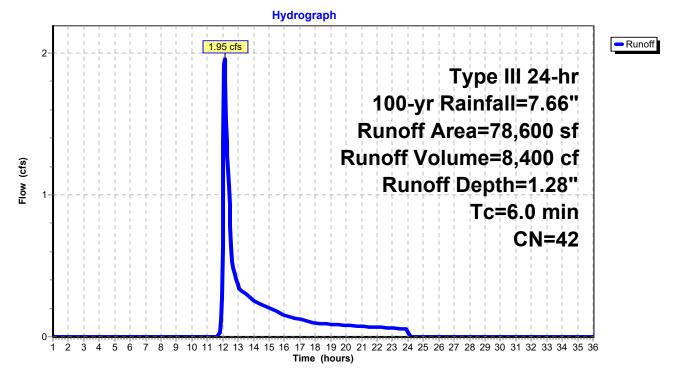
Summary for Subcatchment 5S: Northwestern Area

Runoff = 1.95 cfs @ 12.12 hrs, Volume= 8,400 cf, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

Are	ea (sf)	CN	Description			
	778	39	>75% Grass	s cover, Go	od, HSG A	
10	0,099	61	>75% Grass	s cover, Go	od, HSG B	
50	0,691	30	Woods, Goo	od, HSG A		
	821	55	Woods, Goo	od, HSG B		
1(6,211	67	Brush, Poor	, HSG B		
78	8,600	42	Weighted A	verage		
78	8,600	00 100.00% Pervious Area				
Tc L	Length	Slop	e Velocity	Capacity	Description	
<u>(min)</u>	(feet)	(ft/f	i) (ft/sec)	(cfs)		
6.0					Direct Entry,	

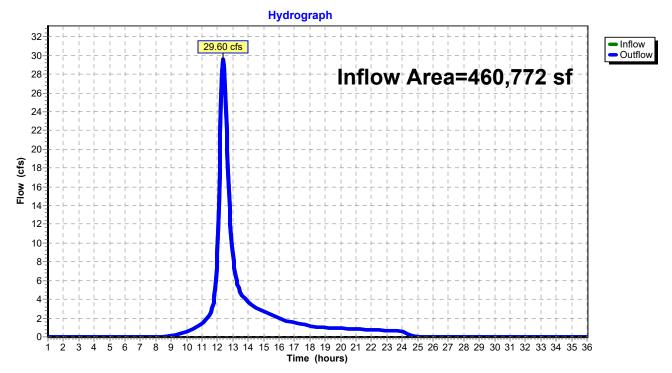
Subcatchment 5S: Northwestern Area



Summary for Reach DP-1: Glover Mill Pond

Inflow Area =		460,772 sf, 32.10% Impervious, Inflow Depth = 4.00" for 100-yr eve	nt
Inflow	=	29.60 cfs @ 12.37 hrs, Volume= 153,522 cf	
Outflow	=	29.60 cfs @ 12.37 hrs, Volume= 153,522 cf, Atten= 0%, Lag= 0.0) min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

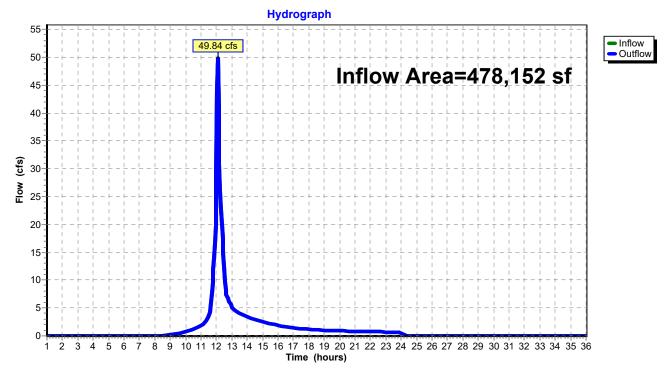


Reach DP-1: Glover Mill Pond

Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area =		478,152 sf,	3.21% Impervious,	Inflow Depth = 3.95"	for 100-yr event
Inflow	=	49.84 cfs @ 1	2.09 hrs, Volume=	157,444 cf	-
Outflow	=	49.84 cfs @ 1	2.09 hrs, Volume=	157,444 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



