NRG – Indian River Landfill
Run-on and Run-Off Control System Plan

Indian River Landfill
Dagsboro, DE

SCS ENGINEERS

25221174.00 | August 2021

St. Charles, IL

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PROFESSIONAL ENGINEER CERTIFICATION

I, Richard D. Southorn, hereby certify that this Run-On and Run-Off Control System Plan meets the requirements of 40 CFR §257.81(c), was prepared by me or under my direct supervision, and that I am a duly licensed Professional Engineer under the laws of the State of Delaware.

This plan has been prepared as a periodic update to the initial Run-On and Run-Off Control System Plan that was certified on October 12, 2016.

Oct. 12, 2021

Richard Southorn, PE

License 20894

Expires 6/30/2022

1.0 INTRODUCTION

The Indian River Landfill, located in Dagsboro, DE, has been permitted by the Delaware Department of Natural Resources and Environmental Control (DNREC) for the purpose of disposing coal combustion residuals (CCR) that is generated by the Indian River Generating Station. This Run-on and Run-off Control System Plan documents that the Landfill's run-on and run-off control systems have been designed and constructed to meet the applicable requirements of Title 40 Code of Federal Regulations (CFR) §257.81 of the CCR Rule.

2.0 REGULATORY REQUIREMENTS

<u>40 CFR §257.81 Run-on and run-off controls for CCR landfills.</u>

(a) The owner or operator of an existing or new CCR landfill or any lateral expansion of a CCR landfill must design, construct, operate, and maintain:

(1) A run-on control system to prevent flow onto the active portion of the CCR unit during the peak discharge from a 24-hour, 25-year storm; and

(2) A run-off control system from the active portion of the CCR unit to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

(b) Run-off from the active portion of the CCR unit must be handled in accordance with the surface water requirements under 40 CFR §257.3-3.

(c) Run-on and run-off control system plan

(1) Content of the plan. The owner or operator must prepare initial and periodic run-on and run-off control system plans for the CCR unit according to the timeframes specified in paragraphs (c)(3) and (4) of this section. These plans must document how the run-on and run-off control systems have been designed and constructed to meet the applicable requirements of this section. Each plan must be supported by appropriate engineering calculations. The owner or operator has completed the initial run-on and run-off control system plan when the plan has been placed in the facility's operating record as required by 40 CFR §257.105(g)(3).

With reference to 40 CFR §257.81(c) above, the Initial Run-On and Run-Off Control System Plan (RORO Plan) was required to be developed no later than October 17, 2016 for existing landfills (40 CFR §257.81(c)(3)(i)). Updates to the RORO Plan are required whenever there is a change in conditions that would substantially affect the written plan in effect (40 CFR §257.81(2), or within five years of the previous plan (40 CFR §257.81(c)(4)).

The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the initial and periodic RORO Plans meet the requirements of 40 CFR §257.81.

3.0 PREVIOUS RUN-ON AND RUN-OFF CONTROL SYSTEMS PLANS

The initial RORO Plan for Indian River Landfill was completed on October 12, 2016 and has been placed on a publicly available website (https://www.nrg.com/legal/coal-combustion-residuals.html) since 2016. As previously stated in Section 2.0, updates to the RORO Plan are required whenever there is a change in conditions that would substantially affect the written plan in effect (40 CFR §257.81(2), or within five years of the previous plan (40 CFR §257.81(c)(4)). No amendments or periodic updates have been completed prior to this Periodic RORO Plan update.

4.0 2021 RUN-ON AND RUN-OFF CONTROL SYSTEM PLAN UPDATE

This document has been prepared as the five-year periodic update to the initial RORO Plan. The run-on and run-off design and conveyance strategy described in this plan is consistent with the initial RORO Plan. However, this periodic RORO Plan expands on the previous evaluation by reporting the hydrologic modeling results for all conveyance elements utilized at the landfill. This plan will replace the initial RORO Plan on a forward-going basis.

The run and run-off control conveyance features at the Indian River Landfill have been reviewed as part of this 2021 Periodic RORO Plan update and have been found to meet the following requirements:

40 CFR §257.81(a) *"The owner or operator of an existing or new CCR landfill or any lateral expansion of a CCR landfill must design, construct, operate, and maintain:*

> *(1) A run-on control system to prevent flow onto the active portion of the CCR unit during the peak discharge from a 24-hour, 25-year storm.*
>
> *(2) A run-off control system from the active portion of the CCR unit to collect and control at least the water volume resulting from a 24-hour, 25-year storm."*

Certification from a professional engineer that the run-on and run-off conveyance features are appropriate is provided on page 1 of this report. Conveyance features that comprise the run-on and run-off control systems at the Indian River Landfill are depicted in Appendix A.

4.1 RUN-ON CONTROL SYSTEM

The permitted Indian River Landfill is bound by a perimeter berm structure that is approximately 8 to 20 feet in height. The perimeter berm structure has been constructed to prevent stormwater run-on onto active and closed portions of the Landfill.

4.2 RUN-OFF CONTROL SYSTEM

Stormwater falling on the Landfill is managed by terrace berms, letdown pipes, perimeter drainage ditches, and detention basins. Terrace berms have been designed to intercept runoff from the final landform in order to prevent erosion and reduce the drainage length of runoff. The terrace berms are generally spaced every 20 vertical feet, or every 60 slope feet. Terrace berms direct stormwater towards letdown pipes that convey stormwater to the perimeter drainage ditches. Letdown pipes are 24" diameter, high-density polyethylene pipe with smooth interior walls that convey stormwater down to the perimeter ditches. Stormwater collected in the perimeter ditches are conveyed to either the Northeast Basin system or the Southwest Basin system. The Northeast Basin system consists of a

West and East Forebay designed to facilitate sediment knock-out prior to entry into the Northeast Basin. The Southwest Basin system includes the Southwest Forebay that is also designed to facilitate sediment knock-out prior to entry into the Southwest Basin.

Stormwater collected from the Indian River Landfill is permitted to discharge into Island Creek, located north of the Indian River Landfill, through a National Pollution Discharge Elimination System (NPDES) permitted outfall. In accordance with 40 CFR §257.81(b), this is consistent with the surface water requirements under 40 CFR §257.3-3[1].

4.3 HYDROLOGIC AND HYDRAULIC ANALYSIS

Engineering calculations to evaluate the run-on and run-off control system at the Indian River Landfill consisted of a hydrologic and hydraulic (H&H) stormwater model prepared using HydroCAD stormwater modeling software. Information used to prepare the HydroCAD stormwater model are summarized within Appendix A.

H&H stormwater analyses has been prepared for the 25-year, 24-hour storm event in accordance with the CCR Rule. All stormwater management calculations were performed utilizing methods outlined in the Soil Conservation Services (SCS) publication on Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55) and computed by HydroCAD software version 10.00. Site conditions were modeled to reflect stormwater runoff based on runoff characteristics such as land cover, soil type, and time of concentration. Stormwater management features such as terrace berms, letdown pipes, perimeter channels, and detention basins have also been modeled.

Detention basins (not included forebays) have been modeled with two discharge methods. Discharge pipes and spillway systems that are designed to manage the flow out of each detention basin have been modeled. Additionally, exfiltration through native soils has also been modeled as a discharge method. According to the USDA Natural Resources Conservation Services (NRCS) Web Soil Survey of Sussex County, Delaware (NRCS Soil Survey)[2], the rate of infiltration for the native soils is 5.95 in/hr. In accordance with the Sussex Conservation District guidelines, a rate of one-half the posted rate was used for design purposes; therefore, the modeled rate was 2.97 in/hr for existing and proposed conditions in all detention basins. Each detention basin has been modeled with these two discharge methods to provide an accurate depiction of the conditions that are observed at the Indian River Landfill.

4.4 RESULTS AND CONCLUSIONS

The HydroCAD stormwater model of the Indian River Landfill was developed to evaluate whether the peak flow from the 25-year, 24-hour storm event could be accommodated without overtopping the run-on and run-off control systems.

The run-on control system discussed previously is designed and constructed to divert stormwater away from the Indian River Landfill and meets the requirements of 40 CFR §257.81(a)(1).

The run-off control system is designed to collect and convey stormwater from the Indian River Landfill and discharge through the permitted outfalls. Based on the results of the HydroCAD stormwater model, the run-off control system was found to accommodate the 25-year, 24-hour storm event without overtopping[3]. The run-on control system meets the requirements of 40 CFR §257.81(a)(2).

5.0 CERTIFICATIONS

Richard D. Southorn, a licensed Professional Engineer in the State of Delaware, has overseen the preparation of this Run-On and Run-Off Control System Plan. A certification statement in accordance with 40 CFR §257.81(c)(5) is provided on Page 1 of this plan.

6.0 RECORDKEEPING AND PERIODIC UPDATES

This Run-On and Run-Off Control System Plan, and all periodic plans, will be placed in the facility's operating record and on NRG's CCR Rule Compliance Data and Information website, as will all amendments. Periodic Run-On and Run-Off Control System Plans will be completed every 5 years per 40 CFR §257.81(c)(4).

Notification will be provided when this Run-On and Run-Off Control System Plan, and all periodic plans, are available in the facility's operating record and on the facility's website in accordance with 40 CFR §257.105(g), §257.106(g), and §257.107(g).

7.0 LANDFILL DEVELOPMENT

Construction activities will include installation of sediment and stormwater controls, waste placement and compaction, and final cover construction.

During cell construction and filling, additional temporary measures will be incorporated to divert stormwater away from active landfilling and liner construction areas. These temporary measures will intercept the runoff from undisturbed areas before it reaches the construction areas (disturbed areas), and the runoff will be conveyed to the landfill perimeter as practical. Any stormwater that collects within the landfill excavation will be routed to temporary stormwater collection sumps. Similarly, any rainfall which ponds on the liner and leachate collection system prior to the placement of waste will be pumped into the stormwater management system.

Temporary diversion measures will be constructed around the active landfilling areas to the extent practical in order to divert stormwater from adjacent daily, intermediate and final cover slopes before it contacts any waste, thereby preventing it from coming into contact with the waste.

8.0 EROSION AND SEDIMENT CONTROLS

Prior to construction of Phase II, a Sediment and Stormwater Management Plan was submitted to and approved by the Delaware Department of Natural Resources and Environmental Control (DNREC). Temporary erosion and sediment controls were designed and implemented in accordance with the DNREC-approved Sediment and Stormwater Management Plan. In addition, the Indian River Generating Station maintains an NPDES Permit the covers the Indian River Landfill.

Erosion and sediment control techniques installed during construction of the Indian River Landfill will not only minimize sediment erosion but will improve the water quality of stormwater runoff. The following erosion and sediment controls will be utilized at the proposed Phase III expansion:

- ❑ Barrier filters such as silt fence, compost filter logs, and straw bale barriers will be installed at a minimum along the entire length of all disturbed slopes where stormwater is being directly discharged off-site until permanent vegetation has been established and sediment control is no longer necessary. Barrier filters will also be used within stormwater drainage channels to provide additional sediment filtration.

- Vegetative filters provide biological filtration to improve water quality where concentrations of sediment are high and flow velocities are relatively low. Vegetative filters may be used along drainage ways or property lines. Vegetative filters may also be used on the side slopes of the detention basin to filter sediment from overland flow.

- Temporary seeding and/or stabilization matting will be installed on areas of exposed soils to minimize erosion.

9.0 INSPECTION AND MAINTENANCE

All temporary and permanent erosion and sediment control measures are maintained and repaired as needed to assure continued performance of their intended function. This program will include performance checks of facilities and grades, remedial grading, sediment removal, vegetative care, and maintenance. Inspections will address points of scour, slope failure, breaching or settling. Inspections are performed at an appropriate frequency in compliance with the Facility NDPES permit and Solid Waste permits. Maintenance includes clearing of sediment from barriers and the basins. Sediments are dredged from the sediment basins as necessary to maintain adequate stormwater detention and functionality of the outlet structures. Sediment removed from the barriers and the detention basins will not be placed in floodplain areas or in areas without adequate BMPs in-place. As necessary, runoff collection features are cleaned, regraded, relined, rip-rapped, etc., to restore design capacities and correct problem areas. A written record of all inspections and maintenance is prepared and placed in the facility Stormwater Pollution Prevention Plan (SWPPP), which is kept at the site.

10.0 REFERENCES

1. U.S. Environmental Protection Agency, Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, Title 40 Code of Federal Regulations Part §257. Federal Register 80, Subpart D, dated April 17, 2015.
2. USDA Natural Resources Conservation Service, Web Soil Survey, dated 2021.
3. SCS Engineers, Indian River Landfill– Stormwater Calculations, Run-On and Run-Off Control System Plan, dated 2021 (Provided as **Appendix A**).

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APPENDIX A

Appendix A.1	Rainfall Totals and Distribution
Appendix A.2	Subcatchment Delineation
Appendix A.3	Weighted Curve Number Determination
Appendix A.4	Time of Concentration Calculation
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Appendix A.6	Landfill Conveyance Feature Sizing
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Appendix A.1

Rainfall Totals and Distributions

SCS ENGINEERS

Job No.	25221174	SHEET NO.	1 of 1
Job:	Indian River Landfill – Run-on / Run-off Evaluation	CALC. NO.	1
Client	NRG	REV. NO.	1
Subject	Rainfall Totals	BY SJL	DATE 7/10/2021
		CHK'D. RDS	DATE 7/30/2021

Problem Statement

Determine the rainfall totals and distributions of the 25-year, 24-hour storm event. The rainfall totals and distributions are used in the HydroCAD Version 10 (HydroCAD) computer model to determine rainfall runoff quantities.

Given

Stormwater discharge rates for the 25-year, 24-hour storm are used to determine the adequacy of the Landfill stormwater management features based on the proposed closure plan conditions.

Rainfall data for the 25-year, 24-hour storm event was obtained from the State of Delaware Department of Natural Resources and Environmental Control (DNREC) Regulatory Guidance Memorandum RGM-1. This document identifies the use of National Oceanic & Atmosphere Administration (NOAA) rainfall distribution curves found in Atlas 14 to be appropriate for stormwater evaluations in Delaware. This document is attached and identifies a specific rainfall depth for the county where the Landfill resides (Sussex County). An excerpt of this document is attached.

Technical Release 55 (TR-55) was consulted to determine the appropriate storm distribution pattern. TR-55 was prepared by the United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS) to provide guidance for urban hydrology for small watersheds. According to TR-55, the Type II 24-hour storm distribution is appropriate for the Landfill, which resides in Sussex County, Delaware. This storm distribution has been programmed into HydroCAD by the software manufacturer and can be chosen from a drop-down list of distribution patterns. A copy of the rainfall distribution map is attached.

Results

The following table provides the rainfall depths provided in the DNREC RGM-1 document.

Table 1 – Rainfall Depths

Storm Event	Interpolated Rainfall Depth (in)
25-year, 24-hour	6.68

The Type II 24-hour storm distribution will be chosen from the drop-down list of distribution patterns programmed into HydroCAD.

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
DIVISION OF WATERSHED STEWARDSHIP

OFFICE OF THE DIRECTOR
89 Kings Highway
DOVER, DELAWARE 19901
PHONE: (302) 739-9921
FAX: (302) 739-6724

SEDIMENT & STORMWATER PROGRAM

REGULATORY GUIDANCE MEMORANDUM

RGM-1

Date: November 7, 2019

Title: Adoption of NOAA Rainfall Distribution Curves

Synopsis: The Delaware State Office of the Natural Resources Conservation Service (NRCS) has adopted the current National Oceanic & Atmospheric Administration (NOAA) Rainfall Distribution curves for the hydrologic design of conservation practices in Delaware in place of the NRCS Type II Rainfall Distribution Curves. In keeping with this, the Delaware Sediment & Stormwater Program will begin accepting the use of the NOAA Rainfall Distribution Curves for the hydrologic design of stormwater management practices intended to comply with the Delaware Sediment & Stormwater Regulations effective January 1, 2020. NOAA Curve C should be used in New Castle and Kent Counties. NOAA Curve D should be used for Sussex County.

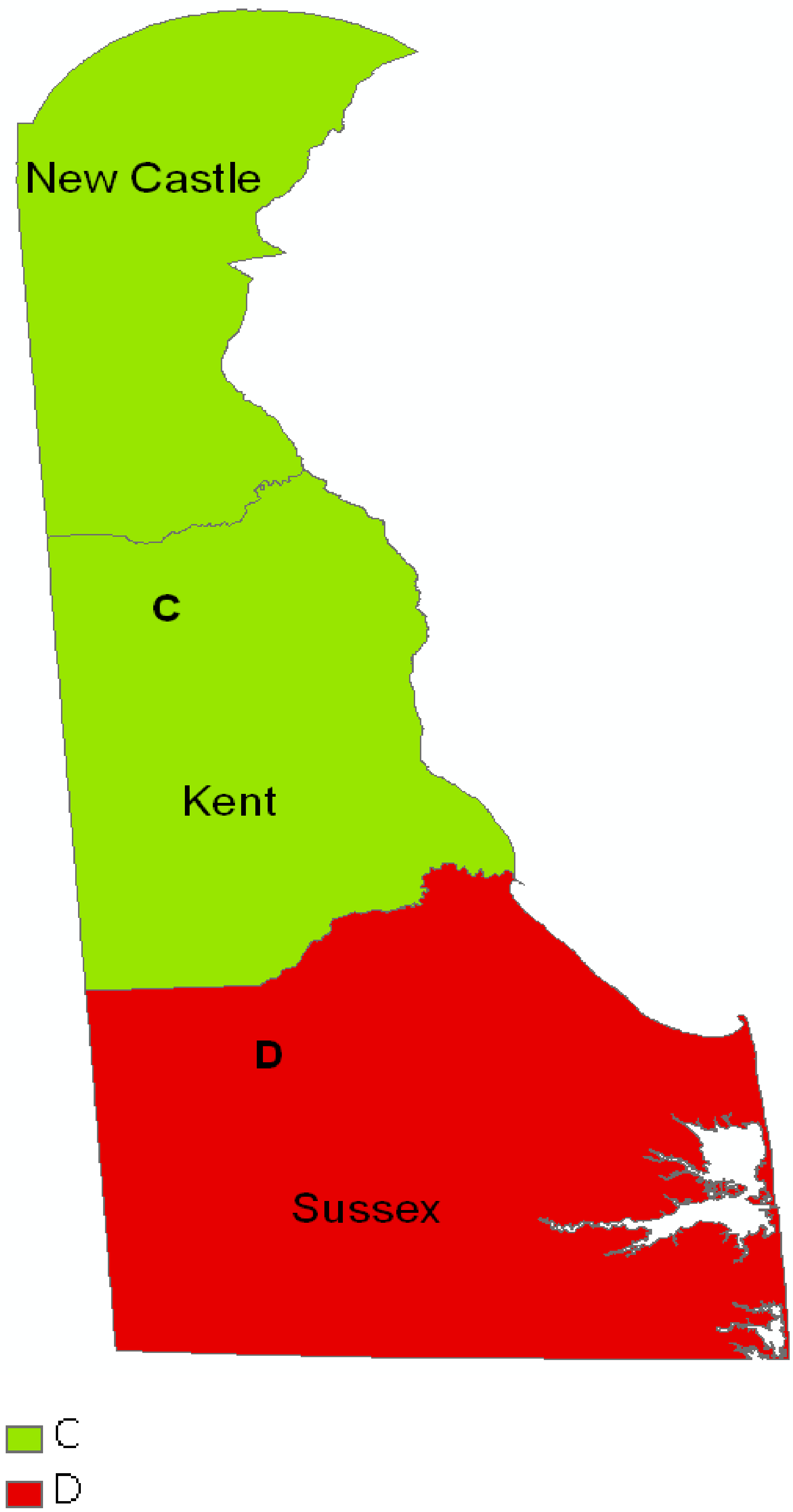
Effective Date: January 1, 2020

Responsible Staff Member

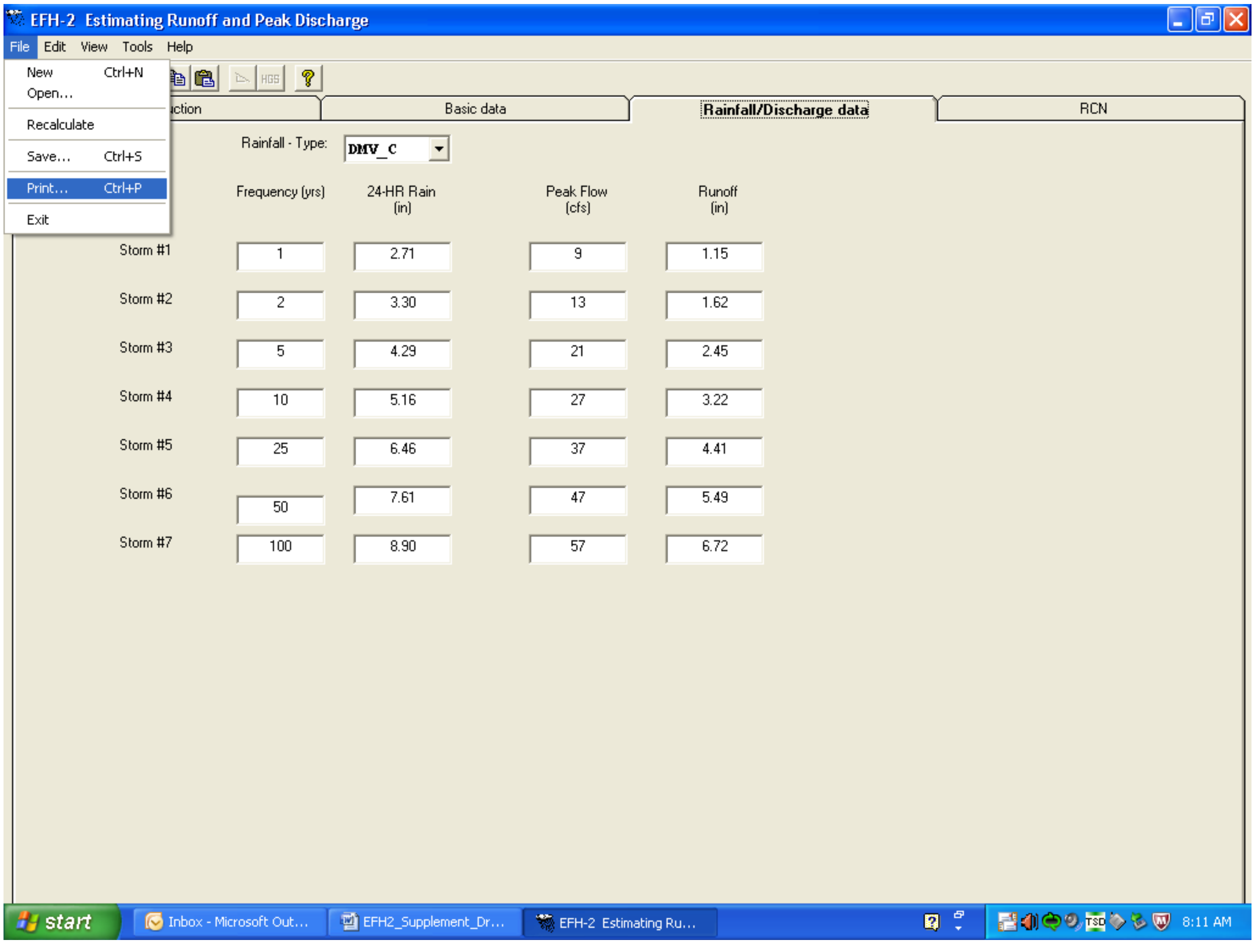
Randell K Greer

Randell K Greer, P.E.
Engineer VI

Delaware's good nature depends on you!



Delaware Regional Rainfall Distributions



To complete the project, click File and Save. Print output if desired. Close EFH-2.

Appendix 1. County rainfall database (county.DE) Notes: Rainfall distribution for each county and zone are shown with the county name (Region C or D). The 24-hour rainfall duration values are in units of inches.

County/Zone	1-year	2-year	5-year	10-year	25-year	50-year	100-year
New Castle NOAA-C	2.64	3.20	4.09	4.85	5.99	6.97	8.05
Kent NOAA-C	2.71	3.30	4.29	5.16	6.46	7.61	8.90
Sussex NOAA-D	2.81	3.42	4.44	5.33	6.68	7.87	9.20

United States
Department of
Agriculture

Natural
Resources
Conservation
Service

Conservation
Engineering
Division

Technical
Release 55

June 1986

Urban Hydrology for Small Watersheds

TR-55

Appendix B Synthetic Rainfall Distributions and Rainfall Data Sources

The highest peak discharges from small watersheds in the United States are usually caused by intense, brief rainfalls that may occur as distinct events or as part of a longer storm. These intense rainstorms do not usually extended over a large area and intensities vary greatly. One common practice in rainfall-runoff analysis is to develop a synthetic rainfall distribution to use in lieu of actual storm events. This distribution includes maximum rainfall intensities for the selected design frequency arranged in a sequence that is critical for producing peak runoff.

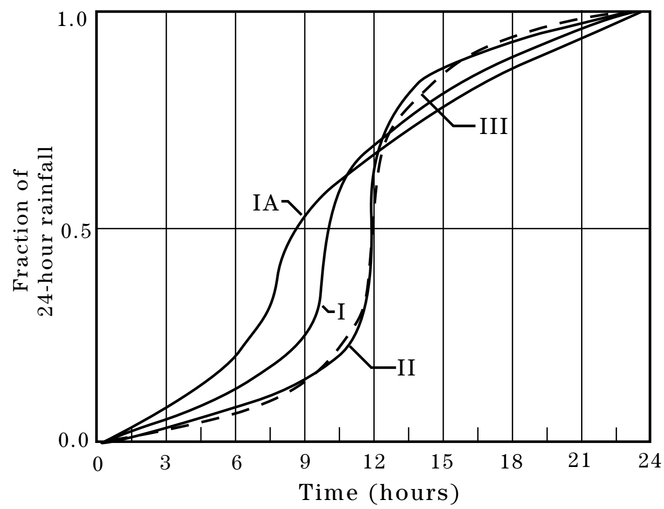
Synthetic rainfall distributions

The length of the most intense rainfall period contributing to the peak runoff rate is related to the time of concentration (T_c) for the watershed. In a hydrograph created with NRCS procedures, the duration of rainfall that directly contributes to the peak is about 170 percent of the T_c. For example, the most intense 8.5-minute rainfall period would contribute to the peak discharge for a watershed with a T_c of 5 minutes. The most intense 8.5-hour period would contribute to the peak for a watershed with a 5-hour T_c.

Different rainfall distributions can be developed for each of these watersheds to emphasize the critical rainfall duration for the peak discharges. However, to avoid the use of a different set of rainfall intensities for each drainage area size, a set of synthetic rainfall distributions having “nested” rainfall intensities was developed. The set “maximizes” the rainfall intensities by incorporating selected short duration intensities within those needed for longer durations at the same probability level.

For the size of the drainage areas for which NRCS usually provides assistance, a storm period of 24 hours was chosen the synthetic rainfall distributions. The 24-hour storm, while longer than that needed to determine peaks for these drainage areas, is appropriate for determining runoff volumes. Therefore, a single storm duration and associated synthetic rainfall distribution can be used to represent not only the peak discharges but also the runoff volumes for a range of drainage area sizes.

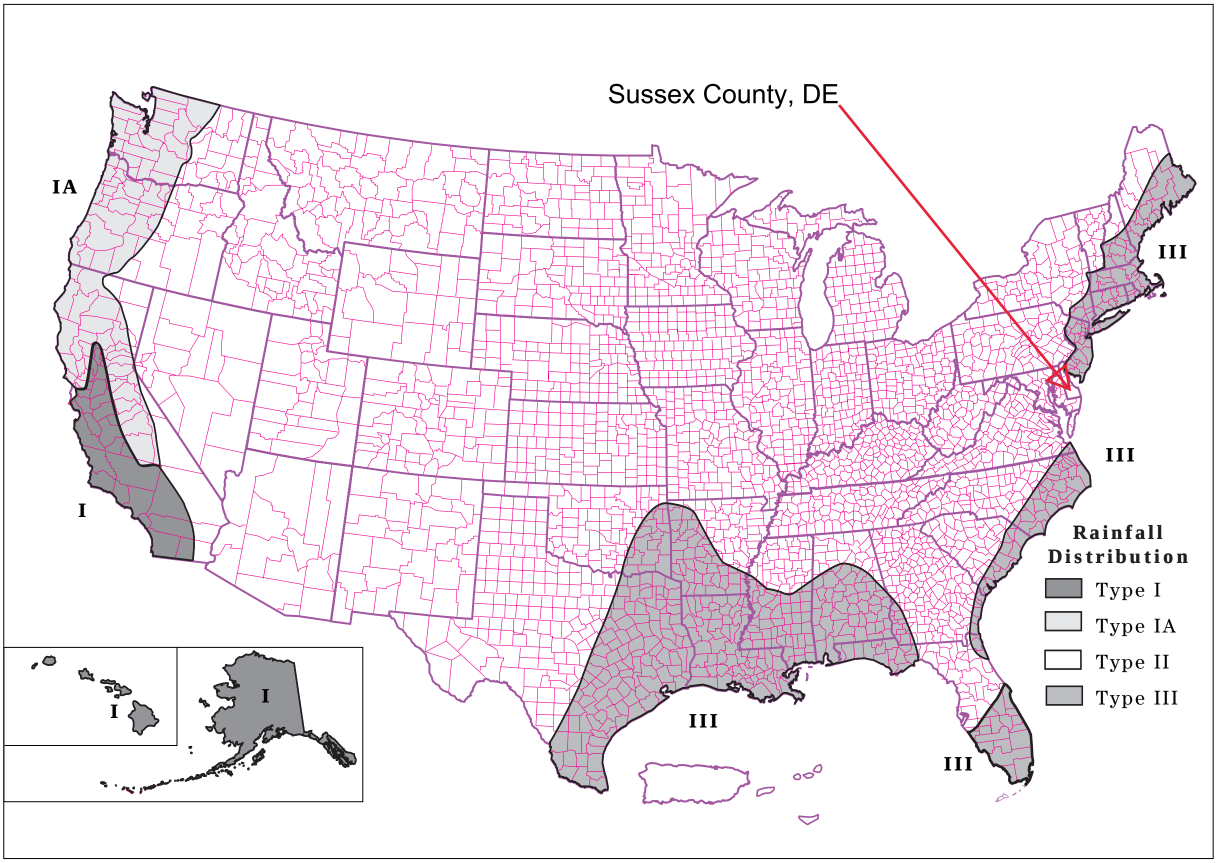
Figure B-1 SCS 24-hour rainfall distributions



The intensity of rainfall varies considerably during a storm as well as geographic regions. To represent various regions of the United States, NRCS developed four synthetic 24-hour rainfall distributions (I, IA, II, and III) from available National Weather Service (NWS) duration-frequency data (Hershfield 1061; Frederick et al., 1977) or local storm data. Type IA is the least intense and type II the most intense short duration rainfall. The four distributions are shown in figure B-1, and figure B-2 shows their approximate geographic boundaries.

Types I and IA represent the Pacific maritime climate with wet winters and dry summers. Type III represents Gulf of Mexico and Atlantic coastal areas where tropical storms bring large 24-hour rainfall amounts. Type II represents the rest of the country. For more precise distribution boundaries in a state having more than one type, contact the NRCS State Conservation Engineer.

Figure B-2 Approximate geographic boundaries for NRCS (SCS) rainfall distributions



Rainfall data sources

This section lists the most current 24-hour rainfall data published by the National Weather Service (NWS) for various parts of the country. Because NWS Technical Paper 40 (TP-40) is out of print, the 24-hour rainfall maps for areas east of the 105th meridian are included here as figures B-3 through B-8. For the area generally west of the 105th meridian, TP-40 has been superseded by NOAA Atlas 2, the Precipitation-Frequency Atlas of the Western United States, published by the National Ocean and Atmospheric Administration.

East of 105th meridian

Hershfield, D.M. 1961. Rainfall frequency atlas of the United States for durations from 30 minutes to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 40. Washington, DC. 155 p.

West of 105th meridian

Miller, J.F., R.H. Frederick, and R.J. Tracey. 1973. Precipitation-frequency atlas of the Western United States. Vol. I Montana; Vol. II, Wyoming; Vol III, Colorado; Vol. IV, New Mexico; Vol V, Idaho; Vol. VI, Utah; Vol. VII, Nevada; Vol. VIII, Arizona; Vol. IX, Washington; Vol. X, Oregon; Vol. XI, California. U.S. Dept. of Commerce, National Weather Service, NOAA Atlas 2. Silver Spring, MD.

Alaska

Miller, John F. 1963. Probable maximum precipitation and rainfall-frequency data for Alaska for areas to 400 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. of Commerce, Weather Bur. Tech. Pap. No. 47. Washington, DC. 69 p.

Hawaii

Weather Bureau. 1962. Rainfall-frequency atlas of the Hawaiian Islands for areas to 200 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 43. Washington, DC. 60 p.

Puerto Rico and Virgin Islands

Weather Bureau. 1961. Generalized estimates of probable maximum precipitation and rainfall-frequency data for Puerto Rico and Virgin Islands for areas to 400 square miles, durations to 24 hours, and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 42. Washington, DC. 94 P.

Appendix A.2

Subcatchment Delineation

SCS ENGINEERS

Job No.	25221174	SHEET NO.	1 of 1
Job:	Indian River Landfill – Run-on/Run-off Evaluation	CALC. NO.	2
Client	NRG	REV. NO.	1
Subject	Subcatchment Delineation	BY SJL	DATE 7/10/2021
		CHK'D. RDS	DATE 7/30/2021

Problem Statement

Delineate the subcatchment areas (watersheds) for the proposed closure plan conditions for the Landfill.

Given

The stormwater management system that is described in this calculation represents all areas that will convey stormwater associated with the proposed closure plan for the Landfill. Subcatchment areas within the Landfill footprint were based on final closed conditions and existing/proposed stormwater management features. Subcatchment areas were delineated using topographic divides and stormwater management feature locations including terrace berms, letdown pipes, perimeter ditches, and culverts.

The subcatchment areas for the proposed conditions are shown on **Figure A.2-1.**

Results

Figure A.2-1 depicts the delineation of the stormwater subcatchments for the proposed closure plan for the Landfill. The attached **Table A.2-1** summarizes the approximate acreage of all subcatchment areas and identifies the ultimate discharge location for each area. The nomenclature for each subcatchment area is described below:

Stormwater Management Feature Location (First Identifier)
SC = Subcatchment

Sub-grouping (Second Identifier)
Letter = Sub-grouping identifier
Number = Quantity within sub-group

Table A.2-1 Subcatchment Area Summary Table													
6.33 Acres		12.03 Acres		3.05 Acres		5.29 Acres		7.65 Acres		4.82 Acres		4.78 Acres	
Ultimate Discharge Location: Northeast Basin (DP-1)		Ultimate Discharge Location: Northeast Basin (DP-1)		Ultimate Discharge Location: Northeast Basin (DP-1)		Ultimate Discharge Location: Northeast Basin (DP-1)		Ultimate Discharge Location: Southwest Basin (DP-2)		Ultimate Discharge Location: Southwest Basin (DP-2)		Ultimate Discharge Location: Northeast Basin (DP-1)	
Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)
SC-A1	0.74	SC-B1	0.43	SC-C1	0.42	SC-D1	1.78	SC-E1	5.74	SC-F1	0.97	SC-G1	0.59
SC-A2	0.39	SC-B2	0.89	SC-C2	0.04	SC-D2	0.10	SC-E2	0.15	SC-F2	1.22	SC-G2	1.10
SC-A3	0.81	SC-B3	3.16	SC-C3	0.55	SC-D3	1.13	SC-E3	0.31	SC-F3	1.36	SC-G3	0.43
SC-A4	0.80	SC-B4	1.18	SC-C4	0.31	SC-D4	1.01	SC-E4	0.39	SC-F4	0.85	SC-G4	0.40
SC-A5	0.43	SC-B5	1.27	SC-C5	0.52	SC-D5	1.05	SC-E5	0.46	SC-F5	0.43	SC-G5	0.44
SC-A6	0.46	SC-B6	0.03	SC-C6	0.31	SC-D6	0.14	SC-E6	0.27			SC-G6	0.40
SC-A7	0.27	SC-B7	0.46	SC-C7	0.48	SC-D7	0.07	SC-E7	0.22			SC-G7	0.22
SC-A8	0.50	SC-B8	0.53	SC-C8	0.30			SC-E8	0.12			SC-G8	0.10
SC-A9	0.68	SC-B9	0.13	SC-C9	0.06							SC-G9	0.81
SC-A10	0.37	SC-B10	0.48	SC-C10	0.05							SC-G10	0.27
SC-A11	0.72	SC-B11	0.02										
SC-A12	0.17	SC-B12	1.00										
		SC-B13	0.28										
		SC-B14	1.11										
		SC-B15	0.59										
		SC-B16	0.33										
		SC-B17	0.16										

6.48 Acres		3.25 Acres		4.3 Acres		11.35 Acres		9.8 Acres		4.21 Acres	
Ultimate Discharge Location: Northeast Basin (DP-1)		Ultimate Discharge Location: Northeast Basin (DP-1)		Ultimate Discharge Location: Northeast Basin (DP-1)		Ultimate Discharge Location: Northeast Basin (DP-1)		Ultimate Discharge Location: Northeast Basin (DP-1)		Ultimate Discharge Location: Southwest Basin (DP-2)	
Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)	Subcatchment Identifier	Area (Acres)
SC-H1	0.54	SC-I1	1.91	SC-J1	2.81	SC-K1	2.80	SC-NE1	0.32	SC-SW1	0.17
SC-H2	0.78	SC-I2	0.54	SC-J2	0.14	SC-K2	1.40	SC-NE2	0.50	SC-SW2	0.40
SC-H3	0.82	SC-I3	0.18	SC-J3	0.29	SC-K3	0.37	SC-NE3	0.47	SC-SW3	0.45
SC-H4	0.71	SC-I4	0.06	SC-J4	0.40	SC-K4	0.66	SC-NE4	0.46	SC-SW4	3.20
SC-H5	0.98	SC-I5	0.40	SC-J5	0.42	SC-K5	0.69	SC-NE5	8.05		
SC-H6	0.93	SC-I6	0.16	SC-J6	0.24	SC-K6	1.11				
SC-H7	0.40					SC-K7	0.63				
SC-H8	0.18					SC-K8	1.09				
SC-H9	0.71					SC-K9	0.57				
SC-H10	0.44					SC-K10	0.94				
						SC-K11	0.29				
						SC-K12	0.15				
						SC-K13	0.41				
						SC-K14	0.25				

Subcatchment Nomenclature Key

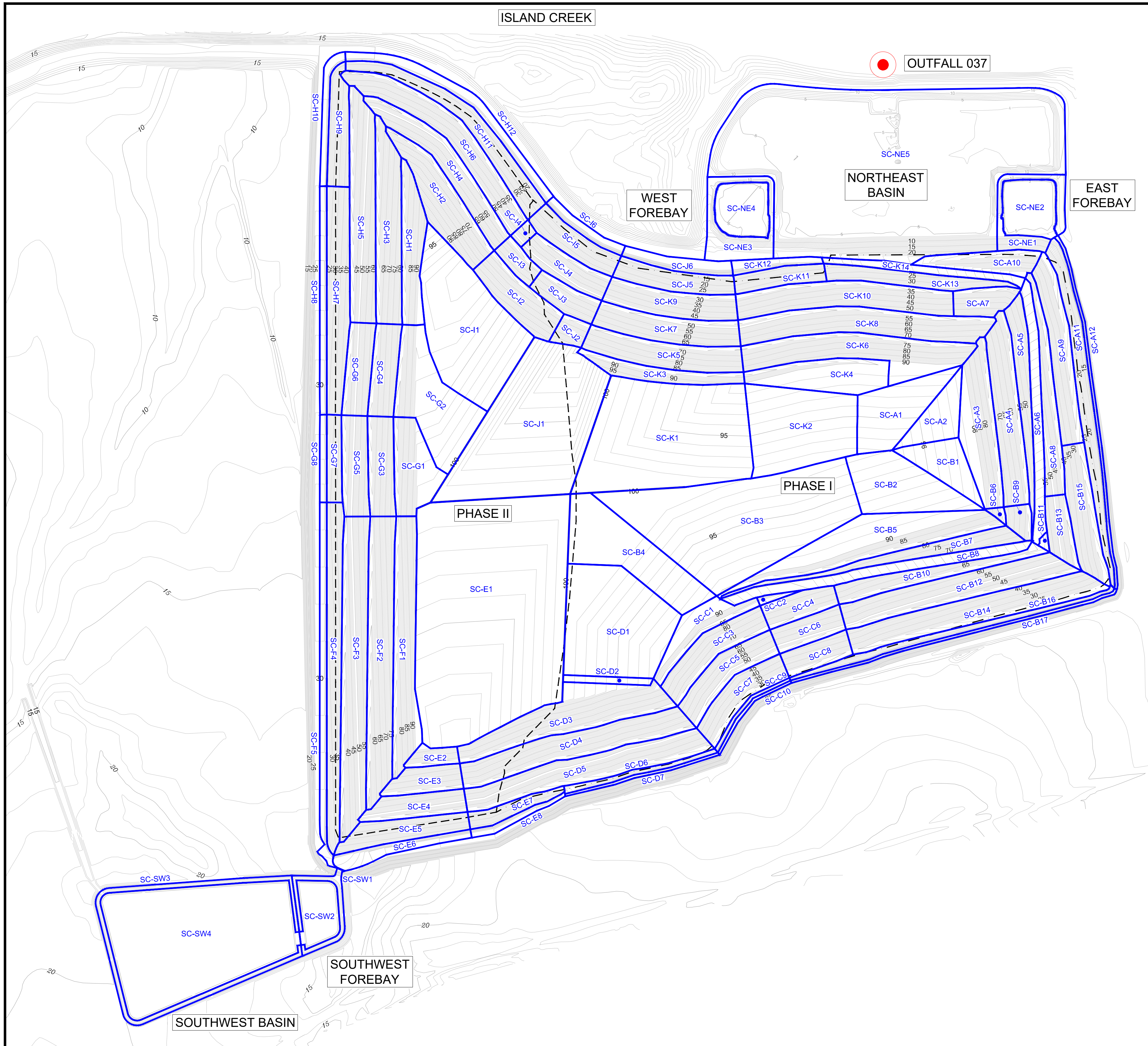
Stormwater Management Feature Location (First Identifier)

SC = Subcatchment

Sub-grouping (Second Identifier)

Letter = Sub-grouping identifier

Number = Quantity within sub-group



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0 300'

GRAPHIC SCALE

LEGEND

- APPROXIMATE PHASE I PERMITTED WASTE BOUNDARY
- APPROXIMATE PHASE II PERMITTED WASTE BOUNDARY
- 10 EXISTING CONTOUR OUTSIDE LANDFILL FOOTPRINT
- 90 EXISTING/PROPOSED CONTOUR WITHIN LANDFILL FOOTPRINT
- OUTFALL LOCATION
- SUBCATCHMENT AREA BOUNDARY

NOTES

1. EXISTING TOPOGRAPHY OF THE SURFACE WATER SEDIMENT CONTROL BASIN IS FROM FILE "09-034 topo.dwg," PREPARED BY SOULE AND ASSOCIATES, P.C., DATED MARCH 2009. ALL OTHER EXISTING TOPOGRAPHY PROVIDED BY WENCK ASSOCIATES, INC., 1800 PIONEER CREEK CENTER, MAPLE PLAIN MN. 55359. DATE OF AERIAL PHOTOGRAPHY: JANUARY 9, 2003.

PROJECT NO.	25221174	DRAWN BY:	SJL
DRAWN:	07/30/21	CHECKED BY:	RDS
REVISED:	??/??/??	APPROVED BY:	

ENGINEER: SCS ENGINEERS, 2830 DAIRY DRIVE MADISON, WI 53718-6751, PHONE: (608) 224-2830

CLIENT: nrg

SITE: INDIAN RIVER LANDFILL, DAGSBORO, DELAWARE

FIGURE A.2-1 SUBCATCHMENT DELINEATION

FIGURE 1 OF 4

Appendix A.3

Weighted Curve Number Determination

Problem Statement

Determine the weighted curve number (CN) for each subcatchment area to be modeled. The CN is used to calculate stormwater runoff for catchment areas.

Given

The software utilized to model the proposed closure plan conditions of the Landfill is HydroCAD. This program calculates a "weighted" curve number value for each subcatchment based on the percentage of total acreage for each soil type and land cover parameter. This method was utilized in this evaluation and is further described in the "Calculation" section below.

Please find the following supporting information attached to this calculation:

- Technical Release 55 (TR-55), Urban Hydrology for Small Watersheds, United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS).
- USDA-NRCS Custom Soil Resource Report for Sussex County, Delaware
- Surficial soil types for the all subcatchment areas associated with the Landfill were delineated using the Custom Soil Resource Report for Sussex County, Delaware published by the USDA-NRCS. As documented in this report, all subcatchments within the Landfill consist of soils from Hydrologic Soil Group A (HSG-A), consistent with native soils adjacent to the Landfill within the property. These areas are shown on **Figure A.3-1**.
- Land cover types were delineated based on the proposed closure plan conditions of the Landfill and review of aerial photography. These areas include grass cover, paved roads with open ditches, gravel roads, and water. These areas are shown on **Figure A.3-1**.
- Once delineated, the acreage for each surficial soil type and land cover type combination within each subcatchment is calculated using AutoCAD Civil 3D 2020 (AutoCAD).

Assumptions

Overview of Curve Numbers

Weighted curve numbers are used to identify the runoff characteristics of a subcatchment area. The curve number is determined by both the land cover that will be encountered by surface water (such as grass, road, etc.) as well as the type of soil that lies under the land cover. The underlying soil is important because soil matrix has a large impact on whether water infiltrates the soil or is shed.

HydroCAD utilizes curve number table values that are published by the USDA-NRCS in technical resource TR-55. The tables provide typical curve numbers for each land cover and soil group pairing.

TR-55 describes the various Hydrologic Soil Groups (HSG) as follows:

Group A: Soils with low runoff potential; typically more than 90 percent sand or gravel.

Group B: Moderately low runoff potential with water transmission through the soil unimpeded. Group B soils typically have between 10 and 20 percent clay and 50 to 90 percent sand and have loamy sand or sandy loam textures.

Group C: Moderately high runoff potential. Typically have between 20 and 40 percent clay and less than 50 percent sand, and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures.

Group D: High runoff potential. Typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures.

According to the NRCS Soil Survey, all undisturbed areas are comprised of soils with Hydrologic Soil Group A, which are a group of soils that have the highest infiltration potential. Furthermore, the surficial soils that were present prior to the development of the currently permitted landfill were also Hydrologic Soil Group A soils. These soils had been stripped for use as a construction cover soil. The specific soils in the development area as identified in the NRCS Soil Survey are identified in the table below.

Sussex County, Delaware (DE005)			
Map Unit Symbol	Map Unit Name	Hydrologic Soil Group (HSG)	Percent %
FhA	Fort Mott-Henlopen complex, 0 to 2 percent slopes	A	31.8
FhB	Fort Mott-Henlopen complex, 2 to 5 percent slopes	A	63.5
UzC	Udorthents, 0 to 10 percent slopes	A	4.7

For calculation purposes, HSG A was selected as all present soils fall within this category. Specific information about each soil type is described below.

Fort Mott-Henlopen complex
The Fort Mott component makes up 45 percent of the map unit with Henlopen making up 35 percent of the map unit. The soil is excessively well drained with a depth to water table that is more than 80 inches. The soil does not flood or pond and is classified as HSG A.

Udorthents
The Udorthents component makes up nearly 90 percent of the map unit. The soil is well drained with a depth to water table that is about 40 to 72 inches. The soil does not flood or pond and is classified as HSG A.

Calculation Method
Each subcatchment area identified in **Appendix A.2** was evaluated to provide an appropriate curve number that is weighted to reflect surficial soils, land cover and antecedent moisture condition. AutoCAD was used to delineate land covers, as further described in the following text. The areas were then manually imported into HydroCAD.

HydroCAD then overlies the information and calculates a composite (weighted) curve number for each subcatchment area using the following equation:

$$CN_c = \frac{CN_1A_1 + CN_2A_2 \; . \; . \; . \; CN_nA_n}{A_1 + A_2 \; . \; . \; . \; A_n}$$

Where: CN_c = Composite CN value
CN_1-CN_n = Individual CN values
$A_1 - A_n$ = Area associated with each CN value

Land Cover

For proposed conditions, the land covers were determined by the proposed closure plan conditions of the Landfill and the existing land covers outside of the Landfill.

Delineated Area	Comments	Corresponding TR-55 Description and Runoff Coefficients				
		Description	Soil Group			
			A	B	C	D
Open Space / Grass Cover	Open grassy spaces were identified for proposed conditions for vegetated areas within the Landfill and the Northeast and Southwest Basins.	Open space, Good Condition (grass cover > 75%)	39	61	74	80
Gravel Roads	Present along the perimeter roadway of the Landfill.	Gravel roads with Right-of-Way	76	85	89	91
Roads and Paved Areas	Present in areas with roads, where surface water is unlikely to infiltrate into the ground.	Streets and Roads, Paved, Open Ditches with Right-of-Way, 50% Impervious	83	89	92	93
Water	Water surface present in the Northeast and Southwest Basin Forebays.	Water Surface, 0% Impervious	98	98	98	98

Antecedent Moisture Condition (AMC)

The antecedent moisture condition indicates the moisture level in the ground immediately preceding a storm event. HydroCAD implements four AMC conditions.

- AMC 1 – Dry
- AMC 2 – Normal
- AMC 3 – Wet
- AMC 4 – Saturated or frozen

AMC 2 was used for this evaluation, which is typical engineering practice.

