INSITE
ENGINEERING, SURVEYING &
LANDSCAPE ARCHITECTURE, P.C.

PRELIMINARY STORMWATER POLLUTION PREVENTION PLAN

For

HILLCREST COMMONS
Town of Carmel and Kent, New York

March 6, 2009

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3 Garrett Place
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1.0 INTRODUCTION

1.1 Project Description

The subject project is located on an 81± acre parcel located in both the Town of Kent and Carmel adjacent to New York State Route 52. The parcel is located such that approximately 90% of the property is located in the Town of Carmel. The parcel and its surroundings are delineated on the attached Location Map (Figure 1). The property is designated as Tax Map Parcel No. 44.10-1-4 in the Town of Carmel and 44.10-2-1 and 44.09-2-27 in the Town of Kent. The parcel is located in the C-(Commercial) Zoning district in the Town of Carmel and the C (Commercial) and R-40 (Residential) Zoning district in the Town of Kent.

The subject parcel consists of woods and brush throughout the majority of the property. Three existing buildings complete with lawns, landscaping, and appurtenances are located in the Town of Kent near Route 52. There are two (2) Town regulated wetlands located on the site, one near the southwestern property line and the other in the northwestern portion of the site adjacent to the existing structures. The elevation ranges from approximate elevation 754 in the central portion of the site to a low point of 504 along the southwestern property line in the Town regulated wetland. The slopes throughout the proposed project range from rolling to generally steep slopes. The soil types on the property vary from well-drained soils across the majority of the site to moderately drained soils. Figure 4 provides a breakdown of the soil types and a listing of these soils in accordance with the *Soils Survey of Putnam and Westchester Counties*.

The subject parcel is proposed to be developed with one hundred fifty (150) residential units to be used as senior housing. Access to the site will be granted from a proposed access road off of New York State Route 52. An emergency access road is proposed to gain access to the property from the southeast corner of the existing Shop-Rite Plaza. The proposed emergency access road will provide an additional entrance to the site for emergency vehicles as well as providing access to the proposed stormwater basins. Water supply and wastewater generated for the proposed project will be serviced by the Town of Carmel municipal water and sewer system.

To the best of our knowledge there are no known enforcement actions, including lawsuits or administrative proceedings, commenced against the applicant, or any principle affiliate of the applicant, for any alleged violations of law related to the applicant of the site, in the five years preceding this application.

1.2 Existing Stormwater Runoff Conditions

The existing stormwater runoff from the subject parcel currently drains to the Croton Falls Reservoir. The subject parcel is located on a knob, causing the stormwater runoff to discharge from the site in all directions. There are existing watercourses located to the east, west and south of the subject parcel. The unnamed watercourse to the west flows in an open channel before being piped underneath the Shop-Rite parking lot and returns to an open channel to the south of the Shop-Rite Plaza. The watercourse to the east of the site is Michael Brook which currently discharges from the nearby Palmer Lake. Regardless of which direction the stormwater drains off of the subject property the runoff will enter one of the adjacent watercourses. Michael Brook and the unnamed watercourse to the west flow north to south merging on the north side of Fair Street before crossing underneath the existing low point in Fair Street.

1.3 Proposed Stormwater Runoff Conditions

The stormwater runoff from the proposed senior housing development will be collected and discharged to seven (7) proposed stormwater basins for mitigation. One Design Point located along the southwestern property line has been chosen to analyze the stormwater runoff both qualitatively and quantitatively, as seen in Figures 3 and 5. The proposed drainage patterns vary from the existing drainage patterns in that approximately 18 acres currently draining to the east (subcatchments 1.1S, 1.2S and a portion of 1.0S and 3S) are proposed to drain to the western watercourse after treatment. The aforementioned drainage areas draining to the western unnamed watercourse in the proposed condition will cause a reduction in the peak flows discharging to the east and Michael Brook. The redirecting of the stormwater runoff that currently discharges to Palmer Lake and Michael Brook will not have any adverse effects. Palmer Lake currently causes flooding problems on NYS Route 52 during storm events therefore less contributing area will lessen the flooding. Also, due to the existing development in Hill and Dale there are no feasible

discharge points for the stormwater runoff in this area of the site. To maintain stormwater runoff to Michael Brook the long steep slopes adjacent to Michael Brook would need to be disturbed to create a stable discharge location to the Brook. This disturbance would have greater impacts than the proposed local redirection of this stormwater runoff. Michael Brook and the un-named watercourse to the west merge just prior to crossing Fair Street in Carmel which is located south of the site. All of the development is proposed to be treated in stormwater basins before being discharged to Design Point 1 and the unnamed watercourse to the west. The attenuation provided by the proposed stormwater basins will mitigate the peak flows exiting the site at Design Point 1 such that there will be a reduction in the peak flows discharged to the unnamed watercourse to the west in the proposed condition. The reduction in the peak flows discharged to the west coupled with the reduction in area, and peak flows discharging to the east and Michael Brook creates an overall reduction in peak flows discharging through the culvert crossing of Fair Street.

2.0 STORMWATER MANAGEMENT

The stormwater management for the subject project requires compliance with several regulatory agencies and codes. To meet the requirements of the New York City Department of Environmental Protection (NYCDEP) and the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit No. GP-0-08-001, several publications were referenced to design the stormwater management systems' quantity and quality issues. The publications include *Reducing the Impacts of Stormwater Runoff from New Development*, April 1992 (Impacts) and the *New York State Stormwater Management Design Manual*, August 2003 (NYSSMM) including *Chapter 10, The Enhanced Phosphorus Supplement Manual.*

Water quality on this project has been addressed to meet the requirements of both the NYCDEP and NYSDEC. A series of stormwater basins, a wetland, and a sand filter have been designed to capture and treat the 1-year design storm in order to address the water quality requirements for the NYSDEC. To meet the water quality standards for the NYCDEP, a combination of swales and stormwater basins have been designed in series.

As required by the NYCDEP regulations 24-hour detention of the 2-year, 24-hour storm has been provided. By detaining the center of mass of the 1-year, 24-hour storm for 24 hours the NYSDEC requirement for Stream Channel Protection has also been provided.

Attenuation of the 10-year, 24-hour peak discharge rates to pre-development rates has been accomplished to address Overbank Flood Control to meet NYSDEC requirements and to address the adequacy of existing and proposed culverts and storm drainage systems for the Town of Carmel, Town of Kent and NYCDEP.

To reduce the risk of flood damage from large storm events and to protect the physical integrity of a stormwater management practices attenuation has been provided for the post-development 100-year, 24-hour storm peak flows to below the pre-development flows. This meets the requirements of both the NYSDEC and NYCDEP.

2.1 Quantitative Analysis

The "HydroCAD" Stormwater Modeling System," by HydroCAD Software Solutions LLC in Tamworth, New Hampshire, was used to model and assess the stormwater flows for the subject project. HydroCAD is a computer-aided design program for modeling the hydrology and hydraulics of stormwater runoff. It is based primarily on hydrology techniques developed by the United States Department of Agriculture, Soil Conservation Service (USDA, SCS) TR-20 method combined with standard hydraulic calculations. The program was used to analyze the 1-year, 2-year, 10-year, 25-year, 50-year and 100-year, 24-hour design storms. Peak flows were calculated for both the pre-development condition and the post-development condition. The input requirements for the HydroCAD computer program are as follows:

Subcatchments (contributing watershed/sub-watersheds)

- Design storm rainfall in inches
- CN (runoff curve number) values which are based on soil type and land use/ground cover
- Tc (time of concentration) flow path information

Stormwater Basins

- Surface area at appropriate elevations
- Flood elevation
- Outlet structure information

The following is a general description of the input data used to calculate the pre- and post-development stormwater runoff values. For detailed information for each subcatchment and pond, see Appendices A & B.

The precipitation values for the various design storms analyzed were obtained from the local County Soil and Water Conservation District office. The values provided are for 24-hour design storms in Putnam County.

Design Storm	**24-Hour Rainfall**
1-Year	3.1”
2-Year	3.5”
10-Year	5.3”
25-Year	6.0”
50-Year	7.0”
100-Year	9.5”

The CN (runoff curve number) values utilized in this report were referenced from the USDA, SCS publication *Urban Hydrology for Small Watersheds*. The following is a summary of the various land uses/ground covers and their associated CN values utilized in this report.

Land Use/Ground Cover	**CN Value**
>75% Grass Cover, B Soil	61
Woods/Grass Combo, B Soil	58
Woods, B Soil	55
1-Acre Lots 20% Impervious, B Soil	68
1/8-Acre Lots (Town Houses), B Soil	85
Paved Parking and Roofs	98
Urban Commercial 85% Impervious, B Soil	92

The soils classifications and data can be found on Figures 2 and 3. The hydrologic soils groups for the project consist of mainly of B soils. The soils on the site consist of Chatfield – Charlton complex (CsD, CrC), Charlton – Hollis (CtC, CuD), Woodbridge Loam (WdB), Sun Loam (Sh), Leicester Loam (LcB), and Urban Land – Charlton (UhB).

The quantitative analysis performed for the subject project involves the assessment of One Design Point. Design Point 1 is located at the southern property line in the Town regulated wetland (as seen on Figures 2 & 3). The following table summarizes the calculated pre-development and post-development peak stormwater runoff flows:

PEAK FLOW SUMMARY (C.F.S.)

24-HOUR DESIGN STORM										
	2-YEAR		10-YEAR		25-YEAR		50-YEAR		100-YEAR	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Design Point 1	42.35	41.82	119.40	115.22	153.87	147.71	205.91	198.56	345.09	336.28

As seen by the above summary, the post-development peak flows for the 2-, 10-, 25-, 50-and 100-year design storms have been attenuated to be less than the pre-development peak flows.

The NYSDEC SPDES General Permit GP-0-08-001 requires Overbank Flood Control ($Q_{p)}$ and Extreme Flood Control (Q_f) to be considered in the design of the proposed stormwater management practices. Overbank Flood Control was considered in the design of the proposed stormwater basins to prevent an increase in the frequency and magnitude of out-of-bank flooding generated by the development. Overbank Flood Control requires the attenuation of the peak post-development 10-year, 24-hour storm event to the pre-development rates. The proposed stormwater basins were also designed to provide Extreme Flood Control. The intent of the extreme flood criteria is to prevent the increased risk of flood damage from large storm events and protect the physical integrity of stormwater management practices. Extreme Flood Control was provided by attenuating the post-development peak discharge from the 100-year storm to near or below the pre-development rates. In addition to Q_p and Q_f controls, the NYSDEC SPDES GP-0-08-001 requires control of the Stream Channel Protection Volume (CP_v). Stream Channel Protection Volume requirements are designed to protect stream channels from erosion from high stormwater velocities and volumes. To protect the stream channels from erosion, 24-hour extended detention of the center of mass of the post-development 1-year, 24-hour storm event is provided. For detailed information see Appendix B.

2.2. Qualitative Analysis

To meet the requirements of the NYCDEP, pollutant runoff amounts were analyzed for both the Pre Development and Post Development conditions. The pollutant loading coefficient method was utilized to calculate the annual export of Biological Oxygen Demand (BOD), Total Phosphorus (TP), Total Nitrogen (TN), and Total Suspended Solids (TSS). The publication *Fundamentals of Urban Runoff Management: Technical and Institutional Issues* produced by the Terrene Institute was referenced to determine the appropriate loading rates for TP, TN, and TSS. The New York State Department of Environmental Conservation (NYSDEC) publication *Reducing the Impacts of Stormwater Runoff from New Development* (*Impacts*) was referenced to determine appropriate loading rates for BOD. The appropriate loading rates were then utilized to calculate the annual pollutant export values. Variables involved with this calculation include soil type and land use/ground cover characteristics.

The following table summarizes the pollutant loading rates utilized for the subject project.

SUMMARY OF POLLUTANT LOADING RATES (LBS/ACRE/YEAR)

Land Use/Ground Cover	BOD	TP	TN	TSS
Woods/ Brush	6.0	0.10	1.8	77.0
1 Acre-Residential	14.0	0.49	3.6	178.0
Multi-Family Residential	50.0	0.63	5.0	395.0
Pavement	111.0	0.98	2.1	446.0

The primary treatment for stormwater runoff discharging from the subject project will be stormwater basins. A monitored outlet is proposed to discharge the 2-year, 24-hour storm over 24 hours or more in order to treat the 2-year, 24-hour storm as required by the NYCDEP regulations. In addition to stormwater basins, dry grass swales will be utilized to treat stormwater runoff. Note that no pollutant removal efficiency has been assumed for the proposed grass swales therefore the following post-development summary is conservative.

The following pollutant removal efficiencies are referenced from the publication *Reducing the Impacts of Stormwater Runoff from New Development*, prepared by the NYSDEC.

LONG TERM POLLUTANT REMOVAL EFFICIENCIES

Treatment Method	BOD	TP	TN	TSS
Design 2 Extended Detention Basins	40%-60%	40%-60%	20%-40%	80%-100%

The following table summarizes the estimated pre-development and post-development annual pollutant loads (calculated in Appendix D) calculated for the subject project.

ANNUAL POLLUTANT SUMMARY

	Annual Loads (lb/yr)			
	BOD	**TP**	**TN**	**TSS**
Pre-Development Annual Pollutant Loads	226.4	4.03	67.3	2853.8
Post-Development Annual Pollutant Loads	292.3 to 179.6	4.73 to 3.28	76.3 to 51.8	1343.0 to 1113.1

As seen by the above summary, the post-development pollutant loads are approximately equal to or less than the pre-development loads as required by the NYCDEP regulations.

With respect to phosphorus, which is the pollutant of concern in the subject TMDL watershed, the SWPPP for the project is expected to achieve better than the calculated mean removal efficiencies due to adjunct stormwater treatment practices that have been incorporated into the project design, but not considered in the stormwater treatment calculations. The adjuncts include catch basin/drain inlet sumps and grass swales. Based on the proposed SWPPP the applicant believes the project will not impact the Town of Carmel's ability to achieve the established TMDL, and the SWPPP does propose stormwater measures to reduce phosphorous loading to the maximum extent practicable. The program for phosphorous reduction has been established in the NYSDEC document entitled *Croton Watershed Phase II Phosphorous TMDL Nonpoint Source Implementation Plan* (TMDL Implementation Plan) dated January 14, 2009. This plan clearly states that for simplicity and ease of local government administration the plan is largely structured to use existing programs to achieve reductions. These programs include:

- Potential additional point source reductions.
- NYSDEC SPDES General Permit for Stormwater Discharges for Municipal Separate Stormwater Sewer Systems (MS4s) Permit No. GP-0-08-002.
- State and regional source control and agricultural programs.
- US EPA Filtration Avoidance Determination Program.
- Putnam County "Croton Plan".
- NYCDEP "Croton Strategy".
- NYCDEP EOH Water Quality Investment Funds, including the Putnam County Septic Repair Program.
- New York State non point source programs.
- NYSDEC – NYCDEP Coordinated Stormwater Enforcement Protocol.

The subject project in consistent with the TMDL Implementation Plan and applicable portions of the above-cited programs.

Based on the fact that the applicant's analysis indicates the mean reduction in post development phosphorous, and the project's consistency with the TMDL Implementation Plan, it is clear that the project

will not have any reservoir basin wide impacts, and the project will not impact the Town of Carmel's ability to achieve the TMDL.

The NYSDEC SPDES General Permit GP-0-08-001 requires that the Water Quality Volume (WQ_v) be treated in order to provide pollutant removal. Treatment of the Water Quality Volume is intended to improve water quality by capturing and treating the runoff volume generated by the 1-year design storm event. The water quality volume is directly related to the amount of impervious cover proposed on the project area. Stormwater basins will be utilized to meet the NYSDEC water quality treatment requirements. Stormwater Basin 1.0P will be designed as a P-1 Micropool Extended Extension Pond, stormwater basin 2.1P will be designed as a F-1 Surface Sand Filter and Pocket Wetland 2.3P will be designed as a W-4 wetland as defined in the *NYS Stormwater Manual*. Additionally Stormwater Basins 1.1P, 1.2P and 2.2P will be designed as Design 2 extended detention basins as defined in Reducing the Impacts. Stormwater basin 2.0P will be utilized as a pretreatment sedimentation practice for stormwater basin 2.1P which is designed as a F-1 surface sand filter. It is assumed that by meeting the Water Quality Volume requirements through employment of the filtration practice, the Micropool extended detention pond, and the Pocket Wetland, the water quality objectives of the NYSDEC have been met.

3.0 STORMWATER CONVEYANCE SYSTEM

The stormwater collection systems for the project consist of grass swales, rip rap swale, drain inlets, and HDPE pipe. The systems will be sized utilizing the Rational Method. The Rational Method is a standard method used by engineers to develop flow rates for sizing collection systems. The Rational Method calculates flows based on a one-hour design storm. The collection systems will be sized to convey, at a minimum, the 25-year design storm.

4.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control will be accomplished by four basic principles: diversion of clean water, containment of sediment, treatment of dirty water, and stabilization of disturbed areas. Diversion of clean water will be accomplished with swales. This diverted water will be safely conveyed around the construction area as necessary and discharged downstream of the disturbed areas. Sediment will be contained with the use of silt fence at the toe of disturbed slopes and excavation of temporary sediment basins. Disturbed areas will be permanently stabilized within 14 days of final grading to limit the required length of time that the temporary facilities must be utilized.

4.1 Temporary Erosion and Sediment Control Facilities

Temporary erosion and sediment control facilities will be installed and maintained as required to reduce the impacts to off-site properties. In general, the following temporary methods and materials will be used to control erosion and sedimentation from the project site:

- Stabilized Construction Entrance
- Diversion Swales
- Silt Fence Barriers
- Stone Check Dams
- Storm Drain Inlet Protection
- Sediment Basins

A stabilized construction entrance will be installed at the entrance to the site as shown on the plan. The design drawings will include details to guide the contractor in the construction of this entrance. The intent of the stabilized construction entrance is to prevent the "tracking" of soil from the site. Dust control will be accomplished with water sprinkling trucks if required. During dry periods, sprinkler trucks will wet all exposed earth surfaces as required to prevent the transport of air-borne particles to adjoining properties.

Stormwater from areas uphill of the subject development area will be diverted. During construction stormwater from areas of disturbance will be diverted through the use of grass swales to other practices such as filter barriers and/or sediment basins. Stone check dams will be installed in the grass swales to reduce runoff velocities and filter sediment picked up from the swale's bottom.

Siltation barriers constructed of geosynthetic filter cloth will be installed liberally at the toe of all disturbed slopes. The intent of these barriers is to contain silt and sediment at the source and inhibit its transport by

stormwater runoff. The siltation barriers will also help reduce the rate of runoff by creating numerous filters through which the stormwater must pass. Siltation barriers will also be installed around catch basins and drain inlets. The intent of these barriers is to prevent silt and sedimentation from entering the stormwater collection system.

The stormwater basins will also act as temporary sediment traps with optional dewatering devices during construction of the proposed road and utilities. Most stormwater runoff from disturbed areas will be directed to the sediment basins. These basins will be sized in accordance with the publication, *New York Guidelines for Urban Erosion and Sediment Control*, printed by the Empire State Chapter Soil and Water Conservation Society.

4.2 Permanent Erosion and Sediment Control Facilities

Permanent erosion and sediment control will be accomplished by diverting stormwater runoff from steep slopes, controlling/reducing stormwater runoff velocities and volumes, and vegetative and structural surface stabilization. All of the permanent facilities are relatively maintenance free and only require periodic inspections.

The temporary sediment basins will be cleaned of all sediment and debris, excavated to their final elevations and dimensions and stabilized with the vegetation as indicated on the plans. Rip rap aprons will be used at the discharge end of all piped drainage systems. Runoff velocities will be reduced to levels that are non-erosive to the receiving waterbodies through use of these aprons.

Other than the actual buildings and driveway surfaces, the primary method for permanently stabilizing disturbed surfaces at the subject site is with vegetation. The vegetation will control stormwater runoff by preventing soil erosion, reducing runoff volume and velocities, and providing a filter medium. Permanent seeding should optimally be undertaken in the spring from March 21st through May 20thand in late summer from August 15th to October 15th. The stormwater basins will allow for settlement of suspended sediment that is generated by stormwater runoff from the site. These facilities provide a central collection area for sediment deposition and eventual disposal.

5.0 IMPLEMENTATION AND MAINTENANCE

5.1 Construction Phase

Details associated with the implementation and maintenance of the proposed stormwater facilities and erosion control measures during construction will be shown on the project plans. A construction sequence has been provided to guide the contractor in the installation of the erosion control measures as well as the site plan features. The erosion control plan includes associated details and notes to aid the contractor in implementing the plan.

The extended detention basins have been designed to limit the routine maintenance requirements. Initially the basins will require regular maintenance until the permanent vegetation is established. Permanent vegetation is considered established when 80% of the final plant density is established. Vegetation should be inspected every 30 days and after every major storm event until established, after which inspections should take place on a quarterly basis and after every large storm event. Damaged areas should be immediately re-seeded and re-mulched. The floor of the basins will be planted with a seed mixture that contains plants that are tolerant of occasional flooding. The seed mixtures contain several plant species that vary slightly in their needs for survival. It is expected that not all of the species will survive within each basin due to variations within each basin such as water, nutrients, and light. During the initial year of planting, the plants may require watering to germinate and become established. Note that several seedings may be required during the first year to completely establish vegetation within the basins. After the initial year of establishment, the basins do not need to be fertilized or watered. A natural selection process will occur over the first few years, such that the species within the seed mixture most suitable to the conditions will survive.

5.2 Long Term Maintenance Plan

The stormwater facilities for the subject project have been designed to minimize the required maintenance. This section discusses the minimum maintenance requirements to insure long term performance of the stormwater facilities. Initially the stormwater facilities will require an increased maintenance and inspection schedule until all portions of the site are stable. Generally the stormwater facilities consist of either collection/conveyance components or treatment components.

The stormwater collection and conveyance systems are composed of concrete drain inlets with cast iron frames and grates, high-density polyethylene pipe, and grass and rip rap swales. Minimal maintenance is typically required for these facilities. Each spring the paved areas will be cleaned to remove the winter's accumulation of traction sand. After this is completed, all drain inlets sumps will be cleaned. All pipes will be checked for debris and blockages and cleaned as required. During the cleaning process, the drain inlets and pipes will be inspected for structural integrity and overall condition; repairs and/or replacement will be made as required. Swales will be inspected for debris, blockages and erosion and shall be cleaned and repaired as required.

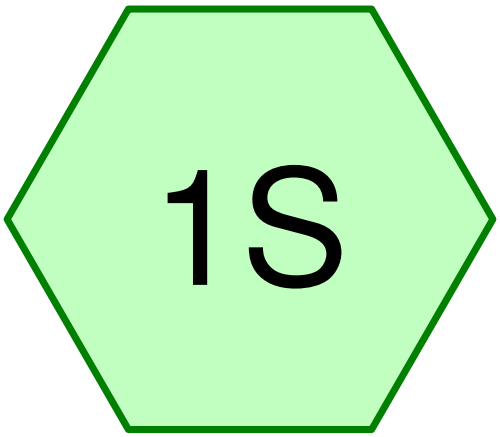
Once the desired vegetative cover is established in the basins, only limited maintenance is required. The basins and outlet structures should be inspected after major storm events and semi-annually. During the inspections, the following should be checked:

- Evidence of clogging of outlet structure.
- Erosion of the flow path through the detention basin.
- Subsidence, erosion, cracking or tree growth on the embankment/berm.
- Condition of the emergency spillway.
- Accumulation of sediment around the outlet structure.
- Adequacy of upstream/downstream channel erosion control measures.
- Erosion of the basin bed and banks.
- Sources of erosion in the contributory drainage, which should be stabilized.

Access to the basins will be through stabilized basin accesses. The accesses are proposed to be graded to final grades and seeded and mulched in accordance with the Erosion & Sedimentation Control Notes. The grass swales, the graded basin accesses, and the side slopes and berms of the basins should be mowed annually to prevent the establishment of woody plants within the swales, accesses, or basin berms. The bottoms of the basins should not be mowed. During the mowing operations, debris and litter should be removed from all parts of the swales, accesses, and basins. Accumulated sediment will need to be removed from the swales and basins approximately every 10 to 20 years, or when 50 percent of their capacity has been reached.

APPENDIX A

Pre-Development Computer Data



Subcat Reach Pond Link

Drainage Diagram for Hillcrest Commons - Pre Dev.

Prepared by Insite Engineering, Surveying and Landscape Architecture, P.C., Printed 3/31/2009

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
19.900	55	Woods, Good, HSG B (1S)
53.000	58	Woods/grass comb., Good, HSG B (1S)
7.000	61	>75% Grass cover, Good, HSG B (1S)
32.000	68	1 acre lots, 20% imp, HSG B (1S)
21.000	92	Urban commercial, 85% imp, HSG B (1S)
132.900		**TOTAL AREA**

Summary for Subcatchment 1S:

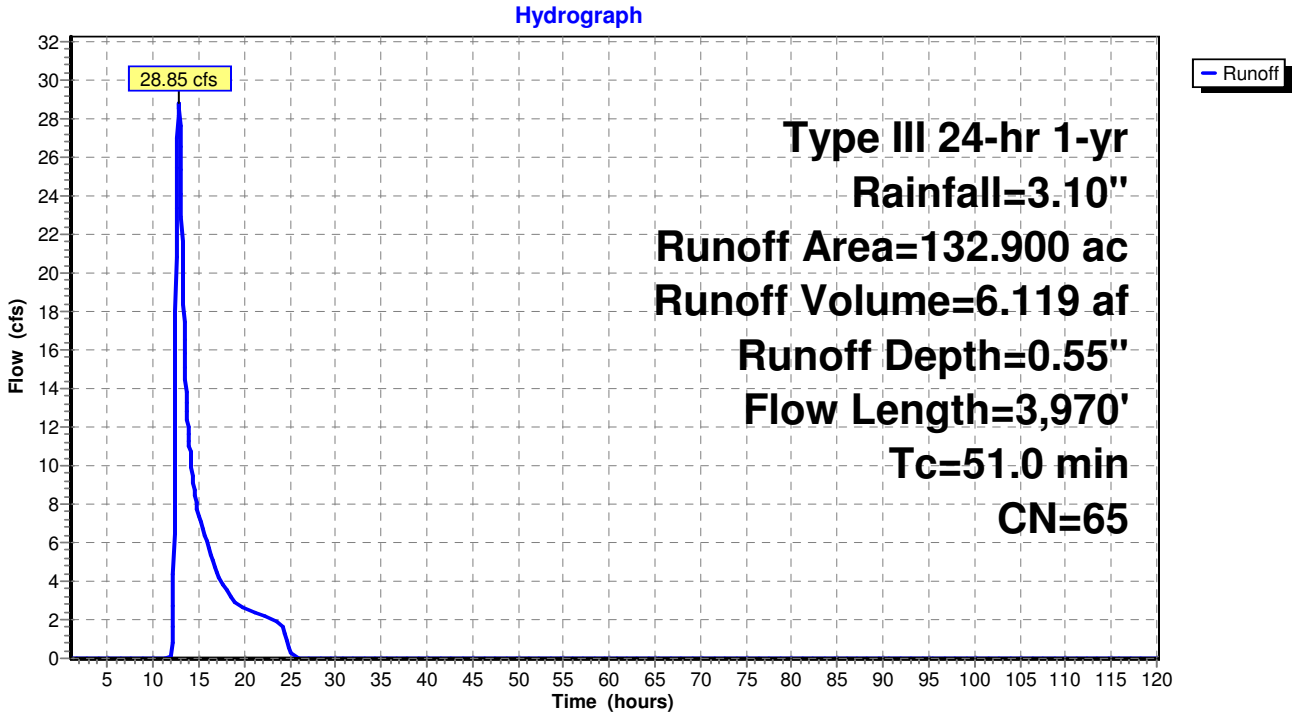
Runoff = 28.85 cfs @ 12.83 hrs, Volume= 6.119 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-120.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
32.000	68	1 acre lots, 20% imp, HSG B
53.000	58	Woods/grass comb., Good, HSG B
7.000	61	>75% Grass cover, Good, HSG B
21.000	92	Urban commercial, 85% imp, HSG B
19.900	55	Woods, Good, HSG B
132.900	65	Weighted Average
108.650		Pervious Area
24.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 1S:

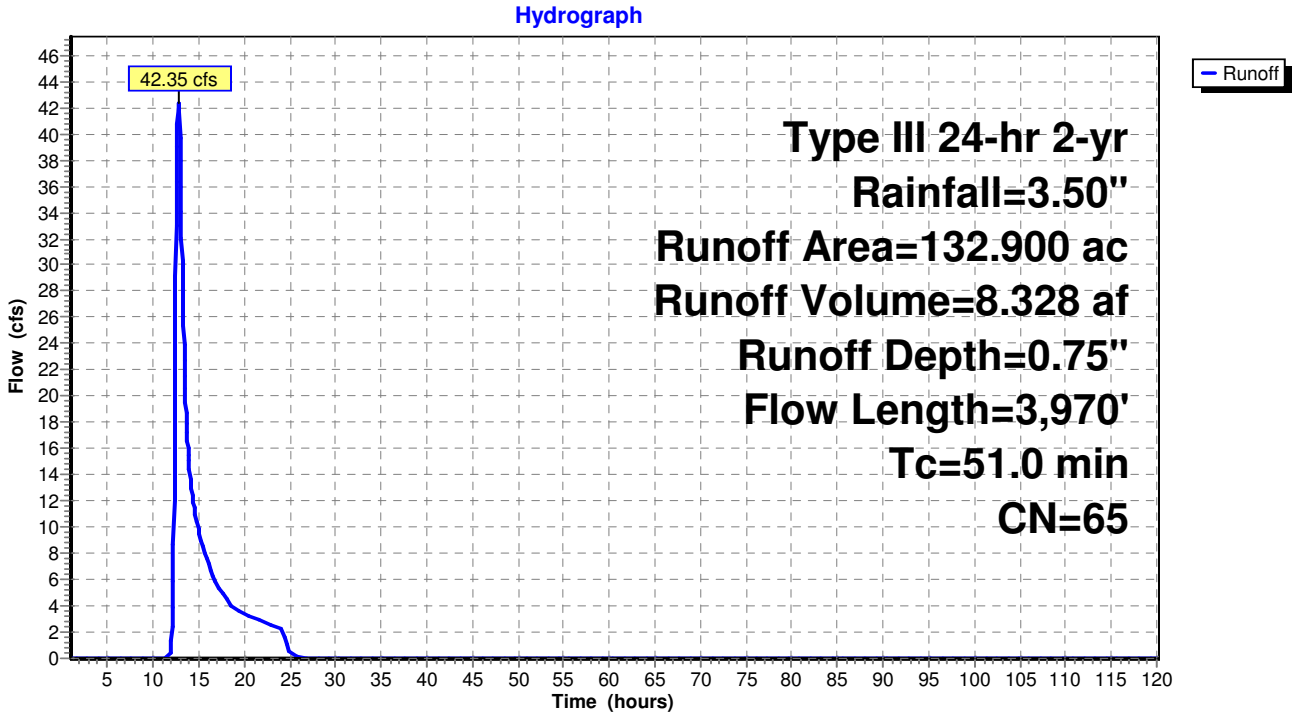
Runoff = 42.35 cfs @ 12.80 hrs, Volume= 8.328 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-120.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
32.000	68	1 acre lots, 20% imp, HSG B
53.000	58	Woods/grass comb., Good, HSG B
7.000	61	>75% Grass cover, Good, HSG B
21.000	92	Urban commercial, 85% imp, HSG B
19.900	55	Woods, Good, HSG B
132.900	65	Weighted Average
108.650		Pervious Area
24.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 1S:

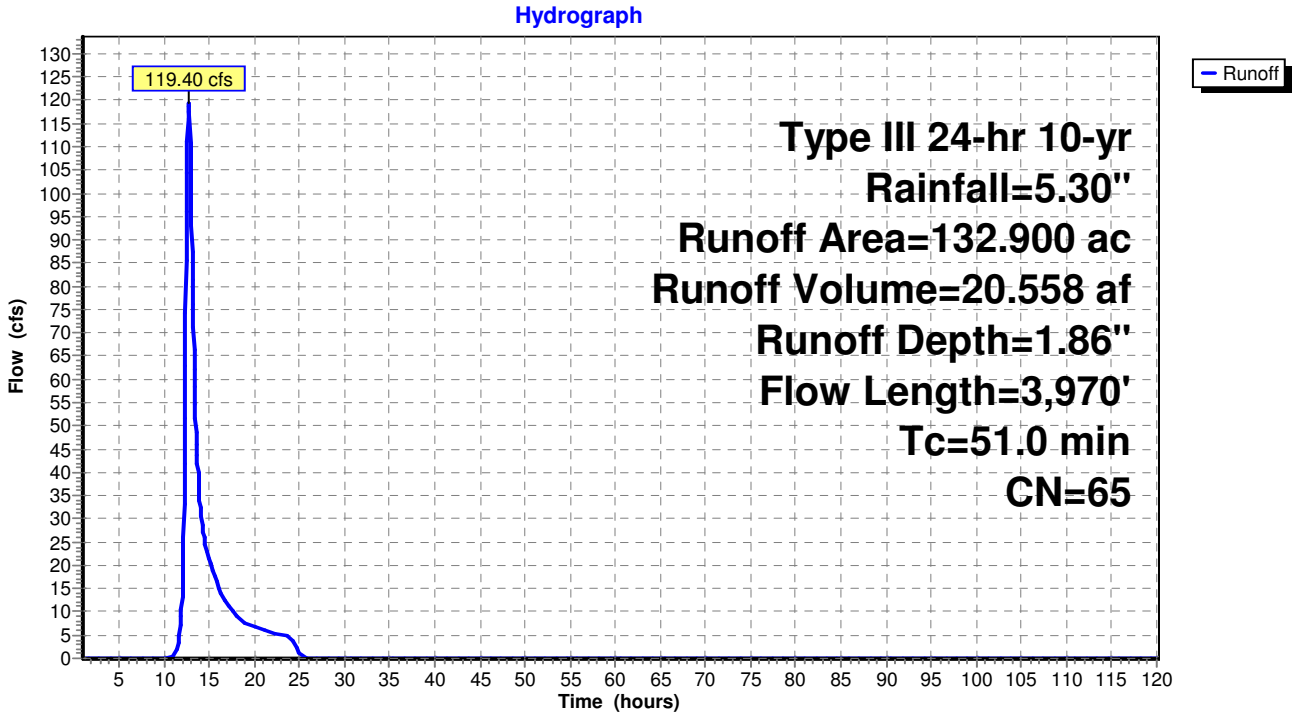
Runoff = 119.40 cfs @ 12.74 hrs, Volume= 20.558 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-120.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
32.000	68	1 acre lots, 20% imp, HSG B
53.000	58	Woods/grass comb., Good, HSG B
7.000	61	>75% Grass cover, Good, HSG B
21.000	92	Urban commercial, 85% imp, HSG B
19.900	55	Woods, Good, HSG B
132.900	65	Weighted Average
108.650		Pervious Area
24.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 1S:

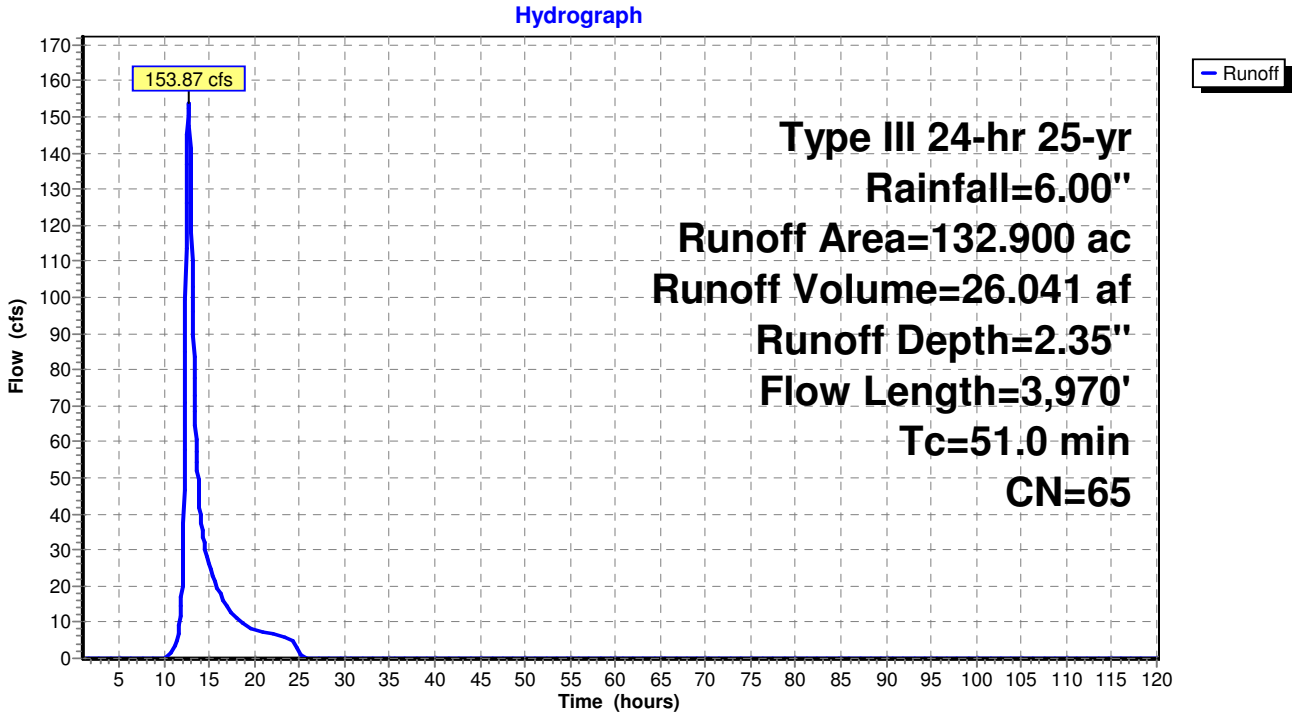
Runoff = 153.87 cfs @ 12.73 hrs, Volume= 26.041 af, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-120.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
32.000	68	1 acre lots, 20% imp, HSG B
53.000	58	Woods/grass comb., Good, HSG B
7.000	61	>75% Grass cover, Good, HSG B
21.000	92	Urban commercial, 85% imp, HSG B
19.900	55	Woods, Good, HSG B
132.900	65	Weighted Average
108.650		Pervious Area
24.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 1S:

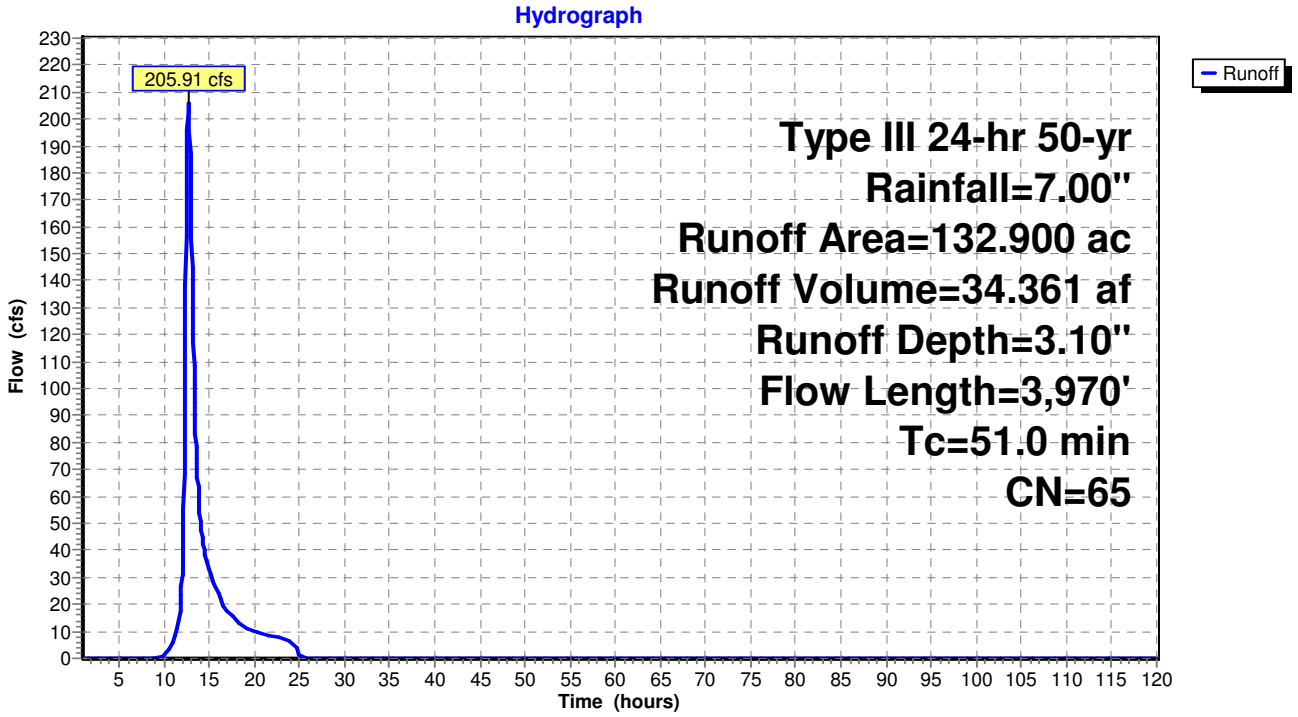
Runoff = 205.91 cfs @ 12.73 hrs, Volume= 34.361 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-120.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-yr Rainfall=7.00"

Area (ac)	CN	Description
32.000	68	1 acre lots, 20% imp, HSG B
53.000	58	Woods/grass comb., Good, HSG B
7.000	61	>75% Grass cover, Good, HSG B
21.000	92	Urban commercial, 85% imp, HSG B
19.900	55	Woods, Good, HSG B
132.900	65	Weighted Average
108.650		Pervious Area
24.250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 1S:

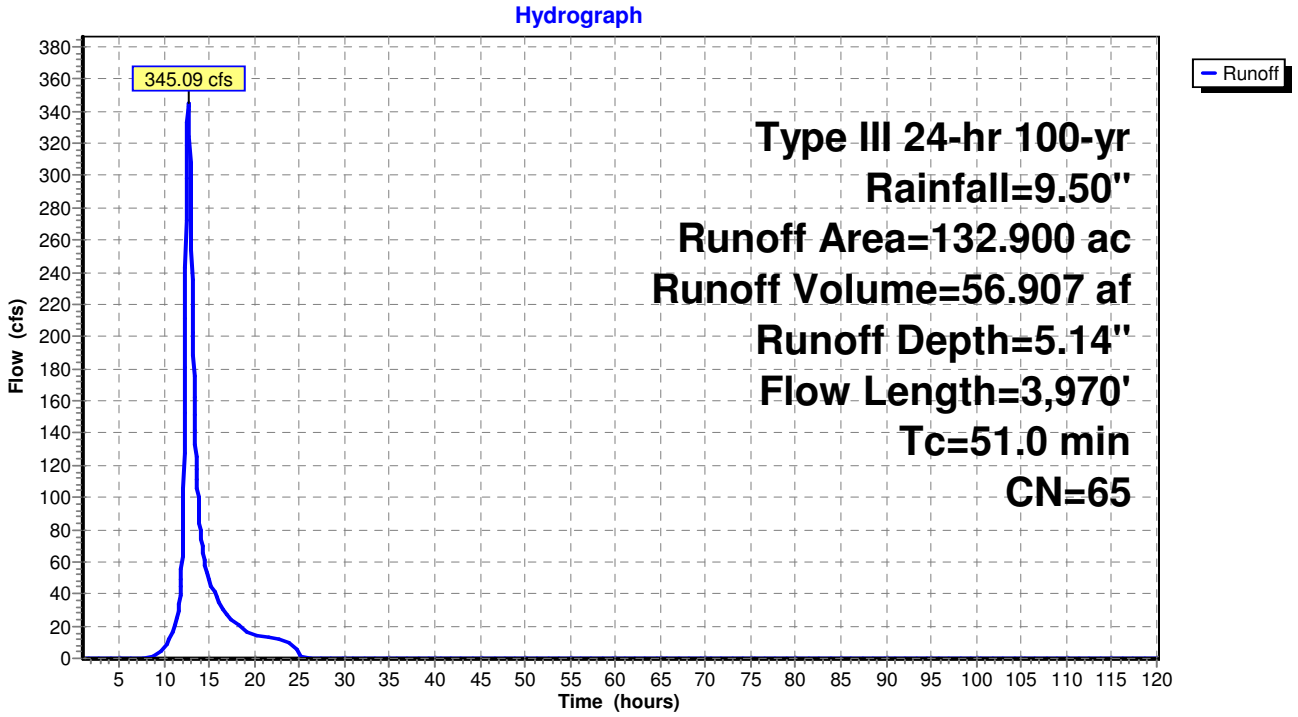
Runoff = 345.09 cfs @ 12.70 hrs, Volume= 56.907 af, Depth= 5.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-120.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
32.000	68	1 acre lots, 20% imp, HSG B
53.000	58	Woods/grass comb., Good, HSG B
7.000	61	>75% Grass cover, Good, HSG B
21.000	92	Urban commercial, 85% imp, HSG B
19.900	55	Woods, Good, HSG B
132.900	65	Weighted Average
108.650		Pervious Area
24.250		Impervious Area

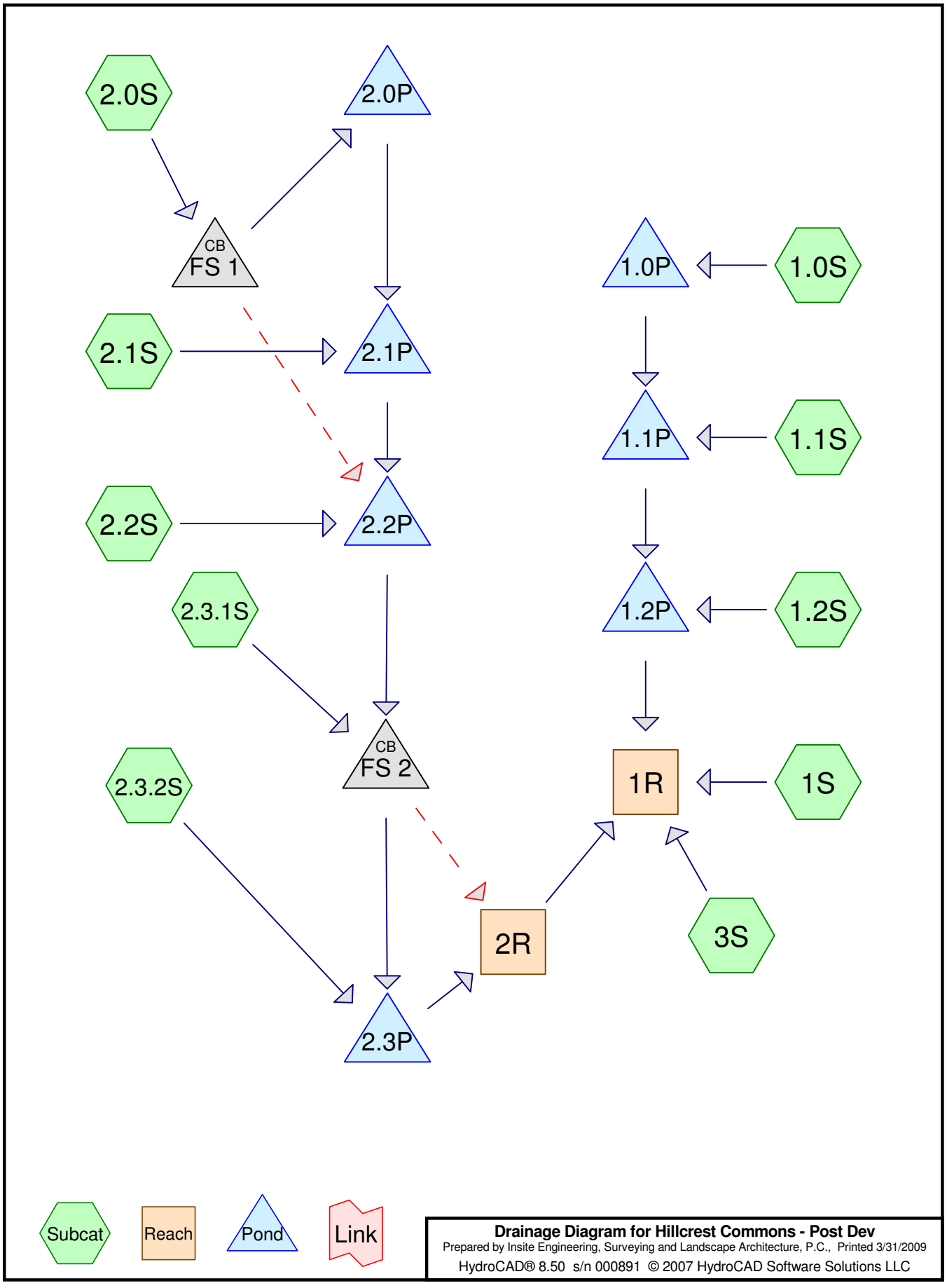
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



APPENDIX B

Post-Development Computer Data



Drainage Diagram for Hillcrest Commons - Post Dev

Prepared by Insite Engineering, Surveying and Landscape Architecture, P.C., Printed 3/31/2009

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
16.000	55	Woods, Good, HSG B (1S)
43.000	58	Woods/grass comb., Good, HSG B (1S)
15.600	60	Woods, Fair, HSG B (1.0S,1.2S,2.0S,2.1S,2.3.2S,3S)
18.100	61	>75% Grass cover, Good, HSG B (1.0S,1.1S,1.2S,1S,2.0S,2.1S,2.2S,2.3.1S,3S)
30.000	68	1 acre lots, 20% imp, HSG B (1S)
0.400	74	>75% Grass cover, Good, HSG C (2.3.2S)
0.100	80	>75% Grass cover, Good, HSG D (2.3.2S)
19.900	92	Urban commercial, 85% imp, HSG B (1S)
8.100	98	Paved parking & roofs (1.0S,2.0S,2.3.1S,2.3.2S,3S)
151.200		**TOTAL AREA**

Summary for Subcatchment 1.0S:

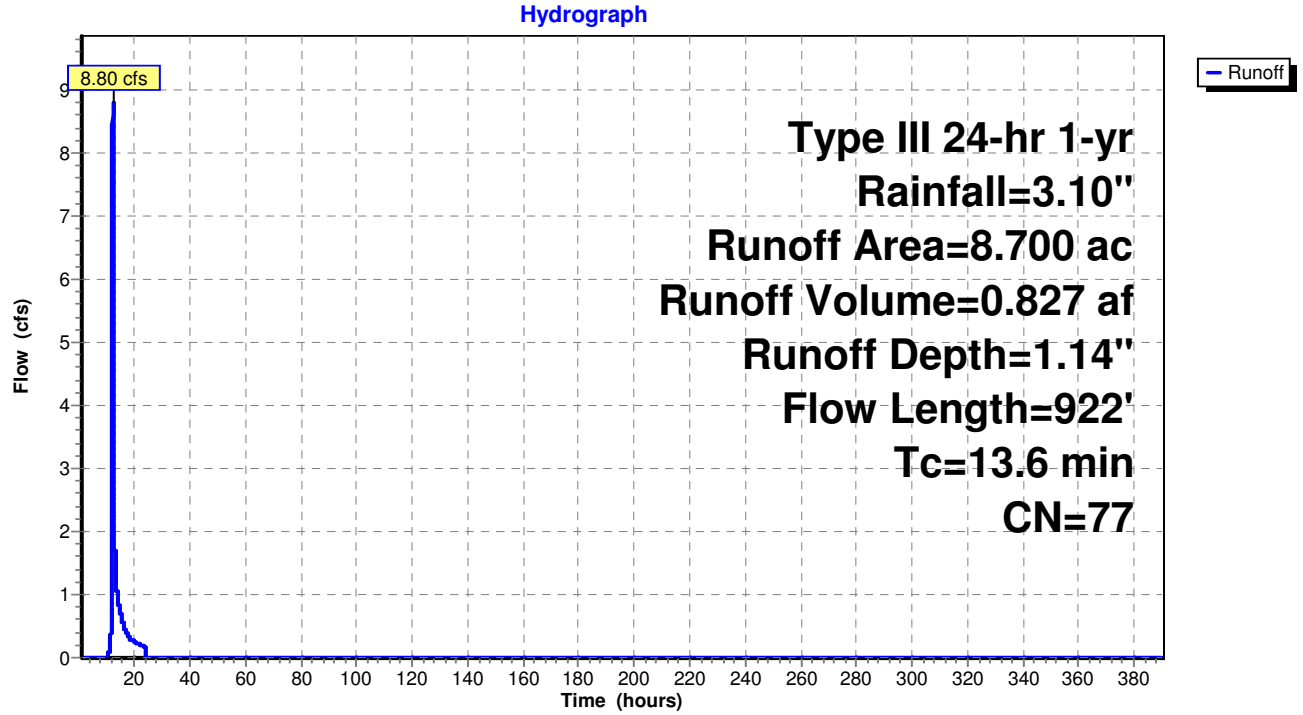
Runoff = 8.80 cfs @ 12.20 hrs, Volume= 0.827 af, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
3.800	98	Paved parking & roofs
1.100	60	Woods, Fair, HSG B
3.800	61	>75% Grass cover, Good, HSG B
8.700	77	Weighted Average
4.900		Pervious Area
3.800		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	221	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	601	0.0900	17.83	31.51	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.6	922	Total			

Subcatchment 1.0S:



Summary for Subcatchment 1.1S:

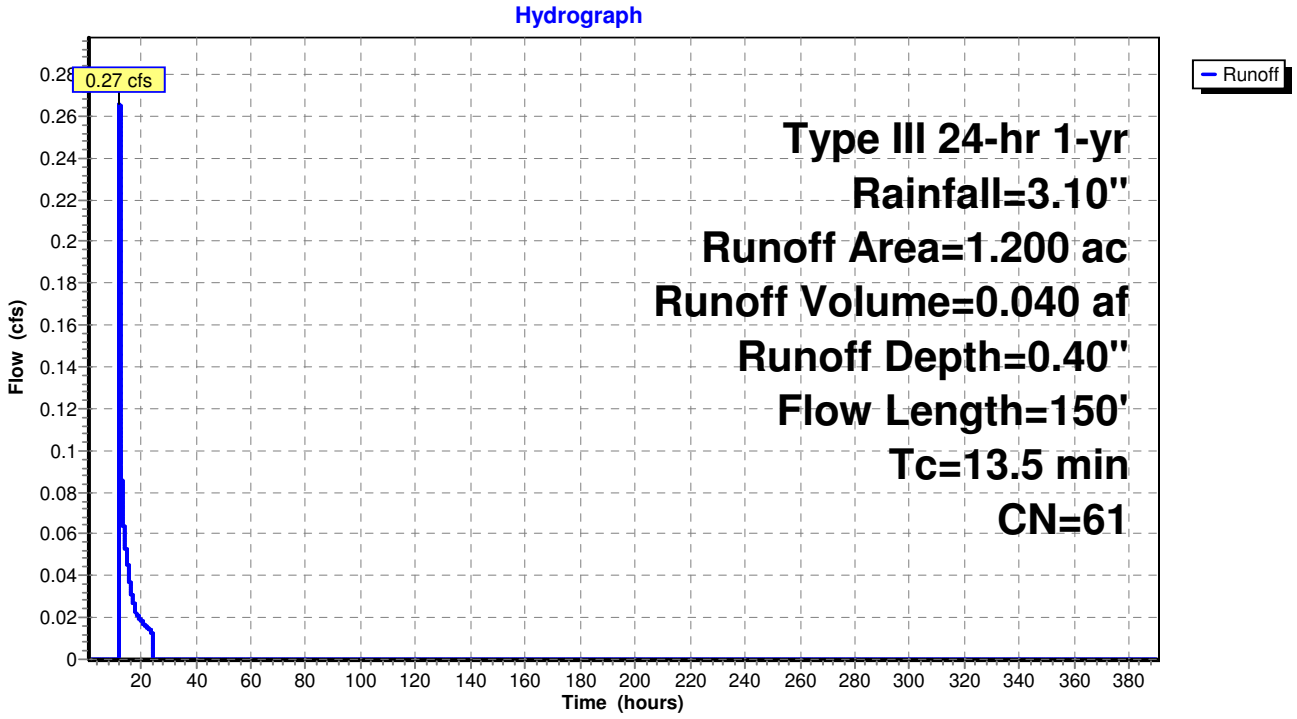
Runoff = 0.27 cfs @ 12.28 hrs, Volume= 0.040 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
1.200	61	>75% Grass cover, Good, HSG B
1.200		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	50	0.1600	2.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	150	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

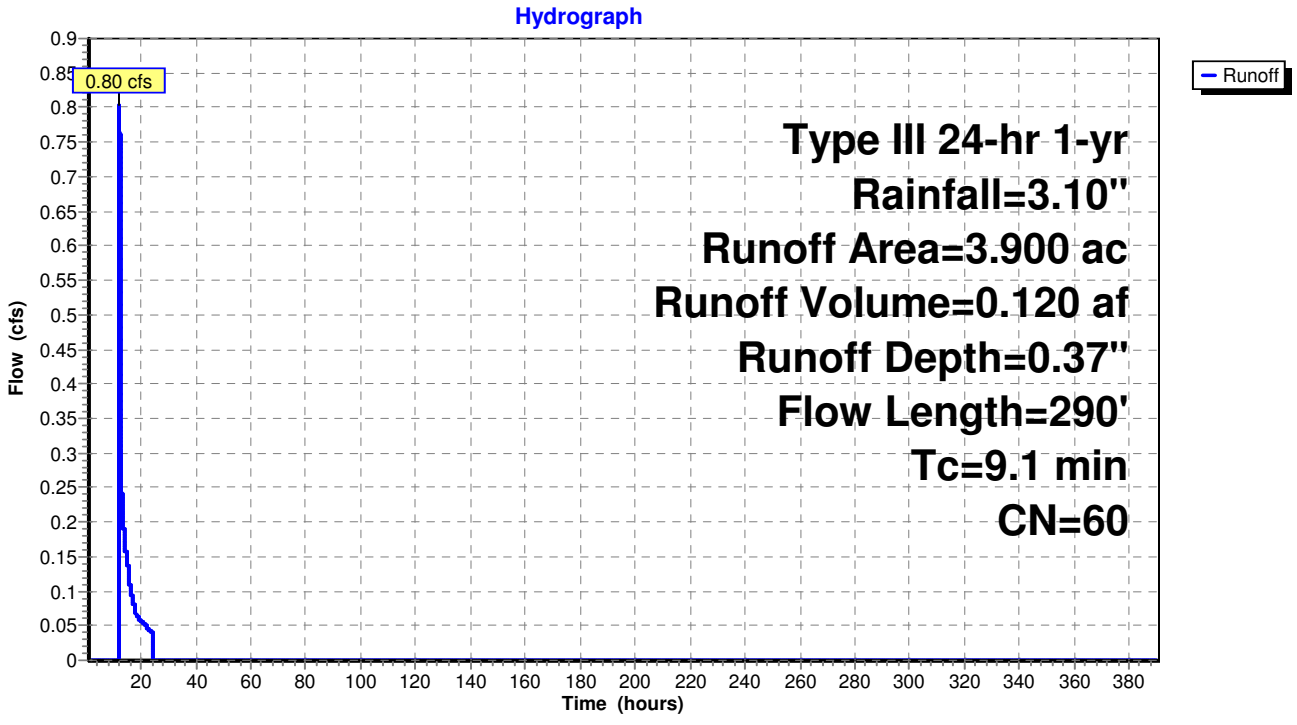
Runoff = 0.80 cfs @ 12.19 hrs, Volume= 0.120 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
2.400	60	Woods, Fair, HSG B
1.500	61	>75% Grass cover, Good, HSG B
3.900	60	Weighted Average
3.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.1140	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	170	0.2350	2.42		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.4800	4.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	290	Total			

Subcatchment 1.2S:



Summary for Subcatchment 1S:

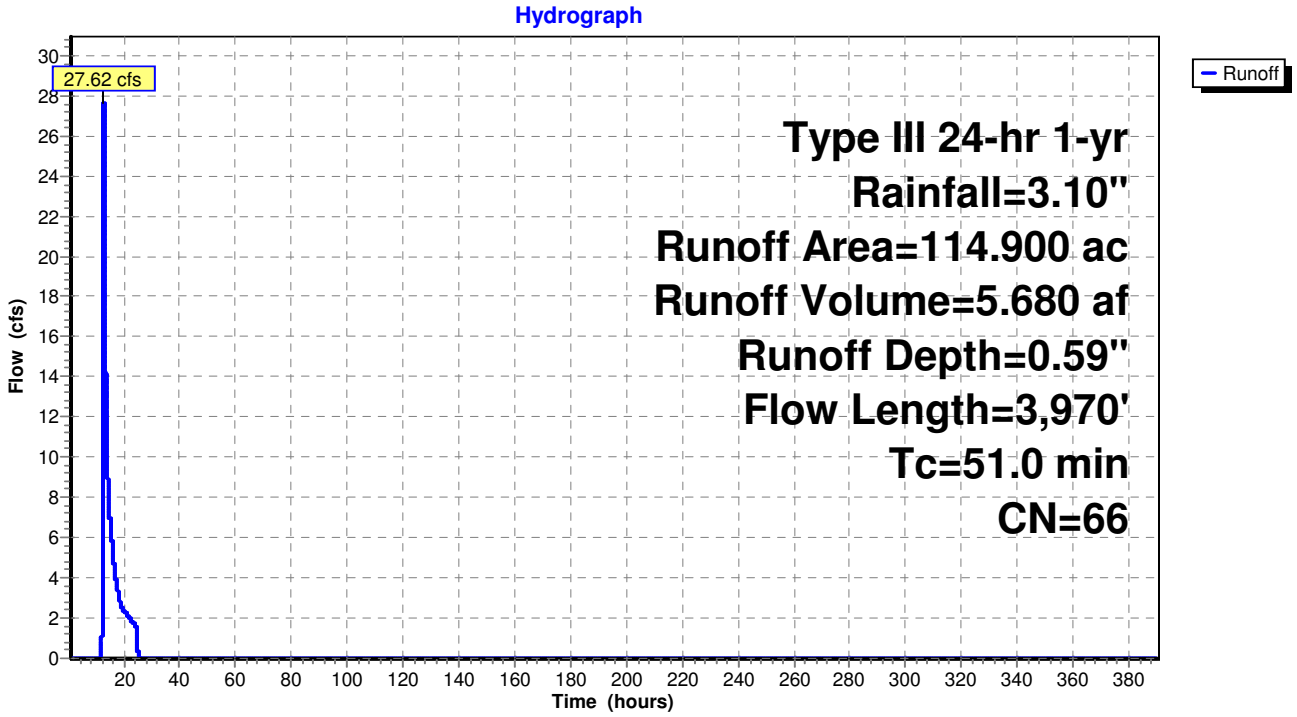
Runoff = 27.62 cfs @ 12.81 hrs, Volume= 5.680 af, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

	Area (ac)	CN	Description
*	30.000	68	1 acre lots, 20% imp, HSG B
*	43.000	58	Woods/grass comb., Good, HSG B
*	6.000	61	>75% Grass cover, Good, HSG B
*	19.900	92	Urban commercial, 85% imp, HSG B
*	16.000	55	Woods, Good, HSG B
	114.900	66	Weighted Average
	91.985		Pervious Area
	22.915		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 2.0S:

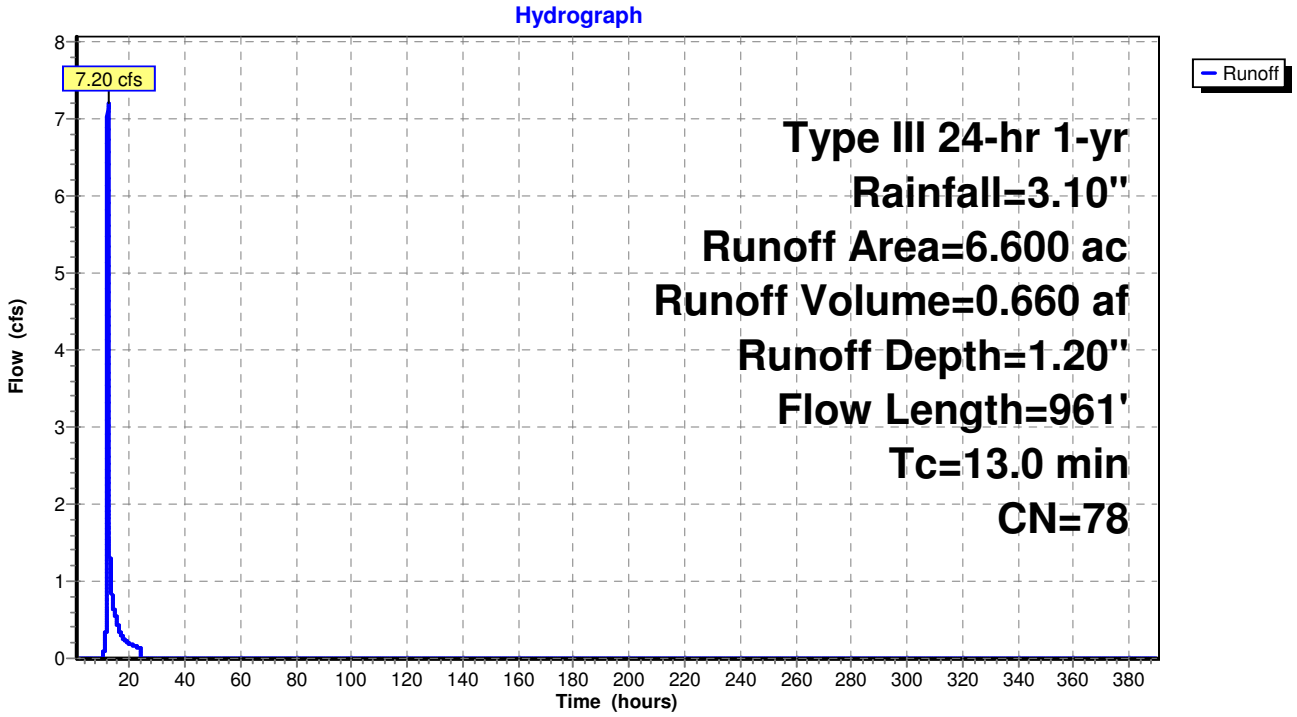
Runoff = 7.20 cfs @ 12.18 hrs, Volume= 0.660 af, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
3.100	98	Paved parking & roofs
1.300	60	Woods, Fair, HSG B
2.200	61	>75% Grass cover, Good, HSG B
6.600	78	Weighted Average
3.500		Pervious Area
3.100		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	16	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	220	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	550	0.1000	18.80	33.22	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.0	961	Total			

Subcatchment 2.0S:



Summary for Subcatchment 2.1S:

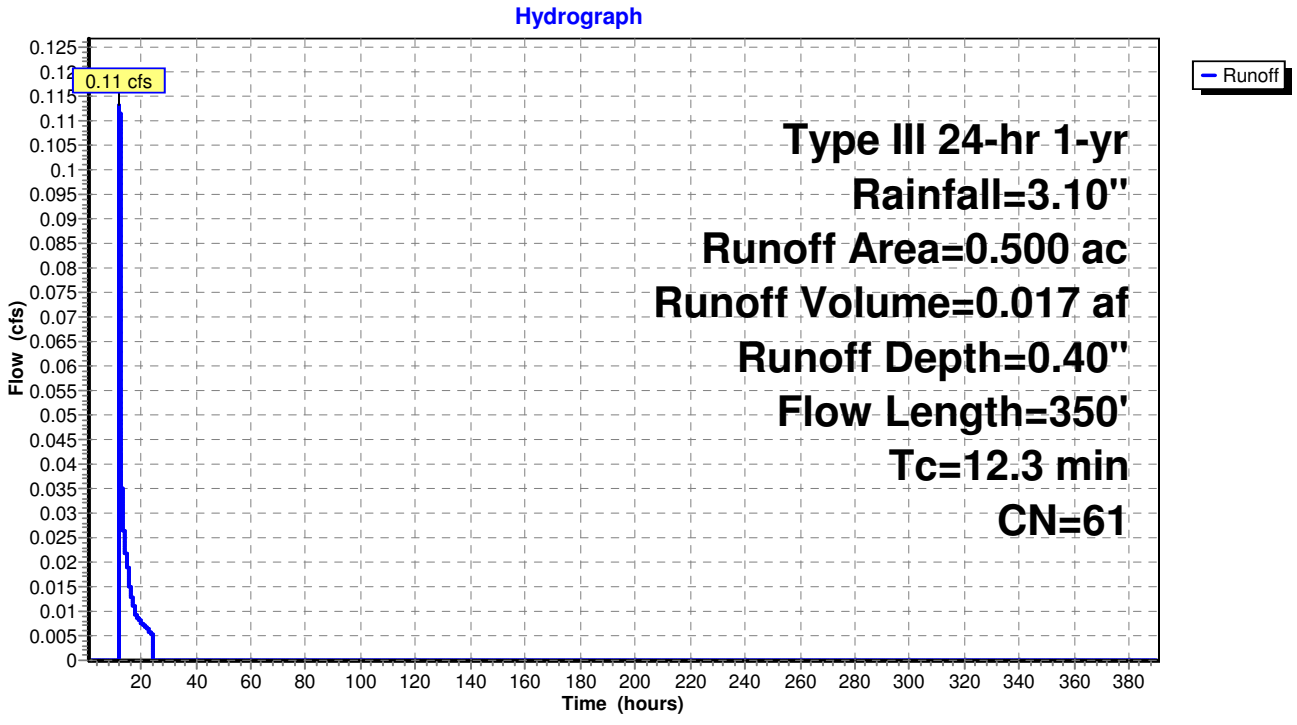
Runoff = 0.11 cfs @ 12.25 hrs, Volume= 0.017 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
0.200	60	Woods, Fair, HSG B
0.300	61	>75% Grass cover, Good, HSG B
0.500	61	Weighted Average
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.7	200	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.3600	4.20		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.3	350	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

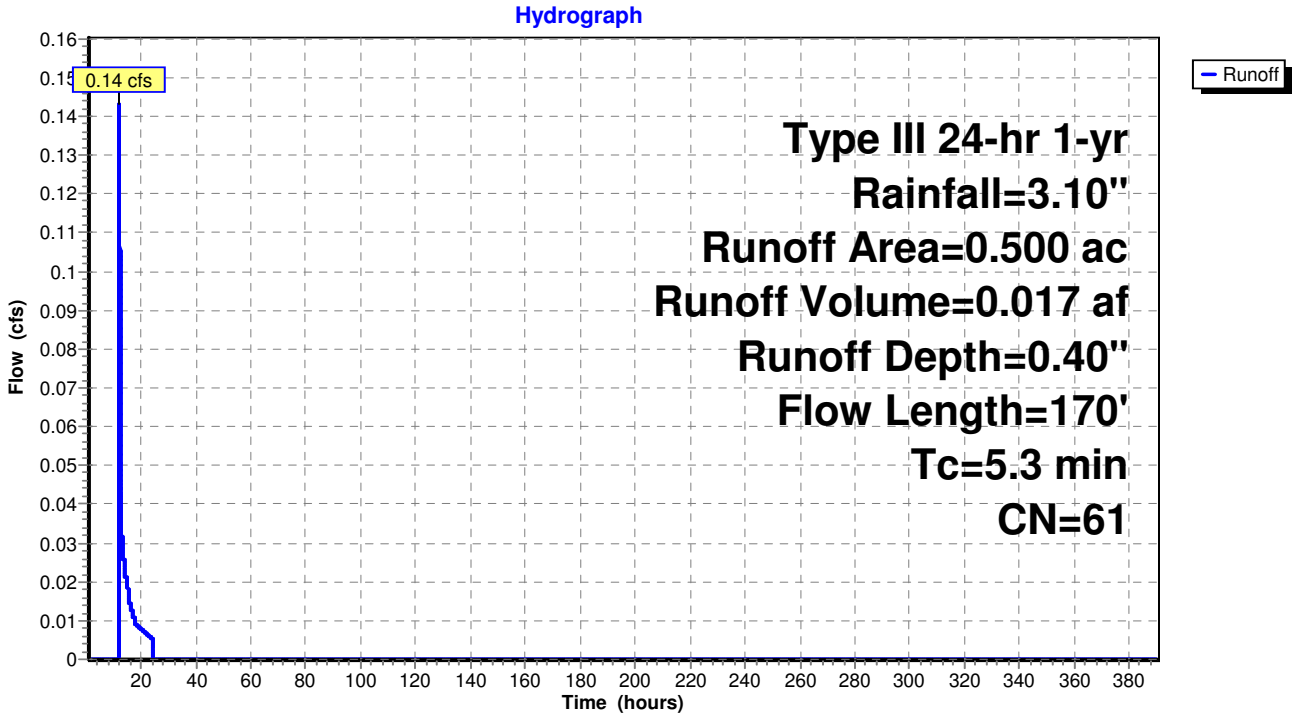
Runoff = 0.14 cfs @ 12.12 hrs, Volume= 0.017 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.1200	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0570	1.67		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.3	170	Total			

Subcatchment 2.2S:



Summary for Subcatchment 2.3.1S:

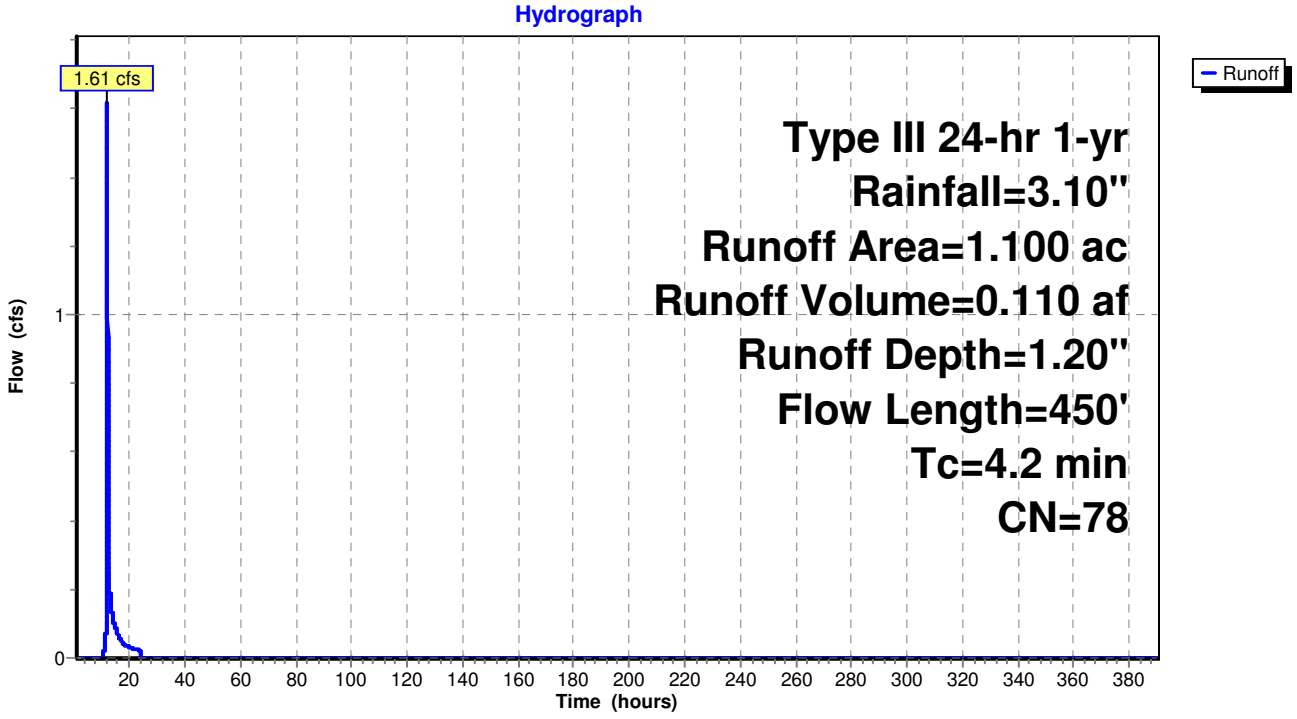
Runoff = 1.61 cfs @ 12.07 hrs, Volume= 0.110 af, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
0.500	98	Paved parking & roofs
0.600	61	>75% Grass cover, Good, HSG B
1.100	78	Weighted Average
0.600		Pervious Area
0.500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2200	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.5	115	0.3000	3.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	235	0.2000	26.58	46.98	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
4.2	450	Total			

Subcatchment 2.3.1S:



Summary for Subcatchment 2.3.2S:

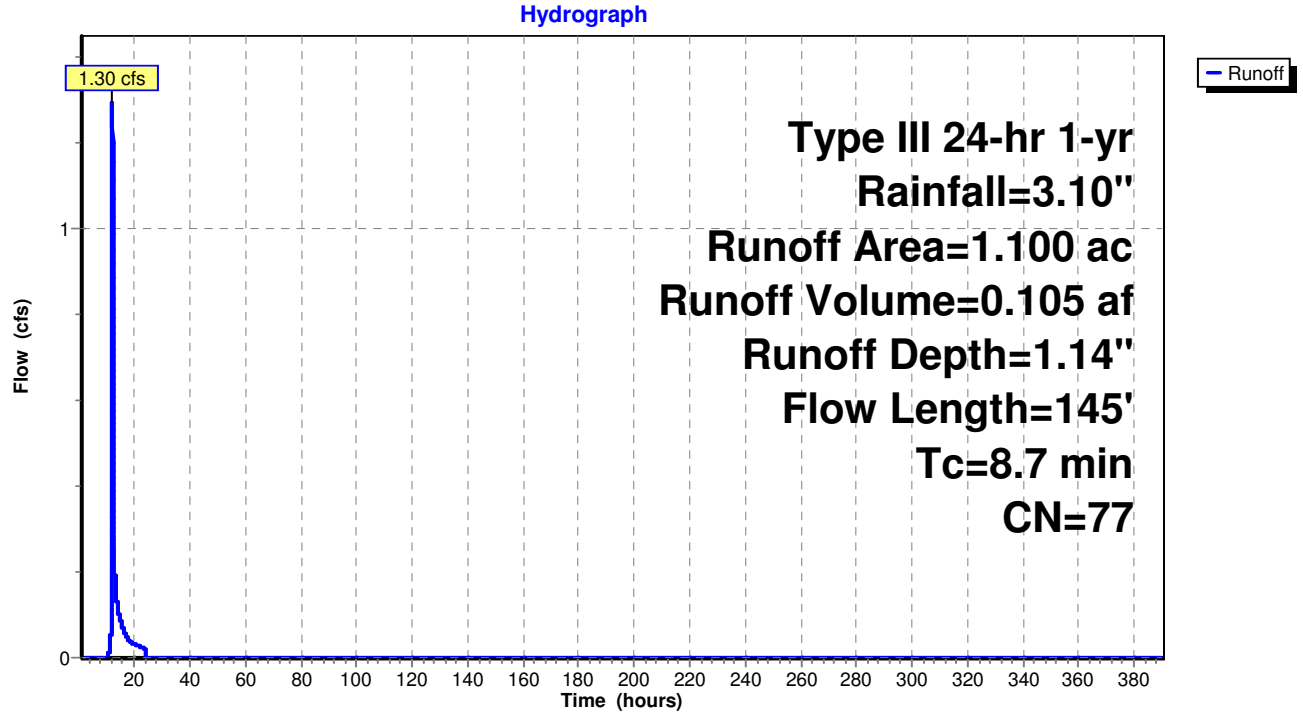
Runoff = 1.30 cfs @ 12.13 hrs, Volume= 0.105 af, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.300	60	Woods, Fair, HSG B
0.400	74	>75% Grass cover, Good, HSG C
0.100	80	>75% Grass cover, Good, HSG D
1.100	77	Weighted Average
0.800		Pervious Area
0.300		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.2000	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	45	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	145	Total			

Subcatchment 2.3.2S:



Summary for Subcatchment 3S:

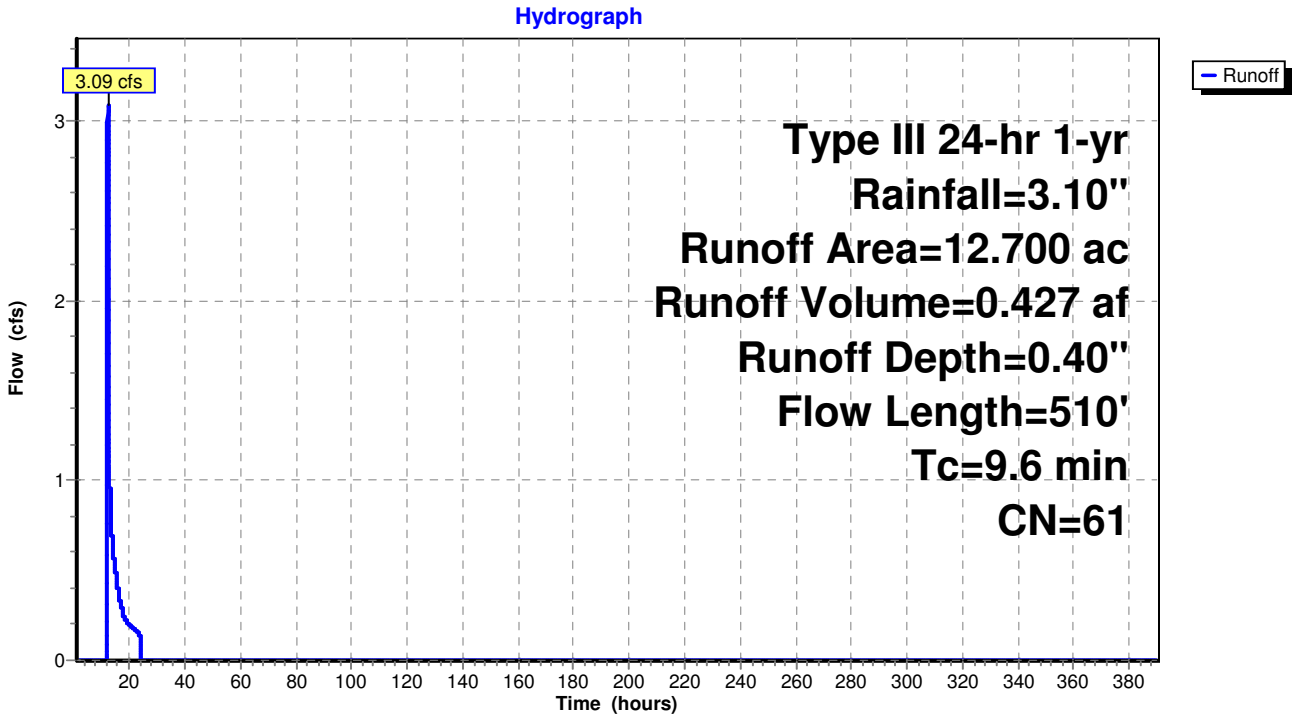
Runoff = 3.09 cfs @ 12.19 hrs, Volume= 0.427 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=3.10"

Area (ac)	CN	Description
0.400	98	Paved parking & roofs
10.300	60	Woods, Fair, HSG B
2.000	61	>75% Grass cover, Good, HSG B
12.700	61	Weighted Average
12.300		Pervious Area
0.400		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.2800	0.23		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	410	0.2930	2.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.6	510	Total			

Subcatchment 3S:

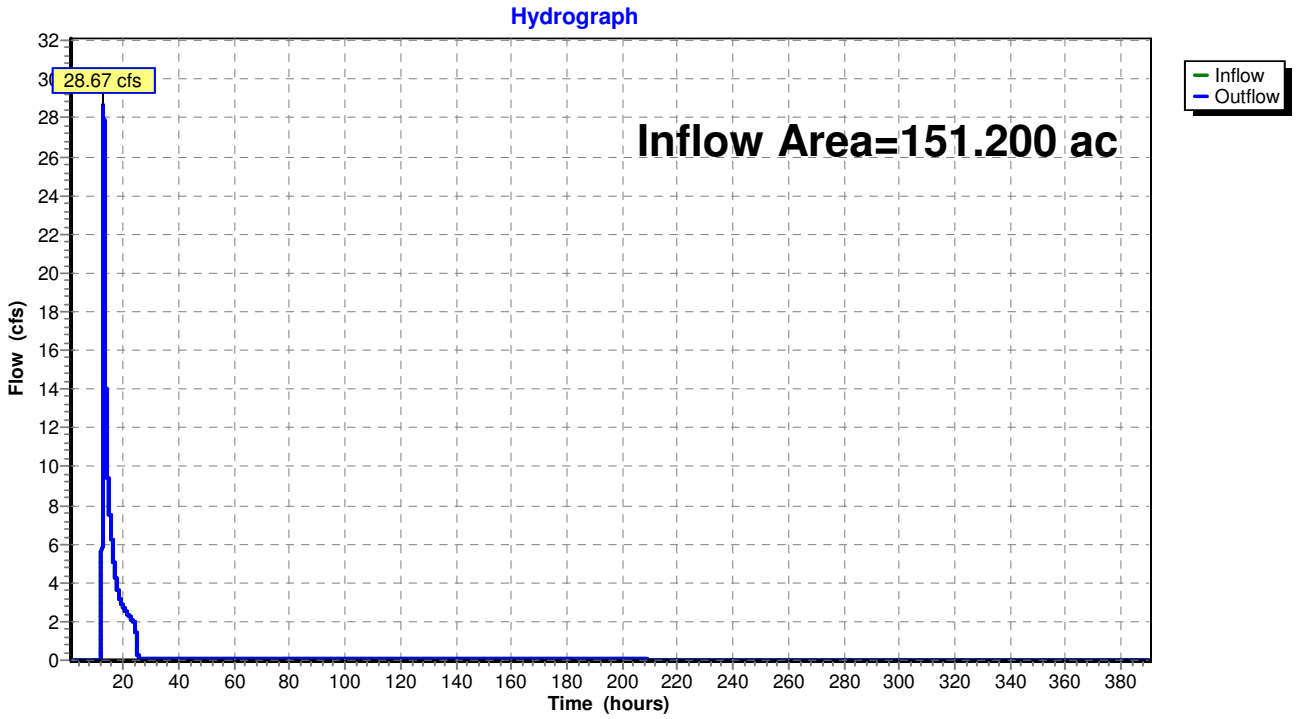


Summary for Reach 1R:

Inflow Area = 151.200 ac, 20.51% Impervious, Inflow Depth = 0.63" for 1-yr event
Inflow = 28.67 cfs @ 12.81 hrs, Volume= 7.991 af
Outflow = 28.67 cfs @ 12.81 hrs, Volume= 7.991 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 1R:

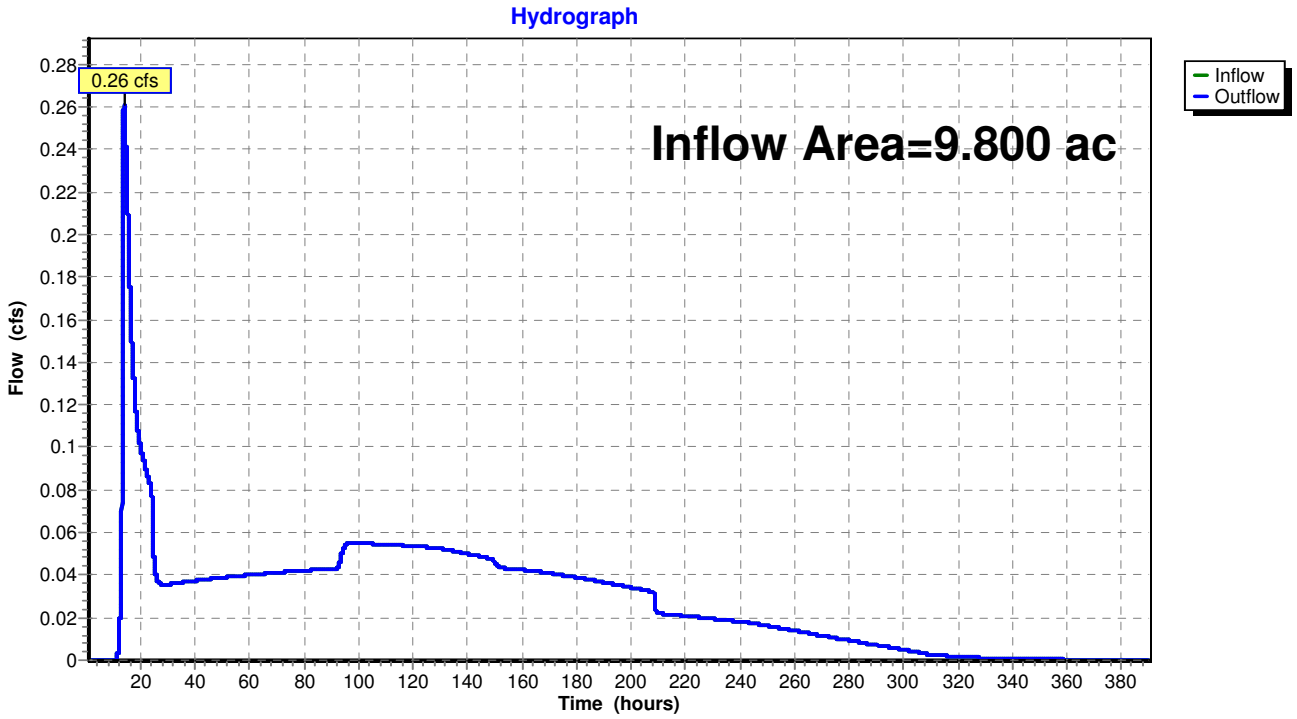


Summary for Reach 2R:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth > 1.11" for 1-yr event
Inflow = 0.26 cfs @ 13.97 hrs, Volume= 0.907 af
Outflow = 0.26 cfs @ 13.97 hrs, Volume= 0.907 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 2R:



Summary for Pond 1.0P:

Inflow Area = 8.700 ac, 43.68% Impervious, Inflow Depth = 1.14" for 1-yr event
Inflow = 8.80 cfs @ 12.20 hrs, Volume= 0.827 af
Outflow = 0.45 cfs @ 16.40 hrs, Volume= 0.825 af, Atten= 95%, Lag= 252.0 min
Primary = 0.45 cfs @ 16.40 hrs, Volume= 0.825 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 674.00' Surf.Area= 14,391 sf Storage= 31,719 cf
Peak Elev= 675.33' @ 16.40 hrs Surf.Area= 17,478 sf Storage= 53,945 cf (22,226 cf above start)
Flood Elev= 677.00' Surf.Area= 22,107 sf Storage= 87,251 cf (55,532 cf above start)

Plug-Flow detention time= 2,942.4 min calculated for 0.097 af (12% of inflow)
Center-of-Mass det. time= 790.3 min (1,651.5 - 861.2)

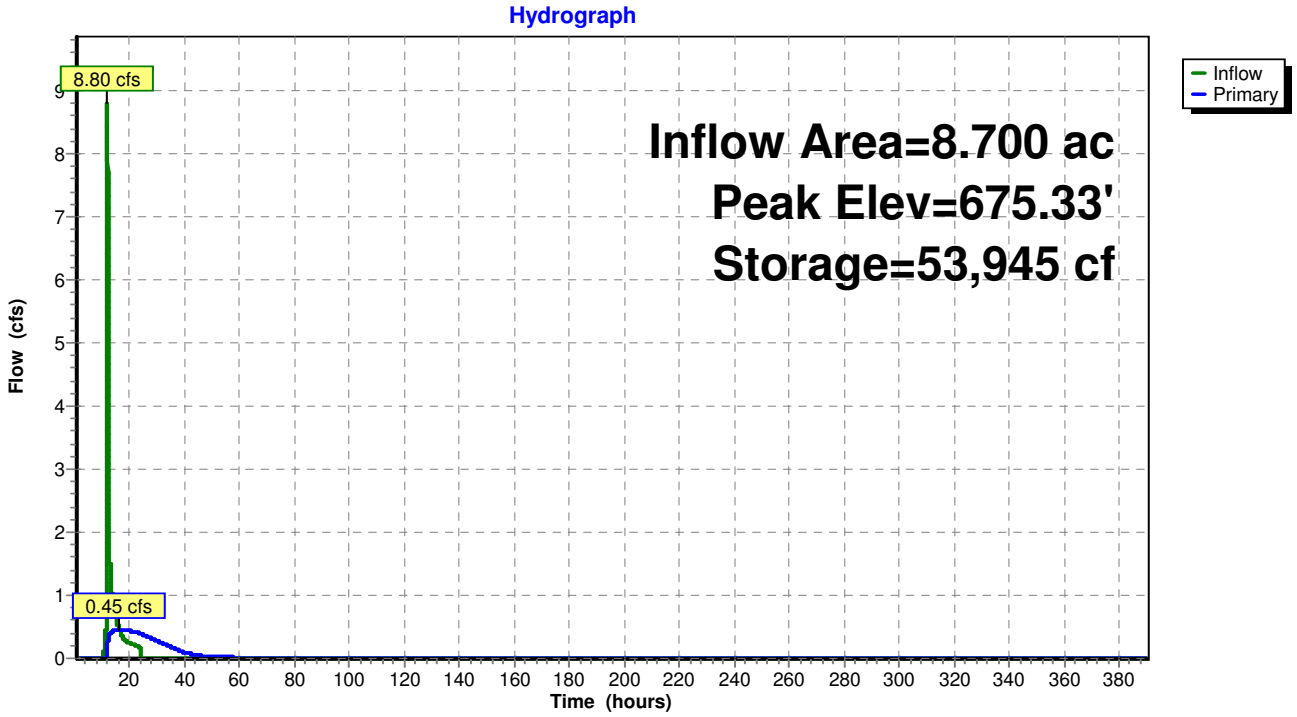
Volume	Invert	Avail.Storage	Storage Description
#1	670.00'	109,358 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
670.00	3,990	0	0
672.00	6,669	10,659	10,659
674.00	14,391	21,060	31,719
676.00	19,034	33,425	65,144
678.00	25,180	44,214	109,358

Device	Routing	Invert	Outlet Devices
#1	Primary	674.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	675.50'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.45 cfs @ 16.40 hrs HW=675.33' TW=665.33' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.45 cfs @ 5.19 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.0P:


Hydrograph
Inflow Area=8.700 ac
Peak Elev=675.33'
Storage=53,945 cf
8.80 cfs
0.45 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 1.1P:

Inflow Area = 9.900 ac, 38.38% Impervious, Inflow Depth > 1.05" for 1-yr event
Inflow = 0.57 cfs @ 12.44 hrs, Volume= 0.866 af
Outflow = 0.29 cfs @ 29.70 hrs, Volume= 0.865 af, Atten= 49%, Lag= 1,036.1 min
Primary = 0.29 cfs @ 29.70 hrs, Volume= 0.865 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 667.26' @ 29.70 hrs Surf.Area= 8,809 sf Storage= 21,147 cf
Flood Elev= 669.00' Surf.Area= 11,900 sf Storage= 39,300 cf

Plug-Flow detention time= 2,135.5 min calculated for 0.865 af (100% of inflow)
Center-of-Mass det. time= 2,115.6 min (3,733.3 - 1,617.7)

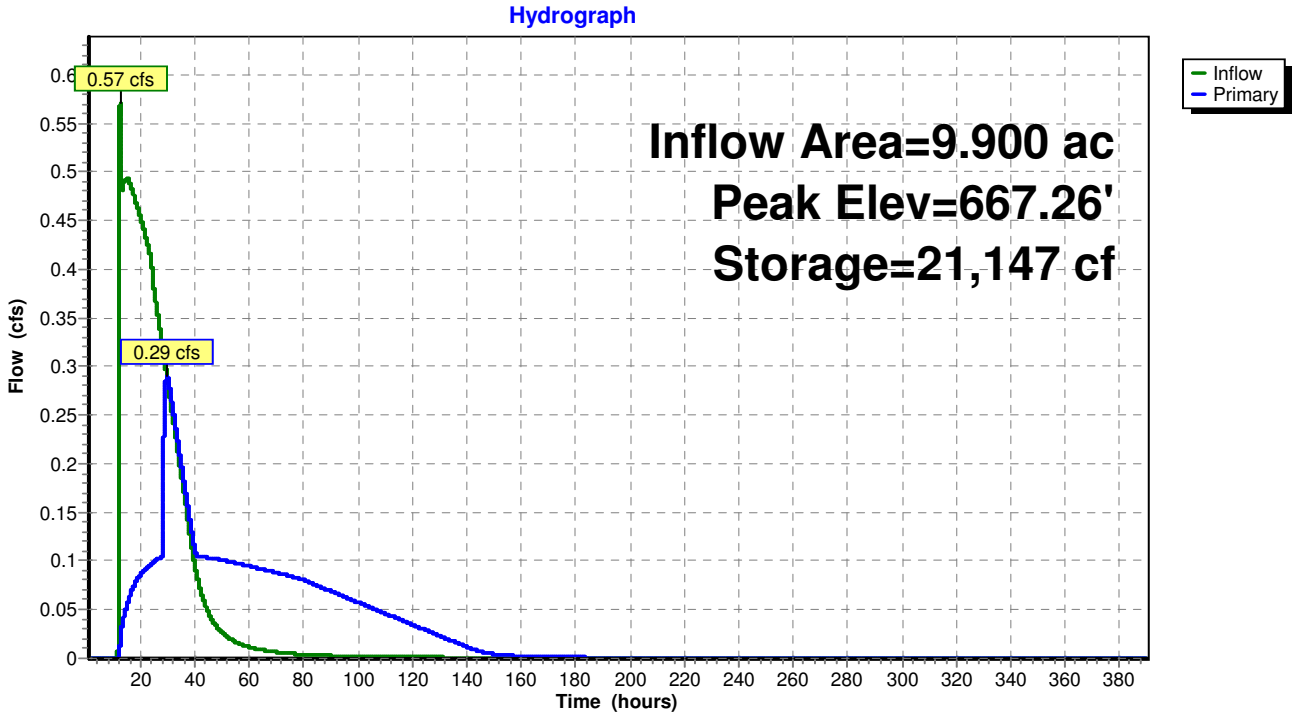
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	51,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	3,800	0	0
666.00	6,800	10,600	10,600
668.00	10,000	16,800	27,400
670.00	13,800	23,800	51,200

Device	Routing	Invert	Outlet Devices
#1	Primary	664.00'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	667.20'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.29 cfs @ 29.70 hrs HW=667.26' TW=636.45' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.11 cfs @ 8.60 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 0.18 cfs @ 0.66 fps)

Pond 1.1P:


Hydrograph
Inflow Area=9.900 ac
Peak Elev=667.26'
Storage=21,147 cf
0.57 cfs
0.29 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 1.2P:

Inflow Area = 13.800 ac, 27.54% Impervious, Inflow Depth > 0.86" for 1-yr event
Inflow = 0.81 cfs @ 12.20 hrs, Volume= 0.985 af
Outflow = 0.08 cfs @ 83.85 hrs, Volume= 0.977 af, Atten= 91%, Lag= 4,299.4 min
Primary = 0.08 cfs @ 83.85 hrs, Volume= 0.977 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 636.87' @ 83.85 hrs Surf.Area= 19,481 sf Storage= 17,162 cf
Flood Elev= 641.00' Surf.Area= 27,600 sf Storage= 113,600 cf

Plug-Flow detention time= 3,236.1 min calculated for 0.977 af (99% of inflow)
Center-of-Mass det. time= 3,156.3 min (6,547.0 - 3,390.6)

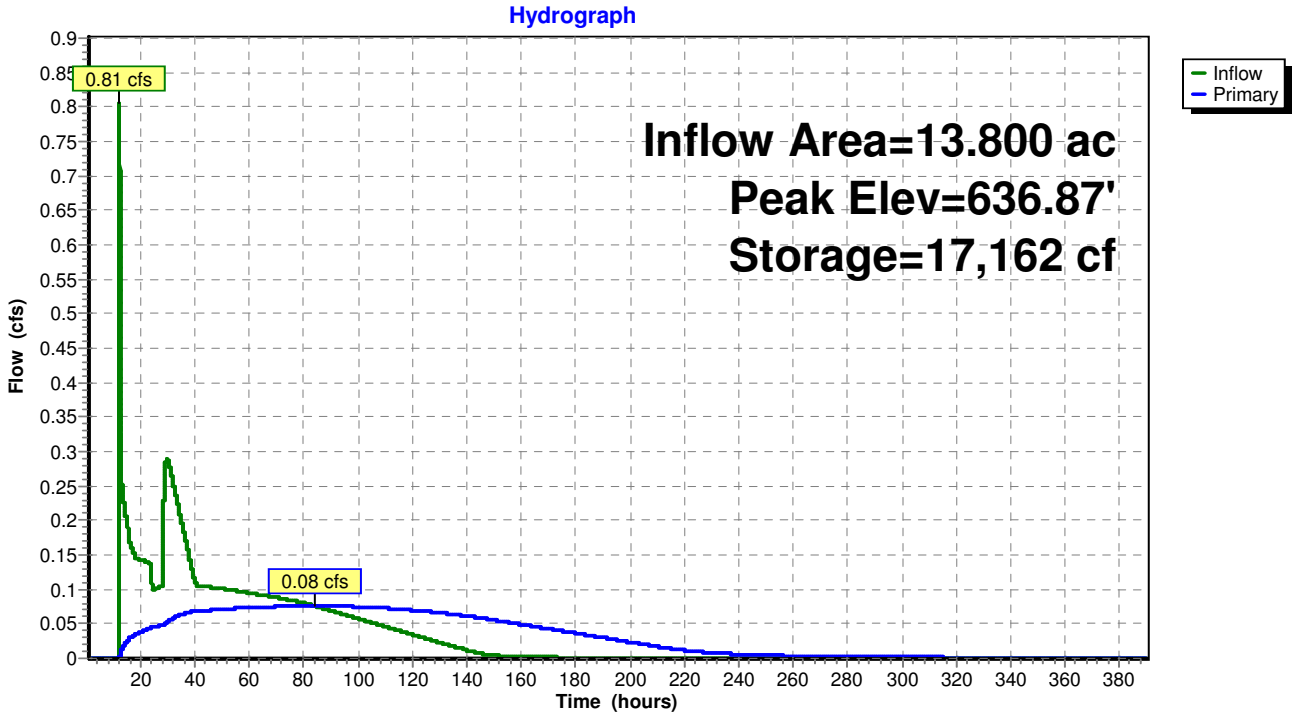
Volume	Invert	Avail.Storage	Storage Description
#1	636.00'	141,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
636.00	18,000	0	0
638.00	21,400	39,400	39,400
640.00	25,200	46,600	86,000
642.00	30,000	55,200	141,200

Device	Routing	Invert	Outlet Devices
#1	Primary	636.00'	**1.8" Vert. Orifice/Grate** C= 0.600
#2	Primary	640.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.08 cfs @ 83.85 hrs HW=636.87' TW=0.00' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.08 cfs @ 4.30 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.2P:


Hydrograph
Inflow Area=13.800 ac
Peak Elev=636.87'
Storage=17,162 cf
0.81 cfs
0.08 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
0.65
0.7
0.75
0.8
0.85
0.9
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.0P:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 1.20" for 1-yr event
Inflow = 7.20 cfs @ 12.18 hrs, Volume= 0.660 af
Outflow = 0.49 cfs @ 15.40 hrs, Volume= 0.660 af, Atten= 93%, Lag= 193.1 min
Primary = 0.49 cfs @ 15.40 hrs, Volume= 0.660 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 668.15' @ 15.40 hrs Surf.Area= 7,071 sf Storage= 19,222 cf
Flood Elev= 669.00' Surf.Area= 8,550 sf Storage= 26,450 cf

Plug-Flow detention time= 2,232.0 min calculated for 0.660 af (100% of inflow)
Center-of-Mass det. time= 2,232.2 min (3,089.7 - 857.4)

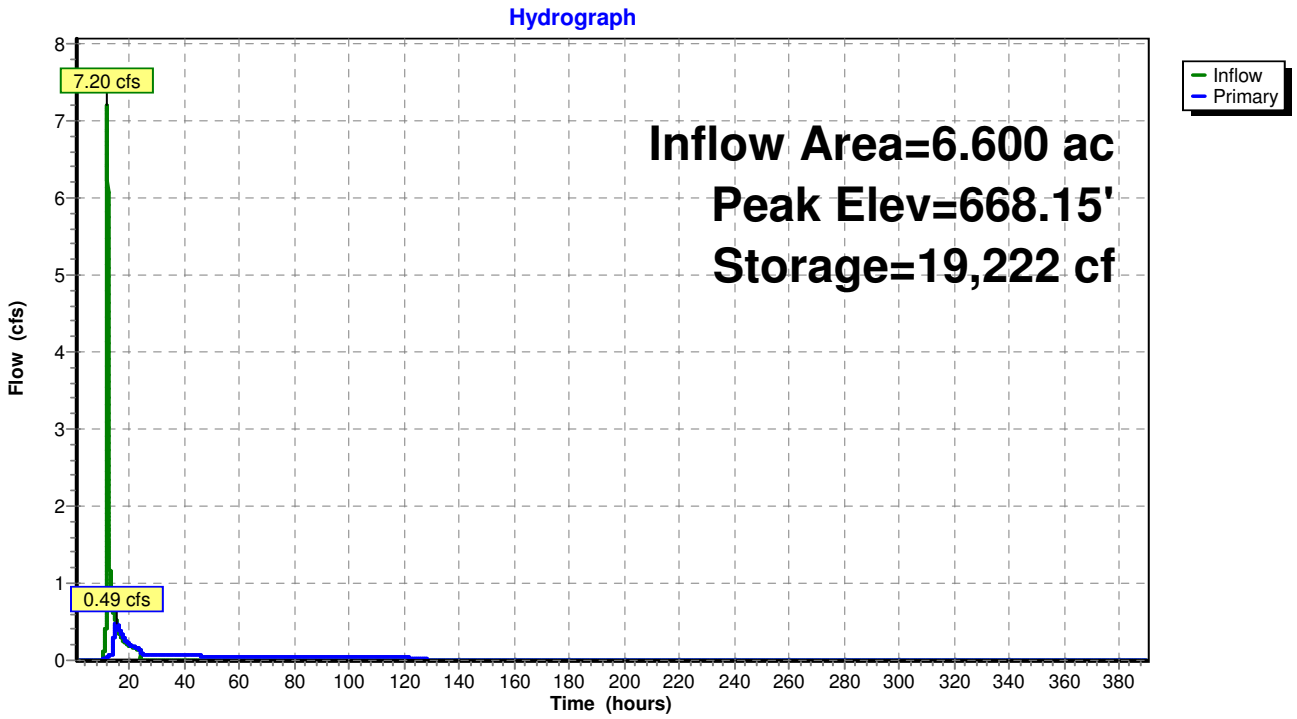
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	35,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	2,300	0	0
666.00	4,400	6,700	6,700
668.00	6,800	11,200	17,900
670.00	10,300	17,100	35,000

Device	Routing	Invert	Outlet Devices
#1	Primary	662.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	668.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	664.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=0.49 cfs @ 15.40 hrs HW=668.15' TW=660.55' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 11.41 fps)
  - **3=Orifice/Grate** (Passes 0.06 cfs of 2.14 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 1.10 fps)

Pond 2.0P:


Hydrograph
Inflow Area=6.600 ac
Peak Elev=668.15'
Storage=19,222 cf
7.20 cfs
0.49 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.1P:

Inflow Area = 7.100 ac, 43.66% Impervious, Inflow Depth = 1.14" for 1-yr event
Inflow = 0.51 cfs @ 15.38 hrs, Volume= 0.677 af
Outflow = 0.06 cfs @ 26.59 hrs, Volume= 0.677 af, Atten= 88%, Lag= 672.7 min
Primary = 0.06 cfs @ 26.59 hrs, Volume= 0.677 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 661.96' @ 26.59 hrs Surf.Area= 5,660 sf Storage= 9,213 cf
Flood Elev= 663.00' Surf.Area= 6,850 sf Storage= 16,250 cf

Plug-Flow detention time= 2,106.2 min calculated for 0.677 af (100% of inflow)
Center-of-Mass det. time= 2,106.3 min (5,142.1 - 3,035.9)

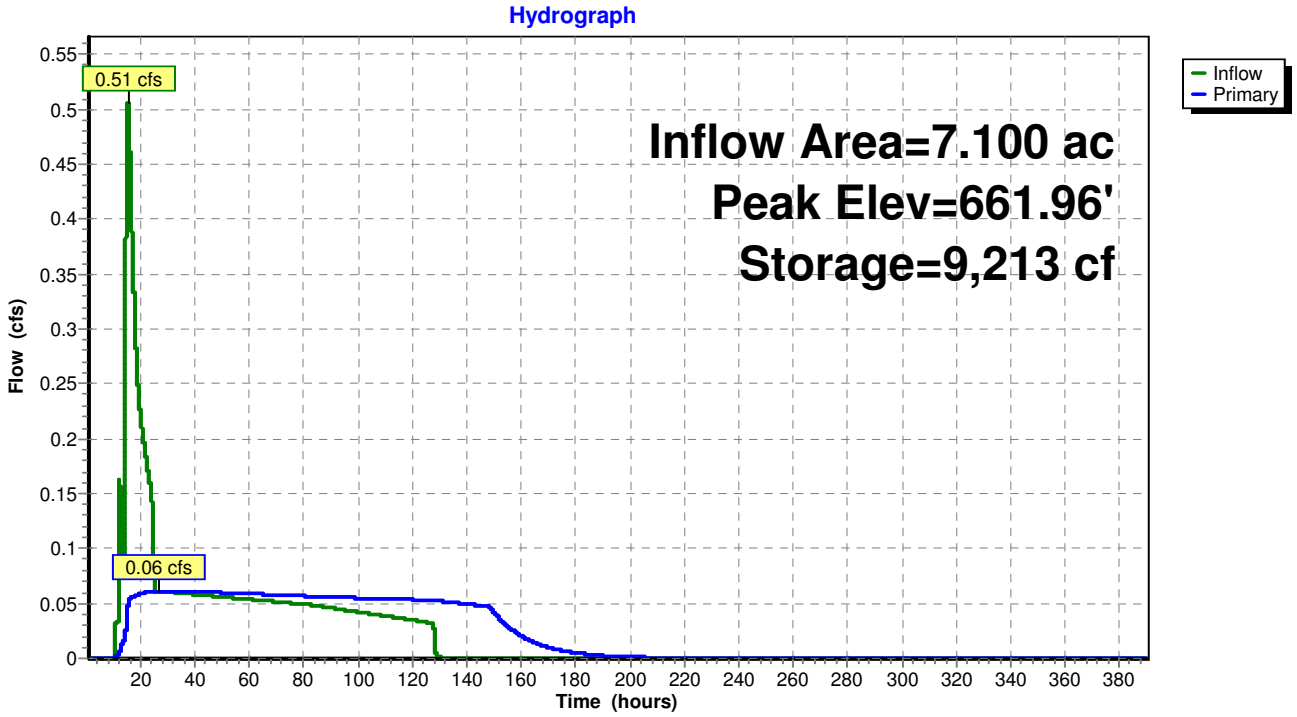
Volume	Invert	Avail.Storage	Storage Description
#1	660.00'	23,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
660.00	3,700	0	0
662.00	5,700	9,400	9,400
664.00	8,000	13,700	23,100

Device	Routing	Invert	Outlet Devices
#1	Primary	656.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	662.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	660.00'	**4.000 in/hr Exfiltration over Surface area above invert** Excluded Surface area = 3,700 sf

Primary OutFlow Max=0.06 cfs @ 26.59 hrs HW=661.96' TW=656.33' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 11.21 fps)
  - **3=Exfiltration** (Passes 0.06 cfs of 0.18 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2.1P:


Hydrograph
Inflow Area=7.100 ac
Peak Elev=661.96'
Storage=9,213 cf
0.51 cfs
0.06 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.2P:

Inflow Area = 7.600 ac, 40.79% Impervious, Inflow Depth = 1.10" for 1-yr event
Inflow = 0.15 cfs @ 12.12 hrs, Volume= 0.694 af
Outflow = 0.06 cfs @ 96.57 hrs, Volume= 0.694 af, Atten= 62%, Lag= 5,067.4 min
Primary = 0.06 cfs @ 96.57 hrs, Volume= 0.694 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 657.26' @ 96.57 hrs Surf.Area= 5,148 sf Storage= 6,106 cf
Flood Elev= 659.00' Surf.Area= 8,000 sf Storage= 17,700 cf

Plug-Flow detention time= 1,655.7 min calculated for 0.694 af (100% of inflow)
Center-of-Mass det. time= 1,655.6 min (6,695.3 - 5,039.7)

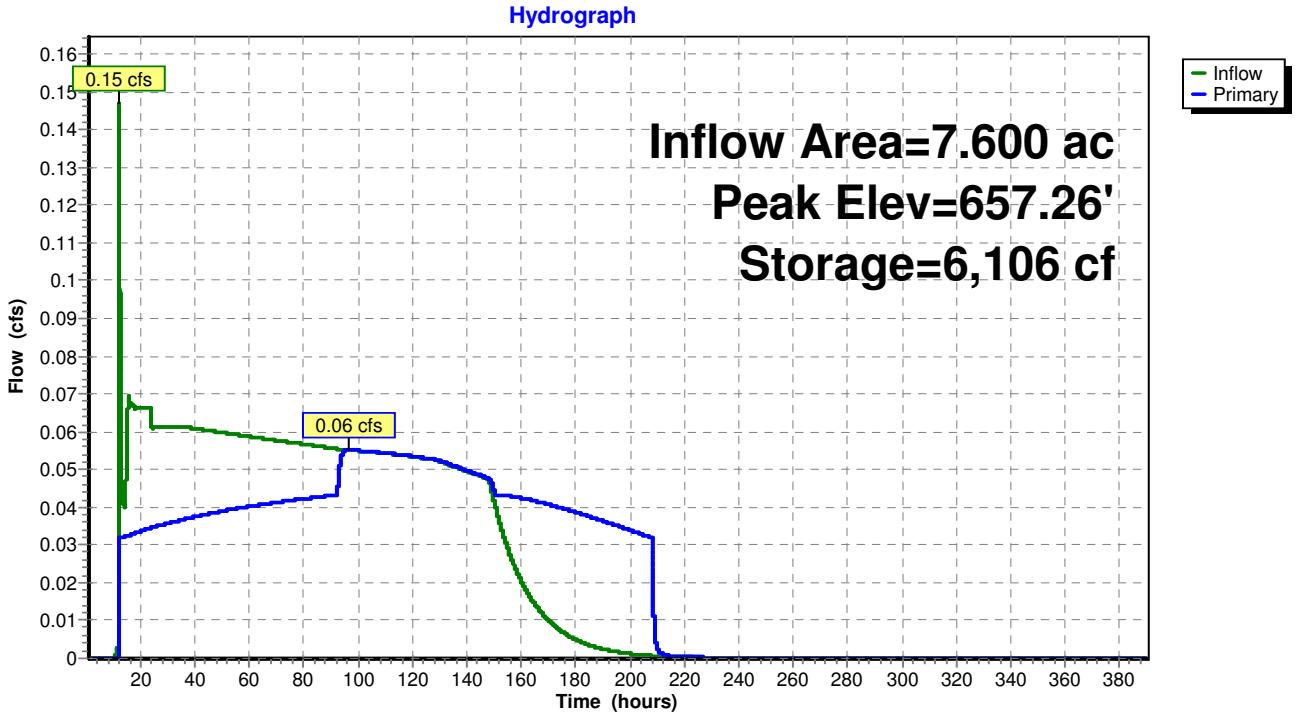
Volume	Invert	Avail.Storage	Storage Description
#1	656.00'	25,700 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
656.00	3,700	0	0
658.00	6,000	9,700	9,700
660.00	10,000	16,000	25,700

Device	Routing	Invert	Outlet Devices
#1	Primary	654.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	657.25'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	656.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=0.06 cfs @ 96.57 hrs HW=657.26' TW=588.61' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.94 fps)
  - **3=Orifice/Grate** (Passes 0.04 cfs of 1.17 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.26 fps)

Pond 2.2P:


Hydrograph
Inflow Area=7.600 ac
Peak Elev=657.26'
Storage=6,106 cf
0.15 cfs
0.06 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
0.11
0.12
0.13
0.14
0.15
0.16
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.3P:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth = 1.11" for 1-yr event
Inflow = 2.73 cfs @ 12.09 hrs, Volume= 0.909 af
Outflow = 0.26 cfs @ 13.97 hrs, Volume= 0.907 af, Atten= 90%, Lag= 112.5 min
Primary = 0.26 cfs @ 13.97 hrs, Volume= 0.907 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 586.50' Surf.Area= 6,267 sf Storage= 13,775 cf
Peak Elev= 587.30' @ 13.97 hrs Surf.Area= 8,224 sf Storage= 19,329 cf (5,554 cf above start)
Flood Elev= 588.25' Surf.Area= 9,578 sf Storage= 28,275 cf (14,500 cf above start)

Plug-Flow detention time= 6,758.8 min calculated for 0.591 af (65% of inflow)
Center-of-Mass det. time= 1,867.2 min (7,182.3 - 5,315.2)

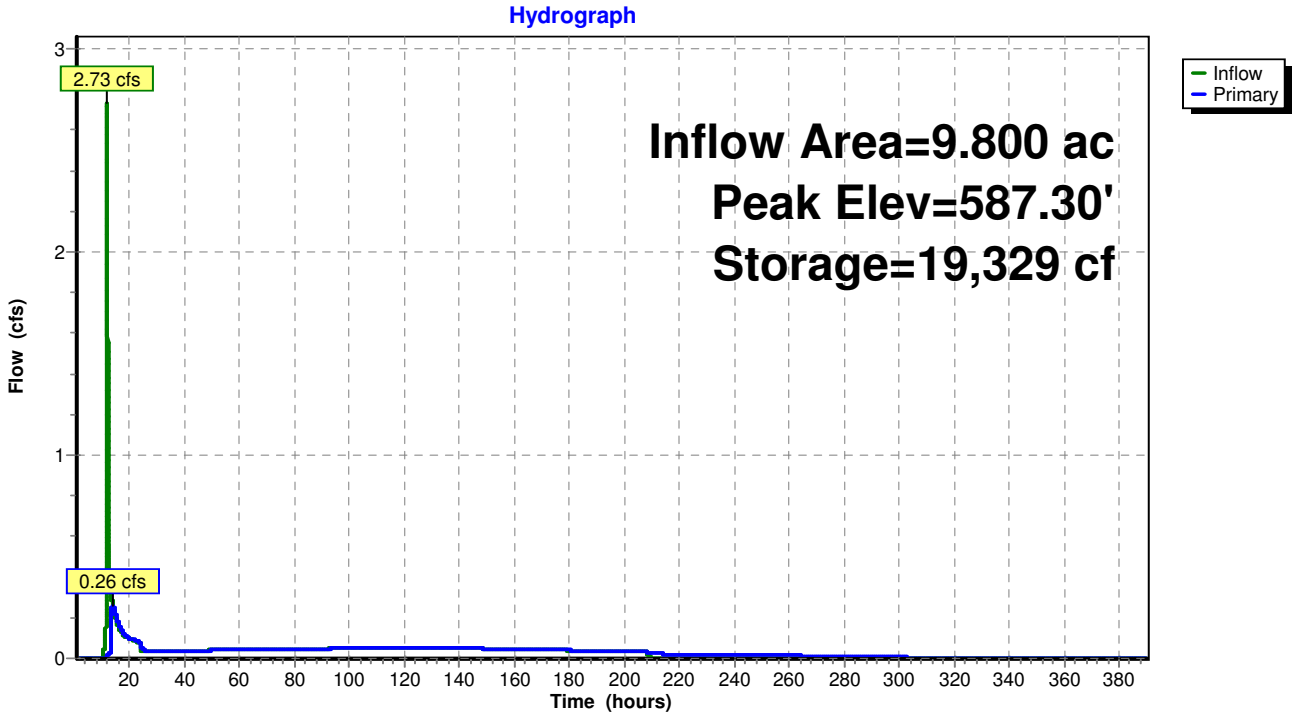
Volume	Invert	Avail.Storage	Storage Description
#1	579.50'	37,675 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
579.50	50	0	0
580.00	150	50	50
582.00	1,000	1,150	1,200
584.00	2,100	3,100	4,300
585.50	3,200	3,975	8,275
587.00	7,800	8,250	16,525
589.25	11,000	21,150	37,675

Device	Routing	Invert	Outlet Devices
#1	Primary	587.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	586.50'	**1.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.26 cfs @ 13.97 hrs HW=587.30' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.24 cfs @ 0.62 fps)
2=Orifice/Grate (Orifice Controls 0.02 cfs @ 4.19 fps)

