



Transcontinental Gas Pipe Line Company, LLC

Section 3-2 PCSM Plan for Effort Loop

Regional Energy Access Expansion Project – Effort Loop

MLV-505LD86

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SECTION 3.2.1
EFFORT LOOP NARRATIVE

1. Project Description

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc. is proposing the Regional Energy Access Expansion Project – Effort Loop. Effort Loop consists of installing approximately 13.8 miles of 42-inch diameter pipeline collocated with Transco's Leidy Line System from MP 43.72 to MP 57.50 in Monroe County, PA. Transco will be installing a Mainline Valve (MLV) near the Effort Loop Pipeline as a means to isolate gas flows along sections of a pipeline.

Effort Loop is proposed as part of the overall Regional Energy Access Expansion Project (Project). Effort Loop is an expansion of Transco's existing natural gas transmission system and an extension of Transco's system through a capacity lease with National Fuel Gas Supply Corporation. The Project will enable Transco to provide 829,400 dekatherms per day (Dth/d) of incremental firm transportation capacity for abundant supplies of natural gas from northern and western Pennsylvania to existing and growing markets in Transco's Zone 6. Transco's Zone 6 includes the portion of the Transco system in Pennsylvania, New York, New Jersey, and Maryland.

The Effort Loop right-of-way (ROW) will be restored to original conditions. This Post Construction Stormwater Management (PCSM) plan has been developed for and is only applicable to the MLV-505LD86 site. The PCSM Plan shall be designed and implemented to be consistent with the PCSM Plan under 25 Pa. Code § 102.8 (relating to PCSM requirements). The work and disturbed areas are located within Transco property, existing easements or legally obtained workspace. The limit of disturbance (LOD) for the MLV-505LD86 site will be approximately 9.60 acres. Subject to FERC's certification and receipt of the necessary permits and authorizations, Transco anticipates construction of the Project would commence in second quarter 2023 to meet a target in-service date of fourth quarter 2024.

2. Topographic Features of the Area

Project Location Maps for the MLV-505LD86 site are included in Attachment 1 The map shows the topographical features of the general site vicinity and is based on the USGS 7.5 Minute topographical mapping of the Blakeslee, Pocono Pines, Brodheadsville, and Saylorsburg, Pennsylvania quadrangles.

3. Receiving Surface Waters

The following table (Table 1) lists each watershed located in the MLV-505LD86 Project Area, its Chapter 93 Water Quality Standards, and Pennsylvania Fish and Boat Commission classifications. A Wetland and Watercourse Delineation Report is included in Attachment A of the ESCP permit application.

Table 1 – Receiving Waters			
Watershed Name	Designated Use	Existing Use	PFBC Classification
MLV-505LD86			
Sugar Hollow Creek	CWF, MF	HQ-CWF, MF	Class A Wild Trout
CWF: Cold Water Fishes, MF: Migratory Fishes			

An evaluation of potential hydrologic impacts to wetlands was undertaken at the MLV-505LD86. There are no significant changes in the pre and post construction drainage area associated with the PCSM facilities. There are no wetlands immediately downslope of the proposed PCSM facility that would result in a change to the hydrologic conditions of the area that would result in a significant impact to wetland hydrology. The pre and post site hydrology will flow into an existing roadside ditch along Sugar Hollow Road then be covered via existing cross pipe into an existing wetland/riparian complex associated with Sugar Hollow Creek. No significant change to the assumed wetland on the east side of Sugar Hollow Road is proposed due to that wetland's hydrology being tied to the high groundwater associated with Sugar Hollow Creek.

4. Types, Depth, Slope, Locations & Limitation of the Soils and Geologic Formations

The soil associations on site were identified by soil map units as mapped in the Web Soil Survey website (<https://websoilsurvey.sc.egov.usda.gov/>) by the United States Dept. of Agriculture (USDA), Natural Resources Conservation Service (NRCS). There are 6 soil mapping units located within the LOD for the MLV-505LD86 site, see Table 2 below.

Table 2 – Soils mapping units within the LOD	
Soil Mapping Unit	Soil Series
MLV-505LD86	
KvB	Klinesville channery silt loam, 3 to 8 percent slopes
KvD	Klinesville channery silt loam, 15 to 25 percent slopes
LkB	Leck kill channery silt loam, 2 to 8 percent slopes
LkC	Leck kill channery silt loam, 8 to 15 percent slopes
LkD	Leck kill channery silt loam, 15 to 25 percent slopes

WKE	Weikert and Klinesville soils, steep

Detailed descriptions and mapping of soil mapping units are provided in the Attachment 2. Soil use limitations (outlined in Table 3) were reviewed in relation to the MLV-505LD86 site and resolutions were identified in Section 4.1.

Table 3 – Limitations of Pennsylvania Soils Pertaining to Earth Disturbance Projects (Erosion and Sediment Control Best Management Practice (BMP) Manual – Technical Guidance Number 363-3134-008/Page 401)																	
SOIL NAME	SOIL WITH SLOPE CLASS	CUTBANKS CAVE	CORROSIVE TO CONCRETE\STEEL	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE/ SEASONAL HIGH WATER TABLE	HYDRIC/ HYDRIC INCLUSIONS	LOW STRENGTH / LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK - SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
Klinesville	KvB, KvD	X	C/S	X	X			X		X		X	X				
Leck Kill	LkB, LkC, LkD	X	C						X	X	X	X	X				X
Weikert	WKE	X	C/S	X				X	X	X	X	X	X				

4.1. Resolution of Soil Limitations

Transco proposes the following resolutions to compensate for soil limitations summarized in Table 3 above:

1. To offset the caving of cutbanks, trenching operations will be conducted in accordance with the OSHA Technical Manual for Trenching.
2. Preventative coatings shall be used to prevent corrosion of concrete and/ or steel.
3. When bedrock is encountered it will be removed by mechanical methods or blasting. Blasting operations will conform with local, state, and federal regulations.
4. Precautions will be taken to prevent slope failure when working within low strength soils by flattening cut / fill slopes, not overloading, maintaining lateral support, and preventing saturation of soils. Low strength soils will not be used for roadway construction.

5. Excavation in soils prone to flooding, slow percolation, ponding, wetness, located in a seasonal high water table, or which are hydric, will likely encounter water. Compensation will involve dewatering with appropriate means such as pump water filter bags, sediment traps, etc.
6. Soils that have the potential to swell, shrink, or heave due to frost action may cause damage to roadways or pads. Where foundations are critical, compensation may require removal and replacement of soils with suitable material.
7. In circumstances where soils appear to be a poor source of topsoil, droughty or prone to wetness, soil testing will be performed to determine the appropriate applications of soil amendments to promote growth. Soils onsite that are fair sources of topsoil, will be identified, stripped and stockpiled for use during restoration.
8. In order to minimize erosion of soils that are easily erodible, compensation may involve providing a protective lining, to apply seed, mulch, erosion control blankets (either in rolls or hydraulically applied), tracking slopes, upstream diversions, waterbars, etc. to minimize soil erosion.

4.2. Geologic Formations

Transco retained Civil & Environmental Consultants, Inc. (CEC) of Pittsburgh, PA to perform a geohazard assessment, the following is provided from their 2020 report. Transco utilized United States Geological Survey (USGS), Geologic Map of Pennsylvania - Map 1, dated 1980 (online), to evaluate geologic hazards on the Project. The desktop analysis completed for the Project by CEC revealed that the Effort Loop Pipeline does not cross known, mapped, or inferred faults. No mines or Karst formations were identified in the site vicinity. However, the analysis outlined that Effort Loop Pipeline lies within a zone of moderate to high landslide incidence and susceptibility.

Due to the moderate to high landslide incidence and susceptibility, a Geological Hazard Assessment and Mitigation Plan was completed by CEC and is submitted with this application (Attachment B). The Geological Hazard Assessment and Mitigation Plan identifies appropriate best management practices to avoid and mitigate for conditions encountered during construction.

5. Characterizations of Earth Disturbance Activities, Including Past, Present, and Proposed Land Uses

Transco will be installing MLV-505LD86 near the Effort Loop Pipeline as a means to isolate gas flows. Pig launchers/receivers, valves and other ancillary facilities will be located at this MLV facility. The work and disturbed areas are located within Transco property, existing easements, or legally obtained workspace where the past, present, and proposed land use is primarily an existing pipeline ROW. Disturbed areas within the temporary workspaces will be restored to the original contours. Using data taken from Google Earth and Multi-Resolution Land Characteristics (MRLC) Consortium website (<https://www.mrlc.gov/viewer/>), it appears that a major portion of the Effort Loop MLV was existing and maintained gas pipeline right-of-way for the past 20 years and will continue to be an existing and maintained gas pipeline right-of-way once the Project is complete. Along the edges of the ROW land use is primarily forested. Based on the surrounding land characteristics, land use prior to ROW construction within the past 50 years would likely have been either forested land or meadow. A gravel pad and access road will be constructed at the Effort Loop MLV-505LD86 site. The contractor will construct stormwater Best Management Practices (BMPs) to mitigate the increase in volume and peak rates associated with construction. The proposed BMPs are designed to evaporate and infiltrate the net increase in volume between the pre- and post-development 2-year rain events. Refer to the Stormwater BMP Sizing Calculations in Attachment 4 for additional information.

6. Post Construction Stormwater Management Best Management Practices, Installation Sequence and PCSM Critical Stages

Increase in stormwater runoff during and after construction shall be controlled by sequencing the operations and using a selection of BMPs. BMP design calculations and drawings are provided in Attachment 4 and PCSM Plan set.

6.1. MLV-505LD86

The MLV-505LD86 site will utilize several PCSM BMPs to control stormwater runoff, attenuate peak flow rate and volume, and provide infiltration. Excess stormwater runoff will be directed to the berms, basin and subsurface beds, via a series of channels, for infiltration and controlled discharge. BMP design calculations and drawings are provided in Attachment 4 and PCSM Plan set. For these calculations, Test Pit 202, Test Pit 203, Test Pit 204, Test Pit 206, Test Pit 207, Test Pit 208 and Test Pit 209 were selected and used for design criteria. See Attachment 3 for the specific infiltration data. Many of these test pits exhibited infiltration rates exceeding 10" per hour. Therefore, each BMP will be constructed with a 24" layer of soil amendment

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underlayment to mitigate excessive dewatering times and to provide additional water quality. A summary of the PCSM BMP design criteria is below.

MLV-505LD86: Test Pit Data

Test Pits					
	TP 206	TP 207	TP 204	TP 202	TP 203
Existing Ground Elevation (ft)	964.23	964.51	913.93	926.17	924.38
Elevation of Confining Layer (ft)	None Found	None Found	None Found	None Found	None Found
Depth to Confining Layer (in)	>52"	>52"	>46"	>36"	>47"
Lowest Observed Infiltration Rate (in/hr)	>18	>18	12.38	11.63	>18

MLV-505LD86: Design Criteria

PCSM BMP					
	Infiltration Berm 1 (TP 206 & 207)	Infiltration Berm 2 (TP 206 & TP 207)	Subsurface Infiltration Bed #1 (TP 204)	Subsurface Infiltration Bed #2 (TP 204)	Infiltration Basin (TP 202 & 203)
Minimum Final Grade (ft)	969	963	912	912	924.5
Interpreted Elevation of Confining Layer (ft)	<965.7	<960.2	NA	NA	<920.5
Provided Separation (in)	>27 (No Confining Layer Found)	>33 (No Confining Layer Found)	>24 (No Confining Layer Found)	>24 (No Confining Layer Found)	>48 (No Confining Layer Found)
Infiltration Rate Used (in/hr)	1.0	1.0	1.0	1.0	1.0

BMP Installation Sequence

The PCSM BMPs should be installed in a manner designed to:

1. Protect BMP areas associated with infiltration from compaction prior to and during installation.
2. Maintain proper Erosion and Sediment Control Measures during construction.
3. As areas are completed, seed and mulch in accordance with the section below.

4. Do not remove Erosion and Sediment Control Measures until site is fully stabilized.
5. Install BMPs as follows:

Infiltration Berms*

- a. Complete site grading and stabilize within the limit of disturbance except where the infiltration berms will be constructed. Make every effort to minimize berm footprint and necessary zone of disturbance (including both removal of exiting vegetation and disturbance of empty soil).
- b. Maintain Compost Filter Sock Sediment Trap #13 until infiltration berms are completed.
- c. Infiltration berm construction should begin with the construction of Berm #2 and proceed in an upgradient manner to Berm #1.
- d. Lightly scarify the soil in the area of the proposed berm before placement of berm fill. Decompact subgrade as necessary to a depth of 2' if subgrade has been overcompacted. Limit construction equipment only to the berm footprint.
- e. Utilize suitable fill material to make up the major portion of the berm. Soil should be added in 8-inch lifts and compacted after each addition according to design specifications. The slope and shape of the berm should be graded out as soil is added.
- f. Protect the surface ponding area at the base of the berm from compaction. If compaction of this area does occur, scarify the soil to a depth of at least 8 inches.
- g. Complete infiltration testing prior to installation of soil amendment and submit to MCCD.
- h. Install soil amendment according to detail.
- i. Complete infiltration testing following installation of soil amendment and submit to MCCD.
- j. Complete final grading of the berm after the top layer of soil is added. Tamp soil down lightly and smooth sides of the berm. The crest and base of the berm should be at level grade. Install erosion control blanket as specified.

- k. Plant berm with turf, meadow plants, shrubs or trees, as desired.
- l. Mulch planted and disturbed areas with compost mulch to prevent erosion while plants become established.
- m. Following berm construction, remove Compost Filter Sock Sediment Trap #13 and establish PCSM Channel C-4 into the berm area.

Infiltration Basin*

- a. Protect infiltration basin area from compaction prior to installation.
- b. Dewater sediment trap as necessary using pump water filter bags. Filter bags will be within the drainage area of existing perimeter compost filter sock.
- c. Remove sediment accumulated within the basin during its use as a sediment trap.
- d. Convert temporary sediment trap outlet control structure to the permanent outlet structure for the infiltration basin. Plug perforations using shrink-proof, water-proof sealant. Contact MCCD prior to the BMP Conversion.
- e. Complete infiltration testing prior to installation of soil amendment and submit to MCCD.
- f. Install soil amendment according to detail.
- g. Complete infiltration testing following installation of soil amendment and submit to MCCD.
- h. Do not remove inlet protection or other erosion and sediment control measures until site is fully stabilized.

Subsurface Infiltration Bed*

- a. Protect infiltration bed area from compaction prior to installation.
- b. Excavate infiltration beds.
- c. Complete infiltration testing prior to installation of soil amendment and submit to MCCD.
- d. Install soil amendment according to the detail

- e. Complete infiltration testing following installation of soil amendment and submit to MCCD.
- f. Install upstream and downstream control structures, cleanouts, perforated piping, and all other necessary stormwater structures.
- g. Install geotextile in accordance with the manufacturer's standards and recommendations.
- h. Clean-washed, uniformly graded aggregate should be placed in the bed in maximum 8-inch lifts. Lightly compact each layer, keeping construction equipment off the bed bottom as much as possible.

Channels/culverts*

- a. Construct PCSM Channels C-5 and C-6 as shown in the plan.
 - b. Stabilize the channels with specified channel linings.
 - c. Install culverts as shown on the plan.
- 6. Sediment that enters BMPs during construction is to be removed within 24 hours.
 - 7. Seed and stabilize remaining topsoil as per Seeding and Mulching specifications.
 - 8. Follow long term operation and maintenance guidelines discussed below.

**Portions of the BMP installation sequence denoted with an asterisk (*) above are critical stages as discussed on this sheet.*

PCSM Critical Stages

Critical points requiring visits by the licensed professional or delegate are as follows:

- 1. Prior to construction to ensure the areas of the infiltration berms, infiltration basin and subsurface infiltration beds have been properly secured with fencing or other methods to prevent compaction of the infiltration areas.
- 2. For the final grading of the access road, ensuring it is constructed according to the plan details for proper conveyance of runoff.
- 3. Following final grading and seeding of the channels in order to confirm they have been constructed according to the plan details for proper collection and conveyance of runoff. Periodic assessments will need to be made to ensure accumulated sediment have been cleaned out, so the channels maintain the necessary design volumes.

4. At the start of construction of the infiltration berms, infiltration basin and subsurface infiltration beds to ascertain the infiltration areas have not been compacted.
5. Prior to installation of the soil amendment to complete infiltration testing.
6. During the layout and excavation of the outlet control structures for the infiltration basin and beds, the professional or delegate will ensure sizing, materials specifications, and construction procedures are followed to enable proper storage in the basin.
7. Following installation of the soil amendment to complete infiltration testing.
8. Following final grading and seeding of the infiltration berms, infiltration basin and subsurface infiltration beds in order to confirm they have been constructed according to the plan details for proper collection, infiltration, and conveyance of runoff. Periodic assessment will need to be made to ensure that accumulated sediment have been cleaned out so the BMPs maintain the necessary design volumes.
9. For final inspection of constructed channels, culverts, berms, basin and beds.
10. At the establishment of hard surface stabilization or 70% vegetation covers to allow removal of E&S controls.
11. Following construction, the licensed professional shall prepare a written report including photographs documenting the various critical stage inspections for the project. This report shall be available to the MCCD upon request.

7. Net Change in Volume and Rate of Runoff

An analysis of pre- and post-development stormwater runoff was performed for the proposed MLV site associated with the Effort Loop Pipeline. The installation of the valve and associated access road will increase the volume of stormwater runoff between the pre and post development 2 year rain event due to the increase in the type and size of the impervious area. The increase in impervious area will increase the pre to post development peak runoff for the 1-, 2-, 10-, 25-, 50-, and 100-year storm events. Design calculations using HydroCAD software are included in Attachment 4. Refer to the Post-Construction Stormwater Management (PCSM) Plan drawings for additional information.

7.1. MLV-505LD86

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Pre- and Post-Construction Stormwater Volume for 2-yr Rainfall event

Pre-construction (cf)	Post-construction before BMPs (cf)	Post-construction after BMPs (cf)	Net (cf)
15,164	18,697	12,352	-2,812

DA-1: Pre-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.01	0.15	0.83	2.00	3.90

DA-1: Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.01	0.07	1.36	3.57	6.23	10.01

DA-1: Post-Construction w/ BMPs Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.00	0.12	0.71	1.49	3.87

DA-1: Difference between Pre-Construction and Post-Construction w/ BMPs

	1-year	2-year	10-year	25-year	50-year	100-year
NET Difference	-0.00	-0.01	-0.03	-0.12	-0.51	-0.03

DA-2: Pre-Construction Peak Discharge Rates(cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.38	0.93	3.22	5.40	7.61	10.45

DA-2: Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
1.06	1.76	4.01	5.91	7.75	10.03

DA-2: Post-Construction w/ BMPs Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.28	0.39	2.07	4.58	6.11	8.01

DA-2: Difference between Pre-Construction and Post-Construction w/ BMPs

	1-year	2-year	10-year	25-year	50-year	100-year
NET Difference	-0.10	-0.54	-1.15	-0.82	-1.50	-2.44

DA-3: Pre-Construction Peak Discharge Rates(cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.00	0.05	0.33	1.25	3.12

DA-3: Post-Construction Peak Discharge Rates (cfs)

1-year	2-year	10-year	25-year	50-year	100-year
0.00	0.00	0.05	0.33	1.25	3.12

8. Temporary and Permanent Stabilization

Appropriate seed mixtures for temporary and permanent stabilization are outlined on the notes sheet of the plan drawings.

8.1. Permanent Stabilization

Upon final completion of an earth disturbance activity or stage or phase of an activity, the site shall immediately have topsoil restored, replaced, or amended, seeded, mulched or otherwise permanently stabilized and protected from accelerated erosion and sedimentation. E&S BMPs shall be implemented and maintained until the permanent stabilization is completed. Once permanent stabilization has been established, the temporary E&S BMPs shall be removed. Areas disturbed in the act of removing temporary E&S BMPs shall be permanently stabilized upon completion of the temporary E&S BMP removal activity. For an earth disturbance activity or stage or phase of an activity to be considered permanently stabilized, the disturbed areas shall be covered with one of the following:

- A minimum uniform 70% perennial vegetative cover, with a density capable of resisting accelerated erosion and sedimentation.
- An acceptable BMP which permanently minimizes accelerated erosion and sedimentation.
- When erosion and sedimentation controls are to be removed in agricultural non-sensitive areas (streams/wetlands), agricultural landowners shall maintain agricultural BMPs per PaDEP regulations.

8.2. Temporary Stabilization

Upon temporary cessation of an earth disturbance activity or stage or phase of an activity where a cessation of earth disturbance activities will exceed 4 days (including agricultural areas), the site shall be immediately seeded, mulched, or otherwise protected from accelerated erosion and sedimentation pending future earth disturbance activities. For an earth disturbance activity or stage or phase of an activity to be considered temporarily stabilized, the disturbed areas shall be covered with one of the following:

- A minimum uniform coverage of mulch and seed, with a density capable of resisting accelerated erosion and sedimentation.

- An acceptable BMP which temporarily minimizes accelerated erosion and sedimentation.

8.3. Stabilization During Non-Growing Season

When utility construction must be done and is completed during a non-growing season, interim stabilization BMPs must be implemented and adequately maintained. The application of straw mulch at the rate of 3.0 tons per acre is required. The BMPs should be inspected weekly (unless snow covered) and after each runoff event to identify areas that become bare. Temporary erosion and sediment pollution controls must be maintained.

9. Long Term Operation and Maintenance Schedule

PCSM BMPs should be properly maintained to ensure their effectiveness. Transcontinental Gas Pipe Line Company, LLC will be responsible for the long-term operation and maintenance of the PCSM BMPs proposed at MLV-505LD86. Sheet flow conditions and infiltration must be sustained throughout the life of the BMP. BMPs should be inspected for clogging from sediment or debris, damage by foot or vehicular traffic, and flow channelization. Inspections should be made on a quarterly basis for the first two years following installation, and then twice per year thereafter. Inspections should also be made after every storm event greater than 1 inch during the establishment period.

Channel linings should be inspected for signs of erosion or dislodging, as applicable. Channels should be inspected for debris, overgrown vegetation, and other blockages. Channels should be cleaned whenever total channel depth is reduced by 25% at location. Vegetated areas will be inspected weekly and after runoff events until permanent vegetation is achieved. Once the vegetation is established, inspections of health, diversity, and density should be performed at least twice per year, during both the growing and non-growing season. Vegetative cover should be sustained at 85% and reestablished if damage greater than 50% is observed. Damaged BMPs will be repaired as soon as possible upon discovery. Repairs will be made to restore BMPs to the original design condition.

Operation and maintenance guidelines should be provided to facility owners and tenants. Sediment and debris should be routinely removed upon observation. If erosion is observed, measures should be taken to improve the dispersion method to address the source of erosion. Sediment should be removed when the BMP is thoroughly dry. Trash and debris removed from the site should be deposited only at suitable disposal/recycling sites and must comply with

applicable local, state, and federal waste regulations. Grass cover should be mowed with low ground pressure equipment annually to control noxious weeds. Mowing should be done only when the soil is dry in order to prevent tracking damage to vegetation, soil compaction, and flow concentrations. If vegetative cover is not fully established within the designated time, it should be replaced with an alternative species. Unwanted or invasive growth should be removed on an annual basis.

Vegetated areas will be inspected weekly and after runoff events until permanent vegetation is achieved. Once the vegetation is established, inspections of health, diversity, and density should be performed at least twice per year, during both the growing and non-growing season. Vegetative cover should be sustained at 85% and reestablished if damage greater than 50% is observed. Damaged BMPs will be repaired as soon as possible upon discovery. Repairs will be made to restore damaged BMPs to the original design condition.

Maintenance activities on the infiltration berms, infiltration beds and basin should be done twice annually and within 72 hours after every major storm event (> 1-inch rainfall depth). Erosion problems, damage to vegetation, sediment and debris accumulation, uniformity of in cross-section and pools of standing water should be inspected.

Transcontinental Gas Pipe Line Company, LLC will be responsible for the long term operation and maintenance of the post-construction stormwater management facilities proposed at the site.

10. Recycling and Disposal of Materials

The restoration of the pipeline right-of-way will require the removal of the temporary materials. The temporary materials include, but may not be limited to, stone surfaces and associated geotextiles. The contractors are required to dispose of the materials at suitable disposal or recycling sites and in compliance with local, state and federal regulations.

Contractors are required to inventory and manage their construction site materials. The goal is to be aware of the materials on-site, ensure they are properly maintained, used, and disposed of, and to make sure the materials are not exposed to stormwater. The following materials or substances are expected to be present on-site during construction (Note: this list is not an all-inclusive list and the materials management plan can be modified to address additional materials used on-site):

- Acids

- Detergents
- Fertilizers (nitrogen/phosphorus)
- Hydroseeding mixtures
- Petroleum based products
- Sanitary wastes
- Soil stabilization additives
- Solder
- Solvents

These materials must be stored as appropriate and shall not contact storm or non-stormwater discharges. Contractor shall provide a weatherproof container to store chemicals or erodible substances that must be kept on the site. Contractor is responsible for reading, maintaining, and making employees and subcontractors aware of Safety Data Sheets (SDSs).

11. Thermal Impacts

Due to the overall nature of the project, thermal impacts to surface waters are not anticipated. The primary means to address thermal impacts on this project is to limit the size and duration of exposed earth. Stormwater runoff associated with the installation of the mainline valve will be routed through the stormwater BMP's designed to retain and infiltrate the first surge of water from the site. The first surge of water will be the warmest water for the duration of the storm event and will quickly cool as the storm event progresses. The BMP's are designed to capture and infiltrate this warmest surge of stormwater. Based on routing calculations, stormwater is not discharged from the BMPS for the first 12 hours during a 100-year/24-hour storm event. The retention period is longer for less intense storms. Therefore, through these measures, there is no significant thermal impact to receiving waters anticipated.

12. Antidegradation Requirements

Transco evaluated the feasibility of non-discharge alternatives that would be located outside of exceptional value (EV) or high-quality (HQ) watersheds. Hydraulic models were analyzed from an efficiency and effectiveness point of view to confirm and minimize the necessary pipeline lengths and diameters to meet the Project purpose and need. The hydraulic model determined the sizing of the MLV-505LD86 site on the Effort Loop Pipeline. In order for the Project to meet the required purpose and need, siting the Effort Loop Pipeline outside of EV and HQ watersheds, is not feasible.

Therefore, Transco determined that there are no cost-effective and environmental sound viable non-discharge alternatives for the project. Transco has minimized project impacts to EV and HQ watersheds through the use of co-location with existing pipelines and protecting riparian buffers within the project workspace. Earth disturbance will be minimized to the extent practical and will be phased or sequenced to only disturbed portions that are necessary for the specific scope of work. Wherever possible, the LOD was decreased to avoid disturbing additional ground and will be kept to the minimum width and depth necessary to safely complete construction activities.

Anti-Degradation Best Available Combination of Technologies (ABACT) standards have been proposed for the MLV-505LD86 site because there are no viable non-discharge alternatives. The Erosion and Sediment Control Plan prepared for the Project outlines a more stringent design and E&S BMPs that meet ABACT standards.

The MLV-505LD86 site will result in increased discharge of stormwater to surface waters which will be mitigated by the implementation of post-construction stormwater management (PCSM) BMPs. Proposed PCSM BMPs are designed with stormwater volume reduction and water quality treatment maximized to the extent practicable within the site constraints to maintain and protect existing water quality and existing and designated uses.

13. Riparian Buffers

Temporary workspace associated with MLV-505LD86 is partially located within the forested riparian buffer of Sugar Hollow Creek. After completing construction activities, the area will be restored to a herbaceous state, as the forested portion of the riparian buffer will not be replanted. This area is located within the line-of-sight for the valve setting permanent access road that joins Sugar Hollow Road, a state road, and must remain non-forested to maintain line-of-sight for PA Department of Transportation requirements to abate a substantial threat to public health or safety.

14. Offsite Discharge Analysis

The stormwater BMPs being constructed at the MLV-505LD86 site are in areas that will discharge stormwater to offsite non-surface water. These areas have been analyzed to reduce the likelihood that these discharges will be erosive to adjacent property owners. The analysis has been performed in accordance with PADEP Document 3150-FS-DEP4124, "Off-Site Discharges

of Stormwaters to Areas That Are Not Surface Waters”. The full analysis is presented in Attachment 6 – Offsite Discharge Report. A summary of the findings is presented below.

14.1. MLV-505LD86

The MLV-505LD86 Yard site utilizes two infiltration berms, an infiltration basin and two subsurface infiltration beds. A series of PCSM channels along the access road will direct stormwater to discharge locations on both the north and south sides of the access road. On the south side of the access road, stormwater from the PCSM channels enters Infiltration Berm 1, flows into Infiltration Berm 2 and discharges to a wooded area near the southeastern part of the MLV-505LD86 site. The remainder of PCSM channels direct stormwater water into two subsurface infiltration beds south of the access road and an infiltration basin that is north of the access road. The Infiltration Basin has an outlet that discharges into an 18” diameter pipe which directs stormwater to the proposed Culvert 7. Infiltration Bed #1 and Infiltration Bed #2 discharge into Culvert 7. Stormwater from Culvert 7 enters the Sugar Hollow Road ditch then leaves the site via an 18” Sugar Hollow Road PennDOT culvert.

The infiltration berms discharge water as sheet flow which travels along a vegetative flow path, eventually entering Sugar Hollow Creek. The area downstream of the outfall is over 90% vegetated. In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity at the proposed Infiltration Berm 2 is 1.34 fps for the 25 year, 24-hour storm event. Since the outlet velocity is below 2.5 fps, downstream erosion will be minimal, if not negligible.

The infiltration basin discharges stormwater to a basin riser pipe outlet, which enters Culvert 7. Infiltration Beds #1 and #2 have a 3” outlet pipe which discharge to Culvert 7. Culvert 7 enters a Sugar Hollow Roadside ditch near the site entrance and then a PennDOT culvert south of the Limits of Disturbance. The area downstream of the outfall is over 90% vegetated. In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity from the roadside ditch is 1.89 feet per second for the for the 25 year, 24-hour storm event. Since the outlet velocity is below 2.5 fps, downstream erosion will be minimal, if not negligible.

15. Non-Structural and Structural Water Quality BMP Description

Limit of disturbance will be minimized to the maximum extent possible by disturbing only those areas necessary to complete the proposed earthwork and BMP installations.

Sensitive features such as wetlands will be protected to the maximum extent possible. These areas will be clearly delineated in the field and protected prior to construction activities taking place. Existing vegetation is not to be removed from the protected area and the areas shall not be subject to grading or movement of existing soils. Protected areas that have been disturbed/compacted during construction will be restored using soil amendment and restoration.

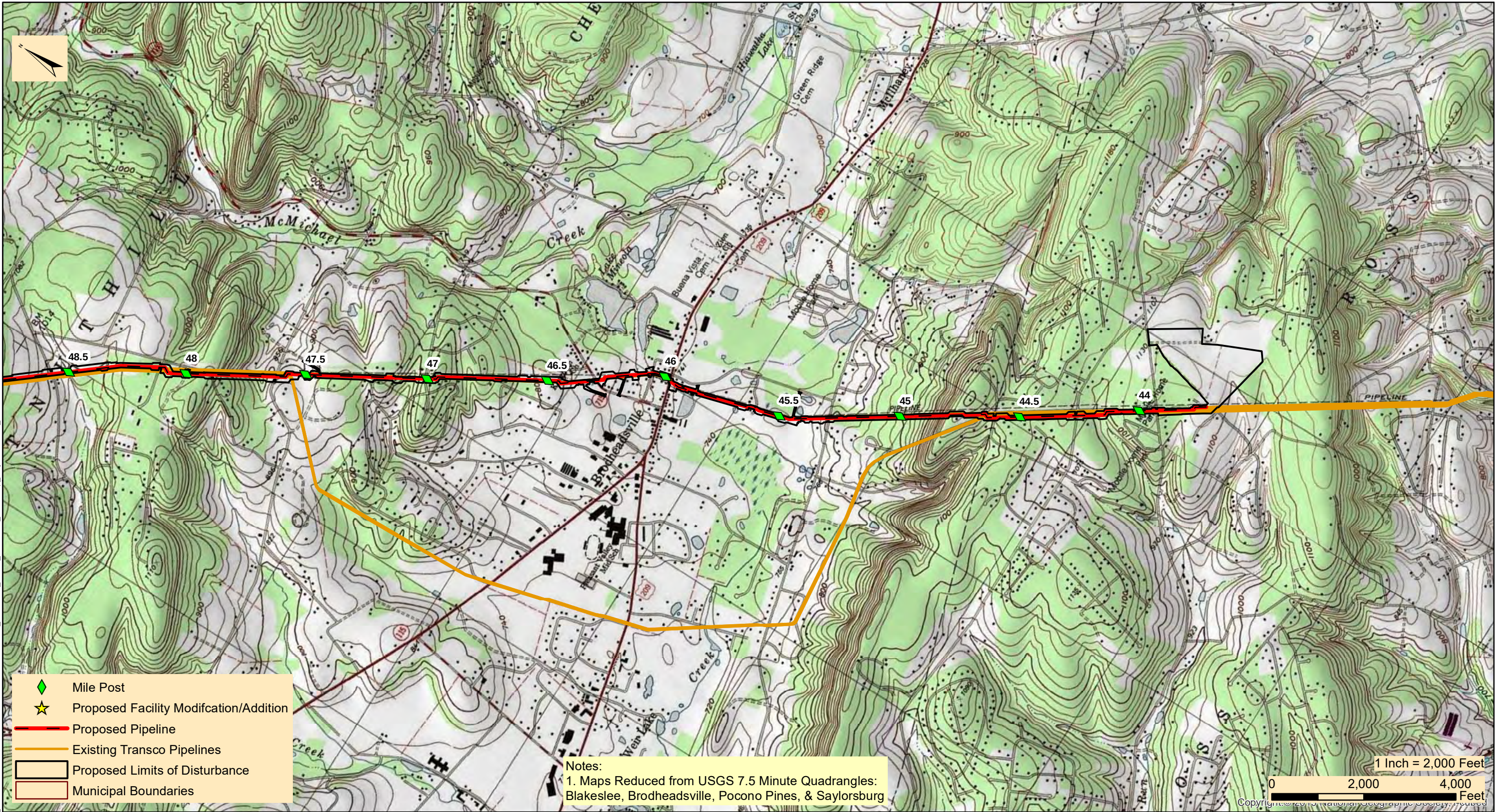
Disturbed areas that are not proposed to be impervious will be revegetated as per the seeding and mulching notes provided in PCSM plan notes. Disturbed areas that are not proposed to be impervious will be revegetated as per the seeding and mulching notes provided in PCSM plan notes. Wherever possible, existing natural drainage patterns will be utilized to divert flow to the proposed BMPs.

16. The PCSM Plan Shall be Prepared by a Person Trained and Experienced in PCSM Methods and Techniques

These plans and narrative were prepared by Patrick Wozinski, PE (BAI Group, LLC) of State College, PA in accordance with the Pennsylvania Department of Environmental Protection Stormwater BMP Manual, December 2006. Plan preparer's resume is provided in Attachment C of the ESCP permit package.

ATTACHMENT 1
PROJECT LOCATION MAPS

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
PROPOSED 42" LEIDY D EFFORT LOOP

PROJECT LOCATION MAP

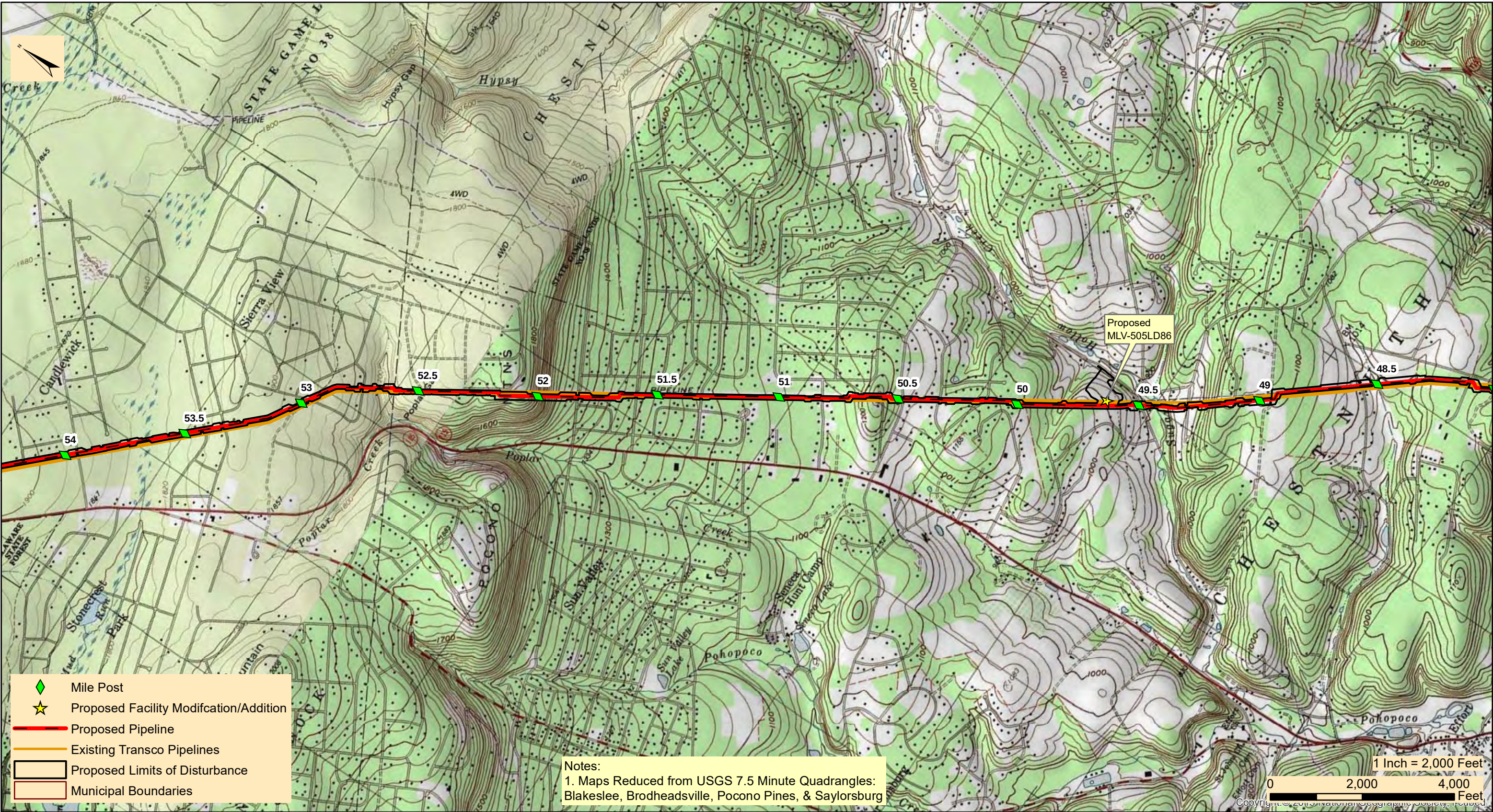
CHESTNUT HILL & ROSS TOWNSHIP

MONROE COUNTY

PENNSYLVANIA

Date:	2/10/2022
Drawn By:	FTN
Figure Number:	EL-1

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
PROPOSED 42" LEIDY D EFFORT LOOP

PROJECT LOCATION MAP

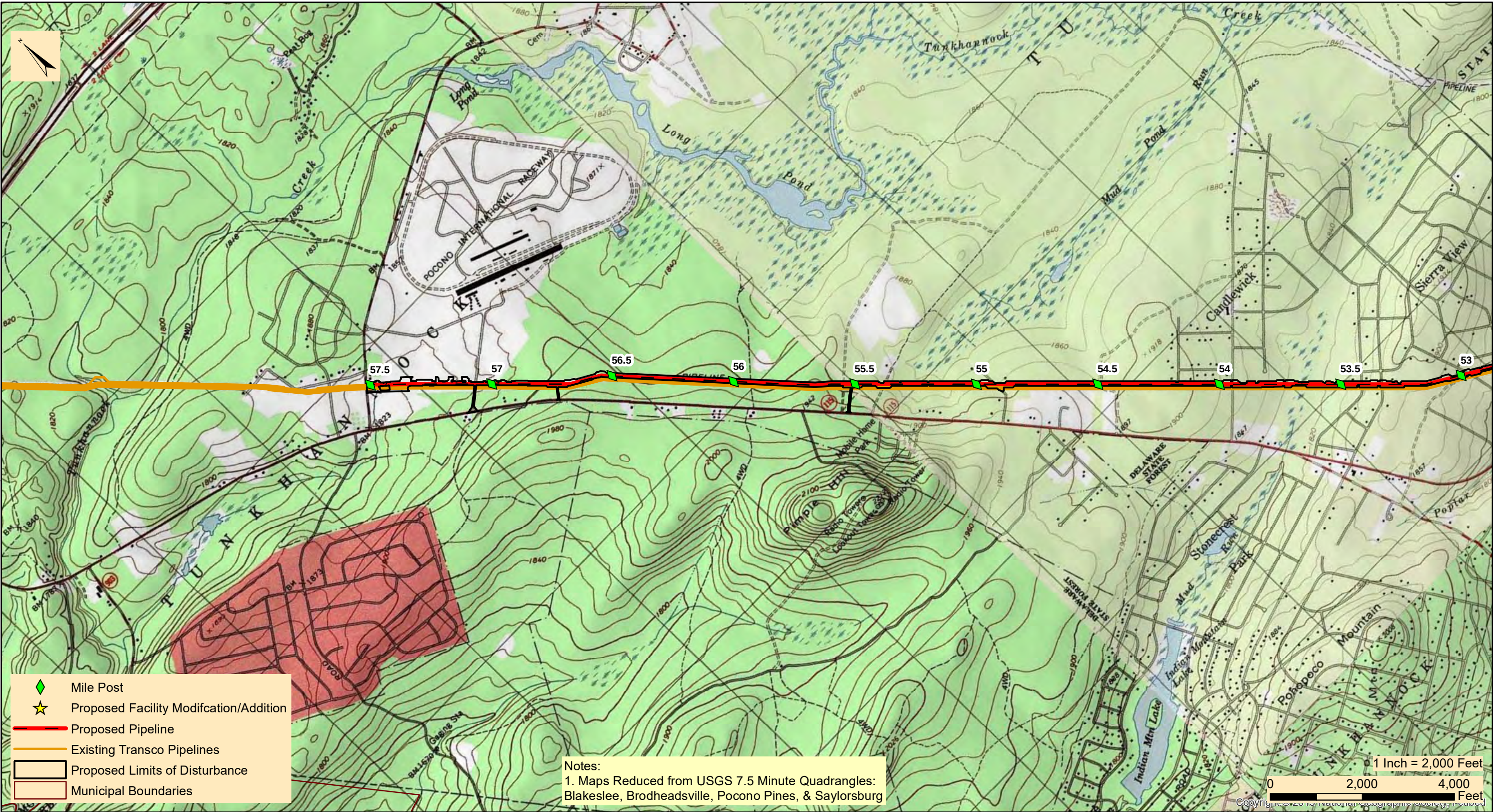
CHESTNUT HILL & TUNKHANNOCK TOWNSHIP

MONROE COUNTY

PENNSYLVANIA

Date:	2/10/2022
Drawn By:	FTN
Figure Number:	EL-2

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
PROPOSED 42" LEIDY D EFFORT LOOP

PROJECT LOCATION MAP

TUNKHANNOCK TOWNSHIP

MONROE COUNTY

PENNSYLVANIA

Date:	2/10/2022
Drawn By:	FTN
Figure Number:	EL-3

ATTACHMENT 2
SOILS MAP AND REPORT



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

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

Custom Soil Resource Report for **Monroe County, Pennsylvania**

LOD



February 18, 2021

Preface

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

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

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

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

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

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

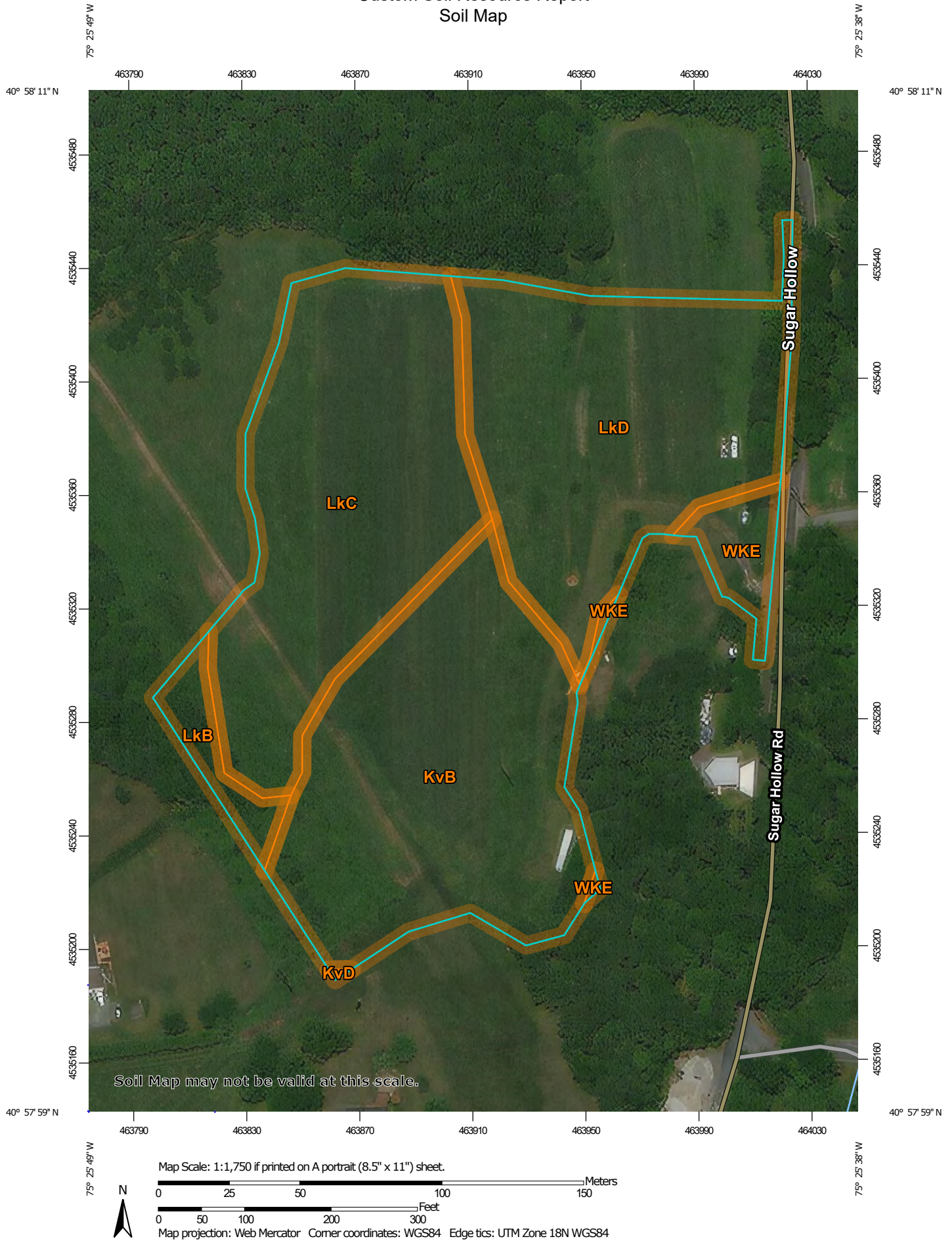
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report Soil Map



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 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Monroe County, Pennsylvania
Survey Area Data: Version 15, Jun 5, 2020

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

Date(s) aerial images were photographed: Sep 20, 2010—Aug 28, 2016

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
KvB	Klinesville channery silt loam, 3 to 8 percent slopes	2.9	32.6%
KvD	Klinesville channery silt loam, 15 to 25 percent slopes	0.0	0.0%
LkB	Leck kill channery silt loam, 2 to 8 percent slopes	0.3	3.0%
LkC	Leck kill channery silt loam, 8 to 15 percent slopes	2.8	31.3%
LkD	Leck kill channery silt loam, 15 to 25 percent slopes	2.6	29.8%
WKE	Weikert and Klinesville soils, steep	0.3	3.3%
Totals for Area of Interest		8.8	100.0%

Map Unit Descriptions

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

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

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

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

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

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

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

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

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

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

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

Monroe County, Pennsylvania

KvB—Klinesville channery silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ybb

Elevation: 300 to 1,300 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 130 to 200 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Klinesville, frost churned, and similar soils: 100 percent

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

Description of Klinesville, Frost Churned

Setting

Landform: Ridges, valleys

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 6 inches: very channery silt loam

H2 - 6 to 15 inches: very channery silt loam

H3 - 15 to 40 inches: channers

R - 40 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 20 to 60 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D

Hydric soil rating: No

KvD—Klinesville channery silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9ybd
Elevation: 300 to 1,300 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Klinesville, frost churned, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klinesville, Frost Churned

Setting

Landform: Valleys, ridges
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 40 inches: channers
R - 40 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 20 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

LkB—Leck kill channery silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ybq
Elevation: 500 to 1,500 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 45 to 54 degrees F
Frost-free period: 140 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Leck kill and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Leck Kill

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Reddish residuum derived from sedimentary rock

Typical profile

H1 - 0 to 10 inches: channery silt loam
H2 - 10 to 27 inches: channery silty clay loam
H3 - 27 to 48 inches: very channery silt loam
R - 48 to 52 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

LkC—Leck kill channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9ybr

Elevation: 500 to 1,500 feet

Mean annual precipitation: 38 to 46 inches

Mean annual air temperature: 45 to 54 degrees F

Frost-free period: 140 to 170 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Leck kill and similar soils: 100 percent

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

Description of Leck Kill

Setting

Landform: Mountains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Reddish residuum derived from sedimentary rock

Typical profile

H1 - 0 to 10 inches: channery silt loam

H2 - 10 to 27 inches: channery silty clay loam

H3 - 27 to 48 inches: very channery silt loam

R - 48 to 52 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: A

Hydric soil rating: No

LkD—Leck kill channery silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9ybs
Elevation: 300 to 2,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Leck kill and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Leck Kill

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 10 inches: channery silt loam
H2 - 10 to 43 inches: channery silt loam
H3 - 43 to 58 inches: very channery silt loam
R - 58 to 62 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 40 to 80 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Calvin

Percent of map unit: 10 percent
Hydric soil rating: No

Klinesville

Percent of map unit: 5 percent
Hydric soil rating: No

Meckesville

Percent of map unit: 5 percent
Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountain flank
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

WKE—Weikert and Klinesville soils, steep

Map Unit Setting

National map unit symbol: 9yd7
Elevation: 300 to 2,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 50 percent
Klinesville, frost churned, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 80 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Klinesville, Frost Churned

Setting

Landform: Ridges, valleys
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 6 inches: very channery silt loam
H2 - 6 to 15 inches: very channery silt loam
H3 - 15 to 45 inches: channers
R - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 80 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock; 20 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Hartleton

Percent of map unit: 8 percent

Landform: — error in exists on —

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear, concave

Across-slope shape: Linear, concave

Hydric soil rating: No

Leck kill

Percent of map unit: 8 percent

Landform: Mountains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Meckesville

Percent of map unit: 4 percent

Landform: Mountain valleys

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

AOI Inventory

This folder contains a collection of tabular reports that present a variety of soil information. Included are various map unit description reports, special soil interpretation reports, and data summary reports.

Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

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

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated)

Monroe County, Pennsylvania

Map Unit: KvB—Klinesville channery silt loam, 3 to 8 percent slopes

Component: Klinesville, frost churned (100%)

The Klinesville, frost churned component makes up 100 percent of the map unit. Slopes are 3 to 8 percent. This component is on ridges, valleys. The parent material consists of residuum weathered from siltstone. Depth to a root restrictive layer, bedrock, lithic, is 20 to 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Map Unit: KvD—Klinesville channery silt loam, 15 to 25 percent slopes

Component: Klinesville, frost churned (100%)

The Klinesville, frost churned component makes up 100 percent of the map unit. Slopes are 15 to 25 percent. This component is on ridges, valleys. The parent material consists of residuum weathered from siltstone. Depth to a root restrictive layer, bedrock, lithic, is 20 to 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

Map Unit: LkB—Leck kill channery silt loam, 2 to 8 percent slopes

Component: Leck Kill (100%)

The Leck Kill component makes up 100 percent of the map unit. Slopes are 3 to 8 percent. This component is on mountainslopes mountains. The parent material consists of reddish residuum derived from sedimentary rock. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available

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water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map Unit: LkC—Leck kill channery silt loam, 8 to 15 percent slopes

Component: Leck Kill (100%)

The Leck Kill component makes up 100 percent of the map unit. Slopes are 8 to 15 percent. This component is on mountainslopes mountains. The parent material consists of reddish residuum derived from sedimentary rock. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

Map Unit: LkD—Leck kill channery silt loam, 15 to 25 percent slopes

Component: Leck Kill (80%)

The Leck Kill component makes up 80 percent of the map unit. Slopes are 15 to 25 percent. This component is on shale hillslopes. The parent material consists of residuum weathered from shale and siltstone. Depth to a root restrictive layer, bedrock, lithic, is 40 to 80 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Component: Calvin (10%)

Generated brief soil descriptions are created for major soil components. The Calvin soil is a minor component.

Component: Klinesville (5%)

Generated brief soil descriptions are created for major soil components. The Klinesville soil is a minor component.

Component: Meckesville (5%)

Generated brief soil descriptions are created for major soil components. The Meckesville soil is a minor component.

Map Unit: WKE—Weikert and Klinesville soils, steep

Component: Weikert (50%)

The Weikert component makes up 50 percent of the map unit. Slopes are 25 to 80 percent. This component is on hills. The parent material consists of residuum weathered from shale and siltstone. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

Component: Klinesville, frost churned (30%)

The Klinesville, frost churned component makes up 30 percent of the map unit. Slopes are 25 to 80 percent. This component is on ridges, valleys. The parent material consists of residuum weathered from siltstone. Depth to a root restrictive layer, bedrock, lithic, is 20 to 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.

Component: Hartleton (8%)

Generated brief soil descriptions are created for major soil components. The Hartleton soil is a minor component.

Component: Leck Kill (8%)

Generated brief soil descriptions are created for major soil components. The Leck Kill soil is a minor component.

Component: Meckesville (4%)

Generated brief soil descriptions are created for major soil components. The Meckesville soil is a minor component.

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit.

Water Features include ponding frequency, flooding frequency, and depth to water table.

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff—Monroe County, Pennsylvania			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group

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Hydrologic Soil Group and Surface Runoff—Monroe County, Pennsylvania			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group
KvB—Klinesville channery silt loam, 3 to 8 percent slopes			
Klinesville, frost churned	100	Low	D
KvD—Klinesville channery silt loam, 15 to 25 percent slopes			
Klinesville, frost churned	100	Medium	D
LkB—Leck kill channery silt loam, 2 to 8 percent slopes			
Leck kill	100	Low	A
LkC—Leck kill channery silt loam, 8 to 15 percent slopes			
Leck kill	100	Low	A
LkD—Leck kill channery silt loam, 15 to 25 percent slopes			
Leck kill	80	Medium	A
WKE—Weikert and Klinesville soils, steep			
Weikert	50	Medium	D
Klinesville, frost churned	30	Medium	D

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- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

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United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

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ATTACHMENT 3
INFILTRATION TEST REPORT



March 4, 2022

**TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC.
A SUBSIDIARY OF THE WILLIAMS COMPANIES, INC.
REGIONAL ENERGY ACCESS EXPANSION PROJECT
MLV-505LD86 MAINLINE VALVE PROJECT**

SITE EVALUATION AND SOIL INFILTRATION TEST REPORT

1.0 SITE SOILS

Based upon mapping provided by the United States Department of Agriculture's Natural Resources Conservation Service (USDA NRCS) Web Soil Survey¹, the project areas under consideration for infiltration best management practices (BMP) are underlain by the following soil series: Klinesville channery silt loam, 3 to 8 percent slopes (KvB), Klinesville channery silt loam, 8 to 15 percent slopes (KvC), Leck kill channery silt loam, 2 to 8 percent slopes (LkB), Leck kill channery silt loam, 8 to 15 percent slopes (LkC), Leck kill channery silt loam, 15 to 25 percent slopes (LkD), and Weikert and Klinesville soils, steep (WKE).

Klinesville silt loam, 3 to 8 percent slopes (KvB) soils consist of gently sloping, somewhat excessively drained soils found in valley backslopes and shoulders. The parent material is residuum weathered from siltstone. Bedrock is typically found at approximately 40 to 44 inches below ground surface (bgs). Depth to the water table generally found below 80 inches bgs and the available water capacity of KvB soils is very low.

Klinesville silt loam, 8 to 15 percent slopes (KvC) soils consist of gently sloping, somewhat excessively drained soils found in valley backslopes and shoulders. The parent material is residuum weathered from siltstone. Bedrock is typically found at approximately 40 to 44 inches bgs. Depth to the water table generally found below 80 inches and the available water capacity of KvC soils is very low.

Klinesville silt loam, 15 to 25 percent slopes (KvD) soils consist of gently sloping, somewhat excessively drained soils found in valley backslopes and shoulders. The parent material is residuum weathered from siltstone. Bedrock is typically found at approximately 40 to 44 inches bgs. Depth to the water table generally found below 80 inches and the available water capacity of KvD soils is very low.

Leck kill silt loam, 2 to 8 percent slopes (LkB) soils consist of gently sloping, well drained soils found in mountain backslopes. The parent material is reddish residuum derived from sedimentary rock. Bedrock is typically found at approximately 48 to 52 inches bgs. Depth to the water table generally found below 80 bgs and the available water capacity of LkC soils is low.

Leck kill silt loam, 8 to 15 percent slopes (LkC) soils consist of gently sloping, well drained soils found in mountain backslopes. The parent material is reddish residuum derived from sedimentary rock. Bedrock is typically found at approximately 48 to 52 inches bgs. Depth to the water table generally found below 80 inches and the available water capacity of LkC soils is low.

¹ <http://websoilsurvey.nrcs.usda.gov/app/>

Leck kill silt loam, 15 to 25 percent slopes (LkD) soils consist of gently sloping, well drained soils found in hillslope summits. The parent material is residuum weathered from siltstone and shale. Bedrock is typically found at approximately 58 to 62 inches bgs. Depth to the water table generally found below 80 inches bgs and the available water capacity of LkD soils is moderate.

The soil infiltration testing described in this report focused on KvB, KvC, KvD, LkB, LVC and LkD soils. These soils are anticipated as being the primary soils in the areas of possible BMPs.

2.0 FIELD INVESTIGATION AND TESTING METHODOLOGY

BAI completed a total of 9 test pits and 18 double-ring infiltrometer tests, two infiltration tests per test pit. Locations were selected to be representative of the main soil series in the areas of potential infiltration BMPs. Figure 1 presents the locations of test pits and corresponding double-ring infiltrometer tests.

Nine test pits (TP 201 through TP 209) were opened using an excavator for soil characterization down to 48 inches bgs on November 16 and 17, 2020. Infiltration tests were also performed in test pits at 48 bgs deep to evaluate infiltration rates of shallow soils in the study area. The infiltration tests used double-ring infiltrometer (DRI) tests.

The DRI tests consisted of PVC rings. The PVC DRI had a nine-inch diameter outer ring (OR) and a six-inch diameter inner ring (IR) set two inches deep into the bottom of each test pit (approximately 48 inches bgs).

DRI tests were used to determine infiltration rates of shallow soils at various locations across the site. DRI testing was initiated by completing a one-hour pre-soak, which involved adding two inches of head to both the OR and IR. By noting the drop in head in each infiltrometer at 30-minute increments during the pre-soak, BAI determined whether a 10 or 30-minute testing interval for the infiltration tests would be used for DRI testing as per the Pennsylvania Stormwater Best Management Practices Manual (Document ID 363-0300-002) Appendix C.

Following the pre-soak, the test pits were refilled to a two-inch head level in both the IR and OR. Drop in head was measured from a fixed reference point in the IR every 10 or 30 minutes for the infiltration tests. The IR and OR were refilled following each reading. Results for DRI tests are discussed in Section 3.0.

3.0 FINDINGS AND CONCLUSIONS

Based upon examination of each test pit, soils beneath the Site consist of brown (7.5YR 4/4) firm, heavy silt to a depth of at 12 inches bgs. At approximately 10 to 12 inches bgs, a brown (5YR 4/4) firm lean silt to lean clay. TP 203 and TP 206 through TP 209 encountered weathered and fractured bedrock beginning at 7 to 40 inches bgs.

No limiting zones were identified. As mentioned above, several test pits encountered fractured and weathered bedrock but not competent to be considered a limiting zone according to the Document ID 363-0300-002. The layer of lean silt to lean clay between 10 to 12 inches bgs was not observed to have redox features. Therefore it was not interpreted as being a limiting zone

and does not appear to impede the infiltration of stormwater. The following table summarizes the limiting zone investigation in each test pit.

Limiting Zone Investigation Results					
Test Pit	Elevation (MSL ft)	Seasonal High Water Table (in)	Water Table (in)	Bedrock (in)	Total Depth (in)
TP 201	925.74	Not encountered	Not encountered	Not encountered	48
TP 202	926.171	Not encountered	Not encountered	Not encountered	36
TP 203	924.379	Not encountered	Not encountered	Not encountered	47
TP 204	913.932	Not encountered	Not encountered	Not encountered	46
TP 205	914.136	Not encountered	Not encountered	Not encountered	48
TP 206	964.231	Not encountered	Not encountered	Not encountered	52
TP 207	964.509	Not encountered	Not encountered	Not encountered	52
TP 208	972.936	Not encountered	Not encountered	Not encountered	54
TP 209	972.785	Not encountered	Not encountered	Not encountered	49

DRI testing was completed within the same soil series in the locations of the potential BMP locations, however only the infiltration rates for TP 202, 203, 204, 206 and 207 were utilized. The following table summarizes the DRI readings for each test pit used for the proposed BMPs. Based on field observations, the infiltration testing was completed at an appropriate location in the soil profile and is representative to the BMP's infiltration elevation.

Infiltration Testing Results								
Test pit	Infiltration Test	Testing Elevation	Reading Interval (min)	Reading 1 (in.)	Reading 2 (in.)	Reading 3 (in.)	Reading 4 (in.)	Infiltration Rate (in./hr)
TP 202*	IT 202A	923.34'	10	>3	>3	>3	>3	>18
	IT 202B	923.34'	10	2.00	2.00	2.00	1.75	11.63
TP 203*	IT 203A	920.63'	10	>3	>3	>3	>3	>18
	IT 203B	920.63'	10	>3	>3	>3	>3	>18
TP 204**	IT 204A	910.26'	10	2.25	2.00	2.00	2.00	12.38
	IT 204B	910.26'	10	>3	>3	>3	>3	>18
TP 206***	IT 206A	960.06'	10	>3	>3	>3	>3	>18
	IT 206B	960.06'	10	>3	>3	>3	>3	>18
TP 207	IT 207A	960.34'	10	>3	>3	>3	>3	>18
	IT 207B	960.34'	10	>3	>3	>3	>3	>18

* Bottom Elevation of Proposed BMP (Infiltration Basin 1) = 924.50'

**Bottom Elevation of Proposed BMP (Infiltration Bed 1 and 2) = 912.00'

***Bottom Elevation of Proposed BMP (Infiltration Berm 1) = 969.00'

**** Bottom Elevation of Proposed BMP (Infiltration Berm 2) = 963.00'

TP 202

The infiltration rate for IT 202A was more than 18 iph with an average rate of more than 3 inches over the last four 10-minute infiltration readings. Infiltration test IT 202B had an infiltration rate of 11.63 iph with an average of 1.937 inches over the last four 10-minute infiltration readings.

TP 203

The infiltration rate for IT 203A more than 18 iph with an average rate of more than 3 inches over the last four 10-minute infiltration readings. Infiltration test IT 203B had an infiltration rate of more than 18 iph with an average rate of more than 3 inches over the last four 10-minute infiltration readings.

TP 204

The infiltration rate for IT 204A was 12.38 iph with an average rate of 2.063 inches over the last four 10-minute infiltration readings. Infiltration test IT 204B had more than 18 iph with an average rate of more than 3 inches over the last four 10-minute infiltration readings.

TP 206

The infiltration rate for IT 206A was more than 18 iph with an average rate of more than 3 inches over the last four 10-minute infiltration readings. Infiltration test IT 206B had an infiltration rate more than 18 iph with an average rate of more than 3 inches over the last four 10-minute infiltration readings.

TP 207

The infiltration rate for IT 207A was more than 18 iph with an average rate of more than 3 inches over the last four 10-minute infiltration readings. Infiltration test IT 207B had an infiltration rate of more than 18 iph with an average rate of more than 3 inches over the last four 10-minute infiltration readings.

4.0 REFERENCES

Pennsylvania Department of Environmental Protection. "Pennsylvania Stormwater Best Management Practices Manual" Document No. 363-0300-02, December 2006.

"Web Soil Survey - Home." Web Soil Survey - Home. United States Department of Agriculture, 6 Dec. 2013. Web. 23 December 2020. <<http://websoilsurvey.nrcs.usda.gov/app/>>.



PLAN NOTE

EACH INFILTRATION TEST LOCATION INDICATED WILL HAVE TWO INFILTRATION TESTS PERFORMED AT EACH DEPTH SELECTED BASED ON THE TST PIT OBSERVATIONS OF LIMITING ZONES AND/OR DEPTH OF THE BASE OF THE ANTICIPATED PCSM BMP AS RECOMMENDED IN APPENDIX C OF PADEP'S BMP MANUAL.

LEGEND

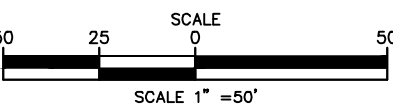
	TRENCH PLUG		EXISTING UTILITY POLE / TOWER
	DIVERSION CHANNEL		EXISTING VALVE
	CLEAN WATER CROSSING		EXISTING CULVERT
	PROPOSED PIPELINE		EXISTING ELECTRIC LINE
	LIMITS OF DISTURBANCE		EXISTING UNDERGROUND ELECTRIC LINE
	APPROX. ENVIRONMENTAL STUDY LIMITS		EXISTING GAS LINE
	DELINEATED WETLAND		EXISTING WATER LINE
	DELINEATED WATERWAY / STREAM (TOP OF BANK)		EXISTING SANITARY LINE
	STREAM FLOW DIRECTION		EXISTING STORM SEWER
	RIPARIAN BUFFER		EXISTING TELEPHONE LINE
	50'/FEMA FLOODWAY		EXISTING FIBER OPTIC LINE
	FEMA 100-YEAR FLOODPLAIN		EXISTING UNDERGROUND CABLE LINE
	SOIL BOUNDARY / TYPE		EXISTING STORM INLET
	EXISTING TREE LINE / TREE/SHRUB		EXISTING SANITARY MANHOLE
	PROPERTY LINE		EXISTING COMMUNICATION/ELECTRIC MANHOLE
	EXISTING FENCE		EXISTING FIRE HYDRANT
	PROPOSED FENCE		EXISTING POWER POLE
	EXISTING LEIDY / TGPL PIPELINES		TEST PIT NOT USED FOR BMP DESIGN
	EXISTING FOREIGN PIPELINES		INFILTRATION TEST USED FOR BMP DESIGN

SOIL LEGEND

LMB	LECK KILL CHANNERY SILT LOAM, 2 TO 8 PERCENT SLOPES
LKC	LECK KILL CHANNERY SILT LOAM, 8 TO 15 PERCENT SLOPES
KVB	KUNESVILLE CHANNERY SILT LOAM, 3 TO 8 PERCENT SLOPES
KVC	KUNESVILLE CHANNERY SILT LOAM, 8 TO 15 PERCENT SLOPES
WKE	WEIKERT AND KUNESVILLE SOILS, STEEP

EXISTING CONDITION NOTES/SOURCES

- EXISTING ROADWAYS, CONTOURS, PROPERTY LINE, TREE LINE, ETC. ARE DERIVED FROM A FIELD SURVEY PERFORMED BY TRANSCO BETWEEN MARCH 2019 AND 2020.
- PROPERTY BOUNDARIES BASED EITHER ON TAX PARCEL INFORMATION PROVIDED BY TRANSCO OR A COMBINATION OF DEED REFERENCE AND FIELD LOCATED EVIDENCE. PROPERTY BOUNDARY LOCATIONS BASED ON TAX PARCEL INFORMATION ARE APPROXIMATE.
- PIPELINE ALIGNMENTS AND LIMITS OF DISTURBANCE PROVIDED BY TRANSCO.
- STREAM AND WETLAND BOUNDARIES BASED ON SURVEYS CONDUCTED BY WHM CONSULTING FROM MARCH 2020 TO OCTOBER 2020.
- DATUM BASED ON PENNSYLVANIA STATE PLANE COORDINATE SYSTEM, NAD 83 NORTH ZONE, NAVD86, ELEVATION MSL, DERIVED FROM GPS OBSERVATION.



PATRICK A. WOZNICK, P.E.		REVISIONS					TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC				
NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.	REGIONAL ENERGY ACCESS PROJECT -				
1	03/01/22	RWS	RESPONSE TO PADEP TECHNICAL DEFICIENCY LETTER				MLV-505LD86 MAINLINE VALVE YARD				
							SOIL TEST PIT LOCATIONS				
							EXISTING CONDITIONS PLAN				
							CHESTNUTHILL TOWNSHIP, MONROE COUNTY, PENNSYLVANIA				
DRAWN BY: RHM		DATE: 03/31/21	ISSUED FOR BID:		SCALE: 1" = 50'						
CHECKED BY: KMC		DATE: 03/31/21	ISSUED FOR CONSTRUCTION:		REVISION:						
APPROVED BY: PW		DATE: 03/31/21					SHEET 1				
WO: 1222837		RID: 108	DRAWING NUMBER: 26-1000-70-28-D		OF 1						

PENNSYLVANIA PROFESSIONAL ENGINEER

ATTACHMENT 4
PCSM PLAN BMP DESIGN WORKSHEETS
AND CALCULATIONS

TABLE OF CONTENTS

Attachment 4

- 4.1 CN Table – MLV-505LD86
- 4.2 Stormwater BMP Manual Appendix D Worksheets – MLV-505LD86
- 4.3 BMP HydroCAD Reports – MLV-505LD86
- 4.4 Channel Design Worksheets – MLV-505LD86
- 4.5 Channel HydroCAD Reports – MLV-505LD86
- 4.6 Riprap Apron Worksheet – MLV-505LD86
- 4.7 BMP Erosion Control Blanket Reports – MLV-505LD86
- 4.8 Channel Erosion Control Blanket Reports – MLV-505LD86

ATTACHMENT 4.1
CN TABLE –
MLV-505LD86

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area ^{2/}	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weedbarrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ^{5/}					
		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ^{1/}

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment ^{2/}	Hydrologic condition ^{3/}	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

¹ Average runoff condition, and $I_a=0.2S$ ² Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.³ Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ^{2/}	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ^{3/}	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 ^{4/}	48	65	73
Woods—grass combination (orchard or tree farm). ^{5/}	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. ^{6/}	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 ^{4/}	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

¹ Average runoff condition, and $I_a = 0.2S$.² *Poor*: <50% ground cover or heavily grazed with no mulch.*Fair*: 50 to 75% ground cover and not heavily grazed.*Good*: > 75% ground cover and lightly or only occasionally grazed.³ *Poor*: <50% ground cover.*Fair*: 50 to 75% ground cover.*Good*: >75% ground cover.⁴ Actual curve number is less than 30; use CN = 30 for runoff computations.⁵ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.⁶ *Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.*Fair*: Woods are grazed but not burned, and some forest litter covers the soil.*Good*: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

Cover description.....		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition ^{2/}	A ^{3/}	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

¹ Average runoff condition, and I_a , = 0.2S. For range in humid regions, use table 2-2c.

² Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

³ Curve numbers for group A have been developed only for desert shrub.

ATTACHMENT 4.2
STORMWATER BMP MANUAL
APPENDIX D WORKSHEET –
MLV-505LD86

General Information

Instructions **General** Volume Rate Quality

Project Name: **Williams REAE - MLV-505LD86** Application Type: **Individual E&S Application**

County: **Monroe** Municipality: **Chestnuthill Township**

Project Type: **New Utilities** ☒ New Project ☐ Minor / Major Amendment

Area: **12.30** acres (In Watershed) Total Earth Disturbance: **9.77** acres (In Watershed)

No. of Post-Construction Discharge Points: **3** Start DP Numbering at: **001**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	4.76	3.77	0.09*	0.17	Discharge to Non-Surface Waters	CWF, MF	Yes
002	1.74	1.73	0.00	0.25	Discharge to Non-Surface Waters	CWF, MF	Yes
003	4.90	3.41	0.00	0.00	Discharge to Non-Surface Waters	CWF, MF	No
Undetained Areas	0.90	0.86	0.00	0.01	Discharge to Non-Surface Waters	CWF	
Totals:	12.30	9.77	0.09	0.435			

Total existing impervious acreage is 0.11 acres. 0.02 acres of this has been considered "meadow"

Volume Management

Project: Williams REAE - MLV-505LD86

Instructions General **Volume** Rate Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): inches Alternative 2-Year / 24-Hour Storm Event inches

Alternative Source:

Pre-Construction Conditions: No. Rows: ☐ Exempt from Meadow in Good Condition ☒ Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious as Meadow	0.02 *	A	30	4.667	0.00	0
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.09 *	A	98	0.041	3.03	989
Forested (Good Condition)	0.75	A	30	4.667	0.00	0
Forested (Good Condition)	0.13	D	77	0.597	1.25	592
Pervious as Meadow	5.94	A	30	4.667	0.00	0
Pervious as Meadow	2.84	D	78	0.564	1.32	13,582
TOTAL (ACRES):		9.77	TOTAL (CF):		15,164	

Post-Construction Conditions: No. Rows:

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.44	A	98	0.041	3.03	4,780

Total existing impervious acreage is 0.11 acres. 0.02 acres of this has been considered "meadow"

Woods (Good Condition)	0.00	A	30	4.667	0.00	0
Woods (Good Condition)	0.00	D	77	0.597	1.25	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	6.43	A	30	4.667	0.00	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	2.91	D	78	0.564	1.32	13,917

TOTAL (ACRES): 9.77

TOTAL (CF): 18,697

NET CHANGE IN VOLUME TO MANAGE (CF): 3,534

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits:

No. Structural BMPs:

5

Start BMP Numbering at:

1

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Infiltration Basin	-	Off-Site	3.77	1,275	3,629	1.00	10	Yes	2.0	1,275	1,275	0
001	2	Infiltration Bed	-	Off-Site	0.23	538	800	1.00	18	No	2.0	538	538	
001	3	Infiltration Bed	-	Off-Site	0.13	457	575	1.00	10	No	2.0	259	431	
002	4	Infiltration Berm & Retentive Grading	-	to BMP No. 5	1.46	4,045	1,913	1.00	18	Yes	2.0	1,876	2,583	1,006
002	5	Infiltration Berm & Retentive Grading	-	Off-Site	0.11	512	1,135	1.00	18	Yes	2.0	512	512	0

Totals: 5,339 1,006

INFILTRATION & ET CREDITS (CF):	6,345

NET CHANGE IN VOLUME TO MANAGE (CF):	3,534

TOTAL CREDITS (CF):	6,345

VOLUME REQUIREMENT SATISFIED

Rate Control

Project: Williams REAE - MLV-505LD86

Instructions

General

Volume

Rate

Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	3.26	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):	4.74	Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):	6.87	Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):	8.09	Alternative 100-Year 24-Hour Storm Event (in):	

☒ Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)			
	Pre-Construction	Post-Construction	Net Change	
2-Year Storm:	0.93	0.39	-0.54	Rate Control Satisfied
10-Year Storm:	3.31	2.19	-1.12	Rate Control Satisfied
50-Year Storm:	10.85	8.06	-2.69	Rate Control Satisfied
100-Year Storm:	17.43	12.44	-4.69	Rate Control Satisfied

Water Quality

Project: Williams REAE - MLV-505LD86

PRINT

Instructions

General

Volume

Rate

Quality

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious as Meadow	Grassland/Herbaceous	0.02	A	0	48.8	0.22	2.30	0.00	0.00	0.00
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.09	A	989	65.0	0.29	2.05	4.01	0.02	0.13
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.75	A	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.13	D	592	45.0	0.13	1.05	1.66	0.00	0.04
Pervious as Meadow	Grassland/Herbaceous	5.94	A	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	2.84	D	13,582	48.8	0.22	2.30	41.39	0.19	1.95

TOTAL (ACRES): 9.77

TOTALS: 47.07 0.21 2.12

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water	Area	Soil	Runoff Volume	Pollutant Conc. (mg/L)	Pollutant Loads (lbs)

Land Cover (from Volume Worksheet)	Quality	(acres)	Group	Volume (cf)	TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.44	A	4,780	65.0	0.29	2.05	19.40	0.09	0.61
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	A	0	45.0	0.13	1.05	0.00	0.00	0.00
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	6.43	A	0	48.8	0.22	2.30	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	2.91	D	13,917	48.8	0.22	2.30	42.41	0.19	2.00

TOTAL (ACRES): 9.77

TOTALS: 61.81 0.28 2.61

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS): **14.74 0.07 0.49**

☒ **Characterize Undetained Areas (for Untreated Stormwater)**

No. Rows: **2**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	3.59	A	30	4.667	0.00	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.78	D	78	0.564	1.32	3,730

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☒ Use default BMP Outflows and Median BMP Outflow Concentrations

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
001	1	Infiltration Basin	-	3.77	1,275	1,275		0	10.00	0.24	1.04	0.00	0.00	0.00
001	2	Infiltration Bed	-	0.23	538	538		0	24.30	0.19	1.19	0.00	0.00	0.00
001	3	Infiltration Bed	-	0.13	457	431		26	24.30	0.19	1.19	0.04	0.00	0.00
002	4	Infiltration Berm & Retentive Grading	-	1.46	4,045	3,589		456	-	-	-	-	-	-
002	5	Infiltration Berm & Retentive Grading	-	0.11	512	512		0	24.00	0.20	0.85	0.00	0.00	0.00

POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):

POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):

NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):

NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):

POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):

TSS	TP	TN
0.04	0.00	0.00
11.37	0.05	0.54
11.41	0.05	0.54
47.07	0.21	2.12

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Pat Wozinski

Spreadsheet User Name

3/1/2022

Date

DEP PCSM SPREADSHEET

SUPPLEMENTAL CALCULATIONS FOR LOADING
RATIOS AND INFILTRATION PERIOD

Transcontinental Gas Pipe Line Company, LLC
Regional Energy Access Expansion Project
PCSM Ratio Table - MLV-515LD86

Ratio Calculations

Site	Drainage Area (SF)	Impervious Area (SF)	Infiltration Area (SF)	Drainage Area : Infiltration Area Ratio ¹	Impervious Area : Infiltration Area Ratio ²
MLV-515LD86					
Infiltration Basin	191,207	4,163	3,629	52.7 : 1	1.1 : 1
Infiltration Bed 1	10,278	2,165	800	12.8 : 1	2.7 : 1
Infiltration Bed 2	5,684	375	575	9.9 : 1	0.7 : 1
Infiltration Berms 1 & 2 ³	68,455	11,069	3,048	22.5 : 1	3.6 : 1

1. PADEP Stormwater BMP Manual *recommends* that BMPs be designed with a maximum total loading ratio of 8:1 relating total drainage area to infiltration area. However, due to the large upgradient area of the site, it is not feasible to maintain this ratio. Utilization of upgradient diversion BMPs was considered, but it was determined that these additional point discharges could lead to long-term maintenance issues. Also, much of the drainage area is A-type soil, which does not lead to significant runoff. Following discussions with Monroe County Conservation District, it was agreed that it is not necessary to achieve this ratio for the PCSM BMPs at this site.

2. PADEP Stormwater BMP Manual requires BMPs to be designed with a maximum impervious loading ratio of 5:1 relating impervious drainage area to infiltration area in non-Karst areas.

3. Infiltration Berms 1 & 2 function in series and are calculated using the combined area.

Ratio 1= Drainage area/Infiltration Area

Ratio 2= Impervious Area/ Infiltration Area

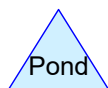
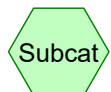
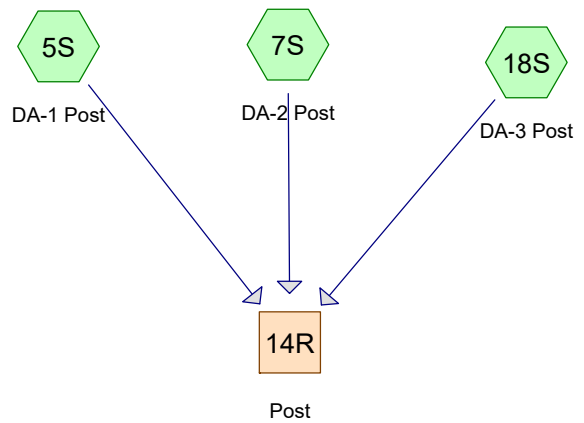
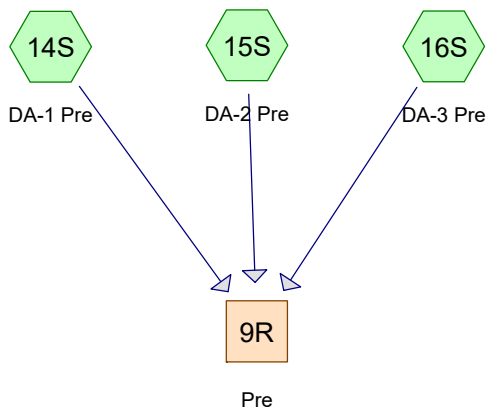
Infiltration Period (hrs) Calculations

Site	Oriface Elevation	Bottom	Depth (ft)	Infiltration rate (in/h)	Infiltration rate (ft/h)	Infiltration Period (hrs)
MLV-515LD86						
Infiltration Basin	925.33	924.50	0.83	1.00	0.08	10.0
Infiltration Bed 1	913.50	912.00	1.50	1.00	0.08	18.0
Infiltration Bed 2	912.80	912.00	0.80	1.00	0.08	9.6
Infiltration Berms 1	964.50	963.00	1.50	1.00	0.08	18.0
Infiltration Berms 2	970.50	969.00	1.50	1.00	0.08	18.0

Infiltration Period(hrs) = Depth(ft)/ Infiltration Rate(ft/h)

Depth = Spillway - Bottom

ATTACHMENT 4.3
BMP HYDROCAD REPORTS –
MLV-505LD86



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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
1,020	30	20% Impervious as Meadow (14S)
4,082	98	Existing Impervious (14S)
18,360	98	Impervious (5S, 7S)
609,902	30	Meadow, non-grazed, HSG A (5S, 7S, 14S, 15S, 16S, 18S)
266,691	78	Meadow, non-grazed, HSG D (5S, 7S, 14S, 15S, 16S, 18S)
114,247	30	Woods, Good, HSG A (5S, 7S, 14S, 15S, 16S, 18S)
60,124	77	Woods, Good, HSG D (5S, 14S, 15S, 16S, 18S)
1,074,426	46	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
724,149	HSG A	5S, 7S, 14S, 15S, 16S, 18S
0	HSG B	
0	HSG C	
326,815	HSG D	5S, 7S, 14S, 15S, 16S, 18S
23,462	Other	5S, 7S, 14S
1,074,426		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	0	1,020	1,020	20% Impervious as Meadow
0	0	0	0	4,082	4,082	Existing Impervious
0	0	0	0	18,360	18,360	Impervious
609,902	0	0	266,691	0	876,593	Meadow, non-grazed
114,247	0	0	60,124	0	174,371	Woods, Good
724,149	0	0	326,815	23,462	1,074,426	TOTAL AREA

MLV 505LD86_Pre&post*Type II 24-hr 1-yr Rainfall=2.72"*

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5S: DA-1 Post

Runoff Area=246,601 sf 2.96% Impervious Runoff Depth>0.03"
Flow Length=1,381' Tc=25.6 min CN=48 Runoff=0.02 cfs 531 cf

Subcatchment 7S: DA-2 Post

Runoff Area=75,708 sf 14.62% Impervious Runoff Depth>0.56"
Flow Length=592' Tc=15.3 min CN=70 Runoff=1.06 cfs 3,540 cf

Subcatchment 14S: DA-1 Pre

Runoff Area=174,425 sf 2.34% Impervious Runoff Depth=0.00"
Flow Length=1,316' Tc=25.5 min CN=41 Runoff=0.00 cfs 0 cf

Subcatchment 15S: DA-2 Pre

Runoff Area=149,107 sf 0.00% Impervious Runoff Depth>0.26"
Flow Length=1,216' Tc=28.9 min CN=61 Runoff=0.38 cfs 3,242 cf

Subcatchment 16S: DA-3 Pre

Runoff Area=213,681 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,087' Tc=22.2 min CN=37 Runoff=0.00 cfs 0 cf

Subcatchment 18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=0.00 cfs 0 cf

Reach 9R: Pre

Inflow=0.38 cfs 3,242 cf
Outflow=0.38 cfs 3,242 cf

Reach 14R: Post

Inflow=1.06 cfs 4,071 cf
Outflow=1.06 cfs 4,071 cf

Total Runoff Area = 1,074,426 sf Runoff Volume = 7,313 cf Average Runoff Depth = 0.08"
97.91% Pervious = 1,051,984 sf 2.09% Impervious = 22,442 sf

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 5S: DA-1 Post

Runoff = 0.02 cfs @ 18.38 hrs, Volume= 531 cf, Depth> 0.03"

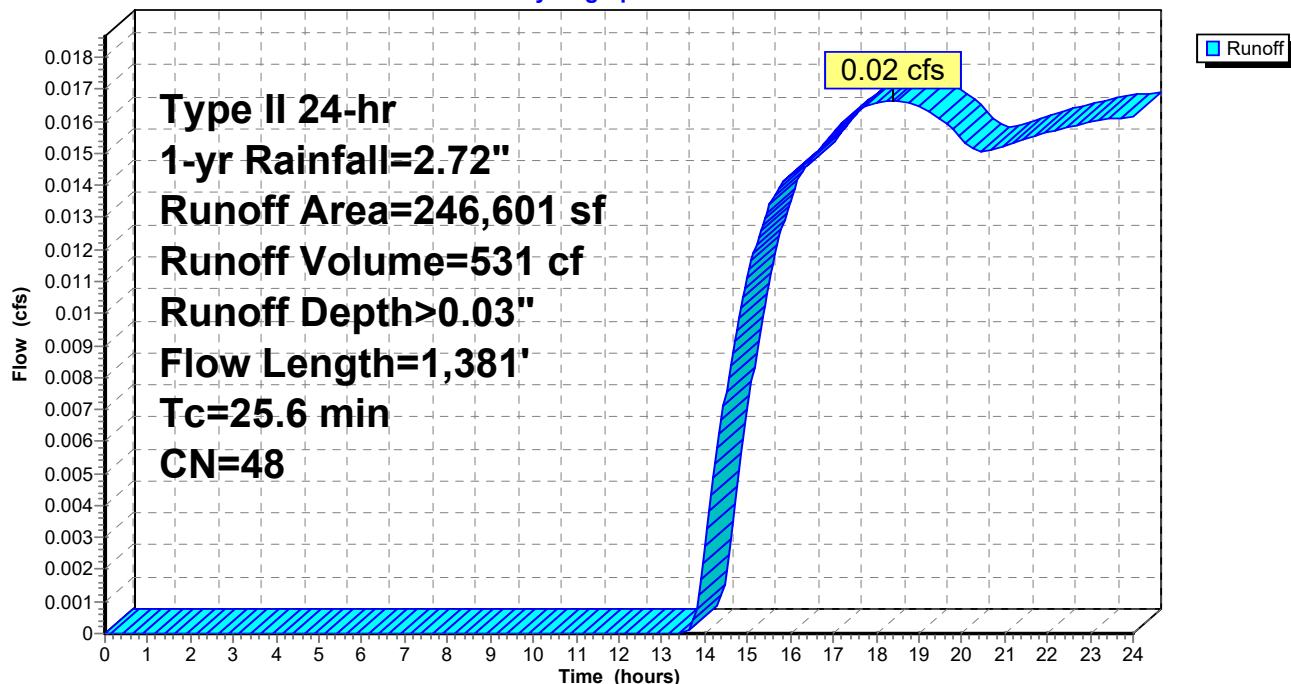
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
42,139	30	Woods, Good, HSG A
13,920	77	Woods, Good, HSG D
112,687	30	Meadow, non-grazed, HSG A
70,562	78	Meadow, non-grazed, HSG D
* 7,293	98	Impervious
246,601	48	Weighted Average
239,308		97.04% Pervious Area
7,293		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0450	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1160	1.70		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.6	1,381	Total			

Subcatchment 5S: DA-1 Post

Hydrograph



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Type II 24-hr 1-yr Rainfall=2.72"

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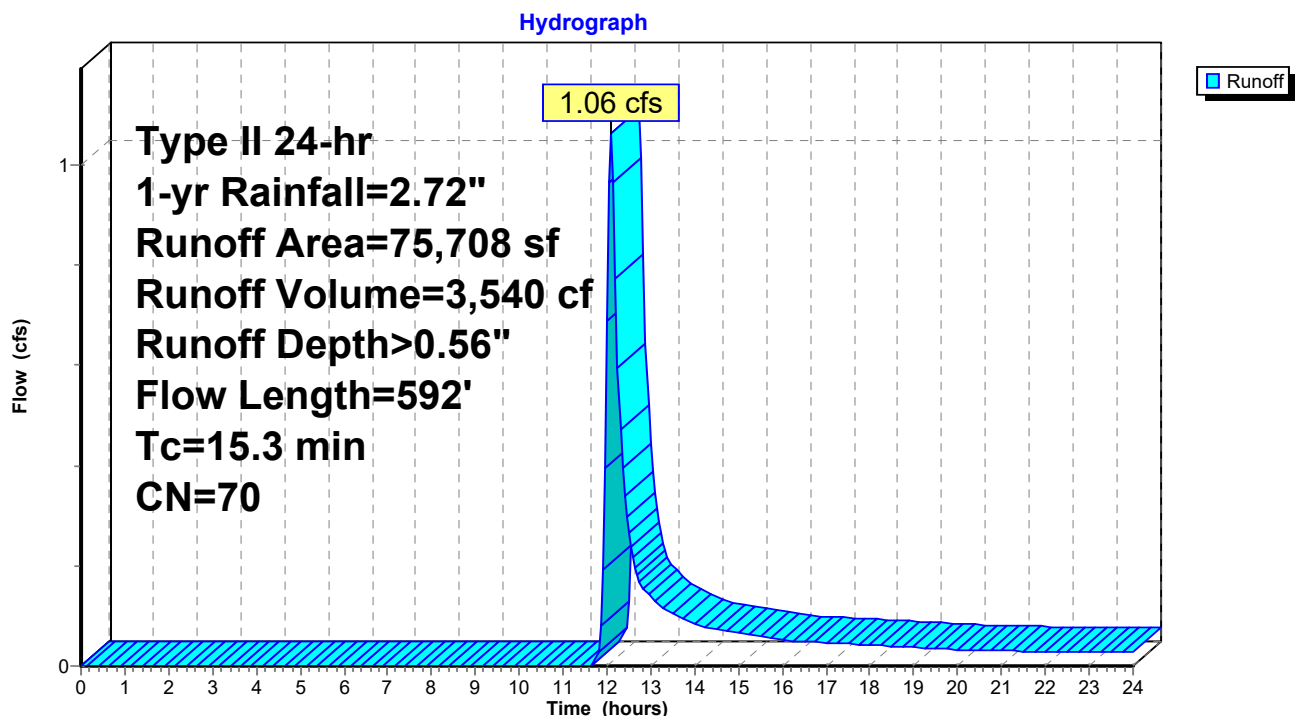
Summary for Subcatchment 7S: DA-2 Post

Runoff = 1.06 cfs @ 12.10 hrs, Volume= 3,540 cf, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
4,976	30	Woods, Good, HSG A
12,609	30	Meadow, non-grazed, HSG A
47,056	78	Meadow, non-grazed, HSG D
* 11,067	98	Impervious
75,708	70	Weighted Average
64,641		85.38% Pervious Area
11,067		14.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.3	130	0.1150	6.88		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.3	362	0.0663	1.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.3	592	Total			

Subcatchment 7S: DA-2 Post

Summary for Subcatchment 14S: DA-1 Pre

[45] Hint: Runoff=Zero

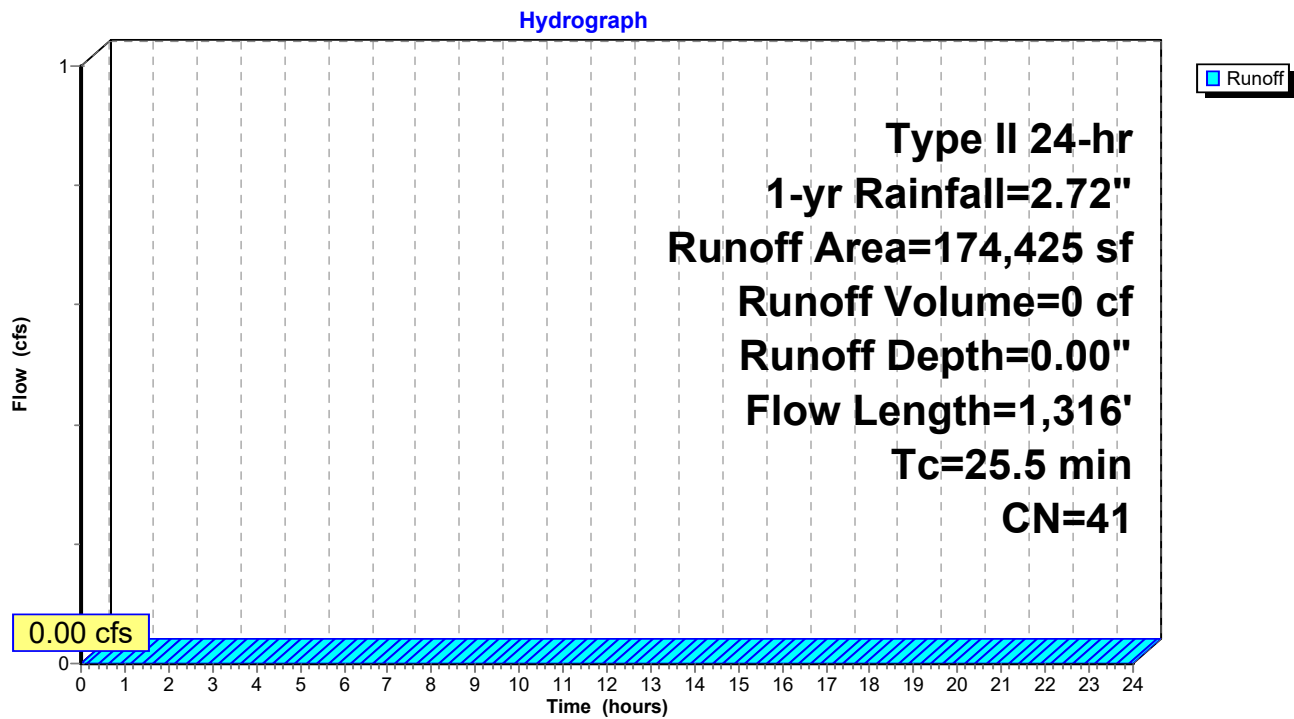
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
25,013	30	Woods, Good, HSG A
6,124	77	Woods, Good, HSG D
108,615	30	Meadow, non-grazed, HSG A
29,571	78	Meadow, non-grazed, HSG D
* 4,082	98	Existing Impervious
* 1,020	30	20% Impervious as Meadow
174,425	41	Weighted Average
170,343		97.66% Pervious Area
4,082		2.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
3.7	398	0.1256	1.77		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.5	1,316	Total			

Subcatchment 14S: DA-1 Pre



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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 15S: DA-2 Pre

Runoff = 0.38 cfs @ 12.35 hrs, Volume= 3,242 cf, Depth> 0.26"

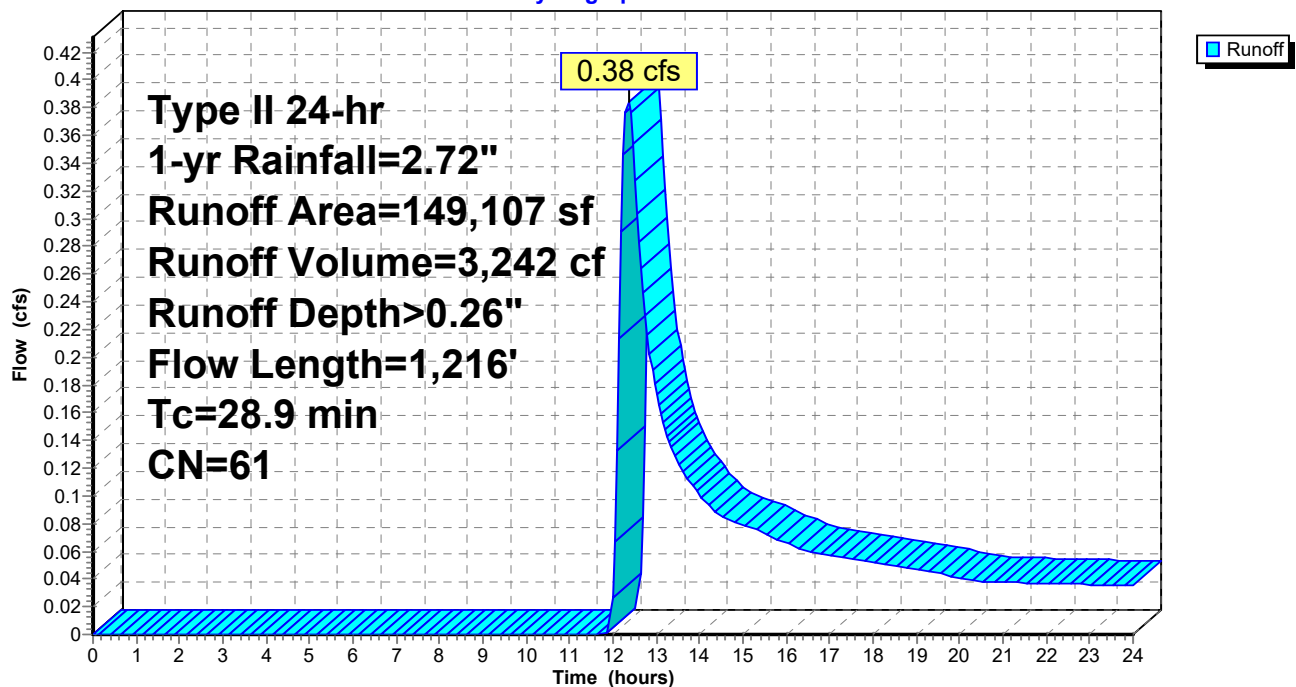
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
24,746	30	Woods, Good, HSG A
7,798	77	Woods, Good, HSG D
28,513	30	Meadow, non-grazed, HSG A
88,050	78	Meadow, non-grazed, HSG D
149,107	61	Weighted Average
149,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0300	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
6.7	639	0.1001	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.1	477	0.0755	1.92		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
28.9	1,216	Total			

Subcatchment 15S: DA-2 Pre

Hydrograph



Summary for Subcatchment 16S: DA-3 Pre

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

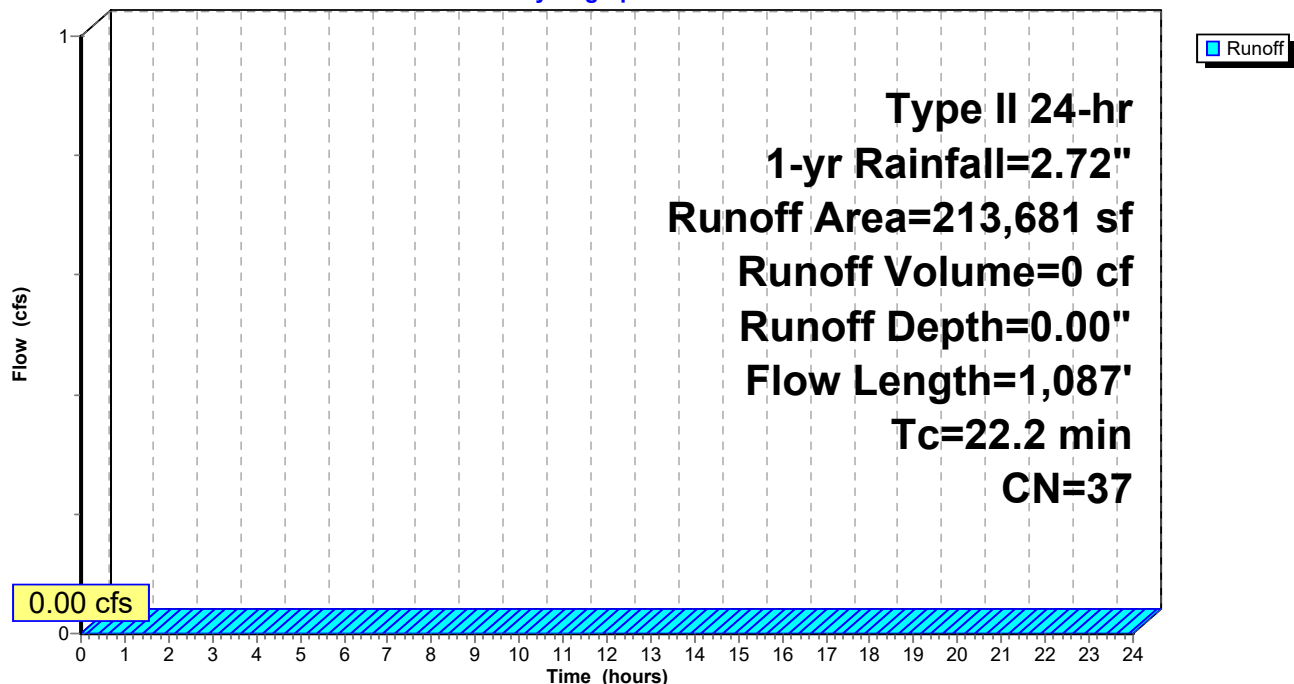
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
8,118	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,696	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
213,681	37	Weighted Average
213,681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0921	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.0	846	0.1123	2.35		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.2	1,087	Total			

Subcatchment 16S: DA-3 Pre

Hydrograph



Summary for Subcatchment 18S: DA-3 Post

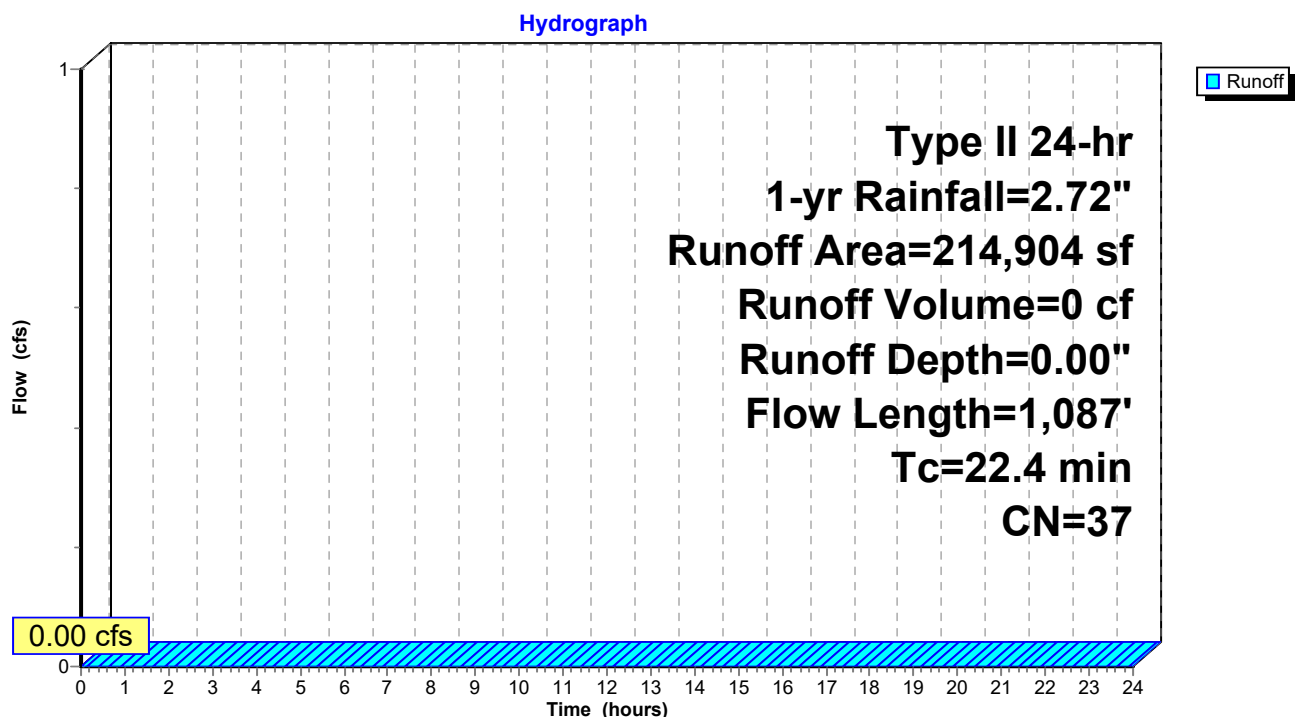
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

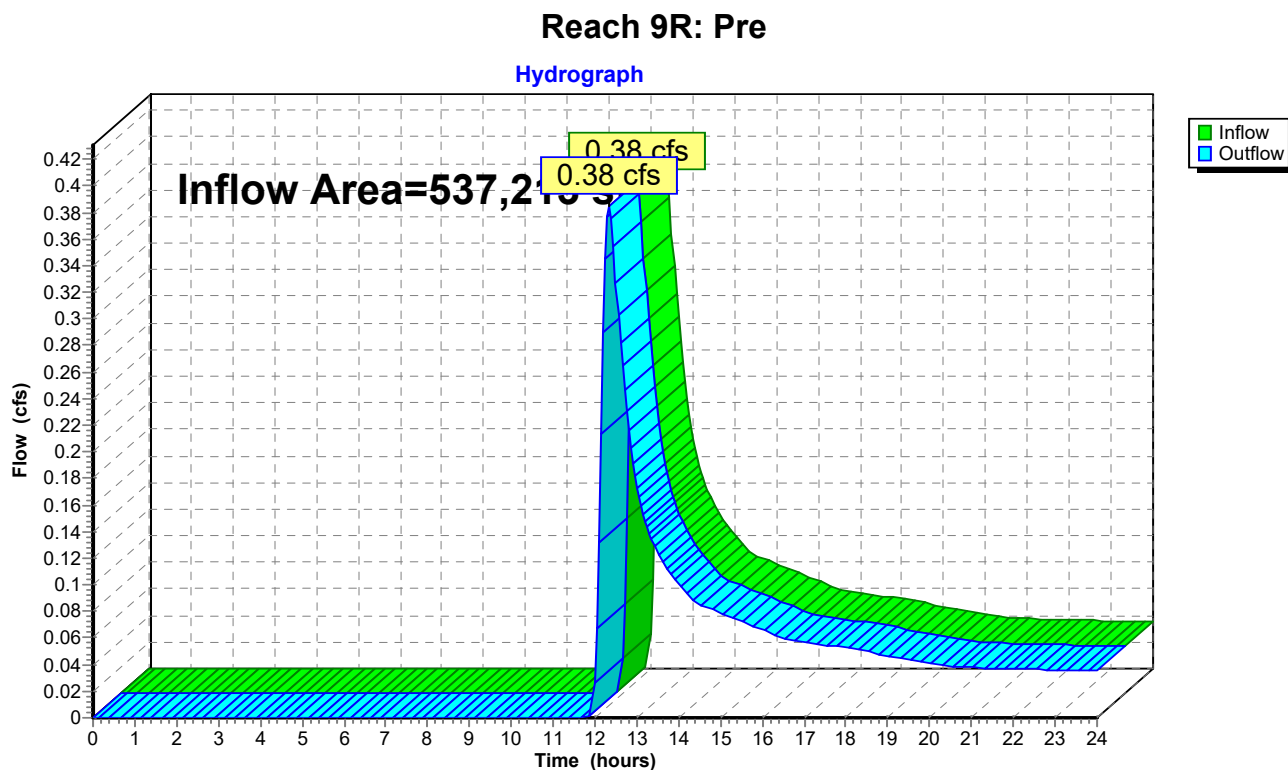
Subcatchment 18S: DA-3 Post

Summary for Reach 9R: Pre

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

Inflow Area = 537,213 sf, 0.76% Impervious, Inflow Depth > 0.07" for 1-yr event
Inflow = 0.38 cfs @ 12.35 hrs, Volume= 3,242 cf
Outflow = 0.38 cfs @ 12.35 hrs, Volume= 3,242 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

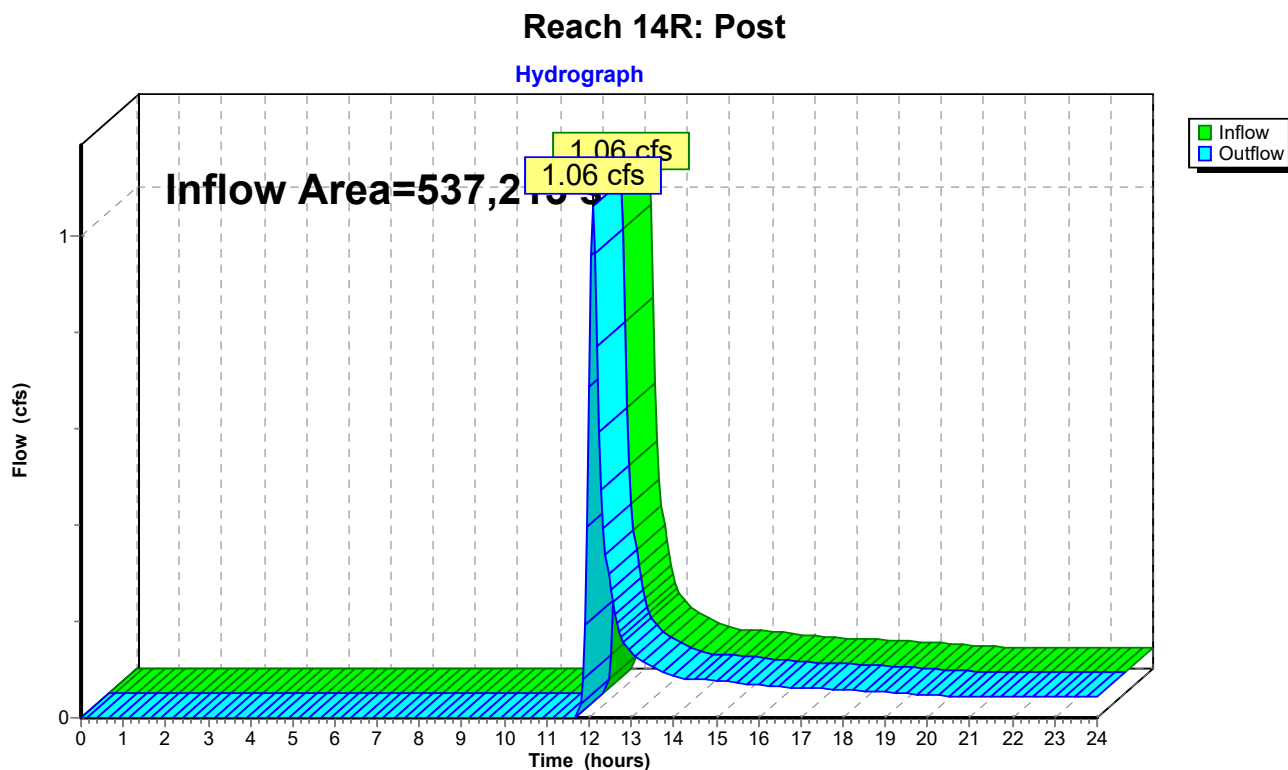


Summary for Reach 14R: Post

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

Inflow Area = 537,213 sf, 3.42% Impervious, Inflow Depth > 0.09" for 1-yr event
Inflow = 1.06 cfs @ 12.10 hrs, Volume= 4,071 cf
Outflow = 1.06 cfs @ 12.10 hrs, Volume= 4,071 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5S: DA-1 Post

Runoff Area=246,601 sf 2.96% Impervious Runoff Depth>0.10"
Flow Length=1,381' Tc=25.6 min CN=48 Runoff=0.07 cfs 2,012 cf

Subcatchment 7S: DA-2 Post

Runoff Area=75,708 sf 14.62% Impervious Runoff Depth>0.86"
Flow Length=592' Tc=15.3 min CN=70 Runoff=1.76 cfs 5,418 cf

Subcatchment 14S: DA-1 Pre

Runoff Area=174,425 sf 2.34% Impervious Runoff Depth>0.01"
Flow Length=1,316' Tc=25.5 min CN=41 Runoff=0.01 cfs 134 cf

Subcatchment 15S: DA-2 Pre

Runoff Area=149,107 sf 0.00% Impervious Runoff Depth>0.46"
Flow Length=1,216' Tc=28.9 min CN=61 Runoff=0.93 cfs 5,745 cf

Subcatchment 16S: DA-3 Pre

Runoff Area=213,681 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,087' Tc=22.2 min CN=37 Runoff=0.00 cfs 0 cf

Subcatchment 18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=0.00 cfs 0 cf

Reach 9R: Pre

Inflow=0.93 cfs 5,879 cf
Outflow=0.93 cfs 5,879 cf

Reach 14R: Post

Inflow=1.76 cfs 7,429 cf
Outflow=1.76 cfs 7,429 cf

Total Runoff Area = 1,074,426 sf Runoff Volume = 13,309 cf Average Runoff Depth = 0.15"
97.91% Pervious = 1,051,984 sf 2.09% Impervious = 22,442 sf

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 5S: DA-1 Post

Runoff = 0.07 cfs @ 13.25 hrs, Volume= 2,012 cf, Depth> 0.10"

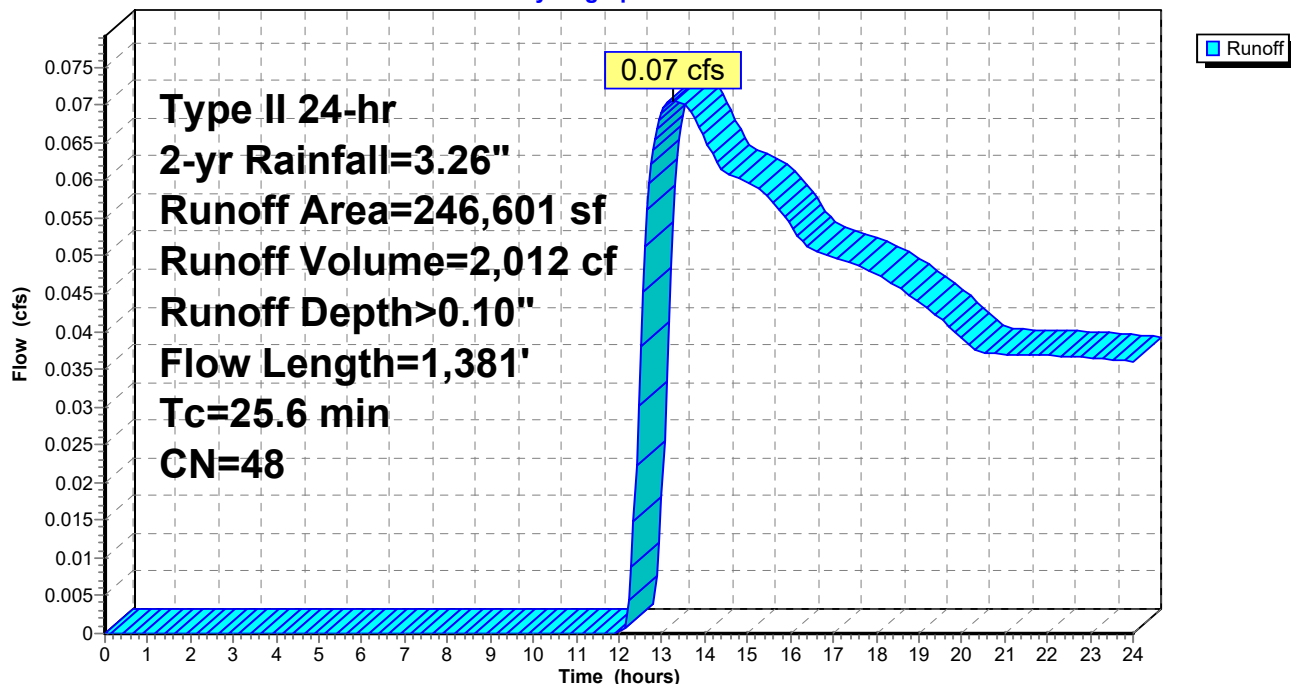
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
42,139	30	Woods, Good, HSG A
13,920	77	Woods, Good, HSG D
112,687	30	Meadow, non-grazed, HSG A
70,562	78	Meadow, non-grazed, HSG D
* 7,293	98	Impervious
246,601	48	Weighted Average
239,308		97.04% Pervious Area
7,293		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0450	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1160	1.70		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.6	1,381	Total			

Subcatchment 5S: DA-1 Post

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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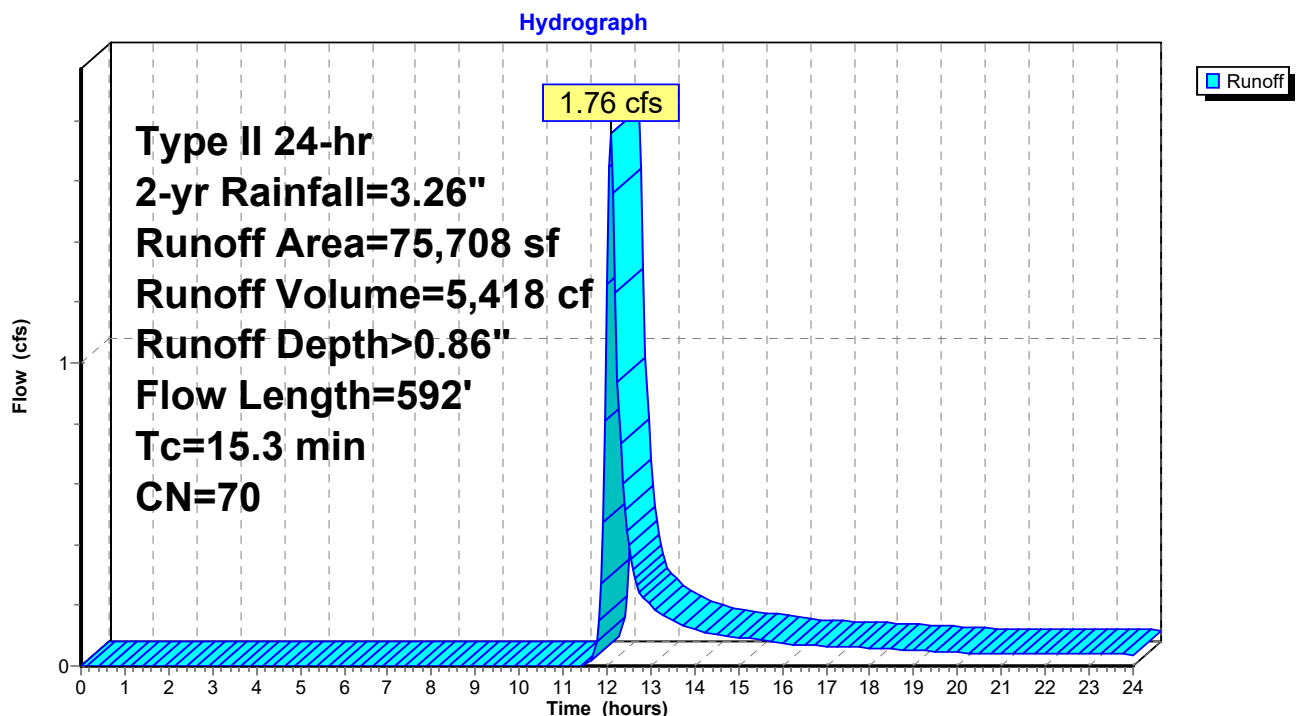
Summary for Subcatchment 7S: DA-2 Post

Runoff = 1.76 cfs @ 12.09 hrs, Volume= 5,418 cf, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
4,976	30	Woods, Good, HSG A
12,609	30	Meadow, non-grazed, HSG A
47,056	78	Meadow, non-grazed, HSG D
* 11,067	98	Impervious
75,708	70	Weighted Average
64,641		85.38% Pervious Area
11,067		14.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.3	130	0.1150	6.88		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.3	362	0.0663	1.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.3	592	Total			

Subcatchment 7S: DA-2 Post

Summary for Subcatchment 14S: DA-1 Pre

[73] Warning: Peak may fall outside time span

Runoff = 0.01 cfs @ 24.00 hrs, Volume= 134 cf, Depth> 0.01"

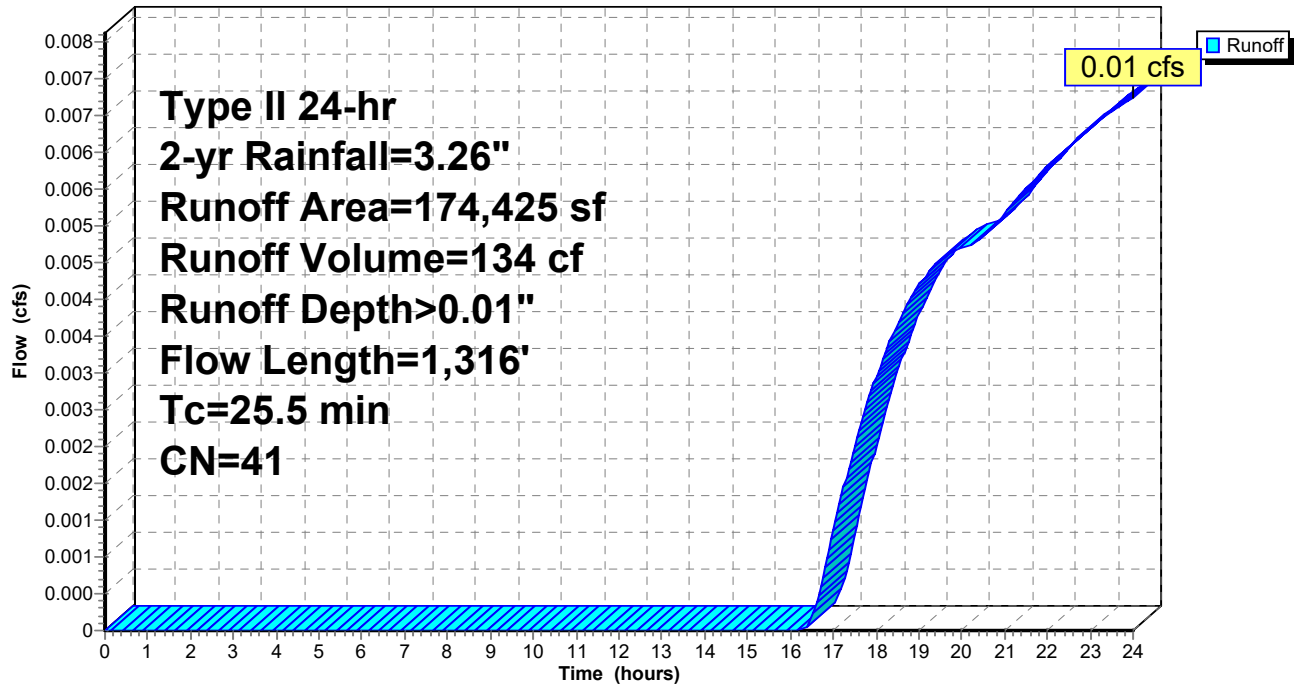
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
25,013	30	Woods, Good, HSG A
6,124	77	Woods, Good, HSG D
108,615	30	Meadow, non-grazed, HSG A
29,571	78	Meadow, non-grazed, HSG D
* 4,082	98	Existing Impervious
* 1,020	30	20% Impervious as Meadow
174,425	41	Weighted Average
170,343		97.66% Pervious Area
4,082		2.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
3.7	398	0.1256	1.77		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.5	1,316	Total			

Subcatchment 14S: DA-1 Pre

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Type II 24-hr 2-yr Rainfall=3.26"

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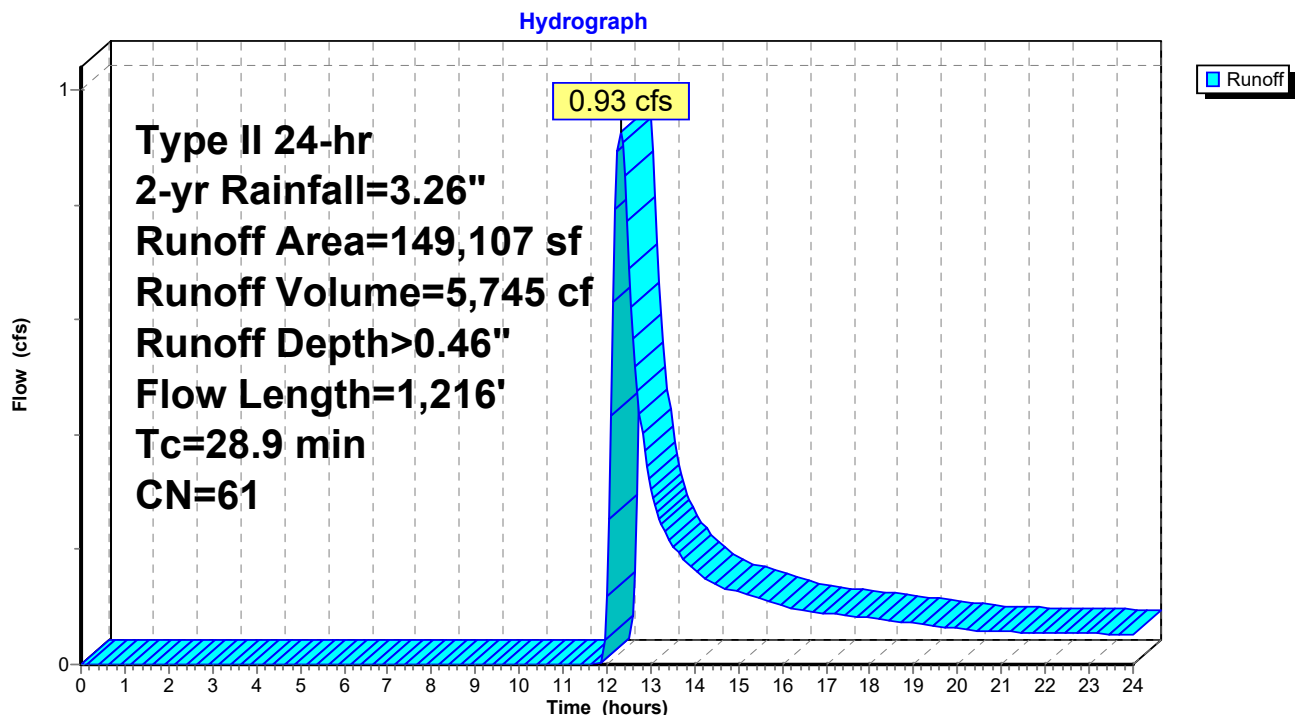
Summary for Subcatchment 15S: DA-2 Pre

Runoff = 0.93 cfs @ 12.31 hrs, Volume= 5,745 cf, Depth> 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
24,746	30	Woods, Good, HSG A
7,798	77	Woods, Good, HSG D
28,513	30	Meadow, non-grazed, HSG A
88,050	78	Meadow, non-grazed, HSG D
149,107	61	Weighted Average
149,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0300	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
6.7	639	0.1001	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.1	477	0.0755	1.92		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
28.9	1,216	Total			

Subcatchment 15S: DA-2 Pre

Summary for Subcatchment 16S: DA-3 Pre

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

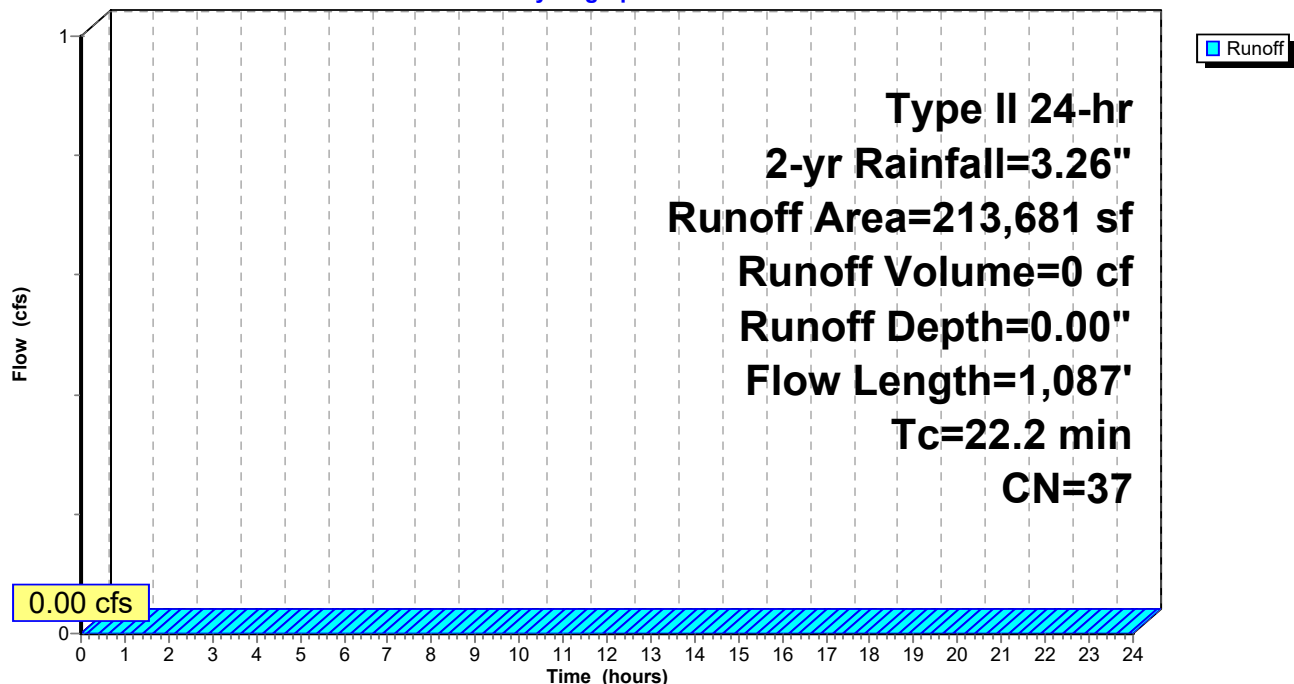
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
8,118	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,696	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
213,681	37	Weighted Average
213,681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0921	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.0	846	0.1123	2.35		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.2	1,087	Total			

Subcatchment 16S: DA-3 Pre

Hydrograph



Summary for Subcatchment 18S: DA-3 Post

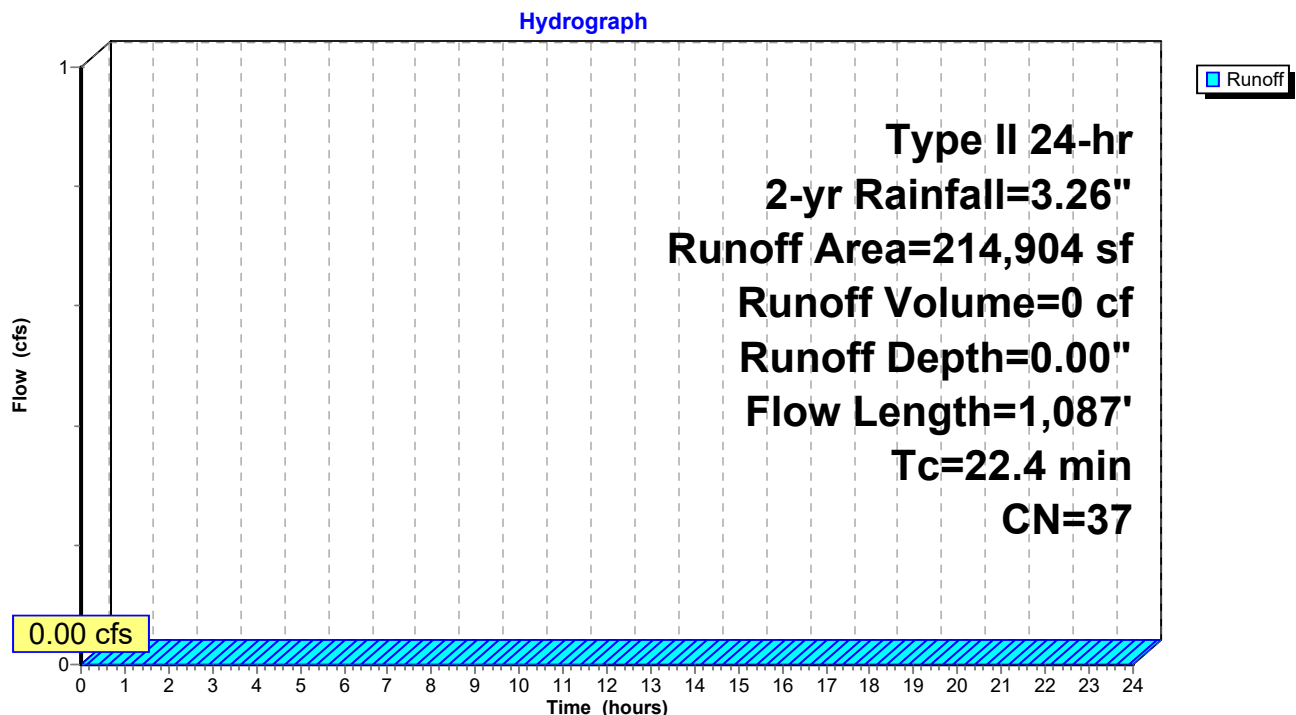
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

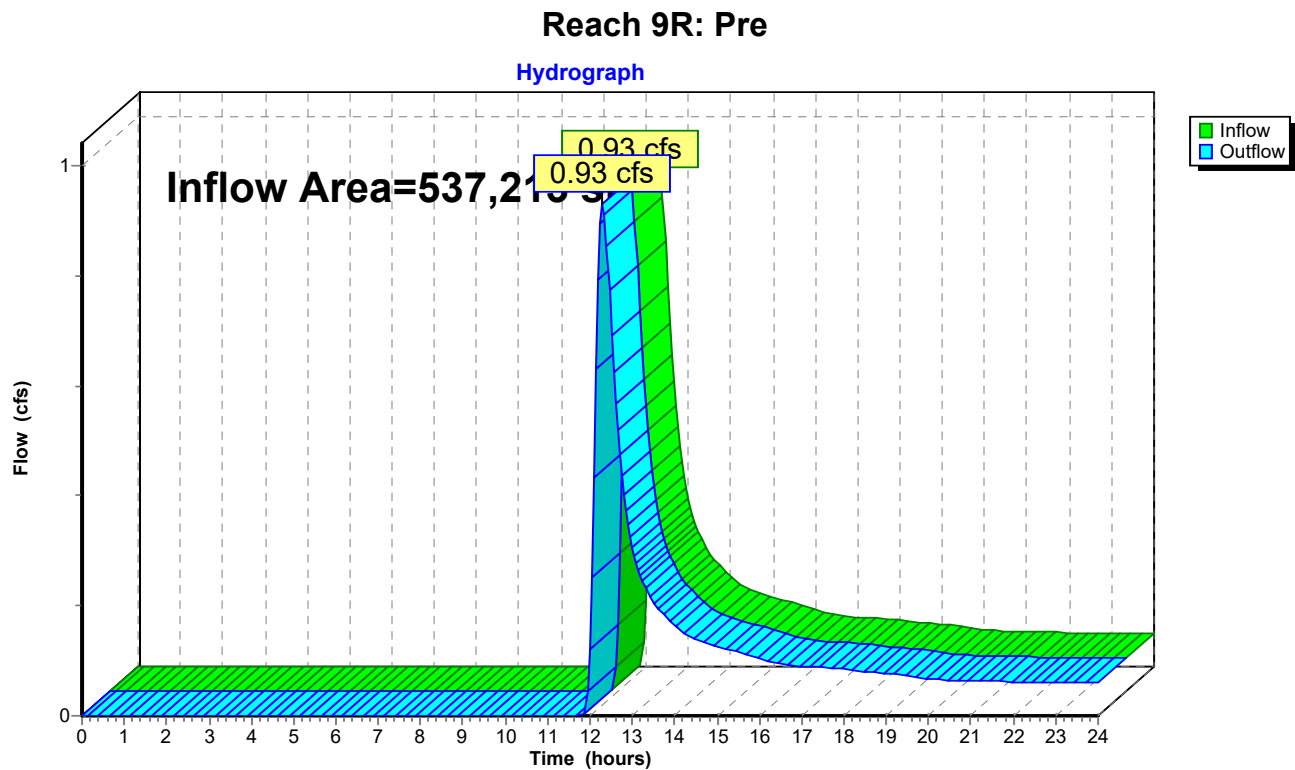
Subcatchment 18S: DA-3 Post

Summary for Reach 9R: Pre

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

Inflow Area = 537,213 sf, 0.76% Impervious, Inflow Depth > 0.13" for 2-yr event
Inflow = 0.93 cfs @ 12.31 hrs, Volume= 5,879 cf
Outflow = 0.93 cfs @ 12.31 hrs, Volume= 5,879 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

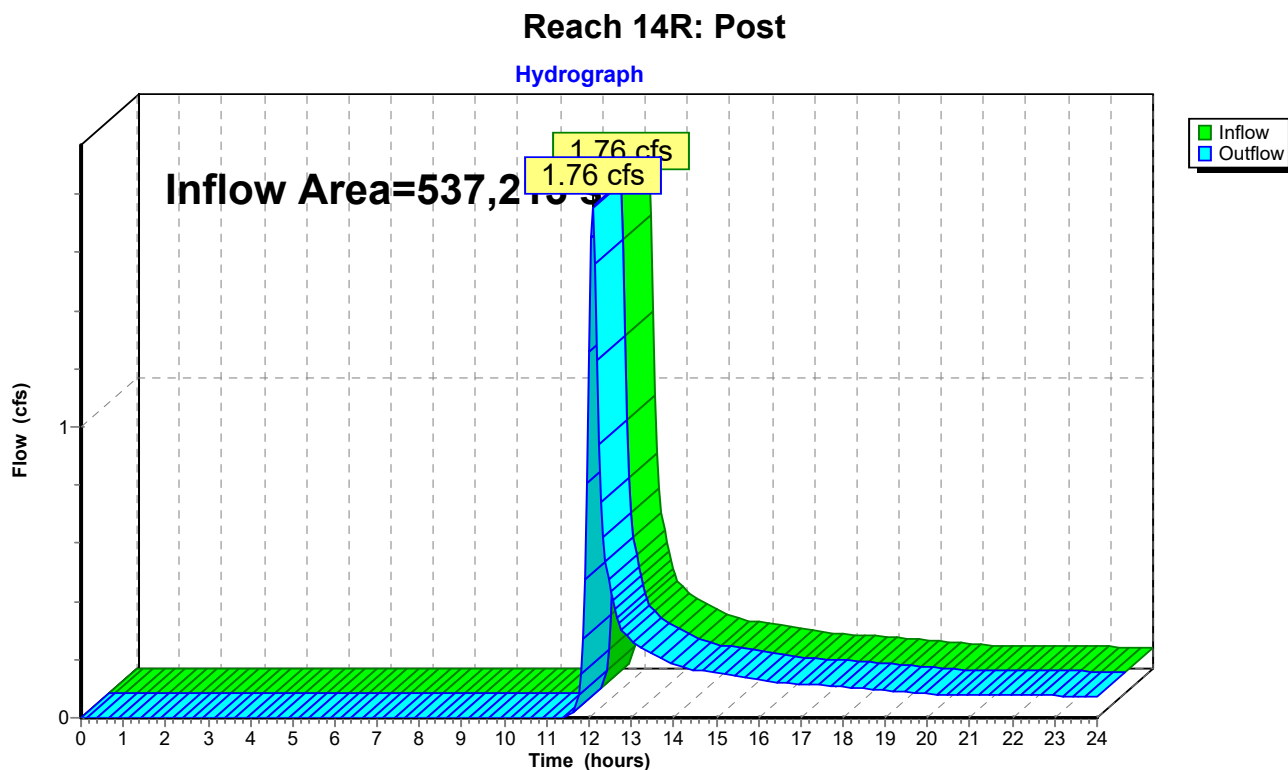


Summary for Reach 14R: Post

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

Inflow Area = 537,213 sf, 3.42% Impervious, Inflow Depth > 0.17" for 2-yr event
Inflow = 1.76 cfs @ 12.09 hrs, Volume= 7,429 cf
Outflow = 1.76 cfs @ 12.09 hrs, Volume= 7,429 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5S: DA-1 Post

Runoff Area=246,601 sf 2.96% Impervious Runoff Depth>0.49"
Flow Length=1,381' Tc=25.6 min CN=48 Runoff=1.36 cfs 10,012 cf

Subcatchment 7S: DA-2 Post

Runoff Area=75,708 sf 14.62% Impervious Runoff Depth>1.84"
Flow Length=592' Tc=15.3 min CN=70 Runoff=4.01 cfs 11,594 cf

Subcatchment 14S: DA-1 Pre

Runoff Area=174,425 sf 2.34% Impervious Runoff Depth>0.21"
Flow Length=1,316' Tc=25.5 min CN=41 Runoff=0.15 cfs 3,040 cf

Subcatchment 15S: DA-2 Pre

Runoff Area=149,107 sf 0.00% Impervious Runoff Depth>1.20"
Flow Length=1,216' Tc=28.9 min CN=61 Runoff=3.22 cfs 14,946 cf

Subcatchment 16S: DA-3 Pre

Runoff Area=213,681 sf 0.00% Impervious Runoff Depth>0.09"
Flow Length=1,087' Tc=22.2 min CN=37 Runoff=0.05 cfs 1,686 cf

Subcatchment 18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth>0.09"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=0.05 cfs 1,695 cf

Reach 9R: Pre

Inflow=3.31 cfs 19,672 cf
Outflow=3.31 cfs 19,672 cf

Reach 14R: Post

Inflow=4.63 cfs 23,300 cf
Outflow=4.63 cfs 23,300 cf

Total Runoff Area = 1,074,426 sf Runoff Volume = 42,973 cf Average Runoff Depth = 0.48"
97.91% Pervious = 1,051,984 sf 2.09% Impervious = 22,442 sf

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Type II 24-hr 10-yr Rainfall=4.74"

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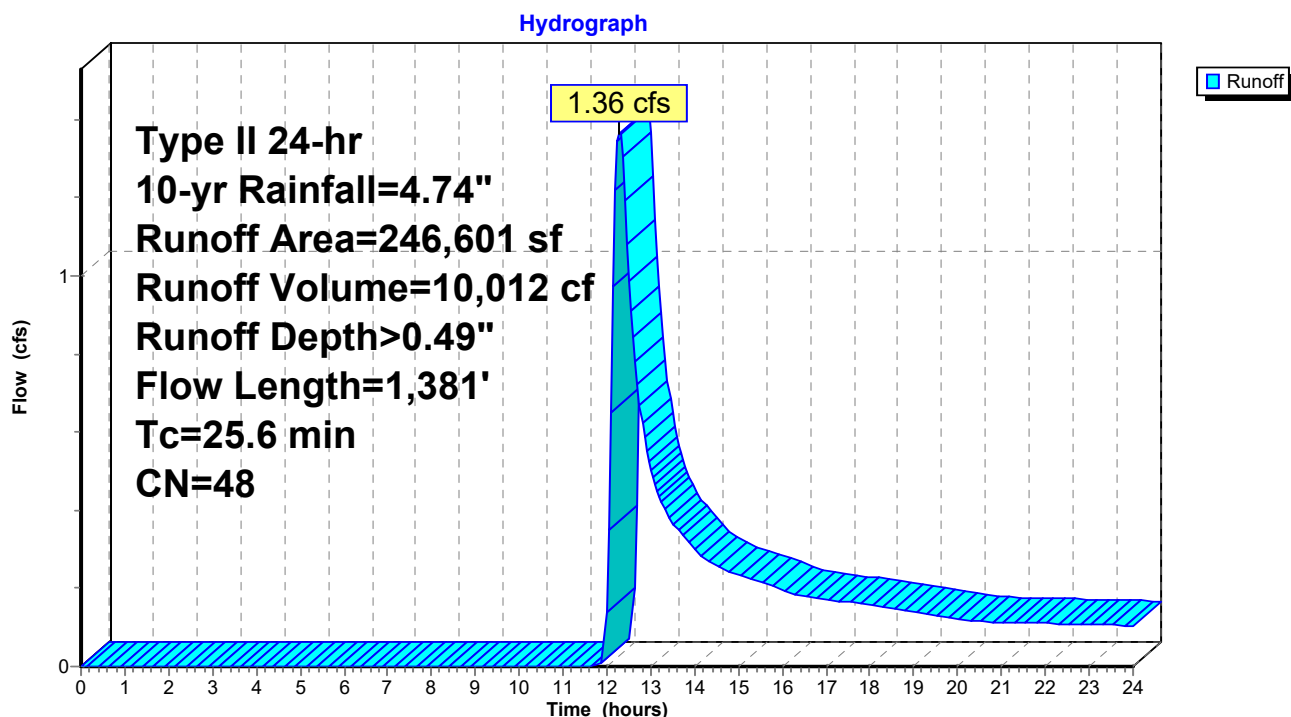
Summary for Subcatchment 5S: DA-1 Post

Runoff = 1.36 cfs @ 12.29 hrs, Volume= 10,012 cf, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
42,139	30	Woods, Good, HSG A
13,920	77	Woods, Good, HSG D
112,687	30	Meadow, non-grazed, HSG A
70,562	78	Meadow, non-grazed, HSG D
* 7,293	98	Impervious
246,601	48	Weighted Average
239,308		97.04% Pervious Area
7,293		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0450	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1160	1.70		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.6	1,381	Total			

Subcatchment 5S: DA-1 Post

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Type II 24-hr 10-yr Rainfall=4.74"

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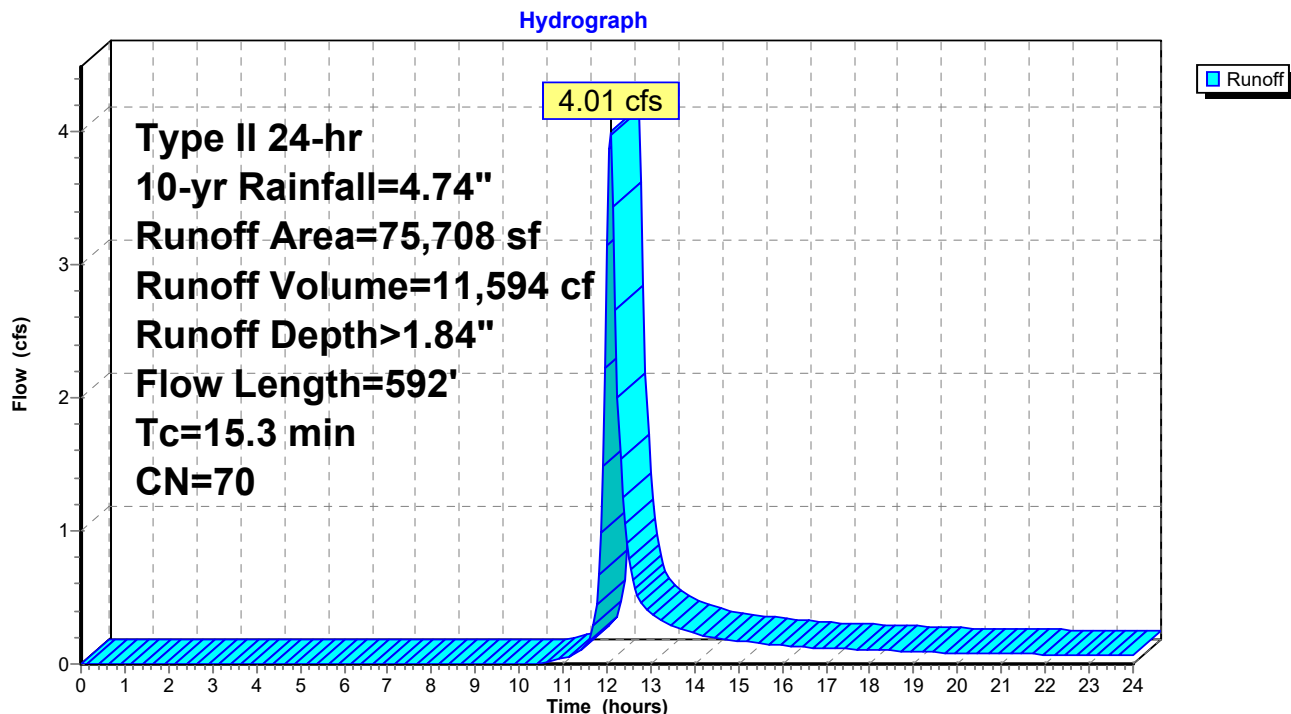
Summary for Subcatchment 7S: DA-2 Post

Runoff = 4.01 cfs @ 12.08 hrs, Volume= 11,594 cf, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
4,976	30	Woods, Good, HSG A
12,609	30	Meadow, non-grazed, HSG A
47,056	78	Meadow, non-grazed, HSG D
* 11,067	98	Impervious
75,708	70	Weighted Average
64,641		85.38% Pervious Area
11,067		14.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.3	130	0.1150	6.88		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.3	362	0.0663	1.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.3	592	Total			

Subcatchment 7S: DA-2 Post

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 14S: DA-1 Pre

Runoff = 0.15 cfs @ 12.62 hrs, Volume= 3,040 cf, Depth> 0.21"

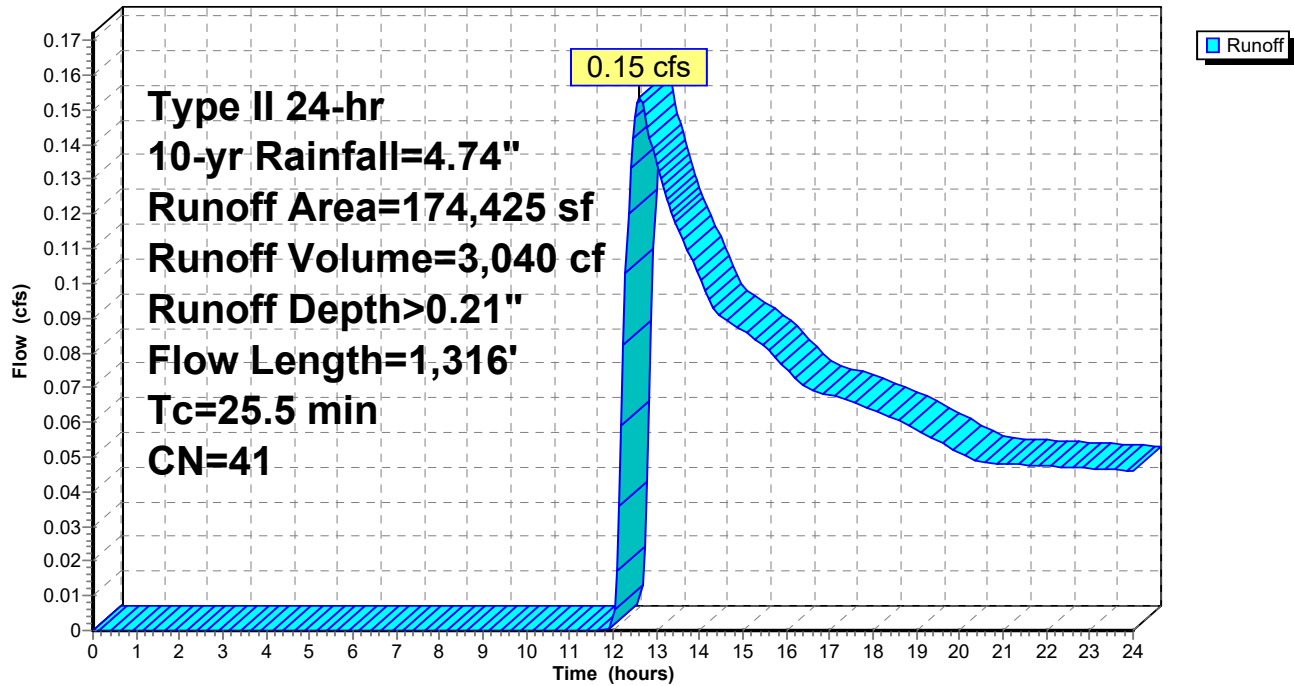
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
25,013	30	Woods, Good, HSG A
6,124	77	Woods, Good, HSG D
108,615	30	Meadow, non-grazed, HSG A
29,571	78	Meadow, non-grazed, HSG D
* 4,082	98	Existing Impervious
* 1,020	30	20% Impervious as Meadow
174,425	41	Weighted Average
170,343		97.66% Pervious Area
4,082		2.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
3.7	398	0.1256	1.77		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.5	1,316	Total			

Subcatchment 14S: DA-1 Pre

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 15S: DA-2 Pre

Runoff = 3.22 cfs @ 12.26 hrs, Volume= 14,946 cf, Depth> 1.20"

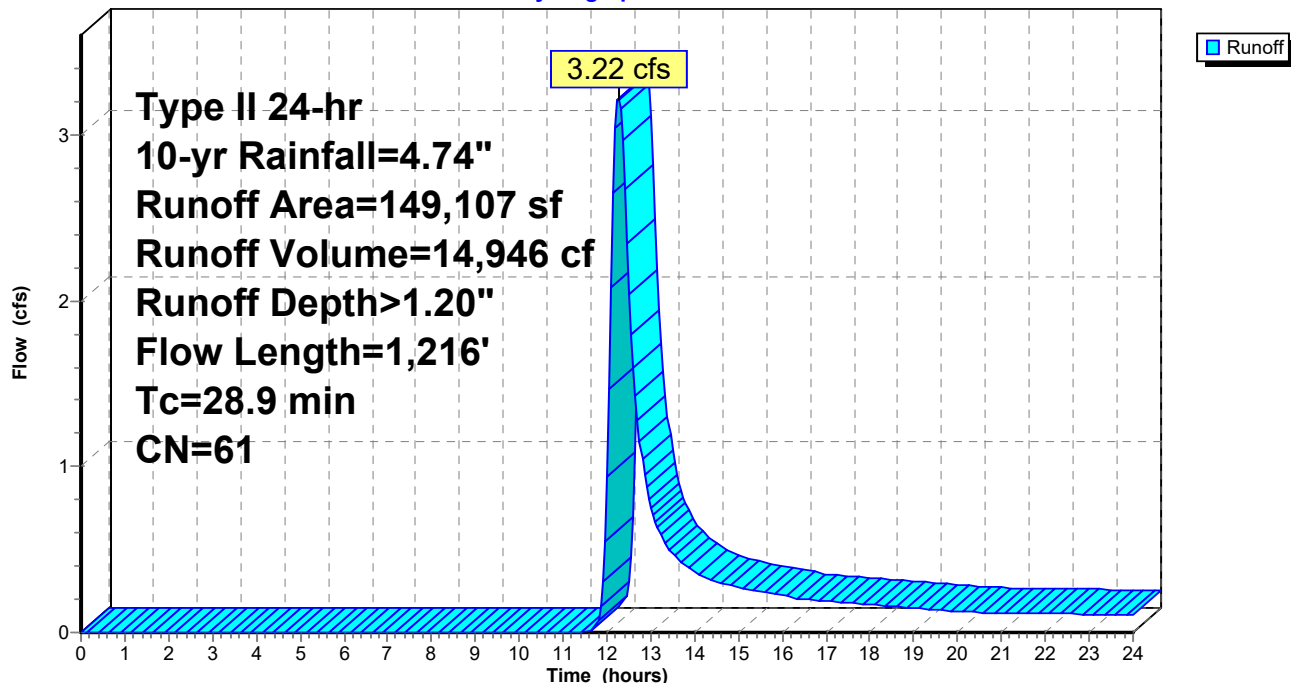
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
24,746	30	Woods, Good, HSG A
7,798	77	Woods, Good, HSG D
28,513	30	Meadow, non-grazed, HSG A
88,050	78	Meadow, non-grazed, HSG D
149,107	61	Weighted Average
149,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0300	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
6.7	639	0.1001	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.1	477	0.0755	1.92		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
28.9	1,216	Total			

Subcatchment 15S: DA-2 Pre

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 16S: DA-3 Pre

Runoff = 0.05 cfs @ 15.20 hrs, Volume= 1,686 cf, Depth> 0.09"

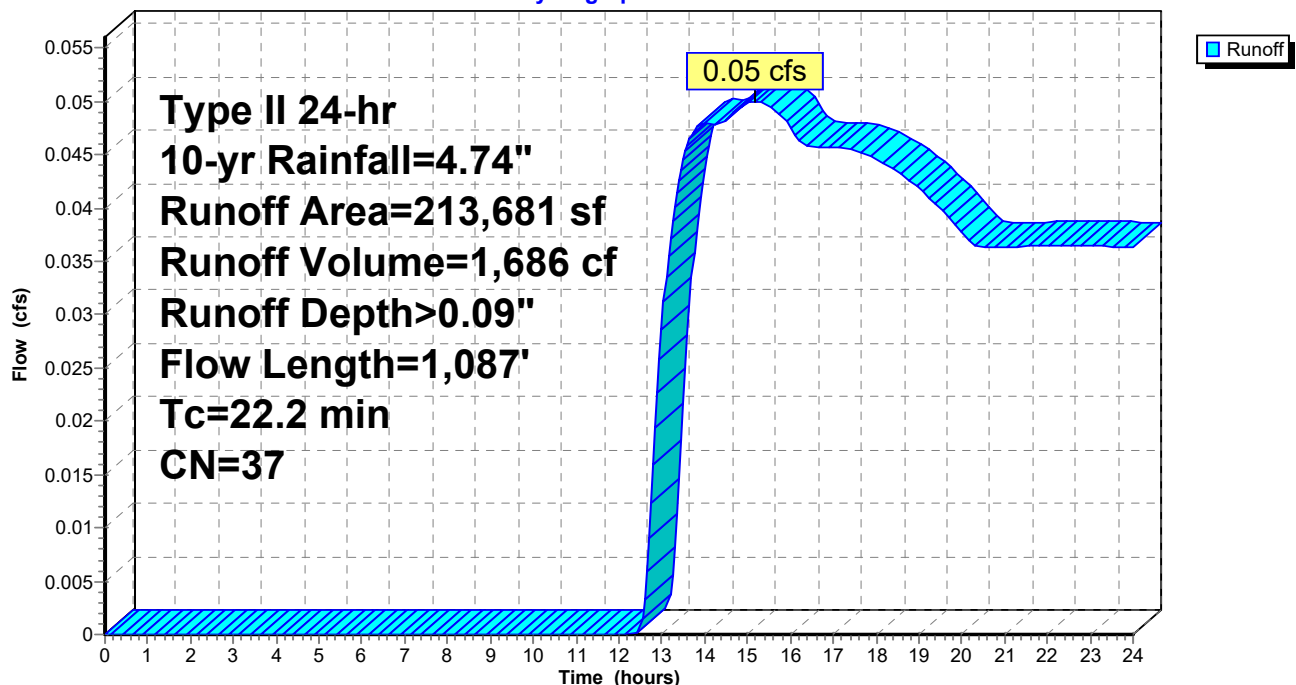
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
8,118	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,696	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
213,681	37	Weighted Average
213,681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0921	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.0	846	0.1123	2.35		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.2	1,087	Total			

Subcatchment 16S: DA-3 Pre

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 18S: DA-3 Post

Runoff = 0.05 cfs @ 15.20 hrs, Volume= 1,695 cf, Depth> 0.09"

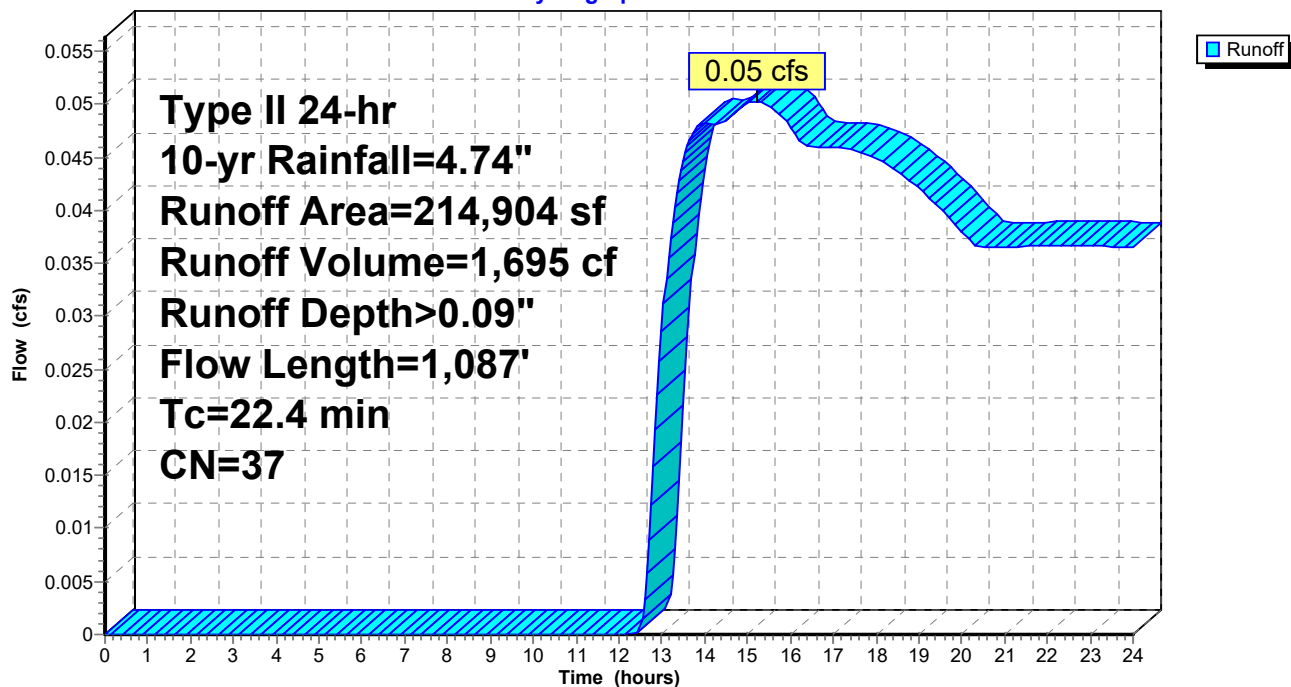
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

Hydrograph

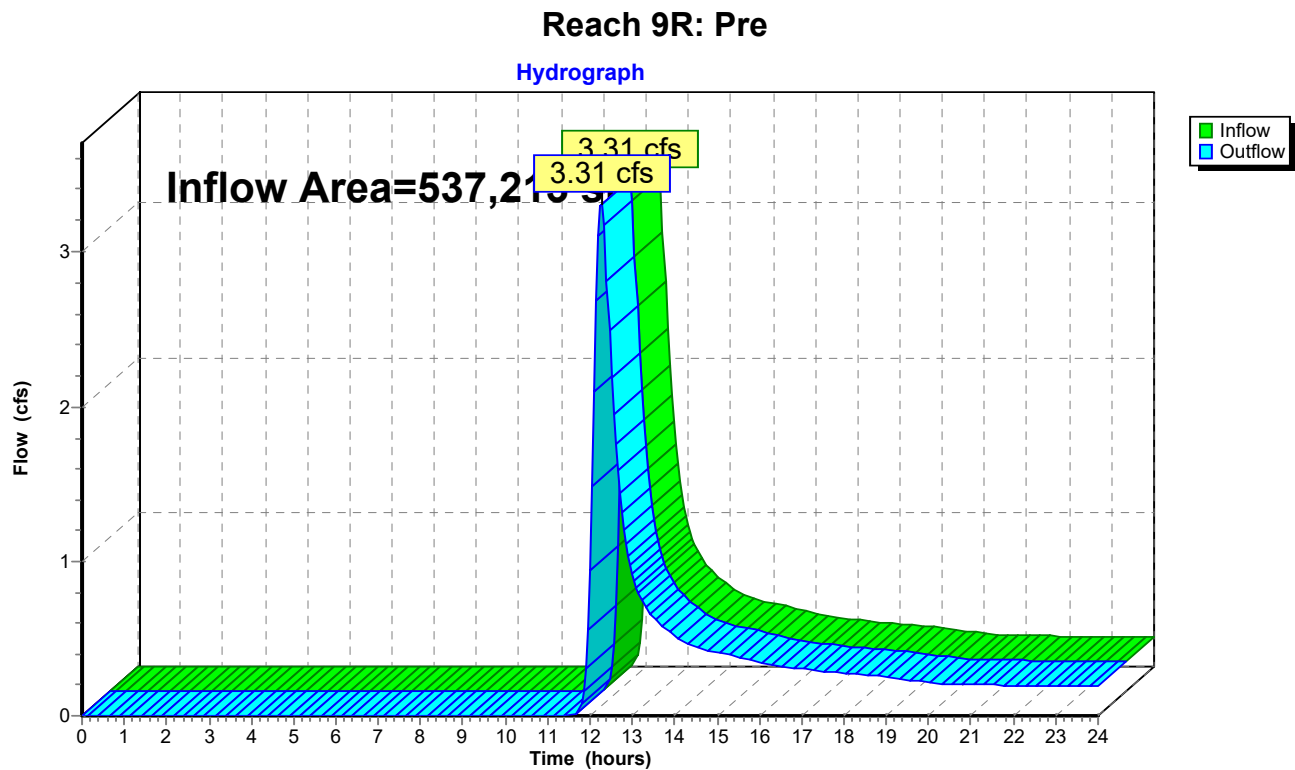


Summary for Reach 9R: Pre

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

Inflow Area = 537,213 sf, 0.76% Impervious, Inflow Depth > 0.44" for 10-yr event
Inflow = 3.31 cfs @ 12.27 hrs, Volume= 19,672 cf
Outflow = 3.31 cfs @ 12.27 hrs, Volume= 19,672 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

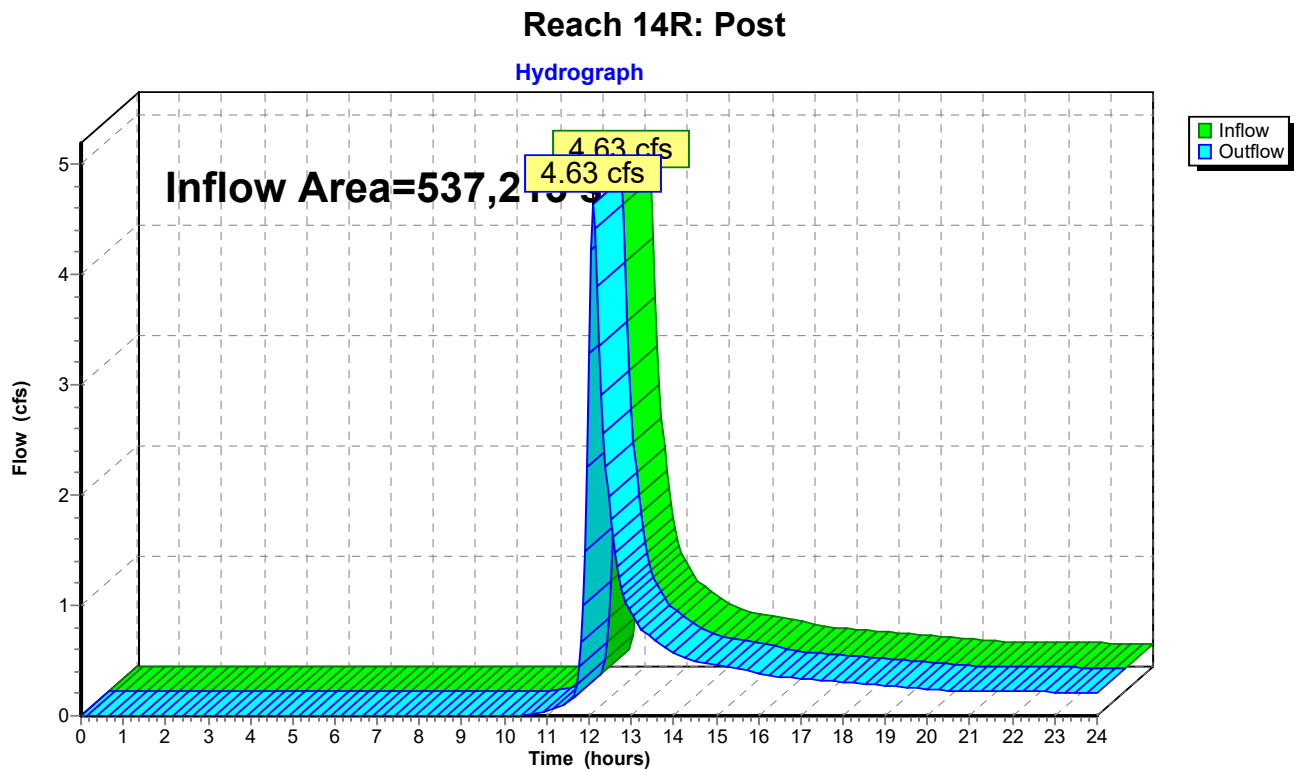


Summary for Reach 14R: Post

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

Inflow Area = 537,213 sf, 3.42% Impervious, Inflow Depth > 0.52" for 10-yr event
Inflow = 4.63 cfs @ 12.11 hrs, Volume= 23,300 cf
Outflow = 4.63 cfs @ 12.11 hrs, Volume= 23,300 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



MLV 505LD86_Pre&post*Type II 24-hr 25-yr Rainfall=5.85"*

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5S: DA-1 Post

Runoff Area=246,601 sf 2.96% Impervious Runoff Depth>0.92"
Flow Length=1,381' Tc=25.6 min CN=48 Runoff=3.57 cfs 18,987 cf

Subcatchment 7S: DA-2 Post

Runoff Area=75,708 sf 14.62% Impervious Runoff Depth>2.68"
Flow Length=592' Tc=15.3 min CN=70 Runoff=5.91 cfs 16,882 cf

Subcatchment 14S: DA-1 Pre

Runoff Area=174,425 sf 2.34% Impervious Runoff Depth>0.50"
Flow Length=1,316' Tc=25.5 min CN=41 Runoff=0.83 cfs 7,286 cf

Subcatchment 15S: DA-2 Pre

Runoff Area=149,107 sf 0.00% Impervious Runoff Depth>1.89"
Flow Length=1,216' Tc=28.9 min CN=61 Runoff=5.40 cfs 23,456 cf

Subcatchment 16S: DA-3 Pre

Runoff Area=213,681 sf 0.00% Impervious Runoff Depth>0.30"
Flow Length=1,087' Tc=22.2 min CN=37 Runoff=0.33 cfs 5,379 cf

Subcatchment 18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth>0.30"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=0.33 cfs 5,409 cf

Reach 9R: Pre

Inflow=6.50 cfs 36,121 cf
Outflow=6.50 cfs 36,121 cf

Reach 14R: Post

Inflow=8.26 cfs 41,278 cf
Outflow=8.26 cfs 41,278 cf

Total Runoff Area = 1,074,426 sf Runoff Volume = 77,399 cf Average Runoff Depth = 0.86"
97.91% Pervious = 1,051,984 sf 2.09% Impervious = 22,442 sf

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Type II 24-hr 25-yr Rainfall=5.85"

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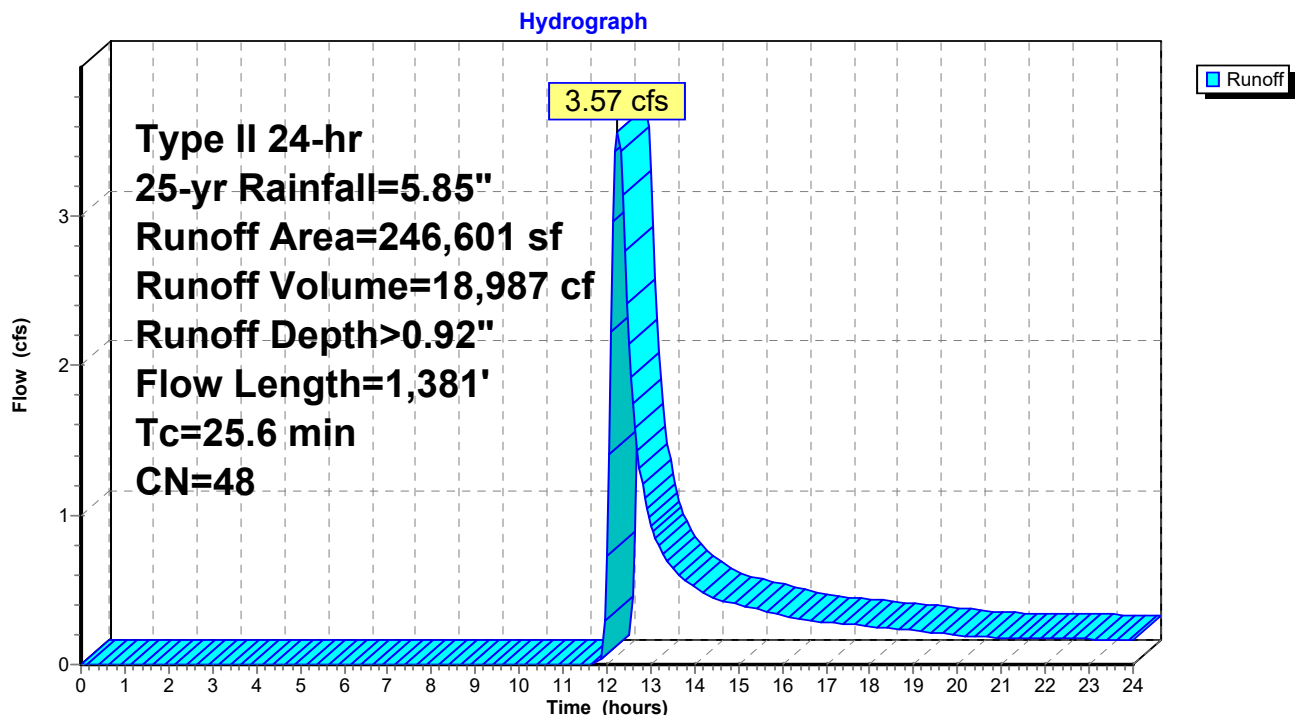
Summary for Subcatchment 5S: DA-1 Post

Runoff = 3.57 cfs @ 12.25 hrs, Volume= 18,987 cf, Depth> 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
42,139	30	Woods, Good, HSG A
13,920	77	Woods, Good, HSG D
112,687	30	Meadow, non-grazed, HSG A
70,562	78	Meadow, non-grazed, HSG D
* 7,293	98	Impervious
246,601	48	Weighted Average
239,308		97.04% Pervious Area
7,293		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0450	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1160	1.70		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.6	1,381	Total			

Subcatchment 5S: DA-1 Post

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Type II 24-hr 25-yr Rainfall=5.85"

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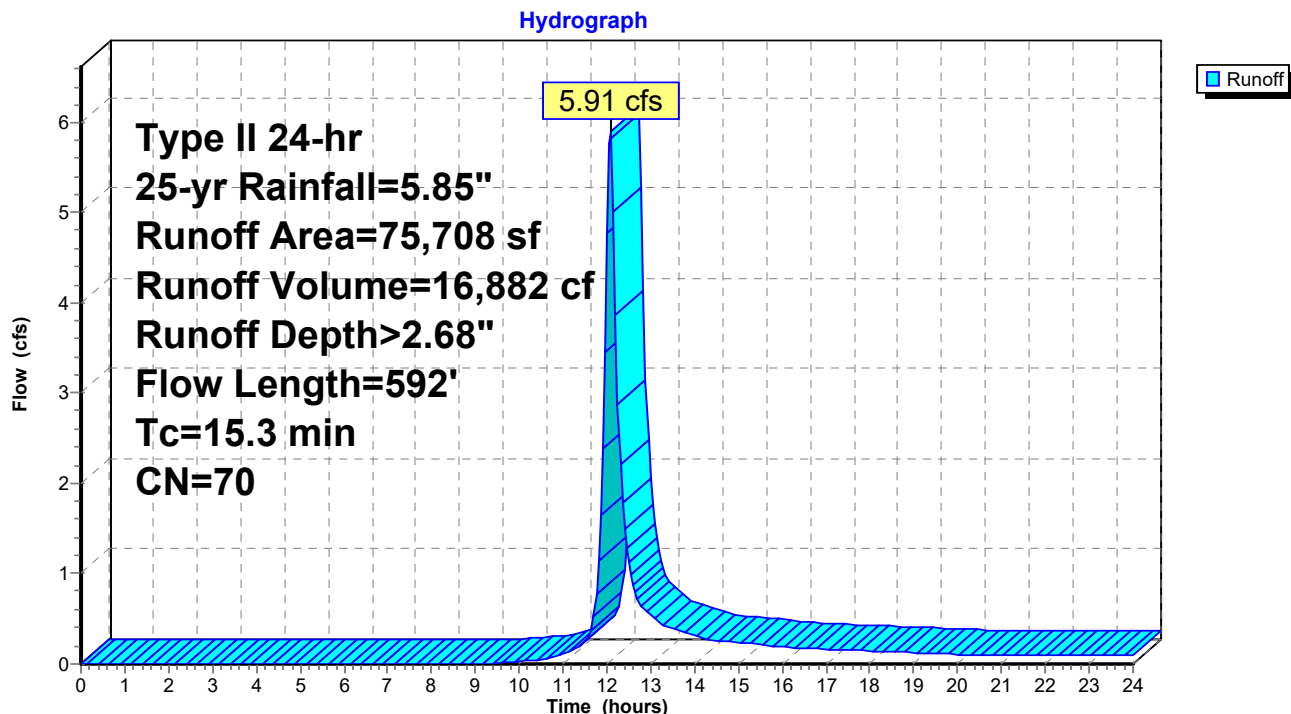
Summary for Subcatchment 7S: DA-2 Post

Runoff = 5.91 cfs @ 12.08 hrs, Volume= 16,882 cf, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
4,976	30	Woods, Good, HSG A
12,609	30	Meadow, non-grazed, HSG A
47,056	78	Meadow, non-grazed, HSG D
* 11,067	98	Impervious
75,708	70	Weighted Average
64,641		85.38% Pervious Area
11,067		14.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.3	130	0.1150	6.88		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.3	362	0.0663	1.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.3	592	Total			

Subcatchment 7S: DA-2 Post

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 14S: DA-1 Pre

Runoff = 0.83 cfs @ 12.31 hrs, Volume= 7,286 cf, Depth> 0.50"

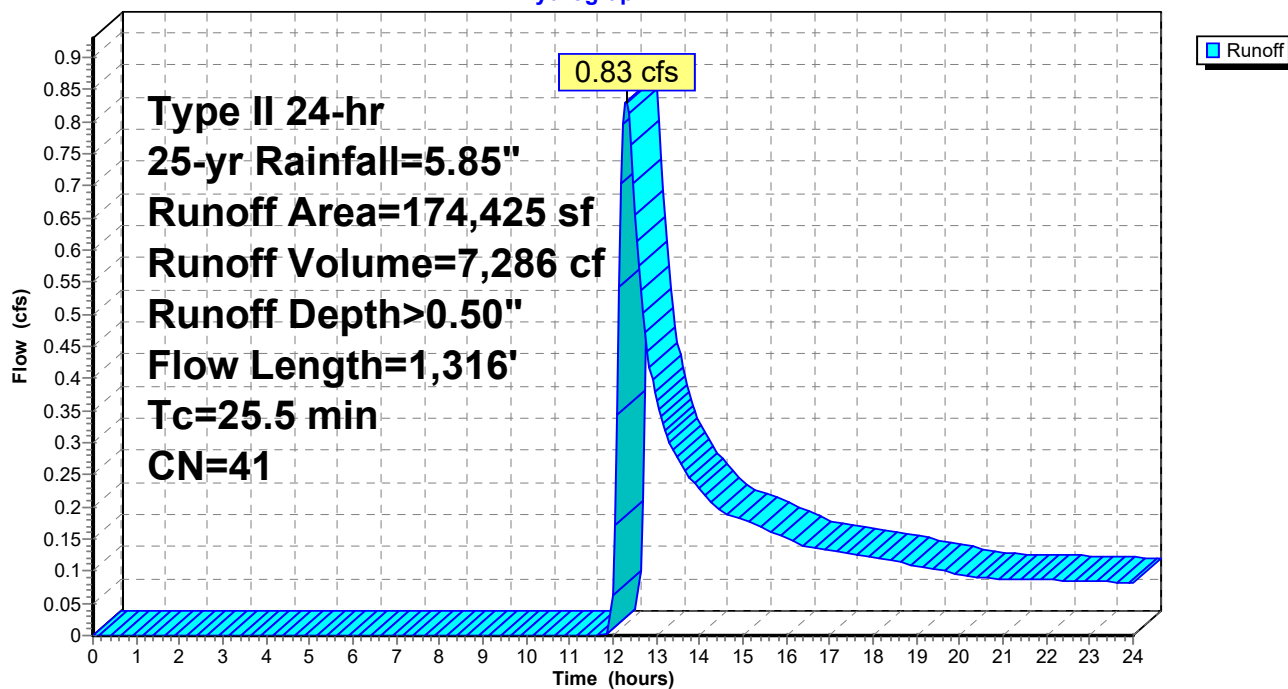
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
25,013	30	Woods, Good, HSG A
6,124	77	Woods, Good, HSG D
108,615	30	Meadow, non-grazed, HSG A
29,571	78	Meadow, non-grazed, HSG D
* 4,082	98	Existing Impervious
* 1,020	30	20% Impervious as Meadow
174,425	41	Weighted Average
170,343		97.66% Pervious Area
4,082		2.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
3.7	398	0.1256	1.77		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.5	1,316	Total			

Subcatchment 14S: DA-1 Pre

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 15S: DA-2 Pre

Runoff = 5.40 cfs @ 12.25 hrs, Volume= 23,456 cf, Depth> 1.89"

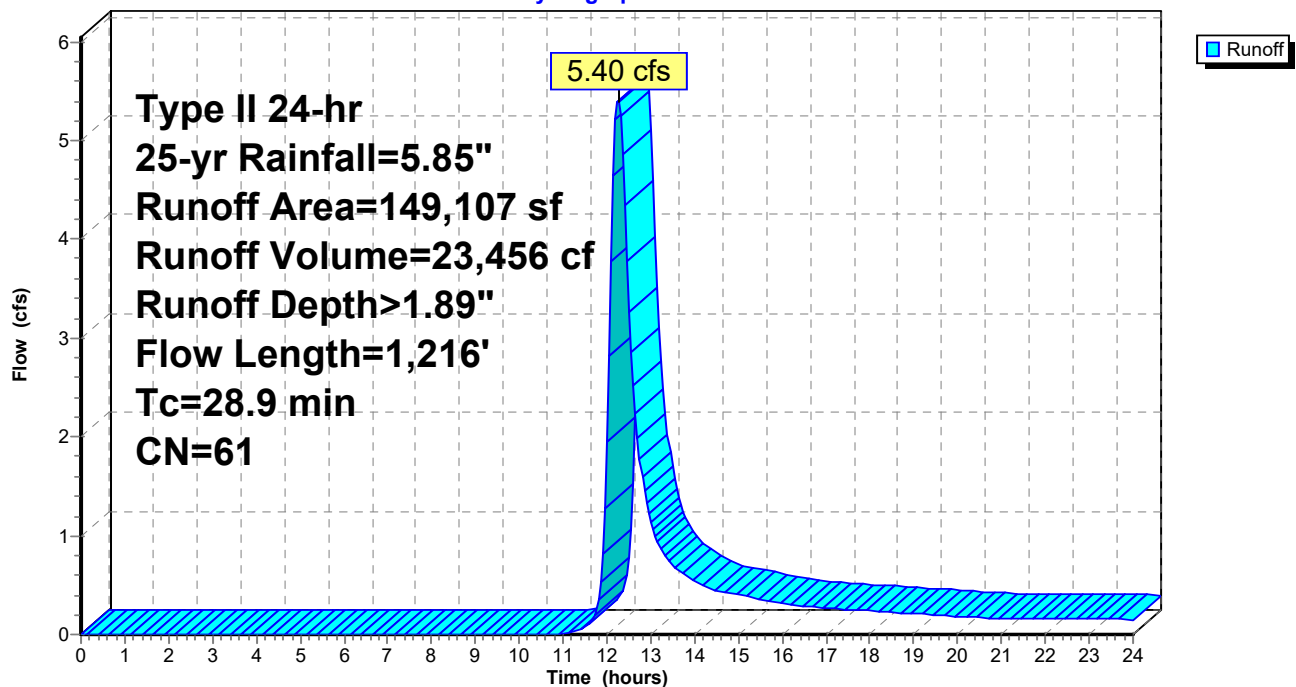
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
24,746	30	Woods, Good, HSG A
7,798	77	Woods, Good, HSG D
28,513	30	Meadow, non-grazed, HSG A
88,050	78	Meadow, non-grazed, HSG D
149,107	61	Weighted Average
149,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0300	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
6.7	639	0.1001	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.1	477	0.0755	1.92		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
28.9	1,216	Total			

Subcatchment 15S: DA-2 Pre

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 16S: DA-3 Pre

Runoff = 0.33 cfs @ 12.43 hrs, Volume= 5,379 cf, Depth> 0.30"

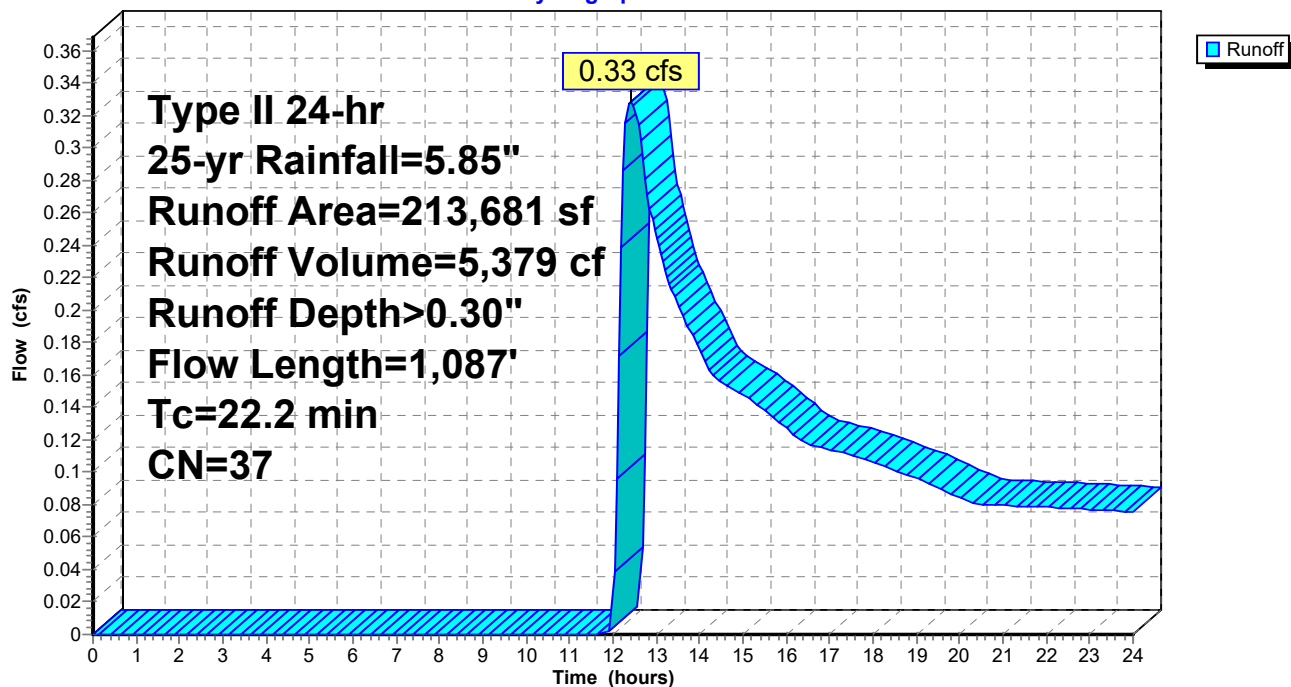
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
8,118	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,696	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
213,681	37	Weighted Average
213,681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0921	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.0	846	0.1123	2.35		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.2	1,087	Total			

Subcatchment 16S: DA-3 Pre

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 18S: DA-3 Post

Runoff = 0.33 cfs @ 12.42 hrs, Volume= 5,409 cf, Depth> 0.30"

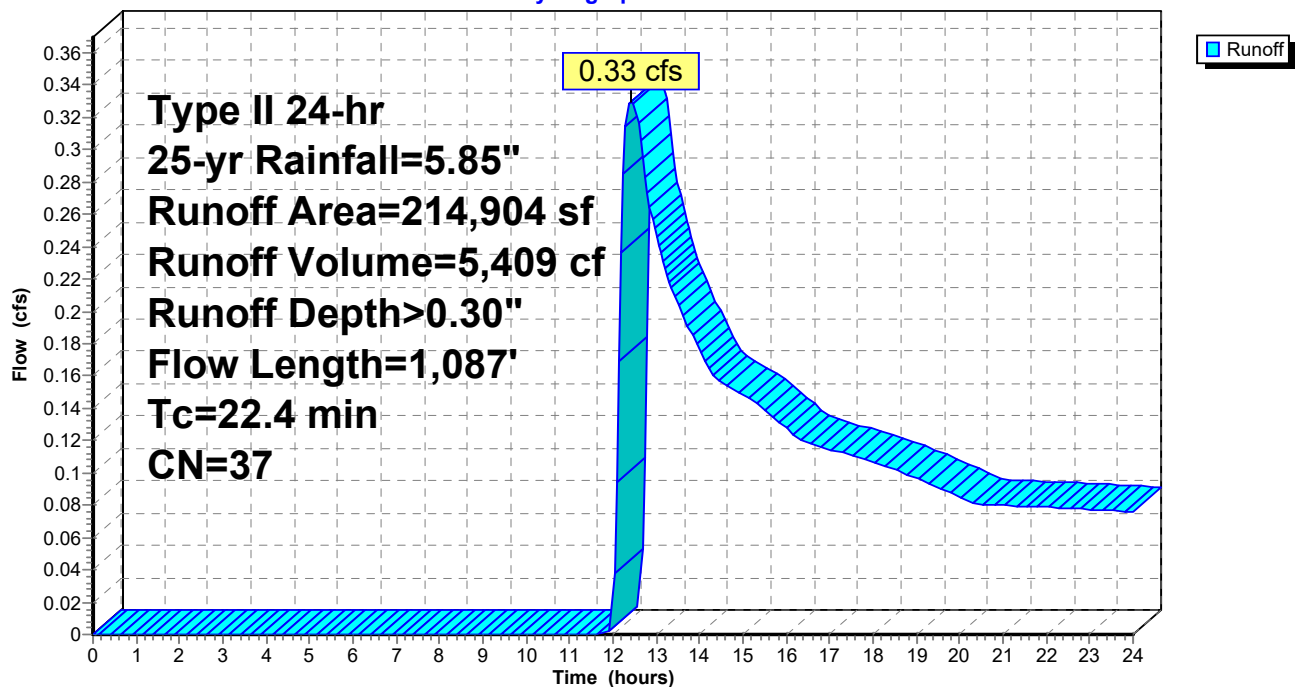
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

Hydrograph

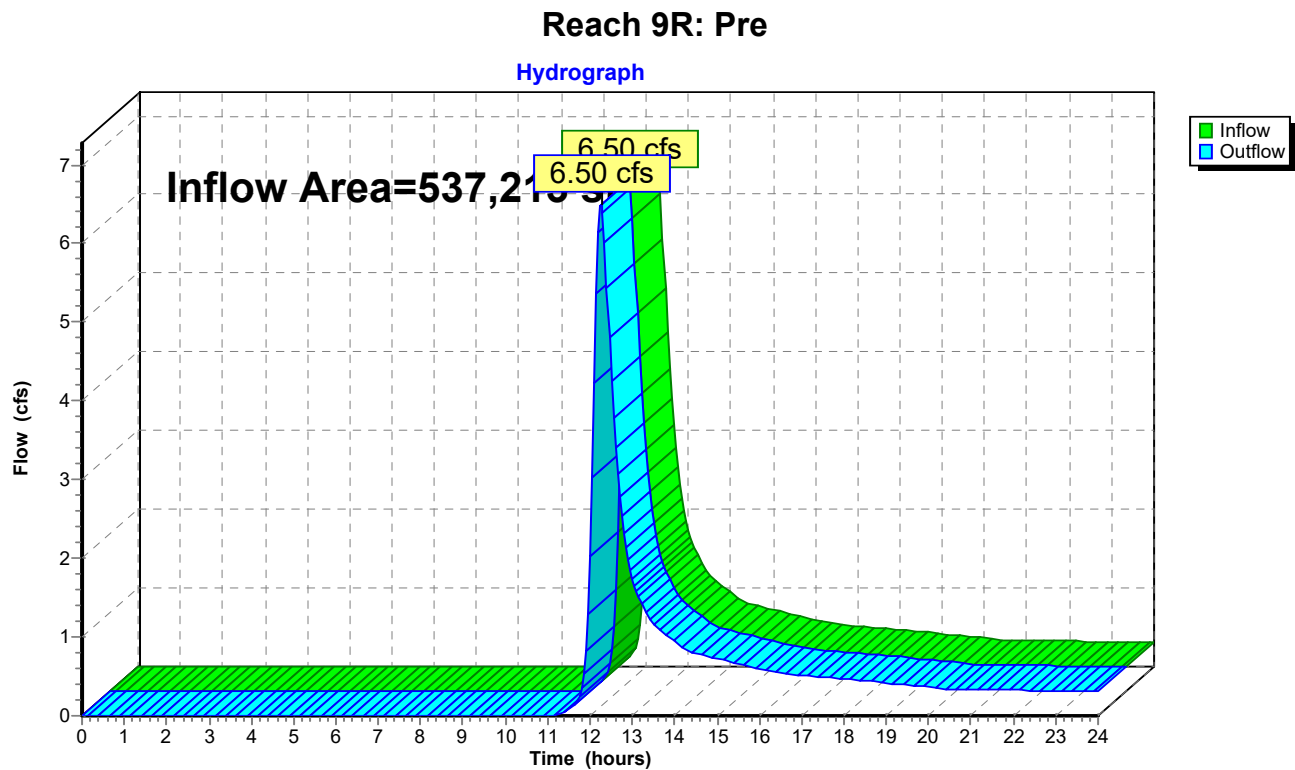


Summary for Reach 9R: Pre

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

Inflow Area = 537,213 sf, 0.76% Impervious, Inflow Depth > 0.81" for 25-yr event
 Inflow = 6.50 cfs @ 12.26 hrs, Volume= 36,121 cf
 Outflow = 6.50 cfs @ 12.26 hrs, Volume= 36,121 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

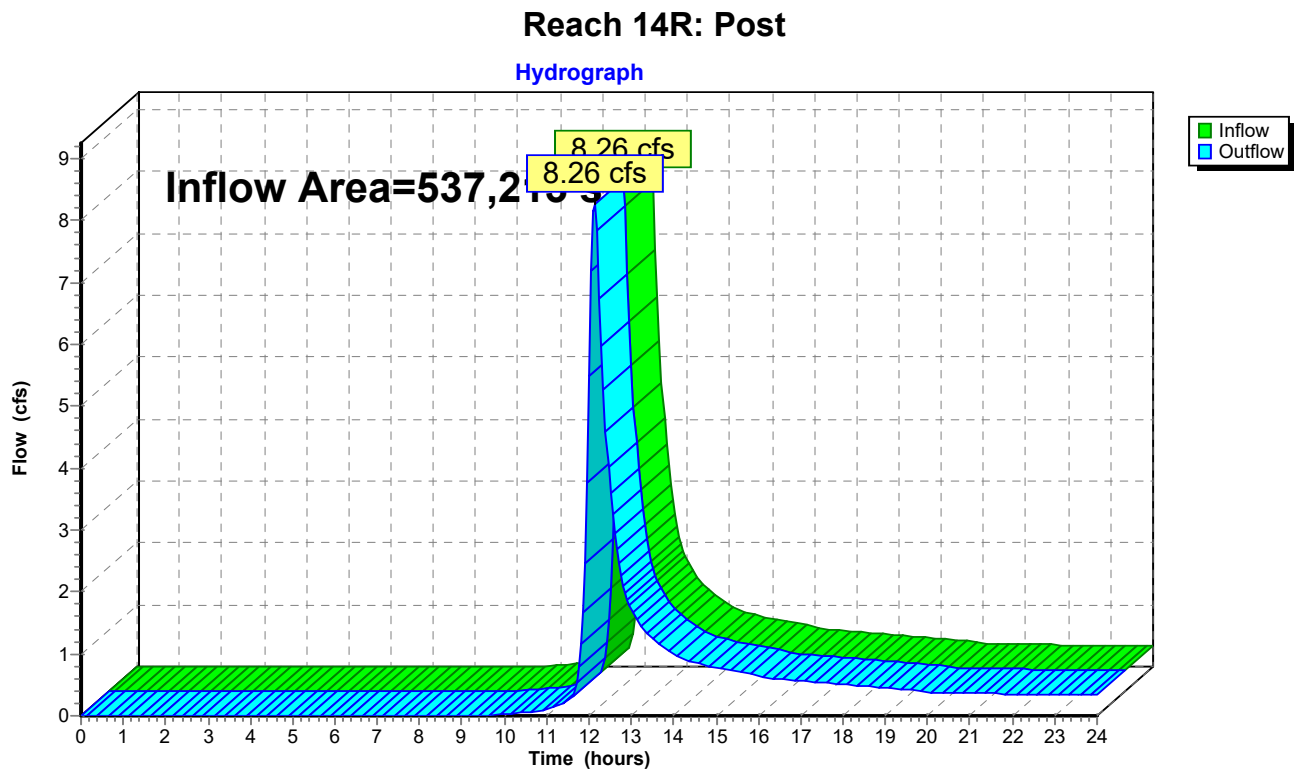


Summary for Reach 14R: Post

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

Inflow Area = 537,213 sf, 3.42% Impervious, Inflow Depth > 0.92" for 25-yr event
Inflow = 8.26 cfs @ 12.12 hrs, Volume= 41,278 cf
Outflow = 8.26 cfs @ 12.12 hrs, Volume= 41,278 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5S: DA-1 Post

Runoff Area=246,601 sf 2.96% Impervious Runoff Depth>1.41"
Flow Length=1,381' Tc=25.6 min CN=48 Runoff=6.23 cfs 28,961 cf

Subcatchment 7S: DA-2 Post

Runoff Area=75,708 sf 14.62% Impervious Runoff Depth>3.50"
Flow Length=592' Tc=15.3 min CN=70 Runoff=7.75 cfs 22,065 cf

Subcatchment 14S: DA-1 Pre

Runoff Area=174,425 sf 2.34% Impervious Runoff Depth>0.86"
Flow Length=1,316' Tc=25.5 min CN=41 Runoff=2.00 cfs 12,443 cf