Results

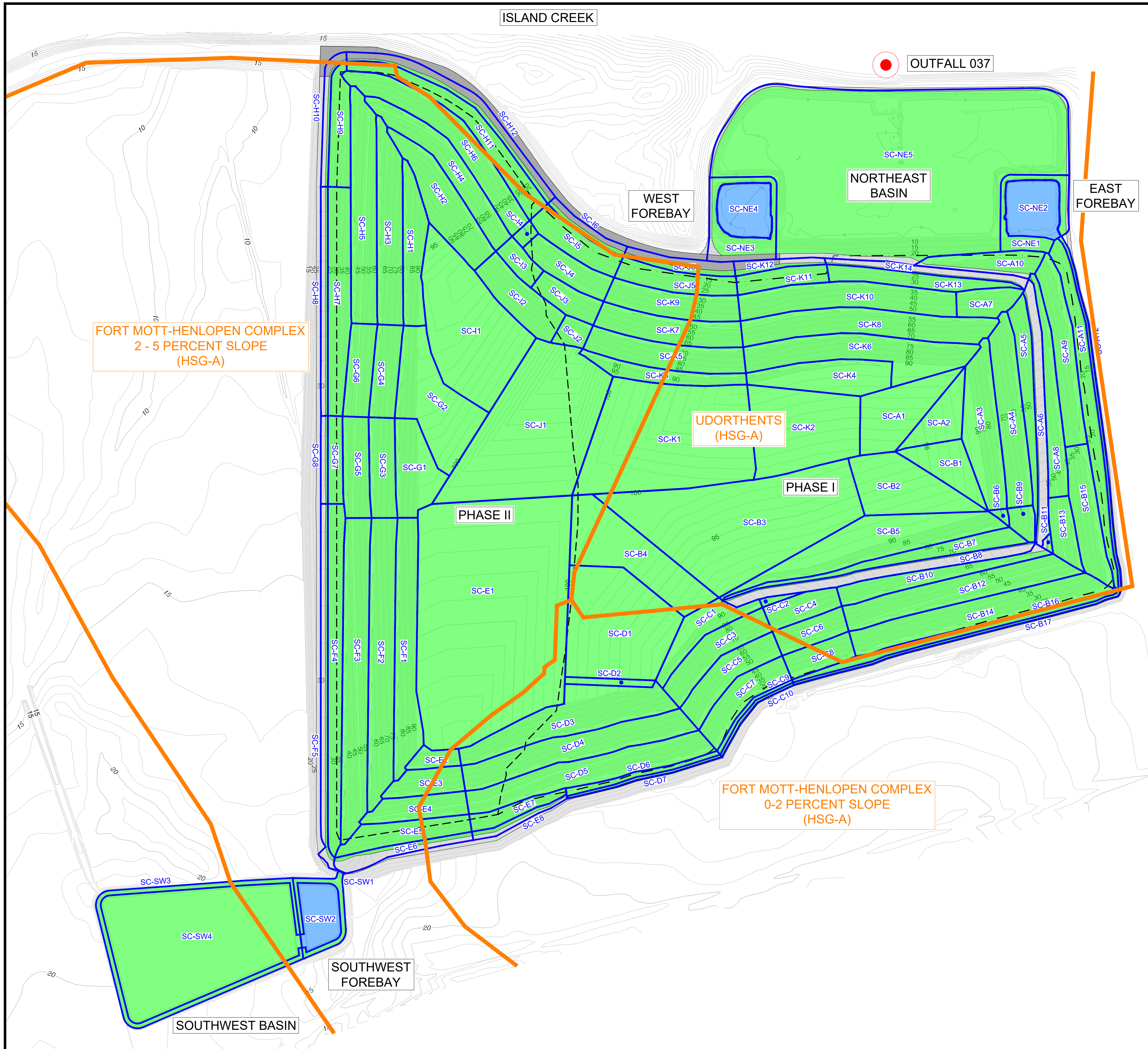
Based on the parameters and methods discussed previously, weighted curve numbers were calculated for all subcatchment areas. A summary of the weighted curve numbers for each subcatchment has been provided in **Table A.3-1.**

Table A.3-1 Determination of Weighted Curve Number						
Subcatchment Area	Landcover Type	Soil Group	Curve Number	Acreage	Percentage of Subacatchment	Weighted Curve Number
SC-A1	>75% Grass cover, Good	A	39	0.74	100.0%	39
SC-A2	>75% Grass cover, Good	A	39	0.39	100.0%	39
SC-A3	>75% Grass cover, Good	A	39	0.81	100.0%	39
SC-A4	>75% Grass cover, Good	A	39	0.80	100.0%	39
SC-A5	>75% Grass cover, Good	A	39	0.43	100.0%	39
SC-A6	>75% Grass cover, Good	A	39	0.07	15.2%	70
	Gravel roads	A	76	0.39	84.8%	
SC-A7	>75% Grass cover, Good	A	39	0.27	100.0%	39
SC-A8	>75% Grass cover, Good	A	39	0.50	100.0%	39
SC-A9	>75% Grass cover, Good	A	39	0.68	100.0%	39
SC-A10	>75% Grass cover, Good	A	39	0.31	84.4%	45
	Gravel roads	A	76	0.06	15.6%	
SC-A11	>75% Grass cover, Good	A	39	0.72	100.0%	39
SC-A12	>75% Grass cover, Good	A	39	0.12	68.2%	51
	Gravel roads	A	76	0.05	31.8%	
SC-B1	>75% Grass cover, Good	A	39	0.43	100.0%	39
SC-B2	>75% Grass cover, Good	A	39	0.89	100.0%	39
SC-B3	>75% Grass cover, Good	A	39	3.16	100.0%	39
SC-B4	>75% Grass cover, Good	A	39	1.18	100.0%	39
SC-B5	>75% Grass cover, Good	A	39	1.27	100.0%	39
SC-B6	>75% Grass cover, Good	A	39	0.03	100.0%	39
SC-B7	>75% Grass cover, Good	A	39	0.46	100.0%	39
SC-B8	>75% Grass cover, Good	A	39	0.08	15.5%	70
	Gravel roads	A	76	0.45	84.5%	
SC-B9	>75% Grass cover, Good	A	39	0.13	100.0%	39
SC-B10	>75% Grass cover, Good	A	39	0.46	96.7%	40
	Gravel roads	A	76	0.02	3.3%	
SC-B11	>75% Grass cover, Good	A	39	0.01	62.8%	53
	Gravel roads	A	76	0.01	37.2%	
SC-B12	>75% Grass cover, Good	A	39	1.00	100.0%	39
SC-B13	>75% Grass cover, Good	A	39	0.28	100.0%	39
SC-B14	>75% Grass cover, Good	A	39	1.11	100.0%	39
SC-B15	>75% Grass cover, Good	A	39	0.59	100.0%	39
SC-B16	>75% Grass cover, Good	A	39	0.33	100.0%	39
SC-B17	>75% Grass cover, Good	A	39	0.11	66.8%	51
	Gravel roads	A	76	0.05	33.2%	

Table A.3-1 Determination of Weighted Curve Number						
Subcatchment Area	Landcover Type	Soil Group	Curve Number	Acreage	Percentage of Subacatchment	Weighted Curve Number
SC-C1	>75% Grass cover, Good	A	39	0.42	100.0%	39
SC-C2	>75% Grass cover, Good	A	39	0.04	100.0%	39
SC-C3	>75% Grass cover, Good	A	39	0.55	100.0%	39
SC-C4	>75% Grass cover, Good	A	39	0.31	100.0%	39
SC-C5	>75% Grass cover, Good	A	39	0.52	100.0%	39
SC-C6	>75% Grass cover, Good	A	39	0.31	100.0%	39
SC-C7	>75% Grass cover, Good	A	39	0.48	100.0%	39
SC-C8	>75% Grass cover, Good	A	39	0.30	100.0%	39
SC-C9	>75% Grass cover, Good	A	39	0.06	100.0%	39
SC-C10	>75% Grass cover, Good	A	39	0.04	67.7%	51
	Gravel roads	A	76	0.02	32.3%	
SC-D1	>75% Grass cover, Good	A	39	1.78	100.0%	39
SC-D2	>75% Grass cover, Good	A	39	0.10	100.0%	39
SC-D3	>75% Grass cover, Good	A	39	1.13	100.0%	39
SC-D4	>75% Grass cover, Good	A	39	1.01	100.0%	39
SC-D5	>75% Grass cover, Good	A	39	1.05	100.0%	39
SC-D6	>75% Grass cover, Good	A	39	0.14	100.0%	39
SC-D7	>75% Grass cover, Good	A	39	0.05	69.1%	50
	Gravel roads	A	76	0.02	30.9%	
SC-E1	>75% Grass cover, Good	A	39	5.74	100.0%	39
SC-E2	>75% Grass cover, Good	A	39	0.15	100.0%	39
SC-E3	>75% Grass cover, Good	A	39	0.31	100.0%	39
SC-E4	>75% Grass cover, Good	A	39	0.39	100.0%	39
SC-E5	>75% Grass cover, Good	A	39	0.46	100.0%	39
SC-E6	>75% Grass cover, Good	A	39	0.09	34.2%	63
	Gravel roads	A	76	0.18	65.8%	
SC-E7	>75% Grass cover, Good	A	39	0.22	100.0%	39
SC-E8	>75% Grass cover, Good	A	39	0.06	49.1%	58
	Gravel roads	A	76	0.06	50.9%	
SC-F1	>75% Grass cover, Good	A	39	0.97	100.0%	39
SC-F2	>75% Grass cover, Good	A	39	1.22	100.0%	39
SC-F3	>75% Grass cover, Good	A	39	1.36	100.0%	39
SC-F4	>75% Grass cover, Good	A	39	0.85	100.0%	39
SC-F5	>75% Grass cover, Good	A	39	0.16	36.0%	63
	Gravel roads	A	76	0.28	64.0%	

Table A.3-1 Determination of Weighted Curve Number						
Subcatchment Area	Landcover Type	Soil Group	Curve Number	Acreage	Percentage of Subacatchment	Weighted Curve Number
SC-G1	>75% Grass cover, Good	A	39	0.59	100.0%	39
SC-G2	>75% Grass cover, Good	A	39	1.10	100.0%	39
SC-G3	>75% Grass cover, Good	A	39	0.43	100.0%	39
SC-G4	>75% Grass cover, Good	A	39	0.40	100.0%	39
SC-G5	>75% Grass cover, Good	A	39	0.44	100.0%	39
SC-G6	>75% Grass cover, Good	A	39	0.40	100.0%	39
SC-G7	>75% Grass cover, Good	A	39	0.22	100.0%	39
SC-G8	>75% Grass cover, Good	A	39	0.04	35.9%	63
	Gravel roads	A	76	0.07	64.1%	
SC-G9	>75% Grass cover, Good	A	39	0.81	100.0%	39
SC-G10	>75% Grass cover, Good	A	39	0.10	36.8%	62
	Gravel roads	A	76	0.17	63.2%	
SC-H1	>75% Grass cover, Good	A	39	0.54	100.0%	39
SC-H2	>75% Grass cover, Good	A	39	0.78	100.0%	39
SC-H3	>75% Grass cover, Good	A	39	0.82	100.0%	39
SC-H4	>75% Grass cover, Good	A	39	0.71	100.0%	39
SC-H5	>75% Grass cover, Good	A	39	0.98	100.0%	39
SC-H6	>75% Grass cover, Good	A	39	0.93	100.0%	39
SC-H7	>75% Grass cover, Good	A	39	0.40	100.0%	39
SC-H8	>75% Grass cover, Good	A	39	0.06	31.4%	66
	Gravel roads	A	76	0.08	46.9%	
	Paved Roads	A	83	0.04	21.7%	
SC-H9	>75% Grass cover, Good	A	39	0.71	100.0%	39
SC-H10	>75% Grass cover, Good	A	39	0.15	34.9%	68
	Paved Roads	A	83	0.29	65.1%	
SC-I1	>75% Grass cover, Good	A	39	1.91	100.0%	39
SC-I2	>75% Grass cover, Good	A	39	0.54	100.0%	39
SC-I3	>75% Grass cover, Good	A	39	0.18	100.0%	39
SC-I4	>75% Grass cover, Good	A	39	0.06	100.0%	39
SC-I5	>75% Grass cover, Good	A	39	0.40	100.0%	39
SC-I6	>75% Grass cover, Good	A	39	0.07	45.5%	63
	Paved Roads	A	83	0.09	54.5%	
SC-J1	>75% Grass cover, Good	A	39	2.81	100.0%	39
SC-J2	>75% Grass cover, Good	A	39	0.14	100.0%	39
SC-J3	>75% Grass cover, Good	A	39	0.29	100.0%	39
SC-J4	>75% Grass cover, Good	A	39	0.40	100.0%	39
SC-J5	>75% Grass cover, Good	A	39	0.42	100.0%	39
SC-J6	>75% Grass cover, Good	A	39	0.10	40.2%	65
	Paved Roads	A	83	0.15	59.8%	

Table A.3-1 Determination of Weighted Curve Number						
Subcatchment Area	Landcover Type	Soil Group	Curve Number	Acreage	Percentage of Subacatchment	Weighted Curve Number
SC-K1	>75% Grass cover, Good	A	39	2.80	100.0%	39
SC-K2	>75% Grass cover, Good	A	39	1.40	100.0%	39
SC-K3	>75% Grass cover, Good	A	39	0.37	100.0%	39
SC-K4	>75% Grass cover, Good	A	39	0.66	100.0%	39
SC-K5	>75% Grass cover, Good	A	39	0.69	100.0%	39
SC-K6	>75% Grass cover, Good	A	39	1.11	100.0%	39
SC-K7	>75% Grass cover, Good	A	39	0.63	100.0%	39
SC-K8	>75% Grass cover, Good	A	39	1.09	100.0%	39
SC-K9	>75% Grass cover, Good	A	39	0.57	100.0%	39
SC-K10	>75% Grass cover, Good	A	39	0.94	100.0%	39
SC-K11	>75% Grass cover, Good	A	39	0.29	100.0%	39
SC-K12	>75% Grass cover, Good	A	39	0.06	40.7%	64
	Gravel roads	A	76	0.04	23.6%	
	Paved Roads	A	83	0.05	35.7%	
SC-K13	>75% Grass cover, Good	A	39	0.41	100.0%	39
SC-K14	>75% Grass cover, Good	A	39	0.05	20.2%	69
	Gravel roads	A	76	0.20	79.8%	
SC-NE1	>75% Grass cover, Good	A	39	0.30	92.5%	42
	Gravel roads	A	76	0.02	7.5%	
SC-NE2	Water Surface, 0% imp	A	98	0.50	100.0%	98
SC-NE3	>75% Grass cover, Good	A	39	0.36	75.8%	49
	Gravel roads	A	76	0.04	9.3%	
	Paved Roads	A	83	0.07	14.8%	
SC-NE4	Water Surface, 0% imp	A	98	0.46	100.0%	98
SC-NE5	>75% Grass cover, Good	A	39	7.76	96.5%	40
	Gravel roads	A	76	0.28	3.5%	
SC-SW1	>75% Grass cover, Good	A	39	0.17	100.0%	39
SC-SW2	Water Surface, 0% imp	A	98	0.40	100.0%	98
SC-SW3	>75% Grass cover, Good	A	39	0.45	100.0%	39
SC-SW4	>75% Grass cover, Good	A	39	3.20	100.0%	39



LEGEND

- - - - -	APPROXIMATE PHASE I PERMITTED WASTE BOUNDARY
------	APPROXIMATE PHASE II PERMITTED WASTE BOUNDARY
10	EXISTING CONTOUR OUTSIDE LANDFILL FOOTPRINT
90	EXISTING/PROPOSED CONTOUR WITHIN LANDFILL FOOTPRINT
●	OUTFALL LOCATION
	SUBCATCHMENT AREA BOUNDARY
	SURFICIAL SOIL TYPE BOUNDARY (USDA-NRCS CUSTOM SOIL REPORT)
	OPEN SPACE / GRASS COVER
	GRAVEL ROADS
	PAVED ROADS
	WATER

NOTES

1. EXISTING TOPOGRAPHY OF THE SURFACE WATER SEDIMENT CONTROL BASIN IS FROM FILE "09-034 topo.dwg," PREPARED BY SOULE AND ASSOCIATES, P.C., DATED MARCH 2009. ALL OTHER EXISTING TOPOGRAPHY PROVIDED BY WENCK ASSOCIATES, INC., 1800 PIONEER CREEK CENTER, MAPLE PLAIN MN. 55359. DATE OF AERIAL PHOTOGRAPHY: JANUARY 9, 2003.

PROJECT NO.	25221174	DRAWN BY:	SJL
DRAWN:	07/21/21	CHECKED BY:	RDS
REVISED:	??/??/??	APPROVED BY:	

ENGINEER: SCS ENGINEERS, 2830 DAIRY DRIVE MADISON, WI 53718-6751, PHONE: (608) 224-2830

CLIENT: nrg

SITE: INDIAN RIVER LANDFILL, DAGSBORO, DELAWARE

FIGURE A.3-1
SURFICIAL SOIL TYPES AND LAND COVER

FIGURE 2 OF 4

United States Department of Agriculture

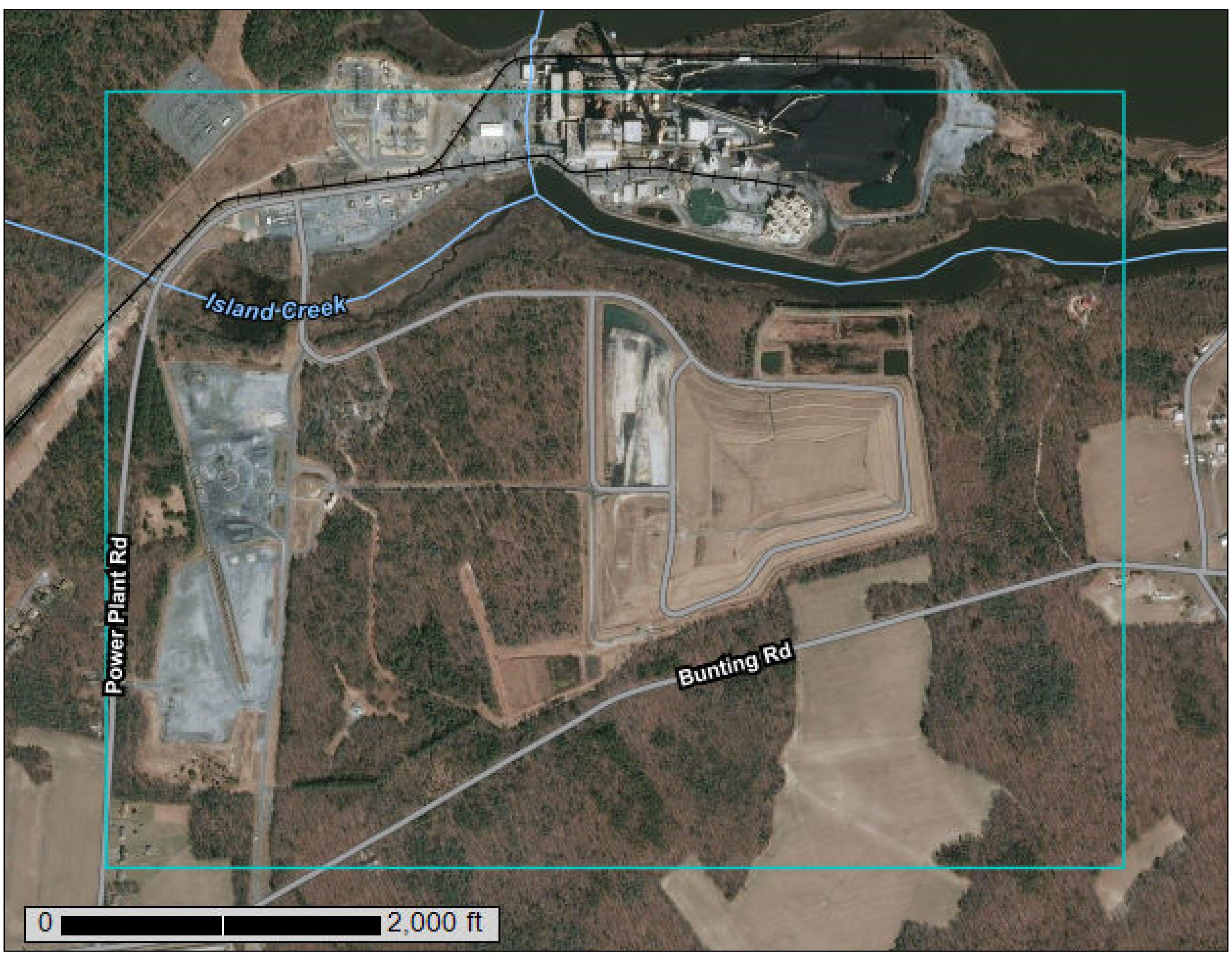
NRCS

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

Sussex County, Delaware



July 9, 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.

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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 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.

Soil Map

Map Scale: 1:12,500 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 150, 300, 600, 900

Feet: 0, 500, 1000, 2000, 3000

N

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Sussex County, Delaware
Survey Area Data: Version 21, Jun 11, 2020

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

Date(s) aerial images were photographed: Nov 21, 2018—Mar 12, 2019

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
BuA	Brockatonorton-Urban land complex, 0 to 2 percent slopes	79.5	11.2%
EvD	Evesboro loamy sand, 5 to 15 percent slopes	1.9	0.3%
FhA	Fort Mott-Henlopen complex, 0 to 2 percent slopes	210.0	29.6%
FhB	Fort Mott-Henlopen complex, 2 to 5 percent slopes	140.1	19.8%
HpA	Henlopen loamy sand, 0 to 2 percent slopes	36.5	5.1%
HpB	Henlopen loamy sand, 2 to 5 percent slopes	37.1	5.2%
KsA	Klej loamy sand, 0 to 2 percent slopes	8.7	1.2%
Ma	Manahawkin muck, frequently flooded	27.9	3.9%
Pa	Pawcatuck mucky peat, very frequently flooded, tidal	26.1	3.7%
RoA	Rosedale loamy sand, 0 to 2 percent slopes	9.7	1.4%
RuA	Runclint loamy sand, 0 to 2 percent slopes	15.9	2.2%
UzC	Udorthents, 0 to 10 percent slopes	89.0	12.6%
WHe1	Herring Creek mucky silt loam, 0 to 1 meter water depth	26.1	3.7%
Totals for Area of Interest		**708.6**	**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.

Sussex County, Delaware

BuA—Brockatonorton-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1qtfp
Elevation: 0 to 130 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Brockatonorton and similar soils: 45 percent
Urban land: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brockatonorton

Setting

Landform: Back-barrier beaches
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy eolian deposits and/or sandy marine deposits

Typical profile

A - 0 to 3 inches: sand
C - 3 to 24 inches: sand
Cg1 - 24 to 50 inches: sand
Oe - 50 to 60 inches: mucky peat
Cg2 - 60 to 72 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline to strongly saline (0.0 to 16.0 mmhos/cm)
Available water capacity: Low (about 5.7 inches)

Interpretive groups

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

Description of Urban Land

Setting

Landform: Flats

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Unranked

Minor Components

Udorthents

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

Beaches

Percent of map unit: 5 percent
Landform: Beaches
Hydric soil rating: Yes

Acquango

Percent of map unit: 3 percent
Landform: Backshores, dunes
Hydric soil rating: No

Transquaking

Percent of map unit: 2 percent
Landform: Tidal marshes
Hydric soil rating: Yes

EvD—Evesboro loamy sand, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1qtgc
Elevation: 0 to 200 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Evesboro

Setting

Landform: Flats, knolls, fluviomarine terraces, dunes
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Sandy eolian deposits and/or fluviomarine sediments

Typical profile

Ap - 0 to 4 inches: loamy sand
E - 4 to 16 inches: loamy sand
Bw - 16 to 39 inches: loamy sand
C - 39 to 80 inches: sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Runclint

Percent of map unit: 10 percent
Landform: Flats, fluviomarine terraces, dunes, knolls
Landform position (three-dimensional): Rise
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Galloway

Percent of map unit: 5 percent
Landform: Depressions, flats
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Cedartown

Percent of map unit: 5 percent
Landform: Knolls, dunes, flats
Landform position (three-dimensional): Rise, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Fort mott

Percent of map unit: 5 percent
Landform: Fluviomarine terraces, flats, knolls
Landform position (three-dimensional): Rise
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

FhA—Fort Mott-Henlopen complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1qtgh
Elevation: 20 to 70 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fort mott and similar soils: 45 percent
Henlopen and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fort Mott

Setting

Landform: Flats, fluviomarine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits over fluviomarine sediments

Typical profile

Ap - 0 to 10 inches: loamy sand
E - 10 to 24 inches: loamy sand
Bt - 24 to 36 inches: sandy loam
C - 36 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.28 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Henlopen

Setting

Landform: Marine terraces, dunes
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy eolian deposits and loamy fluviomarine sediments

Typical profile

Ap - 0 to 10 inches: loamy sand
E - 10 to 46 inches: loamy sand
Bt - 46 to 62 inches: sandy loam
C - 62 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rosedale

Percent of map unit: 5 percent
Landform: Flats, knolls
Hydric soil rating: No

Downer

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

Ingleside

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

Runclint

Percent of map unit: 5 percent
Landform: Dunes, knolls, flats
Hydric soil rating: No

FhB—Fort Mott-Henlopen complex, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1qtgj
Elevation: 20 to 70 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fort mott and similar soils: 45 percent
Henlopen and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fort Mott

Setting

Landform: Flats, knolls, fluviomarine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Sandy eolian deposits over fluviomarine sediments

Typical profile

Ap - 0 to 10 inches: loamy sand
E - 10 to 24 inches: loamy sand
Bt - 24 to 36 inches: sandy loam
C - 36 to 80 inches: loamy sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.28 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Henlopen

Setting

Landform: Marine terraces, dunes
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy eolian deposits and loamy fluviomarine sediments

Typical profile

Ap - 0 to 10 inches: loamy sand
E - 10 to 46 inches: loamy sand
Bt - 46 to 62 inches: sandy loam
C - 62 to 80 inches: sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rosedale

Percent of map unit: 5 percent
Landform: Flats, knolls
Hydric soil rating: No

Runclint

Percent of map unit: 5 percent
Landform: Knolls, flats, dunes
Hydric soil rating: No

Downer

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

Ingleside

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

HpA—Henlopen loamy sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1qth3
Elevation: 20 to 70 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Henlopen

Setting

Landform: Marine terraces, dunes
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy eolian deposits and loamy fluviomarine sediments

Typical profile

Ap - 0 to 10 inches: loamy sand
E - 10 to 46 inches: loamy sand
Bt - 46 to 62 inches: sandy loam
C - 62 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rosedale

Percent of map unit: 5 percent
Landform: Flats, knolls
Hydric soil rating: No

Runclint

Percent of map unit: 5 percent
Landform: Knolls, flats, dunes
Hydric soil rating: No

Ingleside

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

Fort mott

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

HpB—Henlopen loamy sand, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1qth4
Elevation: 20 to 70 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Henlopen

Setting

Landform: Marine terraces, dunes
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy eolian deposits and loamy fluviomarine sediments

Typical profile

Ap - 0 to 10 inches: loamy sand
E - 10 to 46 inches: loamy sand
Bt - 46 to 62 inches: sandy loam
C - 62 to 80 inches: sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rosedale

Percent of map unit: 5 percent
Landform: Flats, knolls
Hydric soil rating: No

Ingleside

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

Fort mott

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

Runclint

Percent of map unit: 5 percent
Landform: Dunes, knolls, flats
Hydric soil rating: No

KsA—Klej loamy sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1qthw
Elevation: 0 to 200 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Klej and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klej

Setting

Landform: Flats, depressions
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Sandy eolian deposits and/or fluviomarine sediments

Typical profile

A - 0 to 7 inches: loamy sand
E - 7 to 14 inches: loamy sand
Bw - 14 to 20 inches: loamy sand
C - 20 to 62 inches: loamy sand
Cg - 62 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.57 to 19.98 in/hr)
Depth to water table: About 10 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Hydric soil rating: No

Minor Components

Galloway

Percent of map unit: 10 percent
Landform: Depressions, flats
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Hammonton

Percent of map unit: 5 percent
Landform: Flats, depressions, drainageways
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Runclint

Percent of map unit: 5 percent
Landform: Knolls, flats, fluviomarine terraces, dunes

Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Berryland, drained
Percent of map unit: 5 percent
Landform: Depressions, flats, swales
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Hurlock, drained
Percent of map unit: 5 percent
Landform: Depressions, flats, swales
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

Ma—Manahawkin muck, frequently flooded

Map Unit Setting
National map unit symbol: 1qtj3
Elevation: 0 to 100 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition
Manahawkin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Manahawkin

Setting
Landform: Swamps, flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Organic, woody material over sandy alluvium

Typical profile
Oa1 - 0 to 8 inches: muck
Oa2 - 8 to 40 inches: muck
Cg - 40 to 80 inches: sand

Properties and qualities
Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.28 to 19.98 in/hr)
Depth to water table: About 0 to 5 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very high (about 17.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Puckum

Percent of map unit: 10 percent
Landform: Flood plains, swamps, depressions
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Indiantown

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Pa—Pawcatuck mucky peat, very frequently flooded, tidal

Map Unit Setting

National map unit symbol: 1qtjf
Elevation: 0 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Pawcatuck, very frequently flooded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pawcatuck, Very Frequently Flooded

Setting

Landform: Tidal flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oe1 - 0 to 14 inches: mucky peat
Oe2 - 14 to 45 inches: mucky peat
Cg1 - 45 to 50 inches: loamy sand
Cg2 - 50 to 90 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.57 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: Frequent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 32.0 mmhos/cm)
Available water capacity: Very high (about 13.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Transquaking

Percent of map unit: 10 percent
Landform: Tidal marshes
Hydric soil rating: Yes

Sunken

Percent of map unit: 5 percent
Landform: Submerged upland tidal marshes
Hydric soil rating: Yes

Mispillion

Percent of map unit: 5 percent
Landform: Tidal marshes, flood plains
Hydric soil rating: Yes

RoA—Rosedale loamy sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1qtjx
Elevation: 0 to 120 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Rosedale

Setting

Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits over fluviomarine deposits

Typical profile

A - 0 to 9 inches: loamy sand
E - 9 to 25 inches: loamy sand
Bt - 25 to 38 inches: sandy loam
C - 38 to 68 inches: loamy sand
2Cg - 68 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: About 40 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Evesboro

Percent of map unit: 10 percent
Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Galloway

Percent of map unit: 5 percent
Landform: Depressions, flats
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Klej

Percent of map unit: 5 percent
Landform: Depressions, flats
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Hambrook

Percent of map unit: 5 percent
Landform: Fluviomarine terraces, flats, depressions
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

RuA—Runclint loamy sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1qtjz
Elevation: 0 to 120 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Runclint

Setting

Landform: Flats, fluviomarine terraces

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits and/or fluviomarine sediments

Typical profile

Ap - 0 to 9 inches: loamy sand
E - 9 to 22 inches: sand
Bw - 22 to 39 inches: sand
BC - 39 to 59 inches: sand
2C - 59 to 80 inches: loamy coarse sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.57 to 19.98 in/hr)
Depth to water table: About 40 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Evesboro

Percent of map unit: 10 percent
Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Klej

Percent of map unit: 5 percent
Landform: Flats, depressions
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Hurlock, drained

Percent of map unit: 5 percent
Landform: Depressions, flats, swales
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

Galloway

Percent of map unit: 5 percent
Landform: Depressions, flats
Down-slope shape: Concave, linear

Across-slope shape: Concave, linear
Hydric soil rating: No

UzC—Udorthents, 0 to 10 percent slopes

Map Unit Setting

National map unit symbol: 1qtkv
Elevation: 10 to 200 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Loamy

Setting

Landform: Knolls, flats
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Fluviomarine sediments

Typical profile

C1 - 0 to 4 inches: sandy loam
C2 - 4 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 40 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Urban land

Percent of map unit: 10 percent
Landform: Flats, knolls
Hydric soil rating: No

WHe1—Herring Creek mucky silt loam, 0 to 1 meter water depth

Map Unit Setting

National map unit symbol: 2xhnk
Elevation: 0 feet
Mean annual precipitation: 41 to 49 inches
Mean annual air temperature: 53 to 60 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Herring creek, 0 to 1 meter water depth, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Herring Creek, 0 To 1 Meter Water Depth

Setting

Landform: Estuarine tidal streams
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mainland cove fine-silty estuarine deposits over woody organic material

Typical profile

Aseg - 0 to 3 inches: mucky silt loam
Cseg - 3 to 24 inches: silt loam
Oeseb1 - 24 to 51 inches: mucky peat
Oeseb2 - 51 to 69 inches: mucky peat

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Subaqueous
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Strongly saline (16.0 to 35.0 mmhos/cm)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Metedeconk, 0 to 1 meter water depth

Percent of map unit: 10 percent
Landform: Estuarine tidal streams
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

Truitt, 0 to 1 meter water depth

Percent of map unit: 5 percent
Landform: Mainland coves
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

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

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

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix A.4

Time of Concentration Calculation

Problem Statement

Summarize the time of concentration input parameters for HydroCAD for each subcatchment area. These parameters are used to describe how stormwater runoff is distributed over time. The time of concentration is defined as the longest amount of time that it would take for a drop of water to travel from the headwater of a subcatchment area to its downstream edge (i.e. prior to exiting the subcatchment area and being managed by a downstream element).

Given

The software utilized to model the proposed closure plan conditions of the Landfill is HydroCAD. This program calculates a "weighted" curve number value for each subcatchment based on the percentage of total acreage for each soil type and land cover parameter. This method was utilized in this evaluation and is further described in the "Calculation" section below.

Please find the following supporting information attached to this calculation:

- The time of concentration flow paths for each subcatchment area are shown in **Figure A.4-1.**
- The methodology that HydroCAD uses to calculate the time of concentration is based on Technical Release (TR) 20 / TR-55, published by the Soil Conservation Service.

Assumptions

The following assumptions were made in the calculations:

- For each subcatchment, the time of concentration (T_c) is the sum of the travel times (T_t) of various consecutive flow segments. Two (2) types of flow are used in the time of concentration calculations: sheet flow and shallow concentrated flow.
- Sheet flow is assumed to become shallow concentrated flow at 100 feet, which is conservative in comparison to 300 feet, which is designated in the TR-55 procedures.
- The Manning's coefficient "n" for sheet flow in grass-covered areas is assumed to be 0.150. This is indicative of short grass cover. During shallow concentrated flow, the average flow velocity is assumed to be 7.0 ft/sec. This is the HydroCAD default for, "Short Grass Pasture" surface cover.
- The Manning's coefficient "n" for sheet flow in paved areas is assumed to be 0.011. This is indicative of smooth surfaces. During shallow concentrated flow, the average flow velocity is assumed to be 20.3 ft/sec. This is the HydroCAD default for, "Paved" surface cover.

Calculations

The following formulas are used by HydroCAD to determine lag times:

Sheet Flow:

Sheet flow is flow over plane surfaces and is calculated by HydroCAD using the following equation.

$$T_t = \frac{(0.007(nL)^{0.8}}{P_2^{\;0.5} \; S^{\;0.4}}$$

Where:

T_t = Travel time (hours)
P_2 = 2-year, 24-hour rainfall depth
S = Land slope along flow path (ft/ft)
L = Flow Length (ft)
n = Manning's coefficient

Shallow Concentrated Flow:

Shallow concentrate flow time is calculated by HydroCAD using the following equation.

$$T_t = \frac{L}{3{,}600V} \quad \text{where} \quad V = K_v \sqrt{s}$$

T_t = Travel Time (hours)
L = Flow Length (ft)
V = Average Velocity (ft/sec)
3,600 = Conversion factor from seconds to hours
K_v = Velocity Factor (ft/sec)
s = Land Slope (ft/sec)

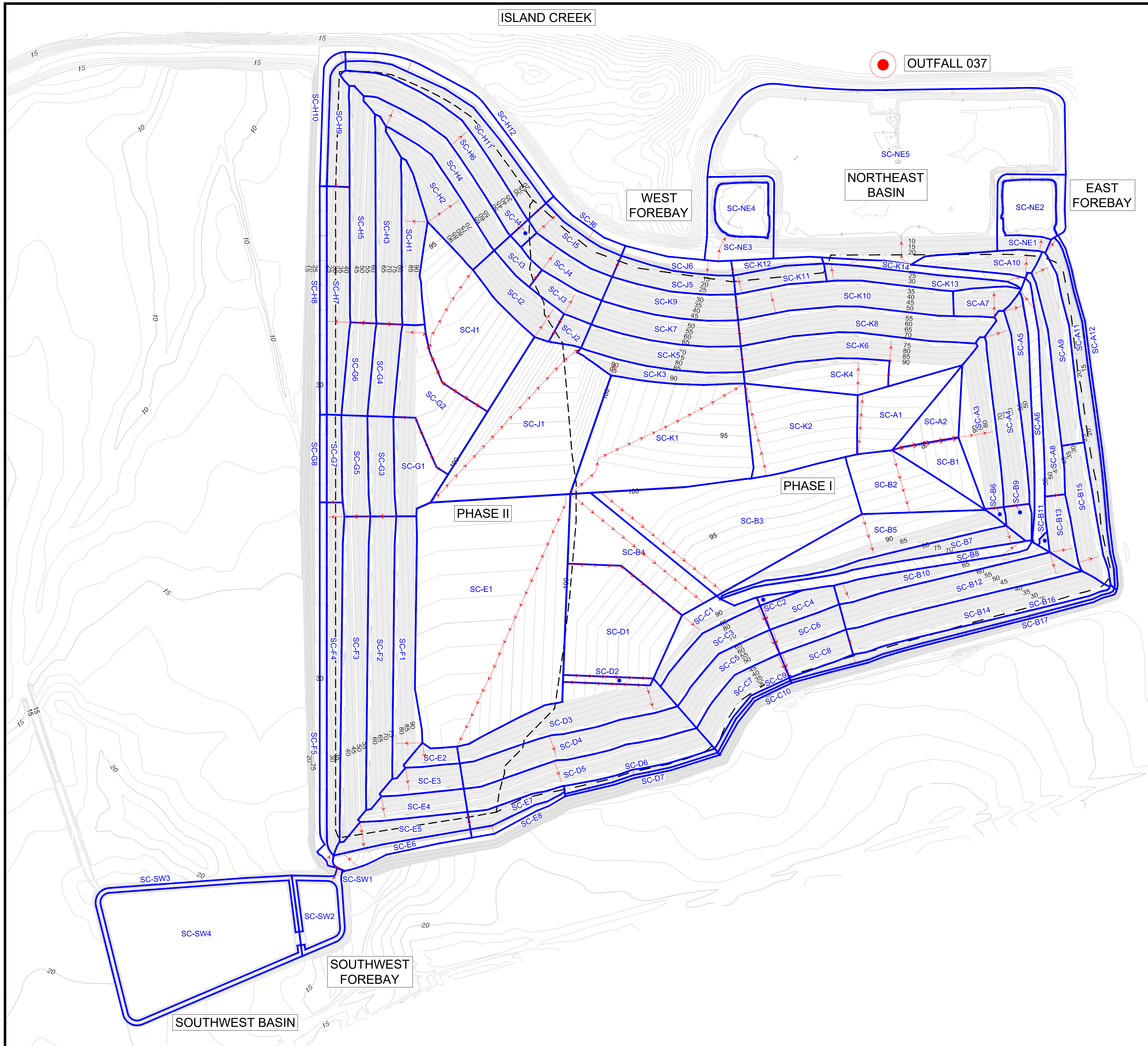
Results

A summary of the flow lengths, slopes, and other key parameters used to calculate the time of concentration for each subcatchment area is provided in attached Table A.4-1. The table also includes the time of concentration values calculated by HydroCAD for each subcatchment area. Refer to Appendix A.8 for a copy of the HydroCAD summary pages which lists the parameters entered in the stormwater model.

Table A.4-1 Subcatchment Time of Concentration Summary							
Subcatchment Area	Area (Acres)	Curve Number	Sheet Flow		Shallow Concentrated Flow		Time of Concentration
			Length (ft)	Slope (ft/ft)	Length (ft)	Slope (ft/ft)	(Min)
SC-A1	0.74	39	100	0.035	-	-	7.6
SC-A2	0.39	39	100	0.035	84	0.035	8.7
SC-A3	0.81	39	94	0.181	-	-	3.7
SC-A4	0.80	39	62	0.333	-	-	2.1
SC-A5	0.43	39	54	0.333	-	-	1.9
SC-A6	0.46	70	61	0.098	-	-	0.4
SC-A7	0.27	39	72	0.333	-	-	2.4
SC-A8	0.50	39	48	0.333	-	-	1.7
SC-A9	0.68	39	50	0.333	-	-	1.8
SC-A10	0.37	45	65	0.231	-	-	2.5
SC-A11	0.72	39	47	0.333	-	-	1.7
SC-A12	0.17	51	12	0.017	-	-	1.9
SC-B1	0.43	39	100	0.035	83	0.035	8.7
SC-B2	0.89	39	100	0.035	75	0.035	8.6
SC-B3	3.16	39	100	0.005	325	0.032	20.9
SC-B4	1.18	39	100	0.005	365	0.024	22.2
SC-B5	1.27	39	100	0.078	10	0.333	5.6
SC-B6	0.03	39	43	0.333	-	-	1.6
SC-B7	0.46	39	50	0.333	-	-	1.8
SC-B8	0.53	70	58	0.069	-	-	0.5
SC-B9	0.13	39	63	0.333	-	-	2.1
SC-B10	0.48	40	46	0.333	-	-	1.7
SC-B11	0.02	53	17	0.005	-	-	4.0
SC-B12	1.00	39	60	0.333	-	-	2.1
SC-B13	0.28	39	61	0.333	-	-	2.1
SC-B14	1.11	39	58	0.333	-	-	2.0
SC-B15	0.59	39	57	0.333	-	-	2.0
SC-B16	0.33	39	24	0.333	-	-	1.0
SC-B17	0.16	51	9	0.125	-	-	0.7
SC-C1	0.42	39	62	0.108	-	-	3.3
SC-C2	0.04	39	17	0.333	-	-	0.7
SC-C3	0.55	39	59	0.333	-	-	2.0
SC-C4	0.31	39	59	0.333	-	-	2.0
SC-C5	0.52	39	59	0.333	-	-	2.0
SC-C6	0.31	39	59	0.333	-	-	2.0
SC-C7	0.48	39	58	0.333	-	-	2.0
SC-C8	0.30	39	58	0.333	-	-	2.0
SC-C9	0.06	39	12	0.333	-	-	0.6
SC-C10	0.05	51	9	0.333	-	-	0.4
SC-D1	1.78	39	100	0.005	256	0.030	20.1
SC-D2	0.10	39	100	0.035	143	0.035	9.4
SC-D3	1.13	39	100	0.035	193	0.135	8.8
SC-D4	1.01	39	61	0.333	-	-	2.1
SC-D5	1.05	39	57	0.333	-	-	2.0
SC-D6	0.14	39	15	0.333	-	-	0.7
SC-D7	0.07	50	8	0.333	-	-	0.4
SC-E1	5.74	39	100	0.014	643	0.013	24.3
SC-E2	0.15	39	55	0.221	-	-	2.3
SC-E3	0.31	39	63	0.333	-	-	2.1
SC-E4	0.39	39	56	0.333	-	-	1.9
SC-E5	0.46	39	72	0.333	-	-	2.4

Table A.4-1 Subcatchment Time of Concentration Summary							
Subcatchment Area	Area (Acres)	Curve Number	Sheet Flow		Shallow Concentrated Flow		Time of Concentration
			Length (ft)	Slope (ft/ft)	Length (ft)	Slope (ft/ft)	(Min)
SC-E6	0.27	63	57	0.070	-	-	0.5
SC-E7	0.22	39	47	0.333	-	-	1.7
SC-E8	0.12	58	23	0.333	-	-	0.1
SC-F1	0.97	39	71	0.239	-	-	2.7
SC-F2	1.22	39	63	0.333	-	-	2.1
SC-F3	1.36	39	63	0.333	-	-	2.1
SC-F4	0.85	39	47	0.333	-	-	1.7
SC-F5	0.43	63	75	0.059	-	-	0.6
SC-G1	0.59	39	100	0.027	133	0.137	9.3
SC-G2	1.10	39	100	0.043	240	0.057	9.4
SC-G3	0.43	39	63	0.333	-	-	2.1
SC-G4	0.40	39	61	0.333	-	-	2.1
SC-G5	0.44	39	63	0.333	-	-	2.1
SC-G6	0.40	39	61	0.333	-	-	2.1
SC-G7	0.22	39	43	0.333	-	-	1.6
SC-G8	0.10	63	19	0.632	-	-	0.1
SC-G9	0.81	39	64	0.333	-	-	2.2
SC-G10	0.27	62	19	0.106	-	-	0.2
SC-H1	0.54	39	60	0.333	-	-	2.1
SC-H2	0.78	39	100	0.333	-	-	3.1
SC-H3	0.82	39	61	0.333	-	-	2.1
SC-H4	0.71	39	51	0.333	-	-	1.8
SC-H5	0.98	39	61	0.333	-	-	2.1
SC-H6	0.93	39	55	0.333	-	-	1.9
SC-H7	0.40	39	61	0.333	-	-	2.1
SC-H8	0.18	66	27	0.037	-	-	2.6
SC-H9	0.71	39	66	0.333	-	-	2.2
SC-H10	0.44	68	31	0.048	-	-	2.6
SC-I1	1.91	39	100	0.043	388	0.015	14.6
SC-I2	0.54	39	91	0.333	-	-	2.9
SC-I3	0.18	39	50	0.333	-	-	1.8
SC-I4	0.06	39	54	0.333	-	-	1.9
SC-I5	0.40	39	74	0.333	-	-	2.4
SC-I6	0.16	63	28	0.170	-	-	0.2
SC-J1	2.81	39	100	0.023	484	0.017	17.8
SC-J2	0.14	39	78	0.333	-	-	2.5
SC-J3	0.29	39	61	0.333	-	-	2.1
SC-J4	0.40	39	63	0.333	-	-	2.1
SC-J5	0.42	39	62	0.333	-	-	2.1
SC-J6	0.24	65	39	0.128	-	-	0.3
SC-K1	2.80	39	100	0.010	472	0.019	20.7
SC-K2	1.40	39	100	0.035	156	0.035	9.6
SC-K3	0.37	39	38	0.333	-	-	1.4
SC-K4	0.66	39	89	0.035	-	-	6.9
SC-K5	0.69	39	61	0.333	-	-	2.1
SC-K6	1.11	39	100	0.125	25	0.333	4.7
SC-K7	0.63	39	61	0.333	-	-	2.1
SC-K8	1.09	39	61	0.333	-	-	2.1
SC-K9	0.57	39	61	0.333	-	-	2.1
SC-K10	0.94	39	60	0.333	-	-	2.1
SC-K11	0.29	39	51	0.333	-	-	1.8

Table A.4-1 Subcatchment Time of Concentration Summary							
Subcatchment Area	Area (Acres)	Curve Number	Sheet Flow		Shallow Concentrated Flow		Time of Concentration
			Length (ft)	Slope (ft/ft)	Length (ft)	Slope (ft/ft)	(Min)
SC-K12	0.15	64	41	0.146	-	-	0.3
SC-K13	0.41	39	46	0.333	-	-	1.7
SC-K14	0.25	69	35	0.092	-	-	0.3
SC-NE1	0.32	42	41	0.333	-	-	1.5
SC-NE2	0.50	98	Diminimus travel time due to direct precipitation.				
SC-NE3	0.47	49	78	0.141	-	-	3.6
SC-NE4	0.46	98	Diminimus travel time due to direct precipitation.				
SC-NE5	8.05	40	94	0.202	-	-	3.6
SC-SW1	0.17	39	41	0.244	-	-	1.7
SC-SW2	0.40	98	Diminimus travel time due to direct precipitation.				
SC-SW3	0.45	39	15	0.200	-	-	0.8
SC-SW4	3.20	98	Diminimus travel time due to direct precipitation.				



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0 300'

GRAPHIC SCALE

LEGEND

APPROXIMATE PHASE I PERMITTED WASTE BOUNDARY

APPROXIMATE PHASE II PERMITTED WASTE BOUNDARY

EXISTING CONTOUR OUTSIDE LANDFILL FOOTPRINT

EXISTING/PROPOSED CONTOUR WITHIN LANDFILL FOOTPRINT

OUTFALL LOCATION

SUBCATCHMENT AREA BOUNDARY

TIME OF CONCENTRATION FLOWPATH

NOTES

1. EXISTING TOPOGRAPHY OF THE SURFACE WATER SEDIMENT CONTROL BASIN IS FROM FILE "09-034 topo.dwg," PREPARED BY SOULE AND ASSOCIATES, P.C., DATED MARCH 2009. ALL OTHER EXISTING TOPOGRAPHY PROVIDED BY WENCK ASSOCIATES, INC., 1800 PIONEER CREEK CENTER, MAPLE PLAIN MN. 55359. DATE OF AERIAL PHOTOGRAPHY: JANUARY 9, 2003.

PROJECT NO. 25221174	DRAWN BY: SJL	ENGINEER	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT	nrg	SITE INDIAN RIVER LANDFILL DAGSBORO, DELAWARE	FIGURE A4-1 TIME OF CONCENTRATION FLOWPAATH	FIGURE 3 OF 4
DRAWN: 07/30/21	CHECKED BY: RDS							
REVISED: ??/??/??	APPROVED BY:							

Appendix A.5

Subcatchment Area Discharge Rates

Job No.	25221174	SHEET NO.	1 of 1
Job:	Indian River Landfill – Run-on/Run-Off Evaluation	CALC. NO.	5
Client	NRG	REV. NO.	1
Subject	Subcatchment Discharge Rates	BY SJL	DATE 7/29/2021
		CHK'D. ZPC	DATE 7/30/2021

Problem Statement

Determine the stormwater runoff rates for the each subcatchment area

Given

Parameters, such as rainfall, acreage, curve number, and flow length discussed in previous sections of this appendix are entered into HydroCAD for each subcatchment. The stormwater discharge rates for each subcatchment are calculated in HydroCAD using these parameters. This calculation sheet provides a summary of the input values and the HydroCAD model results. Equations to determine these parameters are described in previous portions of **Appendix A.**

Storm Model Setup

The stormwater methodology and base information was defined as follows:

Runoff Calculation Method:	SCS TR-20
Reach Routing Method:	Storage Indication Plus Translation Method
Pond Routing Method:	Storage Indication Method (Modified-Plus)
Storm Distribution:	NRCS (SCS) Type III, 24-hour
Unit Hydrograph:	SCS
Antecedent Moisture Condition:	2

The Natural Resources Conservation Service (NRCS) developed methods TR-20 and TR-55 as standardized stormwater modeling. Both provide similar results. TR-20 is the computer-based modeling approach that is more complex and generally considered slightly more accurate than TR-55. TR-55, frequently called the tabular method, was developed after TR-20 to help simplify the modeling process. TR-55 was developed to use chart-based solutions with the SCS runoff equation. For the purpose of this hydrologic model, TR-20 methodology was used.

Model Calculations and Results

The stormwater model was analyzed for the 25-year, 24-hour storm event. A summary of the discharge rates for each subcatchment area is provided in **Table A.5-1.** In addition, reports summarizing the results of the HydroCAD model runs are provided in **Appendix A.8.**

Table A.5-1 Subcatchment Discharge Rate Summary		
Subcatchment Area	Area (Acres)	25-Year, 24-Hour Storm Duration
		cubic feet per second (cfs)
SC-A1	0.74	0.45
SC-A2	0.39	0.23
SC-A3	0.81	0.63
SC-A4	0.80	0.71
SC-A5	0.43	0.38
SC-A6	0.46	3.14
SC-A7	0.27	0.24
SC-A8	0.50	0.45
SC-A9	0.68	0.61
SC-A10	0.37	0.70
SC-A11	0.72	0.65
SC-A12	0.17	0.51
SC-B1	0.43	0.26
SC-B2	0.89	0.54
SC-B3	3.16	1.10
SC-B4	1.18	0.40
SC-B5	1.27	0.93
SC-B6	0.03	0.03
SC-B7	0.46	0.41
SC-B8	0.53	3.64
SC-B9	0.13	0.11
SC-B10	0.48	0.51
SC-B11	0.02	0.06
SC-B12	1.00	0.89
SC-B13	0.28	0.24
SC-B14	1.11	0.99
SC-B15	0.59	0.52
SC-B16	0.33	0.29
SC-B17	0.16	0.49
SC-C1	0.42	0.34
SC-C2	0.04	0.03
SC-C3	0.55	0.49
SC-C4	0.31	0.28
SC-C5	0.52	0.47
SC-C6	0.31	0.28
SC-C7	0.48	0.43
SC-C8	0.30	0.27
SC-C9	0.06	0.06
SC-C10	0.05	0.16
SC-D1	1.78	0.64
SC-D2	0.10	0.06
SC-D3	1.13	0.67
SC-D4	1.01	0.90
SC-D5	1.05	0.94
SC-D6	0.14	0.13
SC-D7	0.07	0.22

Table A.5-1 Subcatchment Discharge Rate Summary		
Subcatchment Area	Area (Acres)	25-Year, 24-Hour Storm Duration
		cubic feet per second (cfs)
SC-E1	5.74	1.80
SC-E2	0.15	0.13
SC-E3	0.31	0.28
SC-E4	0.39	0.34
SC-E5	0.46	0.40
SC-E6	0.27	1.47
SC-E7	0.22	0.20
SC-E8	0.12	0.52
SC-F1	0.97	0.83
SC-F2	1.22	1.08
SC-F3	1.36	1.21
SC-F4	0.85	0.76
SC-F5	0.43	2.35
SC-G1	0.59	0.34
SC-G2	1.10	0.64
SC-G3	0.43	0.38
SC-G4	0.40	0.36
SC-G5	0.44	0.39
SC-G6	0.40	0.36
SC-G7	0.22	0.20
SC-G8	0.10	0.57
SC-G9	0.81	0.72
SC-G10	0.27	1.43
SC-H1	0.54	0.48
SC-H2	0.78	0.64
SC-H3	0.82	0.73
SC-H4	0.71	0.64
SC-H5	0.98	0.87
SC-H6	0.93	0.83
SC-H7	0.40	0.35
SC-H8	0.18	1.01
SC-H9	0.71	0.62
SC-H10	0.44	2.71
SC-I1	1.91	0.84
SC-I2	0.54	0.46
SC-I3	0.18	0.16
SC-I4	0.06	0.05
SC-I5	0.40	0.35
SC-I6	0.16	0.86
SC-J1	2.81	1.09
SC-J2	0.14	0.12
SC-J3	0.29	0.26
SC-J4	0.40	0.35
SC-J5	0.42	0.37
SC-J6	0.24	1.43
SC-K1	2.80	0.98

Table A.5-1 Subcatchment Discharge Rate Summary		
Subcatchment Area	Area (Acres)	25-Year, 24-Hour Storm Duration
		cubic feet per second (cfs)
SC-K2	1.40	0.80
SC-K3	0.37	0.33
SC-K4	0.66	0.44
SC-K5	0.69	0.61
SC-K6	1.11	0.84
SC-K7	0.63	0.56
SC-K8	1.09	0.97
SC-K9	0.57	0.51
SC-K10	0.94	0.84
SC-K11	0.29	0.26
SC-K12	0.15	0.85
SC-K13	0.41	0.37
SC-K14	0.25	1.66
SC-NE1	0.32	0.45
SC-NE2	0.50	5.35
SC-NE3	0.47	1.19
SC-NE4	0.46	4.95
SC-NE5	8.05	7.68
SC-SW1	0.17	0.15
SC-SW2	0.40	4.26
SC-SW3	0.45	0.40
SC-SW4	3.20	2.87

Appendix A.6

Landfill Conveyance Feature Sizing

Problem Statement

Determine whether the stormwater conveyance features that collect and convey stormwater from the Landfill are designed to convey the 25-year, 24-hour storm event without causing erosion or overtopping.

Given

- Stormwater conveyance features include the following:
    - Terrace berms
    - Letdown pipes
    - Perimeter ditches
    - Culverts
- The locations of the stormwater conveyance features for the Landfill are shown on **Figure A.6-1.**
- The design summary of the stormwater conveyance features for the Landfill are provided in the following attached tables:
    - **A.6-1** – Terrace Berm Design Summary
    - **A.6-2** – Letdown Pipe Design Summary
    - **A.6-3** – Perimeter Ditch Design Summary
    - **A.6-4** – Culvert Design Summary
- Discharge rates for each subcatchment area are provided in **Appendix A.5.**

Design Assumptions

Terrace Berms

- Terrace berms on the Landfill consist of a variety of lining materials, depths, sideslopes, bottom widths, and channel slopes. See **Table A.6-1** for these parameters associated with each terrace berm.
- The following Manning's coefficients were modeled to represent the corresponding terrace berm lining:
    - Manning's coefficient = 0.030 = grass
    - Manning's coefficient = 0.035 = riprap
- Terrace berms with identified flow velocities greater than 5 feet per second (fps) in grass-lined berms will be lined with riprap or other approved erosion control material. Tractive forces (shear stress) acting along the terrace bed and sideslope lining shall not exceed the maximum allowable shearing resistance for the selected lining material. It is assumed that all terraces with a flow velocity less than 5 fps meet this criterion and are not anticipated to require erosion control lining material.
- Terrace berms shall convey run-off from the all modeled storm events without overtopping.

Letdown Pipes

- Letdown pipes consist of one (1) 24-inch high-density polyethylene pipe. At each terrace berm intersection, the letdown pipe is equipped with three (3) 24-inch inlets to collect stormwater into the single, 24-inch letdown pipe. This inlet structure allows for the terrace berm to flow into the downchute pipe without having a localized depression at the inlet.
- A Manning's coefficient of 0.013 was modeled in HydroCAD to represent corrugated polyethylene pipe with smooth interior. See Table A.6-2 for specific channel slopes of each letdown pipe.
- Letdown pipes shall convey run-off from the modeled storm events without overtopping or backing up.

Perimeter Ditches

- Perimeter ditch segments are constructed and lined with cable concrete channel lining. Each perimeter ditch has varying depths, sideslopes, bottom widths, and channel slopes. See Table A.6-3 for these parameters associated with each perimeter ditch segment.
- A Manning's coefficient of 0.013 was modeled in HydroCAD to represent concrete channel lining.

Culverts

- Two (2) total culvert locations are used to convey stormwater from the Landfill and have all been constructed.
- Multiple culverts are located at culvert locations C-1 and C-2. The maximum allowable discharge of each culvert is multiplied by the number of culverts when determining its ability to convey each storm event.
- Each culvert location consists of varying pipe diameters and slopes. See Table A.6-4 for these parameters associated with each perimeter ditch segment.
- A Manning's coefficient of 0.012 was modeled in HydroCAD to represent concrete pipes.
- A Manning's coefficient of 0.025 was modeled in HydroCAD to represent corrugated metal pipes.

<u>Calculations and Results</u>

The model results and sizing analysis of the stormwater conveyance features serving the Landfill are provided in the following attached tables:

- A.6-1 – Terrace Berm Design Summary
- A.6-2 – Letdown Pipe Design Summary
- A.6-3 – Perimeter Ditch Design Summary
- A.6-4 – Culvert Design Summary

The following key points are noted:

- All features will convey the stormwater associated with the 10-year and 100-year, 24-hour storm without overtopping, including:
    - Terrace Berms;
    - Letdown Pipes;
    - Perimeter Ditches; and
    - Culverts.
- All grass-lined terrace berms are able to convey the 25-year, 24-hour storm with flow velocities less than 5 fps.
- Outlet protection is or will be provided at the interface between all letdown pipes to perimeter ditch segments, and culvert outlet areas. Outlet protection will consist of riprap or other approved erosion control lining material placed at the outlet location to reduce exit flow velocities and to minimize erosion and scour due to flow velocities exceeding 5 fps.