Pond 2.3P:


Hydrograph
Inflow Area=9.800 ac
Peak Elev=587.30'
Storage=19,329 cf
2.73 cfs
0.26 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond FS 1:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 1.20" for 1-yr event
Inflow = 7.20 cfs @ 12.18 hrs, Volume= 0.660 af
Outflow = 7.20 cfs @ 12.18 hrs, Volume= 0.660 af, Atten= 0%, Lag= 0.0 min
Primary = 7.20 cfs @ 12.18 hrs, Volume= 0.660 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

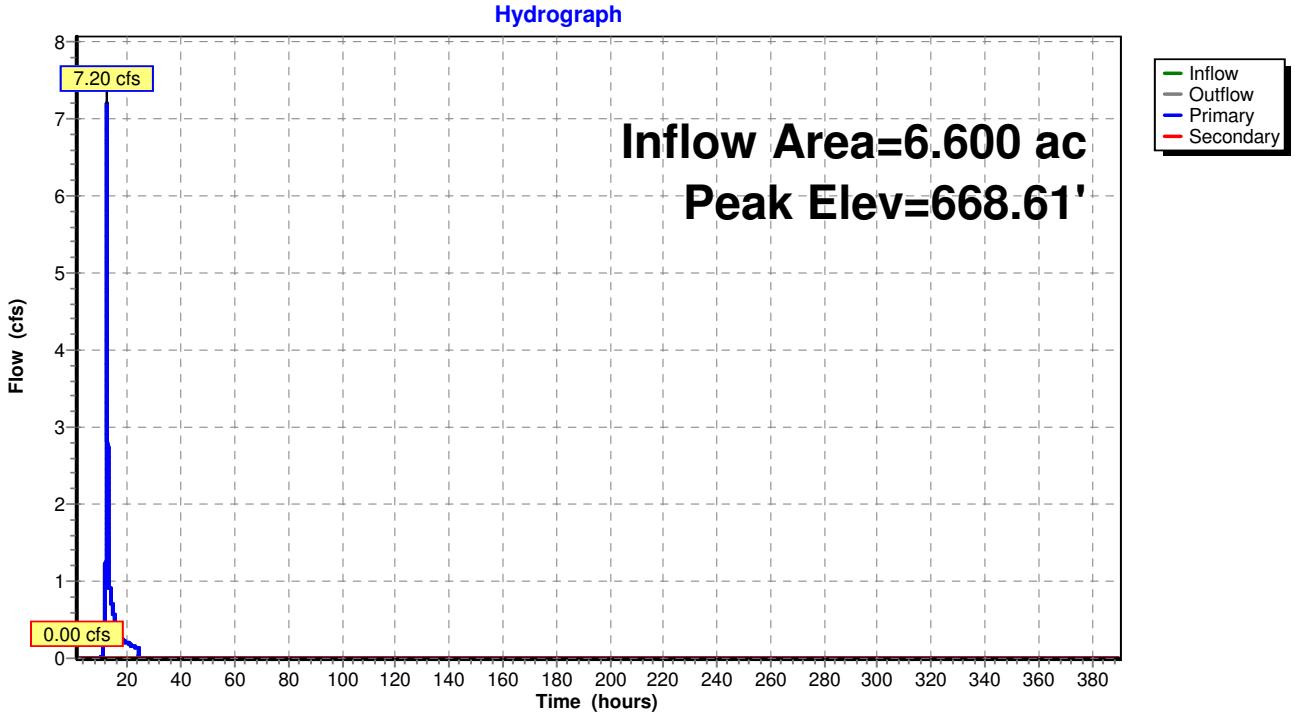
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 668.61' @ 12.18 hrs
Flood Elev= 674.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	666.50'	**15.0" x 35.0' long Culvert** RCP, square edge headwall, Ke= 0.500 Outlet Invert= 666.00' S= 0.0143 '/' Cc= 0.900 n= 0.012
#2	Secondary	669.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=7.20 cfs @ 12.18 hrs HW=668.61' TW=665.74' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 7.20 cfs @ 5.86 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=666.50' TW=656.00' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond FS 1:



Summary for Pond FS 2:

Inflow Area = 8.700 ac, 41.38% Impervious, Inflow Depth = 1.11" for 1-yr event
Inflow = 1.62 cfs @ 12.07 hrs, Volume= 0.804 af
Outflow = 1.62 cfs @ 12.07 hrs, Volume= 0.804 af, Atten= 0%, Lag= 0.0 min
Primary = 1.62 cfs @ 12.07 hrs, Volume= 0.804 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

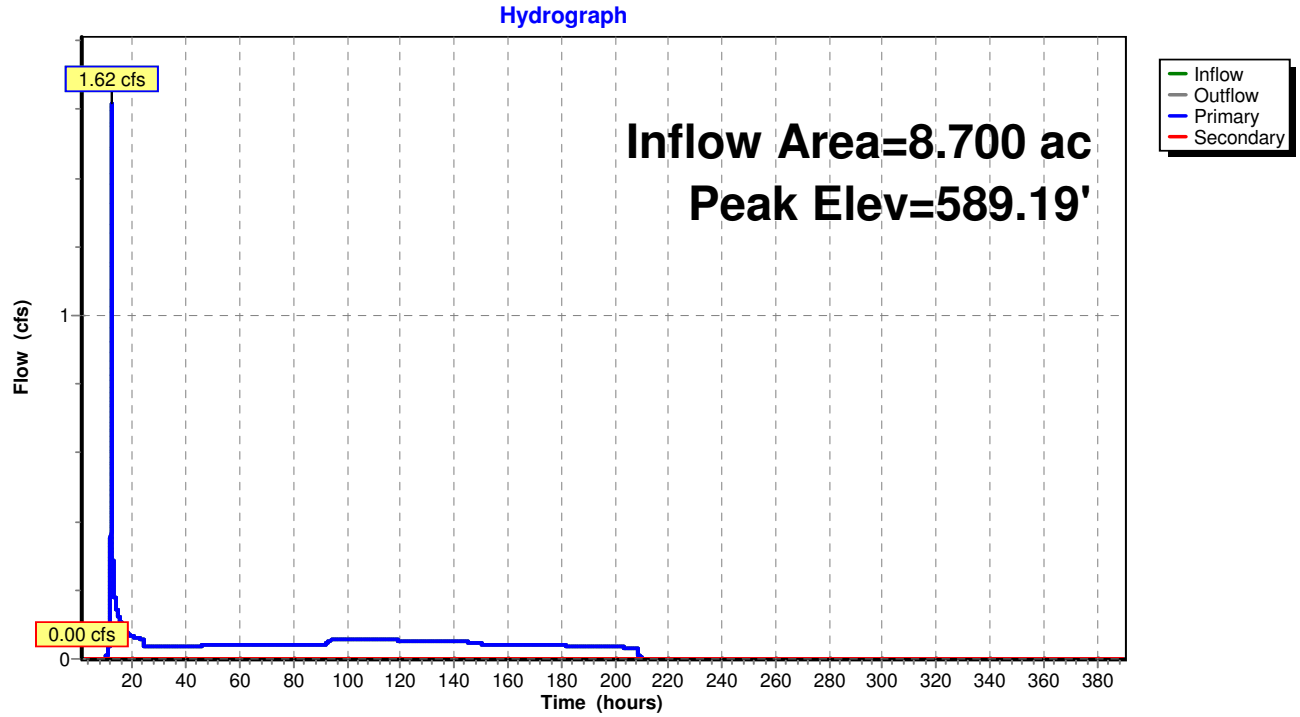
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 589.19' @ 12.07 hrs
Flood Elev= 596.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.50'	**12.0" x 23.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 588.00' S= 0.0217 '/' Cc= 0.900 n= 0.012
#2	Secondary	589.50'	**24.0" x 195.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 582.00' S= 0.0385 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=1.62 cfs @ 12.07 hrs HW=589.19' TW=586.81' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.62 cfs @ 2.82 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=588.50' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Pond FS 2:



Summary for Subcatchment 1.0S:

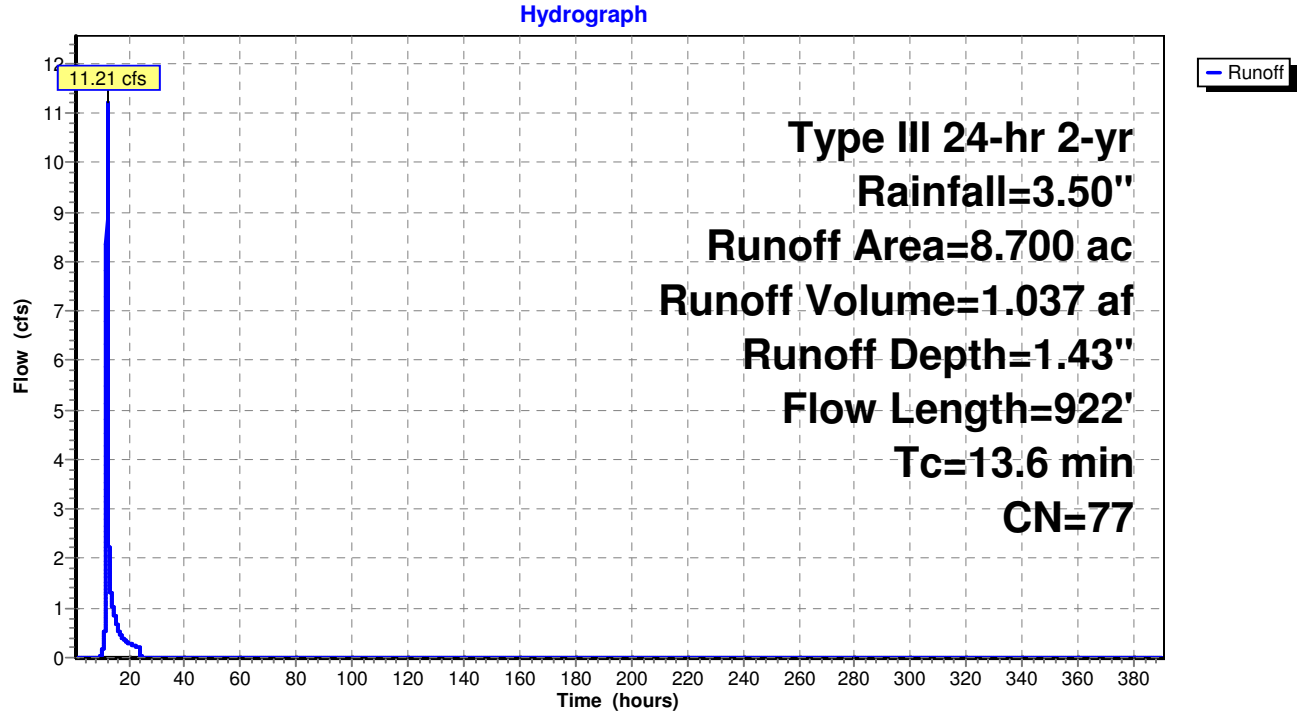
Runoff = 11.21 cfs @ 12.19 hrs, Volume= 1.037 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
3.800	98	Paved parking & roofs
1.100	60	Woods, Fair, HSG B
3.800	61	>75% Grass cover, Good, HSG B
8.700	77	Weighted Average
4.900		Pervious Area
3.800		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	221	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	601	0.0900	17.83	31.51	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.6	922	Total			

Subcatchment 1.0S:



Summary for Subcatchment 1.1S:

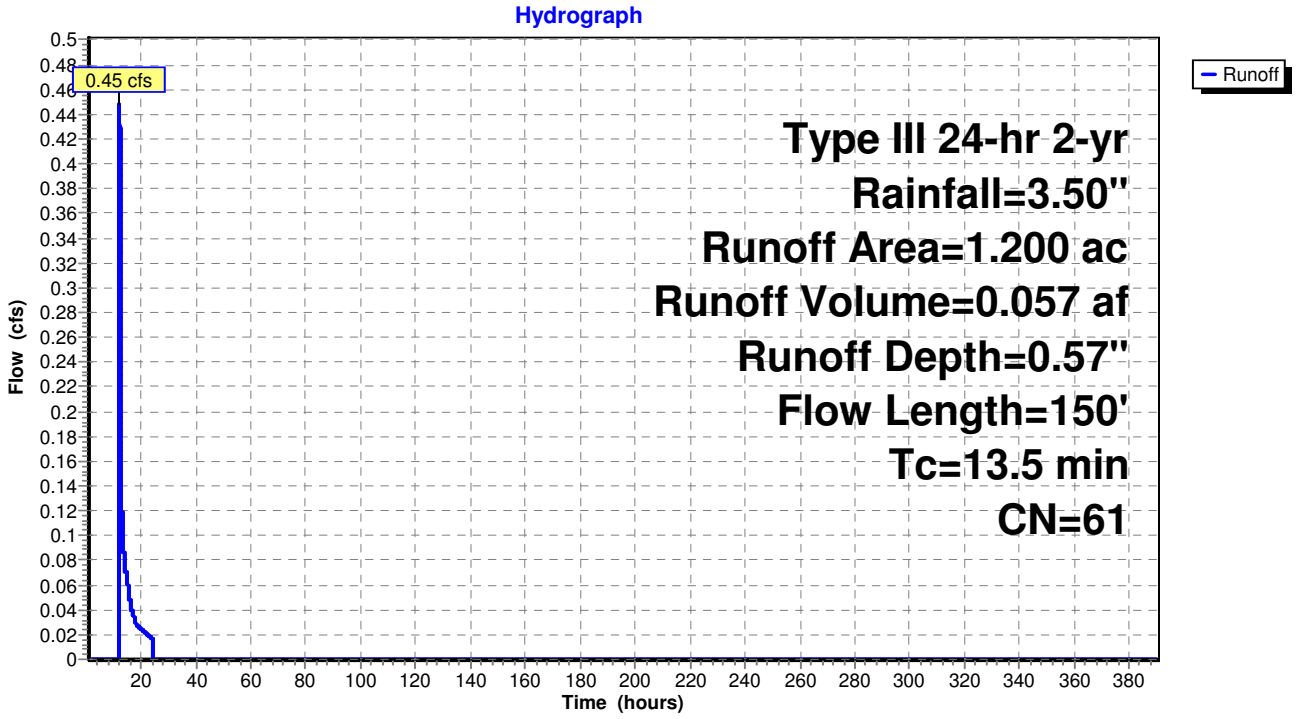
Runoff = 0.45 cfs @ 12.24 hrs, Volume= 0.057 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
1.200	61	>75% Grass cover, Good, HSG B
1.200		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	50	0.1600	2.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	150	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

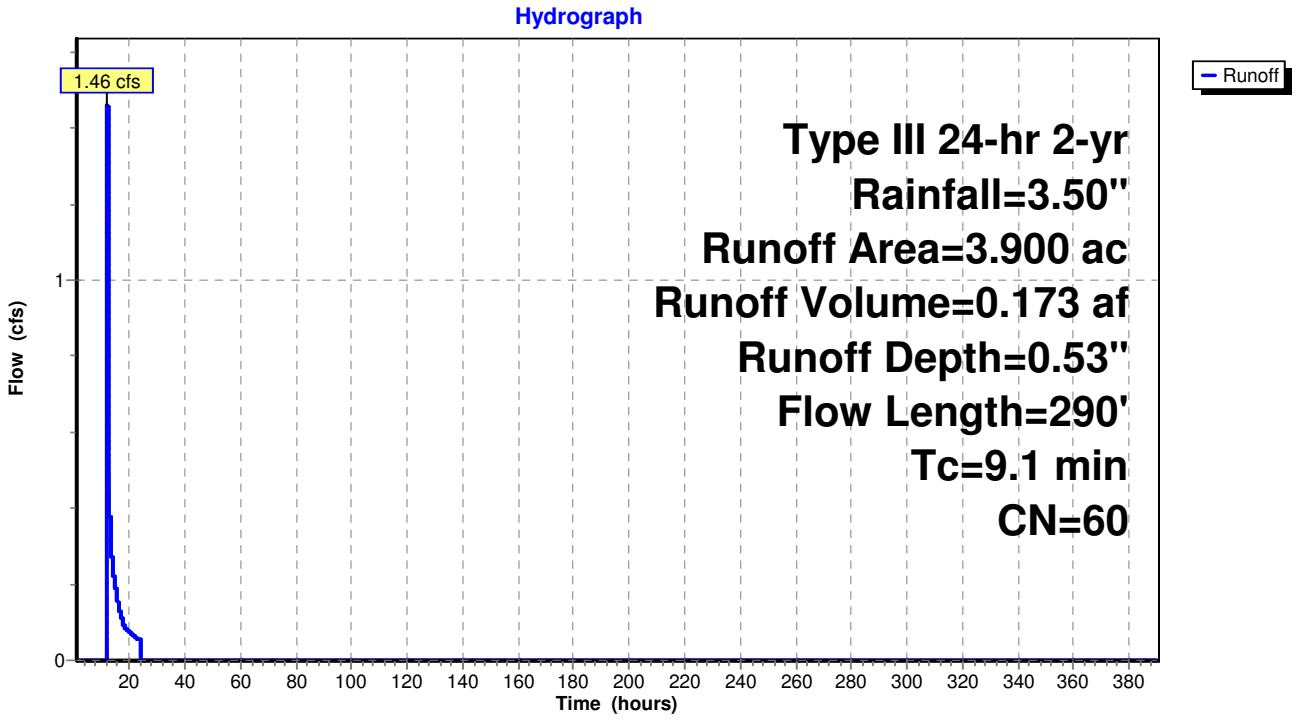
Runoff = 1.46 cfs @ 12.16 hrs, Volume= 0.173 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
2.400	60	Woods, Fair, HSG B
1.500	61	>75% Grass cover, Good, HSG B
3.900	60	Weighted Average
3.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.1140	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	170	0.2350	2.42		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.4800	4.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	290	Total			

Subcatchment 1.2S:



Summary for Subcatchment 1S:

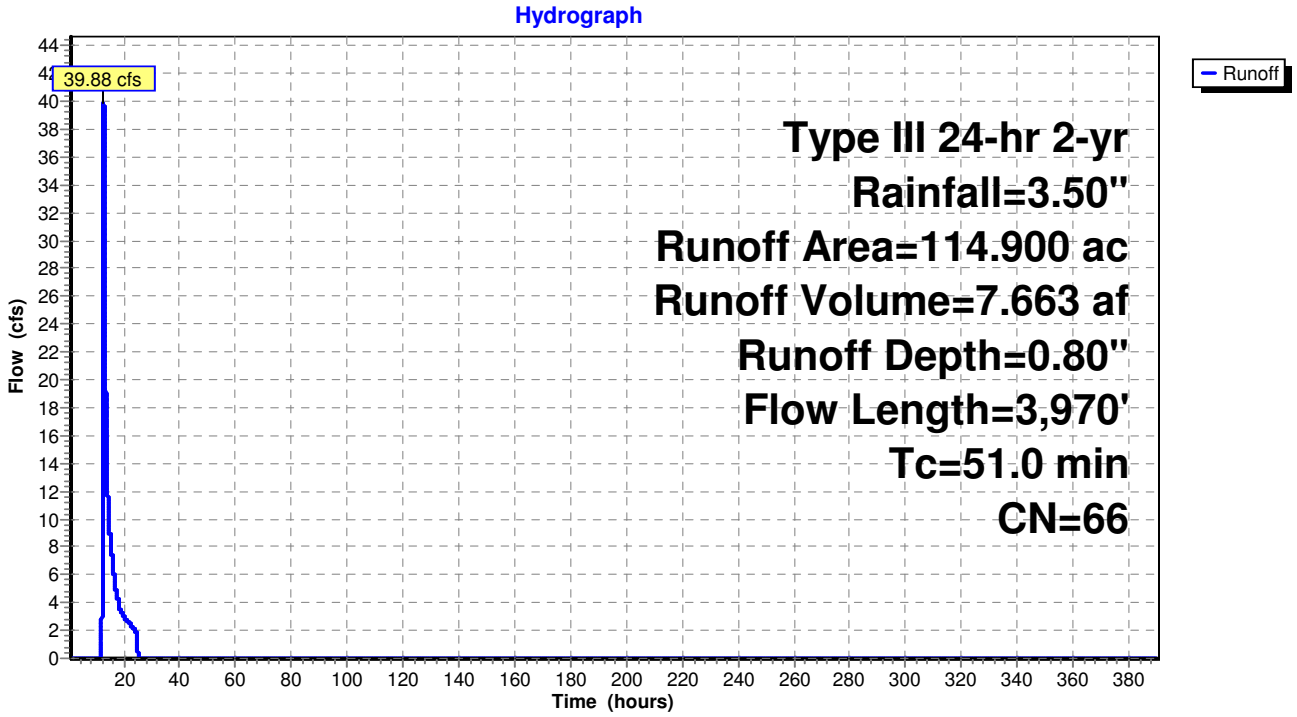
Runoff = 39.88 cfs @ 12.80 hrs, Volume= 7.663 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

	Area (ac)	CN	Description
*	30.000	68	1 acre lots, 20% imp, HSG B
*	43.000	58	Woods/grass comb., Good, HSG B
*	6.000	61	>75% Grass cover, Good, HSG B
*	19.900	92	Urban commercial, 85% imp, HSG B
*	16.000	55	Woods, Good, HSG B
	114.900	66	Weighted Average
	91.985		Pervious Area
	22.915		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 2.0S:

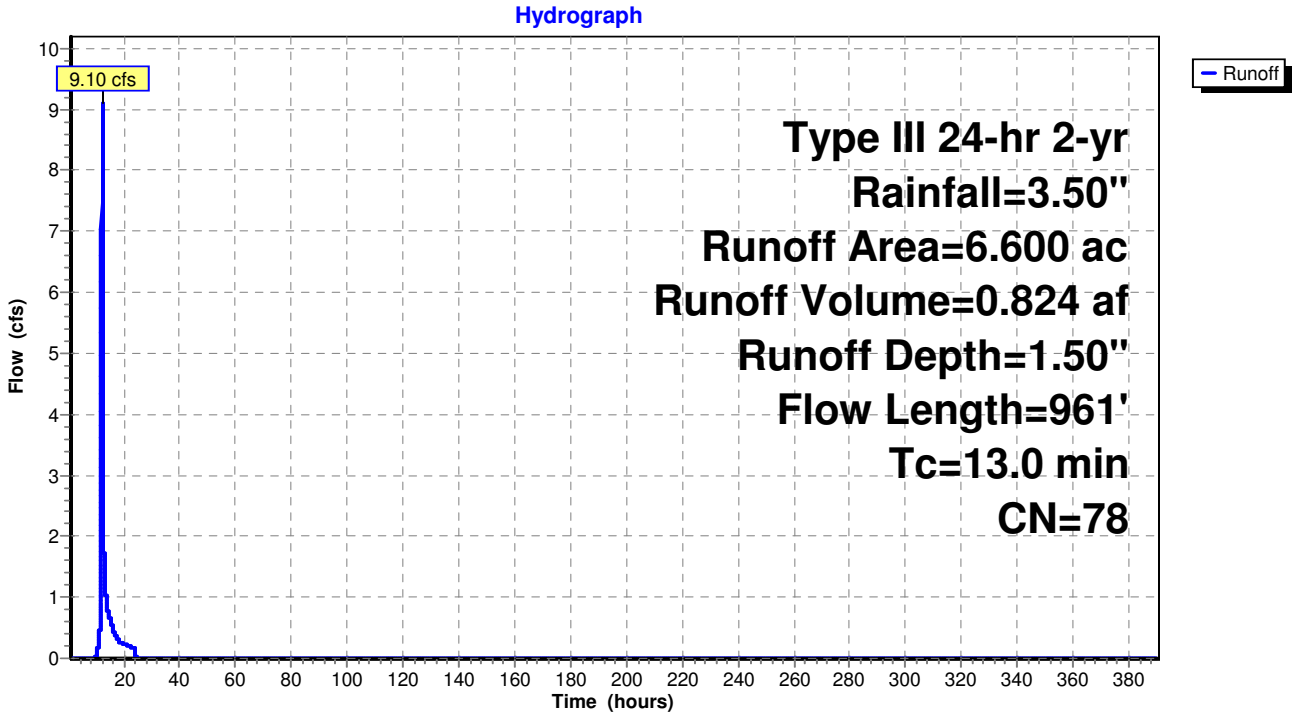
Runoff = 9.10 cfs @ 12.18 hrs, Volume= 0.824 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
3.100	98	Paved parking & roofs
1.300	60	Woods, Fair, HSG B
2.200	61	>75% Grass cover, Good, HSG B
6.600	78	Weighted Average
3.500		Pervious Area
3.100		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	16	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	220	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	550	0.1000	18.80	33.22	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.0	961	Total			

Subcatchment 2.0S:



Summary for Subcatchment 2.1S:

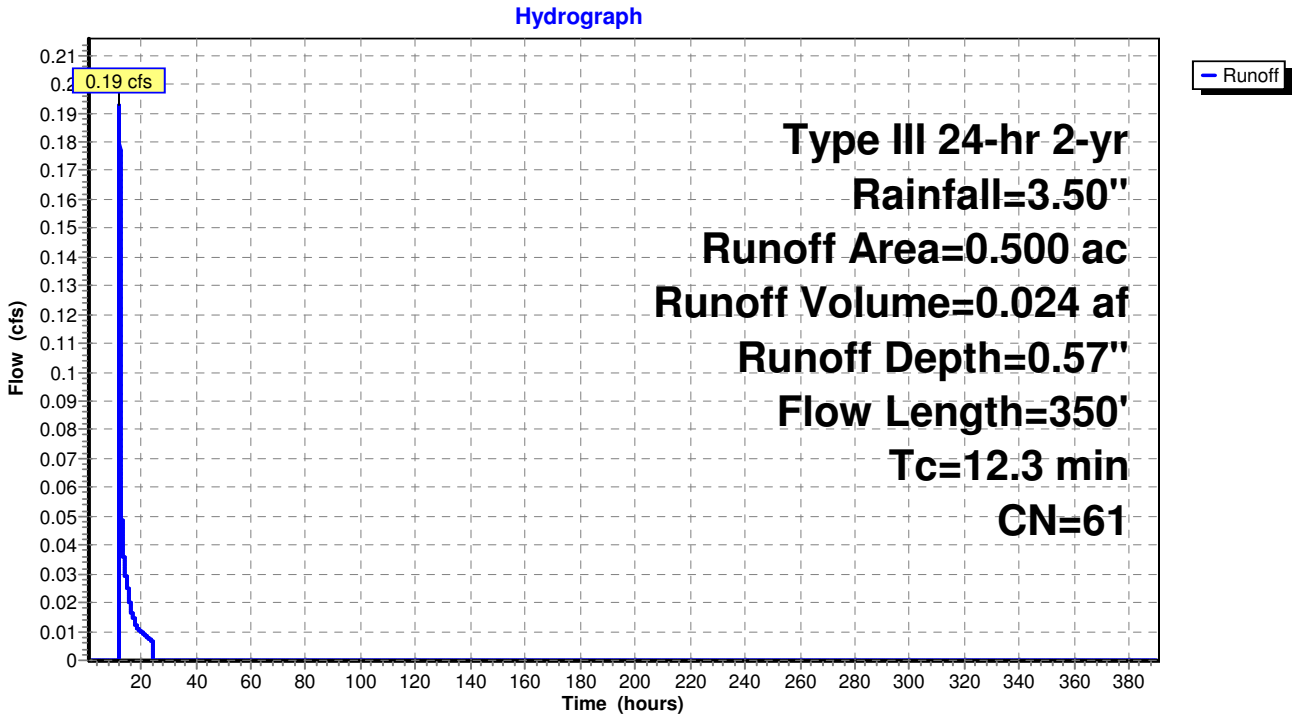
Runoff = 0.19 cfs @ 12.21 hrs, Volume= 0.024 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
0.200	60	Woods, Fair, HSG B
0.300	61	>75% Grass cover, Good, HSG B
0.500	61	Weighted Average
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.7	200	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.3600	4.20		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.3	350	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

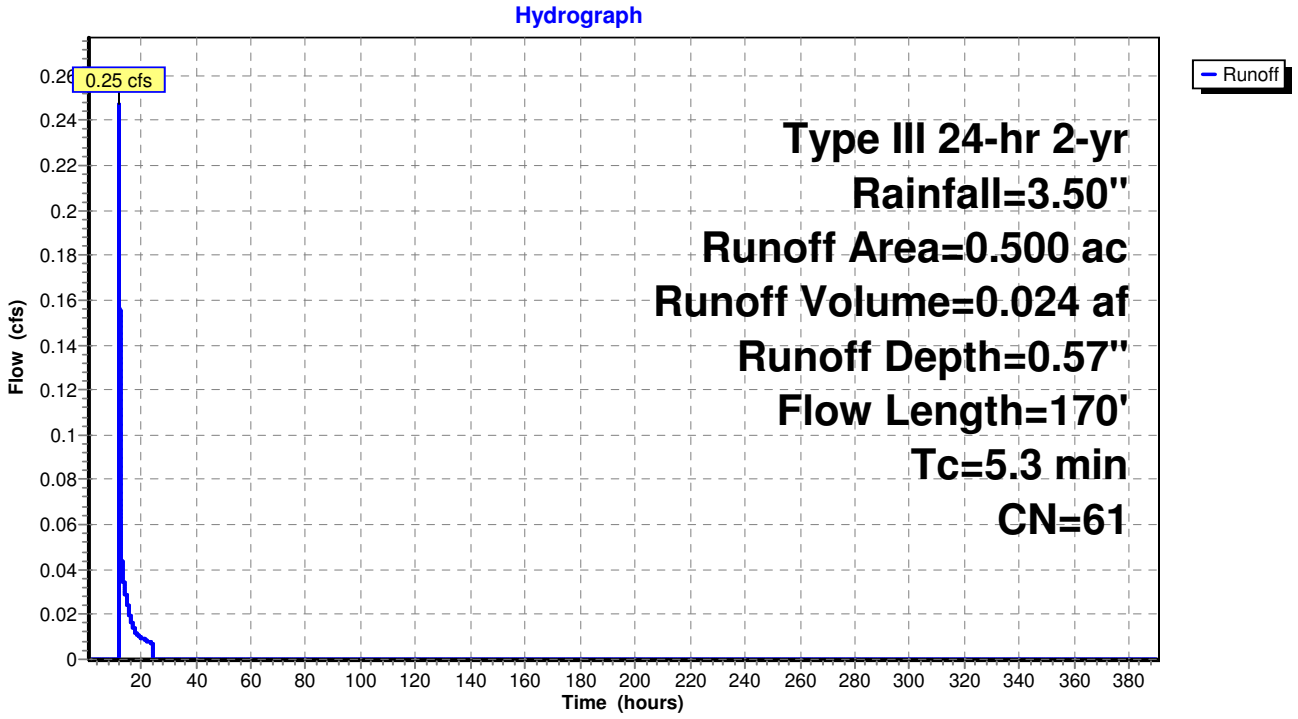
Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.024 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.1200	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0570	1.67		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.3	170	Total			

Subcatchment 2.2S:



Summary for Subcatchment 2.3.1S:

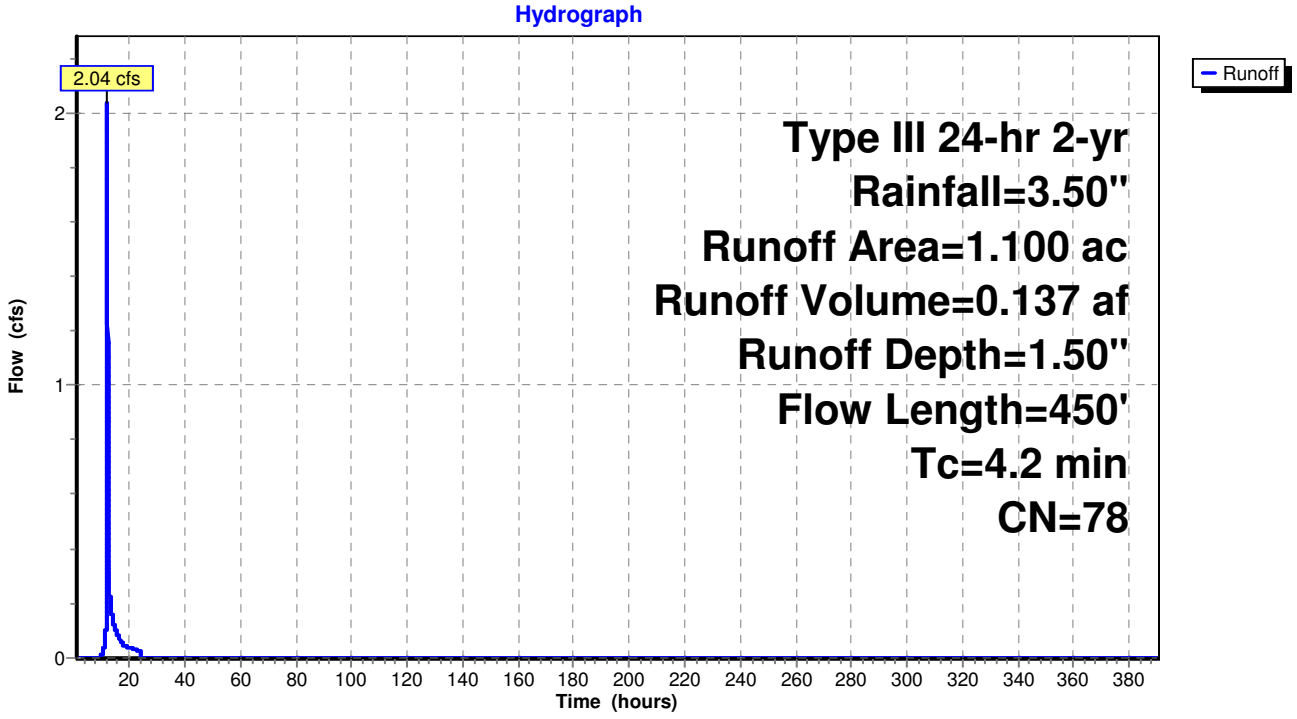
Runoff = 2.04 cfs @ 12.07 hrs, Volume= 0.137 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
0.500	98	Paved parking & roofs
0.600	61	>75% Grass cover, Good, HSG B
1.100	78	Weighted Average
0.600		Pervious Area
0.500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2200	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.5	115	0.3000	3.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	235	0.2000	26.58	46.98	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
4.2	450	Total			

Subcatchment 2.3.1S:



Summary for Subcatchment 2.3.2S:

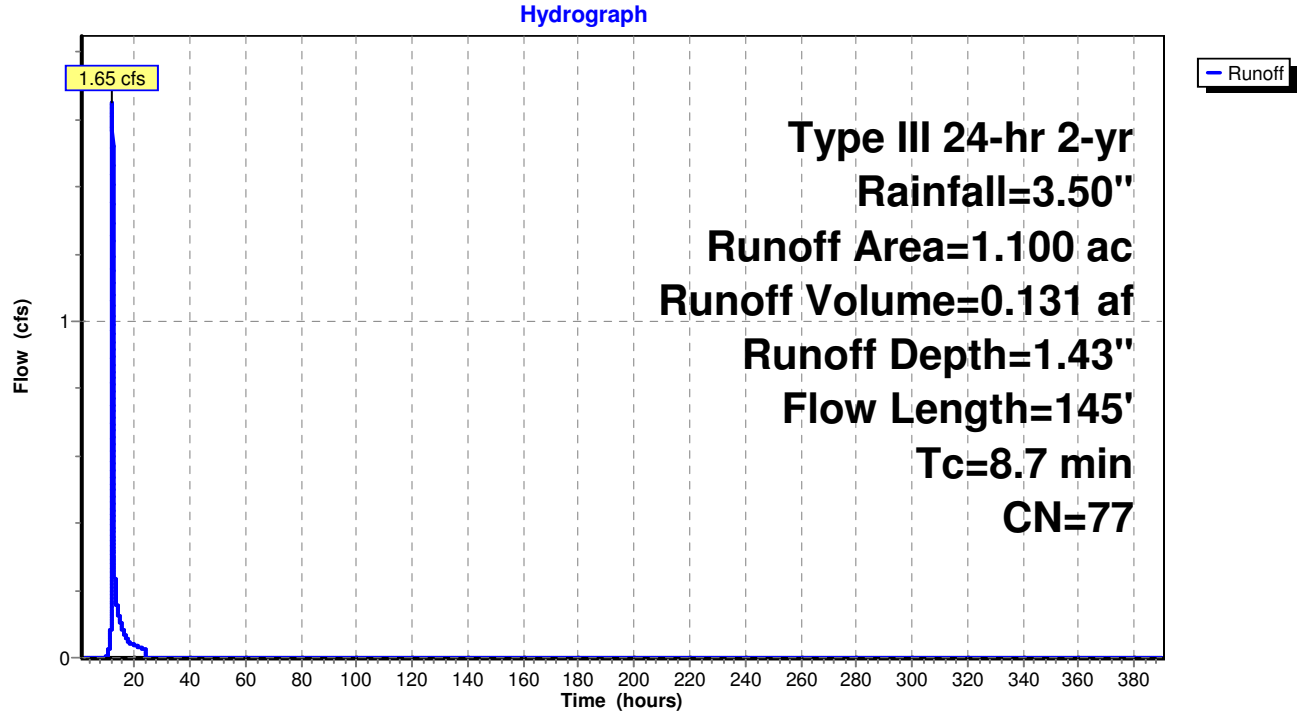
Runoff = 1.65 cfs @ 12.13 hrs, Volume= 0.131 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.300	60	Woods, Fair, HSG B
0.400	74	>75% Grass cover, Good, HSG C
0.100	80	>75% Grass cover, Good, HSG D
1.100	77	Weighted Average
0.800		Pervious Area
0.300		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.2000	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	45	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	145	Total			

Subcatchment 2.3.2S:



Summary for Subcatchment 3S:

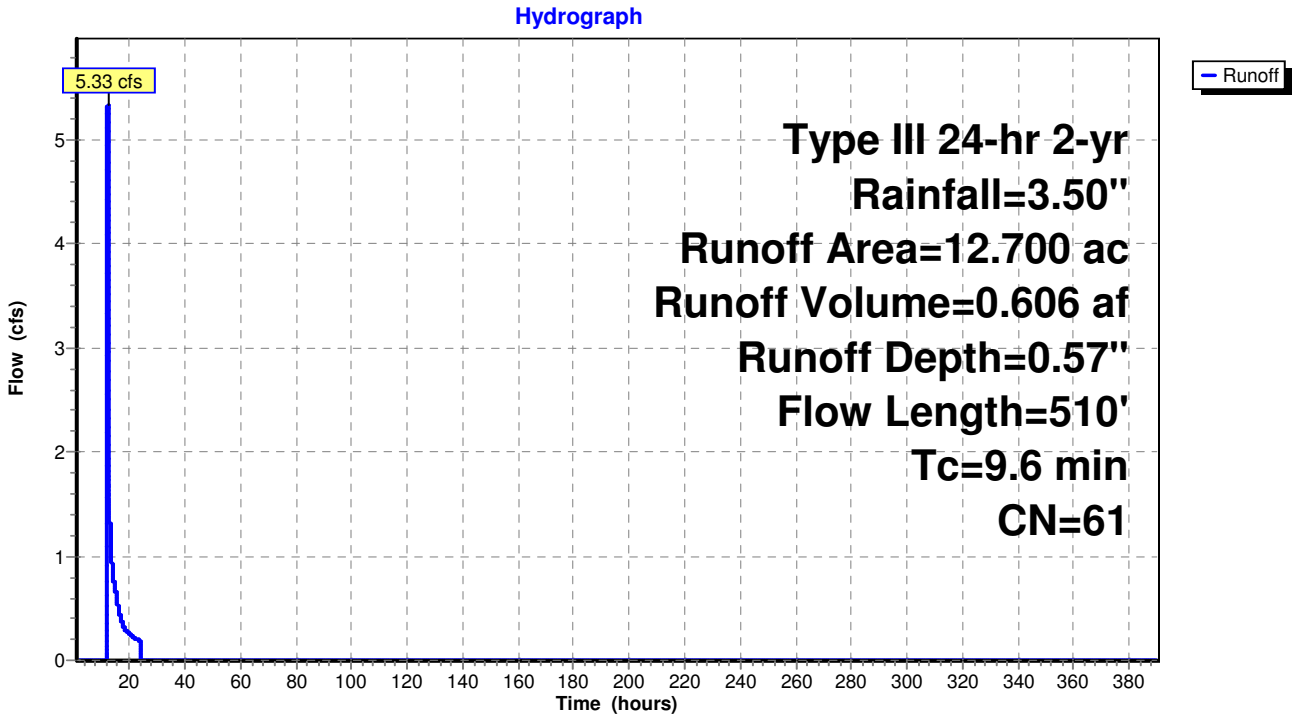
Runoff = 5.33 cfs @ 12.17 hrs, Volume= 0.606 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.50"

Area (ac)	CN	Description
0.400	98	Paved parking & roofs
10.300	60	Woods, Fair, HSG B
2.000	61	>75% Grass cover, Good, HSG B
12.700	61	Weighted Average
12.300		Pervious Area
0.400		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.2800	0.23		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	410	0.2930	2.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.6	510	Total			

Subcatchment 3S:

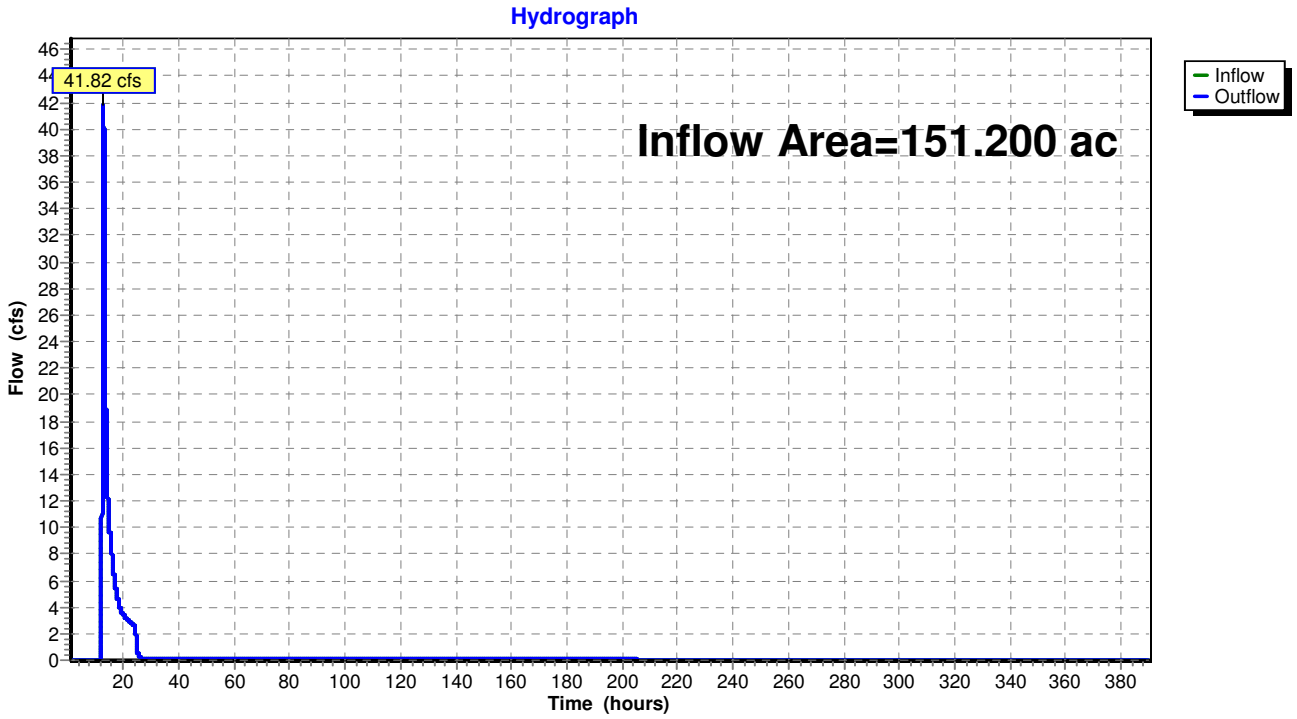


Summary for Reach 1R:

Inflow Area = 151.200 ac, 20.51% Impervious, Inflow Depth = 0.85" for 2-yr event
Inflow = 41.82 cfs @ 12.80 hrs, Volume= 10.663 af
Outflow = 41.82 cfs @ 12.80 hrs, Volume= 10.663 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 1R:

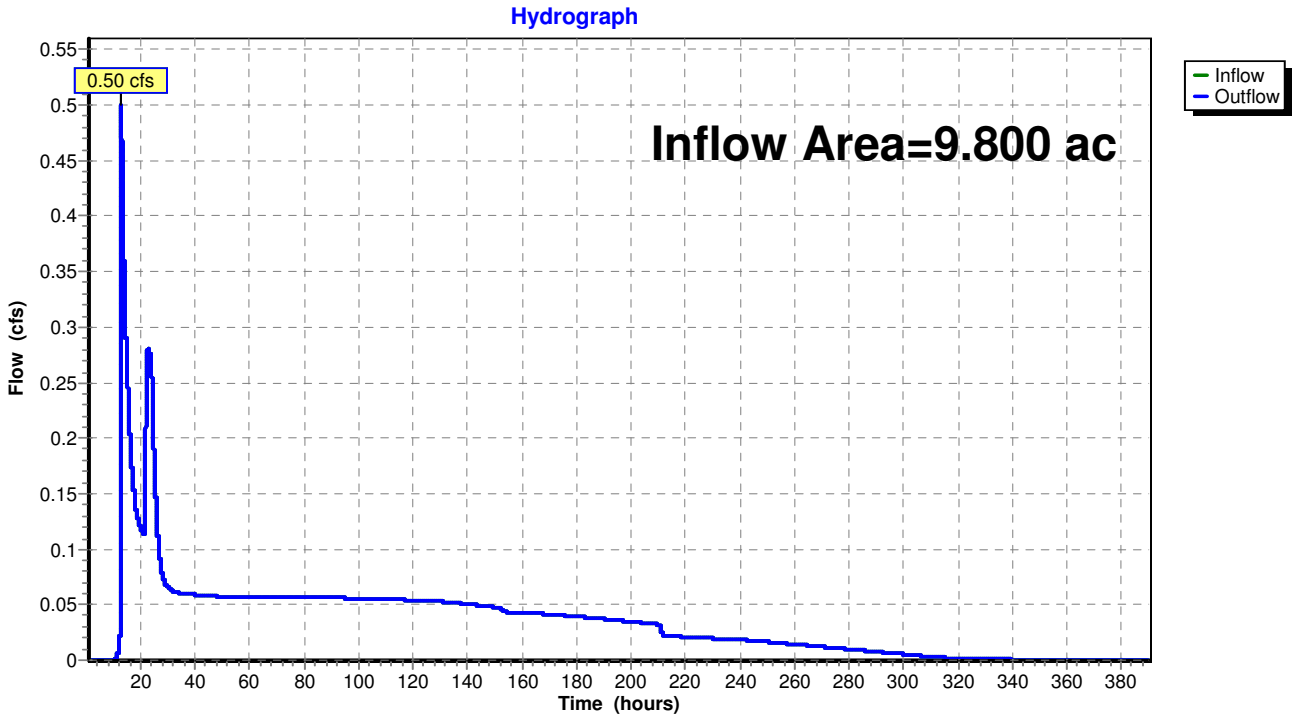


Summary for Reach 2R:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth > 1.39" for 2-yr event
Inflow = 0.50 cfs @ 12.88 hrs, Volume= 1.138 af
Outflow = 0.50 cfs @ 12.88 hrs, Volume= 1.138 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 2R:



Summary for Pond 1.0P:

Inflow Area = 8.700 ac, 43.68% Impervious, Inflow Depth = 1.43" for 2-yr event
Inflow = 11.21 cfs @ 12.19 hrs, Volume= 1.037 af
Outflow = 0.94 cfs @ 14.57 hrs, Volume= 1.035 af, Atten= 92%, Lag= 142.3 min
Primary = 0.94 cfs @ 14.57 hrs, Volume= 1.035 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 674.00' Surf.Area= 14,391 sf Storage= 31,719 cf
Peak Elev= 675.57' @ 14.57 hrs Surf.Area= 18,042 sf Storage= 58,005 cf (26,286 cf above start)
Flood Elev= 677.00' Surf.Area= 22,107 sf Storage= 87,251 cf (55,532 cf above start)

Plug-Flow detention time= 1,880.3 min calculated for 0.307 af (30% of inflow)
Center-of-Mass det. time= 750.4 min (1,604.8 - 854.5)

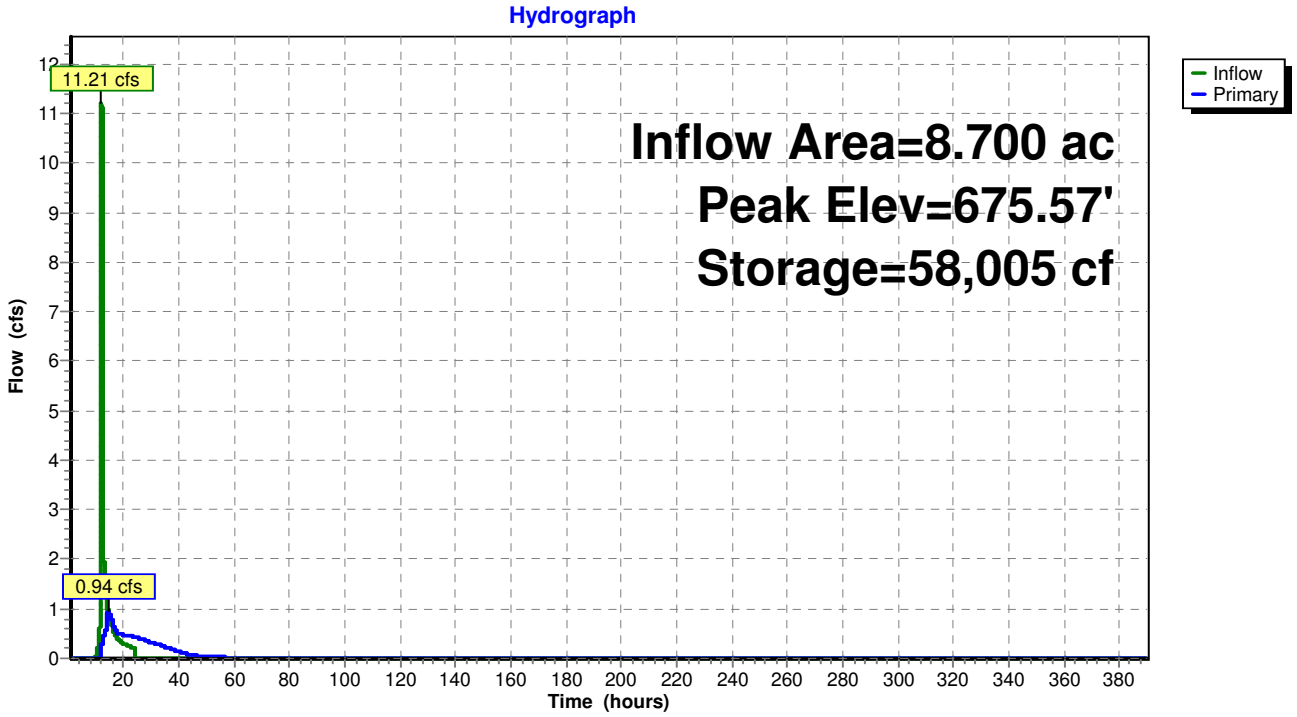
Volume	Invert	Avail.Storage	Storage Description
#1	670.00'	109,358 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
670.00	3,990	0	0
672.00	6,669	10,659	10,659
674.00	14,391	21,060	31,719
676.00	19,034	33,425	65,144
678.00	25,180	44,214	109,358

Device	Routing	Invert	Outlet Devices
#1	Primary	674.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	675.50'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.94 cfs @ 14.57 hrs HW=675.57' TW=665.20' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.50 cfs @ 5.71 fps)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.44 cfs @ 0.76 fps)

Pond 1.0P:


Hydrograph
Inflow Area=8.700 ac
Peak Elev=675.57'
Storage=58,005 cf
11.21 cfs
0.94 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 1.1P:

Inflow Area = 9.900 ac, 38.38% Impervious, Inflow Depth = 1.32" for 2-yr event
Inflow = 1.01 cfs @ 14.54 hrs, Volume= 1.092 af
Outflow = 0.45 cfs @ 24.09 hrs, Volume= 1.091 af, Atten= 55%, Lag= 573.4 min
Primary = 0.45 cfs @ 24.09 hrs, Volume= 1.091 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 667.29' @ 24.09 hrs Surf.Area= 8,856 sf Storage= 21,394 cf
Flood Elev= 669.00' Surf.Area= 11,900 sf Storage= 39,300 cf

Plug-Flow detention time= 1,826.3 min calculated for 1.091 af (100% of inflow)
Center-of-Mass det. time= 1,810.3 min (3,378.7 - 1,568.4)

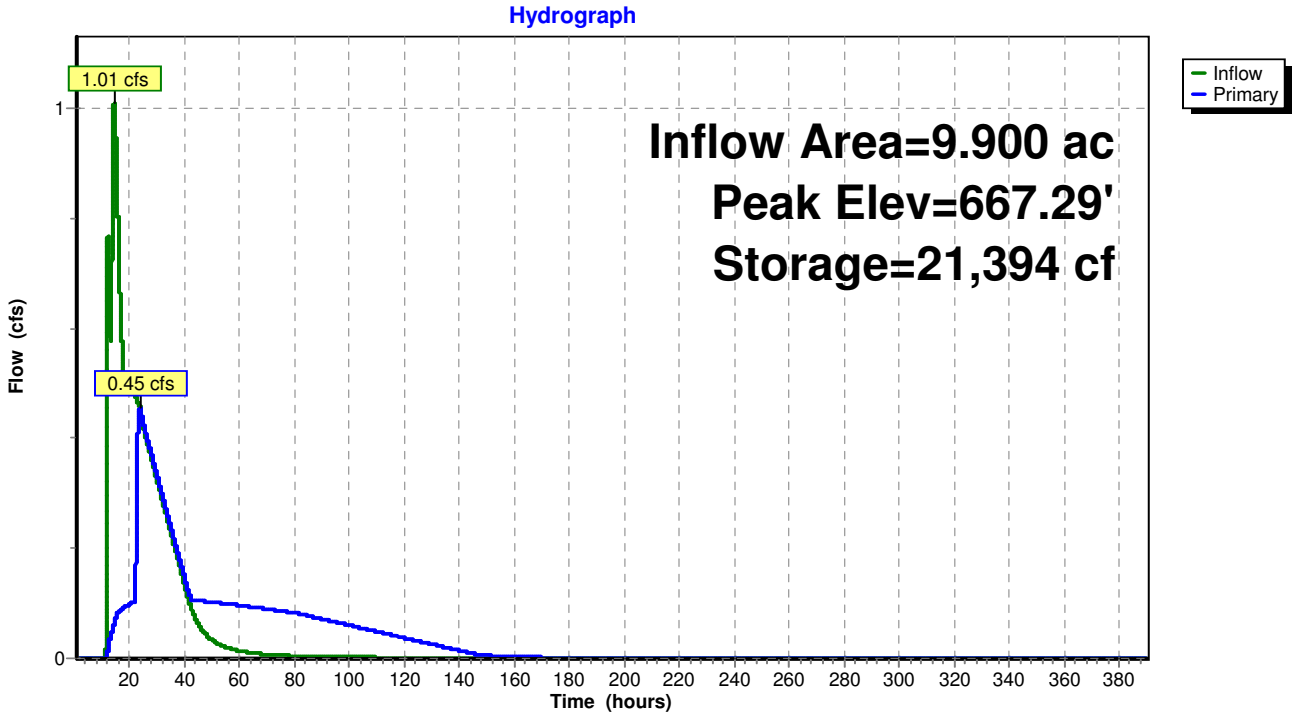
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	51,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	3,800	0	0
666.00	6,800	10,600	10,600
668.00	10,000	16,800	27,400
670.00	13,800	23,800	51,200

Device	Routing	Invert	Outlet Devices
#1	Primary	664.00'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	667.20'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.45 cfs @ 24.09 hrs HW=667.29' TW=636.56' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.11 cfs @ 8.64 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 0.35 cfs @ 0.82 fps)

Pond 1.1P:


Hydrograph
1.01 cfs
0.45 cfs
Inflow Area=9.900 ac
Peak Elev=667.29'
Storage=21,394 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 1.2P:

Inflow Area = 13.800 ac, 27.54% Impervious, Inflow Depth = 1.10" for 2-yr event
Inflow = 1.46 cfs @ 12.17 hrs, Volume= 1.264 af
Outflow = 0.09 cfs @ 66.56 hrs, Volume= 1.255 af, Atten= 94%, Lag= 3,263.9 min
Primary = 0.09 cfs @ 66.56 hrs, Volume= 1.255 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 637.24' @ 66.56 hrs Surf.Area= 20,113 sf Storage= 24,487 cf
Flood Elev= 641.00' Surf.Area= 27,600 sf Storage= 113,600 cf

Plug-Flow detention time= 3,732.5 min calculated for 1.255 af (99% of inflow)
Center-of-Mass det. time= 3,664.2 min (6,705.8 - 3,041.7)

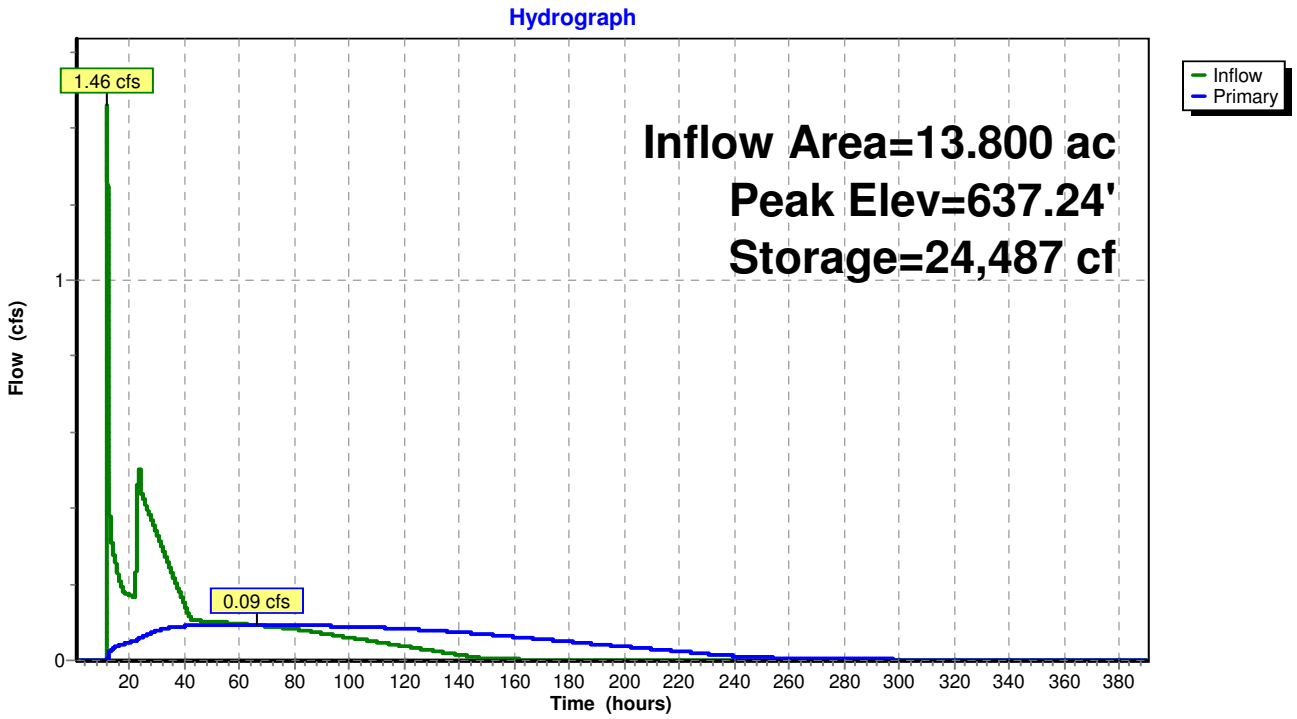
Volume	Invert	Avail.Storage	Storage Description
#1	636.00'	141,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
636.00	18,000	0	0
638.00	21,400	39,400	39,400
640.00	25,200	46,600	86,000
642.00	30,000	55,200	141,200

