DRAINAGE REPORT

PREPARED FOR:
Granite State Conservation Trust
Gilmanton, NH
Belknap County

October 2023

PREPARED BY:

NORWAY PLAINS ASSOCIATES, INC.

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1.0 INTRODUCTION:

This drainage report has been prepared as a supporting document to Granite State Conservation Trust subdivsion in Gilmanton, NH. The proposed 8 lot subdivision is located along Governors Road, near the intersection of Parsonage Hill Road and Meeting House Road. The project will include upgrading about 1,400 feet of the existing class VI road to the Town of Gilmanton road standars. The road way width is twenty feet (20') paved travel way with two-foot (2') shoulders and roadside ditches. The roadway reconstruction will also include a cul-de-sac at the end of the proposed subdivsion.

The purpose of any drainage analysis is to apply current mathematical stormwater modeling techniques used in the fields of Civil and Environmental Engineering, to predict the effect of a proposed construction project will have on the subject parcel. Those parcels include directly abutting the project, any downstream property, and/or drainage structures such as culverts, closed drainage systems, etc.

A design that provides adequate control of stormwater, minimizing and/or eliminating impacts to any downstream drainage structures (i.e. municipal culverts, bridges, etc.), is arrived at through an iterative process using the modeling discussed above. The pre-development drainage analysis reflects the modeling performed for the pre-development surface drainage, and for the land in its existing state. The post-development drainage analysis reflects the results of the final drainage design and provides surface drainage values to compare to the pre-development values. In this way, the design engineer and any review agents are provided with the necessary information to decide if the proposed design meets the requirements outlined in the NHDES regulations and the Town of Gilmanton's regulations.

1.1 REVISIONS:

2.0 SITE AND PROJECT DESCRIPTION:

2.1 PROJECT LOCATION:

The site is located in Gilmanton NH on Governors Road and a short section of Parsonage Hill Road. Please refer to Figure 1 (USGS Map) for a pictorial placement of the project area. The parcels are known as Tax Map 414, Lots 50, 52, & 53 on the Gilmanton Assessing Maps, refer to Figure 2 (Tax Map).

2.2 EXISTING SITE FEATURES:

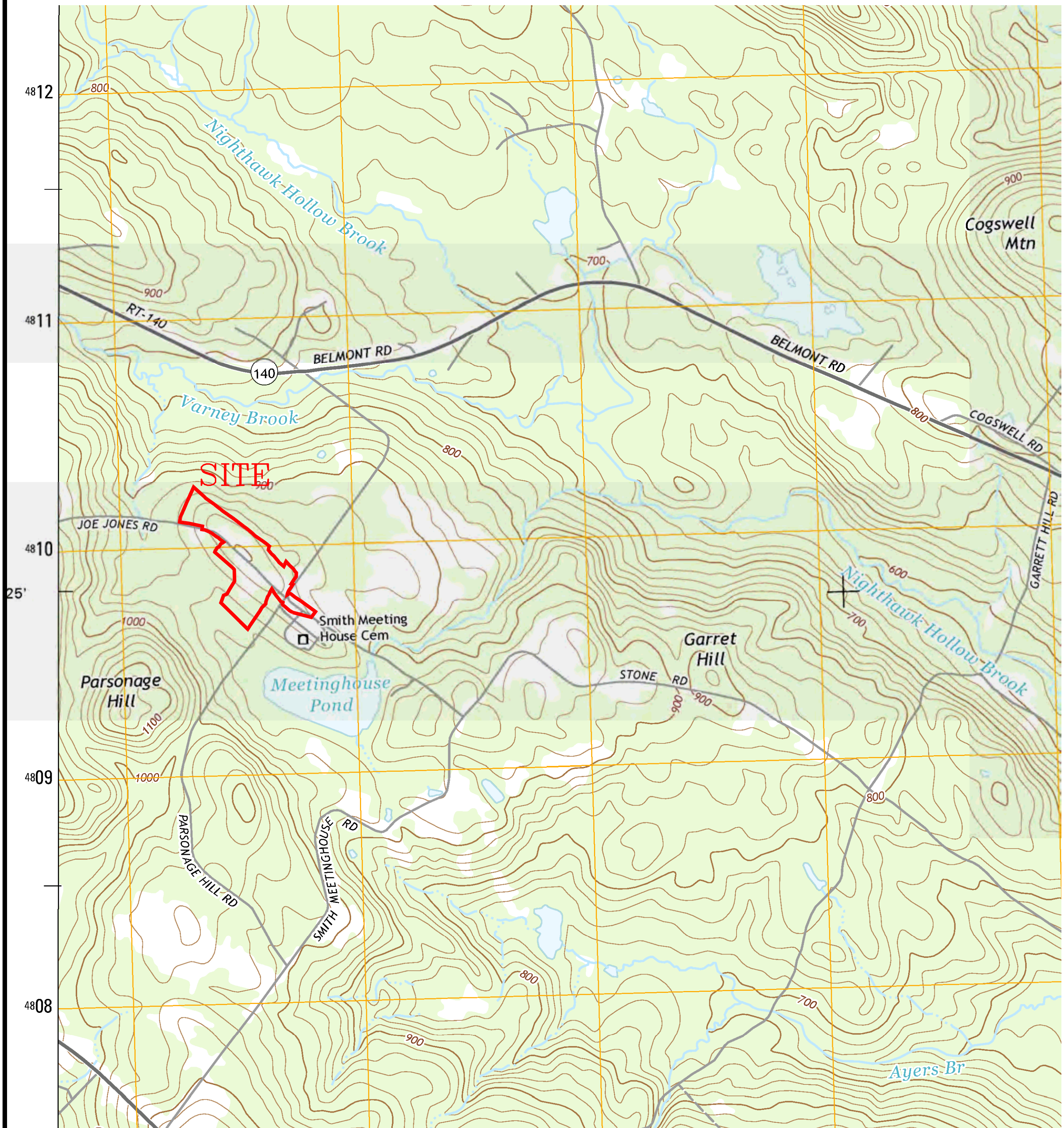
The project area is located along a class VI road with three existing residential homes. The landscape is mostly open fields with wooden areas. The topography is 2 to 25% slopes with an average slope of 10 percent. The existing class VI road, Governors Road, has a small area of exposed ledge. There are no wetlands within the project area.

According to the Natural Resources Conservation Service (NRCS); Custom Soil Resource Report for Merrimack County, New Hampshire; (Appendix A-3).

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
167C	Canterbury fine sandy loam, 8 to 15 percent slopes, very stony	8.2	29.0%
478B	Gilmanton fine sandy loam, 3 to 8 percent slopes	0.7	2.6%
479B	Gilmanton fine sandy loam, 3 to 8 percent slopes, very stony	3.0	10.7%
480B	Millsite-Woodstock-Henniker complex, 3 to 8 percent slopes, very stony	11.8	41.7%

USGS QUADRANGLE

1" = 2000'



1	2	3
4		5
6	7	8

1 Laconia
2 West Alton
3 Wolfeboro
4 Belmont
5 Alton
6 Loudon
7 Pittsfield
8 Parker Mountain

ADJOINING QUADRANGLES

GILMANTON IRONWORKS, NH

2015

FIGURE 1

480C	Millsite-Woodstock-Henniker complex, 8 to 15 percent slopes, very stony	2.4	8.5%
649A	Peacham mucky peat, 0 to 8 percent slopes, very stony	2.1	7.4%
Totals for Area of Interest		**28.2**	**100.0%**

2.3 PROJECT DESCRIPTION:

The Granite State Conservation Trust is proposing an eight-lot subdivision. The project includes upgrading Governors Road, a class VI road, to Gilmanton Road standards. The roadway upgrade is approximately 1,400 feet and will have a width is twenty feet (20’) paved travel way with two-foot (2’) shoulders and roadside ditches.

An extensive stormwater management system has been designed to treat and attenuate all the stormwater generated from the existing and proposed development. The stormwater from the roadway will be treated and attenuated using infiltration basins and detention basins. The stormwater runoff from six of the proposed houses lots, lots 50-1, 50-2 50-3, 53, 53-1 and 53-2 will each have a rain garden that will treat and attenuate.

The stormwater management system has been designed to meet the New Hampshire Department of Environmental Services; Alteration of Terrain regulations.

3.0 METHODOLOGY:

The drainage analysis is based on “Urban Hydrology for Small Watersheds”, as written by the U.S. Soil Conservation Service (S.C.S.) and released as Technical Release 55, in June of 1986. A modified TR-20 method was used to generate runoff. The weighted-Q method was used instead of using composite CN values due to widely differing curve numbers present (e.g. pavement and good condition woods on HSG A soils). This modification to the TR-20 method is recommended by the NRCS for model accuracy over the composite CN method used in WinTR-20, especially when there is a wide difference in curve numbers and lower rainfall amounts (210-VI-NEH Part 630, Ch. 10, pg. 10-16, July 2004). The computer analysis is based on the S.C.S. TR-20 and the stormwater modeling software HYDROCAD™ release 10.1, written by Applied Microcomputer Systems of Chocorua, New Hampshire, was used. The drainage analysis is based on information compiled from the following resources:

- “Governors Road Subdivision” - Norway Plans Associates, Inc.;
- USGS Topographic Map –Gilmanton Ironworks 2015, NH Quadrangle;
- Aerial Photographs – Google Earth 2015;
- NRCS Custom Soil Resource Report for Merrimack County, New Hampshire;
- “Pre- and Post-Development Drainage Plans”

As stated in the introduction, the purpose of this report is to provide information supporting the design of the stormwater control measures employed by this project. A number of sources of information were consulted to prepare the calculations for this infrastructure to check its sufficiency. The USGS Map, Aerial Photos, Test Pit Log, and NRCS Soils Maps for Merrimack County were all consulted. A number of site visits were carried out to confirm site conditions.

The 2, 10, 25 and 50-year storm events have been used to model the stormwater runoff and to determine the adequacy of the chosen stormwater control methods. See Appendix A-12.1 for Extreme Precipitation Tables and other references used in the design and analysis.

If a subcatchment is returned with Times of Concentration (Tc) below the minimum allowed by TR-55 (TR-55 minimum Tc = 0.1 hour = 6 minutes); then Tc values are set in HydroCAD to automatically return a Tc of 6 minutes to insure proper modeling.

Figure 2

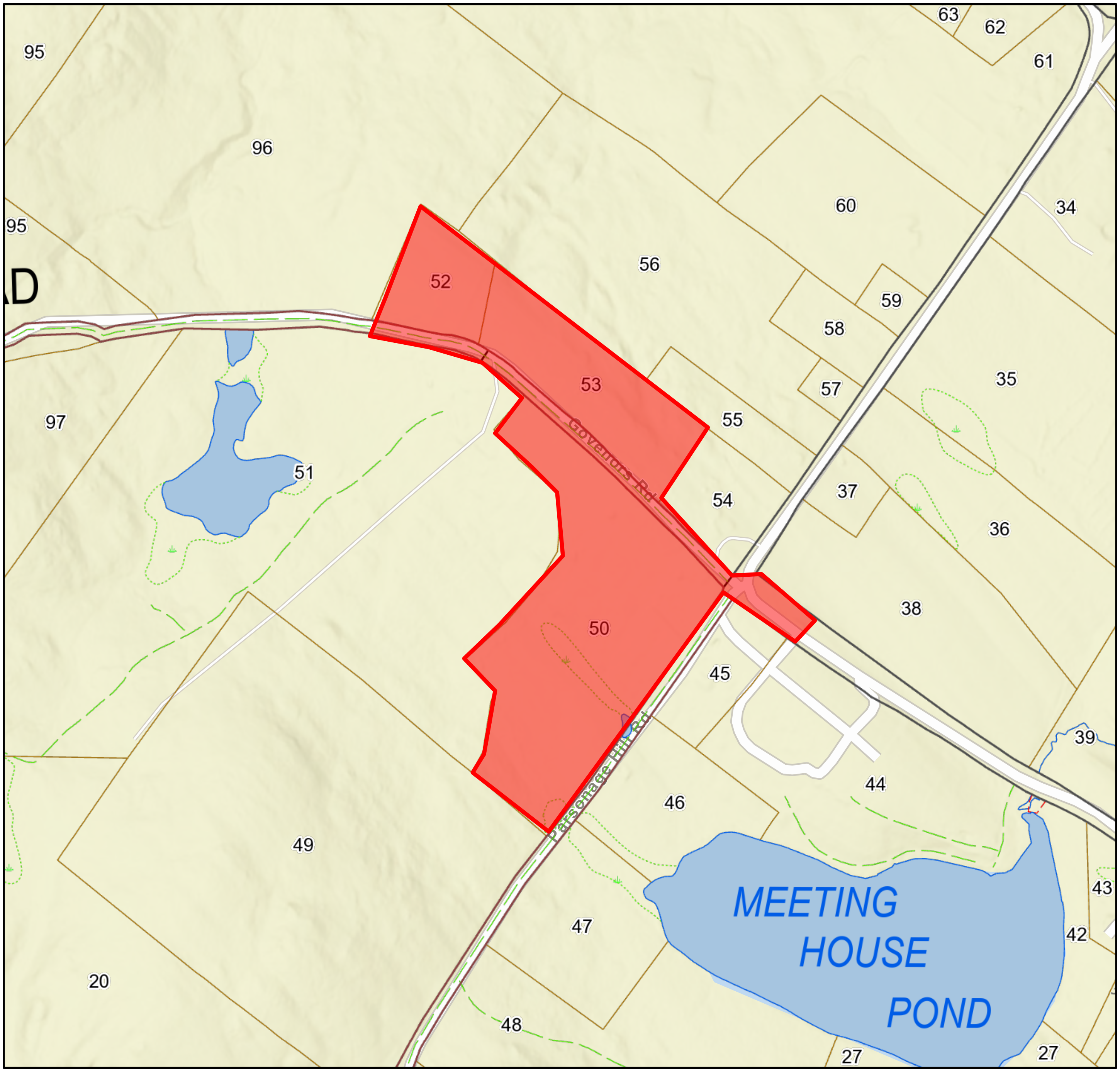
Town of Gilmanton, NH

1 inch = 600 Feet

www.cai-tech.com

October 11, 2023

0 600 1200 1800



CAI Town Line	PWATER	PVTRD-RW	Wetland
Parcel - Poly	ROAD	Road Tic	Wet Areas
DISPUTE	ROADCLASSVI	Trail	Water-poly
PROPERTYLINE	RW	Water	World Hillshade

Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.

A codified system was used to number the Subcatchments, reaches, and ponds, in the drainage analyses. The following Table lists prefixes and their meanings.

3.1 REACH STRUCTURE PREFIXES:

Prefix	Explanation
POA #	Denotes a reach used as a Point of Analysis
#R	Reach

3.2 POND STRUCTURE PREFIXES:

Prefix	Explanation
IB	Infiltration Basin
DB	Detention Basin
CB	Catch basin

4.0 PRE-DEVELOPMENT DRAINAGE ANALYSIS:

The watershed area is 28.2 acres and is divided into eighteen (18) Subcatchments, which flows to sixteen Points of Analysis (POA#). These areas are shown on the Pre-Development Plan in the back of this report.

Table 1 below, summarizes the pre-development runoff occurring during the different storm events for the Subcatchments and at the POA.

Complete HydroCAD model data for the pre-development can be found in Appendix A-7. For a graphical depiction of the Watershed analyzed, flow paths; Subcatchments and POA's refer to the Pre-Development Drainage Plan, Figure D-2 in the pocket at the rear of the report.

TABLE 1: PRE-DEVELOPMENT DRAINAGE ANALYSIS RESULTS SUMMARY:

Subcatchment	Area (Ac.)	2-yr Rate (cfs)	10-yr Rate (cfs)	25-yr Rate (cfs)	50-yr Rate (cfs)
1	1.15	1.2	2.5	3.6	4.6
2	7.83	5.5	13.1	19.7	26.2
3	0.84	0.6	1.5	2.2	3.0
4	0.61	0.4	1.0	1.5	2.1
5	0.90	0.6	1.5	2.3	3.1
6	0.93	0.9	1.6	2.2	2.8
7	1.09	0.5	1.4	2.2	3.0
8	1.02	0.5	1.5	2.3	3.1
9	0.70	0.4	1.0	1.6	2.1
10	1.01	0.5	1.4	2.3	3.1
11	1.54	0.8	2.1	3.3	4.5
12	1.72	1.1	2.8	4.4	5.9
13	1.04	0.7	1.7	2.6	3.6
14	2.58	1.5	3.9	6.0	8.1
15	3.29	1.7	4.1	6.2	8.3
16	0.36	0.4	0.8	1.2	1.5
17	1.21	1.1	2.2	3.1	4.0
18	0.37	0.3	0.7	1.1	1.4
Total	28.19				
POA#1		3.8	8.1	10.2	11.7
POA#2		5.5	13.1	19.7	26.2

Subcatchment	Area (Ac.)	2-yr Rate (cfs)	10-yr Rate (cfs)	25-yr Rate (cfs)	50-yr Rate (cfs)
POA#3		0.6	1.5	2.2	3.0
POA#4		0.4	1.0	1.5	2.1
POA#5		0.6	1.5	2.3	3.1
POA#6		0.9	1.6	2.2	2.8
POA#7		0.5	1.4	2.2	3.0
POA#8		0.5	1.5	2.3	3.1
POA#9		0.4	1.0	1.6	2.1
POA#10		0.5	1.4	2.3	3.1
POA#11		0.8	2.1	3.3	4.5
POA#12		1.1	2.8	4.4	5.9
POA#13		0.7	1.7	2.6	3.6
POA#14		1.5	3.9	6.0	8.1
POA#15		2.9	6.5	9.7	12.8
POA#16		1.4	2.7	3.8	5.0

5.0 POST-DEVELOPMENT DRAINAGE ANALYSIS:

The proposed topography has divided the site into thirty-four (34) Subcatchments. The post-development drainage analysis was performed by then calculating the runoff from these thirty-four (34) subcatchments, which drain to sixteen analysis points.

The stormwater from Governors Road reconstruction will be treated and attenuated at two locations. The first location is adjacent to Meeting House Road and the second location is at the end of the cul-de-sac on proposed lot 53-3.

The first stormwater management system located at Meeting House Road is comprised of a treatment swale and two detention basins. The second stormwater management system is an infiltration basin. Both management systems meet the design requirements found in the NHDEs Aot Env-Wq 1500 rules.

Table 2, below, summarizes the post-development runoff occurring during the different storm events for all of the Subcatchments and at the POA's.

Complete HydroCAD model data for the post-development can be found in Appendix A-7. For a graphical depiction of the Watershed analyzed, flow paths; subcatchments and POA's refer to the Post-Development Drainage Plan, Figure D-2 in the pocket at the rear of the report.

TABLE 2: POST-DEVELOPMENT DRAINAGE ANALYSIS RESULTS SUMMARY:

Subcatchment	Area (Ac.)	2-yr Rate (cfs)	10-yr Rate (cfs)	25-yr Rate (cfs)	50-yr Rate (cfs)
1	0.49	0.5	1.1	1.6	2.1
1A	0.04	0.1	0.1	0.2	0.2
1B	0.20	0.3	0.5	0.8	0.9
1C	0.18	0.3	0.5	0.7	0.9
1D	0.15	0.2	0.4	0.6	0.7
2	7.15	5.2	12.1	18.2	24.2
2A	0.29	0.3	0.7	0.9	1.2
2B	0.39	0.41	0.86	1.25	1.6
3	0.53	0.39	0.95	1.45	1.9
3A	0.31	0.5	0.9	1.3	1.7
4	0.61	0.4	1.0	1.5	2.1
5	0.90	0.6	1.5	2.3	3.1

Subcatchment	Area (Ac.)	2-yr Rate (cfs)	10-yr Rate (cfs)	25-yr Rate (cfs)	50-yr Rate (cfs)
6	0.04	0.0	0.1	0.1	0.2
7	1.43	2.5	4.4	5.9	7.3
7A	0.38	0.3	0.7	1.1	1.5
8	0.34	0.2	0.6	0.9	1.3
8A	0.73	0.7	1.6	2.3	3.1
9	0.70	0.4	1.0	1.6	2.2
10	1.01	0.5	1.5	2.3	3.1
11	1.35	0.7	1.9	3.0	4.1
12	1.60	1.1	2.8	4.2	5.7
12A	0.12	0.2	0.4	0.5	0.7
13	0.72	0.5	1.2	1.9	2.5
13A	0.31	0.4	0.9	1.2	1.6
14	2.35	1.4	3.5	5.5	7.4
14A	0.22	0.3	0.5	0.8	1.0
15	3.30	1.7	4.1	6.2	8.4
16	0.36	0.4	0.8	1.2	1.5
17	0.09	0.1	0.2	0.3	0.4
18	0.36	0.3	0.7	1.1	1.5
19	0.12	0.3	0.4	0.6	0.7
20	0.61	0.9	1.6	2.3	2.9
21	0.24	0.5	0.9	1.2	1.5
22	0.34	0.3	0.6	1.0	1.3
23	0.19	0.2	0.5	0.7	0.9
Total	28.19				
POA#1		3.2	6.9	9.7	11.6
POA#2		5.1	12.1	18.2	25.0
POA#3		0.4	1.0	1.9	2.9
POA#4		0.4	1.0	1.5	2.1
POA#5		0.6	1.5	2.3	3.1
POA#6		0.0	0.1	0.1	0.2
POA#7		0.3	0.6	1.9	2.7
POA#8		0.2	0.6	1.8	2.7
POA#9		0.4	1.0	1.6	2.1
POA#10		0.5	1.4	2.3	3.1
POA#11		0.7	1.9	3.0	4.0
POA#12		1.1	2.8	4.3	5.7
POA#13		0.5	1.2	2.6	3.5
POA#14		1.4	3.5	5.5	7.5
POA#15		1.9	4.6	7.0	9.3
POA#16		0.5	1.1	1.6	2.1

5.1 STORMWATER CONTROL AND TREATMENT PRACTICES:

5.1.1 TREATMENT SWALE

A treatment swale has been designed to provide treatment for the stormwater runoff from the proposed development. The swales are grassed lined. They will have a slope of 0.5% that will outlet into the proposed stormwater management practices.

TABLE 3: SWALE SUMMARY:

	Unit peak discharge (qu) *cfs/mi²/in*	**Water quality volume (WQV)** *cf*	**Water quality flow (WQF)** *cfs*	**Length** *feet*	**Width** *feet*	**Slope**	**Depth of flow (d)** *inches*	**Hydraulic Residence time during the WQF (HRT)** *minutes*
TS	640	1752	0.48	145	7.5	0.5%	2.8	10

5.1.2 INFILTRATION BASIN:

This stormwater management design employs an open Infiltration Basin for the groundwater recharge volume requirement, and to reduce the overall increase volume in stormwater generated from the additional impervious coverage. The stormwater entering the basin has been treated by the upstream Treatment Swale. The basins have a turf bottom. The spillway has been designed to handle a 50-year storm event if there was no infiltration. The basin is not within any groundwater protection area and not within any water intake protection area. Therefore, the basin bottom must have a separation from the seasonal high water of 3-ft.

See the infiltration feasibility report for a detail on the test pits used. The basins adhere to the designed guideline found in Env-Wq 1508.06.

TABLE 4: INFILTRATION BASIN SUMMARY:

The table below is a summary of the inflow and out flow and freeboard of the infiltration basin.

Structure	**2-yr Storm**			**10-yr Storm**			**50-yr Storm**		
	Q_{in}	**Q_{out}**	**Freeboard**	**Q_{in}**	**Q_{out}**	**Freeboard**	**Q_{in}**	**Q_{out}**	**Freeboard**
	(cfs)	**(cfs)**	**(ft)**	**(cfs)**	**(cfs)**	**(ft)**	**(cfs)**	**(cfs)**	**(ft)**
Infiltration Basin	**3.5**	**0.0**	**1.95**	**6.5**	**0.7**	**1.16**	**9.8**	**4.4**	**0.61**

*Q_{out} is the stormwater leaving the system and does not include infiltration.
** Freeboard measured to the top of the earth berm.
Infiltration Basin Berm elevation = 957.00'

5.1.3 INFILTRATION RATES:

Field measurement method for determining the design infiltration rate were conducted by Bailey Associates. Below is a summary of the infiltration tests. Refer to the Infiltration Feasibility Report in Appendix A-11 for details on each infiltration basin including test pit locations.

Env-Wq 1504.13 Amoozemeter

Infiltration Basin	Infiltration Test #	Rate (in/hr)
1	INF-4	*3*

A factor of safety of 0.5 has been applied to the average $K_{sat(analysis)}$. Thus, the design infiltration rate are as follows;

Infiltration Basin #1 **$K_{sat\ (analysis)}$ = 1.5 inches/hour**

5.1.4 DETENTION BASIN

The stormwater management design employs two open detention basin in series to reduce the rate at which stormwater runoff discharges from the site. The basins have been designed to adhere rule Env-Wq1508.17. The basin bottom has the bottom 6-inches below the lowest invert of the out pipe. The spillway has been design to handle a 50-year storm event.

TABLE 5: DETENTION BASIN SUMMARY:

The table below is a summary of the inflow and out flow and freeboard of the infiltration basin.

Structure	10-yr Storm			50-yr Storm			100-yr Storm		
	Q_{in}	Q_{out}	Freeboard	Q_{in}	Q_{out}	Freeboard	Q_{in}	Q_{out}	Freeboard
	(cfs)	(cfs)	(ft)	(cfs)	(cfs)	(ft)	(cfs)	(cfs)	(ft)
Basin 1	**2.2**	**1.0**	**2.31**	**4.2**	**2.2**	**1.32**	**7.6**	**5.0**	**0.70**
Basin 2	**1.1**	**1.1**	**1.87**	**2.3**	**2.1**	**1.50**	**5.4**	**5.1**	**0.31**

Berm elevation = 958.00’
Berm elevation = 950.00

6.0 COMPARISON AND CONCLUSION

6.1 COMPARISON

The following table presents a comparison of the results of the pre-development drainage analysis and the post-development drainage analysis and the Points of Analysis.

6.1.1 SUMMARY RESULTS AT THE POA’S:

As can be seen from the comparison table below, the peak stormwater runoff rates at all the points of analysis (POA) have been reduced or equal. These reductions are the result of capturing the stormwater runoff generated by the development and directing it into the infiltration and detention basins..

TABLE 6: COMPARISON; PRE- & POST-DEVELOPMENT POA’S:

	2-yr Rate (cfs)	10-yr Rate (cfs)	25-yr Rate (cfs)	50-yr Rate (cfs)
POA#1 Pre	3.8	8.1	10.2	11.7
POA#1 Post	3.2	6.9	9.7	11.6
Change	**-0.6**	**-1.2**	**-0.5**	**-0.1**
POA#2 Pre	5.5	13.1	19.7	26.2
POA#2 Post	5.1	12.1	18.2	25.0
Change	**-0.4**	**-1.1**	**-1.5**	**-0.8**
POA#3 Pre	0.6	1.5	2.2	3.0
POA# 3 Post	0.4	1.0	1.9	2.9
Change	**-0.2**	**-0.5**	**-0.3**	**-0.1**
POA#4 Pre	0.4	1.0	1.5	2.1
POA# 4 Post	0.4	1.0	1.5	2.1
Change	**0**	**0**	**0**	**0**
POA#5 Pre	0.6	1.5	2.3	3.1
POA#5 Post	0.6	1.5	2.3	3.1
Change	**0**	**0**	**0**	**0**
POA#6 Pre	0.9	1.6	2.2	2.8

	2-yr Rate (cfs)	10-yr Rate (cfs)	25-yr Rate (cfs)	50-yr Rate (cfs)
POA#6 Post	0.0	0.1	0.1	0.2
Change	**-0.9**	**-1.5**	**-1.1**	**-2.6**
POA#7 Pre	0.5	1.4	2.2	3.0
POA#7 Post	0.3	0.6	1.9	2.7
Change	**-0.2**	**-0.8**	**-0.3**	**-0.4**
POA#8 Pre	0.5	1.5	2.3	3.1
POA#8 Post	0.2	0.6	1.8	2.7
Change	**-0.2**	**-0.9**	**-0.5**	**-0.4**
POA#9 Pre	0.4	1.0	1.6	2.1
POA#9 Post	0.4	1.0	1.6	2.1
Change	**0**	**0**	**0**	**0**
POA#10 Pre	0.5	1.4	2.3	3.1
POA#10 Post	0.5	1.4	2.3	3.1
Change	**0**	**0**	**0**	**0**
POA#11 Pre	0.8	2.1	3.3	4.5
POA#11 Post	0.7	1.9	3.0	4.0
Change	**-0.1**	**-0.2**	**-0.3**	**-0.5**
POA#12 Pre	1.1	2.8	4.4	5.9
POA#12 Post	1.1	2.8	4.2	5.7
Change	**0**	**0**	**-0.2**	**-0.2**
POA#13 Pre	0.7	1.7	2.6	3.6
POA#13 Post	0.5	1.2	2.6	3.5
Change	**-0.2**	**-0.5**	**0**	**-0.1**
POA#14 Pre	1.5	3.9	6.0	8.1
POA#14 Post	1.4	3.5	5.5	7.5
Change	**-0.1**	**-0.4**	**-0.5**	**-0.6**
POA#15 Pre	2.9	6.5	9.7	12.8
POA#15 Post	1.9	4.6	7.0	9.3
Change	**-1.0**	**-1.9**	**-2.7**	**-3.5**
POA#16 Pre	1.4	2.7	3.8	5.0
POA#16 Post	0.5	1.1	1.6	2.1
Change	**-0.9**	**-1.6**	**-2.2**	**-2.9**

6.2 GROUNDWATER RECHARGE VOLUME (GRV):

GRV(req.) = 352 cubic feet
GRV(prov.) = 12,283 cubic feet (during a 2-year storm event)

In each storm event the GRV (req.) volumes of stormwater are required to be infiltrated back into the ground to help maintain the groundwater table. See appendix A-6 for GRV Calculation sheet.

6.3 PEAK RUNOFF CONTROL REQUIREMENTS:

As can be seen above, the 2-year, 10-year, 25-year and the 50-year, 24-hour post-development flow rates and volume do not exceed the pre-development flow rates for the respective storm events. This was achieved by use of Infiltration Basins with outlet control structures and detention basins. Therefore, the overall project has met the peak runoff and volume control requirements.

6.4 CONCLUSION:

As seen in the preceding sections, through the implementation of effective stormwater controls, the peak rate of discharge for the post-development stormwater leaving the site is less than or equal the pre-development conditions for all storm events. This was accomplished using the proposed infiltration basin to attenuate the peak rates.

Temporary erosion control has been designed for the project during construction and this in concert with the permanent measures should maintain stormwater runoff quality down gradient, and maintain the sites contribution to offsite drainage systems at current levels. This design meets current Best Management Practices for stormwater control and provides a responsible stormwater management plan for the proposed work.

APPENDIX A 1

AoT Screening

Legend

- Remediation Sites
- Coastal and Great Bay Region Communities
- Designated Rivers Quartermile Buffer
- Public Water Supply Wells
- Groundwater Classification Areas GA1
- Groundwater Classification Areas GA2
- Water Supply Intake Protection Areas
- Wellhead Protection Areas
- Class A Lakes with a Quarter Mile Buffer
- Class A - All Features
- All Lakes, with a Quarter Mile Buffer
- Outstanding Resource Water Watersheds
- Surface Waters with Impairments with Quarter Mile Buffer
- Watersheds with Chloride Impairments
- Parcels
- Approximate area of disturbance

Map Scale

1: 5,000

© NH DES, http://des.nh.gov

Map Generated: 7/12/2023

Notes

APPENDIX A 2

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: Paul Blanc
POBox 249
Rochester, NH 03866

From: NH Natural Heritage Bureau

Date: 7/18/2023 (This letter is valid through 7/18/2024)

Re: Review by NH Natural Heritage Bureau of request dated 7/18/2023

Permit Type: Alteration of Terrain Permit

NHB ID: NHB23-2165

Applicant: Paul Blanc

Location: Gilmanton
Tax Map: 414, Tax Lot: 53 and 50
Address: Governors Road

Proj. Description: Subdivision with bringing the existing Class VI road(Governors Rd) to town road standards.

The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

MAP OF PROJECT BOUNDARIES FOR: NHB23-2165

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord NH 03301

APPENDIX A 3

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for
Merrimack and Belknap Counties, New Hampshire

October 16, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


71° 22' 9" W
71° 21' 38" W
43° 25' 19" N
43° 24' 49" N
308300
308400
308500
308600
308700
308800
308900
308200
4810400
4810300
4810200
4810100
4810000
4809900
4809800
4809700
4809600
4809500
479B
167C
480C
478B
480B
649A
Soil Map may not be valid at this scale.
Map Scale: 1:4,500 if printed on A portrait (8.5" x 11") sheet.
Meters
0
50
100
200
300
Feet
0
200
400
800
1200
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Merrimack and Belknap Counties, New Hampshire
Survey Area Data: Version 29, Aug 22, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
167C	Canterbury fine sandy loam, 8 to 15 percent slopes, very stony	8.2	29.0%
478B	Gilmanton fine sandy loam, 3 to 8 percent slopes	0.7	2.6%
479B	Gilmanton fine sandy loam, 3 to 8 percent slopes, very stony	3.0	10.8%
480B	Millsite-Woodstock-Henniker complex, 3 to 8 percent slopes, very stony	11.8	41.7%
480C	Millsite-Woodstock-Henniker complex, 8 to 15 percent slopes, very stony	2.4	8.5%
649A	Peacham mucky peat, 0 to 8 percent slopes, very stony	2.1	7.4%
Totals for Area of Interest		**28.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Merrimack and Belknap Counties, New Hampshire

167C—Canterbury fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9dnv
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Farmland of local importance

Map Unit Composition

Canterbury and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canterbury

Setting

Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lodgement till derived from granite, gneiss, or schist

Typical profile

Oe - 0 to 2 inches: slightly decomposed plant material
H1 - 2 to 6 inches: fine sandy loam
H2 - 6 to 28 inches: fine sandy loam
H3 - 28 to 65 inches: fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144BY601ME - Dry Sand, F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Chichester

Percent of map unit: 5 percent

Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Marlow
Percent of map unit: 5 percent
Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Henniker
Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Gilmanton
Percent of map unit: 5 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Metacomet
Percent of map unit: 3 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Metacomet
Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

478B—Gilmanton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: bpmf
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Gilmanton and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilmanton

Setting

Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lodgement till derived from granite, gneiss, or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oa - 2 to 3 inches: slightly decomposed plant material
H1 - 3 to 8 inches: fine sandy loam
H2 - 8 to 24 inches: fine sandy loam
H3 - 24 to 65 inches: fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 16 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F144BY602ME - Sandy Toeslope, F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Pillsbury

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Metacomet

Percent of map unit: 5 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Canterbury

Percent of map unit: 5 percent
Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Peru

Percent of map unit: 4 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Henniker

Percent of map unit: 3 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Peacham

Percent of map unit: 3 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

479B—Gilmanton fine sandy loam, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: bpmj
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Farmland of local importance

Map Unit Composition

Gilmanton and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilmanton

Setting

Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Lodgement till derived from granite, gneiss, or schist; lodgement till derived from granite, gneiss, or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oa - 2 to 3 inches: slightly decomposed plant material
H1 - 3 to 8 inches: fine sandy loam
H2 - 8 to 24 inches: fine sandy loam
H3 - 24 to 65 inches: fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 16 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Ecological site: F144BY602ME - Sandy Toeslope, F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Pillsbury

Percent of map unit: 10 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Canterbury

Percent of map unit: 5 percent
Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Metacomet

Percent of map unit: 4 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Peacham

Percent of map unit: 2 percent
Landform: Depressions
Down-slope shape: Concave

Across-slope shape: Concave
Hydric soil rating: Yes

Peru

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Henniker

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

480B—Millsite-Woodstock-Henniker complex, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9dpy
Elevation: 200 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Farmland of local importance

Map Unit Composition

Millsite and similar soils: 35 percent
Woodstock and similar soils: 20 percent
Henniker and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millsite

Setting

Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 3 inches: very fine sandy loam
H2 - 3 to 13 inches: very fine sandy loam
H3 - 13 to 24 inches: gravelly very fine sandy loam
H4 - 24 to 28 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods), F144BY702ME - Shallow and Moderately-deep Till
Hydric soil rating: No

Description of Woodstock

Setting

Landform: — error in exists on —
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till derived from granite and gneiss

Typical profile

Oe - 0 to 0 inches: slightly decomposed plant material
H1 - 0 to 2 inches: fine sandy loam
H2 - 2 to 11 inches: fine sandy loam
H3 - 11 to 15 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144BY702ME - Shallow and Moderately-deep Till, F144BY701ME - Shallow Till
Hydric soil rating: No

Description of Henniker

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Basal melt-out till derived from granite, gneiss, or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 4 inches: fine sandy loam
H2 - 4 to 34 inches: fine sandy loam
H3 - 34 to 65 inches: fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 38 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Canterbury

Percent of map unit: 5 percent
Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Moosilauke

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Metacomet

Percent of map unit: 3 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Searsport

Percent of map unit: 2 percent
Landform: Outwash terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Chichester

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lyman

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Tunbridge

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: Unranked

Becket

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

480C—Millsite-Woodstock-Henniker complex, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9dpx
Elevation: 200 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days

Farmland classification: Farmland of local importance

Map Unit Composition

Millsite and similar soils: 35 percent
Henniker and similar soils: 20 percent
Woodstock and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millsite

Setting

Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 3 inches: very fine sandy loam
H2 - 3 to 13 inches: very fine sandy loam
H3 - 13 to 24 inches: gravelly very fine sandy loam
H4 - 24 to 28 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144BY702ME - Shallow and Moderately-deep Till, F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Description of Henniker

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Basal melt-out till derived from granite, gneiss, or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 4 inches: fine sandy loam
H2 - 4 to 34 inches: fine sandy loam

H3 - 34 to 65 inches: fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 38 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Description of Woodstock

Setting

Landform: — error in exists on —
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till derived from granite and gneiss

Typical profile

Oe - 0 to 0 inches: slightly decomposed plant material
H1 - 0 to 2 inches: fine sandy loam
H2 - 2 to 11 inches: fine sandy loam
H3 - 11 to 15 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144BY702ME - Shallow and Moderately-deep Till, F144BY701ME - Shallow Till
Hydric soil rating: No

Minor Components

Canterbury

Percent of map unit: 5 percent
Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Moosilauke

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Metacomet

Percent of map unit: 3 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Tunbridge

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lyman

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Searsport

Percent of map unit: 2 percent
Landform: Outwash terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Becket

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: Unranked

Chichester

Percent of map unit: 2 percent
Landform: Hillslopes

Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

649A—Peacham mucky peat, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2ty6t
Elevation: 430 to 1,970 feet
Mean annual precipitation: 31 to 95 inches
Mean annual air temperature: 27 to 52 degrees F
Frost-free period: 70 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Peacham, very stony, and similar soils: 78 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peacham, Very Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over loamy lodgment till derived from schist and/or loamy lodgment till derived from granite and gneiss and/or loamy lodgment till derived from phyllite

Typical profile

Oe - 0 to 2 inches: mucky peat
Oa - 2 to 10 inches: muck
Bg - 10 to 15 inches: fine sandy loam
Cdg1 - 15 to 31 inches: fine sandy loam
Cdg2 - 31 to 65 inches: sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.1 percent
Depth to restrictive feature: 12 to 35 inches to densic material
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144BY301ME - Loamy Till Swamp
Hydric soil rating: Yes

Minor Components

Cabot, very stony

Percent of map unit: 11 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex, concave
Across-slope shape: Convex, concave
Hydric soil rating: Yes

Wonsqueak

Percent of map unit: 8 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Bucksport

Percent of map unit: 2 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Searsport

Percent of map unit: 1 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

APPENDIX A 4

AERIAL PHOTOGRAPGH

1" = 2000'

APPENDIX A 5

Photographs representative the Stormwater Management Area

Photo 1 location of Treatment swale and the two Detention Basins

Photo taken October 2023.

Photographs representative the Stormwater Management Area

Photo 2 Looking the proposed location of the Infiltration basin

Photo taken October 2023.

APPENDIX A 6

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration Basin / IB**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	**← yes**
2.54	ac	A = Area draining to the practice	
0.77	ac	A_I = Impervious area draining to the practice	
0.30	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.32	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.82	ac-in	WQV= 1” x Rv x A	
2,977	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	
744	cf	25% x WQV (check calc for sediment forebay volume)	
Forebay		Method of pretreatment? (not required for clean or roof runoff)	
1,210	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
9,846	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
2,217	sf	A_{SA} = Surface area of the bottom of the pond	
1.50	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
10.7	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
953.00	feet	E_{BTM} = Elevation of the bottom of the basin	
950.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
948.17	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.00	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
4.8	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
na	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
na	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
na	Yes/No	If a trench or underground system is proposed, has observation well been provided?	**←yes**
		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	**← yes**
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
3.0	:1	If a basin is proposed, pond side slopes.	**≥3:1**
955.84	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
956.39	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
957.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	**← yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	**← yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Test Pit 13 SHWT 36"

Infiltration Test Ksat average = 3 in/hr

Stage-Area-Storage for Pond IB: Infiltration Basin (continued)

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
955.65	4,952	5,008	9,345
955.70	5,008	5,065	9,594
955.75	5,065	5,123	9,846
955.80	5,121	5,181	10,101
955.85	5,179	5,240	10,358
955.90	5,236	5,299	10,619
955.95	5,294	5,358	10,882
956.00	5,352	5,418	11,148
956.05	5,407	5,474	11,417
956.10	5,463	5,531	11,689
956.15	5,518	5,589	11,963
956.20	5,575	5,646	12,241
956.25	5,631	5,704	12,521
956.30	5,688	5,762	12,804
956.35	5,744	5,821	13,090
956.40	5,802	5,879	13,378
956.45	5,859	5,938	13,670
956.50	5,917	5,998	13,964
956.55	5,975	6,057	14,261
956.60	6,033	6,117	14,562
956.65	6,092	6,178	14,865
956.70	6,151	6,238	15,171
956.75	6,210	6,299	15,480
956.80	6,269	6,360	15,792
956.85	6,329	6,421	16,107
956.90	6,389	6,483	16,425
956.95	6,449	6,545	16,746
957.00	**6,510**	**6,607**	**17,070**

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden Lot 50-1 / RG 50-1**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.29	ac	A = Area draining to the practice	
0.04	ac	A_I = Impervious area draining to the practice	
0.15	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.18	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.05	ac-in	WQV= 1" x Rv x A	
193	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
48	cf	25% x WQV (check calc for sediment forebay volume)	
145	cf	75% x WQV (check calc for surface sand filter volume)	
Roof		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**$\geq$ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
362	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
21.3	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**$\leq$ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**$\leq$ 72-hrs**
975.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
972.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
972.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
975.50	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**$\geq$ 1'**
3.50	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**$\geq$ 1'**
3.50	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**$\geq$ 1'**
	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
	ft	Elevation of the top of the practice	
-		50 peak elevation $\leq$ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**$\geq$ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
1,116	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

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

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

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

Designer's Notes:
Test pit 2 SHWT 60"

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden Lot 50-2 / RG 50-2**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.39	ac	A = Area draining to the practice	
0.05	ac	A_I = Impervious area draining to the practice	
0.13	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.17	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.06	ac-in	WQV= 1" x Rv x A	
234	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
59	cf	25% x WQV (check calc for sediment forebay volume)	
176	cf	75% x WQV (check calc for surface sand filter volume)	
Roof		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
500	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
18.7	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
981.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
980.50	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
978.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
981.50	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
3.50	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.00	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
985.56	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
986.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
2,864	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

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

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

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

Designer's Notes:
Test pit 3 SHWT 30"

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden Lot 50-3 / RG 50-3**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.31	ac	A = Area draining to the practice	
0.06	ac	A_I = Impervious area draining to the practice	
0.19	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.22	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.07	ac-in	WQV= 1” x Rv x A	
252	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	
63	cf	25% x WQV (check calc for sediment forebay volume)	
189	cf	75% x WQV (check calc for surface sand filter volume)	
Roof		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
362	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
27.9	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
981.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
980.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
977.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
981.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
4.00	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.00	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
984.20	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
984.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
1,116	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

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

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

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

Designer's Notes:

Test pit 4 SHWT 24"

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden Lot 53 / RG 53**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.22	ac	A = Area draining to the practice	
0.04	ac	A_I = Impervious area draining to the practice	
0.18	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.21	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.05	ac-in	WQV= 1" x Rv x A	
171	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
43	cf	25% x WQV (check calc for sediment forebay volume)	
128	cf	75% x WQV (check calc for surface sand filter volume)	
Roof		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
527	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
12.9	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
986.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
985.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
982.33	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
986.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
3.67	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.00	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
989.10	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
989.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
1,174	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

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

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

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

Designer's Notes:

Test pit 9 SHWT 24"

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden Lot 53-1 / RG 53-1**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.32	ac	A = Area draining to the practice	
0.04	ac	A_I = Impervious area draining to the practice	
0.13	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.17	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.05	ac-in	WQV= 1" x Rv x A	
199	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
50	cf	25% x WQV (check calc for sediment forebay volume)	
149	cf	75% x WQV (check calc for surface sand filter volume)	
Roof		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
351	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
22.6	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
984.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
983.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
980.33	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
984.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
3.67	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.00	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
987.21	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
987.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
945	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

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

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

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

Designer's Notes:
Test pit 8 SHWT 24"

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden Lot 53-2 / RG 53-2**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.12	ac	A = Area draining to the practice	
0.04	ac	A_I = Impervious area draining to the practice	
0.33	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.35	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.04	ac-in	WQV= 1" x Rv x A	
152	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
38	cf	25% x WQV (check calc for sediment forebay volume)	
114	cf	75% x WQV (check calc for surface sand filter volume)	
Roof		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
350	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
17.4	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
978.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
976.92	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
973.67	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
978.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
4.33	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.08	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
981.04	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
981.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
943	cf	V = Volume of storage[3] (attach a stage-storage table)	**$\geq$ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**$\geq$ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

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

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

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

Designer's Notes:
Test pit 6 SHWT 25"

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Rain Garden Lot 53-3 / RG 53-3**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.15	ac	A = Area draining to the practice	
0.06	ac	A_I = Impervious area draining to the practice	
0.39	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.40	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.06	ac-in	WQV= 1” x Rv x A	
224	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	
56	cf	25% x WQV (check calc for sediment forebay volume)	
168	cf	75% x WQV (check calc for surface sand filter volume)	
Roof		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
260	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
34.5	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
965.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
963.83	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
962.17	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
965.50	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
3.33	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.67	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
968.63	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
996.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
720	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

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

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

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

Designer's Notes:

Test pit 21 SHWT 38"

TREATMENT SWALE DESIGN CRITERIA
(Env-Wq 1508.08)

Node Name: Treatment Swale / TS

Enter the node name in the drainage analysis (e.g., reach TS 5), if applicable.

YES	Yes/No	Have you reviewed the restrictions on unlined swales outlined in Env-Wq 1508.08(a)?	
ode Name:	Yes/No	Is the system lined? (required if not treated or if above SHWT)	
1.14	ac	A = Area draining to the practice	
0.47	ac	A_I = Impervious area draining to the practice	
6.0	minutes	T_c = Time of Concentration	
0.41	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.42	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.48	ac-in	WQV= 1" x Rv x A	
1,752	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1	inches	P = Amount of rainfall. For WQF in NH, P = 1".	
0.42	inches	D_{WQ} = Water quality depth. D_{WQ} = WQV/A	
92	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*$[Q^2 + 1.25*Q*P]^{0.5}$)	
0.82	inches	S = Potential maximum retention. S = (1000/CN) - 10	
0.164	inches	Ia = initial abstraction. Ia = 0.2S	
640	cfs/mi^2/in	q_u = Unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III	
0.48	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac	
145.00	feet	L = Swale length [1]	**$\geq$ 100'**
7.50	feet	w = Bottom of the swale width[2]	**0 - 8 feet**
957.67	feet	E_{SHWT} = Elevation of SHWT. If none found, use the lowest elev. of test pit.	
960.27	feet	E_{BTM} = Elevation of the bottom of the practice	**$\geq E_{SHWT}$**
3.0	:1	SS_{RIGHT} = Right side slope	**$\geq$3:1**
3.0	:1	SS_{LEFT} = Left side slope	**$\geq$3:1**
0.005	ft/ft	S = Slope of swale in decimal form[3]	**0.005 - .05**
2.8	inches	d = Flow depth in swale at WQF (attach stage-discharge table)	**$\leq$ 4"**
0.15	unitless	d must be < 4", therefore Manning's n = 0.15	
1.91	ft^2	Cross-sectional area check (assume trapezoidal channel)	
8.98	feet	Check wetted perimeter	
0.48	cfs	WQF_{check}.[4]	**WQF_{check} = WQF?**
-1%		Percent difference between WQF_{check} and WQF [4]	**+/- 10%**
10	minutes	HRT = hydraulic residence time during the WQF	**$\geq$ 10 min**
961.68	ft	Peak elevation of the 10-year storm event[5]	
962.00	ft	Elevation of the top of the swale	
YES	Yes/No	10 peak elevation $\leq$ the top of swale	**← yes**

1. Any portion of the swale that is in a roadside ditch shall not count towards the swale length.
2. Widths up to 16' allowed if a dividing berm or structure is used such that neither width is more than 8'.
3. If > 0.02 (2%) then check dams are required. No additional detention time is credited for check dams.
4. The WQF_{check} & WQF should be near equal (within 10%) if you have selected the correct depth off the stage-
5. If the swale does not discharge the 50-year storm without overtopping, hydrologic routing of secondary discharge

Designer's Notes:

Test Pit #12 SHWT@28"

Stage-Discharge for Reach TS: Treament Swale

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
961.00	0.00	0.000
961.02	0.05	0.008
961.04	0.08	0.025
961.06	0.11	0.049
961.08	0.13	0.079
961.10	0.15	0.115
961.12	0.17	0.156
961.14	0.18	0.202
961.16	0.20	0.253
961.18	0.21	0.309
961.20	0.23	0.369
961.22	0.24	0.434
961.24	0.26	0.503
961.26	0.27	0.577
961.28	0.28	0.655
961.30	0.29	0.737
961.32	0.30	0.823
961.34	0.32	0.913
961.36	0.33	1.007
961.38	0.34	1.105
961.40	0.35	1.208
961.42	0.36	1.314
961.44	0.37	1.425
961.46	0.38	1.539
961.48	0.39	1.657
961.50	0.40	1.780
961.52	0.40	1.906
961.54	0.41	2.036
961.56	0.42	2.171
961.58	0.43	2.309
961.60	0.44	2.451
961.62	0.45	2.597
961.64	0.46	2.748
961.66	0.46	2.902
961.68	0.47	3.060
961.70	0.48	3.222
961.72	0.49	3.389
961.74	0.49	3.559
961.76	0.50	3.733
961.78	0.51	3.911
961.80	0.52	4.094
961.82	0.52	4.280
961.84	0.53	4.471
961.86	0.54	4.666
961.88	0.55	4.864
961.90	0.55	5.067
961.92	0.56	5.274
961.94	0.57	5.485
961.96	0.57	5.701
961.98	0.58	5.920
962.00	0.59	6.144
962.02	0.59	6.372
962.04	0.60	6.604
962.06	0.60	6.841
962.08	0.61	7.081
962.10	0.62	7.326
962.12	0.62	7.575
962.14	0.63	7.829
962.16	0.63	8.087
962.18	0.64	8.349
962.20	0.65	8.616
962.22	0.65	8.887
962.24	0.66	9.162
962.26	0.66	9.442
962.28	0.67	9.726
962.30	0.68	10.015
962.32	0.68	10.308
962.34	0.69	10.606
962.36	0.69	10.908
962.38	0.70	11.215
962.40	0.70	11.526
962.42	0.71	11.842
962.44	0.71	12.162
962.46	0.72	12.487
962.48	0.73	12.817
962.50	0.73	13.151
962.52	0.74	13.490
962.54	0.74	13.833
962.56	0.75	14.181
962.58	0.75	14.534
962.60	0.76	14.892
962.62	0.76	15.254
962.64	0.77	15.622
962.66	0.77	15.994
962.68	0.78	16.370
962.70	0.78	16.752
962.72	0.79	17.138
962.74	0.79	17.530
962.76	0.80	17.926
962.78	0.80	18.327
962.80	0.81	18.733
962.82	0.81	19.144
962.84	0.82	19.560
962.86	0.82	19.981
962.88	0.83	20.407
962.90	0.83	20.838
962.92	0.84	21.273
962.94	0.84	21.714
962.96	0.85	22.161
962.98	0.85	22.612
963.00	**0.85**	**23.068**

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION
(Env-Wq 1507.04)

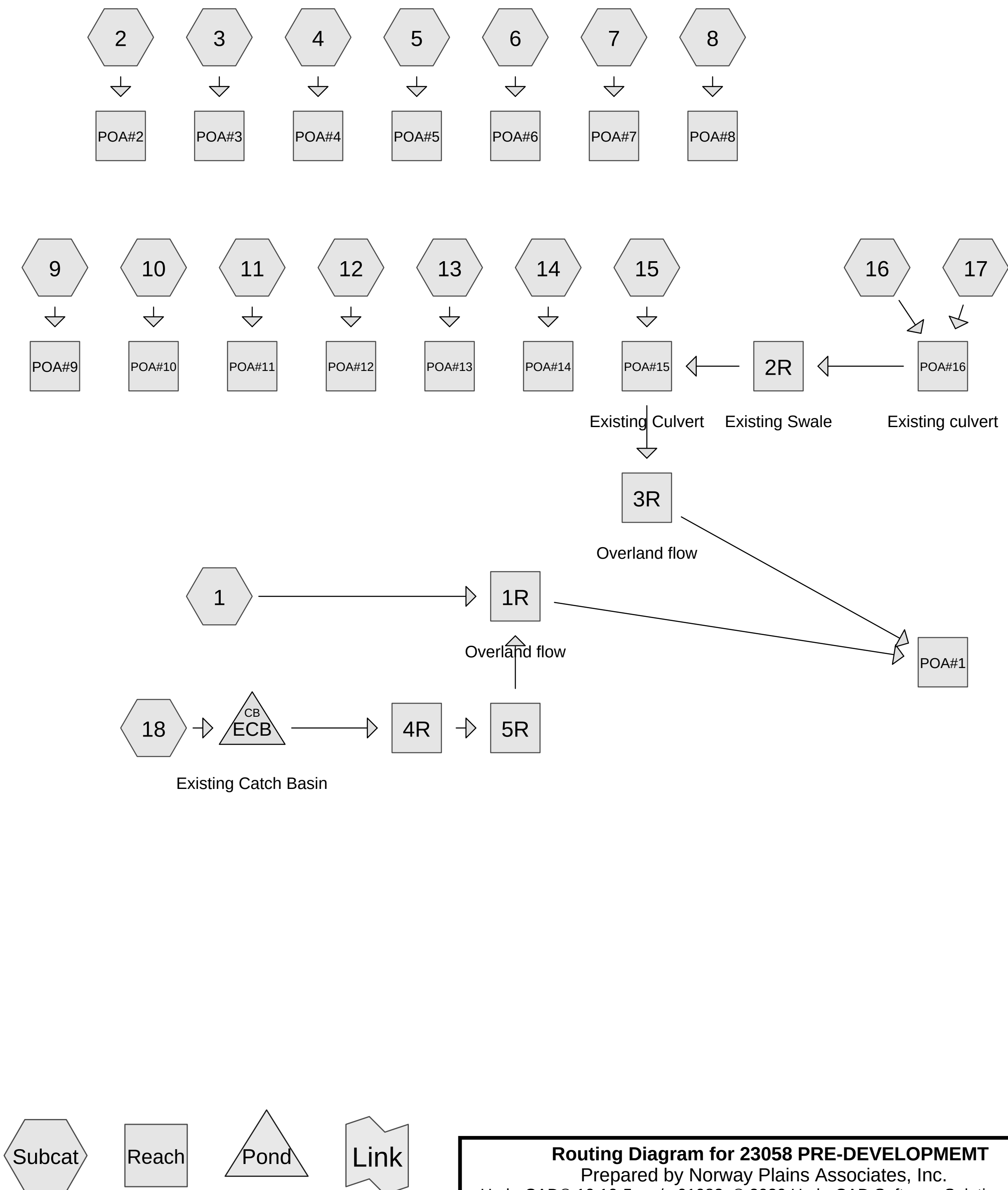
	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
0.97	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.10	inches	Rd = Weighted groundwater recharge depth	
0.097	ac-in	GRV = AI * Rd	
352	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

Pre = 1.08

Post = 2.05

APPENDIX A 7



Routing Diagram for 23058 PRE-DEVELOPMEMT
Prepared by Norway Plains Associates, Inc.
HydroCAD® 10.10-5a s/n 01082 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.30	74	>75% Grass cover, Good HSG C (1, 4, 5, 6, 7, 11, 12, 13, 14, 15, 18)
0.14	80	>75% Grass cover, Good HSG D (2)
7.27	74	>75% Grass cover, Good, HSG C (2, 3, 4, 6, 13, 14, 15, 16, 17)
0.15	65	Brush, Good HSG C (3, 5, 6, 13, 14)
0.10	65	Brush, Good, HSG C (2, 4, 6, 14, 17)
0.32	98	Gravel roads HSG C (1, 6)
0.31	98	Gravel roads, HSG C (2, 6, 17)
0.22	98	Paved parking HSG C (1)
0.12	98	Paved parking, HSG C (15, 16, 17)
0.02	98	Roofs HSG C (18)
0.09	98	Roofs, HSG C (15, 16)
9.63	70	Woods, Good HSG C (1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 18)
1.94	77	Woods, Good HSG D (2)
3.58	70	Woods, Good, HSG C (3, 4, 13, 14, 15, 16, 17)
28.19	**73**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.00	HSG A	
0.00	HSG B	
26.11	HSG C	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
2.08	HSG D	2
0.00	Other	
28.19		**TOTAL AREA**

APPENDIX A 7.1

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=50,189 sf 20.35% Impervious Runoff Depth=1.14"
Flow Length=466' Tc=8.5 min CN=WQ Runoff=1.2 cfs 0.109 af

Subcatchment 2: Runoff Area=341,015 sf 0.02% Impervious Runoff Depth=0.81"
Flow Length=720' Tc=11.9 min CN=WQ Runoff=5.5 cfs 0.529 af

Subcatchment 3: Runoff Area=36,706 sf 0.00% Impervious Runoff Depth=0.76"
Flow Length=275' Tc=8.6 min CN=WQ Runoff=0.6 cfs 0.054 af

Subcatchment 4: Runoff Area=26,621 sf 0.00% Impervious Runoff Depth=0.76"
Flow Length=190' Tc=10.6 min CN=WQ Runoff=0.4 cfs 0.039 af

Subcatchment 5: Runoff Area=38,993 sf 0.00% Impervious Runoff Depth=0.77"
Flow Length=195' Tc=10.0 min CN=WQ Runoff=0.6 cfs 0.058 af

Subcatchment 6: Runoff Area=40,635 sf 32.92% Impervious Runoff Depth=1.35"
Flow Length=890' Tc=21.8 min CN=WQ Runoff=0.9 cfs 0.105 af

Subcatchment 7: Runoff Area=47,529 sf 0.00% Impervious Runoff Depth=0.64"
Flow Length=580' Tc=15.0 min CN=WQ Runoff=0.5 cfs 0.058 af

Subcatchment 8: Runoff Area=44,500 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=390' Tc=10.4 min CN=70 Runoff=0.5 cfs 0.053 af

Subcatchment 9: Runoff Area=30,642 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=410' Tc=10.7 min CN=70 Runoff=0.4 cfs 0.036 af

Subcatchment 10: Runoff Area=43,790 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=355' Tc=10.1 min CN=70 Runoff=0.5 cfs 0.052 af

Subcatchment 11: Runoff Area=66,895 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=420' Tc=11.9 min CN=WQ Runoff=0.8 cfs 0.080 af

Subcatchment 12: Runoff Area=75,027 sf 0.00% Impervious Runoff Depth=0.69"
Flow Length=315' Tc=8.2 min CN=WQ Runoff=1.1 cfs 0.099 af

Subcatchment 13: Runoff Area=45,238 sf 0.00% Impervious Runoff Depth=0.69"
Flow Length=335' Tc=8.4 min CN=WQ Runoff=0.7 cfs 0.060 af

Subcatchment 14: Runoff Area=112,189 sf 0.00% Impervious Runoff Depth=0.68"
Flow Length=490' Tc=11.2 min CN=WQ Runoff=1.5 cfs 0.147 af

Subcatchment 15: Runoff Area=143,682 sf 5.05% Impervious Runoff Depth=0.77"
Flow Length=640' Tc=21.4 min CN=WQ Runoff=1.7 cfs 0.212 af

Subcatchment 16: Runoff Area=15,747 sf 11.09% Impervious Runoff Depth=1.00"
Flow Length=195' Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.030 af

Subcatchment 17: Runoff Area=52,616 sf 25.72% Impervious Runoff Depth=1.23"
Flow Length=800' Tc=15.9 min CN=WQ Runoff=1.1 cfs 0.123 af

Subcatchment 18: Runoff Area=16,072 sf 5.97% Impervious Runoff Depth=0.82"
Flow Length=190' Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.025 af

Reach 1R: Overland flow Avg. Flow Depth=0.12' Max Vel=3.37 fps Inflow=1.5 cfs 0.135 af
n=0.030 L=83.0' S=0.1325 '/' Capacity=7.3 cfs Outflow=1.5 cfs 0.135 af

Reach 2R: Existing Swale Avg. Flow Depth=0.17' Max Vel=4.08 fps Inflow=1.4 cfs 0.153 af
n=0.025 L=45.0' S=0.0889 '/' Capacity=5.9 cfs Outflow=1.4 cfs 0.153 af

Reach 3R: Overland flow Avg. Flow Depth=0.20' Max Vel=2.86 fps Inflow=2.9 cfs 0.366 af
n=0.030 L=400.0' S=0.0500 '/' Capacity=8.9 cfs Outflow=2.9 cfs 0.366 af

Reach 4R: Avg. Flow Depth=0.08' Max Vel=2.69 fps Inflow=0.3 cfs 0.025 af
n=0.030 L=75.0' S=0.1549 '/' Capacity=3.9 cfs Outflow=0.3 cfs 0.025 af

Reach 5R: Avg. Flow Depth=0.09' Max Vel=1.70 fps Inflow=0.3 cfs 0.025 af
n=0.030 L=114.0' S=0.0526 '/' Capacity=2.9 cfs Outflow=0.3 cfs 0.025 af

Reach POA#1: Inflow=3.8 cfs 0.500 af
Outflow=3.8 cfs 0.500 af

Reach POA#10: Inflow=0.5 cfs 0.052 af
Outflow=0.5 cfs 0.052 af

Reach POA#11: Inflow=0.8 cfs 0.080 af
Outflow=0.8 cfs 0.080 af

Reach POA#12: Inflow=1.1 cfs 0.099 af
Outflow=1.1 cfs 0.099 af

Reach POA#13: Inflow=0.7 cfs 0.060 af
Outflow=0.7 cfs 0.060 af

Reach POA#14: Inflow=1.5 cfs 0.147 af
Outflow=1.5 cfs 0.147 af

Reach POA#15: Existing Culvert Avg. Flow Depth=0.51' Max Vel=7.23 fps Inflow=2.9 cfs 0.366 af
12.0" Round Pipe n=0.013 L=40.0' S=0.0250 '/' Capacity=5.6 cfs Outflow=2.9 cfs 0.366 af

Reach POA#16: Existing culvert Avg. Flow Depth=0.28' Max Vel=7.59 fps Inflow=1.4 cfs 0.153 af
12.0" Round Pipe n=0.013 L=20.0' S=0.0500 '/' Capacity=8.0 cfs Outflow=1.4 cfs 0.153 af

Reach POA#2: Inflow=5.5 cfs 0.529 af
Outflow=5.5 cfs 0.529 af

Reach POA#3: Inflow=0.6 cfs 0.054 af
Outflow=0.6 cfs 0.054 af

Reach POA#4: Inflow=0.4 cfs 0.039 af
Outflow=0.4 cfs 0.039 af

Reach POA#5: Inflow=0.6 cfs 0.058 af
Outflow=0.6 cfs 0.058 af

Reach POA#6: Inflow=0.9 cfs 0.105 af
Outflow=0.9 cfs 0.105 af

Reach POA#7: Inflow=0.5 cfs 0.058 af
Outflow=0.5 cfs 0.058 af

Reach POA#8: Inflow=0.5 cfs 0.053 af
Outflow=0.5 cfs 0.053 af

Reach POA#9: Inflow=0.4 cfs 0.036 af
Outflow=0.4 cfs 0.036 af

Pond ECB: Existing Catch Basin Peak Elev=960.16' Inflow=0.3 cfs 0.025 af
15.0" Round Culvert n=0.025 L=45.0' S=0.0500 '/' Outflow=0.3 cfs 0.025 af

Total Runoff Area = 28.19 ac Runoff Volume = 1.869 af Average Runoff Depth = 0.80"
96.16% Pervious = 27.11 ac 3.84% Impervious = 1.08 ac

APPENDIX A 7.2

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=50,189 sf 20.35% Impervious Runoff Depth=2.18"
Flow Length=466' Tc=8.5 min CN=WQ Runoff=2.5 cfs 0.209 af

Subcatchment 2: Runoff Area=341,015 sf 0.02% Impervious Runoff Depth=1.78"
Flow Length=720' Tc=11.9 min CN=WQ Runoff=13.1 cfs 1.159 af

Subcatchment 3: Runoff Area=36,706 sf 0.00% Impervious Runoff Depth=1.71"
Flow Length=275' Tc=8.6 min CN=WQ Runoff=1.5 cfs 0.120 af

Subcatchment 4: Runoff Area=26,621 sf 0.00% Impervious Runoff Depth=1.70"
Flow Length=190' Tc=10.6 min CN=WQ Runoff=1.0 cfs 0.087 af

Subcatchment 5: Runoff Area=38,993 sf 0.00% Impervious Runoff Depth=1.72"
Flow Length=195' Tc=10.0 min CN=WQ Runoff=1.5 cfs 0.128 af

Subcatchment 6: Runoff Area=40,635 sf 32.92% Impervious Runoff Depth=2.43"
Flow Length=890' Tc=21.8 min CN=WQ Runoff=1.6 cfs 0.189 af

Subcatchment 7: Runoff Area=47,529 sf 0.00% Impervious Runoff Depth=1.52"
Flow Length=580' Tc=15.0 min CN=WQ Runoff=1.4 cfs 0.138 af

Subcatchment 8: Runoff Area=44,500 sf 0.00% Impervious Runoff Depth=1.49"
Flow Length=390' Tc=10.4 min CN=70 Runoff=1.5 cfs 0.126 af

Subcatchment 9: Runoff Area=30,642 sf 0.00% Impervious Runoff Depth=1.49"
Flow Length=410' Tc=10.7 min CN=70 Runoff=1.0 cfs 0.087 af

Subcatchment 10: Runoff Area=43,790 sf 0.00% Impervious Runoff Depth=1.49"
Flow Length=355' Tc=10.1 min CN=70 Runoff=1.4 cfs 0.124 af

Subcatchment 11: Runoff Area=66,895 sf 0.00% Impervious Runoff Depth=1.49"
Flow Length=420' Tc=11.9 min CN=WQ Runoff=2.1 cfs 0.190 af

Subcatchment 12: Runoff Area=75,027 sf 0.00% Impervious Runoff Depth=1.59"
Flow Length=315' Tc=8.2 min CN=WQ Runoff=2.8 cfs 0.228 af

Subcatchment 13: Runoff Area=45,238 sf 0.00% Impervious Runoff Depth=1.60"
Flow Length=335' Tc=8.4 min CN=WQ Runoff=1.7 cfs 0.138 af

Subcatchment 14: Runoff Area=112,189 sf 0.00% Impervious Runoff Depth=1.58"
Flow Length=490' Tc=11.2 min CN=WQ Runoff=3.9 cfs 0.339 af

Subcatchment 15: Runoff Area=143,682 sf 5.05% Impervious Runoff Depth=1.69"
Flow Length=640' Tc=21.4 min CN=WQ Runoff=4.1 cfs 0.465 af

Subcatchment 16: Runoff Area=15,747 sf 11.09% Impervious Runoff Depth=2.01"
Flow Length=195' Tc=6.0 min CN=WQ Runoff=0.8 cfs 0.060 af

Subcatchment 17: Runoff Area=52,616 sf 25.72% Impervious Runoff Depth=2.28"
Flow Length=800' Tc=15.9 min CN=WQ Runoff=2.2 cfs 0.229 af

Subcatchment 18: Runoff Area=16,072 sf 5.97% Impervious Runoff Depth=1.75"
Flow Length=190' Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.054 af

Reach 1R: Overland flow Avg. Flow Depth=0.17' Max Vel=4.20 fps Inflow=3.2 cfs 0.263 af
n=0.030 L=83.0' S=0.1325 '/' Capacity=7.3 cfs Outflow=3.2 cfs 0.263 af

Reach 2R: Existing Swale Avg. Flow Depth=0.23' Max Vel=4.89 fps Inflow=2.7 cfs 0.290 af
n=0.025 L=45.0' S=0.0889 '/' Capacity=5.9 cfs Outflow=2.7 cfs 0.290 af

Reach 3R: Overland flow Avg. Flow Depth=0.27' Max Vel=3.51 fps Inflow=5.6 cfs 0.755 af
n=0.030 L=400.0' S=0.0500 '/' Capacity=8.9 cfs Outflow=5.6 cfs 0.755 af

Reach 4R: Avg. Flow Depth=0.11' Max Vel=3.49 fps Inflow=0.7 cfs 0.054 af
n=0.030 L=75.0' S=0.1549 '/' Capacity=3.9 cfs Outflow=0.7 cfs 0.054 af

Reach 5R: Avg. Flow Depth=0.13' Max Vel=2.23 fps Inflow=0.7 cfs 0.054 af
n=0.030 L=114.0' S=0.0526 '/' Capacity=2.9 cfs Outflow=0.7 cfs 0.054 af

Reach POA#1: Inflow=8.1 cfs 1.018 af
Outflow=8.1 cfs 1.018 af

Reach POA#10: Inflow=1.4 cfs 0.124 af
Outflow=1.4 cfs 0.124 af

Reach POA#11: Inflow=2.1 cfs 0.190 af
Outflow=2.1 cfs 0.190 af

Reach POA#12: Inflow=2.8 cfs 0.228 af
Outflow=2.8 cfs 0.228 af

Reach POA#13: Inflow=1.7 cfs 0.138 af
Outflow=1.7 cfs 0.138 af

Reach POA#14: Inflow=3.9 cfs 0.339 af
Outflow=3.9 cfs 0.339 af

Reach POA#15: Existing Culvert Avg. Flow Depth=1.00' Max Vel=8.16 fps Inflow=6.5 cfs 0.755 af
12.0" Round Pipe n=0.013 L=40.0' S=0.0250 '/' Capacity=5.6 cfs Outflow=5.6 cfs 0.755 af

Reach POA#16: Existing culvert Avg. Flow Depth=0.40' Max Vel=9.17 fps Inflow=2.7 cfs 0.290 af
12.0" Round Pipe n=0.013 L=20.0' S=0.0500 '/' Capacity=8.0 cfs Outflow=2.7 cfs 0.290 af

Reach POA#2: Inflow=13.1 cfs 1.159 af
Outflow=13.1 cfs 1.159 af

Reach POA#3: Inflow=1.5 cfs 0.120 af
Outflow=1.5 cfs 0.120 af

Reach POA#4: Inflow=1.0 cfs 0.087 af
Outflow=1.0 cfs 0.087 af

Reach POA#5: Inflow=1.5 cfs 0.128 af
Outflow=1.5 cfs 0.128 af

Reach POA#6: Inflow=1.6 cfs 0.189 af
Outflow=1.6 cfs 0.189 af

Reach POA#7: Inflow=1.4 cfs 0.138 af
Outflow=1.4 cfs 0.138 af

Reach POA#8: Inflow=1.5 cfs 0.126 af
Outflow=1.5 cfs 0.126 af

Reach POA#9: Inflow=1.0 cfs 0.087 af
Outflow=1.0 cfs 0.087 af

Pond ECB: Existing Catch Basin Peak Elev=960.32' Inflow=0.7 cfs 0.054 af
15.0" Round Culvert n=0.025 L=45.0' S=0.0500 '/' Outflow=0.7 cfs 0.054 af

Total Runoff Area = 28.19 ac Runoff Volume = 4.072 af Average Runoff Depth = 1.73"
96.16% Pervious = 27.11 ac 3.84% Impervious = 1.08 ac

APPENDIX A 7.3

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=50,189 sf 20.35% Impervious Runoff Depth=3.08"
Flow Length=466' Tc=8.5 min CN=WQ Runoff=3.6 cfs 0.296 af

Subcatchment 2: Runoff Area=341,015 sf 0.02% Impervious Runoff Depth=2.64"
Flow Length=720' Tc=11.9 min CN=WQ Runoff=19.7 cfs 1.722 af

Subcatchment 3: Runoff Area=36,706 sf 0.00% Impervious Runoff Depth=2.55"
Flow Length=275' Tc=8.6 min CN=WQ Runoff=2.2 cfs 0.179 af

Subcatchment 4: Runoff Area=26,621 sf 0.00% Impervious Runoff Depth=2.55"
Flow Length=190' Tc=10.6 min CN=WQ Runoff=1.5 cfs 0.130 af

Subcatchment 5: Runoff Area=38,993 sf 0.00% Impervious Runoff Depth=2.57"
Flow Length=195' Tc=10.0 min CN=WQ Runoff=2.3 cfs 0.192 af

Subcatchment 6: Runoff Area=40,635 sf 32.92% Impervious Runoff Depth=3.36"
Flow Length=890' Tc=21.8 min CN=WQ Runoff=2.2 cfs 0.261 af

Subcatchment 7: Runoff Area=47,529 sf 0.00% Impervious Runoff Depth=2.32"
Flow Length=580' Tc=15.0 min CN=WQ Runoff=2.2 cfs 0.211 af

Subcatchment 8: Runoff Area=44,500 sf 0.00% Impervious Runoff Depth=2.28"
Flow Length=390' Tc=10.4 min CN=70 Runoff=2.3 cfs 0.194 af

Subcatchment 9: Runoff Area=30,642 sf 0.00% Impervious Runoff Depth=2.28"
Flow Length=410' Tc=10.7 min CN=70 Runoff=1.6 cfs 0.134 af

Subcatchment 10: Runoff Area=43,790 sf 0.00% Impervious Runoff Depth=2.28"
Flow Length=355' Tc=10.1 min CN=70 Runoff=2.3 cfs 0.191 af

Subcatchment 11: Runoff Area=66,895 sf 0.00% Impervious Runoff Depth=2.28"
Flow Length=420' Tc=11.9 min CN=WQ Runoff=3.3 cfs 0.292 af

Subcatchment 12: Runoff Area=75,027 sf 0.00% Impervious Runoff Depth=2.41"
Flow Length=315' Tc=8.2 min CN=WQ Runoff=4.4 cfs 0.346 af