Subcatchment 15S: DA-2 Pre

Runoff Area=149,107 sf 0.00% Impervious Runoff Depth>2.59"
Flow Length=1,216' Tc=28.9 min CN=61 Runoff=7.61 cfs 32,126 cf

Subcatchment 16S: DA-3 Pre

Runoff Area=213,681 sf 0.00% Impervious Runoff Depth>0.58"
Flow Length=1,087' Tc=22.2 min CN=37 Runoff=1.25 cfs 10,297 cf

Subcatchment 18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth>0.58"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=1.25 cfs 10,355 cf

Reach 9R: Pre

Inflow=10.85 cfs 54,867 cf
Outflow=10.85 cfs 54,867 cf

Reach 14R: Post

Inflow=13.03 cfs 61,381 cf
Outflow=13.03 cfs 61,381 cf

Total Runoff Area = 1,074,426 sf Runoff Volume = 116,248 cf Average Runoff Depth = 1.30"
97.91% Pervious = 1,051,984 sf 2.09% Impervious = 22,442 sf

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 5S: DA-1 Post

Runoff = 6.23 cfs @ 12.23 hrs, Volume= 28,961 cf, Depth> 1.41"

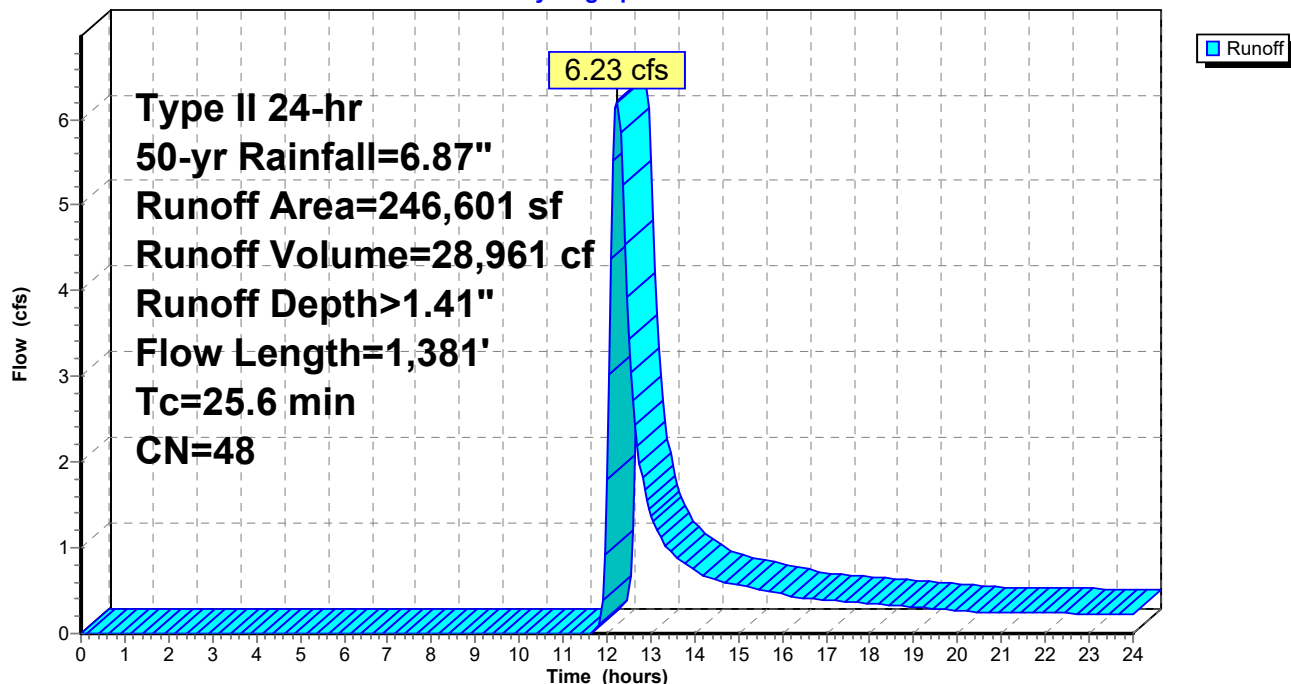
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
42,139	30	Woods, Good, HSG A
13,920	77	Woods, Good, HSG D
112,687	30	Meadow, non-grazed, HSG A
70,562	78	Meadow, non-grazed, HSG D
* 7,293	98	Impervious
246,601	48	Weighted Average
239,308		97.04% Pervious Area
7,293		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0450	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1160	1.70		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.6	1,381	Total			

Subcatchment 5S: DA-1 Post

Hydrograph



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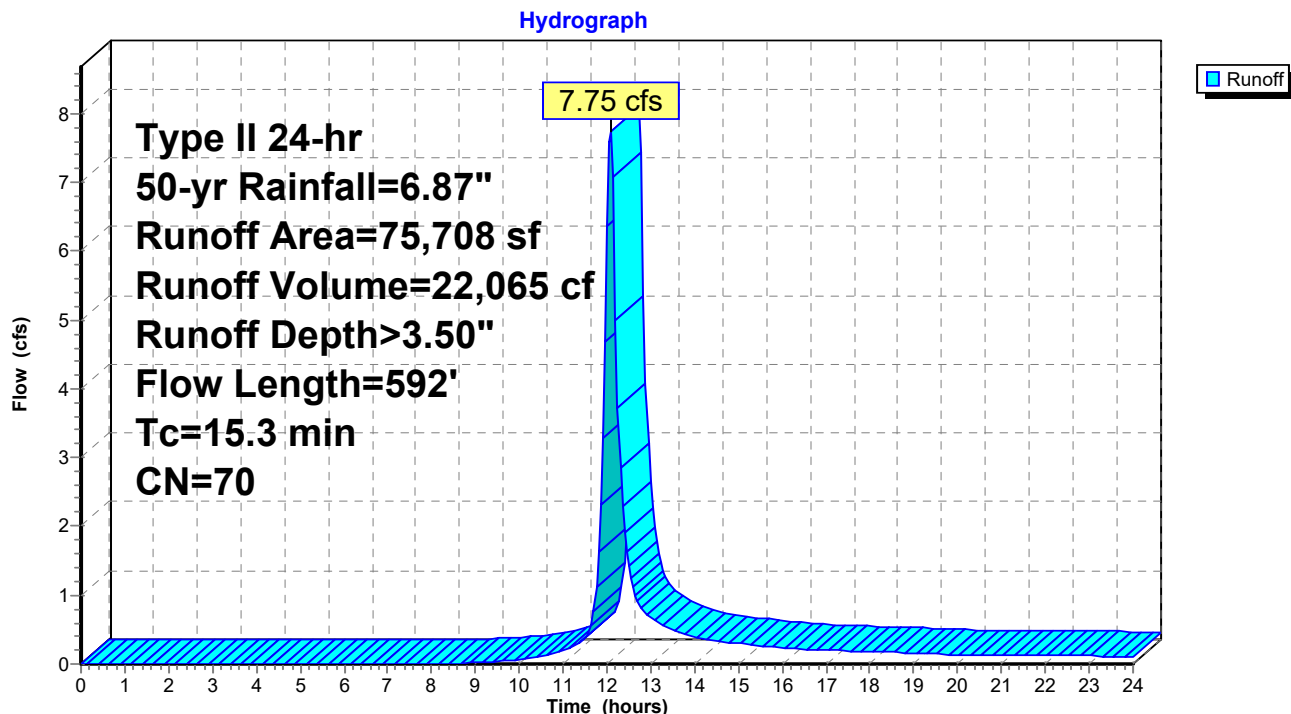
Summary for Subcatchment 7S: DA-2 Post

Runoff = 7.75 cfs @ 12.08 hrs, Volume= 22,065 cf, Depth> 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
4,976	30	Woods, Good, HSG A
12,609	30	Meadow, non-grazed, HSG A
47,056	78	Meadow, non-grazed, HSG D
* 11,067	98	Impervious
75,708	70	Weighted Average
64,641		85.38% Pervious Area
11,067		14.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.3	130	0.1150	6.88		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.3	362	0.0663	1.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.3	592	Total			

Subcatchment 7S: DA-2 Post

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 14S: DA-1 Pre

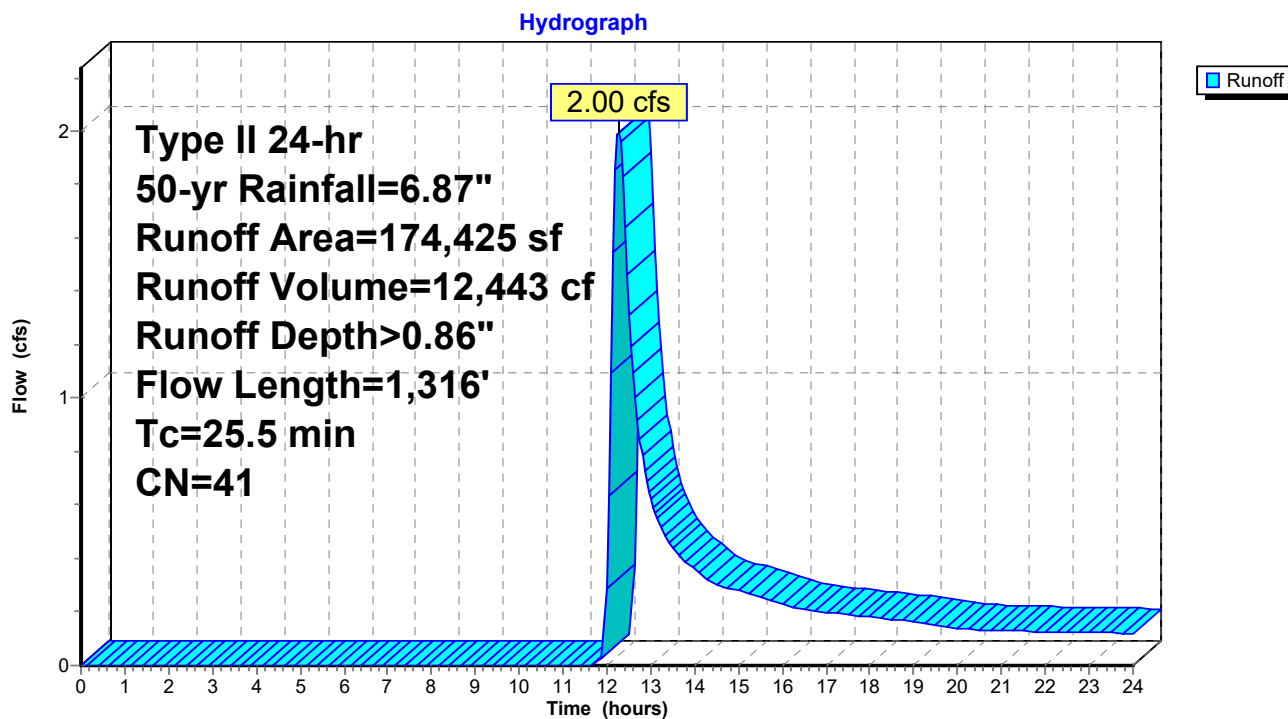
Runoff = 2.00 cfs @ 12.27 hrs, Volume= 12,443 cf, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
25,013	30	Woods, Good, HSG A
6,124	77	Woods, Good, HSG D
108,615	30	Meadow, non-grazed, HSG A
29,571	78	Meadow, non-grazed, HSG D
* 4,082	98	Existing Impervious
* 1,020	30	20% Impervious as Meadow
174,425	41	Weighted Average
170,343		97.66% Pervious Area
4,082		2.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
3.7	398	0.1256	1.77		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.5	1,316	Total			

Subcatchment 14S: DA-1 Pre



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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 15S: DA-2 Pre

Runoff = 7.61 cfs @ 12.25 hrs, Volume= 32,126 cf, Depth> 2.59"

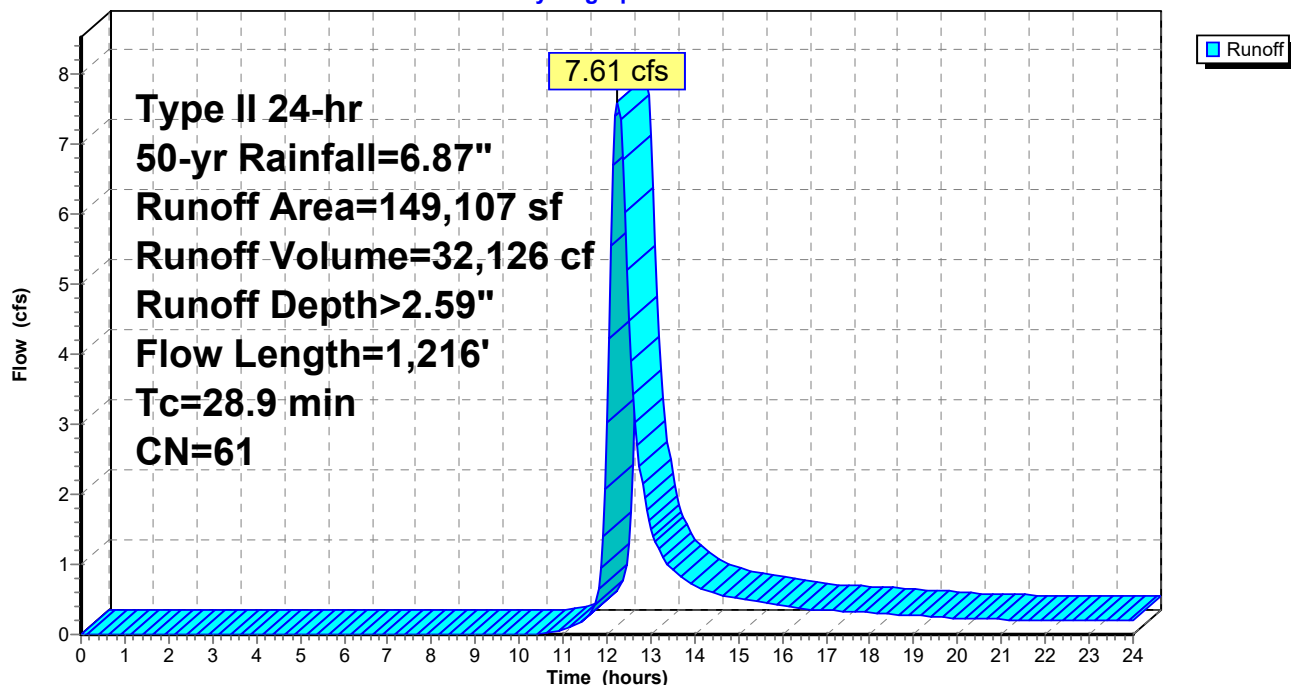
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
24,746	30	Woods, Good, HSG A
7,798	77	Woods, Good, HSG D
28,513	30	Meadow, non-grazed, HSG A
88,050	78	Meadow, non-grazed, HSG D
149,107	61	Weighted Average
149,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0300	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
6.7	639	0.1001	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.1	477	0.0755	1.92		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
28.9	1,216	Total			

Subcatchment 15S: DA-2 Pre

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 16S: DA-3 Pre

Runoff = 1.25 cfs @ 12.26 hrs, Volume= 10,297 cf, Depth> 0.58"

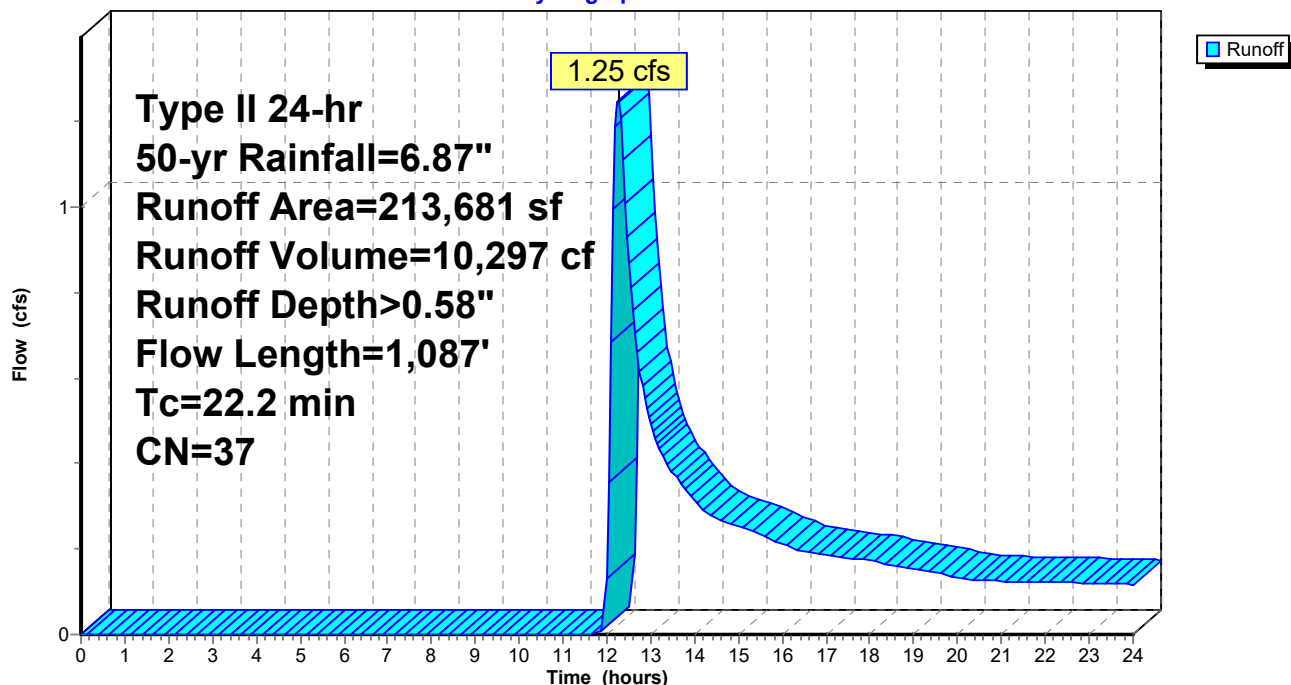
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
8,118	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,696	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
213,681	37	Weighted Average
213,681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0921	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.0	846	0.1123	2.35		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.2	1,087	Total			

Subcatchment 16S: DA-3 Pre

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 18S: DA-3 Post

Runoff = 1.25 cfs @ 12.26 hrs, Volume= 10,355 cf, Depth> 0.58"

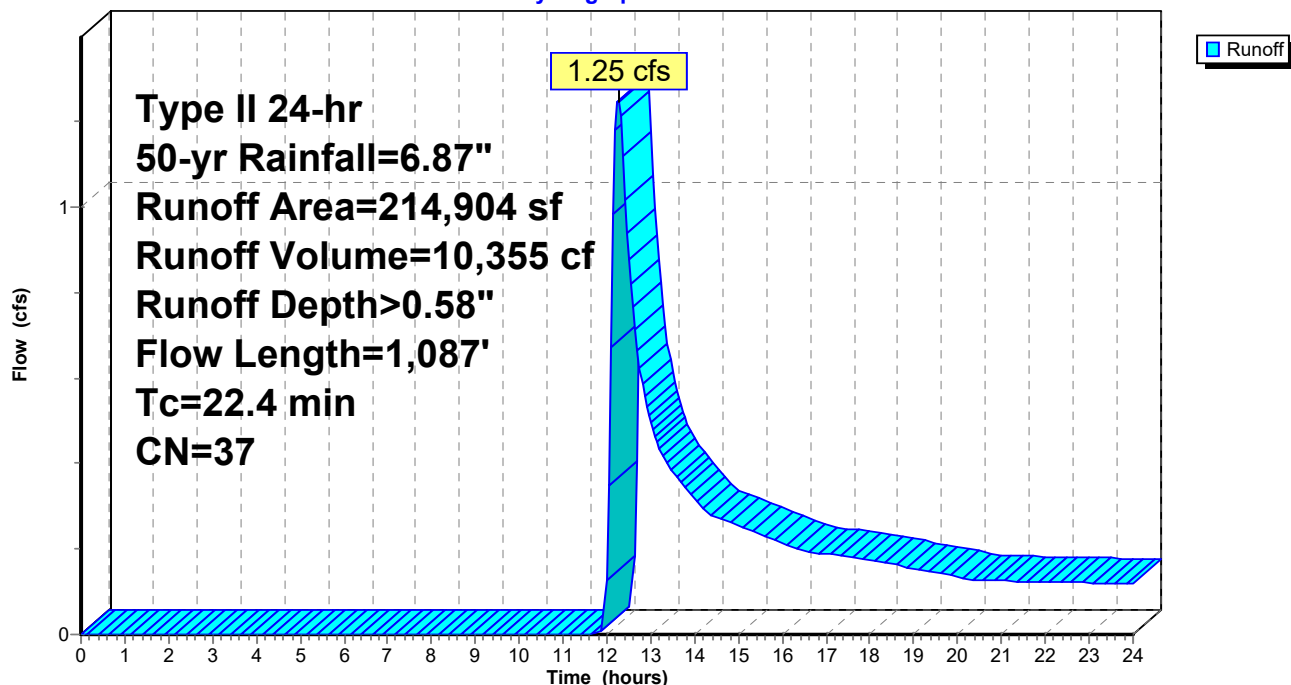
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

Hydrograph

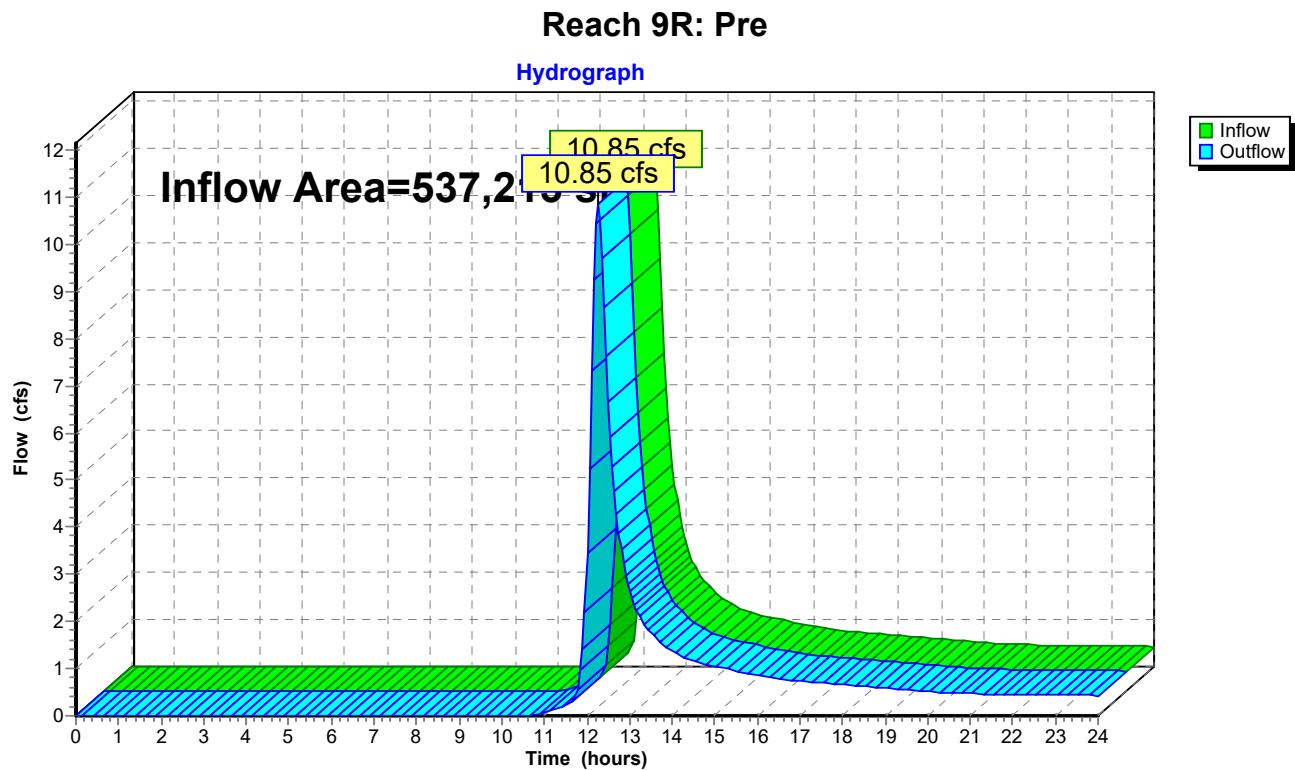


Summary for Reach 9R: Pre

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

Inflow Area = 537,213 sf, 0.76% Impervious, Inflow Depth > 1.23" for 50-yr event
Inflow = 10.85 cfs @ 12.25 hrs, Volume= 54,867 cf
Outflow = 10.85 cfs @ 12.25 hrs, Volume= 54,867 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

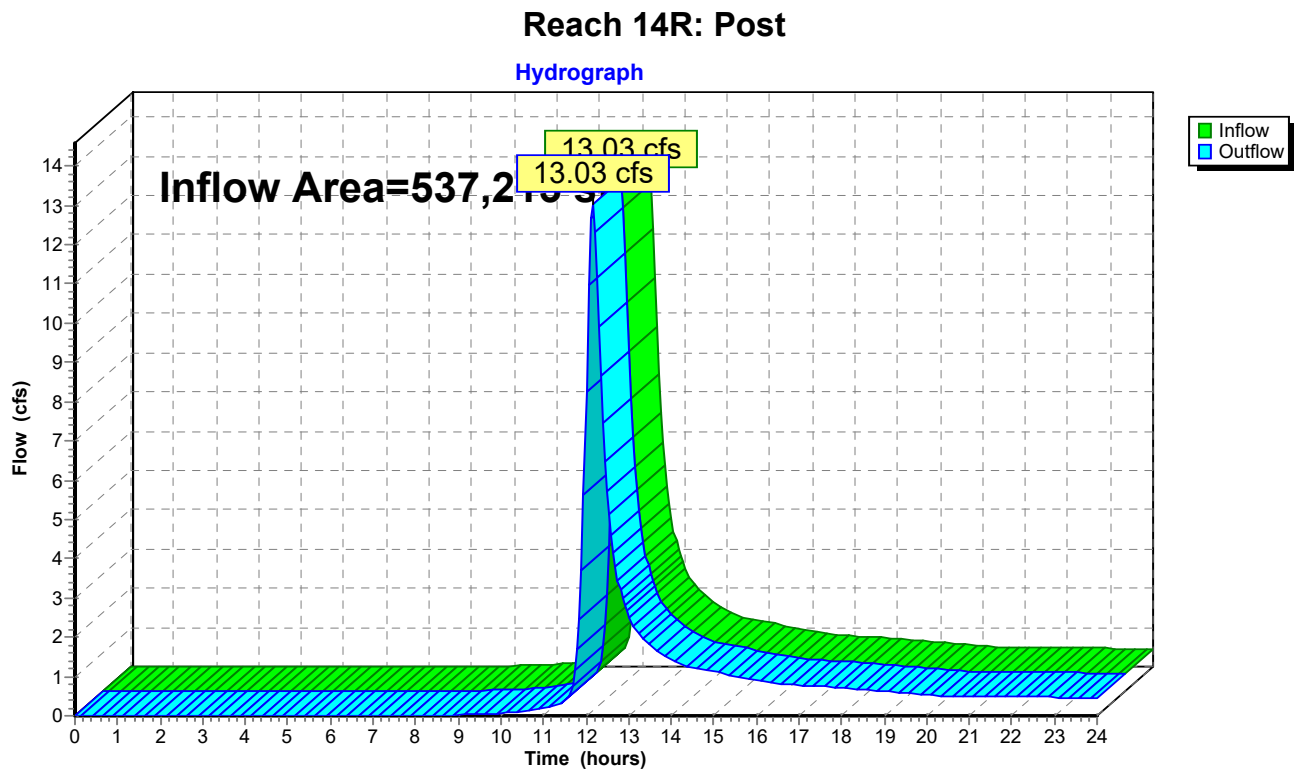


Summary for Reach 14R: Post

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

Inflow Area = 537,213 sf, 3.42% Impervious, Inflow Depth > 1.37" for 50-yr event
Inflow = 13.03 cfs @ 12.14 hrs, Volume= 61,381 cf
Outflow = 13.03 cfs @ 12.14 hrs, Volume= 61,381 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 5S: DA-1 Post

Runoff Area=246,601 sf 2.96% Impervious Runoff Depth>2.07"
Flow Length=1,381' Tc=25.6 min CN=48 Runoff=10.01 cfs 42,631 cf

Subcatchment 7S: DA-2 Post

Runoff Area=75,708 sf 14.62% Impervious Runoff Depth>4.53"
Flow Length=592' Tc=15.3 min CN=70 Runoff=10.03 cfs 28,551 cf

Subcatchment 14S: DA-1 Pre

Runoff Area=174,425 sf 2.34% Impervious Runoff Depth>1.37"
Flow Length=1,316' Tc=25.5 min CN=41 Runoff=3.90 cfs 19,921 cf

Subcatchment 15S: DA-2 Pre

Runoff Area=149,107 sf 0.00% Impervious Runoff Depth>3.48"
Flow Length=1,216' Tc=28.9 min CN=61 Runoff=10.45 cfs 43,296 cf

Subcatchment 16S: DA-3 Pre

Runoff Area=213,681 sf 0.00% Impervious Runoff Depth>1.00"
Flow Length=1,087' Tc=22.2 min CN=37 Runoff=3.12 cfs 17,803 cf

Subcatchment 18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth>1.00"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=3.12 cfs 17,903 cf

Reach 9R: Pre

Inflow=17.43 cfs 81,020 cf
Outflow=17.43 cfs 81,020 cf

Reach 14R: Post

Inflow=20.31 cfs 89,085 cf
Outflow=20.31 cfs 89,085 cf

Total Runoff Area = 1,074,426 sf Runoff Volume = 170,105 cf Average Runoff Depth = 1.90"
97.91% Pervious = 1,051,984 sf 2.09% Impervious = 22,442 sf

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Type II 24-hr 100-yr Rainfall=8.09"

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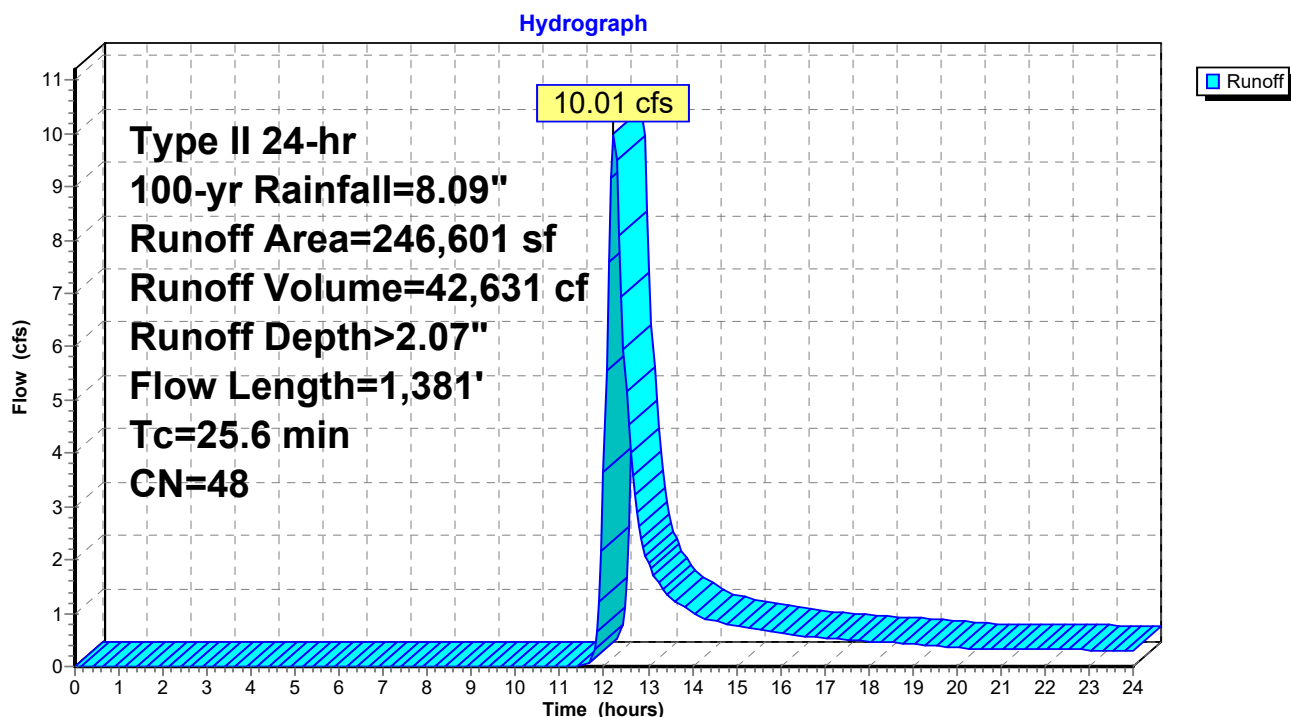
Summary for Subcatchment 5S: DA-1 Post

Runoff = 10.01 cfs @ 12.22 hrs, Volume= 42,631 cf, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
42,139	30	Woods, Good, HSG A
13,920	77	Woods, Good, HSG D
112,687	30	Meadow, non-grazed, HSG A
70,562	78	Meadow, non-grazed, HSG D
* 7,293	98	Impervious
246,601	48	Weighted Average
239,308		97.04% Pervious Area
7,293		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0450	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1160	1.70		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.6	1,381	Total			

Subcatchment 5S: DA-1 Post

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 7S: DA-2 Post

Runoff = 10.03 cfs @ 12.07 hrs, Volume= 28,551 cf, Depth> 4.53"

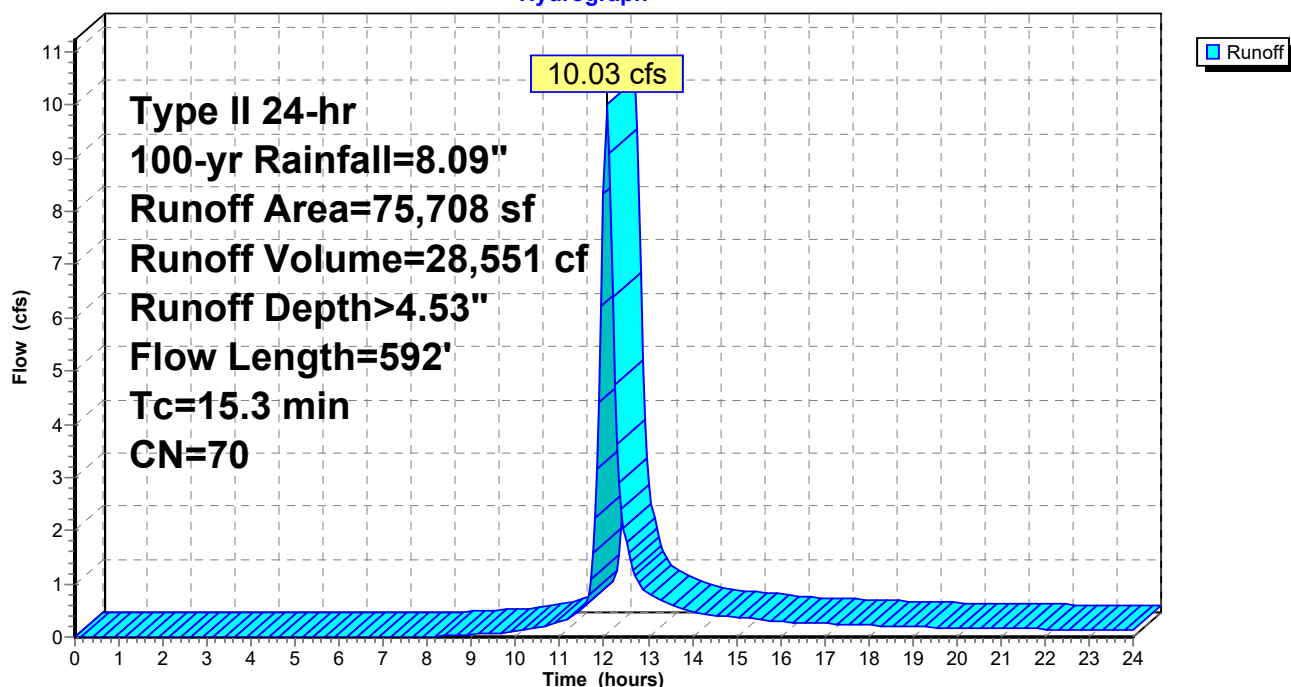
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
4,976	30	Woods, Good, HSG A
12,609	30	Meadow, non-grazed, HSG A
47,056	78	Meadow, non-grazed, HSG D
* 11,067	98	Impervious
75,708	70	Weighted Average
64,641		85.38% Pervious Area
11,067		14.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.0900	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.3	130	0.1150	6.88		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.3	362	0.0663	1.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.3	592	Total			

Subcatchment 7S: DA-2 Post

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 14S: DA-1 Pre

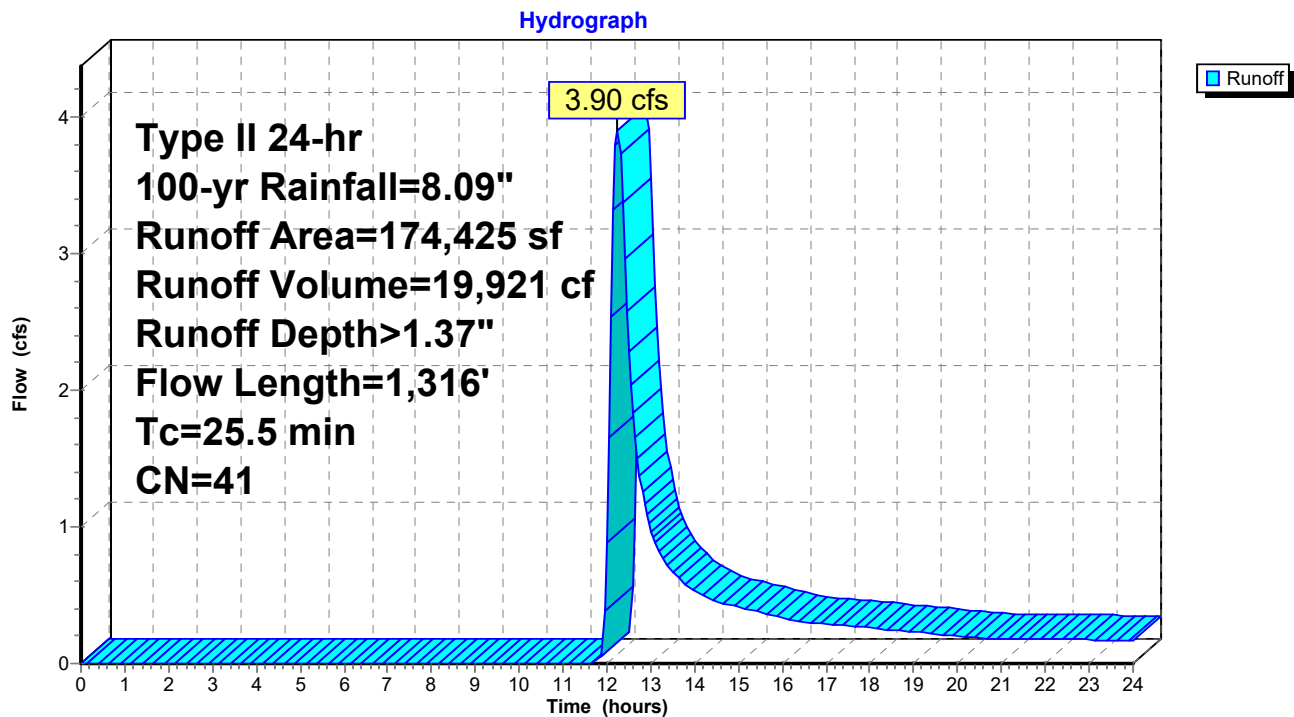
Runoff = 3.90 cfs @ 12.24 hrs, Volume= 19,921 cf, Depth> 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
25,013	30	Woods, Good, HSG A
6,124	77	Woods, Good, HSG D
108,615	30	Meadow, non-grazed, HSG A
29,571	78	Meadow, non-grazed, HSG D
* 4,082	98	Existing Impervious
* 1,020	30	20% Impervious as Meadow
174,425	41	Weighted Average
170,343		97.66% Pervious Area
4,082		2.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
3.7	398	0.1256	1.77		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.7	818	0.1160	2.38		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
25.5	1,316	Total			

Subcatchment 14S: DA-1 Pre



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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 15S: DA-2 Pre

Runoff = 10.45 cfs @ 12.24 hrs, Volume= 43,296 cf, Depth> 3.48"

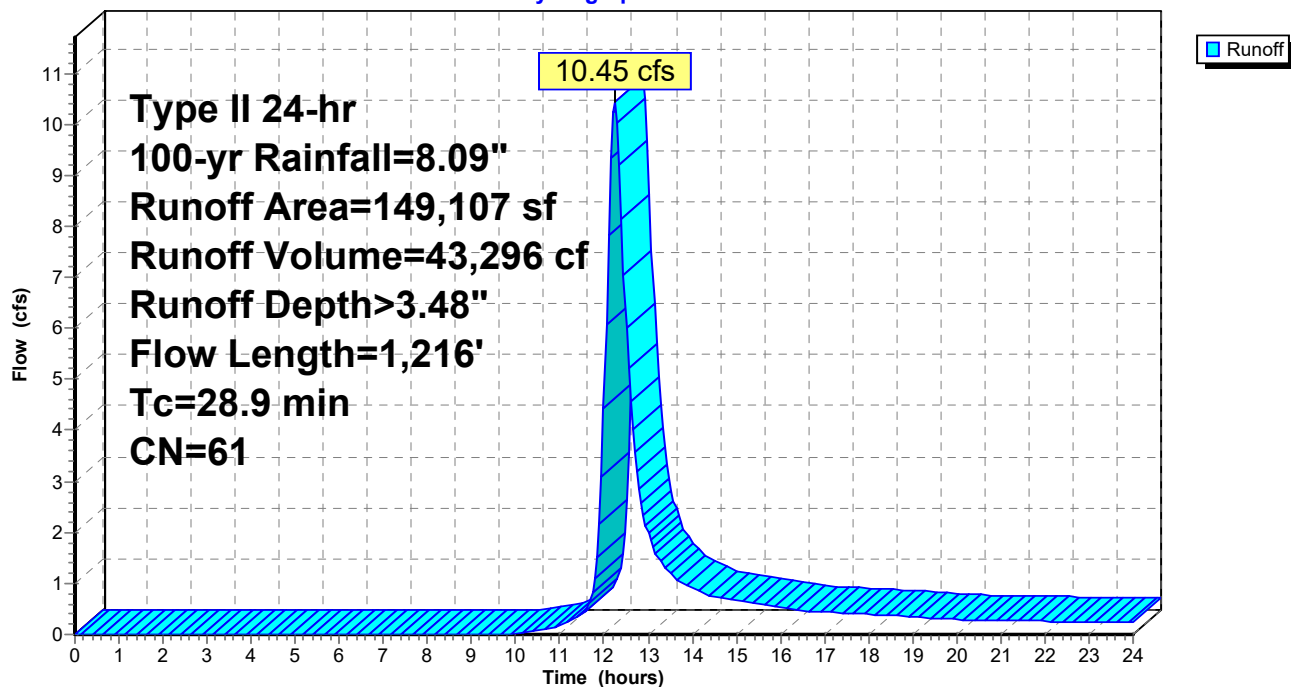
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
24,746	30	Woods, Good, HSG A
7,798	77	Woods, Good, HSG D
28,513	30	Meadow, non-grazed, HSG A
88,050	78	Meadow, non-grazed, HSG D
149,107	61	Weighted Average
149,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	100	0.0300	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
6.7	639	0.1001	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.1	477	0.0755	1.92		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
28.9	1,216	Total			

Subcatchment 15S: DA-2 Pre

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 16S: DA-3 Pre

Runoff = 3.12 cfs @ 12.22 hrs, Volume= 17,803 cf, Depth> 1.00"

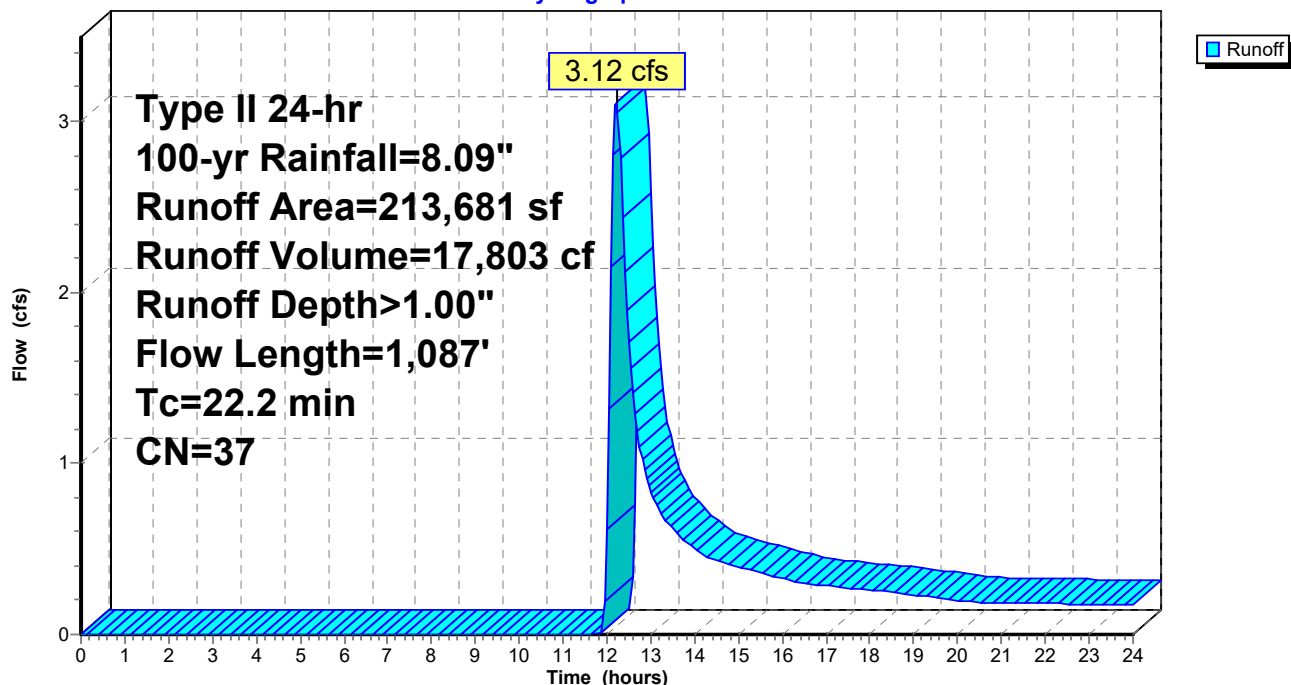
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
8,118	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,696	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
213,681	37	Weighted Average
213,681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0921	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.0	846	0.1123	2.35		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.2	1,087	Total			

Subcatchment 16S: DA-3 Pre

Hydrograph



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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 18S: DA-3 Post

Runoff = 3.12 cfs @ 12.22 hrs, Volume= 17,903 cf, Depth> 1.00"

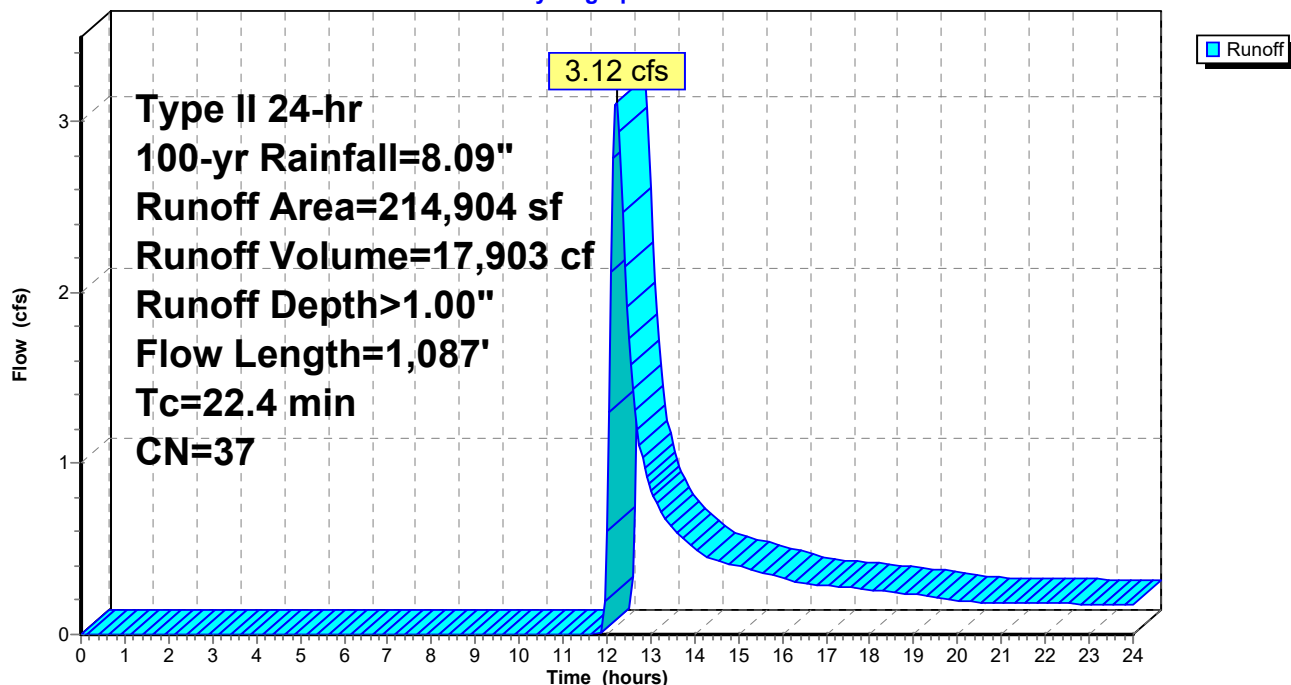
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

Hydrograph

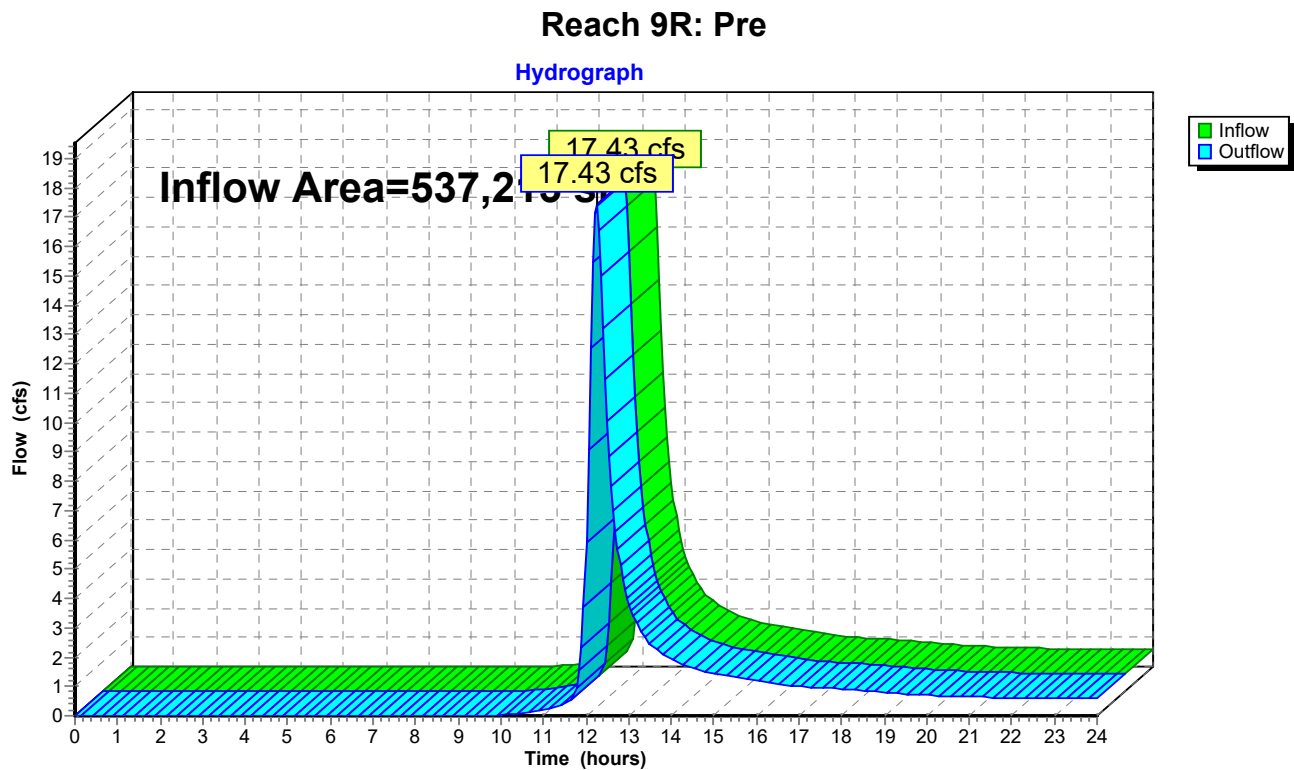


Summary for Reach 9R: Pre

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

Inflow Area = 537,213 sf, 0.76% Impervious, Inflow Depth > 1.81" for 100-yr event
Inflow = 17.43 cfs @ 12.24 hrs, Volume= 81,020 cf
Outflow = 17.43 cfs @ 12.24 hrs, Volume= 81,020 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

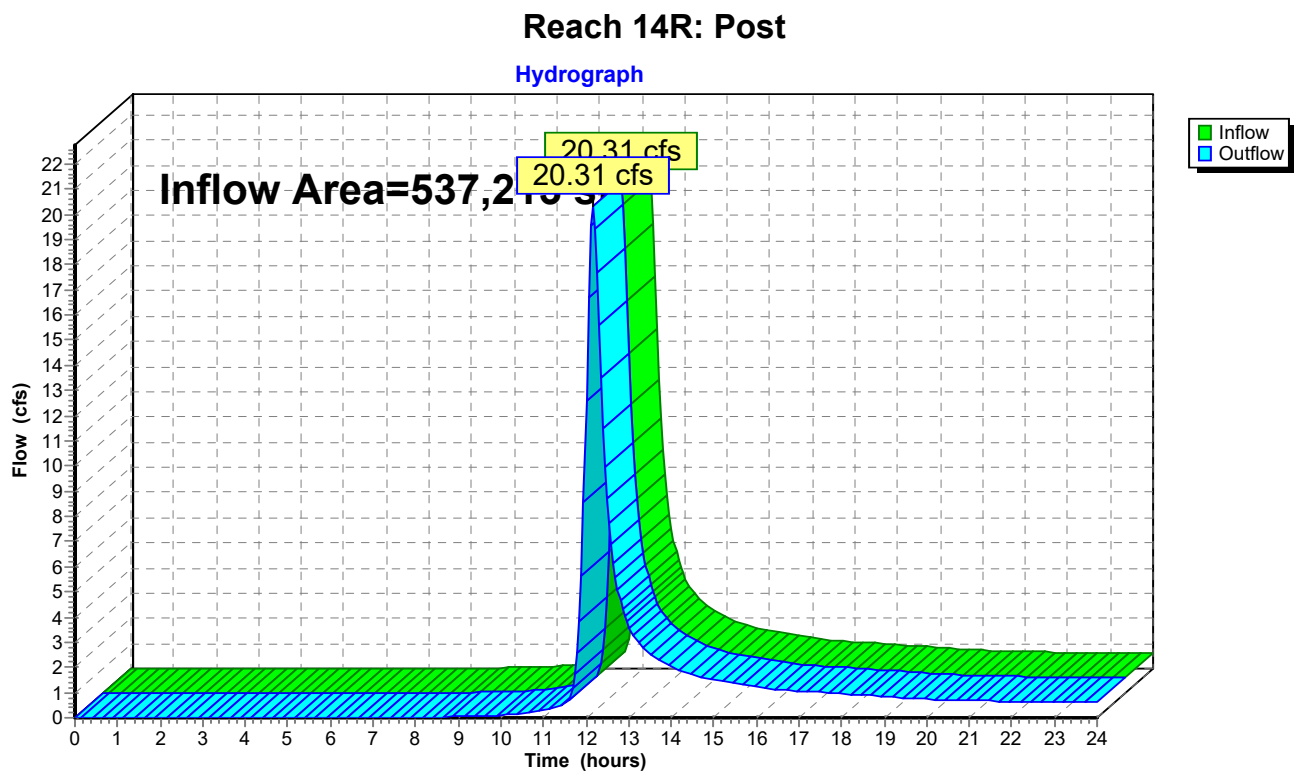


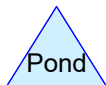
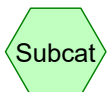
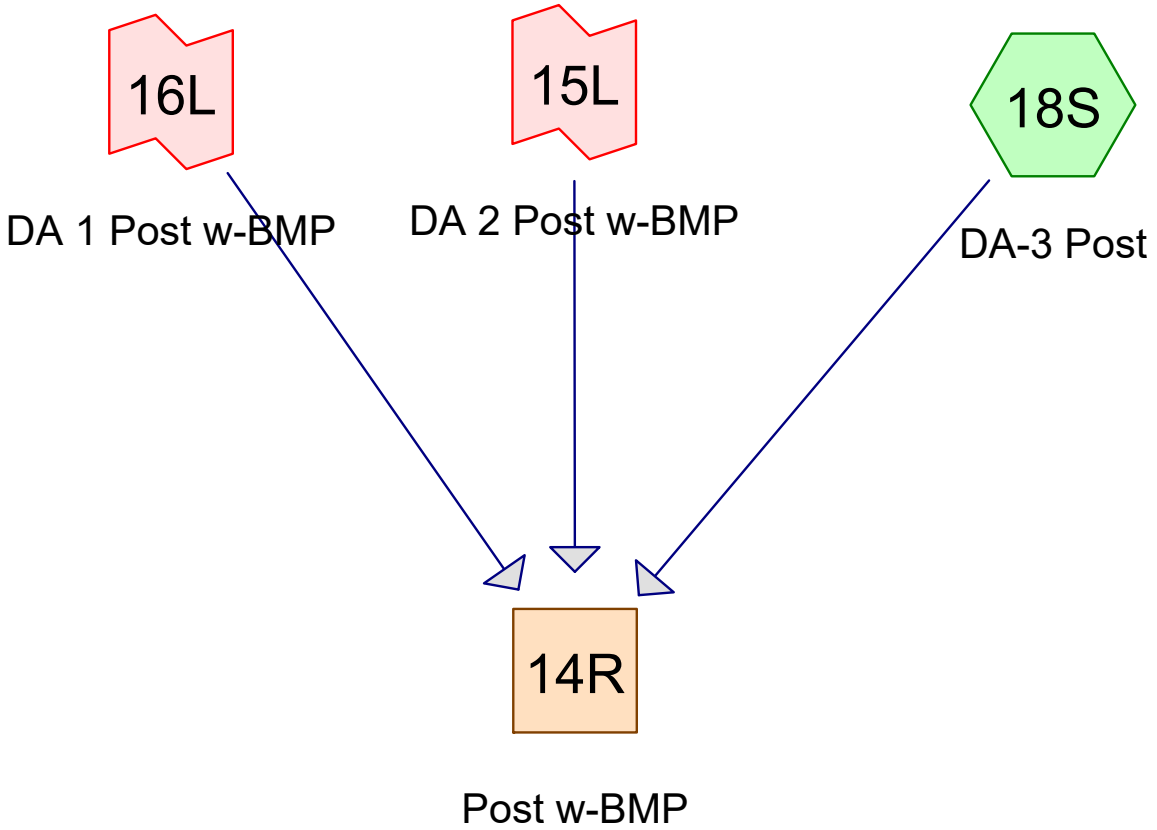
Summary for Reach 14R: Post

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

Inflow Area = 537,213 sf, 3.42% Impervious, Inflow Depth > 1.99" for 100-yr event
Inflow = 20.31 cfs @ 12.15 hrs, Volume= 89,085 cf
Outflow = 20.31 cfs @ 12.15 hrs, Volume= 89,085 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs





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Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
173,782	30	Meadow, non-grazed, HSG A (18S)
15,726	78	Meadow, non-grazed, HSG D (18S)
9,255	30	Woods, Good, HSG A (18S)
16,141	77	Woods, Good, HSG D (18S)
214,904	37	TOTAL AREA

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Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
183,037	HSG A	18S
0	HSG B	
0	HSG C	
31,867	HSG D	18S
0	Other	
214,904		TOTAL AREA

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Ground Covers (selected nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
173,782	0	0	15,726	0	189,508	Meadow, non-grazed	
9,255	0	0	16,141	0	25,396	Woods, Good	
183,037	0	0	31,867	0	214,904	TOTAL AREA	

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Type II 24-hr 1-yr Rainfall=2.72"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=0.00 cfs 0 cf

Reach 14R: Post w-BMP

Inflow=0.27 cfs 509 cf
Outflow=0.27 cfs 509 cf

Link 1-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce Inflow=0.27 cfs 509 cf
Area= 75,800 sf 14.60% Imperv. Primary=0.27 cfs 509 cf

Link 1-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce Inflow=0.00 cfs 0 cf
Area= 246,600 sf 2.96% Imperv. Primary=0.00 cfs 0 cf

Total Runoff Area = 214,904 sf Runoff Volume = 0 cf Average Runoff Depth = 0.00"
100.00% Pervious = 214,904 sf 0.00% Impervious = 0 sf

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 18S: DA-3 Post

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

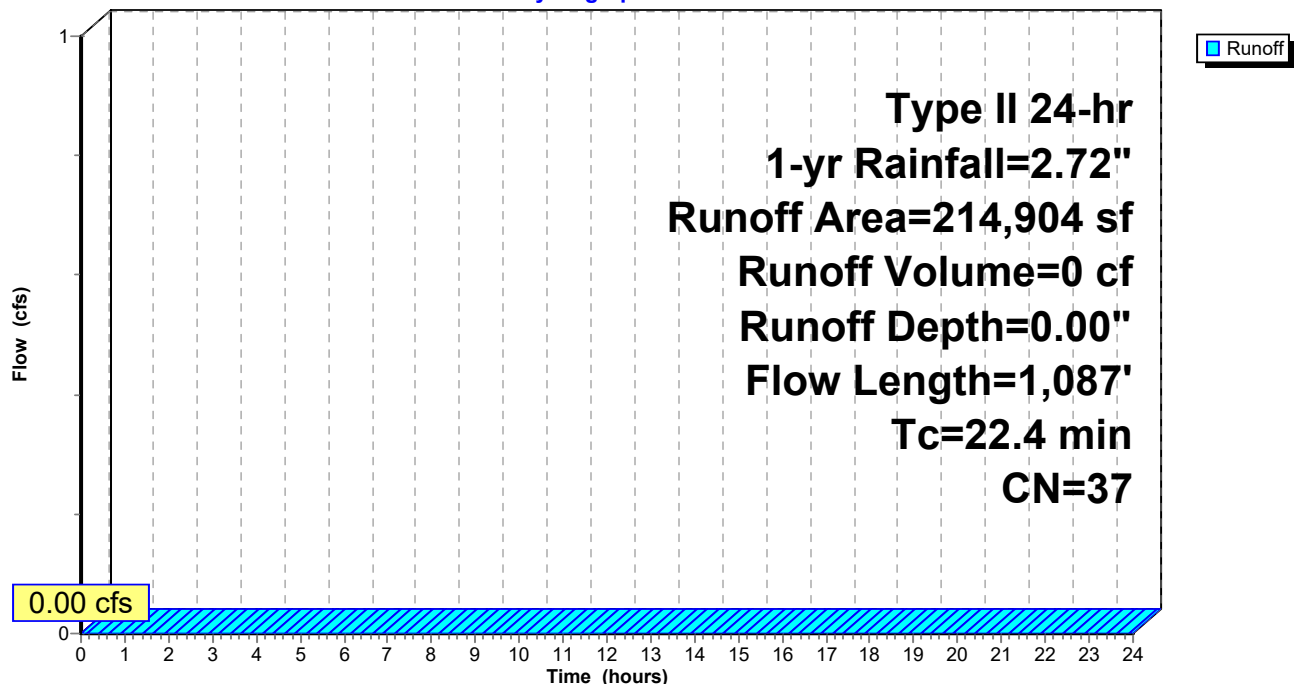
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

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Summary for Reach 14R: Post w-BMP

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

Inflow Area = 537,304 sf, 3.42% Impervious, Inflow Depth > 0.01" for 1-yr event

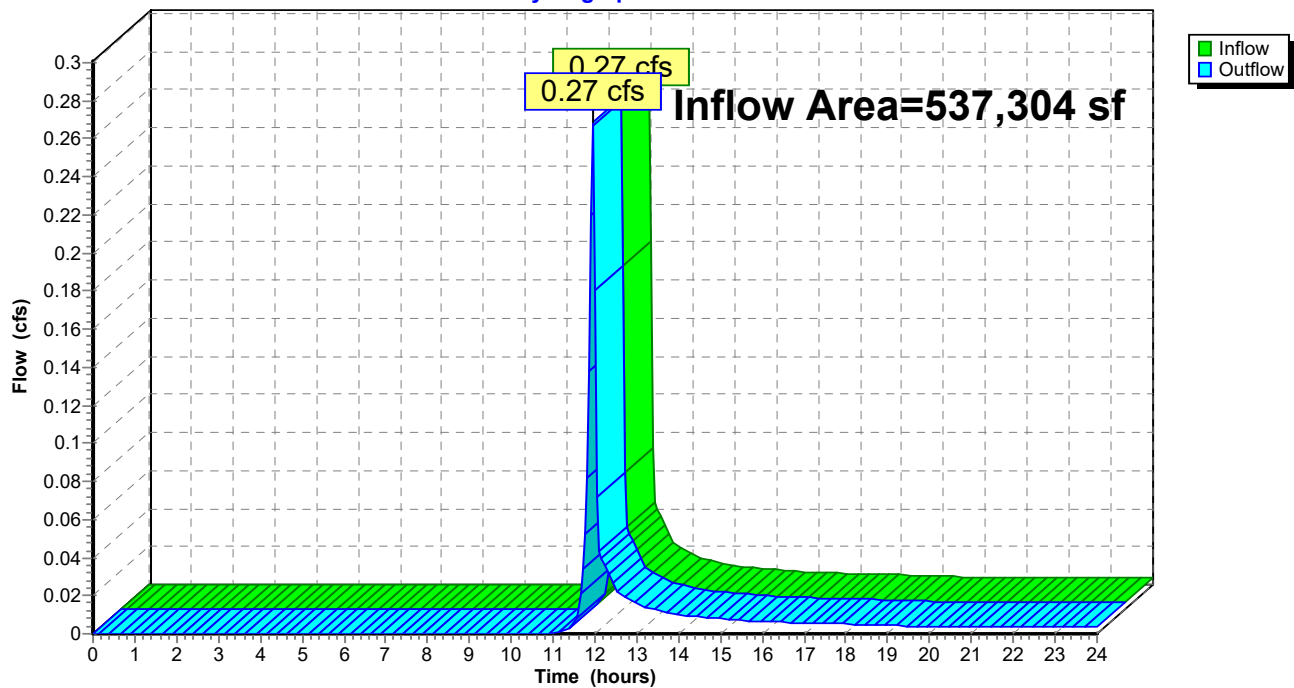
Inflow = 0.27 cfs @ 11.94 hrs, Volume= 509 cf

Outflow = 0.27 cfs @ 11.94 hrs, Volume= 509 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 14R: Post w-BMP

Hydrograph



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Type II 24-hr 1-yr Rainfall=2.72"

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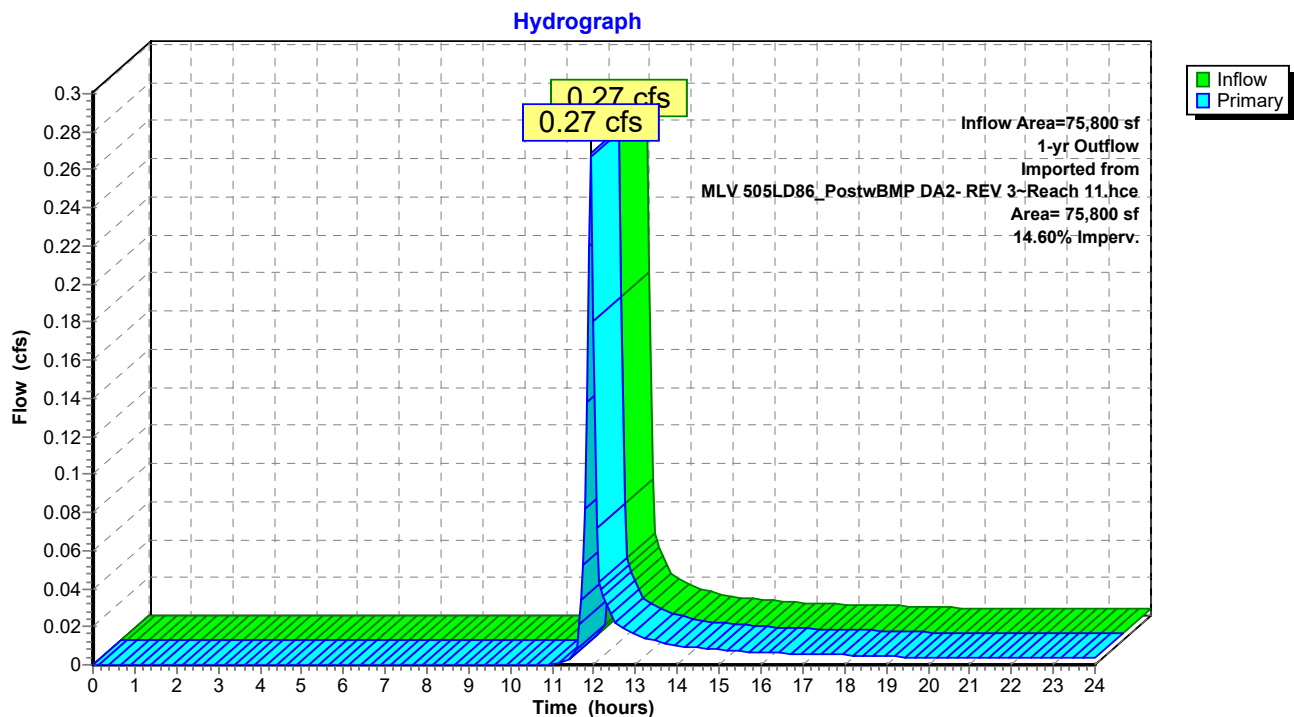
Summary for Link 15L: DA 2 Post w-BMP

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 0.08" for 1-yr event
Inflow = 0.27 cfs @ 11.94 hrs, Volume= 509 cf
Primary = 0.27 cfs @ 11.94 hrs, Volume= 509 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

1-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce

Link 15L: DA 2 Post w-BMP



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Type II 24-hr 1-yr Rainfall=2.72"

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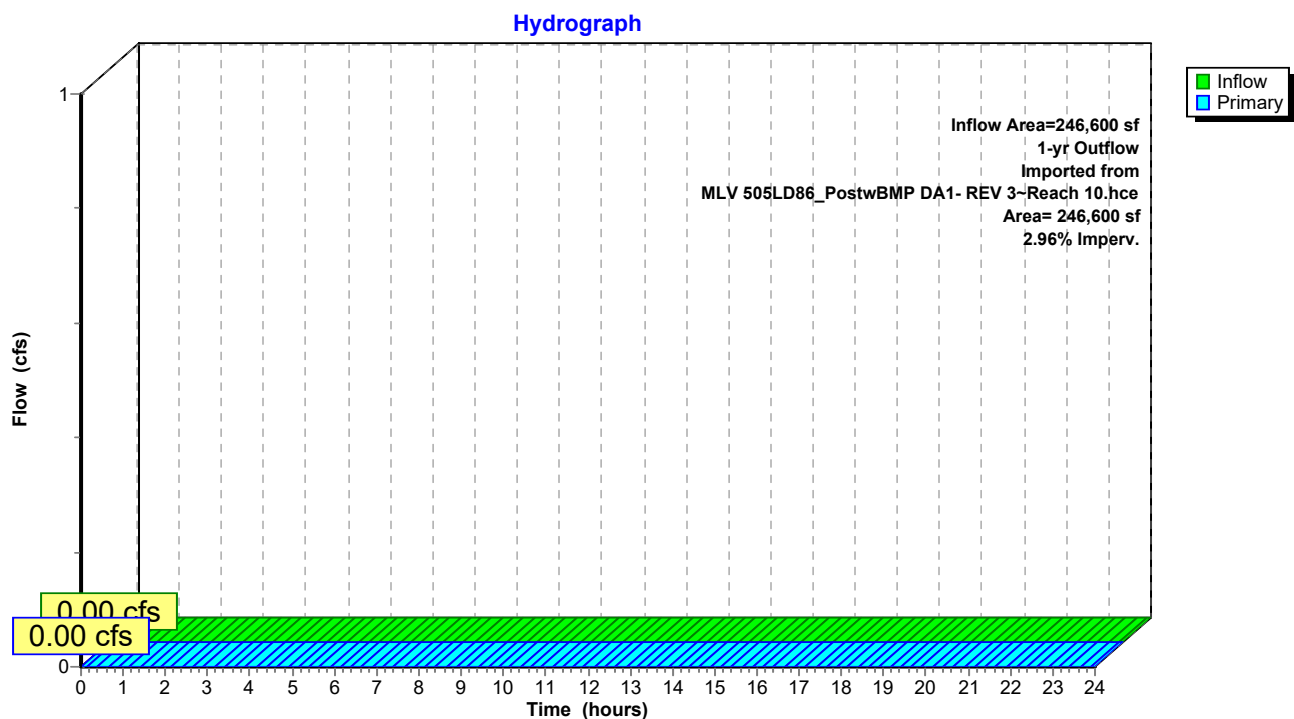
Summary for Link 16L: DA 1 Post w-BMP

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth = 0.00" for 1-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

1-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce

Link 16L: DA 1 Post w-BMP



MLV 505LD86_Post w-BMP*Type II 24-hr 2-yr Rainfall=3.26"*

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=0.00 cfs 0 cf

Reach 14R: Post w-BMP

Inflow=0.39 cfs 745 cf
Outflow=0.39 cfs 745 cf

Link 2-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce Inflow=0.39 cfs 731 cf
Area= 75,800 sf 14.60% Imperv. Primary=0.39 cfs 731 cf

Link 2-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce Inflow=0.00 cfs 14 cf
Area= 246,600 sf 2.96% Imperv. Primary=0.00 cfs 14 cf

Total Runoff Area = 214,904 sf Runoff Volume = 0 cf Average Runoff Depth = 0.00"
100.00% Pervious = 214,904 sf 0.00% Impervious = 0 sf

MLV 505LD86_Post w-BMP

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 18S: DA-3 Post

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

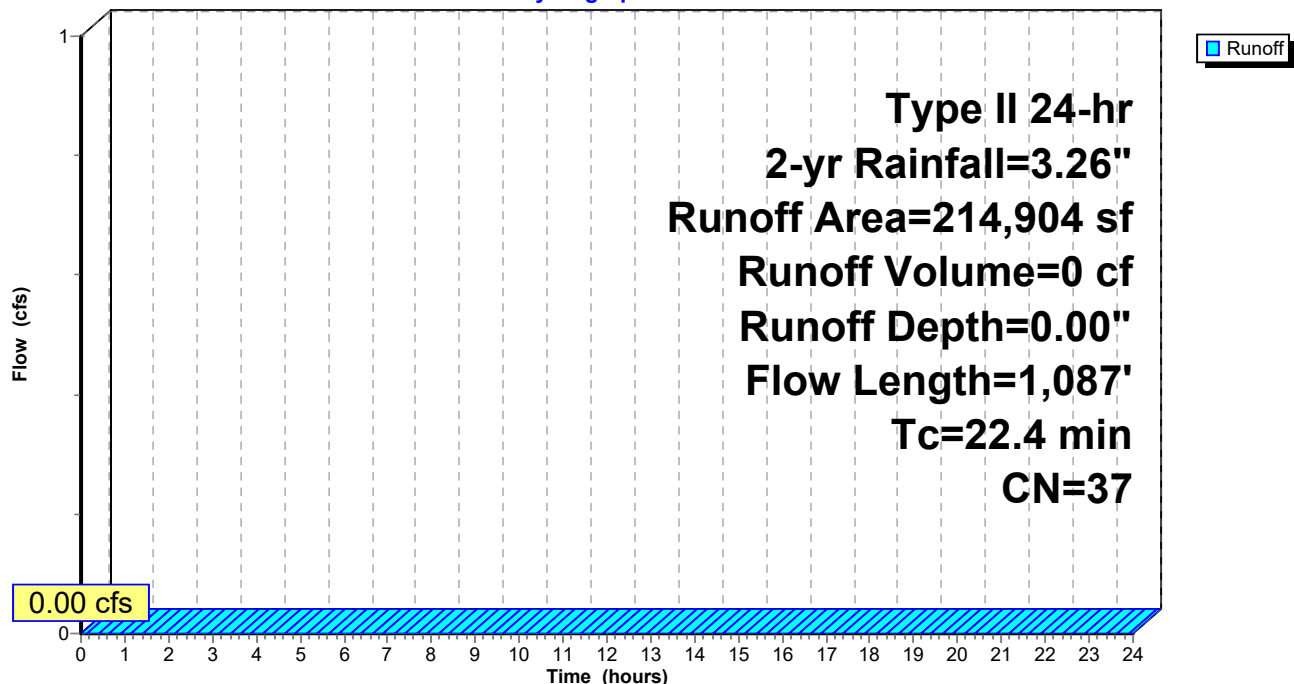
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

Hydrograph



MLV 505LD86_Post w-BMP

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 14R: Post w-BMP

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

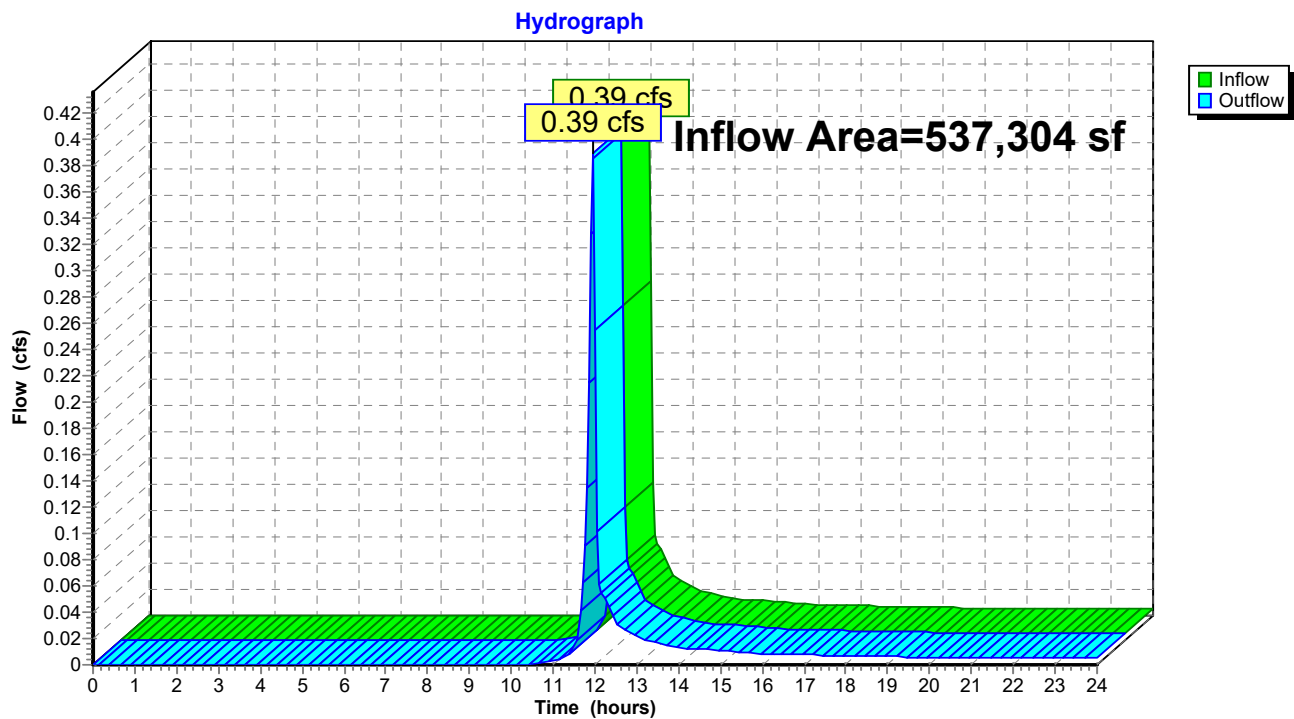
Inflow Area = 537,304 sf, 3.42% Impervious, Inflow Depth > 0.02" for 2-yr event

Inflow = 0.39 cfs @ 11.94 hrs, Volume= 745 cf

Outflow = 0.39 cfs @ 11.94 hrs, Volume= 745 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 14R: Post w-BMP



MLV 505LD86_Post w-BMP

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Type II 24-hr 2-yr Rainfall=3.26"

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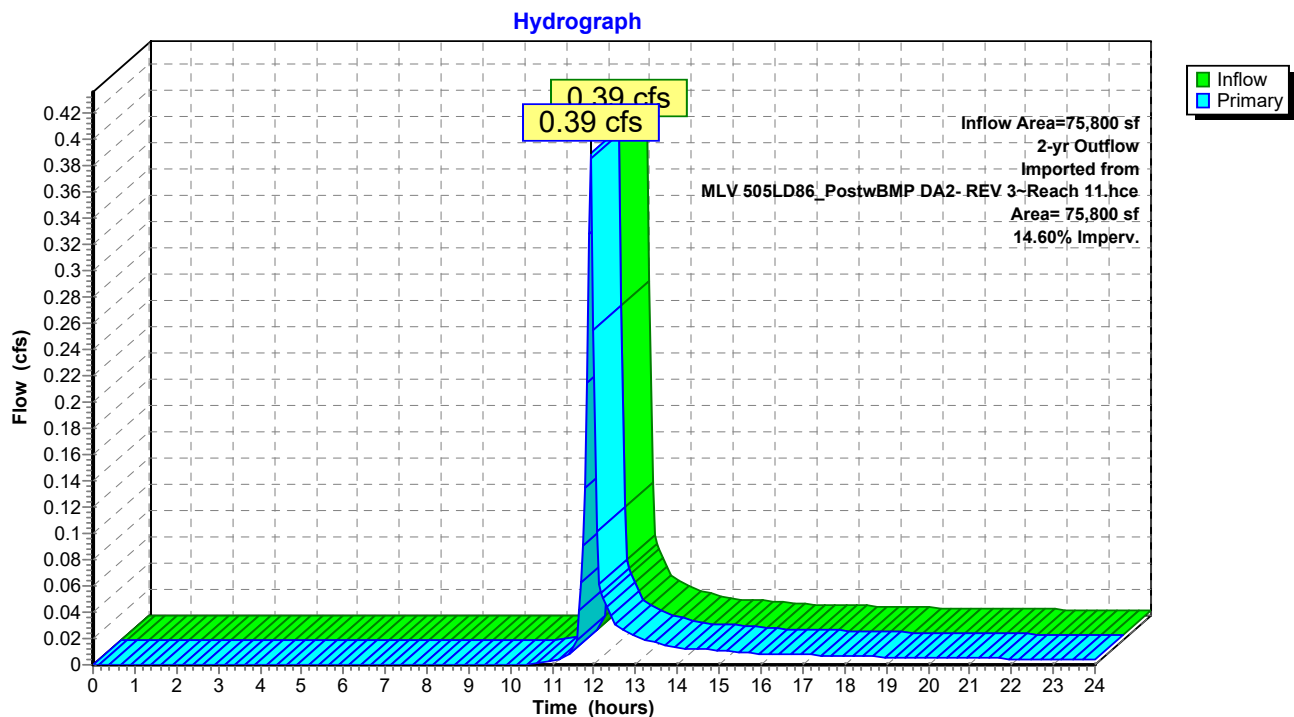
Summary for Link 15L: DA 2 Post w-BMP

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 0.12" for 2-yr event
Inflow = 0.39 cfs @ 11.94 hrs, Volume= 731 cf
Primary = 0.39 cfs @ 11.94 hrs, Volume= 731 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

2-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce

Link 15L: DA 2 Post w-BMP



MLV 505LD86_Post w-BMP

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Link 16L: DA 1 Post w-BMP

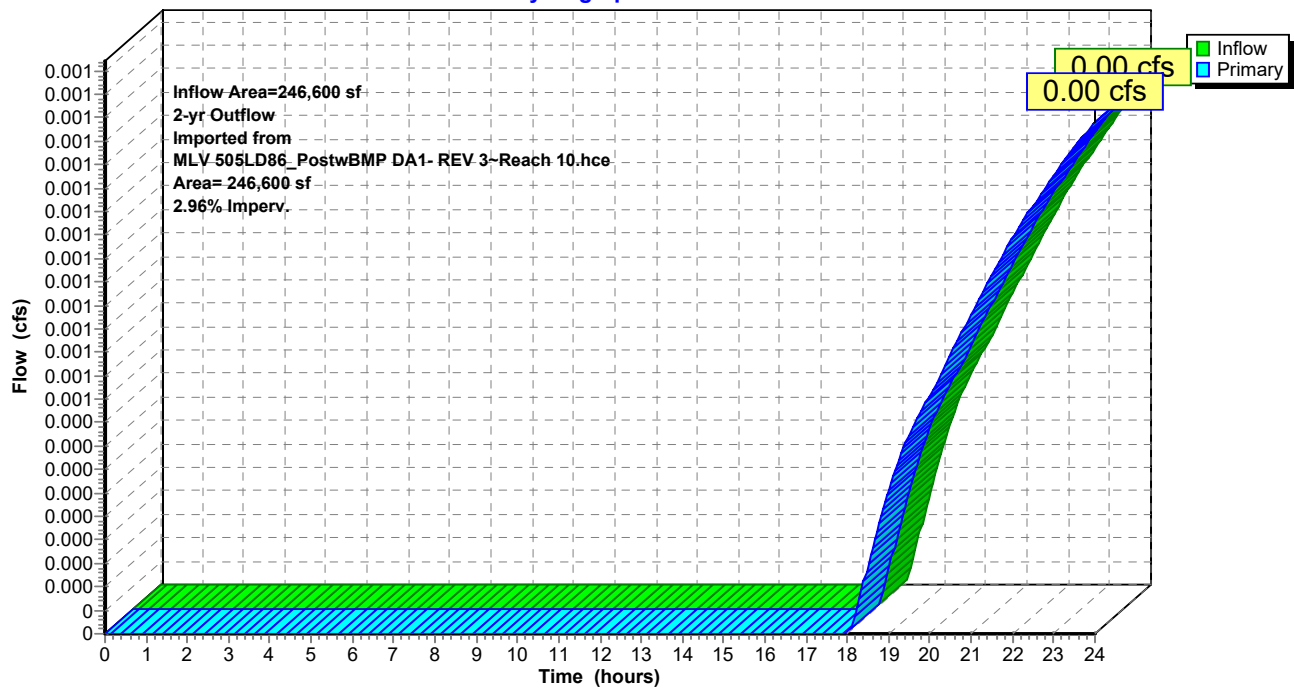
Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.00" for 2-yr event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 14 cf
Primary = 0.00 cfs @ 24.00 hrs, Volume= 14 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

2-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce

Link 16L: DA 1 Post w-BMP

Hydrograph



MLV 505LD86_Post w-BMP

Type II 24-hr 10-yr Rainfall=4.74"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth>0.09"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=0.05 cfs 1,695 cf

Reach 14R: Post w-BMP

Inflow=2.19 cfs 8,378 cf
Outflow=2.19 cfs 8,378 cf

Link 0-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce Inflow=2.07 cfs 5,216 cf
Area= 75,800 sf 14.60% Imperv. Primary=2.07 cfs 5,216 cf

Link 0-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce Inflow=0.12 cfs 1,467 cf
Area= 246,600 sf 2.96% Imperv. Primary=0.12 cfs 1,467 cf

Total Runoff Area = 214,904 sf Runoff Volume = 1,695 cf Average Runoff Depth = 0.09"
100.00% Pervious = 214,904 sf 0.00% Impervious = 0 sf

MLV 505LD86_Post w-BMP

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 18S: DA-3 Post

Runoff = 0.05 cfs @ 15.20 hrs, Volume= 1,695 cf, Depth> 0.09"

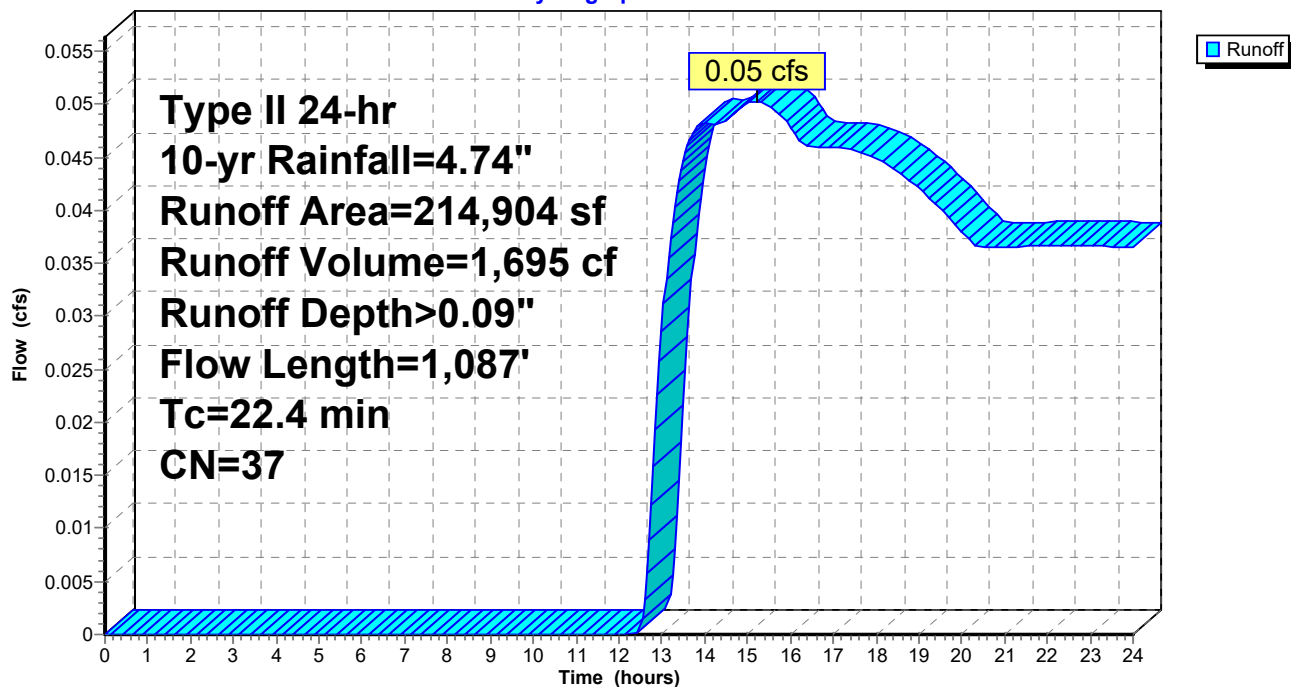
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

Hydrograph



MLV 505LD86_Post w-BMP

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Type II 24-hr 10-yr Rainfall=4.74"

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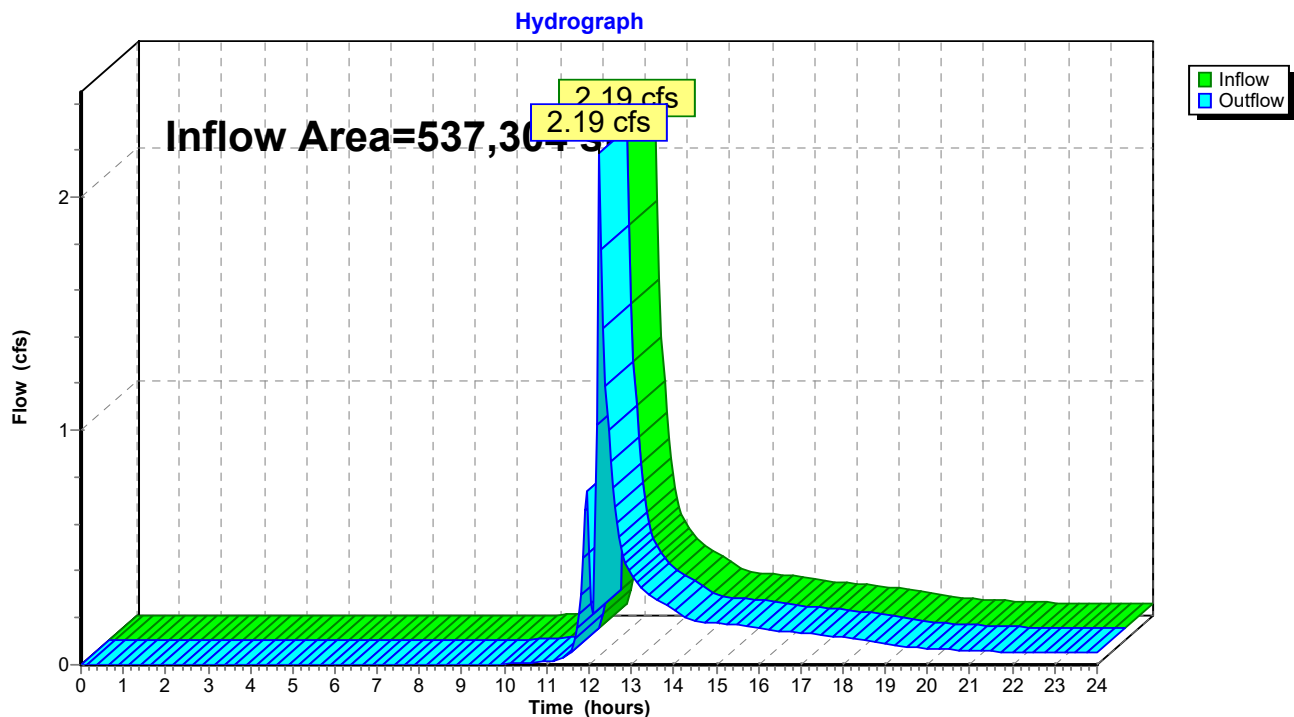
Summary for Reach 14R: Post w-BMP

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

Inflow Area = 537,304 sf, 3.42% Impervious, Inflow Depth > 0.19" for 10-yr event
Inflow = 2.19 cfs @ 12.25 hrs, Volume= 8,378 cf
Outflow = 2.19 cfs @ 12.25 hrs, Volume= 8,378 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 14R: Post w-BMP



MLV 505LD86_Post w-BMP

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Type II 24-hr 10-yr Rainfall=4.74"

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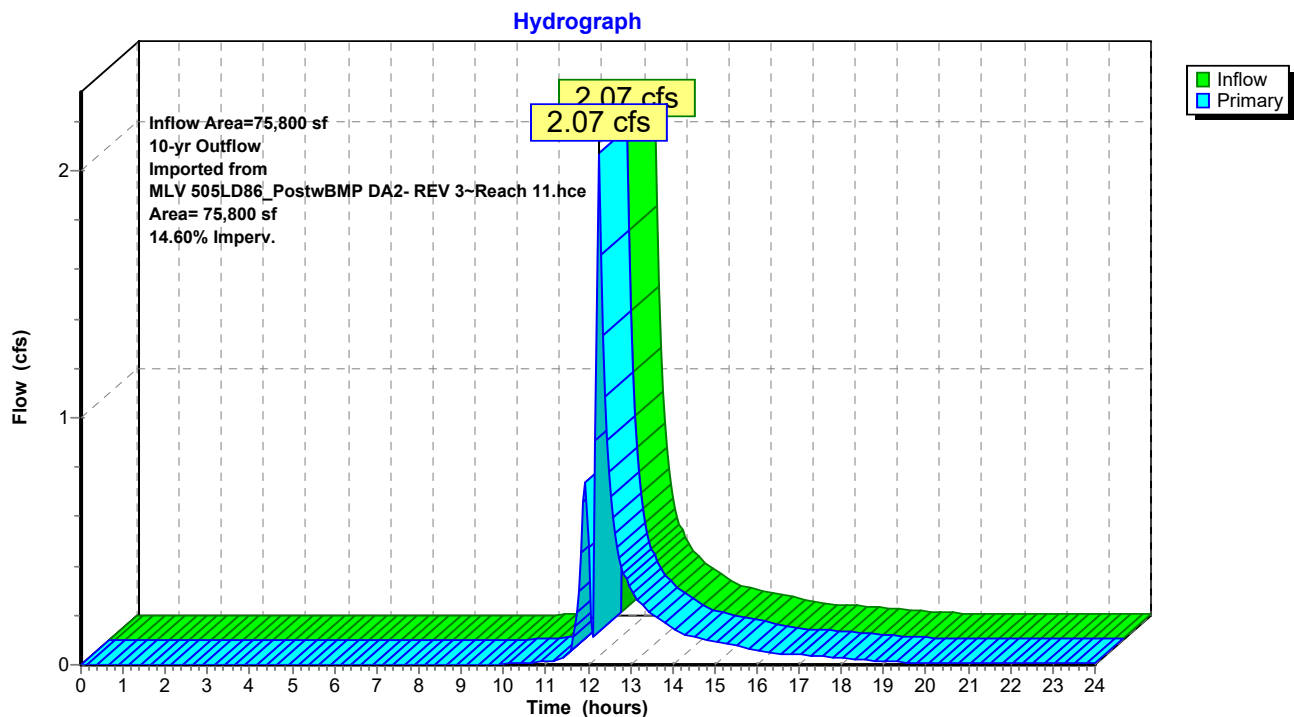
Summary for Link 15L: DA 2 Post w-BMP

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 0.83" for 10-yr event
Inflow = 2.07 cfs @ 12.25 hrs, Volume= 5,216 cf
Primary = 2.07 cfs @ 12.25 hrs, Volume= 5,216 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce

Link 15L: DA 2 Post w-BMP



MLV 505LD86_Post w-BMP

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Type II 24-hr 10-yr Rainfall=4.74"

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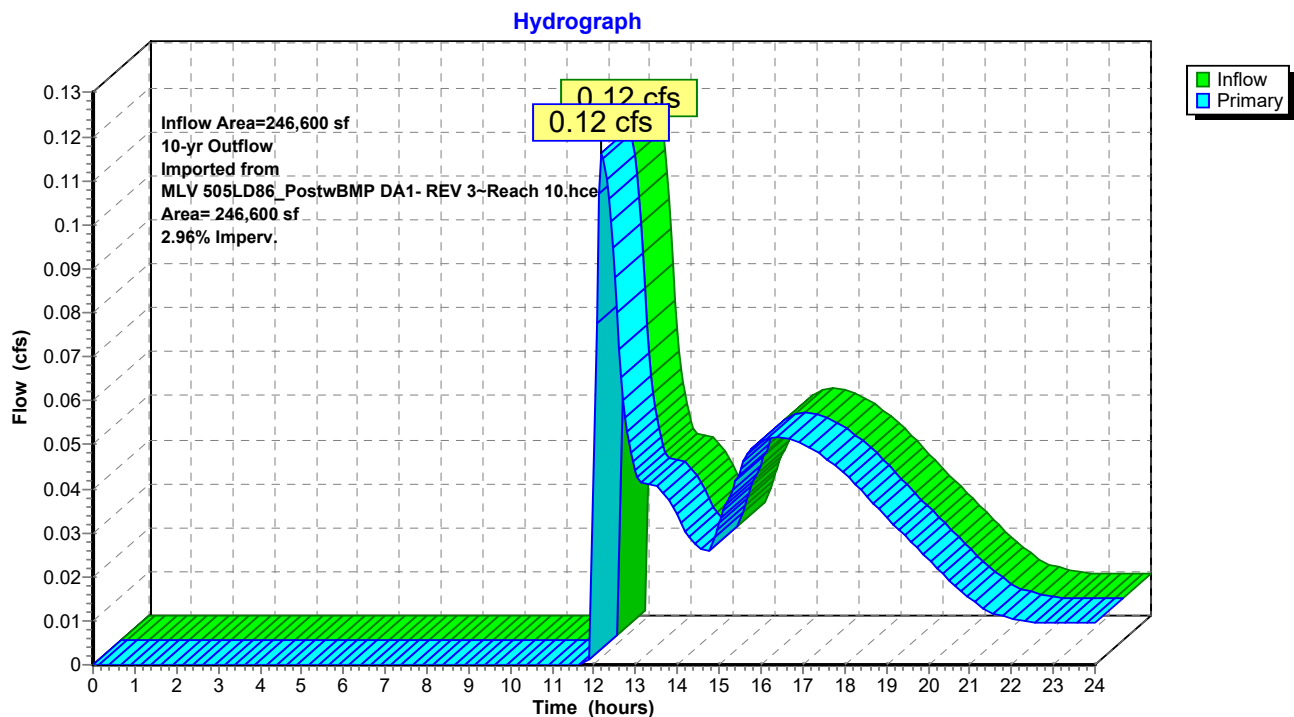
Summary for Link 16L: DA 1 Post w-BMP

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.07" for 10-yr event
Inflow = 0.12 cfs @ 12.19 hrs, Volume= 1,467 cf
Primary = 0.12 cfs @ 12.19 hrs, Volume= 1,467 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce

Link 16L: DA 1 Post w-BMP



MLV 505LD86_Post w-BMP

Type II 24-hr 25-yr Rainfall=5.85"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth>0.30"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=0.33 cfs 5,409 cf

Reach 14R: Post w-BMP

Inflow=5.14 cfs 24,776 cf
Outflow=5.14 cfs 24,776 cf

Link 25-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce Inflow=4.48 cfs 10,106 cf
Area= 75,800 sf 14.60% Imperv. Primary=4.48 cfs 10,106 cf

Link 25-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce Inflow=0.74 cfs 9,261 cf
Area= 246,600 sf 2.96% Imperv. Primary=0.74 cfs 9,261 cf

Total Runoff Area = 214,904 sf Runoff Volume = 5,409 cf Average Runoff Depth = 0.30"
100.00% Pervious = 214,904 sf 0.00% Impervious = 0 sf

MLV 505LD86_Post w-BMP

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 18S: DA-3 Post

Runoff = 0.33 cfs @ 12.42 hrs, Volume= 5,409 cf, Depth> 0.30"

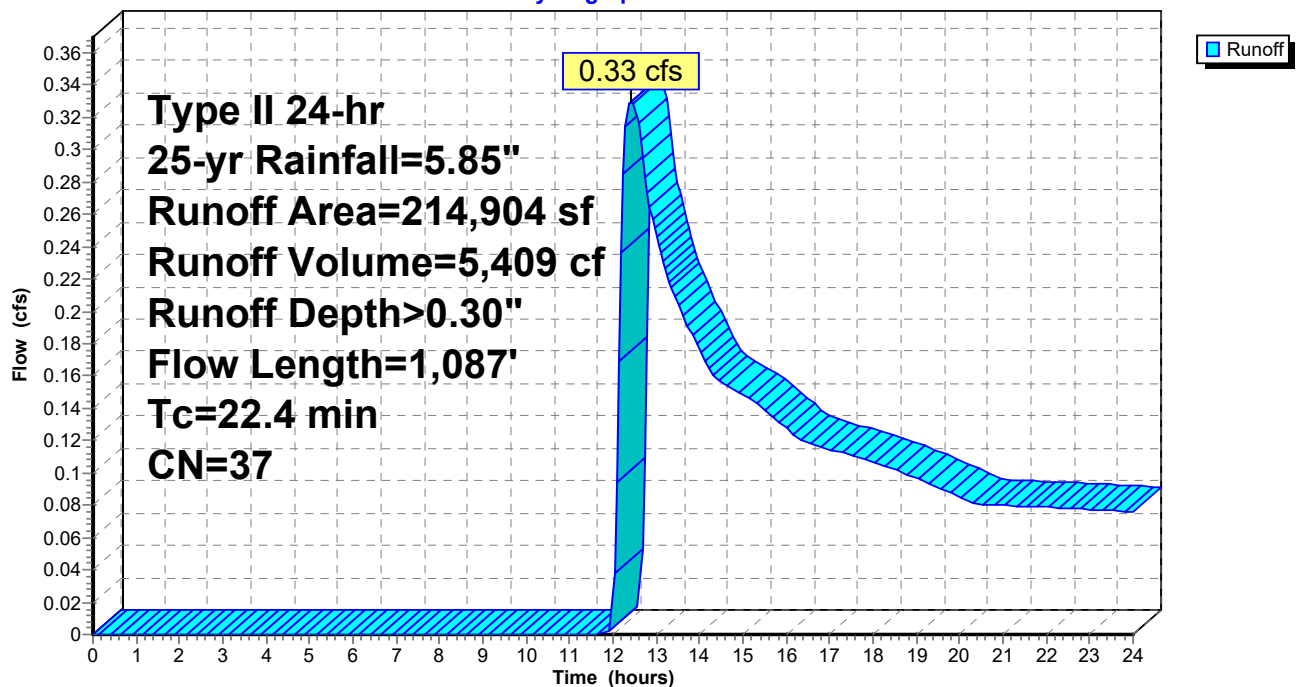
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

Hydrograph



MLV 505LD86_Post w-BMP

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Type II 24-hr 25-yr Rainfall=5.85"

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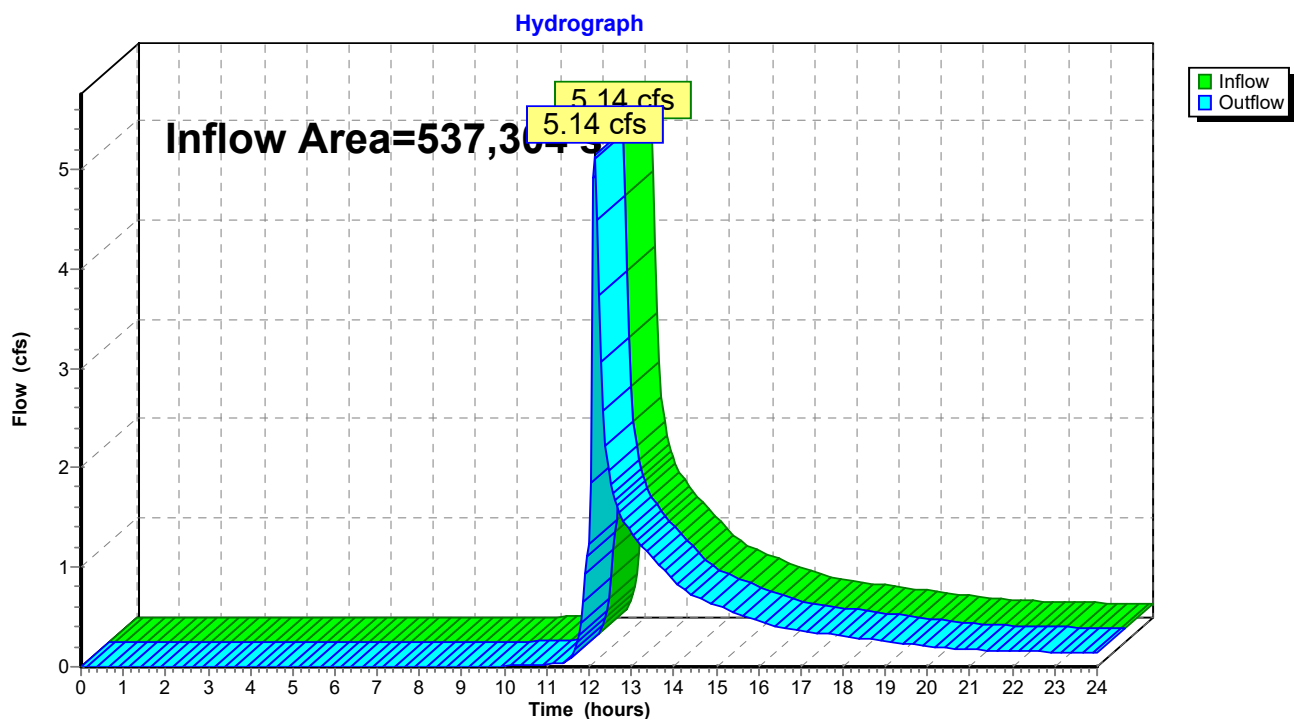
Summary for Reach 14R: Post w-BMP

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

Inflow Area = 537,304 sf, 3.42% Impervious, Inflow Depth > 0.55" for 25-yr event
Inflow = 5.14 cfs @ 12.14 hrs, Volume= 24,776 cf
Outflow = 5.14 cfs @ 12.14 hrs, Volume= 24,776 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 14R: Post w-BMP



MLV 505LD86_Post w-BMP

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Type II 24-hr 25-yr Rainfall=5.85"

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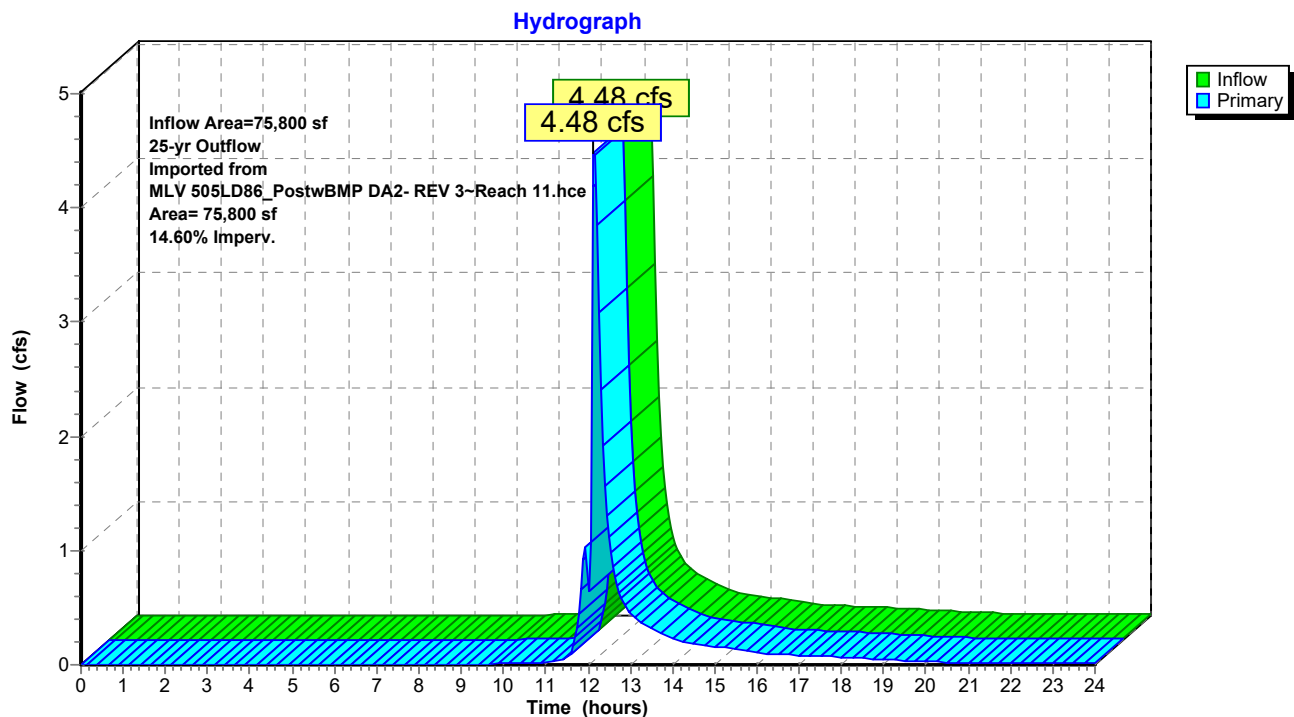
Summary for Link 15L: DA 2 Post w-BMP

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 1.60" for 25-yr event
Inflow = 4.48 cfs @ 12.14 hrs, Volume= 10,106 cf
Primary = 4.48 cfs @ 12.14 hrs, Volume= 10,106 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

25-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce

Link 15L: DA 2 Post w-BMP



MLV 505LD86_Post w-BMP

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Type II 24-hr 25-yr Rainfall=5.85"

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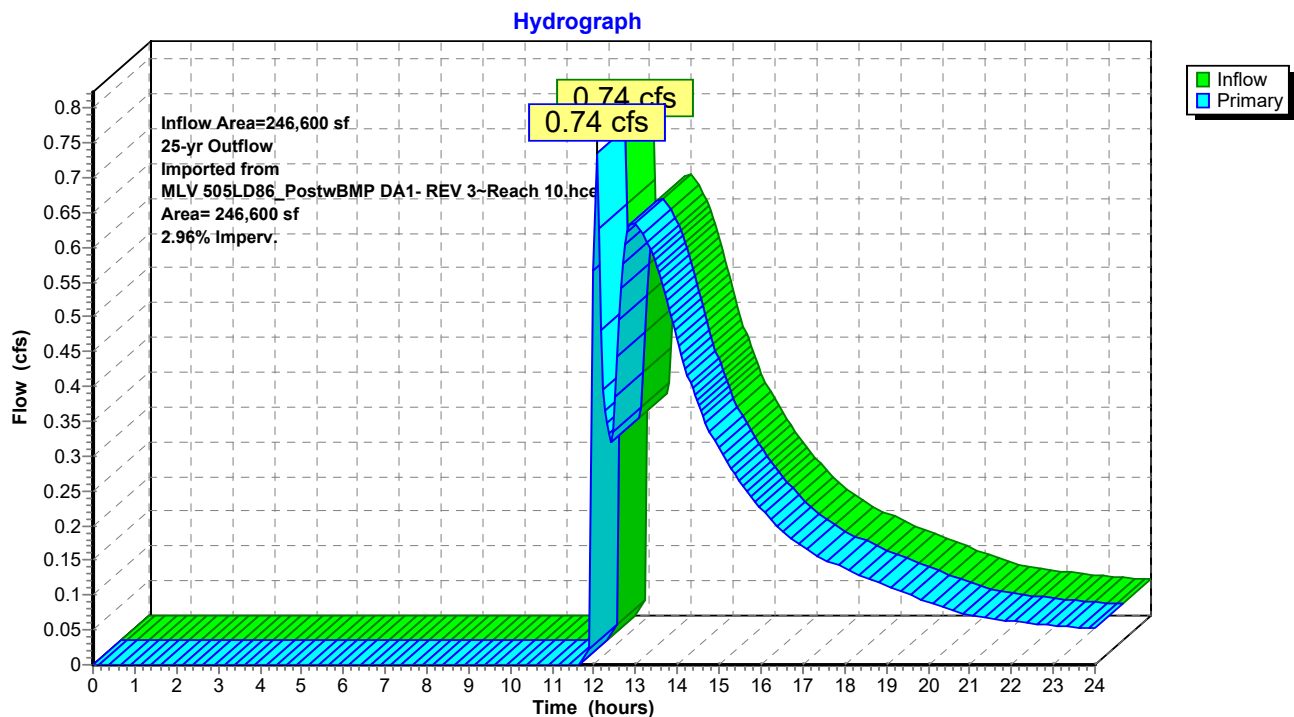
Summary for Link 16L: DA 1 Post w-BMP

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.45" for 25-yr event
Inflow = 0.74 cfs @ 12.06 hrs, Volume= 9,261 cf
Primary = 0.74 cfs @ 12.06 hrs, Volume= 9,261 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

25-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce

Link 16L: DA 1 Post w-BMP



MLV 505LD86_Post w-BMP

Type II 24-hr 50-yr Rainfall=6.87"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth>0.58"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=1.25 cfs 10,355 cf

Reach 14R: Post w-BMP

Inflow=8.06 cfs 43,778 cf
Outflow=8.06 cfs 43,778 cf

Link 10-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce Inflow=6.11 cfs 15,138 cf
Area= 75,800 sf 14.60% Imperv. Primary=6.11 cfs 15,138 cf

Link 10-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce Inflow=1.49 cfs 18,285 cf
Area= 246,600 sf 2.96% Imperv. Primary=1.49 cfs 18,285 cf

Total Runoff Area = 214,904 sf Runoff Volume = 10,355 cf Average Runoff Depth = 0.58"
100.00% Pervious = 214,904 sf 0.00% Impervious = 0 sf

MLV 505LD86_Post w-BMP

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 18S: DA-3 Post

Runoff = 1.25 cfs @ 12.26 hrs, Volume= 10,355 cf, Depth> 0.58"

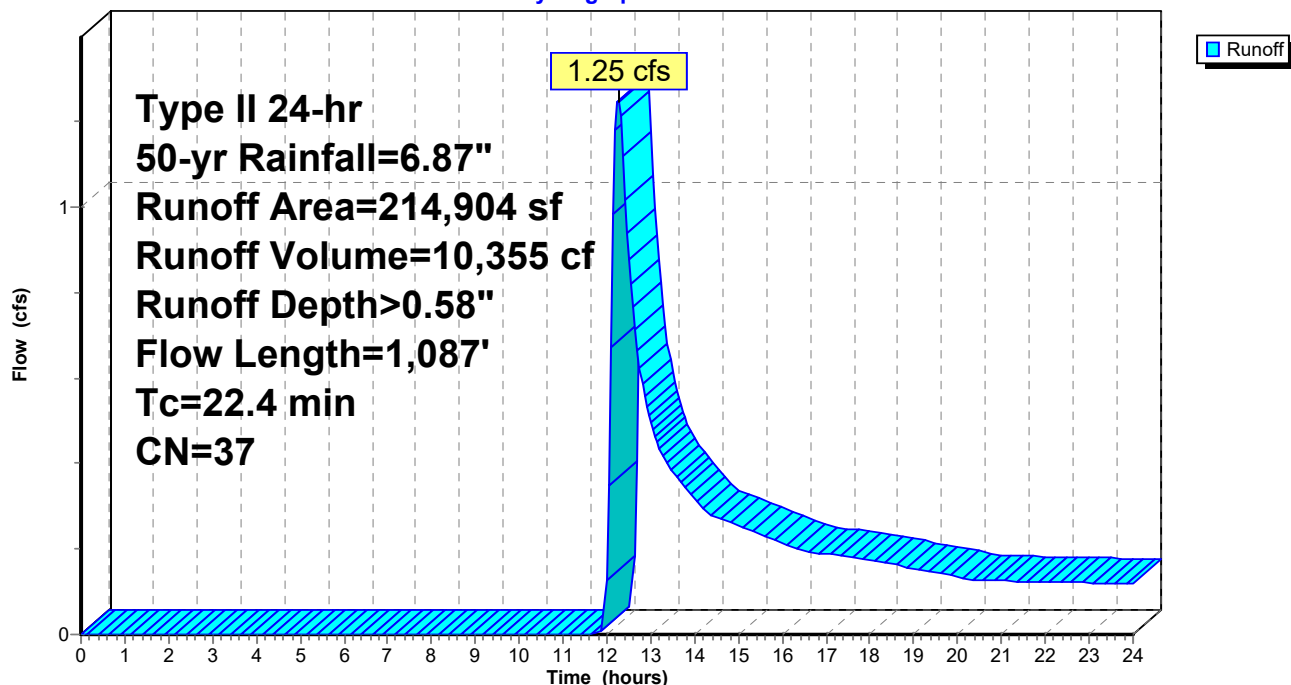
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

Hydrograph



MLV 505LD86_Post w-BMP

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Type II 24-hr 50-yr Rainfall=6.87"

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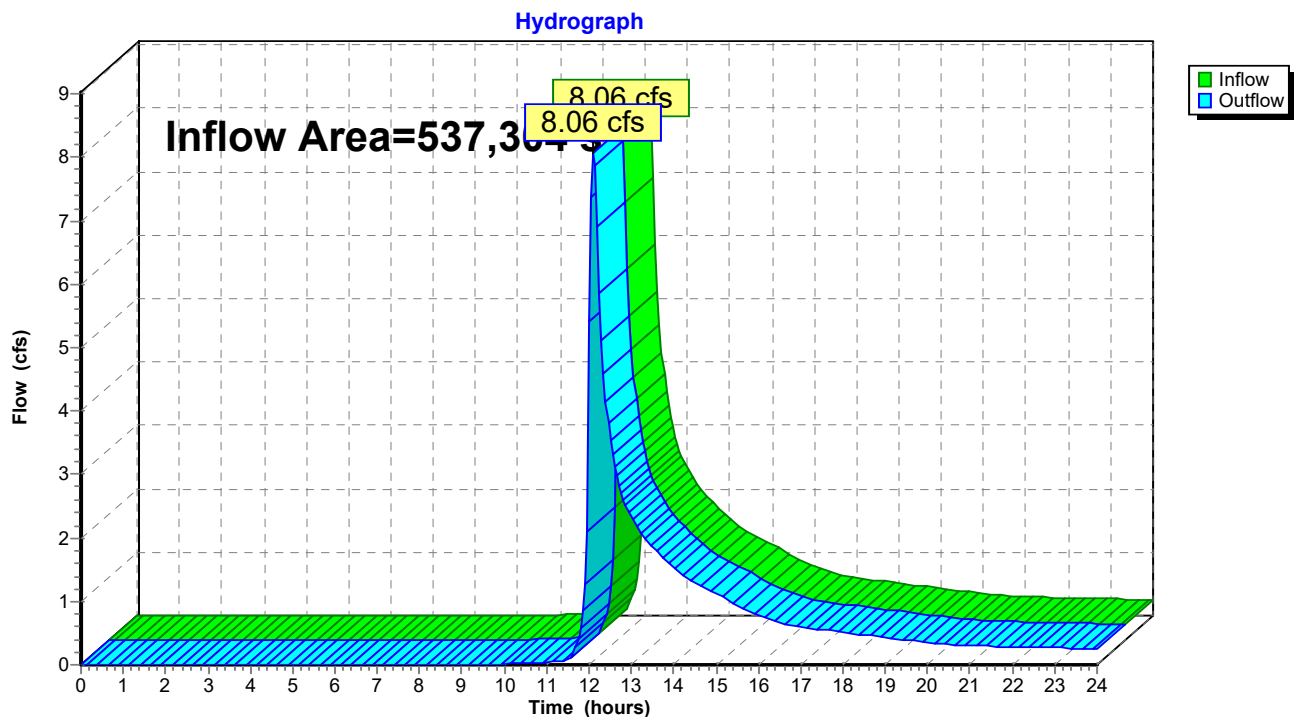
Summary for Reach 14R: Post w-BMP

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

Inflow Area = 537,304 sf, 3.42% Impervious, Inflow Depth > 0.98" for 50-yr event
Inflow = 8.06 cfs @ 12.12 hrs, Volume= 43,778 cf
Outflow = 8.06 cfs @ 12.12 hrs, Volume= 43,778 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 14R: Post w-BMP



MLV 505LD86_Post w-BMP

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Type II 24-hr 50-yr Rainfall=6.87"

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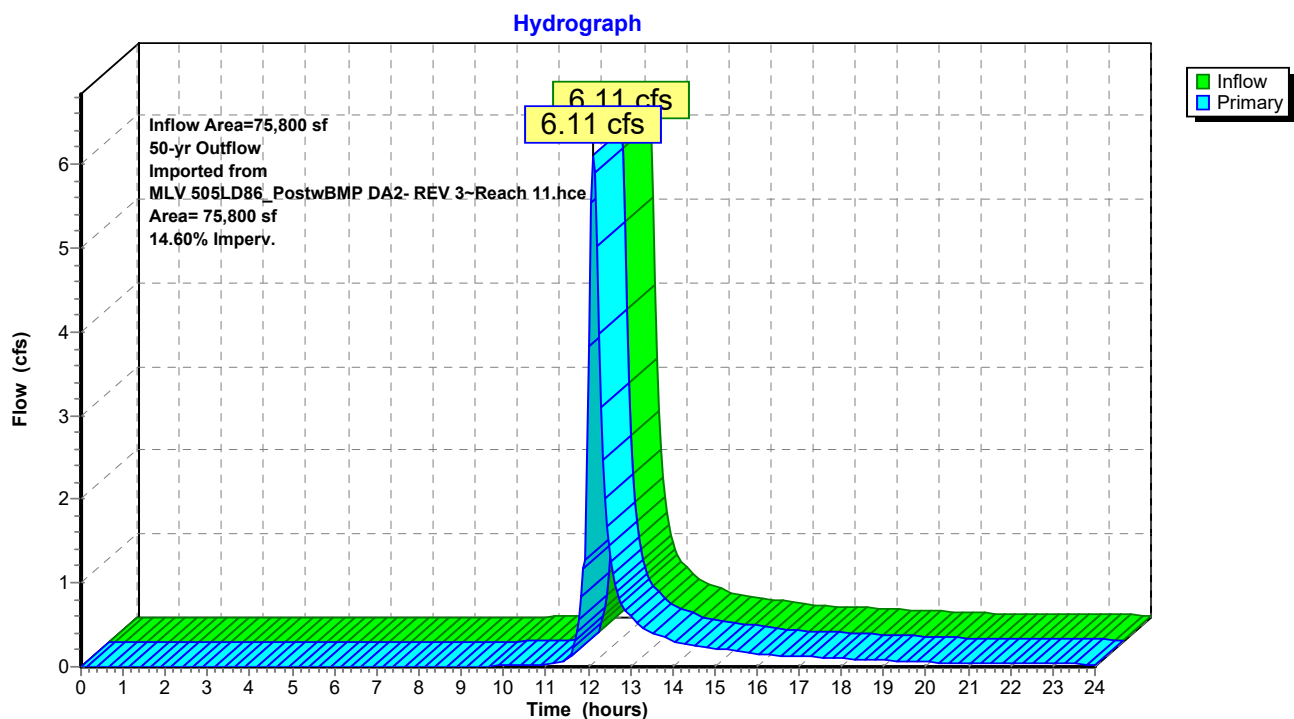
Summary for Link 15L: DA 2 Post w-BMP

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 2.40" for 50-yr event
Inflow = 6.11 cfs @ 12.11 hrs, Volume= 15,138 cf
Primary = 6.11 cfs @ 12.11 hrs, Volume= 15,138 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

50-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce

Link 15L: DA 2 Post w-BMP



MLV 505LD86_Post w-BMP

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Type II 24-hr 50-yr Rainfall=6.87"

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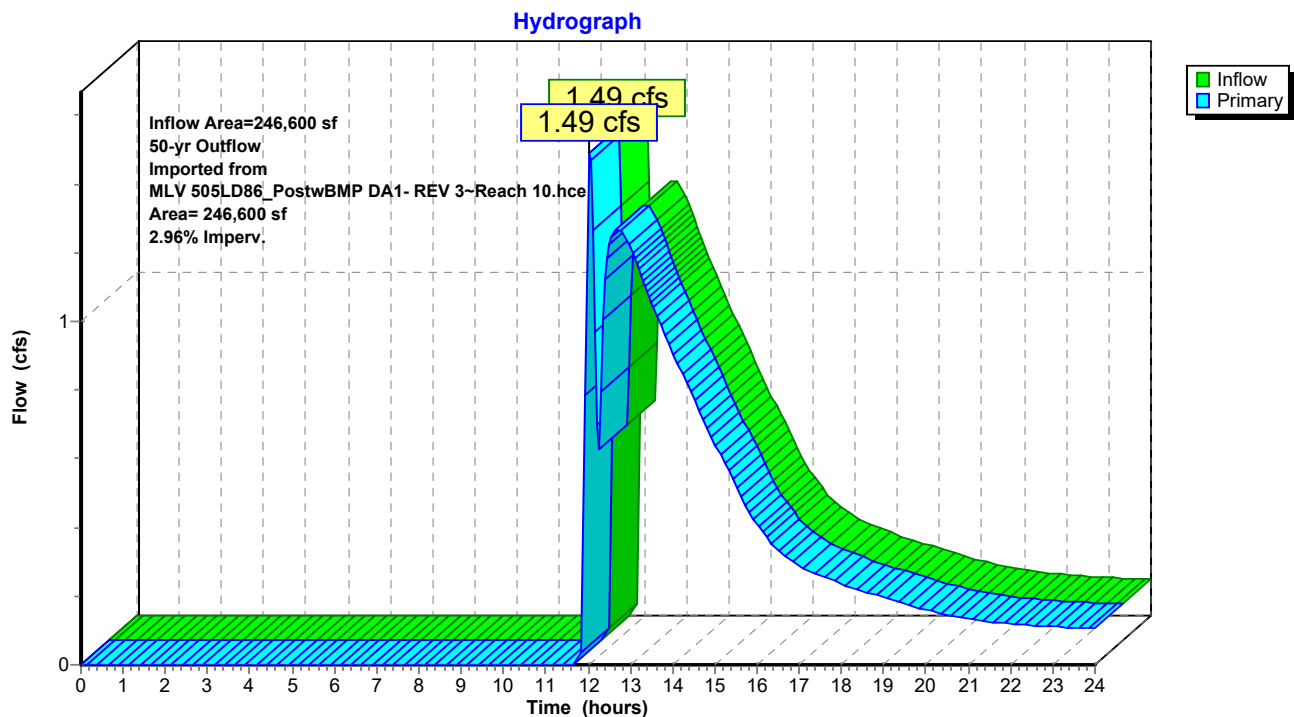
Summary for Link 16L: DA 1 Post w-BMP

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.89" for 50-yr event
Inflow = 1.49 cfs @ 12.03 hrs, Volume= 18,285 cf
Primary = 1.49 cfs @ 12.03 hrs, Volume= 18,285 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

50-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce

Link 16L: DA 1 Post w-BMP



MLV 505LD86_Post w-BMP

Type II 24-hr 100-yr Rainfall=8.09"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 18S: DA-3 Post

Runoff Area=214,904 sf 0.00% Impervious Runoff Depth>1.00"
Flow Length=1,087' Tc=22.4 min CN=37 Runoff=3.12 cfs 17,903 cf

Reach 14R: Post w-BMP

Inflow=12.44 cfs 70,215 cf
Outflow=12.44 cfs 70,215 cf

100-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce Inflow=8.01 cfs 21,408 cf
Area= 75,800 sf 14.60% Imperv. Primary=8.01 cfs 21,408 cf

100-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce Inflow=3.87 cfs 30,904 cf
Area= 246,600 sf 2.96% Imperv. Primary=3.87 cfs 30,904 cf

Total Runoff Area = 214,904 sf Runoff Volume = 17,903 cf Average Runoff Depth = 1.00"
100.00% Pervious = 214,904 sf 0.00% Impervious = 0 sf

MLV 505LD86_Post w-BMP

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 18S: DA-3 Post

Runoff = 3.12 cfs @ 12.22 hrs, Volume= 17,903 cf, Depth> 1.00"

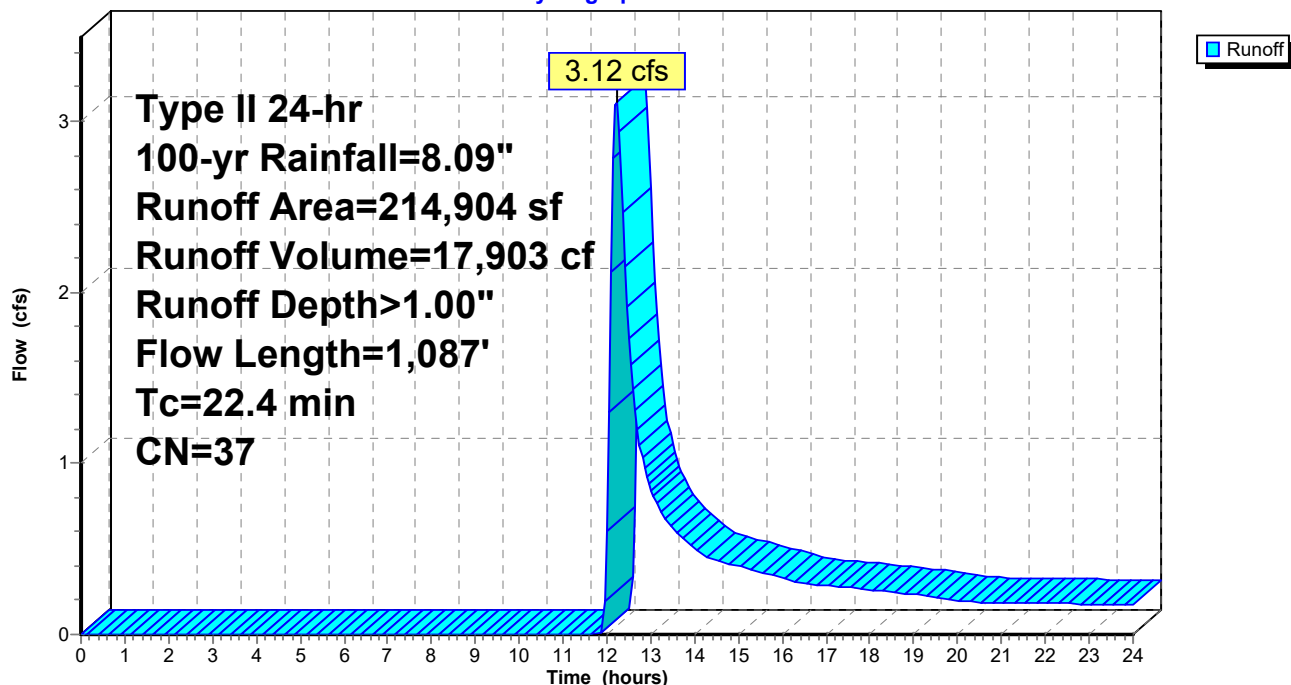
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
9,255	30	Woods, Good, HSG A
16,141	77	Woods, Good, HSG D
173,782	30	Meadow, non-grazed, HSG A
15,726	78	Meadow, non-grazed, HSG D
214,904	37	Weighted Average
214,904		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
1.5	141	0.0920	1.52		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.2	846	0.1060	2.28		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.4	1,087	Total			

Subcatchment 18S: DA-3 Post

Hydrograph



MLV 505LD86_Post w-BMP

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Type II 24-hr 100-yr Rainfall=8.09"

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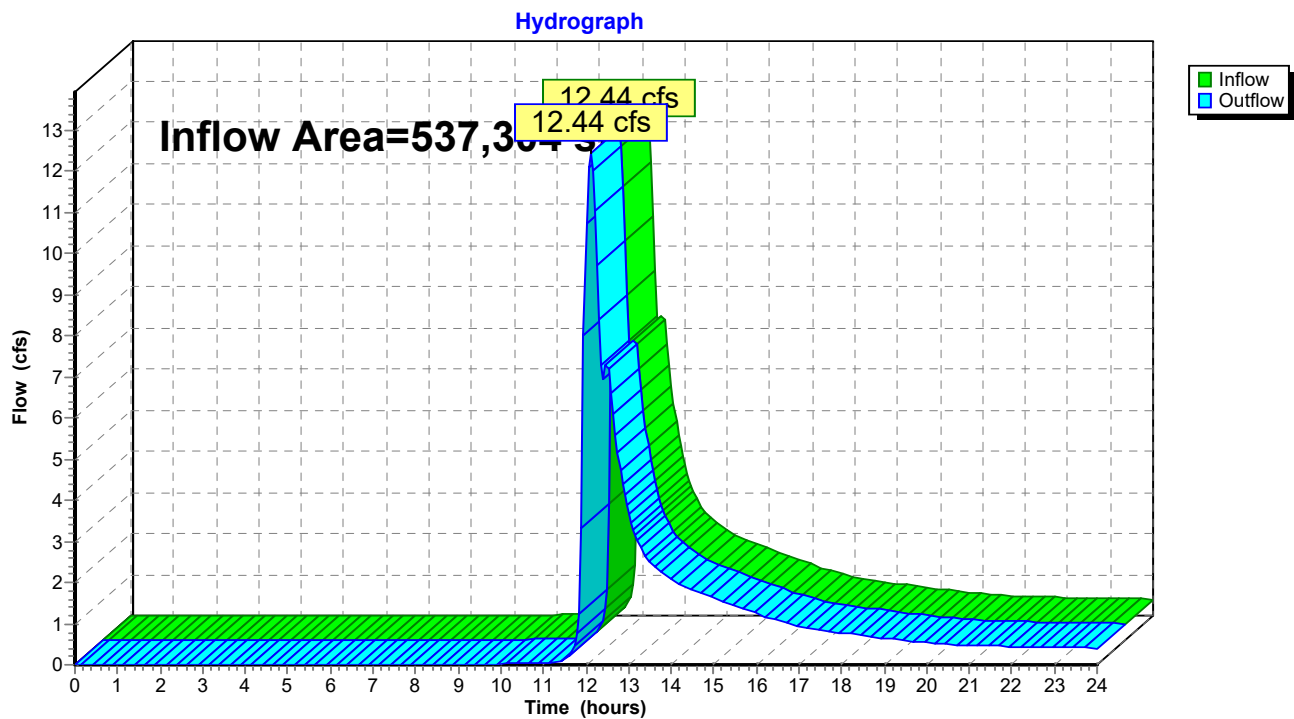
Summary for Reach 14R: Post w-BMP

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

Inflow Area = 537,304 sf, 3.42% Impervious, Inflow Depth > 1.57" for 100-yr event
Inflow = 12.44 cfs @ 12.10 hrs, Volume= 70,215 cf
Outflow = 12.44 cfs @ 12.10 hrs, Volume= 70,215 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 14R: Post w-BMP



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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Link 15L: DA 2 Post w-BMP

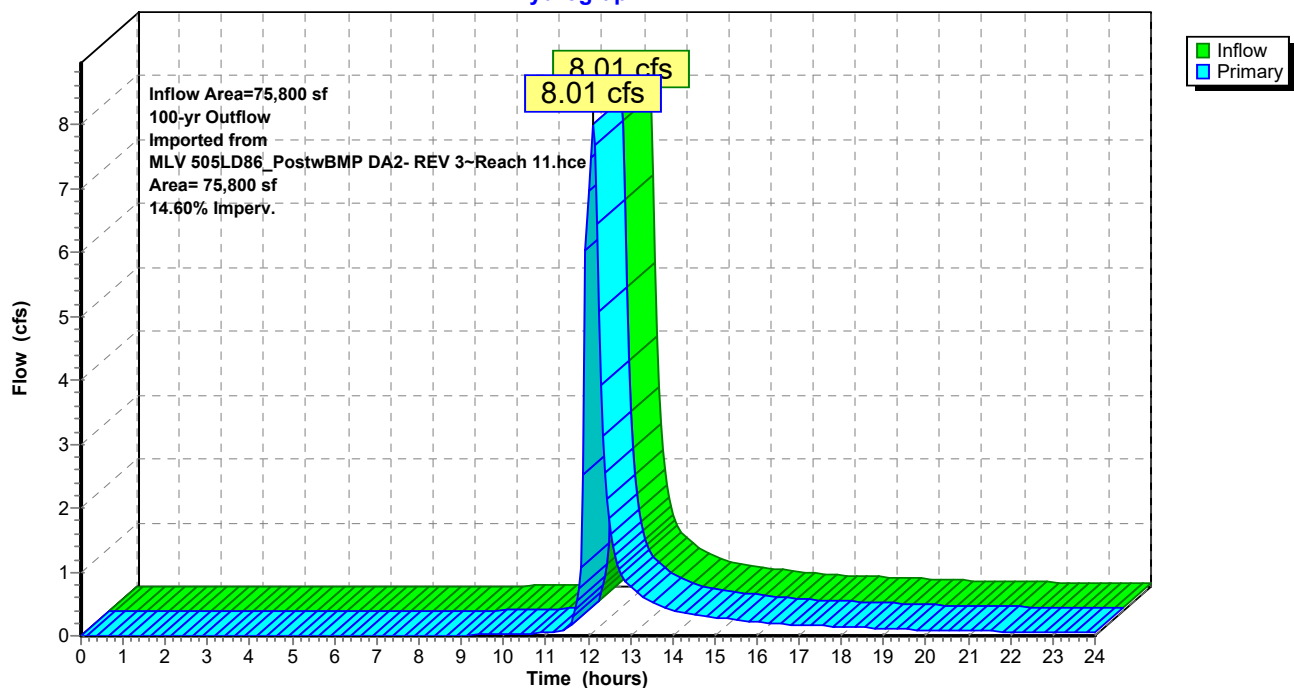
Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 3.39" for 100-yr event
Inflow = 8.01 cfs @ 12.11 hrs, Volume= 21,408 cf
Primary = 8.01 cfs @ 12.11 hrs, Volume= 21,408 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

100-yr Outflow Imported from MLV 505LD86_PostwBMP DA2- REV 3~Reach 11.hce

Link 15L: DA 2 Post w-BMP

Hydrograph



MLV 505LD86_Post w-BMP

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Type II 24-hr 100-yr Rainfall=8.09"

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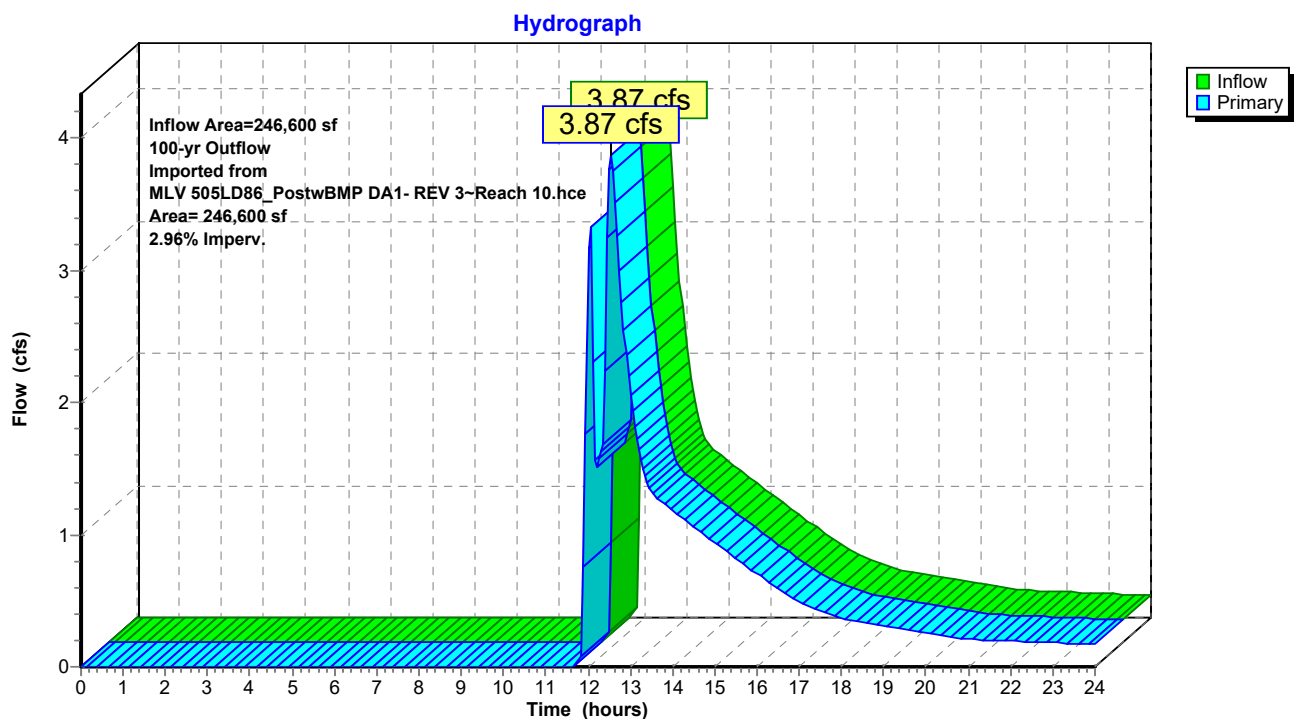
Summary for Link 16L: DA 1 Post w-BMP

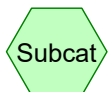
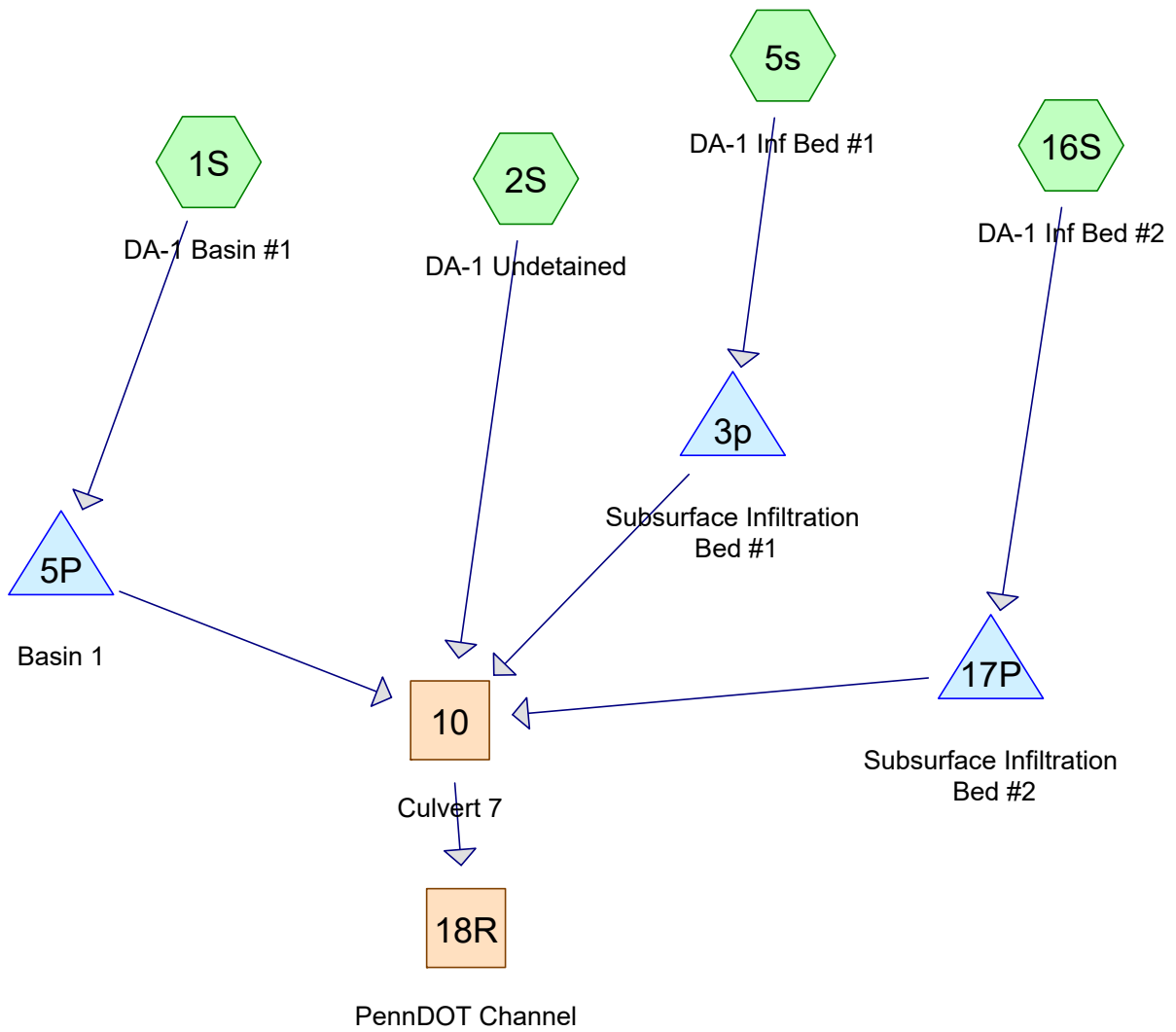
Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 1.50" for 100-yr event
Inflow = 3.87 cfs @ 12.55 hrs, Volume= 30,904 cf
Primary = 3.87 cfs @ 12.55 hrs, Volume= 30,904 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

100-yr Outflow Imported from MLV 505LD86_PostwBMP DA1- REV 3~Reach 10.hce

Link 16L: DA 1 Post w-BMP

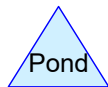




Subcat



Reach



Pond



Link

Routing Diagram for MLV 505LD86_PostwBMP DA1- REV 3
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MLV 505LD86_PostwBMP DA1- REV 3

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
7,293	98	Impervious (1S, 2S, 5s, 16S)
117,845	30	Meadow, non-grazed, HSG A (1S, 2S, 5s, 16S)
65,478	78	Meadow, non-grazed, HSG D (1S, 2S, 5s, 16S)
42,062	30	Woods, Good, HSG A (1S, 2S)
13,922	77	Woods, Good, HSG D (1S, 2S, 16S)
246,600	47	TOTAL AREA

MLV 505LD86_PostwBMP DA1- REV 3

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
159,907	HSG A	1S, 2S, 5s, 16S
0	HSG B	
0	HSG C	
79,400	HSG D	1S, 2S, 5s, 16S
7,293	Other	1S, 2S, 5s, 16S
246,600		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
0	0	0	0	7,293	7,293	Impervious	
117,845	0	0	65,478	0	183,323	Meadow, non-grazed	
42,062	0	0	13,922	0	55,984	Woods, Good	
159,907	0	0	79,400	7,293	246,600	TOTAL AREA	

MLV 505LD86_PostwBMP DA1- REV 3

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	10	911.50	908.00	142.0	0.0246	0.012	18.0	0.0	0.0
2	3p	913.50	912.50	10.0	0.1000	0.024	3.0	0.0	0.0
3	5P	924.50	911.00	71.0	0.1901	0.012	18.0	0.0	0.0
4	17P	912.80	908.50	28.0	0.1536	0.024	3.0	0.0	0.0

MLV 505LD86_PostwBMP DA1- REV 3

Type II 24-hr 1-yr Rainfall=2.72"

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA-1 Basin #1 Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>0.02"
 Flow Length=1,332' Tc=26.4 min CN=47 Runoff=0.01 cfs 279 cf

Subcatchment2S: DA-1 Undetained Runoff Area=39,431 sf 1.50% Impervious Runoff Depth=0.00"
 Flow Length=547' Tc=10.1 min CN=40 Runoff=0.00 cfs 0 cf

Subcatchment5s: DA-1 Inf Bed #1 Runoff Area=10,278 sf 21.06% Impervious Runoff Depth>0.38"
 Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=65 Runoff=0.12 cfs 328 cf

Subcatchment16S: DA-1 Inf Bed #2 Runoff Area=5,684 sf 6.60% Impervious Runoff Depth>0.65"
 Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=72 Runoff=0.14 cfs 306 cf

Reach 10: Culvert 7 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
 18.0" Round Pipe n=0.012 L=142.0' S=0.0246 '/' Capacity=17.87 cfs Outflow=0.00 cfs 0 cf

Reach 18R: PennDOT Channel Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
 n=0.035 L=40.0' S=0.0275 '/' Capacity=20.43 cfs Outflow=0.00 cfs 0 cf

Pond 3p: Subsurface Infiltration Bed #1 Peak Elev=912.19' Storage=69 cf Inflow=0.12 cfs 328 cf
 Discarded=0.02 cfs 327 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 327 cf

Pond 5P: Basin 1 Peak Elev=924.51' Storage=15 cf Inflow=0.01 cfs 279 cf
 Discarded=0.01 cfs 264 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 264 cf

Pond 17P: Subsurface Infiltration Bed #2 Peak Elev=912.35' Storage=98 cf Inflow=0.14 cfs 306 cf
 Discarded=0.01 cfs 305 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 305 cf

Total Runoff Area = 246,600 sf Runoff Volume = 913 cf Average Runoff Depth = 0.04"
97.04% Pervious = 239,307 sf 2.96% Impervious = 7,293 sf

Summary for Subcatchment 1S: DA-1 Basin #1

[73] Warning: Peak may fall outside time span

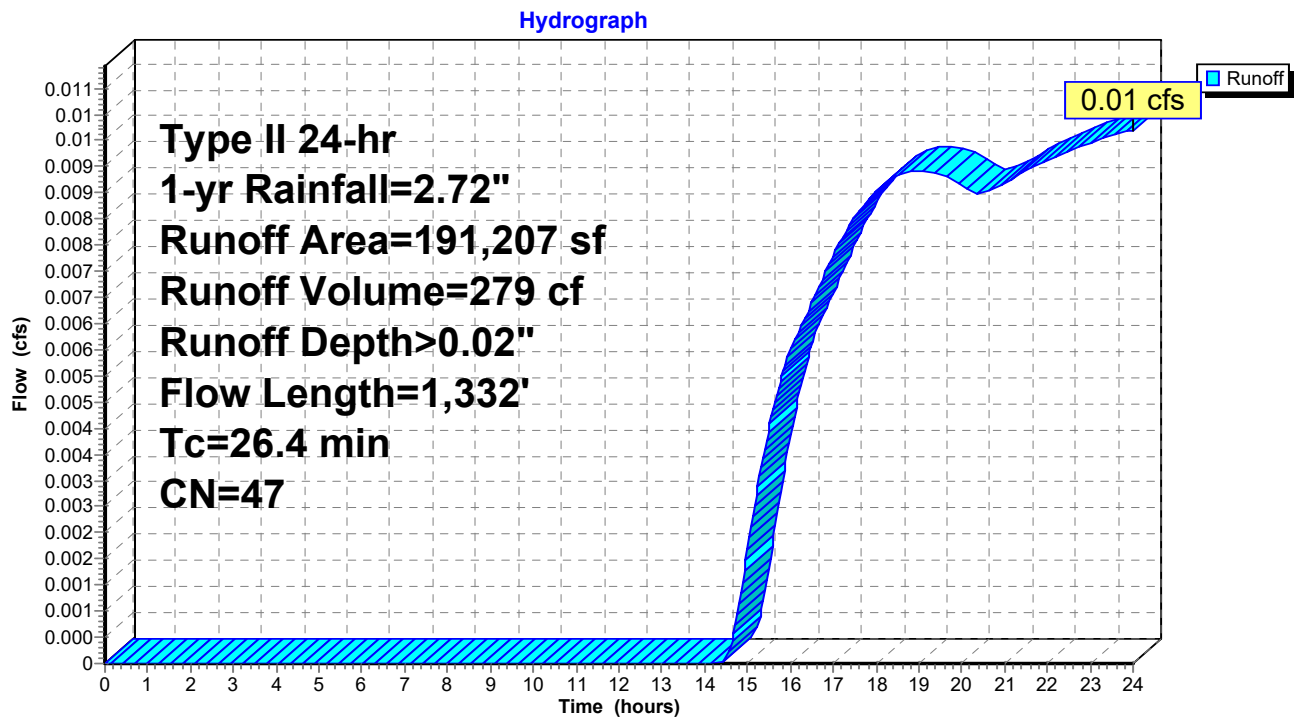
Runoff = 0.01 cfs @ 24.00 hrs, Volume= 279 cf, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.9	463	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.4	554	0.0900	2.10		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
26.4	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



Summary for Subcatchment 2S: DA-1 Undetained

[45] Hint: Runoff=Zero

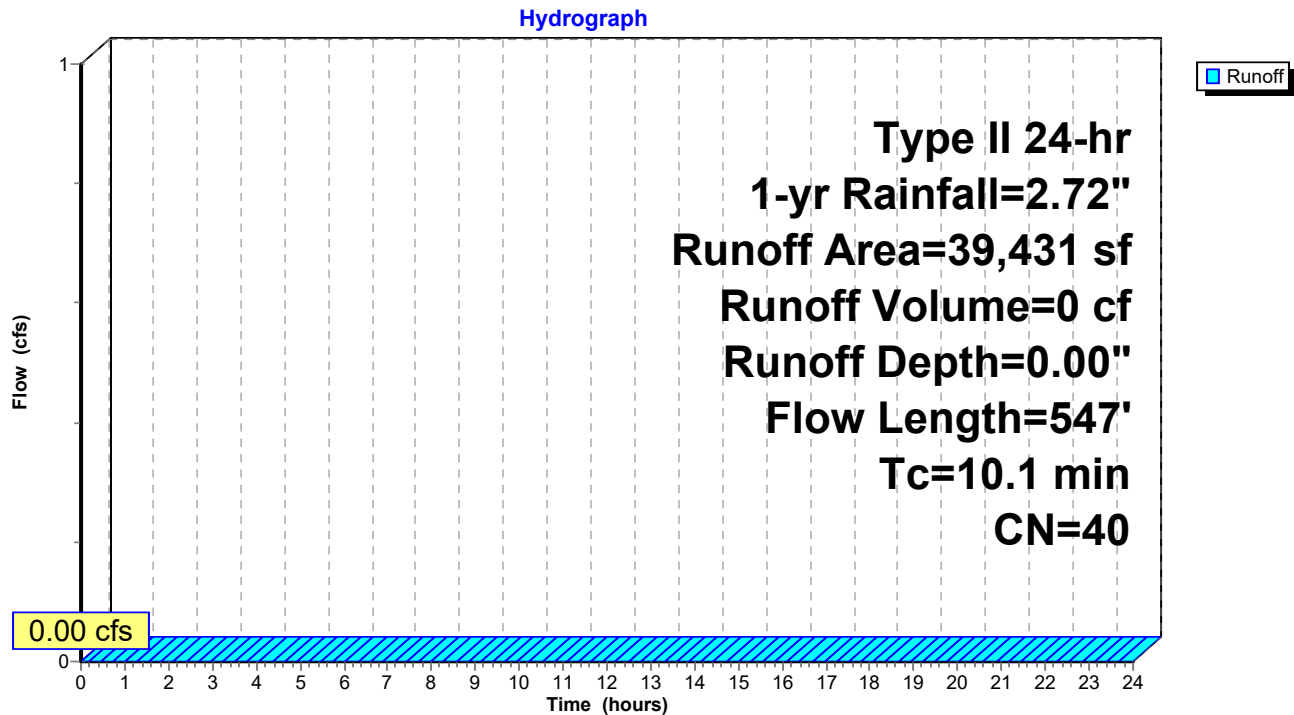
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
1,020	77	Woods, Good, HSG D
20,698	30	Meadow, non-grazed, HSG A
6,598	78	Meadow, non-grazed, HSG D
* 590	98	Impervious
39,431	40	Weighted Average
38,841		98.50% Pervious Area
590		1.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1000	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
1.0	147	0.1200	2.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	300	0.0200	2.89	4.33	Channel Flow, Channel Area= 1.5 sf Perim= 4.5' r= 0.33' n= 0.035
10.1	547	Total			

Subcatchment 2S: DA-1 Undetained



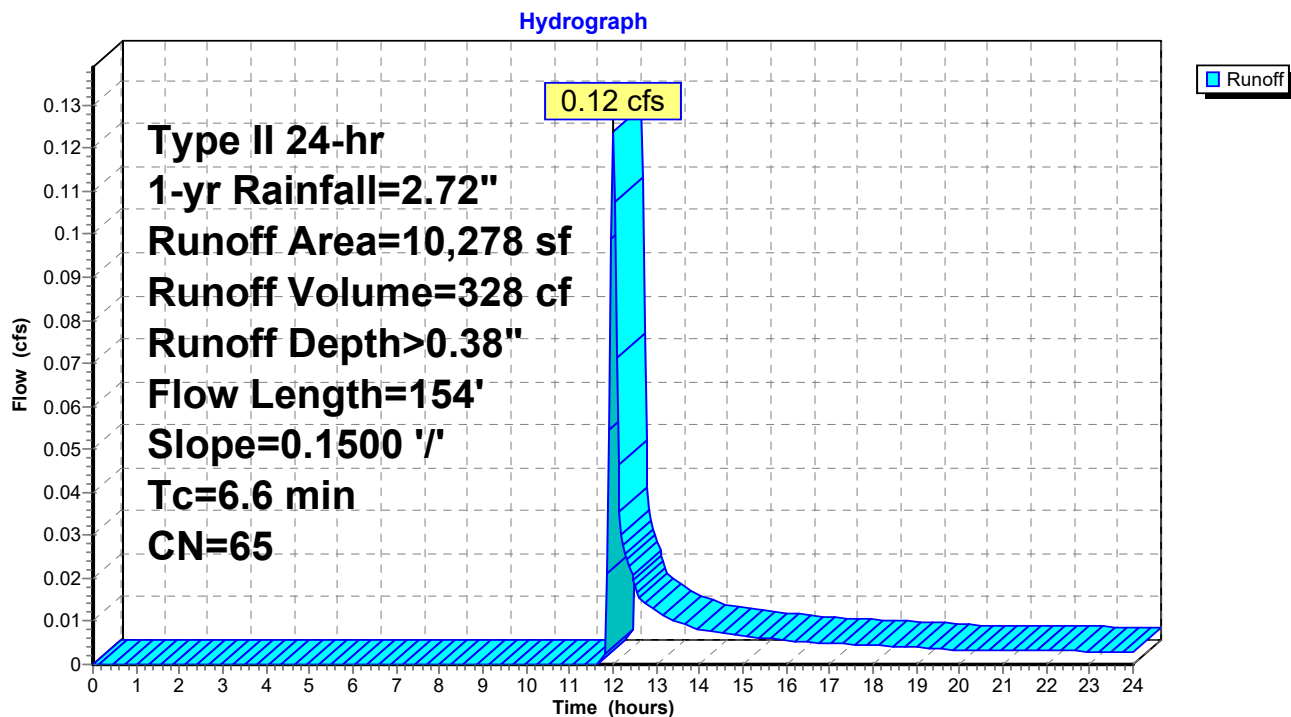
Summary for Subcatchment 5s: DA-1 Inf Bed #1

Runoff = 0.12 cfs @ 12.00 hrs, Volume= 328 cf, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
3,580	30	Meadow, non-grazed, HSG A
4,533	78	Meadow, non-grazed, HSG D
* 2,165	98	Impervious
10,278	65	Weighted Average
8,113		78.94% Pervious Area
2,165		21.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 5s: DA-1 Inf Bed #1

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Type II 24-hr 1-yr Rainfall=2.72"

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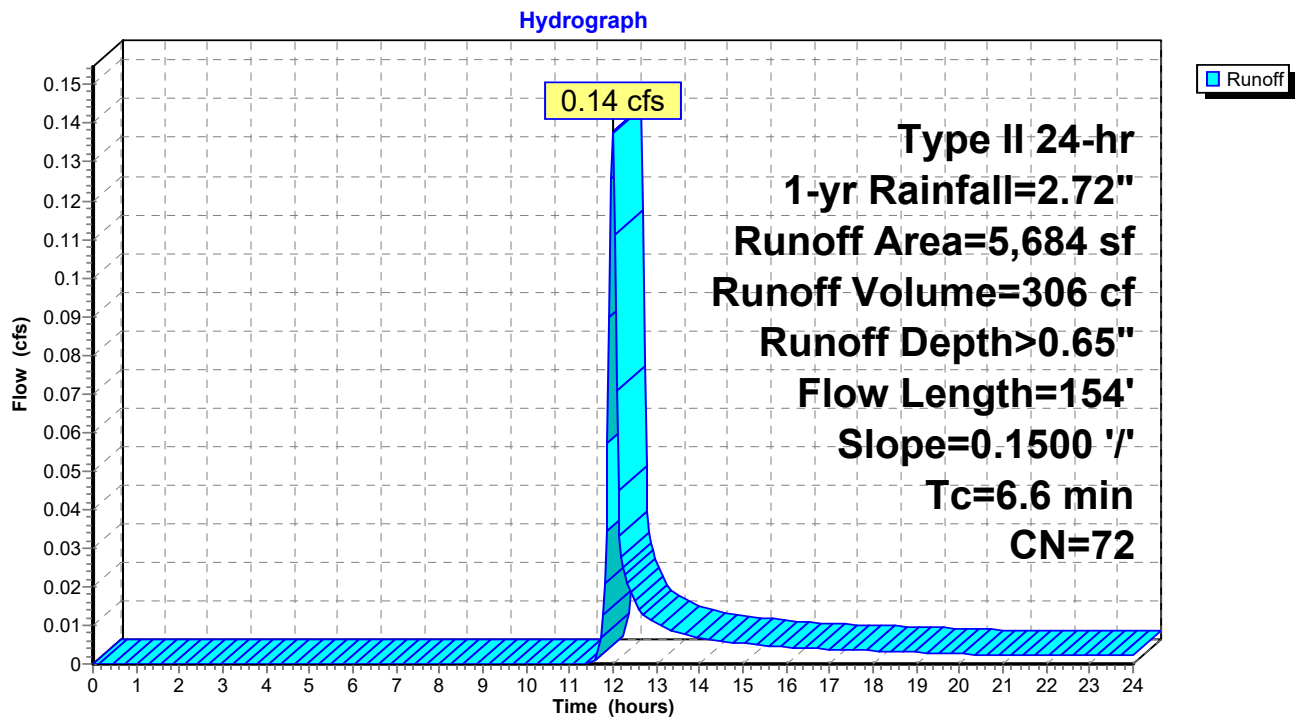
Summary for Subcatchment 16S: DA-1 Inf Bed #2

Runoff = 0.14 cfs @ 11.99 hrs, Volume= 306 cf, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
29	77	Woods, Good, HSG D
925	30	Meadow, non-grazed, HSG A
4,355	78	Meadow, non-grazed, HSG D
* 375	98	Impervious
5,684	72	Weighted Average
5,309		93.40% Pervious Area
375		6.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 16S: DA-1 Inf Bed #2

Summary for Reach 10: Culvert 7

[52] Hint: Inlet/Outlet conditions not evaluated

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 0.50'

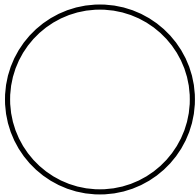
[79] Warning: Submerged Pond 17P Primary device # 3 OUTLET by 3.00'

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth = 0.00" for 1-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 0.00 fps, Avg. Travel Time= 0.0 min

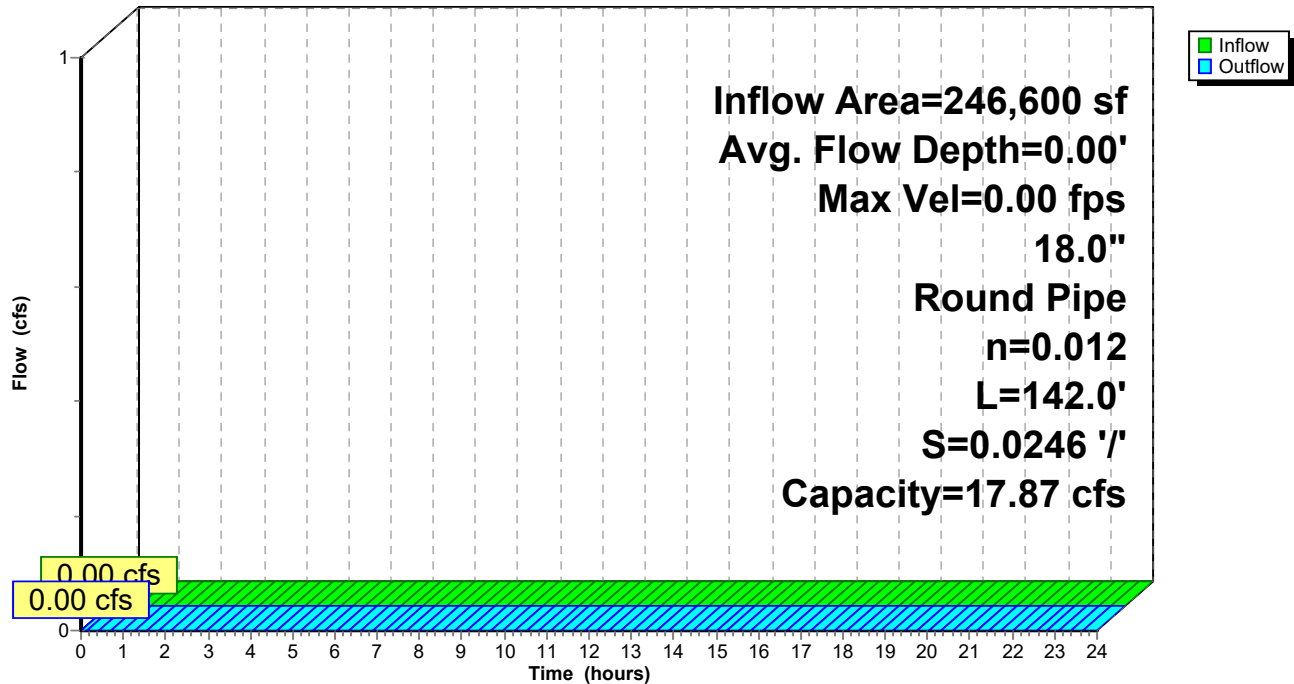
Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 17.87 cfs

18.0" Round Pipe
n= 0.012
Length= 142.0' Slope= 0.0246 '/'
Inlet Invert= 911.50', Outlet Invert= 908.00'



Reach 10: Culvert 7

Hydrograph



Summary for Reach 18R: PennDOT Channel

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth = 0.00" for 1-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

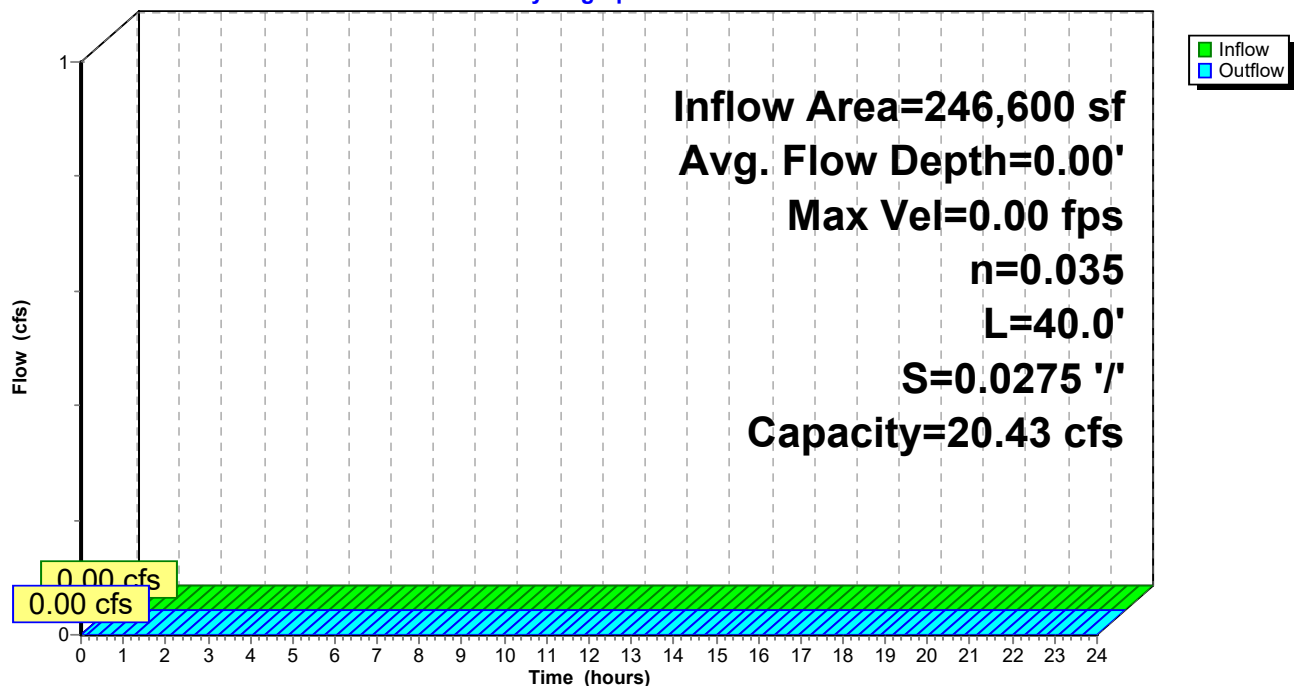
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 20.43 cfs

2.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 40.0' Slope= 0.0275 '/'
Inlet Invert= 908.00', Outlet Invert= 906.90'

**Reach 18R: PennDOT Channel**

Hydrograph



Summary for Pond 3p: Subsurface Infiltration Bed #1

Inflow Area = 10,278 sf, 21.06% Impervious, Inflow Depth > 0.38" for 1-yr event
 Inflow = 0.12 cfs @ 12.00 hrs, Volume= 328 cf
 Outflow = 0.02 cfs @ 12.51 hrs, Volume= 327 cf, Atten= 85%, Lag= 30.3 min
 Discarded = 0.02 cfs @ 12.51 hrs, Volume= 327 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 912.19' @ 12.51 hrs Surf.Area= 800 sf Storage= 69 cf

Plug-Flow detention time= 27.0 min calculated for 326 cf (99% of inflow)
 Center-of-Mass det. time= 24.4 min (935.7 - 911.2)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	795 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,200 cf Overall - 212 cf Embedded = 1,988 cf x 40.0% Voids
#2	912.00'	212 cf	18.0" Round Pipe Storage x 3 Inside #1 L= 40.0'
		1,007 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	800	0	0
913.00	800	800	800
914.00	800	800	1,600
914.75	800	600	2,200

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	913.50'	3.0" Round Culvert L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.1000 ' / Cc= 0.900 n= 0.024, Flow Area= 0.05 sf
#3	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'

Discarded OutFlow Max=0.02 cfs @ 12.51 hrs HW=912.19' (Free Discharge)

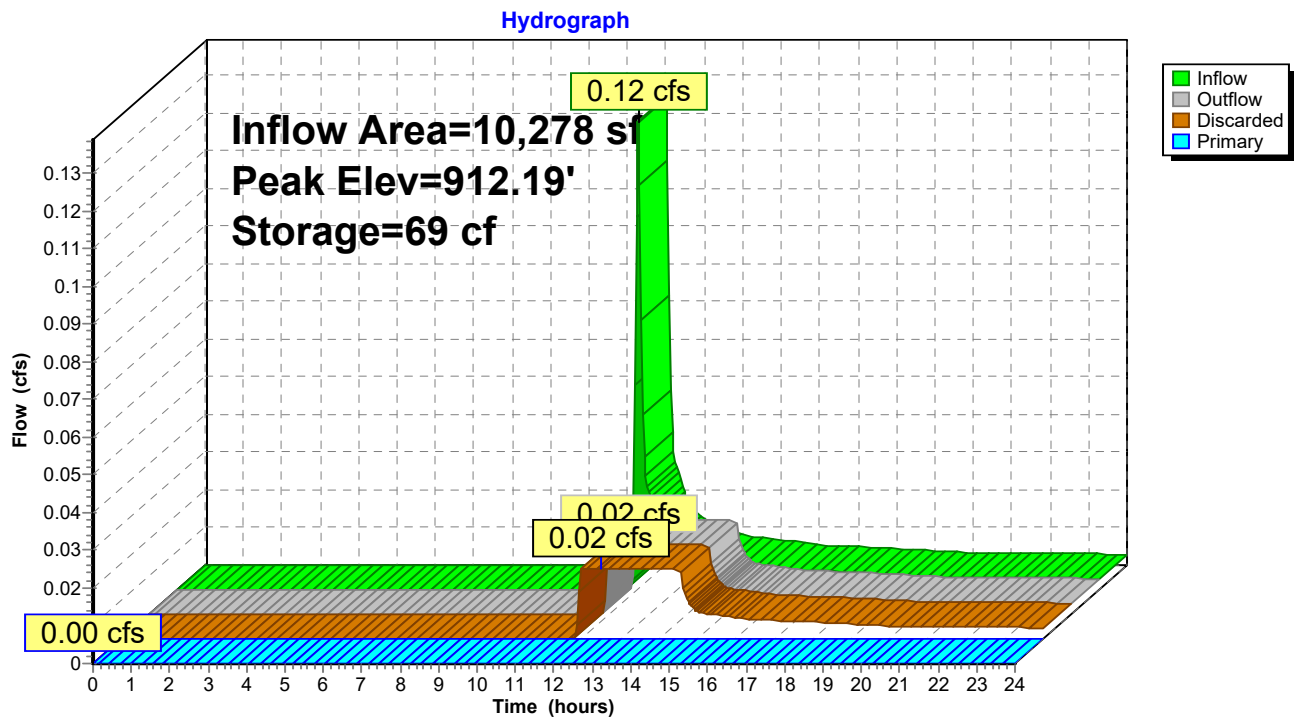
↑ **3=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=912.00' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **2=Culvert** (Controls 0.00 cfs)

Pond 3p: Subsurface Infiltration Bed #1



Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 0.02" for 1-yr event
 Inflow = 0.01 cfs @ 24.00 hrs, Volume= 279 cf
 Outflow = 0.01 cfs @ 24.00 hrs, Volume= 264 cf, Atten= 1%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 24.00 hrs, Volume= 264 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
 Peak Elev= 924.51' @ 24.00 hrs Surf.Area= 2,843 sf Storage= 15 cf

Plug-Flow detention time= 24.2 min calculated for 264 cf (95% of inflow)
 Center-of-Mass det. time= 10.8 min (1,206.1 - 1,195.2)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,904 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
925.33	3,629	1,143	2,677
926.00	4,260	2,643	5,320
927.00	5,278	4,769	10,089
928.00	6,352	5,815	15,904

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Device 4	926.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	924.50'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#4	Primary	924.50'	18.0" Round Culvert L= 71.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 911.00' S= 0.1901 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#5	Device 4	925.33'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.07 cfs @ 24.00 hrs HW=924.51' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=924.50' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

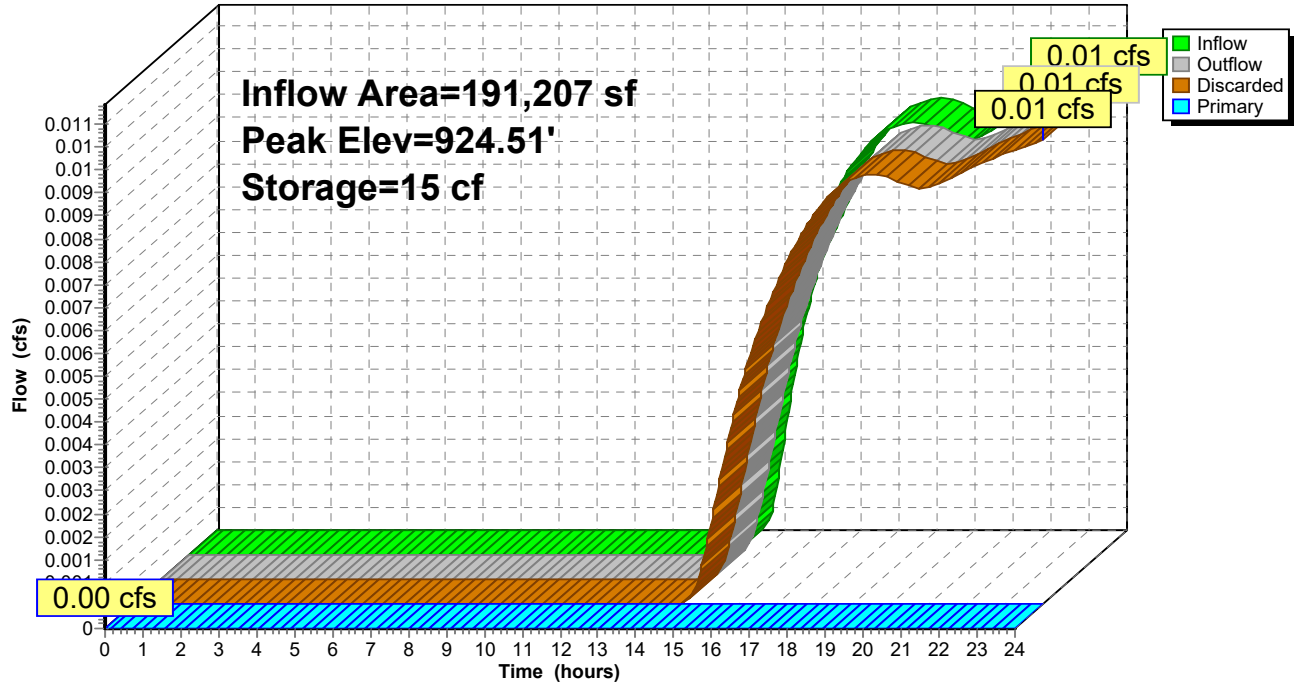
↑ **4=Culvert** (Controls 0.00 cfs)

↑ **2=Orifice/Grate** (Controls 0.00 cfs)

↑ **5=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Basin 1

Hydrograph



Summary for Pond 17P: Subsurface Infiltration Bed #2

Inflow Area = 5,684 sf, 6.60% Impervious, Inflow Depth > 0.65" for 1-yr event
 Inflow = 0.14 cfs @ 11.99 hrs, Volume= 306 cf
 Outflow = 0.01 cfs @ 12.62 hrs, Volume= 305 cf, Atten= 90%, Lag= 37.9 min
 Discarded = 0.01 cfs @ 12.62 hrs, Volume= 305 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 912.35' @ 12.62 hrs Surf.Area= 575 sf Storage= 98 cf

Plug-Flow detention time= 58.1 min calculated for 305 cf (100% of inflow)
 Center-of-Mass det. time= 56.8 min (934.1 - 877.2)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	307 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 863 cf Overall - 94 cf Embedded = 768 cf x 40.0% Voids
#2	912.00'	79 cf	12.0" Round Pipe Storage x 4 Inside #1 L= 25.0'
#3	912.00'	16 cf	12.0" Round Pipe Storage x 2 Inside #1 L= 10.0'
			402 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	575	0	0
913.00	575	575	575
913.50	575	288	863

Device	Routing	Invert	Outlet Devices
#1	Primary	913.25'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'
#3	Primary	912.80'	3.0" Round Culvert L= 28.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 912.80' / 908.50' S= 0.1536 ' / Cc= 0.900 n= 0.024, Flow Area= 0.05 sf

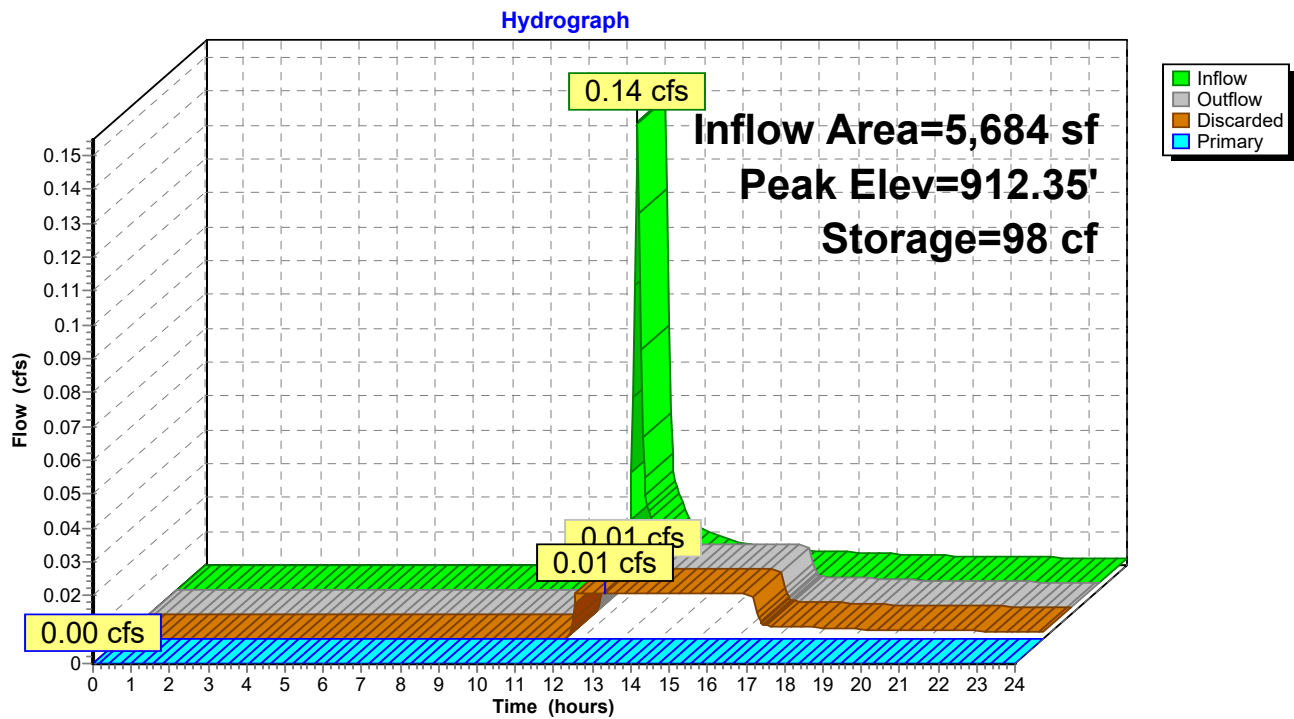
Discarded OutFlow Max=0.01 cfs @ 12.62 hrs HW=912.35' (Free Discharge)

↑ **2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=912.00' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **3=Culvert** (Controls 0.00 cfs)

Pond 17P: Subsurface Infiltration Bed #2

MLV 505LD86_PostwBMP DA1- REV 3*Type II 24-hr 2-yr Rainfall=3.26"*

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA-1 Basin #1 Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>0.08"
Flow Length=1,332' Tc=26.4 min CN=47 Runoff=0.04 cfs 1,275 cf

Subcatchment2S: DA-1 Undetained Runoff Area=39,431 sf 1.50% Impervious Runoff Depth>0.00"
Flow Length=547' Tc=10.1 min CN=40 Runoff=0.00 cfs 14 cf

Subcatchment5s: DA-1 Inf Bed #1 Runoff Area=10,278 sf 21.06% Impervious Runoff Depth>0.63"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=65 Runoff=0.23 cfs 538 cf

Subcatchment16S: DA-1 Inf Bed #2 Runoff Area=5,684 sf 6.60% Impervious Runoff Depth>0.97"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=72 Runoff=0.21 cfs 457 cf

Reach 10: Culvert 7 Avg. Flow Depth=0.01' Max Vel=0.90 fps Inflow=0.00 cfs 14 cf
18.0" Round Pipe n=0.012 L=142.0' S=0.0246 '/' Capacity=17.87 cfs Outflow=0.00 cfs 14 cf

Reach 18R: PennDOT Channel Avg. Flow Depth=0.00' Max Vel=0.32 fps Inflow=0.00 cfs 14 cf
n=0.035 L=40.0' S=0.0275 '/' Capacity=20.43 cfs Outflow=0.00 cfs 13 cf

Pond 3p: Subsurface Infiltration Bed #1 Peak Elev=912.45' Storage=175 cf Inflow=0.23 cfs 538 cf
Discarded=0.02 cfs 536 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 536 cf

Pond 5P: Basin 1 Peak Elev=924.52' Storage=57 cf Inflow=0.04 cfs 1,275 cf
Discarded=0.04 cfs 1,237 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 1,237 cf

Pond 17P: Subsurface Infiltration Bed #2 Peak Elev=912.63' Storage=184 cf Inflow=0.21 cfs 457 cf
Discarded=0.01 cfs 456 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 456 cf

Total Runoff Area = 246,600 sf Runoff Volume = 2,284 cf Average Runoff Depth = 0.11"
97.04% Pervious = 239,307 sf 2.96% Impervious = 7,293 sf

MLV 505LD86_PostwBMP DA1- REV 3

Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 1S: DA-1 Basin #1

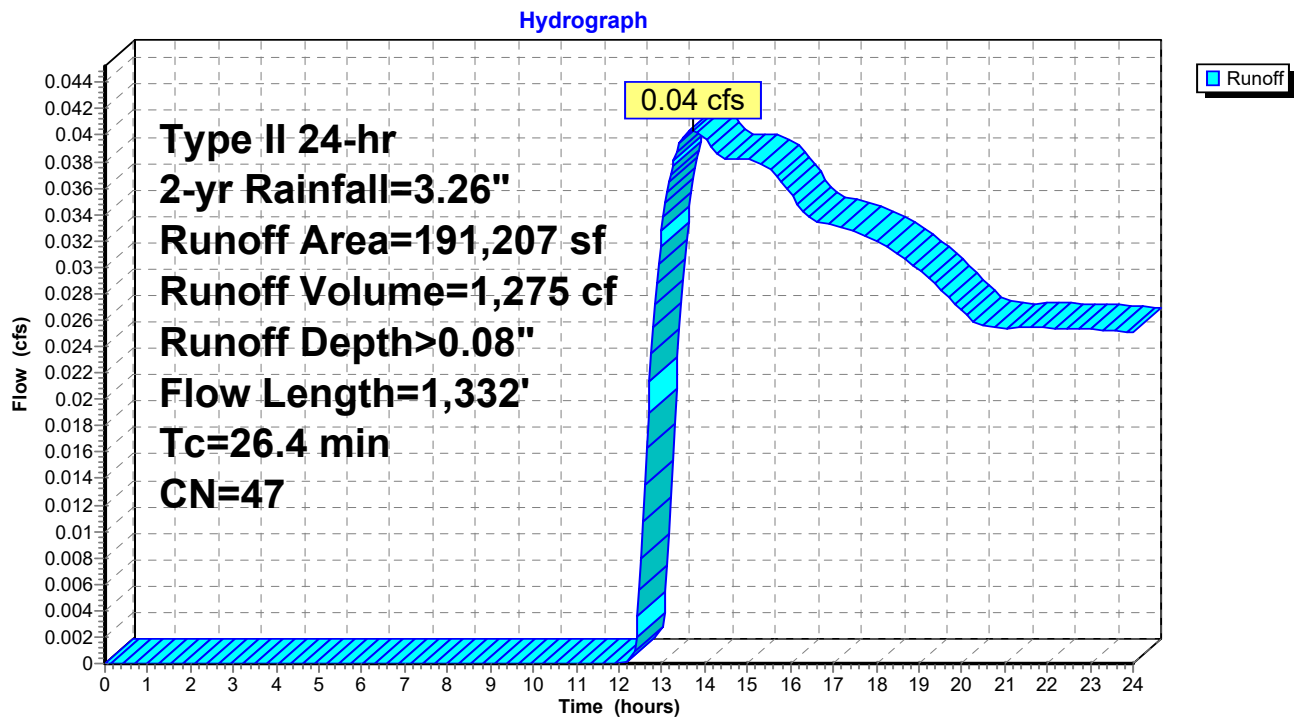
Runoff = 0.04 cfs @ 13.71 hrs, Volume= 1,275 cf, Depth> 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.9	463	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.4	554	0.0900	2.10		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
26.4	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



Summary for Subcatchment 2S: DA-1 Undetained

[73] Warning: Peak may fall outside time span

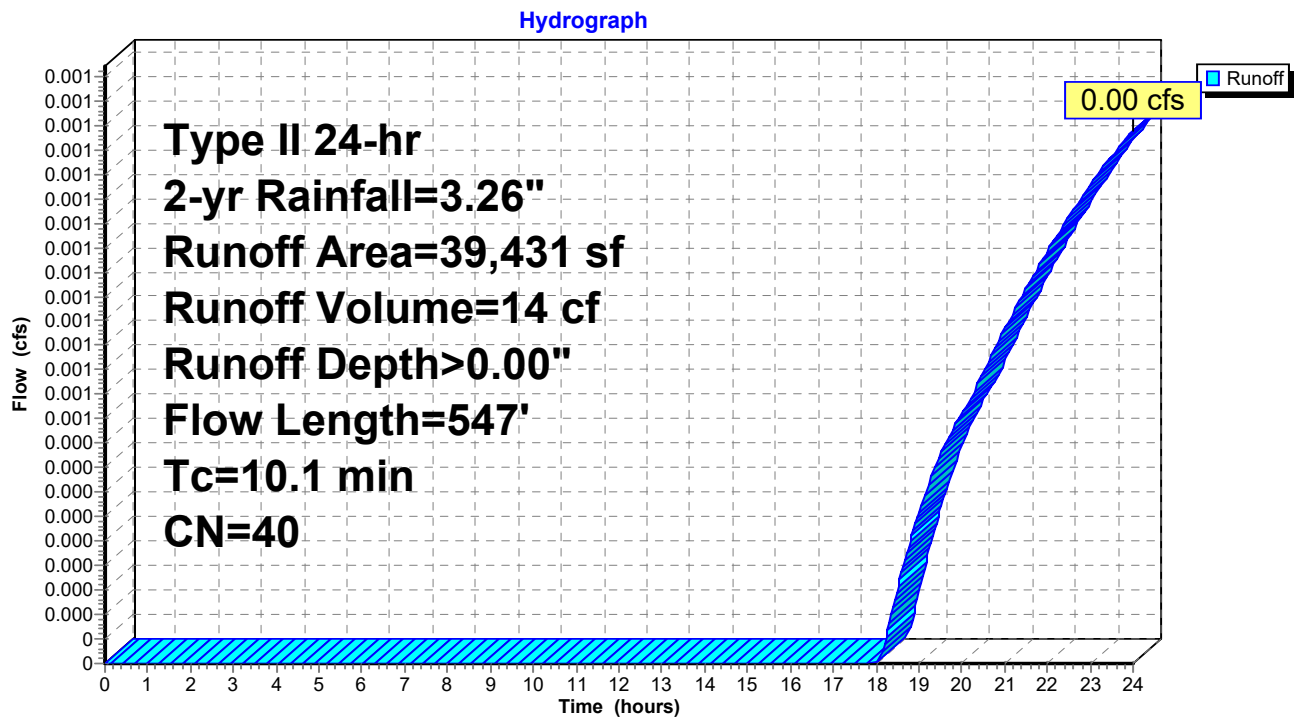
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 14 cf, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
1,020	77	Woods, Good, HSG D
20,698	30	Meadow, non-grazed, HSG A
6,598	78	Meadow, non-grazed, HSG D
* 590	98	Impervious
39,431	40	Weighted Average
38,841		98.50% Pervious Area
590		1.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1000	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
1.0	147	0.1200	2.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	300	0.0200	2.89	4.33	Channel Flow, Channel Area= 1.5 sf Perim= 4.5' r= 0.33' n= 0.035
10.1	547	Total			

Subcatchment 2S: DA-1 Undetained



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 5s: DA-1 Inf Bed #1

Runoff = 0.23 cfs @ 12.00 hrs, Volume= 538 cf, Depth> 0.63"

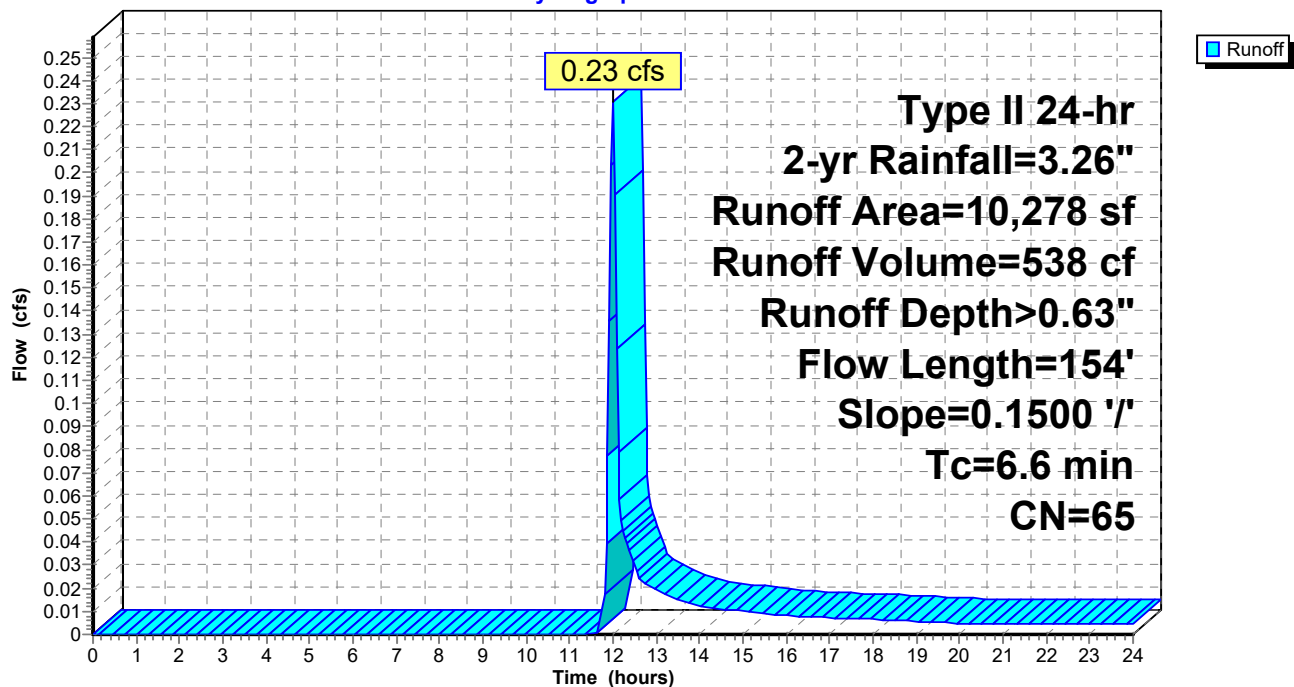
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
3,580	30	Meadow, non-grazed, HSG A
4,533	78	Meadow, non-grazed, HSG D
* 2,165	98	Impervious
10,278	65	Weighted Average
8,113		78.94% Pervious Area
2,165		21.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 5s: DA-1 Inf Bed #1

Hydrograph



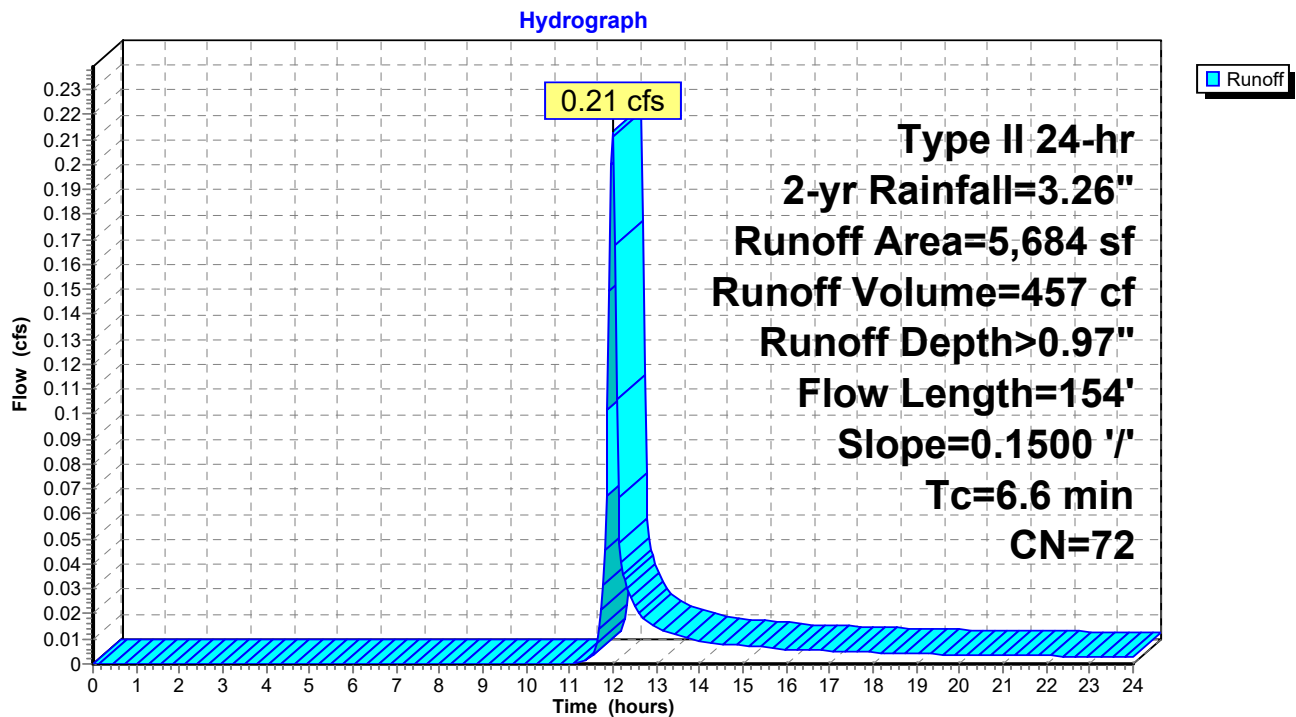
Summary for Subcatchment 16S: DA-1 Inf Bed #2