Table A.6-1
Terrace Berm Design Summary

Terrace Berm Identifier	Design Parameters				Model Results				
	Left Sideslope	Right Sideslope	Slope	Depth	25-Year Storm Peak Velocity	Peak Depth	Design Depth > Peak Depth?	Flow Rate < 5 fps?	Erosion Control Anticipated to be Required?
	(H:1V)	(H:1V)	(ft/ft)	(ft)	(ft/sec)	(ft)	YES/NO	YES/NO	YES/NO
TB-A1	28	1	0.0101	2.00	0.91	0.16	YES	YES	NO
TB-A2	28	1	0.008	2.00	0.73	0.13	YES	YES	NO
TB-A3	10	3	0.019	1.20	1.51	0.21	YES	YES	NO
TB-A4	10	3	0.017	1.20	1.43	0.21	YES	YES	NO
TB-A5	2	3	0.039	2.00	3.49	0.58	YES	YES	NO
TB-A6	10	3	0.023	1.20	1.32	0.15	YES	YES	NO
TB-A7	10	3	0.018	1.20	1.23	0.17	YES	YES	NO
TB-A8	10	3	0.013	1.20	1.22	0.20	YES	YES	NO
TB-A9	10	3	0.016	1.20	1.48	0.24	YES	YES	NO
TB-B1	28	1	0.008	2.00	0.73	0.14	YES	YES	NO
TB-B2	28	1	0.009	2.00	0.90	0.17	YES	YES	NO
TB-B3	28	1	0.006	2.00	0.98	0.25	YES	YES	NO
TB-B4	28	1	0.013	2.00	1.04	0.16	YES	YES	NO
TB-B5	10	3	0.017	1.20	1.90	0.33	YES	YES	NO
TB-B6	10	3	0.020	1.20	0.76	0.07	YES	YES	NO
TB-B7	2	3	0.035	2.00	3.41	0.61	YES	YES	NO
TB-B8	10	3	0.020	1.20	1.06	0.12	YES	YES	NO
TB-B9	10	3	0.017	1.20	1.29	0.18	YES	YES	NO
TB-B10	10	3	0.001	1.20	0.31	0.17	YES	YES	NO
TB-B11	10	3	0.014	1.20	1.33	0.23	YES	YES	NO
TB-B12	10	3	0.010	1.20	0.95	0.17	YES	YES	NO
TB-B13	10	3	0.014	1.20	1.34	0.23	YES	YES	NO
TB-B14	10	3	0.013	1.20	1.20	0.20	YES	YES	NO
TB-C1	10	3	0.008	1.20	0.89	0.19	YES	YES	NO
TB-C2	10	3	0.011	1.20	0.60	0.08	YES	YES	NO
TB-C3	10	3	0.012	1.20	1.19	0.20	YES	YES	NO
TB-C4	10	3	0.011	1.20	1.01	0.18	YES	YES	NO
TB-C5	10	3	0.010	1.20	1.06	0.21	YES	YES	NO
TB-C6	10	3	0.010	1.20	1.00	0.18	YES	YES	NO
TB-C7	10	3	0.010	1.20	1.08	0.20	YES	YES	NO
TB-C8	10	3	0.009	1.20	0.94	0.18	YES	YES	NO

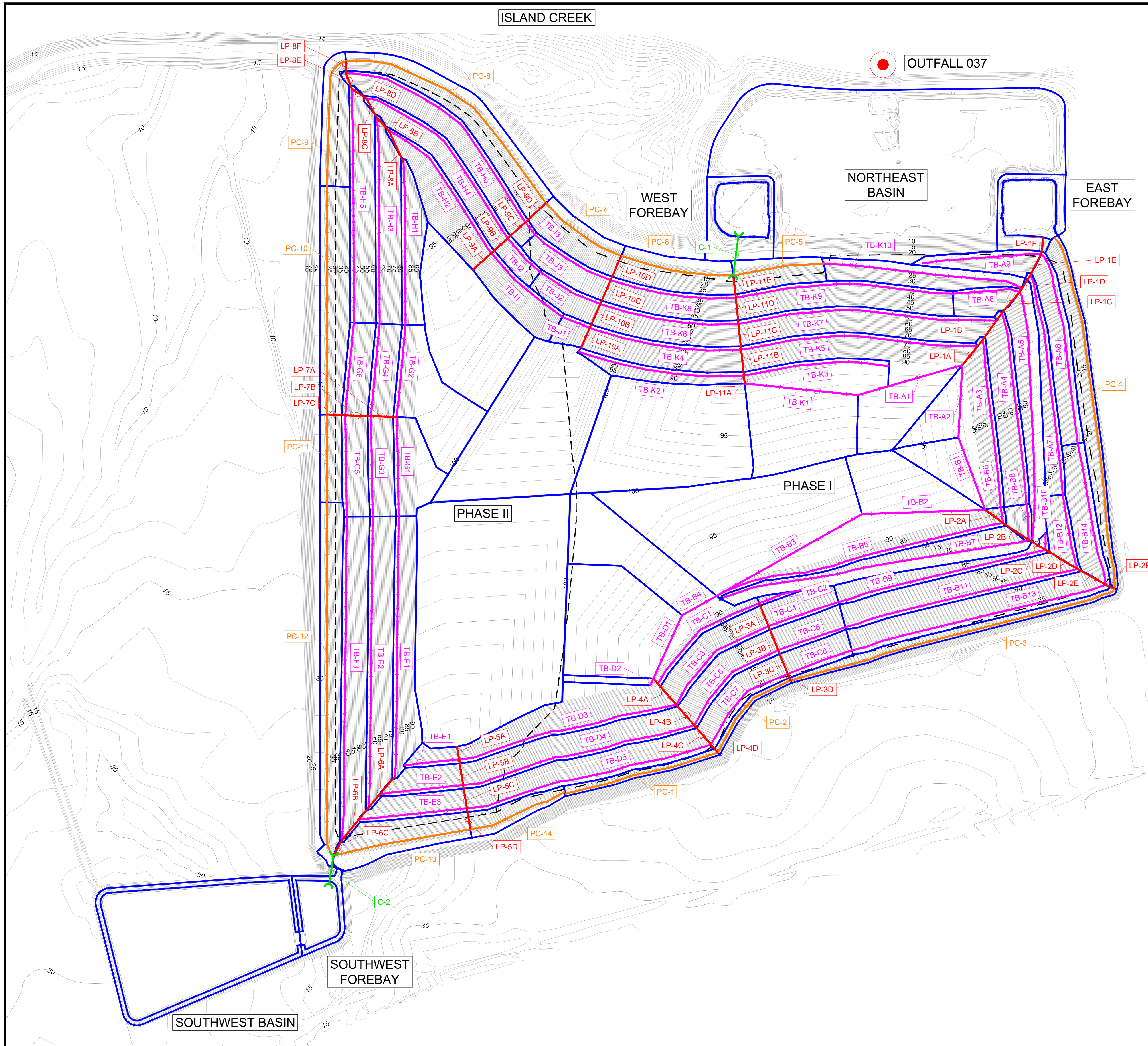
Table A.6-1 Terrace Berm Design Summary									
Terrace Berm Identifier	Design Parameters				Model Results				
	Left Sideslope	Right Sideslope	Slope	Depth	25-Year Storm Peak Velocity	Peak Depth	Design Depth > Peak Depth?	Flow Rate < 5 fps?	Erosion Control Anticipated to be Required?
	(H:1V)	(H:1V)	(ft/ft)	(ft)	(ft/sec)	(ft)	YES/NO	YES/NO	YES/NO
TB-D1	28	1	0.000	2.00	0.31	0.33	YES	YES	NO
TB-D2	28	1	0.006	2.00	0.49	0.09	YES	YES	NO
TB-D3	10	3	0.016	1.20	1.40	0.22	YES	YES	NO
TB-D4	10	3	0.016	1.20	1.42	0.23	YES	YES	NO
TB-D5	10	3	0.015	1.20	1.40	0.23	YES	YES	NO
TB-E1	28	1	0.014	2.00	0.76	0.10	YES	YES	NO
TB-E2	28	1	0.017	2.00	0.96	0.12	YES	YES	NO
TB-E3	28	1	0.015	2.00	0.94	0.13	YES	YES	NO
TB-F1	28	1	0.014	2.00	1.05	0.15	YES	YES	NO
TB-F2	28	1	0.015	2.00	1.14	0.16	YES	YES	NO
TB-F3	28	1	0.016	2.00	1.18	0.16	YES	YES	NO
TB-G1	28	1	0.015	2.00	1.01	0.14	YES	YES	NO
TB-G2	28	1	0.014	2.00	1.15	0.18	YES	YES	NO
TB-G3	28	1	0.015	2.00	0.99	0.13	YES	YES	NO
TB-G4	28	1	0.014	2.00	0.95	0.13	YES	YES	NO
TB-G5	28	1	0.015	2.00	0.99	0.14	YES	YES	NO
TB-G6	28	1	0.014	2.00	0.95	0.13	YES	YES	NO
TB-H1	28	1	0.015	2.00	0.96	0.13	YES	YES	NO
TB-H2	28	1	0.020	2.00	1.23	0.15	YES	YES	NO
TB-H3	28	1	0.019	2.00	1.18	0.15	YES	YES	NO
TB-H4	28	1	0.018	2.00	1.11	0.14	YES	YES	NO
TB-H5	28	1	0.018	2.00	1.19	0.15	YES	YES	NO
TB-H6	28	1	0.018	2.00	1.16	0.15	YES	YES	NO
TB-I1	28	1	0.016	2.00	1.06	0.15	YES	YES	NO
TB-I2	28	1	0.003	2.00	0.43	0.13	YES	YES	NO
TB-I3	28	1	0.024	2.00	0.79	0.07	YES	YES	NO
TB-J1	28	1	0.014	2.00	0.79	0.10	YES	YES	NO
TB-J2	28	1	0.011	2.00	0.81	0.13	YES	YES	NO
TB-J3	28	1	0.014	2.00	0.94	0.13	YES	YES	NO
TB-K1	28	1	0.010	2.00	1.04	0.20	YES	YES	NO
TB-K2	10	3	0.016	1.20	1.12	0.16	YES	YES	NO
TB-K3	10	3	0.016	1.20	1.30	0.19	YES	YES	NO
TB-K4	10	3	0.014	1.20	1.30	0.21	YES	YES	NO
TB-K5	2	3	0.016	2.00	1.59	0.36	YES	YES	NO
TB-K6	10	3	0.016	1.20	1.36	0.21	YES	YES	NO
TB-K7	10	3	0.016	1.20	1.42	0.23	YES	YES	NO
TB-K8	10	3	0.014	1.20	1.27	0.20	YES	YES	NO
TB-K9	10	3	0.013	1.20	1.30	0.23	YES	YES	NO
TB-K10	2	3	0.031	2.00	2.77	0.48	YES	YES	NO

Table A.6-2 Letdown Pipe Design Summary					
Letdown Pipe Identifier	Design Parameters		Model Results		
	Slope (ft/ft)	Diameter (ft)	25-Year Storm Peak Velocity (ft/sec)	Peak Depth (ft)	Design Depth > Peak Depth? YES/NO
LP-1A	0.2386	2	8.9	0.10	YES
LP-1B	0.2152	2	10.0	0.13	YES
LP-1C	0.2497	2	11.7	0.14	YES
LP-1D	0.0186	2	6.3	0.43	YES
LP-1E	0.1629	2	13.5	0.25	YES
LP-1F	0.2823	2	17.1	0.24	YES
LP-2A	0.2186	2	8.9	0.1	YES
LP-2B	0.2175	2	12.1	0.17	YES
LP-2C	0.0375	2	8.1	0.37	YES
LP-2D	0.1782	2	14.1	0.25	YES
LP-2E	0.2073	2	15.2	0.25	YES
LP-2F	0.1426	2	13.6	0.29	YES
LP-3A	0.2832	2	7.2	0.06	YES
LP-3B	0.2698	2	9.9	0.1	YES
LP-3C	0.2465	2	11.3	0.14	YES
LP-3D	0.0622	2	7.7	0.22	YES
LP-4A	0.2424	2	8.9	0.1	YES
LP-4B	0.2710	2	10.5	0.11	YES
LP-4C	0.2465	2	10.9	0.13	YES
LP-4D	0.0706	2	7.6	0.2	YES
LP-5A	0.3331	2	14.7	0.16	YES
LP-5B	0.2723	2	13.8	0.17	YES
LP-5C	0.2654	2	13.8	0.18	YES
LP-5D	0.2340	2	13.4	0.19	YES

Table A.6-2 Letdown Pipe Design Summary					
Letdown Pipe Identifier	Design Parameters		Model Results		
	Slope	Diameter	25-Year Storm Peak Velocity	Peak Depth	Design Depth > Peak Depth?
	(ft/ft)	(ft)	(ft/sec)	(ft)	YES/NO
LP-6A	0.1909	2	7.3	0.09	YES
LP-6B	0.1855	2	9.3	0.13	YES
LP-6C	0.1688	2	10.3	0.16	YES
LP-7A	0.2774	2	10.6	0.11	YES
LP-7B	0.2710	2	11.8	0.14	YES
LP-7C	0.2406	2	12.3	0.16	YES
LP-8A	0.1795	2	6.4	0.07	YES
LP-8B	0.1351	2	7.8	0.12	YES
LP-8C	0.1483	2	9.2	0.15	YES
LP-8D	0.2292	2	11.6	0.15	YES
LP-8E	0.2203	2	12.4	0.18	YES
LP-8F	0.1298	2	10.9	0.22	YES
LP-9A	0.3254	2	11.5	0.12	YES
LP-9B	0.2394	2	11.3	0.14	YES
LP-9C	0.2937	2	12.4	0.14	YES
LP-9D	0.2626	2	12.0	0.14	YES
LP-10A	0.2729	2	11.7	0.14	YES
LP-10B	0.2690	2	11.8	0.14	YES
LP-10C	0.2742	2	12.1	0.14	YES
LP-10D	0.3047	2	13.1	0.15	YES
LP-11A	0.1951	2	11.8	0.18	YES
LP-11B	0.2714	2	14.2	0.18	YES
LP-11C	0.2663	2	15.4	0.21	YES
LP-11D	0.2523	2	16.1	0.24	YES
LP-11E	0.3240	2	18.4	0.24	YES

Table A.6-3 Perimeter Ditch Design Summary										
Ditch Name	Design Parameters							Model Results		
	Left Sideslope	Right Sideslope	Slope	Depth	Base Width	Manning's Coefficient	Lining Material	25-Year Storm Peak Velocity	Peak Depth	Design Depth > Peak Depth?
	(H:1V)	(H:1V)	(ft/ft)	(ft)	(ft)	(n)	-	(ft/sec)	(ft)	YES/NO
PC-1	1	1	0.0146	1.0	8	0.013	Concrete	1.15	0.02	YES
PC-2	1	1	0.0080	1.0	8	0.013	Concrete	2.49	0.12	YES
PC-3	1	1	0.0113	1.0	8	0.013	Concrete	3.85	0.19	YES
PC-4	2	3	0.0099	2.0	6	0.013	Concrete	3.94	0.22	YES
PC-5	2	3	0.0201	2.0	2	0.013	Concrete	4.68	0.19	YES
PC-6	2	3	0.0064	2.0	6	0.013	Concrete	3.75	0.30	YES
PC-7	2	3	0.0041	2.0	4	0.013	Concrete	3.29	0.37	YES
PC-8	2	3	0.0057	2.0	2	0.013	Concrete	3.84	0.41	YES
PC-9	2	3	0.0028	2.0	2	0.013	Concrete	2.64	0.39	YES
PC-10	2	3	0.0148	2.0	2	0.013	Concrete	4.27	0.21	YES
PC-11	2	3	0.0160	2.0	2	0.013	Concrete	2.86	0.10	YES
PC-12	2	3	0.0104	2.0	2	0.013	Concrete	3.83	0.24	YES
PC-13	2	3	0.0160	2.0	2	0.013	Concrete	4.40	0.21	YES
PC-14	2	3	0.0214	2.0	2	0.013	Concrete	3.10	0.09	YES

Table A.6-4 Culvert Design Summary							
Culvert Location Identifier	Design Parameters				Model Results		
	Diameter (in)	Slope (%)	Pipe Material	Number of Culverts at Location	25-Year Storm Peak Velocity (ft/sec)	Peak Depth (in)	Design Diameter > Peak Depth? YES/NO
C-1	24	0.30	Corrugated Metal Pipe	2	6.75	13.32	YES
C-2	30	9.85	Concrete Pipe	2	12.56	3.48	YES



LEGEND

— — — — — —	APPROXIMATE PHASE I PERMITTED WASTE BOUNDARY
– – – – – – – –	APPROXIMATE PHASE II PERMITTED WASTE BOUNDARY
10	EXISTING CONTOUR OUTSIDE LANDFILL FOOTPRINT
90	EXISTING/PROPOSED CONTOUR WITHIN LANDFILL FOOTPRINT
	OUTFALL LOCATION
	SUBCATCHMENT AREA BOUNDARY
	EXISTING CULVERT LOCATION
	TERRACE BERM LOCATION
	LETDOWN PIPE LOCATION
	PERIMETER DITCH LOCATION

NOTES

1. EXISTING TOPOGRAPHY OF THE SURFACE WATER SEDIMENT CONTROL BASIN IS FROM FILE "09-034 topo.dwg," PREPARED BY SOULE AND ASSOCIATES, P.C., DATED MARCH 2009. ALL OTHER EXISTING TOPOGRAPHY PROVIDED BY WENCK ASSOCIATES, INC., 1800 PIONEER CREEK CENTER, MAPLE PLAIN MN. 55359. DATE OF AERIAL PHOTOGRAPHY: JANUARY 9, 2003.

PROJECT NO. 25221174	DRAWN BY: SJL	ENGINEER	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT	nrg	SITE	INDIAN RIVER LANDFILL DAGSBORO, DELAWARE	FIGURE A.6-1 STORMWATER CONVEYANCE FEATURES
DRAWN: 07/21/21	CHECKED BY: RDS							FIGURE
REVISED: ??/??/??	APPROVED BY:							4 OF 4

Appendix A.7

Detention Basin Sizing

Problem Statement

Determine whether the detention basins are designed to convey the 25-year, 24-hour storm event without causing erosion or overtopping.

Given

- Elevation-area storage summaries for the Northeast and Southwest Detention Basins is provided in **Table A.7-1**.
- All other key model parameters for the Northeast and Southwest Detention Basins is provided in **Table A.7-2**.
- The Northeast Detention Basin is equipped with two (2) forebays, the West Forebay and the East Forebay. The forebays collect stormwater from the Landfill prior to discharge into the Northeast Detention Basin.
- The Southwest Detention Basin is equipped with one (1) forebay, the Southwest Forebay. The forebay collects stormwater from the Landfill prior to discharge into the Southwest Detention Basin.
- All detention basins have been modeled with two (2) discharge methods. Discharge pipes and spillway systems that are designed to manage the flow out of each detention basin have been modeled. Additionally, exfiltration through native soils has also been modeled as a discharge method. According to the Sussex County Soil Survey, the rate of infiltration for the native soils is 5.95 in/hr. In accordance with the Sussex Conservation District guidelines, a rate of one-half the posted rate was used for design purposes; therefore, the modeled rate was 2.97 in/hr for the detention basins. The forebay systems are <u>not</u> modeled with this exfiltration parameter.

Calculations

HydroCAD was used to model the peak storage volume of both basins. The storage volume considers both the inflow, elevation-storage relationships of the basin, and outflow from the basin discharges including exfiltration.

Storage volumes were determined by measuring the area of each elevation contour in AutoCAD Civil 3D 2020 and entering the results into HydroCAD. HydroCAD then calculates a prismatic volume such that it can recalculate a storage volume at any bounded elevation. The normal water elevation for the forebay systems was set such that any dead-storage beneath this elevation was not accounted for as storage capacity.

The model results and sizing analysis for the basins including the peak elevation and discharge rates is provided in **Table A.7-3**.

Results

Based on the peak elevation results shown in **Table A.7-3**, the basins provide sufficient volume to detain the 25-year, 24-hour storm event without overtopping or causing downstream erosion. Please refer to **Appendix A.8** for copies of the HydroCAD output files that supplement these conclusions.

TABLE A.7-1 Stormwater Basin Elevation-Storage Summary			
Elevation (ft MSL)	Surface Area (ft^2)	Incremental Storage (ft^3)	Cumulative Storage (ft^3)
Northeast Basin System			
West Forebay			
5.00	13,918	0	0
6.00	18,744	16,331	16,331
7.00	20,143	19,444	35,775
8.00	21,730	20,937	56,711
9.00	23,191	22,461	79,172
10.00	24,846	24,019	103,190
East Forebay			
5.00	16,828	0	0
6.00	19,651	18,240	18,240
7.00	21,422	20,537	38,776
8.00	23,109	22,266	61,042
9.00	24,775	23,942	84,984
10.00	28,341	26,558	111,542
Northeast Basin			
5.00	241,617	0	0
6.00	266,595	254,106	254,106
7.00	275,843	271,219	525,325
8.00	286,099	280,971	806,296
9.00	296,412	291,256	1,097,552
10.00	306,793	301,603	1,399,154
Southwest Basin System			
Southwest Forebay			
15.00	13,915	0	0
16.00	15,403	14,659	14,659
17.00	16,959	16,181	30,840
18.00	18,585	17,772	48,612
19.00	20,280	19,433	68,045
20.00	22,044	21,162	89,207
Southwest Basin			
15.00	129,810	0	0
16.00	134,325	132,068	132,068
17.00	138,901	136,613	268,681
18.00	143,540	141,221	409,901
19.00	148,240	145,890	555,791
20.00	153,002	150,621	706,412

TABLE A.7-2 Basin / Forebay Outlet Structure Summary Table			
Design Parameter		Basin / Forebay Element	Unit of Measure
	West Forebay		
Weir Spillway	Weir Elevation	7.0	ft MSL
	Weir Depth	3.0	ft
	Weir Bottom Width	36.0	ft
	Weir Sideslopes	3	H:1V
	East Forebay		
Weir Spillway	Weir Elevation	7.0	ft MSL
	Weir Depth	3.0	ft
	Weir Bottom Width	20.0	ft
	Weir Sideslopes	3	H:1V
	Northeast Basin		
Skimmer	Skimmer Elevation	5.0	ft MSL
	Approximate Full Flow	0.113	cubic feet per second
Exfiltration	Exfiltration conductivity	2.970	inches per hour
	Groundwater Elevation	4.0	ft MSL
	Southwest Forebay		
Weir Structure	Weir Elevation	17.0	ft MSL
	Weir Depth	2.0	ft
	Weir Bottom Width	36.0	ft
	Weir Sideslopes	2	H:1V
	Southwest Basin		
Weir Structure	Weir Elevation	18.0	ft MSL
	Weir Depth	2.0	ft
	Weir Bottom Width	10.0	ft
	Weir Sideslopes	3	H:1V
Exfiltration	Exfiltration conductivity	2.970	inches per hour
	Groundwater Elevation	14.0	ft MSL

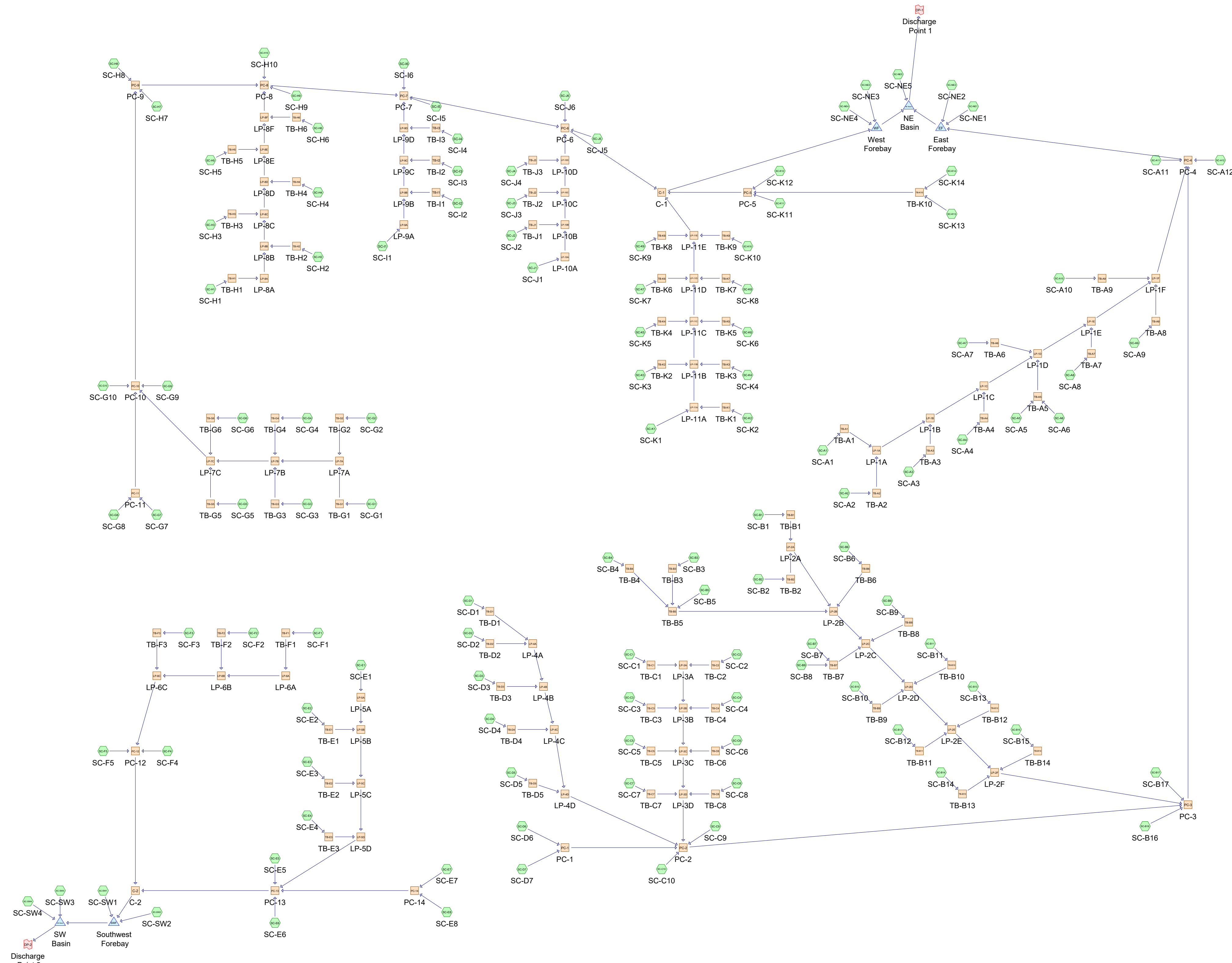
TABLE A.7-3 Basin Design Summary				
Basin / Forebay	Normal Water Level (ft MSL)	Top of Berm Elevation (ft MSL)	25-Year, 24-Hour Elevation (ft MSL)	Minimum Freeboard (ft)
West Forebay	7.00	10.00	7.22	2.78
East Forebay	7.00	10.00	7.22	2.78
Northeast Basin	5.00	10.00	5.06	4.94
Southwest Forebay	17.00	20.00	17.13	2.87
Southwest Basin	15.00	20.00	15.03	4.97

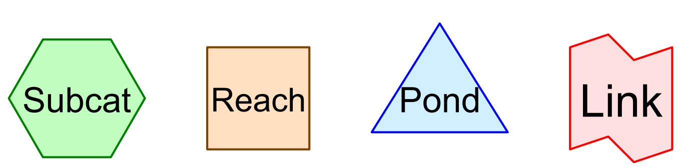
Appendix A.8

HydroCAD Output Files

HydroCAD Output Files

25-Year, 24-Hour Storm Event





Routing Diagram for Indian River Landfill Full

Prepared by SCS Engineers, Printed 7/28/2021

HydroCAD® 10.00-25 s/n 05804 © 2019 HydroCAD Software Solutions LLC

Summary for Subcatchment SC-A1: SC-A1

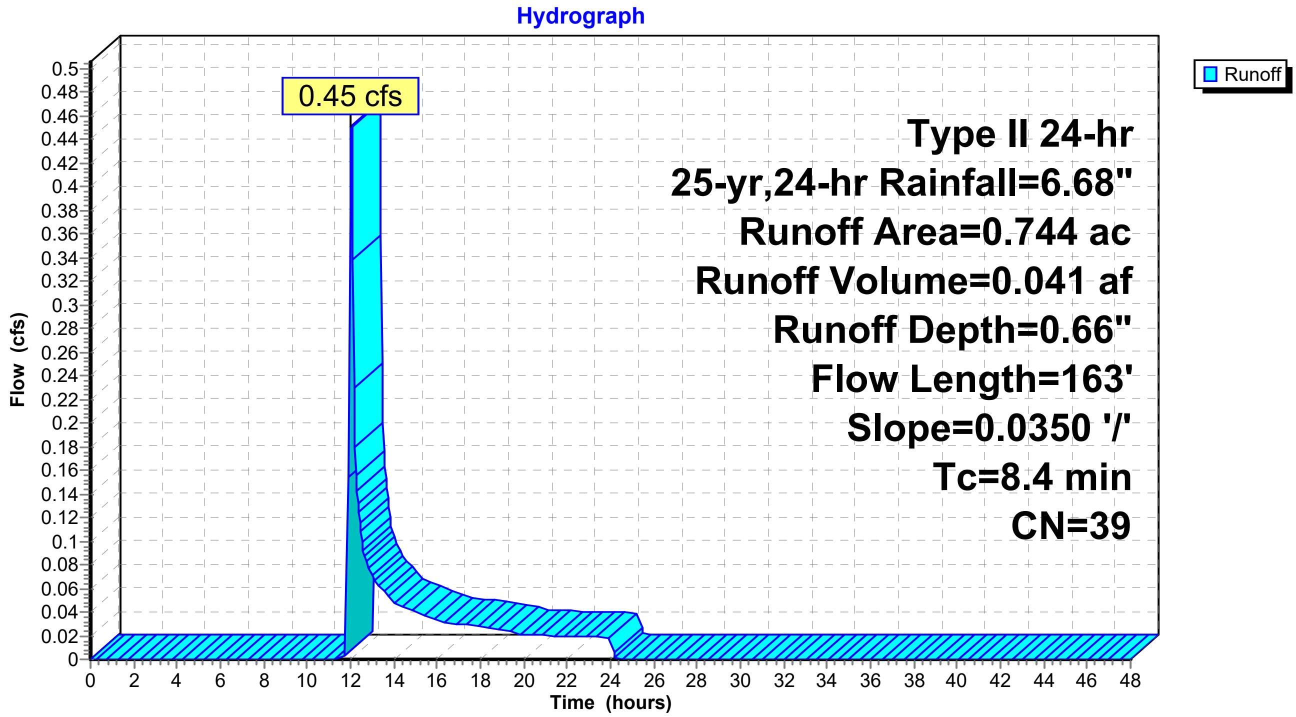
Runoff = 0.45 cfs @ 12.04 hrs, Volume= 0.041 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.744	39	>75% Grass cover, Good, HSG A
0.744		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0350	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.8	63	0.0350	1.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.4	163	Total			

Subcatchment SC-A1: SC-A1



Summary for Subcatchment SC-A10: SC-A10

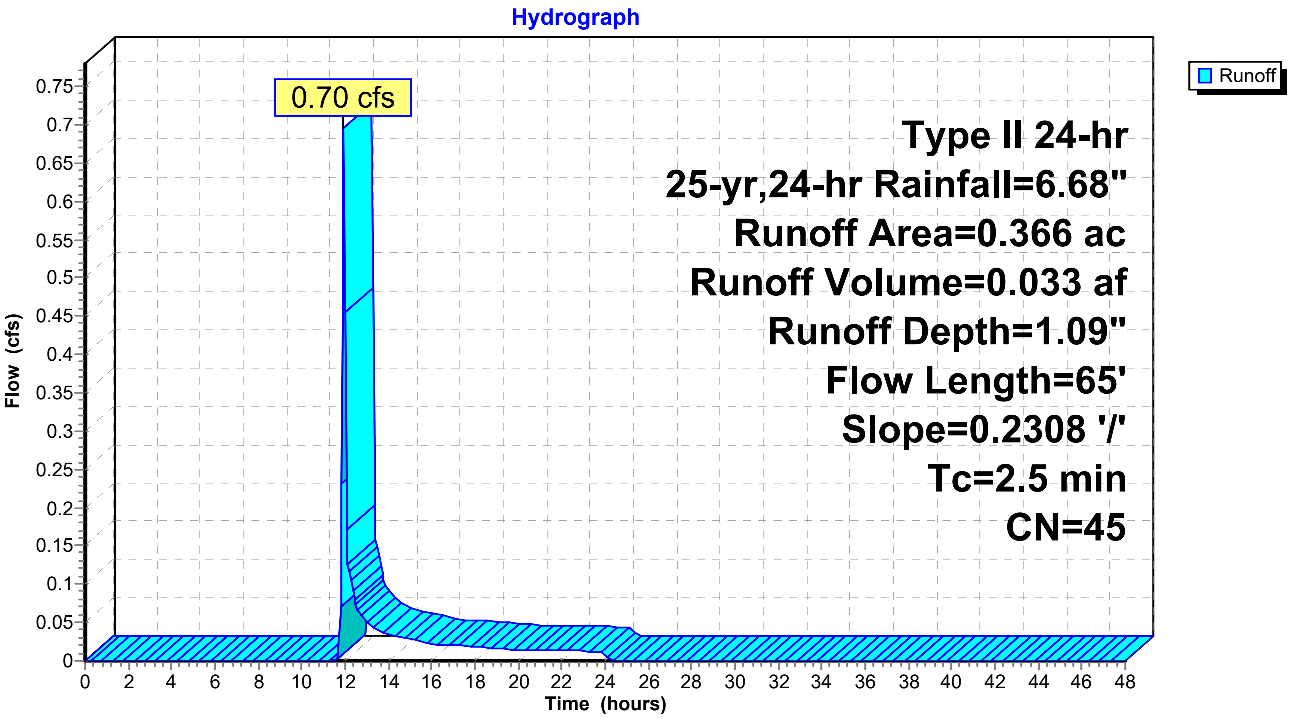
Runoff = 0.70 cfs @ 11.95 hrs, Volume= 0.033 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.309	39	>75% Grass cover, Good, HSG A
0.057	76	Gravel roads, HSG A
0.366	45	Weighted Average
0.366		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	65	0.2308	0.43		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-A10: SC-A10



Summary for Subcatchment SC-A11: SC-A11

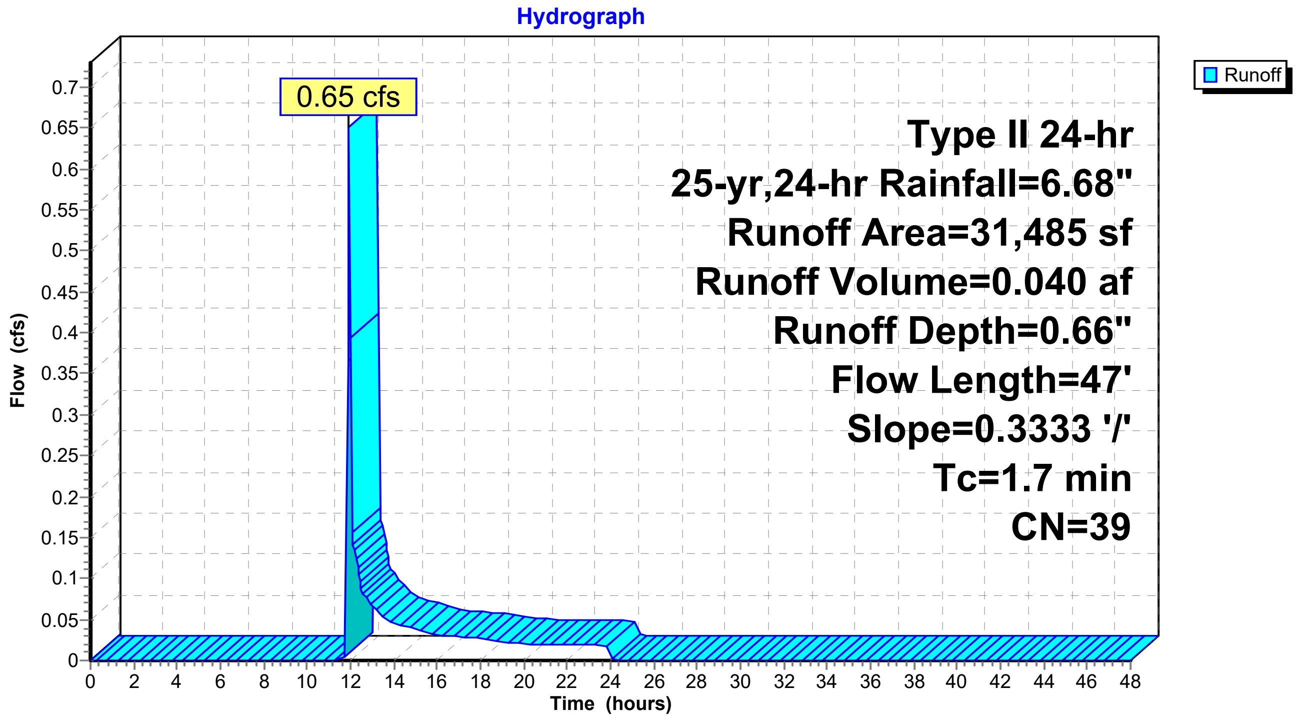
Runoff = 0.65 cfs @ 11.95 hrs, Volume= 0.040 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
31,485	39	>75% Grass cover, Good, HSG A
31,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	47	0.3333	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-A11: SC-A11



Summary for Subcatchment SC-A12: SC-A12

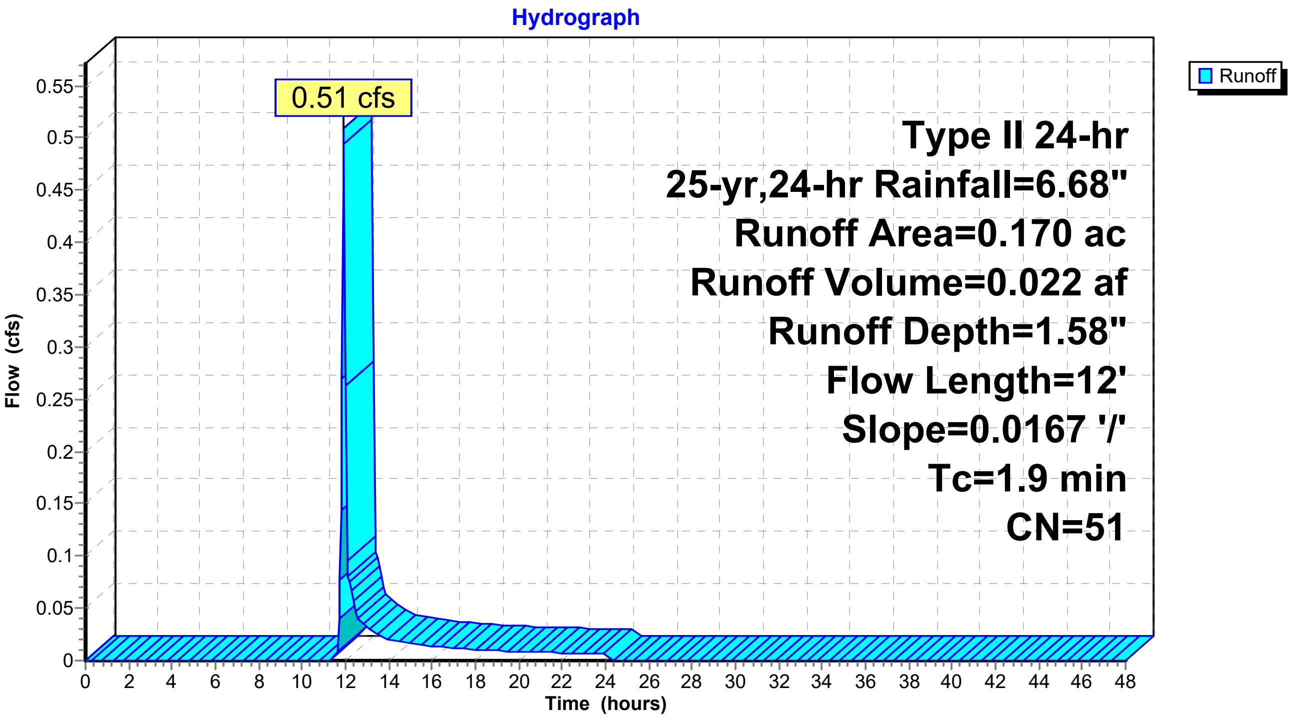
Runoff = 0.51 cfs @ 11.93 hrs, Volume= 0.022 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.116	39	>75% Grass cover, Good, HSG A
0.054	76	Gravel roads, HSG A
0.170	51	Weighted Average
0.170		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	12	0.0167	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-A12: SC-A12



Summary for Subcatchment SC-A2: SC-A2

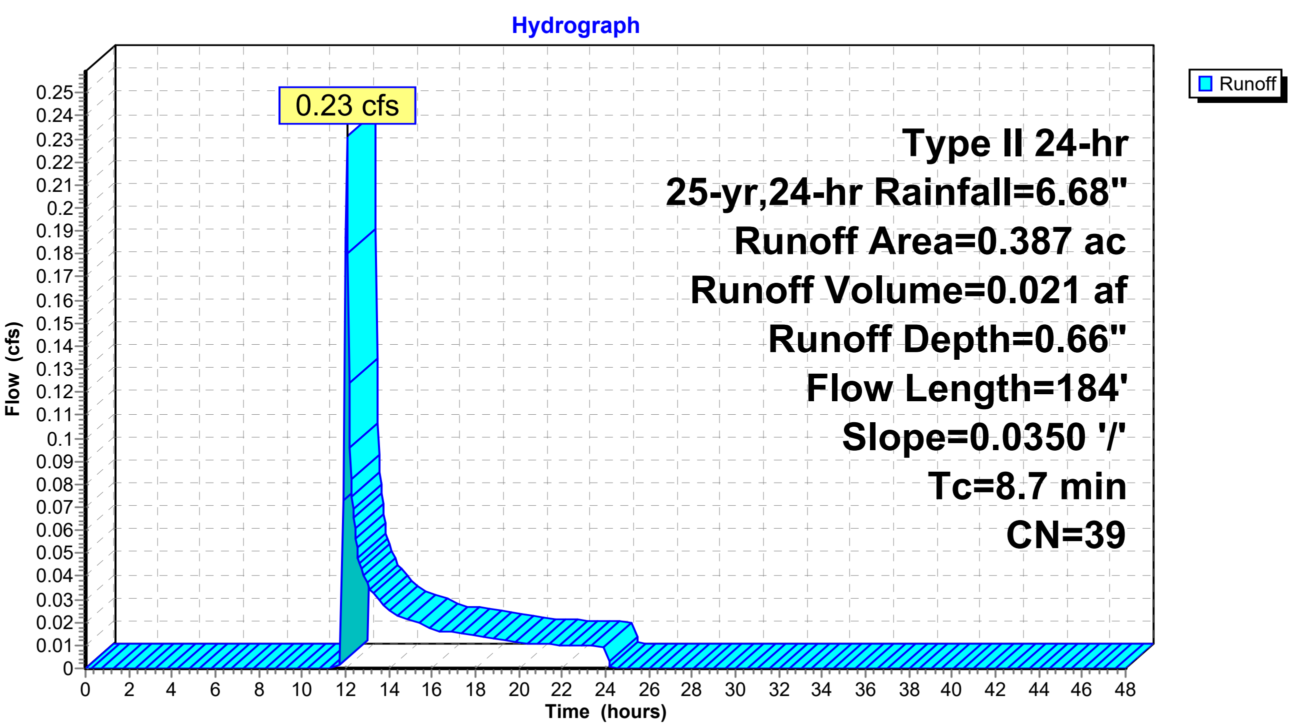
Runoff = 0.23 cfs @ 12.05 hrs, Volume= 0.021 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.387	39	>75% Grass cover, Good, HSG A
0.387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0350	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
1.1	84	0.0350	1.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.7	184	Total			

Subcatchment SC-A2: SC-A2



Summary for Subcatchment SC-A3: SC-A3

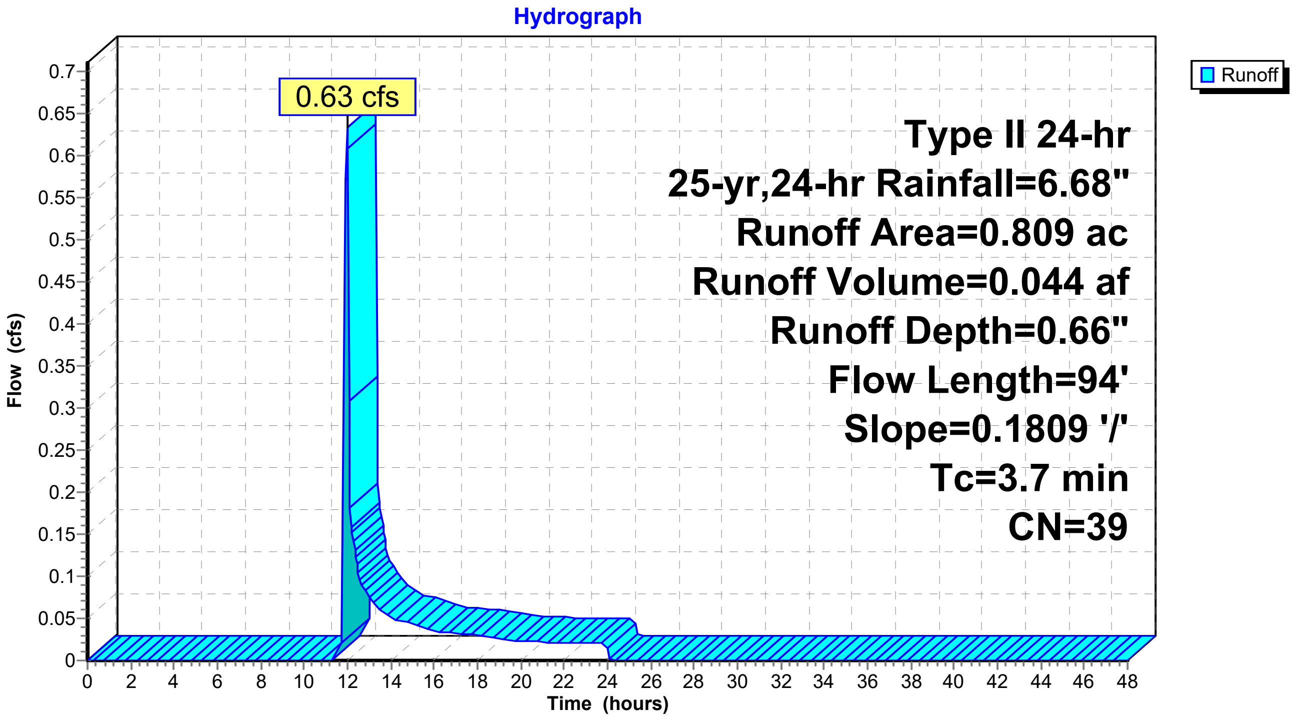
Runoff = 0.63 cfs @ 11.98 hrs, Volume= 0.044 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.809	39	>75% Grass cover, Good, HSG A
0.809		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	94	0.1809	0.42		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-A3: SC-A3



Summary for Subcatchment SC-A4: SC-A4

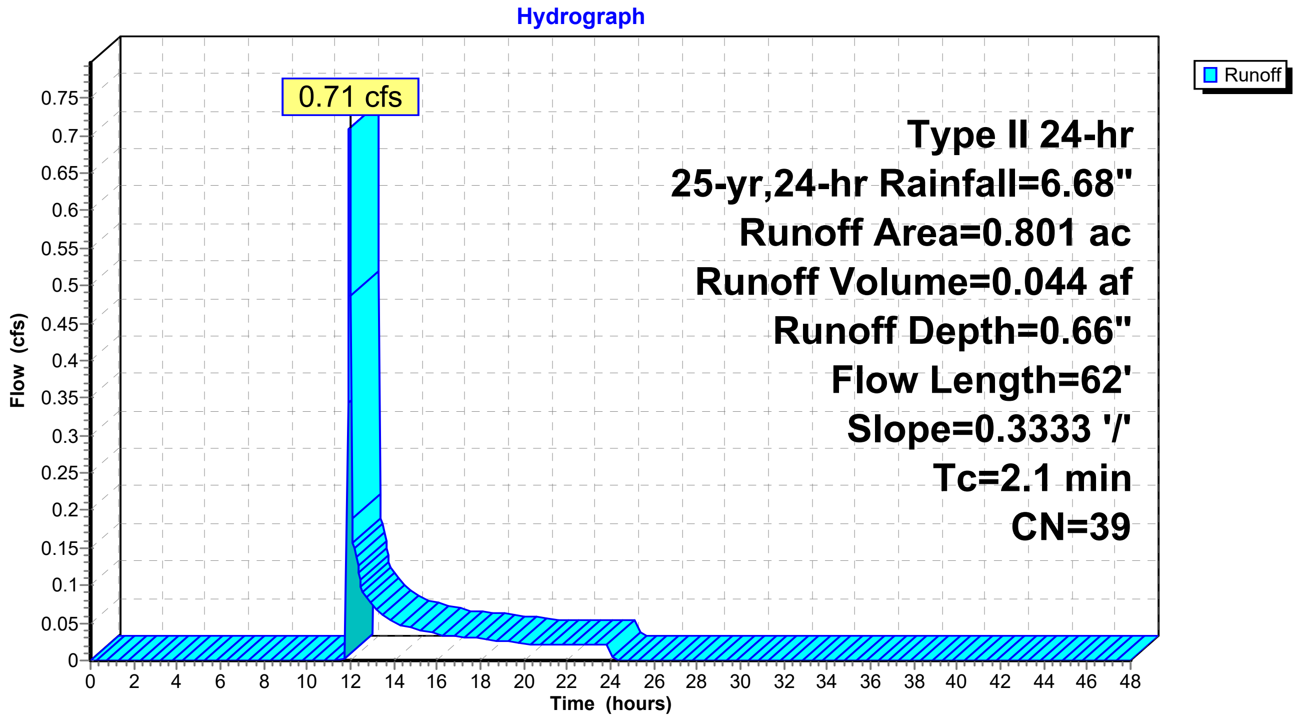
Runoff = 0.71 cfs @ 11.96 hrs, Volume= 0.044 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.801	39	>75% Grass cover, Good, HSG A
0.801		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	62	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-A4: SC-A4



Summary for Subcatchment SC-A5: SC-A5

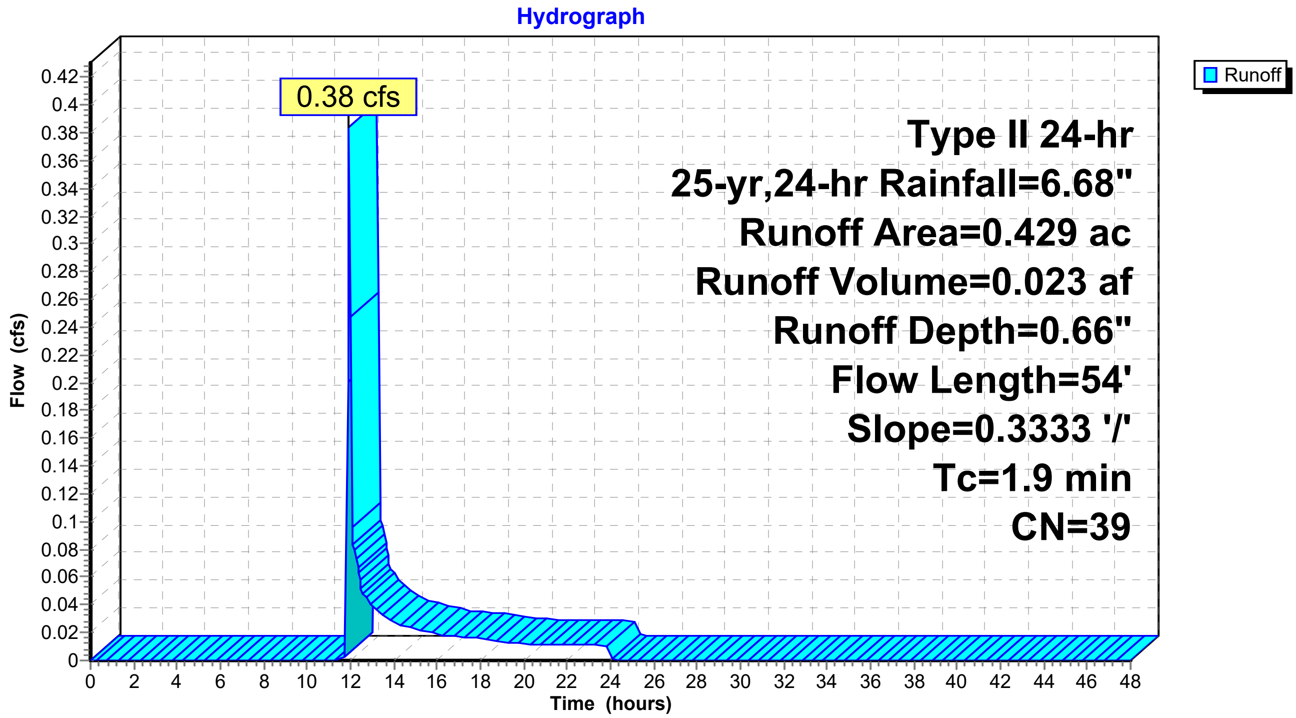
Runoff = 0.38 cfs @ 11.95 hrs, Volume= 0.023 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.429	39	>75% Grass cover, Good, HSG A
0.429		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	54	0.3333	0.48		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-A5: SC-A5



Summary for Subcatchment SC-A6: SC-A6

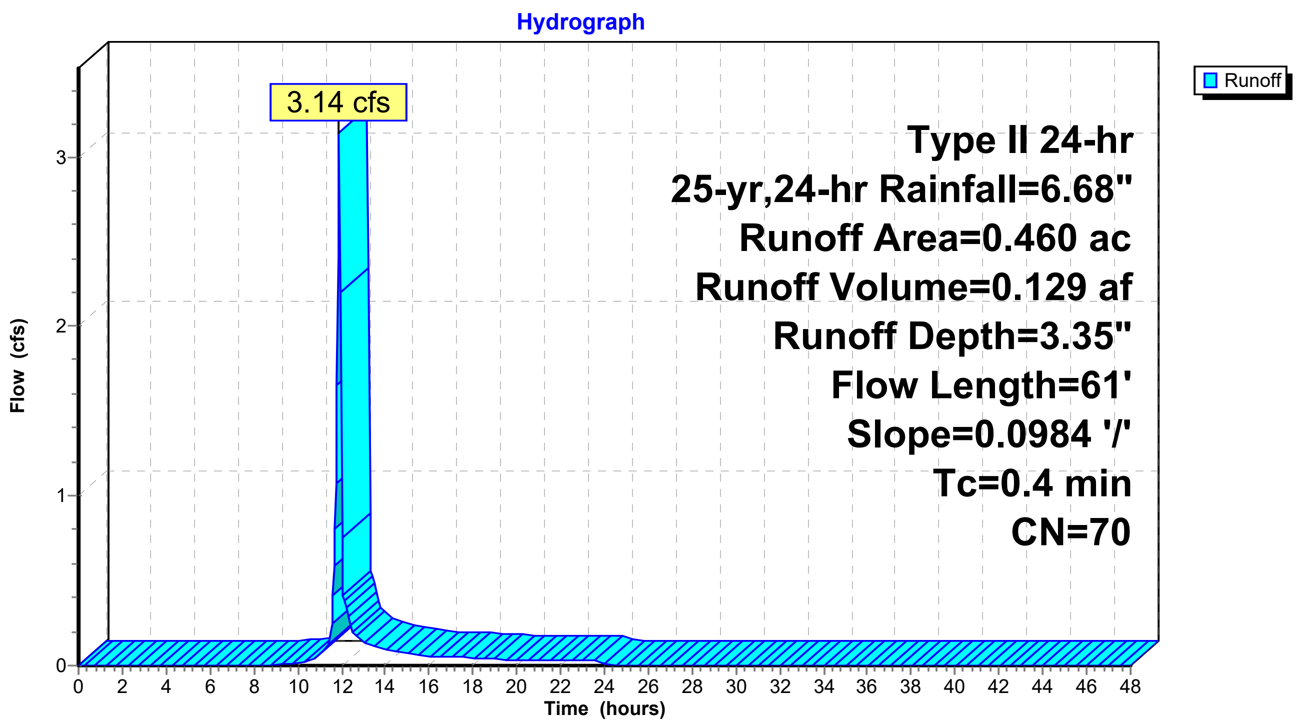
Runoff = 3.14 cfs @ 11.90 hrs, Volume= 0.129 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.070	39	>75% Grass cover, Good, HSG A
0.390	76	Gravel roads, HSG A
0.460	70	Weighted Average
0.460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	61	0.0984	2.43		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-A6: SC-A6



Summary for Subcatchment SC-A7: SC-A7

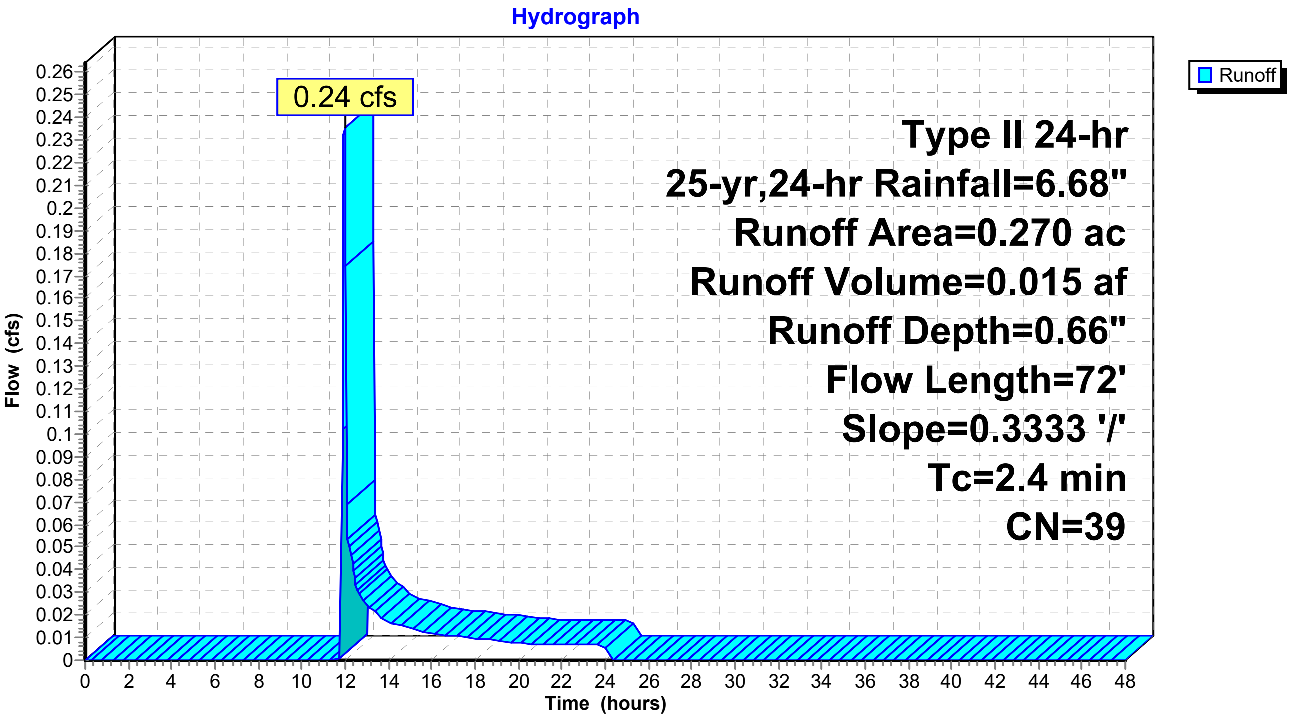
Runoff = 0.24 cfs @ 11.96 hrs, Volume= 0.015 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.270	39	>75% Grass cover, Good, HSG A
0.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	72	0.3333	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-A7: SC-A7



