

STORMWATER POLLUTION PREVENTION PLAN AND CALCULATIONS REPORT

for

Hackett Boulevard Apartments

Prepared by

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EV Job# 20483

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Part 1:

Narrative

I. Project Description

The Applicant, Ron Stein is proposing a 39-unit, 4-story apartment building, with a building footprint of 15,750 SF+/- at 42 Besch Avenue, Albany NY 12208. Parking will be provided on the ground level of the proposed building. The total lot area is 0.67 acres and is located on Tax Parcels 76.46-4-29 & 30. The project will also include the construction of new sidewalks and access drives, stormwater management, utilities (water, sanitary sewer, electric), landscaping and other associated infrastructure.

II. Existing Conditions of Site and Surrounding Areas

The site is bordered by Hackett Boulevard to the north, an existing Marriot Hotel and Parking area to the east, and residential properties to the south and west. The site is mostly wooded and steeply sloped, sloping from south to north towards Hackett Boulevard at an average slope 25%+/- . A shallow surface stormwater detention area is located on the north portion of the property, along Hackett Boulevard. This stormwater area collects/attenuates runoff from the adjacent Marriot property and will be relocated as part of this project. An 84" diameter concrete combined sanitary/storm sewer crosses the northeastern corner of the property. A 16" waterline is located on the northern side of Hackett Boulevard.

III. Receiving Water

The project drains to an existing 84" diameter combined sanitary/storm sewer that crosses the northeastern corner of the property, as described above. The combined sewer flows to the east and ultimately to a wastewater treatment plant. Runoff from the wastewater treatment plant ultimately flows to the Hudson River, located to the east. The project is located within the City of Albany Combined Sewer Overlay (CSO).

IV. Potential Impacts to Natural Resources

There are no wetlands, floodplains, threatened or endangered species, or other natural resources located in the project area according to the New York State Environmental Resource Mapper.

V. Site Soils Information

The soils on the site were mapped using the NRCS Web Soil Survey. The following soils are located on the site:

- Uh– Udorthents, clayey-Urban land complex. These soils are typically consistent with previously developed land. The Hydrological Soil Group was determined by examining the surrounding, non-urban land soils, which are comprised mostly of Hudson silt loam, which are Hydrologic Soil Group C/D. Due to these soils being located in an area that is known to have flooding issues on the site, the saturated soil condition with a Hydrological Soil Group D was used.

- Ut – Urban Land-Udorthents complex, 0-8 percent slopes. These soils are typically consistent with previously developed land. The Hydrologic Soil Group was determined by examining the surrounding, non-urban land soils, which are comprised mostly of Hudson silt loam, which are Hydrologic Soil Group C/D. Since these soils are located primarily towards the rear of the site, on steep slopes, it was assumed that these soils are not saturated constantly. Therefore a Hydrological Soil Group C was used.

VI. Proposed Conditions

As stated in the project description, a 4-story (15,750 SF+/- footprint) is proposed, along with access drives and sidewalk in the front of the building along Hackett Boulevard. Due to the development on the project site, the existing detention basin along Hackett Boulevard, described in Section II above, will need to be demolished. This detention basin, which stores a volume of runoff from the adjacent Marriot site to the north (TMPs# 76.46-5-22 and 76.46-5-1), will be replaced with subsurface detention at a 1:1 ratio of storage volume and relocated to the Marriott site.

The runoff generated from the new, on-site impervious area (consisting of the entire roof) will be collected with roof drains and conveyed to catch basins within the parking garage area. These catch basins, which will collect runoff from snowmelt or vehicles tracking runoff into the parking garage, combined with the roof runoff will be conveyed to a Contech CDS hydrodynamic separator unit, which will provide treatment for the 90% storm event. Once treated in the Contech CDS unit, runoff will be conveyed to a proposed 48,000-gallon concrete stormwater tank located under the proposed parking area, which will provide attenuation for larger storm events in accordance with the NYSDEC and City of Albany requirements. An outlet structure in this tank will reduce the flows to pre-development rates prior to discharging to the existing 84" combined sanitary/storm sewer. The storm system will utilize an existing 8" PVC storm pipe outlet from the removed detention basin as the outlet, in order to limit the new connections into the existing combined sewer.

In order to meet requirements of the State Pollutant Discharge Elimination System (SPDES) Discharge Permit for the City of Albany Combined Sewer Overflow, specifically Best Management Practices (BMPs) for Combined Sewer Overlays item 9, referring to the infiltration and inflow (I/I) requirement, the project will provide a rain garden/bio-retention area in front of the building to help infiltrate a portion of the roof runoff.

Section VII of this report discusses the stormwater management methodology in more detail.

VII. Stormwater Management Methodology

The stormwater design was prepared in accordance with the New York State Stormwater Management Manual and the City of Albany Regulations. The following objectives were established in the development of the Stormwater Management Plan for the proposed project:

1. Reduction of Peak Runoff Rates

Reduce the total post-development peak discharges to pre-development discharges for the 1-YR, 10-YR, and 100-YR storms in accordance with the New York State Stormwater Management Manual. In accordance with the City of Albany regulations, the 100-year post-development flow must be reduced to a 10-year pre-development flow when discharging to

combined sewers. This 100-year post-development to 10-year pre-development reduction will be met for the on-site flows.

2. Relocation of Existing Detention Basin Volume

Relocate storage from the existing detention basin (which is to be removed) to subsurface detention basins on adjacent Marriott property at a 1:1 ratio of storage volume.

3. Water Quality Volume and Compliance with Requirements of the NYS Stormwater Manual

Provide water quality (WQv) Channel Protection (CPv), Overbank Flood Control (Qp), and Extreme Flood Control (Qf) in accordance with the New York State Stormwater Management Manual.

4. Infiltration/Inflow (I/I) Requirements for Combined Sewer Discharges

Per City of Albany and NYSDEC regulations, infiltration and inflow (I/I) reduction for proposed developments that discharge to the combined sewer shall be at least equal to the estimated increased peak hourly dry-weather flow or four (4) times the average daily dry-weather flow, whichever is greater.

- Sewer: (based on 1994 plumbing code fixtures): 39 bedrooms x 90 GPD = 3,510 GPD
I/I requirement = 4 x 3,510 Gal = 14,040 Gal = 1877 CF

For purposes of analyzing the development from this project, one (1) point of interest was established. The point of interest (shown on the drainage map as P.O.I.#1) is located at the point where the proposed development enters the combined sewer. Table 1 describes the total areas and land cover conditions for P.O.I.#1 in both the pre-development and post-development conditions. All land cover conditions have been modeled as woods in the pre-development condition.

Table 1: Summary of Areas

	PRE-DEVELOPMENT	POST-DEVELOPMENT
<i>ON-SITE RUNOFF (Outside Hackett Boulevard ROW)*</i>		
Woods, C-soils	0.546 Ac.	0.283 Ac.
Woods, D-soils	0.291 Ac.	0 Ac.
Lawn, C-soils	0 Ac.	0.076 Ac.
Lawn, D-soils	0 Ac.	0.096 Ac.
Impervious Surfaces	0 Ac.	0.382 Ac.
TOTAL ON-SITE AREA	0.837 Ac.	0.837 Ac
* Onsite Area includes 0.167 Ac. from upslope, off-site areas		
<i>OFF-SITE RUNOFF (Within the Hackett Boulevard ROW)</i>		
Woods, C-soils	0.202 Ac.	0 Ac.
Lawn, C-soils	0 Ac.	0.139 Ac.
Impervious Surfaces	0 Ac.	0.063 Ac.
TOTAL AREA	0.202 Ac.	0.202 Ac.

PRE-DEVELOPMENT HYDROLOGY

Using the established Point of Interest, a drainage area was delineated. Time of concentrations and runoff curve numbers were determined the drainage area and input into HydroCAD. Pre-Development conditions were analyzed for the 1-, 2-, 10-, and 100-year frequency storm events using SCS TR-20 Method as provided by *HydroCAD version 10.10*. All program input and output can be found in Part 5 of this report.

POST-DEVELOPMENT HYDROLOGY

The runoff curve numbers and time of concentration values were adjusted for the post-development conditions. A minimum time of concentration value of 5 minutes was utilized for the catchment areas containing impervious areas in the post-development calculations. Again, by using the SCS TR-20 method as provided by *HydroCAD version 10.10*, the peak runoff rates were determined for the 1-, 2-, 10-, and 100-year frequency storm events. All program input and output can be found in Part 5 of this report.

See Section VIII for how the stated objectives were satisfied.

VIII. Stormwater Objectives

The following section outlines how the stated stormwater objectives, described in Section VII above, were satisfied for the project:

Objective 1: Reduction of Peak Runoff Rates

To mitigate the increase in runoff from pre-development to post-development condition, one (1) subsurface, 48,000-gallon concrete tank has been designed to attenuate and reduce the flows to pre-development levels prior to discharging from the site. This practice is described further in Section IX of this report.

- ON-SITE Peak Runoff Rates:
Table 2 summarizes the results of the stormwater management analysis for pre-development and post-development runoff rate control.

Table 2: P.O.I.#1 Summary of Peak Flows for On-Site Flows

	1-YR	2-YR	10-YR	100-YR
<i>PRE-DEVELOPMENT (Node 1L)</i>	<i>0.53 cfs</i>	<i>0.84 cfs</i>	<i>2.31 cfs</i>	<i>5.56 cfs</i>
POST-DEVELOPMENT (Node 2L)	0.22 cfs	0.29 cfs	0.89 cfs	2.25 cfs

As can be seen by Table 2, the 100-year post-development peak flow rate is reduced to less than the 10-year pre-development peak flow rate for the on-site flows, satisfying the City of Albany requirements for sites discharging to combined sewers.

- TOTAL (OFF-SITE AND ON-SITE) Peak Runoff Rates:
Table 3 summarizes the results of the stormwater management analysis for pre-development and post-development runoff rates for the entire project, including the areas within the Hackett Boulevard ROW.

Table 3: P.O.I.#1 Summary of Total Peak Flows

	1-YR	2-YR	10-YR	50-YR	100-YR
<i>PRE-DEVELOPMENT (Node 3L)</i>	<i>0.72 cfs</i>	<i>1.11 cfs</i>	<i>2.98 cfs</i>	<i>4.89 cfs</i>	<i>7.03 cfs</i>
POST-DEVELOPMENT (Node 4L)	0.60 cfs	0.78 cfs	1.79 cfs	2.70 cfs	3.61 cfs
% reduction	16.7%	29.7%	39.9%	44.8%	48.6%

As can be seen by Table 3, the post-development peak flow rates are reduced to less than the pre-development peak flow rates for all design storms. While site restriction in the Hackett Boulevard ROW limit the opportunity to reduce peak rates further, the 50 year post-development storm is reduced to the 10-year pre-development storm, and the 100-year storm is reduced by almost 50% in the post-development condition.

Objective 2: Relocation of Existing Detention Basin Volume

The storage volume of the existing detention basin, estimated between the elevations of 164 and 166, is 3,915 CF. While there is a catch basin located at the bottom that functions as an outlet, in the larger storm events the basin is known to fill to the berm elevation of 166. Therefore, the entire volume below the berm is used as a conservative approach.

Due to the grades in the adjacent parking area, the storage volume replacement will be accomplished using two (2) subsurface detention basins, each consisting of a 47'L x 20.5'W x 3.5'D stone bed with 4 rows of arch chambers and 6 chambers to a row, totaling 24 arch chambers per basin. The basins will be wrapped in an impermeable liner. The storage volume for these basins were calculated assuming StormTECH SC-740 chambers. Basin #1 will be designed with an outlet structure that will allow the runoff to overflow in the larger storm events.

Each basin has a storage volume of 2,010 CF, totaling 4,020 CF of total volume, which exceeds the storage volume provided in the existing detention basin.

Objective 3: Water Quality Volume and Compliance with Requirements of the NYS Stormwater Manual

All new impervious from the proposed building is directed to a proposed Contech CDS 2015-4 hydrodynamic separator unit.

Water Quality Volume (Entire Roof Area)

$P = 1.20''$; Area = 0.362 Ac; I = 100; Rv = 0.95

$WQv = (P \cdot Rv \cdot A) / 12 = 0.03439 \text{ Ac-FT} = 1,498 \text{ CF}$

WQv = 1,498 CF

Water Quality Peak Flow Calculation

$P = 1.20''$

$Q = WQv / \text{Drainage Area} = 1,498 \text{ CF} / 15,750 \text{ SF} = 0.095 \text{ FT} = 1.14 \text{ in.}$

Modified CN = 100 (Per New York State Stormwater Manual)

WQv Peak Flow = 0.64 CFS

With a treatment capacity of 0.7 CFS, the Contech CDS 2015-4-C hydrodynamic separator unit has the capacity to provide treatment for the entire water quality volume storm, thus satisfying the WQv requirement.

- **Channel Protection Volume (CPv)**

The Cpv required is the post-development 1-year storm volume draining to the proposed Infiltration Basin. A minimum 1" diameter orifice in the proposed stormwater tank outlet structure has been designed to reduce the peak flow rate for 100% of the 1-YR storm event, with a center of mass detention time of 12 hrs, which satisfies the CPv requirement.

- **Total Overbank Flood Control Criteria (Qp)**

The post-development peak runoff rate during the 10-year storm event has been reduced to less than pre-development levels. The flows are as follows:

Pre-Development = 2.98 CFS

Post-Development = 1.79 CFS (39.9% reduction)

- **Total Extreme Flood Control Criteria (Qf)**

The post-development peak runoff rate during the 100-year storm event has been reduced to less than pre-development levels. The flows are as follows:

Pre-Development = 7.03 CFS

Post-Development = 3.61 CFS (48.8% reduction)

Objective 4: Infiltration/Inflow (I/I) Requirements for Combined Sewer Discharges

A rain garden has been designed to allow a portion of the roof to infiltrate in order to meet the I/I requirement for combined sewer discharges. The rain garden will consist of 24" of amended soil and 6" of ponding. An assumed infiltration rate of 2"/hr was used in the calculations. The contractor will verify infiltration rates during construction.

For this project, ½ of the roof was directed to the rain garden. During the 50-year storm event, 2,003 CF of runoff volume is exfiltrated and discarded through the proposed rain garden, which exceeds the required I/I volume of 1,877 CF. See Part 6 for the rain garden routing.

IX. Post-Construction Stormwater Management Treatment Practices

Subsurface Attenuation Tank:

A 48,000 Gallon subsurface stormwater attenuation tank has been designed to attenuate and reduce the post-development flows for the larger storm events to pre-development levels prior to discharging into the combined sanitary/storm sewer. Runoff will be conveyed to the tank as described in Sections VI. The bottom of the proposed attenuation tank is at elevation 161.5. An outlet structure consisting of a 1" diameter orifice, set at the bottom of the tank, has been designed to meet the flow rate requirements for CPv. A 4" diameter orifice and 8" diameter overflow have been designed to mitigate peak flows for the larger storm events. There is no pretreatment required for this practice, as the runoff will already have been treated in the proposed Contech

hydrodynamic separator prior to entering the tank. In addition, the catch basins located in the parking garage area will have sumps in the bottoms to allow any larger particles tracked in by vehicles to settle before entering the tank.

Contech CDS2015-4-C Hydrodynamic Separator:

A Contech CDS2015-4-C hydrodynamic separator will be utilized to meet the water quality component, as described in the previous section of this report. The CDS2015-4-C has a treatment capacity of 0.7 CFS and a maximum internal bypass capacity of 10.0 CFS, per Contech specifications. The peak flow, during the WQv storm event, based on a modified curve number of 100, is 0.64 CFs, and the 100-year flow through the unit is 3.73 CFS, which are below the treatment and internal bypass capacities.

Soil Restoration (per Section 5.1.6 of the NYS Stormwater Manual):

In accordance with Section 5.1.6 of the NYS Stormwater Manual, Soil Restoration techniques shall be applied to all proposed lawn areas. Soil Restoration shall consist of the following procedure:

- 1) Apply three (3) inches of compost of subsoil. Compost shall be aged, from plant derived materials, free of viable weed seeds, have no visible free water or dust produced when handling, pass through a 1/2" screen, and have a pH suitable to grow desired plants.
- 2) Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor mounted disc, or tiller, mixing, and circulating air and compost into subsoils. In area of proposed infiltration basin, install orange construction fencing around basin bottom to keep construction equipment from crossing the proposed basin bottom.
- 3) Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.
- 4) Apply topsoil to a depth of 6 inches.
- 5) Vegetate as required by approved plan.

X. Storm Sewer Collection and Conveyance Design

Stormwater catch basins and pipes within the development were designed to safely convey the 100-year storm event without surcharging any of the catch basins. Storm sewers have been designed using the *Hydraflow Storm Sewer Extension for AutoCAD Civil 3D* software. All calculations and output from the storm sewer design can be found in Part 7 of this report.

XI. Erosion and Sediment Control Design

Typical Erosion and Sediment Control facilities, details, and specifications are shown on the plan. These measures are intended to minimize the impact of the project on surrounding and downstream properties, both during and after construction. All erosion and sediment control measures will be installed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Erosion and sediment control measures provided on the site include:

Temporary Measures

- Silt Fence
Silt Fence has been designed downslope of any disturbed areas, since all disturbed areas are small and will not contribute large amount of runoff. The silt fence provided shall meet the

specifications in the NYS E&S Manual. Silt fence shall remain in place until all upslope areas have achieved permanent stabilization.

- Stabilized Construction Access
A Stabilized Construction Access will be provided to prevent the tracking of sediment onto Hackett Boulevard. The stabilized construction access shall remain in place until the site has been stabilized and there is no potential for sediment to be tracked off-site from construction vehicles.
- Erosion Control Blanket
Erosion Control Blanket (North American Green S75BN or approved equivalent) shall be provided on all disturbed 3:1 slopes or greater, and erosion control blanket (North American Green S150BN or approved equivalent) shall be provided in all channels.
- Storm Drain Inlet Protection
Inlet Protection will be provided on all new catch basins.
- Dust Control
Dust shall be controlled through the application of water, as required to prevent migration beyond the project limits. Control of dust remains an ongoing responsibility of the contractor until the site is fully stabilized.

Vegetative Measures

- Protecting Vegetation
Tree protection fencing or other type of temporary fencing shall be installed along any tree lines adjacent to work areas or around individual trees to remain to ensure that there is no unnecessary damage or disturbance to these trees. In addition, the area of the proposed subsurface infiltration basin shall be protected to prevent construction traffic from compacting the infiltration area.
- Topsoiling/Seeding/Mulching
All proposed grass/lawn areas will be covered with 6" of topsoil to achieve final grade. These areas will be seeded and mulched within 48 hours of final grading per the details and specs shown on the plan.

XII. Maintenance and Inspections

The operator shall comply with all aspects of the following regarding maintenance and inspections:

- 1) New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-20-001);
- 2) New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;
- 3) New York State Stormwater Management Design Manual, dated January 2015 (or most current);
- 4) City of Albany local codes and laws.

Requirements for the Qualified Inspector and Qualified Professional

The operator is responsible for designating a “qualified inspector” to perform the inspections for the site during construction. Per the SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002), a qualified inspector means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individuals.

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

A qualified inspector can also be a person that meets the “qualified professional” qualifications in addition to the qualified inspector qualifications. Per the SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001), a qualified professional means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

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

Inspections

At a minimum, the qualified inspector shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved final stabilization, and all points of discharge. The qualified inspector shall prepare an inspection report subsequent to each and every inspection, including all aspects listed within Part IV.C.4 of the General Permit. Within one (1) business day of the completion of an inspection, the qualified inspector shall notify the owner or operator and appropriate contractor or subcontractor of any corrective actions that need to be taken. The contractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

During Construction, all inspections shall be conducted as follows:

- During construction and when soil disturbance is on-going, the qualified inspector shall conduct a site inspection at least every seven (7) calendar days AND as soon as reasonably possible during or after weather resulting in runoff from the site.
- When soil disturbances have been temporarily suspended (e.g. winter shutdown, etc.), and temporary measures have been applied to all disturbed areas, the qualified inspector shall conduct a site inspection at least once every thirty (30) calendar days. The owner or operator shall notify the DOW Water (SPDES) Program contact at the Regional Office in writing prior to reducing the frequency of inspections.
- When soil disturbances have been stopped with partial project completion, the qualified inspector can stop conducting inspections if all areas disturbed as part of the project shutdown date have achieved final stabilization and all post construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The owner or operator shall notify the DOW Water (SPDES) Program contact at the Regional Office in writing prior to reducing the frequency of inspections. If soil disturbances are not resumed within two (2) years from the date of the shutdown, the owner or operator shall have the qualified inspector perform a final inspection and certify that all disturbed activities have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformation with the SWPPP by signing the “Final Stabilization” and “Post-Construction Stormwater Management Practice” certification statements on the NOT. The owner or operator shall then submit the completed NOT form.

After construction, the post-construction stormwater management features shall be inspected on an annual basis to ensure that they are functioning properly. See the Long-Term Operation and Maintenance Plan.

Maintenance

- Temporary Erosion and Sediment Control Practices
Maintenance procedures and guidelines for specific temporary erosion and sediment control features are detailed in the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. The following detail maintenance procedures for temporary measures at a minimum:
 - Silt Fence:
Damaged silt fence shall be repaired as needed. Maintenance shall be performed and sediment shall be removed when sediment is visibly built up behind the silt fence (typically to a height of about 1/2 the fence height).

- Inlet Protection:
Remove sediment as needed and maintain stone around inlet to ensure that runoff passes over the stone into the catch basin and not past the structure. After rain storms, remove sediment to provide for accurate storage volume for subsequent rain storms. Fabric over catch basins shall be maintained to ensure that runoff is not bypassing the catch basin.

- Stabilized Construction Access:
The stabilized construction access shall be maintained in a condition which will prevent tracking of sediment onto public right-of-way. When washing is required, it shall be done on the area stabilized with aggregate, which drains to an approved sediment trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

- Permanent Erosion and Sediment Control Practices and Post Construction Stormwater Features
Maintenance procedures and guidelines for specific permanent erosion and sediment control features are detailed in the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016 and the New York State Stormwater Management Design Manual, dated January 2015 (or most current). The following detail maintenance procedures for permanent measures at a minimum:
 - Contech CDS Unit:
The Contech unit shall be maintained as recommended by the manufacturer's specifications, which are included in Part 8 of this Report.

 - Stormwater Attenuation Tank:
The proposed stormwater tank shall be inspected annually and shall be cleaned out if any sediment has accumulated in the tank.

 - Catch Basins
Catch basins shall be inspected annually and shall be cleaned out when sediment has accumulated to within 6 inches of the invert out.

Part 2:

E&S Checklist and Construction Sequence

APPENDIX E

EROSION AND SEDIMENT CONTROL PLAN REVIEW CHECKLIST

Project Name Hackett Boulevard Apartments
(EV# 20483) Site Location City of Albany, Albany County, NY

Applicant's Name & Address Ron Stein
204 Winding Brook Road
New Rochelle, NY 10804

General

A narrative statement shall be provided that describes the proposed project nature and purpose; the existing site conditions including topography, vegetation and drainage; adjacent and off-site areas affected by the project; description of the soils on the site and key properties; notations of critical areas such as steep slopes, channels or wetlands; the overall phasing, sequencing and stabilization plan; total disturbed area and, areas not to be disturbed, and soil restoration plan.

I. Construction Drawings

Are the following items shown on the construction drawings:	<u>Yes</u>	<u>No</u>	
1. Vicinity Map with scale and north arrow	<u>X</u>	_____	C0.0
2. Legend, scales, N arrow on plan view	<u>X</u>	_____	ALL PLANS
3. Existing and proposed topography shown with contours labeled with spots elevations in critical areas	<u>X</u>	_____	C1.0, C2.0, C2.1
4. Scope of the plan noted in the Title Block	<u>X</u>	_____	ALL PLANS
5. Limits of clearing and grading shown , and methods of spoil disposal	<u>X</u>	_____	C1.0
6. Existing vegetation delineated	<u>X</u>	_____	C1.0
7. Soil boundaries shown on the existing and proposed plan views	<u>X</u>	_____	C2.2
8. Existing drainage patterns, 100 year floodplain and sub-areas shown, runoff outfall locations identified	<u>X</u>	_____	DRAINAGE MAPS
9. Existing and proposed development facilities/ improvements shown	<u>X</u>	_____	C1.0, C2.0
10. Location of Erosion and Sediment control practices as phased with construction, with dimensions and material specifications	<u>X</u>	_____	C2.2
11. Phasing plan with 5 acre threshold limits shown	_____	<u>N/A</u>	
12. Stockpile locations, staging areas, access points, and concrete trunk washout locations clearly defined	<u>X</u>	_____	C2.2
13. Street profiles, utility locations, property boundaries and, easement delineations shown	<u>N/A</u>	_____	
14. Soil Restoration Plan detailed on the site plan	<u>X</u>	_____	C2.2

II. <u>Construction Notes & Details</u>	<u>Yes</u>	<u>No</u>	
1. Specific sequence of operation given for each phase	<u>X</u>	<u> </u>	C2.2
2. Inspection and maintenance schedule shown for the specific practices	<u>X</u>	<u> </u>	NARRATIVE
3. Design details show all dimensions and installation details necessary for construction	<u>X</u>	<u> </u>	C3.0-C3.5
4. Implementation schedule for E&S practices is provided with removal criteria stated	<u>X</u>	<u> </u>	C2.2
5. Site pollution and construction waste management plan incorporated in the notes	<u>X</u>	<u> </u>	C2.2
6. Site Inspections during construction are noted on the drawings and are in accordance with the General Permit for Stormwater Discharges from Construction Activities	<u>X</u>	<u> </u>	C2.2

III. Erosion & Sediment Control Practices

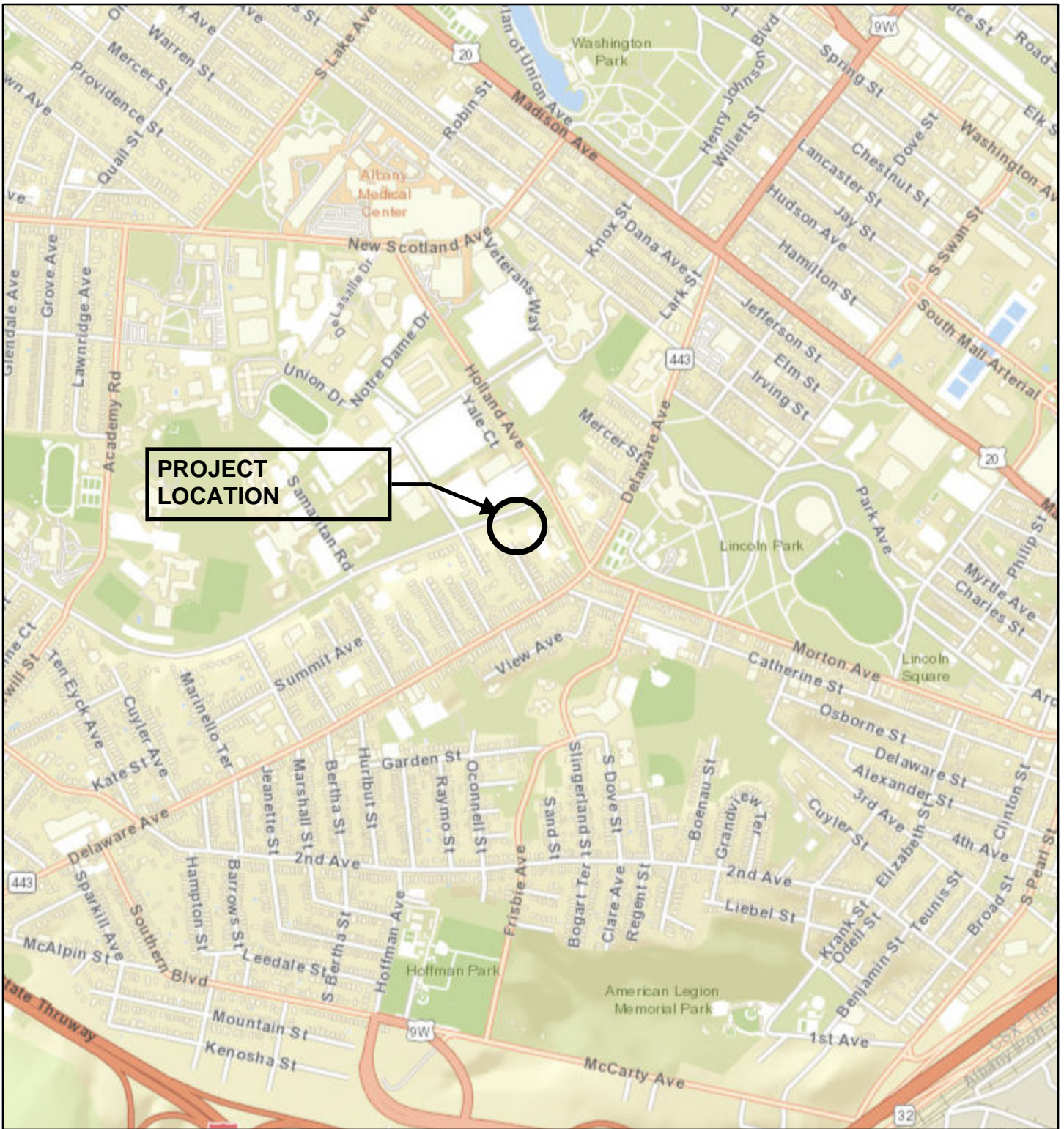
A. <u>General</u>	<u>Yes</u>	<u>No</u>	
1. Practice meets purpose and design criteria	<u>X</u>	<u> </u>	C2.2 - Narrative
2. Standard details and construction notes are provided	<u>X</u>	<u> </u>	C2.2, C3.3 and C3.4
3. Special timing of practice noted if applicable	<u>X</u>	<u> </u>	C2.2 (Sequencing)
4. Provisions for traffic crossings shown on the drawings where necessary	<u> </u>	<u>N/A</u>	
B. <u>Practices Controlling Runoff</u>	<u>Yes</u>	<u>No</u>	
1. Positive drainage is maintained with contributing drainage area shown	<u>X</u>	<u> </u>	C2.2
2. Flow grades properly stabilized	<u>X</u>	<u> </u>	C2.2
3. Adequate outlet or discharge condition stabilized	<u>X</u>	<u> </u>	C2.2
4. Necessary dimensions, gradations, calculations, and materials shown	<u>X</u>	<u> </u>	C2.2, Narrative
C. <u>Practices Stabilizing Soil</u>	<u>Yes</u>	<u>No</u>	
1. Seeding rates and areas properly shown on the drawings	<u>X</u>	<u> </u>	C3.3
2. Mulch materials and rates specified on the drawings	<u>X</u>	<u> </u>	C3.3
3. Sequencing and timing provisions limit soil exposure to 7 to 14 days as appropriate	<u>X</u>	<u> </u>	C2.2

C. Practices Stabilizing Soil (cont'd)	<u>Yes</u>	<u>No</u>	
4. Rolled Erosion Control Products (RECP's) used are specified to location and appropriate weight/tie down	<u>X</u>	<u> </u>	C2.2
5. All soil seed bed preparation and amendments are specified on the drawings or in the specifications	<u>X</u>	<u> </u>	C2.2
6. The seeding dates are specified to cover the entire year for both temporary and permanent seedings	<u>X</u>	<u> </u>	C2.2
7. Maximum created slopes are no steeper than 2 foot horizontal to 1 foot vertical with Cut and Fill slopes shown	<u>X</u>	<u> </u>	C2.2
D. Practices Controlling Sediment	<u>Yes</u>	<u>No</u>	
1. Sediment traps/basins are sized in accordance with criteria	<u> </u>	<u>N/A</u>	
2. The contributing drainage area is shown on the grading plan	<u>X</u>	<u> </u>	C2.2
3. All scaled dimensions and volumes are shown on the plan	<u>X</u>	<u> </u>	C2.2
4. Maintenance requirements and clean out elevations established for all sediment control practices (50% capacity)	<u>X</u>	<u> </u>	C2.2
5. All access points of the project are shown to be stabilized	<u>X</u>	<u> </u>	C2.2
6. Storm drain inlets adequately protected	<u>X</u>	<u> </u>	C2.2
7. Buffer filter strips are appropriately sited and installed	<u>N/A</u>	<u> </u>	
7. Silt fences are shown on the contour lines with no more than one quarter acre per 100 foot drainage to it	<u>X</u>	<u> </u>	C2.2
8. Temporary sediment traps are not being used at locations of future stormwater infiltration facilities	<u>X</u>	<u> </u>	C2.2
9. Dewatering devices for traps and basins are adequately designed with details shown on the plans	<u> </u>	<u>N/A</u>	
10. Geotextile filter bags are properly sited, sized, and have their maintenance requirements detailed on the drawings	<u> </u>	<u>N/A</u>	
11. Turbidity curtains are properly located with installation, anchoring, and maintenance details shown on the plans	<u> </u>	<u>N/A</u>	

Part 3:

Site Location and Natural Resource Maps

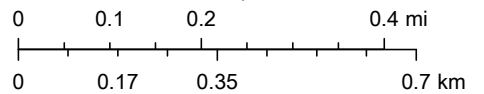
Hackett Boulevard Apartments Location Map



1/21/2021, 8:48:13 AM

 Municipal Boundaries

1:18,056



Esri, HERE, Garmin, INCREMENT P, NGA, USGS

In Cooperation with CHA, Inc.
Esri, HERE, Garmin, INCREMENT P, NGA, USGS |

Aerial Map



**PROJECT
LOCATION**

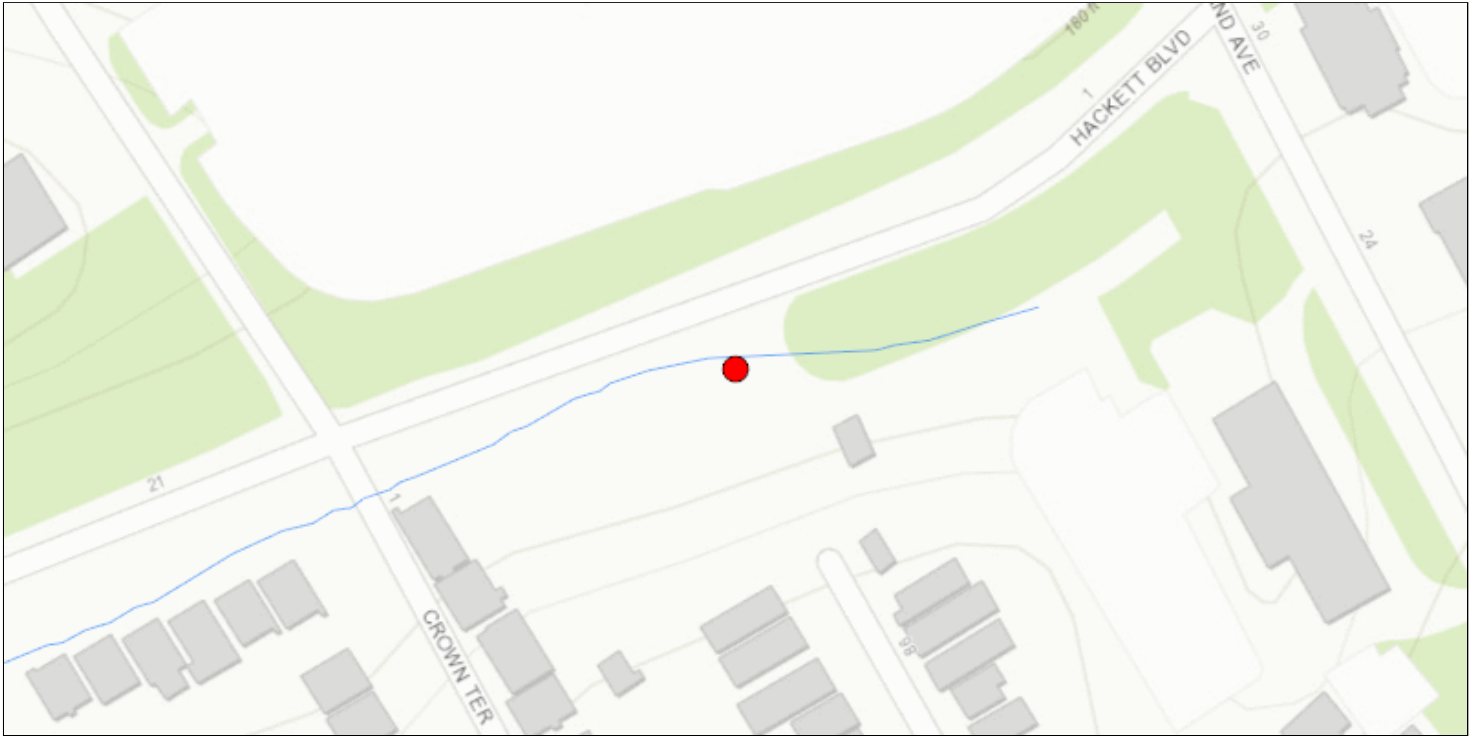
1" = 180 ft



**MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT**

City of Albany, New York makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Environmental Resource Mapper



The coordinates of the point you clicked on are:

UTM 18

Easting: 600496.4653000907

Northing: 4722290.807754592

Longitude/Latitude

Longitude: -73.77405442007937

Latitude: 42.64652596107203

The approximate address of the point you clicked on is:

47 Besch Ave, Albany, New York, 12209

County: Albany

City: Albany

USGS Quad: ALBANY

DEC Region

Region 4:

(Capital Region/Northern Catskills) Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie counties. For more information visit <http://www.dec.ny.gov/about/611.html>.

National Wetands Inventory

Attribute: undefined

Type: undefined

Acres: undefined

For more information about the National Wetands Inventory wetlands visit <http://www.fws.gov/wetlands/>

If your project or action is within or near an area with a rare animal, a permit may be required if the species is listed as endangered or threatened and the department determines the action may be harmful to the species or its habitat.

If your project or action is within or near an area with rare plants and/or significant natural communities, the environmental impacts may need to be addressed.

The presence of a unique geological feature or landform near a project, unto itself, does not trigger a requirement for a NYS DEC permit. Readers are advised, however, that there is the chance that a unique feature may also show in another data layer (ie. a wetland) and thus be subject to permit jurisdiction.

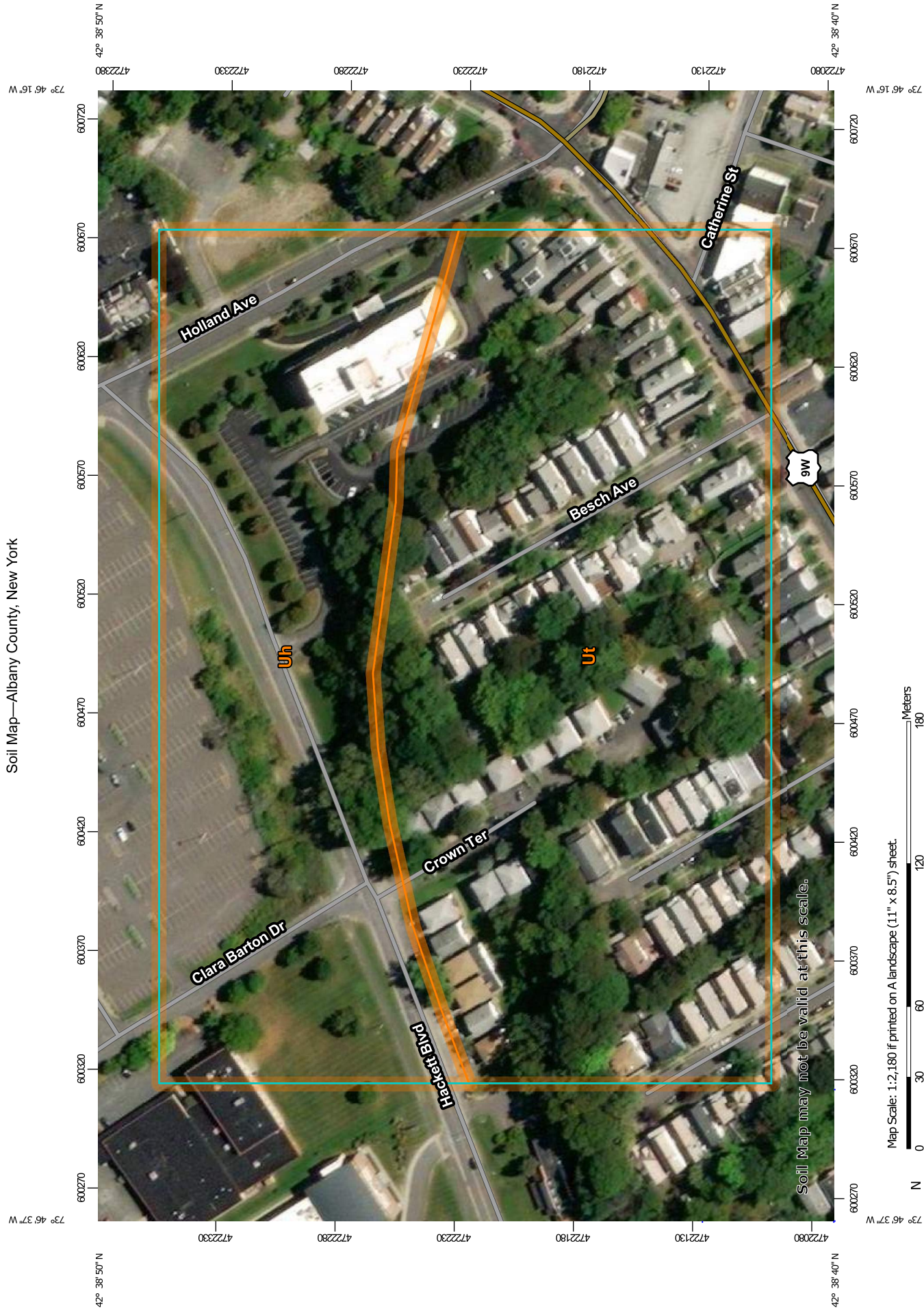
Please refer to the "Need a Permit?" tab for permit information or other authorizations regarding these natural resources.