Runoff = 0.21 cfs @ 11.99 hrs, Volume= 457 cf, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
29	77	Woods, Good, HSG D
925	30	Meadow, non-grazed, HSG A
4,355	78	Meadow, non-grazed, HSG D
* 375	98	Impervious
5,684	72	Weighted Average
5,309		93.40% Pervious Area
375		6.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 16S: DA-1 Inf Bed #2

Summary for Reach 10: Culvert 7

[52] Hint: Inlet/Outlet conditions not evaluated

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 0.51'

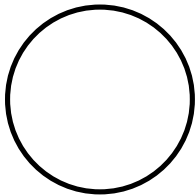
[79] Warning: Submerged Pond 17P Primary device # 3 OUTLET by 3.01'

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.00" for 2-yr event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 14 cf
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 14 cf, Atten= 1%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Max. Velocity= 0.90 fps, Min. Travel Time= 2.6 min
Avg. Velocity= 0.90 fps, Avg. Travel Time= 2.6 min

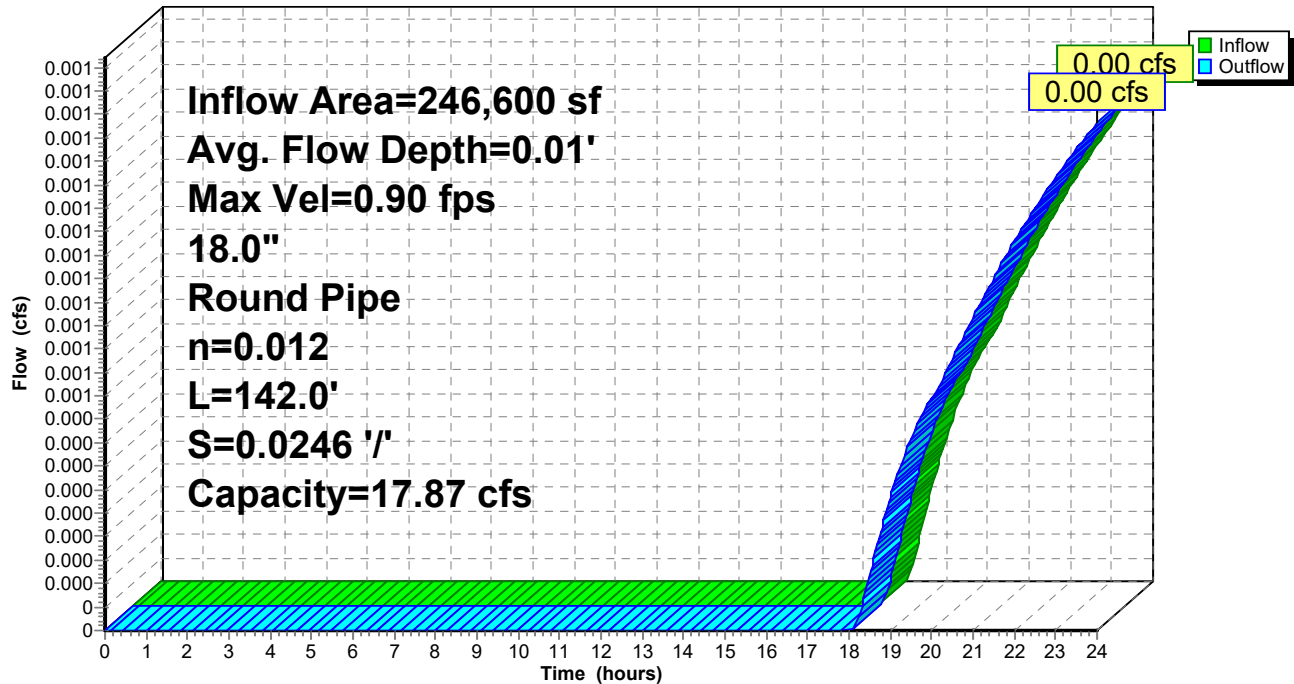
Peak Storage= 0 cf @ 24.00 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 17.87 cfs

18.0" Round Pipe
n= 0.012
Length= 142.0' Slope= 0.0246 '/'
Inlet Invert= 911.50', Outlet Invert= 908.00'



Reach 10: Culvert 7

Hydrograph



Summary for Reach 18R: PennDOT Channel

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.00" for 2-yr event
 Inflow = 0.00 cfs @ 24.00 hrs, Volume= 14 cf
 Outflow = 0.00 cfs @ 24.00 hrs, Volume= 13 cf, Atten= 1%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Max. Velocity= 0.32 fps, Min. Travel Time= 2.1 min

Avg. Velocity = 0.32 fps, Avg. Travel Time= 2.1 min

Peak Storage= 0 cf @ 24.00 hrs

Average Depth at Peak Storage= 0.00'

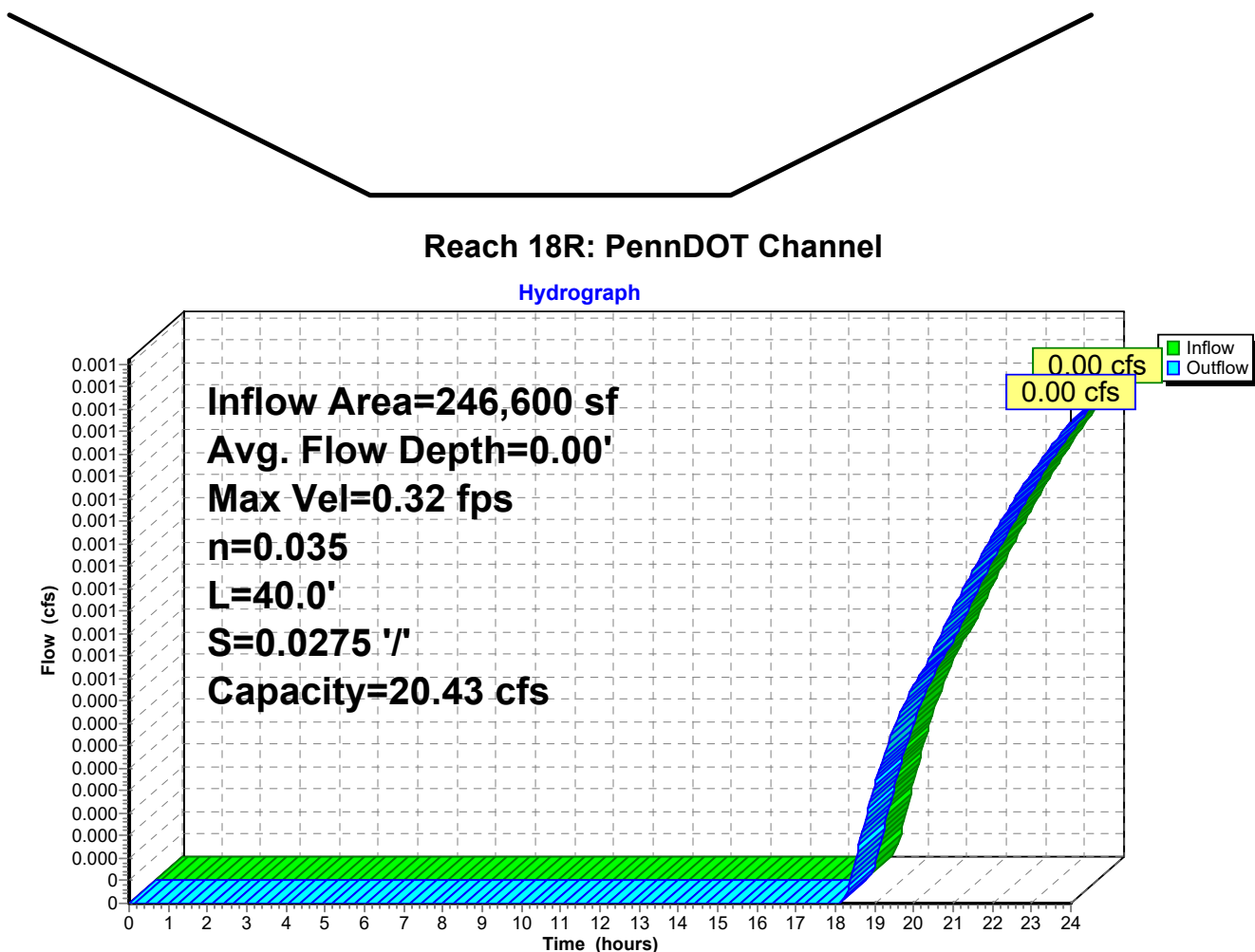
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 20.43 cfs

2.00' x 1.00' deep channel, $n = 0.035$

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

Length= 40.0' Slope= 0.0275 '/

Inlet Invert= 908.00'. Outlet Invert= 906.90'



Summary for Pond 3p: Subsurface Infiltration Bed #1

Inflow Area = 10,278 sf, 21.06% Impervious, Inflow Depth > 0.63" for 2-yr event
 Inflow = 0.23 cfs @ 12.00 hrs, Volume= 538 cf
 Outflow = 0.02 cfs @ 13.05 hrs, Volume= 536 cf, Atten= 92%, Lag= 63.4 min
 Discarded = 0.02 cfs @ 13.05 hrs, Volume= 536 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 912.45' @ 13.05 hrs Surf.Area= 800 sf Storage= 175 cf

Plug-Flow detention time= 83.6 min calculated for 536 cf (100% of inflow)
 Center-of-Mass det. time= 81.4 min (971.8 - 890.3)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	795 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,200 cf Overall - 212 cf Embedded = 1,988 cf x 40.0% Voids
#2	912.00'	212 cf	18.0" Round Pipe Storage x 3 Inside #1 L= 40.0'
		1,007 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	800	0	0
913.00	800	800	800
914.00	800	800	1,600
914.75	800	600	2,200

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	913.50'	3.0" Round Culvert L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.1000 ' / Cc= 0.900 n= 0.024, Flow Area= 0.05 sf
#3	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'

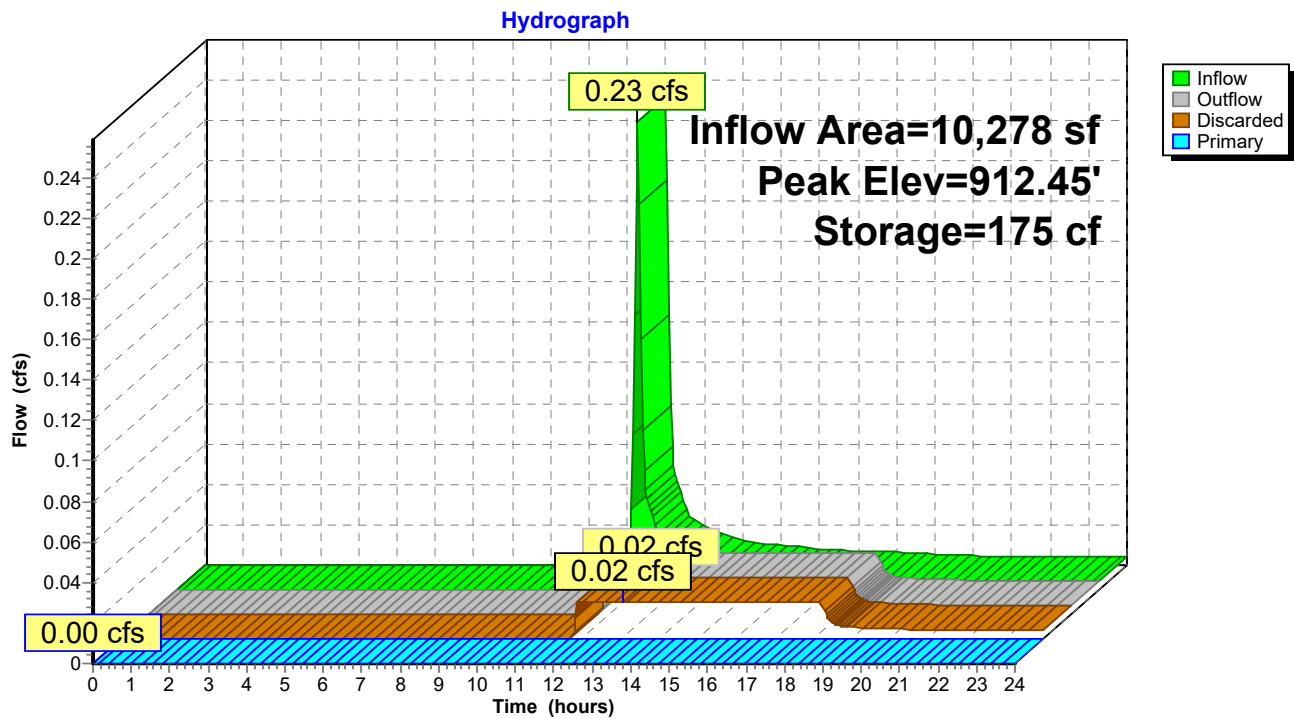
Discarded OutFlow Max=0.02 cfs @ 13.05 hrs HW=912.45' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=912.00' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **2=Culvert** (Controls 0.00 cfs)

Pond 3p: Subsurface Infiltration Bed #1

Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 0.08" for 2-yr event
 Inflow = 0.04 cfs @ 13.71 hrs, Volume= 1,275 cf
 Outflow = 0.04 cfs @ 14.33 hrs, Volume= 1,237 cf, Atten= 5%, Lag= 36.8 min
 Discarded = 0.04 cfs @ 14.33 hrs, Volume= 1,237 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
 Peak Elev= 924.52' @ 14.33 hrs Surf.Area= 2,857 sf Storage= 57 cf

Plug-Flow detention time= 24.6 min calculated for 1,237 cf (97% of inflow)
 Center-of-Mass det. time= 13.6 min (1,083.0 - 1,069.4)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,904 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
925.33	3,629	1,143	2,677
926.00	4,260	2,643	5,320
927.00	5,278	4,769	10,089
928.00	6,352	5,815	15,904

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Device 4	926.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	924.50'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#4	Primary	924.50'	18.0" Round Culvert L= 71.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 911.00' S= 0.1901 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#5	Device 4	925.33'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.07 cfs @ 14.33 hrs HW=924.52' (Free Discharge)

↑**3=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=924.50' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

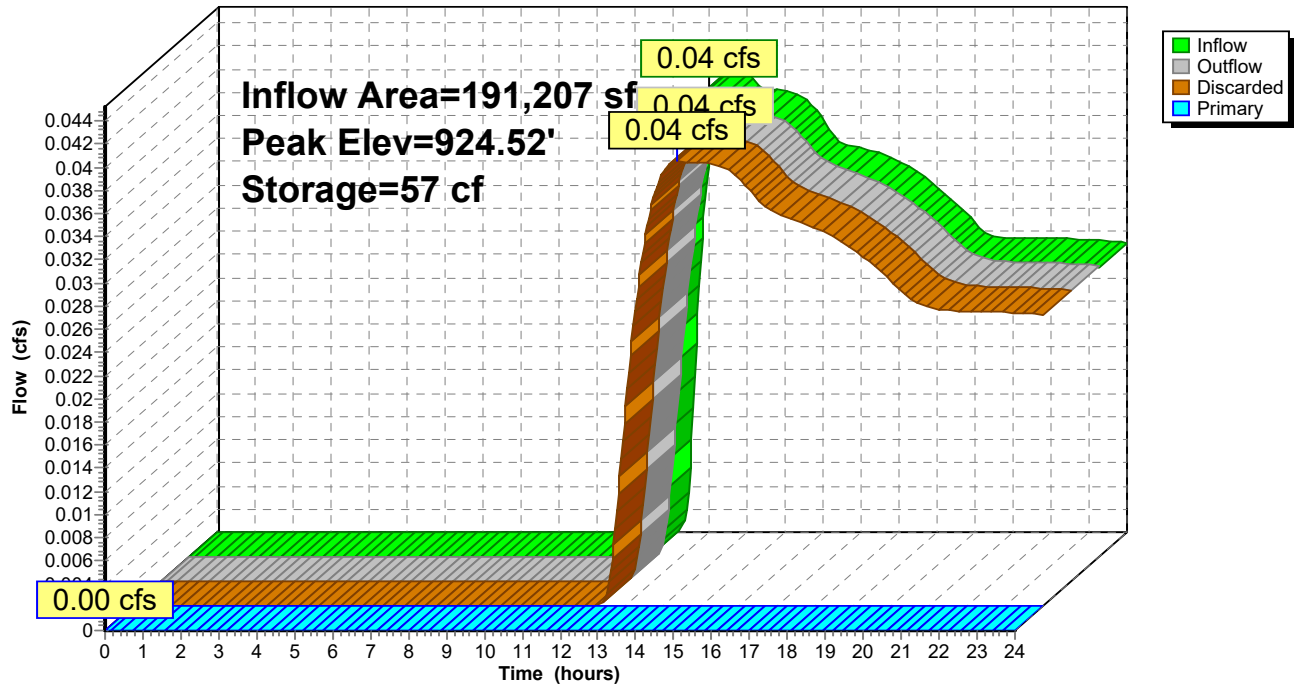
↑**4=Culvert** (Controls 0.00 cfs)

↑**2=Orifice/Grate** (Controls 0.00 cfs)

↑**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Basin 1

Hydrograph



Summary for Pond 17P: Subsurface Infiltration Bed #2

Inflow Area = 5,684 sf, 6.60% Impervious, Inflow Depth > 0.97" for 2-yr event
 Inflow = 0.21 cfs @ 11.99 hrs, Volume= 457 cf
 Outflow = 0.01 cfs @ 13.17 hrs, Volume= 456 cf, Atten= 94%, Lag= 71.0 min
 Discarded = 0.01 cfs @ 13.17 hrs, Volume= 456 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

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

Peak Elev= 912.63' @ 13.17 hrs Surf.Area= 575 sf Storage= 184 cf

Plug-Flow detention time= 128.6 min calculated for 456 cf (100% of inflow)

Center-of-Mass det. time= 127.4 min (991.1 - 863.7)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	307 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 863 cf Overall - 94 cf Embedded = 768 cf x 40.0% Voids
#2	912.00'	79 cf	12.0" Round Pipe Storage x 4 Inside #1 L= 25.0'
#3	912.00'	16 cf	12.0" Round Pipe Storage x 2 Inside #1 L= 10.0'
			402 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	575	0	0
913.00	575	575	575
913.50	575	288	863

Device	Routing	Invert	Outlet Devices
#1	Primary	913.25'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'
#3	Primary	912.80'	3.0" Round Culvert L= 28.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 912.80' / 908.50' S= 0.1536 ' S= 0.1536 ' Cc= 0.900 n= 0.024, Flow Area= 0.05 sf

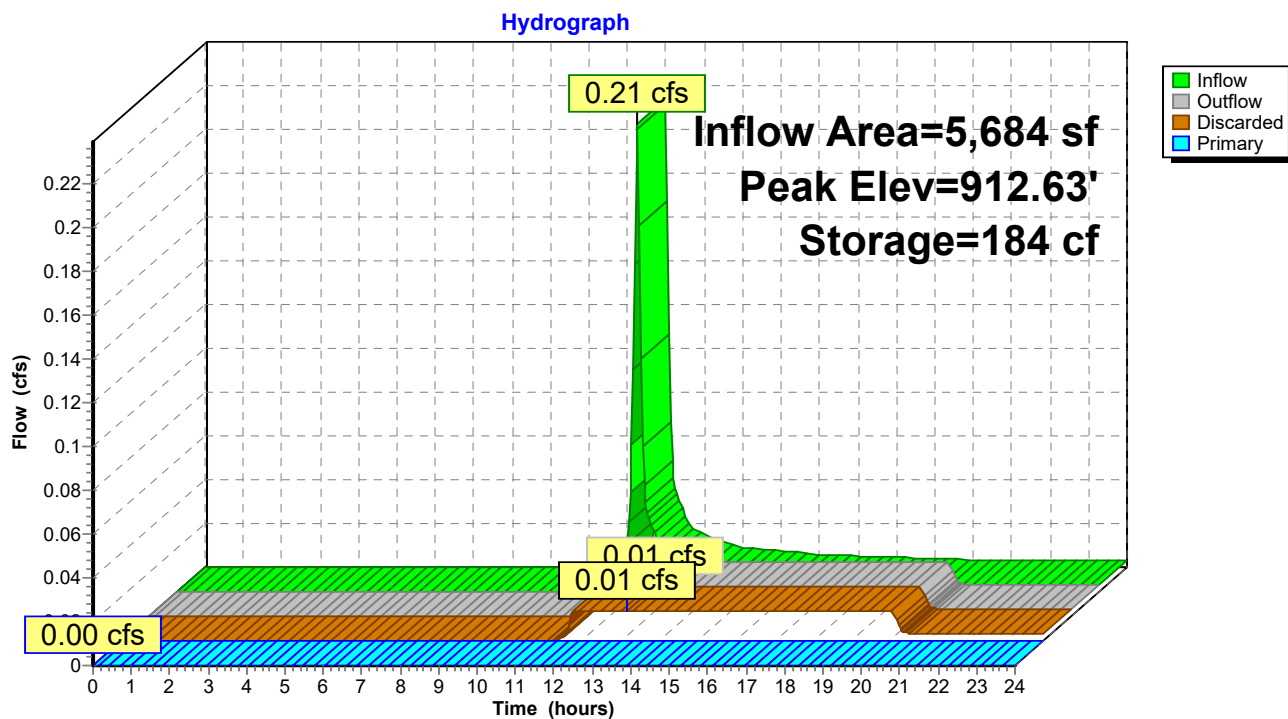
Discarded OutFlow Max=0.01 cfs @ 13.17 hrs HW=912.63' (Free Discharge)

↑ **2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=912.00' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **3=Culvert** (Controls 0.00 cfs)

Pond 17P: Subsurface Infiltration Bed #2

MLV 505LD86_PostwBMP DA1- REV 3*Type II 24-hr 10-yr Rainfall=4.74"*

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-1 Basin #1

Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>0.44"
Flow Length=1,332' Tc=26.4 min CN=47 Runoff=0.86 cfs 7,042 cf

Subcatchment 2S: DA-1 Undetained

Runoff Area=39,431 sf 1.50% Impervious Runoff Depth>0.18"
Flow Length=547' Tc=10.1 min CN=40 Runoff=0.03 cfs 590 cf

Subcatchment 5s: DA-1 Inf Bed #1

Runoff Area=10,278 sf 21.06% Impervious Runoff Depth>1.48"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=65 Runoff=0.60 cfs 1,268 cf

Subcatchment 16S: DA-1 Inf Bed #2

Runoff Area=5,684 sf 6.60% Impervious Runoff Depth>2.00"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=72 Runoff=0.45 cfs 946 cf

Reach 10: Culvert 7

Avg. Flow Depth=0.09' Max Vel=2.86 fps Inflow=0.12 cfs 1,468 cf
18.0" Round Pipe n=0.012 L=142.0' S=0.0246 '/' Capacity=17.87 cfs Outflow=0.12 cfs 1,466 cf

Reach 18R: PennDOT Channel

Avg. Flow Depth=0.06' Max Vel=0.99 fps Inflow=0.12 cfs 1,466 cf
n=0.035 L=40.0' S=0.0275 '/' Capacity=20.43 cfs Outflow=0.12 cfs 1,465 cf

Pond 3p: Subsurface Infiltration Bed #1

Peak Elev=913.57' Storage=629 cf Inflow=0.60 cfs 1,268 cf
Discarded=0.02 cfs 834 cf Primary=0.01 cfs 52 cf Outflow=0.03 cfs 886 cf

Pond 5P: Basin 1

Peak Elev=925.40' Storage=2,922 cf Inflow=0.86 cfs 7,042 cf
Discarded=0.09 cfs 3,884 cf Primary=0.04 cfs 556 cf Outflow=0.13 cfs 4,440 cf

Pond 17P: Subsurface Infiltration Bed #2

Peak Elev=913.21' Storage=334 cf Inflow=0.45 cfs 946 cf
Discarded=0.01 cfs 625 cf Primary=0.10 cfs 271 cf Outflow=0.11 cfs 895 cf

Total Runoff Area = 246,600 sf Runoff Volume = 9,845 cf Average Runoff Depth = 0.48"
97.04% Pervious = 239,307 sf 2.96% Impervious = 7,293 sf

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 1S: DA-1 Basin #1

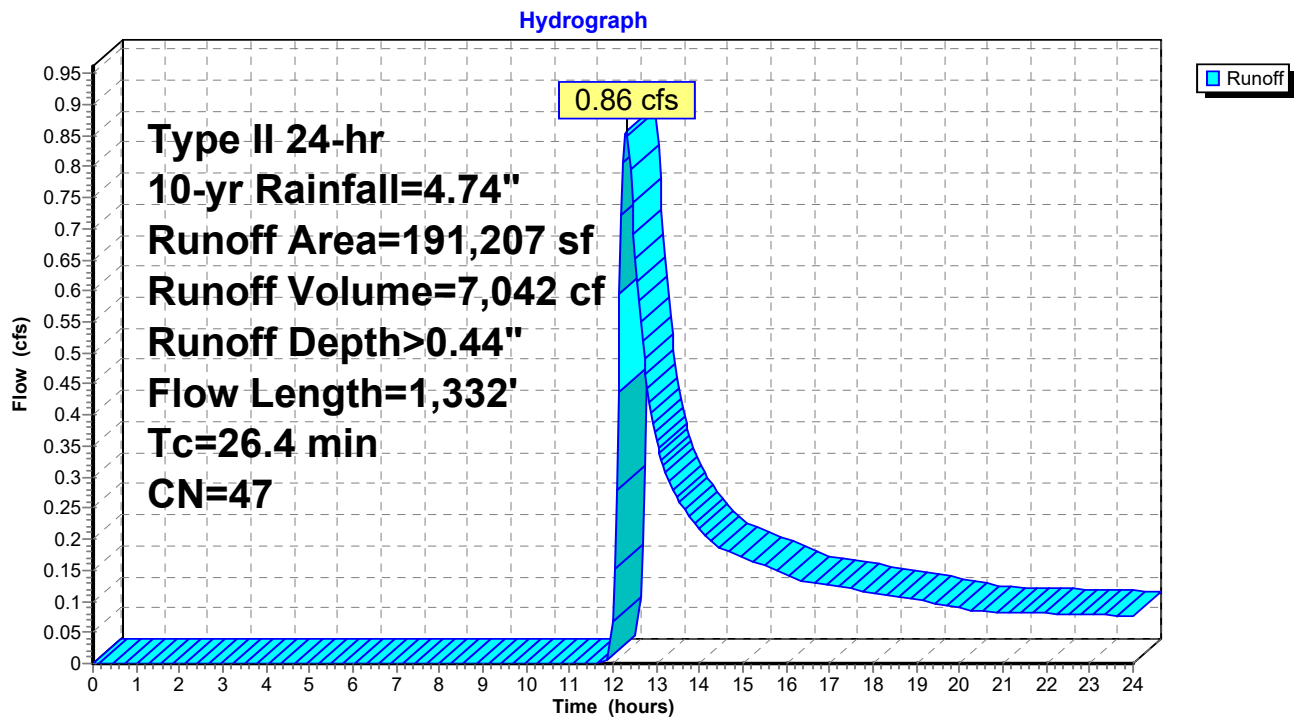
Runoff = 0.86 cfs @ 12.31 hrs, Volume= 7,042 cf, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.9	463	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.4	554	0.0900	2.10		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
26.4	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



Summary for Subcatchment 2S: DA-1 Undetained

Runoff = 0.03 cfs @ 12.45 hrs, Volume= 590 cf, Depth> 0.18"

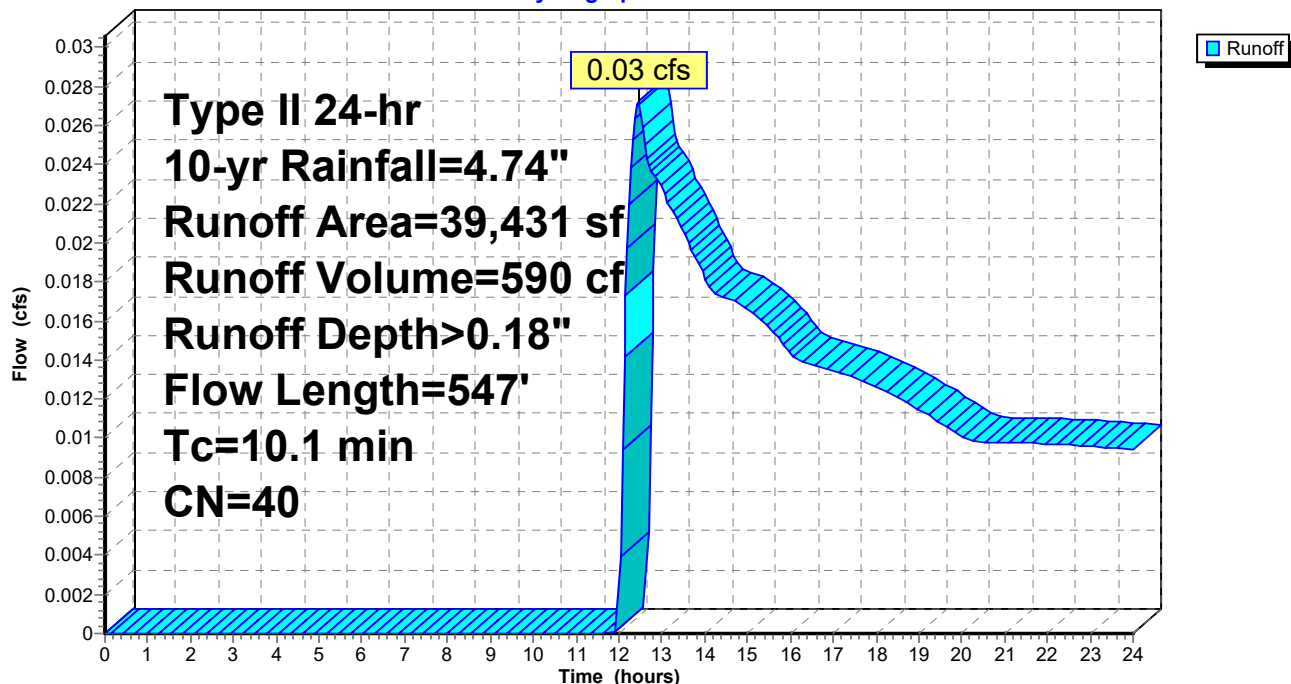
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
1,020	77	Woods, Good, HSG D
20,698	30	Meadow, non-grazed, HSG A
6,598	78	Meadow, non-grazed, HSG D
* 590	98	Impervious
39,431	40	Weighted Average
38,841		98.50% Pervious Area
590		1.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1000	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
1.0	147	0.1200	2.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	300	0.0200	2.89	4.33	Channel Flow, Channel Area= 1.5 sf Perim= 4.5' r= 0.33' n= 0.035
10.1	547	Total			

Subcatchment 2S: DA-1 Undetained

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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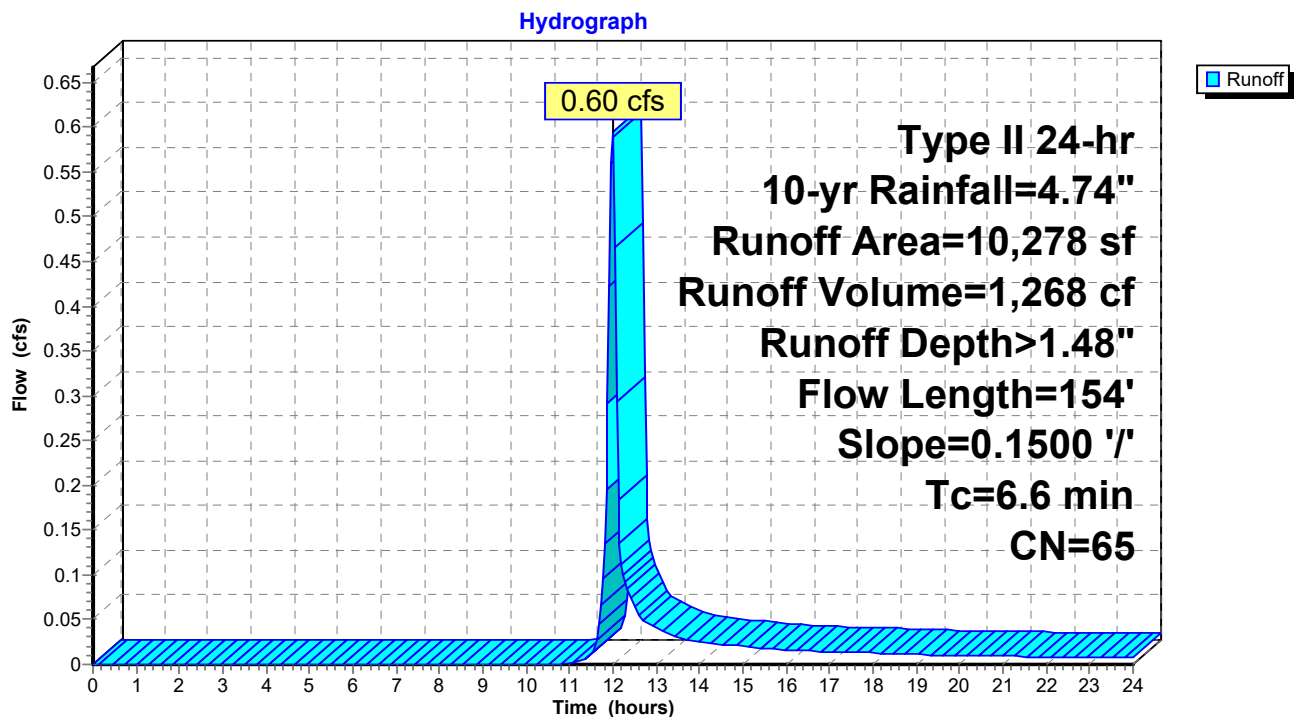
Summary for Subcatchment 5s: DA-1 Inf Bed #1

Runoff = 0.60 cfs @ 11.99 hrs, Volume= 1,268 cf, Depth> 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
3,580	30	Meadow, non-grazed, HSG A
4,533	78	Meadow, non-grazed, HSG D
* 2,165	98	Impervious
10,278	65	Weighted Average
8,113		78.94% Pervious Area
2,165		21.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 5s: DA-1 Inf Bed #1

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 16S: DA-1 Inf Bed #2

Runoff = 0.45 cfs @ 11.98 hrs, Volume= 946 cf, Depth> 2.00"

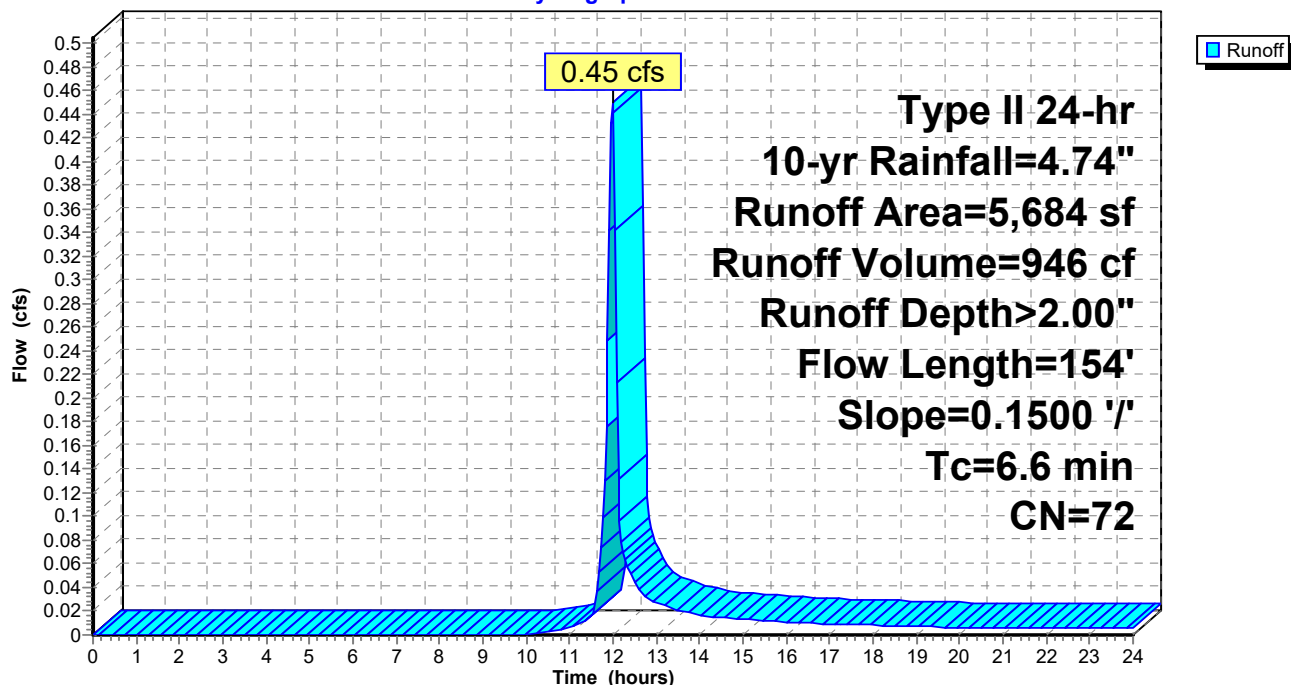
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
29	77	Woods, Good, HSG D
925	30	Meadow, non-grazed, HSG A
4,355	78	Meadow, non-grazed, HSG D
* 375	98	Impervious
5,684	72	Weighted Average
5,309		93.40% Pervious Area
375		6.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 16S: DA-1 Inf Bed #2

Hydrograph



Summary for Reach 10: Culvert 7

[52] Hint: Inlet/Outlet conditions not evaluated

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 0.59'

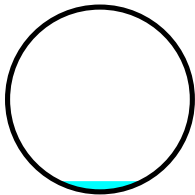
[79] Warning: Submerged Pond 17P Primary device # 3 OUTLET by 3.09'

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.07" for 10-yr event
Inflow = 0.12 cfs @ 12.18 hrs, Volume= 1,468 cf
Outflow = 0.12 cfs @ 12.21 hrs, Volume= 1,466 cf, Atten= 0%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Max. Velocity= 2.86 fps, Min. Travel Time= 0.8 min
Avg. Velocity= 1.89 fps, Avg. Travel Time= 1.3 min

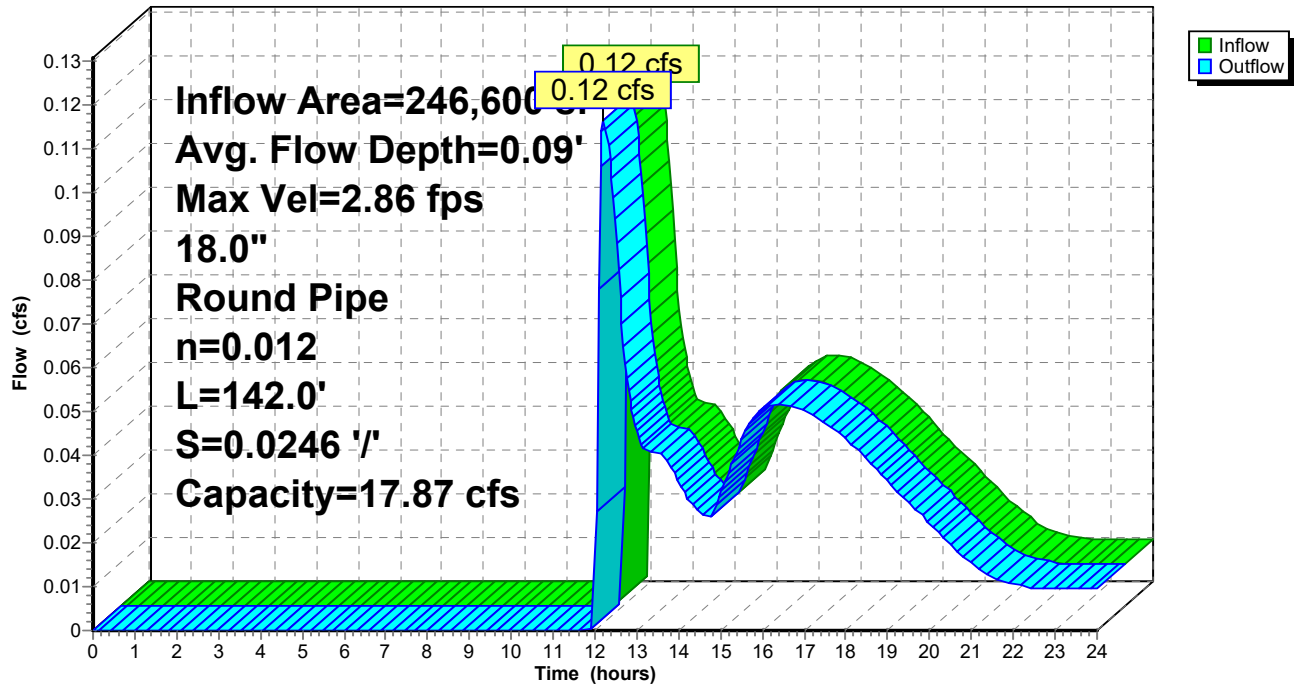
Peak Storage= 6 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 17.87 cfs

18.0" Round Pipe
n= 0.012
Length= 142.0' Slope= 0.0246 '/'
Inlet Invert= 911.50', Outlet Invert= 908.00'



Reach 10: Culvert 7

Hydrograph



Summary for Reach 18R: PennDOT Channel

[61] Hint: Exceeded Reach 10 outlet invert by 0.06' @ 12.20 hrs

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.07" for 10-yr event
 Inflow = 0.12 cfs @ 12.21 hrs, Volume= 1,466 cf
 Outflow = 0.12 cfs @ 12.23 hrs, Volume= 1,465 cf, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Max. Velocity= 0.99 fps, Min. Travel Time= 0.7 min

Avg. Velocity = 0.59 fps, Avg. Travel Time= 1.1 min

Peak Storage= 5 cf @ 12.21 hrs

Average Depth at Peak Storage= 0.06'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 20.43 cfs

2.00' x 1.00' deep channel, n= 0.035

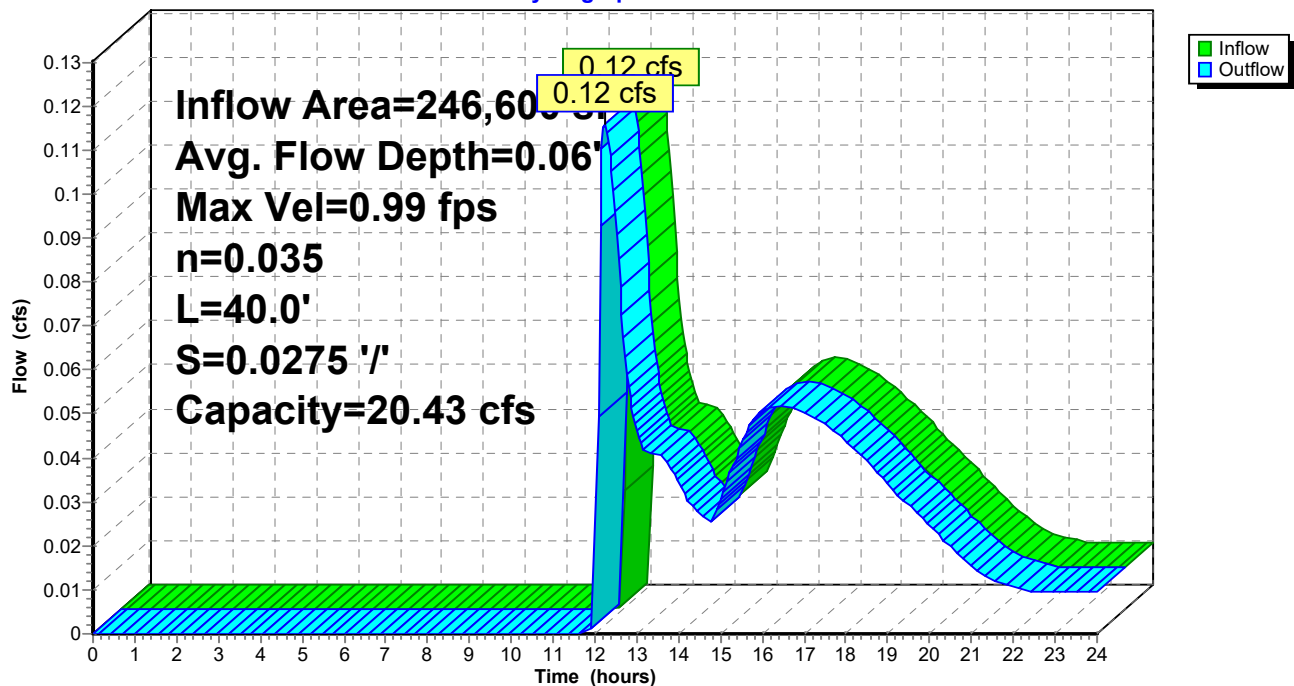
Side Slope Z-value= 2.0 '/' Top Width= 6.00'

Length= 40.0' Slope= 0.0275 '/'

Inlet Invert= 908.00', Outlet Invert= 906.90'

**Reach 18R: PennDOT Channel**

Hydrograph



Summary for Pond 3p: Subsurface Infiltration Bed #1

Inflow Area = 10,278 sf, 21.06% Impervious, Inflow Depth > 1.48" for 10-yr event
 Inflow = 0.60 cfs @ 11.99 hrs, Volume= 1,268 cf
 Outflow = 0.03 cfs @ 13.73 hrs, Volume= 886 cf, Atten= 95%, Lag= 104.8 min
 Discarded = 0.02 cfs @ 13.73 hrs, Volume= 834 cf
 Primary = 0.01 cfs @ 13.73 hrs, Volume= 52 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 913.57' @ 13.73 hrs Surf.Area= 800 sf Storage= 629 cf

Plug-Flow detention time= 306.3 min calculated for 886 cf (70% of inflow)
 Center-of-Mass det. time= 193.4 min (1,053.8 - 860.4)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	795 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,200 cf Overall - 212 cf Embedded = 1,988 cf x 40.0% Voids
#2	912.00'	212 cf	18.0" Round Pipe Storage x 3 Inside #1 L= 40.0'
		1,007 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	800	0	0
913.00	800	800	800
914.00	800	800	1,600
914.75	800	600	2,200

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	913.50'	3.0" Round Culvert L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.1000 ' / Cc= 0.900 n= 0.024, Flow Area= 0.05 sf
#3	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'

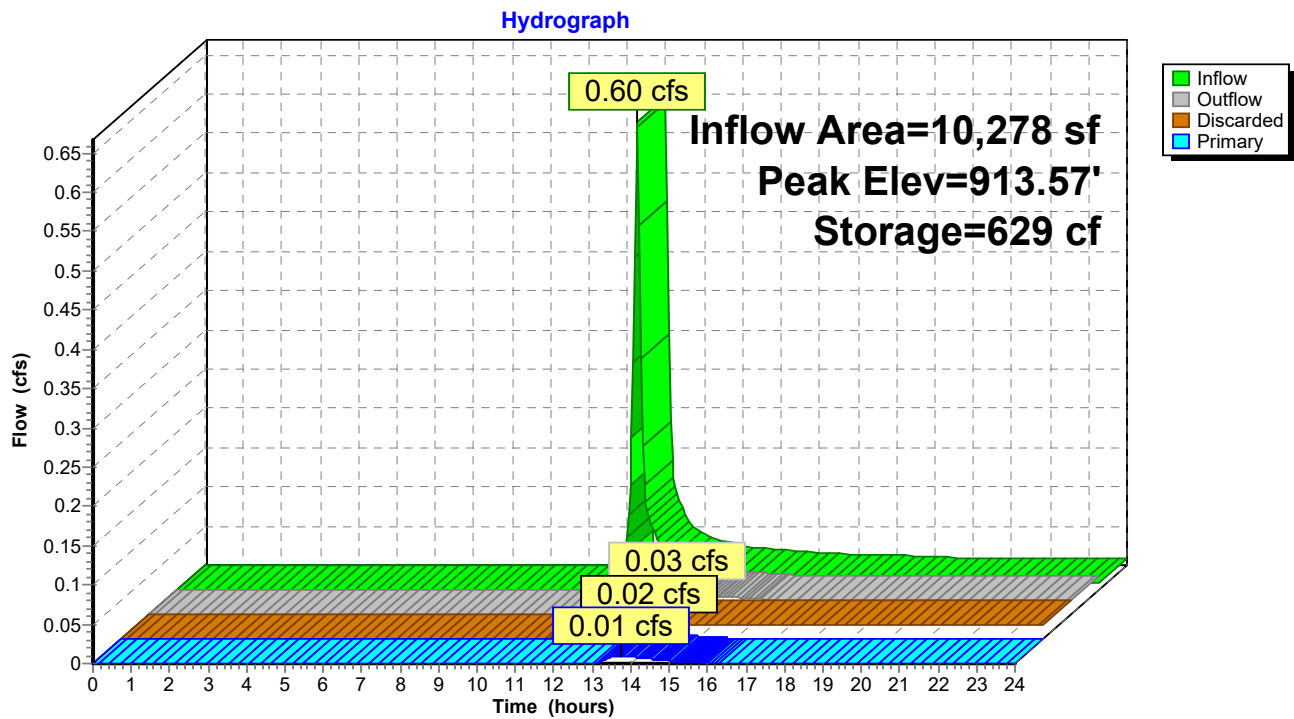
Discarded OutFlow Max=0.02 cfs @ 13.73 hrs HW=913.57' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.01 cfs @ 13.73 hrs HW=913.57' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **2=Culvert** (Inlet Controls 0.01 cfs @ 0.89 fps)

Pond 3p: Subsurface Infiltration Bed #1

Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 0.44" for 10-yr event
 Inflow = 0.86 cfs @ 12.31 hrs, Volume= 7,042 cf
 Outflow = 0.13 cfs @ 16.43 hrs, Volume= 4,440 cf, Atten= 85%, Lag= 247.4 min
 Discarded = 0.09 cfs @ 16.43 hrs, Volume= 3,884 cf
 Primary = 0.04 cfs @ 16.43 hrs, Volume= 556 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
 Peak Elev= 925.40' @ 16.43 hrs Surf.Area= 3,692 sf Storage= 2,922 cf

Plug-Flow detention time= 270.1 min calculated for 4,433 cf (63% of inflow)
 Center-of-Mass det. time= 131.1 min (1,084.1 - 953.0)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,904 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
925.33	3,629	1,143	2,677
926.00	4,260	2,643	5,320
927.00	5,278	4,769	10,089
928.00	6,352	5,815	15,904

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Device 4	926.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	924.50'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#4	Primary	924.50'	18.0" Round Culvert L= 71.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 911.00' S= 0.1901 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#5	Device 4	925.33'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.09 cfs @ 16.43 hrs HW=925.40' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.04 cfs @ 16.43 hrs HW=925.40' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

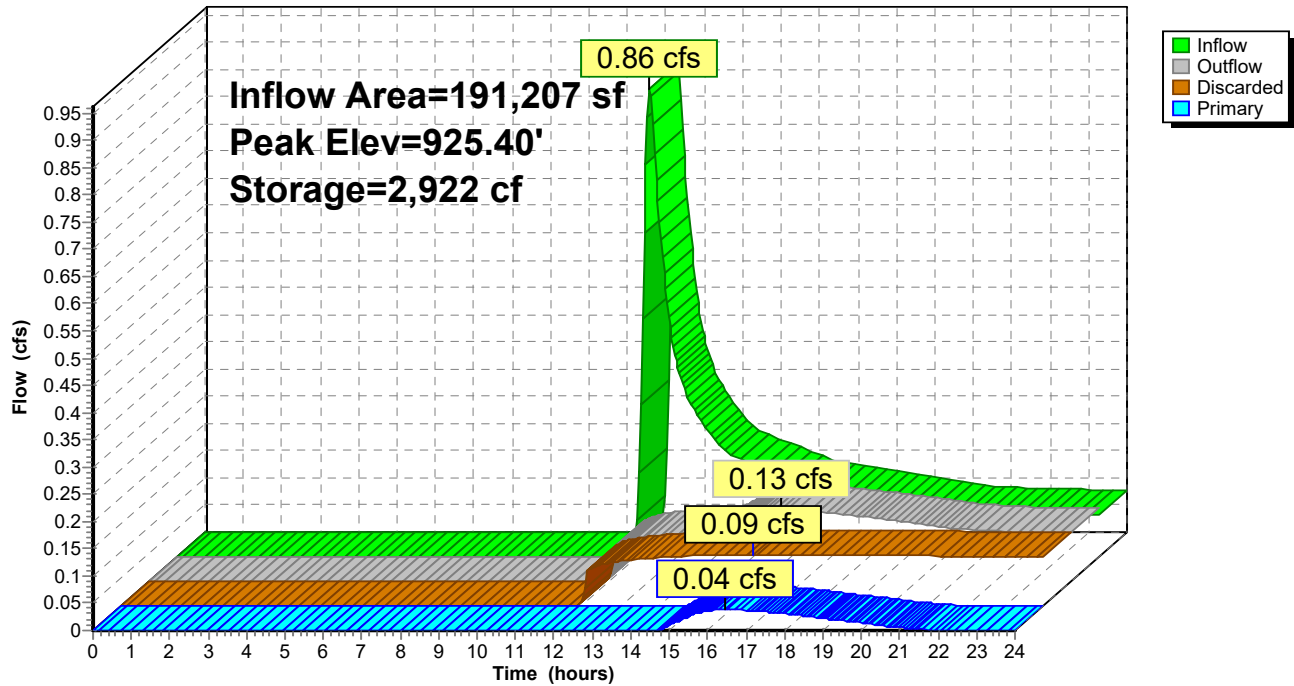
↑ **4=Culvert** (Passes 0.04 cfs of 4.44 cfs potential flow)

↑ **2=Orifice/Grate** (Controls 0.00 cfs)

↑ **5=Orifice/Grate** (Orifice Controls 0.04 cfs @ 0.83 fps)

Pond 5P: Basin 1

Hydrograph



Summary for Pond 17P: Subsurface Infiltration Bed #2

Inflow Area = 5,684 sf, 6.60% Impervious, Inflow Depth > 2.00" for 10-yr event
 Inflow = 0.45 cfs @ 11.98 hrs, Volume= 946 cf
 Outflow = 0.11 cfs @ 12.14 hrs, Volume= 895 cf, Atten= 75%, Lag= 9.6 min
 Discarded = 0.01 cfs @ 12.14 hrs, Volume= 625 cf
 Primary = 0.10 cfs @ 12.14 hrs, Volume= 271 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 913.21' @ 12.14 hrs Surf.Area= 575 sf Storage= 334 cf

Plug-Flow detention time= 150.4 min calculated for 894 cf (95% of inflow)
 Center-of-Mass det. time= 121.2 min (962.8 - 841.6)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	307 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 863 cf Overall - 94 cf Embedded = 768 cf x 40.0% Voids
#2	912.00'	79 cf	12.0" Round Pipe Storage x 4 Inside #1 L= 25.0'
#3	912.00'	16 cf	12.0" Round Pipe Storage x 2 Inside #1 L= 10.0'
			402 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	575	0	0
913.00	575	575	575
913.50	575	288	863

Device	Routing	Invert	Outlet Devices
#1	Primary	913.25'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'
#3	Primary	912.80'	3.0" Round Culvert L= 28.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 912.80' / 908.50' S= 0.1536 ' Cc= 0.900 n= 0.024, Flow Area= 0.05 sf

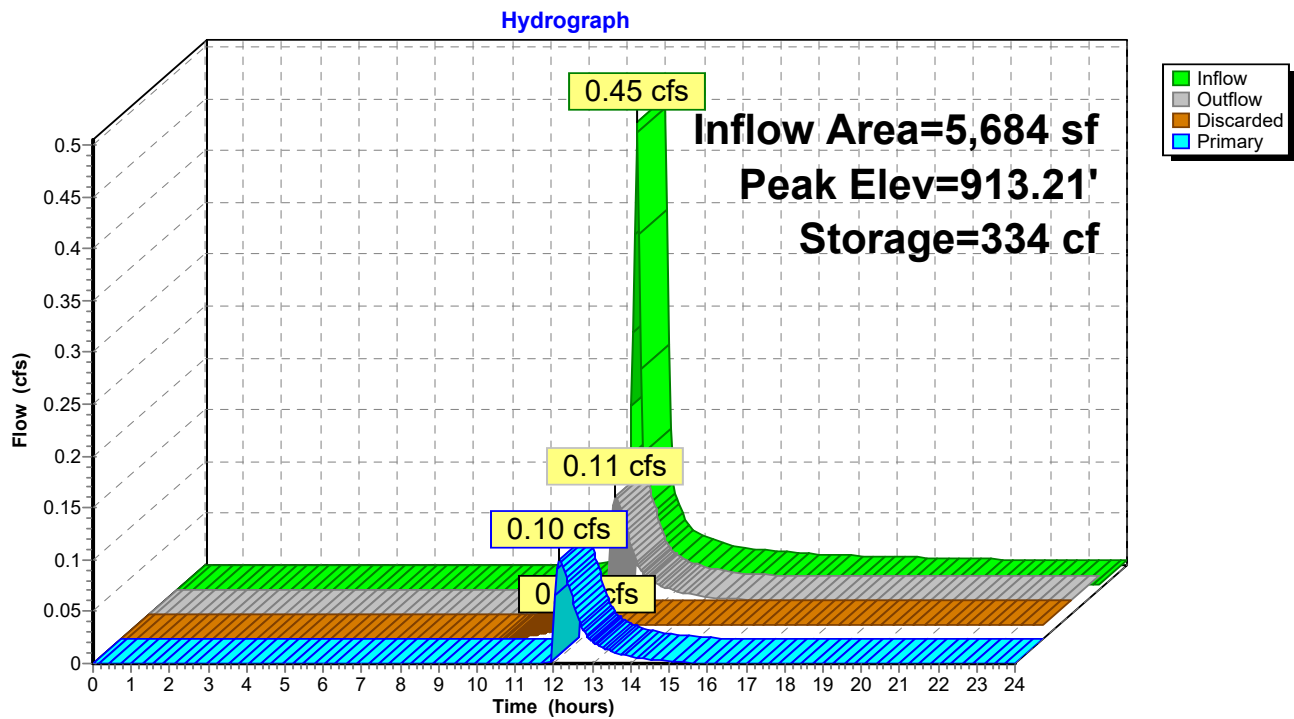
Discarded OutFlow Max=0.01 cfs @ 12.14 hrs HW=913.21' (Free Discharge)

↑ **2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.10 cfs @ 12.14 hrs HW=913.21' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **3=Culvert** (Inlet Controls 0.10 cfs @ 2.02 fps)

Pond 17P: Subsurface Infiltration Bed #2

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA-1 Basin #1 Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>0.86"
Flow Length=1,332' Tc=26.4 min CN=47 Runoff=2.40 cfs 13,675 cf

Subcatchment2S: DA-1 Undetained Runoff Area=39,431 sf 1.50% Impervious Runoff Depth>0.45"
Flow Length=547' Tc=10.1 min CN=40 Runoff=0.26 cfs 1,487 cf

Subcatchment5s: DA-1 Inf Bed #1 Runoff Area=10,278 sf 21.06% Impervious Runoff Depth>2.24"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=65 Runoff=0.91 cfs 1,918 cf

Subcatchment16S: DA-1 Inf Bed #2 Runoff Area=5,684 sf 6.60% Impervious Runoff Depth>2.87"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=72 Runoff=0.65 cfs 1,358 cf

Reach 10: Culvert 7 Avg. Flow Depth=0.21' Max Vel=5.03 fps Inflow=0.76 cfs 9,256 cf
18.0" Round Pipe n=0.012 L=142.0' S=0.0246 '/' Capacity=17.87 cfs Outflow=0.72 cfs 9,251 cf

Reach 18R: PennDOT Channel Avg. Flow Depth=0.16' Max Vel=1.89 fps Inflow=0.72 cfs 9,251 cf
n=0.035 L=40.0' S=0.0275 '/' Capacity=20.43 cfs Outflow=0.71 cfs 9,247 cf

Pond 3p: Subsurface Infiltration Bed #1 Peak Elev=913.92' Storage=741 cf Inflow=0.91 cfs 1,918 cf
Discarded=0.02 cfs 864 cf Primary=0.13 cfs 561 cf Outflow=0.15 cfs 1,425 cf

Pond 5P: Basin 1 Peak Elev=925.72' Storage=4,170 cf Inflow=2.40 cfs 13,675 cf
Discarded=0.10 cfs 4,149 cf Primary=0.49 cfs 6,618 cf Outflow=0.60 cfs 10,767 cf

Pond 17P: Subsurface Infiltration Bed #2 Peak Elev=913.36' Storage=370 cf Inflow=0.65 cfs 1,358 cf
Discarded=0.01 cfs 654 cf Primary=0.51 cfs 589 cf Outflow=0.53 cfs 1,243 cf

Total Runoff Area = 246,600 sf Runoff Volume = 18,437 cf Average Runoff Depth = 0.90"
97.04% Pervious = 239,307 sf 2.96% Impervious = 7,293 sf

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 1S: DA-1 Basin #1

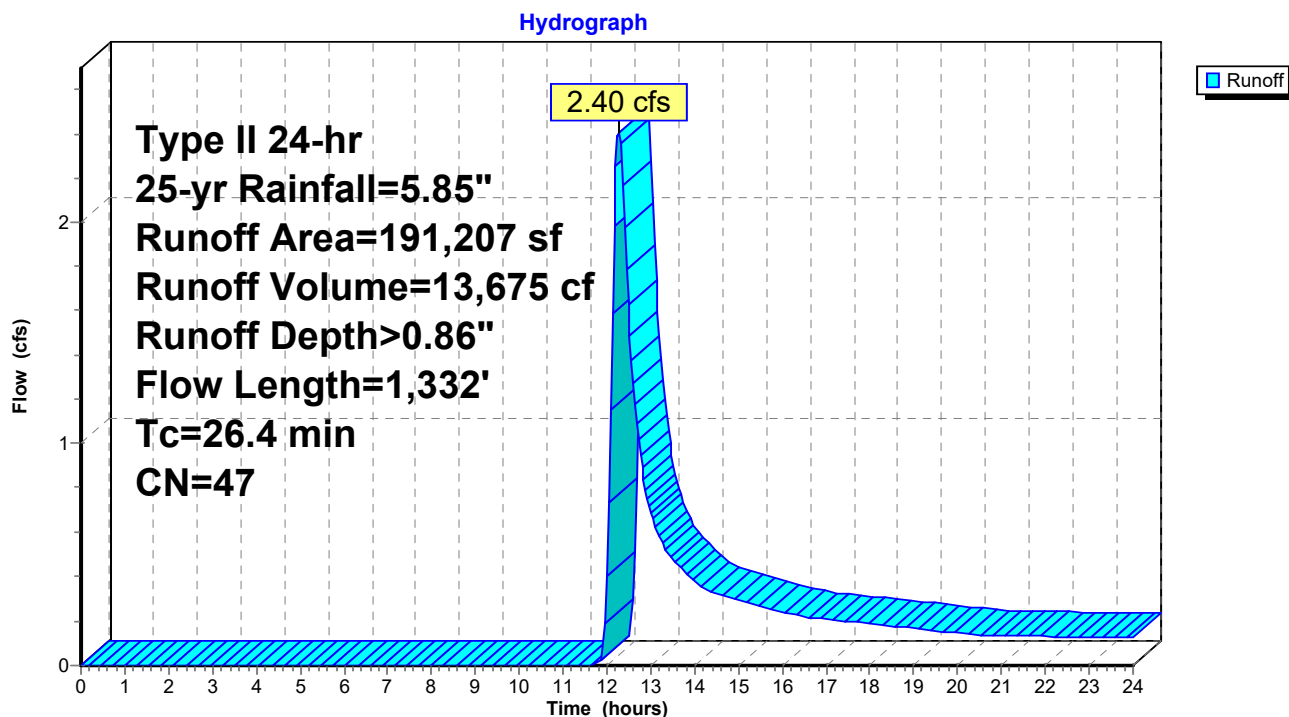
Runoff = 2.40 cfs @ 12.27 hrs, Volume= 13,675 cf, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.9	463	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.4	554	0.0900	2.10		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
26.4	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



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Type II 24-hr 25-yr Rainfall=5.85"

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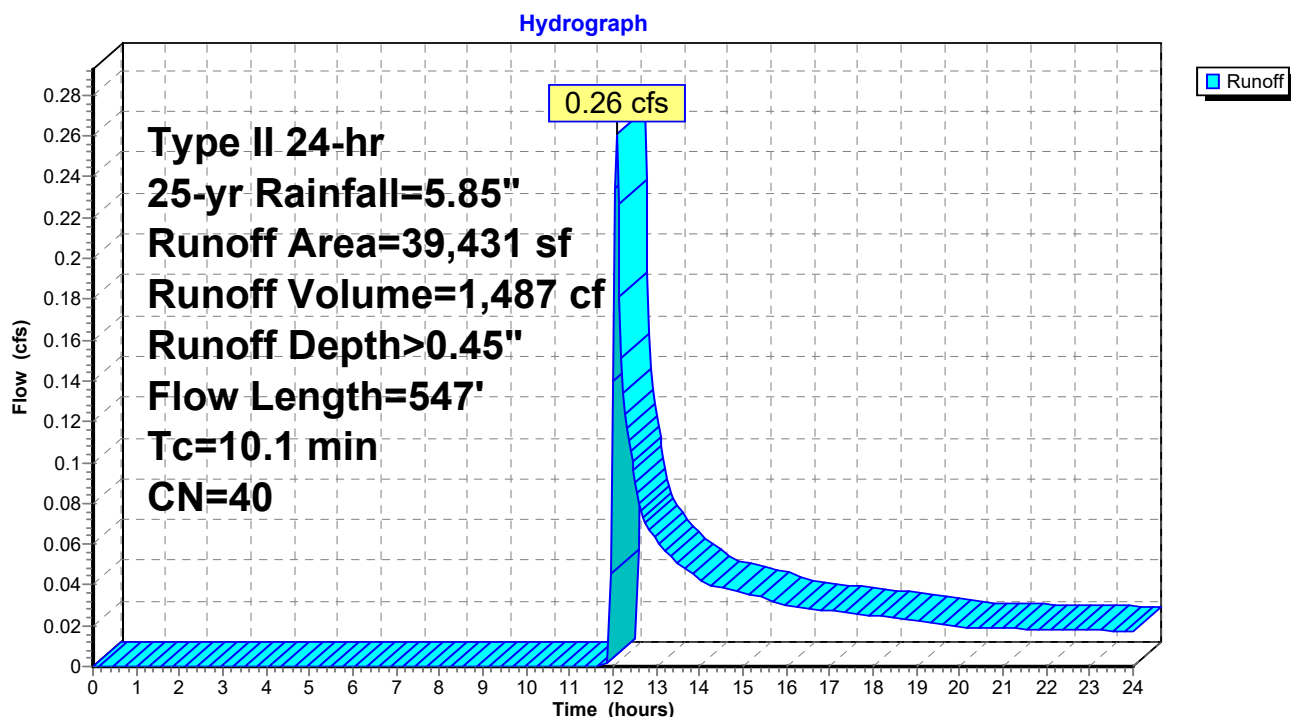
Summary for Subcatchment 2S: DA-1 Undetained

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 1,487 cf, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
1,020	77	Woods, Good, HSG D
20,698	30	Meadow, non-grazed, HSG A
6,598	78	Meadow, non-grazed, HSG D
* 590	98	Impervious
39,431	40	Weighted Average
38,841		98.50% Pervious Area
590		1.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1000	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
1.0	147	0.1200	2.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	300	0.0200	2.89	4.33	Channel Flow, Channel Area= 1.5 sf Perim= 4.5' r= 0.33' n= 0.035
10.1	547	Total			

Subcatchment 2S: DA-1 Undetained

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Type II 24-hr 25-yr Rainfall=5.85"

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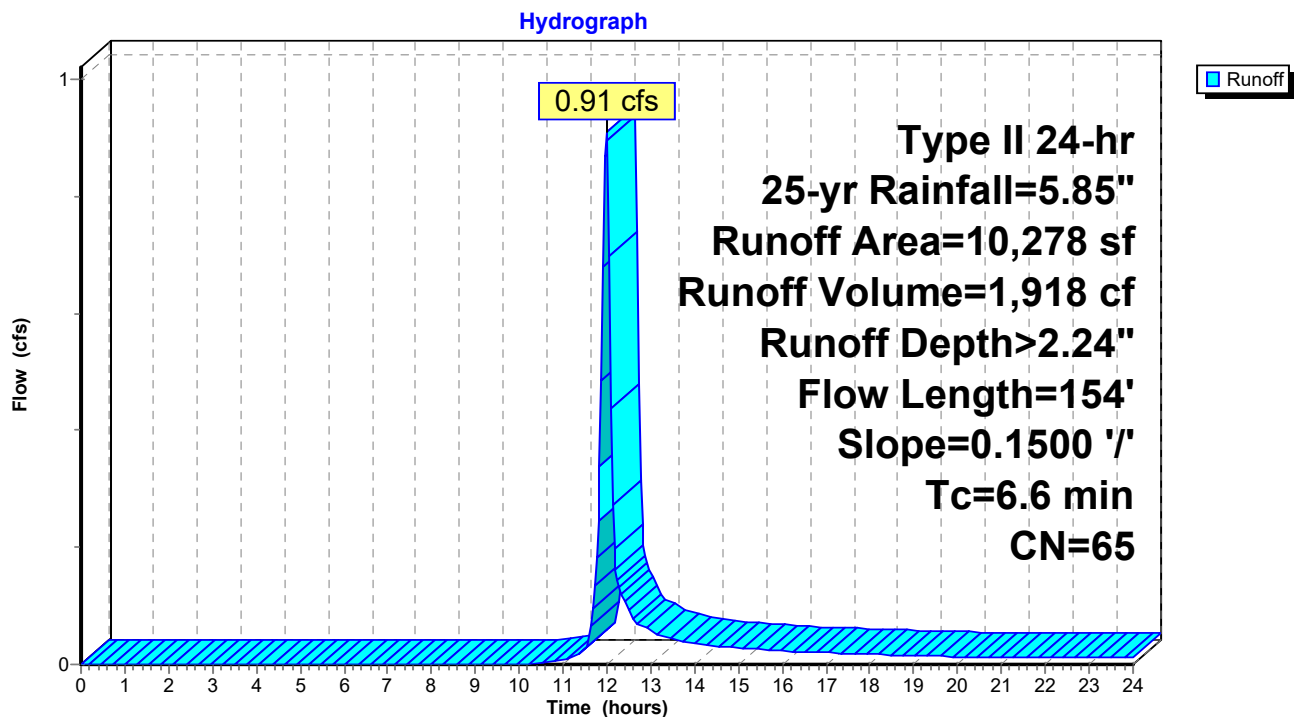
Summary for Subcatchment 5s: DA-1 Inf Bed #1

Runoff = 0.91 cfs @ 11.98 hrs, Volume= 1,918 cf, Depth> 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
3,580	30	Meadow, non-grazed, HSG A
4,533	78	Meadow, non-grazed, HSG D
* 2,165	98	Impervious
10,278	65	Weighted Average
8,113		78.94% Pervious Area
2,165		21.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 5s: DA-1 Inf Bed #1

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Type II 24-hr 25-yr Rainfall=5.85"

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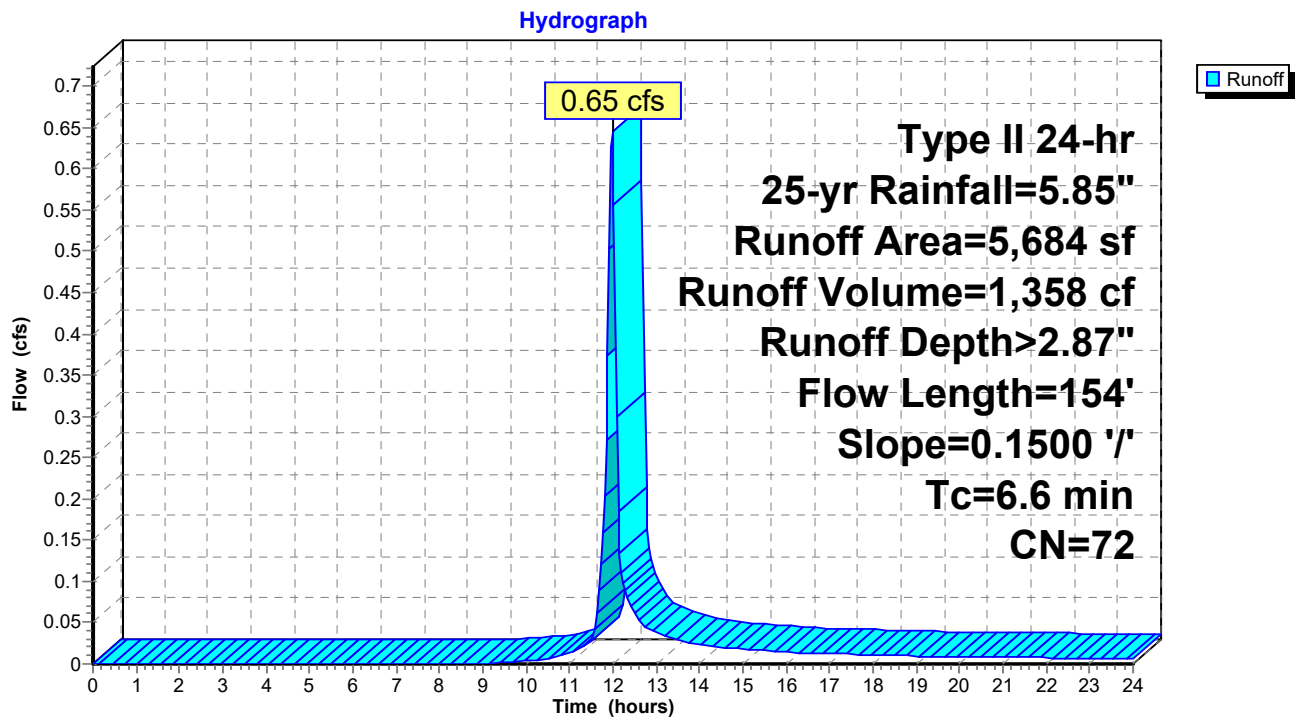
Summary for Subcatchment 16S: DA-1 Inf Bed #2

Runoff = 0.65 cfs @ 11.98 hrs, Volume= 1,358 cf, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
29	77	Woods, Good, HSG D
925	30	Meadow, non-grazed, HSG A
4,355	78	Meadow, non-grazed, HSG D
* 375	98	Impervious
5,684	72	Weighted Average
5,309		93.40% Pervious Area
375		6.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 16S: DA-1 Inf Bed #2

Summary for Reach 10: Culvert 7

[52] Hint: Inlet/Outlet conditions not evaluated

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 0.71'

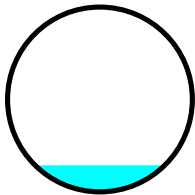
[79] Warning: Submerged Pond 17P Primary device # 3 OUTLET by 3.21'

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.45" for 25-yr event
Inflow = 0.76 cfs @ 12.05 hrs, Volume= 9,256 cf
Outflow = 0.72 cfs @ 12.06 hrs, Volume= 9,251 cf, Atten= 5%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Max. Velocity= 5.03 fps, Min. Travel Time= 0.5 min
Avg. Velocity= 3.19 fps, Avg. Travel Time= 0.7 min

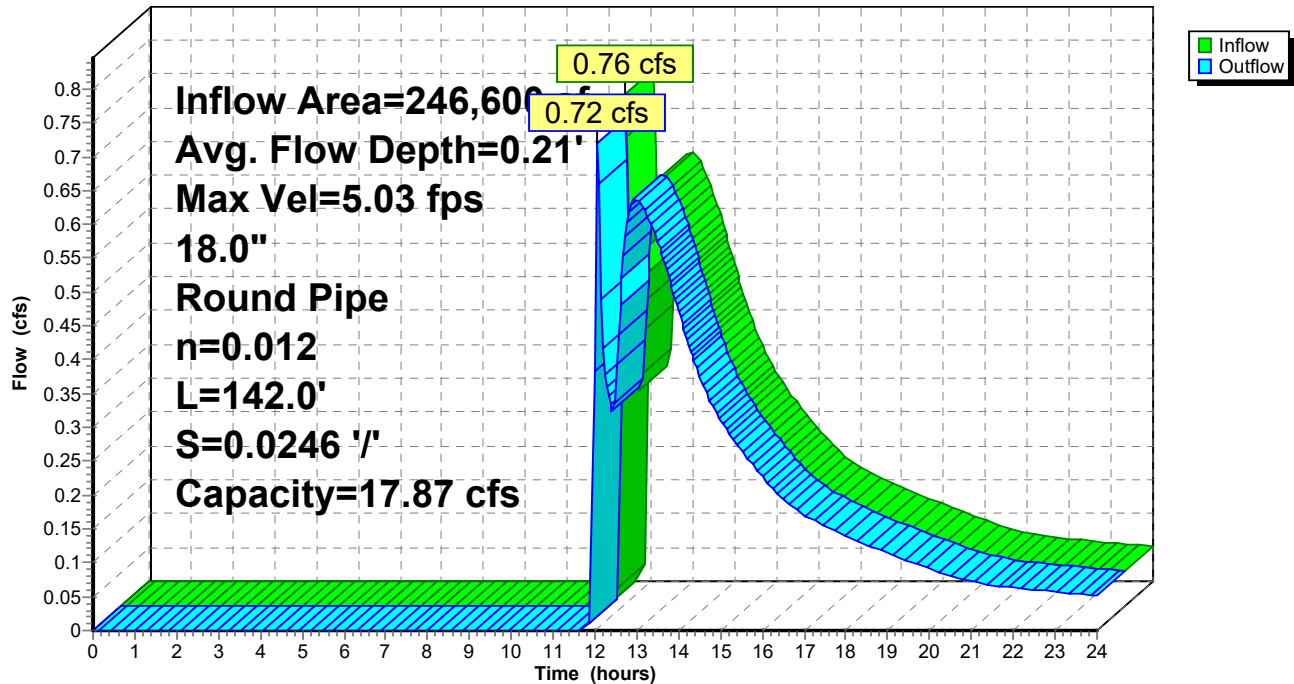
Peak Storage= 22 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 17.87 cfs

18.0" Round Pipe
n= 0.012
Length= 142.0' Slope= 0.0246 '/'
Inlet Invert= 911.50', Outlet Invert= 908.00'



Reach 10: Culvert 7

Hydrograph



Summary for Reach 18R: PennDOT Channel

[61] Hint: Exceeded Reach 10 outlet invert by 0.16' @ 12.08 hrs

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.45" for 25-yr event
 Inflow = 0.72 cfs @ 12.06 hrs, Volume= 9,251 cf
 Outflow = 0.71 cfs @ 12.08 hrs, Volume= 9,247 cf, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Max. Velocity= 1.89 fps, Min. Travel Time= 0.4 min

Avg. Velocity= 1.14 fps, Avg. Travel Time= 0.6 min

Peak Storage= 15 cf @ 12.07 hrs

Average Depth at Peak Storage= 0.16'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 20.43 cfs

2.00' x 1.00' deep channel, n= 0.035

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

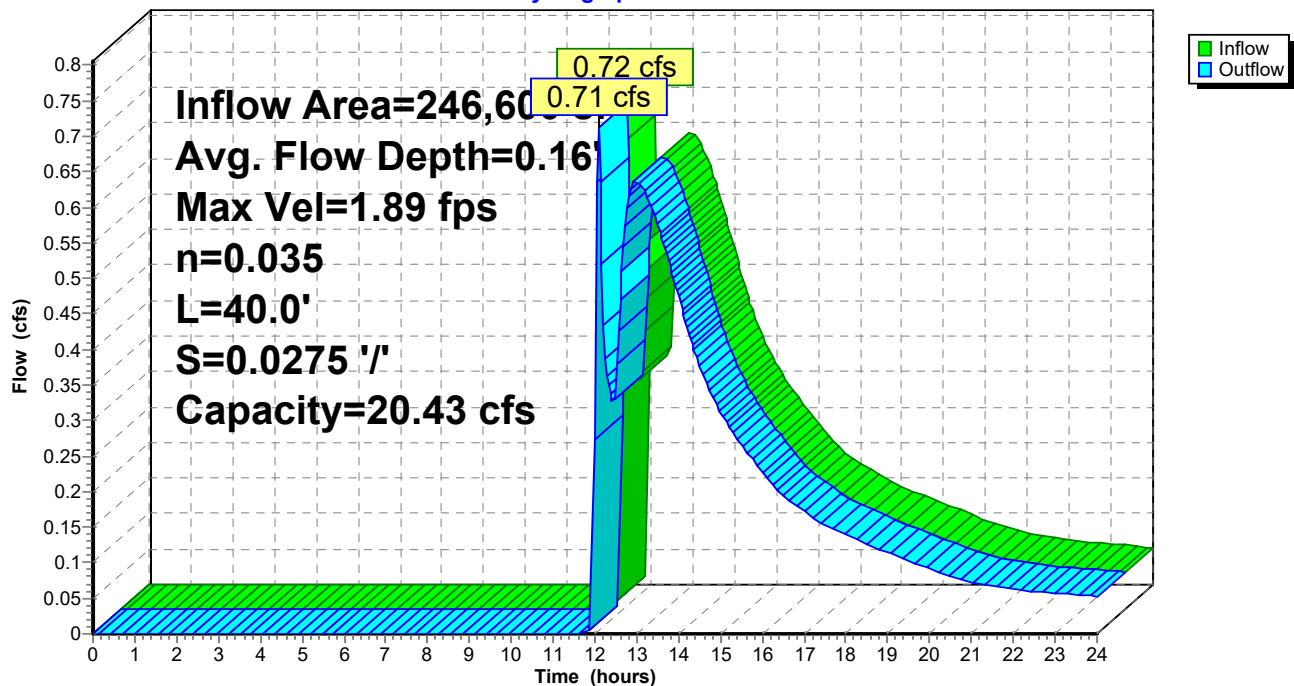
Length= 40.0' Slope= 0.0275 '/'

Inlet Invert= 908.00', Outlet Invert= 906.90'



Reach 18R: PennDOT Channel

Hydrograph



Summary for Pond 3p: Subsurface Infiltration Bed #1

Inflow Area = 10,278 sf, 21.06% Impervious, Inflow Depth > 2.24" for 25-yr event
 Inflow = 0.91 cfs @ 11.98 hrs, Volume= 1,918 cf
 Outflow = 0.15 cfs @ 12.24 hrs, Volume= 1,425 cf, Atten= 84%, Lag= 15.3 min
 Discarded = 0.02 cfs @ 12.24 hrs, Volume= 864 cf
 Primary = 0.13 cfs @ 12.24 hrs, Volume= 561 cf

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

Peak Elev= 913.92' @ 12.24 hrs Surf.Area= 800 sf Storage= 741 cf

Plug-Flow detention time= 202.1 min calculated for 1,423 cf (74% of inflow)

Center-of-Mass det. time= 102.2 min (950.0 - 847.8)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	795 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,200 cf Overall - 212 cf Embedded = 1,988 cf x 40.0% Voids
#2	912.00'	212 cf	18.0" Round Pipe Storage x 3 Inside #1 L= 40.0'
		1,007 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	800	0	0
913.00	800	800	800
914.00	800	800	1,600
914.75	800	600	2,200

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	913.50'	3.0" Round Culvert L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.1000 ' / Cc= 0.900 n= 0.024, Flow Area= 0.05 sf
#3	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'

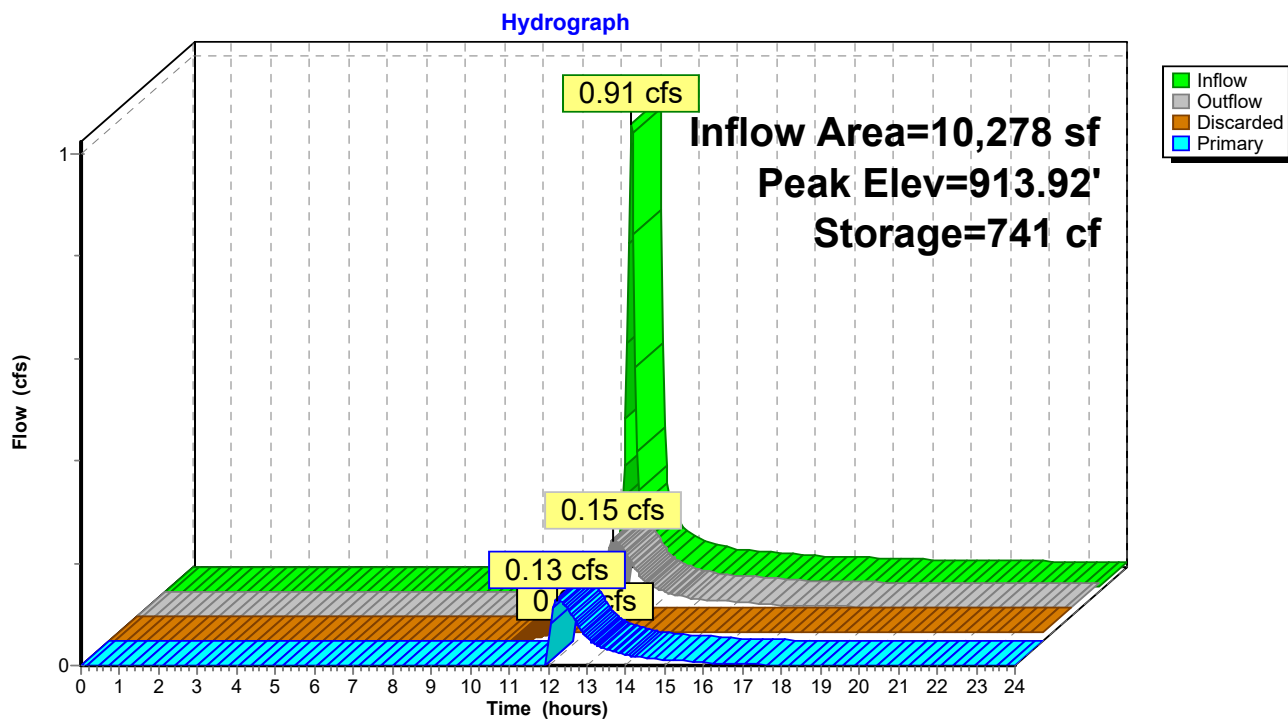
Discarded OutFlow Max=0.02 cfs @ 12.24 hrs HW=913.92' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.13 cfs @ 12.24 hrs HW=913.92' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **2=Culvert** (Inlet Controls 0.13 cfs @ 2.61 fps)

Pond 3p: Subsurface Infiltration Bed #1

Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 0.86" for 25-yr event
 Inflow = 2.40 cfs @ 12.27 hrs, Volume= 13,675 cf
 Outflow = 0.60 cfs @ 13.16 hrs, Volume= 10,767 cf, Atten= 75%, Lag= 53.4 min
 Discarded = 0.10 cfs @ 13.16 hrs, Volume= 4,149 cf
 Primary = 0.49 cfs @ 13.16 hrs, Volume= 6,618 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
 Peak Elev= 925.72' @ 13.16 hrs Surf.Area= 3,998 sf Storage= 4,170 cf

Plug-Flow detention time= 165.7 min calculated for 10,749 cf (79% of inflow)
 Center-of-Mass det. time= 75.0 min (995.9 - 920.9)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,904 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
925.33	3,629	1,143	2,677
926.00	4,260	2,643	5,320
927.00	5,278	4,769	10,089
928.00	6,352	5,815	15,904

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Device 4	926.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	924.50'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#4	Primary	924.50'	18.0" Round Culvert L= 71.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 911.00' S= 0.1901 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#5	Device 4	925.33'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.10 cfs @ 13.16 hrs HW=925.72' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.10 cfs)

Primary OutFlow Max=0.49 cfs @ 13.16 hrs HW=925.72' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

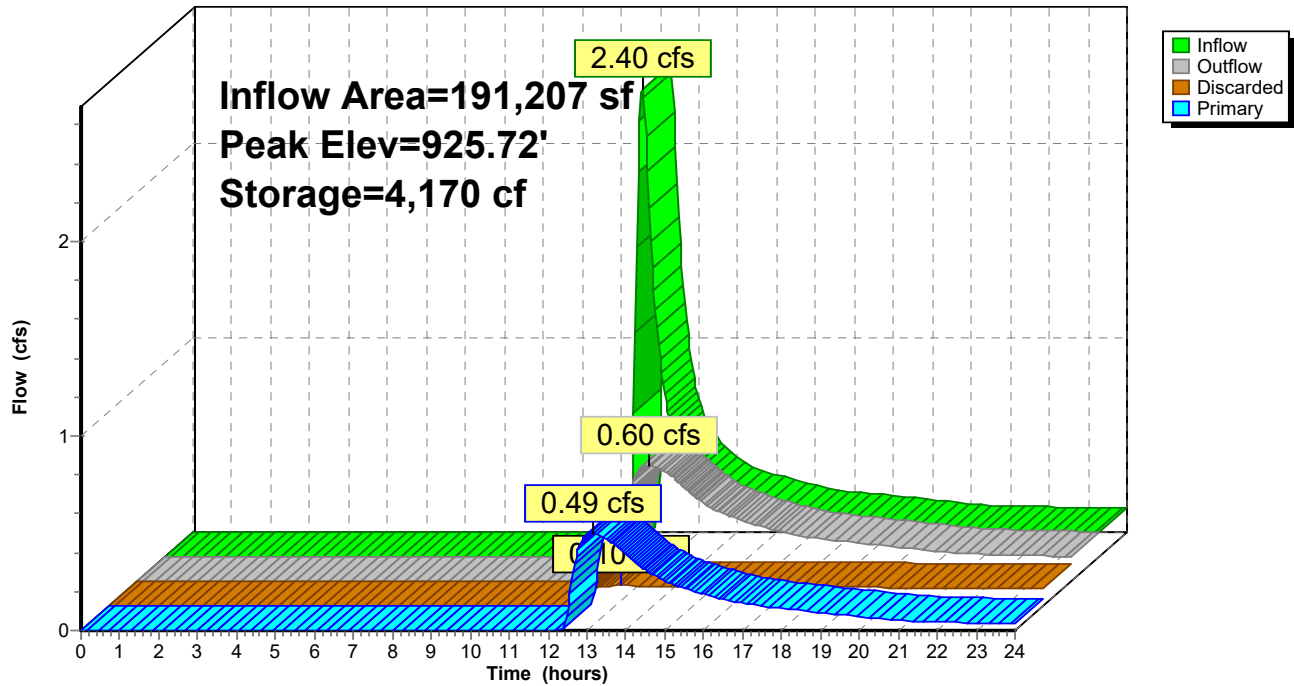
↑ **4=Culvert** (Passes 0.49 cfs of 7.25 cfs potential flow)

↑ **2=Orifice/Grate** (Controls 0.00 cfs)

↑ **5=Orifice/Grate** (Orifice Controls 0.49 cfs @ 2.22 fps)

Pond 5P: Basin 1

Hydrograph



Summary for Pond 17P: Subsurface Infiltration Bed #2

Inflow Area = 5,684 sf, 6.60% Impervious, Inflow Depth > 2.87" for 25-yr event
 Inflow = 0.65 cfs @ 11.98 hrs, Volume= 1,358 cf
 Outflow = 0.53 cfs @ 12.03 hrs, Volume= 1,243 cf, Atten= 18%, Lag= 3.2 min
 Discarded = 0.01 cfs @ 12.03 hrs, Volume= 654 cf
 Primary = 0.51 cfs @ 12.03 hrs, Volume= 589 cf

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

Peak Elev= 913.36' @ 12.03 hrs Surf.Area= 575 sf Storage= 370 cf

Plug-Flow detention time= 115.4 min calculated for 1,241 cf (91% of inflow)

Center-of-Mass det. time= 71.4 min (902.6 - 831.2)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	307 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 863 cf Overall - 94 cf Embedded = 768 cf x 40.0% Voids
#2	912.00'	79 cf	12.0" Round Pipe Storage x 4 Inside #1 L= 25.0'
#3	912.00'	16 cf	12.0" Round Pipe Storage x 2 Inside #1 L= 10.0'
			402 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	575	0	0
913.00	575	575	575
913.50	575	288	863

Device	Routing	Invert	Outlet Devices
#1	Primary	913.25'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'
#3	Primary	912.80'	3.0" Round Culvert L= 28.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 912.80' / 908.50' S= 0.1536 ' / Cc= 0.900 n= 0.024, Flow Area= 0.05 sf

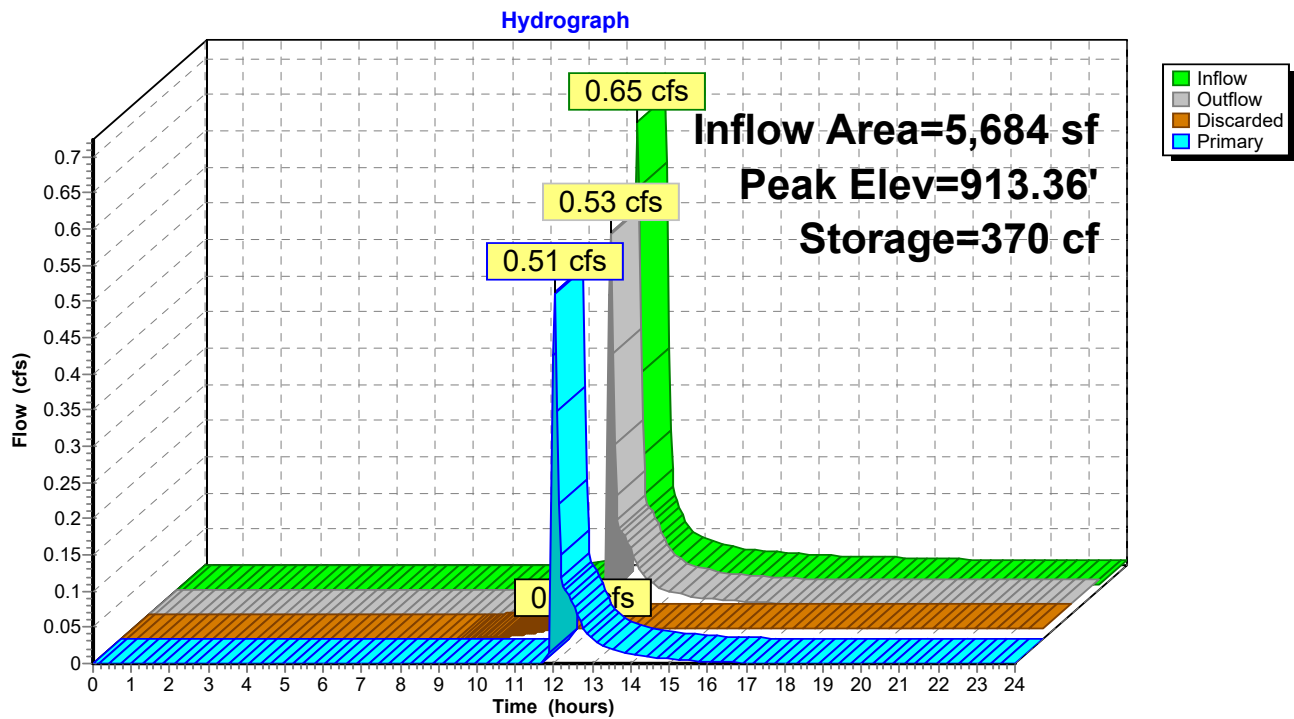
Discarded OutFlow Max=0.01 cfs @ 12.03 hrs HW=913.36' (Free Discharge)

↑ **2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.50 cfs @ 12.03 hrs HW=913.36' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.37 cfs @ 0.84 fps)

↑ **3=Culvert** (Inlet Controls 0.12 cfs @ 2.51 fps)

Pond 17P: Subsurface Infiltration Bed #2

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-1 Basin #1

Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>1.33"
Flow Length=1,332' Tc=26.4 min CN=47 Runoff=4.33 cfs 21,118 cf

Subcatchment 2S: DA-1 Undetained

Runoff Area=39,431 sf 1.50% Impervious Runoff Depth>0.79"
Flow Length=547' Tc=10.1 min CN=40 Runoff=0.71 cfs 2,596 cf

Subcatchment 5s: DA-1 Inf Bed #1

Runoff Area=10,278 sf 21.06% Impervious Runoff Depth>3.00"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=65 Runoff=1.22 cfs 2,567 cf

Subcatchment 16S: DA-1 Inf Bed #2

Runoff Area=5,684 sf 6.60% Impervious Runoff Depth>3.71"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=72 Runoff=0.83 cfs 1,759 cf

Reach 10: Culvert 7

Avg. Flow Depth=0.29' Max Vel=6.14 fps Inflow=1.52 cfs 18,271 cf
18.0" Round Pipe n=0.012 L=142.0' S=0.0246 '/' Capacity=17.87 cfs Outflow=1.49 cfs 18,263 cf

Reach 18R: PennDOT Channel

Avg. Flow Depth=0.25' Max Vel=2.40 fps Inflow=1.49 cfs 18,263 cf
n=0.035 L=40.0' S=0.0275 '/' Capacity=20.43 cfs Outflow=1.49 cfs 18,257 cf

Pond 3p: Subsurface Infiltration Bed #1

Peak Elev=914.57' Storage=951 cf Inflow=1.22 cfs 2,567 cf
Discarded=0.02 cfs 896 cf Primary=0.39 cfs 1,111 cf Outflow=0.41 cfs 2,007 cf

Pond 5P: Basin 1

Peak Elev=926.28' Storage=6,542 cf Inflow=4.33 cfs 21,118 cf
Discarded=0.12 cfs 4,385 cf Primary=0.94 cfs 13,648 cf Outflow=1.07 cfs 18,033 cf

Pond 17P: Subsurface Infiltration Bed #2

Peak Elev=913.41' Storage=381 cf Inflow=0.83 cfs 1,759 cf
Discarded=0.01 cfs 681 cf Primary=0.80 cfs 916 cf Outflow=0.81 cfs 1,597 cf

Total Runoff Area = 246,600 sf Runoff Volume = 28,040 cf Average Runoff Depth = 1.36"
97.04% Pervious = 239,307 sf 2.96% Impervious = 7,293 sf

Summary for Subcatchment 1S: DA-1 Basin #1

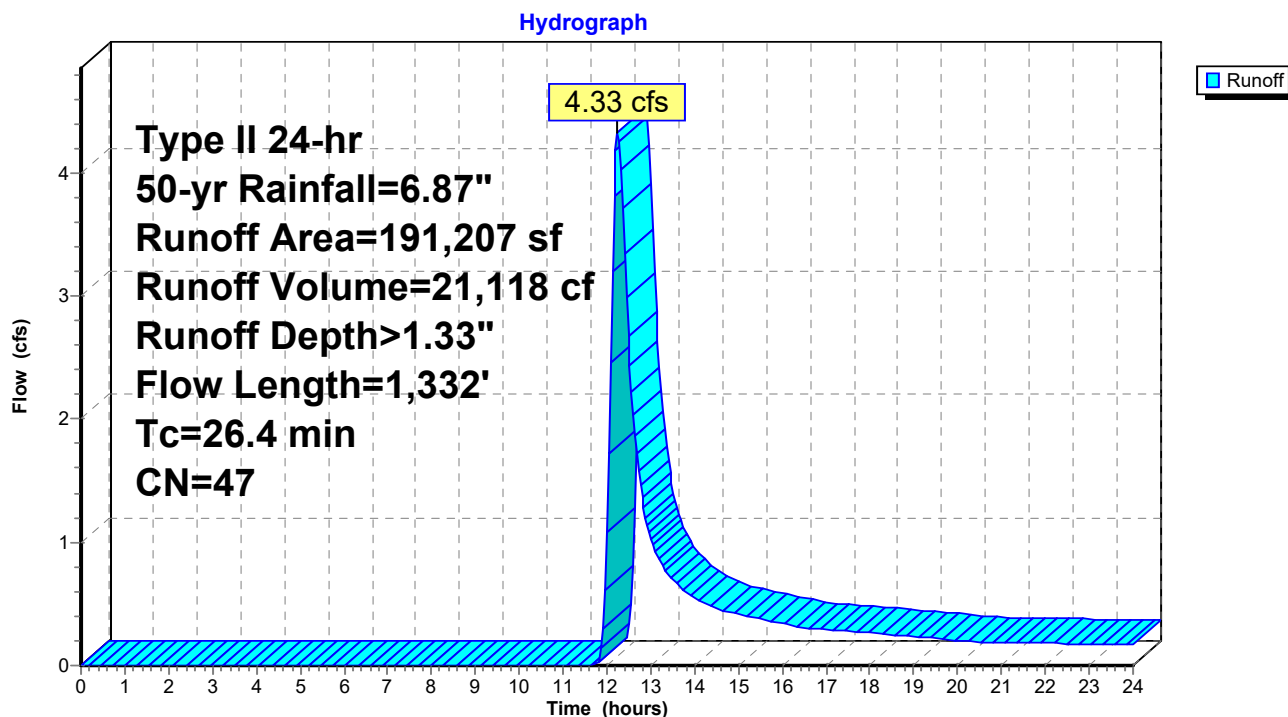
Runoff = 4.33 cfs @ 12.25 hrs, Volume= 21,118 cf, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.9	463	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.4	554	0.0900	2.10		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
26.4	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



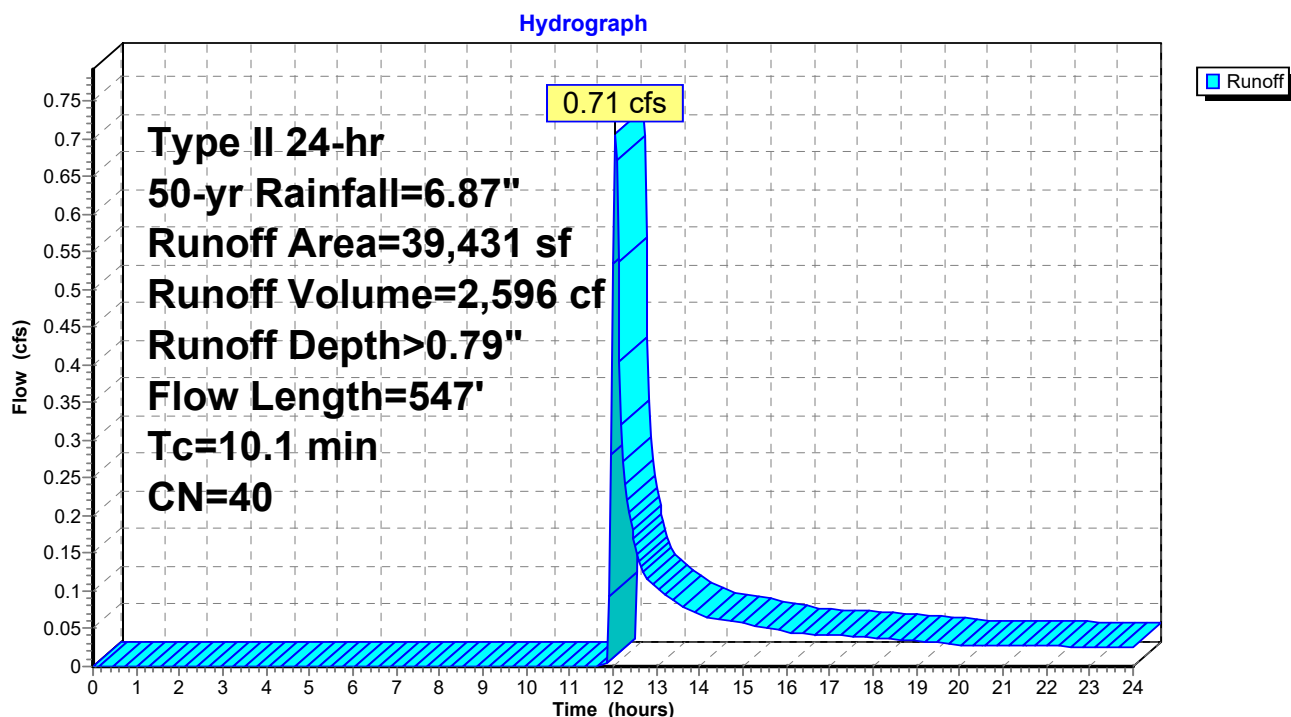
Summary for Subcatchment 2S: DA-1 Undetained

Runoff = 0.71 cfs @ 12.06 hrs, Volume= 2,596 cf, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
1,020	77	Woods, Good, HSG D
20,698	30	Meadow, non-grazed, HSG A
6,598	78	Meadow, non-grazed, HSG D
* 590	98	Impervious
39,431	40	Weighted Average
38,841		98.50% Pervious Area
590		1.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1000	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
1.0	147	0.1200	2.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	300	0.0200	2.89	4.33	Channel Flow, Channel Area= 1.5 sf Perim= 4.5' r= 0.33' n= 0.035
10.1	547	Total			

Subcatchment 2S: DA-1 Undetained

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Type II 24-hr 50-yr Rainfall=6.87"

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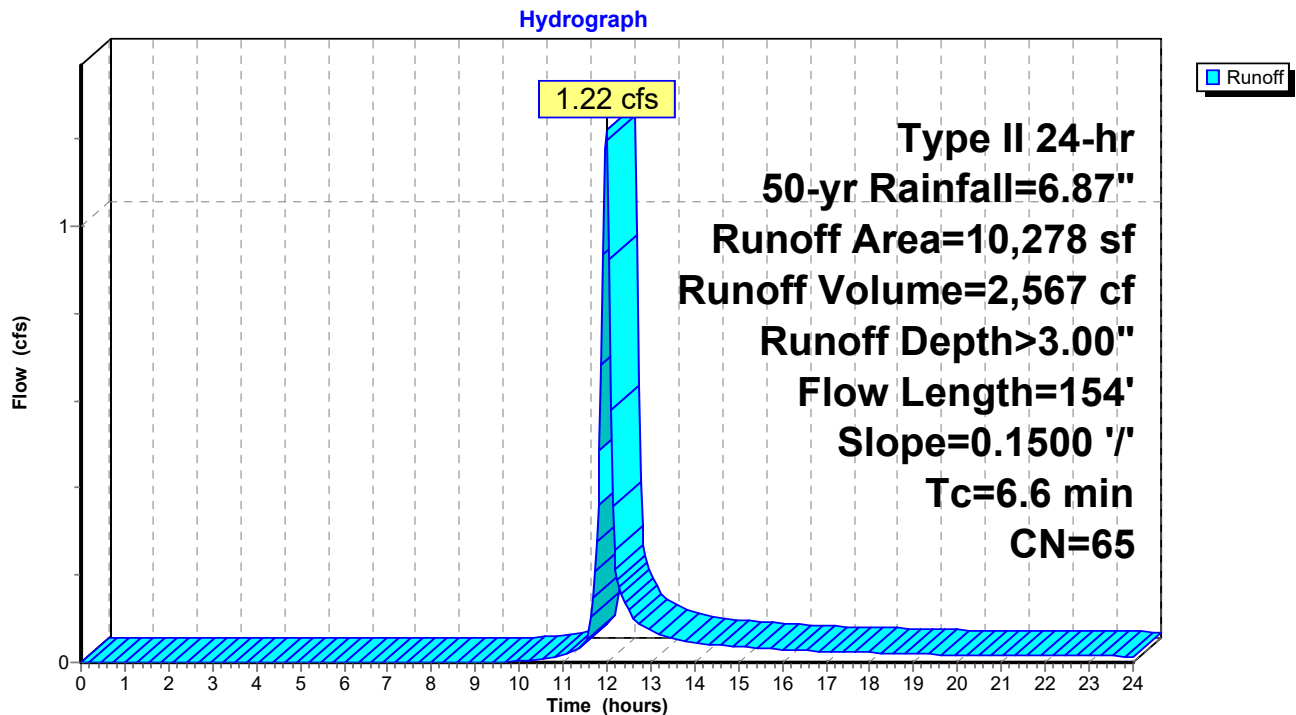
Summary for Subcatchment 5s: DA-1 Inf Bed #1

Runoff = 1.22 cfs @ 11.98 hrs, Volume= 2,567 cf, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
3,580	30	Meadow, non-grazed, HSG A
4,533	78	Meadow, non-grazed, HSG D
* 2,165	98	Impervious
10,278	65	Weighted Average
8,113		78.94% Pervious Area
2,165		21.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 5s: DA-1 Inf Bed #1

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Type II 24-hr 50-yr Rainfall=6.87"

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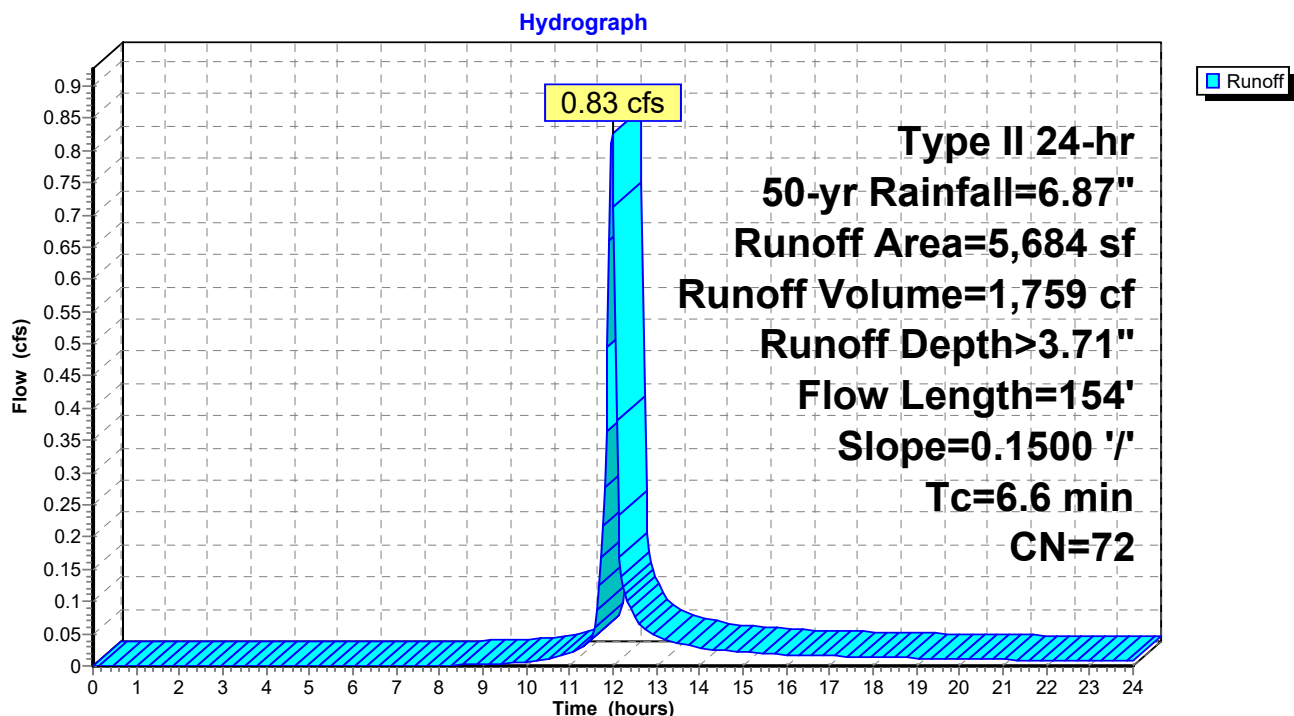
Summary for Subcatchment 16S: DA-1 Inf Bed #2

Runoff = 0.83 cfs @ 11.98 hrs, Volume= 1,759 cf, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
29	77	Woods, Good, HSG D
925	30	Meadow, non-grazed, HSG A
4,355	78	Meadow, non-grazed, HSG D
* 375	98	Impervious
5,684	72	Weighted Average
5,309		93.40% Pervious Area
375		6.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 16S: DA-1 Inf Bed #2

Summary for Reach 10: Culvert 7

[52] Hint: Inlet/Outlet conditions not evaluated

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 0.79'

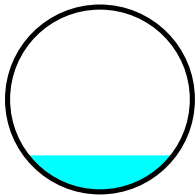
[79] Warning: Submerged Pond 17P Primary device # 3 OUTLET by 3.29'

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.89" for 50-yr event
Inflow = 1.52 cfs @ 12.03 hrs, Volume= 18,271 cf
Outflow = 1.49 cfs @ 12.04 hrs, Volume= 18,263 cf, Atten= 2%, Lag= 0.8 min

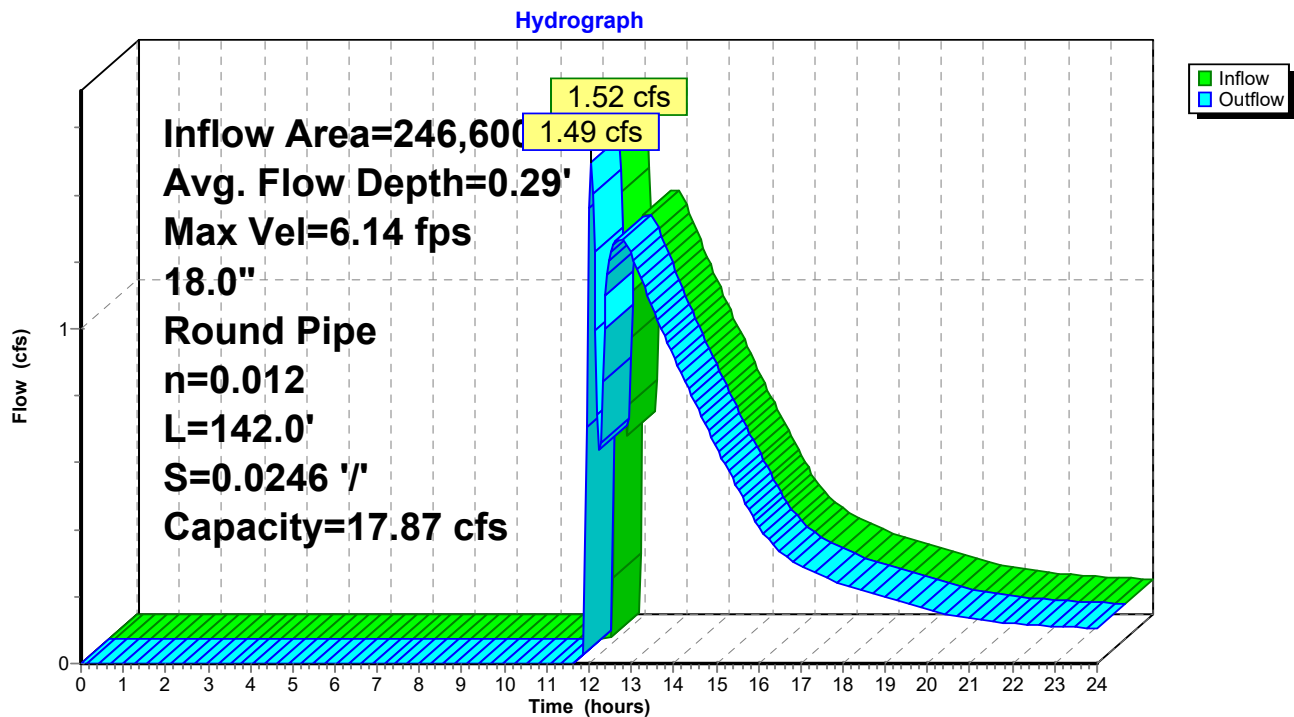
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Max. Velocity= 6.14 fps, Min. Travel Time= 0.4 min
Avg. Velocity= 3.87 fps, Avg. Travel Time= 0.6 min

Peak Storage= 35 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 17.87 cfs

18.0" Round Pipe
n= 0.012
Length= 142.0' Slope= 0.0246 '/'
Inlet Invert= 911.50', Outlet Invert= 908.00'



Reach 10: Culvert 7



Summary for Reach 18R: PennDOT Channel

[61] Hint: Exceeded Reach 10 outlet invert by 0.25' @ 12.04 hrs

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 0.89" for 50-yr event
 Inflow = 1.49 cfs @ 12.04 hrs, Volume= 18,263 cf
 Outflow = 1.49 cfs @ 12.05 hrs, Volume= 18,257 cf, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Max. Velocity= 2.40 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 1.43 fps, Avg. Travel Time= 0.5 min

Peak Storage= 25 cf @ 12.05 hrs

Average Depth at Peak Storage= 0.25'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 20.43 cfs

2.00' x 1.00' deep channel, n= 0.035

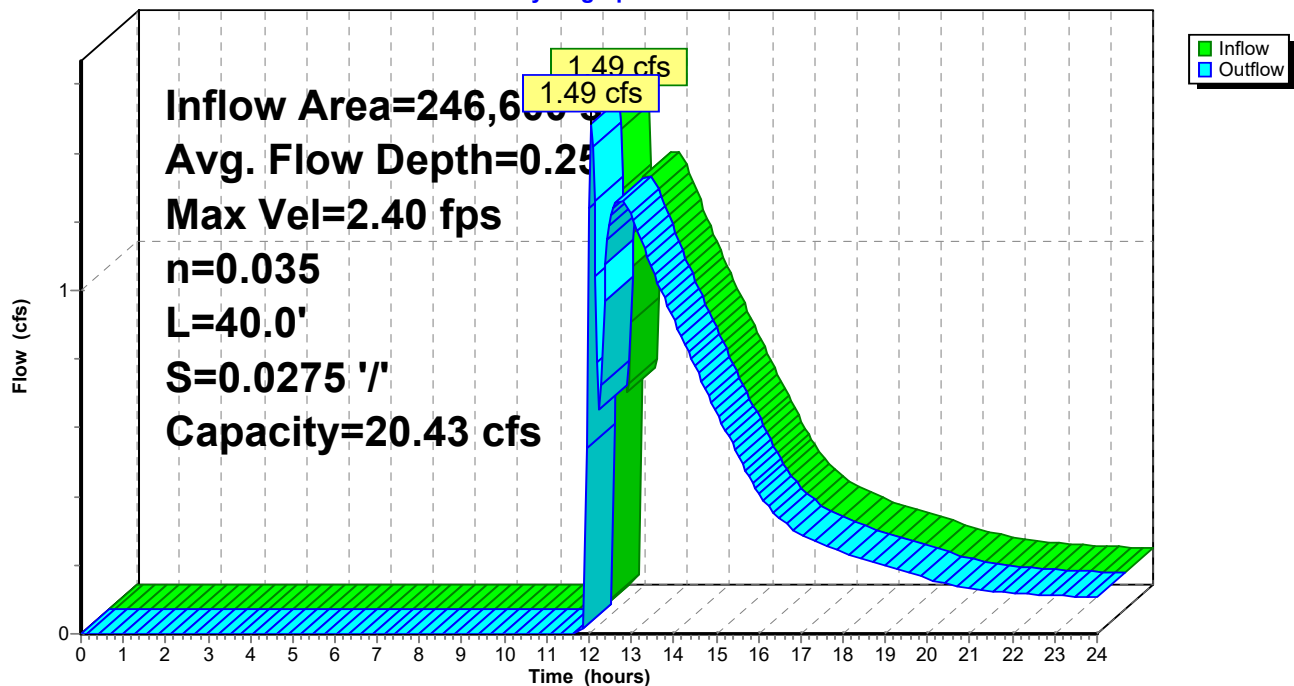
Side Slope Z-value= 2.0 '/' Top Width= 6.00'

Length= 40.0' Slope= 0.0275 '/'

Inlet Invert= 908.00', Outlet Invert= 906.90'

**Reach 18R: PennDOT Channel**

Hydrograph



Summary for Pond 3p: Subsurface Infiltration Bed #1

Inflow Area = 10,278 sf, 21.06% Impervious, Inflow Depth > 3.00" for 50-yr event
 Inflow = 1.22 cfs @ 11.98 hrs, Volume= 2,567 cf
 Outflow = 0.41 cfs @ 12.13 hrs, Volume= 2,007 cf, Atten= 67%, Lag= 8.6 min
 Discarded = 0.02 cfs @ 12.13 hrs, Volume= 896 cf
 Primary = 0.39 cfs @ 12.13 hrs, Volume= 1,111 cf

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

Peak Elev= 914.57' @ 12.13 hrs Surf.Area= 800 sf Storage= 951 cf

Plug-Flow detention time= 153.9 min calculated for 2,004 cf (78% of inflow)

Center-of-Mass det. time= 64.8 min (904.0 - 839.2)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	795 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,200 cf Overall - 212 cf Embedded = 1,988 cf x 40.0% Voids
#2	912.00'	212 cf	18.0" Round Pipe Storage x 3 Inside #1 L= 40.0'
		1,007 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	800	0	0
913.00	800	800	800
914.00	800	800	1,600
914.75	800	600	2,200

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	913.50'	3.0" Round Culvert L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.1000 ' / Cc= 0.900 n= 0.024, Flow Area= 0.05 sf
#3	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'

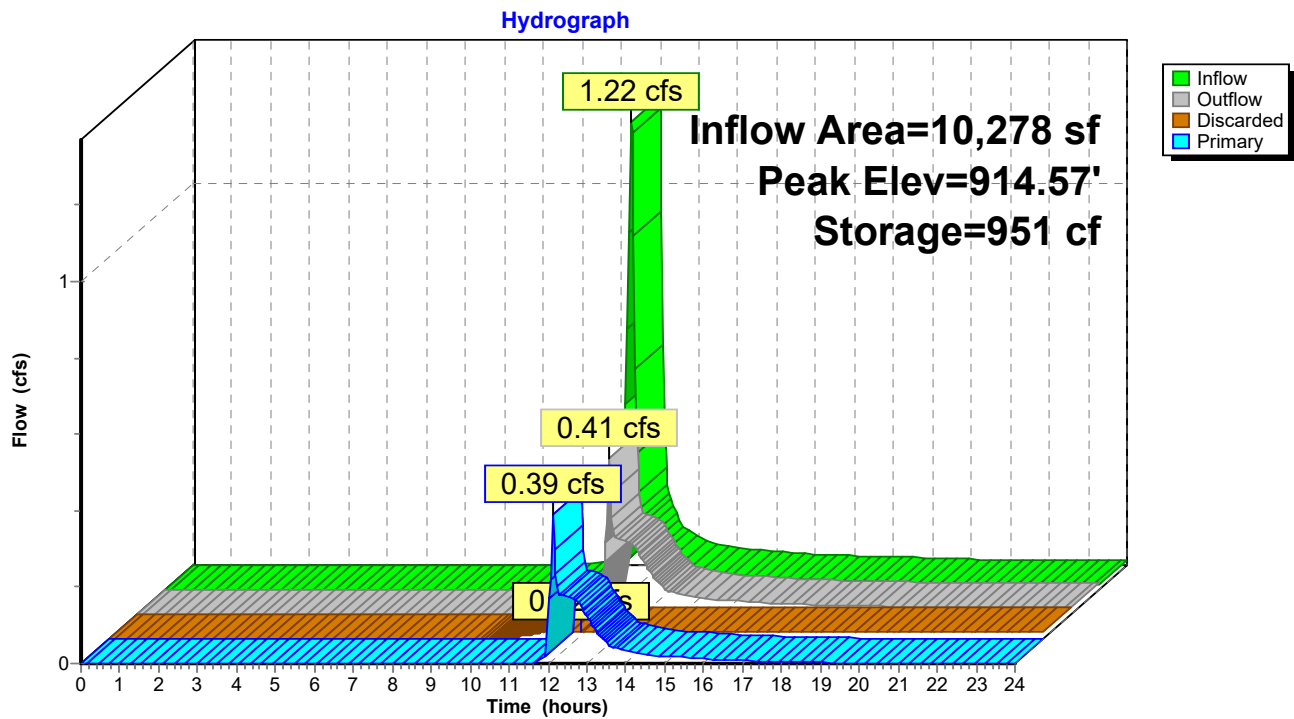
Discarded OutFlow Max=0.02 cfs @ 12.13 hrs HW=914.57' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.37 cfs @ 12.13 hrs HW=914.57' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.18 cfs @ 0.67 fps)

↑ **2=Culvert** (Barrel Controls 0.18 cfs @ 3.76 fps)

Pond 3p: Subsurface Infiltration Bed #1

Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 1.33" for 50-yr event
 Inflow = 4.33 cfs @ 12.25 hrs, Volume= 21,118 cf
 Outflow = 1.07 cfs @ 12.97 hrs, Volume= 18,033 cf, Atten= 75%, Lag= 43.5 min
 Discarded = 0.12 cfs @ 12.97 hrs, Volume= 4,385 cf
 Primary = 0.94 cfs @ 12.97 hrs, Volume= 13,648 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
 Peak Elev= 926.28' @ 12.97 hrs Surf.Area= 4,543 sf Storage= 6,542 cf

Plug-Flow detention time= 128.4 min calculated for 18,003 cf (85% of inflow)
 Center-of-Mass det. time= 61.4 min (964.7 - 903.3)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,904 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
925.33	3,629	1,143	2,677
926.00	4,260	2,643	5,320
927.00	5,278	4,769	10,089
928.00	6,352	5,815	15,904

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Device 4	926.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	924.50'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#4	Primary	924.50'	18.0" Round Culvert L= 71.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 911.00' S= 0.1901 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#5	Device 4	925.33'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.12 cfs @ 12.97 hrs HW=926.28' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.12 cfs)

Primary OutFlow Max=0.94 cfs @ 12.97 hrs HW=926.28' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

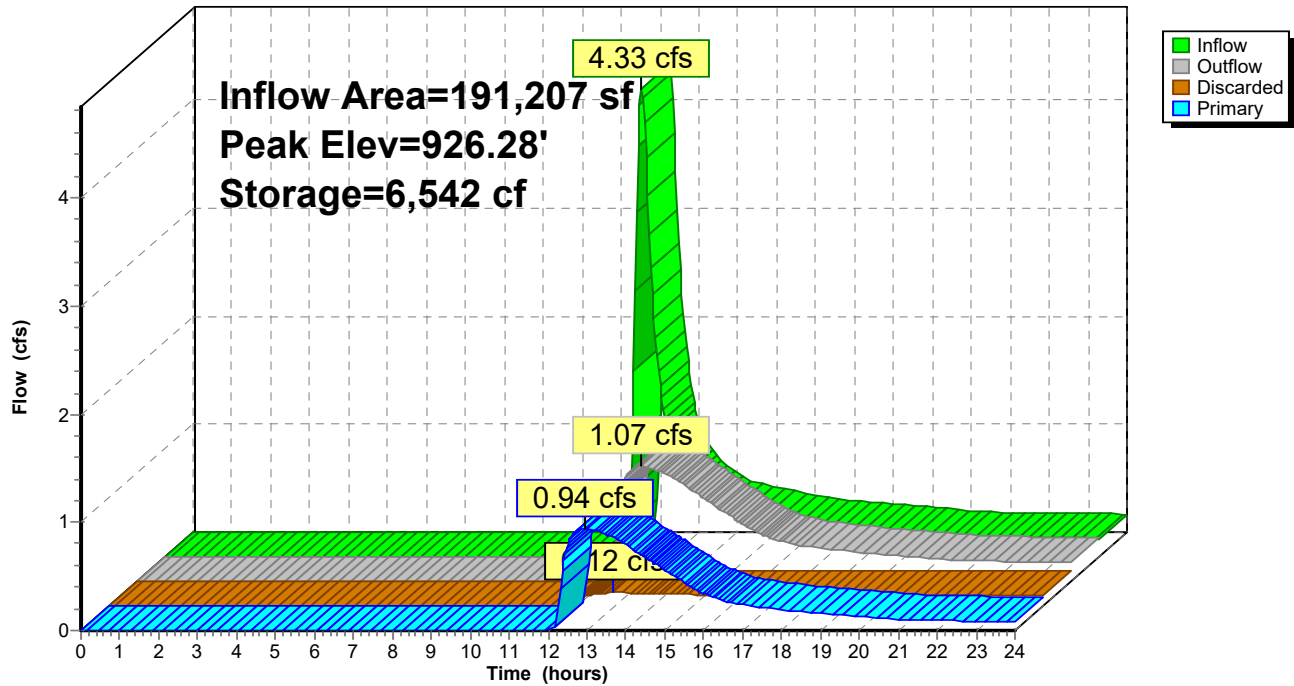
↑ **4=Culvert** (Passes 0.94 cfs of 10.78 cfs potential flow)

↑ **2=Orifice/Grate** (Controls 0.00 cfs)

↑ **5=Orifice/Grate** (Orifice Controls 0.94 cfs @ 4.25 fps)

Pond 5P: Basin 1

Hydrograph



Summary for Pond 17P: Subsurface Infiltration Bed #2

Inflow Area = 5,684 sf, 6.60% Impervious, Inflow Depth > 3.71" for 50-yr event
 Inflow = 0.83 cfs @ 11.98 hrs, Volume= 1,759 cf
 Outflow = 0.81 cfs @ 12.00 hrs, Volume= 1,597 cf, Atten= 2%, Lag= 1.0 min
 Discarded = 0.01 cfs @ 12.00 hrs, Volume= 681 cf
 Primary = 0.80 cfs @ 12.00 hrs, Volume= 916 cf

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

Peak Elev= 913.41' @ 12.00 hrs Surf.Area= 575 sf Storage= 381 cf

Plug-Flow detention time= 93.7 min calculated for 1,597 cf (91% of inflow)

Center-of-Mass det. time= 46.2 min (870.0 - 823.8)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	307 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 863 cf Overall - 94 cf Embedded = 768 cf x 40.0% Voids
#2	912.00'	79 cf	12.0" Round Pipe Storage x 4 Inside #1 L= 25.0'
#3	912.00'	16 cf	12.0" Round Pipe Storage x 2 Inside #1 L= 10.0'
402 cf			Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	575	0	0
913.00	575	575	575
913.50	575	288	863

Device	Routing	Invert	Outlet Devices
#1	Primary	913.25'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'
#3	Primary	912.80'	3.0" Round Culvert L= 28.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 912.80' / 908.50' S= 0.1536 ' S= 0.1536 ' Cc= 0.900 n= 0.024, Flow Area= 0.05 sf

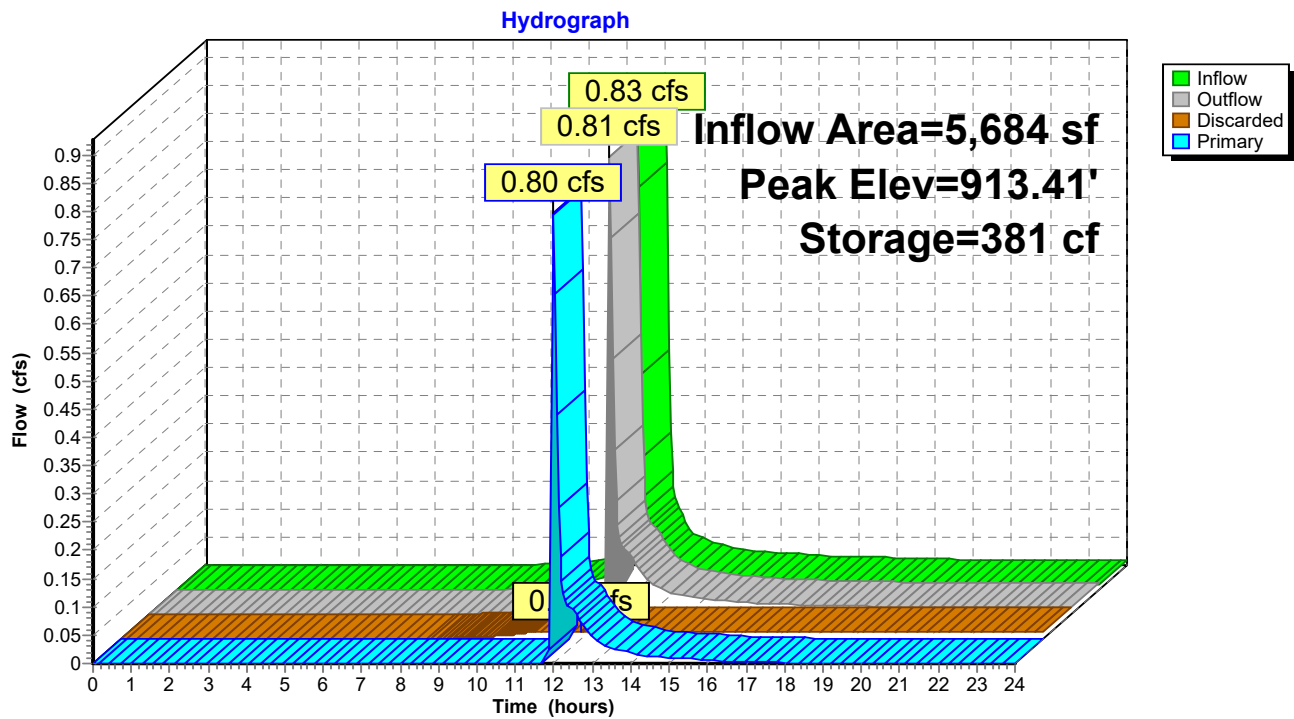
Discarded OutFlow Max=0.01 cfs @ 12.00 hrs HW=913.41' (Free Discharge)

↑ **2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.78 cfs @ 12.00 hrs HW=913.41' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.65 cfs @ 1.02 fps)

↑ **3=Culvert** (Inlet Controls 0.13 cfs @ 2.65 fps)

Pond 17P: Subsurface Infiltration Bed #2

MLV 505LD86_PostwBMP DA1- REV 3*Type II 24-hr 100-yr Rainfall=8.09"*

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DA-1 Basin #1

Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>1.97"
Flow Length=1,332' Tc=26.4 min CN=47 Runoff=7.09 cfs 31,387 cf

Subcatchment 2S: DA-1 Undetained

Runoff Area=39,431 sf 1.50% Impervious Runoff Depth>1.28"
Flow Length=547' Tc=10.1 min CN=40 Runoff=1.42 cfs 4,220 cf

Subcatchment 5s: DA-1 Inf Bed #1

Runoff Area=10,278 sf 21.06% Impervious Runoff Depth>3.96"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=65 Runoff=1.61 cfs 3,393 cf

Subcatchment 16S: DA-1 Inf Bed #2

Runoff Area=5,684 sf 6.60% Impervious Runoff Depth>4.77"
Flow Length=154' Slope=0.1500 '/' Tc=6.6 min CN=72 Runoff=1.05 cfs 2,258 cf

Reach 10: Culvert 7

Avg. Flow Depth=0.48' Max Vel=8.08 fps Inflow=3.90 cfs 30,888 cf
18.0" Round Pipe n=0.012 L=142.0' S=0.0246 '/' Capacity=17.87 cfs Outflow=3.88 cfs 30,877 cf

Reach 18R: PennDOT Channel

Avg. Flow Depth=0.42' Max Vel=3.22 fps Inflow=3.88 cfs 30,877 cf
n=0.035 L=40.0' S=0.0275 '/' Capacity=20.43 cfs Outflow=3.88 cfs 30,869 cf

Pond 3p: Subsurface Infiltration Bed #1

Peak Elev=914.73' Storage=1,000 cf Inflow=1.61 cfs 3,393 cf
Discarded=0.02 cfs 935 cf Primary=1.29 cfs 1,859 cf Outflow=1.31 cfs 2,793 cf

Pond 5P: Basin 1

Peak Elev=926.72' Storage=8,669 cf Inflow=7.09 cfs 31,387 cf
Discarded=0.14 cfs 4,642 cf Primary=3.36 cfs 23,479 cf Outflow=3.50 cfs 28,121 cf

Pond 17P: Subsurface Infiltration Bed #2

Peak Elev=913.45' Storage=389 cf Inflow=1.05 cfs 2,258 cf
Discarded=0.01 cfs 712 cf Primary=1.03 cfs 1,331 cf Outflow=1.04 cfs 2,043 cf

Total Runoff Area = 246,600 sf Runoff Volume = 41,258 cf Average Runoff Depth = 2.01"
97.04% Pervious = 239,307 sf 2.96% Impervious = 7,293 sf

Summary for Subcatchment 1S: DA-1 Basin #1

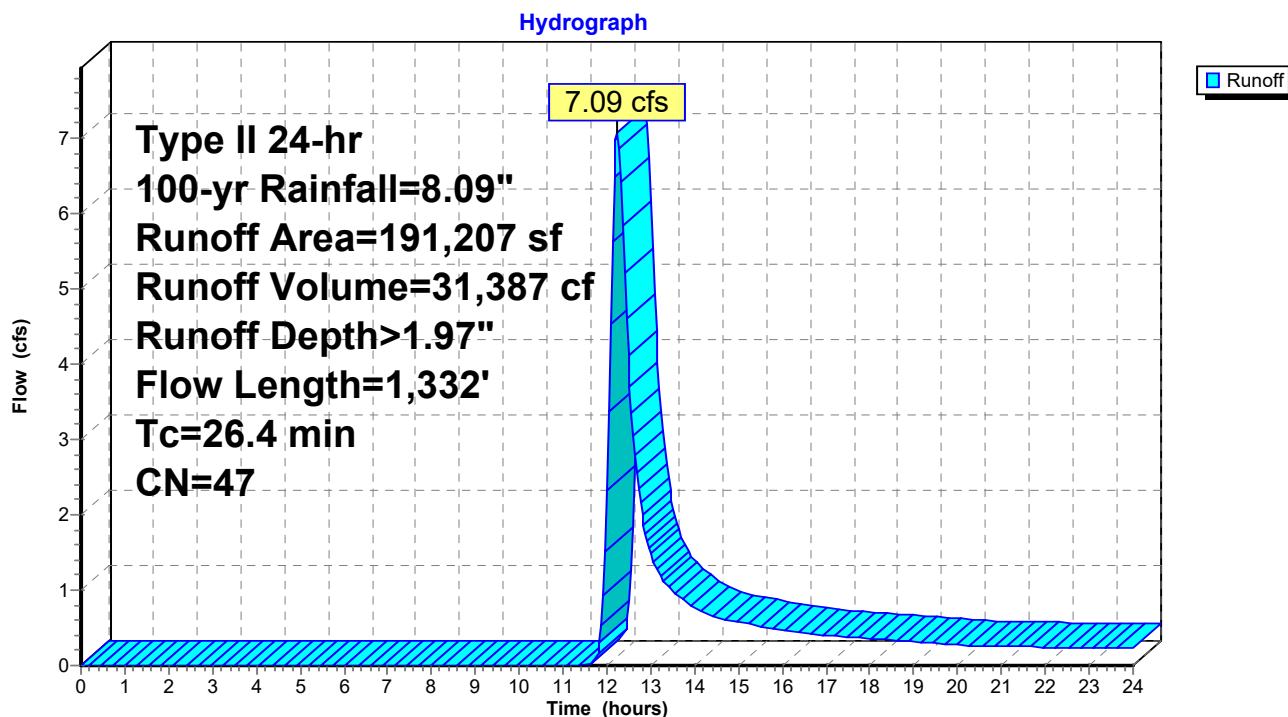
Runoff = 7.09 cfs @ 12.23 hrs, Volume= 31,387 cf, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.9	463	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.4	554	0.0900	2.10		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
26.4	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



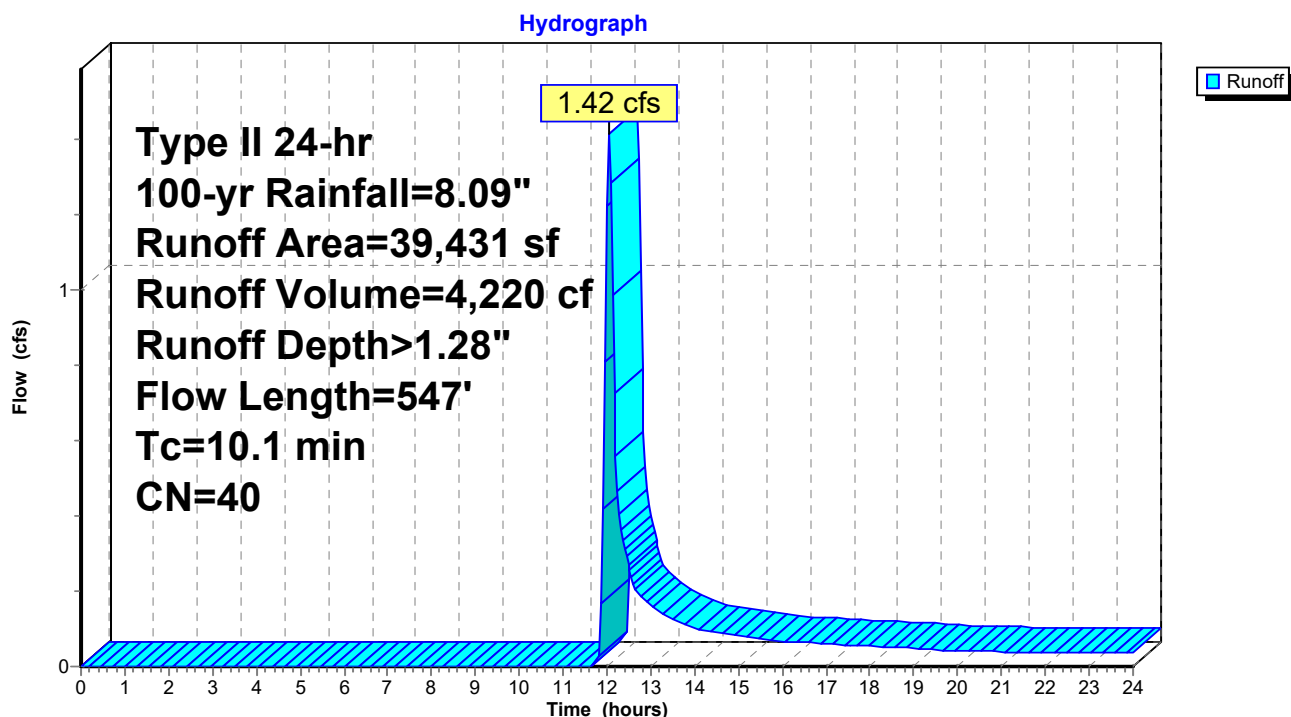
Summary for Subcatchment 2S: DA-1 Undetained

Runoff = 1.42 cfs @ 12.04 hrs, Volume= 4,220 cf, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
1,020	77	Woods, Good, HSG D
20,698	30	Meadow, non-grazed, HSG A
6,598	78	Meadow, non-grazed, HSG D
* 590	98	Impervious
39,431	40	Weighted Average
38,841		98.50% Pervious Area
590		1.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1000	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
1.0	147	0.1200	2.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	300	0.0200	2.89	4.33	Channel Flow, Channel Area= 1.5 sf Perim= 4.5' r= 0.33' n= 0.035
10.1	547	Total			

Subcatchment 2S: DA-1 Undetained

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Type II 24-hr 100-yr Rainfall=8.09"

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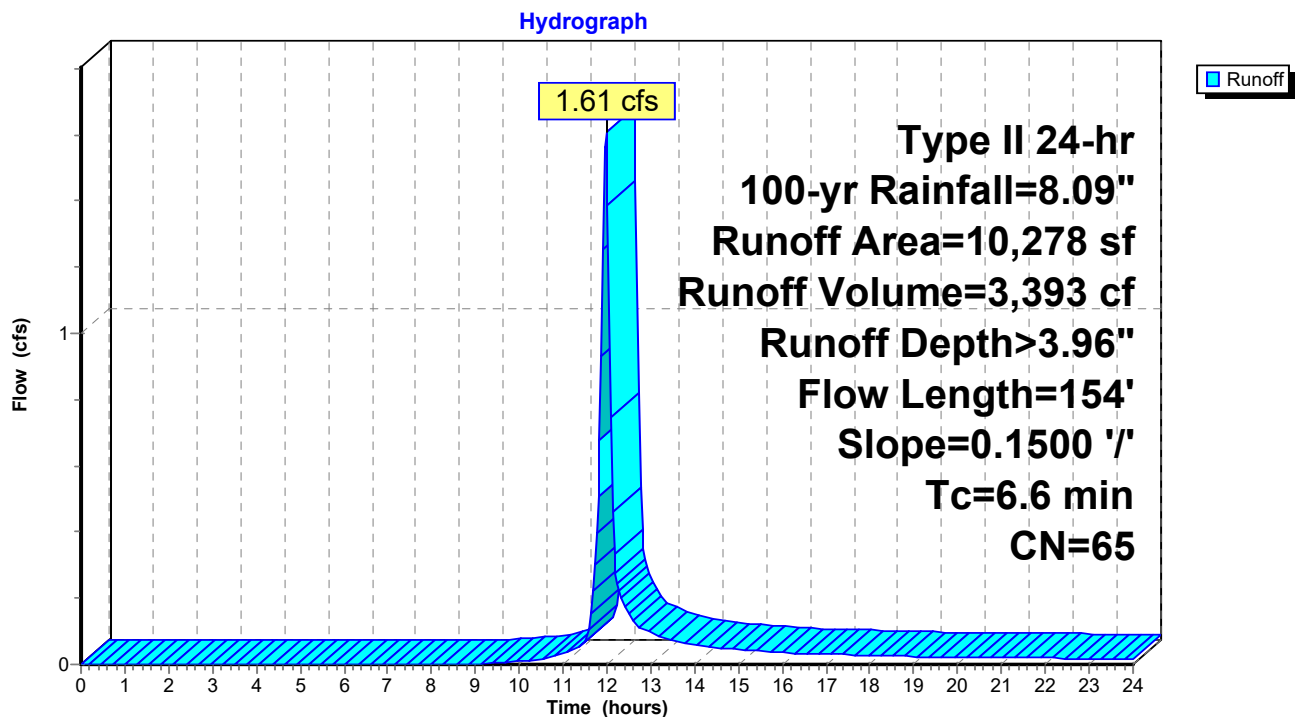
Summary for Subcatchment 5s: DA-1 Inf Bed #1

Runoff = 1.61 cfs @ 11.98 hrs, Volume= 3,393 cf, Depth> 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
3,580	30	Meadow, non-grazed, HSG A
4,533	78	Meadow, non-grazed, HSG D
* 2,165	98	Impervious
10,278	65	Weighted Average
8,113		78.94% Pervious Area
2,165		21.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 5s: DA-1 Inf Bed #1

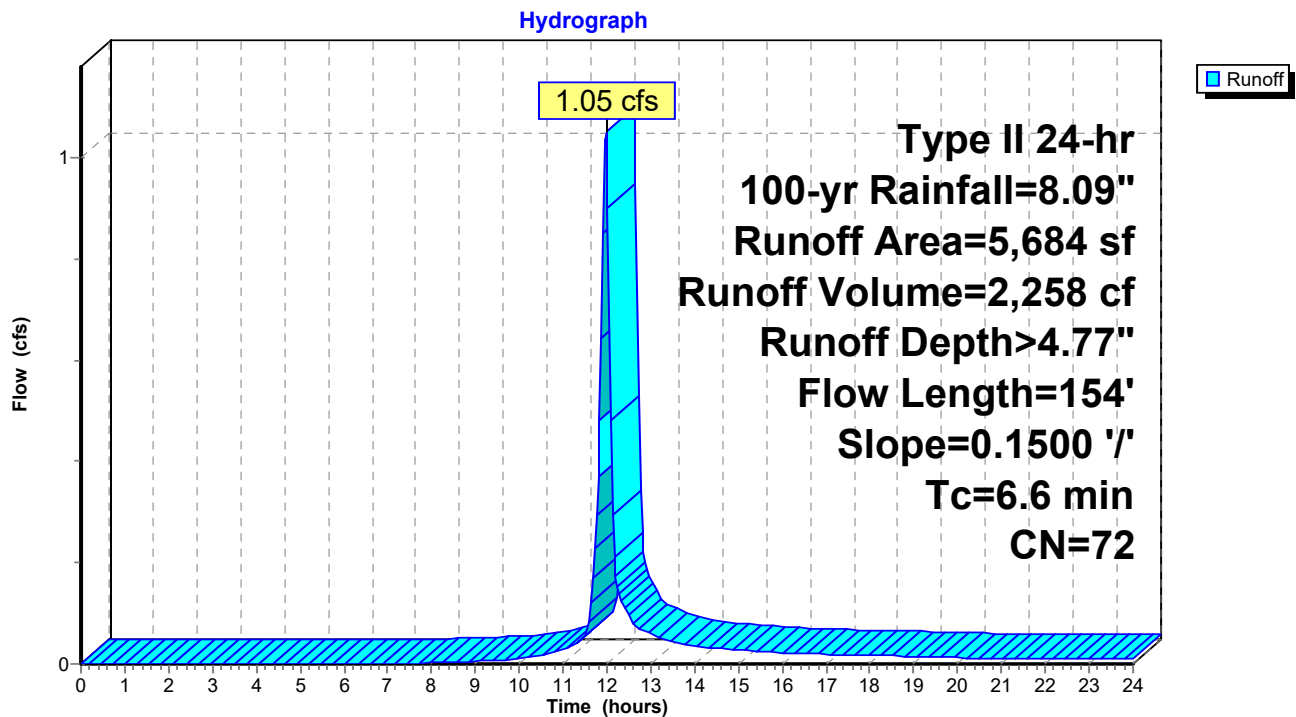
Summary for Subcatchment 16S: DA-1 Inf Bed #2

Runoff = 1.05 cfs @ 11.98 hrs, Volume= 2,258 cf, Depth> 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
29	77	Woods, Good, HSG D
925	30	Meadow, non-grazed, HSG A
4,355	78	Meadow, non-grazed, HSG D
* 375	98	Impervious
5,684	72	Weighted Average
5,309		93.40% Pervious Area
375		6.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1500	0.26		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"
0.3	54	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.6	154	Total			

Subcatchment 16S: DA-1 Inf Bed #2

Summary for Reach 10: Culvert 7

[52] Hint: Inlet/Outlet conditions not evaluated

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 0.97'

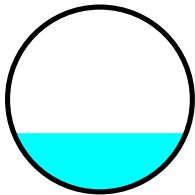
[79] Warning: Submerged Pond 17P Primary device # 3 OUTLET by 3.47'

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 1.50" for 100-yr event
Inflow = 3.90 cfs @ 12.54 hrs, Volume= 30,888 cf
Outflow = 3.88 cfs @ 12.55 hrs, Volume= 30,877 cf, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Max. Velocity= 8.08 fps, Min. Travel Time= 0.3 min
Avg. Velocity= 4.47 fps, Avg. Travel Time= 0.5 min

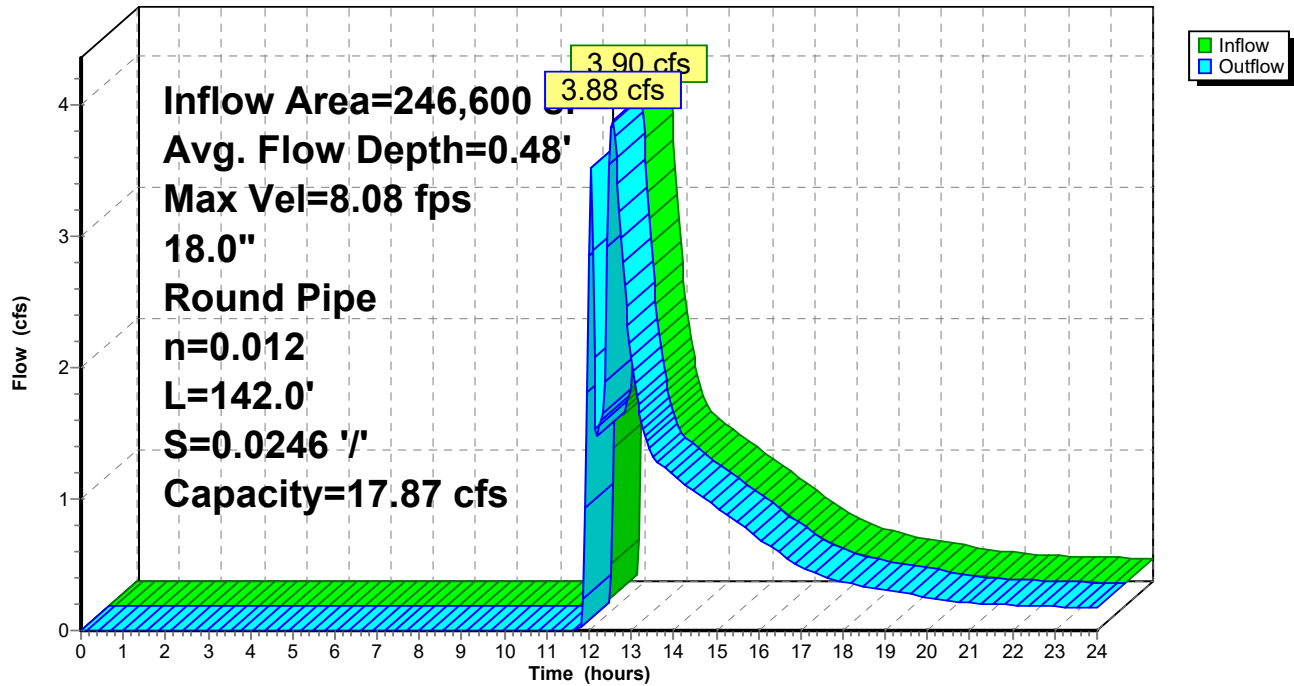
Peak Storage= 68 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 17.87 cfs

18.0" Round Pipe
n= 0.012
Length= 142.0' Slope= 0.0246 '/'
Inlet Invert= 911.50', Outlet Invert= 908.00'



Reach 10: Culvert 7

Hydrograph



Summary for Reach 18R: PennDOT Channel

[61] Hint: Exceeded Reach 10 outlet invert by 0.42' @ 12.56 hrs

Inflow Area = 246,600 sf, 2.96% Impervious, Inflow Depth > 1.50" for 100-yr event
 Inflow = 3.88 cfs @ 12.55 hrs, Volume= 30,877 cf
 Outflow = 3.88 cfs @ 12.56 hrs, Volume= 30,869 cf, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs

Max. Velocity= 3.22 fps, Min. Travel Time= 0.2 min

Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.4 min

Peak Storage= 48 cf @ 12.56 hrs

Average Depth at Peak Storage= 0.42'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 20.43 cfs

2.00' x 1.00' deep channel, n= 0.035

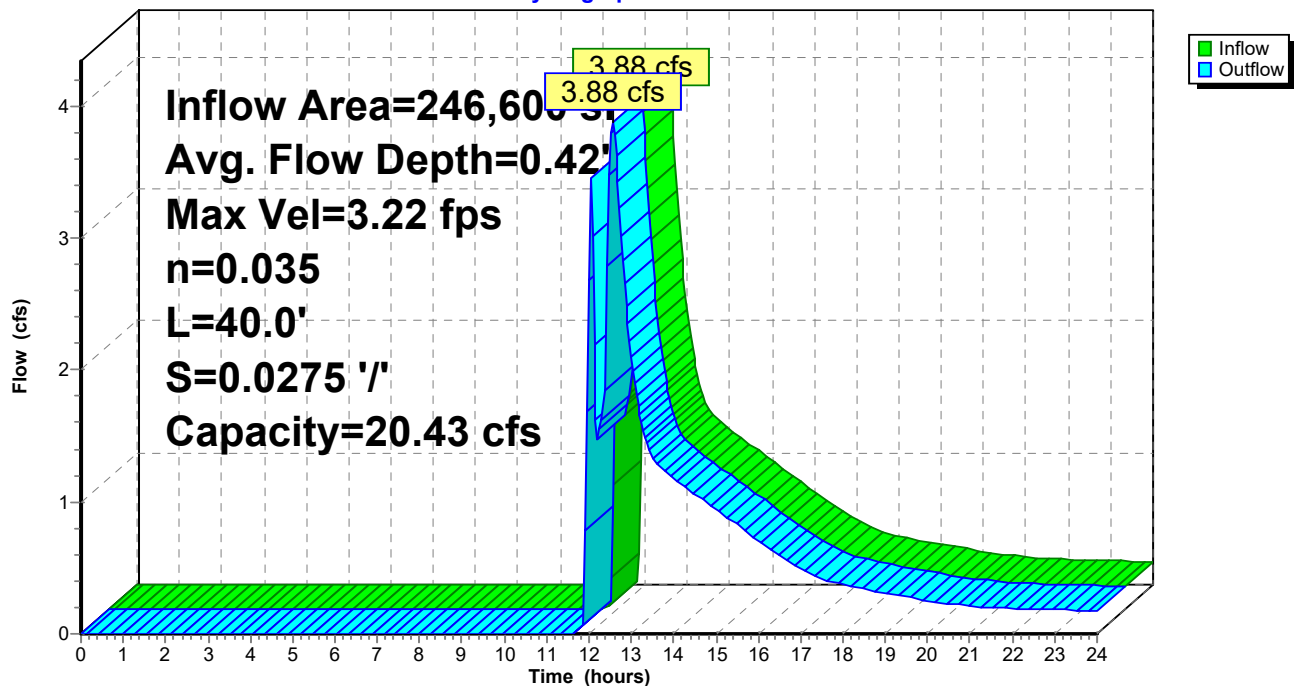
Side Slope Z-value= 2.0 '/' Top Width= 6.00'

Length= 40.0' Slope= 0.0275 '/'

Inlet Invert= 908.00', Outlet Invert= 906.90'

**Reach 18R: PennDOT Channel**

Hydrograph



Summary for Pond 3p: Subsurface Infiltration Bed #1

Inflow Area = 10,278 sf, 21.06% Impervious, Inflow Depth > 3.96" for 100-yr event
 Inflow = 1.61 cfs @ 11.98 hrs, Volume= 3,393 cf
 Outflow = 1.31 cfs @ 12.04 hrs, Volume= 2,793 cf, Atten= 19%, Lag= 3.5 min
 Discarded = 0.02 cfs @ 12.04 hrs, Volume= 935 cf
 Primary = 1.29 cfs @ 12.04 hrs, Volume= 1,859 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 914.73' @ 12.04 hrs Surf.Area= 800 sf Storage= 1,000 cf

Plug-Flow detention time= 117.8 min calculated for 2,793 cf (82% of inflow)
 Center-of-Mass det. time= 40.4 min (871.6 - 831.2)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	795 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 2,200 cf Overall - 212 cf Embedded = 1,988 cf x 40.0% Voids
#2	912.00'	212 cf	18.0" Round Pipe Storage x 3 Inside #1 L= 40.0'
		1,007 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	800	0	0
913.00	800	800	800
914.00	800	800	1,600
914.75	800	600	2,200

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	913.50'	3.0" Round Culvert L= 10.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.1000 ' / Cc= 0.900 n= 0.024, Flow Area= 0.05 sf
#3	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'

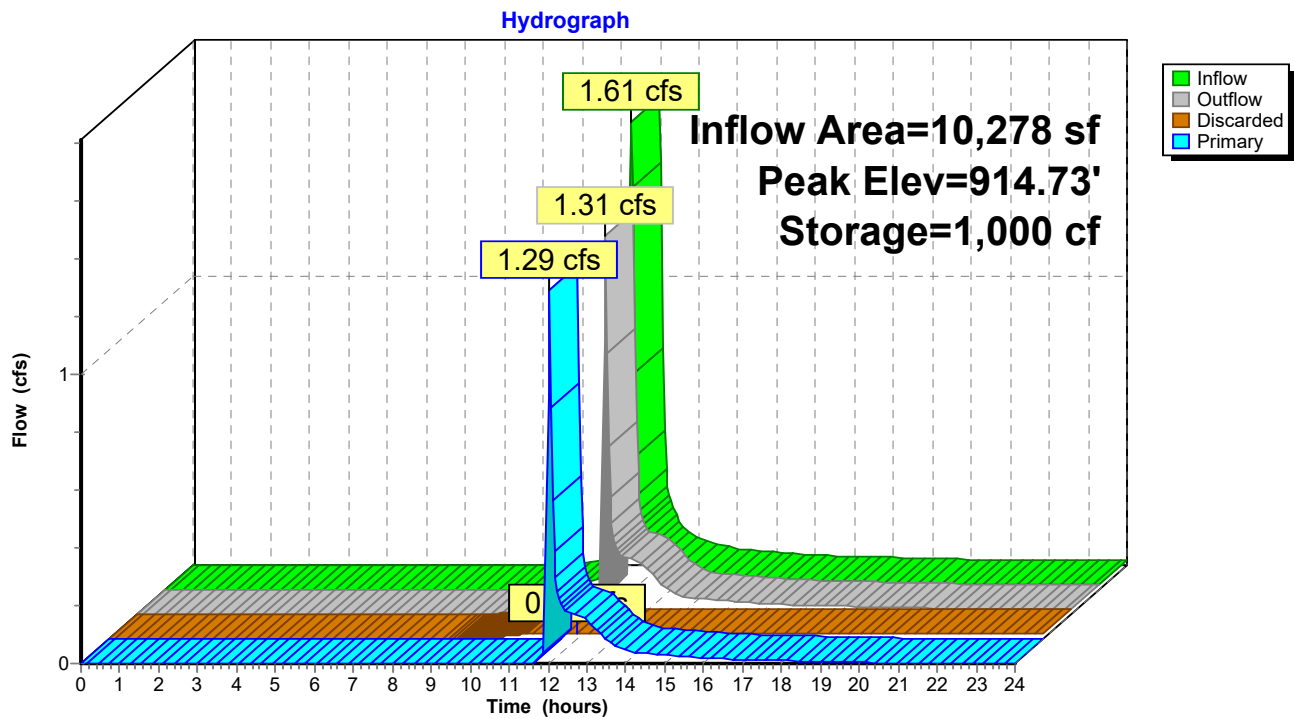
Discarded OutFlow Max=0.02 cfs @ 12.04 hrs HW=914.72' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=1.28 cfs @ 12.04 hrs HW=914.72' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 1.09 cfs @ 1.21 fps)

↑ **2=Culvert** (Barrel Controls 0.19 cfs @ 3.92 fps)

Pond 3p: Subsurface Infiltration Bed #1

Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 1.97" for 100-yr event
 Inflow = 7.09 cfs @ 12.23 hrs, Volume= 31,387 cf
 Outflow = 3.50 cfs @ 12.55 hrs, Volume= 28,121 cf, Atten= 51%, Lag= 18.8 min
 Discarded = 0.14 cfs @ 12.55 hrs, Volume= 4,642 cf
 Primary = 3.36 cfs @ 12.55 hrs, Volume= 23,479 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
 Peak Elev= 926.72' @ 12.55 hrs Surf.Area= 4,997 sf Storage= 8,669 cf

Plug-Flow detention time= 102.3 min calculated for 28,121 cf (90% of inflow)
 Center-of-Mass det. time= 51.6 min (940.6 - 889.1)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,904 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
925.33	3,629	1,143	2,677
926.00	4,260	2,643	5,320
927.00	5,278	4,769	10,089
928.00	6,352	5,815	15,904

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Device 4	926.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	924.50'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#4	Primary	924.50'	18.0" Round Culvert L= 71.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 911.00' S= 0.1901 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#5	Device 4	925.33'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.14 cfs @ 12.55 hrs HW=926.72' (Free Discharge)

↑ **3=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=3.34 cfs @ 12.55 hrs HW=926.72' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

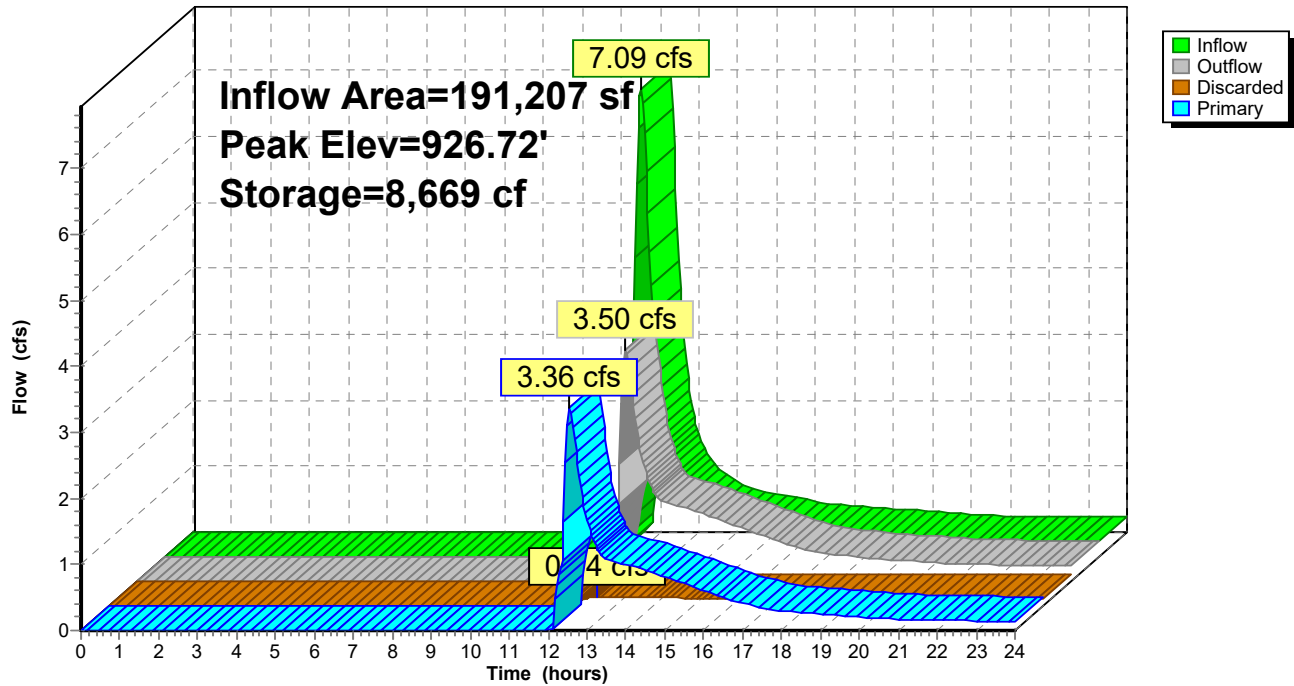
↑ **4=Culvert** (Passes 3.34 cfs of 12.91 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 2.16 cfs @ 1.54 fps)

↑ **5=Orifice/Grate** (Orifice Controls 1.18 cfs @ 5.33 fps)

Pond 5P: Basin 1

Hydrograph



Summary for Pond 17P: Subsurface Infiltration Bed #2

Inflow Area = 5,684 sf, 6.60% Impervious, Inflow Depth > 4.77" for 100-yr event
 Inflow = 1.05 cfs @ 11.98 hrs, Volume= 2,258 cf
 Outflow = 1.04 cfs @ 11.99 hrs, Volume= 2,043 cf, Atten= 1%, Lag= 0.5 min
 Discarded = 0.01 cfs @ 11.99 hrs, Volume= 712 cf
 Primary = 1.03 cfs @ 11.99 hrs, Volume= 1,331 cf

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

Peak Elev= 913.45' @ 11.99 hrs Surf.Area= 575 sf Storage= 389 cf

Plug-Flow detention time= 78.4 min calculated for 2,040 cf (90% of inflow)

Center-of-Mass det. time= 30.0 min (846.7 - 816.7)

Volume	Invert	Avail.Storage	Storage Description
#1	912.00'	307 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 863 cf Overall - 94 cf Embedded = 768 cf x 40.0% Voids
#2	912.00'	79 cf	12.0" Round Pipe Storage x 4 Inside #1 L= 25.0'
#3	912.00'	16 cf	12.0" Round Pipe Storage x 2 Inside #1 L= 10.0'
			402 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
912.00	575	0	0
913.00	575	575	575
913.50	575	288	863

Device	Routing	Invert	Outlet Devices
#1	Primary	913.25'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	912.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = -4.00'
#3	Primary	912.80'	3.0" Round Culvert L= 28.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 912.80' / 908.50' S= 0.1536 ' / Cc= 0.900 n= 0.024, Flow Area= 0.05 sf

Discarded OutFlow Max=0.01 cfs @ 11.99 hrs HW=913.44' (Free Discharge)

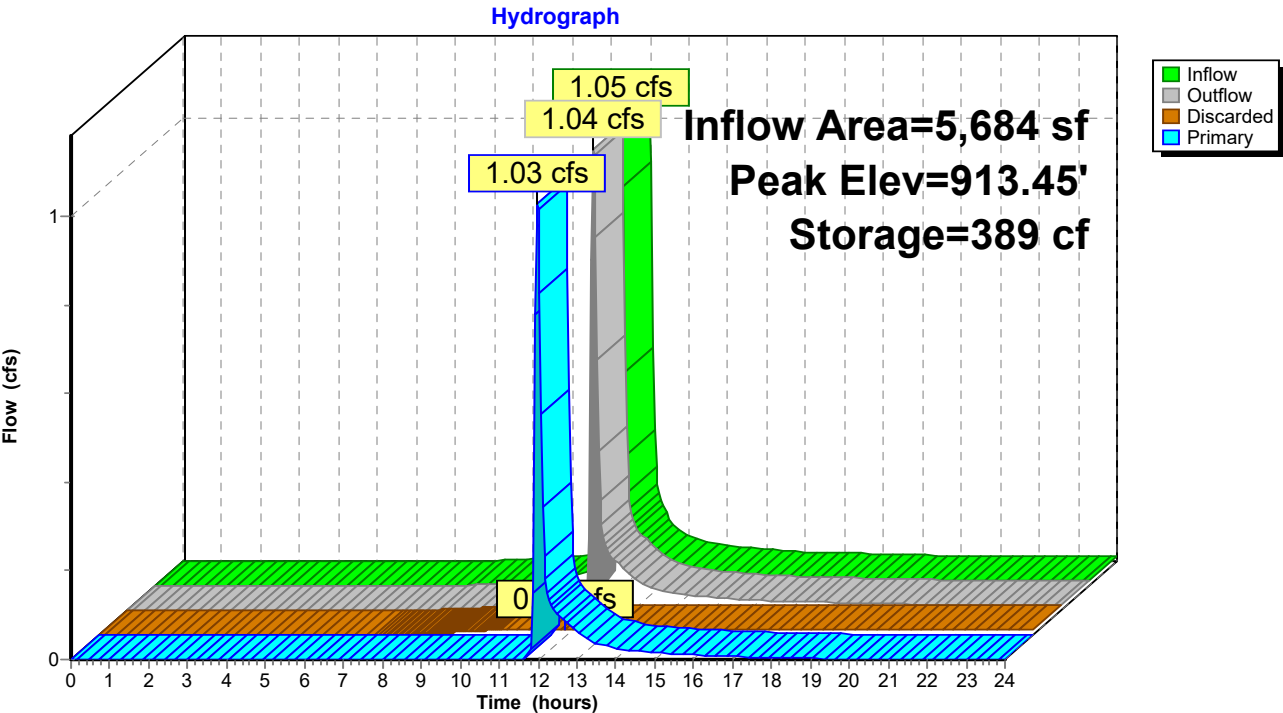
↑ **2=Exfiltration** (Controls 0.01 cfs)

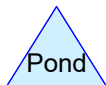
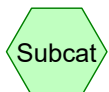
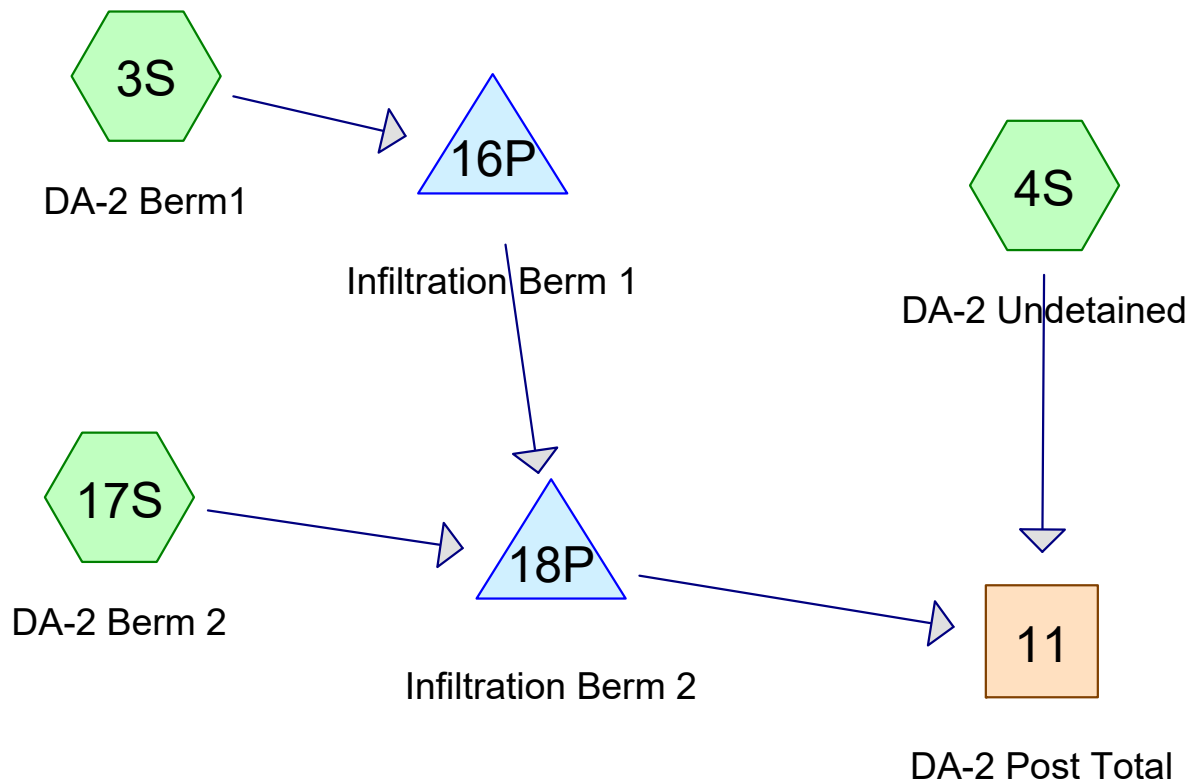
Primary OutFlow Max=1.00 cfs @ 11.99 hrs HW=913.44' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.87 cfs @ 1.12 fps)

↑ **3=Culvert** (Inlet Controls 0.13 cfs @ 2.74 fps)

Pond 17P: Subsurface Infiltration Bed #2





Routing Diagram for MLV 505LD86_PostwBMP DA2- REV 3
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MLV 505LD86_PostwBMP DA2- REV 3

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
11,069	98	Imperviuos (3S)
12,601	30	Meadow, non-grazed, HSG A (3S, 4S)
47,169	78	Meadow, non-grazed, HSG D (3S, 4S, 17S)
4,961	30	Woods, Good, HSG A (3S)
75,800	70	TOTAL AREA

MLV 505LD86_PostwBMP DA2- REV 3

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
17,562	HSG A	3S, 4S
0	HSG B	
0	HSG C	
47,169	HSG D	3S, 4S, 17S
11,069	Other	3S
75,800		TOTAL AREA

MLV 505LD86_PostwBMP DA2- REV 3

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
0	0	0	0	11,069	11,069	Imperviuos	
12,601	0	0	47,169	0	59,770	Meadow, non-grazed	
4,961	0	0	0	0	4,961	Woods, Good	
17,562	0	0	47,169	11,069	75,800	TOTAL AREA	

MLV 505LD86_PostwBMP DA2- REV 3*Type II 24-hr 1-yr Rainfall=2.72"*

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Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: DA-2 Berm1

Runoff Area=63,791 sf 17.35% Impervious Runoff Depth>0.48"
Flow Length=526' Tc=15.7 min CN=68 Runoff=0.72 cfs 2,577 cf

Subcatchment4S: DA-2 Undetained

Runoff Area=7,345 sf 0.00% Impervious Runoff Depth>0.83"
Flow Length=221' Tc=3.0 min CN=76 Runoff=0.28 cfs 508 cf

Subcatchment17S: DA-2 Berm 2

Runoff Area=4,664 sf 0.00% Impervious Runoff Depth>0.93"
Flow Length=40' Slope=0.1500 '/' Tc=3.0 min CN=78 Runoff=0.20 cfs 363 cf

Reach 11: DA-2 Post Total

Inflow=0.28 cfs 508 cf
Outflow=0.28 cfs 508 cf

Pond 16P: Infiltration Berm 1

Peak Elev=970.24' Storage=1,260 cf Inflow=0.72 cfs 2,577 cf
Discarded=0.04 cfs 1,606 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 1,606 cf

Pond 18P: Infiltration Berm 2

Peak Elev=963.35' Storage=148 cf Inflow=0.20 cfs 363 cf
Discarded=0.01 cfs 361 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 361 cf

Total Runoff Area = 75,800 sf Runoff Volume = 3,448 cf Average Runoff Depth = 0.55"
85.40% Pervious = 64,731 sf 14.60% Impervious = 11,069 sf

MLV 505LD86_PostwBMP DA2- REV 3

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 3S: DA-2 Berm1

Runoff = 0.72 cfs @ 12.11 hrs, Volume= 2,577 cf, Depth> 0.48"

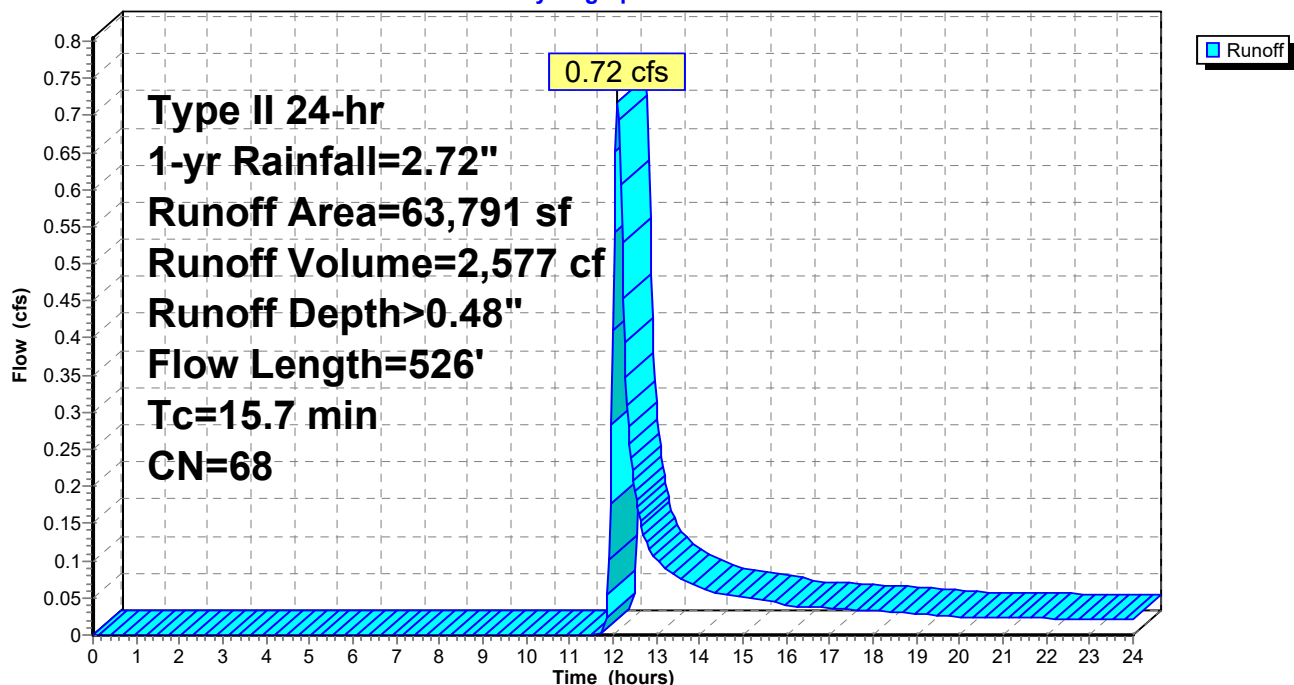
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type II 24-hr 1-yr Rainfall=2.72"

	Area (sf)	CN	Description
*	11,069	98	Imperviuos
	4,961	30	Woods, Good, HSG A
	12,328	30	Meadow, non-grazed, HSG A
	35,433	78	Meadow, non-grazed, HSG D
	63,791	68	Weighted Average
	52,722		82.65% Pervious Area
	11,069		17.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0800	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.4	130	0.0885	6.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.1	296	0.0507	1.58		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.7	526	Total			

Subcatchment 3S: DA-2 Berm1

Hydrograph



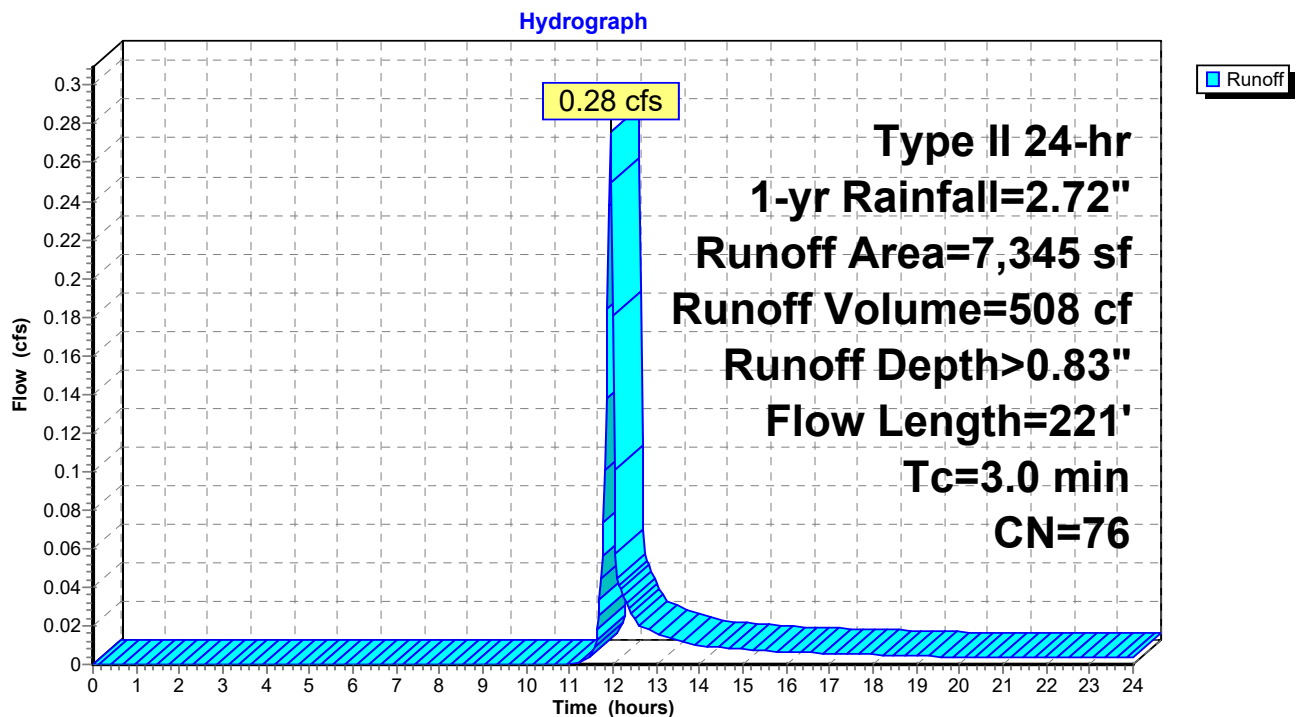
Summary for Subcatchment 4S: DA-2 Undetained[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.28 cfs @ 11.94 hrs, Volume= 508 cf, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
273	30	Meadow, non-grazed, HSG A
7,072	78	Meadow, non-grazed, HSG D
7,345	76	Weighted Average
7,345		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	31	0.1290	0.29		Sheet Flow, Grass: Short $n=0.150$ $P2=3.26"$
1.2	190	0.2580	2.54		Shallow Concentrated Flow, Woodland $K_v=5.0$ fps
3.0	221	Total			

Subcatchment 4S: DA-2 Undetained

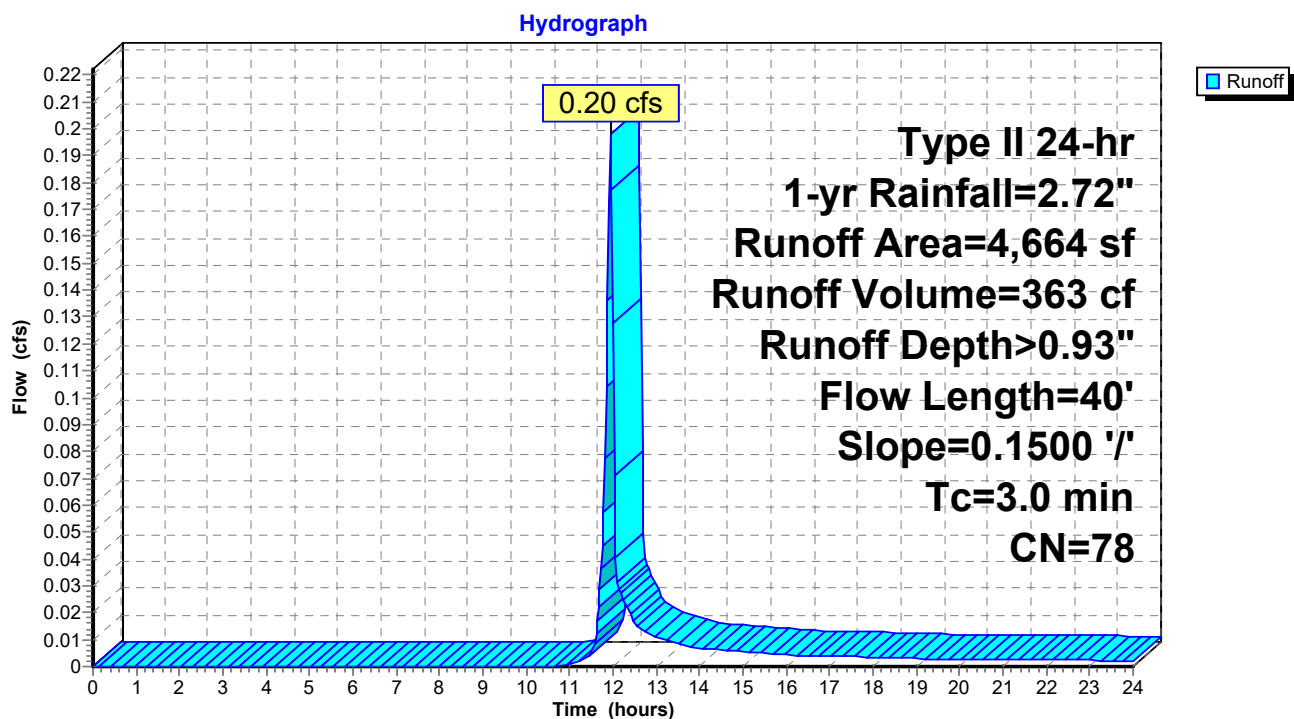
Summary for Subcatchment 17S: DA-2 Berm 2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.20 cfs @ 11.94 hrs, Volume= 363 cf, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
4,664	78	Meadow, non-grazed, HSG D
4,664		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	40	0.1500	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"

Subcatchment 17S: DA-2 Berm 2

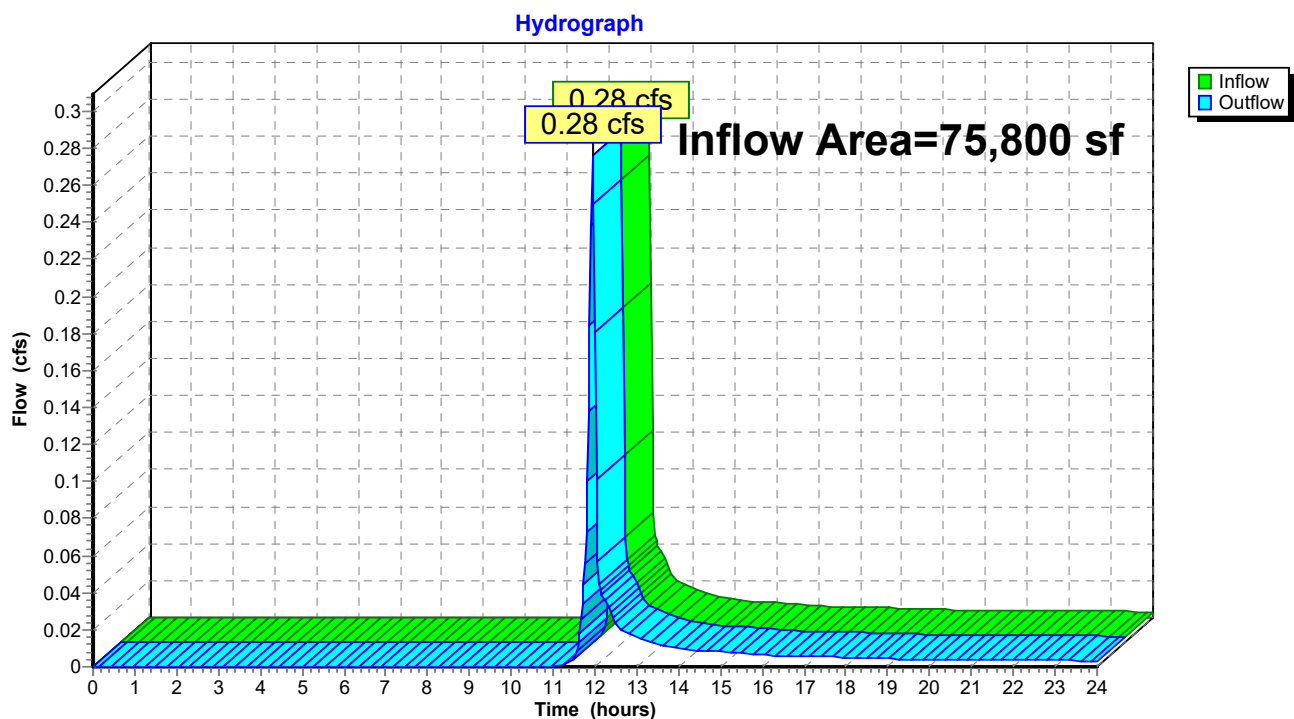
Summary for Reach 11: DA-2 Post Total

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

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 0.08" for 1-yr event
 Inflow = 0.28 cfs @ 11.94 hrs, Volume= 508 cf
 Outflow = 0.28 cfs @ 11.94 hrs, Volume= 508 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Reach 11: DA-2 Post Total



Summary for Pond 16P: Infiltration Berm 1

Inflow Area = 63,791 sf, 17.35% Impervious, Inflow Depth > 0.48" for 1-yr event
 Inflow = 0.72 cfs @ 12.11 hrs, Volume= 2,577 cf
 Outflow = 0.04 cfs @ 16.11 hrs, Volume= 1,606 cf, Atten= 94%, Lag= 239.9 min
 Discarded = 0.04 cfs @ 16.11 hrs, Volume= 1,606 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 970.24' @ 16.11 hrs Surf.Area= 1,611 sf Storage= 1,260 cf

Plug-Flow detention time= 314.2 min calculated for 1,604 cf (62% of inflow)
 Center-of-Mass det. time= 178.2 min (1,079.5 - 901.2)

Volume	Invert	Avail.Storage	Storage Description
#1	969.00'	2,871 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

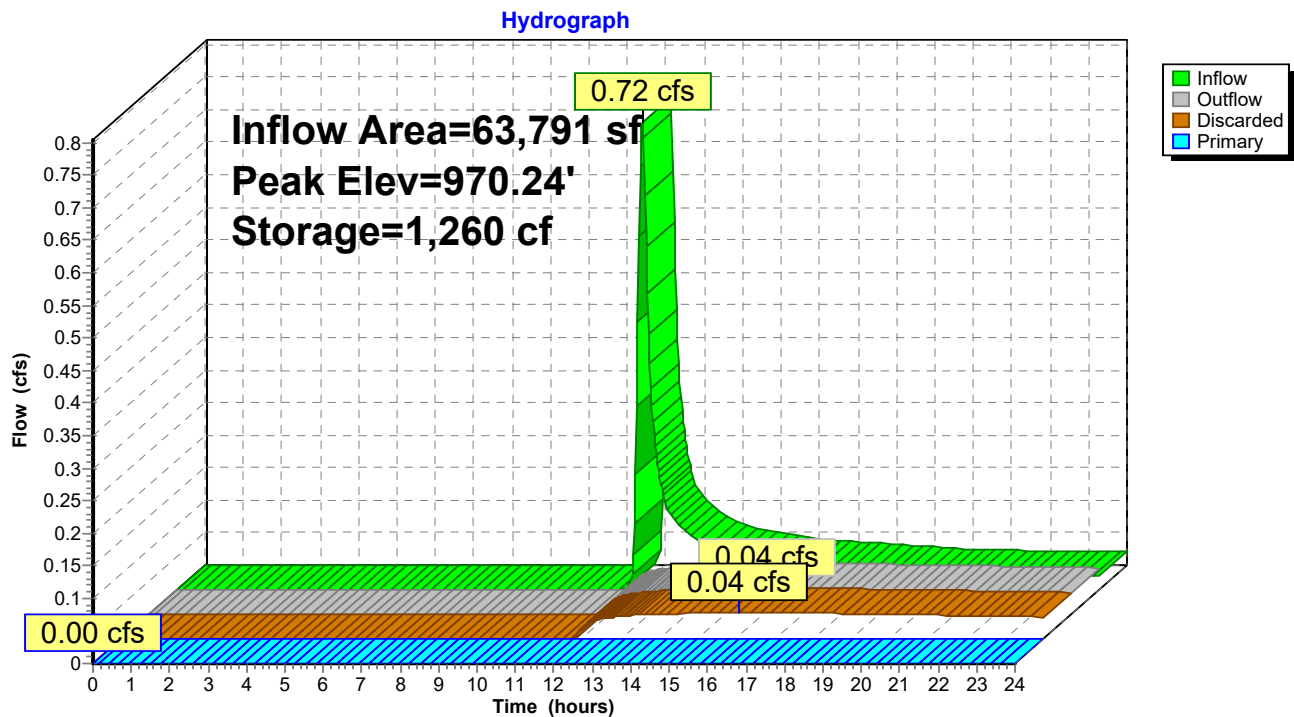
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
969.00	511	0	0
970.00	1,300	906	906
971.00	2,579	1,940	2,845
971.01	2,579	26	2,871

Device	Routing	Invert	Outlet Devices
#1	Primary	971.00'	128.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	970.50'	5.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	969.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.04 cfs @ 16.11 hrs HW=970.24' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=969.00' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 16P: Infiltration Berm 1



Summary for Pond 18P: Infiltration Berm 2

Inflow Area = 68,455 sf, 16.17% Impervious, Inflow Depth > 0.06" for 1-yr event
 Inflow = 0.20 cfs @ 11.94 hrs, Volume= 363 cf
 Outflow = 0.01 cfs @ 12.77 hrs, Volume= 361 cf, Atten= 94%, Lag= 49.8 min
 Discarded = 0.01 cfs @ 12.77 hrs, Volume= 361 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 963.35' @ 12.77 hrs Surf.Area= 516 sf Storage= 148 cf

Plug-Flow detention time= 118.6 min calculated for 360 cf (99% of inflow)
 Center-of-Mass det. time= 115.4 min (967.4 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	963.00'	1,736 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

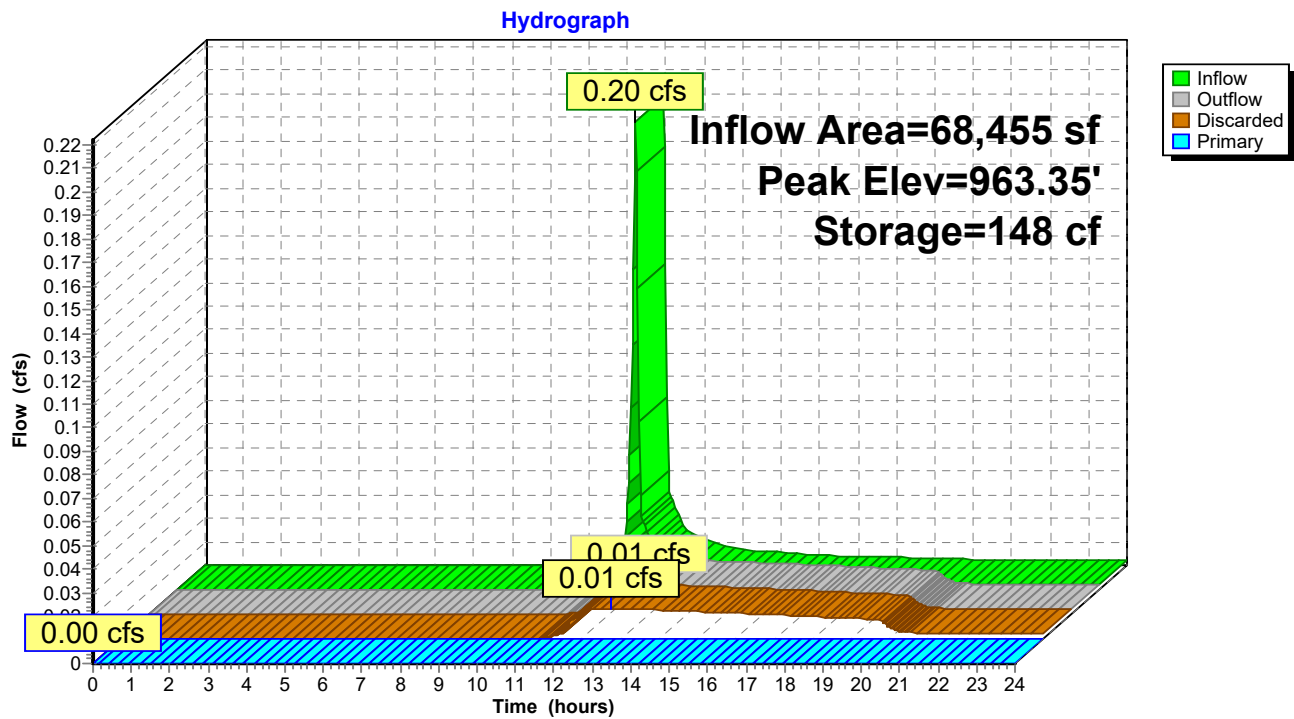
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
963.00	340	0	0
964.00	848	594	594
965.00	1,407	1,128	1,722
965.01	1,407	14	1,736

Device	Routing	Invert	Outlet Devices
#1	Primary	965.00'	74.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	964.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	963.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.01 cfs @ 12.77 hrs HW=963.35' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=963.00' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 18P: Infiltration Berm 2



MLV 505LD86_PostwBMP DA2- REV 3*Type II 24-hr 2-yr Rainfall=3.26"*

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Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: DA-2 Berm1

Runoff Area=63,791 sf 17.35% Impervious Runoff Depth>0.76"
Flow Length=526' Tc=15.7 min CN=68 Runoff=1.26 cfs 4,045 cf

Subcatchment4S: DA-2 Undetained

Runoff Area=7,345 sf 0.00% Impervious Runoff Depth>1.19"
Flow Length=221' Tc=3.0 min CN=76 Runoff=0.40 cfs 730 cf