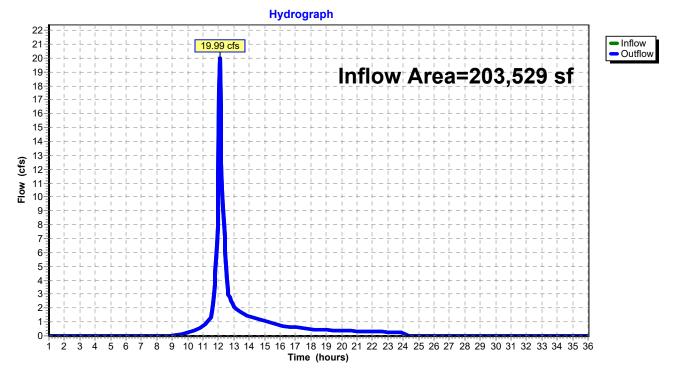
Reach DP-2: Eastern Intermittent Stream

Summary for Reach DP-3: Upland Bog

Inflow Area =		203,529 sf,	0.00% Impervious,	Inflow Depth = 3.73"	for 100-yr event
Inflow	=	19.99 cfs @ 1	12.09 hrs, Volume=	63,276 cf	-
Outflow	=	19.99 cfs @ 1	12.09 hrs, Volume=	63,276 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

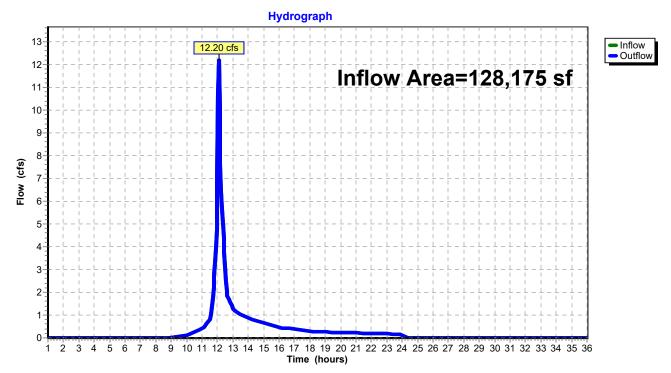
Reach DP-3: Upland Bog



Summary for Reach DP-4: Excavated Area

Inflow Area =		128,175 sf,	0.00% Impervious,	Inflow Depth = 3.62"	for 100-yr event
Inflow	=	12.20 cfs @ 1	12.09 hrs, Volume=	38,678 cf	
Outflow	=	12.20 cfs @ 1	12.09 hrs, Volume=	38,678 cf, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs



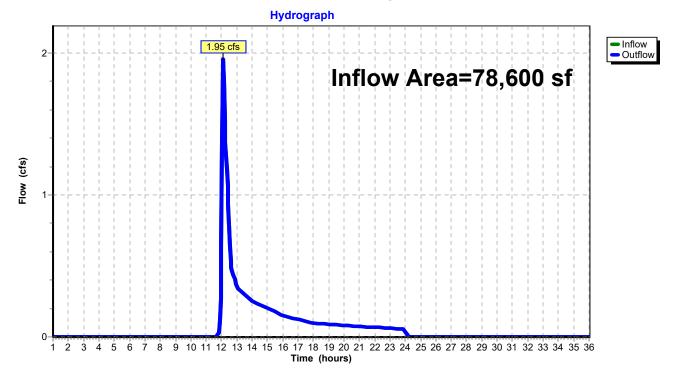
Reach DP-4: Excavated Area

Summary for Reach DP-5: Herring Brook

Inflow Area =	78,600 sf,	0.00% Impervious,	Inflow Depth = 1.28"	for 100-yr event
Inflow =	1.95 cfs @ 1	I2.12 hrs, Volume=	8,400 cf	·
Outflow =	1.95 cfs @ 1	12.12 hrs, Volume=	8,400 cf, Atter	n= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook



Summary for Pond 1P: Raingarden

Inflow Area =	8,674 sf, 34.83% Impervious,	Inflow Depth = 2.87" for 100-yr event
Inflow =	0.64 cfs @ 12.10 hrs, Volume=	2,073 cf
Outflow =	0.19 cfs @ 12.48 hrs, Volume=	2,073 cf, Atten= 70%, Lag= 22.7 min
Discarded =	0.06 cfs @ 12.48 hrs, Volume=	1,595 cf
Primary =	0.13 cfs @ 12.48 hrs, Volume=	478 cf

Routing by Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Peak Elev= 65.82' @ 12.48 hrs Surf.Area= 965 sf Storage= 618 cf

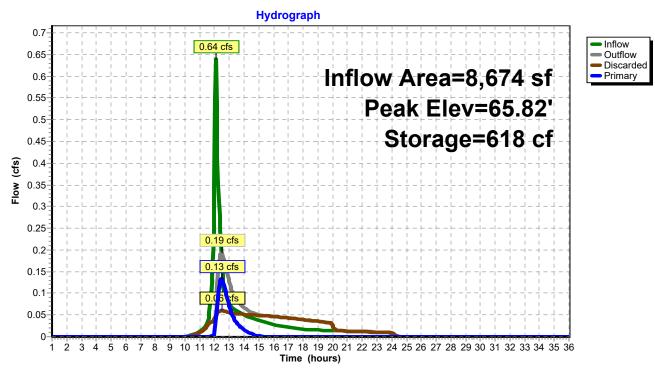
Plug-Flow detention time= 68.3 min calculated for 2,073 cf (100% of inflow) Center-of-Mass det. time= 68.2 min (921.2 - 853.1)

Volume	Invert	Avail.St	torage	Storage Description					
#1	65.00')' 3,082 cf		Custom Stage Data (Irregular)Listed below (Recalc)					
Elevatio (fee				m. Inc.Store Cum.Store et) (cubic-feet) (cubic-feet)		Wet.Area (sq-ft)			
65.0 66.0 67.0 67.5)0)0)0	552 1 1,067 1 1,660 2		58.0 0 0 552 31.0 795 795 1,195 06.0 1,353 2,148 1,989 19.0 934 3,082 2,441		552 1,195 1,989			
Device	Routing Invert Outlet Devices								
#1	Discarded	65.00		0 in/hr Exfiltration o	over Wetted area				
#2	Primary	65.50'		4.0" Round Culvert					
#3	Primary	66.80	Inlet n= 0 ' 10.0 Head 2.50 Coet	3.00 3.50 4.00 4.	0' / 65.30' S= 0.01 , smooth interior, F h Broad-Crested R 0.60 0.80 1.00 1.2 50 5.00 5.50 4 2.69 2.68 2.67	00 '/' Cc= 0.900 Flow Area= 0.09 sf Rectangular Weir 0 1.40 1.60 1.80 2.00 2.67 2.65 2.66 2.66			
Discard	Discarded OutFlow Max=0.06 cfs @ 12.48 hrs HW=65.82' (Free Discharge)								

1=Exfiltration (Exfiltration Controls 0.06 cfs)