Disclaimer: If you are considering a project or action in, or near, a wetland or a stream, a NYS DEC permit may be required. The Environmental Resources Mapper does not show all natural resources which are regulated by NYS DEC, and for which permits from NYS DEC are required. For example, Regulated Tidal Wetlands, and Wild, Scenic, and Recreational Rivers, are currently not included on the maps.

Part 4:

Soils Mapping and Information

Soil Map—Albany County, New York



Map Scale: 1:2,180 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



MAP LEGEND

- Area of Interest (AOI)
- Area of Interest (AOI)
- Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points
- Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features
- Water Features**
- Streams and Canals
- Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads
- Background**
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Albany County, New York
 Survey Area Data: Version 18, Jun 11, 2020

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

Date(s) aerial images were photographed: Jul 1, 2014—Sep 22, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Uh	Udorthents, clayey-Urban land complex	9.3	40.6%
Ut	Urban land-Udorthents complex, 0 to 8 percent slopes	13.6	59.4%
Totals for Area of Interest		22.9	100.0%

Albany County, New York

Uh—Udorthents, clayey-Urban land complex

Map Unit Setting

National map unit symbol: 9pj2

Elevation: 20 to 310 feet

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, clayey, and similar soils: 40 percent

Urban land: 30 percent

Minor components: 30 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Clayey

Typical profile

H1 - 0 to 18 inches: silty clay

H2 - 18 to 72 inches: stratified silt loam to clay

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Moderate (about 8.2 inches)

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Minor Components

Scio

Percent of map unit: 10 percent

Hydric soil rating: No

Hudson

Percent of map unit: 10 percent

Hydric soil rating: No

Rhinebeck

Percent of map unit: 7 percent

Hydric soil rating: No

Madalin

Percent of map unit: 3 percent

Landform: Depressions

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Albany County, New York

Survey Area Data: Version 18, Jun 11, 2020

Albany County, New York

Ut—Urban land-Udorthents complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9pjb
Elevation: 0 to 460 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 50 percent
Udorthents and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Description of Udorthents

Typical profile

H1 - 0 to 4 inches: channery loam
H2 - 4 to 70 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 5.4 inches)

Minor Components

Unnamed soils, moderately well

Percent of map unit: 10 percent

Unnamed soils, poorly

Percent of map unit: 10 percent

Data Source Information

Soil Survey Area: Albany County, New York

Survey Area Data: Version 18, Jun 11, 2020

Part 5:

**HydroCAD Report
(1-YR, 2-YR, 10-YR, 25-YR, 50-YR and 100-YR)**

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New York
Location	
Longitude	73.774 degrees West
Latitude	42.646 degrees North
Elevation	0 feet
Date/Time	Wed, 10 Feb 2021 19:42:31 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.54	0.71	0.89	1.10	1yr	0.77	0.95	1.25	1.53	1.85	2.24	2.51	1yr	1.98	2.41	2.83	3.39	3.89	1yr
2yr	0.34	0.53	0.66	0.87	1.09	1.35	2yr	0.94	1.21	1.54	1.85	2.21	2.62	2.95	2yr	2.32	2.84	3.30	3.90	4.45	2yr
5yr	0.41	0.63	0.79	1.06	1.36	1.69	5yr	1.17	1.47	1.93	2.32	2.75	3.24	3.66	5yr	2.87	3.52	4.08	4.71	5.36	5yr
10yr	0.45	0.71	0.90	1.23	1.60	2.00	10yr	1.38	1.71	2.29	2.75	3.25	3.81	4.31	10yr	3.37	4.15	4.78	5.43	6.17	10yr
25yr	0.54	0.85	1.09	1.50	1.99	2.50	25yr	1.71	2.09	2.86	3.44	4.05	4.71	5.37	25yr	4.17	5.16	5.92	6.57	7.43	25yr
50yr	0.60	0.96	1.24	1.74	2.34	2.98	50yr	2.02	2.43	3.41	4.09	4.79	5.53	6.33	50yr	4.90	6.09	6.96	7.59	8.57	50yr
100yr	0.69	1.11	1.43	2.03	2.77	3.52	100yr	2.39	2.82	4.04	4.84	5.66	6.51	7.47	100yr	5.76	7.19	8.19	8.77	9.88	100yr
200yr	0.78	1.27	1.65	2.37	3.27	4.19	200yr	2.82	3.29	4.80	5.74	6.69	7.66	8.83	200yr	6.78	8.49	9.64	10.14	11.39	200yr
500yr	0.93	1.53	2.00	2.91	4.08	5.25	500yr	3.52	4.03	6.02	7.19	8.35	9.51	11.02	500yr	8.42	10.60	11.96	12.29	13.78	500yr

Lower Confidence Limits

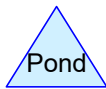
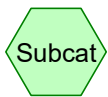
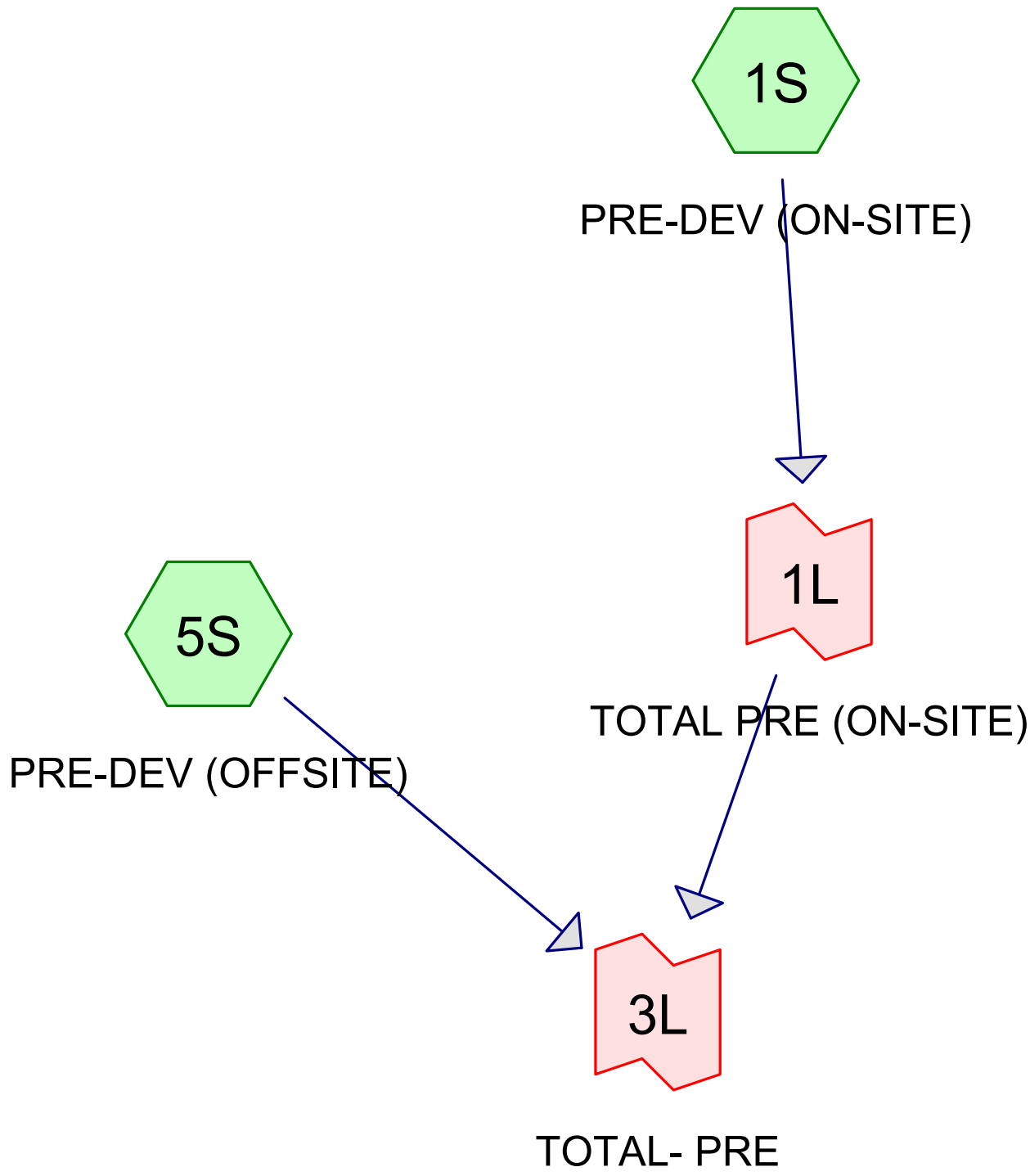
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.20	0.30	0.37	0.50	0.61	0.84	1yr	0.53	0.82	0.92	1.17	1.42	1.84	2.14	1yr	1.63	2.06	2.34	3.12	3.67	1yr
2yr	0.33	0.51	0.63	0.86	1.05	1.19	2yr	0.91	1.16	1.32	1.70	2.19	2.55	2.87	2yr	2.26	2.76	3.21	3.80	4.33	2yr
5yr	0.37	0.57	0.70	0.96	1.23	1.37	5yr	1.06	1.34	1.53	1.97	2.50	3.03	3.43	5yr	2.68	3.30	3.79	4.41	5.00	5yr
10yr	0.39	0.60	0.75	1.05	1.35	1.54	10yr	1.17	1.50	1.70	2.17	2.82	3.42	3.92	10yr	3.03	3.77	4.29	4.95	5.56	10yr
25yr	0.43	0.65	0.81	1.16	1.53	1.78	25yr	1.32	1.74	1.95	2.50	3.22	3.98	4.69	25yr	3.52	4.51	5.06	5.76	6.37	25yr
50yr	0.46	0.69	0.86	1.24	1.67	2.00	50yr	1.44	1.96	2.17	2.77	3.54	4.47	5.38	50yr	3.95	5.18	5.71	6.46	7.06	50yr
100yr	0.49	0.74	0.93	1.34	1.84	2.26	100yr	1.59	2.21	2.42	3.09	3.88	5.01	6.18	100yr	4.43	5.94	6.47	7.26	7.84	100yr
200yr	0.53	0.80	1.01	1.46	2.04	2.55	200yr	1.76	2.50	2.71	3.46	4.25	5.60	7.12	200yr	4.95	6.84	7.33	8.16	8.69	200yr
500yr	0.60	0.89	1.14	1.66	2.36	3.02	500yr	2.04	2.95	3.14	4.02	4.78	6.50	8.59	500yr	5.75	8.26	8.65	9.53	9.98	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.32	0.50	0.61	0.82	1.00	1.05	1yr	0.87	1.02	1.29	1.63	2.06	2.41	2.68	1yr	2.14	2.58	2.99	3.56	4.11	1yr
2yr	0.37	0.57	0.70	0.95	1.18	1.29	2yr	1.01	1.26	1.46	1.86	2.32	2.73	3.04	2yr	2.42	2.92	3.40	4.03	4.60	2yr
5yr	0.44	0.68	0.84	1.16	1.47	1.65	5yr	1.27	1.62	1.90	2.37	2.99	3.43	3.91	5yr	3.03	3.76	4.36	5.03	5.73	5yr
10yr	0.52	0.80	0.99	1.38	1.79	2.00	10yr	1.54	1.95	2.32	2.87	3.46	4.14	4.76	10yr	3.67	4.57	5.28	6.01	6.79	10yr
25yr	0.65	0.98	1.22	1.74	2.29	2.55	25yr	1.98	2.50	3.04	3.67	4.34	5.31	6.13	25yr	4.70	5.90	6.80	7.56	8.51	25yr
50yr	0.76	1.15	1.44	2.06	2.78	3.08	50yr	2.40	3.01	3.71	4.45	5.15	6.41	7.45	50yr	5.67	7.16	8.23	8.99	10.11	50yr
100yr	0.90	1.36	1.70	2.45	3.36	3.70	100yr	2.90	3.62	4.54	5.37	6.11	7.76	9.04	100yr	6.87	8.69	9.99	10.71	12.01	100yr
200yr	1.06	1.60	2.02	2.93	4.08	4.46	200yr	3.52	4.36	5.54	6.49	7.29	9.41	10.98	200yr	8.33	10.56	12.12	12.76	14.27	200yr
500yr	1.33	1.98	2.55	3.70	5.26	5.68	500yr	4.54	5.55	7.25	8.35	9.25	12.18	14.20	500yr	10.78	13.65	15.69	16.09	17.98	500yr



Pre-Development



20483-hydro

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.546	70	Woods, Good, HSG C (1S)
0.493	77	Woods, Good, HSG D (1S, 5S)
1.039	73	TOTAL AREA

20483-hydro

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.546	HSG C	1S
0.493	HSG D	1S, 5S
0.000	Other	
1.039		TOTAL AREA

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: PRE-DEV (ON-SITE) Runoff Area=0.837 ac 0.00% Impervious Runoff Depth=0.42"
Flow Length=235' Slope=0.2500 '/' Tc=6.9 min CN=WQ Runoff=0.53 cfs 0.029 af

Subcatchment5S: PRE-DEV (OFFSITE) Runoff Area=0.202 ac 0.00% Impervious Runoff Depth=0.58"
Tc=5.0 min CN=77 Runoff=0.21 cfs 0.010 af

Link 1L: TOTAL PRE (ON-SITE) Inflow=0.53 cfs 0.029 af
Primary=0.53 cfs 0.029 af

Link 3L: TOTAL-PRE Inflow=0.72 cfs 0.039 af
Primary=0.72 cfs 0.039 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.039 af Average Runoff Depth = 0.45"
100.00% Pervious = 1.039 ac 0.00% Impervious = 0.000 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: PRE-DEV (ON-SITE) Runoff Area=0.837 ac 0.00% Impervious Runoff Depth=0.62"
Flow Length=235' Slope=0.2500 '/' Tc=6.9 min CN=WQ Runoff=0.84 cfs 0.043 af

Subcatchment5S: PRE-DEV (OFFSITE) Runoff Area=0.202 ac 0.00% Impervious Runoff Depth=0.82"
Tc=5.0 min CN=77 Runoff=0.30 cfs 0.014 af

Link 1L: TOTAL PRE (ON-SITE) Inflow=0.84 cfs 0.043 af
Primary=0.84 cfs 0.043 af

Link 3L: TOTAL-PRE Inflow=1.11 cfs 0.057 af
Primary=1.11 cfs 0.057 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.057 af Average Runoff Depth = 0.66"
100.00% Pervious = 1.039 ac 0.00% Impervious = 0.000 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: PRE-DEV (ON-SITE) Runoff Area=0.837 ac 0.00% Impervious Runoff Depth=1.60"
Flow Length=235' Slope=0.2500 '/' Tc=6.9 min CN=WQ Runoff=2.31 cfs 0.112 af

Subcatchment5S: PRE-DEV (OFFSITE) Runoff Area=0.202 ac 0.00% Impervious Runoff Depth=1.93"
Tc=5.0 min CN=77 Runoff=0.72 cfs 0.032 af

Link 1L: TOTAL PRE (ON-SITE) Inflow=2.31 cfs 0.112 af
Primary=2.31 cfs 0.112 af

Link 3L: TOTAL-PRE Inflow=2.98 cfs 0.144 af
Primary=2.98 cfs 0.144 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.144 af Average Runoff Depth = 1.67"
100.00% Pervious = 1.039 ac 0.00% Impervious = 0.000 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: PRE-DEV (ON-SITE) Runoff Area=0.837 ac 0.00% Impervious Runoff Depth=2.02"
Flow Length=235' Slope=0.2500 '/' Tc=6.9 min CN=WQ Runoff=2.92 cfs 0.141 af

Subcatchment5S: PRE-DEV (OFFSITE) Runoff Area=0.202 ac 0.00% Impervious Runoff Depth=2.38"
Tc=5.0 min CN=77 Runoff=0.89 cfs 0.040 af

Link 1L: TOTAL PRE (ON-SITE) Inflow=2.92 cfs 0.141 af
Primary=2.92 cfs 0.141 af

Link 3L: TOTAL-PRE Inflow=3.73 cfs 0.181 af
Primary=3.73 cfs 0.181 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.181 af Average Runoff Depth = 2.09"
100.00% Pervious = 1.039 ac 0.00% Impervious = 0.000 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: PRE-DEV (ON-SITE) Runoff Area=0.837 ac 0.00% Impervious Runoff Depth=2.66"
Flow Length=235' Slope=0.2500 '/' Tc=6.9 min CN=WQ Runoff=3.84 cfs 0.185 af

Subcatchment5S: PRE-DEV (OFFSITE) Runoff Area=0.202 ac 0.00% Impervious Runoff Depth=3.07"
Tc=5.0 min CN=77 Runoff=1.14 cfs 0.052 af

Link 1L: TOTAL PRE (ON-SITE) Inflow=3.84 cfs 0.185 af
Primary=3.84 cfs 0.185 af

Link 3L: TOTAL-PRE Inflow=4.89 cfs 0.237 af
Primary=4.89 cfs 0.237 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.237 af Average Runoff Depth = 2.74"
100.00% Pervious = 1.039 ac 0.00% Impervious = 0.000 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: PRE-DEV (ON-SITE) Runoff Area=0.837 ac 0.00% Impervious Runoff Depth=3.88"
Flow Length=235' Slope=0.2500 '/' Tc=6.9 min CN=WQ Runoff=5.56 cfs 0.271 af

Subcatchment5S: PRE-DEV (OFFSITE) Runoff Area=0.202 ac 0.00% Impervious Runoff Depth=4.37"
Tc=5.0 min CN=77 Runoff=1.60 cfs 0.073 af

Link 1L: TOTAL PRE (ON-SITE) Inflow=5.56 cfs 0.271 af
Primary=5.56 cfs 0.271 af

Link 3L: TOTAL-PRE Inflow=7.03 cfs 0.344 af
Primary=7.03 cfs 0.344 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.344 af Average Runoff Depth = 3.97"
100.00% Pervious = 1.039 ac 0.00% Impervious = 0.000 ac

20483-hydro

Type II 24-hr 1-YR Rainfall=2.23"

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Page 1

Summary for Subcatchment 1S: PRE-DEV (ON-SITE)

Runoff = 0.53 cfs @ 12.00 hrs, Volume= 0.029 af, Depth= 0.42"

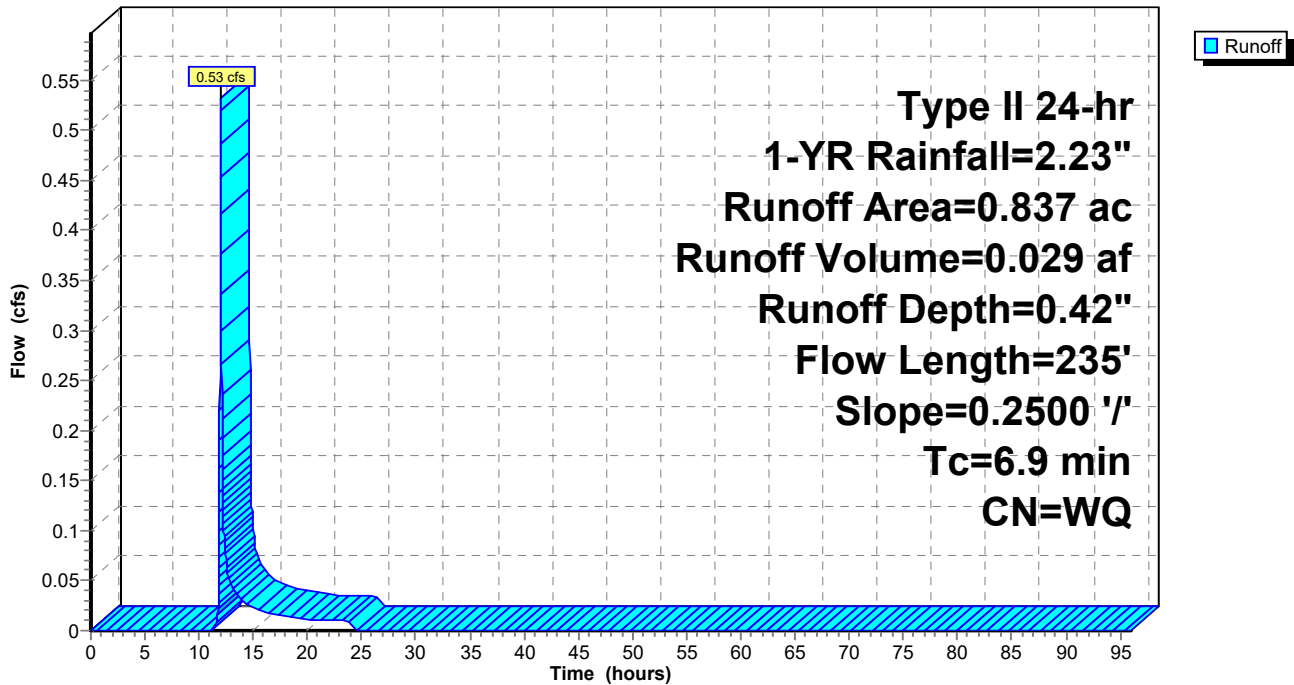
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-YR Rainfall=2.23"

Area (ac)	CN	Description
0.546	70	Woods, Good, HSG C
0.291	77	Woods, Good, HSG D
0.837		Weighted Average
0.837		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB
					Woods: Light underbrush n= 0.400 P2= 2.62"
1.2	175	0.2500	2.50		Shallow Concentrated Flow, BC
					Woodland Kv= 5.0 fps
6.9	235	Total			

Subcatchment 1S: PRE-DEV (ON-SITE)

Hydrograph



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Type II 24-hr 1-YR Rainfall=2.23"

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Summary for Subcatchment 5S: PRE-DEV (OFFSITE)

Runoff = 0.21 cfs @ 11.97 hrs, Volume= 0.010 af, Depth= 0.58"

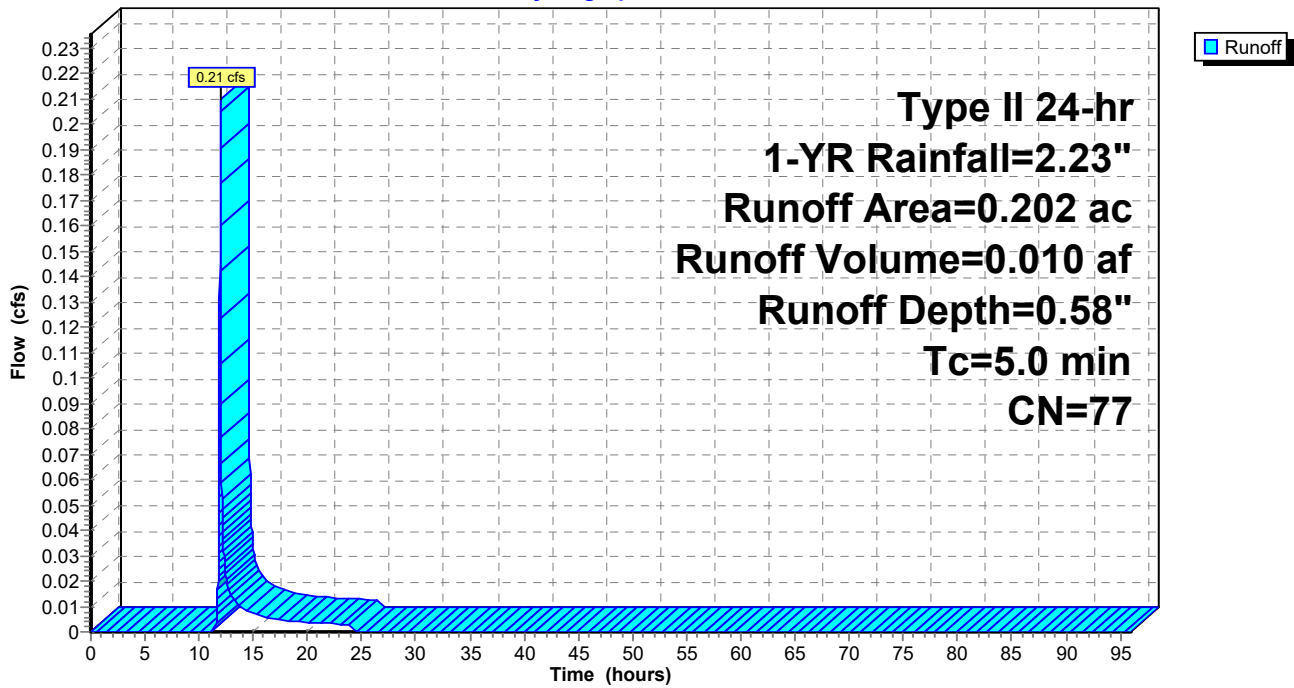
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-YR Rainfall=2.23"

Area (ac)	CN	Description
0.202	77	Woods, Good, HSG D
0.202		100.00% Pervious Area

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

Subcatchment 5S: PRE-DEV (OFFSITE)

Hydrograph



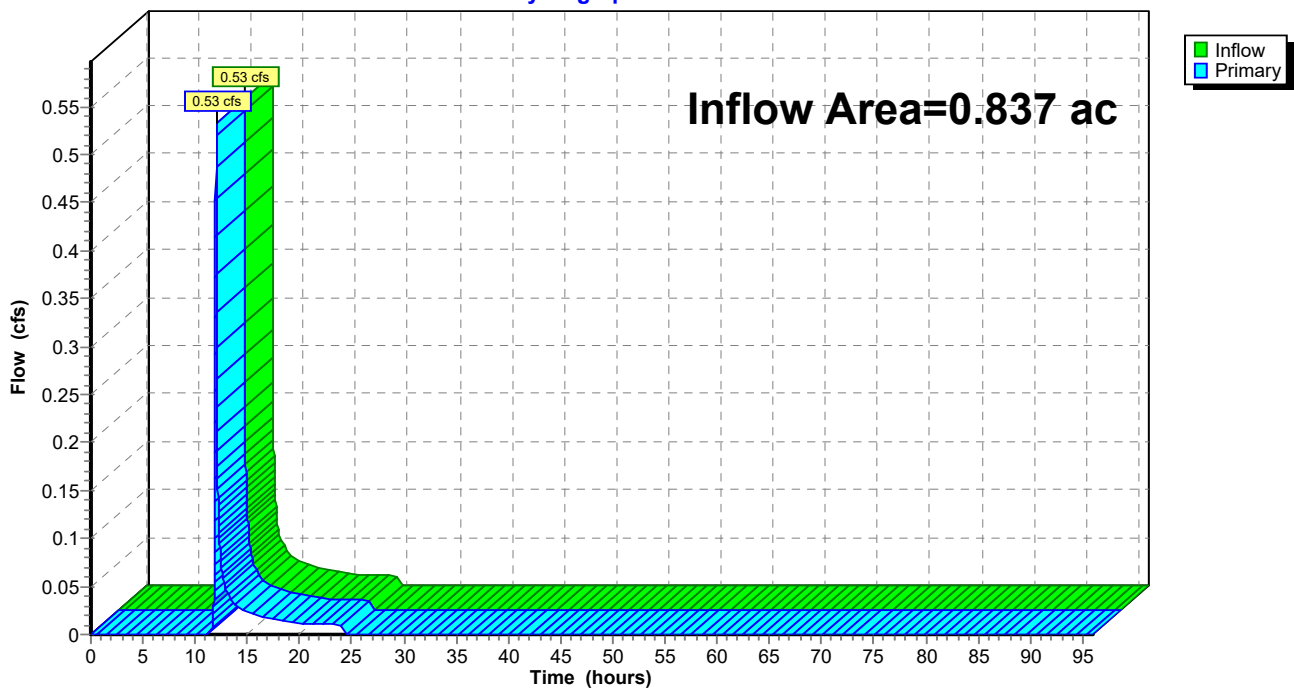
Summary for Link 1L: TOTAL PRE (ON-SITE)

Inflow Area = 0.837 ac, 0.00% Impervious, Inflow Depth = 0.42" for 1-YR event
Inflow = 0.53 cfs @ 12.00 hrs, Volume= 0.029 af
Primary = 0.53 cfs @ 12.01 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: TOTAL PRE (ON-SITE)

Hydrograph



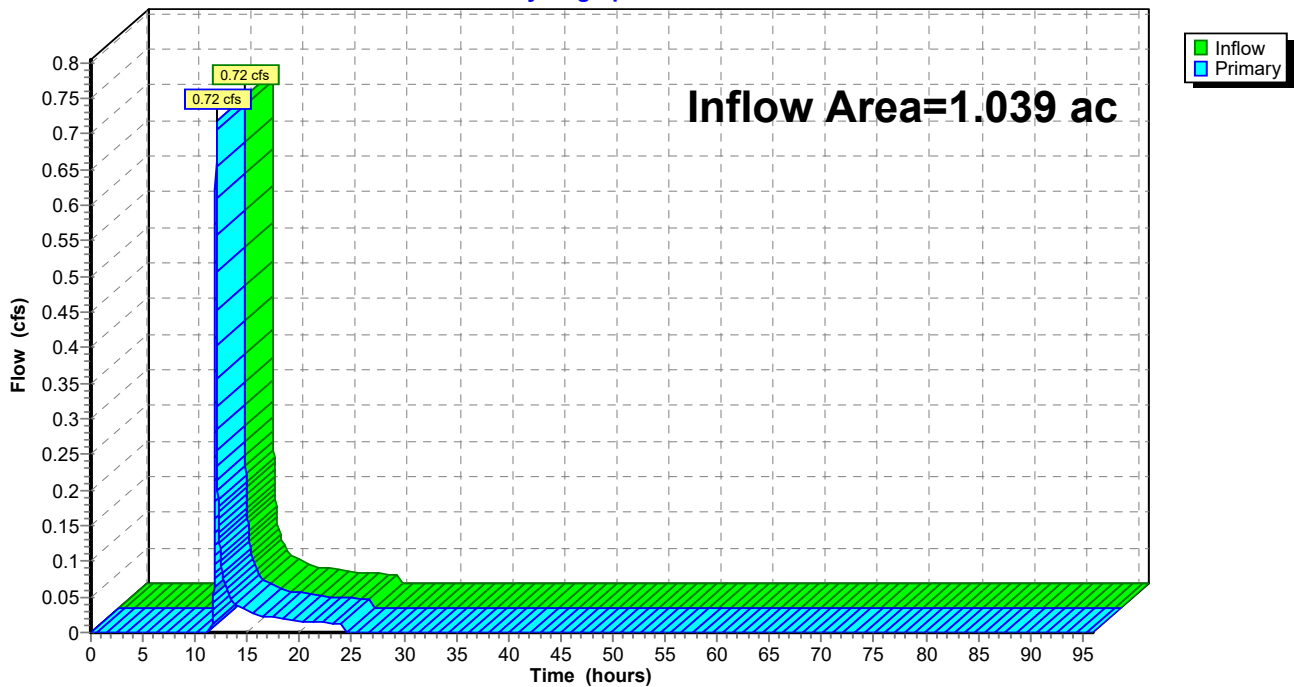
Summary for Link 3L: TOTAL- PRE

Inflow Area = 1.039 ac, 0.00% Impervious, Inflow Depth = 0.45" for 1-YR event
Inflow = 0.72 cfs @ 12.00 hrs, Volume= 0.039 af
Primary = 0.72 cfs @ 12.01 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: TOTAL- PRE

Hydrograph



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Type II 24-hr 2-YR Rainfall=2.62"

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Summary for Subcatchment 1S: PRE-DEV (ON-SITE)

Runoff = 0.84 cfs @ 12.00 hrs, Volume= 0.043 af, Depth= 0.62"

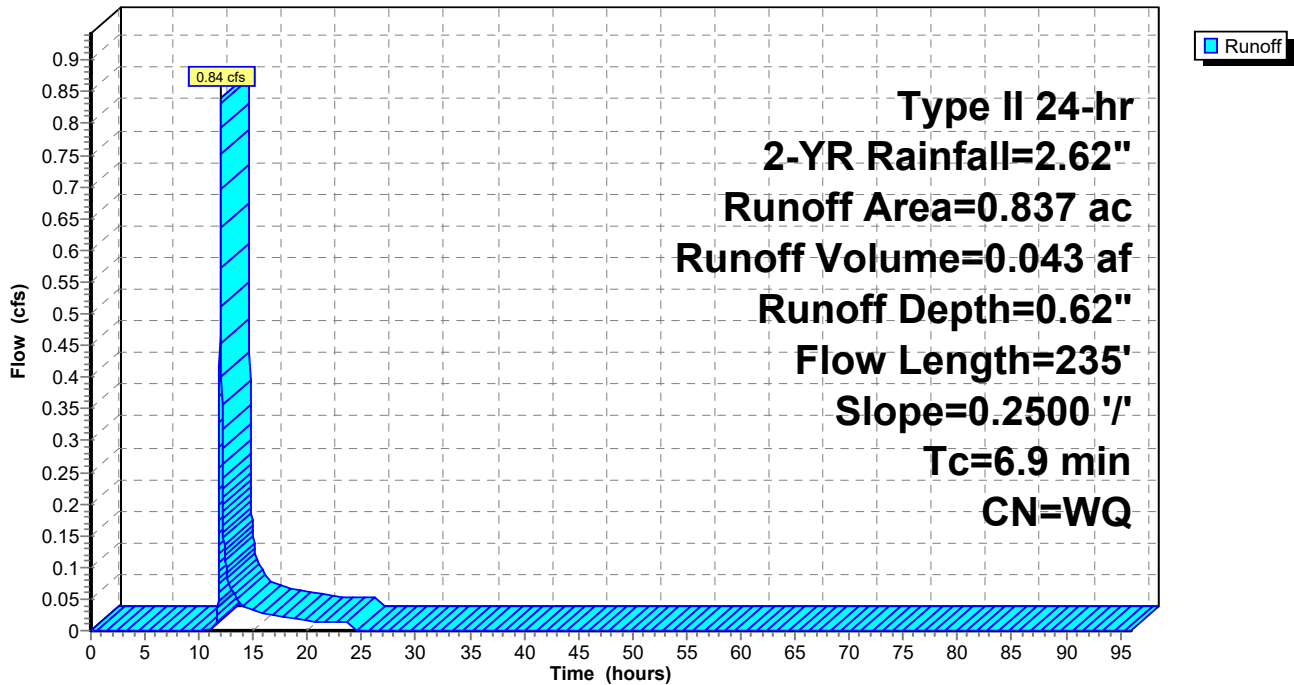
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-YR Rainfall=2.62"

Area (ac)	CN	Description
0.546	70	Woods, Good, HSG C
0.291	77	Woods, Good, HSG D
0.837		Weighted Average
0.837		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB
1.2	175	0.2500	2.50		Woods: Light underbrush n= 0.400 P2= 2.62"
					Shallow Concentrated Flow, BC
					Woodland Kv= 5.0 fps
6.9	235	Total			

Subcatchment 1S: PRE-DEV (ON-SITE)

Hydrograph



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Type II 24-hr 2-YR Rainfall=2.62"

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Summary for Subcatchment 5S: PRE-DEV (OFFSITE)

Runoff = 0.30 cfs @ 11.97 hrs, Volume= 0.014 af, Depth= 0.82"

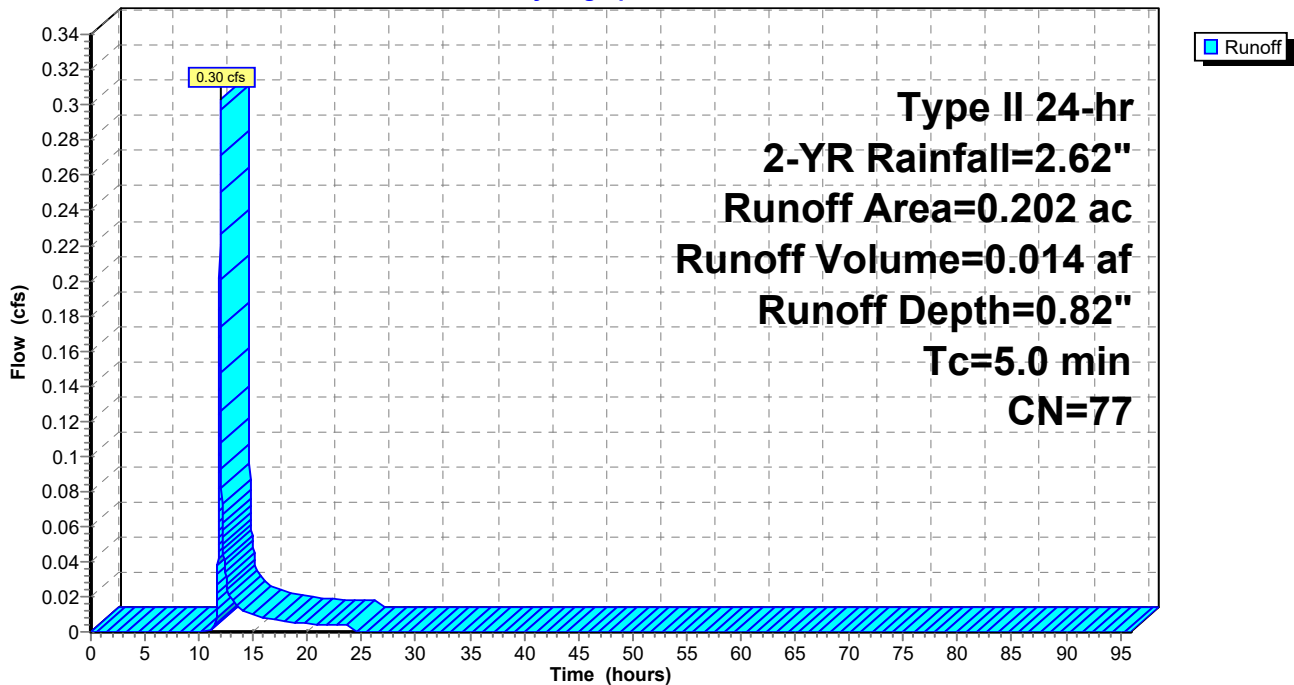
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-YR Rainfall=2.62"

Area (ac)	CN	Description
0.202	77	Woods, Good, HSG D
0.202		100.00% Pervious Area

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

Subcatchment 5S: PRE-DEV (OFFSITE)

Hydrograph



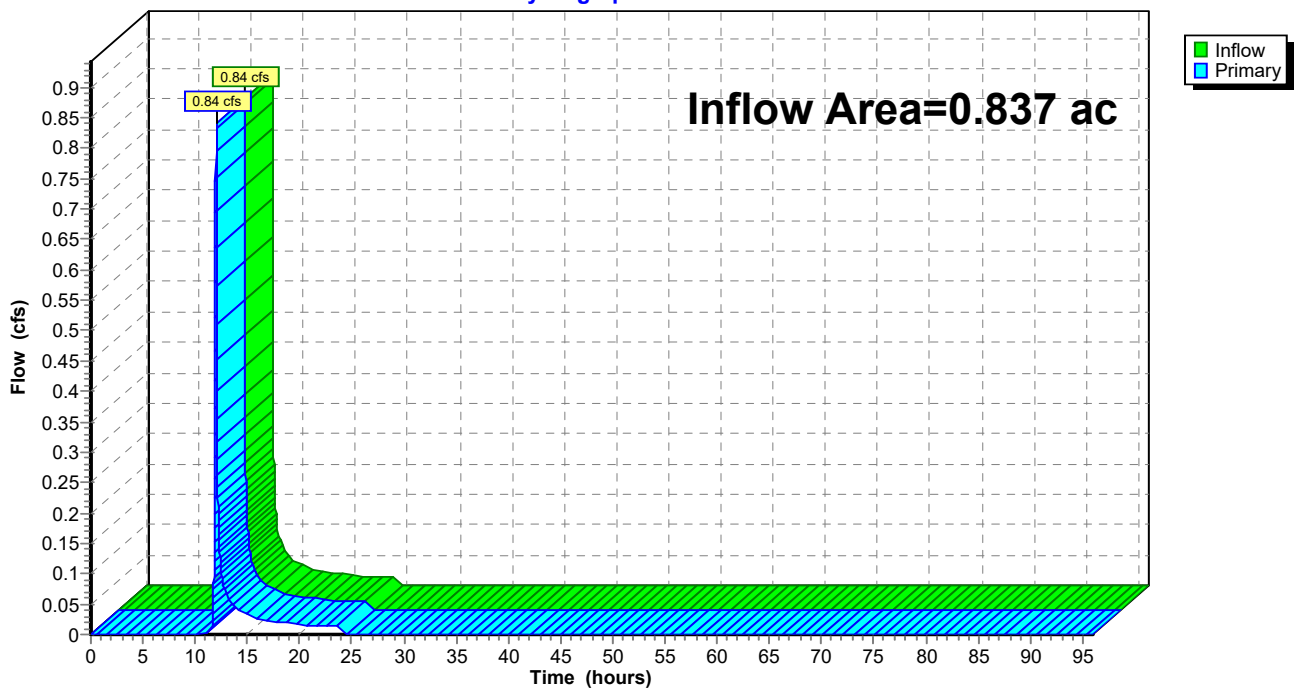
Summary for Link 1L: TOTAL PRE (ON-SITE)

Inflow Area = 0.837 ac, 0.00% Impervious, Inflow Depth = 0.62" for 2-YR event
Inflow = 0.84 cfs @ 12.00 hrs, Volume= 0.043 af
Primary = 0.84 cfs @ 12.01 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: TOTAL PRE (ON-SITE)