Subcatchment17S: DA-2 Berm 2

Runoff Area=4,664 sf 0.00% Impervious Runoff Depth>1.32"
Flow Length=40' Slope=0.1500 '/' Tc=3.0 min CN=78 Runoff=0.28 cfs 512 cf

Reach 11: DA-2 Post Total

Inflow=0.40 cfs 730 cf
Outflow=0.40 cfs 730 cf

Pond 16P: Infiltration Berm 1

Peak Elev=970.52' Storage=1,751 cf Inflow=1.26 cfs 4,045 cf
Discarded=0.05 cfs 2,041 cf Primary=0.10 cfs 547 cf Outflow=0.15 cfs 2,589 cf

Pond 18P: Infiltration Berm 2

Peak Elev=964.02' Storage=613 cf Inflow=0.28 cfs 1,059 cf
Discarded=0.02 cfs 845 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 845 cf

Total Runoff Area = 75,800 sf Runoff Volume = 5,287 cf Average Runoff Depth = 0.84"
85.40% Pervious = 64,731 sf 14.60% Impervious = 11,069 sf

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Type II 24-hr 2-yr Rainfall=3.26"

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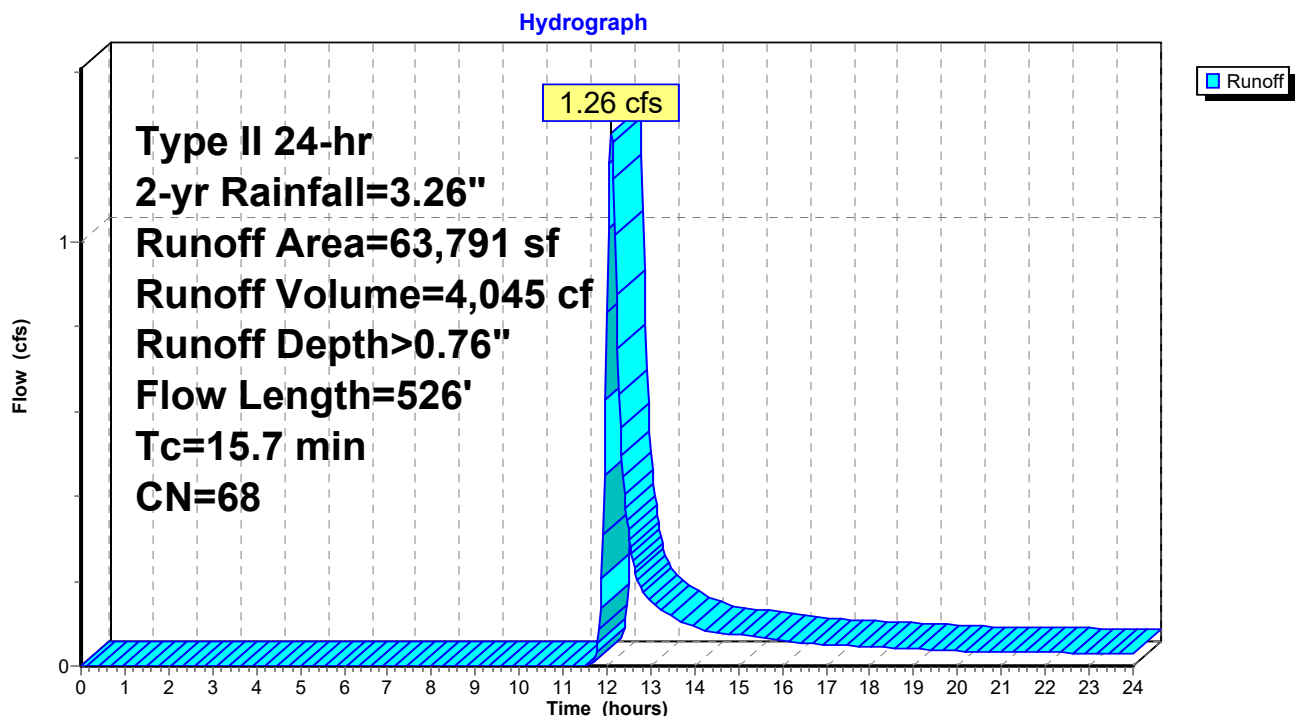
Summary for Subcatchment 3S: DA-2 Berm1

Runoff = 1.26 cfs @ 12.10 hrs, Volume= 4,045 cf, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type II 24-hr 2-yr Rainfall=3.26"

	Area (sf)	CN	Description
*	11,069	98	Impervious
	4,961	30	Woods, Good, HSG A
	12,328	30	Meadow, non-grazed, HSG A
	35,433	78	Meadow, non-grazed, HSG D
	63,791	68	Weighted Average
	52,722		82.65% Pervious Area
	11,069		17.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0800	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.4	130	0.0885	6.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.1	296	0.0507	1.58		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.7	526	Total			

Subcatchment 3S: DA-2 Berm1

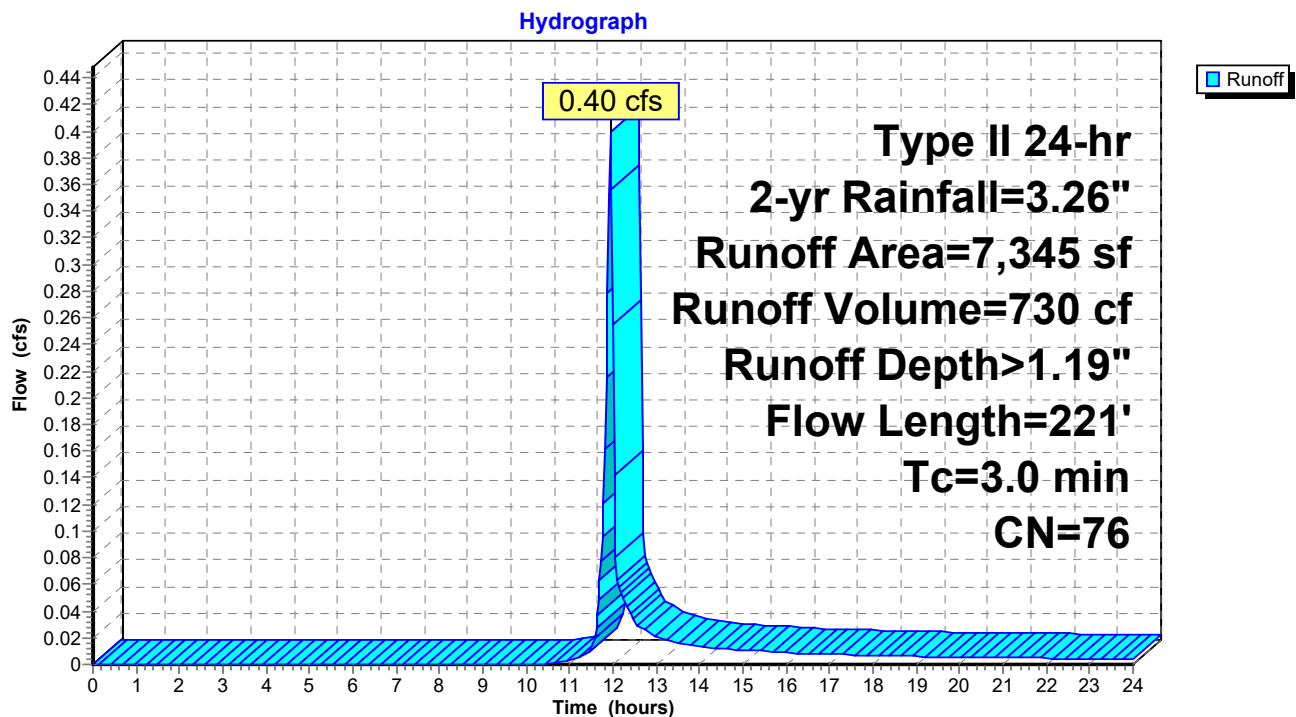
Summary for Subcatchment 4S: DA-2 Undetained[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.40 cfs @ 11.94 hrs, Volume= 730 cf, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
273	30	Meadow, non-grazed, HSG A
7,072	78	Meadow, non-grazed, HSG D
7,345	76	Weighted Average
7,345		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	31	0.1290	0.29		Sheet Flow, Grass: Short n= 0.150 P2= 3.26"
1.2	190	0.2580	2.54		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
3.0	221	Total			

Subcatchment 4S: DA-2 Undetained

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Type II 24-hr 2-yr Rainfall=3.26"

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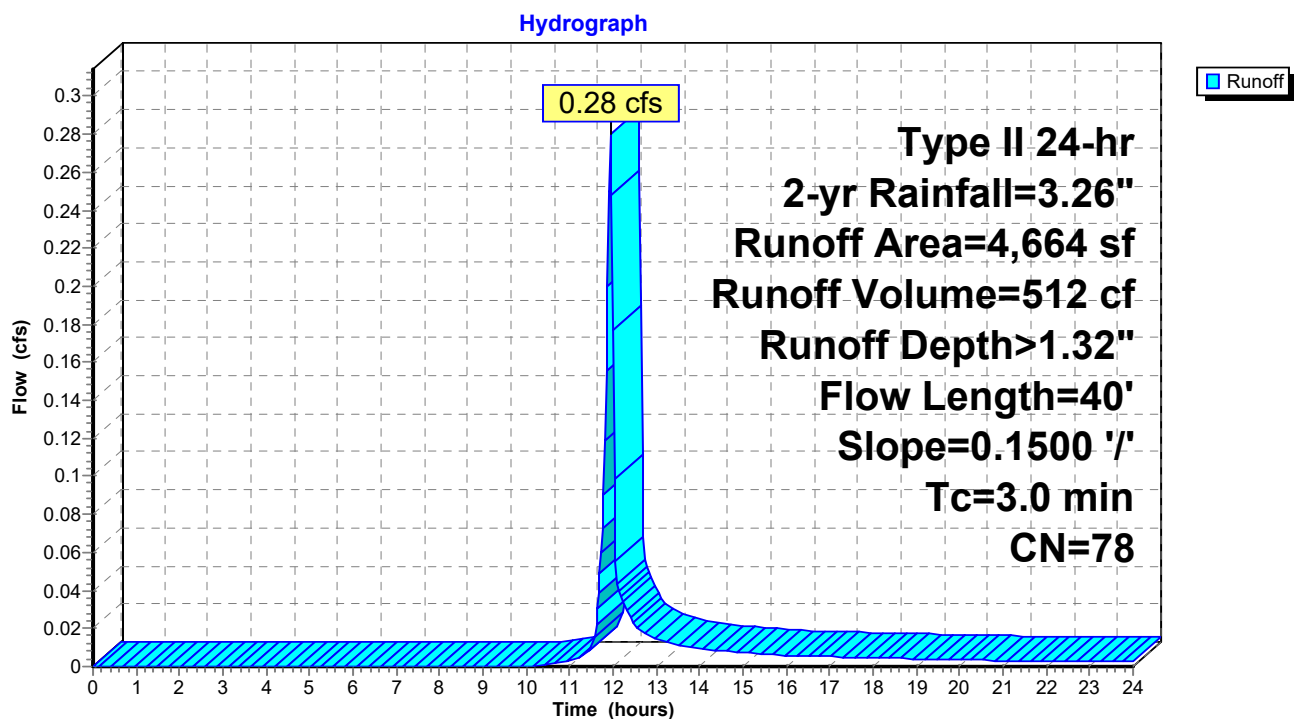
Summary for Subcatchment 17S: DA-2 Berm 2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.28 cfs @ 11.94 hrs, Volume= 512 cf, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
4,664	78	Meadow, non-grazed, HSG D
4,664		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	40	0.1500	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"

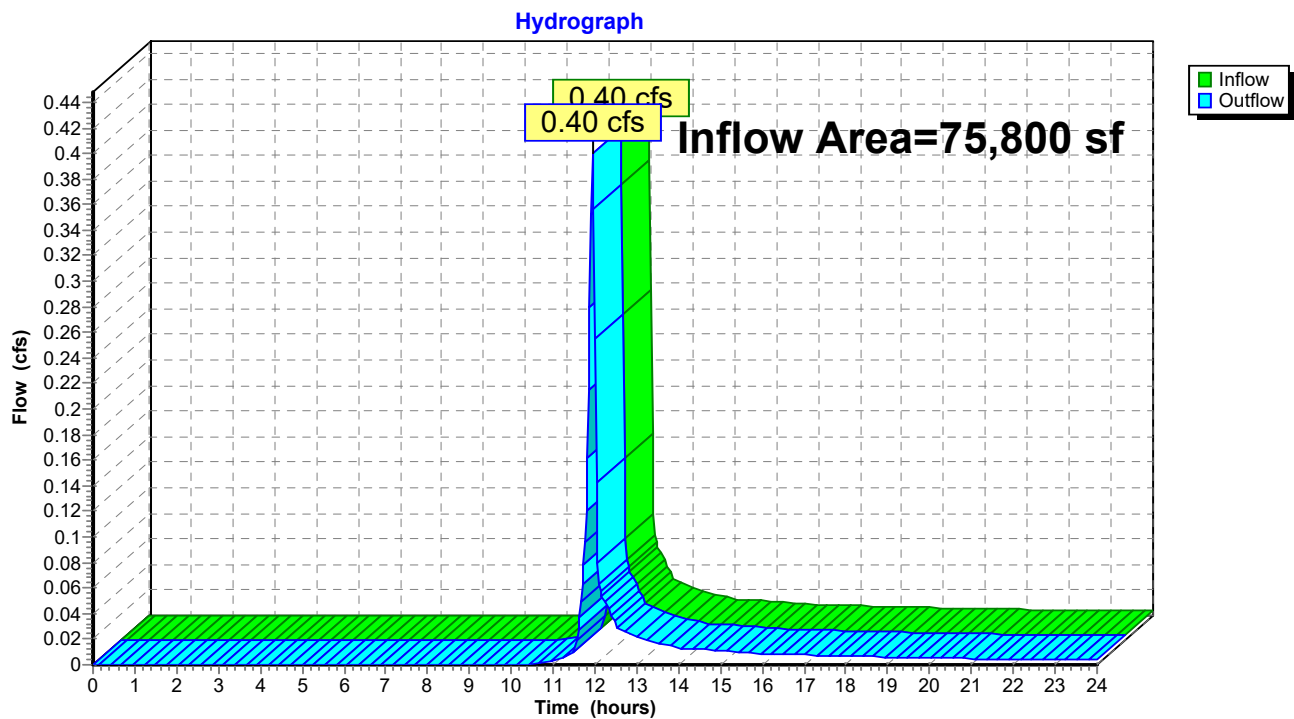
Subcatchment 17S: DA-2 Berm 2

Summary for Reach 11: DA-2 Post Total

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

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 0.12" for 2-yr event
Inflow = 0.40 cfs @ 11.94 hrs, Volume= 730 cf
Outflow = 0.40 cfs @ 11.94 hrs, Volume= 730 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Reach 11: DA-2 Post Total

Summary for Pond 16P: Infiltration Berm 1

Inflow Area = 63,791 sf, 17.35% Impervious, Inflow Depth > 0.76" for 2-yr event
 Inflow = 1.26 cfs @ 12.10 hrs, Volume= 4,045 cf
 Outflow = 0.15 cfs @ 12.99 hrs, Volume= 2,589 cf, Atten= 88%, Lag= 53.7 min
 Discarded = 0.05 cfs @ 12.99 hrs, Volume= 2,041 cf
 Primary = 0.10 cfs @ 12.99 hrs, Volume= 547 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 970.52' @ 12.99 hrs Surf.Area= 1,963 sf Storage= 1,751 cf

Plug-Flow detention time= 270.8 min calculated for 2,589 cf (64% of inflow)
 Center-of-Mass det. time= 142.7 min (1,027.0 - 884.3)

Volume	Invert	Avail.Storage	Storage Description
#1	969.00'	2,871 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

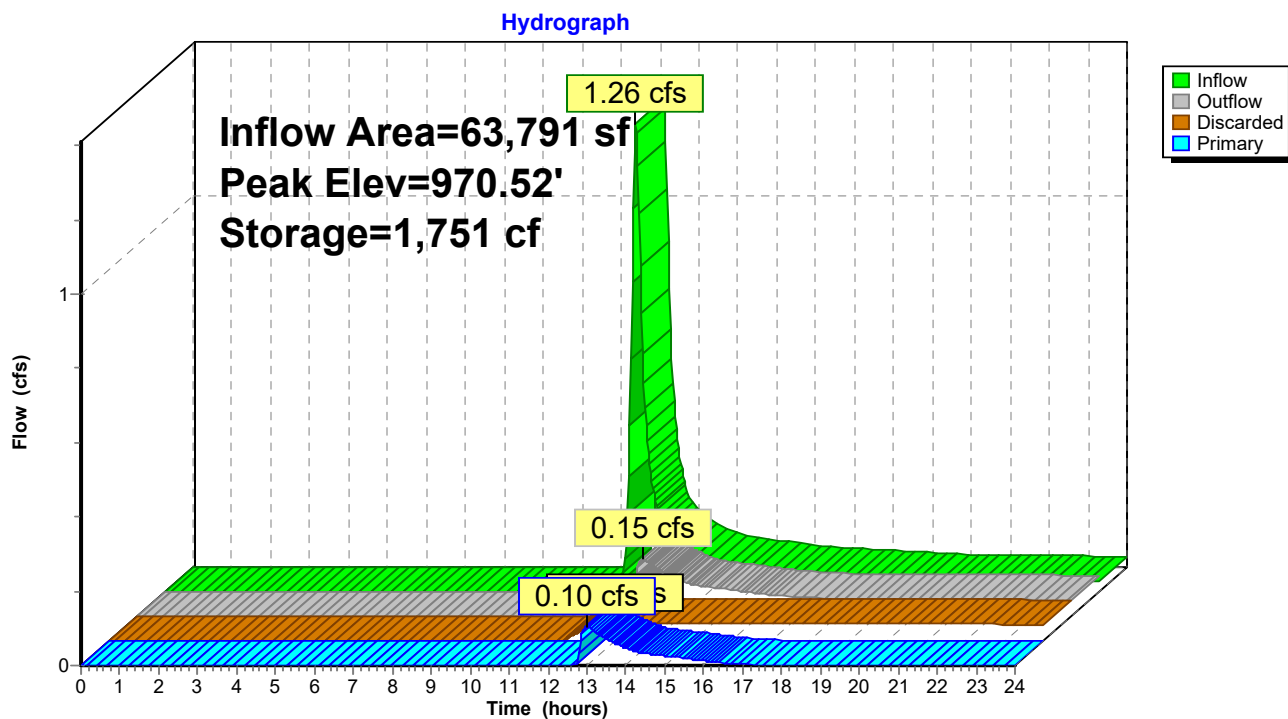
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
969.00	511	0	0
970.00	1,300	906	906
971.00	2,579	1,940	2,845
971.01	2,579	26	2,871

Device	Routing	Invert	Outlet Devices
#1	Primary	971.00'	128.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	970.50'	5.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	969.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.05 cfs @ 12.99 hrs HW=970.52' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.09 cfs @ 12.99 hrs HW=970.52' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.09 cfs @ 0.34 fps)

Pond 16P: Infiltration Berm 1



Summary for Pond 18P: Infiltration Berm 2

Inflow Area = 68,455 sf, 16.17% Impervious, Inflow Depth > 0.19" for 2-yr event
 Inflow = 0.28 cfs @ 11.94 hrs, Volume= 1,059 cf
 Outflow = 0.02 cfs @ 15.73 hrs, Volume= 845 cf, Atten= 92%, Lag= 227.6 min
 Discarded = 0.02 cfs @ 15.73 hrs, Volume= 845 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 964.02' @ 15.73 hrs Surf.Area= 861 sf Storage= 613 cf

Plug-Flow detention time= 270.6 min calculated for 844 cf (80% of inflow)
 Center-of-Mass det. time= 214.8 min (1,056.6 - 841.7)

Volume	Invert	Avail.Storage	Storage Description
#1	963.00'	1,736 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

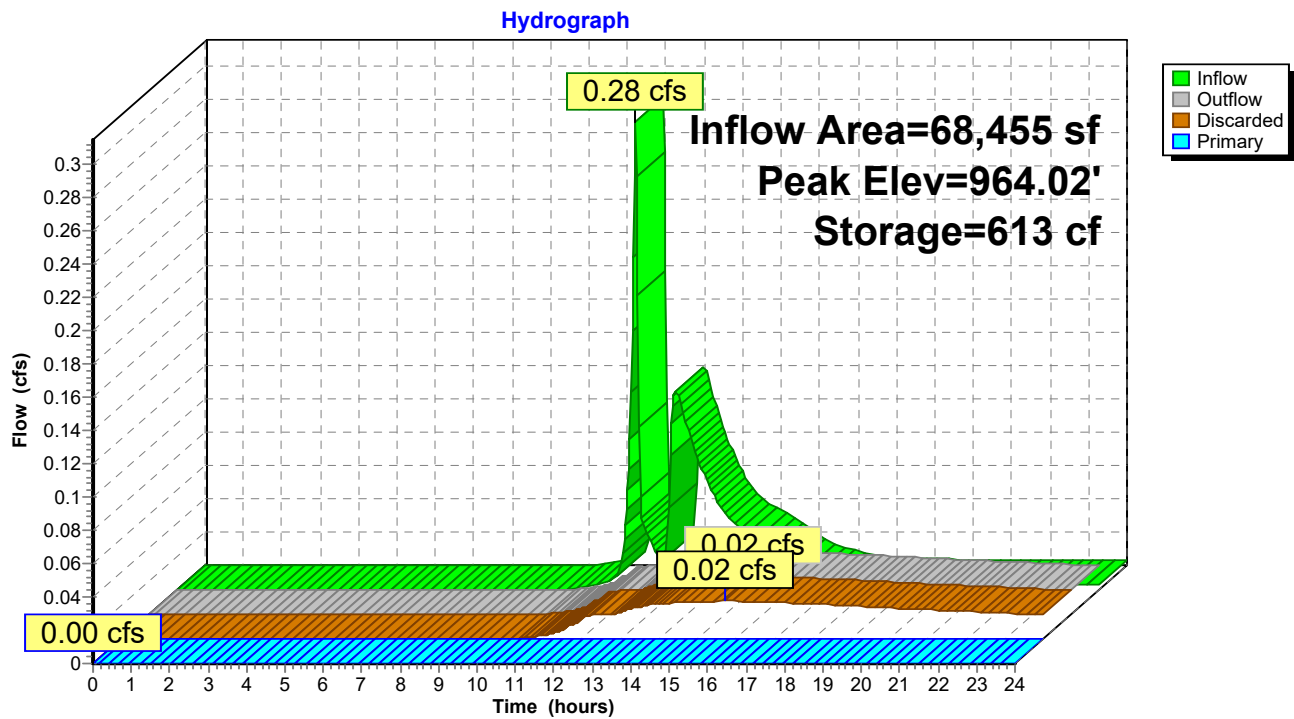
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
963.00	340	0	0
964.00	848	594	594
965.00	1,407	1,128	1,722
965.01	1,407	14	1,736

Device	Routing	Invert	Outlet Devices
#1	Primary	965.00'	74.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	964.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	963.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.02 cfs @ 15.73 hrs HW=964.02' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=963.00' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 18P: Infiltration Berm 2



MLV 505LD86_PostwBMP DA2- REV 3*Type II 24-hr 10-yr Rainfall=4.74"*

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Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: DA-2 Berm1

Runoff Area=63,791 sf 17.35% Impervious Runoff Depth>1.69"
Flow Length=526' Tc=15.7 min CN=68 Runoff=3.06 cfs 8,976 cf

Subcatchment4S: DA-2 Undetained

Runoff Area=7,345 sf 0.00% Impervious Runoff Depth>2.32"
Flow Length=221' Tc=3.0 min CN=76 Runoff=0.77 cfs 1,421 cf

Subcatchment17S: DA-2 Berm 2

Runoff Area=4,664 sf 0.00% Impervious Runoff Depth>2.49"
Flow Length=40' Slope=0.1500 '/' Tc=3.0 min CN=78 Runoff=0.52 cfs 968 cf

Reach 11: DA-2 Post Total

Inflow=2.17 cfs 5,230 cf
Outflow=2.17 cfs 5,230 cf

Pond 16P: Infiltration Berm 1

Peak Elev=970.67' Storage=2,059 cf Inflow=3.06 cfs 8,976 cf
Discarded=0.05 cfs 2,175 cf Primary=2.62 cfs 5,089 cf Outflow=2.67 cfs 7,264 cf

Pond 18P: Infiltration Berm 2

Peak Elev=964.67' Storage=1,284 cf Inflow=2.68 cfs 6,058 cf
Discarded=0.03 cfs 1,378 cf Primary=2.08 cfs 3,809 cf Outflow=2.12 cfs 5,187 cf

Total Runoff Area = 75,800 sf Runoff Volume = 11,365 cf Average Runoff Depth = 1.80"
85.40% Pervious = 64,731 sf 14.60% Impervious = 11,069 sf

MLV 505LD86_PostwBMP DA2- REV 3

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Type II 24-hr 10-yr Rainfall=4.74"

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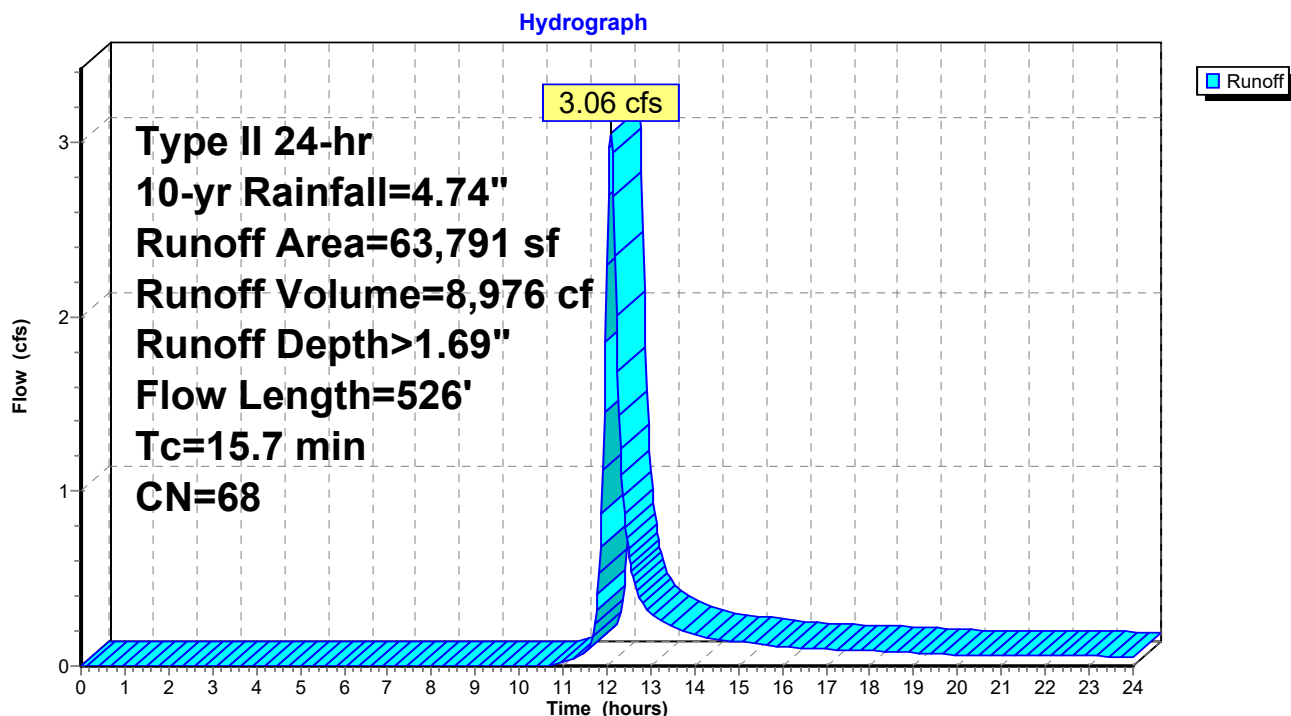
Summary for Subcatchment 3S: DA-2 Berm1

Runoff = 3.06 cfs @ 12.09 hrs, Volume= 8,976 cf, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type II 24-hr 10-yr Rainfall=4.74"

	Area (sf)	CN	Description
*	11,069	98	Imperviuos
	4,961	30	Woods, Good, HSG A
	12,328	30	Meadow, non-grazed, HSG A
	35,433	78	Meadow, non-grazed, HSG D
	63,791	68	Weighted Average
	52,722		82.65% Pervious Area
	11,069		17.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0800	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.4	130	0.0885	6.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.1	296	0.0507	1.58		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.7	526	Total			

Subcatchment 3S: DA-2 Berm1

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Type II 24-hr 10-yr Rainfall=4.74"

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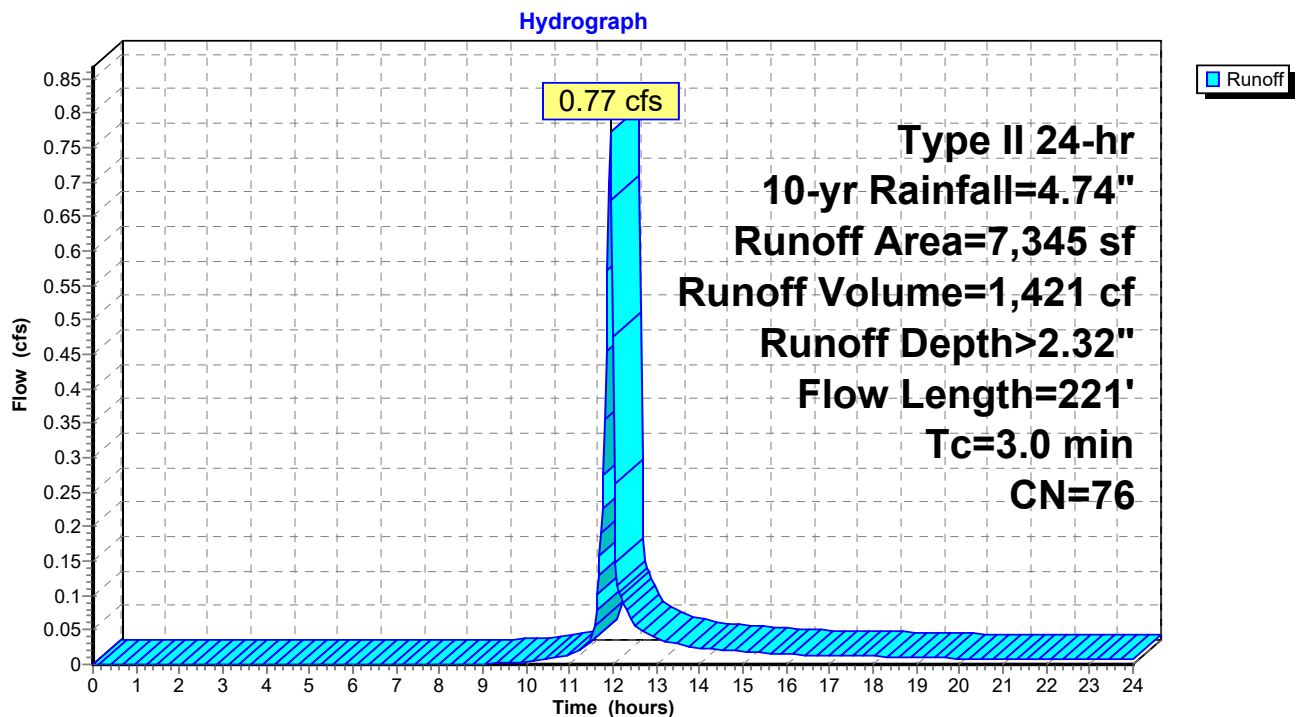
Summary for Subcatchment 4S: DA-2 Undetained[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.77 cfs @ 11.94 hrs, Volume= 1,421 cf, Depth> 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
273	30	Meadow, non-grazed, HSG A
7,072	78	Meadow, non-grazed, HSG D
7,345	76	Weighted Average
7,345		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	31	0.1290	0.29		Sheet Flow, Grass: Short $n=0.150$ $P2=3.26"$
1.2	190	0.2580	2.54		Shallow Concentrated Flow, Woodland $K_v=5.0$ fps
3.0	221	Total			

Subcatchment 4S: DA-2 Undetained

MLV 505LD86_PostwBMP DA2- REV 3

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Type II 24-hr 10-yr Rainfall=4.74"

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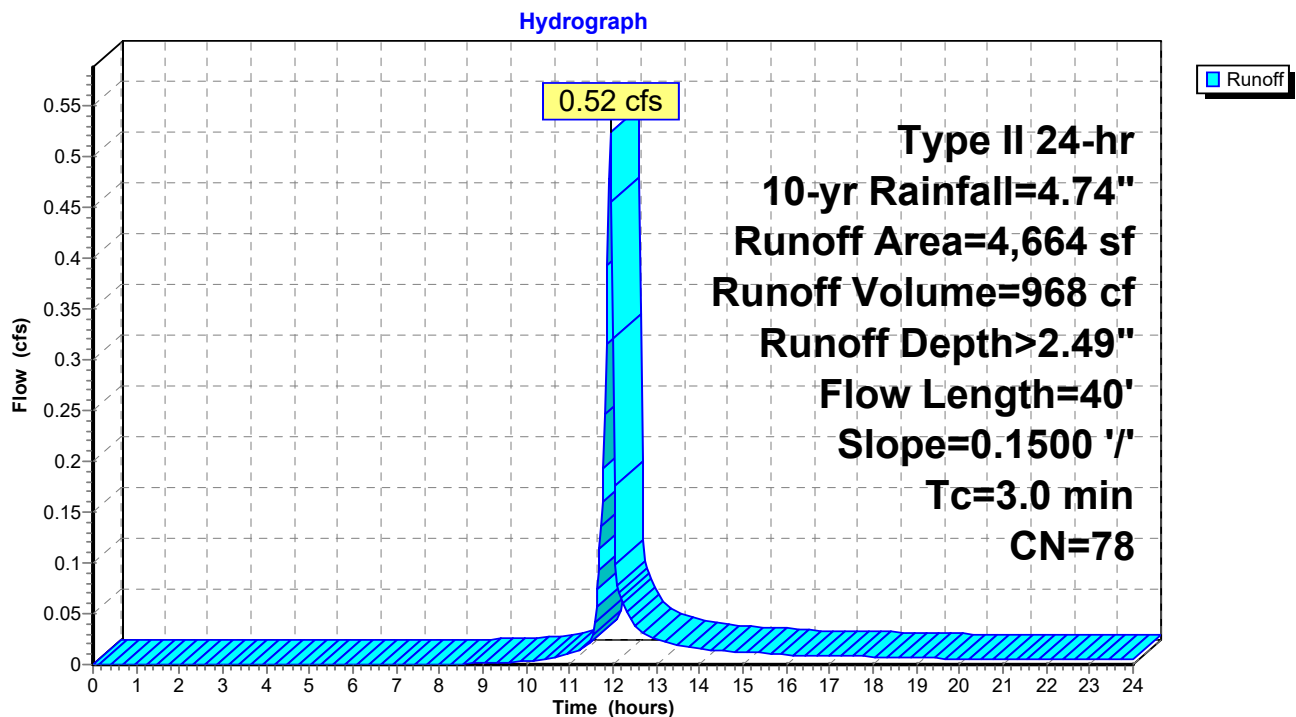
Summary for Subcatchment 17S: DA-2 Berm 2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.52 cfs @ 11.94 hrs, Volume= 968 cf, Depth> 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
4,664	78	Meadow, non-grazed, HSG D
4,664		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	40	0.1500	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"

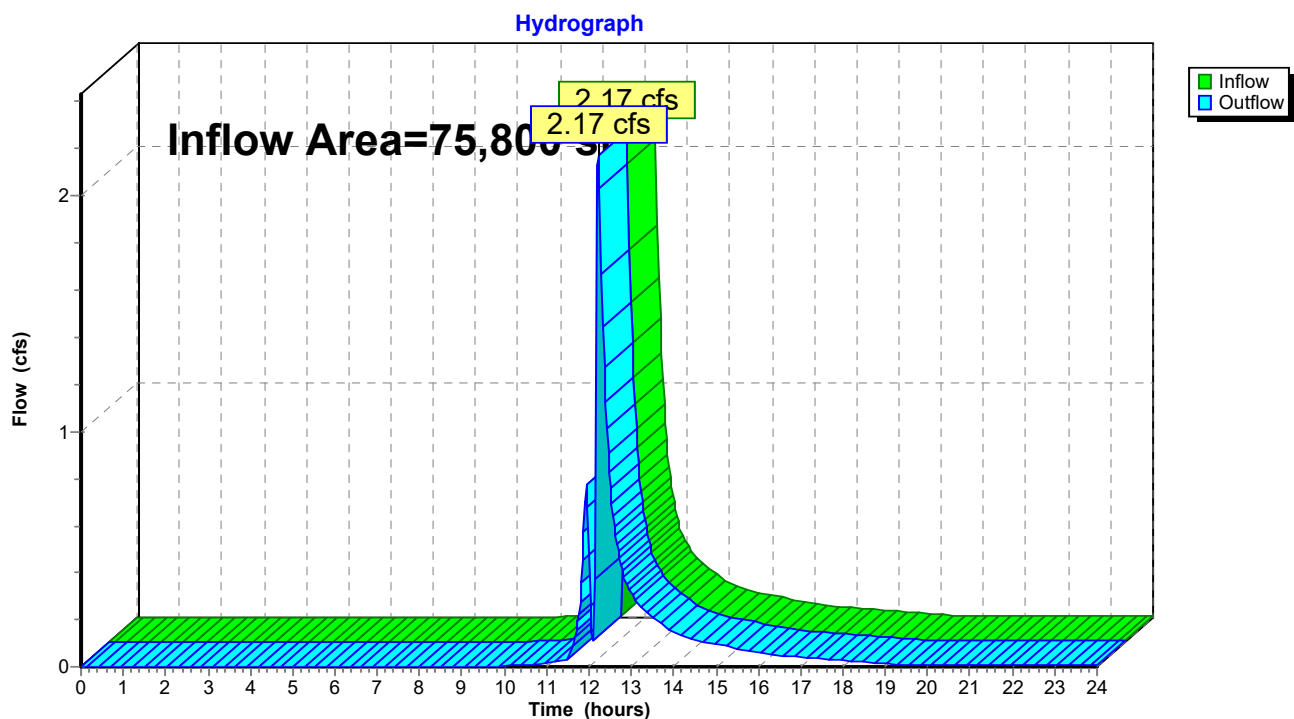
Subcatchment 17S: DA-2 Berm 2

Summary for Reach 11: DA-2 Post Total

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

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 0.83" for 10-yr event
Inflow = 2.17 cfs @ 12.23 hrs, Volume= 5,230 cf
Outflow = 2.17 cfs @ 12.23 hrs, Volume= 5,230 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Reach 11: DA-2 Post Total

Summary for Pond 16P: Infiltration Berm 1

Inflow Area = 63,791 sf, 17.35% Impervious, Inflow Depth > 1.69" for 10-yr event
 Inflow = 3.06 cfs @ 12.09 hrs, Volume= 8,976 cf
 Outflow = 2.67 cfs @ 12.16 hrs, Volume= 7,264 cf, Atten= 13%, Lag= 4.1 min
 Discarded = 0.05 cfs @ 12.16 hrs, Volume= 2,175 cf
 Primary = 2.62 cfs @ 12.16 hrs, Volume= 5,089 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 970.67' @ 12.16 hrs Surf.Area= 2,154 sf Storage= 2,059 cf

Plug-Flow detention time= 118.5 min calculated for 7,255 cf (81% of inflow)
 Center-of-Mass det. time= 36.4 min (895.1 - 858.7)

Volume	Invert	Avail.Storage	Storage Description
#1	969.00'	2,871 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

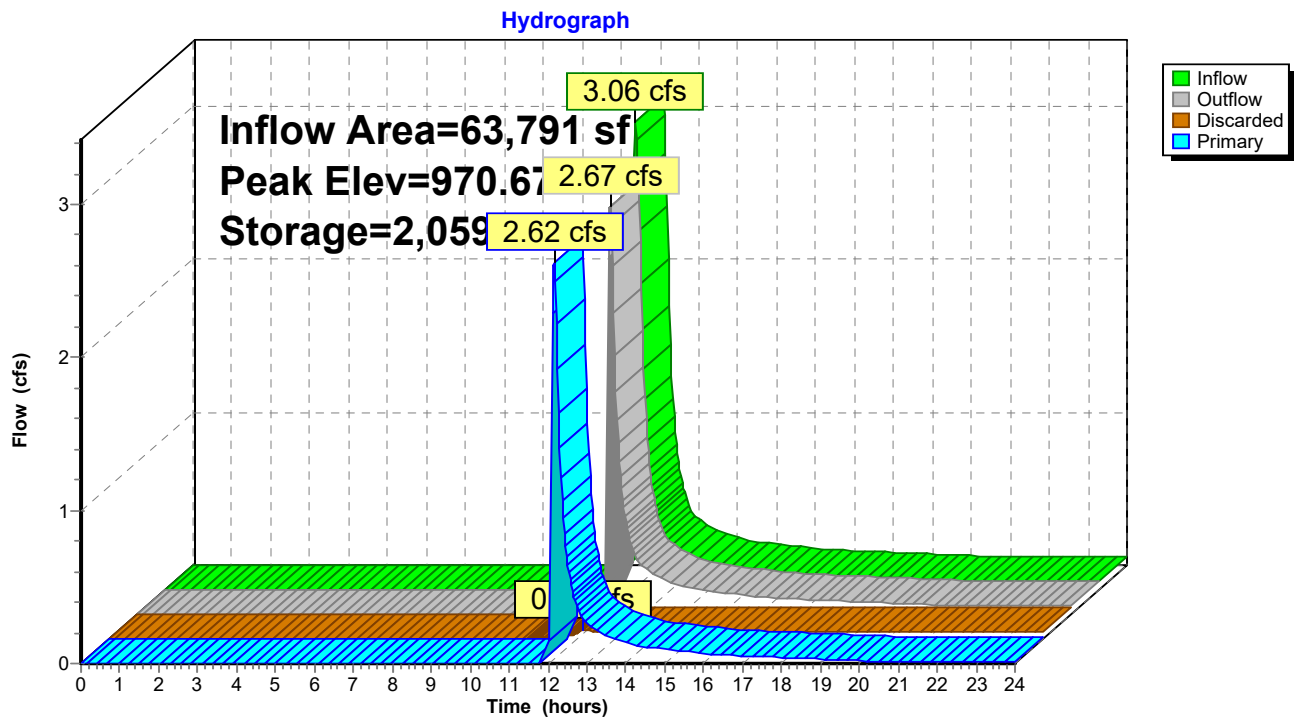
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
969.00	511	0	0
970.00	1,300	906	906
971.00	2,579	1,940	2,845
971.01	2,579	26	2,871

Device	Routing	Invert	Outlet Devices
#1	Primary	971.00'	128.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	970.50'	5.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	969.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.05 cfs @ 12.16 hrs HW=970.67' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=2.58 cfs @ 12.16 hrs HW=970.67' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 2.58 cfs @ 1.03 fps)

Pond 16P: Infiltration Berm 1



Summary for Pond 18P: Infiltration Berm 2

Inflow Area = 68,455 sf, 16.17% Impervious, Inflow Depth > 1.06" for 10-yr event
 Inflow = 2.68 cfs @ 12.16 hrs, Volume= 6,058 cf
 Outflow = 2.12 cfs @ 12.23 hrs, Volume= 5,187 cf, Atten= 21%, Lag= 4.2 min
 Discarded = 0.03 cfs @ 12.23 hrs, Volume= 1,378 cf
 Primary = 2.08 cfs @ 12.23 hrs, Volume= 3,809 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 964.67' @ 12.23 hrs Surf.Area= 1,221 sf Storage= 1,284 cf

Plug-Flow detention time= 94.3 min calculated for 5,187 cf (86% of inflow)
 Center-of-Mass det. time= 43.6 min (865.2 - 821.6)

Volume	Invert	Avail.Storage	Storage Description
#1	963.00'	1,736 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

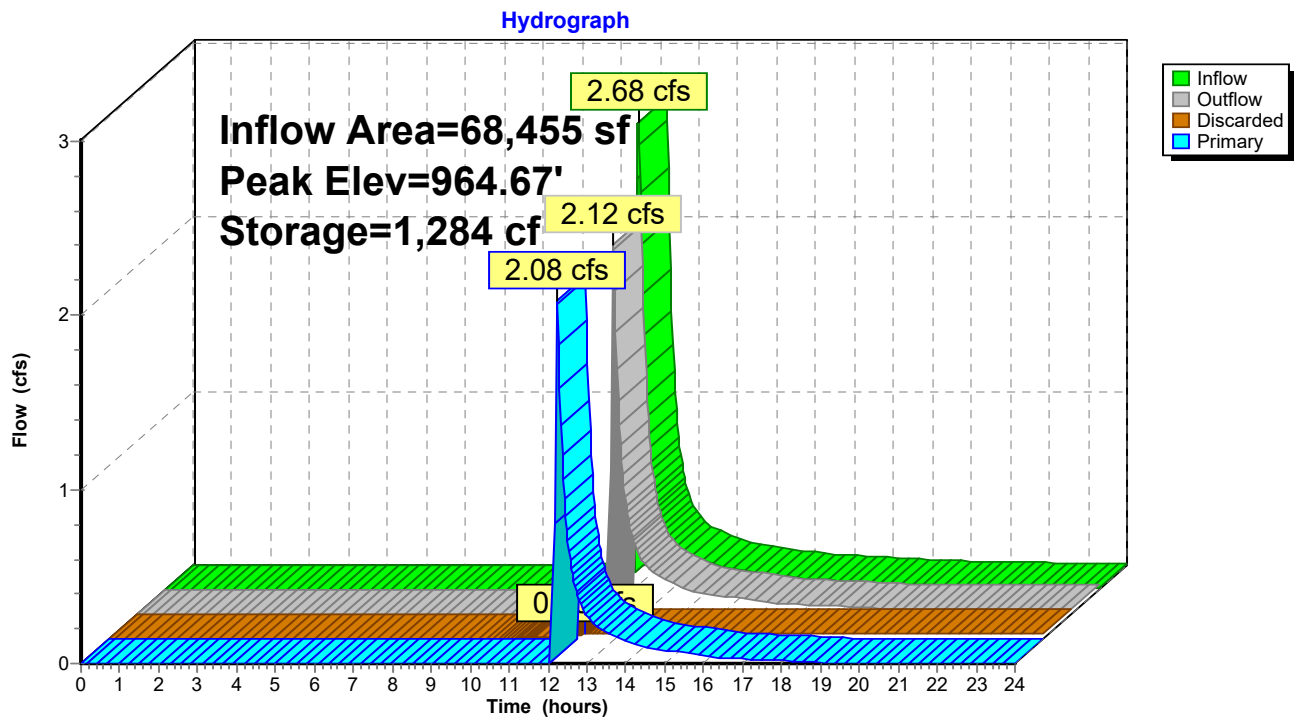
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
963.00	340	0	0
964.00	848	594	594
965.00	1,407	1,128	1,722
965.01	1,407	14	1,736

Device	Routing	Invert	Outlet Devices
#1	Primary	965.00'	74.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	964.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	963.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.03 cfs @ 12.23 hrs HW=964.67' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=2.05 cfs @ 12.23 hrs HW=964.67' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 2.05 cfs @ 1.03 fps)

Pond 18P: Infiltration Berm 2



MLV 505LD86_PostwBMP DA2- REV 3*Type II 24-hr 25-yr Rainfall=5.85"*

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Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: DA-2 Berm1

Runoff Area=63,791 sf 17.35% Impervious Runoff Depth>2.50"
Flow Length=526' Tc=15.7 min CN=68 Runoff=4.60 cfs 13,263 cf

Subcatchment4S: DA-2 Undetained

Runoff Area=7,345 sf 0.00% Impervious Runoff Depth>3.25"
Flow Length=221' Tc=3.0 min CN=76 Runoff=1.07 cfs 1,989 cf

Subcatchment17S: DA-2 Berm 2

Runoff Area=4,664 sf 0.00% Impervious Runoff Depth>3.44"
Flow Length=40' Slope=0.1500 '/' Tc=3.0 min CN=78 Runoff=0.72 cfs 1,339 cf

Reach 11: DA-2 Post Total

Inflow=4.58 cfs 10,094 cf
Outflow=4.58 cfs 10,094 cf

Pond 16P: Infiltration Berm 1

Peak Elev=970.74' Storage=2,212 cf Inflow=4.60 cfs 13,263 cf
Discarded=0.06 cfs 2,250 cf Primary=4.43 cfs 9,291 cf Outflow=4.49 cfs 11,542 cf

Pond 18P: Infiltration Berm 2

Peak Elev=964.78' Storage=1,419 cf Inflow=4.53 cfs 10,630 cf
Discarded=0.04 cfs 1,443 cf Primary=4.44 cfs 8,105 cf Outflow=4.48 cfs 9,547 cf

Total Runoff Area = 75,800 sf Runoff Volume = 16,591 cf Average Runoff Depth = 2.63"
85.40% Pervious = 64,731 sf 14.60% Impervious = 11,069 sf

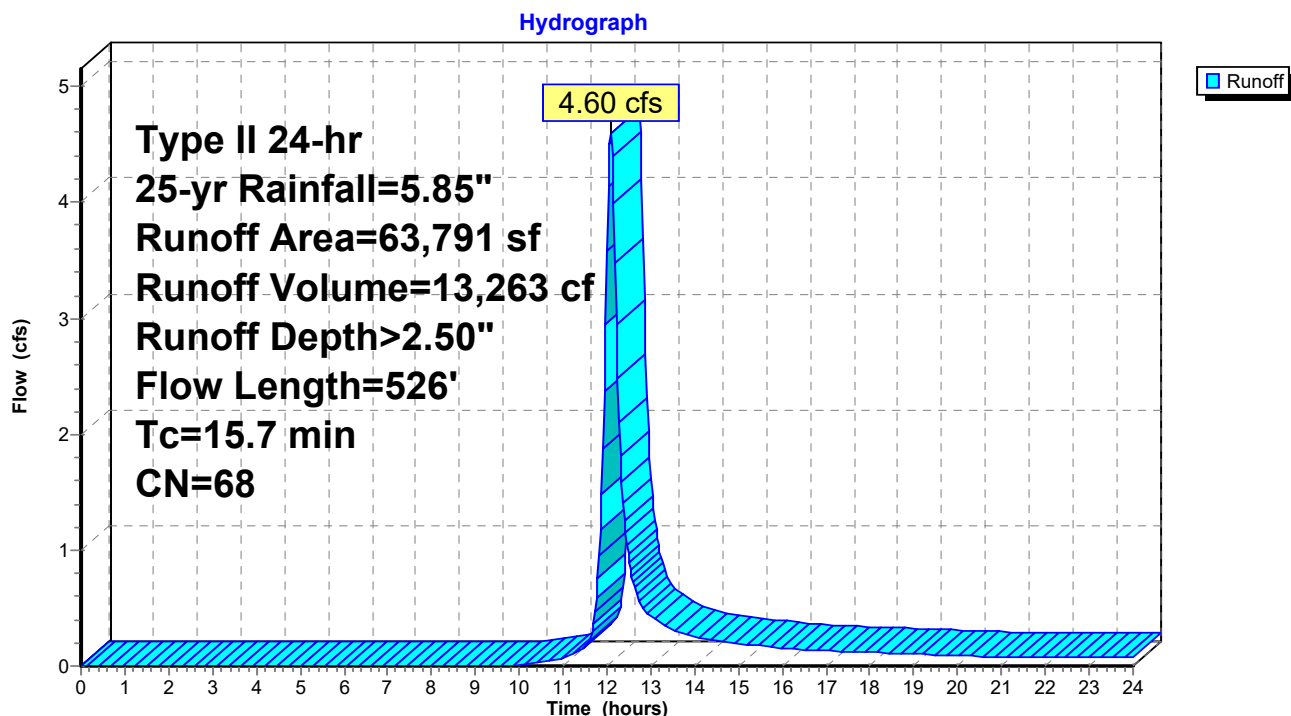
Summary for Subcatchment 3S: DA-2 Berm1

Runoff = 4.60 cfs @ 12.08 hrs, Volume= 13,263 cf, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type II 24-hr 25-yr Rainfall=5.85"

	Area (sf)	CN	Description
*	11,069	98	Impervious
	4,961	30	Woods, Good, HSG A
	12,328	30	Meadow, non-grazed, HSG A
	35,433	78	Meadow, non-grazed, HSG D
	63,791	68	Weighted Average
	52,722		82.65% Pervious Area
	11,069		17.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0800	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.4	130	0.0885	6.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.1	296	0.0507	1.58		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.7	526	Total			

Subcatchment 3S: DA-2 Berm1

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Type II 24-hr 25-yr Rainfall=5.85"

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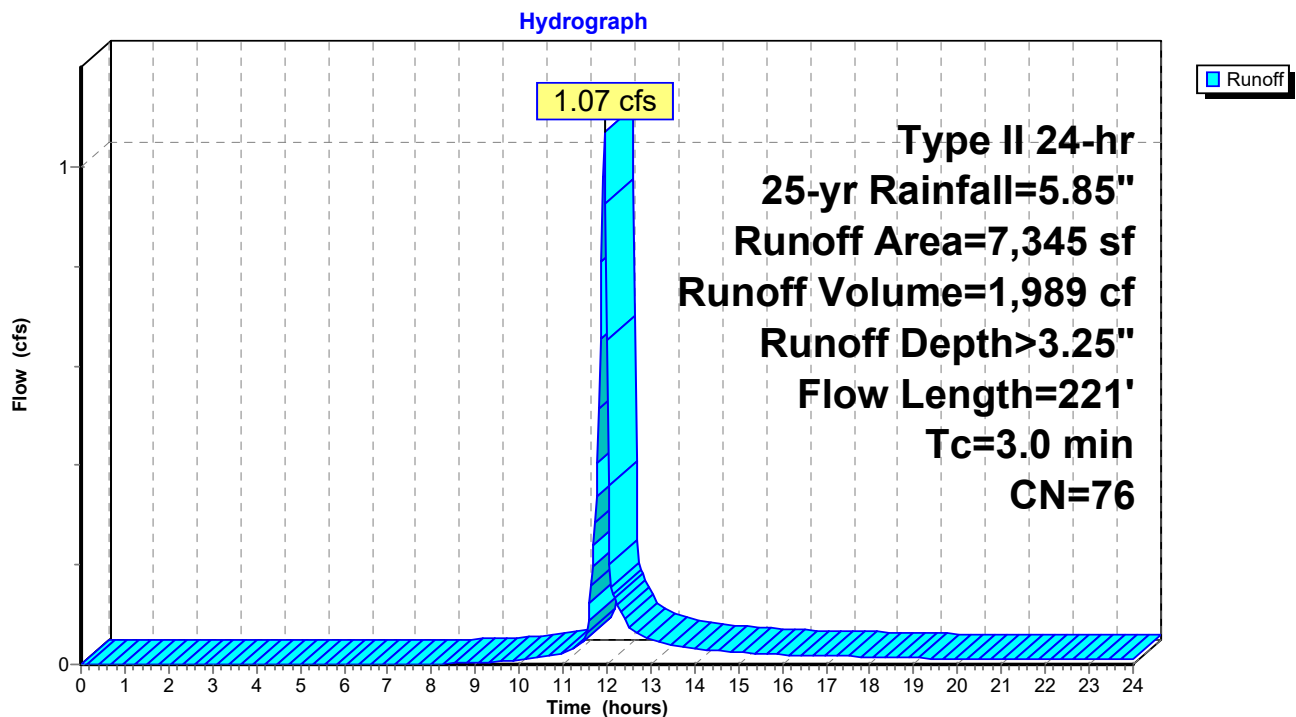
Summary for Subcatchment 4S: DA-2 Undetained[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.07 cfs @ 11.94 hrs, Volume= 1,989 cf, Depth> 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
273	30	Meadow, non-grazed, HSG A
7,072	78	Meadow, non-grazed, HSG D
7,345	76	Weighted Average
7,345		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	31	0.1290	0.29		Sheet Flow, Grass: Short $n=0.150$ $P2=3.26"$
1.2	190	0.2580	2.54		Shallow Concentrated Flow, Woodland $K_v=5.0$ fps
3.0	221	Total			

Subcatchment 4S: DA-2 Undetained

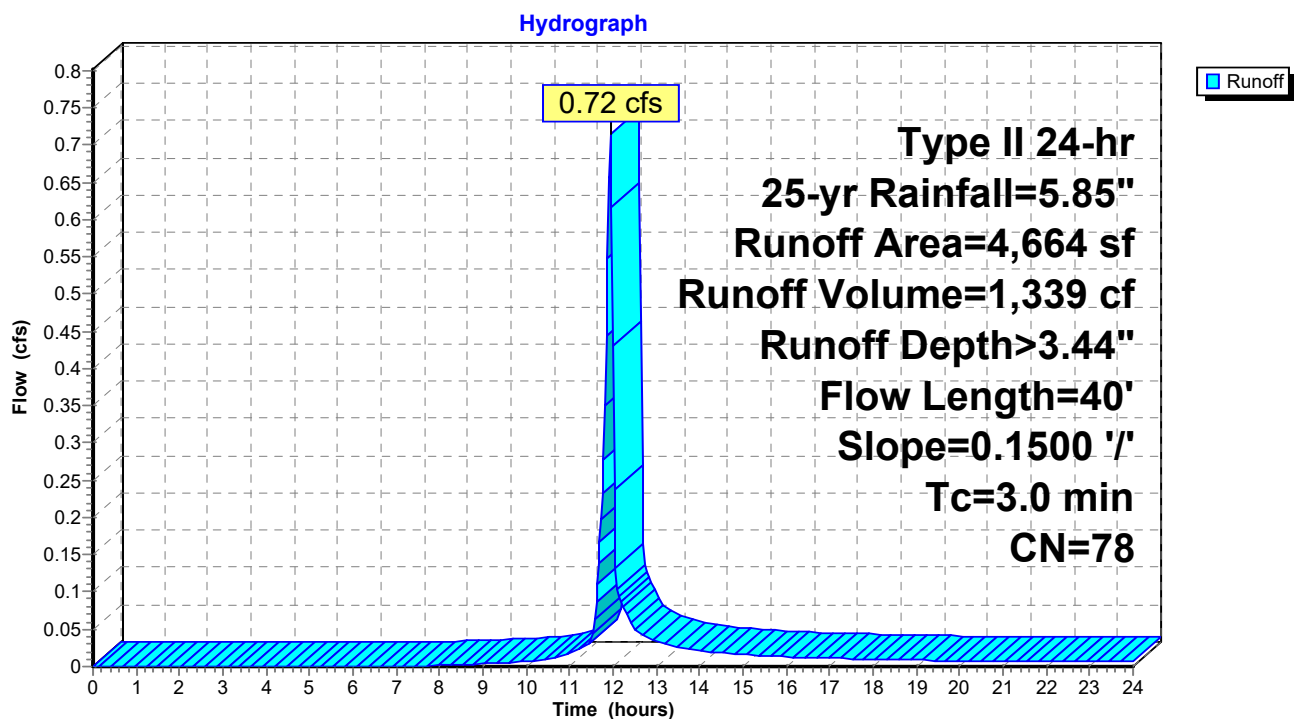
Summary for Subcatchment 17S: DA-2 Berm 2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.72 cfs @ 11.94 hrs, Volume= 1,339 cf, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
4,664	78	Meadow, non-grazed, HSG D
4,664		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	40	0.1500	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"

Subcatchment 17S: DA-2 Berm 2

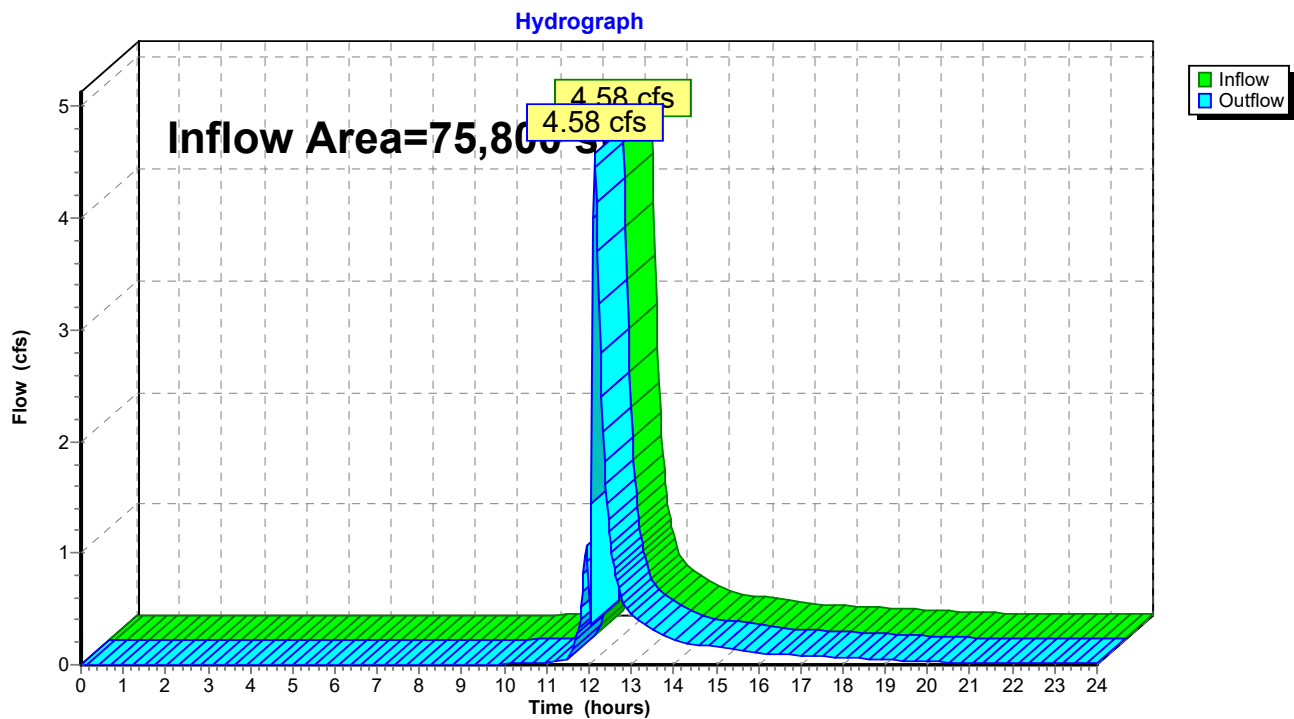
Summary for Reach 11: DA-2 Post Total

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

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 1.60" for 25-yr event
 Inflow = 4.58 cfs @ 12.13 hrs, Volume= 10,094 cf
 Outflow = 4.58 cfs @ 12.13 hrs, Volume= 10,094 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Reach 11: DA-2 Post Total



Summary for Pond 16P: Infiltration Berm 1

Inflow Area = 63,791 sf, 17.35% Impervious, Inflow Depth > 2.50" for 25-yr event
 Inflow = 4.60 cfs @ 12.08 hrs, Volume= 13,263 cf
 Outflow = 4.49 cfs @ 12.11 hrs, Volume= 11,542 cf, Atten= 3%, Lag= 1.5 min
 Discarded = 0.06 cfs @ 12.11 hrs, Volume= 2,250 cf
 Primary = 4.43 cfs @ 12.11 hrs, Volume= 9,291 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 970.74' @ 12.11 hrs Surf.Area= 2,243 sf Storage= 2,212 cf

Plug-Flow detention time= 84.6 min calculated for 11,527 cf (87% of inflow)
 Center-of-Mass det. time= 23.3 min (870.6 - 847.3)

Volume	Invert	Avail.Storage	Storage Description
#1	969.00'	2,871 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

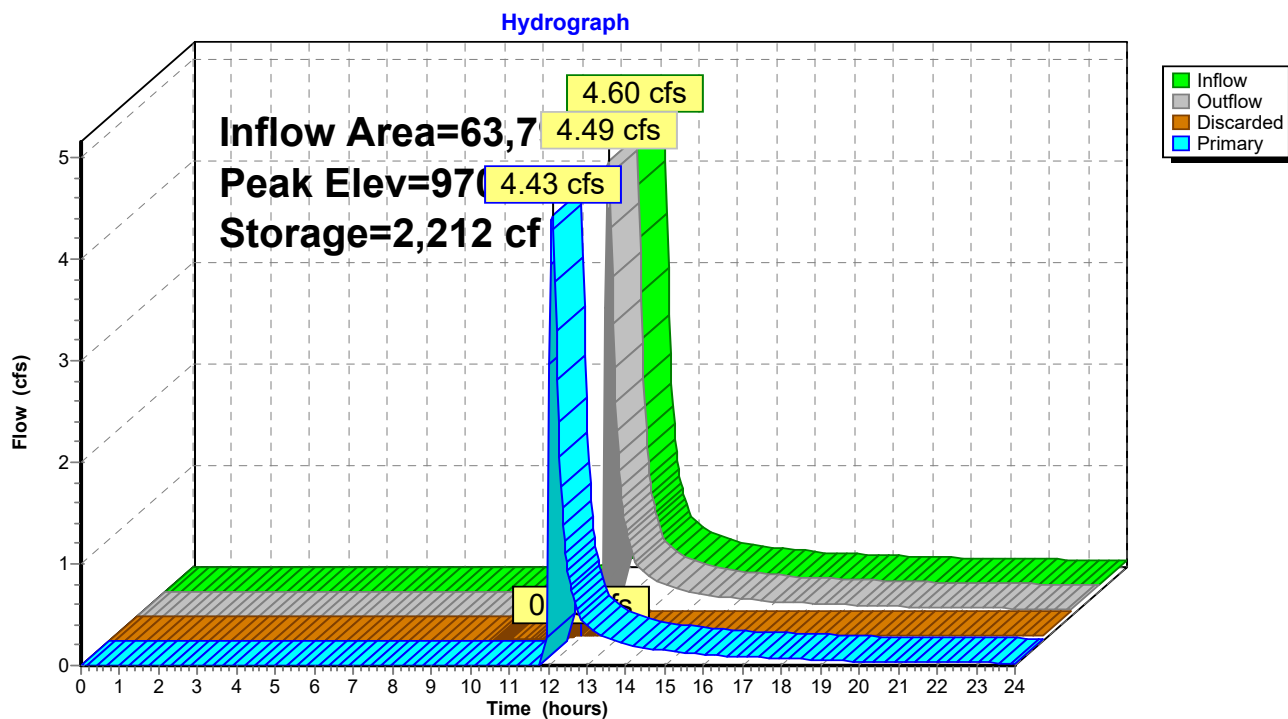
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
969.00	511	0	0
970.00	1,300	906	906
971.00	2,579	1,940	2,845
971.01	2,579	26	2,871

Device	Routing	Invert	Outlet Devices
#1	Primary	971.00'	128.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	970.50'	5.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	969.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.06 cfs @ 12.11 hrs HW=970.74' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=4.39 cfs @ 12.11 hrs HW=970.74' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 4.39 cfs @ 1.24 fps)

Pond 16P: Infiltration Berm 1



Summary for Pond 18P: Infiltration Berm 2

Inflow Area = 68,455 sf, 16.17% Impervious, Inflow Depth > 1.86" for 25-yr event
 Inflow = 4.53 cfs @ 12.11 hrs, Volume= 10,630 cf
 Outflow = 4.48 cfs @ 12.13 hrs, Volume= 9,547 cf, Atten= 1%, Lag= 1.4 min
 Discarded = 0.04 cfs @ 12.13 hrs, Volume= 1,443 cf
 Primary = 4.44 cfs @ 12.13 hrs, Volume= 8,105 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 964.78' @ 12.13 hrs Surf.Area= 1,281 sf Storage= 1,419 cf

Plug-Flow detention time= 59.2 min calculated for 9,547 cf (90% of inflow)
 Center-of-Mass det. time= 14.5 min (838.8 - 824.3)

Volume	Invert	Avail.Storage	Storage Description
#1	963.00'	1,736 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

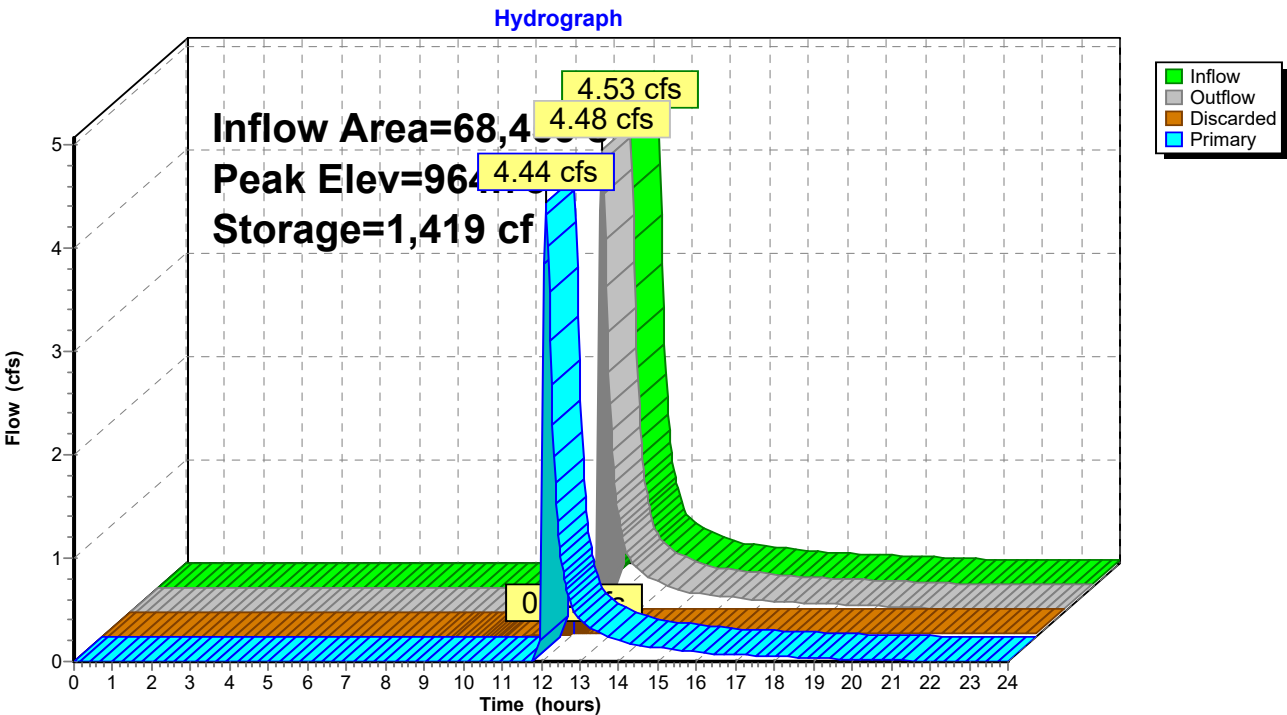
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
963.00	340	0	0
964.00	848	594	594
965.00	1,407	1,128	1,722
965.01	1,407	14	1,736

Device	Routing	Invert	Outlet Devices
#1	Primary	965.00'	74.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	964.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	963.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.04 cfs @ 12.13 hrs HW=964.77' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=4.37 cfs @ 12.13 hrs HW=964.77' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 4.37 cfs @ 1.34 fps)

Pond 18P: Infiltration Berm 2



MLV 505LD86_PostwBMP DA2- REV 3*Type II 24-hr 50-yr Rainfall=6.87"*

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Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: DA-2 Berm1

Runoff Area=63,791 sf 17.35% Impervious Runoff Depth>3.29"
Flow Length=526' Tc=15.7 min CN=68 Runoff=6.11 cfs 17,497 cf

Subcatchment4S: DA-2 Undetained

Runoff Area=7,345 sf 0.00% Impervious Runoff Depth>4.14"
Flow Length=221' Tc=3.0 min CN=76 Runoff=1.35 cfs 2,534 cf

Subcatchment17S: DA-2 Berm 2

Runoff Area=4,664 sf 0.00% Impervious Runoff Depth>4.35"
Flow Length=40' Slope=0.1500 '/' Tc=3.0 min CN=78 Runoff=0.89 cfs 1,693 cf

Reach 11: DA-2 Post Total

Inflow=6.15 cfs 15,082 cf
Outflow=6.15 cfs 15,082 cf

Pond 16P: Infiltration Berm 1

Peak Elev=970.79' Storage=2,326 cf Inflow=6.11 cfs 17,497 cf
Discarded=0.06 cfs 2,327 cf Primary=5.94 cfs 13,430 cf Outflow=6.00 cfs 15,757 cf

Pond 18P: Infiltration Berm 2

Peak Elev=964.83' Storage=1,495 cf Inflow=6.06 cfs 15,123 cf
Discarded=0.04 cfs 1,479 cf Primary=5.97 cfs 12,548 cf Outflow=6.01 cfs 14,027 cf

Total Runoff Area = 75,800 sf Runoff Volume = 21,723 cf Average Runoff Depth = 3.44"
85.40% Pervious = 64,731 sf 14.60% Impervious = 11,069 sf

MLV 505LD86_PostwBMP DA2- REV 3

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Type II 24-hr 50-yr Rainfall=6.87"

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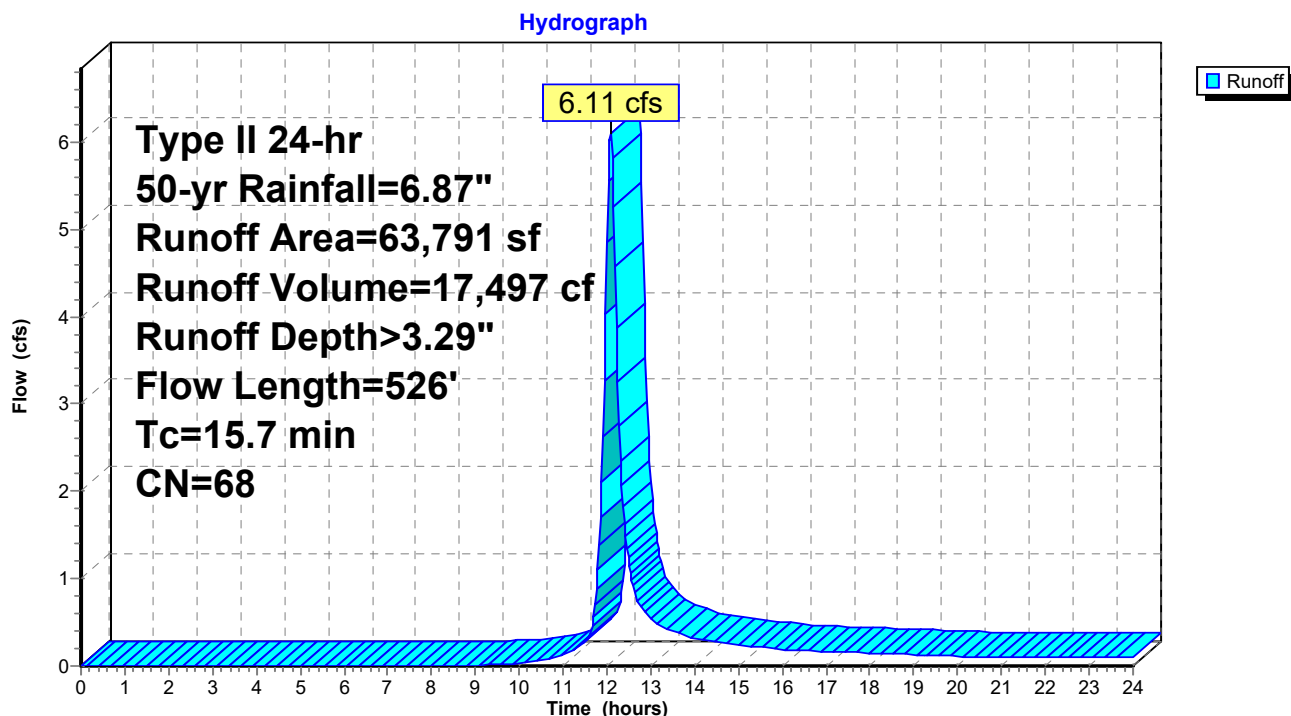
Summary for Subcatchment 3S: DA-2 Berm1

Runoff = 6.11 cfs @ 12.08 hrs, Volume= 17,497 cf, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type II 24-hr 50-yr Rainfall=6.87"

	Area (sf)	CN	Description
*	11,069	98	Imperviuos
	4,961	30	Woods, Good, HSG A
	12,328	30	Meadow, non-grazed, HSG A
	35,433	78	Meadow, non-grazed, HSG D
	63,791	68	Weighted Average
	52,722		82.65% Pervious Area
	11,069		17.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0800	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.4	130	0.0885	6.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.1	296	0.0507	1.58		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.7	526	Total			

Subcatchment 3S: DA-2 Berm1

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Type II 24-hr 50-yr Rainfall=6.87"

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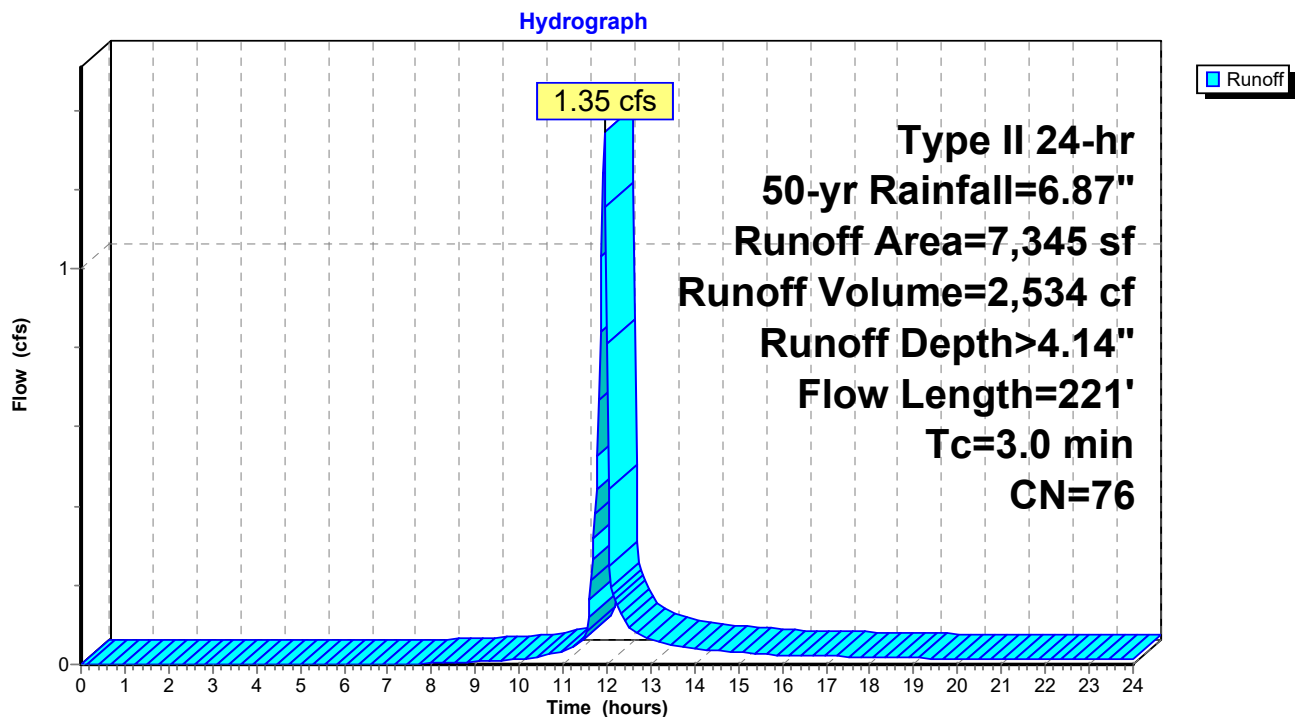
Summary for Subcatchment 4S: DA-2 Undetained[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.35 cfs @ 11.94 hrs, Volume= 2,534 cf, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
273	30	Meadow, non-grazed, HSG A
7,072	78	Meadow, non-grazed, HSG D
7,345	76	Weighted Average
7,345		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	31	0.1290	0.29		Sheet Flow, Grass: Short $n=0.150$ $P2=3.26"$
1.2	190	0.2580	2.54		Shallow Concentrated Flow, Woodland $K_v=5.0$ fps
3.0	221	Total			

Subcatchment 4S: DA-2 Undetained

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Type II 24-hr 50-yr Rainfall=6.87"

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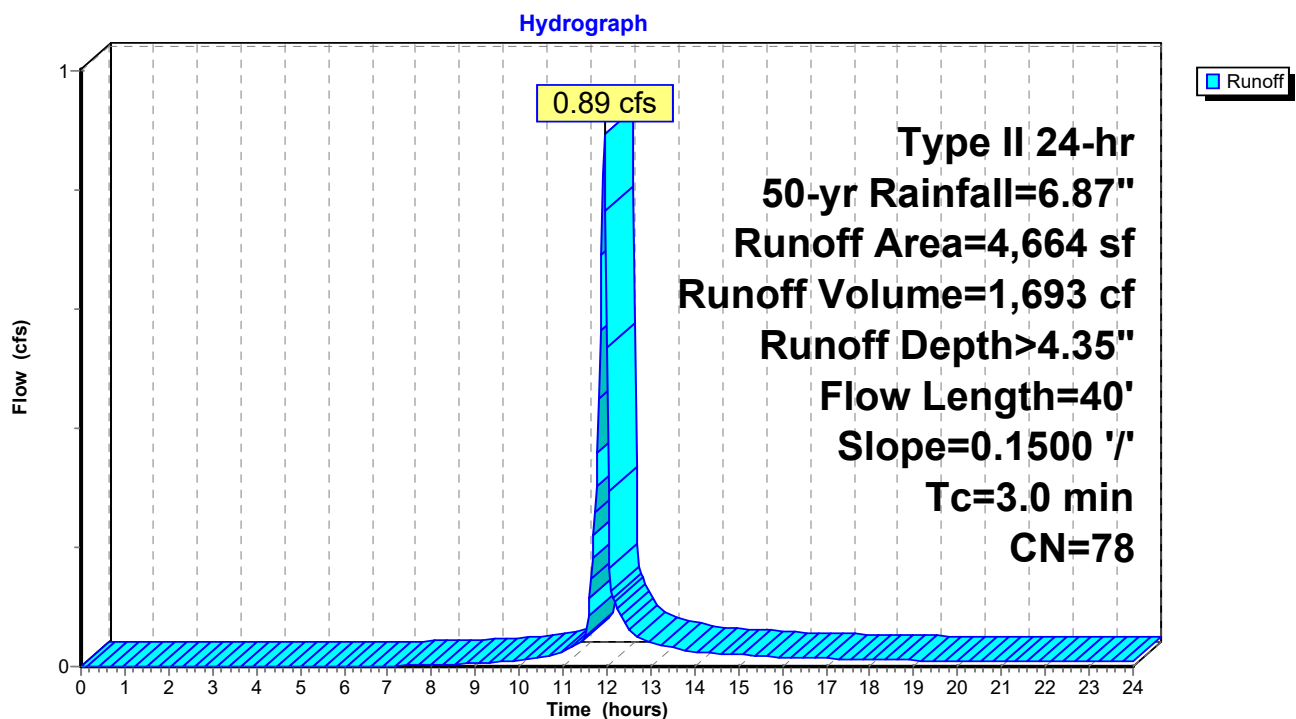
Summary for Subcatchment 17S: DA-2 Berm 2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.89 cfs @ 11.94 hrs, Volume= 1,693 cf, Depth> 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
4,664	78	Meadow, non-grazed, HSG D
4,664		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	40	0.1500	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"

Subcatchment 17S: DA-2 Berm 2

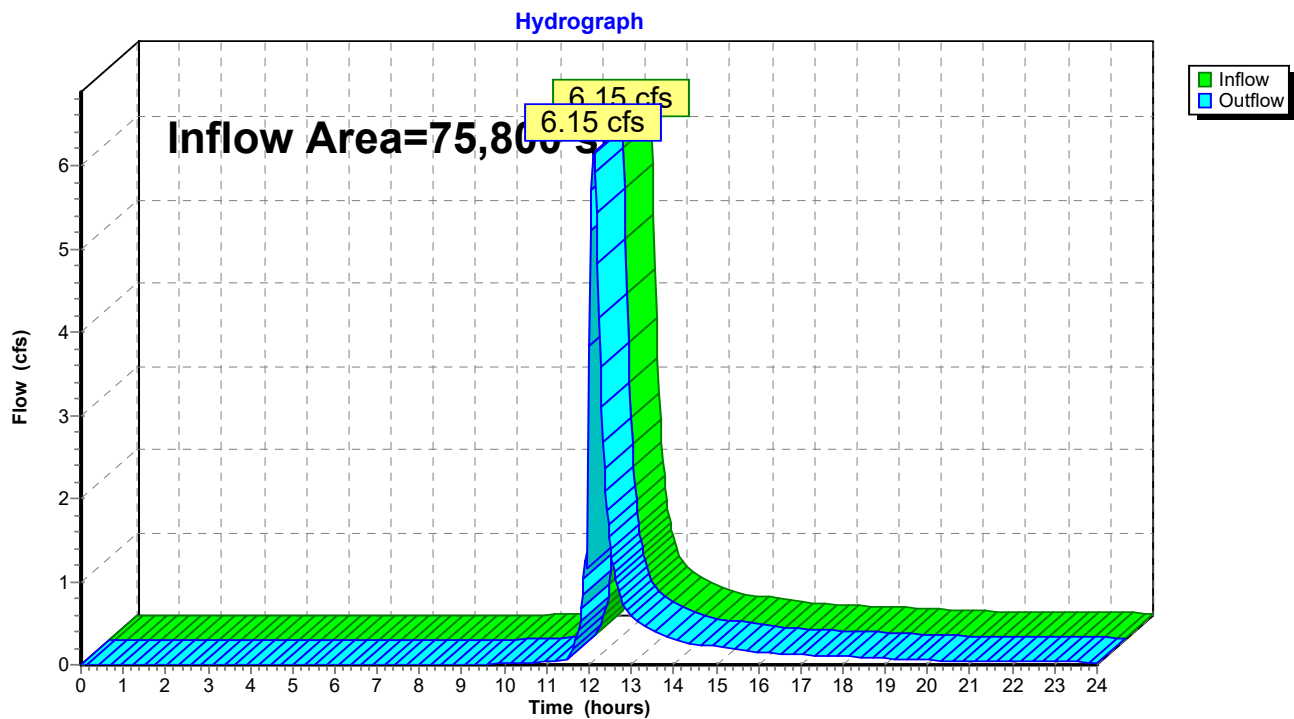
Summary for Reach 11: DA-2 Post Total

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

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 2.39" for 50-yr event
 Inflow = 6.15 cfs @ 12.11 hrs, Volume= 15,082 cf
 Outflow = 6.15 cfs @ 12.11 hrs, Volume= 15,082 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Reach 11: DA-2 Post Total



Summary for Pond 16P: Infiltration Berm 1

Inflow Area = 63,791 sf, 17.35% Impervious, Inflow Depth > 3.29" for 50-yr event
 Inflow = 6.11 cfs @ 12.08 hrs, Volume= 17,497 cf
 Outflow = 6.00 cfs @ 12.10 hrs, Volume= 15,757 cf, Atten= 2%, Lag= 1.2 min
 Discarded = 0.06 cfs @ 12.10 hrs, Volume= 2,327 cf
 Primary = 5.94 cfs @ 12.10 hrs, Volume= 13,430 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 970.79' @ 12.10 hrs Surf.Area= 2,307 sf Storage= 2,326 cf

Plug-Flow detention time= 67.9 min calculated for 15,737 cf (90% of inflow)
 Center-of-Mass det. time= 18.2 min (857.6 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	969.00'	2,871 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

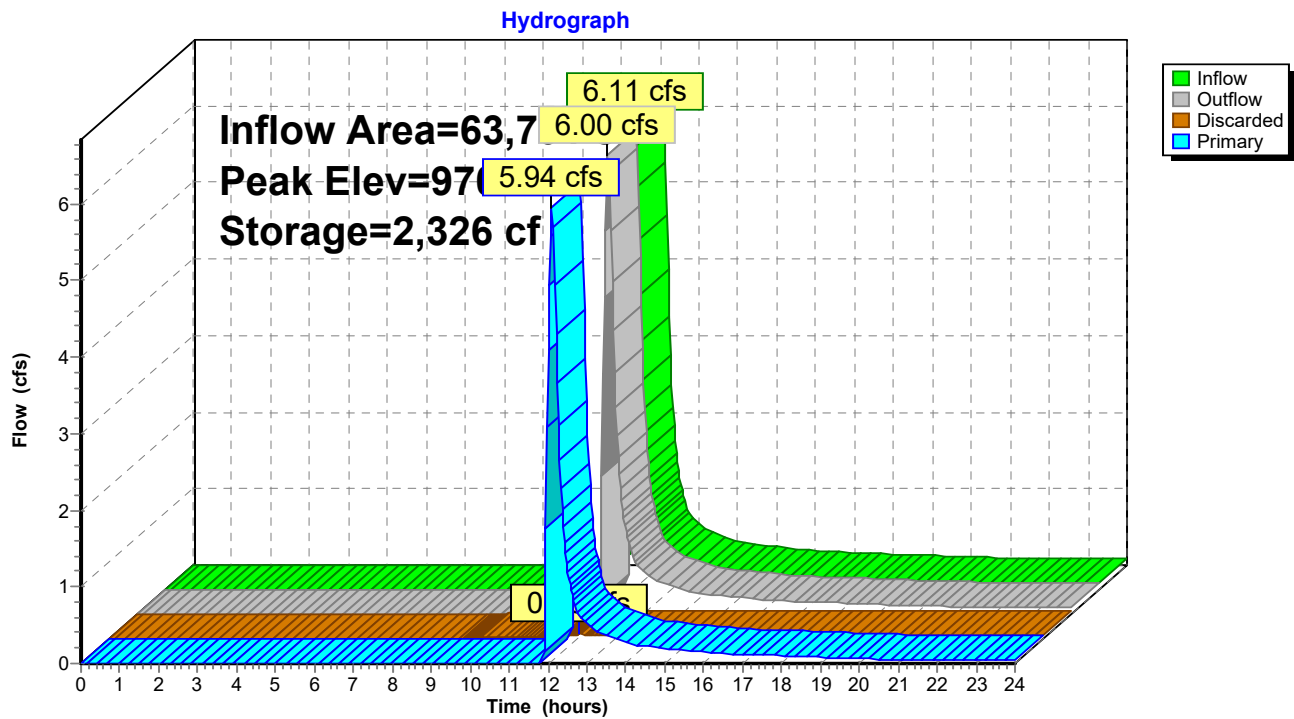
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
969.00	511	0	0
970.00	1,300	906	906
971.00	2,579	1,940	2,845
971.01	2,579	26	2,871

Device	Routing	Invert	Outlet Devices
#1	Primary	971.00'	128.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	970.50'	5.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	969.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.06 cfs @ 12.10 hrs HW=970.79' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=5.90 cfs @ 12.10 hrs HW=970.79' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 5.90 cfs @ 1.37 fps)

Pond 16P: Infiltration Berm 1



Summary for Pond 18P: Infiltration Berm 2

Inflow Area = 68,455 sf, 16.17% Impervious, Inflow Depth > 2.65" for 50-yr event
 Inflow = 6.06 cfs @ 12.10 hrs, Volume= 15,123 cf
 Outflow = 6.01 cfs @ 12.11 hrs, Volume= 14,027 cf, Atten= 1%, Lag= 0.8 min
 Discarded = 0.04 cfs @ 12.11 hrs, Volume= 1,479 cf
 Primary = 5.97 cfs @ 12.11 hrs, Volume= 12,548 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 964.83' @ 12.11 hrs Surf.Area= 1,314 sf Storage= 1,495 cf

Plug-Flow detention time= 46.2 min calculated for 14,027 cf (93% of inflow)
 Center-of-Mass det. time= 10.5 min (834.1 - 823.6)

Volume	Invert	Avail.Storage	Storage Description
#1	963.00'	1,736 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

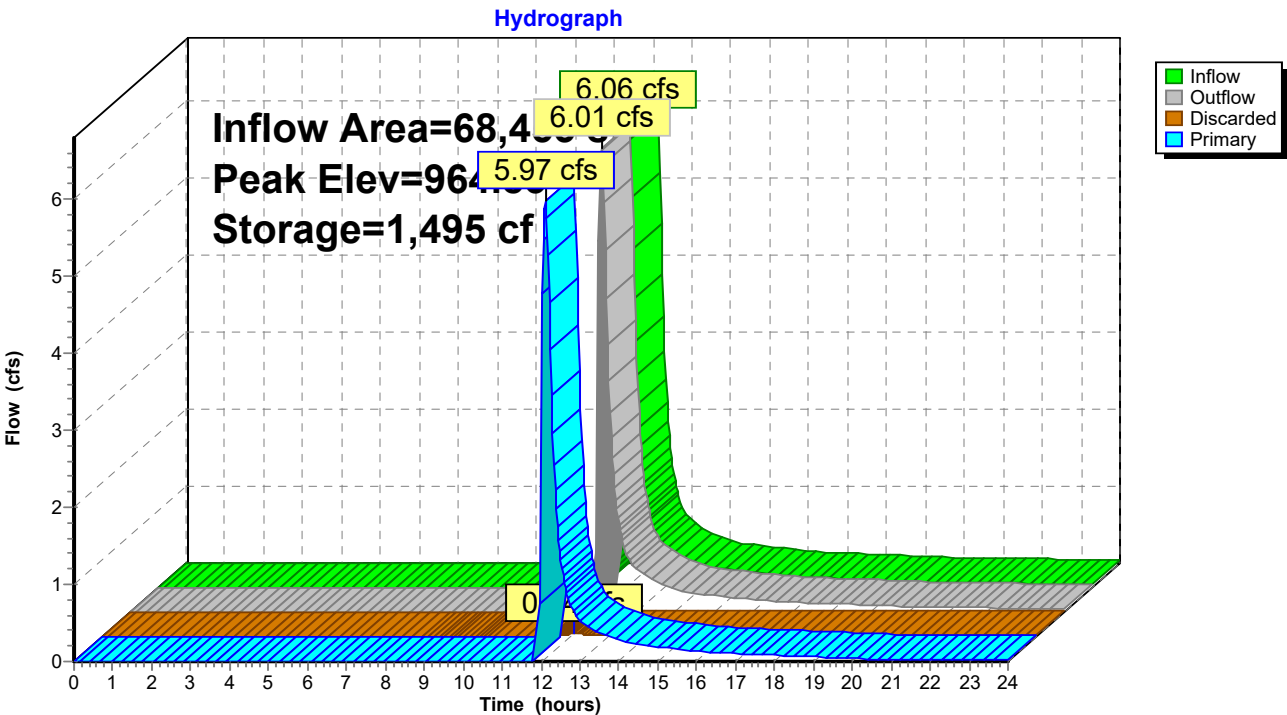
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
963.00	340	0	0
964.00	848	594	594
965.00	1,407	1,128	1,722
965.01	1,407	14	1,736

Device	Routing	Invert	Outlet Devices
#1	Primary	965.00'	74.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	964.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	963.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.04 cfs @ 12.11 hrs HW=964.83' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=5.94 cfs @ 12.11 hrs HW=964.83' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 5.94 cfs @ 1.49 fps)

Pond 18P: Infiltration Berm 2



MLV 505LD86_PostwBMP DA2- REV 3*Type II 24-hr 100-yr Rainfall=8.09"*

Prepared by {enter your company name here}

Printed 6/22/2022

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Time span=0.00-24.00 hrs, dt=0.03 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: DA-2 Berm1

Runoff Area=63,791 sf 17.35% Impervious Runoff Depth>4.29"
Flow Length=526' Tc=15.7 min CN=68 Runoff=7.98 cfs 22,826 cf

Subcatchment4S: DA-2 Undetained

Runoff Area=7,345 sf 0.00% Impervious Runoff Depth>5.24"
Flow Length=221' Tc=3.0 min CN=76 Runoff=1.69 cfs 3,206 cf

Subcatchment17S: DA-2 Berm 2

Runoff Area=4,664 sf 0.00% Impervious Runoff Depth>5.47"
Flow Length=40' Slope=0.1500 '/' Tc=3.0 min CN=78 Runoff=1.11 cfs 2,127 cf

Reach 11: DA-2 Post Total

Inflow=8.07 cfs 21,389 cf
Outflow=8.07 cfs 21,389 cf

Pond 16P: Infiltration Berm 1

Peak Elev=970.84' Storage=2,455 cf Inflow=7.98 cfs 22,826 cf
Discarded=0.06 cfs 2,423 cf Primary=7.80 cfs 18,661 cf Outflow=7.86 cfs 21,085 cf

Pond 18P: Infiltration Berm 2

Peak Elev=964.90' Storage=1,580 cf Inflow=7.95 cfs 20,788 cf
Discarded=0.04 cfs 1,521 cf Primary=7.84 cfs 18,183 cf Outflow=7.88 cfs 19,704 cf

Total Runoff Area = 75,800 sf Runoff Volume = 28,158 cf Average Runoff Depth = 4.46"
85.40% Pervious = 64,731 sf 14.60% Impervious = 11,069 sf

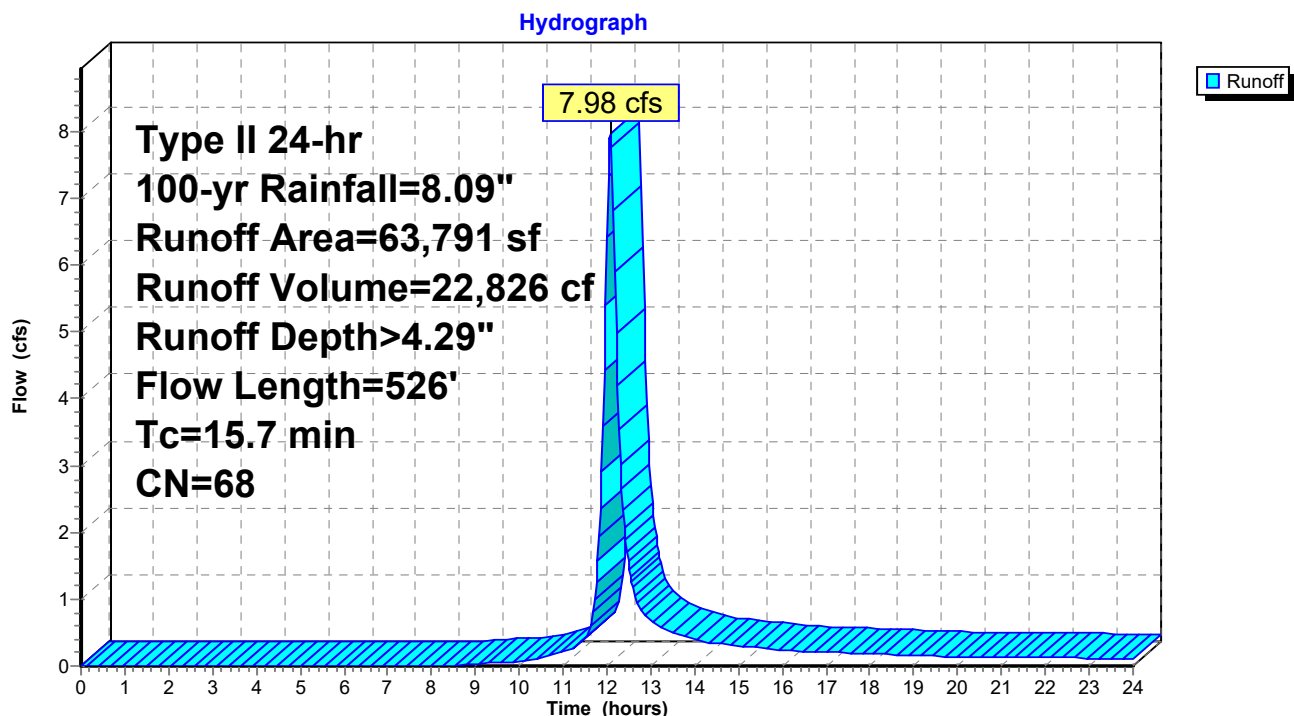
Summary for Subcatchment 3S: DA-2 Berm1

Runoff = 7.98 cfs @ 12.08 hrs, Volume= 22,826 cf, Depth> 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs
Type II 24-hr 100-yr Rainfall=8.09"

	Area (sf)	CN	Description
*	11,069	98	Imperviuos
	4,961	30	Woods, Good, HSG A
	12,328	30	Meadow, non-grazed, HSG A
	35,433	78	Meadow, non-grazed, HSG D
	63,791	68	Weighted Average
	52,722		82.65% Pervious Area
	11,069		17.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0800	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
0.4	130	0.0885	6.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
3.1	296	0.0507	1.58		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.7	526	Total			

Subcatchment 3S: DA-2 Berm1

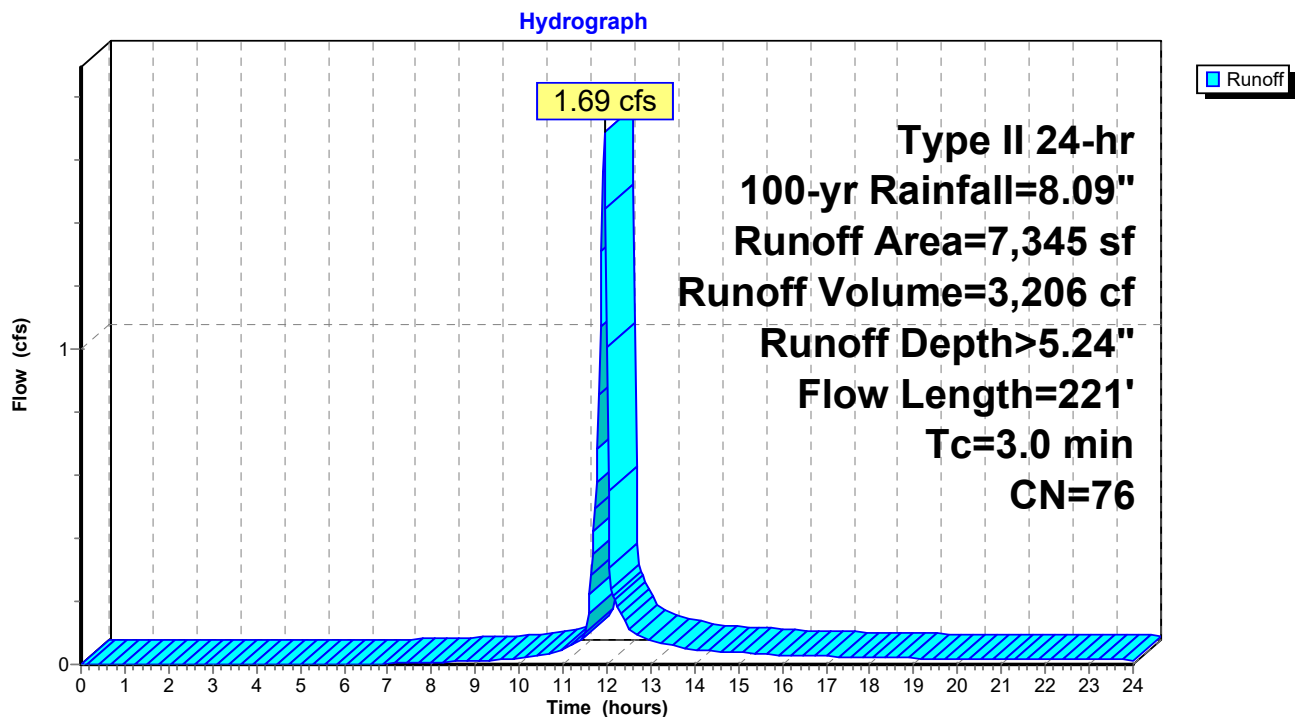
Summary for Subcatchment 4S: DA-2 Undetained[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.69 cfs @ 11.94 hrs, Volume= 3,206 cf, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
273	30	Meadow, non-grazed, HSG A
7,072	78	Meadow, non-grazed, HSG D
7,345	76	Weighted Average
7,345		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	31	0.1290	0.29		Sheet Flow, Grass: Short $n=0.150$ $P2=3.26"$
1.2	190	0.2580	2.54		Shallow Concentrated Flow, Woodland $K_v=5.0$ fps
3.0	221	Total			

Subcatchment 4S: DA-2 Undetained

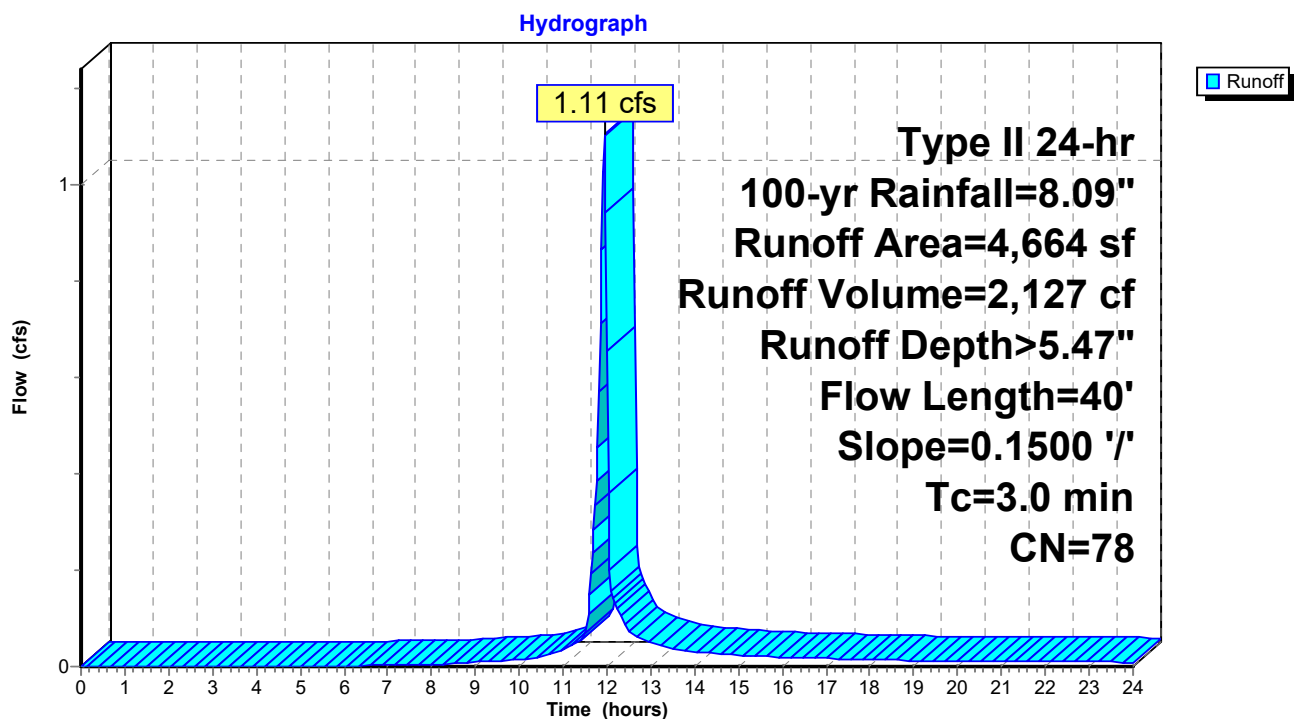
Summary for Subcatchment 17S: DA-2 Berm 2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.11 cfs @ 11.93 hrs, Volume= 2,127 cf, Depth> 5.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.03$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
4,664	78	Meadow, non-grazed, HSG D
4,664		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	40	0.1500	0.22		Sheet Flow, Grass: Dense n= 0.240 P2= 3.26"

Subcatchment 17S: DA-2 Berm 2

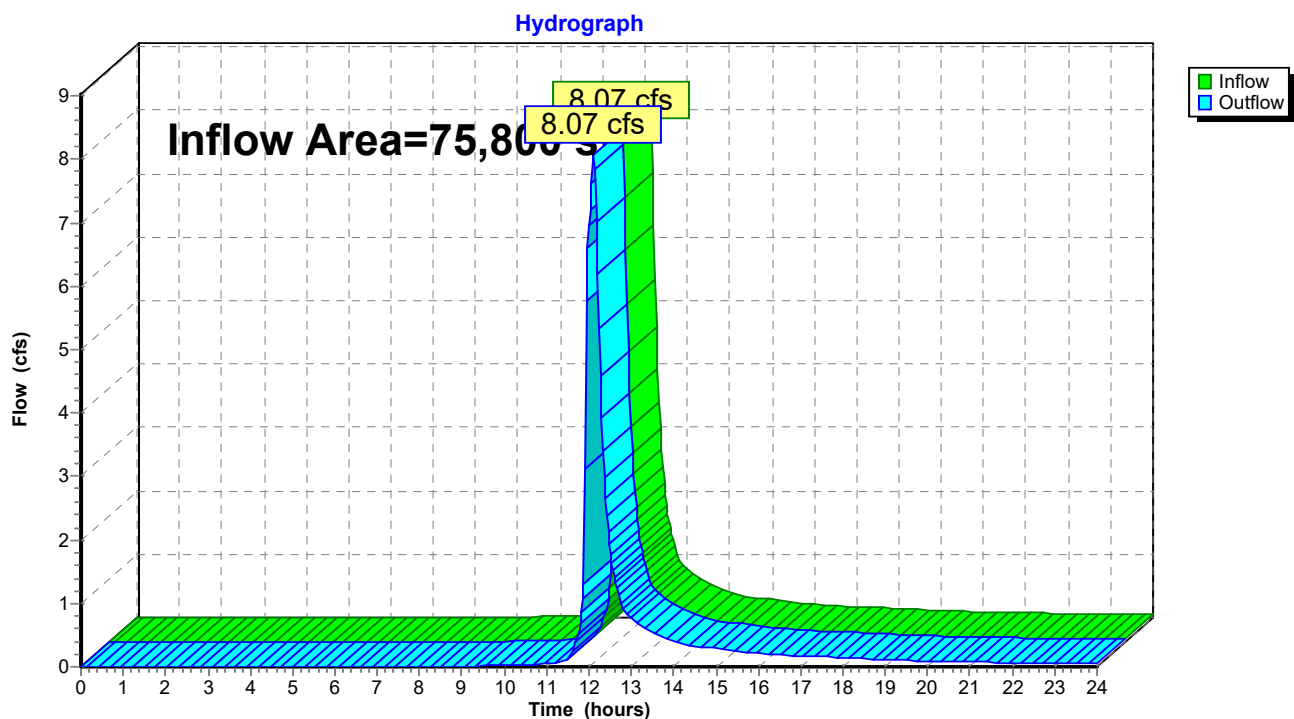
Summary for Reach 11: DA-2 Post Total

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

Inflow Area = 75,800 sf, 14.60% Impervious, Inflow Depth > 3.39" for 100-yr event
 Inflow = 8.07 cfs @ 12.11 hrs, Volume= 21,389 cf
 Outflow = 8.07 cfs @ 12.11 hrs, Volume= 21,389 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs

Reach 11: DA-2 Post Total



Summary for Pond 16P: Infiltration Berm 1

Inflow Area = 63,791 sf, 17.35% Impervious, Inflow Depth > 4.29" for 100-yr event
 Inflow = 7.98 cfs @ 12.08 hrs, Volume= 22,826 cf
 Outflow = 7.86 cfs @ 12.10 hrs, Volume= 21,085 cf, Atten= 2%, Lag= 1.1 min
 Discarded = 0.06 cfs @ 12.10 hrs, Volume= 2,423 cf
 Primary = 7.80 cfs @ 12.10 hrs, Volume= 18,661 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 970.84' @ 12.10 hrs Surf.Area= 2,378 sf Storage= 2,455 cf

Plug-Flow detention time= 55.1 min calculated for 21,058 cf (92% of inflow)
 Center-of-Mass det. time= 15.2 min (847.1 - 831.9)

Volume	Invert	Avail.Storage	Storage Description
#1	969.00'	2,871 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

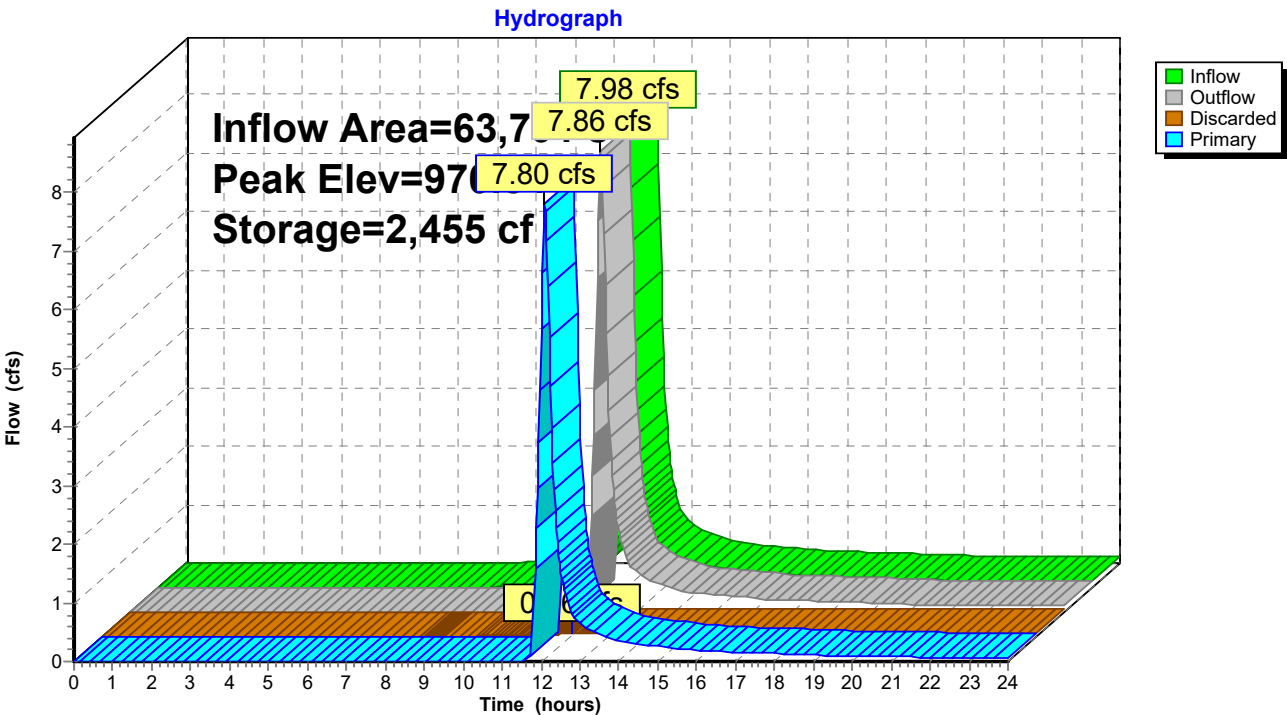
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
969.00	511	0	0
970.00	1,300	906	906
971.00	2,579	1,940	2,845
971.01	2,579	26	2,871

Device	Routing	Invert	Outlet Devices
#1	Primary	971.00'	128.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	970.50'	5.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	969.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.06 cfs @ 12.10 hrs HW=970.84' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=7.75 cfs @ 12.10 hrs HW=970.84' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 7.75 cfs @ 1.51 fps)

Pond 16P: Infiltration Berm 1



Summary for Pond 18P: Infiltration Berm 2

Inflow Area = 68,455 sf, 16.17% Impervious, Inflow Depth > 3.64" for 100-yr event
 Inflow = 7.95 cfs @ 12.10 hrs, Volume= 20,788 cf
 Outflow = 7.88 cfs @ 12.11 hrs, Volume= 19,704 cf, Atten= 1%, Lag= 0.7 min
 Discarded = 0.04 cfs @ 12.11 hrs, Volume= 1,521 cf
 Primary = 7.84 cfs @ 12.11 hrs, Volume= 18,183 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.03 hrs / 2
 Peak Elev= 964.90' @ 12.11 hrs Surf.Area= 1,350 sf Storage= 1,580 cf

Plug-Flow detention time= 35.5 min calculated for 19,679 cf (95% of inflow)
 Center-of-Mass det. time= 7.9 min (829.4 - 821.4)

Volume	Invert	Avail.Storage	Storage Description
#1	963.00'	1,736 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

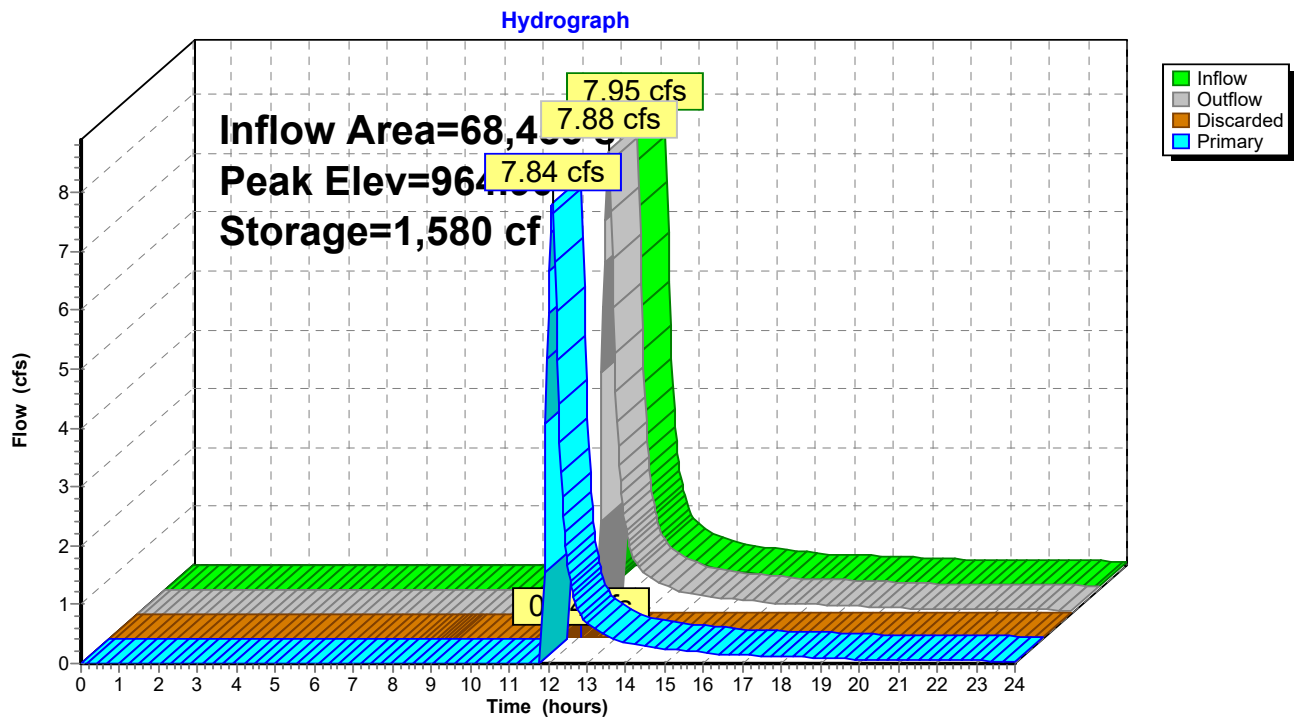
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
963.00	340	0	0
964.00	848	594	594
965.00	1,407	1,128	1,722
965.01	1,407	14	1,736

Device	Routing	Invert	Outlet Devices
#1	Primary	965.00'	74.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	964.50'	4.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 3.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	963.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 958.00'

Discarded OutFlow Max=0.04 cfs @ 12.11 hrs HW=964.90' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=7.80 cfs @ 12.11 hrs HW=964.90' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 7.80 cfs @ 1.64 fps)

Pond 18P: Infiltration Berm 2



ATTACHMENT 4.4
CHANNEL DESIGN WORKSHEETS –
MLV-505LD86

STANDARD E&S WORKSHEET # 9**Time of Concentration**PROJECT NAME: Williams REAE – MLV-505LD86LOCATION: Monroe County, PAPREPARED BY: GODATE: 07/08/2022CHECKED BY: PWDATE: 07/08/2022**TIME OF CONCENTRATION:**

PATH NUMBER	T _c (min)	METHOD
SH - DC - 001	5	Direct
SH - CC - 002	5	Direct
SH - CC - 003	5	Direct
SH - CC - 004	5	Direct
SH - CC - 005	5	Direct
SH - CC - 006	5	Direct
SH - CC - 007	5	Direct
SH - CC - 008	5	Direct
SH - CC - 009	5	Direct
SH - CC - 010	5	Direct

$$T_{c \text{ (sheet flow)}} = \left[\frac{2.48(n)}{3.6} \right]^{0.4673}$$

n Type of Cover
0.02 smooth pavement
0.1 bare parched soil
0.3 poor grass cover
0.4 average grass cover
0.8 dense grass cover
(L = 150' maximum)

CHANNEL DIMENSIONS:

PATH NUMBER	BOTTOM WIDTH (ft)	LEFT SIDE SLOPE (H:V)	RIGHT SIDE SLOPE (H:V)	TOTAL DEPTH (ft)	TOP WIDTH (ft)
SH - DC - 001	1	2	2	0.75	4
SH - CC - 002	2	2	2	0.75	5
SH - CC - 003	2	2	2	1	6
SH - CC - 004	4	2	2	0.75	7
SH - CC - 005	3	2	2	1	7
SH - CC - 006	2	2	2	1	6
SH - CC - 007	2	2	2	1	6
SH - CC - 008	2	2	2	1	6
SH - CC - 009	1	2	2	0.75	4
SH - CC - 010	1	2	2	0.75	4

STANDARD E&S WORKSHEET # 11

Channel Design Data

PROJECT NAME: Williams REAE – MLV-505LD86

LOCATION: Monroe County, PA

PREPARED BY: CD

DATE: 02/21/2022

CHECKED BY: PW

DATE: 02/21/2022

CHANNEL OR CHANNEL SECTION	SH-DC-001			
TEMPORARY OR PERMANENT? (T OR P)	T	P		
DESIGN STORM (2, 5, OR 10 YR)	10	10		
ACRES (AC)	3.68	3.68		
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A		
Q _r (REQUIRED CAPACITY) (CFS)	0.11	0.11		
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.34	0.22		
PROTECTIVE LINING ²	SC150BN	ECM w/ VEG.		
n (MANNING'S COEFFICIENT) ²	0.050	0.080		
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0		
V (CALCULATED AT FLOW DEPTH d) (FPS)	0.9	0.6		
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0		
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.1	0.1		
CHANNEL BOTTOM WIDTH (FT)	1	1		
CHANNEL SIDE SLOPES (H:V)	2	2		
D (TOTAL DEPTH) (FT)	0.75	0.75		
CHANNEL TOP WIDTH @ D (FT)	4	4		
d (CALCULATED FLOW DEPTH) (FT)	0.25	0.25		
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	2	2		
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	4.0	4.0		
d ₅₀ STONE SIZE (IN)	-	-		
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.375	0.375		
R (HYDRAULIC RADIUS) (FT)	0.177	0.177		
S (BED SLOPE) ³ (FT/FT)	0.010	0.010		
S _c (CRITICAL SLOPE) (FT/FT)	0.069	0.176		
.7S _c (FT/FT)	0.048	0.123		
1.3S _c (FT/FT)	0.089	0.228		
STABLE FLOW? (Y/N)	Y	Y		
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-		
FREEBOARD BASED ON STABLE FLOW (FT)	0.5	0.5		
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5		
DESIGN METHOD FOR PROTECTIVE LINING ⁵	V	V		
PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)				

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET # 11

Channel Design Data

PROJECT NAME: Williams REAE – MLV-505LD86

LOCATION: Monroe County, PA

PREPARED BY: BM

DATE: 02/21/2022

CHECKED BY: PW

DATE: 02/21/2022

CHANNEL OR CHANNEL SECTION	SH-CC-002		SH-CC-003	
TEMPORARY OR PERMANENT? (T OR P)	T	P	T	P
DESIGN STORM (2, 5, OR 10 YR)	10	10	10	10
ACRES (AC)	0.09	0.09	0.57	0.57
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	0.42	0.42	1.58	1.58
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.77	0.64	2.08	1.65
PROTECTIVE LINING ²	SC150BN	ECM w/ veg.	SC150BN	ECM w/ veg.
n (MANNING'S COEFFICIENT) ²	0.050	0.055	0.050	0.063
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.7	1.5	2.4	1.9
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.5	0.4	0.8	0.8
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2
D (TOTAL DEPTH) (FT)	0.75	0.75	1.0	1.0
CHANNEL TOP WIDTH @ D (FT)	5	5	6	6
d (CALCULATED FLOW DEPTH) (FT)	0.19	0.18	0.33	0.33
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	2.76	2.72	4.64	4.64
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	10.53	11.11	25.00	25.00
d ₅₀ STONE SIZE (IN)	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.452	0.425	0.878	0.878
R (HYDRAULIC RADIUS) (FT)	0.159	0.151	0.253	0.253
S (BED SLOPE) ³ (FT/FT)	0.038	0.038	0.040	0.040
S _c (CRITICAL SLOPE) (FT/FT)	0.069	0.085	0.060	0.097
.7S _c (FT/FT)	0.049	0.060	0.042	0.068
1.3S _c (FT/FT)	0.090	0.111	0.078	0.126
STABLE FLOW? (Y/N)	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.56	0.57	0.67	0.67
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION	SH-CC-004		SH-CC-005	
TEMPORARY OR PERMANENT? (T OR P)	T	P	T	P
DESIGN STORM (2, 5, OR 10 YR)	10	10	10	10
ACRES (AC)	0.62	0.62	1.46	1.46
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	1.73	1.73	3.82	3.82
Q (CALCULATED AT FLOW DEPTH d) (CFS)	1.89	1.89	4.03	3.99
PROTECTIVE LINING ²	SC150BN	ECM w/ veg.	SC150BN	ECM w/ veg.
n (MANNING'S COEFFICIENT) ²	0.050	0.050	0.050	0.045
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	2.7	2.7	3.6	3.8
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	1.1	1.1	1.7	1.6
CHANNEL BOTTOM WIDTH (FT)	4	4	3	3
CHANNEL SIDE SLOPES (H:V)	2	2	2	2
D (TOTAL DEPTH) (FT)	0.75	0.75	1.0	1.0
CHANNEL TOP WIDTH @ D (FT)	7	7	7	7
d (CALCULATED FLOW DEPTH) (FT)	0.16	0.16	0.31	0.29
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	4.64	4.64	4.24	4.16
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	25.0	25.0	9.68	10.34
d ₅₀ STONE SIZE (IN)	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.691	0.691	1.122	1.038
R (HYDRAULIC RADIUS) (FT)	0.147	0.147	0.256	0.242
S (BED SLOPE) ³ (FT/FT)	0.110	0.110	0.090	0.090
S _c (CRITICAL SLOPE) (FT/FT)	0.070	0.070	0.059	0.049
.7S _c (FT/FT)	0.049	0.049	0.042	0.034
1.3S _c (FT/FT)	0.091	0.091	0.077	0.064
STABLE FLOW? (Y/N)	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.59	0.59	0.69	0.71
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.
6. Shear stress calculations for rip-rap channels assume a 40% void ratio in the riprap on the channel bottoms (not the side slopes) in accordance with Chapter 6 of the E&S Manual.

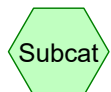
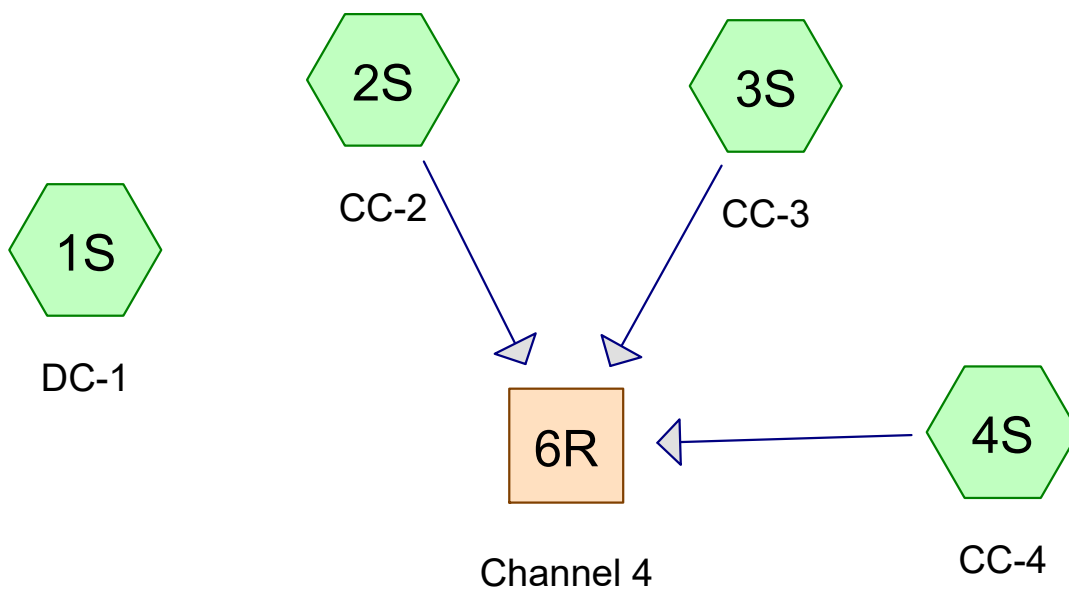
CHANNEL OR CHANNEL SECTION	SH-CC-006	SH-CC-007	SH-CC-008	
TEMPORARY OR PERMANENT? (T OR P)	P	P	T	P
DESIGN STORM (2, 5, OR 10 YR)	10	10	10	10
ACRES (AC)	1.81	1.93	1.98	1.98
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	4.10	5.06	4.58	4.58
Q (CALCULATED AT FLOW DEPTH d) (CFS)	4.2	5.3	5.58	5.10
PROTECTIVE LINING ²	R-4 Riprap	R-4 Riprap	SC150BN	ECM w veg.
n (MANNING'S COEFFICIENT) ²	0.070	0.64	0.050	0.045
V _a (ALLOWABLE VELOCITY) (FPS)	9.0	9.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	3.5	4.2	3.7	3.9
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.0	2.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.0	1.1	2.0	1.8
CHANNEL BOTTOM WIDTH (FT)	2	2	2	2
CHANNEL SIDE SLOPES (H:V)	2	2	2	2
D (TOTAL DEPTH) (FT)	1.0	1.0	1.0	1.0
CHANNEL TOP WIDTH @ D (FT)	6	6	6	6
d (CALCULATED FLOW DEPTH) (FT)	0.42	0.50	0.50	0.45
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	3.68	4.00	4.00	3.80
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	4.76	4.00	4.00	4.44
d ₅₀ STONE SIZE (IN)	6	6	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	1.193	1.500	1.500	1.305
R (HYDRAULIC RADIUS) (FT)	0.308	0.354	0.354	0.325
S (BED SLOPE) ³ (FT/FT)	0.13	0.113	0.063	0.063
S _c (CRITICAL SLOPE) (FT/FT)	0.111	0.088	0.054	0.045
.7S _c (FT/FT)	0.078	0.062	0.038	0.032
1.3S _c (FT/FT)	0.14	0.11	0.071	0.059
STABLE FLOW? (Y/N)	N	Y	N	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	0.58	-	0.5	-
FREEBOARD BASED ON STABLE FLOW (FT)	-	0.5	-	0.55
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.
6. Shear stress calculations for rip-rap channels assume a 40% void ratio in the riprap on the channel bottoms (not the side slopes) in accordance with Chapter 6 of the E&S Manual.

CHANNEL OR CHANNEL SECTION	SH-CC-009		SH-CC-010	
TEMPORARY OR PERMANENT? (T OR P)	T	P	T	P
DESIGN STORM (2, 5, OR 10 YR)	10	10	10	10
ACRES (AC)	0.06	0.06	0.12	0.12
MULTIPLIER (1.6, 2.25, or 2.75) ¹	N/A	N/A	N/A	N/A
Q _r (REQUIRED CAPACITY) (CFS)	0.22	0.22	0.7	0.7
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.25	0.23	0.89	0.81
PROTECTIVE LINING ²	SC150BN	ECM w veg.	SC150BN	ECM w veg.
n (MANNING'S COEFFICIENT) ²	0.050	0.055	0.050	0.055
V _a (ALLOWABLE VELOCITY) (FPS)	8.0	15.0	8.0	15.0
V (CALCULATED AT FLOW DEPTH d) (FPS)	2.1	1.9	3.2	2.9
T _a (MAX ALLOWABLE SHEAR STRESS) (LB/FT ²)	2.1	8.0	2.1	8.0
T _d (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT ²)	0.9	0.9	1.8	1.8
CHANNEL BOTTOM WIDTH (FT)	1	1	1	1
CHANNEL SIDE SLOPES (H:V)	2	2	2	2
D (TOTAL DEPTH) (FT)	0.75	0.75	0.75	0.75
CHANNEL TOP WIDTH @ D (FT)	4	4	4	4
d (CALCULATED FLOW DEPTH) (FT)	0.1	0.1	0.2	0.2
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	1.4	1.4	1.8	1.8
BOTTOM WIDTH: FLOW DEPTH RATIO (12:1 MAX)	10	10	5	5
d ₅₀ STONE SIZE (IN)	-	-	-	-
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.120	0.120	0.280	0.280
R (HYDRAULIC RADIUS) (FT)	0.083	0.083	0.148	0.148
S (BED SLOPE) ³ (FT/FT)	0.139	0.139	0.148	0.148
S _c (CRITICAL SLOPE) (FT/FT)	0.086	0.104	0.072	0.088
.7S _c (FT/FT)	0.060	0.073	0.051	0.061
1.3S _c (FT/FT)	0.112	0.136	0.094	0.114
STABLE FLOW? (Y/N)	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	-	-	-	-
FREEBOARD BASED ON STABLE FLOW (FT)	0.65	0.65	0.55	0.55
MINIMUM REQUIRED FREEBOARD ⁴ (FT)	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING ⁵ PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.
6. Shear stress calculations for rip-rap channels assume a 40% void ratio in the riprap on the channel bottoms (not the side slopes) in accordance with Chapter 6 of the E&S Manual.

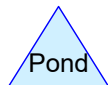
ATTACHMENT 4.5
CHANNEL HYDROCAD REPORTS –
MLV-505LD86



Subcat



Reach



Pond



Link

Routing Diagram for MLV 505LD86_Channels 1-4 REV 2
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MLV 505LD86_Channels 1-4 REV 2

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
104,226	30	Meadow, non-grazed, HSG A (1S, 3S)
13,199	78	Meadow, non-grazed, HSG D (1S, 2S, 3S, 4S)
5,051	98	Paved parking, HSG A (3S)
1,251	98	Paved parking, HSG D (2S, 3S)
30,585	30	Woods, Good, HSG A (1S)
32,717	77	Woods, Good, HSG D (1S)
187,029	44	TOTAL AREA

MLV 505LD86_Channels 1-4 REV 2

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
139,862	HSG A	1S, 3S
0	HSG B	
0	HSG C	
47,167	HSG D	1S, 2S, 3S, 4S
0	Other	
187,029		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
104,226	0	0	13,199	0	117,425	Meadow, non-grazed	
5,051	0	0	1,251	0	6,302	Paved parking	
30,585	0	0	32,717	0	63,302	Woods, Good	
139,862	0	0	47,167	0	187,029	TOTAL AREA	

MLV 505LD86_Channels 1-4 REV 2*Type II 24-hr 1-yr Rainfall=2.72"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DC-1Runoff Area=160,162 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=40 Runoff=0.00 cfs 0 cf**Subcatchment2S: CC-2**Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=79 Runoff=0.16 cfs 327 cf**Subcatchment3S: CC-3**Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=0.32"
Tc=5.0 min CN=63 Runoff=0.20 cfs 560 cf**Subcatchment4S: CC-4**Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=0.93"
Tc=5.0 min CN=78 Runoff=0.08 cfs 158 cf**Reach 6R: Channel 4**Avg. Flow Depth=0.08' Max Vel=1.32 fps Inflow=0.43 cfs 1,045 cf
n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=0.41 cfs 1,045 cf**Total Runoff Area = 187,029 sf Runoff Volume = 1,045 cf Average Runoff Depth = 0.07"**
96.63% Pervious = 180,727 sf 3.37% Impervious = 6,302 sf

MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 1S: DC-1[49] Hint: $T_c < 2dt$ may require smaller dt

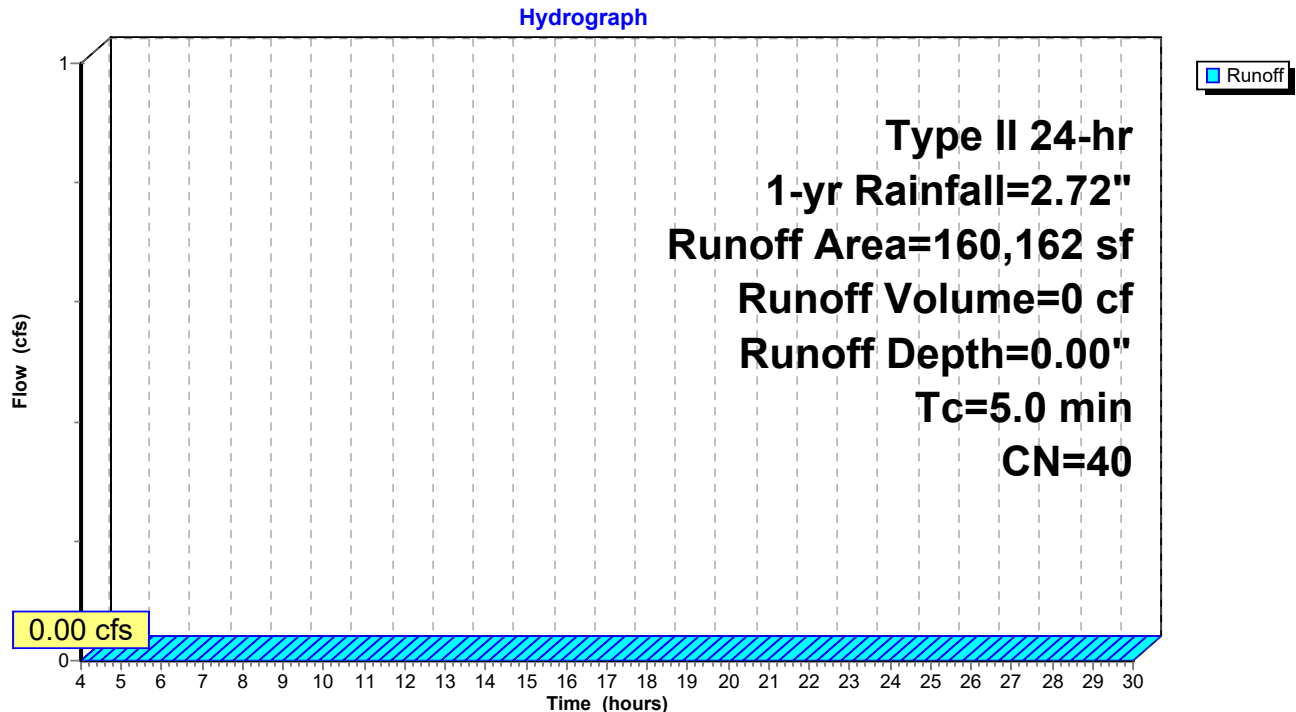
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 4.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
30,585	30	Woods, Good, HSG A
32,717	77	Woods, Good, HSG D
94,974	30	Meadow, non-grazed, HSG A
1,886	78	Meadow, non-grazed, HSG D
160,162	40	Weighted Average
160,162		100.00% Pervious Area

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

Subcatchment 1S: DC-1

MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 2S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.16 cfs @ 11.96 hrs, Volume= 327 cf, Depth= 0.99"

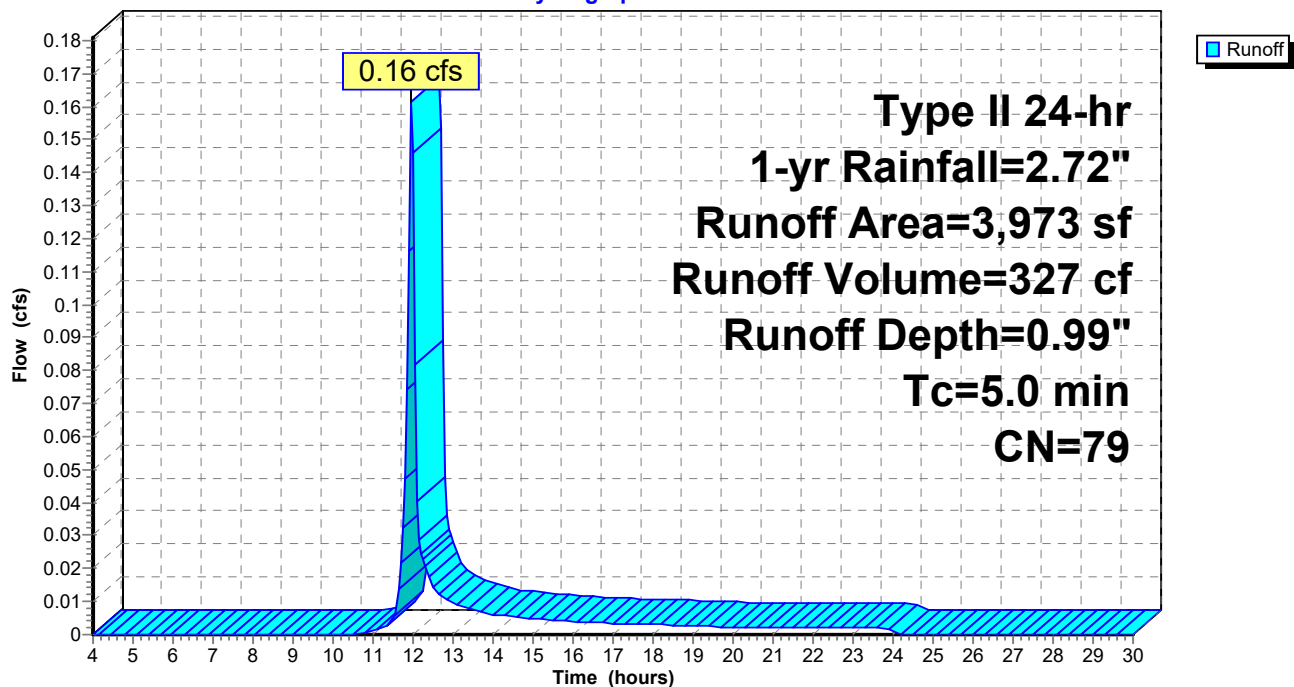
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 2S: CC-2

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.20 cfs @ 11.99 hrs, Volume= 560 cf, Depth= 0.32"

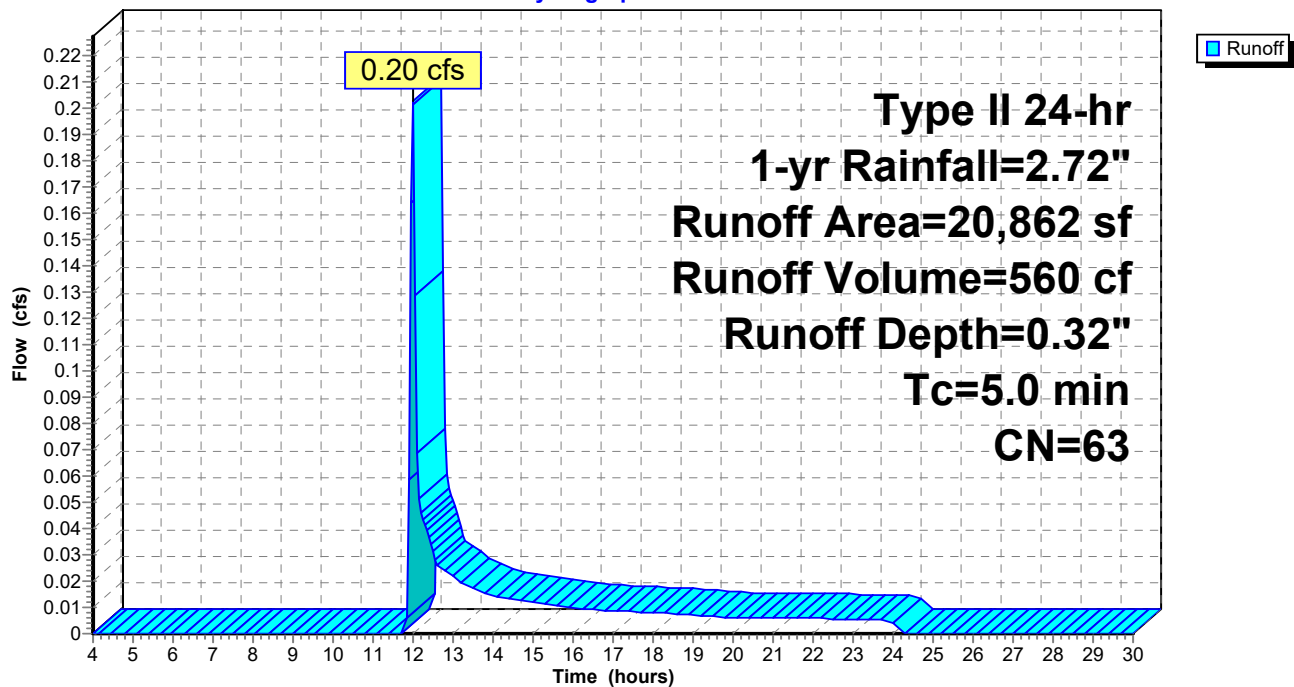
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 3S: CC-3

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.08 cfs @ 11.96 hrs, Volume= 158 cf, Depth= 0.93"

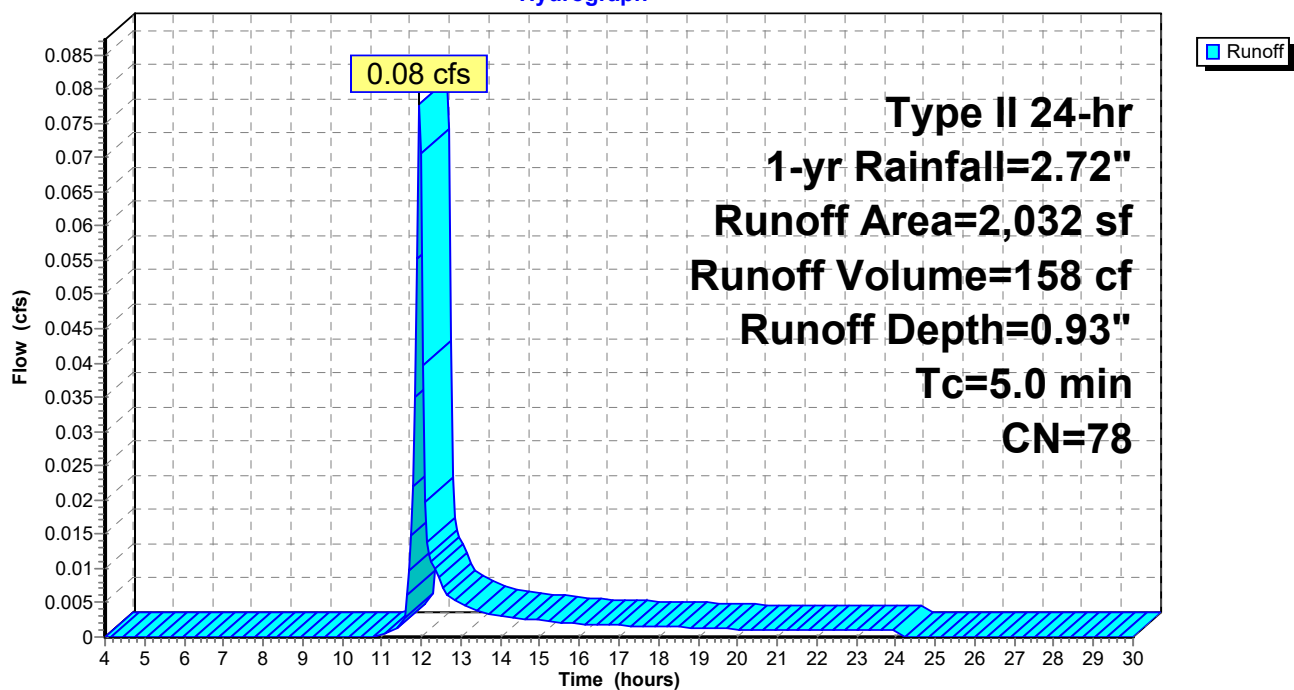
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 23.46% Impervious, Inflow Depth = 0.47" for 1-yr event
Inflow = 0.43 cfs @ 11.98 hrs, Volume= 1,045 cf
Outflow = 0.41 cfs @ 12.00 hrs, Volume= 1,045 cf, Atten= 5%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.32 fps, Min. Travel Time= 0.8 min
Avg. Velocity= 0.37 fps, Avg. Travel Time= 2.8 min

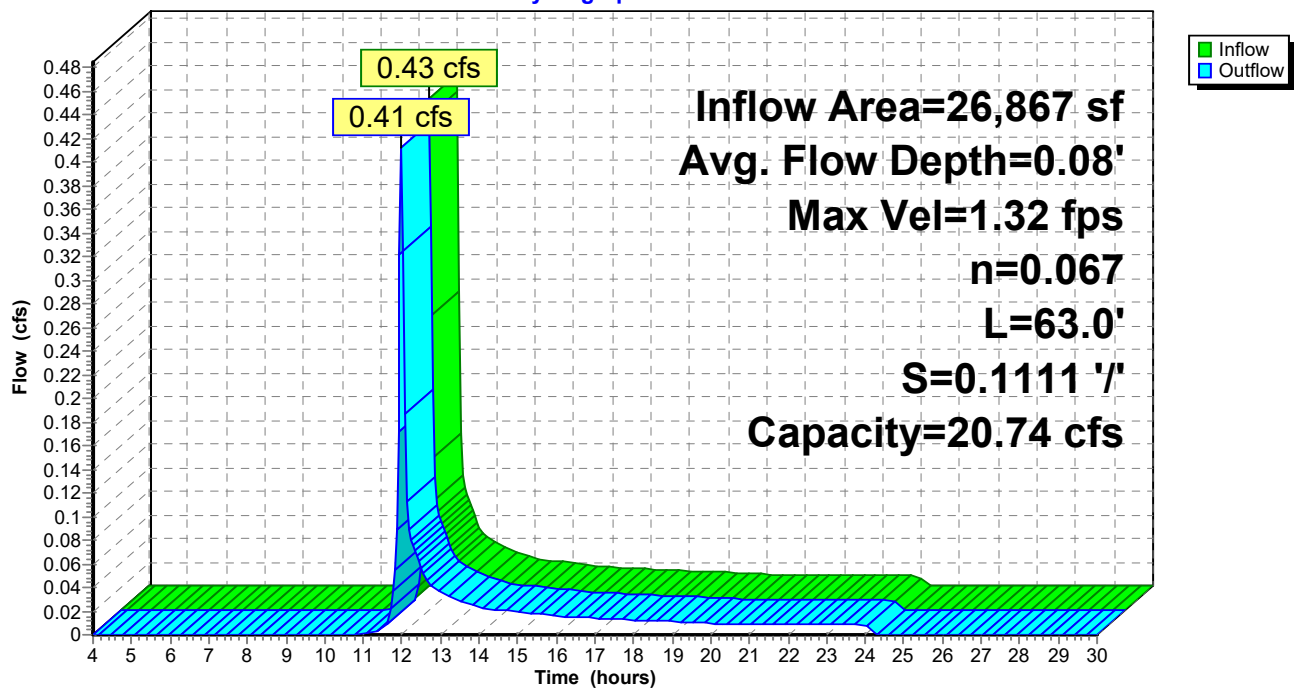
Peak Storage= 21 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2*Type II 24-hr 2-yr Rainfall=3.26"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DC-1 Runoff Area=160,162 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=40 Runoff=0.00 cfs 59 cf

Subcatchment2S: CC-2 Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=1.38"
Tc=5.0 min CN=79 Runoff=0.23 cfs 458 cf

Subcatchment3S: CC-3 Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=0.55"
Tc=5.0 min CN=63 Runoff=0.41 cfs 950 cf

Subcatchment4S: CC-4 Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=1.32"
Tc=5.0 min CN=78 Runoff=0.11 cfs 223 cf

Reach 6R: Channel 4 Avg. Flow Depth=0.11' Max Vel=1.60 fps Inflow=0.74 cfs 1,631 cf
n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=0.71 cfs 1,631 cf

Total Runoff Area = 187,029 sf Runoff Volume = 1,690 cf Average Runoff Depth = 0.11"
96.63% Pervious = 180,727 sf 3.37% Impervious = 6,302 sf

Summary for Subcatchment 1S: DC-1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 59 cf, Depth= 0.00"

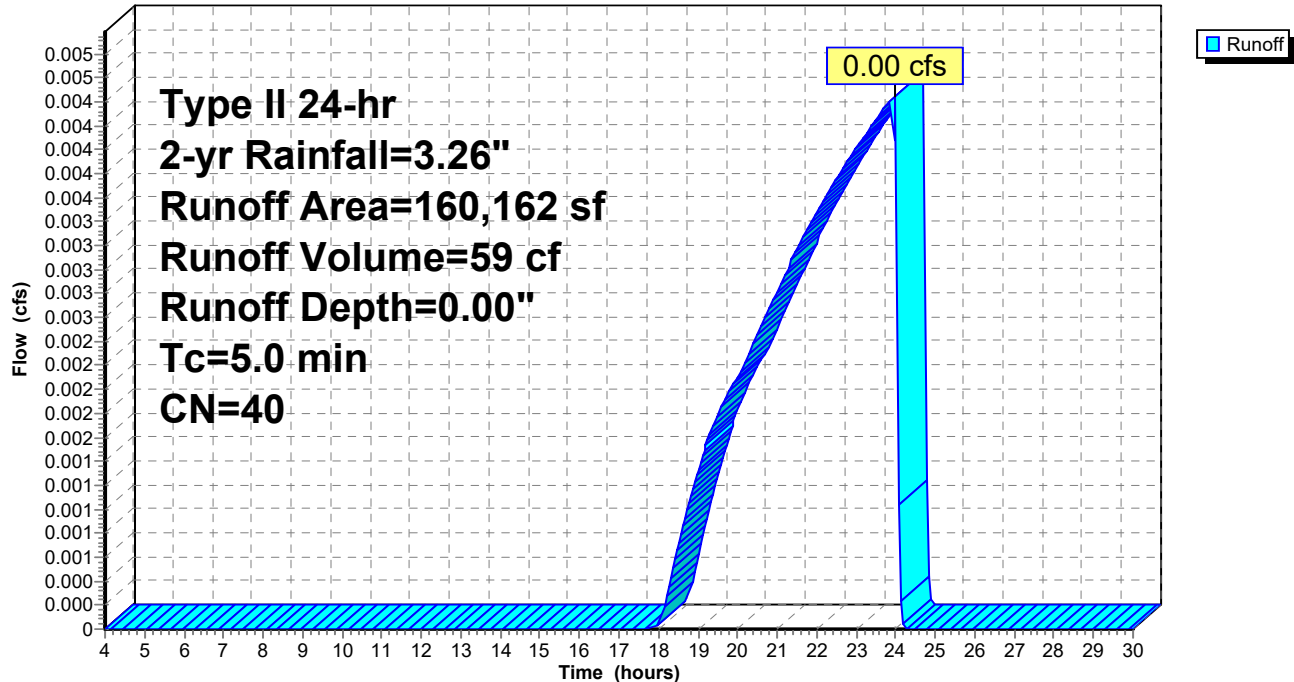
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
30,585	30	Woods, Good, HSG A
32,717	77	Woods, Good, HSG D
94,974	30	Meadow, non-grazed, HSG A
1,886	78	Meadow, non-grazed, HSG D
160,162	40	Weighted Average
160,162		100.00% Pervious Area

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

Subcatchment 1S: DC-1

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 2S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.23 cfs @ 11.96 hrs, Volume= 458 cf, Depth= 1.38"

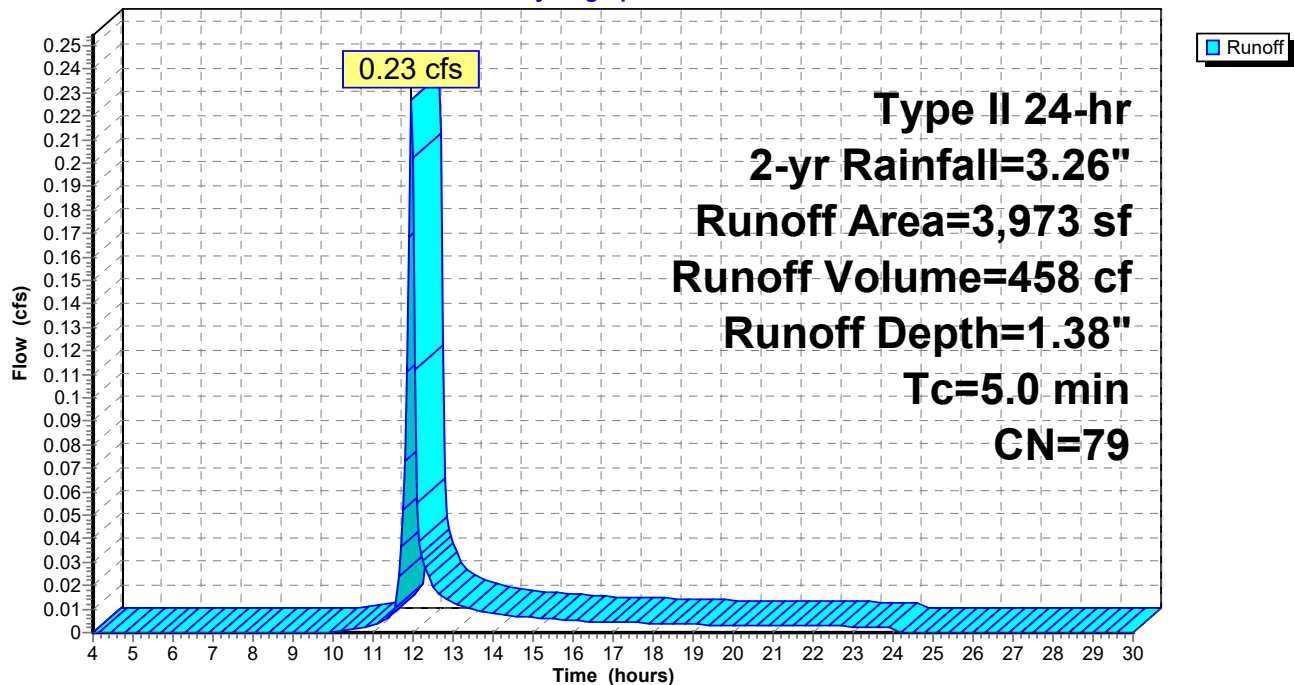
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 2S: CC-2

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.41 cfs @ 11.98 hrs, Volume= 950 cf, Depth= 0.55"

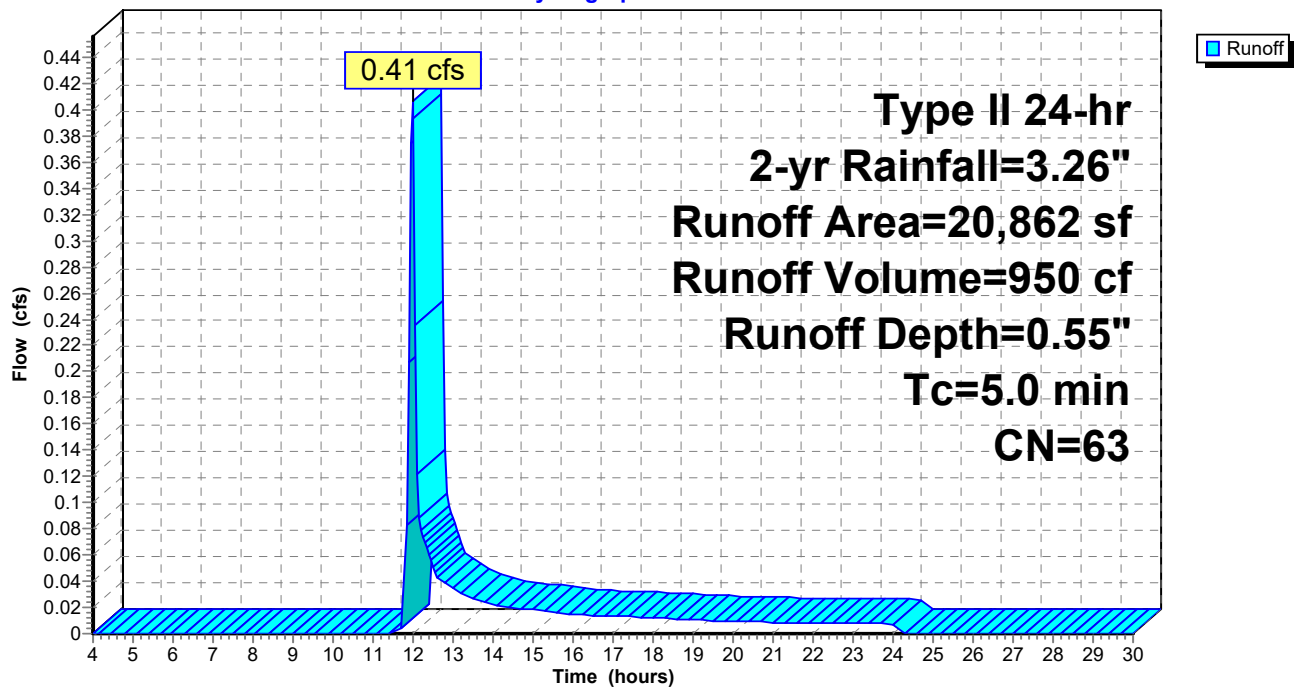
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 3S: CC-3

Hydrograph



Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.11 cfs @ 11.96 hrs, Volume= 223 cf, Depth= 1.32"

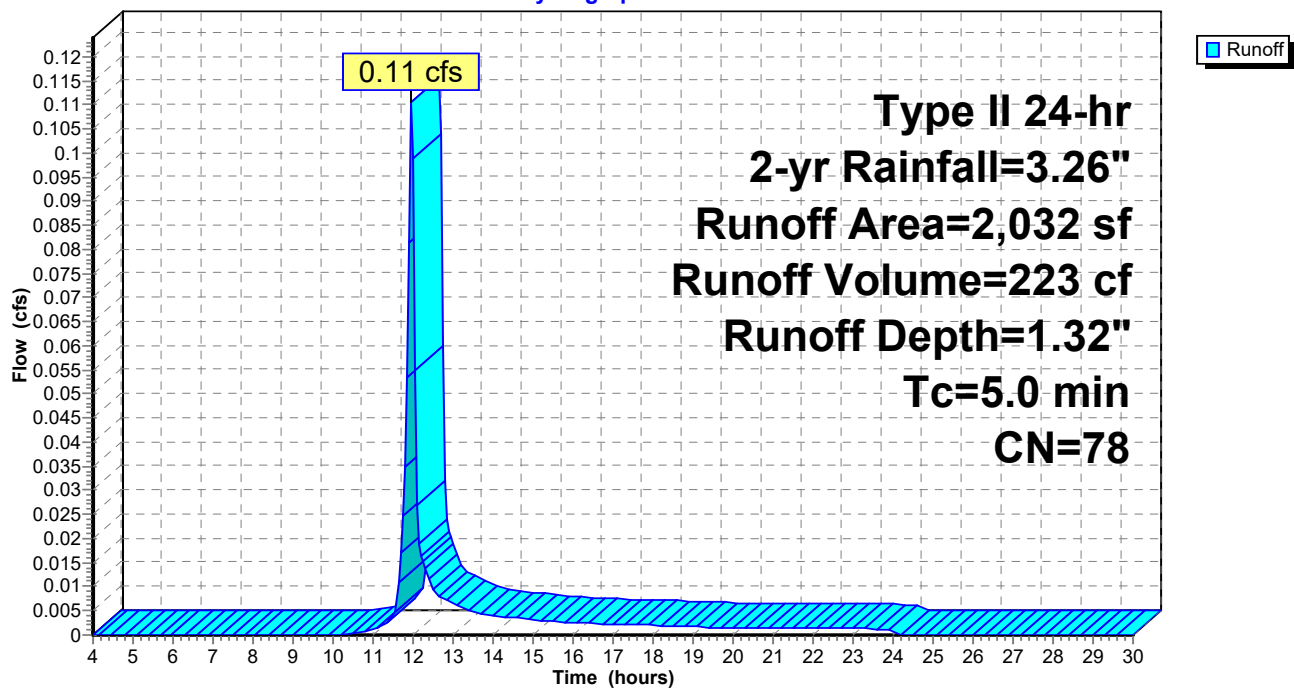
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 23.46% Impervious, Inflow Depth = 0.73" for 2-yr event
Inflow = 0.74 cfs @ 11.97 hrs, Volume= 1,631 cf
Outflow = 0.71 cfs @ 11.99 hrs, Volume= 1,631 cf, Atten= 3%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.60 fps, Min. Travel Time= 0.7 min
Avg. Velocity= 0.42 fps, Avg. Travel Time= 2.5 min

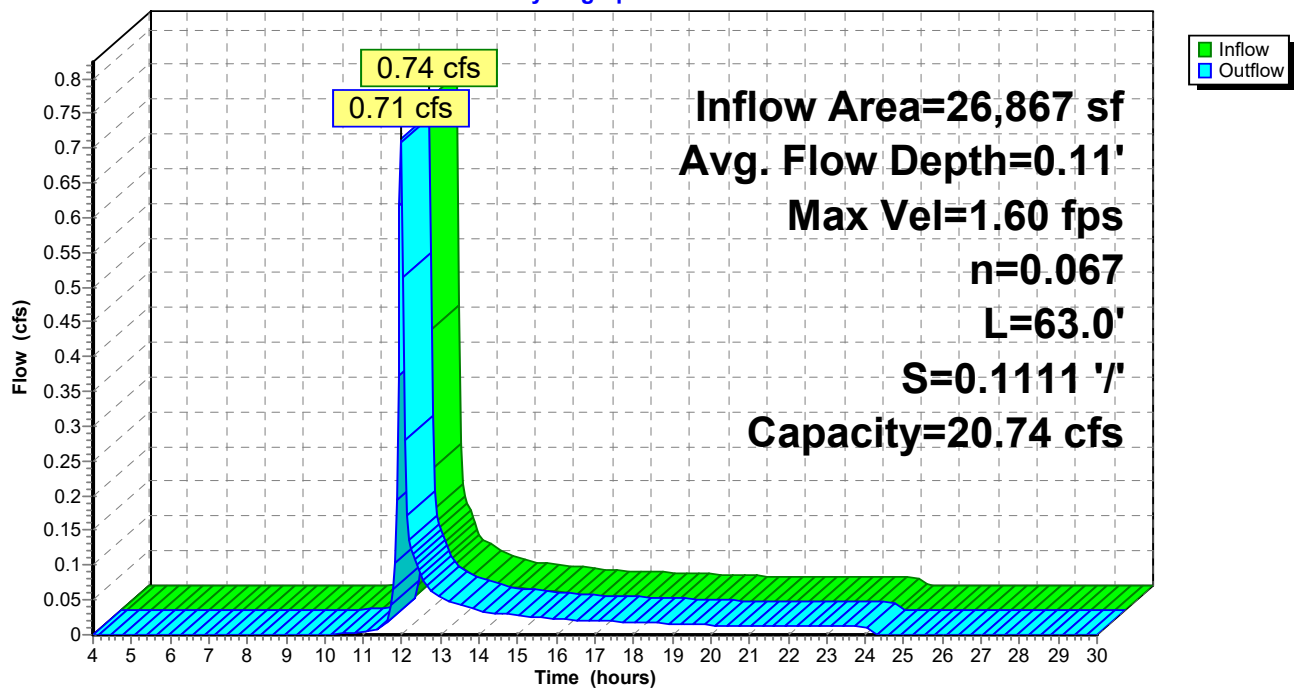
Peak Storage= 29 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2*Type II 24-hr 10-yr Rainfall=4.74"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DC-1

Runoff Area=160,162 sf 0.00% Impervious Runoff Depth=0.18"
Tc=5.0 min CN=40 Runoff=0.11 cfs 2,414 cf

Subcatchment2S: CC-2

Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=2.58"
Tc=5.0 min CN=79 Runoff=0.42 cfs 854 cf

Subcatchment3S: CC-3

Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=1.35"
Tc=5.0 min CN=63 Runoff=1.13 cfs 2,341 cf

Subcatchment4S: CC-4

Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=2.49"
Tc=5.0 min CN=78 Runoff=0.21 cfs 422 cf

Reach 6R: Channel 4

Avg. Flow Depth=0.18' Max Vel=2.19 fps Inflow=1.76 cfs 3,617 cf
n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=1.71 cfs 3,617 cf

Total Runoff Area = 187,029 sf Runoff Volume = 6,031 cf Average Runoff Depth = 0.39"
96.63% Pervious = 180,727 sf 3.37% Impervious = 6,302 sf

MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 1S: DC-1[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.11 cfs @ 12.36 hrs, Volume= 2,414 cf, Depth= 0.18"

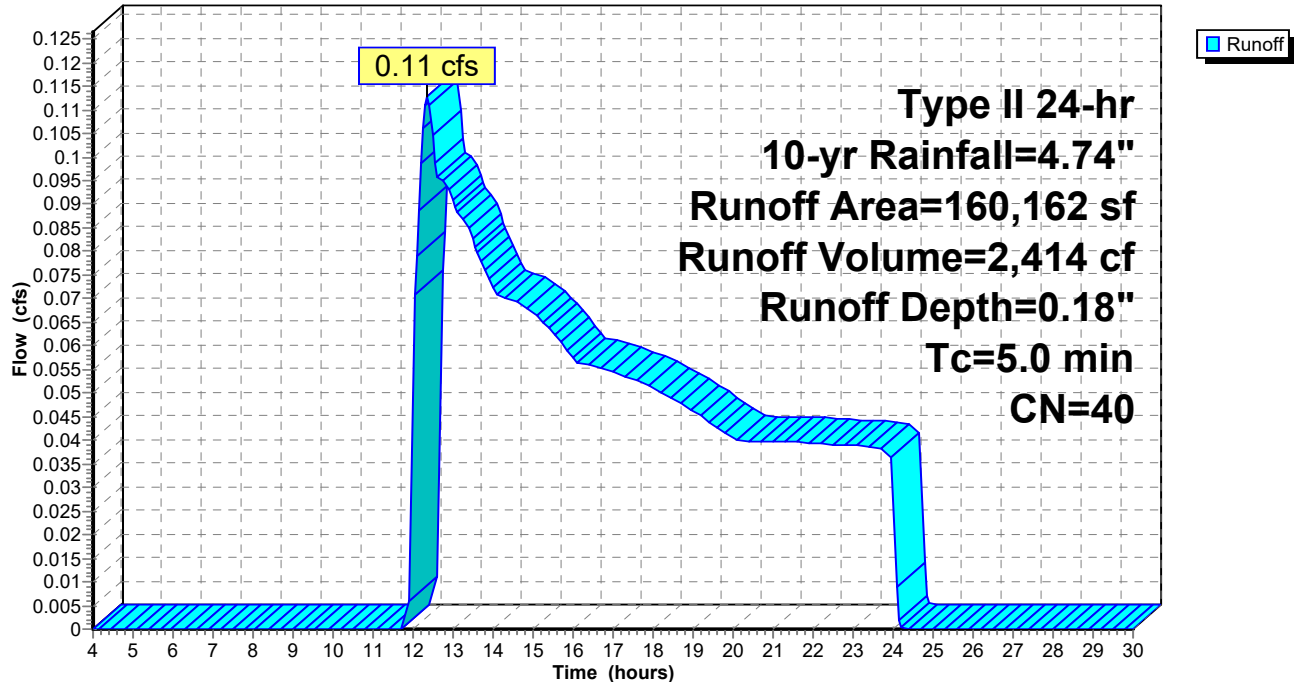
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
30,585	30	Woods, Good, HSG A
32,717	77	Woods, Good, HSG D
94,974	30	Meadow, non-grazed, HSG A
1,886	78	Meadow, non-grazed, HSG D
160,162	40	Weighted Average
160,162		100.00% Pervious Area

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

Subcatchment 1S: DC-1

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 2S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.42 cfs @ 11.96 hrs, Volume= 854 cf, Depth= 2.58"

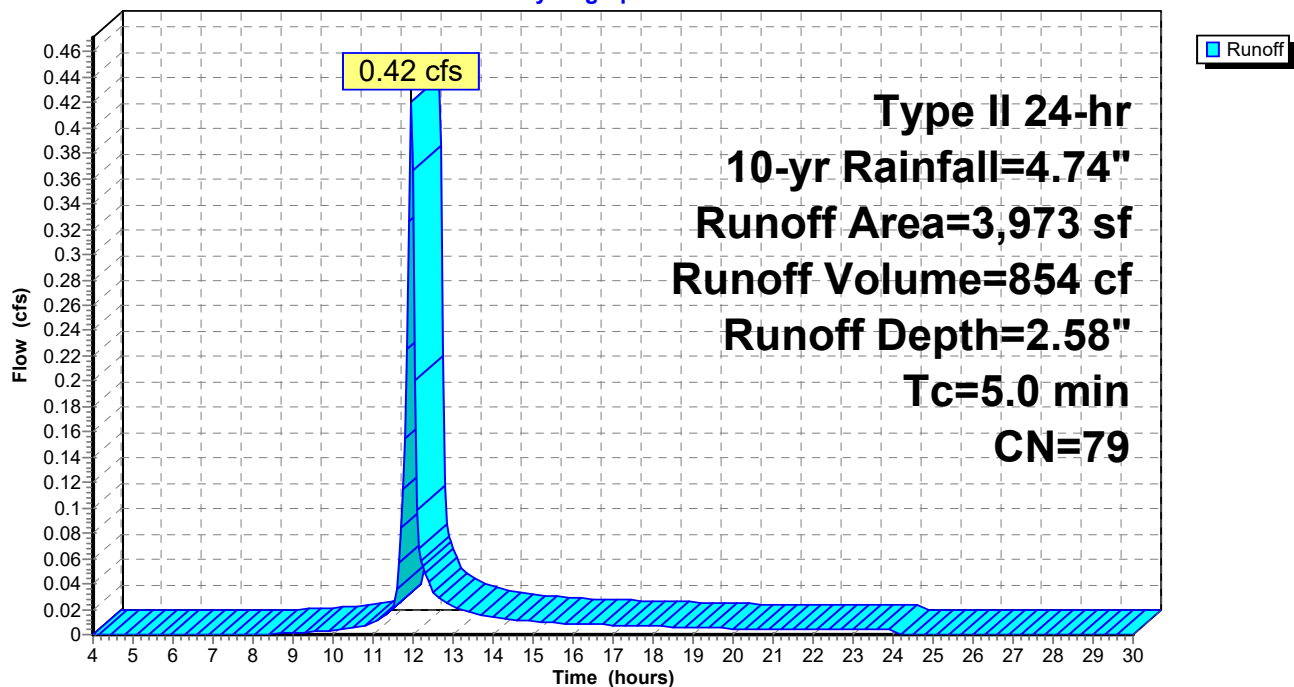
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 2S: CC-2

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 10-yr Rainfall=4.74"

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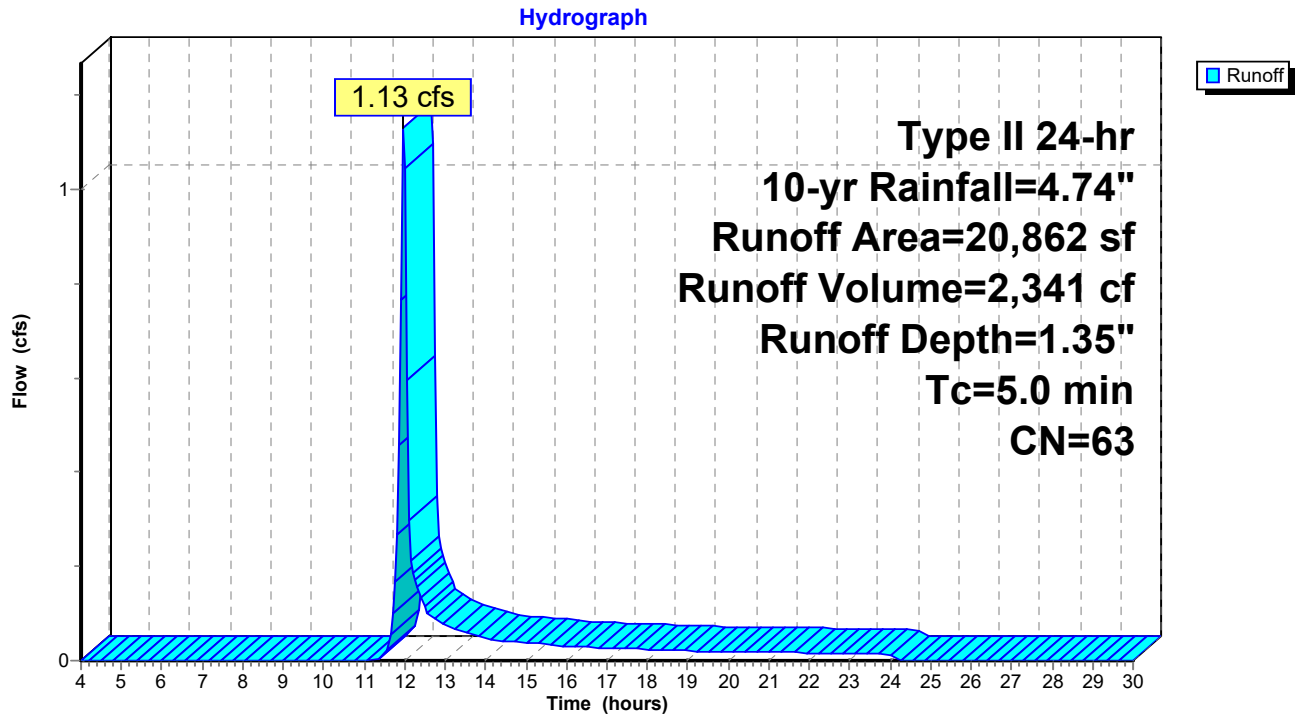
Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.13 cfs @ 11.97 hrs, Volume= 2,341 cf, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 3S: CC-3

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 4S: CC-4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.21 cfs @ 11.96 hrs, Volume= 422 cf, Depth= 2.49"

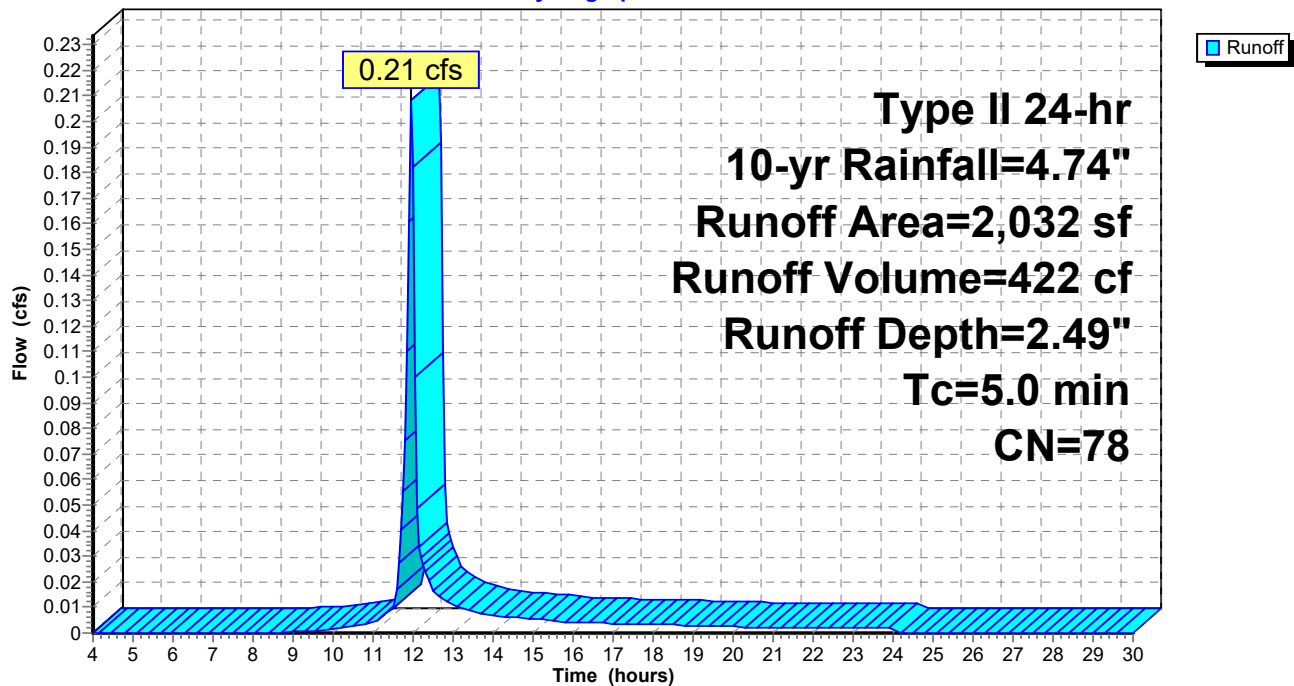
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 23.46% Impervious, Inflow Depth = 1.62" for 10-yr event
Inflow = 1.76 cfs @ 11.96 hrs, Volume= 3,617 cf
Outflow = 1.71 cfs @ 11.98 hrs, Volume= 3,617 cf, Atten= 3%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.19 fps, Min. Travel Time= 0.5 min
Avg. Velocity= 0.51 fps, Avg. Travel Time= 2.1 min

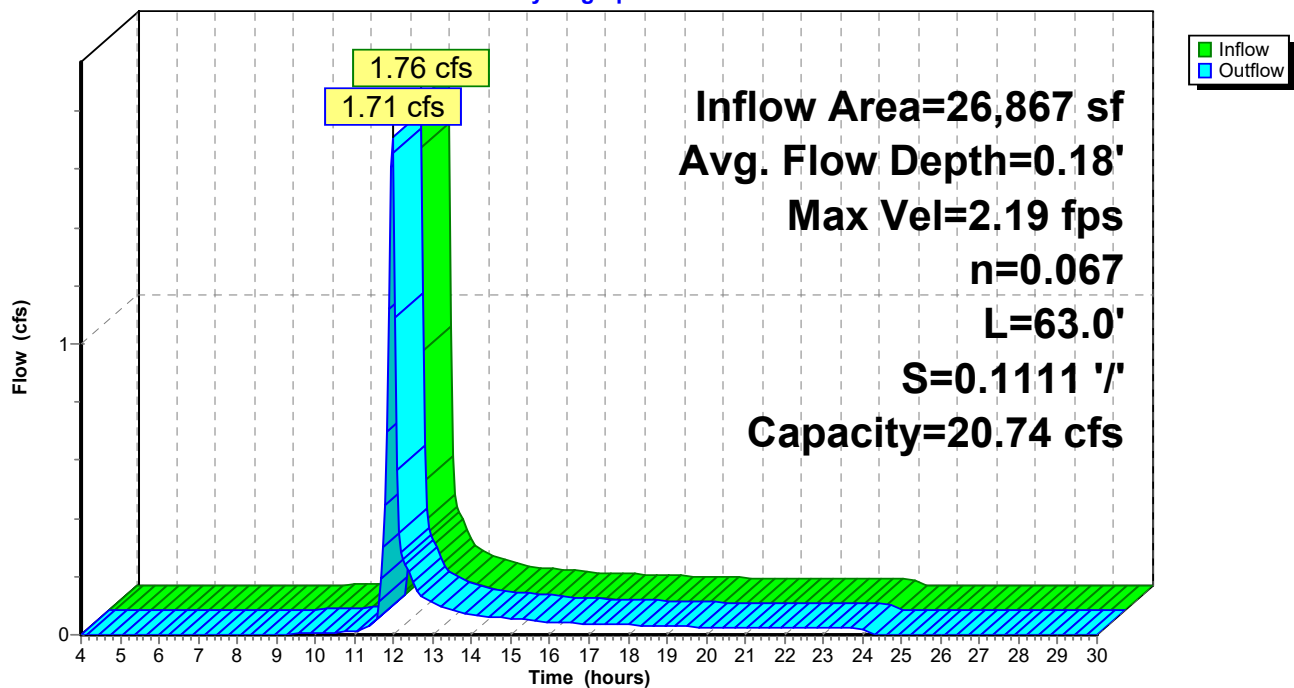
Peak Storage= 50 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2*Type II 24-hr 25-yr Rainfall=5.85"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DC-1Runoff Area=160,162 sf 0.00% Impervious Runoff Depth=0.46"
Tc=5.0 min CN=40 Runoff=1.49 cfs 6,073 cf**Subcatchment2S: CC-2**Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=3.55"
Tc=5.0 min CN=79 Runoff=0.57 cfs 1,174 cf**Subcatchment3S: CC-3**Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=2.07"
Tc=5.0 min CN=63 Runoff=1.78 cfs 3,603 cf**Subcatchment4S: CC-4**Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=3.45"
Tc=5.0 min CN=78 Runoff=0.29 cfs 584 cf**Reach 6R: Channel 4**Avg. Flow Depth=0.23' Max Vel=2.54 fps Inflow=2.63 cfs 5,360 cf
n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=2.54 cfs 5,360 cf**Total Runoff Area = 187,029 sf Runoff Volume = 11,434 cf Average Runoff Depth = 0.73"**
96.63% Pervious = 180,727 sf 3.37% Impervious = 6,302 sf

MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 25-yr Rainfall=5.85"

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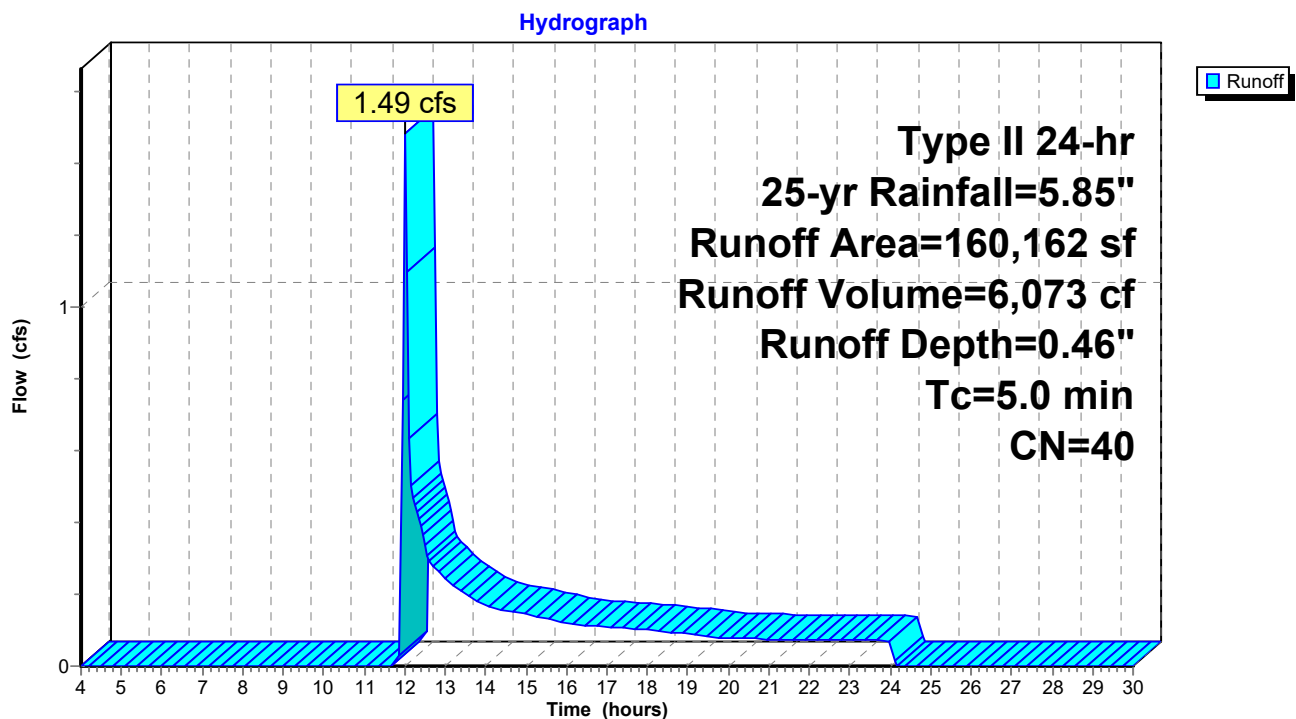
Summary for Subcatchment 1S: DC-1[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.49 cfs @ 12.01 hrs, Volume= 6,073 cf, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
30,585	30	Woods, Good, HSG A
32,717	77	Woods, Good, HSG D
94,974	30	Meadow, non-grazed, HSG A
1,886	78	Meadow, non-grazed, HSG D
160,162	40	Weighted Average
160,162		100.00% Pervious Area

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

Subcatchment 1S: DC-1

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 2S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.57 cfs @ 11.96 hrs, Volume= 1,174 cf, Depth= 3.55"

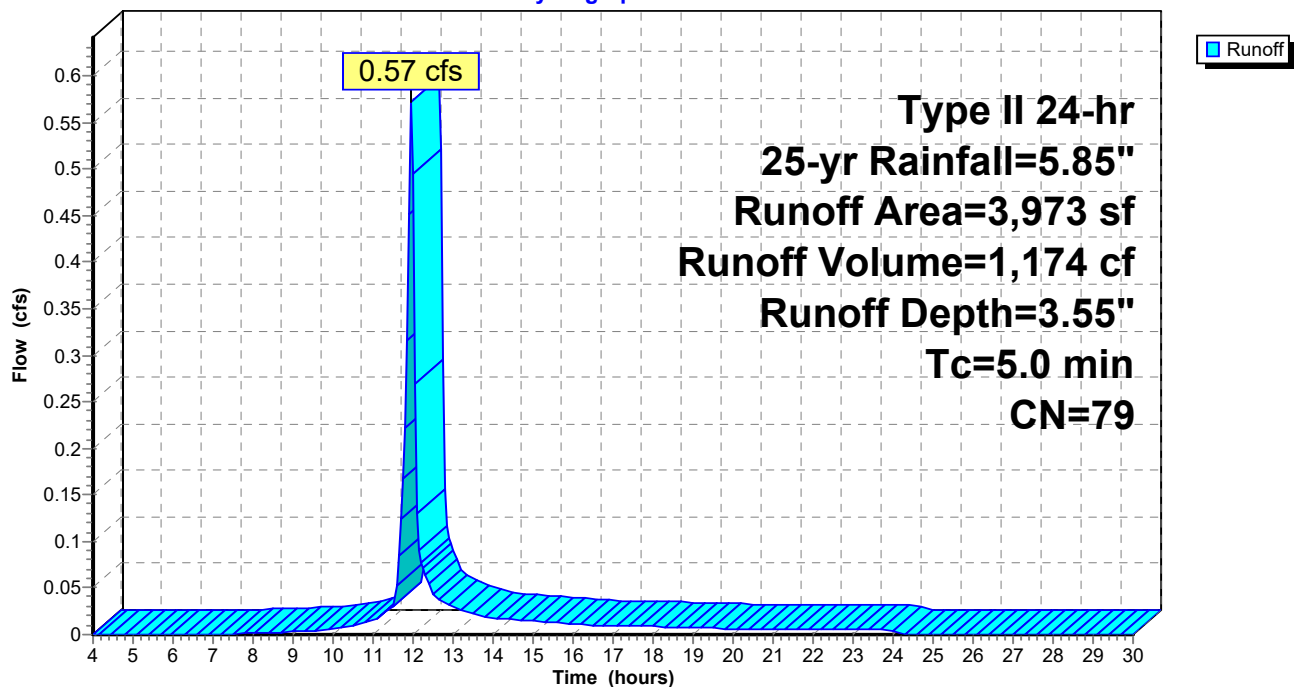
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 2S: CC-2

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 25-yr Rainfall=5.85"

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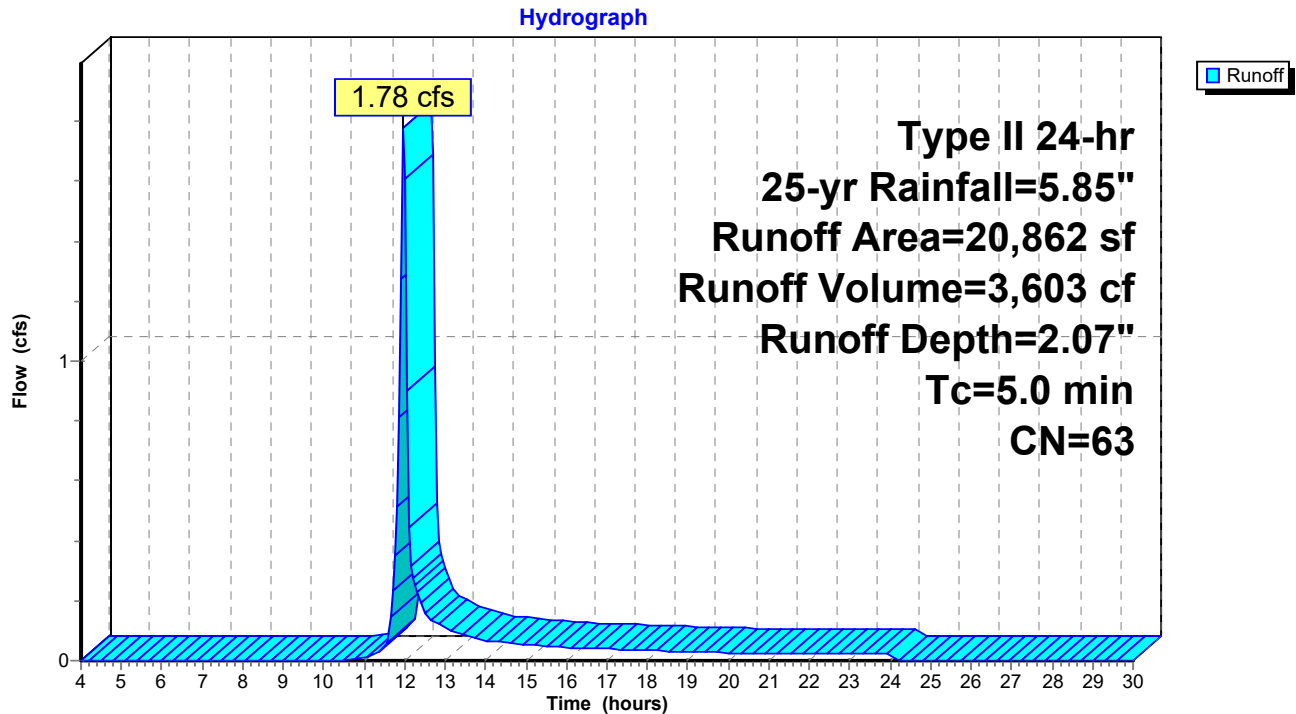
Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.78 cfs @ 11.96 hrs, Volume= 3,603 cf, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 3S: CC-3

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.29 cfs @ 11.96 hrs, Volume= 584 cf, Depth= 3.45"

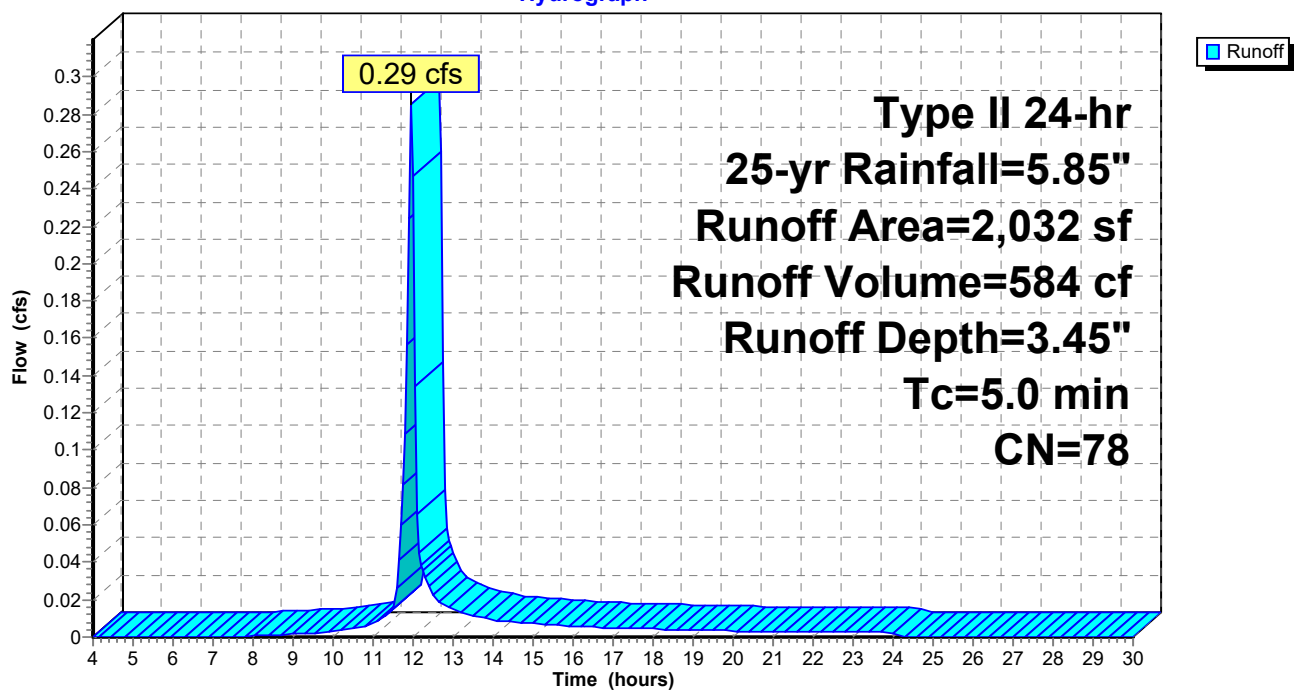
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 23.46% Impervious, Inflow Depth = 2.39" for 25-yr event
Inflow = 2.63 cfs @ 11.96 hrs, Volume= 5,360 cf
Outflow = 2.54 cfs @ 11.97 hrs, Volume= 5,360 cf, Atten= 3%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.54 fps, Min. Travel Time= 0.4 min
Avg. Velocity= 0.56 fps, Avg. Travel Time= 1.9 min