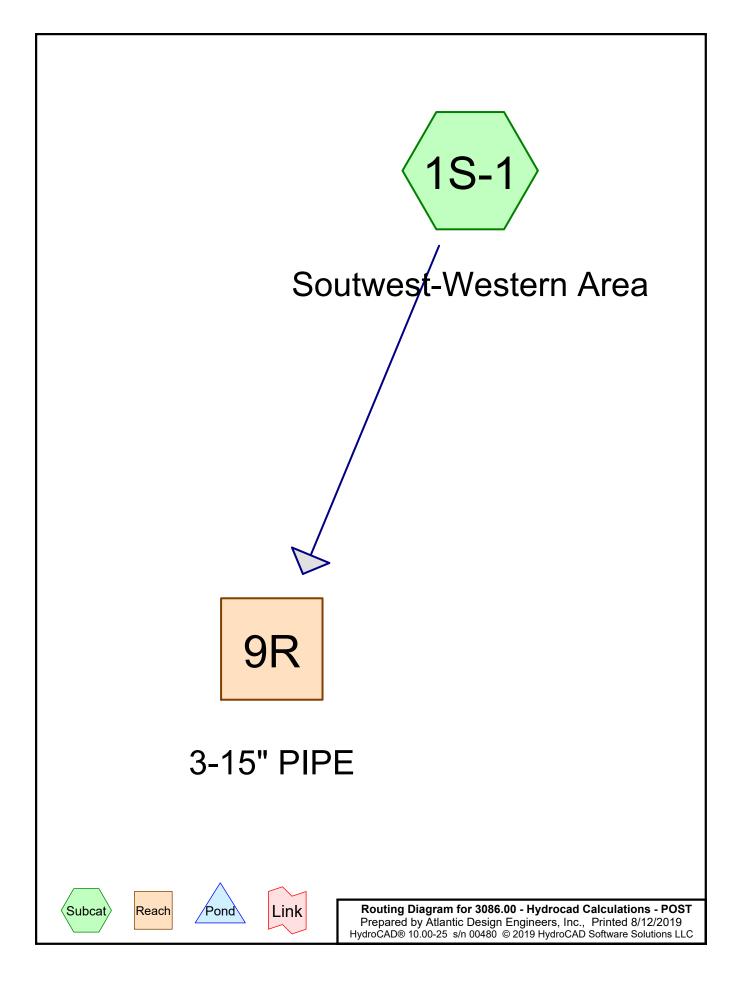
Primary OutFlow Max=0.13 cfs @ 12.48 hrs HW=65.82' (Free Discharge) 2=Culvert (Inlet Controls 0.13 cfs @ 1.53 fps)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)



Pond 1P: Raingarden

PIPE SIZING CALCULATIONS



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	Tipe Listing (selected flodes)								
Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	9R	0.50	-0.52	30.0	0.0340	0.012	15.0	0.0	0.0

Pipe Listing (selected nodes)

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Type III 24-hr 100-yr Rainfall=7.66" Printed 8/12/2019 LLC Page 3

Time span=1.00-36.00 hrs, dt=0.05 hrs, 701 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S-1: Soutwest-Western Runoff Area=452,098 sf 32.04% Impervious Runoff Depth=4.06" Flow Length=985' Tc=26.5 min CN=69 Runoff=29.47 cfs 153,044 cf

 Reach 9R: 3-15" PIPE
 Avg. Flow Depth=0.82'
 Max Vel=11.56 fps
 Inflow=29.47 cfs
 153,044 cf

 15.0" Round Pipe x 3.00
 n=0.012
 L=30.0'
 S=0.0340 '/'
 Capacity=38.71 cfs
 Outflow=29.46 cfs
 153,044 cf

Total Runoff Area = 452,098 sf Runoff Volume = 153,044 cf Average Runoff Depth = 4.06" 67.96% Pervious = 307,229 sf 32.04% Impervious = 144,869 sf Prepared by Atlantic Design Engineers, Inc. HydroCAD® 10.00-25 s/n 00480 © 2019 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S-1: Soutwest-Western Area

Runoff = 29.47 cfs @ 12.37 hrs, Volume= 153,044 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