Subcatchment 13: Runoff Area=45,238 sf 0.00% Impervious Runoff Depth=2.42"
Flow Length=335' Tc=8.4 min CN=WQ Runoff=2.6 cfs 0.209 af

Subcatchment 14: Runoff Area=112,189 sf 0.00% Impervious Runoff Depth=2.40"
Flow Length=490' Tc=11.2 min CN=WQ Runoff=6.0 cfs 0.515 af

Subcatchment 15: Runoff Area=143,682 sf 5.05% Impervious Runoff Depth=2.52"
Flow Length=640' Tc=21.4 min CN=WQ Runoff=6.2 cfs 0.693 af

Subcatchment 16: Runoff Area=15,747 sf 11.09% Impervious Runoff Depth=2.89"
Flow Length=195' Tc=6.0 min CN=WQ Runoff=1.2 cfs 0.087 af

Subcatchment 17: Runoff Area=52,616 sf 25.72% Impervious Runoff Depth=3.19"
Flow Length=800' Tc=15.9 min CN=WQ Runoff=3.1 cfs 0.321 af

Subcatchment 18: Runoff Area=16,072 sf 5.97% Impervious Runoff Depth=2.60"
Flow Length=190' Tc=6.0 min CN=WQ Runoff=1.1 cfs 0.080 af

Reach 1R: Overland flow Avg. Flow Depth=0.20' Max Vel=4.72 fps Inflow=4.7 cfs 0.375 af
n=0.030 L=83.0' S=0.1325 '/' Capacity=7.3 cfs Outflow=4.6 cfs 0.375 af

Reach 2R: Existing Swale Avg. Flow Depth=0.27' Max Vel=5.36 fps Inflow=3.8 cfs 0.408 af
n=0.025 L=45.0' S=0.0889 '/' Capacity=5.9 cfs Outflow=3.8 cfs 0.408 af

Reach 3R: Overland flow Avg. Flow Depth=0.27' Max Vel=3.51 fps Inflow=5.6 cfs 1.101 af
n=0.030 L=400.0' S=0.0500 '/' Capacity=8.9 cfs Outflow=5.6 cfs 1.101 af

Reach 4R: Avg. Flow Depth=0.14' Max Vel=3.96 fps Inflow=1.1 cfs 0.080 af
n=0.030 L=75.0' S=0.1549 '/' Capacity=3.9 cfs Outflow=1.1 cfs 0.080 af

Reach 5R: Avg. Flow Depth=0.16' Max Vel=2.54 fps Inflow=1.1 cfs 0.080 af
n=0.030 L=114.0' S=0.0526 '/' Capacity=2.9 cfs Outflow=1.1 cfs 0.080 af

Reach POA#1: Inflow=10.2 cfs 1.477 af
Outflow=10.2 cfs 1.477 af

Reach POA#10: Inflow=2.3 cfs 0.191 af
Outflow=2.3 cfs 0.191 af

Reach POA#11: Inflow=3.3 cfs 0.292 af
Outflow=3.3 cfs 0.292 af

Reach POA#12: Inflow=4.4 cfs 0.346 af
Outflow=4.4 cfs 0.346 af

Reach POA#13: Inflow=2.6 cfs 0.209 af
Outflow=2.6 cfs 0.209 af

Reach POA#14: Inflow=6.0 cfs 0.515 af
Outflow=6.0 cfs 0.515 af

Reach POA#15: Existing Culvert Avg. Flow Depth=1.00' Max Vel=8.15 fps Inflow=9.7 cfs 1.101 af
12.0" Round Pipe n=0.013 L=40.0' S=0.0250 '/' Capacity=5.6 cfs Outflow=5.6 cfs 1.101 af

Reach POA#16: Existing culvert Avg. Flow Depth=0.49' Max Vel=10.05 fps Inflow=3.8 cfs 0.408 af
12.0" Round Pipe n=0.013 L=20.0' S=0.0500 '/' Capacity=8.0 cfs Outflow=3.8 cfs 0.408 af

Reach POA#2: Inflow=19.7 cfs 1.722 af
Outflow=19.7 cfs 1.722 af

Reach POA#3: Inflow=2.2 cfs 0.179 af
Outflow=2.2 cfs 0.179 af

Reach POA#4: Inflow=1.5 cfs 0.130 af
Outflow=1.5 cfs 0.130 af

Reach POA#5: Inflow=2.3 cfs 0.192 af
Outflow=2.3 cfs 0.192 af

Reach POA#6: Inflow=2.2 cfs 0.261 af
Outflow=2.2 cfs 0.261 af

Reach POA#7: Inflow=2.2 cfs 0.211 af
Outflow=2.2 cfs 0.211 af

Reach POA#8: Inflow=2.3 cfs 0.194 af
Outflow=2.3 cfs 0.194 af

Reach POA#9: Inflow=1.6 cfs 0.134 af
Outflow=1.6 cfs 0.134 af

Pond ECB: Existing Catch Basin Peak Elev=960.43' Inflow=1.1 cfs 0.080 af
15.0" Round Culvert n=0.025 L=45.0' S=0.0500 '/' Outflow=1.1 cfs 0.080 af

Total Runoff Area = 28.19 ac Runoff Volume = 6.055 af Average Runoff Depth = 2.58"
96.16% Pervious = 27.11 ac 3.84% Impervious = 1.08 ac

APPENDIX A 7.4

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=50,189 sf 20.35% Impervious Runoff Depth=3.96"
Flow Length=466' Tc=8.5 min CN=WQ Runoff=4.6 cfs 0.380 af

Subcatchment 2: Runoff Area=341,015 sf 0.02% Impervious Runoff Depth=3.49"
Flow Length=720' Tc=11.9 min CN=WQ Runoff=26.2 cfs 2.277 af

Subcatchment 3: Runoff Area=36,706 sf 0.00% Impervious Runoff Depth=3.39"
Flow Length=275' Tc=8.6 min CN=WQ Runoff=3.0 cfs 0.238 af

Subcatchment 4: Runoff Area=26,621 sf 0.00% Impervious Runoff Depth=3.39"
Flow Length=190' Tc=10.6 min CN=WQ Runoff=2.1 cfs 0.173 af

Subcatchment 5: Runoff Area=38,993 sf 0.00% Impervious Runoff Depth=3.41"
Flow Length=195' Tc=10.0 min CN=WQ Runoff=3.1 cfs 0.255 af

Subcatchment 6: Runoff Area=40,635 sf 32.92% Impervious Runoff Depth=4.25"
Flow Length=890' Tc=21.8 min CN=WQ Runoff=2.8 cfs 0.331 af

Subcatchment 7: Runoff Area=47,529 sf 0.00% Impervious Runoff Depth=3.13"
Flow Length=580' Tc=15.0 min CN=WQ Runoff=3.0 cfs 0.285 af

Subcatchment 8: Runoff Area=44,500 sf 0.00% Impervious Runoff Depth=3.09"
Flow Length=390' Tc=10.4 min CN=70 Runoff=3.1 cfs 0.263 af

Subcatchment 9: Runoff Area=30,642 sf 0.00% Impervious Runoff Depth=3.09"
Flow Length=410' Tc=10.7 min CN=70 Runoff=2.1 cfs 0.181 af

Subcatchment 10: Runoff Area=43,790 sf 0.00% Impervious Runoff Depth=3.09"
Flow Length=355' Tc=10.1 min CN=70 Runoff=3.1 cfs 0.258 af

Subcatchment 11: Runoff Area=66,895 sf 0.00% Impervious Runoff Depth=3.09"
Flow Length=420' Tc=11.9 min CN=WQ Runoff=4.5 cfs 0.395 af

Subcatchment 12: Runoff Area=75,027 sf 0.00% Impervious Runoff Depth=3.23"
Flow Length=315' Tc=8.2 min CN=WQ Runoff=5.9 cfs 0.464 af

Subcatchment 13: Runoff Area=45,238 sf 0.00% Impervious Runoff Depth=3.24"
Flow Length=335' Tc=8.4 min CN=WQ Runoff=3.6 cfs 0.280 af

Subcatchment 14: Runoff Area=112,189 sf 0.00% Impervious Runoff Depth=3.22"
Flow Length=490' Tc=11.2 min CN=WQ Runoff=8.1 cfs 0.691 af

Subcatchment 15: Runoff Area=143,682 sf 5.05% Impervious Runoff Depth=3.35"
Flow Length=640' Tc=21.4 min CN=WQ Runoff=8.3 cfs 0.920 af

Subcatchment 16: Runoff Area=15,747 sf 11.09% Impervious Runoff Depth=3.76"
Flow Length=195' Tc=6.0 min CN=WQ Runoff=1.5 cfs 0.113 af

Subcatchment 17: Runoff Area=52,616 sf 25.72% Impervious Runoff Depth=4.07"
Flow Length=800' Tc=15.9 min CN=WQ Runoff=4.0 cfs 0.410 af

Subcatchment 18: Runoff Area=16,072 sf 5.97% Impervious Runoff Depth=3.43"
Flow Length=190' Tc=6.0 min CN=WQ Runoff=1.4 cfs 0.106 af

Reach 1R: Overland flow Avg. Flow Depth=0.23' Max Vel=5.12 fps Inflow=6.1 cfs 0.485 af
n=0.030 L=83.0' S=0.1325 '/' Capacity=7.3 cfs Outflow=6.0 cfs 0.485 af

Reach 2R: Existing Swale Avg. Flow Depth=0.31' Max Vel=5.72 fps Inflow=5.0 cfs 0.523 af
n=0.025 L=45.0' S=0.0889 '/' Capacity=5.9 cfs Outflow=5.0 cfs 0.523 af

Reach 3R: Overland flow Avg. Flow Depth=0.27' Max Vel=3.51 fps Inflow=5.6 cfs 1.444 af
n=0.030 L=400.0' S=0.0500 '/' Capacity=8.9 cfs Outflow=5.6 cfs 1.444 af

Reach 4R: Avg. Flow Depth=0.16' Max Vel=4.32 fps Inflow=1.4 cfs 0.106 af
n=0.030 L=75.0' S=0.1549 '/' Capacity=3.9 cfs Outflow=1.4 cfs 0.106 af

Reach 5R: Avg. Flow Depth=0.18' Max Vel=2.77 fps Inflow=1.4 cfs 0.106 af
n=0.030 L=114.0' S=0.0526 '/' Capacity=2.9 cfs Outflow=1.4 cfs 0.106 af

Reach POA#1: Inflow=11.7 cfs 1.929 af
Outflow=11.7 cfs 1.929 af

Reach POA#10: Inflow=3.1 cfs 0.258 af
Outflow=3.1 cfs 0.258 af

Reach POA#11: Inflow=4.5 cfs 0.395 af
Outflow=4.5 cfs 0.395 af

Reach POA#12: Inflow=5.9 cfs 0.464 af
Outflow=5.9 cfs 0.464 af

Reach POA#13: Inflow=3.6 cfs 0.280 af
Outflow=3.6 cfs 0.280 af

Reach POA#14: Inflow=8.1 cfs 0.691 af
Outflow=8.1 cfs 0.691 af

Reach POA#15: Existing Culvert Avg. Flow Depth=1.00' Max Vel=8.18 fps Inflow=12.8 cfs 1.444 af
12.0" Round Pipe n=0.013 L=40.0' S=0.0250 '/' Capacity=5.6 cfs Outflow=5.6 cfs 1.444 af

Reach POA#16: Existing culvert Avg. Flow Depth=0.57' Max Vel=10.68 fps Inflow=5.0 cfs 0.523 af
12.0" Round Pipe n=0.013 L=20.0' S=0.0500 '/' Capacity=8.0 cfs Outflow=5.0 cfs 0.523 af

Reach POA#2: Inflow=26.2 cfs 2.277 af
Outflow=26.2 cfs 2.277 af

Reach POA#3: Inflow=3.0 cfs 0.238 af
Outflow=3.0 cfs 0.238 af

Reach POA#4: Inflow=2.1 cfs 0.173 af
Outflow=2.1 cfs 0.173 af

Reach POA#5: Inflow=3.1 cfs 0.255 af
Outflow=3.1 cfs 0.255 af

Reach POA#6: Inflow=2.8 cfs 0.331 af
Outflow=2.8 cfs 0.331 af

Reach POA#7: Inflow=3.0 cfs 0.285 af
Outflow=3.0 cfs 0.285 af

Reach POA#8: Inflow=3.1 cfs 0.263 af
Outflow=3.1 cfs 0.263 af

Reach POA#9: Inflow=2.1 cfs 0.181 af
Outflow=2.1 cfs 0.181 af

Pond ECB: Existing Catch Basin Peak Elev=960.53' Inflow=1.4 cfs 0.106 af
15.0" Round Culvert n=0.025 L=45.0' S=0.0500 '/' Outflow=1.4 cfs 0.106 af

Total Runoff Area = 28.19 ac Runoff Volume = 8.019 af Average Runoff Depth = 3.41"
96.16% Pervious = 27.11 ac 3.84% Impervious = 1.08 ac

APPENDIX A 7.5

Summary for Subcatchment 1:

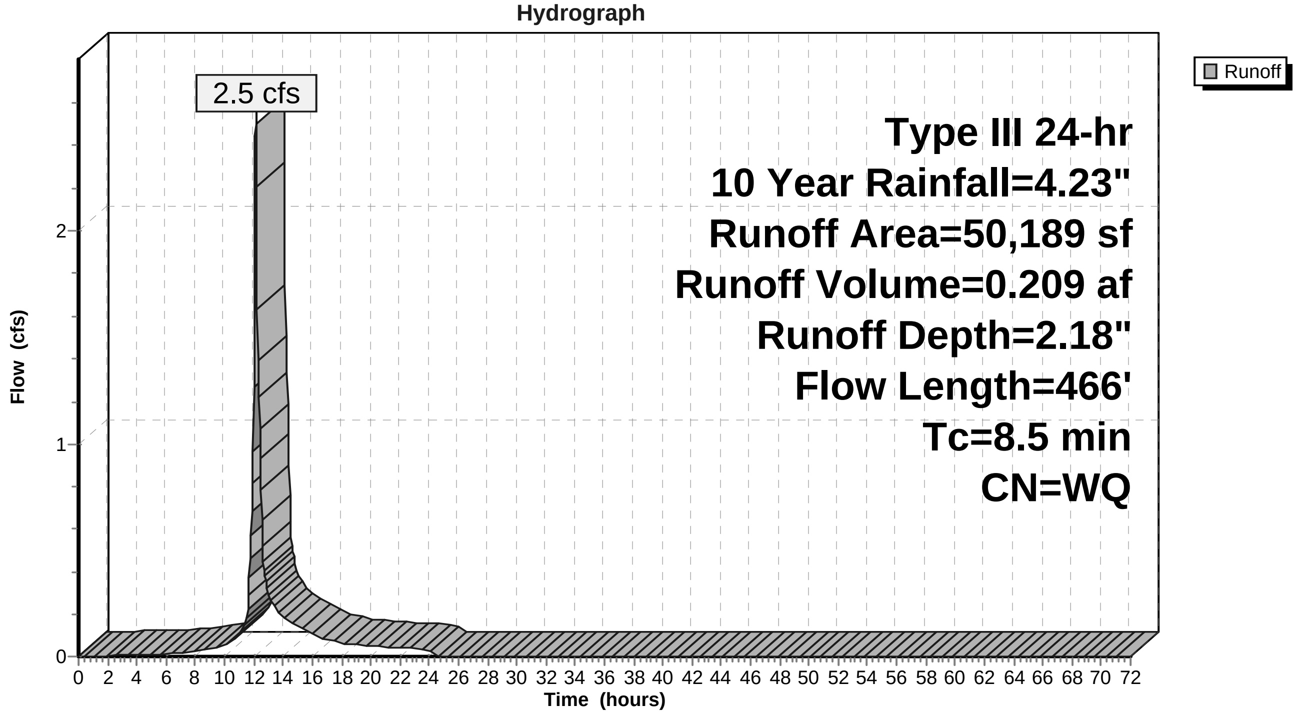
Runoff = 2.5 cfs @ 12.12 hrs, Volume= 0.209 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
	7,691	70	Woods, Good HSG C
*	709	98	Gravel roads HSG C
	9,504	98	Paved parking HSG C
	32,285	74	>75% Grass cover, Good HSG C
	50,189		Weighted Average
	39,976		79.65% Pervious Area
	10,213		20.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0700	0.23		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
0.2	20	0.0850	2.04		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.1	18	0.0500	4.54		**Shallow Concentrated Flow, C-->D** Paved Kv= 20.3 fps
1.1	140	0.1000	2.21		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.5	238	0.0500	1.12		**Shallow Concentrated Flow, E-->F** Woodland Kv= 5.0 fps
8.5	466	Total			

Subcatchment 1:



Summary for Subcatchment 2:

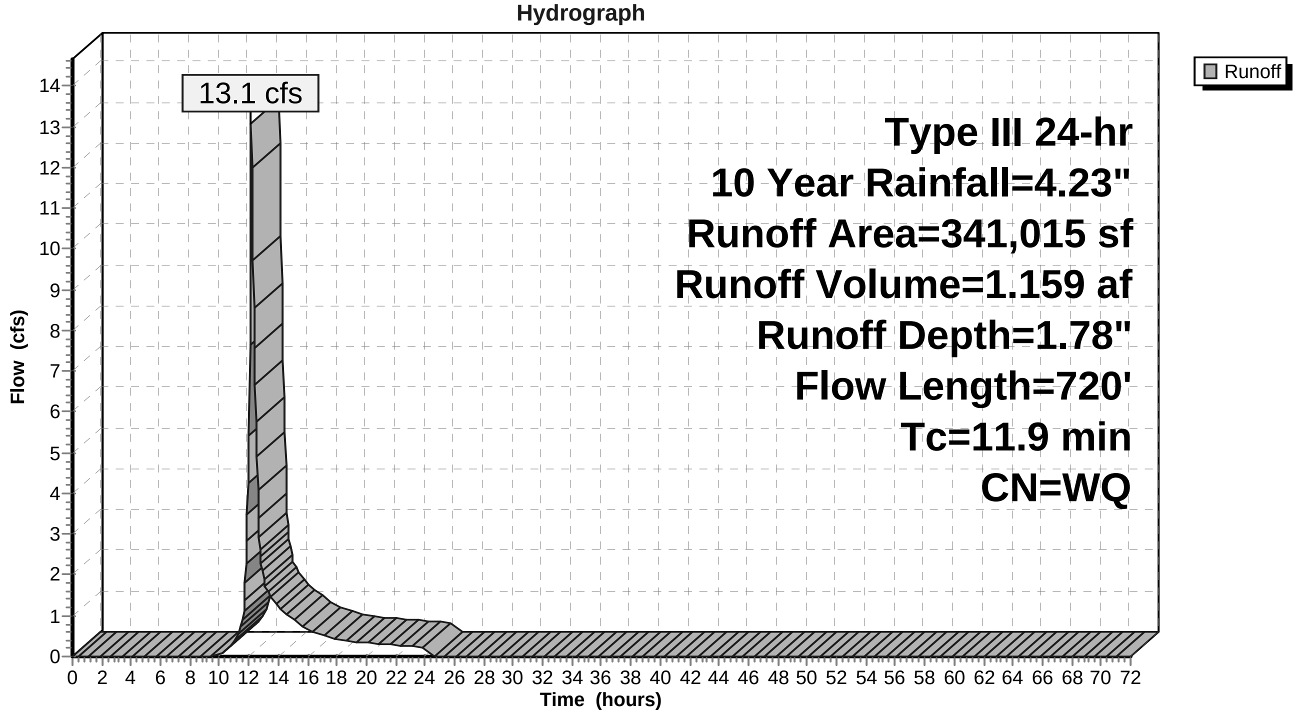
Runoff = 13.1 cfs @ 12.17 hrs, Volume= 1.159 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
	84,721	77	Woods, Good HSG D
	66,421	70	Woods, Good HSG C
	254	65	Brush, Good, HSG C
*	59	98	Gravel roads, HSG C
	183,567	74	>75% Grass cover, Good, HSG C
	5,993	80	>75% Grass cover, Good HSG D
	341,015		Weighted Average
	340,956		99.98% Pervious Area
	59		0.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0800	0.28		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
1.2	175	0.1200	2.42		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
4.7	445	0.1000	1.58		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
11.9	720	Total			

Subcatchment 2:



Summary for Subcatchment 3:

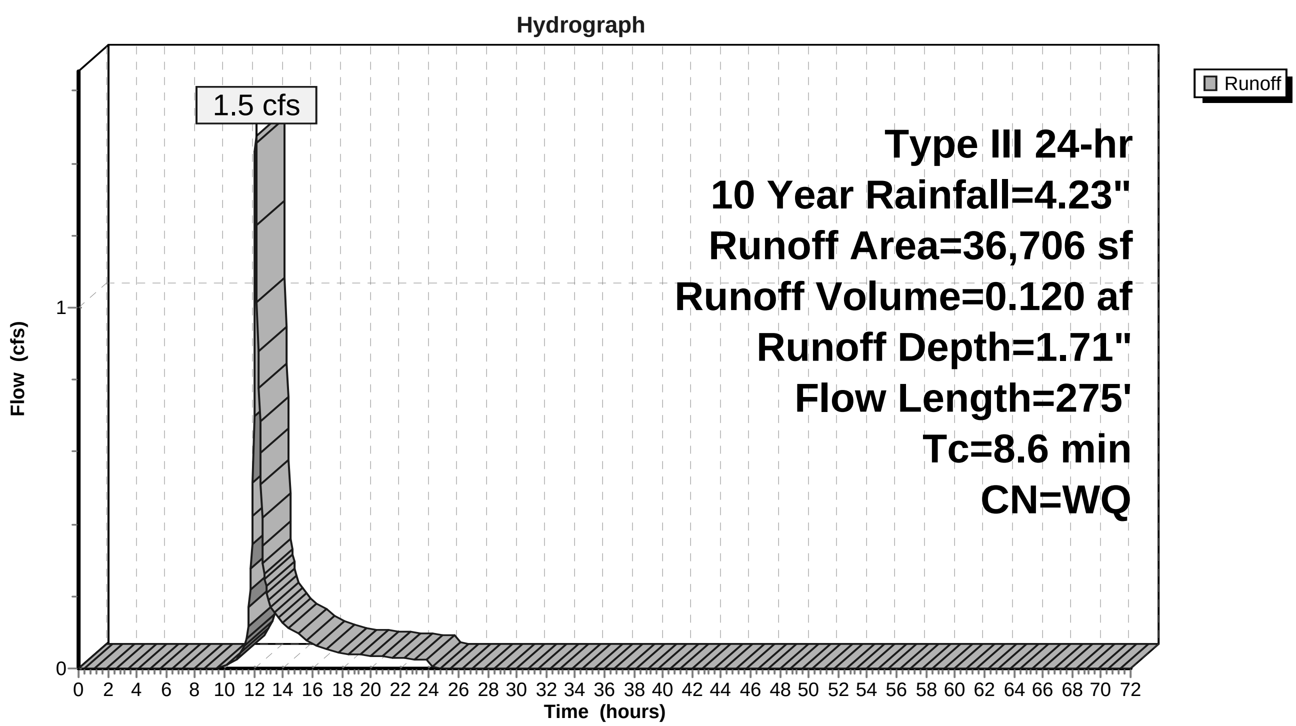
Runoff = 1.5 cfs @ 12.13 hrs, Volume= 0.120 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
1,364	65	Brush, Good HSG C
5,164	70	Woods, Good, HSG C
30,178	74	>75% Grass cover, Good, HSG C
36,706		Weighted Average
36,706		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0500	0.23		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
0.9	125	0.1200	2.42		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.5	50	0.1000	1.58		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
8.6	275	Total			

Subcatchment 3:



Summary for Subcatchment 4:

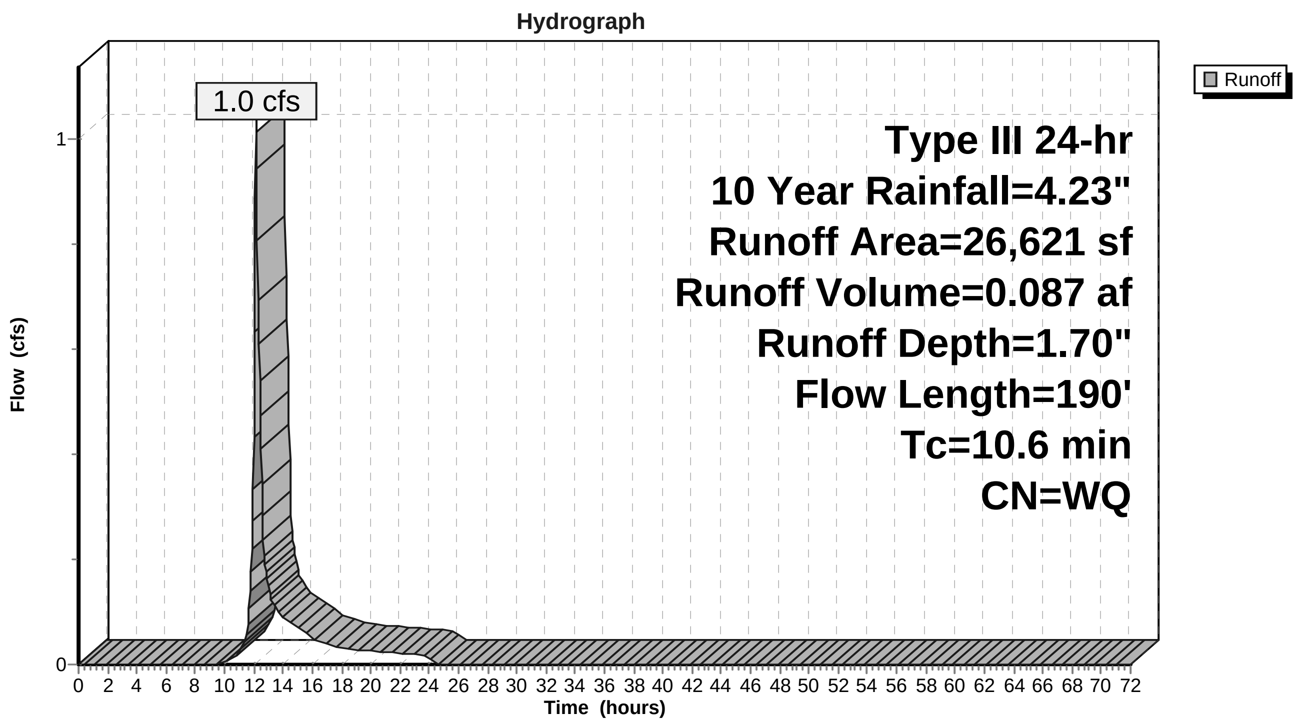
Runoff = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
2,345	70	Woods, Good HSG C
556	70	Woods, Good, HSG C
1,406	65	Brush, Good, HSG C
2,117	74	>75% Grass cover, Good, HSG C
20,197	74	>75% Grass cover, Good HSG C
26,621		Weighted Average
26,621		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0600	0.17		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
0.5	65	0.1100	2.32		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.3	25	0.0800	1.41		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
10.6	190	Total			

Subcatchment 4:



Summary for Subcatchment 5:

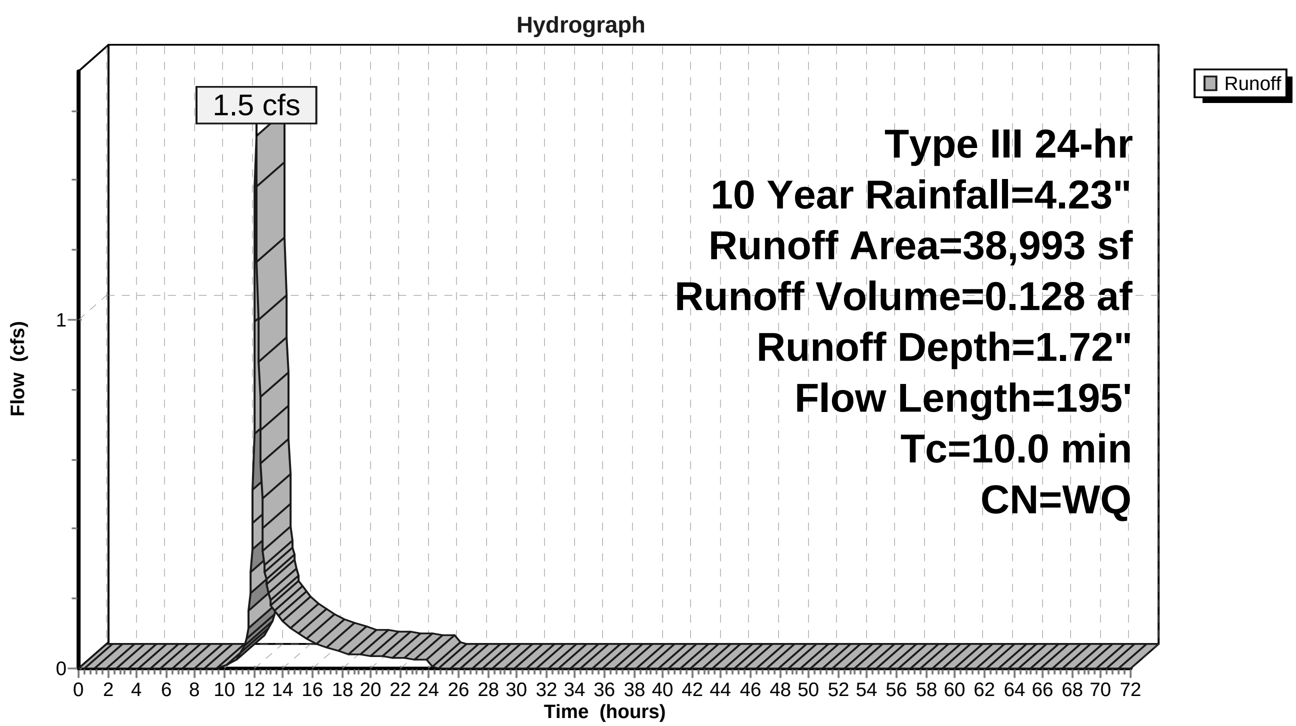
Runoff = 1.5 cfs @ 12.15 hrs, Volume= 0.128 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
5,033	70	Woods, Good HSG C
765	65	Brush, Good HSG C
33,195	74	>75% Grass cover, Good HSG C
38,993		Weighted Average
38,993		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0700	0.18		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
0.5	70	0.0950	2.16		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.3	25	0.0800	1.41		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
10.0	195	Total			

Subcatchment 5:



Summary for Subcatchment 6:

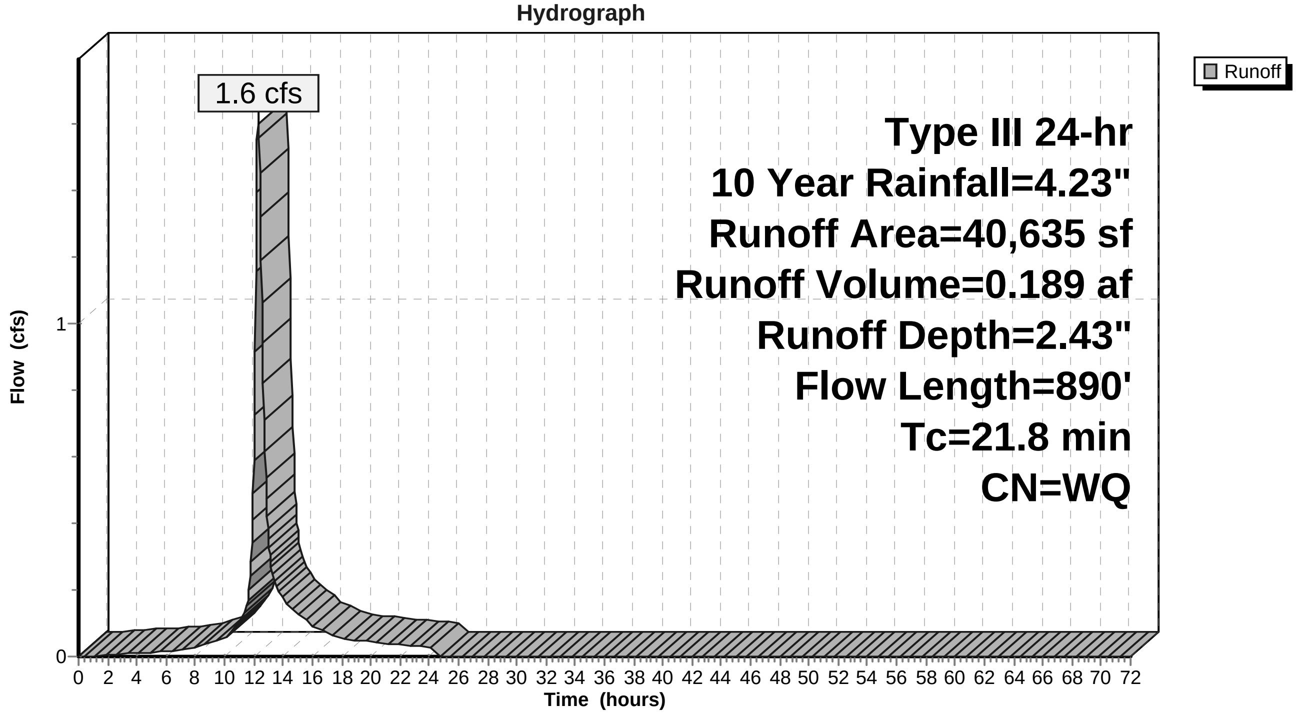
Runoff = 1.6 cfs @ 12.30 hrs, Volume= 0.189 af, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
*	314	98	Gravel roads, HSG C
	2,788	65	Brush, Good HSG C
	359	65	Brush, Good, HSG C
	2,803	70	Woods, Good HSG C
*	13,063	98	Gravel roads HSG C
	557	74	>75% Grass cover, Good, HSG C
	20,751	74	>75% Grass cover, Good HSG C
	40,635		Weighted Average
	27,258		67.08% Pervious Area
	13,377		32.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0100	0.11		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
11.7	600	0.0150	0.86		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
2.2	240	0.0700	1.85		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
21.8	890	Total			

Subcatchment 6:



Summary for Subcatchment 7:

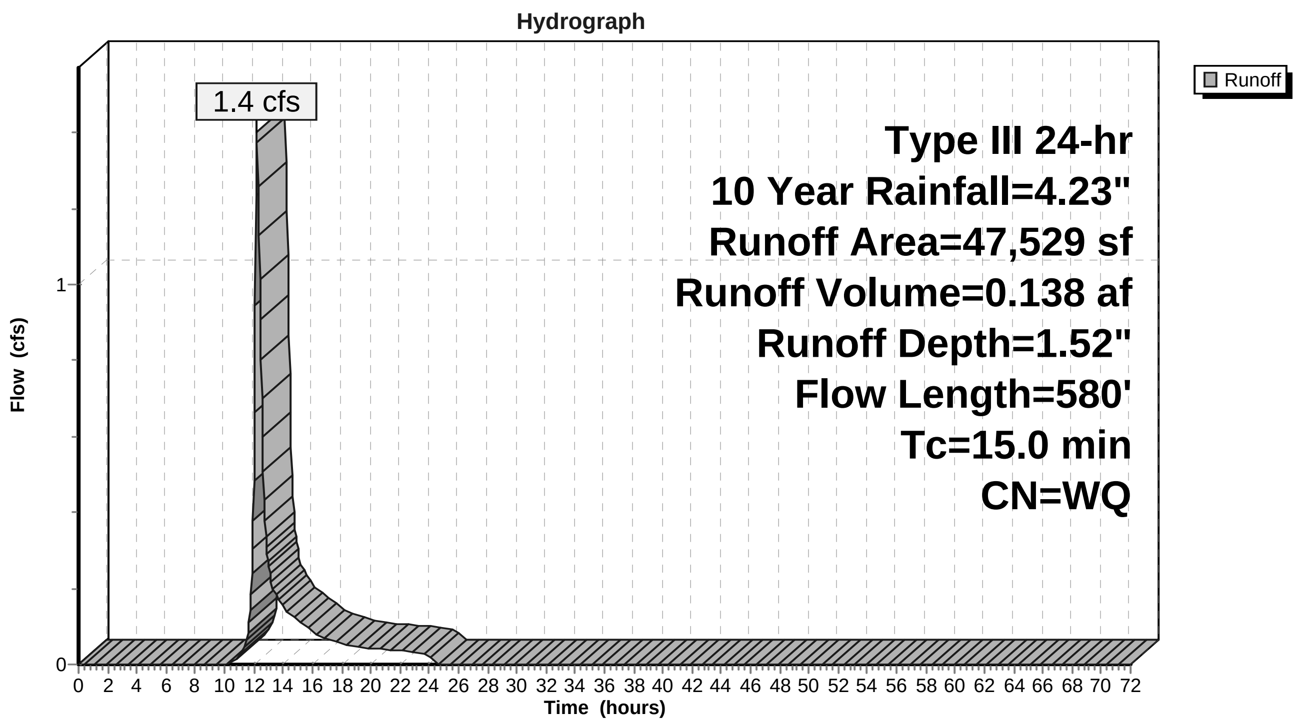
Runoff = 1.4 cfs @ 12.22 hrs, Volume= 0.138 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
42,111	70	Woods, Good HSG C
5,418	74	>75% Grass cover, Good HSG C
47,529		Weighted Average
47,529		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0500	0.09		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
5.9	530	0.0900	1.50		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
15.0	580	Total			

Subcatchment 7:



Summary for Subcatchment 8:

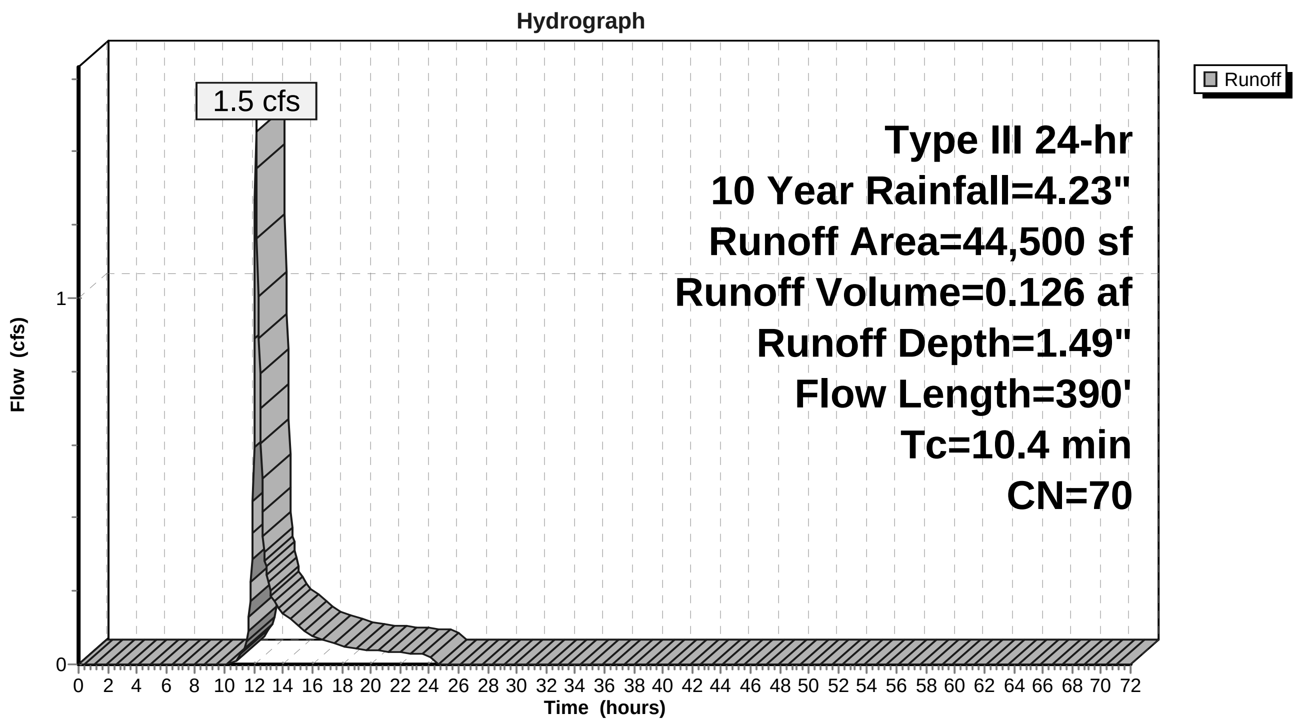
Runoff = 1.5 cfs @ 12.16 hrs, Volume= 0.126 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
44,500	70	Woods, Good HSG C
44,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.1100	0.13		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
3.8	340	0.0900	1.50		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
10.4	390	Total			

Subcatchment 8:



Summary for Subcatchment 9:

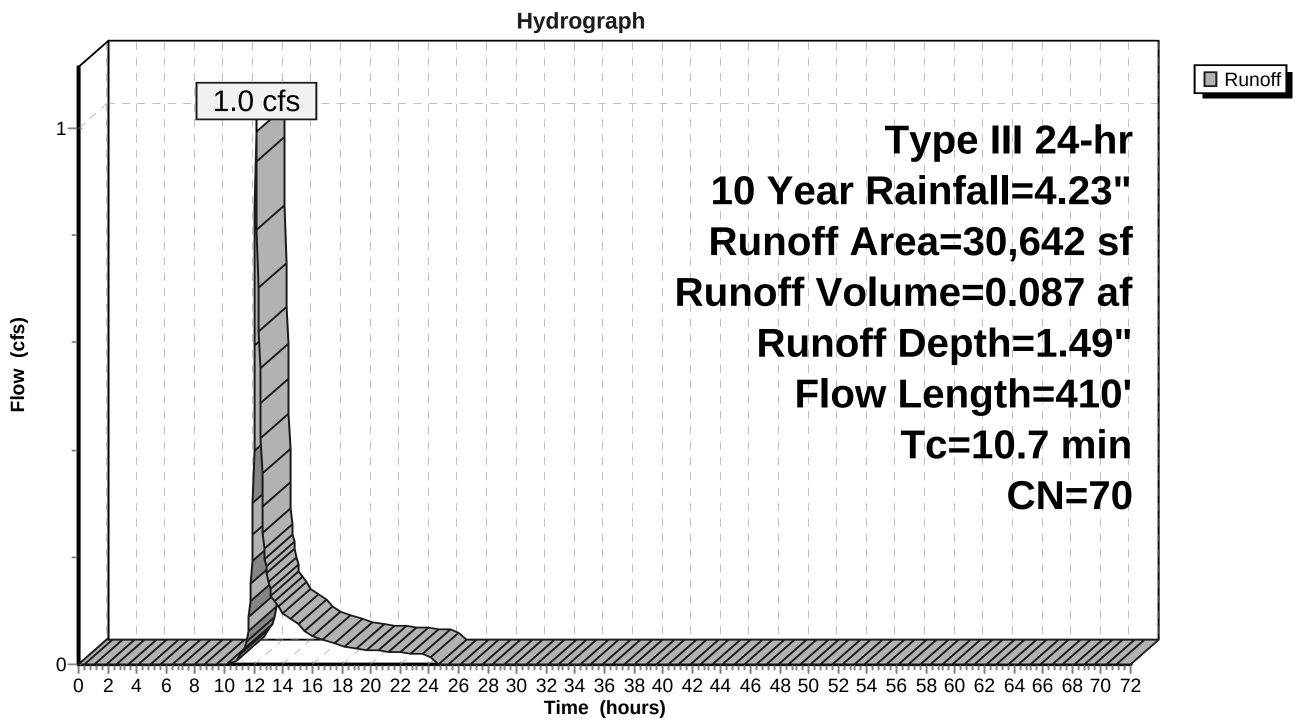
Runoff = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
30,642	70	Woods, Good HSG C
30,642		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0900	0.12		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
3.5	360	0.1200	1.73		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
10.7	410	Total			

Subcatchment 9:



Summary for Subcatchment 10:

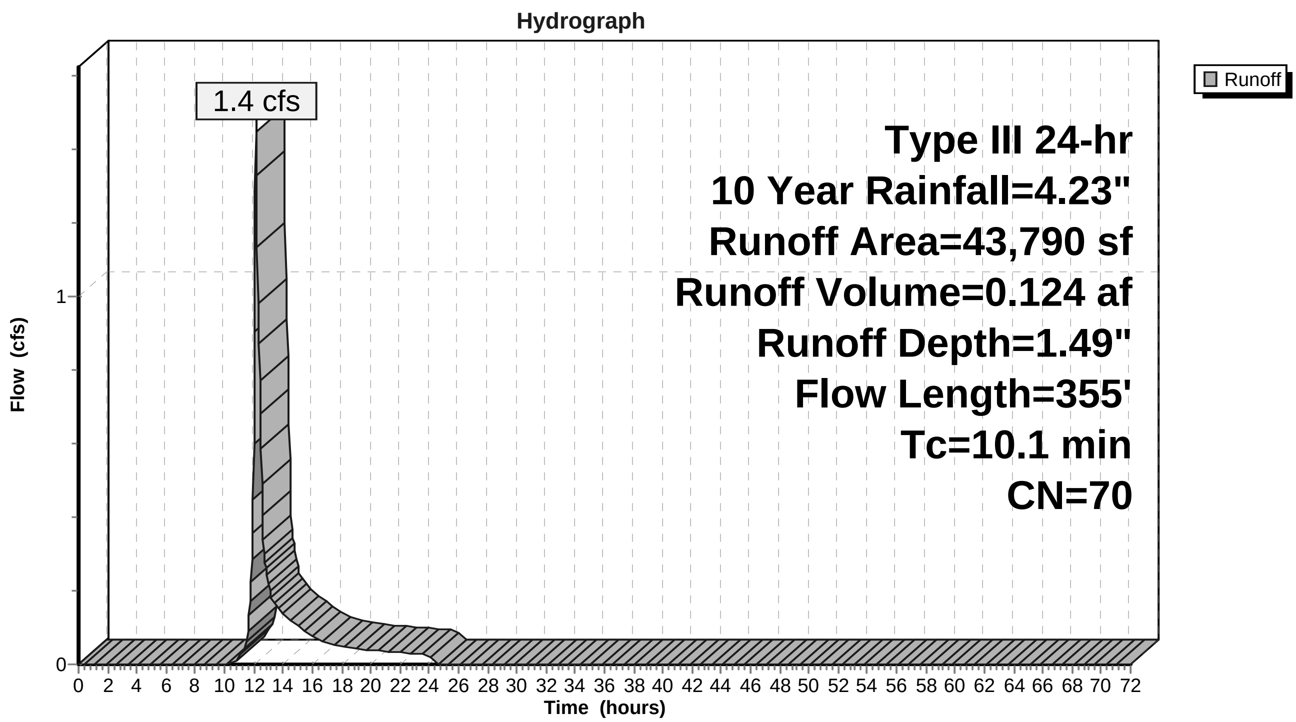
Runoff = 1.4 cfs @ 12.15 hrs, Volume= 0.124 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
43,790	70	Woods, Good HSG C
43,790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0950	0.12		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
3.1	305	0.1100	1.66		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
10.1	355	Total			

Subcatchment 10:



Summary for Subcatchment 11:

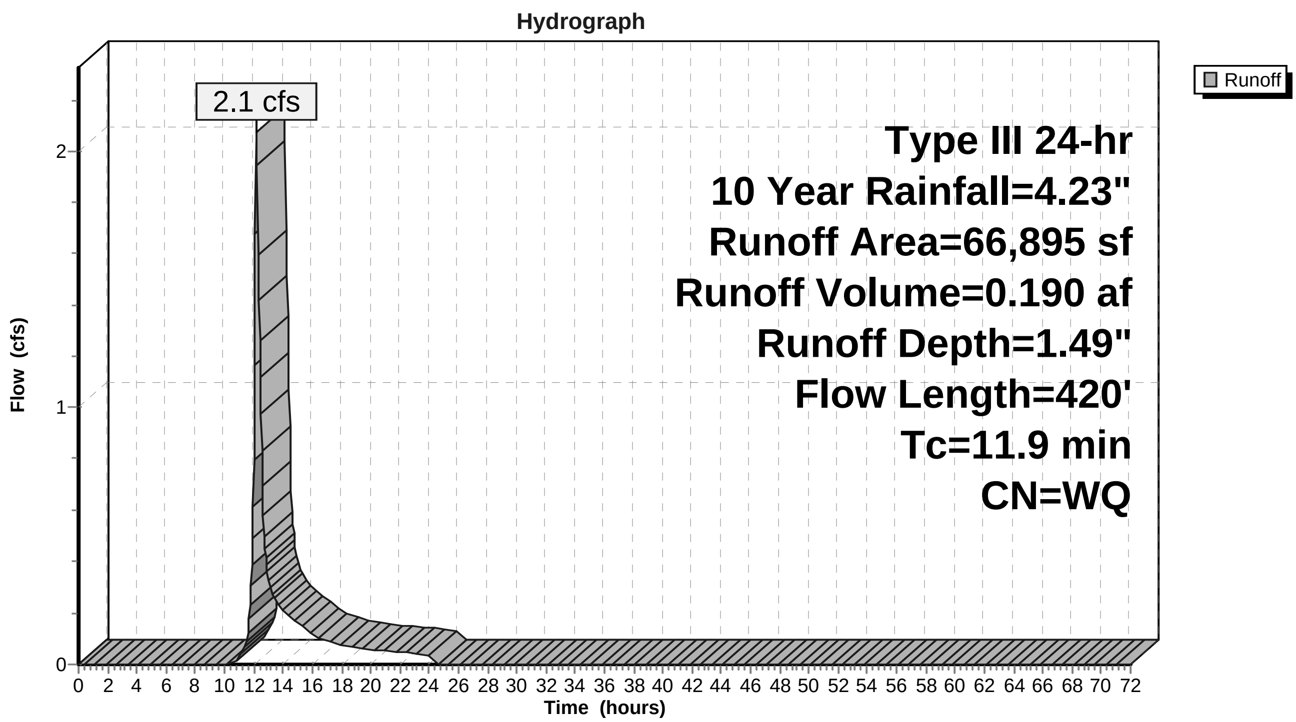
Runoff = 2.1 cfs @ 12.18 hrs, Volume= 0.190 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
66,854	70	Woods, Good HSG C
41	74	>75% Grass cover, Good HSG C
66,895		Weighted Average
66,895		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0500	0.09		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
2.8	370	0.2000	2.24		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
11.9	420	Total			

Subcatchment 11:



Summary for Subcatchment 12:

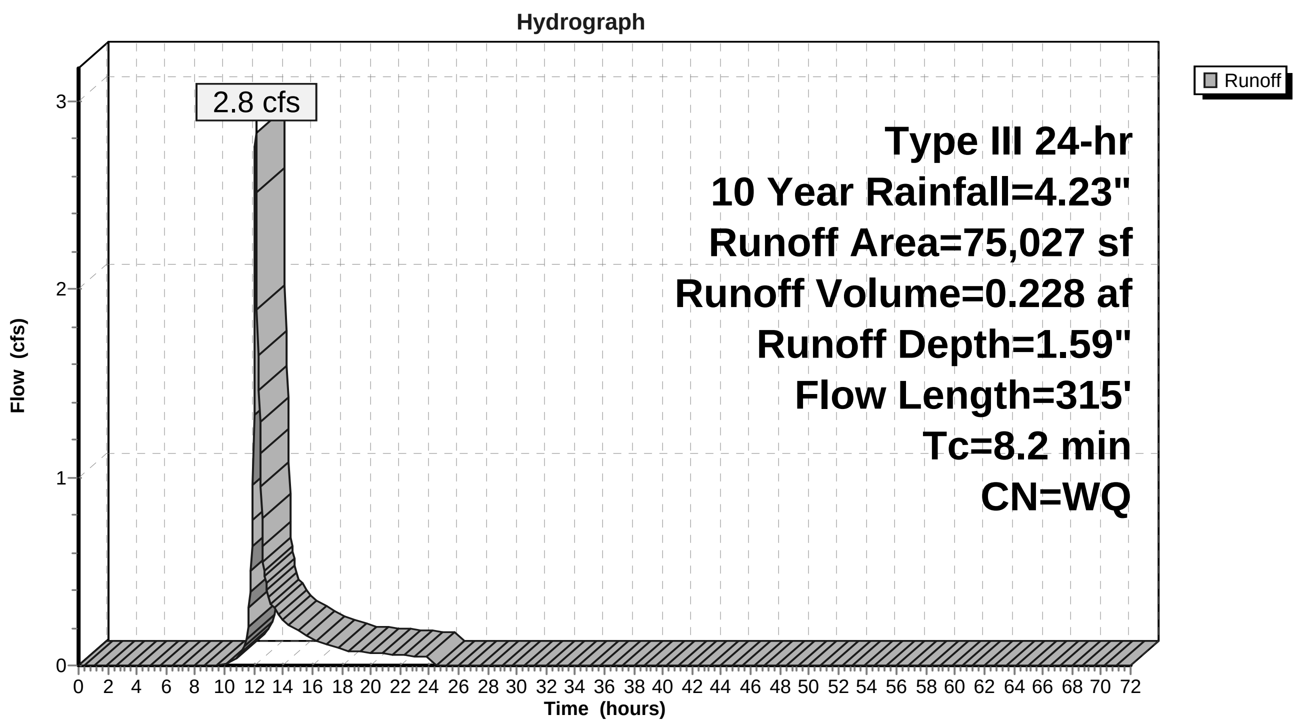
Runoff = 2.8 cfs @ 12.12 hrs, Volume= 0.228 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
47,701	70	Woods, Good HSG C
27,326	74	>75% Grass cover, Good HSG C
75,027		Weighted Average
75,027		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0500	0.14		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
1.0	120	0.0750	1.92		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
1.2	145	0.1700	2.06		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
8.2	315	Total			

Subcatchment 12:



Summary for Subcatchment 13:

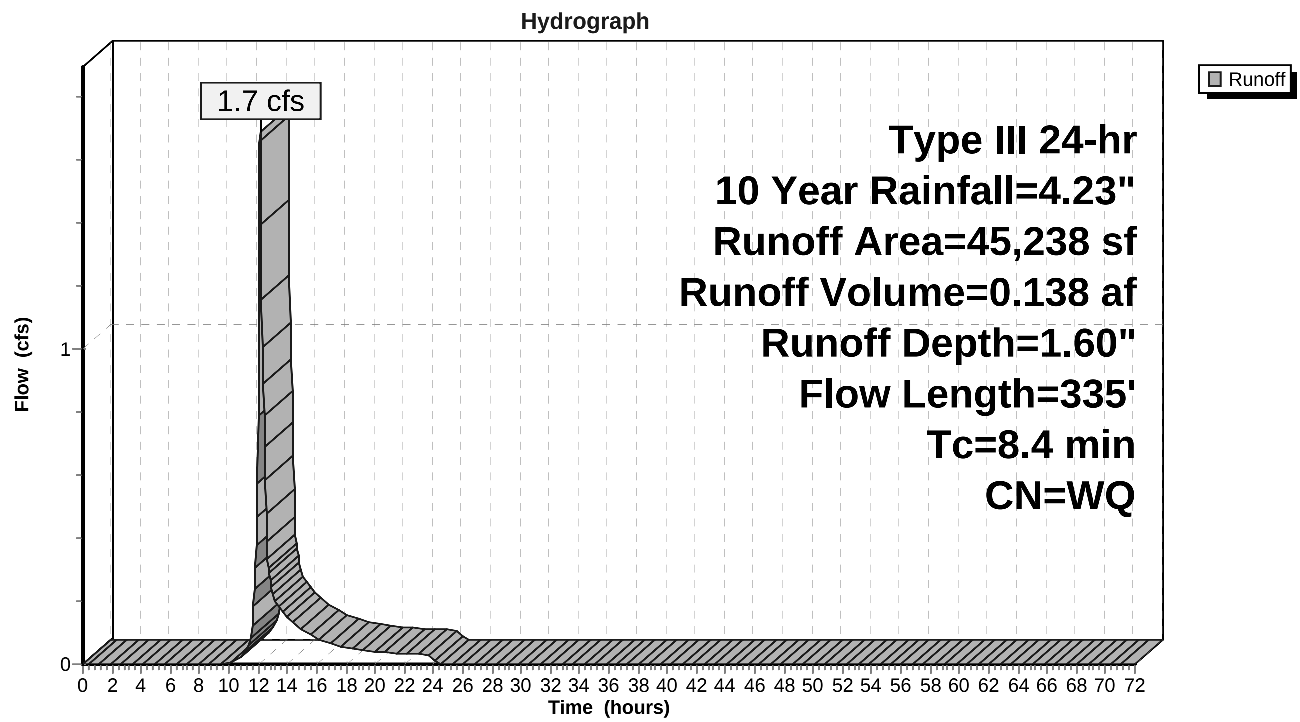
Runoff = 1.7 cfs @ 12.13 hrs, Volume= 0.138 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
727	70	Woods, Good, HSG C
519	65	Brush, Good HSG C
25,656	70	Woods, Good HSG C
1,866	74	>75% Grass cover, Good, HSG C
16,470	74	>75% Grass cover, Good HSG C
45,238		Weighted Average
45,238		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0500	0.14		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
0.5	60	0.0700	1.85		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
1.9	225	0.1500	1.94		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
8.4	335	Total			

Subcatchment 13:



Summary for Subcatchment 14:

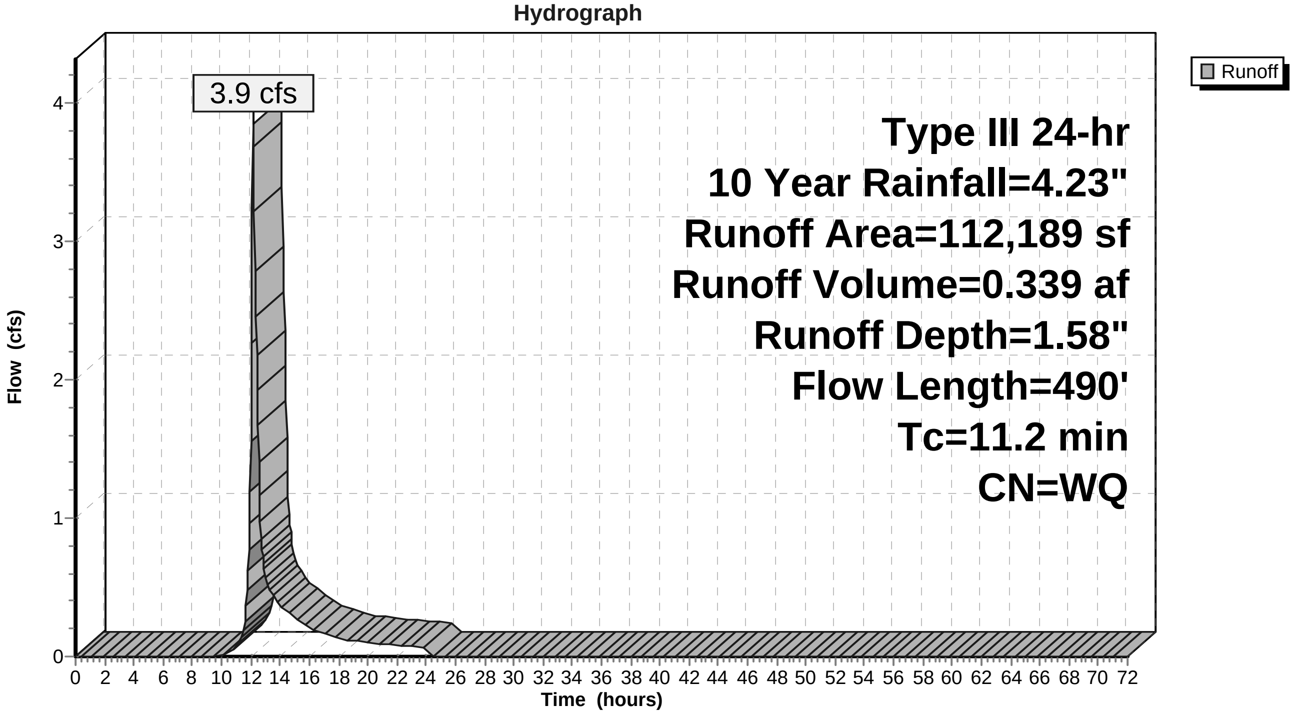
Runoff = 3.9 cfs @ 12.17 hrs, Volume= 0.339 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
69,583	70	Woods, Good, HSG C
936	65	Brush, Good HSG C
289	65	Brush, Good, HSG C
2,208	70	Woods, Good HSG C
16,721	74	>75% Grass cover, Good, HSG C
22,452	74	>75% Grass cover, Good HSG C
112,189		Weighted Average
112,189		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0500	0.14		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
1.1	105	0.1100	1.66		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
0.5	70	0.2200	2.35		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
3.6	265	0.0600	1.22		**Shallow Concentrated Flow, D-->E** Woodland Kv= 5.0 fps
11.2	490	Total			

Subcatchment 14:



Summary for Subcatchment 15:

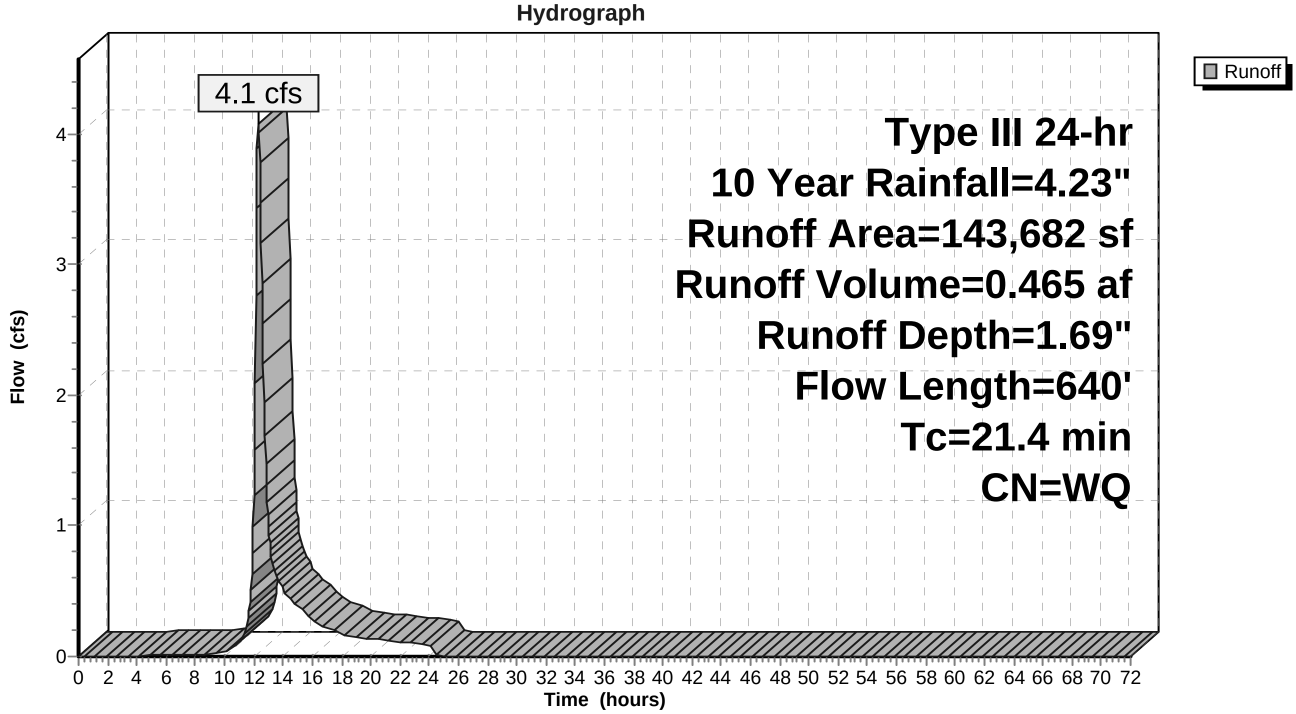
Runoff = 4.1 cfs @ 12.31 hrs, Volume= 0.465 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
23,482	70	Woods, Good HSG C
72,926	70	Woods, Good, HSG C
3,821	98	Paved parking, HSG C
3,441	98	Roofs, HSG C
37,781	74	>75% Grass cover, Good, HSG C
2,231	74	>75% Grass cover, Good HSG C
143,682		Weighted Average
136,420		94.95% Pervious Area
7,262		5.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0700	0.10		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
6.3	215	0.0130	0.57		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
7.2	375	0.0300	0.87		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
21.4	640	Total			

Subcatchment 15:



Summary for Subcatchment 16:

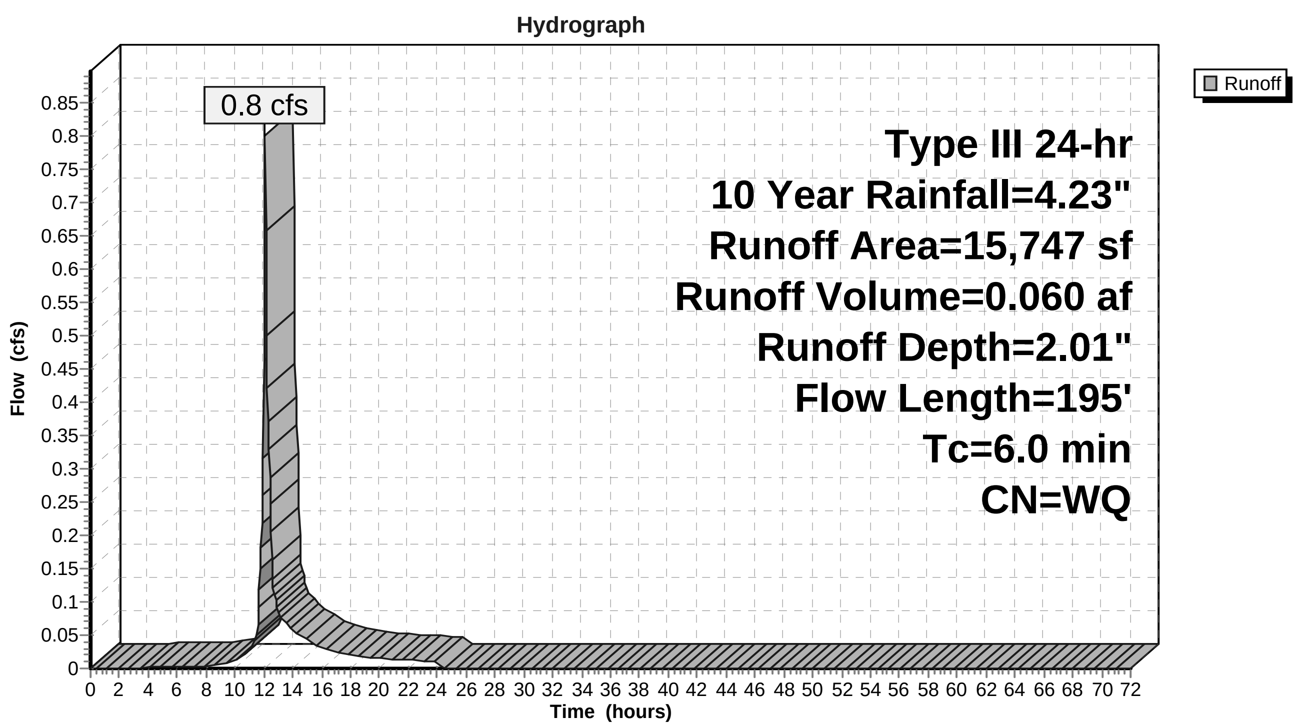
Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.060 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
449	70	Woods, Good, HSG C
1,216	98	Paved parking, HSG C
531	98	Roofs, HSG C
13,551	74	>75% Grass cover, Good, HSG C
15,747		Weighted Average
14,000		88.91% Pervious Area
1,747		11.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0700	0.23		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
1.0	145	0.1250	2.47		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
4.6	195	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 16:



Summary for Subcatchment 17:

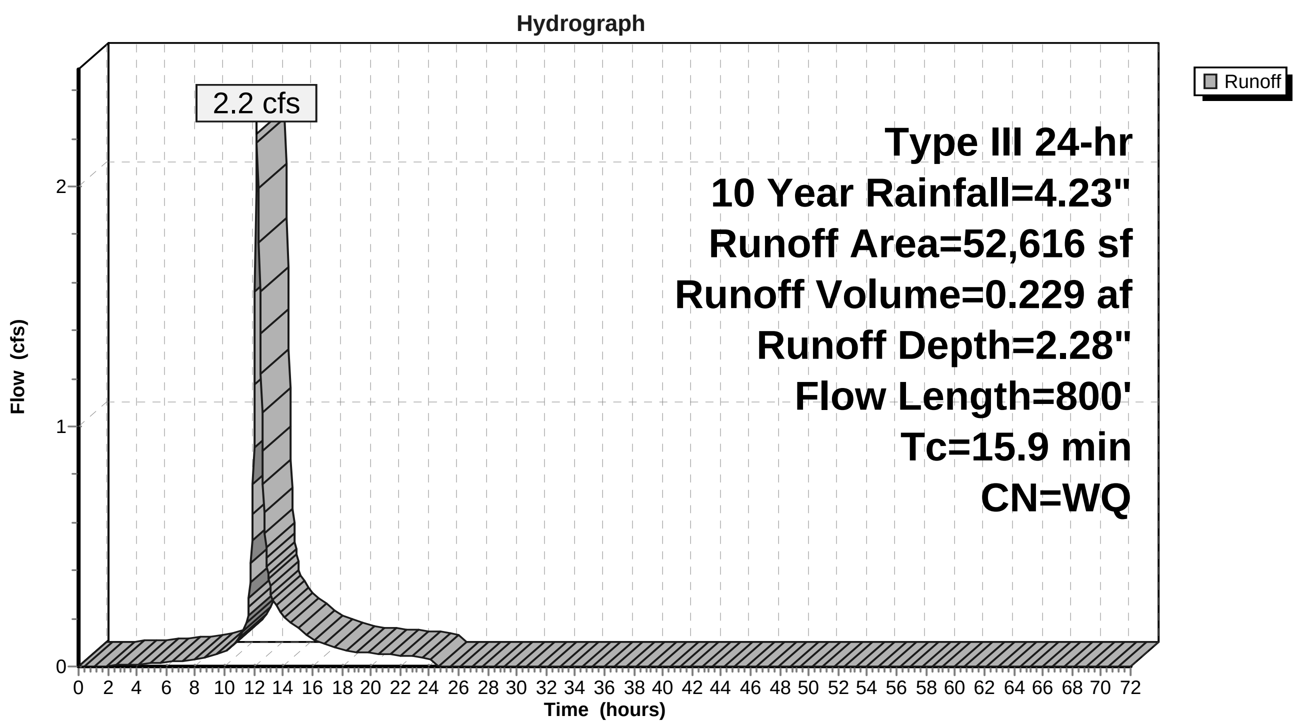
Runoff = 2.2 cfs @ 12.22 hrs, Volume= 0.229 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
	2,185	65	Brush, Good, HSG C
	6,642	70	Woods, Good, HSG C
	313	98	Paved parking, HSG C
*	13,218	98	Gravel roads, HSG C
	30,258	74	>75% Grass cover, Good, HSG C
	52,616		Weighted Average
	39,085		74.28% Pervious Area
	13,531		25.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0100	0.11		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
8.0	750	0.0500	1.57		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
15.9	800	Total			

Subcatchment 17:



Summary for Subcatchment 18:

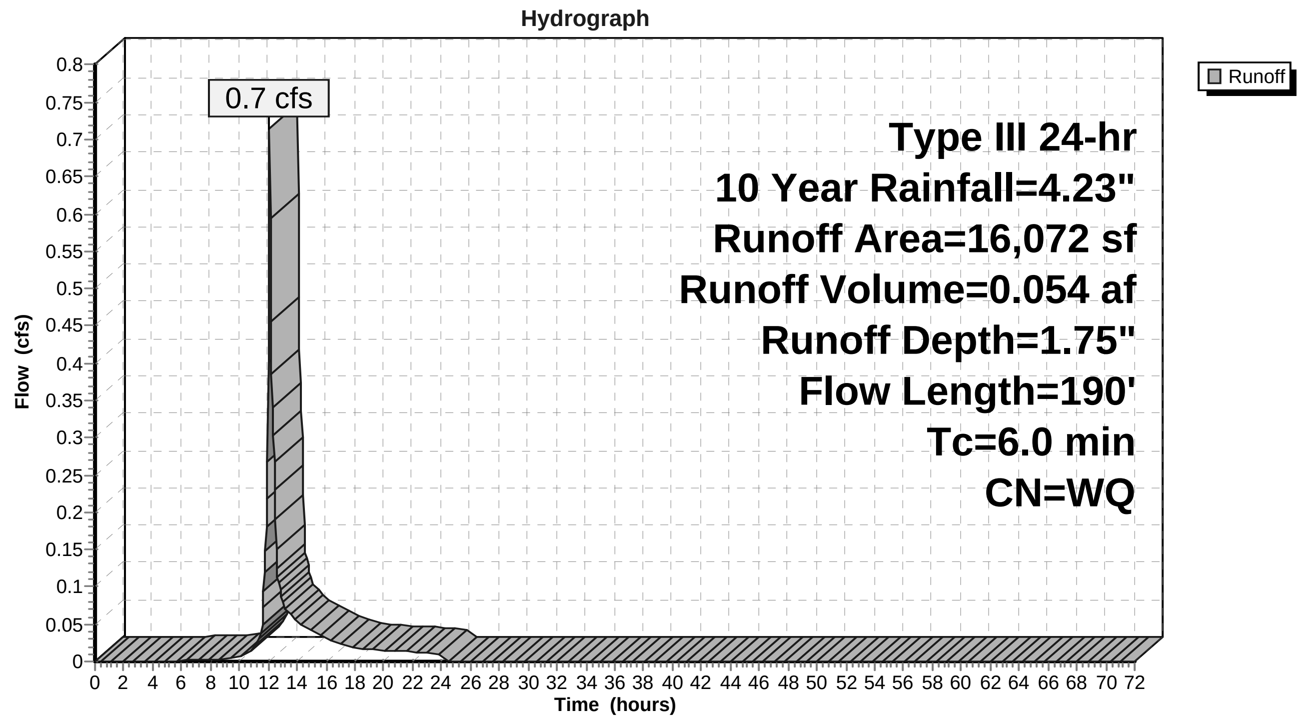
Runoff = 0.7 cfs @ 12.10 hrs, Volume= 0.054 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
8,375	70	Woods, Good HSG C
959	98	Roofs HSG C
6,738	74	>75% Grass cover, Good HSG C
16,072		Weighted Average
15,113		94.03% Pervious Area
959		5.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.4000	0.46		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
0.8	70	0.0850	1.46		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
0.7	70	0.0500	1.57		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.3	190	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 18:



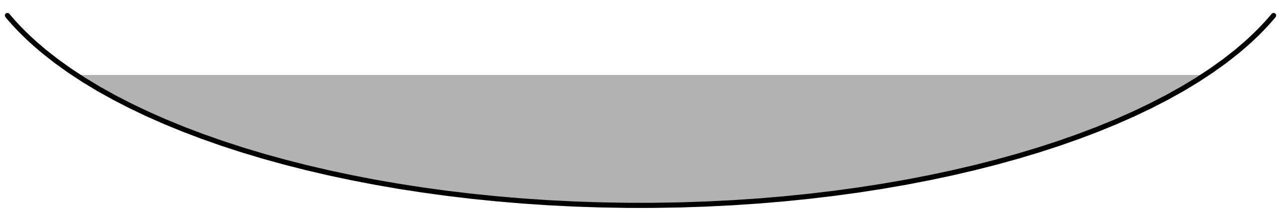
Summary for Reach 1R: Overland flow

Inflow Area =	1.52 ac, 16.86% Impervious, Inflow Depth = 2.07"	for 10 Year event	
Inflow =	3.2 cfs @ 12.12 hrs, Volume=	0.263 af	
Outflow =	3.2 cfs @ 12.12 hrs, Volume=	0.263 af, Atten= 0%, Lag= 0.3 min	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 4.20 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 1.1 min

Peak Storage= 63 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 6.63'
Bank-Full Depth= 0.25' Flow Area= 1.3 sf, Capacity= 7.3 cfs

8.00' x 0.25' deep Parabolic Channel, n= 0.030 Short grass
Length= 83.0' Slope= 0.1325 '/'
Inlet Invert= 940.00', Outlet Invert= 929.00'



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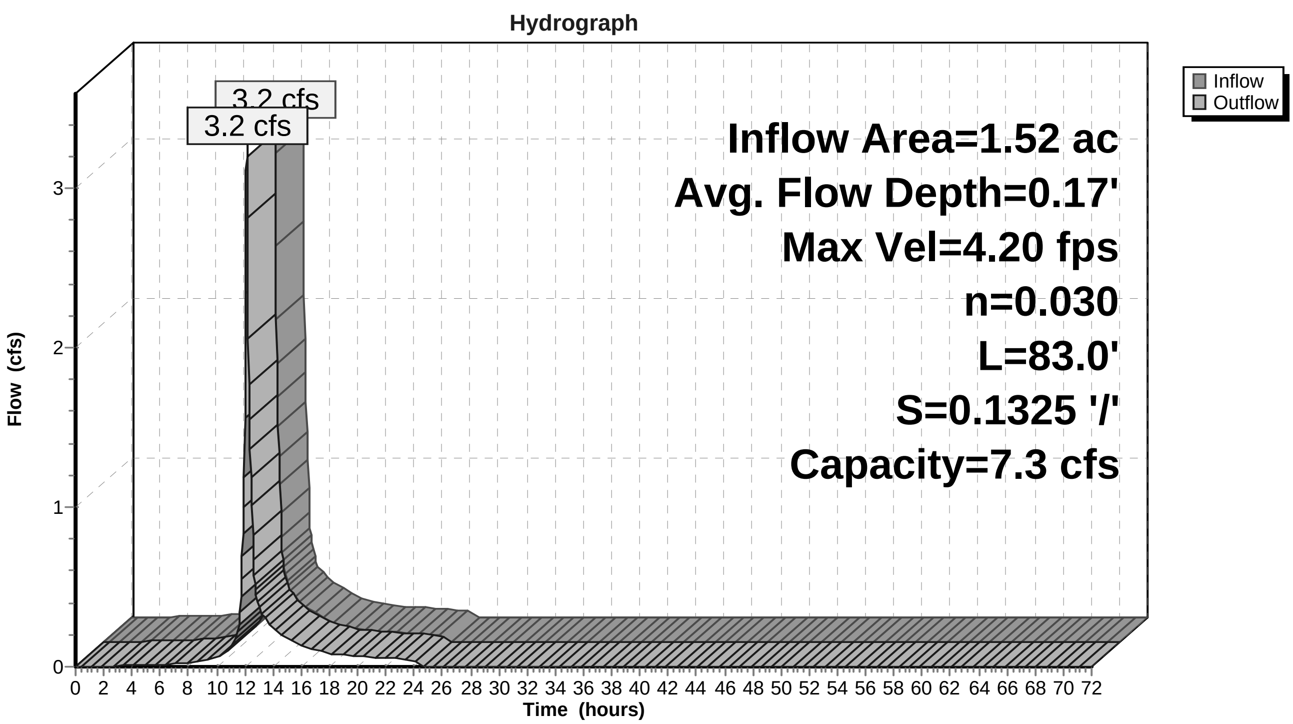
Reach 1R: Overland flow



Summary for Reach 2R: Existing Swale

Inflow Area = 1.57 ac, 22.35% Impervious, Inflow Depth = 2.22" for 10 Year event
Inflow = 2.7 cfs @ 12.20 hrs, Volume= 0.290 af
Outflow = 2.7 cfs @ 12.20 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.1 min

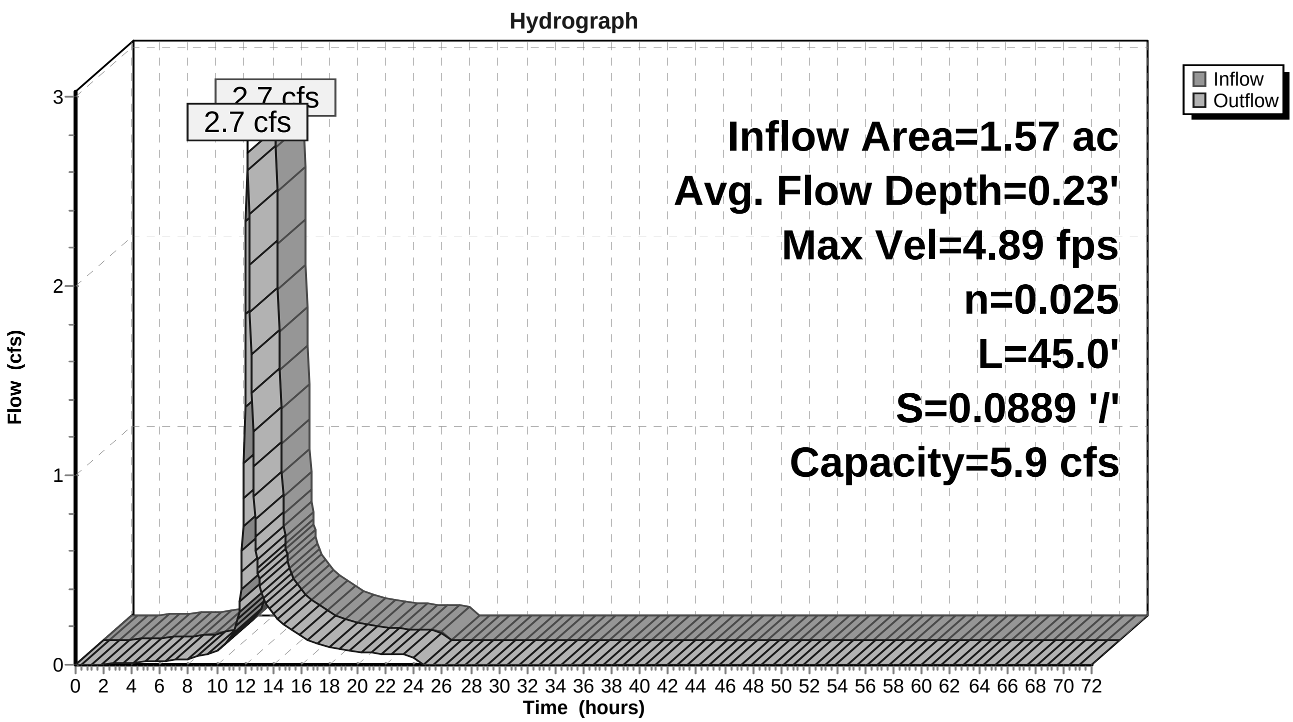
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 4.89 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.67 fps, Avg. Travel Time= 0.4 min

Peak Storage= 25 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 3.78'
Bank-Full Depth= 0.33' Flow Area= 1.0 sf, Capacity= 5.9 cfs

1.00' x 0.33' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 6.0 '/' Top Width= 4.96'
Length= 45.0' Slope= 0.0889 '/'
Inlet Invert= 954.00', Outlet Invert= 950.00'

‡

Reach 2R: Existing Swale



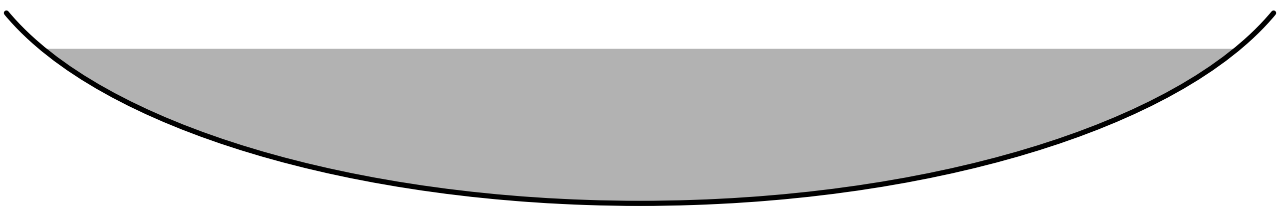
Summary for Reach 3R: Overland flow

Inflow Area = 4.87 ac, 10.63% Impervious, Inflow Depth = 1.86" for 10 Year event
Inflow = 5.6 cfs @ 12.20 hrs, Volume= 0.755 af
Outflow = 5.6 cfs @ 12.25 hrs, Volume= 0.755 af, Atten= 0%, Lag= 3.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 3.51 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 6.0 min

Peak Storage= 643 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.27' , Surface Width= 9.01'
Bank-Full Depth= 0.33' Flow Area= 2.2 sf, Capacity= 8.9 cfs

10.00' x 0.33' deep Parabolic Channel, n= 0.030 Short grass
Length= 400.0' Slope= 0.0500 '/'
Inlet Invert= 949.00', Outlet Invert= 929.00'



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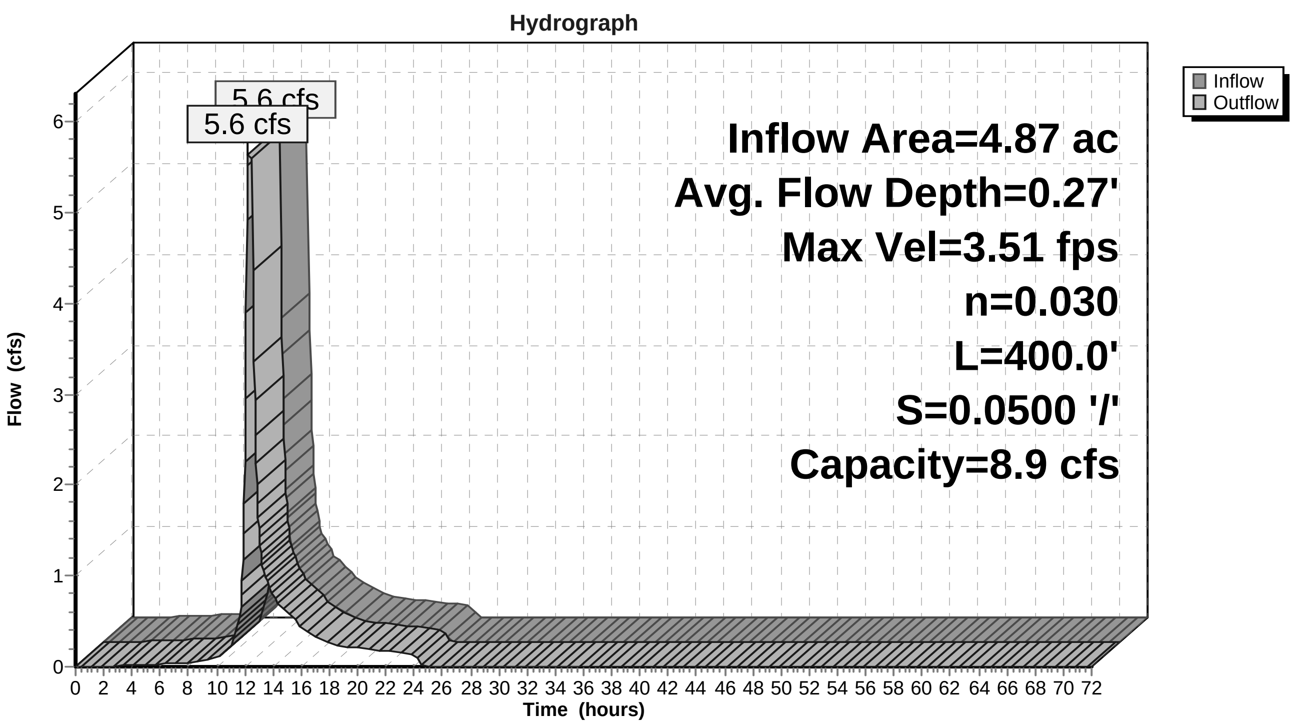
Reach 3R: Overland flow



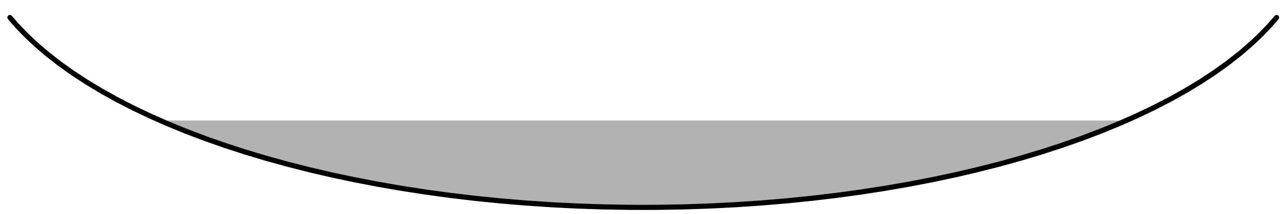
Summary for Reach 4R:

Inflow Area = 0.37 ac, 5.97% Impervious, Inflow Depth = 1.75" for 10 Year event
Inflow = 0.7 cfs @ 12.10 hrs, Volume= 0.054 af
Outflow = 0.7 cfs @ 12.10 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 3.49 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 1.3 min

Peak Storage= 15 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 2.70'
Bank-Full Depth= 0.25' Flow Area= 0.7 sf, Capacity= 3.9 cfs

4.00' x 0.25' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 75.0' Slope= 0.1549 '/'
Inlet Invert= 957.62', Outlet Invert= 946.00'



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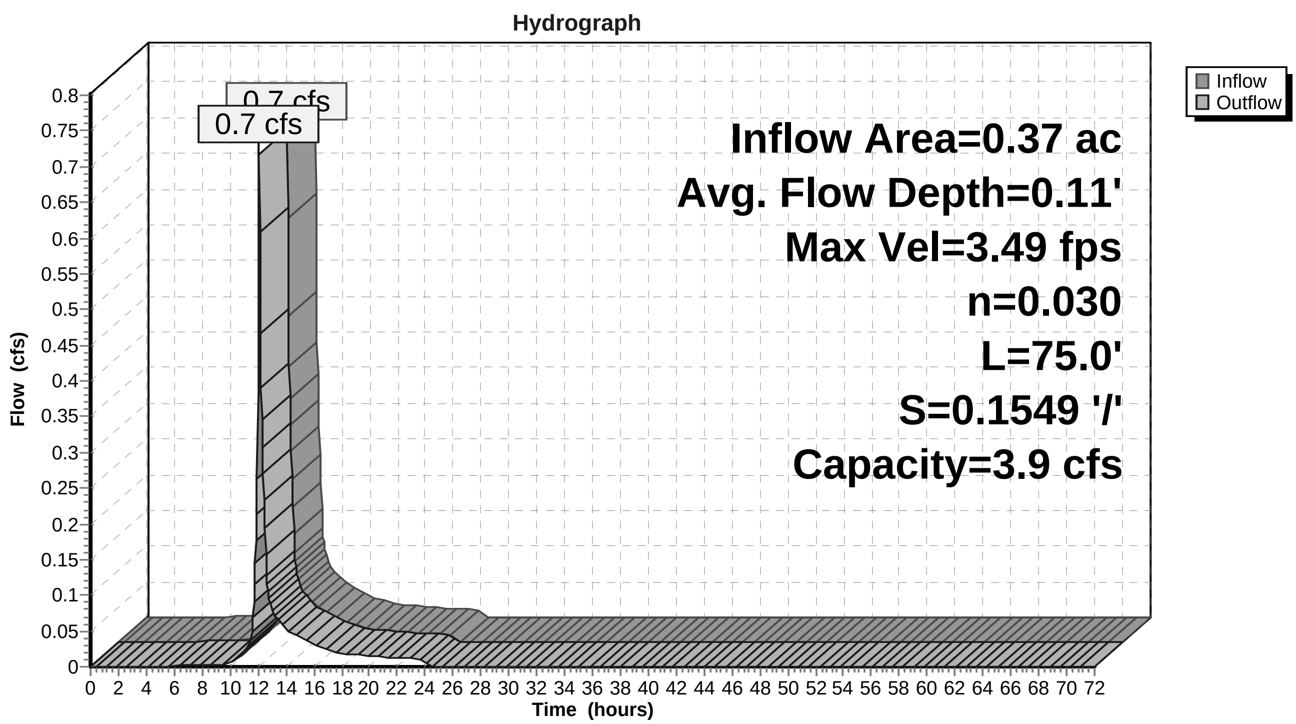
Reach 4R:



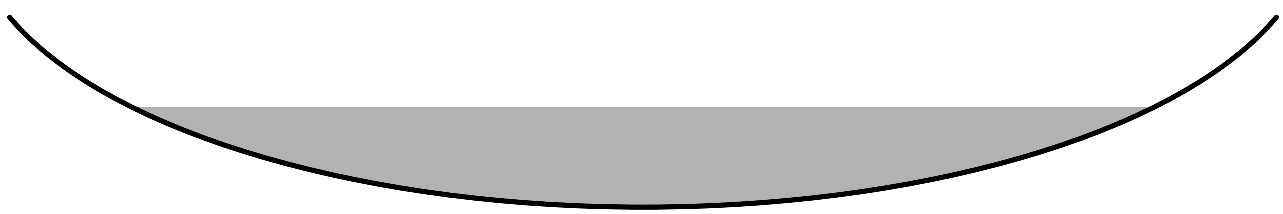
Summary for Reach 5R:

Inflow Area = 0.37 ac, 5.97% Impervious, Inflow Depth = 1.75" for 10 Year event
Inflow = 0.7 cfs @ 12.10 hrs, Volume= 0.054 af
Outflow = 0.7 cfs @ 12.11 hrs, Volume= 0.054 af, Atten= 1%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 2.23 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 3.1 min

Peak Storage= 36 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 3.63'
Bank-Full Depth= 0.25' Flow Area= 0.8 sf, Capacity= 2.9 cfs

5.00' x 0.25' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 114.0' Slope= 0.0526 '/'
Inlet Invert= 946.00', Outlet Invert= 940.00'



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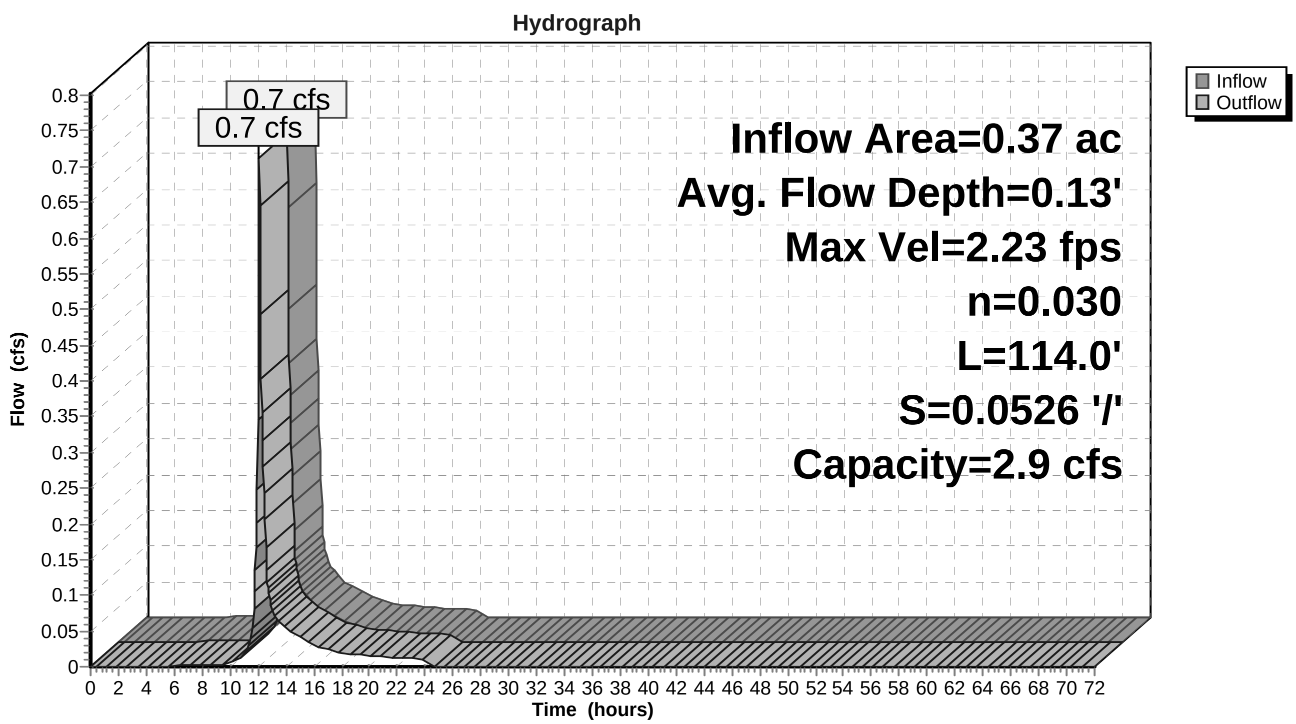
Reach 5R:

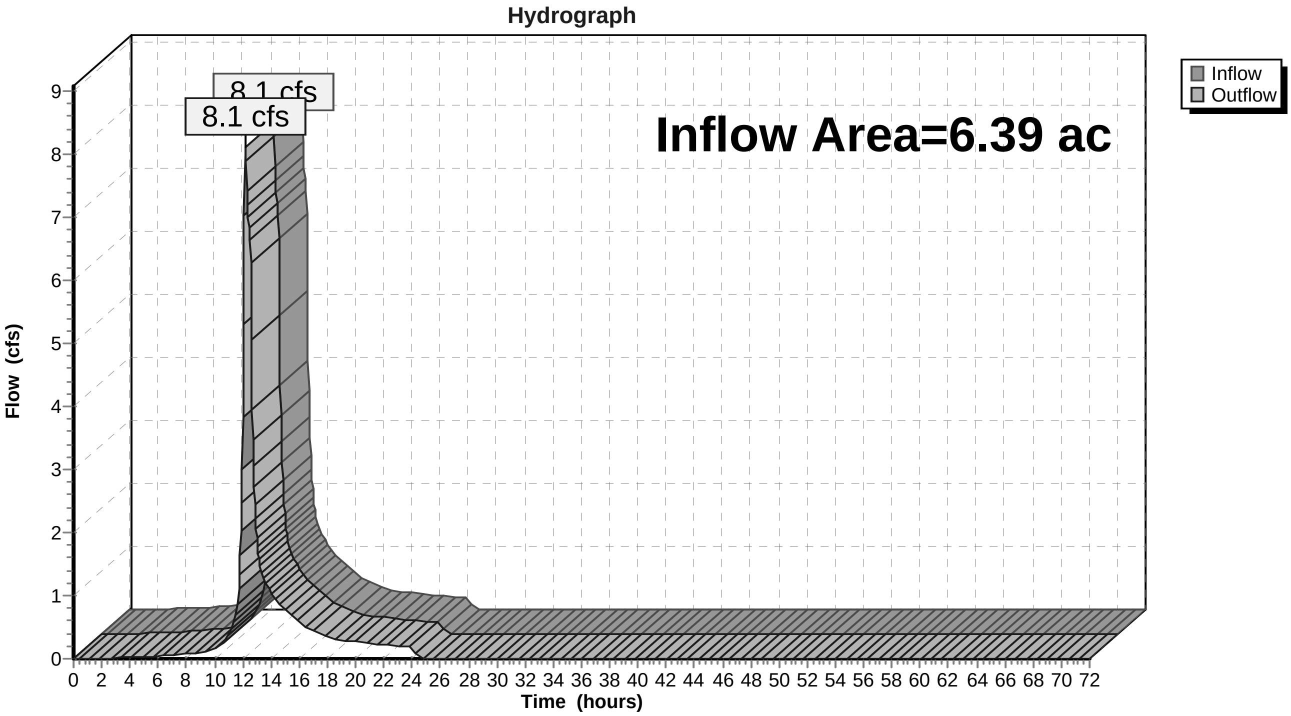


Summary for Reach POA#1:

Inflow Area =	6.39 ac, 12.11% Impervious, Inflow Depth = 1.91"	for 10 Year event
Inflow =	8.1 cfs @ 12.18 hrs, Volume=	1.018 af
Outflow =	8.1 cfs @ 12.18 hrs, Volume=	1.018 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

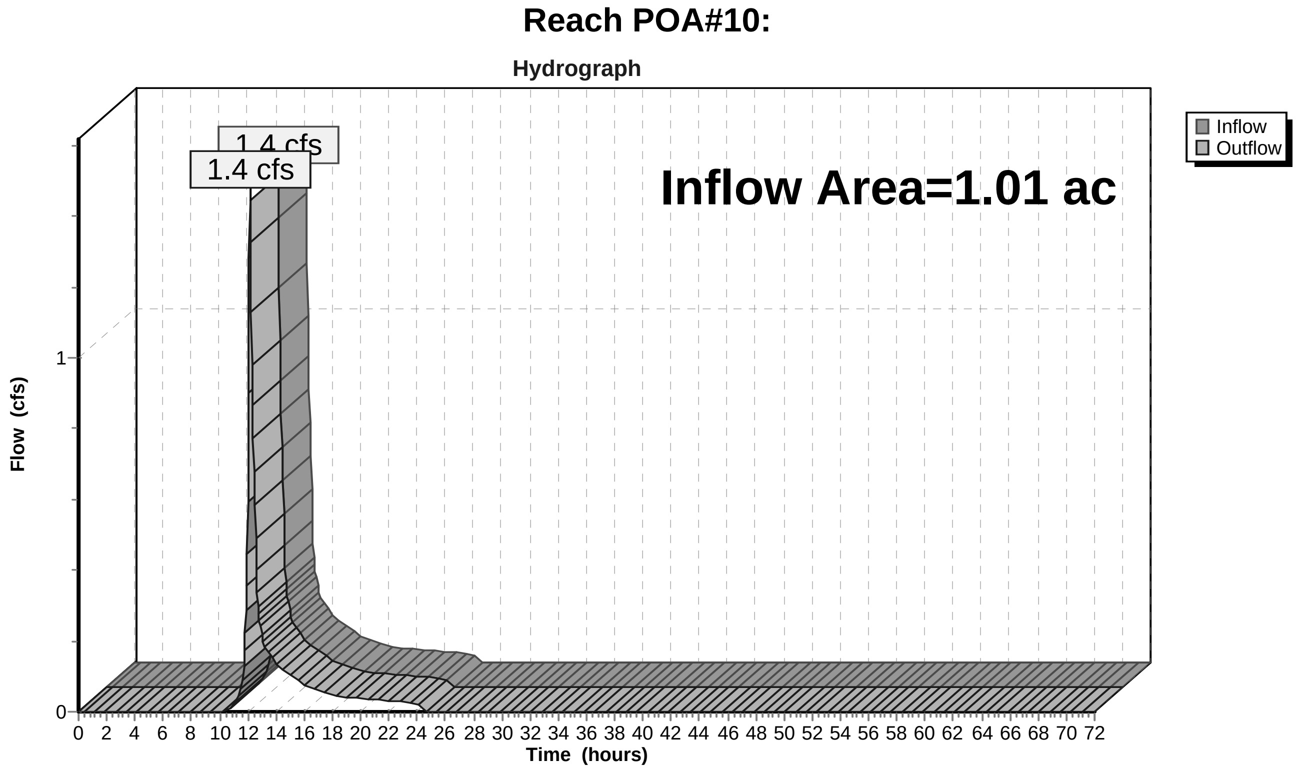
Reach POA#1:



Summary for Reach POA#10:

Inflow Area = 1.01 ac, 0.00% Impervious, Inflow Depth = 1.49" for 10 Year event
Inflow = 1.4 cfs @ 12.15 hrs, Volume= 0.124 af
Outflow = 1.4 cfs @ 12.15 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

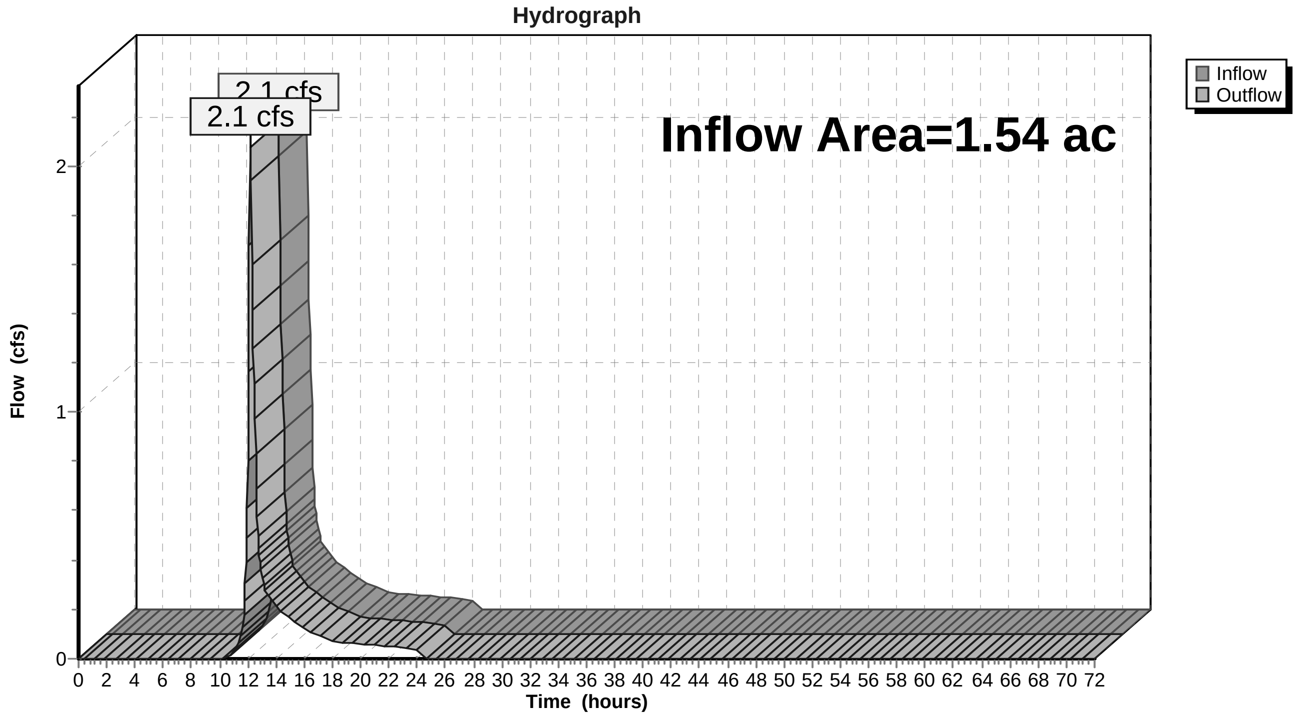


Summary for Reach POA#11:

Inflow Area =	1.54 ac, 0.00% Impervious, Inflow Depth = 1.49"	for 10 Year event	
Inflow =	2.1 cfs @ 12.18 hrs, Volume=	0.190 af	
Outflow =	2.1 cfs @ 12.18 hrs, Volume=	0.190 af, Atten= 0%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#11:

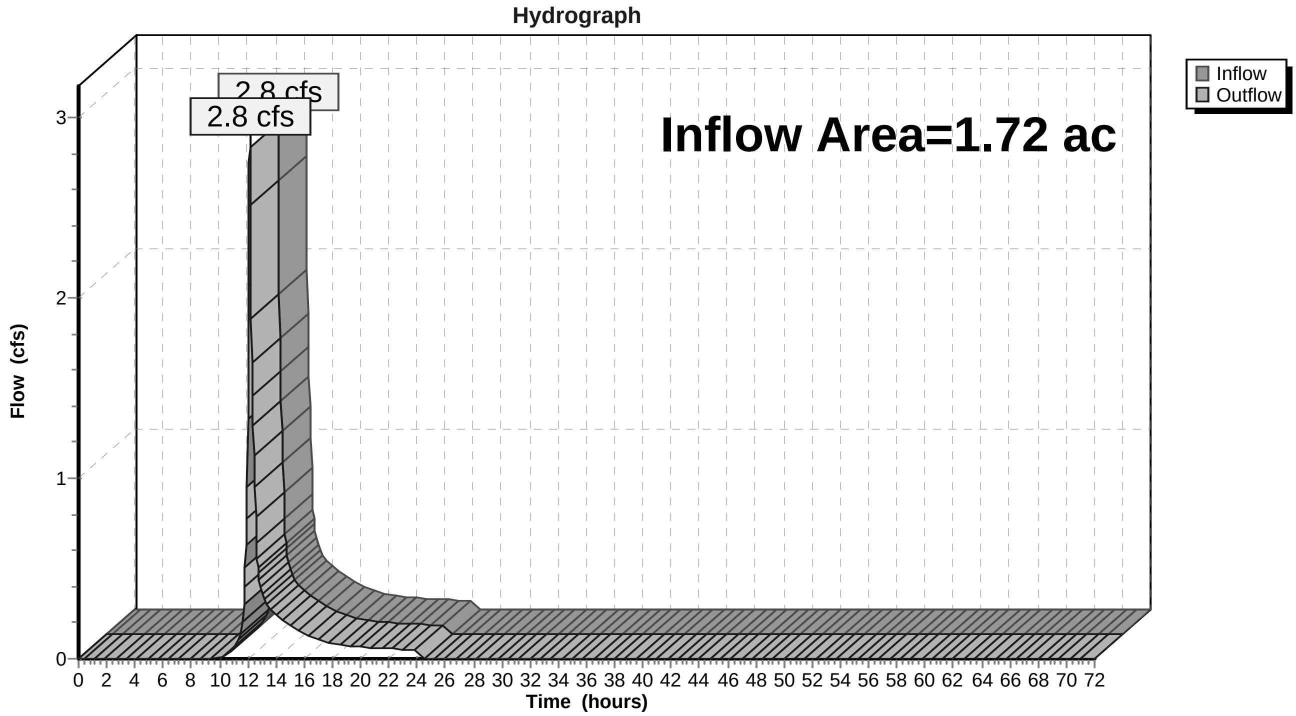


Summary for Reach POA#12:

Inflow Area =	1.72 ac,	0.00% Impervious, Inflow Depth = 1.59"	for 10 Year event
Inflow =	2.8 cfs @	12.12 hrs, Volume=	0.228 af
Outflow =	2.8 cfs @	12.12 hrs, Volume=	0.228 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#12:

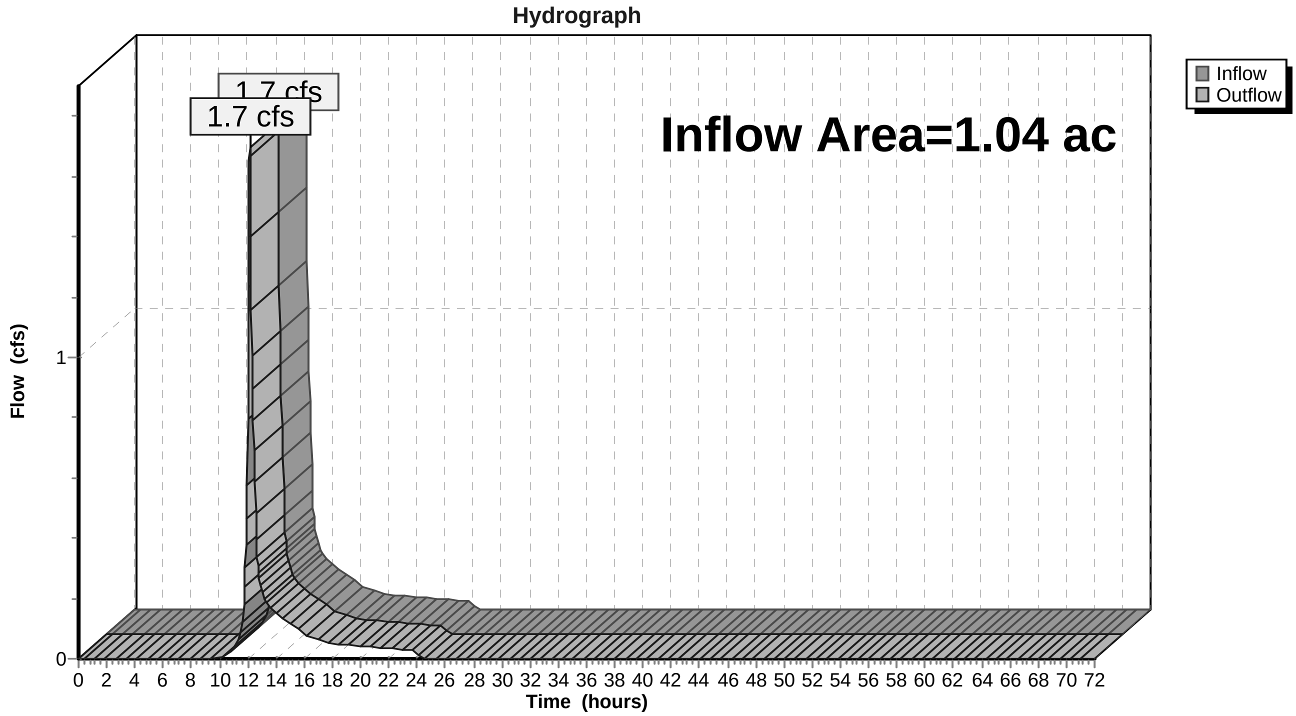


Summary for Reach POA#13:

Inflow Area = 1.04 ac, 0.00% Impervious, Inflow Depth = 1.60" for 10 Year event
Inflow = 1.7 cfs @ 12.13 hrs, Volume= 0.138 af
Outflow = 1.7 cfs @ 12.13 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#13:

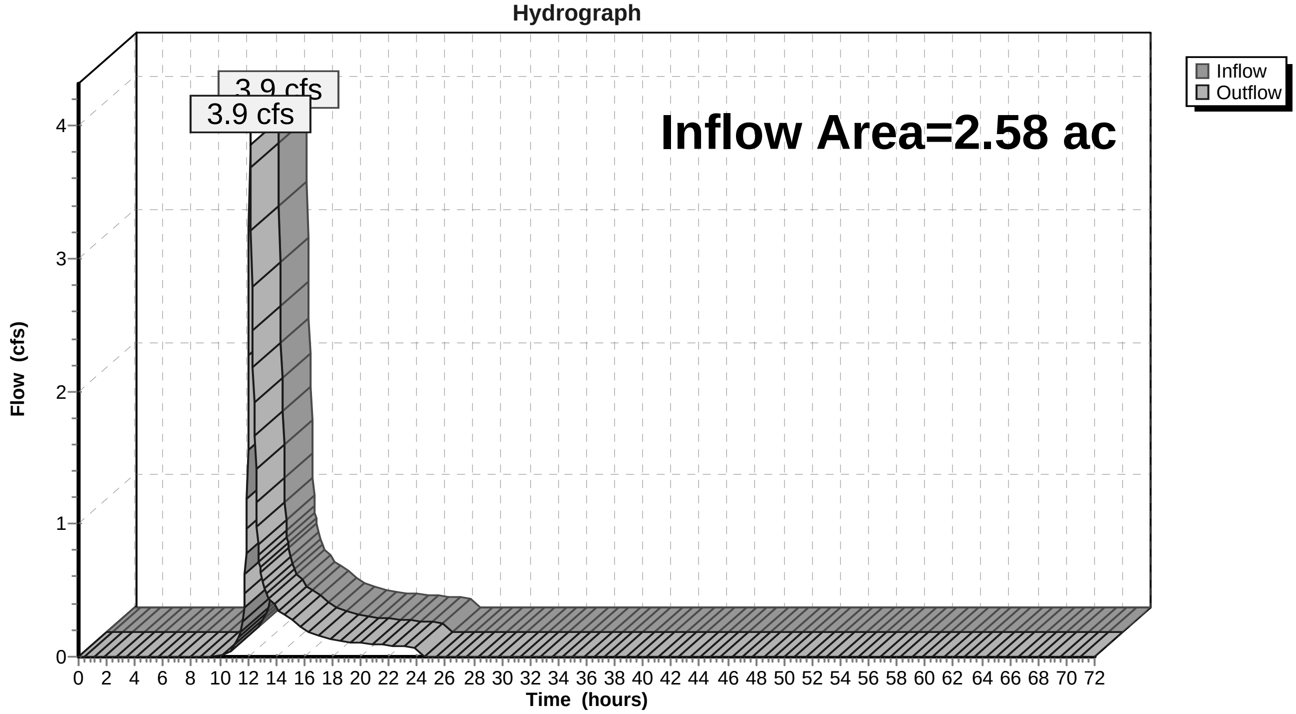


Summary for Reach POA#14:

Inflow Area = 2.58 ac, 0.00% Impervious, Inflow Depth = 1.58" for 10 Year event
Inflow = 3.9 cfs @ 12.17 hrs, Volume= 0.339 af
Outflow = 3.9 cfs @ 12.17 hrs, Volume= 0.339 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#14:



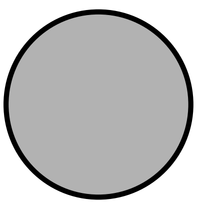
Summary for Reach POA#15: Existing Culvert

Inflow Area = 4.87 ac, 10.63% Impervious, Inflow Depth = 1.86" for 10 Year event
Inflow = 6.5 cfs @ 12.27 hrs, Volume= 0.755 af
Outflow = 5.6 cfs @ 12.20 hrs, Volume= 0.755 af, Atten= 14%, Lag= 0.0 min

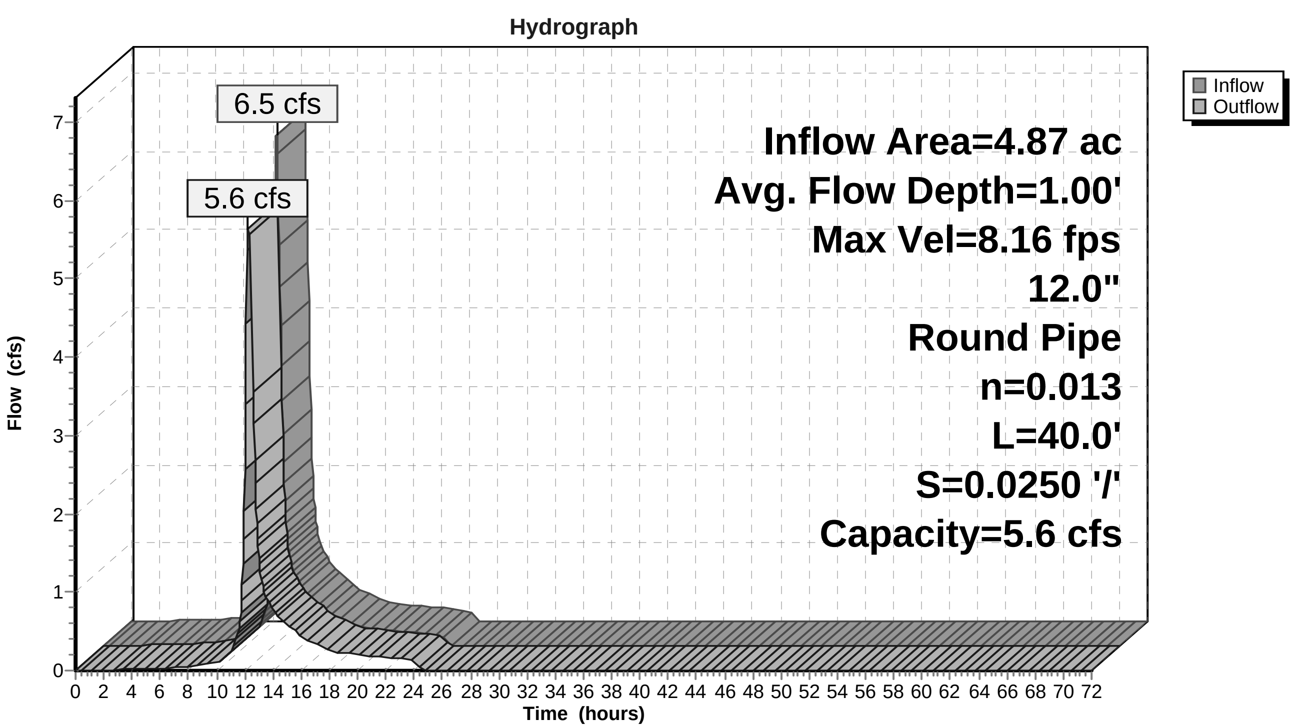
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 8.16 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.13 fps, Avg. Travel Time= 0.2 min

Peak Storage= 31 cf @ 12.20 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.6 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 40.0' Slope= 0.0250 '/'
Inlet Invert= 950.00', Outlet Invert= 949.00'



Reach POA#15: Existing Culvert



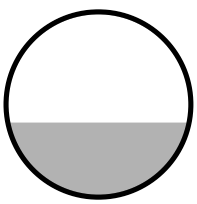
Summary for Reach POA#16: Existing culvert

Inflow Area = 1.57 ac, 22.35% Impervious, Inflow Depth = 2.22" for 10 Year event
Inflow = 2.7 cfs @ 12.20 hrs, Volume= 0.290 af
Outflow = 2.7 cfs @ 12.20 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.0 min

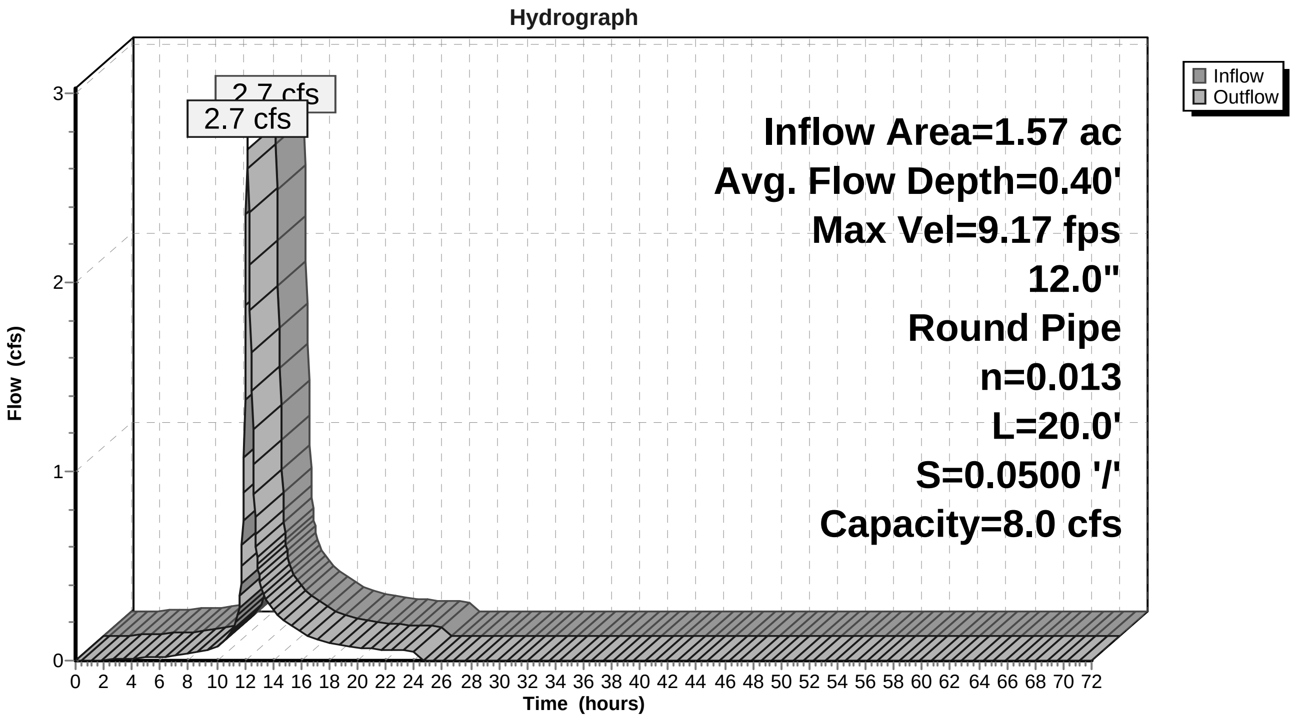
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 9.17 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.16 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.40' , Surface Width= 0.98'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.0 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0500 '/'
Inlet Invert= 955.00', Outlet Invert= 954.00'



Reach POA#16: Existing culvert

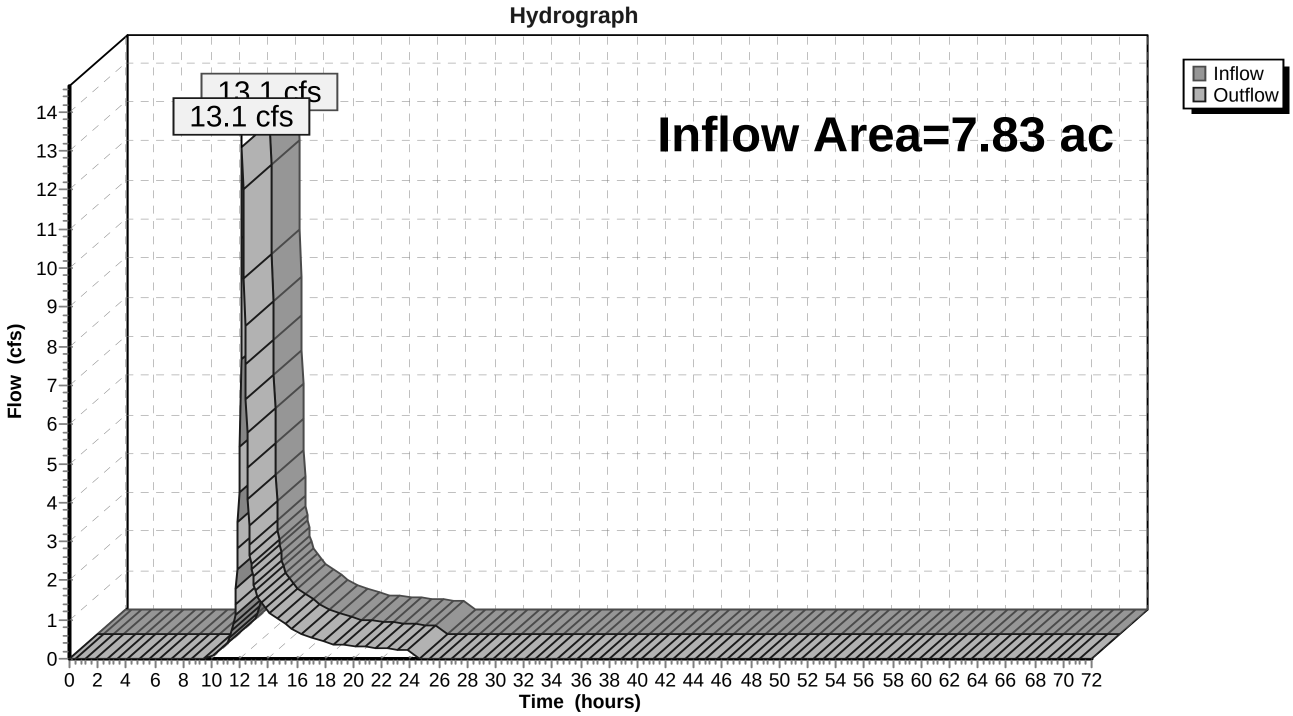


Summary for Reach POA#2:

Inflow Area =	7.83 ac,	0.02% Impervious, Inflow Depth = 1.78"	for 10 Year event
Inflow =	13.1 cfs @	12.17 hrs, Volume=	1.159 af
Outflow =	13.1 cfs @	12.17 hrs, Volume=	1.159 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#2:

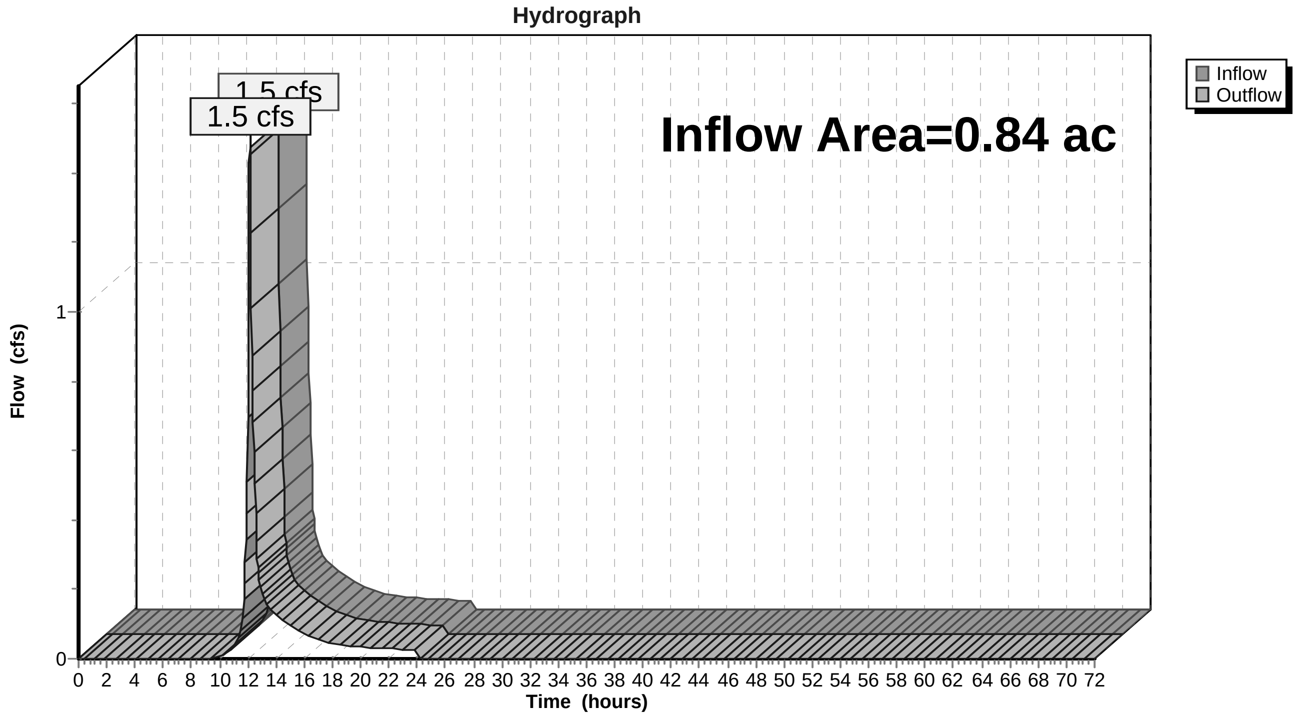


Summary for Reach POA#3:

Inflow Area =	0.84 ac,	0.00% Impervious, Inflow Depth = 1.71"	for 10 Year event	
Inflow =	1.5 cfs @	12.13 hrs, Volume=	0.120 af	
Outflow =	1.5 cfs @	12.13 hrs, Volume=	0.120 af, Atten= 0%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#3:

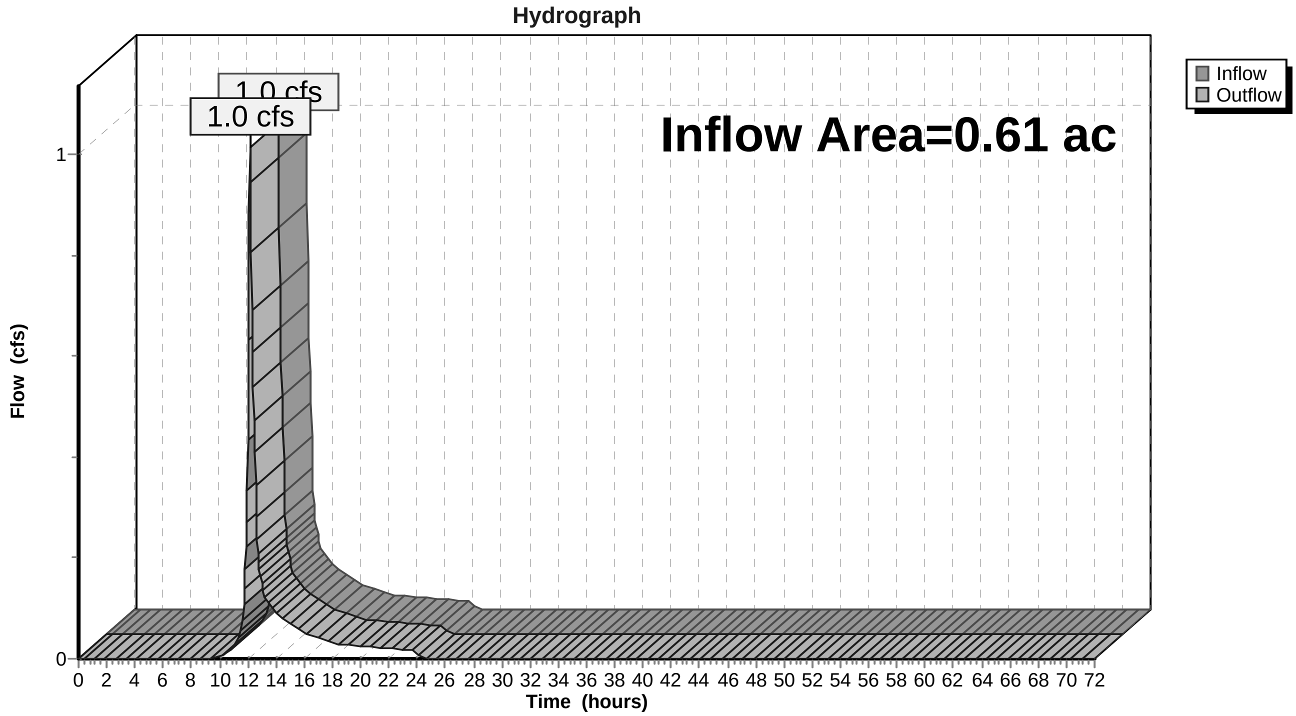


Summary for Reach POA#4:

Inflow Area = 0.61 ac, 0.00% Impervious, Inflow Depth = 1.70" for 10 Year event
Inflow = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af
Outflow = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#4:

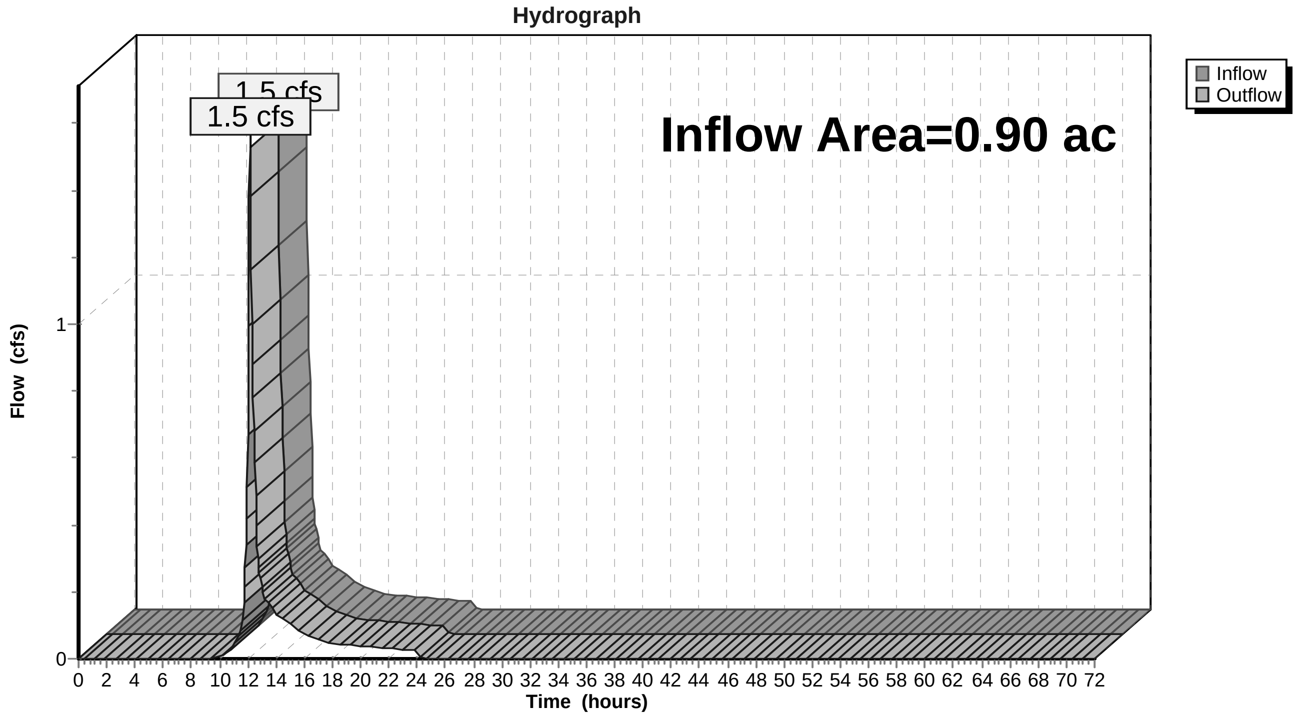


Summary for Reach POA#5:

Inflow Area =	0.90 ac,	0.00% Impervious, Inflow Depth = 1.72"	for 10 Year event
Inflow =	1.5 cfs @	12.15 hrs, Volume=	0.128 af
Outflow =	1.5 cfs @	12.15 hrs, Volume=	0.128 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#5:

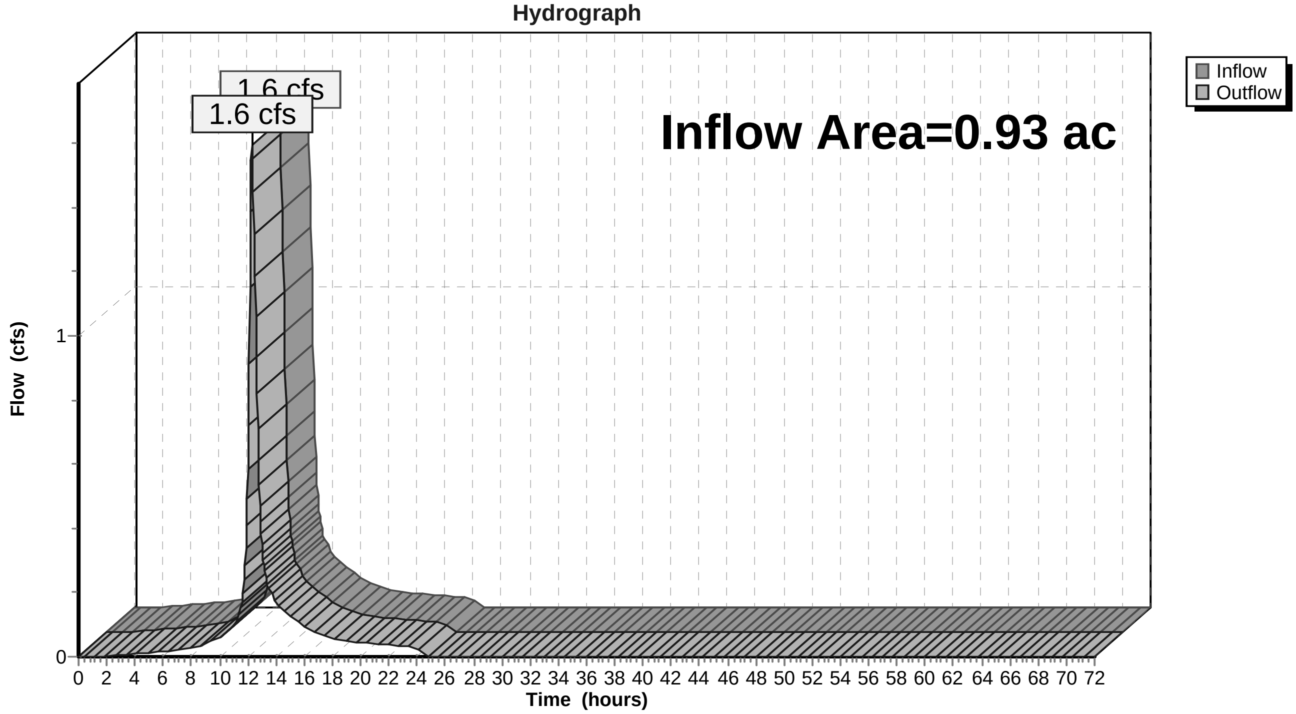


Summary for Reach POA#6:

Inflow Area = 0.93 ac, 32.92% Impervious, Inflow Depth = 2.43" for 10 Year event
Inflow = 1.6 cfs @ 12.30 hrs, Volume= 0.189 af
Outflow = 1.6 cfs @ 12.30 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#6:

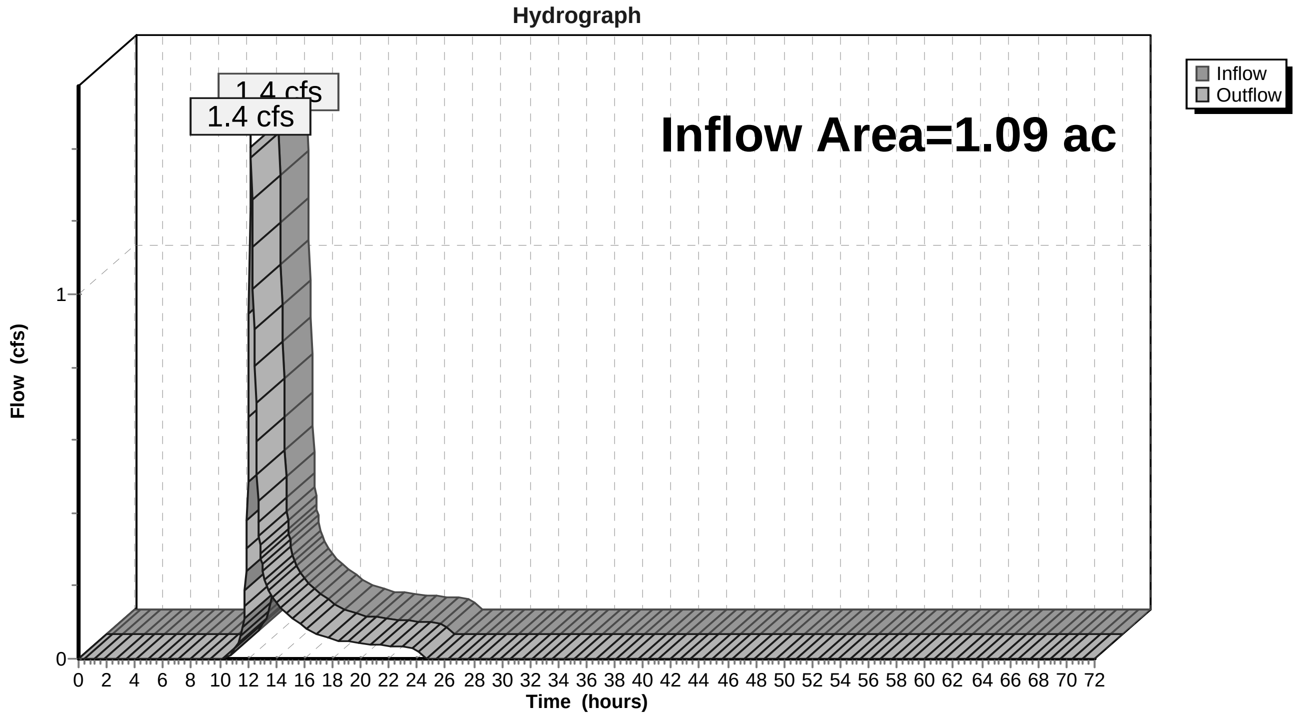


Summary for Reach POA#7:

Inflow Area =	1.09 ac, 0.00% Impervious,	Inflow Depth = 1.52"	for 10 Year event
Inflow =	1.4 cfs @ 12.22 hrs,	Volume=	0.138 af
Outflow =	1.4 cfs @ 12.22 hrs,	Volume=	0.138 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#7:

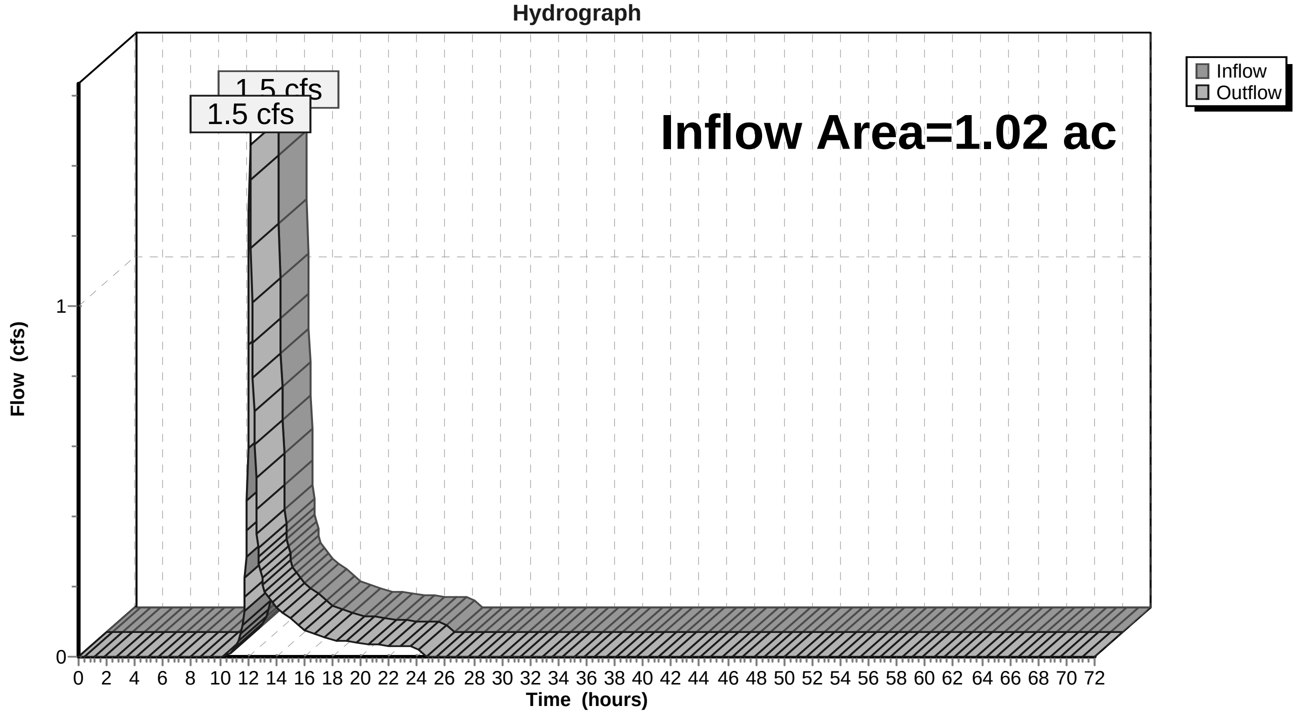


Summary for Reach POA#8:

Inflow Area = 1.02 ac, 0.00% Impervious, Inflow Depth = 1.49" for 10 Year event
Inflow = 1.5 cfs @ 12.16 hrs, Volume= 0.126 af
Outflow = 1.5 cfs @ 12.16 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#8:

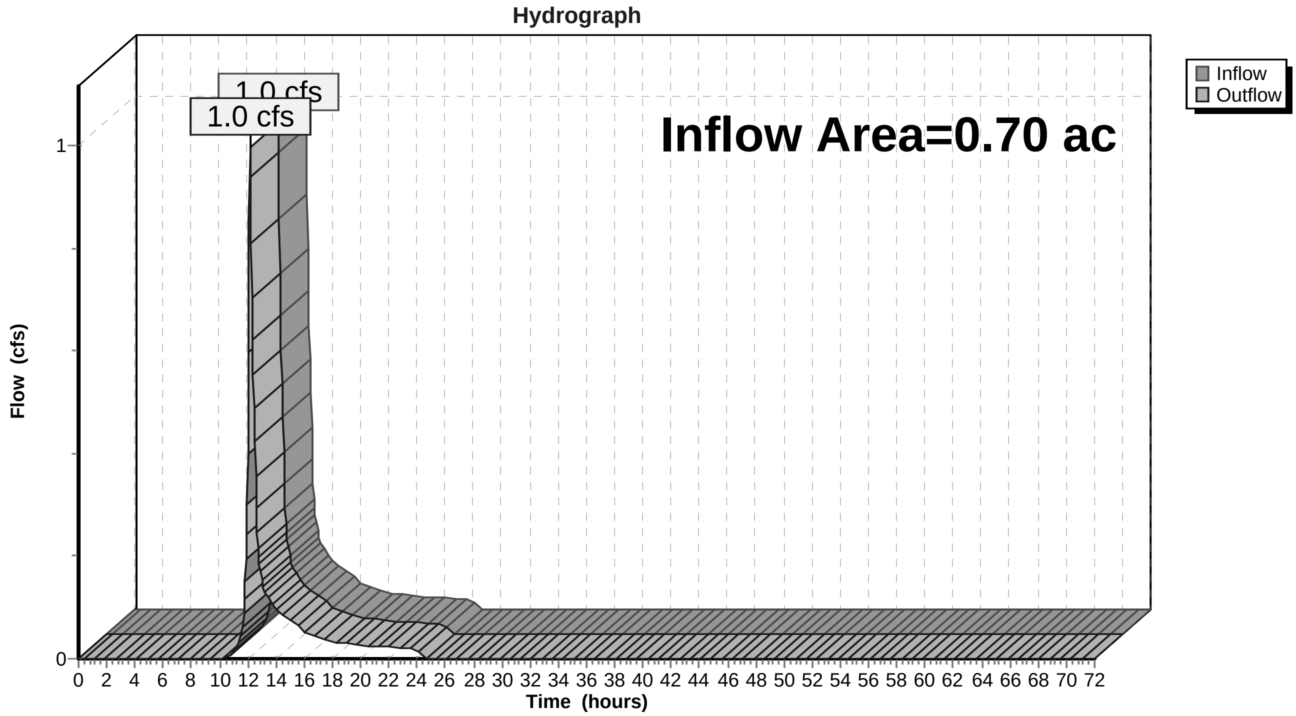


Summary for Reach POA#9:

Inflow Area = 0.70 ac, 0.00% Impervious, Inflow Depth = 1.49" for 10 Year event
Inflow = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af
Outflow = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#9:



Summary for Pond ECB: Existing Catch Basin

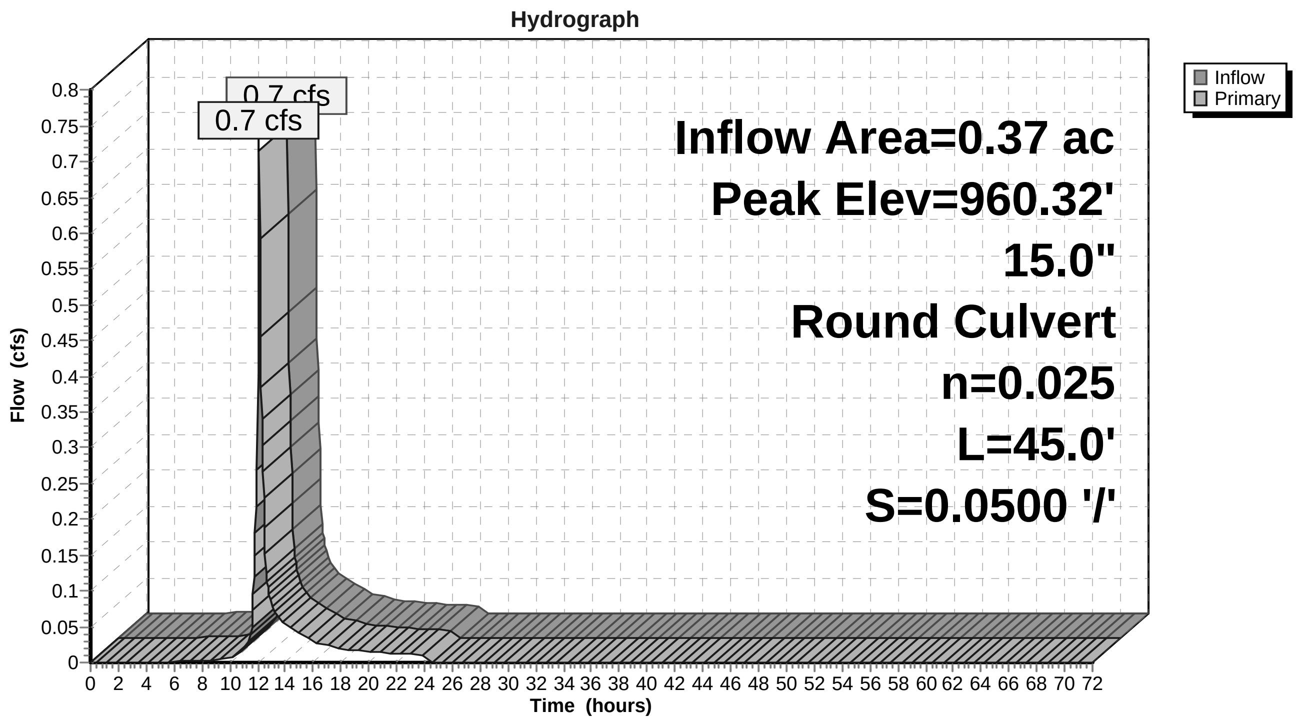
Inflow Area =	0.37 ac, 5.97% Impervious, Inflow Depth = 1.75"	for 10 Year event	
Inflow =	0.7 cfs @ 12.10 hrs, Volume=	0.054 af	
Outflow =	0.7 cfs @ 12.10 hrs, Volume=	0.054 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.7 cfs @ 12.10 hrs, Volume=	0.054 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 960.32' @ 12.10 hrs

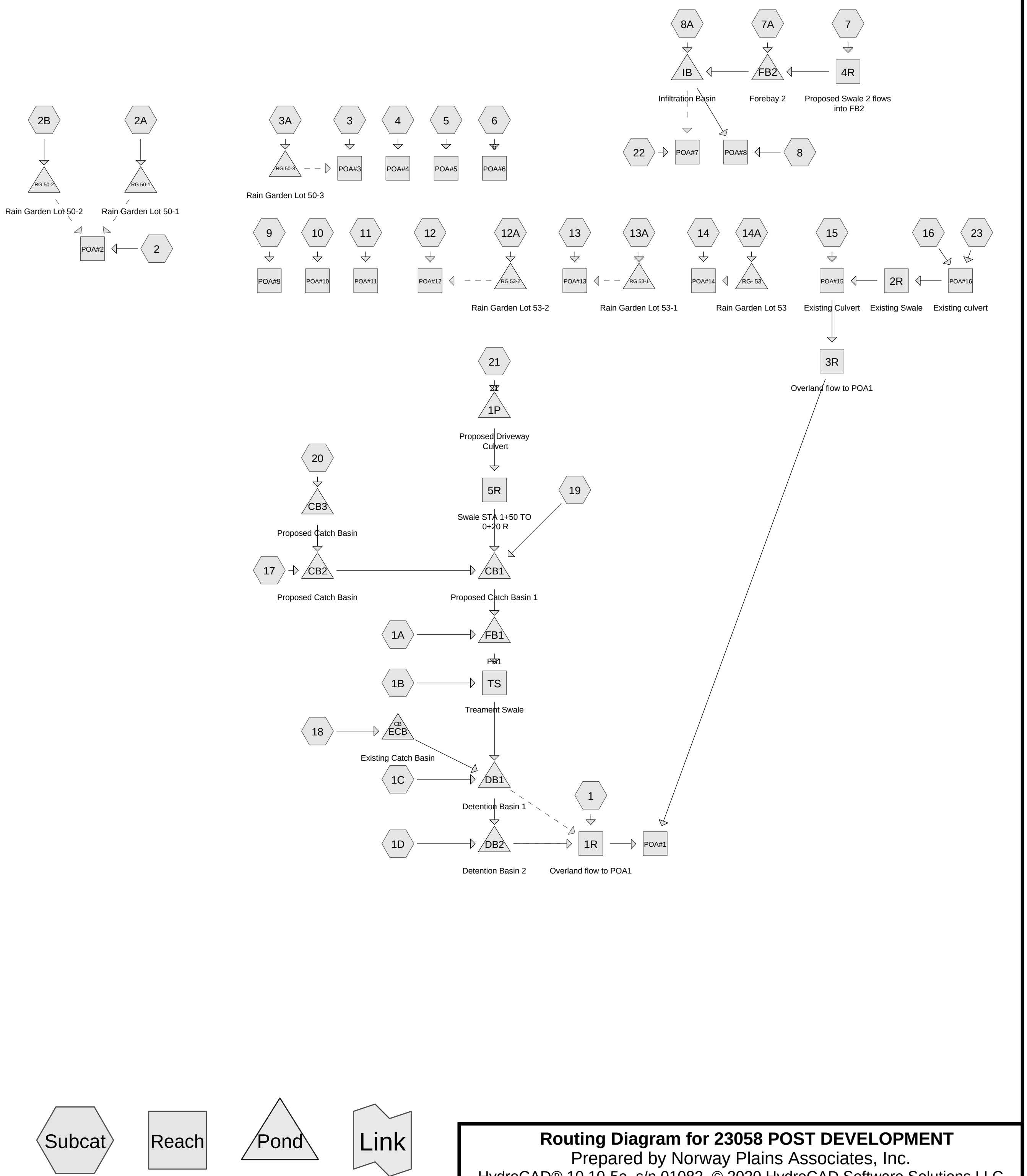
Device	Routing	Invert	Outlet Devices
#1	Primary	959.87'	**15.0" Round Culvert** L= 45.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 959.87' / 957.62' S= 0.0500 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=0.7 cfs @ 12.10 hrs HW=960.32' TW=957.73' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.7 cfs @ 1.80 fps)

Pond ECB: Existing Catch Basin



APPENDIX A 7.6



Routing Diagram for 23058 POST DEVELOPMENT
Prepared by Norway Plains Associates, Inc.
HydroCAD® 10.10-5a s/n 01082 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
11.91	74	>75% Grass cover, Good HSG C (1, 1A, 1B, 1C, 1D, 2, 2A, 2B, 3, 3A, 4, 5, 6, 7, 7A, 8, 8A, 11, 12, 12A, 13, 13A, 14, 14A, 15, 17, 18, 19, 20, 21, 22, 23)
0.14	80	>75% Grass cover, Good HSG D (2)
1.23	74	>75% Grass cover, Good, HSG C (4, 15, 16)
0.02	65	Brush, Good HSG C (5)
0.03	65	Brush, Good, HSG C (4)
0.25	98	Gravel roads HSG C (1B, 2, 7, 17, 19, 20, 21, 23)
0.00	89	Gravel roads HSG C (1C)
1.20	98	Paved parking HSG C (1, 1A, 1B, 1C, 1D, 2, 2B, 3A, 7, 8A, 17, 19, 20, 21, 23)
0.18	98	Paved parking, HSG C (12, 13, 14, 15, 16)
0.32	98	Roofs HSG C (2A, 2B, 3A, 8A, 12A, 13A, 14A, 18)
0.09	98	Roofs, HSG C (15, 16)
6.95	70	Woods, Good HSG C (2, 3, 4, 5, 7, 7A, 8, 8A, 9, 10, 11, 12, 12A, 13A, 15, 18, 20, 21, 22, 23)
1.94	77	Woods, Good HSG D (2)
3.93	70	Woods, Good, HSG C (1, 2B, 4, 13, 14, 15, 16)
28.19	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.00	HSG A	
0.00	HSG B	
26.11	HSG C	1, 1A, 1B, 1C, 1D, 2, 2A, 2B, 3, 3A, 4, 5, 6, 7, 7A, 8, 8A, 9, 10, 11, 12, 12A, 13, 13A, 14, 14A, 15, 16, 17, 18, 19, 20, 21, 22, 23
2.08	HSG D	2
0.00	Other	
28.19		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=21,752 sf 6.78% Impervious Runoff Depth=0.91"
Flow Length=410' Tc=6.0 min CN=WQ Runoff=0.5 cfs 0.038 af

Subcatchment 1A: Runoff Area=1,879 sf 32.52% Impervious Runoff Depth=1.39"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 0.005 af

Subcatchment 1B: Runoff Area=8,661 sf 33.66% Impervious Runoff Depth=1.41"
Flow Length=67' Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.023 af

Subcatchment 1C: Runoff Area=8,041 sf 31.92% Impervious Runoff Depth=1.38"
Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.021 af

Subcatchment 1D: Runoff Area=6,717 sf 28.75% Impervious Runoff Depth=1.32"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.017 af

Subcatchment 2: Runoff Area=311,463 sf 0.31% Impervious Runoff Depth=0.82"
Flow Length=705' Tc=11.8 min CN=WQ Runoff=5.1 cfs 0.487 af

Subcatchment 2A: Runoff Area=12,643 sf 14.68% Impervious Runoff Depth=1.07"
Flow Length=185' Tc=7.3 min CN=WQ Runoff=0.3 cfs 0.026 af

Subcatchment 2B: Runoff Area=16,907 sf 13.35% Impervious Runoff Depth=1.04"
Flow Length=145' Tc=7.0 min CN=WQ Runoff=0.4 cfs 0.034 af

Subcatchment 3: Runoff Area=23,141 sf 0.00% Impervious Runoff Depth=0.77"
Flow Length=275' Tc=8.6 min CN=WQ Runoff=0.4 cfs 0.034 af

Subcatchment 3A: Runoff Area=13,565 sf 19.40% Impervious Runoff Depth=1.15"
Tc=0.0 min CN=WQ Runoff=0.4 cfs 0.030 af

Subcatchment 4: Runoff Area=26,621 sf 0.00% Impervious Runoff Depth=0.76"
Flow Length=190' Tc=10.6 min CN=WQ Runoff=0.4 cfs 0.039 af

Subcatchment 5: Runoff Area=38,993 sf 0.00% Impervious Runoff Depth=0.77"
Flow Length=195' Tc=10.0 min CN=WQ Runoff=0.6 cfs 0.058 af

Subcatchment 6: 6 Runoff Area=1,925 sf 0.00% Impervious Runoff Depth=0.80"
Tc=6.0 min CN=74 Runoff=0.0 cfs 0.003 af

Subcatchment 7: Runoff Area=62,105 sf 49.96% Impervious Runoff Depth=1.70"
Flow Length=1,101' Tc=6.0 min CN=WQ Runoff=2.5 cfs 0.202 af

Subcatchment 7A: Runoff Area=16,510 sf 0.00% Impervious Runoff Depth=0.75"
Flow Length=215' Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.024 af

Subcatchment 8: Runoff Area=14,804 sf 0.00% Impervious Runoff Depth=0.68"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.019 af

Subcatchment 8A: Runoff Area=32,013 sf 8.62% Impervious Runoff Depth=0.93"
Flow Length=280' Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.057 af

Subcatchment 9: Runoff Area=30,642 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=410' Tc=10.7 min CN=70 Runoff=0.4 cfs 0.036 af

Subcatchment 10: Runoff Area=43,790 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=355' Tc=10.1 min CN=70 Runoff=0.5 cfs 0.052 af

Subcatchment 11: Runoff Area=58,947 sf 0.00% Impervious Runoff Depth=0.64"
Flow Length=420' Tc=11.9 min CN=WQ Runoff=0.7 cfs 0.072 af

Subcatchment 12: Runoff Area=69,836 sf 2.14% Impervious Runoff Depth=0.75"
Flow Length=315' Tc=8.2 min CN=WQ Runoff=1.1 cfs 0.100 af

Subcatchment 12A: Runoff Area=5,145 sf 36.07% Impervious Runoff Depth=1.45"
Tc=0.0 min CN=WQ Runoff=0.2 cfs 0.014 af

Subcatchment 13: Runoff Area=31,572 sf 2.15% Impervious Runoff Depth=0.71"
Flow Length=335' Tc=8.4 min CN=WQ Runoff=0.5 cfs 0.043 af

Subcatchment 13A: Runoff Area=13,712 sf 13.54% Impervious Runoff Depth=1.02"
Tc=0.0 min CN=WQ Runoff=0.4 cfs 0.027 af

Subcatchment 14: Runoff Area=102,524 sf 0.70% Impervious Runoff Depth=0.69"
Flow Length=490' Tc=11.2 min CN=WQ Runoff=1.4 cfs 0.135 af

Subcatchment 14A: Runoff Area=9,666 sf 19.20% Impervious Runoff Depth=1.15"
Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.021 af

Subcatchment 15: Runoff Area=143,682 sf 5.05% Impervious Runoff Depth=0.77"
Flow Length=640' Tc=21.4 min CN=WQ Runoff=1.7 cfs 0.212 af

Subcatchment 16: Runoff Area=15,747 sf 11.09% Impervious Runoff Depth=1.00"
Flow Length=195' Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.030 af

Subcatchment 17: Runoff Area=4,110 sf 21.00% Impervious Runoff Depth=1.18"
Flow Length=80' Slope=0.0700 '/' Tc=6.0 min CN=WQ Runoff=0.1 cfs 0.009 af

Subcatchment 18: Runoff Area=16,072 sf 5.97% Impervious Runoff Depth=0.82"
Flow Length=190' Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.025 af

Subcatchment 19: Runoff Area=5,258 sf 74.55% Impervious Runoff Depth=2.14"
Flow Length=131' Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.022 af

Subcatchment 20: Runoff Area=26,480 sf 32.42% Impervious Runoff Depth=1.38"
Flow Length=619' Tc=6.0 min CN=WQ Runoff=0.9 cfs 0.070 af

Subcatchment 21: 21 Runoff Area=10,304 sf 58.66% Impervious Runoff Depth=1.85"
Tc=0.0 min CN=WQ Runoff=0.5 cfs 0.037 af

Subcatchment 22: Runoff Area=14,761 sf 0.00% Impervious Runoff Depth=0.72"
Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.020 af

Subcatchment 23: Runoff Area=8,099 sf 5.57% Impervious Runoff Depth=0.90"
Tc=0.0 min CN=WQ Runoff=0.2 cfs 0.014 af

Reach 1R: Overland flow to POA1 Avg. Flow Depth=0.11' Max Vel=3.23 fps Inflow=1.3 cfs 0.267 af
n=0.030 L=83.0' S=0.1325 '/' Capacity=7.3 cfs Outflow=1.3 cfs 0.267 af

Reach 2R: Existing Swale Avg. Flow Depth=0.10' Max Vel=3.08 fps Inflow=0.5 cfs 0.044 af
n=0.025 L=45.0' S=0.0889 '/' Capacity=5.9 cfs Outflow=0.5 cfs 0.044 af

Reach 3R: Overland flow to POA1 Avg. Flow Depth=0.16' Max Vel=2.52 fps Inflow=1.9 cfs 0.256 af
n=0.030 L=400.0' S=0.0500 '/' Capacity=8.9 cfs Outflow=1.9 cfs 0.256 af

Reach 4R: Proposed Swale 2 flows into Avg. Flow Depth=0.20' Max Vel=4.77 fps Inflow=2.5 cfs 0.202 af
n=0.030 L=204.0' S=0.1069 '/' Capacity=57.6 cfs Outflow=2.5 cfs 0.202 af

Reach 5R: Swale STA 1+50 TO 0+20 R Avg. Flow Depth=0.17' Max Vel=2.09 fps Inflow=0.5 cfs 0.037 af
n=0.035 L=120.0' S=0.0375 '/' Capacity=45.8 cfs Outflow=0.5 cfs 0.037 af

Reach POA#1: Inflow=3.2 cfs 0.523 af
Outflow=3.2 cfs 0.523 af

Reach POA#10: Inflow=0.5 cfs 0.052 af
Outflow=0.5 cfs 0.052 af

Reach POA#11: Inflow=0.7 cfs 0.072 af
Outflow=0.7 cfs 0.072 af

Reach POA#12: Inflow=1.1 cfs 0.100 af
Outflow=1.1 cfs 0.100 af

Reach POA#13: Inflow=0.5 cfs 0.043 af
Outflow=0.5 cfs 0.043 af

Reach POA#14: Inflow=1.4 cfs 0.135 af
Outflow=1.4 cfs 0.135 af

Reach POA#15: Existing Culvert Avg. Flow Depth=0.40' Max Vel=6.50 fps Inflow=1.9 cfs 0.256 af
12.0" Round Pipe n=0.013 L=40.0' S=0.0250 '/' Capacity=5.6 cfs Outflow=1.9 cfs 0.256 af

Reach POA#16: Existing culvert Avg. Flow Depth=0.17' Max Vel=5.64 fps Inflow=0.5 cfs 0.044 af
12.0" Round Pipe n=0.013 L=20.0' S=0.0500 '/' Capacity=8.0 cfs Outflow=0.5 cfs 0.044 af

Reach POA#2: Inflow=5.1 cfs 0.487 af
Outflow=5.1 cfs 0.487 af

Reach POA#3: Inflow=0.4 cfs 0.034 af
Outflow=0.4 cfs 0.034 af

Reach POA#4: Inflow=0.4 cfs 0.039 af
Outflow=0.4 cfs 0.039 af

Reach POA#5: Inflow=0.6 cfs 0.058 af
Outflow=0.6 cfs 0.058 af

Reach POA#6: Inflow=0.0 cfs 0.003 af
Outflow=0.0 cfs 0.003 af

Reach POA#7: Inflow=0.3 cfs 0.020 af
Outflow=0.3 cfs 0.020 af

Reach POA#8: Inflow=0.2 cfs 0.019 af
Outflow=0.2 cfs 0.019 af

Reach POA#9: Inflow=0.4 cfs 0.036 af
Outflow=0.4 cfs 0.036 af

Reach TS: Treament Swale Avg. Flow Depth=0.48' Max Vel=0.38 fps Inflow=1.9 cfs 0.166 af
n=0.150 L=145.0' S=0.0050 '/' Capacity=23.1 cfs Outflow=1.6 cfs 0.166 af

Pond 1P: Proposed Driveway Culvert Peak Elev=973.09' Storage=7 cf Inflow=0.5 cfs 0.037 af
15.0" Round Culvert n=0.013 L=40.0' S=0.0187 '/' Outflow=0.5 cfs 0.037 af

Pond CB1: Proposed Catch Basin 1 Peak Elev=963.48' Storage=19 cf Inflow=1.6 cfs 0.137 af
15.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=1.6 cfs 0.137 af

Pond CB2: Proposed Catch Basin Peak Elev=963.68' Storage=2 cf Inflow=1.0 cfs 0.079 af
15.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=1.0 cfs 0.079 af

Pond CB3: Proposed Catch Basin Peak Elev=965.94' Storage=5 cf Inflow=0.9 cfs 0.070 af
15.0" Round Culvert n=0.013 L=45.0' S=0.0333 '/' Outflow=0.9 cfs 0.070 af

Pond DB1: Detention Basin 1 Peak Elev=955.69' Storage=1,957 cf Inflow=2.1 cfs 0.212 af
Primary=1.0 cfs 0.212 af Secondary=0.0 cfs 0.000 af Outflow=1.0 cfs 0.212 af

Pond DB2: Detention Basin 2 Peak Elev=948.13' Storage=522 cf Inflow=1.1 cfs 0.229 af
Primary=1.1 cfs 0.229 af Secondary=0.0 cfs 0.000 af Outflow=1.1 cfs 0.229 af

Pond ECB: Existing Catch Basin Peak Elev=960.16' Inflow=0.3 cfs 0.025 af
15.0" Round Culvert n=0.025 L=45.0' S=0.0500 '/' Outflow=0.3 cfs 0.025 af

Pond FB1: FB1 Peak Elev=961.51' Storage=162 cf Inflow=1.7 cfs 0.142 af
Outflow=1.6 cfs 0.142 af

Pond FB2: Forebay 2 Peak Elev=955.15' Storage=1,353 cf Inflow=2.8 cfs 0.225 af
Outflow=2.8 cfs 0.225 af

Pond IB: Infiltration Basin Peak Elev=955.05' Storage=6,566 cf Inflow=3.5 cfs 0.282 af
=0.2 cfs 0.282 af Primary=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af Tertiary=0.0 cfs 0.000 af Outflow=0.2 cfs 0.282 af

Pond RG 50-1: Rain Garden Lot 50-1 Peak Elev=978.20' Storage=787 cf Inflow=0.3 cfs 0.026 af
Discarded=0.0 cfs 0.026 af Secondary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.026 af

Pond RG 50-2: Rain Garden Lot 50-2 Peak Elev=984.32' Storage=1,058 cf Inflow=0.4 cfs 0.034 af
Discarded=0.0 cfs 0.032 af Secondary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.032 af

Pond RG 50-3: Rain Garden Lot 50-3 Peak Elev=0.00' Storage=0 cf
Discarded=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af

Pond RG 53-1: Rain Garden Lot 53-1 Peak Elev=986.90' Storage=852 cf Inflow=0.4 cfs 0.027 af
Discarded=0.0 cfs 0.025 af Secondary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.025 af

Pond RG 53-2: Rain Garden Lot 53-2 Peak Elev=0.00' Storage=0 cf
Discarded=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af

Pond RG- 53: Rain Garden Lot 53 Peak Elev=988.42' Storage=621 cf Inflow=0.3 cfs 0.021 af
Discarded=0.0 cfs 0.021 af Secondary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.021 af

Total Runoff Area = 28.19 ac Runoff Volume = 2.055 af Average Runoff Depth = 0.87"
92.73% Pervious = 26.14 ac 7.27% Impervious = 2.05 ac

APPENDIX A 7.7

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=21,752 sf 6.78% Impervious Runoff Depth=1.90"
Flow Length=410' Tc=6.0 min CN=WQ Runoff=1.1 cfs 0.079 af

Subcatchment 1A: Runoff Area=1,879 sf 32.52% Impervious Runoff Depth=2.49"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 0.009 af

Subcatchment 1B: Runoff Area=8,661 sf 33.66% Impervious Runoff Depth=2.52"
Flow Length=67' Tc=6.0 min CN=WQ Runoff=0.5 cfs 0.042 af

Subcatchment 1C: Runoff Area=8,041 sf 31.92% Impervious Runoff Depth=2.48"
Tc=6.0 min CN=WQ Runoff=0.5 cfs 0.038 af

Subcatchment 1D: Runoff Area=6,717 sf 28.75% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.031 af

Subcatchment 2: Runoff Area=311,463 sf 0.31% Impervious Runoff Depth=1.79"
Flow Length=705' Tc=11.8 min CN=WQ Runoff=12.1 cfs 1.064 af

Subcatchment 2A: Runoff Area=12,643 sf 14.68% Impervious Runoff Depth=2.09"
Flow Length=185' Tc=7.3 min CN=WQ Runoff=0.6 cfs 0.051 af

Subcatchment 2B: Runoff Area=16,907 sf 13.35% Impervious Runoff Depth=2.06"
Flow Length=145' Tc=7.0 min CN=WQ Runoff=0.9 cfs 0.067 af

Subcatchment 3: Runoff Area=23,141 sf 0.00% Impervious Runoff Depth=1.71"
Flow Length=275' Tc=8.6 min CN=WQ Runoff=0.9 cfs 0.076 af

Subcatchment 3A: Runoff Area=13,565 sf 19.40% Impervious Runoff Depth=2.20"
Tc=0.0 min CN=WQ Runoff=0.9 cfs 0.057 af

Subcatchment 4: Runoff Area=26,621 sf 0.00% Impervious Runoff Depth=1.70"
Flow Length=190' Tc=10.6 min CN=WQ Runoff=1.0 cfs 0.087 af

Subcatchment 5: Runoff Area=38,993 sf 0.00% Impervious Runoff Depth=1.72"
Flow Length=195' Tc=10.0 min CN=WQ Runoff=1.5 cfs 0.128 af

Subcatchment 6: 6 Runoff Area=1,925 sf 0.00% Impervious Runoff Depth=1.77"
Tc=6.0 min CN=74 Runoff=0.1 cfs 0.007 af

Subcatchment 7: Runoff Area=62,105 sf 49.96% Impervious Runoff Depth=2.87"
Flow Length=1,101' Tc=6.0 min CN=WQ Runoff=4.3 cfs 0.342 af

Subcatchment 7A: Runoff Area=16,510 sf 0.00% Impervious Runoff Depth=1.69"
Flow Length=215' Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.053 af

Subcatchment 8: Runoff Area=14,804 sf 0.00% Impervious Runoff Depth=1.58"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 0.045 af

Subcatchment 8A: Runoff Area=32,013 sf 8.62% Impervious Runoff Depth=1.91"
Flow Length=280' Tc=6.0 min CN=WQ Runoff=1.6 cfs 0.117 af

Subcatchment 9: Runoff Area=30,642 sf 0.00% Impervious Runoff Depth=1.49"
Flow Length=410' Tc=10.7 min CN=70 Runoff=1.0 cfs 0.087 af

Subcatchment 10: Runoff Area=43,790 sf 0.00% Impervious Runoff Depth=1.49"
Flow Length=355' Tc=10.1 min CN=70 Runoff=1.4 cfs 0.124 af

Subcatchment 11: Runoff Area=58,947 sf 0.00% Impervious Runoff Depth=1.51"
Flow Length=420' Tc=11.9 min CN=WQ Runoff=1.9 cfs 0.171 af

Subcatchment 12: Runoff Area=69,836 sf 2.14% Impervious Runoff Depth=1.67"
Flow Length=315' Tc=8.2 min CN=WQ Runoff=2.8 cfs 0.223 af

Subcatchment 12A: Runoff Area=5,145 sf 36.07% Impervious Runoff Depth=2.57"
Tc=0.0 min CN=WQ Runoff=0.4 cfs 0.025 af

Subcatchment 13: Runoff Area=31,572 sf 2.15% Impervious Runoff Depth=1.60"
Flow Length=335' Tc=8.4 min CN=WQ Runoff=1.2 cfs 0.097 af

Subcatchment 13A: Runoff Area=13,712 sf 13.54% Impervious Runoff Depth=2.04"
Tc=0.0 min CN=WQ Runoff=0.8 cfs 0.053 af

Subcatchment 14: Runoff Area=102,524 sf 0.70% Impervious Runoff Depth=1.59"
Flow Length=490' Tc=11.2 min CN=WQ Runoff=3.5 cfs 0.311 af

Subcatchment 14A: Runoff Area=9,666 sf 19.20% Impervious Runoff Depth=2.19"
Tc=6.0 min CN=WQ Runoff=0.5 cfs 0.041 af

Subcatchment 15: Runoff Area=143,682 sf 5.05% Impervious Runoff Depth=1.69"
Flow Length=640' Tc=21.4 min CN=WQ Runoff=4.1 cfs 0.465 af

Subcatchment 16: Runoff Area=15,747 sf 11.09% Impervious Runoff Depth=2.01"
Flow Length=195' Tc=6.0 min CN=WQ Runoff=0.8 cfs 0.060 af

Subcatchment 17: Runoff Area=4,110 sf 21.00% Impervious Runoff Depth=2.23"
Flow Length=80' Slope=0.0700 '/' Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.018 af

Subcatchment 18: Runoff Area=16,072 sf 5.97% Impervious Runoff Depth=1.75"
Flow Length=190' Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.054 af

Subcatchment 19: Runoff Area=5,258 sf 74.55% Impervious Runoff Depth=3.43"
Flow Length=131' Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.034 af

Subcatchment 20: Runoff Area=26,480 sf 32.42% Impervious Runoff Depth=2.48"
Flow Length=619' Tc=6.0 min CN=WQ Runoff=1.6 cfs 0.126 af

Subcatchment 21: 21 Runoff Area=10,304 sf 58.66% Impervious Runoff Depth=3.07"
Tc=0.0 min CN=WQ Runoff=0.9 cfs 0.061 af

Subcatchment 22: Runoff Area=14,761 sf 0.00% Impervious Runoff Depth=1.64"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 0.046 af

Subcatchment 23: Runoff Area=8,099 sf 5.57% Impervious Runoff Depth=1.89"
Tc=0.0 min CN=WQ Runoff=0.5 cfs 0.029 af

Reach 1R: Overland flow to POA1 Avg. Flow Depth=0.15' Max Vel=3.91 fps Inflow=2.5 cfs 0.491 af
n=0.030 L=83.0' S=0.1325 '/' Capacity=7.3 cfs Outflow=2.5 cfs 0.491 af

Reach 2R: Existing Swale Avg. Flow Depth=0.15' Max Vel=3.82 fps Inflow=1.1 cfs 0.090 af
n=0.025 L=45.0' S=0.0889 '/' Capacity=5.9 cfs Outflow=1.1 cfs 0.090 af

Reach 3R: Overland flow to POA1 Avg. Flow Depth=0.24' Max Vel=3.28 fps Inflow=4.6 cfs 0.554 af
n=0.030 L=400.0' S=0.0500 '/' Capacity=8.9 cfs Outflow=4.6 cfs 0.554 af

Reach 4R: Proposed Swale 2 flows into Avg. Flow Depth=0.27' Max Vel=5.63 fps Inflow=4.3 cfs 0.342 af
n=0.030 L=204.0' S=0.1069 '/' Capacity=57.6 cfs Outflow=4.3 cfs 0.342 af

Reach 5R: Swale STA 1+50 TO 0+20 R Avg. Flow Depth=0.23' Max Vel=2.43 fps Inflow=0.9 cfs 0.061 af
n=0.035 L=120.0' S=0.0375 '/' Capacity=45.8 cfs Outflow=0.8 cfs 0.061 af

Reach POA#1: Inflow=6.9 cfs 1.045 af
Outflow=6.9 cfs 1.045 af

Reach POA#10: Inflow=1.4 cfs 0.124 af
Outflow=1.4 cfs 0.124 af

Reach POA#11: Inflow=1.9 cfs 0.171 af
Outflow=1.9 cfs 0.171 af

Reach POA#12: Inflow=2.8 cfs 0.223 af
Outflow=2.8 cfs 0.223 af

Reach POA#13: Inflow=1.2 cfs 0.120 af
Outflow=1.2 cfs 0.120 af

Reach POA#14: Inflow=3.5 cfs 0.315 af
Outflow=3.5 cfs 0.315 af

Reach POA#15: Existing Culvert Avg. Flow Depth=0.69' Max Vel=8.00 fps Inflow=4.6 cfs 0.554 af
12.0" Round Pipe n=0.013 L=40.0' S=0.0250 '/' Capacity=5.6 cfs Outflow=4.6 cfs 0.554 af

Reach POA#16: Existing culvert Avg. Flow Depth=0.25' Max Vel=7.08 fps Inflow=1.1 cfs 0.090 af
12.0" Round Pipe n=0.013 L=20.0' S=0.0500 '/' Capacity=8.0 cfs Outflow=1.1 cfs 0.090 af

Reach POA#2: Inflow=12.1 cfs 1.079 af
Outflow=12.1 cfs 1.079 af

Reach POA#3: Inflow=0.9 cfs 0.076 af
Outflow=0.9 cfs 0.076 af

Reach POA#4: Inflow=1.0 cfs 0.087 af
Outflow=1.0 cfs 0.087 af

Reach POA#5: Inflow=1.5 cfs 0.128 af
Outflow=1.5 cfs 0.128 af

Reach POA#6: Inflow=0.1 cfs 0.007 af
Outflow=0.1 cfs 0.007 af

Reach POA#7: Inflow=0.6 cfs 0.086 af
Outflow=0.6 cfs 0.086 af

Reach POA#8: Inflow=0.6 cfs 0.084 af
Outflow=0.6 cfs 0.084 af

Reach POA#9: Inflow=1.0 cfs 0.087 af
Outflow=1.0 cfs 0.087 af

Reach TS: Treament Swale Avg. Flow Depth=0.68' Max Vel=0.47 fps Inflow=3.4 cfs 0.289 af
n=0.150 L=145.0' S=0.0050 '/' Capacity=23.1 cfs Outflow=3.0 cfs 0.289 af

Pond 1P: Proposed Driveway Culvert Peak Elev=973.19' Storage=12 cf Inflow=0.9 cfs 0.061 af
15.0" Round Culvert n=0.013 L=40.0' S=0.0187 '/' Outflow=0.9 cfs 0.061 af

Pond CB1: Proposed Catch Basin 1 Peak Elev=963.78' Storage=24 cf Inflow=2.9 cfs 0.238 af
15.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=2.9 cfs 0.238 af

Pond CB2: Proposed Catch Basin Peak Elev=963.99' Storage=6 cf Inflow=1.8 cfs 0.143 af
15.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=1.8 cfs 0.143 af

Pond CB3: Proposed Catch Basin Peak Elev=966.12' Storage=7 cf Inflow=1.6 cfs 0.126 af
15.0" Round Culvert n=0.013 L=45.0' S=0.0333 '/' Outflow=1.6 cfs 0.126 af

Pond DB1: Detention Basin 1 Peak Elev=956.68' Storage=3,772 cf Inflow=4.2 cfs 0.381 af
Primary=2.2 cfs 0.381 af Secondary=0.0 cfs 0.000 af Outflow=2.2 cfs 0.381 af

Pond DB2: Detention Basin 2 Peak Elev=948.50' Storage=800 cf Inflow=2.3 cfs 0.412 af
Primary=2.1 cfs 0.412 af Secondary=0.0 cfs 0.000 af Outflow=2.1 cfs 0.412 af

Pond ECB: Existing Catch Basin Peak Elev=960.32' Inflow=0.7 cfs 0.054 af
15.0" Round Culvert n=0.025 L=45.0' S=0.0500 '/' Outflow=0.7 cfs 0.054 af

Pond FB1: FB1 Peak Elev=961.73' Storage=199 cf Inflow=3.0 cfs 0.247 af
Outflow=2.9 cfs 0.247 af

Pond FB2: Forebay 2 Peak Elev=955.84' Storage=2,091 cf Inflow=5.0 cfs 0.395 af
Outflow=5.0 cfs 0.393 af

Pond IB: Infiltration Basin Peak Elev=955.84' Storage=10,331 cf Inflow=6.5 cfs 0.510 af
=0.2 cfs 0.431 af Primary=0.2 cfs 0.040 af Secondary=0.0 cfs 0.000 af Tertiary=0.2 cfs 0.040 af Outflow=0.7 cfs 0.510 af

Pond RG 50-1: Rain Garden Lot 50-1 Peak Elev=978.53' Storage=1,152 cf Inflow=0.6 cfs 0.051 af
Discarded=0.0 cfs 0.033 af Secondary=0.1 cfs 0.015 af Outflow=0.1 cfs 0.048 af

Pond RG 50-2: Rain Garden Lot 50-2 Peak Elev=985.19' Storage=2,299 cf Inflow=0.9 cfs 0.067 af
Discarded=0.0 cfs 0.051 af Secondary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.051 af

Pond RG 50-3: Rain Garden Lot 50-3 Peak Elev=0.00' Storage=0 cf
Discarded=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af

Pond RG 53-1: Rain Garden Lot 53-1 Peak Elev=987.06' Storage=1,007 cf Inflow=0.8 cfs 0.053 af
Discarded=0.0 cfs 0.028 af Secondary=0.2 cfs 0.023 af Outflow=0.2 cfs 0.051 af

Pond RG 53-2: Rain Garden Lot 53-2 Peak Elev=0.00' Storage=0 cf
Discarded=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af

Pond RG- 53: Rain Garden Lot 53 Peak Elev=989.01' Storage=1,187 cf Inflow=0.5 cfs 0.041 af
Discarded=0.0 cfs 0.033 af Secondary=0.0 cfs 0.004 af Outflow=0.0 cfs 0.037 af

Total Runoff Area = 28.19 ac Runoff Volume = 4.316 af Average Runoff Depth = 1.84"
92.73% Pervious = 26.14 ac 7.27% Impervious = 2.05 ac

APPENDIX A 7.8

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=21,752 sf 6.78% Impervious Runoff Depth=2.77"
Flow Length=410' Tc=6.0 min CN=WQ Runoff=1.6 cfs 0.115 af

Subcatchment 1A: Runoff Area=1,879 sf 32.52% Impervious Runoff Depth=3.43"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.012 af

Subcatchment 1B: Runoff Area=8,661 sf 33.66% Impervious Runoff Depth=3.46"
Flow Length=67' Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.057 af

Subcatchment 1C: Runoff Area=8,041 sf 31.92% Impervious Runoff Depth=3.42"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.053 af

Subcatchment 1D: Runoff Area=6,717 sf 28.75% Impervious Runoff Depth=3.34"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 0.043 af

Subcatchment 2: Runoff Area=311,463 sf 0.31% Impervious Runoff Depth=2.65"
Flow Length=705' Tc=11.8 min CN=WQ Runoff=18.1 cfs 1.579 af

Subcatchment 2A: Runoff Area=12,643 sf 14.68% Impervious Runoff Depth=2.99"
Flow Length=185' Tc=7.3 min CN=WQ Runoff=0.9 cfs 0.072 af

Subcatchment 2B: Runoff Area=16,907 sf 13.35% Impervious Runoff Depth=2.95"
Flow Length=145' Tc=7.0 min CN=WQ Runoff=1.2 cfs 0.095 af

Subcatchment 3: Runoff Area=23,141 sf 0.00% Impervious Runoff Depth=2.56"
Flow Length=275' Tc=8.6 min CN=WQ Runoff=1.4 cfs 0.114 af

Subcatchment 3A: Runoff Area=13,565 sf 19.40% Impervious Runoff Depth=3.11"
Tc=0.0 min CN=WQ Runoff=1.2 cfs 0.081 af

Subcatchment 4: Runoff Area=26,621 sf 0.00% Impervious Runoff Depth=2.55"
Flow Length=190' Tc=10.6 min CN=WQ Runoff=1.5 cfs 0.130 af

Subcatchment 5: Runoff Area=38,993 sf 0.00% Impervious Runoff Depth=2.57"
Flow Length=195' Tc=10.0 min CN=WQ Runoff=2.3 cfs 0.192 af

Subcatchment 6: 6 Runoff Area=1,925 sf 0.00% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=74 Runoff=0.1 cfs 0.010 af

Subcatchment 7: Runoff Area=62,105 sf 49.96% Impervious Runoff Depth=3.85"
Flow Length=1,101' Tc=6.0 min CN=WQ Runoff=5.8 cfs 0.458 af

Subcatchment 7A: Runoff Area=16,510 sf 0.00% Impervious Runoff Depth=2.54"
Flow Length=215' Tc=6.0 min CN=WQ Runoff=1.1 cfs 0.080 af

Subcatchment 8: Runoff Area=14,804 sf 0.00% Impervious Runoff Depth=2.40"
Tc=6.0 min CN=WQ Runoff=0.9 cfs 0.068 af

Subcatchment 8A: Runoff Area=32,013 sf 8.62% Impervious Runoff Depth=2.79"
Flow Length=280' Tc=6.0 min CN=WQ Runoff=2.3 cfs 0.171 af

Subcatchment 9: Runoff Area=30,642 sf 0.00% Impervious Runoff Depth=2.28"
Flow Length=410' Tc=10.7 min CN=70 Runoff=1.6 cfs 0.134 af

Subcatchment 10: Runoff Area=43,790 sf 0.00% Impervious Runoff Depth=2.28"
Flow Length=355' Tc=10.1 min CN=70 Runoff=2.3 cfs 0.191 af

Subcatchment 11: Runoff Area=58,947 sf 0.00% Impervious Runoff Depth=2.32"
Flow Length=420' Tc=11.9 min CN=WQ Runoff=3.0 cfs 0.261 af

Subcatchment 12: Runoff Area=69,836 sf 2.14% Impervious Runoff Depth=2.50"
Flow Length=315' Tc=8.2 min CN=WQ Runoff=4.2 cfs 0.334 af

Subcatchment 12A: Runoff Area=5,145 sf 36.07% Impervious Runoff Depth=3.52"
Tc=0.0 min CN=WQ Runoff=0.5 cfs 0.035 af

Subcatchment 13: Runoff Area=31,572 sf 2.15% Impervious Runoff Depth=2.42"
Flow Length=335' Tc=8.4 min CN=WQ Runoff=1.8 cfs 0.146 af

Subcatchment 13A: Runoff Area=13,712 sf 13.54% Impervious Runoff Depth=2.92"
Tc=0.0 min CN=WQ Runoff=1.2 cfs 0.077 af

Subcatchment 14: Runoff Area=102,524 sf 0.70% Impervious Runoff Depth=2.41"
Flow Length=490' Tc=11.2 min CN=WQ Runoff=5.5 cfs 0.472 af

Subcatchment 14A: Runoff Area=9,666 sf 19.20% Impervious Runoff Depth=3.10"
Tc=6.0 min CN=WQ Runoff=0.8 cfs 0.057 af

Subcatchment 15: Runoff Area=143,682 sf 5.05% Impervious Runoff Depth=2.52"
Flow Length=640' Tc=21.4 min CN=WQ Runoff=6.2 cfs 0.693 af

Subcatchment 16: Runoff Area=15,747 sf 11.09% Impervious Runoff Depth=2.89"
Flow Length=195' Tc=6.0 min CN=WQ Runoff=1.2 cfs 0.087 af

Subcatchment 17: Runoff Area=4,110 sf 21.00% Impervious Runoff Depth=3.15"
Flow Length=80' Slope=0.0700 '/' Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.025 af

Subcatchment 18: Runoff Area=16,072 sf 5.97% Impervious Runoff Depth=2.60"
Flow Length=190' Tc=6.0 min CN=WQ Runoff=1.1 cfs 0.080 af

Subcatchment 19: Runoff Area=5,258 sf 74.55% Impervious Runoff Depth=4.47"
Flow Length=131' Tc=6.0 min CN=WQ Runoff=0.6 cfs 0.045 af

Subcatchment 20: Runoff Area=26,480 sf 32.42% Impervious Runoff Depth=3.42"
Flow Length=619' Tc=6.0 min CN=WQ Runoff=2.2 cfs 0.173 af

Subcatchment 21: 21 Runoff Area=10,304 sf 58.66% Impervious Runoff Depth=4.07"
Tc=0.0 min CN=WQ Runoff=1.2 cfs 0.080 af

Subcatchment 22: Runoff Area=14,761 sf 0.00% Impervious Runoff Depth=2.47"
Tc=6.0 min CN=WQ Runoff=1.0 cfs 0.070 af

Subcatchment 23: Runoff Area=8,099 sf 5.57% Impervious Runoff Depth=2.77"
Tc=0.0 min CN=WQ Runoff=0.7 cfs 0.043 af

Reach 1R: Overland flow to POA1 Avg. Flow Depth=0.19' Max Vel=4.55 fps Inflow=4.0 cfs 0.683 af
n=0.030 L=83.0' S=0.1325 '/' Capacity=7.3 cfs Outflow=4.0 cfs 0.683 af

Reach 2R: Existing Swale Avg. Flow Depth=0.18' Max Vel=4.24 fps Inflow=1.6 cfs 0.130 af
n=0.025 L=45.0' S=0.0889 '/' Capacity=5.9 cfs Outflow=1.6 cfs 0.130 af

Reach 3R: Overland flow to POA1 Avg. Flow Depth=0.27' Max Vel=3.51 fps Inflow=5.6 cfs 0.823 af
n=0.030 L=400.0' S=0.0500 '/' Capacity=8.9 cfs Outflow=5.6 cfs 0.823 af

Reach 4R: Proposed Swale 2 flows into Avg. Flow Depth=0.32' Max Vel=6.15 fps Inflow=5.8 cfs 0.458 af
n=0.030 L=204.0' S=0.1069 '/' Capacity=57.6 cfs Outflow=5.8 cfs 0.458 af

Reach 5R: Swale STA 1+50 TO 0+20 R Avg. Flow Depth=0.27' Max Vel=2.64 fps Inflow=1.2 cfs 0.080 af
n=0.035 L=120.0' S=0.0375 '/' Capacity=45.8 cfs Outflow=1.1 cfs 0.080 af

Reach POA#1: Inflow=9.7 cfs 1.507 af
Outflow=9.7 cfs 1.507 af

Reach POA#10: Inflow=2.3 cfs 0.191 af
Outflow=2.3 cfs 0.191 af

Reach POA#11: Inflow=3.0 cfs 0.261 af
Outflow=3.0 cfs 0.261 af

Reach POA#12: Inflow=4.2 cfs 0.334 af
Outflow=4.2 cfs 0.334 af

Reach POA#13: Inflow=2.6 cfs 0.192 af
Outflow=2.6 cfs 0.192 af

Reach POA#14: Inflow=5.5 cfs 0.492 af
Outflow=5.5 cfs 0.492 af

Reach POA#15: Existing Culvert Avg. Flow Depth=1.00' Max Vel=8.18 fps Inflow=7.0 cfs 0.823 af
12.0" Round Pipe n=0.013 L=40.0' S=0.0250 '/' Capacity=5.6 cfs Outflow=5.6 cfs 0.823 af

Reach POA#16: Existing culvert Avg. Flow Depth=0.30' Max Vel=7.91 fps Inflow=1.6 cfs 0.130 af
12.0" Round Pipe n=0.013 L=20.0' S=0.0500 '/' Capacity=8.0 cfs Outflow=1.6 cfs 0.130 af

Reach POA#2: Inflow=18.2 cfs 1.628 af
Outflow=18.2 cfs 1.628 af

Reach POA#3: Inflow=1.4 cfs 0.114 af
Outflow=1.4 cfs 0.114 af

Reach POA#4: Inflow=1.5 cfs 0.130 af
Outflow=1.5 cfs 0.130 af

Reach POA#5: Inflow=2.3 cfs 0.192 af
Outflow=2.3 cfs 0.192 af

Reach POA#6: Inflow=0.1 cfs 0.010 af
Outflow=0.1 cfs 0.010 af

Reach POA#7: Inflow=1.9 cfs 0.194 af
Outflow=1.9 cfs 0.194 af

Reach POA#8: Inflow=1.9 cfs 0.192 af
Outflow=1.9 cfs 0.192 af

Reach POA#9: Inflow=1.6 cfs 0.134 af
Outflow=1.6 cfs 0.134 af

Reach TS: Treament Swale Avg. Flow Depth=0.81' Max Vel=0.52 fps Inflow=4.7 cfs 0.393 af
n=0.150 L=145.0' S=0.0050 '/' Capacity=23.1 cfs Outflow=4.2 cfs 0.393 af

Pond 1P: Proposed Driveway Culvert Peak Elev=973.26' Storage=16 cf Inflow=1.2 cfs 0.080 af
15.0" Round Culvert n=0.013 L=40.0' S=0.0187 '/' Outflow=1.2 cfs 0.080 af

Pond CB1: Proposed Catch Basin 1 Peak Elev=964.02' Storage=29 cf Inflow=3.9 cfs 0.323 af
15.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=3.9 cfs 0.323 af

Pond CB2: Proposed Catch Basin Peak Elev=964.25' Storage=9 cf Inflow=2.6 cfs 0.198 af
15.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=2.6 cfs 0.198 af

Pond CB3: Proposed Catch Basin Peak Elev=966.24' Storage=9 cf Inflow=2.2 cfs 0.173 af
15.0" Round Culvert n=0.013 L=45.0' S=0.0333 '/' Outflow=2.2 cfs 0.173 af

Pond DB1: Detention Basin 1 Peak Elev=956.95' Storage=4,376 cf Inflow=5.9 cfs 0.525 af
Primary=4.0 cfs 0.525 af Secondary=0.0 cfs 0.000 af Outflow=4.0 cfs 0.525 af

Pond DB2: Detention Basin 2 Peak Elev=949.35' Storage=1,676 cf Inflow=4.3 cfs 0.568 af
Primary=3.5 cfs 0.568 af Secondary=0.0 cfs 0.000 af Outflow=3.5 cfs 0.568 af

Pond ECB: Existing Catch Basin Peak Elev=960.43' Inflow=1.1 cfs 0.080 af
15.0" Round Culvert n=0.025 L=45.0' S=0.0500 '/' Outflow=1.1 cfs 0.080 af

Pond FB1: FB1 Peak Elev=961.88' Storage=228 cf Inflow=4.1 cfs 0.335 af
Outflow=4.0 cfs 0.335 af

Pond FB2: Forebay 2 Peak Elev=956.07' Storage=2,368 cf Inflow=6.9 cfs 0.538 af
Outflow=5.3 cfs 0.537 af

Pond IB: Infiltration Basin Peak Elev=956.07' Storage=11,507 cf Inflow=7.4 cfs 0.708 af
=0.2 cfs 0.459 af Primary=1.5 cfs 0.124 af Secondary=0.0 cfs 0.000 af Tertiary=1.5 cfs 0.124 af Outflow=3.1 cfs 0.708 af

Pond RG 50-1: Rain Garden Lot 50-1 Peak Elev=978.60' Storage=1,239 cf Inflow=0.9 cfs 0.072 af
Discarded=0.0 cfs 0.034 af Secondary=0.5 cfs 0.036 af Outflow=0.5 cfs 0.069 af

Pond RG 50-2: Rain Garden Lot 50-2 Peak Elev=985.52' Storage=2,910 cf Inflow=1.2 cfs 0.095 af
Discarded=0.0 cfs 0.059 af Secondary=0.1 cfs 0.013 af Outflow=0.1 cfs 0.072 af

Pond RG 50-3: Rain Garden Lot 50-3 Peak Elev=0.00' Storage=0 cf
Discarded=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af

Pond RG 53-1: Rain Garden Lot 53-1 Peak Elev=987.14' Storage=1,086 cf Inflow=1.2 cfs 0.077 af
Discarded=0.0 cfs 0.028 af Secondary=0.8 cfs 0.046 af Outflow=0.8 cfs 0.074 af

Pond RG 53-2: Rain Garden Lot 53-2 Peak Elev=0.00' Storage=0 cf
Discarded=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af

Pond RG- 53: Rain Garden Lot 53 Peak Elev=989.05' Storage=1,231 cf Inflow=0.8 cfs 0.057 af
Discarded=0.0 cfs 0.033 af Secondary=0.2 cfs 0.020 af Outflow=0.2 cfs 0.054 af

Total Runoff Area = 28.19 ac Runoff Volume = 6.334 af Average Runoff Depth = 2.70"
92.73% Pervious = 26.14 ac 7.27% Impervious = 2.05 ac

APPENDIX A 7.9

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=21,752 sf 6.78% Impervious Runoff Depth=3.63"
Flow Length=410' Tc=6.0 min CN=WQ Runoff=2.1 cfs 0.151 af

Subcatchment 1A: Runoff Area=1,879 sf 32.52% Impervious Runoff Depth=4.34"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.016 af

Subcatchment 1B: Runoff Area=8,661 sf 33.66% Impervious Runoff Depth=4.37"
Flow Length=67' Tc=6.0 min CN=WQ Runoff=0.9 cfs 0.072 af

Subcatchment 1C: Runoff Area=8,041 sf 31.92% Impervious Runoff Depth=4.32"
Tc=6.0 min CN=WQ Runoff=0.9 cfs 0.066 af

Subcatchment 1D: Runoff Area=6,717 sf 28.75% Impervious Runoff Depth=4.24"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.054 af

Subcatchment 2: Runoff Area=311,463 sf 0.31% Impervious Runoff Depth=3.50"
Flow Length=705' Tc=11.8 min CN=WQ Runoff=24.1 cfs 2.086 af

Subcatchment 2A: Runoff Area=12,643 sf 14.68% Impervious Runoff Depth=3.87"
Flow Length=185' Tc=7.3 min CN=WQ Runoff=1.2 cfs 0.094 af

Subcatchment 2B: Runoff Area=16,907 sf 13.35% Impervious Runoff Depth=3.82"
Flow Length=145' Tc=7.0 min CN=WQ Runoff=1.6 cfs 0.124 af

Subcatchment 3: Runoff Area=23,141 sf 0.00% Impervious Runoff Depth=3.41"
Flow Length=275' Tc=8.6 min CN=WQ Runoff=1.9 cfs 0.151 af

Subcatchment 3A: Runoff Area=13,565 sf 19.40% Impervious Runoff Depth=3.99"
Tc=0.0 min CN=WQ Runoff=1.6 cfs 0.104 af

Subcatchment 4: Runoff Area=26,621 sf 0.00% Impervious Runoff Depth=3.39"
Flow Length=190' Tc=10.6 min CN=WQ Runoff=2.1 cfs 0.173 af

Subcatchment 5: Runoff Area=38,993 sf 0.00% Impervious Runoff Depth=3.41"
Flow Length=195' Tc=10.0 min CN=WQ Runoff=3.1 cfs 0.255 af

Subcatchment 6: 6 Runoff Area=1,925 sf 0.00% Impervious Runoff Depth=3.48"
Tc=6.0 min CN=74 Runoff=0.2 cfs 0.013 af

Subcatchment 7: Runoff Area=62,105 sf 49.96% Impervious Runoff Depth=4.79"
Flow Length=1,101' Tc=6.0 min CN=WQ Runoff=7.2 cfs 0.569 af

Subcatchment 7A: Runoff Area=16,510 sf 0.00% Impervious Runoff Depth=3.38"
Flow Length=215' Tc=6.0 min CN=WQ Runoff=1.5 cfs 0.107 af

Subcatchment 8: Runoff Area=14,804 sf 0.00% Impervious Runoff Depth=3.22"
Tc=6.0 min CN=WQ Runoff=1.3 cfs 0.091 af

Subcatchment 8A: Runoff Area=32,013 sf 8.62% Impervious Runoff Depth=3.65"
Flow Length=280' Tc=6.0 min CN=WQ Runoff=3.0 cfs 0.223 af

Subcatchment 9: Runoff Area=30,642 sf 0.00% Impervious Runoff Depth=3.09"
Flow Length=410' Tc=10.7 min CN=70 Runoff=2.1 cfs 0.181 af

Subcatchment 10: Runoff Area=43,790 sf 0.00% Impervious Runoff Depth=3.09"
Flow Length=355' Tc=10.1 min CN=70 Runoff=3.1 cfs 0.258 af

Subcatchment 11: Runoff Area=58,947 sf 0.00% Impervious Runoff Depth=3.12"
Flow Length=420' Tc=11.9 min CN=WQ Runoff=4.0 cfs 0.352 af

Subcatchment 12: Runoff Area=69,836 sf 2.14% Impervious Runoff Depth=3.33"
Flow Length=315' Tc=8.2 min CN=WQ Runoff=5.7 cfs 0.445 af

Subcatchment 12A: Runoff Area=5,145 sf 36.07% Impervious Runoff Depth=4.43"
Tc=0.0 min CN=WQ Runoff=0.7 cfs 0.044 af

Subcatchment 13: Runoff Area=31,572 sf 2.15% Impervious Runoff Depth=3.24"
Flow Length=335' Tc=8.4 min CN=WQ Runoff=2.5 cfs 0.196 af

Subcatchment 13A: Runoff Area=13,712 sf 13.54% Impervious Runoff Depth=3.79"
Tc=0.0 min CN=WQ Runoff=1.6 cfs 0.099 af

Subcatchment 14: Runoff Area=102,524 sf 0.70% Impervious Runoff Depth=3.22"
Flow Length=490' Tc=11.2 min CN=WQ Runoff=7.4 cfs 0.632 af

Subcatchment 14A: Runoff Area=9,666 sf 19.20% Impervious Runoff Depth=3.99"
Tc=6.0 min CN=WQ Runoff=1.0 cfs 0.074 af

Subcatchment 15: Runoff Area=143,682 sf 5.05% Impervious Runoff Depth=3.35"
Flow Length=640' Tc=21.4 min CN=WQ Runoff=8.3 cfs 0.920 af

Subcatchment 16: Runoff Area=15,747 sf 11.09% Impervious Runoff Depth=3.76"
Flow Length=195' Tc=6.0 min CN=WQ Runoff=1.5 cfs 0.113 af

Subcatchment 17: Runoff Area=4,110 sf 21.00% Impervious Runoff Depth=4.03"
Flow Length=80' Slope=0.0700 '/' Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.032 af

Subcatchment 18: Runoff Area=16,072 sf 5.97% Impervious Runoff Depth=3.43"
Flow Length=190' Tc=6.0 min CN=WQ Runoff=1.4 cfs 0.106 af

Subcatchment 19: Runoff Area=5,258 sf 74.55% Impervious Runoff Depth=5.44"
Flow Length=131' Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.055 af

Subcatchment 20: Runoff Area=26,480 sf 32.42% Impervious Runoff Depth=4.32"
Flow Length=619' Tc=6.0 min CN=WQ Runoff=2.8 cfs 0.219 af

Subcatchment 21: 21 Runoff Area=10,304 sf 58.66% Impervious Runoff Depth=5.02"
Tc=0.0 min CN=WQ Runoff=1.4 cfs 0.099 af

Subcatchment 22: Runoff Area=14,761 sf 0.00% Impervious Runoff Depth=3.30"
Tc=6.0 min CN=WQ Runoff=1.3 cfs 0.093 af

Subcatchment 23: Runoff Area=8,099 sf 5.57% Impervious Runoff Depth=3.63"
Tc=0.0 min CN=WQ Runoff=0.9 cfs 0.056 af

Reach 1R: Overland flow to POA1 Avg. Flow Depth=0.23' Max Vel=5.12 fps Inflow=5.9 cfs 0.870 af
n=0.030 L=83.0' S=0.1325 '/' Capacity=7.3 cfs Outflow=5.9 cfs 0.870 af

Reach 2R: Existing Swale Avg. Flow Depth=0.20' Max Vel=4.56 fps Inflow=2.1 cfs 0.170 af
n=0.025 L=45.0' S=0.0889 '/' Capacity=5.9 cfs Outflow=2.1 cfs 0.170 af

Reach 3R: Overland flow to POA1 Avg. Flow Depth=0.27' Max Vel=3.51 fps Inflow=5.7 cfs 1.090 af
n=0.030 L=400.0' S=0.0500 '/' Capacity=8.9 cfs Outflow=5.7 cfs 1.090 af

Reach 4R: Proposed Swale 2 flows into Avg. Flow Depth=0.36' Max Vel=6.55 fps Inflow=7.2 cfs 0.569 af
n=0.030 L=204.0' S=0.1069 '/' Capacity=57.6 cfs Outflow=7.2 cfs 0.569 af

Reach 5R: Swale STA 1+50 TO 0+20 R Avg. Flow Depth=0.30' Max Vel=2.80 fps Inflow=1.4 cfs 0.099 af
n=0.035 L=120.0' S=0.0375 '/' Capacity=45.8 cfs Outflow=1.4 cfs 0.099 af

Reach POA#1: Inflow=11.6 cfs 1.960 af
Outflow=11.6 cfs 1.960 af

Reach POA#10: Inflow=3.1 cfs 0.258 af
Outflow=3.1 cfs 0.258 af

Reach POA#11: Inflow=4.0 cfs 0.352 af
Outflow=4.0 cfs 0.352 af

Reach POA#12: Inflow=5.7 cfs 0.445 af
Outflow=5.7 cfs 0.445 af

Reach POA#13: Inflow=3.5 cfs 0.264 af
Outflow=3.5 cfs 0.264 af

Reach POA#14: Inflow=7.5 cfs 0.668 af
Outflow=7.5 cfs 0.668 af

Reach POA#15: Existing Culvert Avg. Flow Depth=1.00' Max Vel=8.17 fps Inflow=9.3 cfs 1.090 af
12.0" Round Pipe n=0.013 L=40.0' S=0.0250 '/' Capacity=5.6 cfs Outflow=5.7 cfs 1.090 af

Reach POA#16: Existing culvert Avg. Flow Depth=0.35' Max Vel=8.53 fps Inflow=2.1 cfs 0.170 af
12.0" Round Pipe n=0.013 L=20.0' S=0.0500 '/' Capacity=8.0 cfs Outflow=2.1 cfs 0.170 af

Reach POA#2: Inflow=25.0 cfs 2.184 af
Outflow=25.0 cfs 2.184 af

Reach POA#3: Inflow=1.9 cfs 0.151 af
Outflow=1.9 cfs 0.151 af

Reach POA#4: Inflow=2.1 cfs 0.173 af
Outflow=2.1 cfs 0.173 af

Reach POA#5: Inflow=3.1 cfs 0.255 af
Outflow=3.1 cfs 0.255 af

Reach POA#6: Inflow=0.2 cfs 0.013 af
Outflow=0.2 cfs 0.013 af

Reach POA#7: Inflow=2.7 cfs 0.303 af
Outflow=2.7 cfs 0.303 af

Reach POA#8: Inflow=2.7 cfs 0.301 af
Outflow=2.7 cfs 0.301 af

Reach POA#9: Inflow=2.1 cfs 0.181 af
Outflow=2.1 cfs 0.181 af

Reach TS: Treament Swale Avg. Flow Depth=0.93' Max Vel=0.56 fps Inflow=5.9 cfs 0.492 af
n=0.150 L=145.0' S=0.0050 '/' Capacity=23.1 cfs Outflow=5.3 cfs 0.492 af

Pond 1P: Proposed Driveway Culvert Peak Elev=973.33' Storage=20 cf Inflow=1.4 cfs 0.099 af
15.0" Round Culvert n=0.013 L=40.0' S=0.0187 '/' Outflow=1.4 cfs 0.099 af

Pond CB1: Proposed Catch Basin 1 Peak Elev=964.29' Storage=34 cf Inflow=4.9 cfs 0.404 af
15.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=4.9 cfs 0.404 af

Pond CB2: Proposed Catch Basin Peak Elev=964.58' Storage=13 cf Inflow=3.3 cfs 0.251 af
15.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=3.3 cfs 0.251 af

Pond CB3: Proposed Catch Basin Peak Elev=966.36' Storage=10 cf Inflow=2.8 cfs 0.219 af
15.0" Round Culvert n=0.013 L=45.0' S=0.0333 '/' Outflow=2.8 cfs 0.219 af

Pond DB1: Detention Basin 1 Peak Elev=957.30' Storage=5,246 cf Inflow=7.6 cfs 0.664 af
Primary=5.0 cfs 0.664 af Secondary=0.0 cfs 0.000 af Outflow=5.0 cfs 0.664 af

Pond DB2: Detention Basin 2 Peak Elev=949.69' Storage=2,138 cf Inflow=5.3 cfs 0.719 af
Primary=3.9 cfs 0.698 af Secondary=1.2 cfs 0.021 af Outflow=5.1 cfs 0.719 af

Pond ECB: Existing Catch Basin Peak Elev=960.53' Inflow=1.4 cfs 0.106 af
15.0" Round Culvert n=0.025 L=45.0' S=0.0500 '/' Outflow=1.4 cfs 0.106 af

Pond FB1: FB1 Peak Elev=962.01' Storage=253 cf Inflow=5.1 cfs 0.420 af
Outflow=5.0 cfs 0.420 af

Pond FB2: Forebay 2 Peak Elev=956.39' Storage=2,801 cf Inflow=8.7 cfs 0.676 af
Outflow=6.8 cfs 0.675 af

Pond IB: Infiltration Basin Peak Elev=956.39' Storage=13,311 cf Inflow=9.8 cfs 0.898 af
=0.2 cfs 0.479 af Primary=2.1 cfs 0.209 af Secondary=0.0 cfs 0.000 af Tertiary=2.1 cfs 0.209 af Outflow=4.4 cfs 0.898 af

Pond RG 50-1: Rain Garden Lot 50-1 Peak Elev=978.66' Storage=1,318 cf Inflow=1.2 cfs 0.094 af
Discarded=0.0 cfs 0.034 af Secondary=0.9 cfs 0.057 af Outflow=0.9 cfs 0.091 af

Pond RG 50-2: Rain Garden Lot 50-2 Peak Elev=985.56' Storage=2,977 cf Inflow=1.6 cfs 0.124 af
Discarded=0.0 cfs 0.059 af Secondary=0.2 cfs 0.041 af Outflow=0.2 cfs 0.100 af

Pond RG 50-3: Rain Garden Lot 50-3 Peak Elev=0.00' Storage=0 cf
Discarded=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af

Pond RG 53-1: Rain Garden Lot 53-1 Peak Elev=987.21' Storage=1,155 cf Inflow=1.6 cfs 0.099 af
Discarded=0.0 cfs 0.028 af Secondary=1.4 cfs 0.069 af Outflow=1.4 cfs 0.097 af

Pond RG 53-2: Rain Garden Lot 53-2 Peak Elev=0.00' Storage=0 cf
Discarded=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af

Pond RG- 53: Rain Garden Lot 53 Peak Elev=989.10' Storage=1,289 cf Inflow=1.0 cfs 0.074 af
Discarded=0.0 cfs 0.034 af Secondary=0.5 cfs 0.036 af Outflow=0.5 cfs 0.070 af

Total Runoff Area = 28.19 ac Runoff Volume = 8.323 af Average Runoff Depth = 3.54"
92.73% Pervious = 26.14 ac 7.27% Impervious = 2.05 ac

APPENDIX A 7.10

Summary for Subcatchment 1:

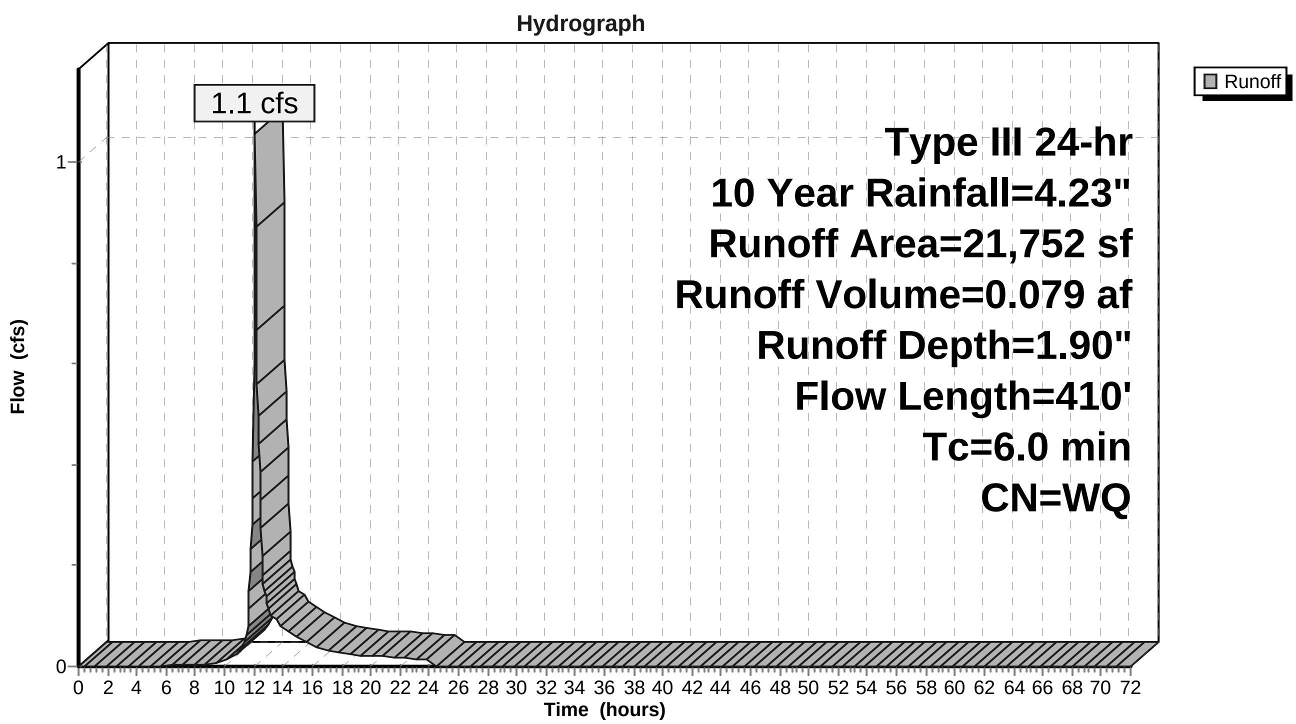
Runoff = 1.1 cfs @ 12.10 hrs, Volume= 0.079 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
1,474	98	Paved parking HSG C
18,881	74	>75% Grass cover, Good HSG C
1,397	70	Woods, Good, HSG C
21,752		Weighted Average
20,278		93.22% Pervious Area
1,474		6.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	50	0.1000	0.27		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
2.2	225	0.0600	1.71		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.5	135	0.0500	4.54		**Shallow Concentrated Flow, C-->D** Paved Kv= 20.3 fps
5.8	410	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1:



Summary for Subcatchment 1A:

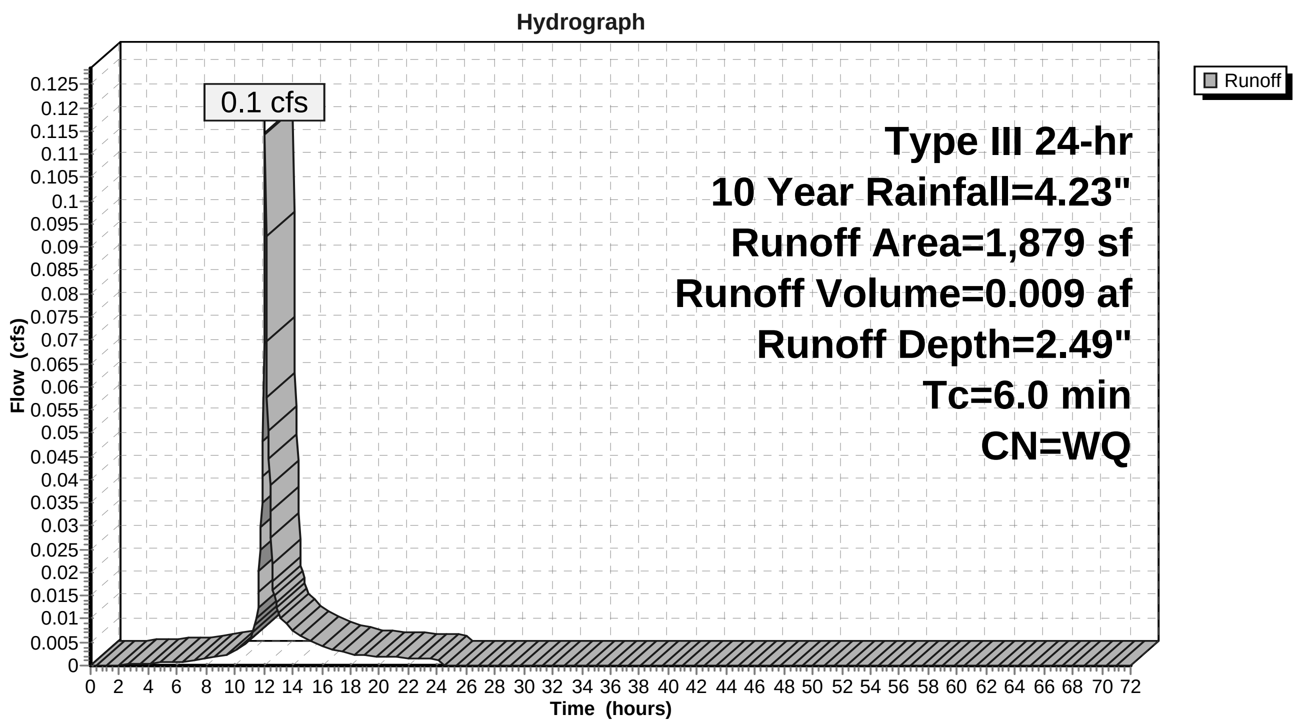
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 0.009 af, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
611	98	Paved parking HSG C
1,268	74	>75% Grass cover, Good HSG C
1,879		Weighted Average
1,268		67.48% Pervious Area
611		32.52% Impervious Area

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

Subcatchment 1A:



Summary for Subcatchment 1B:

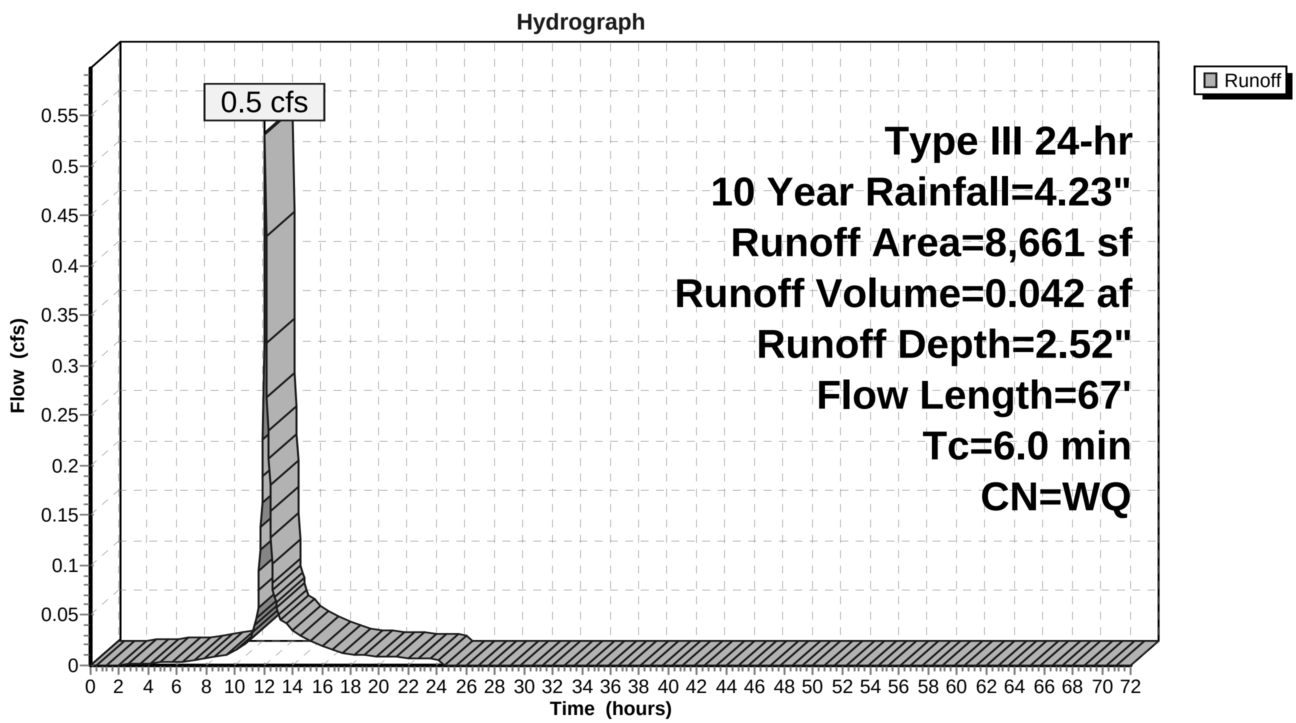
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
*	50	98	Gravel roads HSG C
	2,865	98	Paved parking HSG C
	5,746	74	>75% Grass cover, Good HSG C
	8,661		Weighted Average
	5,746		66.34% Pervious Area
	2,915		33.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	22	0.0500	1.38		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 2.83"
0.3	45	0.1700	2.89		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.6	67	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 1B:



Summary for Subcatchment 1C:

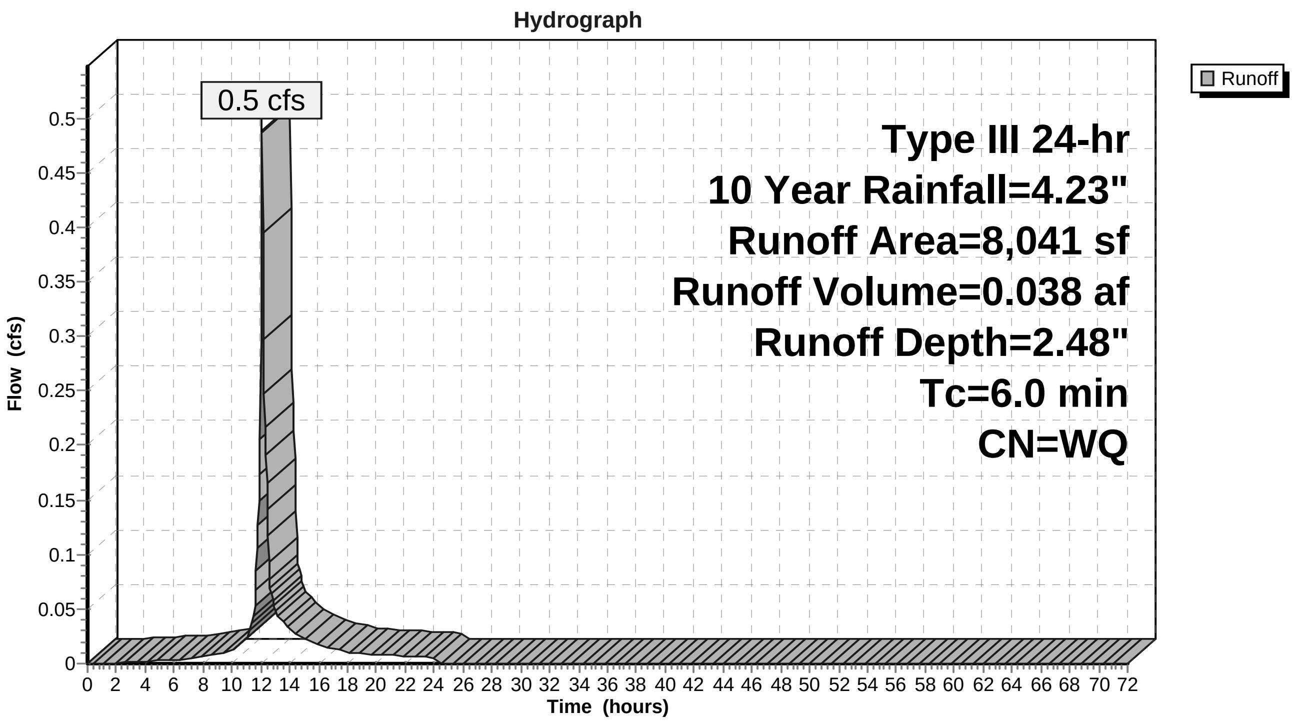
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.038 af, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
2	89	Gravel roads HSG C
2,567	98	Paved parking HSG C
5,472	74	>75% Grass cover, Good HSG C
8,041		Weighted Average
5,474		68.08% Pervious Area
2,567		31.92% Impervious Area

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

Subcatchment 1C:



Summary for Subcatchment 1D:

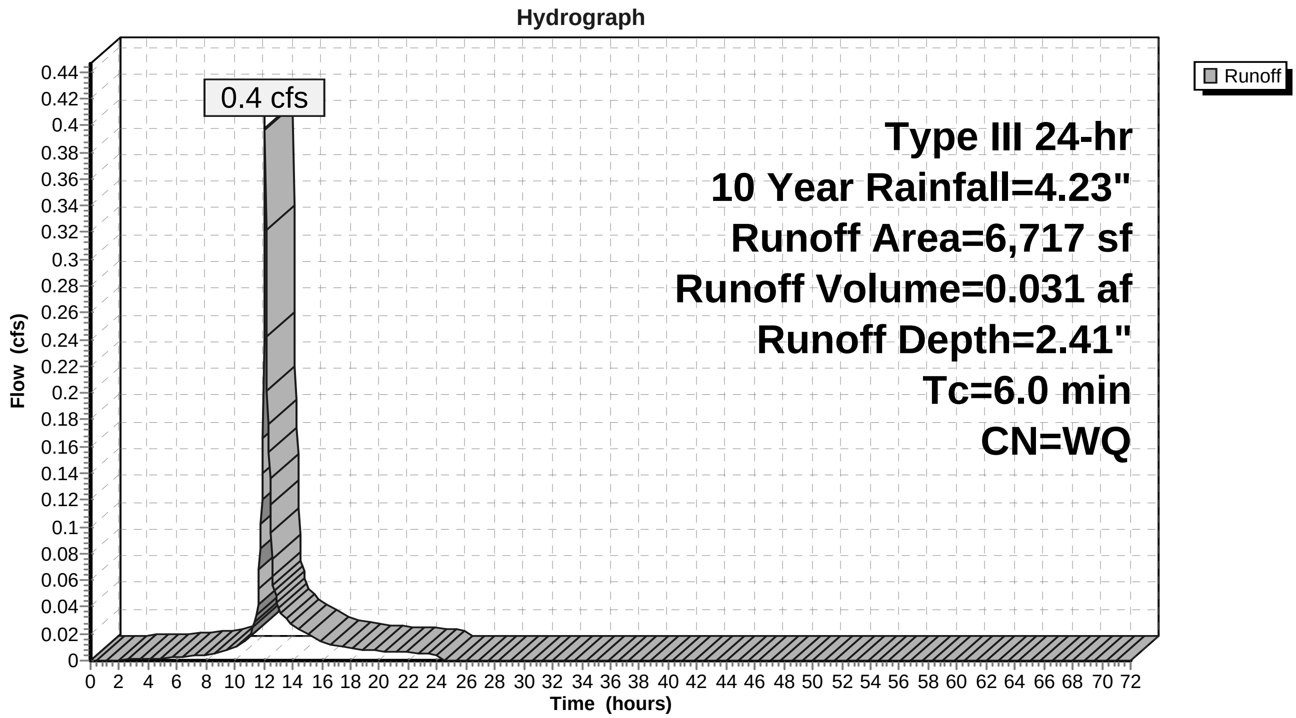
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
1,931	98	Paved parking HSG C
4,786	74	>75% Grass cover, Good HSG C
6,717		Weighted Average
4,786		71.25% Pervious Area
1,931		28.75% Impervious Area

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

Subcatchment 1D:



Summary for Subcatchment 2:

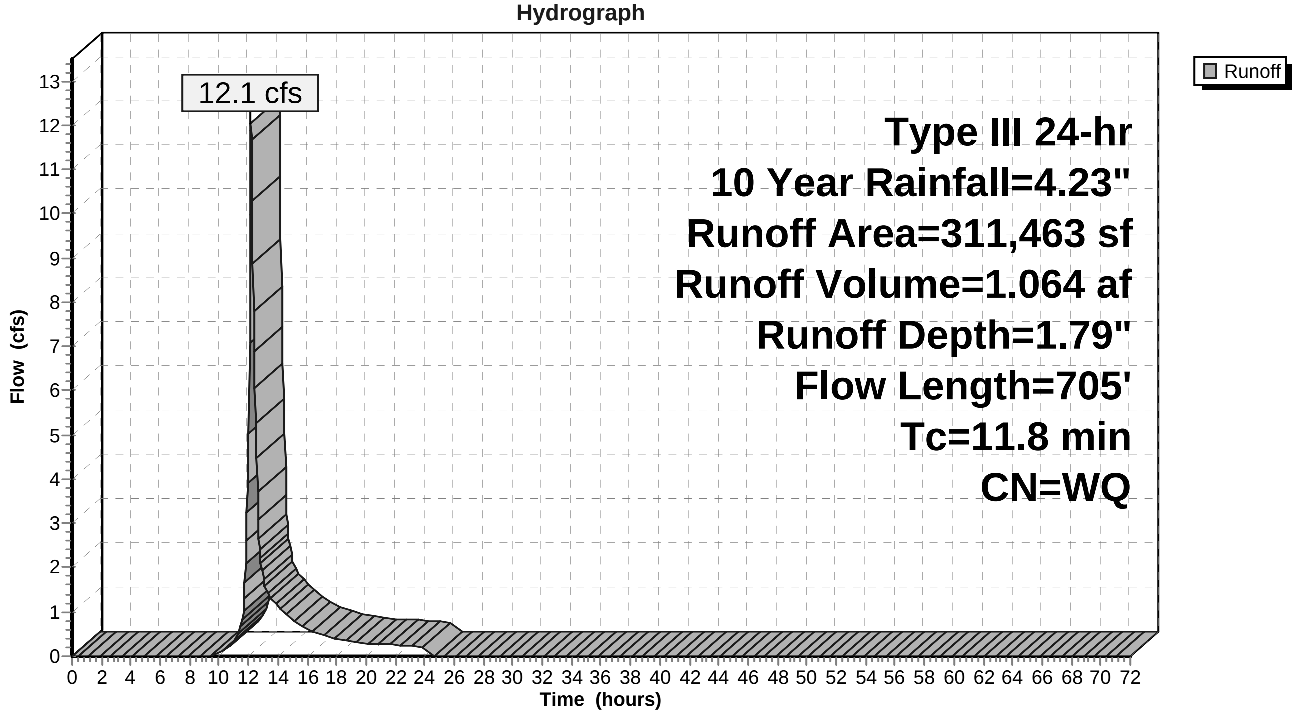
Runoff = 12.1 cfs @ 12.17 hrs, Volume= 1.064 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
	84,721	77	Woods, Good HSG D
	894	98	Paved parking HSG C
*	59	98	Gravel roads HSG C
	65,108	70	Woods, Good HSG C
	154,688	74	>75% Grass cover, Good HSG C
	5,993	80	>75% Grass cover, Good HSG D
	311,463		Weighted Average
	310,510		99.69% Pervious Area
	953		0.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0800	0.28		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
1.4	190	0.1000	2.21		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
4.4	415	0.1000	1.58		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
11.8	705	Total			

Subcatchment 2:



Summary for Subcatchment 2A:

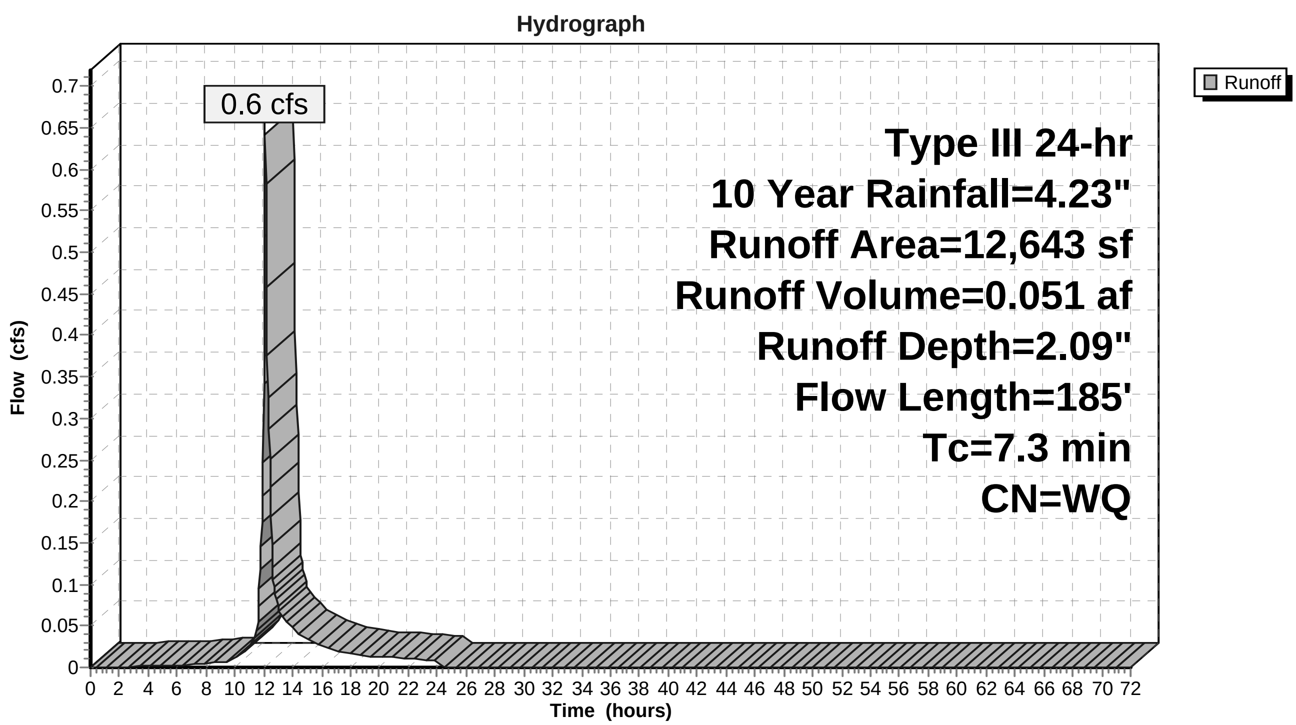
Runoff = 0.6 cfs @ 12.11 hrs, Volume= 0.051 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
1,856	98	Roofs HSG C
10,787	74	>75% Grass cover, Good HSG C
12,643		Weighted Average
10,787		85.32% Pervious Area
1,856		14.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	100	0.0600	0.25		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
0.6	85	0.1100	2.32		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
7.3	185	Total			

Subcatchment 2A:



Summary for Subcatchment 2B:

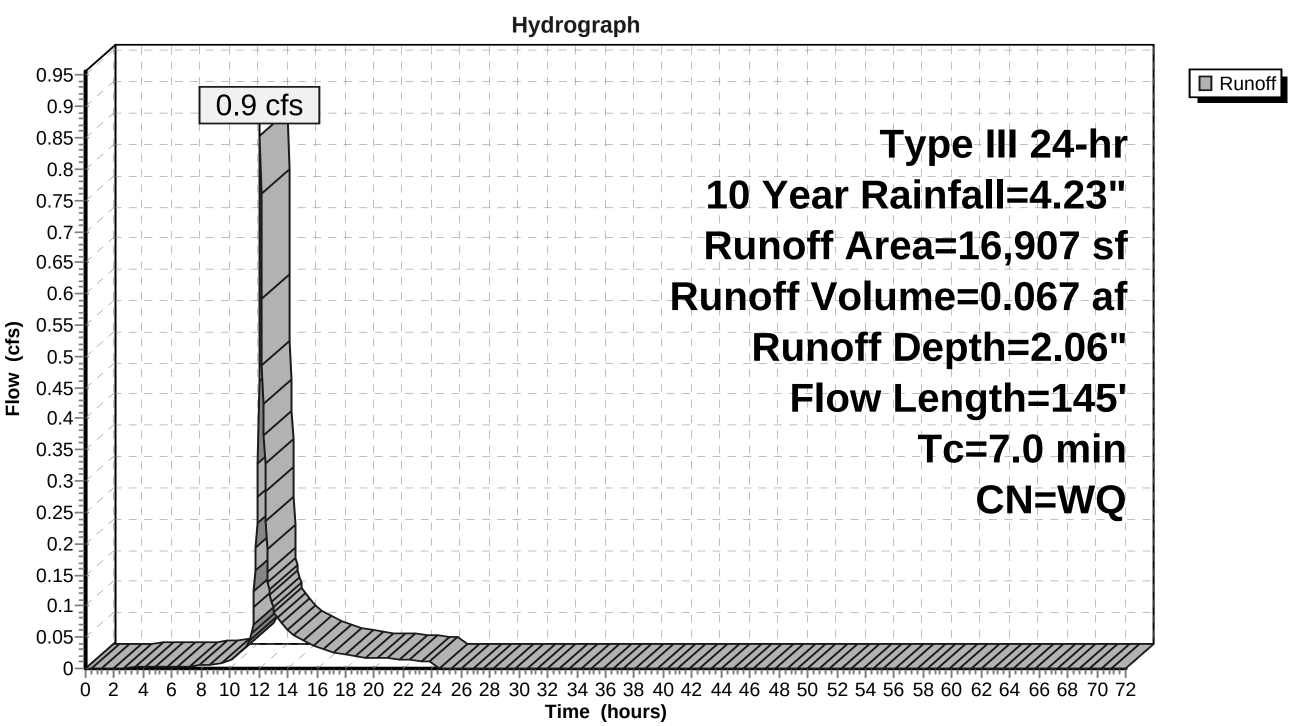
Runoff = 0.9 cfs @ 12.11 hrs, Volume= 0.067 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
401	98	Paved parking HSG C
1,856	98	Roofs HSG C
14,256	74	>75% Grass cover, Good HSG C
394	70	Woods, Good, HSG C
16,907		Weighted Average
14,650		86.65% Pervious Area
2,257		13.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	100	0.0600	0.25		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
0.3	45	0.1200	2.42		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
7.0	145	Total			

Subcatchment 2B:



Summary for Subcatchment 3:

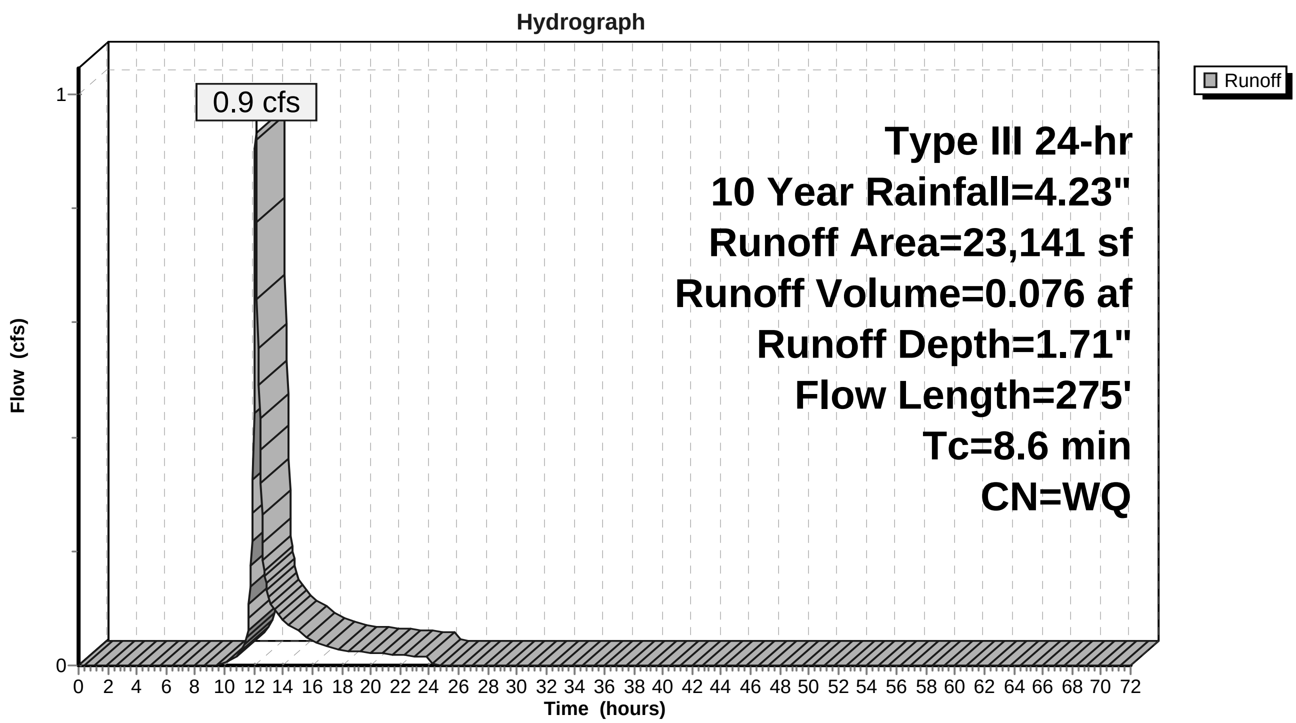
Runoff = 0.9 cfs @ 12.13 hrs, Volume= 0.076 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
4,432	70	Woods, Good HSG C
18,709	74	>75% Grass cover, Good HSG C
23,141		Weighted Average
23,141		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0500	0.23		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
0.9	125	0.1200	2.42		**Shallow Concentrated Flow, A-->B** Short Grass Pasture Kv= 7.0 fps
0.5	50	0.1000	1.58		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
8.6	275	Total			

Subcatchment 3:



Summary for Subcatchment 3A:

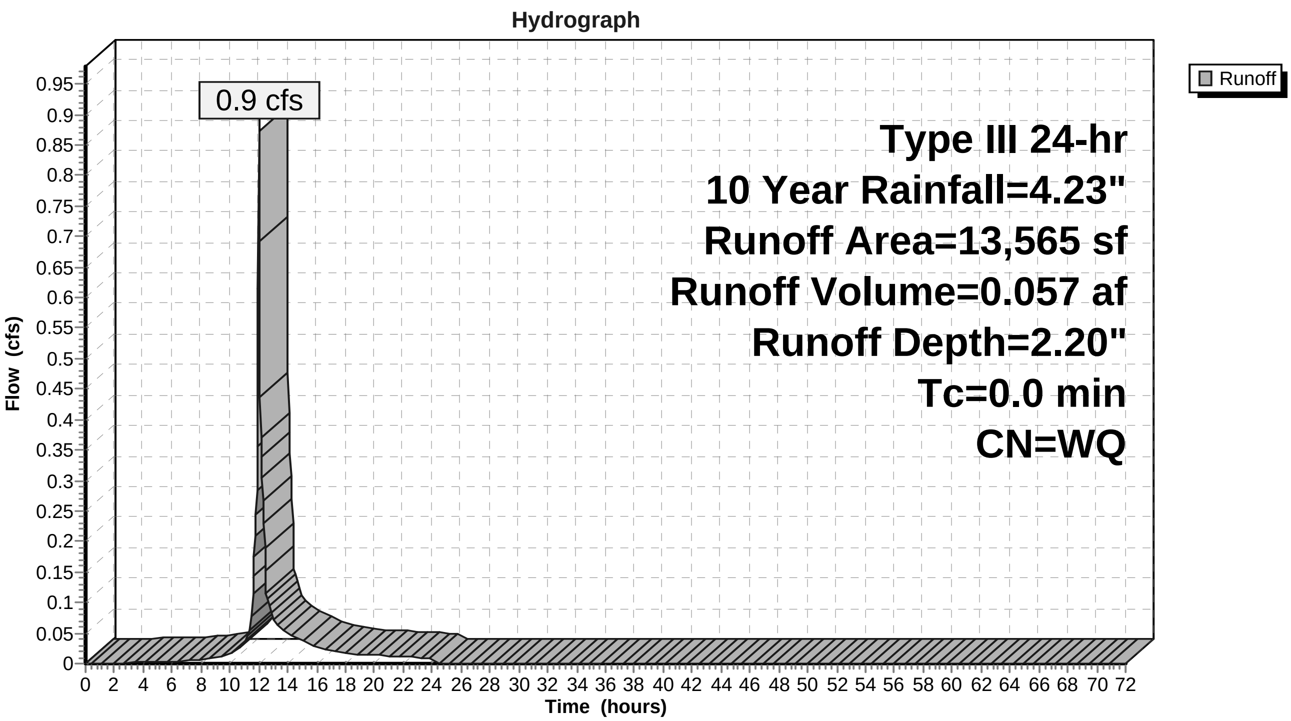
Runoff = 0.9 cfs @ 12.00 hrs, Volume= 0.057 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
776	98	Paved parking HSG C
1,856	98	Roofs HSG C
10,933	74	>75% Grass cover, Good HSG C
13,565		Weighted Average
10,933		80.60% Pervious Area
2,632		19.40% Impervious Area

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

Subcatchment 3A:



Summary for Subcatchment 4:

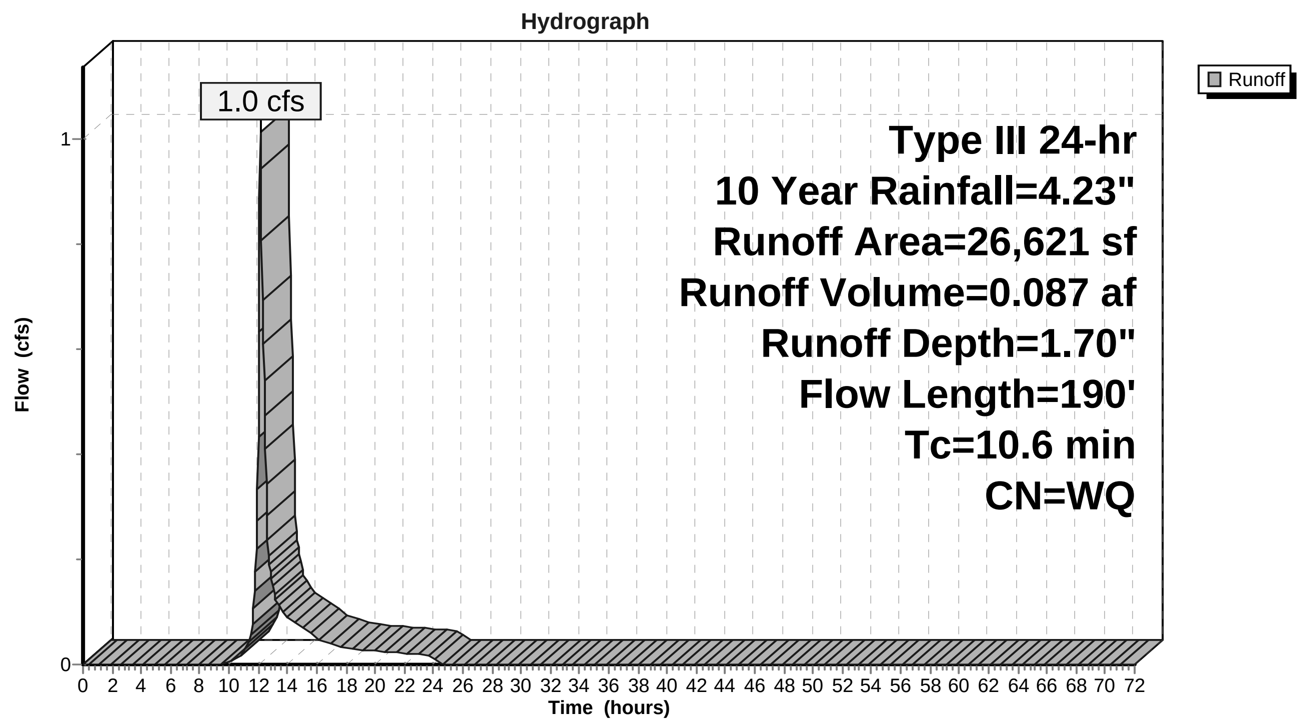
Runoff = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
2,345	70	Woods, Good HSG C
556	70	Woods, Good, HSG C
1,406	65	Brush, Good, HSG C
2,117	74	>75% Grass cover, Good, HSG C
20,197	74	>75% Grass cover, Good HSG C
26,621		Weighted Average
26,621		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0600	0.17		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
0.5	65	0.1100	2.32		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.3	25	0.0800	1.41		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
10.6	190	Total			

Subcatchment 4:



Summary for Subcatchment 5:

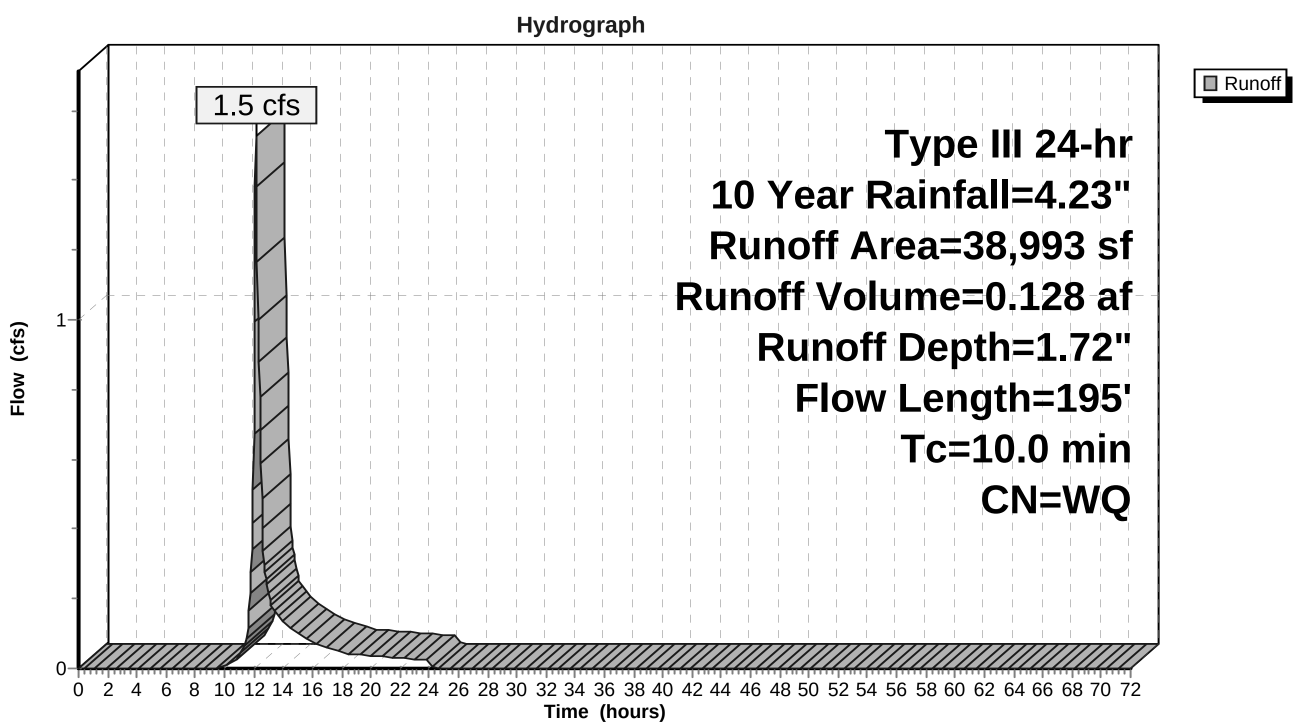
Runoff = 1.5 cfs @ 12.15 hrs, Volume= 0.128 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
5,033	70	Woods, Good HSG C
765	65	Brush, Good HSG C
33,195	74	>75% Grass cover, Good HSG C
38,993		Weighted Average
38,993		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0700	0.18		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
0.5	70	0.0950	2.16		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.3	25	0.0800	1.41		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
10.0	195	Total			

Subcatchment 5:



Summary for Subcatchment 6: 6

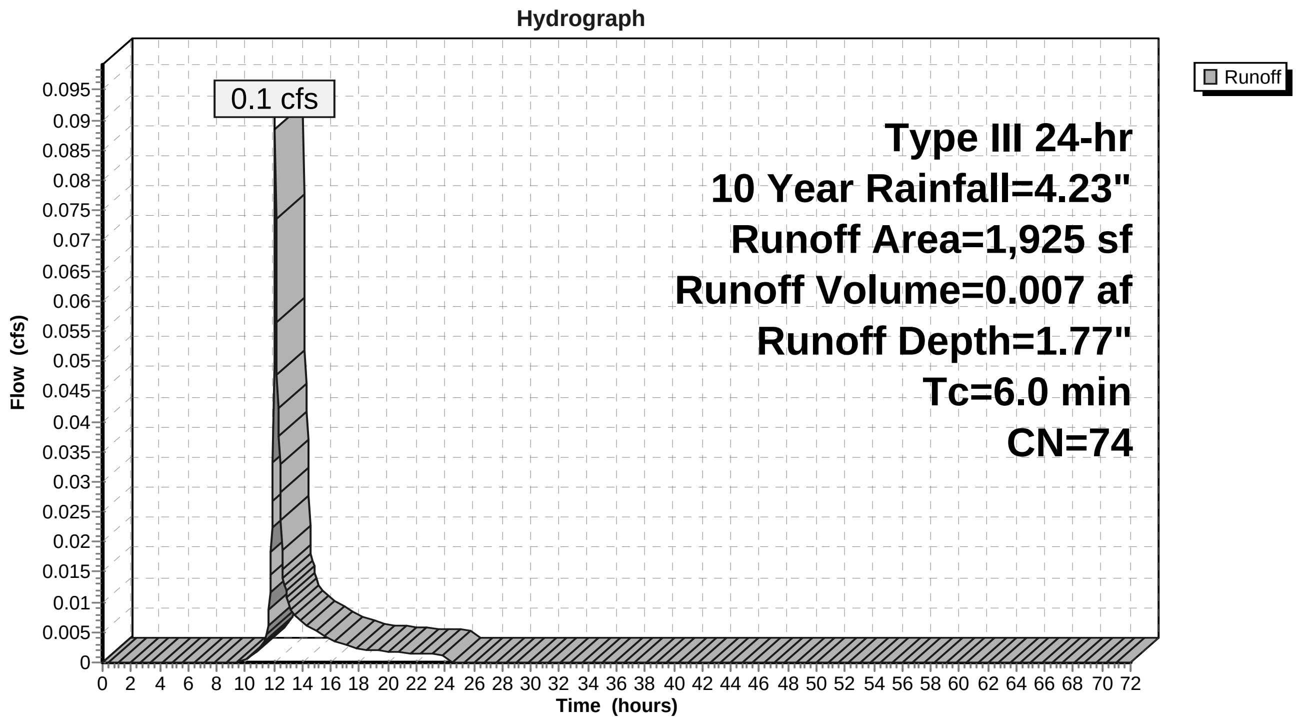
Runoff = 0.1 cfs @ 12.10 hrs, Volume= 0.007 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
1,925	74	>75% Grass cover, Good HSG C
1,925		100.00% Pervious Area

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

Subcatchment 6: 6



Summary for Subcatchment 7:

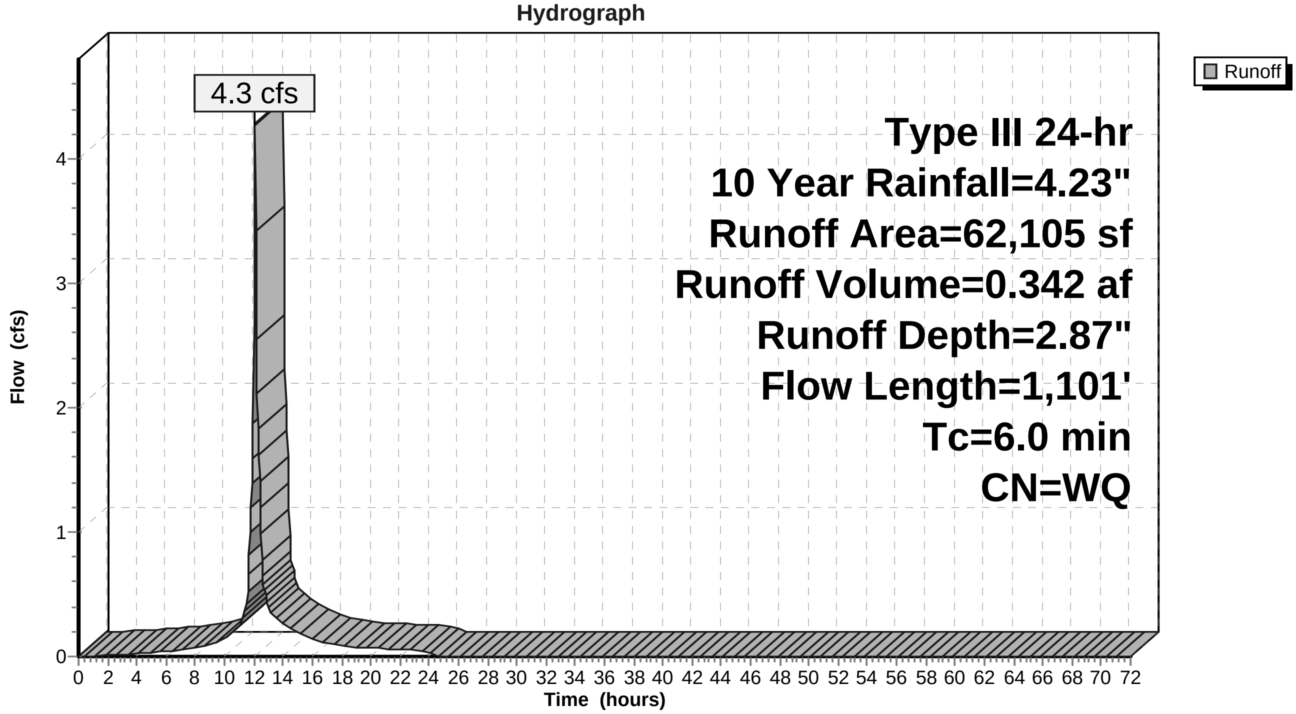
Runoff = 4.3 cfs @ 12.09 hrs, Volume= 0.342 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
	24,714	98	Paved parking HSG C
*	6,316	98	Gravel roads HSG C
	1,207	70	Woods, Good HSG C
	29,868	74	>75% Grass cover, Good HSG C
	62,105		Weighted Average
	31,075		50.04% Pervious Area
	31,030		49.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0200	0.83		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 2.83"
0.5	10	0.3300	0.31		**Sheet Flow, B-->C** Grass: Short n= 0.150 P2= 2.83"
2.1	760	0.0450	5.96	12.85	**Trap/Vee/Rect Channel Flow, C-->D** Bot.W=1.00' D=0.75' Z= 3.0 & 2.0 '/' Top.W=4.75' n= 0.030 Earth, grassed & winding
1.6	320	0.0140	3.32	7.17	**Trap/Vee/Rect Channel Flow, C-->D** Bot.W=1.00' D=0.75' Z= 3.0 & 2.0 '/' Top.W=4.75' n= 0.030 Earth, grassed & winding
4.4	1,101	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 7:



Summary for Subcatchment 7A:

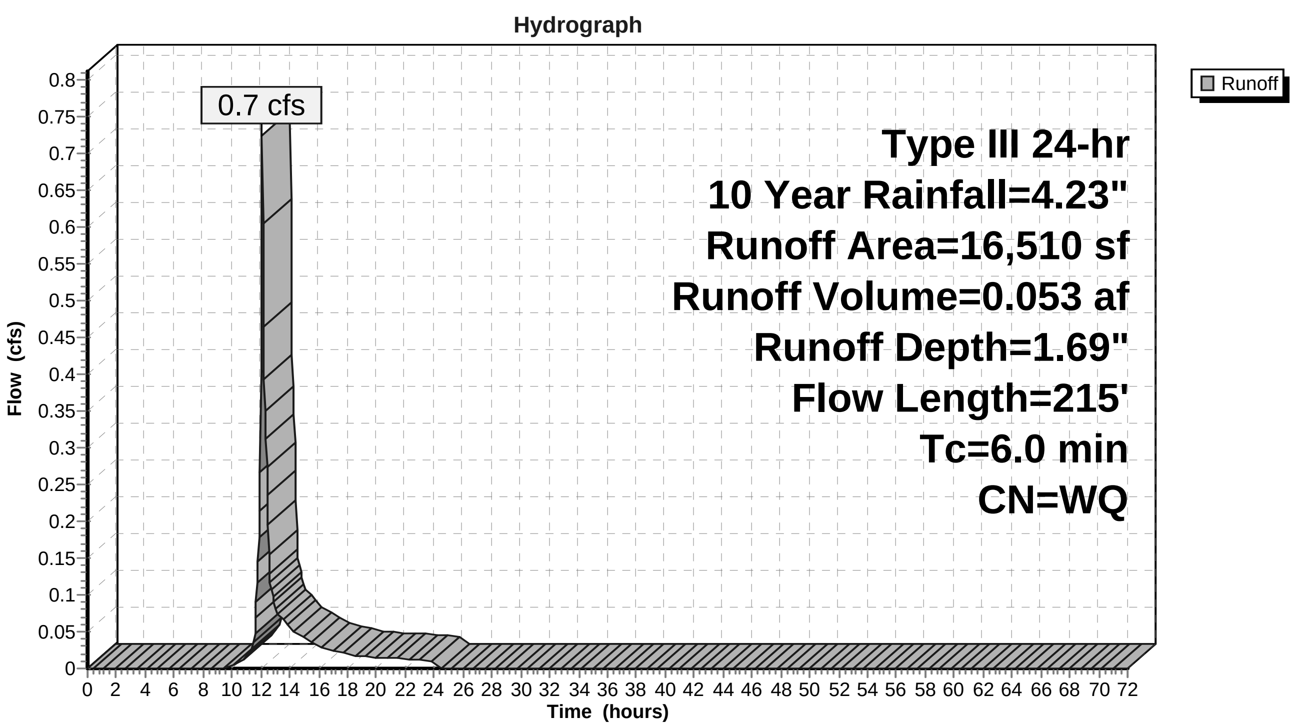
Runoff = 0.7 cfs @ 12.10 hrs, Volume= 0.053 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
4,347	70	Woods, Good HSG C
12,163	74	>75% Grass cover, Good HSG C
16,510		Weighted Average
16,510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	50	0.1400	0.30		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
1.1	145	0.1000	2.21		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.1	20	0.0300	3.06	2.01	**Trap/Vee/Rect Channel Flow, C-->D** Bot.W=1.00' D=0.33' Z= 3.0 '/' Top.W=2.98' n= 0.030 Earth, grassed & winding
3.9	215	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 7A:



Summary for Subcatchment 8:

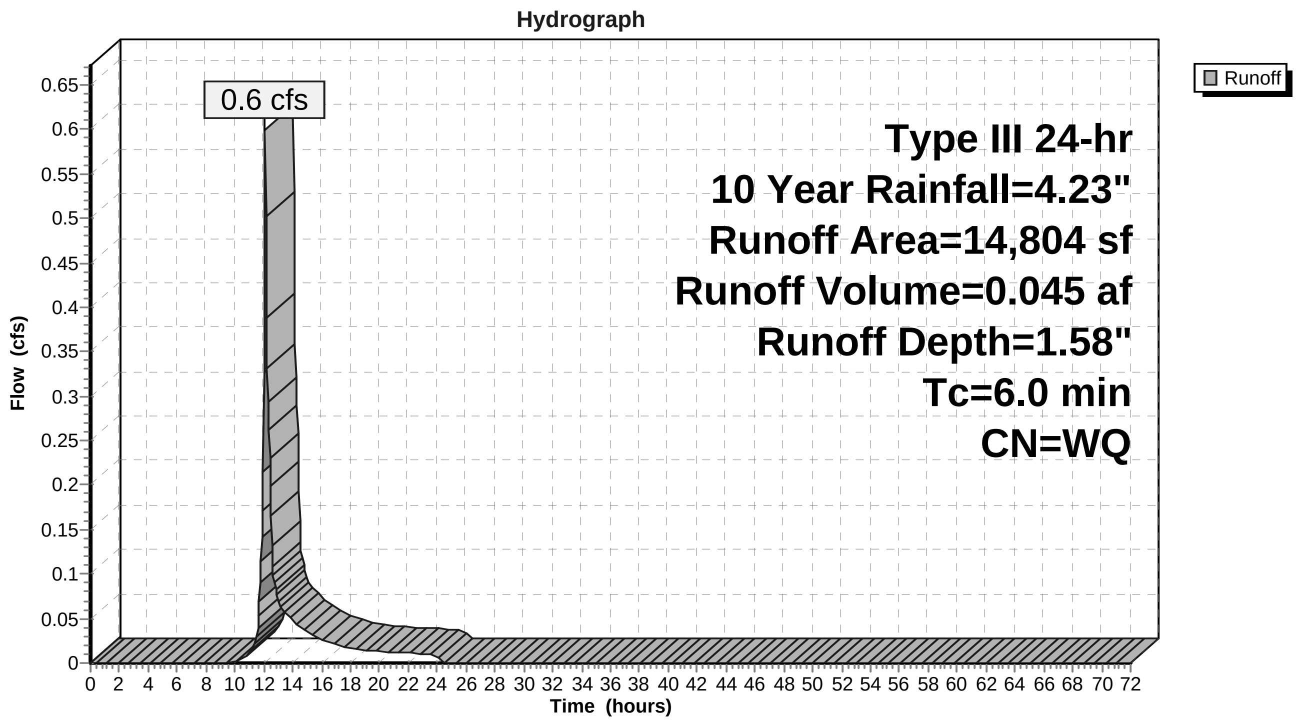
Runoff = 0.6 cfs @ 12.10 hrs, Volume= 0.045 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
9,919	70	Woods, Good HSG C
4,885	74	>75% Grass cover, Good HSG C
14,804		Weighted Average
14,804		100.00% Pervious Area

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

Subcatchment 8:



Summary for Subcatchment 8A:

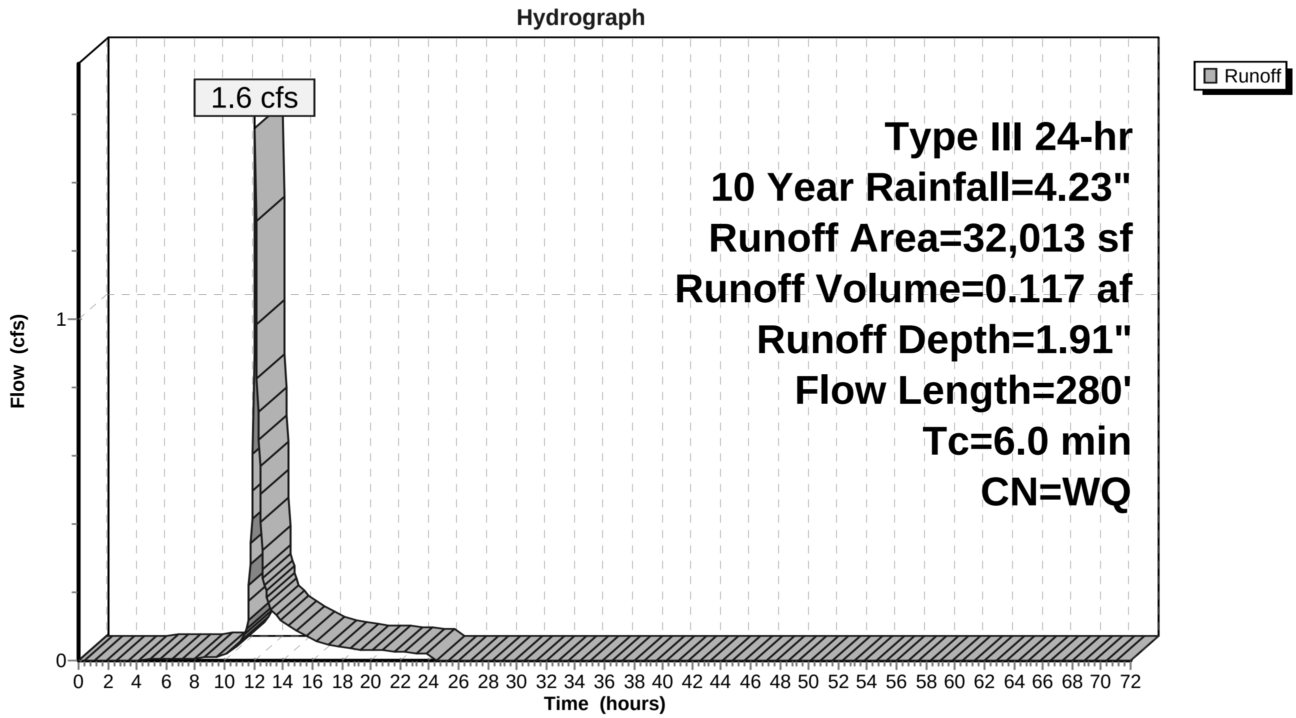
Runoff = 1.6 cfs @ 12.10 hrs, Volume= 0.117 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
902	98	Paved parking HSG C
1,856	98	Roofs HSG C
5,079	70	Woods, Good HSG C
24,176	74	>75% Grass cover, Good HSG C
32,013		Weighted Average
29,255		91.38% Pervious Area
2,758		8.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0700	0.23		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
0.8	100	0.0900	2.10		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
1.1	100	0.0900	1.50		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
0.1	30	0.3300	4.02		**Shallow Concentrated Flow, D-->E** Short Grass Pasture Kv= 7.0 fps
5.6	280	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 8A:



Summary for Subcatchment 9:

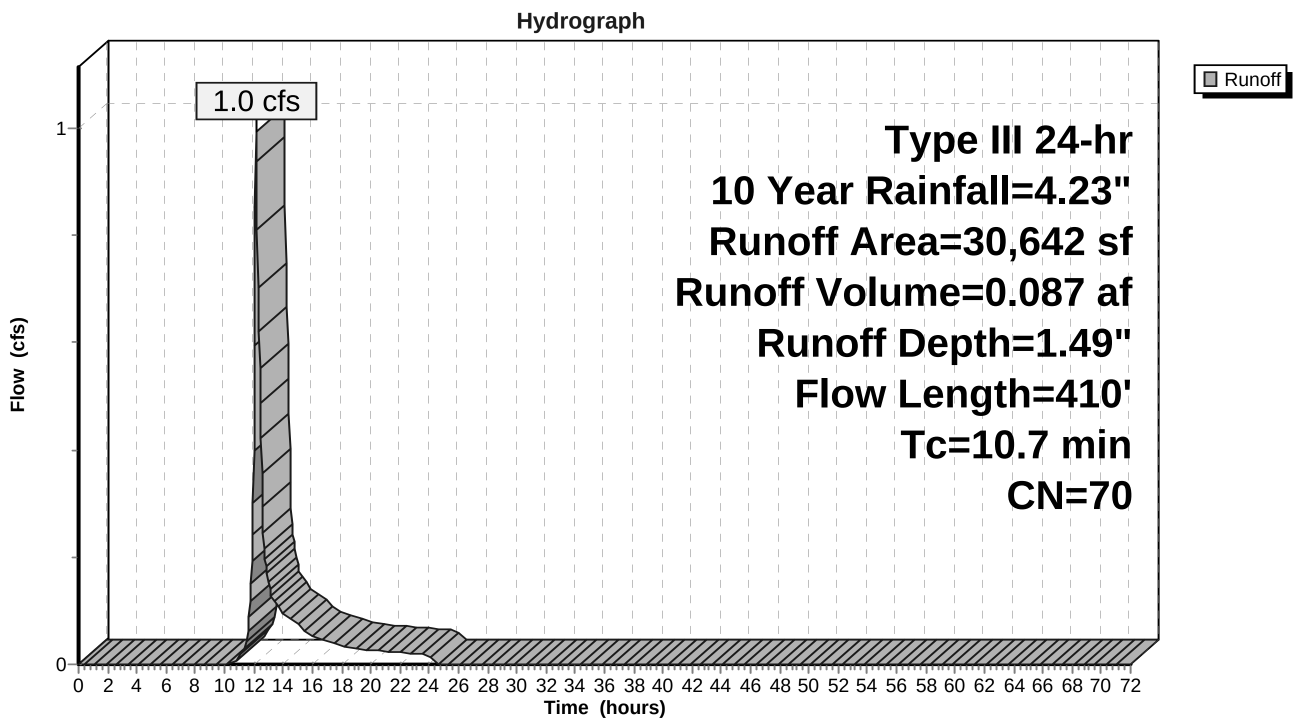
Runoff = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
30,642	70	Woods, Good HSG C
30,642		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0900	0.12		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
3.5	360	0.1200	1.73		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
10.7	410	Total			

Subcatchment 9:



Summary for Subcatchment 10:

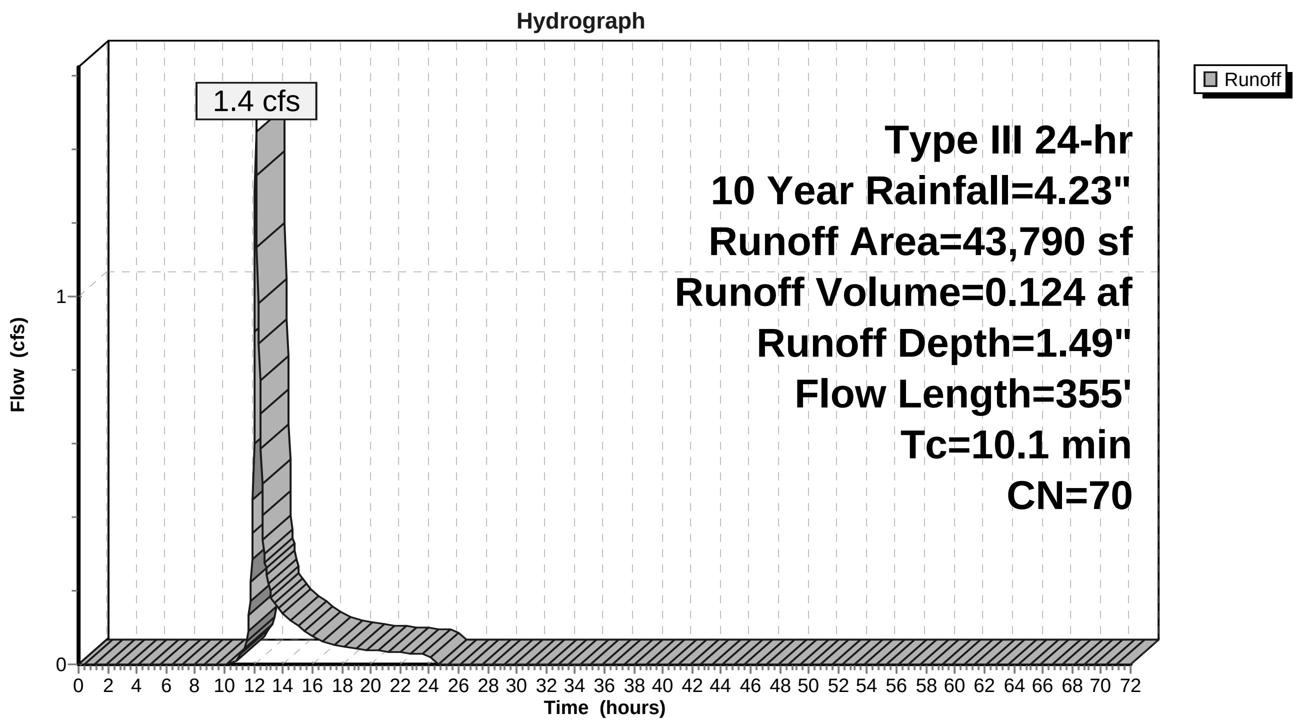
Runoff = 1.4 cfs @ 12.15 hrs, Volume= 0.124 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
43,790	70	Woods, Good HSG C
43,790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0950	0.12		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
3.1	305	0.1100	1.66		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
10.1	355	Total			

Subcatchment 10:



Summary for Subcatchment 11:

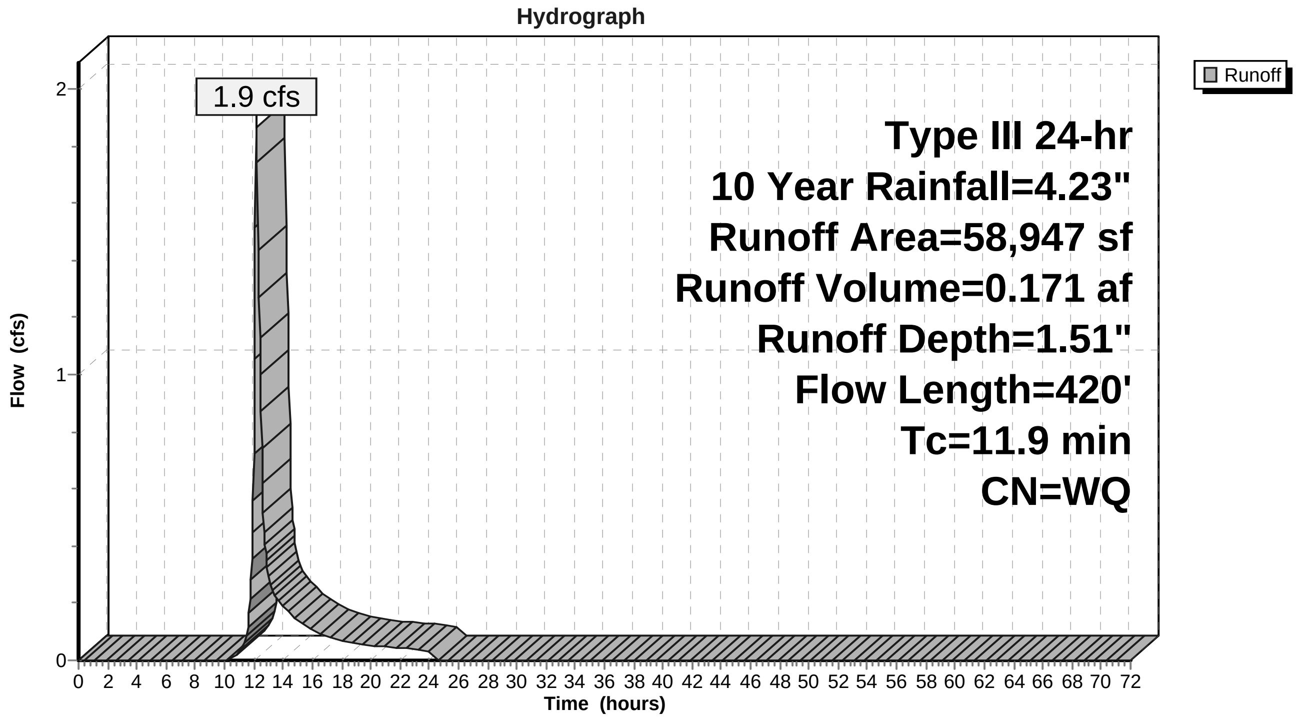
Runoff = 1.9 cfs @ 12.18 hrs, Volume= 0.171 af, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
53,140	70	Woods, Good HSG C
5,807	74	>75% Grass cover, Good HSG C
58,947		Weighted Average
58,947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0500	0.09		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
2.8	370	0.2000	2.24		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
11.9	420	Total			

Subcatchment 11:



Summary for Subcatchment 12:

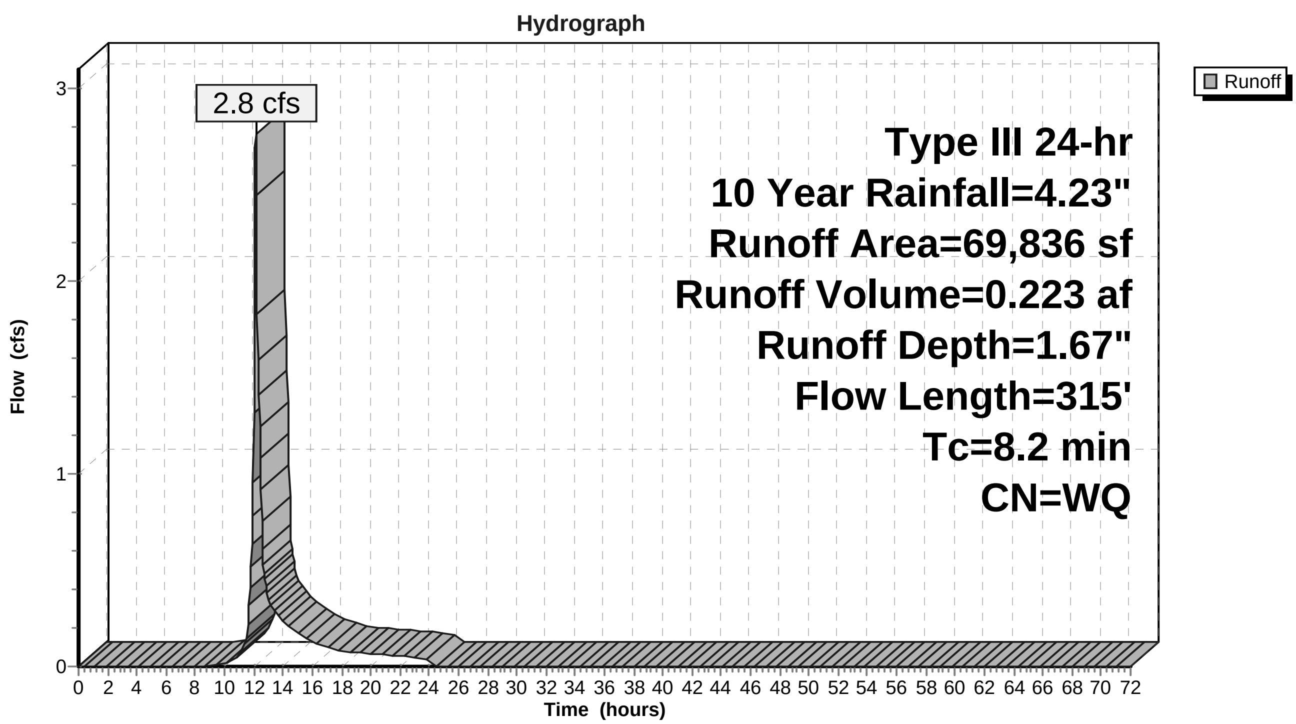
Runoff = 2.8 cfs @ 12.12 hrs, Volume= 0.223 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
36,440	70	Woods, Good HSG C
31,902	74	>75% Grass cover, Good HSG C
1,494	98	Paved parking, HSG C
69,836		Weighted Average
68,342		97.86% Pervious Area
1,494		2.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0500	0.14		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
1.0	120	0.0750	1.92		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
1.2	145	0.1700	2.06		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
8.2	315	Total			

Subcatchment 12:



Summary for Subcatchment 12A:

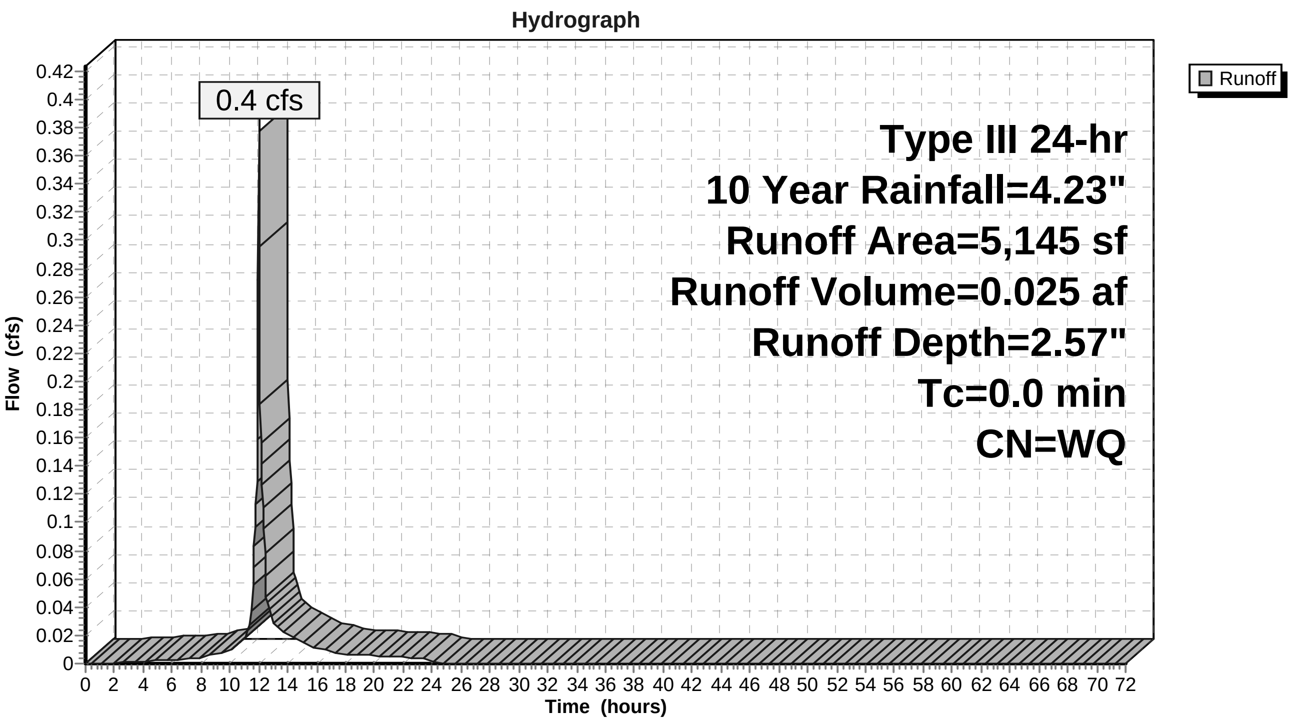
Runoff = 0.4 cfs @ 12.00 hrs, Volume= 0.025 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
1,856	98	Roofs HSG C
6	70	Woods, Good HSG C
3,283	74	>75% Grass cover, Good HSG C
5,145		Weighted Average
3,289		63.93% Pervious Area
1,856		36.07% Impervious Area

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

Subcatchment 12A:



Summary for Subcatchment 13:

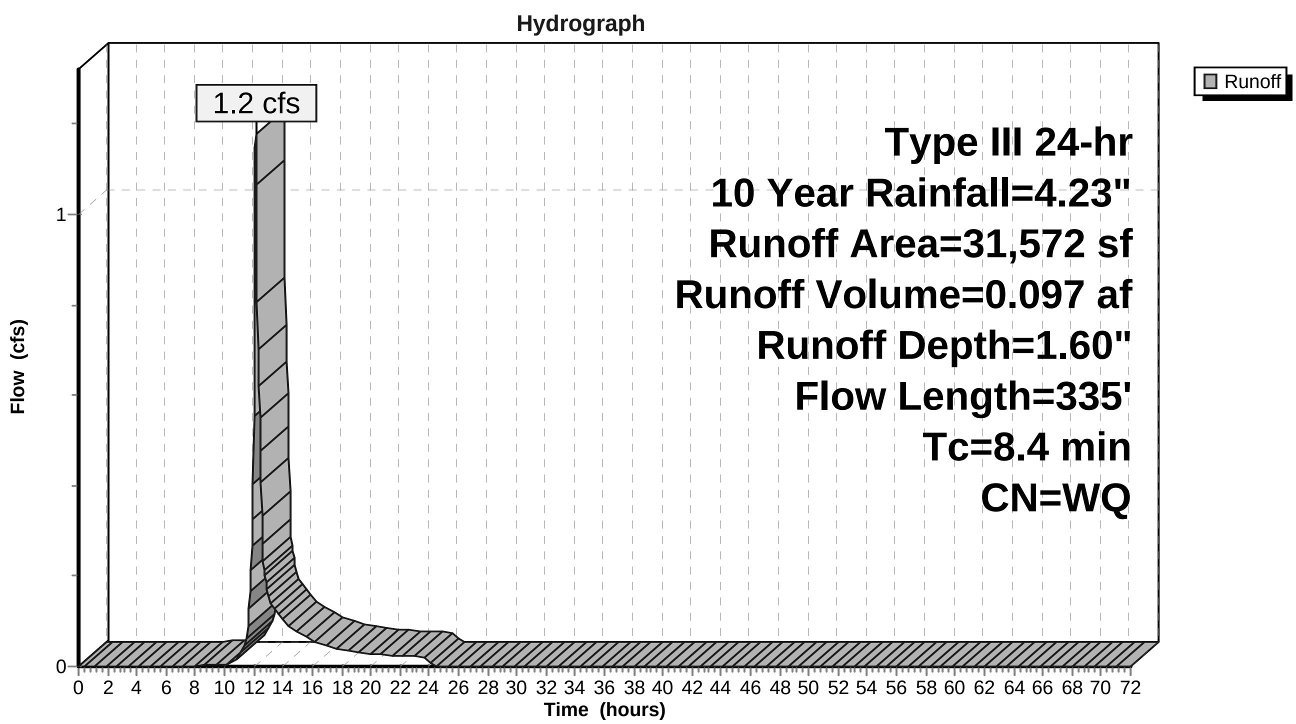
Runoff = 1.2 cfs @ 12.13 hrs, Volume= 0.097 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
23,591	70	Woods, Good, HSG C
7,302	74	>75% Grass cover, Good HSG C
679	98	Paved parking, HSG C
31,572		Weighted Average
30,893		97.85% Pervious Area
679		2.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0500	0.14		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
0.5	60	0.0700	1.85		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
1.9	225	0.1500	1.94		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
8.4	335	Total			

Subcatchment 13:



Summary for Subcatchment 13A:

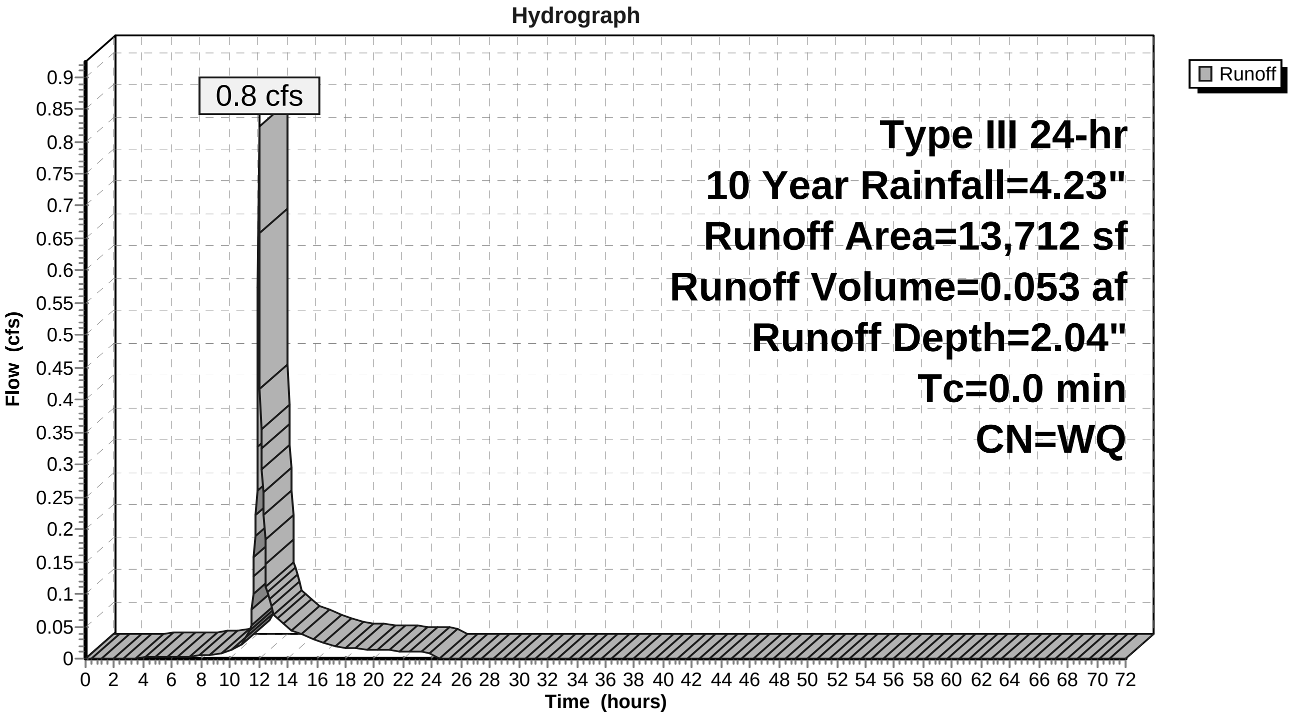
Runoff = 0.8 cfs @ 12.01 hrs, Volume= 0.053 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
1,856	98	Roofs HSG C
1,606	70	Woods, Good HSG C
10,250	74	>75% Grass cover, Good HSG C
13,712		Weighted Average
11,856		86.46% Pervious Area
1,856		13.54% Impervious Area

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

Subcatchment 13A:



Summary for Subcatchment 14:

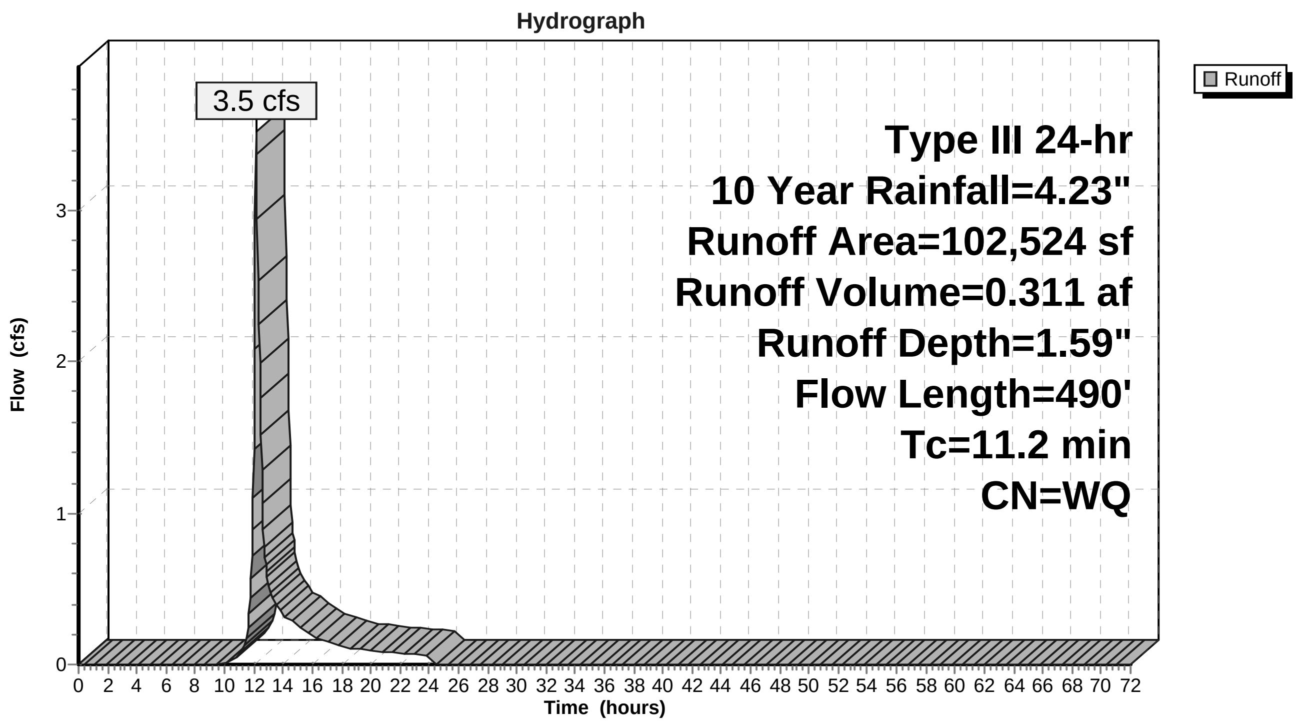
Runoff = 3.5 cfs @ 12.17 hrs, Volume= 0.311 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
71,791	70	Woods, Good, HSG C
30,020	74	>75% Grass cover, Good HSG C
713	98	Paved parking, HSG C
102,524		Weighted Average
101,811		99.30% Pervious Area
713		0.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0500	0.14		**Sheet Flow, A-->B** Grass: Dense n= 0.240 P2= 2.83"
1.1	105	0.1100	1.66		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
0.5	70	0.2200	2.35		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
3.6	265	0.0600	1.22		**Shallow Concentrated Flow, D-->E** Woodland Kv= 5.0 fps
11.2	490	Total			