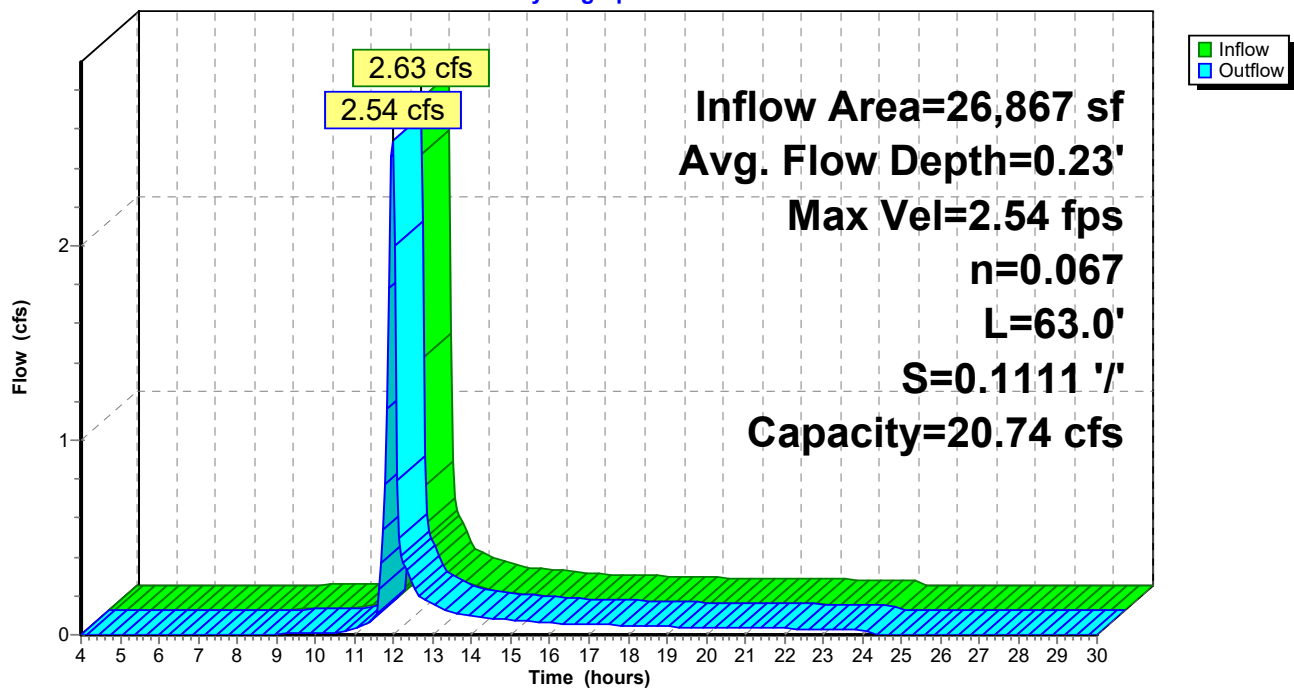
Peak Storage= 64 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2*Type II 24-hr 50-yr Rainfall=6.87"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DC-1

Runoff Area=160,162 sf 0.00% Impervious Runoff Depth=0.79"
Tc=5.0 min CN=40 Runoff=3.78 cfs 10,593 cf

Subcatchment2S: CC-2

Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=4.47"
Tc=5.0 min CN=79 Runoff=0.71 cfs 1,478 cf

Subcatchment3S: CC-3

Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=2.80"
Tc=5.0 min CN=63 Runoff=2.42 cfs 4,875 cf

Subcatchment4S: CC-4

Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=78 Runoff=0.36 cfs 738 cf

Reach 6R: Channel 4

Avg. Flow Depth=0.27' Max Vel=2.81 fps Inflow=3.49 cfs 7,091 cf
n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=3.38 cfs 7,091 cf

Total Runoff Area = 187,029 sf Runoff Volume = 17,684 cf Average Runoff Depth = 1.13"
96.63% Pervious = 180,727 sf 3.37% Impervious = 6,302 sf

MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 1S: DC-1[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.78 cfs @ 11.99 hrs, Volume= 10,593 cf, Depth= 0.79"

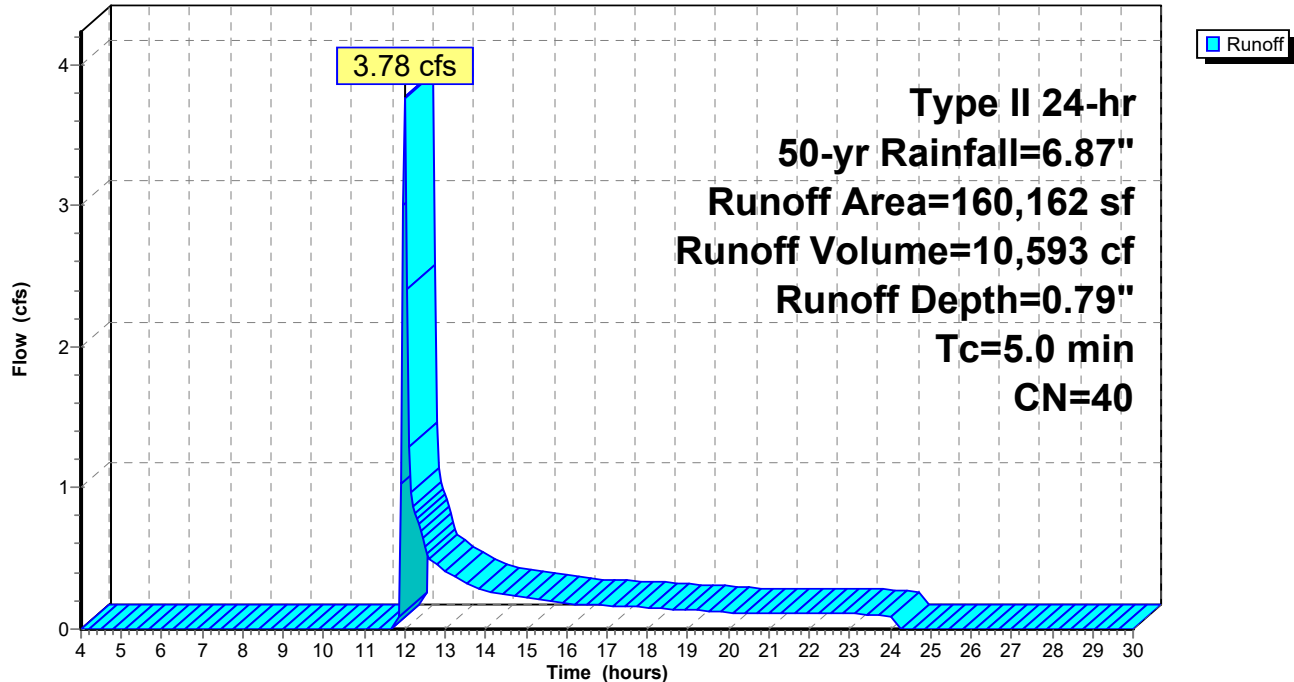
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
30,585	30	Woods, Good, HSG A
32,717	77	Woods, Good, HSG D
94,974	30	Meadow, non-grazed, HSG A
1,886	78	Meadow, non-grazed, HSG D
160,162	40	Weighted Average
160,162		100.00% Pervious Area

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

Subcatchment 1S: DC-1

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 2S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.71 cfs @ 11.95 hrs, Volume= 1,478 cf, Depth= 4.47"

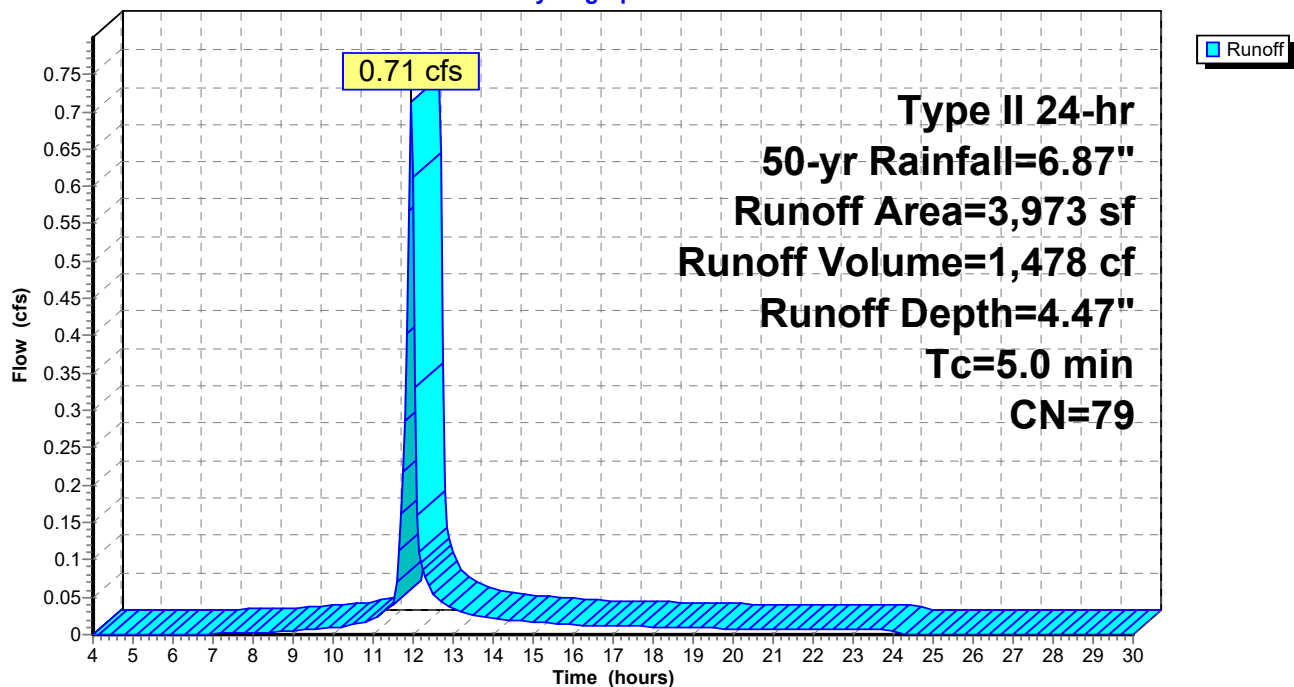
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 2S: CC-2

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 50-yr Rainfall=6.87"

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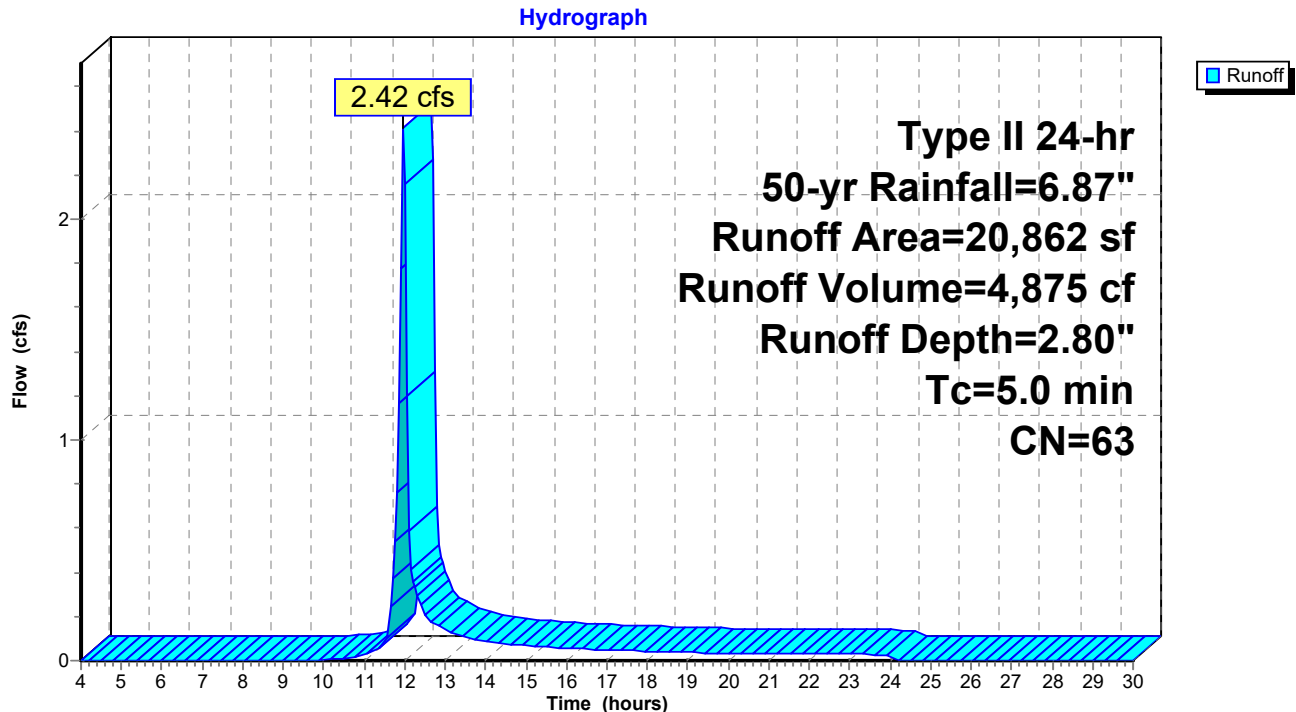
Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.42 cfs @ 11.96 hrs, Volume= 4,875 cf, Depth= 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 3S: CC-3

MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.36 cfs @ 11.95 hrs, Volume= 738 cf, Depth= 4.36"

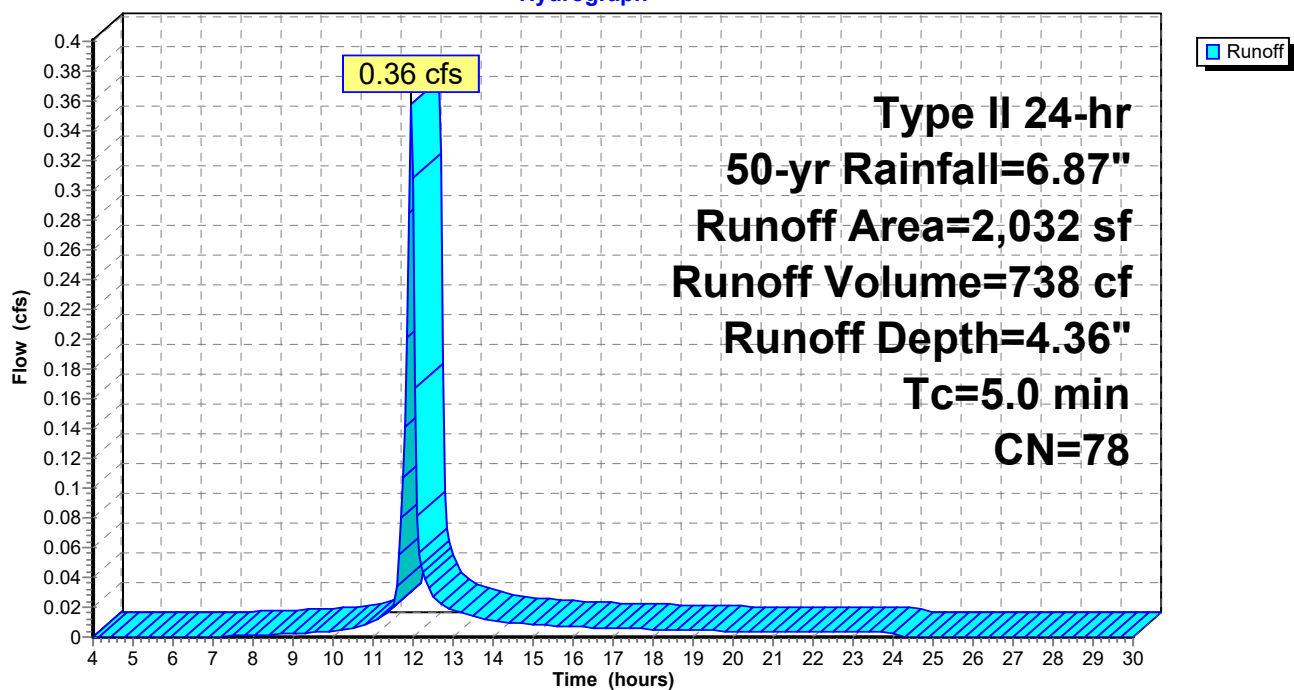
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 23.46% Impervious, Inflow Depth = 3.17" for 50-yr event
Inflow = 3.49 cfs @ 11.96 hrs, Volume= 7,091 cf
Outflow = 3.38 cfs @ 11.97 hrs, Volume= 7,091 cf, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.81 fps, Min. Travel Time= 0.4 min
Avg. Velocity= 0.61 fps, Avg. Travel Time= 1.7 min

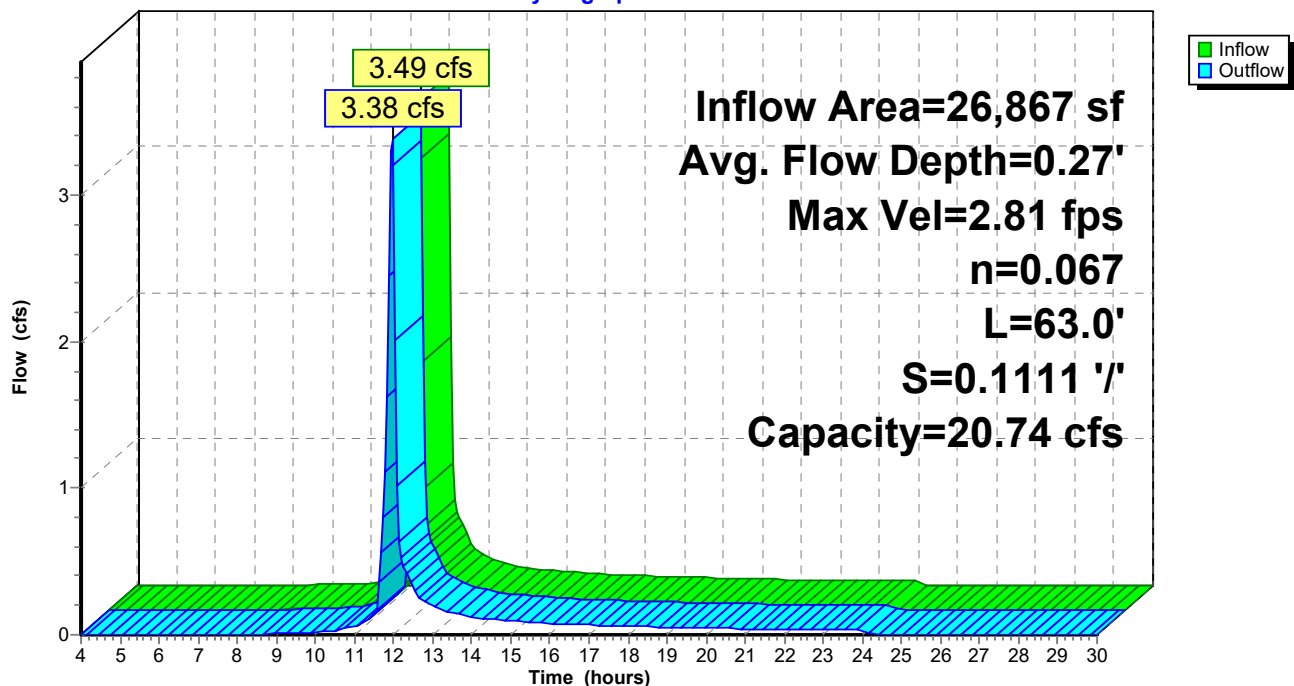
Peak Storage= 77 cf @ 11.96 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2*Type II 24-hr 100-yr Rainfall=8.09"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DC-1

Runoff Area=160,162 sf 0.00% Impervious Runoff Depth=1.29"
Tc=5.0 min CN=40 Runoff=7.24 cfs 17,212 cf

Subcatchment2S: CC-2

Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=5.59"
Tc=5.0 min CN=79 Runoff=0.88 cfs 1,851 cf

Subcatchment3S: CC-3

Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=3.74"
Tc=5.0 min CN=63 Runoff=3.23 cfs 6,501 cf

Subcatchment4S: CC-4

Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=5.47"
Tc=5.0 min CN=78 Runoff=0.44 cfs 927 cf

Reach 6R: Channel 4

Avg. Flow Depth=0.32' Max Vel=3.08 fps Inflow=4.55 cfs 9,279 cf
n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=4.42 cfs 9,279 cf

Total Runoff Area = 187,029 sf Runoff Volume = 26,492 cf Average Runoff Depth = 1.70"
96.63% Pervious = 180,727 sf 3.37% Impervious = 6,302 sf

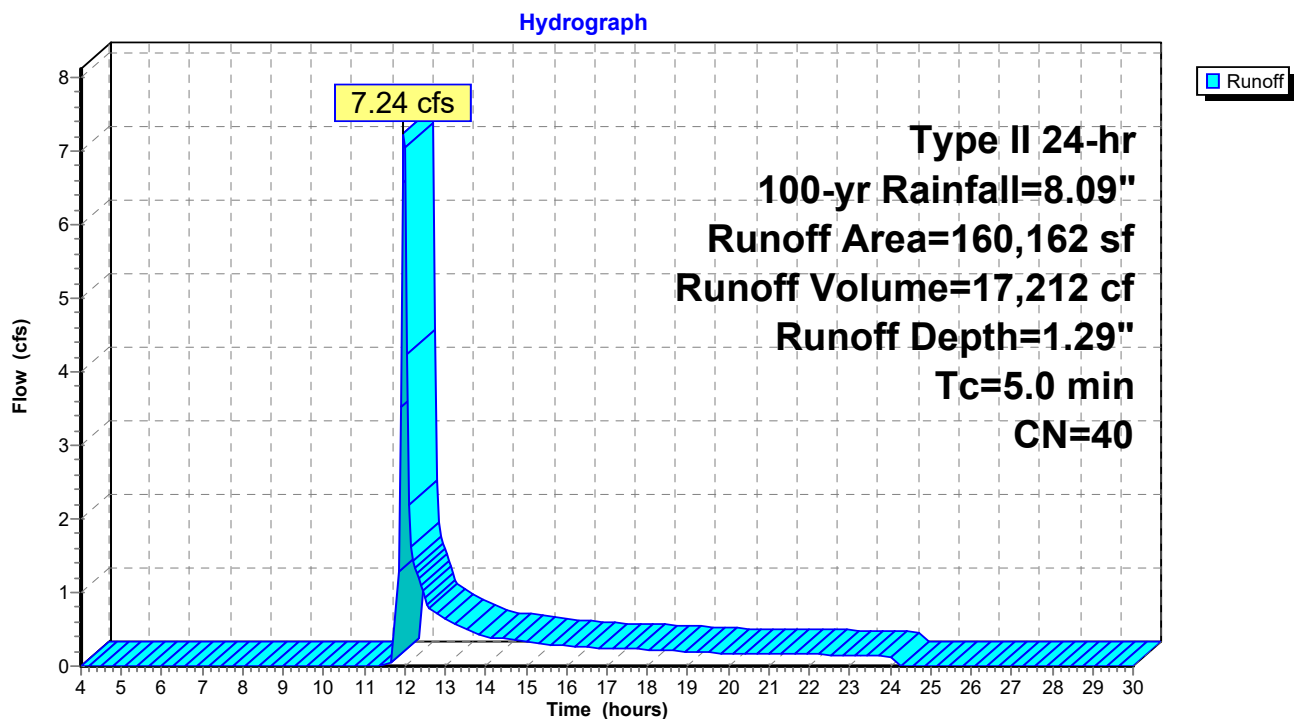
Summary for Subcatchment 1S: DC-1[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 7.24 cfs @ 11.98 hrs, Volume= 17,212 cf, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
30,585	30	Woods, Good, HSG A
32,717	77	Woods, Good, HSG D
94,974	30	Meadow, non-grazed, HSG A
1,886	78	Meadow, non-grazed, HSG D
160,162	40	Weighted Average
160,162		100.00% Pervious Area

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

Subcatchment 1S: DC-1

MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 2S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.88 cfs @ 11.95 hrs, Volume= 1,851 cf, Depth= 5.59"

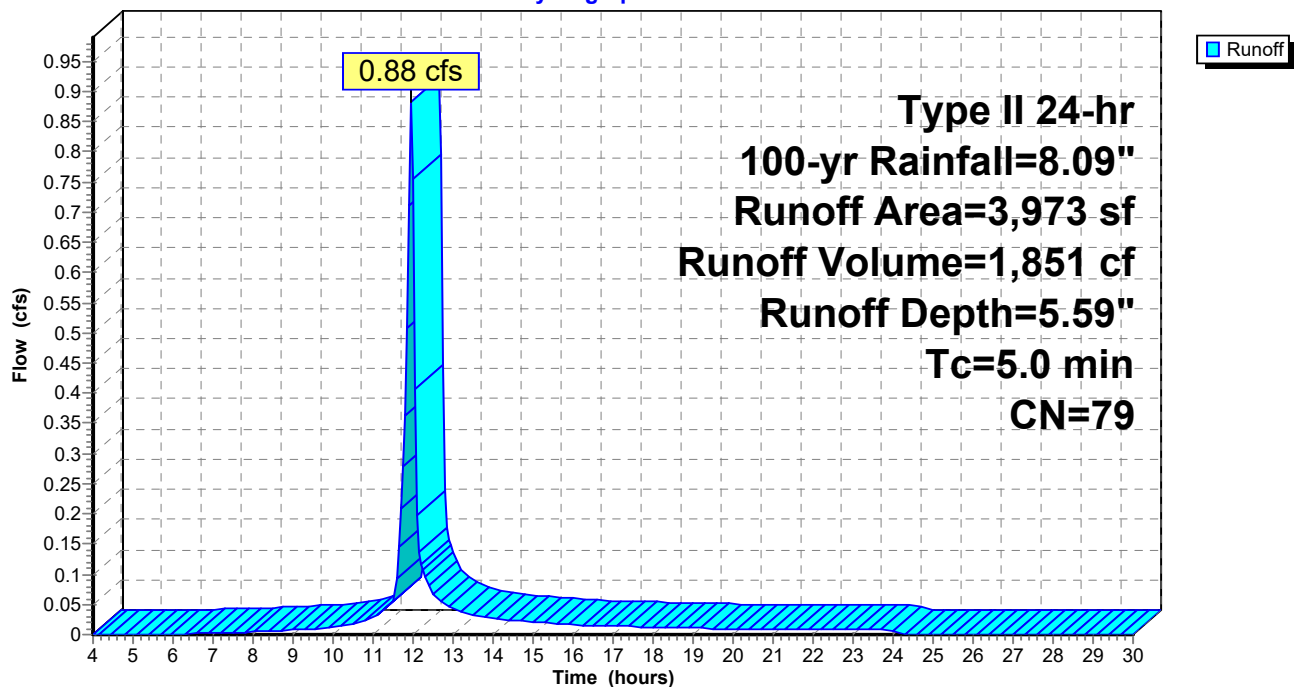
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 2S: CC-2

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 100-yr Rainfall=8.09"

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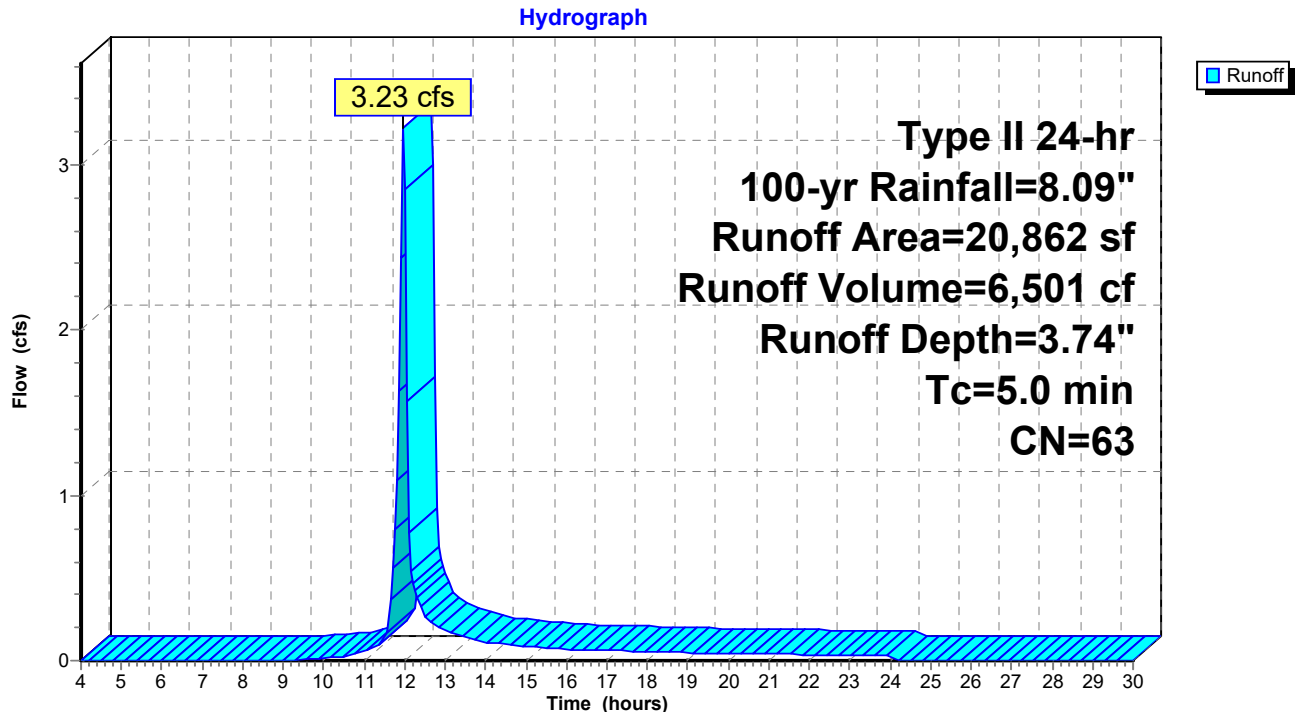
Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.23 cfs @ 11.96 hrs, Volume= 6,501 cf, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 3S: CC-3

Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.44 cfs @ 11.95 hrs, Volume= 927 cf, Depth= 5.47"

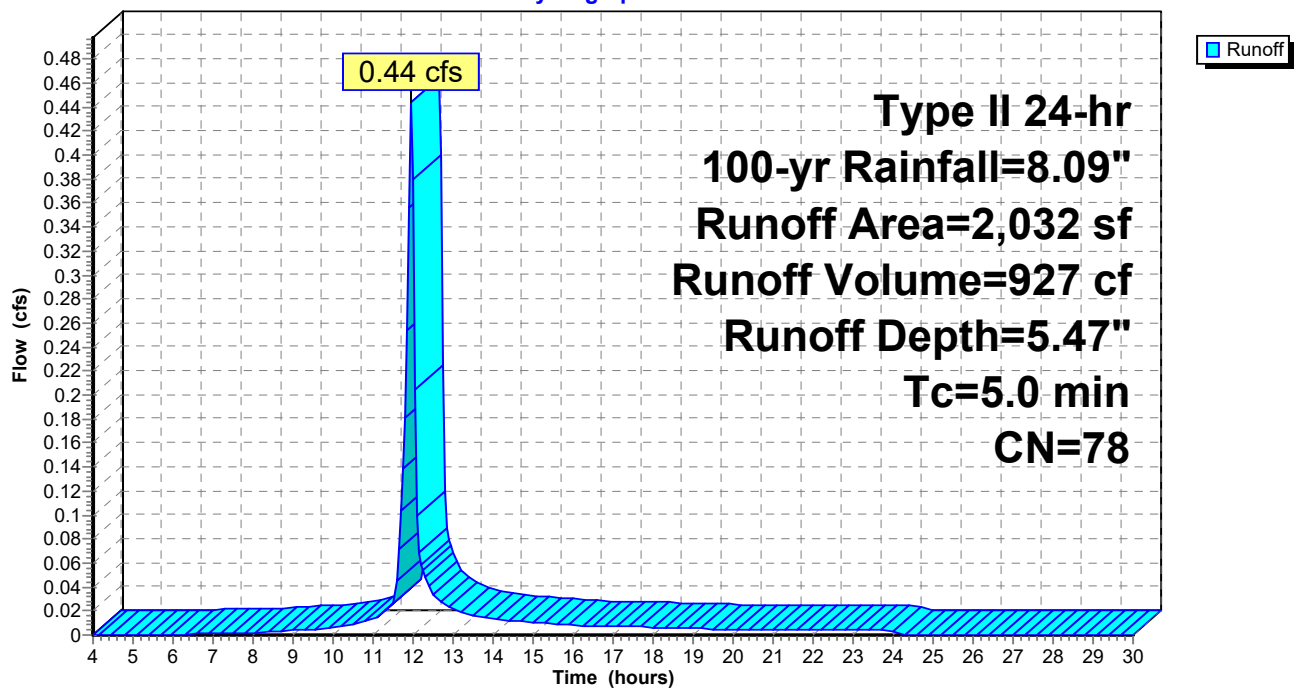
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



MLV 505LD86_Channels 1-4 REV 2

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 23.46% Impervious, Inflow Depth = 4.14" for 100-yr event
Inflow = 4.55 cfs @ 11.96 hrs, Volume= 9,279 cf
Outflow = 4.42 cfs @ 11.97 hrs, Volume= 9,279 cf, Atten= 3%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.08 fps, Min. Travel Time= 0.3 min
Avg. Velocity= 0.65 fps, Avg. Travel Time= 1.6 min

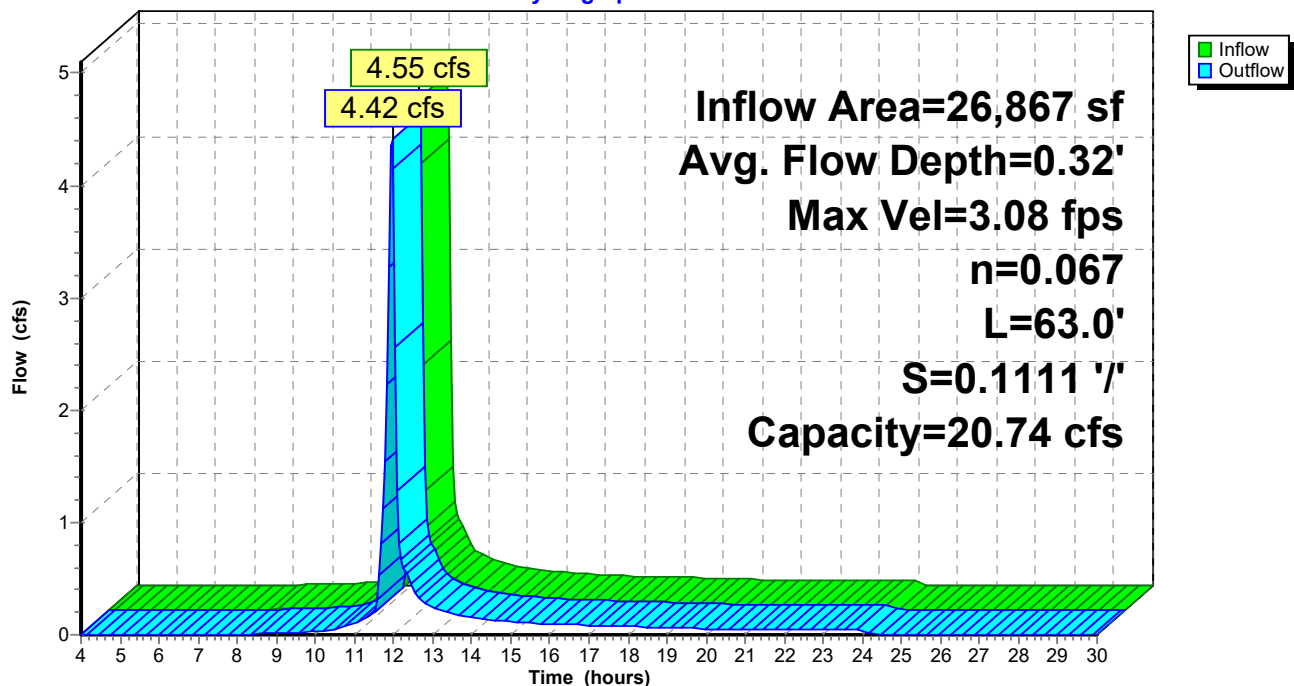
Peak Storage= 92 cf @ 11.96 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

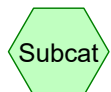
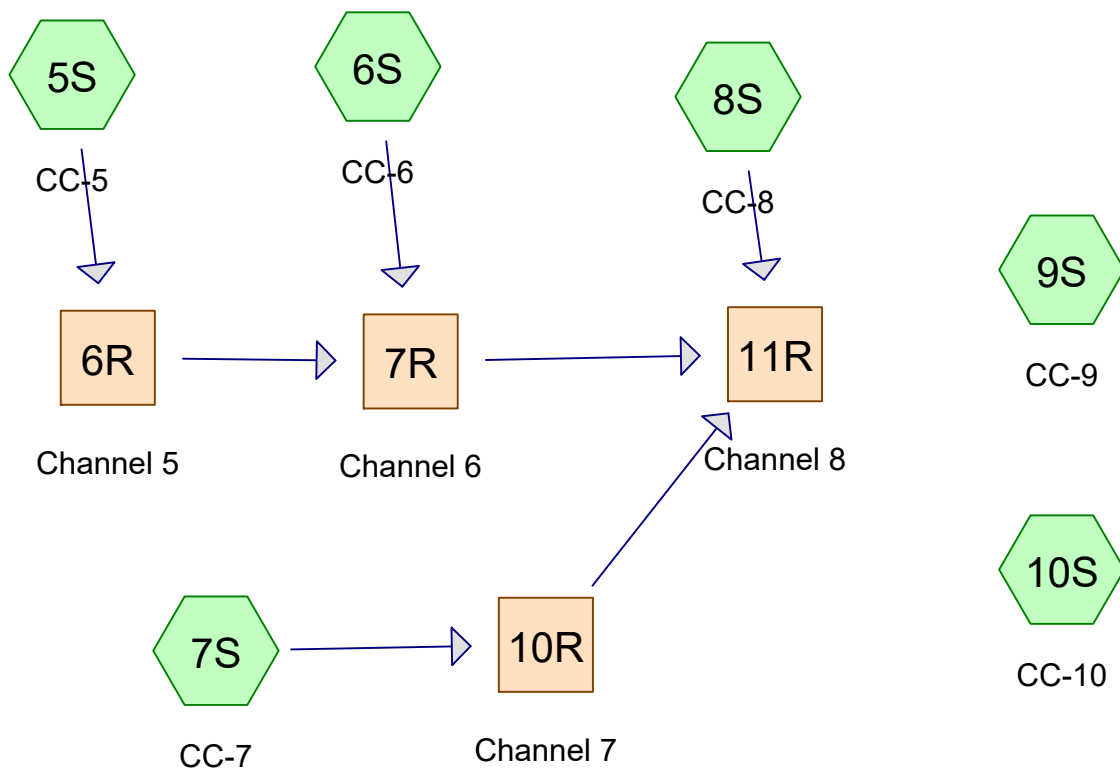
4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph

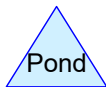




Subcat



Reach



Pond



Link

Routing Diagram for MLV 505LD86_Channels 5-10 REV 2
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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
31,356	30	Meadow, non-grazed, HSG A (5S, 6S, 7S, 8S, 9S, 10S)
48,216	78	Meadow, non-grazed, HSG D (5S, 6S, 7S, 9S, 10S)
6,772	98	Paved parking, HSG A (5S, 6S, 7S, 9S, 10S)
4,611	98	Paved parking, HSG D (5S, 6S, 7S, 10S)
783	98	Water Surface, HSG D (9S)
91,738	64	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
38,128	HSG A	5S, 6S, 7S, 8S, 9S, 10S
0	HSG B	
0	HSG C	
53,610	HSG D	5S, 6S, 7S, 9S, 10S
0	Other	
91,738		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
31,356	0	0	48,216	0	79,572	Meadow, non-grazed	
6,772	0	0	4,611	0	11,383	Paved parking	
0	0	0	783	0	783	Water Surface	
38,128	0	0	53,610	0	91,738	TOTAL AREA	

MLV 505LD86_Channels 5-10 REV 2*Type II 24-hr 1-yr Rainfall=2.72"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5	Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=0.38" Tc=5.0 min CN=65 Runoff=0.81 cfs 2,028 cf
Subcatchment6S: CC-6	Runoff Area=15,485 sf 11.48% Impervious Runoff Depth=0.15" Tc=5.0 min CN=56 Runoff=0.02 cfs 189 cf
Subcatchment7S: CC-7	Runoff Area=5,181 sf 57.98% Impervious Runoff Depth=1.04" Tc=5.0 min CN=80 Runoff=0.22 cfs 451 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.00" Tc=5.0 min CN=30 Runoff=0.00 cfs 0 cf
Subcatchment9S: CC-9	Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=0.74" Tc=5.0 min CN=74 Runoff=0.07 cfs 154 cf
Subcatchment10S: CC-10	Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=0.83" Tc=5.0 min CN=76 Runoff=0.10 cfs 198 cf
Reach 6R: Channel 5	Avg. Flow Depth=0.12' Max Vel=2.01 fps Inflow=0.81 cfs 2,028 cf n=0.050 L=246.0' S=0.0894 '/' Capacity=34.00 cfs Outflow=0.72 cfs 2,028 cf
Reach 7R: Channel 6	Avg. Flow Depth=0.14' Max Vel=2.24 fps Inflow=0.74 cfs 2,217 cf n=0.054 L=171.0' S=0.1094 '/' Capacity=26.41 cfs Outflow=0.68 cfs 2,217 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.06' Max Vel=1.46 fps Inflow=0.22 cfs 451 cf n=0.055 L=405.0' S=0.1309 '/' Capacity=28.37 cfs Outflow=0.18 cfs 451 cf
Reach 11R: Channel 8	Avg. Flow Depth=0.17' Max Vel=2.24 fps Inflow=0.86 cfs 2,668 cf n=0.045 L=75.0' S=0.0627 '/' Capacity=23.99 cfs Outflow=0.84 cfs 2,668 cf

Total Runoff Area = 91,738 sf Runoff Volume = 3,021 cf Average Runoff Depth = 0.40"
86.74% Pervious = 79,572 sf 13.26% Impervious = 12,166 sf

MLV 505LD86_Channels 5-10 REV 2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.81 cfs @ 11.99 hrs, Volume= 2,028 cf, Depth= 0.38"

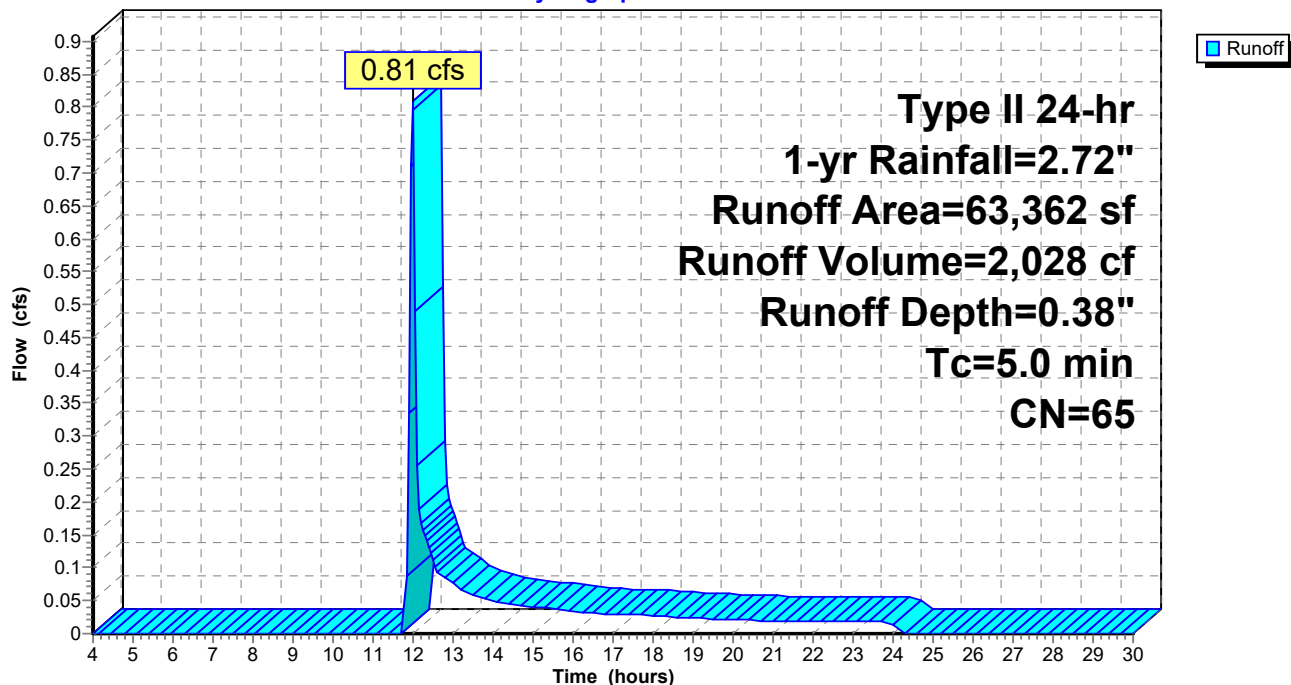
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

Hydrograph



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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 6S: CC-6[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.02 cfs @ 12.03 hrs, Volume= 189 cf, Depth= 0.15"

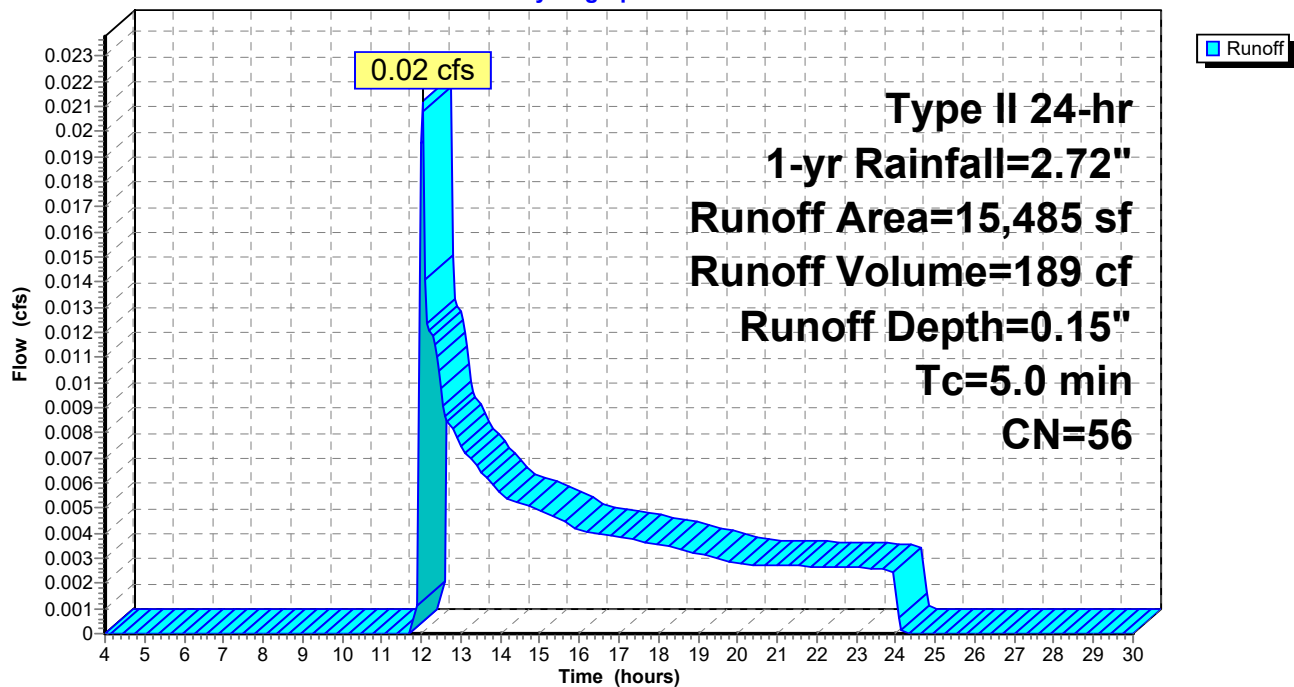
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
7,682	30	Meadow, non-grazed, HSG A
6,026	78	Meadow, non-grazed, HSG D
1,255	98	Paved parking, HSG A
522	98	Paved parking, HSG D
15,485	56	Weighted Average
13,708		88.52% Pervious Area
1,777		11.48% Impervious Area

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

Subcatchment 6S: CC-6

Hydrograph



MLV 505LD86_Channels 5-10 REV 2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.22 cfs @ 11.96 hrs, Volume= 451 cf, Depth= 1.04"

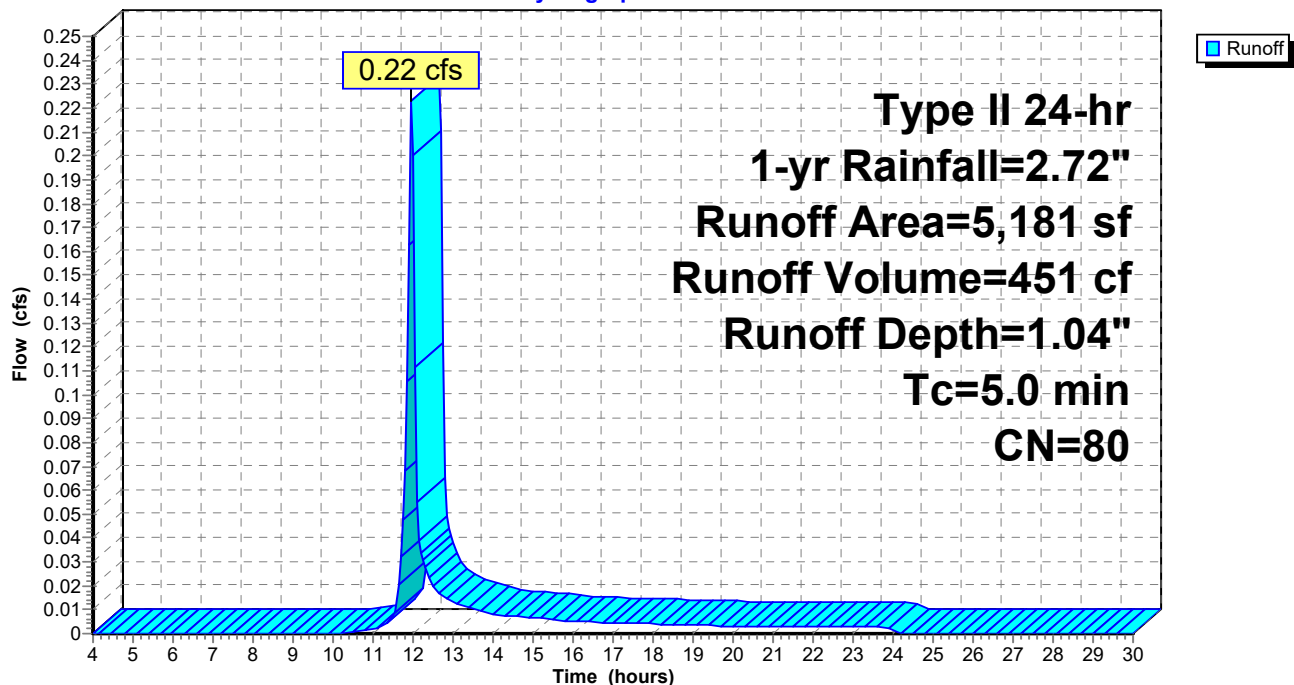
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
1,049	30	Meadow, non-grazed, HSG A
1,128	78	Meadow, non-grazed, HSG D
2,071	98	Paved parking, HSG A
933	98	Paved parking, HSG D
5,181	80	Weighted Average
2,177		42.02% Pervious Area
3,004		57.98% Impervious Area

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

Subcatchment 7S: CC-7

Hydrograph



Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

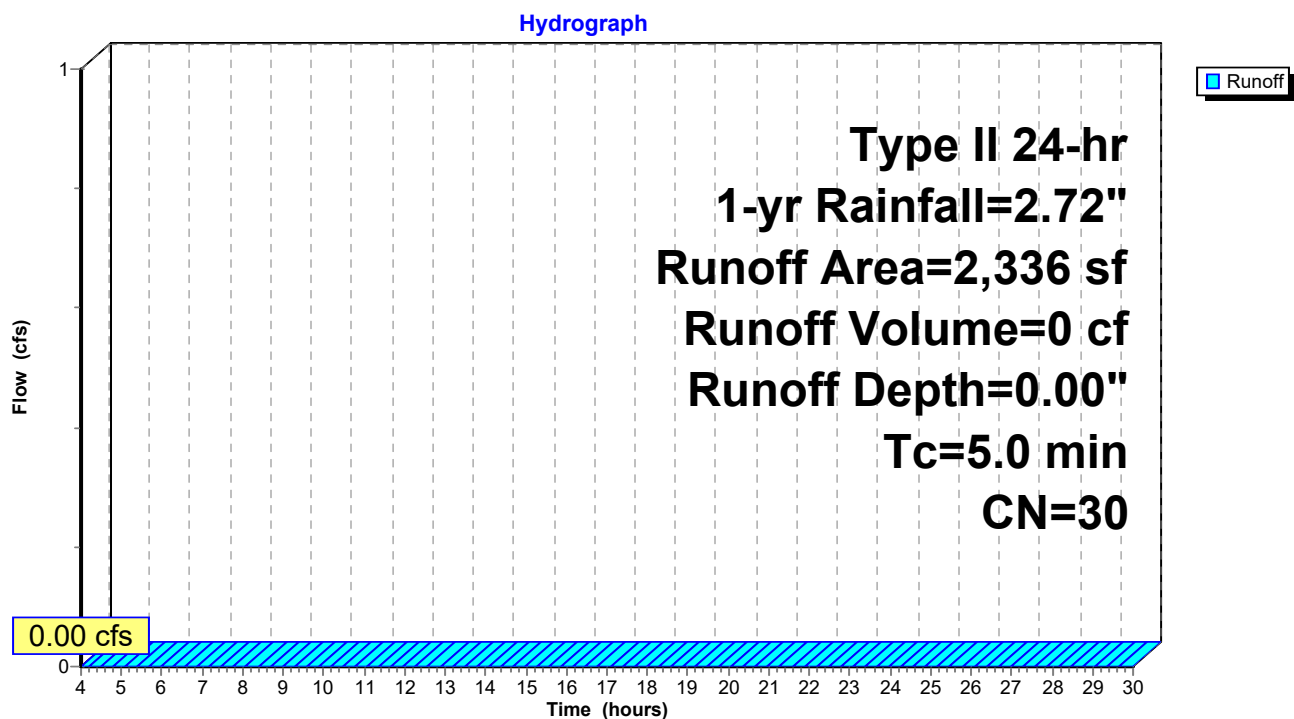
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 4.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.07 cfs @ 11.97 hrs, Volume= 154 cf, Depth= 0.74"

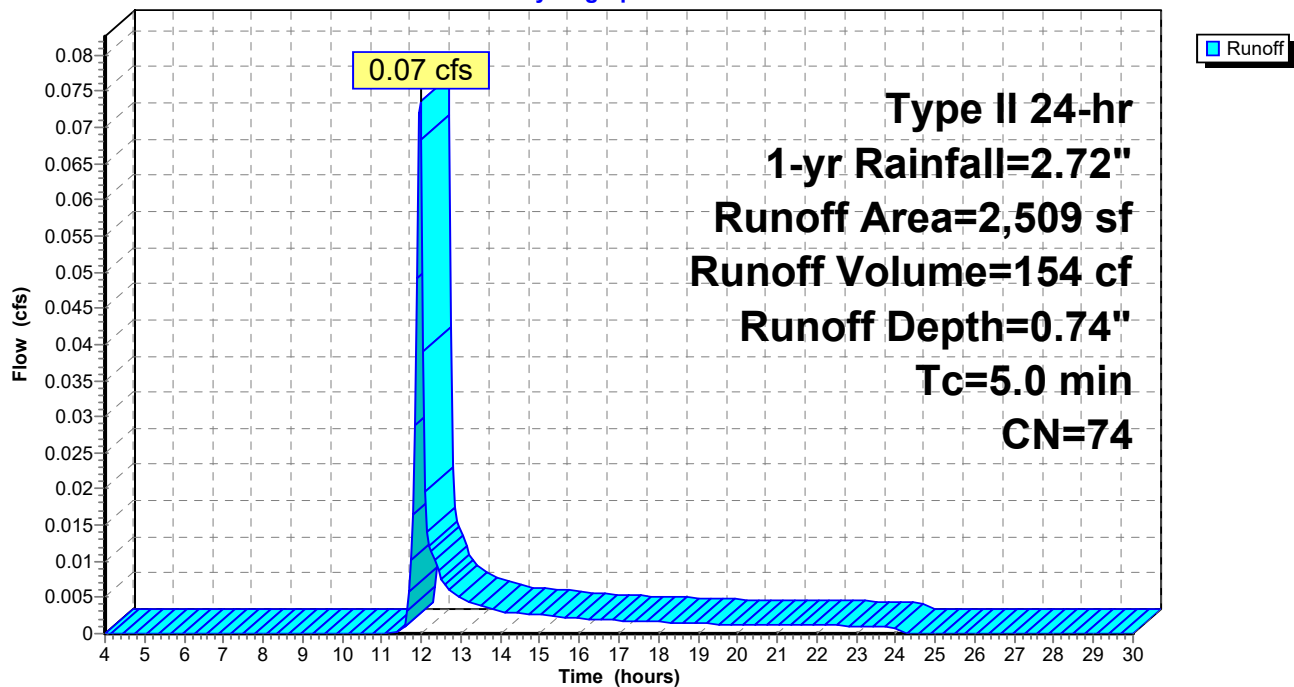
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



MLV 505LD86_Channels 5-10 REV 2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.10 cfs @ 11.97 hrs, Volume= 198 cf, Depth= 0.83"

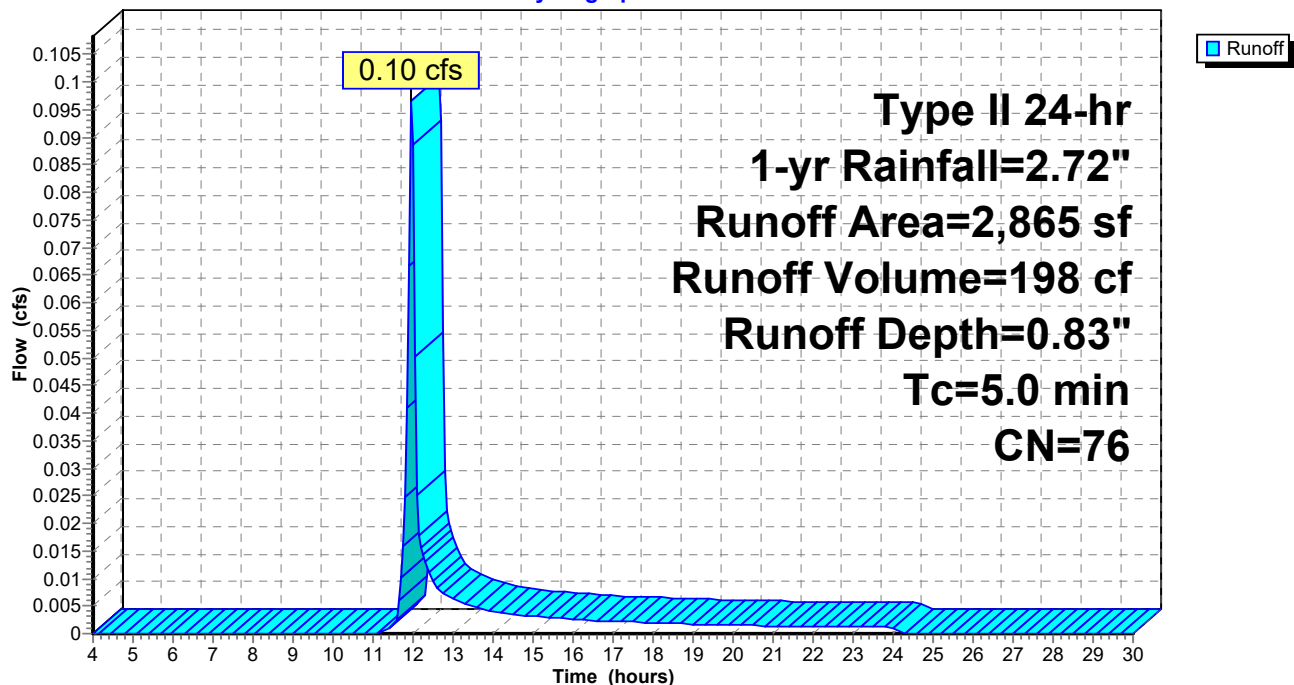
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

Hydrograph



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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Reach 6R: Channel 5

[65] Warning: Inlet elevation not specified

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 0.38" for 1-yr event
Inflow = 0.81 cfs @ 11.99 hrs, Volume= 2,028 cf
Outflow = 0.72 cfs @ 12.05 hrs, Volume= 2,028 cf, Atten= 11%, Lag= 3.7 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.01 fps, Min. Travel Time= 2.0 min

Avg. Velocity = 0.62 fps, Avg. Travel Time= 6.6 min

Peak Storage= 94 cf @ 12.01 hrs

Average Depth at Peak Storage= 0.12'

Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 34.00 cfs

3.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 7.00'

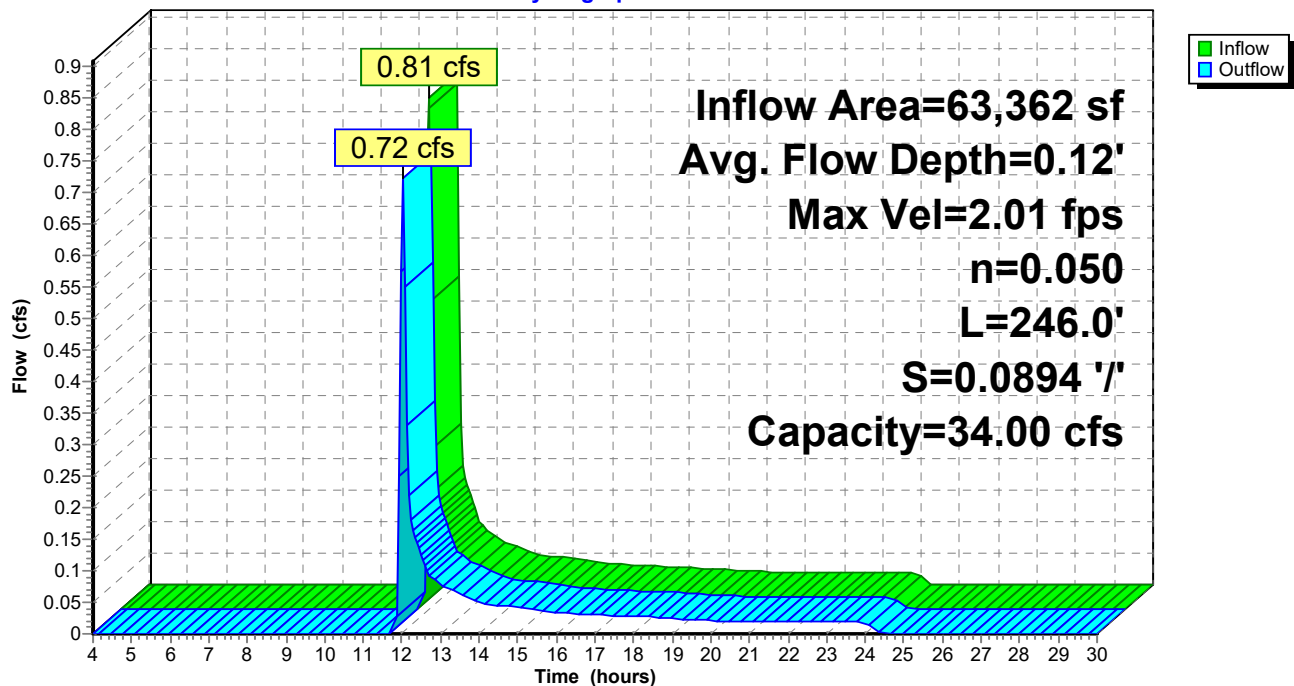
Length= 246.0' Slope= 0.0894 '/'

Inlet Invert= 0.00', Outlet Invert= -22.00'



Reach 6R: Channel 5

Hydrograph



Summary for Reach 7R: Channel 6

[65] Warning: Inlet elevation not specified

Inflow Area = 78,847 sf, 8.11% Impervious, Inflow Depth = 0.34" for 1-yr event
 Inflow = 0.74 cfs @ 12.05 hrs, Volume= 2,217 cf
 Outflow = 0.68 cfs @ 12.09 hrs, Volume= 2,217 cf, Atten= 9%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.24 fps, Min. Travel Time= 1.3 min

Avg. Velocity = 0.74 fps, Avg. Travel Time= 3.8 min

Peak Storage= 56 cf @ 12.06 hrs

Average Depth at Peak Storage= 0.14'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.41 cfs

2.00' x 1.00' deep channel, n= 0.054

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

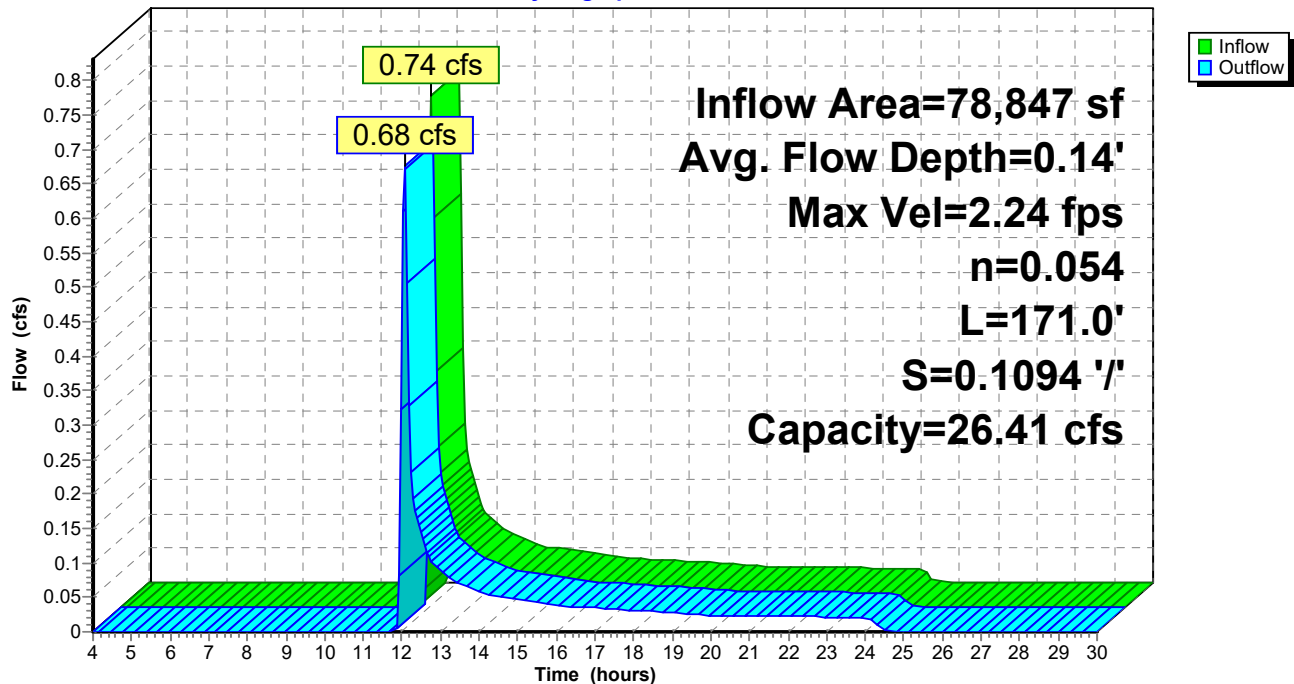
Length= 171.0' Slope= 0.1094 '/'

Inlet Invert= 0.00', Outlet Invert= -18.70'



Reach 7R: Channel 6

Hydrograph



Summary for Reach 10R: Channel 7

[65] Warning: Inlet elevation not specified

Inflow Area = 5,181 sf, 57.98% Impervious, Inflow Depth = 1.04" for 1-yr event
 Inflow = 0.22 cfs @ 11.96 hrs, Volume= 451 cf
 Outflow = 0.18 cfs @ 12.08 hrs, Volume= 451 cf, Atten= 18%, Lag= 7.3 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.46 fps, Min. Travel Time= 4.6 min
 Avg. Velocity = 0.49 fps, Avg. Travel Time= 13.9 min

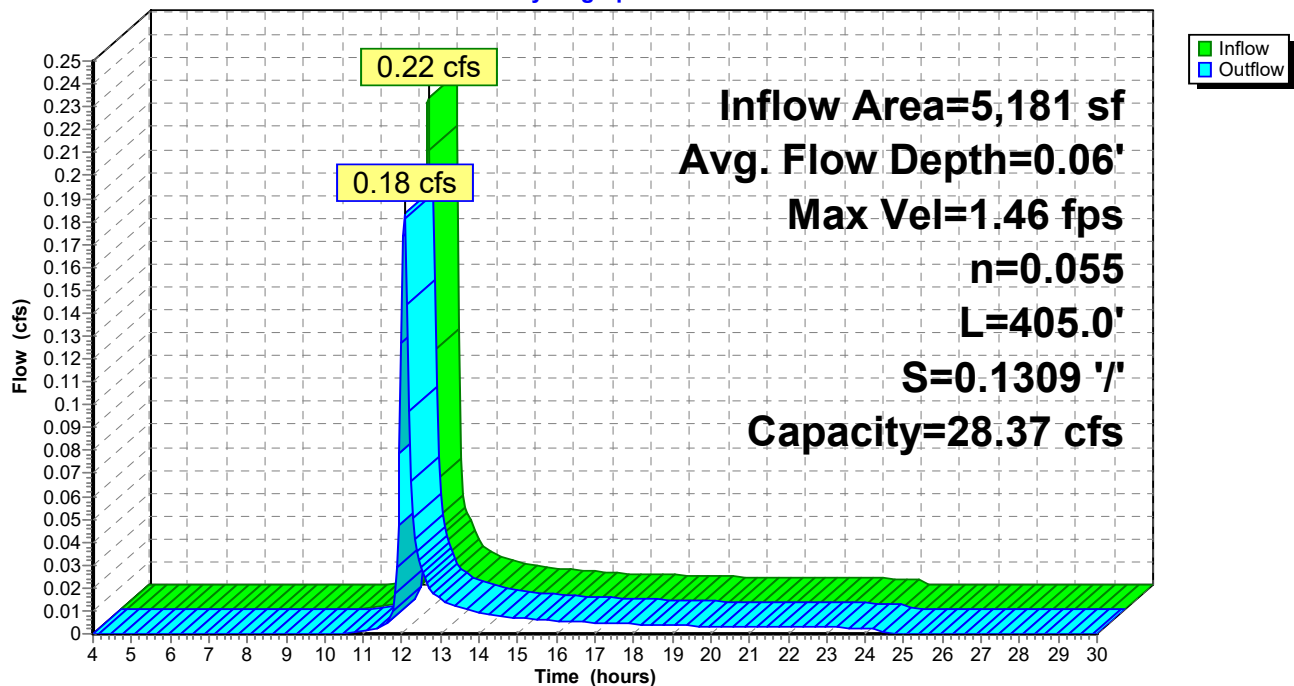
Peak Storage= 53 cf @ 12.00 hrs
 Average Depth at Peak Storage= 0.06'
 Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 28.37 cfs

2.00' x 1.00' deep channel, n= 0.055
 Side Slope Z-value= 2.0 '/' Top Width= 6.00'
 Length= 405.0' Slope= 0.1309 '/'
 Inlet Invert= 0.00', Outlet Invert= -53.00'



Reach 10R: Channel 7

Hydrograph



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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Reach 11R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,364 sf, 10.88% Impervious, Inflow Depth = 0.37" for 1-yr event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 2,668 cf
Outflow = 0.84 cfs @ 12.10 hrs, Volume= 2,668 cf, Atten= 2%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.24 fps, Min. Travel Time= 0.6 min

Avg. Velocity = 0.70 fps, Avg. Travel Time= 1.8 min

Peak Storage= 29 cf @ 12.09 hrs

Average Depth at Peak Storage= 0.17'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.99 cfs

2.00' x 1.00' deep channel, n= 0.045

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

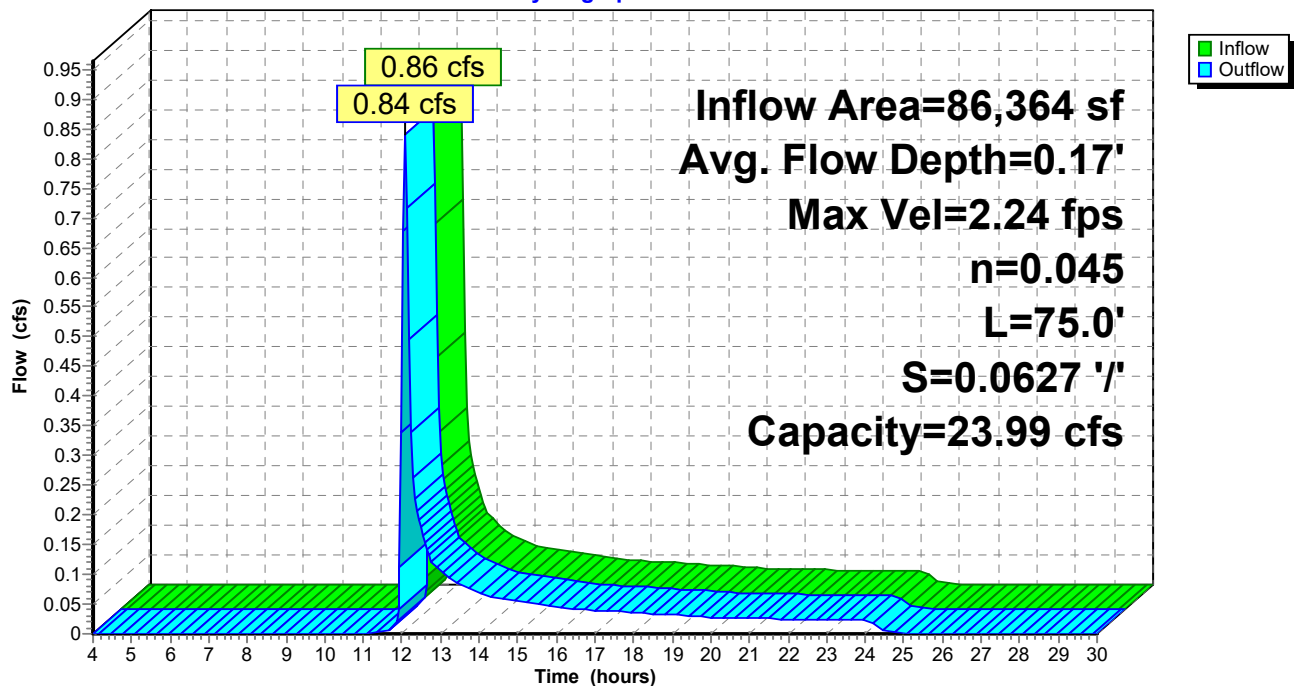
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 11R: Channel 8

Hydrograph



MLV 505LD86_Channels 5-10 REV 2*Type II 24-hr 2-yr Rainfall=3.26"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5	Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=0.63" Tc=5.0 min CN=65 Runoff=1.49 cfs 3,325 cf
Subcatchment6S: CC-6	Runoff Area=15,485 sf 11.48% Impervious Runoff Depth=0.30" Tc=5.0 min CN=56 Runoff=0.11 cfs 385 cf
Subcatchment7S: CC-7	Runoff Area=5,181 sf 57.98% Impervious Runoff Depth=1.45" Tc=5.0 min CN=80 Runoff=0.31 cfs 625 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.00" Tc=5.0 min CN=30 Runoff=0.00 cfs 0 cf
Subcatchment9S: CC-9	Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=1.08" Tc=5.0 min CN=74 Runoff=0.11 cfs 225 cf
Subcatchment10S: CC-10	Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=1.19" Tc=5.0 min CN=76 Runoff=0.14 cfs 285 cf
Reach 6R: Channel 5	Avg. Flow Depth=0.17' Max Vel=2.53 fps Inflow=1.49 cfs 3,325 cf n=0.050 L=246.0' S=0.0894 '/' Capacity=34.00 cfs Outflow=1.35 cfs 3,325 cf
Reach 7R: Channel 6	Avg. Flow Depth=0.21' Max Vel=2.81 fps Inflow=1.46 cfs 3,711 cf n=0.054 L=171.0' S=0.1094 '/' Capacity=26.41 cfs Outflow=1.38 cfs 3,711 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.08' Max Vel=1.67 fps Inflow=0.31 cfs 625 cf n=0.055 L=405.0' S=0.1309 '/' Capacity=28.37 cfs Outflow=0.26 cfs 625 cf
Reach 11R: Channel 8	Avg. Flow Depth=0.24' Max Vel=2.76 fps Inflow=1.64 cfs 4,336 cf n=0.045 L=75.0' S=0.0627 '/' Capacity=23.99 cfs Outflow=1.60 cfs 4,336 cf

Total Runoff Area = 91,738 sf Runoff Volume = 4,846 cf Average Runoff Depth = 0.63"
86.74% Pervious = 79,572 sf 13.26% Impervious = 12,166 sf

MLV 505LD86_Channels 5-10 REV 2

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Type II 24-hr 2-yr Rainfall=3.26"

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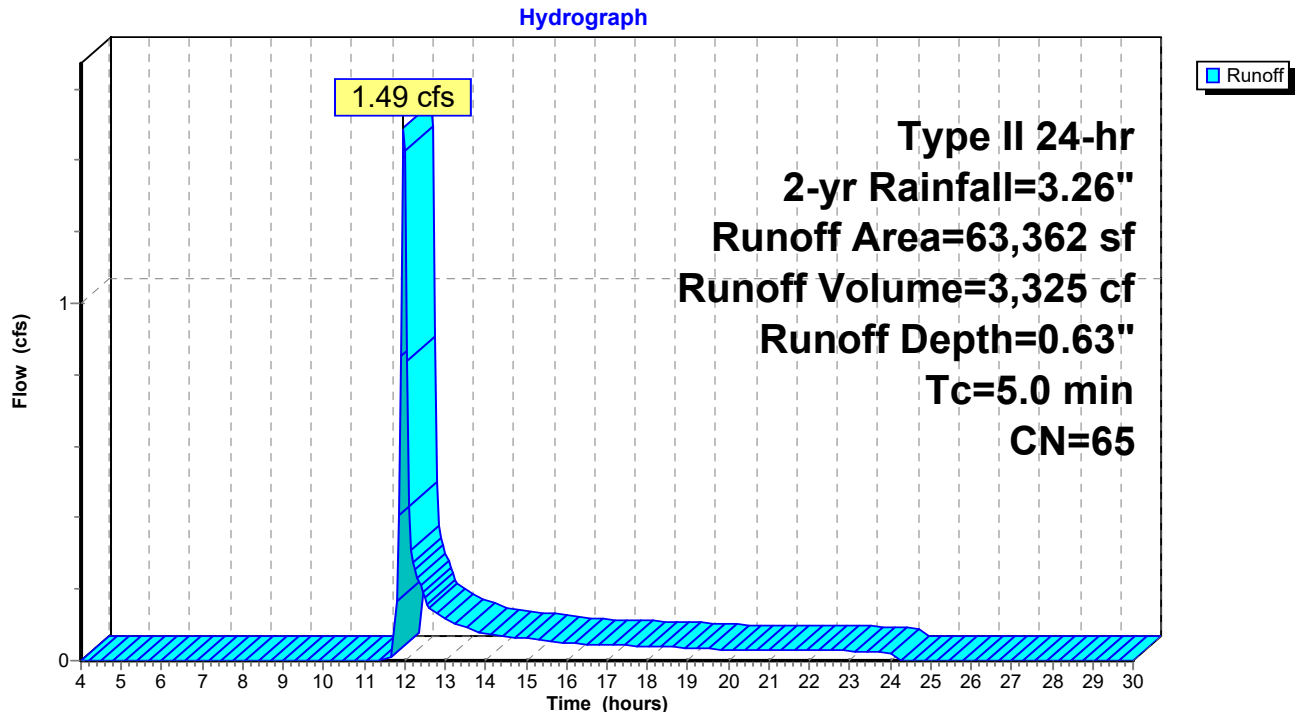
Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.49 cfs @ 11.98 hrs, Volume= 3,325 cf, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 6S: CC-6[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.11 cfs @ 12.00 hrs, Volume= 385 cf, Depth= 0.30"

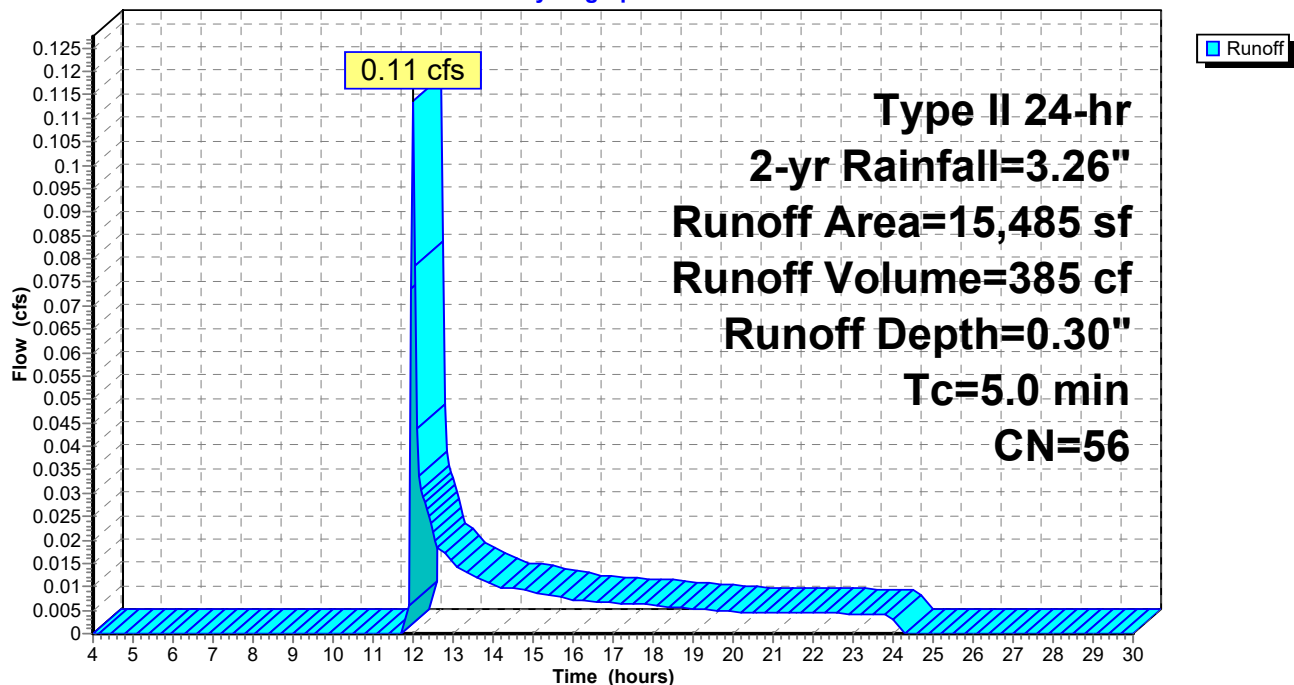
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
7,682	30	Meadow, non-grazed, HSG A
6,026	78	Meadow, non-grazed, HSG D
1,255	98	Paved parking, HSG A
522	98	Paved parking, HSG D
15,485	56	Weighted Average
13,708		88.52% Pervious Area
1,777		11.48% Impervious Area

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

Subcatchment 6S: CC-6

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.31 cfs @ 11.96 hrs, Volume= 625 cf, Depth= 1.45"

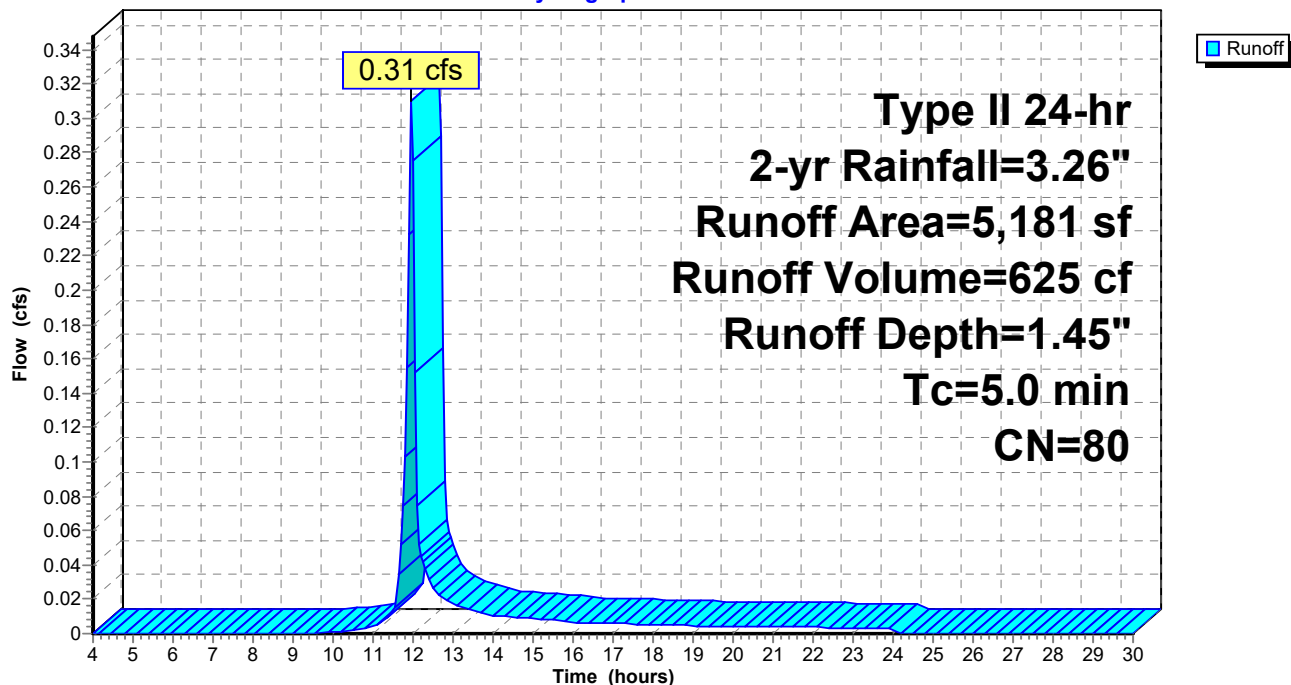
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
1,049	30	Meadow, non-grazed, HSG A
1,128	78	Meadow, non-grazed, HSG D
2,071	98	Paved parking, HSG A
933	98	Paved parking, HSG D
5,181	80	Weighted Average
2,177		42.02% Pervious Area
3,004		57.98% Impervious Area

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

Subcatchment 7S: CC-7

Hydrograph



Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

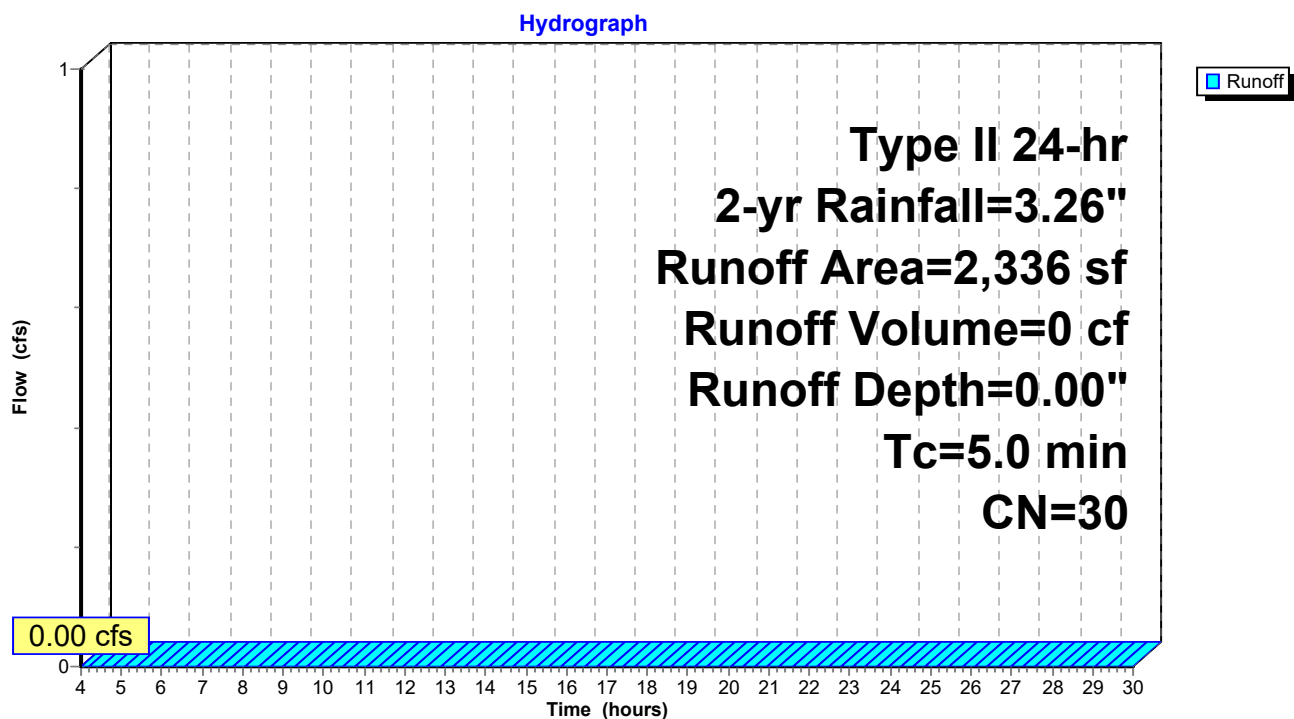
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 4.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.11 cfs @ 11.96 hrs, Volume= 225 cf, Depth= 1.08"

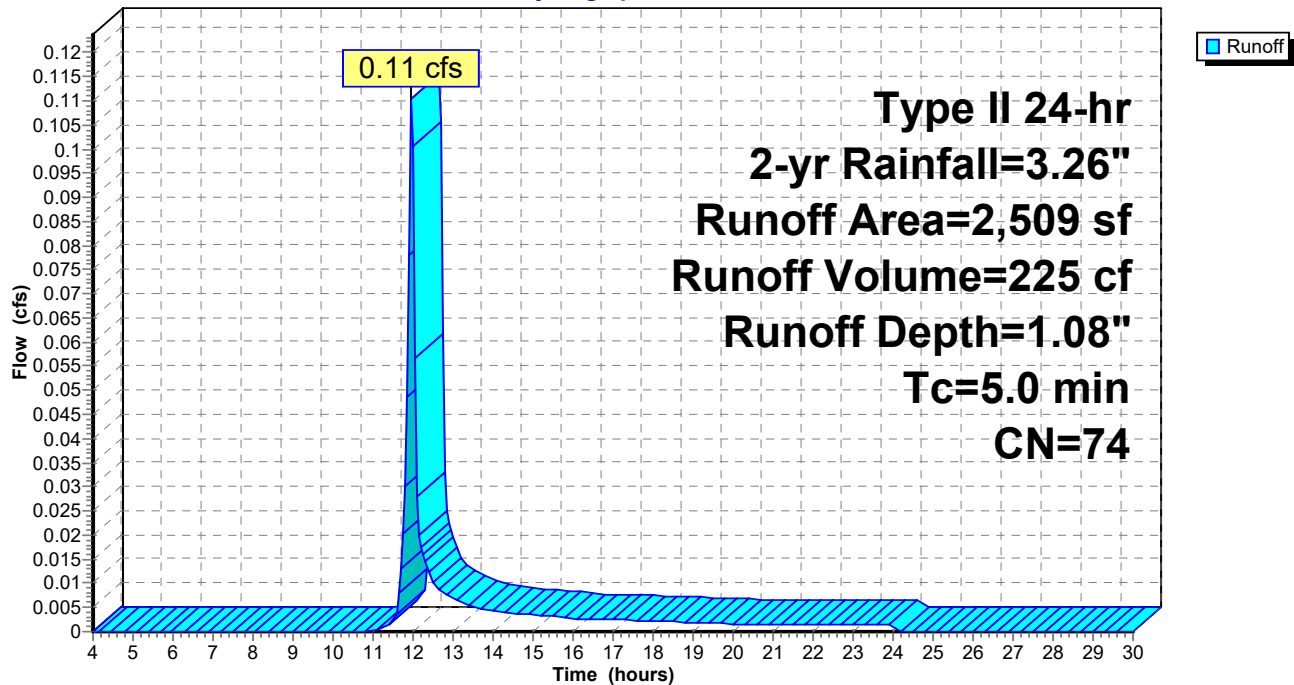
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.14 cfs @ 11.96 hrs, Volume= 285 cf, Depth= 1.19"

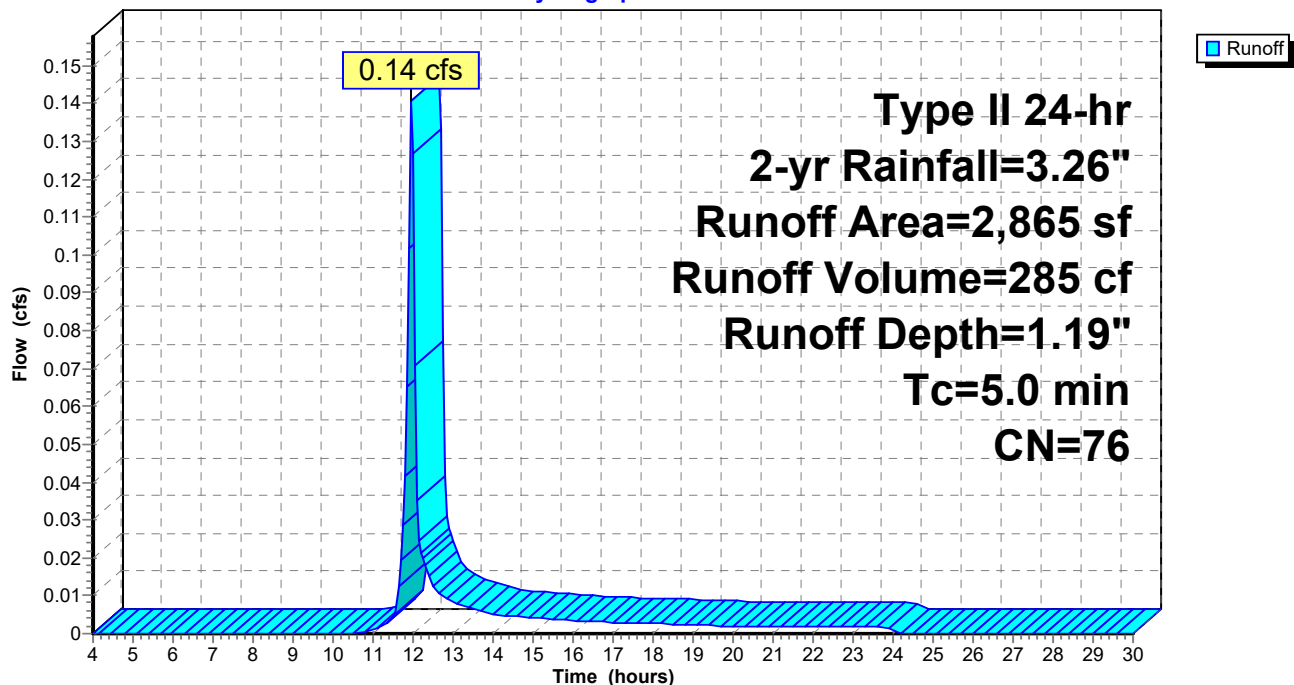
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 6R: Channel 5

[65] Warning: Inlet elevation not specified

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 0.63" for 2-yr event
Inflow = 1.49 cfs @ 11.98 hrs, Volume= 3,325 cf
Outflow = 1.35 cfs @ 12.02 hrs, Volume= 3,325 cf, Atten= 9%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.53 fps, Min. Travel Time= 1.6 min

Avg. Velocity = 0.72 fps, Avg. Travel Time= 5.7 min

Peak Storage= 141 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.17'

Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 34.00 cfs

3.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 7.00'

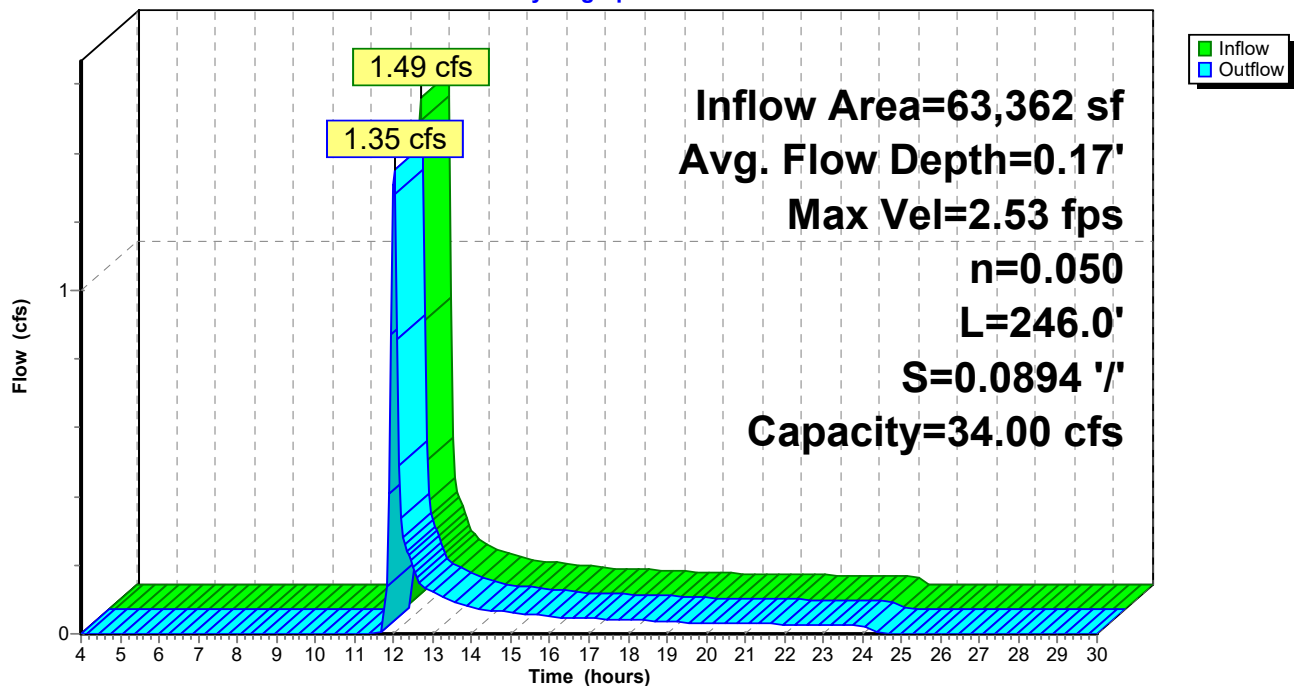
Length= 246.0' Slope= 0.0894 '/'

Inlet Invert= 0.00', Outlet Invert= -22.00'



Reach 6R: Channel 5

Hydrograph



Summary for Reach 7R: Channel 6

[65] Warning: Inlet elevation not specified

Inflow Area = 78,847 sf, 8.11% Impervious, Inflow Depth = 0.56" for 2-yr event
 Inflow = 1.46 cfs @ 12.02 hrs, Volume= 3,711 cf
 Outflow = 1.38 cfs @ 12.05 hrs, Volume= 3,711 cf, Atten= 5%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.81 fps, Min. Travel Time= 1.0 min

Avg. Velocity = 0.87 fps, Avg. Travel Time= 3.3 min

Peak Storage= 87 cf @ 12.03 hrs

Average Depth at Peak Storage= 0.21'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.41 cfs

2.00' x 1.00' deep channel, n= 0.054

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

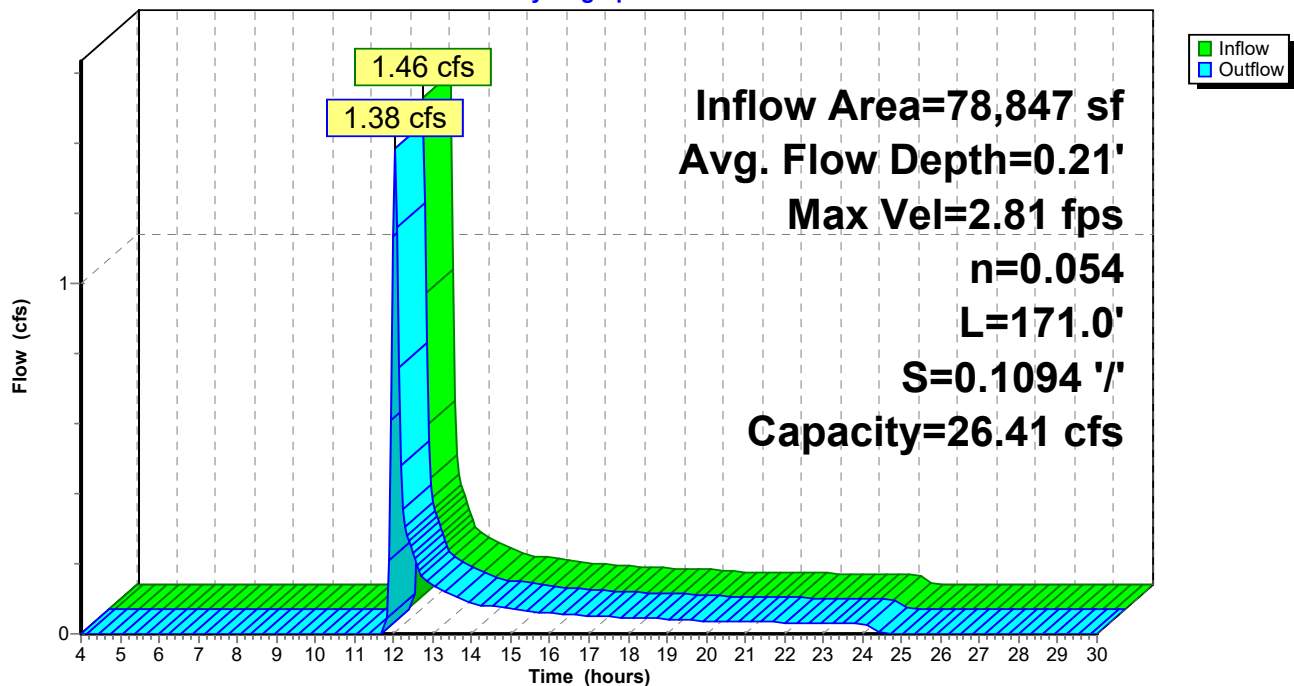
Length= 171.0' Slope= 0.1094 '/'

Inlet Invert= 0.00', Outlet Invert= -18.70'



Reach 7R: Channel 6

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 10R: Channel 7

[65] Warning: Inlet elevation not specified

Inflow Area = 5,181 sf, 57.98% Impervious, Inflow Depth = 1.45" for 2-yr event
Inflow = 0.31 cfs @ 11.96 hrs, Volume= 625 cf
Outflow = 0.26 cfs @ 12.06 hrs, Volume= 625 cf, Atten= 15%, Lag= 6.3 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.67 fps, Min. Travel Time= 4.0 min

Avg. Velocity= 0.50 fps, Avg. Travel Time= 13.5 min

Peak Storage= 67 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.08'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 28.37 cfs

2.00' x 1.00' deep channel, n= 0.055

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

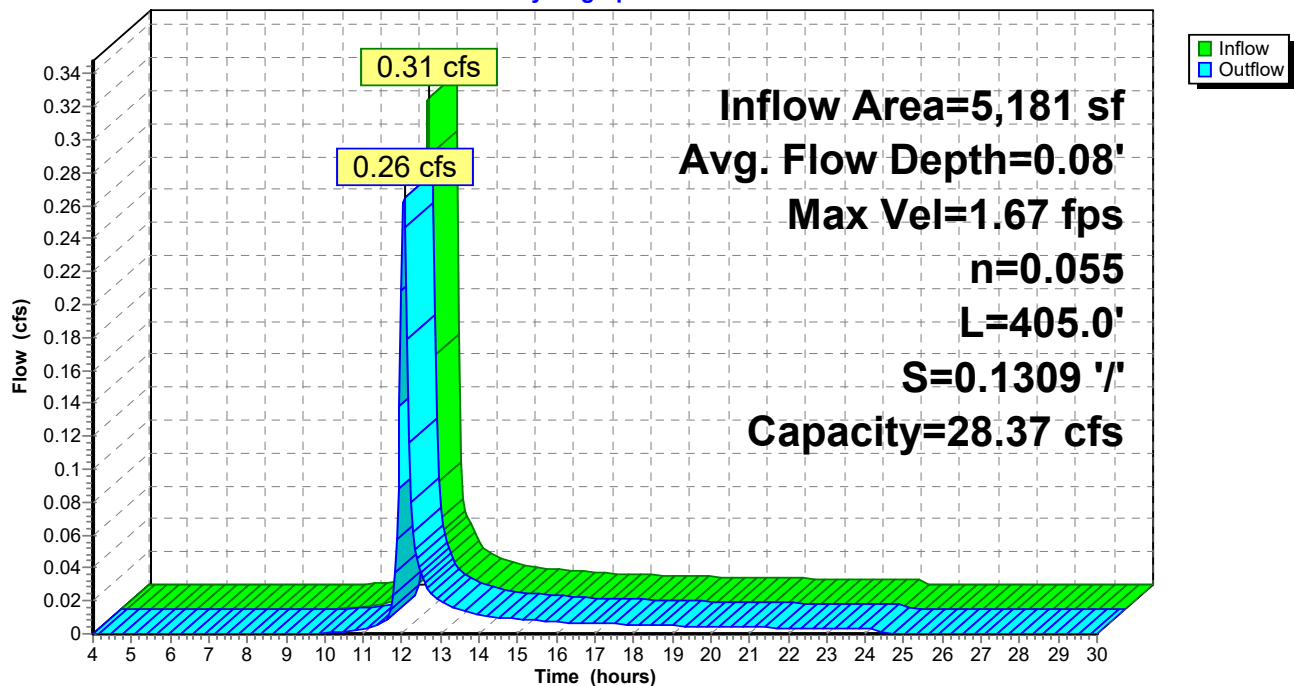
Length= 405.0' Slope= 0.1309 '/'

Inlet Invert= 0.00', Outlet Invert= -53.00'



Reach 10R: Channel 7

Hydrograph



MLV 505LD86_Channels 5-10 REV 2

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 11R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,364 sf, 10.88% Impervious, Inflow Depth = 0.60" for 2-yr event
Inflow = 1.64 cfs @ 12.05 hrs, Volume= 4,336 cf
Outflow = 1.60 cfs @ 12.06 hrs, Volume= 4,336 cf, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.76 fps, Min. Travel Time= 0.5 min

Avg. Velocity = 0.79 fps, Avg. Travel Time= 1.6 min

Peak Storage= 45 cf @ 12.06 hrs

Average Depth at Peak Storage= 0.24'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.99 cfs

2.00' x 1.00' deep channel, n= 0.045

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

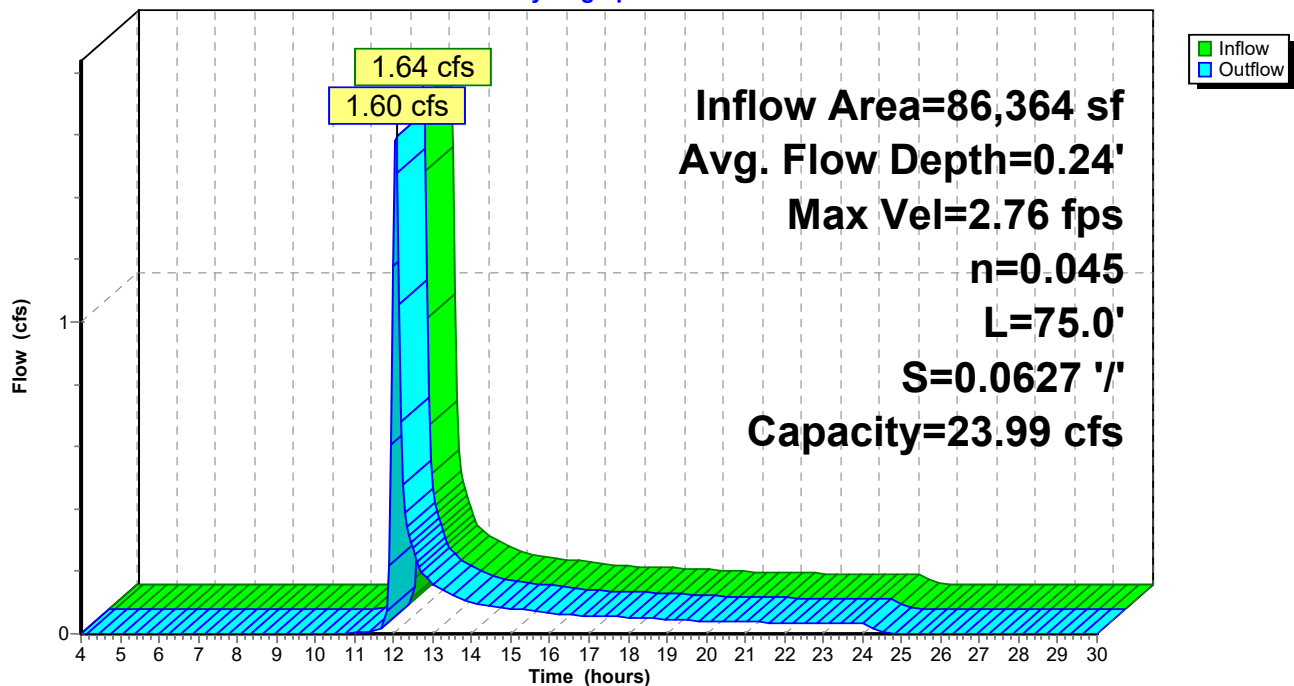
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 11R: Channel 8

Hydrograph



MLV 505LD86_Channels 5-10 REV 2*Type II 24-hr 10-yr Rainfall=4.74"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5	Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=1.48" Tc=5.0 min CN=65 Runoff=3.82 cfs 7,831 cf
Subcatchment6S: CC-6	Runoff Area=15,485 sf 11.48% Impervious Runoff Depth=0.91" Tc=5.0 min CN=56 Runoff=0.53 cfs 1,175 cf
Subcatchment7S: CC-7	Runoff Area=5,181 sf 57.98% Impervious Runoff Depth=2.67" Tc=5.0 min CN=80 Runoff=0.57 cfs 1,152 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.00" Tc=5.0 min CN=30 Runoff=0.00 cfs 0 cf
Subcatchment9S: CC-9	Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=2.16" Tc=5.0 min CN=74 Runoff=0.22 cfs 451 cf
Subcatchment10S: CC-10	Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=2.32" Tc=5.0 min CN=76 Runoff=0.27 cfs 555 cf
Reach 6R: Channel 5	Avg. Flow Depth=0.30' Max Vel=3.48 fps Inflow=3.82 cfs 7,831 cf n=0.050 L=246.0' S=0.0894 '/' Capacity=34.00 cfs Outflow=3.59 cfs 7,831 cf
Reach 7R: Channel 6	Avg. Flow Depth=0.38' Max Vel=3.91 fps Inflow=4.10 cfs 9,006 cf n=0.054 L=171.0' S=0.1094 '/' Capacity=26.41 cfs Outflow=3.91 cfs 9,006 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.11' Max Vel=2.09 fps Inflow=0.57 cfs 1,152 cf n=0.055 L=405.0' S=0.1309 '/' Capacity=28.37 cfs Outflow=0.52 cfs 1,152 cf
Reach 11R: Channel 8	Avg. Flow Depth=0.41' Max Vel=3.71 fps Inflow=4.40 cfs 10,157 cf n=0.045 L=75.0' S=0.0627 '/' Capacity=23.99 cfs Outflow=4.32 cfs 10,157 cf

Total Runoff Area = 91,738 sf Runoff Volume = 11,163 cf Average Runoff Depth = 1.46"
86.74% Pervious = 79,572 sf 13.26% Impervious = 12,166 sf

MLV 505LD86_Channels 5-10 REV 2

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.82 cfs @ 11.97 hrs, Volume= 7,831 cf, Depth= 1.48"

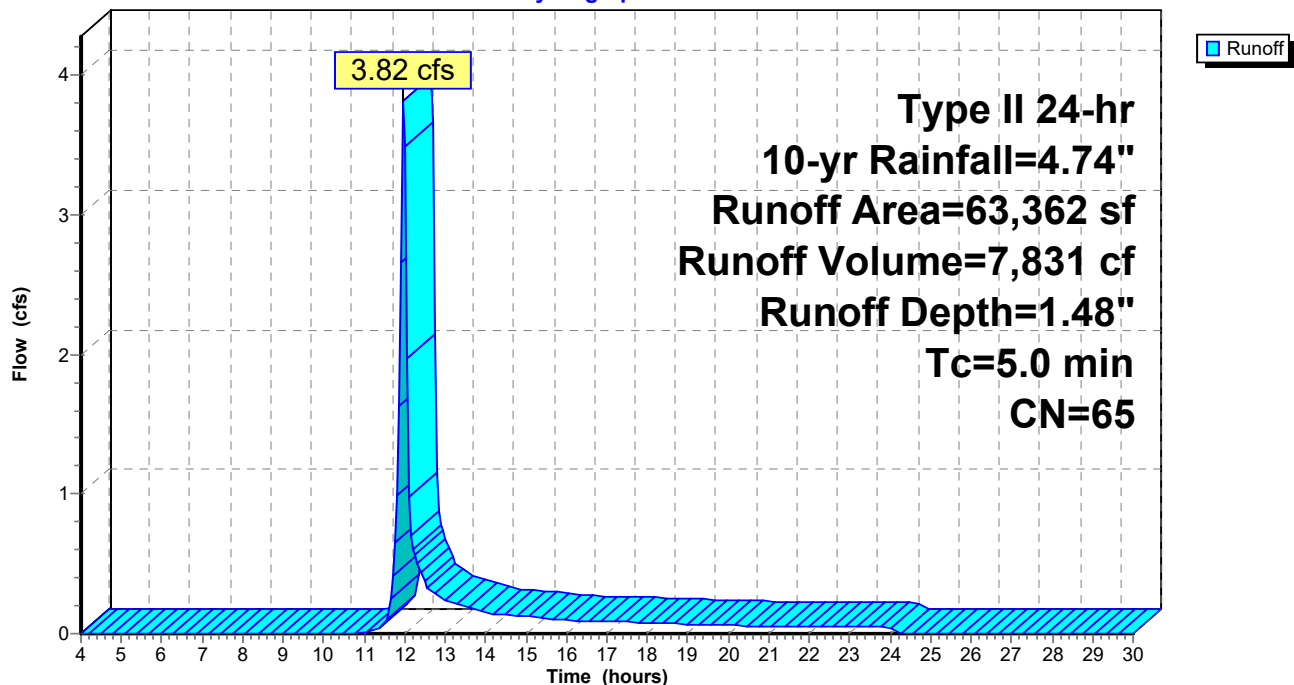
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 6S: CC-6[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.53 cfs @ 11.98 hrs, Volume= 1,175 cf, Depth= 0.91"

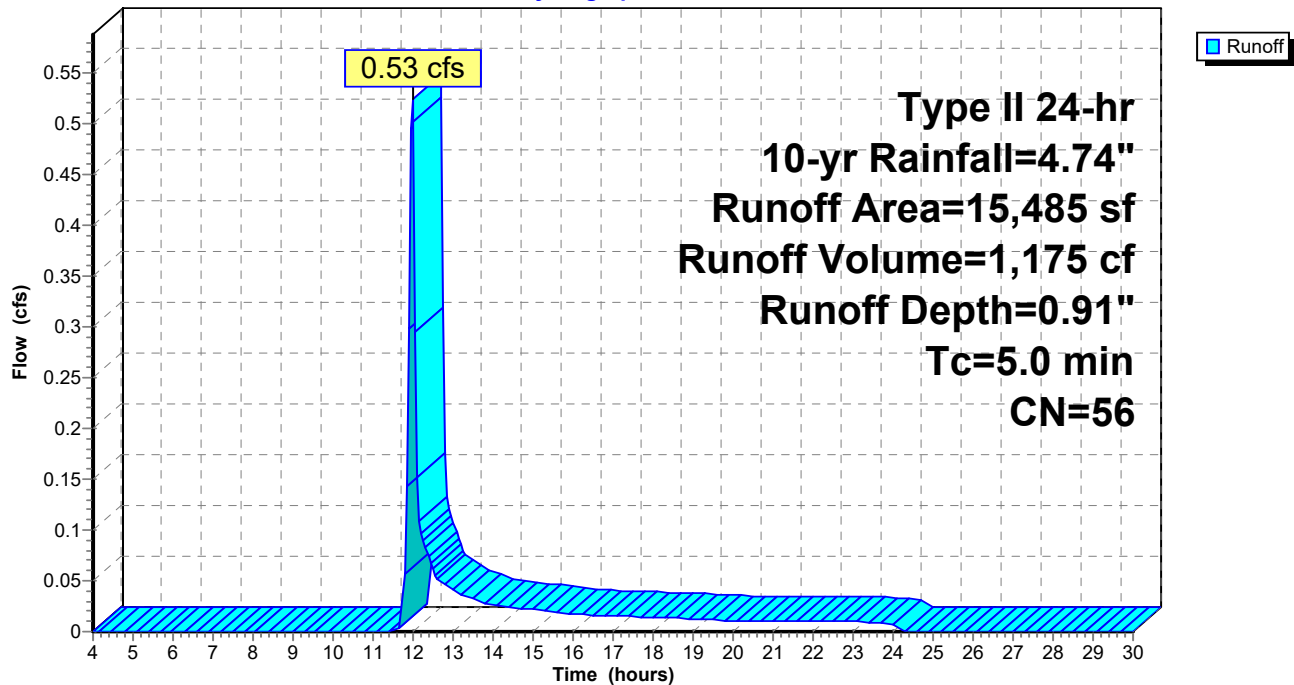
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
7,682	30	Meadow, non-grazed, HSG A
6,026	78	Meadow, non-grazed, HSG D
1,255	98	Paved parking, HSG A
522	98	Paved parking, HSG D
15,485	56	Weighted Average
13,708		88.52% Pervious Area
1,777		11.48% Impervious Area

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

Subcatchment 6S: CC-6

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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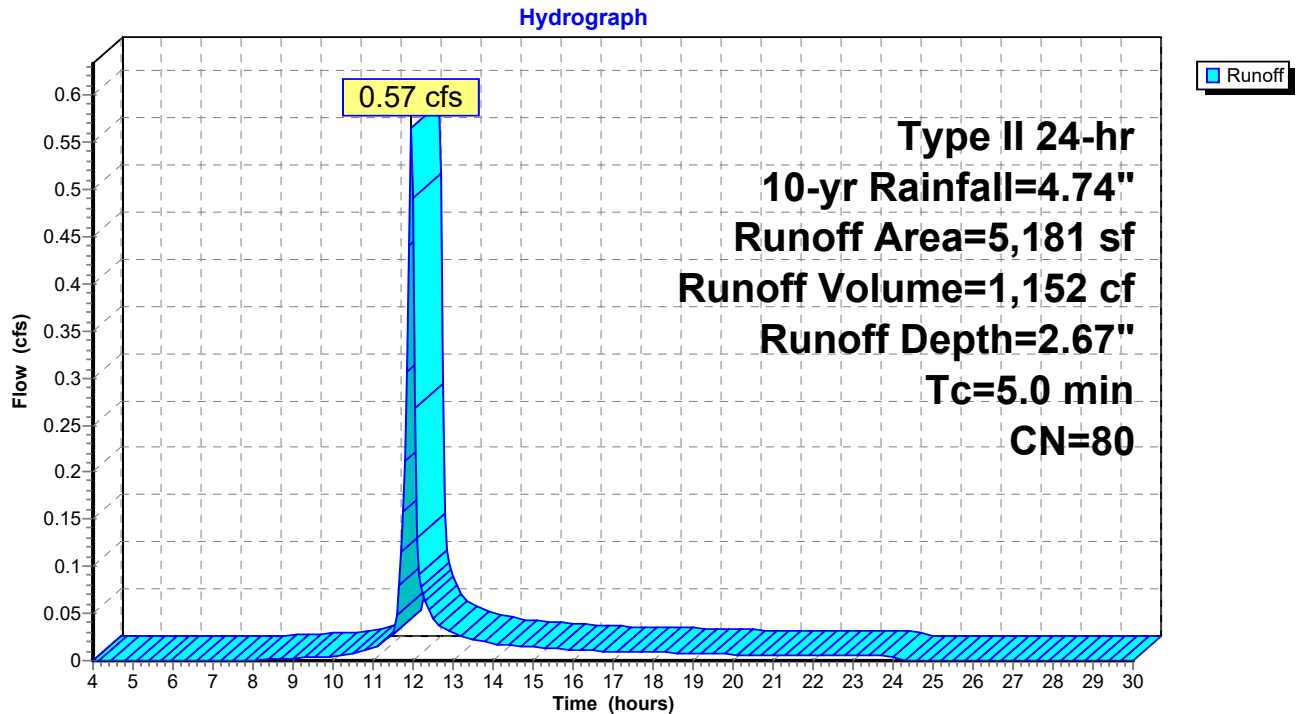
Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.57 cfs @ 11.96 hrs, Volume= 1,152 cf, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
1,049	30	Meadow, non-grazed, HSG A
1,128	78	Meadow, non-grazed, HSG D
2,071	98	Paved parking, HSG A
933	98	Paved parking, HSG D
5,181	80	Weighted Average
2,177		42.02% Pervious Area
3,004		57.98% Impervious Area

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

Subcatchment 7S: CC-7

Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.00 cfs @ 23.98 hrs, Volume= 0 cf, Depth= 0.00"

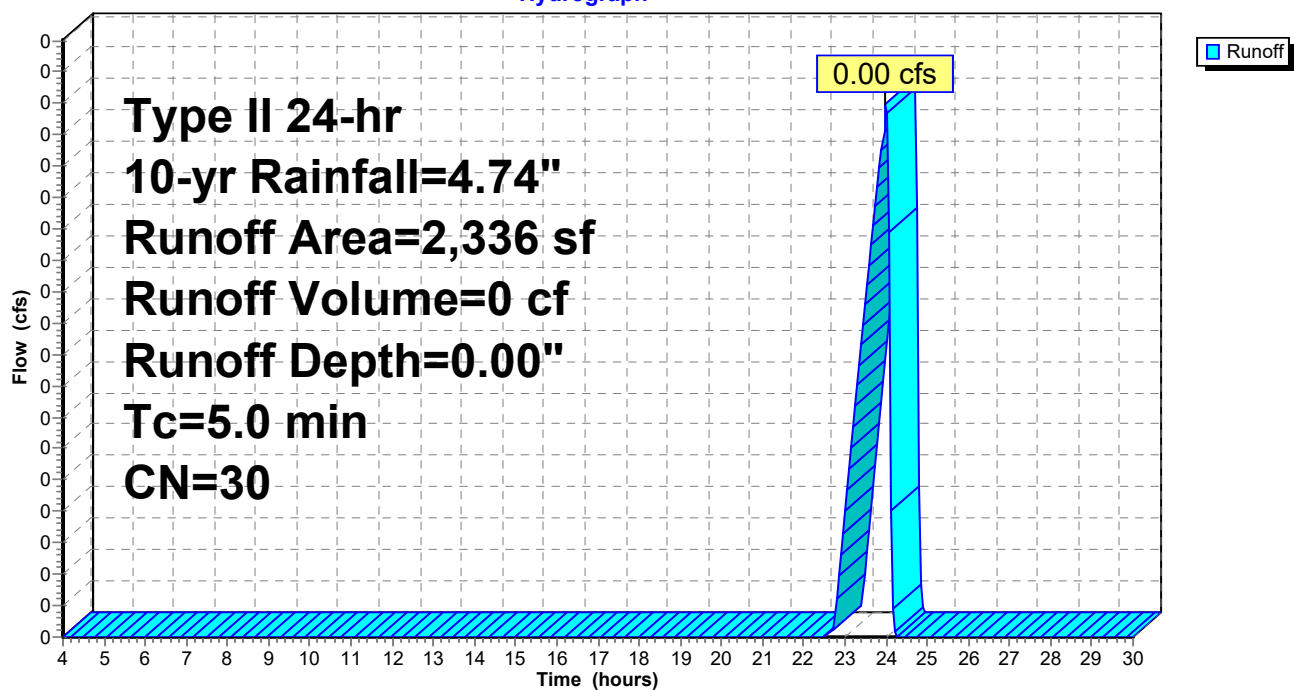
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.22 cfs @ 11.96 hrs, Volume= 451 cf, Depth= 2.16"

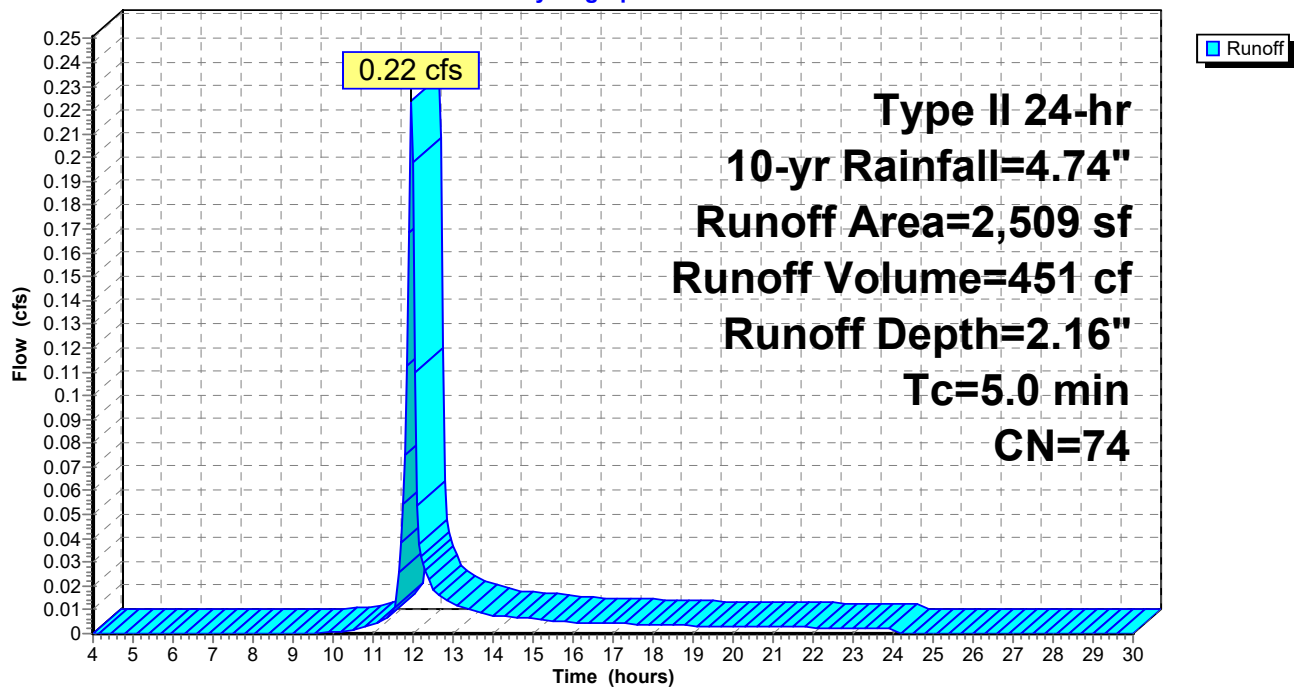
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.27 cfs @ 11.96 hrs, Volume= 555 cf, Depth= 2.32"

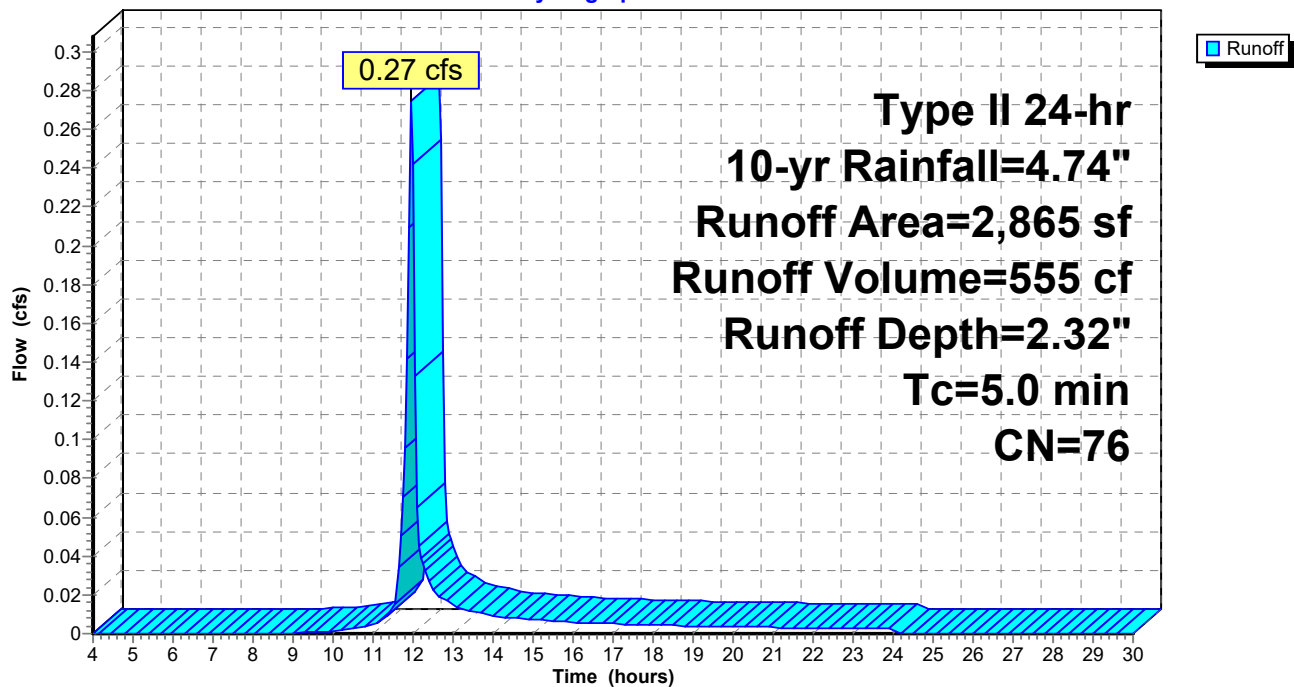
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 6R: Channel 5

[65] Warning: Inlet elevation not specified

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 1.48" for 10-yr event
Inflow = 3.82 cfs @ 11.97 hrs, Volume= 7,831 cf
Outflow = 3.59 cfs @ 12.00 hrs, Volume= 7,831 cf, Atten= 6%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.48 fps, Min. Travel Time= 1.2 min

Avg. Velocity = 0.92 fps, Avg. Travel Time= 4.5 min

Peak Storage= 265 cf @ 11.98 hrs

Average Depth at Peak Storage= 0.30'

Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 34.00 cfs

3.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 7.00'

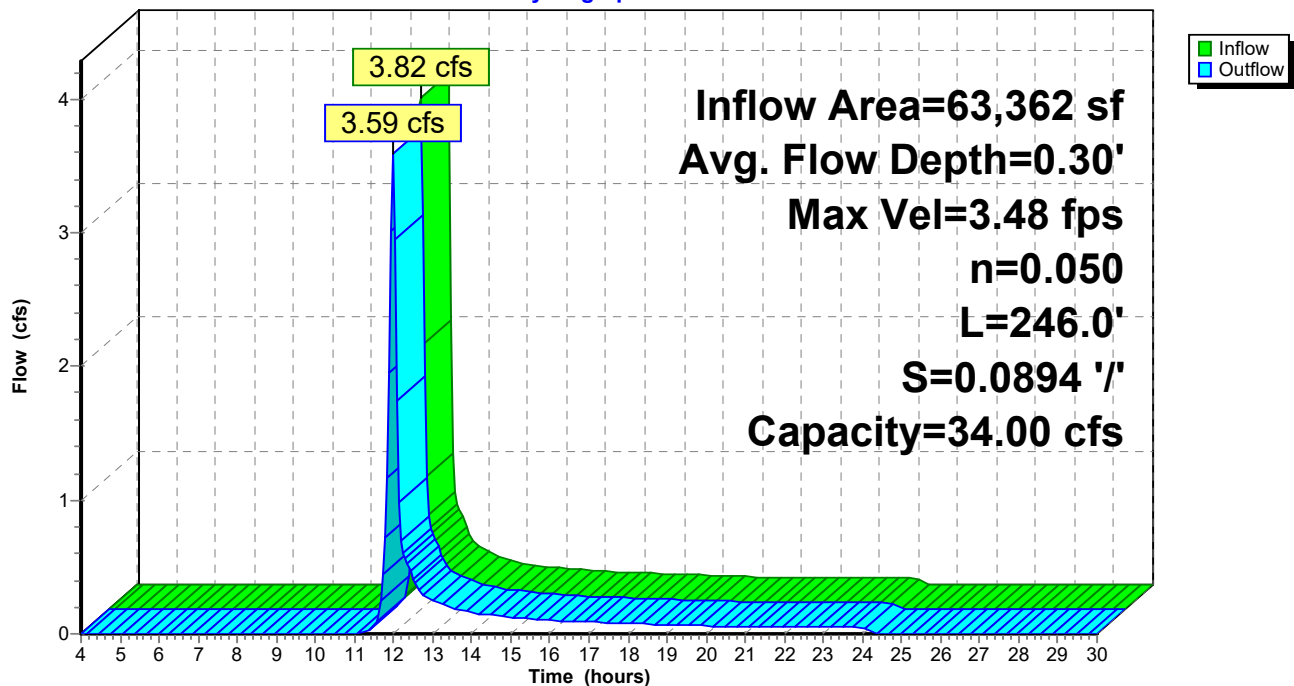
Length= 246.0' Slope= 0.0894 '/'

Inlet Invert= 0.00', Outlet Invert= -22.00'



Reach 6R: Channel 5

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 7R: Channel 6

[65] Warning: Inlet elevation not specified

Inflow Area = 78,847 sf, 8.11% Impervious, Inflow Depth = 1.37" for 10-yr event
Inflow = 4.10 cfs @ 12.00 hrs, Volume= 9,006 cf
Outflow = 3.91 cfs @ 12.01 hrs, Volume= 9,006 cf, Atten= 5%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.91 fps, Min. Travel Time= 0.7 min

Avg. Velocity= 1.12 fps, Avg. Travel Time= 2.5 min

Peak Storage= 178 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.38'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.41 cfs

2.00' x 1.00' deep channel, n= 0.054

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

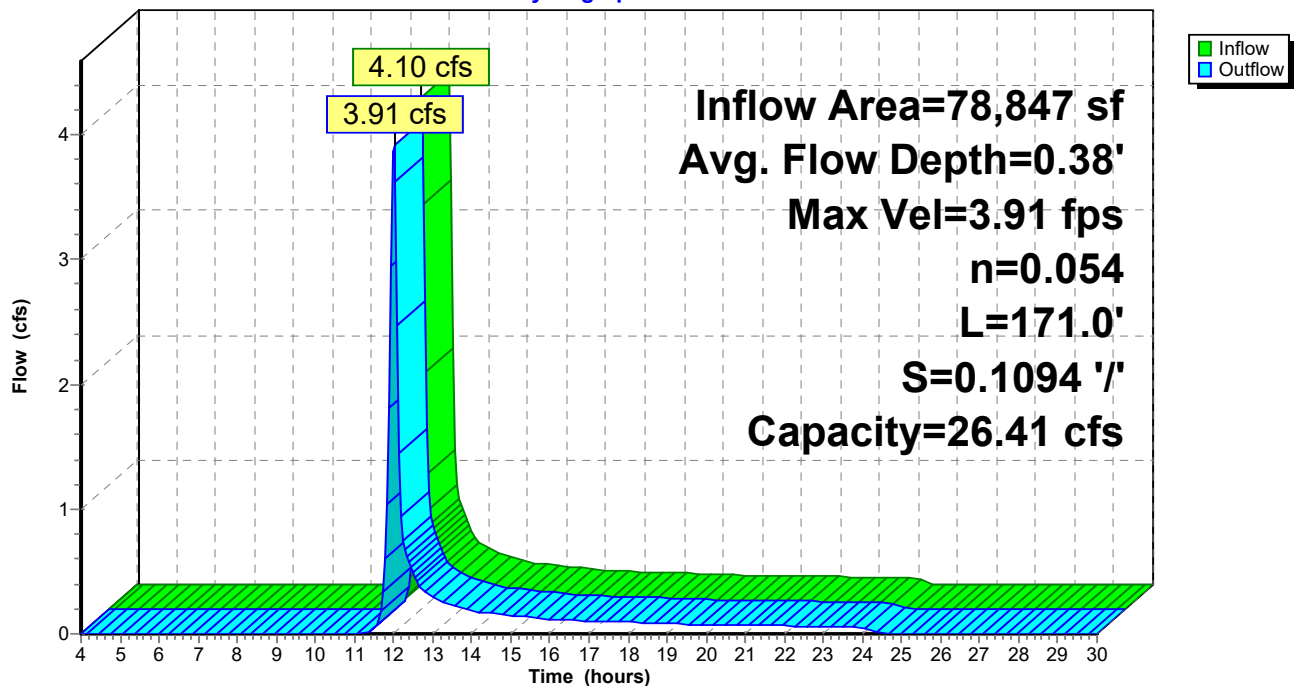
Length= 171.0' Slope= 0.1094 '/'

Inlet Invert= 0.00', Outlet Invert= -18.70'



Reach 7R: Channel 6

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 10R: Channel 7

[65] Warning: Inlet elevation not specified

Inflow Area = 5,181 sf, 57.98% Impervious, Inflow Depth = 2.67" for 10-yr event
Inflow = 0.57 cfs @ 11.96 hrs, Volume= 1,152 cf
Outflow = 0.52 cfs @ 12.04 hrs, Volume= 1,152 cf, Atten= 9%, Lag= 5.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.09 fps, Min. Travel Time= 3.2 min

Avg. Velocity = 0.54 fps, Avg. Travel Time= 12.5 min

Peak Storage= 101 cf @ 11.99 hrs

Average Depth at Peak Storage= 0.11'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 28.37 cfs

2.00' x 1.00' deep channel, n= 0.055

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

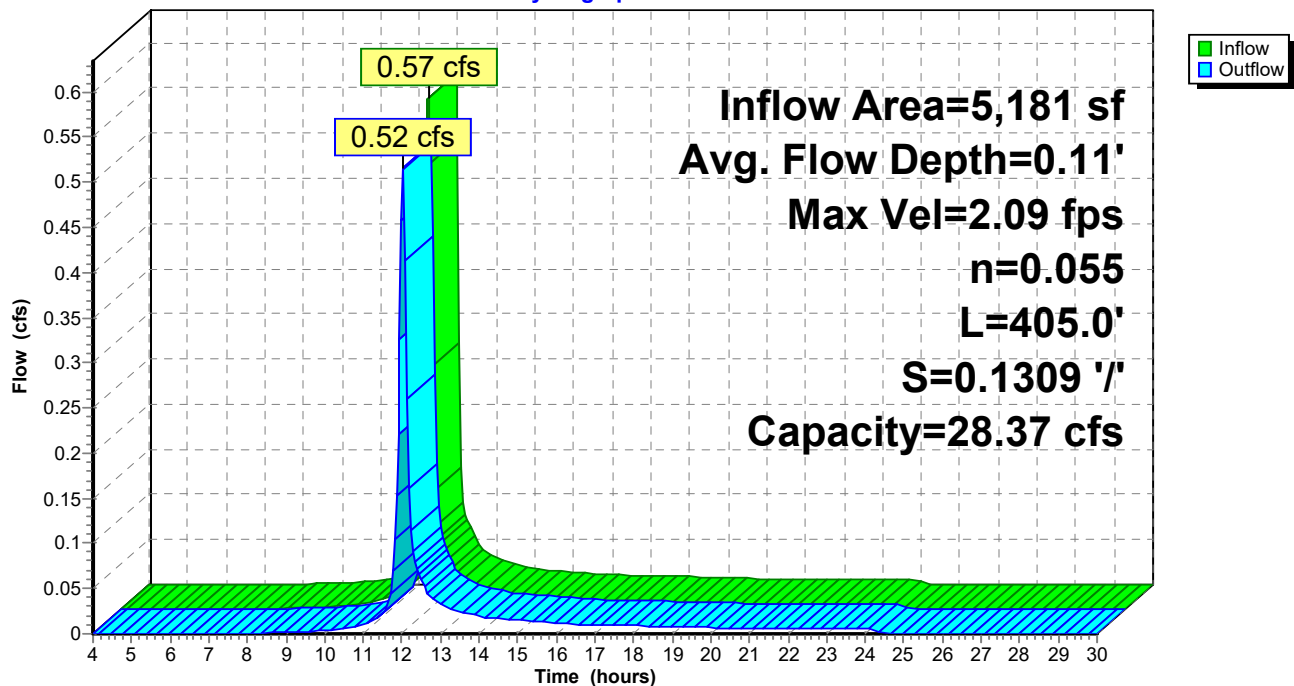
Length= 405.0' Slope= 0.1309 '/'

Inlet Invert= 0.00', Outlet Invert= -53.00'



Reach 10R: Channel 7

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 11R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,364 sf, 10.88% Impervious, Inflow Depth = 1.41" for 10-yr event
Inflow = 4.40 cfs @ 12.02 hrs, Volume= 10,157 cf
Outflow = 4.32 cfs @ 12.03 hrs, Volume= 10,157 cf, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.71 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 0.95 fps, Avg. Travel Time= 1.3 min

Peak Storage= 88 cf @ 12.02 hrs

Average Depth at Peak Storage= 0.41'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.99 cfs

2.00' x 1.00' deep channel, n= 0.045

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

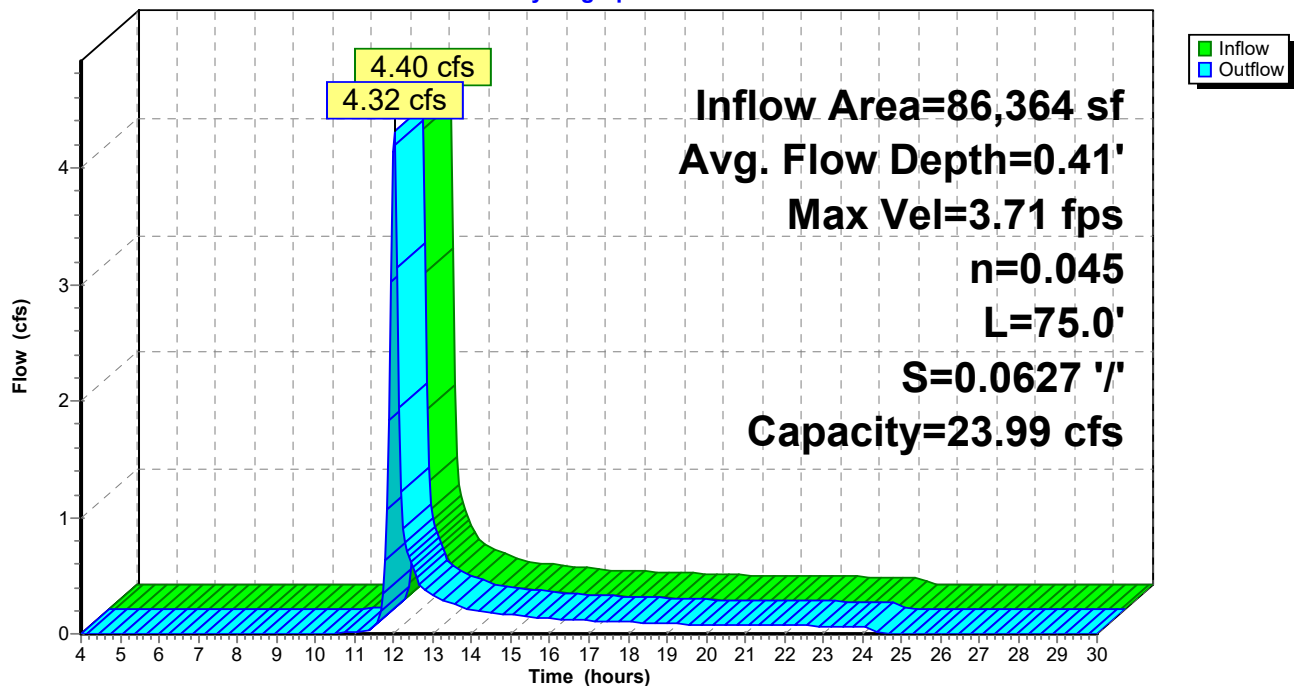
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 11R: Channel 8

Hydrograph



MLV 505LD86_Channels 5-10 REV 2*Type II 24-hr 25-yr Rainfall=5.85"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5	Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=2.24" Tc=5.0 min CN=65 Runoff=5.87 cfs 11,843 cf
Subcatchment6S: CC-6	Runoff Area=15,485 sf 11.48% Impervious Runoff Depth=1.51" Tc=5.0 min CN=56 Runoff=0.93 cfs 1,947 cf
Subcatchment7S: CC-7	Runoff Area=5,181 sf 57.98% Impervious Runoff Depth=3.65" Tc=5.0 min CN=80 Runoff=0.77 cfs 1,574 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.06" Tc=5.0 min CN=30 Runoff=0.00 cfs 11 cf
Subcatchment9S: CC-9	Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=3.06" Tc=5.0 min CN=74 Runoff=0.32 cfs 640 cf
Subcatchment10S: CC-10	Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=3.25" Tc=5.0 min CN=76 Runoff=0.38 cfs 776 cf
Reach 6R: Channel 5	Avg. Flow Depth=0.38' Max Vel=3.98 fps Inflow=5.87 cfs 11,843 cf n=0.050 L=246.0' S=0.0894 '/ Capacity=34.00 cfs Outflow=5.55 cfs 11,843 cf
Reach 7R: Channel 6	Avg. Flow Depth=0.48' Max Vel=4.47 fps Inflow=6.45 cfs 13,789 cf n=0.054 L=171.0' S=0.1094 '/ Capacity=26.41 cfs Outflow=6.22 cfs 13,789 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.13' Max Vel=2.33 fps Inflow=0.77 cfs 1,574 cf n=0.055 L=405.0' S=0.1309 '/ Capacity=28.37 cfs Outflow=0.71 cfs 1,574 cf
Reach 11R: Channel 8	Avg. Flow Depth=0.53' Max Vel=4.25 fps Inflow=6.89 cfs 15,375 cf n=0.045 L=75.0' S=0.0627 '/ Capacity=23.99 cfs Outflow=6.76 cfs 15,375 cf

Total Runoff Area = 91,738 sf Runoff Volume = 16,790 cf Average Runoff Depth = 2.20"
86.74% Pervious = 79,572 sf 13.26% Impervious = 12,166 sf

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 5.87 cfs @ 11.96 hrs, Volume= 11,843 cf, Depth= 2.24"

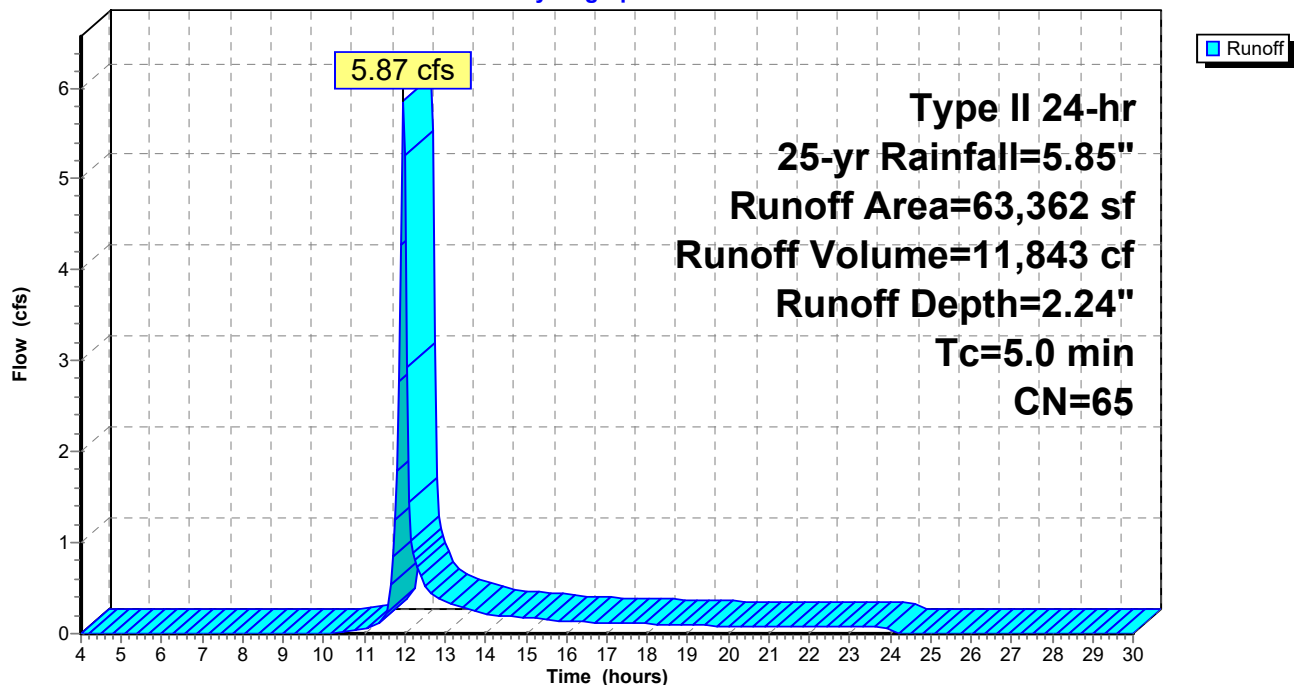
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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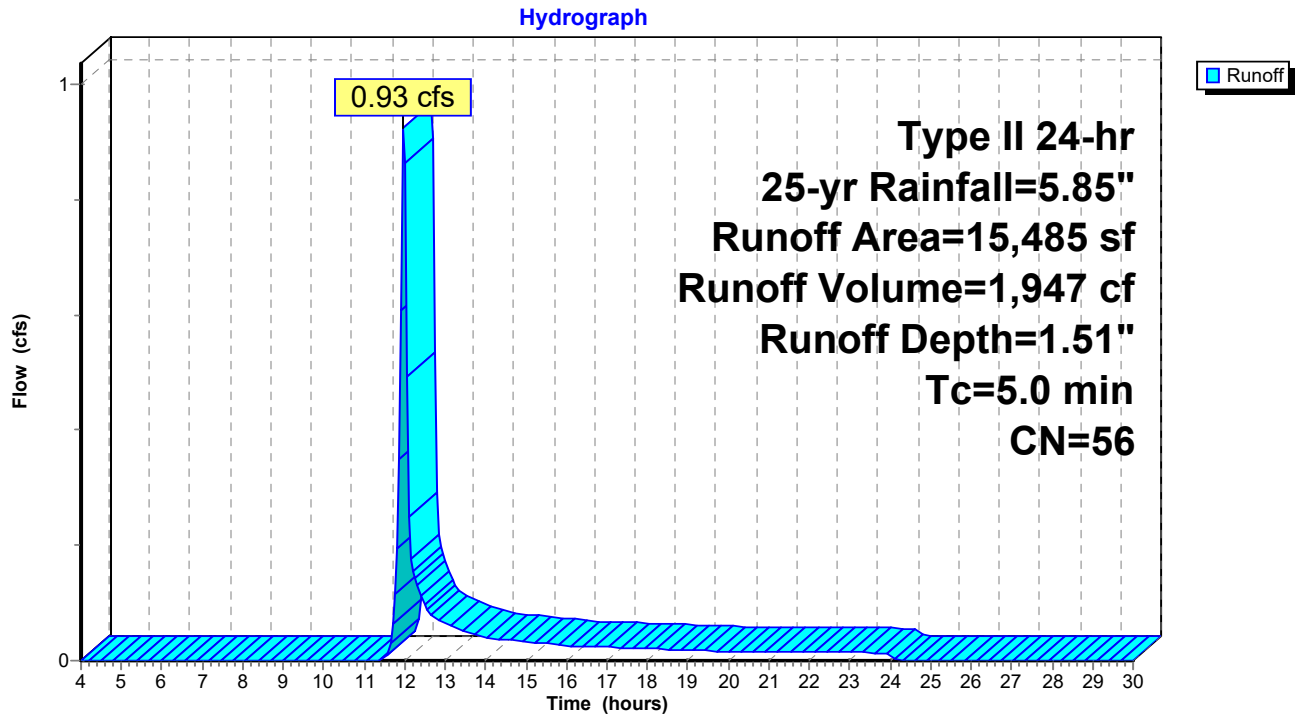
Summary for Subcatchment 6S: CC-6[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.93 cfs @ 11.97 hrs, Volume= 1,947 cf, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
7,682	30	Meadow, non-grazed, HSG A
6,026	78	Meadow, non-grazed, HSG D
1,255	98	Paved parking, HSG A
522	98	Paved parking, HSG D
15,485	56	Weighted Average
13,708		88.52% Pervious Area
1,777		11.48% Impervious Area

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

Subcatchment 6S: CC-6

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.77 cfs @ 11.96 hrs, Volume= 1,574 cf, Depth= 3.65"

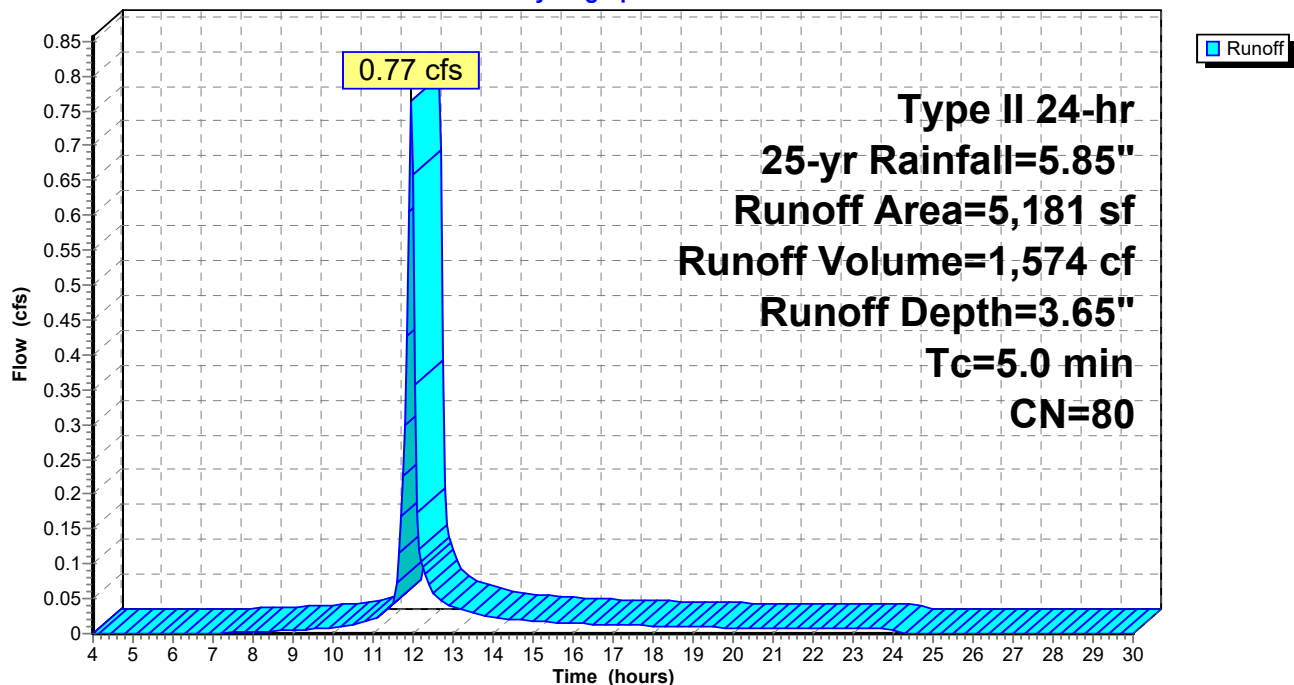
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

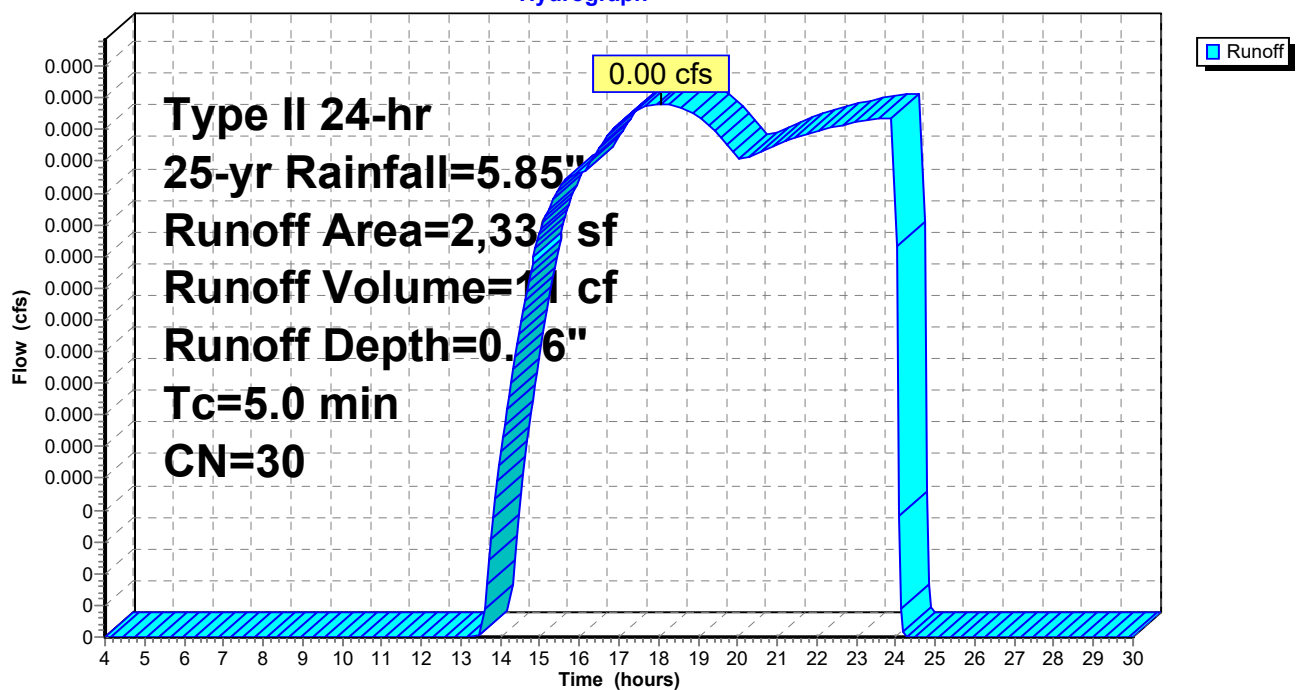
Area (sf)	CN	Description
1,049	30	Meadow, non-grazed, HSG A
1,128	78	Meadow, non-grazed, HSG D
2,071	98	Paved parking, HSG A
933	98	Paved parking, HSG D
5,181	80	Weighted Average
2,177		42.02% Pervious Area
3,004		57.98% Impervious Area

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

Subcatchment 7S: CC-7

Hydrograph





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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.32 cfs @ 11.96 hrs, Volume= 640 cf, Depth= 3.06"

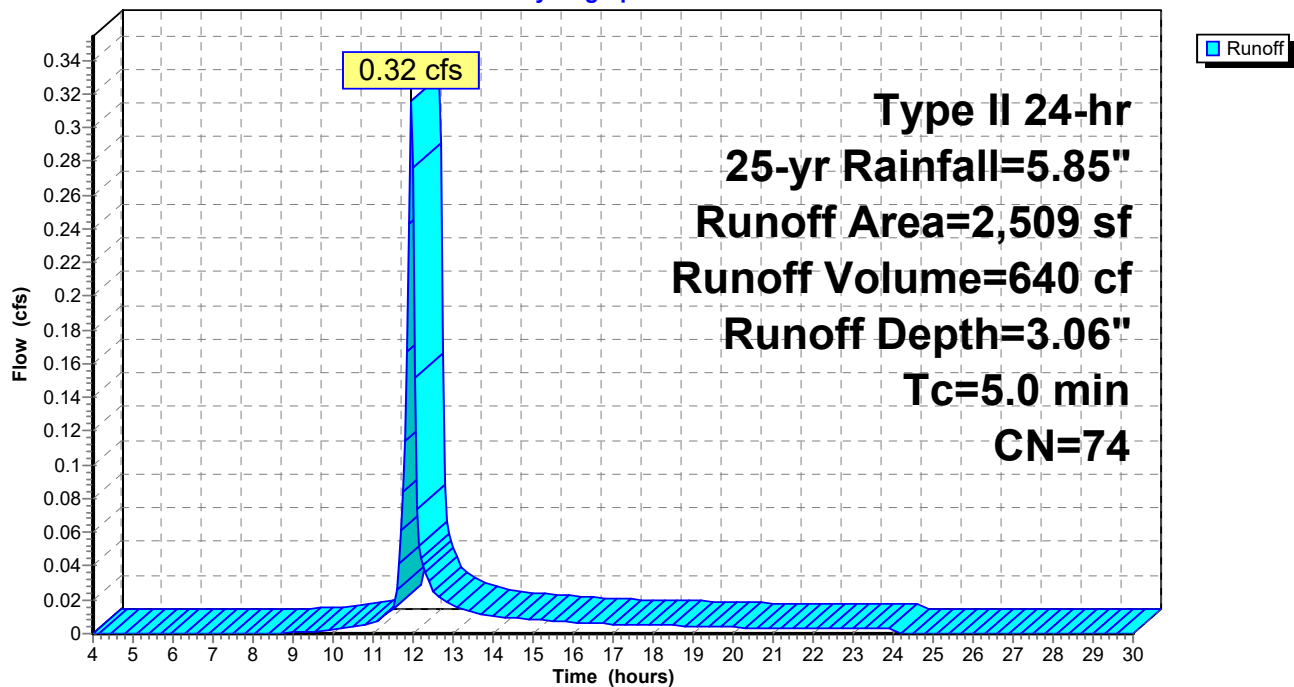
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



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Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.38 cfs @ 11.96 hrs, Volume= 776 cf, Depth= 3.25"

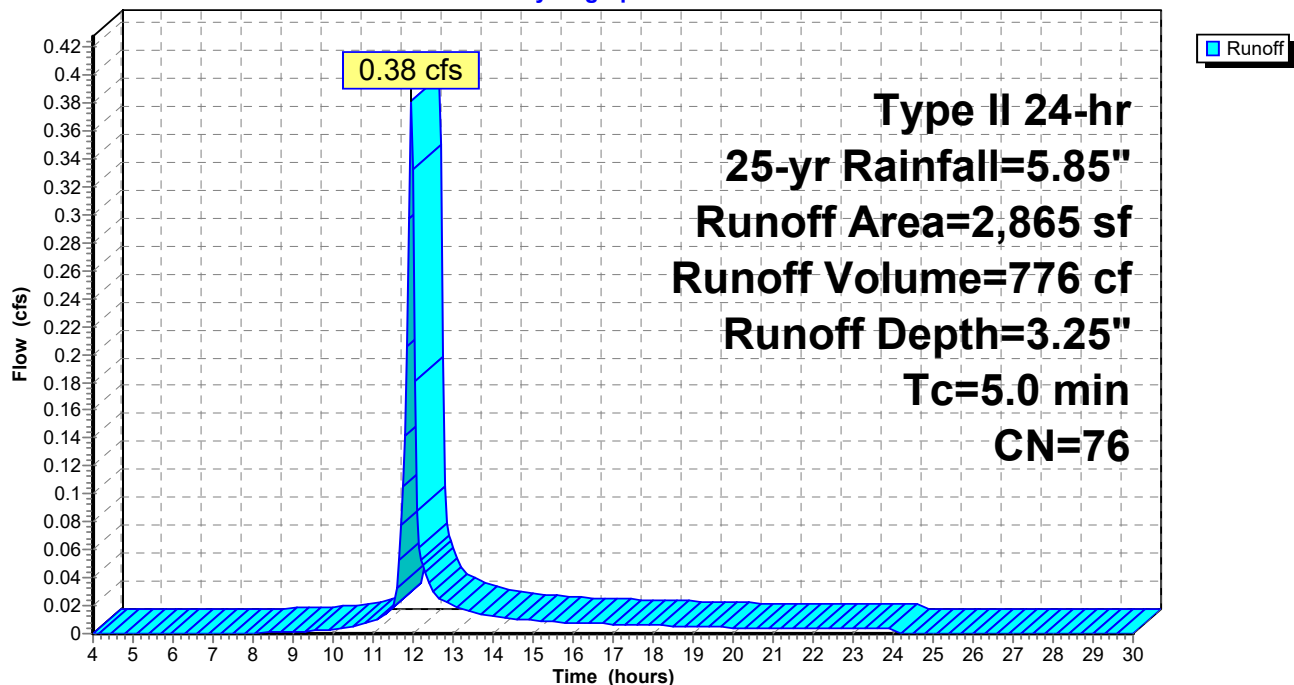
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

Hydrograph



MLV 505LD86_Channels 5-10 REV 2

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 6R: Channel 5

[65] Warning: Inlet elevation not specified

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 2.24" for 25-yr event
Inflow = 5.87 cfs @ 11.96 hrs, Volume= 11,843 cf
Outflow = 5.55 cfs @ 11.99 hrs, Volume= 11,843 cf, Atten= 5%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.98 fps, Min. Travel Time= 1.0 min

Avg. Velocity = 1.03 fps, Avg. Travel Time= 4.0 min

Peak Storage= 353 cf @ 11.98 hrs

Average Depth at Peak Storage= 0.38'

Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 34.00 cfs

3.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 7.00'

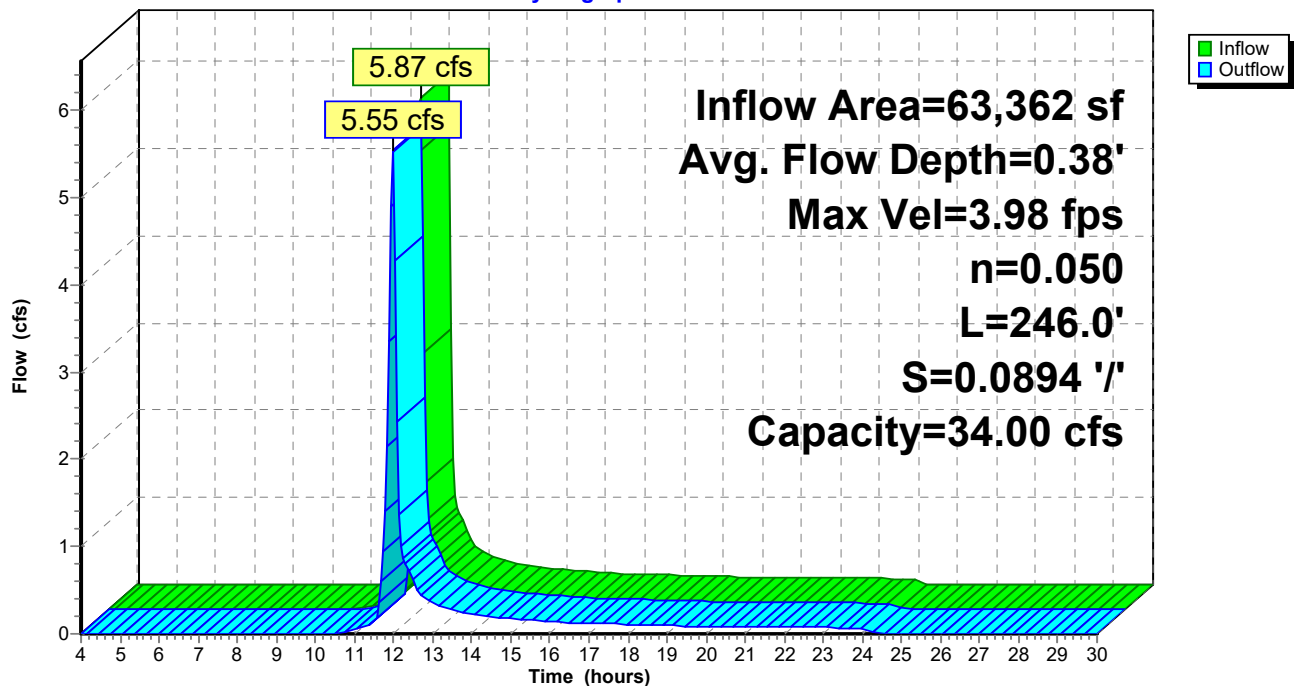
Length= 246.0' Slope= 0.0894 '/'

Inlet Invert= 0.00', Outlet Invert= -22.00'



Reach 6R: Channel 5

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 7R: Channel 6

[65] Warning: Inlet elevation not specified

Inflow Area = 78,847 sf, 8.11% Impervious, Inflow Depth = 2.10" for 25-yr event
Inflow = 6.45 cfs @ 11.99 hrs, Volume= 13,789 cf
Outflow = 6.22 cfs @ 12.00 hrs, Volume= 13,789 cf, Atten= 4%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.47 fps, Min. Travel Time= 0.6 min

Avg. Velocity = 1.25 fps, Avg. Travel Time= 2.3 min

Peak Storage= 245 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.48'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.41 cfs

2.00' x 1.00' deep channel, n= 0.054

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

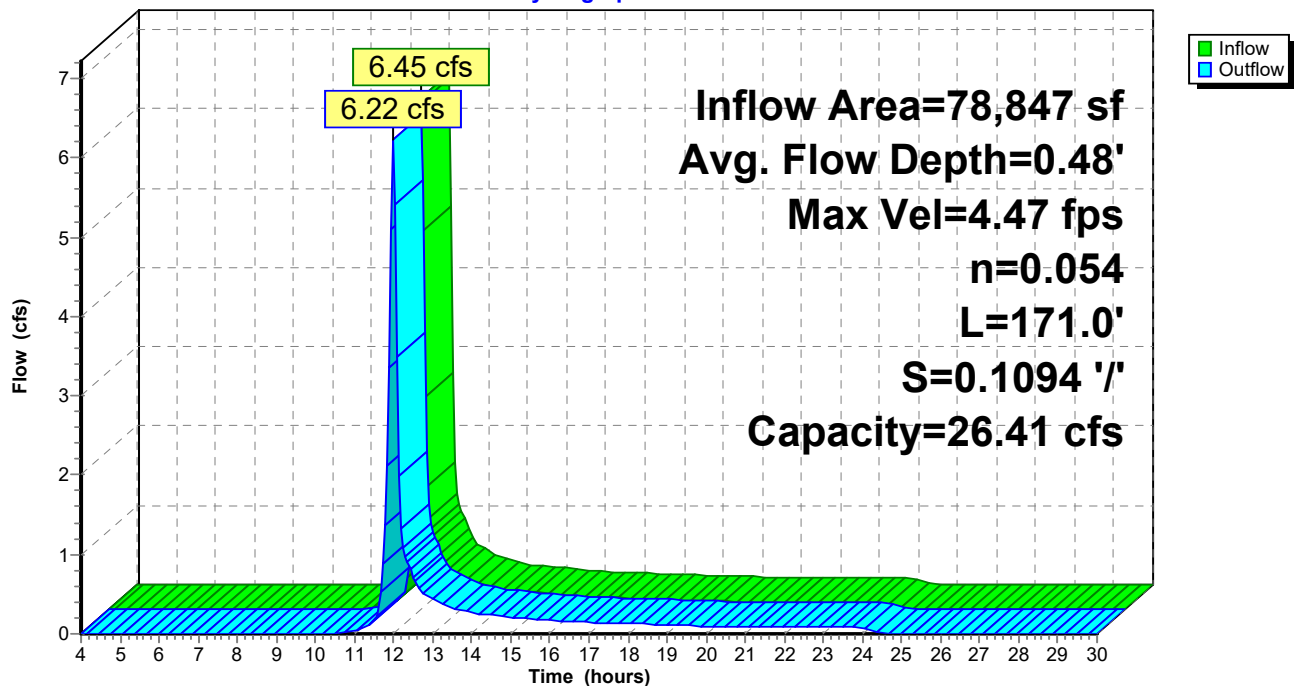
Length= 171.0' Slope= 0.1094 '/'

Inlet Invert= 0.00', Outlet Invert= -18.70'



Reach 7R: Channel 6

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 10R: Channel 7

[65] Warning: Inlet elevation not specified

Inflow Area = 5,181 sf, 57.98% Impervious, Inflow Depth = 3.65" for 25-yr event
Inflow = 0.77 cfs @ 11.96 hrs, Volume= 1,574 cf
Outflow = 0.71 cfs @ 12.04 hrs, Volume= 1,574 cf, Atten= 7%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.33 fps, Min. Travel Time= 2.9 min

Avg. Velocity = 0.57 fps, Avg. Travel Time= 11.9 min

Peak Storage= 123 cf @ 11.99 hrs

Average Depth at Peak Storage= 0.13'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 28.37 cfs

2.00' x 1.00' deep channel, n= 0.055

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

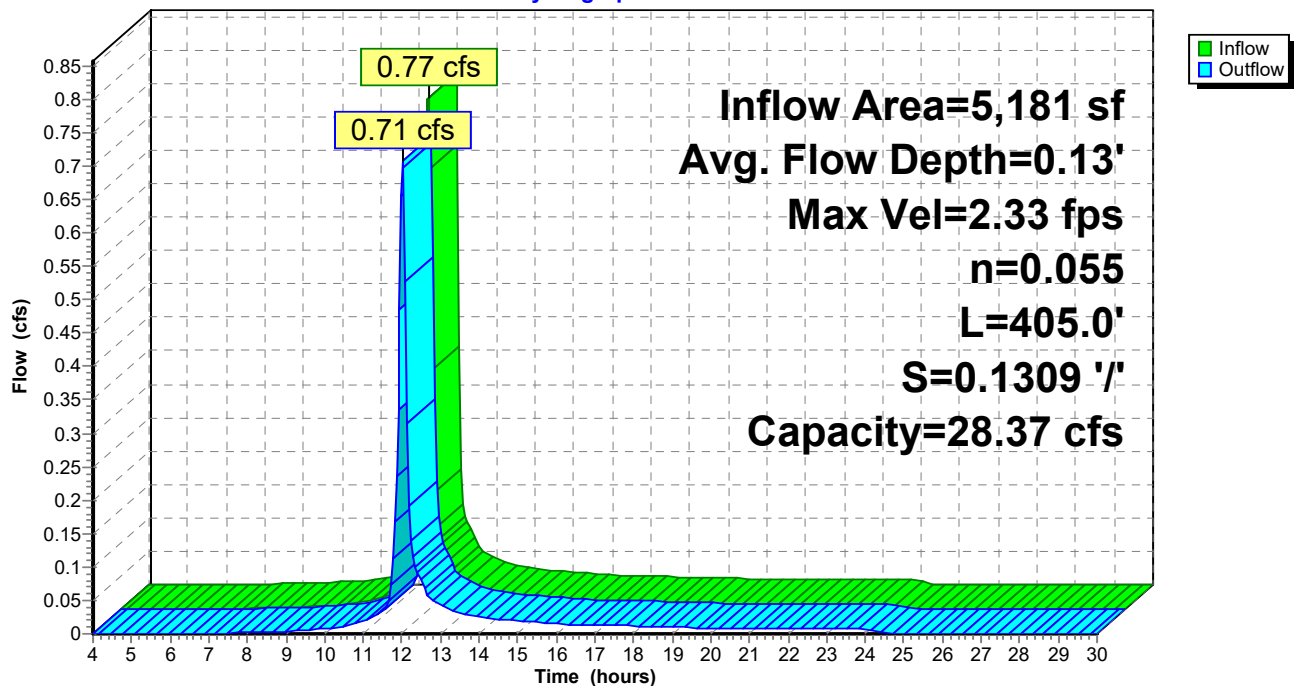
Length= 405.0' Slope= 0.1309 '/'

Inlet Invert= 0.00', Outlet Invert= -53.00'



Reach 10R: Channel 7

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 11R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,364 sf, 10.88% Impervious, Inflow Depth = 2.14" for 25-yr event
Inflow = 6.89 cfs @ 12.01 hrs, Volume= 15,375 cf
Outflow = 6.76 cfs @ 12.01 hrs, Volume= 15,375 cf, Atten= 2%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.25 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 1.05 fps, Avg. Travel Time= 1.2 min

Peak Storage= 121 cf @ 12.01 hrs

Average Depth at Peak Storage= 0.53'

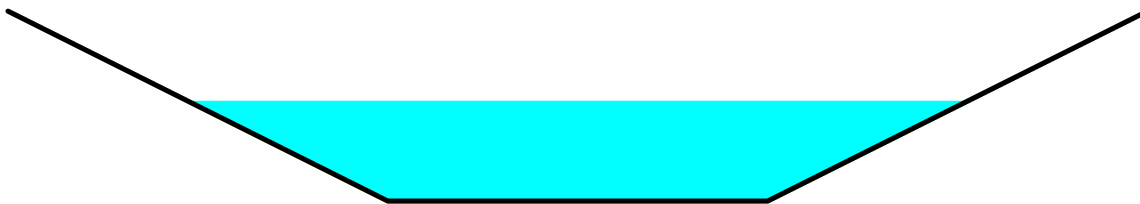
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.99 cfs

2.00' x 1.00' deep channel, n= 0.045

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

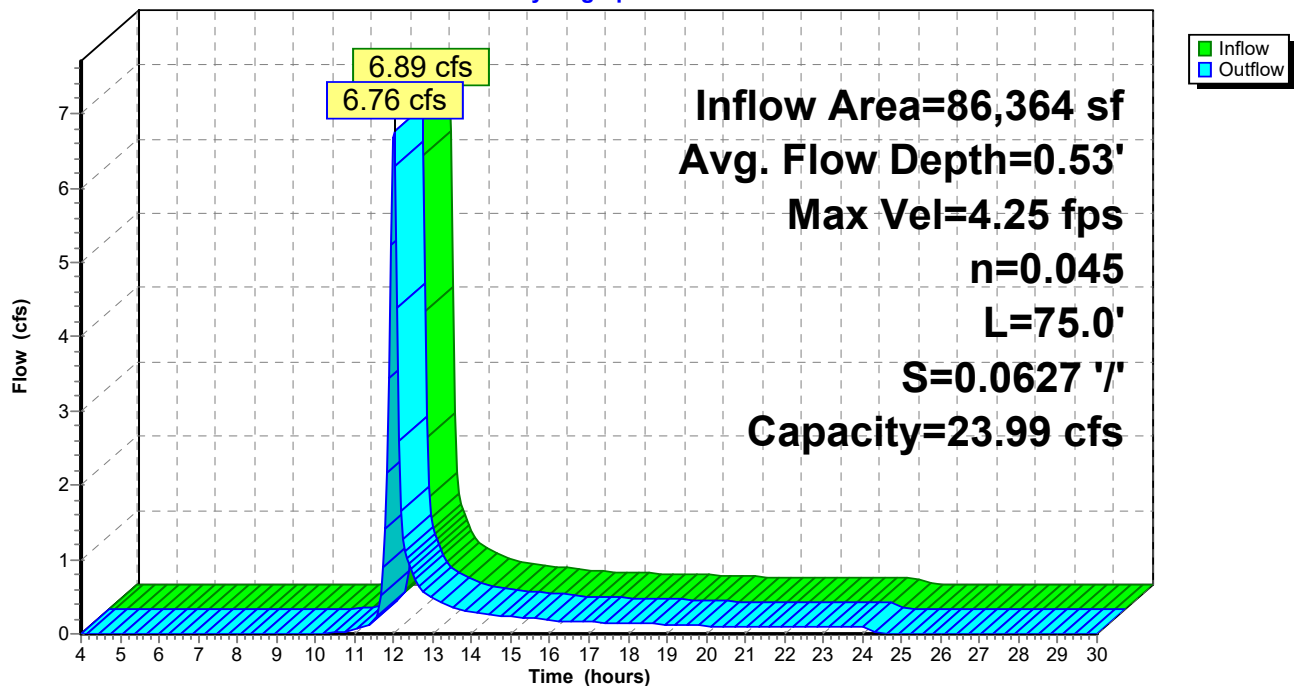
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 11R: Channel 8

Hydrograph



MLV 505LD86_Channels 5-10 REV 2*Type II 24-hr 50-yr Rainfall=6.87"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5	Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=3.00" Tc=5.0 min CN=65 Runoff=7.87 cfs 15,853 cf
Subcatchment6S: CC-6	Runoff Area=15,485 sf 11.48% Impervious Runoff Depth=2.13" Tc=5.0 min CN=56 Runoff=1.34 cfs 2,754 cf
Subcatchment7S: CC-7	Runoff Area=5,181 sf 57.98% Impervious Runoff Depth=4.57" Tc=5.0 min CN=80 Runoff=0.95 cfs 1,975 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.19" Tc=5.0 min CN=30 Runoff=0.00 cfs 37 cf
Subcatchment9S: CC-9	Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=3.93" Tc=5.0 min CN=74 Runoff=0.40 cfs 821 cf
Subcatchment10S: CC-10	Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=4.14" Tc=5.0 min CN=76 Runoff=0.48 cfs 989 cf
Reach 6R: Channel 5	Avg. Flow Depth=0.45' Max Vel=4.35 fps Inflow=7.87 cfs 15,853 cf n=0.050 L=246.0' S=0.0894 '/ Capacity=34.00 cfs Outflow=7.48 cfs 15,853 cf
Reach 7R: Channel 6	Avg. Flow Depth=0.57' Max Vel=4.88 fps Inflow=8.78 cfs 18,607 cf n=0.054 L=171.0' S=0.1094 '/ Capacity=26.41 cfs Outflow=8.52 cfs 18,607 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.15' Max Vel=2.51 fps Inflow=0.95 cfs 1,975 cf n=0.055 L=405.0' S=0.1309 '/ Capacity=28.37 cfs Outflow=0.87 cfs 1,975 cf
Reach 11R: Channel 8	Avg. Flow Depth=0.62' Max Vel=4.64 fps Inflow=9.35 cfs 20,619 cf n=0.045 L=75.0' S=0.0627 '/ Capacity=23.99 cfs Outflow=9.21 cfs 20,619 cf

Total Runoff Area = 91,738 sf Runoff Volume = 22,429 cf Average Runoff Depth = 2.93"
86.74% Pervious = 79,572 sf 13.26% Impervious = 12,166 sf

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Type II 24-hr 50-yr Rainfall=6.87"

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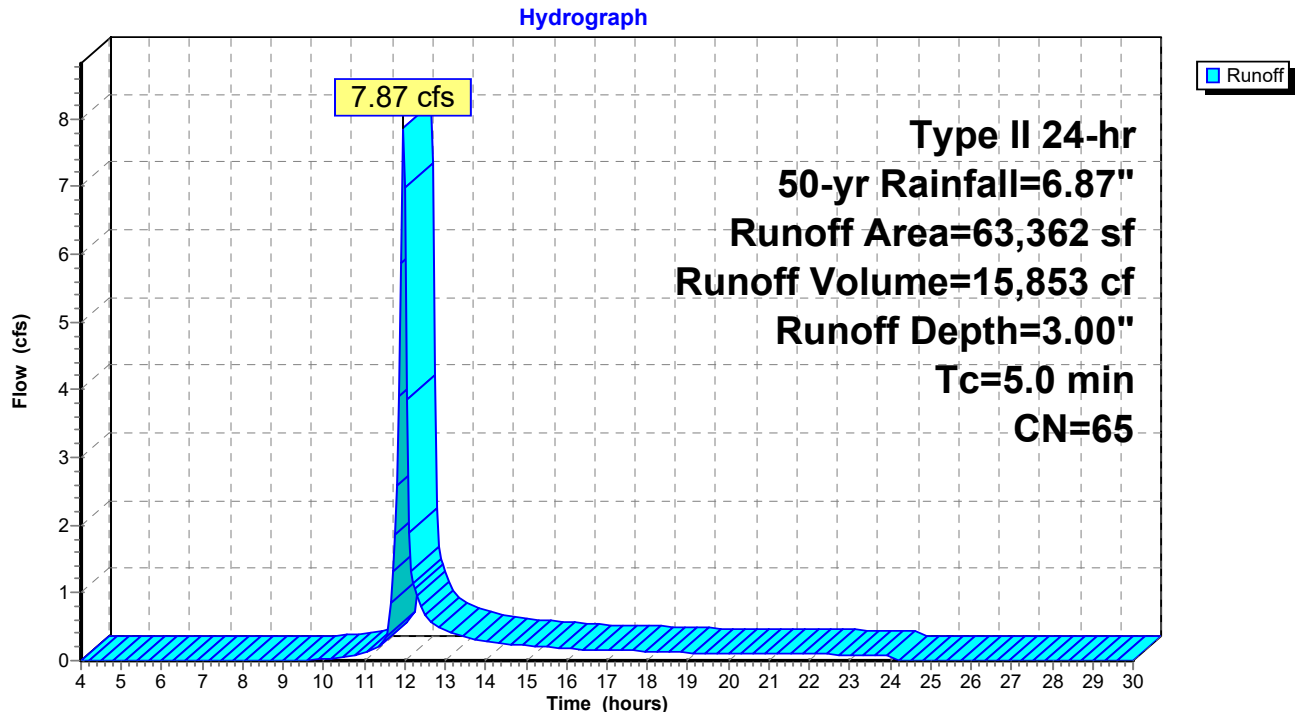
Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 7.87 cfs @ 11.96 hrs, Volume= 15,853 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

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Type II 24-hr 50-yr Rainfall=6.87"

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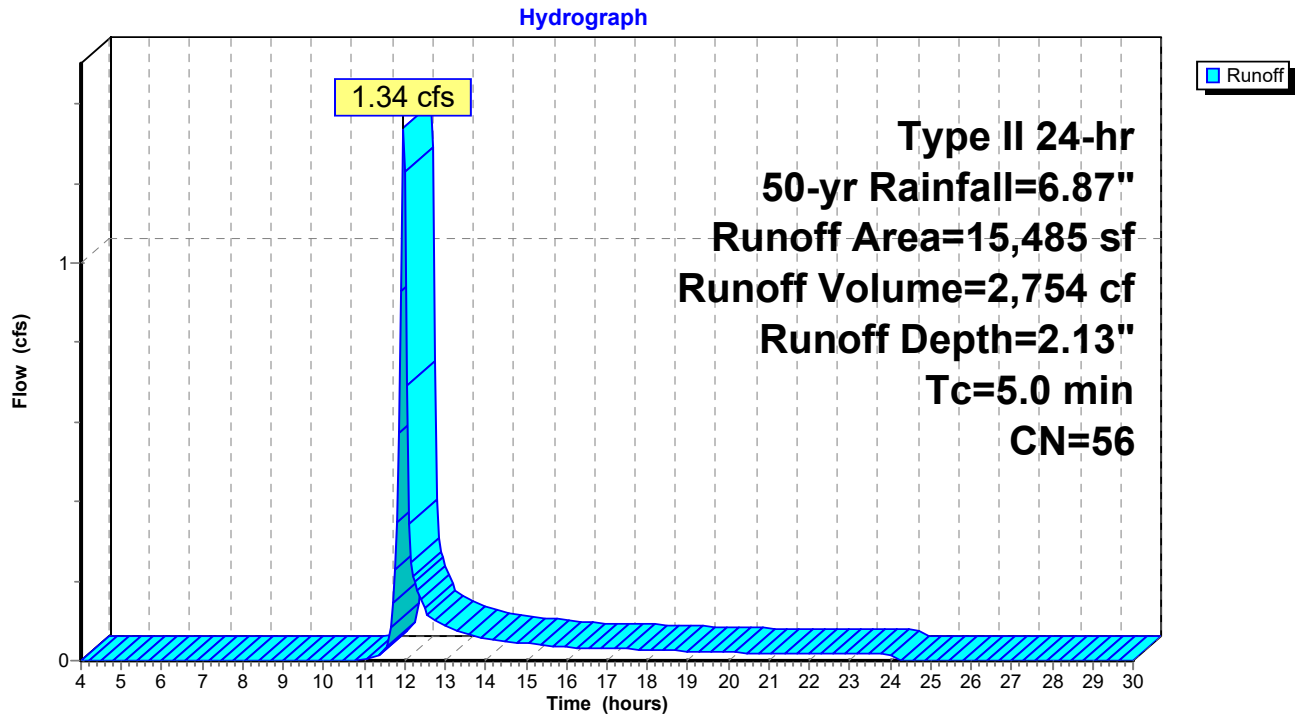
Summary for Subcatchment 6S: CC-6[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.34 cfs @ 11.97 hrs, Volume= 2,754 cf, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
7,682	30	Meadow, non-grazed, HSG A
6,026	78	Meadow, non-grazed, HSG D
1,255	98	Paved parking, HSG A
522	98	Paved parking, HSG D
15,485	56	Weighted Average
13,708		88.52% Pervious Area
1,777		11.48% Impervious Area

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

Subcatchment 6S: CC-6

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Type II 24-hr 50-yr Rainfall=6.87"

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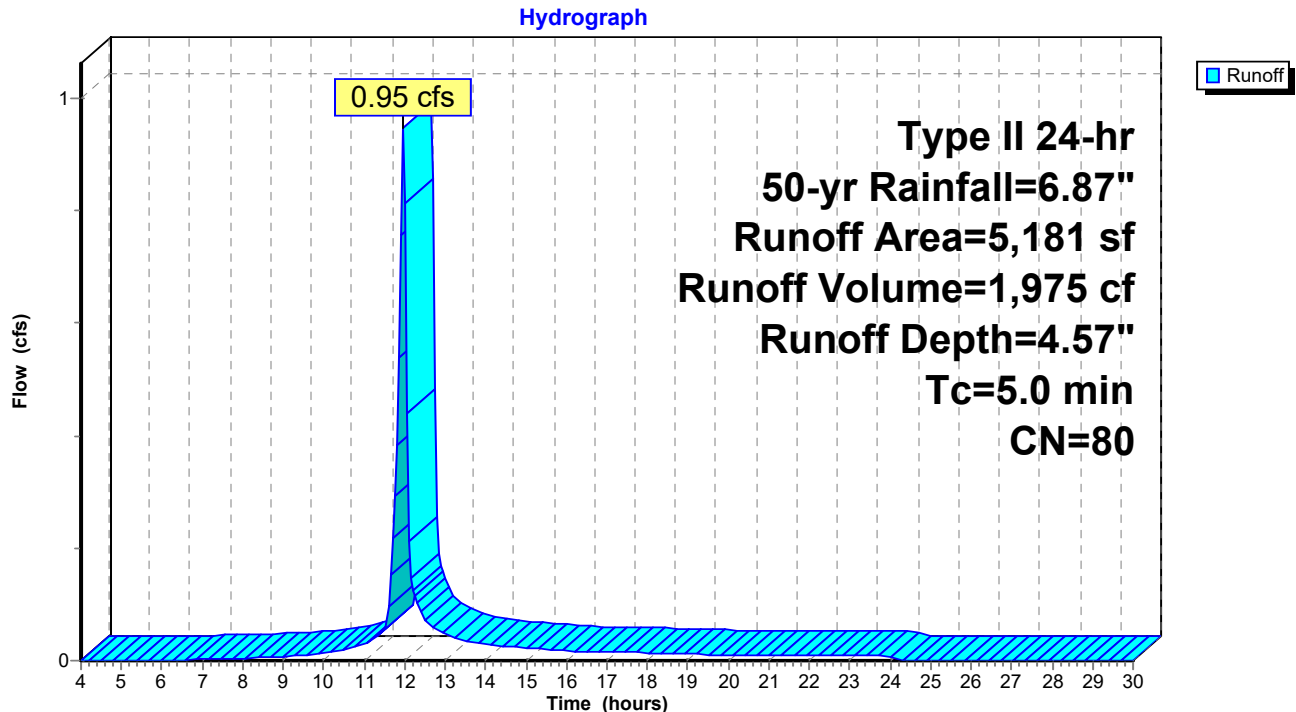
Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.95 cfs @ 11.95 hrs, Volume= 1,975 cf, Depth= 4.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
1,049	30	Meadow, non-grazed, HSG A
1,128	78	Meadow, non-grazed, HSG D
2,071	98	Paved parking, HSG A
933	98	Paved parking, HSG D
5,181	80	Weighted Average
2,177		42.02% Pervious Area
3,004		57.98% Impervious Area

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

Subcatchment 7S: CC-7

Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.00 cfs @ 13.28 hrs, Volume= 37 cf, Depth= 0.19"

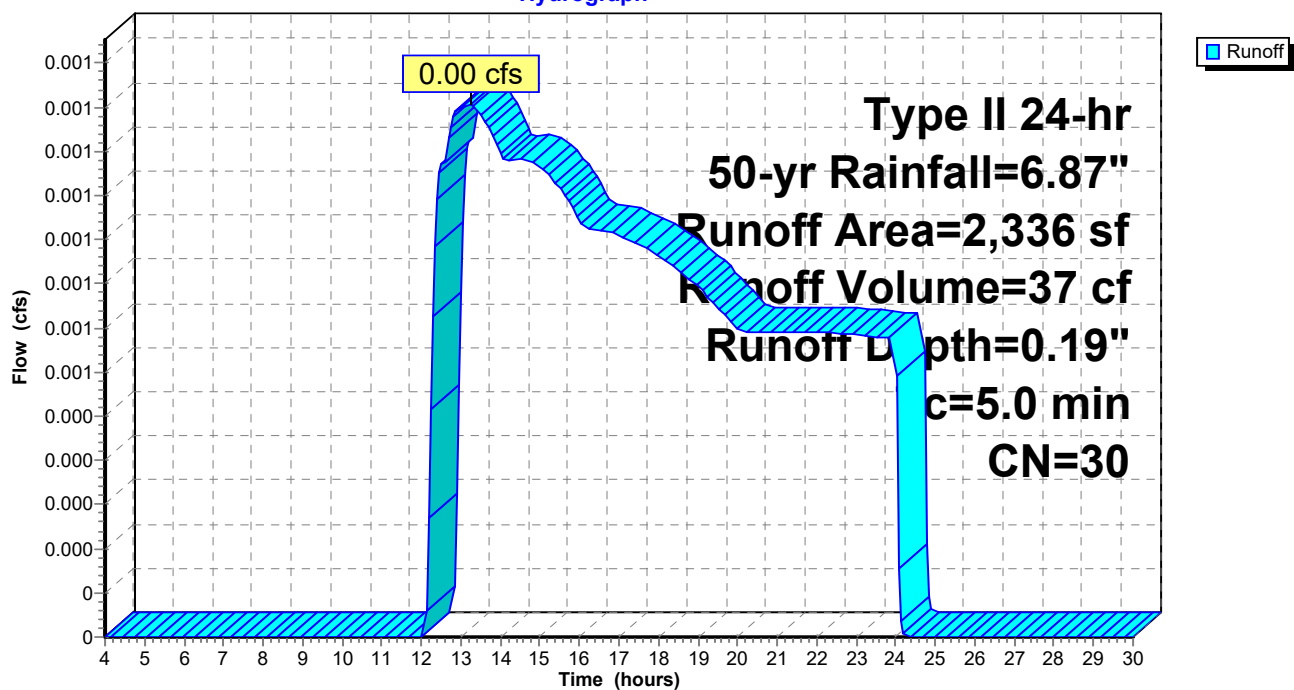
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.40 cfs @ 11.96 hrs, Volume= 821 cf, Depth= 3.93"

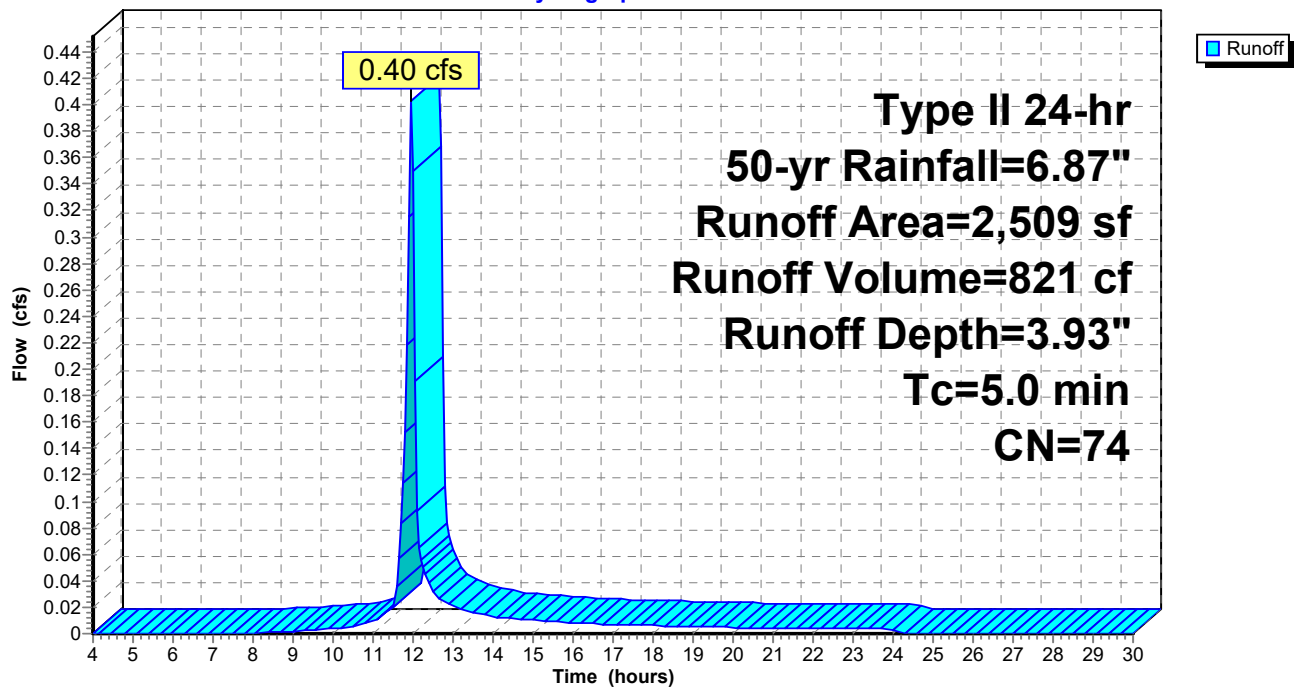
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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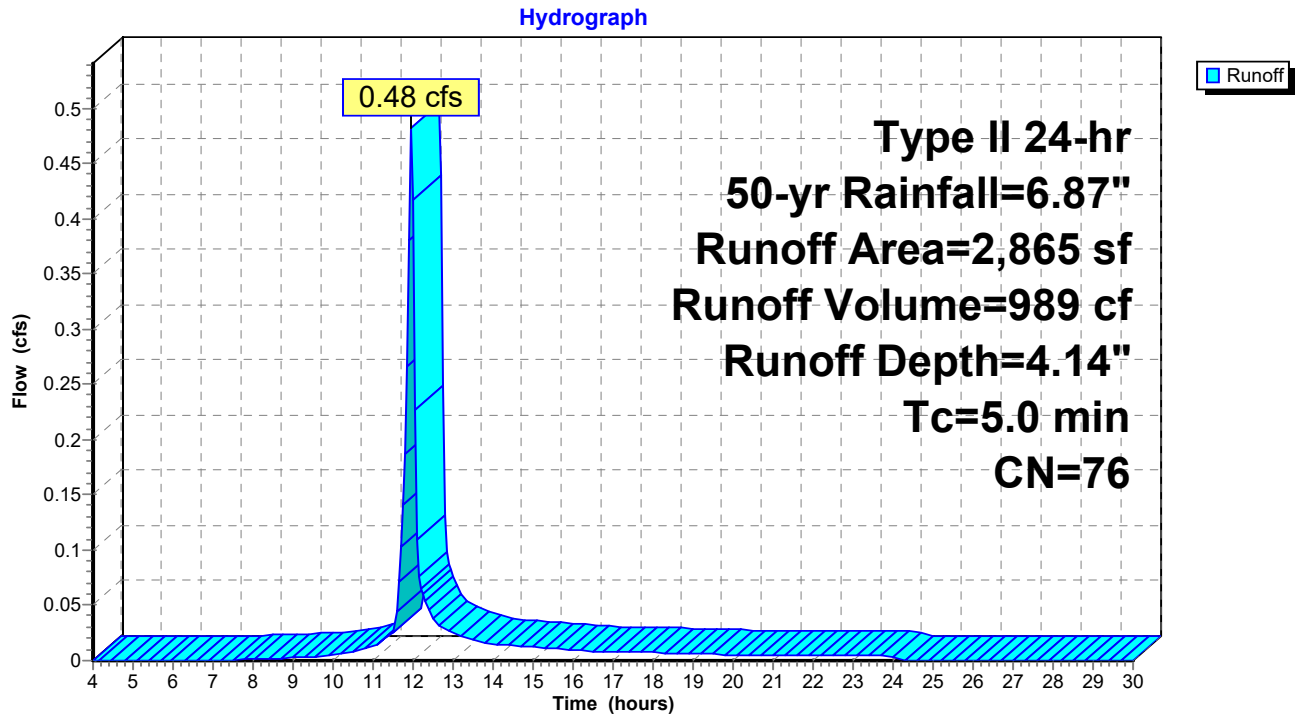
Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.48 cfs @ 11.96 hrs, Volume= 989 cf, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 6R: Channel 5