A	rea (sf)	CN E	Description						
	3,887	76 0	76 Gravel roads, HSG A						
	9,914	85 C	Gravel roads, HSG B						
	4,046	39 >	75% Gras	s cover, Go	bod, HSG A				
1	39,352	61 >	75% Gras	s cover, Go	bod, HSG B				
	14,765	98 F	Paved park	ing, HSG A	N Contraction of the second				
1	03,603	98 F	Paved park	ing, HSG B					
	26,501	98 F	Roofs, HSG	βB					
	76,367		,	od, HSG A					
	175			od, HSG B					
	73,488	67 E	Brush, Pool	r, HSG B					
4	52,098	69 V	Veighted A	verage					
3	807,229	6	7.96% Per	vious Area					
1	44,869	3	2.04% Imp	pervious Are	ea				
Tc	Length	Slope	Velocity		Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
20.2	50	0.0050	0.04		Sheet Flow,				
					Woods: Light underbrush n= 0.400 P2= 3.60"				
2.2	150	0.0050	1.14		Shallow Concentrated Flow,				
					Unpaved Kv= 16.1 fps				
2.1	380	0.0230	3.08		Shallow Concentrated Flow,				
_					Paved Kv= 20.3 fps				
2.0	405	0.0420	3.30		Shallow Concentrated Flow,				
					Unpaved Kv= 16.1 fps				
26 5	085	Total							

26.5 985 Total

Summary for Reach 9R: 3-15" PIPE

 Inflow Area =
 452,098 sf, 32.04% Impervious, Inflow Depth = 4.06" for 100-yr event

 Inflow =
 29.47 cfs @ 12.37 hrs, Volume=
 153,044 cf

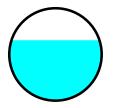
 Outflow =
 29.46 cfs @ 12.37 hrs, Volume=
 153,044 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Max. Velocity= 11.56 fps, Min. Travel Time= 0.0 min Avg. Velocity = 4.83 fps, Avg. Travel Time= 0.1 min

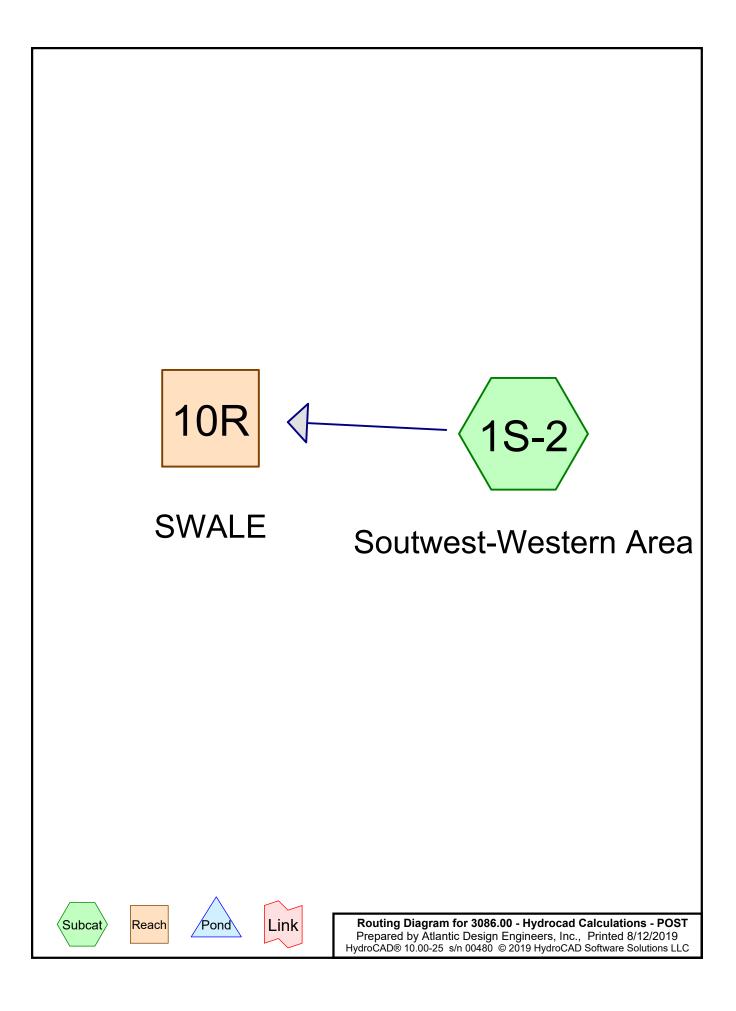
Peak Storage= 76 cf @ 12.37 hrs Average Depth at Peak Storage= 0.82' Bank-Full Depth= 1.25' Flow Area= 3.7 sf, Capacity= 38.71 cfs