Summary for Subcatchment SC-A8: SC-A8

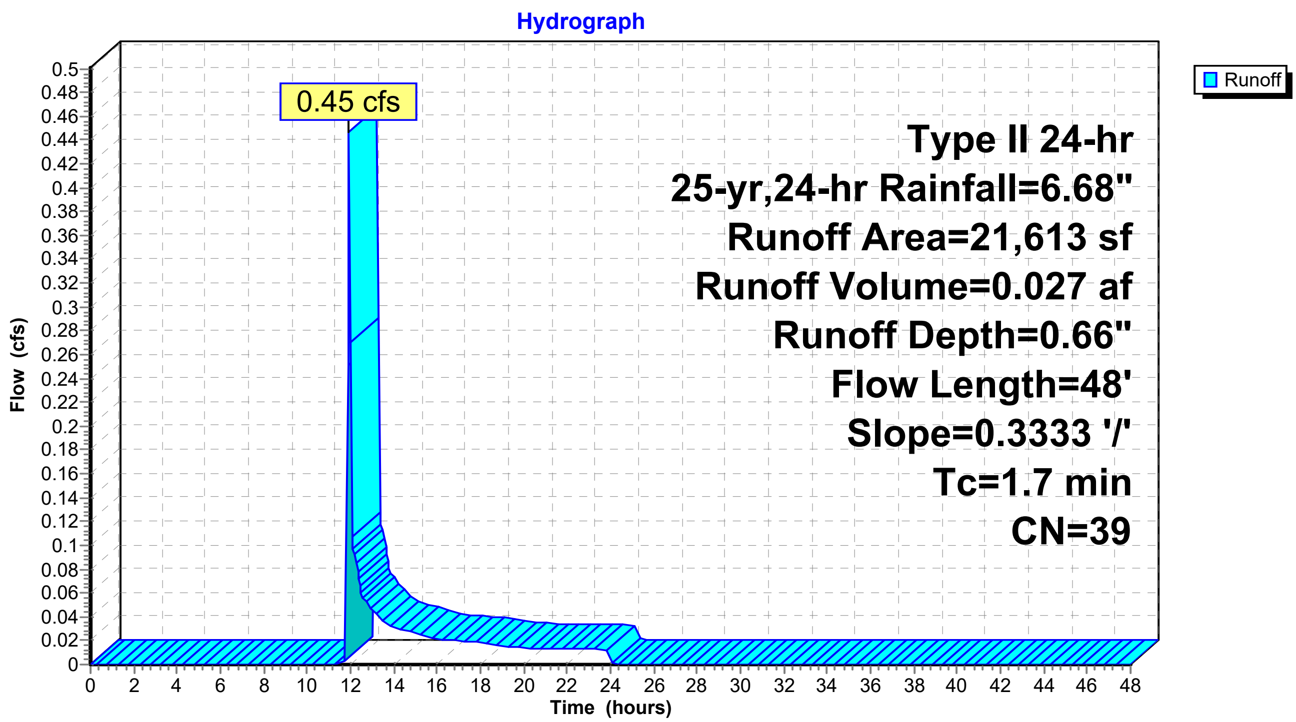
Runoff = 0.45 cfs @ 11.95 hrs, Volume= 0.027 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
21,613	39	>75% Grass cover, Good, HSG A
21,613		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	48	0.3333	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-A8: SC-A8



Summary for Subcatchment SC-A9: SC-A9

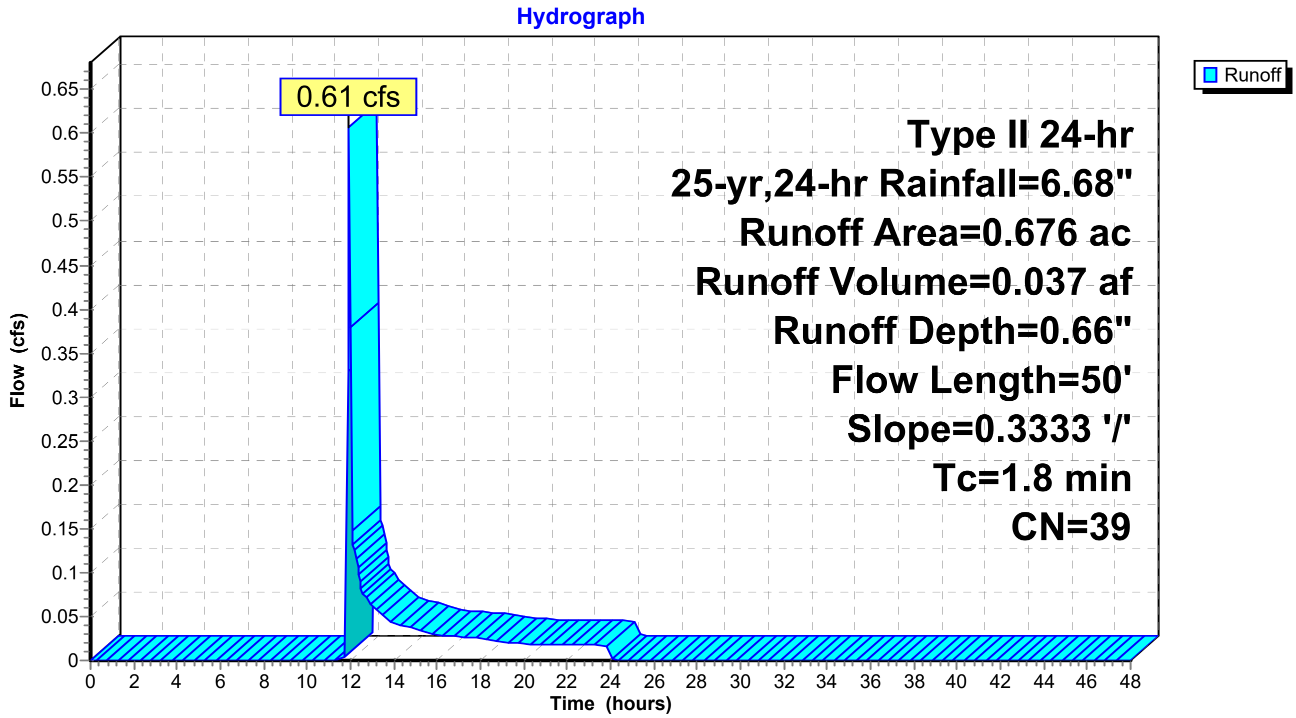
Runoff = 0.61 cfs @ 11.95 hrs, Volume= 0.037 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.676	39	>75% Grass cover, Good, HSG A
0.676		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.3333	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-A9: SC-A9



Summary for Subcatchment SC-B1: SC-B1

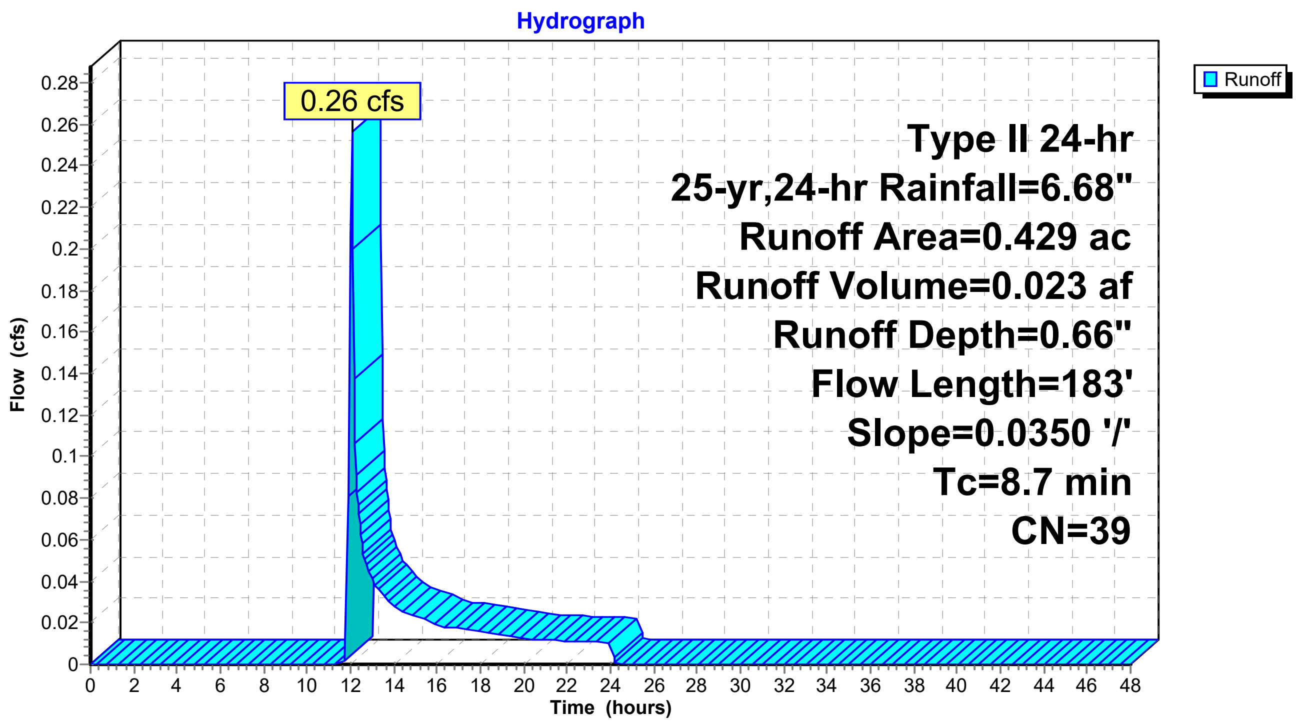
Runoff = 0.26 cfs @ 12.05 hrs, Volume= 0.023 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.429	39	>75% Grass cover, Good, HSG A
0.429		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0350	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
1.1	83	0.0350	1.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.7	183	Total			

Subcatchment SC-B1: SC-B1



Summary for Subcatchment SC-B10: SC-B10

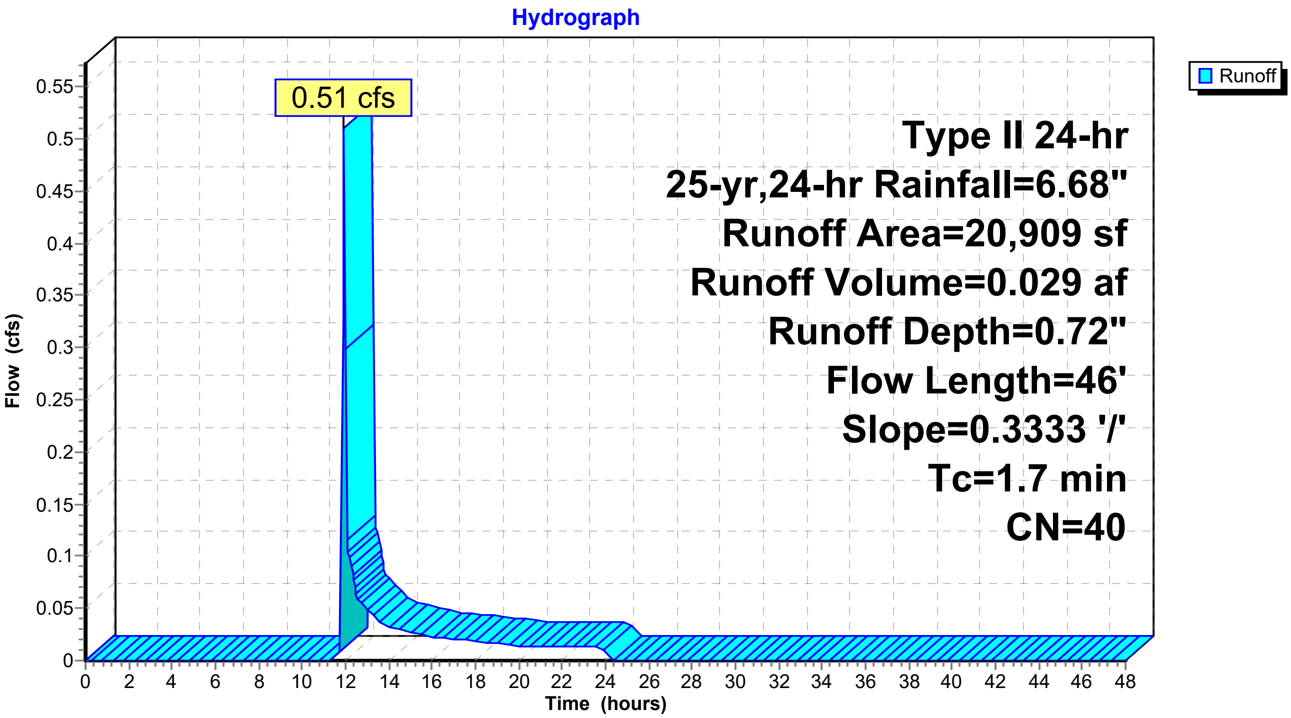
Runoff = 0.51 cfs @ 11.95 hrs, Volume= 0.029 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
20,213	39	>75% Grass cover, Good, HSG A
696	76	Gravel roads, HSG A
20,909	40	Weighted Average
20,909		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	46	0.3333	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B10: SC-B10



Summary for Subcatchment SC-B11: SC-B11

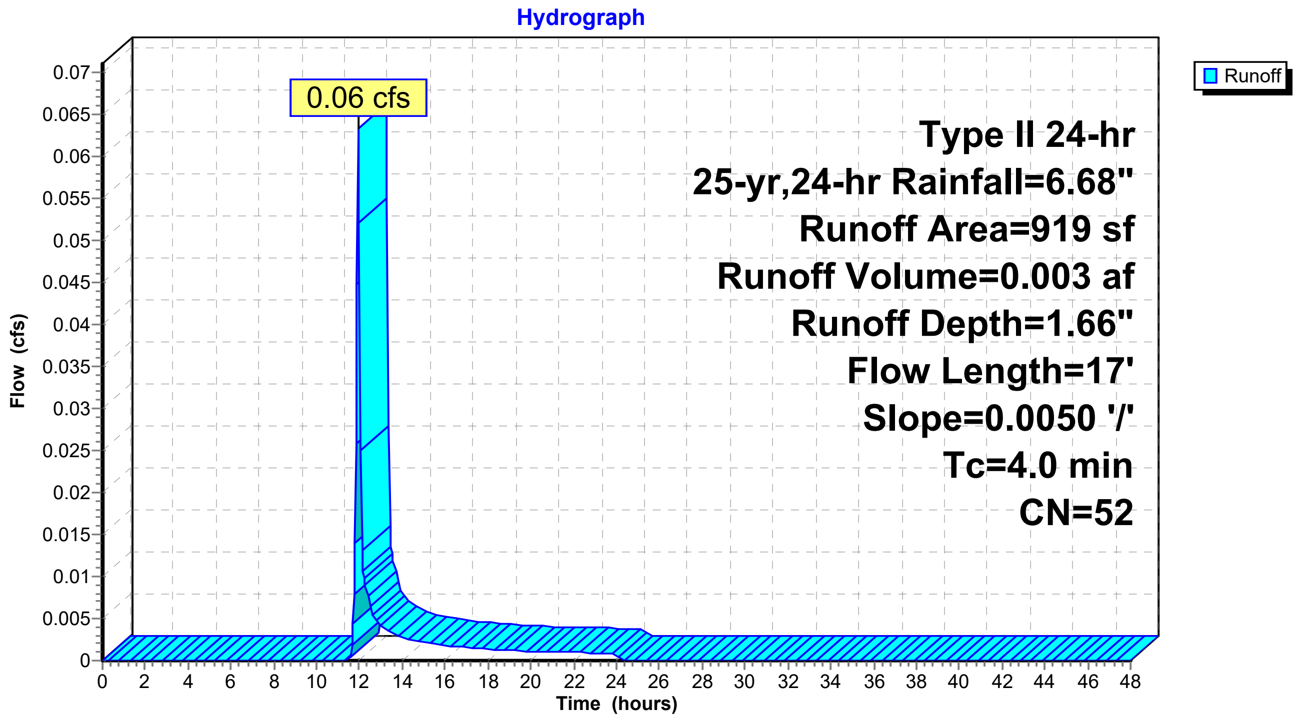
Runoff = 0.06 cfs @ 11.96 hrs, Volume= 0.003 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
588	39	>75% Grass cover, Good, HSG A
331	76	Gravel roads, HSG A
919	52	Weighted Average
919		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	17	0.0050	0.07		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B11: SC-B11



Summary for Subcatchment SC-B12: SC-B12

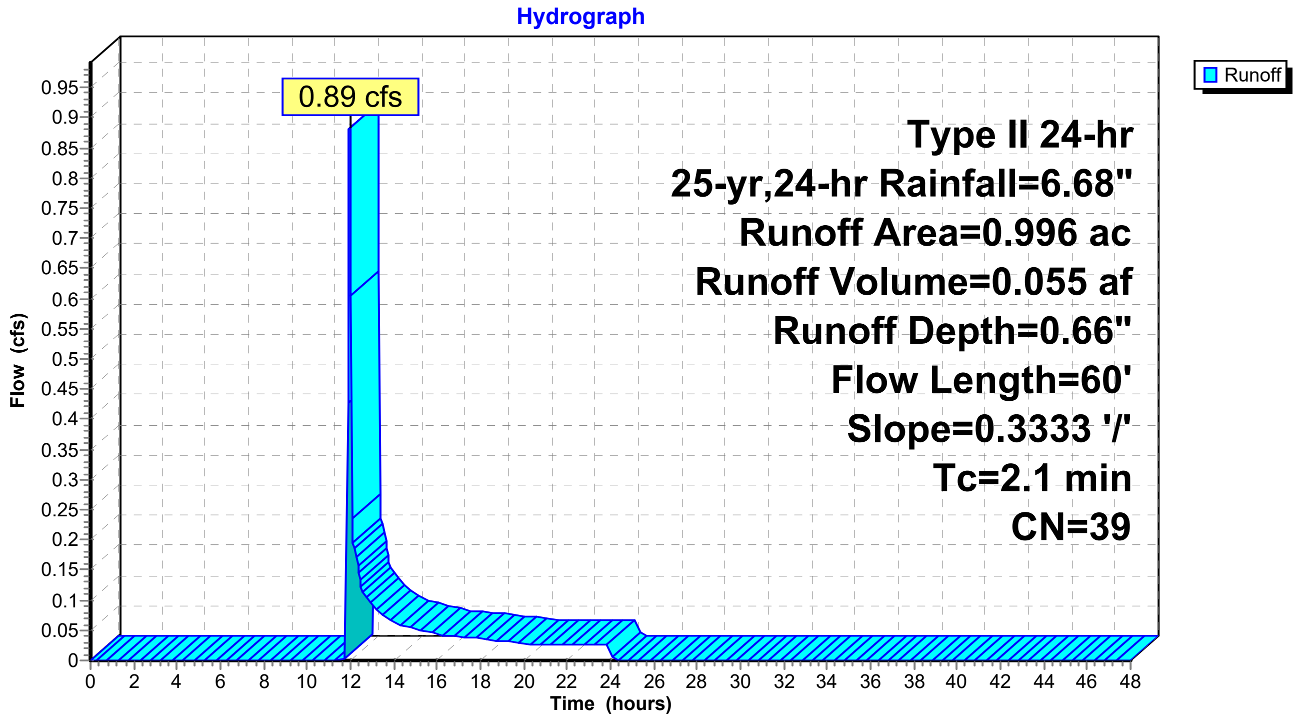
Runoff = 0.89 cfs @ 11.96 hrs, Volume= 0.055 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.996	39	>75% Grass cover, Good, HSG A
0.996		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	60	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B12: SC-B12



Summary for Subcatchment SC-B13: SC-B13

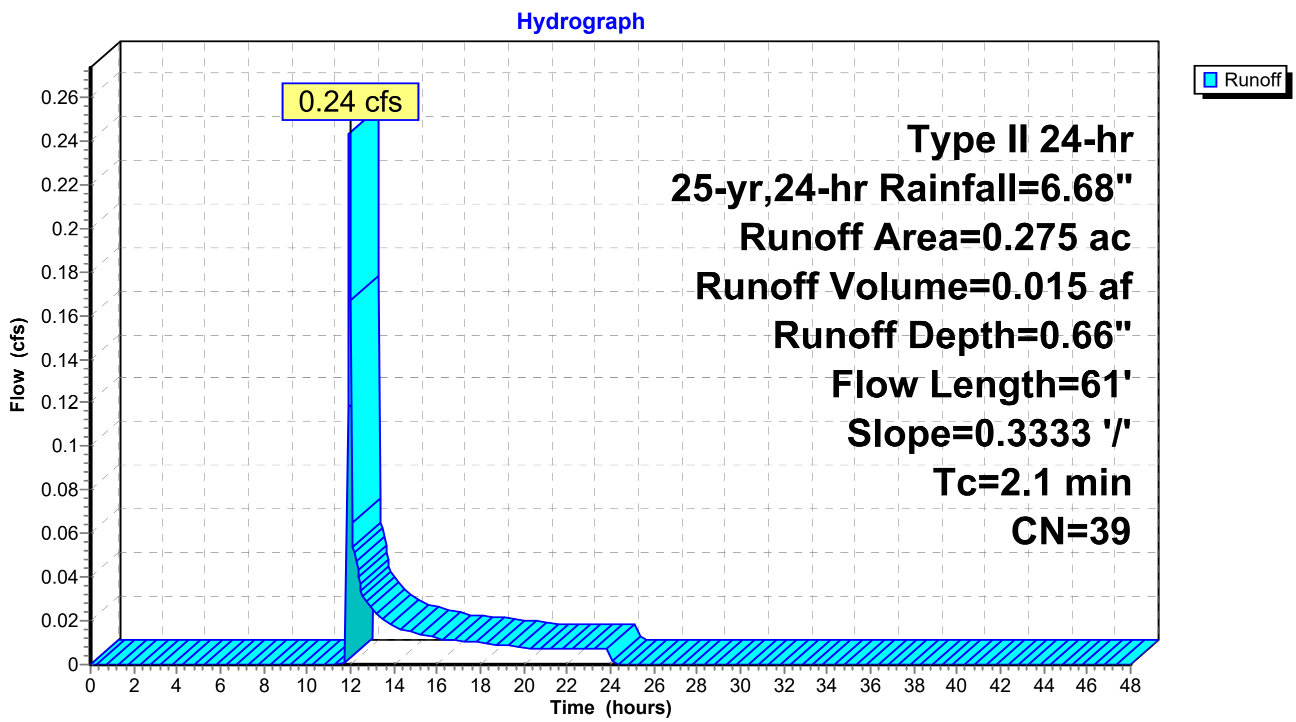
Runoff = 0.24 cfs @ 11.96 hrs, Volume= 0.015 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.275	39	>75% Grass cover, Good, HSG A
0.275		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B13: SC-B13



Summary for Subcatchment SC-B14: SC-B14

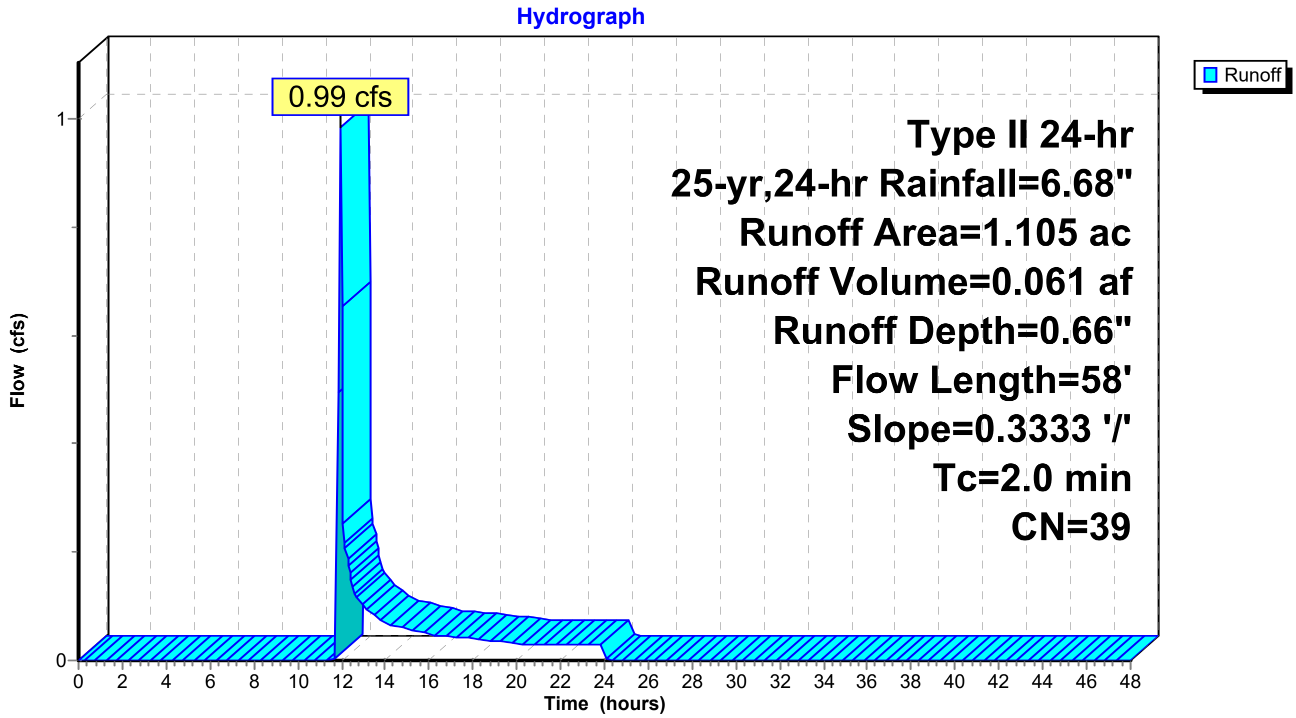
Runoff = 0.99 cfs @ 11.95 hrs, Volume= 0.061 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.105	39	>75% Grass cover, Good, HSG A
1.105		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	58	0.3333	0.48		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B14: SC-B14



Summary for Subcatchment SC-B15: SC-B15

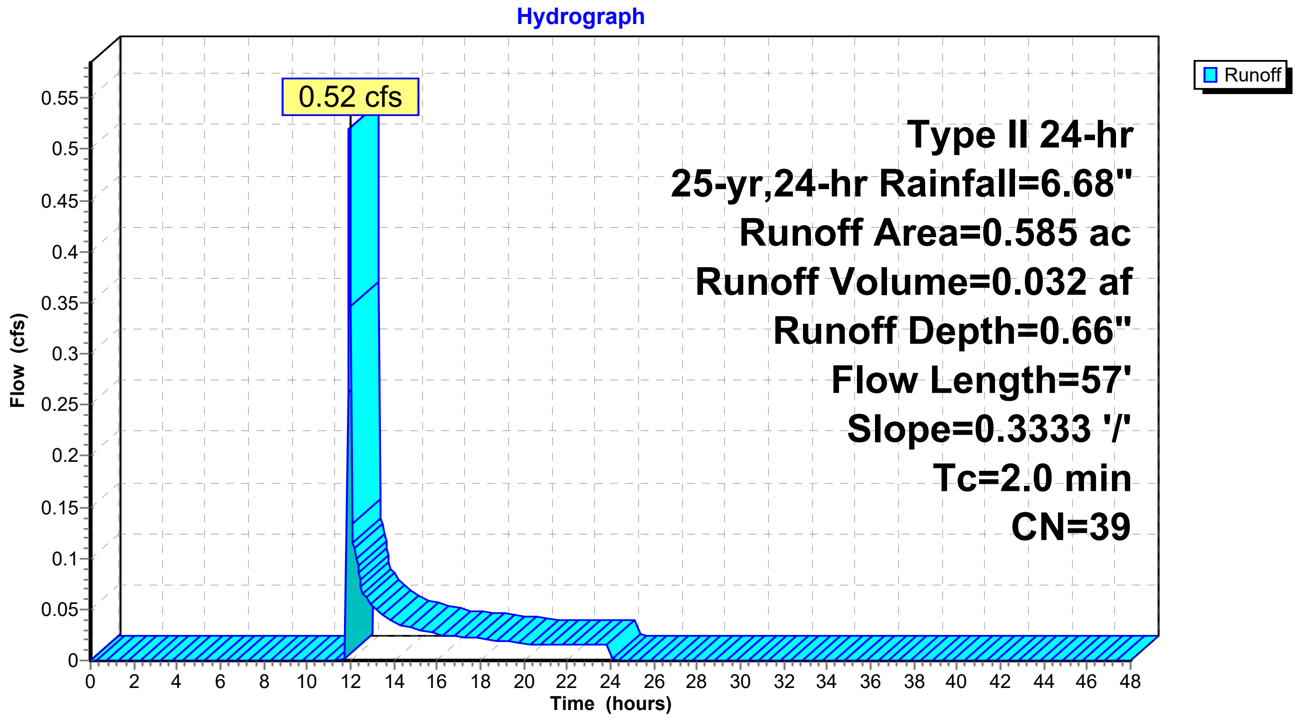
Runoff = 0.52 cfs @ 11.95 hrs, Volume= 0.032 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.585	39	>75% Grass cover, Good, HSG A
0.585		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	57	0.3333	0.48		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B15: SC-B15



Summary for Subcatchment SC-B16: SC-B16

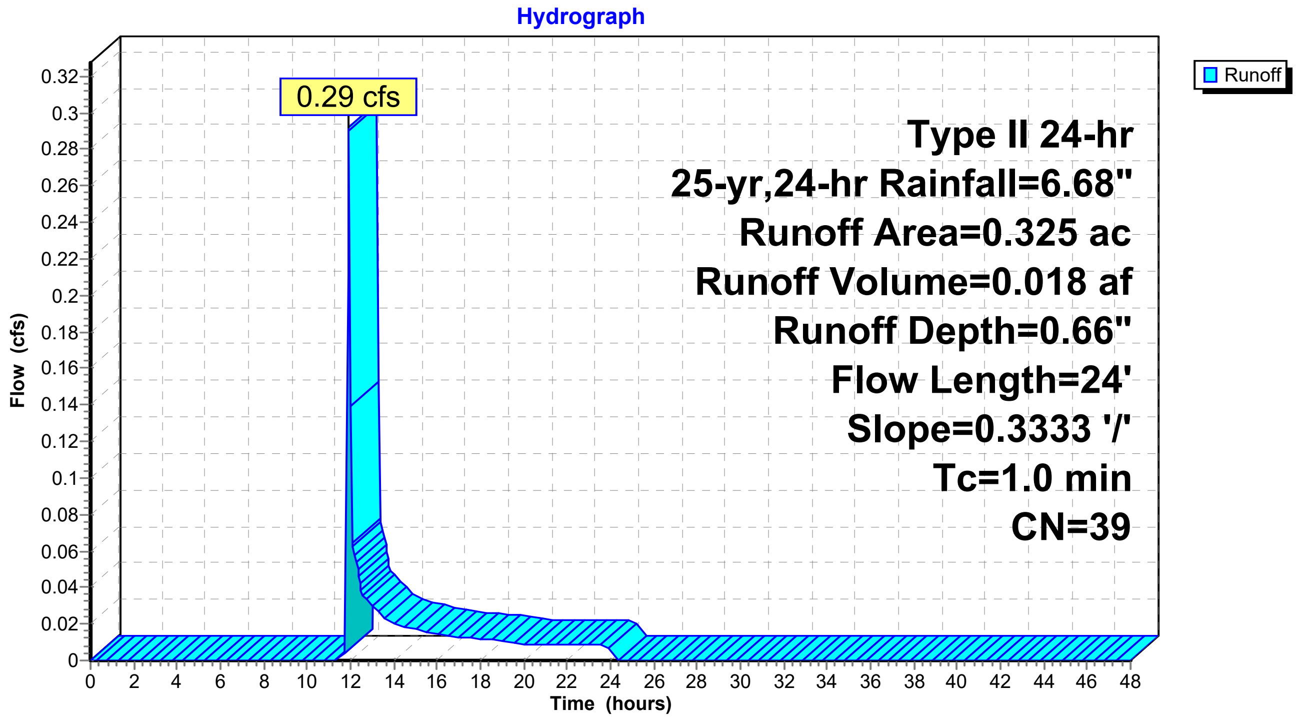
Runoff = 0.29 cfs @ 11.94 hrs, Volume= 0.018 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.325	39	>75% Grass cover, Good, HSG A
0.325		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	24	0.3333	0.41		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B16: SC-B16



Summary for Subcatchment SC-B17: SC-B17

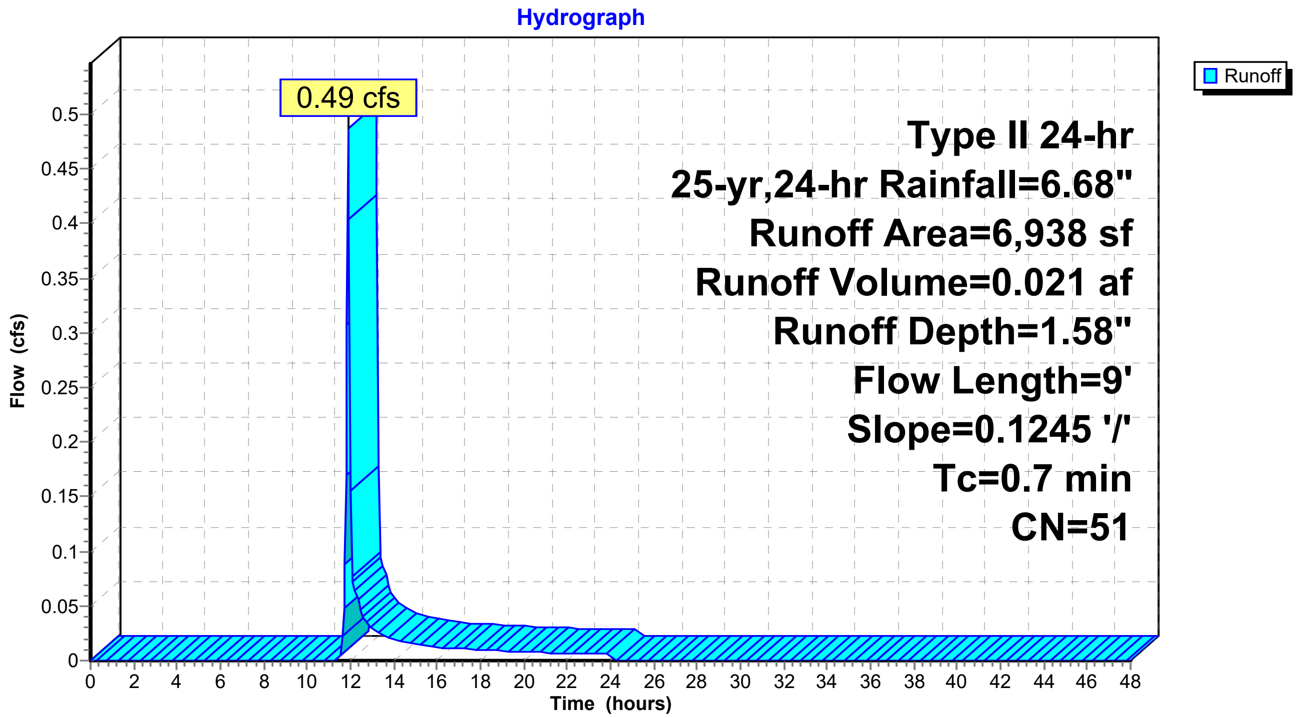
Runoff = 0.49 cfs @ 11.91 hrs, Volume= 0.021 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
4,649	39	>75% Grass cover, Good, HSG A
2,289	76	Gravel roads, HSG A
6,938	51	Weighted Average
6,938		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	9	0.1245	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B17: SC-B17



Summary for Subcatchment SC-B2: SC-B2

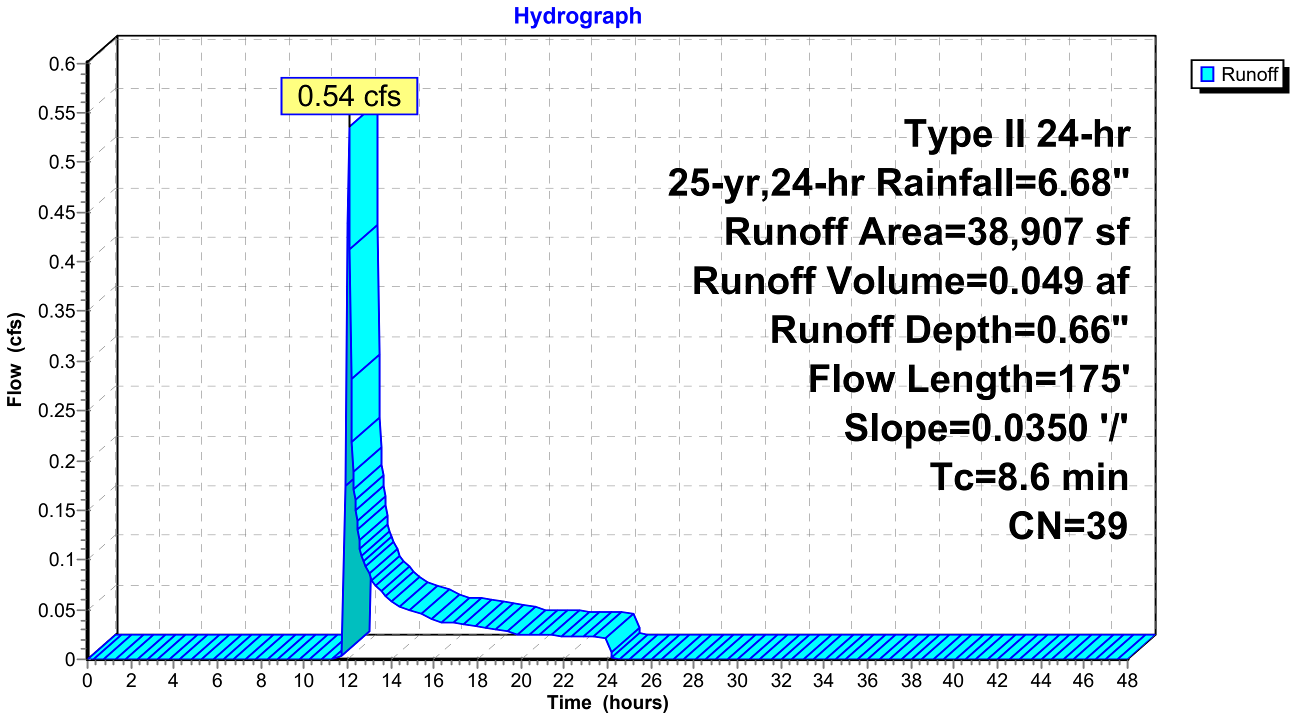
Runoff = 0.54 cfs @ 12.05 hrs, Volume= 0.049 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
38,907	39	>75% Grass cover, Good, HSG A
38,907		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0350	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
1.0	75	0.0350	1.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.6	175	Total			

Subcatchment SC-B2: SC-B2



Summary for Subcatchment SC-B3: SC-B3

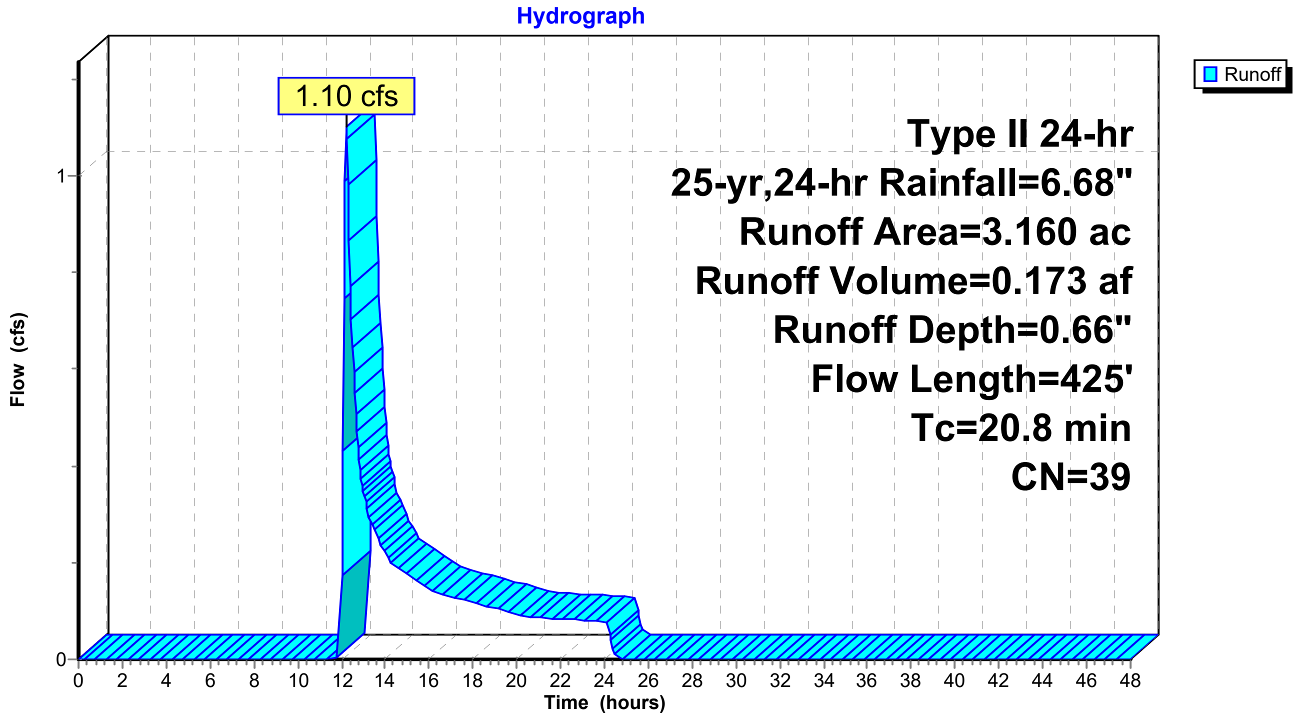
Runoff = 1.10 cfs @ 12.22 hrs, Volume= 0.173 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
3.160	39	>75% Grass cover, Good, HSG A
3.160		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0050	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
4.3	325	0.0323	1.26		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	425	Total			

Subcatchment SC-B3: SC-B3



Summary for Subcatchment SC-B4: SC-B4

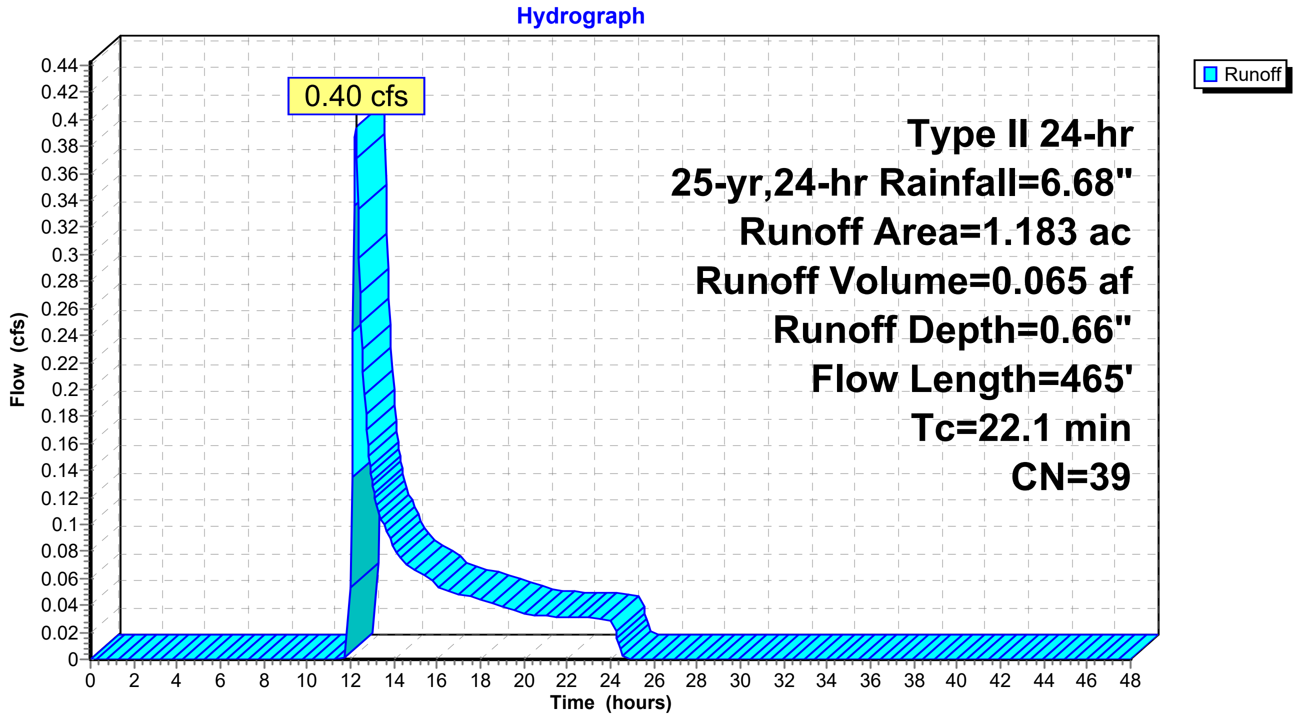
Runoff = 0.40 cfs @ 12.24 hrs, Volume= 0.065 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.183	39	>75% Grass cover, Good, HSG A
1.183		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0050	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
5.6	365	0.0237	1.08		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.1	465	Total			

Subcatchment SC-B4: SC-B4



Summary for Subcatchment SC-B5: SC-B5

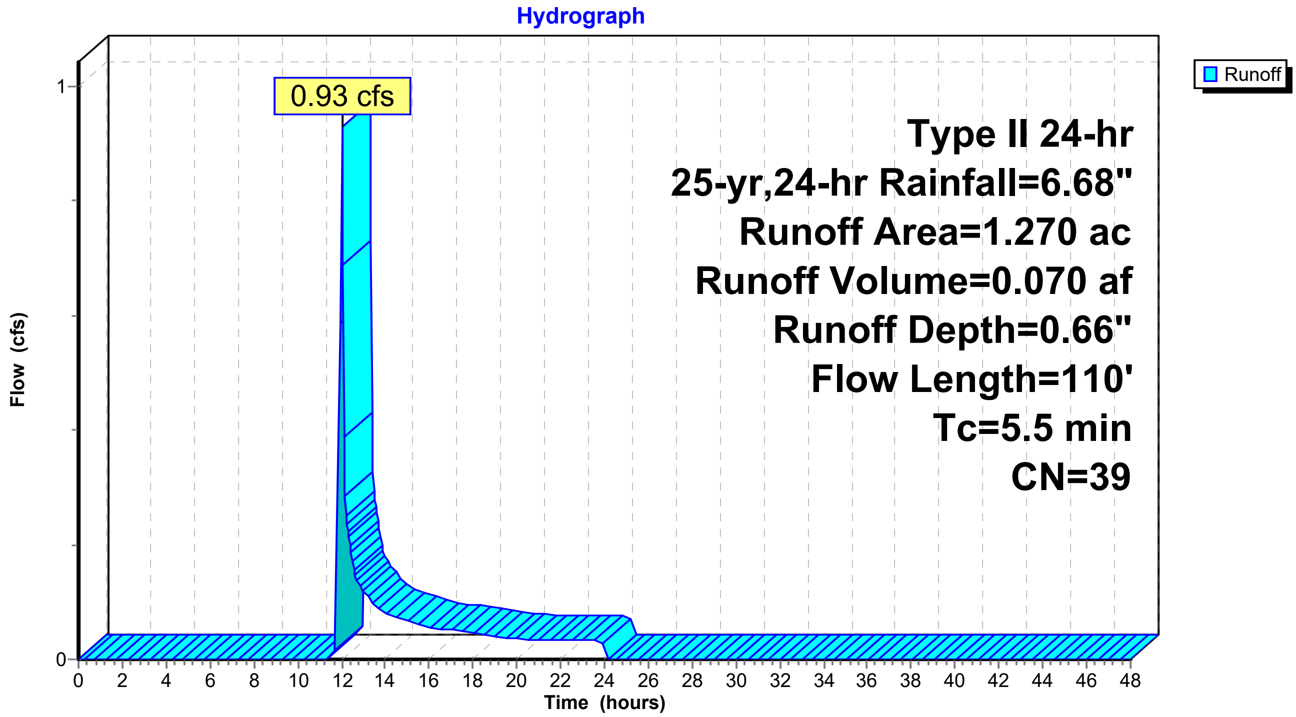
Runoff = 0.93 cfs @ 12.00 hrs, Volume= 0.070 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.270	39	>75% Grass cover, Good, HSG A
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0777	0.30		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.0	10	0.3333	4.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.5	110	Total			

Subcatchment SC-B5: SC-B5



Summary for Subcatchment SC-B6: SC-B6

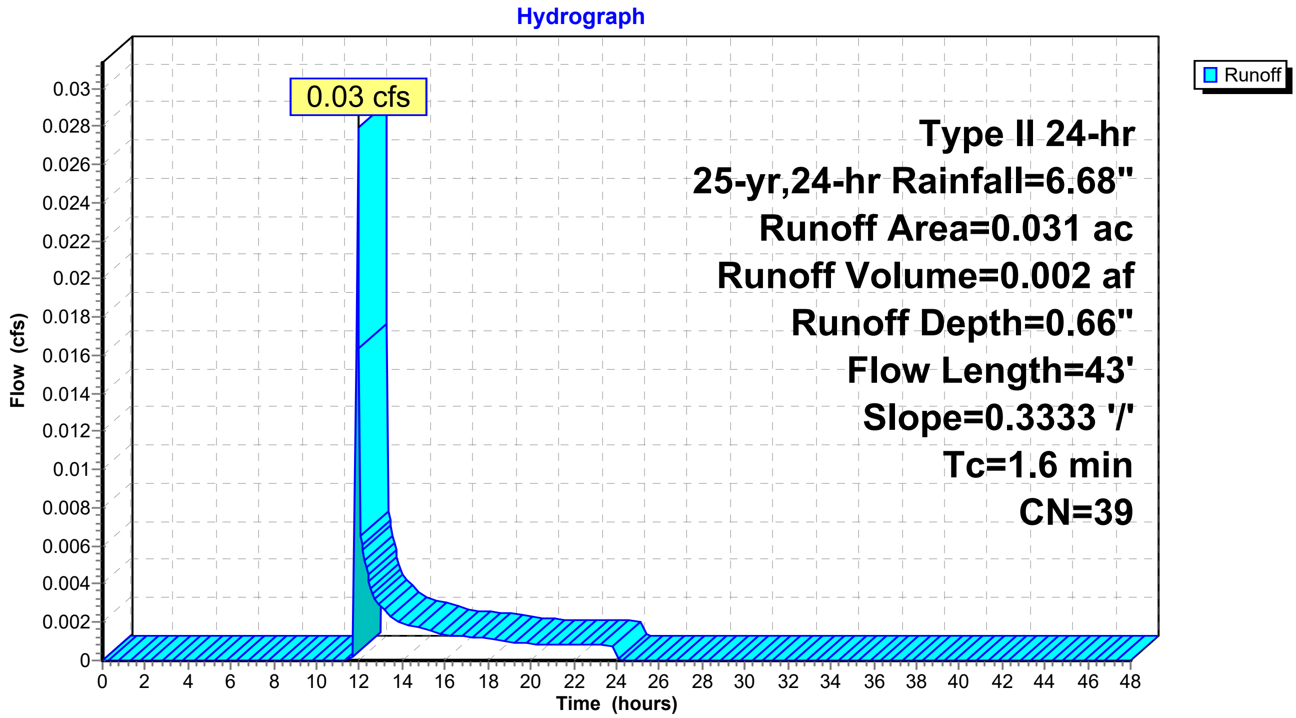
Runoff = 0.03 cfs @ 11.95 hrs, Volume= 0.002 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.031	39	>75% Grass cover, Good, HSG A
0.031		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	43	0.3333	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B6: SC-B6



Summary for Subcatchment SC-B7: SC-B7

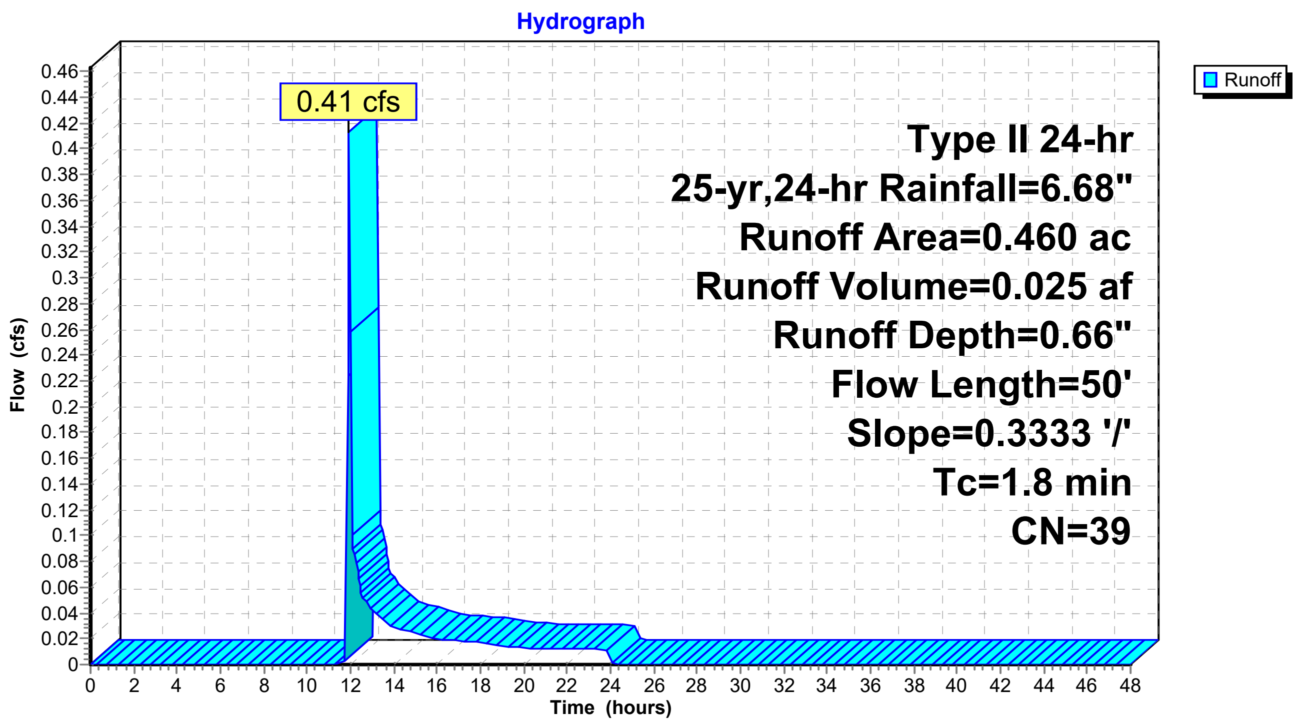
Runoff = 0.41 cfs @ 11.95 hrs, Volume= 0.025 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.460	39	>75% Grass cover, Good, HSG A
0.460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.3333	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B7: SC-B7



Summary for Subcatchment SC-B8: SC-B8

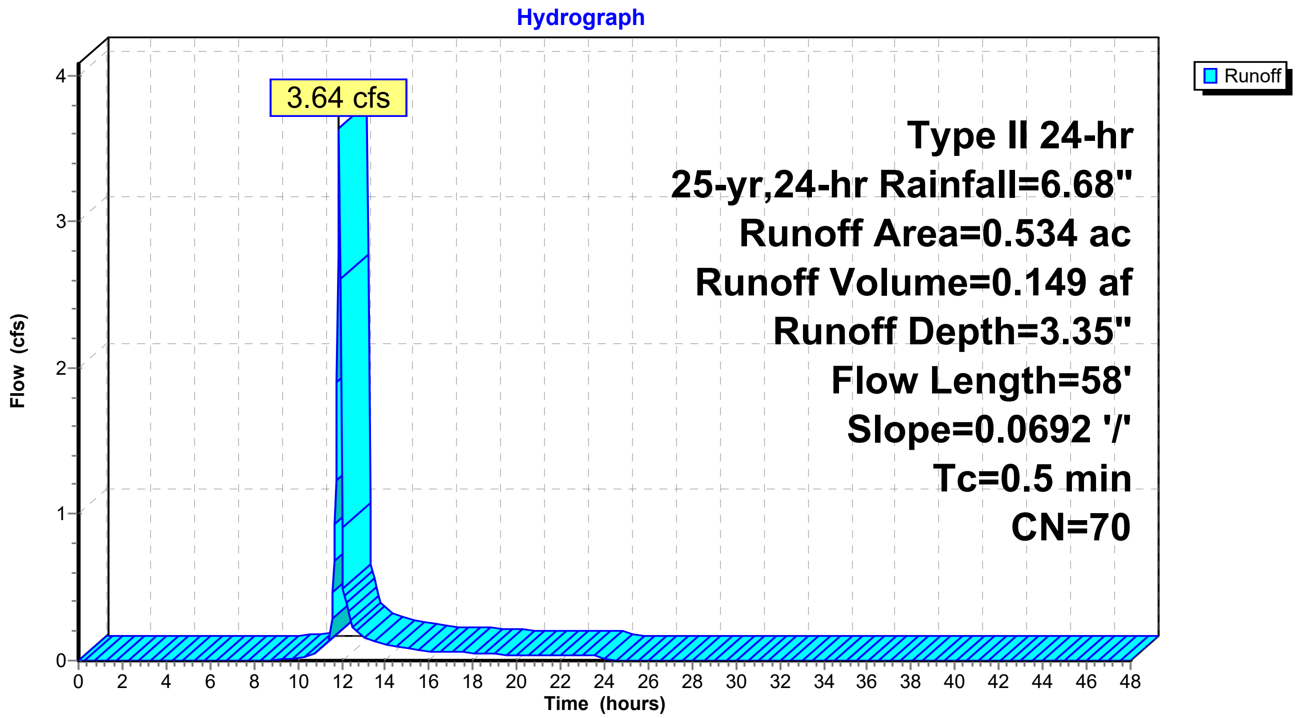
Runoff = 3.64 cfs @ 11.90 hrs, Volume= 0.149 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.083	39	>75% Grass cover, Good, HSG A
0.451	76	Gravel roads, HSG A
0.534	70	Weighted Average
0.534		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	58	0.0692	2.09		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-B8: SC-B8