Device	Routing	Invert	Outlet Devices
#1	Primary	636.00'	**1.8" Vert. Orifice/Grate** C= 0.600
#2	Primary	640.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.09 cfs @ 66.56 hrs HW=637.24' TW=0.00' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.09 cfs @ 5.20 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.2P:


Hydrograph
Inflow Area=13.800 ac
Peak Elev=637.24'
Storage=24,487 cf
1.46 cfs
0.09 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.0P:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 1.50" for 2-yr event
Inflow = 9.10 cfs @ 12.18 hrs, Volume= 0.824 af
Outflow = 0.95 cfs @ 13.76 hrs, Volume= 0.824 af, Atten= 90%, Lag= 94.7 min
Primary = 0.95 cfs @ 13.76 hrs, Volume= 0.824 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 668.25' @ 13.76 hrs Surf.Area= 7,238 sf Storage= 20,038 cf
Flood Elev= 669.00' Surf.Area= 8,550 sf Storage= 26,450 cf

Plug-Flow detention time= 1,810.8 min calculated for 0.824 af (100% of inflow)
Center-of-Mass det. time= 1,810.7 min (2,661.5 - 850.9)

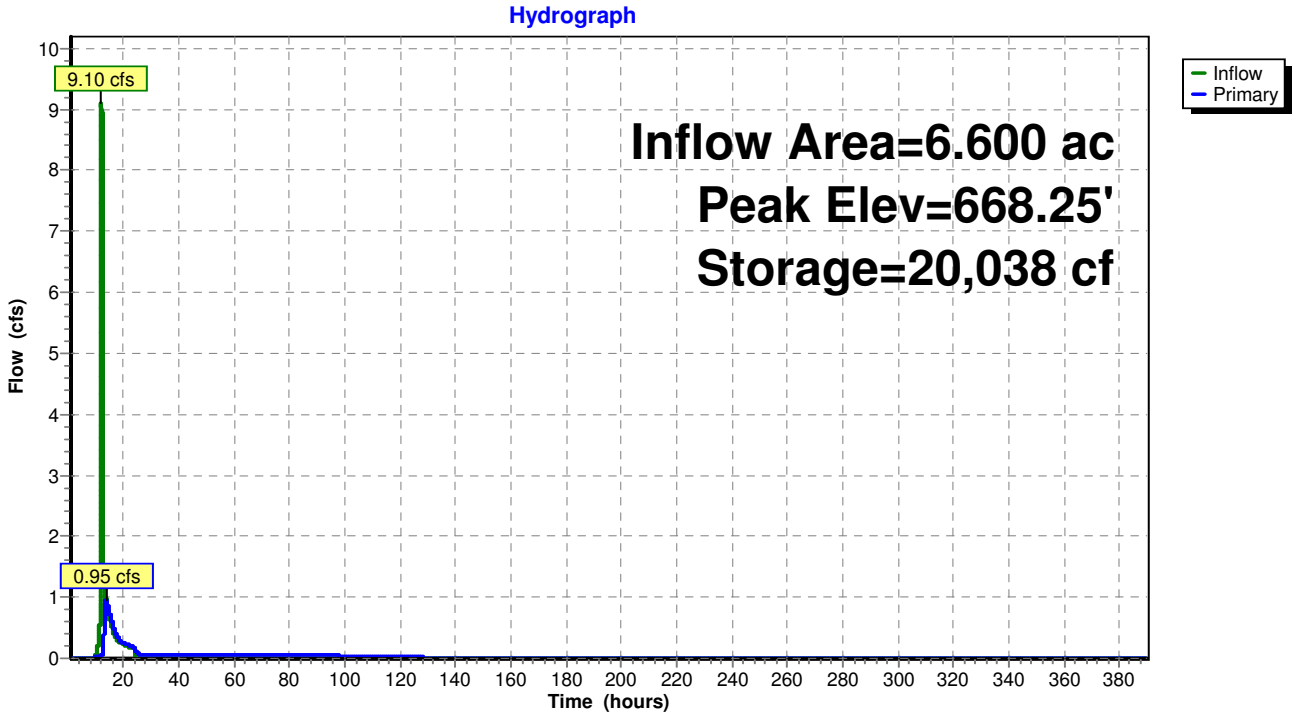
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	35,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	2,300	0	0
666.00	4,400	6,700	6,700
668.00	6,800	11,200	17,900
670.00	10,300	17,100	35,000

Device	Routing	Invert	Outlet Devices
#1	Primary	662.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	668.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	664.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=0.95 cfs @ 13.76 hrs HW=668.25' TW=660.69' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 11.50 fps)
  - **3=Orifice/Grate** (Passes 0.06 cfs of 2.16 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 0.88 cfs @ 1.42 fps)

Pond 2.0P:


Hydrograph
Inflow
Primary
9.10 cfs
0.95 cfs
Inflow Area=6.600 ac
Peak Elev=668.25'
Storage=20,038 cf
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.1P:

Inflow Area = 7.100 ac, 43.66% Impervious, Inflow Depth = 1.43" for 2-yr event
Inflow = 0.98 cfs @ 13.75 hrs, Volume= 0.847 af
Outflow = 0.40 cfs @ 17.51 hrs, Volume= 0.847 af, Atten= 59%, Lag= 225.7 min
Primary = 0.40 cfs @ 17.51 hrs, Volume= 0.847 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 662.13' @ 17.51 hrs Surf.Area= 5,853 sf Storage= 10,310 cf
Flood Elev= 663.00' Surf.Area= 6,850 sf Storage= 16,250 cf

Plug-Flow detention time= 1,839.5 min calculated for 0.847 af (100% of inflow)
Center-of-Mass det. time= 1,839.5 min (4,451.7 - 2,612.2)

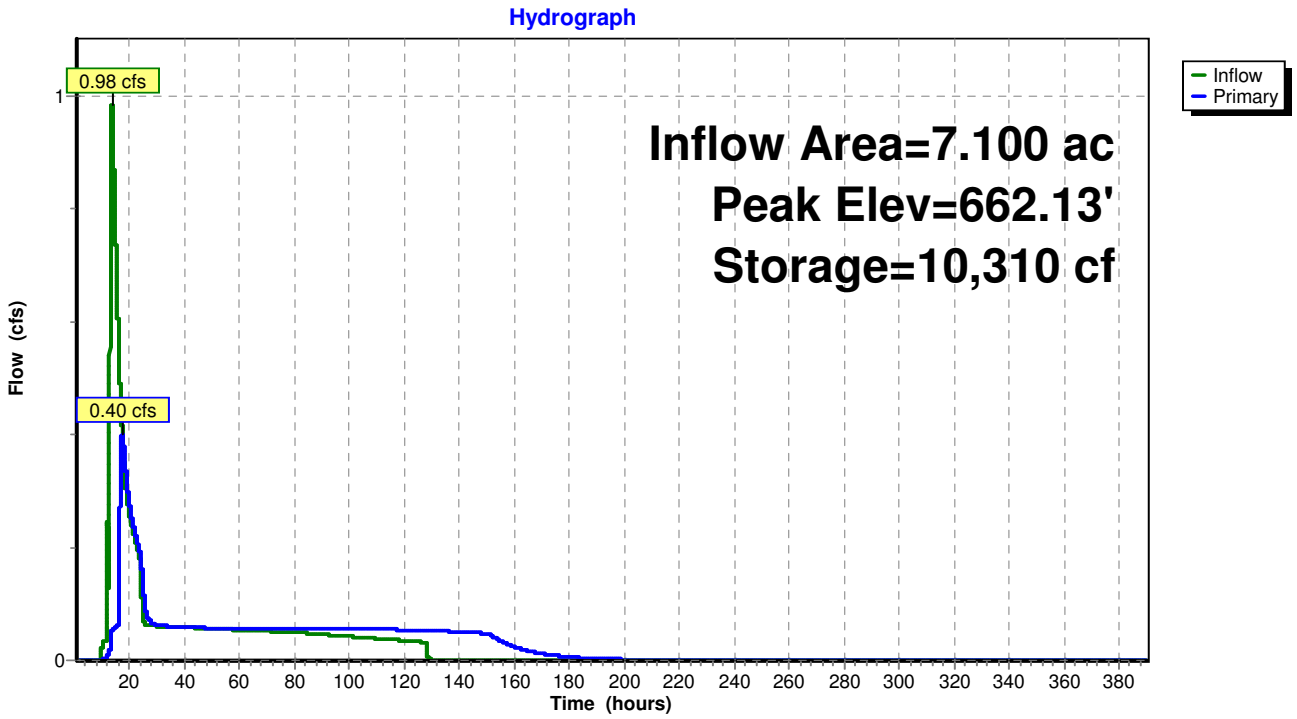
Volume	Invert	Avail.Storage	Storage Description
#1	660.00'	23,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
660.00	3,700	0	0
662.00	5,700	9,400	9,400
664.00	8,000	13,700	23,100

Device	Routing	Invert	Outlet Devices
#1	Primary	656.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	662.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	660.00'	**4.000 in/hr Exfiltration over Surface area above invert** Excluded Surface area = 3,700 sf

Primary OutFlow Max=0.40 cfs @ 17.51 hrs HW=662.13' TW=656.46' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 11.39 fps)
  - **3=Exfiltration** (Passes 0.06 cfs of 0.20 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 0.34 cfs @ 1.02 fps)

Pond 2.1P:


Hydrograph
0.98 cfs
0.40 cfs
Inflow Area=7.100 ac
Peak Elev=662.13'
Storage=10,310 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.2P:

Inflow Area = 7.600 ac, 40.79% Impervious, Inflow Depth = 1.38" for 2-yr event
Inflow = 0.41 cfs @ 17.49 hrs, Volume= 0.871 af
Outflow = 0.23 cfs @ 22.37 hrs, Volume= 0.871 af, Atten= 45%, Lag= 292.7 min
Primary = 0.23 cfs @ 22.37 hrs, Volume= 0.871 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 657.31' @ 22.37 hrs Surf.Area= 5,202 sf Storage= 6,335 cf
Flood Elev= 659.00' Surf.Area= 8,000 sf Storage= 17,700 cf

Plug-Flow detention time= 1,616.2 min calculated for 0.871 af (100% of inflow)
Center-of-Mass det. time= 1,616.1 min (5,970.6 - 4,354.5)

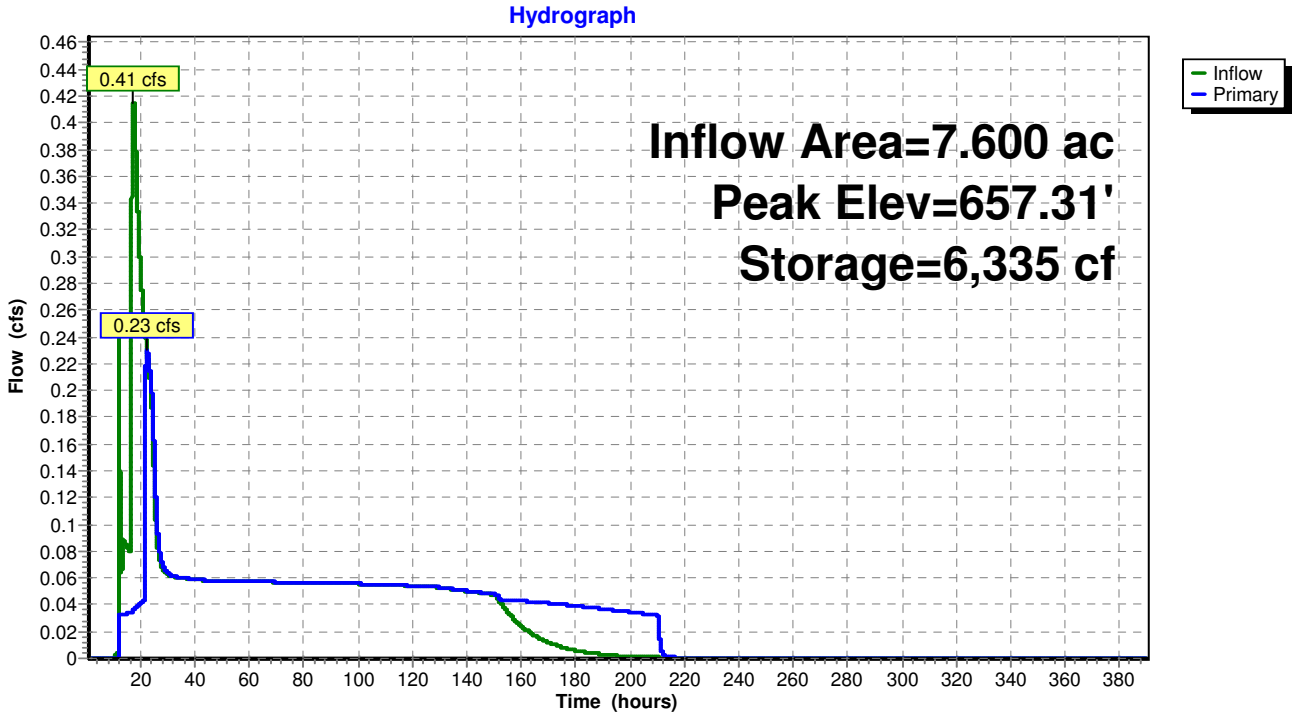
Volume	Invert	Avail.Storage	Storage Description
#1	656.00'	25,700 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
656.00	3,700	0	0
658.00	6,000	9,700	9,700
660.00	10,000	16,000	25,700

Device	Routing	Invert	Outlet Devices
#1	Primary	654.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	657.25'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	656.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=0.23 cfs @ 22.37 hrs HW=657.31' TW=588.75' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.04 cfs @ 8.01 fps)
  - **3=Orifice/Grate** (Passes 0.04 cfs of 1.19 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 0.19 cfs @ 0.66 fps)

Pond 2.2P:


Hydrograph
Inflow Area=7.600 ac
Peak Elev=657.31'
Storage=6,335 cf
0.41 cfs
0.23 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0.46
0.44
0.42
0.4
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380

Summary for Pond 2.3P:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth = 1.40" for 2-yr event
Inflow = 3.49 cfs @ 12.09 hrs, Volume= 1.140 af
Outflow = 0.50 cfs @ 12.88 hrs, Volume= 1.138 af, Atten= 86%, Lag= 47.5 min
Primary = 0.50 cfs @ 12.88 hrs, Volume= 1.138 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 586.50' Surf.Area= 6,267 sf Storage= 13,775 cf
Peak Elev= 587.33' @ 12.88 hrs Surf.Area= 8,265 sf Storage= 19,597 cf (5,822 cf above start)
Flood Elev= 588.25' Surf.Area= 9,578 sf Storage= 28,275 cf (14,500 cf above start)

Plug-Flow detention time= 5,354.5 min calculated for 0.822 af (72% of inflow)
Center-of-Mass det. time= 1,509.3 min (6,273.2 - 4,763.9)

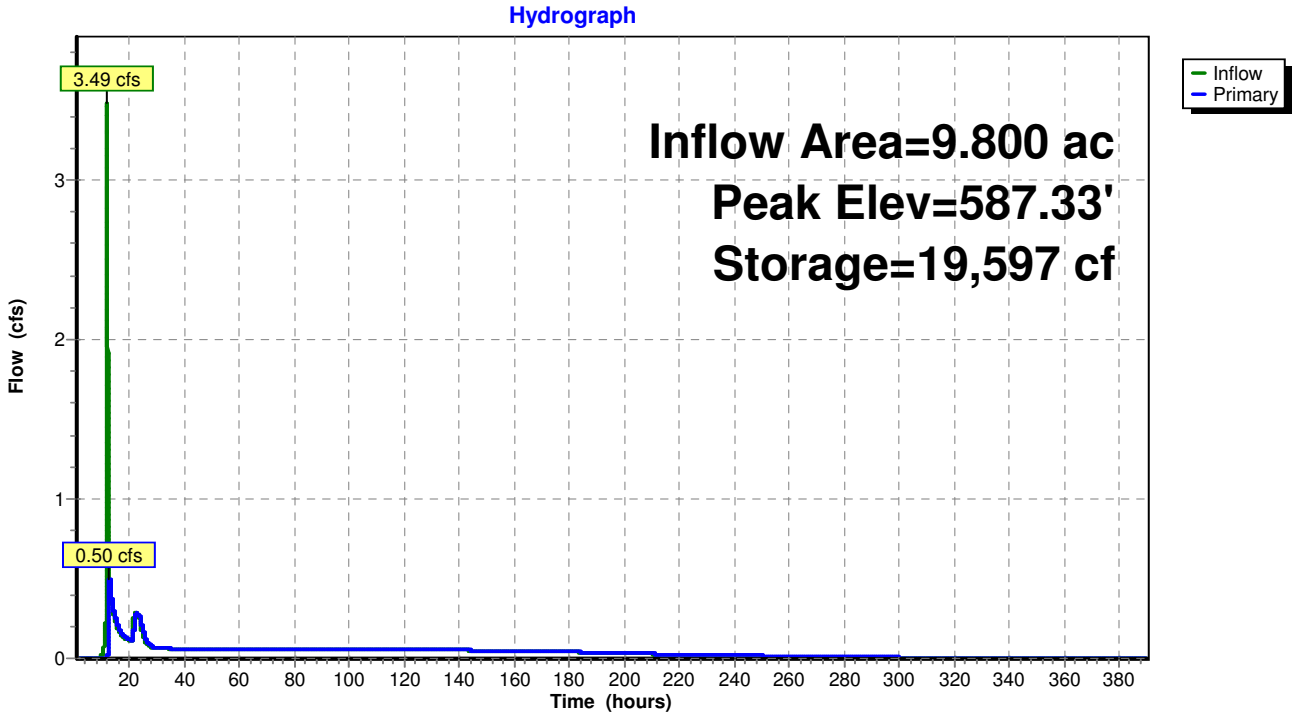
Volume	Invert	Avail.Storage	Storage Description
#1	579.50'	37,675 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
579.50	50	0	0
580.00	150	50	50
582.00	1,000	1,150	1,200
584.00	2,100	3,100	4,300
585.50	3,200	3,975	8,275
587.00	7,800	8,250	16,525
589.25	11,000	21,150	37,675

Device	Routing	Invert	Outlet Devices
#1	Primary	587.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	586.50'	**1.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.50 cfs @ 12.88 hrs HW=587.33' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.48 cfs @ 0.78 fps)
2=Orifice/Grate (Orifice Controls 0.02 cfs @ 4.27 fps)

Pond 2.3P:


Hydrograph
Inflow Area=9.800 ac
Peak Elev=587.33'
Storage=19,597 cf
3.49 cfs
0.50 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond FS 1:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 1.50" for 2-yr event
Inflow = 9.10 cfs @ 12.18 hrs, Volume= 0.824 af
Outflow = 9.10 cfs @ 12.18 hrs, Volume= 0.824 af, Atten= 0%, Lag= 0.0 min
Primary = 9.10 cfs @ 12.18 hrs, Volume= 0.824 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

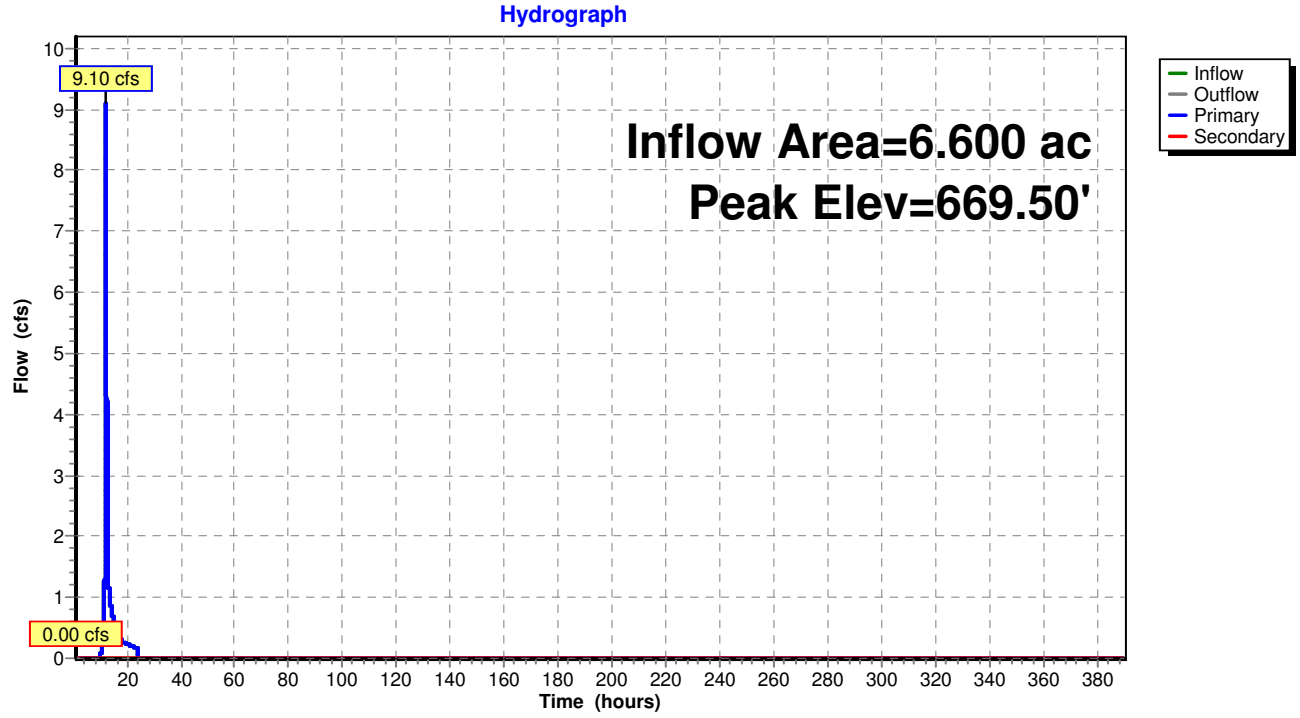
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 669.50' @ 12.18 hrs
Flood Elev= 674.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	666.50'	**15.0" x 35.0' long Culvert** RCP, square edge headwall, Ke= 0.500 Outlet Invert= 666.00' S= 0.0143 '/' Cc= 0.900 n= 0.012
#2	Secondary	669.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=9.09 cfs @ 12.18 hrs HW=669.49' TW=666.23' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 9.09 cfs @ 7.41 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=666.50' TW=656.00' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond FS 1:



Summary for Pond FS 2:

Inflow Area = 8.700 ac, 41.38% Impervious, Inflow Depth = 1.39" for 2-yr event
Inflow = 2.06 cfs @ 12.07 hrs, Volume= 1.009 af
Outflow = 2.06 cfs @ 12.07 hrs, Volume= 1.009 af, Atten= 0%, Lag= 0.0 min
Primary = 2.06 cfs @ 12.07 hrs, Volume= 1.009 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

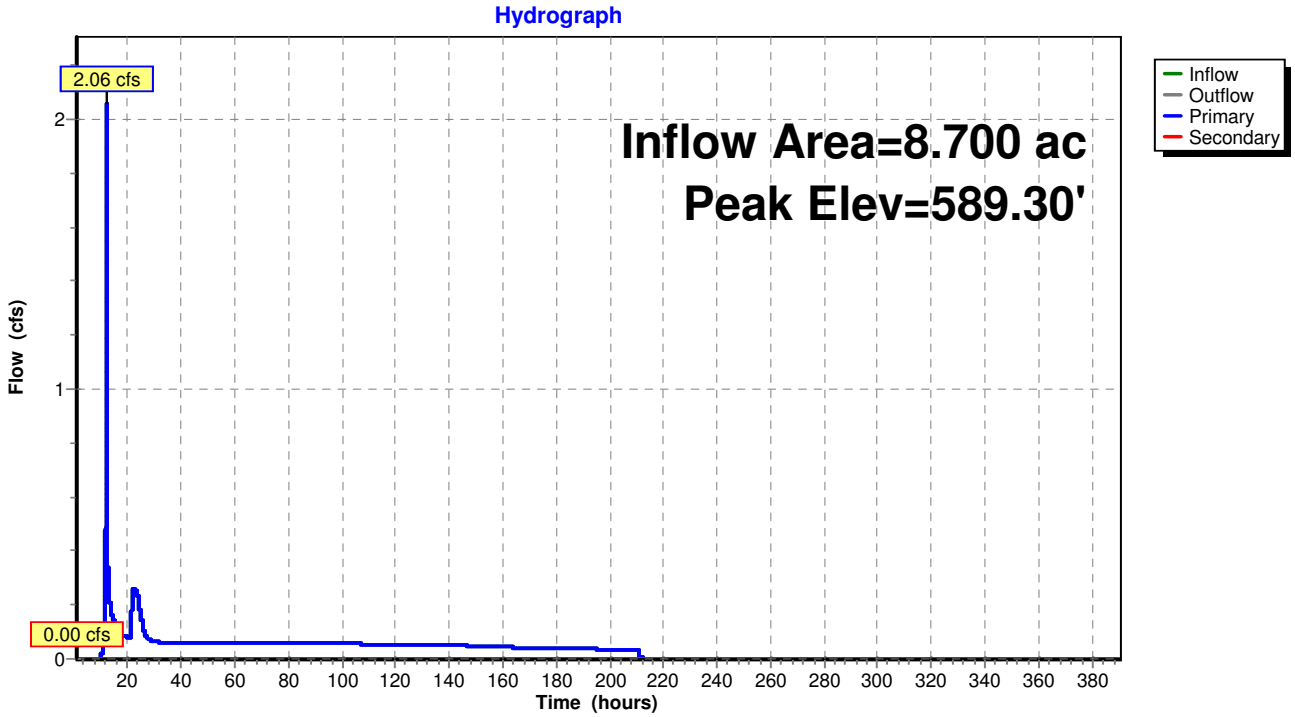
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 589.30' @ 12.07 hrs
Flood Elev= 596.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.50'	**12.0" x 23.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 588.00' S= 0.0217 '/' Cc= 0.900 n= 0.012
#2	Secondary	589.50'	**24.0" x 195.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 582.00' S= 0.0385 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=2.06 cfs @ 12.07 hrs HW=589.30' TW=586.93' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.06 cfs @ 3.05 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=588.50' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Pond FS 2:



Summary for Subcatchment 1.0S:

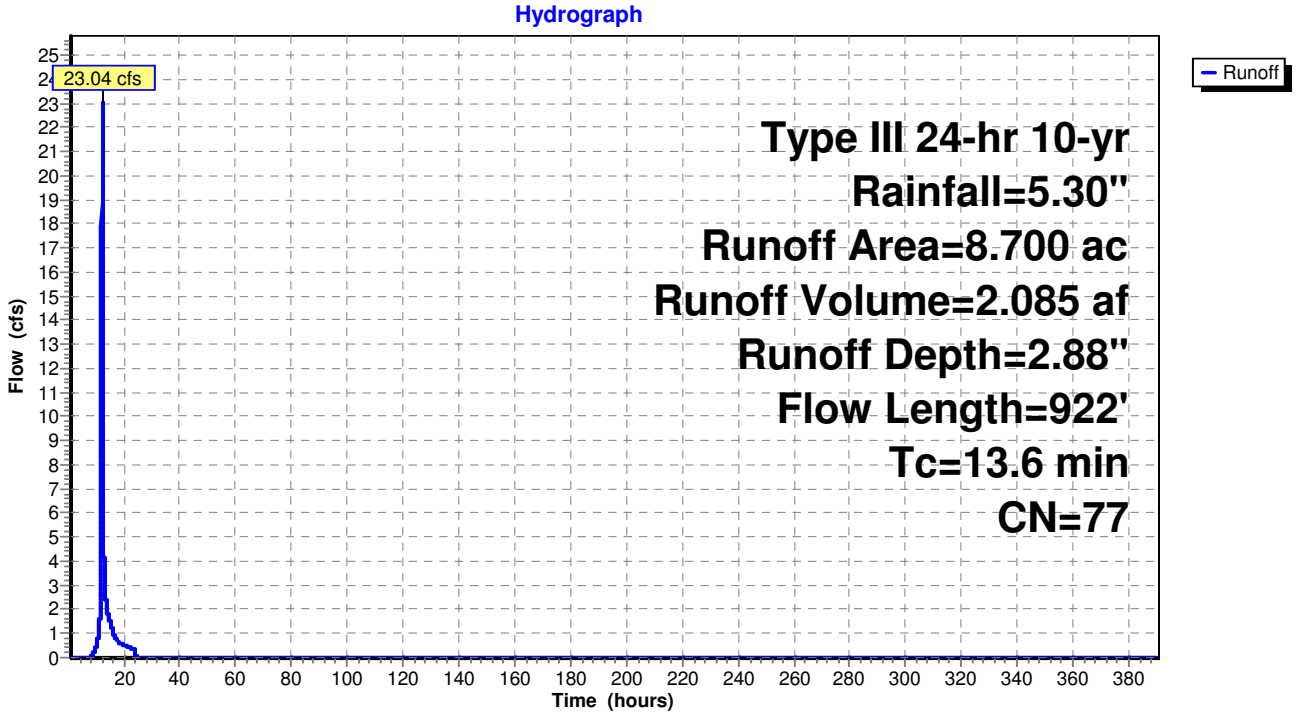
Runoff = 23.04 cfs @ 12.19 hrs, Volume= 2.085 af, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
3.800	98	Paved parking & roofs
1.100	60	Woods, Fair, HSG B
3.800	61	>75% Grass cover, Good, HSG B
8.700	77	Weighted Average
4.900		Pervious Area
3.800		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	221	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	601	0.0900	17.83	31.51	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.6	922	Total			

Subcatchment 1.0S:



Summary for Subcatchment 1.1S:

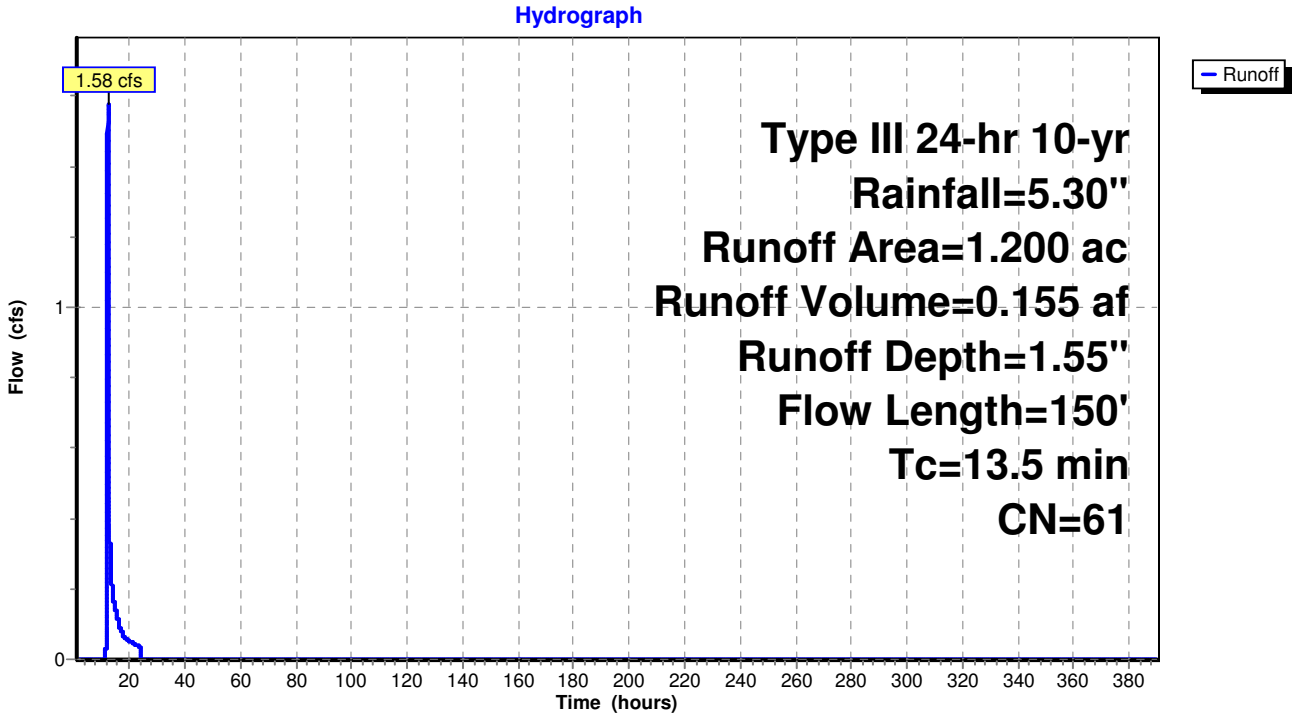
Runoff = 1.58 cfs @ 12.20 hrs, Volume= 0.155 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
1.200	61	>75% Grass cover, Good, HSG B
1.200		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	50	0.1600	2.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	150	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

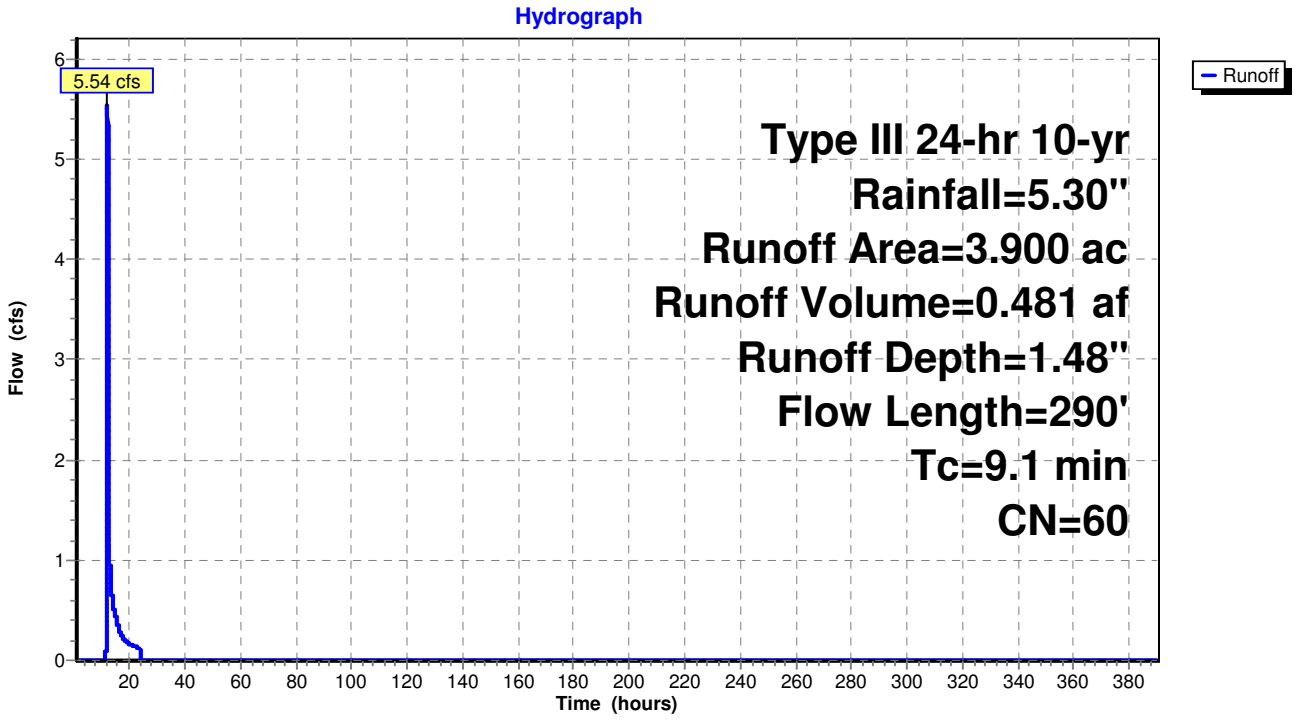
Runoff = 5.54 cfs @ 12.14 hrs, Volume= 0.481 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
2.400	60	Woods, Fair, HSG B
1.500	61	>75% Grass cover, Good, HSG B
3.900	60	Weighted Average
3.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.1140	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	170	0.2350	2.42		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.4800	4.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	290	Total			

Subcatchment 1.2S:



Summary for Subcatchment 1S:

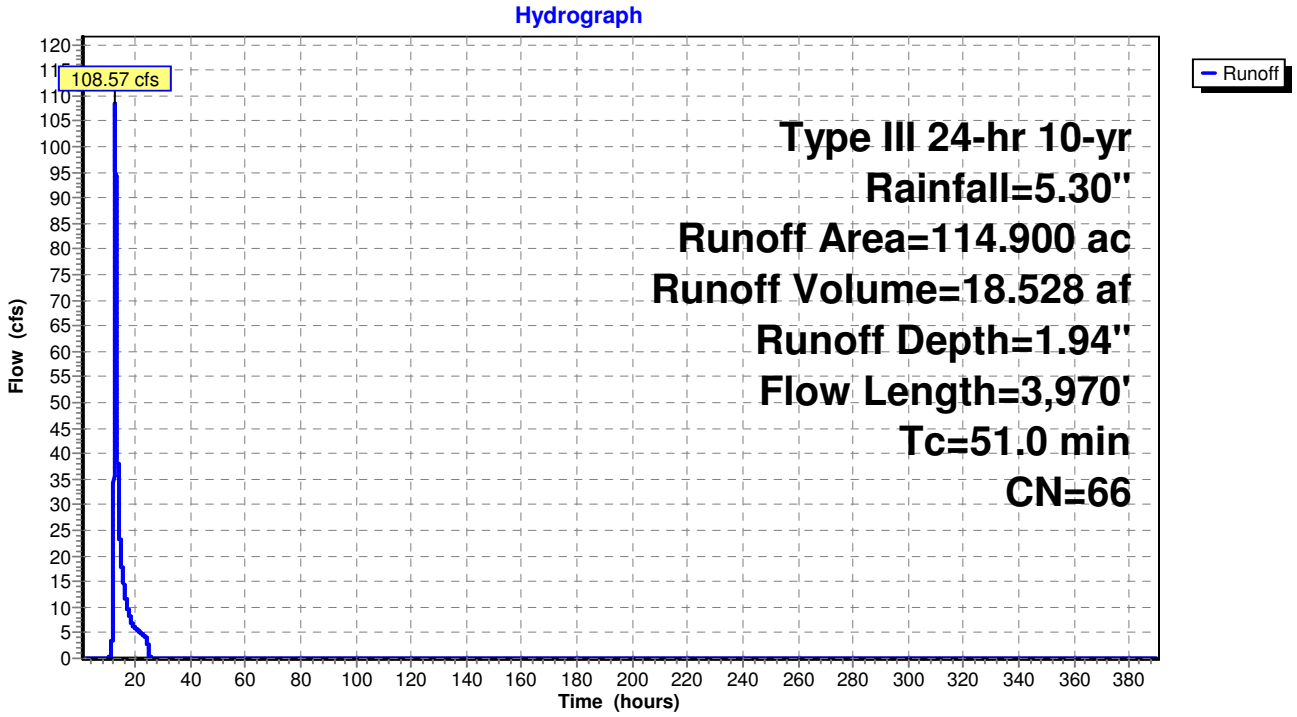
Runoff = 108.57 cfs @ 12.75 hrs, Volume= 18.528 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

	Area (ac)	CN	Description
*	30.000	68	1 acre lots, 20% imp, HSG B
*	43.000	58	Woods/grass comb., Good, HSG B
*	6.000	61	>75% Grass cover, Good, HSG B
*	19.900	92	Urban commercial, 85% imp, HSG B
*	16.000	55	Woods, Good, HSG B
	114.900	66	Weighted Average
	91.985		Pervious Area
	22.915		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 2.0S:

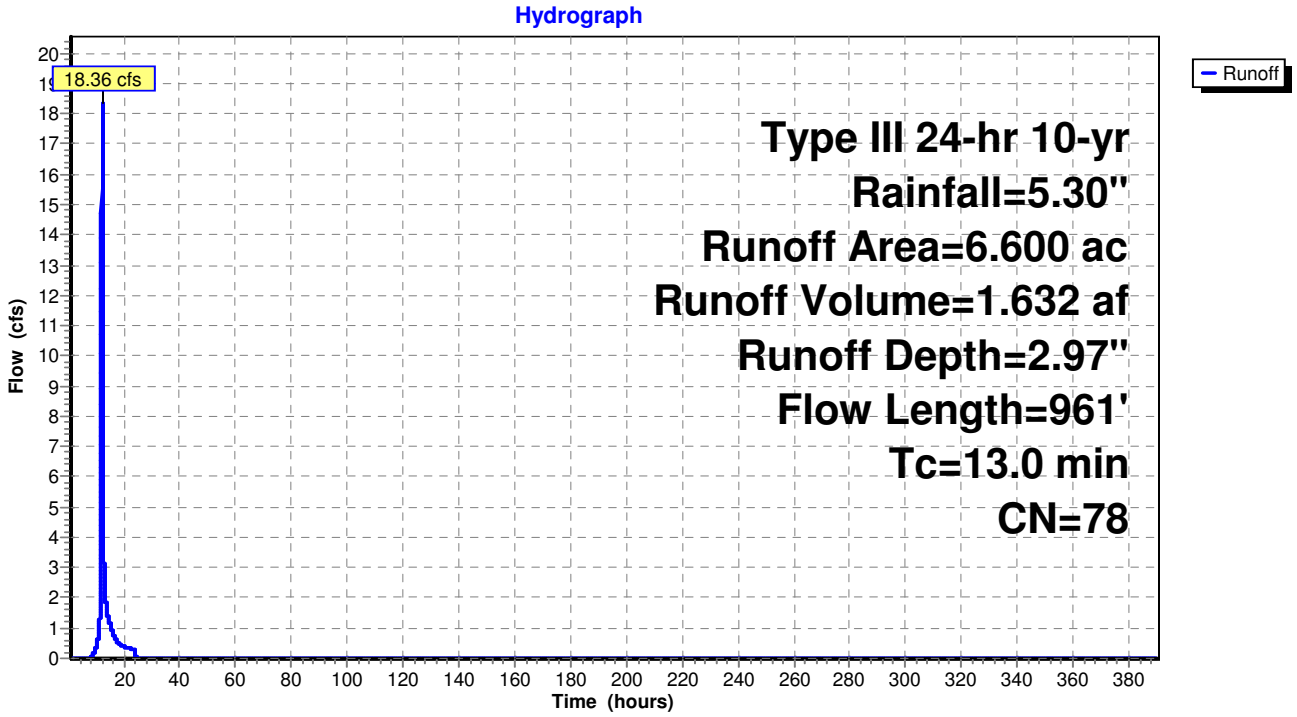
Runoff = 18.36 cfs @ 12.18 hrs, Volume= 1.632 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
3.100	98	Paved parking & roofs
1.300	60	Woods, Fair, HSG B
2.200	61	>75% Grass cover, Good, HSG B
6.600	78	Weighted Average
3.500		Pervious Area
3.100		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	16	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	220	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	550	0.1000	18.80	33.22	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.0	961	Total			

Subcatchment 2.0S:



Summary for Subcatchment 2.1S:

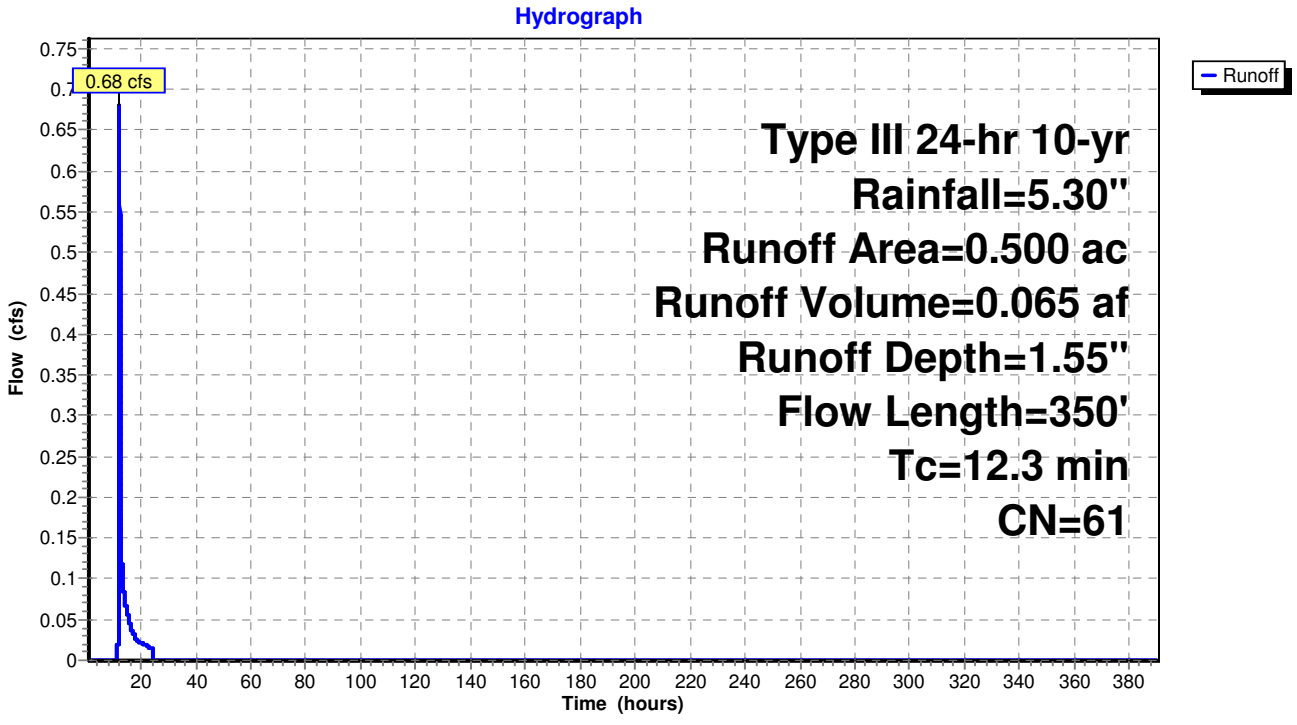
Runoff = 0.68 cfs @ 12.18 hrs, Volume= 0.065 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
0.200	60	Woods, Fair, HSG B
0.300	61	>75% Grass cover, Good, HSG B
0.500	61	Weighted Average
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.7	200	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.3600	4.20		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.3	350	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

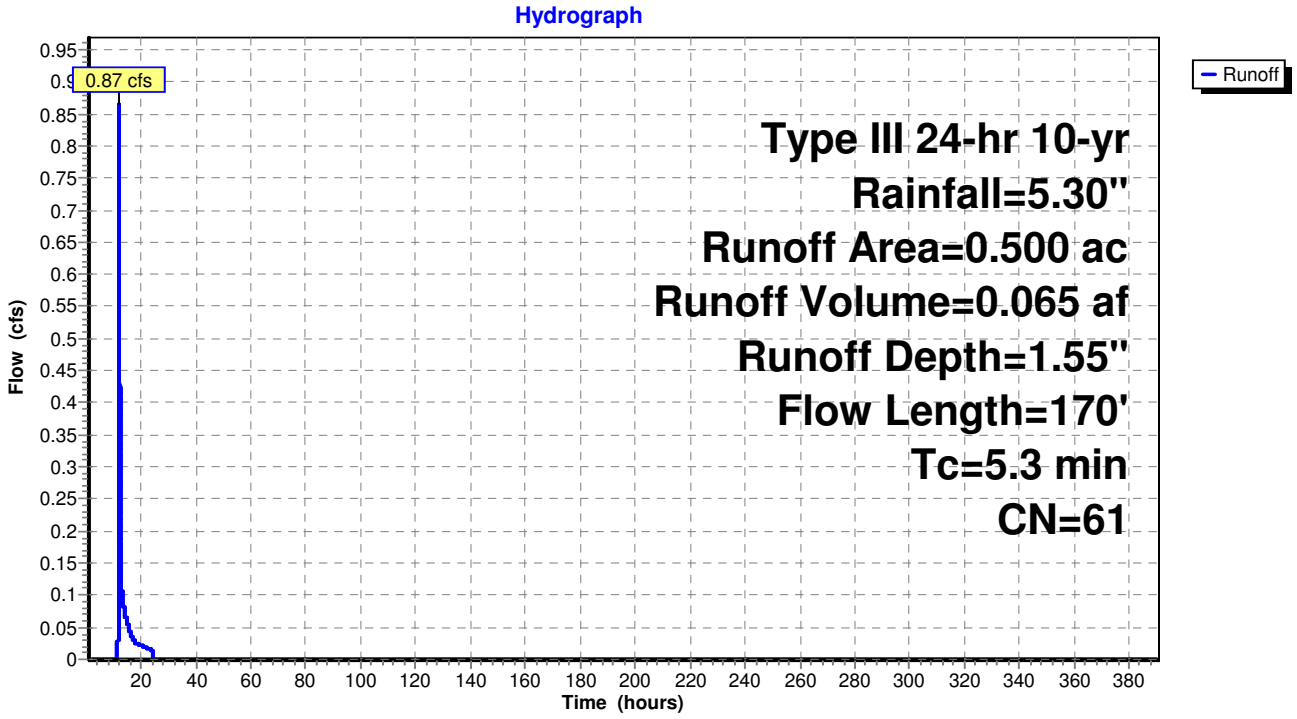
Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.065 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.1200	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0570	1.67		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.3	170	Total			

Subcatchment 2.2S:



Summary for Subcatchment 2.3.1S:

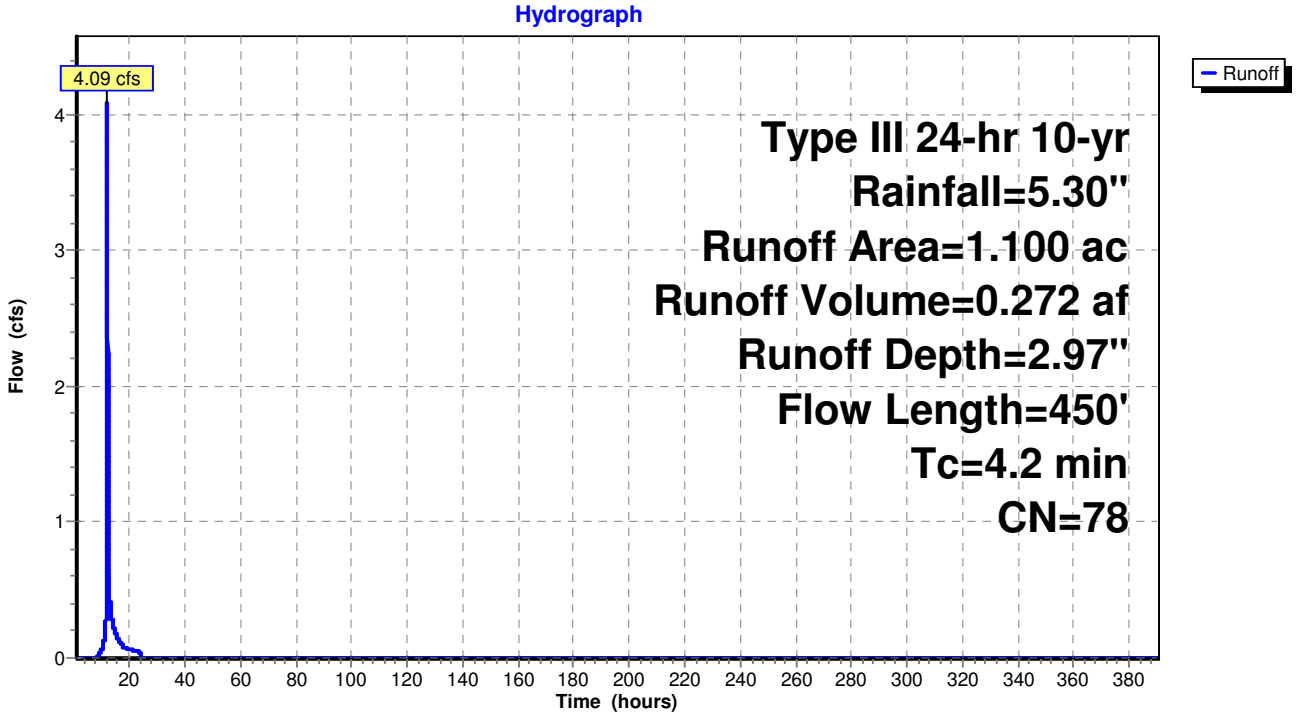
Runoff = 4.09 cfs @ 12.06 hrs, Volume= 0.272 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
0.500	98	Paved parking & roofs
0.600	61	>75% Grass cover, Good, HSG B
1.100	78	Weighted Average
0.600		Pervious Area
0.500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2200	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.5	115	0.3000	3.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	235	0.2000	26.58	46.98	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
4.2	450	Total			

Subcatchment 2.3.1S:



Summary for Subcatchment 2.3.2S:

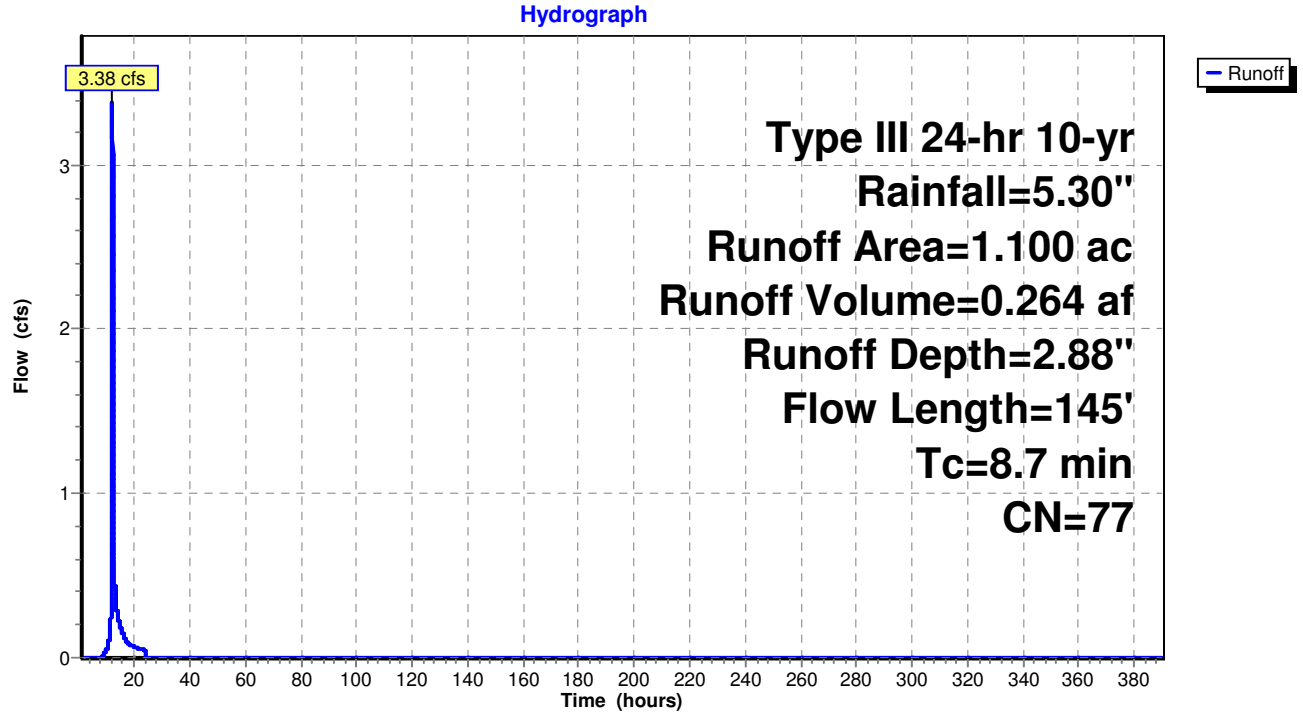
Runoff = 3.38 cfs @ 12.12 hrs, Volume= 0.264 af, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.300	60	Woods, Fair, HSG B
0.400	74	>75% Grass cover, Good, HSG C
0.100	80	>75% Grass cover, Good, HSG D
1.100	77	Weighted Average
0.800		Pervious Area
0.300		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.2000	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	45	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	145	Total			

Subcatchment 2.3.2S:



Summary for Subcatchment 3S:

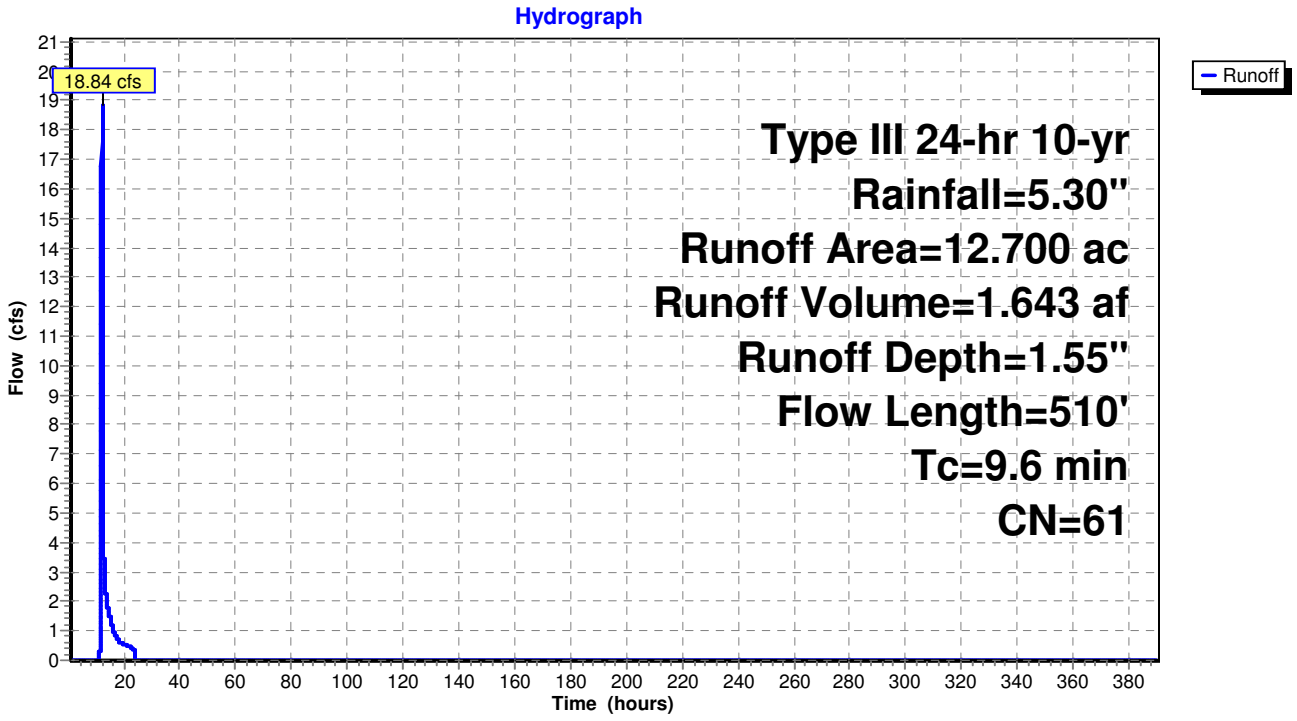
Runoff = 18.84 cfs @ 12.15 hrs, Volume= 1.643 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.30"

Area (ac)	CN	Description
0.400	98	Paved parking & roofs
10.300	60	Woods, Fair, HSG B
2.000	61	>75% Grass cover, Good, HSG B
12.700	61	Weighted Average
12.300		Pervious Area
0.400		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.2800	0.23		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	410	0.2930	2.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.6	510	Total			

Subcatchment 3S:

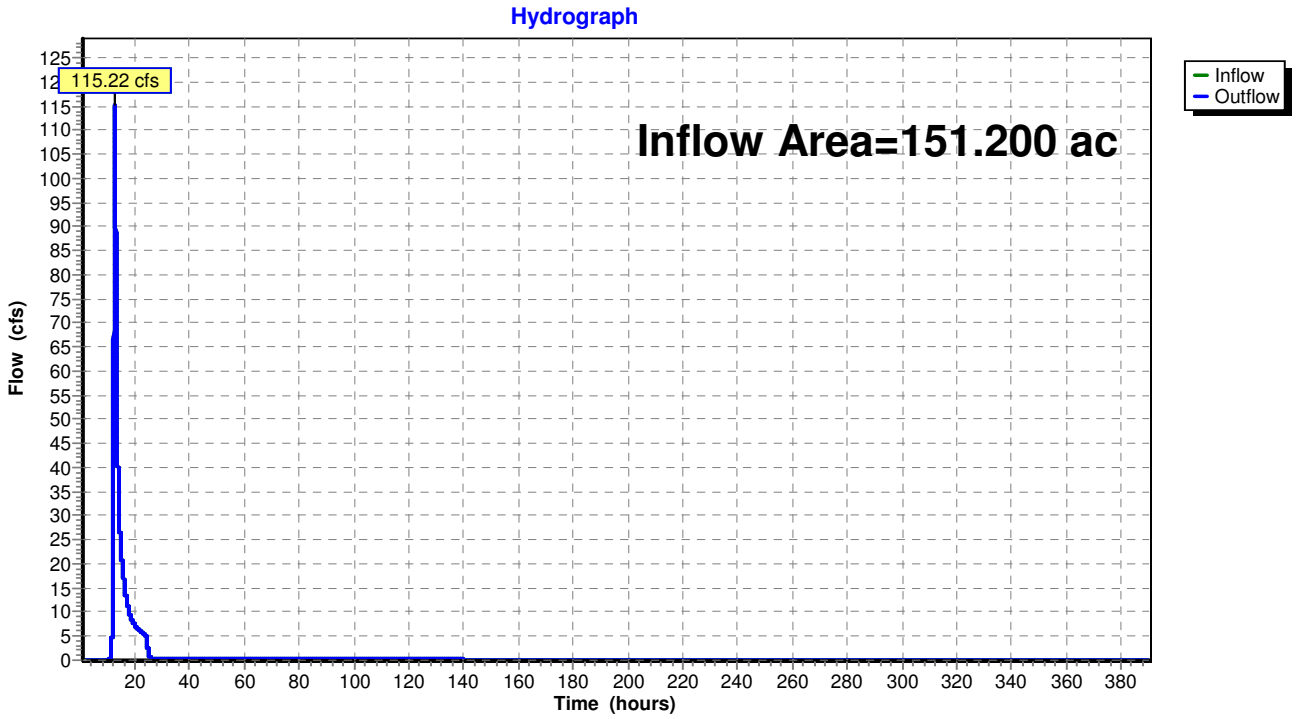


Summary for Reach 1R:

Inflow Area = 151.200 ac, 20.51% Impervious, Inflow Depth = 2.00" for 10-yr event
Inflow = 115.22 cfs @ 12.74 hrs, Volume= 25.170 af
Outflow = 115.22 cfs @ 12.74 hrs, Volume= 25.170 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 1R:

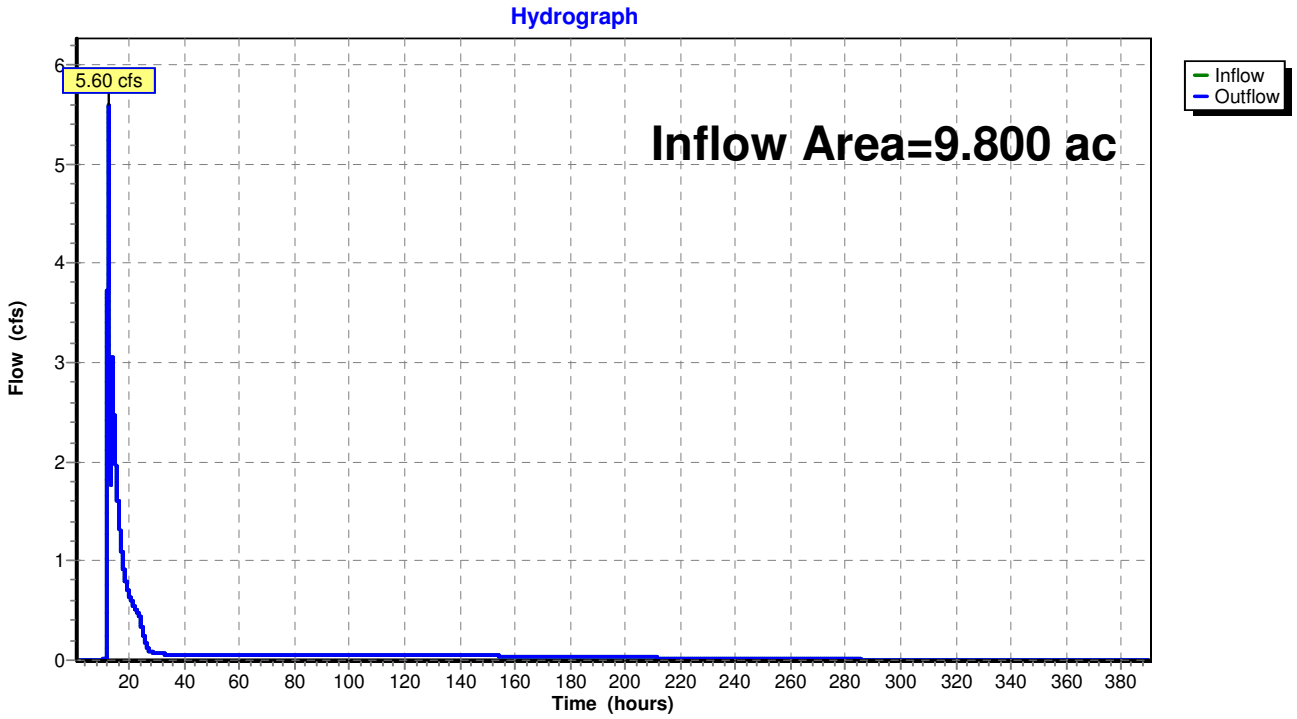


Summary for Reach 2R:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 5.60 cfs @ 12.42 hrs, Volume= 2.296 af
Outflow = 5.60 cfs @ 12.42 hrs, Volume= 2.296 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 2R:



Summary for Pond 1.0P:

Inflow Area = 8.700 ac, 43.68% Impervious, Inflow Depth = 2.88" for 10-yr event
Inflow = 23.04 cfs @ 12.19 hrs, Volume= 2.085 af
Outflow = 11.00 cfs @ 12.49 hrs, Volume= 2.083 af, Atten= 52%, Lag= 18.1 min
Primary = 11.00 cfs @ 12.49 hrs, Volume= 2.083 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 674.00' Surf.Area= 14,391 sf Storage= 31,719 cf
Peak Elev= 676.07' @ 12.49 hrs Surf.Area= 19,239 sf Storage= 66,622 cf (34,903 cf above start)
Flood Elev= 677.00' Surf.Area= 22,107 sf Storage= 87,251 cf (55,532 cf above start)

Plug-Flow detention time= 804.8 min calculated for 1.355 af (65% of inflow)
Center-of-Mass det. time= 431.7 min (1,265.8 - 834.1)

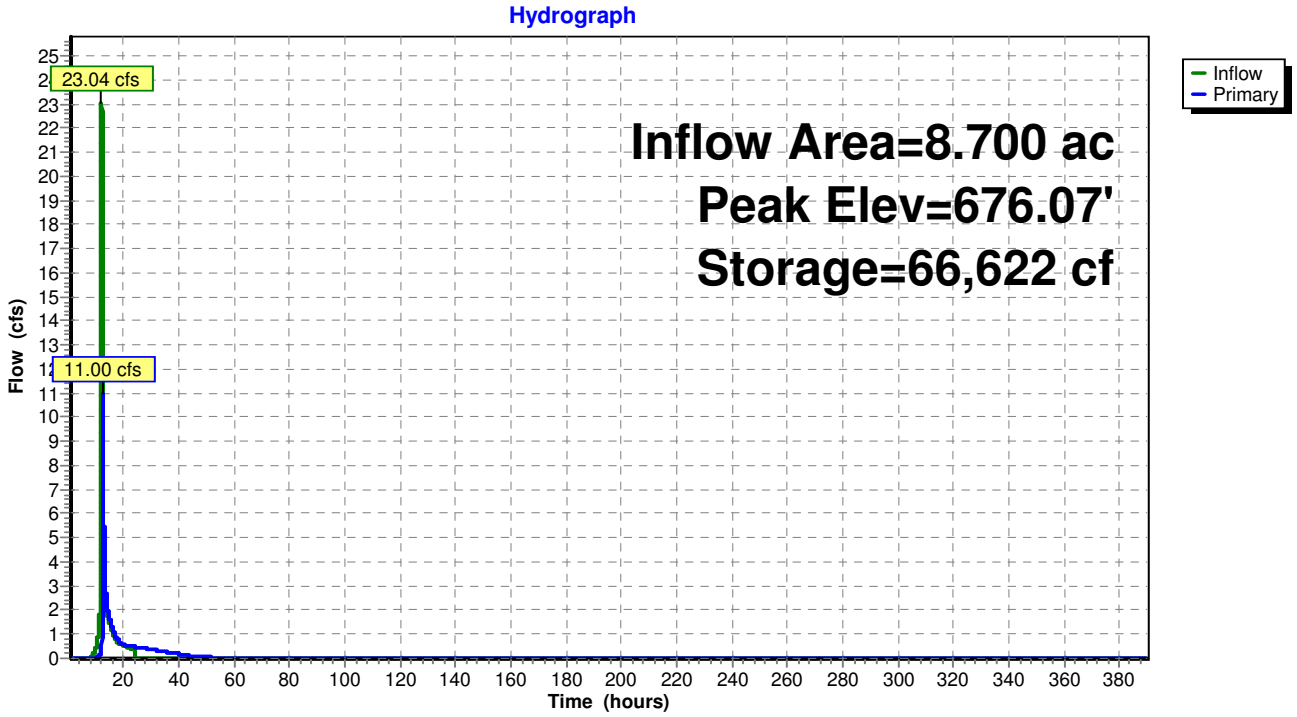
Volume	Invert	Avail.Storage	Storage Description
#1	670.00'	109,358 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
670.00	3,990	0	0
672.00	6,669	10,659	10,659
674.00	14,391	21,060	31,719
676.00	19,034	33,425	65,144
678.00	25,180	44,214	109,358

Device	Routing	Invert	Outlet Devices
#1	Primary	674.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	675.50'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=11.00 cfs @ 12.49 hrs HW=676.07' TW=666.07' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.58 cfs @ 6.64 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 10.43 cfs @ 2.30 fps)

Pond 1.0P:


Hydrograph
Inflow
Primary
Inflow Area=8.700 ac
Peak Elev=676.07'
Storage=66,622 cf
23.04 cfs
11.00 cfs
Flow (cfs)
Time (hours)

Summary for Pond 1.1P:

Inflow Area = 9.900 ac, 38.38% Impervious, Inflow Depth = 2.71" for 10-yr event
Inflow = 11.91 cfs @ 12.48 hrs, Volume= 2.238 af
Outflow = 4.64 cfs @ 13.09 hrs, Volume= 2.237 af, Atten= 61%, Lag= 36.9 min
Primary = 4.64 cfs @ 13.09 hrs, Volume= 2.237 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 667.65' @ 13.09 hrs Surf.Area= 9,446 sf Storage= 24,493 cf
Flood Elev= 669.00' Surf.Area= 11,900 sf Storage= 39,300 cf

Plug-Flow detention time= 979.2 min calculated for 2.237 af (100% of inflow)
Center-of-Mass det. time= 971.2 min (2,209.9 - 1,238.7)

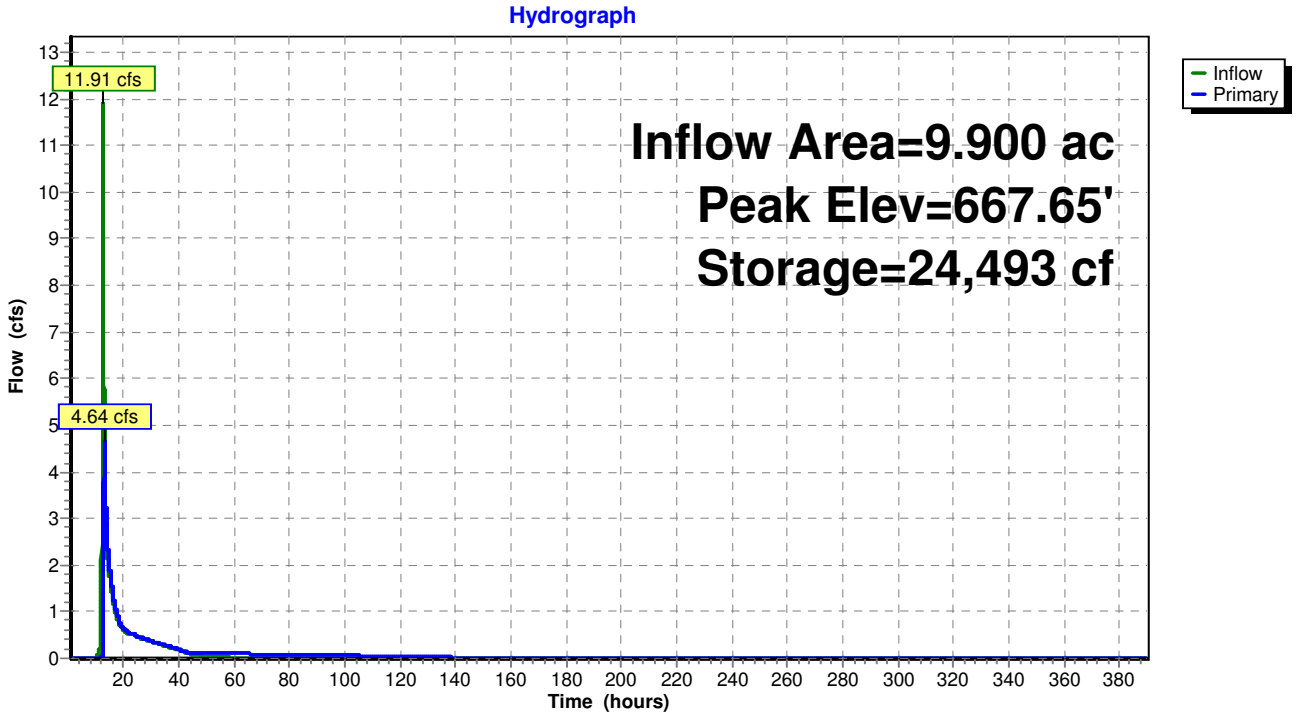
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	51,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	3,800	0	0
666.00	6,800	10,600	10,600
668.00	10,000	16,800	27,400
670.00	13,800	23,800	51,200

Device	Routing	Invert	Outlet Devices
#1	Primary	664.00'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	667.20'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.64 cfs @ 13.09 hrs HW=667.65' TW=636.73' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.11 cfs @ 9.12 fps)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 4.53 cfs @ 2.00 fps)

Pond 1.1P:


Hydrograph
Inflow Area=9.900 ac
Peak Elev=667.65'
Storage=24,493 cf
11.91 cfs
4.64 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 1.2P:

Inflow Area = 13.800 ac, 27.54% Impervious, Inflow Depth = 2.36" for 10-yr event
Inflow = 5.57 cfs @ 12.14 hrs, Volume= 2.718 af
Outflow = 0.16 cfs @ 41.55 hrs, Volume= 2.702 af, Atten= 97%, Lag= 1,764.4 min
Primary = 0.16 cfs @ 41.55 hrs, Volume= 2.702 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 639.64' @ 41.55 hrs Surf.Area= 24,511 sf Storage= 77,550 cf
Flood Elev= 641.00' Surf.Area= 27,600 sf Storage= 113,600 cf

Plug-Flow detention time= 6,038.4 min calculated for 2.702 af (99% of inflow)
Center-of-Mass det. time= 5,984.2 min (7,957.7 - 1,973.5)

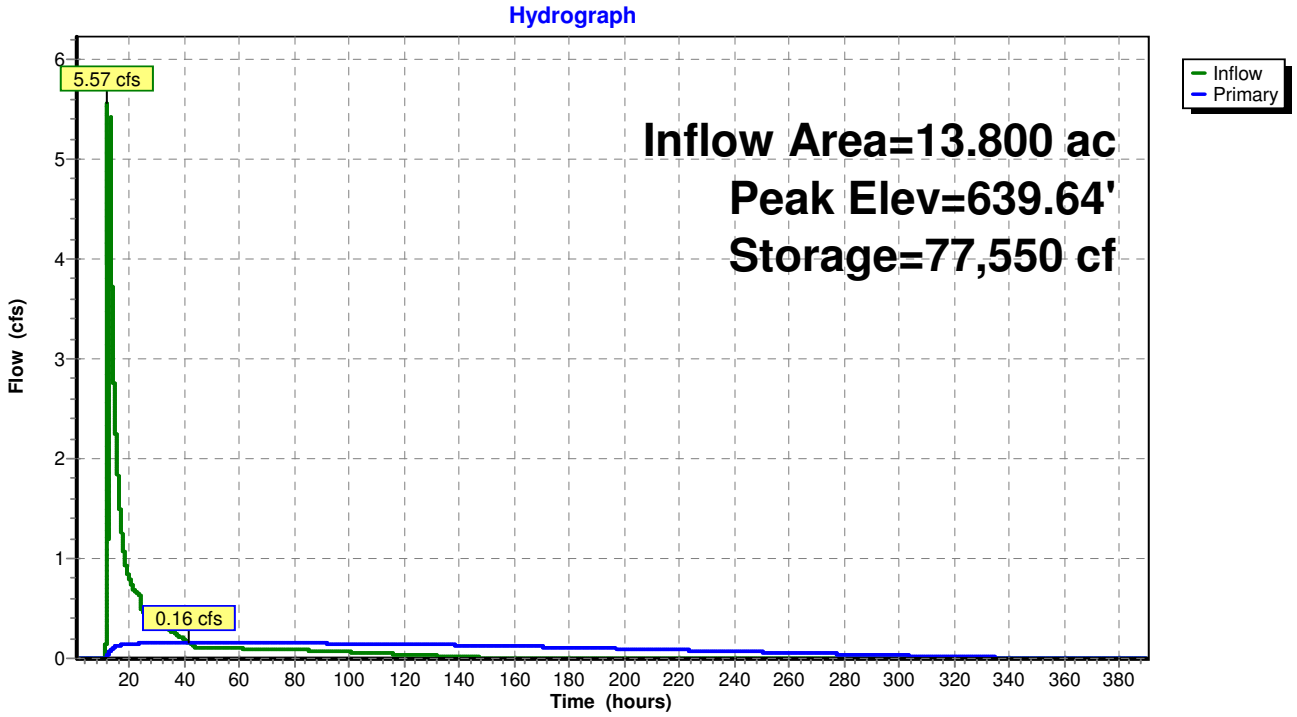
Volume	Invert	Avail.Storage	Storage Description
#1	636.00'	141,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
636.00	18,000	0	0
638.00	21,400	39,400	39,400
640.00	25,200	46,600	86,000
642.00	30,000	55,200	141,200

Device	Routing	Invert	Outlet Devices
#1	Primary	636.00'	**1.8" Vert. Orifice/Grate** C= 0.600
#2	Primary	640.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.16 cfs @ 41.55 hrs HW=639.64' TW=0.00' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.16 cfs @ 9.09 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1.2P:


Hydrograph
Inflow Area=13.800 ac
Peak Elev=639.64'
Storage=77,550 cf
5.57 cfs
0.16 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.0P:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 2.58" for 10-yr event
Inflow = 9.75 cfs @ 12.09 hrs, Volume= 1.421 af
Outflow = 5.01 cfs @ 12.64 hrs, Volume= 1.421 af, Atten= 49%, Lag= 32.9 min
Primary = 5.01 cfs @ 12.64 hrs, Volume= 1.421 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 668.72' @ 12.64 hrs Surf.Area= 8,065 sf Storage= 24,083 cf
Flood Elev= 669.00' Surf.Area= 8,550 sf Storage= 26,450 cf

Plug-Flow detention time= 1,077.4 min calculated for 1.421 af (100% of inflow)
Center-of-Mass det. time= 1,077.3 min (1,922.5 - 845.2)

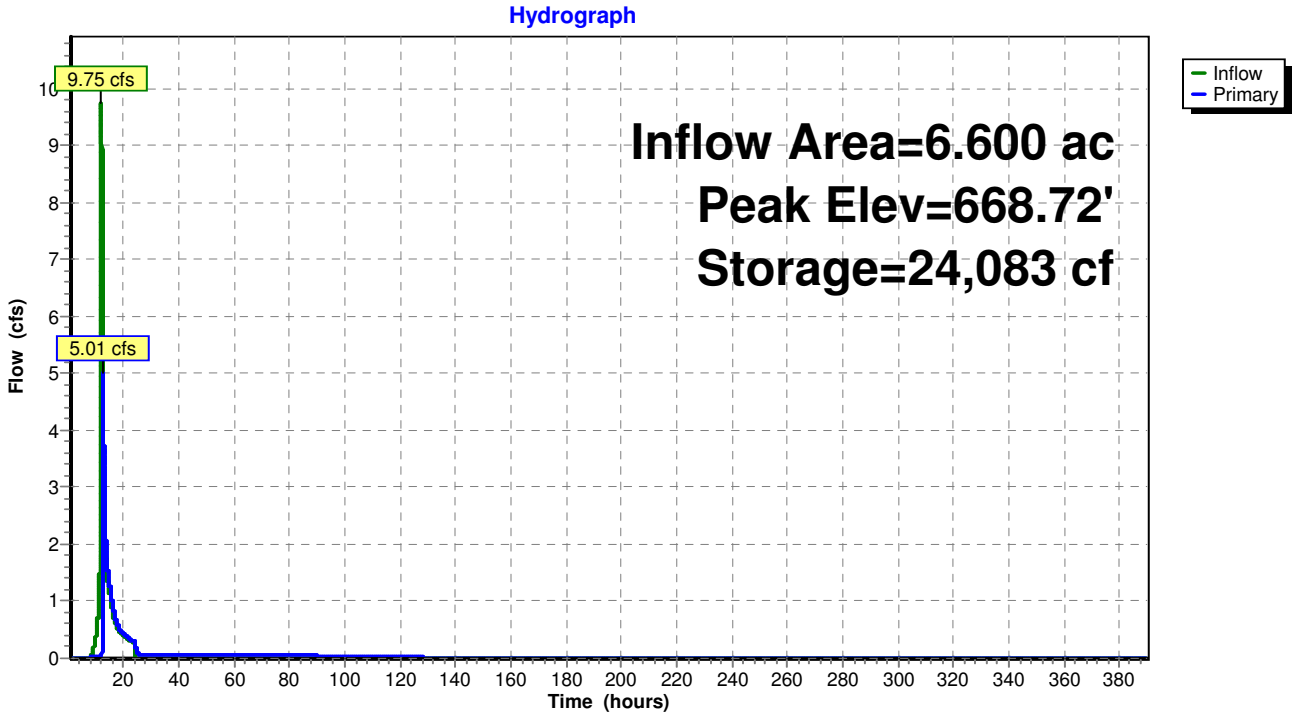
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	35,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	2,300	0	0
666.00	4,400	6,700	6,700
668.00	6,800	11,200	17,900
670.00	10,300	17,100	35,000

Device	Routing	Invert	Outlet Devices
#1	Primary	662.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	668.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	664.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=5.01 cfs @ 12.64 hrs HW=668.72' TW=661.36' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 11.97 fps)
  - **3=Orifice/Grate** (Passes 0.07 cfs of 2.28 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 4.94 cfs @ 2.73 fps)

Pond 2.0P:


Hydrograph
Inflow Area=6.600 ac
Peak Elev=668.72'
Storage=24,083 cf
9.75 cfs
5.01 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.1P:

Inflow Area = 7.100 ac, 43.66% Impervious, Inflow Depth = 2.51" for 10-yr event
Inflow = 5.23 cfs @ 12.63 hrs, Volume= 1.486 af
Outflow = 2.56 cfs @ 13.37 hrs, Volume= 1.486 af, Atten= 51%, Lag= 44.4 min
Primary = 2.56 cfs @ 13.37 hrs, Volume= 1.486 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 662.48' @ 13.37 hrs Surf.Area= 6,255 sf Storage= 12,705 cf
Flood Elev= 663.00' Surf.Area= 6,850 sf Storage= 16,250 cf

Plug-Flow detention time= 1,079.9 min calculated for 1.486 af (100% of inflow)
Center-of-Mass det. time= 1,079.9 min (2,956.7 - 1,876.8)

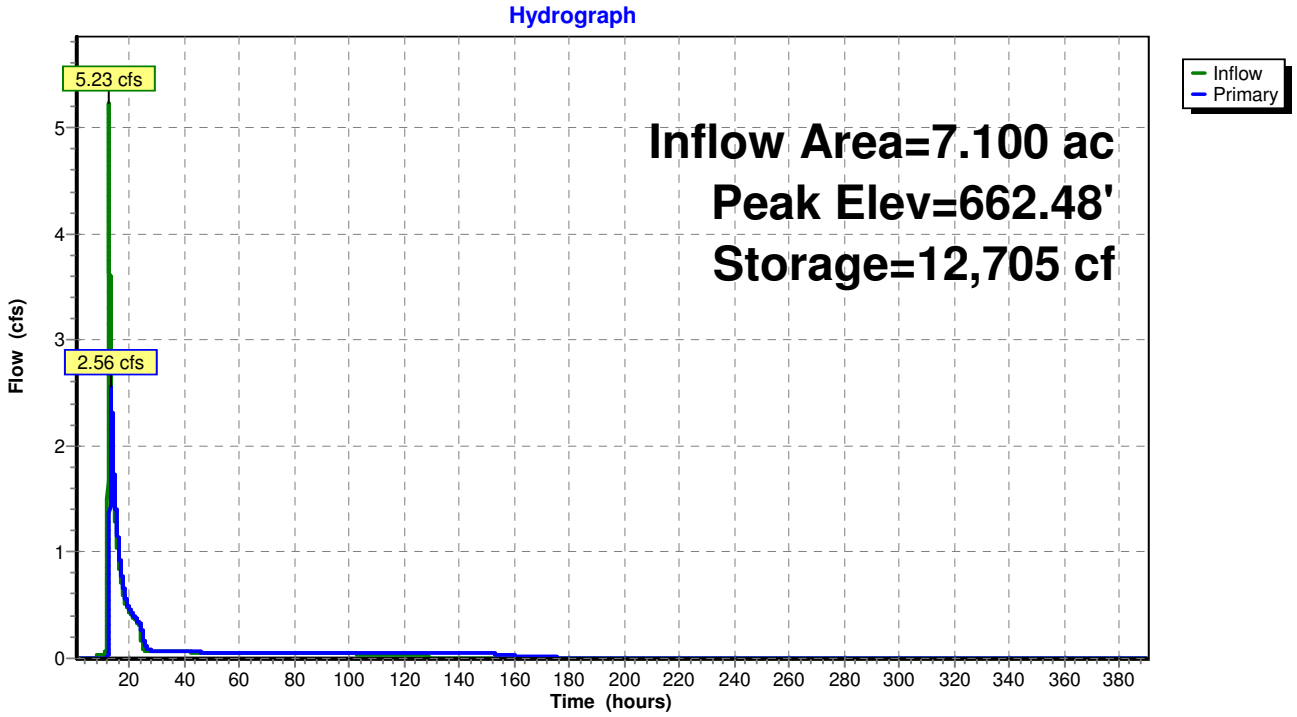
Volume	Invert	Avail.Storage	Storage Description
#1	660.00'	23,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
660.00	3,700	0	0
662.00	5,700	9,400	9,400
664.00	8,000	13,700	23,100

Device	Routing	Invert	Outlet Devices
#1	Primary	656.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	662.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	660.00'	**4.000 in/hr Exfiltration over Surface area above invert** Excluded Surface area = 3,700 sf

Primary OutFlow Max=2.56 cfs @ 13.37 hrs HW=662.48' TW=657.55' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 10.69 fps)
  - **3=Exfiltration** (Passes 0.06 cfs of 0.24 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 2.50 cfs @ 2.07 fps)

Pond 2.1P:


Hydrograph
Inflow Area=7.100 ac
Peak Elev=662.48'
Storage=12,705 cf
5.23 cfs
2.56 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.2P:

Inflow Area = 7.600 ac, 40.79% Impervious, Inflow Depth = 2.78" for 10-yr event
Inflow = 9.70 cfs @ 12.18 hrs, Volume= 1.762 af
Outflow = 3.52 cfs @ 12.42 hrs, Volume= 1.762 af, Atten= 64%, Lag= 14.3 min
Primary = 3.52 cfs @ 12.42 hrs, Volume= 1.762 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 657.63' @ 12.42 hrs Surf.Area= 5,580 sf Storage= 7,928 cf
Flood Elev= 659.00' Surf.Area= 8,000 sf Storage= 17,700 cf

Plug-Flow detention time= 834.9 min calculated for 1.762 af (100% of inflow)
Center-of-Mass det. time= 834.8 min (3,448.3 - 2,613.4)

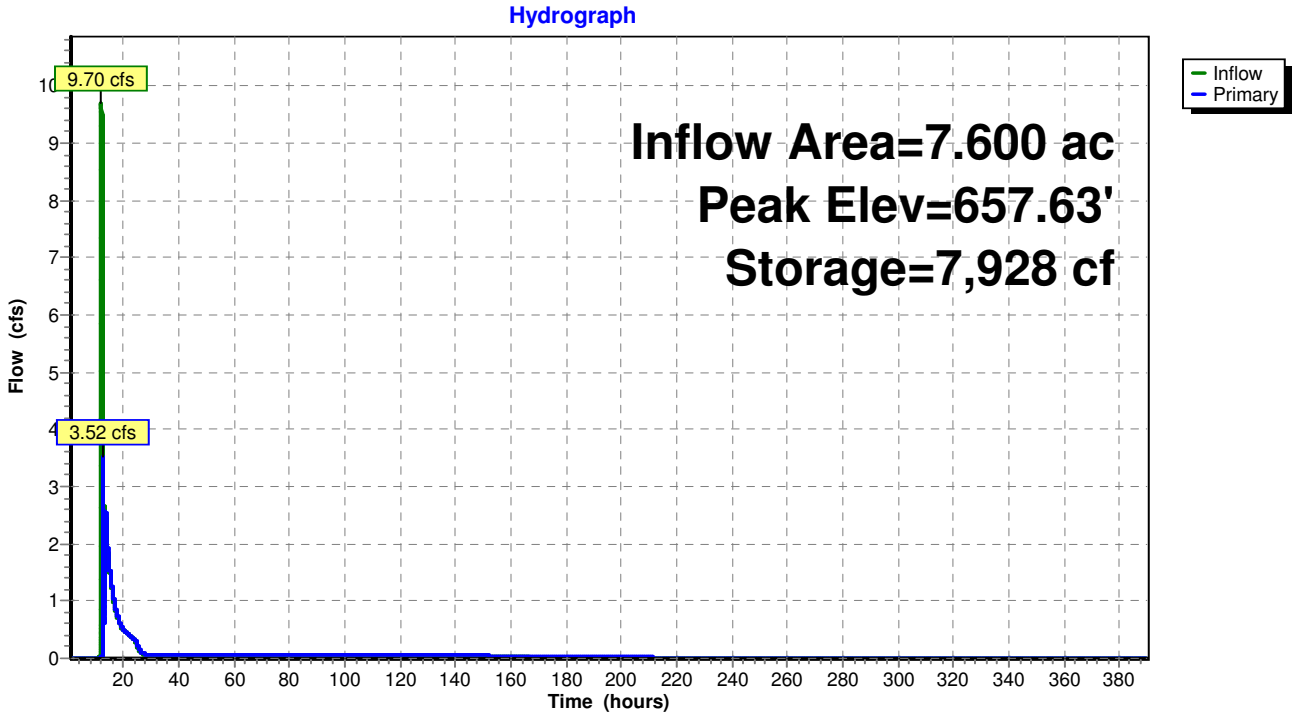
Volume	Invert	Avail.Storage	Storage Description
#1	656.00'	25,700 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
656.00	3,700	0	0
658.00	6,000	9,700	9,700
660.00	10,000	16,000	25,700

Device	Routing	Invert	Outlet Devices
#1	Primary	654.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	657.25'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	656.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=3.52 cfs @ 12.42 hrs HW=657.63' TW=589.91' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 8.47 fps)
  - **3=Orifice/Grate** (Passes 0.05 cfs of 1.33 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 3.47 cfs @ 1.80 fps)

Pond 2.2P:


Hydrograph
Inflow
Primary
9.70 cfs
3.52 cfs
Inflow Area=7.600 ac
Peak Elev=657.63'
Storage=7,928 cf
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.3P:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth = 2.79" for 10-yr event
Inflow = 6.56 cfs @ 12.10 hrs, Volume= 2.279 af
Outflow = 4.65 cfs @ 12.47 hrs, Volume= 2.278 af, Atten= 29%, Lag= 22.1 min
Primary = 4.65 cfs @ 12.47 hrs, Volume= 2.278 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 586.50' Surf.Area= 6,267 sf Storage= 13,775 cf
Peak Elev= 587.59' @ 12.47 hrs Surf.Area= 8,643 sf Storage= 22,095 cf (8,320 cf above start)
Flood Elev= 588.25' Surf.Area= 9,578 sf Storage= 28,275 cf (14,500 cf above start)

Plug-Flow detention time= 2,345.0 min calculated for 1.962 af (86% of inflow)
Center-of-Mass det. time= 763.4 min (3,617.2 - 2,853.8)

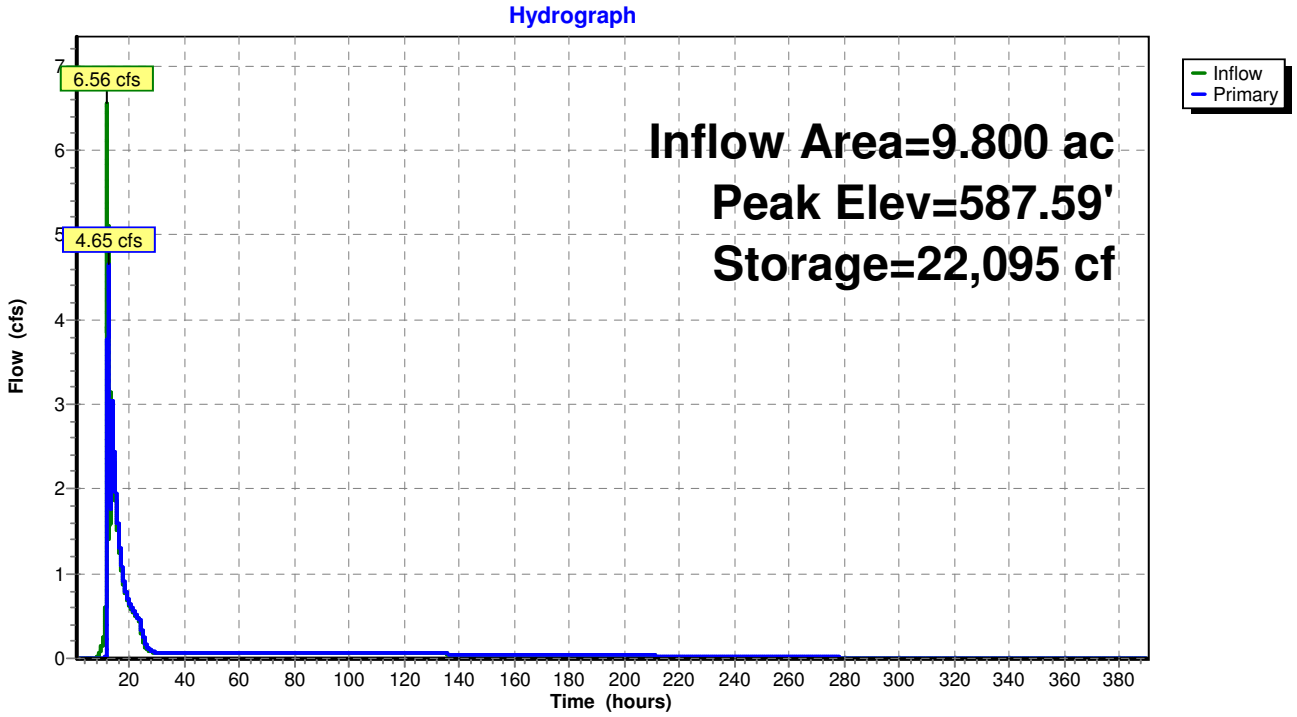
Volume	Invert	Avail.Storage	Storage Description
#1	579.50'	37,675 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
579.50	50	0	0
580.00	150	50	50
582.00	1,000	1,150	1,200
584.00	2,100	3,100	4,300
585.50	3,200	3,975	8,275
587.00	7,800	8,250	16,525
589.25	11,000	21,150	37,675

Device	Routing	Invert	Outlet Devices
#1	Primary	587.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	586.50'	**1.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=4.65 cfs @ 12.47 hrs HW=587.59' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 4.63 cfs @ 1.69 fps)
2=Orifice/Grate (Orifice Controls 0.03 cfs @ 4.94 fps)

Pond 2.3P:


Hydrograph
Inflow Area=9.800 ac
Peak Elev=587.59'
Storage=22,095 cf
6.56 cfs
4.65 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond FS 1:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 2.97" for 10-yr event
Inflow = 18.36 cfs @ 12.18 hrs, Volume= 1.632 af
Outflow = 18.36 cfs @ 12.18 hrs, Volume= 1.632 af, Atten= 0%, Lag= 0.0 min
Primary = 9.75 cfs @ 12.09 hrs, Volume= 1.421 af
Secondary = 9.12 cfs @ 12.19 hrs, Volume= 0.211 af

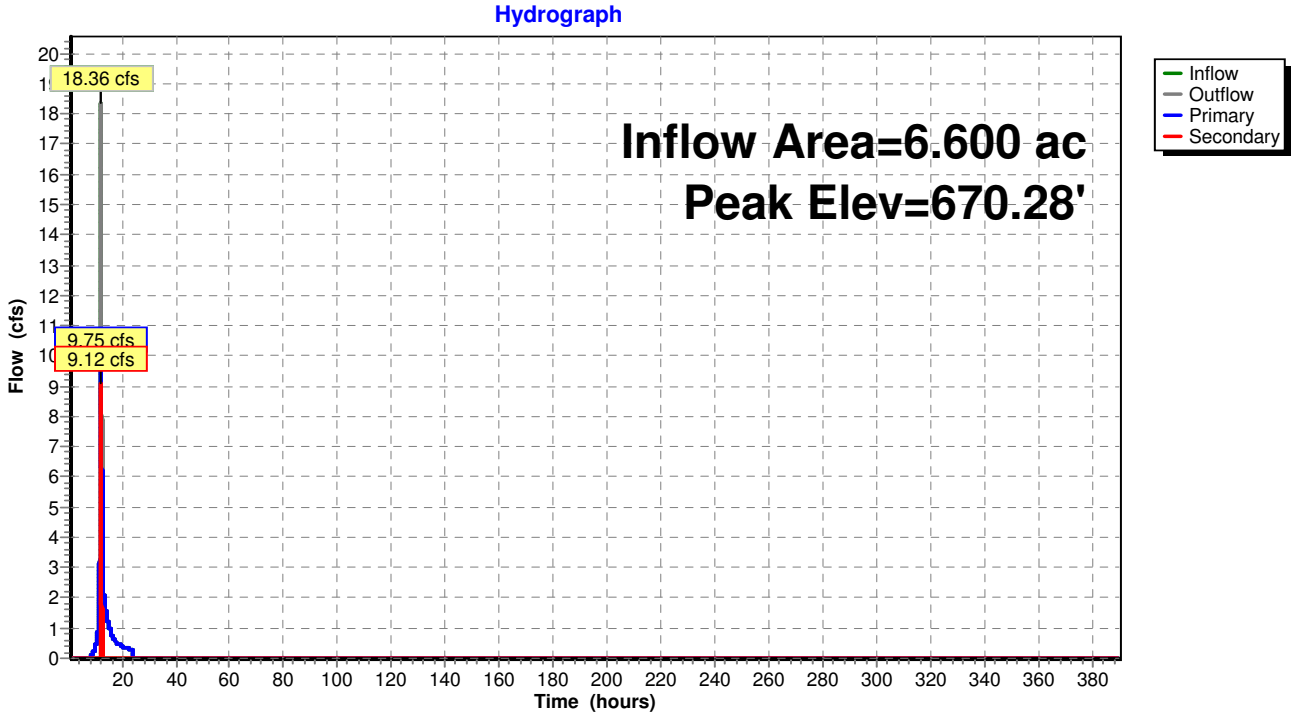
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 670.28' @ 12.19 hrs
Flood Elev= 674.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	666.50'	**15.0" x 35.0' long Culvert** RCP, square edge headwall, Ke= 0.500 Outlet Invert= 666.00' S= 0.0143 '/' Cc= 0.900 n= 0.012
#2	Secondary	669.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=9.63 cfs @ 12.09 hrs HW=669.98' TW=667.32' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 9.63 cfs @ 7.85 fps)

Secondary OutFlow Max=9.11 cfs @ 12.19 hrs HW=670.28' TW=656.77' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 9.11 cfs @ 2.91 fps)

Pond FS 1:



Summary for Pond FS 2:

Inflow Area = 8.700 ac, 41.38% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 4.65 cfs @ 12.41 hrs, Volume= 2.034 af
Outflow = 4.65 cfs @ 12.41 hrs, Volume= 2.034 af, Atten= 0%, Lag= 0.0 min
Primary = 3.62 cfs @ 12.41 hrs, Volume= 2.016 af
Secondary = 1.03 cfs @ 12.41 hrs, Volume= 0.018 af

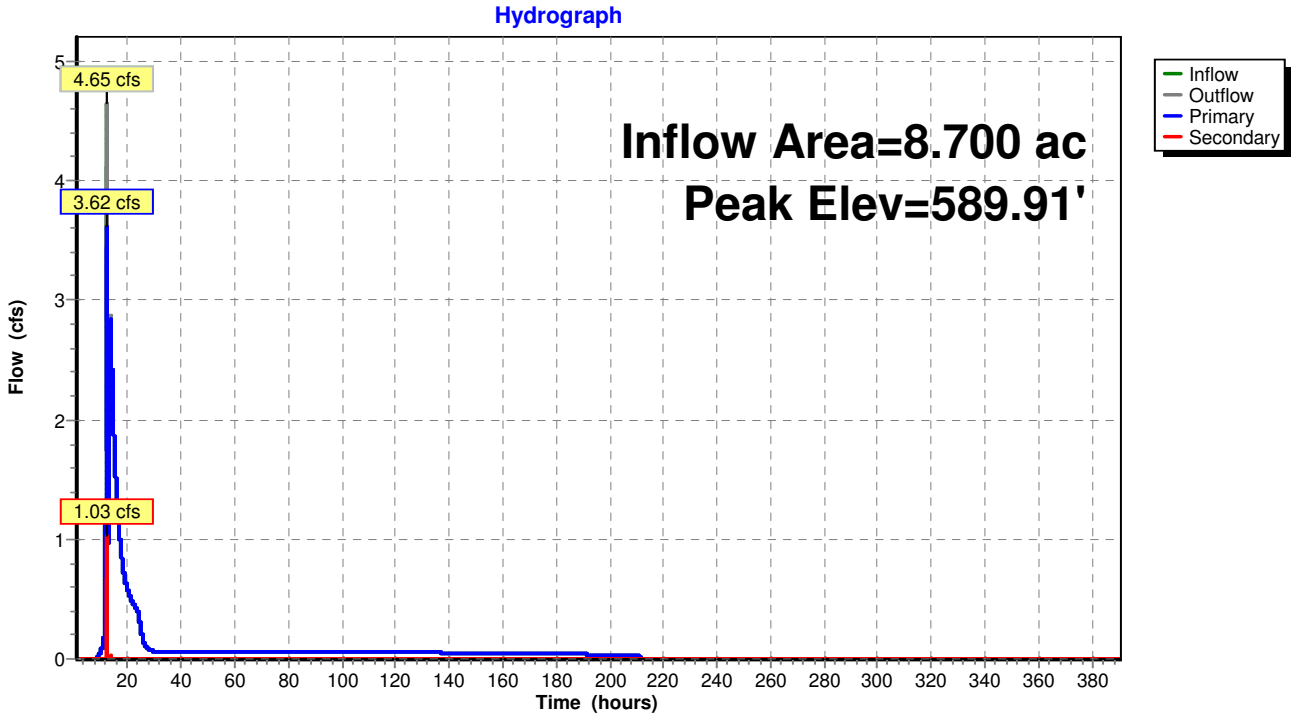
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 589.91' @ 12.41 hrs
Flood Elev= 596.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.50'	**12.0" x 23.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 588.00' S= 0.0217 '/' Cc= 0.900 n= 0.012
#2	Secondary	589.50'	**24.0" x 195.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 582.00' S= 0.0385 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=3.62 cfs @ 12.41 hrs HW=589.91' TW=587.59' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 3.62 cfs @ 4.60 fps)

Secondary OutFlow Max=1.03 cfs @ 12.41 hrs HW=589.91' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 1.03 cfs @ 2.19 fps)

Pond FS 2:



Summary for Subcatchment 1.0S:

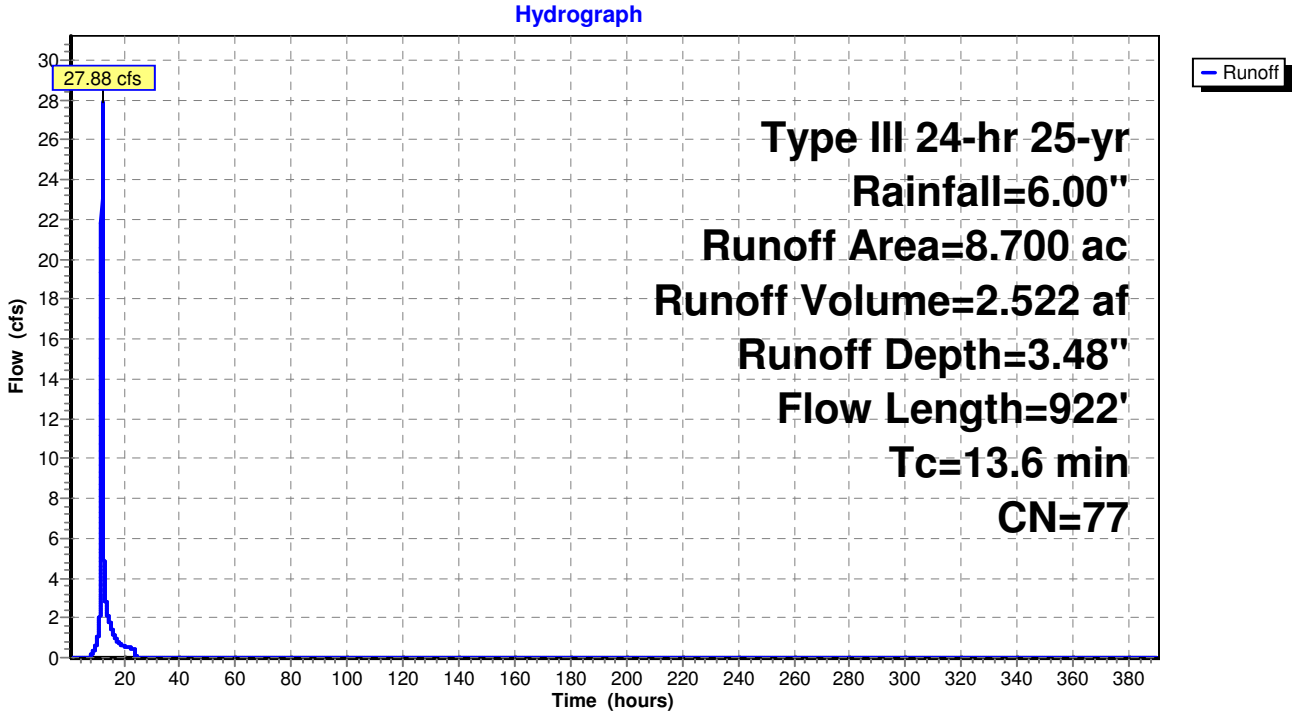
Runoff = 27.88 cfs @ 12.19 hrs, Volume= 2.522 af, Depth= 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
3.800	98	Paved parking & roofs
1.100	60	Woods, Fair, HSG B
3.800	61	>75% Grass cover, Good, HSG B
8.700	77	Weighted Average
4.900		Pervious Area
3.800		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	221	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	601	0.0900	17.83	31.51	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.6	922	Total			

Subcatchment 1.0S:



Summary for Subcatchment 1.1S:

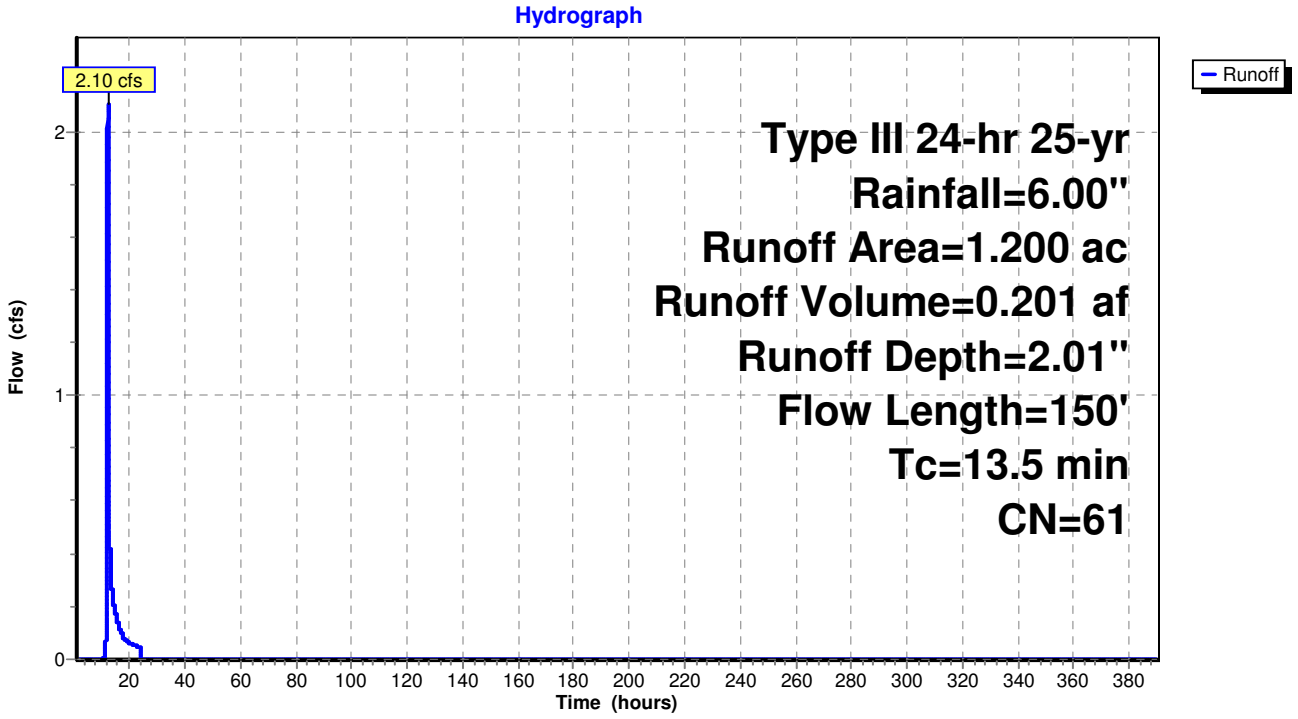
Runoff = 2.10 cfs @ 12.20 hrs, Volume= 0.201 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
1.200	61	>75% Grass cover, Good, HSG B
1.200		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	50	0.1600	2.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	150	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

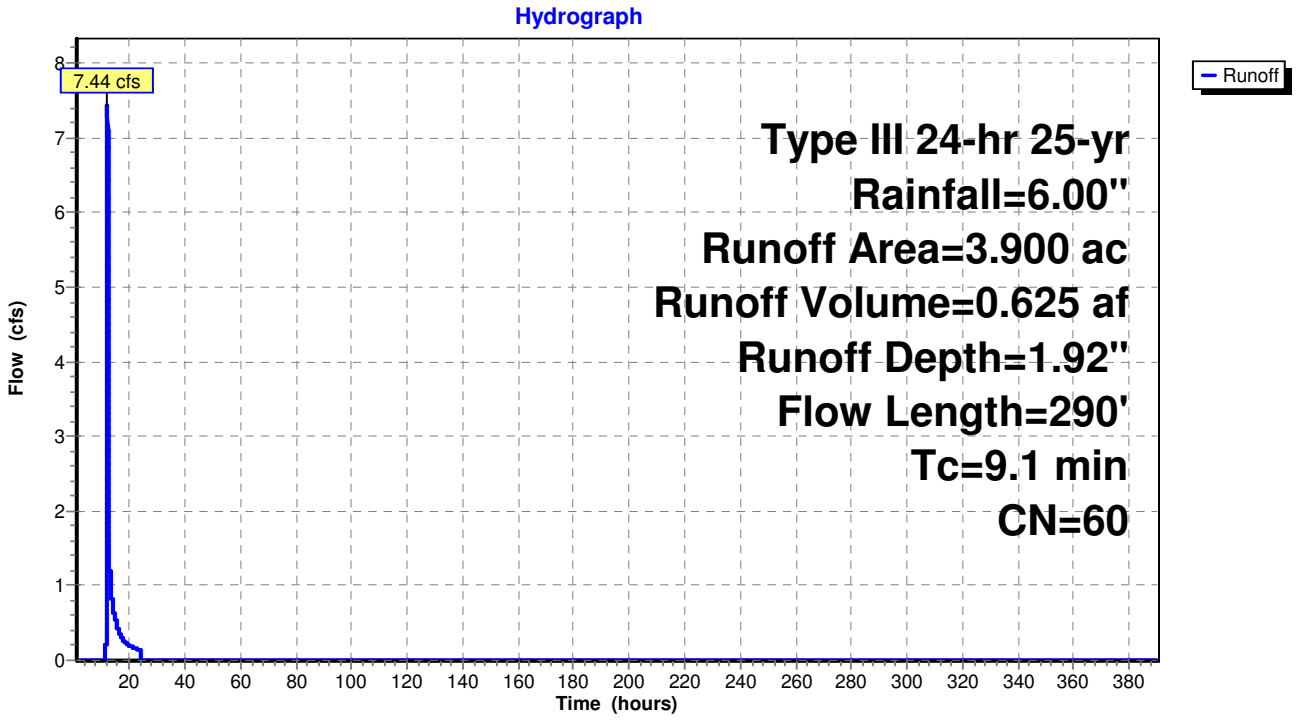
Runoff = 7.44 cfs @ 12.14 hrs, Volume= 0.625 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
2.400	60	Woods, Fair, HSG B
1.500	61	>75% Grass cover, Good, HSG B
3.900	60	Weighted Average
3.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.1140	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	170	0.2350	2.42		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.4800	4.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	290	Total			

Subcatchment 1.2S:



Summary for Subcatchment 1S:

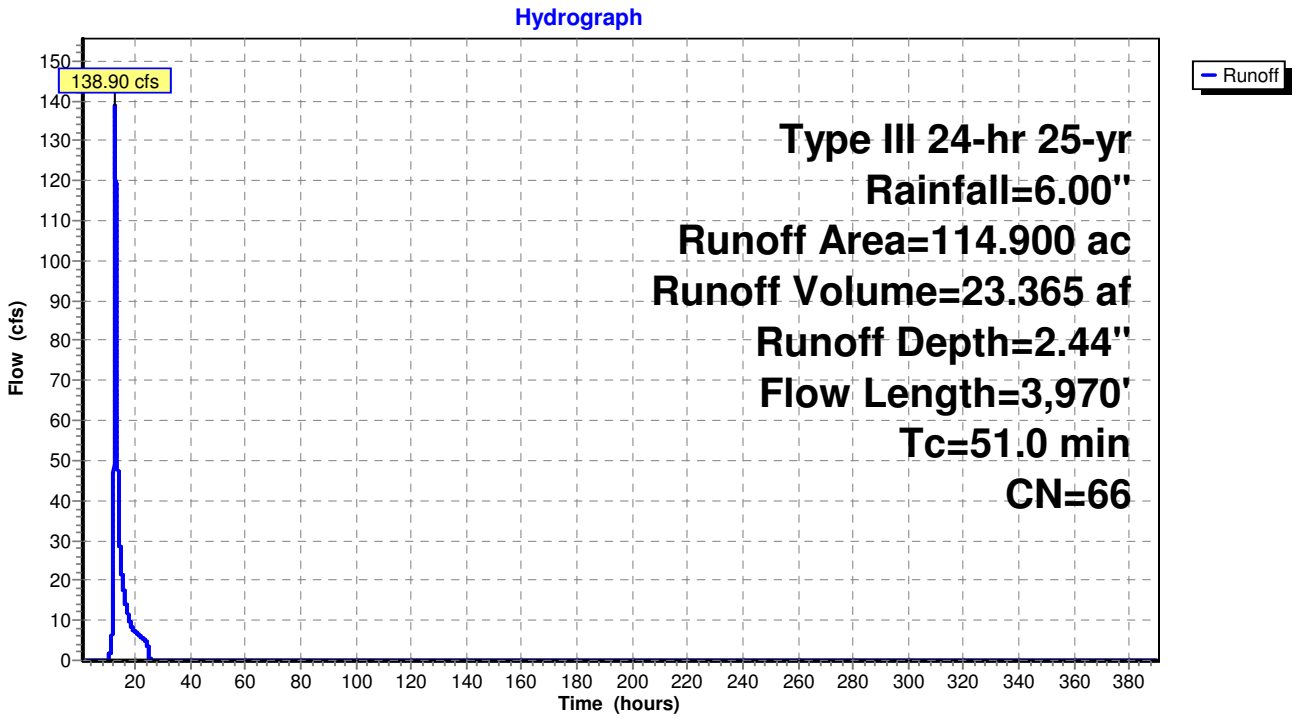
Runoff = 138.90 cfs @ 12.75 hrs, Volume= 23.365 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (ac)	CN	Description
*	30.000	68	1 acre lots, 20% imp, HSG B
*	43.000	58	Woods/grass comb., Good, HSG B
*	6.000	61	>75% Grass cover, Good, HSG B
*	19.900	92	Urban commercial, 85% imp, HSG B
*	16.000	55	Woods, Good, HSG B
	114.900	66	Weighted Average
	91.985		Pervious Area
	22.915		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 2.0S:

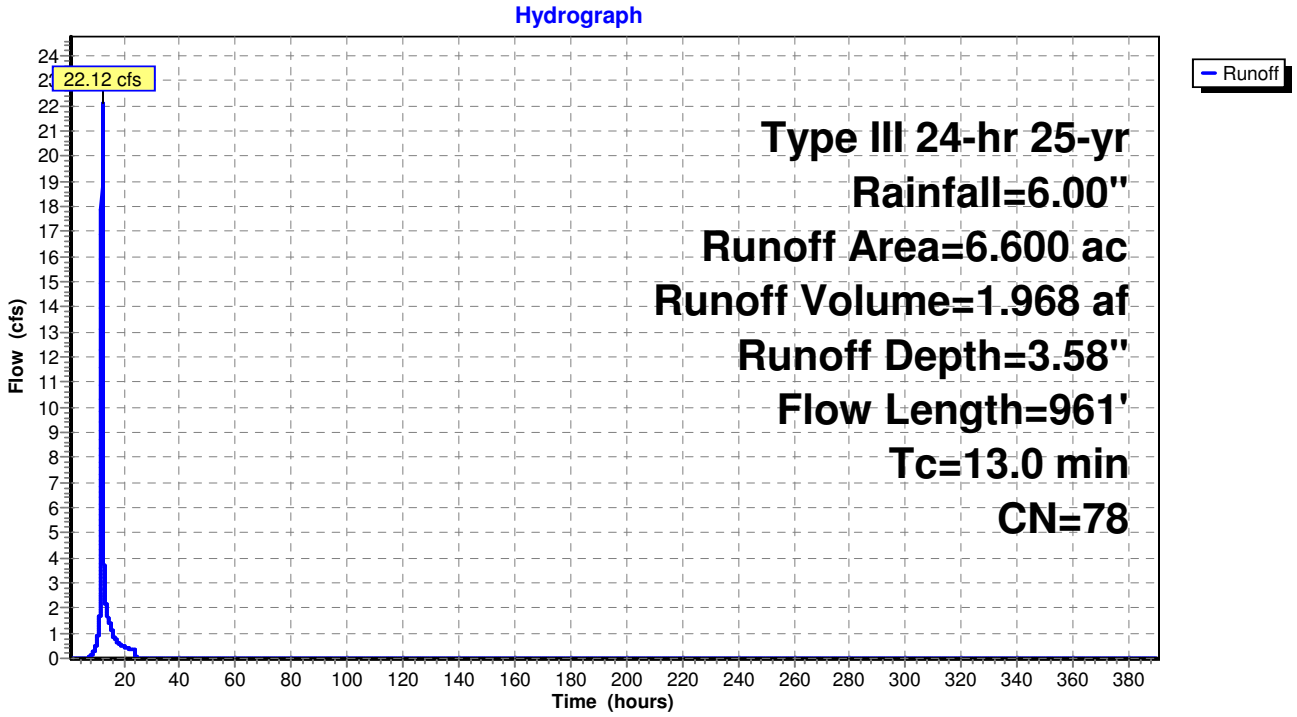
Runoff = 22.12 cfs @ 12.18 hrs, Volume= 1.968 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
3.100	98	Paved parking & roofs
1.300	60	Woods, Fair, HSG B
2.200	61	>75% Grass cover, Good, HSG B
6.600	78	Weighted Average
3.500		Pervious Area
3.100		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	16	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	220	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	550	0.1000	18.80	33.22	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.0	961	Total			