Hydrograph



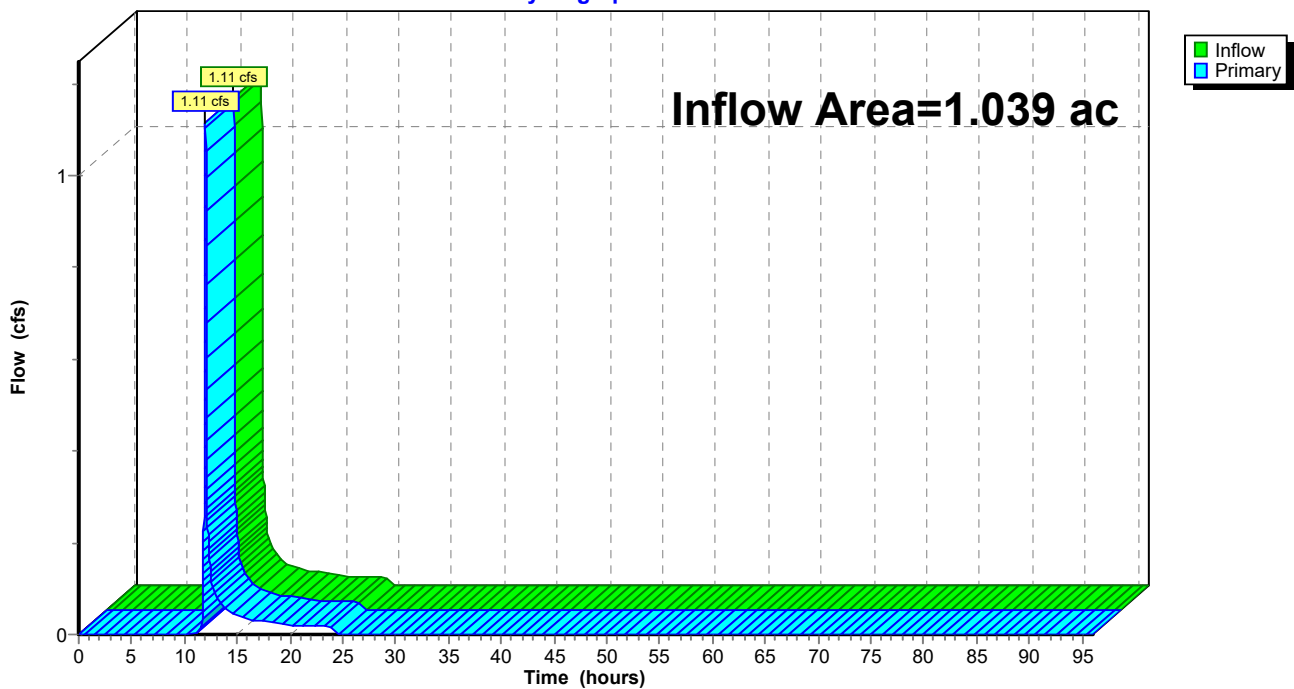
Summary for Link 3L: TOTAL- PRE

Inflow Area = 1.039 ac, 0.00% Impervious, Inflow Depth = 0.66" for 2-YR event
Inflow = 1.11 cfs @ 11.99 hrs, Volume= 0.057 af
Primary = 1.11 cfs @ 12.00 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: TOTAL- PRE

Hydrograph



20483-hydro

Summary for Subcatchment 1S: PRE-DEV (ON-SITE)

Runoff = 2.31 cfs @ 11.99 hrs, Volume= 0.112 af, Depth= 1.60"

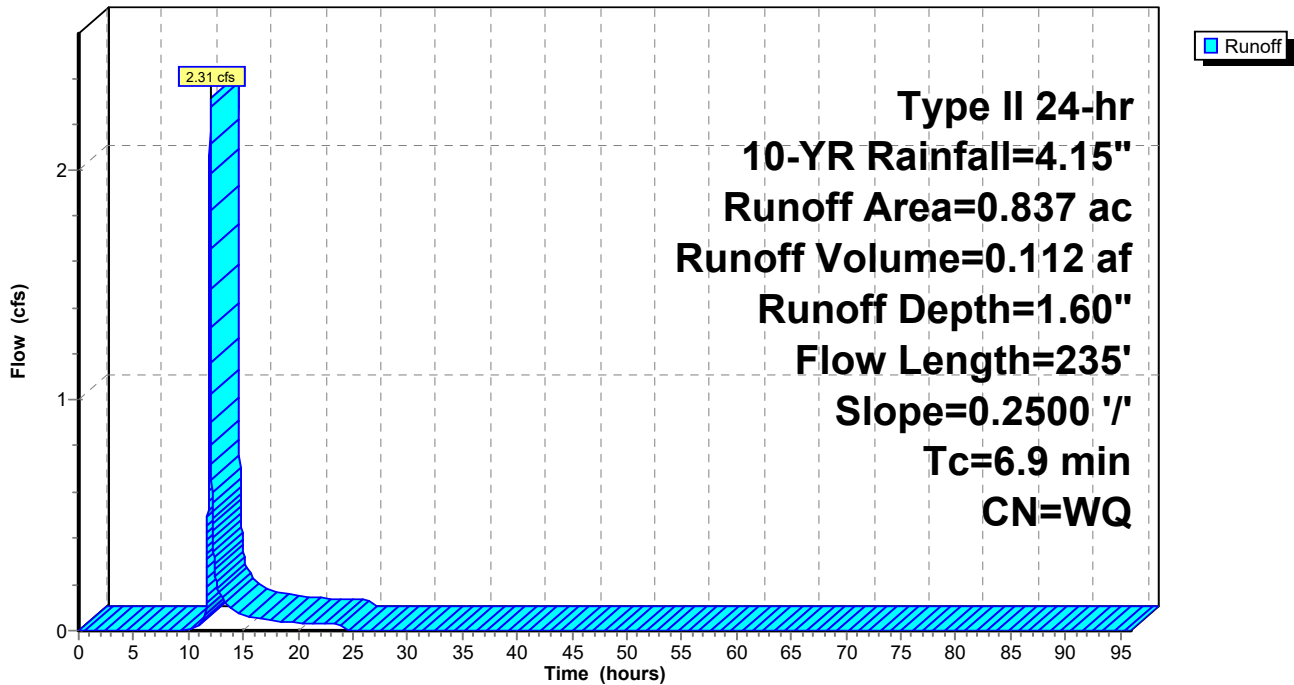
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-YR Rainfall=4.15"

Area (ac)	CN	Description
0.546	70	Woods, Good, HSG C
0.291	77	Woods, Good, HSG D
0.837		Weighted Average
0.837		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB
1.2	175	0.2500	2.50		Woods: Light underbrush n= 0.400 P2= 2.62"
					Shallow Concentrated Flow, BC
					Woodland Kv= 5.0 fps
6.9	235	Total			

Subcatchment 1S: PRE-DEV (ON-SITE)

Hydrograph



Summary for Subcatchment 5S: PRE-DEV (OFFSITE)

Runoff = 0.72 cfs @ 11.96 hrs, Volume= 0.032 af, Depth= 1.93"

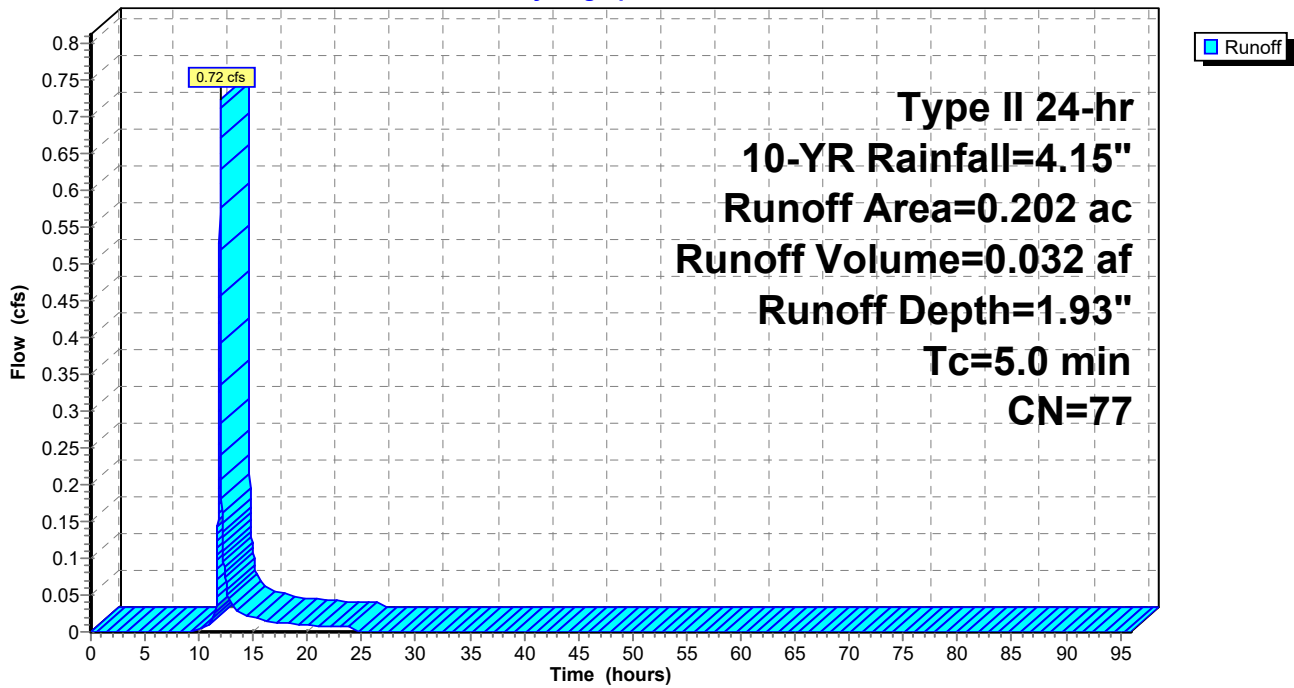
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-YR Rainfall=4.15"

Area (ac)	CN	Description
0.202	77	Woods, Good, HSG D
0.202		100.00% Pervious Area

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

Subcatchment 5S: PRE-DEV (OFFSITE)

Hydrograph



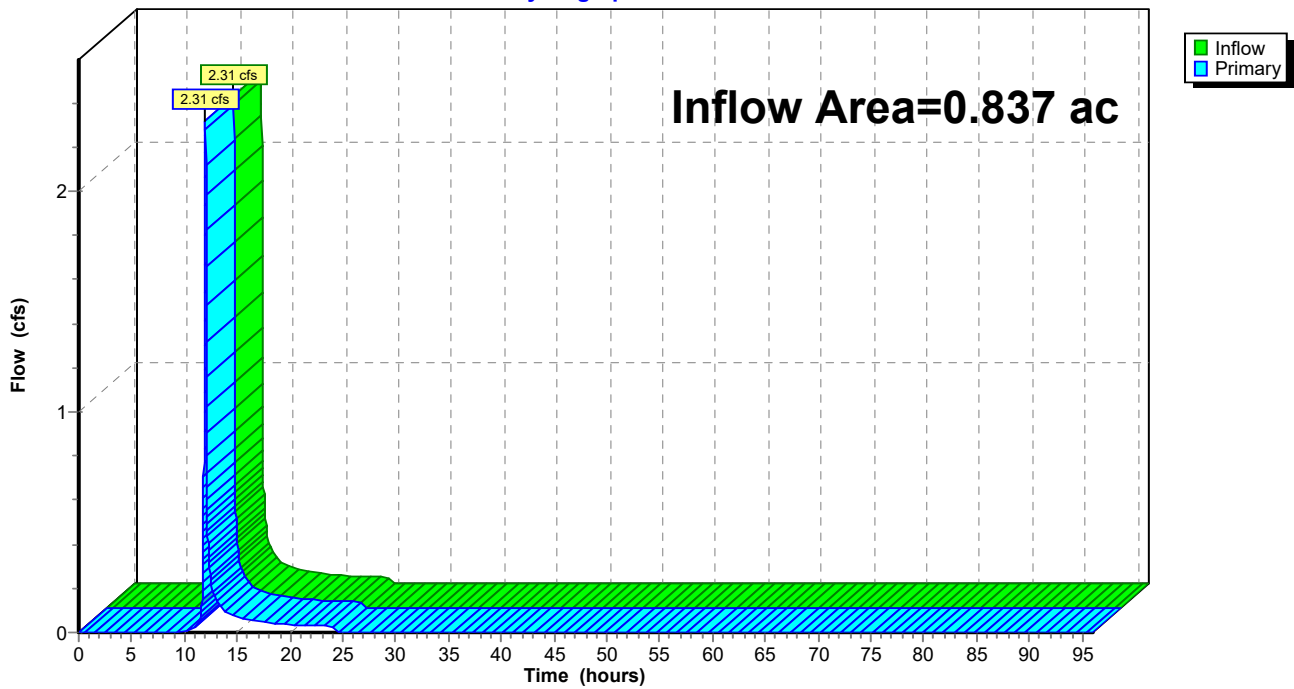
Summary for Link 1L: TOTAL PRE (ON-SITE)

Inflow Area = 0.837 ac, 0.00% Impervious, Inflow Depth = 1.60" for 10-YR event
Inflow = 2.31 cfs @ 11.99 hrs, Volume= 0.112 af
Primary = 2.31 cfs @ 12.00 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: TOTAL PRE (ON-SITE)

Hydrograph



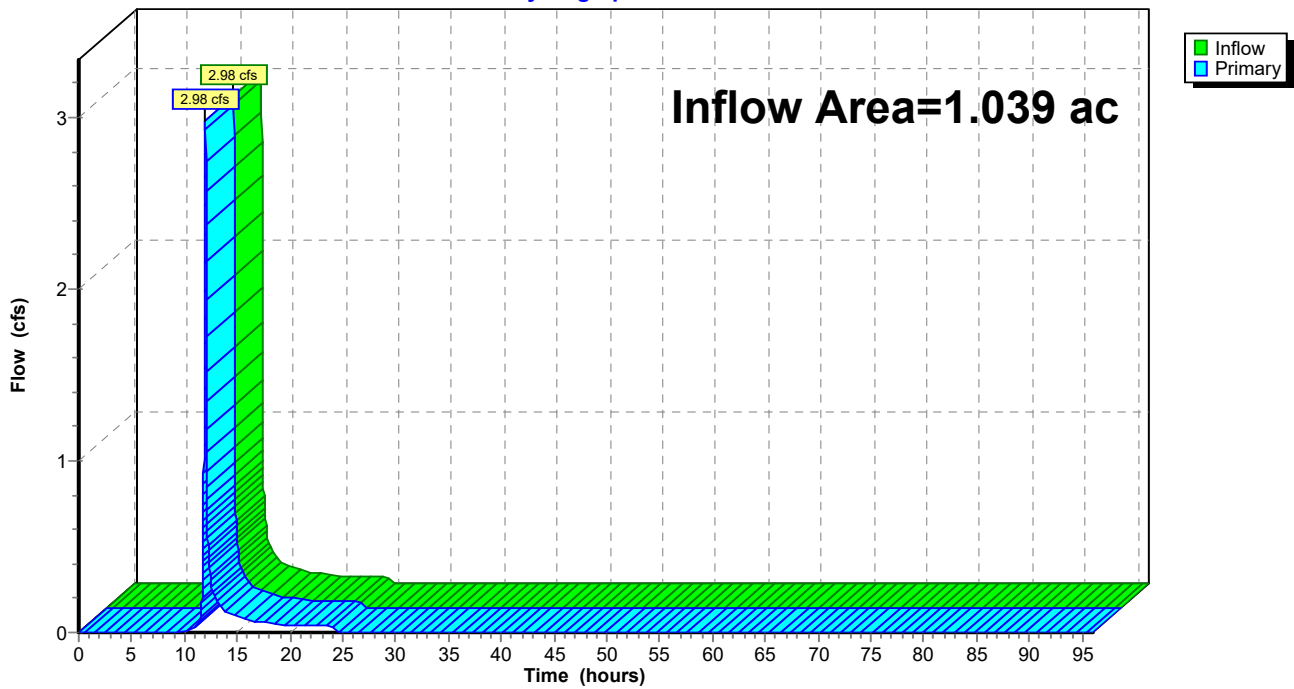
Summary for Link 3L: TOTAL- PRE

Inflow Area = 1.039 ac, 0.00% Impervious, Inflow Depth = 1.67" for 10-YR event
Inflow = 2.98 cfs @ 11.99 hrs, Volume= 0.144 af
Primary = 2.98 cfs @ 12.00 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: TOTAL- PRE

Hydrograph



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Type II 24-hr 25-YR Rainfall=4.71"

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Summary for Subcatchment 1S: PRE-DEV (ON-SITE)

Runoff = 2.92 cfs @ 11.99 hrs, Volume= 0.141 af, Depth= 2.02"

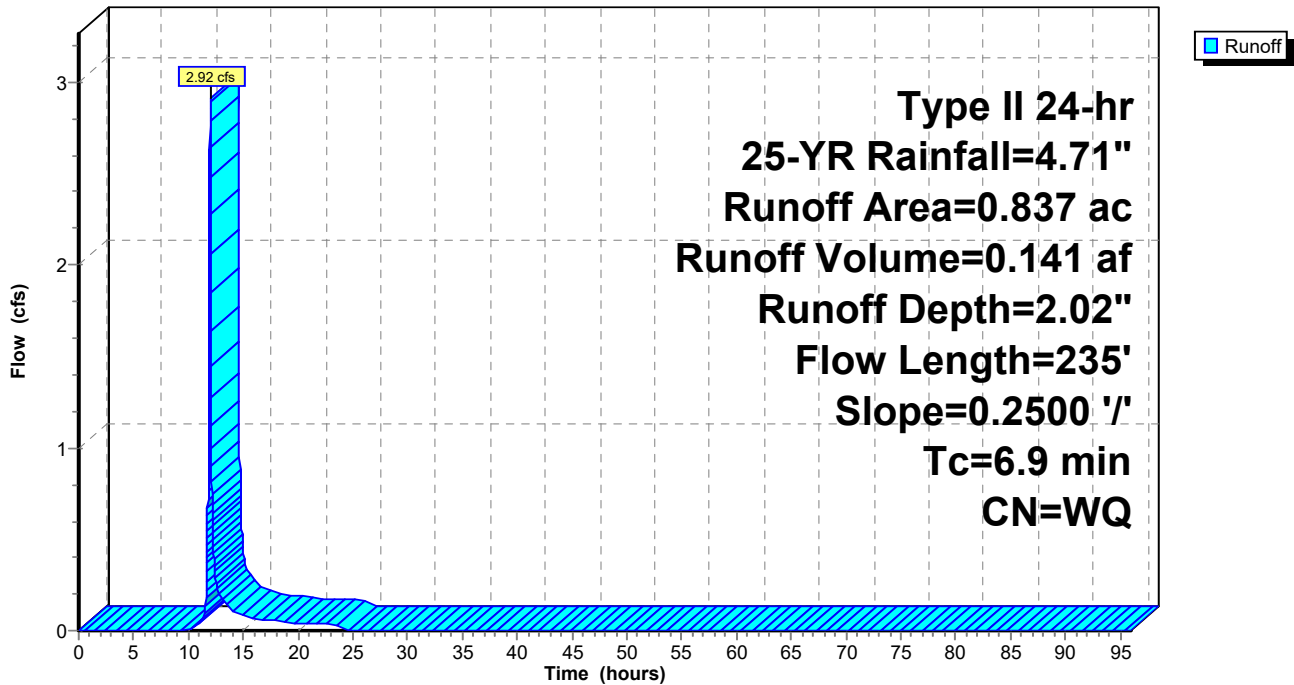
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-YR Rainfall=4.71"

Area (ac)	CN	Description
0.546	70	Woods, Good, HSG C
0.291	77	Woods, Good, HSG D
0.837		Weighted Average
0.837		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB
1.2	175	0.2500	2.50		Woods: Light underbrush n= 0.400 P2= 2.62"
					Shallow Concentrated Flow, BC
					Woodland Kv= 5.0 fps
6.9	235	Total			

Subcatchment 1S: PRE-DEV (ON-SITE)

Hydrograph



Summary for Subcatchment 5S: PRE-DEV (OFFSITE)

Runoff = 0.89 cfs @ 11.96 hrs, Volume= 0.040 af, Depth= 2.38"

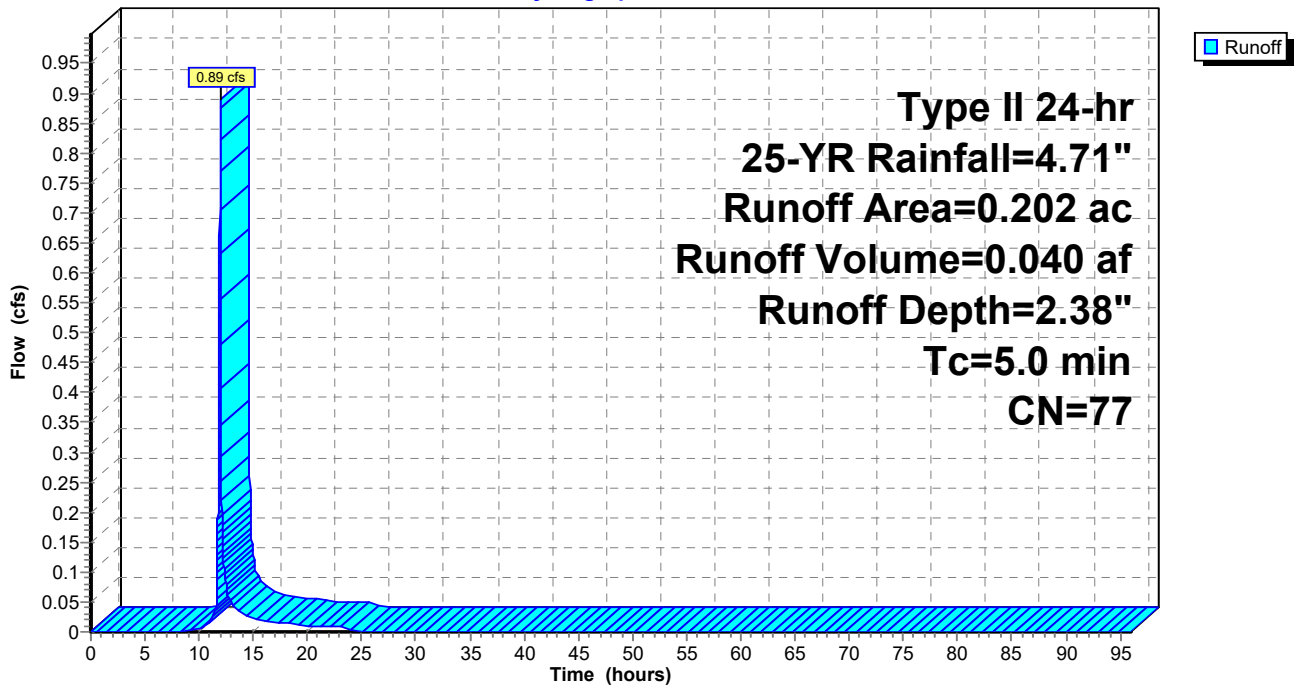
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-YR Rainfall=4.71"

Area (ac)	CN	Description
0.202	77	Woods, Good, HSG D
0.202		100.00% Pervious Area

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

Subcatchment 5S: PRE-DEV (OFFSITE)

Hydrograph



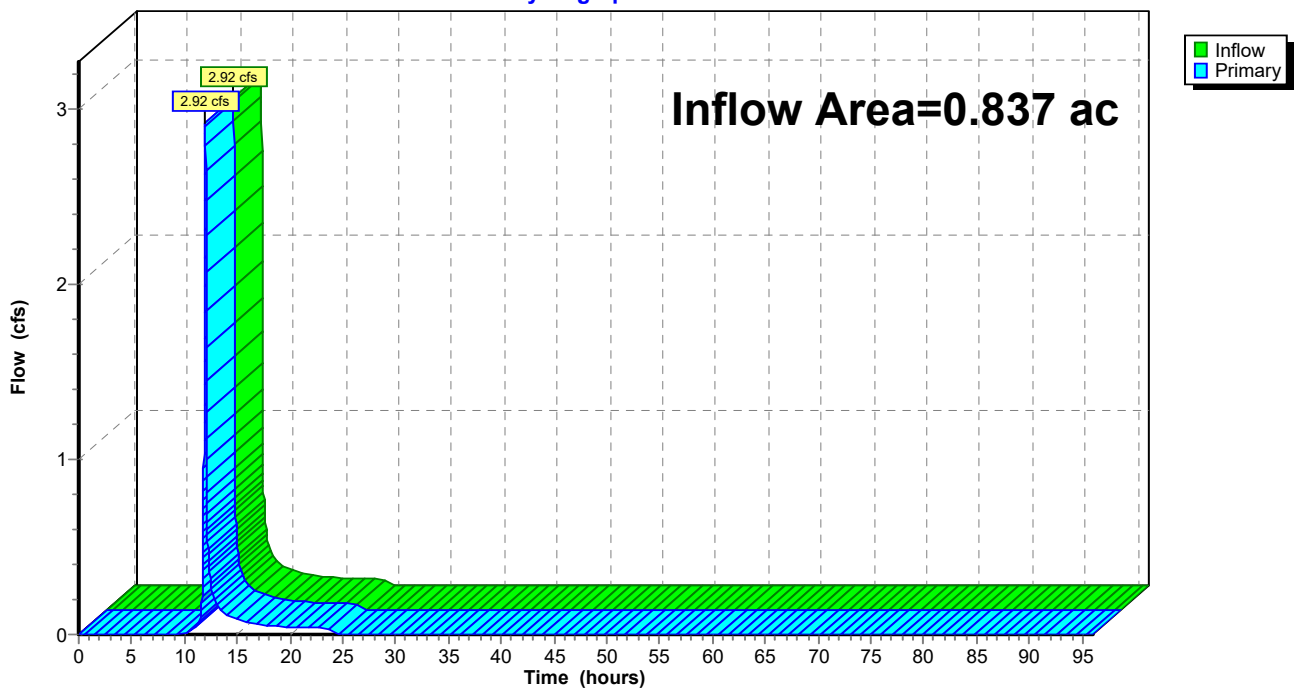
Summary for Link 1L: TOTAL PRE (ON-SITE)

Inflow Area = 0.837 ac, 0.00% Impervious, Inflow Depth = 2.02" for 25-YR event
Inflow = 2.92 cfs @ 11.99 hrs, Volume= 0.141 af
Primary = 2.92 cfs @ 12.00 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: TOTAL PRE (ON-SITE)

Hydrograph



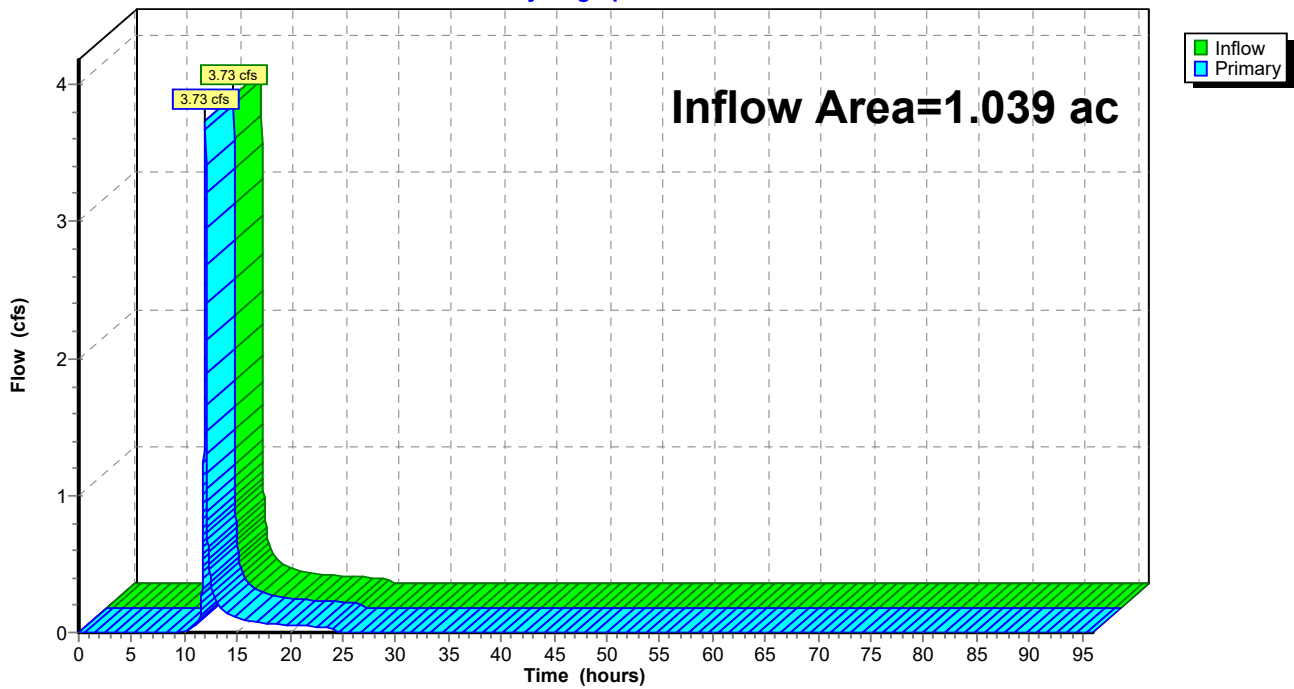
Summary for Link 3L: TOTAL- PRE

Inflow Area = 1.039 ac, 0.00% Impervious, Inflow Depth = 2.09" for 25-YR event
Inflow = 3.73 cfs @ 11.99 hrs, Volume= 0.181 af
Primary = 3.73 cfs @ 12.00 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: TOTAL- PRE

Hydrograph



20483-hydro

Summary for Subcatchment 1S: PRE-DEV (ON-SITE)

Runoff = 3.84 cfs @ 11.98 hrs, Volume= 0.185 af, Depth= 2.66"

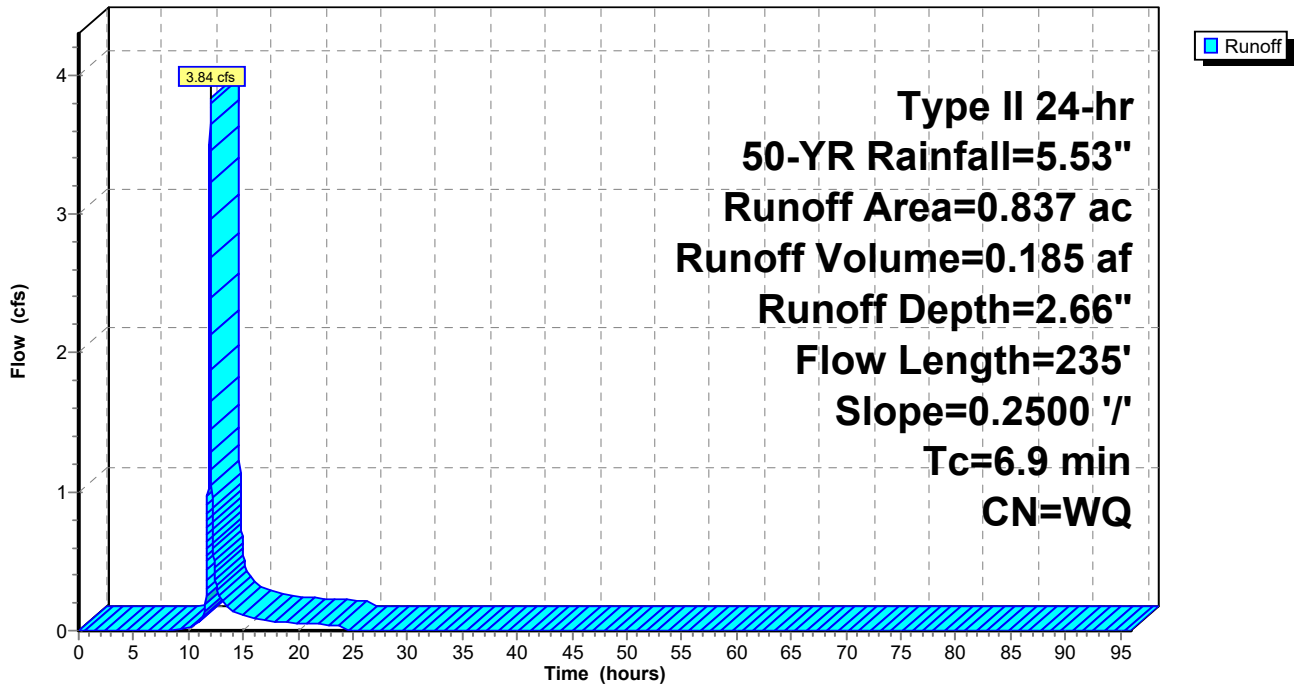
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-YR Rainfall=5.53"

Area (ac)	CN	Description
0.546	70	Woods, Good, HSG C
0.291	77	Woods, Good, HSG D
0.837		Weighted Average
0.837		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB
					Woods: Light underbrush n= 0.400 P2= 2.62"
1.2	175	0.2500	2.50		Shallow Concentrated Flow, BC
					Woodland Kv= 5.0 fps
6.9	235	Total			

Subcatchment 1S: PRE-DEV (ON-SITE)

Hydrograph



Summary for Subcatchment 5S: PRE-DEV (OFFSITE)

Runoff = 1.14 cfs @ 11.96 hrs, Volume= 0.052 af, Depth= 3.07"

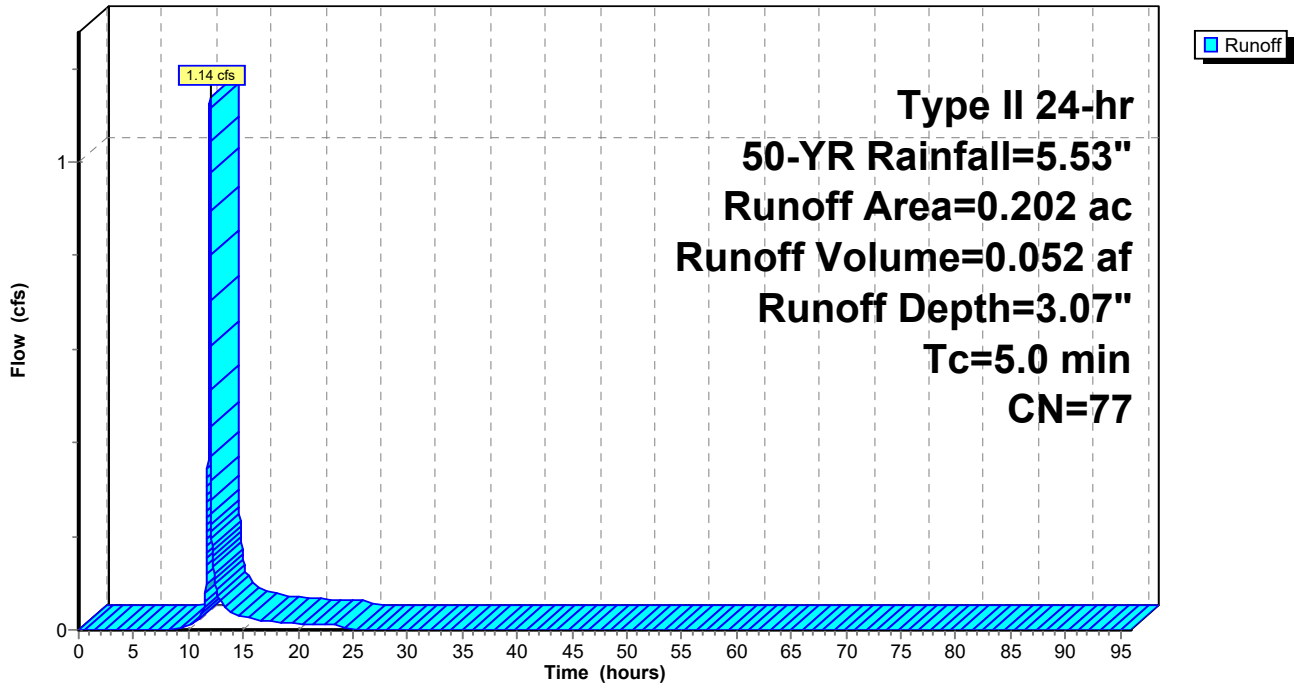
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-YR Rainfall=5.53"

Area (ac)	CN	Description
0.202	77	Woods, Good, HSG D
0.202		100.00% Pervious Area

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

Subcatchment 5S: PRE-DEV (OFFSITE)

Hydrograph



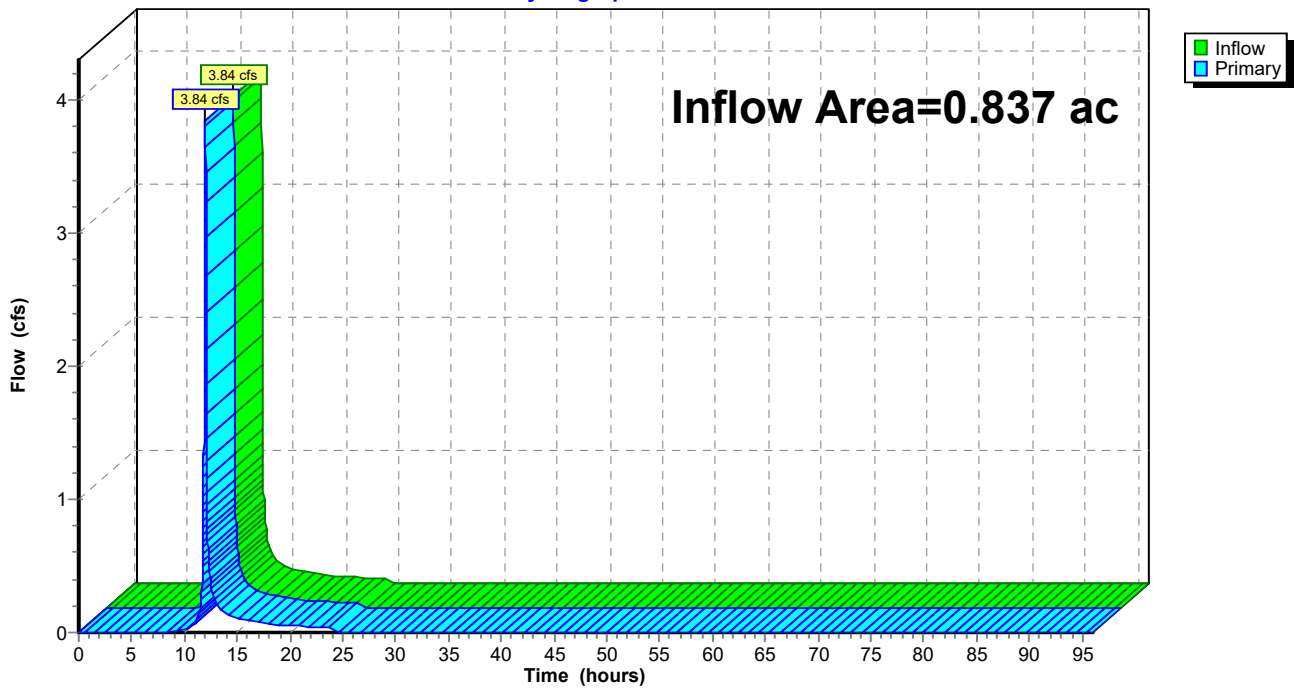
Summary for Link 1L: TOTAL PRE (ON-SITE)

Inflow Area = 0.837 ac, 0.00% Impervious, Inflow Depth = 2.66" for 50-YR event
Inflow = 3.84 cfs @ 11.98 hrs, Volume= 0.185 af
Primary = 3.84 cfs @ 11.99 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: TOTAL PRE (ON-SITE)

Hydrograph



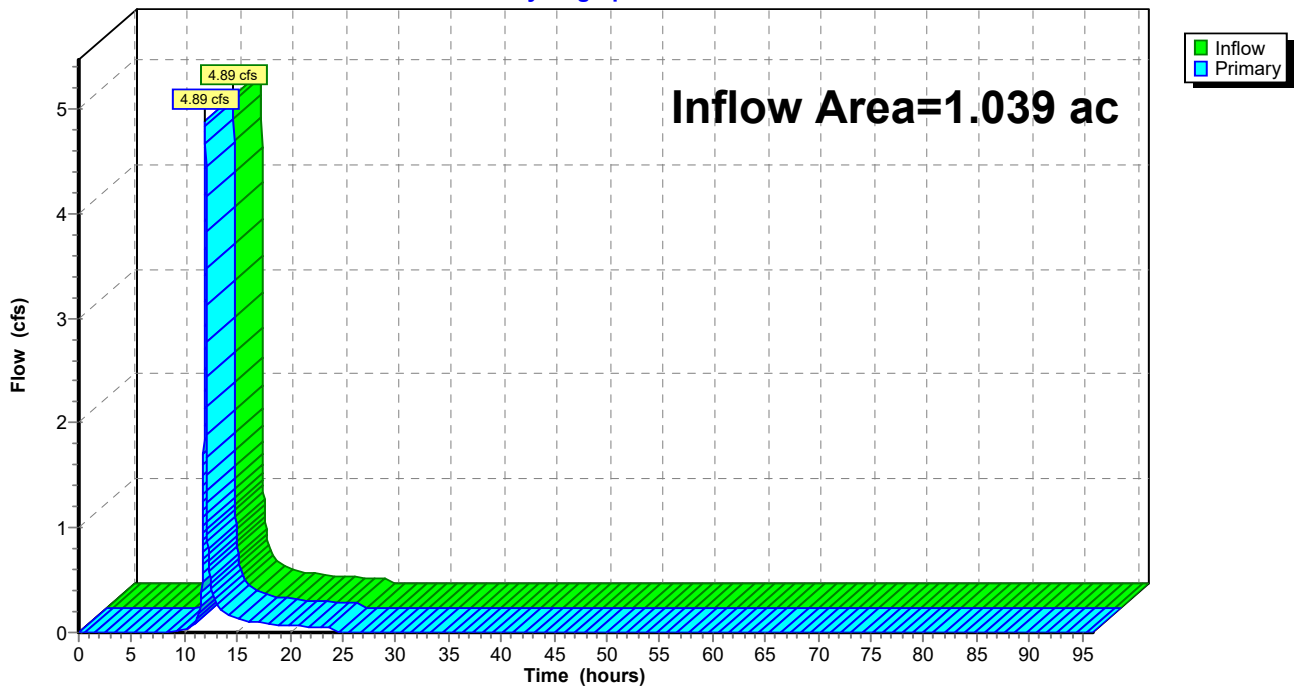
Summary for Link 3L: TOTAL- PRE

Inflow Area = 1.039 ac, 0.00% Impervious, Inflow Depth = 2.74" for 50-YR event
Inflow = 4.89 cfs @ 11.99 hrs, Volume= 0.237 af
Primary = 4.89 cfs @ 12.00 hrs, Volume= 0.237 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: TOTAL- PRE