Summary for Subcatchment SC-B9: SC-B9

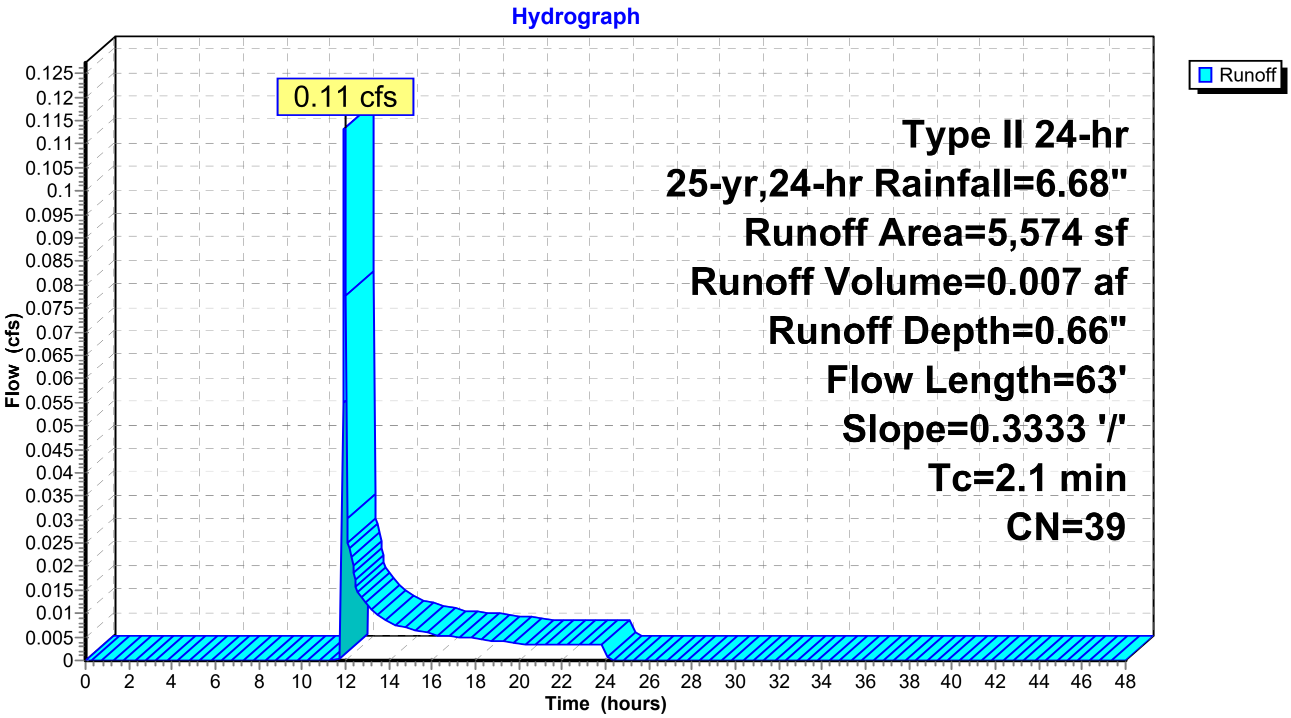
Runoff = 0.11 cfs @ 11.96 hrs, Volume= 0.007 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
5,574	39	>75% Grass cover, Good, HSG A
5,574		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	63	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-B9: SC-B9



Summary for Subcatchment SC-C1: SC-C1

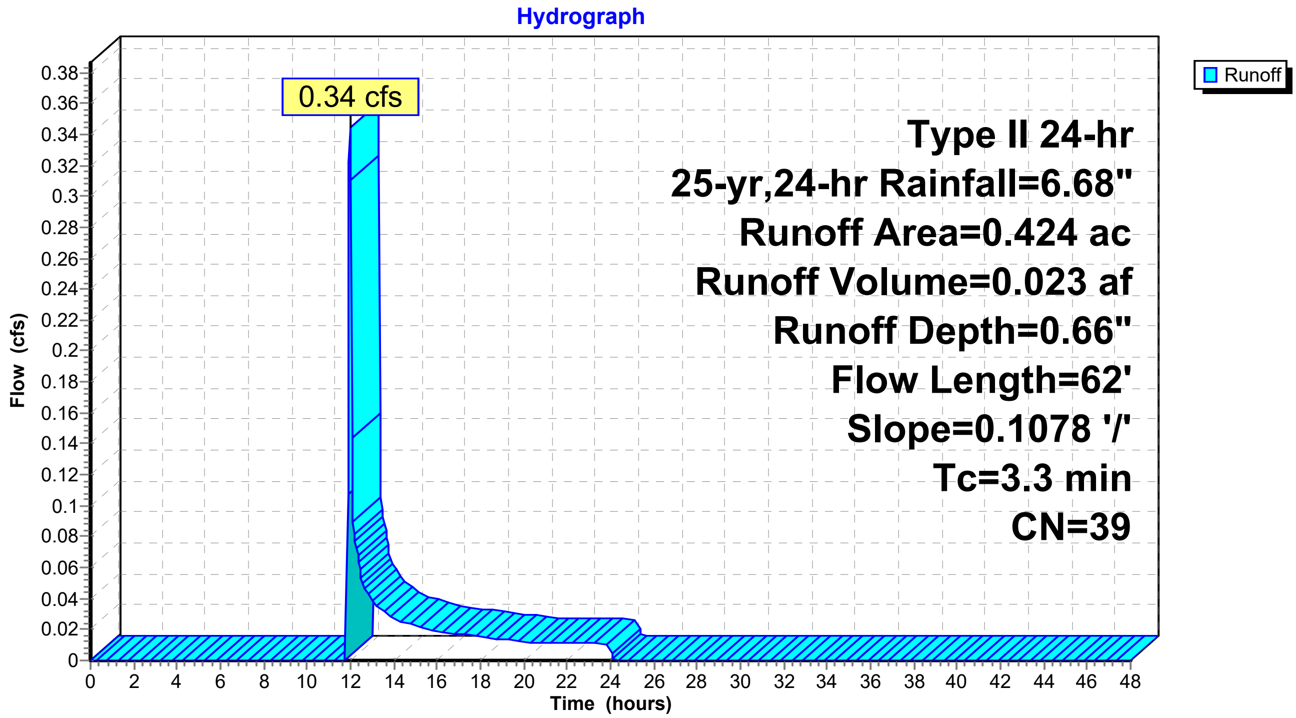
Runoff = 0.34 cfs @ 11.97 hrs, Volume= 0.023 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.424	39	>75% Grass cover, Good, HSG A
0.424		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	62	0.1078	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C1: SC-C1



Summary for Subcatchment SC-C10: SC-C10

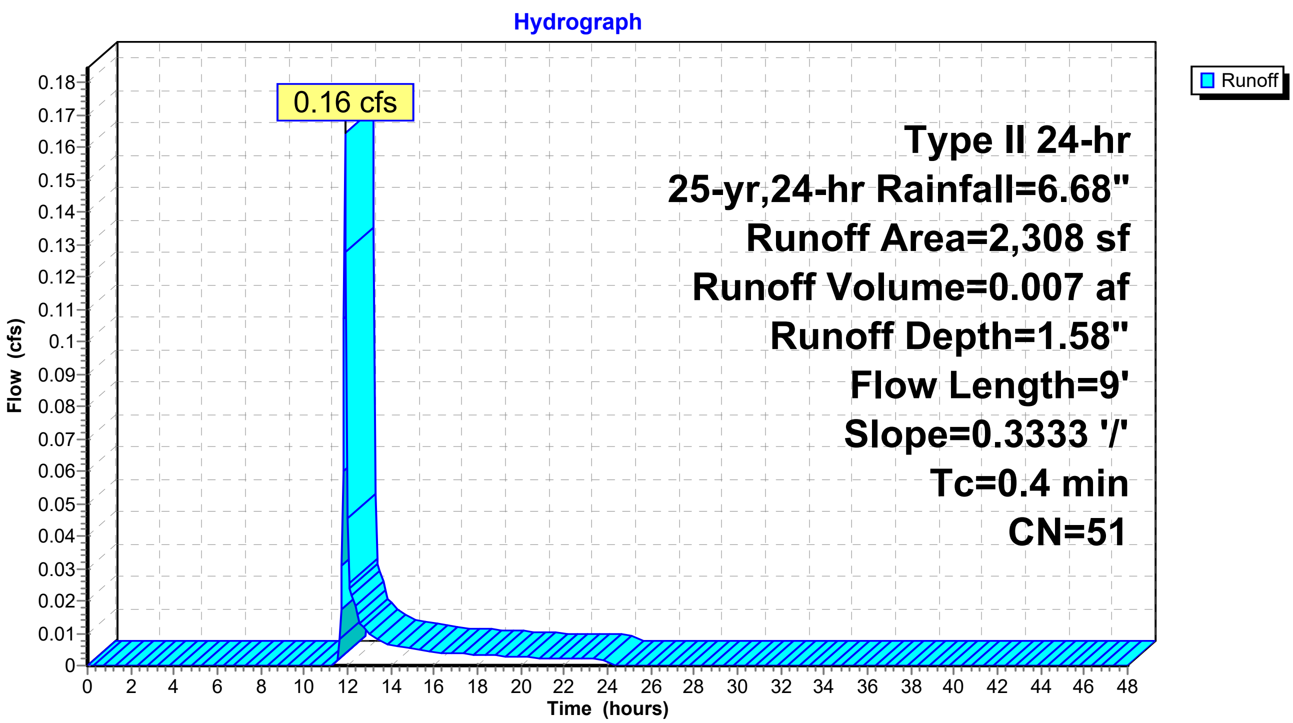
Runoff = 0.16 cfs @ 11.91 hrs, Volume= 0.007 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
1,551	39	>75% Grass cover, Good, HSG A
757	76	Gravel roads, HSG A
2,308	51	Weighted Average
2,308		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	9	0.3333	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C10: SC-C10



Summary for Subcatchment SC-C2: SC-C2

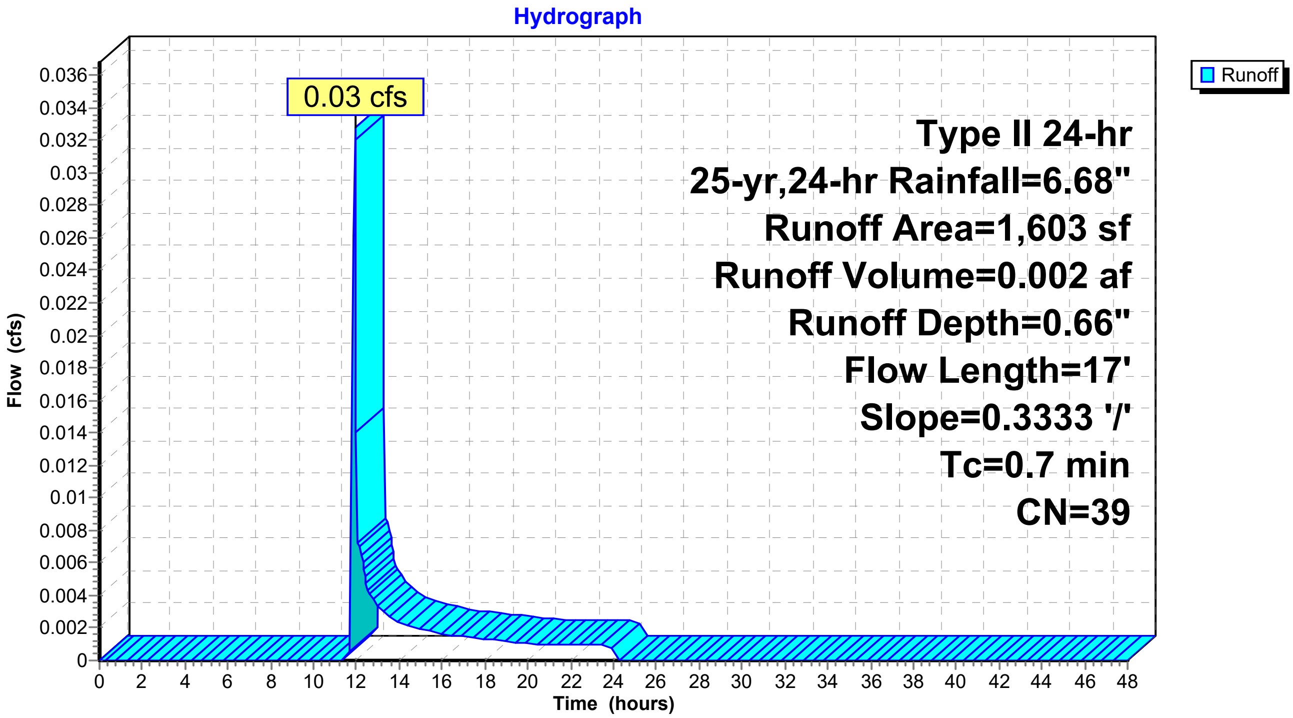
Runoff = 0.03 cfs @ 11.94 hrs, Volume= 0.002 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
1,603	39	>75% Grass cover, Good, HSG A
1,603		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	17	0.3333	0.38		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C2: SC-C2



Summary for Subcatchment SC-C3: SC-C3

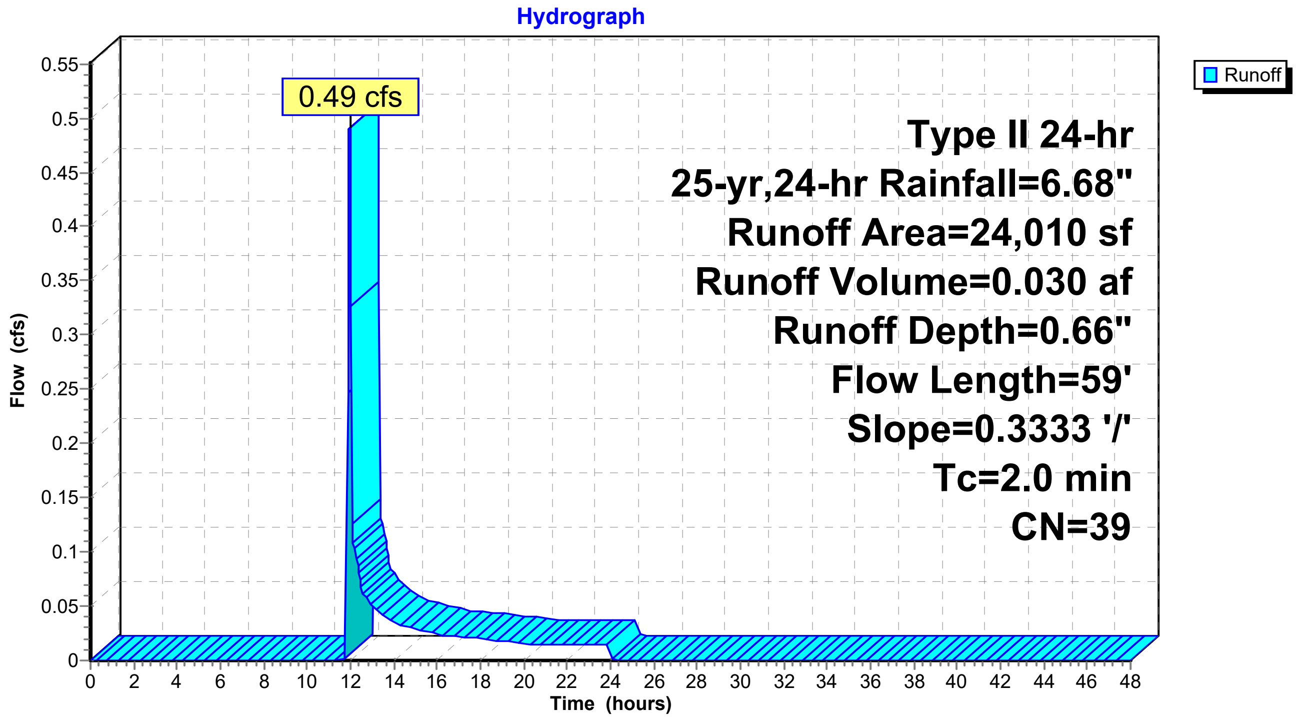
Runoff = 0.49 cfs @ 11.95 hrs, Volume= 0.030 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
24,010	39	>75% Grass cover, Good, HSG A
24,010		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	59	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C3: SC-C3



Summary for Subcatchment SC-C4: SC-C4

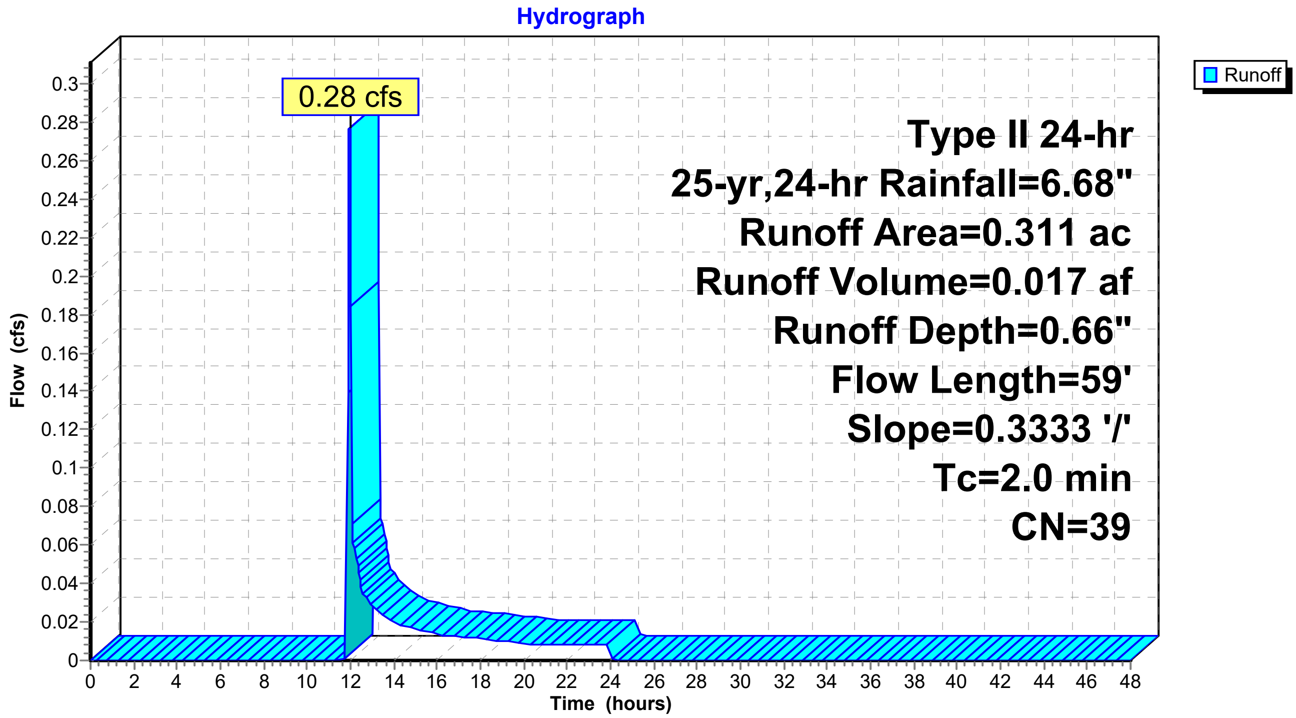
Runoff = 0.28 cfs @ 11.95 hrs, Volume= 0.017 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.311	39	>75% Grass cover, Good, HSG A
0.311		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	59	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C4: SC-C4



Summary for Subcatchment SC-C5: SC-C5

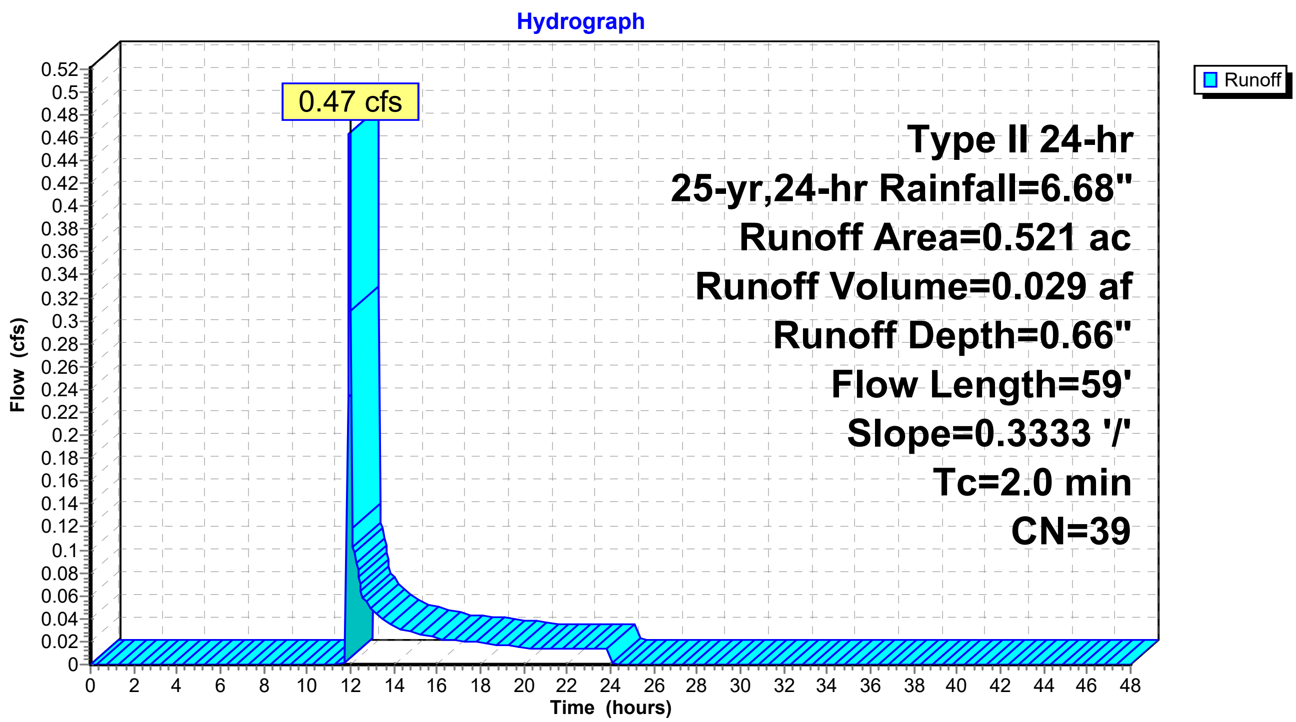
Runoff = 0.47 cfs @ 11.95 hrs, Volume= 0.029 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.521	39	>75% Grass cover, Good, HSG A
0.521		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	59	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C5: SC-C5



Summary for Subcatchment SC-C6: SC-C6

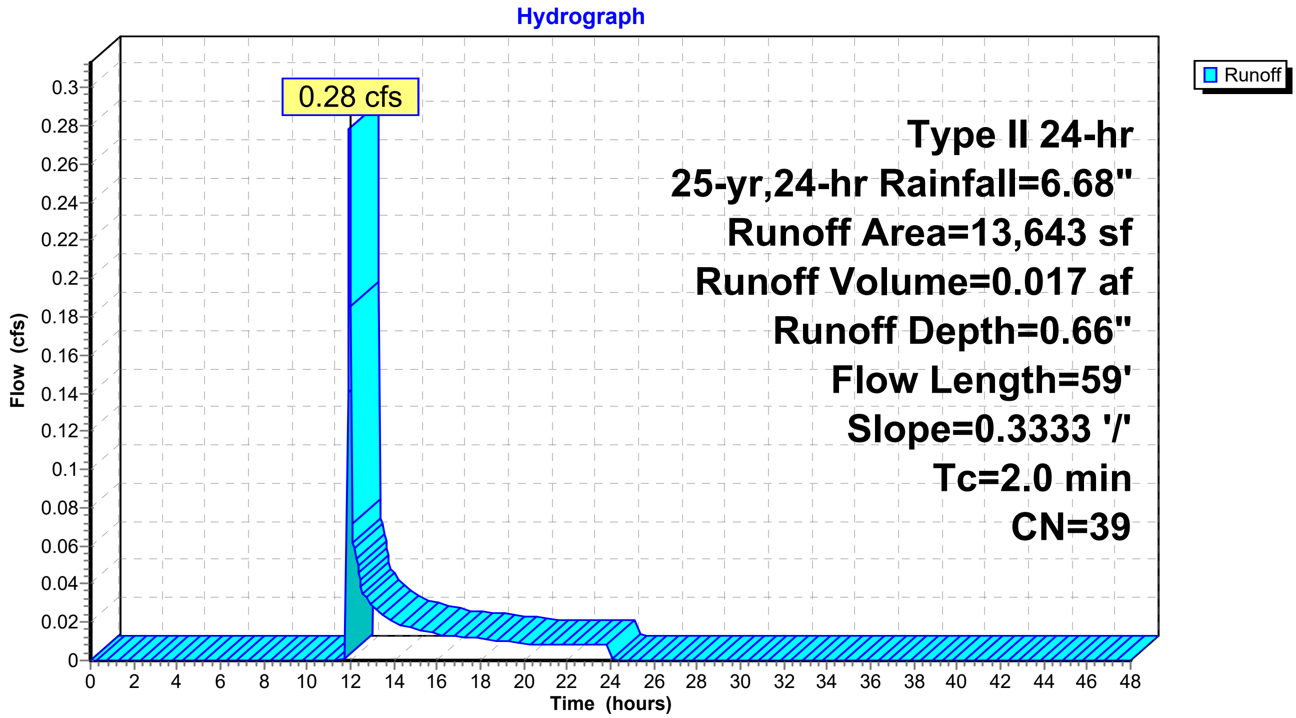
Runoff = 0.28 cfs @ 11.95 hrs, Volume= 0.017 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
13,643	39	>75% Grass cover, Good, HSG A
13,643		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	59	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C6: SC-C6



Summary for Subcatchment SC-C7: SC-C7

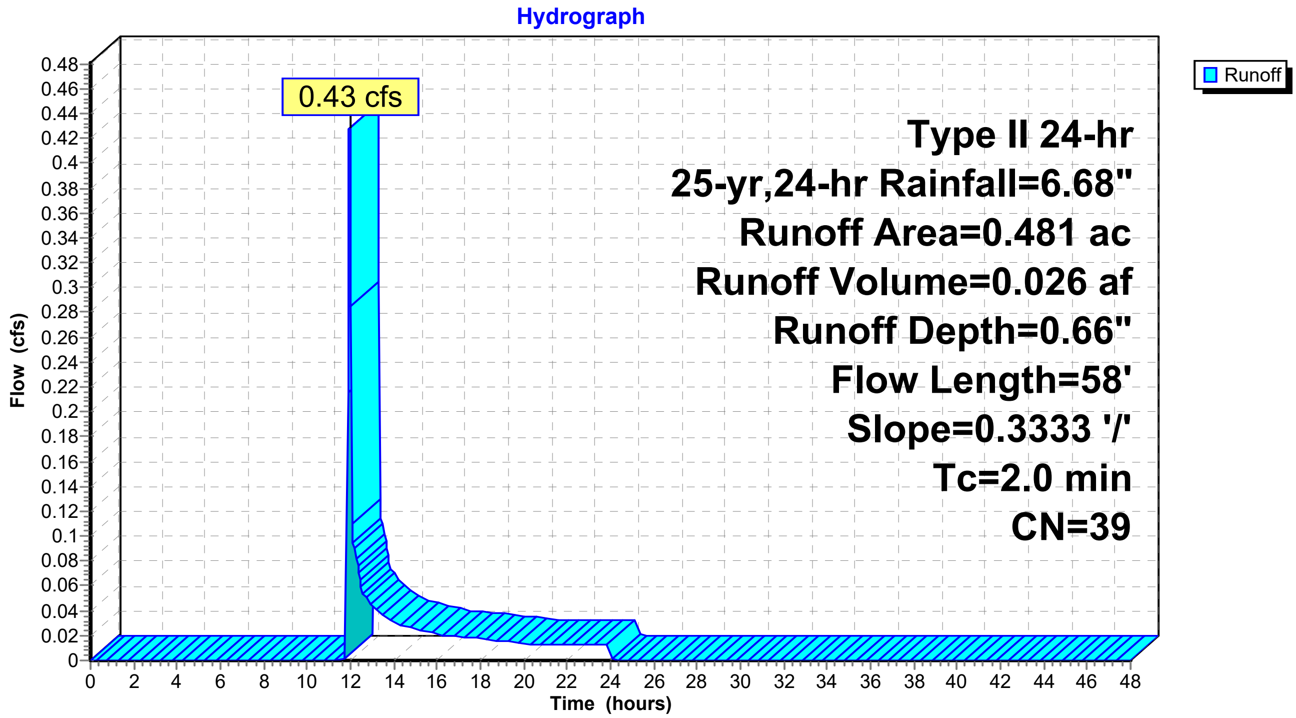
Runoff = 0.43 cfs @ 11.95 hrs, Volume= 0.026 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.481	39	>75% Grass cover, Good, HSG A
0.481		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	58	0.3333	0.48		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C7: SC-C7



Summary for Subcatchment SC-C8: SC-C8

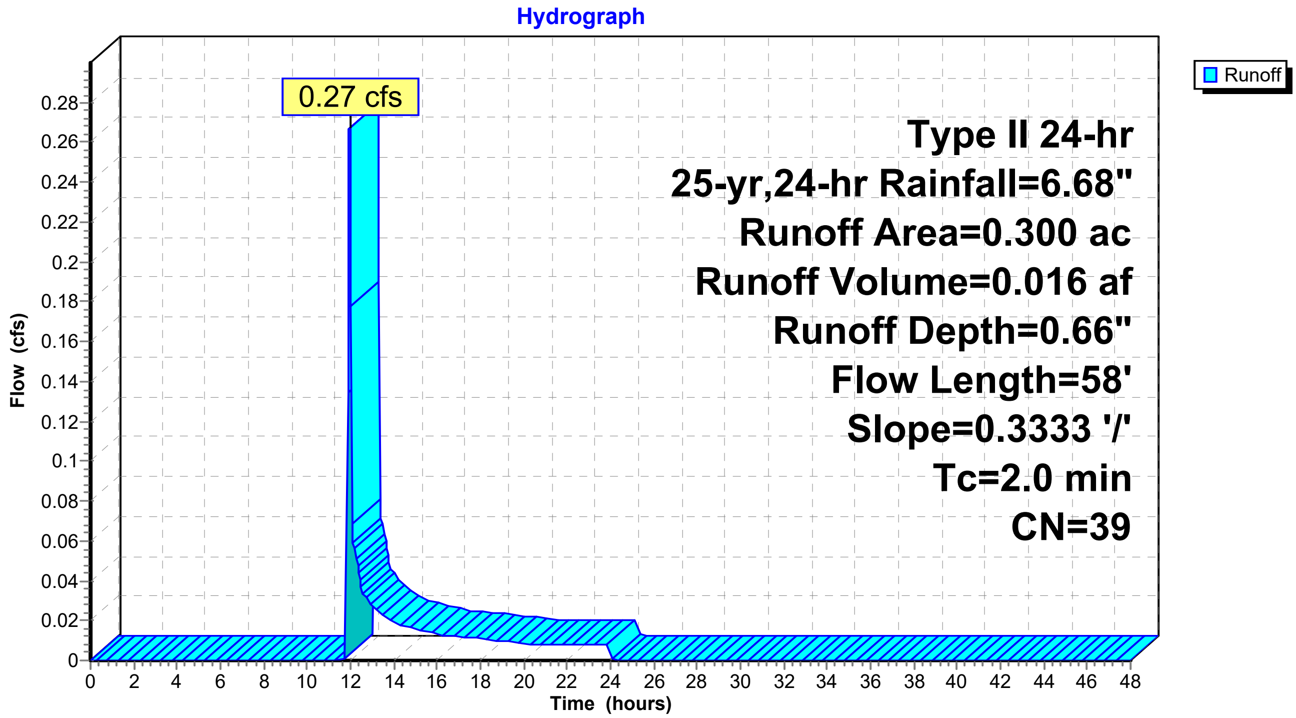
Runoff = 0.27 cfs @ 11.95 hrs, Volume= 0.016 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.300	39	>75% Grass cover, Good, HSG A
0.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	58	0.3333	0.48		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C8: SC-C8



Summary for Subcatchment SC-C9: SC-C9

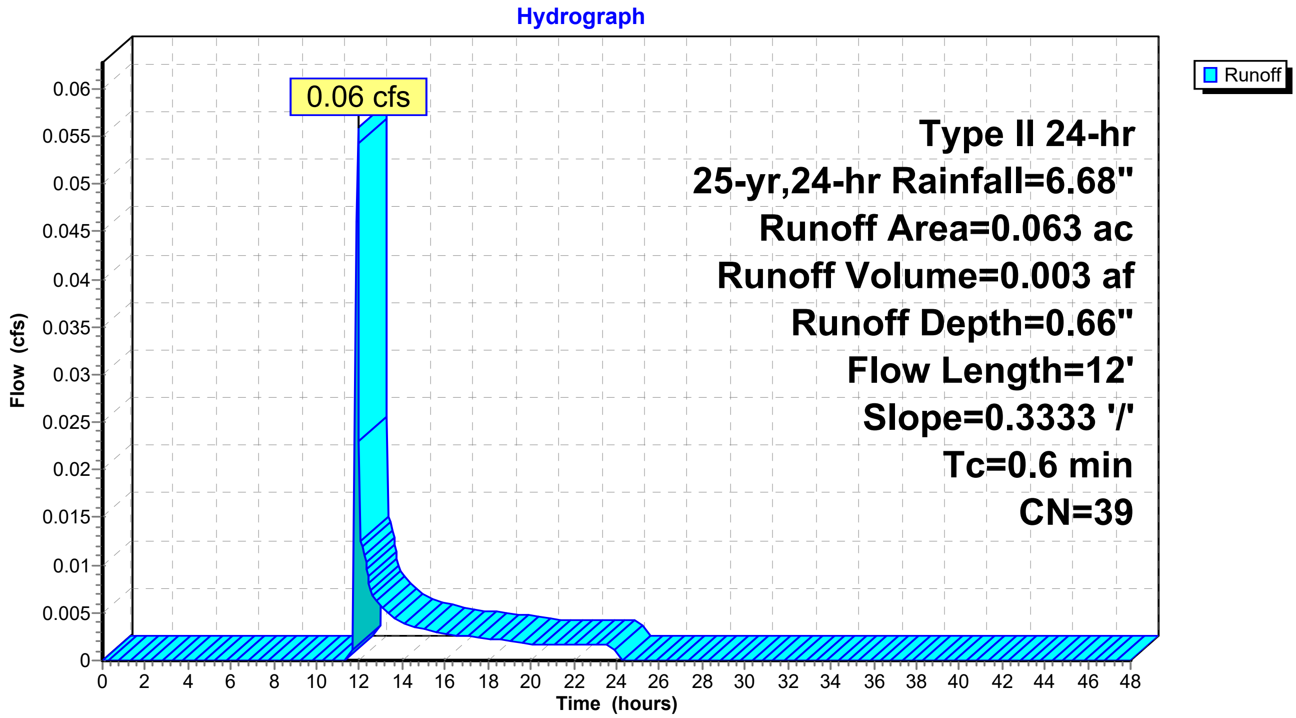
Runoff = 0.06 cfs @ 11.94 hrs, Volume= 0.003 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.063	39	>75% Grass cover, Good, HSG A
0.063		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	12	0.3333	0.35		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-C9: SC-C9



Summary for Subcatchment SC-D1: SC-D1

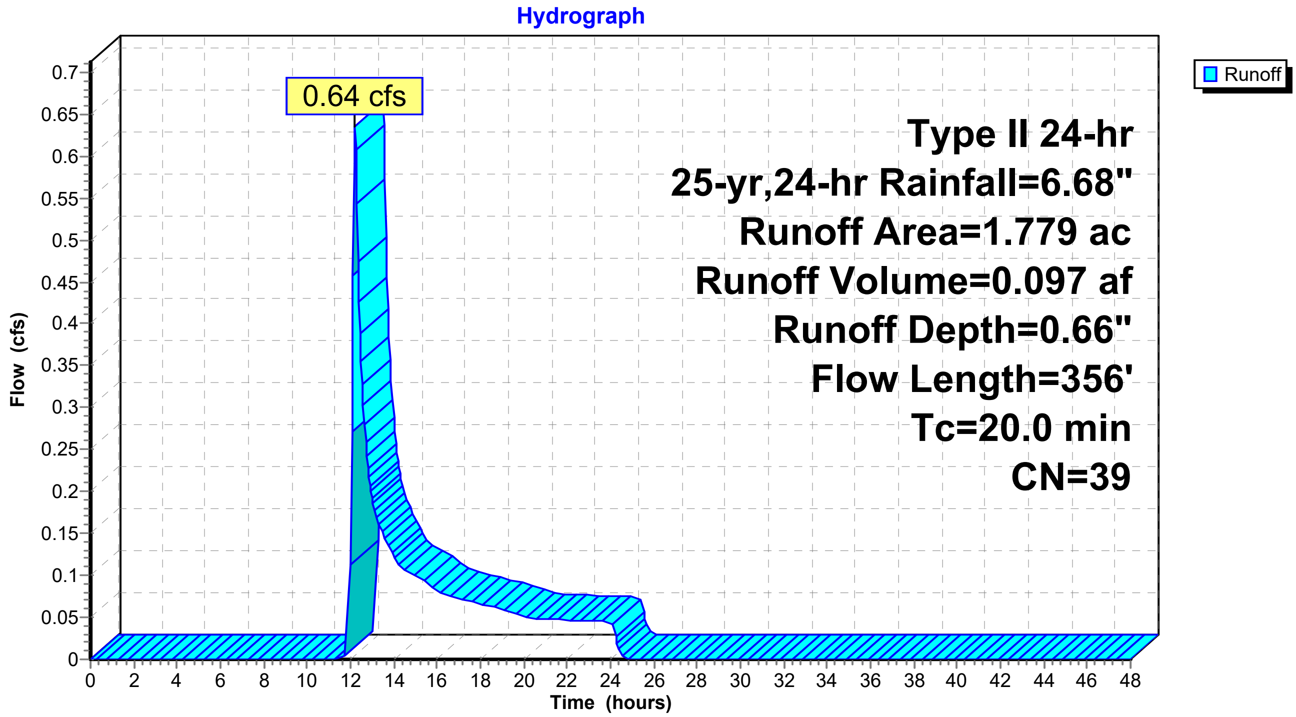
Runoff = 0.64 cfs @ 12.21 hrs, Volume= 0.097 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.779	39	>75% Grass cover, Good, HSG A
1.779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0050	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
3.5	256	0.0301	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.0	356	Total			

Subcatchment SC-D1: SC-D1



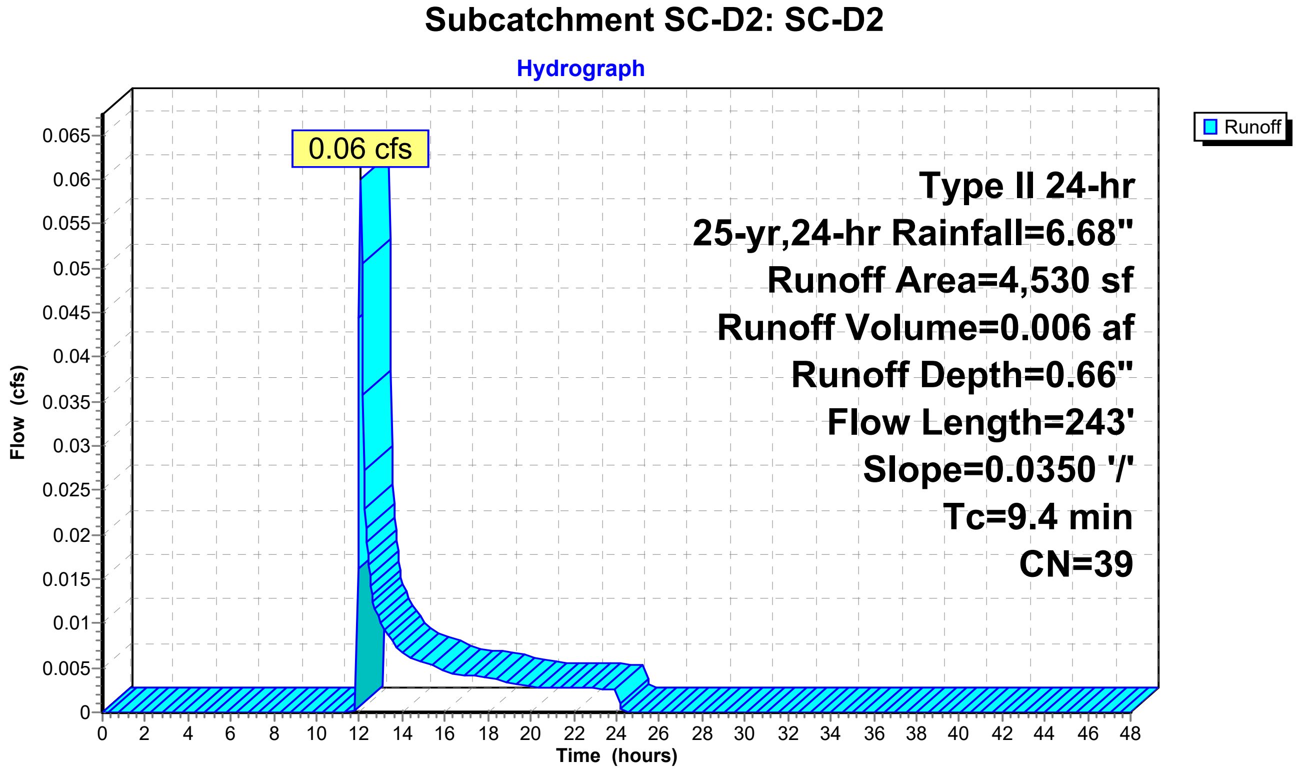
Summary for Subcatchment SC-D2: SC-D2

Runoff = 0.06 cfs @ 12.06 hrs, Volume= 0.006 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
4,530	39	>75% Grass cover, Good, HSG A
4,530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0350	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
1.8	143	0.0350	1.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.4	243	Total			



Summary for Subcatchment SC-D3: SC-D3

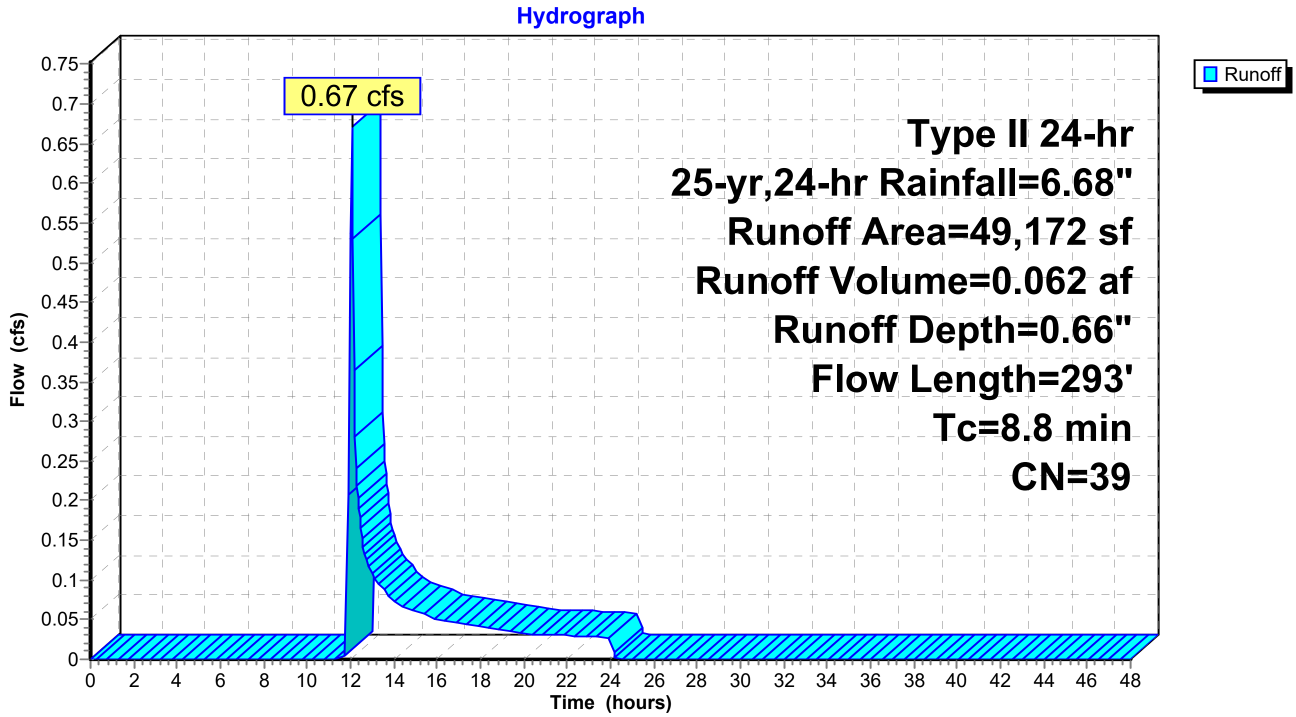
Runoff = 0.67 cfs @ 12.05 hrs, Volume= 0.062 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
49,172	39	>75% Grass cover, Good, HSG A
49,172		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0350	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
1.2	193	0.1352	2.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.8	293	Total			

Subcatchment SC-D3: SC-D3



Summary for Subcatchment SC-D4: SC-D4

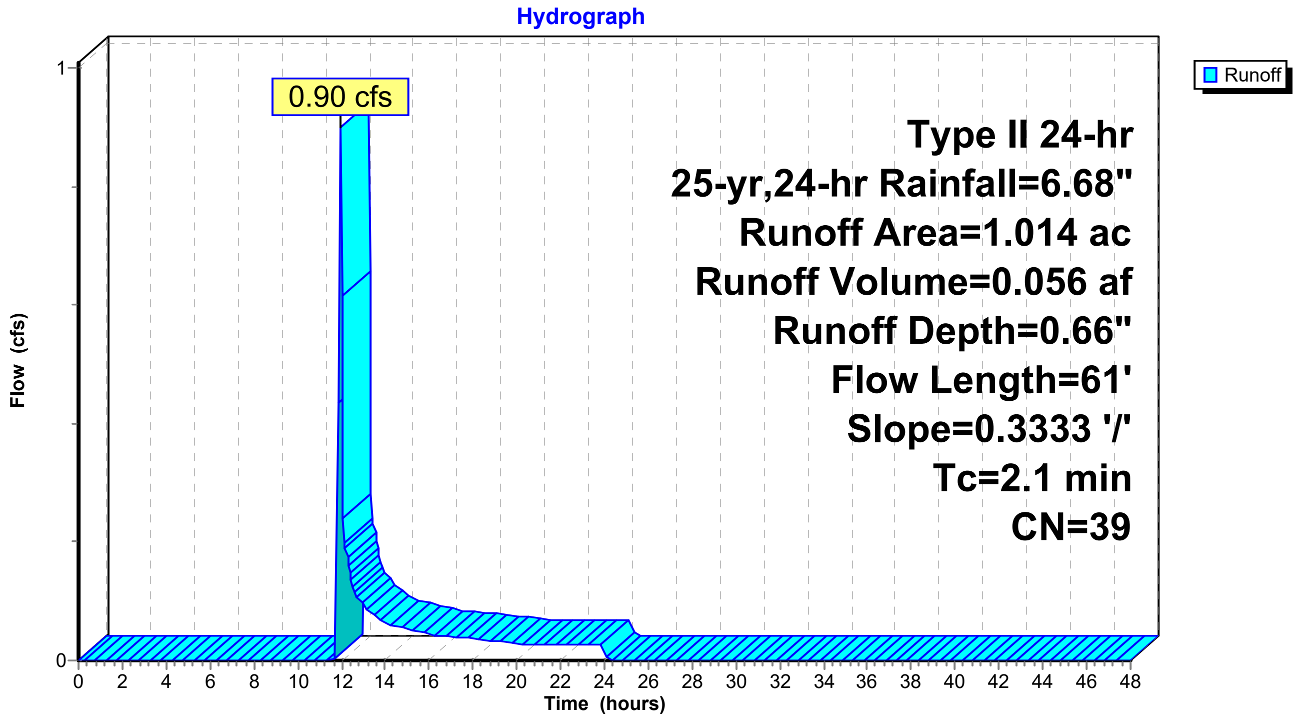
Runoff = 0.90 cfs @ 11.96 hrs, Volume= 0.056 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.014	39	>75% Grass cover, Good, HSG A
1.014		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-D4: SC-D4



Summary for Subcatchment SC-D5: SC-D5

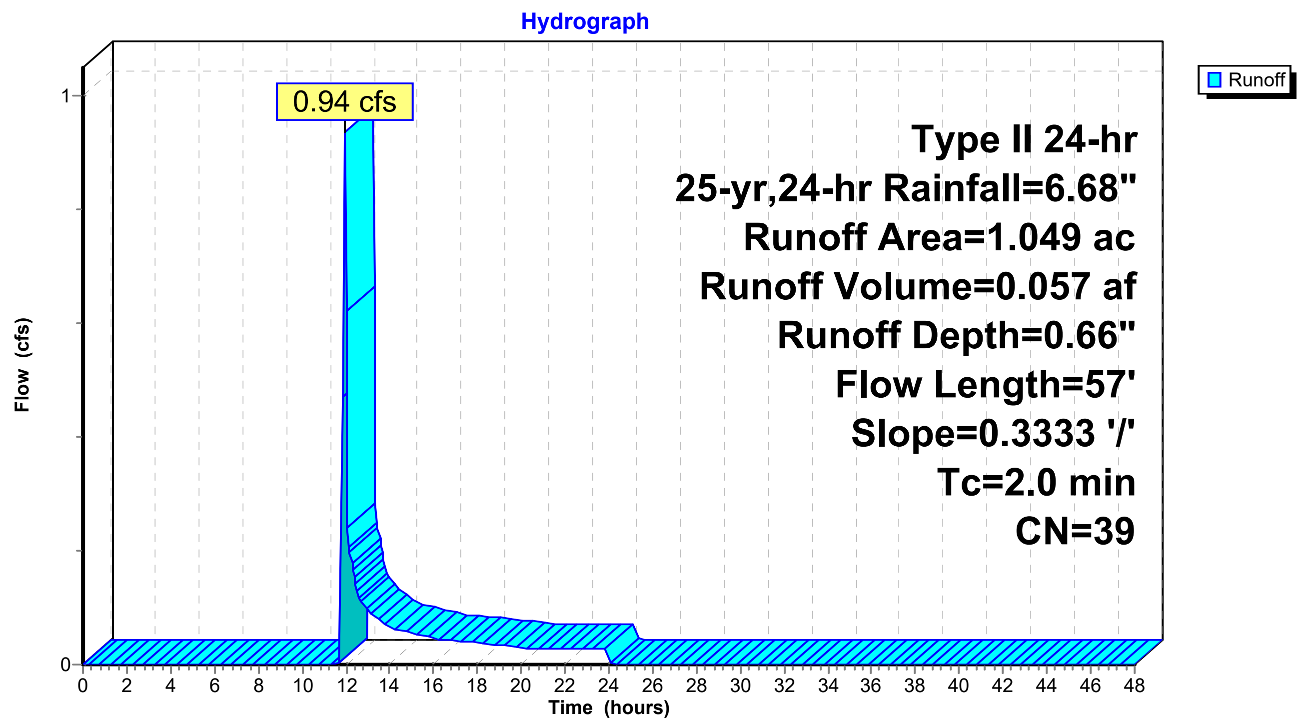
Runoff = 0.94 cfs @ 11.95 hrs, Volume= 0.057 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.049	39	>75% Grass cover, Good, HSG A
1.049		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	57	0.3333	0.48		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-D5: SC-D5



Summary for Subcatchment SC-D6: SC-D6

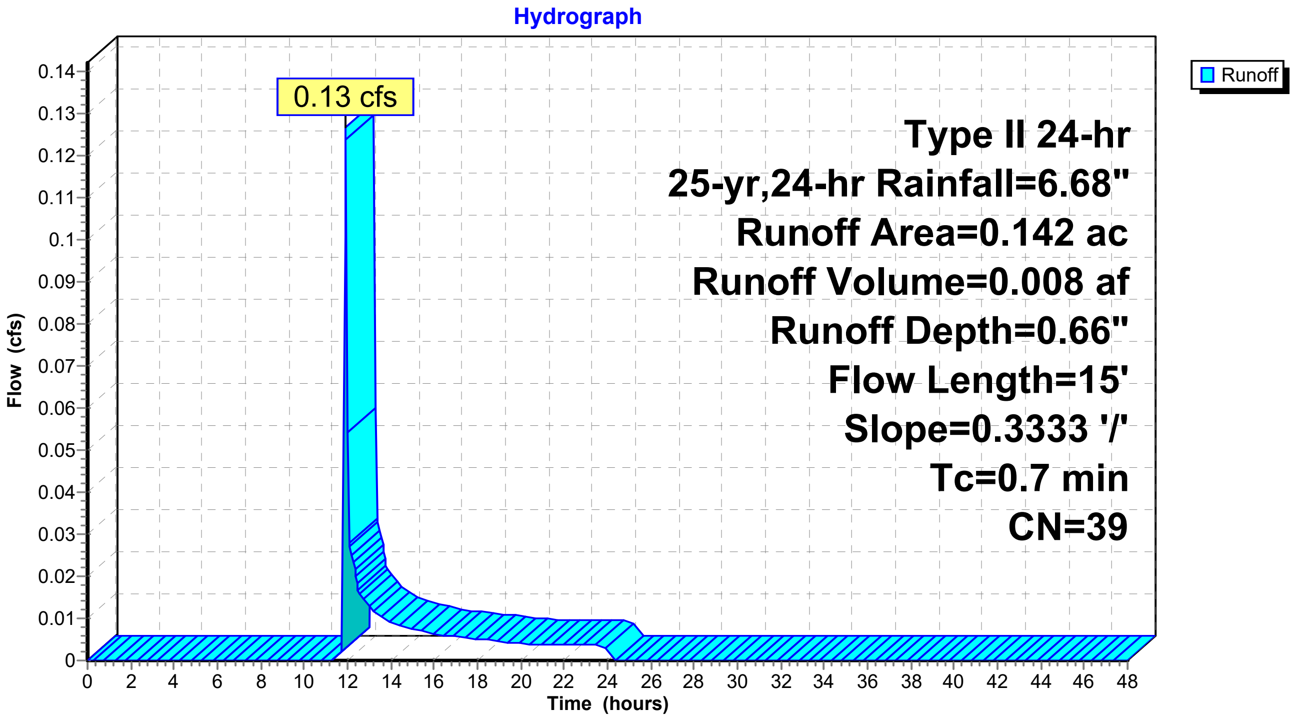
Runoff = 0.13 cfs @ 11.94 hrs, Volume= 0.008 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.142	39	>75% Grass cover, Good, HSG A
0.142		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	15	0.3333	0.37		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-D6: SC-D6