Subcatchment 14:



Summary for Subcatchment 14A:

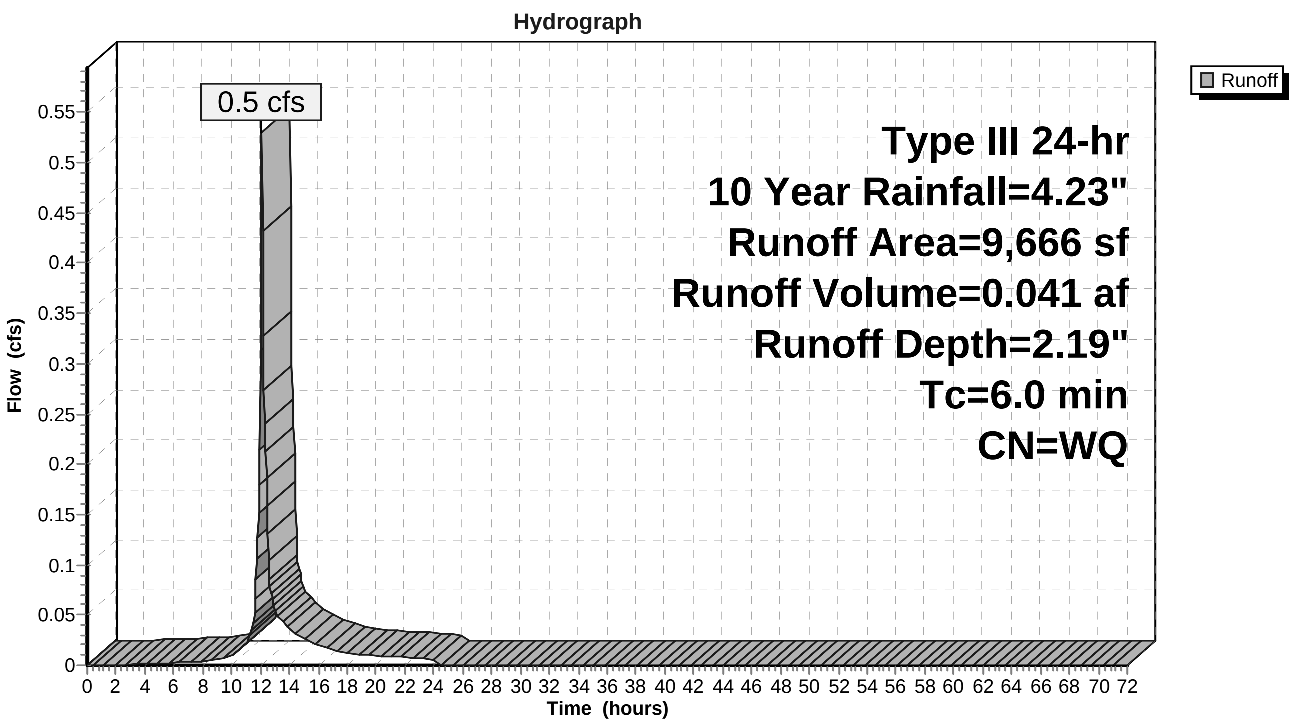
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
1,856	98	Roofs HSG C
7,810	74	>75% Grass cover, Good HSG C
9,666		Weighted Average
7,810		80.80% Pervious Area
1,856		19.20% Impervious Area

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

Subcatchment 14A:



Summary for Subcatchment 15:

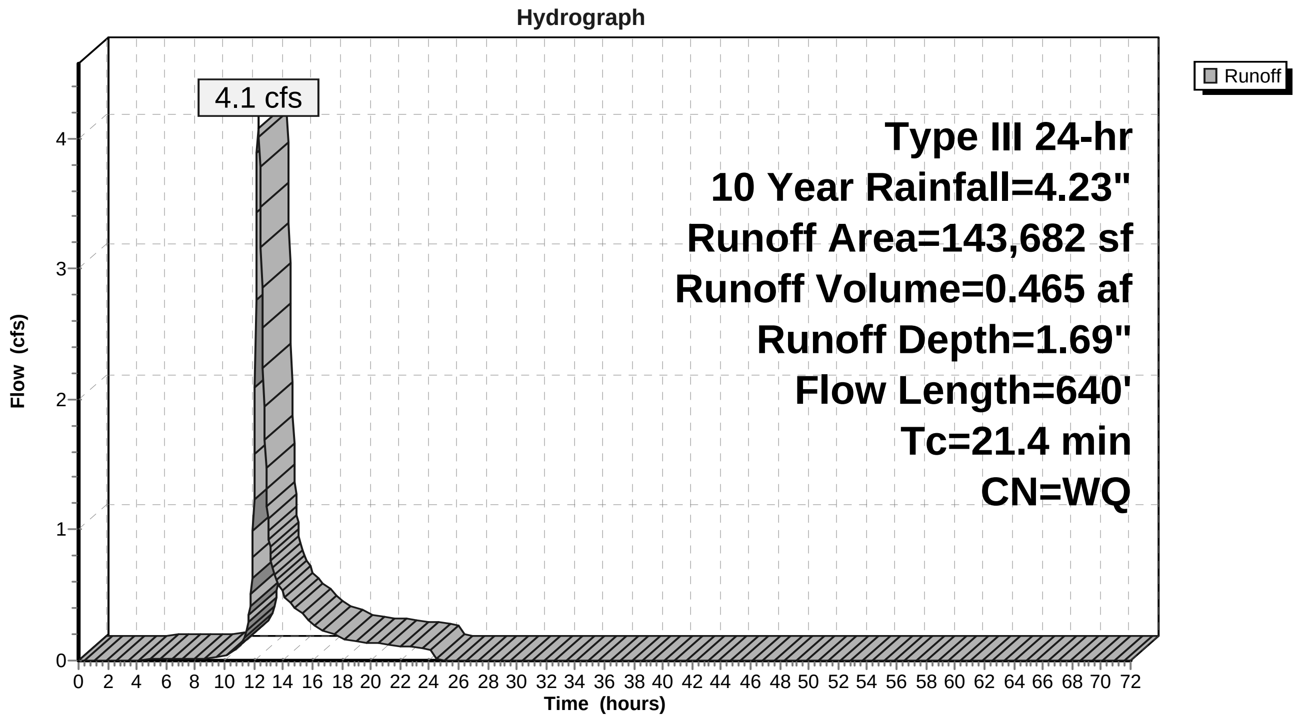
Runoff = 4.1 cfs @ 12.31 hrs, Volume= 0.465 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
23,482	70	Woods, Good HSG C
72,926	70	Woods, Good, HSG C
3,821	98	Paved parking, HSG C
3,441	98	Roofs, HSG C
37,781	74	>75% Grass cover, Good, HSG C
2,231	74	>75% Grass cover, Good HSG C
143,682		Weighted Average
136,420		94.95% Pervious Area
7,262		5.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0700	0.10		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.83"
6.3	215	0.0130	0.57		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
7.2	375	0.0300	0.87		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
21.4	640	Total			

Subcatchment 15:



Summary for Subcatchment 16:

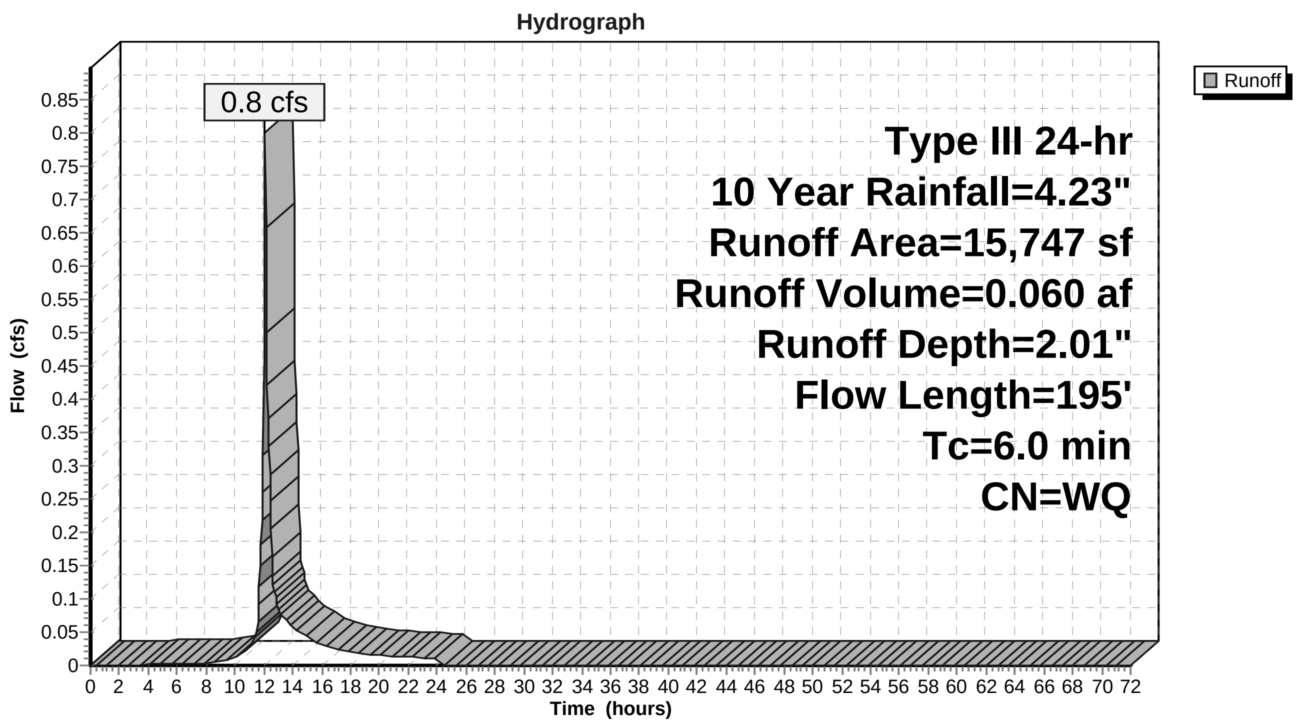
Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.060 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
449	70	Woods, Good, HSG C
1,216	98	Paved parking, HSG C
531	98	Roofs, HSG C
13,551	74	>75% Grass cover, Good, HSG C
15,747		Weighted Average
14,000		88.91% Pervious Area
1,747		11.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0700	0.23		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
1.0	145	0.1250	2.47		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
4.6	195	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 16:



Summary for Subcatchment 17:

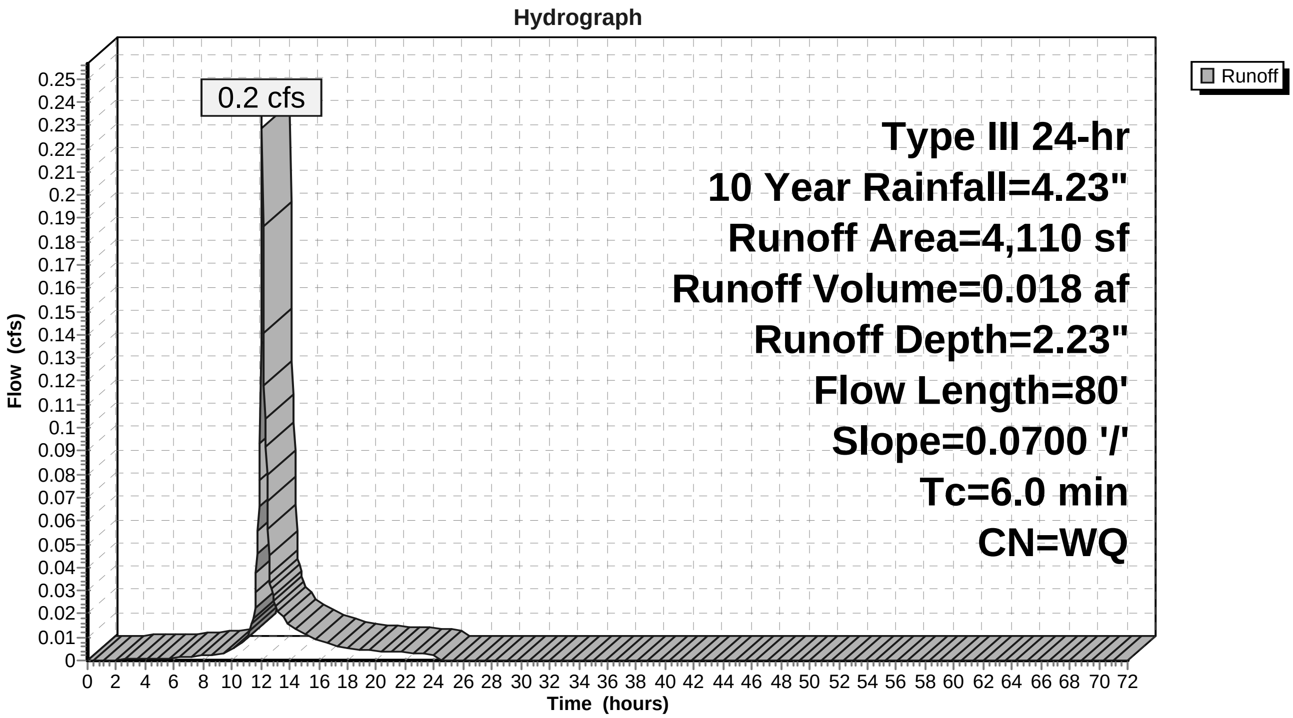
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 0.018 af, Depth= 2.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
	417	98	Paved parking HSG C
*	446	98	Gravel roads HSG C
	3,247	74	>75% Grass cover, Good HSG C
	4,110		Weighted Average
	3,247		79.00% Pervious Area
	863		21.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0700	0.23		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
0.3	30	0.0700	1.85		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
3.9	80	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 17:



Summary for Subcatchment 18:

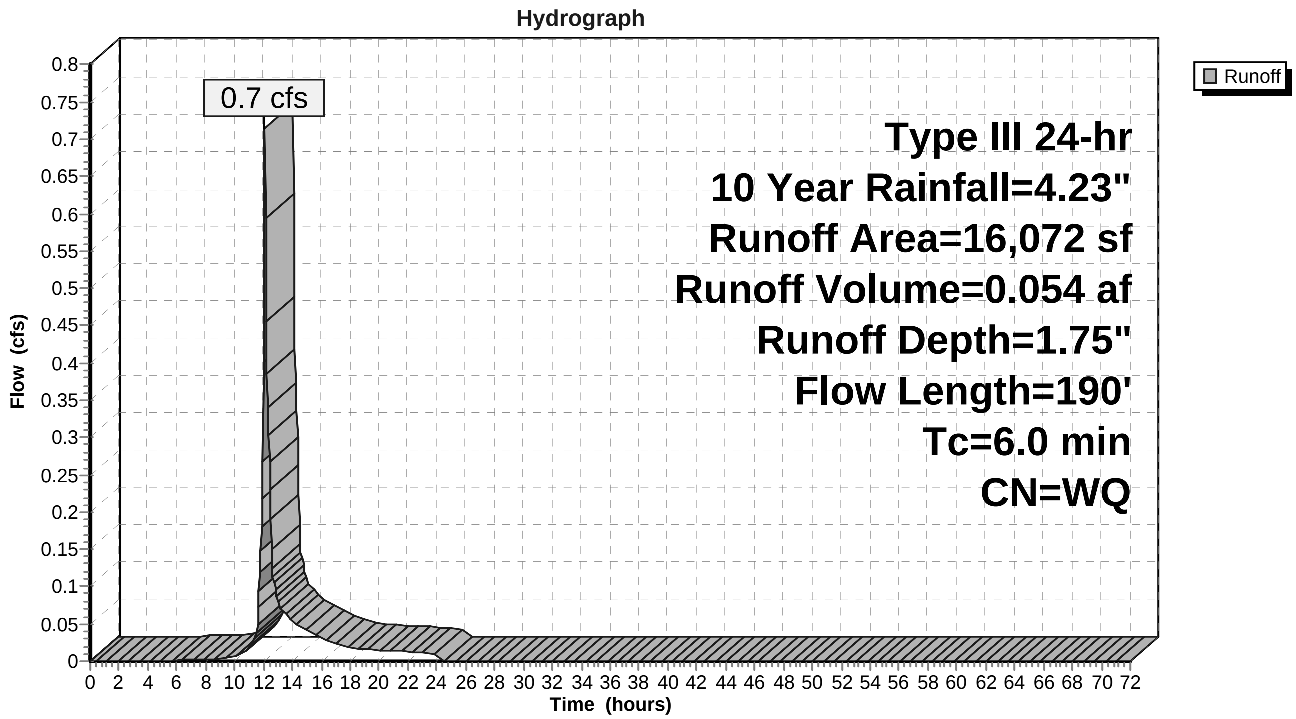
Runoff = 0.7 cfs @ 12.10 hrs, Volume= 0.054 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
8,375	70	Woods, Good HSG C
959	98	Roofs HSG C
6,738	74	>75% Grass cover, Good HSG C
16,072		Weighted Average
15,113		94.03% Pervious Area
959		5.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.4000	0.46		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.83"
0.8	70	0.0850	1.46		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
0.7	70	0.0500	1.57		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.3	190	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 18:



Summary for Subcatchment 19:

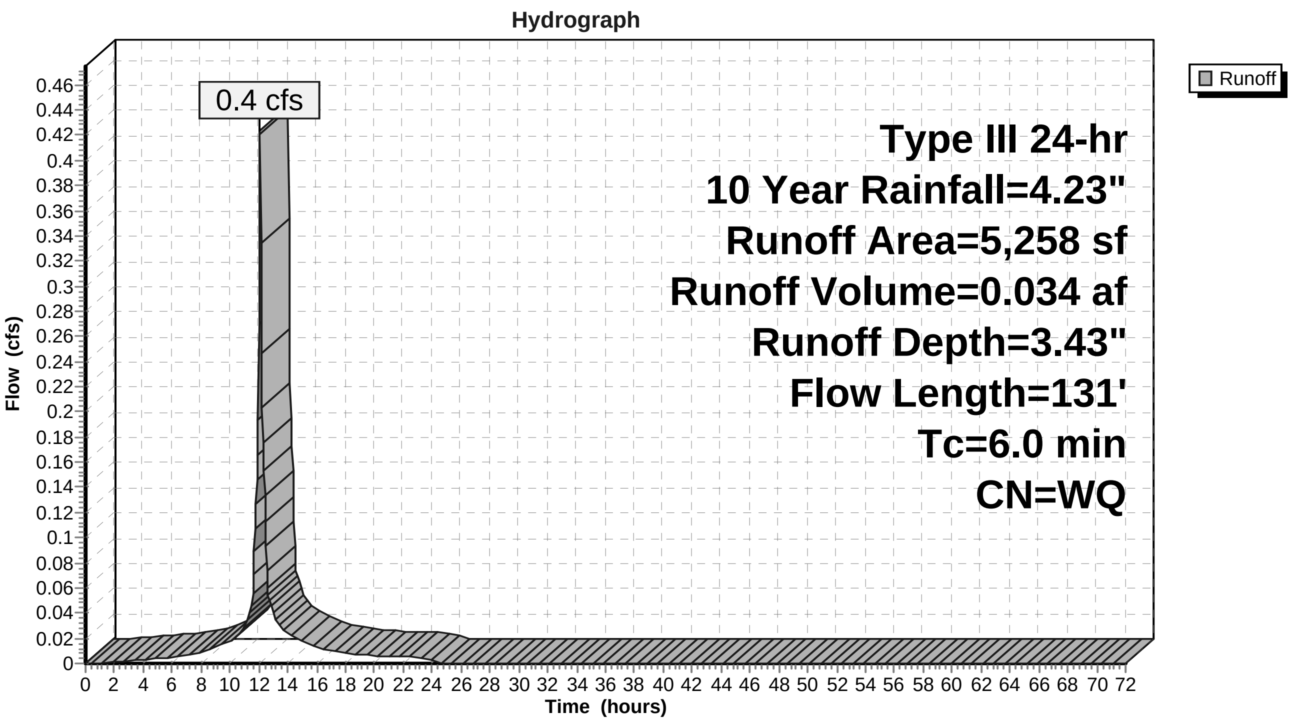
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
*	522	98	Gravel roads HSG C
	3,398	98	Paved parking HSG C
	1,338	74	>75% Grass cover, Good HSG C
	5,258		Weighted Average
	1,338		25.45% Pervious Area
	3,920		74.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	11	0.0200	0.83		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 2.83"
0.2	120	0.0375	8.14	53.43	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.50' Z= 2.0 & 2.5 '/' Top.W=7.75' n= 0.030 Earth, grassed & winding
0.4	131	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 19:



Summary for Subcatchment 20:

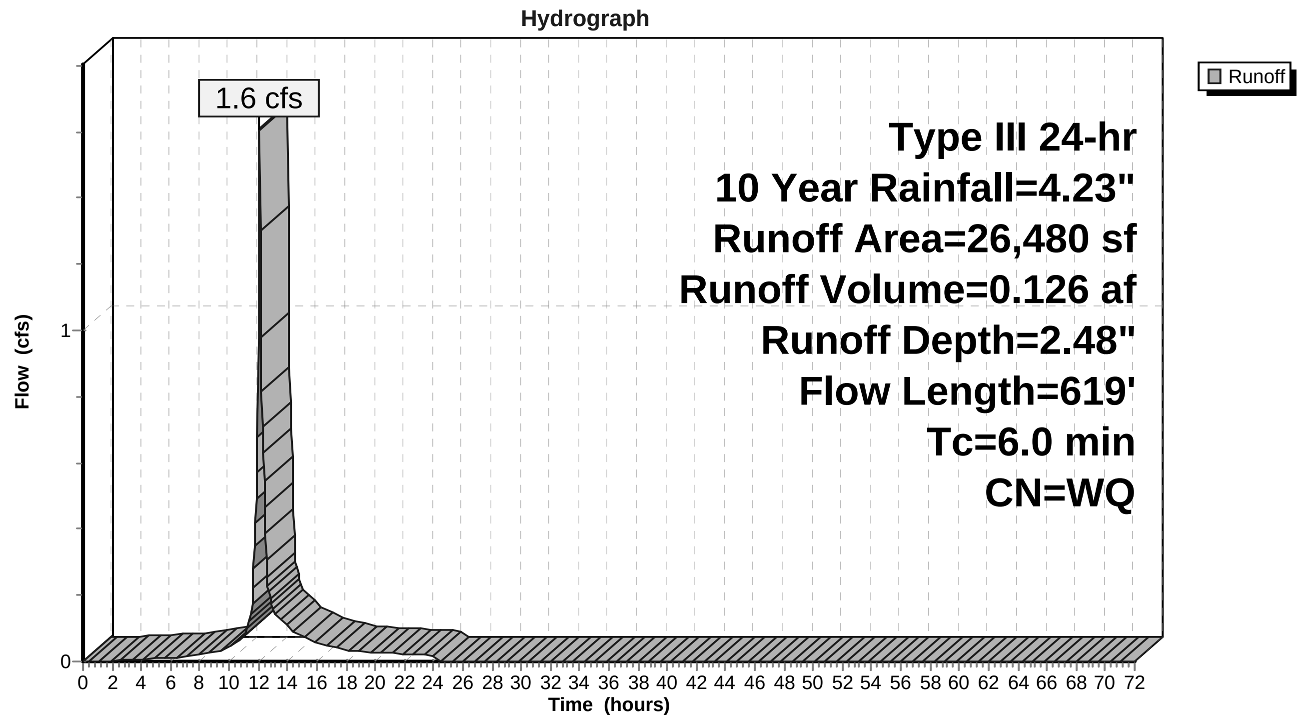
Runoff = 1.6 cfs @ 12.09 hrs, Volume= 0.126 af, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
	6,362	98	Paved parking HSG C
*	2,224	98	Gravel roads HSG C
	629	70	Woods, Good HSG C
	17,265	74	>75% Grass cover, Good HSG C
	26,480		Weighted Average
	17,894		67.58% Pervious Area
	8,586		32.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	14	0.0200	0.87		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 2.83"
1.0	605	0.0600	10.30	67.58	**Trap/Vee/Rect Channel Flow, B-->C** Bot.W=1.00' D=1.50' Z= 2.5 & 2.0 '/' Top.W=7.75' n= 0.030 Earth, grassed & winding
1.3	619	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 20:



Summary for Subcatchment 21: 21

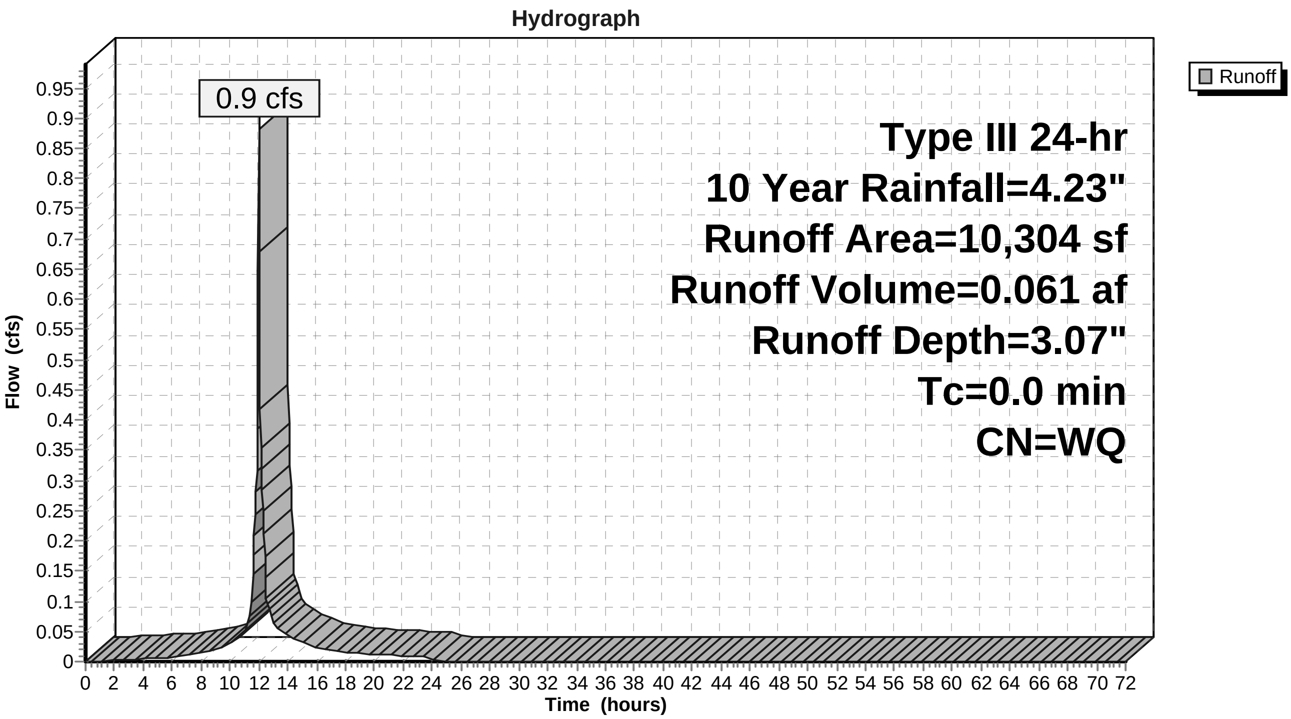
Runoff = 0.9 cfs @ 12.00 hrs, Volume= 0.061 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
*	1,409	98	Gravel roads HSG C
	4,635	98	Paved parking HSG C
	132	70	Woods, Good HSG C
	4,128	74	>75% Grass cover, Good HSG C
	10,304		Weighted Average
	4,260		41.34% Pervious Area
	6,044		58.66% Impervious Area

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

Subcatchment 21: 21



Summary for Subcatchment 22:

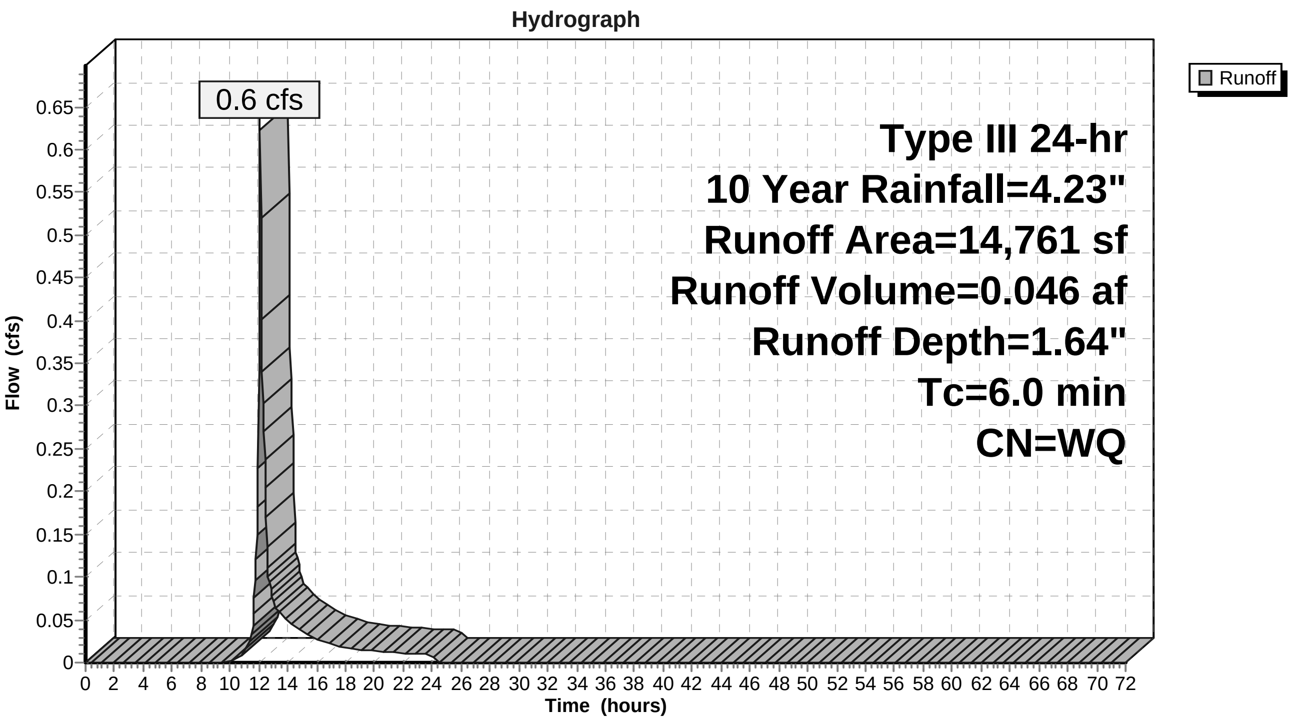
Runoff = 0.6 cfs @ 12.10 hrs, Volume= 0.046 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

Area (sf)	CN	Description
6,810	70	Woods, Good HSG C
7,951	74	>75% Grass cover, Good HSG C
14,761		Weighted Average
14,761		100.00% Pervious Area

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

Subcatchment 22:



Summary for Subcatchment 23:

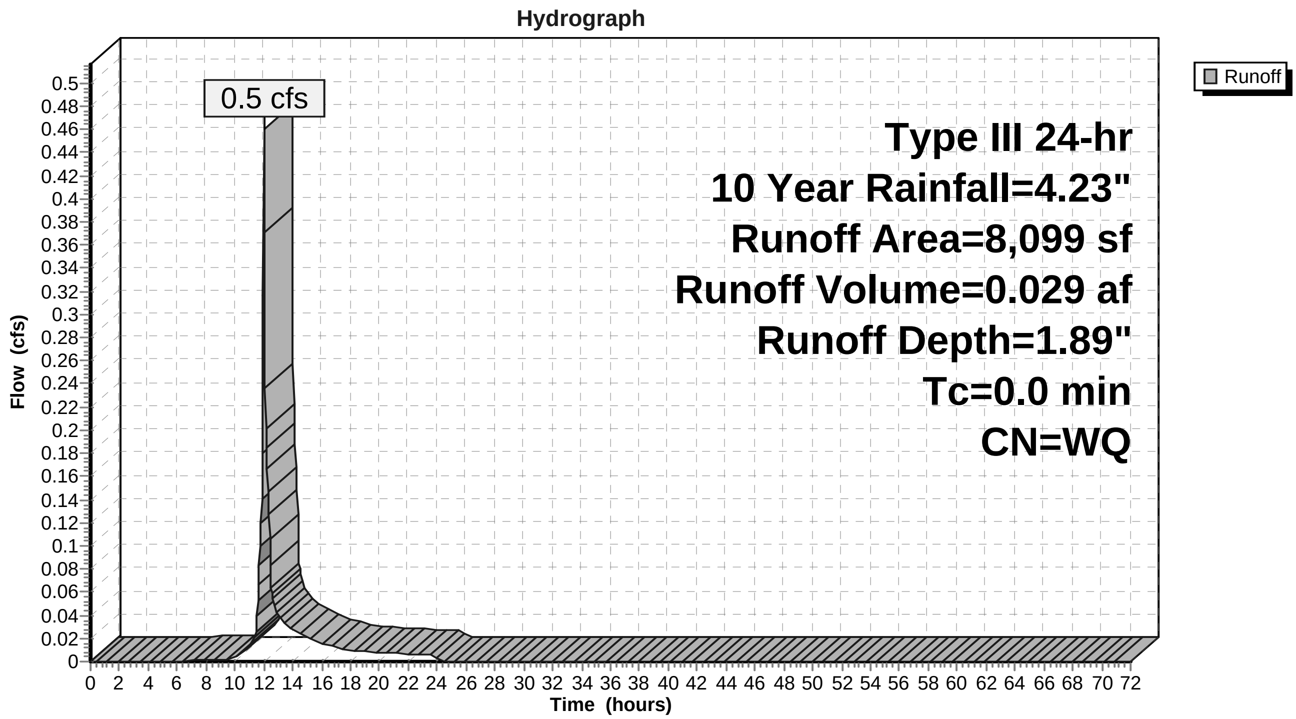
Runoff = 0.5 cfs @ 12.01 hrs, Volume= 0.029 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.23"

	Area (sf)	CN	Description
*	39	98	Gravel roads HSG C
	412	98	Paved parking HSG C
	23	70	Woods, Good HSG C
	7,625	74	>75% Grass cover, Good HSG C
	8,099		Weighted Average
	7,648		94.43% Pervious Area
	451		5.57% Impervious Area

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

Subcatchment 23:



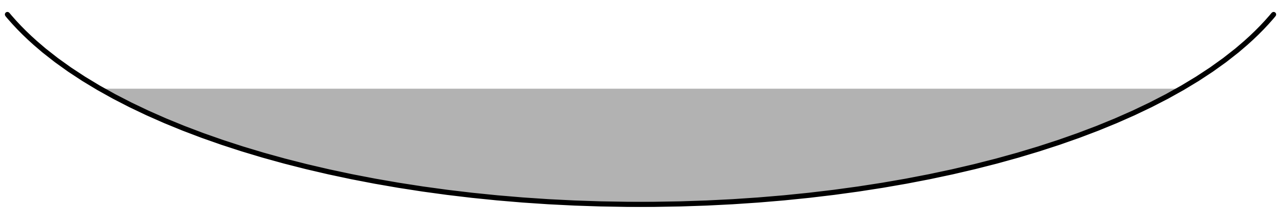
Summary for Reach 1R: Overland flow to POA1

Inflow Area = 2.51 ac, 27.33% Impervious, Inflow Depth = 2.35" for 10 Year event
Inflow = 2.5 cfs @ 12.41 hrs, Volume= 0.491 af
Outflow = 2.5 cfs @ 12.41 hrs, Volume= 0.491 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 3.91 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.05 fps, Avg. Travel Time= 1.3 min

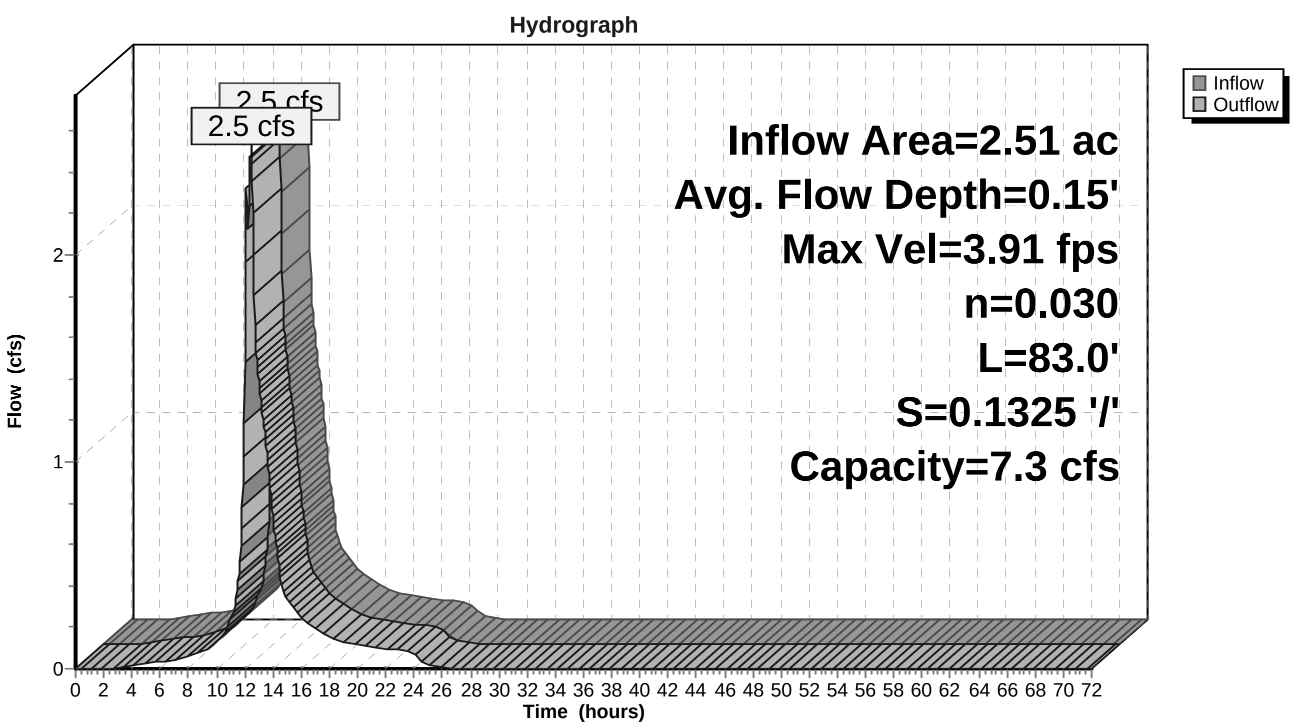
Peak Storage= 52 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 6.24'
Bank-Full Depth= 0.25' Flow Area= 1.3 sf, Capacity= 7.3 cfs

8.00' x 0.25' deep Parabolic Channel, n= 0.030 Short grass
Length= 83.0' Slope= 0.1325 '/'
Inlet Invert= 940.00', Outlet Invert= 929.00'



‡

Reach 1R: Overland flow to POA1



Summary for Reach 2R: Existing Swale

Inflow Area = 0.55 ac, 9.22% Impervious, Inflow Depth = 1.97" for 10 Year event
Inflow = 1.1 cfs @ 12.06 hrs, Volume= 0.090 af
Outflow = 1.1 cfs @ 12.07 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.1 min

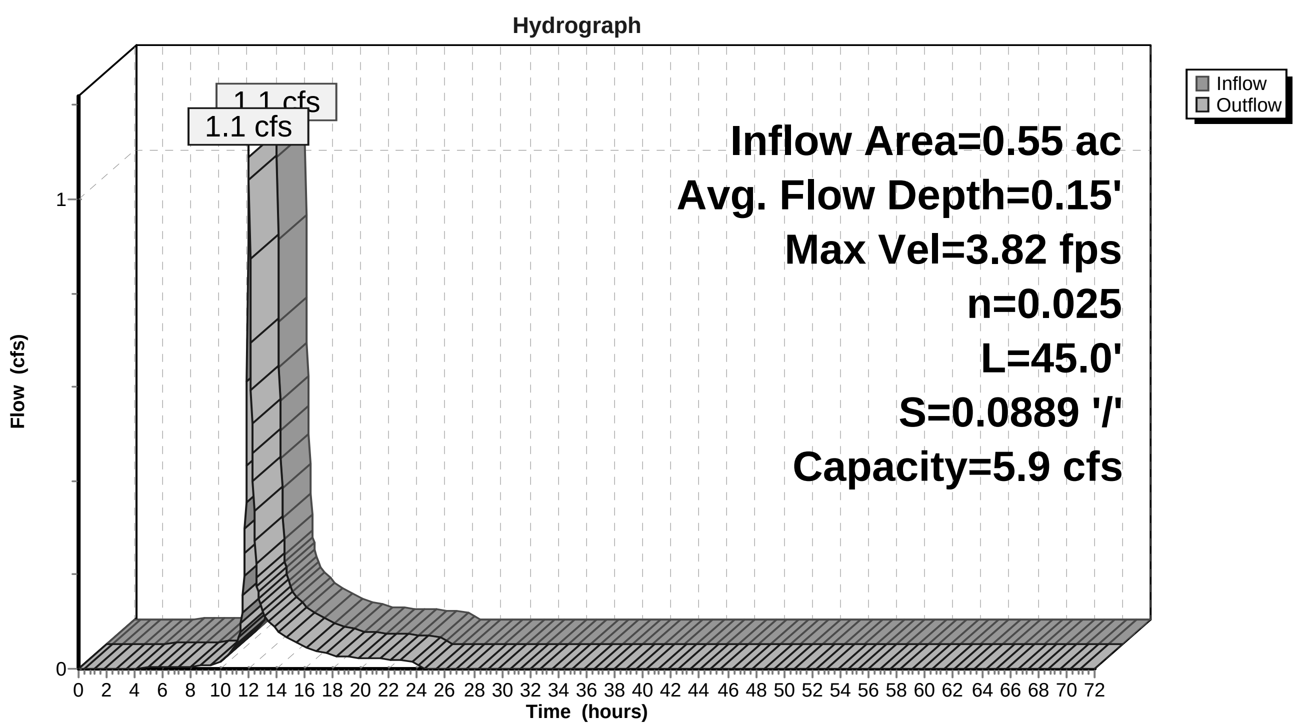
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 3.82 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 0.7 min

Peak Storage= 13 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 2.80'
Bank-Full Depth= 0.33' Flow Area= 1.0 sf, Capacity= 5.9 cfs

1.00' x 0.33' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 6.0 '/' Top Width= 4.96'
Length= 45.0' Slope= 0.0889 '/'
Inlet Invert= 954.00', Outlet Invert= 950.00'

‡

Reach 2R: Existing Swale



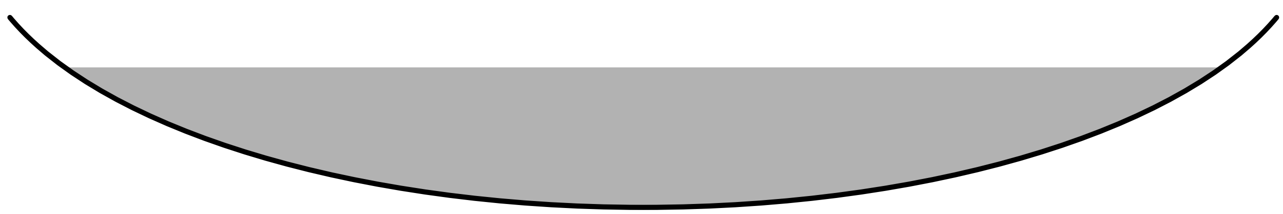
Summary for Reach 3R: Overland flow to POA1

Inflow Area = 3.85 ac, 5.65% Impervious, Inflow Depth = 1.73" for 10 Year event
Inflow = 4.6 cfs @ 12.30 hrs, Volume= 0.554 af
Outflow = 4.6 cfs @ 12.32 hrs, Volume= 0.554 af, Atten= 1%, Lag= 1.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 3.28 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 6.8 min

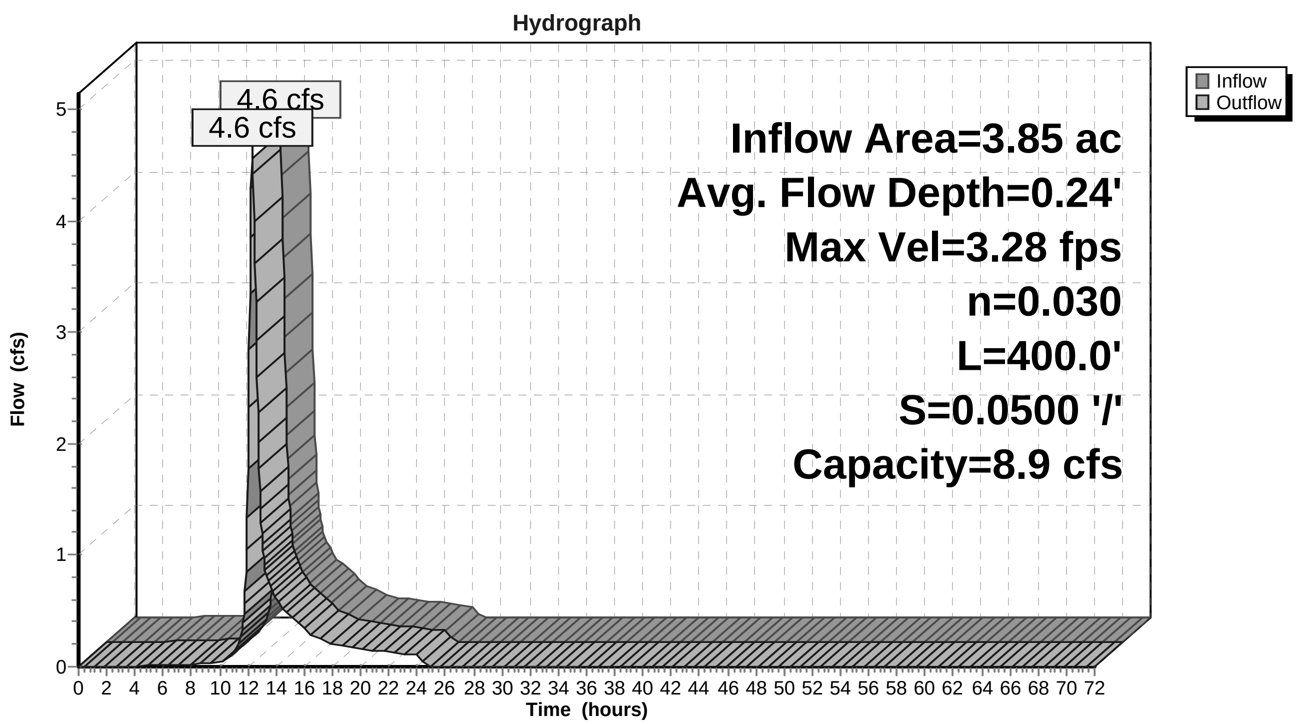
Peak Storage= 556 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.24' , Surface Width= 8.58'
Bank-Full Depth= 0.33' Flow Area= 2.2 sf, Capacity= 8.9 cfs

10.00' x 0.33' deep Parabolic Channel, n= 0.030 Short grass
Length= 400.0' Slope= 0.0500 '/'
Inlet Invert= 949.00', Outlet Invert= 929.00'



‡

Reach 3R: Overland flow to POA1



Summary for Reach 4R: Proposed Swale 2 flows into FB2

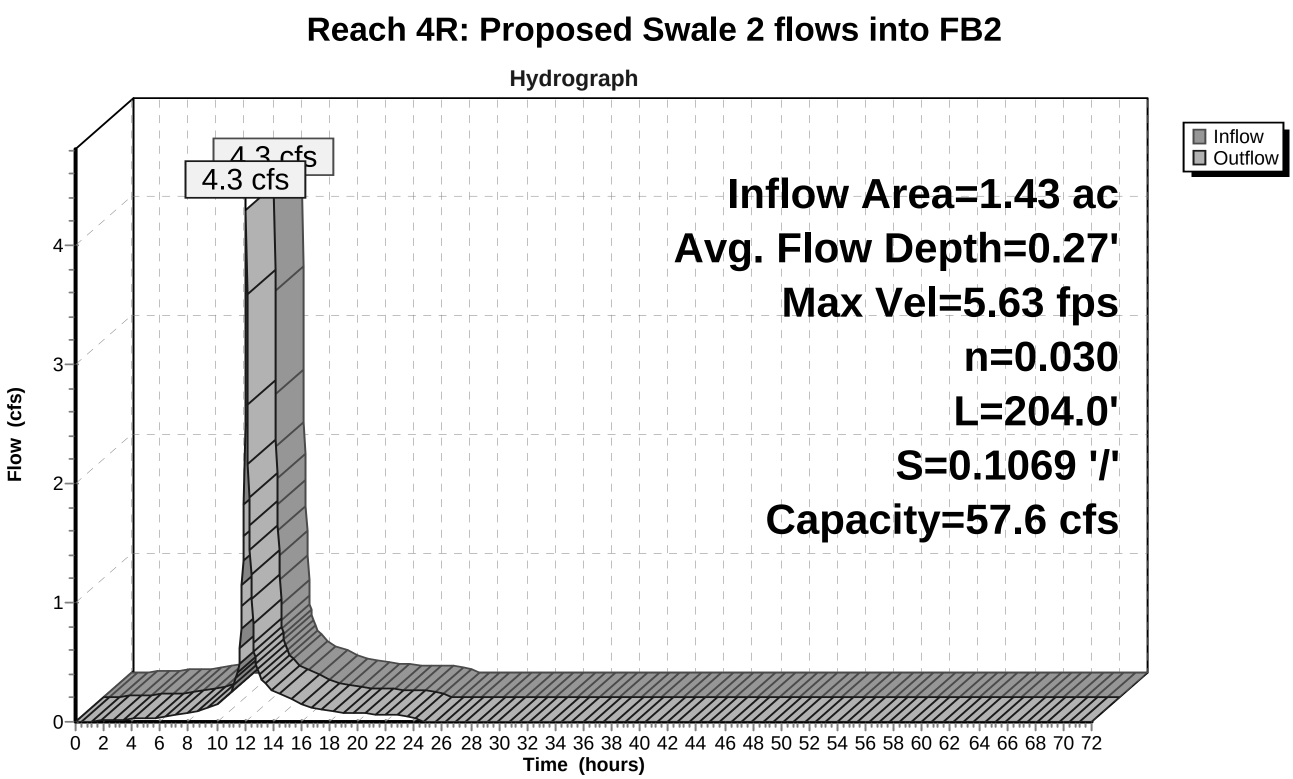
Inflow Area =	1.43 ac, 49.96% Impervious, Inflow Depth = 2.87"	for 10 Year event
Inflow =	4.3 cfs @ 12.09 hrs, Volume=	0.342 af
Outflow =	4.3 cfs @ 12.10 hrs, Volume=	0.342 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 5.63 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 2.2 min

Peak Storage= 155 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.27' , Surface Width= 3.63'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 57.6 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 204.0' Slope= 0.1069 '/'
Inlet Invert= 974.80', Outlet Invert= 953.00'

‡



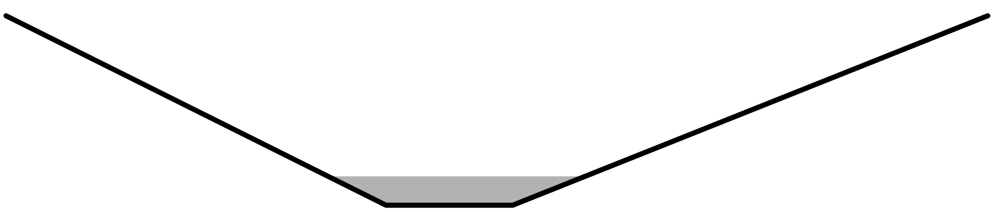
Summary for Reach 5R: Swale STA 1+50 TO 0+20 R

Inflow Area = 0.24 ac, 58.66% Impervious, Inflow Depth = 3.07" for 10 Year event
Inflow = 0.9 cfs @ 12.01 hrs, Volume= 0.061 af
Outflow = 0.8 cfs @ 12.02 hrs, Volume= 0.061 af, Atten= 3%, Lag= 0.7 min

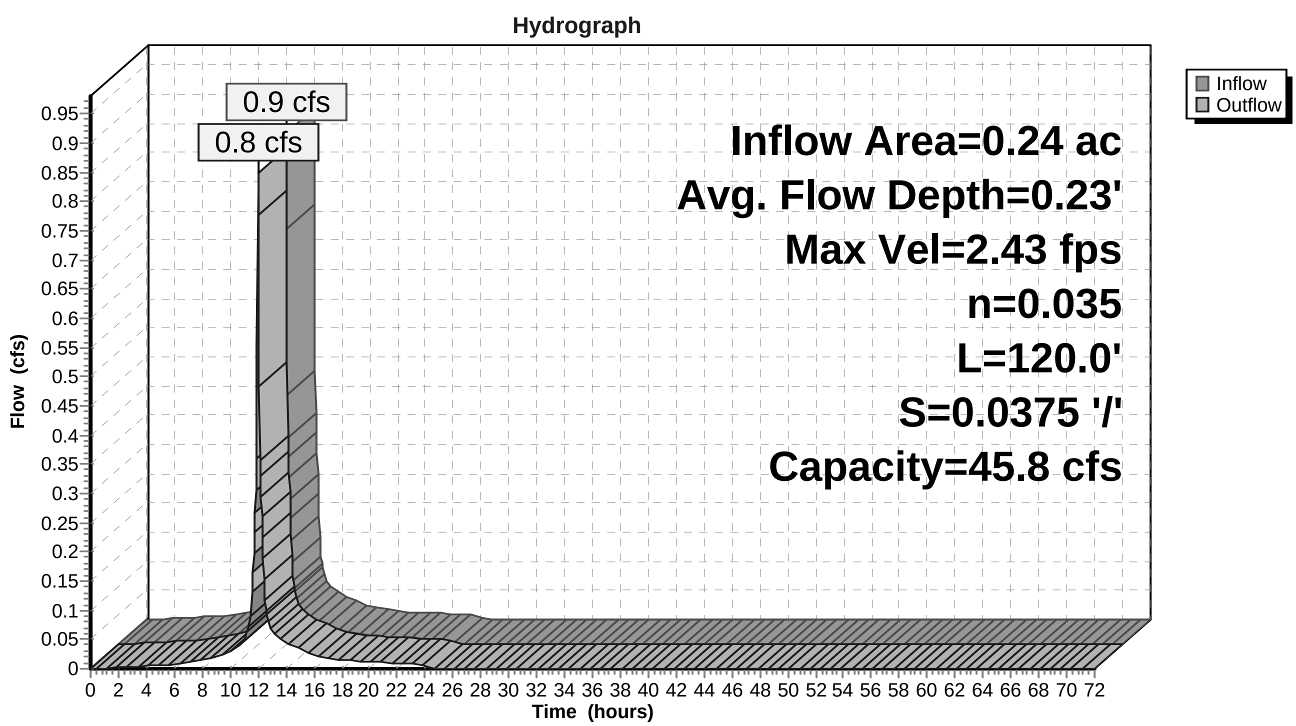
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 2.43 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 2.8 min

Peak Storage= 42 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 2.03'
Bank-Full Depth= 1.50' Flow Area= 6.6 sf, Capacity= 45.8 cfs

1.00' x 1.50' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 2.5 '/' Top Width= 7.75'
Length= 120.0' Slope= 0.0375 '/'
Inlet Invert= 972.00', Outlet Invert= 967.50'



Reach 5R: Swale STA 1+50 TO 0+20 R

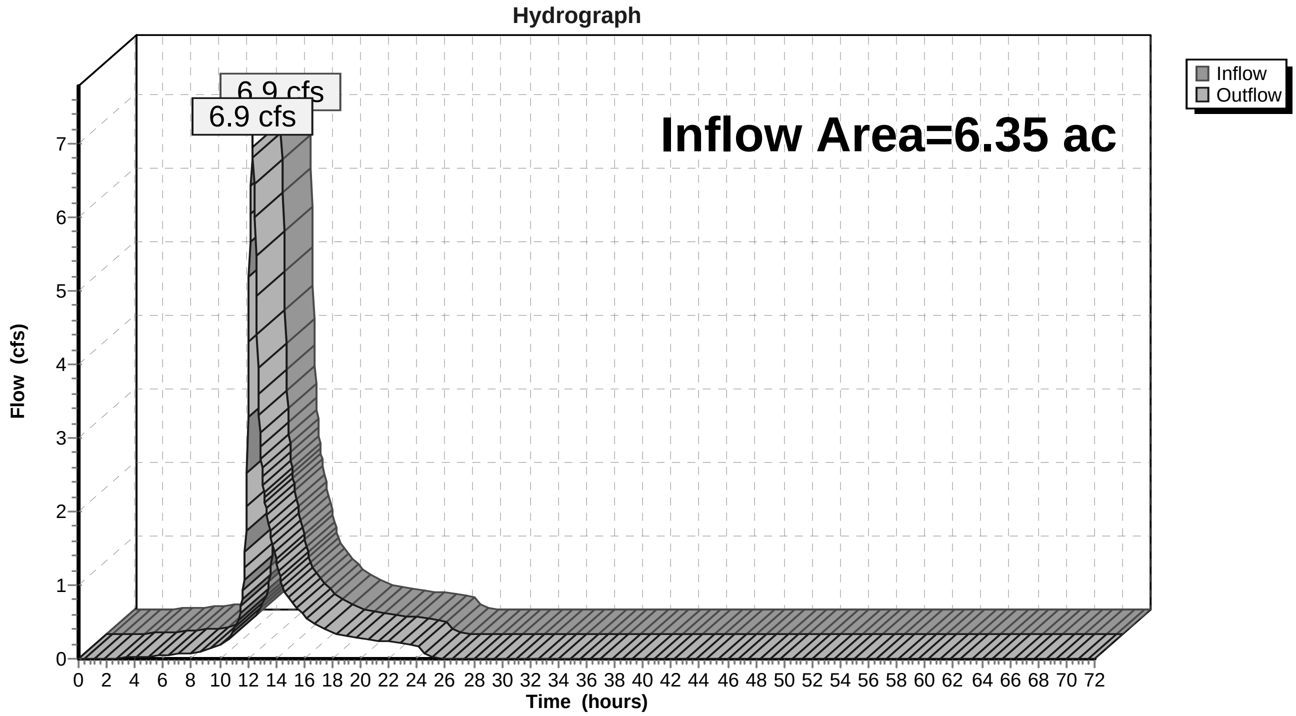


Summary for Reach POA#1:

Inflow Area = 6.35 ac, 14.21% Impervious, Inflow Depth = 1.97" for 10 Year event
Inflow = 6.9 cfs @ 12.35 hrs, Volume= 1.045 af
Outflow = 6.9 cfs @ 12.35 hrs, Volume= 1.045 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#1:

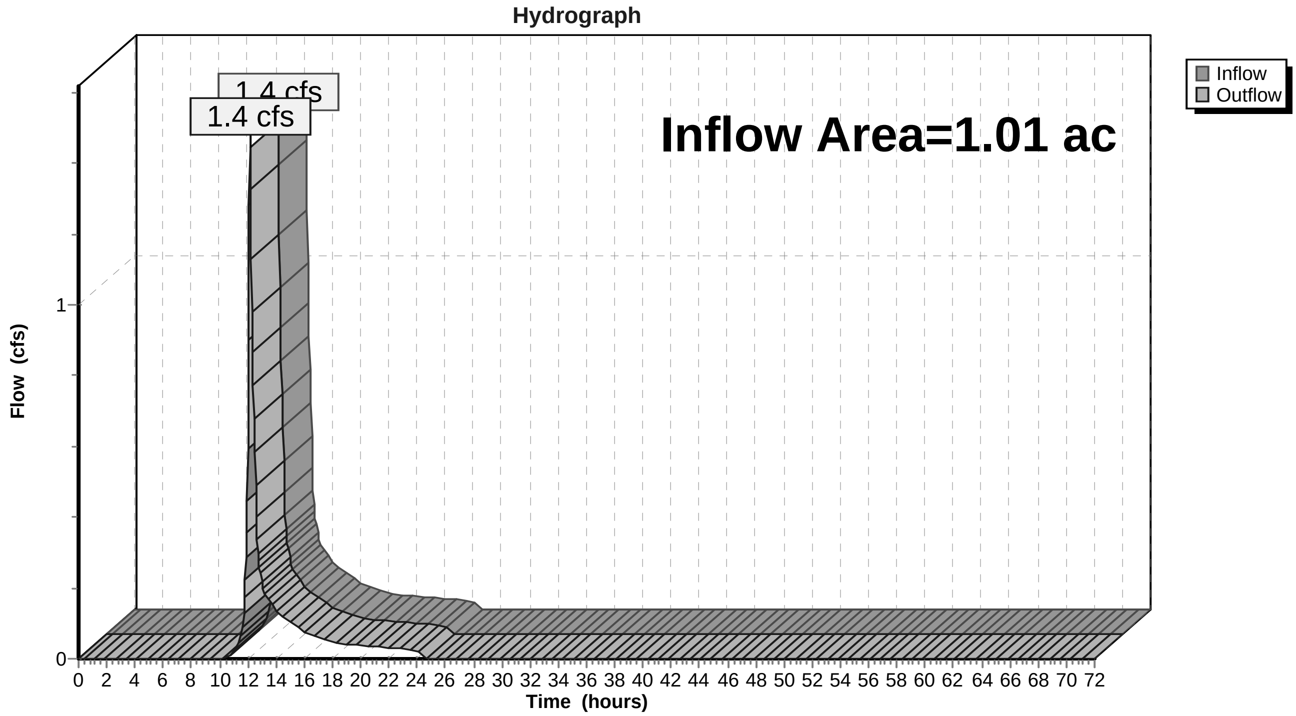


Summary for Reach POA#10:

Inflow Area = 1.01 ac, 0.00% Impervious, Inflow Depth = 1.49" for 10 Year event
Inflow = 1.4 cfs @ 12.15 hrs, Volume= 0.124 af
Outflow = 1.4 cfs @ 12.15 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#10:

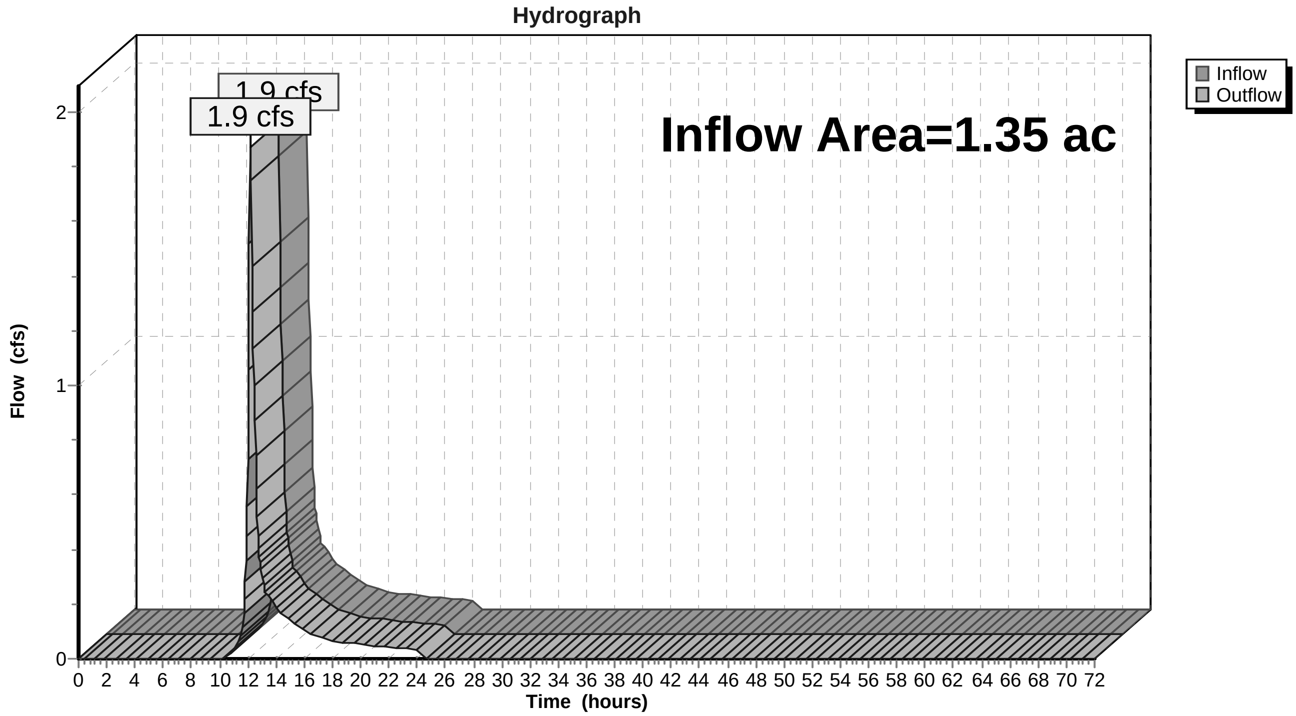


Summary for Reach POA#11:

Inflow Area =	1.35 ac,	0.00% Impervious, Inflow Depth =	1.51"	for 10 Year event
Inflow =	1.9 cfs @	12.18 hrs, Volume=	0.171 af	
Outflow =	1.9 cfs @	12.18 hrs, Volume=	0.171 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#11:

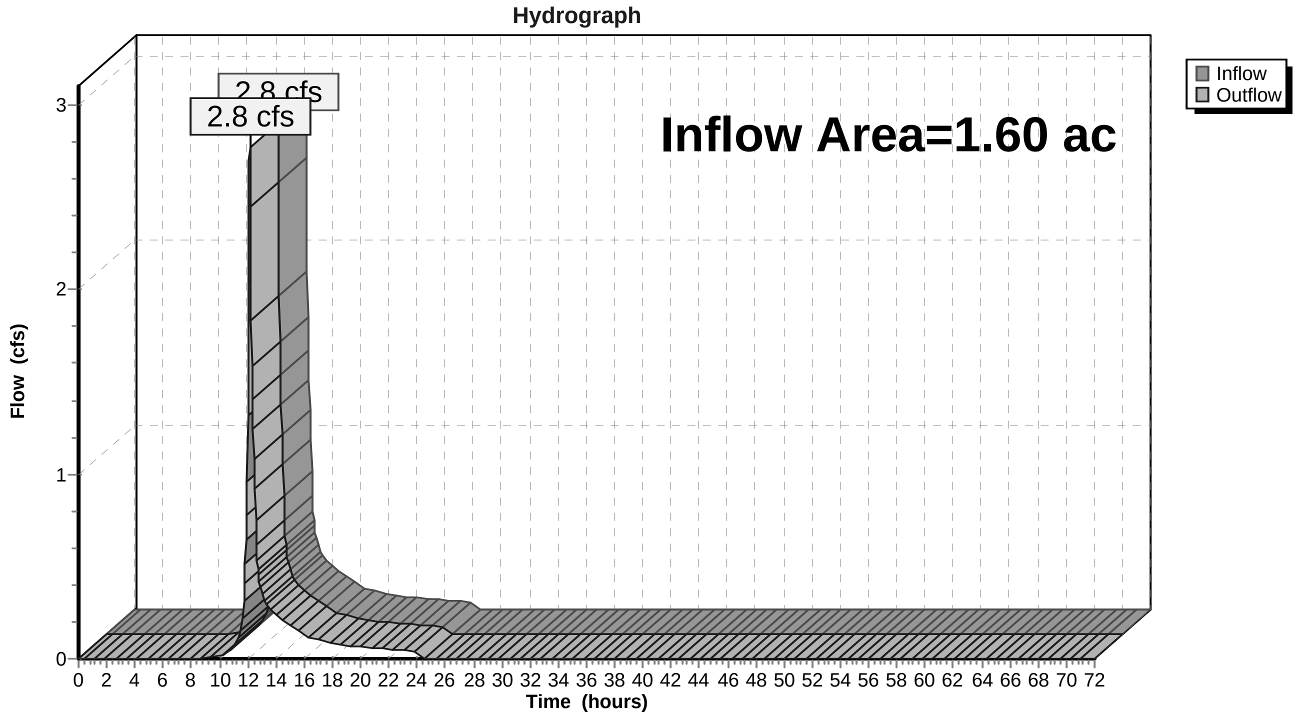


Summary for Reach POA#12:

Inflow Area =	1.60 ac,	2.14% Impervious, Inflow Depth = 1.67"	for 10 Year event
Inflow =	2.8 cfs @	12.12 hrs, Volume=	0.223 af
Outflow =	2.8 cfs @	12.12 hrs, Volume=	0.223 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#12:

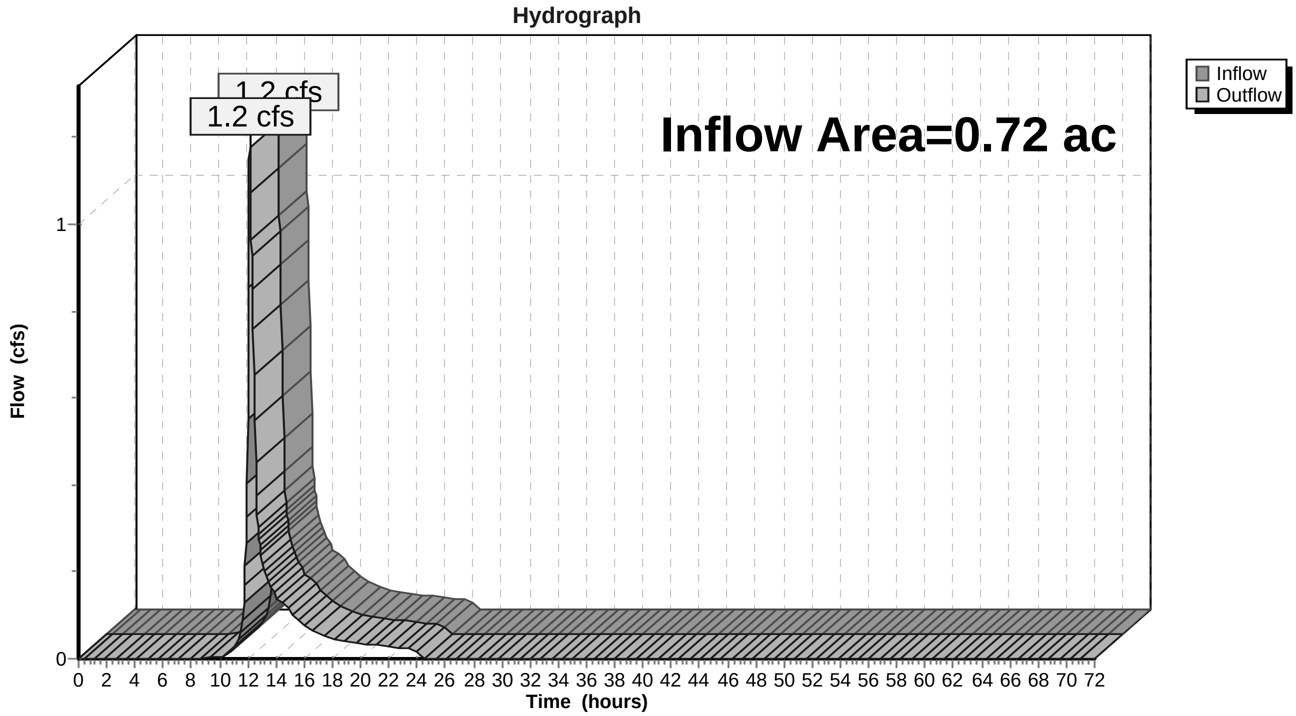


Summary for Reach POA#13:

Inflow Area =	0.72 ac,	2.15% Impervious, Inflow Depth = 1.99"	for 10 Year event
Inflow =	1.2 cfs @	12.13 hrs, Volume=	0.120 af
Outflow =	1.2 cfs @	12.13 hrs, Volume=	0.120 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#13:

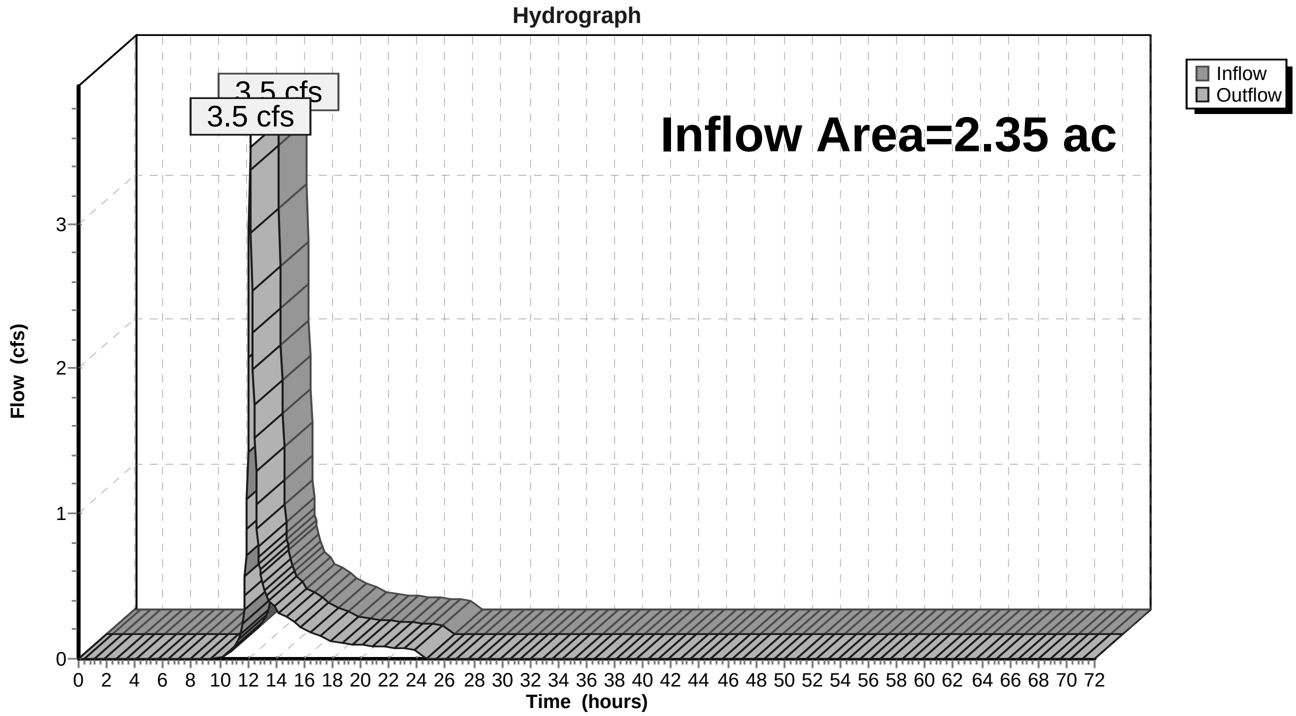


Summary for Reach POA#14:

Inflow Area = 2.35 ac, 0.70% Impervious, Inflow Depth = 1.61" for 10 Year event
Inflow = 3.5 cfs @ 12.17 hrs, Volume= 0.315 af
Outflow = 3.5 cfs @ 12.17 hrs, Volume= 0.315 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#14:



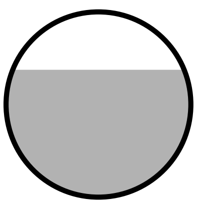
Summary for Reach POA#15: Existing Culvert

Inflow Area = 3.85 ac, 5.65% Impervious, Inflow Depth = 1.73" for 10 Year event
Inflow = 4.6 cfs @ 12.30 hrs, Volume= 0.554 af
Outflow = 4.6 cfs @ 12.30 hrs, Volume= 0.554 af, Atten= 0%, Lag= 0.1 min

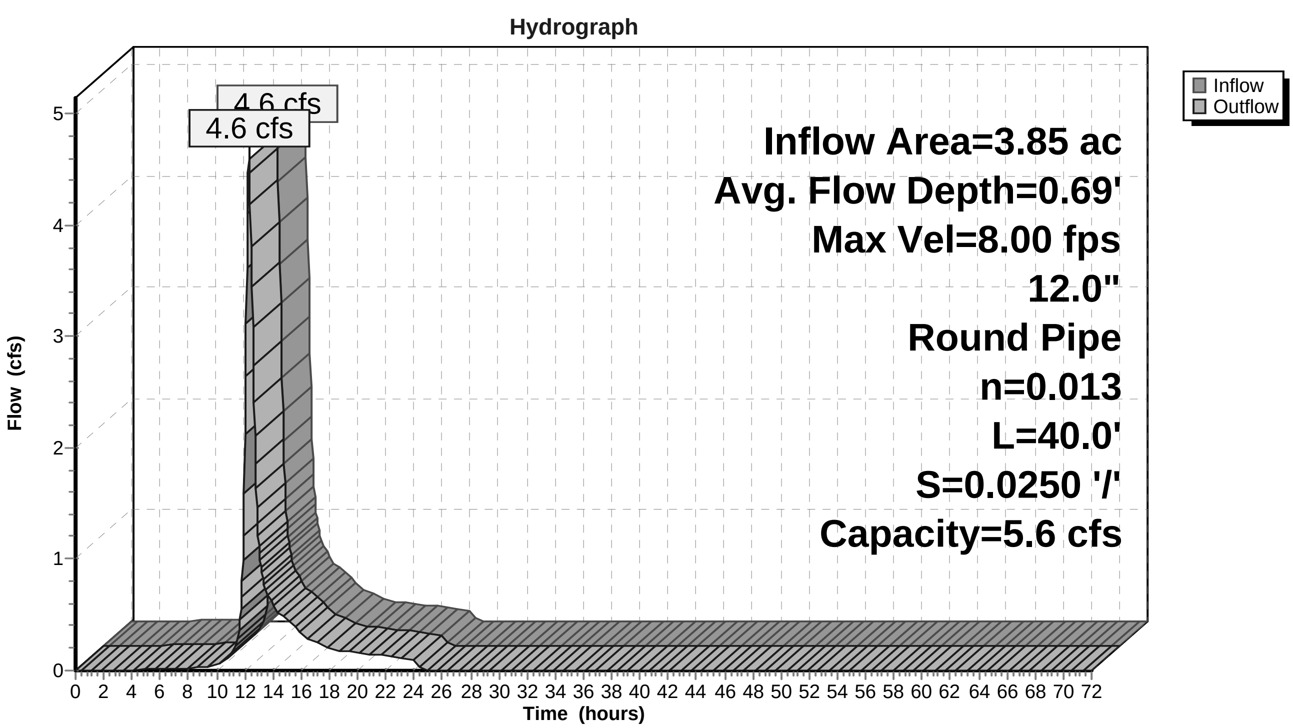
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 8.00 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.80 fps, Avg. Travel Time= 0.2 min

Peak Storage= 23 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.69' , Surface Width= 0.93'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.6 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 40.0' Slope= 0.0250 '/'
Inlet Invert= 950.00', Outlet Invert= 949.00'



Reach POA#15: Existing Culvert



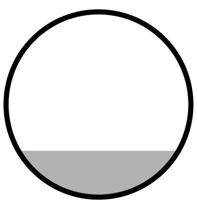
Summary for Reach POA#16: Existing culvert

Inflow Area = 0.55 ac, 9.22% Impervious, Inflow Depth = 1.97" for 10 Year event
Inflow = 1.1 cfs @ 12.06 hrs, Volume= 0.090 af
Outflow = 1.1 cfs @ 12.06 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

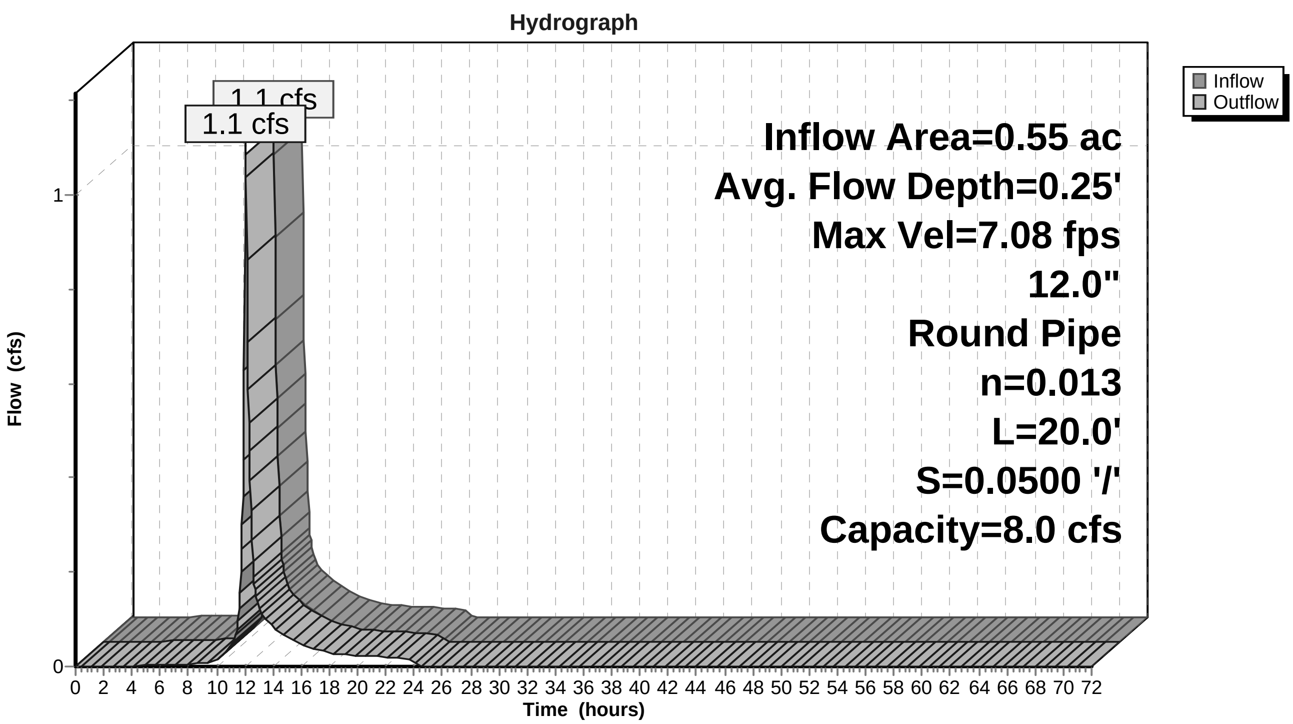
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 7.08 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.18 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.06 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 0.87'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.0 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0500 '/'
Inlet Invert= 955.00', Outlet Invert= 954.00'



Reach POA#16: Existing culvert

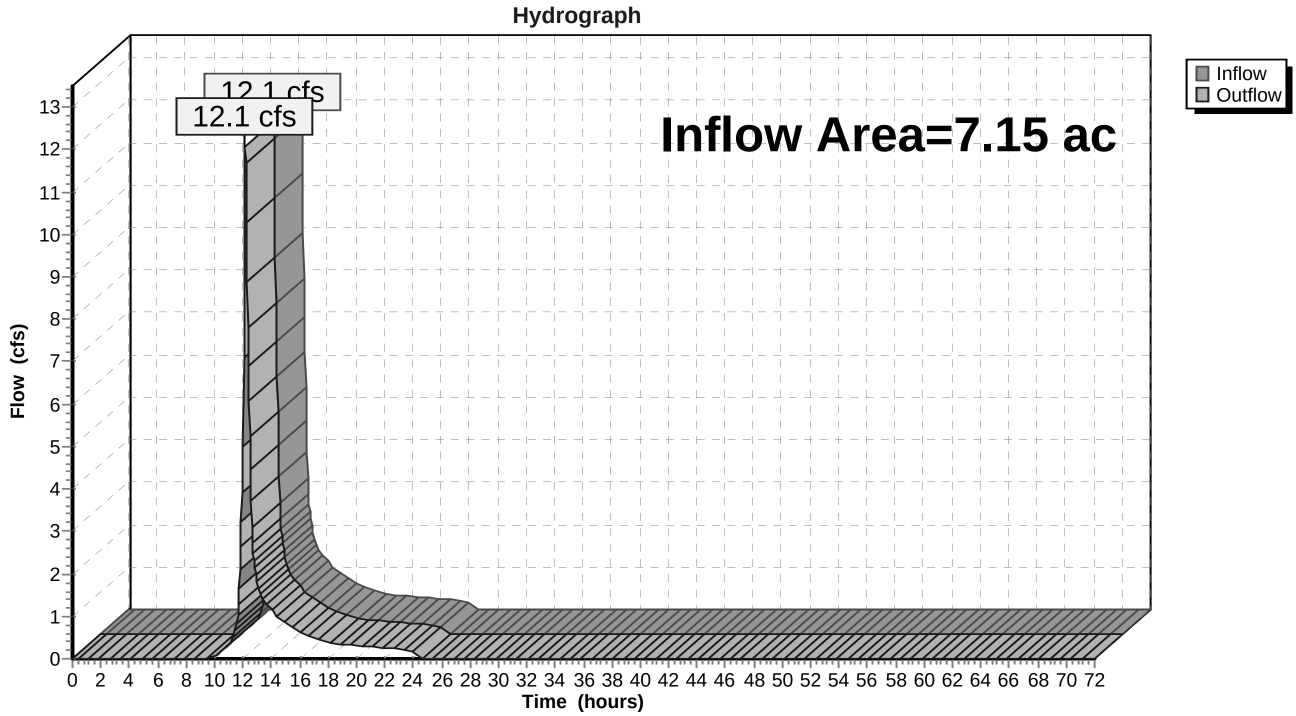


Summary for Reach POA#2:

Inflow Area =	7.15 ac,	0.31% Impervious, Inflow Depth = 1.81"	for 10 Year event	
Inflow =	12.1 cfs @	12.17 hrs, Volume=	1.079 af	
Outflow =	12.1 cfs @	12.17 hrs, Volume=	1.079 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#2:

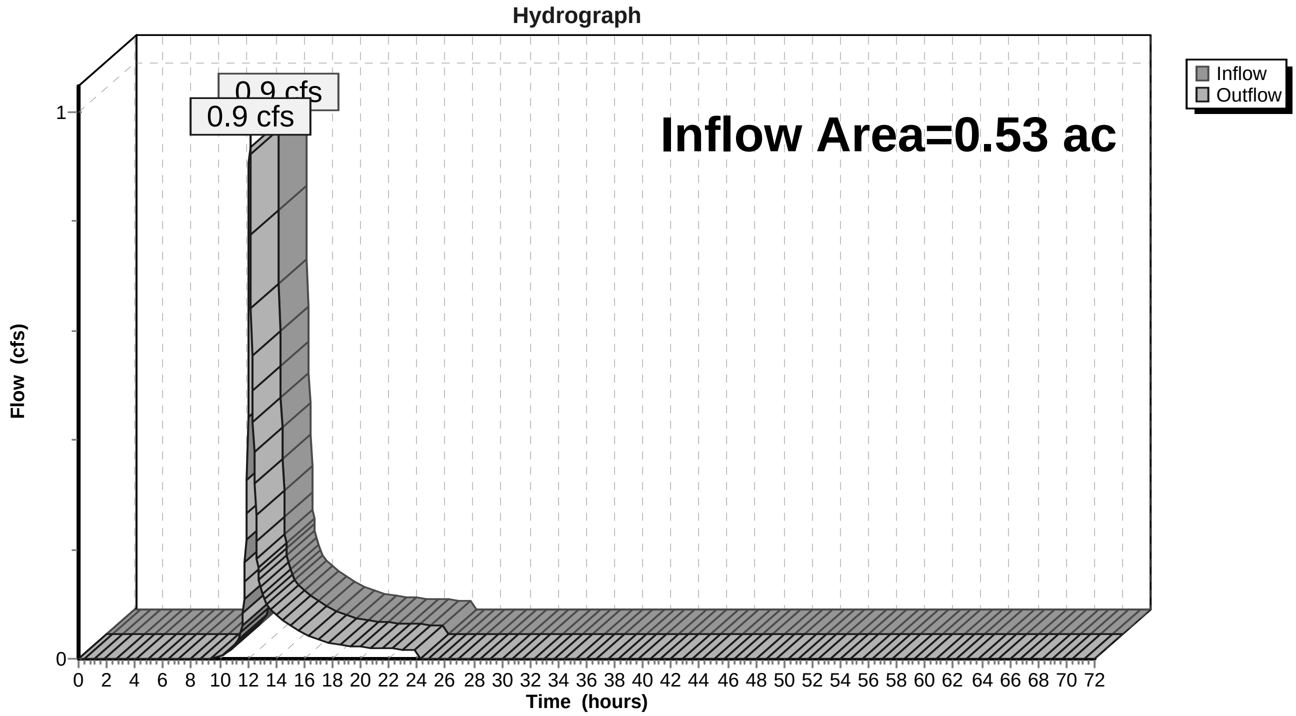


Summary for Reach POA#3:

Inflow Area =	0.53 ac,	0.00% Impervious, Inflow Depth = 1.71"	for 10 Year event
Inflow =	0.9 cfs @	12.13 hrs, Volume=	0.076 af
Outflow =	0.9 cfs @	12.13 hrs, Volume=	0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#3:

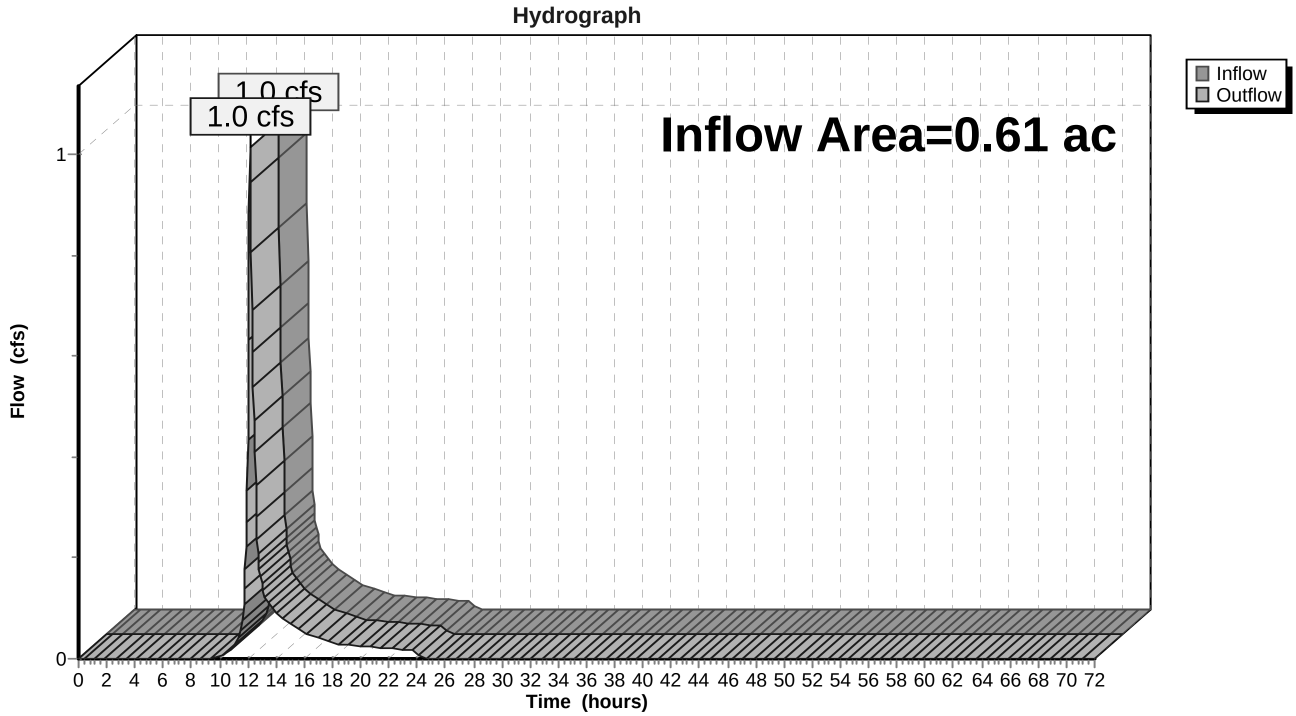


Summary for Reach POA#4:

Inflow Area = 0.61 ac, 0.00% Impervious, Inflow Depth = 1.70" for 10 Year event
Inflow = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af
Outflow = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#4:

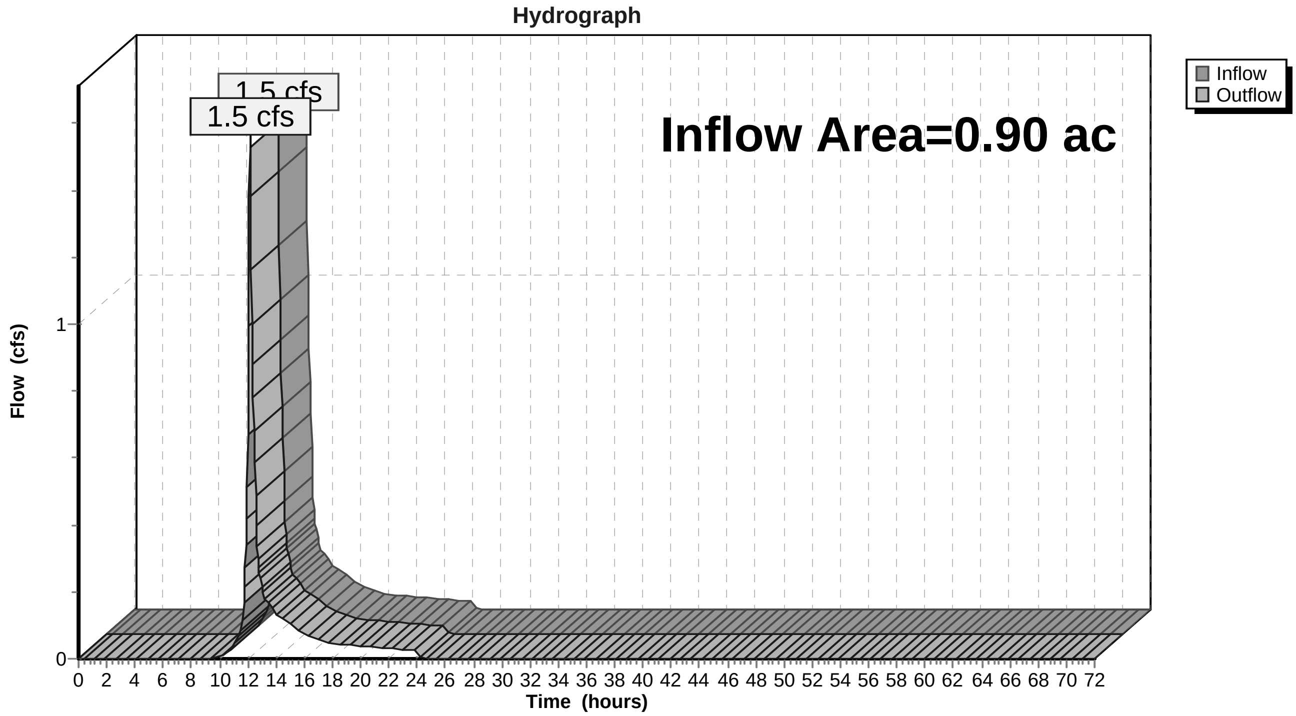


Summary for Reach POA#5:

Inflow Area = 0.90 ac, 0.00% Impervious, Inflow Depth = 1.72" for 10 Year event
Inflow = 1.5 cfs @ 12.15 hrs, Volume= 0.128 af
Outflow = 1.5 cfs @ 12.15 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#5:

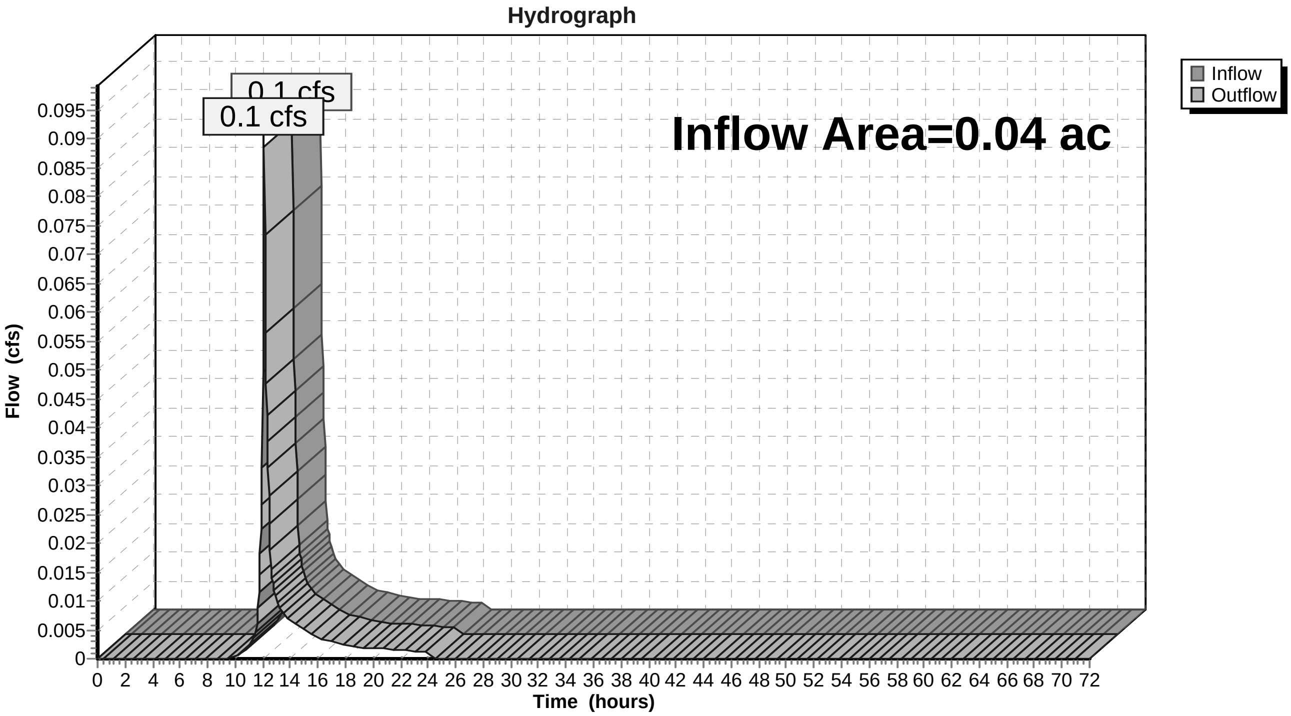


Summary for Reach POA#6:

Inflow Area = 0.04 ac, 0.00% Impervious, Inflow Depth = 1.77" for 10 Year event
Inflow = 0.1 cfs @ 12.10 hrs, Volume= 0.007 af
Outflow = 0.1 cfs @ 12.10 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#6:

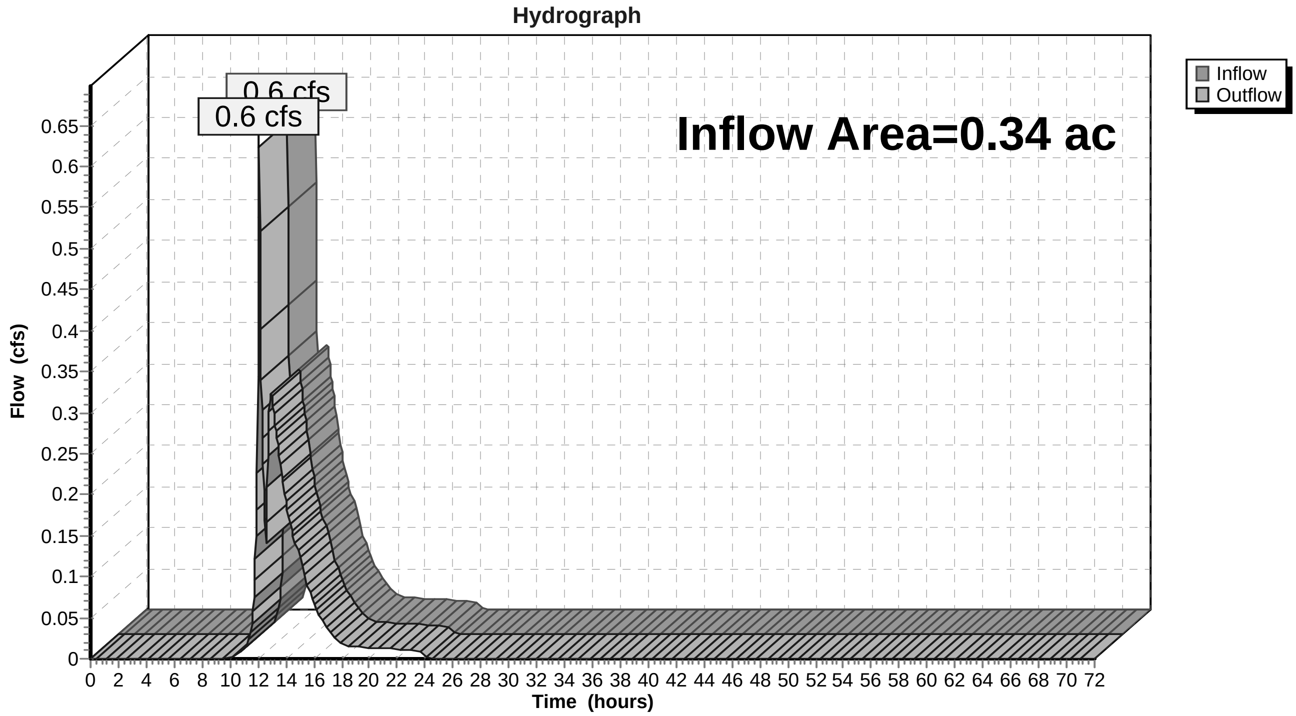


Summary for Reach POA#7:

Inflow Area =	0.34 ac,	0.00% Impervious, Inflow Depth =	3.04"	for 10 Year event
Inflow =	0.6 cfs @	12.10 hrs, Volume=	0.086 af	
Outflow =	0.6 cfs @	12.10 hrs, Volume=	0.086 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#7:

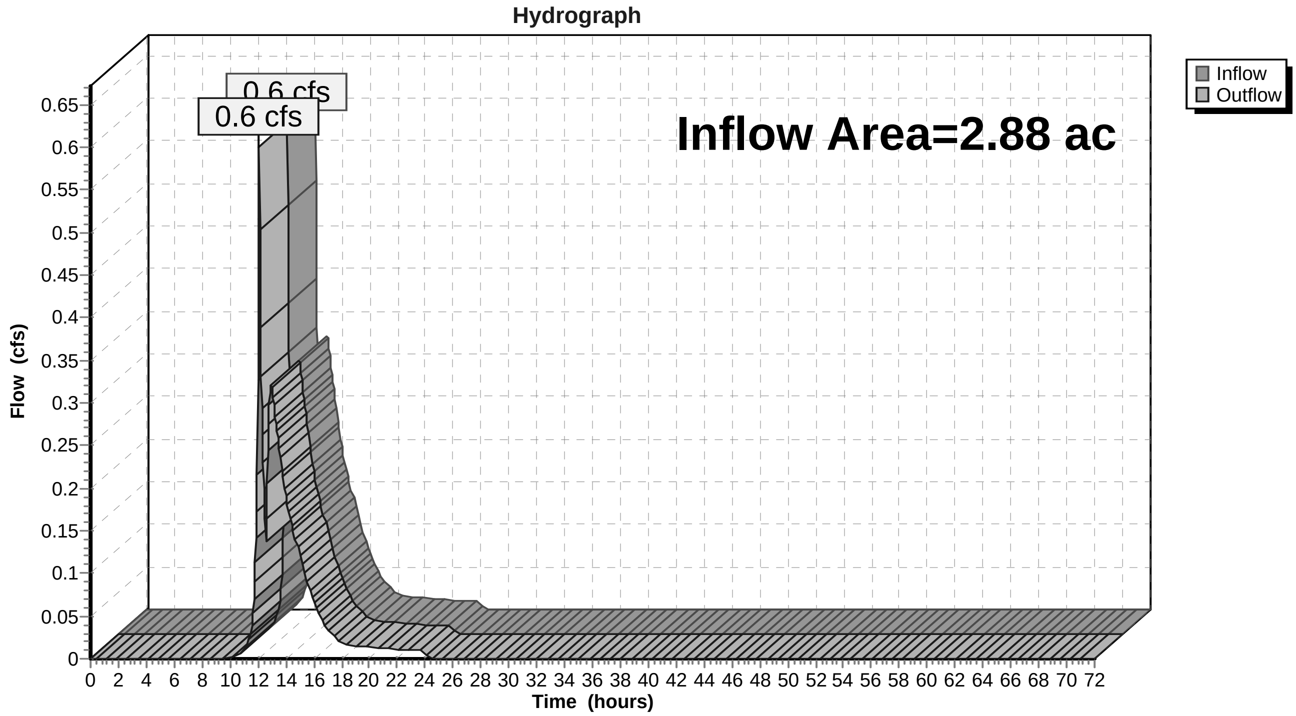


Summary for Reach POA#8:

Inflow Area = 2.88 ac, 26.94% Impervious, Inflow Depth = 0.35" for 10 Year event
Inflow = 0.6 cfs @ 12.10 hrs, Volume= 0.084 af
Outflow = 0.6 cfs @ 12.10 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#8:

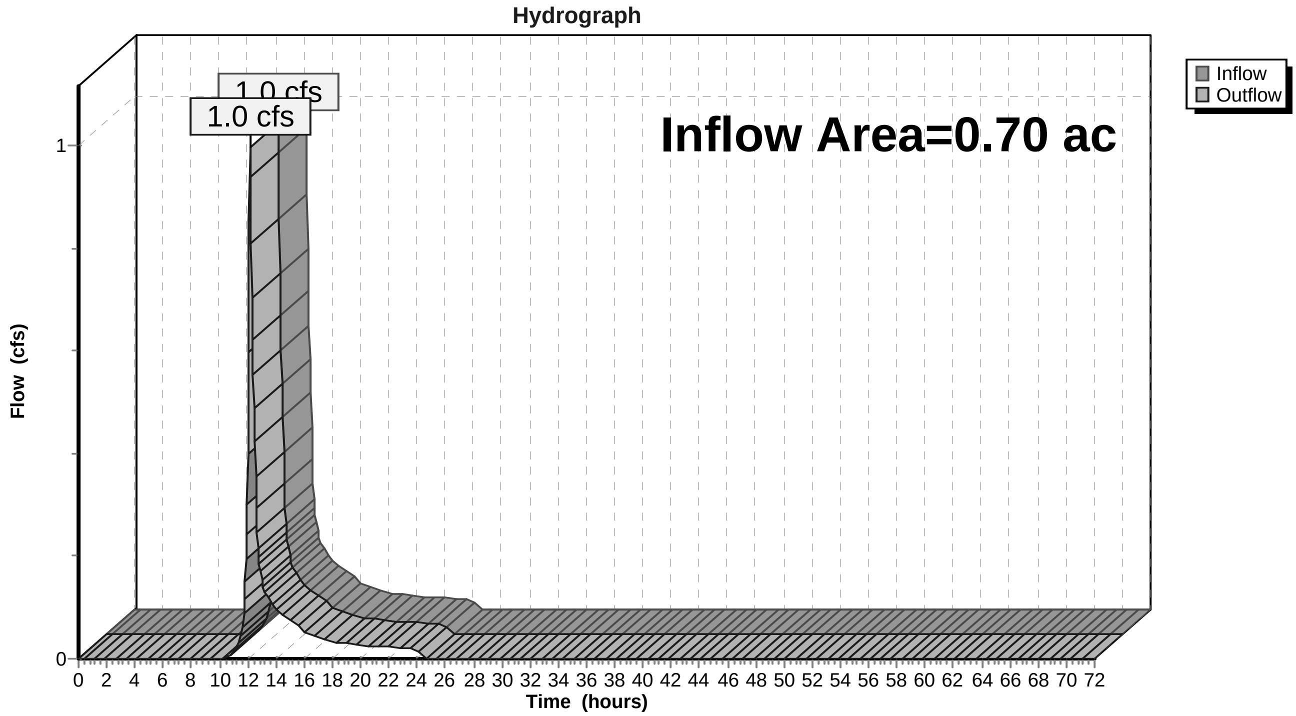


Summary for Reach POA#9:

Inflow Area = 0.70 ac, 0.00% Impervious, Inflow Depth = 1.49" for 10 Year event
Inflow = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af
Outflow = 1.0 cfs @ 12.16 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2

Reach POA#9:



Summary for Reach TS: Treament Swale

Inflow Area = 1.30 ac, 40.46% Impervious, Inflow Depth = 2.66" for 10 Year event
Inflow = 3.4 cfs @ 12.08 hrs, Volume= 0.289 af
Outflow = 3.0 cfs @ 12.14 hrs, Volume= 0.289 af, Atten= 12%, Lag= 3.3 min

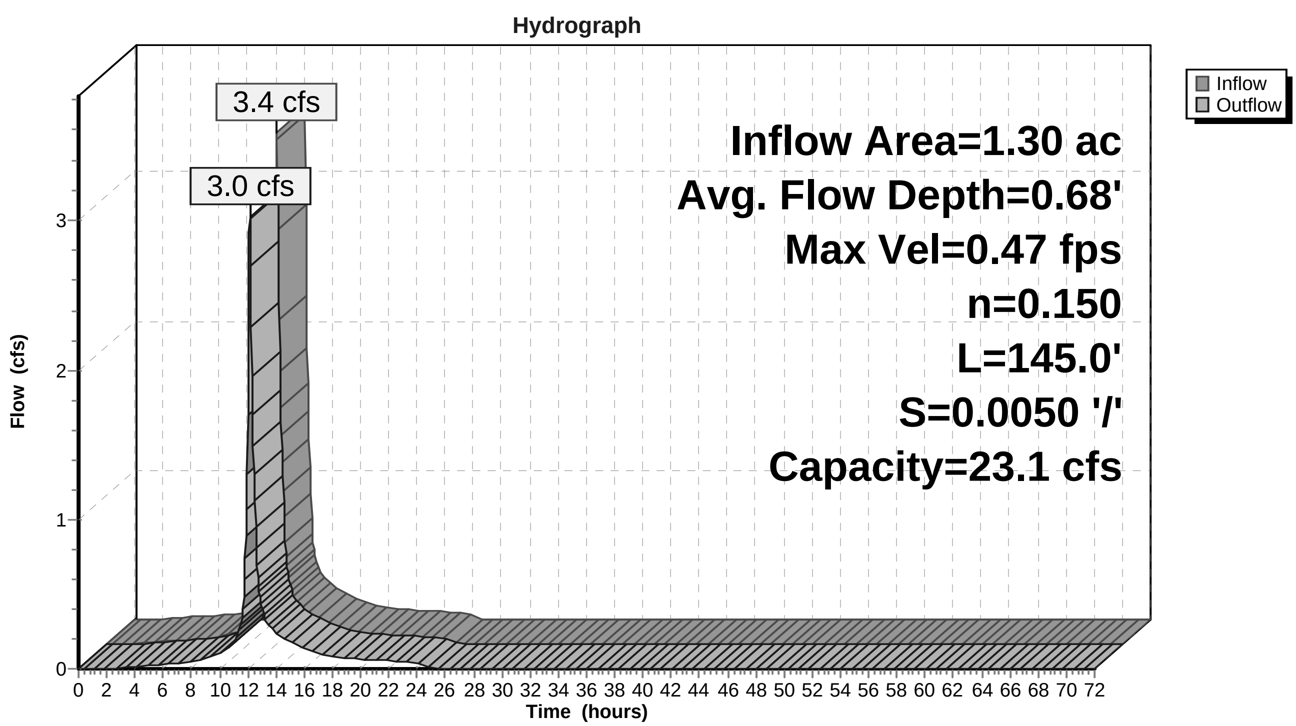
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.47 fps, Min. Travel Time= 5.1 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 21.4 min

Peak Storage= 935 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.68' , Surface Width= 11.56'
Bank-Full Depth= 2.00' Flow Area= 27.0 sf, Capacity= 23.1 cfs

7.50' x 2.00' deep channel, n= 0.150
Side Slope Z-value= 3.0 '/' Top Width= 19.50'
Length= 145.0' Slope= 0.0050 '/'
Inlet Invert= 961.00', Outlet Invert= 960.27'

‡

Reach TS: Treament Swale



Summary for Pond 1P: Proposed Driveway Culvert

Inflow Area = 0.24 ac, 58.66% Impervious, Inflow Depth = 3.07" for 10 Year event
Inflow = 0.9 cfs @ 12.00 hrs, Volume= 0.061 af
Outflow = 0.9 cfs @ 12.01 hrs, Volume= 0.061 af, Atten= 1%, Lag= 0.2 min
Primary = 0.9 cfs @ 12.01 hrs, Volume= 0.061 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 973.19' @ 12.01 hrs Surf.Area= 49 sf Storage= 12 cf

Plug-Flow detention time= 1.4 min calculated for 0.061 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (768.4 - 767.9)

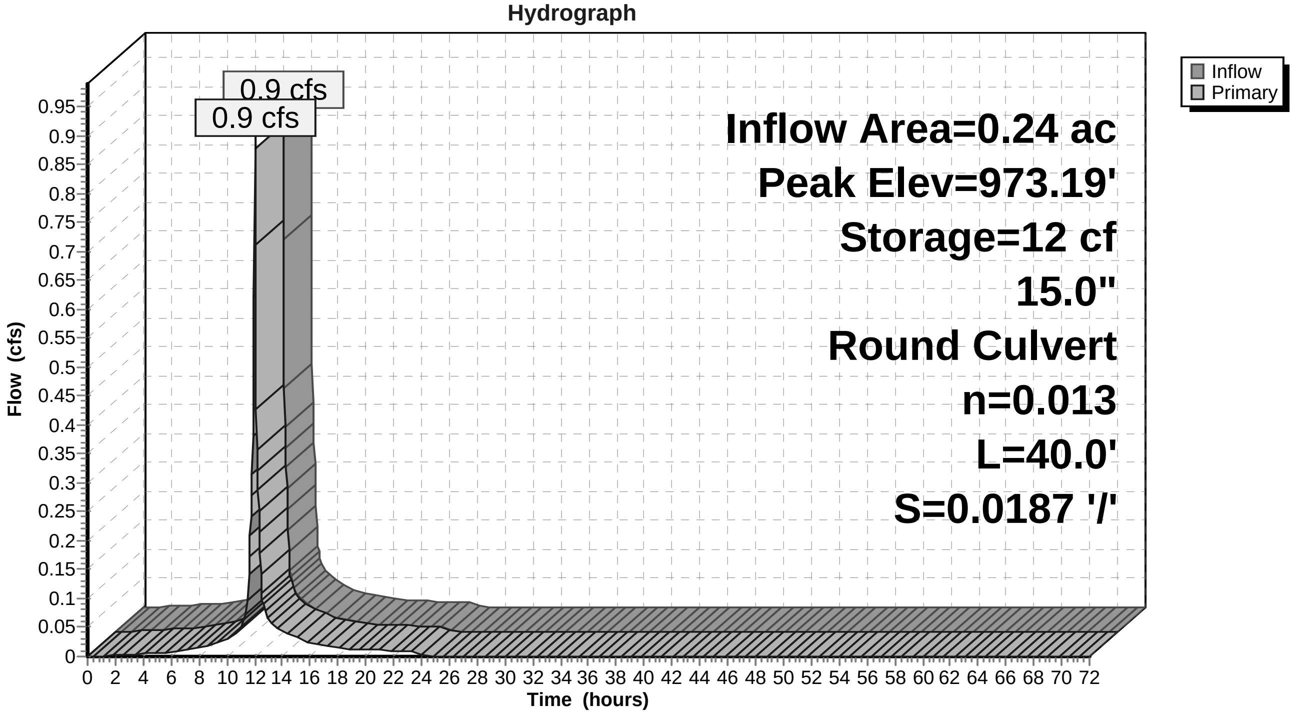
Volume	Invert	Avail.Storage	Storage Description
#1	972.75'	1,175 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
972.75	10	0	0	10
976.00	976	1,175	1,175	996

Device	Routing	Invert	Outlet Devices
#1	Primary	972.75'	**15.0" Round 15" CPP** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 972.75' / 972.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.9 cfs @ 12.01 hrs HW=973.19' TW=972.22' (Dynamic Tailwater)
1=15" CPP (Inlet Controls 0.9 cfs @ 2.25 fps)

Pond 1P: Proposed Driveway Culvert



Summary for Pond CB1: Proposed Catch Basin 1

Inflow Area = 1.06 ac, 42.06% Impervious, Inflow Depth = 2.70" for 10 Year event
Inflow = 2.9 cfs @ 12.07 hrs, Volume= 0.238 af
Outflow = 2.9 cfs @ 12.07 hrs, Volume= 0.238 af, Atten= 0%, Lag= 0.1 min
Primary = 2.9 cfs @ 12.07 hrs, Volume= 0.238 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 963.78' @ 12.07 hrs Surf.Area= 19 sf Storage= 24 cf

Plug-Flow detention time= 2.0 min calculated for 0.238 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (787.0 - 786.3)

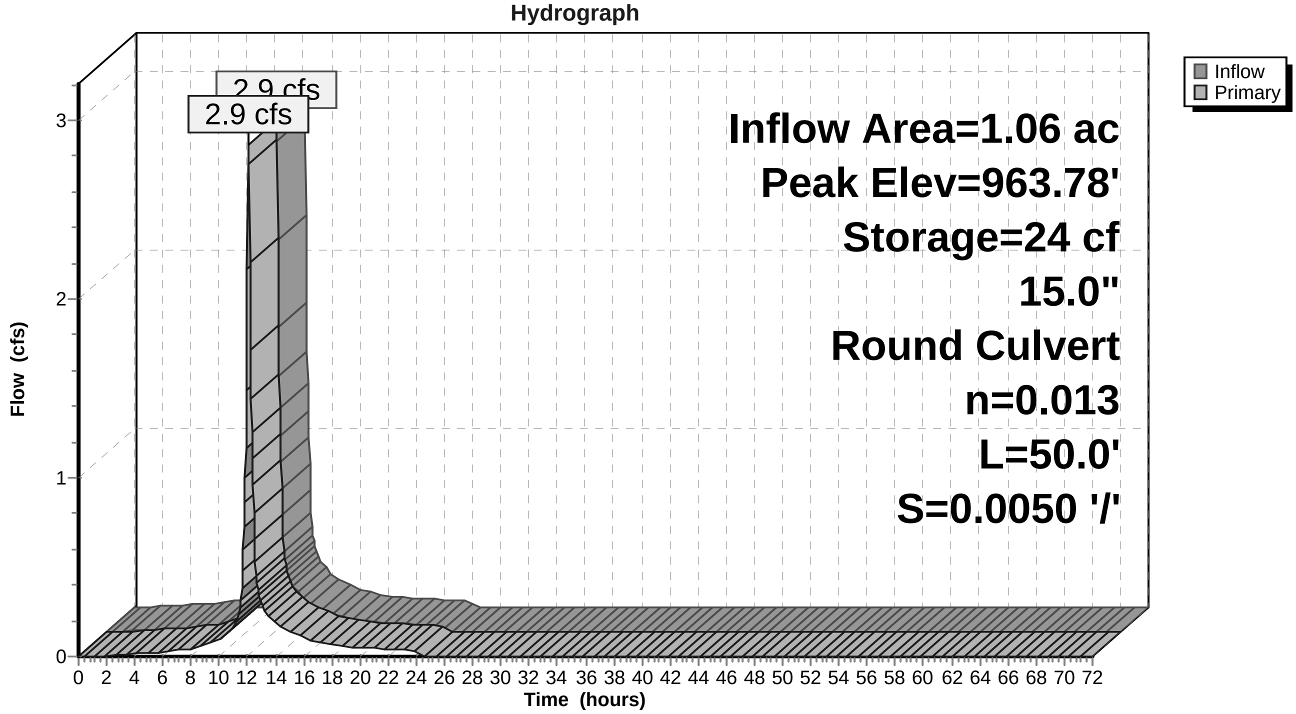
Volume	Invert	Avail.Storage	Storage Description
#1	962.50'	87 cf	**5-ft dia Basin (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
962.50	19	0	0	19
966.50	19	76	76	81
967.50	4	11	87	100

Device	Routing	Invert	Outlet Devices
#1	Primary	962.75'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 962.75' / 962.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.8 cfs @ 12.07 hrs HW=963.76' TW=961.69' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.8 cfs @ 3.59 fps)

Pond CB1: Proposed Catch Basin 1



Summary for Pond CB2: Proposed Catch Basin

Inflow Area = 0.70 ac, 30.89% Impervious, Inflow Depth = 2.45" for 10 Year event
Inflow = 1.8 cfs @ 12.09 hrs, Volume= 0.143 af
Outflow = 1.8 cfs @ 12.09 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.1 min
Primary = 1.8 cfs @ 12.09 hrs, Volume= 0.143 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 963.99' @ 12.08 hrs Surf.Area= 12 sf Storage= 6 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (798.5 - 798.5)

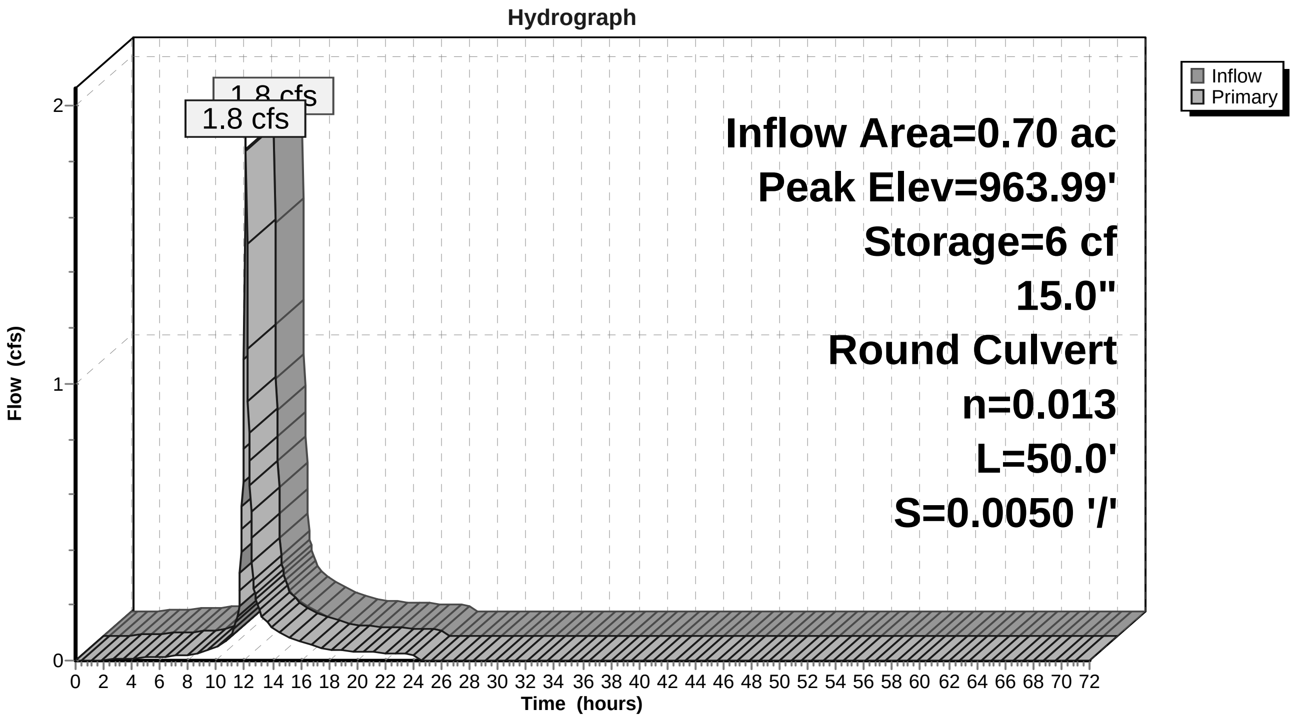
Volume	Invert	Avail.Storage	Storage Description
#1	963.50'	44 cf	**4-ft dia Basin (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
963.50	12	0	0	12
966.50	12	36	36	49
967.50	4	8	44	61

Device	Routing	Invert	Outlet Devices
#1	Primary	963.00'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 963.00' / 962.75' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.8 cfs @ 12.09 hrs HW=963.98' TW=963.75' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.8 cfs @ 2.42 fps)

Pond CB2: Proposed Catch Basin



Summary for Pond CB3: Proposed Catch Basin

Inflow Area = 0.61 ac, 32.42% Impervious, Inflow Depth = 2.48" for 10 Year event
Inflow = 1.6 cfs @ 12.09 hrs, Volume= 0.126 af
Outflow = 1.6 cfs @ 12.09 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min
Primary = 1.6 cfs @ 12.09 hrs, Volume= 0.126 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 966.12' @ 12.09 hrs Surf.Area= 12 sf Storage= 7 cf

Plug-Flow detention time= 1.3 min calculated for 0.126 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (796.8 - 796.5)

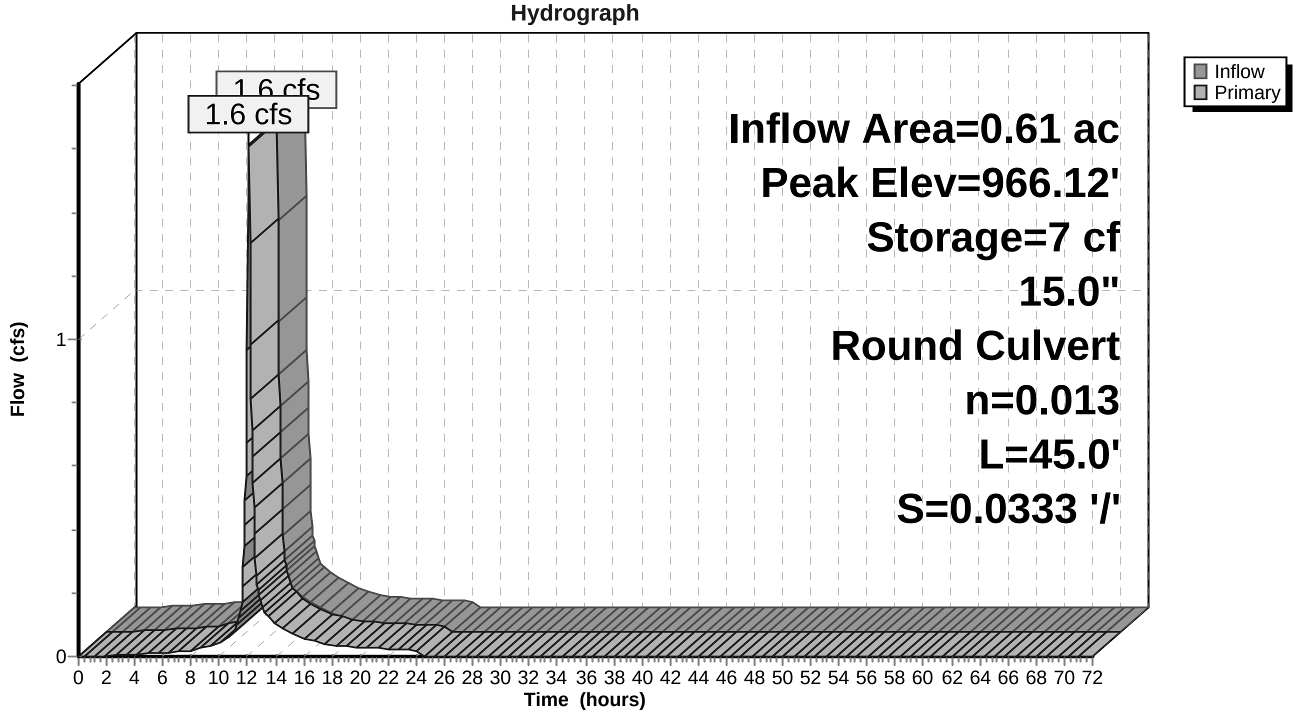
Volume	Invert	Avail.Storage	Storage Description
#1	965.50'	47 cf	**4-ft dia Basin (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
965.50	12	0	0	12
968.75	12	39	39	52
969.75	4	8	47	64

Device	Routing	Invert	Outlet Devices
#1	Primary	965.50'	**15.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 965.50' / 964.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.6 cfs @ 12.09 hrs HW=966.11' TW=963.98' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.6 cfs @ 2.66 fps)

Pond CB3: Proposed Catch Basin



Summary for Pond DB1: Detention Basin 1

Inflow Area = 1.86 ac, 32.75% Impervious, Inflow Depth = 2.46" for 10 Year event
Inflow = 4.2 cfs @ 12.12 hrs, Volume= 0.381 af
Outflow = 2.2 cfs @ 12.37 hrs, Volume= 0.381 af, Atten= 48%, Lag= 14.9 min
Primary = 2.2 cfs @ 12.37 hrs, Volume= 0.381 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Automatic Starting Elev= 954.50' Surf.Area= 992 sf Storage= 445 cf
Peak Elev= 956.68' @ 12.37 hrs Surf.Area= 2,139 sf Storage= 3,772 cf (3,328 cf above start)

Plug-Flow detention time= 50.5 min calculated for 0.371 af (97% of inflow)
Center-of-Mass det. time= 19.8 min (826.2 - 806.5)

Volume	Invert	Avail.Storage	Storage Description
#1	954.00'	7,191 cf	**Basin (Conic)** Listed below (Recalc)

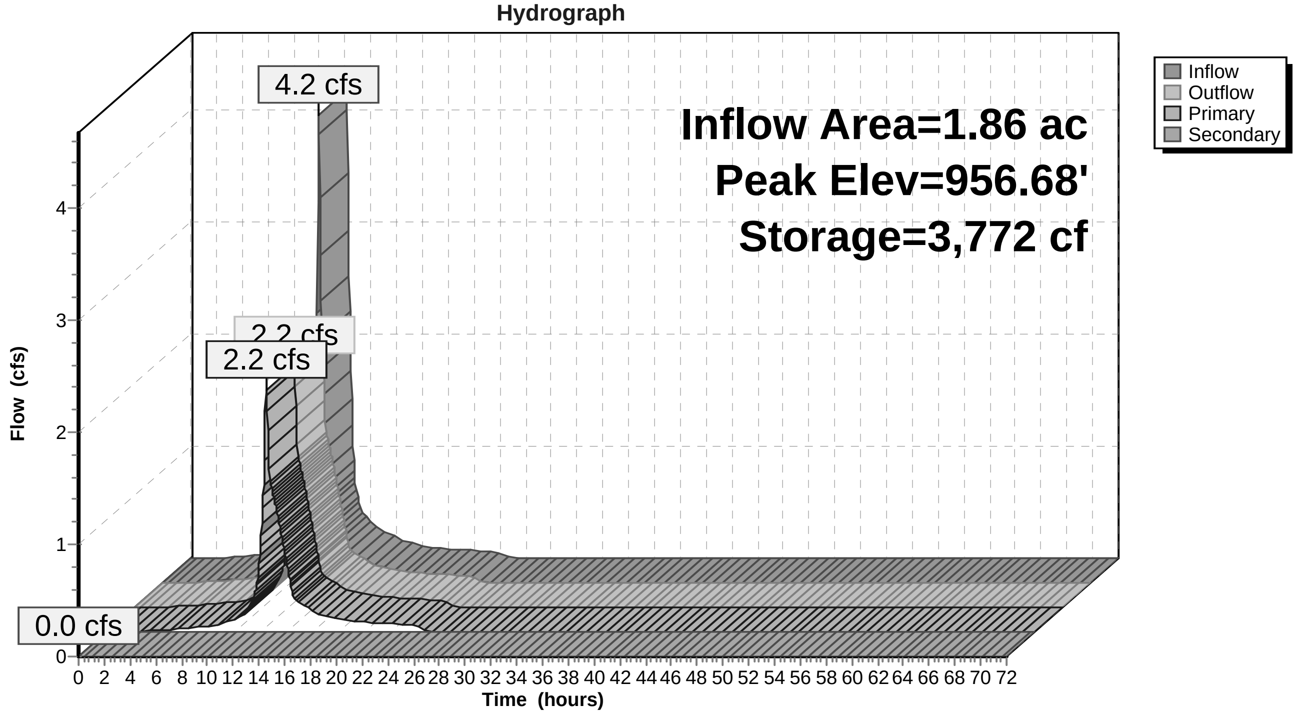
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
954.00	790	0	0	790
958.00	3,051	7,191	7,191	3,127

Device	Routing	Invert	Outlet Devices
#1	Primary	952.50'	**12.0" Round Outlet Structure DB1** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 952.50' / 950.00' S= 0.0625 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	954.50'	**6.0" Horiz. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	956.50'	**12.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	957.50'	**6.0' long x 8.0' breadth Emergency Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=2.1 cfs @ 12.37 hrs HW=956.67' TW=948.45' (Dynamic Tailwater)
└─**1=Outlet Structure DB1** (Passes 2.1 cfs of 5.7 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.4 cfs @ 7.10 fps)
  └─**3=Grate** (Weir Controls 0.7 cfs @ 1.36 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=954.50' TW=940.00' (Dynamic Tailwater)
└─**4=Emergency Spillway** (Controls 0.0 cfs)

Pond DB1: Detention Basin 1



Summary for Pond DB2: Detention Basin 2

Inflow Area = 2.01 ac, 32.44% Impervious, Inflow Depth = 2.46" for 10 Year event
Inflow = 2.3 cfs @ 12.36 hrs, Volume= 0.412 af
Outflow = 2.1 cfs @ 12.44 hrs, Volume= 0.412 af, Atten= 8%, Lag= 5.0 min
Primary = 2.1 cfs @ 12.44 hrs, Volume= 0.412 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Automatic Starting Elev= 947.50' Surf.Area= 436 sf Storage= 179 cf
Peak Elev= 948.50' @ 12.45 hrs Surf.Area= 827 sf Storage= 800 cf (620 cf above start)

Plug-Flow detention time= 21.3 min calculated for 0.408 af (99% of inflow)
Center-of-Mass det. time= 8.3 min (832.6 - 824.3)

Volume	Invert	Avail.Storage	Storage Description
#1	947.00'	2,622 cf	**Basin (Conic)** Listed below (Recalc)

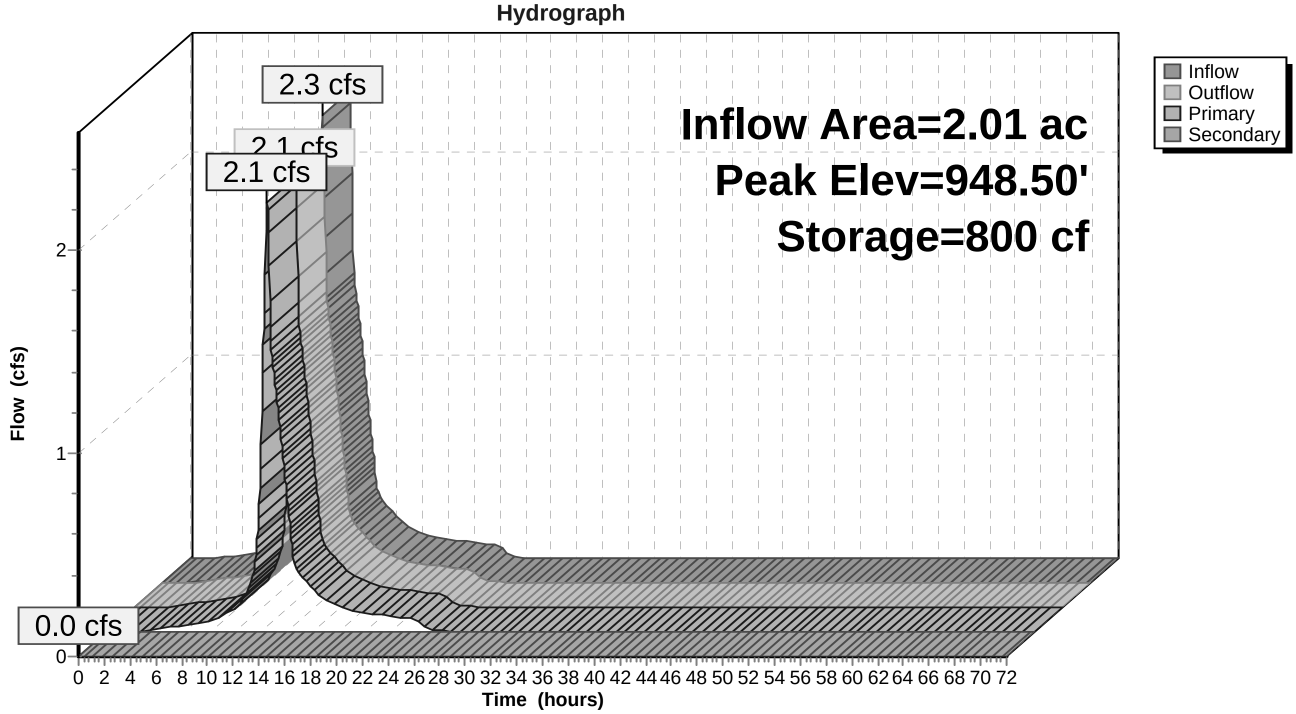
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
947.00	287	0	0	287
950.00	1,647	2,622	2,622	1,681

Device	Routing	Invert	Outlet Devices
#1	Primary	947.50'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 947.50' / 940.00' S= 0.1875 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	949.50'	**6.0' long x 8.0' breadth Emergency Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=2.1 cfs @ 12.44 hrs HW=948.50' TW=940.15' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.1 cfs @ 2.68 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=947.50' TW=940.00' (Dynamic Tailwater)
↑—**2=Emergency Spillway** (Controls 0.0 cfs)

Pond DB2: Detention Basin 2



Summary for Pond ECB: Existing Catch Basin

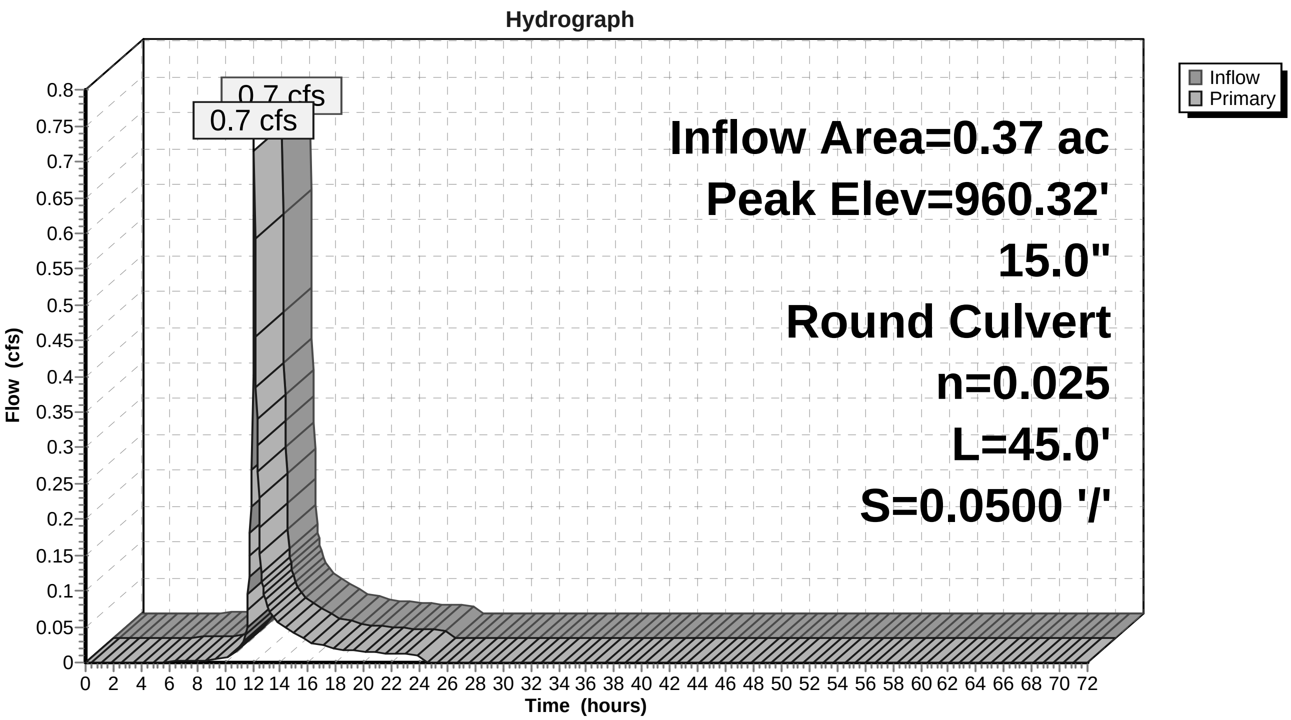
Inflow Area =	0.37 ac,	5.97% Impervious,	Inflow Depth = 1.75"	for 10 Year event	
Inflow =	0.7 cfs @	12.10 hrs,	Volume=	0.054 af	
Outflow =	0.7 cfs @	12.10 hrs,	Volume=	0.054 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.7 cfs @	12.10 hrs,	Volume=	0.054 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 960.32' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	959.87'	**15.0" Round Culvert** L= 45.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 959.87' / 957.62' S= 0.0500 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=0.7 cfs @ 12.10 hrs HW=960.32' TW=955.86' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.7 cfs @ 1.80 fps)

Pond ECB: Existing Catch Basin



Summary for Pond FB1: FB1

Inflow Area = 1.10 ac, 41.69% Impervious, Inflow Depth = 2.69" for 10 Year event
Inflow = 3.0 cfs @ 12.07 hrs, Volume= 0.247 af
Outflow = 2.9 cfs @ 12.08 hrs, Volume= 0.247 af, Atten= 3%, Lag= 0.4 min
Primary = 2.9 cfs @ 12.08 hrs, Volume= 0.247 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Automatic Starting Elev= 961.00' Surf.Area= 122 sf Storage= 91 cf
Peak Elev= 961.73' @ 12.12 hrs Surf.Area= 178 sf Storage= 199 cf (108 cf above start)

Plug-Flow detention time= 12.1 min calculated for 0.245 af (99% of inflow)
Center-of-Mass det. time= 1.6 min (788.9 - 787.3)

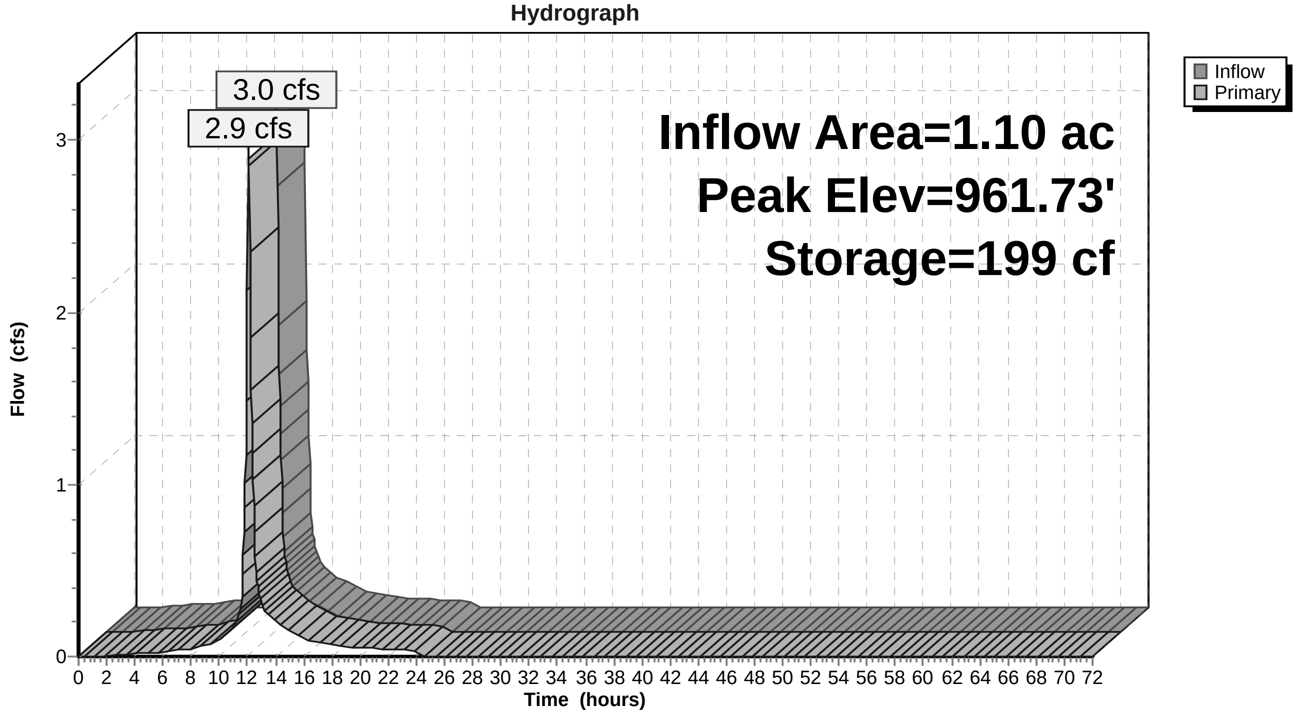
Volume	Invert	Avail.Storage	Storage Description
#1	960.00'	427 cf	**BASIN (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
960.00	63	0	0	63
962.00	201	251	251	222
962.50	527	176	427	549

Device	Routing	Invert	Outlet Devices
#1	Primary	961.00'	**4.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=2.9 cfs @ 12.08 hrs HW=961.70' TW=961.63' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.9 cfs @ 1.05 fps)

Pond FB1: FB1


Hydrograph
3.0 cfs
2.9 cfs
Inflow Area=1.10 ac
Peak Elev=961.73'
Storage=199 cf
Inflow
Primary
Flow (cfs)
0
1
2
3
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Summary for Pond FB2: Forebay 2

Inflow Area = 1.80 ac, 39.47% Impervious, Inflow Depth = 2.63" for 10 Year event
Inflow = 5.0 cfs @ 12.10 hrs, Volume= 0.395 af
Outflow = 5.0 cfs @ 12.10 hrs, Volume= 0.393 af, Atten= 0%, Lag= 0.4 min
Primary = 5.0 cfs @ 12.10 hrs, Volume= 0.393 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Automatic Starting Elev= 955.00' Surf.Area= 895 sf Storage= 1,210 cf
Peak Elev= 955.84' @ 12.97 hrs Surf.Area= 1,196 sf Storage= 2,091 cf (880 cf above start)

Plug-Flow detention time= 105.8 min calculated for 0.365 af (92% of inflow)
Center-of-Mass det. time= 34.3 min (824.9 - 790.6)

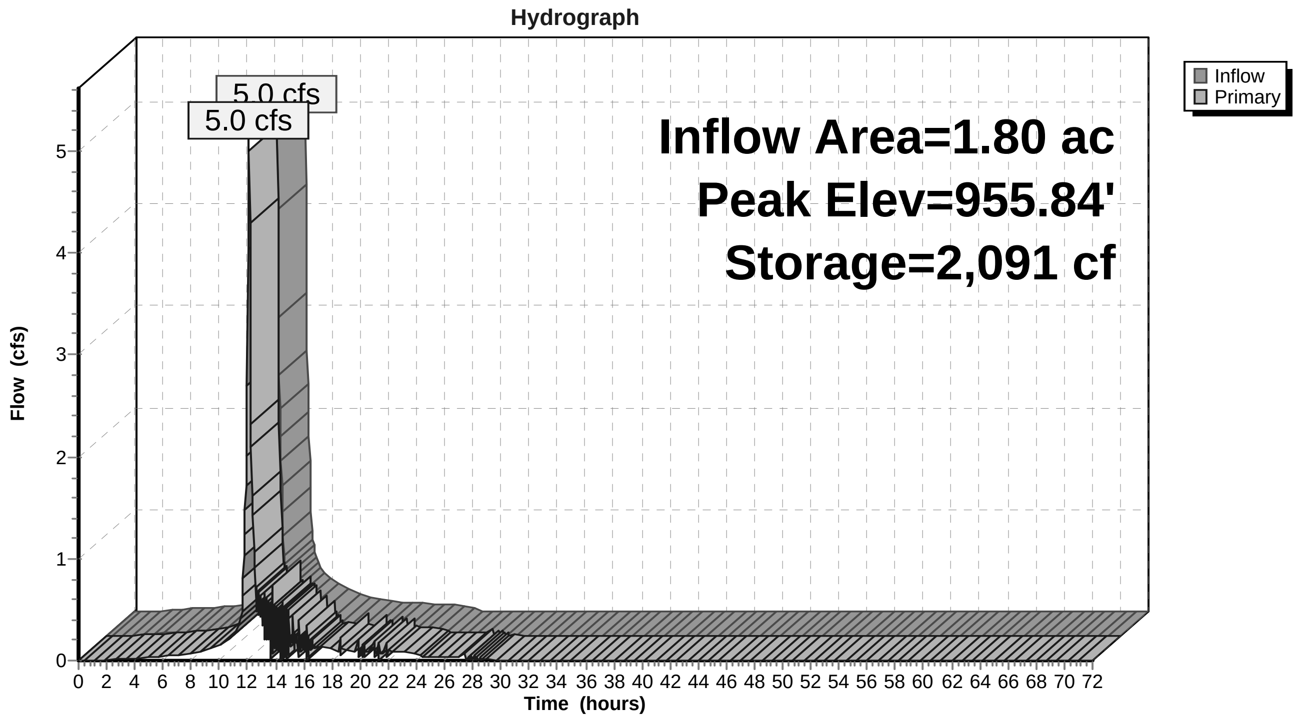
Volume	Invert	Avail.Storage	Storage Description
#1	953.00'	3,729 cf	**basin (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
953.00	356	0	0	356
956.00	1,256	2,281	2,281	1,301
957.00	1,650	1,449	3,729	1,718