Hydrograph



Summary for Subcatchment 1S: PRE-DEV (ON-SITE)

Runoff = 5.56 cfs @ 11.98 hrs, Volume= 0.271 af, Depth= 3.88"

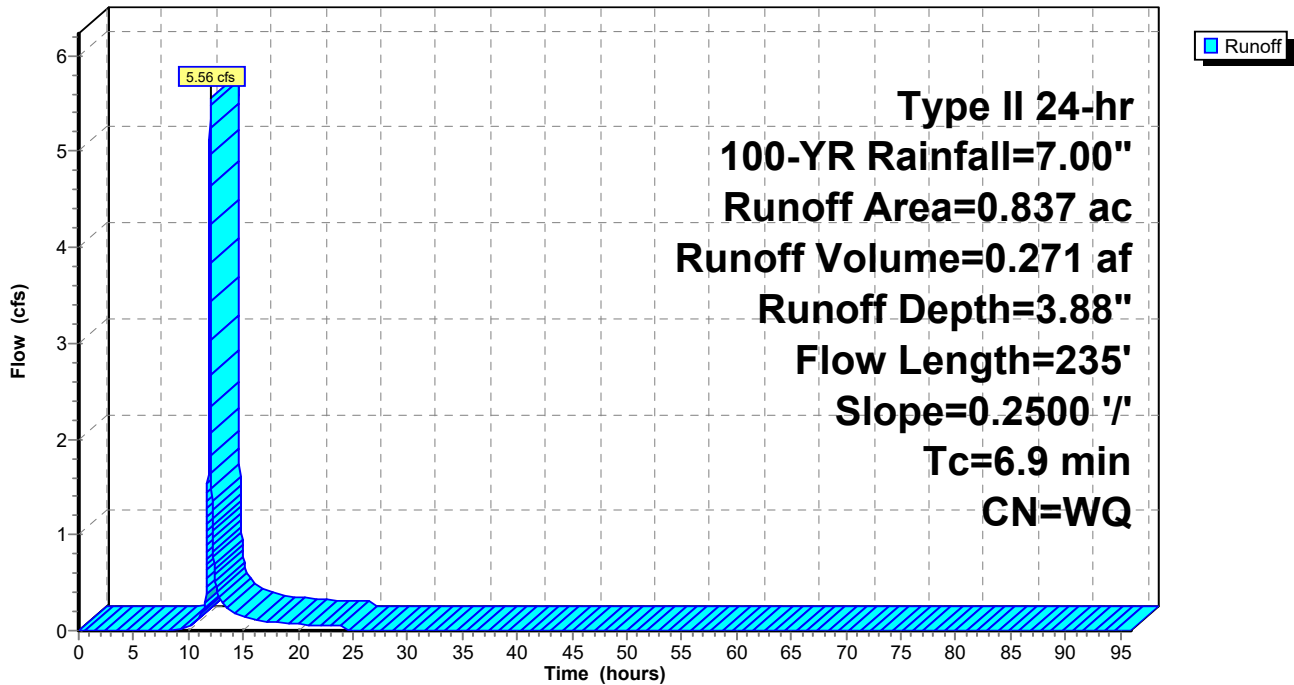
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=7.00"

Area (ac)	CN	Description
0.546	70	Woods, Good, HSG C
0.291	77	Woods, Good, HSG D
0.837		Weighted Average
0.837		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB
					Woods: Light underbrush n= 0.400 P2= 2.62"
1.2	175	0.2500	2.50		Shallow Concentrated Flow, BC
					Woodland Kv= 5.0 fps
6.9	235	Total			

Subcatchment 1S: PRE-DEV (ON-SITE)

Hydrograph



Summary for Subcatchment 5S: PRE-DEV (OFFSITE)

Runoff = 1.60 cfs @ 11.96 hrs, Volume= 0.073 af, Depth= 4.37"

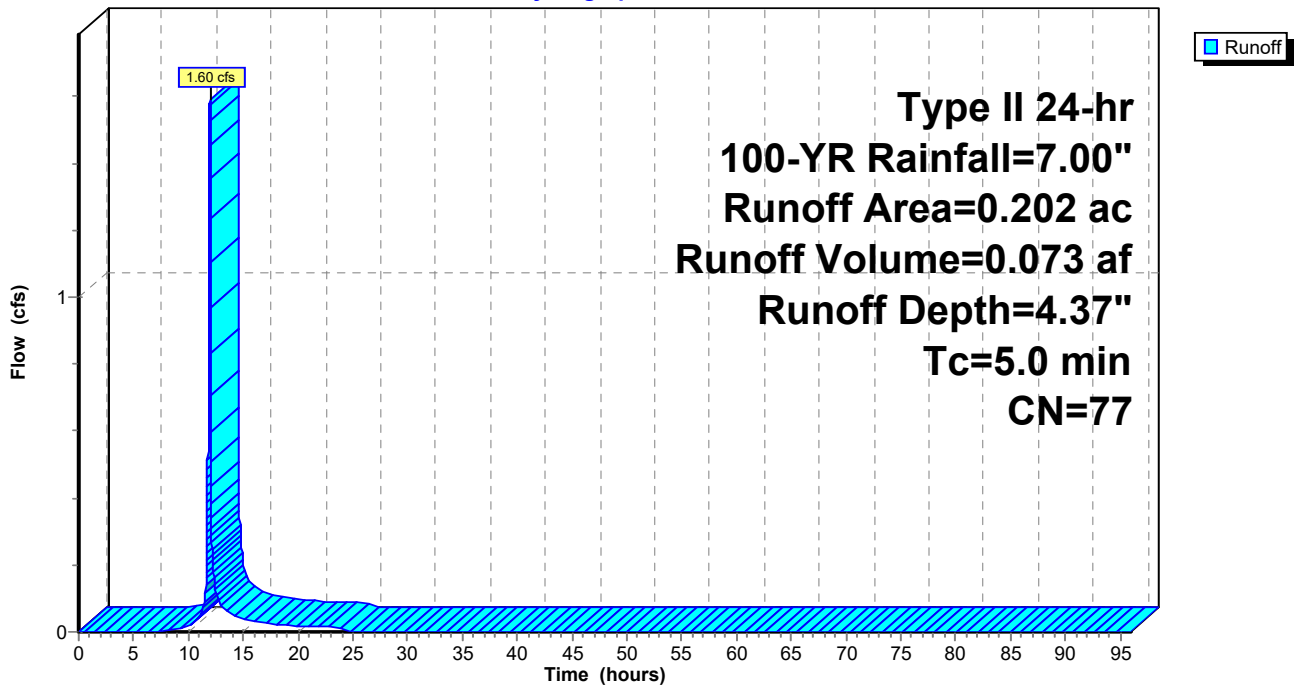
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=7.00"

Area (ac)	CN	Description
0.202	77	Woods, Good, HSG D
0.202		100.00% Pervious Area

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

Subcatchment 5S: PRE-DEV (OFFSITE)

Hydrograph



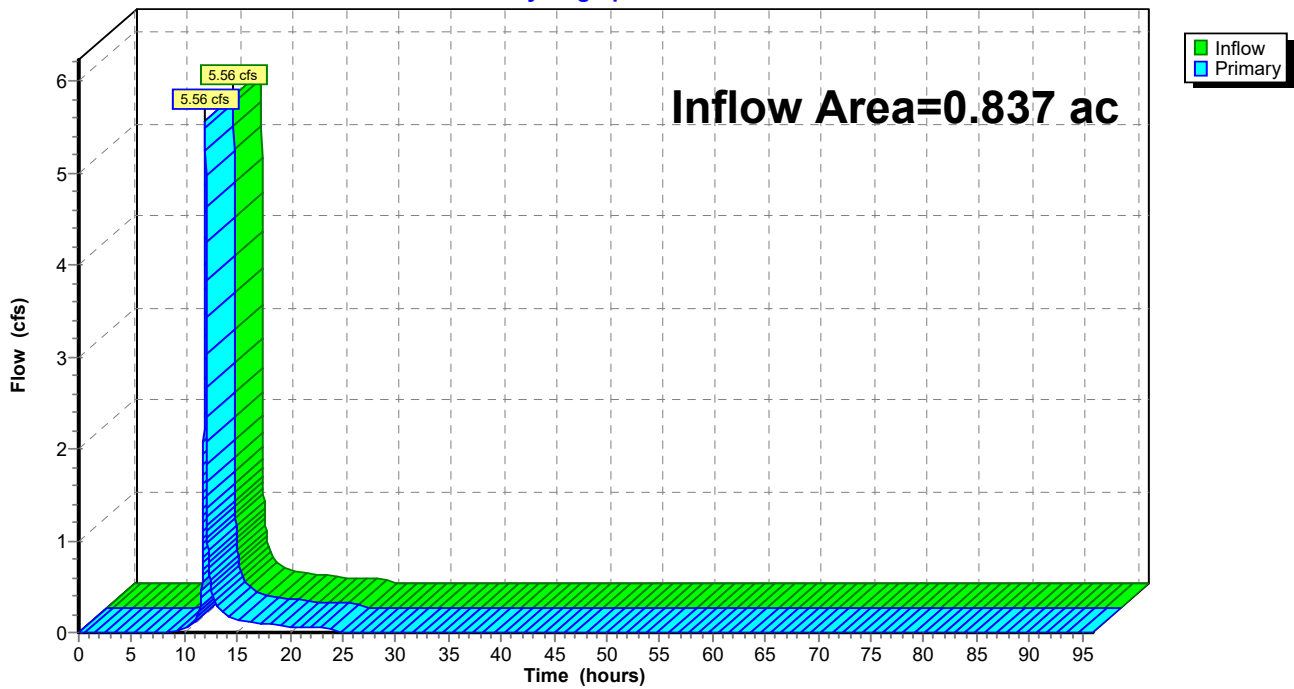
Summary for Link 1L: TOTAL PRE (ON-SITE)

Inflow Area = 0.837 ac, 0.00% Impervious, Inflow Depth = 3.88" for 100-YR event
Inflow = 5.56 cfs @ 11.98 hrs, Volume= 0.271 af
Primary = 5.56 cfs @ 11.99 hrs, Volume= 0.271 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 1L: TOTAL PRE (ON-SITE)

Hydrograph



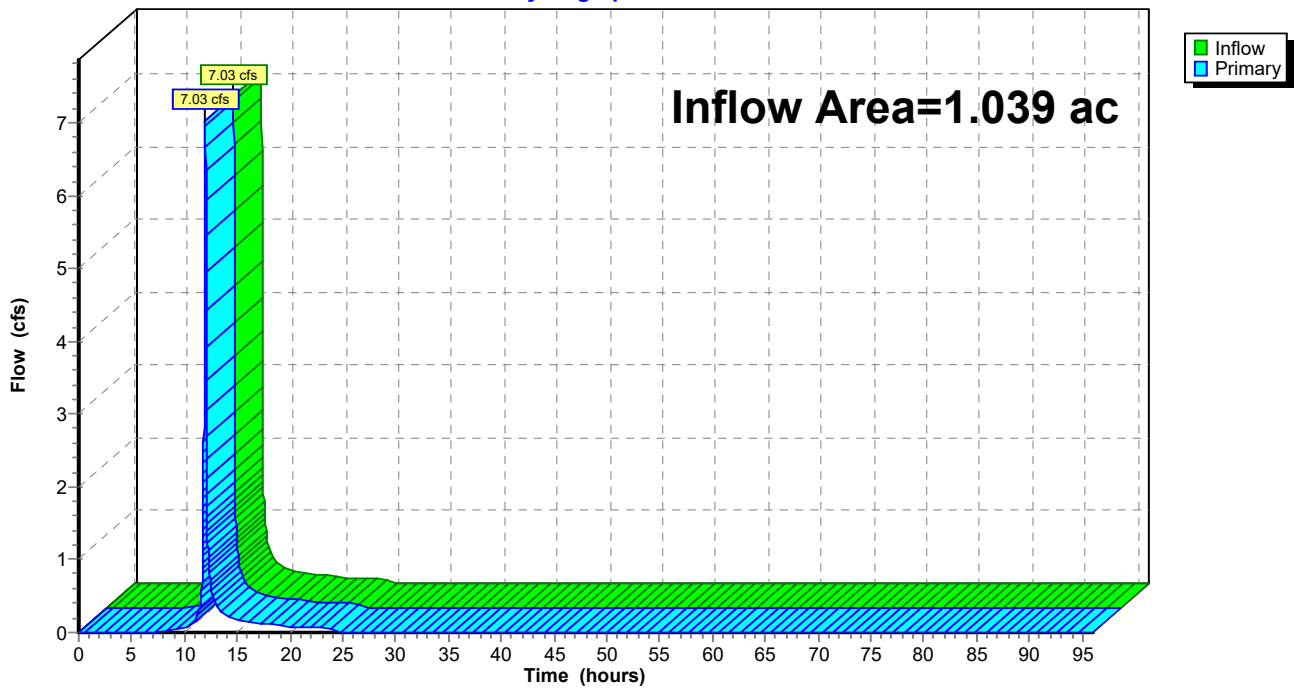
Summary for Link 3L: TOTAL- PRE

Inflow Area = 1.039 ac, 0.00% Impervious, Inflow Depth = 3.97" for 100-YR event
Inflow = 7.03 cfs @ 11.98 hrs, Volume= 0.344 af
Primary = 7.03 cfs @ 11.99 hrs, Volume= 0.344 af, Atten= 0%, Lag= 0.6 min

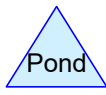
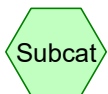
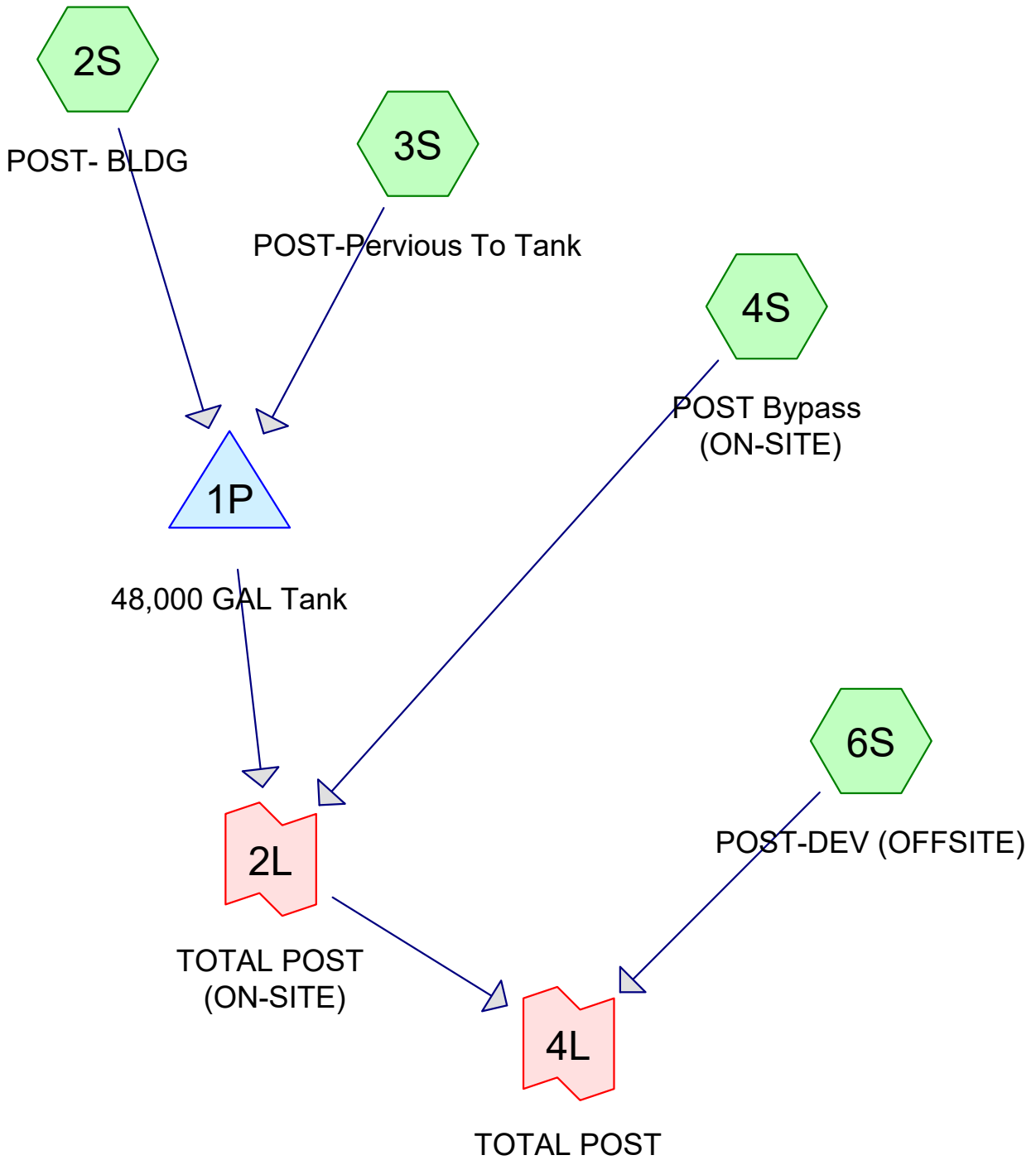
Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: TOTAL- PRE

Hydrograph



Post-Development



Routing Diagram for 20483-hydro
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20483-hydro

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.076	74	>75% Grass cover, Good, HSG C (3S, 4S)
0.235	80	>75% Grass cover, Good, HSG D (4S, 6S)
0.362	98	Building (2S)
0.083	98	Impervious (4S, 6S)
0.283	70	Woods, Good, HSG C (3S)
1.039	85	TOTAL AREA

20483-hydro

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.359	HSG C	3S, 4S
0.235	HSG D	4S, 6S
0.445	Other	2S, 4S, 6S
1.039		TOTAL AREA

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment2S: POST-BLDG Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=2.00"
Tc=5.0 min CN=98 Runoff=1.17 cfs 0.060 af

Subcatchment3S: POST-PerviousTo Tank Runoff Area=0.349 ac 0.00% Impervious Runoff Depth=0.36"
Flow Length=163' Tc=6.1 min CN=WQ Runoff=0.19 cfs 0.010 af

Subcatchment4S: POST Bypass (ON-SITE) Runoff Area=0.126 ac 15.87% Impervious Runoff Depth=0.89"
Tc=5.0 min CN=WQ Runoff=0.20 cfs 0.009 af

Subcatchment6S: POST-DEV(OFFSITE) Runoff Area=0.202 ac 31.19% Impervious Runoff Depth=1.11"
Tc=5.0 min CN=WQ Runoff=0.38 cfs 0.019 af

Pond 1P: 48,000 GAL Tank Peak Elev=163.73' Storage=1,922 cf Inflow=1.33 cfs 0.071 af
Outflow=0.03 cfs 0.071 af

Link 2L: TOTAL POST (ON-SITE) Inflow=0.22 cfs 0.080 af
Primary=0.22 cfs 0.080 af

Link 4L: TOTAL POST Inflow=0.60 cfs 0.099 af
Primary=0.60 cfs 0.099 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.099 af Average Runoff Depth = 1.14"
57.17% Pervious = 0.594 ac 42.83% Impervious = 0.445 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment2S: POST-BLDG Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=2.39"
Tc=5.0 min CN=98 Runoff=1.38 cfs 0.072 af

Subcatchment3S: POST-PerviousTo Tank Runoff Area=0.349 ac 0.00% Impervious Runoff Depth=0.54"
Flow Length=163' Tc=6.1 min CN=WQ Runoff=0.31 cfs 0.016 af

Subcatchment4S: POST Bypass (ON-SITE) Runoff Area=0.126 ac 15.87% Impervious Runoff Depth=1.17"
Tc=5.0 min CN=WQ Runoff=0.26 cfs 0.012 af

Subcatchment6S: POST-DEV(OFFSITE) Runoff Area=0.202 ac 31.19% Impervious Runoff Depth=1.41"
Tc=5.0 min CN=WQ Runoff=0.49 cfs 0.024 af

Pond 1P: 48,000 GAL Tank Peak Elev=163.93' Storage=2,146 cf Inflow=1.66 cfs 0.088 af
Outflow=0.11 cfs 0.088 af

Link 2L: TOTAL POST (ON-SITE) Inflow=0.29 cfs 0.100 af
Primary=0.29 cfs 0.100 af

Link 4L: TOTAL POST Inflow=0.78 cfs 0.124 af
Primary=0.78 cfs 0.124 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.124 af Average Runoff Depth = 1.43"
57.17% Pervious = 0.594 ac 42.83% Impervious = 0.445 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment2S: POST-BLDG Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=3.91"
Tc=5.0 min CN=98 Runoff=2.20 cfs 0.118 af

Subcatchment3S: POST-PerviousTo Tank Runoff Area=0.349 ac 0.00% Impervious Runoff Depth=1.48"
Flow Length=163' Tc=6.1 min CN=WQ Runoff=0.92 cfs 0.043 af

Subcatchment4S: POST Bypass (ON-SITE) Runoff Area=0.126 ac 15.87% Impervious Runoff Depth=2.41"
Tc=5.0 min CN=WQ Runoff=0.54 cfs 0.025 af

Subcatchment6S: POST-DEV(OFFSITE) Runoff Area=0.202 ac 31.19% Impervious Runoff Depth=2.71"
Tc=5.0 min CN=WQ Runoff=0.94 cfs 0.046 af

Pond 1P: 48,000 GAL Tank Peak Elev=165.11' Storage=3,454 cf Inflow=3.09 cfs 0.161 af
Outflow=0.51 cfs 0.161 af

Link 2L: TOTAL POST (ON-SITE) Inflow=0.89 cfs 0.186 af
Primary=0.89 cfs 0.186 af

Link 4L: TOTAL POST Inflow=1.79 cfs 0.232 af
Primary=1.79 cfs 0.232 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.232 af Average Runoff Depth = 2.68"
57.17% Pervious = 0.594 ac 42.83% Impervious = 0.445 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment2S: POST-BLDG Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=4.47"
Tc=5.0 min CN=98 Runoff=2.50 cfs 0.135 af

Subcatchment3S: POST-PerviousTo Tank Runoff Area=0.349 ac 0.00% Impervious Runoff Depth=1.88"
Flow Length=163' Tc=6.1 min CN=WQ Runoff=1.17 cfs 0.055 af

Subcatchment4S: POST Bypass (ON-SITE) Runoff Area=0.126 ac 15.87% Impervious Runoff Depth=2.89"
Tc=5.0 min CN=WQ Runoff=0.64 cfs 0.030 af

Subcatchment6S: POST-DEV(OFFSITE) Runoff Area=0.202 ac 31.19% Impervious Runoff Depth=3.21"
Tc=5.0 min CN=WQ Runoff=1.11 cfs 0.054 af

Pond 1P: 48,000 GAL Tank Peak Elev=165.65' Storage=4,048 cf Inflow=3.64 cfs 0.190 af
Outflow=0.60 cfs 0.190 af

Link 2L: TOTAL POST (ON-SITE) Inflow=1.09 cfs 0.220 af
Primary=1.09 cfs 0.220 af

Link 4L: TOTAL POST Inflow=2.17 cfs 0.274 af
Primary=2.17 cfs 0.274 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.274 af Average Runoff Depth = 3.17"
57.17% Pervious = 0.594 ac 42.83% Impervious = 0.445 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment2S: POST-BLDG Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=5.29"
Tc=5.0 min CN=98 Runoff=2.94 cfs 0.160 af

Subcatchment3S: POST-PerviousTo Tank Runoff Area=0.349 ac 0.00% Impervious Runoff Depth=2.50"
Flow Length=163' Tc=6.1 min CN=WQ Runoff=1.56 cfs 0.073 af

Subcatchment4S: POST Bypass (ON-SITE) Runoff Area=0.126 ac 15.87% Impervious Runoff Depth=3.62"
Tc=5.0 min CN=WQ Runoff=0.80 cfs 0.038 af

Subcatchment6S: POST-DEV(OFFSITE) Runoff Area=0.202 ac 31.19% Impervious Runoff Depth=3.96"
Tc=5.0 min CN=WQ Runoff=1.36 cfs 0.067 af

Pond 1P: 48,000 GAL Tank Peak Elev=166.46' Storage=4,954 cf Inflow=4.46 cfs 0.233 af
Outflow=0.73 cfs 0.232 af

Link 2L: TOTAL POST (ON-SITE) Inflow=1.37 cfs 0.270 af
Primary=1.37 cfs 0.270 af

Link 4L: TOTAL POST Inflow=2.70 cfs 0.337 af
Primary=2.70 cfs 0.337 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.337 af Average Runoff Depth = 3.89"
57.17% Pervious = 0.594 ac 42.83% Impervious = 0.445 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment2S: POST-BLDG Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=6.76"
Tc=5.0 min CN=98 Runoff=3.73 cfs 0.204 af

Subcatchment3S: POST-PerviousTo Tank Runoff Area=0.349 ac 0.00% Impervious Runoff Depth=3.70"
Flow Length=163' Tc=6.1 min CN=WQ Runoff=2.29 cfs 0.108 af

Subcatchment4S: POST Bypass (ON-SITE) Runoff Area=0.126 ac 15.87% Impervious Runoff Depth=4.97"
Tc=5.0 min CN=WQ Runoff=1.09 cfs 0.052 af

Subcatchment6S: POST-DEV (OFFSITE) Runoff Area=0.202 ac 31.19% Impervious Runoff Depth=5.34"
Tc=5.0 min CN=WQ Runoff=1.82 cfs 0.090 af

Pond 1P: 48,000 GAL Tank Peak Elev=167.75' Storage=6,383 cf Inflow=5.97 cfs 0.312 af
Outflow=1.88 cfs 0.311 af

Link 2L: TOTAL POST (ON-SITE) Inflow=2.25 cfs 0.364 af
Primary=2.25 cfs 0.364 af

Link 4L: TOTAL POST Inflow=3.61 cfs 0.453 af
Primary=3.61 cfs 0.453 af

Total Runoff Area = 1.039 ac Runoff Volume = 0.454 af Average Runoff Depth = 5.24"
57.17% Pervious = 0.594 ac 42.83% Impervious = 0.445 ac

20483-hydro

Type II 24-hr 1-YR Rainfall=2.23"

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Page 1

Summary for Subcatchment 2S: POST- BLDG

Runoff = 1.17 cfs @ 11.96 hrs, Volume= 0.060 af, Depth= 2.00"

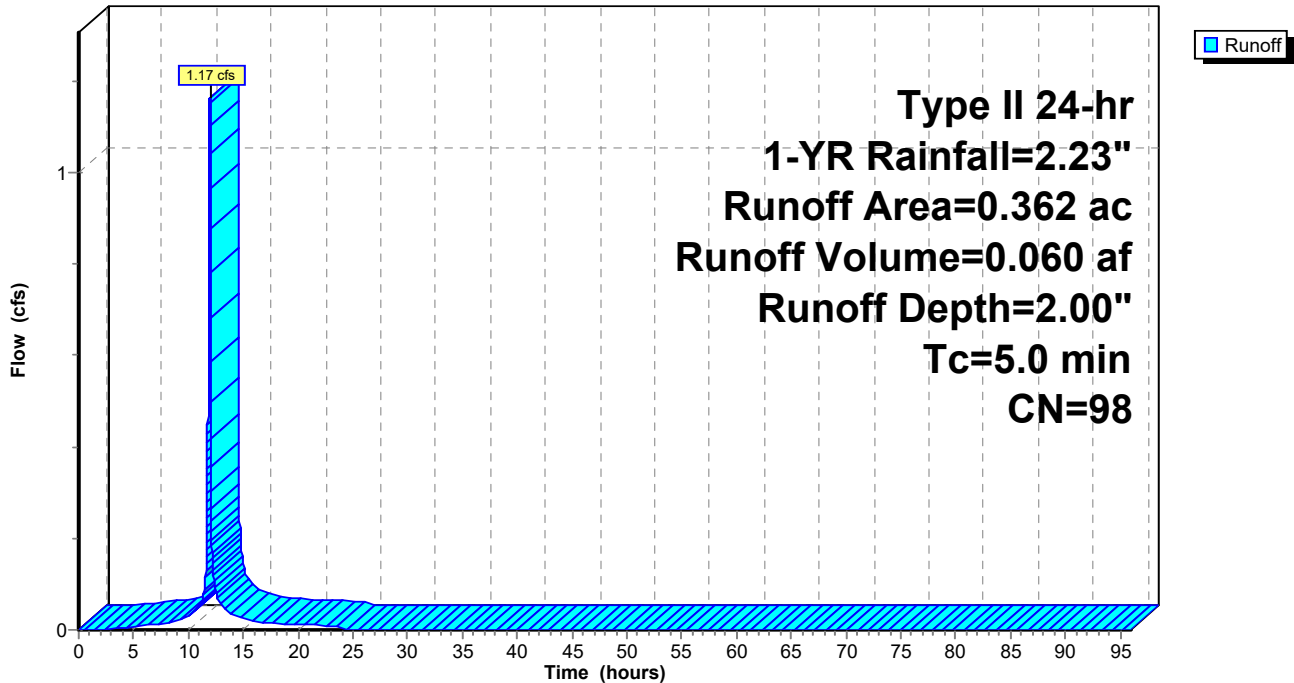
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-YR Rainfall=2.23"

Area (ac)	CN	Description
* 0.362	98	Building
0.362		100.00% Impervious Area

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

Subcatchment 2S: POST- BLDG

Hydrograph



Summary for Subcatchment 3S: POST-Pervious To Tank

Runoff = 0.19 cfs @ 11.99 hrs, Volume= 0.010 af, Depth= 0.36"

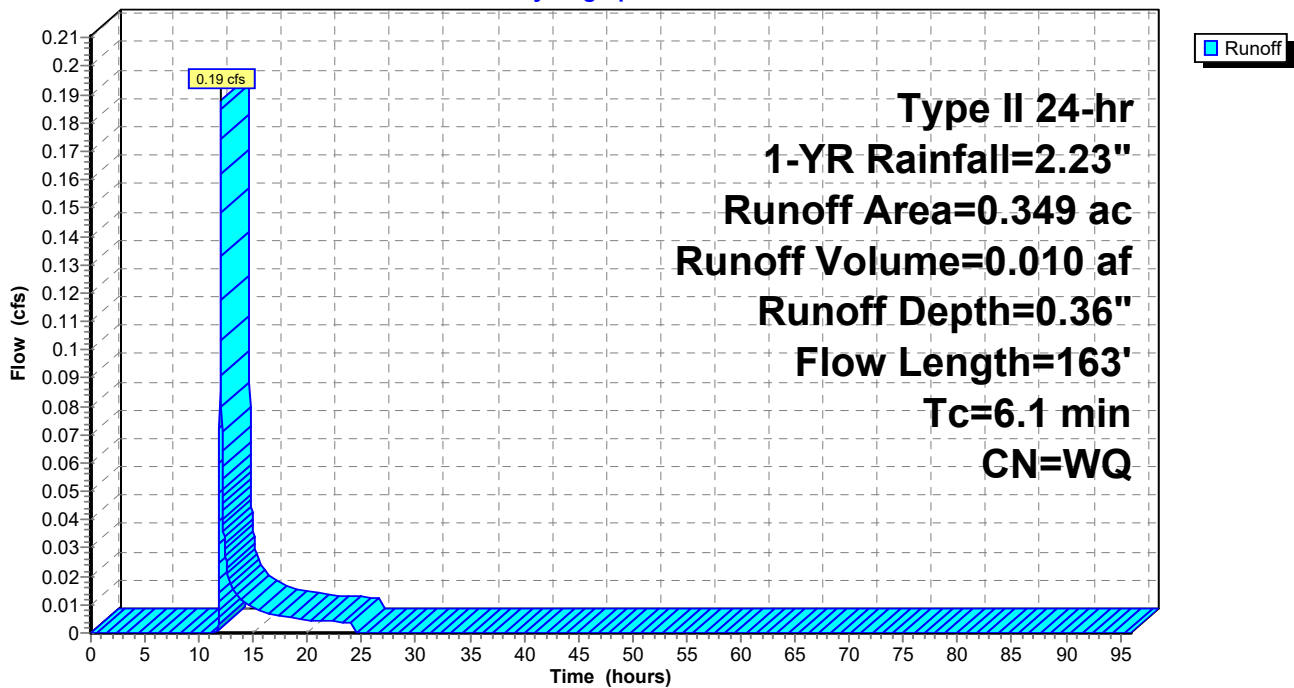
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-YR Rainfall=2.23"

Area (ac)	CN	Description
0.283	70	Woods, Good, HSG C
0.066	74	>75% Grass cover, Good, HSG C
0.349		Weighted Average
0.349		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.62"
0.2	28	0.2500	2.50		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
0.2	75	0.0100	6.06	59.04	Trap/Vee/Rect Channel Flow, CD Bot.W=2.00' D=1.50' Z= 3.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
6.1	163	Total			

Subcatchment 3S: POST-Pervious To Tank

Hydrograph



20483-hydro

Type II 24-hr 1-YR Rainfall=2.23"

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Summary for Subcatchment 4S: POST Bypass (ON-SITE)

Runoff = 0.20 cfs @ 11.96 hrs, Volume= 0.009 af, Depth= 0.89"

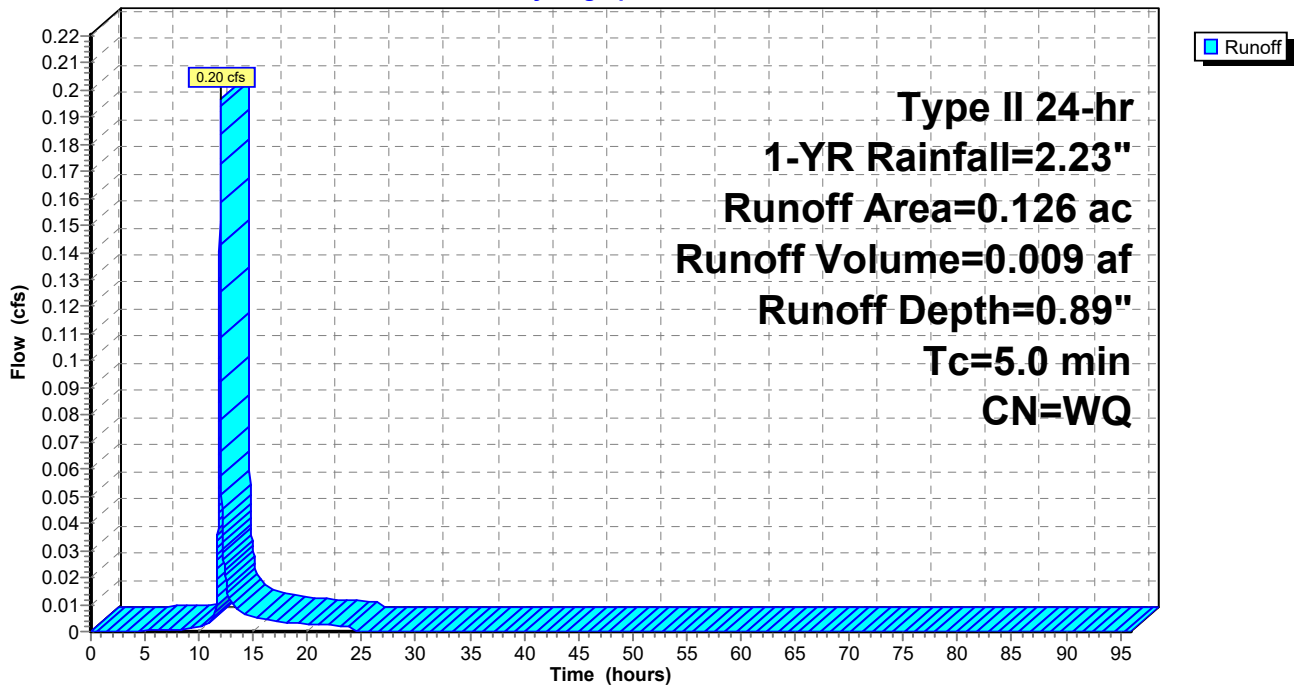
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-YR Rainfall=2.23"

Area (ac)	CN	Description
* 0.020	98	Impervious
0.010	74	>75% Grass cover, Good, HSG C
0.096	80	>75% Grass cover, Good, HSG D
<hr/>		
0.126		Weighted Average
0.106		84.13% Pervious Area
0.020		15.87% Impervious Area

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

Subcatchment 4S: POST Bypass (ON-SITE)

Hydrograph



Summary for Subcatchment 6S: POST-DEV (OFFSITE)

Runoff = 0.38 cfs @ 11.96 hrs, Volume= 0.019 af, Depth= 1.11"

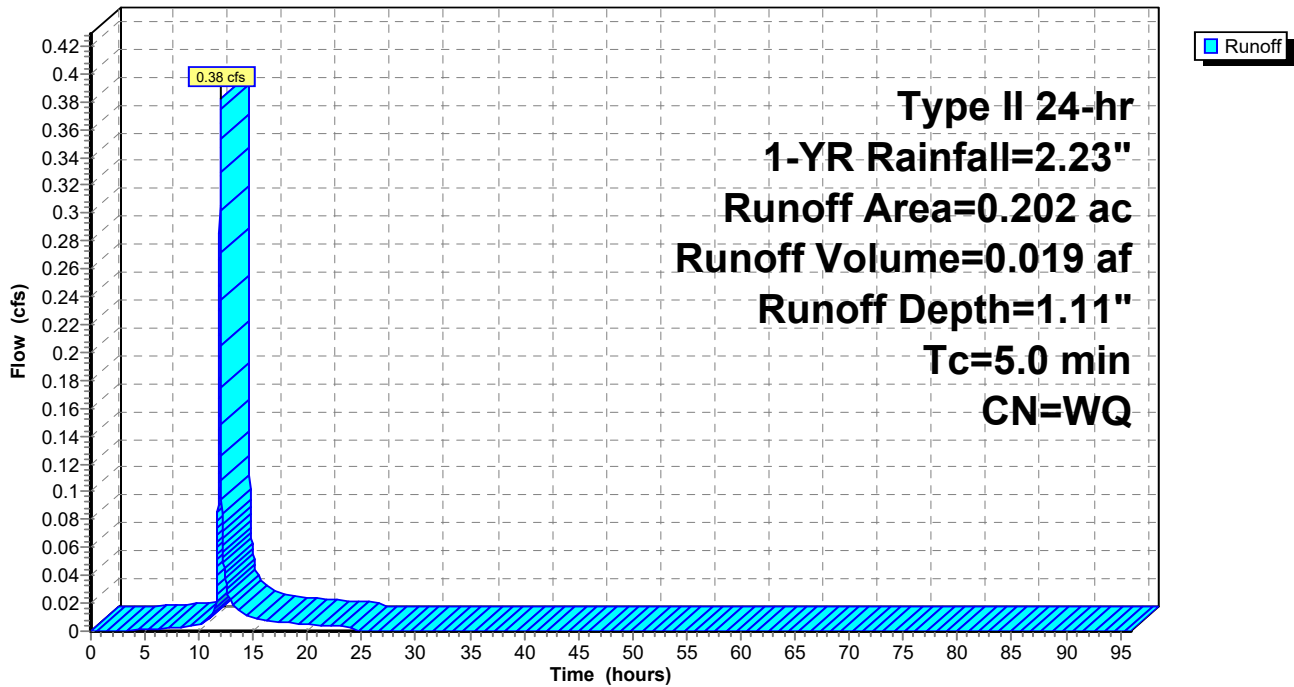
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-YR Rainfall=2.23"

Area (ac)	CN	Description
* 0.063	98	Impervious
0.139	80	>75% Grass cover, Good, HSG D
0.202		Weighted Average
0.139		68.81% Pervious Area
0.063		31.19% Impervious Area

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

Subcatchment 6S: POST-DEV (OFFSITE)

Hydrograph



20483-hydro

Type II 24-hr 1-YR Rainfall=2.23"

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Summary for Pond 1P: 48,000 GAL Tank

Inflow Area = 0.711 ac, 50.91% Impervious, Inflow Depth = 1.20" for 1-YR event
 Inflow = 1.33 cfs @ 11.96 hrs, Volume= 0.071 af
 Outflow = 0.03 cfs @ 14.92 hrs, Volume= 0.071 af, Atten= 97%, Lag= 177.4 min
 Primary = 0.03 cfs @ 14.92 hrs, Volume= 0.071 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 163.73' @ 14.92 hrs Surf.Area= 1,110 sf Storage= 1,922 cf

Plug-Flow detention time= 712.1 min calculated for 0.071 af (100% of inflow)
 Center-of-Mass det. time= 711.0 min (1,492.0 - 781.0)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	6,383 cf	18.50'W x 60.00'L x 5.75'H Prismatic