Summary for Subcatchment SC-D7: SC-D7

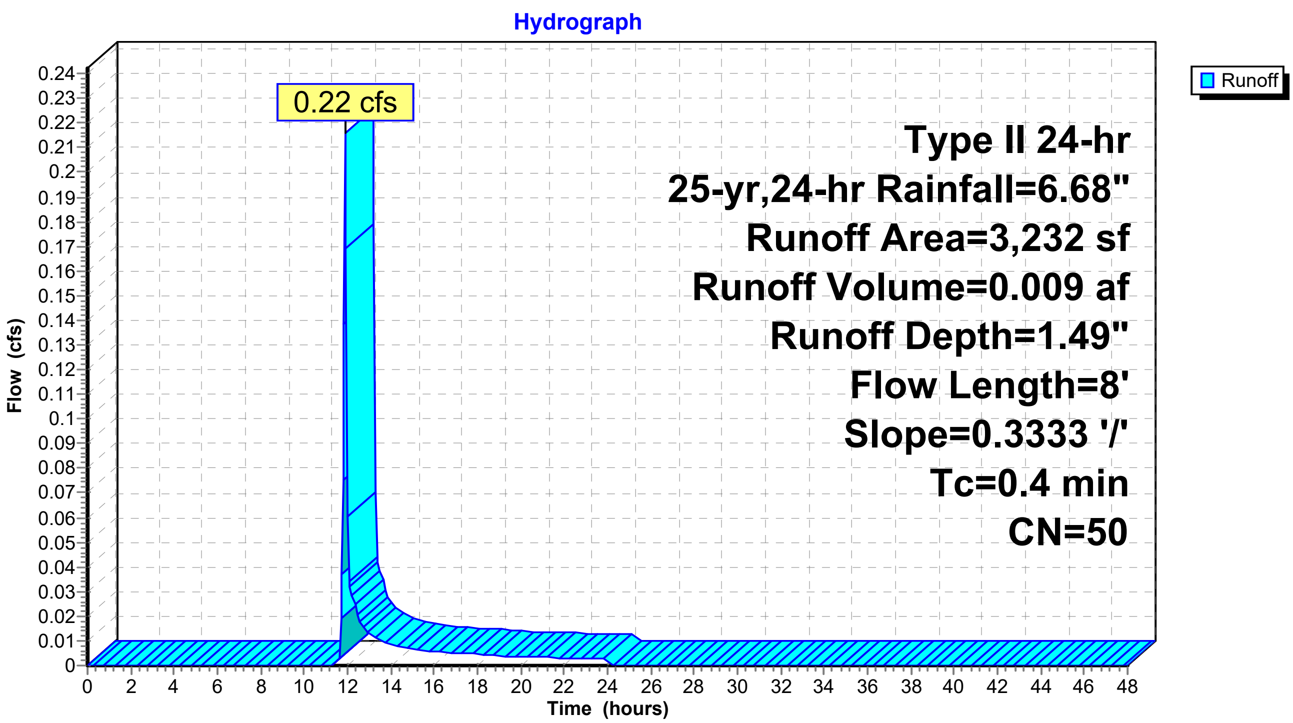
Runoff = 0.22 cfs @ 11.91 hrs, Volume= 0.009 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
2,236	39	>75% Grass cover, Good, HSG A
996	76	Gravel roads, HSG A
3,232	50	Weighted Average
3,232		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	8	0.3333	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-D7: SC-D7



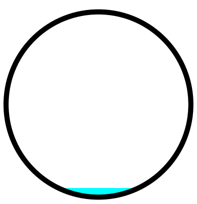
Summary for Reach LP-1A: LP-1A

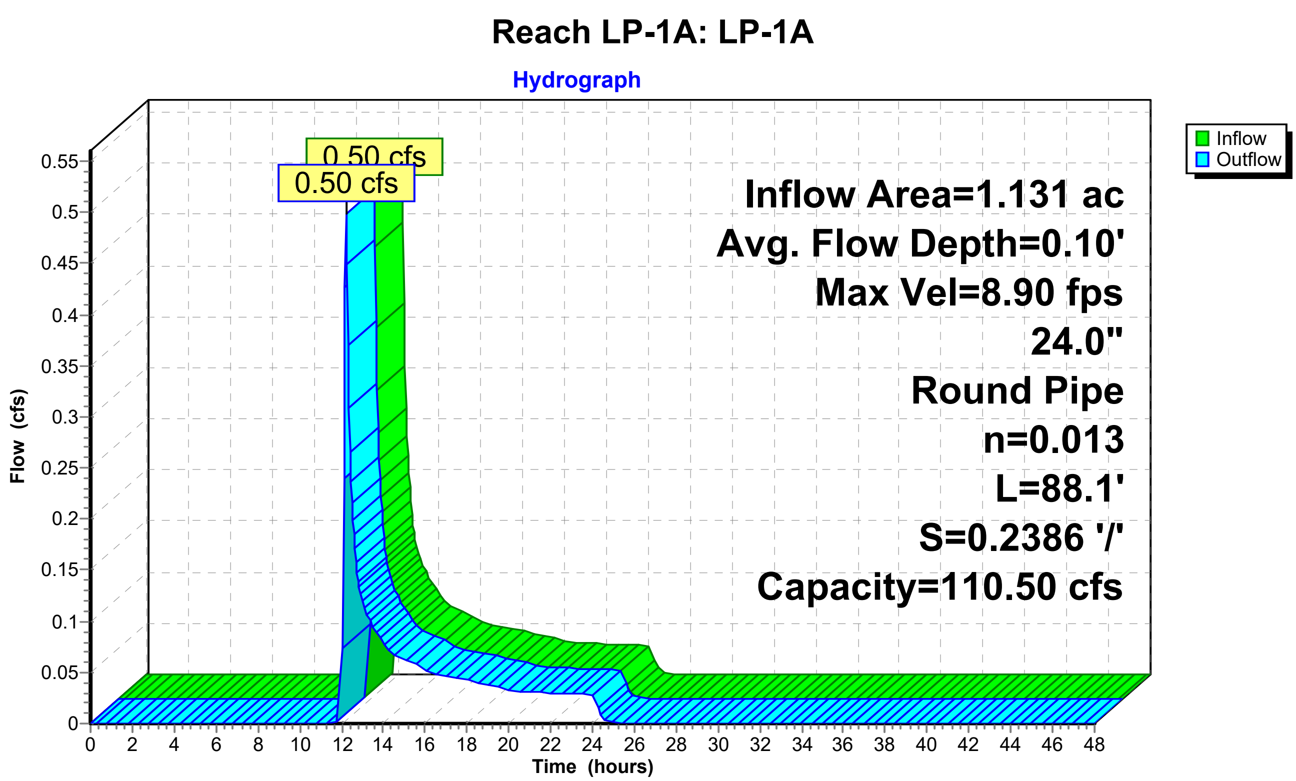
Inflow Area = 1.131 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.50 cfs @ 12.20 hrs, Volume= 0.062 af
Outflow = 0.50 cfs @ 12.20 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.90 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.46 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 110.50 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 88.1' Slope= 0.2386 '/'
Inlet Invert= 90.02', Outlet Invert= 69.00'





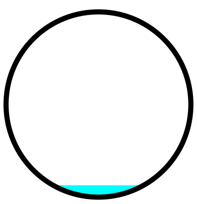
Summary for Reach LP-1B: LP-1B

Inflow Area = 1.940 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.84 cfs @ 12.17 hrs, Volume= 0.106 af
Outflow = 0.83 cfs @ 12.17 hrs, Volume= 0.106 af, Atten= 1%, Lag= 0.2 min

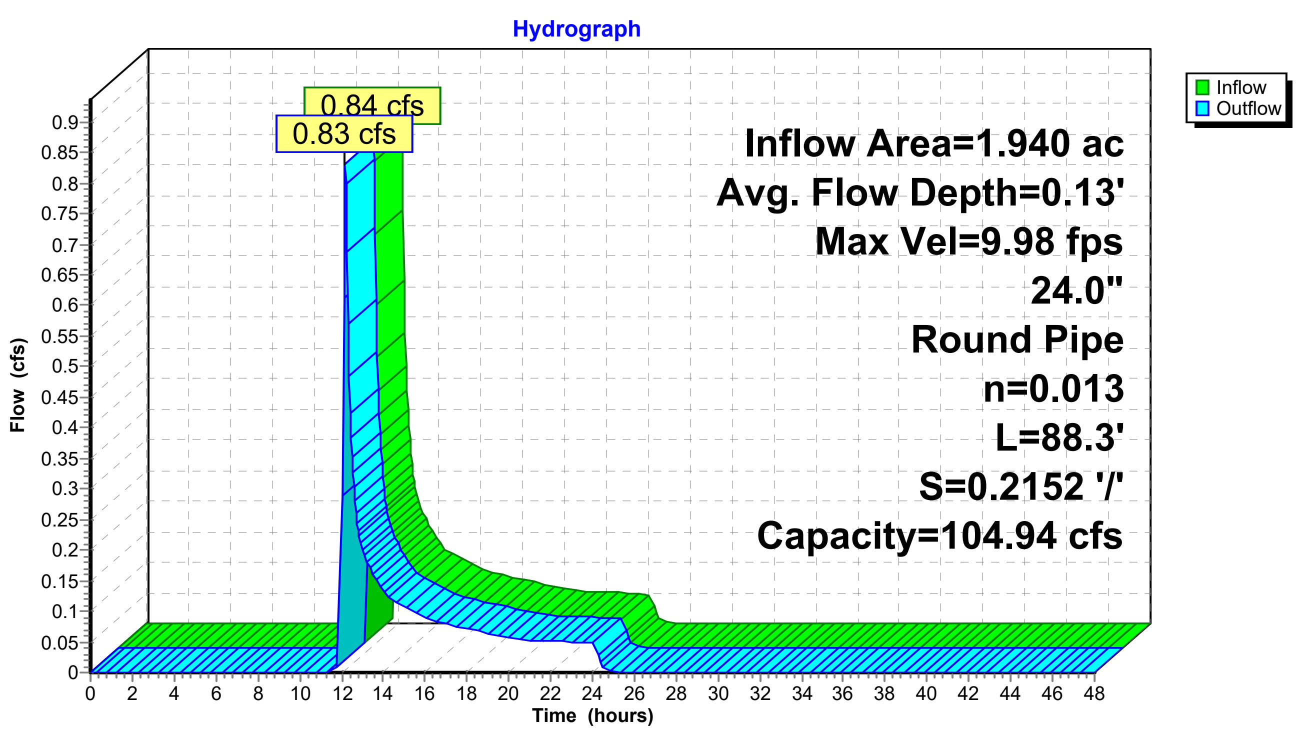
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.98 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.91 fps, Avg. Travel Time= 0.3 min

Peak Storage= 7 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 104.94 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 88.3' Slope= 0.2152 '/'
Inlet Invert= 69.00', Outlet Invert= 50.00'



Reach LP-1B: LP-1B



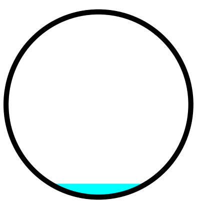
Summary for Reach LP-1C: LP-1C

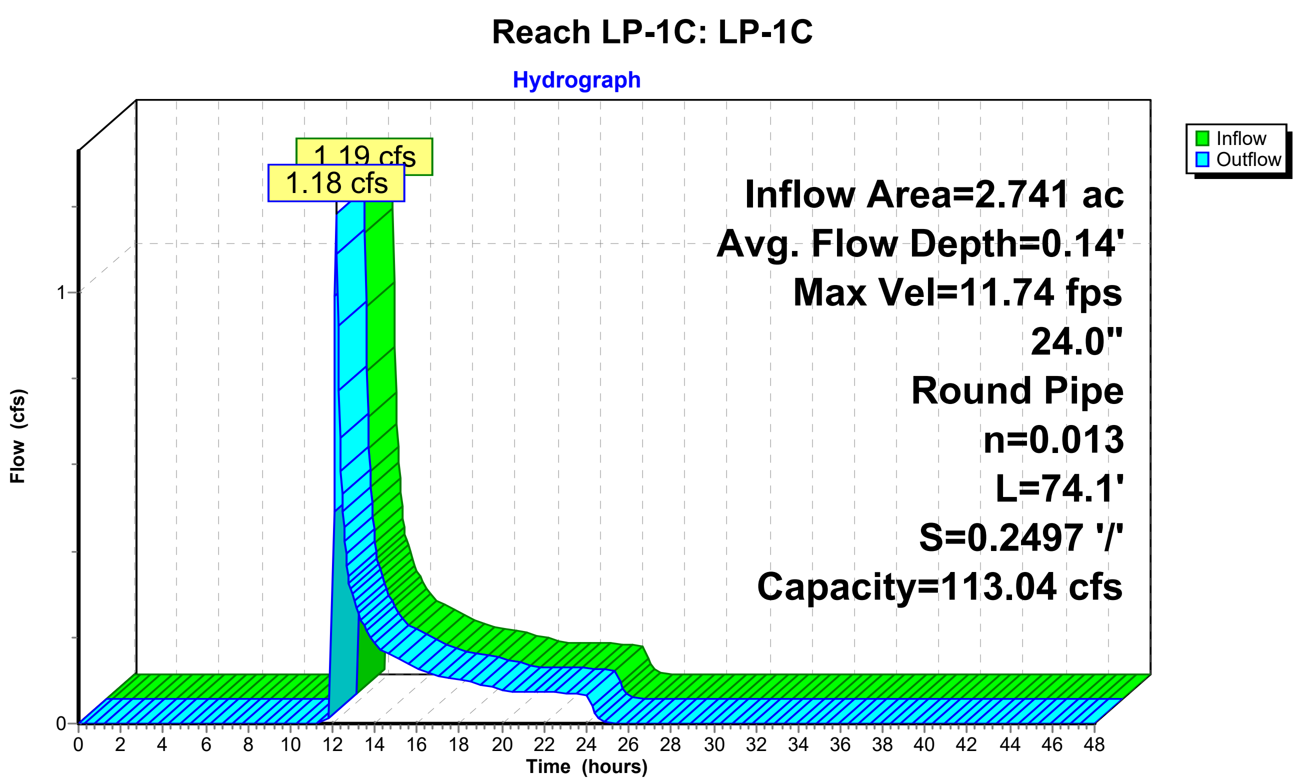
Inflow Area = 2.741 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.19 cfs @ 12.16 hrs, Volume= 0.150 af
Outflow = 1.18 cfs @ 12.16 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.74 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.64 fps, Avg. Travel Time= 0.2 min

Peak Storage= 7 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 113.04 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 74.1' Slope= 0.2497 '/'
Inlet Invert= 50.00', Outlet Invert= 31.50'





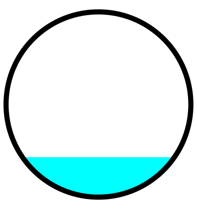
Summary for Reach LP-1D: LP-1D

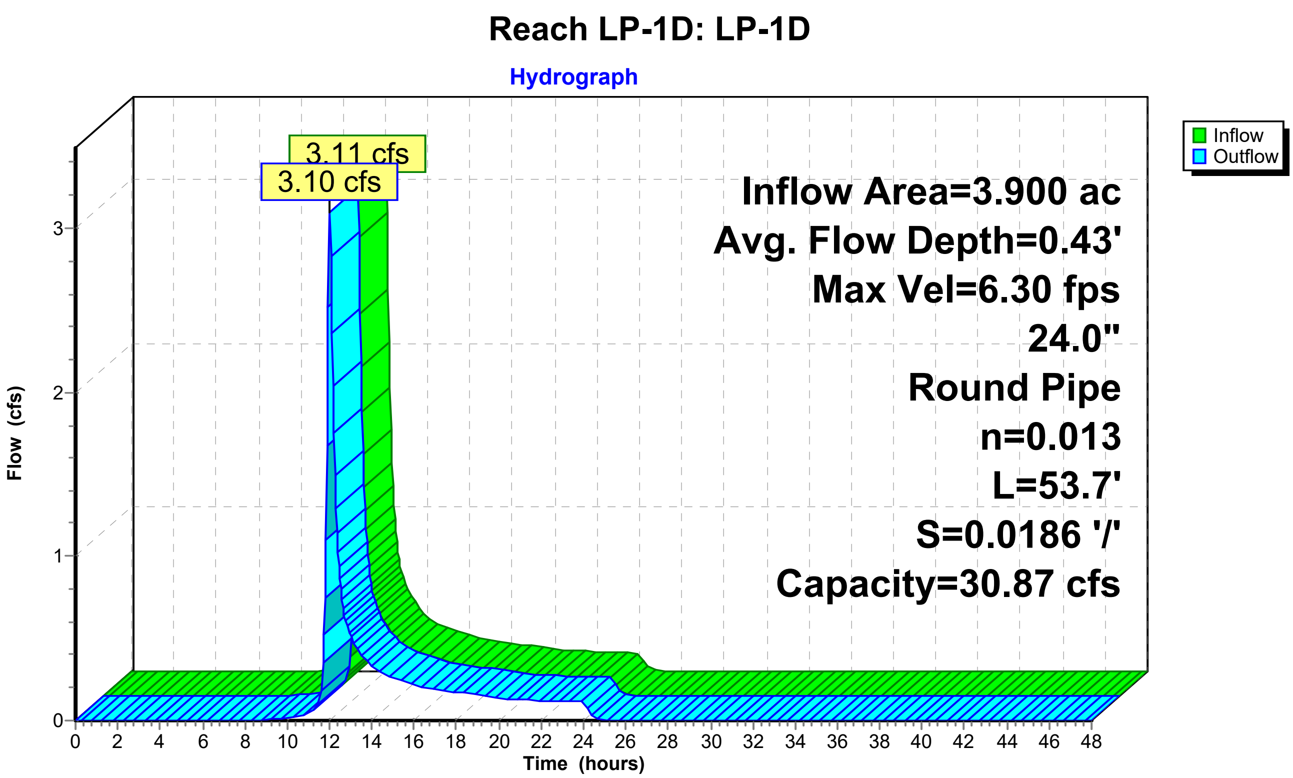
Inflow Area =	3.900 ac,	0.00% Impervious, Inflow Depth =	0.98"	for 25-yr,24-hr event
Inflow =	3.11 cfs @	12.01 hrs, Volume=	0.317 af	
Outflow =	3.10 cfs @	12.01 hrs, Volume=	0.317 af,	Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.30 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.38 fps, Avg. Travel Time= 0.4 min

Peak Storage= 27 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 30.87 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 53.7' Slope= 0.0186 '/'
Inlet Invert= 31.50', Outlet Invert= 30.50'





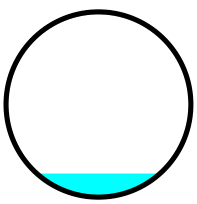
Summary for Reach LP-1E: LP-1E

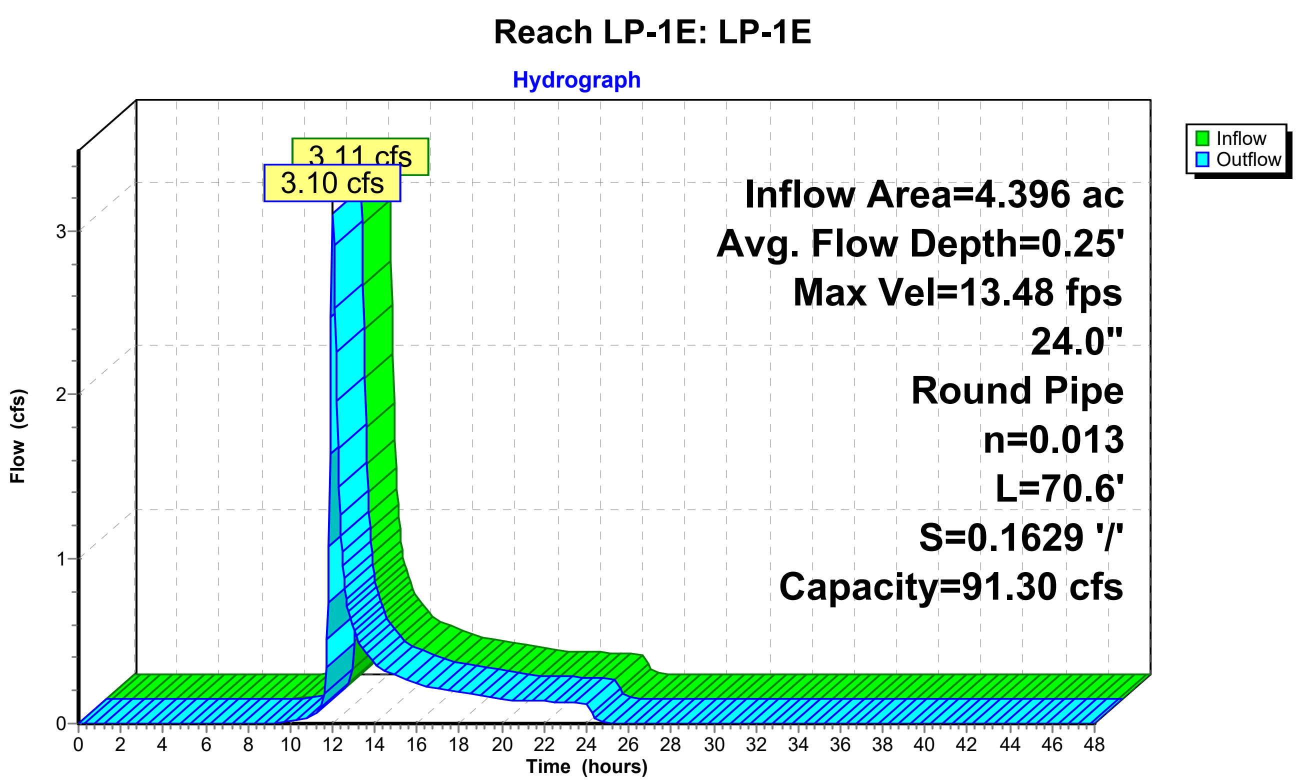
Inflow Area = 4.396 ac, 0.00% Impervious, Inflow Depth = 0.94" for 25-yr,24-hr event
Inflow = 3.11 cfs @ 12.01 hrs, Volume= 0.344 af
Outflow = 3.10 cfs @ 12.01 hrs, Volume= 0.344 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.48 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.39 fps, Avg. Travel Time= 0.2 min

Peak Storage= 16 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 91.30 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 70.6' Slope= 0.1629 '/'
Inlet Invert= 30.50', Outlet Invert= 19.00'





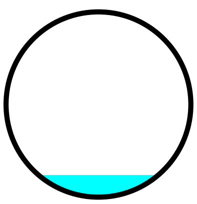
Summary for Reach LP-1F: LP-1F

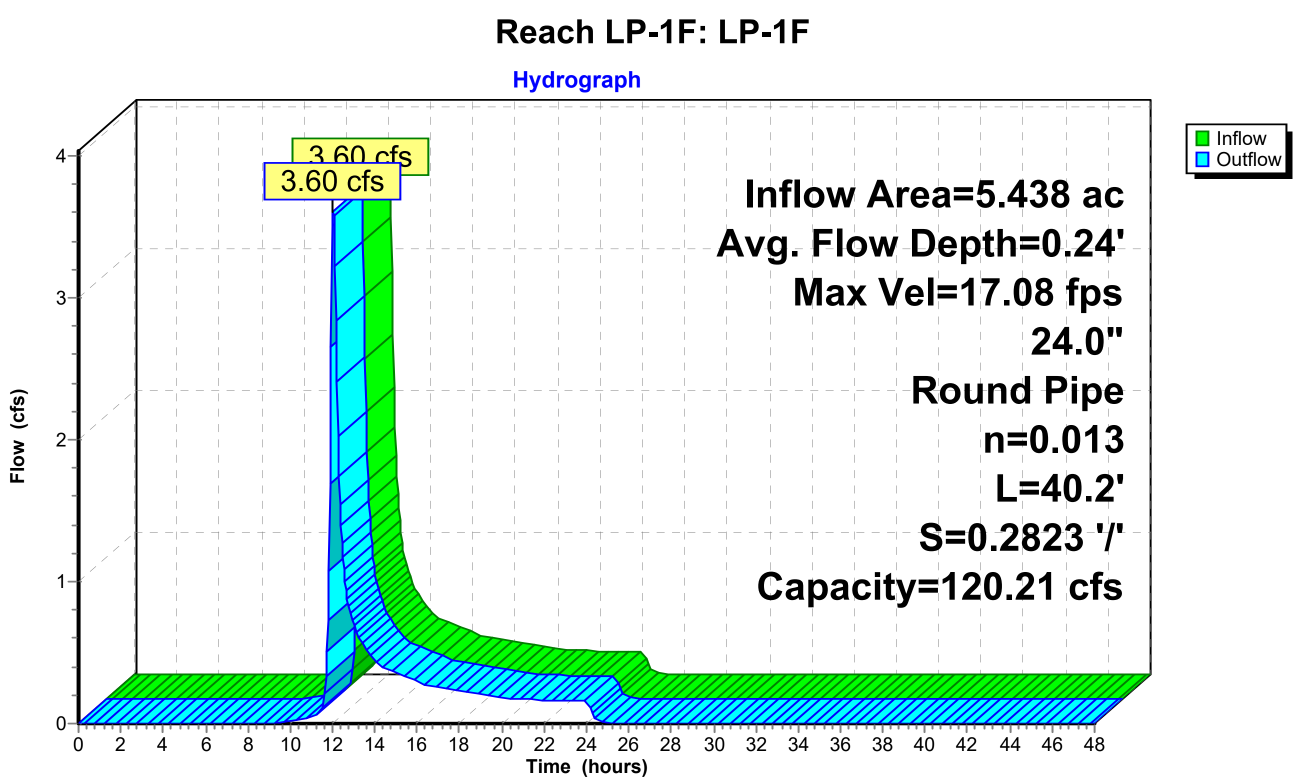
Inflow Area = 5.438 ac, 0.00% Impervious, Inflow Depth = 0.91" for 25-yr,24-hr event
Inflow = 3.60 cfs @ 12.03 hrs, Volume= 0.414 af
Outflow = 3.60 cfs @ 12.03 hrs, Volume= 0.414 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 17.08 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 6.92 fps, Avg. Travel Time= 0.1 min

Peak Storage= 8 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 120.21 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 40.2' Slope= 0.2823 '/'
Inlet Invert= 19.00', Outlet Invert= 7.65'





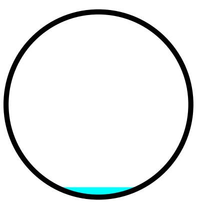
Summary for Reach LP-2A: LP-2A

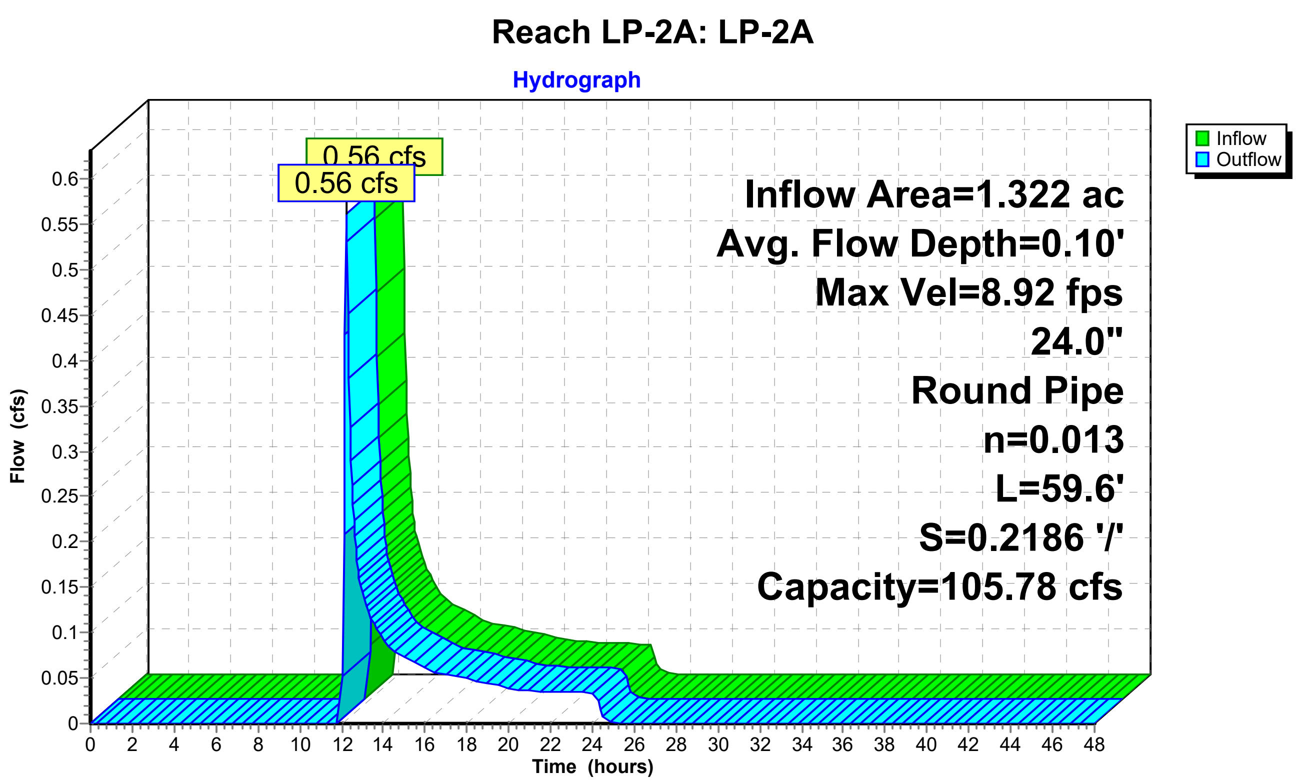
Inflow Area = 1.322 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.56 cfs @ 12.21 hrs, Volume= 0.072 af
Outflow = 0.56 cfs @ 12.22 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.92 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.48 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 105.78 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 59.6' Slope= 0.2186 '/'
Inlet Invert= 90.03', Outlet Invert= 77.00'





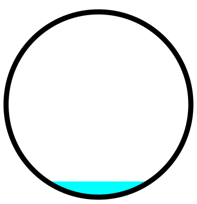
Summary for Reach LP-2B: LP-2B

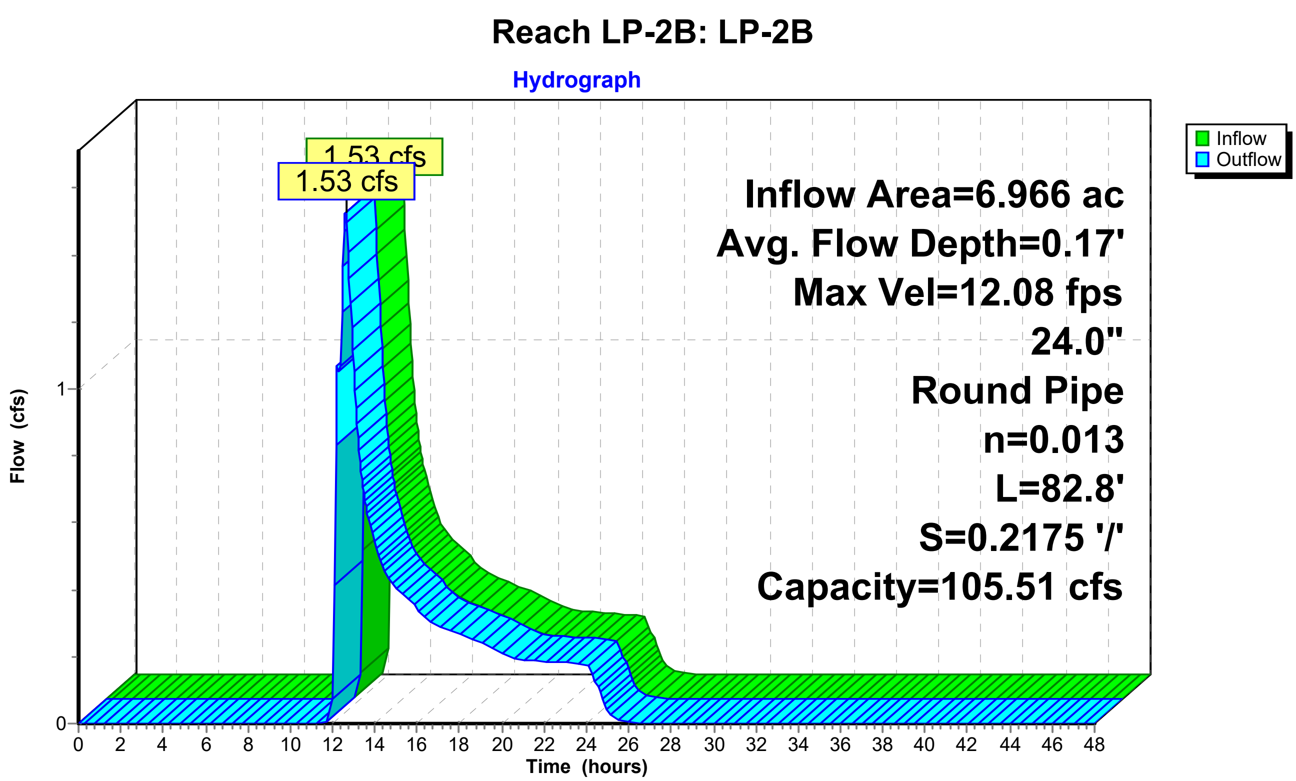
Inflow Area = 6.966 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.53 cfs @ 12.62 hrs, Volume= 0.382 af
Outflow = 1.53 cfs @ 12.62 hrs, Volume= 0.382 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.08 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.61 fps, Avg. Travel Time= 0.2 min

Peak Storage= 10 cf @ 12.62 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 105.51 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 82.8' Slope= 0.2175 '/'
Inlet Invert= 77.00', Outlet Invert= 58.99'





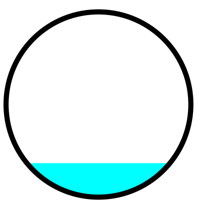
Summary for Reach LP-2C: LP-2C

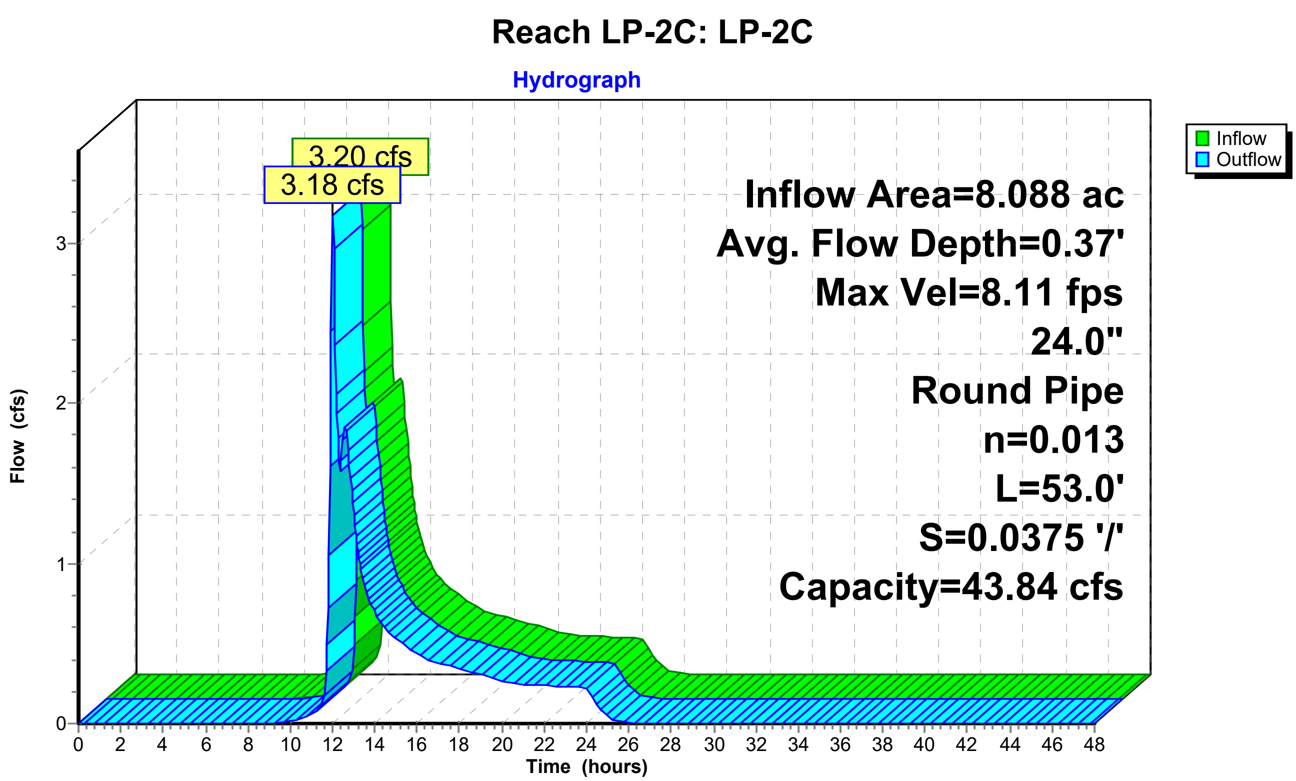
Inflow Area = 8.088 ac, 0.00% Impervious, Inflow Depth = 0.84" for 25-yr,24-hr event
Inflow = 3.20 cfs @ 12.01 hrs, Volume= 0.563 af
Outflow = 3.18 cfs @ 12.01 hrs, Volume= 0.563 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.11 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.44 fps, Avg. Travel Time= 0.3 min

Peak Storage= 21 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 43.84 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 53.0' Slope= 0.0375 '/'
Inlet Invert= 58.99', Outlet Invert= 57.00'





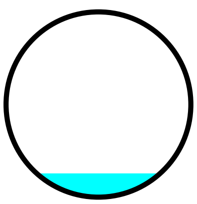
Summary for Reach LP-2D: LP-2D

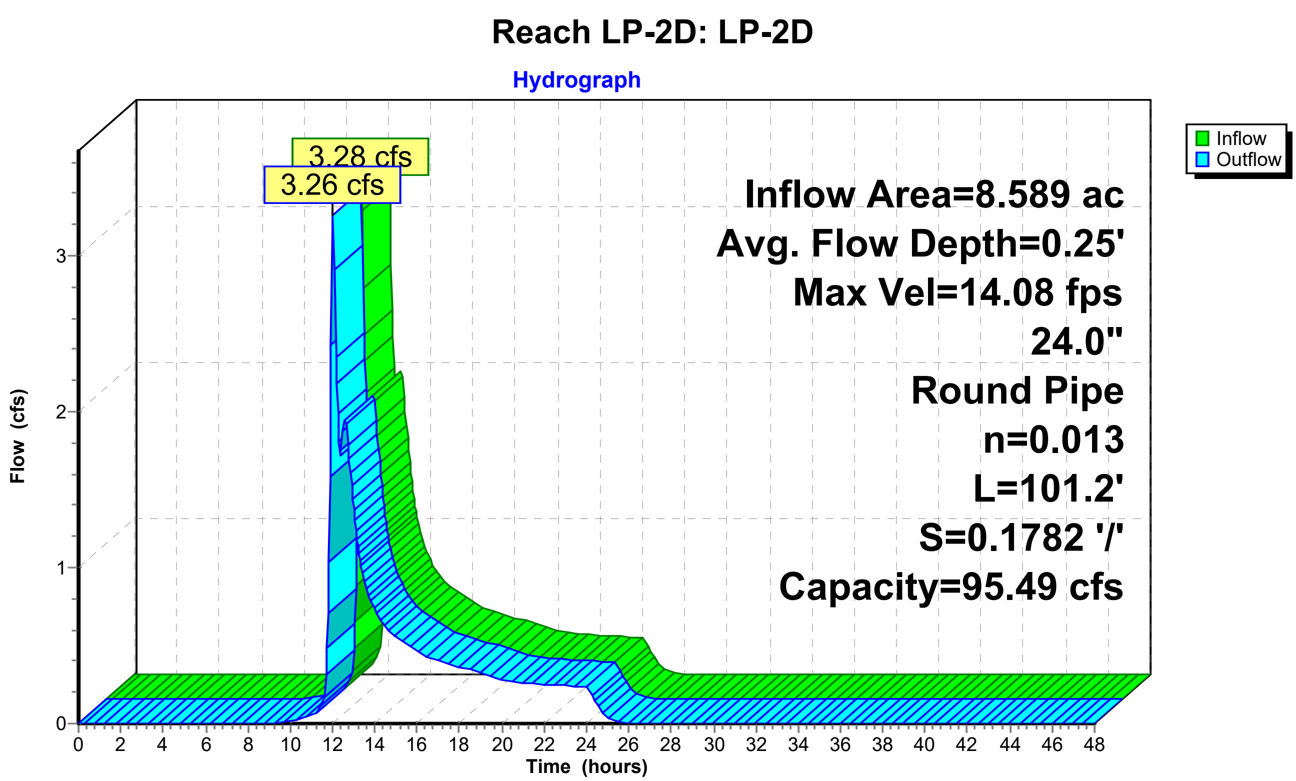
Inflow Area = 8.589 ac, 0.00% Impervious, Inflow Depth = 0.83" for 25-yr,24-hr event
Inflow = 3.28 cfs @ 12.02 hrs, Volume= 0.595 af
Outflow = 3.26 cfs @ 12.02 hrs, Volume= 0.595 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.08 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.29 fps, Avg. Travel Time= 0.3 min

Peak Storage= 23 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 95.49 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 101.2' Slope= 0.1782 '/'
Inlet Invert= 57.00', Outlet Invert= 38.97'





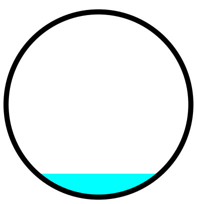
Summary for Reach LP-2E: LP-2E

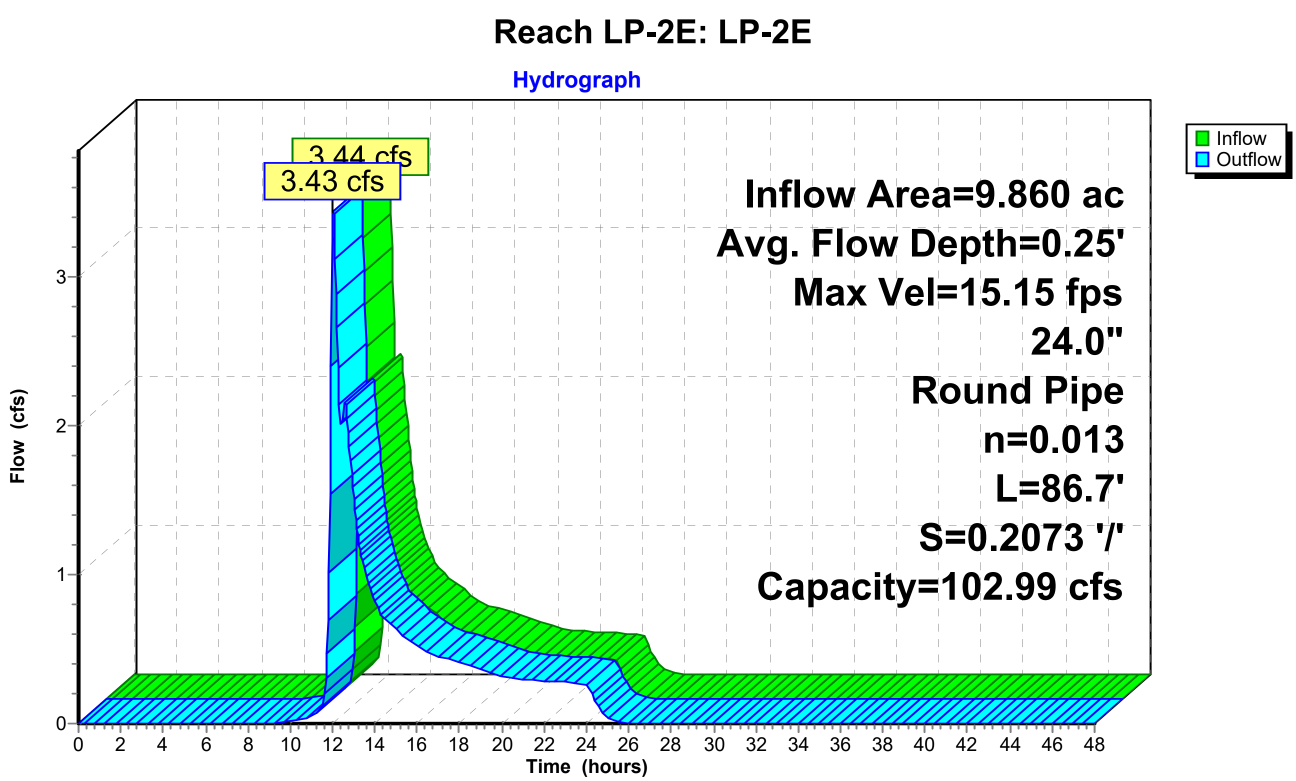
Inflow Area = 9.860 ac, 0.00% Impervious, Inflow Depth = 0.81" for 25-yr,24-hr event
Inflow = 3.44 cfs @ 12.04 hrs, Volume= 0.665 af
Outflow = 3.43 cfs @ 12.04 hrs, Volume= 0.665 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 15.15 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.82 fps, Avg. Travel Time= 0.2 min

Peak Storage= 20 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 102.99 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 86.7' Slope= 0.2073 '/'
Inlet Invert= 38.97', Outlet Invert= 21.00'





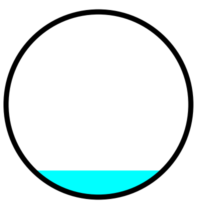
Summary for Reach LP-2F: LP-2F

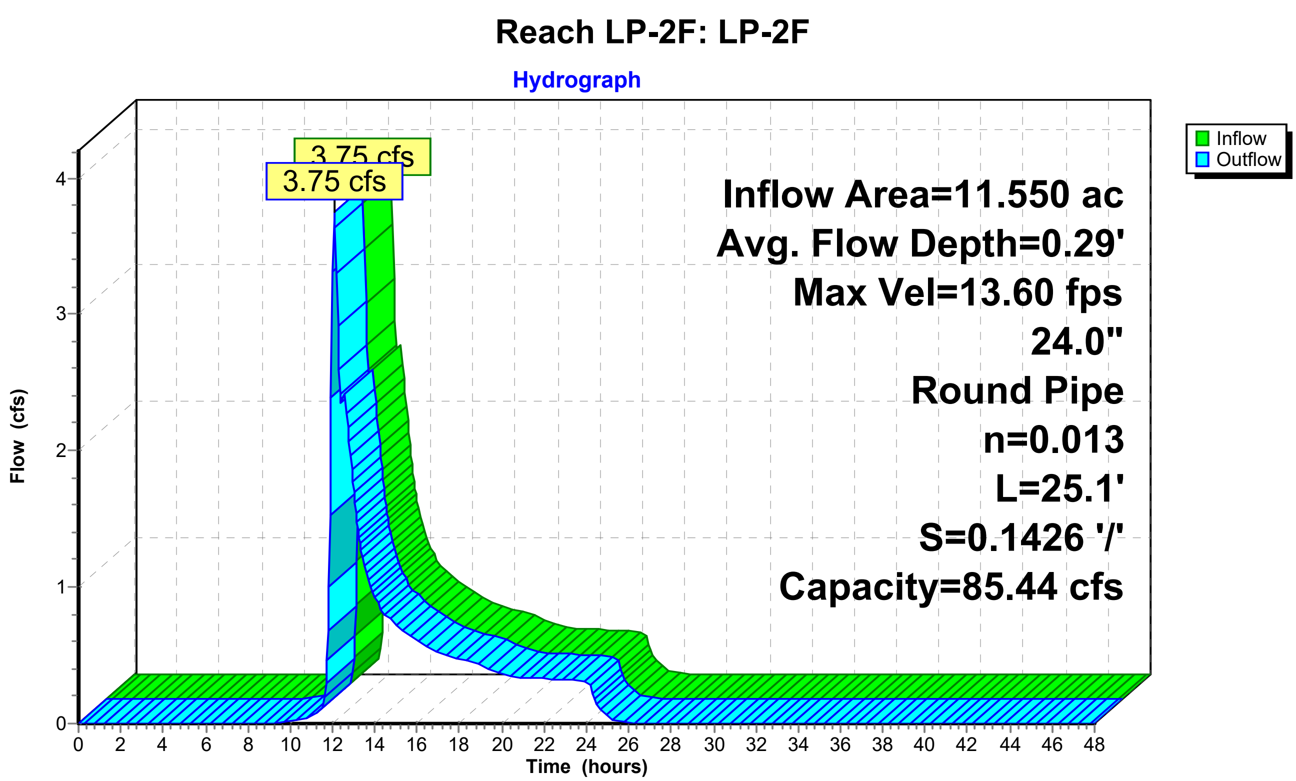
Inflow Area = 11.550 ac, 0.00% Impervious, Inflow Depth = 0.79" for 25-yr,24-hr event
Inflow = 3.75 cfs @ 12.07 hrs, Volume= 0.757 af
Outflow = 3.75 cfs @ 12.07 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.60 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 6.13 fps, Avg. Travel Time= 0.1 min

Peak Storage= 7 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 85.44 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 25.1' Slope= 0.1426 '/'
Inlet Invert= 21.00', Outlet Invert= 17.42'





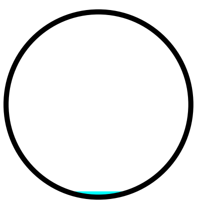
Summary for Reach LP-3A: LP-3A

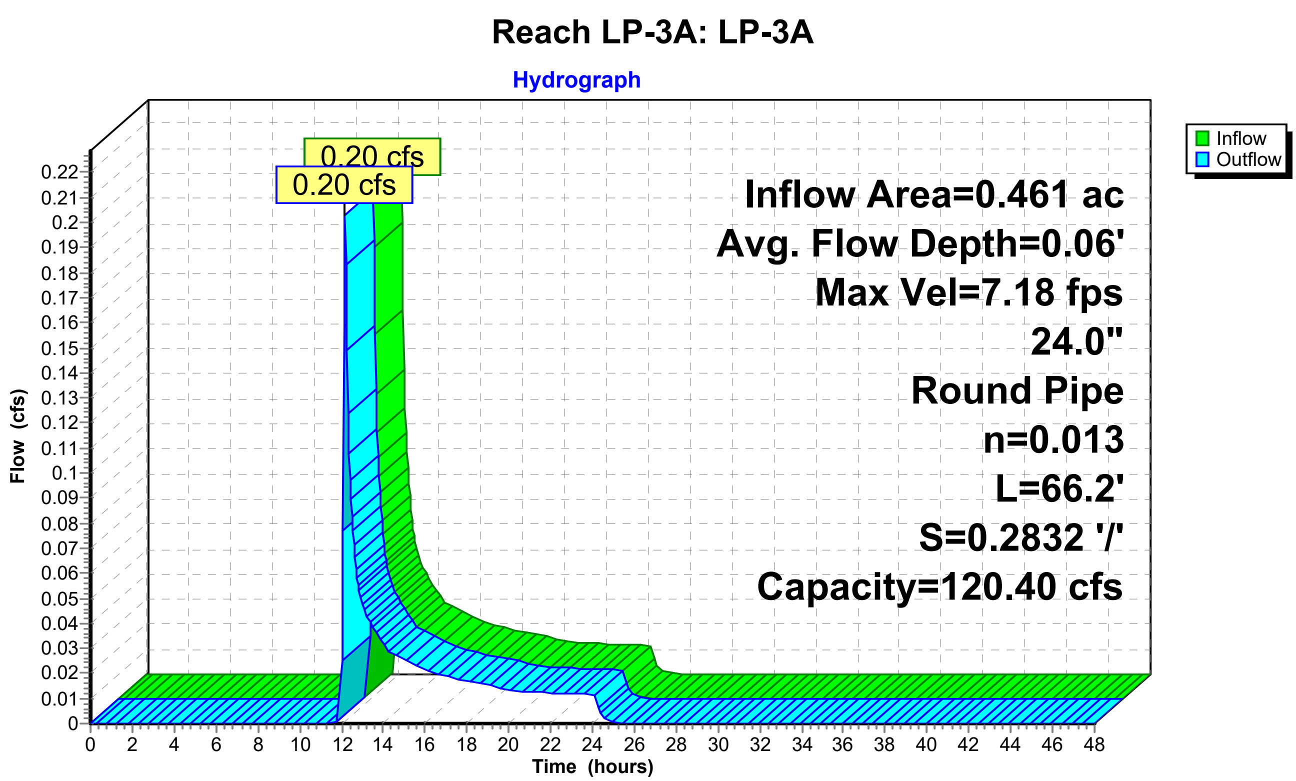
Inflow Area = 0.461 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.20 cfs @ 12.16 hrs, Volume= 0.025 af
Outflow = 0.20 cfs @ 12.16 hrs, Volume= 0.025 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.18 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.76 fps, Avg. Travel Time= 0.3 min

Peak Storage= 2 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 120.40 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 66.2' Slope= 0.2832 '/'
Inlet Invert= 83.59', Outlet Invert= 64.84'





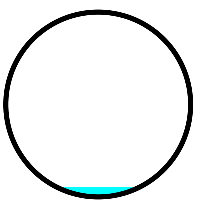
Summary for Reach LP-3B: LP-3B

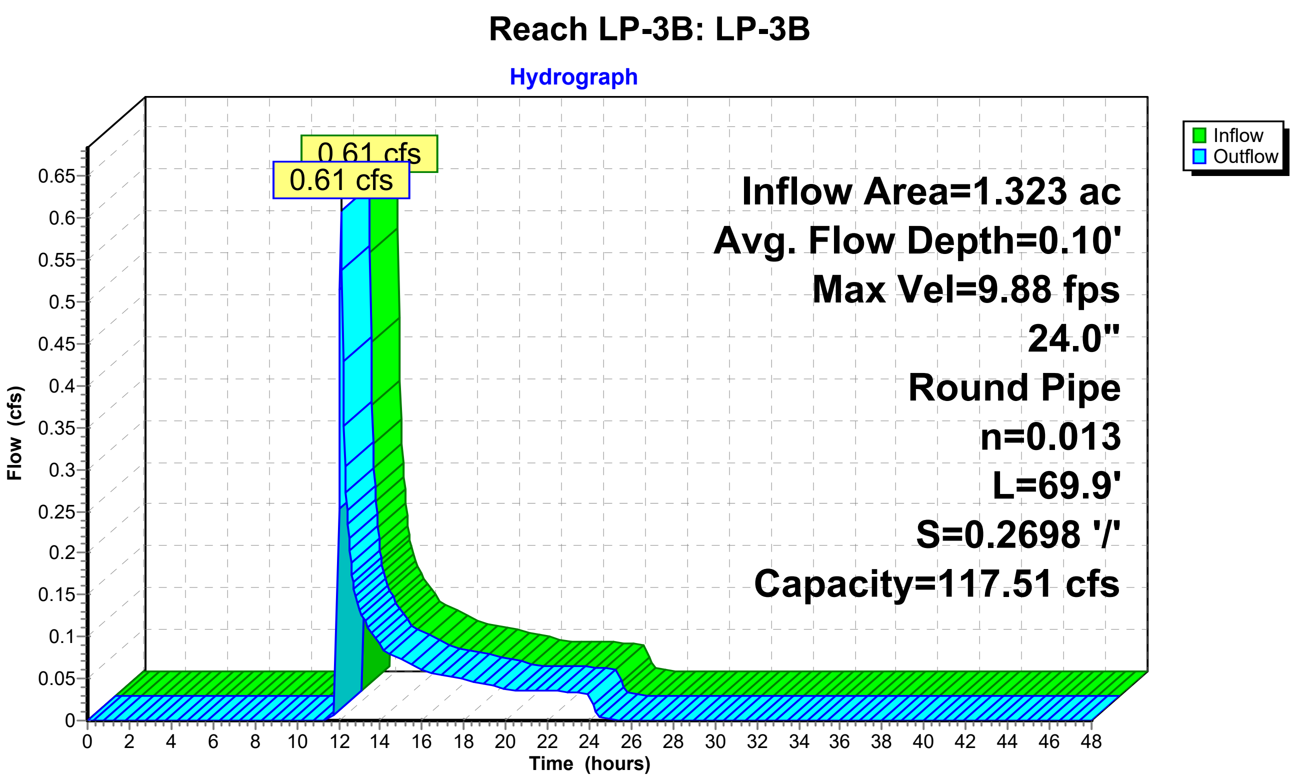
Inflow Area = 1.323 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.61 cfs @ 12.10 hrs, Volume= 0.072 af
Outflow = 0.61 cfs @ 12.10 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.88 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.86 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 117.51 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 69.9' Slope= 0.2698 '/'
Inlet Invert= 64.84', Outlet Invert= 45.98'