[65] Warning: Inlet elevation not specified

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 3.00" for 50-yr event
Inflow = 7.87 cfs @ 11.96 hrs, Volume= 15,853 cf
Outflow = 7.48 cfs @ 11.99 hrs, Volume= 15,853 cf, Atten= 5%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.35 fps, Min. Travel Time= 0.9 min

Avg. Velocity= 1.11 fps, Avg. Travel Time= 3.7 min

Peak Storage= 429 cf @ 11.97 hrs

Average Depth at Peak Storage= 0.45'

Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 34.00 cfs

3.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 7.00'

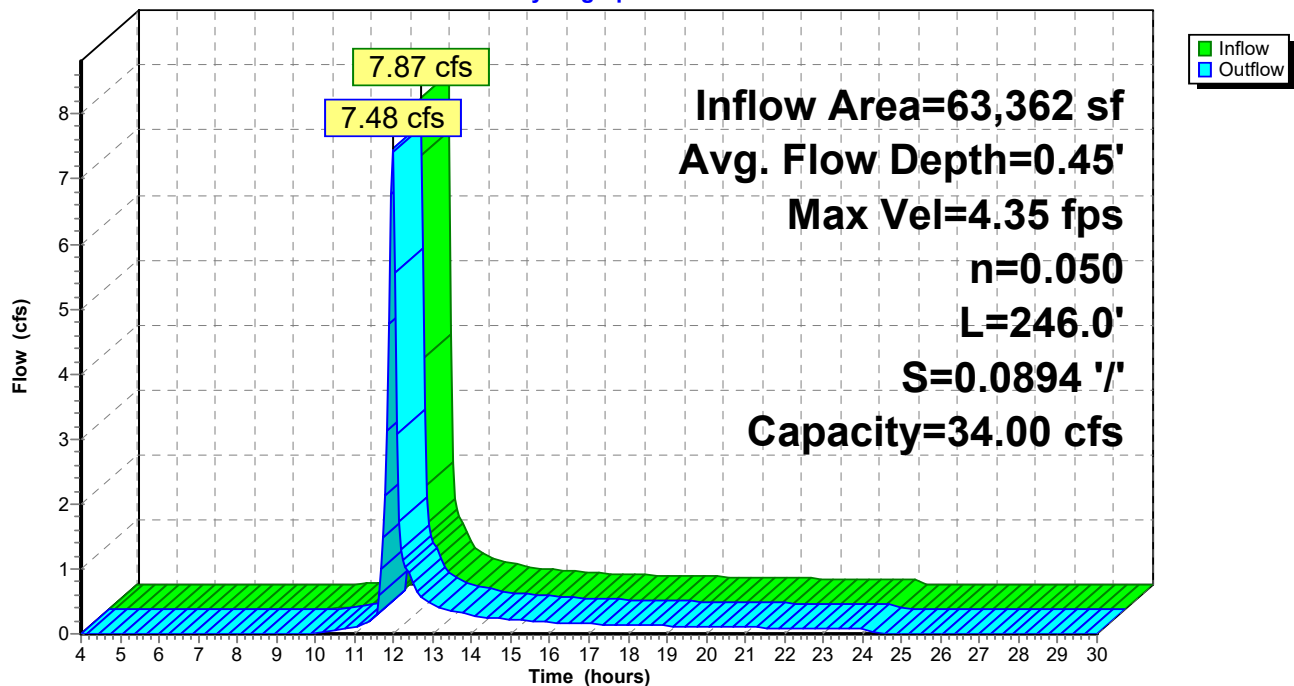
Length= 246.0' Slope= 0.0894 '/'

Inlet Invert= 0.00', Outlet Invert= -22.00'



Reach 6R: Channel 5

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 7R: Channel 6

[65] Warning: Inlet elevation not specified

Inflow Area = 78,847 sf, 8.11% Impervious, Inflow Depth = 2.83" for 50-yr event
Inflow = 8.78 cfs @ 11.98 hrs, Volume= 18,607 cf
Outflow = 8.52 cfs @ 12.00 hrs, Volume= 18,607 cf, Atten= 3%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.88 fps, Min. Travel Time= 0.6 min

Avg. Velocity= 1.34 fps, Avg. Travel Time= 2.1 min

Peak Storage= 306 cf @ 11.99 hrs

Average Depth at Peak Storage= 0.57'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.41 cfs

2.00' x 1.00' deep channel, n= 0.054

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

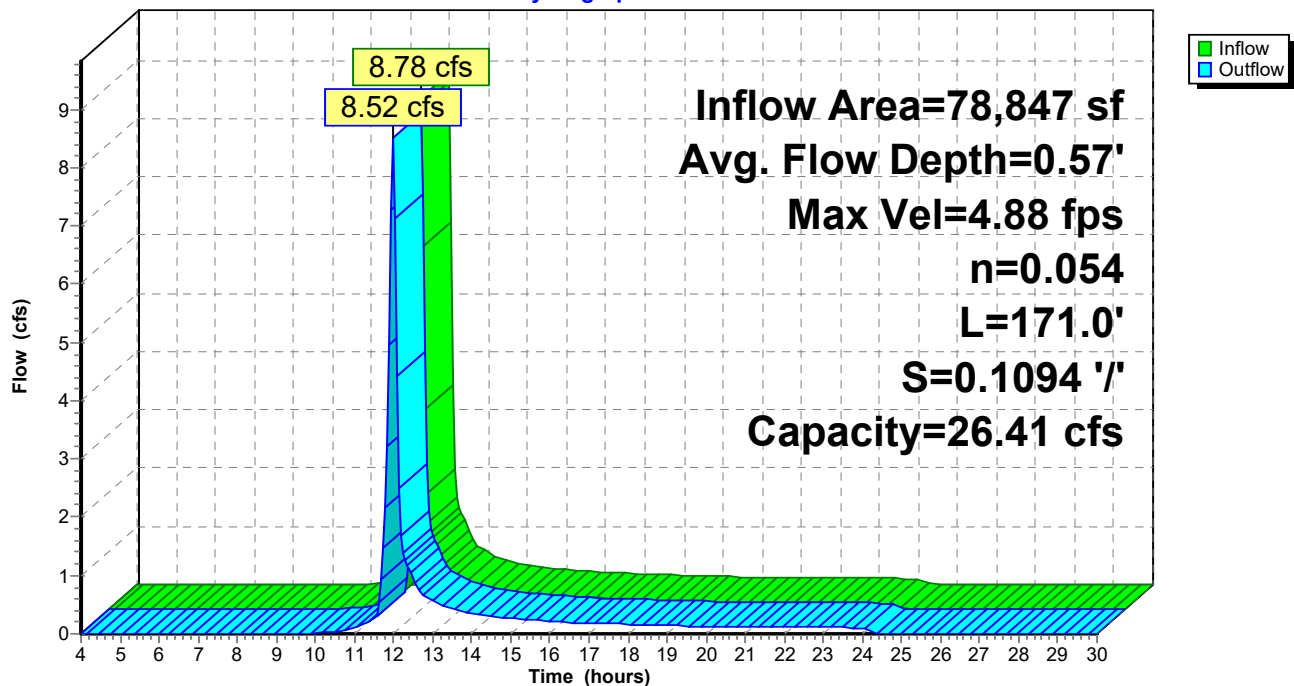
Length= 171.0' Slope= 0.1094 '/'

Inlet Invert= 0.00', Outlet Invert= -18.70'



Reach 7R: Channel 6

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 10R: Channel 7

[65] Warning: Inlet elevation not specified

Inflow Area = 5,181 sf, 57.98% Impervious, Inflow Depth = 4.57" for 50-yr event
Inflow = 0.95 cfs @ 11.95 hrs, Volume= 1,975 cf
Outflow = 0.87 cfs @ 12.03 hrs, Volume= 1,975 cf, Atten= 8%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.51 fps, Min. Travel Time= 2.7 min

Avg. Velocity = 0.60 fps, Avg. Travel Time= 11.3 min

Peak Storage= 143 cf @ 11.98 hrs

Average Depth at Peak Storage= 0.15'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 28.37 cfs

2.00' x 1.00' deep channel, n= 0.055

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

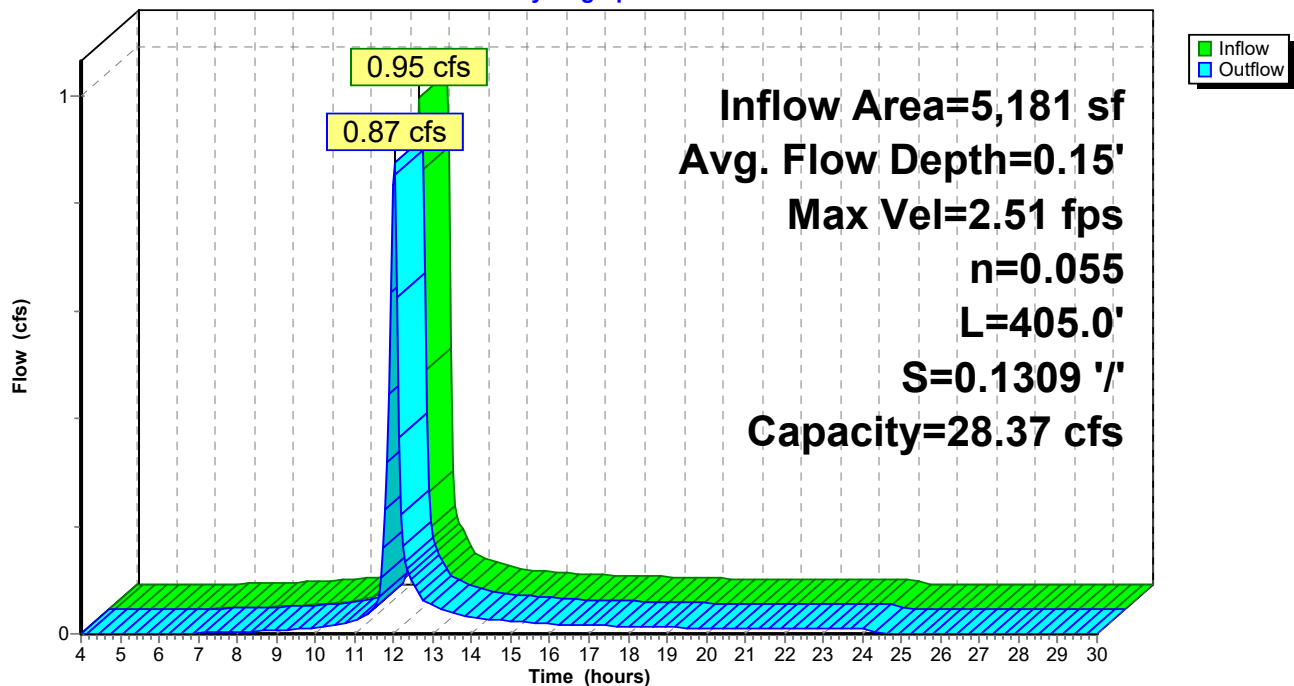
Length= 405.0' Slope= 0.1309 '/'

Inlet Invert= 0.00', Outlet Invert= -53.00'



Reach 10R: Channel 7

Hydrograph



MLV 505LD86_Channels 5-10 REV 2

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 11R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,364 sf, 10.88% Impervious, Inflow Depth = 2.86" for 50-yr event
Inflow = 9.35 cfs @ 12.00 hrs, Volume= 20,619 cf
Outflow = 9.21 cfs @ 12.01 hrs, Volume= 20,619 cf, Atten= 2%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.64 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 1.13 fps, Avg. Travel Time= 1.1 min

Peak Storage= 151 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.62'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.99 cfs

2.00' x 1.00' deep channel, n= 0.045

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

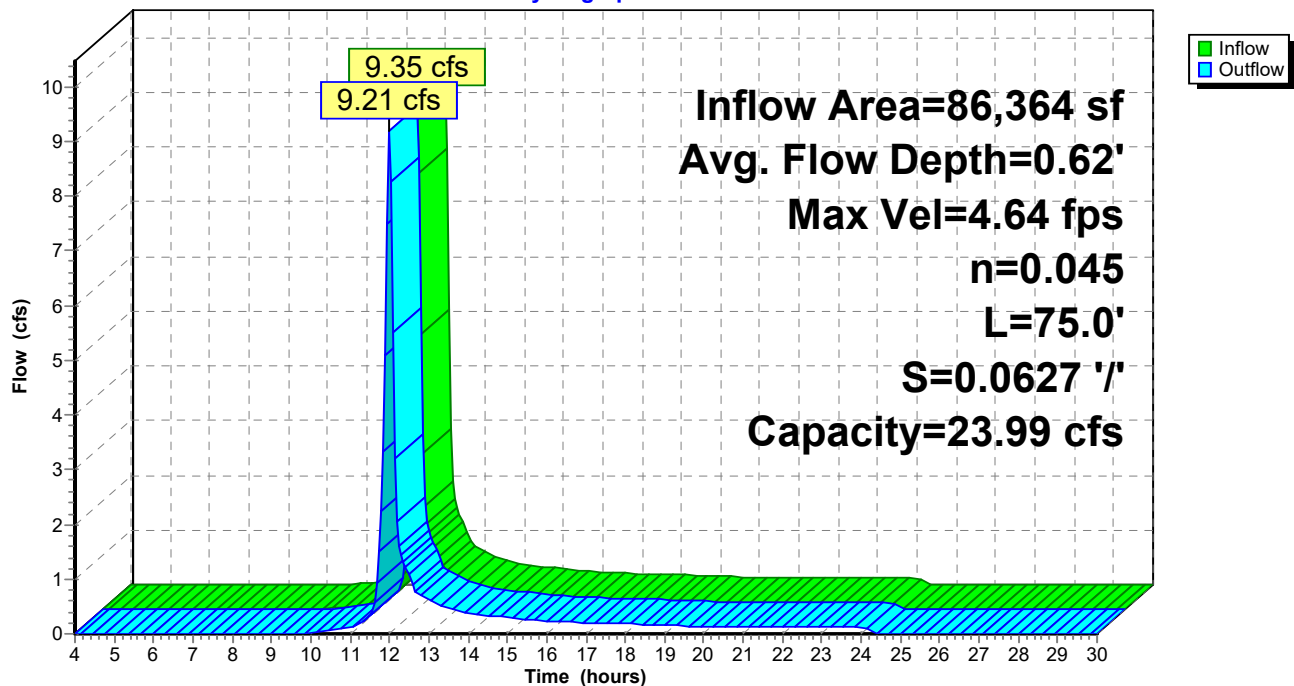
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 11R: Channel 8

Hydrograph



MLV 505LD86_Channels 5-10 REV 2*Type II 24-hr 100-yr Rainfall=8.09"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5	Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=3.97" Tc=5.0 min CN=65 Runoff=10.38 cfs 20,947 cf
Subcatchment6S: CC-6	Runoff Area=15,485 sf 11.48% Impervious Runoff Depth=2.96" Tc=5.0 min CN=56 Runoff=1.88 cfs 3,814 cf
Subcatchment7S: CC-7	Runoff Area=5,181 sf 57.98% Impervious Runoff Depth=5.71" Tc=5.0 min CN=80 Runoff=1.17 cfs 2,465 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.44" Tc=5.0 min CN=30 Runoff=0.01 cfs 85 cf
Subcatchment9S: CC-9	Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=5.01" Tc=5.0 min CN=74 Runoff=0.51 cfs 1,047 cf
Subcatchment10S: CC-10	Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=5.24" Tc=5.0 min CN=76 Runoff=0.60 cfs 1,251 cf
Reach 6R: Channel 5	Avg. Flow Depth=0.52' Max Vel=4.76 fps Inflow=10.38 cfs 20,947 cf n=0.050 L=246.0' S=0.0894 '/ Capacity=34.00 cfs Outflow=9.89 cfs 20,947 cf
Reach 7R: Channel 6	Avg. Flow Depth=0.66' Max Vel=5.28 fps Inflow=11.71 cfs 24,761 cf n=0.054 L=171.0' S=0.1094 '/ Capacity=26.41 cfs Outflow=11.42 cfs 24,761 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.17' Max Vel=2.70 fps Inflow=1.17 cfs 2,465 cf n=0.055 L=405.0' S=0.1309 '/ Capacity=28.37 cfs Outflow=1.07 cfs 2,465 cf
Reach 11R: Channel 8	Avg. Flow Depth=0.72' Max Vel=5.03 fps Inflow=12.46 cfs 27,312 cf n=0.045 L=75.0' S=0.0627 '/ Capacity=23.99 cfs Outflow=12.29 cfs 27,312 cf

Total Runoff Area = 91,738 sf Runoff Volume = 29,609 cf Average Runoff Depth = 3.87"
86.74% Pervious = 79,572 sf 13.26% Impervious = 12,166 sf

MLV 505LD86_Channels 5-10 REV 2

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 10.38 cfs @ 11.96 hrs, Volume= 20,947 cf, Depth= 3.97"

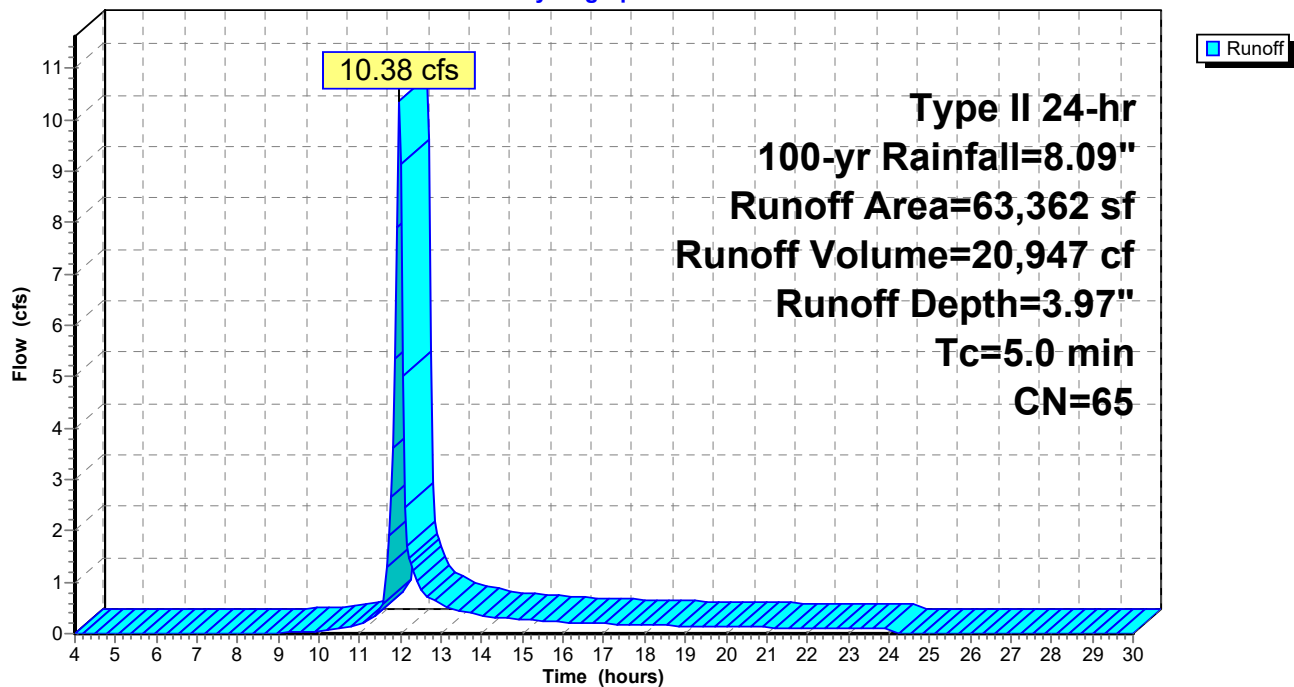
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

Hydrograph



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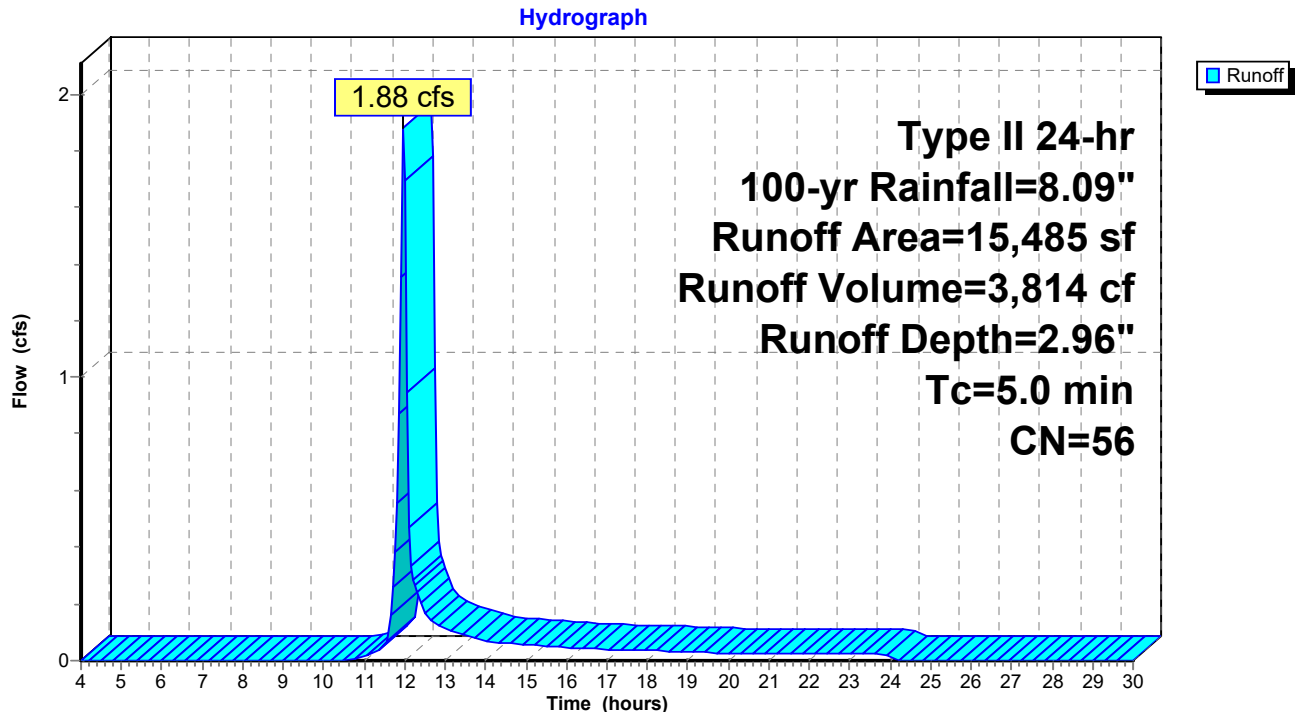
Summary for Subcatchment 6S: CC-6[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.88 cfs @ 11.96 hrs, Volume= 3,814 cf, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
7,682	30	Meadow, non-grazed, HSG A
6,026	78	Meadow, non-grazed, HSG D
1,255	98	Paved parking, HSG A
522	98	Paved parking, HSG D
15,485	56	Weighted Average
13,708		88.52% Pervious Area
1,777		11.48% Impervious Area

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

Subcatchment 6S: CC-6

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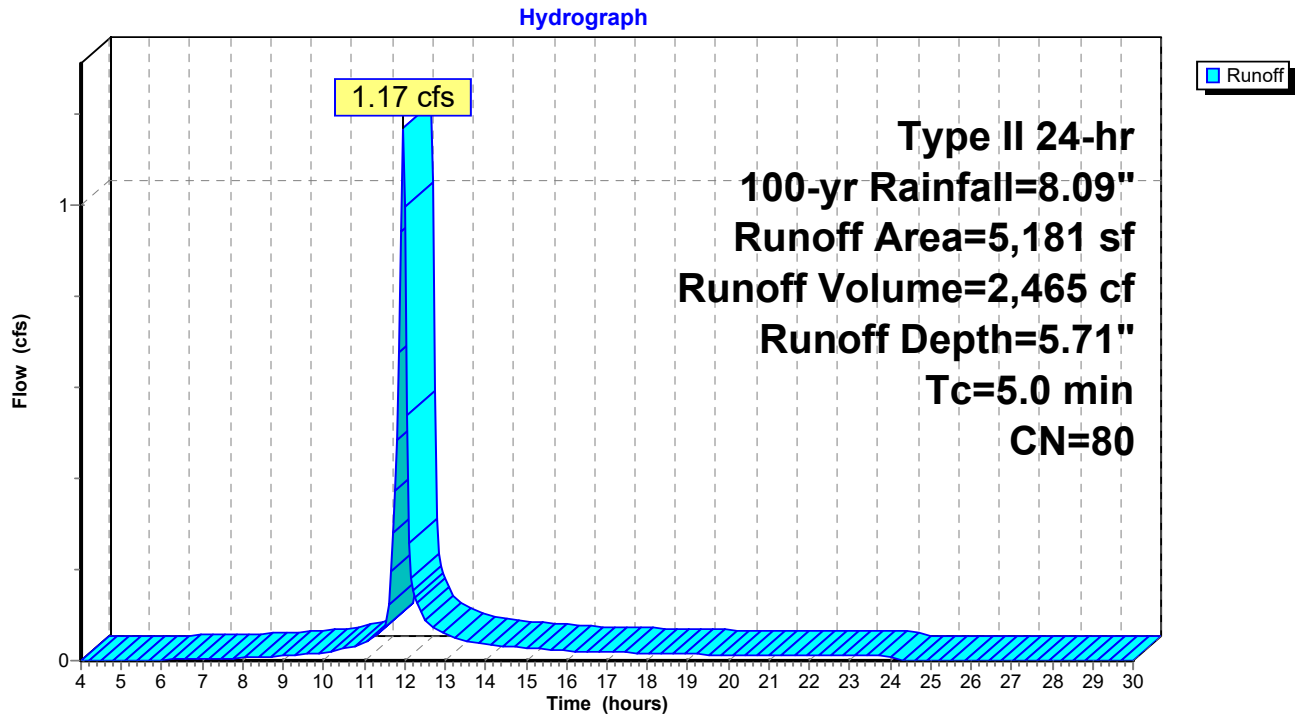
Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.17 cfs @ 11.95 hrs, Volume= 2,465 cf, Depth= 5.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
1,049	30	Meadow, non-grazed, HSG A
1,128	78	Meadow, non-grazed, HSG D
2,071	98	Paved parking, HSG A
933	98	Paved parking, HSG D
5,181	80	Weighted Average
2,177		42.02% Pervious Area
3,004		57.98% Impervious Area

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

Subcatchment 7S: CC-7

Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.01 cfs @ 12.03 hrs, Volume= 85 cf, Depth= 0.44"

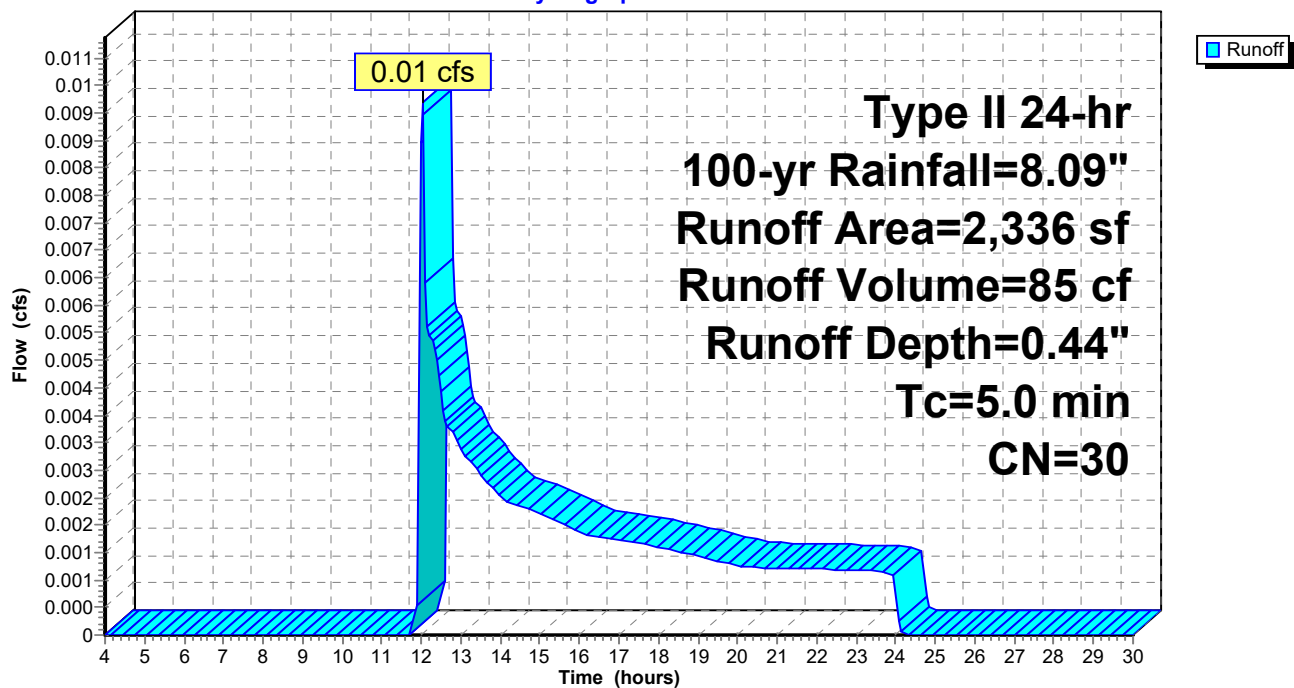
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

Hydrograph



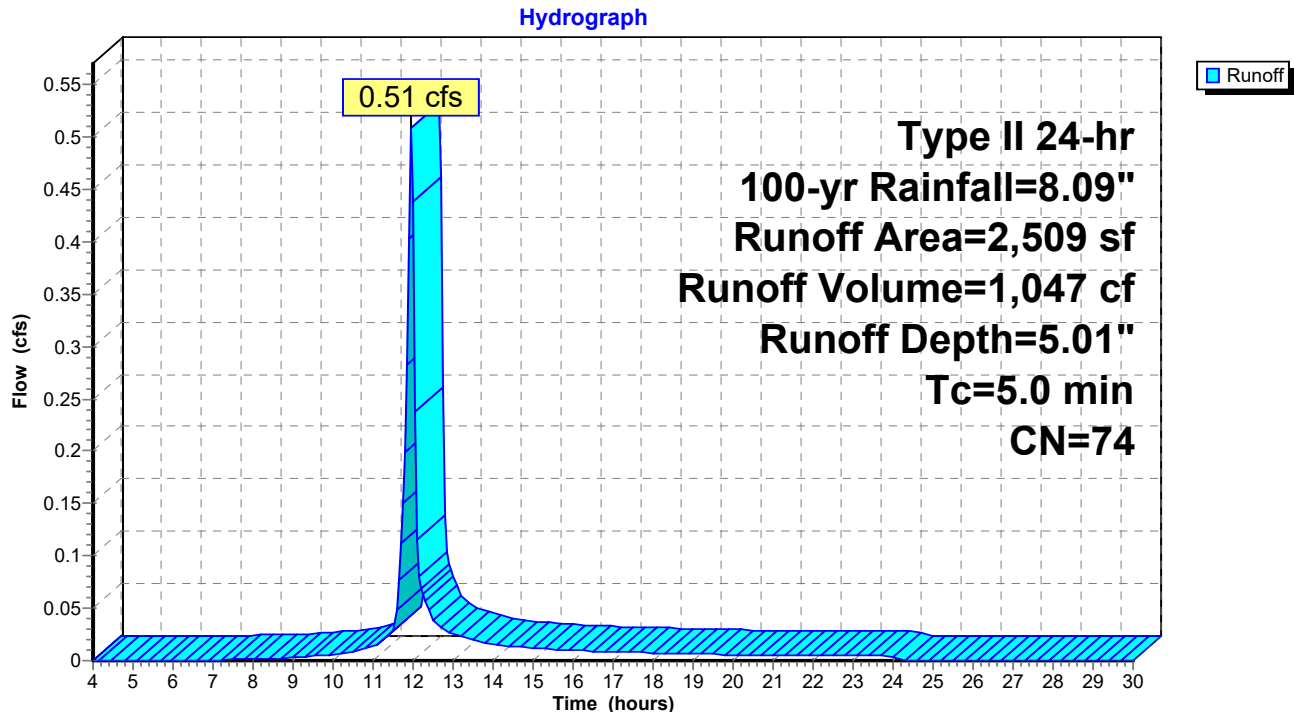
Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.51 cfs @ 11.96 hrs, Volume= 1,047 cf, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

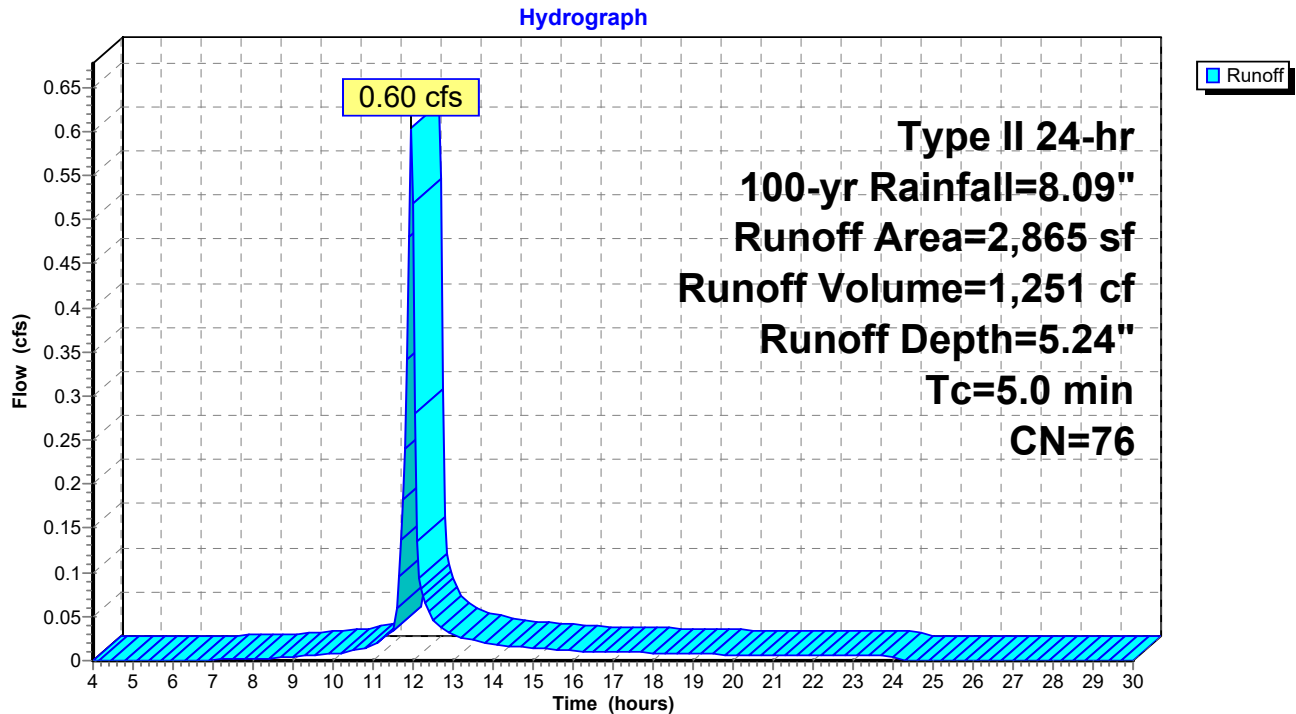
Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.60 cfs @ 11.95 hrs, Volume= 1,251 cf, Depth= 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

Summary for Reach 6R: Channel 5

[65] Warning: Inlet elevation not specified

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 3.97" for 100-yr event
 Inflow = 10.38 cfs @ 11.96 hrs, Volume= 20,947 cf
 Outflow = 9.89 cfs @ 11.98 hrs, Volume= 20,947 cf, Atten= 5%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.76 fps, Min. Travel Time= 0.9 min

Avg. Velocity = 1.20 fps, Avg. Travel Time= 3.4 min

Peak Storage= 520 cf @ 11.97 hrs

Average Depth at Peak Storage= 0.52'

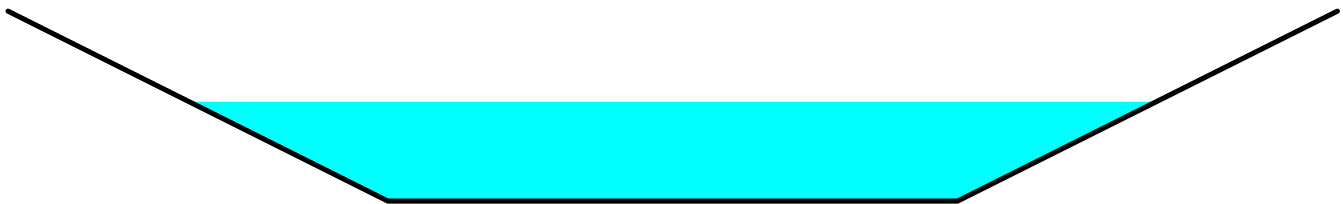
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 34.00 cfs

3.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 7.00'

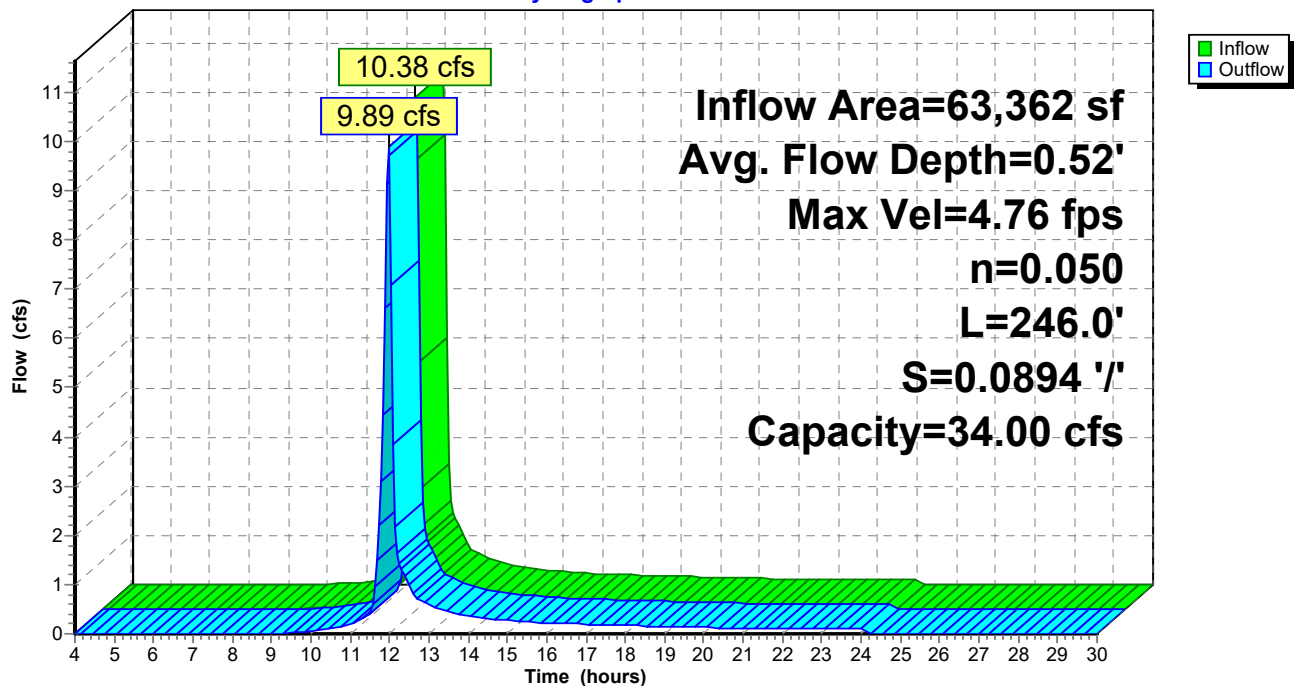
Length= 246.0' Slope= 0.0894 '/'

Inlet Invert= 0.00', Outlet Invert= -22.00'



Reach 6R: Channel 5

Hydrograph



Summary for Reach 7R: Channel 6

[65] Warning: Inlet elevation not specified

Inflow Area = 78,847 sf, 8.11% Impervious, Inflow Depth = 3.77" for 100-yr event
 Inflow = 11.71 cfs @ 11.98 hrs, Volume= 24,761 cf
 Outflow = 11.42 cfs @ 11.99 hrs, Volume= 24,761 cf, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.28 fps, Min. Travel Time= 0.5 min

Avg. Velocity = 1.45 fps, Avg. Travel Time= 2.0 min

Peak Storage= 378 cf @ 11.99 hrs

Average Depth at Peak Storage= 0.66'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.41 cfs

2.00' x 1.00' deep channel, n= 0.054

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

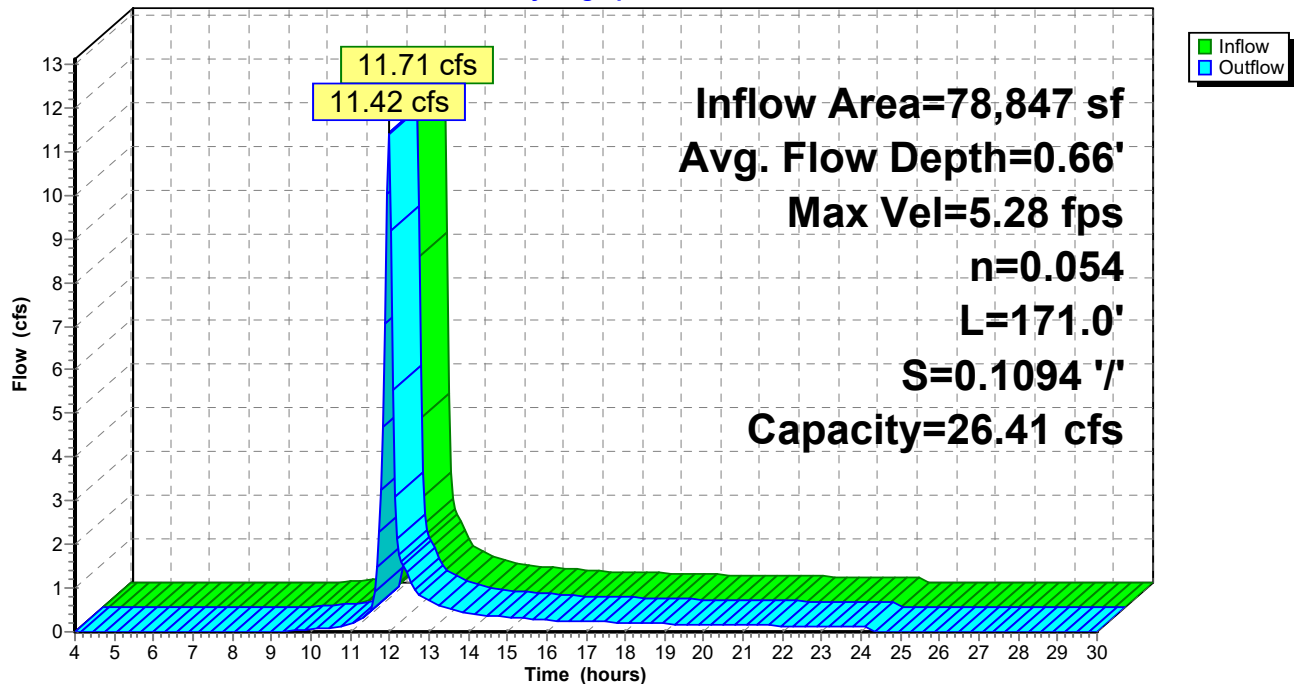
Length= 171.0' Slope= 0.1094 '/'

Inlet Invert= 0.00', Outlet Invert= -18.70'



Reach 7R: Channel 6

Hydrograph



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Summary for Reach 10R: Channel 7

[65] Warning: Inlet elevation not specified

Inflow Area = 5,181 sf, 57.98% Impervious, Inflow Depth = 5.71" for 100-yr event
Inflow = 1.17 cfs @ 11.95 hrs, Volume= 2,465 cf
Outflow = 1.07 cfs @ 12.02 hrs, Volume= 2,465 cf, Atten= 9%, Lag= 4.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.70 fps, Min. Travel Time= 2.5 min

Avg. Velocity = 0.63 fps, Avg. Travel Time= 10.7 min

Peak Storage= 165 cf @ 11.98 hrs

Average Depth at Peak Storage= 0.17'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 28.37 cfs

2.00' x 1.00' deep channel, n= 0.055

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

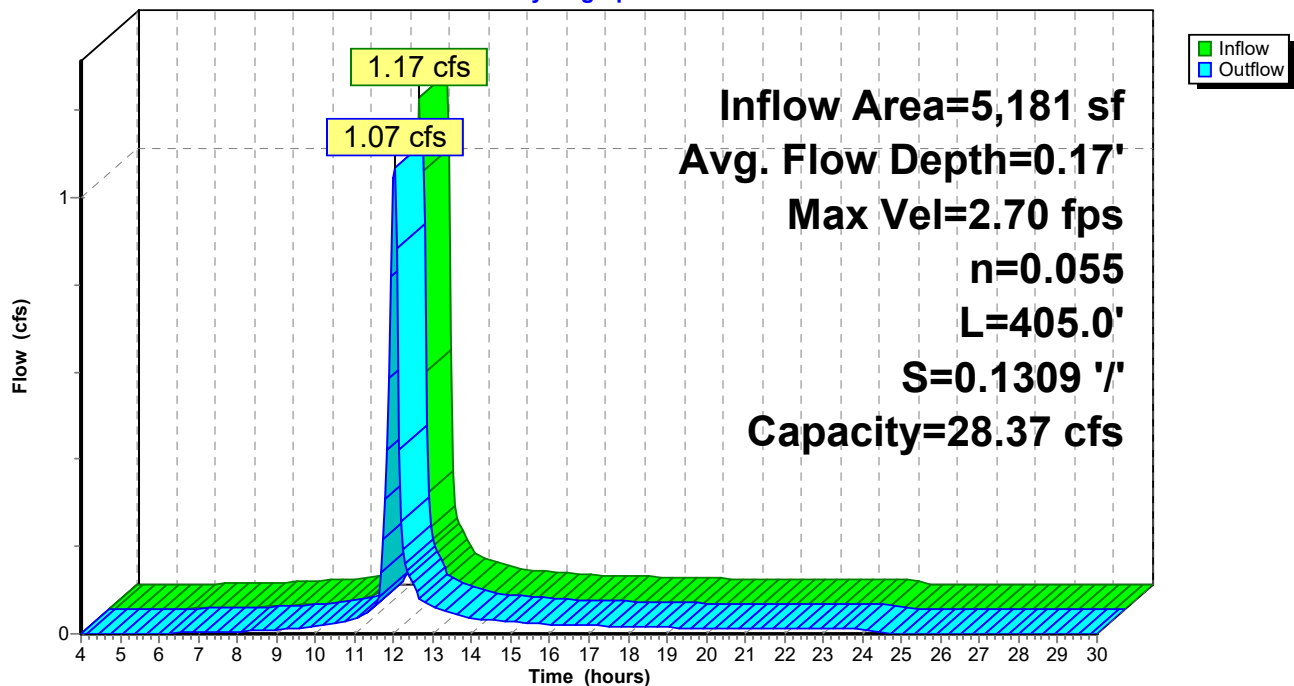
Length= 405.0' Slope= 0.1309 '/'

Inlet Invert= 0.00', Outlet Invert= -53.00'



Reach 10R: Channel 7

Hydrograph



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Summary for Reach 11R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,364 sf, 10.88% Impervious, Inflow Depth = 3.79" for 100-yr event
Inflow = 12.46 cfs @ 12.00 hrs, Volume= 27,312 cf
Outflow = 12.29 cfs @ 12.00 hrs, Volume= 27,312 cf, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.03 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 1.22 fps, Avg. Travel Time= 1.0 min

Peak Storage= 186 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.72'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.99 cfs

2.00' x 1.00' deep channel, n= 0.045

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

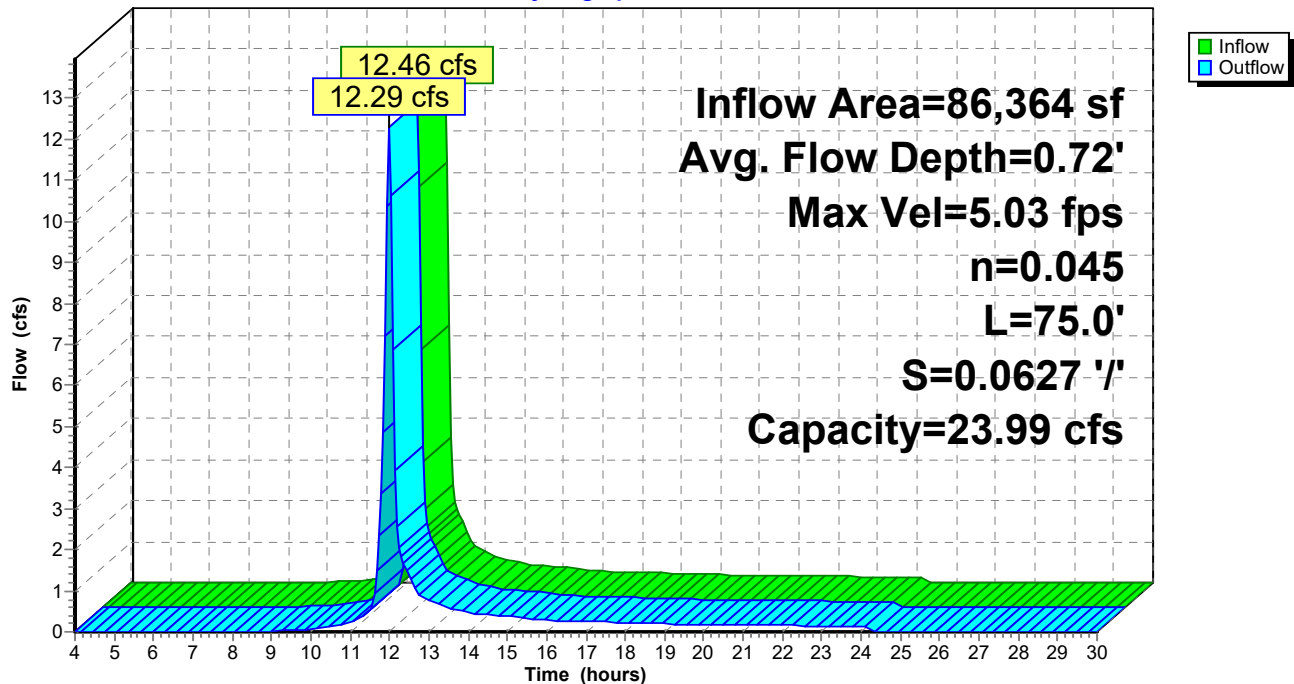
Length= 75.0' Slope= 0.0627 '/'

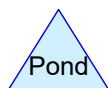
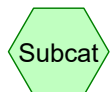
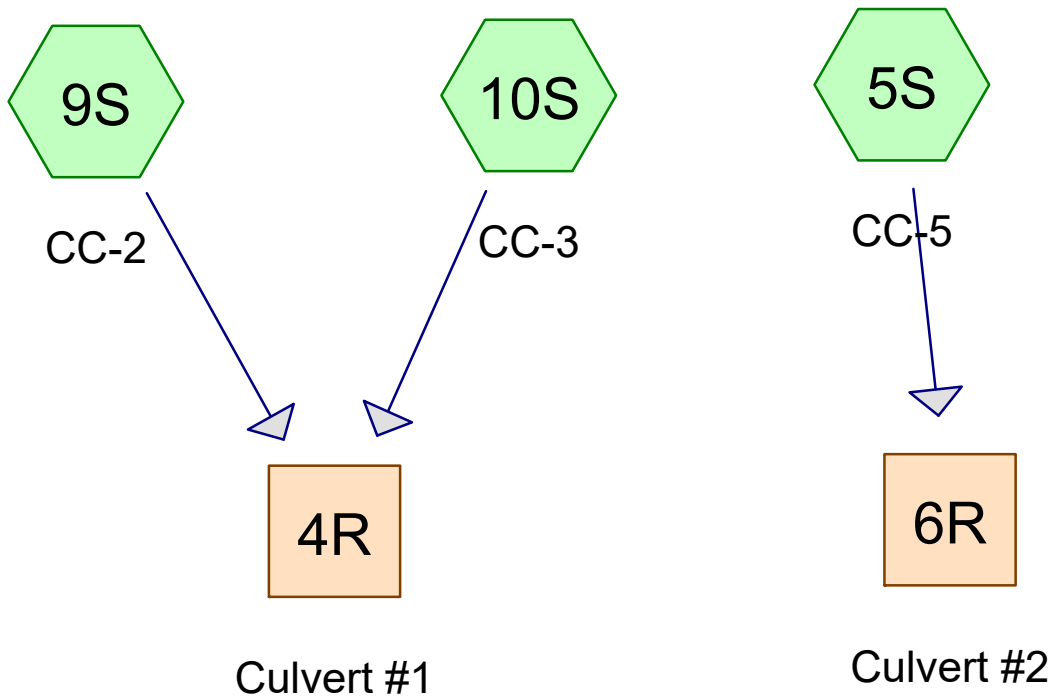
Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 11R: Channel 8

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
28,059	30	Meadow, non-grazed, HSG A (5S, 10S)
49,220	78	Meadow, non-grazed, HSG D (5S, 9S, 10S)
7,189	98	Paved parking, HSG A (5S, 10S)
3,729	98	Paved parking, HSG D (5S, 9S, 10S)
88,197	65	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
35,248	HSG A	5S, 10S
0	HSG B	
0	HSG C	
52,949	HSG D	5S, 9S, 10S
0	Other	
88,197		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
28,059	0	0	49,220	0	77,279	Meadow, non-grazed	
7,189	0	0	3,729	0	10,918	Paved parking	
35,248	0	0	52,949	0	88,197	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	4R	972.00	971.50	28.7	0.0174	0.012	12.0	0.0	0.0
2	6R	951.50	951.00	50.0	0.0100	0.012	18.0	0.0	0.0

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5

Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=0.38"
Tc=5.0 min CN=65 Runoff=0.81 cfs 2,028 cf

Subcatchment9S: CC-2

Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=79 Runoff=0.16 cfs 327 cf

Subcatchment10S: CC-3

Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=0.32"
Tc=5.0 min CN=63 Runoff=0.20 cfs 560 cf

Reach 4R: Culvert #1

Avg. Flow Depth=0.18' Max Vel=3.72 fps Inflow=0.36 cfs 887 cf
12.0" Round Pipe n=0.012 L=28.7' S=0.0174 '/' Capacity=5.09 cfs Outflow=0.35 cfs 887 cf

Reach 6R: Culvert #2

Avg. Flow Depth=0.27' Max Vel=3.72 fps Inflow=0.81 cfs 2,028 cf
18.0" Round Pipe n=0.012 L=50.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=0.80 cfs 2,028 cf

Total Runoff Area = 88,197 sf Runoff Volume = 2,915 cf Average Runoff Depth = 0.40"
87.62% Pervious = 77,279 sf 12.38% Impervious = 10,918 sf

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Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.81 cfs @ 11.99 hrs, Volume= 2,028 cf, Depth= 0.38"

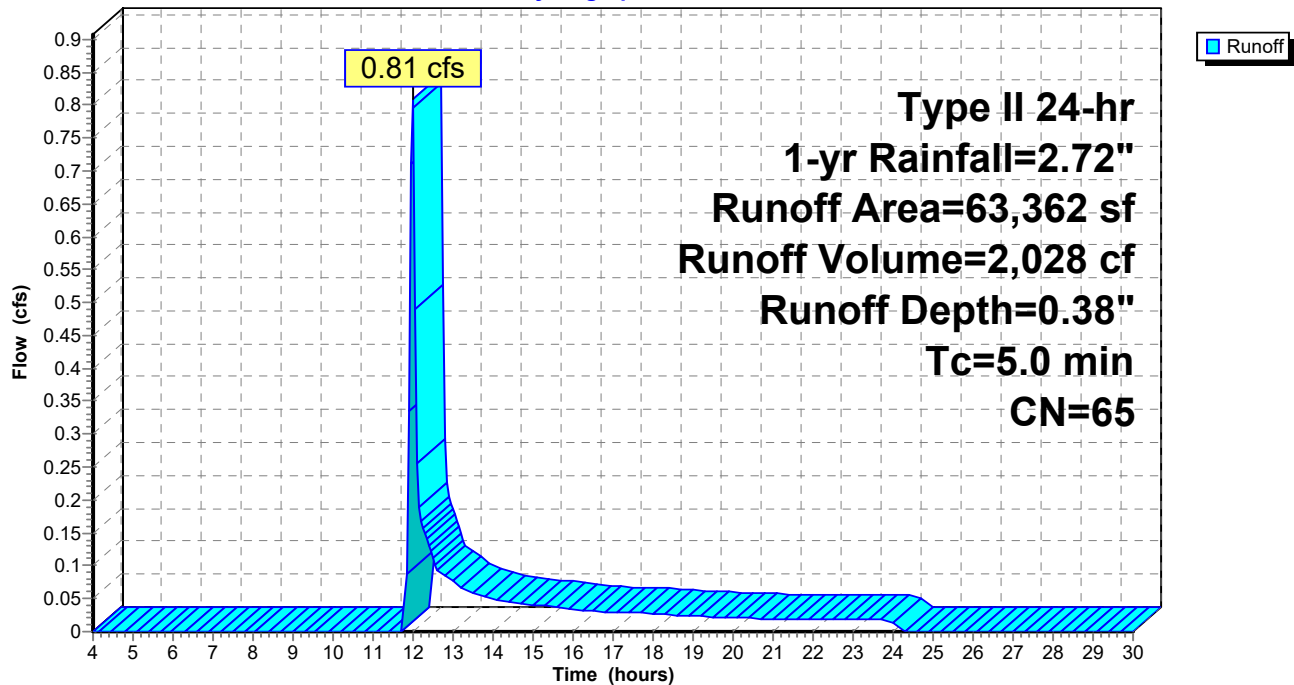
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

Hydrograph



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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 9S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.16 cfs @ 11.96 hrs, Volume= 327 cf, Depth= 0.99"

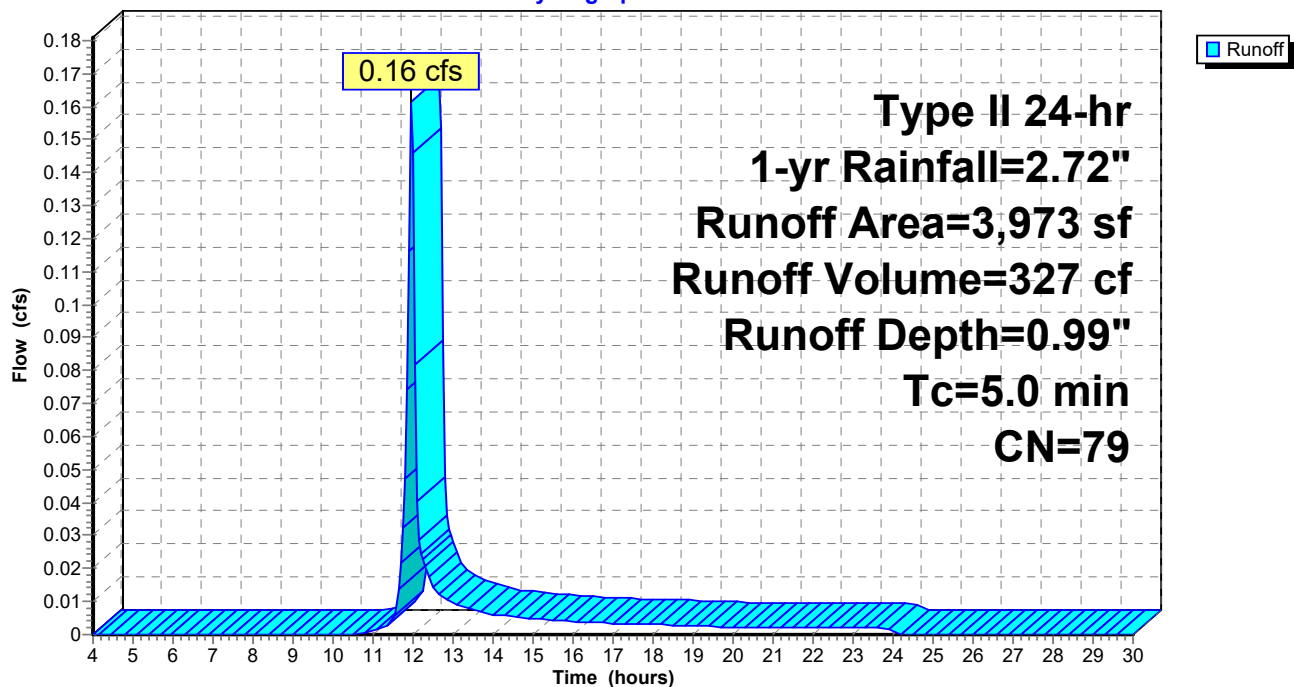
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 9S: CC-2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 10S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.20 cfs @ 11.99 hrs, Volume= 560 cf, Depth= 0.32"

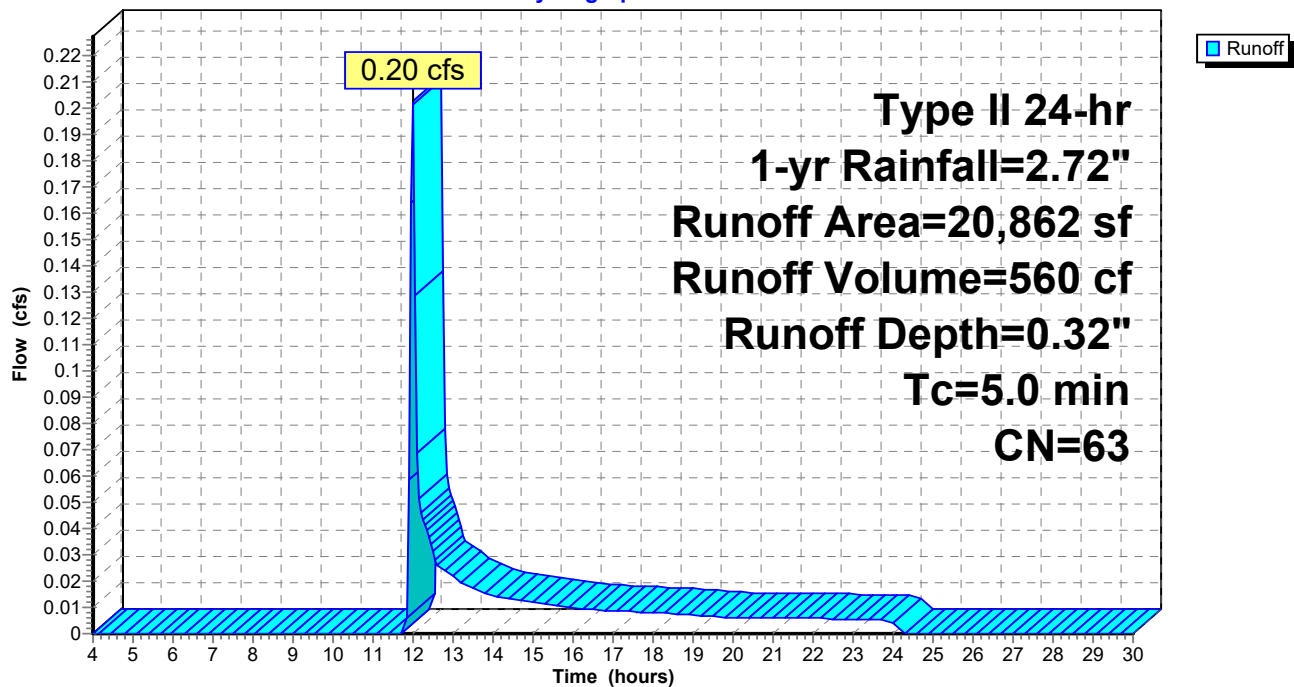
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 10S: CC-3

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Summary for Reach 4R: Culvert #1

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 24,835 sf, 25.38% Impervious, Inflow Depth = 0.43" for 1-yr event
Inflow = 0.36 cfs @ 11.98 hrs, Volume= 887 cf
Outflow = 0.35 cfs @ 11.99 hrs, Volume= 887 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.72 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 1.36 fps, Avg. Travel Time= 0.4 min

Peak Storage= 3 cf @ 11.98 hrs

Average Depth at Peak Storage= 0.18'

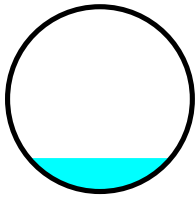
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.09 cfs

12.0" Round Pipe

n= 0.012

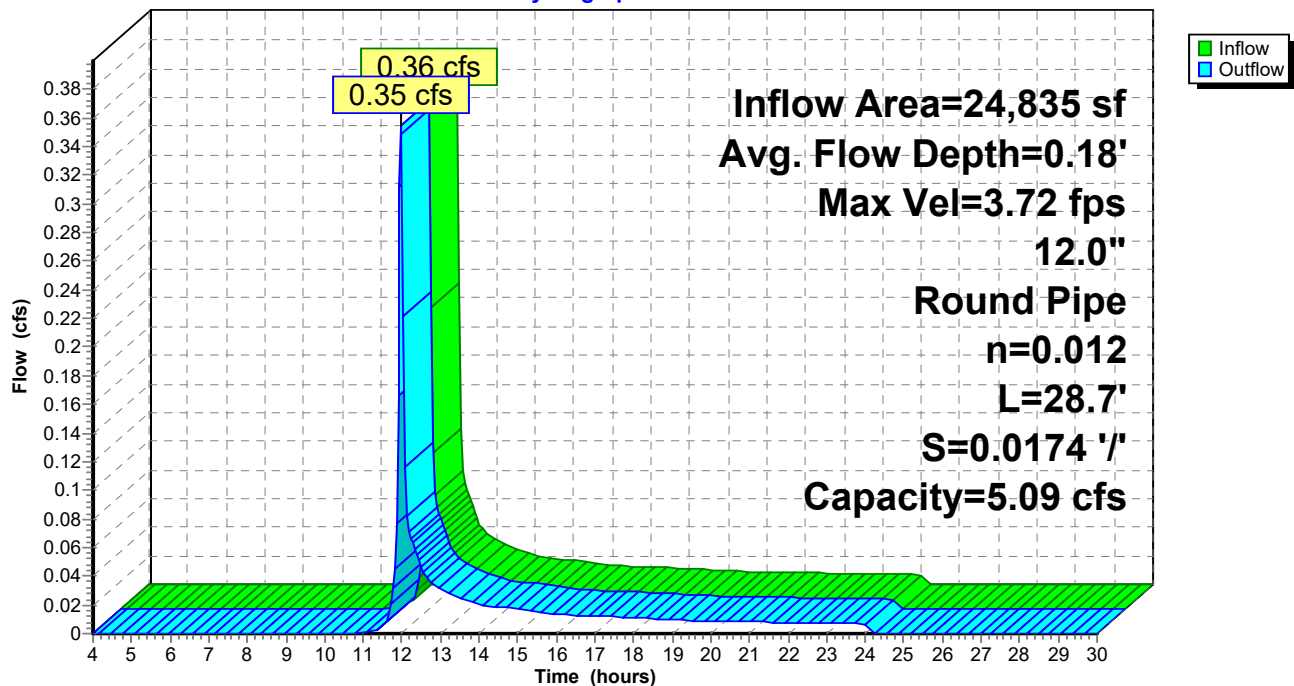
Length= 28.7' Slope= 0.0174 '/'

Inlet Invert= 972.00', Outlet Invert= 971.50'



Reach 4R: Culvert #1

Hydrograph



MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Reach 6R: Culvert #2

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 0.38" for 1-yr event
Inflow = 0.81 cfs @ 11.99 hrs, Volume= 2,028 cf
Outflow = 0.80 cfs @ 11.99 hrs, Volume= 2,028 cf, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.72 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 1.43 fps, Avg. Travel Time= 0.6 min

Peak Storage= 11 cf @ 11.99 hrs

Average Depth at Peak Storage= 0.27'

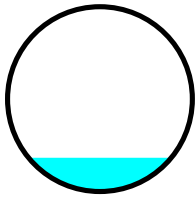
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe

n= 0.012 Corrugated PP, smooth interior

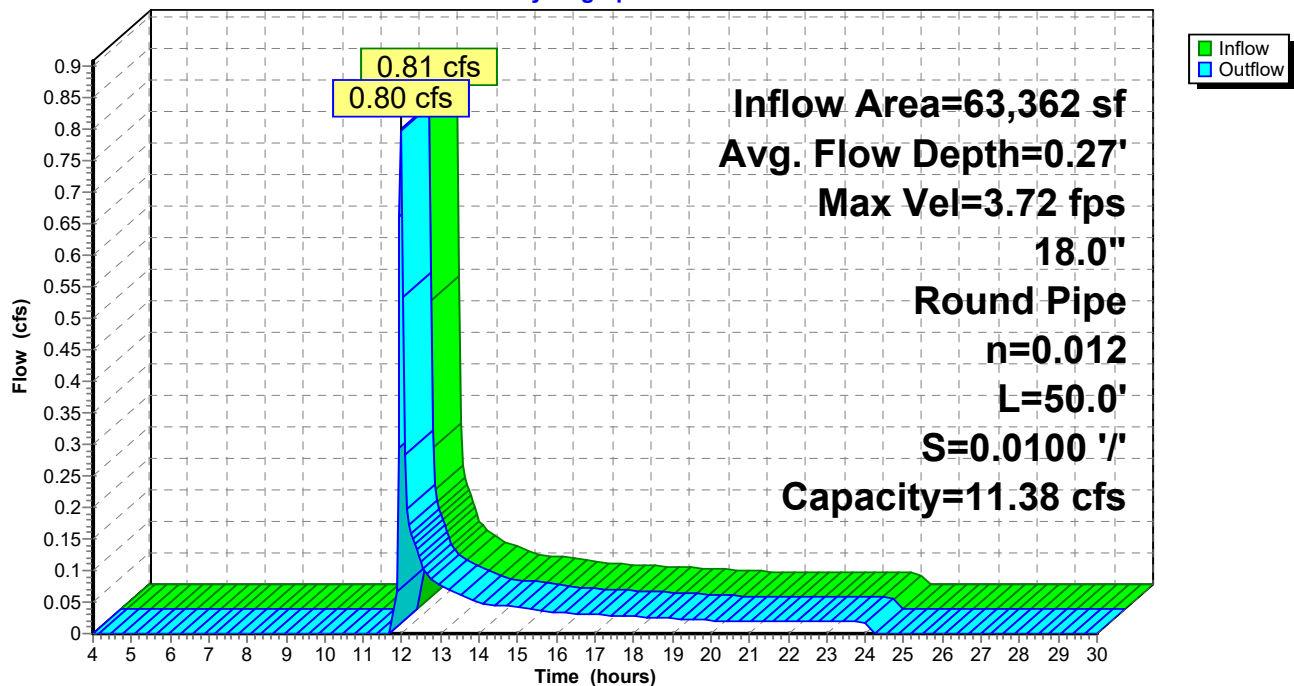
Length= 50.0' Slope= 0.0100 '/'

Inlet Invert= 951.50', Outlet Invert= 951.00'



Reach 6R: Culvert #2

Hydrograph



MLV 505LD86_Culvert 1-3_rev2*Type II 24-hr 2-yr Rainfall=3.26"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5

Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=0.63"
Tc=5.0 min CN=65 Runoff=1.49 cfs 3,325 cf

Subcatchment9S: CC-2

Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=1.38"
Tc=5.0 min CN=79 Runoff=0.23 cfs 458 cf

Subcatchment10S: CC-3

Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=0.55"
Tc=5.0 min CN=63 Runoff=0.41 cfs 950 cf

Reach 4R: Culvert #1

Avg. Flow Depth=0.24' Max Vel=4.35 fps Inflow=0.63 cfs 1,408 cf
12.0" Round Pipe n=0.012 L=28.7' S=0.0174 '/' Capacity=5.09 cfs Outflow=0.63 cfs 1,408 cf

Reach 6R: Culvert #2

Avg. Flow Depth=0.37' Max Vel=4.41 fps Inflow=1.49 cfs 3,325 cf
18.0" Round Pipe n=0.012 L=50.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=1.48 cfs 3,325 cf

Total Runoff Area = 88,197 sf Runoff Volume = 4,733 cf Average Runoff Depth = 0.64"
87.62% Pervious = 77,279 sf 12.38% Impervious = 10,918 sf

MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 2-yr Rainfall=3.26"

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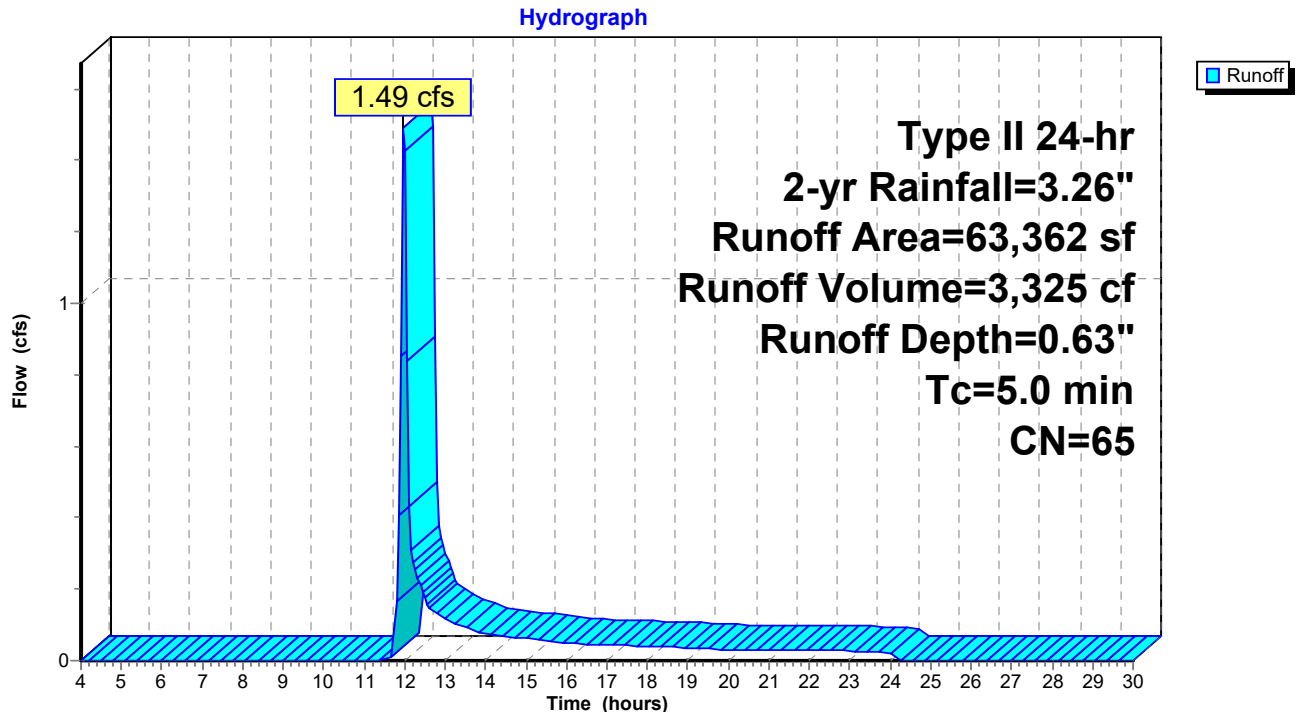
Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.49 cfs @ 11.98 hrs, Volume= 3,325 cf, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 9S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.23 cfs @ 11.96 hrs, Volume= 458 cf, Depth= 1.38"

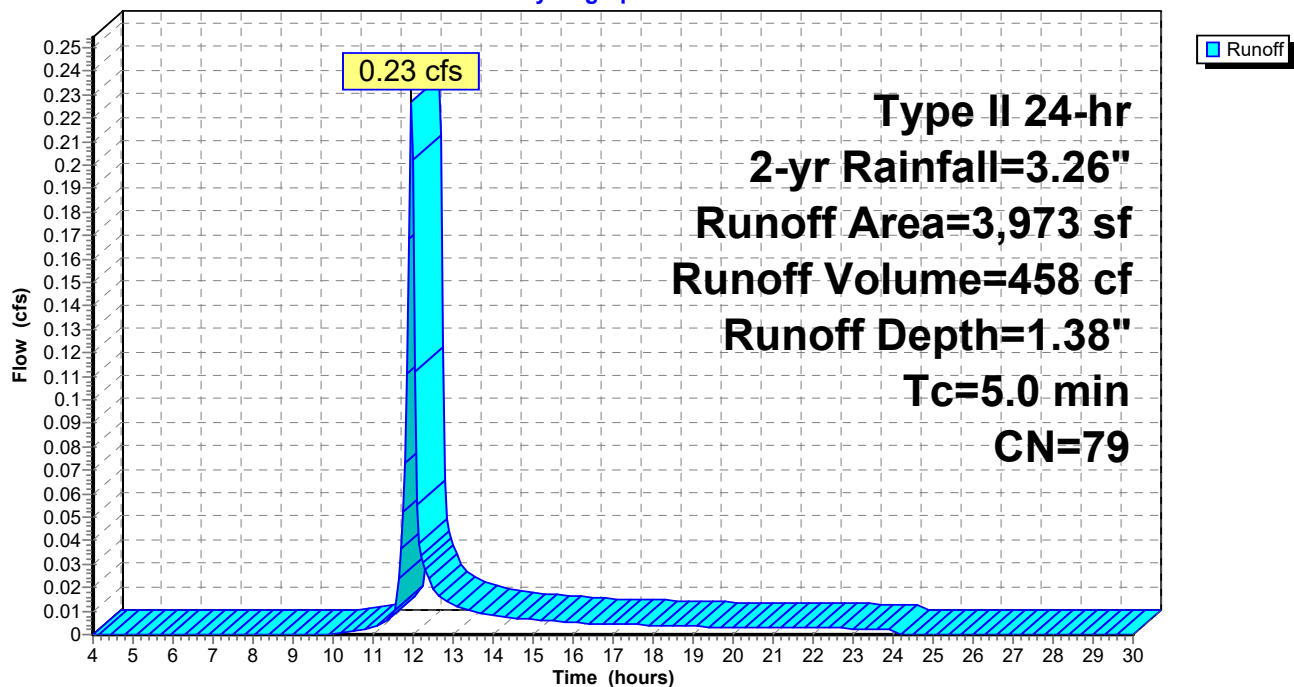
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 9S: CC-2

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 10S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.41 cfs @ 11.98 hrs, Volume= 950 cf, Depth= 0.55"

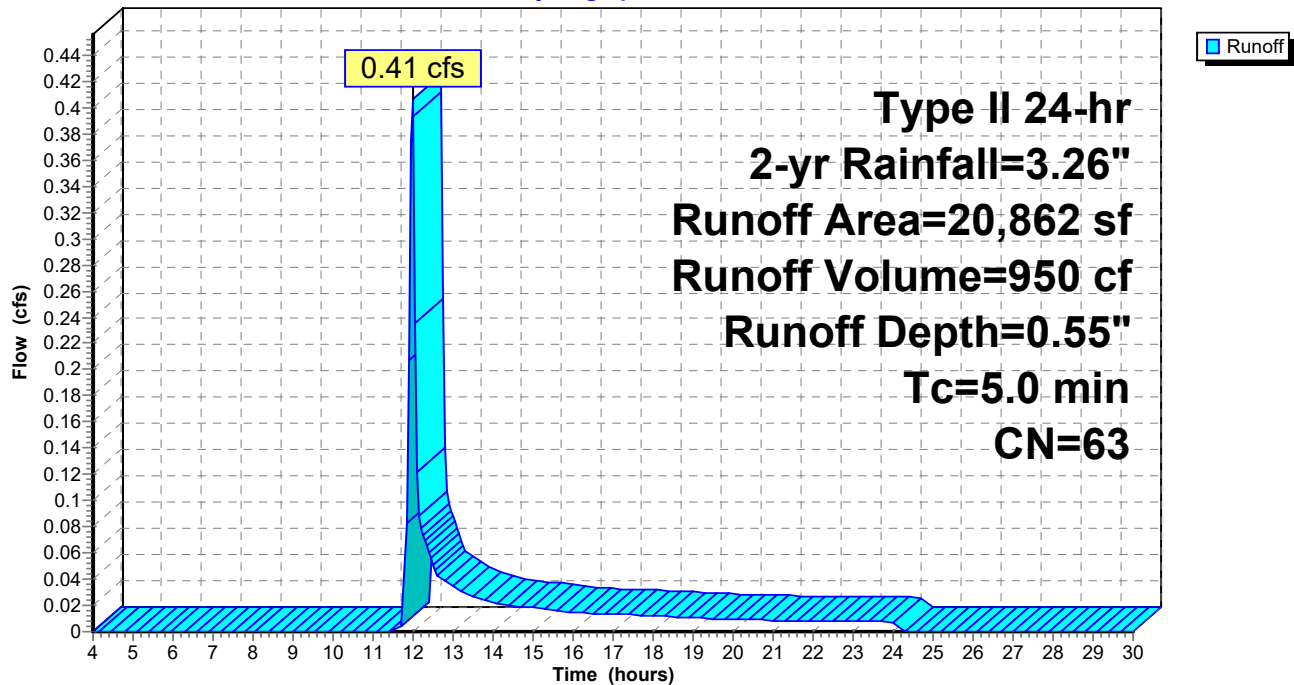
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 10S: CC-3

Hydrograph



MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 4R: Culvert #1

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 24,835 sf, 25.38% Impervious, Inflow Depth = 0.68" for 2-yr event
Inflow = 0.63 cfs @ 11.97 hrs, Volume= 1,408 cf
Outflow = 0.63 cfs @ 11.98 hrs, Volume= 1,408 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.35 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 1.49 fps, Avg. Travel Time= 0.3 min

Peak Storage= 4 cf @ 11.98 hrs

Average Depth at Peak Storage= 0.24'

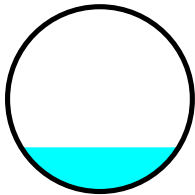
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.09 cfs

12.0" Round Pipe

n= 0.012

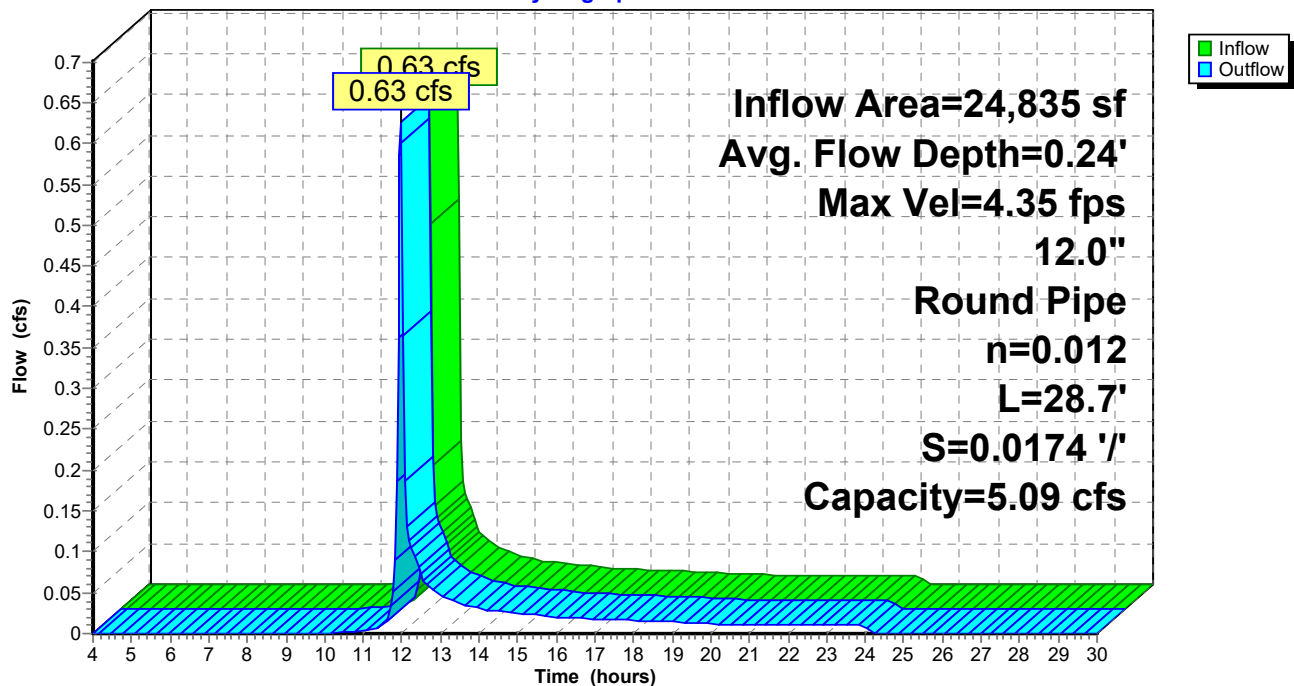
Length= 28.7' Slope= 0.0174 '/'

Inlet Invert= 972.00', Outlet Invert= 971.50'



Reach 4R: Culvert #1

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 6R: Culvert #2

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 0.63" for 2-yr event
Inflow = 1.49 cfs @ 11.98 hrs, Volume= 3,325 cf
Outflow = 1.48 cfs @ 11.98 hrs, Volume= 3,325 cf, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.41 fps, Min. Travel Time= 0.2 min

Avg. Velocity = 1.62 fps, Avg. Travel Time= 0.5 min

Peak Storage= 17 cf @ 11.98 hrs

Average Depth at Peak Storage= 0.37'

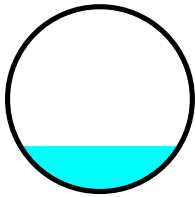
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe

n= 0.012 Corrugated PP, smooth interior

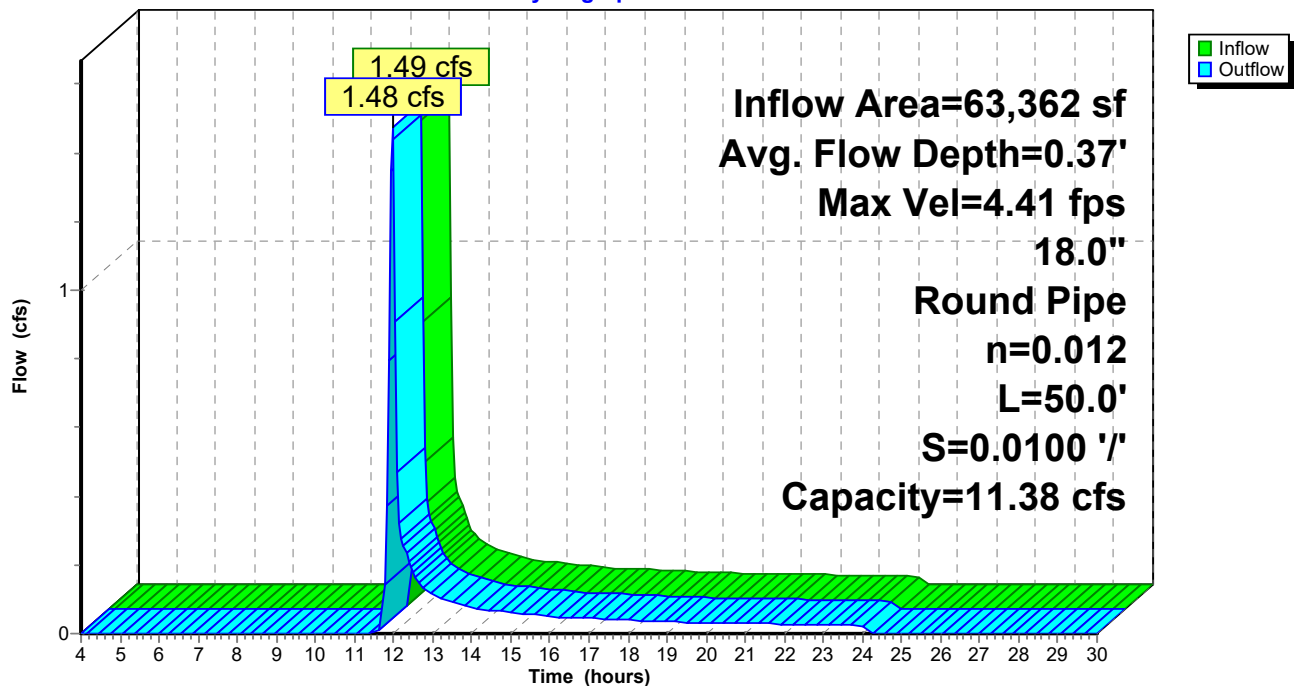
Length= 50.0' Slope= 0.0100 '/

Inlet Invert= 951.50', Outlet Invert= 951.00'



Reach 6R: Culvert #2

Hydrograph



MLV 505LD86_Culvert 1-3_rev2*Type II 24-hr 10-yr Rainfall=4.74"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5

Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=1.48"
Tc=5.0 min CN=65 Runoff=3.82 cfs 7,831 cf

Subcatchment9S: CC-2

Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=2.58"
Tc=5.0 min CN=79 Runoff=0.42 cfs 854 cf

Subcatchment10S: CC-3

Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=1.35"
Tc=5.0 min CN=63 Runoff=1.13 cfs 2,341 cf

Reach 4R: Culvert #1

Avg. Flow Depth=0.38' Max Vel=5.66 fps Inflow=1.55 cfs 3,195 cf
12.0" Round Pipe n=0.012 L=28.7' S=0.0174 '/' Capacity=5.09 cfs Outflow=1.54 cfs 3,195 cf

Reach 6R: Culvert #2

Avg. Flow Depth=0.60' Max Vel=5.76 fps Inflow=3.82 cfs 7,831 cf
18.0" Round Pipe n=0.012 L=50.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=3.77 cfs 7,831 cf

Total Runoff Area = 88,197 sf Runoff Volume = 11,026 cf Average Runoff Depth = 1.50"
87.62% Pervious = 77,279 sf 12.38% Impervious = 10,918 sf

MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 10-yr Rainfall=4.74"

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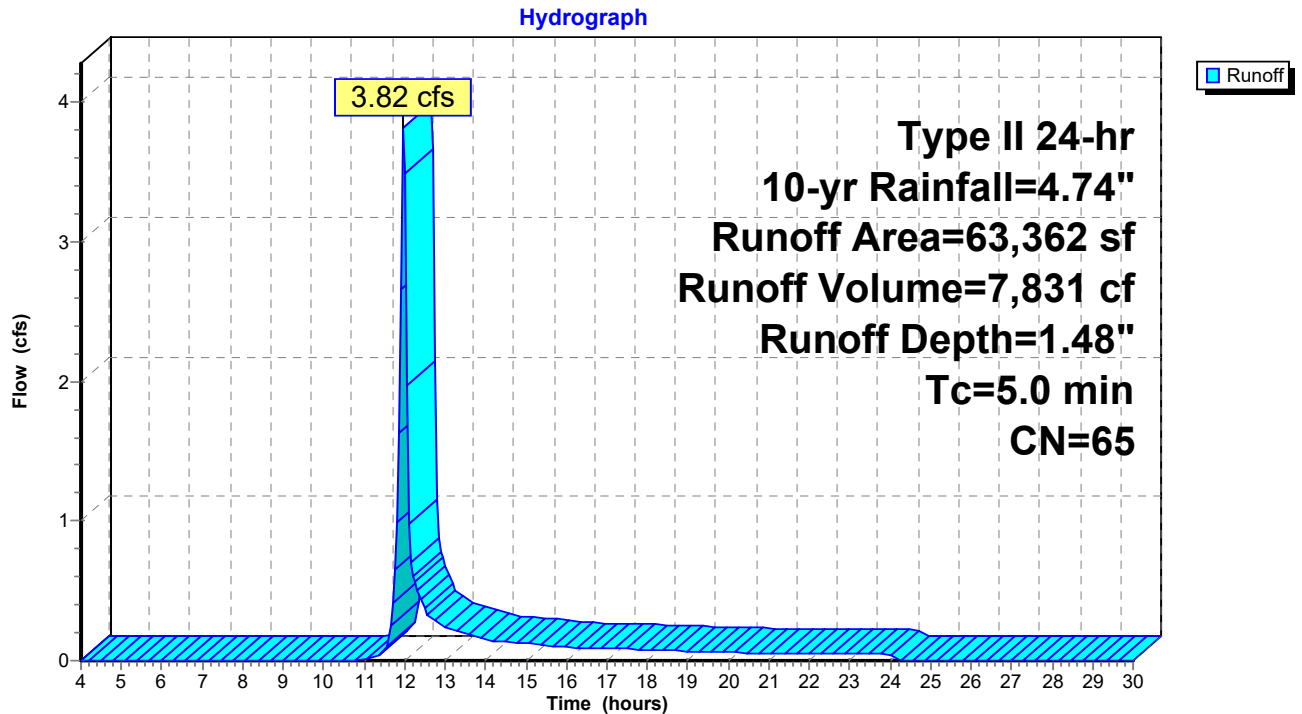
Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.82 cfs @ 11.97 hrs, Volume= 7,831 cf, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 9S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.42 cfs @ 11.96 hrs, Volume= 854 cf, Depth= 2.58"

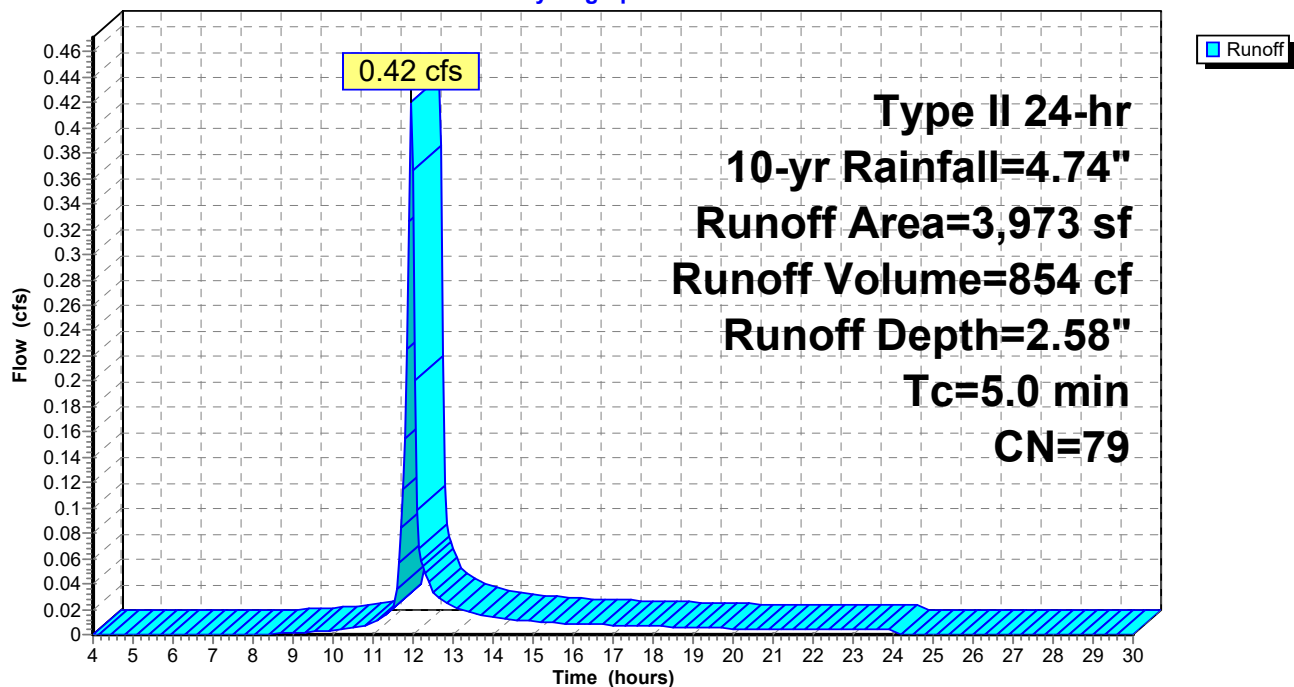
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 9S: CC-2

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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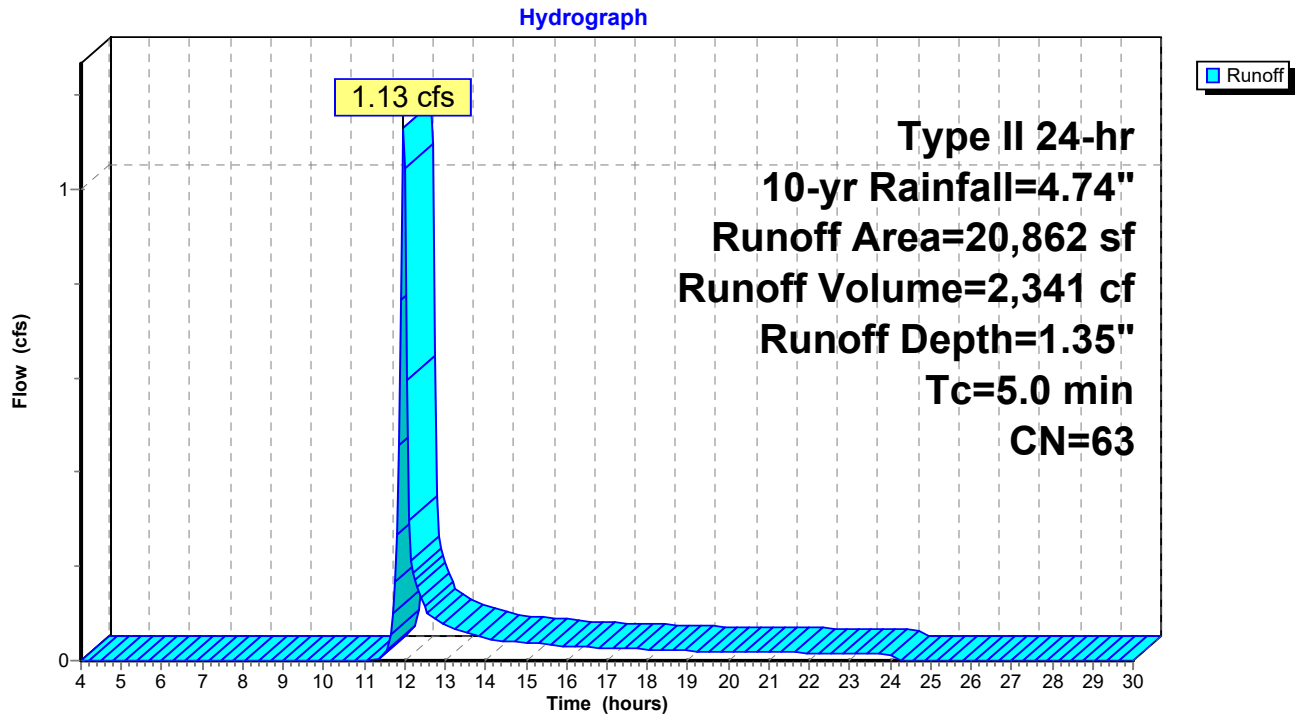
Summary for Subcatchment 10S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.13 cfs @ 11.97 hrs, Volume= 2,341 cf, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 10S: CC-3

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 4R: Culvert #1

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 24,835 sf, 25.38% Impervious, Inflow Depth = 1.54" for 10-yr event
Inflow = 1.55 cfs @ 11.96 hrs, Volume= 3,195 cf
Outflow = 1.54 cfs @ 11.97 hrs, Volume= 3,195 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.66 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 1.74 fps, Avg. Travel Time= 0.3 min

Peak Storage= 8 cf @ 11.97 hrs

Average Depth at Peak Storage= 0.38'

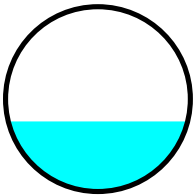
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.09 cfs

12.0" Round Pipe

n= 0.012

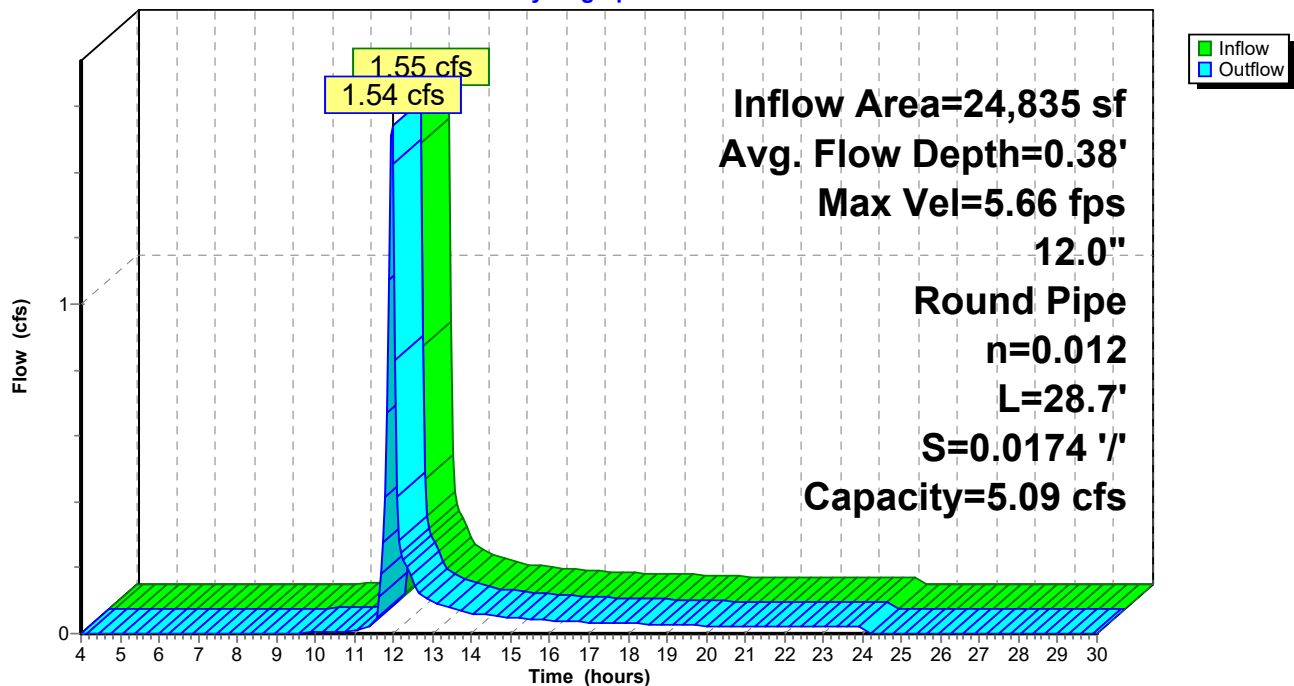
Length= 28.7' Slope= 0.0174 '/'

Inlet Invert= 972.00', Outlet Invert= 971.50'



Reach 4R: Culvert #1

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 6R: Culvert #2

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 1.48" for 10-yr event
Inflow = 3.82 cfs @ 11.97 hrs, Volume= 7,831 cf
Outflow = 3.77 cfs @ 11.97 hrs, Volume= 7,831 cf, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.76 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 1.99 fps, Avg. Travel Time= 0.4 min

Peak Storage= 33 cf @ 11.97 hrs

Average Depth at Peak Storage= 0.60'

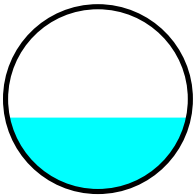
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe

n= 0.012 Corrugated PP, smooth interior

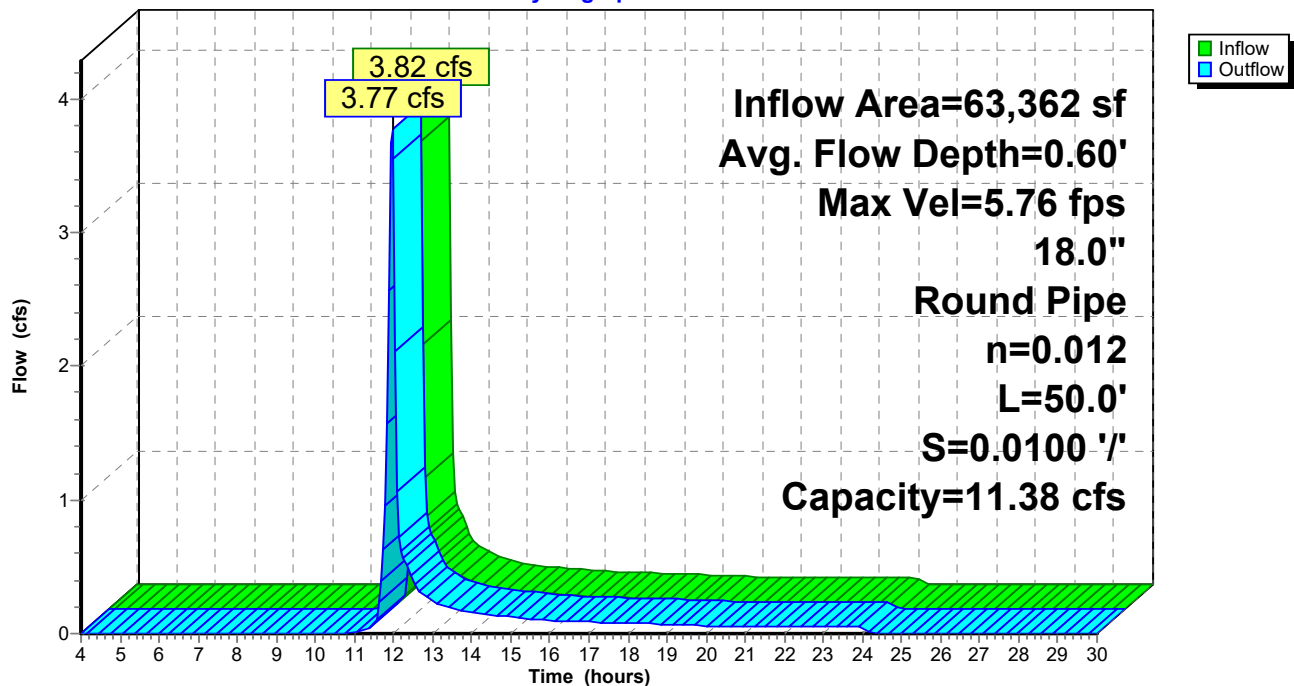
Length= 50.0' Slope= 0.0100 '/'

Inlet Invert= 951.50', Outlet Invert= 951.00'



Reach 6R: Culvert #2

Hydrograph



MLV 505LD86_Culvert 1-3_rev2*Type II 24-hr 25-yr Rainfall=5.85"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5

Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=2.24"
Tc=5.0 min CN=65 Runoff=5.87 cfs 11,843 cf

Subcatchment9S: CC-2

Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=3.55"
Tc=5.0 min CN=79 Runoff=0.57 cfs 1,174 cf

Subcatchment10S: CC-3

Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=2.07"
Tc=5.0 min CN=63 Runoff=1.78 cfs 3,603 cf

Reach 4R: Culvert #1

Avg. Flow Depth=0.48' Max Vel=6.33 fps Inflow=2.35 cfs 4,777 cf
12.0" Round Pipe n=0.012 L=28.7' S=0.0174 '/' Capacity=5.09 cfs Outflow=2.33 cfs 4,777 cf

Reach 6R: Culvert #2

Avg. Flow Depth=0.76' Max Vel=6.46 fps Inflow=5.87 cfs 11,843 cf
18.0" Round Pipe n=0.012 L=50.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=5.79 cfs 11,843 cf

Total Runoff Area = 88,197 sf Runoff Volume = 16,619 cf Average Runoff Depth = 2.26"
87.62% Pervious = 77,279 sf 12.38% Impervious = 10,918 sf

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 5.87 cfs @ 11.96 hrs, Volume= 11,843 cf, Depth= 2.24"

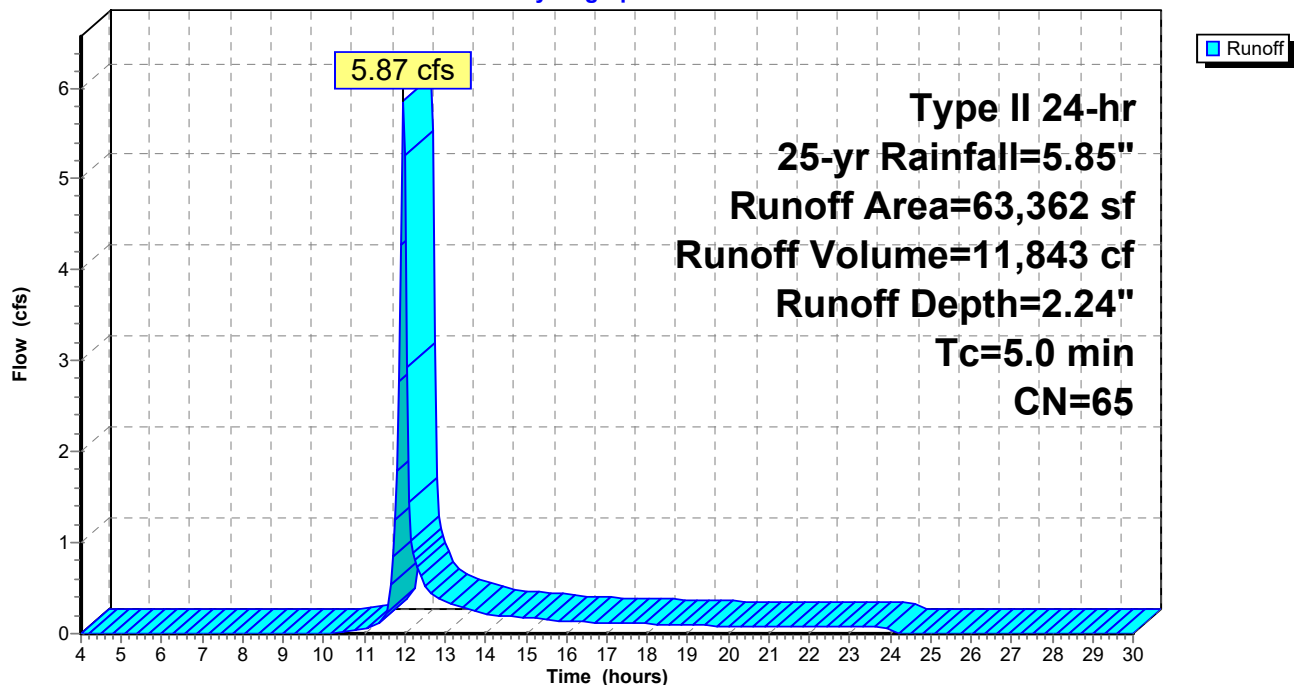
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

Hydrograph



MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 9S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.57 cfs @ 11.96 hrs, Volume= 1,174 cf, Depth= 3.55"

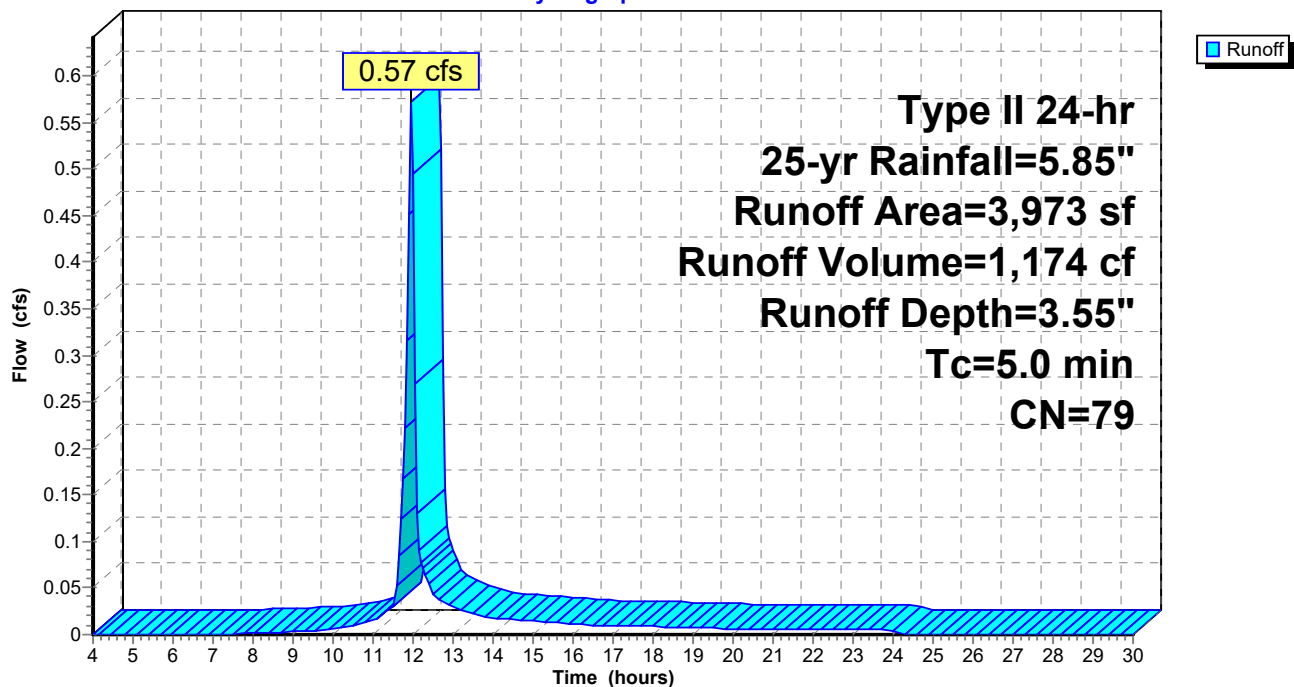
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 9S: CC-2

Hydrograph



MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 25-yr Rainfall=5.85"

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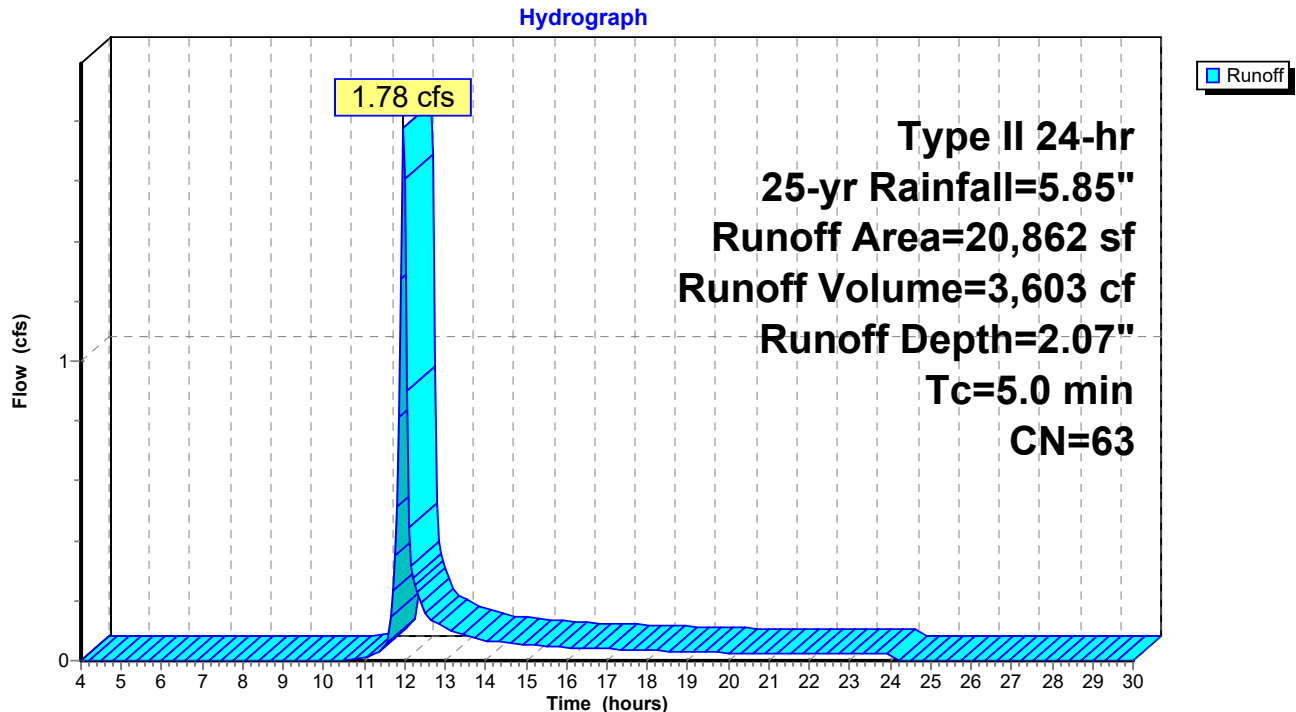
Summary for Subcatchment 10S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.78 cfs @ 11.96 hrs, Volume= 3,603 cf, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 10S: CC-3

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 4R: Culvert #1

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 24,835 sf, 25.38% Impervious, Inflow Depth = 2.31" for 25-yr event
Inflow = 2.35 cfs @ 11.96 hrs, Volume= 4,777 cf
Outflow = 2.33 cfs @ 11.96 hrs, Volume= 4,777 cf, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.33 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 1.87 fps, Avg. Travel Time= 0.3 min

Peak Storage= 11 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.48'

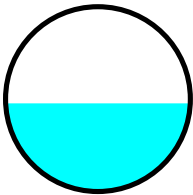
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.09 cfs

12.0" Round Pipe

n= 0.012

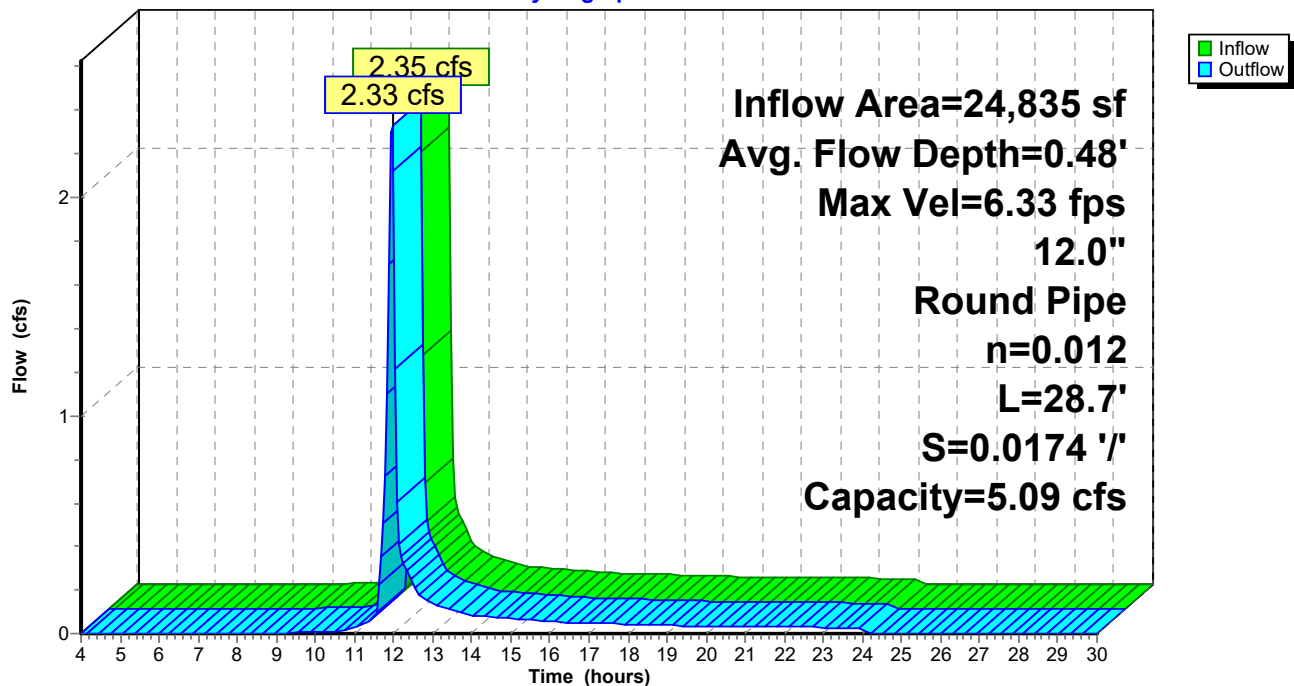
Length= 28.7' Slope= 0.0174 '/'

Inlet Invert= 972.00', Outlet Invert= 971.50'



Reach 4R: Culvert #1

Hydrograph



MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 6R: Culvert #2

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 2.24" for 25-yr event
Inflow = 5.87 cfs @ 11.96 hrs, Volume= 11,843 cf
Outflow = 5.79 cfs @ 11.97 hrs, Volume= 11,843 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.46 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 2.17 fps, Avg. Travel Time= 0.4 min

Peak Storage= 45 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.76'

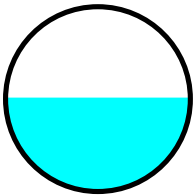
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe

n= 0.012 Corrugated PP, smooth interior

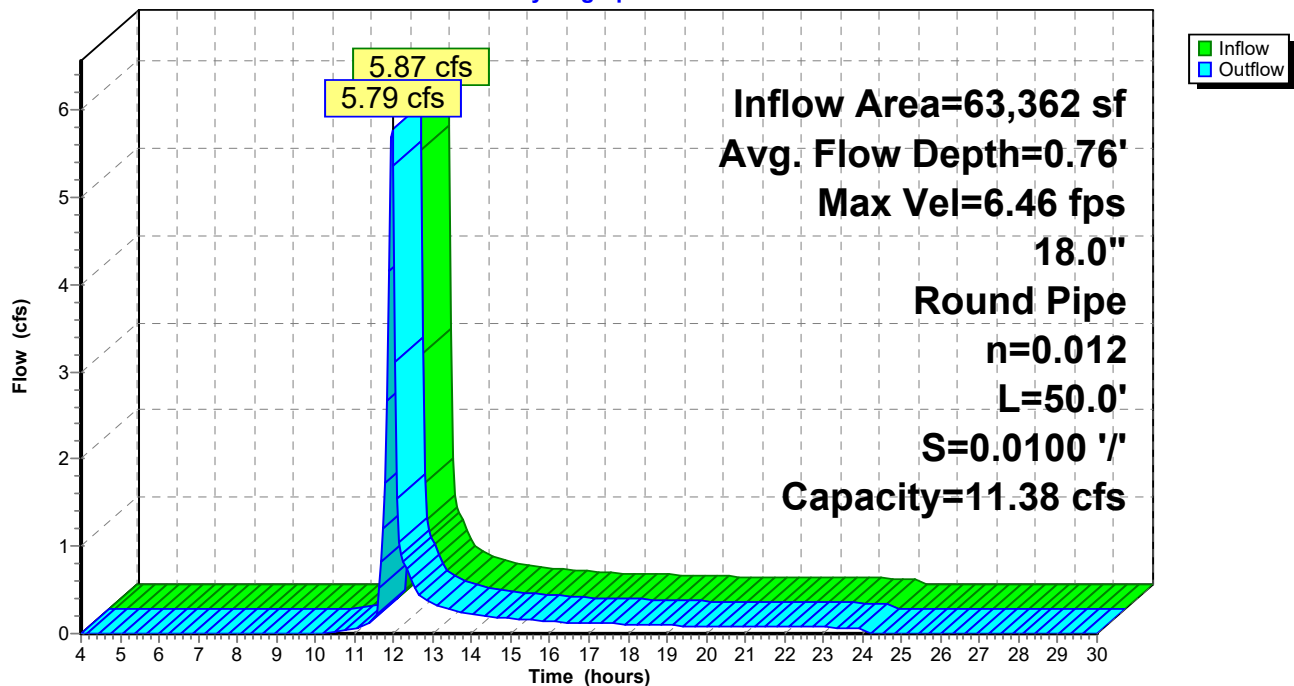
Length= 50.0' Slope= 0.0100 '/

Inlet Invert= 951.50', Outlet Invert= 951.00'



Reach 6R: Culvert #2

Hydrograph



MLV 505LD86_Culvert 1-3_rev2*Type II 24-hr 50-yr Rainfall=6.87"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5

Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=3.00"
Tc=5.0 min CN=65 Runoff=7.87 cfs 15,853 cf

Subcatchment9S: CC-2

Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=4.47"
Tc=5.0 min CN=79 Runoff=0.71 cfs 1,478 cf

Subcatchment10S: CC-3

Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=2.80"
Tc=5.0 min CN=63 Runoff=2.42 cfs 4,875 cf

Reach 4R: Culvert #1

Avg. Flow Depth=0.57' Max Vel=6.80 fps Inflow=3.13 cfs 6,353 cf
12.0" Round Pipe n=0.012 L=28.7' S=0.0174 '/' Capacity=5.09 cfs Outflow=3.11 cfs 6,353 cf

Reach 6R: Culvert #2

Avg. Flow Depth=0.92' Max Vel=6.93 fps Inflow=7.87 cfs 15,853 cf
18.0" Round Pipe n=0.012 L=50.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=7.78 cfs 15,853 cf

Total Runoff Area = 88,197 sf Runoff Volume = 22,206 cf Average Runoff Depth = 3.02"
87.62% Pervious = 77,279 sf 12.38% Impervious = 10,918 sf

MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 50-yr Rainfall=6.87"

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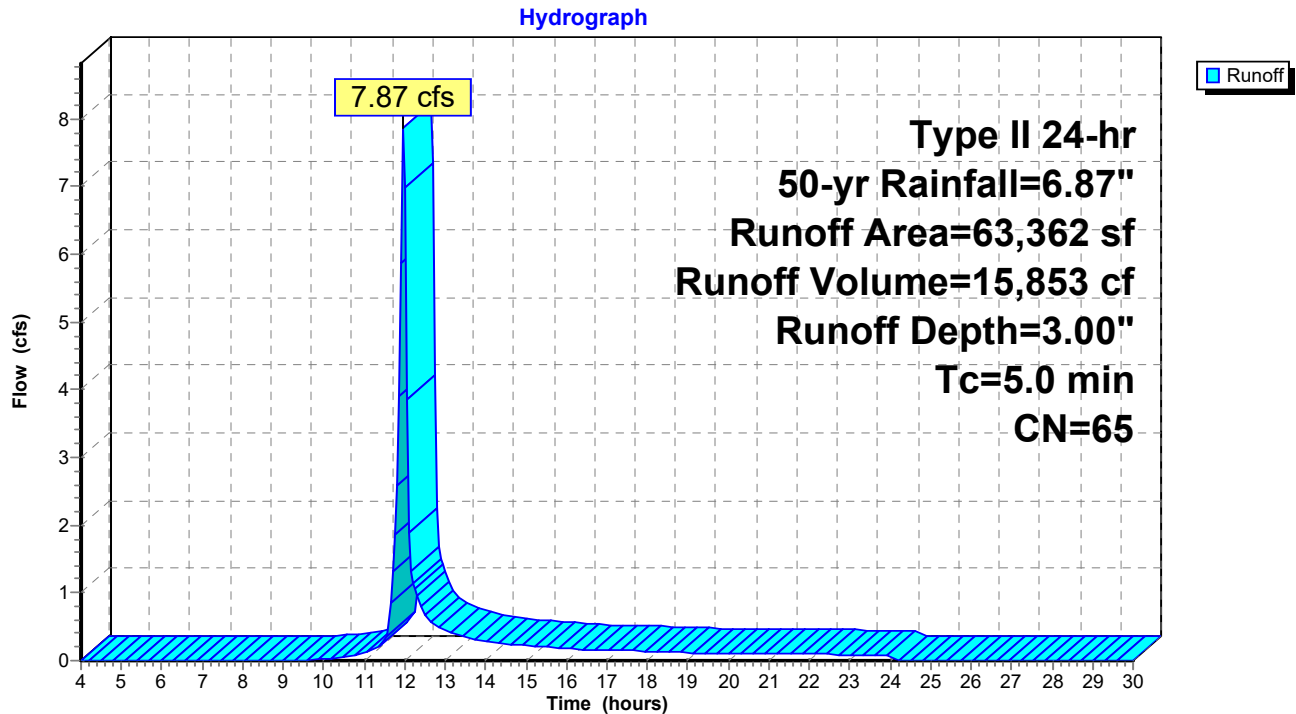
Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 7.87 cfs @ 11.96 hrs, Volume= 15,853 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 9S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.71 cfs @ 11.95 hrs, Volume= 1,478 cf, Depth= 4.47"

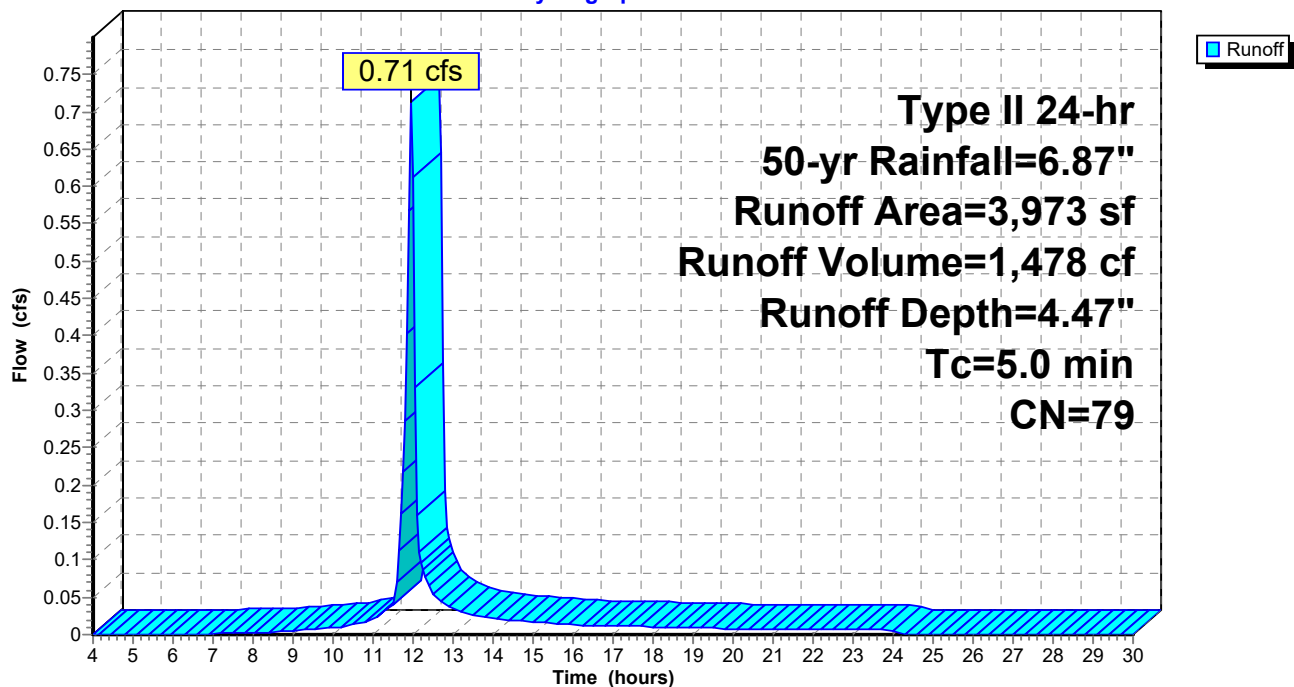
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 9S: CC-2

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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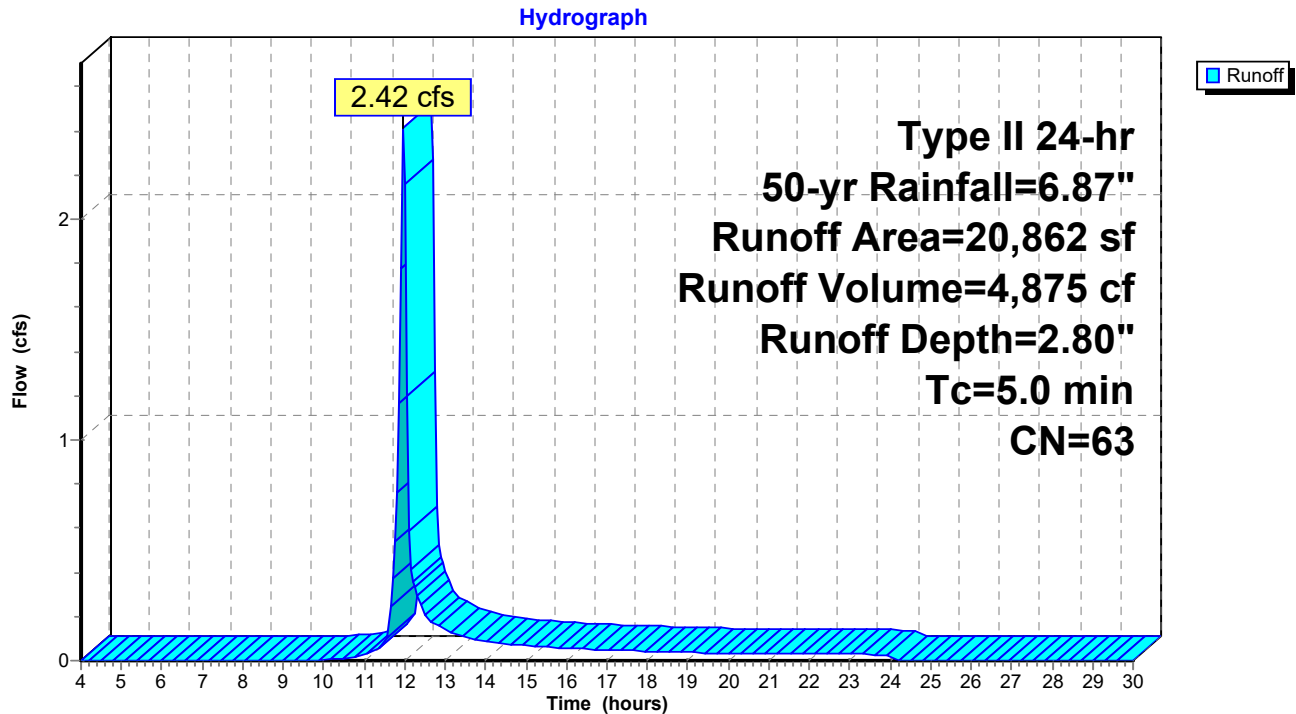
Summary for Subcatchment 10S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.42 cfs @ 11.96 hrs, Volume= 4,875 cf, Depth= 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 10S: CC-3

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 4R: Culvert #1

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 24,835 sf, 25.38% Impervious, Inflow Depth = 3.07" for 50-yr event
Inflow = 3.13 cfs @ 11.96 hrs, Volume= 6,353 cf
Outflow = 3.11 cfs @ 11.96 hrs, Volume= 6,353 cf, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.80 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 1.99 fps, Avg. Travel Time= 0.2 min

Peak Storage= 13 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.57'

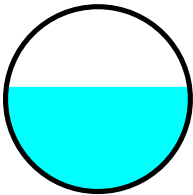
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.09 cfs

12.0" Round Pipe

n= 0.012

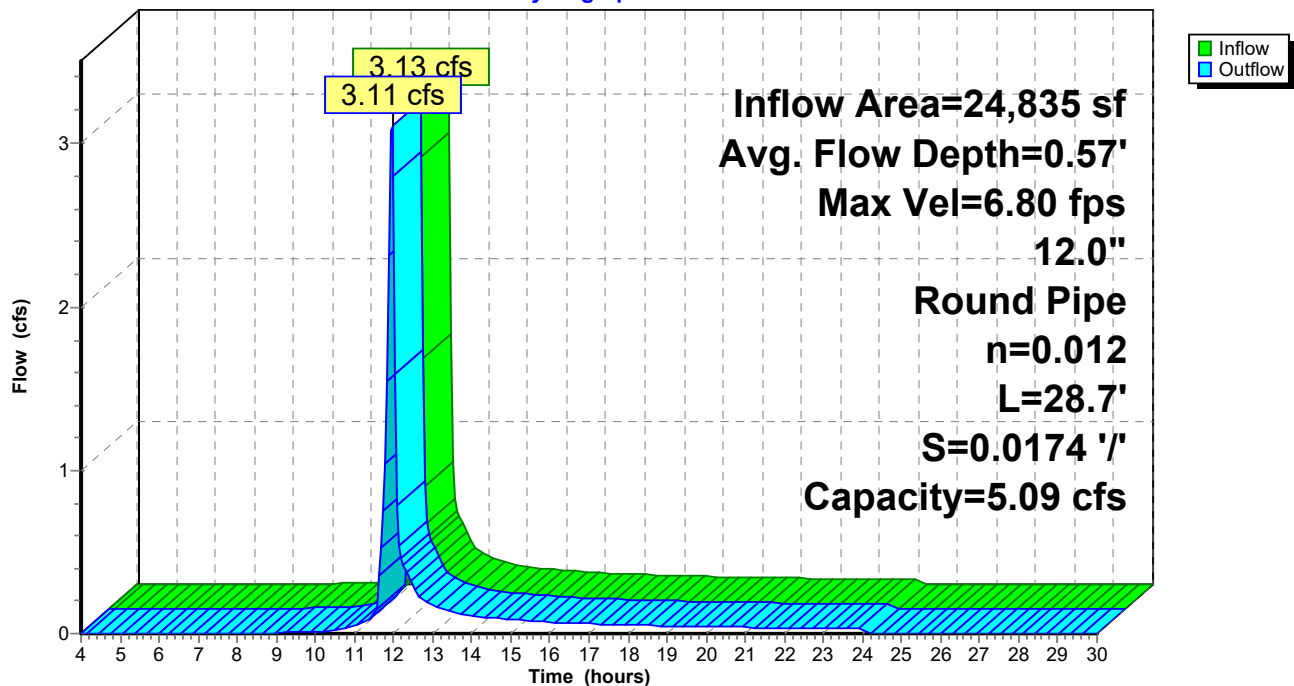
Length= 28.7' Slope= 0.0174 '/'

Inlet Invert= 972.00', Outlet Invert= 971.50'



Reach 4R: Culvert #1

Hydrograph



MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 6R: Culvert #2

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 3.00" for 50-yr event
Inflow = 7.87 cfs @ 11.96 hrs, Volume= 15,853 cf
Outflow = 7.78 cfs @ 11.96 hrs, Volume= 15,853 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.93 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 2.30 fps, Avg. Travel Time= 0.4 min

Peak Storage= 56 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.92'

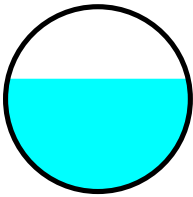
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe

n= 0.012 Corrugated PP, smooth interior

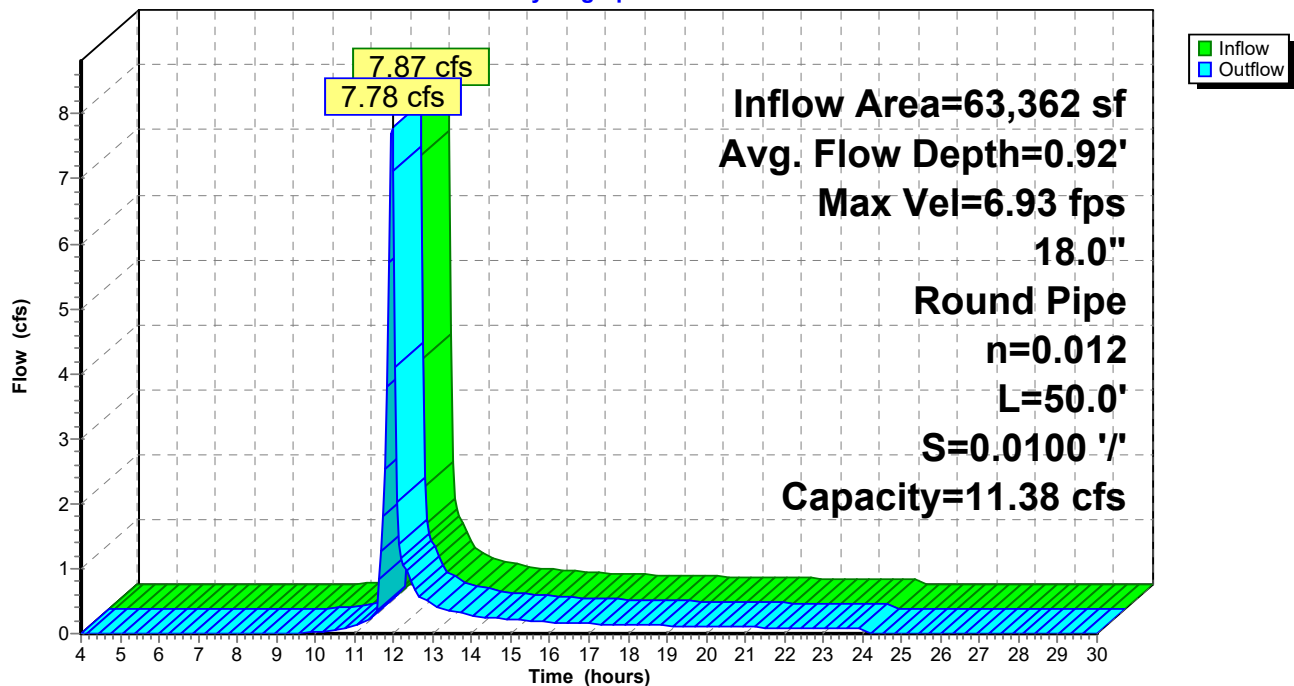
Length= 50.0' Slope= 0.0100 '/'

Inlet Invert= 951.50', Outlet Invert= 951.00'



Reach 6R: Culvert #2

Hydrograph



MLV 505LD86_Culvert 1-3_rev2*Type II 24-hr 100-yr Rainfall=8.09"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5S: CC-5

Runoff Area=63,362 sf 7.29% Impervious Runoff Depth=3.97"
Tc=5.0 min CN=65 Runoff=10.38 cfs 20,947 cf

Subcatchment9S: CC-2

Runoff Area=3,973 sf 3.80% Impervious Runoff Depth=5.59"
Tc=5.0 min CN=79 Runoff=0.88 cfs 1,851 cf

Subcatchment10S: CC-3

Runoff Area=20,862 sf 29.48% Impervious Runoff Depth=3.74"
Tc=5.0 min CN=63 Runoff=3.23 cfs 6,501 cf

Reach 4R: Culvert #1

Avg. Flow Depth=0.68' Max Vel=7.21 fps Inflow=4.11 cfs 8,353 cf
12.0" Round Pipe n=0.012 L=28.7' S=0.0174 '/' Capacity=5.09 cfs Outflow=4.08 cfs 8,353 cf

Reach 6R: Culvert #2

Avg. Flow Depth=1.12' Max Vel=7.29 fps Inflow=10.38 cfs 20,947 cf
18.0" Round Pipe n=0.012 L=50.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=10.26 cfs 20,947 cf

Total Runoff Area = 88,197 sf Runoff Volume = 29,300 cf Average Runoff Depth = 3.99"
87.62% Pervious = 77,279 sf 12.38% Impervious = 10,918 sf

MLV 505LD86_Culvert 1-3_rev2

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Type II 24-hr 100-yr Rainfall=8.09"

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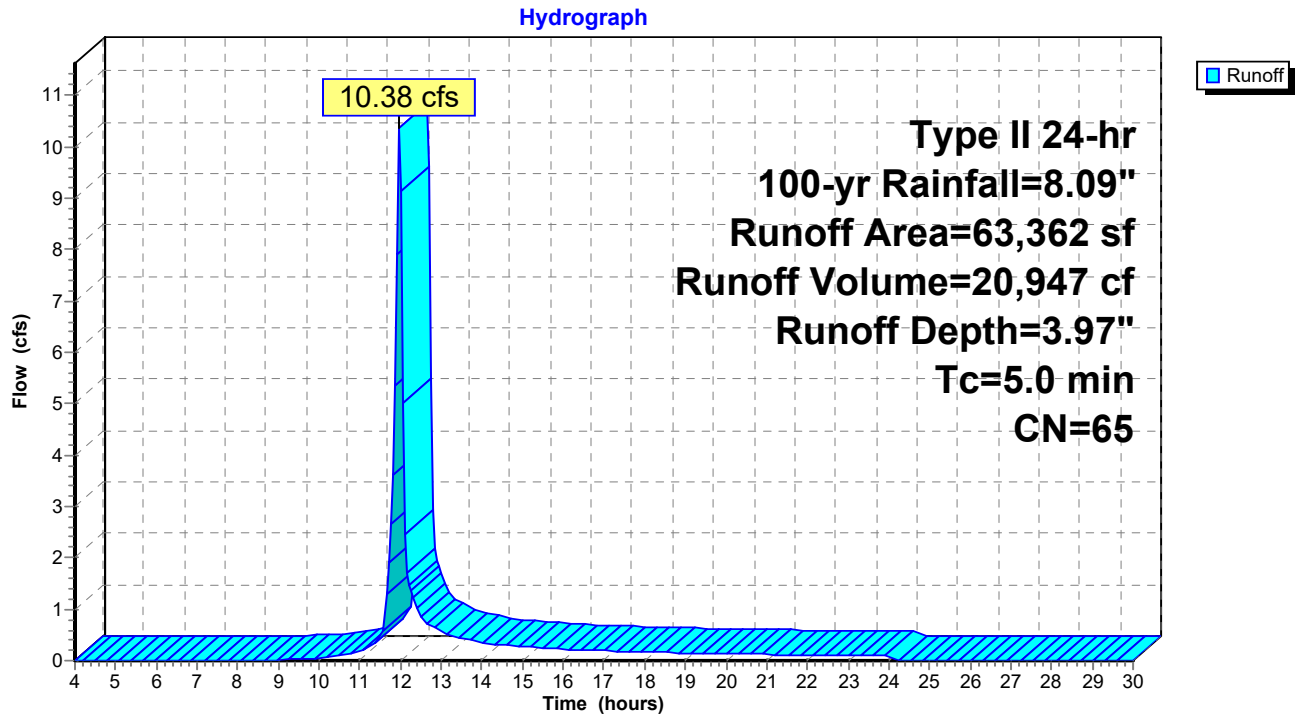
Summary for Subcatchment 5S: CC-5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 10.38 cfs @ 11.96 hrs, Volume= 20,947 cf, Depth= 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
18,807	30	Meadow, non-grazed, HSG A
39,939	78	Meadow, non-grazed, HSG D
2,138	98	Paved parking, HSG A
2,478	98	Paved parking, HSG D
63,362	65	Weighted Average
58,746		92.71% Pervious Area
4,616		7.29% Impervious Area

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

Subcatchment 5S: CC-5

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 9S: CC-2[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.88 cfs @ 11.95 hrs, Volume= 1,851 cf, Depth= 5.59"

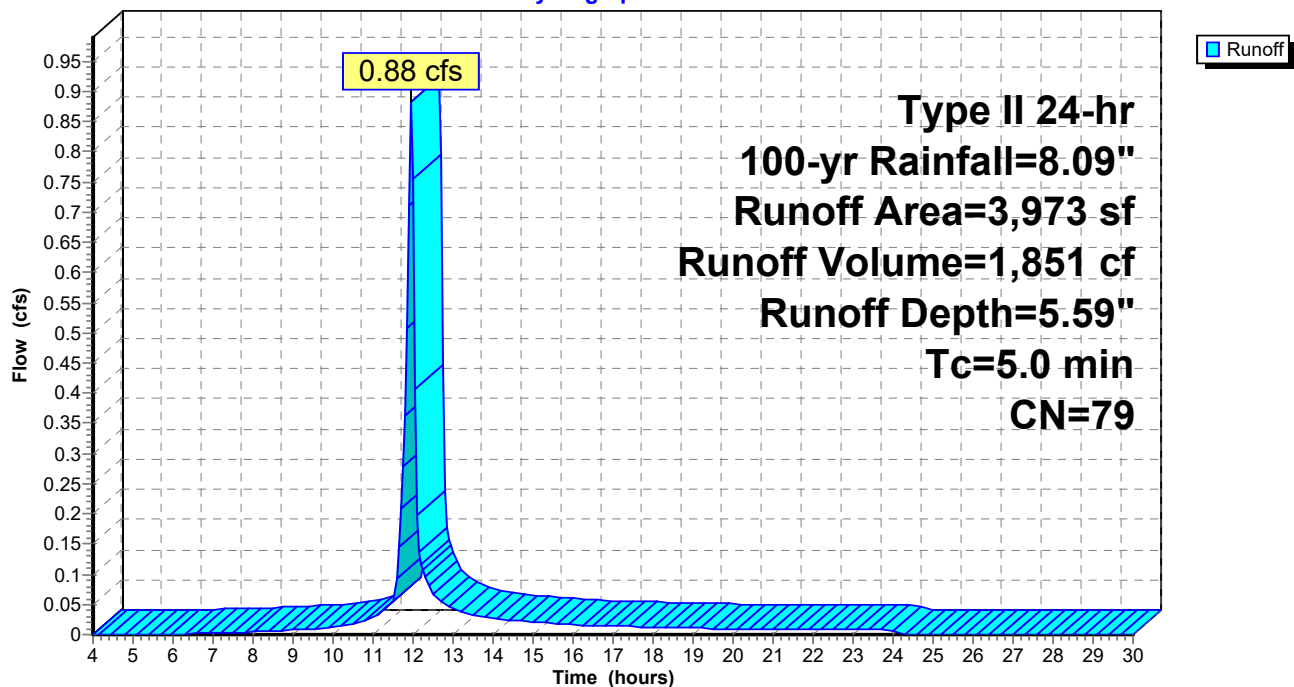
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
3,822	78	Meadow, non-grazed, HSG D
151	98	Paved parking, HSG D
3,973	79	Weighted Average
3,822		96.20% Pervious Area
151		3.80% Impervious Area

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

Subcatchment 9S: CC-2

Hydrograph



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Type II 24-hr 100-yr Rainfall=8.09"

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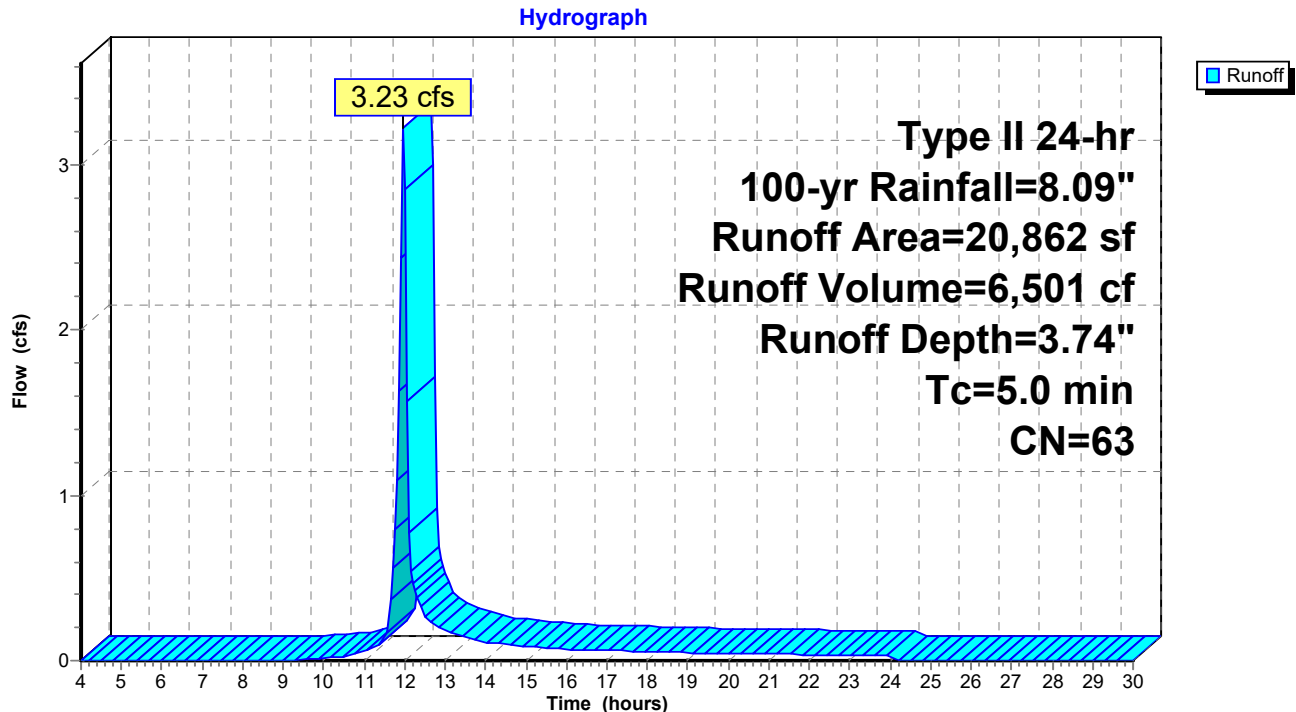
Summary for Subcatchment 10S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.23 cfs @ 11.96 hrs, Volume= 6,501 cf, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
5,459	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
1,100	98	Paved parking, HSG D
20,862	63	Weighted Average
14,711		70.52% Pervious Area
6,151		29.48% Impervious Area

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

Subcatchment 10S: CC-3

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Reach 4R: Culvert #1

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 24,835 sf, 25.38% Impervious, Inflow Depth = 4.04" for 100-yr event
Inflow = 4.11 cfs @ 11.96 hrs, Volume= 8,353 cf
Outflow = 4.08 cfs @ 11.96 hrs, Volume= 8,353 cf, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 7.21 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 2.12 fps, Avg. Travel Time= 0.2 min

Peak Storage= 16 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.68'

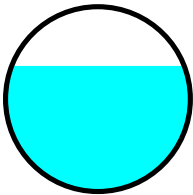
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.09 cfs

12.0" Round Pipe

n= 0.012

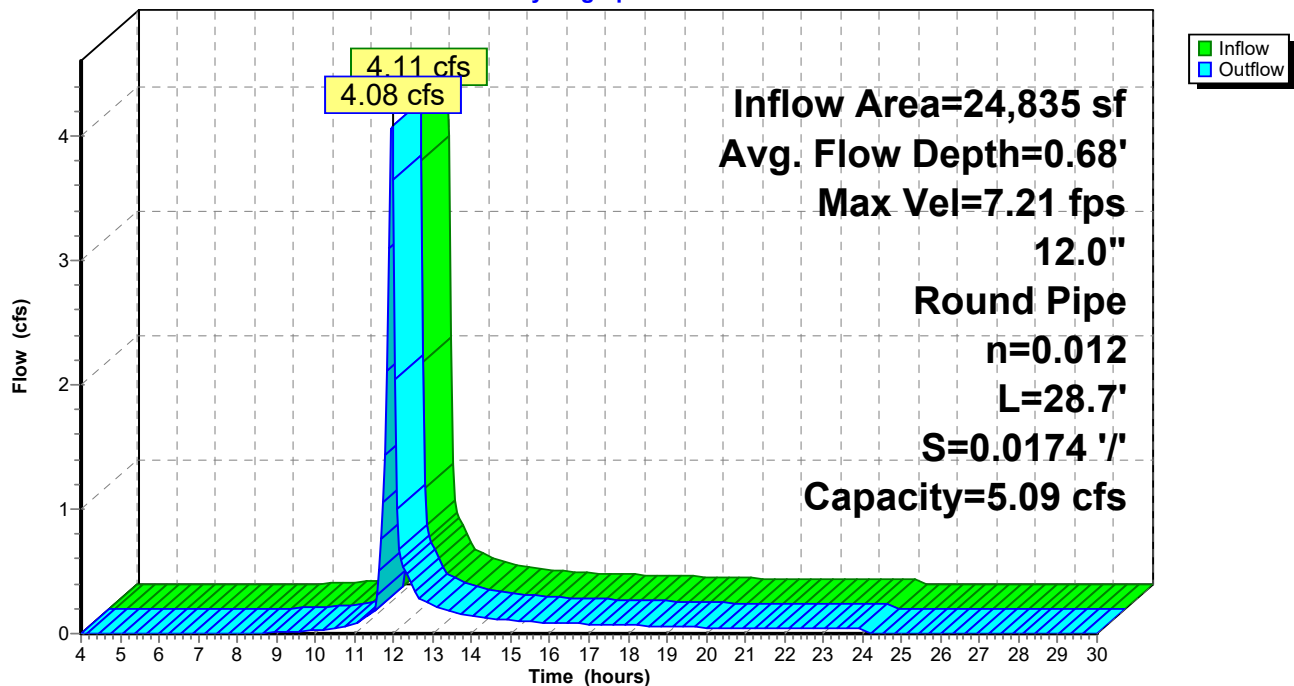
Length= 28.7' Slope= 0.0174 '/'

Inlet Invert= 972.00', Outlet Invert= 971.50'



Reach 4R: Culvert #1

Hydrograph



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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Reach 6R: Culvert #2

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 63,362 sf, 7.29% Impervious, Inflow Depth = 3.97" for 100-yr event
Inflow = 10.38 cfs @ 11.96 hrs, Volume= 20,947 cf
Outflow = 10.26 cfs @ 11.96 hrs, Volume= 20,947 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 7.29 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 2.44 fps, Avg. Travel Time= 0.3 min

Peak Storage= 71 cf @ 11.96 hrs

Average Depth at Peak Storage= 1.12'

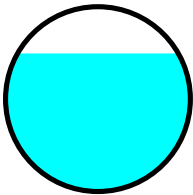
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe

n= 0.012 Corrugated PP, smooth interior

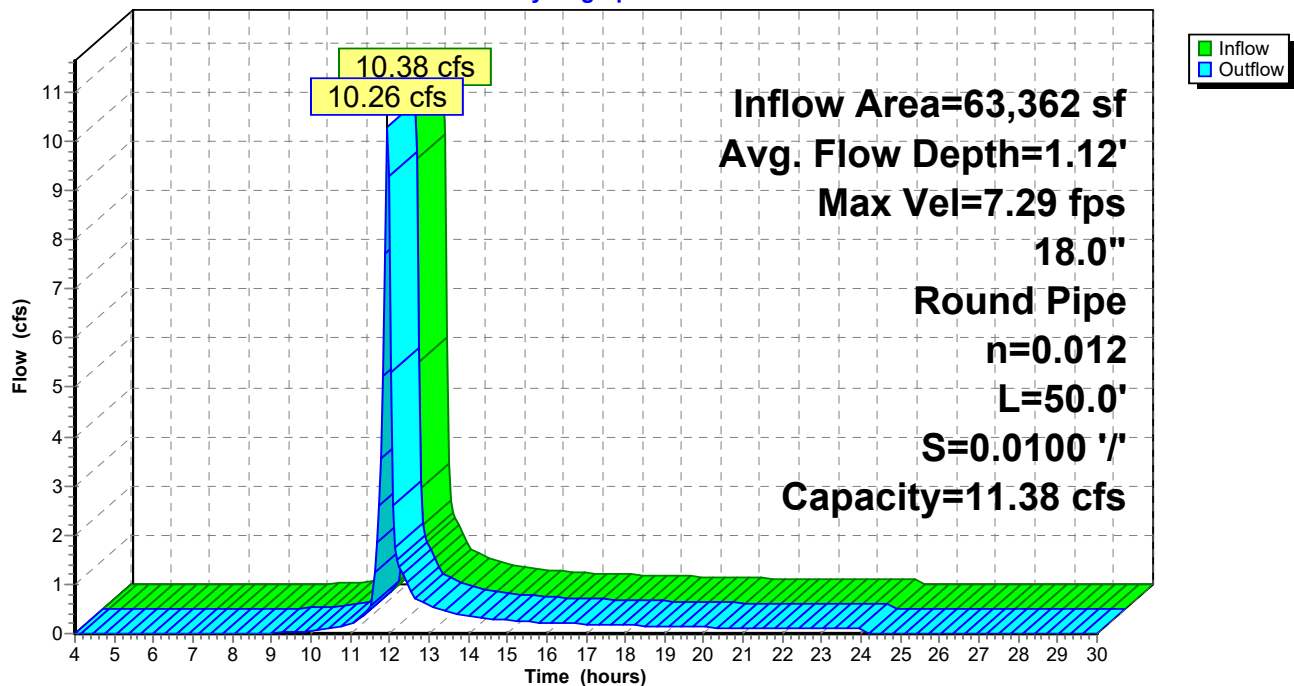
Length= 50.0' Slope= 0.0100 '/

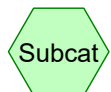
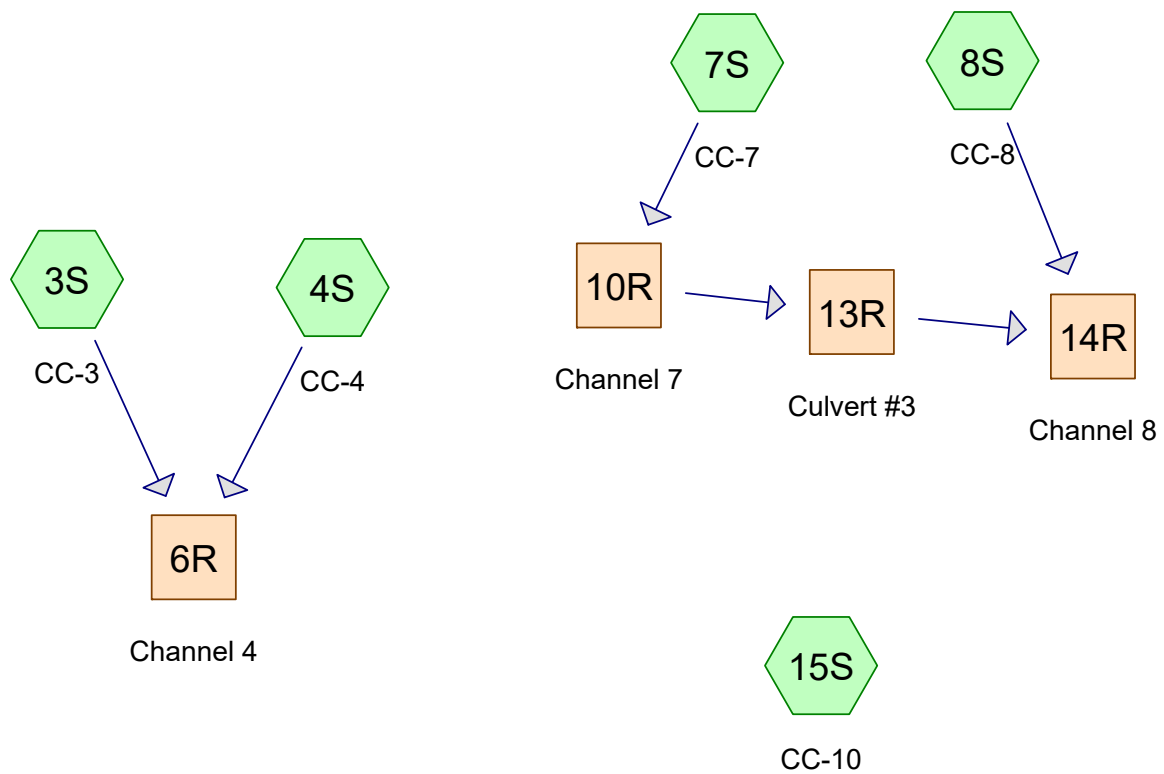
Inlet Invert= 951.50', Outlet Invert= 951.00'



Reach 6R: Culvert #2

Hydrograph

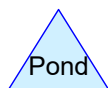




Subcat



Reach



Pond



Link

Routing Diagram for MLV 505LD86_Channels REV 2 Phase 1
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MLV 505LD86_Channels REV 2 Phase 1

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
39,721	30	Meadow, non-grazed, HSG A (3S, 7S, 8S, 15S)
57,397	78	Meadow, non-grazed, HSG D (3S, 4S, 7S, 15S)
12,302	98	Paved parking, HSG A (3S, 7S, 15S)
9,065	98	Paved parking, HSG D (3S, 7S, 15S)
118,485	66	TOTAL AREA

MLV 505LD86_Channels REV 2 Phase 1

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
52,023	HSG A	3S, 7S, 8S, 15S
0	HSG B	
0	HSG C	
66,462	HSG D	3S, 4S, 7S, 15S
0	Other	
118,485		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
39,721	0	0	57,397	0	97,118	Meadow, non-grazed	
12,302	0	0	9,065	0	21,367	Paved parking	
52,023	0	0	66,462	0	118,485	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	13R	929.50	928.34	26.0	0.0446	0.012	12.0	0.0	0.0

MLV 505LD86_Channels REV 2 Phase 1*Type II 24-hr 1-yr Rainfall=2.72"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: CC-3	Runoff Area=24,835 sf 29.80% Impervious Runoff Depth=0.42" Tc=5.0 min CN=66 Runoff=0.36 cfs 864 cf
Subcatchment4S: CC-4	Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=0.93" Tc=5.0 min CN=78 Runoff=0.08 cfs 158 cf
Subcatchment7S: CC-7	Runoff Area=83,908 sf 13.34% Impervious Runoff Depth=0.38" Tc=5.0 min CN=65 Runoff=1.07 cfs 2,686 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.00" Tc=5.0 min CN=30 Runoff=0.00 cfs 0 cf
Subcatchment15S: CC-10	Runoff Area=5,374 sf 51.53% Impervious Runoff Depth=0.78" Tc=5.0 min CN=75 Runoff=0.17 cfs 351 cf
Reach 6R: Channel 4	Avg. Flow Depth=0.08' Max Vel=1.32 fps Inflow=0.43 cfs 1,022 cf n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=0.41 cfs 1,022 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.17' Max Vel=2.45 fps Inflow=1.07 cfs 2,686 cf n=0.055 L=405.0' S=0.1130 '/' Capacity=26.35 cfs Outflow=0.95 cfs 2,686 cf
Reach 13R: Culvert #3 12.0" Round Pipe x 2.00	Avg. Flow Depth=0.16' Max Vel=5.62 fps Inflow=0.95 cfs 2,686 cf n=0.012 L=26.0' S=0.0446 '/' Capacity=16.31 cfs Outflow=0.94 cfs 2,686 cf
Reach 14R: Channel 8	Avg. Flow Depth=0.18' Max Vel=2.10 fps Inflow=0.94 cfs 2,686 cf n=0.050 L=75.0' S=0.0627 '/' Capacity=21.59 cfs Outflow=0.89 cfs 2,686 cf

Total Runoff Area = 118,485 sf Runoff Volume = 4,059 cf Average Runoff Depth = 0.41"
81.97% Pervious = 97,118 sf 18.03% Impervious = 21,367 sf

MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.36 cfs @ 11.98 hrs, Volume= 864 cf, Depth= 0.42"

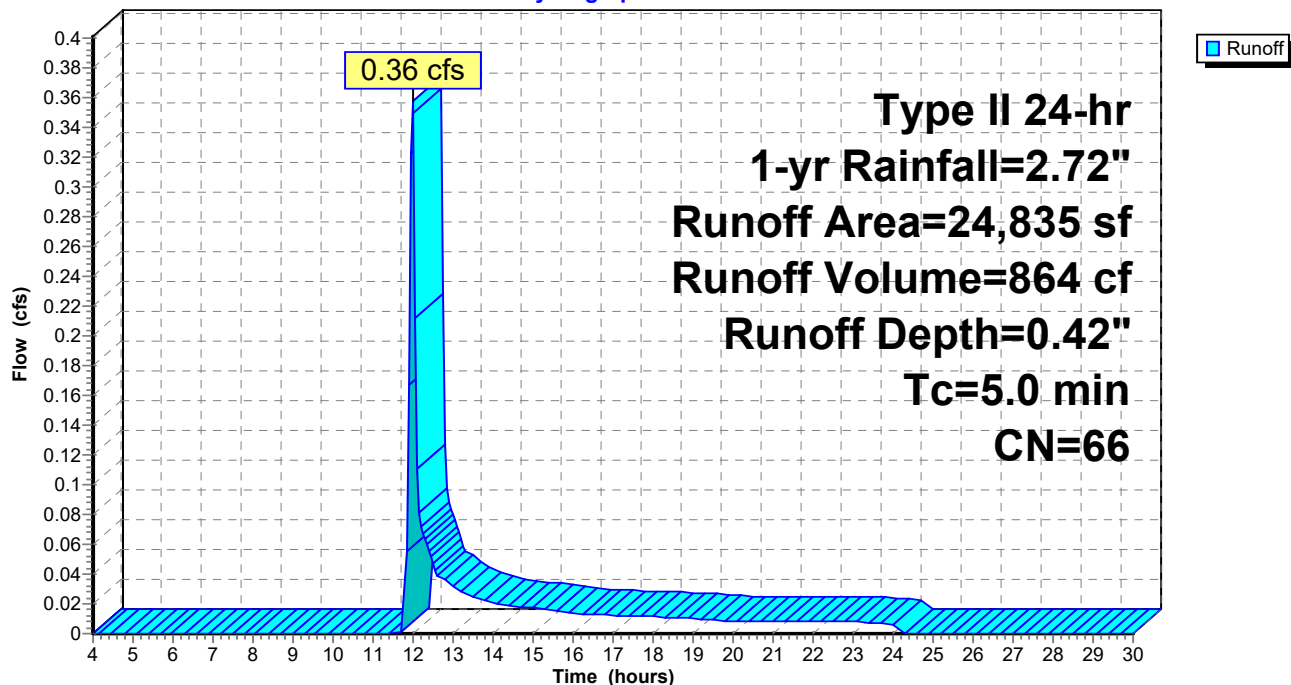
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
8,181	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
2,351	98	Paved parking, HSG D
24,835	66	Weighted Average
17,433		70.20% Pervious Area
7,402		29.80% Impervious Area

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

Subcatchment 3S: CC-3

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.08 cfs @ 11.96 hrs, Volume= 158 cf, Depth= 0.93"

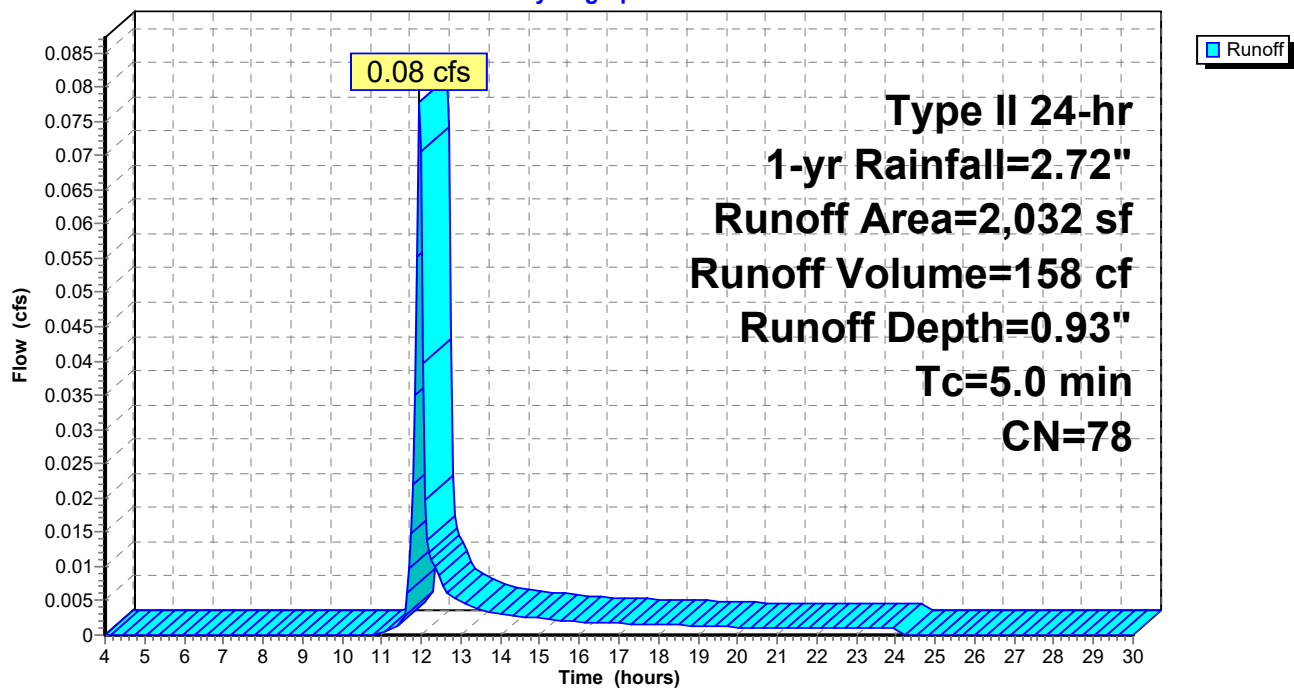
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 1-yr Rainfall=2.72"

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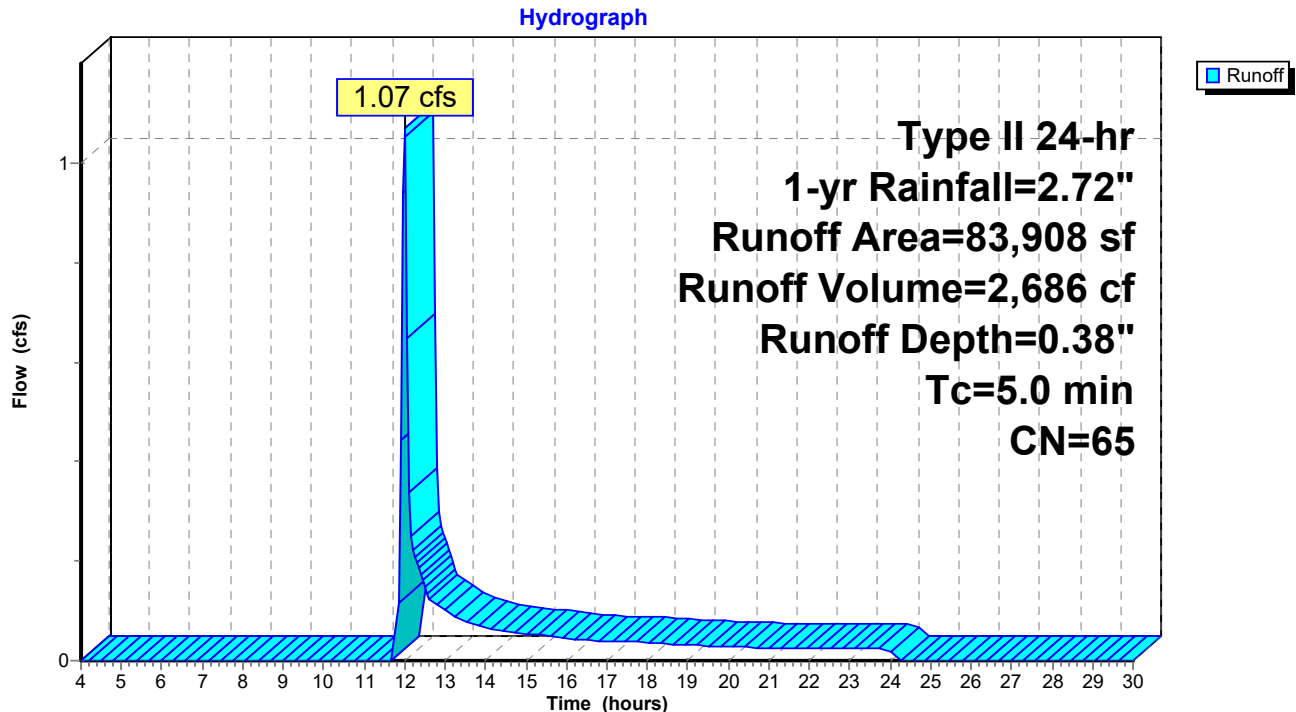
Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.07 cfs @ 11.99 hrs, Volume= 2,686 cf, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
26,651	30	Meadow, non-grazed, HSG A
46,061	78	Meadow, non-grazed, HSG D
5,943	98	Paved parking, HSG A
5,253	98	Paved parking, HSG D
83,908	65	Weighted Average
72,712		86.66% Pervious Area
11,196		13.34% Impervious Area

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

Subcatchment 7S: CC-7

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

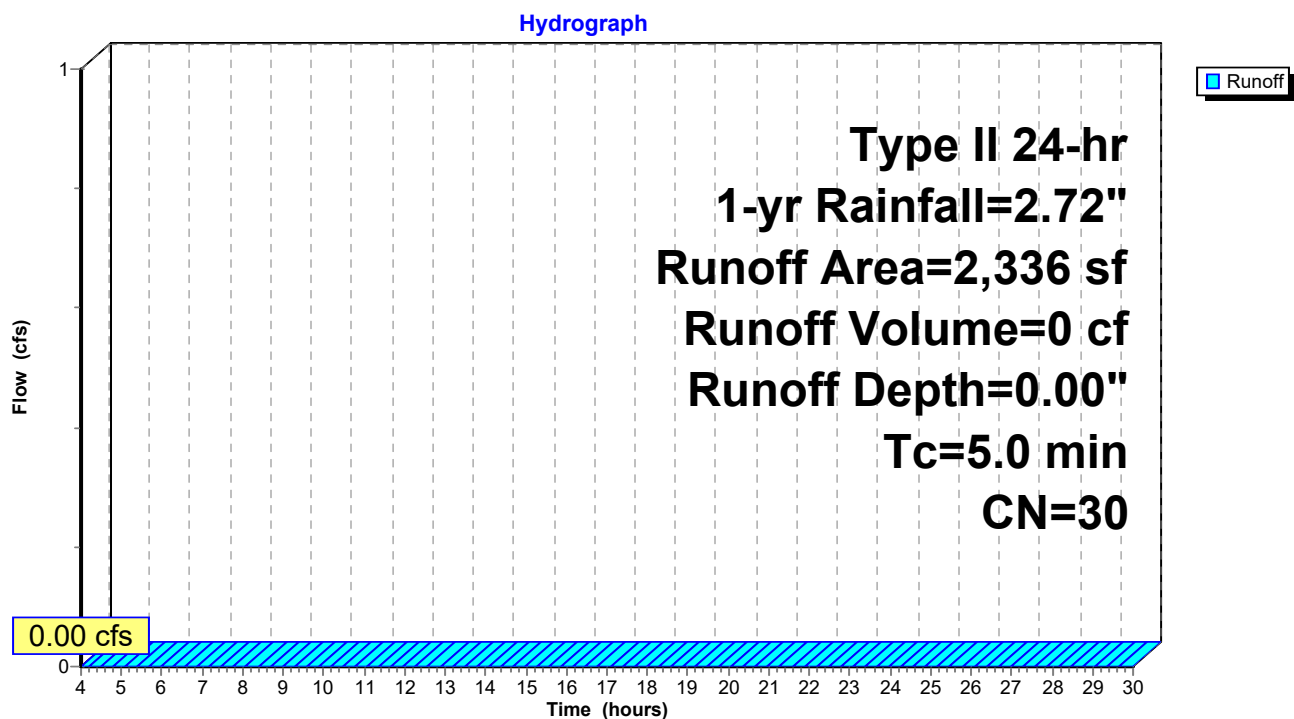
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 4.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 15S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.17 cfs @ 11.97 hrs, Volume= 351 cf, Depth= 0.78"

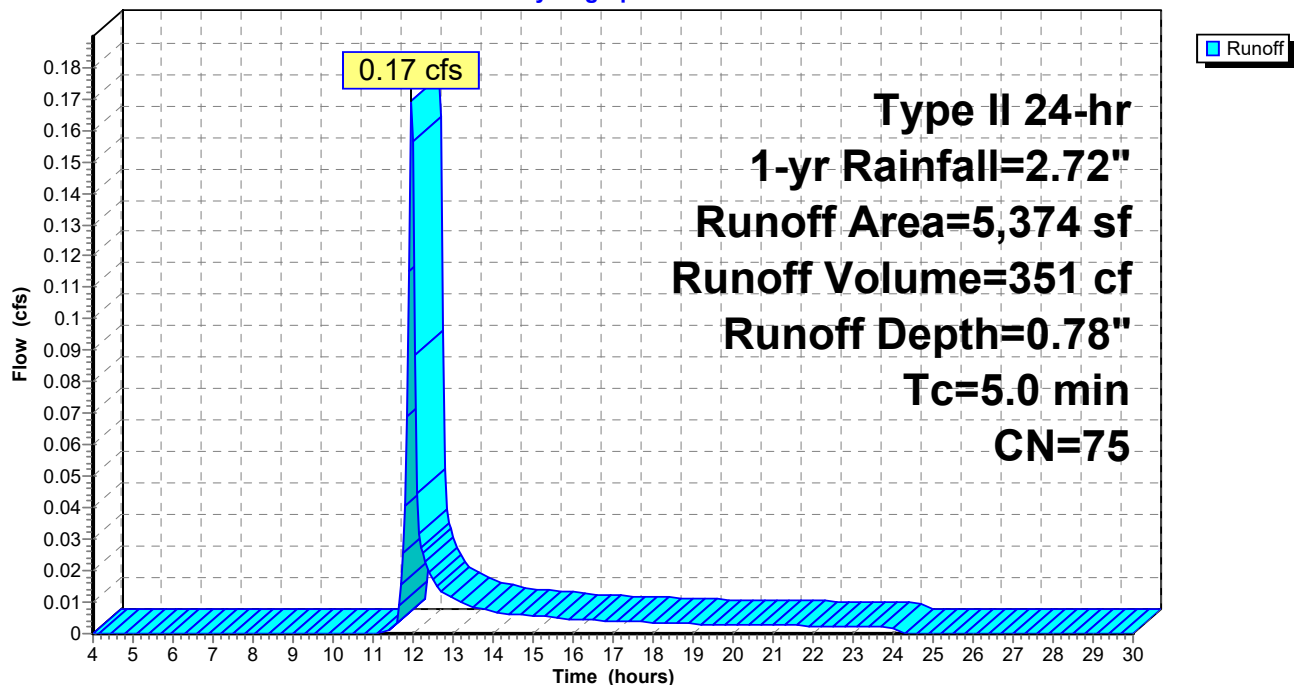
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
1,482	30	Meadow, non-grazed, HSG A
1,123	78	Meadow, non-grazed, HSG D
1,308	98	Paved parking, HSG A
1,461	98	Paved parking, HSG D
5,374	75	Weighted Average
2,605		48.47% Pervious Area
2,769		51.53% Impervious Area

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

Subcatchment 15S: CC-10

Hydrograph



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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 27.55% Impervious, Inflow Depth = 0.46" for 1-yr event
Inflow = 0.43 cfs @ 11.98 hrs, Volume= 1,022 cf
Outflow = 0.41 cfs @ 12.00 hrs, Volume= 1,022 cf, Atten= 5%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.32 fps, Min. Travel Time= 0.8 min
Avg. Velocity= 0.37 fps, Avg. Travel Time= 2.8 min

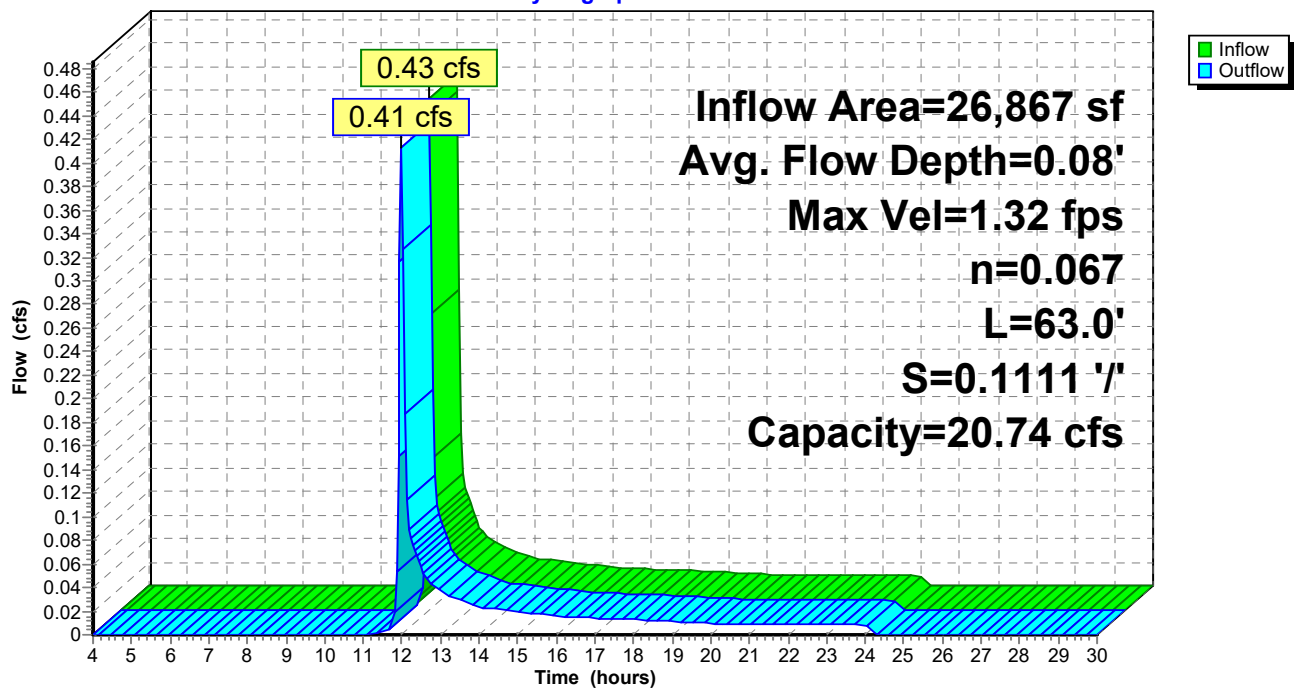
Peak Storage= 21 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



Summary for Reach 10R: Channel 7

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 0.38" for 1-yr event
 Inflow = 1.07 cfs @ 11.99 hrs, Volume= 2,686 cf
 Outflow = 0.95 cfs @ 12.06 hrs, Volume= 2,686 cf, Atten= 12%, Lag= 4.7 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.45 fps, Min. Travel Time= 2.8 min
 Avg. Velocity = 0.78 fps, Avg. Travel Time= 8.7 min

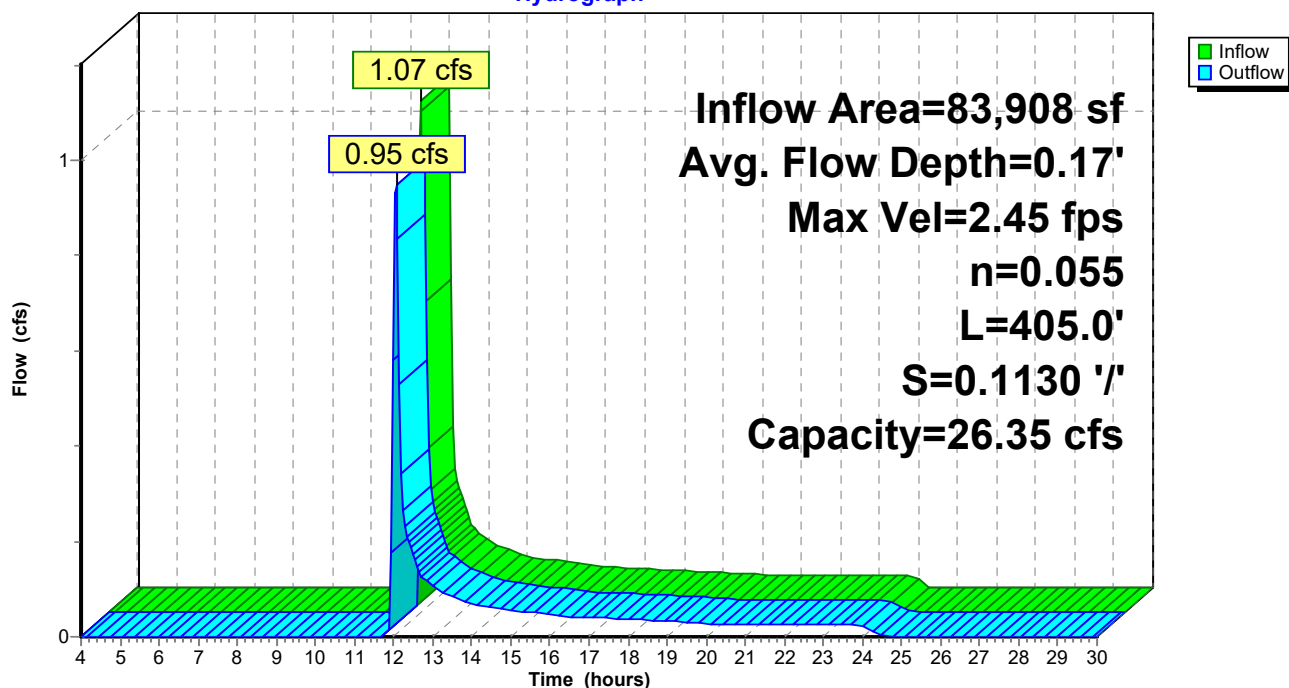
Peak Storage= 158 cf @ 12.02 hrs
 Average Depth at Peak Storage= 0.17'
 Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.35 cfs

2.00' x 1.00' deep channel, n= 0.055
 Side Slope Z-value= 2.0 '/' Top Width= 6.00'
 Length= 405.0' Slope= 0.1130 '/'
 Inlet Invert= 974.75', Outlet Invert= 929.00'



Reach 10R: Channel 7

Hydrograph



Summary for Reach 13R: Culvert #3

[52] Hint: Inlet/Outlet conditions not evaluated

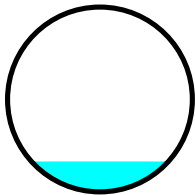
[62] Hint: Exceeded Reach 10R OUTLET depth by 0.53' @ 12.10 hrs

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 0.38" for 1-yr event
Inflow = 0.95 cfs @ 12.06 hrs, Volume= 2,686 cf
Outflow = 0.94 cfs @ 12.07 hrs, Volume= 2,686 cf, Atten= 1%, Lag= 0.1 min

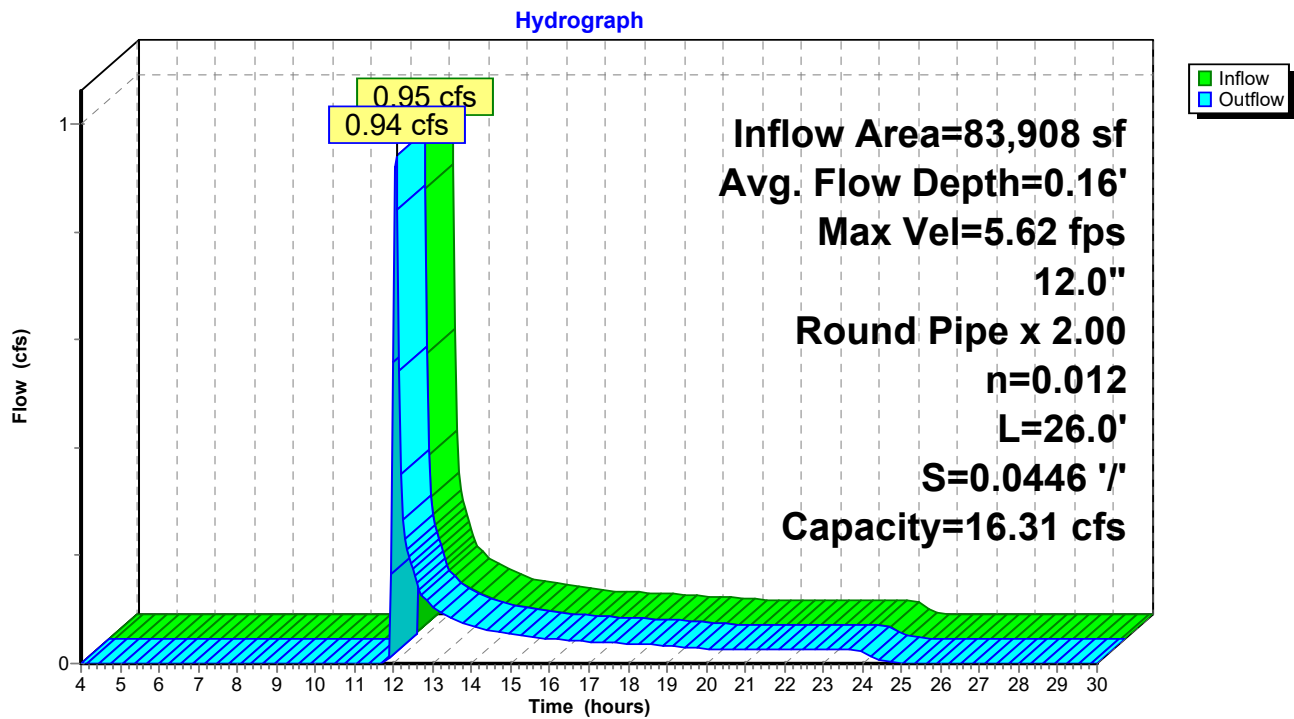
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.62 fps, Min. Travel Time= 0.1 min
Avg. Velocity= 2.16 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.00' Flow Area= 1.6 sf, Capacity= 16.31 cfs

A factor of 2.00 has been applied to the storage and discharge capacity
12.0" Round Pipe
n= 0.012
Length= 26.0' Slope= 0.0446 '/
Inlet Invert= 929.50', Outlet Invert= 928.34'



Reach 13R: Culvert #3



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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Reach 14R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,244 sf, 12.98% Impervious, Inflow Depth = 0.37" for 1-yr event
Inflow = 0.94 cfs @ 12.07 hrs, Volume= 2,686 cf
Outflow = 0.89 cfs @ 12.09 hrs, Volume= 2,686 cf, Atten= 6%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.10 fps, Min. Travel Time= 0.6 min

Avg. Velocity = 0.68 fps, Avg. Travel Time= 1.8 min

Peak Storage= 33 cf @ 12.07 hrs

Average Depth at Peak Storage= 0.18'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.59 cfs

2.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

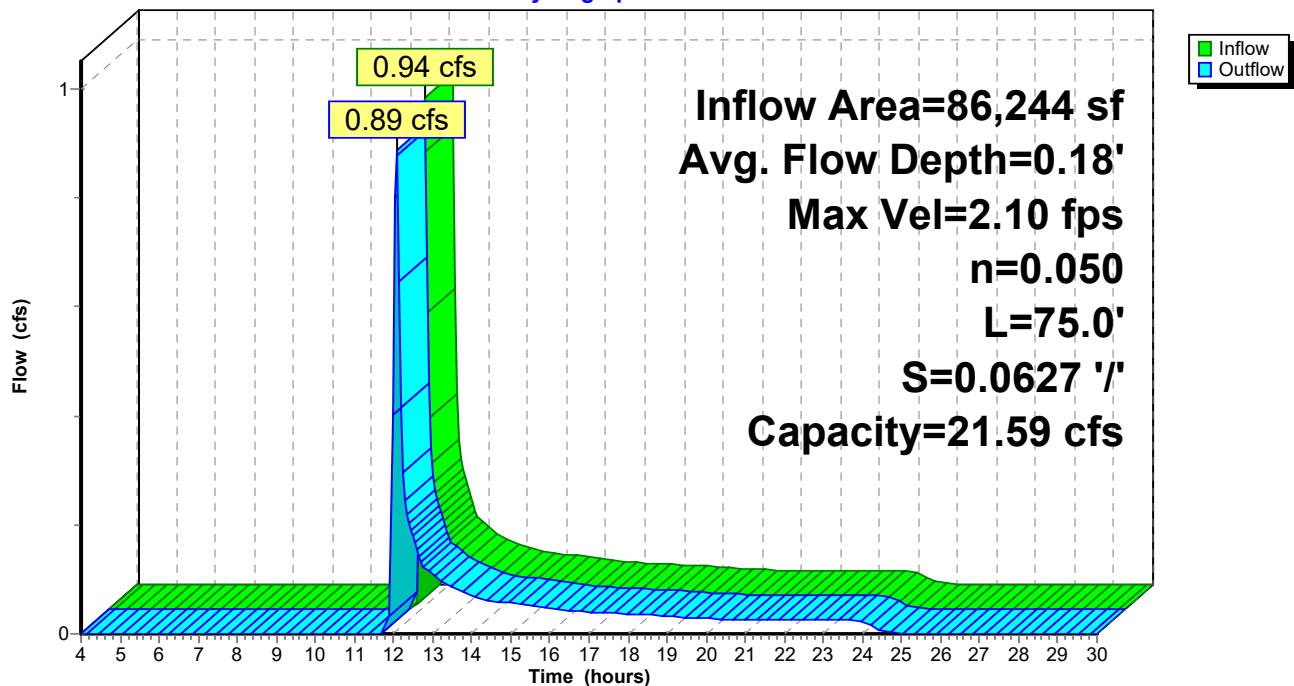
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 14R: Channel 8

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1*Type II 24-hr 2-yr Rainfall=3.26"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: CC-3	Runoff Area=24,835 sf 29.80% Impervious Runoff Depth=0.67" Tc=5.0 min CN=66 Runoff=0.63 cfs 1,394 cf
Subcatchment4S: CC-4	Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=1.32" Tc=5.0 min CN=78 Runoff=0.11 cfs 223 cf
Subcatchment7S: CC-7	Runoff Area=83,908 sf 13.34% Impervious Runoff Depth=0.63" Tc=5.0 min CN=65 Runoff=1.97 cfs 4,403 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.00" Tc=5.0 min CN=30 Runoff=0.00 cfs 0 cf
Subcatchment15S: CC-10	Runoff Area=5,374 sf 51.53% Impervious Runoff Depth=1.13" Tc=5.0 min CN=75 Runoff=0.25 cfs 508 cf
Reach 6R: Channel 4	Avg. Flow Depth=0.11' Max Vel=1.60 fps Inflow=0.74 cfs 1,617 cf n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=0.72 cfs 1,617 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.24' Max Vel=3.07 fps Inflow=1.97 cfs 4,403 cf n=0.055 L=405.0' S=0.1130 '/' Capacity=26.35 cfs Outflow=1.78 cfs 4,403 cf
Reach 13R: Culvert #3 12.0" Round Pipe x 2.00	Avg. Flow Depth=0.22' Max Vel=6.80 fps Inflow=1.78 cfs 4,403 cf n=0.012 L=26.0' S=0.0446 '/' Capacity=16.31 cfs Outflow=1.77 cfs 4,403 cf
Reach 14R: Channel 8	Avg. Flow Depth=0.27' Max Vel=2.63 fps Inflow=1.77 cfs 4,403 cf n=0.050 L=75.0' S=0.0627 '/' Capacity=21.59 cfs Outflow=1.72 cfs 4,403 cf