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A factor of 3.00 has been applied to the storage and discharge capacity 15.0" Round Pipe n= 0.012 Corrugated PP, smooth interior Length= 30.0' Slope= 0.0340 '/' Inlet Invert= 0.50', Outlet Invert= -0.52'



SWALE SIZING CALCULATIONS



Time span=1.00-36.00 hrs, dt=0.05 hrs, 701 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S-2: Soutwest-Western Runoff Area=452,098 sf 32.04% Impervious Runoff Depth=4.06" Flow Length=985' Tc=26.5 min CN=69 Runoff=29.47 cfs 153,044 cf

 Reach 10R: SWALE
 Avg. Flow Depth=0.98'
 Max Vel=3.78 fps
 Inflow=29.47 cfs
 153,044 cf

 n=0.069
 L=40.0'
 S=0.0500 '/'
 Capacity=122.71 cfs
 Outflow=29.41 cfs
 153,044 cf

Total Runoff Area = 452,098 sf Runoff Volume = 153,044 cf Average Runoff Depth = 4.06" 67.96% Pervious = 307,229 sf 32.04% Impervious = 144,869 sf

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Summary for Subcatchment 1S-2: Soutwest-Western Area

Runoff = 29.47 cfs @ 12.37 hrs, Volume= 153,044 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Type III 24-hr 100-yr Rainfall=7.66"

A	rea (sf)	CN E	Description						
	3,887	76 C	76 Gravel roads, HSG A						
	9,914	85 C	Gravel roads, HSG B						
	4,046	39 >	75% Gras	s cover, Go	ood, HSG A				
1	39,352	61 >	75% Gras	s cover, Go	ood, HSG B				
	14,765	98 F	Paved park	ing, HSG A	N N N N N N N N N N N N N N N N N N N				
1	03,603	98 F	Paved park	ing, HSG B					
	26,501	98 F	Roofs, HSG	βB					
	76,367			od, HSG A					
	175		Voods, Go	od, HSG B					
	73,488	67 E	Brush, Pool	r, HSG B					
4	52,098	69 V	Veighted A	verage					
3	807,229	6	7.96% Per	vious Area					
1	44,869	3	2.04% Imp	pervious Are	ea				
Tc	Length	Slope	Velocity		Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
20.2	50	0.0050	0.04		Sheet Flow,				
					Woods: Light underbrush n= 0.400 P2= 3.60"				
2.2	150	0.0050	1.14		Shallow Concentrated Flow,				
					Unpaved Kv= 16.1 fps				
2.1	380	0.0230	3.08		Shallow Concentrated Flow,				
					Paved Kv= 20.3 fps				
2.0	405	0.0420	3.30		Shallow Concentrated Flow,				
					Unpaved Kv= 16.1 fps				
26 5	085	Total							

26.5 985 Total

Summary for Reach 10R: SWALE

 Inflow Area =
 452,098 sf, 32.04% Impervious, Inflow Depth = 4.06" for 100-yr event

 Inflow =
 29.47 cfs @ 12.37 hrs, Volume=
 153,044 cf

 Outflow =
 29.41 cfs @ 12.38 hrs, Volume=
 153,044 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs Max. Velocity= 3.78 fps, Min. Travel Time= 0.2 min Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.5 min

Peak Storage= 312 cf @ 12.37 hrs Average Depth at Peak Storage= 0.98' Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 122.71 cfs

Type III 24-hr 100-yr Rainfall=7.66" Printed 8/12/2019 LLC Page 4

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5.00' x 2.00' deep channel, n= 0.069 Riprap, 6-inch Side Slope Z-value= 3.0 '/' Top Width= 17.00' Length= 40.0' Slope= 0.0500 '/' Inlet Invert= 50.00', Outlet Invert= 48.00'

‡