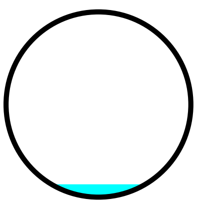
Summary for Reach LP-3C: LP-3C

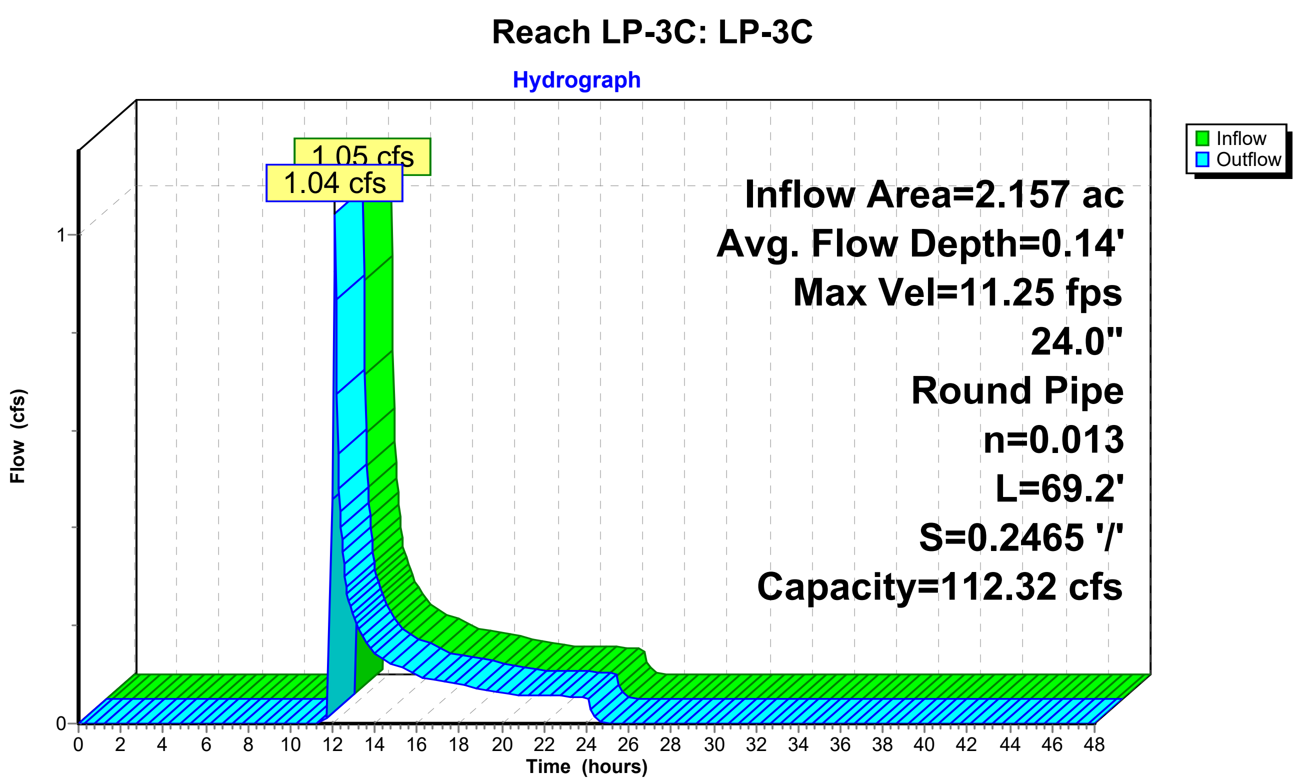
Inflow Area = 2.157 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.05 cfs @ 12.09 hrs, Volume= 0.118 af
Outflow = 1.04 cfs @ 12.10 hrs, Volume= 0.118 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.25 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.30 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 112.32 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 69.2' Slope= 0.2465 '/'
Inlet Invert= 45.98', Outlet Invert= 28.92'





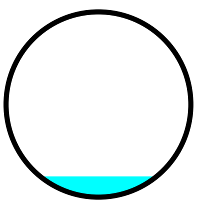
Summary for Reach LP-3D: LP-3D

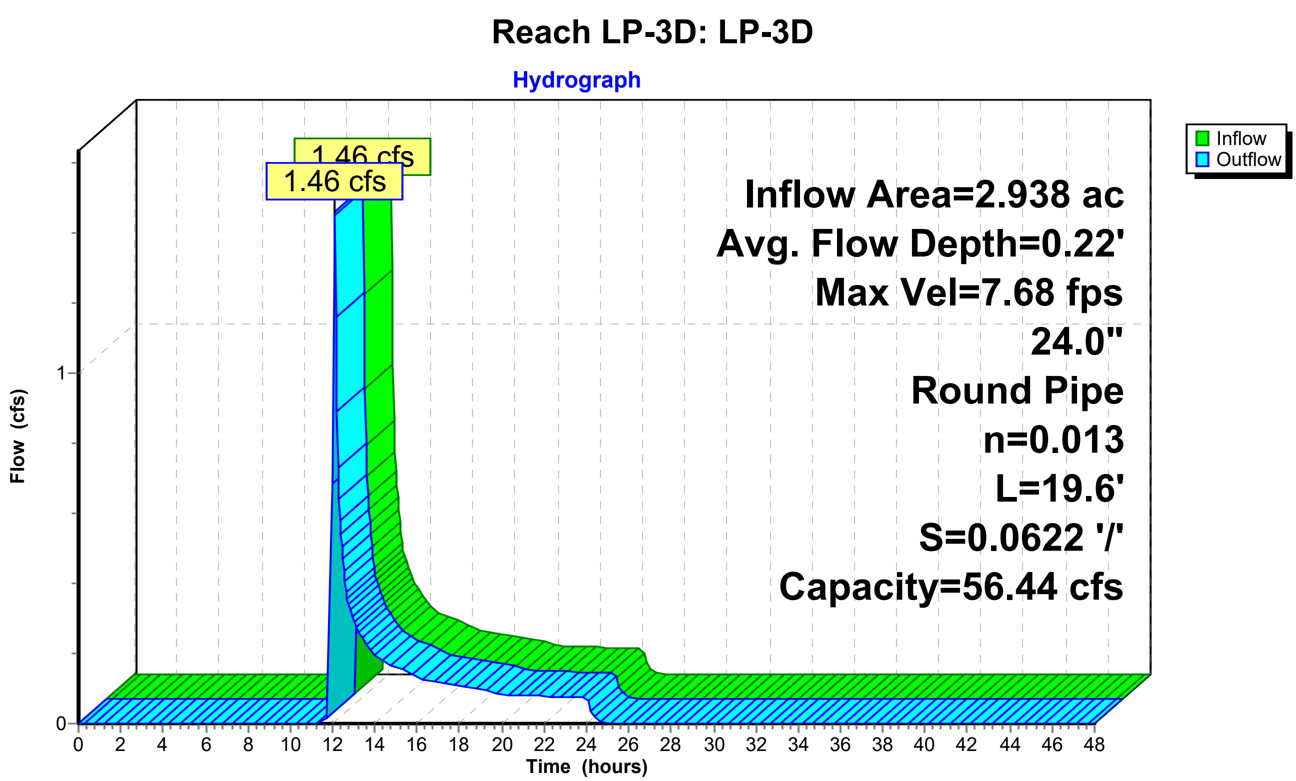
Inflow Area = 2.938 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.46 cfs @ 12.09 hrs, Volume= 0.161 af
Outflow = 1.46 cfs @ 12.09 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.68 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.46 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 56.44 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 19.6' Slope= 0.0622 '/'
Inlet Invert= 28.92', Outlet Invert= 27.70'





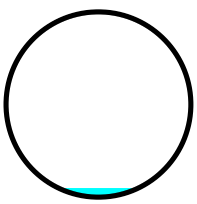
Summary for Reach LP-4A: LP-4A

Inflow Area = 1.883 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.50 cfs @ 12.52 hrs, Volume= 0.103 af
Outflow = 0.49 cfs @ 12.53 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.3 min

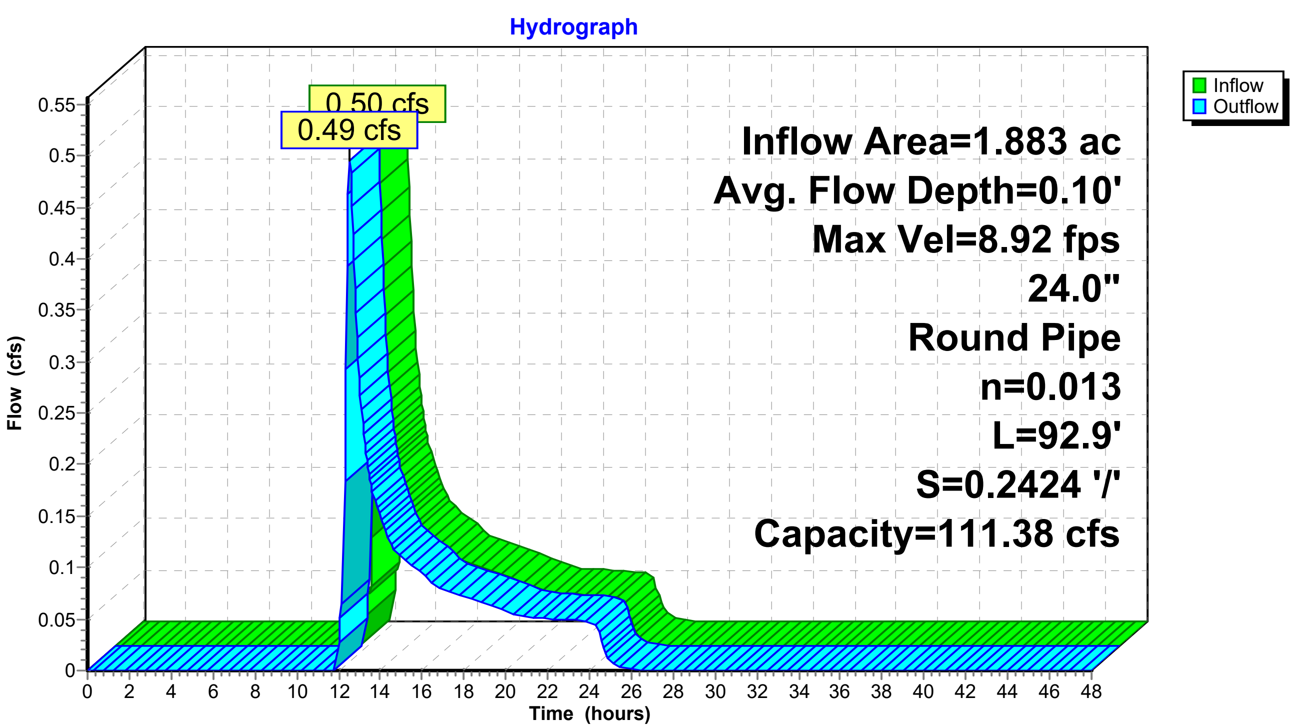
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.92 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.97 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 111.38 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 92.9' Slope= 0.2424 '/'
Inlet Invert= 91.52', Outlet Invert= 69.00'



Reach LP-4A: LP-4A



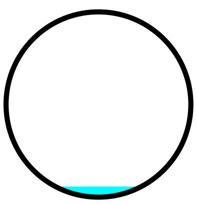
Summary for Reach LP-4B: LP-4B

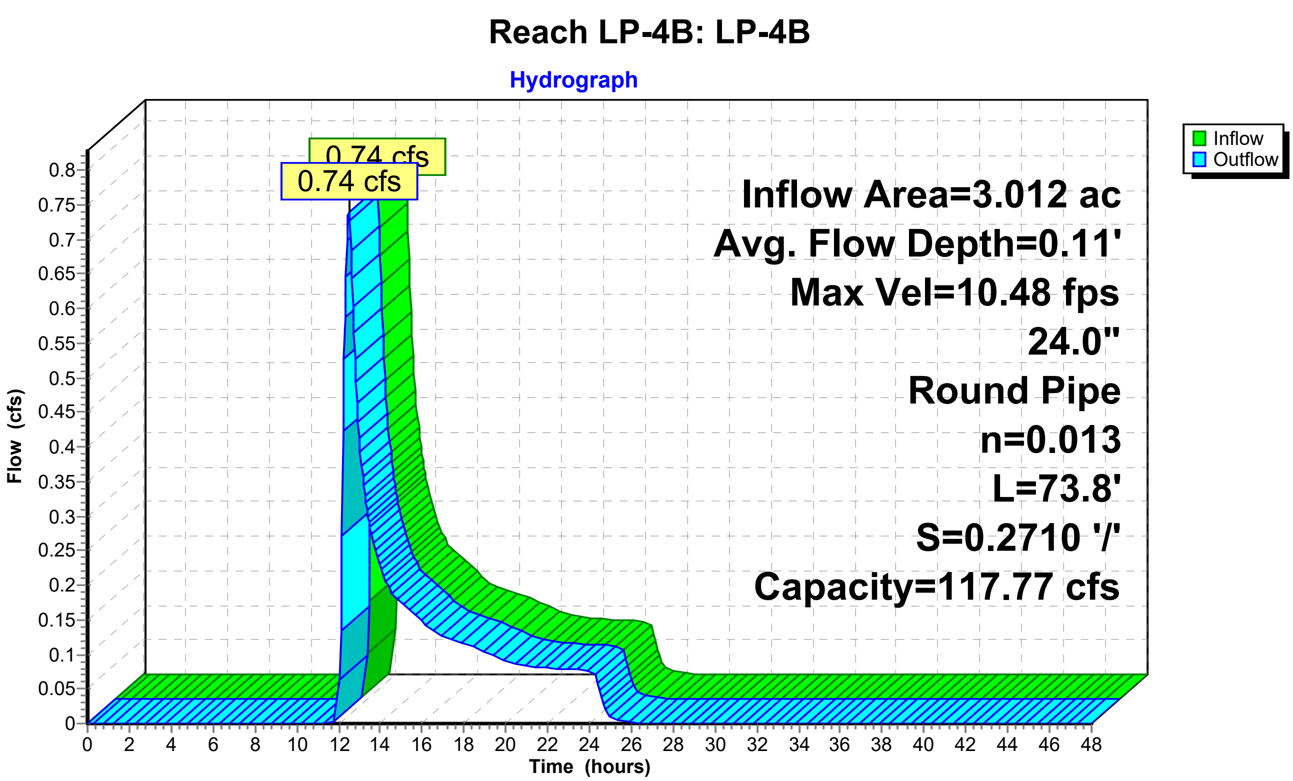
Inflow Area = 3.012 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.74 cfs @ 12.48 hrs, Volume= 0.165 af
Outflow = 0.74 cfs @ 12.48 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.48 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.81 fps, Avg. Travel Time= 0.2 min

Peak Storage= 5 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 117.77 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 73.8' Slope= 0.2710 '/'
Inlet Invert= 69.00', Outlet Invert= 49.00'





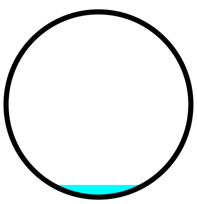
Summary for Reach LP-4C: LP-4C

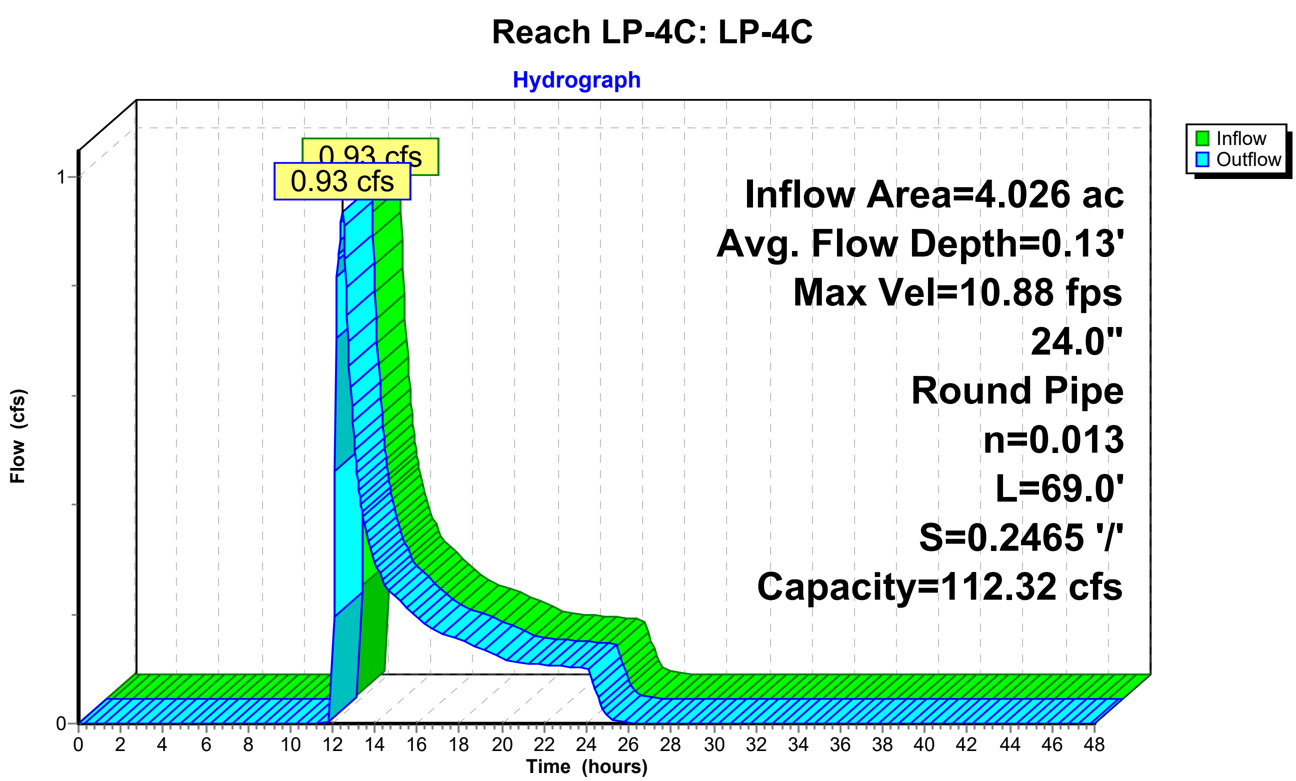
Inflow Area = 4.026 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.93 cfs @ 12.46 hrs, Volume= 0.221 af
Outflow = 0.93 cfs @ 12.46 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.88 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.06 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 112.32 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 69.0' Slope= 0.2465 '/'
Inlet Invert= 49.00', Outlet Invert= 31.99'





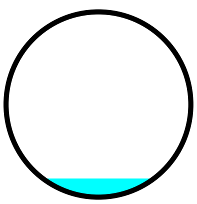
Summary for Reach LP-4D: LP-4D

Inflow Area = 5.075 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.24 cfs @ 12.21 hrs, Volume= 0.278 af
Outflow = 1.24 cfs @ 12.21 hrs, Volume= 0.278 af, Atten= 0%, Lag= 0.1 min

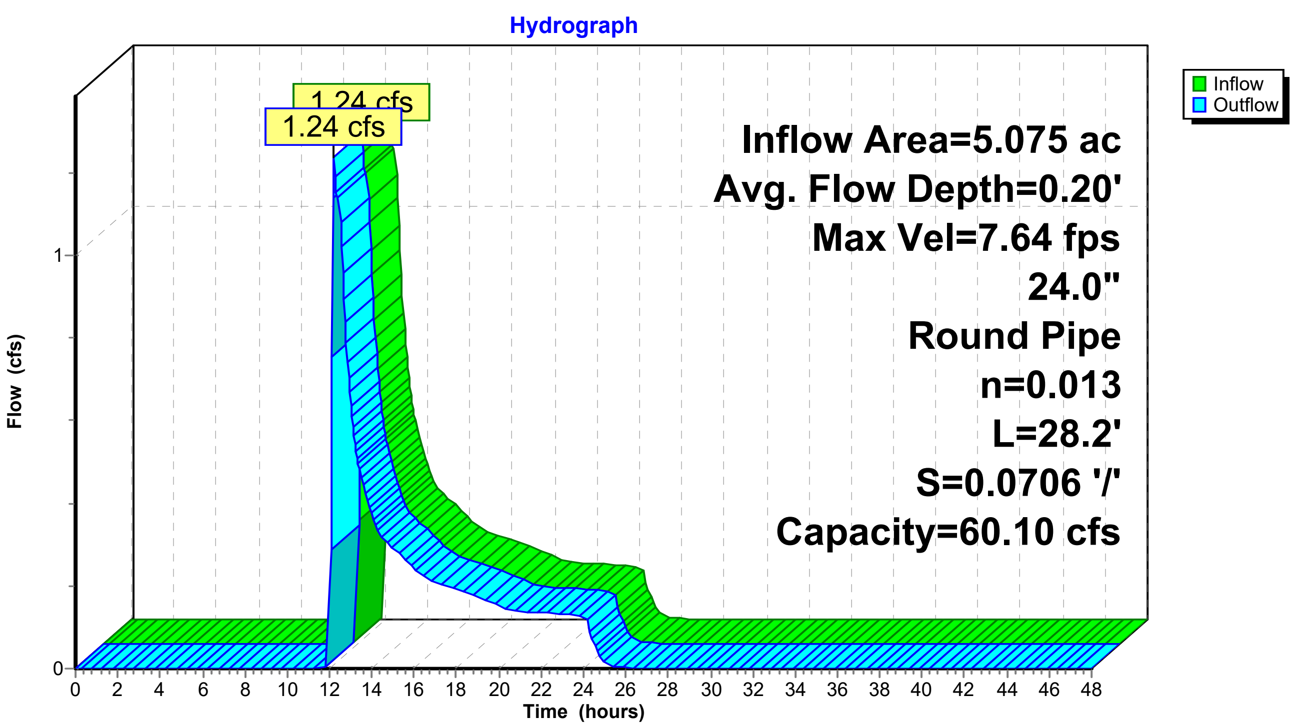
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.64 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.99 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 60.10 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 28.2' Slope= 0.0706 '/'
Inlet Invert= 31.99', Outlet Invert= 30.00'



Reach LP-4D: LP-4D



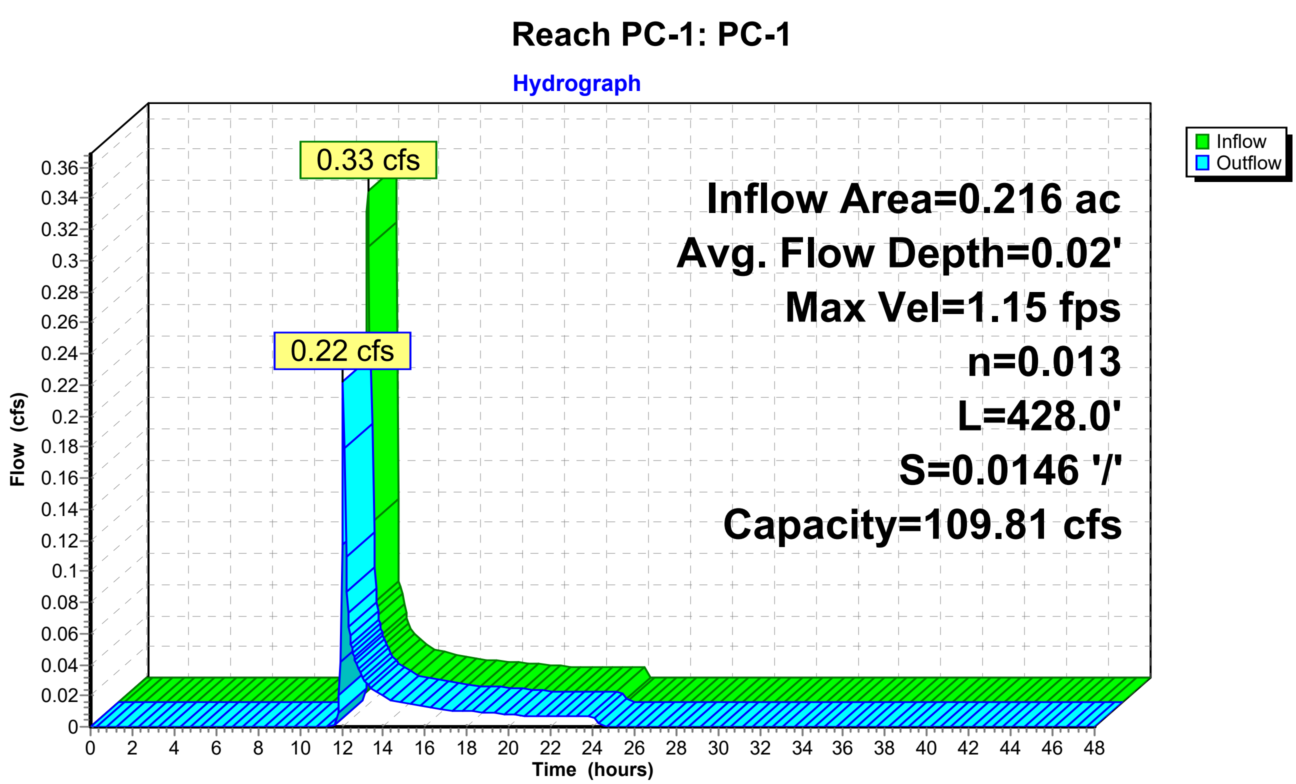
Summary for Reach PC-1: PC-1

Inflow Area = 0.216 ac, 0.00% Impervious, Inflow Depth = 0.94" for 25-yr,24-hr event
Inflow = 0.33 cfs @ 11.92 hrs, Volume= 0.017 af
Outflow = 0.22 cfs @ 12.07 hrs, Volume= 0.017 af, Atten= 33%, Lag= 9.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.15 fps, Min. Travel Time= 6.2 min
Avg. Velocity = 0.65 fps, Avg. Travel Time= 11.0 min

Peak Storage= 83 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.00' Flow Area= 9.0 sf, Capacity= 109.81 cfs

8.00' x 1.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 428.0' Slope= 0.0146 '/'
Inlet Invert= 36.24', Outlet Invert= 30.00'



Summary for Reach PC-2: PC-2

Inflow Area = 8.345 ac, 0.00% Impervious, Inflow Depth = 0.67" for 25-yr,24-hr event
Inflow = 2.50 cfs @ 12.13 hrs, Volume= 0.466 af
Outflow = 2.45 cfs @ 12.20 hrs, Volume= 0.466 af, Atten= 2%, Lag= 3.9 min

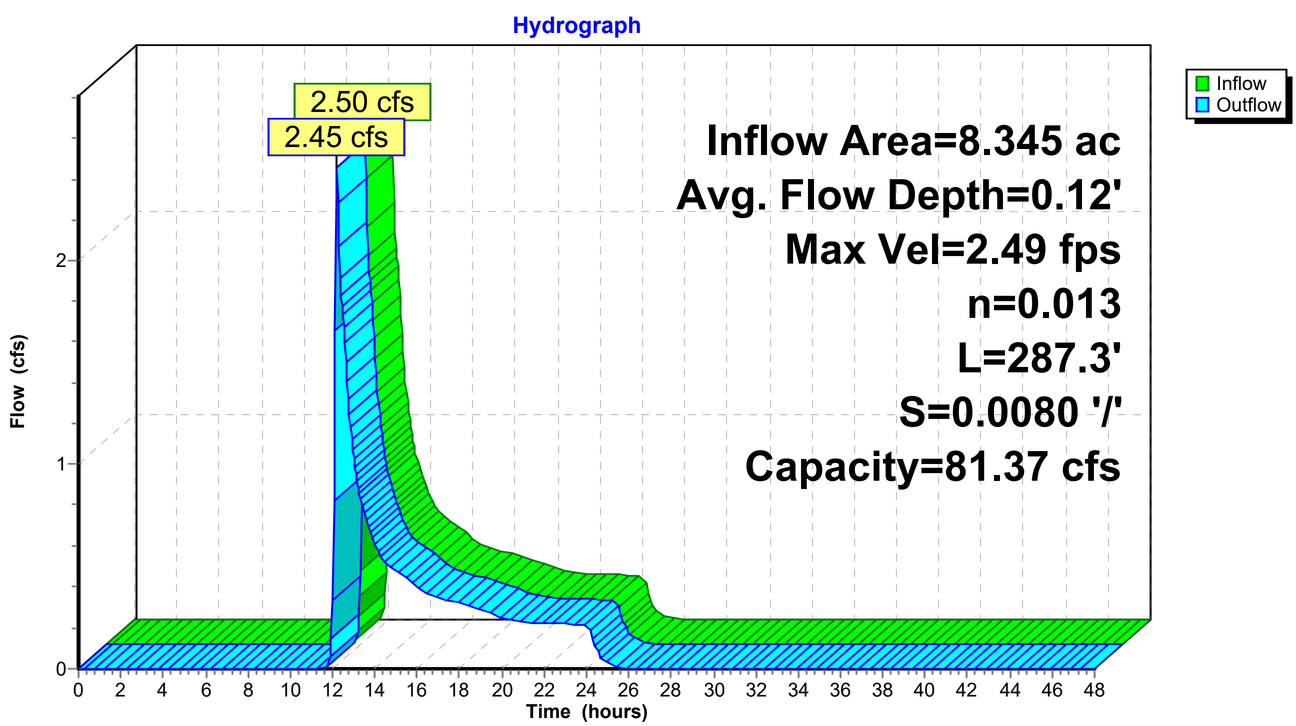
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.49 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 4.9 min

Peak Storage= 288 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 1.00' Flow Area= 9.0 sf, Capacity= 81.37 cfs

8.00' x 1.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 287.3' Slope= 0.0080 '/'
Inlet Invert= 30.00', Outlet Invert= 27.70'

‡

Reach PC-2: PC-2



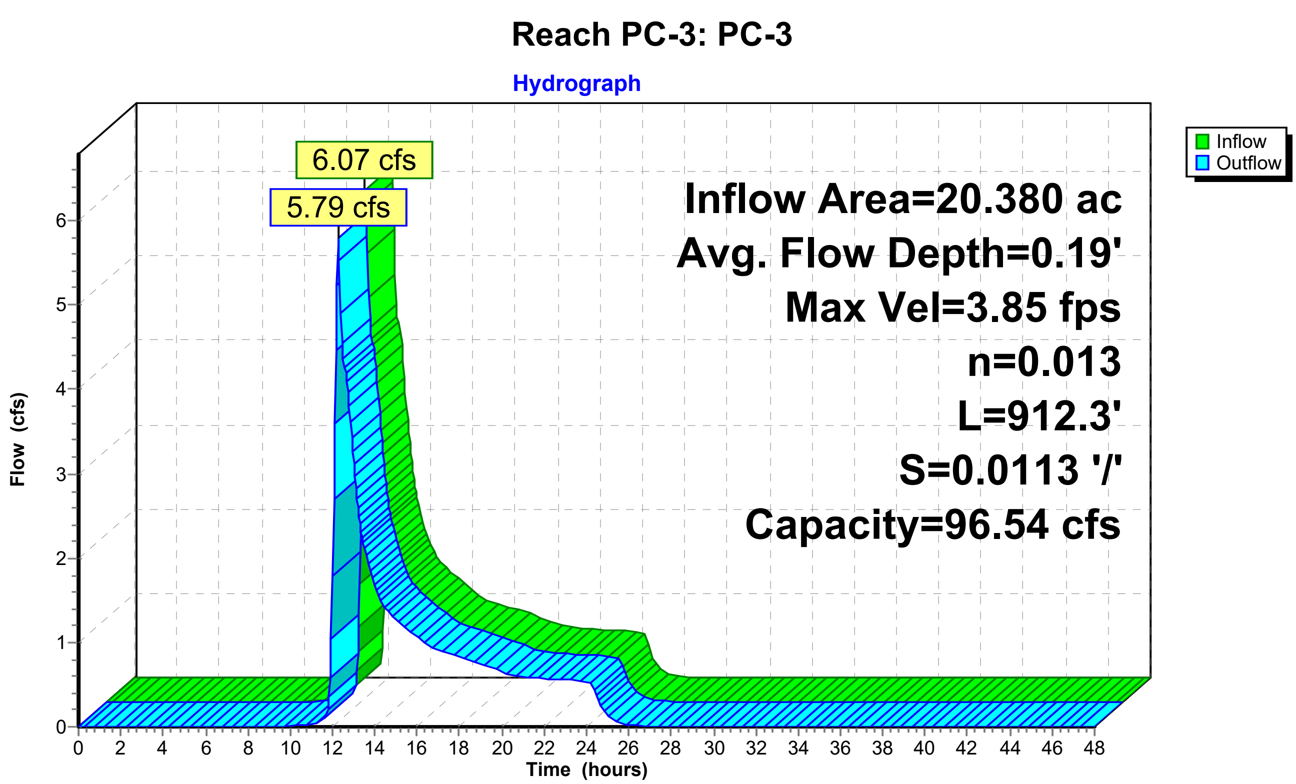
Summary for Reach PC-3: PC-3

Inflow Area =	20.380 ac,	0.00% Impervious, Inflow Depth = 0.74"	for 25-yr,24-hr event
Inflow =	6.07 cfs @	12.16 hrs, Volume=	1.262 af
Outflow =	5.79 cfs @	12.27 hrs, Volume=	1.262 af, Atten= 5%, Lag= 6.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.85 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 11.1 min

Peak Storage= 1,388 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.00' Flow Area= 9.0 sf, Capacity= 96.54 cfs

8.00' x 1.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 912.3' Slope= 0.0113 '/'
Inlet Invert= 27.70', Outlet Invert= 17.42'



Summary for Reach PC-4: PC-4

Inflow Area = 21.273 ac, 0.00% Impervious, Inflow Depth = 0.75" for 25-yr,24-hr event
Inflow = 5.98 cfs @ 12.27 hrs, Volume= 1.324 af
Outflow = 5.74 cfs @ 12.39 hrs, Volume= 1.324 af, Atten= 4%, Lag= 7.2 min

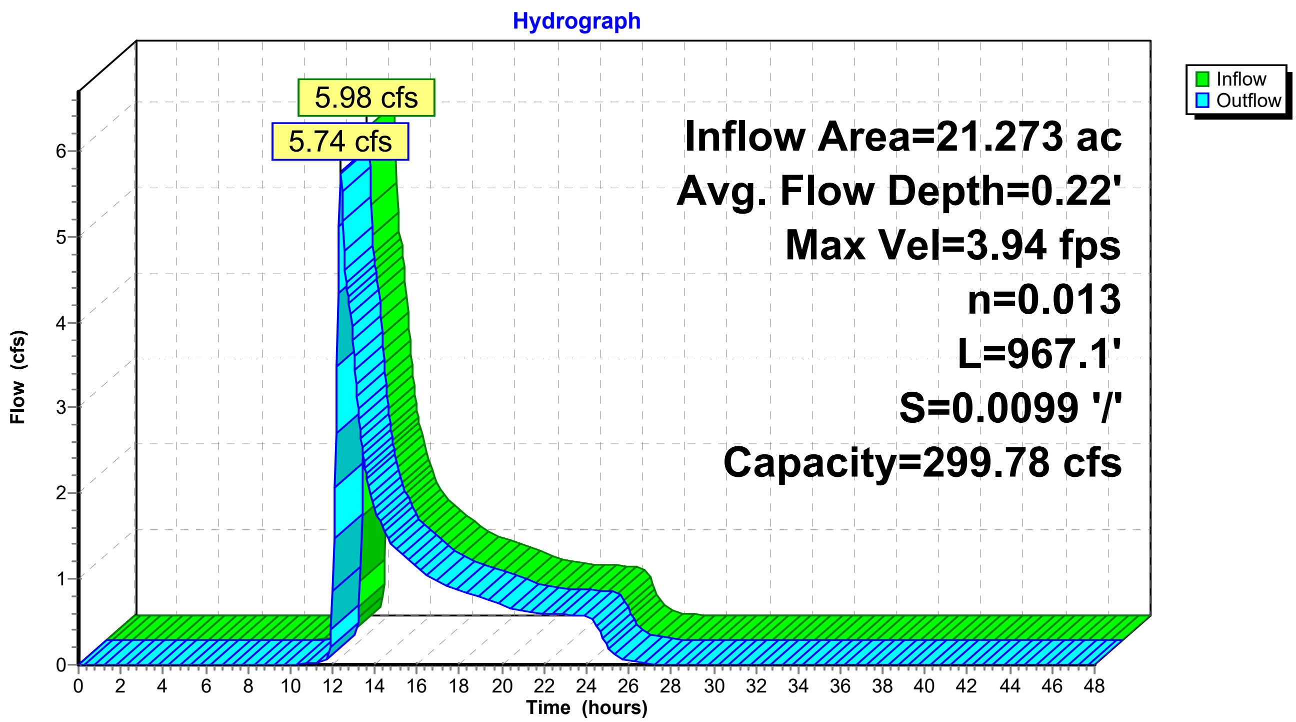
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.94 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 10.2 min

Peak Storage= 1,422 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 299.78 cfs

6.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 16.00'
Length= 967.1' Slope= 0.0099 '/'
Inlet Invert= 17.42', Outlet Invert= 7.83'

‡

Reach PC-4: PC-4



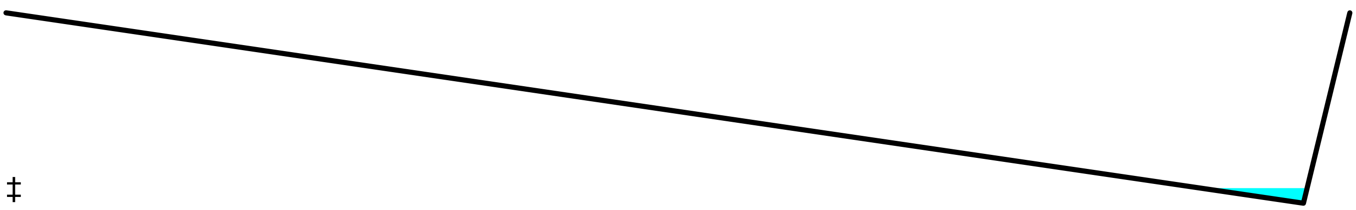
Summary for Reach TB-A1: TB-A1

Inflow Area = 0.744 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.45 cfs @ 12.04 hrs, Volume= 0.041 af
Outflow = 0.33 cfs @ 12.21 hrs, Volume= 0.041 af, Atten= 27%, Lag= 9.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.91 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 10.2 min

Peak Storage= 108 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 286.55 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 293.7' Slope= 0.0101 '/'
Inlet Invert= 93.00', Outlet Invert= 90.02'



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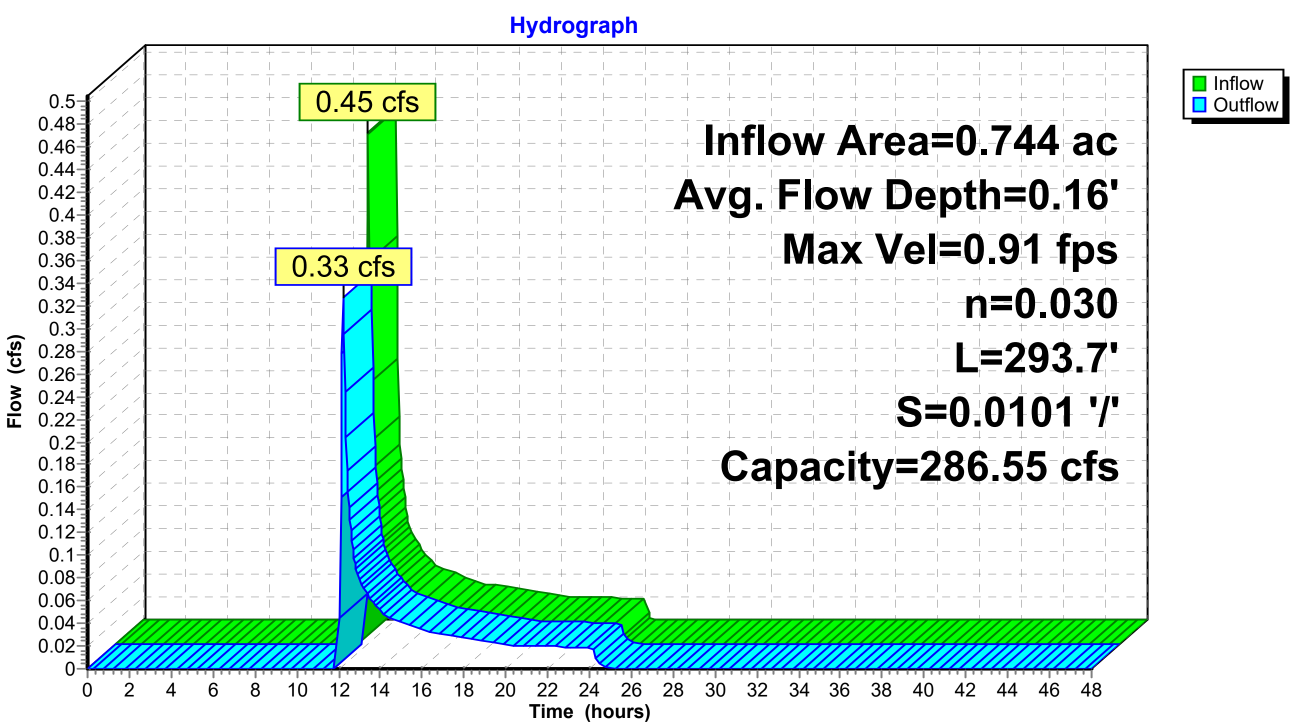
Reach TB-A1: TB-A1



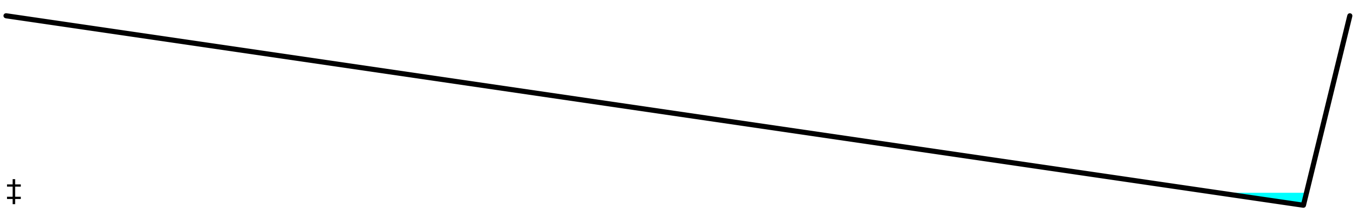
Summary for Reach TB-A2: TB-A2

Inflow Area = 0.387 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.23 cfs @ 12.05 hrs, Volume= 0.021 af
Outflow = 0.17 cfs @ 12.19 hrs, Volume= 0.021 af, Atten= 25%, Lag= 8.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.73 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 8.3 min

Peak Storage= 49 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 259.76 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 195.5' Slope= 0.0083 '/'
Inlet Invert= 91.65', Outlet Invert= 90.02'



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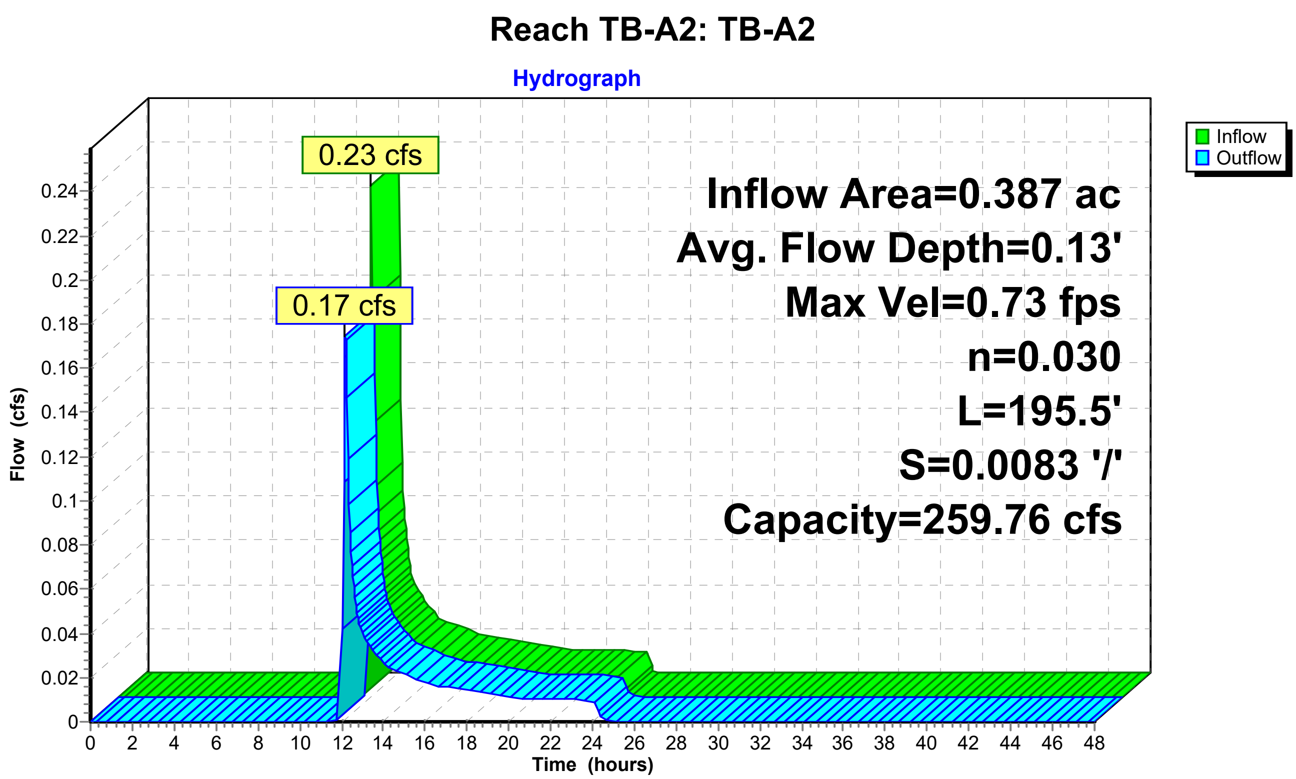


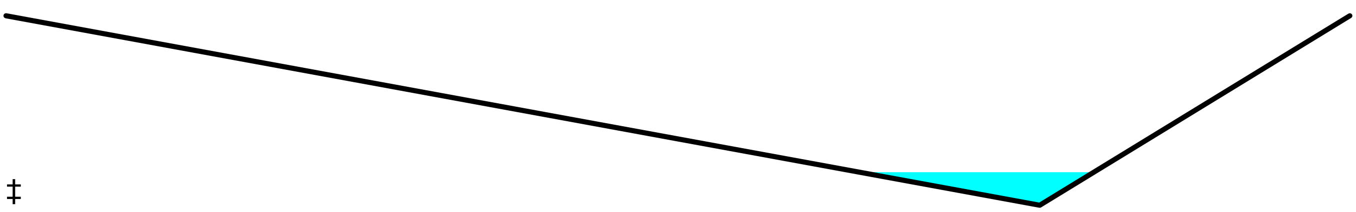
Summary for Reach TB-A3: TB-A3

Inflow Area = 0.809 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.63 cfs @ 11.98 hrs, Volume= 0.044 af
Outflow = 0.42 cfs @ 12.12 hrs, Volume= 0.044 af, Atten= 34%, Lag= 8.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.51 fps, Min. Travel Time= 5.0 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 10.4 min

Peak Storage= 130 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 45.49 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 455.2' Slope= 0.0194 '/'
Inlet Invert= 77.85', Outlet Invert= 69.00'



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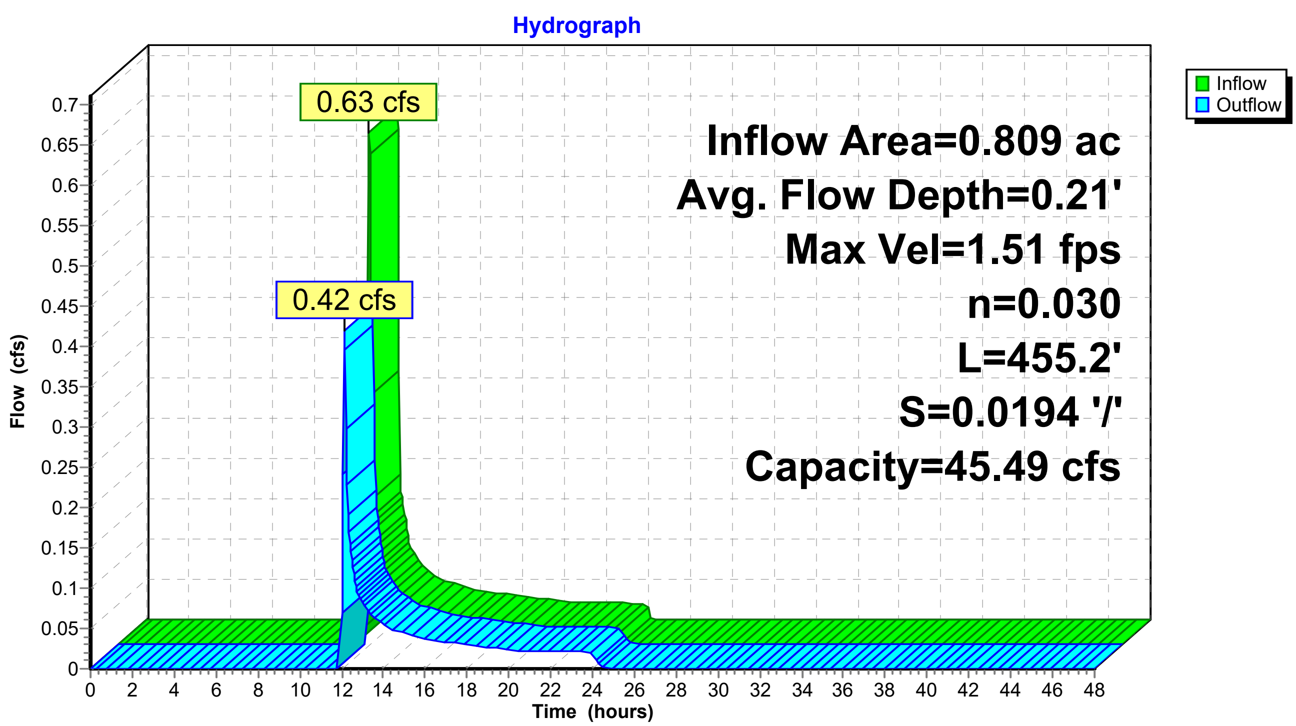
Reach TB-A3: TB-A3



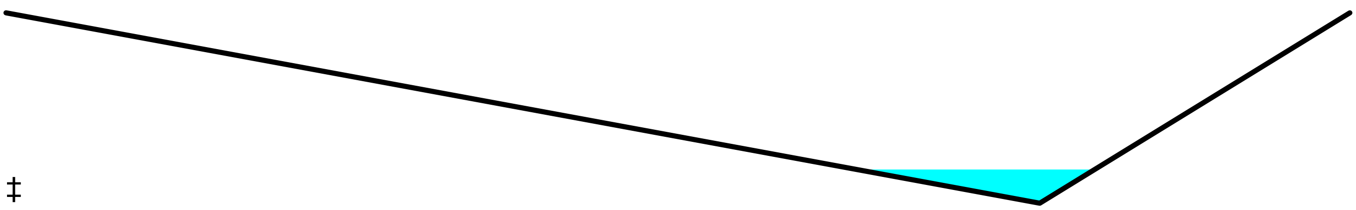
Summary for Reach TB-A4: TB-A4

Inflow Area = 0.801 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.71 cfs @ 11.96 hrs, Volume= 0.044 af
Outflow = 0.42 cfs @ 12.12 hrs, Volume= 0.044 af, Atten= 42%, Lag= 9.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.43 fps, Min. Travel Time= 6.1 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 12.7 min

Peak Storage= 152 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 42.81 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 520.5' Slope= 0.0172 '/'
Inlet Invert= 58.96', Outlet Invert= 50.00'



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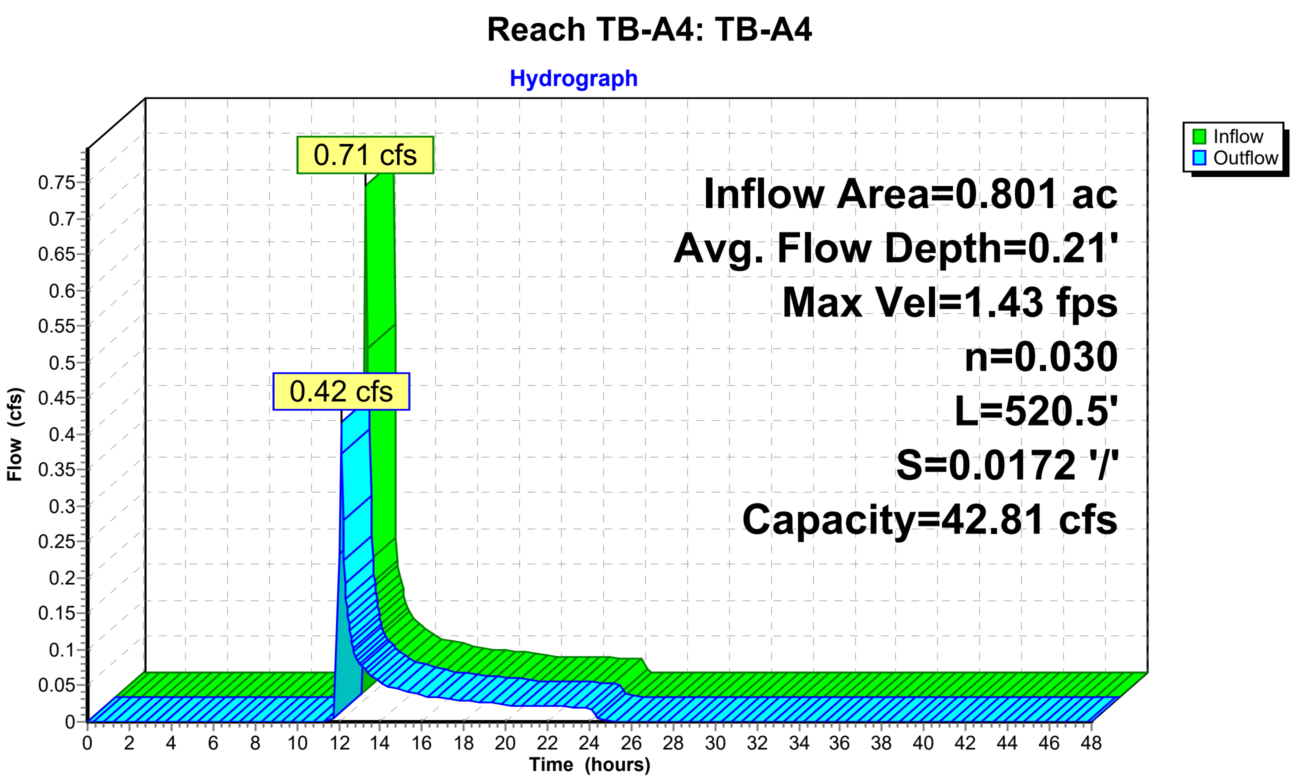


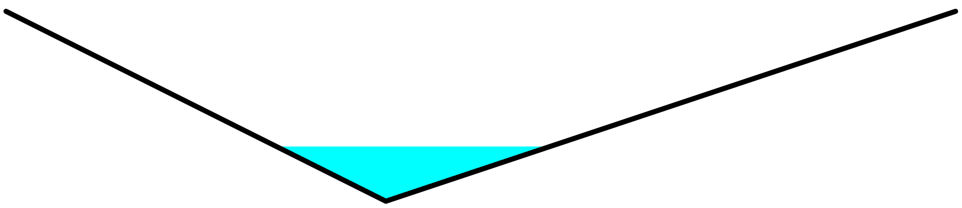
Summary for Reach TB-A5: TB-A5

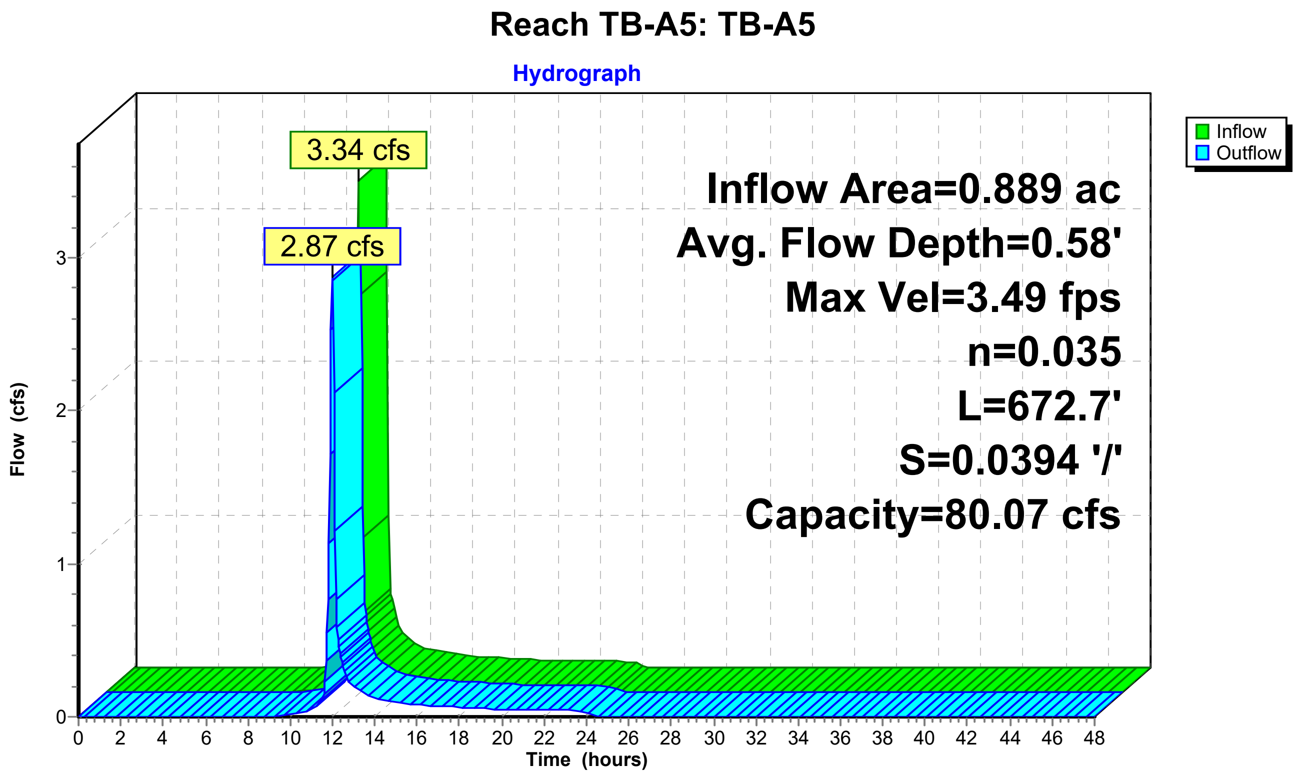
Inflow Area = 0.889 ac, 0.00% Impervious, Inflow Depth = 2.05" for 25-yr,24-hr event
Inflow = 3.34 cfs @ 11.90 hrs, Volume= 0.152 af
Outflow = 2.87 cfs @ 11.99 hrs, Volume= 0.152 af, Atten= 14%, Lag= 5.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.49 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 9.0 min