Total Runoff Area = 118,485 sf Runoff Volume = 6,529 cf Average Runoff Depth = 0.66"
81.97% Pervious = 97,118 sf 18.03% Impervious = 21,367 sf

MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 2-yr Rainfall=3.26"

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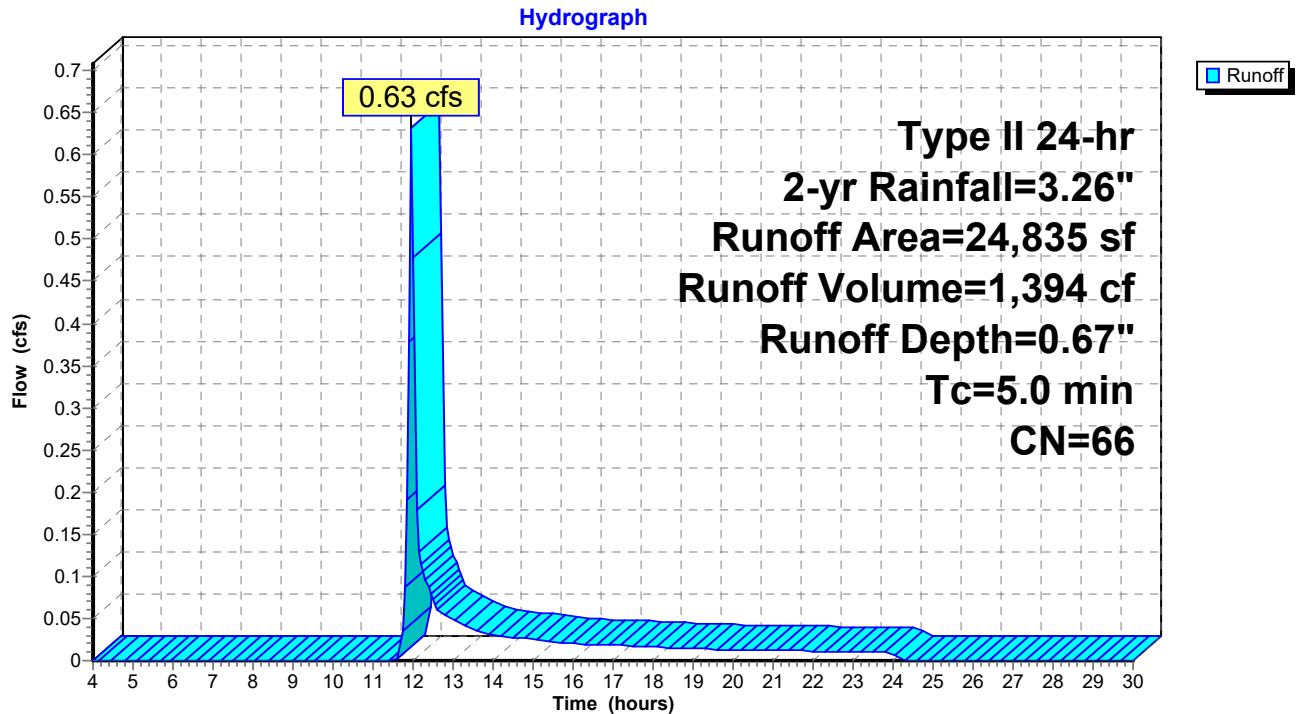
Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.63 cfs @ 11.97 hrs, Volume= 1,394 cf, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
8,181	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
2,351	98	Paved parking, HSG D
24,835	66	Weighted Average
17,433		70.20% Pervious Area
7,402		29.80% Impervious Area

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

Subcatchment 3S: CC-3

Summary for Subcatchment 4S: CC-4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.11 cfs @ 11.96 hrs, Volume= 223 cf, Depth= 1.32"

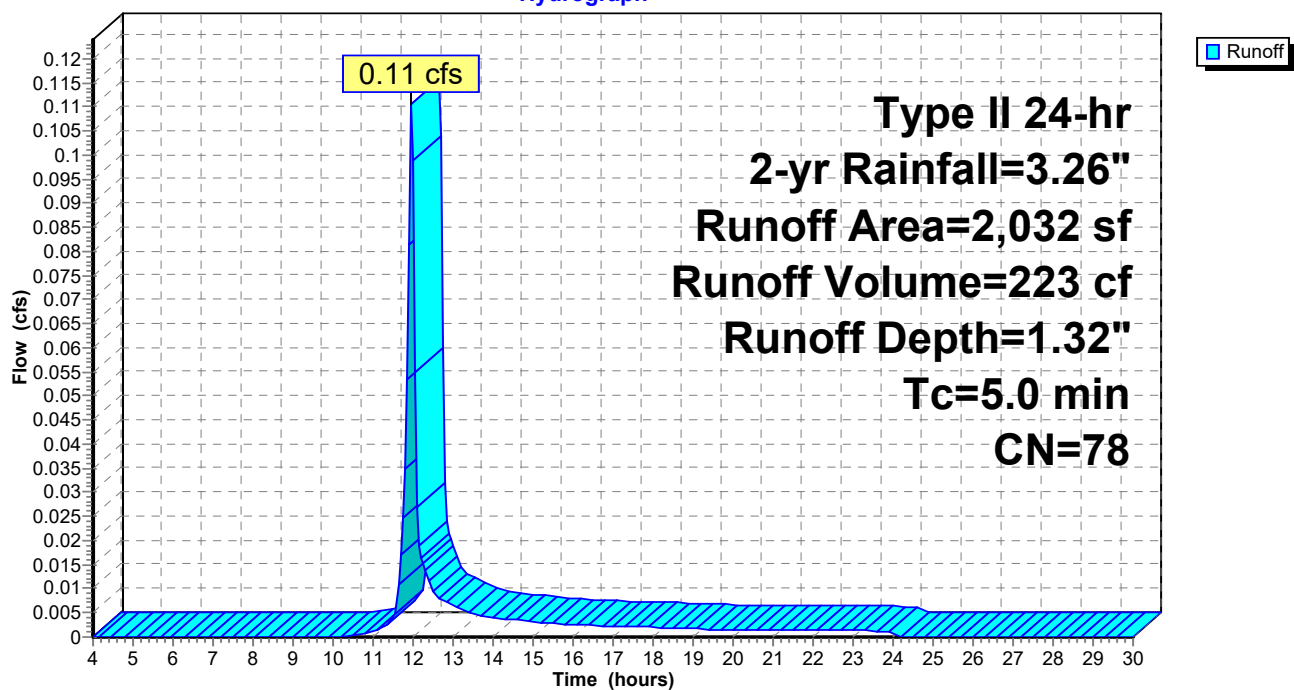
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 2-yr Rainfall=3.26"

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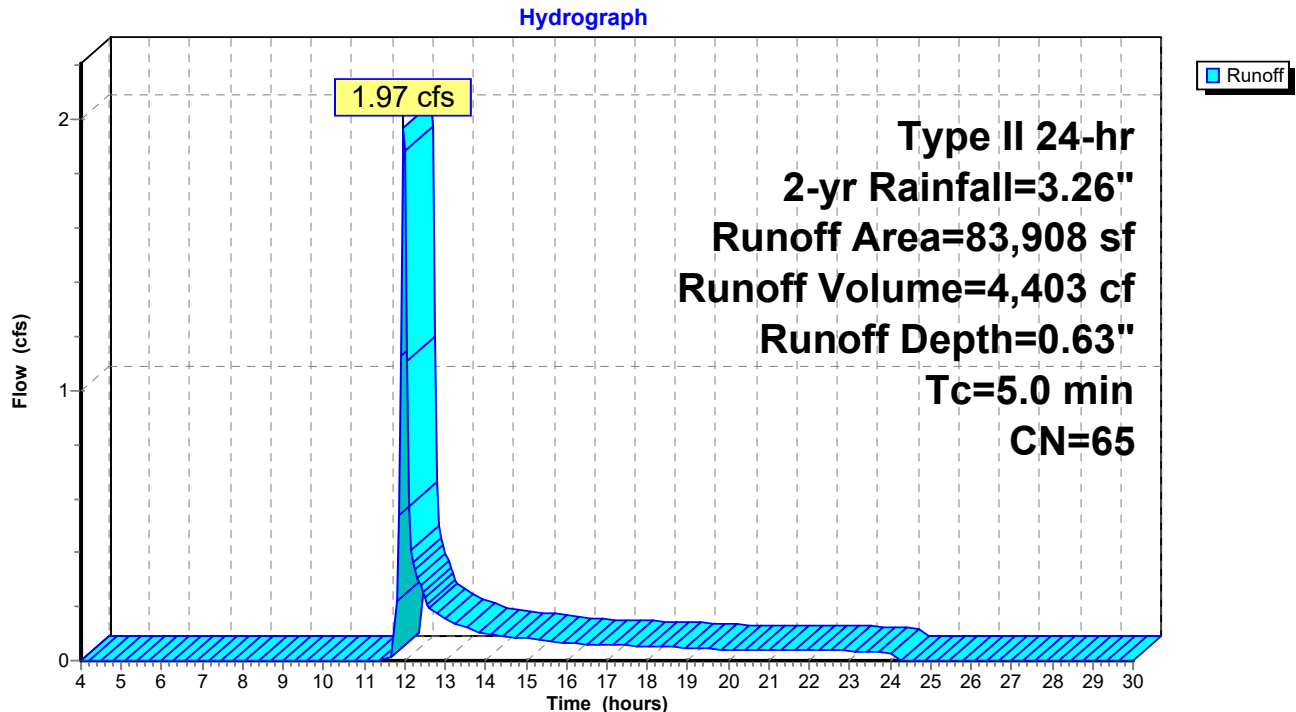
Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.97 cfs @ 11.98 hrs, Volume= 4,403 cf, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
26,651	30	Meadow, non-grazed, HSG A
46,061	78	Meadow, non-grazed, HSG D
5,943	98	Paved parking, HSG A
5,253	98	Paved parking, HSG D
83,908	65	Weighted Average
72,712		86.66% Pervious Area
11,196		13.34% Impervious Area

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

Subcatchment 7S: CC-7

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

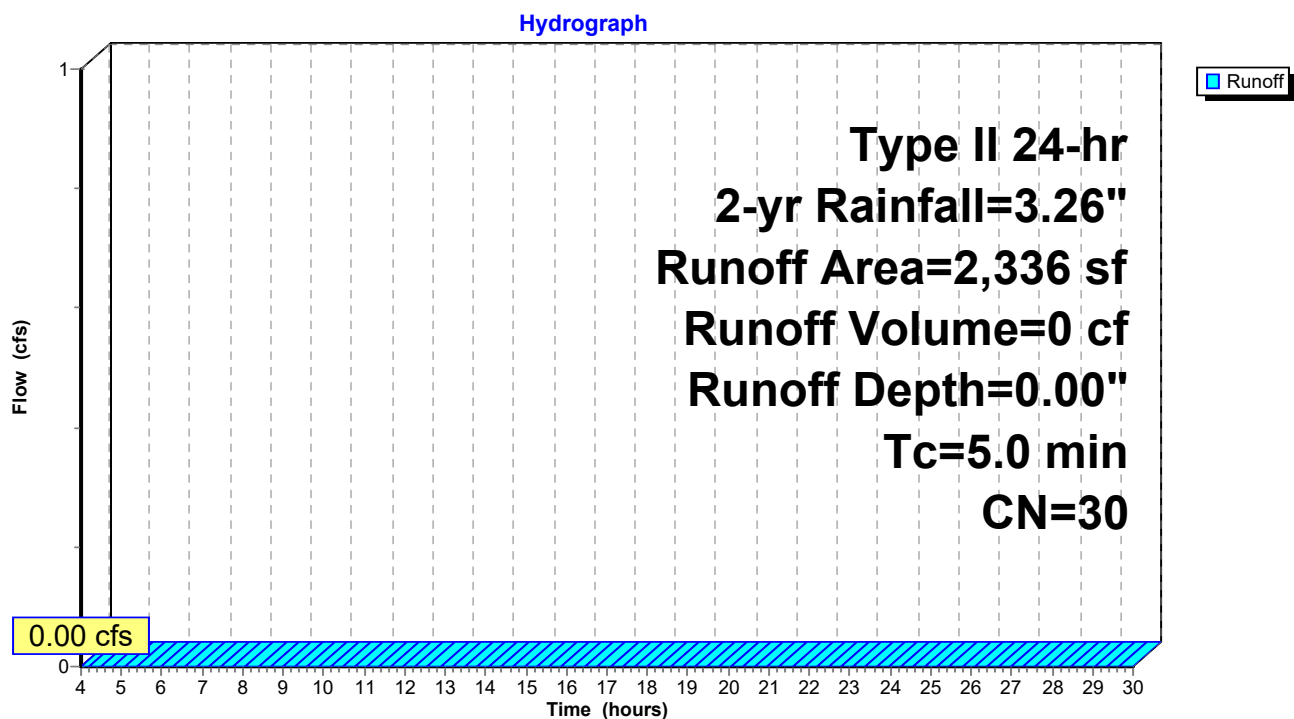
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 4.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 15S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.25 cfs @ 11.96 hrs, Volume= 508 cf, Depth= 1.13"

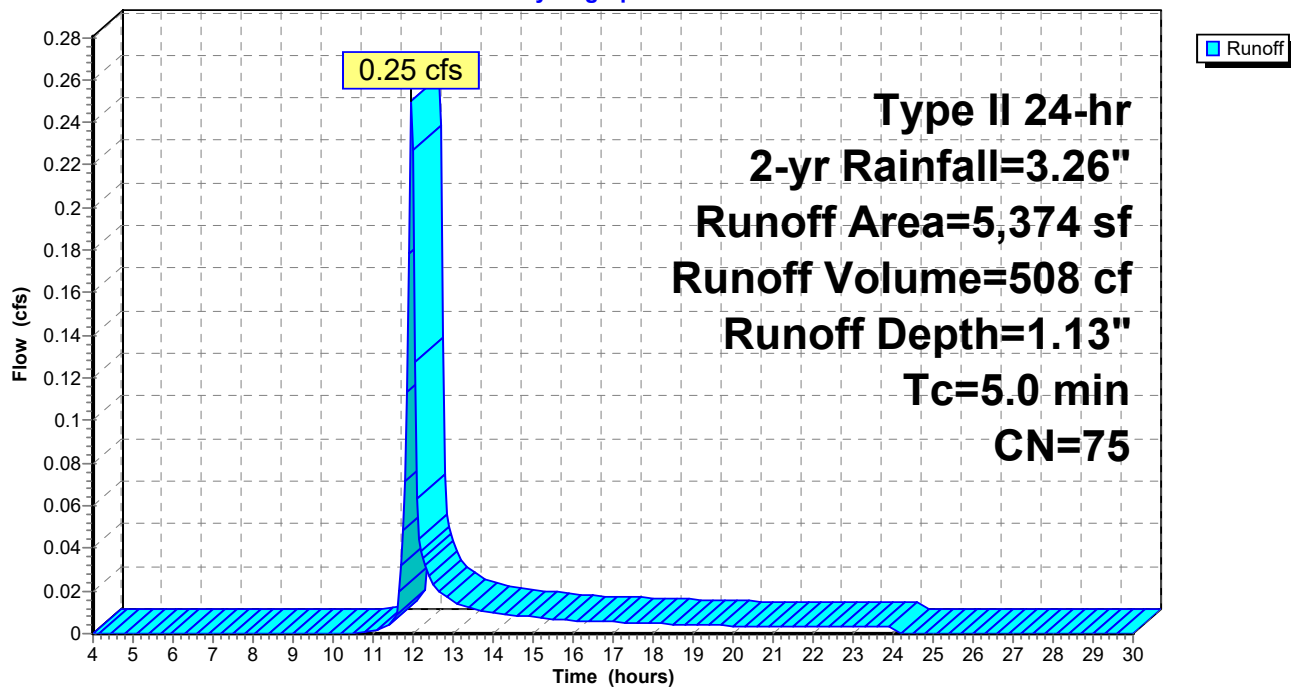
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
1,482	30	Meadow, non-grazed, HSG A
1,123	78	Meadow, non-grazed, HSG D
1,308	98	Paved parking, HSG A
1,461	98	Paved parking, HSG D
5,374	75	Weighted Average
2,605		48.47% Pervious Area
2,769		51.53% Impervious Area

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

Subcatchment 15S: CC-10

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 27.55% Impervious, Inflow Depth = 0.72" for 2-yr event
Inflow = 0.74 cfs @ 11.97 hrs, Volume= 1,617 cf
Outflow = 0.72 cfs @ 11.99 hrs, Volume= 1,617 cf, Atten= 3%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.60 fps, Min. Travel Time= 0.7 min
Avg. Velocity= 0.42 fps, Avg. Travel Time= 2.5 min

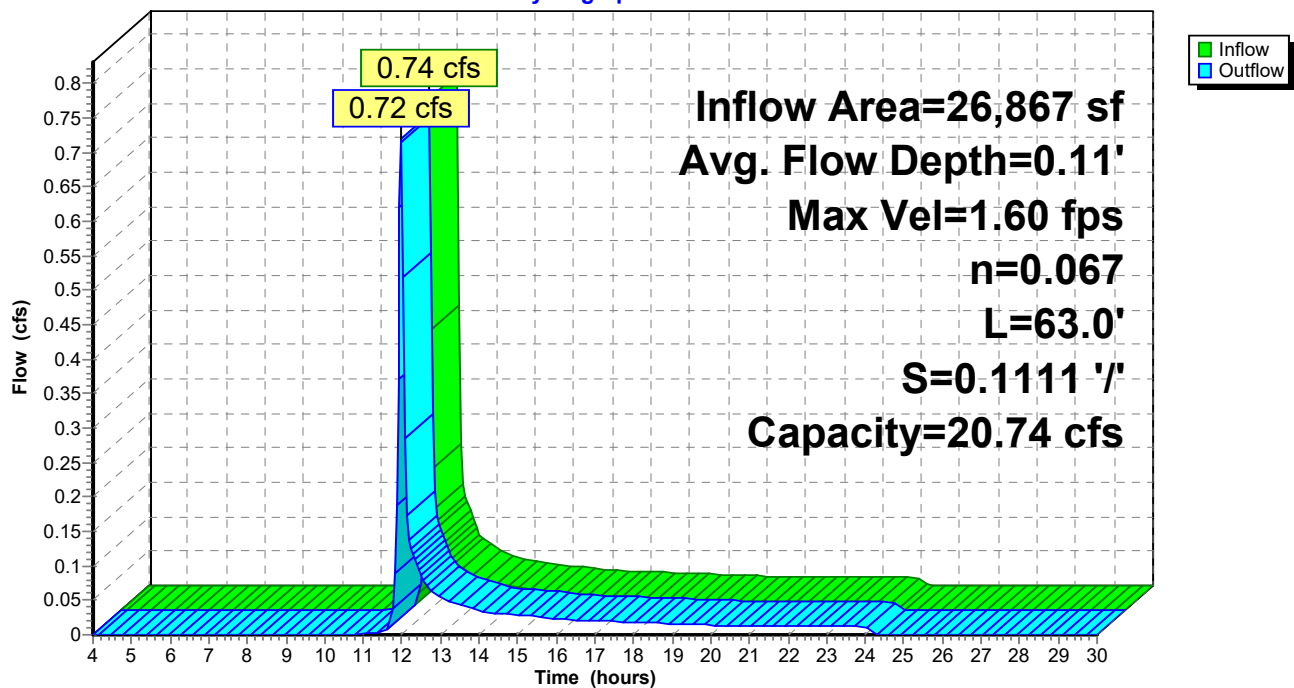
Peak Storage= 29 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 10R: Channel 7

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 0.63" for 2-yr event
Inflow = 1.97 cfs @ 11.98 hrs, Volume= 4,403 cf
Outflow = 1.78 cfs @ 12.04 hrs, Volume= 4,403 cf, Atten= 10%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.07 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.90 fps, Avg. Travel Time= 7.5 min

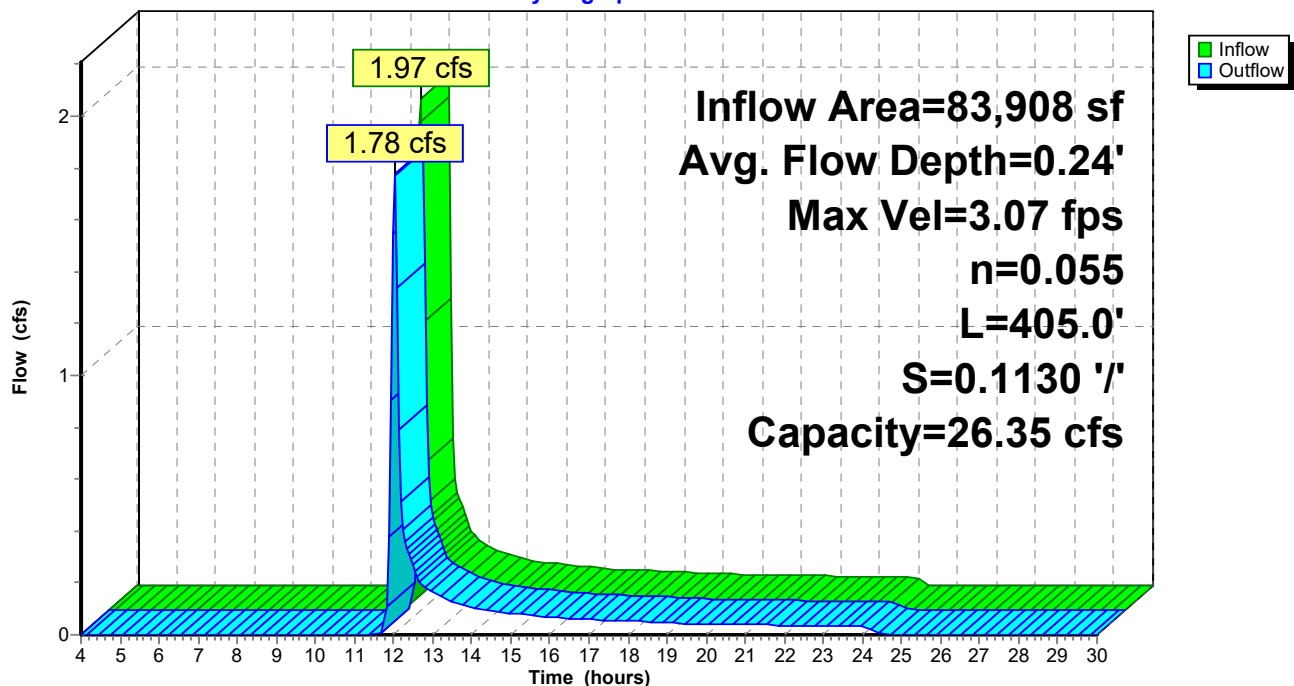
Peak Storage= 246 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.35 cfs

2.00' x 1.00' deep channel, n= 0.055
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 405.0' Slope= 0.1130 '/'
Inlet Invert= 974.75', Outlet Invert= 929.00'



Reach 10R: Channel 7

Hydrograph



Summary for Reach 13R: Culvert #3

[52] Hint: Inlet/Outlet conditions not evaluated

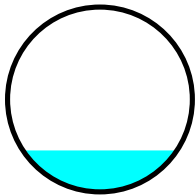
[62] Hint: Exceeded Reach 10R OUTLET depth by 0.54' @ 12.10 hrs

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 0.63" for 2-yr event
Inflow = 1.78 cfs @ 12.04 hrs, Volume= 4,403 cf
Outflow = 1.77 cfs @ 12.04 hrs, Volume= 4,403 cf, Atten= 0%, Lag= 0.1 min

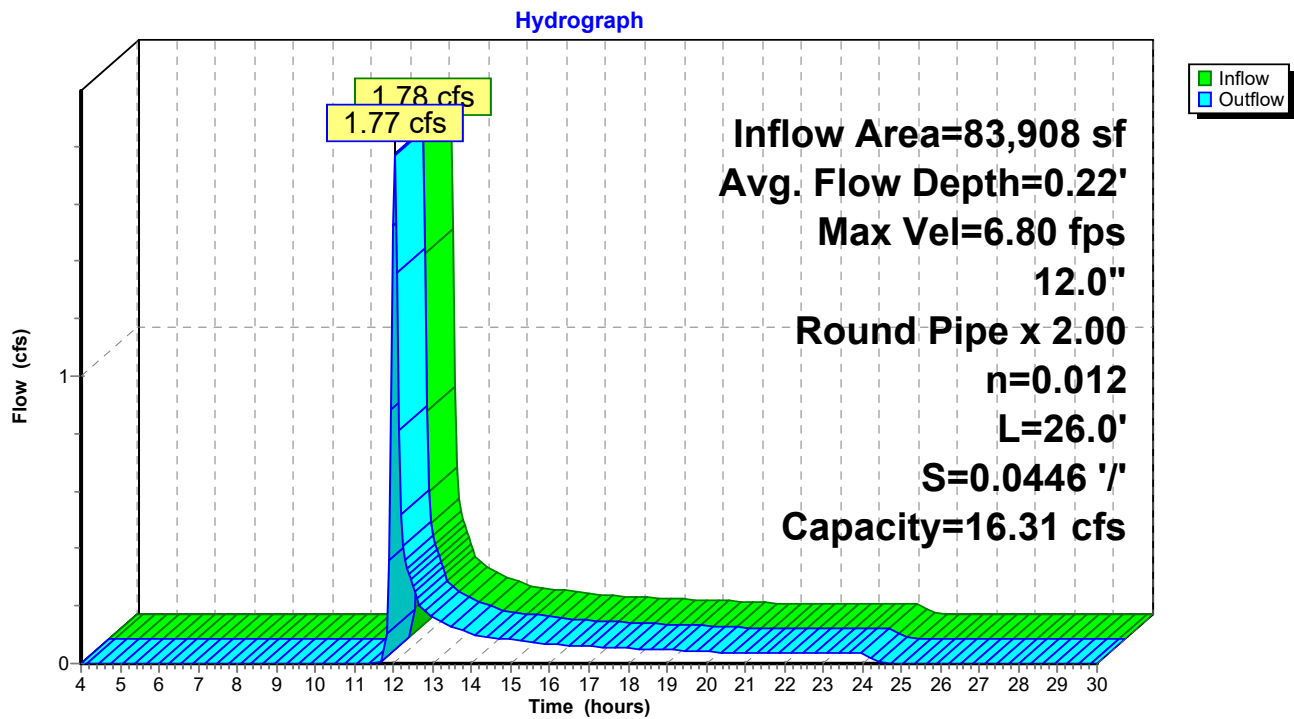
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.80 fps, Min. Travel Time= 0.1 min
Avg. Velocity= 2.42 fps, Avg. Travel Time= 0.2 min

Peak Storage= 7 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00' Flow Area= 1.6 sf, Capacity= 16.31 cfs

A factor of 2.00 has been applied to the storage and discharge capacity
12.0" Round Pipe
n= 0.012
Length= 26.0' Slope= 0.0446 '/
Inlet Invert= 929.50', Outlet Invert= 928.34'



Reach 13R: Culvert #3



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 14R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,244 sf, 12.98% Impervious, Inflow Depth = 0.61" for 2-yr event
Inflow = 1.77 cfs @ 12.04 hrs, Volume= 4,403 cf
Outflow = 1.72 cfs @ 12.06 hrs, Volume= 4,403 cf, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.63 fps, Min. Travel Time= 0.5 min

Avg. Velocity = 0.79 fps, Avg. Travel Time= 1.6 min

Peak Storage= 50 cf @ 12.05 hrs

Average Depth at Peak Storage= 0.27'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.59 cfs

2.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

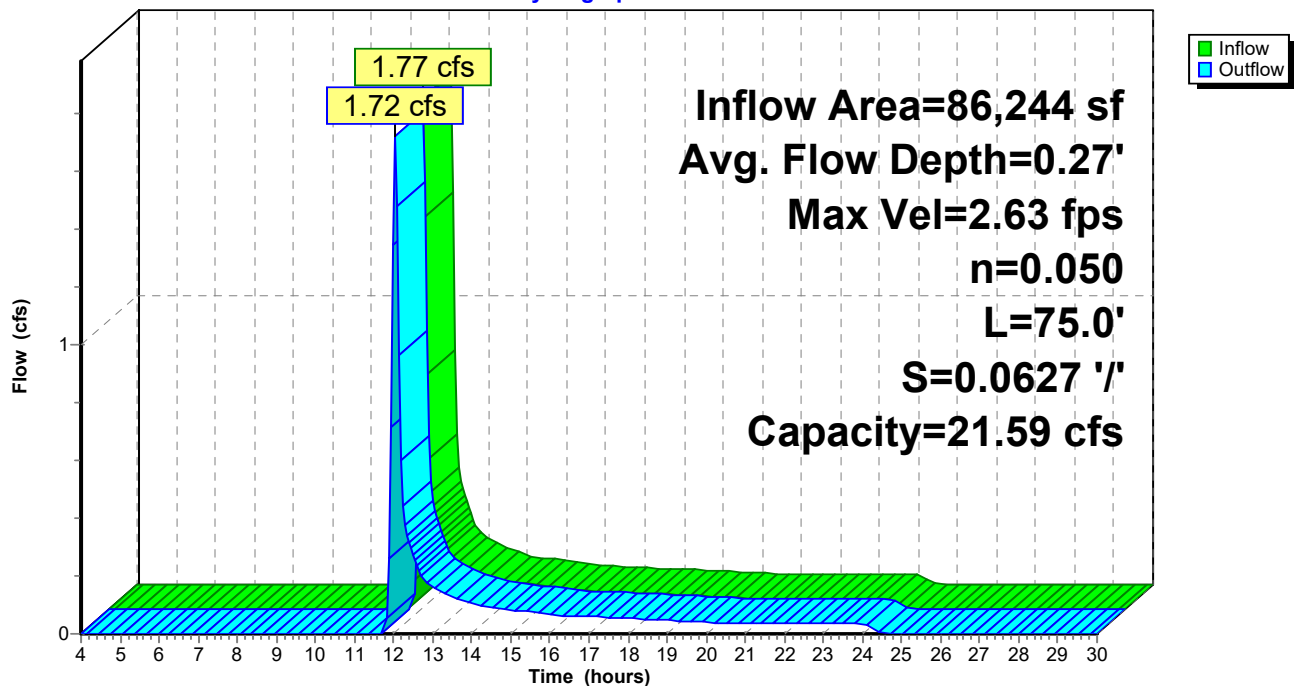
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 14R: Channel 8

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1*Type II 24-hr 10-yr Rainfall=4.74"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: CC-3	Runoff Area=24,835 sf 29.80% Impervious Runoff Depth=1.55" Tc=5.0 min CN=66 Runoff=1.58 cfs 3,214 cf
Subcatchment4S: CC-4	Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=2.49" Tc=5.0 min CN=78 Runoff=0.21 cfs 422 cf
Subcatchment7S: CC-7	Runoff Area=83,908 sf 13.34% Impervious Runoff Depth=1.48" Tc=5.0 min CN=65 Runoff=5.06 cfs 10,370 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.00" Tc=5.0 min CN=30 Runoff=0.00 cfs 0 cf
Subcatchment15S: CC-10	Runoff Area=5,374 sf 51.53% Impervious Runoff Depth=2.24" Tc=5.0 min CN=75 Runoff=0.50 cfs 1,003 cf
Reach 6R: Channel 4	Avg. Flow Depth=0.18' Max Vel=2.20 fps Inflow=1.78 cfs 3,636 cf n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=1.73 cfs 3,636 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.42' Max Vel=4.12 fps Inflow=5.06 cfs 10,370 cf n=0.055 L=405.0' S=0.1130 '/' Capacity=26.35 cfs Outflow=4.63 cfs 10,370 cf
Reach 13R: Culvert #3 12.0" Round Pipe x 2.00	Avg. Flow Depth=0.36' Max Vel=8.91 fps Inflow=4.63 cfs 10,370 cf n=0.012 L=26.0' S=0.0446 '/' Capacity=16.31 cfs Outflow=4.62 cfs 10,370 cf
Reach 14R: Channel 8	Avg. Flow Depth=0.45' Max Vel=3.50 fps Inflow=4.62 cfs 10,370 cf n=0.050 L=75.0' S=0.0627 '/' Capacity=21.59 cfs Outflow=4.51 cfs 10,370 cf

Total Runoff Area = 118,485 sf Runoff Volume = 15,009 cf Average Runoff Depth = 1.52"
81.97% Pervious = 97,118 sf 18.03% Impervious = 21,367 sf

MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 10-yr Rainfall=4.74"

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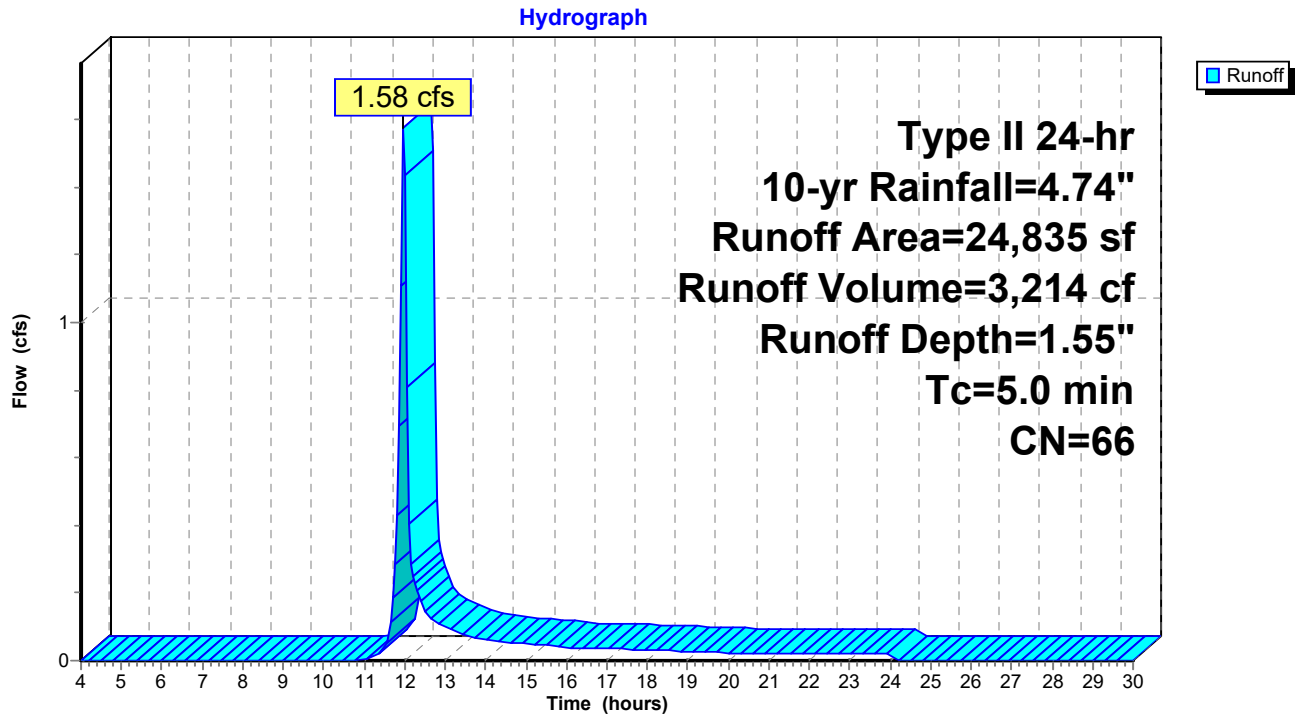
Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.58 cfs @ 11.96 hrs, Volume= 3,214 cf, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
8,181	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
2,351	98	Paved parking, HSG D
24,835	66	Weighted Average
17,433		70.20% Pervious Area
7,402		29.80% Impervious Area

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

Subcatchment 3S: CC-3

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.21 cfs @ 11.96 hrs, Volume= 422 cf, Depth= 2.49"

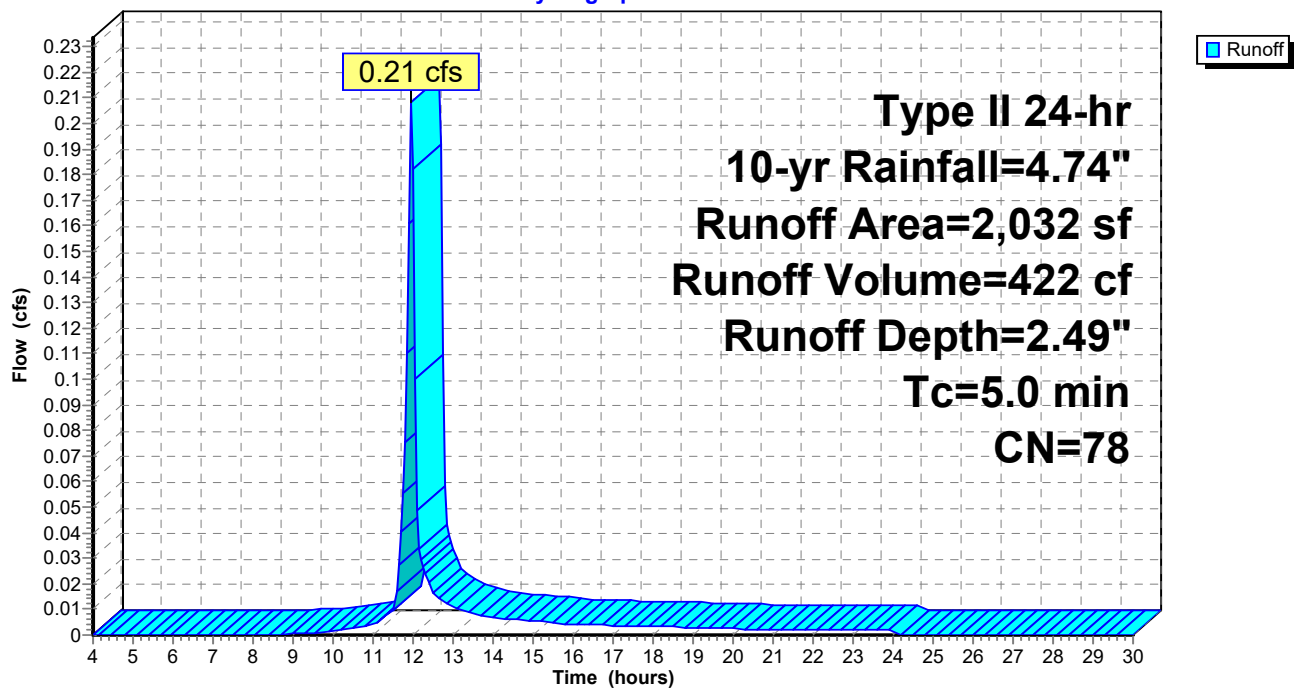
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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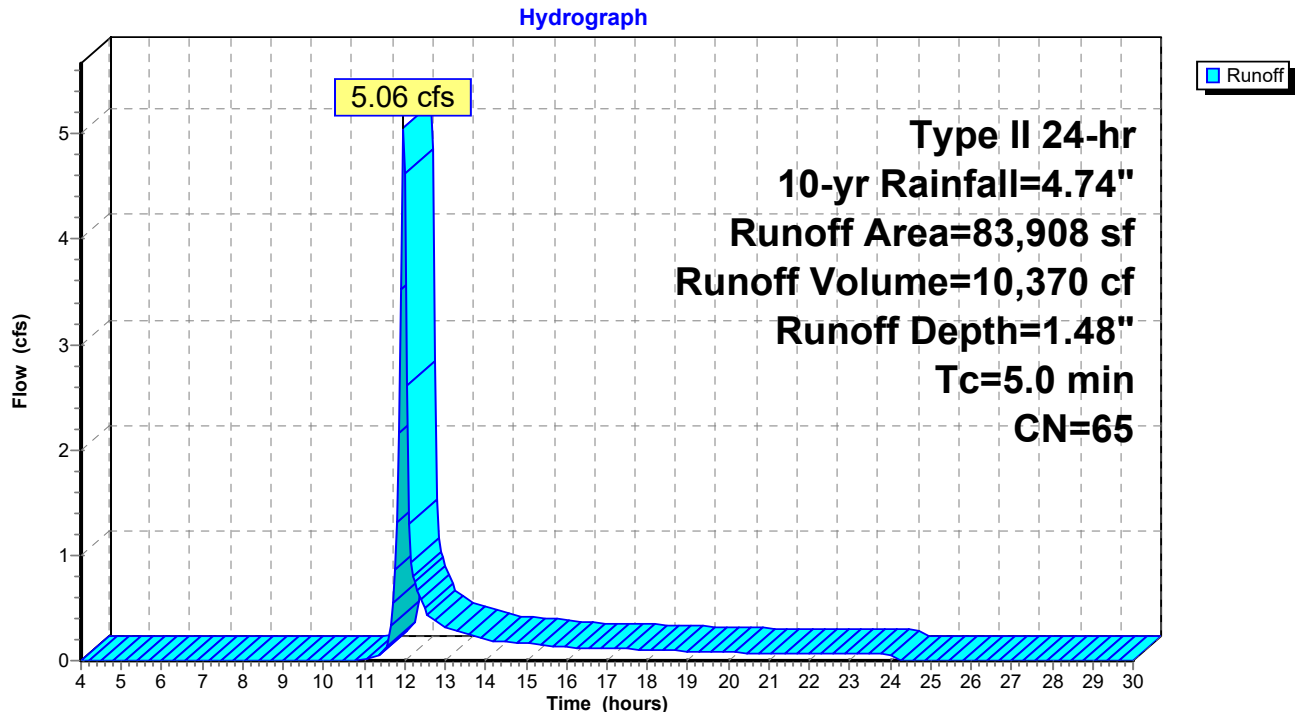
Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 5.06 cfs @ 11.97 hrs, Volume= 10,370 cf, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
26,651	30	Meadow, non-grazed, HSG A
46,061	78	Meadow, non-grazed, HSG D
5,943	98	Paved parking, HSG A
5,253	98	Paved parking, HSG D
83,908	65	Weighted Average
72,712		86.66% Pervious Area
11,196		13.34% Impervious Area

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

Subcatchment 7S: CC-7

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.00 cfs @ 23.98 hrs, Volume= 0 cf, Depth= 0.00"

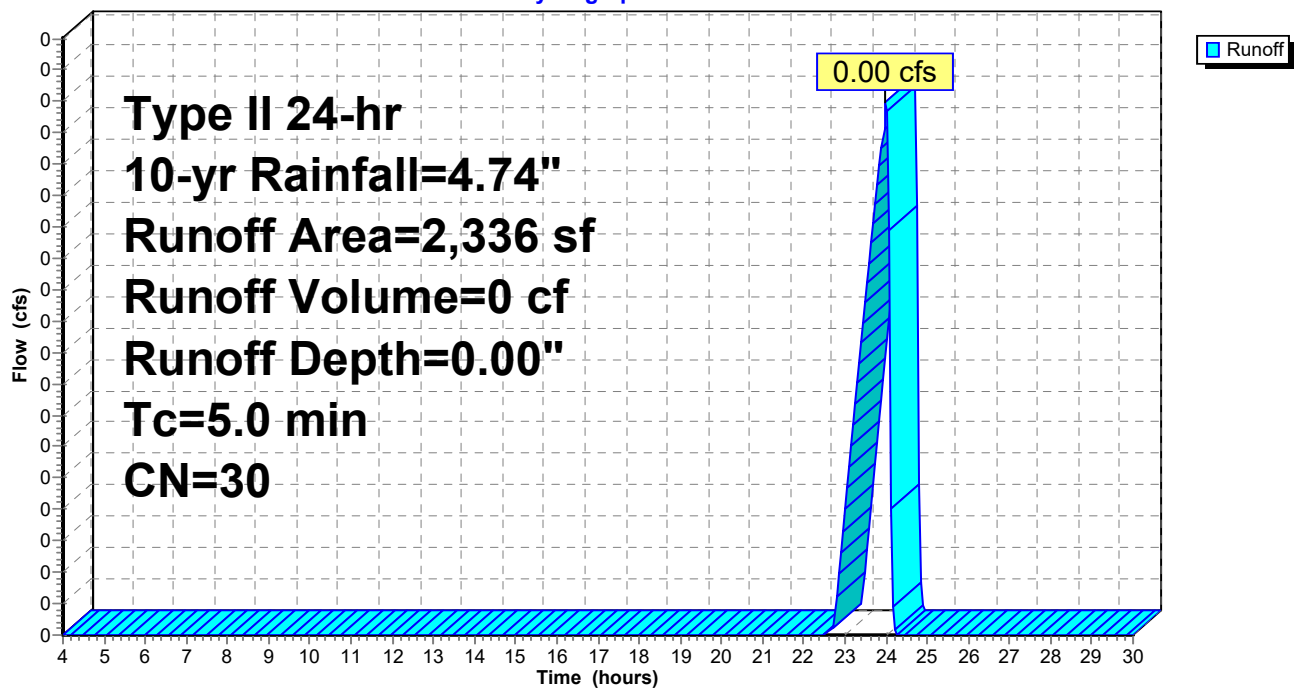
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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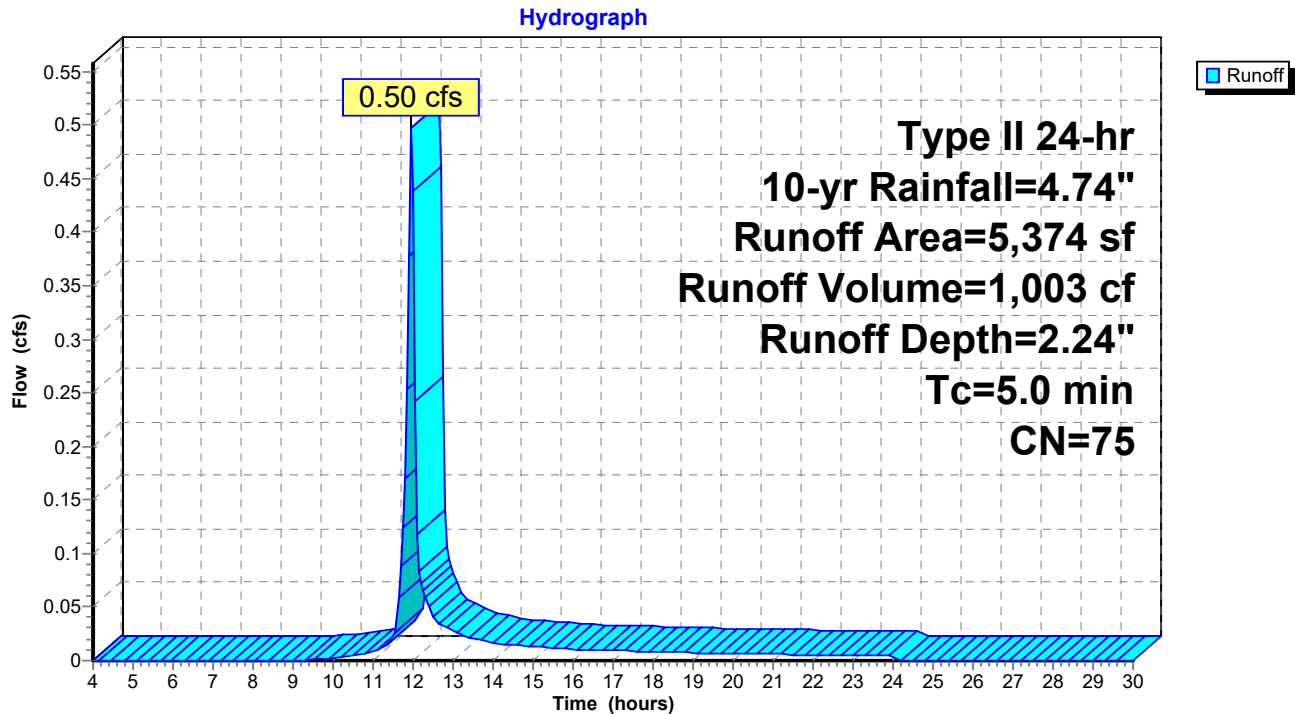
Summary for Subcatchment 15S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.50 cfs @ 11.96 hrs, Volume= 1,003 cf, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
1,482	30	Meadow, non-grazed, HSG A
1,123	78	Meadow, non-grazed, HSG D
1,308	98	Paved parking, HSG A
1,461	98	Paved parking, HSG D
5,374	75	Weighted Average
2,605		48.47% Pervious Area
2,769		51.53% Impervious Area

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

Subcatchment 15S: CC-10

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 27.55% Impervious, Inflow Depth = 1.62" for 10-yr event
Inflow = 1.78 cfs @ 11.96 hrs, Volume= 3,636 cf
Outflow = 1.73 cfs @ 11.98 hrs, Volume= 3,636 cf, Atten= 3%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 0.5 min
Avg. Velocity= 0.52 fps, Avg. Travel Time= 2.0 min

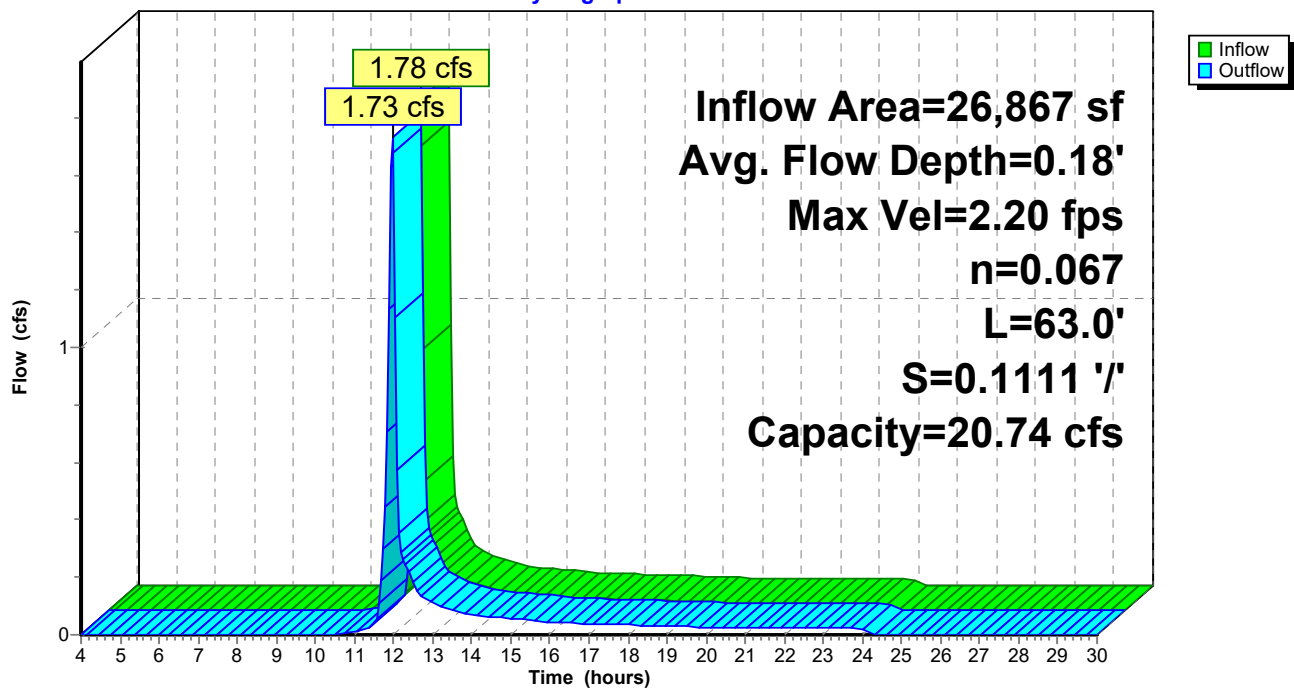
Peak Storage= 50 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 10R: Channel 7

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 1.48" for 10-yr event
Inflow = 5.06 cfs @ 11.97 hrs, Volume= 10,370 cf
Outflow = 4.63 cfs @ 12.01 hrs, Volume= 10,370 cf, Atten= 8%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.12 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 5.9 min

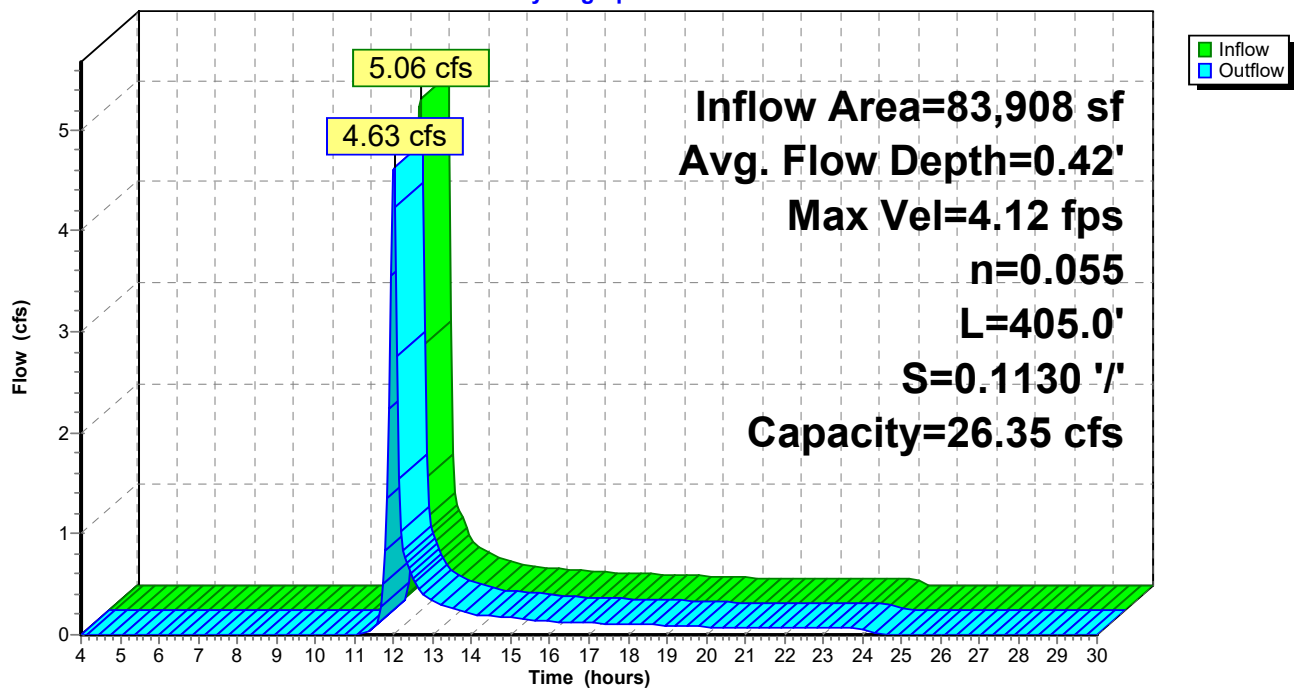
Peak Storage= 482 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.35 cfs

2.00' x 1.00' deep channel, n= 0.055
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 405.0' Slope= 0.1130 '/'
Inlet Invert= 974.75', Outlet Invert= 929.00'



Reach 10R: Channel 7

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 13R: Culvert #3

[52] Hint: Inlet/Outlet conditions not evaluated

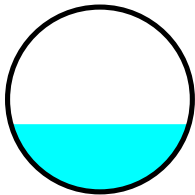
[62] Hint: Exceeded Reach 10R OUTLET depth by 0.53' @ 12.10 hrs

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 1.48" for 10-yr event
Inflow = 4.63 cfs @ 12.01 hrs, Volume= 10,370 cf
Outflow = 4.62 cfs @ 12.01 hrs, Volume= 10,370 cf, Atten= 0%, Lag= 0.1 min

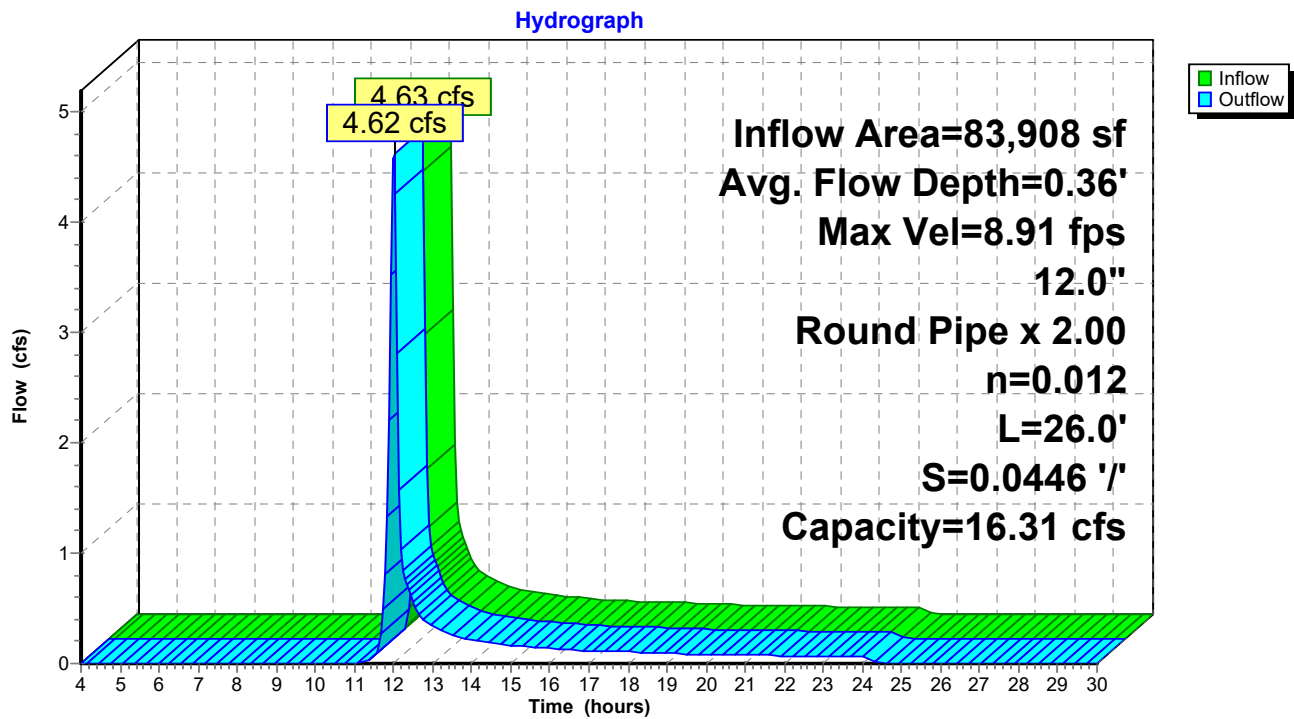
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.91 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 2.95 fps, Avg. Travel Time= 0.1 min

Peak Storage= 13 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00' Flow Area= 1.6 sf, Capacity= 16.31 cfs

A factor of 2.00 has been applied to the storage and discharge capacity
12.0" Round Pipe
n= 0.012
Length= 26.0' Slope= 0.0446 '/
Inlet Invert= 929.50', Outlet Invert= 928.34'



Reach 13R: Culvert #3



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 14R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,244 sf, 12.98% Impervious, Inflow Depth = 1.44" for 10-yr event
Inflow = 4.62 cfs @ 12.01 hrs, Volume= 10,370 cf
Outflow = 4.51 cfs @ 12.02 hrs, Volume= 10,370 cf, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.50 fps, Min. Travel Time= 0.4 min

Avg. Velocity = 1.00 fps, Avg. Travel Time= 1.2 min

Peak Storage= 98 cf @ 12.02 hrs

Average Depth at Peak Storage= 0.45'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.59 cfs

2.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

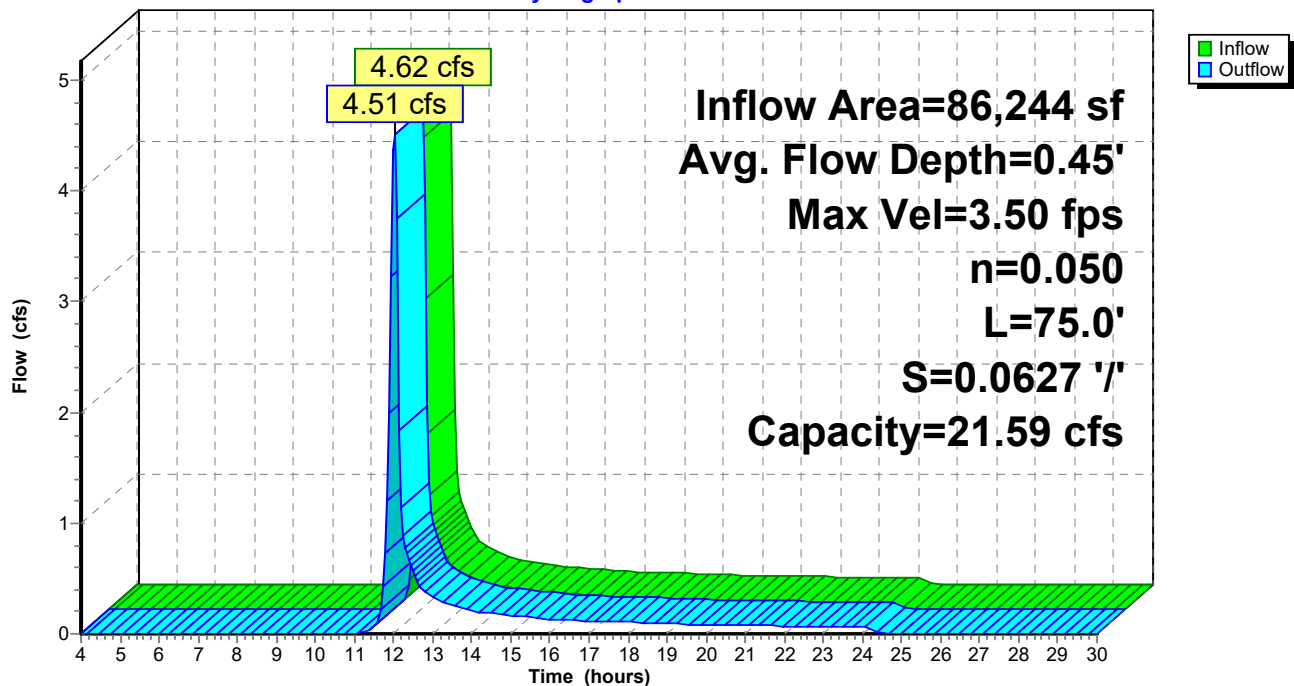
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 14R: Channel 8

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1*Type II 24-hr 25-yr Rainfall=5.85"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: CC-3 Runoff Area=24,835 sf 29.80% Impervious Runoff Depth=2.33"
Tc=5.0 min CN=66 Runoff=2.39 cfs 4,821 cf

Subcatchment4S: CC-4 Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=3.45"
Tc=5.0 min CN=78 Runoff=0.29 cfs 584 cf

Subcatchment7S: CC-7 Runoff Area=83,908 sf 13.34% Impervious Runoff Depth=2.24"
Tc=5.0 min CN=65 Runoff=7.77 cfs 15,683 cf

Subcatchment8S: CC-8 Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.06"
Tc=5.0 min CN=30 Runoff=0.00 cfs 11 cf

Subcatchment15S: CC-10 Runoff Area=5,374 sf 51.53% Impervious Runoff Depth=3.15"
Tc=5.0 min CN=75 Runoff=0.70 cfs 1,413 cf

Reach 6R: Channel 4 Avg. Flow Depth=0.23' Max Vel=2.55 fps Inflow=2.68 cfs 5,405 cf
n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=2.58 cfs 5,405 cf

Reach 10R: Channel 7 Avg. Flow Depth=0.53' Max Vel=4.65 fps Inflow=7.77 cfs 15,683 cf
n=0.055 L=405.0' S=0.1130 '/' Capacity=26.35 cfs Outflow=7.19 cfs 15,683 cf

Reach 13R: Culvert #3 Avg. Flow Depth=0.46' Max Vel=10.05 fps Inflow=7.19 cfs 15,683 cf
12.0" Round Pipe x 2.00 n=0.012 L=26.0' S=0.0446 '/' Capacity=16.31 cfs Outflow=7.17 cfs 15,683 cf

Reach 14R: Channel 8 Avg. Flow Depth=0.57' Max Vel=3.99 fps Inflow=7.17 cfs 15,694 cf
n=0.050 L=75.0' S=0.0627 '/' Capacity=21.59 cfs Outflow=7.03 cfs 15,694 cf

Total Runoff Area = 118,485 sf Runoff Volume = 22,512 cf Average Runoff Depth = 2.28"
81.97% Pervious = 97,118 sf 18.03% Impervious = 21,367 sf

MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 25-yr Rainfall=5.85"

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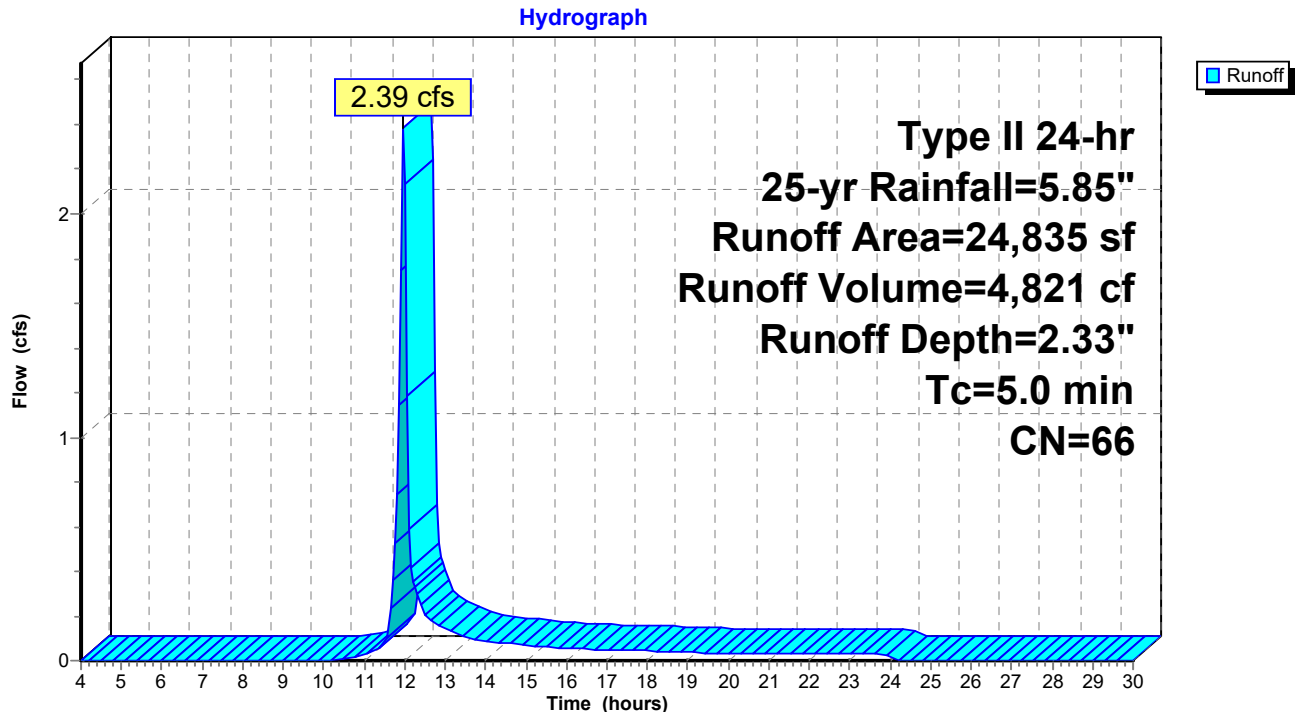
Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.39 cfs @ 11.96 hrs, Volume= 4,821 cf, Depth= 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
8,181	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
2,351	98	Paved parking, HSG D
24,835	66	Weighted Average
17,433		70.20% Pervious Area
7,402		29.80% Impervious Area

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

Subcatchment 3S: CC-3

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.29 cfs @ 11.96 hrs, Volume= 584 cf, Depth= 3.45"

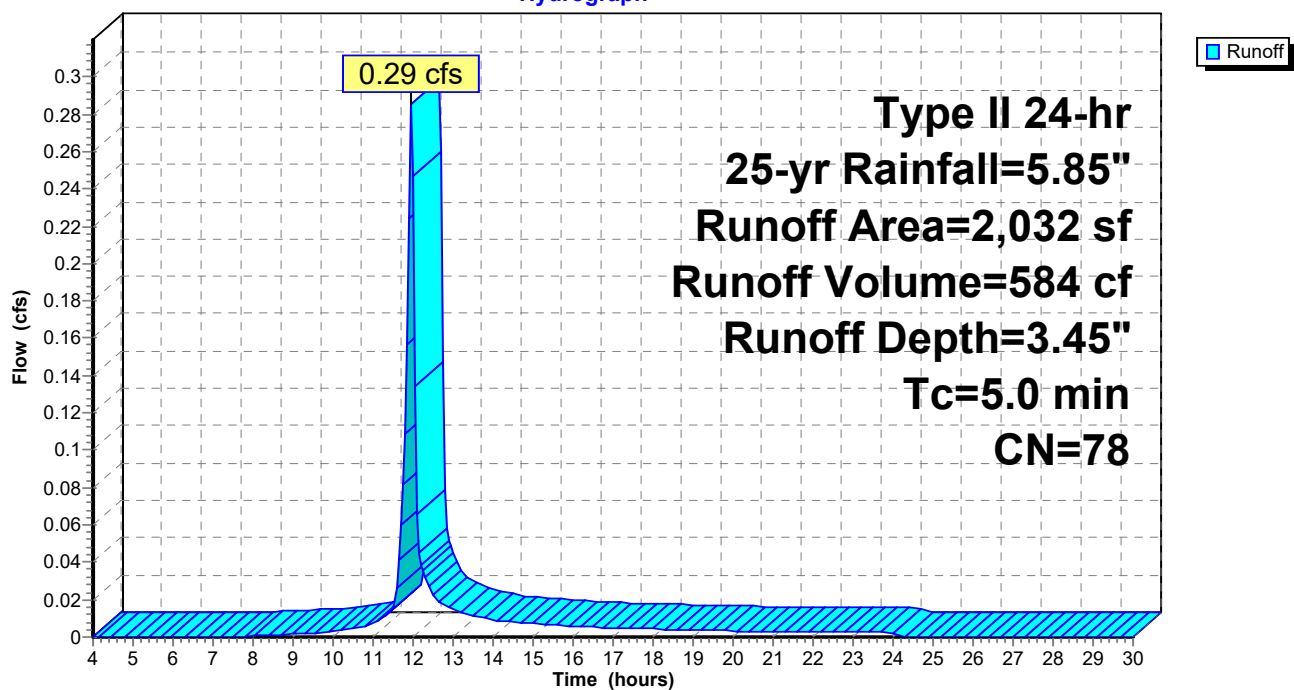
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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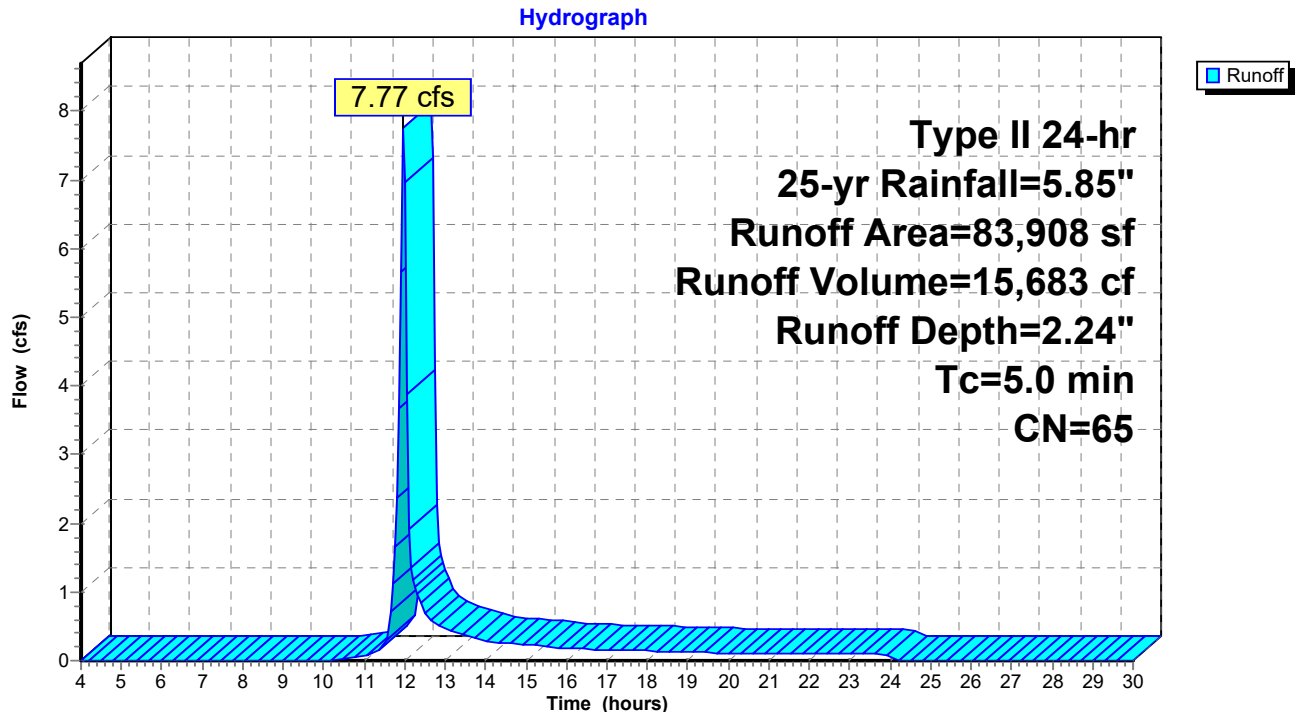
Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 7.77 cfs @ 11.96 hrs, Volume= 15,683 cf, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
26,651	30	Meadow, non-grazed, HSG A
46,061	78	Meadow, non-grazed, HSG D
5,943	98	Paved parking, HSG A
5,253	98	Paved parking, HSG D
83,908	65	Weighted Average
72,712		86.66% Pervious Area
11,196		13.34% Impervious Area

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

Subcatchment 7S: CC-7

Summary for Subcatchment 8S: CC-8

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.00 cfs @ 18.07 hrs, Volume= 11 cf, Depth= 0.06"

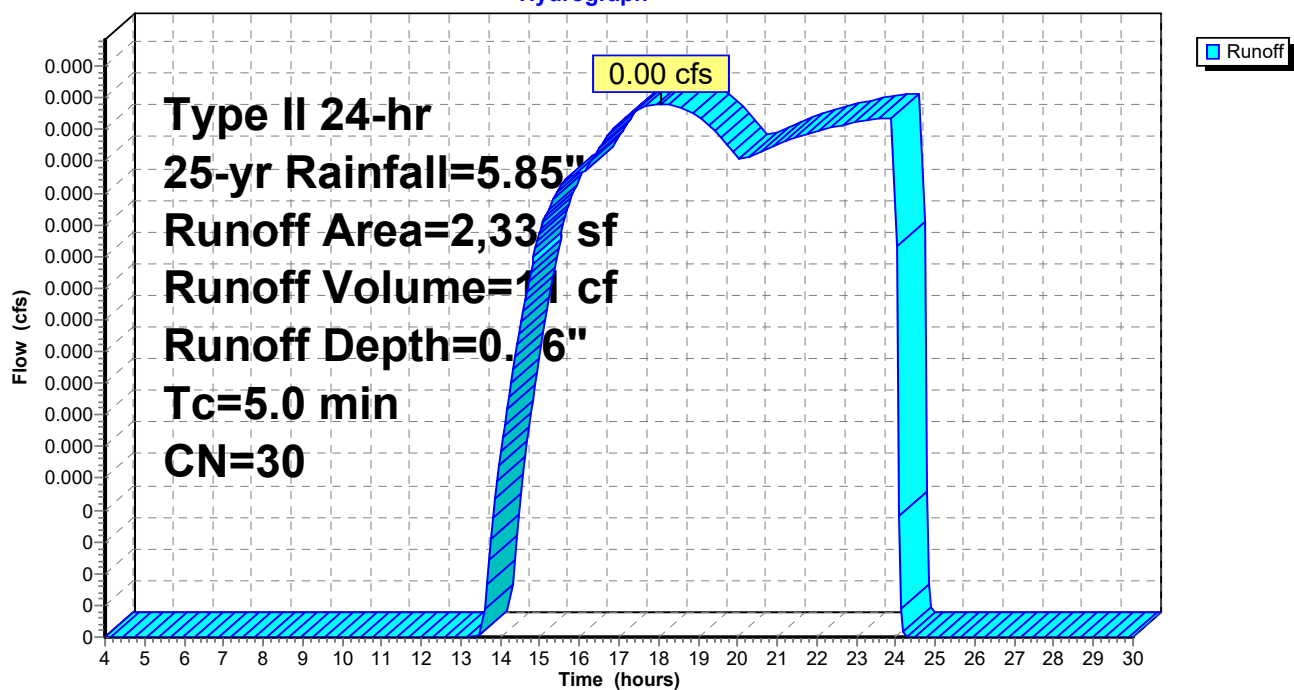
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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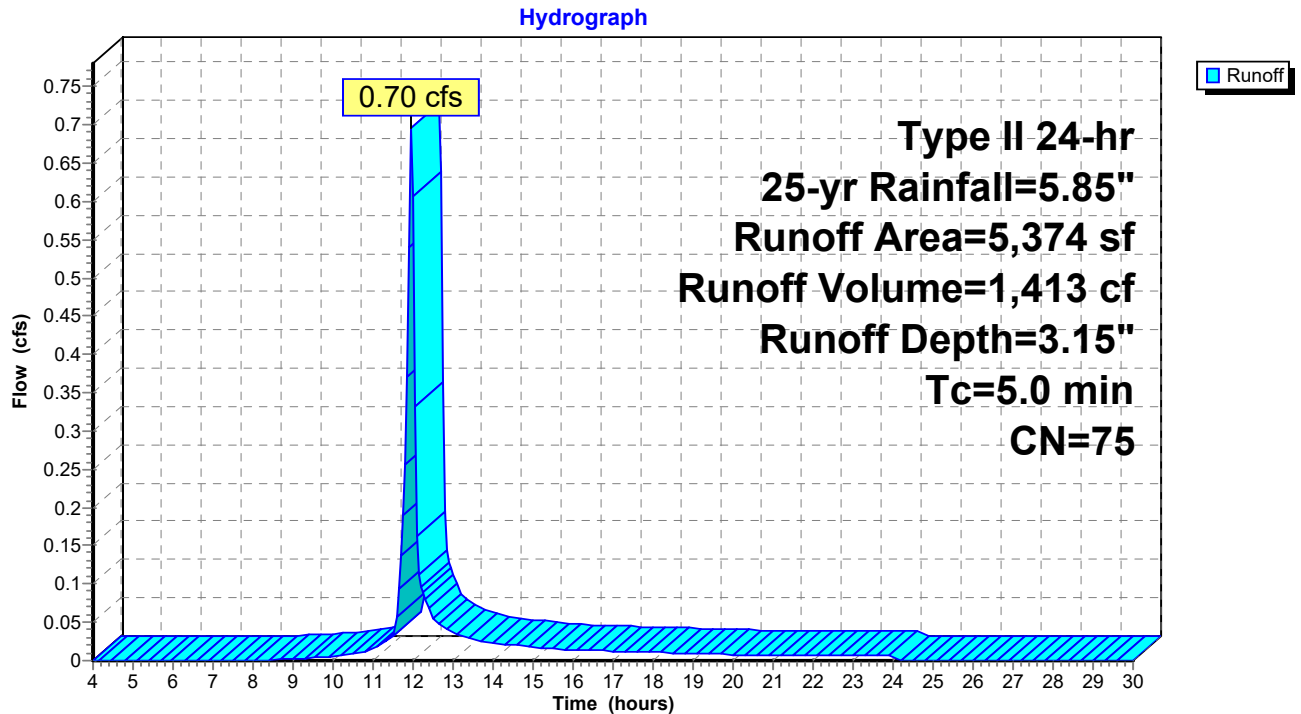
Summary for Subcatchment 15S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.70 cfs @ 11.96 hrs, Volume= 1,413 cf, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
1,482	30	Meadow, non-grazed, HSG A
1,123	78	Meadow, non-grazed, HSG D
1,308	98	Paved parking, HSG A
1,461	98	Paved parking, HSG D
5,374	75	Weighted Average
2,605		48.47% Pervious Area
2,769		51.53% Impervious Area

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

Subcatchment 15S: CC-10

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 27.55% Impervious, Inflow Depth = 2.41" for 25-yr event
Inflow = 2.68 cfs @ 11.96 hrs, Volume= 5,405 cf
Outflow = 2.58 cfs @ 11.97 hrs, Volume= 5,405 cf, Atten= 3%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.55 fps, Min. Travel Time= 0.4 min
Avg. Velocity= 0.57 fps, Avg. Travel Time= 1.8 min

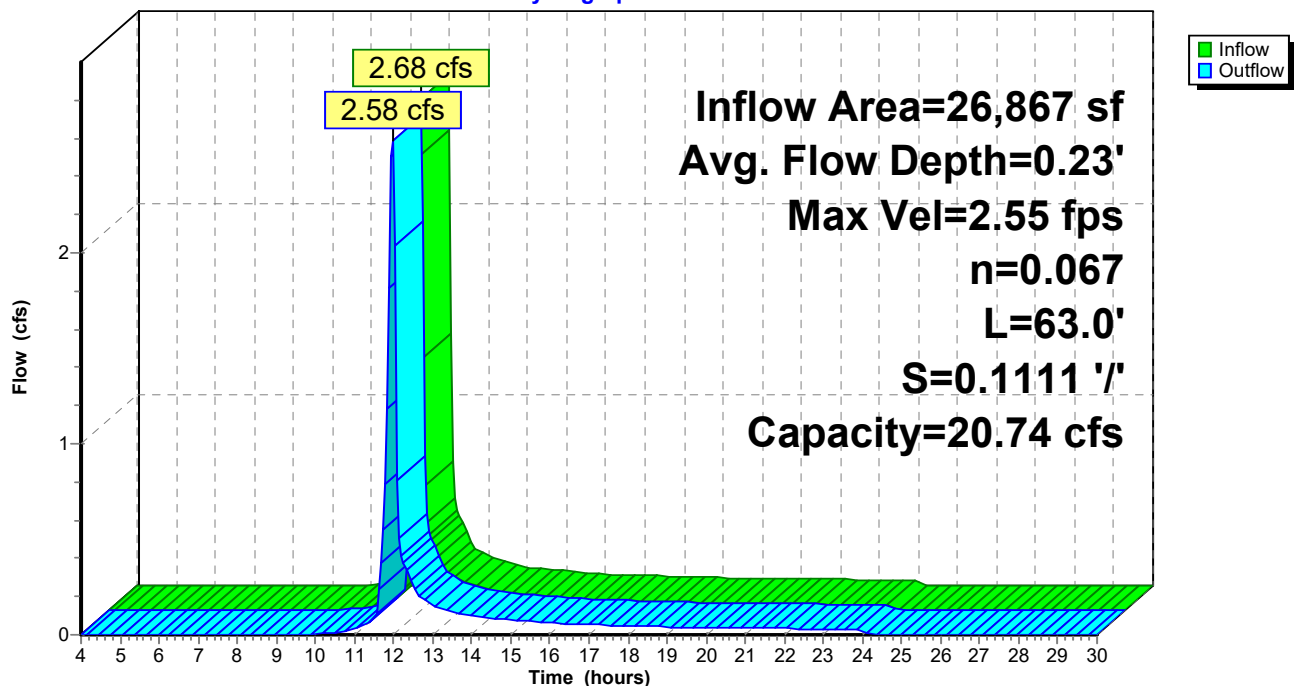
Peak Storage= 65 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 10R: Channel 7

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 2.24" for 25-yr event
Inflow = 7.77 cfs @ 11.96 hrs, Volume= 15,683 cf
Outflow = 7.19 cfs @ 12.00 hrs, Volume= 15,683 cf, Atten= 7%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.65 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 5.3 min

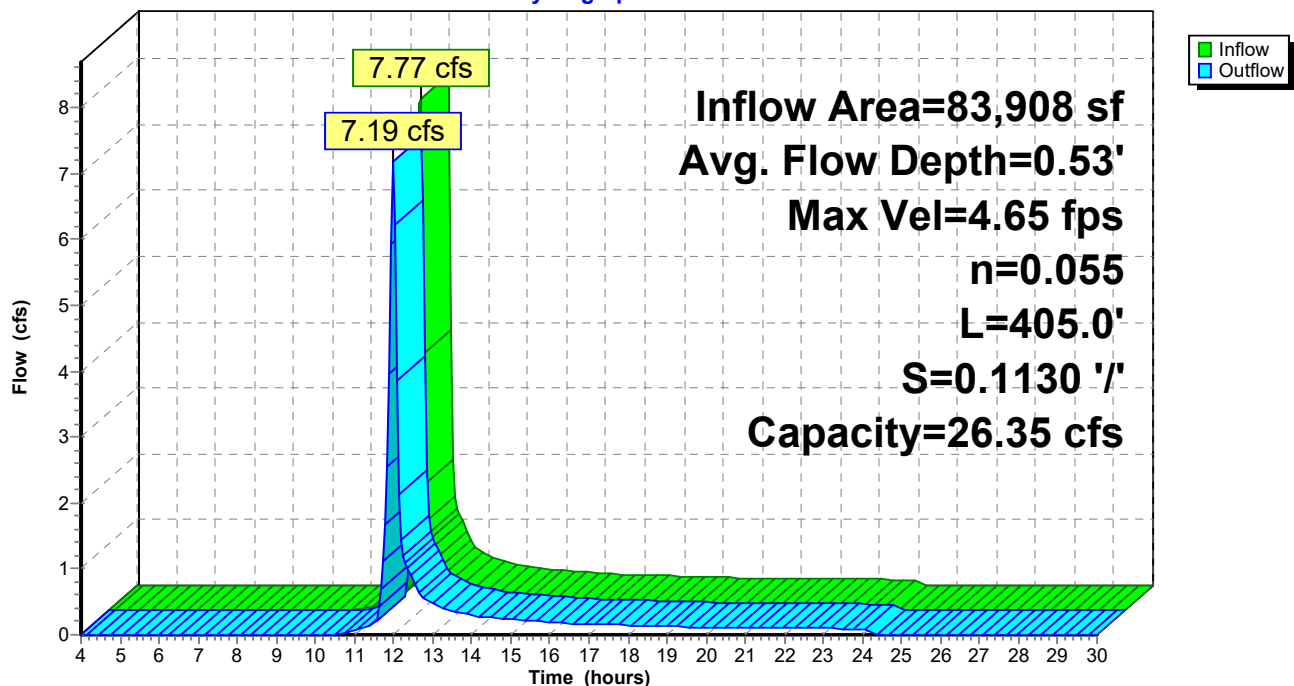
Peak Storage= 654 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.35 cfs

2.00' x 1.00' deep channel, n= 0.055
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 405.0' Slope= 0.1130 '/'
Inlet Invert= 974.75', Outlet Invert= 929.00'



Reach 10R: Channel 7

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 13R: Culvert #3

[52] Hint: Inlet/Outlet conditions not evaluated

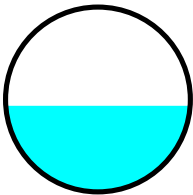
[62] Hint: Exceeded Reach 10R OUTLET depth by 0.53' @ 12.10 hrs

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 2.24" for 25-yr event
Inflow = 7.19 cfs @ 12.00 hrs, Volume= 15,683 cf
Outflow = 7.17 cfs @ 12.00 hrs, Volume= 15,683 cf, Atten= 0%, Lag= 0.1 min

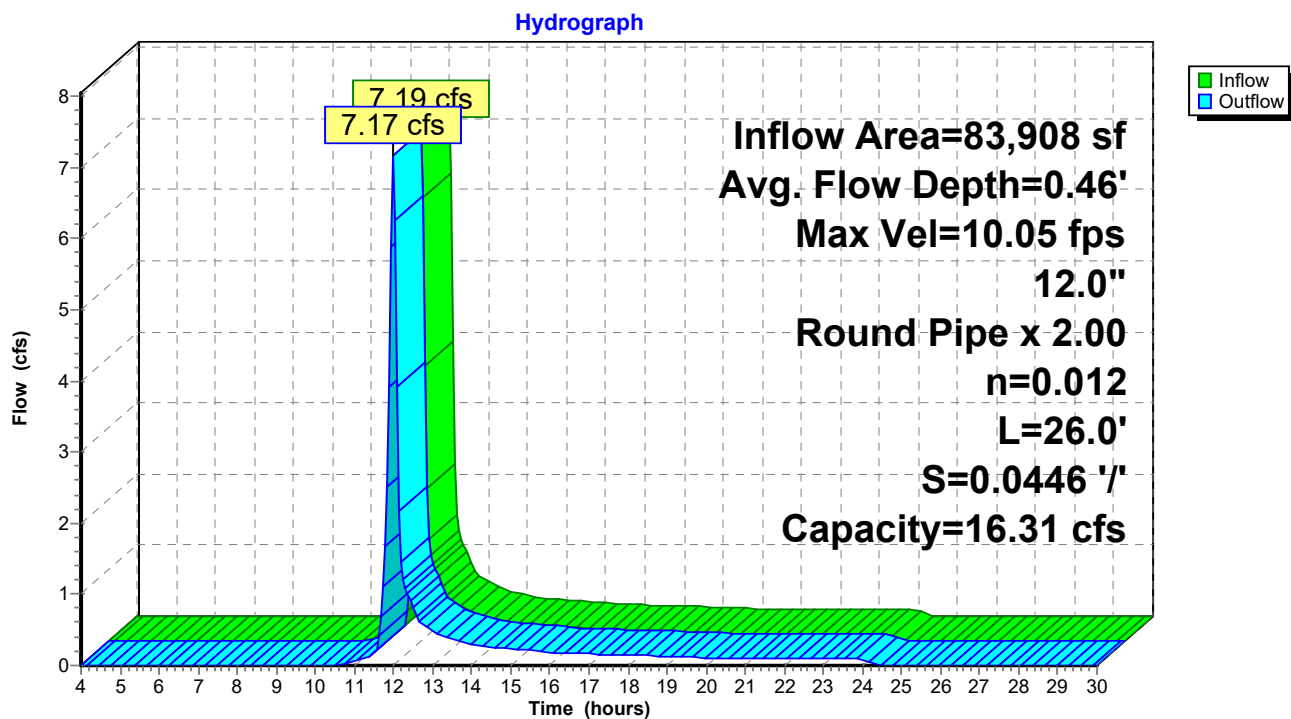
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.05 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 3.23 fps, Avg. Travel Time= 0.1 min

Peak Storage= 19 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 1.00' Flow Area= 1.6 sf, Capacity= 16.31 cfs

A factor of 2.00 has been applied to the storage and discharge capacity
12.0" Round Pipe
n= 0.012
Length= 26.0' Slope= 0.0446 '/
Inlet Invert= 929.50', Outlet Invert= 928.34'



Reach 13R: Culvert #3



MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 14R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,244 sf, 12.98% Impervious, Inflow Depth = 2.18" for 25-yr event
Inflow = 7.17 cfs @ 12.00 hrs, Volume= 15,694 cf
Outflow = 7.03 cfs @ 12.01 hrs, Volume= 15,694 cf, Atten= 2%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.99 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 1.12 fps, Avg. Travel Time= 1.1 min

Peak Storage= 134 cf @ 12.01 hrs

Average Depth at Peak Storage= 0.57'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.59 cfs

2.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

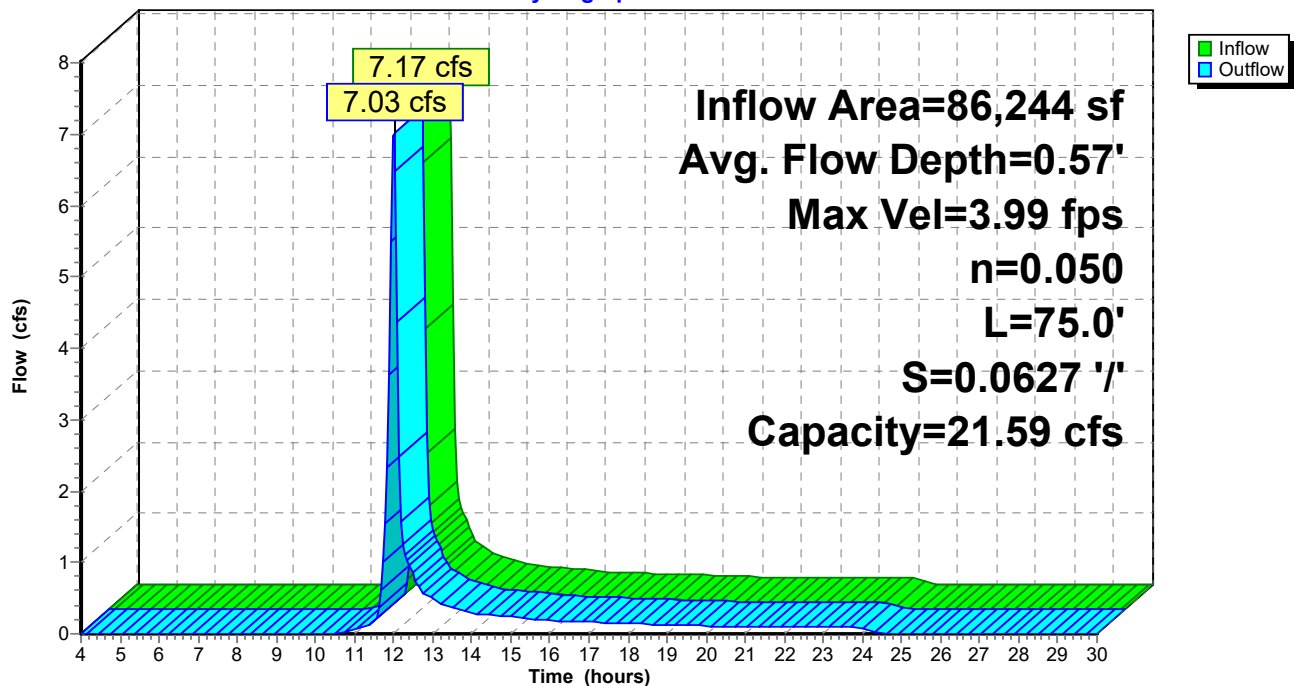
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 14R: Channel 8

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1*Type II 24-hr 50-yr Rainfall=6.87"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: CC-3	Runoff Area=24,835 sf 29.80% Impervious Runoff Depth=3.10" Tc=5.0 min CN=66 Runoff=3.19 cfs 6,421 cf
Subcatchment4S: CC-4	Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=4.36" Tc=5.0 min CN=78 Runoff=0.36 cfs 738 cf
Subcatchment7S: CC-7	Runoff Area=83,908 sf 13.34% Impervious Runoff Depth=3.00" Tc=5.0 min CN=65 Runoff=10.43 cfs 20,994 cf
Subcatchment8S: CC-8	Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.19" Tc=5.0 min CN=30 Runoff=0.00 cfs 37 cf
Subcatchment15S: CC-10	Runoff Area=5,374 sf 51.53% Impervious Runoff Depth=4.04" Tc=5.0 min CN=75 Runoff=0.88 cfs 1,807 cf
Reach 6R: Channel 4	Avg. Flow Depth=0.27' Max Vel=2.82 fps Inflow=3.55 cfs 7,159 cf n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=3.43 cfs 7,159 cf
Reach 10R: Channel 7	Avg. Flow Depth=0.62' Max Vel=5.05 fps Inflow=10.43 cfs 20,994 cf n=0.055 L=405.0' S=0.1130 '/' Capacity=26.35 cfs Outflow=9.71 cfs 20,994 cf
Reach 13R: Culvert #3 12.0" Round Pipe x 2.00	Avg. Flow Depth=0.56' Max Vel=10.83 fps Inflow=9.71 cfs 20,994 cf n=0.012 L=26.0' S=0.0446 '/' Capacity=16.31 cfs Outflow=9.69 cfs 20,994 cf
Reach 14R: Channel 8	Avg. Flow Depth=0.67' Max Vel=4.34 fps Inflow=9.69 cfs 21,031 cf n=0.050 L=75.0' S=0.0627 '/' Capacity=21.59 cfs Outflow=9.52 cfs 21,031 cf

Total Runoff Area = 118,485 sf Runoff Volume = 29,997 cf Average Runoff Depth = 3.04"
81.97% Pervious = 97,118 sf 18.03% Impervious = 21,367 sf

MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 50-yr Rainfall=6.87"

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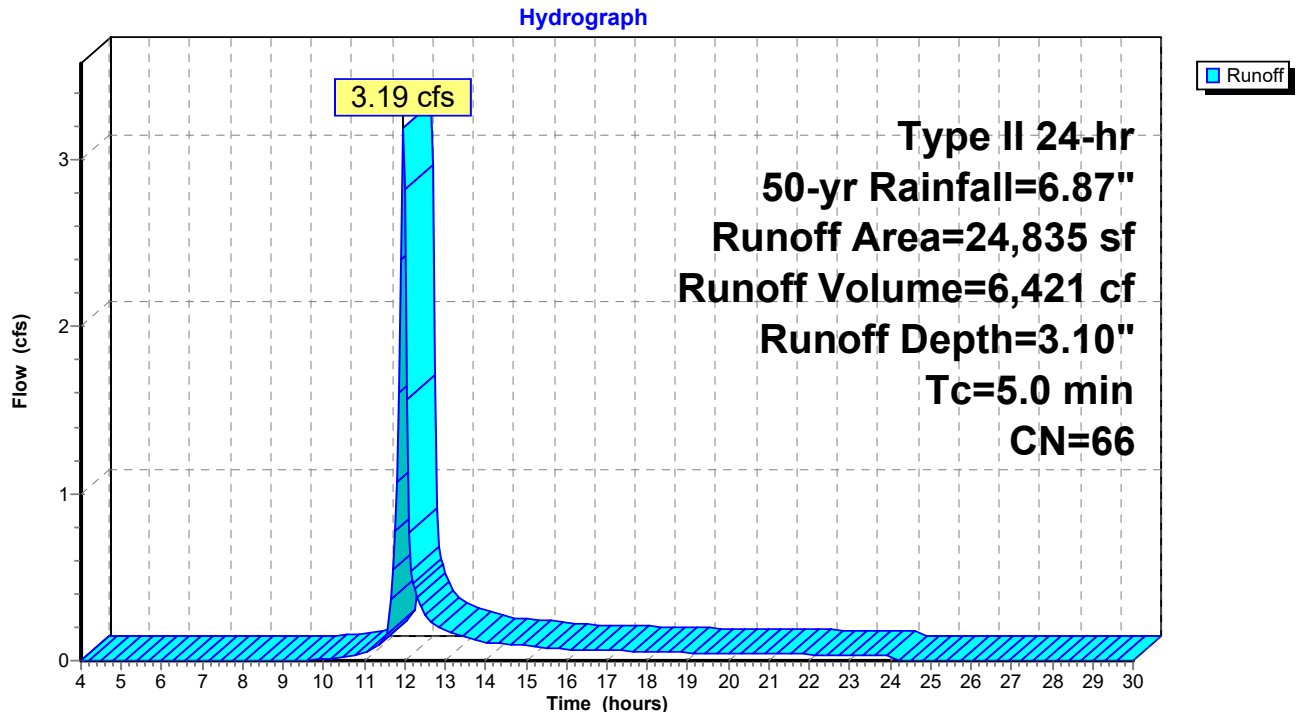
Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.19 cfs @ 11.96 hrs, Volume= 6,421 cf, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
8,181	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
2,351	98	Paved parking, HSG D
24,835	66	Weighted Average
17,433		70.20% Pervious Area
7,402		29.80% Impervious Area

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

Subcatchment 3S: CC-3

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Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.36 cfs @ 11.95 hrs, Volume= 738 cf, Depth= 4.36"

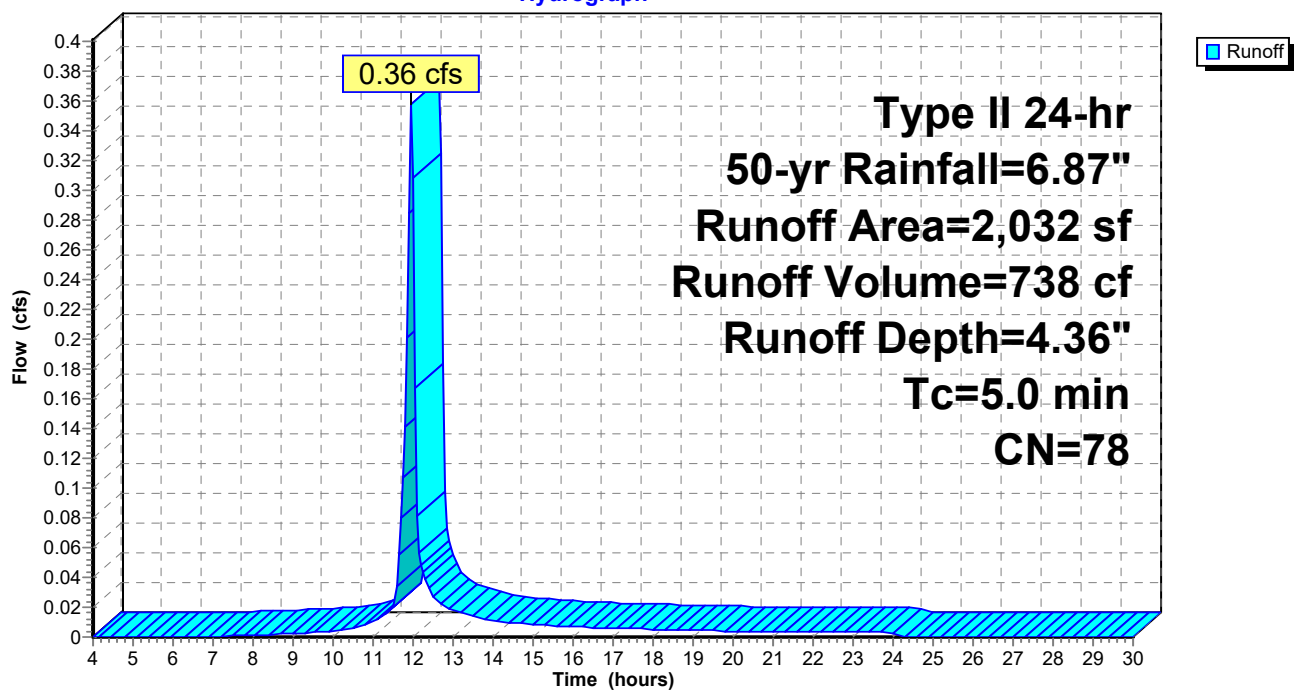
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 50-yr Rainfall=6.87"

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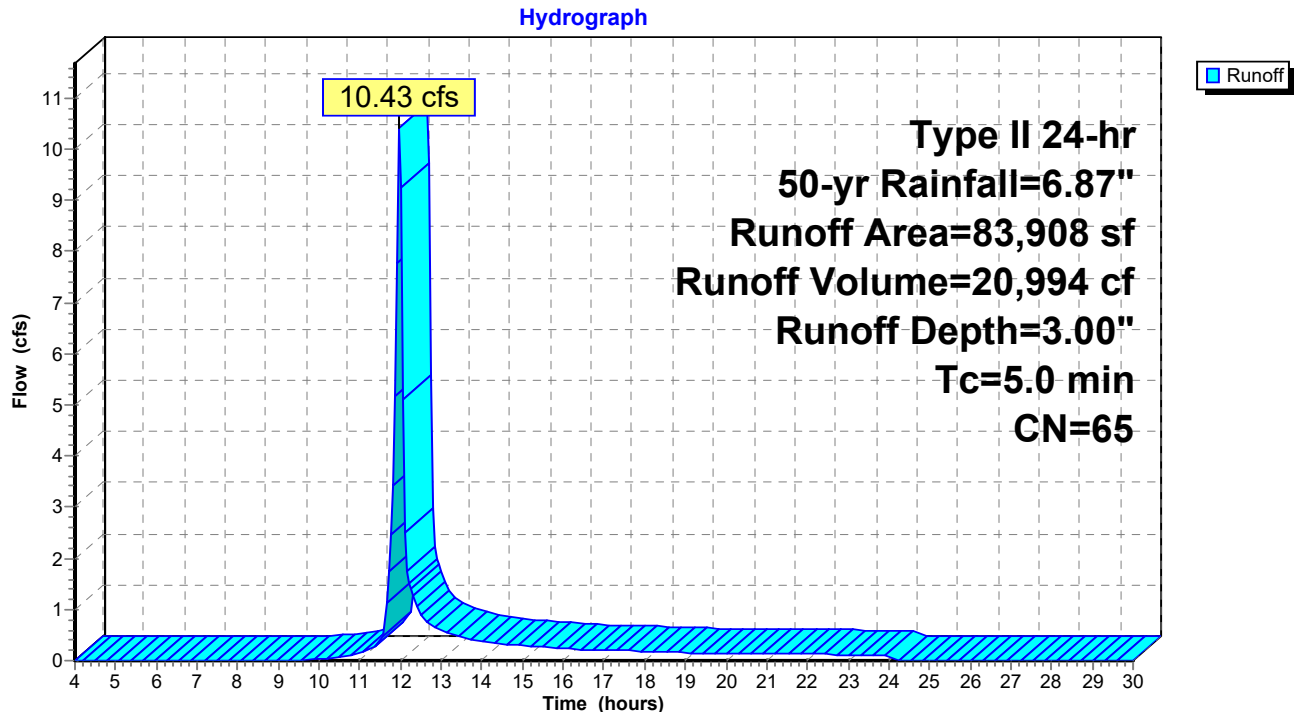
Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 10.43 cfs @ 11.96 hrs, Volume= 20,994 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
26,651	30	Meadow, non-grazed, HSG A
46,061	78	Meadow, non-grazed, HSG D
5,943	98	Paved parking, HSG A
5,253	98	Paved parking, HSG D
83,908	65	Weighted Average
72,712		86.66% Pervious Area
11,196		13.34% Impervious Area

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

Subcatchment 7S: CC-7

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Type II 24-hr 50-yr Rainfall=6.87"

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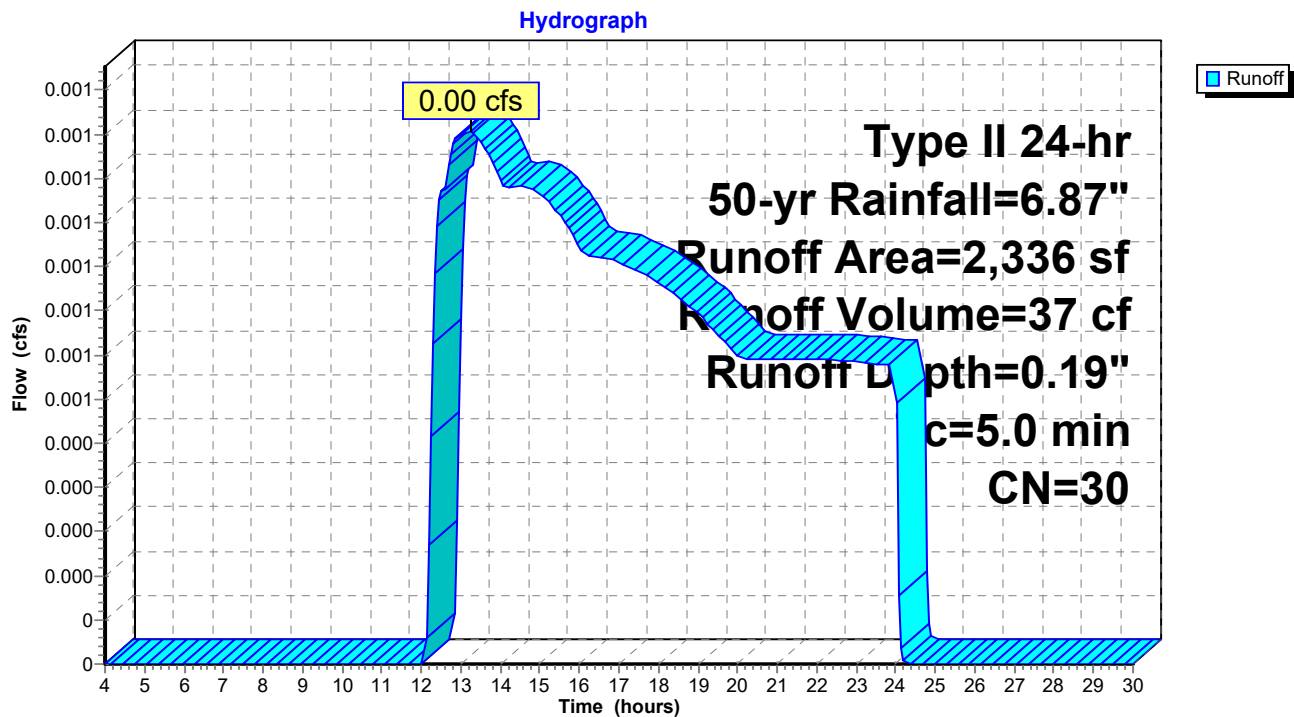
Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.00 cfs @ 13.28 hrs, Volume= 37 cf, Depth= 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 50-yr Rainfall=6.87"

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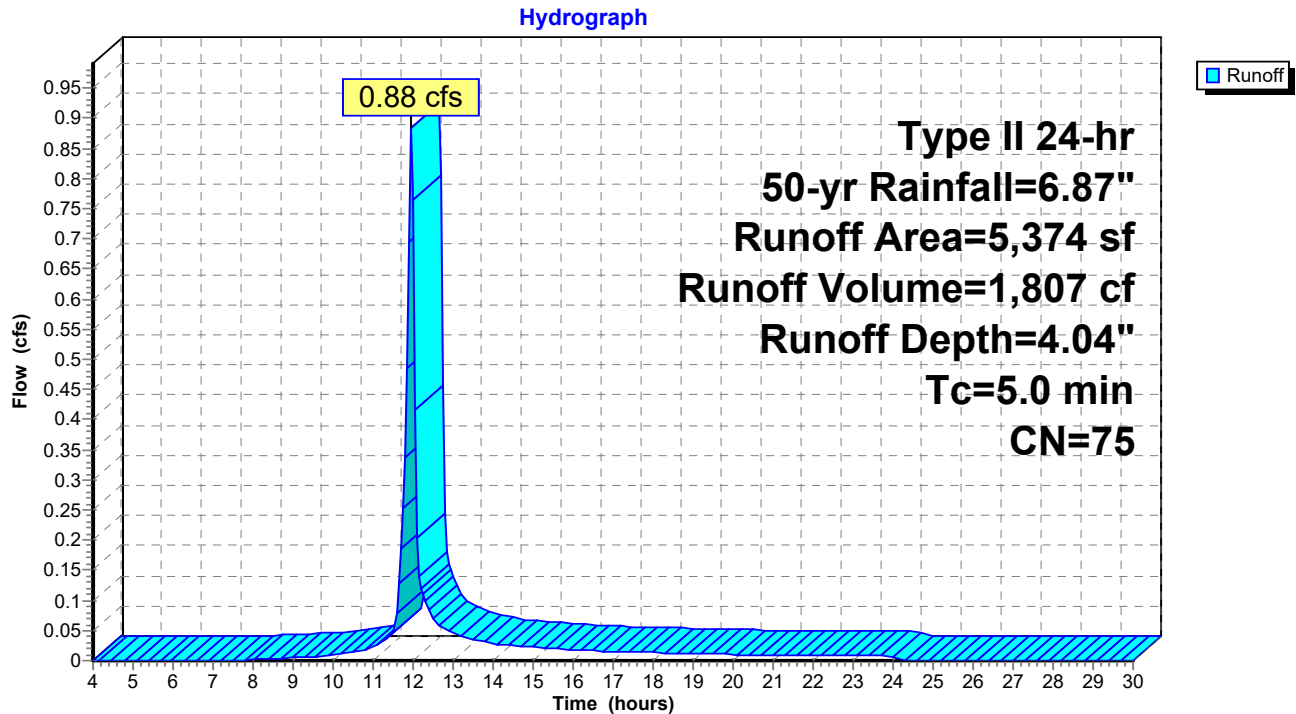
Summary for Subcatchment 15S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.88 cfs @ 11.96 hrs, Volume= 1,807 cf, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
1,482	30	Meadow, non-grazed, HSG A
1,123	78	Meadow, non-grazed, HSG D
1,308	98	Paved parking, HSG A
1,461	98	Paved parking, HSG D
5,374	75	Weighted Average
2,605		48.47% Pervious Area
2,769		51.53% Impervious Area

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

Subcatchment 15S: CC-10

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 27.55% Impervious, Inflow Depth = 3.20" for 50-yr event
Inflow = 3.55 cfs @ 11.96 hrs, Volume= 7,159 cf
Outflow = 3.43 cfs @ 11.97 hrs, Volume= 7,159 cf, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.82 fps, Min. Travel Time= 0.4 min
Avg. Velocity= 0.61 fps, Avg. Travel Time= 1.7 min

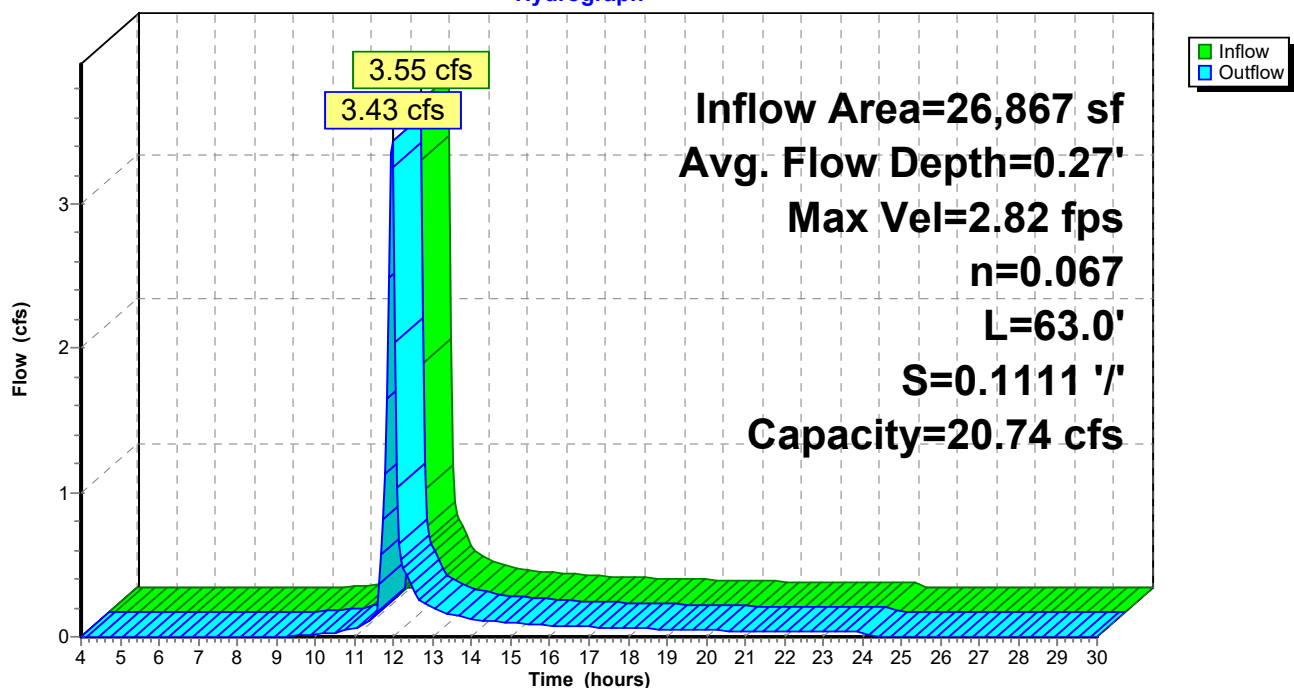
Peak Storage= 78 cf @ 11.96 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 10R: Channel 7

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 3.00" for 50-yr event
Inflow = 10.43 cfs @ 11.96 hrs, Volume= 20,994 cf
Outflow = 9.71 cfs @ 12.00 hrs, Volume= 20,994 cf, Atten= 7%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.05 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 4.9 min

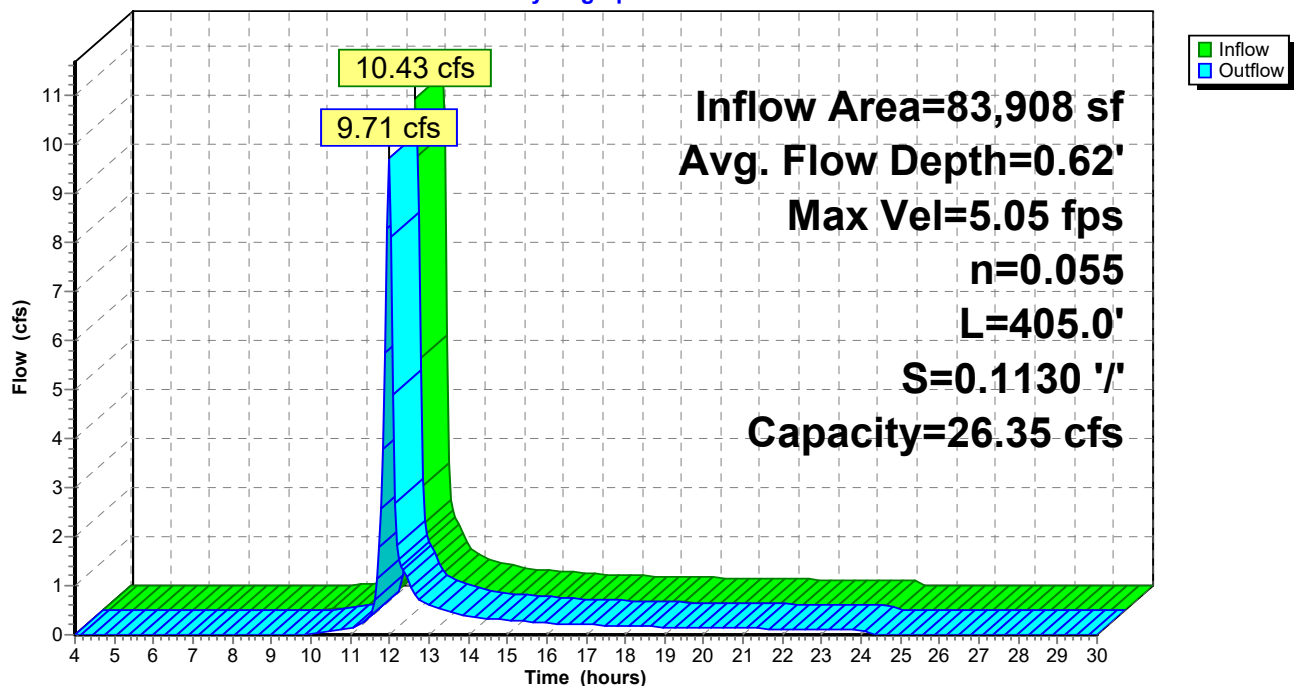
Peak Storage= 809 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.35 cfs

2.00' x 1.00' deep channel, n= 0.055
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 405.0' Slope= 0.1130 '/'
Inlet Invert= 974.75', Outlet Invert= 929.00'



Reach 10R: Channel 7

Hydrograph



Summary for Reach 13R: Culvert #3

[52] Hint: Inlet/Outlet conditions not evaluated

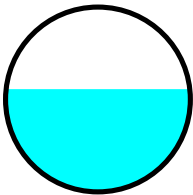
[62] Hint: Exceeded Reach 10R OUTLET depth by 0.53' @ 12.10 hrs

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 3.00" for 50-yr event
Inflow = 9.71 cfs @ 12.00 hrs, Volume= 20,994 cf
Outflow = 9.69 cfs @ 12.00 hrs, Volume= 20,994 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.83 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 3.43 fps, Avg. Travel Time= 0.1 min

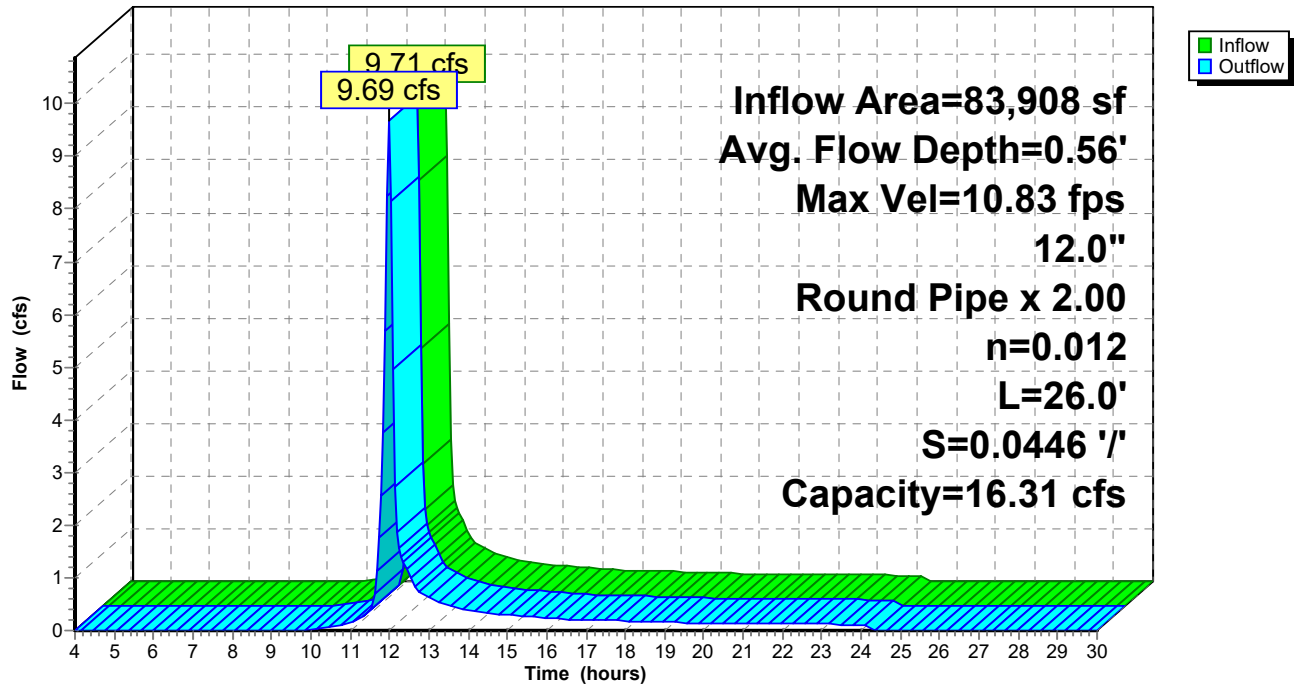
Peak Storage= 23 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.00' Flow Area= 1.6 sf, Capacity= 16.31 cfs

A factor of 2.00 has been applied to the storage and discharge capacity
12.0" Round Pipe
n= 0.012
Length= 26.0' Slope= 0.0446 '/
Inlet Invert= 929.50', Outlet Invert= 928.34'



Reach 13R: Culvert #3

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 14R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,244 sf, 12.98% Impervious, Inflow Depth = 2.93" for 50-yr event
Inflow = 9.69 cfs @ 12.00 hrs, Volume= 21,031 cf
Outflow = 9.52 cfs @ 12.01 hrs, Volume= 21,031 cf, Atten= 2%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.34 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 1.20 fps, Avg. Travel Time= 1.0 min

Peak Storage= 167 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.67'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.59 cfs

2.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

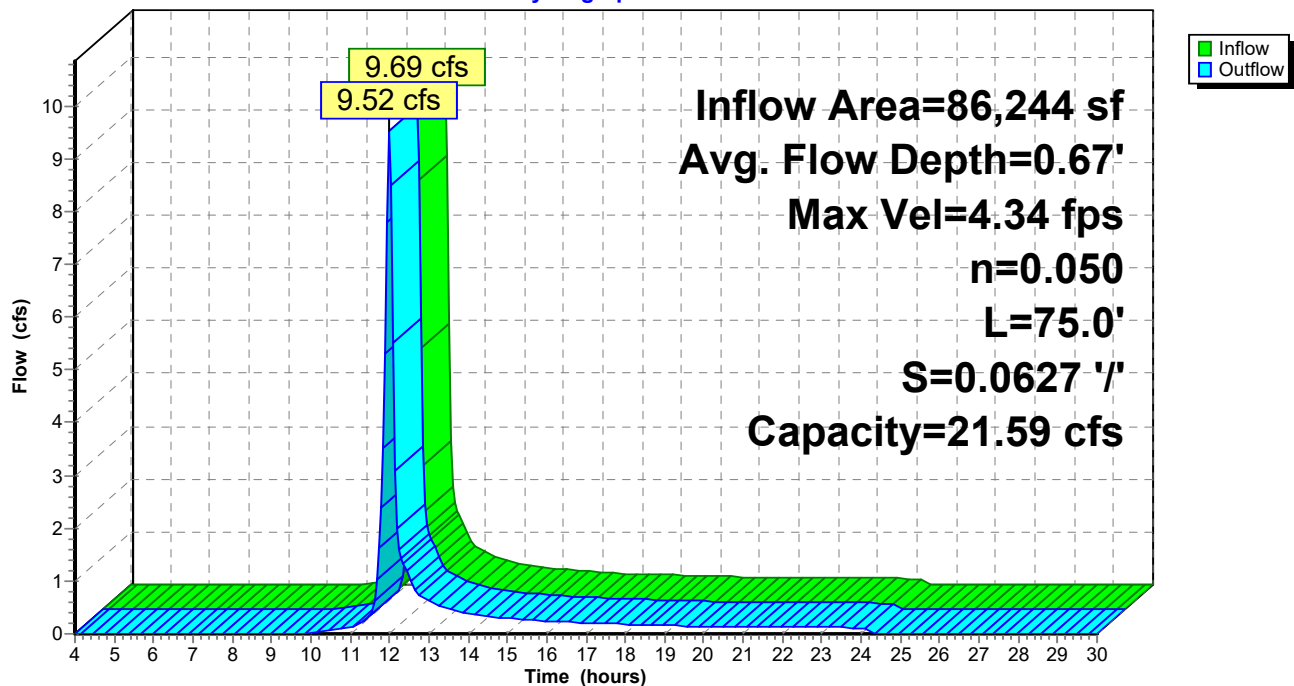
Length= 75.0' Slope= 0.0627 '/'

Inlet Invert= 0.00', Outlet Invert= -4.70'



Reach 14R: Channel 8

Hydrograph



MLV 505LD86_Channels REV 2 Phase 1*Type II 24-hr 100-yr Rainfall=8.09"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: CC-3 Runoff Area=24,835 sf 29.80% Impervious Runoff Depth=4.08"
Tc=5.0 min CN=66 Runoff=4.18 cfs 8,447 cf

Subcatchment4S: CC-4 Runoff Area=2,032 sf 0.00% Impervious Runoff Depth=5.47"
Tc=5.0 min CN=78 Runoff=0.44 cfs 927 cf

Subcatchment7S: CC-7 Runoff Area=83,908 sf 13.34% Impervious Runoff Depth=3.97"
Tc=5.0 min CN=65 Runoff=13.75 cfs 27,739 cf

Subcatchment8S: CC-8 Runoff Area=2,336 sf 0.00% Impervious Runoff Depth=0.44"
Tc=5.0 min CN=30 Runoff=0.01 cfs 85 cf

Subcatchment15S: CC-10 Runoff Area=5,374 sf 51.53% Impervious Runoff Depth=5.12"
Tc=5.0 min CN=75 Runoff=1.11 cfs 2,294 cf

Reach 6R: Channel 4 Avg. Flow Depth=0.32' Max Vel=3.10 fps Inflow=4.63 cfs 9,374 cf
n=0.067 L=63.0' S=0.1111 '/' Capacity=20.74 cfs Outflow=4.49 cfs 9,374 cf

Reach 10R: Channel 7 Avg. Flow Depth=0.71' Max Vel=5.44 fps Inflow=13.75 cfs 27,739 cf
n=0.055 L=405.0' S=0.1130 '/' Capacity=26.35 cfs Outflow=12.87 cfs 27,739 cf

Reach 13R: Culvert #3 Avg. Flow Depth=0.67' Max Vel=11.50 fps Inflow=12.87 cfs 27,739 cf
12.0" Round Pipe x 2.00 n=0.012 L=26.0' S=0.0446 '/' Capacity=16.31 cfs Outflow=12.84 cfs 27,739 cf

Reach 14R: Channel 8 Avg. Flow Depth=0.77' Max Vel=4.70 fps Inflow=12.85 cfs 27,825 cf
n=0.050 L=75.0' S=0.0627 '/' Capacity=21.59 cfs Outflow=12.66 cfs 27,825 cf

Total Runoff Area = 118,485 sf Runoff Volume = 39,493 cf Average Runoff Depth = 4.00"
81.97% Pervious = 97,118 sf 18.03% Impervious = 21,367 sf

MLV 505LD86_Channels REV 2 Phase 1

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Type II 24-hr 100-yr Rainfall=8.09"

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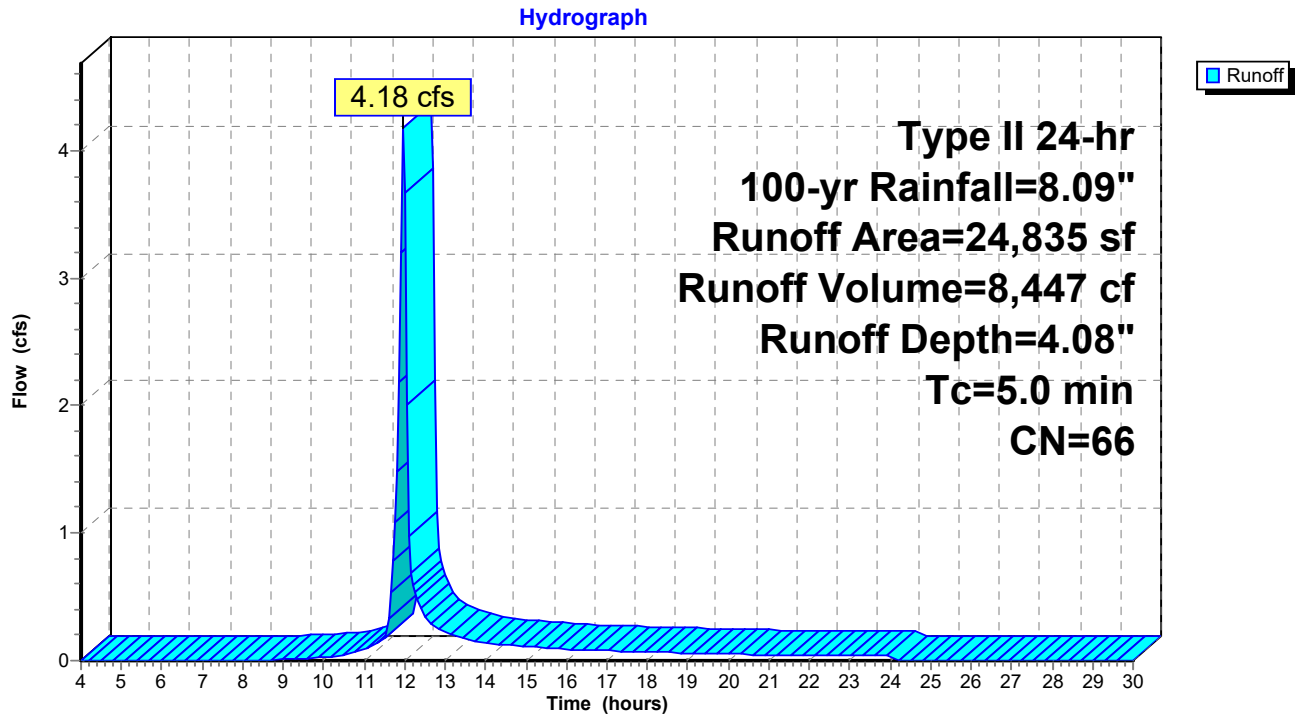
Summary for Subcatchment 3S: CC-3[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 4.18 cfs @ 11.96 hrs, Volume= 8,447 cf, Depth= 4.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
9,252	30	Meadow, non-grazed, HSG A
8,181	78	Meadow, non-grazed, HSG D
5,051	98	Paved parking, HSG A
2,351	98	Paved parking, HSG D
24,835	66	Weighted Average
17,433		70.20% Pervious Area
7,402		29.80% Impervious Area

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

Subcatchment 3S: CC-3

Summary for Subcatchment 4S: CC-4[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.44 cfs @ 11.95 hrs, Volume= 927 cf, Depth= 5.47"

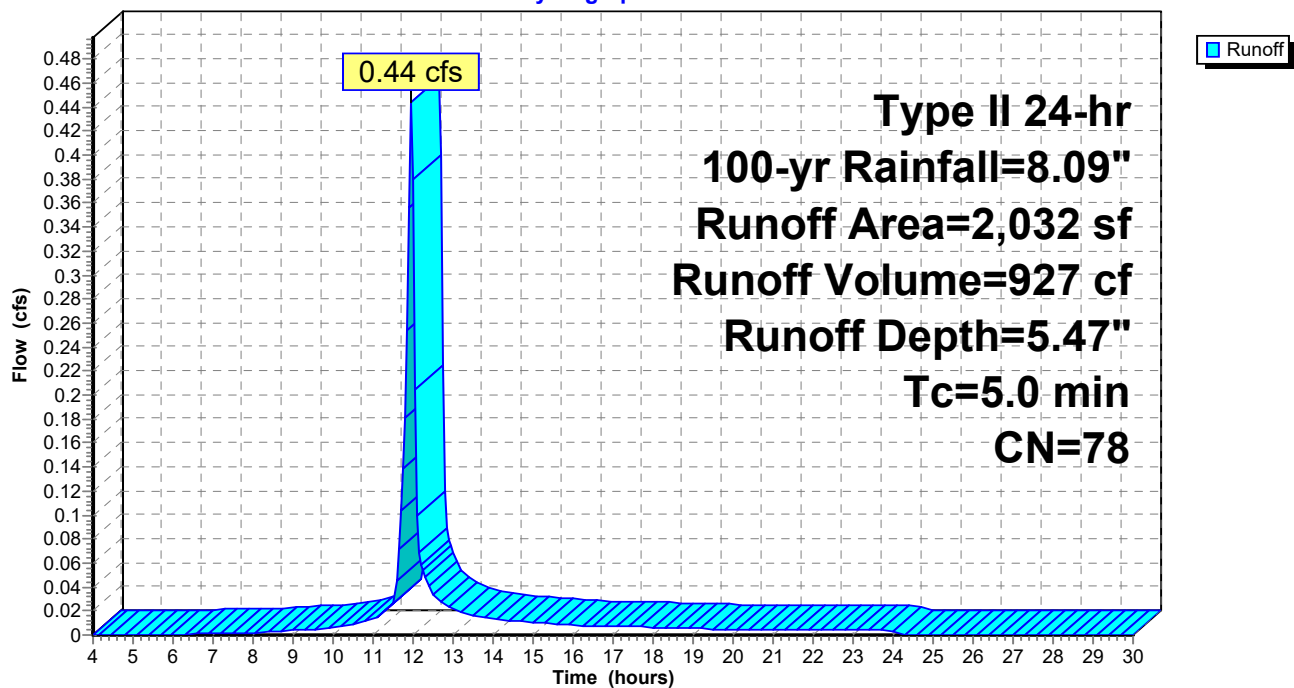
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
2,032	78	Meadow, non-grazed, HSG D
2,032		100.00% Pervious Area

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

Subcatchment 4S: CC-4

Hydrograph



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Type II 24-hr 100-yr Rainfall=8.09"

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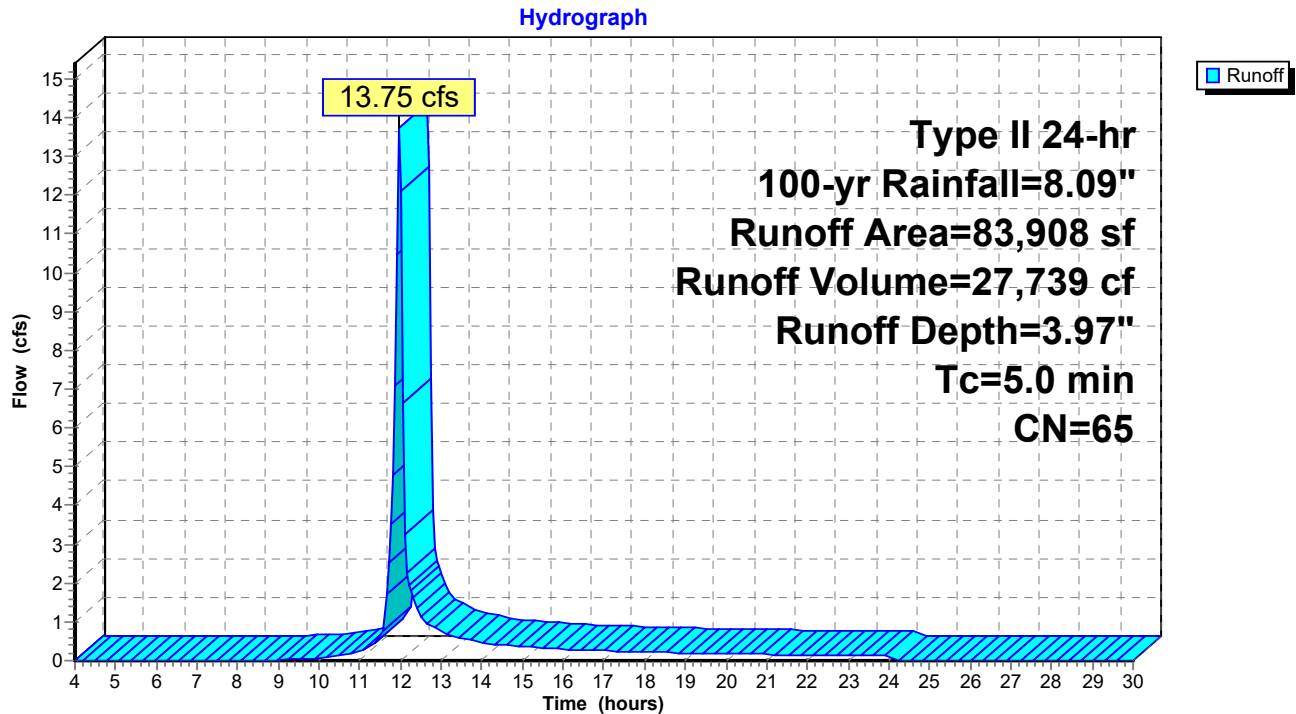
Summary for Subcatchment 7S: CC-7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 13.75 cfs @ 11.96 hrs, Volume= 27,739 cf, Depth= 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
26,651	30	Meadow, non-grazed, HSG A
46,061	78	Meadow, non-grazed, HSG D
5,943	98	Paved parking, HSG A
5,253	98	Paved parking, HSG D
83,908	65	Weighted Average
72,712		86.66% Pervious Area
11,196		13.34% Impervious Area

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

Subcatchment 7S: CC-7

Summary for Subcatchment 8S: CC-8[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.01 cfs @ 12.03 hrs, Volume= 85 cf, Depth= 0.44"

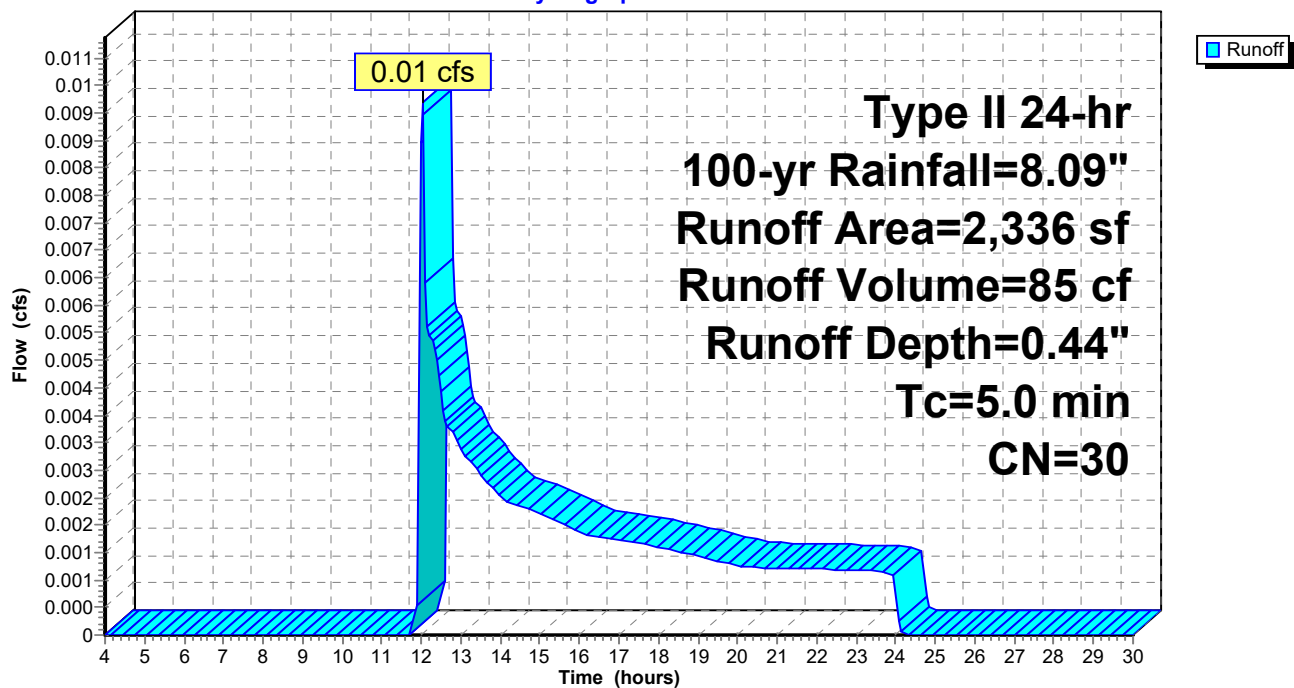
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
2,336	30	Meadow, non-grazed, HSG A
2,336		100.00% Pervious Area

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

Subcatchment 8S: CC-8

Hydrograph



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Type II 24-hr 100-yr Rainfall=8.09"

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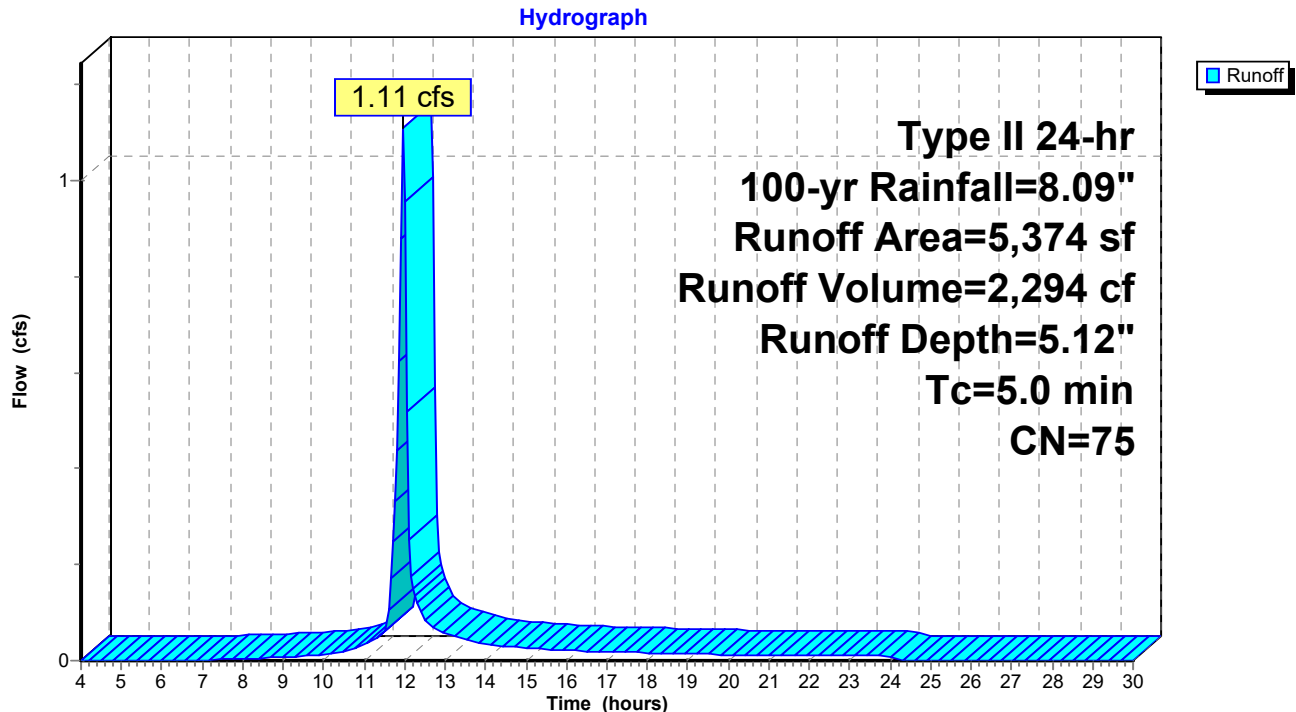
Summary for Subcatchment 15S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.11 cfs @ 11.95 hrs, Volume= 2,294 cf, Depth= 5.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
1,482	30	Meadow, non-grazed, HSG A
1,123	78	Meadow, non-grazed, HSG D
1,308	98	Paved parking, HSG A
1,461	98	Paved parking, HSG D
5,374	75	Weighted Average
2,605		48.47% Pervious Area
2,769		51.53% Impervious Area

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

Subcatchment 15S: CC-10

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Reach 6R: Channel 4

Inflow Area = 26,867 sf, 27.55% Impervious, Inflow Depth = 4.19" for 100-yr event
Inflow = 4.63 cfs @ 11.96 hrs, Volume= 9,374 cf
Outflow = 4.49 cfs @ 11.97 hrs, Volume= 9,374 cf, Atten= 3%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.10 fps, Min. Travel Time= 0.3 min
Avg. Velocity= 0.66 fps, Avg. Travel Time= 1.6 min

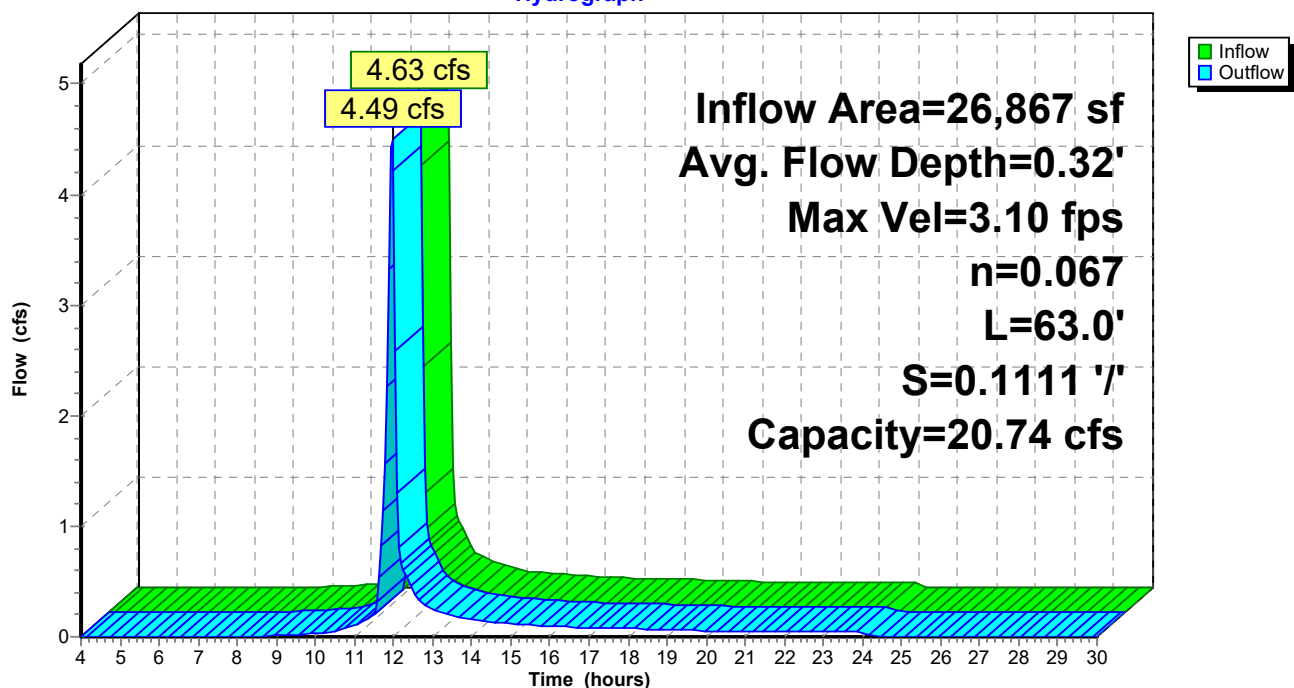
Peak Storage= 93 cf @ 11.96 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 0.75' Flow Area= 4.1 sf, Capacity= 20.74 cfs

4.00' x 0.75' deep channel, n= 0.067
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 63.0' Slope= 0.1111 '/'
Inlet Invert= 979.00', Outlet Invert= 972.00'



Reach 6R: Channel 4

Hydrograph



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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Reach 10R: Channel 7

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 3.97" for 100-yr event
Inflow = 13.75 cfs @ 11.96 hrs, Volume= 27,739 cf
Outflow = 12.87 cfs @ 11.99 hrs, Volume= 27,739 cf, Atten= 6%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.44 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.48 fps, Avg. Travel Time= 4.6 min

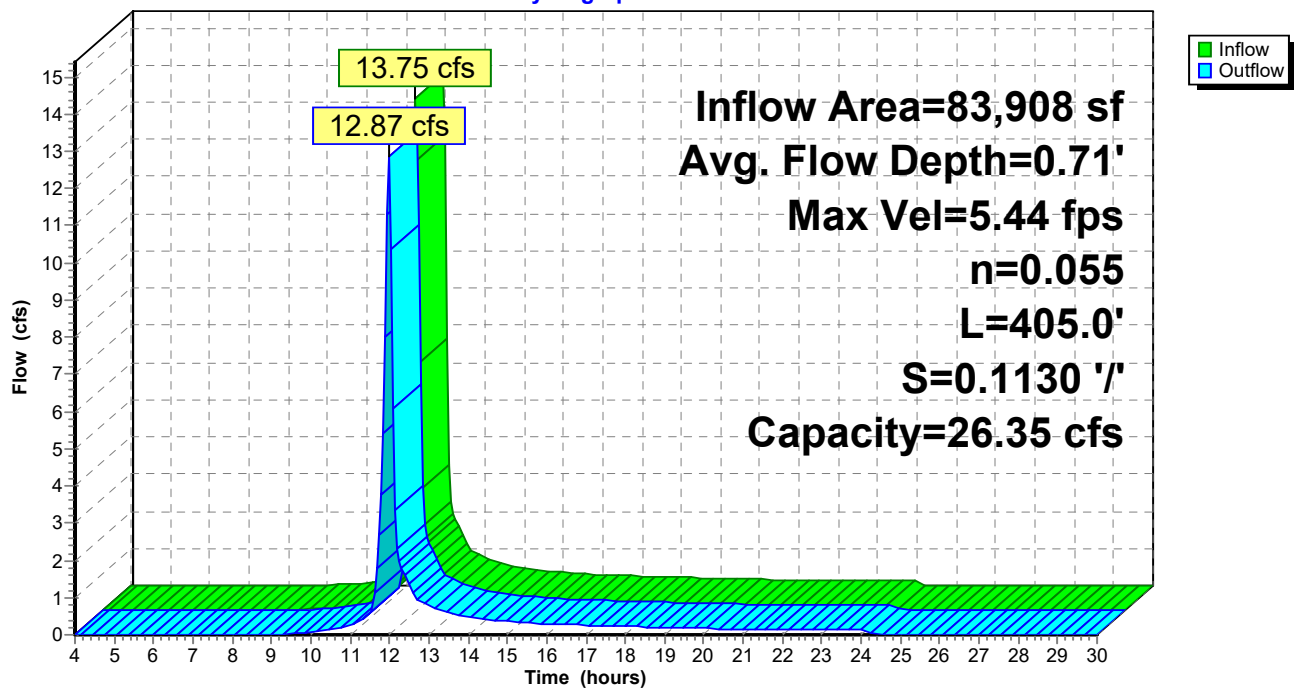
Peak Storage= 990 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 26.35 cfs

2.00' x 1.00' deep channel, n= 0.055
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 405.0' Slope= 0.1130 '/'
Inlet Invert= 974.75', Outlet Invert= 929.00'



Reach 10R: Channel 7

Hydrograph



Summary for Reach 13R: Culvert #3

[52] Hint: Inlet/Outlet conditions not evaluated

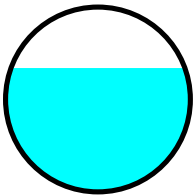
[62] Hint: Exceeded Reach 10R OUTLET depth by 0.53' @ 12.10 hrs

Inflow Area = 83,908 sf, 13.34% Impervious, Inflow Depth = 3.97" for 100-yr event
Inflow = 12.87 cfs @ 11.99 hrs, Volume= 27,739 cf
Outflow = 12.84 cfs @ 12.00 hrs, Volume= 27,739 cf, Atten= 0%, Lag= 0.1 min

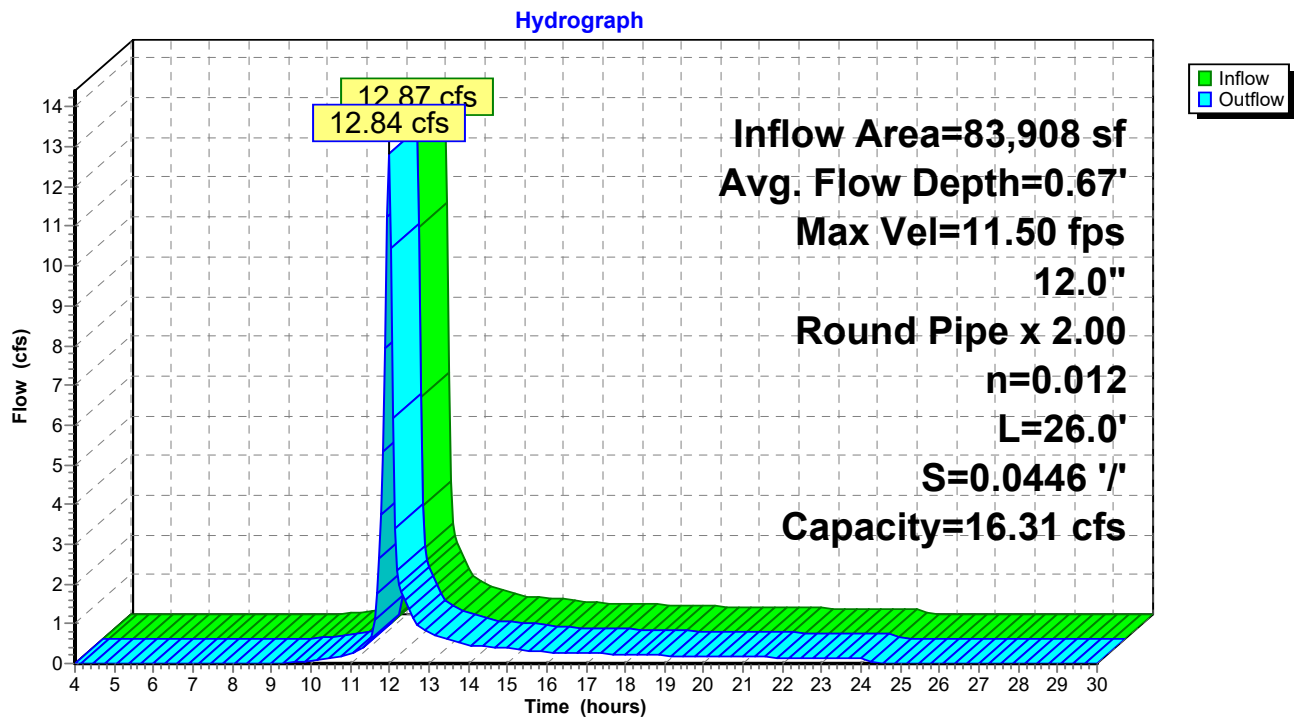
Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.50 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 3.63 fps, Avg. Travel Time= 0.1 min

Peak Storage= 29 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.67'
Bank-Full Depth= 1.00' Flow Area= 1.6 sf, Capacity= 16.31 cfs

A factor of 2.00 has been applied to the storage and discharge capacity
12.0" Round Pipe
n= 0.012
Length= 26.0' Slope= 0.0446 '/
Inlet Invert= 929.50', Outlet Invert= 928.34'



Reach 13R: Culvert #3



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Summary for Reach 14R: Channel 8

[65] Warning: Inlet elevation not specified

Inflow Area = 86,244 sf, 12.98% Impervious, Inflow Depth = 3.87" for 100-yr event
Inflow = 12.85 cfs @ 12.00 hrs, Volume= 27,825 cf
Outflow = 12.66 cfs @ 12.00 hrs, Volume= 27,825 cf, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.70 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 1.29 fps, Avg. Travel Time= 1.0 min

Peak Storage= 205 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.77'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.59 cfs

2.00' x 1.00' deep channel, n= 0.050

Side Slope Z-value= 2.0 '/' Top Width= 6.00'

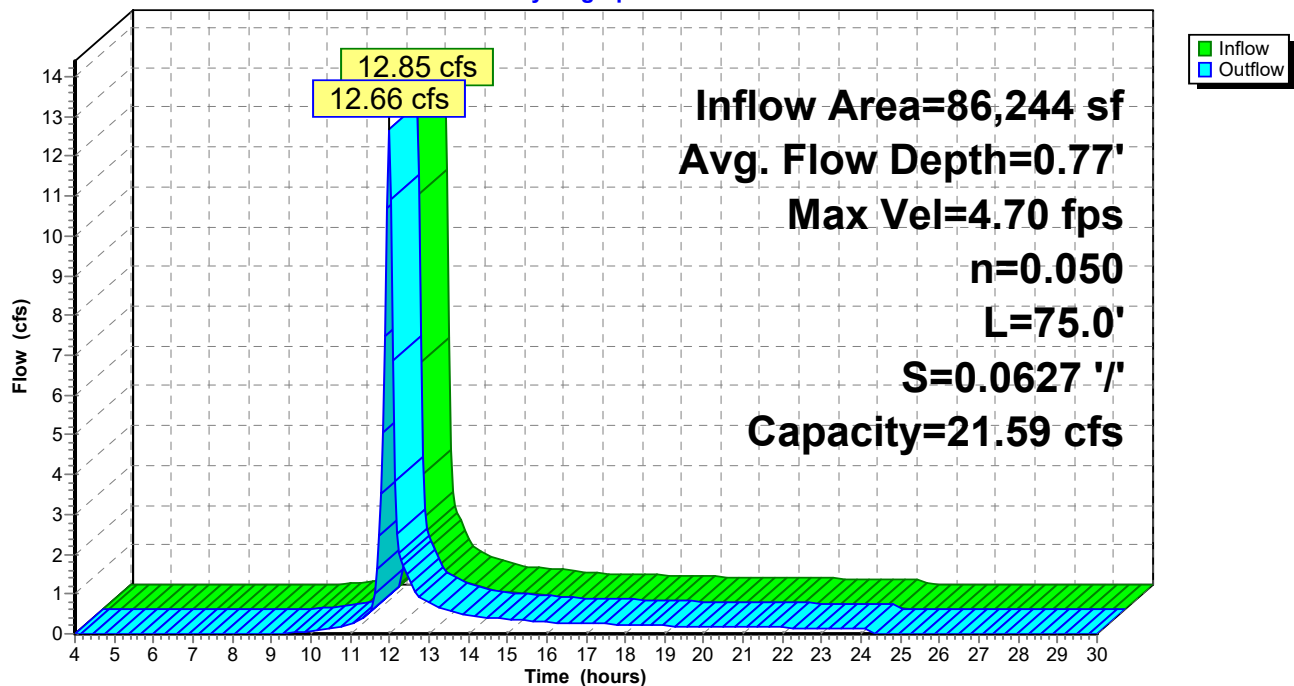
Length= 75.0' Slope= 0.0627 '/'

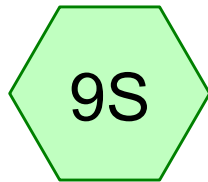
Inlet Invert= 0.00', Outlet Invert= -4.70'



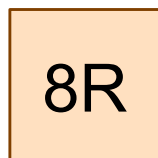
Reach 14R: Channel 8

Hydrograph

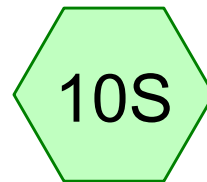




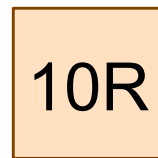
CC-9



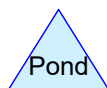
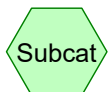
Culvert #4



CC-10



Culvert #5



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Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
1,482	30	Meadow, non-grazed, HSG A (9S, 10S)
1,123	78	Meadow, non-grazed, HSG D (9S, 10S)
1,308	98	Paved parking, HSG A (9S, 10S)
678	98	Paved parking, HSG D (10S)
783	98	Water Surface, HSG D (9S)
5,374	75	TOTAL AREA

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Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
2,790	HSG A	9S, 10S
0	HSG B	
0	HSG C	
2,584	HSG D	9S, 10S
0	Other	
5,374		TOTAL AREA

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Page 4

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
1,482	0	0	1,123	0	2,605	Meadow, non-grazed	
1,308	0	0	678	0	1,986	Paved parking	
0	0	0	783	0	783	Water Surface	
2,790	0	0	2,584	0	5,374	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	8R	913.00	912.50	27.0	0.0185	0.012	12.0	0.0	0.0
2	10R	916.00	912.50	31.0	0.1129	0.012	12.0	0.0	0.0

MLV 505LD86_Culvert 4-5_rev2*Type II 24-hr 1-yr Rainfall=2.72"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment9S: CC-9

Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=0.74"
Tc=5.0 min CN=74 Runoff=0.07 cfs 154 cf

Subcatchment10S: CC-10

Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=0.83"
Tc=5.0 min CN=76 Runoff=0.10 cfs 198 cf

Reach 8R: Culvert #4

Avg. Flow Depth=0.08' Max Vel=2.36 fps Inflow=0.07 cfs 154 cf
12.0" Round Pipe n=0.012 L=27.0' S=0.0185 '/' Capacity=5.25 cfs Outflow=0.07 cfs 154 cf

Reach 10R: Culvert #5

Avg. Flow Depth=0.06' Max Vel=4.82 fps Inflow=0.10 cfs 198 cf
12.0" Round Pipe n=0.012 L=31.0' S=0.1129 '/' Capacity=12.97 cfs Outflow=0.10 cfs 198 cf

Total Runoff Area = 5,374 sf Runoff Volume = 352 cf Average Runoff Depth = 0.79"
48.47% Pervious = 2,605 sf 51.53% Impervious = 2,769 sf

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.07 cfs @ 11.97 hrs, Volume= 154 cf, Depth= 0.74"

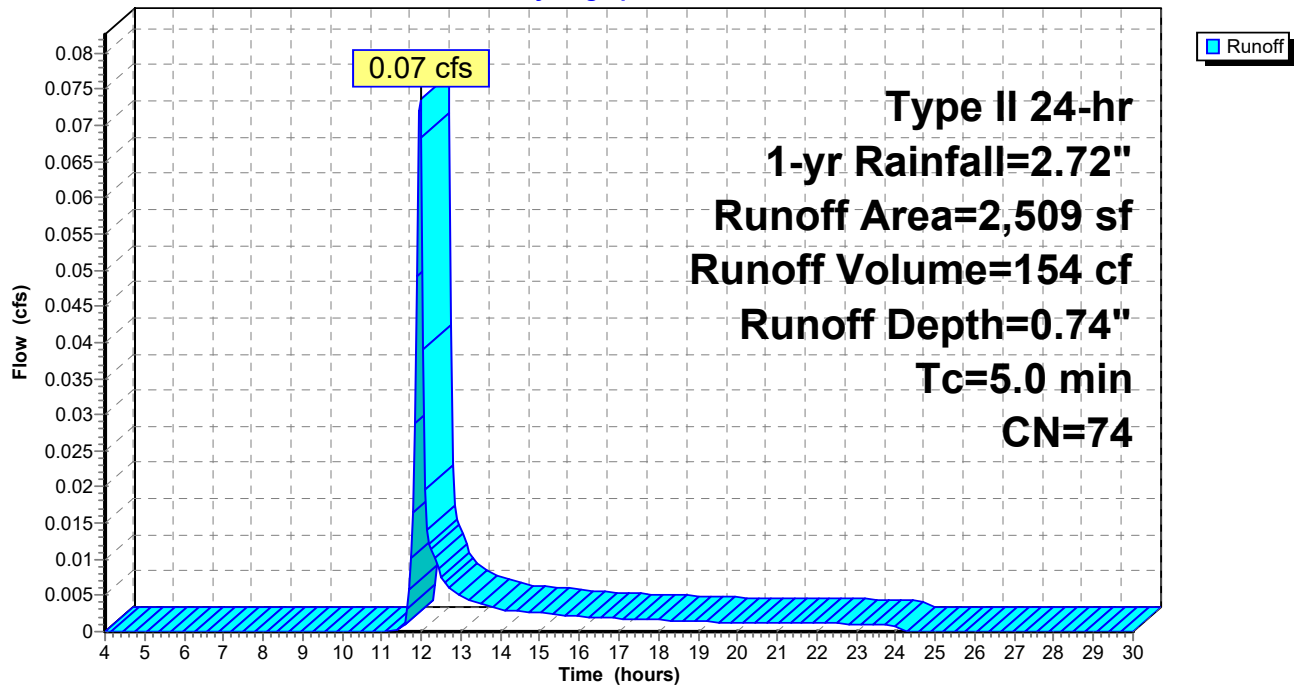
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



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Type II 24-hr 1-yr Rainfall=2.72"

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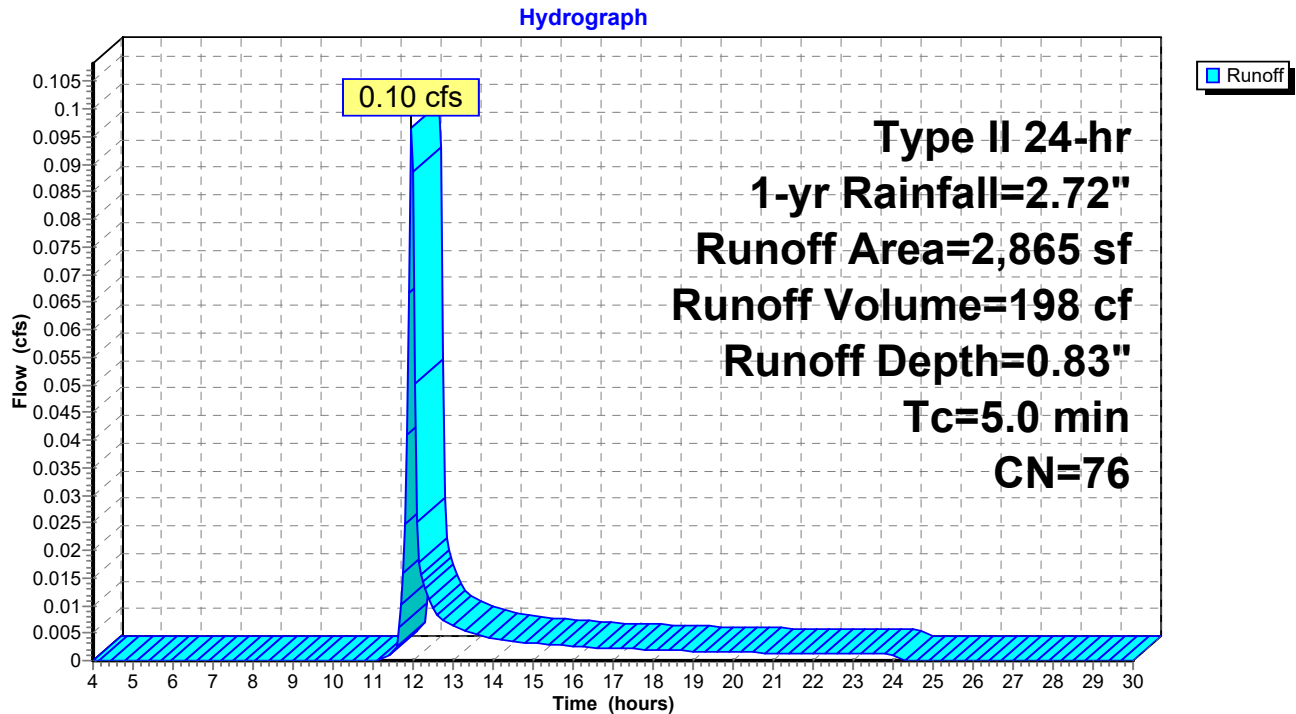
Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.10 cfs @ 11.97 hrs, Volume= 198 cf, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Reach 8R: Culvert #4

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,509 sf, 56.44% Impervious, Inflow Depth = 0.74" for 1-yr event
Inflow = 0.07 cfs @ 11.97 hrs, Volume= 154 cf
Outflow = 0.07 cfs @ 11.98 hrs, Volume= 154 cf, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.36 fps, Min. Travel Time= 0.2 min

Avg. Velocity = 0.84 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1 cf @ 11.97 hrs

Average Depth at Peak Storage= 0.08'

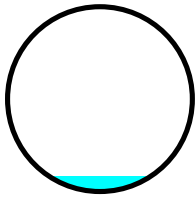
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.25 cfs

12.0" Round Pipe

n= 0.012

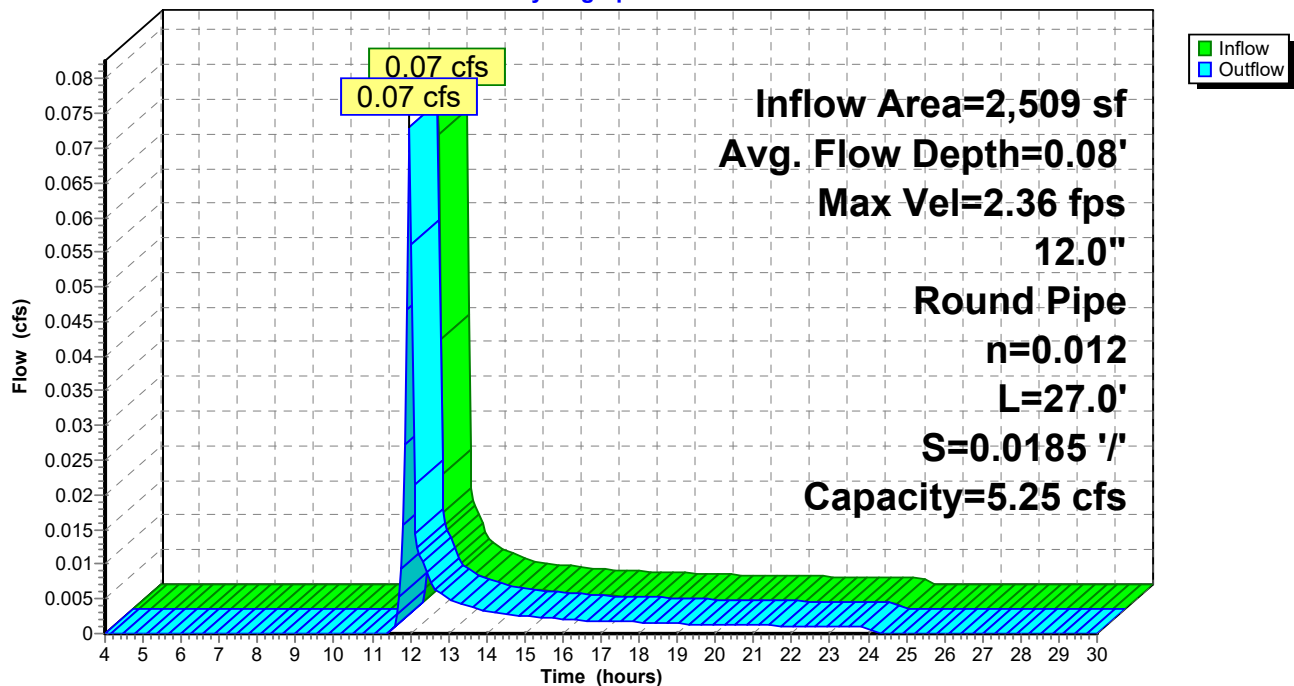
Length= 27.0' Slope= 0.0185 '/

Inlet Invert= 913.00', Outlet Invert= 912.50'



Reach 8R: Culvert #4

Hydrograph



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Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Reach 10R: Culvert #5

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,865 sf, 47.23% Impervious, Inflow Depth = 0.83" for 1-yr event
Inflow = 0.10 cfs @ 11.97 hrs, Volume= 198 cf
Outflow = 0.10 cfs @ 11.97 hrs, Volume= 198 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.82 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 1.72 fps, Avg. Travel Time= 0.3 min

Peak Storage= 1 cf @ 11.97 hrs

Average Depth at Peak Storage= 0.06'

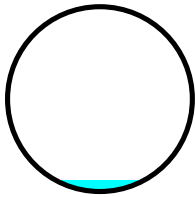
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 12.97 cfs

12.0" Round Pipe

n= 0.012

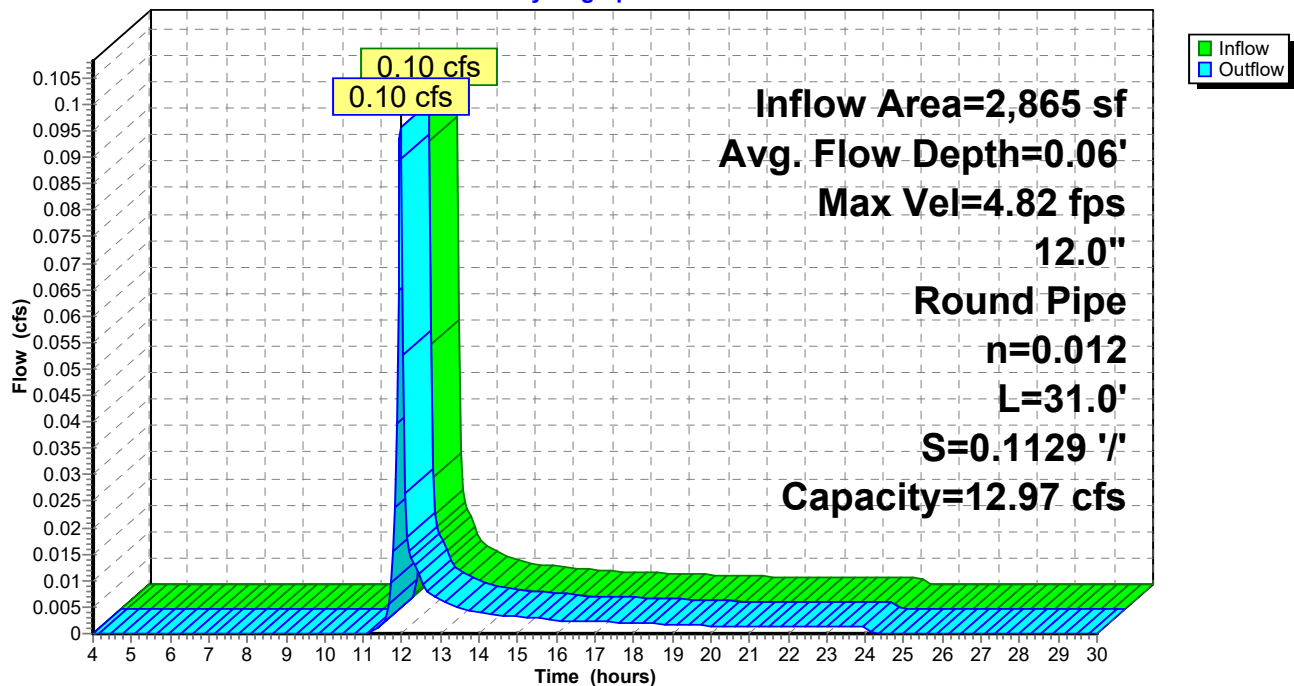
Length= 31.0' Slope= 0.1129 '/'

Inlet Invert= 916.00', Outlet Invert= 912.50'



Reach 10R: Culvert #5

Hydrograph



MLV 505LD86_Culvert 4-5_rev2*Type II 24-hr 2-yr Rainfall=3.26"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment9S: CC-9

Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=1.08"
Tc=5.0 min CN=74 Runoff=0.11 cfs 225 cf

Subcatchment10S: CC-10

Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=1.19"
Tc=5.0 min CN=76 Runoff=0.14 cfs 285 cf

Reach 8R: Culvert #4

Avg. Flow Depth=0.10' Max Vel=2.67 fps Inflow=0.11 cfs 225 cf
12.0" Round Pipe n=0.012 L=27.0' S=0.0185 '/' Capacity=5.25 cfs Outflow=0.11 cfs 225 cf

Reach 10R: Culvert #5

Avg. Flow Depth=0.07' Max Vel=5.42 fps Inflow=0.14 cfs 285 cf
12.0" Round Pipe n=0.012 L=31.0' S=0.1129 '/' Capacity=12.97 cfs Outflow=0.14 cfs 285 cf

Total Runoff Area = 5,374 sf Runoff Volume = 510 cf Average Runoff Depth = 1.14"
48.47% Pervious = 2,605 sf 51.53% Impervious = 2,769 sf

MLV 505LD86_Culvert 4-5_rev2

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.11 cfs @ 11.96 hrs, Volume= 225 cf, Depth= 1.08"

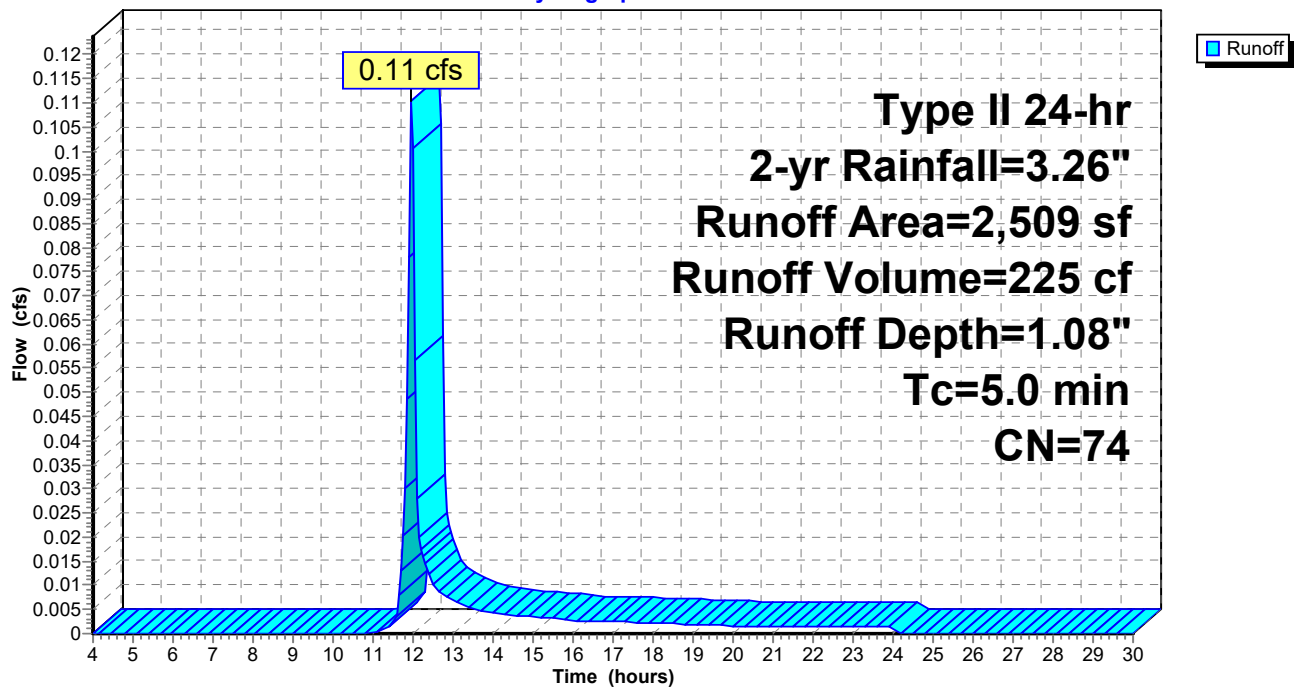
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



MLV 505LD86_Culvert 4-5_rev2

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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.14 cfs @ 11.96 hrs, Volume= 285 cf, Depth= 1.19"

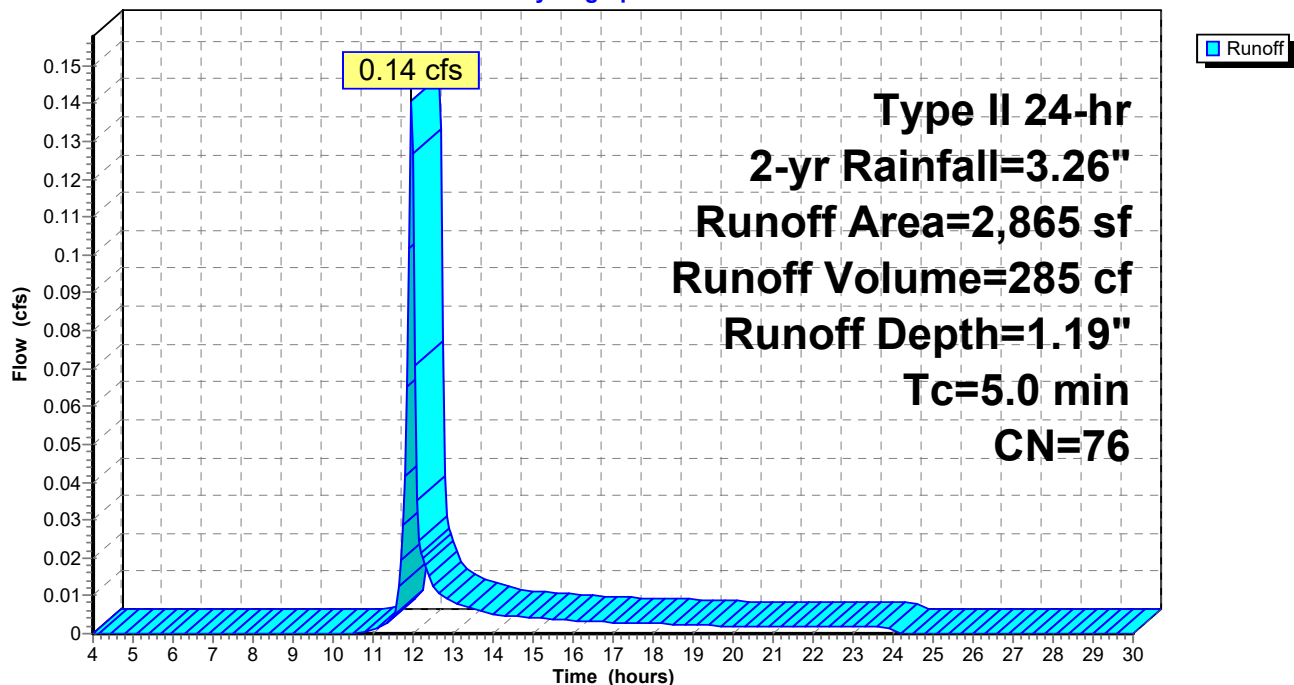
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 8R: Culvert #4

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,509 sf, 56.44% Impervious, Inflow Depth = 1.08" for 2-yr event
Inflow = 0.11 cfs @ 11.96 hrs, Volume= 225 cf
Outflow = 0.11 cfs @ 11.97 hrs, Volume= 225 cf, Atten= 2%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.67 fps, Min. Travel Time= 0.2 min

Avg. Velocity = 0.92 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1 cf @ 11.97 hrs

Average Depth at Peak Storage= 0.10'

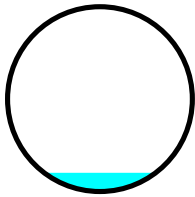
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.25 cfs

12.0" Round Pipe

n= 0.012

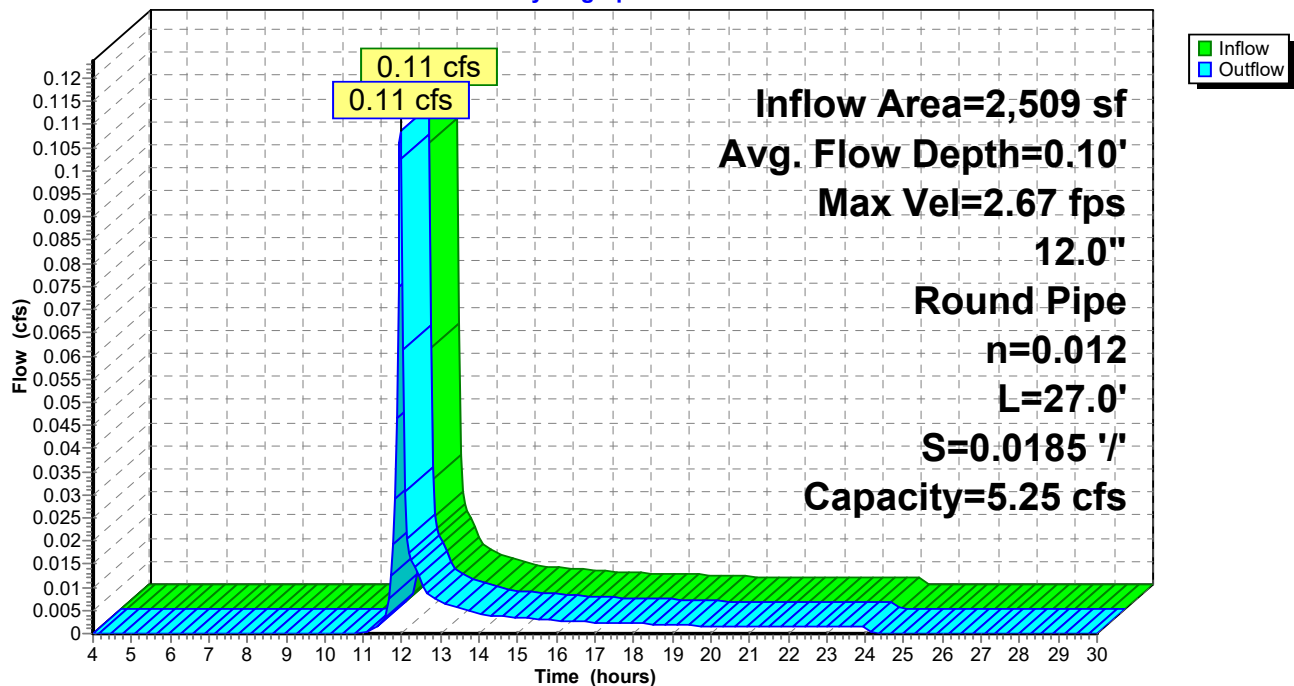
Length= 27.0' Slope= 0.0185 '/

Inlet Invert= 913.00', Outlet Invert= 912.50'



Reach 8R: Culvert #4

Hydrograph



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Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Reach 10R: Culvert #5

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,865 sf, 47.23% Impervious, Inflow Depth = 1.19" for 2-yr event
Inflow = 0.14 cfs @ 11.96 hrs, Volume= 285 cf
Outflow = 0.14 cfs @ 11.97 hrs, Volume= 285 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.42 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 1.84 fps, Avg. Travel Time= 0.3 min

Peak Storage= 1 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.07'

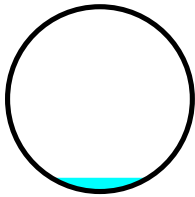
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 12.97 cfs

12.0" Round Pipe

n= 0.012

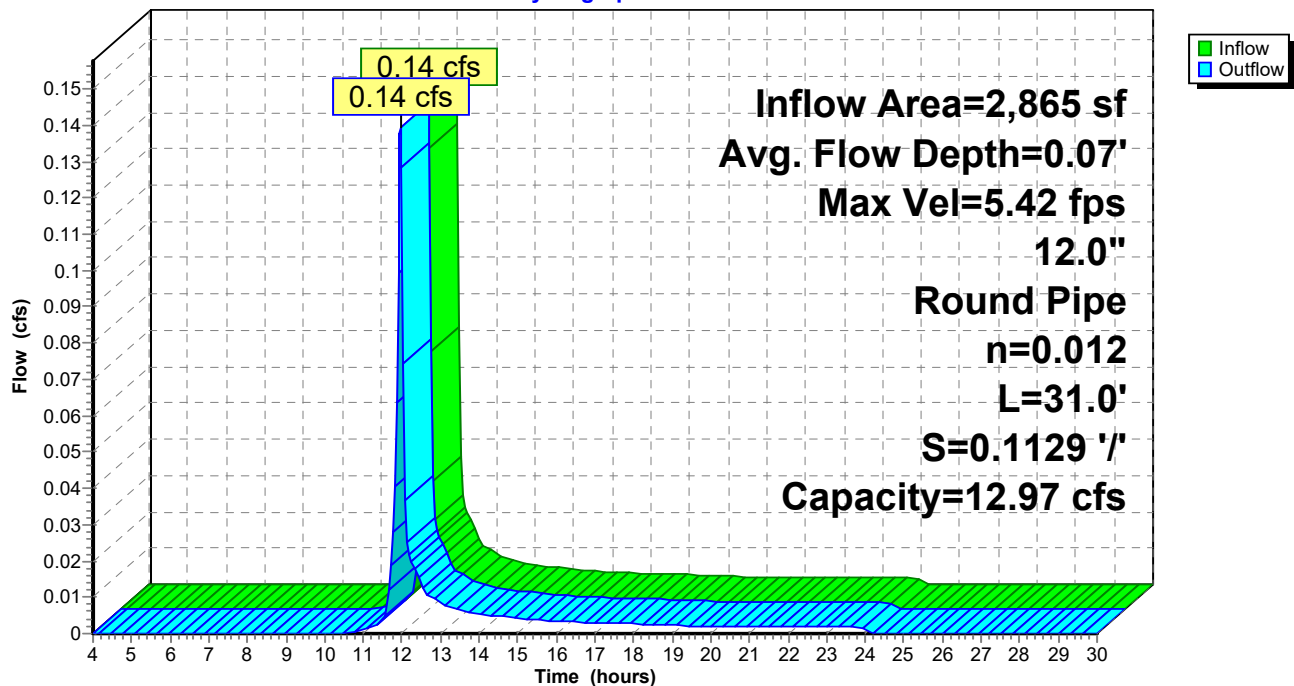
Length= 31.0' Slope= 0.1129 '/'

Inlet Invert= 916.00', Outlet Invert= 912.50'



Reach 10R: Culvert #5

Hydrograph



MLV 505LD86_Culvert 4-5_rev2*Type II 24-hr 10-yr Rainfall=4.74"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment9S: CC-9

Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=2.16"
Tc=5.0 min CN=74 Runoff=0.22 cfs 451 cf

Subcatchment10S: CC-10

Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=2.32"
Tc=5.0 min CN=76 Runoff=0.27 cfs 555 cf

Reach 8R: Culvert #4

Avg. Flow Depth=0.14' Max Vel=3.31 fps Inflow=0.22 cfs 451 cf
12.0" Round Pipe n=0.012 L=27.0' S=0.0185 ' Capacity=5.25 cfs Outflow=0.22 cfs 451 cf

Reach 10R: Culvert #5

Avg. Flow Depth=0.10' Max Vel=6.64 fps Inflow=0.27 cfs 555 cf
12.0" Round Pipe n=0.012 L=31.0' S=0.1129 ' Capacity=12.97 cfs Outflow=0.27 cfs 555 cf

Total Runoff Area = 5,374 sf Runoff Volume = 1,006 cf Average Runoff Depth = 2.25"
48.47% Pervious = 2,605 sf 51.53% Impervious = 2,769 sf

MLV 505LD86_Culvert 4-5_rev2

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.22 cfs @ 11.96 hrs, Volume= 451 cf, Depth= 2.16"

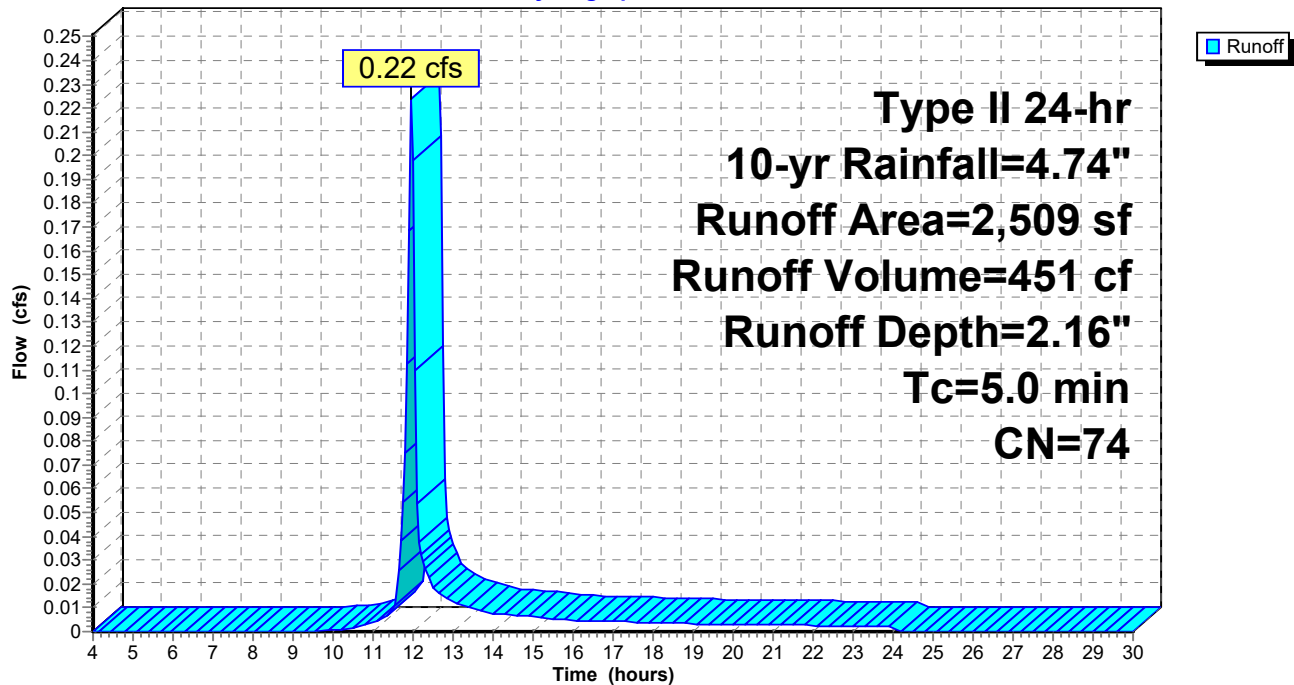
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



MLV 505LD86_Culvert 4-5_rev2

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.27 cfs @ 11.96 hrs, Volume= 555 cf, Depth= 2.32"

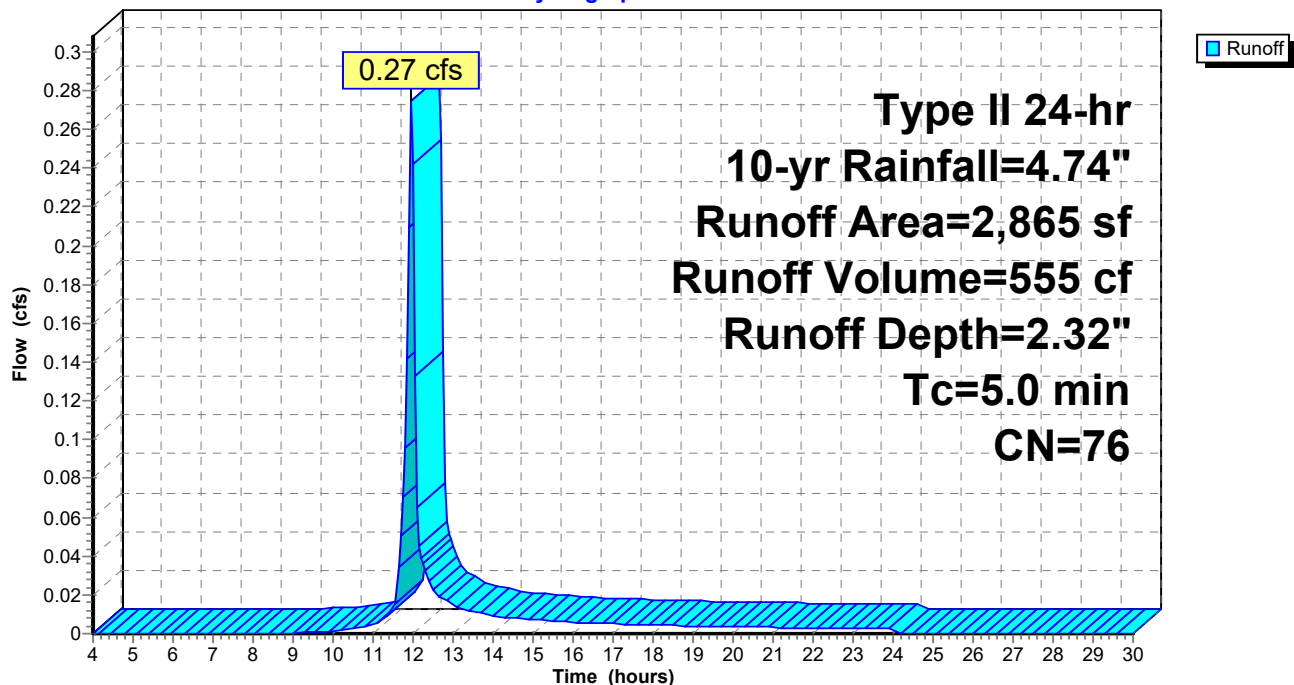
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

Hydrograph



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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 8R: Culvert #4

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,509 sf, 56.44% Impervious, Inflow Depth = 2.16" for 10-yr event
Inflow = 0.22 cfs @ 11.96 hrs, Volume= 451 cf
Outflow = 0.22 cfs @ 11.96 hrs, Volume= 451 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.31 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 1.05 fps, Avg. Travel Time= 0.4 min

Peak Storage= 2 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.14'

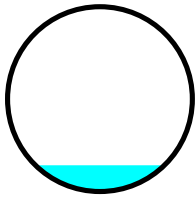
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.25 cfs