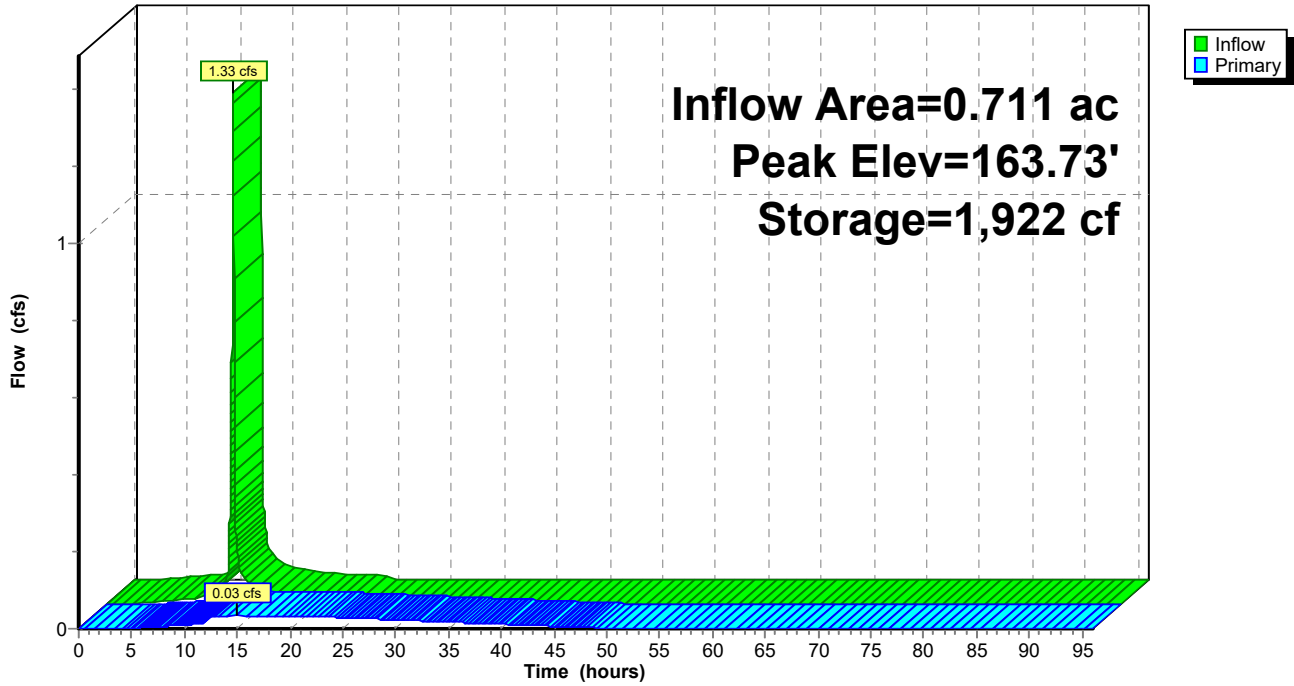
Device	Routing	Invert	Outlet Devices
#1	Primary	162.00'	12.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 162.00' / 161.90' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	162.00'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	163.75'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	167.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 14.92 hrs HW=163.73' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.03 cfs of 4.20 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.03 cfs @ 6.26 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)
- 4=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: 48,000 GAL Tank

Hydrograph



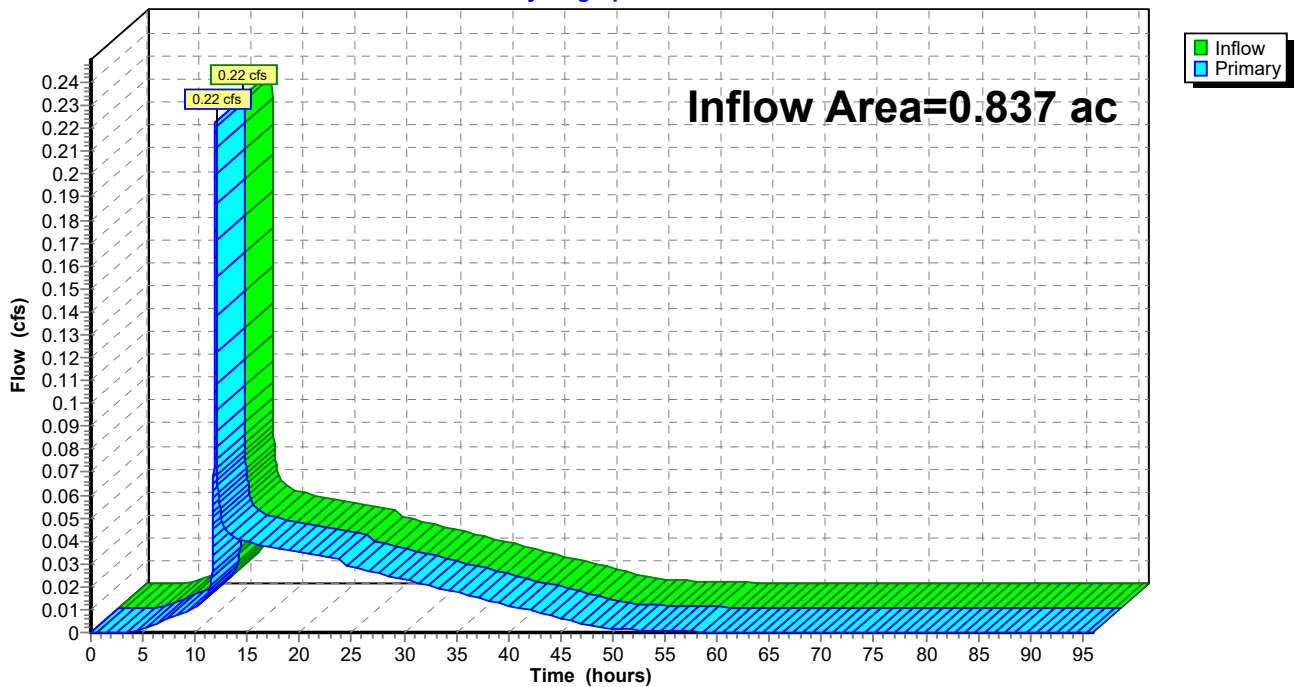
Summary for Link 2L: TOTAL POST (ON-SITE)

Inflow Area = 0.837 ac, 45.64% Impervious, Inflow Depth > 1.15" for 1-YR event
Inflow = 0.22 cfs @ 11.97 hrs, Volume= 0.080 af
Primary = 0.22 cfs @ 11.98 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: TOTAL POST (ON-SITE)

Hydrograph



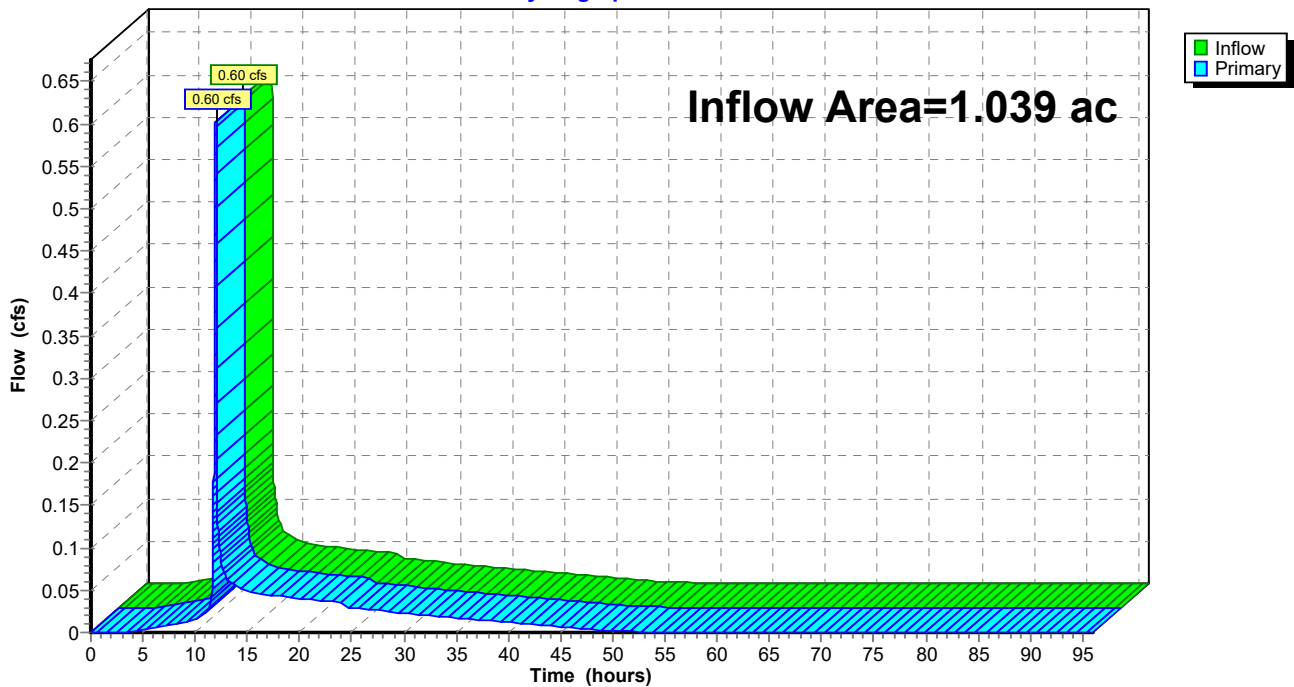
Summary for Link 4L: TOTAL POST

Inflow Area = 1.039 ac, 42.83% Impervious, Inflow Depth = 1.14" for 1-YR event
Inflow = 0.60 cfs @ 11.97 hrs, Volume= 0.099 af
Primary = 0.60 cfs @ 11.98 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: TOTAL POST

Hydrograph



20483-hydro

Type II 24-hr 2-YR Rainfall=2.62"

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Summary for Subcatchment 2S: POST- BLDG

Runoff = 1.38 cfs @ 11.96 hrs, Volume= 0.072 af, Depth= 2.39"

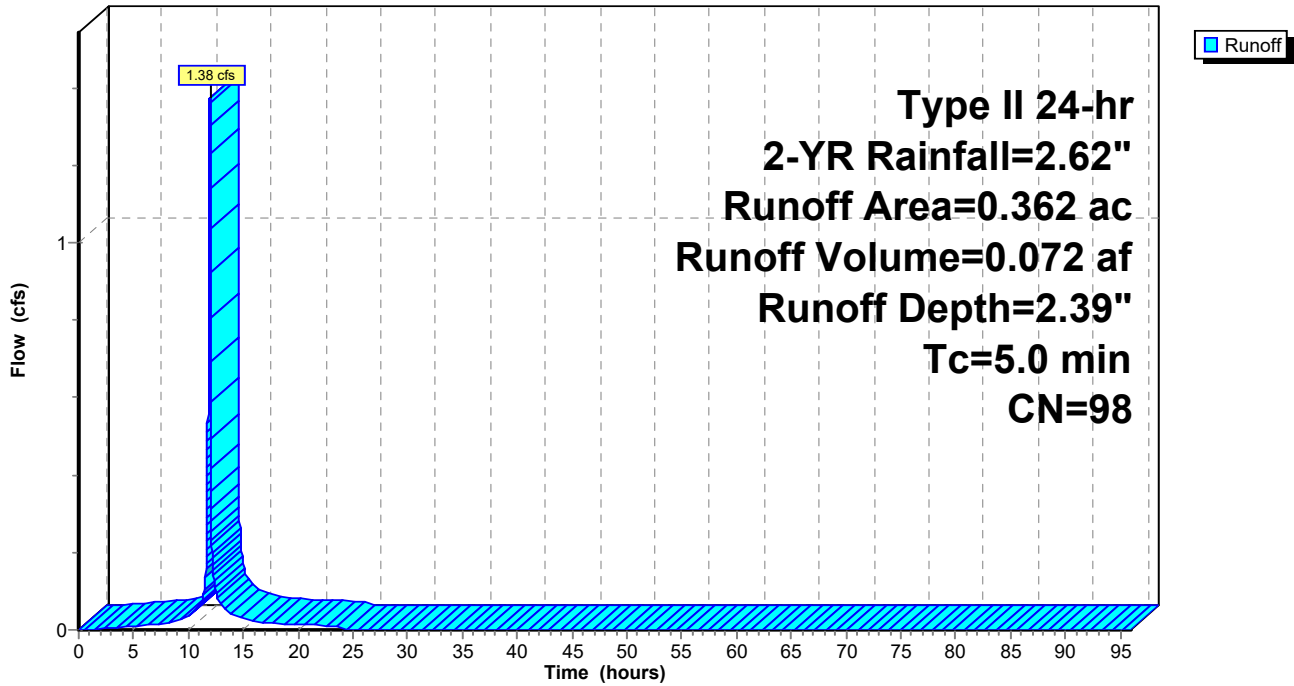
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-YR Rainfall=2.62"

Area (ac)	CN	Description
* 0.362	98	Building
0.362		100.00% Impervious Area

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

Subcatchment 2S: POST- BLDG

Hydrograph



Summary for Subcatchment 3S: POST-Pervious To Tank

Runoff = 0.31 cfs @ 11.99 hrs, Volume= 0.016 af, Depth= 0.54"

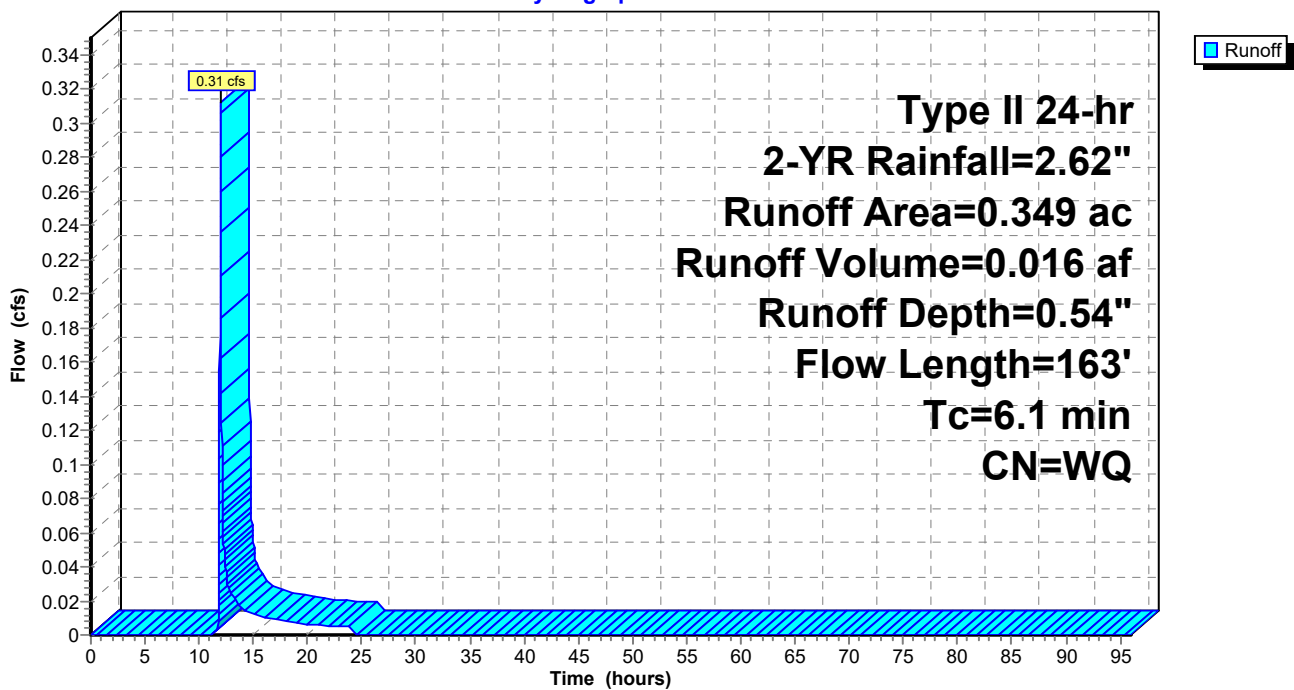
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-YR Rainfall=2.62"

Area (ac)	CN	Description
0.283	70	Woods, Good, HSG C
0.066	74	>75% Grass cover, Good, HSG C
0.349		Weighted Average
0.349		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.62"
0.2	28	0.2500	2.50		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
0.2	75	0.0100	6.06	59.04	Trap/Vee/Rect Channel Flow, CD Bot.W=2.00' D=1.50' Z= 3.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
6.1	163	Total			

Subcatchment 3S: POST-Pervious To Tank

Hydrograph



20483-hydro

Type II 24-hr 2-YR Rainfall=2.62"

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Summary for Subcatchment 4S: POST Bypass (ON-SITE)

Runoff = 0.26 cfs @ 11.96 hrs, Volume= 0.012 af, Depth= 1.17"

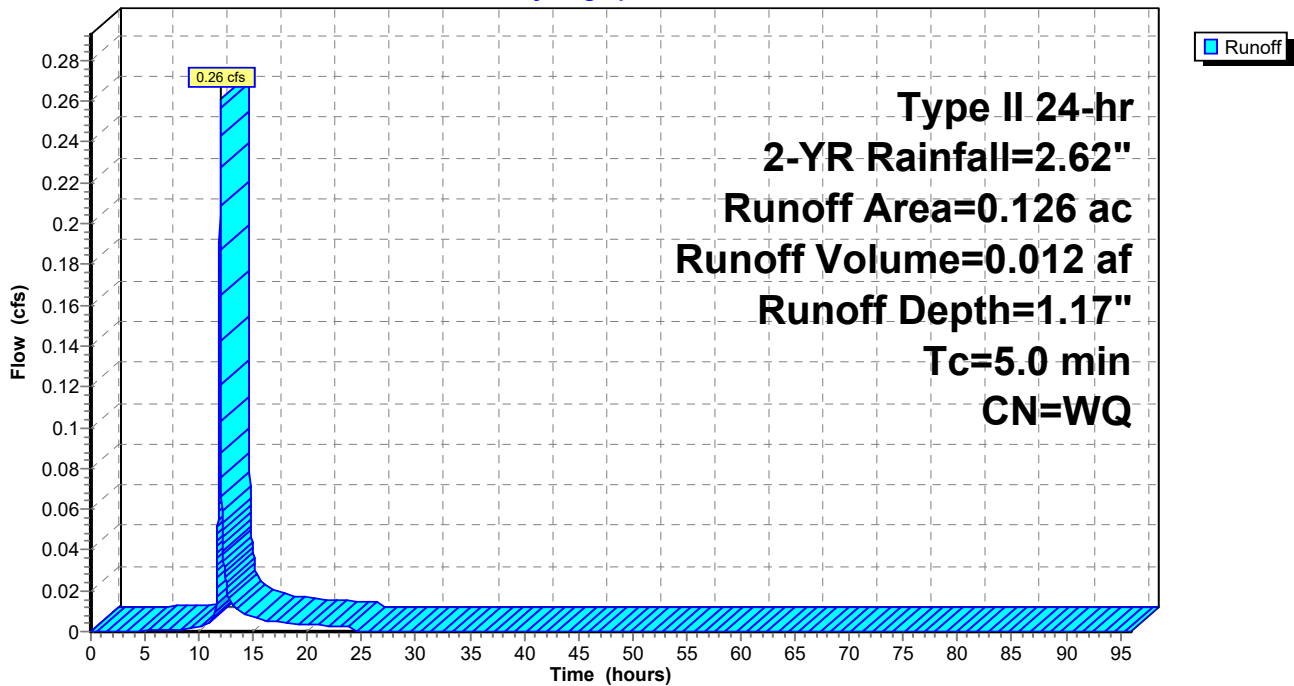
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=2.62"

Area (ac)	CN	Description
* 0.020	98	Impervious
0.010	74	>75% Grass cover, Good, HSG C
0.096	80	>75% Grass cover, Good, HSG D
<hr/>		
0.126		Weighted Average
0.106		84.13% Pervious Area
0.020		15.87% Impervious Area

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

Subcatchment 4S: POST Bypass (ON-SITE)

Hydrograph



20483-hydro

Type II 24-hr 2-YR Rainfall=2.62"

Prepared by Engineering Ventures, PC

Printed 2/11/2021

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Summary for Subcatchment 6S: POST-DEV (OFFSITE)

Runoff = 0.49 cfs @ 11.96 hrs, Volume= 0.024 af, Depth= 1.41"

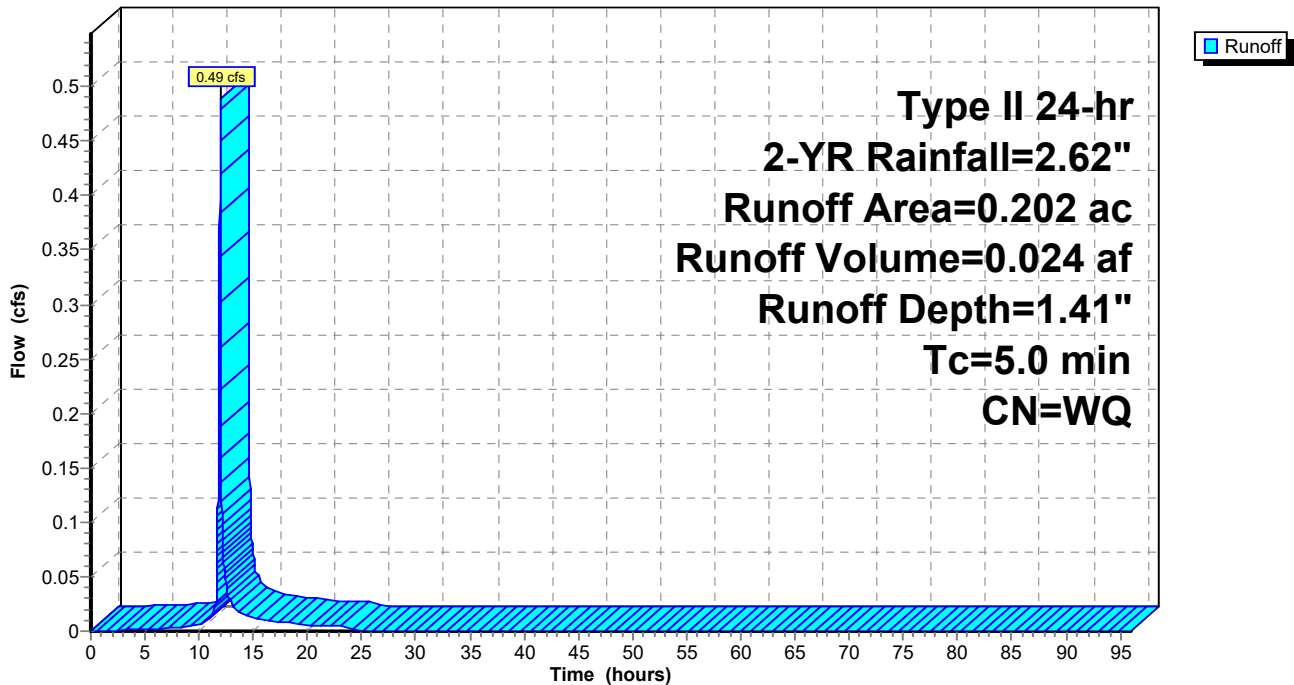
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-YR Rainfall=2.62"

Area (ac)	CN	Description
* 0.063	98	Impervious
0.139	80	>75% Grass cover, Good, HSG D
0.202		Weighted Average
0.139		68.81% Pervious Area
0.063		31.19% Impervious Area

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

Subcatchment 6S: POST-DEV (OFFSITE)

Hydrograph



Summary for Pond 1P: 48,000 GAL Tank

Inflow Area = 0.711 ac, 50.91% Impervious, Inflow Depth = 1.48" for 2-YR event
 Inflow = 1.66 cfs @ 11.96 hrs, Volume= 0.088 af
 Outflow = 0.11 cfs @ 12.67 hrs, Volume= 0.088 af, Atten= 94%, Lag= 42.5 min
 Primary = 0.11 cfs @ 12.67 hrs, Volume= 0.088 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 163.93' @ 12.67 hrs Surf.Area= 1,110 sf Storage= 2,146 cf

Plug-Flow detention time= 642.3 min calculated for 0.088 af (100% of inflow)
 Center-of-Mass det. time= 641.7 min (1,421.2 - 779.5)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	6,383 cf	18.50'W x 60.00'L x 5.75'H Prismaoid

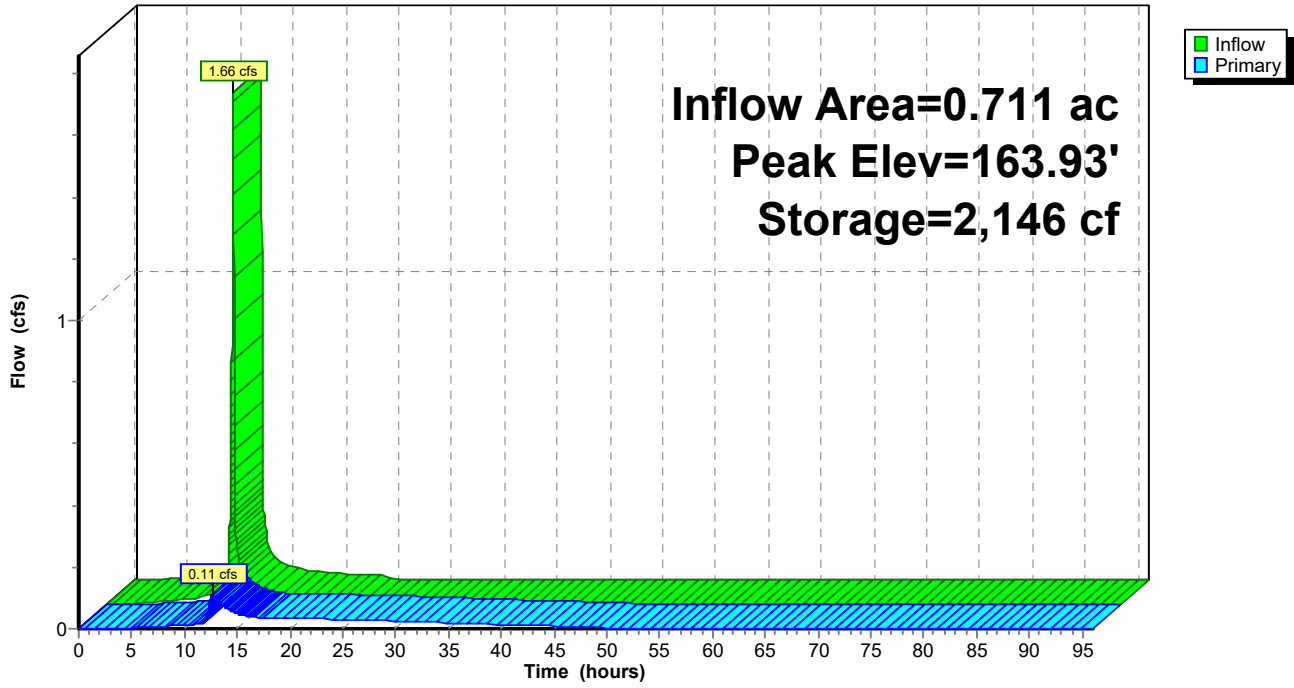
Device	Routing	Invert	Outlet Devices
#1	Primary	162.00'	12.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 162.00' / 161.90' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	162.00'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	163.75'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	167.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.11 cfs @ 12.67 hrs HW=163.93' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.11 cfs of 4.53 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.04 cfs @ 6.62 fps)
- 3=Orifice/Grate (Orifice Controls 0.07 cfs @ 1.46 fps)
- 4=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: 48,000 GAL Tank

Hydrograph



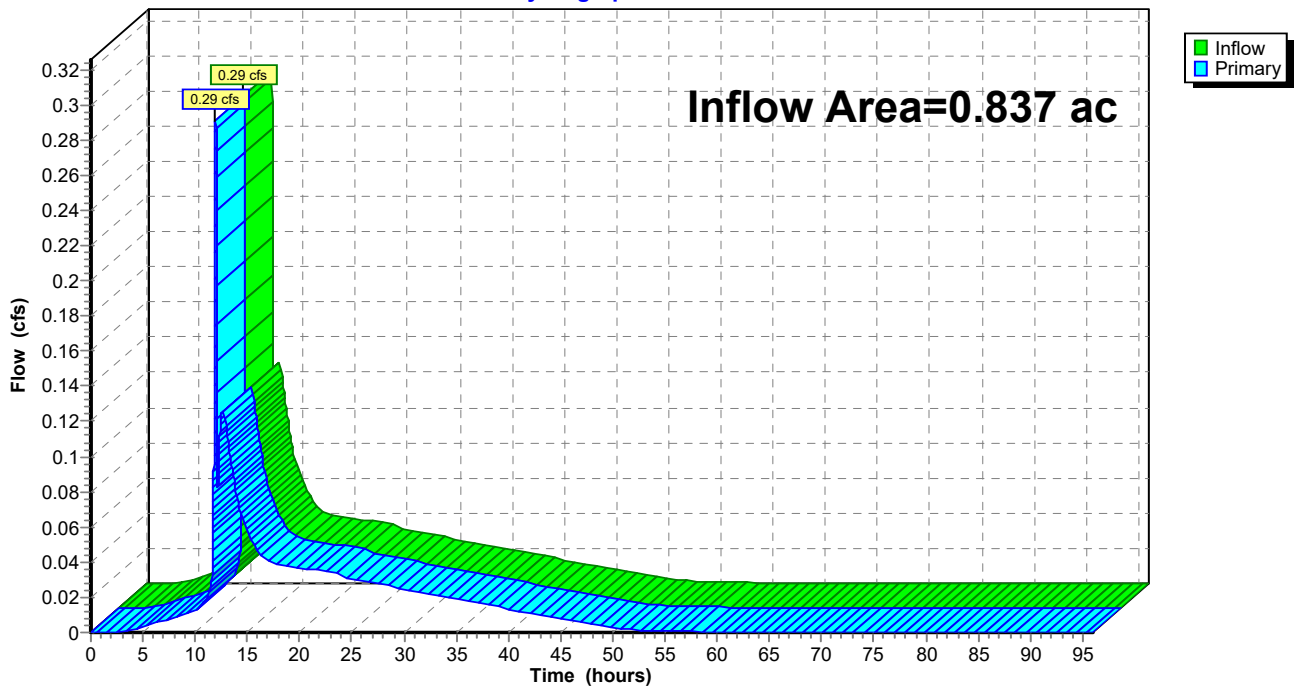
Summary for Link 2L: TOTAL POST (ON-SITE)

Inflow Area = 0.837 ac, 45.64% Impervious, Inflow Depth > 1.44" for 2-YR event
Inflow = 0.29 cfs @ 11.96 hrs, Volume= 0.100 af
Primary = 0.29 cfs @ 11.97 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: TOTAL POST (ON-SITE)

Hydrograph



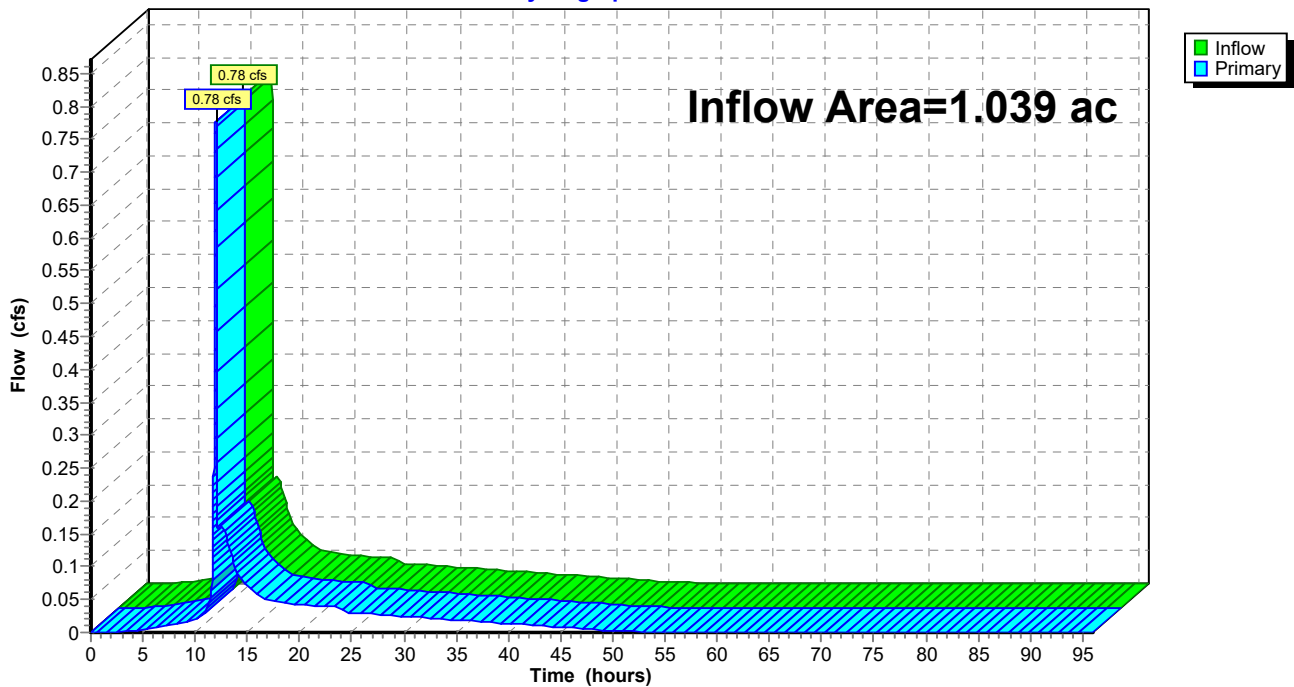
Summary for Link 4L: TOTAL POST

Inflow Area = 1.039 ac, 42.83% Impervious, Inflow Depth = 1.43" for 2-YR event
Inflow = 0.78 cfs @ 11.97 hrs, Volume= 0.124 af
Primary = 0.78 cfs @ 11.98 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: TOTAL POST

Hydrograph



Summary for Subcatchment 2S: POST- BLDG

Runoff = 2.20 cfs @ 11.96 hrs, Volume= 0.118 af, Depth= 3.91"

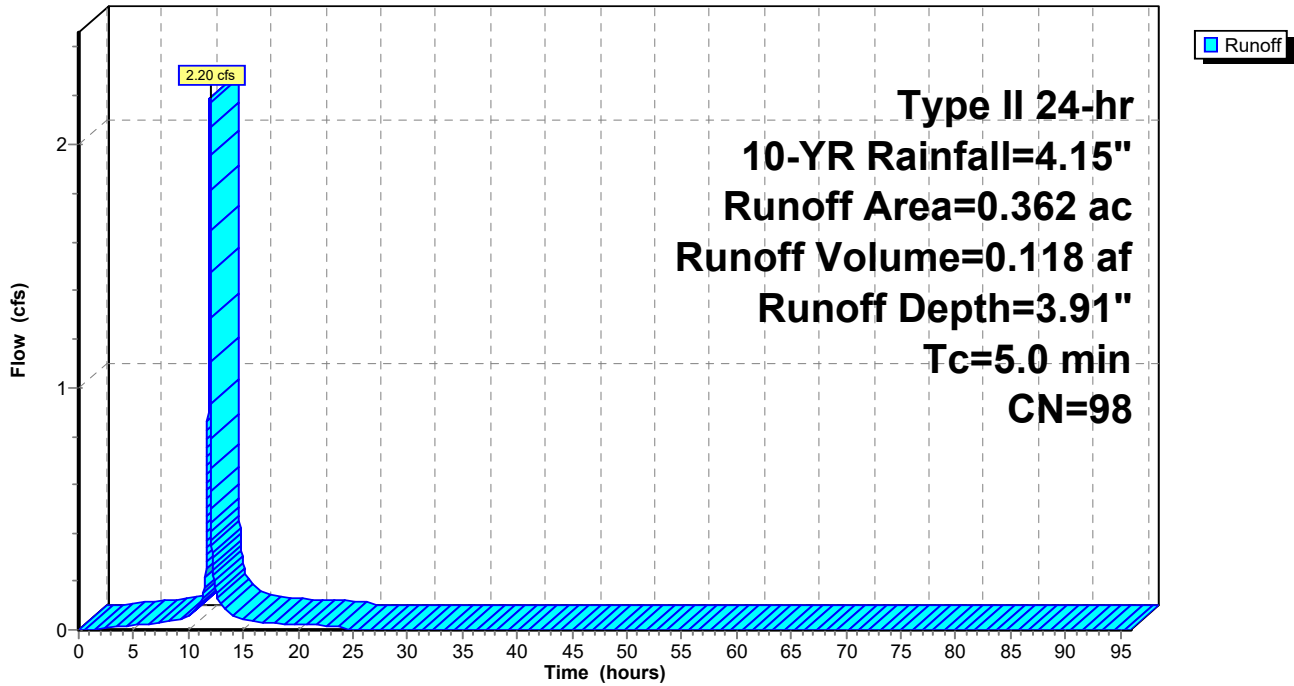
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-YR Rainfall=4.15"

Area (ac)	CN	Description
* 0.362	98	Building
0.362		100.00% Impervious Area

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

Subcatchment 2S: POST- BLDG

Hydrograph



Summary for Subcatchment 3S: POST-Pervious To Tank

Runoff = 0.92 cfs @ 11.98 hrs, Volume= 0.043 af, Depth= 1.48"

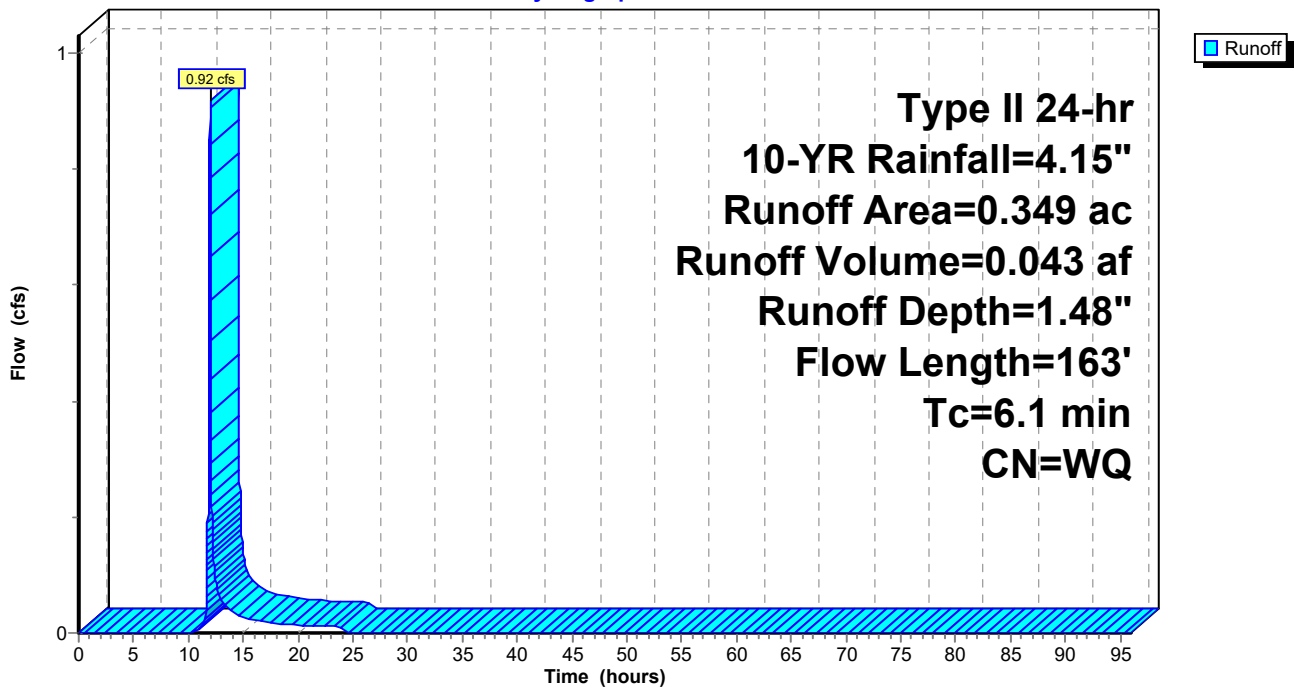
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-YR Rainfall=4.15"

Area (ac)	CN	Description
0.283	70	Woods, Good, HSG C
0.066	74	>75% Grass cover, Good, HSG C
0.349		Weighted Average
0.349		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.62"
0.2	28	0.2500	2.50		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
0.2	75	0.0100	6.06	59.04	Trap/Vee/Rect Channel Flow, CD Bot.W=2.00' D=1.50' Z= 3.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
6.1	163	Total			

Subcatchment 3S: POST-Pervious To Tank

Hydrograph



Summary for Subcatchment 4S: POST Bypass (ON-SITE)

Runoff = 0.54 cfs @ 11.96 hrs, Volume= 0.025 af, Depth= 2.41"