Device	Routing	Invert	Outlet Devices
#1	Primary	955.00'	**18.0' long x 11.0' breadth Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64

Primary OutFlow Max=5.0 cfs @ 12.10 hrs HW=955.23' TW=954.84' (Dynamic Tailwater)
└─**1=Spillway** (Weir Controls 5.0 cfs @ 1.21 fps)

Pond FB2: Forebay 2



Summary for Pond IB: Infiltration Basin

Inflow Area = 2.54 ac, 30.54% Impervious, Inflow Depth = 2.41" for 10 Year event
Inflow = 6.5 cfs @ 12.10 hrs, Volume= 0.510 af
Outflow = 0.7 cfs @ 12.99 hrs, Volume= 0.510 af, Atten= 90%, Lag= 53.1 min
Discarded = 0.2 cfs @ 12.99 hrs, Volume= 0.431 af
Primary = 0.2 cfs @ 12.99 hrs, Volume= 0.040 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Tertiary = 0.2 cfs @ 12.99 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 955.84' @ 12.99 hrs Surf.Area= 5,173 sf Storage= 10,331 cf

Plug-Flow detention time= 538.5 min calculated for 0.510 af (100% of inflow)
Center-of-Mass det. time= 538.8 min (1,364.9 - 826.1)

Volume	Invert	Avail.Storage	Storage Description
#1	953.00'	17,070 cf	**Basin (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
953.00	2,217	0	0	2,217
955.00	4,250	6,358	6,358	4,289
956.00	5,352	4,790	11,148	5,418
957.00	6,510	5,922	17,070	6,607

Device	Routing	Invert	Outlet Devices
#1	Discarded	953.00'	**1.500 in/hr Ksat = 3 in/hr over Wetted area** Phase-In= 0.01'
#2	Primary	952.00'	**15.0" Round OS2-IB to POA8** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 952.00' / 948.00' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	955.75'	**10.0" Horiz. Grate for OS2** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	952.00'	**15.0" Round OS1-IB to POA7** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 952.00' / 948.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#5	Device 4	955.75'	**10.0" Horiz. Grate for OS1** C= 0.600 Limited to weir flow at low heads
#6	Secondary	956.60'	**10.0' long x 7.4' breadth Emergency Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.41 2.53 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.67 2.69 2.72 2.76

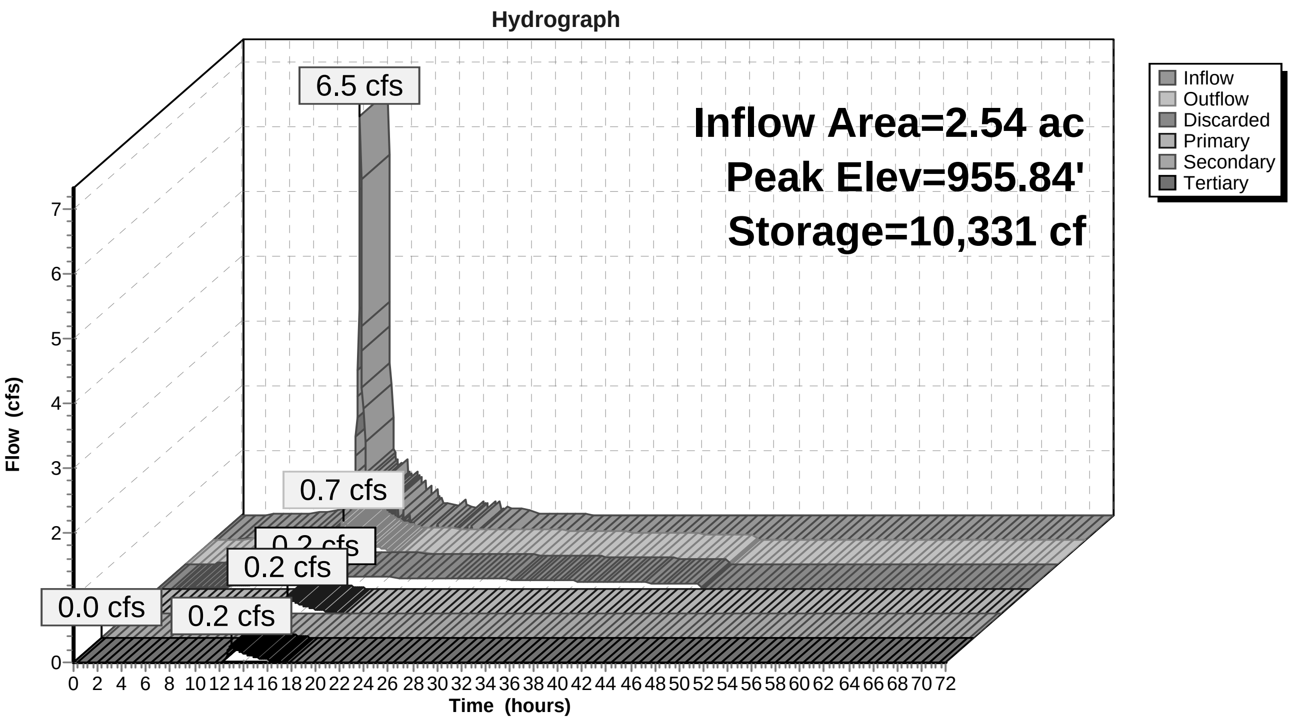
Discarded OutFlow Max=0.2 cfs @ 12.99 hrs HW=955.84' (Free Discharge)
└─**1=Ksat = 3 in/hr** (Exfiltration Controls 0.2 cfs)

Primary OutFlow Max=0.2 cfs @ 12.99 hrs HW=955.84' TW=0.00' (Dynamic Tailwater)
└─**2=OS2-IB to POA8** (Passes 0.2 cfs of 8.4 cfs potential flow)
  └─**3=Grate for OS2** (Weir Controls 0.2 cfs @ 1.01 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=953.00' TW=0.00' (Dynamic Tailwater)
└─**6=Emergency Spillway** (Controls 0.0 cfs)

Tertiary OutFlow Max=0.2 cfs @ 12.99 hrs HW=955.84' TW=0.00' (Dynamic Tailwater)
└─**4=OS1-IB to POA7** (Passes 0.2 cfs of 8.4 cfs potential flow)
  └─**5=Grate for OS1** (Weir Controls 0.2 cfs @ 1.01 fps)

Pond IB: Infiltration Basin



Summary for Pond RG 50-1: Rain Garden Lot 50-1

Inflow Area = 0.29 ac, 14.68% Impervious, Inflow Depth = 2.09" for 10 Year event
Inflow = 0.6 cfs @ 12.11 hrs, Volume= 0.051 af
Outflow = 0.1 cfs @ 12.87 hrs, Volume= 0.048 af, Atten= 87%, Lag= 45.5 min
Discarded = 0.0 cfs @ 12.87 hrs, Volume= 0.033 af
Secondary = 0.1 cfs @ 12.87 hrs, Volume= 0.015 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 978.53' @ 12.87 hrs Surf.Area= 1,230 sf Storage= 1,152 cf

Plug-Flow detention time= 972.5 min calculated for 0.048 af (94% of inflow)
Center-of-Mass det. time= 943.0 min (1,763.6 - 820.6)

Volume	Invert	Avail.Storage	Storage Description
#1	977.00'	1,815 cf	**Basin (Conic)** Listed below (Recalc)

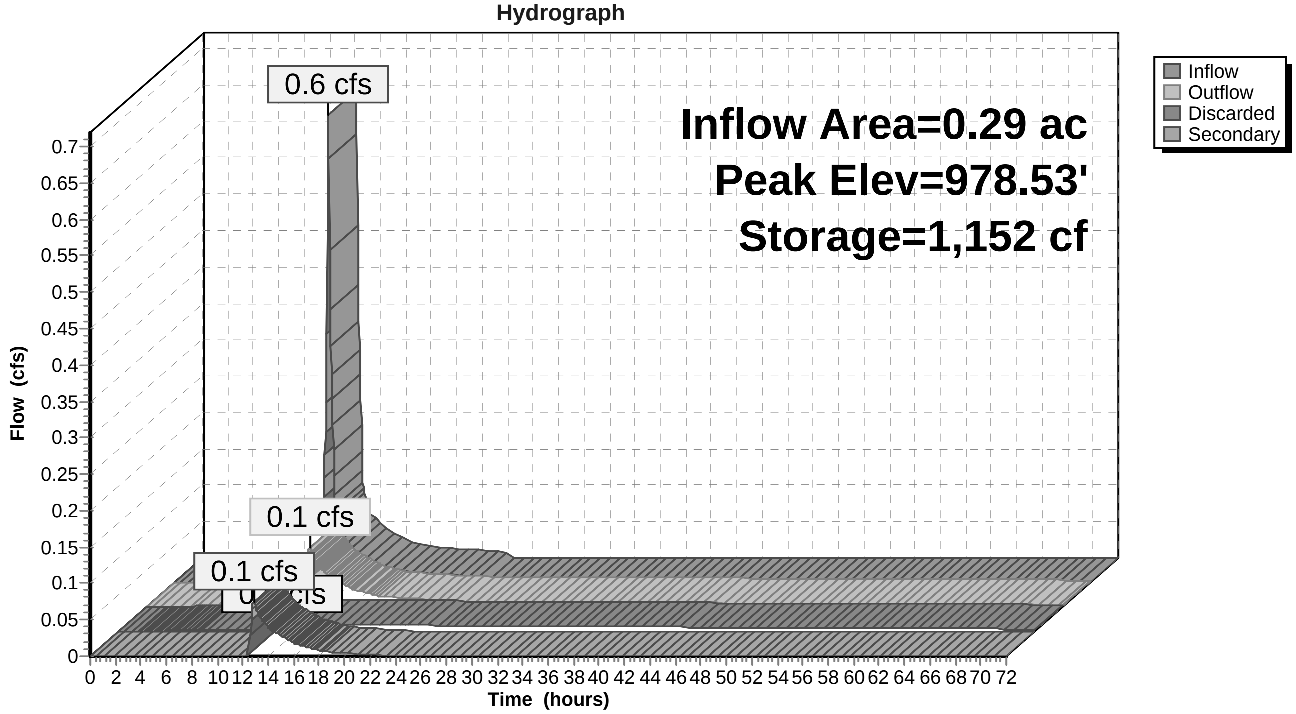
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
977.00	362	0	0	362
979.00	1,600	1,815	1,815	1,618

Device	Routing	Invert	Outlet Devices
#1	Discarded	977.00'	**0.300 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Secondary	978.50'	**6.0' long x 3.5' 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) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Discarded OutFlow Max=0.0 cfs @ 12.87 hrs HW=978.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Secondary OutFlow Max=0.1 cfs @ 12.87 hrs HW=978.53' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.1 cfs @ 0.42 fps)

Pond RG 50-1: Rain Garden Lot 50-1



Summary for Pond RG 50-2: Rain Garden Lot 50-2

Inflow Area = 0.39 ac, 13.35% Impervious, Inflow Depth = 2.06" for 10 Year event
Inflow = 0.9 cfs @ 12.11 hrs, Volume= 0.067 af
Outflow = 0.0 cfs @ 23.33 hrs, Volume= 0.051 af, Atten= 99%, Lag= 673.4 min
Discarded = 0.0 cfs @ 23.33 hrs, Volume= 0.051 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 985.19' @ 23.33 hrs Surf.Area= 1,720 sf Storage= 2,299 cf

Plug-Flow detention time= 1,532.7 min calculated for 0.051 af (76% of inflow)
Center-of-Mass det. time= 1,442.8 min (2,265.3 - 822.5)

Volume	Invert	Avail.Storage	Storage Description
#1	983.00'	3,939 cf	**Basin (Conic)** Listed below (Recalc)

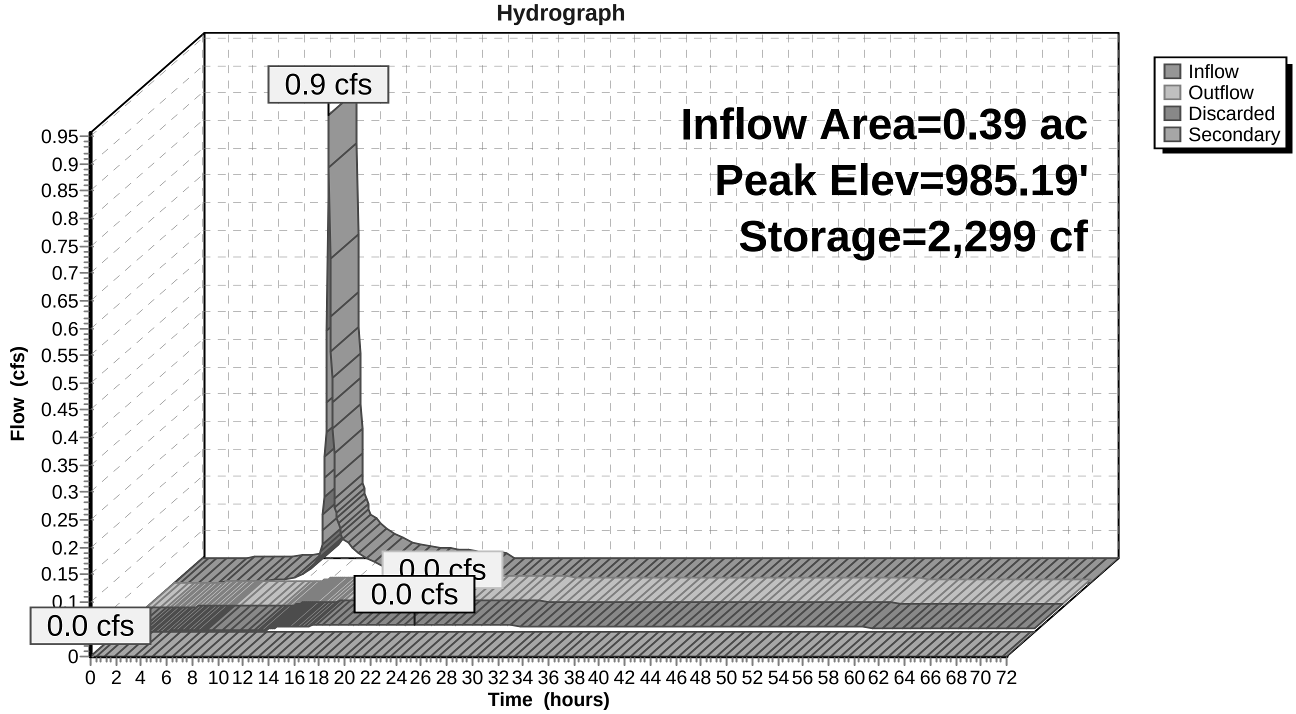
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
983.00	500	0	0	500
986.00	2,354	3,939	3,939	2,392

Device	Routing	Invert	Outlet Devices
#1	Discarded	983.00'	**0.300 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Secondary	985.50'	**6.0' long x 3.5' 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) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Discarded OutFlow Max=0.0 cfs @ 23.33 hrs HW=985.19' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=983.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond RG 50-2: Rain Garden Lot 50-2



Summary for Pond RG 50-3: Rain Garden Lot 50-3

Volume	Invert	Avail.Storage	Storage Description
#1	982.50'	1,815 cf	**Basin (Conic)** Listed below (Recalc)

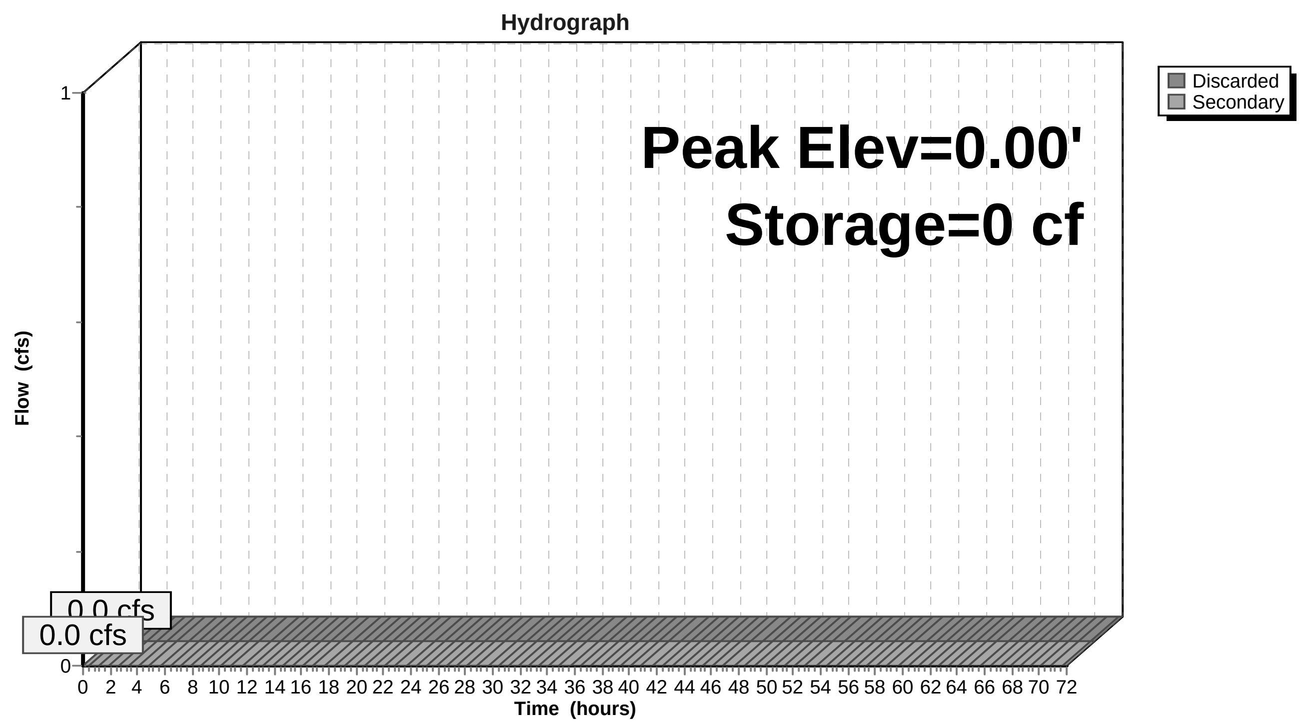
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
982.50	362	0	0	362
984.50	1,600	1,815	1,815	1,618

Device	Routing	Invert	Outlet Devices
#1	Discarded	982.50'	**0.805 in/hr Average Ksat = 1.61 over Wetted area** Phase-In= 0.01'
#2	Secondary	984.00'	**6.0' long x 3.5' 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) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Discarded OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Average Ksat = 1.61** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond RG 50-3: Rain Garden Lot 50-3



Summary for Pond RG 53-1: Rain Garden Lot 53-1

Inflow Area = 0.31 ac, 13.54% Impervious, Inflow Depth = 2.04" for 10 Year event
Inflow = 0.8 cfs @ 12.01 hrs, Volume= 0.053 af
Outflow = 0.2 cfs @ 12.33 hrs, Volume= 0.051 af, Atten= 71%, Lag= 19.5 min
Discarded = 0.0 cfs @ 12.33 hrs, Volume= 0.028 af
Secondary = 0.2 cfs @ 12.33 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 987.06' @ 12.33 hrs Surf.Area= 991 sf Storage= 1,007 cf

Plug-Flow detention time= 786.6 min calculated for 0.051 af (95% of inflow)
Center-of-Mass det. time= 760.8 min (1,576.9 - 816.1)

Volume	Invert	Avail.Storage	Storage Description
#1	985.50'	1,490 cf	**Basin (Conic)** Listed below (Recalc)

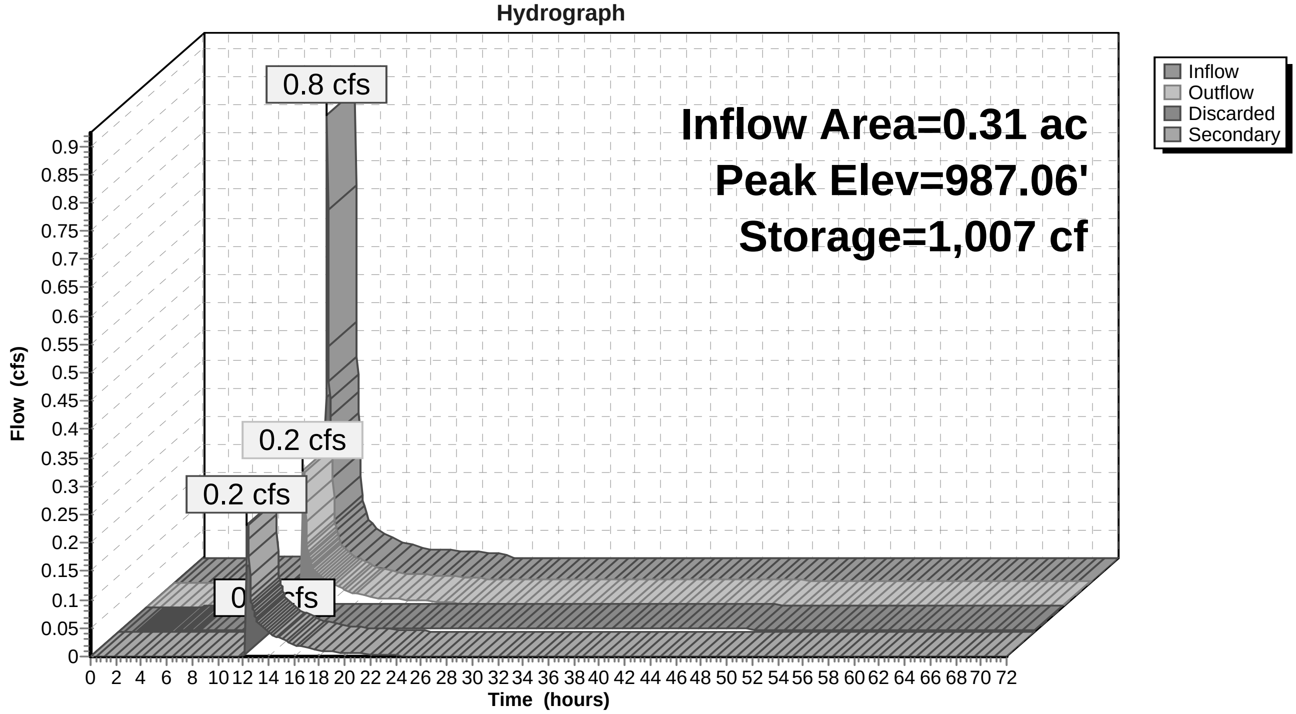
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
985.50	351	0	0	351
987.50	1,227	1,490	1,490	1,247

Device	Routing	Invert	Outlet Devices
#1	Discarded	985.50'	**0.300 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Secondary	987.00'	**6.0' long x 3.5' 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) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Discarded OutFlow Max=0.0 cfs @ 12.33 hrs HW=987.06' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Secondary OutFlow Max=0.2 cfs @ 12.33 hrs HW=987.06' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.2 cfs @ 0.61 fps)

Pond RG 53-1: Rain Garden Lot 53-1



Summary for Pond RG 53-2: Rain Garden Lot 53-2

Volume	Invert	Avail.Storage	Storage Description
#1	979.50'	1,488 cf	**Basin (Conic)** Listed below (Recalc)

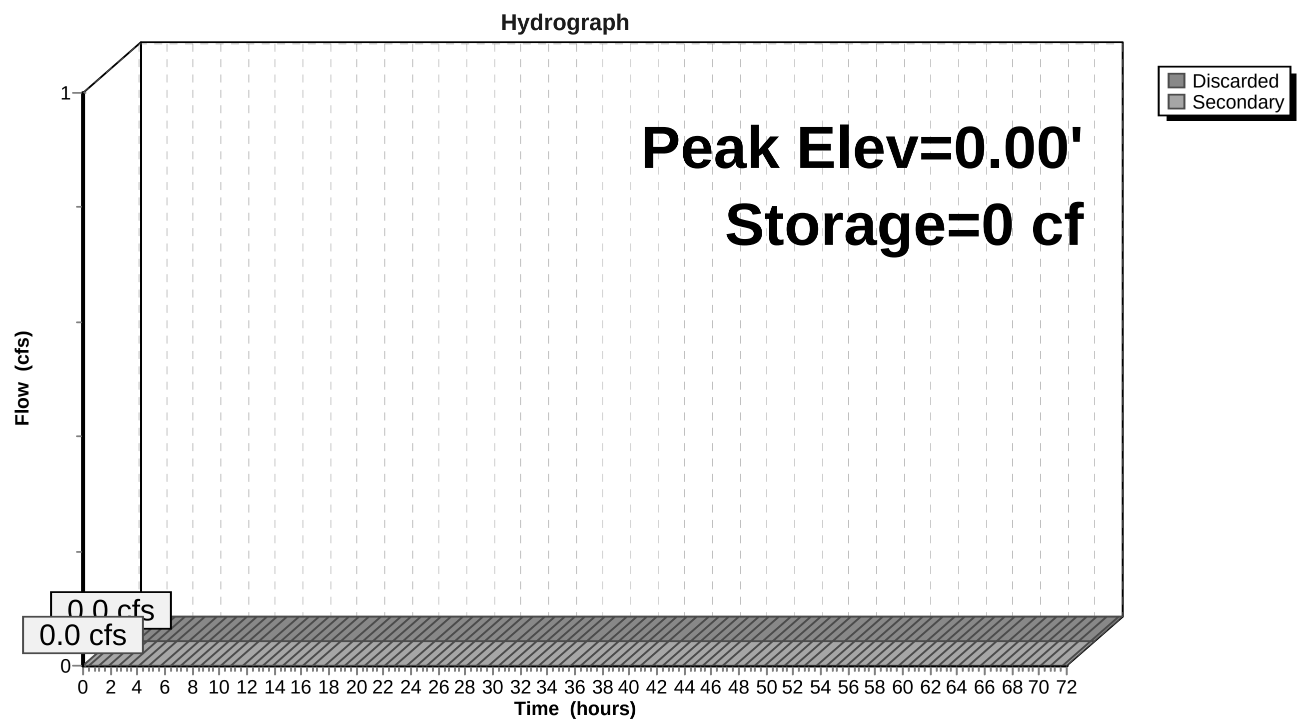
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
979.50	350	0	0	350
981.50	1,227	1,488	1,488	1,247

Device	Routing	Invert	Outlet Devices
#1	Discarded	979.50'	**0.300 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Secondary	981.00'	**6.0' long x 3.5' 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) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Discarded OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Exfiltration** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond RG 53-2: Rain Garden Lot 53-2



Summary for Pond RG- 53: Rain Garden Lot 53

Inflow Area = 0.22 ac, 19.20% Impervious, Inflow Depth = 2.19" for 10 Year event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.0 cfs @ 15.13 hrs, Volume= 0.037 af, Atten= 95%, Lag= 182.0 min
Discarded = 0.0 cfs @ 15.13 hrs, Volume= 0.033 af
Secondary = 0.0 cfs @ 15.13 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 989.01' @ 15.13 hrs Surf.Area= 1,076 sf Storage= 1,187 cf

Plug-Flow detention time= 1,323.4 min calculated for 0.037 af (91% of inflow)
Center-of-Mass det. time= 1,276.7 min (2,089.4 - 812.8)

Volume	Invert	Avail.Storage	Storage Description
#1	987.50'	1,765 cf	**Basin (Conic)** Listed below (Recalc)

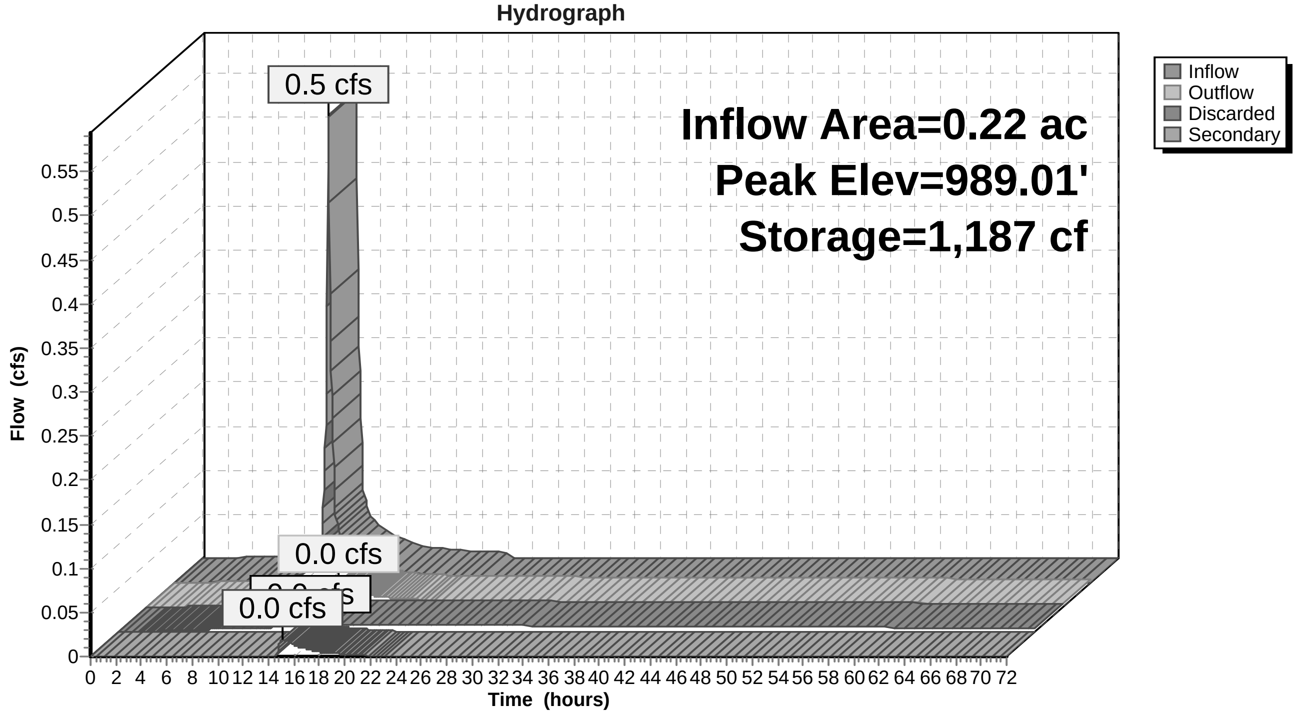
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
987.50	527	0	0	527
989.50	1,294	1,765	1,765	1,322

Device	Routing	Invert	Outlet Devices
#1	Discarded	987.50'	**0.300 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Secondary	989.00'	**6.0' long x 3.5' 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) 2.41 2.56 2.69 2.67 2.66 2.66 2.65 2.67 2.67 2.70 2.77 2.83 2.87 2.93 3.10 3.19 3.32

Discarded OutFlow Max=0.0 cfs @ 15.13 hrs HW=989.01' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 15.13 hrs HW=989.01' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.0 cfs @ 0.26 fps)

Pond RG- 53: Rain Garden Lot 53



APPENDIX A 8

Project Name: Granite State Conservation TR. Project Location.: Governors Road
Project No.: 23058 Date: OCT By: PCB Chk'd By: SAL

Design Storm: 10 Year

Apron Location: CB1 to FB1

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**2.88**	**cfs**	←		**From HydroCAD**
Channel Bottom Width =	**2**	**ft.**			
Slope (along channel) =	**0.33**	**ft/ft**			
Left Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Right Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Depth of Flow =	**0.17**	**ft.**	←		**Iterative User Input**
Manning's 'n' =	0.0330				
Area =	0.43	sq.ft.			
Wetted Perimeter =	3.08	ft.			
Hydraulic Radius =	0.14	ft.			
Top Width =	3.02	ft.			
Velocity =	6.93	ft/sec			
Q (determined) =	**2.96**	**cfs**		**FLOW DEPTH ACHIEVED**	

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**15**	**Inches** ←	**From HydroCAD**
Tail Water Depth (TW) =	**0.17**	**ft.**	
Length of Apron (La) =	12	ft.	
Width of Apron @ Do (Wo) =	4	ft.	
Width of Apron @ D.S. End (W) =	16	ft.	
Width of Apron if Channel (W) =	2	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do 0.25

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.39 ft. or 4.6 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 4.627811 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	**Size of Stone (inches)**		
100	7	to	9
85	6	to	8
50	5	to	7
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 14 **in. use** 9 in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

Project Name: Granite State Conservation TR.		Project Location.: Meeting House Road	
Project No.: 23058	Date: OCT	By: PCB	Chk'd By: SAL

Design Storm: 10 Year

Apron Location: DB#1

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**2.17**	**cfs**	←		**From HydroCAD**
Channel Bottom Width =	**2**	**ft.**			
Slope (along channel) =	**0.33**	**ft/ft**			
Left Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Right Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Depth of Flow =	**0.15**	**ft.**	←		**Iterative User Input**
Manning's 'n' =	0.0330				
Area =	0.37	sq.ft.			
Wetted Perimeter =	2.95	ft.			
Hydraulic Radius =	0.12	ft.			
Top Width =	2.90	ft.			
Velocity =	6.45	ft/sec			
Q (determined) =	**2.37**	**cfs**	**FLOW DEPTH ACHIEVED**		

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**12**	**Inches** ←	**From HydroCAD**
Tail Water Depth (TW) =	**0.15**	**ft.**	
Length of Apron (La) =	11	ft.	
Width of Apron @ Do (Wo) =	3	ft.	
Width of Apron @ D.S. End (W) =	14	ft.	
Width of Apron if Channel (W) =	2	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do 0.20

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.37 ft. or 4.5 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 4.495034 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	**Size of Stone (inches)**		
100	7	to	9
85	6	to	8
50	4	to	7
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 13 **in. use** 9 in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

Project Name: Granite State Conservation TR. Project Location.: Governors Road
Project No.: 23058 Date: OCT By: PCB Chk'd By: SAL

Design Storm: 10 Year

Apron Location: DB#2

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**2.32**	**cfs**		**From HydroCAD**
Channel Bottom Width =	**2**	**ft.**		
Slope (along channel) =	**0.03**	**ft/ft**		
Left Side Slope =	**3**	**h:v ang. =**	18.43	deg.
Right Side Slope =	**3**	**h:v ang. =**	18.43	deg.
Depth of Flow =	**0.29**	**ft.**		**Iterative User Input**
Manning's 'n' =	0.0330			
Area =	0.83	sq.ft.		
Wetted Perimeter =	3.83	ft.		
Hydraulic Radius =	0.22	ft.		
Top Width =	3.74	ft.		
Velocity =	2.82	ft/sec		
Q (determined) =	**2.34**	**cfs**		**FLOW DEPTH ACHIEVED**

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**12**	**Inches**	**From HydroCAD**
Tail Water Depth (TW) =	**0.29**	**ft.**	
Length of Apron (La) =	11	ft.	
Width of Apron @ Do (Wo) =	3	ft.	
Width of Apron @ D.S. End (W) =	14	ft.	
Width of Apron if Channel (W) =	2	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do 0.20

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.21 ft. or 2.5 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 3 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	Size of Stone (inches)		
100	5	to	6
85	4	to	5
50	3	to	5
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 9 **in. use** 9 in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

Project Name: Granite State Conservation TR. Project Location.: Governors Road
Project No.: 23058 Date: 20-Sep By: PCB Chk'd By: SAL

Design Storm: 10 Year

Apron Location: Existing 15"

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**1.87**	**cfs**	←		**From HydroCAD**
Channel Bottom Width =	**3**	**ft.**			
Slope (along channel) =	**0.33**	**ft/ft**			
Left Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Right Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Depth of Flow =	**0.15**	**ft.**	←		**Iterative User Input**
Manning's 'n' =	0.0330				
Area =	0.52	sq.ft.			
Wetted Perimeter =	3.95	ft.			
Hydraulic Radius =	0.13	ft.			
Top Width =	3.90	ft.			
Velocity =	6.67	ft/sec			
Q (determined) =	**3.45**	**cfs**			**FLOW DEPTH ACHIEVED**

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**15**	**Inches** ←	**From HydroCAD**
Tail Water Depth (TW) =	**0.15**	**ft.**	
Length of Apron (La) =	11	ft.	
Width of Apron @ Do (Wo) =	4	ft.	
Width of Apron @ D.S. End (W) =	15	ft.	
Width of Apron if Channel (W) =	3	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do 0.25

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.25 ft. or 2.9 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 3 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	**Size of Stone (inches)**		
100	5	to	6
85	4	to	5
50	3	to	5
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 9 **in. use** 9 in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

Project Name: Granite State Conservation TR. Project Location.: Governors Road
Project No.: 23058 Date: 13-Oct By: PCB Chk'd By: SAL

Design Storm: **10** **Year**

Apron Location: **OS1-IB**

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**0.25**	**cfs**	←		**From HydroCAD**
Channel Bottom Width =	**5**	**ft.**			
Slope (along channel) =	**0.01**	**ft/ft**			
Left Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Right Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Depth of Flow =	**0.07**	**ft.**	←		**Iterative User Input**
Manning's 'n' =	0.0330				
Area =	0.36	sq.ft.			
Wetted Perimeter =	5.44	ft.			
Hydraulic Radius =	0.07	ft.			
Top Width =	5.42	ft.			
Velocity =	0.74	ft/sec			
Q (determined) =	**0.27**	**cfs**			**FLOW DEPTH ACHIEVED**

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**12**	**Inches** ←	**From HydroCAD**
Tail Water Depth (TW) =	**0.07**	**ft.**	
Length of Apron (La) =	7	ft.	
Width of Apron @ Do (Wo) =	3	ft.	
Width of Apron @ D.S. End (W) =	10	ft.	
Width of Apron if Channel (W) =	5	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do 0.20

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.04 ft. or 0.5 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 3 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	Size of Stone (inches)		
100	5	to	6
85	4	to	5
50	3	to	5
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 9 **in. use** **9** in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

Project Name:	Granite State Conservation TR.	Project Location.:	Governors Road
Project No.:	22053	Date:	13-Oct
By:	PCB	Chk'd By:	SAL

Design Storm: **10** **Year**

Apron Location: **OS2-IB**

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**9.00**	**cfs**	←		**From HydroCAD**
Channel Bottom Width =	**4**	**ft.**			
Slope (along channel) =	**0.01**	**ft/ft**			
Left Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Right Side Slope =	**3**	**h:v ang. =**	18.43	deg.	
Depth of Flow =	**0.6**	**ft.**	←		**Iterative User Input**
Manning's 'n' =	0.0330				
Area =	3.48	sq.ft.			
Wetted Perimeter =	7.79	ft.			
Hydraulic Radius =	0.45	ft.			
Top Width =	7.60	ft.			
Velocity =	2.63	ft/sec			
Q (determined) =	**9.15**	**cfs**			**FLOW DEPTH ACHIEVED**

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**30**	**Inches** ←	**From HydroCAD**
Tail Water Depth (TW) =	**0.60**	**ft.**	
Length of Apron (La) =	22	ft.	
Width of Apron @ Do (Wo) =	8	ft.	
Width of Apron @ D.S. End (W) =	29	ft.	
Width of Apron if Channel (W) =	4	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do 0.50

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.25 ft. or 3.0 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 3 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	**Size of Stone (inches)**		
100	5	to	6
85	4	to	5
50	3	to	5
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 9 **in. use** **9** in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

FORMULAE USED:

(Reference NHDES Erosion Control Handbook, Pages 7-114, 7-115)

Note: This spreadsheet was generated using the print-out "Pipe Outlet Protection Apron Design and d50 Riprap Sizing" prepared by Ed Minick of the Rockingham County Conservation District as a guide.

Manning's Uniform Channel Flow:	Q = 1.486*(A x r^(2/3) x s^(1/2)) / n
Length of Apron (La) TW < Do/2:	La = (1.8 x Q/(Do^(1.5)) + 7Do
Length of Apron (La) TW > Do/2:	La = (3.0 x Q/(Do^(1.5)) + 7Do
Width of Apron @ D.S. End TW < Do/2:	W = 3Do + La
Width of Apron @ D.S. End TW >= Do/2:	W = 3Do + 0.4La
Width of D.S. End if Channel:	W = Channel Bottom Width
Width of Apron at Culvert:	Wo = 3 xDo

APPENDIX A 9

INFILTRATION FEASIBILITY REPORT

PREPARED FOR:
Granite State Conservation Trust
Gilmanton, NH
Belknap County

October 2023

PREPARED BY:

NORWAY PLAINS ASSOCIATES, INC.

Scott A. Lawler, P.E.
N.H. Reg. #10026

2 CONTINENTAL BOULEVARD, P.O. BOX 249, ROCHESTER, NEW HAMPSHIRE 03866-0249 (603) 335-3948

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1.0 INTRODUCTION

The purpose of this report is to address the requirements of Env-Wq 1503.08(f)(3) and 1504.13 for the proposed practices which relies on the infiltration of stormwater into the ground. There is one infiltration basin used to infiltrate stormwater runoff for the project.

1.1 INFILTRATION BASIN

An infiltration basin is employed on the site to control the rate of discharge, the volume, comply with ground water recharge requirements and used to treat the storwmater from the proposed site. The basin will have a turf bottom with two outlet structures and an emergency spillway. The runoff entering this basin will have been treated by a treatment swale. This infiltration basin will be 2 feet deep, which will provide 0.51 feet of freeboard during the 50-year storm event. The emergency spillway has an elevation 956.5 feet. The emergency spillway has been designed for a 50-year storm event if the basin had no infiltration.

1.1.1 LOCATION OF THE PRACTICE:

The infiltration basin will be constructed to the east of the developed area.

1.1.2 DESCRIPTION OF THE EXISTING TOPOGRAPHY:

The proposed infiltration basin will be constructed in a lightly wood area with an average slope of 5% to 8%.

1.1.3 LOCATION OF THE TEST PITS

Test pit 13 was dug within the proposed system area. The proposed infiltration system has a basal area of 2,217 square feet, thus requires 1 test pit to be dug.

1.1.4 TEST PIT DATA

Test pit 13 was dug, observed and recorded on October 12, 2023 by Jessica J. Bailey, Certified Wetland Scientist #260. The test pit was flagged in the field, numbered, and the locations are noted on the plans provided. Bedrock was not encountered at the test pit location.

1.1.5 TEST PIT PROFILE DESCRIPTION

TEST PIT(s) #13; INSPECTOR; JESSICA J. BAILEY, CWS #260
Date: October 12, 2023

DEPTH (inches or cm)	HORIZON	COLOR	TEXTURE	STRUCTURE / CONSISTENCY	COMMENTS
0 – 6”	Oi	10YR 2/1	Loam	Granular / Very Friable	-
6 – 12”	A	2.5Y 4/4	Loamy Fine Sand	Weak Granular / Friable	-
12 – 24”	B1	2.5Y 5/4	Loamy Fine to Very Fine Sand	Med. Granular / Firm	-

24 – 34"	B2	2.5Y 4/4	Loamy Coarse Sand	Med. Granular / Friable	-
34 -42"	B3	2.5Y 4/2	Loamy Gravelly Sand	Med. Granular / Firm	Redox Few / Distinct
42 – 50"	BC	2.5Y 4/4	Loamy Fine to Very Fine Sand	Med. Granular / Friable	Common / Distinct
50 – 59"	C1	2.5Y 4/4	Loamy Fine to Very Fine Sand	Med. Granular / Friable	Many / Prominent
59 – 73"	C2	2.5Y 4/4	Loamy Fine to Very Fine Sand	Med. Granular / Friable	Many / Prominent

Observations: Estimated SHWT @ 36"
Vegetation: Forested

1.1.6 ELEVATION OF THE SEASONAL HIGH WATER TABLE (SHWT):

The depth to the estimated seasonal high-water table for test pit 13 was 36 inches. There was no ledge encountered to a depth of 73 inches. The existing ground elevation near the location of the test pit 13 is 953.0 feet. The estimated seasonal high water was determined based on test pit 13 at 950.0 feet. The basin bottom was set at 3 feet above ESHWT at 953.0'.

1.1.7 DESIGN INFILTRATION RATE

The infiltration rate was determined using Field Measurement method as described in Env-Wq1504.14(e)(1) Amoozemeter, constant head well pereameter.

Infiltration Test #	Rate (in/hr)
4.1	*1.0*
4.2	*4.89*
4.3	*4.18*

A factor of safety of 0.5 has been applied to the average $K_{sat(analysis)}$. Thus, the design infiltration rate are as follows Infiltration Basin #1 **$K_{sat\ (analysis)}$ = 1.5 inches/hour**

APPENDIX A-9.1

SCALE: 1" = 50'

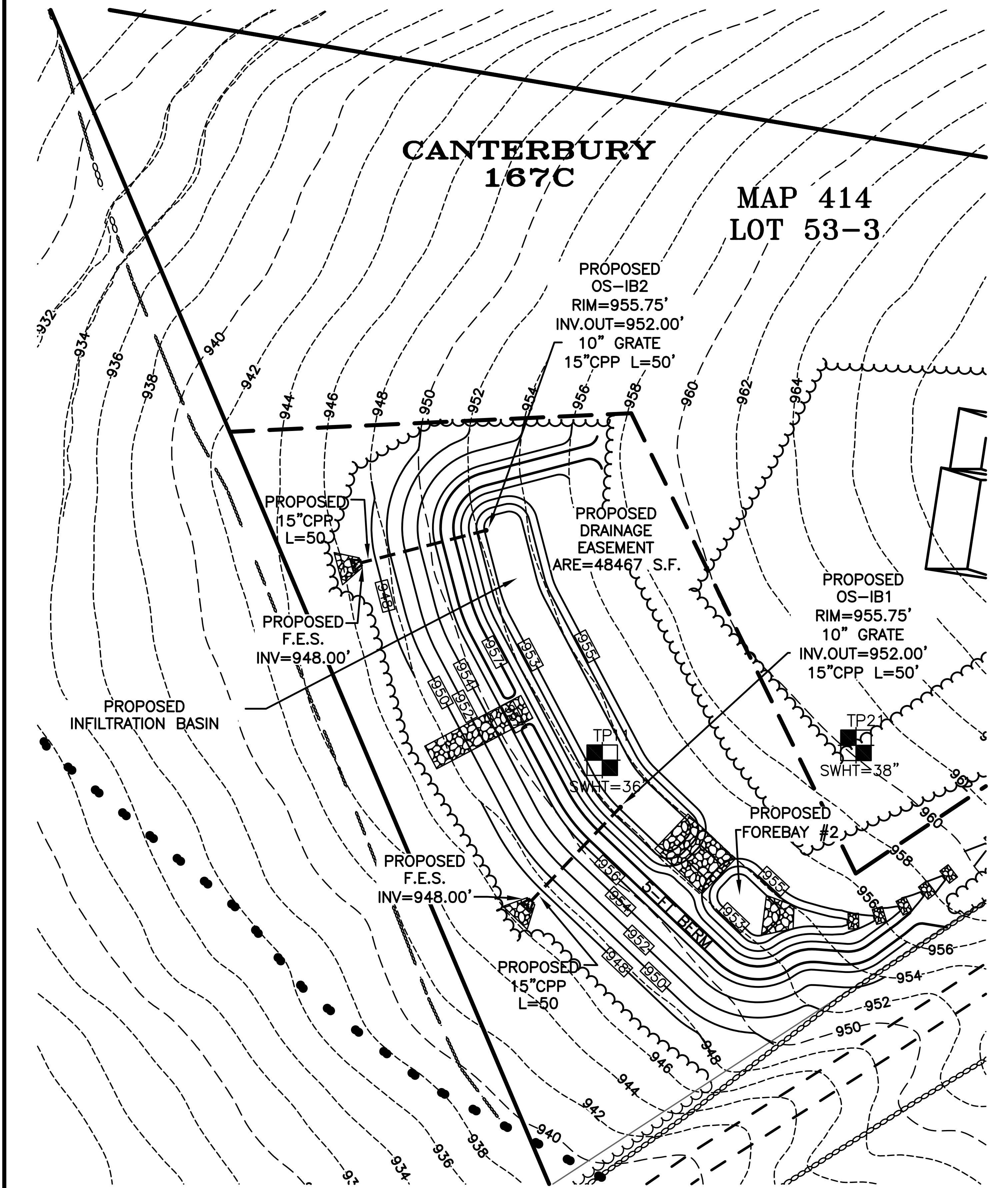

FIGURE 1

APPENDIX A 10

STORMWATER MANAGEMENT SYSTEMS INSPECTION & MAINTENANCE MANUAL

PREPARED FOR:
Granite State Conservation TR.
Gilmanton, NH
Belknap County

October 2023

PREPARED BY:

NORWAY PLAINS ASSOCIATES, INC.

Scott A. Lawler, P.E.
N.H. Reg. #10026

2 CONTINENTAL BOULEVARD, P.O. BOX 249, ROCHESTER, NEW HAMPSHIRE 03866-0249 (603) 335-3948

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APPENDICES

1.0 INTRODUCTION:

The purpose of this Manual is to:

1) Make the Property Owner/Facility Operator explicitly aware of the maintenance responsibility that goes along with the design site that is located on Governors Road in Gilmanton, NH.
2) Provide maintenance and inspection guidelines to be followed by this property owner, their successors and assigns and the agents thereof.

1.1 SUMMARY OF STORMWATER MANAGEMENT PRACTICES ON-SITE:

There are four (4) primary stormwater management practices employed on the site that will require routine inspection and maintenance to insure proper functioning of stormwater controls into the future.

1) CLOSED DRAINAGE SYSTEM (CULVERTS & CATCH BASINS)
2) SEDIMENT FOREBAY
3) IN-GROUND INFILTRATION & DETENTION BASINS
4) STORMWATER TREATMENT SWALE

1.2 RESPONSIBLE PARTIES:

Town of Gilmanton
Board of Selectmen
PO Box 550
Gilmanton, NH 03237

1.3 LONG TERM AGREEMENT

I the undersigned have read this inspection and maintenance manual. With the signature below, I acknowledge that it is the responsibility of the Town of Gilmanton to maintain or have maintained by qualified professionals all of the stormwater management practices outlined in this manual for perpetuity and that all successors will be responsible for inspection and maintenance of the stormwater management practices as well. I also acknowledge that it is the responsibility of the Town of Gilmanton to document any transfer of ownership and responsibility with the New Hampshire Department of Environmental Services.

Town of Gilmanton, selectman Date

2.0 INSPECTION & MAINTENANCE (CONSTRUCTION):

During Construction it is important to maintain the site where construction is ongoing in a manner that minimizes tracking of silt, sediment and construction materials onto the gravel surface areas as well as the bottoms of the SEDIMENT FOREBAY, the IN-GROUND INFILTRATION and DETENTION BASINS. Sediment should be monitored at all culvert inlet and catch basin grates throughout construction and excessive build up should be removed and disposed of in accordance with state and local requirements.

2.1 INSPECTION (CONSTRUCTION):

1) The Site Construction Contractor Shall perform a daily inspection of the entire site to ensure that construction activities are not impacting:

    a. Areas not currently under construction

    b. Areas under construction but sensitive to sediment and silt deposition
        - Gravel and crushed gravel courses
        - Closed Drainage System (i.e. culverts and catch basins)
        - Treatment Swales
        - Sediment Forebays
        - In-Ground Infiltration Basin
        - Detention Basin

2) The Site superintendent or his designee shall walk the perimeter of the site taking note of any sedimentation /siltation that may be occurring.

3) All silt fences, silt sock and or earth berm, and catch basin silt sacks shall be inspected weekly and after each rain event.

4) The Stabilized Construction Exit shall be inspected daily to ensure any mud, sediment and or silt is not tracked off site and is limited on site.

2.2 MAINTENANCE (CONSTRUCTION):

1) The Site Construction Contractor shall be responsible for all erosion and sediment control devices during construction. Refer to the Plan Set "*Governors Road Subdivision*" for all best management practices (BMP's) locations, details on proper installation and, construction sequencing. (sheet C-7 through sheet C-11)

2) In an effort to limit travel on the IN-GROUND INFILTRATION, DETENTION BASIN AREAS and FOREBAY area should be constructed early in the construction sequence and stabilized as soon as possible.

3) Orange Construction Fence and Silt Fence and Silt Sock must be installed around the perimeters of the Infiltration Basin to discourage travel, storage or other construction related activity in these areas.

4) If silt, sand or sediment becomes noticeably deposited on areas of travel not within the work zone these areas shall be swept or cleaned as appropriate.

3.0 INSPECTION & MAINTENANCE (OPERATION):

To ensure the prolonged operational life of all the stormwater management practices employed on the site it is imperative that a logical and thorough inspection and maintenance plan be implemented. The following sections outline the Inspection & Maintenance Schedule and methods to be employed on site after the completion of construction during the operational life of individual stormwater management practices employed.

3.1 GENERAL SITE:

The site shall undergo general inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist):

1) **Litter and Trash pick-up and removal:**
   a. **Inspection Frequency:**
      - Weekly

   b. **Minimum Inspection Requirements:**
      - Inspect the site within the limits of the lawn areas for blown or loose litter.

   c. **Maintenance/Cleanout Threshold:**
      - Clean as required;
      - Clean when visually apparent litter or trash spillage occurs.

3.2 PAVED ROADWAY:

The paved roadway areas shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist)

1) **Paved Roadway Sweeping:**
   a. **Inspection/Maintenance Frequency:**
      - At least 1 time per year, preferably 2 times a year (Early Spring prior to May 15 and Fall prior to October 15) it is mandatory that the parking areas be swept to limit the amount of sand and sediment entering the CLOSED DRAINAGE SYSTEM.

   b. **Minimum Inspection Requirements:**
      - Mandatory sweeping performed by a qualified professional*
      - Typical street sweeping equipment is acceptable for sweeping the paved areas.

2) **De-icing Agents:**
   The use of sand as a de-icing agent is allowed **BUT**, should be monitored and applied in minimum amounts necessary. Use the log in Appendix 3 to document the use of de-icing agents.

   a. **Inspection/Maintenance Frequency:**
      - After every plowing, the site manager shall inspect the parking area to determine the need for salt/sand application.

   b. **Minimum Inspection/Maintenance Requirements:**

- Sand shall be applied only as necessary. This will vary depending on sun exposure. The use of sand shall be minimized.
- Salt shall be applied only as necessary. This will vary depending on sun exposure. The use of salt shall be minimized.

c. **Maintenance Threshold:**
- After plowing of appreciable snow

3.3 CLOSED DRAINAGE SYSTEM (CATCH BASINS AND PIPE, ETC.):

The Closed Drainage System shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist).

1) **Catch basins w/ Oil & Debris Trap:**

d. **Inspection/Maintenance Frequency:**
- At least 2 times per year (Early Spring prior to May 15, Late Fall prior to October 15) same time as the parking inspections.

e. **Minimum Inspection/Maintenance Requirements:**
- Check for sediment accumulation;
- Check for floatable contaminants (i.e. oils etc.)
- Check for floatable trash (i.e. cigarette butts, paper etc.)
- Sumps to be vacuumed out by truck mounted vacuum equipment designed for the job.

f. **Maintenance/Cleanout Threshold:**
- Sediment depth ≥ 1-ft.
- Floatable depth ≥ 6-inches.

3) **Drainage pipes:**

a. **Inspection/Maintenance Frequency:**
- 1 time every 2 years (Early Spring after April 15 or Fall after October 15) same time as the pavement sweeping

b. **Minimum Inspection/Maintenance Requirements:**
- Check for sediment accumulation;
- Check for clogging

c. **Maintenance/Cleanout Threshold:**
- Sediment depth ≥ 1-inch
- Clogged

3.4 SEDIMENT FOREBAYS:

The Sediment Forebays shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist).

1) **Sediment Forebays:**

a. **Inspection/Maintenance Frequency:**
- 2 times a year (Early Spring prior to May 15, Fall prior to October 15). Conduct periodic mowing of the detention pond and sediment forebay slopes and embankments (minimum twice a year) to eliminate woody growth from the embankments and bottom. Mowing the

pond bottom and embankments when mowing the rest of the site is recommended.

b. **<u>Minimum Inspection/Maintenance Requirements:</u>**
- Check for sediment accumulation;
- Check for floatable contaminants (i.e. oils etc.)
- Check for floatable trash (i.e. cigarette butts, paper etc.)
- Sediment Forebays to be cleaned out and the side slopes and bottoms to be restored to a stabilized condition using equipment appropriate for the job.
- Check the outlet control structure and pipes.

c. **<u>Maintenance/Cleanout Threshold:</u>**
- Remove and dispose of accumulated sediment based on inspection. When sediment has reached the red mark on the sediment staff gage installed in the forebay, remove sediment and dispose of it off-site in accordance with state and local regulations.

Forebay #1	=	*960.5'*
Forebay #2	=	*953.5'*

- Remove debris from the outlet structure of the sediment forebay (i.e. stone check dam) at least once annually.
- Remove debris and sediment from the outlet control structures at least once annually.

3.5 IN-GROUND INFILTRATION & DETENTION BASINS:

The In-Ground Infiltration & Detention Basins shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist).

1) **<u>In-ground Infiltration & Detention Basins:</u>**

a. **<u>Inspection/Maintenance Frequency:</u>**
- Inspect pretreatment measures bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15.
- Inspect infiltration surface bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15.
- Inspect infiltration surface after any rainfall event of 2.5-inches in a 24-hour period or greater.
- Conduct periodic mowing of the infiltration basin slopes and embankments (minimum twice a year) to eliminate woody growth from the embankments and bottom. Mowing the infiltration basin embankments when mowing the rest of the site is recommended.

b. **<u>Minimum Inspection/Maintenance Requirements:</u>**
- Remove and dispose of accumulated sediment based on inspection. Repair area of removal as necessary to restore infiltration capacity.
- Perform maintenance and rehabilitation based on inspections.
- Remove debris (if any) from infiltration basin inlet based on inspection.
- If the infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional (i.e. professional engineer, certified soils scientist, etc.) should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration surface.

3.6 TREATMENT SWALES AND DRAINAGE DITCHES:

The Treatment Swale and Drainage Ditches shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist).

1) **Treatment Swales and Drainage Ditches:**

   a. **Inspection/Maintenance Frequency:**

      - Inspect the swale and ditches bi-annually; once in the spring prior to May 15 and once in the fall prior to October 15.
      - Inspect the swale and ditches after any rainfall event of 2.5-inches in a 24-hour period or greater.
      - Conduct periodic mowing of the swale and ditches (bottom and embankments) at least twice a year to eliminate woody growth from the embankments and bottom. Mowing the swale and ditches when mowing the rest of the site is recommended, no shorter than 4 inches.

   b. **Minimum Inspection/Maintenance Requirements:**

      - Remove and dispose of accumulated sediment based on inspection. Repair area of removal as necessary. Restore grass cover as necessary.
      - Perform maintenance and rehabilitation based on inspections.

3.7 SEDIMENT & WASTE MATERIAL DISPOSAL:

All material removed from the STORMWATER MANAGEMENT PRACTICES on site shall be disposed of in accordance with local, state and federal regulations offsite.

3.8 QUALIFIED STORMWATER SYSTEM MAINTENANCE SERVICE:

It is strongly recommended that the maintenance of the Stormwater Management Practices outlined above, excepting the General Site Maintenance, be performed by a qualified company such as:

Stormwater Compliance, LLC
8 Blue Moon Drive
North Yarmouth, ME 04097
207-712-7181
info@stormwatercomp.com

Companies of this nature have all the necessary equipment to maintain drainage systems.

4.0 RECORD KEEPING; LONG TERM INSPECTION & MAINTENANCE – REPORTING REQUIREMENTS:

Inspection and maintenance logs for stormwater practices employed by new development and re-development with substantial stormwater management infrastructure shall be kept and provided to representative of the NHDES – Alteration of Terrain Program upon request.

APPENDIX A-1:

STORMWATER MANAGEMENT SYSTEM: INSPECTION & MAINTENANCE CHECKLIST

STORMWATER MANAGEMENT SYSTEM: INSPECTION AND MAINTENANCE LOG

Appendix A- 1
Stormwater Management System:
Inspection and Maintenance Checklist

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
General Site:			
Litter and Trash pick-up	Weekly	• Inspect the site within the limits of the lawn areas for blown or loose litter.	• Clean as required • Clean when visually apparent litter or trash spillage has occurred
Control of Invasive Species	Monthly	• Inspect the site where plantings have occurred for any species listed in appendix A-2.	• Disposed of the invasive species in accordance with A-2.
Paved Surface Inspection	Twice per year – spring and fall	Check all gravel surfaces for erosion	Re-grade as needed to promote sheet flow and prevent channelization of runoff on the gravel surface
De-icing Agent Application	• After every plowing, the site manager shall inspect the parking area to determine the need for sand application.	• Sand shall be applied only as necessary. This will vary depending on sun exposure. The use of sand shall be minimized. • Salt shall be applied only as necessary. This will vary depending on sun exposure. The use of salt shall be minimized.	• After plowing of appreciable snowfall
Detention Basin	• Twice per year – spring(Prior to May 15 and prior to Oct 15th fall)	• Remove and dispose of accumulated sediment based on inspection. Repair area of removal as necessary to restore detention capacity. • Remove debris (if any) from detention basin inlet based on inspection.	• Conduct periodic mowing of the detention basin slopes and embankments (minimum twice a year) to eliminate woody growth from the embankments and bottom. Mowing the detention basin embankments when mowing the rest of the site is recommended.
Drainage Pipes	• 1 time every 2 years (Early Spring after April 15 or Fall after October 15)	• Check for sediment accumulation; • Check for clogging	• Sediment depth $\geq$ 1-inch • Clog
In-ground Infiltration Basin	• Inspect pretreatment measures (i.e. sediment fore bays) Bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15. • Inspect infiltration surface bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15.	• Remove and dispose of accumulated sediment based on inspection. Repair area of removal as necessary to restore infiltration capacity. • Perform maintenance and rehabilitation based on inspections. • Remove debris (if any) from infiltration basin inlet based on inspection.	N/A

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
	• Inspect infiltration surface after any rainfall event of 2.5-inches in a 24-hour period or greater. • Conduct periodic mowing of the infiltration basin slopes and embankments (minimum twice a year) to eliminate woody growth from the embankments and bottom. Mowing the infiltration basin embankments when mowing the rest of the site is recommended.	• If the infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional (i.e. professional engineer, certified soils scientist, etc.) should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration surface.	
Treatment Swales and Drainage Ditches	• Inspect bi-annually, once in the spring prior to May 15 and once in the fall prior to Oct. 15 • Inspect after any rainfall greater than 2.5 inches in 24-hours	• Conduct periodic mowing at least twice per year to eliminate woody growth from the sides and bottom	• Remove and dispose of accumulated sediment. Repair area of removal as necessary. Restore grass cover as necessary.

Stormwater Management System Inspection & Maintenance Log

Date Inspected	Inspector	Cleaning/Repair Needed (List Items/Comments)	Date of Cleaning repair	Performed By

APPENDIX A-2:

CONTROL OF INVASIVE PLANTS

CONTROL OF INVASIVE PLANTS

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

<u>Background:</u>

Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

UNIVERSITY *of* NEW HAMPSHIRE
COOPERATIVE EXTENSION

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.

Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.

Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

Woody Plants	Method of Reproducing	Methods of Disposal
Norway maple *(Acer platanoides)* European barberry *(Berberis vulgaris)* Japanese barberry *(Berberis thunbergii)* autumn olive *(Elaeagnus umbellata)* burning bush *(Euonymus alatus)* Morrow's honeysuckle *(Lonicera morrowii)* Tatarian honeysuckle *(Lonicera tatarica)* showy bush honeysuckle *(Lonicera x bella)* common buckthorn *(Rhamnus cathartica)* glossy buckthorn *(Frangula alnus)*	**Fruit and Seeds**	**Prior to fruit/seed ripening** Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Use as firewood. ▪ Make a brush pile. ▪ Chip. ▪ Burn.
		After fruit/seed is ripe Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip once all fruit has dropped from branches. ▪ Leave resulting chips on site and monitor.
oriental bittersweet *(Celastrus orbiculatus)* multiflora rose *(Rosa multiflora)*	**Fruits, Seeds, Plant Fragments**	**Prior to fruit/seed ripening** Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Make a brush pile. ▪ Burn.
		After fruit/seed is ripe Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.

<table>
<tr><th>Non-Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">garlic mustard
(Alliaria petiolata)
spotted knapweed
(Centaurea maculosa)
▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling.
black swallow-wort
(Cynanchum nigrum)
▪ May cause skin rash. Wear gloves and long sleeves when handling.
pale swallow-wort
(Cynanchum rossicum)
giant hogweed
(Heracleum mantegazzianum)
▪ Can cause major skin rash. Wear gloves and long sleeves when handling.
dame's rocket
(Hesperis matronalis)
perennial pepperweed
(Lepidium latifolium)
purple loosestrife
(Lythrum salicaria)
Japanese stilt grass
(Microstegium vimineum)
mile-a-minute weed
(Polygonum perfoliatum)</td><td rowspan="2">**Fruits and Seeds**</td><td>**Prior to flowering**
Depends on scale of infestation
Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>**During and following flowering**
Do nothing until the following year or remove flowering heads and bag and let rot.

Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>common reed
(*Phragmites australis*)
Japanese knotweed
(Polygonum cuspidatum)
Bohemian knotweed
(Polygonum x bohemicum)</td><td>**Fruits, Seeds, Plant Fragments**
Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.</td><td>**Small infestation**
▪ Bag all plant material and let rot.
▪ Never pile and use resulting material as compost.
▪ Burn.

Large infestation
▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile.
▪ Monitor and remove any sprouting material.
▪ Pile, let dry, and burn.</td></tr>
</table>

January 2010

APPENDIX A-3:

DE-ICING LOG

Deicing Log

Date Applied	Type of Deicing Material	Amount Applied

APPENDIX A 11

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing	Yes
State	New Hampshire
Location	New Hampshire, United States
Latitude	43.417 degrees North
Longitude	71.365 degrees West
Elevation	290 feet
Date/Time	Wed Jul 12 2023 13:07:40 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.26	0.39	0.49	0.64	0.80	1.01	**1yr**	0.69	0.96	1.17	1.47	1.86	2.36	2.61	**1yr**	2.09	2.51
2yr	0.31	0.48	0.60	0.80	1.00	1.26	**2yr**	0.86	1.15	1.45	1.82	2.27	2.83	3.16	**2yr**	2.50	3.04
5yr	0.37	0.58	0.72	0.97	1.24	1.57	**5yr**	1.07	1.43	1.82	2.29	2.85	3.55	4.00	**5yr**	3.15	3.85
10yr	0.41	0.65	0.82	1.12	1.46	1.87	**10yr**	1.26	1.69	2.18	2.73	3.41	4.23	4.78	**10yr**	3.74	4.60
25yr	0.49	0.77	0.99	1.36	1.81	2.34	**25yr**	1.56	2.12	2.73	3.45	4.30	5.33	6.06	**25yr**	4.72	5.83
50yr	0.55	0.88	1.13	1.58	2.13	2.78	**50yr**	1.84	2.50	3.26	4.11	5.13	6.35	7.26	**50yr**	5.62	6.98
100yr	0.62	1.01	1.30	1.84	2.51	3.31	**100yr**	2.17	2.97	3.89	4.92	6.13	7.57	8.69	**100yr**	6.70	8.35
200yr	0.71	1.16	1.50	2.15	2.96	3.92	**200yr**	2.56	3.52	4.62	5.86	7.31	9.02	10.41	**200yr**	7.98	10.01
500yr	0.84	1.39	1.81	2.63	3.69	4.93	**500yr**	3.19	4.42	5.83	7.41	9.25	11.40	13.22	**500yr**	10.09	12.71

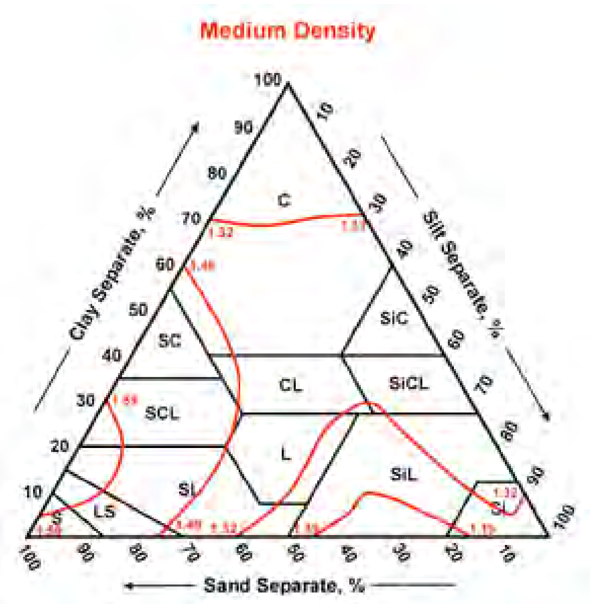
Lower Confidence Limits

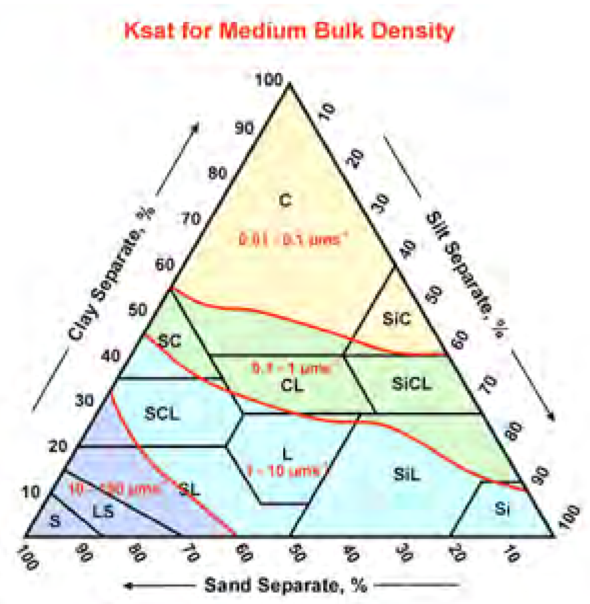
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.23	0.35	0.43	0.58	0.71	0.88	**1yr**	0.62	0.87	0.96	1.29	1.48	1.97	2.34	**1yr**	1.74	2.25
2yr	0.30	0.47	0.58	0.78	0.96	1.15	**2yr**	0.83	1.13	1.31	1.73	2.21	2.73	3.05	**2yr**	2.41	2.94
5yr	0.35	0.53	0.66	0.91	1.15	1.37	**5yr**	1.00	1.34	1.56	2.03	2.64	3.25	3.67	**5yr**	2.87	3.53
10yr	0.38	0.59	0.73	1.02	1.32	1.55	**10yr**	1.14	1.52	1.77	2.28	2.97	3.70	4.21	**10yr**	3.27	4.04
25yr	0.44	0.67	0.83	1.19	1.57	1.85	**25yr**	1.35	1.81	2.09	2.67	3.42	4.38	5.03	**25yr**	3.88	4.83
50yr	0.49	0.74	0.93	1.33	1.79	2.11	**50yr**	1.55	2.07	2.39	3.00	3.78	4.97	5.76	**50yr**	4.39	5.54
100yr	0.55	0.83	1.03	1.49	2.05	2.41	**100yr**	1.77	2.36	2.72	3.38	4.19	5.62	6.61	**100yr**	4.98	6.35
200yr	0.61	0.92	1.16	1.68	2.35	2.76	**200yr**	2.02	2.70	3.10	3.80	4.64	6.36	7.56	**200yr**	5.63	7.27
500yr	0.71	1.05	1.36	1.97	2.80	3.32	**500yr**	2.42	3.24	3.69	4.45	5.32	7.45	9.05	**500yr**	6.60	8.71

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.28	0.43	0.53	0.71	0.87	1.06	**1yr**	0.75	1.04	1.21	1.60	1.98	2.56	2.84	**1yr**	2.27	2.73
2yr	0.32	0.50	0.62	0.84	1.03	1.23	**2yr**	0.89	1.20	1.40	1.85	2.42	2.95	3.30	**2yr**	2.62	3.17
5yr	0.39	0.60	0.75	1.03	1.31	1.57	**5yr**	1.13	1.53	1.80	2.39	3.05	3.89	4.33	**5yr**	3.44	4.17
10yr	0.47	0.72	0.89	1.24	1.60	1.89	**10yr**	1.38	1.85	2.16	2.84	3.62	4.81	5.34	**10yr**	4.25	5.14
25yr	0.59	0.90	1.11	1.59	2.09	2.44	**25yr**	1.81	2.39	2.79	3.66	4.65	6.38	7.07	**25yr**	5.64	6.79
50yr	0.70	1.07	1.33	1.91	2.57	2.97	**50yr**	2.22	2.90	3.40	4.41	5.62	7.91	8.73	**50yr**	7.00	8.40
100yr	0.84	1.27	1.59	2.30	3.15	3.61	**100yr**	2.72	3.53	4.13	5.34	6.81	9.85	10.81	**100yr**	8.72	10.39
200yr	1.01	1.51	1.92	2.78	3.88	4.40	**200yr**	3.34	4.30	5.03	6.46	8.25	12.26	13.39	**200yr**	10.85	12.87
500yr	1.28	1.91	2.45	3.56	5.07	5.73	**500yr**	4.37	5.60	6.52	8.32	10.65	16.39	17.77	**500yr**	14.51	17.09

K_{sat} VALUES
FOR
NEW HAMPSHIRE SOILS
(Including Hydrologic and DES Soil Lot Sizing Groups)





From: Guide for Estimating Ksat from Soil Properties (**Exhibit 618-9**). (http://soils.usda.gov/technical/handbook/contents/part618ex.html)

Sponsored by the Society of Soil Scientists of Northern New England
SSSNNE Special Publication No. 5
September, 2009

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Ricker	674	2.0	6.0	2.00	6.0	A	4	rganic over bedrock (up to 4" of minera	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep

no longer recognized
organic materials

LAND SURVEYORS | CIVIL ENGINEERS

PRE–DEVELOPMENT
TAX MAP 414, LOT 50, 52 & 53
GOVERNORS ROAD
GILMANTON, NH
PREPARED FOR:
GRANITE STATE CONSERVATION TRUST
OCTOBER 2023
GRAPHIC SCALE
80 0 40 80 160 320
1 INCH = 80 FEET

FILE NO. 458
PLAN NO. C–xxx
DWG. NO. 23058 PP–1
F.B. NO.

D–1

LAND SURVEYORS

CIVIL ENGINEERS

POST-DEVELOPMENT
GOVERNORS ROAD
GILMANTON
BELKNAP COUNTY
NEW HAMPSHIRE
JULY 2023

GRAPHIC SCALE

50 0 25 50 100 200

1 INCH = 50 FEET

D-2

FILE NO. 458
PLAN NO. C-xxx
DWG. NO. 23058 PP-1
F.B. NO.

31 Mooney Street, Alton, N.H. 603-875-3948

NORWAY PLAINS ASSOCIATES, INC.

2 Continental Blvd., Rochester, N.H. 603-335-3948