Subcatchment 2.0S:



Summary for Subcatchment 2.1S:

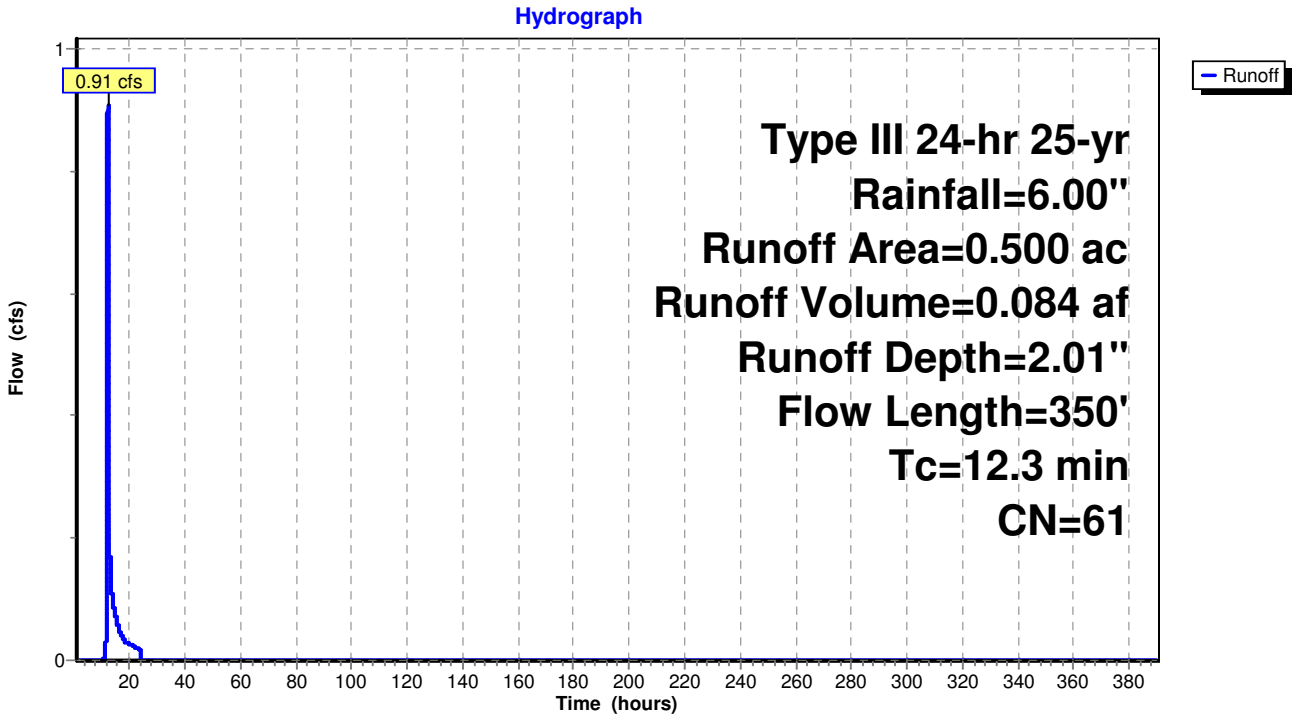
Runoff = 0.91 cfs @ 12.18 hrs, Volume= 0.084 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
0.200	60	Woods, Fair, HSG B
0.300	61	>75% Grass cover, Good, HSG B
0.500	61	Weighted Average
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.7	200	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.3600	4.20		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.3	350	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

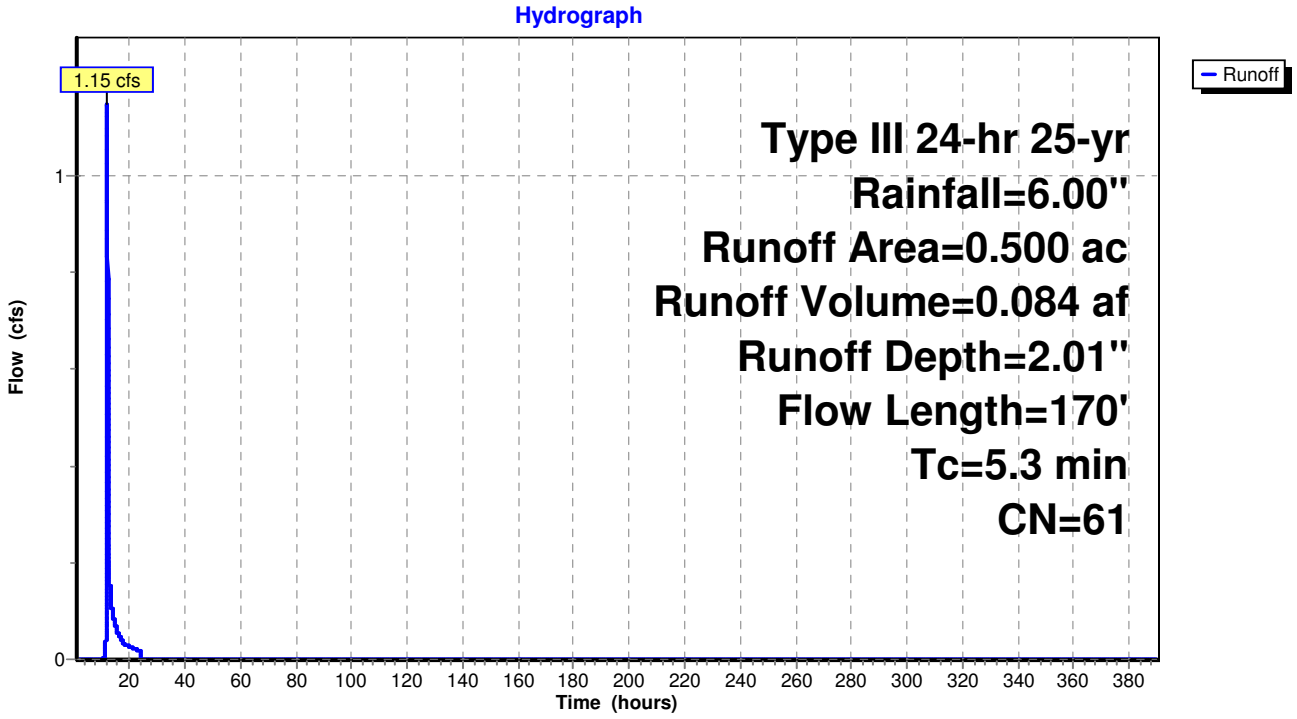
Runoff = 1.15 cfs @ 12.09 hrs, Volume= 0.084 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.1200	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0570	1.67		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.3	170	Total			

Subcatchment 2.2S:



Summary for Subcatchment 2.3.1S:

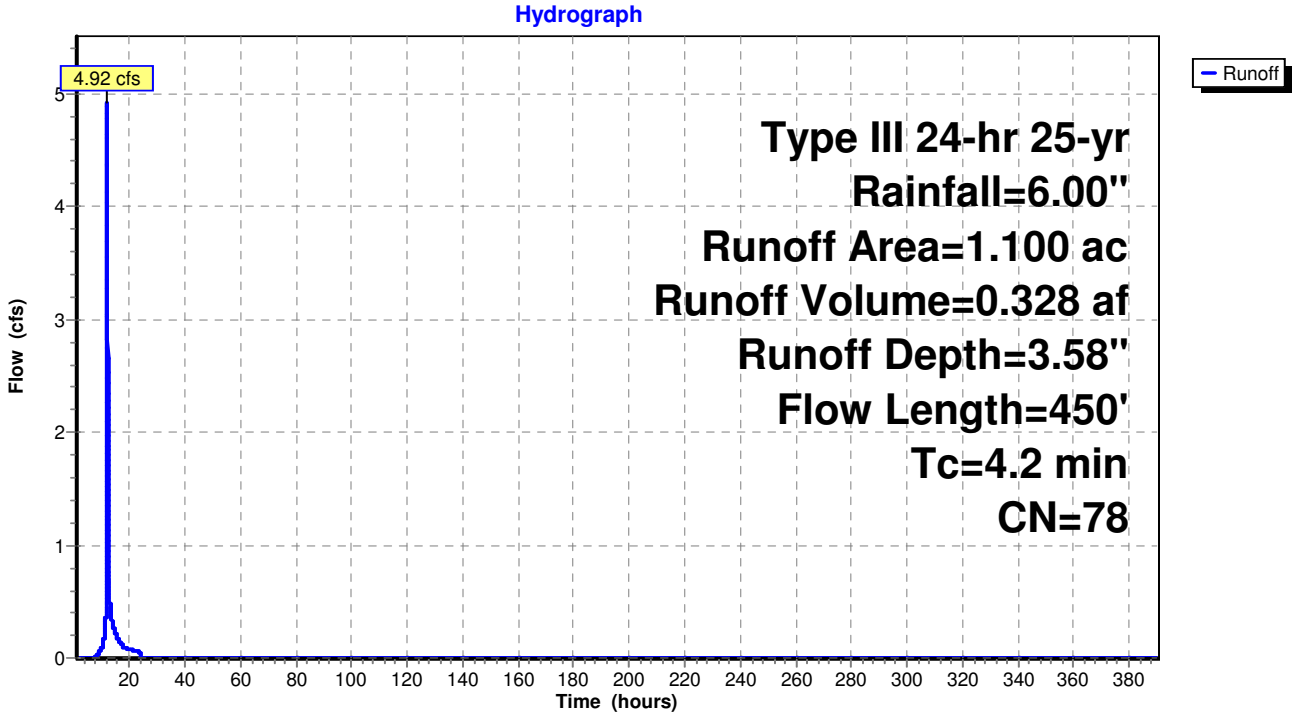
Runoff = 4.92 cfs @ 12.06 hrs, Volume= 0.328 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
0.500	98	Paved parking & roofs
0.600	61	>75% Grass cover, Good, HSG B
1.100	78	Weighted Average
0.600		Pervious Area
0.500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2200	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.5	115	0.3000	3.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	235	0.2000	26.58	46.98	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
4.2	450	Total			

Subcatchment 2.3.1S:



Summary for Subcatchment 2.3.2S:

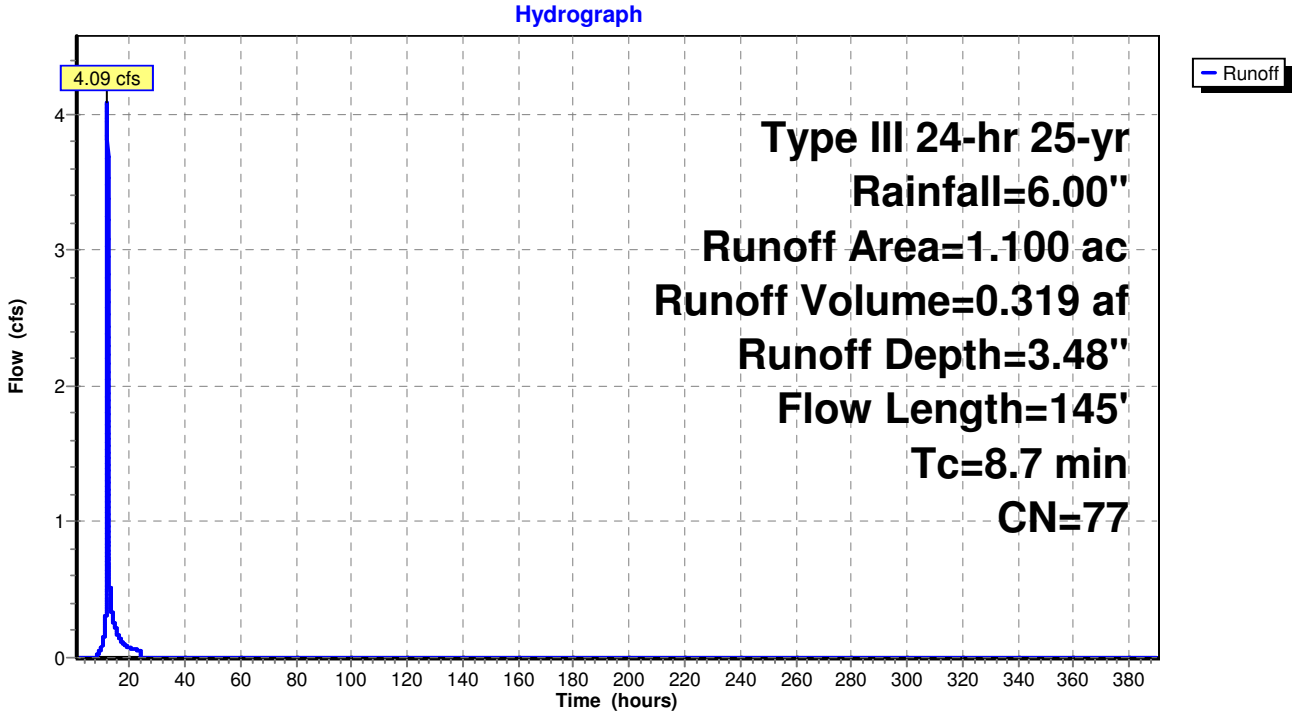
Runoff = 4.09 cfs @ 12.12 hrs, Volume= 0.319 af, Depth= 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.300	60	Woods, Fair, HSG B
0.400	74	>75% Grass cover, Good, HSG C
0.100	80	>75% Grass cover, Good, HSG D
1.100	77	Weighted Average
0.800		Pervious Area
0.300		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.2000	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	45	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	145	Total			

Subcatchment 2.3.2S:



Summary for Subcatchment 3S:

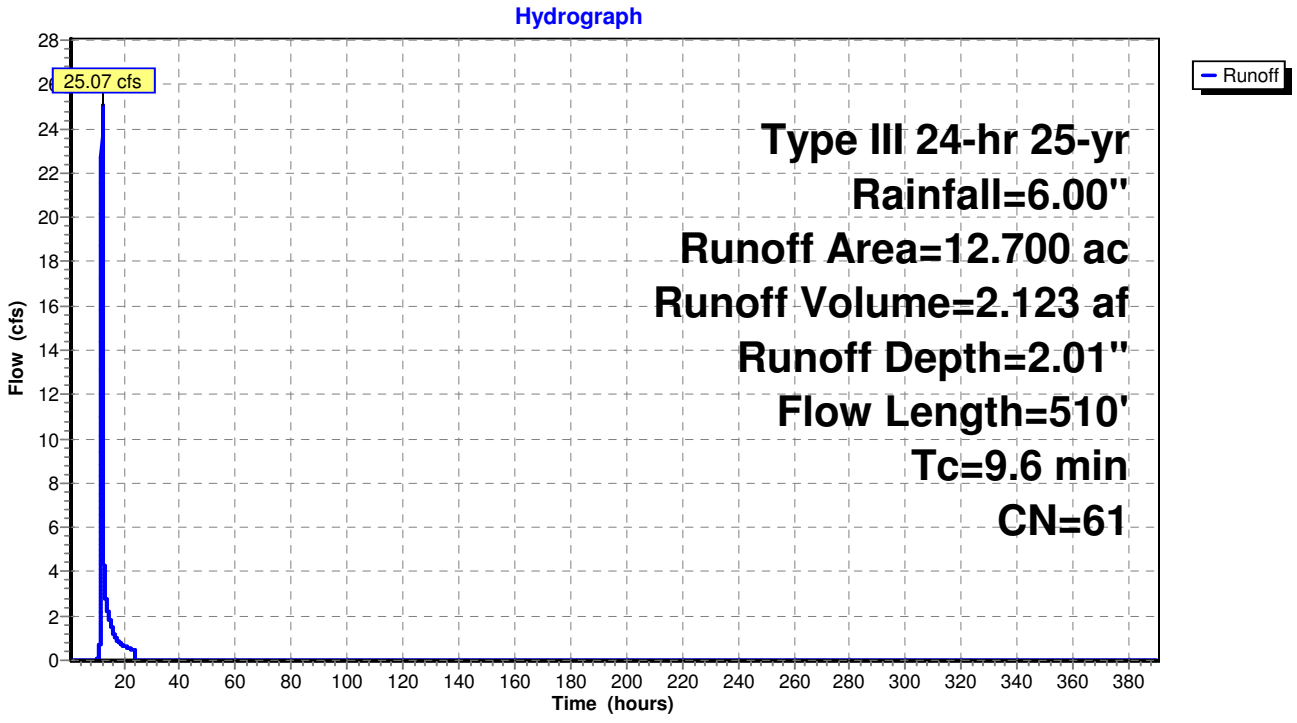
Runoff = 25.07 cfs @ 12.14 hrs, Volume= 2.123 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
0.400	98	Paved parking & roofs
10.300	60	Woods, Fair, HSG B
2.000	61	>75% Grass cover, Good, HSG B
12.700	61	Weighted Average
12.300		Pervious Area
0.400		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.2800	0.23		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	410	0.2930	2.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.6	510	Total			

Subcatchment 3S:

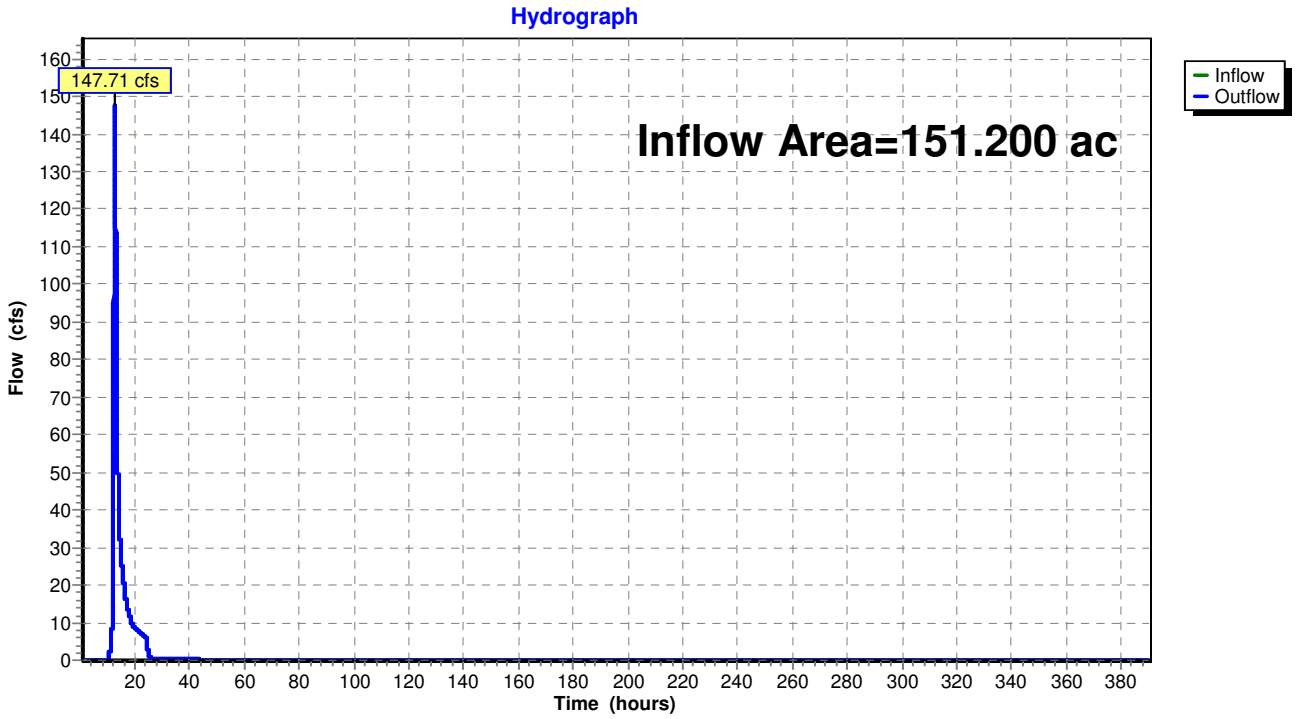


Summary for Reach 1R:

Inflow Area = 151.200 ac, 20.51% Impervious, Inflow Depth = 2.51" for 25-yr event
Inflow = 147.71 cfs @ 12.70 hrs, Volume= 31.592 af
Outflow = 147.71 cfs @ 12.70 hrs, Volume= 31.592 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 1R:

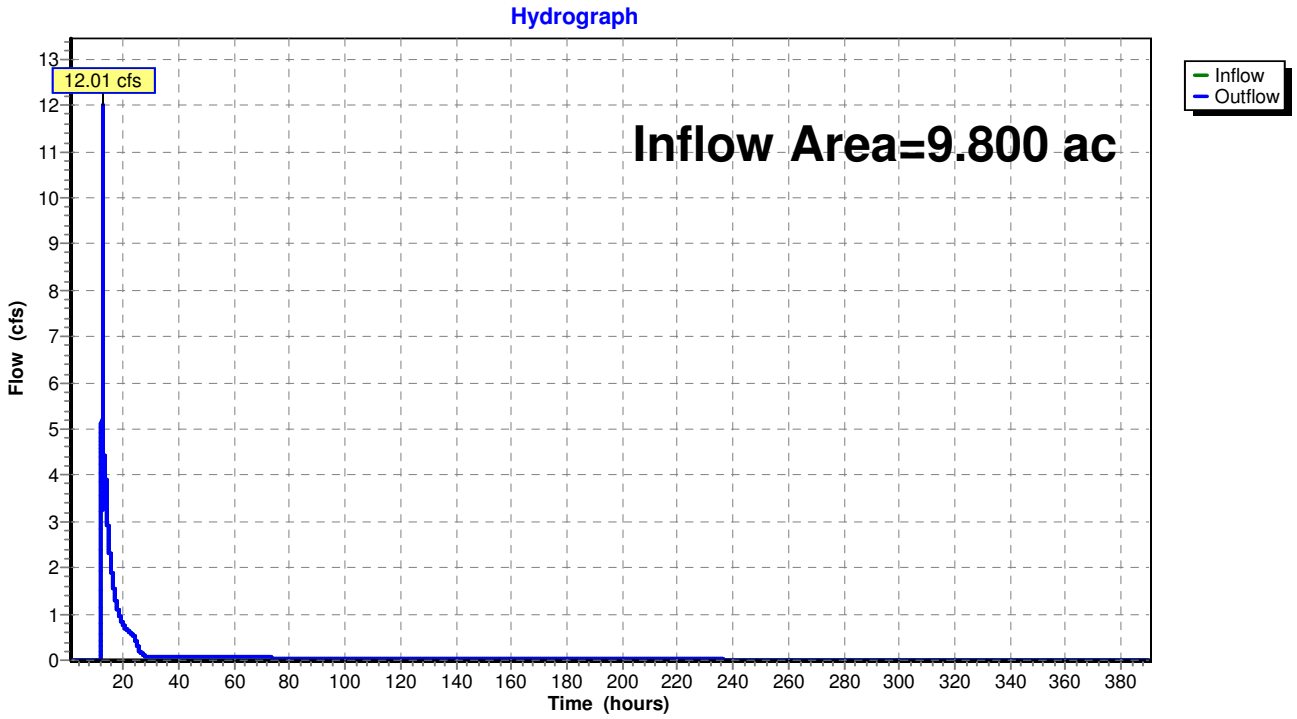


Summary for Reach 2R:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth = 3.41" for 25-yr event
Inflow = 12.01 cfs @ 12.32 hrs, Volume= 2.781 af
Outflow = 12.01 cfs @ 12.32 hrs, Volume= 2.781 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 2R:



Summary for Pond 1.0P:

Inflow Area = 8.700 ac, 43.68% Impervious, Inflow Depth = 3.48" for 25-yr event
Inflow = 27.88 cfs @ 12.19 hrs, Volume= 2.522 af
Outflow = 16.21 cfs @ 12.41 hrs, Volume= 2.520 af, Atten= 42%, Lag= 13.5 min
Primary = 16.21 cfs @ 12.41 hrs, Volume= 2.520 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 674.00' Surf.Area= 14,391 sf Storage= 31,719 cf
Peak Elev= 676.22' @ 12.41 hrs Surf.Area= 19,703 sf Storage= 69,954 cf (38,235 cf above start)
Flood Elev= 677.00' Surf.Area= 22,107 sf Storage= 87,251 cf (55,532 cf above start)

Plug-Flow detention time= 644.2 min calculated for 1.792 af (71% of inflow)
Center-of-Mass det. time= 367.5 min (1,196.1 - 828.6)

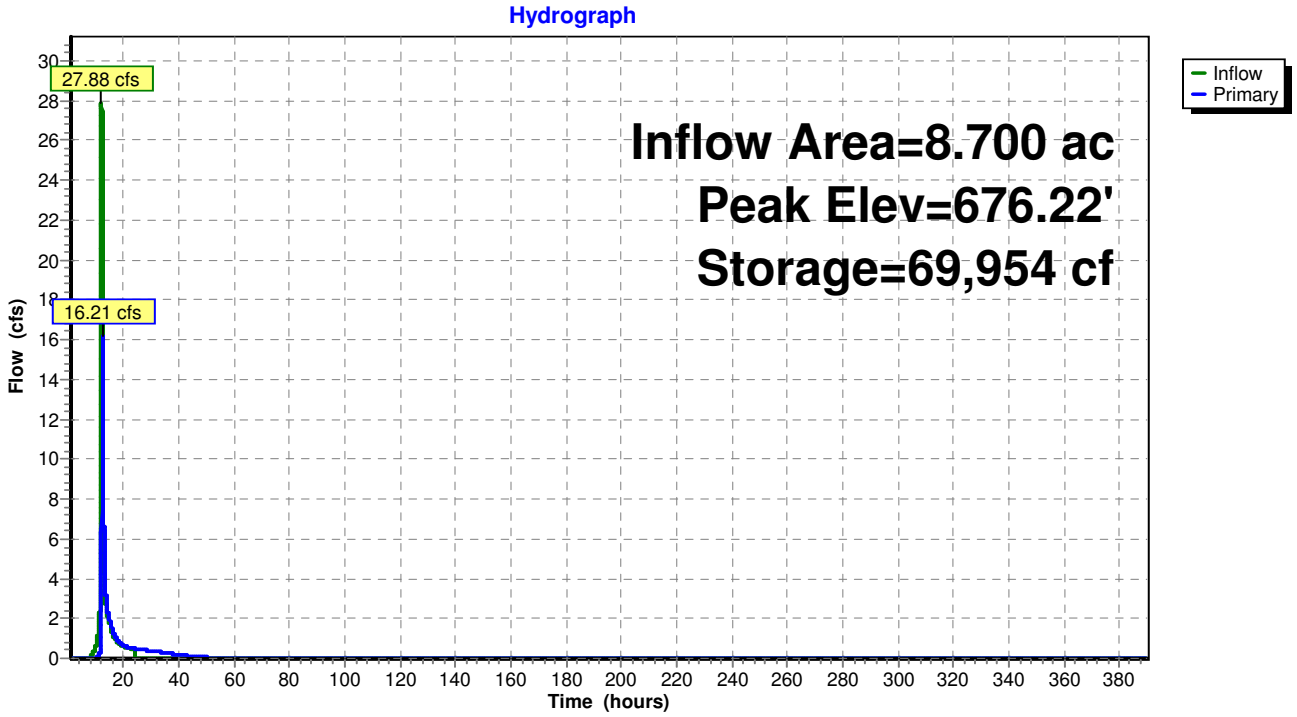
Volume	Invert	Avail.Storage	Storage Description
#1	670.00'	109,358 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
670.00	3,990	0	0
672.00	6,669	10,659	10,659
674.00	14,391	21,060	31,719
676.00	19,034	33,425	65,144
678.00	25,180	44,214	109,358

Device	Routing	Invert	Outlet Devices
#1	Primary	674.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	675.50'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=16.21 cfs @ 12.41 hrs HW=676.22' TW=666.55' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.60 cfs @ 6.90 fps)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 15.60 cfs @ 2.72 fps)

Pond 1.0P:


Hydrograph
Inflow
Primary
27.88 cfs
16.21 cfs
Inflow Area=8.700 ac
Peak Elev=676.22'
Storage=69,954 cf
Flow (cfs)
Time (hours)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 1.1P:

Inflow Area = 9.900 ac, 38.38% Impervious, Inflow Depth = 3.30" for 25-yr event
Inflow = 17.60 cfs @ 12.40 hrs, Volume= 2.721 af
Outflow = 10.35 cfs @ 12.75 hrs, Volume= 2.720 af, Atten= 41%, Lag= 21.1 min
Primary = 10.35 cfs @ 12.75 hrs, Volume= 2.720 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 667.94' @ 12.75 hrs Surf.Area= 9,900 sf Storage= 26,876 cf
Flood Elev= 669.00' Surf.Area= 11,900 sf Storage= 39,300 cf

Plug-Flow detention time= 812.8 min calculated for 2.720 af (100% of inflow)
Center-of-Mass det. time= 806.2 min (1,978.0 - 1,171.9)

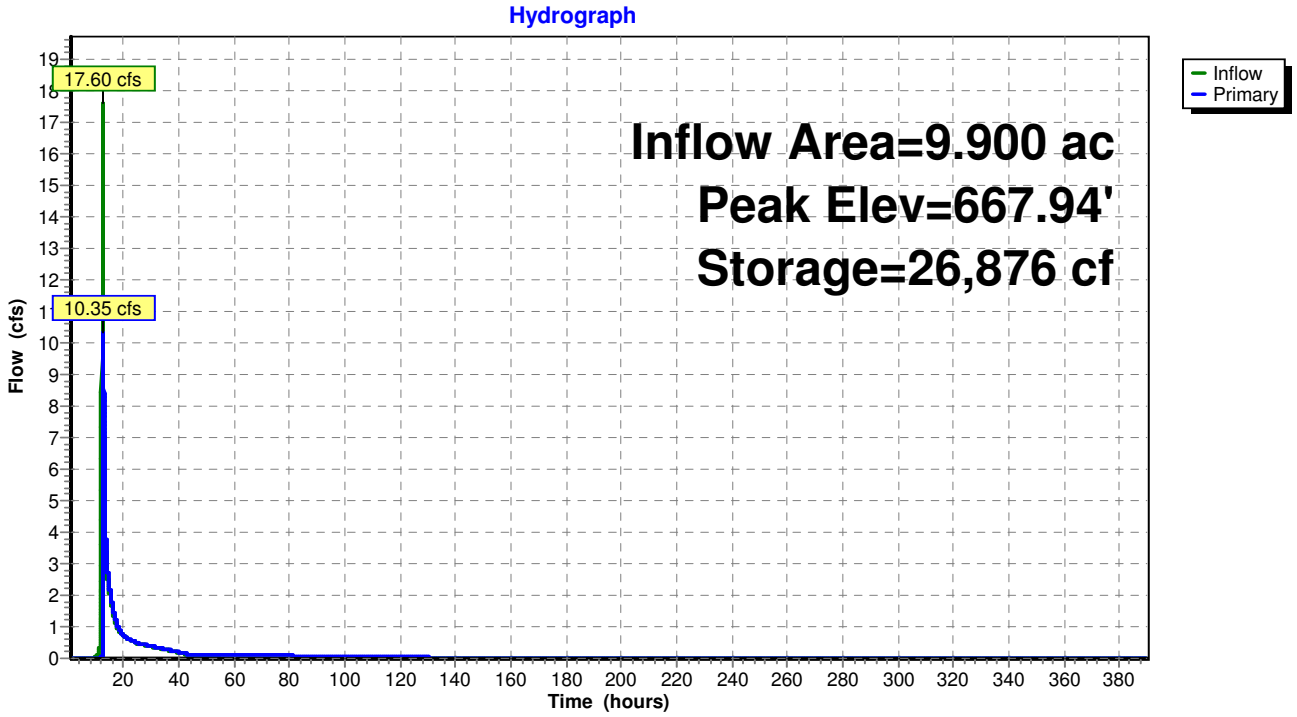
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	51,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	3,800	0	0
666.00	6,800	10,600	10,600
668.00	10,000	16,800	27,400
670.00	13,800	23,800	51,200

Device	Routing	Invert	Outlet Devices
#1	Primary	664.00'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	667.20'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=10.35 cfs @ 12.75 hrs HW=667.94' TW=636.95' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.12 cfs @ 9.48 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 10.23 cfs @ 2.78 fps)

Pond 1.1P:


Hydrograph
Inflow Area=9.900 ac
Peak Elev=667.94'
Storage=26,876 cf
17.60 cfs
10.35 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 1.2P:

Inflow Area = 13.800 ac, 27.54% Impervious, Inflow Depth = 2.91" for 25-yr event
Inflow = 11.73 cfs @ 12.75 hrs, Volume= 3.344 af
Outflow = 0.43 cfs @ 27.60 hrs, Volume= 3.324 af, Atten= 96%, Lag= 891.1 min
Primary = 0.43 cfs @ 27.60 hrs, Volume= 3.324 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 640.30' @ 27.60 hrs Surf.Area= 25,920 sf Storage= 94,284 cf
Flood Elev= 641.00' Surf.Area= 27,600 sf Storage= 113,600 cf

Plug-Flow detention time= 6,193.9 min calculated for 3.324 af (99% of inflow)
Center-of-Mass det. time= 6,139.2 min (7,909.5 - 1,770.3)

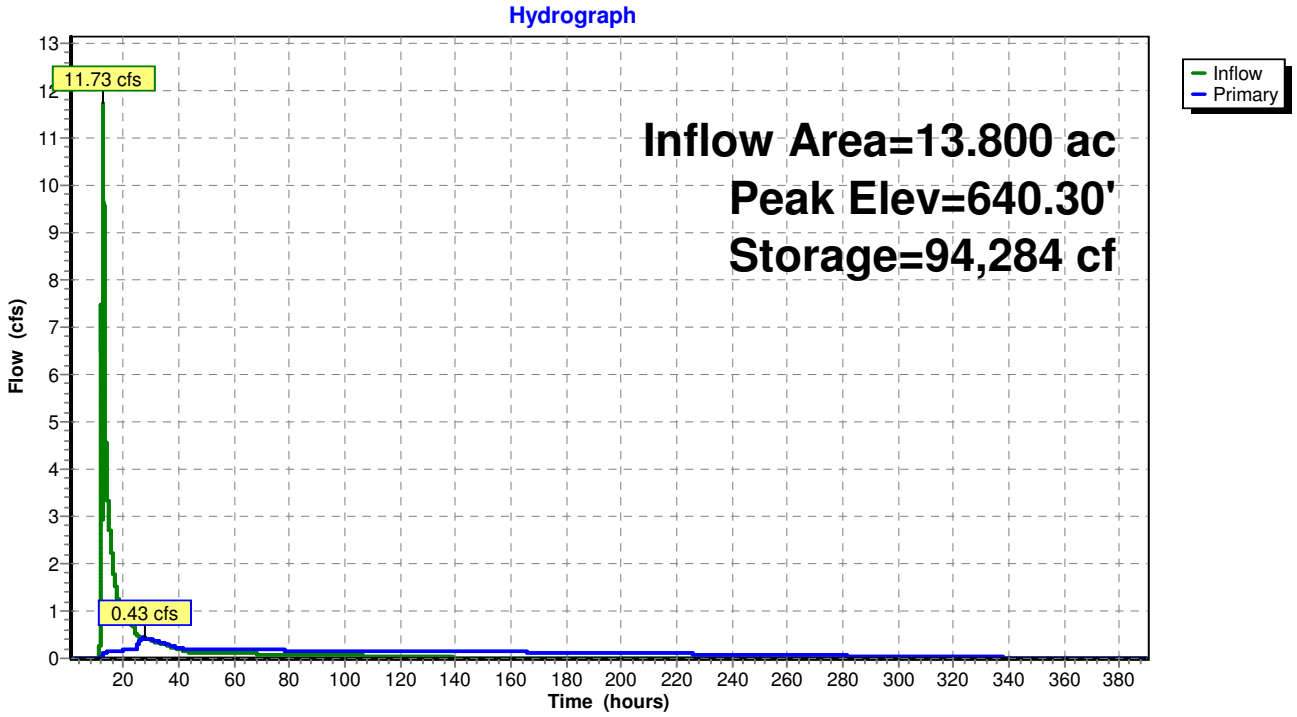
Volume	Invert	Avail.Storage	Storage Description
#1	636.00'	141,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
636.00	18,000	0	0
638.00	21,400	39,400	39,400
640.00	25,200	46,600	86,000
642.00	30,000	55,200	141,200

Device	Routing	Invert	Outlet Devices
#1	Primary	636.00'	**1.8" Vert. Orifice/Grate** C= 0.600
#2	Primary	640.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.43 cfs @ 27.60 hrs HW=640.30' TW=0.00' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.17 cfs @ 9.90 fps)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 0.25 cfs @ 0.63 fps)

Pond 1.2P:


Hydrograph
Inflow Area=13.800 ac
Peak Elev=640.30'
Storage=94,284 cf
11.73 cfs
0.43 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.0P:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 2.95" for 25-yr event
Inflow = 9.01 cfs @ 12.07 hrs, Volume= 1.622 af
Outflow = 5.78 cfs @ 12.59 hrs, Volume= 1.622 af, Atten= 36%, Lag= 30.8 min
Primary = 5.78 cfs @ 12.59 hrs, Volume= 1.622 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 668.79' @ 12.59 hrs Surf.Area= 8,175 sf Storage= 24,618 cf
Flood Elev= 669.00' Surf.Area= 8,550 sf Storage= 26,450 cf

Plug-Flow detention time= 951.8 min calculated for 1.622 af (100% of inflow)
Center-of-Mass det. time= 951.6 min (1,796.5 - 844.9)

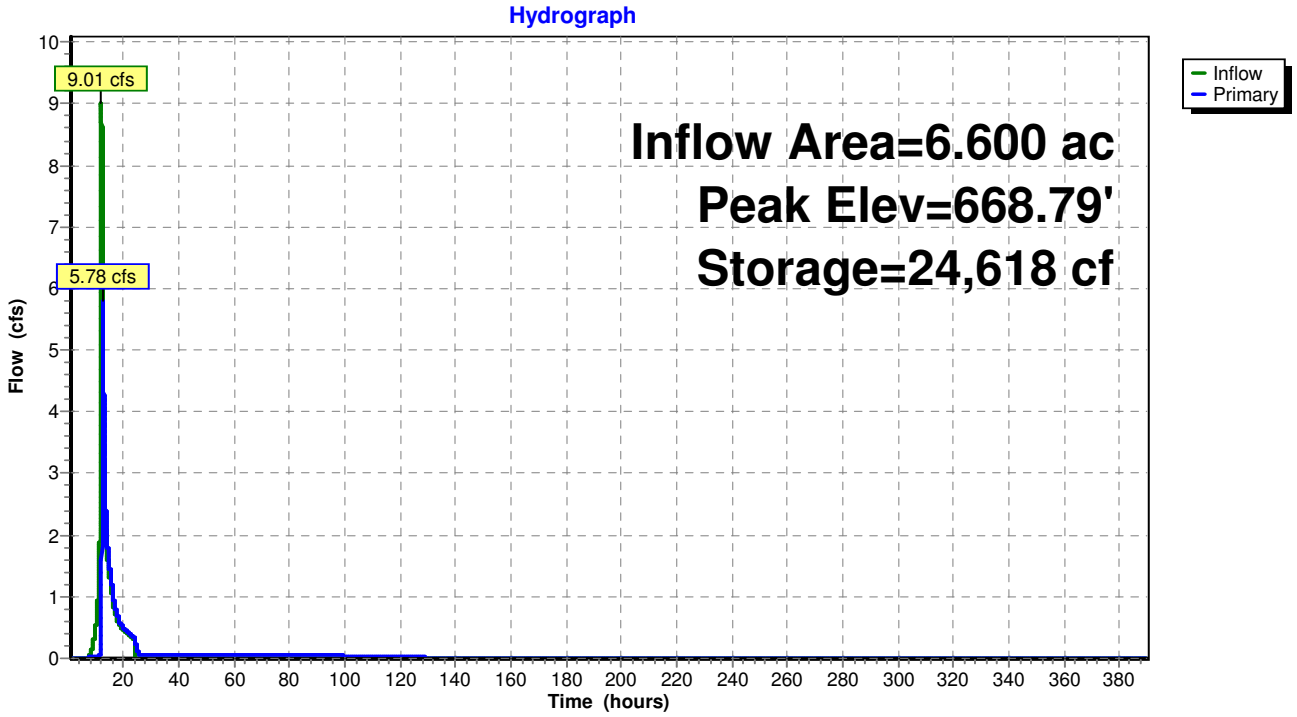
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	35,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	2,300	0	0
666.00	4,400	6,700	6,700
668.00	6,800	11,200	17,900
670.00	10,300	17,100	35,000

Device	Routing	Invert	Outlet Devices
#1	Primary	662.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	668.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	664.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=5.78 cfs @ 12.59 hrs HW=668.79' TW=661.80' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 12.03 fps)
  - **3=Orifice/Grate** (Passes 0.07 cfs of 2.29 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 5.72 cfs @ 2.91 fps)

Pond 2.0P:


Hydrograph
Inflow Area=6.600 ac
Peak Elev=668.79'
Storage=24,618 cf
9.01 cfs
5.78 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.1P:

Inflow Area = 7.100 ac, 43.66% Impervious, Inflow Depth = 2.88" for 25-yr event
Inflow = 6.14 cfs @ 12.56 hrs, Volume= 1.706 af
Outflow = 3.72 cfs @ 13.10 hrs, Volume= 1.706 af, Atten= 39%, Lag= 32.7 min
Primary = 3.72 cfs @ 13.10 hrs, Volume= 1.706 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 662.61' @ 13.10 hrs Surf.Area= 6,399 sf Storage= 13,566 cf
Flood Elev= 663.00' Surf.Area= 6,850 sf Storage= 16,250 cf

Plug-Flow detention time= 945.0 min calculated for 1.706 af (100% of inflow)
Center-of-Mass det. time= 945.0 min (2,696.0 - 1,750.9)

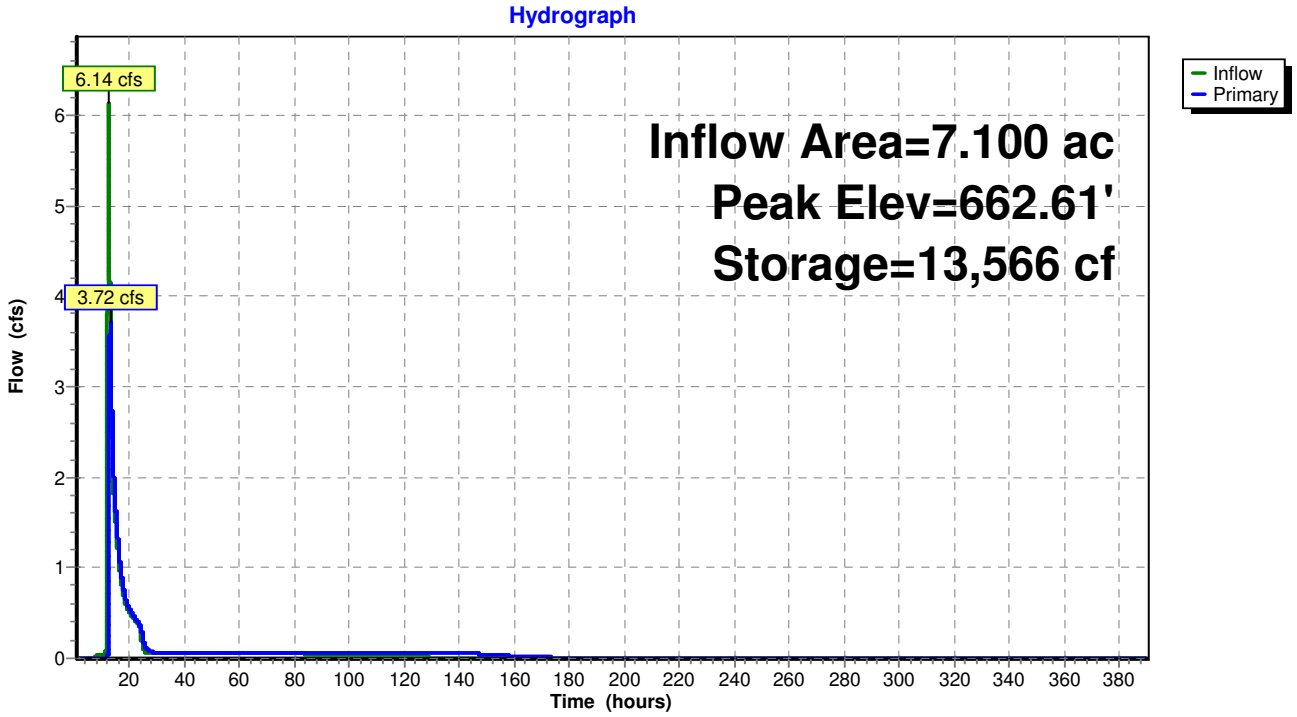
Volume	Invert	Avail.Storage	Storage Description
#1	660.00'	23,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
660.00	3,700	0	0
662.00	5,700	9,400	9,400
664.00	8,000	13,700	23,100

Device	Routing	Invert	Outlet Devices
#1	Primary	656.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	662.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	660.00'	**4.000 in/hr Exfiltration over Surface area above invert** Excluded Surface area = 3,700 sf

Primary OutFlow Max=3.72 cfs @ 13.10 hrs HW=662.61' TW=657.64' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 10.73 fps)
  - **3=Exfiltration** (Passes 0.06 cfs of 0.25 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 3.66 cfs @ 2.41 fps)

Pond 2.1P:


Hydrograph
Inflow Area=7.100 ac
Peak Elev=662.61'
Storage=13,566 cf
6.14 cfs
3.72 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.2P:

Inflow Area = 7.600 ac, 40.79% Impervious, Inflow Depth = 3.37" for 25-yr event
Inflow = 14.05 cfs @ 12.18 hrs, Volume= 2.136 af
Outflow = 8.60 cfs @ 12.32 hrs, Volume= 2.136 af, Atten= 39%, Lag= 8.7 min
Primary = 8.60 cfs @ 12.32 hrs, Volume= 2.136 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 657.92' @ 12.32 hrs Surf.Area= 5,903 sf Storage= 9,289 cf
Flood Elev= 659.00' Surf.Area= 8,000 sf Storage= 17,700 cf

Plug-Flow detention time= 690.7 min calculated for 2.135 af (100% of inflow)
Center-of-Mass det. time= 690.7 min (2,997.0 - 2,306.3)

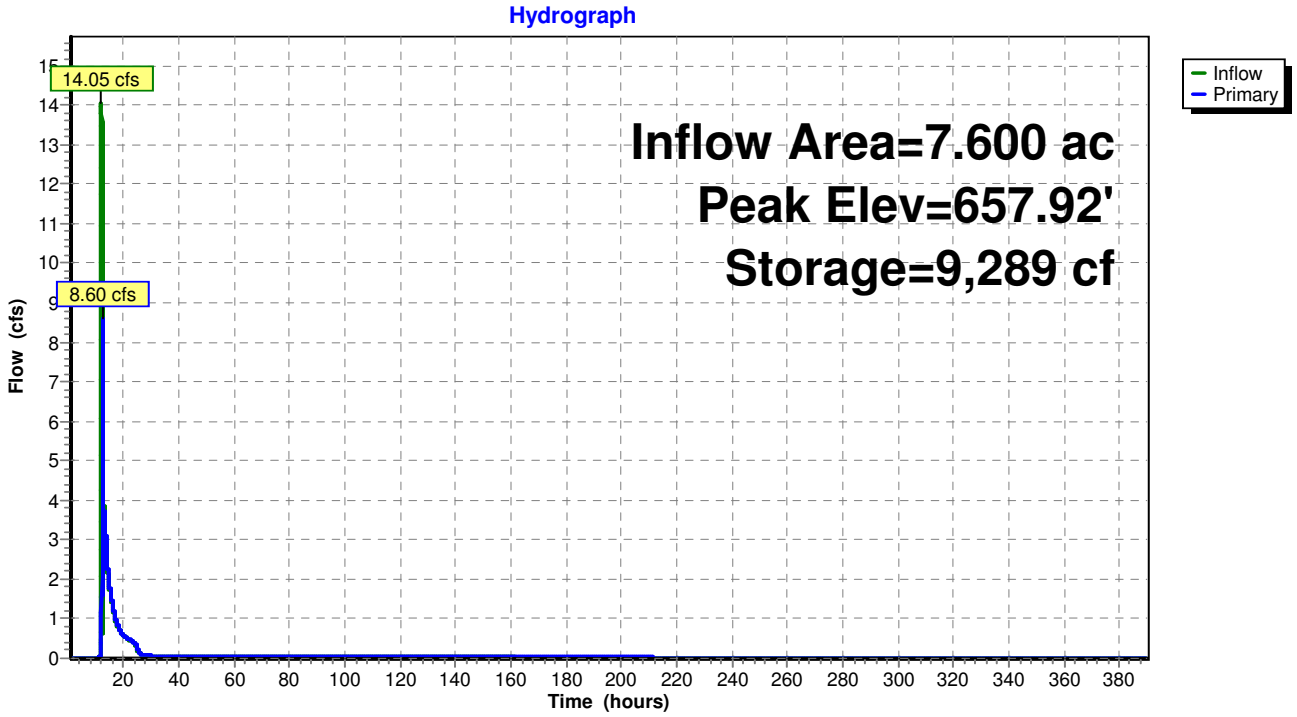
Volume	Invert	Avail.Storage	Storage Description
#1	656.00'	25,700 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
656.00	3,700	0	0
658.00	6,000	9,700	9,700
660.00	10,000	16,000	25,700

Device	Routing	Invert	Outlet Devices
#1	Primary	654.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	657.25'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	656.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=8.59 cfs @ 12.32 hrs HW=657.91' TW=590.53' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 8.84 fps)
  - **3=Orifice/Grate** (Passes 0.05 cfs of 1.45 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 8.54 cfs @ 2.57 fps)

Pond 2.2P:


Hydrograph
14.05 cfs
8.60 cfs
Inflow Area=7.600 ac
Peak Elev=657.92'
Storage=9,289 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.3P:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth = 3.22" for 25-yr event
Inflow = 7.52 cfs @ 12.11 hrs, Volume= 2.629 af
Outflow = 6.44 cfs @ 12.37 hrs, Volume= 2.627 af, Atten= 14%, Lag= 15.9 min
Primary = 6.44 cfs @ 12.37 hrs, Volume= 2.627 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 586.50' Surf.Area= 6,267 sf Storage= 13,775 cf
Peak Elev= 587.67' @ 12.37 hrs Surf.Area= 8,754 sf Storage= 22,828 cf (9,053 cf above start)
Flood Elev= 588.25' Surf.Area= 9,578 sf Storage= 28,275 cf (14,500 cf above start)

Plug-Flow detention time= 1,995.6 min calculated for 2.311 af (88% of inflow)
Center-of-Mass det. time= 664.0 min (3,256.6 - 2,592.6)

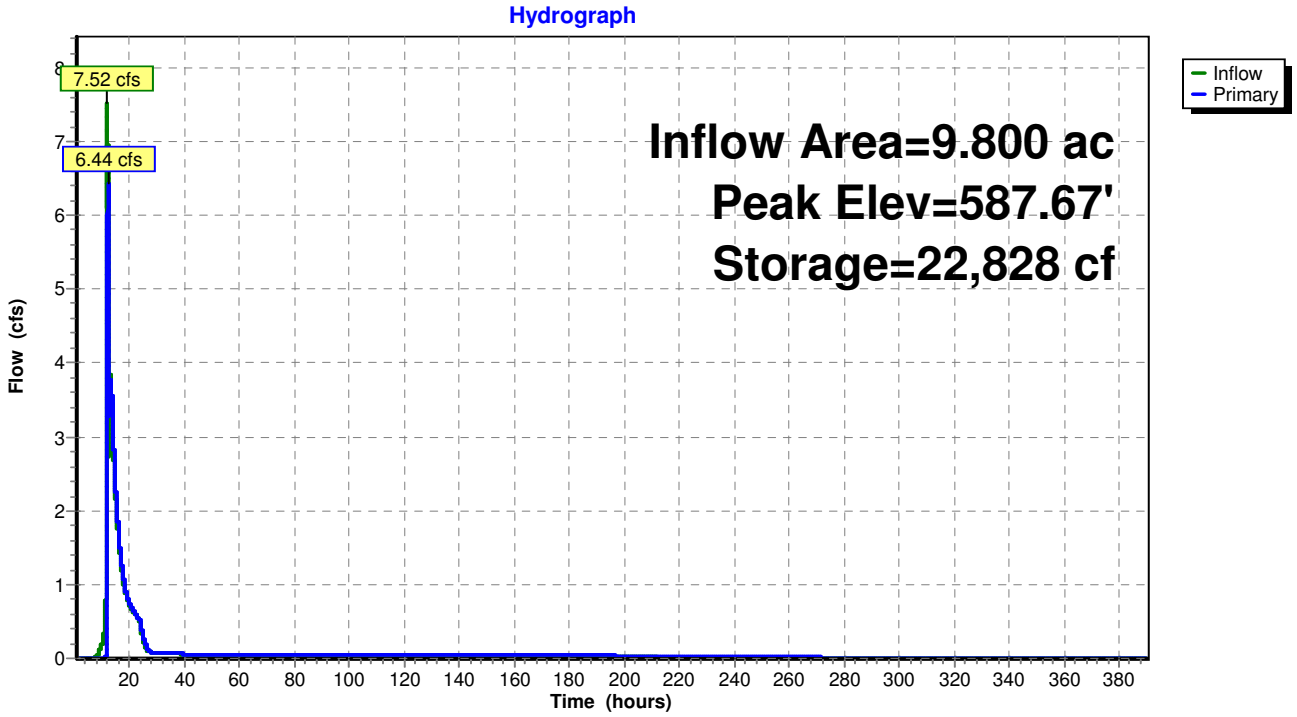
Volume	Invert	Avail.Storage	Storage Description
#1	579.50'	37,675 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
579.50	50	0	0
580.00	150	50	50
582.00	1,000	1,150	1,200
584.00	2,100	3,100	4,300
585.50	3,200	3,975	8,275
587.00	7,800	8,250	16,525
589.25	11,000	21,150	37,675

Device	Routing	Invert	Outlet Devices
#1	Primary	587.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	586.50'	**1.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=6.44 cfs @ 12.37 hrs HW=587.67' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 6.41 cfs @ 1.90 fps)
2=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.12 fps)

Pond 2.3P:


Hydrograph
7.52 cfs
6.44 cfs
Inflow Area=9.800 ac
Peak Elev=587.67'
Storage=22,828 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond FS 1:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 3.58" for 25-yr event
Inflow = 22.12 cfs @ 12.18 hrs, Volume= 1.968 af
Outflow = 22.12 cfs @ 12.18 hrs, Volume= 1.968 af, Atten= 0%, Lag= 0.0 min
Primary = 9.01 cfs @ 12.07 hrs, Volume= 1.622 af
Secondary = 13.28 cfs @ 12.18 hrs, Volume= 0.346 af

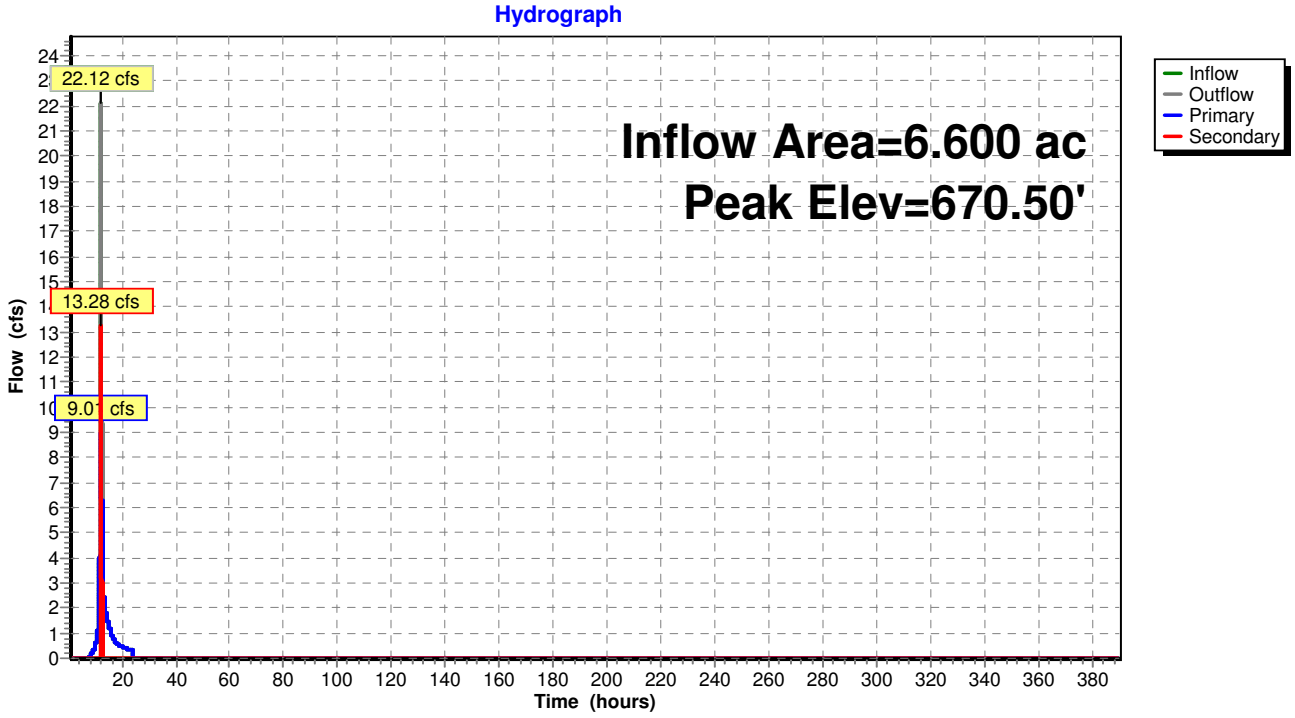
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 670.50' @ 12.18 hrs
Flood Elev= 674.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	666.50'	**15.0" x 35.0' long Culvert** RCP, square edge headwall, Ke= 0.500 Outlet Invert= 666.00' S= 0.0143 '/' Cc= 0.900 n= 0.012
#2	Secondary	669.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=8.90 cfs @ 12.07 hrs HW=670.12' TW=667.86' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 8.90 cfs @ 7.25 fps)

Secondary OutFlow Max=13.27 cfs @ 12.18 hrs HW=670.50' TW=657.25' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 13.27 cfs @ 3.32 fps)

Pond FS 1:



Summary for Pond FS 2:

Inflow Area = 8.700 ac, 41.38% Impervious, Inflow Depth = 3.40" for 25-yr event
Inflow = 10.35 cfs @ 12.32 hrs, Volume= 2.464 af
Outflow = 10.35 cfs @ 12.32 hrs, Volume= 2.464 af, Atten= 0%, Lag= 0.0 min
Primary = 4.68 cfs @ 12.32 hrs, Volume= 2.310 af
Secondary = 5.67 cfs @ 12.32 hrs, Volume= 0.154 af