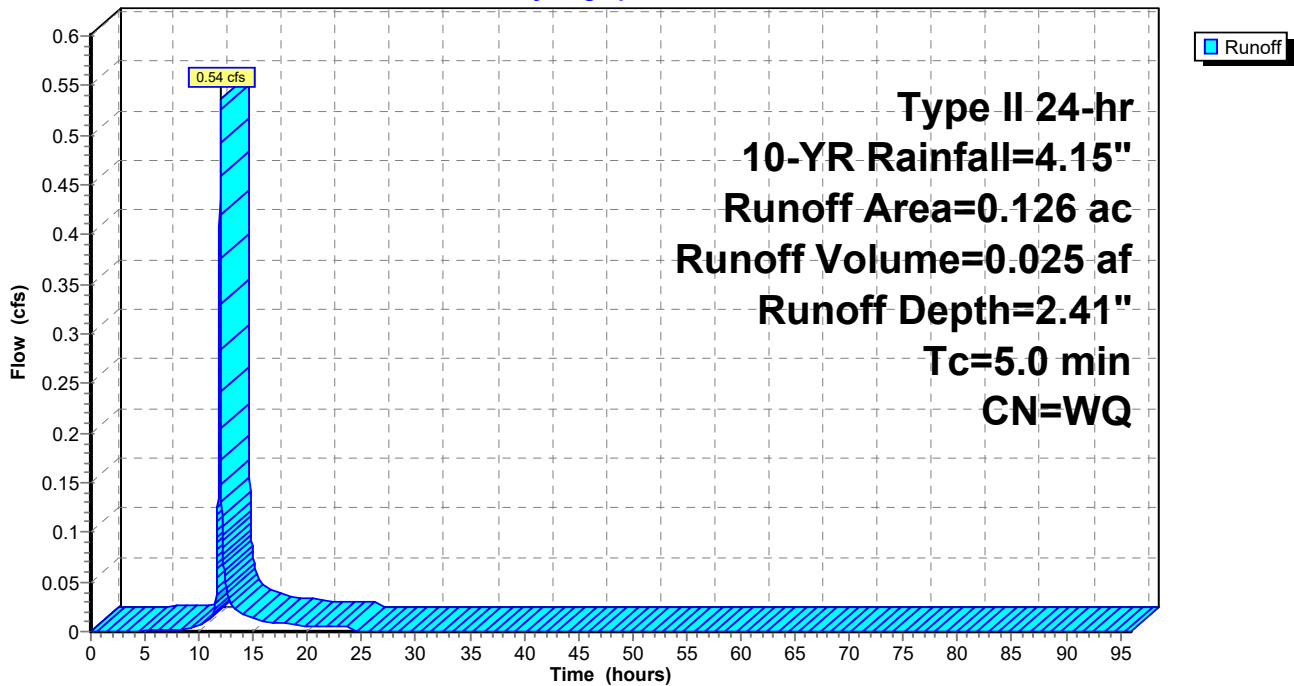
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-YR Rainfall=4.15"

Area (ac)	CN	Description
* 0.020	98	Impervious
0.010	74	>75% Grass cover, Good, HSG C
0.096	80	>75% Grass cover, Good, HSG D
<hr/>		
0.126		Weighted Average
0.106		84.13% Pervious Area
0.020		15.87% Impervious Area

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

Subcatchment 4S: POST Bypass (ON-SITE)

Hydrograph



Summary for Subcatchment 6S: POST-DEV (OFFSITE)

Runoff = 0.94 cfs @ 11.96 hrs, Volume= 0.046 af, Depth= 2.71"

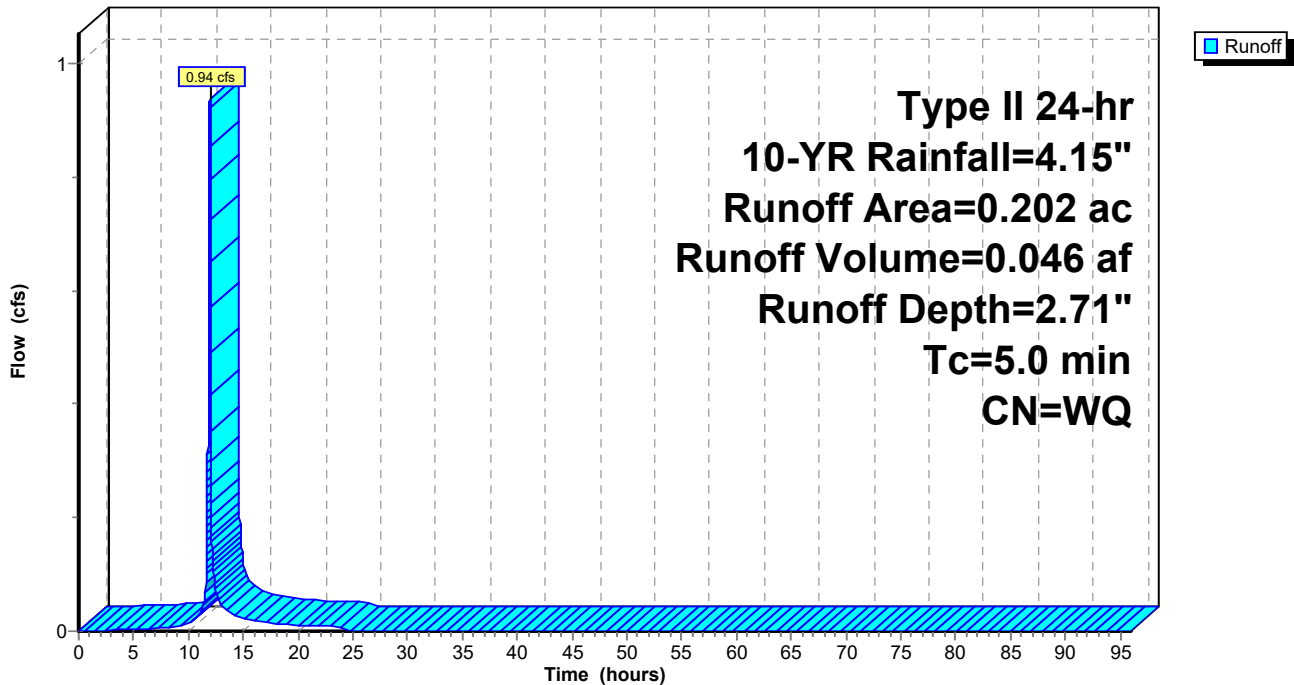
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-YR Rainfall=4.15"

Area (ac)	CN	Description
* 0.063	98	Impervious
0.139	80	>75% Grass cover, Good, HSG D
0.202		Weighted Average
0.139		68.81% Pervious Area
0.063		31.19% Impervious Area

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

Subcatchment 6S: POST-DEV (OFFSITE)

Hydrograph



Summary for Pond 1P: 48,000 GAL Tank

Inflow Area = 0.711 ac, 50.91% Impervious, Inflow Depth = 2.72" for 10-YR event
 Inflow = 3.09 cfs @ 11.96 hrs, Volume= 0.161 af
 Outflow = 0.51 cfs @ 12.15 hrs, Volume= 0.161 af, Atten= 84%, Lag= 11.5 min
 Primary = 0.51 cfs @ 12.15 hrs, Volume= 0.161 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 165.11' @ 12.15 hrs Surf.Area= 1,110 sf Storage= 3,454 cf

Plug-Flow detention time= 425.2 min calculated for 0.161 af (100% of inflow)
 Center-of-Mass det. time= 425.1 min (1,199.8 - 774.7)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	6,383 cf	18.50'W x 60.00'L x 5.75'H Prismatic

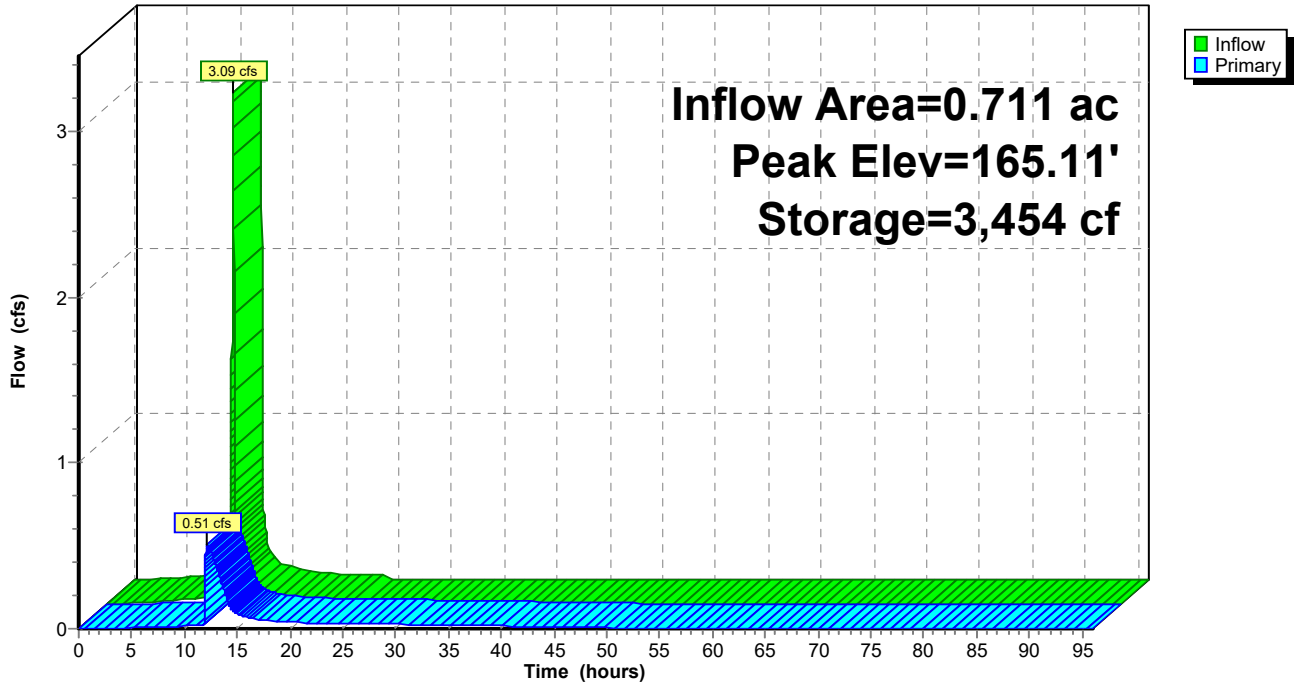
Device	Routing	Invert	Outlet Devices
#1	Primary	162.00'	12.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 162.00' / 161.90' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	162.00'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	163.75'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	167.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.51 cfs @ 12.15 hrs HW=165.11' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.51 cfs of 6.11 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.05 cfs @ 8.44 fps)
- 3=Orifice/Grate (Orifice Controls 0.46 cfs @ 5.26 fps)
- 4=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: 48,000 GAL Tank

Hydrograph



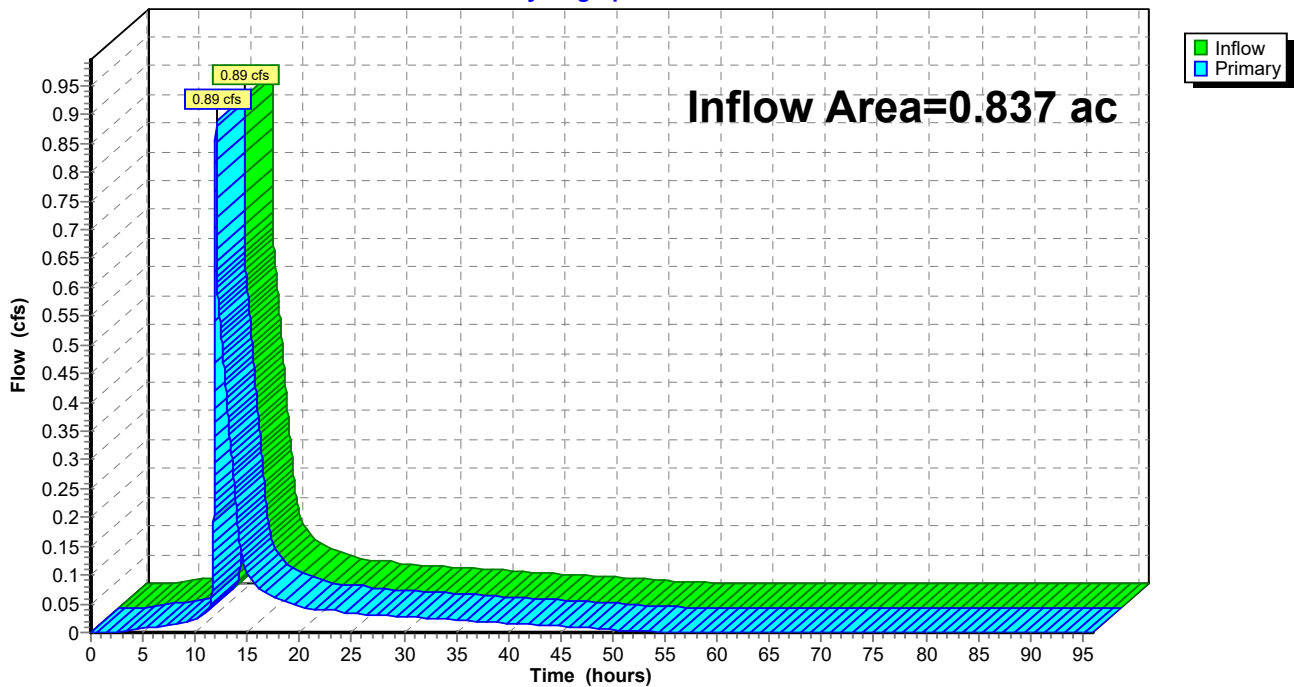
Summary for Link 2L: TOTAL POST (ON-SITE)

Inflow Area = 0.837 ac, 45.64% Impervious, Inflow Depth = 2.67" for 10-YR event
Inflow = 0.89 cfs @ 11.98 hrs, Volume= 0.186 af
Primary = 0.89 cfs @ 11.99 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: TOTAL POST (ON-SITE)

Hydrograph



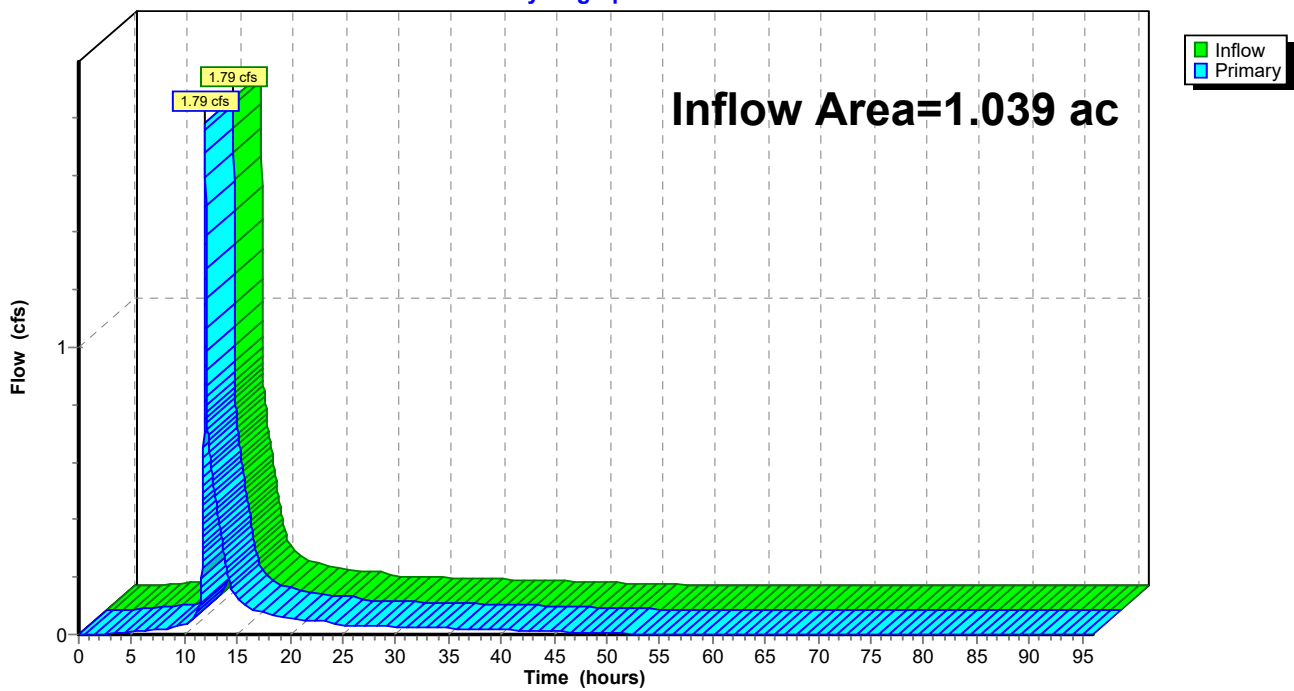
Summary for Link 4L: TOTAL POST

Inflow Area = 1.039 ac, 42.83% Impervious, Inflow Depth = 2.68" for 10-YR event
Inflow = 1.79 cfs @ 11.97 hrs, Volume= 0.232 af
Primary = 1.79 cfs @ 11.98 hrs, Volume= 0.232 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: TOTAL POST

Hydrograph



20483-hydro

Type II 24-hr 25-YR Rainfall=4.71"

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Summary for Subcatchment 2S: POST- BLDG

Runoff = 2.50 cfs @ 11.96 hrs, Volume= 0.135 af, Depth= 4.47"

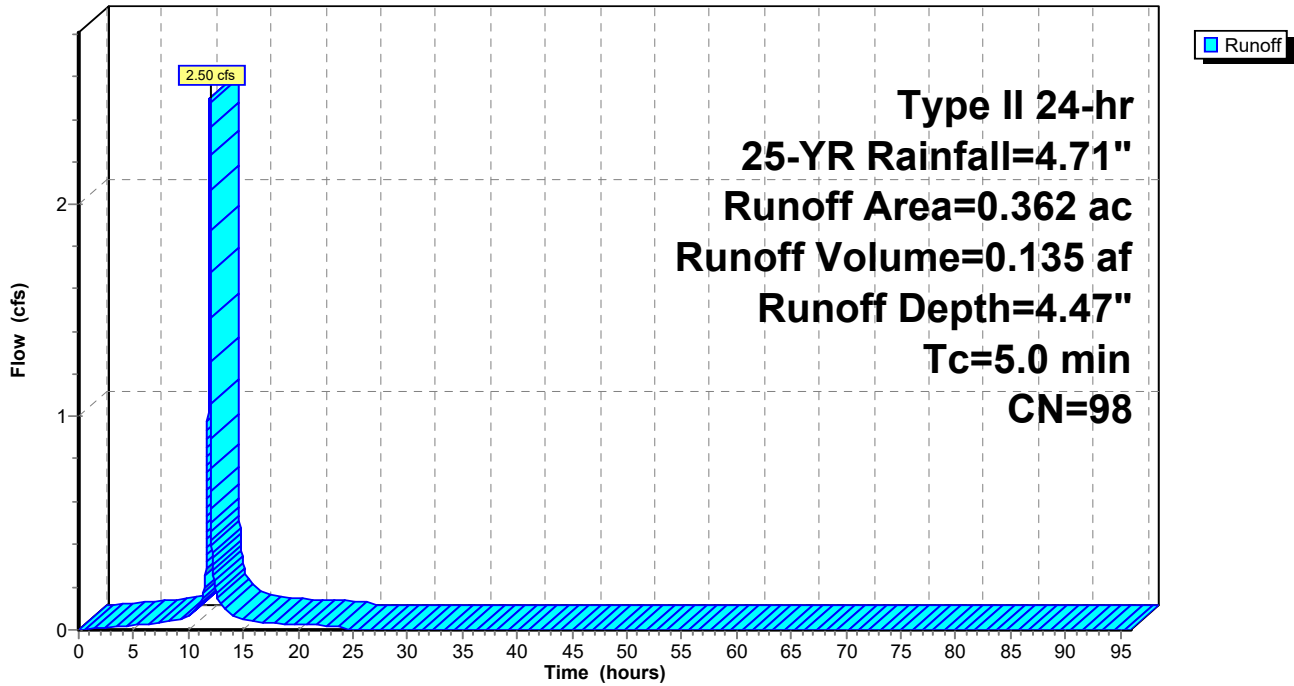
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-YR Rainfall=4.71"

Area (ac)	CN	Description
* 0.362	98	Building
0.362		100.00% Impervious Area

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

Subcatchment 2S: POST- BLDG

Hydrograph



Summary for Subcatchment 3S: POST-Pervious To Tank

Runoff = 1.17 cfs @ 11.98 hrs, Volume= 0.055 af, Depth= 1.88"

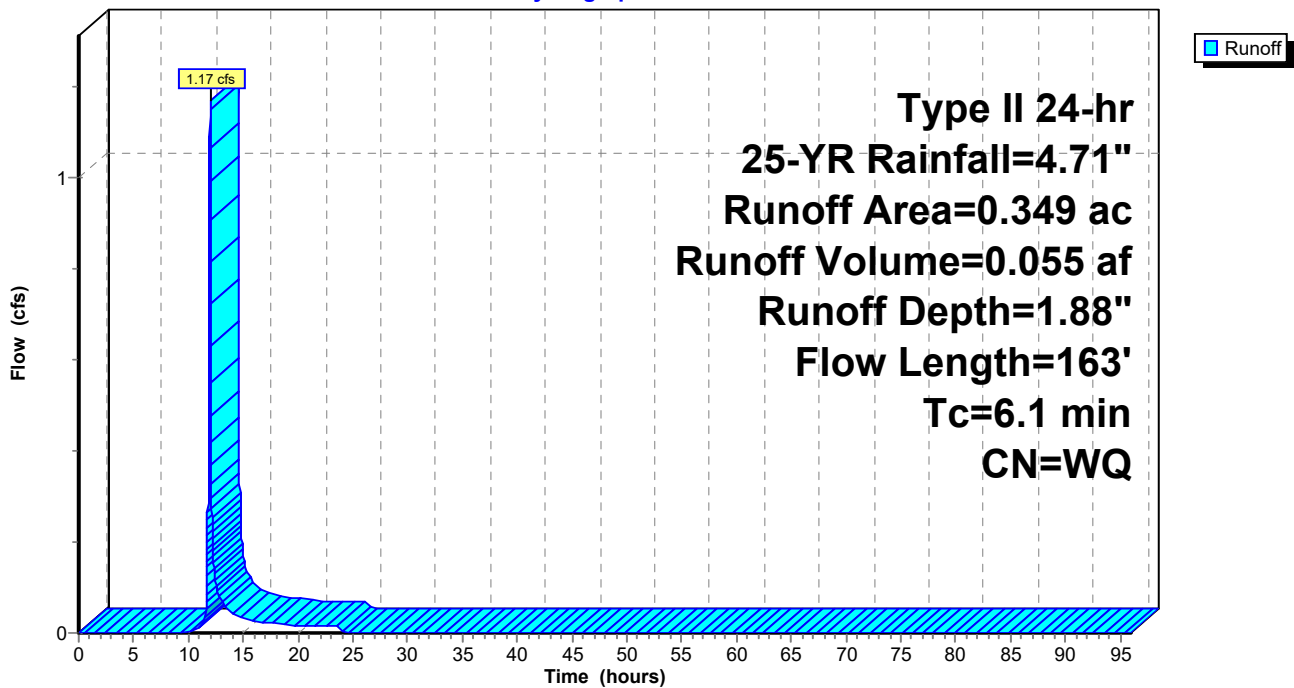
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-YR Rainfall=4.71"

Area (ac)	CN	Description
0.283	70	Woods, Good, HSG C
0.066	74	>75% Grass cover, Good, HSG C
0.349		Weighted Average
0.349		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.62"
0.2	28	0.2500	2.50		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
0.2	75	0.0100	6.06	59.04	Trap/Vee/Rect Channel Flow, CD Bot.W=2.00' D=1.50' Z= 3.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
6.1	163	Total			

Subcatchment 3S: POST-Pervious To Tank

Hydrograph



20483-hydro

Type II 24-hr 25-YR Rainfall=4.71"

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Summary for Subcatchment 4S: POST Bypass (ON-SITE)

Runoff = 0.64 cfs @ 11.96 hrs, Volume= 0.030 af, Depth= 2.89"

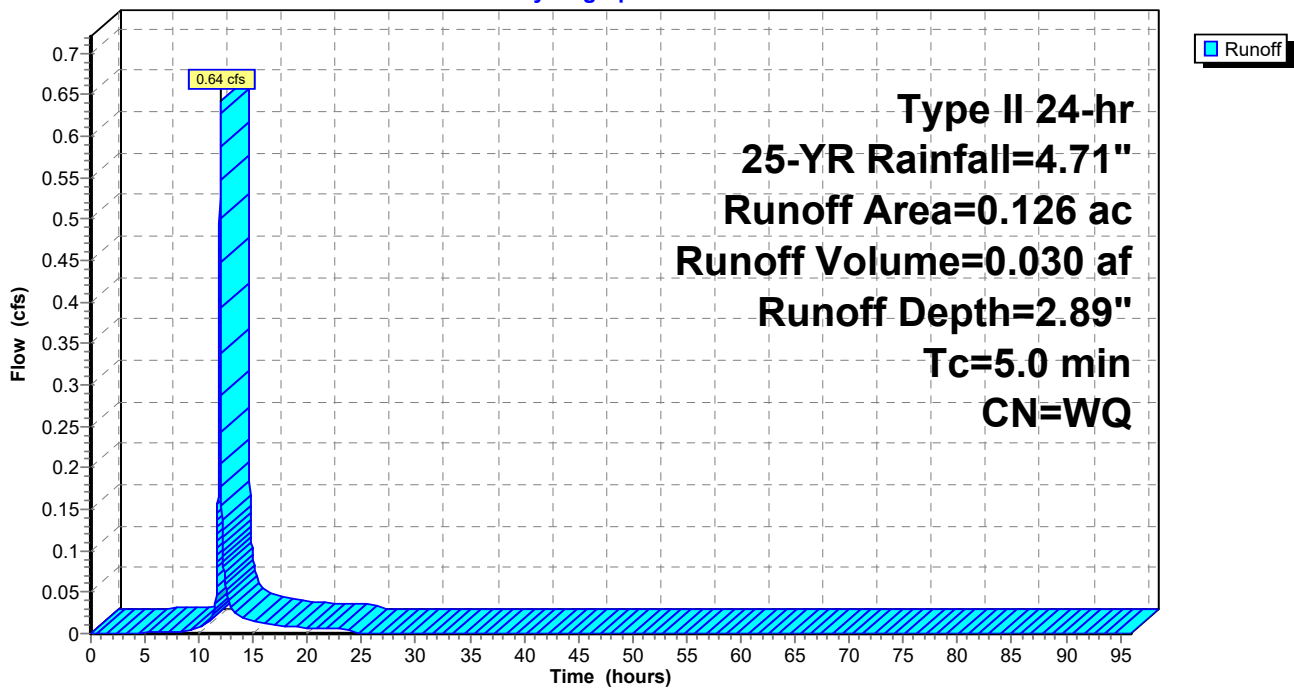
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-YR Rainfall=4.71"

Area (ac)	CN	Description
* 0.020	98	Impervious
0.010	74	>75% Grass cover, Good, HSG C
0.096	80	>75% Grass cover, Good, HSG D
<hr/>		
0.126		Weighted Average
0.106		84.13% Pervious Area
0.020		15.87% Impervious Area

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

Subcatchment 4S: POST Bypass (ON-SITE)

Hydrograph



Summary for Subcatchment 6S: POST-DEV (OFFSITE)

Runoff = 1.11 cfs @ 11.96 hrs, Volume= 0.054 af, Depth= 3.21"

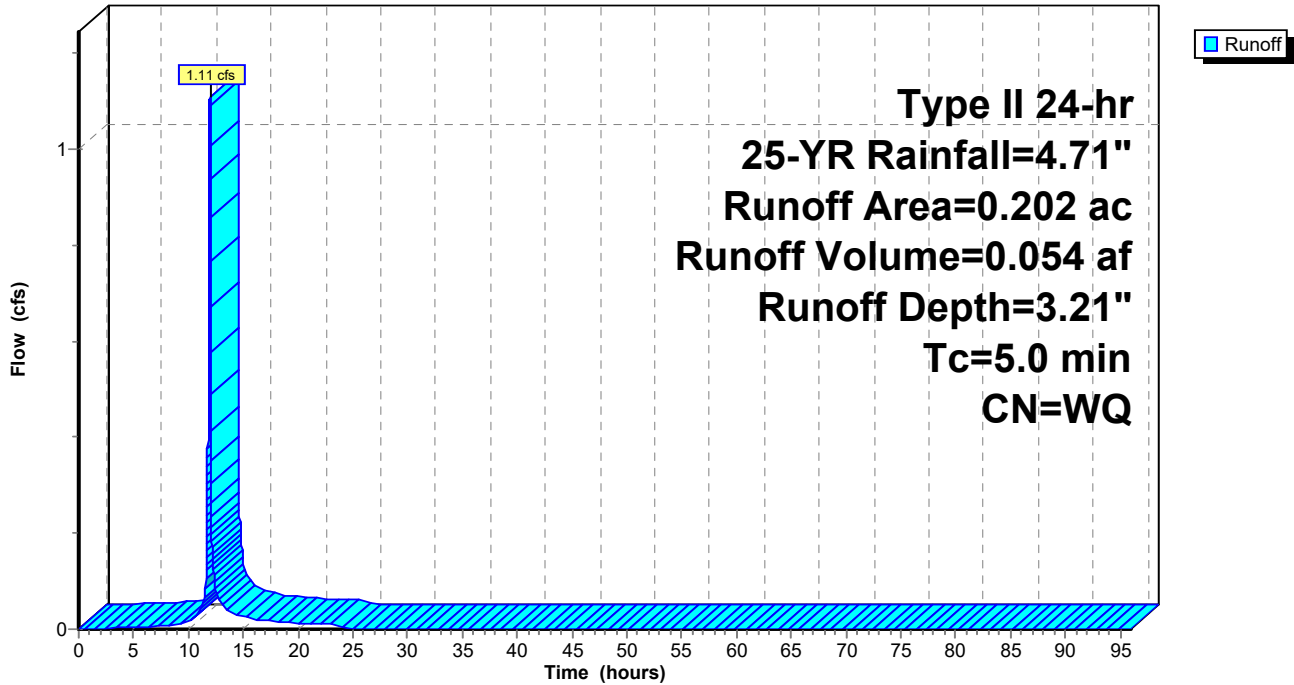
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-YR Rainfall=4.71"

Area (ac)	CN	Description
* 0.063	98	Impervious
0.139	80	>75% Grass cover, Good, HSG D
0.202		Weighted Average
0.139		68.81% Pervious Area
0.063		31.19% Impervious Area

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

Subcatchment 6S: POST-DEV (OFFSITE)

Hydrograph



Summary for Pond 1P: 48,000 GAL Tank

Inflow Area = 0.711 ac, 50.91% Impervious, Inflow Depth = 3.20" for 25-YR event
 Inflow = 3.64 cfs @ 11.96 hrs, Volume= 0.190 af
 Outflow = 0.60 cfs @ 12.15 hrs, Volume= 0.190 af, Atten= 83%, Lag= 11.3 min
 Primary = 0.60 cfs @ 12.15 hrs, Volume= 0.190 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 165.65' @ 12.15 hrs Surf.Area= 1,110 sf Storage= 4,048 cf

Plug-Flow detention time= 380.3 min calculated for 0.190 af (100% of inflow)
 Center-of-Mass det. time= 379.8 min (1,153.1 - 773.3)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	6,383 cf	18.50'W x 60.00'L x 5.75'H Prismaoid

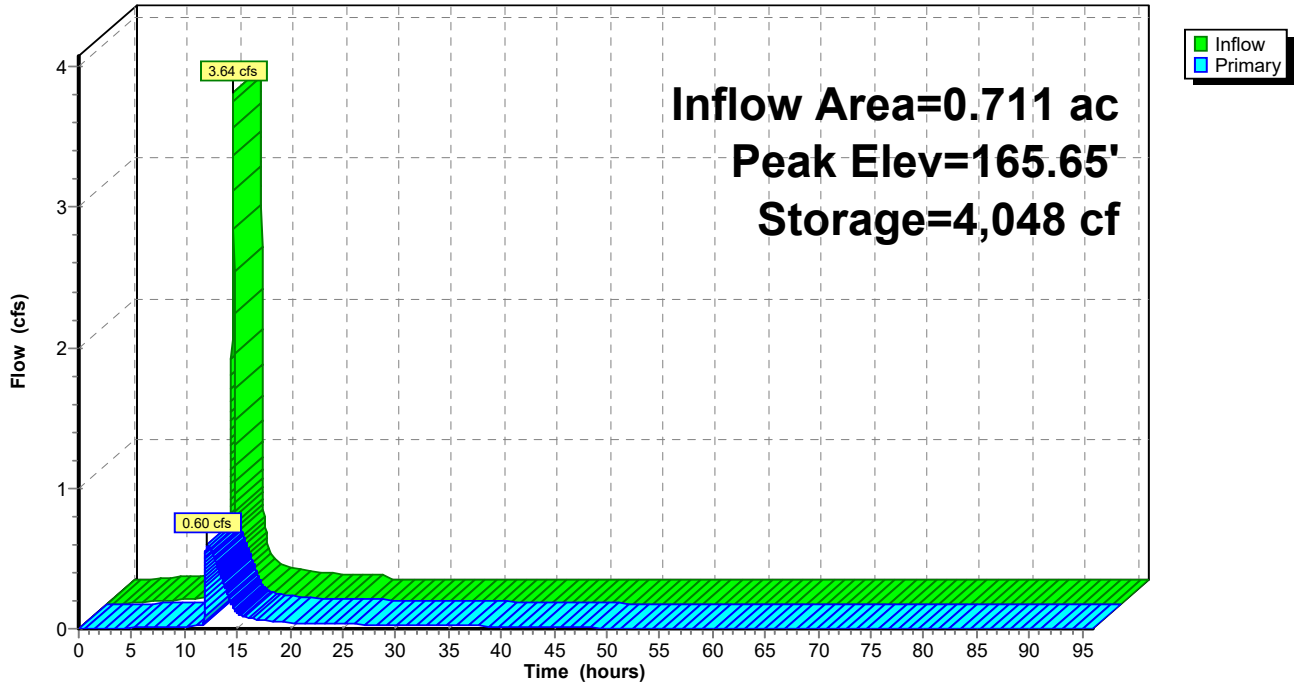
Device	Routing	Invert	Outlet Devices
#1	Primary	162.00'	12.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 162.00' / 161.90' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	162.00'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	163.75'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	167.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.60 cfs @ 12.15 hrs HW=165.65' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.60 cfs of 6.71 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.05 cfs @ 9.14 fps)
- 3=Orifice/Grate (Orifice Controls 0.55 cfs @ 6.33 fps)
- 4=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: 48,000 GAL Tank

Hydrograph



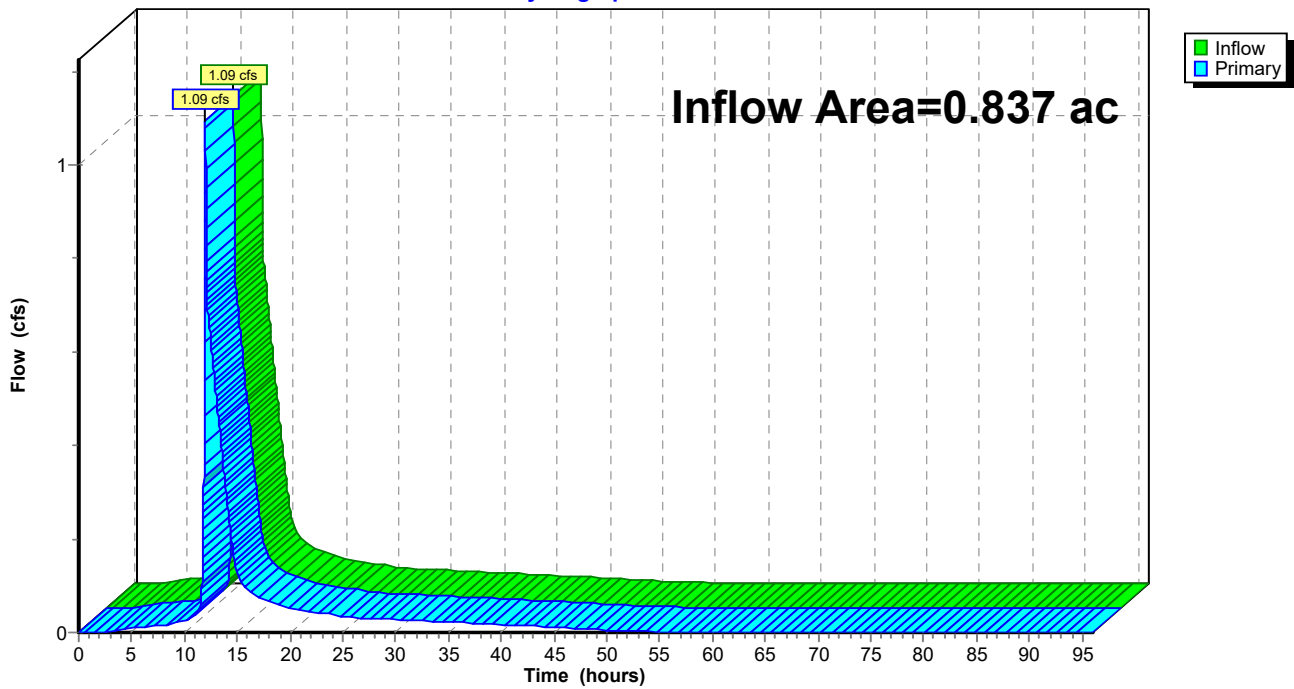
Summary for Link 2L: TOTAL POST (ON-SITE)

Inflow Area = 0.837 ac, 45.64% Impervious, Inflow Depth = 3.15" for 25-YR event
Inflow = 1.09 cfs @ 11.98 hrs, Volume= 0.220 af
Primary = 1.09 cfs @ 11.99 hrs, Volume= 0.220 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: TOTAL POST (ON-SITE)

Hydrograph



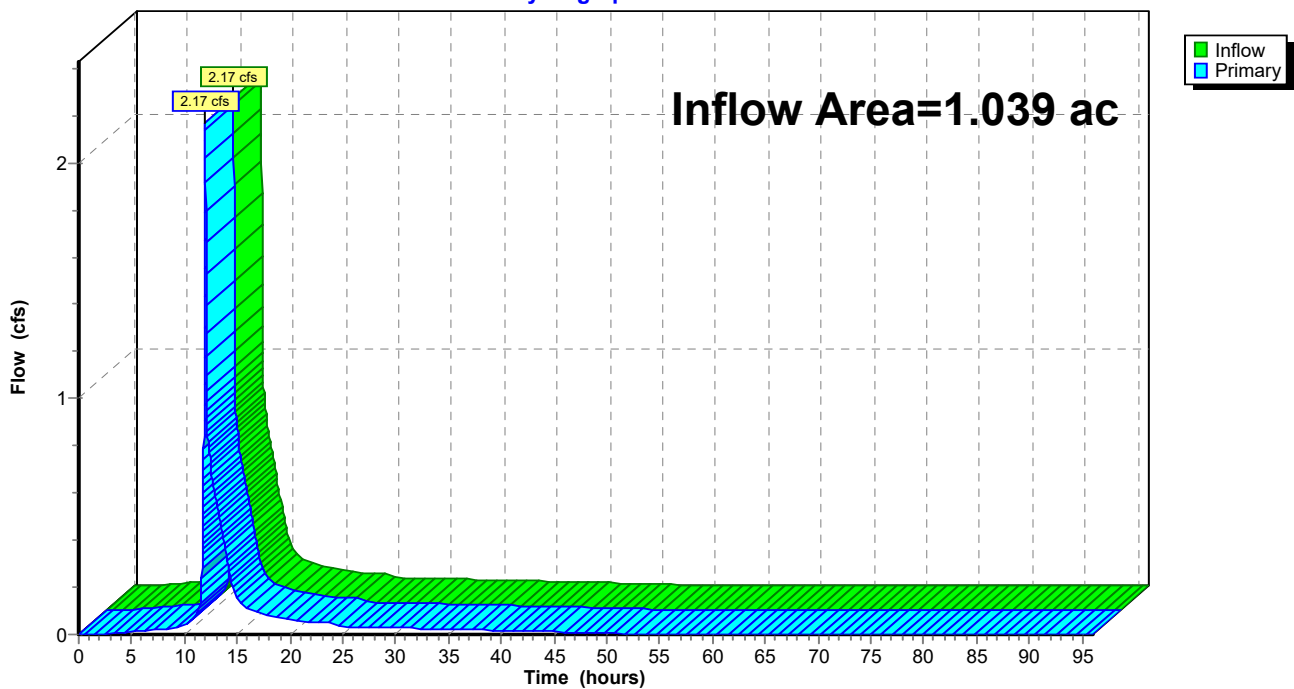
Summary for Link 4L: TOTAL POST

Inflow Area = 1.039 ac, 42.83% Impervious, Inflow Depth = 3.16" for 25-YR event
Inflow = 2.17 cfs @ 11.97 hrs, Volume= 0.274 af
Primary = 2.17 cfs @ 11.98 hrs, Volume= 0.274 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: TOTAL POST

Hydrograph



Summary for Subcatchment 2S: POST- BLDG

Runoff = 2.94 cfs @ 11.96 hrs, Volume= 0.160 af, Depth= 5.29"