12.0" Round Pipe

n= 0.012

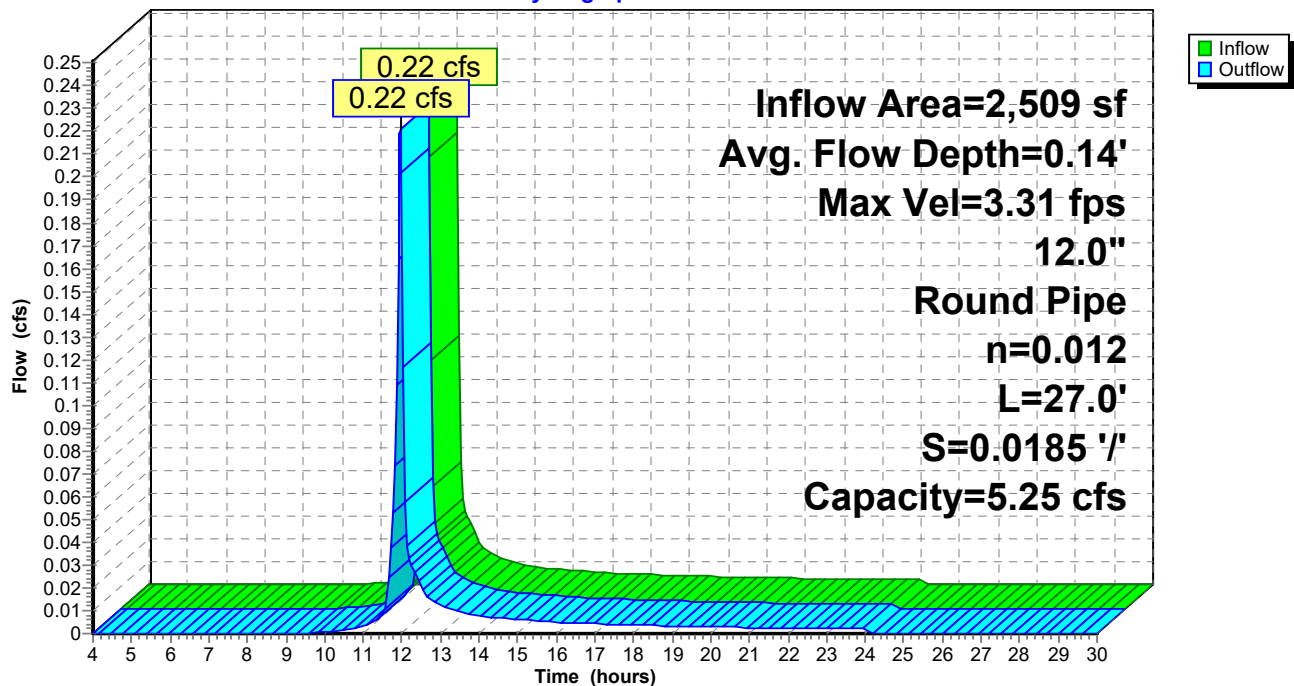
Length= 27.0' Slope= 0.0185 '/

Inlet Invert= 913.00', Outlet Invert= 912.50'



Reach 8R: Culvert #4

Hydrograph



MLV 505LD86_Culvert 4-5_rev2

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Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Reach 10R: Culvert #5

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,865 sf, 47.23% Impervious, Inflow Depth = 2.32" for 10-yr event
Inflow = 0.27 cfs @ 11.96 hrs, Volume= 555 cf
Outflow = 0.27 cfs @ 11.96 hrs, Volume= 555 cf, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.64 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 2.13 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.10'

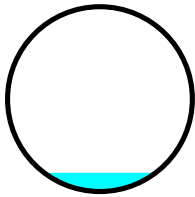
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 12.97 cfs

12.0" Round Pipe

n= 0.012

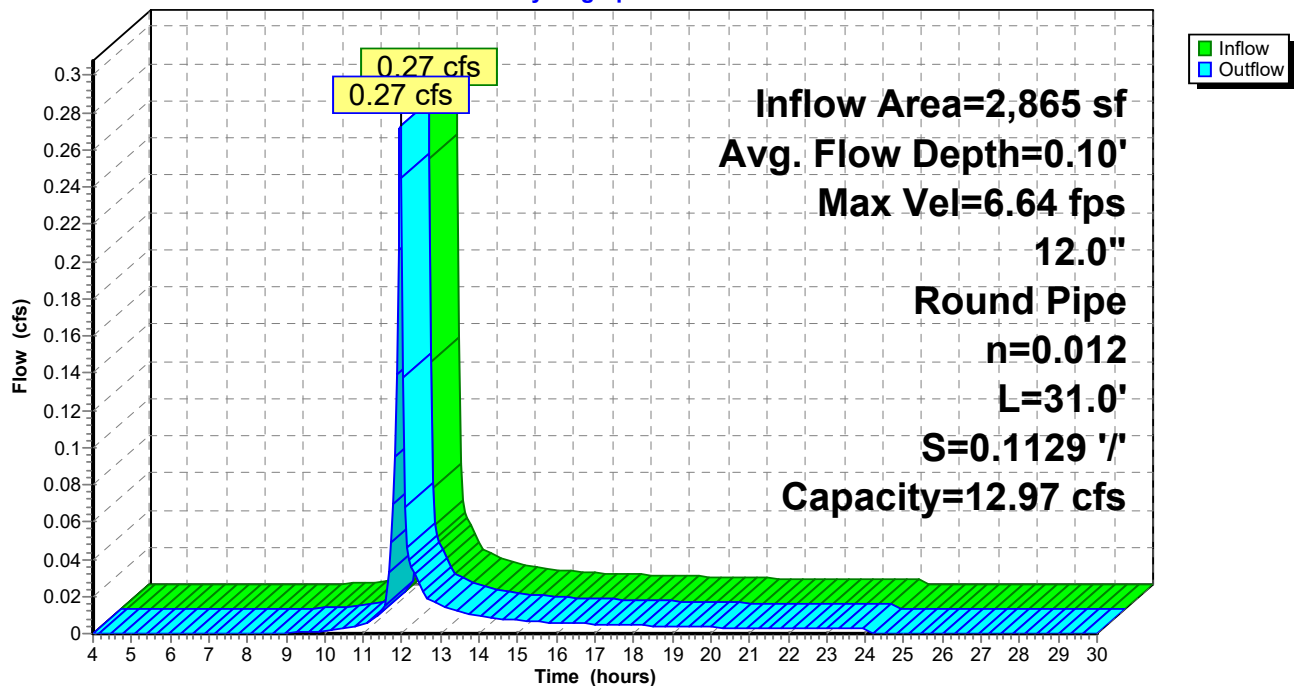
Length= 31.0' Slope= 0.1129 '/'

Inlet Invert= 916.00', Outlet Invert= 912.50'



Reach 10R: Culvert #5

Hydrograph



MLV 505LD86_Culvert 4-5_rev2*Type II 24-hr 25-yr Rainfall=5.85"*

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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment9S: CC-9

Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=3.06"
Tc=5.0 min CN=74 Runoff=0.32 cfs 640 cf

Subcatchment10S: CC-10

Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=3.25"
Tc=5.0 min CN=76 Runoff=0.38 cfs 776 cf

Reach 8R: Culvert #4

Avg. Flow Depth=0.17' Max Vel=3.67 fps Inflow=0.32 cfs 640 cf
12.0" Round Pipe n=0.012 L=27.0' S=0.0185 '/' Capacity=5.25 cfs Outflow=0.31 cfs 640 cf

Reach 10R: Culvert #5

Avg. Flow Depth=0.12' Max Vel=7.34 fps Inflow=0.38 cfs 776 cf
12.0" Round Pipe n=0.012 L=31.0' S=0.1129 '/' Capacity=12.97 cfs Outflow=0.38 cfs 776 cf

Total Runoff Area = 5,374 sf Runoff Volume = 1,416 cf Average Runoff Depth = 3.16"
48.47% Pervious = 2,605 sf 51.53% Impervious = 2,769 sf

MLV 505LD86_Culvert 4-5_rev2

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.32 cfs @ 11.96 hrs, Volume= 640 cf, Depth= 3.06"

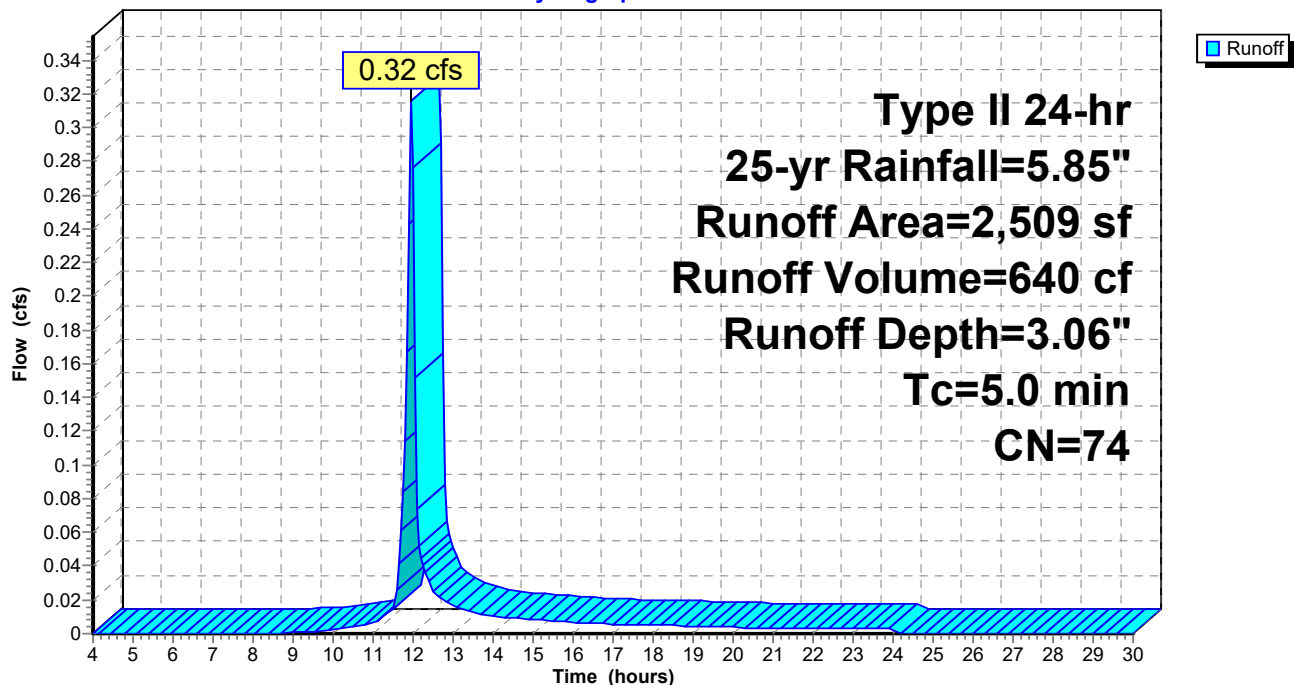
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.38 cfs @ 11.96 hrs, Volume= 776 cf, Depth= 3.25"

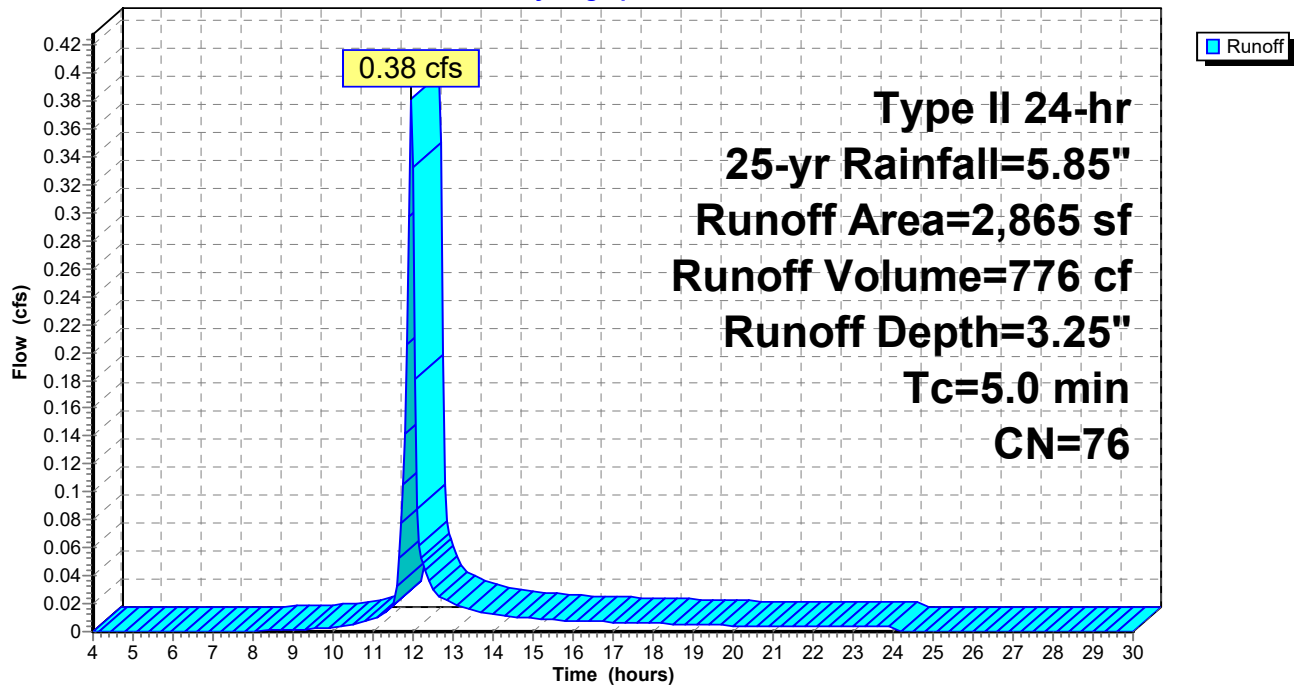
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 8R: Culvert #4

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,509 sf, 56.44% Impervious, Inflow Depth = 3.06" for 25-yr event
Inflow = 0.32 cfs @ 11.96 hrs, Volume= 640 cf
Outflow = 0.31 cfs @ 11.96 hrs, Volume= 640 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.67 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 1.13 fps, Avg. Travel Time= 0.4 min

Peak Storage= 2 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.17'

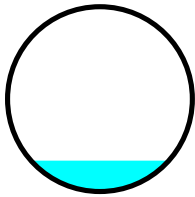
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.25 cfs

12.0" Round Pipe

n= 0.012

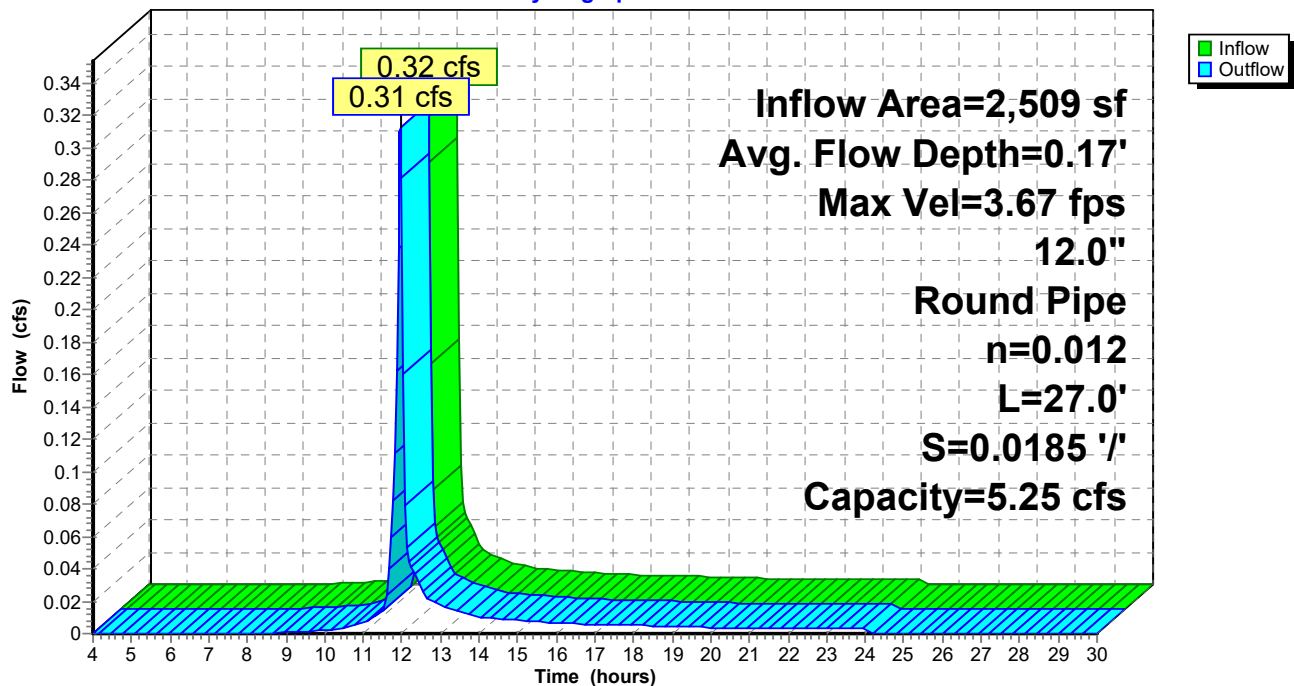
Length= 27.0' Slope= 0.0185 '/'

Inlet Invert= 913.00', Outlet Invert= 912.50'



Reach 8R: Culvert #4

Hydrograph



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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Reach 10R: Culvert #5

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,865 sf, 47.23% Impervious, Inflow Depth = 3.25" for 25-yr event
Inflow = 0.38 cfs @ 11.96 hrs, Volume= 776 cf
Outflow = 0.38 cfs @ 11.96 hrs, Volume= 776 cf, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 7.34 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 2.28 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.12'

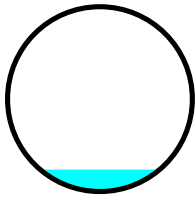
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 12.97 cfs

12.0" Round Pipe

n= 0.012

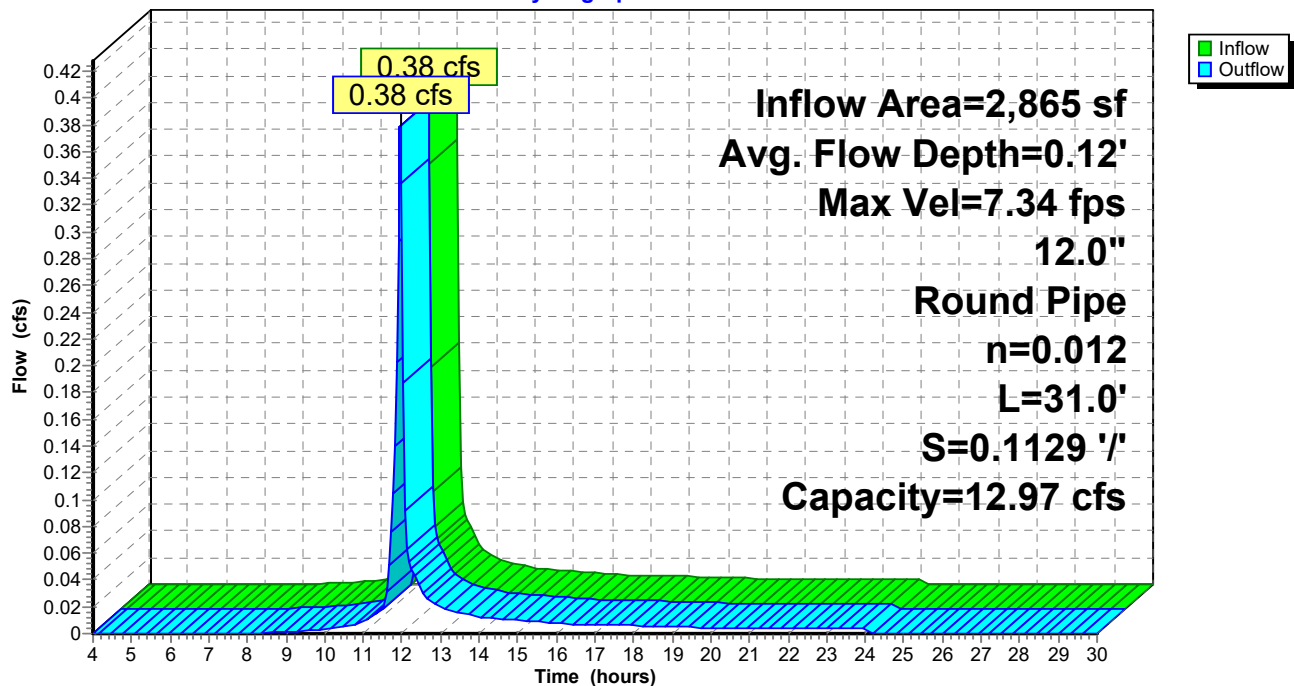
Length= 31.0' Slope= 0.1129 '/'

Inlet Invert= 916.00', Outlet Invert= 912.50'



Reach 10R: Culvert #5

Hydrograph



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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment9S: CC-9

Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=3.93"
Tc=5.0 min CN=74 Runoff=0.40 cfs 821 cf

Subcatchment10S: CC-10

Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=4.14"
Tc=5.0 min CN=76 Runoff=0.48 cfs 989 cf

Reach 8R: Culvert #4

Avg. Flow Depth=0.19' Max Vel=3.95 fps Inflow=0.40 cfs 821 cf
12.0" Round Pipe n=0.012 L=27.0' S=0.0185 '/' Capacity=5.25 cfs Outflow=0.40 cfs 821 cf

Reach 10R: Culvert #5

Avg. Flow Depth=0.13' Max Vel=7.87 fps Inflow=0.48 cfs 989 cf
12.0" Round Pipe n=0.012 L=31.0' S=0.1129 '/' Capacity=12.97 cfs Outflow=0.48 cfs 989 cf

Total Runoff Area = 5,374 sf Runoff Volume = 1,810 cf Average Runoff Depth = 4.04"
48.47% Pervious = 2,605 sf 51.53% Impervious = 2,769 sf

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.40 cfs @ 11.96 hrs, Volume= 821 cf, Depth= 3.93"

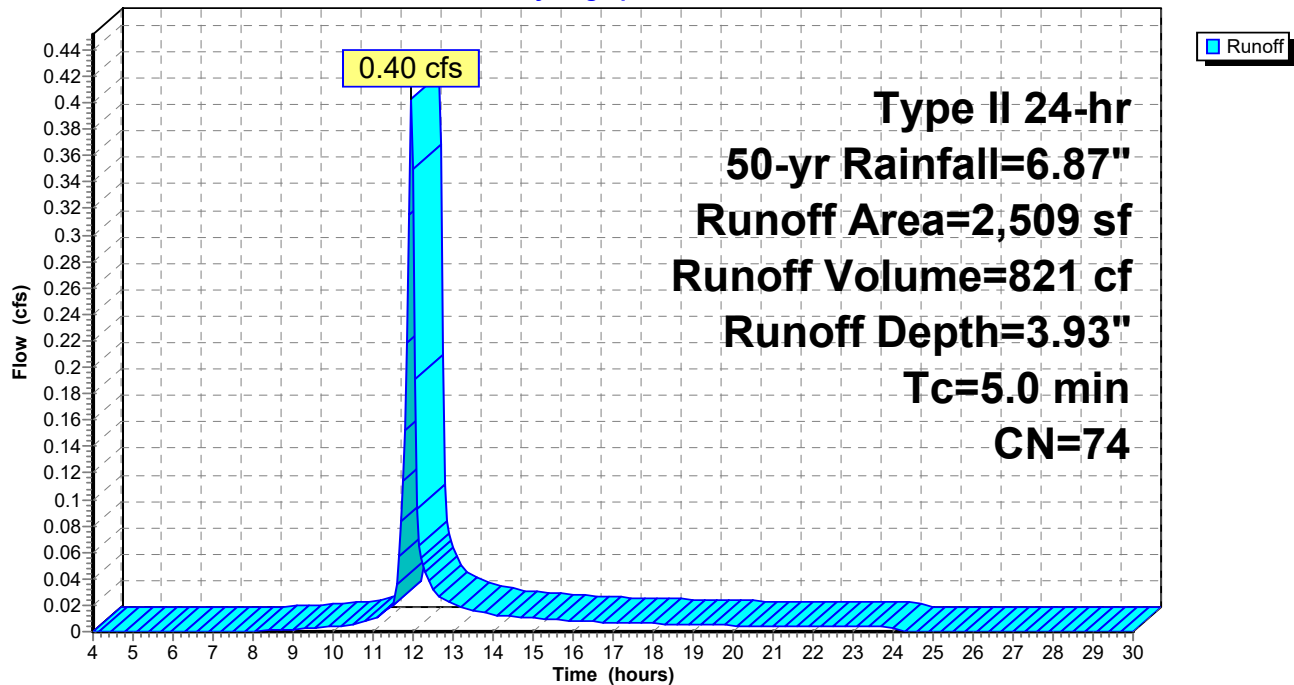
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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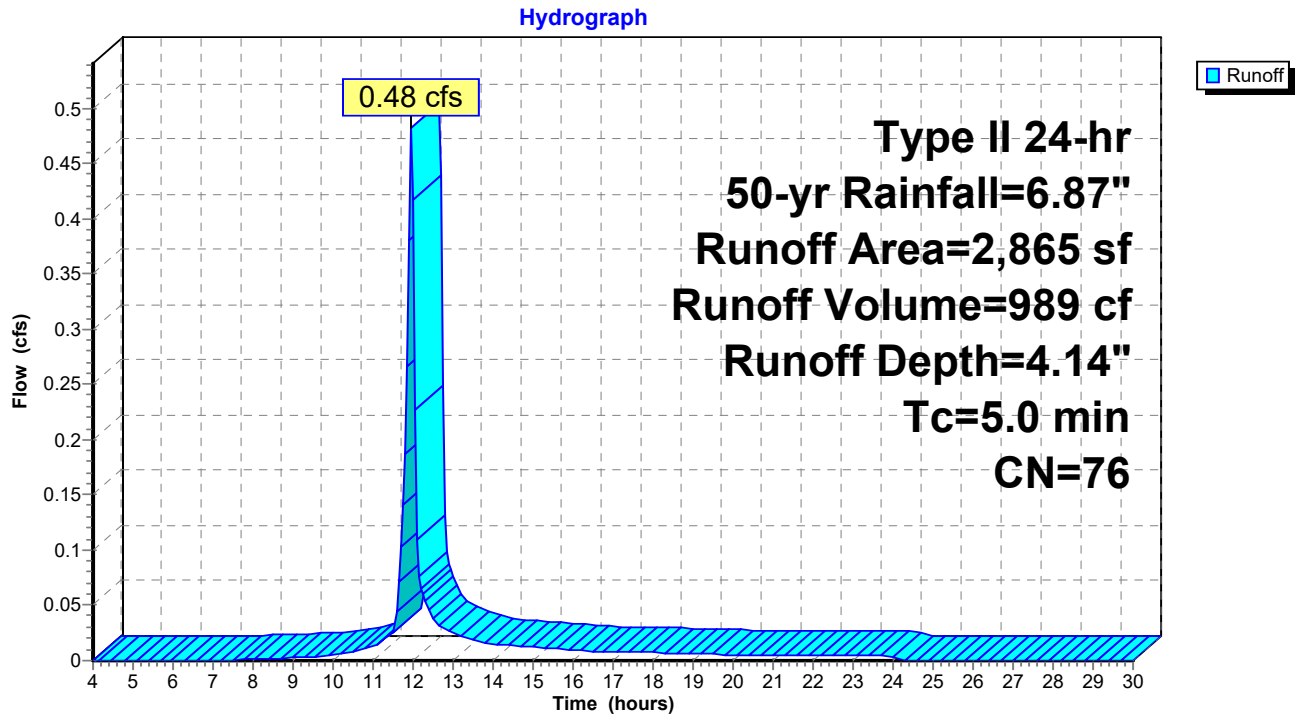
Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.48 cfs @ 11.96 hrs, Volume= 989 cf, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 8R: Culvert #4

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,509 sf, 56.44% Impervious, Inflow Depth = 3.93" for 50-yr event
Inflow = 0.40 cfs @ 11.96 hrs, Volume= 821 cf
Outflow = 0.40 cfs @ 11.96 hrs, Volume= 821 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.95 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 1.19 fps, Avg. Travel Time= 0.4 min

Peak Storage= 3 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.19'

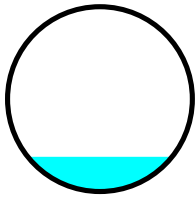
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.25 cfs

12.0" Round Pipe

n= 0.012

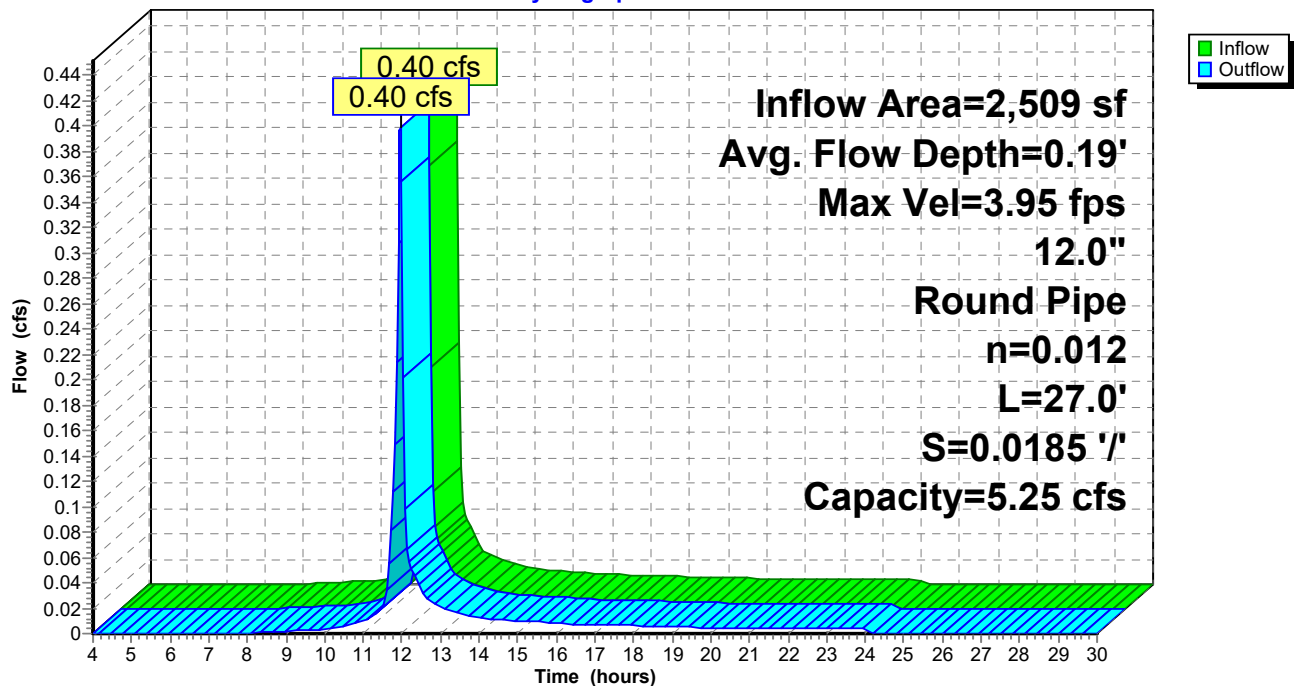
Length= 27.0' Slope= 0.0185 '/

Inlet Invert= 913.00', Outlet Invert= 912.50'



Reach 8R: Culvert #4

Hydrograph



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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Reach 10R: Culvert #5

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,865 sf, 47.23% Impervious, Inflow Depth = 4.14" for 50-yr event
Inflow = 0.48 cfs @ 11.96 hrs, Volume= 989 cf
Outflow = 0.48 cfs @ 11.96 hrs, Volume= 989 cf, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 7.87 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 2.39 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.13'

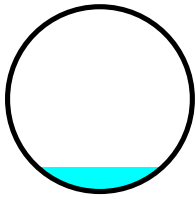
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 12.97 cfs

12.0" Round Pipe

n= 0.012

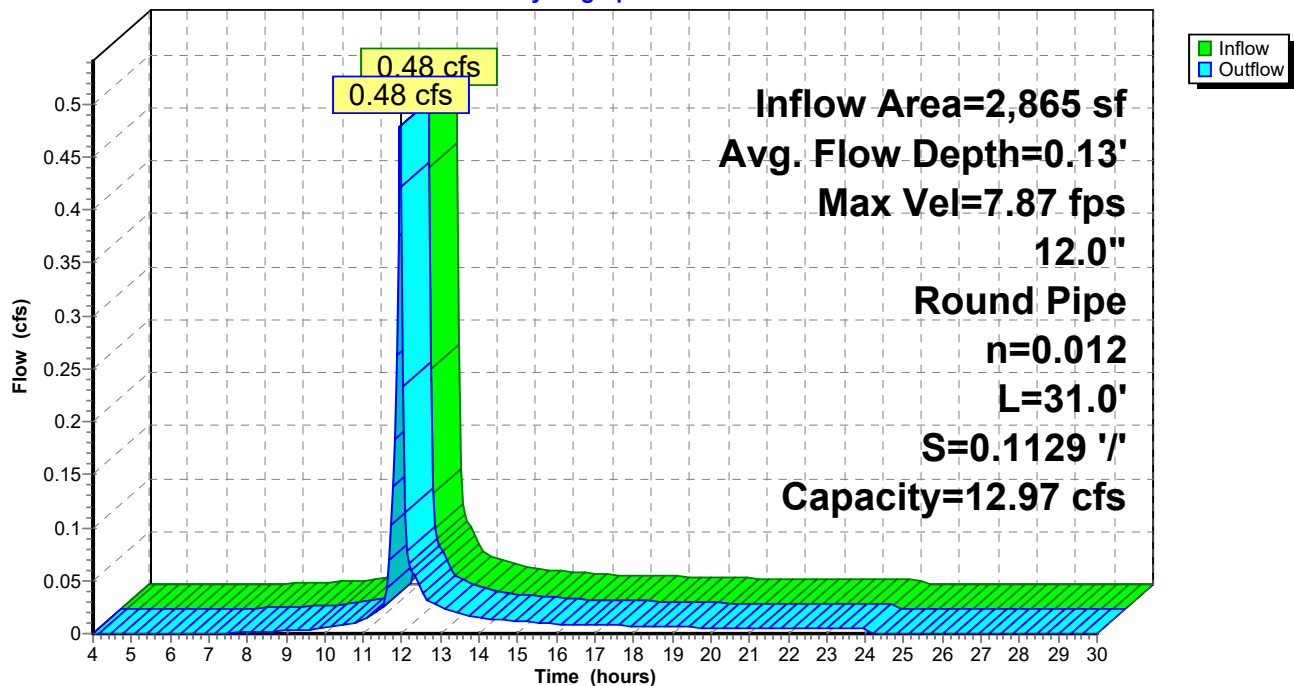
Length= 31.0' Slope= 0.1129 '/'

Inlet Invert= 916.00', Outlet Invert= 912.50'



Reach 10R: Culvert #5

Hydrograph



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Time span=4.00-30.00 hrs, dt=0.05 hrs, 521 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment9S: CC-9

Runoff Area=2,509 sf 56.44% Impervious Runoff Depth=5.01"
Tc=5.0 min CN=74 Runoff=0.51 cfs 1,047 cf

Subcatchment10S: CC-10

Runoff Area=2,865 sf 47.23% Impervious Runoff Depth=5.24"
Tc=5.0 min CN=76 Runoff=0.60 cfs 1,251 cf

Reach 8R: Culvert #4

Avg. Flow Depth=0.21' Max Vel=4.23 fps Inflow=0.51 cfs 1,047 cf
12.0" Round Pipe n=0.012 L=27.0' S=0.0185 '/' Capacity=5.25 cfs Outflow=0.50 cfs 1,047 cf

Reach 10R: Culvert #5

Avg. Flow Depth=0.15' Max Vel=8.42 fps Inflow=0.60 cfs 1,251 cf
12.0" Round Pipe n=0.012 L=31.0' S=0.1129 '/' Capacity=12.97 cfs Outflow=0.60 cfs 1,251 cf

Total Runoff Area = 5,374 sf Runoff Volume = 2,298 cf Average Runoff Depth = 5.13"
48.47% Pervious = 2,605 sf 51.53% Impervious = 2,769 sf

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Type II 24-hr 100-yr Rainfall=8.09"

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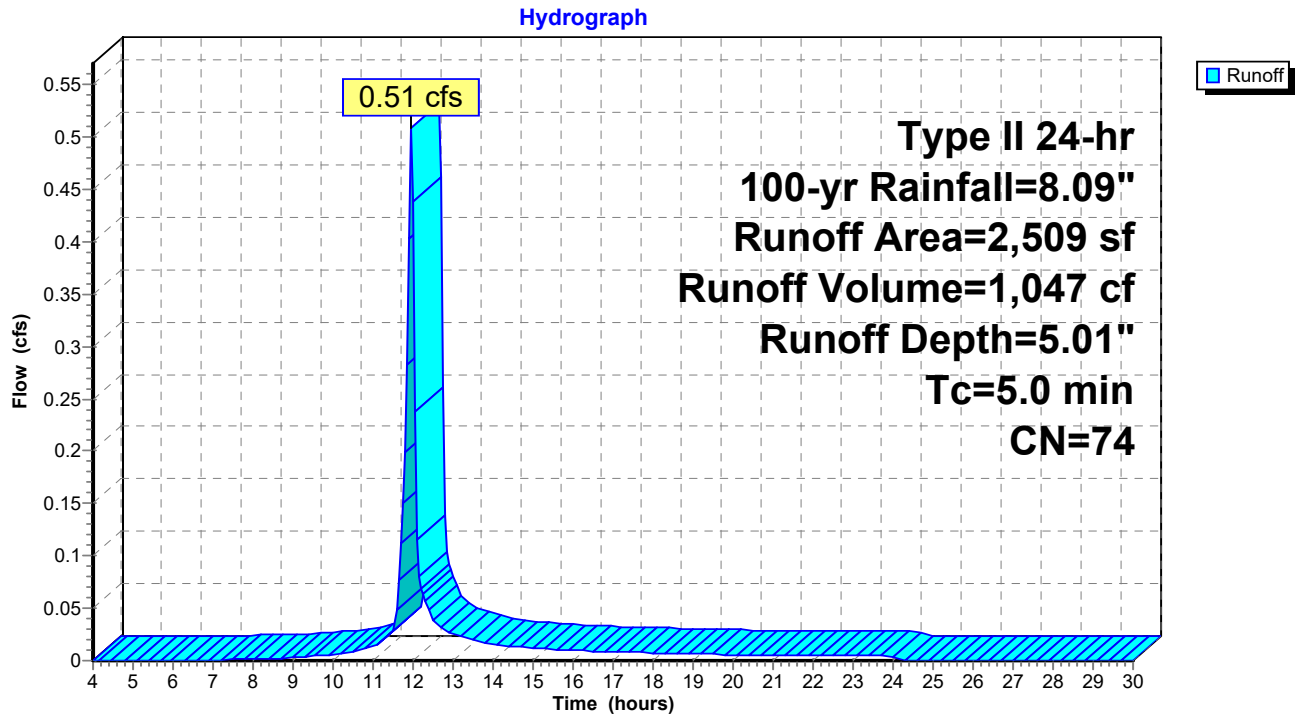
Summary for Subcatchment 9S: CC-9[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.51 cfs @ 11.96 hrs, Volume= 1,047 cf, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
815	30	Meadow, non-grazed, HSG A
278	78	Meadow, non-grazed, HSG D
633	98	Paved parking, HSG A
783	98	Water Surface, HSG D
2,509	74	Weighted Average
1,093		43.56% Pervious Area
1,416		56.44% Impervious Area

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

Subcatchment 9S: CC-9

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Type II 24-hr 100-yr Rainfall=8.09"

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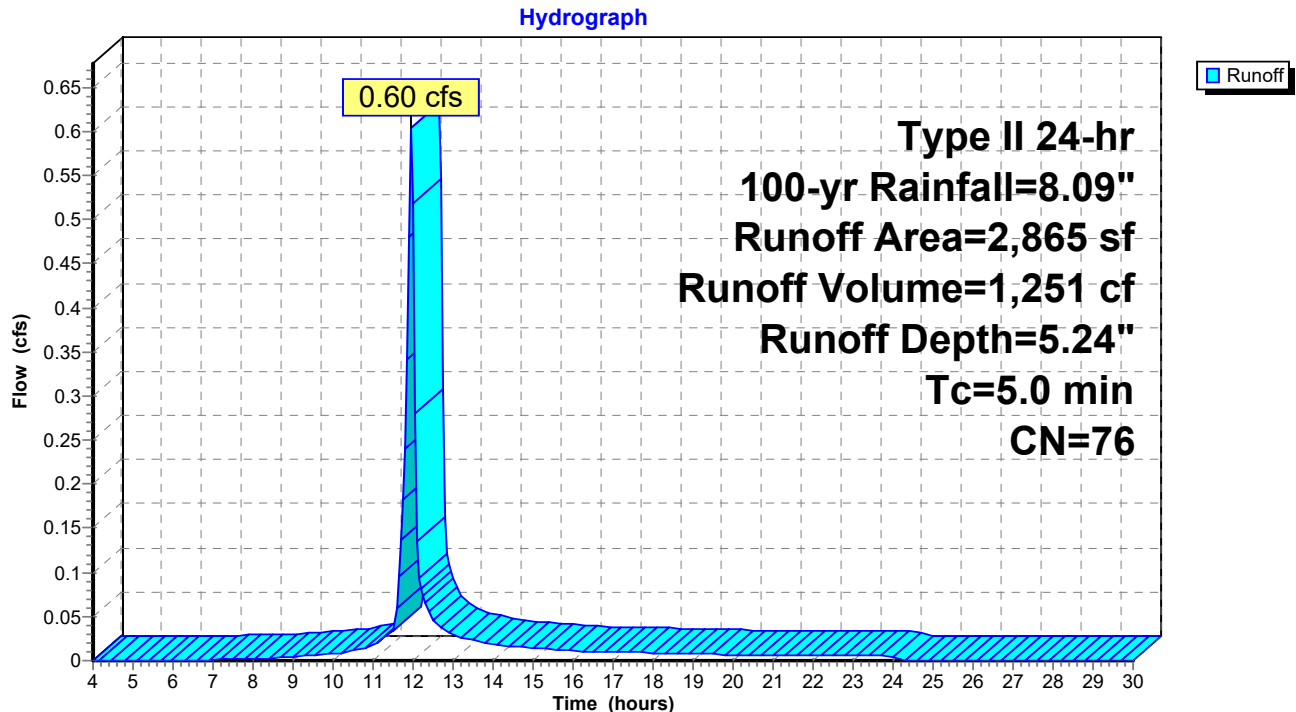
Summary for Subcatchment 10S: CC-10[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.60 cfs @ 11.95 hrs, Volume= 1,251 cf, Depth= 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-30.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
667	30	Meadow, non-grazed, HSG A
845	78	Meadow, non-grazed, HSG D
675	98	Paved parking, HSG A
678	98	Paved parking, HSG D
2,865	76	Weighted Average
1,512		52.77% Pervious Area
1,353		47.23% Impervious Area

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

Subcatchment 10S: CC-10

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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Reach 8R: Culvert #4

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,509 sf, 56.44% Impervious, Inflow Depth = 5.01" for 100-yr event
Inflow = 0.51 cfs @ 11.96 hrs, Volume= 1,047 cf
Outflow = 0.50 cfs @ 11.96 hrs, Volume= 1,047 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.23 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 1.25 fps, Avg. Travel Time= 0.4 min

Peak Storage= 3 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.21'

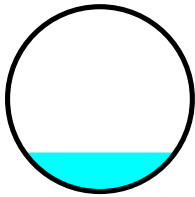
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.25 cfs

12.0" Round Pipe

n= 0.012

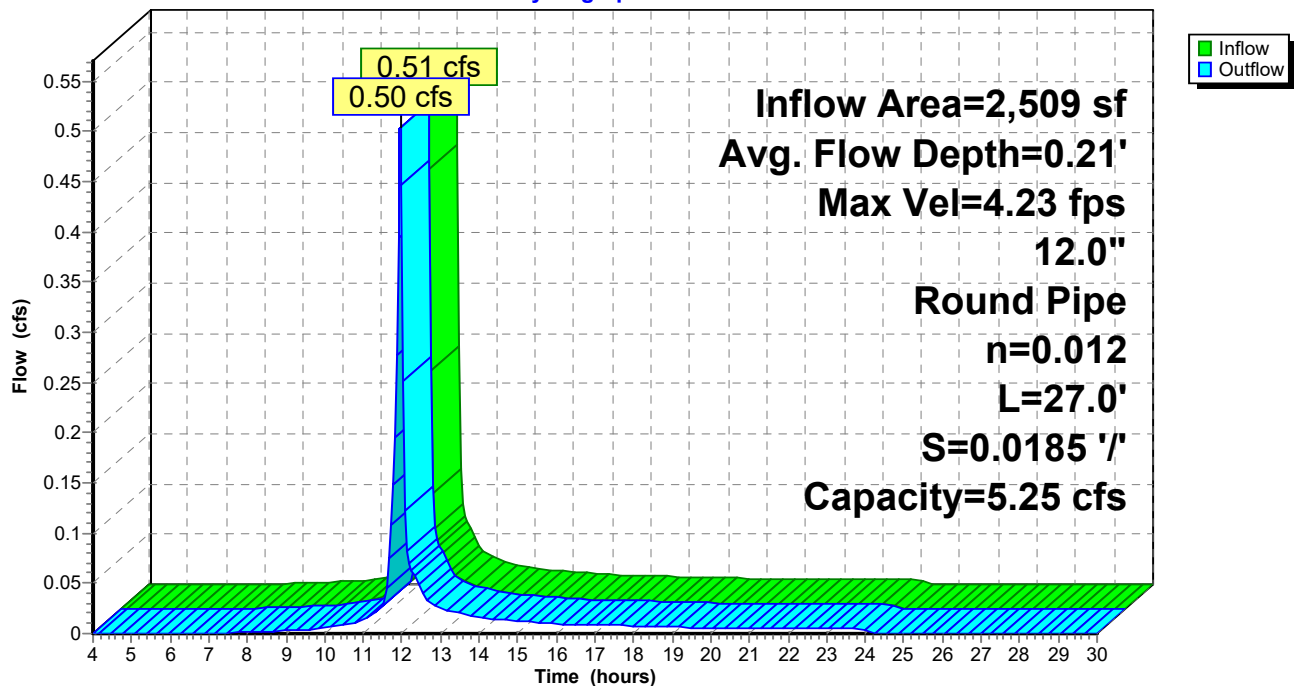
Length= 27.0' Slope= 0.0185 '/

Inlet Invert= 913.00', Outlet Invert= 912.50'



Reach 8R: Culvert #4

Hydrograph



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Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Reach 10R: Culvert #5

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2,865 sf, 47.23% Impervious, Inflow Depth = 5.24" for 100-yr event
Inflow = 0.60 cfs @ 11.95 hrs, Volume= 1,251 cf
Outflow = 0.60 cfs @ 11.96 hrs, Volume= 1,251 cf, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 4.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 8.42 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 2.50 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 11.96 hrs

Average Depth at Peak Storage= 0.15'

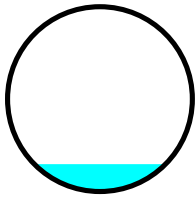
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 12.97 cfs

12.0" Round Pipe

n= 0.012

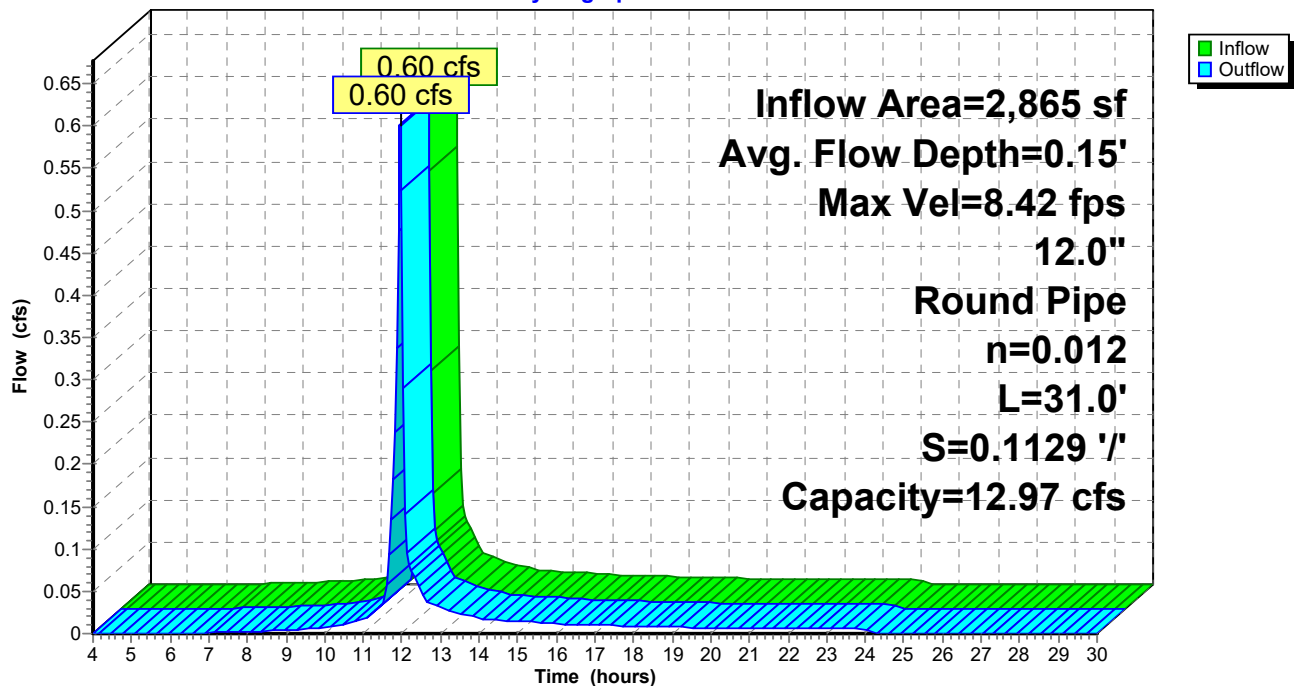
Length= 31.0' Slope= 0.1129 '/'

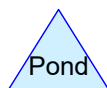
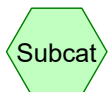
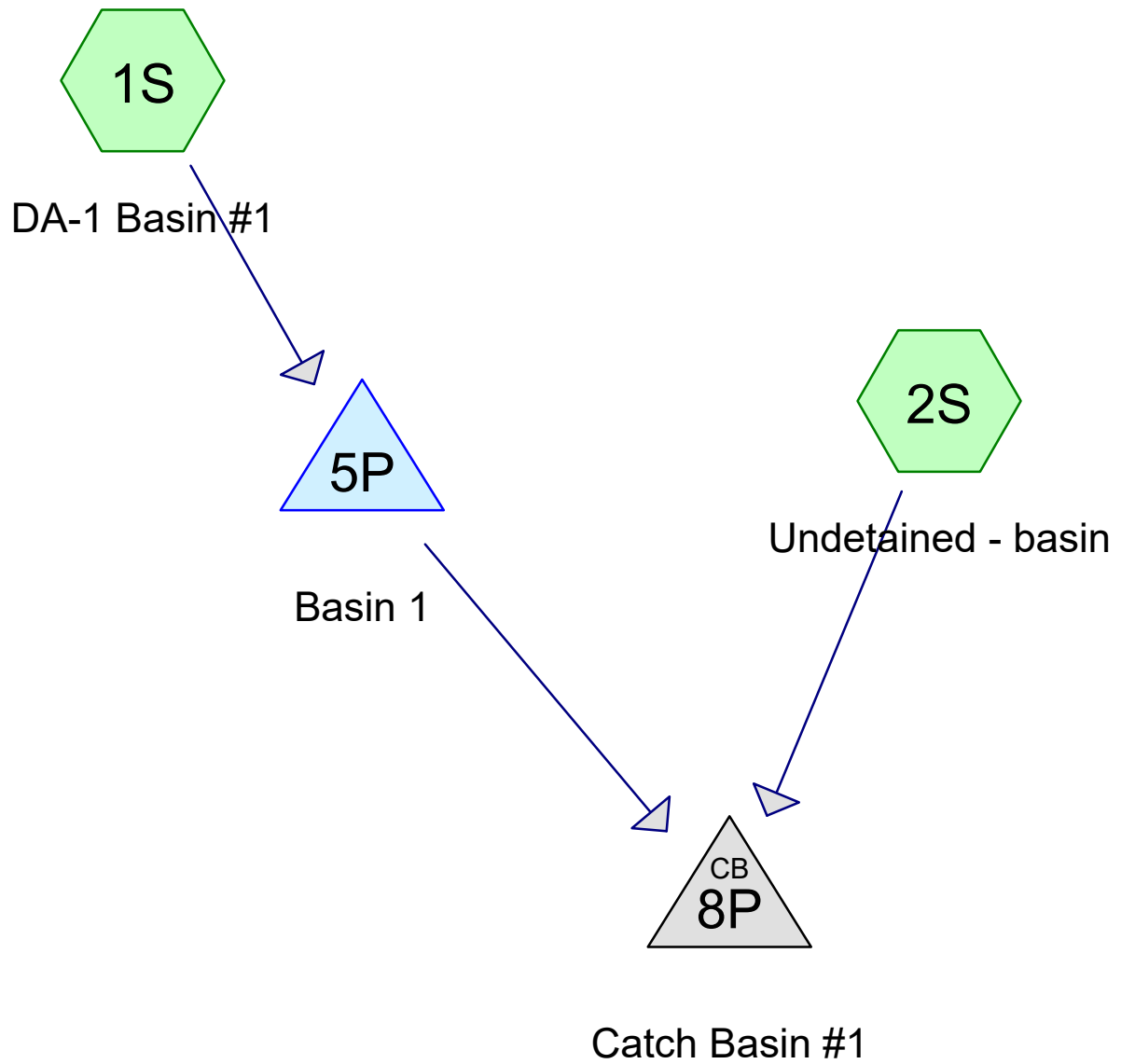
Inlet Invert= 916.00', Outlet Invert= 912.50'



Reach 10R: Culvert #5

Hydrograph





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Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
4,613	98	Impervious (1S, 2S)
113,033	30	Meadow, non-grazed, HSG A (1S, 2S)
50,291	78	Meadow, non-grazed, HSG D (1S, 2S)
42,062	30	Woods, Good, HSG A (1S, 2S)
13,443	77	Woods, Good, HSG D (1S, 2S)
223,442	45	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
155,095	HSG A	1S, 2S
0	HSG B	
0	HSG C	
63,734	HSG D	1S, 2S
4,613	Other	1S, 2S
223,442		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Number
0	0	0	0	4,613	4,613	Impervious	
113,033	0	0	50,291	0	163,324	Meadow, non-grazed	
42,062	0	0	13,443	0	55,505	Woods, Good	
155,095	0	0	63,734	4,613	223,442	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	5P	924.50	910.00	51.0	0.2843	0.012	18.0	0.0	0.0
2	8P	911.50	908.00	142.0	0.0246	0.012	18.0	0.0	0.0

MLV 505LD86_Culvert 6-7_rev2*Type II 24-hr 1-yr Rainfall=2.72"*

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Time span=4.00-24.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA-1 Basin #1

Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>0.02"
Flow Length=1,332' Tc=25.9 min CN=47 Runoff=0.01 cfs 279 cf

Subcatchment2S: Undetained - basin

Runoff Area=32,235 sf 1.40% Impervious Runoff Depth=0.00"
Flow Length=247' Tc=5.6 min CN=32 Runoff=0.00 cfs 0 cf

Pond 5P: Basin 1

Peak Elev=924.50' Storage=6 cf Inflow=0.01 cfs 279 cf
Discarded=0.01 cfs 273 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 273 cf

Pond 8P: Catch Basin #1

Peak Elev=911.50' Inflow=0.00 cfs 0 cf
18.0" Round Culvert n=0.012 L=142.0' S=0.0246 '/' Outflow=0.00 cfs 0 cf

Total Runoff Area = 223,442 sf Runoff Volume = 279 cf Average Runoff Depth = 0.01"
97.94% Pervious = 218,829 sf 2.06% Impervious = 4,613 sf

MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 1S: DA-1 Basin #1

[73] Warning: Peak may fall outside time span

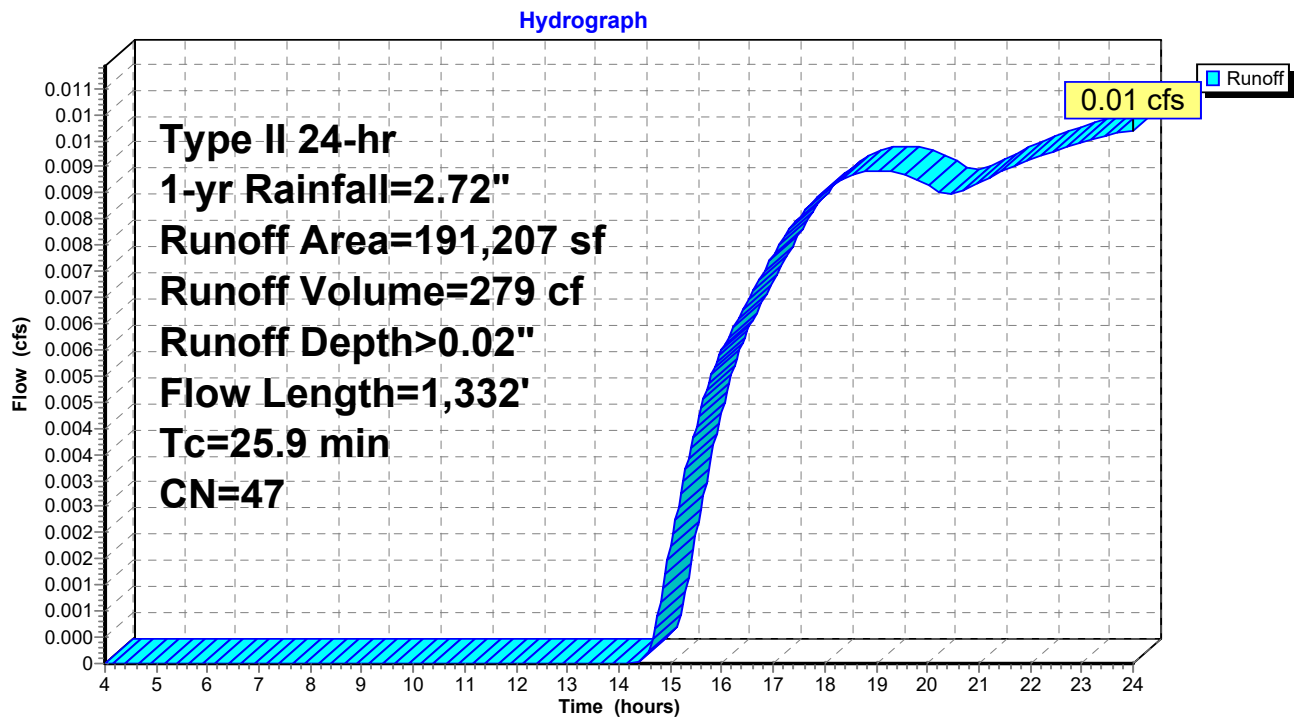
Runoff = 0.01 cfs @ 24.00 hrs, Volume= 279 cf, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1167	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.3	554	0.0922	2.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
25.9	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 1-yr Rainfall=2.72"

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Summary for Subcatchment 2S: Undetained - basin[49] Hint: $T_c < 2dt$ may require smaller dt

[45] Hint: Runoff=Zero

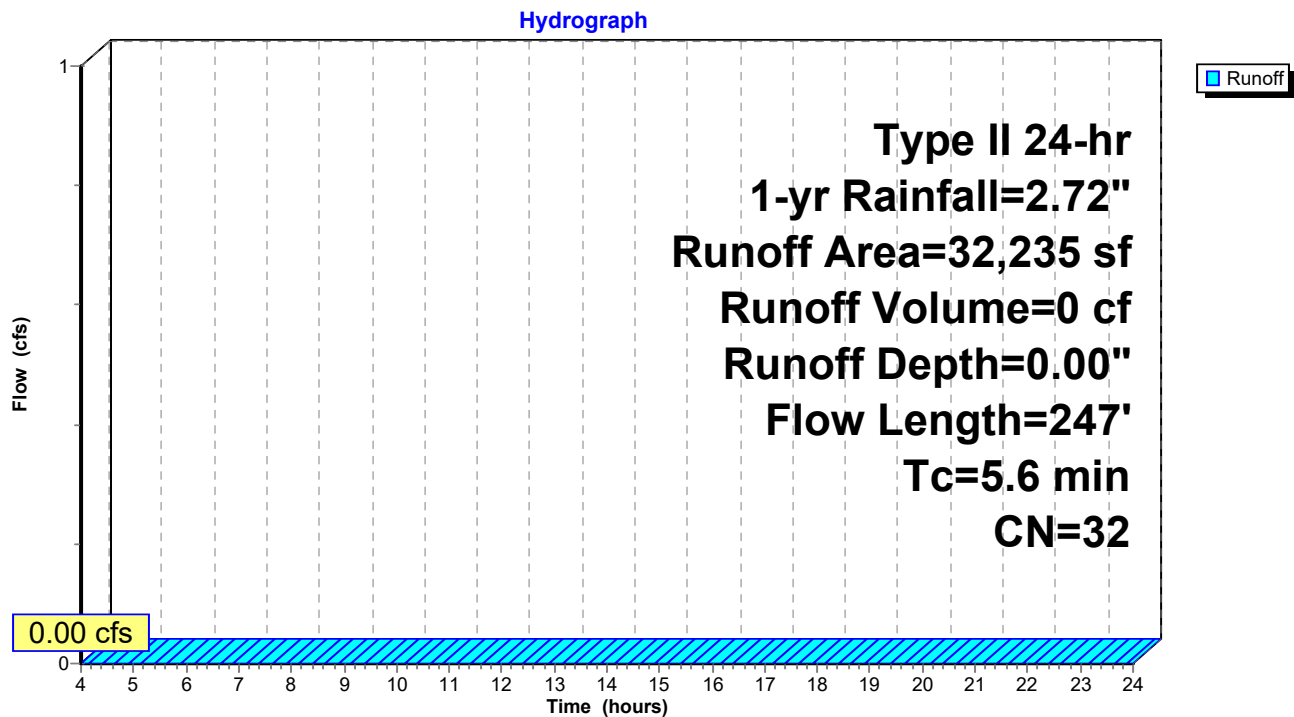
Runoff = 0.00 cfs @ 4.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 1-yr Rainfall=2.72"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
570	77	Woods, Good, HSG D
20,391	30	Meadow, non-grazed, HSG A
299	78	Meadow, non-grazed, HSG D
* 450	98	Impervious
32,235	32	Weighted Average
31,785		98.60% Pervious Area
450		1.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1200	0.35		Sheet Flow, Grass: Short n= 0.150 P2= 3.26"
0.9	147	0.1630	2.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.6	247	Total			

Subcatchment 2S: Undetained - basin



Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 0.02" for 1-yr event
 Inflow = 0.01 cfs @ 24.00 hrs, Volume= 279 cf
 Outflow = 0.01 cfs @ 24.00 hrs, Volume= 273 cf, Atten= 0%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 24.00 hrs, Volume= 273 cf
 Primary = 0.00 cfs @ 4.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 924.50' @ 24.00 hrs Surf.Area= 2,840 sf Storage= 6 cf

Plug-Flow detention time= 9.4 min calculated for 273 cf (98% of inflow)
 Center-of-Mass det. time= 4.3 min (1,199.5 - 1,195.2)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,897 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
926.00	4,260	3,779	5,313
927.00	5,278	4,769	10,082
928.00	6,352	5,815	15,897

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	4.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	924.50'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#3	Device 4	926.50'	24.0" Vert. Orifice/Grate C= 0.600
#4	Primary	924.50'	18.0" Round Culvert#6 L= 51.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 910.00' S= 0.2843 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Discarded OutFlow Max=0.20 cfs @ 24.00 hrs HW=924.50' (Free Discharge)

↑ **2=Exfiltration** (Controls 0.20 cfs)

Primary OutFlow Max=0.00 cfs @ 4.00 hrs HW=924.50' (Free Discharge)

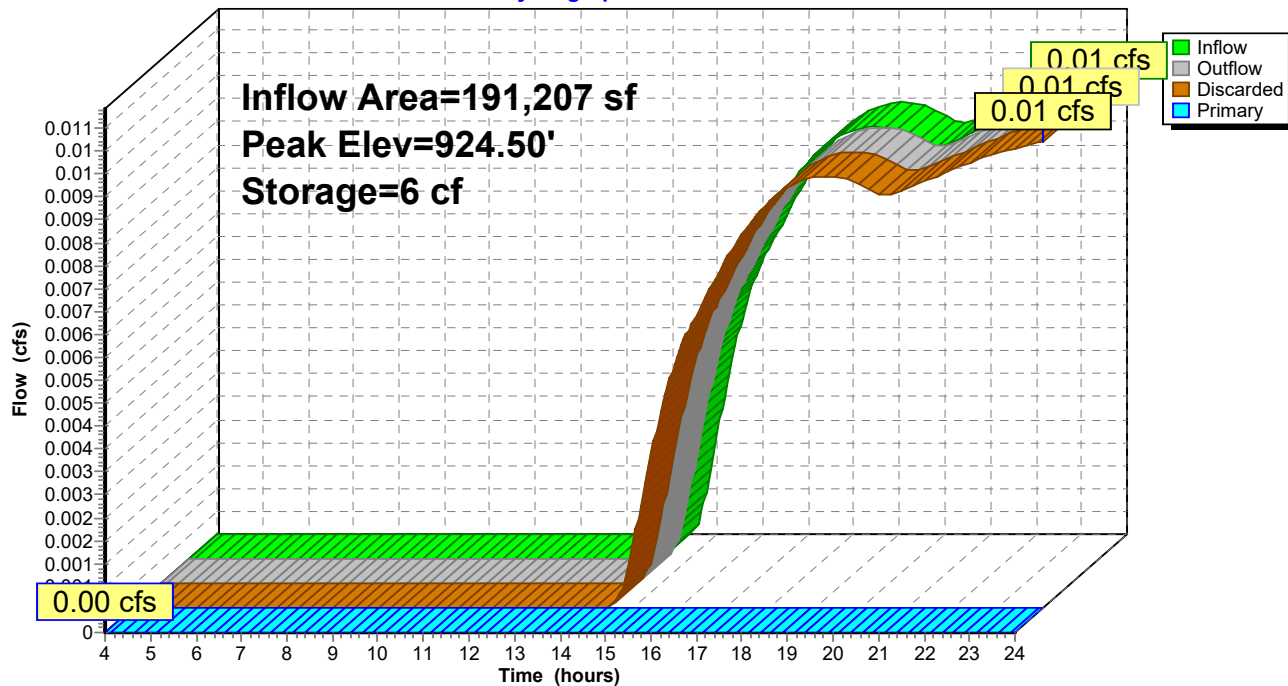
↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **4=Culvert#6** (Controls 0.00 cfs)

↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Basin 1

Hydrograph



Summary for Pond 8P: Catch Basin #1

[57] Hint: Peaked at 911.50' (Flood elevation advised)

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 1.50'

Inflow Area = 223,442 sf, 2.06% Impervious, Inflow Depth = 0.00" for 1-yr event
 Inflow = 0.00 cfs @ 4.00 hrs, Volume= 0 cf
 Outflow = 0.00 cfs @ 4.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 4.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 911.50' @ 4.00 hrs

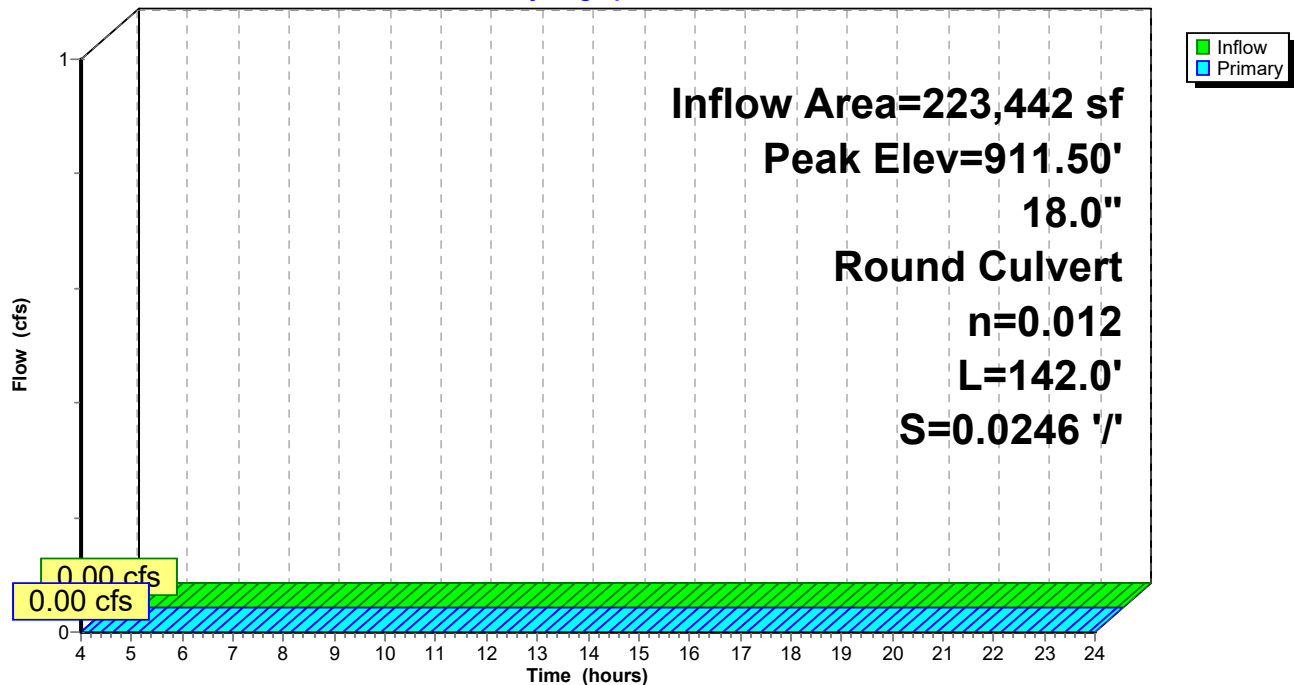
Device	Routing	Invert	Outlet Devices
#1	Primary	911.50'	18.0" Round Culvert#7 L= 142.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 911.50' / 908.00' S= 0.0246 '/ Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 4.00 hrs HW=911.50' (Free Discharge)

↑1=Culvert#7 (Controls 0.00 cfs)

Pond 8P: Catch Basin #1

Hydrograph



MLV 505LD86_Culvert 6-7_rev2*Type II 24-hr 2-yr Rainfall=3.26"*

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Time span=4.00-24.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA-1 Basin #1

Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>0.08"
Flow Length=1,332' Tc=25.9 min CN=47 Runoff=0.04 cfs 1,276 cf

Subcatchment2S: Undetained - basin

Runoff Area=32,235 sf 1.40% Impervious Runoff Depth=0.00"
Flow Length=247' Tc=5.6 min CN=32 Runoff=0.00 cfs 0 cf

Pond 5P: Basin 1

Peak Elev=924.51' Storage=23 cf Inflow=0.04 cfs 1,276 cf
Discarded=0.04 cfs 1,262 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 1,262 cf

Pond 8P: Catch Basin #1

Peak Elev=911.50' Inflow=0.00 cfs 0 cf
18.0" Round Culvert n=0.012 L=142.0' S=0.0246 '/' Outflow=0.00 cfs 0 cf

Total Runoff Area = 223,442 sf Runoff Volume = 1,276 cf Average Runoff Depth = 0.07"
97.94% Pervious = 218,829 sf 2.06% Impervious = 4,613 sf

MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 1S: DA-1 Basin #1

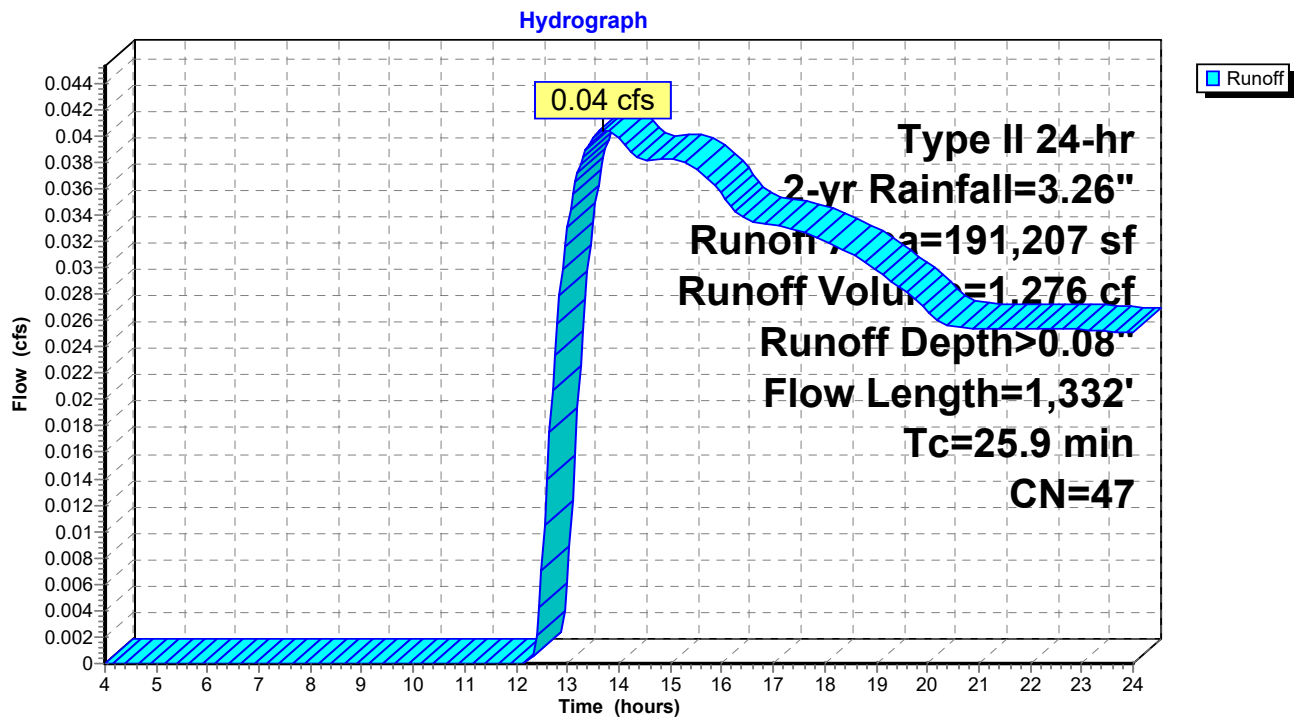
Runoff = 0.04 cfs @ 13.70 hrs, Volume= 1,276 cf, Depth> 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1167	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.3	554	0.0922	2.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
25.9	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 2-yr Rainfall=3.26"

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Summary for Subcatchment 2S: Undetained - basin[49] Hint: $T_c < 2dt$ may require smaller dt

[45] Hint: Runoff=Zero

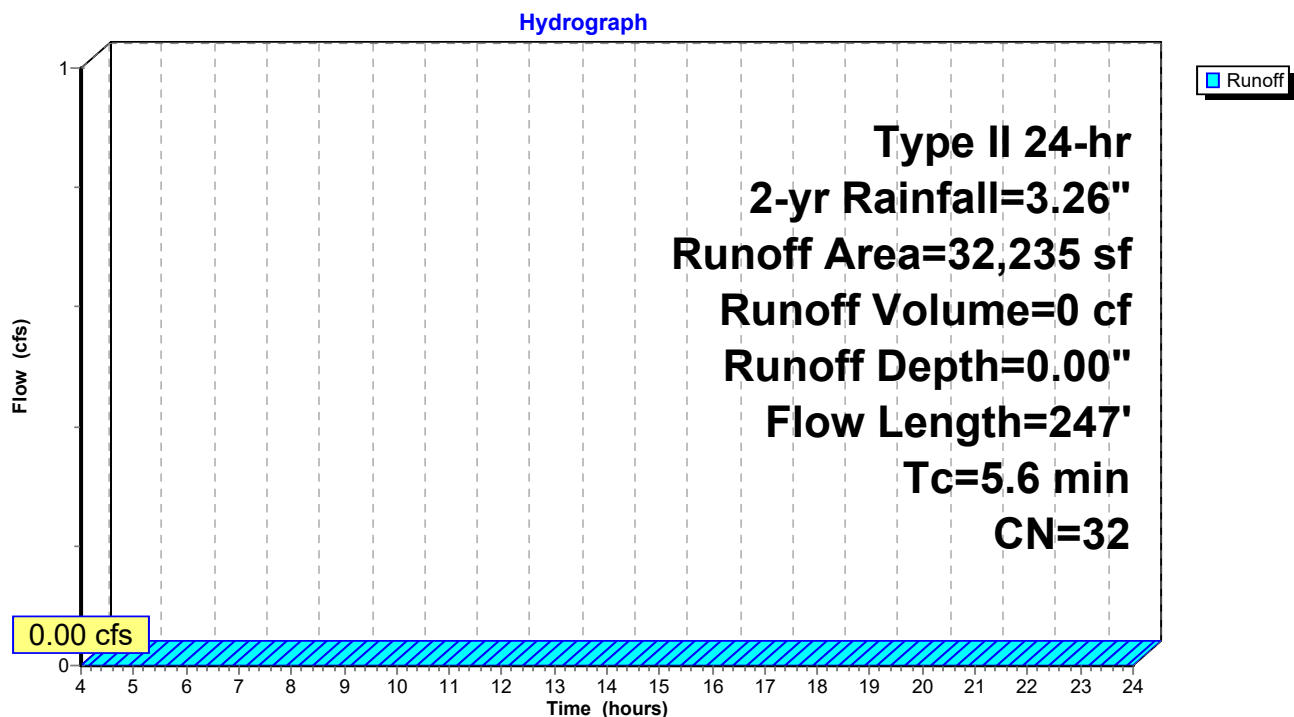
Runoff = 0.00 cfs @ 4.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 2-yr Rainfall=3.26"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
570	77	Woods, Good, HSG D
20,391	30	Meadow, non-grazed, HSG A
299	78	Meadow, non-grazed, HSG D
* 450	98	Impervious
32,235	32	Weighted Average
31,785		98.60% Pervious Area
450		1.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1200	0.35		Sheet Flow, Grass: Short n= 0.150 P2= 3.26"
0.9	147	0.1630	2.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.6	247	Total			

Subcatchment 2S: Undetained - basin



Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 0.08" for 2-yr event
 Inflow = 0.04 cfs @ 13.70 hrs, Volume= 1,276 cf
 Outflow = 0.04 cfs @ 13.90 hrs, Volume= 1,262 cf, Atten= 1%, Lag= 12.4 min
 Discarded = 0.04 cfs @ 13.90 hrs, Volume= 1,262 cf
 Primary = 0.00 cfs @ 4.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 924.51' @ 13.90 hrs Surf.Area= 2,845 sf Storage= 23 cf

Plug-Flow detention time= 9.4 min calculated for 1,262 cf (99% of inflow)
 Center-of-Mass det. time= 5.3 min (1,074.5 - 1,069.2)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,897 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
926.00	4,260	3,779	5,313
927.00	5,278	4,769	10,082
928.00	6,352	5,815	15,897

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	4.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	924.50'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#3	Device 4	926.50'	24.0" Vert. Orifice/Grate C= 0.600
#4	Primary	924.50'	18.0" Round Culvert#6 L= 51.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 910.00' S= 0.2843 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Discarded OutFlow Max=0.20 cfs @ 13.90 hrs HW=924.51' (Free Discharge)

↑**2=Exfiltration** (Controls 0.20 cfs)

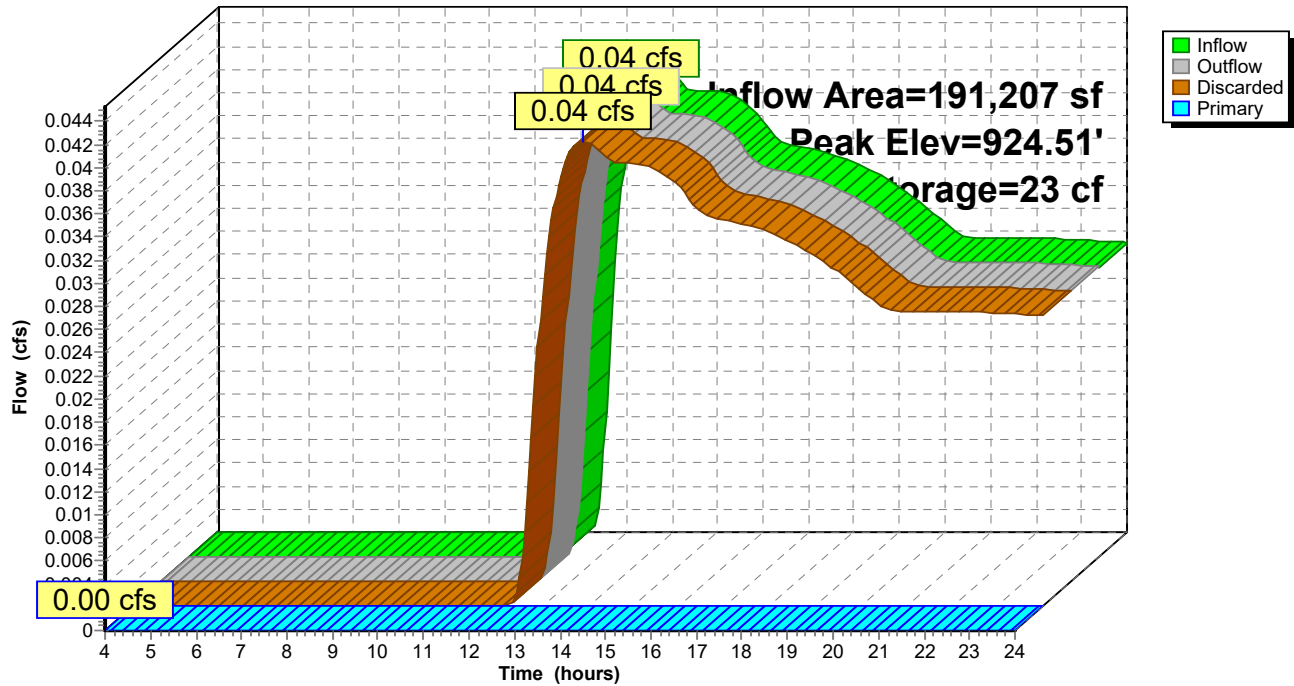
Primary OutFlow Max=0.00 cfs @ 4.00 hrs HW=924.50' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑**4=Culvert#6** (Controls 0.00 cfs)

↑**3=Orifice/Grate** (Controls 0.00 cfs)

Hydrograph



Summary for Pond 8P: Catch Basin #1

[57] Hint: Peaked at 911.50' (Flood elevation advised)

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 1.50'

Inflow Area = 223,442 sf, 2.06% Impervious, Inflow Depth = 0.00" for 2-yr event
 Inflow = 0.00 cfs @ 4.00 hrs, Volume= 0 cf
 Outflow = 0.00 cfs @ 4.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 4.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 911.50' @ 4.00 hrs

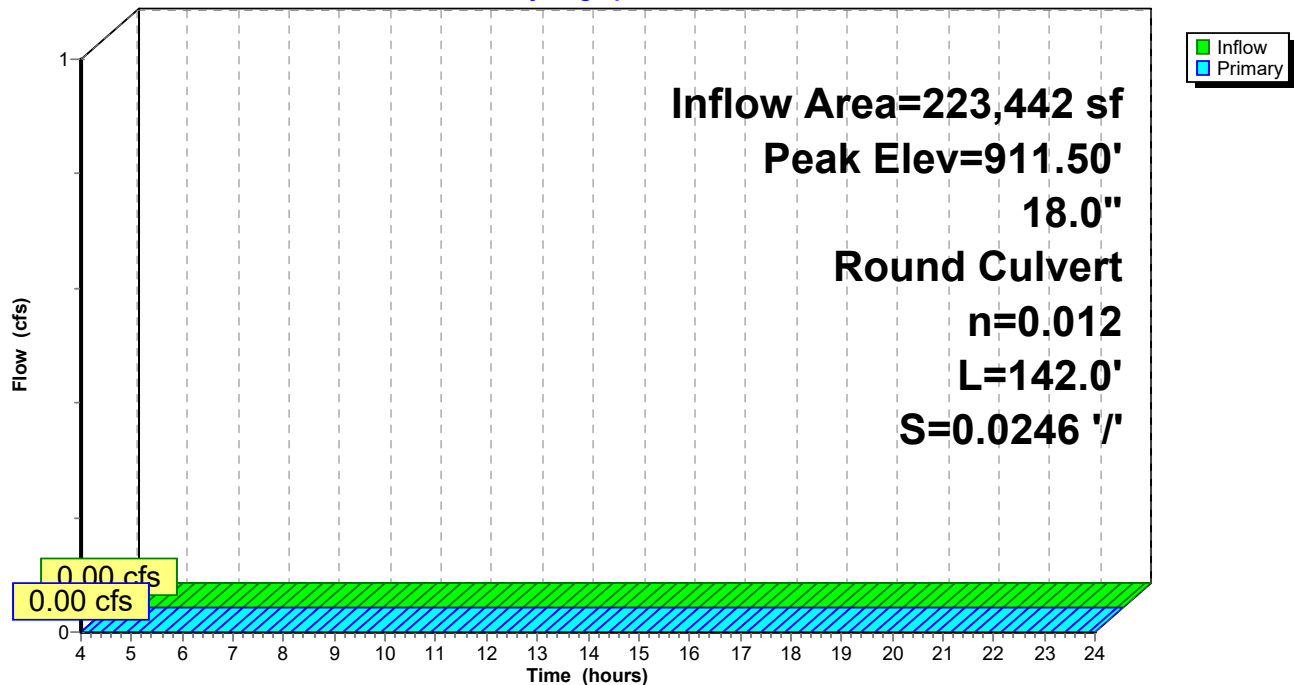
Device	Routing	Invert	Outlet Devices
#1	Primary	911.50'	18.0" Round Culvert#7 L= 142.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 911.50' / 908.00' S= 0.0246 '/ Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 4.00 hrs HW=911.50' (Free Discharge)

1=Culvert#7 (Controls 0.00 cfs)

Pond 8P: Catch Basin #1

Hydrograph



MLV 505LD86_Culvert 6-7_rev2*Type II 24-hr 10-yr Rainfall=4.74"*

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Time span=4.00-24.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA-1 Basin #1

Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>0.44"
Flow Length=1,332' Tc=25.9 min CN=47 Runoff=0.87 cfs 7,045 cf

Subcatchment2S: Undetained - basin

Runoff Area=32,235 sf 1.40% Impervious Runoff Depth>0.01"
Flow Length=247' Tc=5.6 min CN=32 Runoff=0.00 cfs 29 cf

Pond 5P: Basin 1

Peak Elev=924.96' Storage=1,418 cf Inflow=0.87 cfs 7,045 cf
Discarded=0.24 cfs 7,001 cf Primary=0.00 cfs 0 cf Outflow=0.24 cfs 7,001 cf

Pond 8P: Catch Basin #1

Peak Elev=911.52' Inflow=0.00 cfs 29 cf
18.0" Round Culvert n=0.012 L=142.0' S=0.0246 '/' Outflow=0.00 cfs 29 cf

Total Runoff Area = 223,442 sf Runoff Volume = 7,074 cf Average Runoff Depth = 0.38"
97.94% Pervious = 218,829 sf 2.06% Impervious = 4,613 sf

MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 1S: DA-1 Basin #1

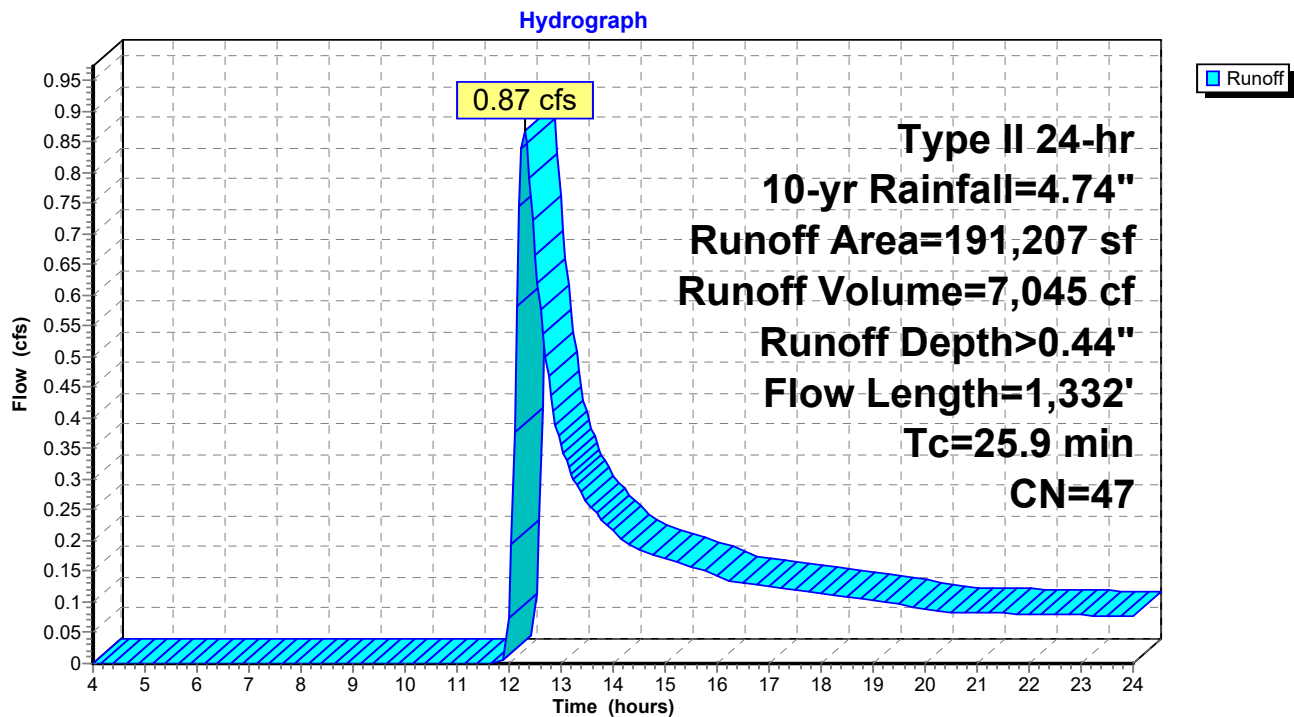
Runoff = 0.87 cfs @ 12.30 hrs, Volume= 7,045 cf, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1167	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.3	554	0.0922	2.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
25.9	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 10-yr Rainfall=4.74"

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Summary for Subcatchment 2S: Undetained - basin[49] Hint: $T_c < 2dt$ may require smaller dt

[73] Warning: Peak may fall outside time span

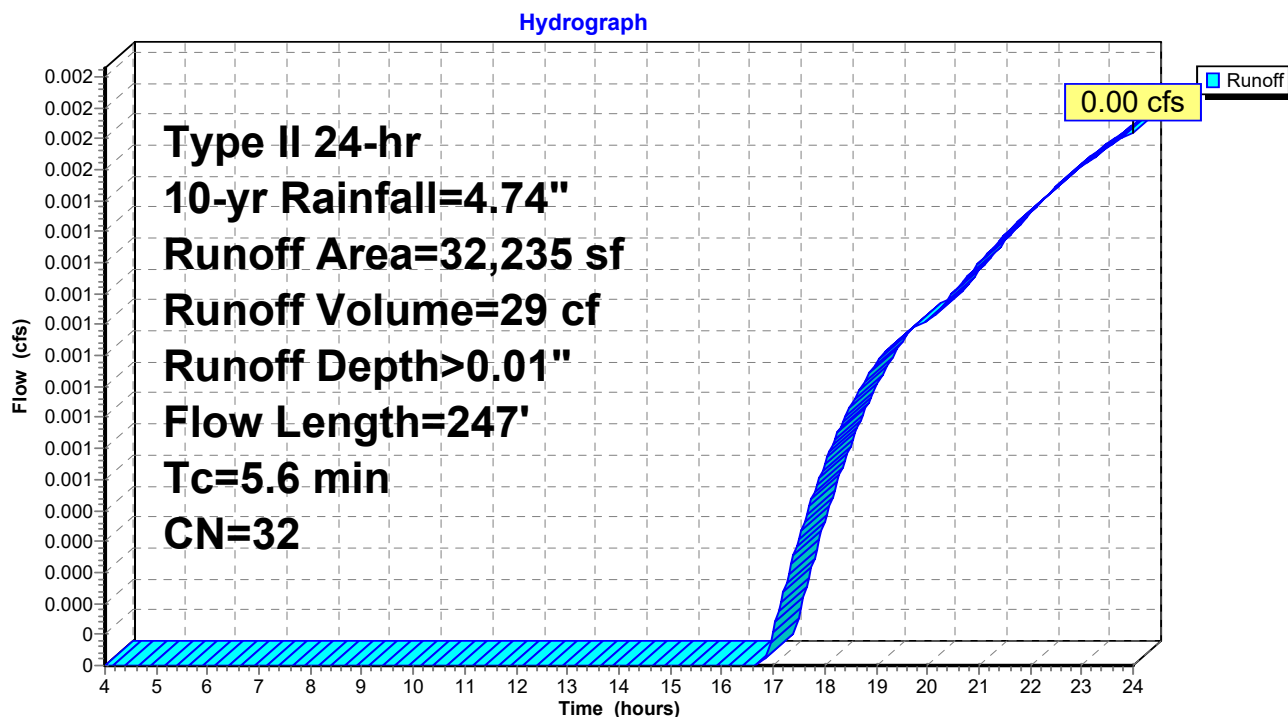
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 29 cf, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 10-yr Rainfall=4.74"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
570	77	Woods, Good, HSG D
20,391	30	Meadow, non-grazed, HSG A
299	78	Meadow, non-grazed, HSG D
* 450	98	Impervious
32,235	32	Weighted Average
31,785		98.60% Pervious Area
450		1.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1200	0.35		Sheet Flow, Grass: Short n= 0.150 P2= 3.26"
0.9	147	0.1630	2.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.6	247	Total			

Subcatchment 2S: Undetained - basin



Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 0.44" for 10-yr event
 Inflow = 0.87 cfs @ 12.30 hrs, Volume= 7,045 cf
 Outflow = 0.24 cfs @ 13.74 hrs, Volume= 7,001 cf, Atten= 73%, Lag= 86.3 min
 Discarded = 0.24 cfs @ 13.74 hrs, Volume= 7,001 cf
 Primary = 0.00 cfs @ 4.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 924.96' @ 13.74 hrs Surf.Area= 3,266 sf Storage= 1,418 cf

Plug-Flow detention time= 53.8 min calculated for 6,984 cf (99% of inflow)
 Center-of-Mass det. time= 50.7 min (1,003.4 - 952.7)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,897 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
926.00	4,260	3,779	5,313
927.00	5,278	4,769	10,082
928.00	6,352	5,815	15,897

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	4.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	924.50'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#3	Device 4	926.50'	24.0" Vert. Orifice/Grate C= 0.600
#4	Primary	924.50'	18.0" Round Culvert#6 L= 51.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 910.00' S= 0.2843 ' /' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Discarded OutFlow Max=0.24 cfs @ 13.74 hrs HW=924.96' (Free Discharge)

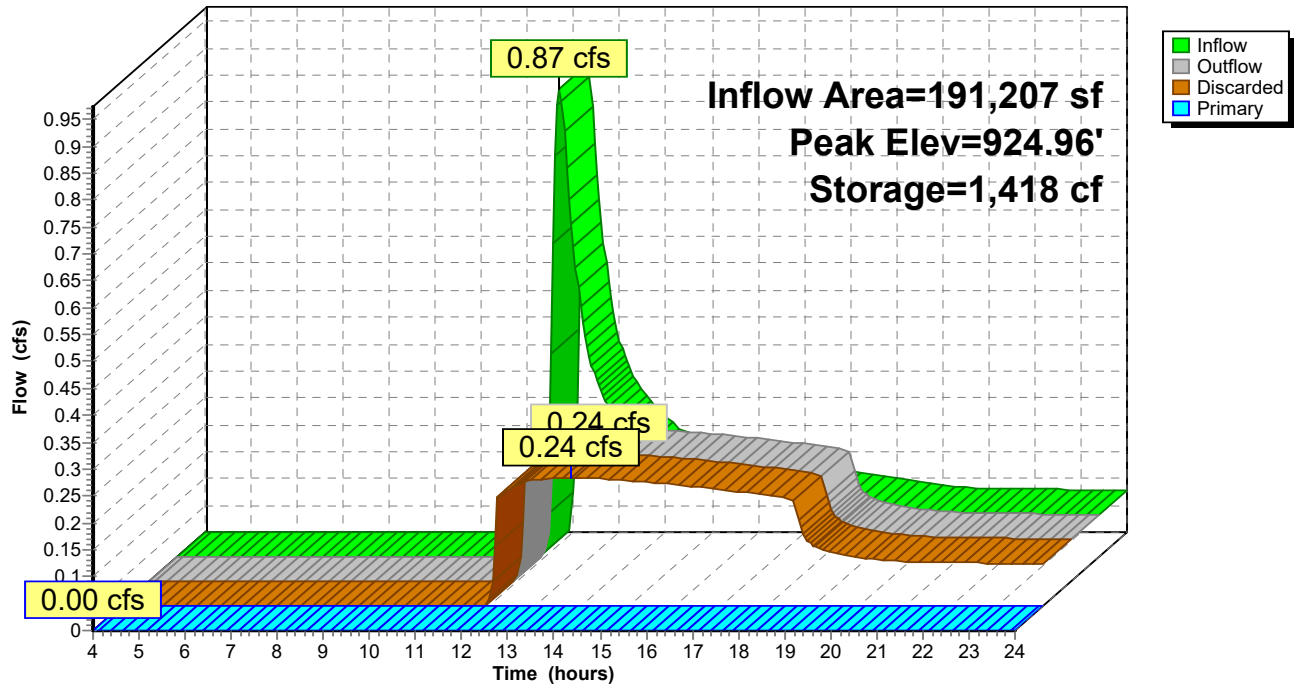
↑ **2=Exfiltration** (Controls 0.24 cfs)

Primary OutFlow Max=0.00 cfs @ 4.00 hrs HW=924.50' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **4=Culvert#6** (Controls 0.00 cfs)

↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Basin 1**Hydrograph**

Summary for Pond 8P: Catch Basin #1

[57] Hint: Peaked at 911.52' (Flood elevation advised)

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 1.52'

Inflow Area = 223,442 sf, 2.06% Impervious, Inflow Depth > 0.00" for 10-yr event
 Inflow = 0.00 cfs @ 24.00 hrs, Volume= 29 cf
 Outflow = 0.00 cfs @ 24.00 hrs, Volume= 29 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 24.00 hrs, Volume= 29 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 911.52' @ 24.00 hrs

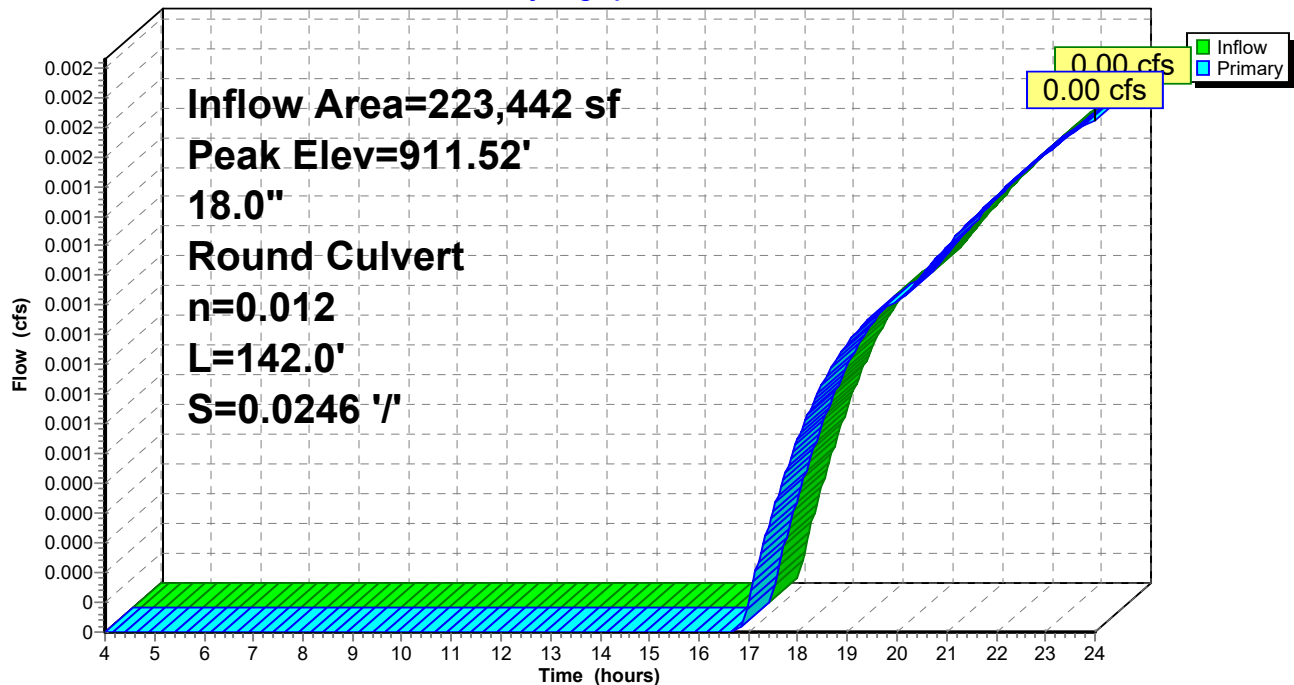
Device	Routing	Invert	Outlet Devices
#1	Primary	911.50'	18.0" Round Culvert#7 L= 142.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 911.50' / 908.00' S= 0.0246 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 24.00 hrs HW=911.52' (Free Discharge)

↑1=Culvert#7 (Inlet Controls 0.00 cfs @ 0.44 fps)

Pond 8P: Catch Basin #1

Hydrograph



MLV 505LD86_Culvert 6-7_rev2*Type II 24-hr 25-yr Rainfall=5.85"*

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Time span=4.00-24.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA-1 Basin #1

Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>0.86"
Flow Length=1,332' Tc=25.9 min CN=47 Runoff=2.44 cfs 13,680 cf

Subcatchment2S: Undetained - basin

Runoff Area=32,235 sf 1.40% Impervious Runoff Depth>0.11"
Flow Length=247' Tc=5.6 min CN=32 Runoff=0.01 cfs 300 cf

Pond 5P: Basin 1

Peak Elev=925.89' Storage=4,842 cf Inflow=2.44 cfs 13,680 cf
Discarded=0.33 cfs 12,522 cf Primary=0.00 cfs 0 cf Outflow=0.33 cfs 12,522 cf

Pond 8P: Catch Basin #1

Peak Elev=911.54' Inflow=0.01 cfs 300 cf
18.0" Round Culvert n=0.012 L=142.0' S=0.0246 '/' Outflow=0.01 cfs 300 cf

Total Runoff Area = 223,442 sf Runoff Volume = 13,980 cf Average Runoff Depth = 0.75"
97.94% Pervious = 218,829 sf 2.06% Impervious = 4,613 sf

MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 1S: DA-1 Basin #1

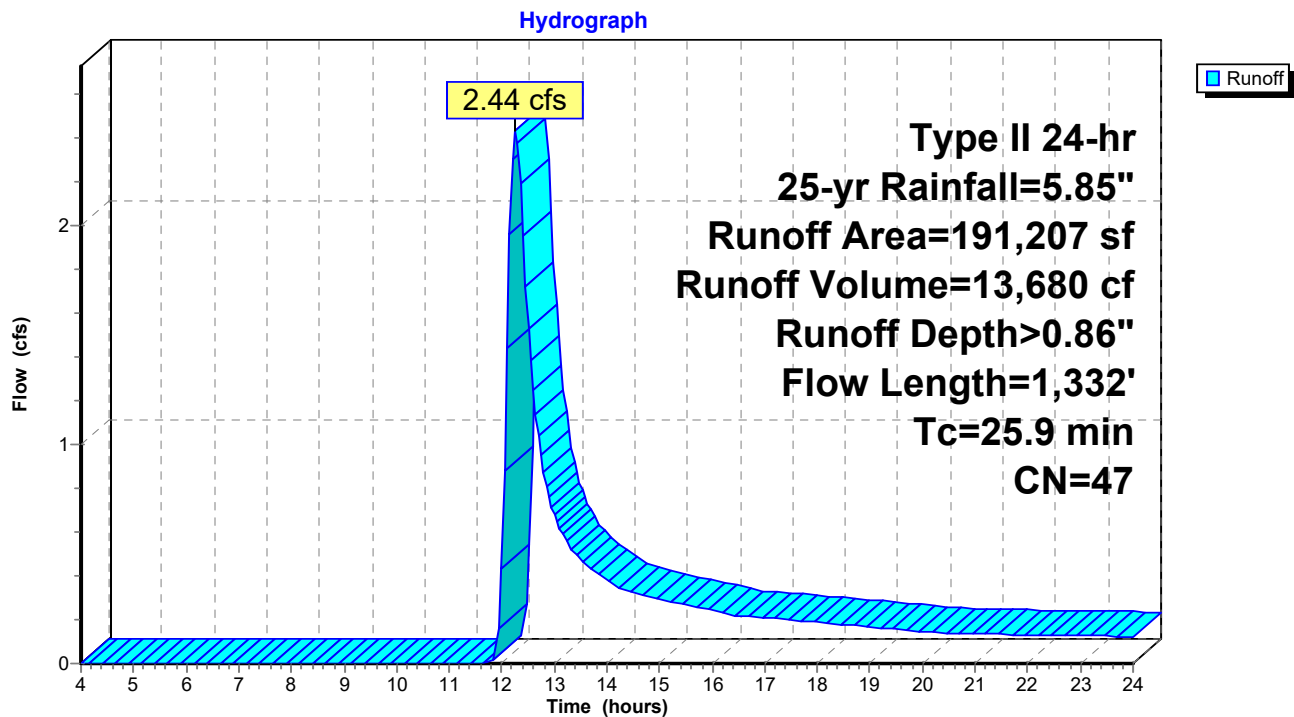
Runoff = 2.44 cfs @ 12.26 hrs, Volume= 13,680 cf, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1167	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.3	554	0.0922	2.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
25.9	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



MLV 505LD86_Culvert 6-7_rev2

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Type II 24-hr 25-yr Rainfall=5.85"

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Summary for Subcatchment 2S: Undetained - basin[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.01 cfs @ 15.03 hrs, Volume= 300 cf, Depth> 0.11"

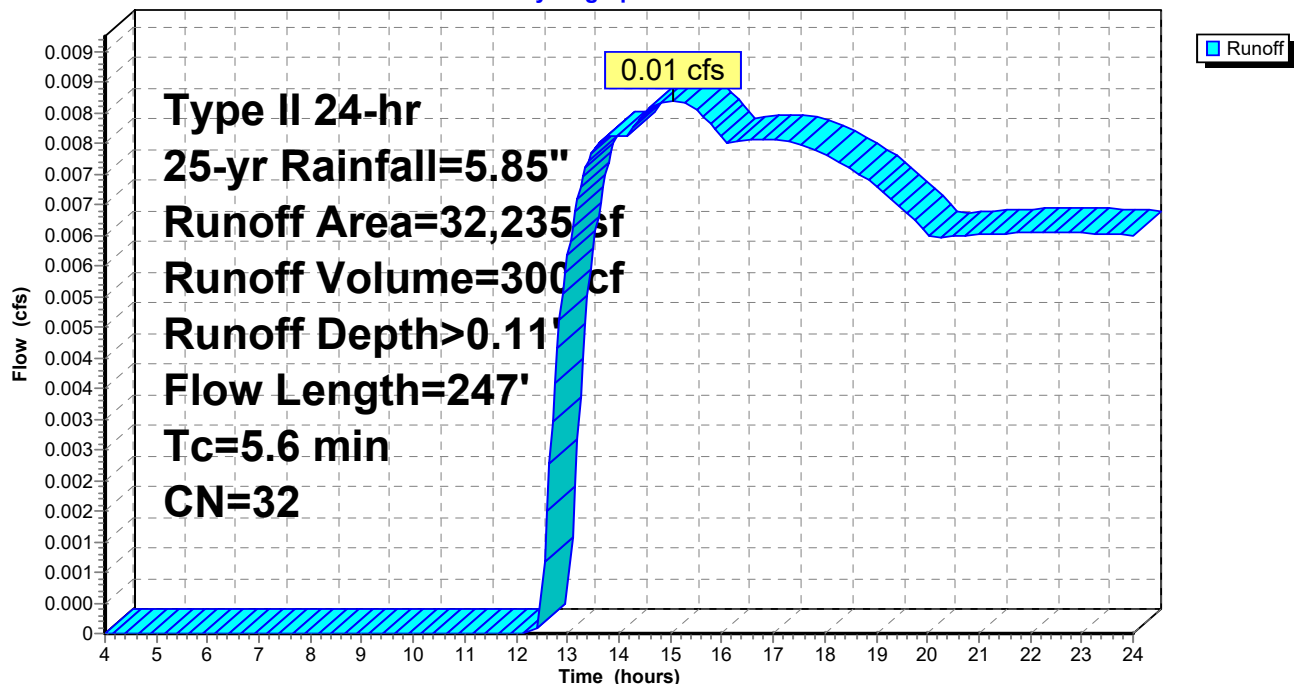
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 25-yr Rainfall=5.85"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
570	77	Woods, Good, HSG D
20,391	30	Meadow, non-grazed, HSG A
299	78	Meadow, non-grazed, HSG D
* 450	98	Impervious
32,235	32	Weighted Average
31,785		98.60% Pervious Area
450		1.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1200	0.35		Sheet Flow, Grass: Short $n=0.150$ $P2=3.26"$
0.9	147	0.1630	2.83		Shallow Concentrated Flow, Short Grass Pasture $K_v=7.0$ fps
5.6	247	Total			

Subcatchment 2S: Undetained - basin

Hydrograph



Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 0.86" for 25-yr event
 Inflow = 2.44 cfs @ 12.26 hrs, Volume= 13,680 cf
 Outflow = 0.33 cfs @ 14.41 hrs, Volume= 12,522 cf, Atten= 87%, Lag= 128.9 min
 Discarded = 0.33 cfs @ 14.41 hrs, Volume= 12,522 cf
 Primary = 0.00 cfs @ 4.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 925.89' @ 14.41 hrs Surf.Area= 4,152 sf Storage= 4,842 cf

Plug-Flow detention time= 185.3 min calculated for 12,491 cf (91% of inflow)
 Center-of-Mass det. time= 144.1 min (1,064.8 - 920.7)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,897 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
926.00	4,260	3,779	5,313
927.00	5,278	4,769	10,082
928.00	6,352	5,815	15,897

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	4.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	924.50'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#3	Device 4	926.50'	24.0" Vert. Orifice/Grate C= 0.600
#4	Primary	924.50'	18.0" Round Culvert#6 L= 51.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 910.00' S= 0.2843 ' /' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Discarded OutFlow Max=0.33 cfs @ 14.41 hrs HW=925.89' (Free Discharge)

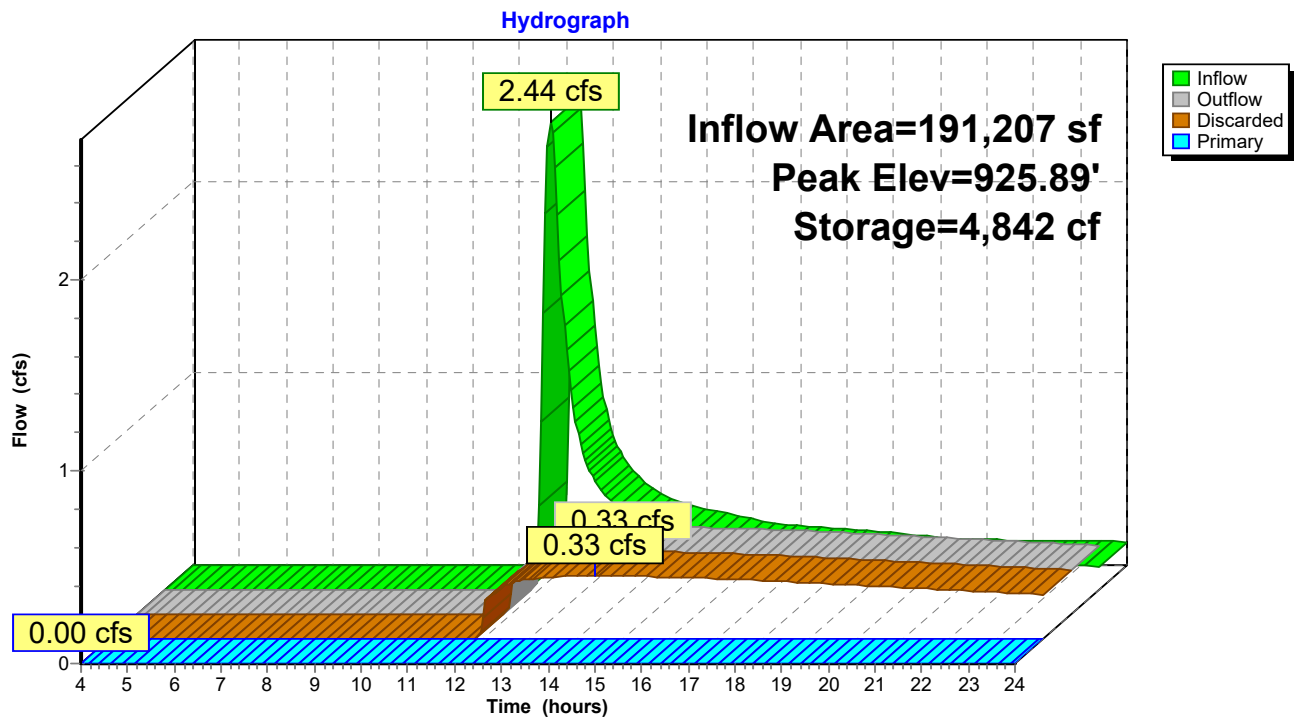
↑ **2=Exfiltration** (Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 4.00 hrs HW=924.50' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **4=Culvert#6** (Controls 0.00 cfs)

↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Basin 1

Summary for Pond 8P: Catch Basin #1

[57] Hint: Peaked at 911.54' (Flood elevation advised)

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 1.54'

Inflow Area = 223,442 sf, 2.06% Impervious, Inflow Depth > 0.02" for 25-yr event
 Inflow = 0.01 cfs @ 15.03 hrs, Volume= 300 cf
 Outflow = 0.01 cfs @ 15.03 hrs, Volume= 300 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.01 cfs @ 15.03 hrs, Volume= 300 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 911.54' @ 15.03 hrs

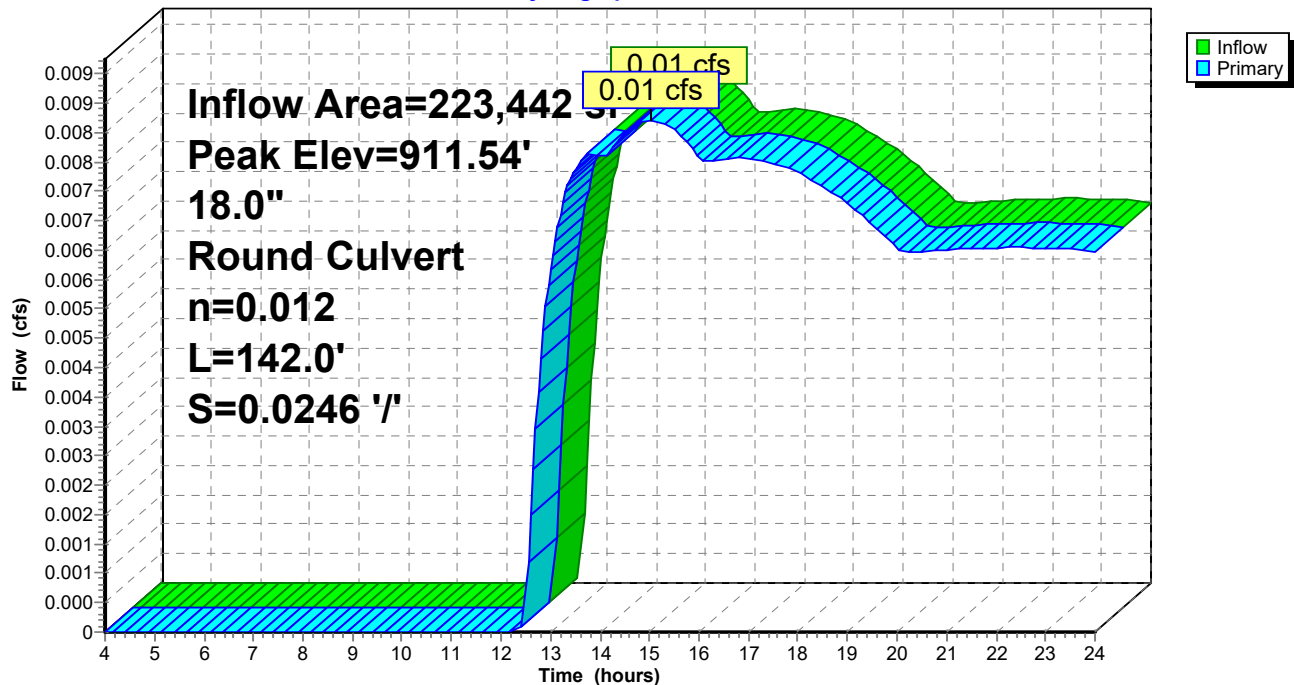
Device	Routing	Invert	Outlet Devices
#1	Primary	911.50'	18.0" Round Culvert#7 L= 142.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 911.50' / 908.00' S= 0.0246 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.01 cfs @ 15.03 hrs HW=911.54' (Free Discharge)

↑1=Culvert#7 (Inlet Controls 0.01 cfs @ 0.67 fps)

Pond 8P: Catch Basin #1

Hydrograph



MLV 505LD86_Culvert 6-7_rev2*Type II 24-hr 50-yr Rainfall=6.87"*

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Time span=4.00-24.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA-1 Basin #1

Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>1.33"
Flow Length=1,332' Tc=25.9 min CN=47 Runoff=4.38 cfs 21,126 cf

Subcatchment2S: Undetained - basin

Runoff Area=32,235 sf 1.40% Impervious Runoff Depth>0.29"
Flow Length=247' Tc=5.6 min CN=32 Runoff=0.04 cfs 770 cf

Pond 5P: Basin 1

Peak Elev=926.68' Storage=8,434 cf Inflow=4.38 cfs 21,126 cf
Discarded=0.41 cfs 15,899 cf Primary=0.20 cfs 1,273 cf Outflow=0.61 cfs 17,173 cf

Pond 8P: Catch Basin #1

Peak Elev=911.71' Inflow=0.22 cfs 2,043 cf
18.0" Round Culvert n=0.012 L=142.0' S=0.0246 ' Outflow=0.22 cfs 2,043 cf

Total Runoff Area = 223,442 sf Runoff Volume = 21,896 cf Average Runoff Depth = 1.18"
97.94% Pervious = 218,829 sf 2.06% Impervious = 4,613 sf

MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 1S: DA-1 Basin #1

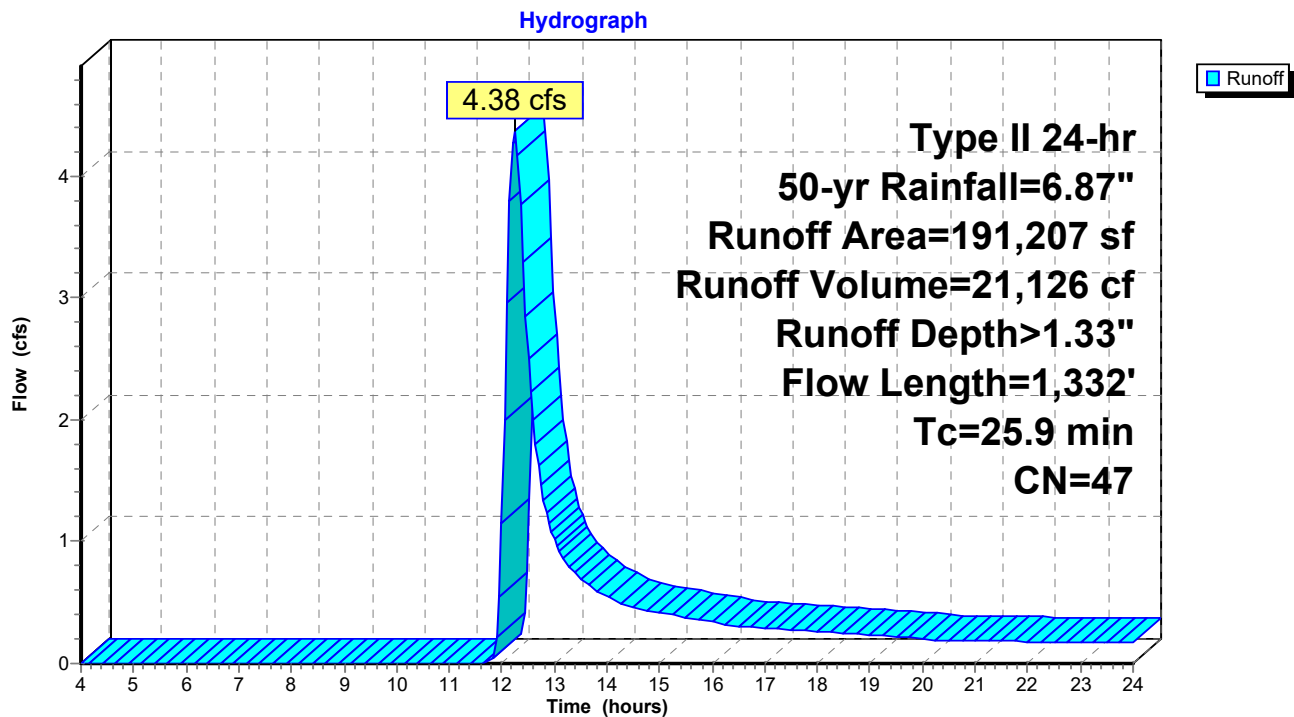
Runoff = 4.38 cfs @ 12.24 hrs, Volume= 21,126 cf, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1167	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.3	554	0.0922	2.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
25.9	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Subcatchment 2S: Undetained - basin[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.04 cfs @ 12.34 hrs, Volume= 770 cf, Depth> 0.29"

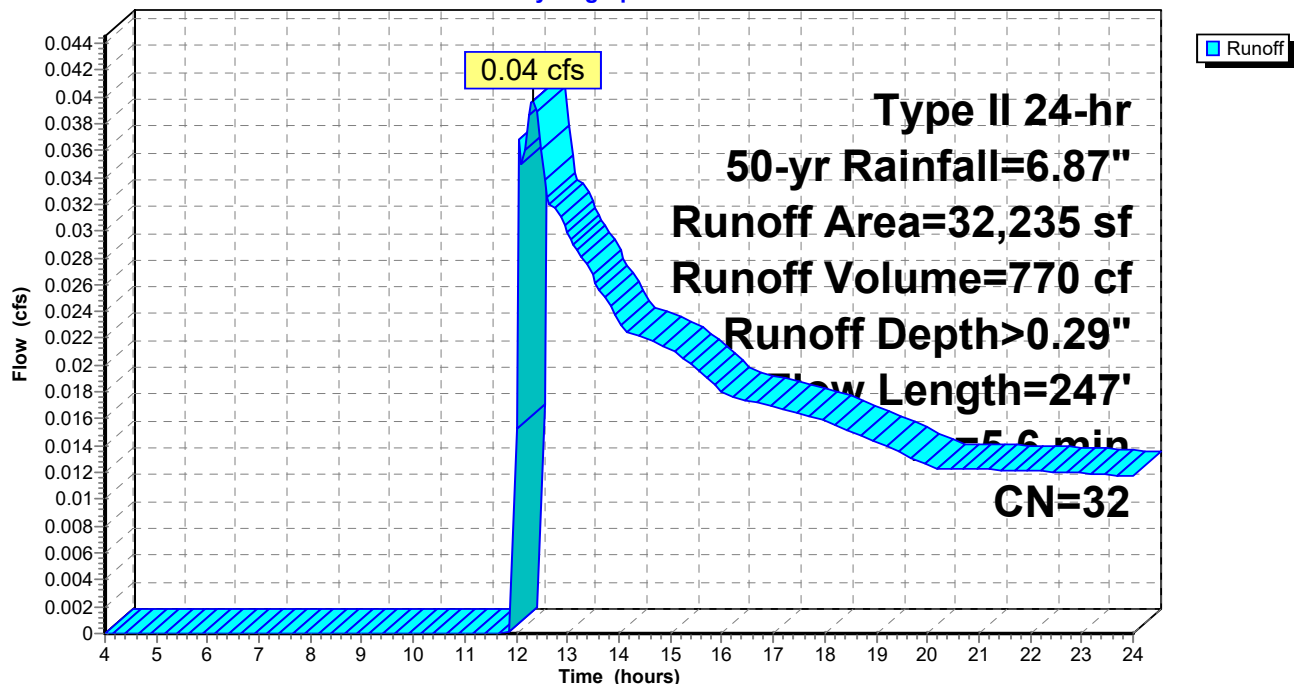
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 50-yr Rainfall=6.87"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
570	77	Woods, Good, HSG D
20,391	30	Meadow, non-grazed, HSG A
299	78	Meadow, non-grazed, HSG D
* 450	98	Impervious
32,235	32	Weighted Average
31,785		98.60% Pervious Area
450		1.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1200	0.35		Sheet Flow, Grass: Short $n=0.150$ $P2=3.26"$
0.9	147	0.1630	2.83		Shallow Concentrated Flow, Short Grass Pasture $K_v=7.0$ fps
5.6	247	Total			

Subcatchment 2S: Undetained - basin

Hydrograph



MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 1.33" for 50-yr event
 Inflow = 4.38 cfs @ 12.24 hrs, Volume= 21,126 cf
 Outflow = 0.61 cfs @ 13.76 hrs, Volume= 17,173 cf, Atten= 86%, Lag= 91.0 min
 Discarded = 0.41 cfs @ 13.76 hrs, Volume= 15,899 cf
 Primary = 0.20 cfs @ 13.76 hrs, Volume= 1,273 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 926.68' @ 13.76 hrs Surf.Area= 4,950 sf Storage= 8,434 cf

Plug-Flow detention time= 231.1 min calculated for 17,173 cf (81% of inflow)
 Center-of-Mass det. time= 148.9 min (1,051.9 - 903.0)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,897 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
926.00	4,260	3,779	5,313
927.00	5,278	4,769	10,082
928.00	6,352	5,815	15,897

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	4.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	924.50'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#3	Device 4	926.50'	24.0" Vert. Orifice/Grate C= 0.600
#4	Primary	924.50'	18.0" Round Culvert#6 L= 51.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 910.00' S= 0.2843 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Discarded OutFlow Max=0.41 cfs @ 13.76 hrs HW=926.68' (Free Discharge)

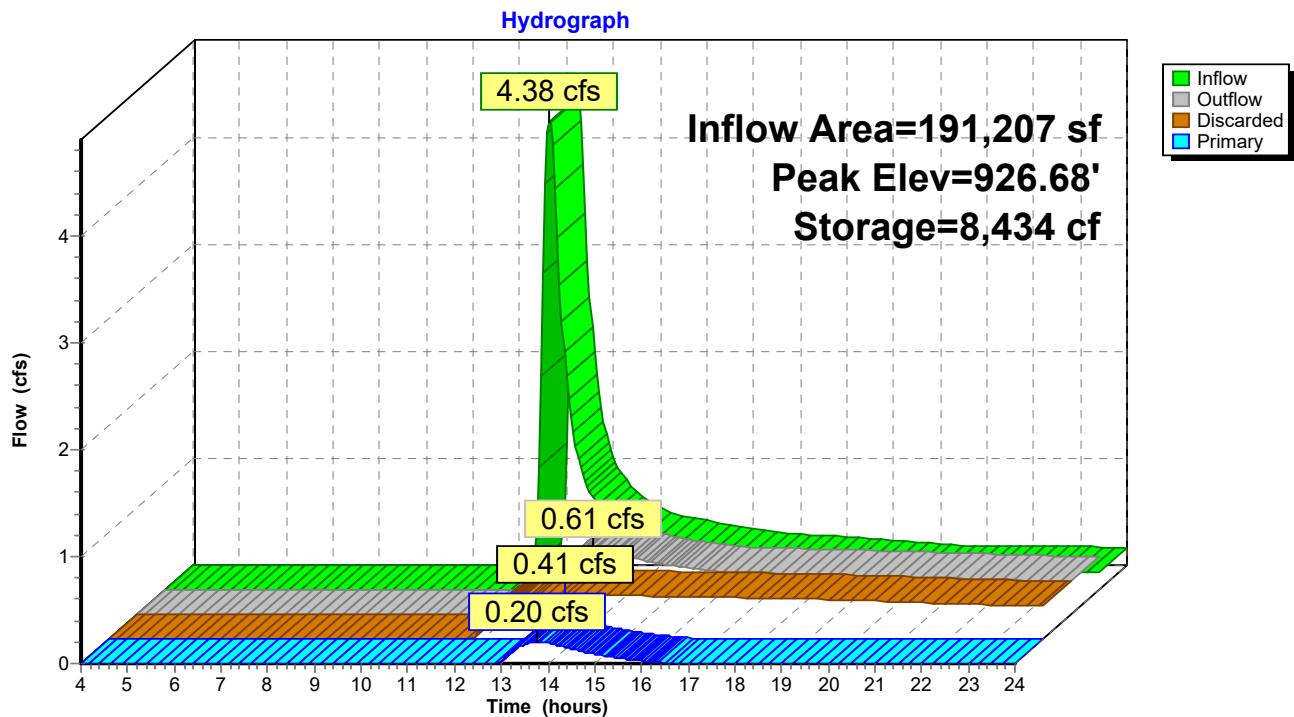
↑**2=Exfiltration** (Controls 0.41 cfs)

Primary OutFlow Max=0.20 cfs @ 13.76 hrs HW=926.68' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑**4=Culvert#6** (Passes 0.20 cfs of 12.71 cfs potential flow)

↑**3=Orifice/Grate** (Orifice Controls 0.20 cfs @ 1.44 fps)

Pond 5P: Basin 1

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Type II 24-hr 50-yr Rainfall=6.87"

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Summary for Pond 8P: Catch Basin #1

[57] Hint: Peaked at 911.71' (Flood elevation advised)

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 1.71'

Inflow Area = 223,442 sf, 2.06% Impervious, Inflow Depth > 0.11" for 50-yr event
Inflow = 0.22 cfs @ 13.74 hrs, Volume= 2,043 cf
Outflow = 0.22 cfs @ 13.74 hrs, Volume= 2,043 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.22 cfs @ 13.74 hrs, Volume= 2,043 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs

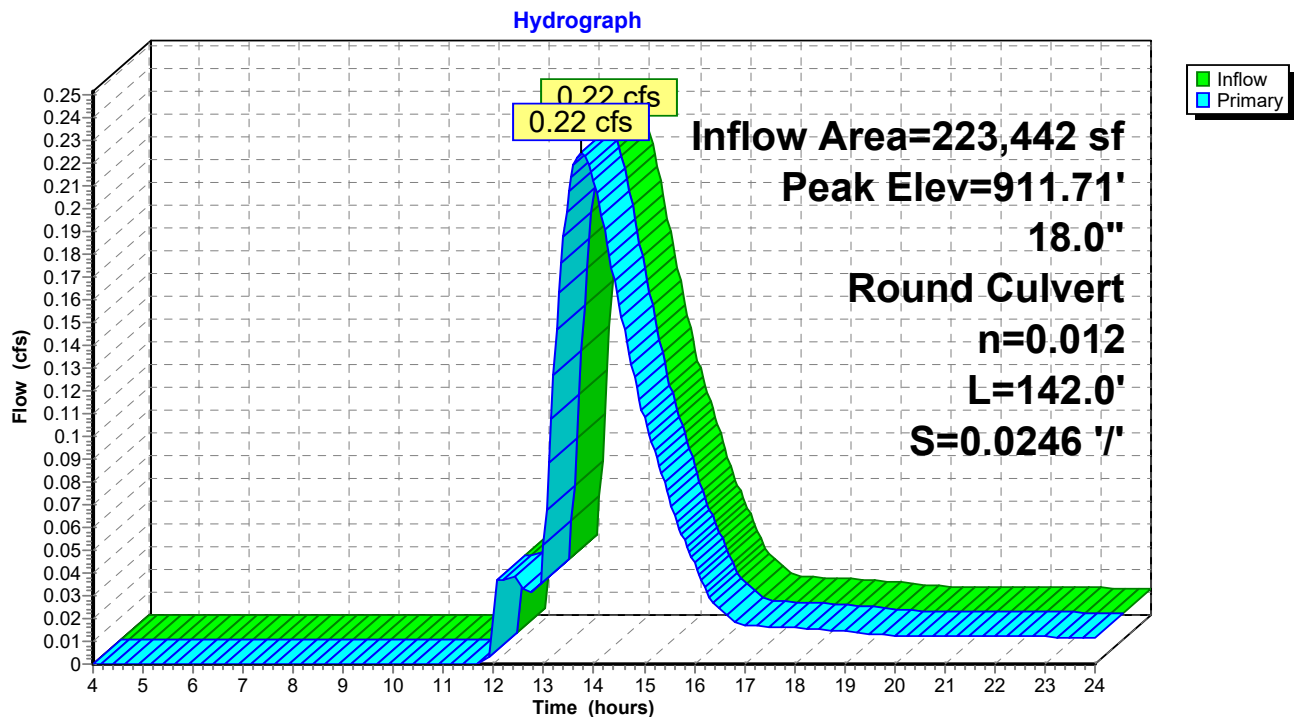
Peak Elev= 911.71' @ 13.74 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	911.50'	18.0" Round Culvert#7 L= 142.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 911.50' / 908.00' S= 0.0246 '/ S= 0.0246 '/ Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.22 cfs @ 13.74 hrs HW=911.71' (Free Discharge)

↑1=Culvert#7 (Inlet Controls 0.22 cfs @ 1.54 fps)

Pond 8P: Catch Basin #1



MLV 505LD86_Culvert 6-7_rev2*Type II 24-hr 100-yr Rainfall=8.09"*

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Time span=4.00-24.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: DA-1 Basin #1

Runoff Area=191,207 sf 2.18% Impervious Runoff Depth>1.97"
Flow Length=1,332' Tc=25.9 min CN=47 Runoff=7.16 cfs 31,397 cf

Subcatchment2S: Undetained - basin

Runoff Area=32,235 sf 1.40% Impervious Runoff Depth>0.59"
Flow Length=247' Tc=5.6 min CN=32 Runoff=0.33 cfs 1,575 cf

Pond 5P: Basin 1

Peak Elev=927.05' Storage=10,368 cf Inflow=7.16 cfs 31,397 cf
Discarded=0.45 cfs 17,054 cf Primary=1.94 cfs 8,850 cf Outflow=2.39 cfs 25,904 cf

Pond 8P: Catch Basin #1

Peak Elev=912.15' Inflow=2.01 cfs 10,424 cf
18.0" Round Culvert n=0.012 L=142.0' S=0.0246 '/' Outflow=2.01 cfs 10,424 cf

Total Runoff Area = 223,442 sf Runoff Volume = 32,972 cf Average Runoff Depth = 1.77"
97.94% Pervious = 218,829 sf 2.06% Impervious = 4,613 sf

MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 100-yr Rainfall=8.09"

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Summary for Subcatchment 1S: DA-1 Basin #1

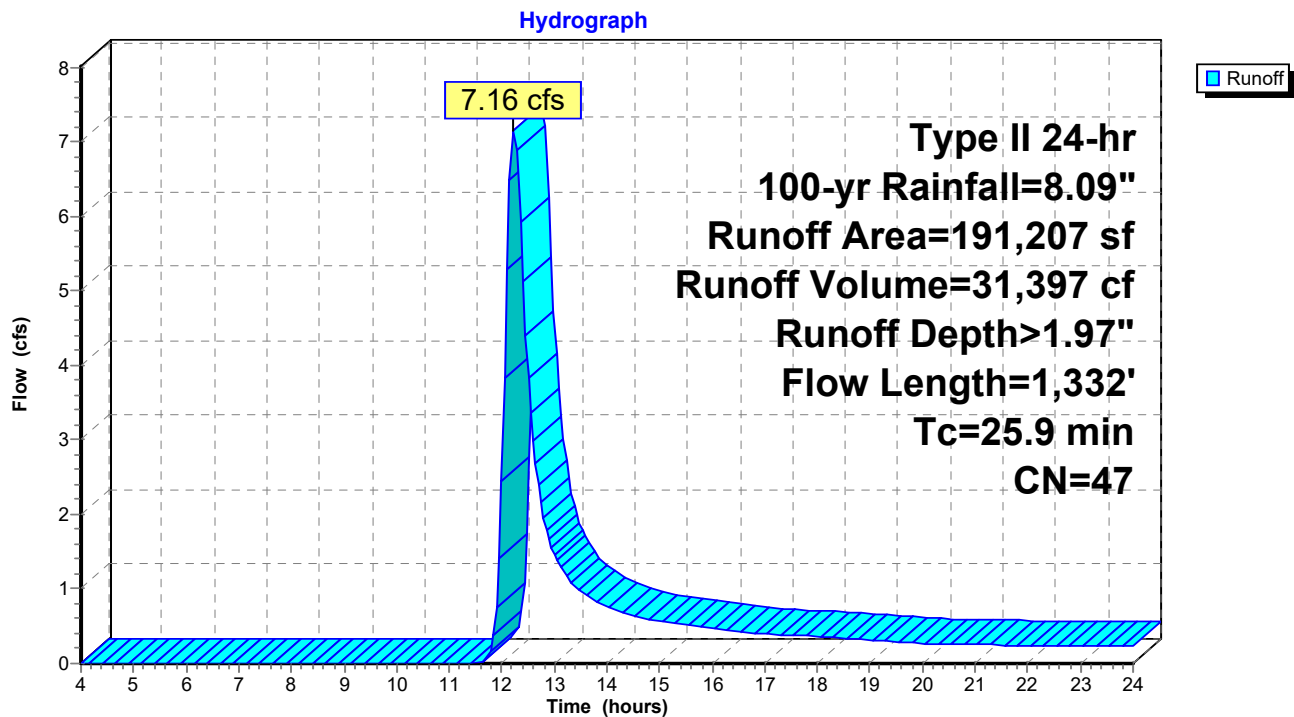
Runoff = 7.16 cfs @ 12.23 hrs, Volume= 31,397 cf, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
31,537	30	Woods, Good, HSG A
12,873	77	Woods, Good, HSG D
92,642	30	Meadow, non-grazed, HSG A
49,992	78	Meadow, non-grazed, HSG D
* 4,163	98	Impervious
191,207	47	Weighted Average
187,044		97.82% Pervious Area
4,163		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.26"
4.5	463	0.1167	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.3	554	0.0922	2.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	215	0.0630	3.64	5.10	Channel Flow, Area= 1.4 sf Perim= 4.1' r= 0.34' n= 0.050
25.9	1,332	Total			

Subcatchment 1S: DA-1 Basin #1



MLV 505LD86_Culvert 6-7_rev2

Type II 24-hr 100-yr Rainfall=8.09"

Prepared by {enter your company name here}

Printed 6/27/2022

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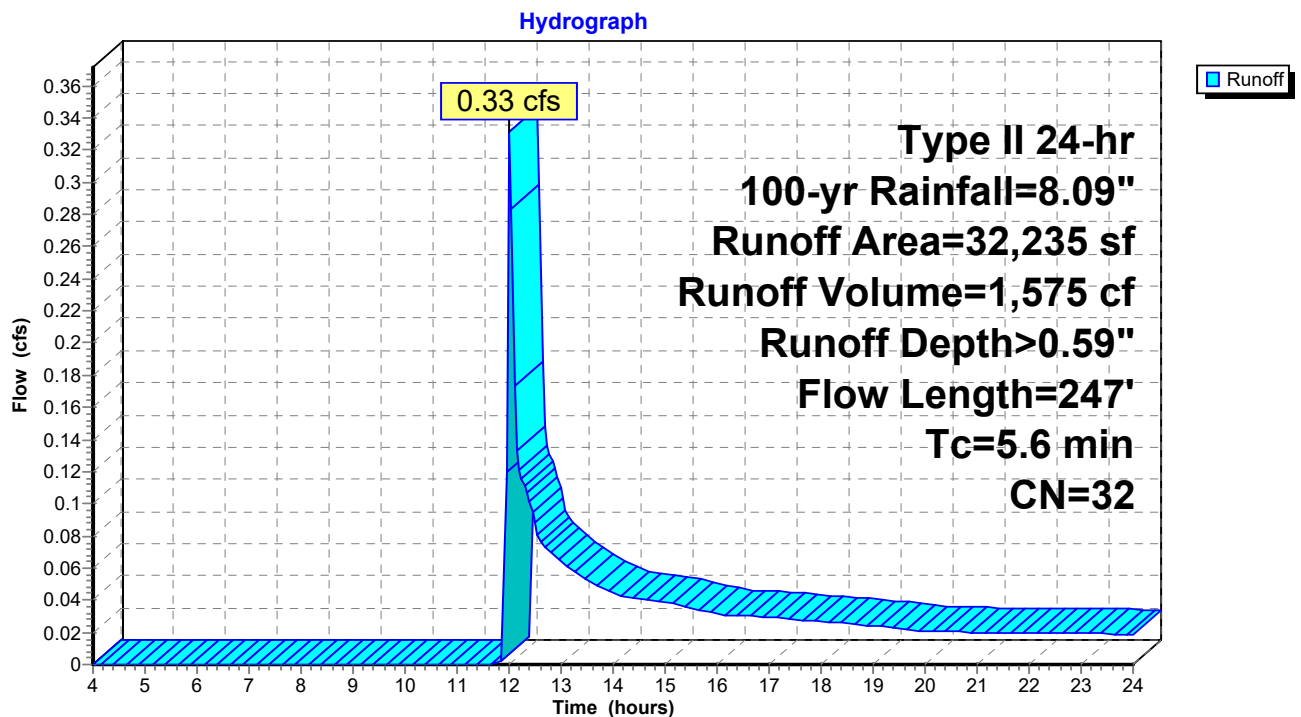
Summary for Subcatchment 2S: Undetained - basin[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.33 cfs @ 12.02 hrs, Volume= 1,575 cf, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-24.00 hrs, $dt=0.05$ hrs
Type II 24-hr 100-yr Rainfall=8.09"

Area (sf)	CN	Description
10,525	30	Woods, Good, HSG A
570	77	Woods, Good, HSG D
20,391	30	Meadow, non-grazed, HSG A
299	78	Meadow, non-grazed, HSG D
* 450	98	Impervious
32,235	32	Weighted Average
31,785		98.60% Pervious Area
450		1.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1200	0.35		Sheet Flow, Grass: Short $n=0.150$ $P2=3.26"$
0.9	147	0.1630	2.83		Shallow Concentrated Flow, Short Grass Pasture $K_v=7.0$ fps
5.6	247	Total			

Subcatchment 2S: Undetained - basin

Summary for Pond 5P: Basin 1

Inflow Area = 191,207 sf, 2.18% Impervious, Inflow Depth > 1.97" for 100-yr event
 Inflow = 7.16 cfs @ 12.23 hrs, Volume= 31,397 cf
 Outflow = 2.39 cfs @ 12.71 hrs, Volume= 25,904 cf, Atten= 67%, Lag= 28.9 min
 Discarded = 0.45 cfs @ 12.71 hrs, Volume= 17,054 cf
 Primary = 1.94 cfs @ 12.71 hrs, Volume= 8,850 cf

Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 927.05' @ 12.71 hrs Surf.Area= 5,336 sf Storage= 10,368 cf

Plug-Flow detention time= 171.2 min calculated for 25,839 cf (82% of inflow)
 Center-of-Mass det. time= 93.9 min (982.7 - 888.8)

Volume	Invert	Avail.Storage	Storage Description
#1	924.50'	15,897 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
924.50	2,838	0	0
925.00	3,298	1,534	1,534
926.00	4,260	3,779	5,313
927.00	5,278	4,769	10,082
928.00	6,352	5,815	15,897

Device	Routing	Invert	Outlet Devices
#1	Primary	927.00'	4.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	924.50'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 916.00'
#3	Device 4	926.50'	24.0" Vert. Orifice/Grate C= 0.600
#4	Primary	924.50'	18.0" Round Culvert#6 L= 51.0' Box, headwall w/3 rounded edges, Ke= 0.200 Inlet / Outlet Invert= 924.50' / 910.00' S= 0.2843 ' /' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Discarded OutFlow Max=0.45 cfs @ 12.71 hrs HW=927.05' (Free Discharge)

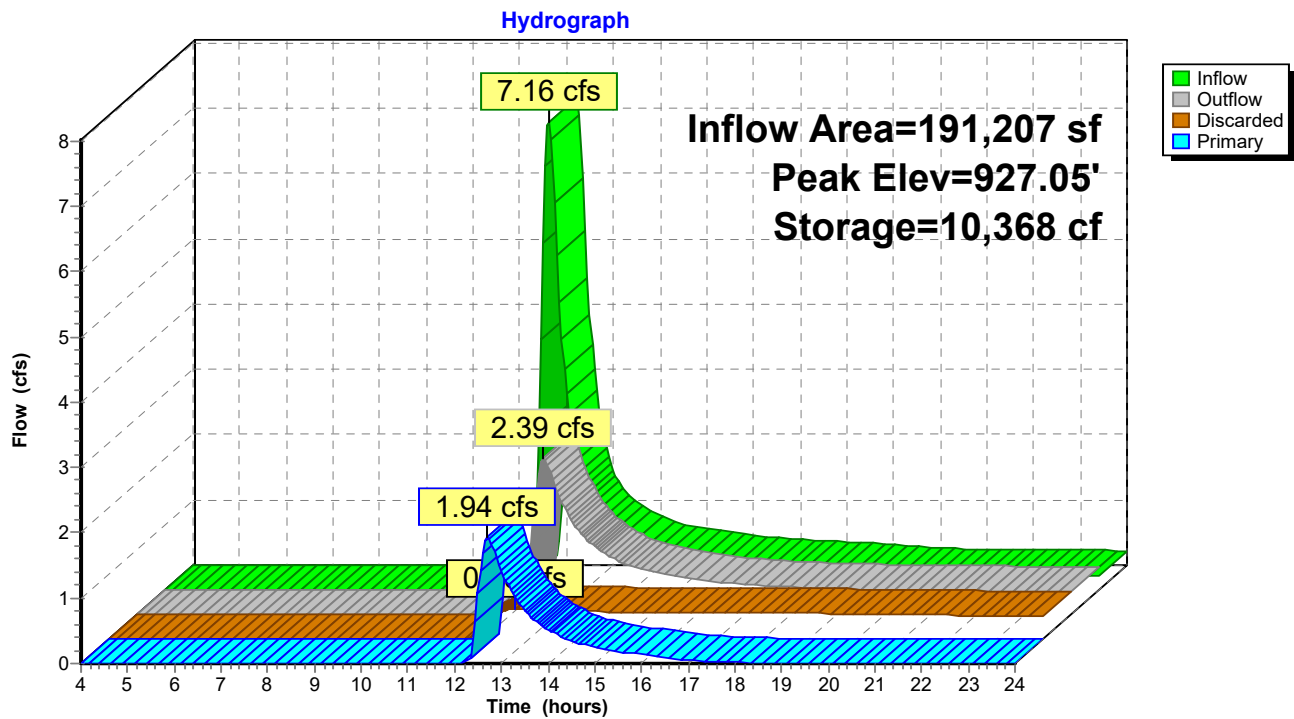
↑ **2=Exfiltration** (Controls 0.45 cfs)

Primary OutFlow Max=1.93 cfs @ 12.71 hrs HW=927.05' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.13 cfs @ 0.62 fps)

↑ **4=Culvert#6** (Passes 1.79 cfs of 14.28 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 1.79 cfs @ 2.53 fps)

Pond 5P: Basin 1

Summary for Pond 8P: Catch Basin #1

[57] Hint: Peaked at 912.15' (Flood elevation advised)

[79] Warning: Submerged Pond 5P Primary device # 4 OUTLET by 2.15'

Inflow Area = 223,442 sf, 2.06% Impervious, Inflow Depth > 0.56" for 100-yr event
 Inflow = 2.01 cfs @ 12.71 hrs, Volume= 10,424 cf
 Outflow = 2.01 cfs @ 12.71 hrs, Volume= 10,424 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.01 cfs @ 12.71 hrs, Volume= 10,424 cf

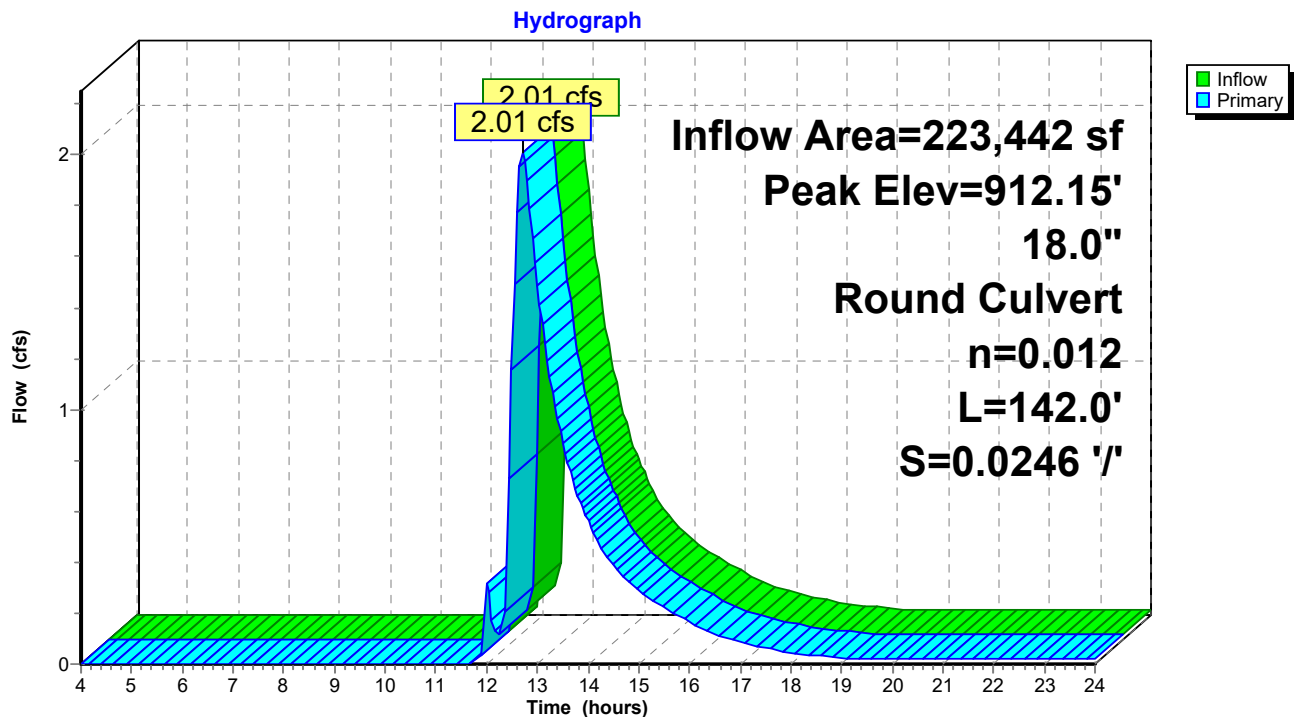
Routing by Stor-Ind method, Time Span= 4.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 912.15' @ 12.71 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	911.50'	18.0" Round Culvert#7 L= 142.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 911.50' / 908.00' S= 0.0246 '/ Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=2.00 cfs @ 12.71 hrs HW=912.15' (Free Discharge)

↑1=Culvert#7 (Inlet Controls 2.00 cfs @ 2.74 fps)

Pond 8P: Catch Basin #1

ATTACHMENT 4.6
RIPRAP APRON WORKSHEET –
MLV-505LD86

STANDARD E&S WORKSHEET # 20

Riprap Apron Outlet Protection

PROJECT NAME: Williams REAE – MLV-505LD86

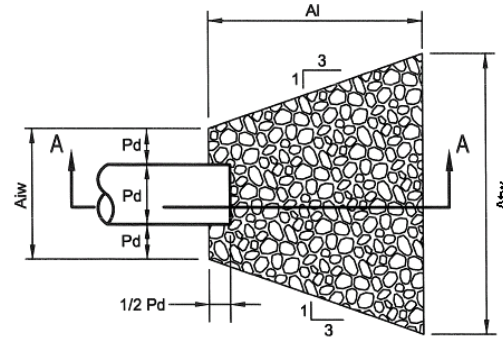
LOCATION: Monroe County, PA

PREPARED BY: GO

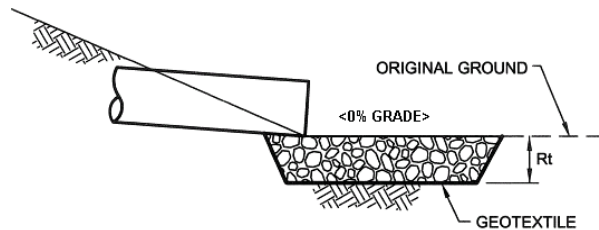
DATE: 7/20/2022

CHECKED BY: PW

DATE: 7/20/2022



PLAN VIEW



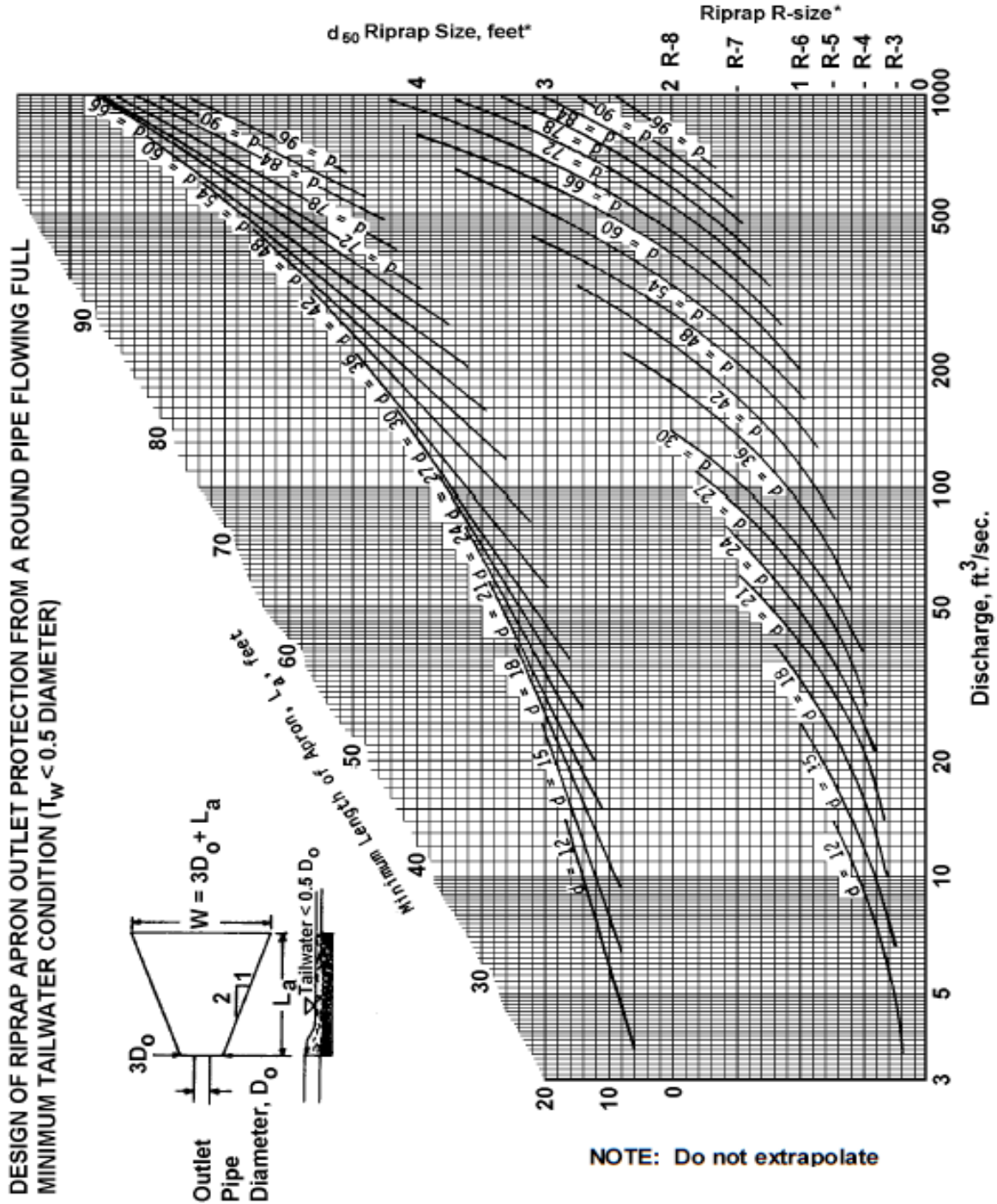
SECTION A - A

NO.	PIPE DIA. Do (in.)	TAIL WATER COND. (Max or Min)	MAN. "n" FOR PIPE	PIPE SLOPE (FT/FT)	Q (CFS)	V* (FPS)	RIPRAP SIZE	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
1	12	Min	0.012	0.017	1.55	5.87	R-3	9	6	3	9
2	24	Min	0.012	0.110	1.76	3.74	R-3	9	6	12	18
3	18	Min	0.012	0.010	3.82	5.76**	R-3	9	8	4.5	12.5
4	(2) 12	Min	0.012	0.045	12.80	11.49	R-5	27	16	5	21
5	24	Min	0.012	0.063	4.4	3.71	R-3	9	6	6	12
6	18	Min	0.012	0.025	3.90	8.08**	R-4	18	6	4.5	10.5

*: The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Manning's equation to calculate velocity for pipe slopes ≥ 0.05 ft/ft.

**: Designed for 100 year storm.

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Adapted from USDA - NRCS

Not to be used for Box Culverts

ATTACHMENT 4.7
BMP EROSION CONTROL BLANKET REPORT –
MLV-505LD86



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SPILLWAY ANALYSIS

> > > Infiltration Berm #1

Name Infiltration Berm #1
 Discharge 1.43
 Peak Flow Period 12.6
 Channel Slope 0.333
 Channel Bottom Width 5
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.43 cfs	4.35 ft/s	0.07 ft	0.032	2 lbs/ft ²	1.37 lbs/ft ²	1.46	STABLE	D
Underlying Substrate	Straight	1.43 cfs	4.35 ft/s	0.07 ft	0.032	1.47 lbs/ft ²	1.33 lbs/ft ²	1.1	STABLE	D

Unreinforced Vegetation - Class C - Sod Former - Good 65-79%

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.43 cfs	3.79 ft/s	0.08 ft	0.04	4 lbs/ft ²	1.57 lbs/ft ²	2.55	STABLE	--
Underlying Substrate	Straight	1.43 cfs	3.79 ft/s	0.08 ft	0.04	2.06 lbs/ft ²	1.52 lbs/ft ²	1.35	STABLE	--



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SPILLWAY ANALYSIS

> > > Infiltration Berm #2

Name Infiltration Berm #2
 Discharge 1.38
 Peak Flow Period 12.6
 Channel Slope 0.333
 Channel Bottom Width 4
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.38 cfs	4.72 ft/s	0.07 ft	0.031	2 lbs/ft ²	1.51 lbs/ft ²	1.32	STABLE	D
Underlying Substrate	Straight	1.38 cfs	4.72 ft/s	0.07 ft	0.031	1.47 lbs/ft ²	1.46 lbs/ft ²	1.01	STABLE	D

Unreinforced Vegetation - Class C - Sod Former - Good 65-79%

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.38 cfs	4.15 ft/s	0.08 ft	0.038	4 lbs/ft ²	1.72 lbs/ft ²	2.32	STABLE	--
Underlying Substrate	Straight	1.38 cfs	4.15 ft/s	0.08 ft	0.038	1.93 lbs/ft ²	1.66 lbs/ft ²	1.16	STABLE	--



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SPILLWAY ANALYSIS

> > > Infiltration Basin

Name Infiltration Basin
Discharge 3.36
Peak Flow Period 12.55
Channel Slope 0.01
Channel Bottom Width 20
Low Flow Liner
Retardence Class C 6-12 in
Vegetation Type Sod Former
Vegetation Density Good 65-79%
Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	3.36 cfs	0.85 ft/s	0.2 ft	0.059	2 lbs/ft ²	0.12 lbs/ft ²	16.3	STABLE	D
Underlying Substrate	Straight	3.36 cfs	0.85 ft/s	0.2 ft	0.059	1.47 lbs/ft ²	0.12 lbs/ft ²	12.16	STABLE	D

Unreinforced Vegetation - Class C - Sod Former - Good 65-79%

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	3.36 cfs	0.62 ft/s	0.27 ft	0.097	4 lbs/ft ²	0.17 lbs/ft ²	24.08	STABLE	--
Underlying Substrate	Straight	3.36 cfs	0.62 ft/s	0.27 ft	0.097	12.35 lbs/ft ²	0.16 lbs/ft ²	76.12	STABLE	--



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SPILLWAY ANALYSIS

> > > Berm 1

Name Berm 1
Discharge 7.8
Peak Flow Period 12.1
Channel Slope 0.01
Channel Bottom Width 5
Low Flow Liner
Retardence Class C 6-12 in
Vegetation Type Sod Former
Vegetation Density Good 65-79%
Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	7.8 cfs	2.16 ft/s	0.64 ft	0.045	2 lbs/ft ²	0.4 lbs/ft ²	5	STABLE	D
Underlying Substrate	Straight	7.8 cfs	2.16 ft/s	0.64 ft	0.045	1.47 lbs/ft ²	0.33 lbs/ft ²	4.42	STABLE	D

Unreinforced Vegetation - Class C - Sod Former - Good 65-79%

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	7.8 cfs	1.65 ft/s	0.81 ft	0.067	4 lbs/ft ²	0.51 lbs/ft ²	7.89	STABLE	--
Underlying Substrate	Straight	7.8 cfs	1.65 ft/s	0.81 ft	0.067	5.95 lbs/ft ²	0.4 lbs/ft ²	14.74	STABLE	--



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SPILLWAY ANALYSIS

> > > Berm 2

Name Berm 2
Discharge 7.84
Peak Flow Period 12.11
Channel Slope 0.01
Channel Bottom Width 4
Low Flow Liner
Retardence Class C 6-12 in
Vegetation Type Sod Former
Vegetation Density Good 65-79%
Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	7.84 cfs	2.29 ft/s	0.72 ft	0.044	2 lbs/ft ²	0.45 lbs/ft ²	4.42	STABLE	D
Underlying Substrate	Straight	7.84 cfs	2.29 ft/s	0.72 ft	0.044	1.47 lbs/ft ²	0.35 lbs/ft ²	4.15	STABLE	D

Unreinforced Vegetation - Class C - Sod Former - Good 65-79%

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	7.84 cfs	1.75 ft/s	0.91 ft	0.066	4 lbs/ft ²	0.57 lbs/ft ²	7.01	STABLE	--
Underlying Substrate	Straight	7.84 cfs	1.75 ft/s	0.91 ft	0.066	5.71 lbs/ft ²	0.43 lbs/ft ²	13.42	STABLE	--

ATTACHMENT 4.8
CHANNEL EROSION CONTROL BLANKET REPORTS –
MLV-505LD86



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CHANNEL ANALYSIS

> > > SH-DC-001

Name SH-DC-001
 Discharge 0.11
 Channel Slope 0.01
 Channel Bottom Width 1
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	0.11 cfs	0.66 ft/s	0.13 ft	0.05	2 lbs/ft ²	0.08 lbs/ft ²	24.41	STABLE	D
Underlying Substrate	Straight	0.11 cfs	0.66 ft/s	0.13 ft	0.05	1.47 lbs/ft ²	0.07 lbs/ft ²	22.48	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	0.11 cfs	0.66 ft/s	0.13 ft	0.05	4 lbs/ft ²	0.08 lbs/ft ²	48.81	STABLE	--
Underlying Substrate	Straight	0.11 cfs	0.66 ft/s	0.13 ft	0.05	4 lbs/ft ²	0.07 lbs/ft ²	61.36	STABLE	--



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CHANNEL ANALYSIS

> > > SH-CC-002

Name SH-CC-002
 Discharge 0.42
 Channel Slope 0.038
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	0.42 cfs	1.38 ft/s	0.13 ft	0.05	2 lbs/ft ²	0.32 lbs/ft ²	6.31	STABLE	D
Underlying Substrate	Straight	0.42 cfs	1.38 ft/s	0.13 ft	0.05	1.47 lbs/ft ²	0.28 lbs/ft ²	5.29	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	0.42 cfs	1.38 ft/s	0.13 ft	0.05	4 lbs/ft ²	0.32 lbs/ft ²	12.61	STABLE	--
Underlying Substrate	Straight	0.42 cfs	1.38 ft/s	0.13 ft	0.05	4 lbs/ft ²	0.28 lbs/ft ²	14.45	STABLE	--



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CHANNEL ANALYSIS

> > > SH-CC-003

Name SH-CC-003
 Discharge 1.13
 Channel Slope 0.04
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.13 cfs	1.96 ft/s	0.23 ft	0.05	2 lbs/ft ²	0.58 lbs/ft ²	3.43	STABLE	D
Underlying Substrate	Straight	1.13 cfs	1.96 ft/s	0.23 ft	0.05	1.47 lbs/ft ²	0.47 lbs/ft ²	3.1	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.13 cfs	1.96 ft/s	0.23 ft	0.05	4 lbs/ft ²	0.58 lbs/ft ²	6.86	STABLE	--
Underlying Substrate	Straight	1.13 cfs	1.96 ft/s	0.23 ft	0.05	4 lbs/ft ²	0.47 lbs/ft ²	8.47	STABLE	--



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CHANNEL ANALYSIS

> > > SH-CC-004

Name SH-CC-004
 Discharge 1.76
 Channel Slope 0.11
 Channel Bottom Width 4
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	1.76 cfs	2.67 ft/s	0.15 ft	0.05	2 lbs/ft ²	1.05 lbs/ft ²	1.9	STABLE	D
Underlying Substrate	Straight	1.76 cfs	2.67 ft/s	0.15 ft	0.05	1.47 lbs/ft ²	0.97 lbs/ft ²	1.52	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	1.76 cfs	2.67 ft/s	0.15 ft	0.05	4 lbs/ft ²	1.05 lbs/ft ²	3.8	STABLE	--
Underlying Substrate	Straight	1.76 cfs	2.67 ft/s	0.15 ft	0.05	4 lbs/ft ²	0.97 lbs/ft ²	4.14	STABLE	--



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CHANNEL ANALYSIS

> > > SH-CC-005

Name SH-CC-005
 Discharge 3.82
 Channel Slope 0.09
 Channel Bottom Width 3
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	3.82 cfs	3.53 ft/s	0.3 ft	0.05	2 lbs/ft ²	1.69 lbs/ft ²	1.19	STABLE	D
Underlying Substrate	Straight	3.82 cfs	3.53 ft/s	0.3 ft	0.05	1.47 lbs/ft ²	1.4 lbs/ft ²	1.05	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	3.82 cfs	3.53 ft/s	0.3 ft	0.05	4 lbs/ft ²	1.69 lbs/ft ²	2.37	STABLE	--
Underlying Substrate	Straight	3.82 cfs	3.53 ft/s	0.3 ft	0.05	4 lbs/ft ²	1.4 lbs/ft ²	2.86	STABLE	--

CHANNEL ANALYSIS

> > > SH-CC-006

Name

SH-CC-006

Discharge

4.12

Channel Slope

0.13

Channel Bottom Width

3

Left Side Slope

2

Right Side Slope

2

Low Flow Liner

Retardence Class

C 6-12 in

Vegetation Type

Sod Former

Vegetation Density

Good 65-79%

Soil Type

Silt Loam (SM)

Rock Riprap

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Rock Riprap Unvegetated	Straight	4.12 cfs	5.5 ft/s	0.22 ft	0.032	2 lbs/ft2	1.53 lbs/ft2	1.31	STABLE	--



North American Green
5401 St. Wendel-Cynthiana Rd.
Poseyville, Indiana 47633
Tel. 800.772.2040
>Fax 812.867.0247
www.nagreen.com
ECMDS v7.0

CHANNEL ANALYSIS

> > > SH-CC-007

Name SH-CC-007
Discharge 0.57
Channel Slope 0.13
Channel Bottom Width 1
Left Side Slope 2
Right Side Slope 2
Low Flow Liner
Retardence Class C 6-12 in
Vegetation Type Sod Former
Vegetation Density Good 65-79%
Soil Type Silt Loam (SM)

Rock Riprap

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Rock Riprap Unvegetated	Straight	0.57 cfs	3.16 ft/s	0.1 ft	0.032	1 lbs/ft2	0.67 lbs/ft2	1.5	STABLE	--



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CHANNEL ANALYSIS

> > > SH-CC-008

Name SH-CC-008
 Discharge 4.5
 Channel Slope 0.063
 Channel Bottom Width 2
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	4.5 cfs	3.5 ft/s	0.44 ft	0.05	2 lbs/ft ²	1.75 lbs/ft ²	1.14	STABLE	D
Underlying Substrate	Straight	4.5 cfs	3.5 ft/s	0.44 ft	0.05	1.47 lbs/ft ²	1.27 lbs/ft ²	1.16	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	4.5 cfs	3.5 ft/s	0.44 ft	0.05	4 lbs/ft ²	1.75 lbs/ft ²	2.29	STABLE	--
Underlying Substrate	Straight	4.5 cfs	3.5 ft/s	0.44 ft	0.05	4 lbs/ft ²	1.27 lbs/ft ²	3.16	STABLE	--



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CHANNEL ANALYSIS

> > > SH-CC-009

Name SH-CC-009
 Discharge 0.22
 Channel Slope 0.139
 Channel Bottom Width 1
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	0.22 cfs	2 ft/s	0.09 ft	0.05	2 lbs/ft ²	0.8 lbs/ft ²	2.52	STABLE	D
Underlying Substrate	Straight	0.22 cfs	2 ft/s	0.09 ft	0.05	1.47 lbs/ft ²	0.67 lbs/ft ²	2.2	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	0.22 cfs	2 ft/s	0.09 ft	0.05	4 lbs/ft ²	0.8 lbs/ft ²	5.03	STABLE	--
Underlying Substrate	Straight	0.22 cfs	2 ft/s	0.09 ft	0.05	4 lbs/ft ²	0.67 lbs/ft ²	5.99	STABLE	--



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 ECMDS v7.0

CHANNEL ANALYSIS

> > > SH-CC-010

Name SH-CC-010
 Discharge 0.27
 Channel Slope 0.148
 Channel Bottom Width 1
 Left Side Slope 2
 Right Side Slope 2
 Low Flow Liner
 Retardence Class C 6-12 in
 Vegetation Type Sod Former
 Vegetation Density Good 65-79%
 Soil Type Silt Loam (SM)

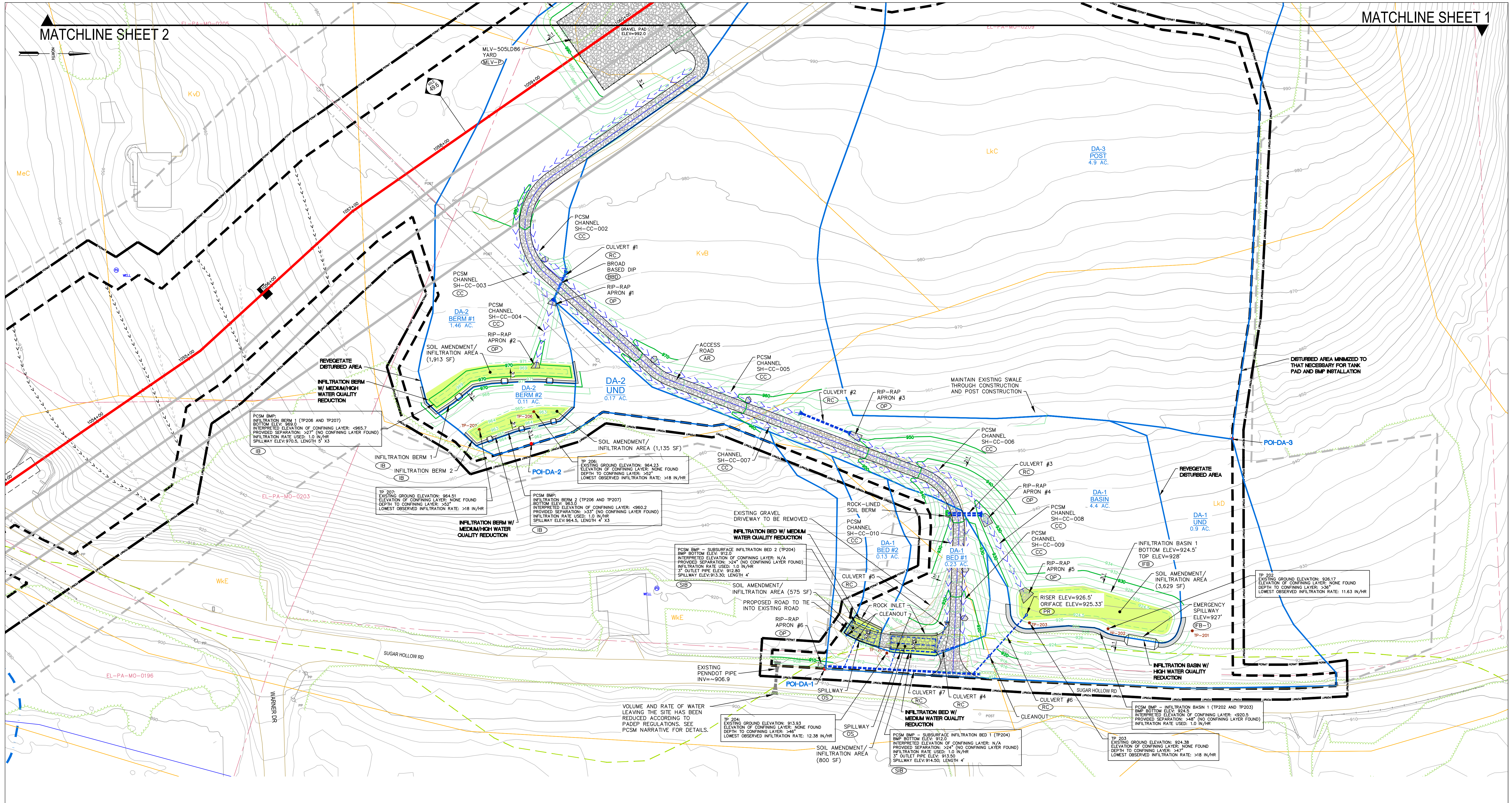
SC150BN

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
SC150BN Unvegetated	Straight	0.27 cfs	2.16 ft/s	0.1 ft	0.05	2 lbs/ft ²	0.91 lbs/ft ²	2.19	STABLE	D
Underlying Substrate	Straight	0.27 cfs	2.16 ft/s	0.1 ft	0.05	1.47 lbs/ft ²	0.76 lbs/ft ²	1.93	STABLE	D

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	0.27 cfs	2.16 ft/s	0.1 ft	0.05	4 lbs/ft ²	0.91 lbs/ft ²	4.39	STABLE	--
Underlying Substrate	Straight	0.27 cfs	2.16 ft/s	0.1 ft	0.05	4 lbs/ft ²	0.76 lbs/ft ²	5.28	STABLE	--

ATTACHMENT 5
NON-STRUCTURAL AND STRUCTURAL WATER QUALITY
BMPS MAP



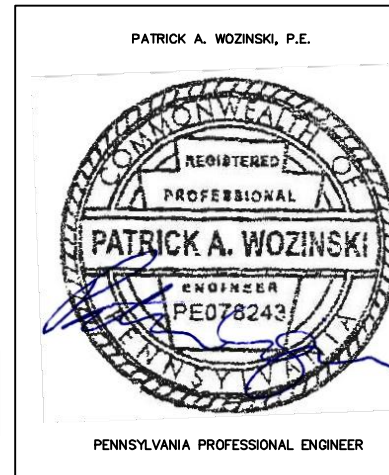
LEGEND

SOIL LEGEND

L&C LECK KILL CHANNERY SILT LOAM, 2 TO 8 PERCENT SLOPES
L&C LECK KILL CHANNERY SILT LOAM, 8 TO 15 PERCENT SLOPES
K&B KUNESVILLE CHANNERY SILT LOAM, 3 TO 8 PERCENT SLOPES
K&C KUNESVILLE CHANNERY SILT LOAM, 8 TO 15 PERCENT SLOPES
W&E WEIKERT AND KUNESVILLE SOILS, STEEP

EXISTING CONDITION NOTES/SOURCES

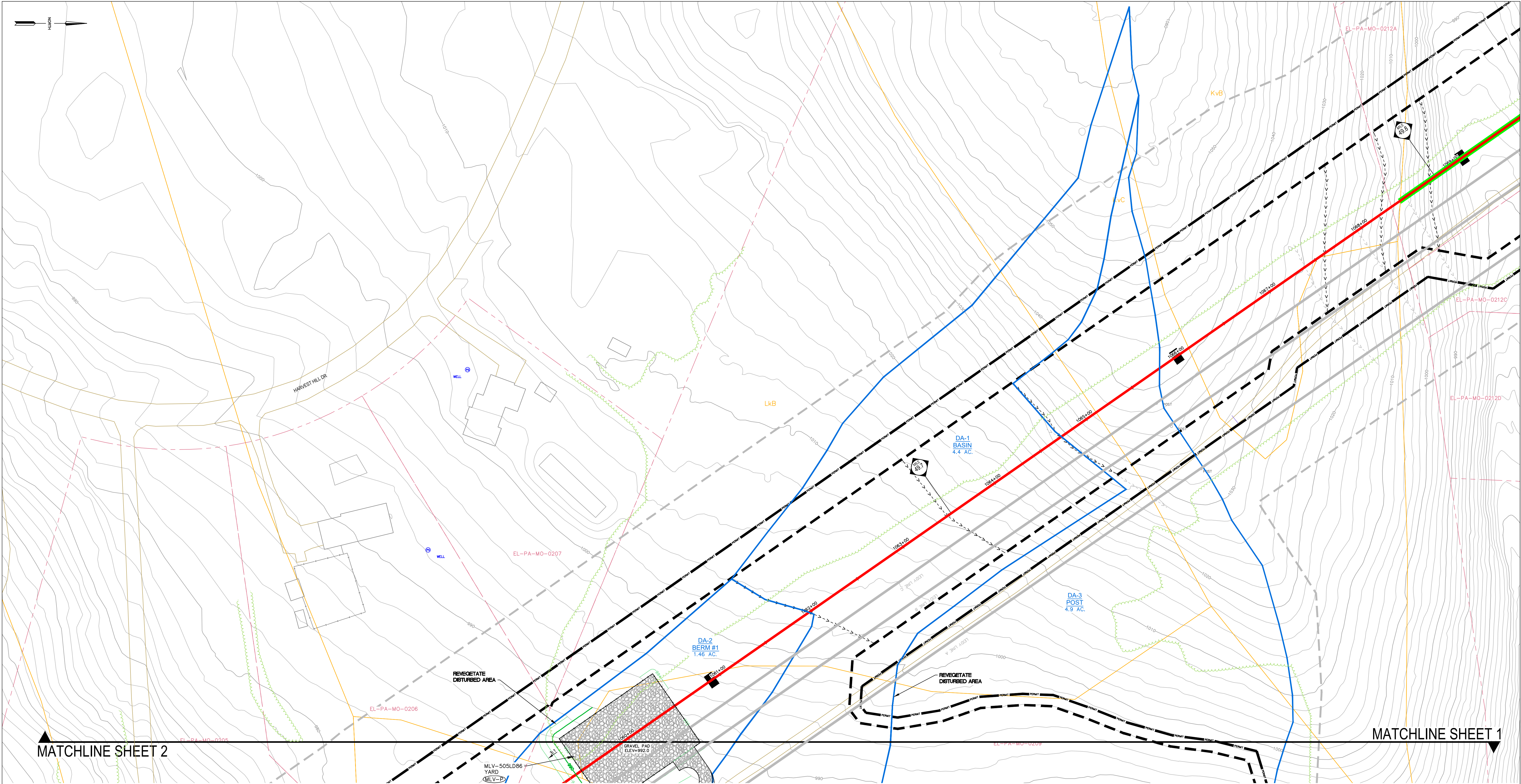
1. EXISTING ROADWAYS, CONTOURS, PROPERTY LINE, TREE LINE, ETC. ARE DERIVED FROM A FIELD SURVEY PERFORMED BY TRANSCO BETWEEN 2019 AND 2020.
2. PROPERTY BOUNDARIES BASED EITHER ON TAX PARCEL INFORMATION PROVIDED BY TRANSCO OR A COMBINATION OF DEED REFERENCE AND FIELD LOCATED EVIDENCE. PROPERTY BOUNDARY LOCATIONS BASED ON TAX PARCEL INFORMATION ARE APPROXIMATE.
3. PIPELINE ALIGNMENTS AND LIMITS OF DISTURBANCE PROVIDED BY TRANSCO.
4. STREAM AND WETLAND BOUNDARIES BASED ON SURVEYS CONDUCTED BY WWM CONSULTING FROM MARCH 2020 TO OCTOBER 2020.
5. DATUM BASED ON PENNSYLVANIA STATE PLANE COORDINATE SYSTEM, NAD 83 NORTH ZONE, NAVD83 ELEVATION MSL, DERIVED FROM GPS OBSERVATION.



REVISIONS					W.O. NO.	CHK.	APP.
NO.	DATE	BY	DESCRIPTION				
1	06/25/21	RHM	REVISED PER PADEP COMMENTS.				
2	03/01/22	RHM	RESPONSE TO PADEP TECHNICAL DEFICIENCY LETTER				
3	07/08/22	RHM	RESPONSE TO PADEP JUNE 2022 TECHNICAL DEFICIENCY LETTER				

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
MLV-505LD86
POST CONSTRUCTION STORMWATER MANAGEMENT PLAN
ATTACHMENT 5 WATER QUALITY BMP'S MAP 1
CHESTNUTHILL TOWNSHIP, MONROE COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 03/31/21	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: RJN	DATE: 03/31/21	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: PW	DATE: 03/31/21	DRAWING NUMBER: 26-1000-70-28-D	SHEET 1
WO: 1222637	RID: 108		OF 2



LEGEND

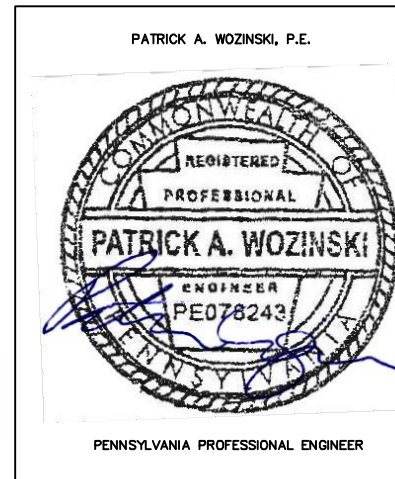
	PROPERTY LINE		EXISTING LDDY / TGPL PIPELINES		PROPOSED PIPELINE
	EXISTING RIGHT-OF-WAY		EXISTING FOREIGN PIPELINES		PROPOSED PIPELINE GROUNDDED
	ESCP PERMIT BOUNDARY		EXISTING UTILITY POLE / TOWER		PROPOSED WATERBAR AND OUTLET STRUCTURE
	LIMITS OF DISTURBANCE		EXISTING VALVE		PROPOSED CHANNEL
	EXISTING FENCE		EXISTING CULVERT		PROPOSED FENCE
	EXISTING STONE ROW		EXISTING ELECTRIC LINE		PROPOSED GRAVEL
	EXISTING STRUCTURE		EXISTING UNDERGROUND ELECTRIC LINE		PROPOSED GRADE MAJOR CONTOURS (10' C.I.)
	EXISTING EDGE OF ROAD		EXISTING GAS LINE		PROPOSED GRADE MINOR CONTOURS (2' C.I.)
	EXISTING GRADE MAJOR CONTOURS (10' C.I.)		EXISTING WATER LINE		PROPOSED INFILTRATION AREA W/ SOIL AMENDMENT
	EXISTING GRADE MINOR CONTOURS (2' C.I.)		EXISTING SANITARY LINE		POST-CONSTRUCTION DRAINAGE AREA
	EXISTING WATERBAR AND OUTLET STRUCTURE		EXISTING STORM SEWER		
	APPROX. ENVIRONMENTAL STUDY LIMITS		EXISTING TELEPHONE LINE		
	DELINEATED WETLAND		EXISTING FIBER OPTIC LINE		
	DELINEATED WATERWAY / STREAM (TOP OF BANK)		EXISTING UNDERGROUND CABLE LINE		
	STREAM FLOW DIRECTION		EXISTING STORM INLET		
	50' FEMA FLOODWAY		EXISTING SANITARY MANHOLE		
	FEMA 100-YEAR FLOODPLAIN		EXISTING COMMUNICATION/ELECTRIC MANHOLE		
	SOIL BOUNDARY / TYPE		EXISTING FIRE HYDRANT		
	EXISTING TREELINE / TREE/SHRUB		EXISTING POWER POLE		
			EXISTING WELL		

SOIL LEGEND

LvB	LECK KILL CHANNERY SILT LOAM, 2 TO 8 PERCENT SLOPES
LvC	LECK KILL CHANNERY SILT LOAM, 8 TO 15 PERCENT SLOPES
KvB	KUNESVILLE CHANNERY SILT LOAM, 3 TO 8 PERCENT SLOPES
KvC	KUNESVILLE CHANNERY SILT LOAM, 8 TO 15 PERCENT SLOPES
WkE	WEIKERT AND KUNESVILLE SOILS, STEEP

EXISTING CONDITION NOTES/SOURCES

1. EXISTING ROADWAYS, CONTOURS, PROPERTY LINE, TREE LINE, ETC. ARE DERIVED FROM A FIELD SURVEY PERFORMED BY TRANSCO BETWEEN 2010 AND 2020.
2. PROPERTY BOUNDARIES BASED EITHER ON TAX PARCEL INFORMATION PROVIDED BY TRANSCO OR A COMBINATION OF DEED REFERENCE AND FIELD LOCATED EVIDENCE. PROPERTY BOUNDARY LOCATIONS BASED ON TAX PARCEL INFORMATION ARE APPROXIMATE.
3. PIPELINE ALIGNMENTS AND LIMITS OF DISTURBANCE PROVIDED BY TRANSCO.
4. STREAM AND WETLAND BOUNDARIES BASED ON SURVEYS CONDUCTED BY WWM CONSULTING FROM MARCH 2020 TO OCTOBER 2020.
5. DATUM BASED ON PENNSYLVANIA STATE PLANE COORDINATE SYSTEM, NAD 83 NORTH ZONE, NAVD83 ELEVATION MSL, DERIVED FROM GPS OBSERVATION.



REVISIONS					W.O. NO.	CHK.	APP.
NO.	DATE	BY	DESCRIPTION				
1	06/29/21	RHM	REVISED PER PADEP COMMENTS.				
2	03/01/22	RHM	RESPONSE TO PADEP TECHNICAL DEFICIENCY LETTER				
3	07/08/22	RHM	RESPONSE TO PADEP JUNE 2022 TECHNICAL DEFICIENCY LETTER				

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC REGIONAL ENERGY ACCESS EXPANSION PROJECT MLV-505LD86 POST CONSTRUCTION STORMWATER MANAGEMENT PLAN ATTACHMENT 5 WATER QUALITY BMP'S MAP 2 CHESTNUTHILL TOWNSHIP, MONROE COUNTY, PENNSYLVANIA				SCALE: AS NOTED	
DRAWN BY: RHM	DATE: 03/31/21	ISSUED FOR BID:	SCALE: AS NOTED	SHEET 2 OF 2	
CHECKED BY: RJN	DATE: 03/31/21	ISSUED FOR CONSTRUCTION:	REVISION:		
APPROVED BY: PW	DATE: 03/31/21	DRAWING NUMBER: 26-1000-70-28-D			
WO: 1222637	RID: 108				

ATTACHMENT 6
OFFSITE DISCHARGE REPORT



Transcontinental Gas Pipe Line Company, LLC

Offsite Discharge Report

Regional Energy Access Expansion Project

Effort Loop

MLV-505LD86

April 2021
(Revised July 2022)

1.0 Project Description

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc., is proposing the Regional Energy Access Expansion Project – Effort Loop (Project). MLV-505LD86 is proposed as part of the overall Project. The MLV-505LD86 site will utilize several PCSM BMPs to control stormwater runoff, attenuate peak flow rate and volume, and provide infiltration. Excess stormwater runoff will be directed to the basin, berms and subsurface beds, via a series of collection channels, for infiltration and controlled discharge. The new MLV facility will require Erosion and Sediment (E&S) Control and Post Construction Stormwater Management (PCSM) Best Management Practices (BMPs) to manage stormwater runoff during and after construction.

Transco has developed an Offsite Discharge Report for the discharges associated with the proposed BMPs. An Offsite Discharge Report is performed to ensure that no offsite erosion will occur downstream of the proposed activities. The analysis conducted for this project followed the sequence outlined in PaDEP's factsheet for offsite discharges (Document #3930-FS-DEP4124).

2.0 Conveyance Best Management Practices

Erosion and Sediment Control and Post Construction Stormwater Management BMPs are proposed to manage stormwater runoff during and after construction. A series of PCSM channels along the access road will direct stormwater to discharge locations on both the north and south sides of the access road. On the south side of the access road, stormwater from the PCSM channels enters Infiltration Berm 1, flows into Infiltration Berm 2 and discharges water to a wooded area east of the berms. The remainder of PCSM channels direct stormwater water into two subsurface infiltration beds south of the access road and an infiltration basin that is north of the access road. The Infiltration Basin has an outlet that discharges into an 18" diameter pipe which directs stormwater to the Sugar Hollow Road ditch. Infiltration Bed #1 and Infiltration Bed #2 discharge to Culvert 7. Stormwater from the Sugar Hollow Road ditch leaves the site via an 18" Sugar Hollow Road PennDOT culvert. These BMPs will be installed to mitigate both the net increase in volume between the pre- and post-development 2-year storm events and the increase (pre-post development) in peak runoff for the 2-, 10-, 50-, and 100-year storm events.

2.1 Infiltration Berm 1 and Infiltration Berm 2

Infiltration Berm 1 flows into Infiltration Berm 2 which discharges stormwater toward the adjacent forested area located east of the Limits of Disturbance. The stormwater is discharged as sheet flow and travels along a vegetative flow path until it reaches the Sugar Hollow Road ditch and then crosses Sugar Hollow Road via a PennDOT culvert, eventually entering Sugar Hollow Creek. The flow path is depicted on Exhibit 1.0. Soil types and the erodibility factors within the flow path are shown on Table 1.

Table 1 – Soils Mapped within Flow Path	
Soil Mapping Unit	Soil Erodibility Factor, K_f
KvB	$K_f = 0.15$
WKE	$K_f = 0.05$
Pp	$K_f = 0.43$

The soil erodibility factors are shown in Table 1. A low K value indicates the soil will not easily erode whereas a high K value means the soil will easily erode. KvB and WKE soils have a low susceptibility to erosion (0.15, 0.05) and Pp soils have a moderate susceptibility to erosion (0.43). Photos were taken along the flow path of the downstream area to show the vegetative cover.



Photo 1: Existing Area at Proposed Infiltration Berm 2



Photo 2: Area Downgradient of the Proposed Infiltration Berm 2

Photo 1 shows the existing condition where Infiltration Berm 2 is proposed. The area will be graded to facilitate the installation of Infiltration Berm 1 and Infiltration Berm 2 and then revegetated. Photo 2 shows the areas downgradient of the proposed Infiltration Berm 2, which is over 90% vegetated. In the E&S and PCSM Narrative, site calculations are provided that show the pre- and post-construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity at the proposed Infiltration Berm 2 is 1.34 feet per second for the 25 year, 24-hour storm event.

2.2 Infiltration Basin, Subsurface Infiltration Bed #1 and Subsurface Infiltration Bed #2

The infiltration basin discharges stormwater to a basin riser pipe outlet which travels through a culvert that crosses beneath the site entrance and then continues along the Sugar Hollow Road ditch near the site entrance. Infiltration Beds #1 and #2 have a 3" outlet pipe which discharge to Culvert 7. Stormwater in the Sugar Hollow ditch leaves the site via an 18" PennDOT culvert which goes beneath Sugar Hollow Road and eventually

enters Sugar Hollow Creek. The flow path is depicted in Exhibit 1.0. Soil types and the erodibility factors within the flow path are shown on Table 2.

Table 2 – Soils Mapped within Flow Path	
Soil Mapping Unit	Soil Erodibility Factor, K_f
WKE	$K_f = 0.05$
Pp	$K_f = 0.43$

The soil erodibility factor is shown in Table 2. A low K value indicates the soil will not easily erode whereas a high K value means the soil will easily erode. The soil in the flow path is considered moderately erodible (0.05, 0.43). Photos were taken along the flow path of the downstream area to show the vegetative cover.



Photo 3: Existing Area at Proposed Basin Outlet



Photo 4: Area Downgradient of the Proposed Basin Outlet



Photo 5: Existing Area and Area Downgradient Proposed Subsurface Infiltration Beds



Photo 6: Existing PennDOT Culvert Inlet



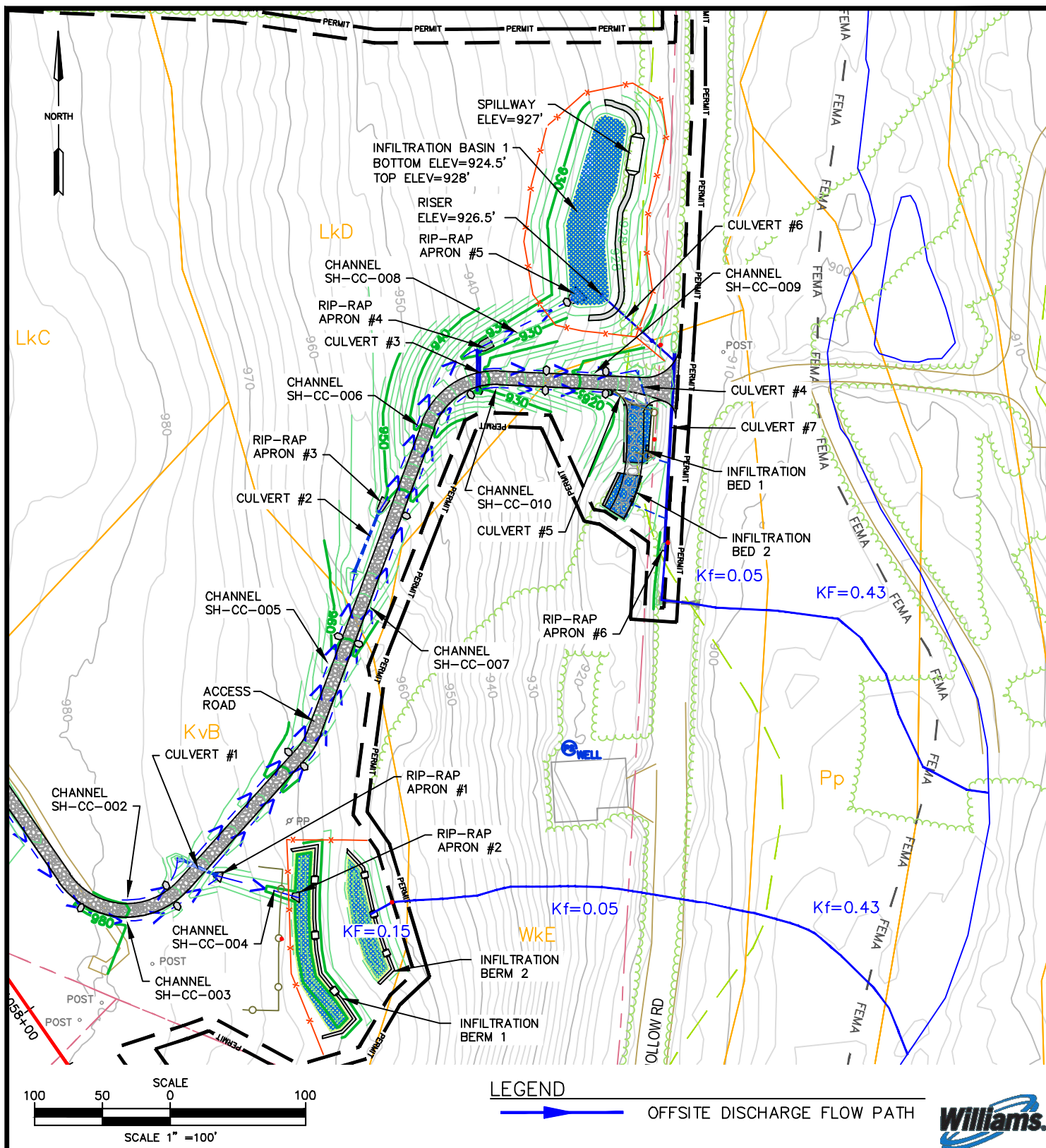
Photo 7: Existing Area Downgradient of PennDOT Culvert

Photo 3 shows the existing condition where the basin outlet is proposed. The area will be graded to facilitate the installation of the infiltration basin and basin outlet then revegetated. Photo 4 shows the areas downgradient of the proposed basin outlet, which is over 90% vegetated. Photo 5 shows the area existing conditions where the subsurface infiltration beds are proposed as well as the area downgradient of the beds. Photo 6 shows the inlet area of the PennDOT 18" diameter culvert. Construction activities and installation of BMPs will not increase flows to or overwhelm this culvert. Photo 7 shows the existing area downstream of the PennDOT culvert.

In the E&S and PCSM Narrative, site calculations are provided that show the Pre- and Post-Construction runoff flow rates and volume. These calculations show a reduction in the post-construction discharge rates and volumes. Calculations indicated that the discharge velocity from the roadside ditch is 1.89 feet per second for the for the 25 year, 24-hour storm event. Since the outlet velocity is below 2.5 fps, downstream erosion will be minimal, if not negligible. Overall, stormwater volumes and rates will be reduced and discharge from the basin and infiltration beds will not promote erosion to downstream areas.

3.0 Conclusion

Based on the existing vegetative conditions, low discharge velocities from the BMPs, reduced peak flow rates and volumes from the site, and the low to moderate soil erodibility values associated with the property, downgradient soil erosion is not anticipated as a result of the proposed development of this site.



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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
REGIONAL ENERGY ACCESS EXPANSION PROJECT
MLV-505LD86

EROSION AND SEDIMENTATION CONTROL PLAN

FLOW PATH

CHESTNUTHILL TWP

MONROE COUNTY

PENNSYLVANIA

DATE:

02/22/22

DRAWN BY:

RWS

CHECKED:

PW

WHM DRAWING NO:

FLOW PATH

EXHIBIT 1.0

SECTION 3.2.2
MLV-505LD86 DRAWINGS