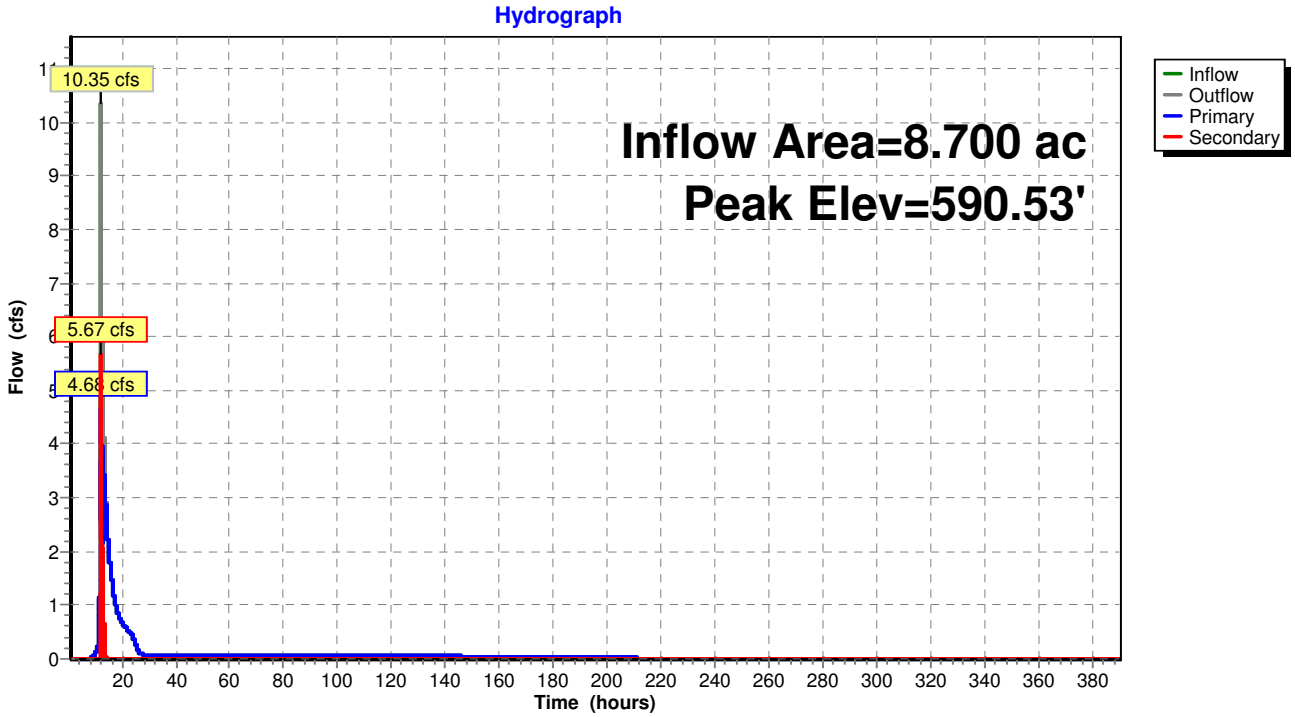
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 590.53' @ 12.32 hrs
Flood Elev= 596.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.50'	**12.0" x 23.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 588.00' S= 0.0217 '/' Cc= 0.900 n= 0.012
#2	Secondary	589.50'	**24.0" x 195.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 582.00' S= 0.0385 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=4.68 cfs @ 12.32 hrs HW=590.53' TW=587.67' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 4.68 cfs @ 5.96 fps)

Secondary OutFlow Max=5.66 cfs @ 12.32 hrs HW=590.53' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 5.66 cfs @ 3.46 fps)

Pond FS 2:



Summary for Subcatchment 1.0S:

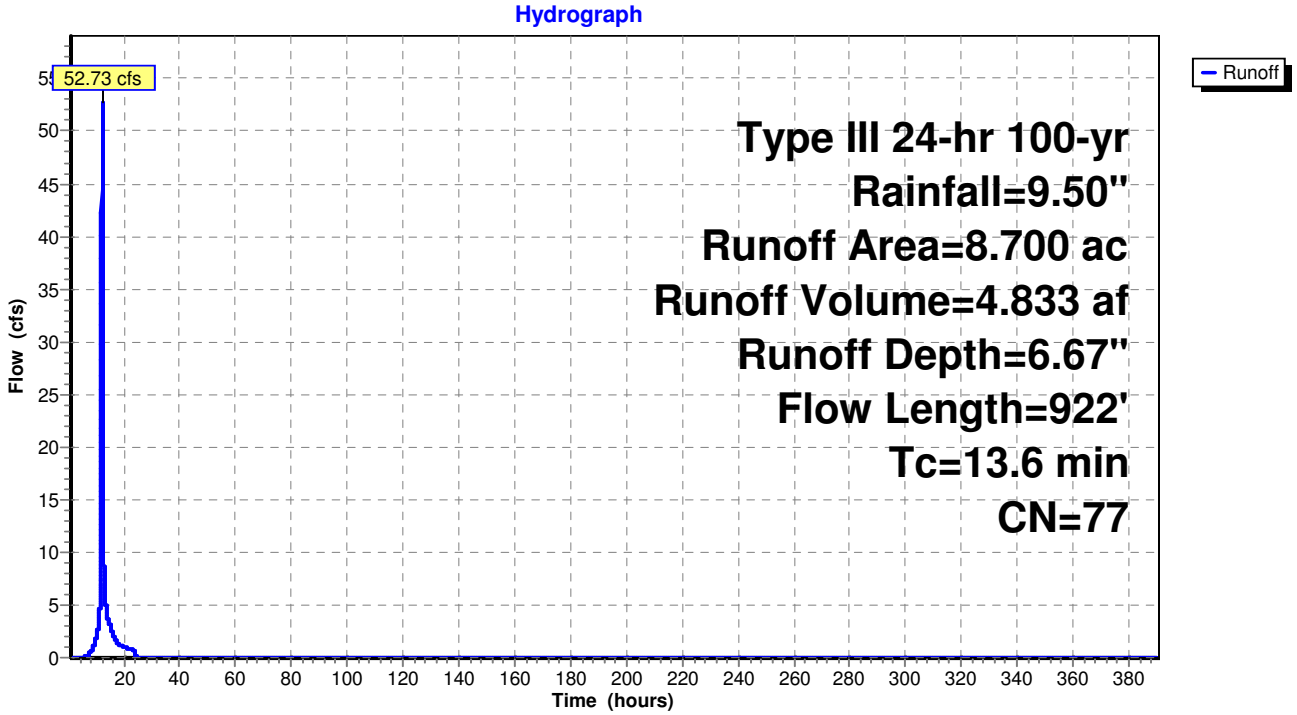
Runoff = 52.73 cfs @ 12.18 hrs, Volume= 4.833 af, Depth= 6.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
3.800	98	Paved parking & roofs
1.100	60	Woods, Fair, HSG B
3.800	61	>75% Grass cover, Good, HSG B
8.700	77	Weighted Average
4.900		Pervious Area
3.800		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	221	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	601	0.0900	17.83	31.51	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.6	922	Total			

Subcatchment 1.0S:



Summary for Subcatchment 1.1S:

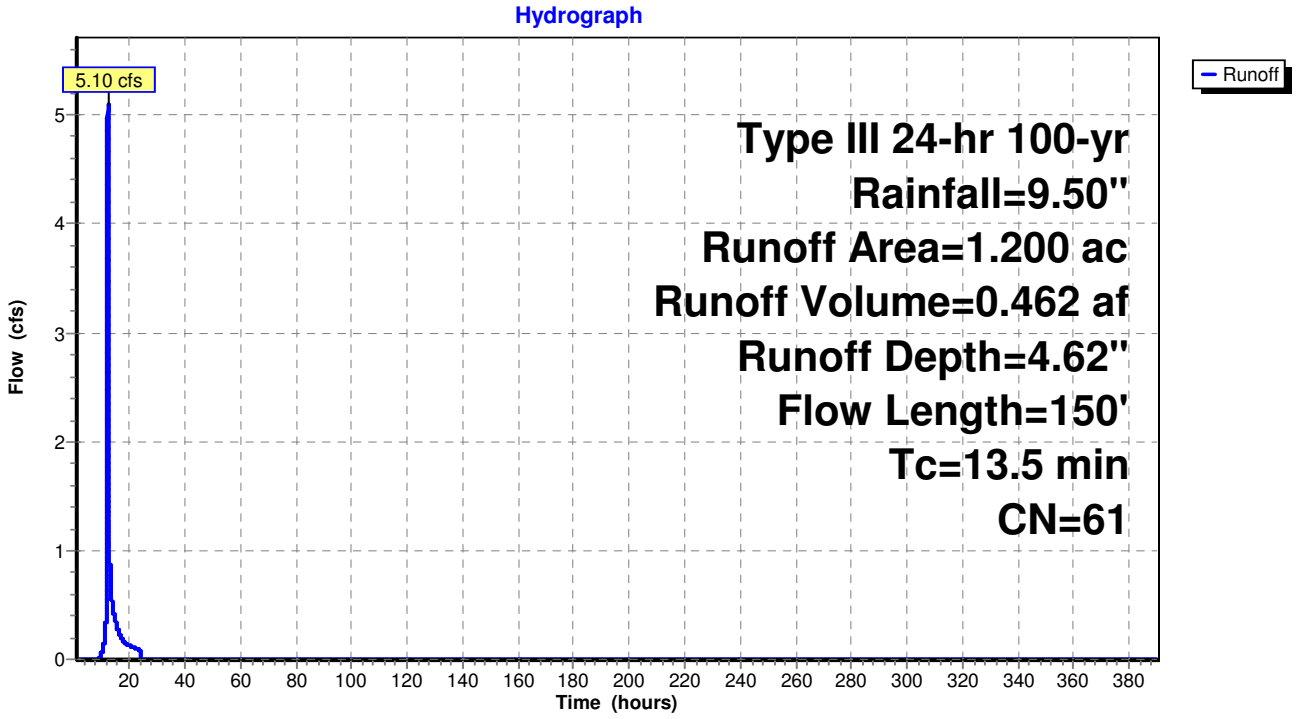
Runoff = 5.10 cfs @ 12.19 hrs, Volume= 0.462 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
1.200	61	>75% Grass cover, Good, HSG B
1.200		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	50	0.1600	2.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	150	Total			

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

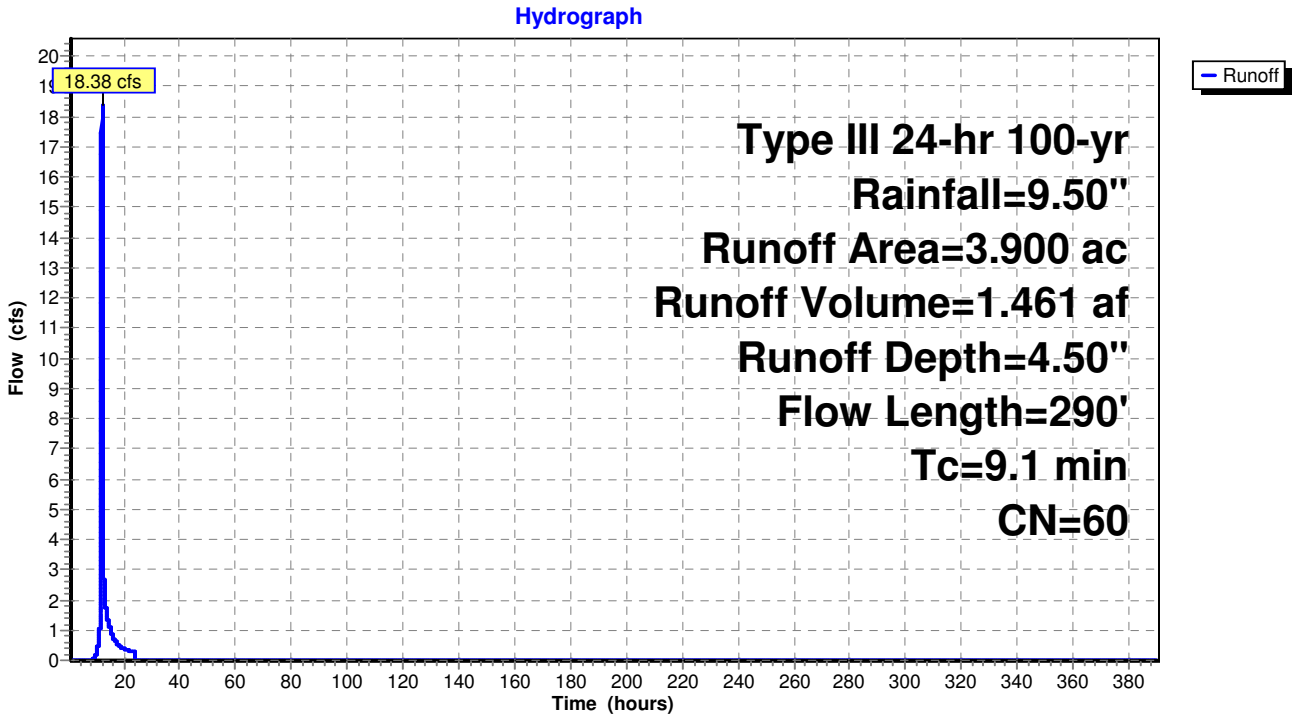
Runoff = 18.38 cfs @ 12.13 hrs, Volume= 1.461 af, Depth= 4.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
2.400	60	Woods, Fair, HSG B
1.500	61	>75% Grass cover, Good, HSG B
3.900	60	Weighted Average
3.900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.1140	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	170	0.2350	2.42		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.4800	4.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	290	Total			

Subcatchment 1.2S:



Summary for Subcatchment 1S:

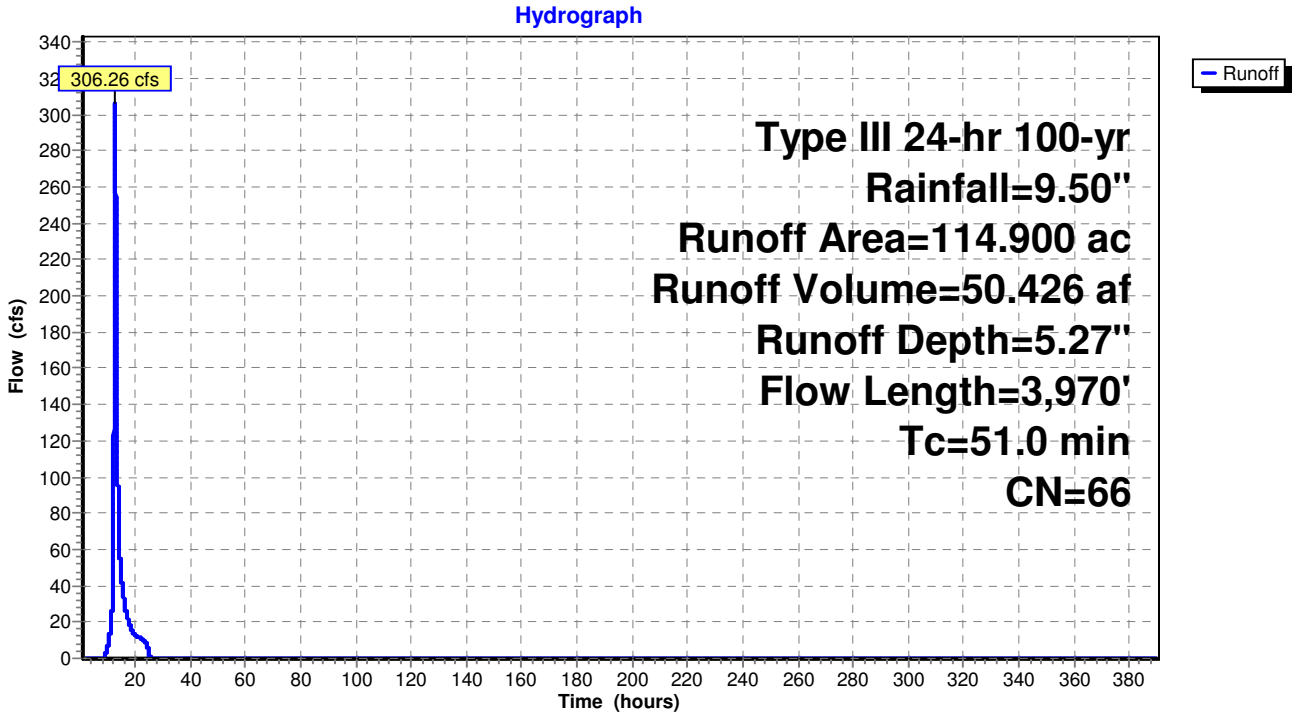
Runoff = 306.26 cfs @ 12.70 hrs, Volume= 50.426 af, Depth= 5.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

	Area (ac)	CN	Description
*	30.000	68	1 acre lots, 20% imp, HSG B
*	43.000	58	Woods/grass comb., Good, HSG B
*	6.000	61	>75% Grass cover, Good, HSG B
*	19.900	92	Urban commercial, 85% imp, HSG B
*	16.000	55	Woods, Good, HSG B
	114.900	66	Weighted Average
	91.985		Pervious Area
	22.915		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
24.2	1,700	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	970	0.0220	10.23	200.88	**Circular Channel (pipe),** Diam= 60.0" Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
4.7	1,200	0.0300	4.29	6.44	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 2.0 '/' Top.W=4.00' n= 0.030 Earth, grassed & winding
51.0	3,970	Total			

Subcatchment 1S:



Summary for Subcatchment 2.0S:

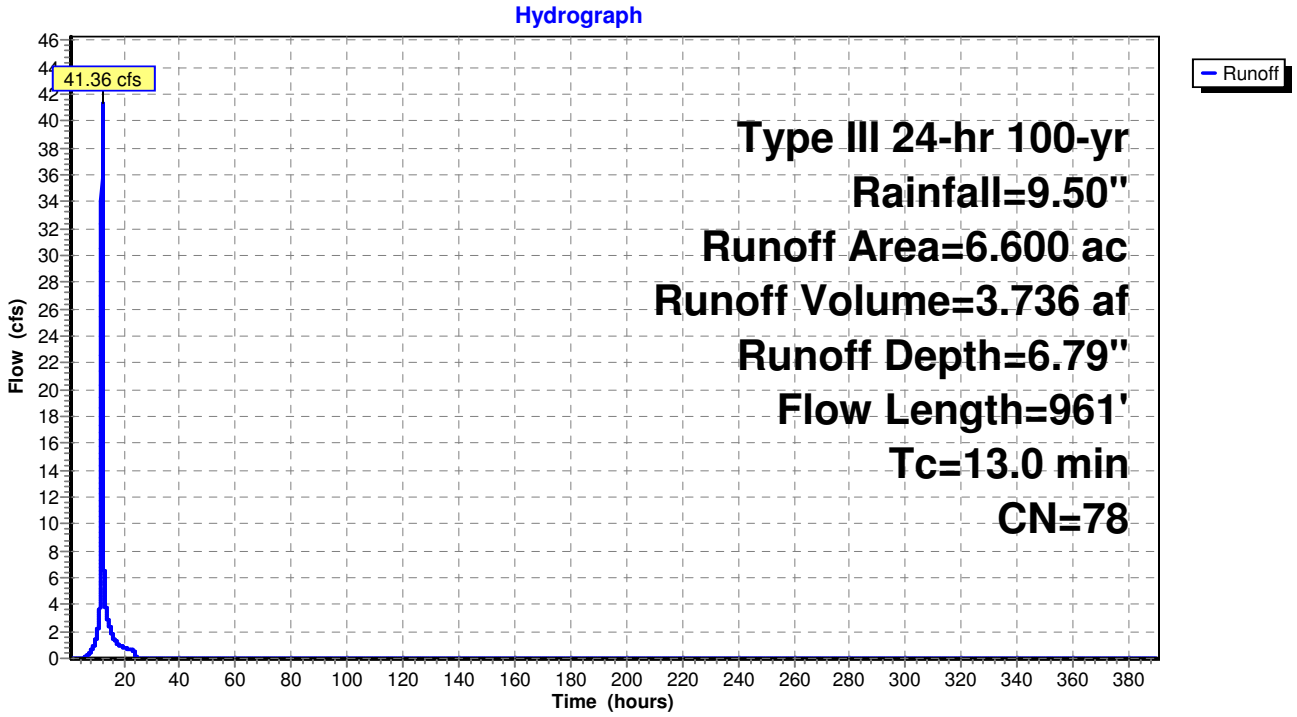
Runoff = 41.36 cfs @ 12.18 hrs, Volume= 3.736 af, Depth= 6.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
3.100	98	Paved parking & roofs
1.300	60	Woods, Fair, HSG B
2.200	61	>75% Grass cover, Good, HSG B
6.600	78	Weighted Average
3.500		Pervious Area
3.100		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	16	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	220	0.0800	1.98		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	550	0.1000	18.80	33.22	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
13.0	961	Total			

Subcatchment 2.0S:



Summary for Subcatchment 2.1S:

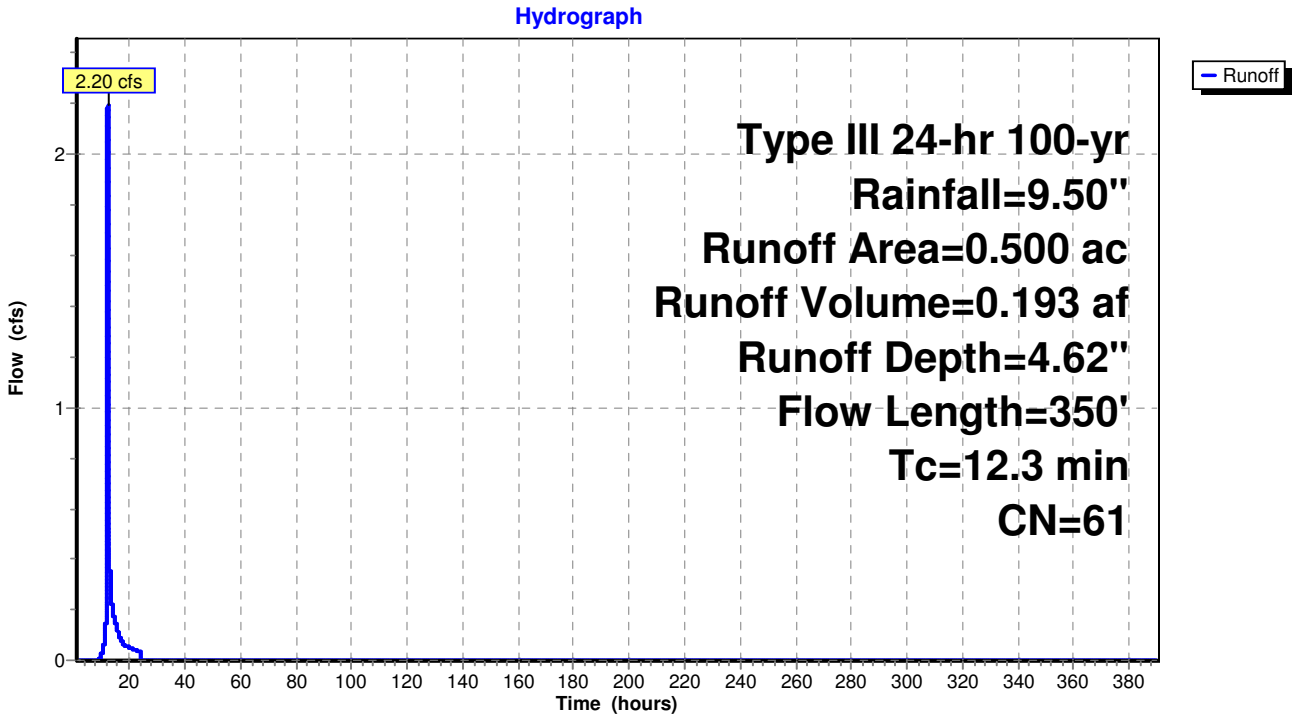
Runoff = 2.20 cfs @ 12.17 hrs, Volume= 0.193 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
0.200	60	Woods, Fair, HSG B
0.300	61	>75% Grass cover, Good, HSG B
0.500	61	Weighted Average
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.7	200	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.3600	4.20		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.3	350	Total			

Subcatchment 2.1S:



Summary for Subcatchment 2.2S:

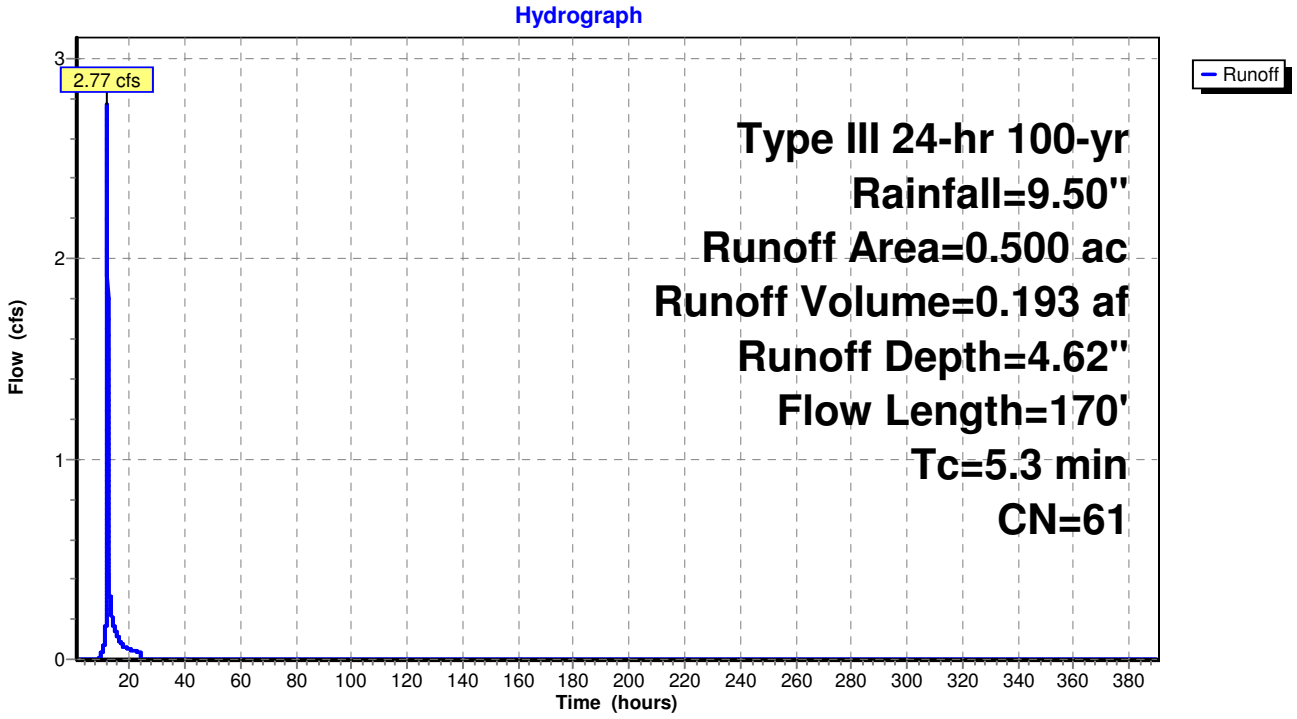
Runoff = 2.77 cfs @ 12.08 hrs, Volume= 0.193 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.1200	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.7	70	0.0570	1.67		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.3	170	Total			

Subcatchment 2.2S:



Summary for Subcatchment 2.3.1S:

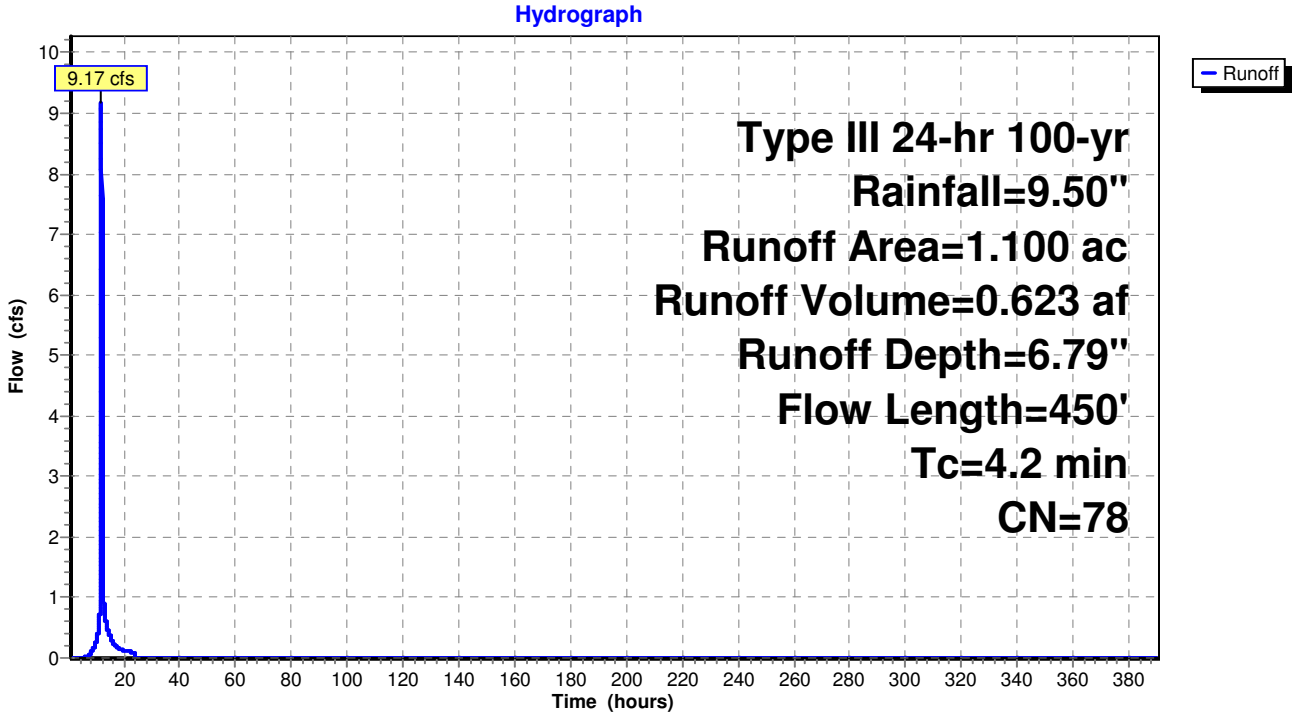
Runoff = 9.17 cfs @ 12.06 hrs, Volume= 0.623 af, Depth= 6.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
0.500	98	Paved parking & roofs
0.600	61	>75% Grass cover, Good, HSG B
1.100	78	Weighted Average
0.600		Pervious Area
0.500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	100	0.2200	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.5	115	0.3000	3.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	235	0.2000	26.58	46.98	**Circular Channel (pipe),** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
4.2	450	Total			

Subcatchment 2.3.1S:



Summary for Subcatchment 2.3.2S:

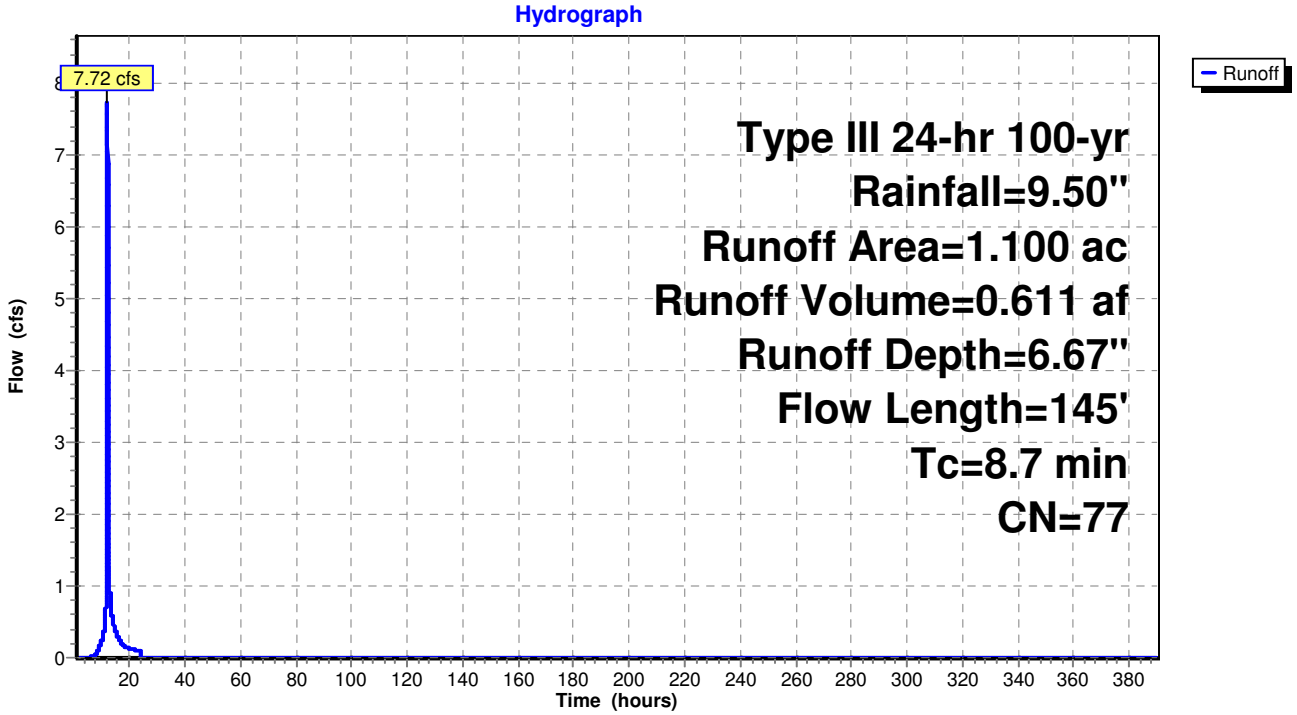
Runoff = 7.72 cfs @ 12.12 hrs, Volume= 0.611 af, Depth= 6.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.300	60	Woods, Fair, HSG B
0.400	74	>75% Grass cover, Good, HSG C
0.100	80	>75% Grass cover, Good, HSG D
1.100	77	Weighted Average
0.800		Pervious Area
0.300		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.2000	0.20		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	45	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	145	Total			

Subcatchment 2.3.2S:



Summary for Subcatchment 3S:

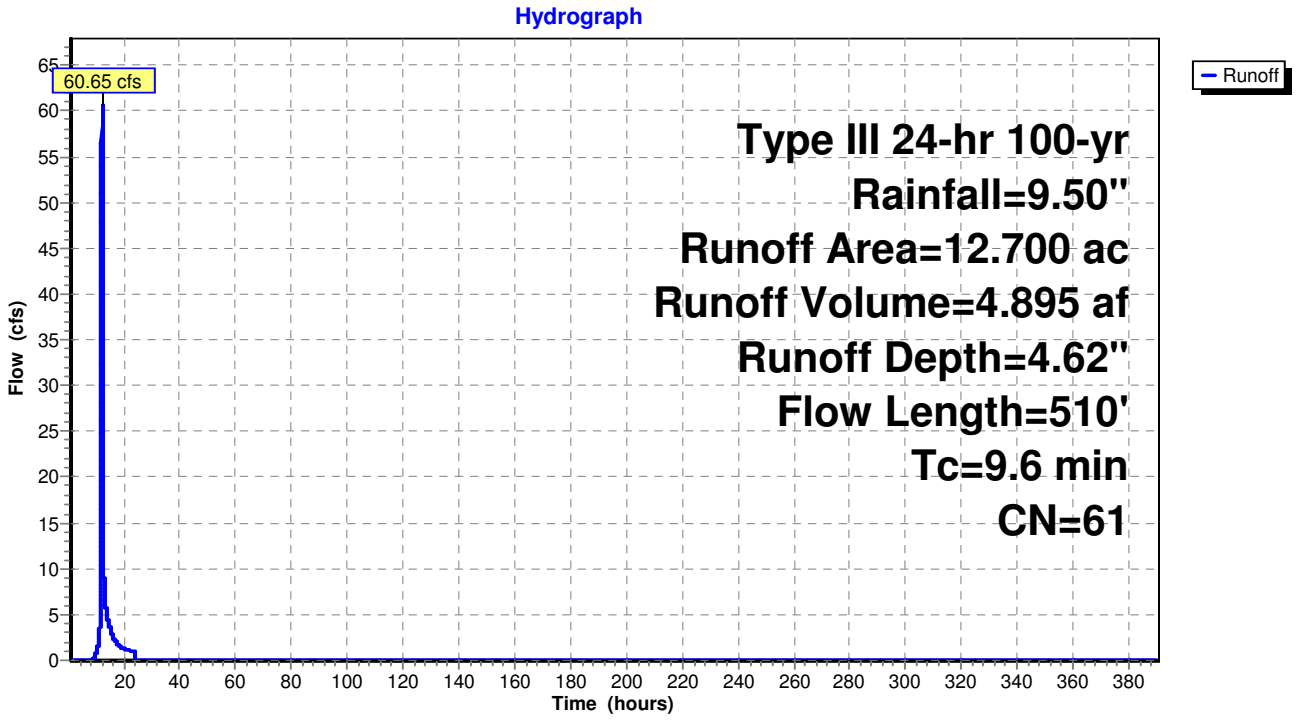
Runoff = 60.65 cfs @ 12.14 hrs, Volume= 4.895 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=9.50"

Area (ac)	CN	Description
0.400	98	Paved parking & roofs
10.300	60	Woods, Fair, HSG B
2.000	61	>75% Grass cover, Good, HSG B
12.700	61	Weighted Average
12.300		Pervious Area
0.400		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.2800	0.23		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	410	0.2930	2.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.6	510	Total			

Subcatchment 3S:

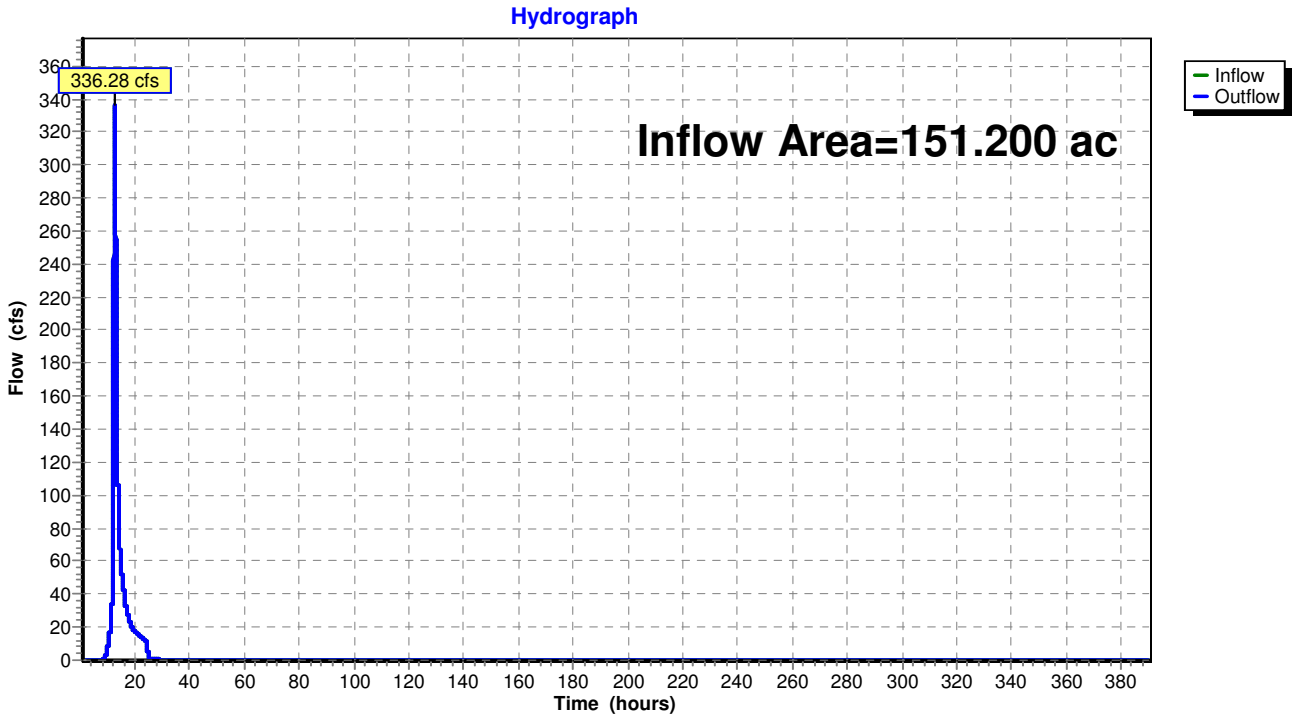


Summary for Reach 1R:

Inflow Area = 151.200 ac, 20.51% Impervious, Inflow Depth = 5.35" for 100-yr event
Inflow = 336.28 cfs @ 12.64 hrs, Volume= 67.407 af
Outflow = 336.28 cfs @ 12.64 hrs, Volume= 67.407 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 1R:

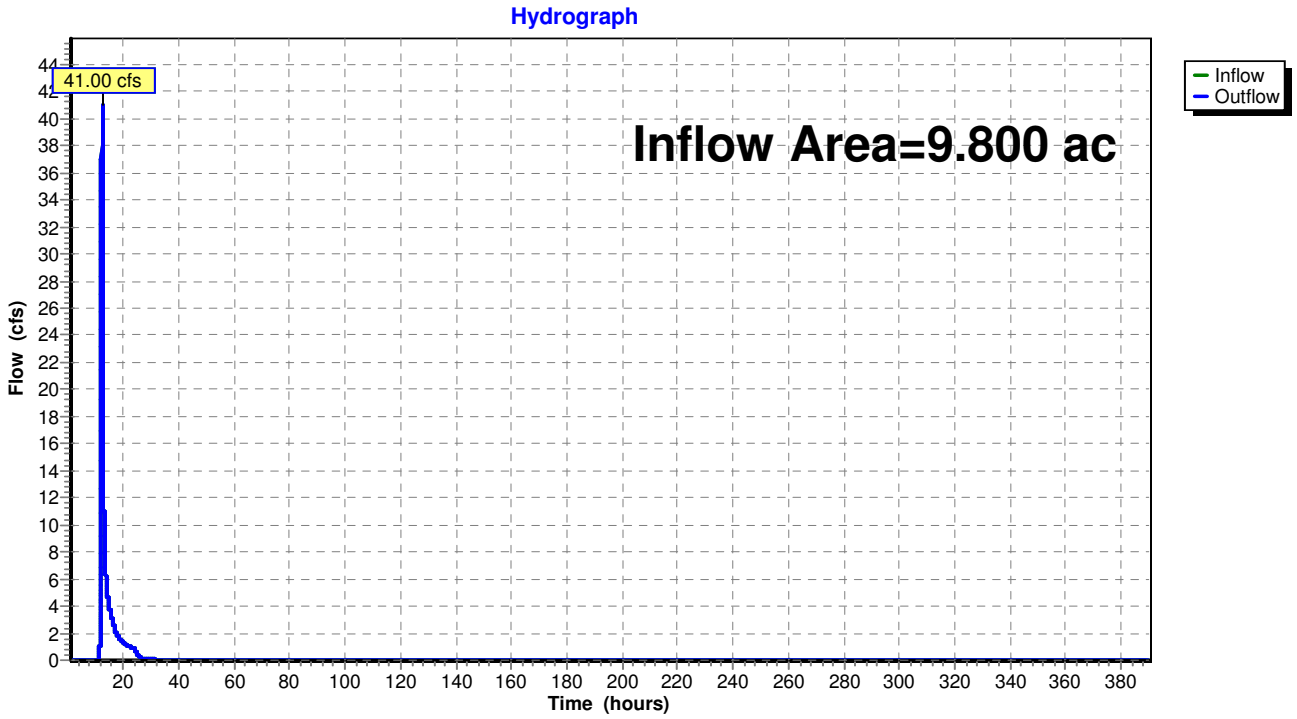


Summary for Reach 2R:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth = 6.56" for 100-yr event
Inflow = 41.00 cfs @ 12.26 hrs, Volume= 5.353 af
Outflow = 41.00 cfs @ 12.26 hrs, Volume= 5.353 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs

Reach 2R:



Summary for Pond 1.0P:

Inflow Area = 8.700 ac, 43.68% Impervious, Inflow Depth = 6.67" for 100-yr event
Inflow = 52.73 cfs @ 12.18 hrs, Volume= 4.833 af
Outflow = 41.44 cfs @ 12.29 hrs, Volume= 4.831 af, Atten= 21%, Lag= 6.6 min
Primary = 41.44 cfs @ 12.29 hrs, Volume= 4.831 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 674.00' Surf.Area= 14,391 sf Storage= 31,719 cf
Peak Elev= 676.83' @ 12.29 hrs Surf.Area= 21,585 sf Storage= 83,499 cf (51,780 cf above start)
Flood Elev= 677.00' Surf.Area= 22,107 sf Storage= 87,251 cf (55,532 cf above start)

Plug-Flow detention time= 329.5 min calculated for 4.103 af (85% of inflow)
Center-of-Mass det. time= 210.8 min (1,021.0 - 810.2)

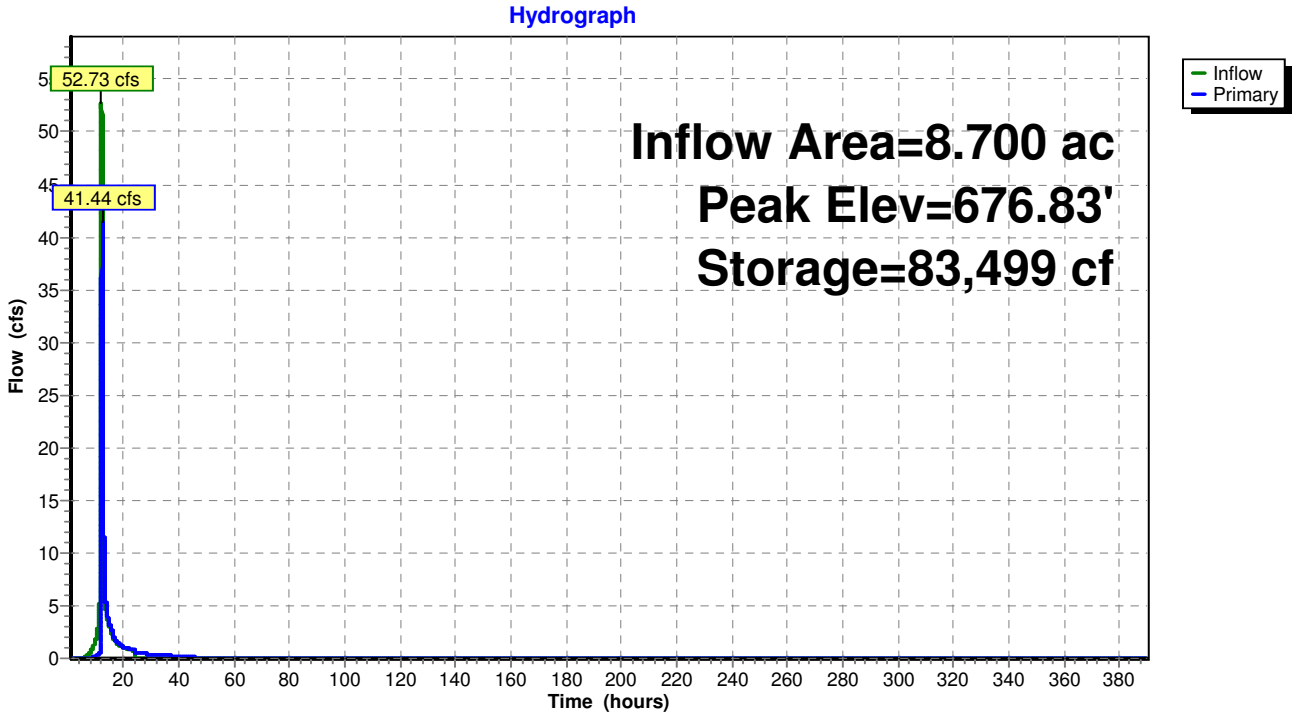
Volume	Invert	Avail.Storage	Storage Description
#1	670.00'	109,358 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
670.00	3,990	0	0
672.00	6,669	10,659	10,659
674.00	14,391	21,060	31,719
676.00	19,034	33,425	65,144
678.00	25,180	44,214	109,358

Device	Routing	Invert	Outlet Devices
#1	Primary	674.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	675.50'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=41.42 cfs @ 12.29 hrs HW=676.83' TW=668.75' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.69 cfs @ 7.86 fps)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 40.74 cfs @ 3.83 fps)

Pond 1.0P:


Hydrograph
52.73 cfs
41.44 cfs
Inflow Area=8.700 ac
Peak Elev=676.83'
Storage=83,499 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0
5
10
15
20
25
30
35
40
45
50
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 1.1P:

Inflow Area = 9.900 ac, 38.38% Impervious, Inflow Depth = 6.42" for 100-yr event
Inflow = 45.65 cfs @ 12.28 hrs, Volume= 5.293 af
Outflow = 39.52 cfs @ 12.42 hrs, Volume= 5.292 af, Atten= 13%, Lag= 8.5 min
Primary = 39.52 cfs @ 12.42 hrs, Volume= 5.292 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 668.98' @ 12.42 hrs Surf.Area= 11,860 sf Storage= 39,050 cf
Flood Elev= 669.00' Surf.Area= 11,900 sf Storage= 39,300 cf

Plug-Flow detention time= 427.8 min calculated for 5.292 af (100% of inflow)
Center-of-Mass det. time= 424.4 min (1,429.8 - 1,005.4)

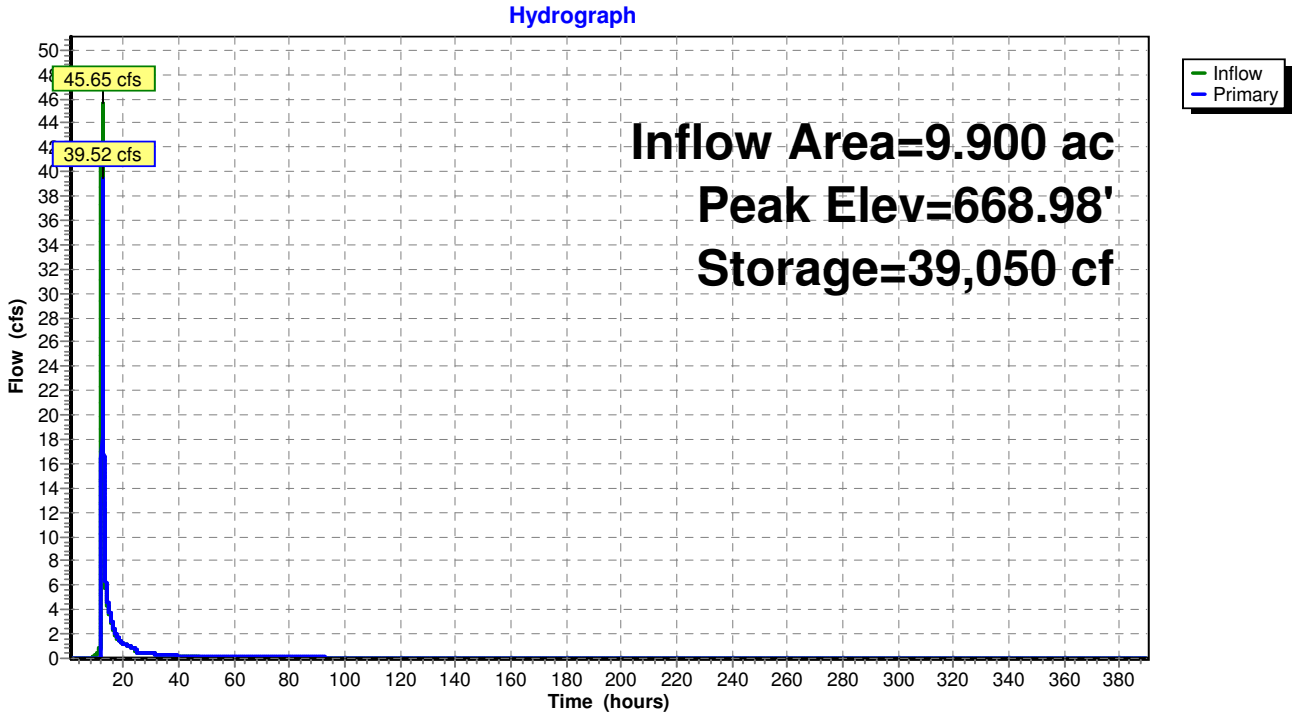
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	51,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	3,800	0	0
666.00	6,800	10,600	10,600
668.00	10,000	16,800	27,400
670.00	13,800	23,800	51,200

Device	Routing	Invert	Outlet Devices
#1	Primary	664.00'	**1.5" Vert. Orifice/Grate** C= 0.600
#2	Primary	667.20'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=39.51 cfs @ 12.42 hrs HW=668.98' TW=638.77' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.13 cfs @ 10.68 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 39.38 cfs @ 4.43 fps)

Pond 1.1P:


Hydrograph
45.65 cfs
39.52 cfs
Inflow Area=9.900 ac
Peak Elev=668.98'
Storage=39,050 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 1.2P:

Inflow Area = 13.800 ac, 27.54% Impervious, Inflow Depth = 5.87" for 100-yr event
Inflow = 47.65 cfs @ 12.39 hrs, Volume= 6.754 af
Outflow = 14.88 cfs @ 13.08 hrs, Volume= 6.733 af, Atten= 69%, Lag= 41.4 min
Primary = 14.88 cfs @ 13.08 hrs, Volume= 6.733 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 640.94' @ 13.08 hrs Surf.Area= 27,463 sf Storage= 112,029 cf
Flood Elev= 641.00' Surf.Area= 27,600 sf Storage= 113,600 cf

Plug-Flow detention time= 3,137.5 min calculated for 6.733 af (100% of inflow)
Center-of-Mass det. time= 3,108.9 min (4,411.1 - 1,302.2)

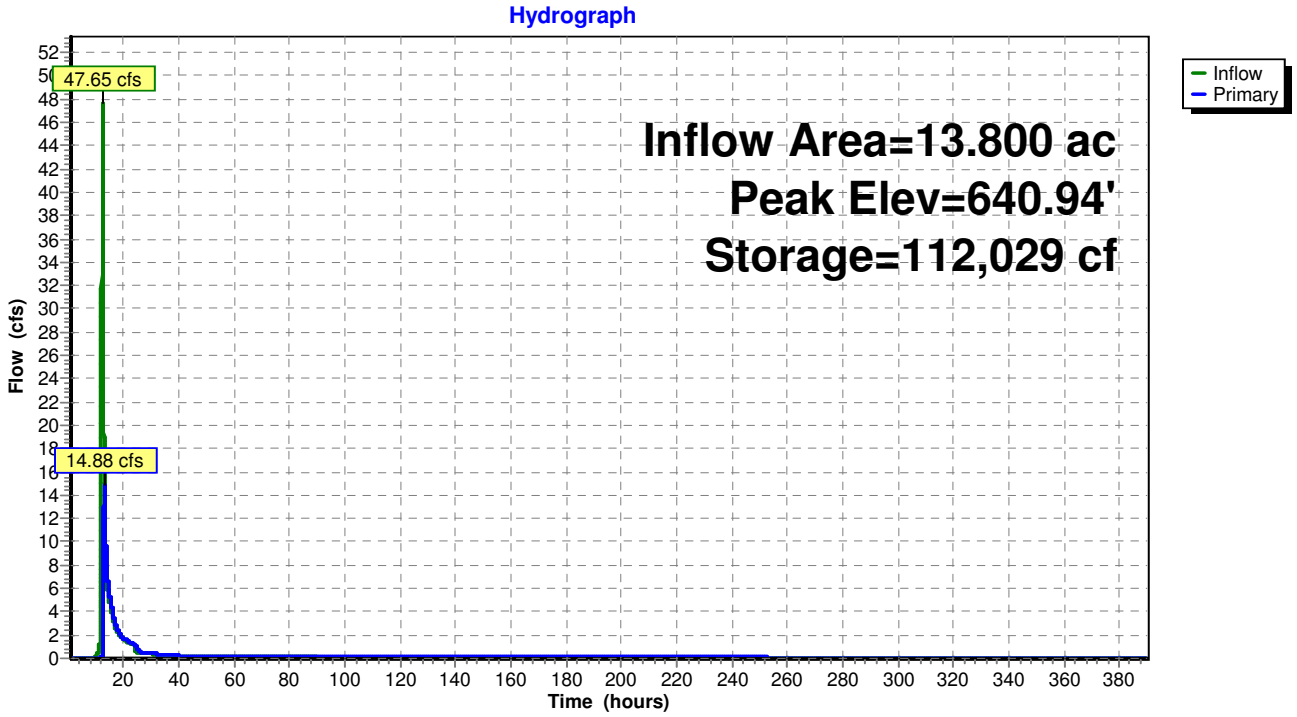
Volume	Invert	Avail.Storage	Storage Description
#1	636.00'	141,200 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
636.00	18,000	0	0
638.00	21,400	39,400	39,400
640.00	25,200	46,600	86,000
642.00	30,000	55,200	141,200

Device	Routing	Invert	Outlet Devices
#1	Primary	636.00'	**1.8" Vert. Orifice/Grate** C= 0.600
#2	Primary	640.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=14.88 cfs @ 13.08 hrs HW=640.94' TW=0.00' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.19 cfs @ 10.62 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 14.69 cfs @ 2.65 fps)

Pond 1.2P:


Hydrograph
Inflow Area=13.800 ac
Peak Elev=640.94'
Storage=112,029 cf
47.65 cfs
14.88 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2.0P:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 4.74" for 100-yr event
Inflow = 9.12 cfs @ 12.17 hrs, Volume= 2.604 af
Outflow = 8.09 cfs @ 12.32 hrs, Volume= 2.604 af, Atten= 11%, Lag= 9.0 min
Primary = 8.09 cfs @ 12.32 hrs, Volume= 2.604 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 668.98' @ 12.32 hrs Surf.Area= 8,511 sf Storage= 26,260 cf
Flood Elev= 669.00' Surf.Area= 8,550 sf Storage= 26,450 cf

Plug-Flow detention time= 616.3 min calculated for 2.604 af (100% of inflow)
Center-of-Mass det. time= 616.5 min (1,455.9 - 839.4)

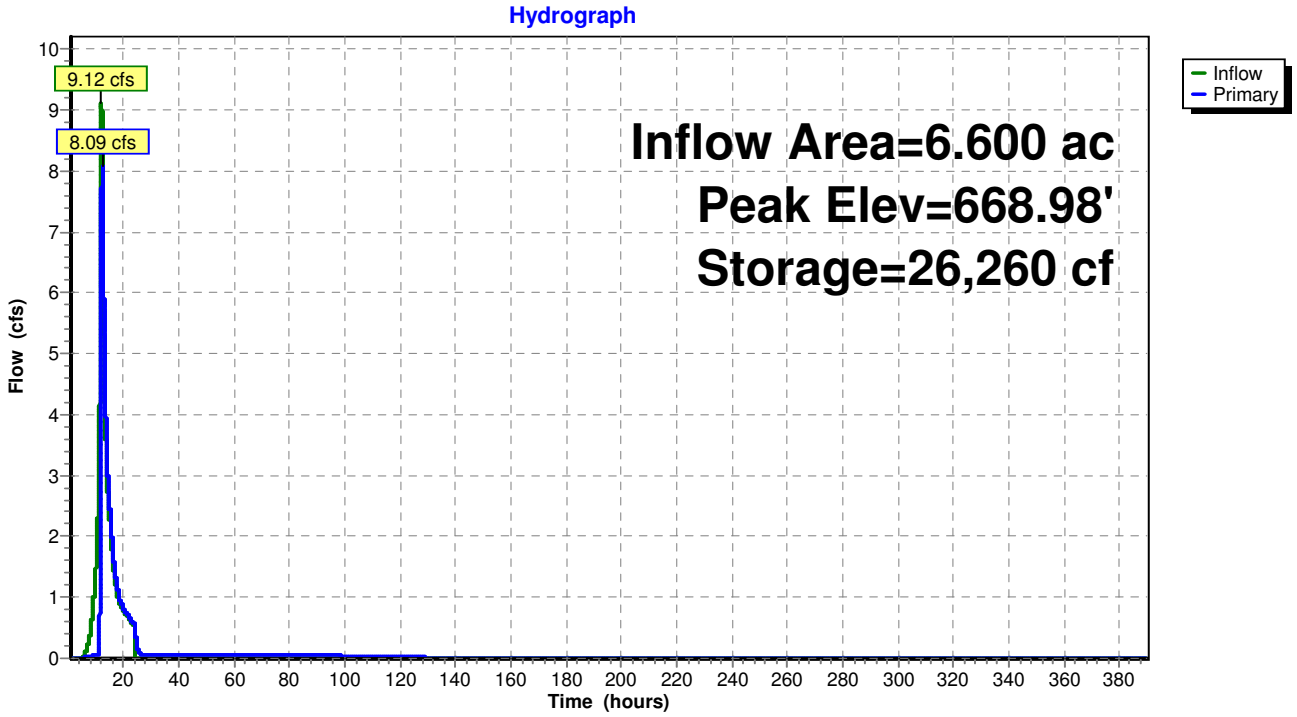
Volume	Invert	Avail.Storage	Storage Description
#1	664.00'	35,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
664.00	2,300	0	0
666.00	4,400	6,700	6,700
668.00	6,800	11,200	17,900
670.00	10,300	17,100	35,000