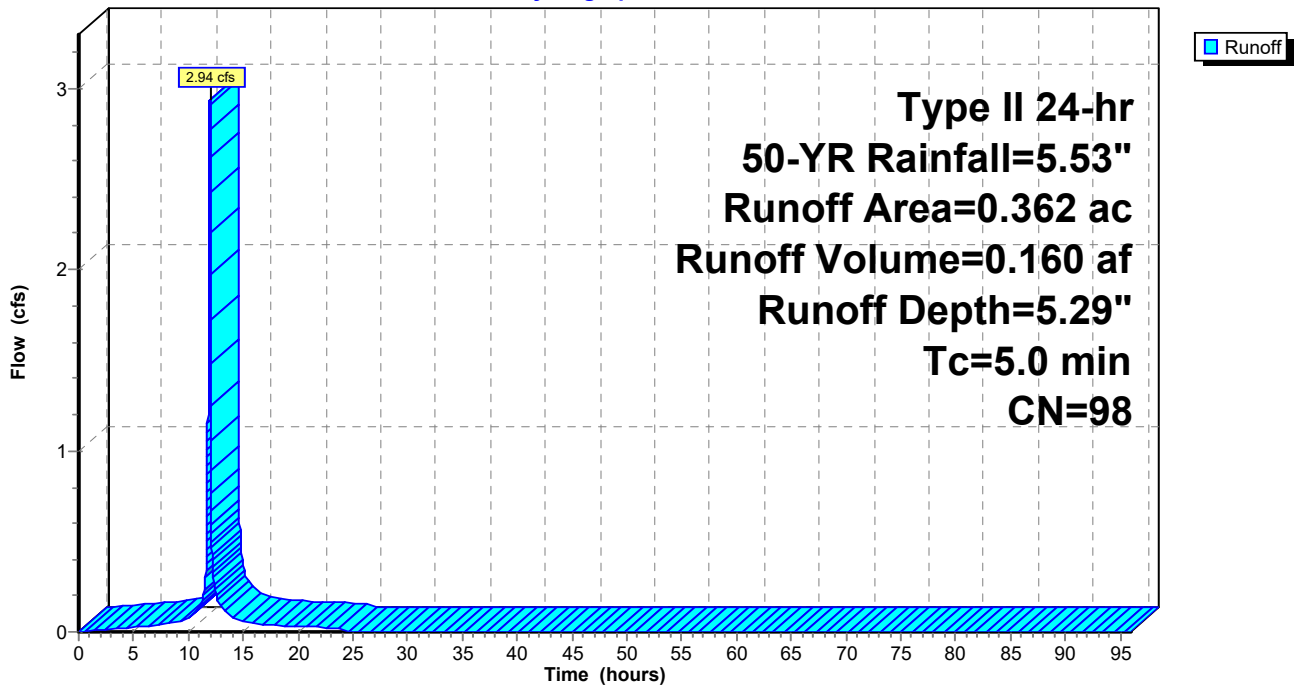
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-YR Rainfall=5.53"

Area (ac)	CN	Description
* 0.362	98	Building
0.362		100.00% Impervious Area

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

Subcatchment 2S: POST- BLDG

Hydrograph



Summary for Subcatchment 3S: POST-Pervious To Tank

Runoff = 1.56 cfs @ 11.98 hrs, Volume= 0.073 af, Depth= 2.50"

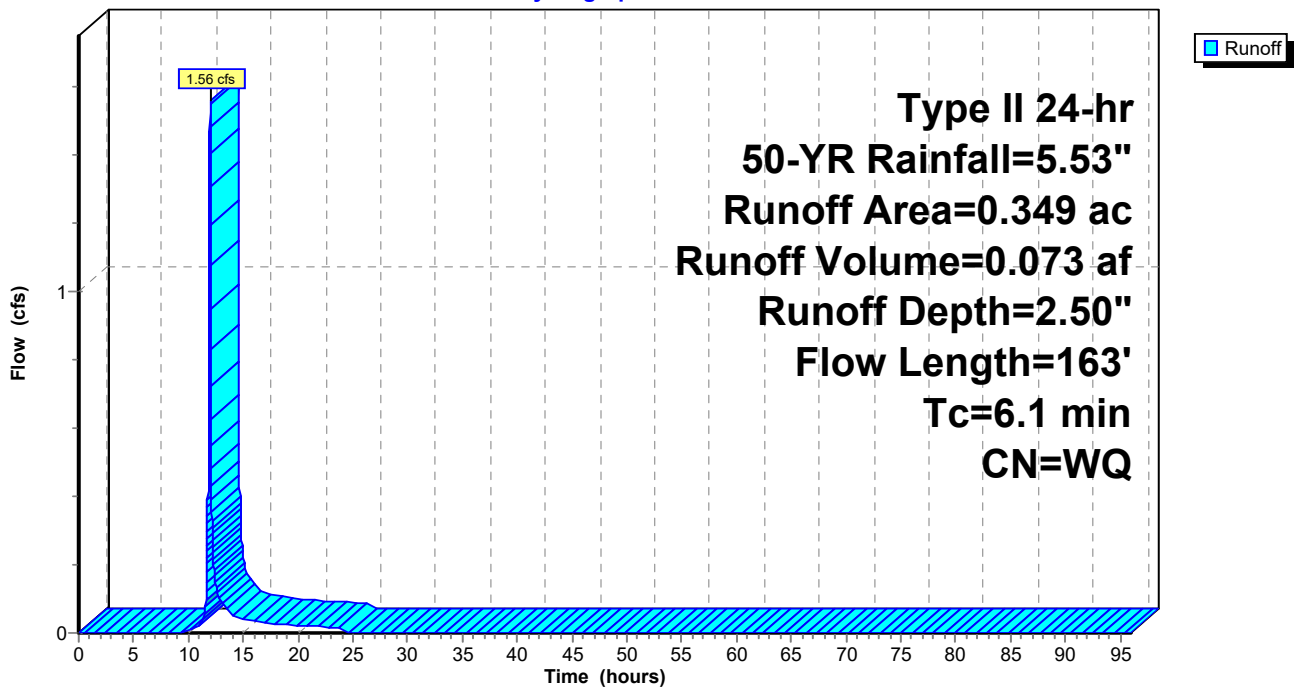
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-YR Rainfall=5.53"

Area (ac)	CN	Description
0.283	70	Woods, Good, HSG C
0.066	74	>75% Grass cover, Good, HSG C
0.349		Weighted Average
0.349		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.62"
0.2	28	0.2500	2.50		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
0.2	75	0.0100	6.06	59.04	Trap/Vee/Rect Channel Flow, CD Bot.W=2.00' D=1.50' Z= 3.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
6.1	163	Total			

Subcatchment 3S: POST-Pervious To Tank

Hydrograph



Summary for Subcatchment 4S: POST Bypass (ON-SITE)

Runoff = 0.80 cfs @ 11.96 hrs, Volume= 0.038 af, Depth= 3.62"

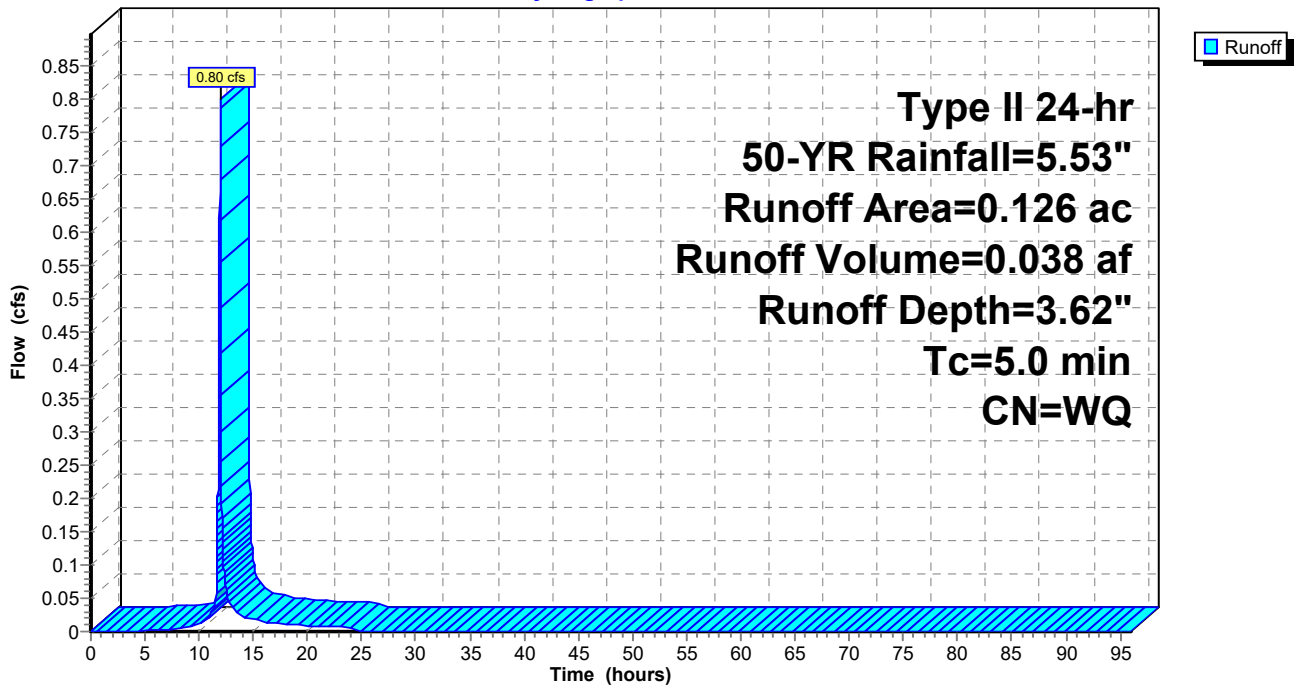
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-YR Rainfall=5.53"

Area (ac)	CN	Description
* 0.020	98	Impervious
0.010	74	>75% Grass cover, Good, HSG C
0.096	80	>75% Grass cover, Good, HSG D
<hr/>		
0.126		Weighted Average
0.106		84.13% Pervious Area
0.020		15.87% Impervious Area

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

Subcatchment 4S: POST Bypass (ON-SITE)

Hydrograph



Summary for Subcatchment 6S: POST-DEV (OFFSITE)

Runoff = 1.36 cfs @ 11.96 hrs, Volume= 0.067 af, Depth= 3.96"

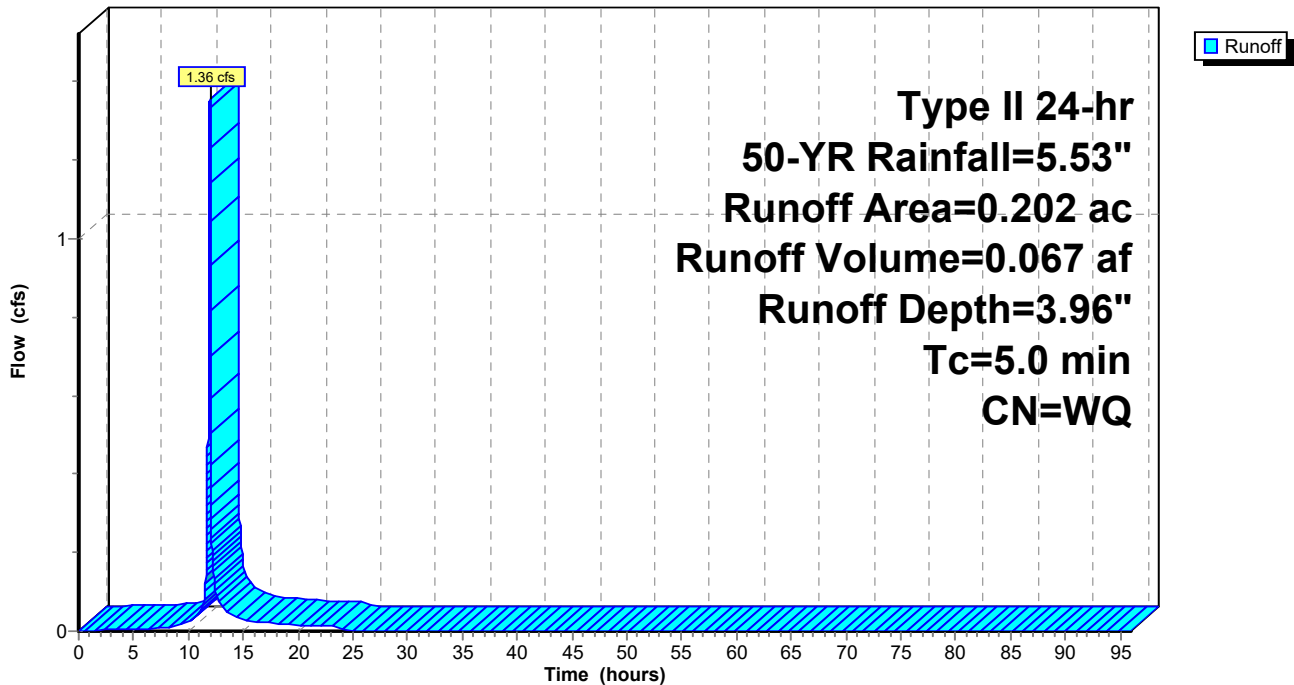
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-YR Rainfall=5.53"

Area (ac)	CN	Description
* 0.063	98	Impervious
0.139	80	>75% Grass cover, Good, HSG D
0.202		Weighted Average
0.139		68.81% Pervious Area
0.063		31.19% Impervious Area

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

Subcatchment 6S: POST-DEV (OFFSITE)

Hydrograph



Summary for Pond 1P: 48,000 GAL Tank

Inflow Area = 0.711 ac, 50.91% Impervious, Inflow Depth = 3.92" for 50-YR event
 Inflow = 4.46 cfs @ 11.96 hrs, Volume= 0.233 af
 Outflow = 0.73 cfs @ 12.15 hrs, Volume= 0.232 af, Atten= 84%, Lag= 11.5 min
 Primary = 0.73 cfs @ 12.15 hrs, Volume= 0.232 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 166.46' @ 12.15 hrs Surf.Area= 1,110 sf Storage= 4,954 cf

Plug-Flow detention time= 330.7 min calculated for 0.232 af (100% of inflow)
 Center-of-Mass det. time= 330.3 min (1,101.7 - 771.3)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	6,383 cf	18.50'W x 60.00'L x 5.75'H Prismatic

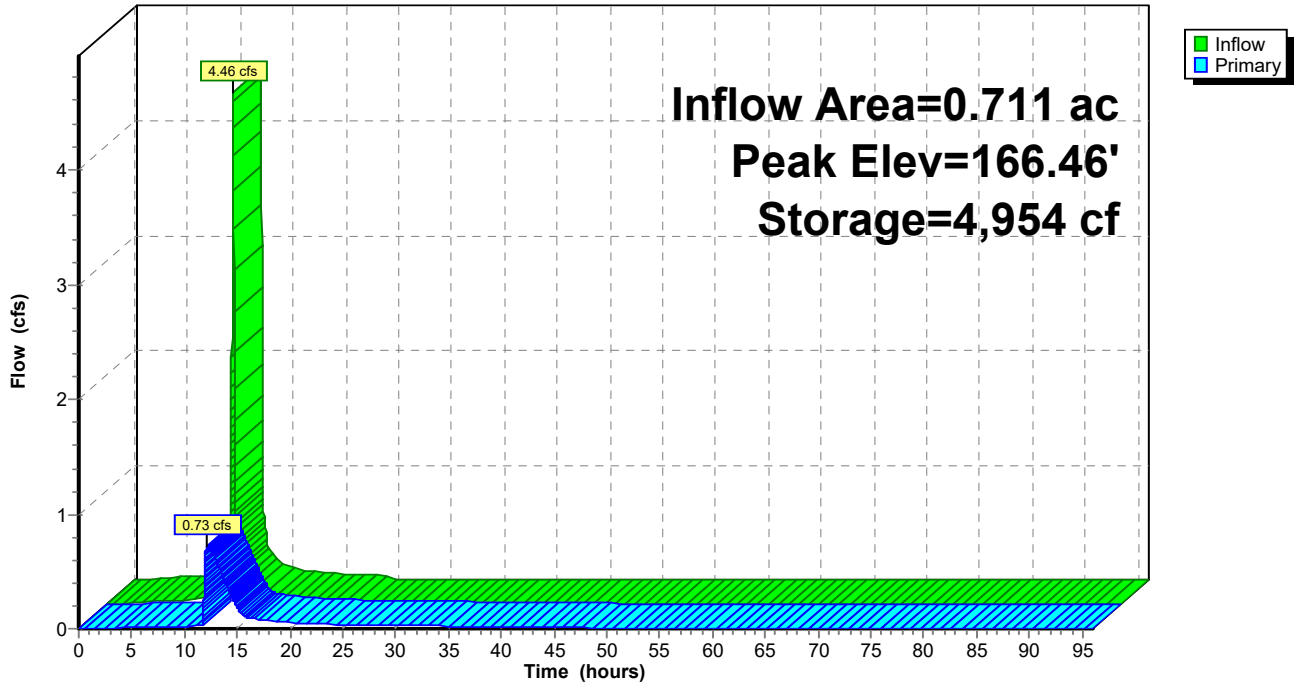
Device	Routing	Invert	Outlet Devices
#1	Primary	162.00'	12.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 162.00' / 161.90' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	162.00'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	163.75'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	167.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.73 cfs @ 12.15 hrs HW=166.46' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.73 cfs of 7.53 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.06 cfs @ 10.12 fps)
- 3=Orifice/Grate (Orifice Controls 0.67 cfs @ 7.68 fps)
- 4=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: 48,000 GAL Tank

Hydrograph



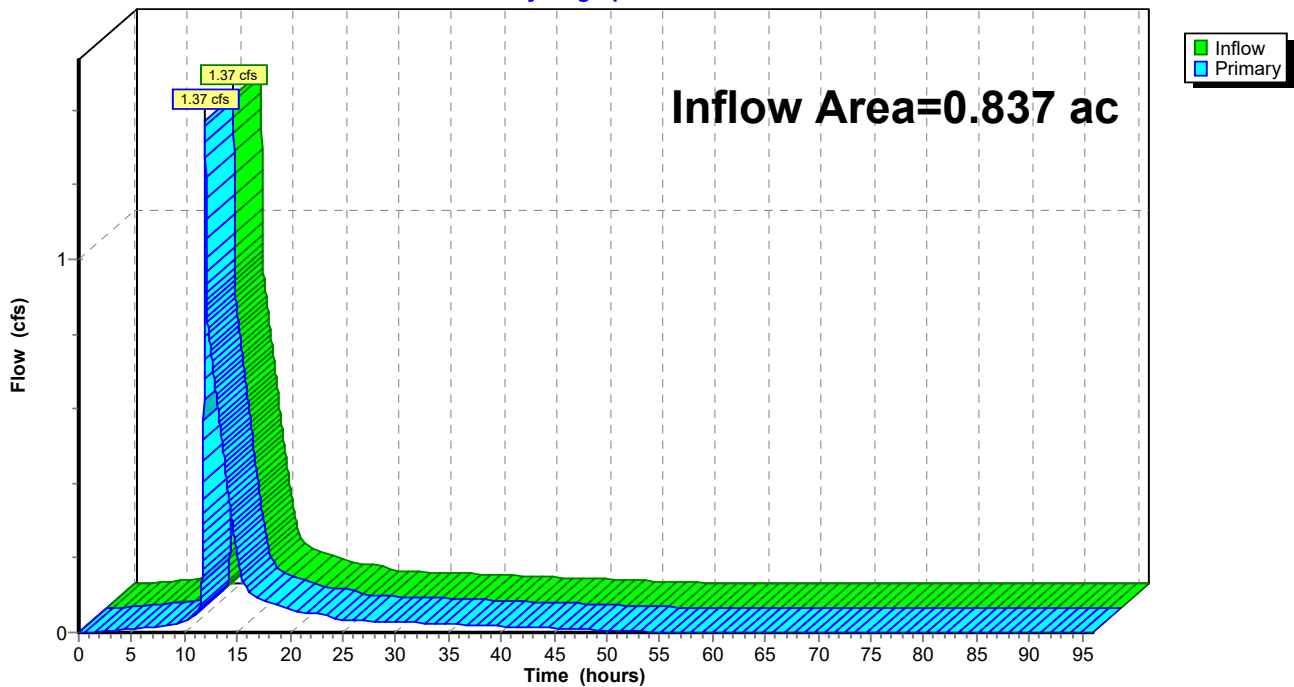
Summary for Link 2L: TOTAL POST (ON-SITE)

Inflow Area = 0.837 ac, 45.64% Impervious, Inflow Depth = 3.88" for 50-YR event
Inflow = 1.37 cfs @ 11.97 hrs, Volume= 0.270 af
Primary = 1.37 cfs @ 11.98 hrs, Volume= 0.270 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: TOTAL POST (ON-SITE)

Hydrograph



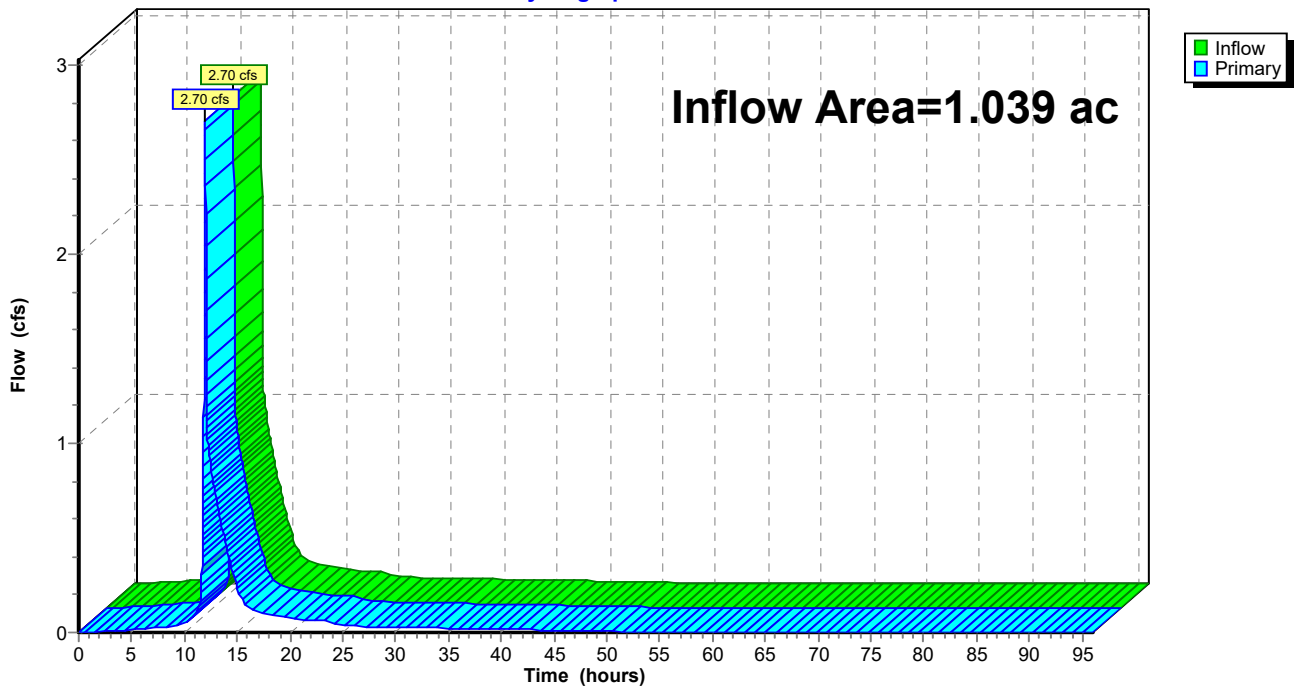
Summary for Link 4L: TOTAL POST

Inflow Area = 1.039 ac, 42.83% Impervious, Inflow Depth = 3.89" for 50-YR event
Inflow = 2.70 cfs @ 11.97 hrs, Volume= 0.337 af
Primary = 2.70 cfs @ 11.98 hrs, Volume= 0.337 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: TOTAL POST

Hydrograph



Summary for Subcatchment 2S: POST- BLDG

Runoff = 3.73 cfs @ 11.96 hrs, Volume= 0.204 af, Depth= 6.76"

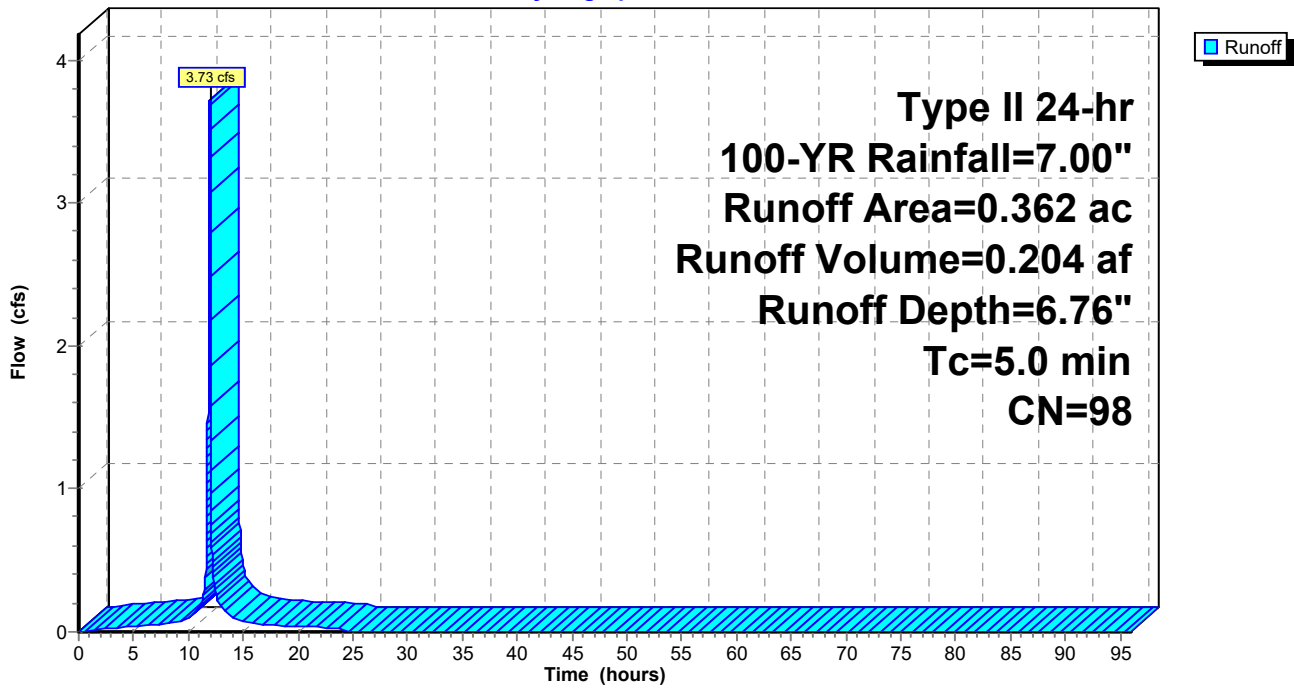
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=7.00"

Area (ac)	CN	Description
* 0.362	98	Building
0.362		100.00% Impervious Area

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

Subcatchment 2S: POST- BLDG

Hydrograph



Summary for Subcatchment 3S: POST-Pervious To Tank

Runoff = 2.29 cfs @ 11.97 hrs, Volume= 0.108 af, Depth= 3.70"

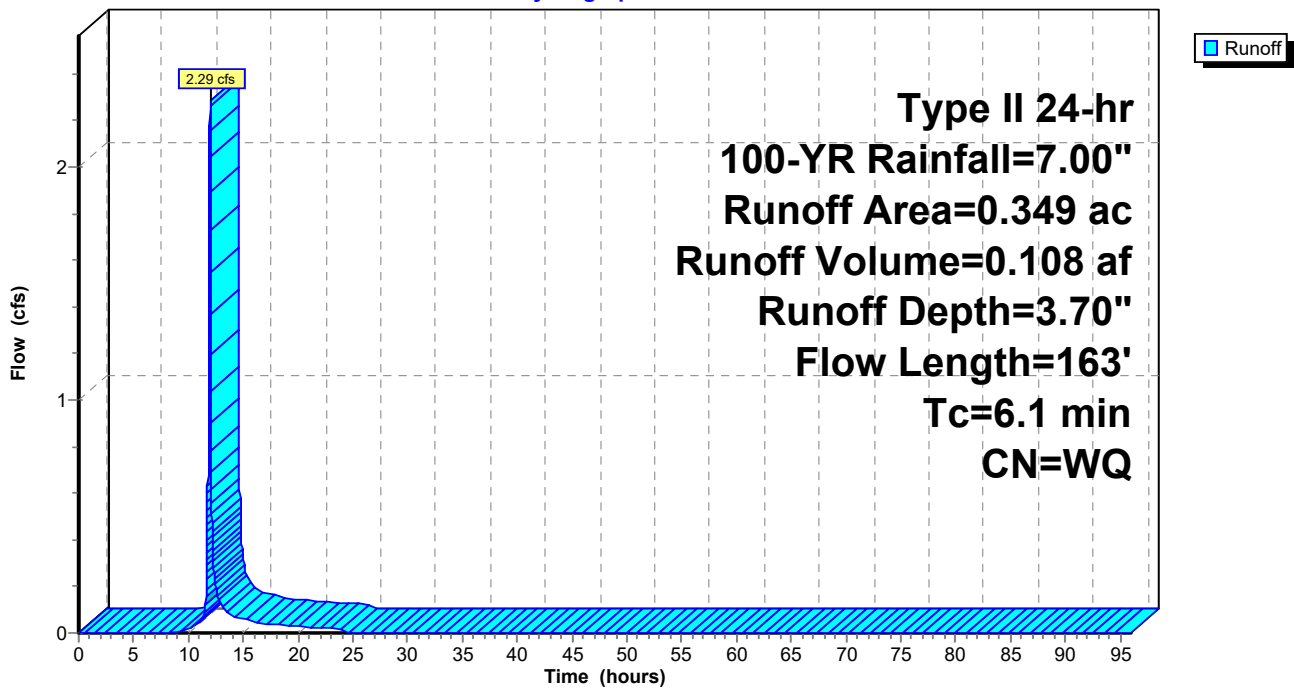
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=7.00"

Area (ac)	CN	Description
0.283	70	Woods, Good, HSG C
0.066	74	>75% Grass cover, Good, HSG C
0.349		Weighted Average
0.349		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	60	0.2500	0.17		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.62"
0.2	28	0.2500	2.50		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
0.2	75	0.0100	6.06	59.04	Trap/Vee/Rect Channel Flow, CD Bot.W=2.00' D=1.50' Z= 3.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
6.1	163	Total			

Subcatchment 3S: POST-Pervious To Tank

Hydrograph



Summary for Subcatchment 4S: POST Bypass (ON-SITE)

Runoff = 1.09 cfs @ 11.96 hrs, Volume= 0.052 af, Depth= 4.97"

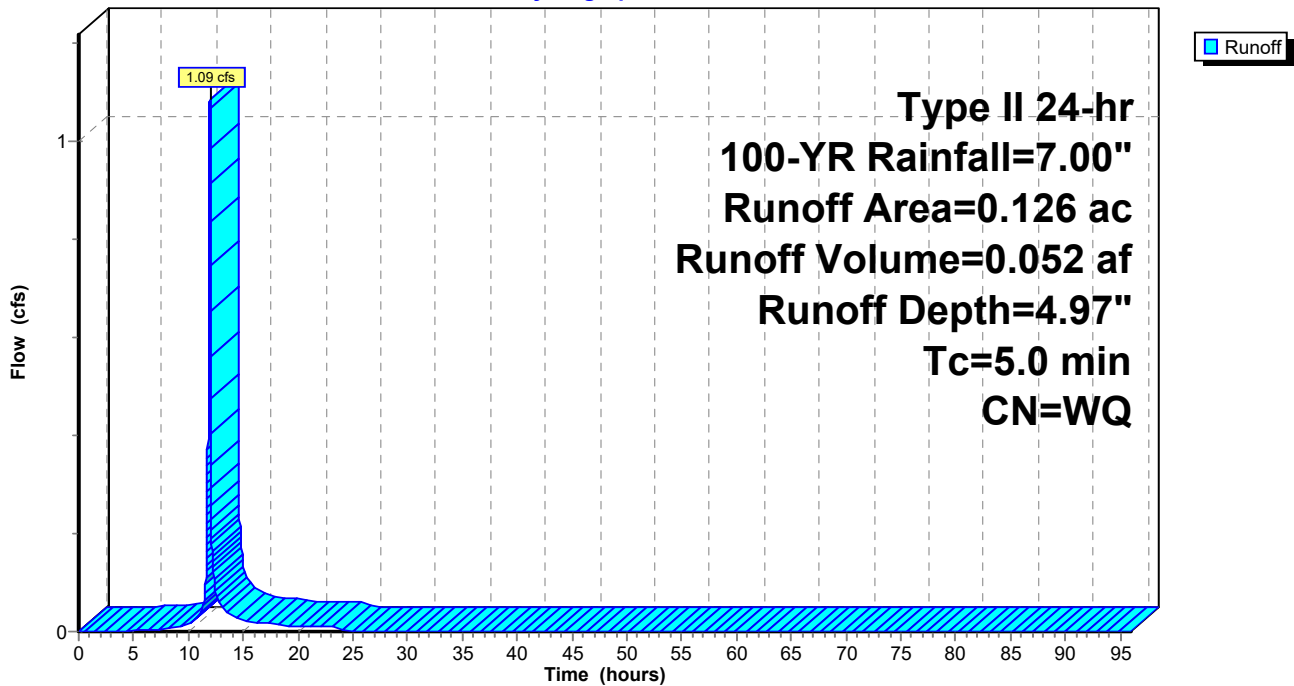
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=7.00"

Area (ac)	CN	Description
* 0.020	98	Impervious
0.010	74	>75% Grass cover, Good, HSG C
0.096	80	>75% Grass cover, Good, HSG D
<hr/>		
0.126		Weighted Average
0.106		84.13% Pervious Area
0.020		15.87% Impervious Area

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

Subcatchment 4S: POST Bypass (ON-SITE)

Hydrograph



Summary for Subcatchment 6S: POST-DEV (OFFSITE)

Runoff = 1.82 cfs @ 11.96 hrs, Volume= 0.090 af, Depth= 5.34"

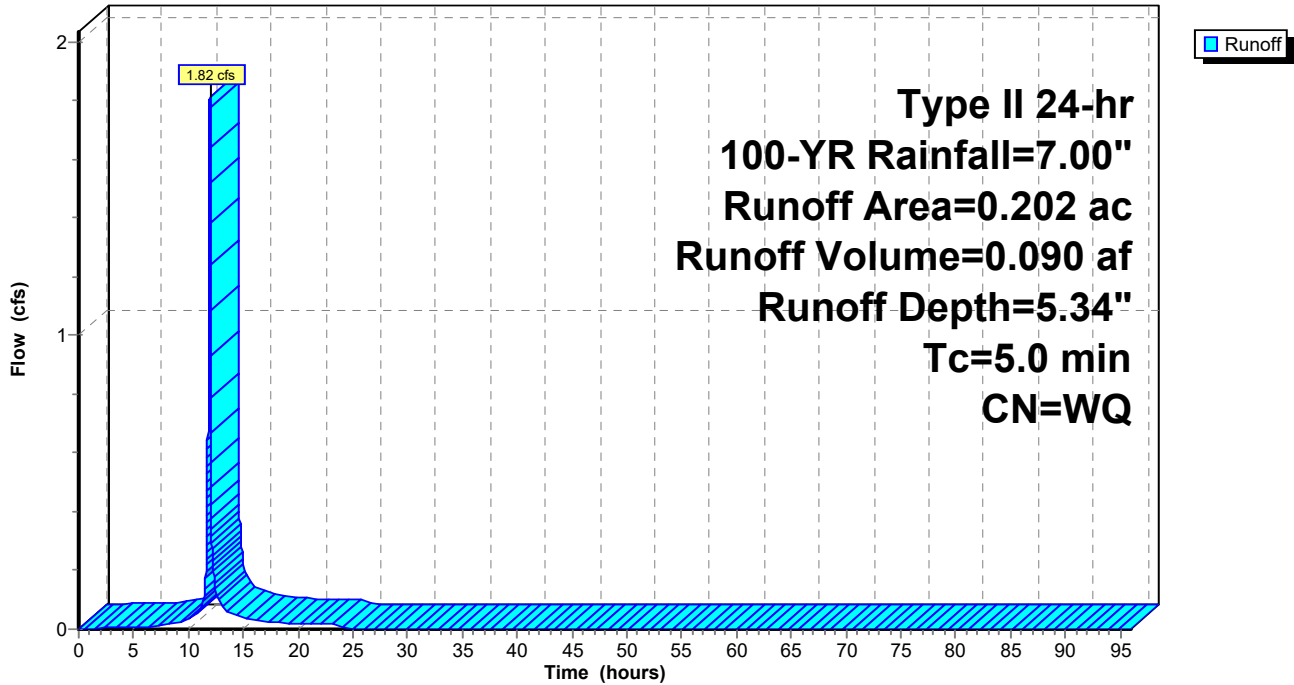
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=7.00"

Area (ac)	CN	Description
* 0.063	98	Impervious
0.139	80	>75% Grass cover, Good, HSG D
0.202		Weighted Average
0.139		68.81% Pervious Area
0.063		31.19% Impervious Area

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

Subcatchment 6S: POST-DEV (OFFSITE)

Hydrograph



Summary for Pond 1P: 48,000 GAL Tank

Inflow Area = 0.711 ac, 50.91% Impervious, Inflow Depth = 5.26" for 100-YR event
 Inflow = 5.97 cfs @ 11.96 hrs, Volume= 0.312 af
 Outflow = 1.88 cfs @ 12.08 hrs, Volume= 0.311 af, Atten= 69%, Lag= 7.3 min
 Primary = 1.88 cfs @ 12.08 hrs, Volume= 0.311 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 167.75' @ 12.08 hrs Surf.Area= 1,110 sf Storage= 6,383 cf

Plug-Flow detention time= 271.5 min calculated for 0.311 af (100% of inflow)
 Center-of-Mass det. time= 271.2 min (1,039.5 - 768.3)

Volume	Invert	Avail.Storage	Storage Description
#1	162.00'	6,383 cf	18.50'W x 60.00'L x 5.75'H Prismatic

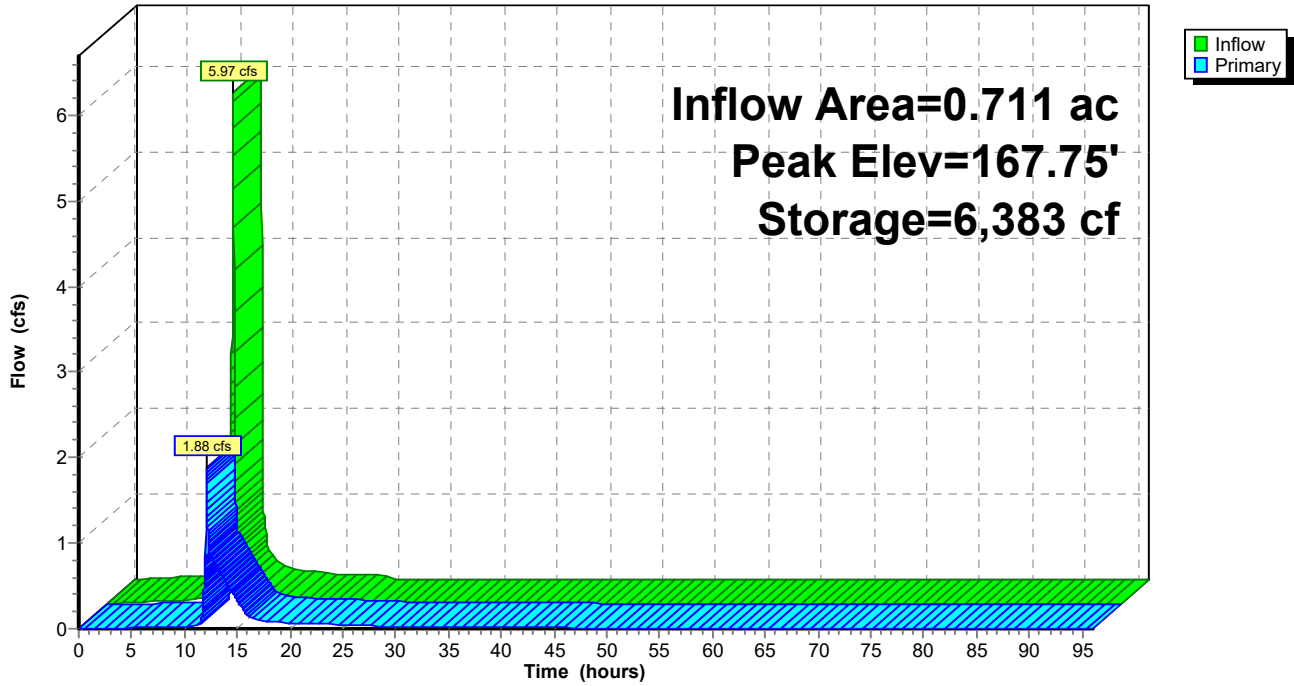
Device	Routing	Invert	Outlet Devices
#1	Primary	162.00'	12.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 162.00' / 161.90' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	162.00'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	163.75'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	167.40'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.88 cfs @ 12.08 hrs HW=167.75' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 1.88 cfs of 8.66 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.06 cfs @ 11.50 fps)
- 3=Orifice/Grate (Orifice Controls 0.82 cfs @ 9.43 fps)
- 4=Orifice/Grate (Orifice Controls 0.99 cfs @ 2.85 fps)