Device	Routing	Invert	Outlet Devices
#1	Primary	662.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	668.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	664.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=8.08 cfs @ 12.32 hrs HW=668.98' TW=662.87' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 11.90 fps)
  - **3=Orifice/Grate** (Passes 0.06 cfs of 2.34 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 8.02 cfs @ 3.28 fps)

Pond 2.0P:


Hydrograph
Inflow Area=6.600 ac
Peak Elev=668.98'
Storage=26,260 cf
9.12 cfs
8.09 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.1P:

Inflow Area = 7.100 ac, 43.66% Impervious, Inflow Depth = 4.73" for 100-yr event
Inflow = 9.90 cfs @ 12.23 hrs, Volume= 2.797 af
Outflow = 8.38 cfs @ 12.54 hrs, Volume= 2.797 af, Atten= 15%, Lag= 18.6 min
Primary = 8.38 cfs @ 12.54 hrs, Volume= 2.797 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 663.00' @ 12.54 hrs Surf.Area= 6,852 sf Storage= 16,263 cf
Flood Elev= 663.00' Surf.Area= 6,850 sf Storage= 16,250 cf

Plug-Flow detention time= 587.0 min calculated for 2.797 af (100% of inflow)
Center-of-Mass det. time= 587.1 min (2,000.7 - 1,413.5)

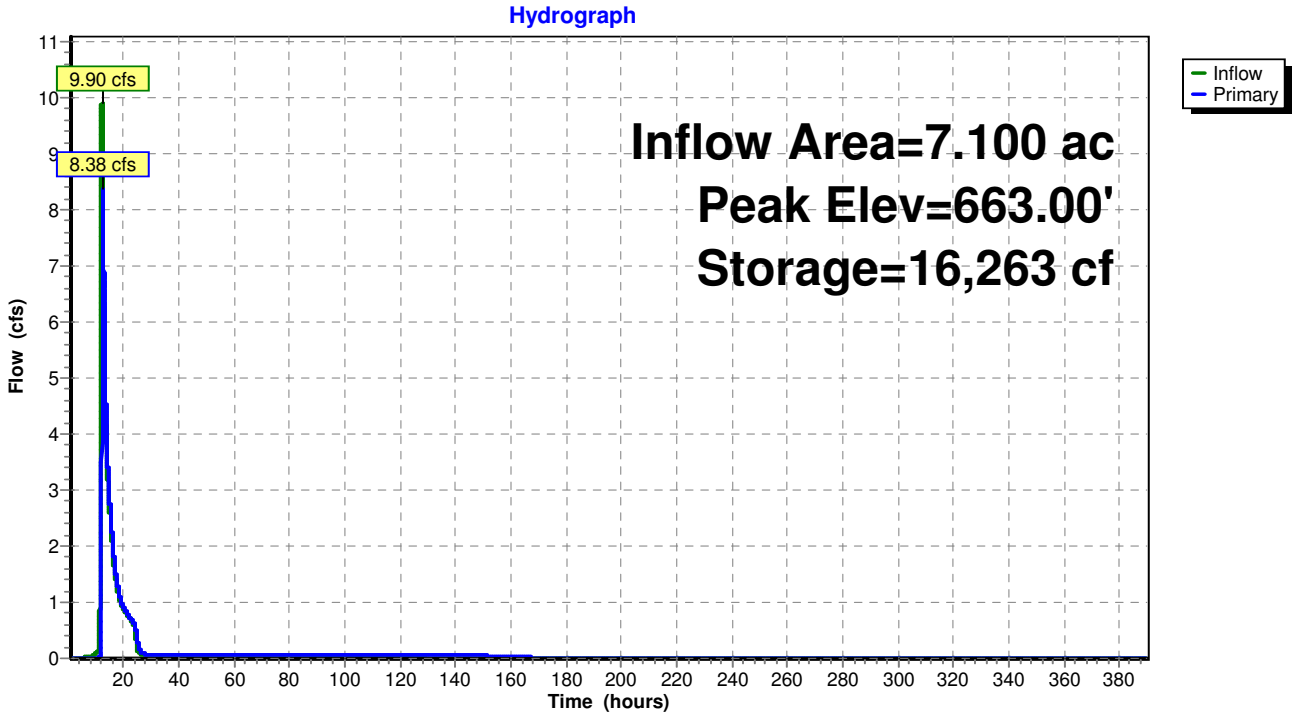
Volume	Invert	Avail.Storage	Storage Description
#1	660.00'	23,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
660.00	3,700	0	0
662.00	5,700	9,400	9,400
664.00	8,000	13,700	23,100

Device	Routing	Invert	Outlet Devices
#1	Primary	656.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	662.00'	**2.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	660.00'	**4.000 in/hr Exfiltration over Surface area above invert** Excluded Surface area = 3,700 sf

Primary OutFlow Max=8.38 cfs @ 12.54 hrs HW=663.00' TW=658.42' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 10.30 fps)
  - **3=Exfiltration** (Passes 0.06 cfs of 0.29 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 8.32 cfs @ 3.32 fps)

Pond 2.1P:


Hydrograph
9.90 cfs
8.38 cfs
Inflow Area=7.100 ac
Peak Elev=663.00'
Storage=16,263 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380

Summary for Pond 2.2P:

Inflow Area = 7.600 ac, 40.79% Impervious, Inflow Depth = 6.51" for 100-yr event
Inflow = 36.79 cfs @ 12.18 hrs, Volume= 4.121 af
Outflow = 32.54 cfs @ 12.27 hrs, Volume= 4.121 af, Atten= 12%, Lag= 4.9 min
Primary = 32.54 cfs @ 12.27 hrs, Volume= 4.121 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 658.81' @ 12.27 hrs Surf.Area= 7,629 sf Storage= 16,215 cf
Flood Elev= 659.00' Surf.Area= 8,000 sf Storage= 17,700 cf

Plug-Flow detention time= 362.0 min calculated for 4.121 af (100% of inflow)
Center-of-Mass det. time= 362.0 min (1,960.4 - 1,598.4)

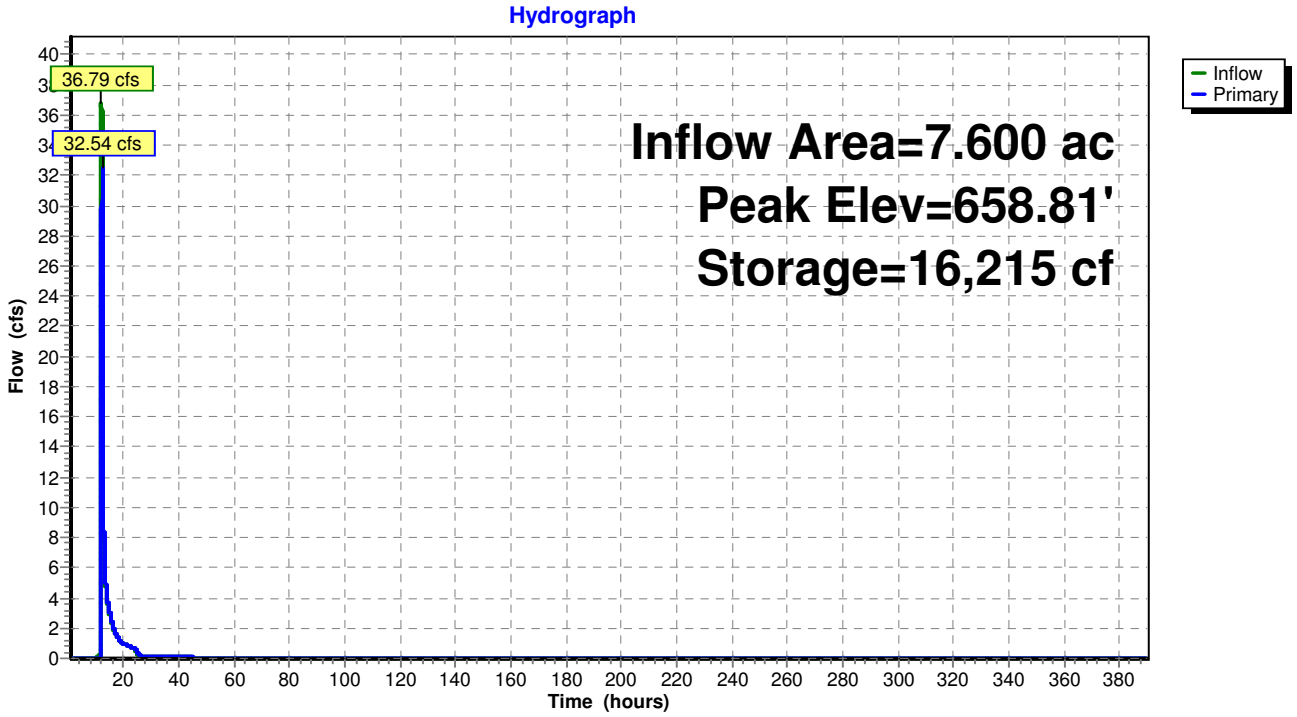
Volume	Invert	Avail.Storage	Storage Description
#1	656.00'	25,700 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
656.00	3,700	0	0
658.00	6,000	9,700	9,700
660.00	10,000	16,000	25,700

Device	Routing	Invert	Outlet Devices
#1	Primary	654.50'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	657.25'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	656.00'	**0.5" Vert. Orifice/Grate X 160.00** C= 0.600

Primary OutFlow Max=32.52 cfs @ 12.27 hrs HW=658.81' TW=593.87' (Dynamic Tailwater)
- **1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 9.95 fps)
  - **3=Orifice/Grate** (Passes 0.05 cfs of 1.76 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 32.47 cfs @ 4.15 fps)

Pond 2.2P:


Hydrograph
36.79 cfs
32.54 cfs
Inflow Area=7.600 ac
Peak Elev=658.81'
Storage=16,215 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2.3P:

Inflow Area = 9.800 ac, 39.80% Impervious, Inflow Depth = 4.71" for 100-yr event
Inflow = 14.54 cfs @ 12.14 hrs, Volume= 3.850 af
Outflow = 13.22 cfs @ 12.25 hrs, Volume= 3.848 af, Atten= 9%, Lag= 6.1 min
Primary = 13.22 cfs @ 12.25 hrs, Volume= 3.848 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Starting Elev= 586.50' Surf.Area= 6,267 sf Storage= 13,775 cf
Peak Elev= 587.90' @ 12.25 hrs Surf.Area= 9,082 sf Storage= 24,999 cf (11,224 cf above start)
Flood Elev= 588.25' Surf.Area= 9,578 sf Storage= 28,275 cf (14,500 cf above start)

Plug-Flow detention time= 1,316.9 min calculated for 3.532 af (92% of inflow)
Center-of-Mass det. time= 459.6 min (2,520.1 - 2,060.4)

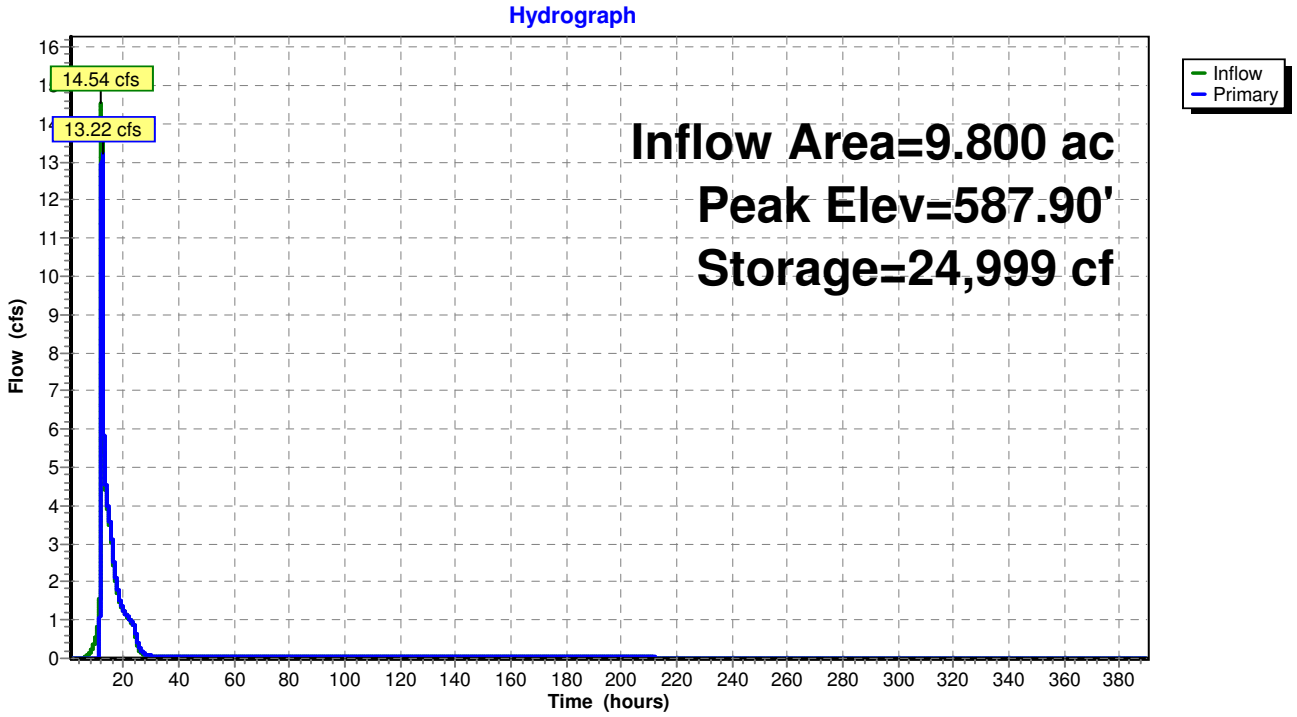
Volume	Invert	Avail.Storage	Storage Description
#1	579.50'	37,675 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
579.50	50	0	0
580.00	150	50	50
582.00	1,000	1,150	1,200
584.00	2,100	3,100	4,300
585.50	3,200	3,975	8,275
587.00	7,800	8,250	16,525
589.25	11,000	21,150	37,675

Device	Routing	Invert	Outlet Devices
#1	Primary	587.25'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	586.50'	**1.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=13.22 cfs @ 12.25 hrs HW=587.90' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 13.19 cfs @ 2.53 fps)
2=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.61 fps)

Pond 2.3P:


Hydrograph
14.54 cfs
13.22 cfs
Inflow Area=9.800 ac
Peak Elev=587.90'
Storage=24,999 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond FS 1:

Inflow Area = 6.600 ac, 46.97% Impervious, Inflow Depth = 6.79" for 100-yr event
Inflow = 41.36 cfs @ 12.18 hrs, Volume= 3.736 af
Outflow = 41.36 cfs @ 12.18 hrs, Volume= 3.736 af, Atten= 0%, Lag= 0.0 min
Primary = 9.12 cfs @ 12.17 hrs, Volume= 2.604 af
Secondary = 32.24 cfs @ 12.18 hrs, Volume= 1.131 af

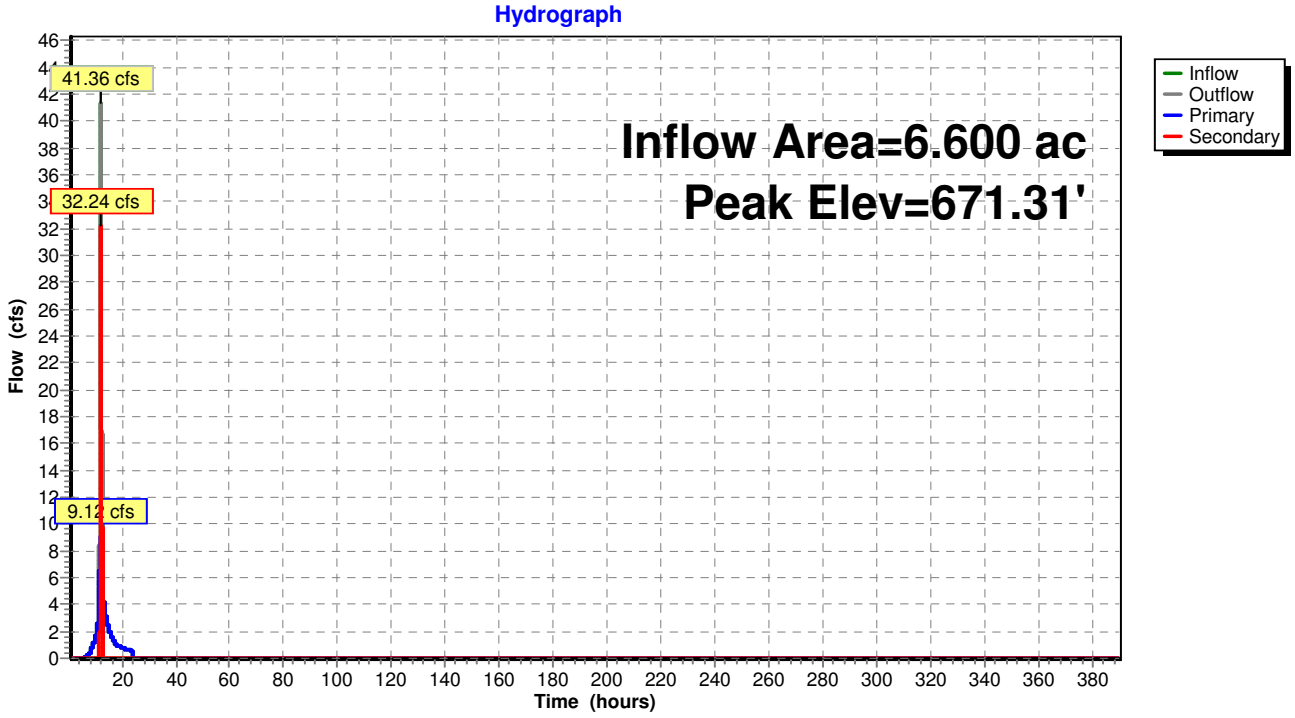
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 671.31' @ 12.18 hrs
Flood Elev= 674.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	666.50'	**15.0" x 35.0' long Culvert** RCP, square edge headwall, Ke= 0.500 Outlet Invert= 666.00' S= 0.0143 '/' Cc= 0.900 n= 0.012
#2	Secondary	669.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=9.11 cfs @ 12.17 hrs HW=671.30' TW=668.93' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 9.11 cfs @ 7.42 fps)

Secondary OutFlow Max=32.20 cfs @ 12.18 hrs HW=671.30' TW=658.63' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 32.20 cfs @ 4.46 fps)

Pond FS 1:



Summary for Pond FS 2:

Inflow Area = 8.700 ac, 41.38% Impervious, Inflow Depth = 6.54" for 100-yr event
Inflow = 36.14 cfs @ 12.26 hrs, Volume= 4.744 af
Outflow = 36.14 cfs @ 12.26 hrs, Volume= 4.744 af, Atten= 0%, Lag= 0.0 min
Primary = 8.35 cfs @ 12.26 hrs, Volume= 3.238 af
Secondary = 27.79 cfs @ 12.26 hrs, Volume= 1.505 af

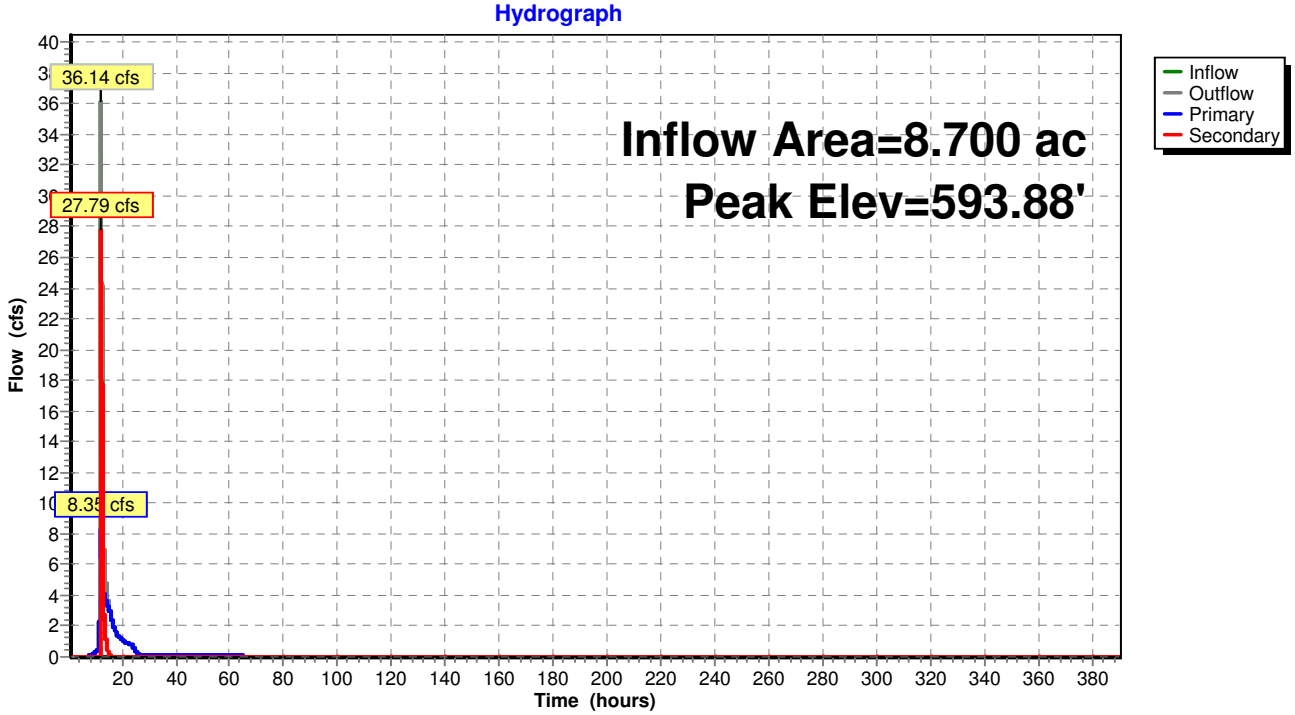
Routing by Dyn-Stor-Ind method, Time Span= 1.00-390.00 hrs, dt= 0.01 hrs
Peak Elev= 593.88' @ 12.26 hrs
Flood Elev= 596.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	588.50'	**12.0" x 23.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 588.00' S= 0.0217 '/' Cc= 0.900 n= 0.012
#2	Secondary	589.50'	**24.0" x 195.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 582.00' S= 0.0385 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=8.35 cfs @ 12.26 hrs HW=593.87' TW=587.90' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 8.35 cfs @ 10.63 fps)

Secondary OutFlow Max=27.78 cfs @ 12.26 hrs HW=593.87' TW=0.00' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 27.78 cfs @ 8.84 fps)

Pond FS 2:



APPENDIX C

Soil Testing Results

INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

DEEP TEST HOLE DATA SHEET

PROJECT: HILLCREST COMMONS DATE OF TESTING: 9/28/05

JOB NO.: 01176.100 SHEET NO. _____ OF _____

DEPTH	HOLE NO. SW 1	HOLE NO. SW 2	HOLE NO. SW3
GL	TOPSOIL	TOPSOIL	TOPSOIL
0.5'			
1.0'	MEDIUM BROWN	MEDIUM BROWN	MEDIUM BROWN
1.5'	SANDY LOAM	SANDY LOAM	SANDY LOAM
2.0'			
2.5'			
3.0'	SANDY LOAM	FINE BROWN	FINE BROWN
3.5'	WITH COBBLES	SANDY LOAM	SANDY LOAM
4.0'	AND ROCK		
4.5'			
5.0'			
5.5'			
6.0'			
6.5'			
7.0'			
7.5'			
8.0'			
8.5'			
9.0'			
9.5'			
10.0'			
Level at which groundwater is encountered	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
Level to which water level rises after being encountered	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
Level at which mottling is observed	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE

Deep hole observations made by: MARGARET O'CONNOR - NYCDEP Date: 9/28/05

JANINE McCOLGAN - NYCDEP

MICHELLE MICOLI - INSITE

1485 Route 22, Brewster, New York 10509 (845) 278-4990 Fax (845) 278-6392
www.insite-eng.com

INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

DEEP TEST HOLE DATA SHEET

PROJECT: HILLCREST COMMONS DATE OF TESTING: 9/23/05

JOB NO.: 01176.100 SHEET NO. _____ OF _____

DEPTH	HOLE NO. SW 4	HOLE NO. SW 5	HOLE NO. SW 6
GL	TOPSOIL	TOPSOIL	TOPSOIL
0.5'			
1.0'	MEDIUM BROWN	MEDIUM BROWN	MEDIUM BROWN
1.5'	SANDY LOAM	SANDY LOAM	SANDY LOAM
2.0'			
2.5'	SLIGHTLY	FINE SANDY	
3.0'	COMPACT FINE	LOAM	
3.5'	SANDY LOAM		
4.0'		VERY COMPACT	VERY COMPACT
4.5'		FINE SANDY	SANDY LOAM
5.0'		LOAM	
5.5'		WITH COBBLES	
6.0'		AND ROCKS	
6.5'			
7.0'			
7.5'			
8.0'			
8.5'			
9.0'			
9.5'			
10.0'			
Level at which groundwater is encountered	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
Level to which water level rises after being encountered	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
Level at which mottling is observed	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE

Deep hole observations made by: MARGARET O'CONNOR - NYCDEP Date: 9/23/05

JANINE MCCOLGAN - NYCDEP

MICHELLE MICOLI - INSITE

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DEEP TEST HOLE DATA SHEET

PROJECT: HILLCREST COMMONS DATE OF TESTING: 9/28/05

JOB NO.: 017610D SHEET NO. _____ OF _____

DEPTH	HOLE NO. SW7	HOLE NO. SW8	HOLE NO. SW9
GL	TOPSOIL	TOPSOIL	TOPSOIL
0.5'			
1.0'		MEDIUM BROWN	MEDIUM BROWN
1.5'	REDDISH BROWN	FINE SANDY	SANDY LOAM
2.0'	FINE SANDY	LOAM	
2.5'	LOAM		
3.0'			MODERATELY
3.5'	FINE MEDIUM	MODERATELY	COMPACT FINE
4.0'	SAND	COMPACT	SANDY LOAM
4.5'	SOME FINES	GRAVELLY SAND	
5.0'			
5.5'			
6.0'			
6.5'			
7.0'			
7.5'			
8.0'			
8.5'			
9.0'			
9.5'			
10.0'			
Level at which groundwater is encountered	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
Level to which water level rises after being encountered	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
Level at which mottling is observed	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE

Deep hole observations made by: MARGRET O'CONNOR - NYSDEP Date: 9/28/05

JANINE MCCOLGAN - NYSDEP

MICHELLE MICOLI - INSITE

1485 Route 22, Brewster, New York 10509 (845) 278-4990 Fax (845) 278-6392
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DEEP TEST HOLE DATA SHEET

PROJECT: HILLCREST COMMONS DATE OF TESTING: 9/23/05

JOB NO.: 01776.100 SHEET NO. ____ OF ____

DEPTH	HOLE NO. SW10	HOLE NO. SW11	HOLE NO.
GL	TOPSOIL	TOPSOIL	
0.5'			
1.0'	MEDIUM BROWN FINE	MEDIUM BROWN	
1.5'	SANDY LOAM	FINE SANDY	
2.0'		LOAM WITH SOME	
2.5'		GRAVEL	
3.0'	WHITE FINE		
3.5'	SAND	LIGHT GREY	
4.0'		FINE SAND	
4.5'		WITH GRAVEL	
5.0'		AND COBBLES	
5.5'			
6.0'			
6.5'			
7.0'			
7.5'			
8.0'			
8.5'			
9.0'			
9.5'			
10.0'			
Level at which groundwater is encountered	NOT APPLICABLE	NOT APPLICABLE	
Level to which water level rises after being encountered	NOT APPLICABLE	NOT APPLICABLE	
Level at which mottling is observed	4.0'	NOT APPLICABLE	

Deep hole observations made by: MARGARET O'CONNOR - WKDEP Date: 9/23/05

JANINE MCCOLGAN - WKDEP

MICHELLE MICOLI - INSITE

1485 Route 22, Brewster, New York 10509 (845) 278-4990 Fax (845) 278-6392
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APPENDIX D

Annual Pollutant Loading Rate Calculations

PRE-DEVELOPMENT HILLCREST COMMONS ANNUAL POLLUTANT LOADS

Land use/Ground Cover	Area (Acres)	BOD	TP	TN	TSS	BOD	TP	TN	TSS
Woods/Brush	35.40	6.0	0.1	1.8	77.0	212.4	3.54	63.7	2725.8
1 Acre-Residential	1.00	14.0	0.49	3.6	128.0	14.0	0.49	3.6	128.0
					TOTALS	**226.4**	**4.03**	**67.3**	**2853.8**

POST-DEVELOPMENT HILLCREST COMMONS ANNUAL POLLUTANT LOADS

SUB 1.0S

		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods/Brush	1.10	6.0	0.1	1.8	77.0	6.6	0.11	2.0	84.7
Multi-Family Residential	7.60	50.0	0.63	5	395.0	380.0	4.79	38.0	3002.0
					TOTALS PRIOR TO TREATMENT	386.6	4.90	40.0	3086.7
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 1.0P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						232.0	2.94	32.0	617.3
SUBTOTALS						to	to	to	to
						154.6	1.96	24.0	0.0
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 1.1P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						139.2	1.76	25.6	123.5
SUBTOTALS						to	to	to	to
						61.9	0.78	14.4	0.0
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 1.2P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						83.5	**1.06**	**20.5**	**24.7**
TOTALS AFTER TREATMENT						to	to	to	to
						24.7	**0.31**	**8.6**	**0.0**

SUB 1.1S

		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods/Brush	1.20	6.0	0.1	1.8	77.0	7.2	0.12	2.2	92.4
				TOTALS PRIOR TO TREATMENT		7.2	0.12	2.2	92.4
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 1.1P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						4.3	0.07	1.7	18.5
SUBTOTALS						to	to	to	to
						2.9	0.05	1.3	0.0
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 1.2P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						2.6	**0.0**	**1.4**	**3.7**
TOTALS AFTER TREATMENT						to	to	to	to
						1.2	**0.0**	**0.8**	**0.0**

SUB 1.2S

		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods/Brush	3.90	6.0	0.1	1.8	77.0	23.4	0.39	7.0	300.3
				TOTALS PRIOR TO TREATMENT		23.4	0.39	7.0	300.3
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 1.2P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						14.0	**0.23**	**5.6**	**60.1**
TOTALS AFTER TREATMENT						to	to	to	to
						9.4	**0.16**	**4.2**	**0.0**

SUB 3S

		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods/Brush	10.30	6.0	0.1	1.8	77.0	61.8	1.03	18.5	793.1
1 Acre-Residential	2.50	14.0	0.49	3.6	128.0	35.0	1.23	9.0	320.0
				TOTALS WITH NO TREATMENT		**96.8**	**2.26**	**27.5**	**1113.1**

SUB 2.0S									
		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods/Brush	1.30	6.0	0.1	1.8	77.0	7.8	0.13	2.3	100.1
Multi-Family Residential	5.30	50.0	0.63	5.0	395.0	265.0	3.34	26.5	2093.5
		TOTALS PRIOR TO TREATMENT				272.8	3.47	28.8	2193.6
DESIGN 2 EXTENDED DETENTION POND 2.0P POLLUTANT REMOVAL EFFICIENCIES						40%	40%	20%	80%
						to	to	to	to
						60%	60%	40%	100%
SUBTOTALS						163.7	2.08	23.1	438.7
						to	to	to	to
						109.1	1.39	17.3	0.0
DESIGN 2 EXTENDED DETENTION POND 2.1P POLLUTANT REMOVAL EFFICIENCIES						40%	40%	20%	80%
						to	to	to	to
						60%	60%	40%	100%
SUBTOTALS						98.2	1.25	18.5	87.7
						to	to	to	to
						43.6	0.56	10.4	0.0
DESIGN 2 EXTENDED DETENTION POND 2.2P POLLUTANT REMOVAL EFFICIENCIES						40%	40%	20%	80%
						to	to	to	to
						60%	60%	40%	100%
SUBTOTALS						58.9	0.75	14.8	17.5
						to	to	to	to
						17.5	0.22	6.2	0.0
DESIGN 2 EXTENDED DETENTION POND 2.3P POLLUTANT REMOVAL EFFICIENCIES						40%	40%	20%	80%
						to	to	to	to
						60%	60%	40%	100%
TOTALS AFTER TREATMENT						**35.4**	**0.45**	**11.8**	**3.5**
						to	to	to	to
						7.0	**0.09**	**3.7**	**0.0**

SUB 2.1S

		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods/Brush	0.50	6.0	0.1	1.8	77.0	3.0	0.05	0.9	38.5
		TOTALS PRIOR TO TREATMENT				3.0	0.05	0.9	38.5
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 2.1P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						1.8	0.03	0.7	7.7
SUBTOTALS						to	to	to	to
						1.2	0.02	0.5	0.0
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 2.2P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						1.1	0.02	0.6	1.5
SUBTOTALS						to	to	to	to
						0.5	0.01	0.3	0.0
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 2.3P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						0.6	**0.01**	**0.5**	**0.3**
TOTALS AFTER TREATMENT						to	to	to	to
						0.2	**0.00**	**0.2**	**0.0**

SUB 2.2S

		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods/Brush	0.50	6.0	0.1	1.8	77.0	3.0	0.05	0.9	38.5
		TOTALS PRIOR TO TREATMENT				3.0	0.05	0.9	38.5
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 2.2P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						1.8	0.03	0.7	7.7
SUBTOTALS						to	to	to	to
						1.2	0.02	0.5	0.0
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 2.3P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						1.1	**0.02**	**0.6**	**1.5**
TOTALS AFTER TREATMENT						to	to	to	to
						0.5	**0.01**	**0.3**	**0.0**

SUB 2.3S

		Rates (lb/ac/yr)				Annual Loads (lb/yr)			
Land use/Ground Cover	**Area (Acres)**	**BOD**	**TP**	**TN**	**TSS**	**BOD**	**TP**	**TN**	**TSS**
Woods/Brush	1.40	6.0	0.1	1.8	77.0	8.4	0.14	2.5	107.8
Pavement	0.80	111.0	1.2	10.1	716.0	88.8	0.96	8.1	572.8
		TOTALS PRIOR TO TREATMENT				97.2	1.10	10.6	680.6
						40%	40%	20%	80%
DESIGN 2 EXTENDED DETENTION POND 2.3P POLLUTANT REMOVAL EFFICIENCIES						to	to	to	to
						60%	60%	40%	100%
						58.3	**0.66**	**8.5**	**136.1**
TOTALS AFTER TREATMENT						to	to	to	to
						38.9	**0.44**	**6.4**	**0.0**

POST-DEVELOPMENT TOTALS

	BOD	**TP**	**TN**	**TSS**
	292.3	**4.73**	**76.3**	**1343.0**
TOTALS AFTER TREATMENT	to	to	to	to
	178.6	**3.28**	**51.8**	**1113.1**

APPENDIX E

Project and Owner Information

Site Data:

Hillcrest Commens
NYS Route 52
Town of Carmel and Kent, New York

Tax Map Numbers: 40.10-1-4 (Carmel), 44.10-2-1(Kent), and 44.09-2-27 (Kent)
Area: 80.85 ± acres

Owner Information:

BBJ Associates, LLC
570 Taxter Road, 6th Floor
Elmsford, NY 10523

Party Responsible Short-Term Maintenance of the Stormwater Management Facilities:

BBJ Associates, LLC
570 Taxter Road, 6th Floor
Elmsford, NY 10523

Party Responsible for Long-Term Maintenance of the Stormwater Management Facilities:

BBJ Associates, LLC
570 Taxter Road, 6th Floor
Elmsford, NY 10523

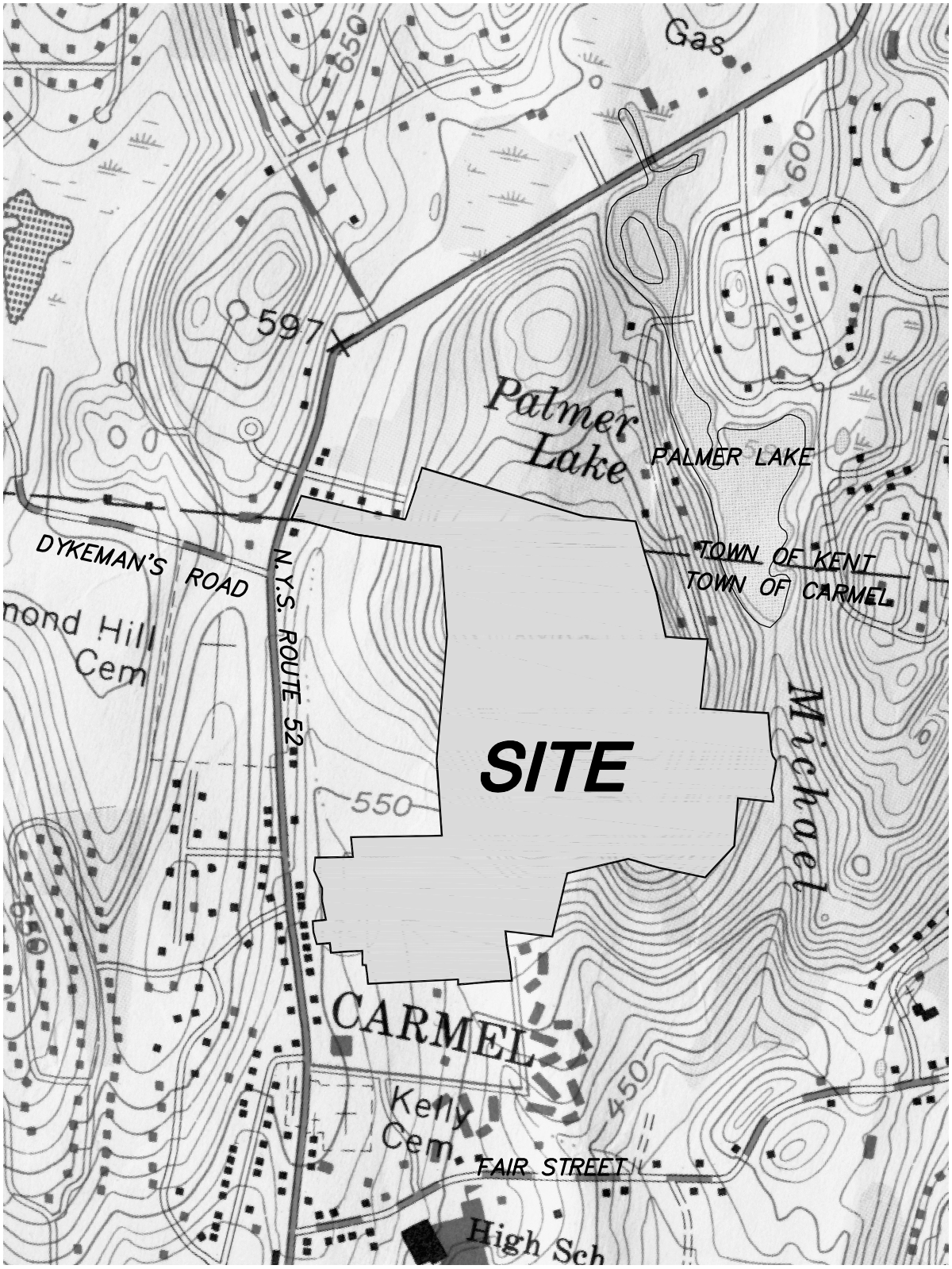
APPENDIX F

Temporary Sediment Trap Sizing Calculations

3600 CF minimum of storage required for each acre of contributing area

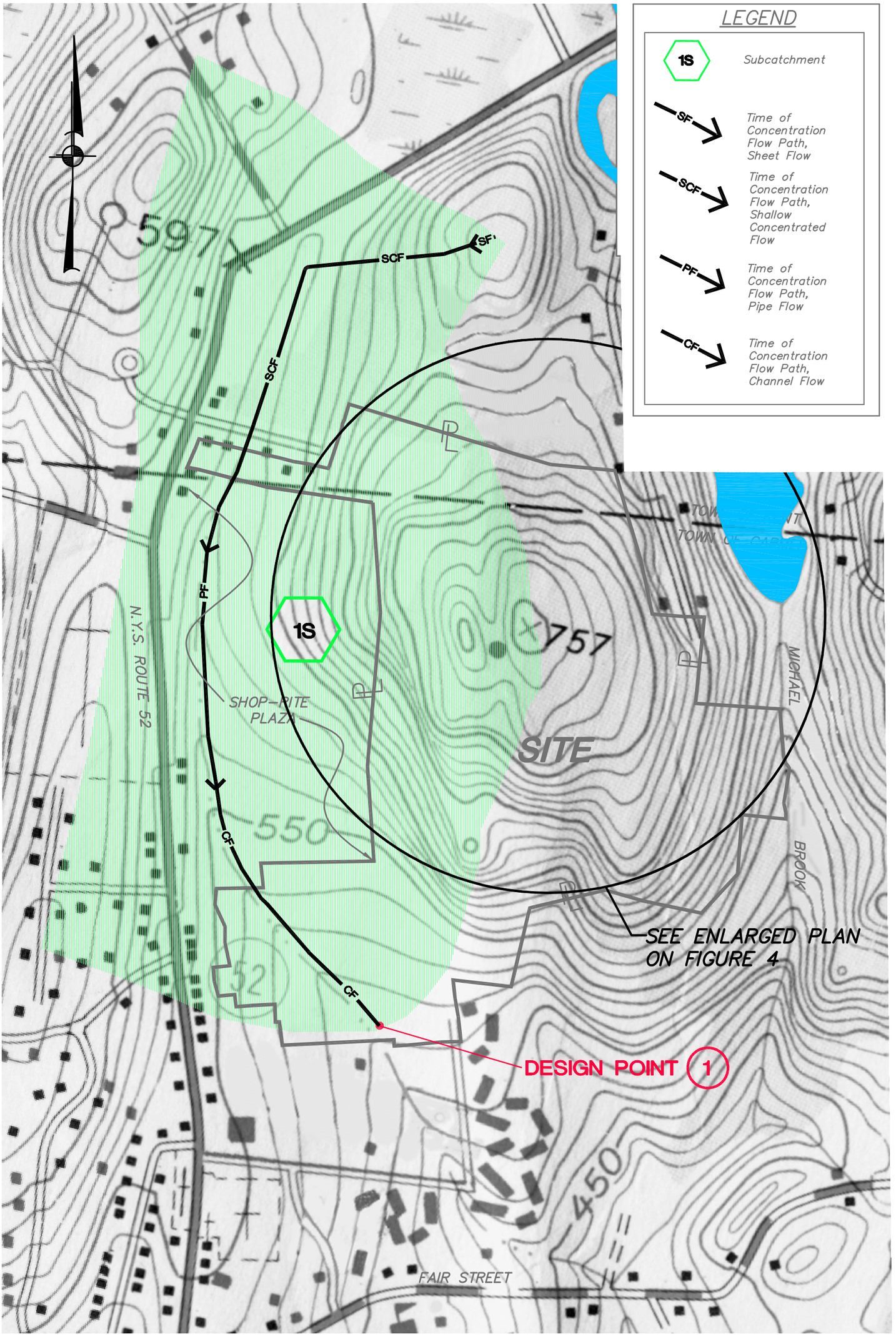
Temporary Sediment Trap #	Contributing Area	Minimum Volume Required	Volume Provided
1.0P	8.1 AC	29,160 CF	33,425 CF
1.1P	9.3 AC	33,480 CF	33,500 CF
1.2P	13.2 AC	47,520 CF	92,900 CF
2.0P	6.6 AC	23,760 CF	26,450 CF
2.1P	7.1 AC	25,560 CF	32,975 CF

FIGURES



PROJECT: HILLCREST COMMONS N.Y.S. ROUTE 52, TOWN OF CARMEL & KENT, PUTNAM COUNTY, NEW YORK LOCATION MAP	PREPARED BY: INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C. 3 Garrett Place • Carmel, New York 10512 Phone (845) 225-9690 • Fax (845) 225-9717 www.insite-eng.com	**DATE:** 4-27-04 **SCALE:** 1" = 800' **PROJECT NO.:** 01176.100 **FIGURE:** 1

Z:\E\01176100\Stormwater\SDEIS Site Plan\Figures\2008-08-15\Figure 1.dwg, 3/31/2009 3:14:29 PM, brianh, 1:1

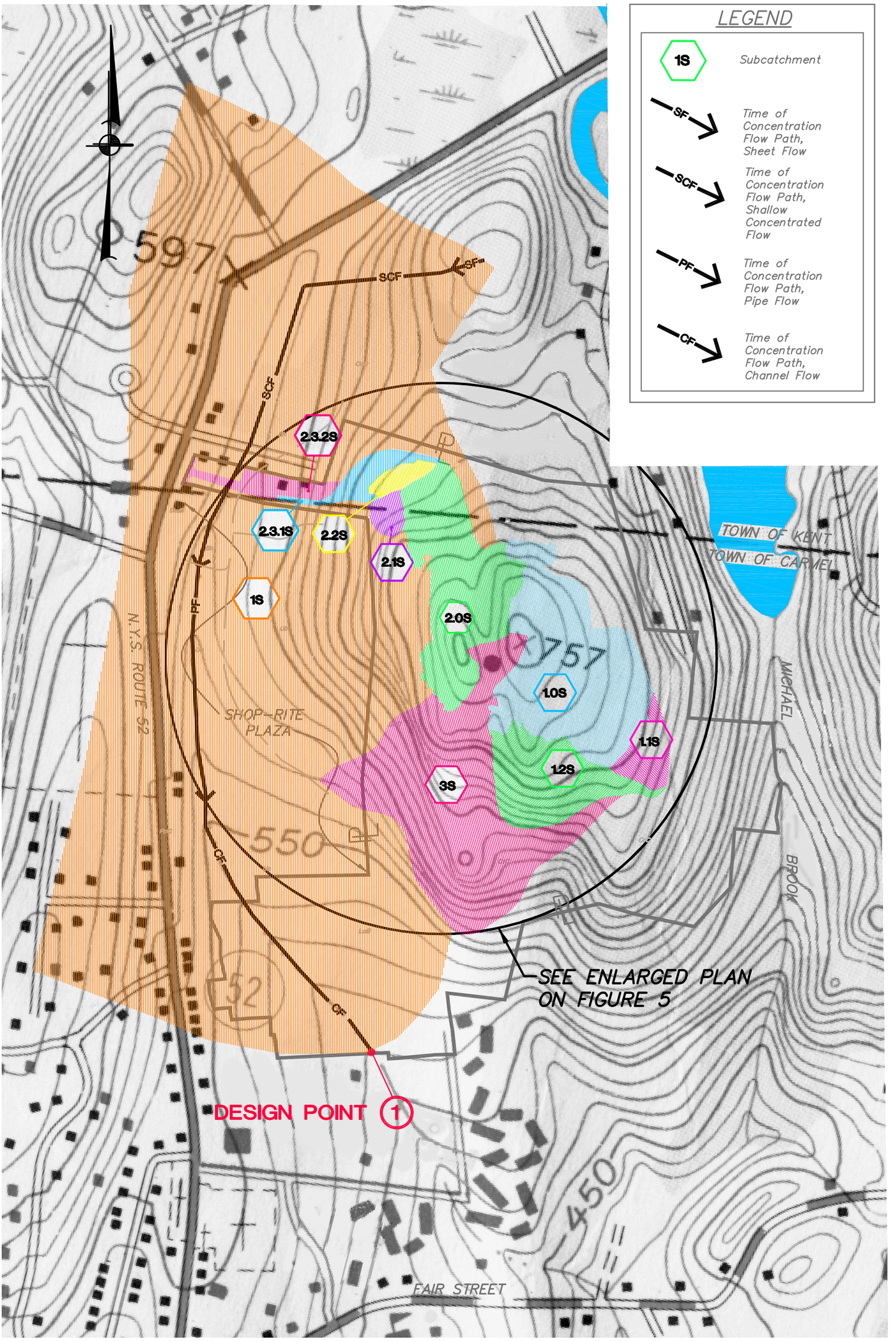


PROJECT: HILLCREST COMMONS
N.Y.S. ROUTE 52, TOWN OF CARMEL & KENT, PUTNAM COUNTY, NEW YORK
DRAWING: PRE-DEVELOPMENT DRAINAGE MAP

PREPARED BY:
INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place • Carmel, New York 10512
Phone (845) 225-9690 • Fax (845) 225-9717
www.insite-eng.com

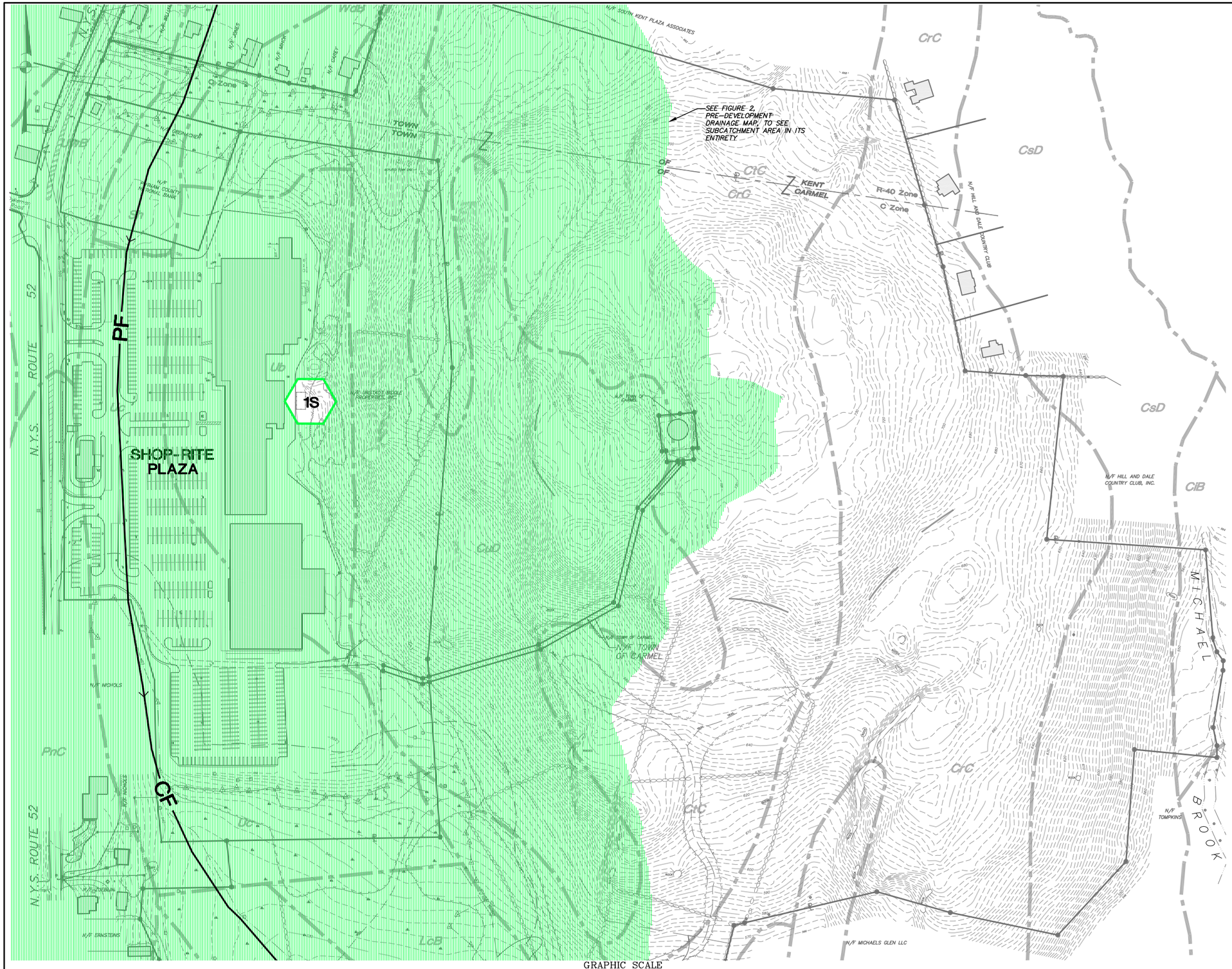
DATE:	2-6-09
SCALE:	1" = 400'
PROJECT NO.:	01176.100
FIGURE:	2

Z:\E01176100\Stormwater\SDEIS Site Plan\Figures\2008-08-15\Figure 2.dwg, 3/31/2009 3:19:12 PM, brianh, 1:1



PROJECT: HILLCREST COMMONS N.Y.S. ROUTE 52, TOWN OF CARMEL & KENT, PUTNAM COUNTY, NEW YORK	PREPARED BY: INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C. 3 Garrett Place • Carmel, New York 10512 Phone (845) 225-9690 • Fax (845) 225-9717 www.insite-eng.com	DATE: 2-6-09
DRAWING: POST-DEVELOPMENT DRAINAGE MAP		SCALE: 1" = 400'
		PROJECT NO.: 01176.100
		FIGURE: 3

Z:\E\01176100\Stormwater\SDEIS Site Plan\Figures\2008-08-15\Figure 3.dwg, 3/31/2009 3:57:03 PM, brianh, 1:1



GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

Z:\01176200\Stormwater\SCS\ Site Plan\Figures\2008-08-15\Figure 4.dwg, 4/1/2009 8:52:38 AM, brook.11

LEGEND

- 1S — Subcatchment
- T — Time of Concentration Flow Path, Sheet Flow
- Tscf — Time of Concentration Flow Path, Shallow Concentrated Flow
- Tpf — Time of Concentration Flow Path, Pipe Flow
- Tcf — Time of Concentration Flow Path, Channel Flow

SOILS LEGEND

SOILS	DESCRIPTION	HYDROLOGICAL GROUP
	Soils Boundary	–
CrC	Charlton–Chatfield, rolling, very rocky	B
CsD	Chatfield–Charlton complex, hilly, very rocky	B
CtC	Chatfield–Hollis–Rock outcrop complex, rolling	B
CuD	Chatfield–Hollis rock outcrop	B
LcB	Leicester loam, 3% to 8% slopes, stony	C
Sh	Sun loam	D
UhB	Urban land– Charlton complex	B
WdB	Woodbridge loam	C

NO.	DATE	REVISION	BY

INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place
Carmel, NY 10512
(845) 225-9690
(845) 225-9717 fax
www.insite-eng.com

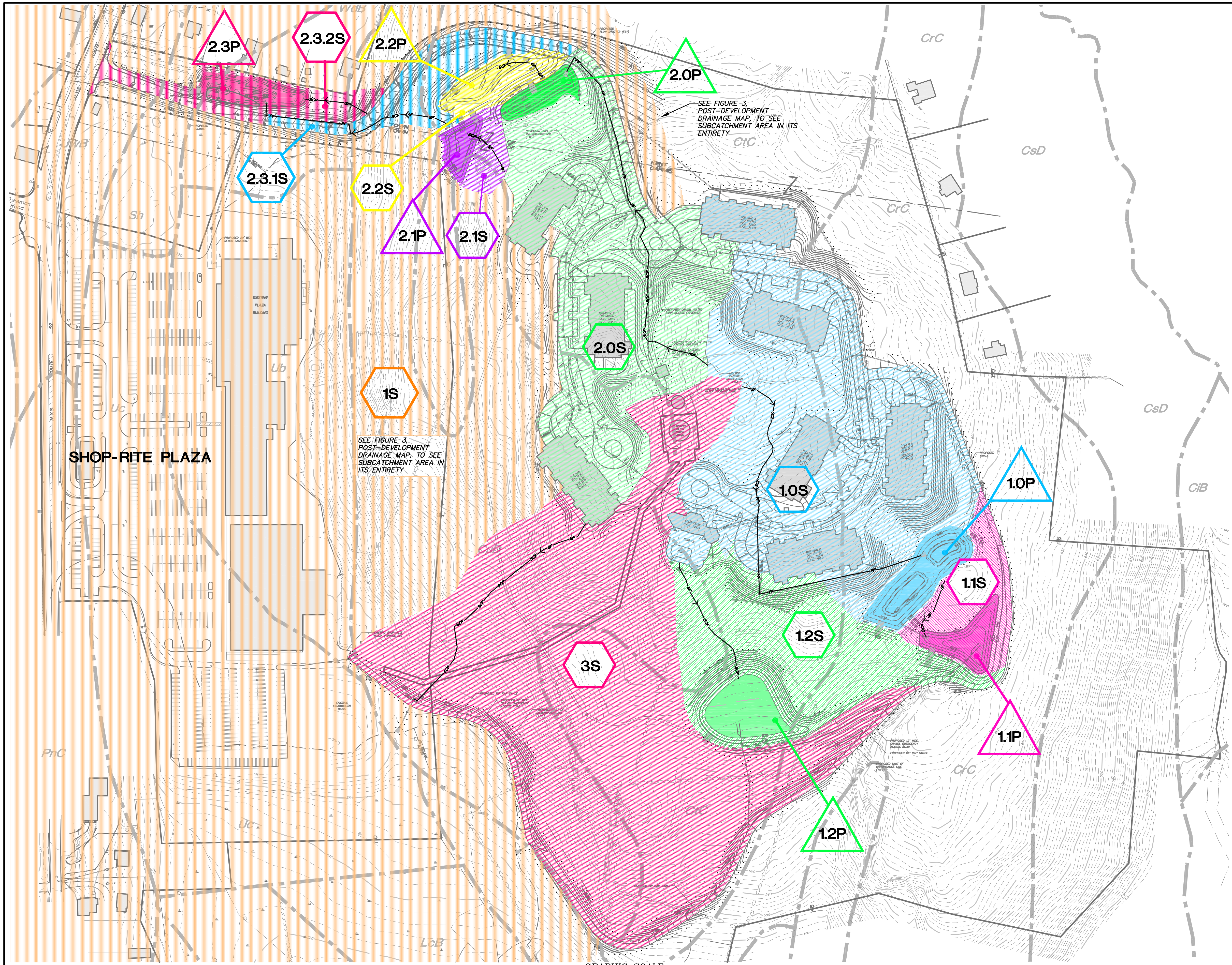
PROJECT: HILLCREST COMMONS

N.Y.S. ROUTE 52, TOWN OF CARMEL & KENT, PUTNAM COUNTY, NEW YORK

DRAWING: ENLARGED PRE-DEVELOPMENT DRAINAGE MAP

PROJECT NO.	01176.100	PROJECT MANAGER	J.J.C.
DATE	2-6-09	DRAWN BY	B.J.H.
SCALE	1" = 100'	CHECKED BY	

FIGURE NO. 4



GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

LEGEND

- 1S — Subcatchment
- SF — Time of Concentration Flow Path, Sheet Flow
- SCF — Time of Concentration Flow Path, Shallow Concentrated Flow
- PF — Time of Concentration Flow Path, Pipe Flow
- 1.0P — Stormwater Management Basin

SOILS LEGEND

SOILS	DESCRIPTION	HYDROLOGICAL GROUP
	Soils Boundary	–
CrC	Charlton–Chatfield, rolling, very rocky	B
CsD	Chatfield–Charlton complex, hilly, very rocky	B
CtC	Chatfield–Hollis–Rock outcrop complex, rolling	B
CuD	Chatfield–Hollis rock outcrop	B
LcB	Leicester loam, 3% to 8% slopes, stony	C
Sh	Sun loam	D
UhB	Urban land– Charlton complex	B
WdB	Woodbridge loam	C

NO.	DATE	REVISION	BY

INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place
Carmel, NY 10512
(845) 225–9690
(845) 225–9717 fax
www.insite–eng.com

PROJECT:
HILLCREST COMMONS
N.Y.S. ROUTE 52, TOWN OF CARMEL & KENT, PUTNAM COUNTY, NEW YORK

DRAWING:
ENLARGED POST–DEVELOPMENT DRAINAGE MAP

PROJECT NO.	01176.100	PROJECT MANAGER	J.J.C.	FIGURE NO.
DATE	2–6–09	DRAWN BY	M.D.M.	5
SCALE	1" = 100'	CHECKED BY		