Pond 1P: 48,000 GAL Tank

Hydrograph



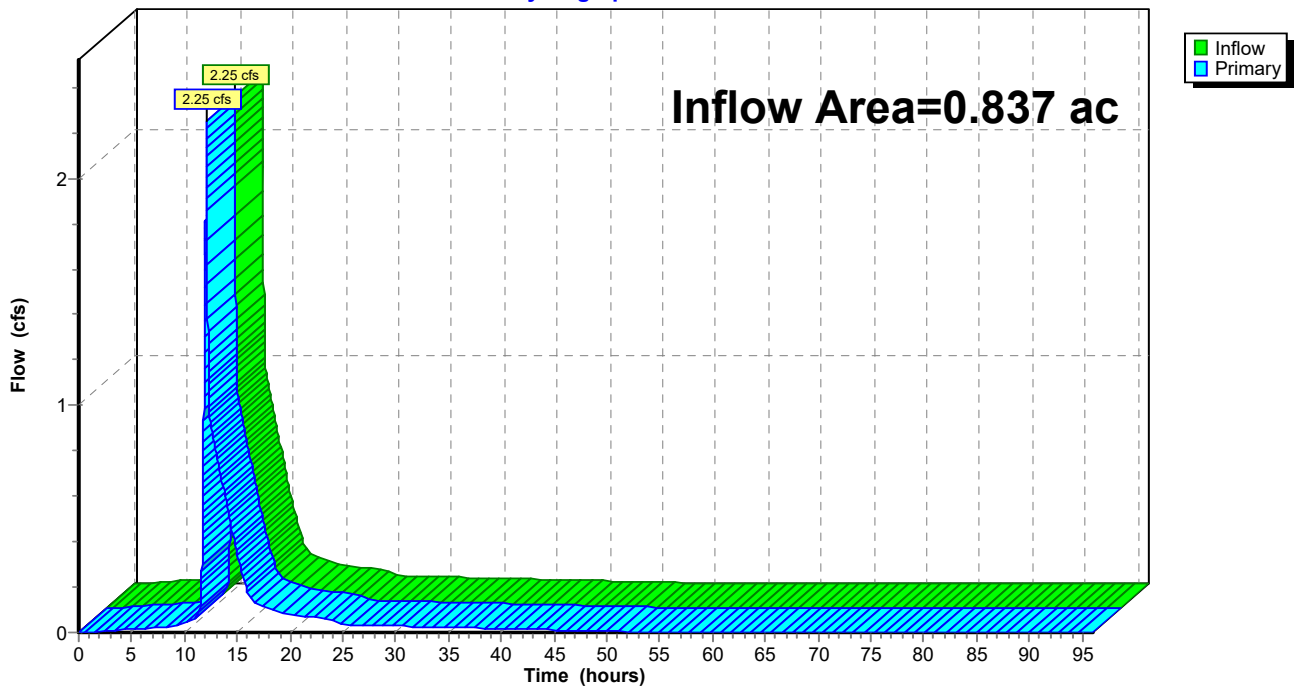
Summary for Link 2L: TOTAL POST (ON-SITE)

Inflow Area = 0.837 ac, 45.64% Impervious, Inflow Depth = 5.21" for 100-YR event
Inflow = 2.25 cfs @ 12.05 hrs, Volume= 0.364 af
Primary = 2.25 cfs @ 12.06 hrs, Volume= 0.364 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: TOTAL POST (ON-SITE)

Hydrograph



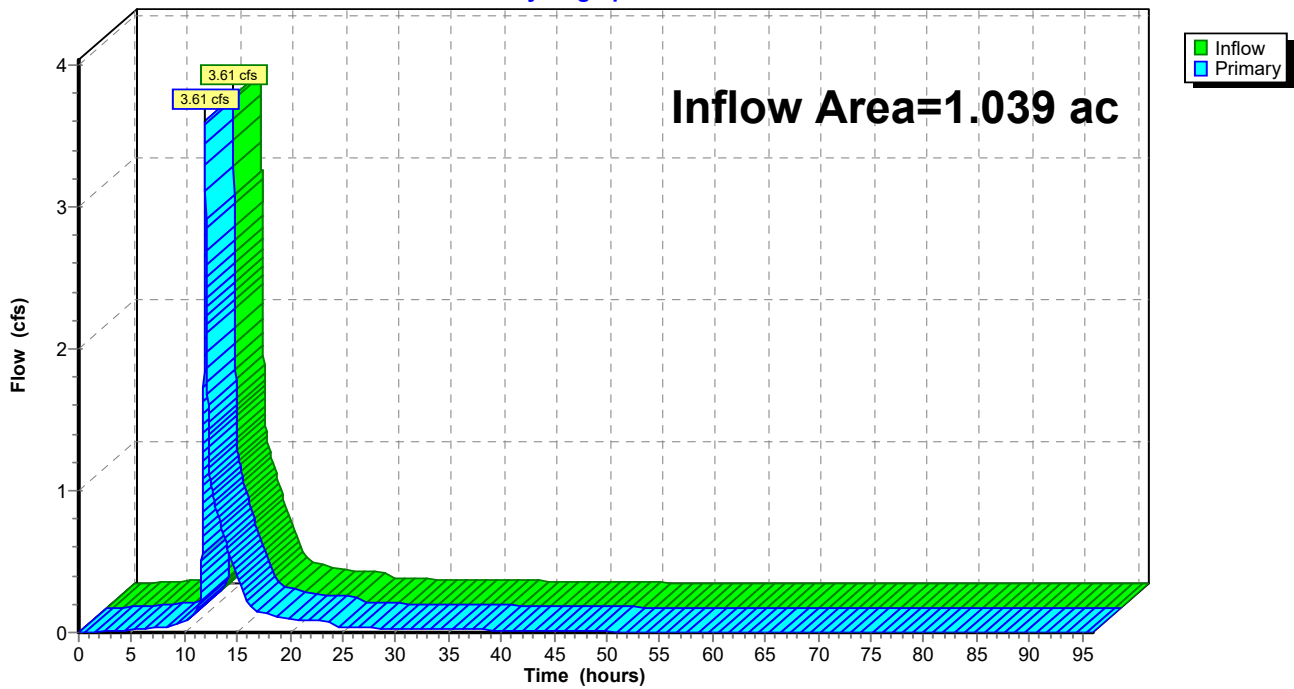
Summary for Link 4L: TOTAL POST

Inflow Area = 1.039 ac, 42.83% Impervious, Inflow Depth = 5.24" for 100-YR event
Inflow = 3.61 cfs @ 11.97 hrs, Volume= 0.453 af
Primary = 3.61 cfs @ 11.98 hrs, Volume= 0.453 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: TOTAL POST

Hydrograph



Part 6:

Water Quality (WQv) and Individual SMP Calculations

WATER QUALITY PEAK FLOW CALC

$$WQV \text{ FROM ROOF} = 1,498 \text{ CF} \quad P = 1.2''$$

$$Q \text{ (in)} = \frac{WQV}{\text{DRAINAGE AREA}} = \frac{1,498 \text{ CF}}{15,750} = 0.095'' = 1.14'' \text{ RUNOFF}$$

MOD.

$$CN = 1000 / [10 + 5P + 10Q - 10(Q^2 + 1.25QP)^{1/2}]$$

$$= 1000 / [10 + 5(1.2) + 10(1.14) - 10[1.14^2 + 1.25(1.14)(1.2)]^{1/2}]$$

$$= 99.48 \Rightarrow \text{USE } CN = 100$$

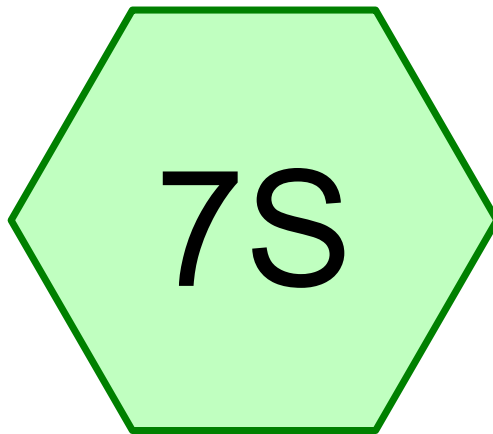
↳ PER HYDROCAD, DURING WQV STORM EVENT, FLOW = 0.64 CFS

TREATMENT CAPACITY OF CDS 2015-4-C = 0.7 CFS ✓

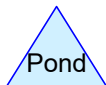
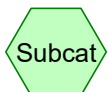
→ CHECK OVER FLOW

FROM HYDROCAD, 100-TR FLOW = 3.73 CFS

• BYPASS CAPACITY OF CDS 2015-4-C = 10 CFS ✓



WQv Calc to Contech Unit



Routing Diagram for 20483-hydro

Prepared by Engineering Ventures, PC, Printed 2/11/2021
HydroCAD® 10.10-4a s/n 02106 © 2020 HydroCAD Software Solutions LLC

20483-hydro

Summary for Subcatchment 7S: WQv Calc to Contech Unit

Runoff = 0.64 cfs @ 11.96 hrs, Volume= 0.036 af, Depth= 1.20"

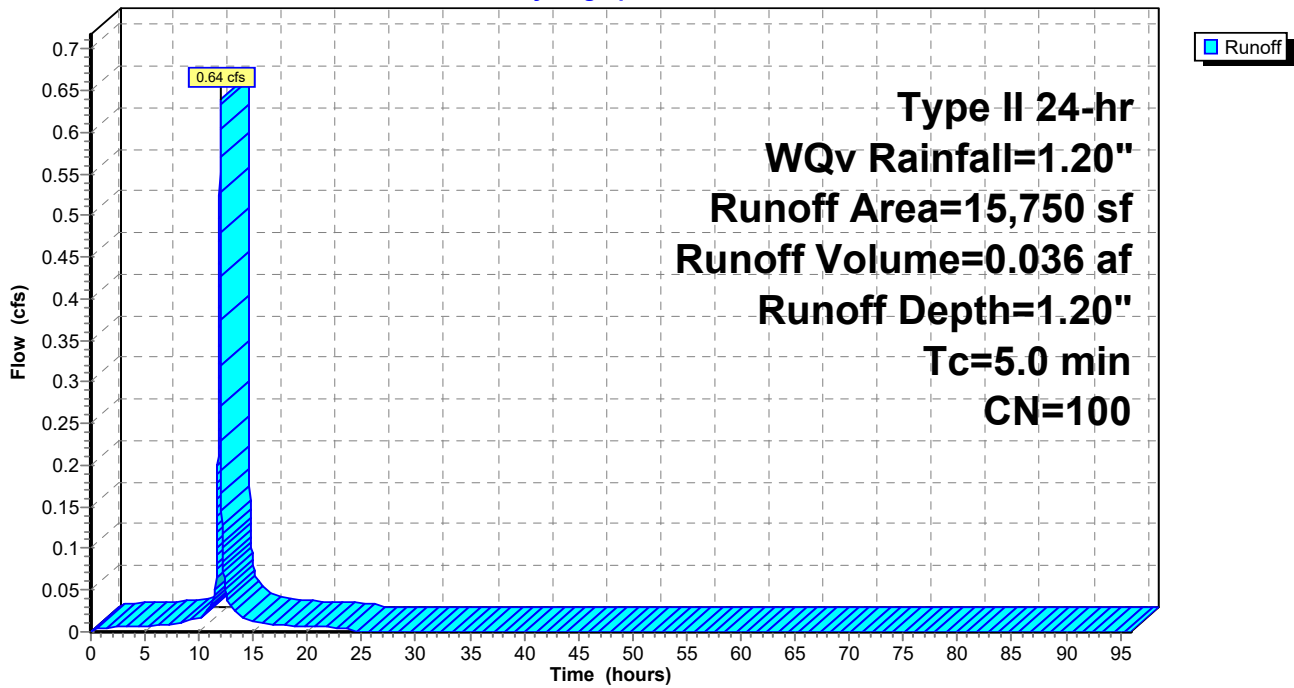
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr WQv Rainfall=1.20"

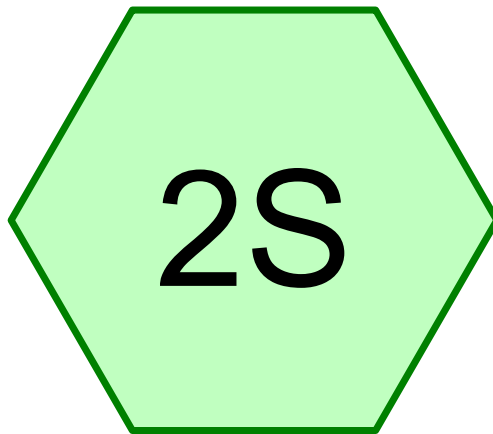
Area (sf)	CN	Description
* 15,750	100	
15,750		100.00% Impervious Area

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

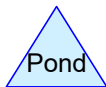
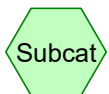
Subcatchment 7S: WQv Calc to Contech Unit

Hydrograph





POST- BLDG



20483-hydro

Summary for Subcatchment 2S: POST- BLDG

Runoff = 3.73 cfs @ 11.96 hrs, Volume= 0.204 af, Depth= 6.76"

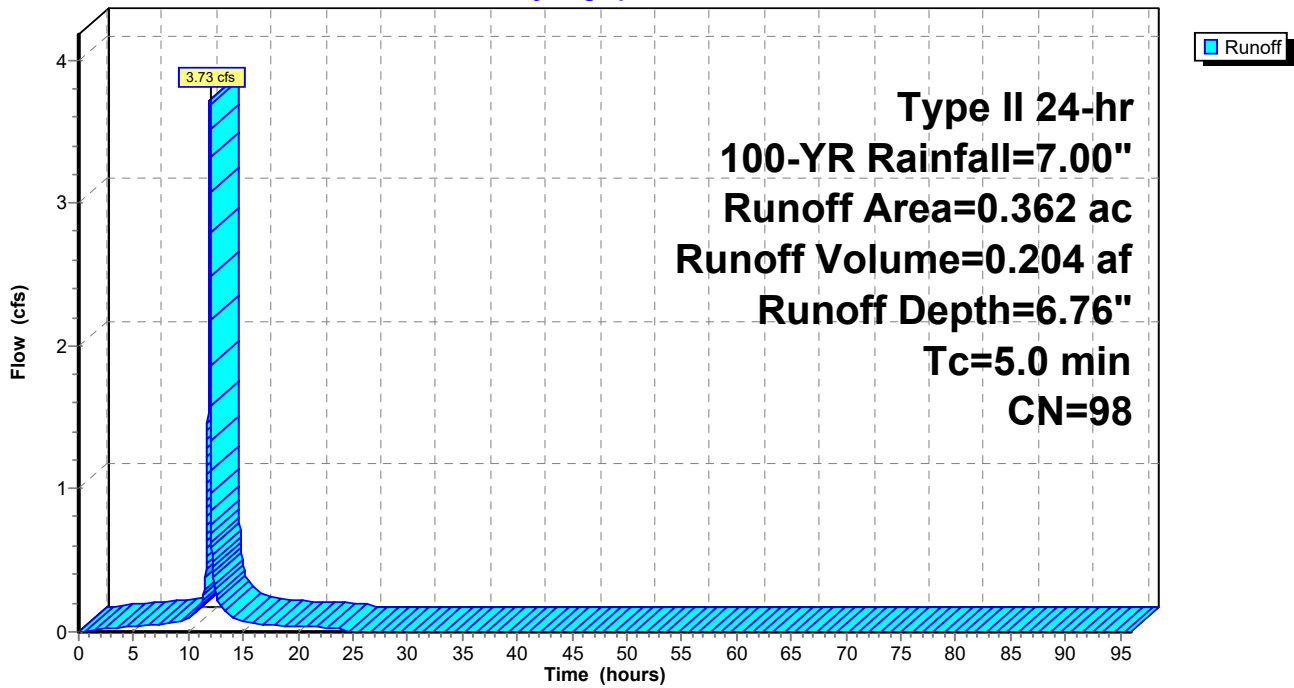
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=7.00"

Area (ac)	CN	Description
* 0.362	98	Building
0.362		100.00% Impervious Area

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

Subcatchment 2S: POST- BLDG

Hydrograph



SECTION [____]

STORM WATER TREATMENT DEVICE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope

The Contractor shall furnish all labor, equipment and materials necessary to install the storm water treatment device(s) (SWTD) and appurtenances specified in the Drawings and these specifications.

B. Related Sections

Section 02240: Dewatering

Section 02260: Excavation Support and Protection

Section 02315: Excavation and Fill

Section 02340: Soil Stabilization

1.2 QUALITY ASSURANCES

A. Inspection

All components shall be subject to inspection by the engineer at the place of manufacture and/or installation. All components are subject to rejected or identified for repair if the quality of materials and manufacturing do not comply with the requirements of this specification. Components which have been identified as defective may be subject for repair where final acceptance of the component is contingent on the discretion of the Engineer.

B. Warranty

The manufacturer shall guarantee the SWTD components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the owner for installation. The manufacturer shall upon its determination repair, correct or replace any manufacturer originated defects advised in writing to the manufacturer within the referenced warranty period. The use of SWTD components shall be limited to the application for which it was specifically designed.

C. Manufacturer's Performance Certificate

The SWTD manufacturer shall submit to the Engineer of Record a "Manufacturer's Performance Certification" certifying that each SWTD is capable of achieving the specified removal efficiencies listed in these specifications. The certification shall be supported by independent third-party research.

1.3 SUBMITTALS

A. Shop Drawings

The contractor shall prepare and submit shop drawings in accordance with Section [_____] of the contract documents. The shop drawings shall detail horizontal and vertical dimensioning, reinforcement and joint type and locations.

PART 2.0 – PRODUCTS

2.1 MATERIALS AND DESIGN

A. Precast concrete components shall conform to applicable sections of ASTM C 478, ASTM C 857 and ASTM C 858 and the following:

1. Concrete shall achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi);
2. Unless otherwise noted, the precast concrete sections shall be designed to withstand lateral earth and AASHTO H-20 traffic loads;
3. Cement shall be Type III Portland Cement conforming to ASTM C 150;
4. Aggregates shall conform to ASTM C 33;
5. Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to ASTM A 615, A 185, or A 497.
6. Joints shall be sealed with preformed joint sealing compound conforming to ASTM C 990.
7. Shipping of components shall not be initiated until a minimum compressive strength of 4,000 psi is attained or five (5) calendar days after fabrication has expired, whichever occurs first.

B. Internal Components and appurtenances shall conform to the following:

1. Screen and support structure shall be manufactured of Type 316 and 316L stainless steel conforming to ASTM F 1267-01;
2. Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320;
3. Fiberglass components shall conform to the National Bureau of Standards PS-15 and coated with an isophalic polyester gelcoat;
4. Access system(s) conform to the following:
 - a. Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to ASTM A 48 Class 30.

2.2 PERFORMANCE

A. REMOVAL EFFICIENCIES

1. The SWTD shall be capable of achieving an 80 percent average annual reduction for a particle distribution having a mean particle size (d_{50}) of 125 microns
2. The SWTD shall be capable of capturing and retaining 100 percent of pollutants greater than or equal to 3/16 of an inch regardless of the pollutant's specific gravity (i.e.: floatable and neutrally buoyant materials) for flows up to the device's rated-treatment capacity. The SWTD shall be designed to retain all previously captured pollutants addressed by this subsection under all flow conditions.
3. The SWTD shall be capable of capturing and retaining total petroleum hydrocarbons. The SWTD shall be capable of achieving a removal efficiency of 92 and 78 percent when the device is operating at 25 and 50 percent of its rated-treatment capacity. These removal efficiencies shall be based on independent third-party research for influent oil concentrations representative of storm water runoff (20 ± 5 mg/L). The SWTD shall be greater than 99 percent effective in controlling dry-weather accidental oil spills.

B. HYDRAULIC CAPACITY

1. The SWTD shall provide a rated-treatment capacity in accordance with Table 1. At this rated-treatment capacity, the device shall be capable of achieving an 80 percent removal efficiency for a particle distribution having a mean particle size (d_{50}) of 125 microns. This removal efficiency shall be supported by independent third-party research.
2. The SWTD shall maintain the peak conveyance capacity of the drainage network as defined by the Engineer.

C. STORAGE CAPACITY

1. The SWTD shall be designed with a sump chamber for the storage of captured sediments and other negatively buoyant pollutants in between maintenance cycles. The minimum storage capacity provided by the sump chamber shall be in accordance with the volume listed in Table 1. The boundaries of the sump chamber shall be limited to that which do not degrade the SWTD's treatment efficiency as captured pollutants accumulate. The sump chamber shall be separate from the treatment processing portion(s) of the SWTD to minimize the probability of fine particle re-suspension. In order to not restrict the Owner's ability to maintain the SWTD, the minimum dimension providing access from the ground surface to the sump chamber shall be 20 inches in diameter.
2. The SWTD shall be designed to capture and retain Total Petroleum Hydrocarbons generated by wet-weather flow and dry-weather gross spills.



The minimum storage capacity provided by the SWTD shall be in accordance with the volume listed in Table 1.

2.3 MANUFACTURER

The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer.

PART 3 – EXECUTION

3.1 HANDLING AND STORAGE

1. The contractor shall exercise care in the storage and handling of the SWTD components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be born by the contractor.

3.2 INSTALLATION

1. The SWTD shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours notice shall be provided to the manufacturer prior to their performance of the services included under this subsection.
2. The contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces. The contractor shall trim all protruding lifting provisions flush with the adjacent concrete surface in a manner, which leaves no sharp points or edges.
3. The contractor shall removal all loose material and pooling water from the SWTD prior to the transfer of operational responsibility to the Owner.

TABLE 1
Storm Water Treatment Device
Hydraulic and Storage Capacities

CDS Model	Treatment Capacity (cfs)/(L/s)	Minimum Sump Storage Capacity (yd³)/ (m³)	Minimum Oil Storage Capacity (gal)/(L)
CDS2015-4-C	0.7 (19.8)	0.9 (0.7)	61 (232)
CDS2015-5-C	0.7 (19.8)	1.5 (1.1)	83 (313)
CDS2020-C	1.1 (31.2)	1.5 (1.1)	99 (376)
CDS2025-C	1.6 (45.3)	1.5 (1.1)	116 (439)
CDS3020-C	2.0 (56.6)	2.1 (1.6)	184 (696)
CDS3025-C	2.4 (68.0)	2.1 (1.6)	210 (795)
CDS3030-C	3.0 (85.0)	2.1 (1.6)	236 (895)
CDS3035-C	3.8 (106.2)	2.1 (1.6)	263 (994)
CDS4030-C	4.5 (127.4)	5.6 (4.3)	426 (1612)
CDS4040-C	6.0 (169.9)	5.6 (4.3)	520 (1970)
CDS4045-C	7.5 (212.4)	5.6 (4.3)	568 (2149)
CDS5640-C	9.0 (254.9)	8.7 (6.7)	758 (2869)
CDS5653-C	14.0 (396.5)	8.7 (6.7)	965 (3652)
CDS5668-C	19.0 (538.1)	8.7 (6.7)	1172 (4435)
CDS5678-C	25.0 (708)	8.7 (6.7)	1309 (4956)
CDS2015-5-F	0.7 (19.8)	1.5 (1.1)	109 (413)
CDS2020-5-F	1.1 (31.2)	1.5 (1.1)	142 (538)
CDS2025-5-F	1.6 (45.3)	1.5 (1.1)	153 (579)
CDS3020-6-F	2.0 (56.6)	2.1 (1.6)	202 (765)
CDS3030-6-F	3.0 (85.0)	2.1 (1.6)	288 (1089)
CDS3035-6-F	3.8 (106.2)	2.1 (1.6)	327 (1236)
CDS4030-7-F	4.5 (127.4)	4.3 (3.3)	402 (1522)
CDS4040-7-F	6.0 (169.9)	4.3 (3.3)	500 (1892)
CDS4045-7-F	7.5 (212.4)	4.3 (3.3)	543 (2056)
CDS5640-8-F	9.0 (254.9)	5.6 (4.3)	554 (2098)
CDS5653-8-F	14.0 (396.5)	5.6 (4.3)	720 (2727)
CDS5668-8-F	19.0 (538.1)	5.6 (4.3)	859 (3252)
CDS5678-8-F	25.0 (708)	5.6 (4.3)	1081 (4091)
CDS3030-V	3.0 (85.0)	1.5 (1.1)	N/A
CDS5042-V	9.0 (254.9)	1.6 (1.2)	N/A
CDS5050-V	11.0 (311.5)	1.6 (1.2)	N/A
CDS7070-V	26.0 (736.3)	3.3 (2.5)	N/A
CDS10060-V	30.0 (849.6)	7.1 (5.4)	N/A
CDS10080-V	50.0 (1416.0)	7.1 (5.4)	N/A
CDS100100-V	64.0 (1812.5)	7.1 (5.4)	N/A

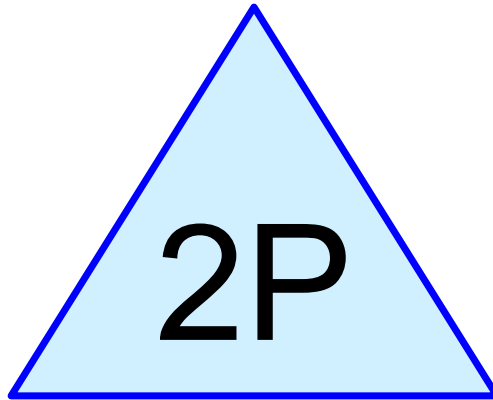
0.7 CFS > 0.64 CFS

CDS2015-4-C has capacity to treat WQv Storm

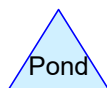
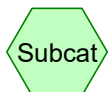
* Note that all “-C” systems can be fitted with a grated inlet if necessary

* Note that system internals for the “-C” and “-F” models can be put in larger manholes to accommodate site demands which may change standard capacities listed above

END OF SECTION



Subsurface Det Basin 1



Summary for Pond 2P: Subsurface Det Basin 1

Volume	Invert	Avail.Storage	Storage Description
#1	165.00'	908 cf	20.50'W x 47.00'L x 3.50'H Prismatic Impervious 3,372 cf Overall - 1,103 cf Embedded = 2,270 cf x 40.0% Voids
#2	165.50'	1,103 cf	ADS_StormTech SC-740 +Cap x 24 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 24 Chambers in 4 Rows
		2,010 cf	Total Available Storage

Stage-Area-Storage for Pond 2P: Subsurface Det Basin 1

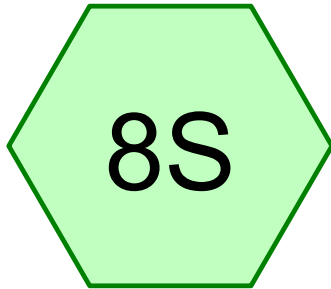
Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
165.00	0	167.55	1,611
165.05	19	167.60	1,638
165.10	39	167.65	1,664
165.15	58	167.70	1,690
165.20	77	167.75	1,713
165.25	96	167.80	1,736
165.30	116	167.85	1,757
165.35	135	167.90	1,778
165.40	154	167.95	1,798
165.45	173	168.00	1,818
165.50	193	168.05	1,837
165.55	231	168.10	1,856
165.60	269	168.15	1,876
165.65	308	168.20	1,895
165.70	346	168.25	1,914
165.75	384	168.30	1,933
165.80	422	168.35	1,953
165.85	460	168.40	1,972
165.90	497	168.45	1,991
165.95	535	168.50	2,010
166.00	572		
166.05	609		
166.10	646		
166.15	683		
166.20	720		
166.25	757		
166.30	793		
166.35	829		
166.40	865		
166.45	901		
166.50	937		
166.55	972		
166.60	1,007		
166.65	1,042		
166.70	1,077		
166.75	1,111		
166.80	1,145		
166.85	1,179		
166.90	1,212		
166.95	1,245		
167.00	1,278		
167.05	1,311		
167.10	1,343		
167.15	1,375		
167.20	1,406		
167.25	1,437		
167.30	1,467		
167.35	1,497		
167.40	1,526		
167.45	1,555		
167.50	1,584		

Summary for Pond 3P: Subsurface Det Basin 2

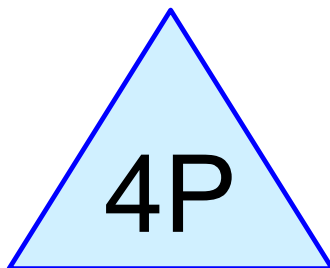
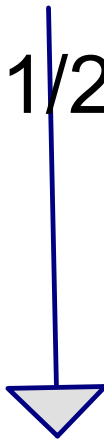
Volume	Invert	Avail.Storage	Storage Description
#1	168.00'	908 cf	20.50'W x 47.00'L x 3.50'H Prismatic 3,372 cf Overall - 1,103 cf Embedded = 2,270 cf x 40.0% Voids
#2	168.50'	1,103 cf	ADS_StormTech SC-740 +Cap x 24 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 24 Chambers in 4 Rows
		2,010 cf	Total Available Storage

Stage-Area-Storage for Pond 3P: Subsurface Det Basin 2

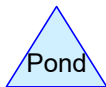
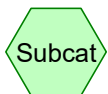
Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
168.00	0	170.55	1,611
168.05	19	170.60	1,638
168.10	39	170.65	1,664
168.15	58	170.70	1,690
168.20	77	170.75	1,713
168.25	96	170.80	1,736
168.30	116	170.85	1,757
168.35	135	170.90	1,778
168.40	154	170.95	1,798
168.45	173	171.00	1,818
168.50	193	171.05	1,837
168.55	231	171.10	1,856
168.60	269	171.15	1,876
168.65	308	171.20	1,895
168.70	346	171.25	1,914
168.75	384	171.30	1,933
168.80	422	171.35	1,953
168.85	460	171.40	1,972
168.90	497	171.45	1,991
168.95	535	171.50	2,010
169.00	572		
169.05	609		
169.10	646		
169.15	683		
169.20	720		
169.25	757		
169.30	793		
169.35	829		
169.40	865		
169.45	901		
169.50	937		
169.55	972		
169.60	1,007		
169.65	1,042		
169.70	1,077		
169.75	1,111		
169.80	1,145		
169.85	1,179		
169.90	1,212		
169.95	1,245		
170.00	1,278		
170.05	1,311		
170.10	1,343		
170.15	1,375		
170.20	1,406		
170.25	1,437		
170.30	1,467		
170.35	1,497		
170.40	1,526		
170.45	1,555		
170.50	1,584		



POST- 1/2 BLDG



RAIN GARDEN



Routing Diagram for 20483-hydro

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20483-hydro

Type II 24-hr 1-YR Rainfall=2.23"

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Page 3

Summary for Subcatchment 8S: POST- 1/2 BLDG

Runoff = 0.58 cfs @ 11.96 hrs, Volume= 0.030 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.23"

Area (ac)	CN	Description
* 0.181	98	1/2 Building
0.181		100.00% Impervious Area

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

Summary for Pond 4P: RAIN GARDEN

Inflow Area = 0.181 ac, 100.00% Impervious, Inflow Depth = 2.00" for 1-YR event
 Inflow = 0.58 cfs @ 11.96 hrs, Volume= 0.030 af
 Outflow = 0.22 cfs @ 12.06 hrs, Volume= 0.035 af, Atten= 62%, Lag= 6.4 min
 Discarded = 0.03 cfs @ 12.06 hrs, Volume= 0.032 af
 Primary = 0.19 cfs @ 12.06 hrs, Volume= 0.003 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 167.07' @ 12.06 hrs Surf.Area= 730 sf Storage= 491 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 68.9 min (828.9 - 760.0)

Volume	Invert	Avail.Storage	Storage Description
#1	164.25'	859 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
164.25	414	0.0	0	0
166.25	414	20.0	166	166
166.50	414	0.0	0	166
167.00	690	100.0	276	442
167.50	981	100.0	418	859

Device	Routing	Invert	Outlet Devices
#1	Discarded	164.25'	2.000 in/hr Exfiltration over Surface area
#2	Primary	167.00'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.06 hrs HW=167.07' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.19 cfs @ 12.06 hrs HW=167.07' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 0.19 cfs @ 0.86 fps)

20483-hydro

Type II 24-hr 10-YR Rainfall=4.15"

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Summary for Subcatchment 8S: POST- 1/2 BLDG

Runoff = 1.10 cfs @ 11.96 hrs, Volume= 0.059 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.15"

Area (ac)	CN	Description
* 0.181	98	1/2 Building
0.181		100.00% Impervious Area

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

Summary for Pond 4P: RAIN GARDEN

Inflow Area = 0.181 ac, 100.00% Impervious, Inflow Depth = 3.91" for 10-YR event
 Inflow = 1.10 cfs @ 11.96 hrs, Volume= 0.059 af
 Outflow = 1.05 cfs @ 11.98 hrs, Volume= 0.061 af, Atten= 5%, Lag= 1.7 min
 Discarded = 0.04 cfs @ 11.98 hrs, Volume= 0.040 af
 Primary = 1.01 cfs @ 11.98 hrs, Volume= 0.021 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 167.21' @ 11.98 hrs Surf.Area= 814 sf Storage= 602 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 68.9 min (815.2 - 746.3)

Volume	Invert	Avail.Storage	Storage Description
#1	164.25'	859 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
164.25	414	0.0	0	0
166.25	414	20.0	166	166
166.50	414	0.0	0	166
167.00	690	100.0	276	442
167.50	981	100.0	418	859

Device	Routing	Invert	Outlet Devices
#1	Discarded	164.25'	2.000 in/hr Exfiltration over Surface area
#2	Primary	167.00'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 11.98 hrs HW=167.21' (Free Discharge)
 ↕ **1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.01 cfs @ 11.98 hrs HW=167.21' (Free Discharge)
 ↕ **2=Orifice/Grate** (Weir Controls 1.01 cfs @ 1.51 fps)

20483-hydro

Type II 24-hr 50-YR Rainfall=5.53"

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Summary for Subcatchment 8S: POST- 1/2 BLDG

Runoff = 1.47 cfs @ 11.96 hrs, Volume= 0.080 af, Depth= 5.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=5.53"

Area (ac)	CN	Description
* 0.181	98	1/2 Building
0.181		100.00% Impervious Area

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

Summary for Pond 4P: RAIN GARDEN

Inflow Area = 0.181 ac, 100.00% Impervious, Inflow Depth = 5.29" for 50-YR event
 Inflow = 1.47 cfs @ 11.96 hrs, Volume= 0.080 af
 Outflow = 1.42 cfs @ 11.98 hrs, Volume= 0.081 af, Atten= 4%, Lag= 1.5 min
 Discarded = 0.04 cfs @ 11.98 hrs, Volume= 0.046 af
 Primary = 1.38 cfs @ 11.98 hrs, Volume= 0.035 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 167.26' @ 11.98 hrs Surf.Area= 842 sf Storage= 642 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 72.0 min (813.3 - 741.3)

Volume	Invert	Avail.Storage	Storage Description
#1	164.25'	859 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
164.25	414	0.0	0	0
166.25	414	20.0	166	166
166.50	414	0.0	0	166
167.00	690	100.0	276	442
167.50	981	100.0	418	859

Device	Routing	Invert	Outlet Devices
#1	Discarded	164.25'	2.000 in/hr Exfiltration over Surface area
#2	Primary	167.00'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 11.98 hrs HW=167.26' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.38 cfs @ 11.98 hrs HW=167.26' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 1.38 cfs @ 1.67 fps)

Summary for Subcatchment 8S: POST- 1/2 BLDG

Runoff = 1.87 cfs @ 11.96 hrs, Volume= 0.102 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=7.00"

Area (ac)	CN	Description
* 0.181	98	1/2 Building
0.181		100.00% Impervious Area

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

Summary for Pond 4P: RAIN GARDEN

Inflow Area = 0.181 ac, 100.00% Impervious, Inflow Depth = 6.76" for 100-YR event
 Inflow = 1.87 cfs @ 11.96 hrs, Volume= 0.102 af
 Outflow = 1.80 cfs @ 11.98 hrs, Volume= 0.103 af, Atten= 3%, Lag= 1.5 min
 Discarded = 0.04 cfs @ 11.98 hrs, Volume= 0.051 af
 Primary = 1.76 cfs @ 11.98 hrs, Volume= 0.052 af

Routing by Sim-Route method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 167.31' @ 11.98 hrs Surf.Area= 870 sf Storage= 682 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 72.1 min (810.0 - 737.8)

Volume	Invert	Avail.Storage	Storage Description
#1	164.25'	859 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
164.25	414	0.0	0	0
166.25	414	20.0	166	166
166.50	414	0.0	0	166
167.00	690	100.0	276	442
167.50	981	100.0	418	859

Device	Routing	Invert	Outlet Devices
#1	Discarded	164.25'	2.000 in/hr Exfiltration over Surface area
#2	Primary	167.00'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 11.98 hrs HW=167.31' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.76 cfs @ 11.98 hrs HW=167.31' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 1.76 cfs @ 1.82 fps)

20483-hydro

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Events for Subcatchment 8S: POST- 1/2 BLDG

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-YR	2.23	0.58	0.030	2.00
10-YR	4.15	1.10	0.059	3.91
50-YR	5.53	1.47	0.080	5.29
100-YR	7.00	1.87	0.102	6.76

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Events for Pond 4P: RAIN GARDEN

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-YR	0.58	0.22	0.03	0.19	167.07	491
10-YR	1.10	1.05	0.04	1.01	167.21	602
50-YR	1.47	1.42	0.04	1.38	167.26	642
100-YR	1.87	1.80	0.04	1.76	167.31	682

Part 9:

Plans

HACKETT BOULEVARD

(132' R.O.W.)

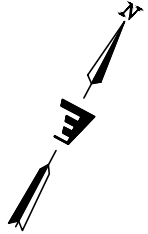
5S PRE-DEV (OFF-SITE)
(0.202 AC.)

P.O.I. #1


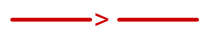
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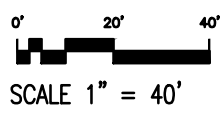

1S PRE-DEV (ON-SITE)
(0.837 AC.)

COMPACTOR
RECYCLING



LEGEND

-  CATCHMENT BOUNDARY
-  TIME OF CONCENTRATION PATH

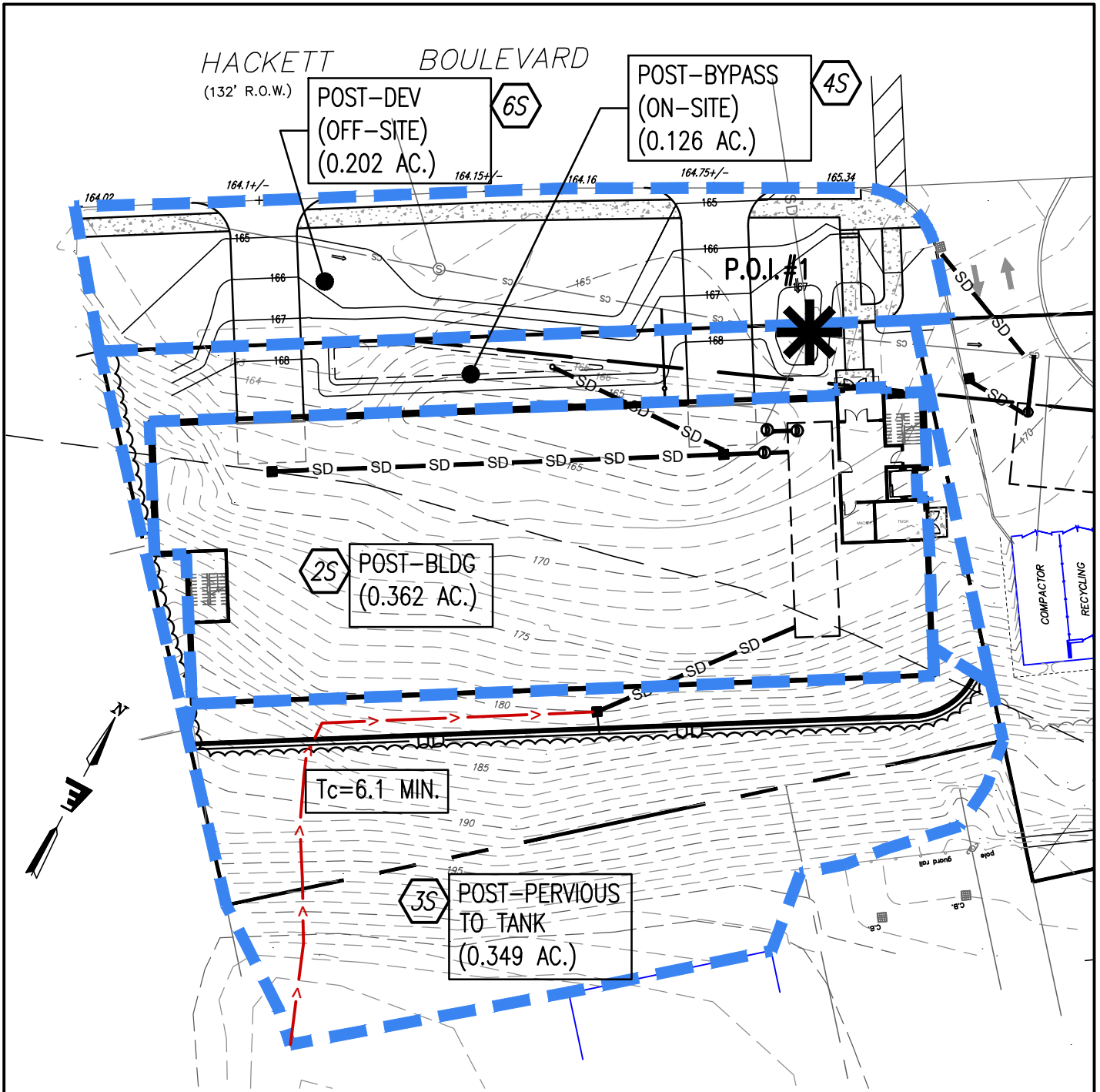



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PRE-DEVELOPMENT DRAINAGE AREA MAP

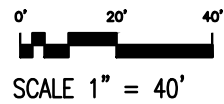
HACKETT BOULEVARD APARTMENTS

Checked By: MJD	Scale: 1" = 40'
Drawn By: MJD	Project No.: 20483
Date: 2/11/2021	Drawing No.: HYD1



LEGEND

- CATCHMENT BOUNDARY
- TIME OF CONCENTRATION PATH



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POST-DEVELOPMENT DRAINAGE AREA MAP

HACKETT BOULEVARD APARTMENTS

Checked By: MJD	Scale: 1" = 40'
Drawn By: MJD	Project No.: 20483
Date: 2/11/2021	Drawing No.: HYD2