Peak Storage= 559 cf @ 11.94 hrs
Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 80.07 cfs

0.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 3.0 '/' Top Width= 10.00'
Length= 672.7' Slope= 0.0394 '/'
Inlet Invert= 58.00', Outlet Invert= 31.50'





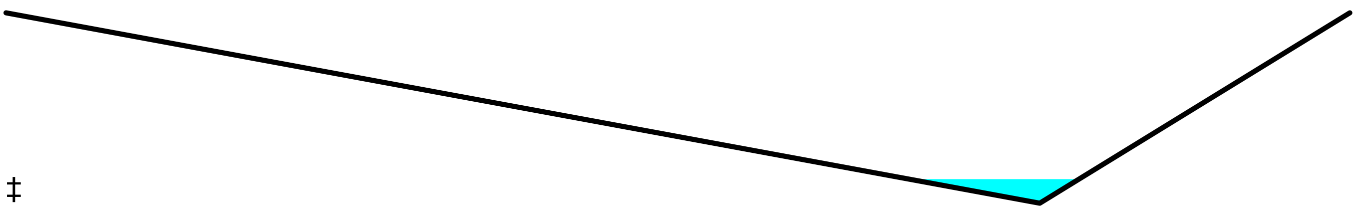
Summary for Reach TB-A6: TB-A6

Inflow Area = 0.270 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.24 cfs @ 11.96 hrs, Volume= 0.015 af
Outflow = 0.18 cfs @ 12.04 hrs, Volume= 0.015 af, Atten= 22%, Lag= 4.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.32 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 4.7 min

Peak Storage= 27 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 49.05 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 181.0' Slope= 0.0226 '/'
Inlet Invert= 35.59', Outlet Invert= 31.50'



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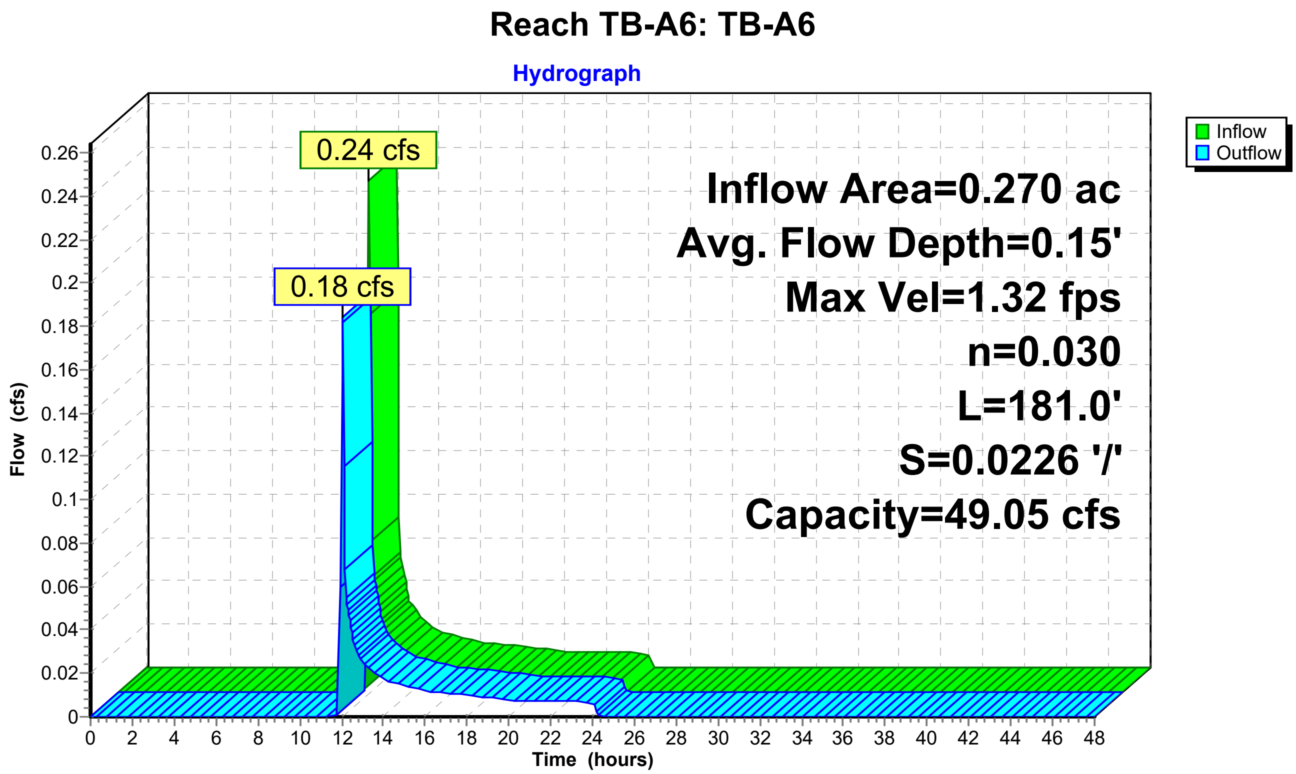


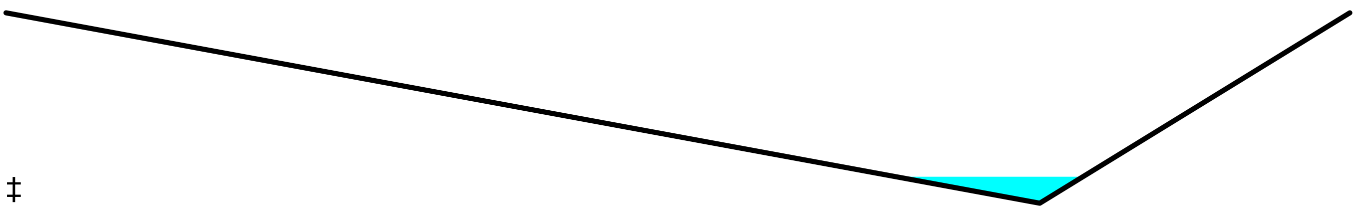
Summary for Reach TB-A7: TB-A7

Inflow Area = 0.496 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.45 cfs @ 11.95 hrs, Volume= 0.027 af
Outflow = 0.22 cfs @ 12.16 hrs, Volume= 0.027 af, Atten= 52%, Lag= 12.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.23 fps, Min. Travel Time= 8.1 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 16.3 min

Peak Storage= 108 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 43.28 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 599.5' Slope= 0.0176 '/'
Inlet Invert= 41.05', Outlet Invert= 30.50'



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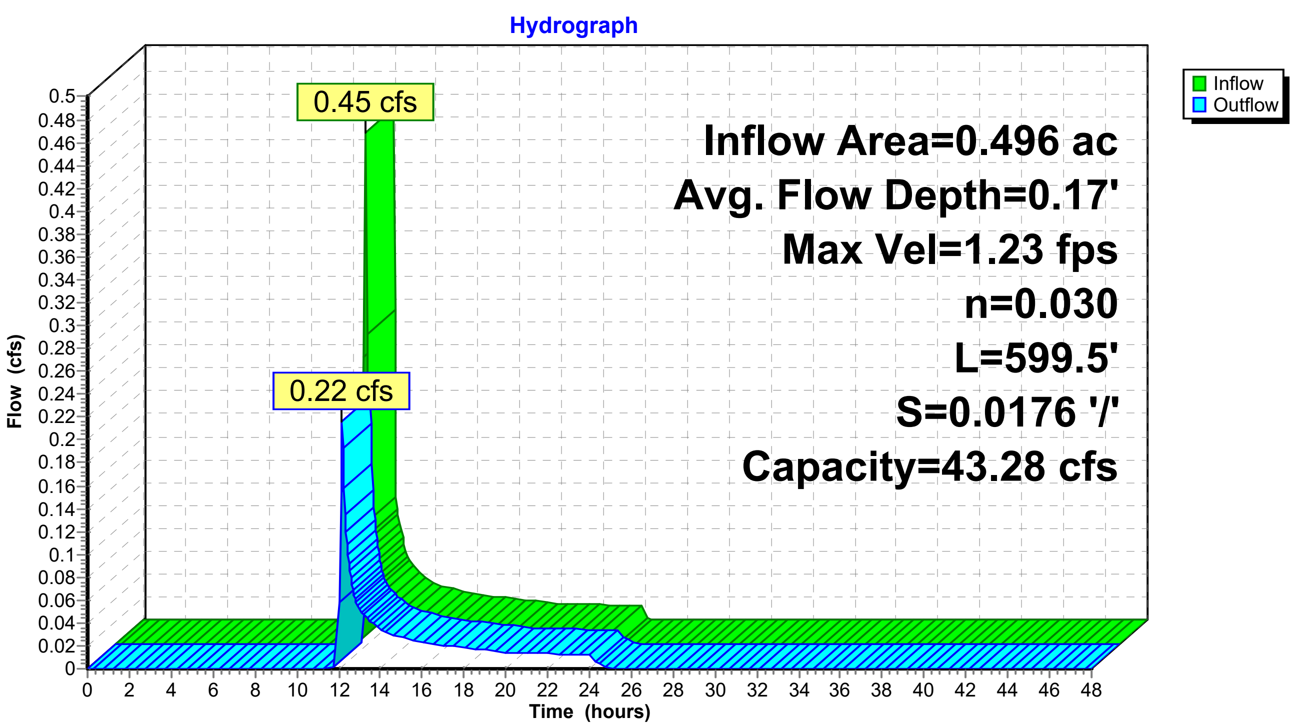
Reach TB-A7: TB-A7



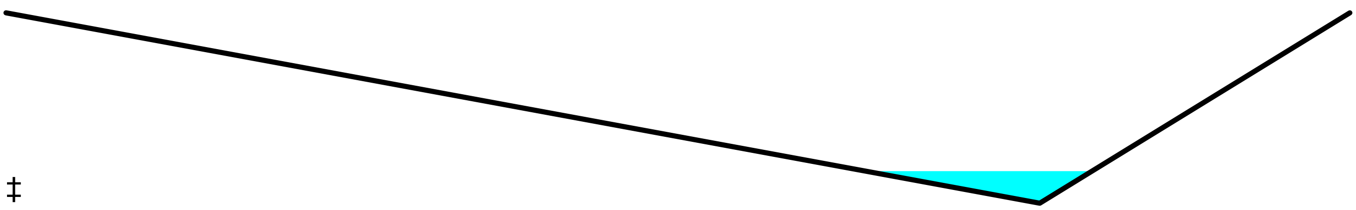
Summary for Reach TB-A8: TB-A8

Inflow Area = 0.676 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.61 cfs @ 11.95 hrs, Volume= 0.037 af
Outflow = 0.30 cfs @ 12.15 hrs, Volume= 0.037 af, Atten= 50%, Lag= 11.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.22 fps, Min. Travel Time= 7.2 min
Avg. Velocity = 0.59 fps, Avg. Travel Time= 14.9 min

Peak Storage= 140 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 37.59 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 524.4' Slope= 0.0133 '/'
Inlet Invert= 25.96', Outlet Invert= 19.00'



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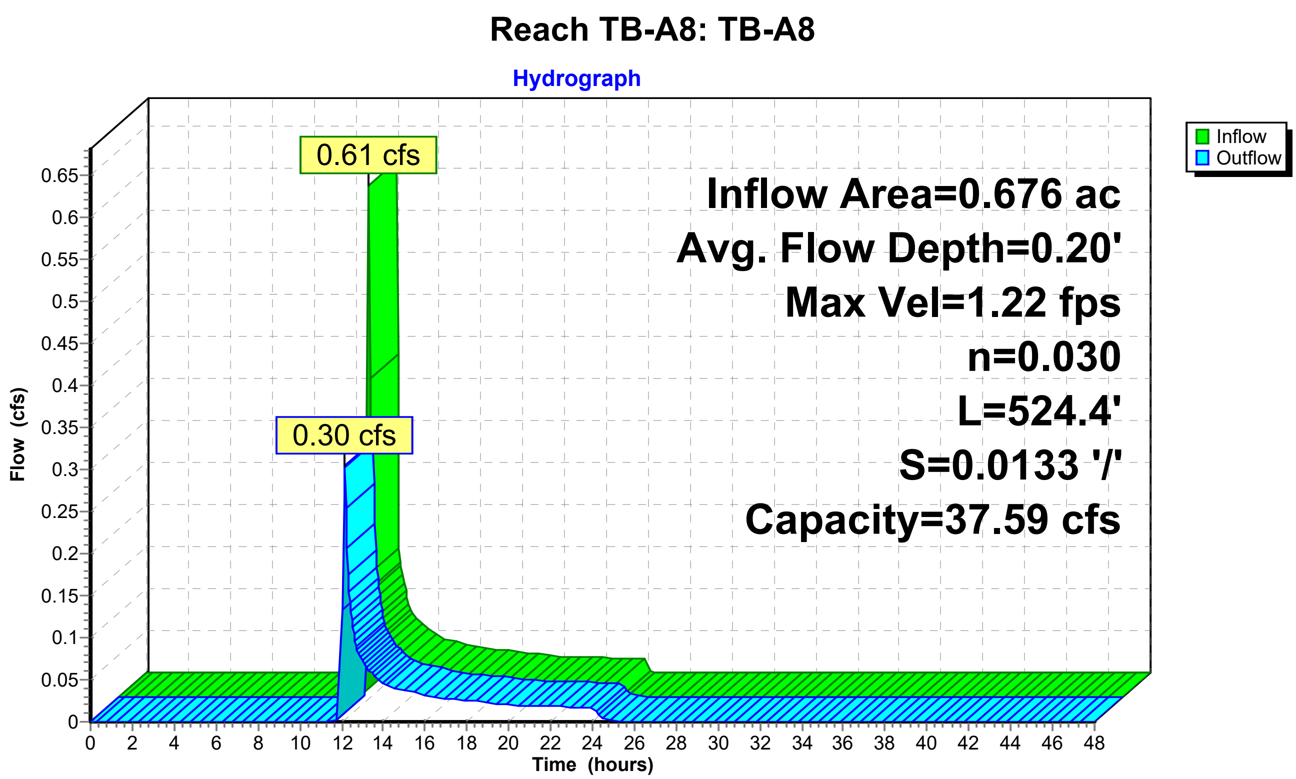


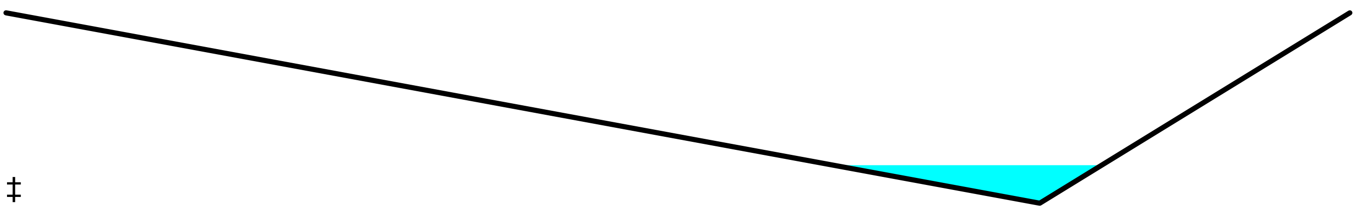
Summary for Reach TB-A9: TB-A9

Inflow Area = 0.366 ac, 0.00% Impervious, Inflow Depth = 1.09" for 25-yr,24-hr event
Inflow = 0.70 cfs @ 11.95 hrs, Volume= 0.033 af
Outflow = 0.53 cfs @ 12.05 hrs, Volume= 0.033 af, Atten= 24%, Lag= 6.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.48 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 8.6 min

Peak Storage= 120 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 40.69 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 321.5' Slope= 0.0156 '/'
Inlet Invert= 24.00', Outlet Invert= 19.00'



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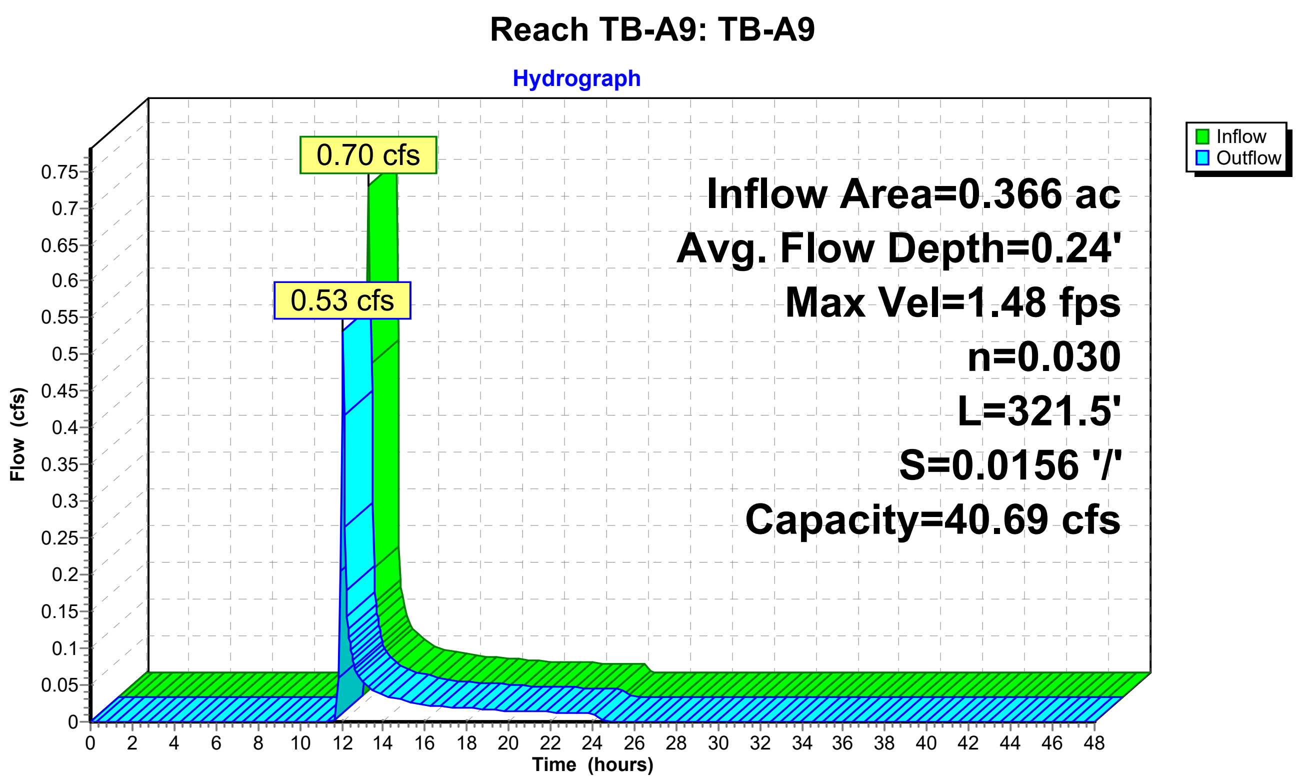


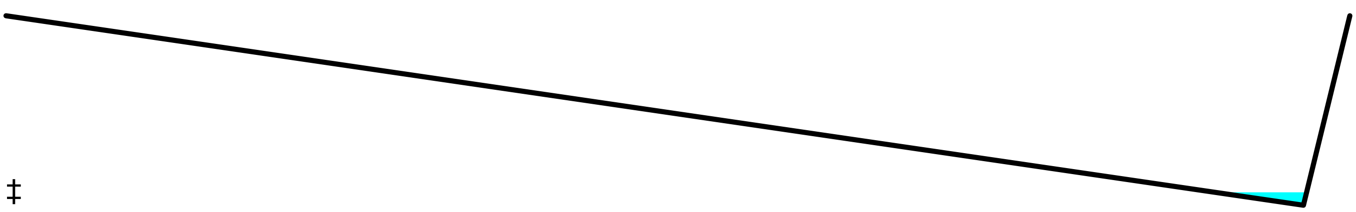
Summary for Reach TB-B1: TB-B1

Inflow Area = 0.429 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.26 cfs @ 12.05 hrs, Volume= 0.023 af
Outflow = 0.19 cfs @ 12.20 hrs, Volume= 0.023 af, Atten= 26%, Lag= 8.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.73 fps, Min. Travel Time= 4.8 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 8.9 min

Peak Storage= 57 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 250.87 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 208.3' Slope= 0.0078 '/'
Inlet Invert= 91.65', Outlet Invert= 90.03'



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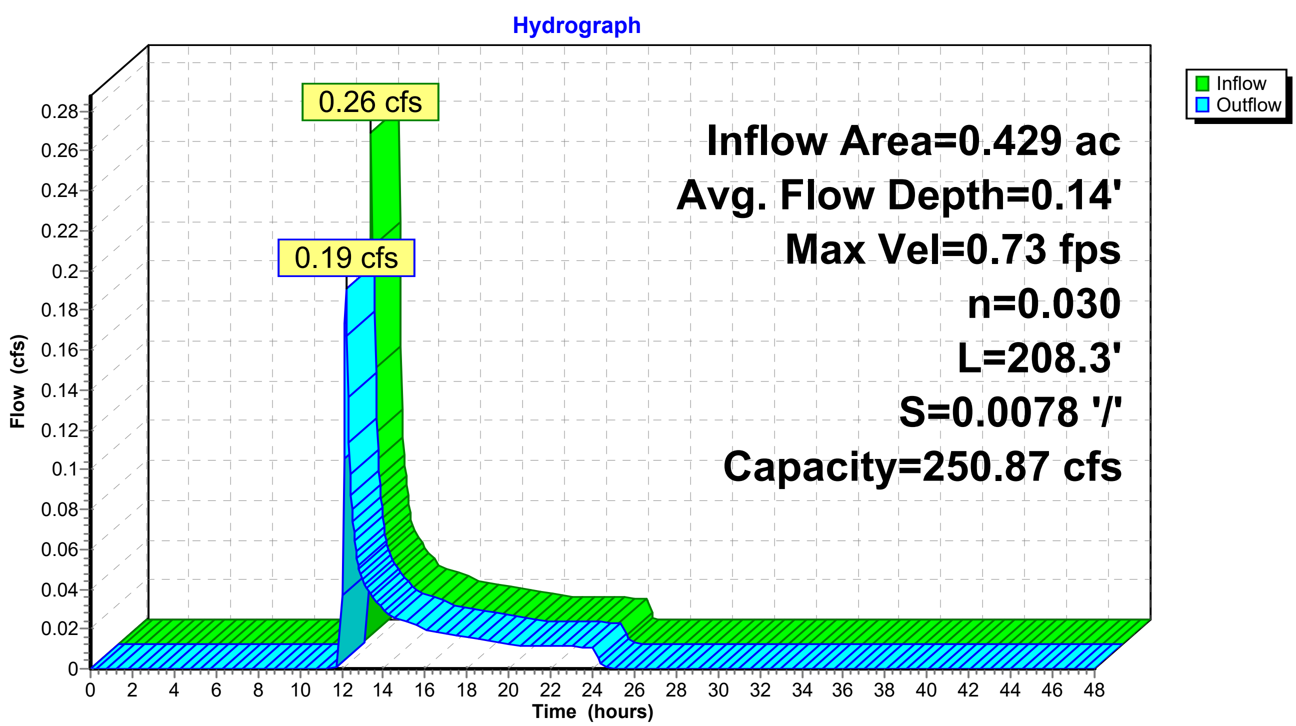
Reach TB-B1: TB-B1



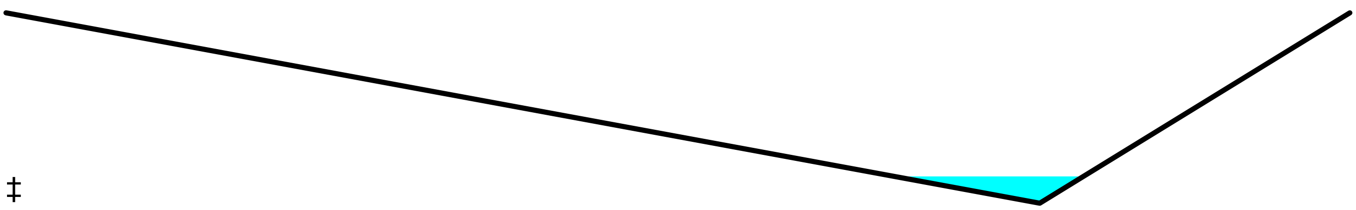
Summary for Reach TB-B10: TB-B10

Inflow Area = 0.021 ac, 0.00% Impervious, Inflow Depth = 1.66" for 25-yr,24-hr event
Inflow = 0.06 cfs @ 11.96 hrs, Volume= 0.003 af
Outflow = 0.06 cfs @ 12.03 hrs, Volume= 0.003 af, Atten= 13%, Lag= 4.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.31 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 5.9 min

Peak Storage= 8 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 10.83 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 45.4' Slope= 0.0011 '/'
Inlet Invert= 57.05', Outlet Invert= 57.00'



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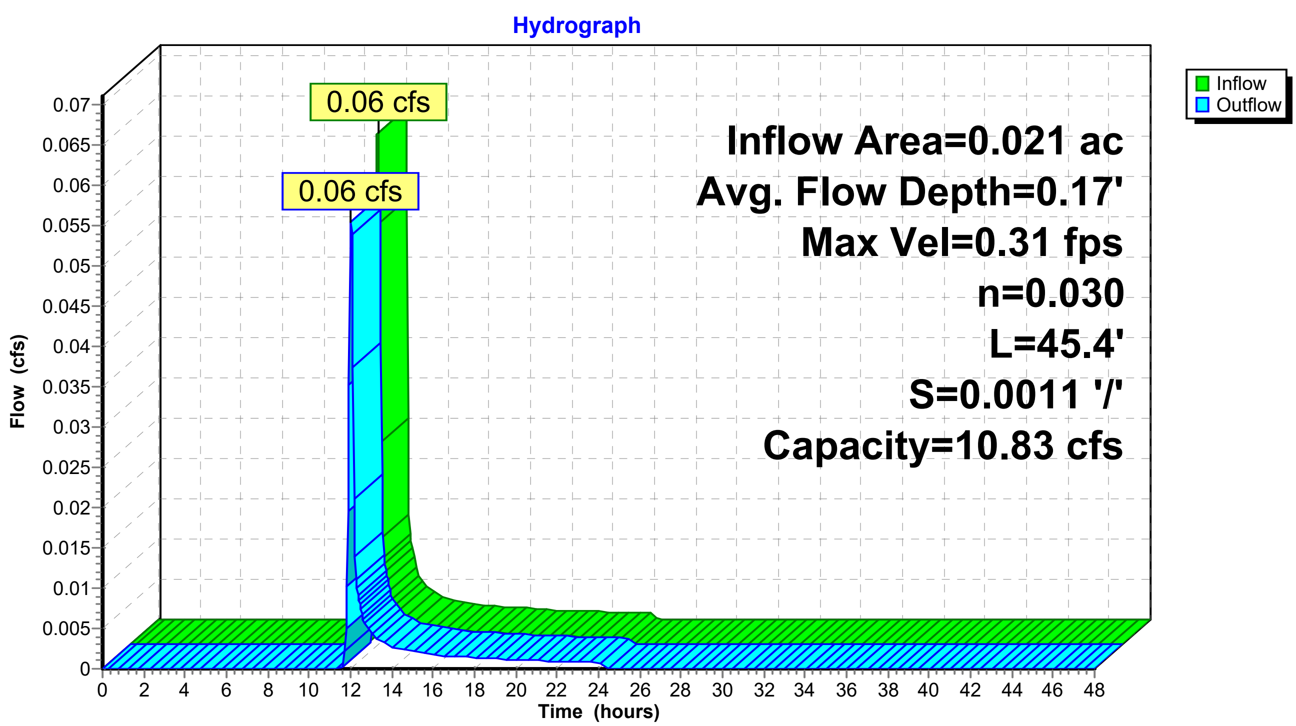
Reach TB-B10: TB-B10



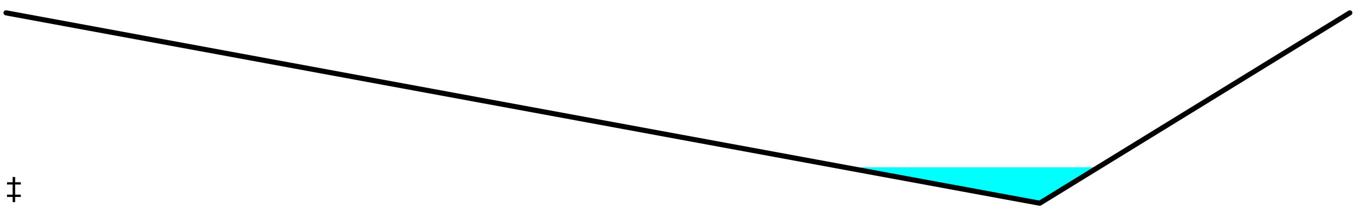
Summary for Reach TB-B11: TB-B11

Inflow Area = 0.996 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.89 cfs @ 11.96 hrs, Volume= 0.055 af
Outflow = 0.43 cfs @ 12.17 hrs, Volume= 0.055 af, Atten= 51%, Lag= 12.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.33 fps, Min. Travel Time= 8.1 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 17.0 min

Peak Storage= 215 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 38.47 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 646.8' Slope= 0.0139 '/'
Inlet Invert= 47.96', Outlet Invert= 38.97'



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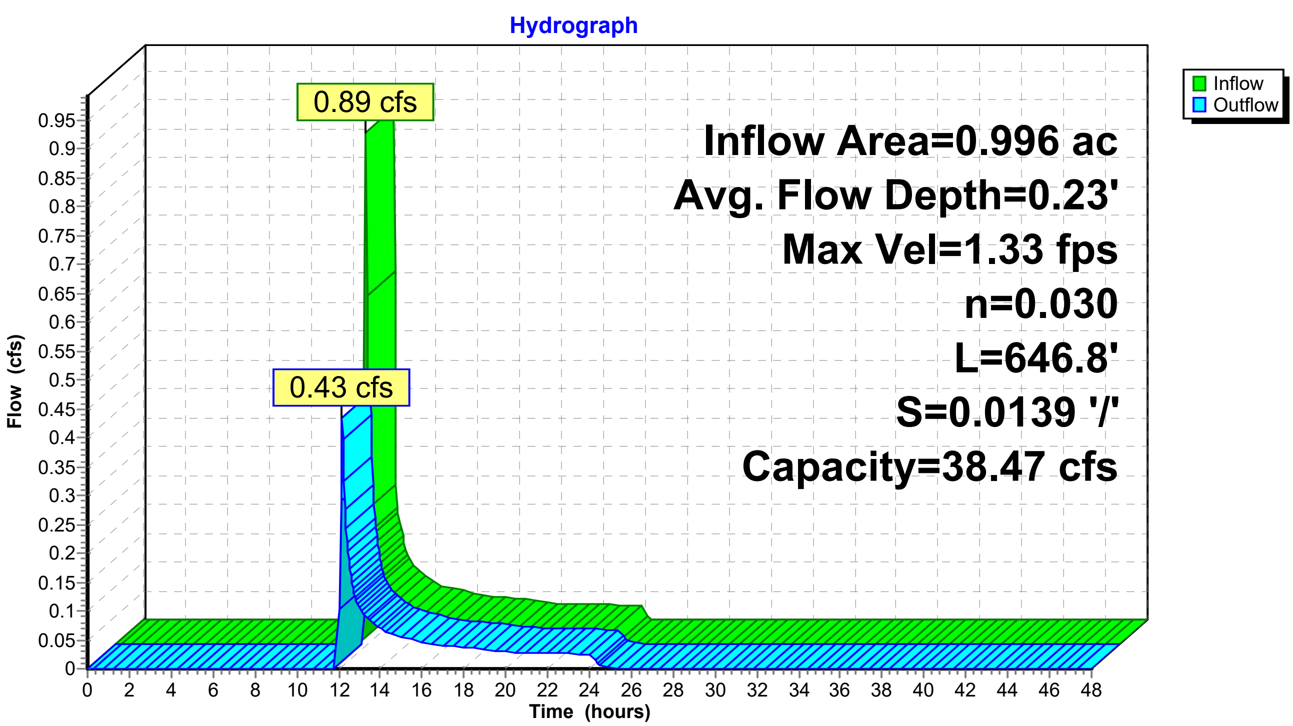
Reach TB-B11: TB-B11



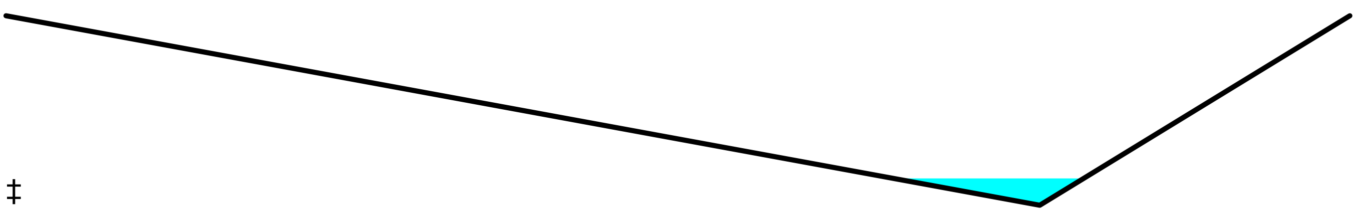
Summary for Reach TB-B12: TB-B12

Inflow Area = 0.275 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.24 cfs @ 11.96 hrs, Volume= 0.015 af
Outflow = 0.17 cfs @ 12.06 hrs, Volume= 0.015 af, Atten= 30%, Lag= 6.3 min

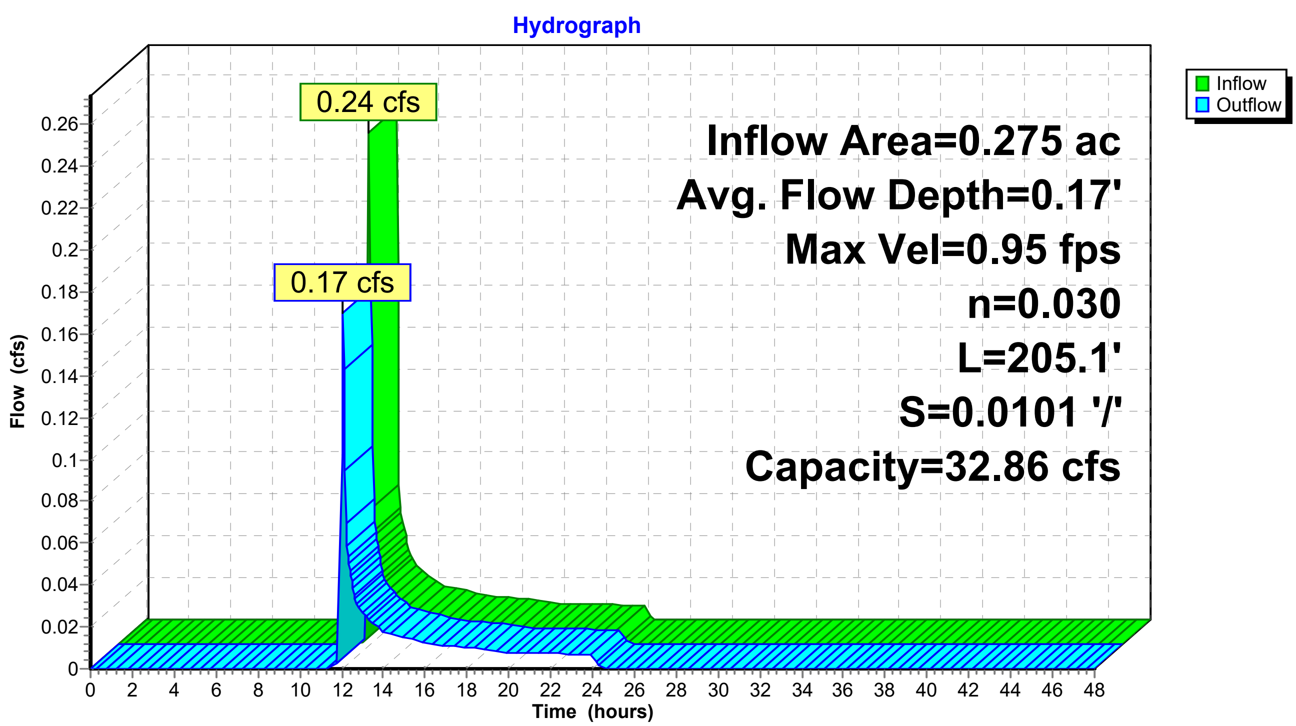
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.95 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.46 fps, Avg. Travel Time= 7.4 min

Peak Storage= 39 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 32.86 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 205.1' Slope= 0.0101 '/'
Inlet Invert= 41.05', Outlet Invert= 38.97'



Reach TB-B12: TB-B12



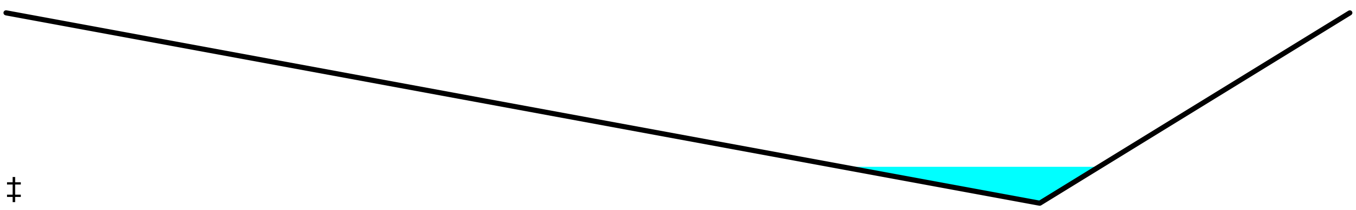
Summary for Reach TB-B13: TB-B13

Inflow Area = 1.105 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.99 cfs @ 11.95 hrs, Volume= 0.061 af
Outflow = 0.47 cfs @ 12.17 hrs, Volume= 0.061 af, Atten= 52%, Lag= 13.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.34 fps, Min. Travel Time= 8.8 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 18.6 min

Peak Storage= 241 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 37.97 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 708.2' Slope= 0.0135 '/'
Inlet Invert= 30.59', Outlet Invert= 21.00'



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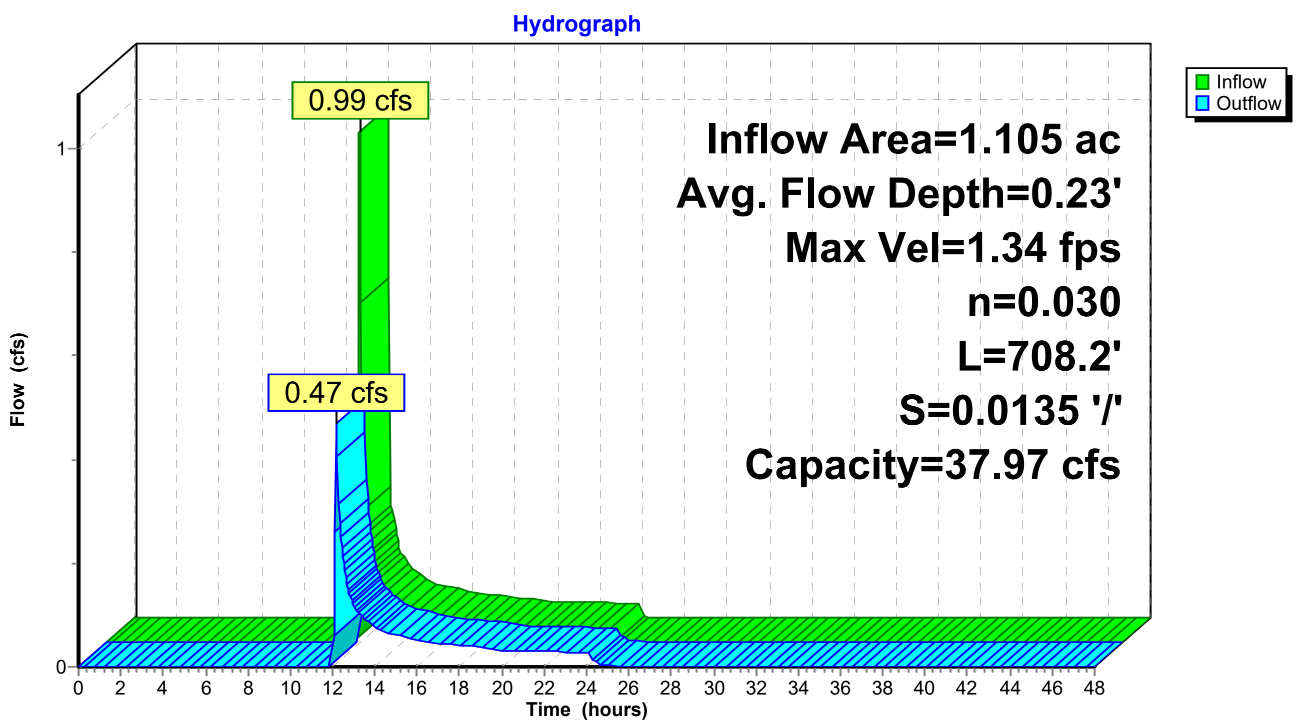
Reach TB-B13: TB-B13



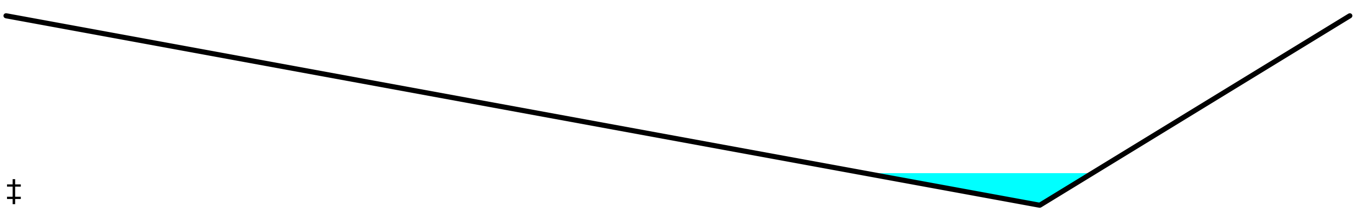
Summary for Reach TB-B14: TB-B14

Inflow Area = 0.585 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.52 cfs @ 11.95 hrs, Volume= 0.032 af
Outflow = 0.31 cfs @ 12.11 hrs, Volume= 0.032 af, Atten= 40%, Lag= 9.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.20 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 11.3 min

Peak Storage= 105 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 36.81 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 389.6' Slope= 0.0127 '/'
Inlet Invert= 25.96', Outlet Invert= 21.00'



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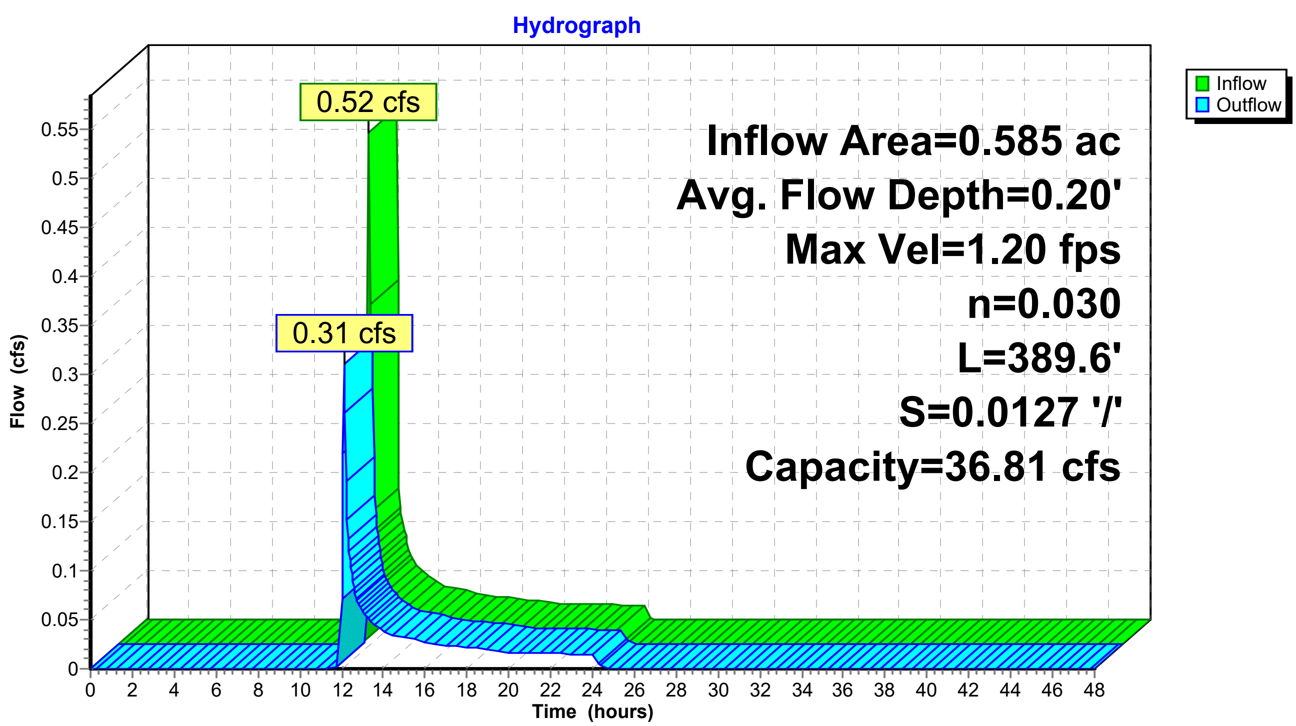
Reach TB-B14: TB-B14



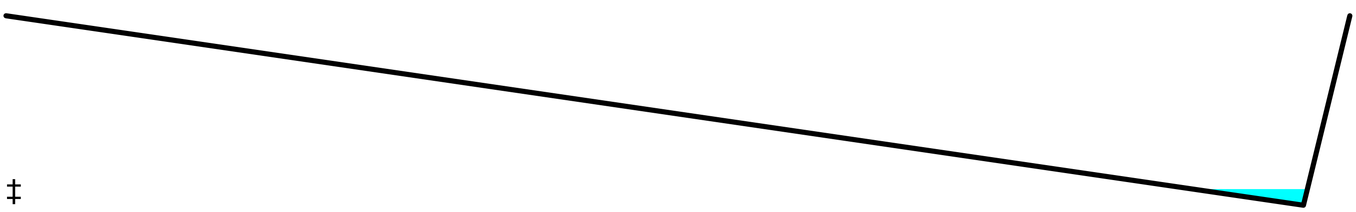
Summary for Reach TB-B2: TB-B2

Inflow Area = 0.893 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.54 cfs @ 12.05 hrs, Volume= 0.049 af
Outflow = 0.38 cfs @ 12.22 hrs, Volume= 0.049 af, Atten= 30%, Lag= 10.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.90 fps, Min. Travel Time= 6.2 min
Avg. Velocity = 0.47 fps, Avg. Travel Time= 11.8 min

Peak Storage= 140 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 268.82 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 332.6' Slope= 0.0089 '/'
Inlet Invert= 93.00', Outlet Invert= 90.03'



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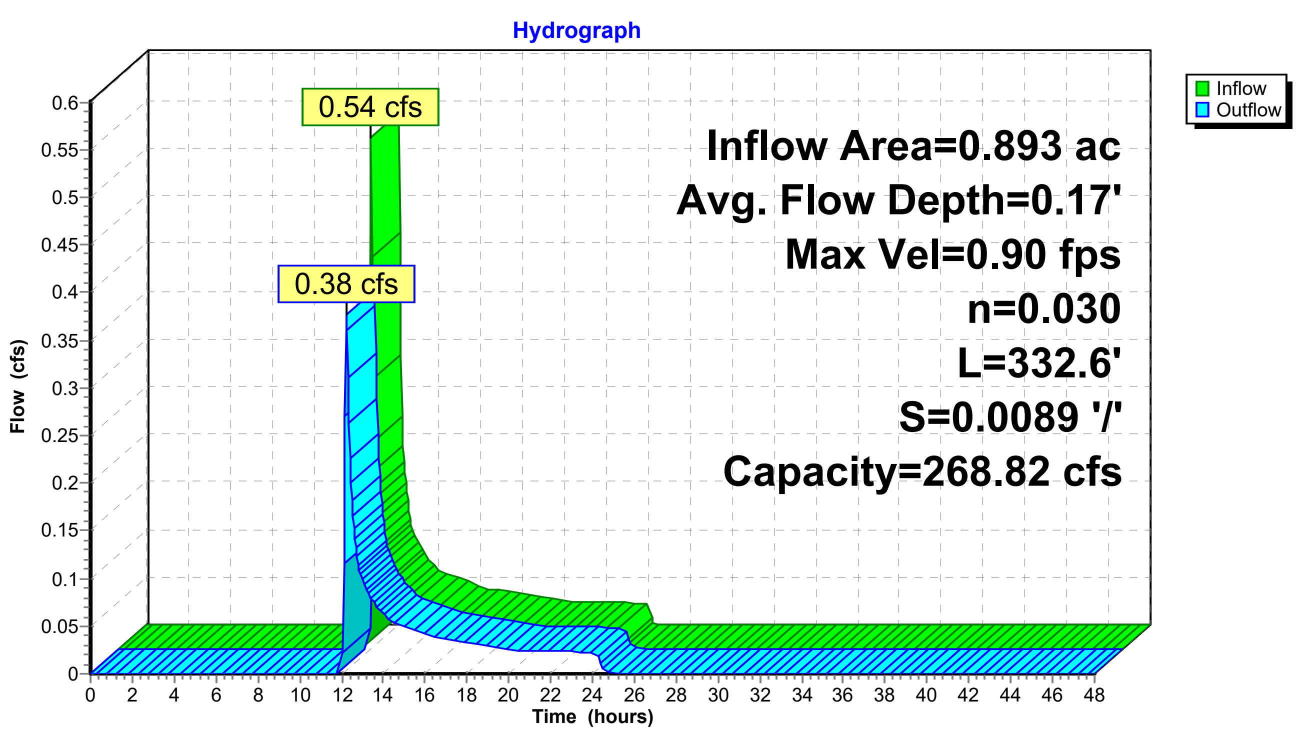
Reach TB-B2: TB-B2



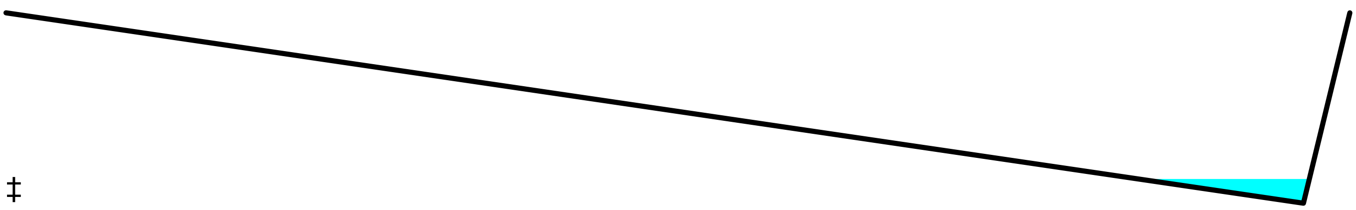
Summary for Reach TB-B3: TB-B3

Inflow Area = 3.160 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.10 cfs @ 12.22 hrs, Volume= 0.173 af
Outflow = 0.91 cfs @ 12.46 hrs, Volume= 0.173 af, Atten= 17%, Lag= 14.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.98 fps, Min. Travel Time= 7.7 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 14.7 min

Peak Storage= 423 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 223.62 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 449.9' Slope= 0.0062 '/'
Inlet Invert= 93.00', Outlet Invert= 90.22'



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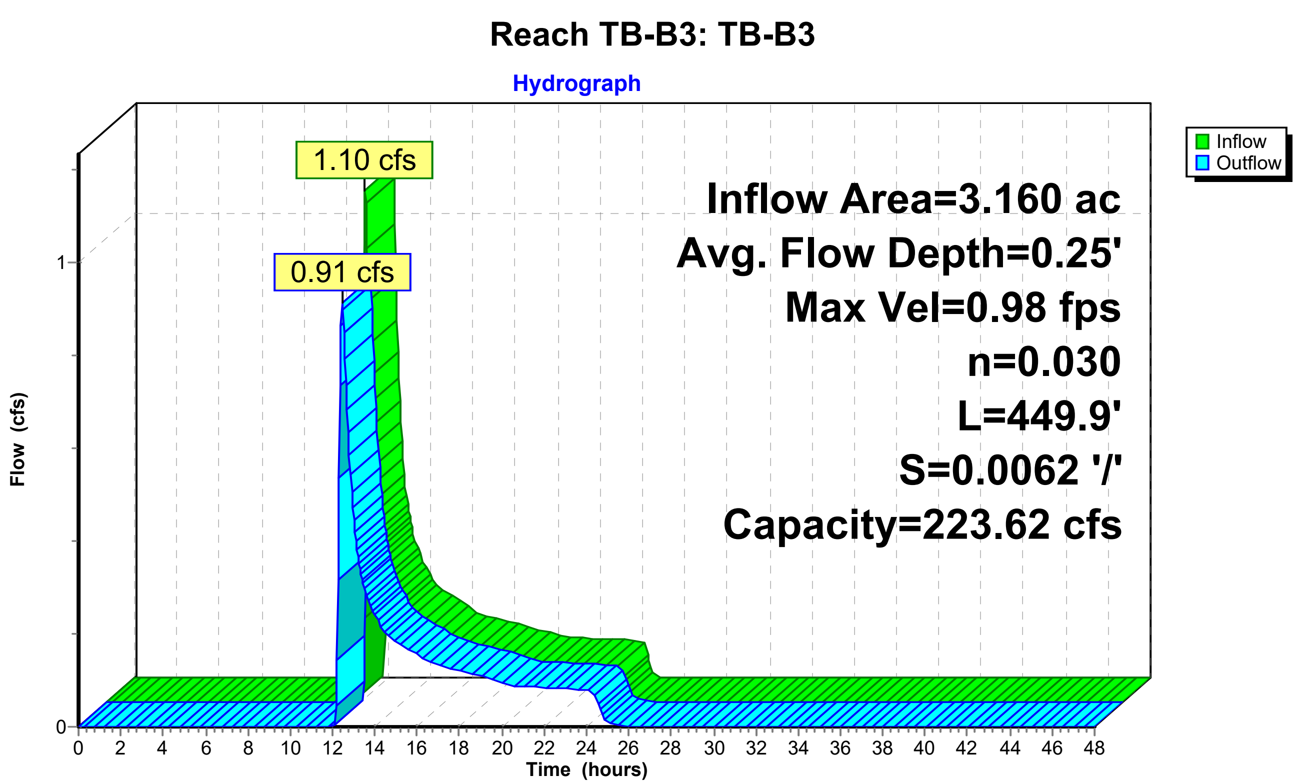


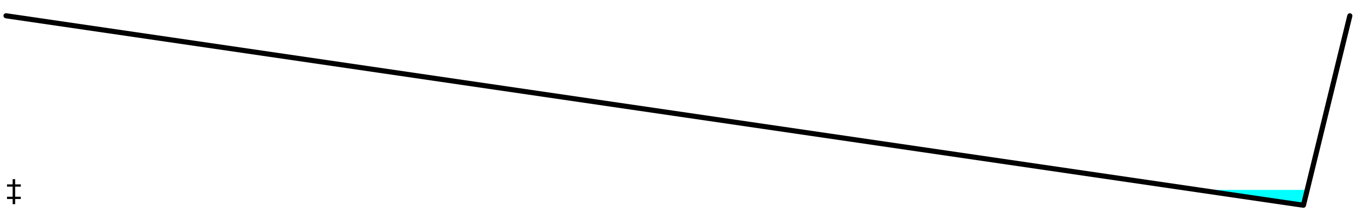
Summary for Reach TB-B4: TB-B4

Inflow Area = 1.183 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.40 cfs @ 12.24 hrs, Volume= 0.065 af
Outflow = 0.39 cfs @ 12.29 hrs, Volume= 0.065 af, Atten= 2%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.04 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 2.9 min

Peak Storage= 41 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 322.76 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 107.2' Slope= 0.0129 '/'
Inlet Invert= 91.60', Outlet Invert= 90.22'



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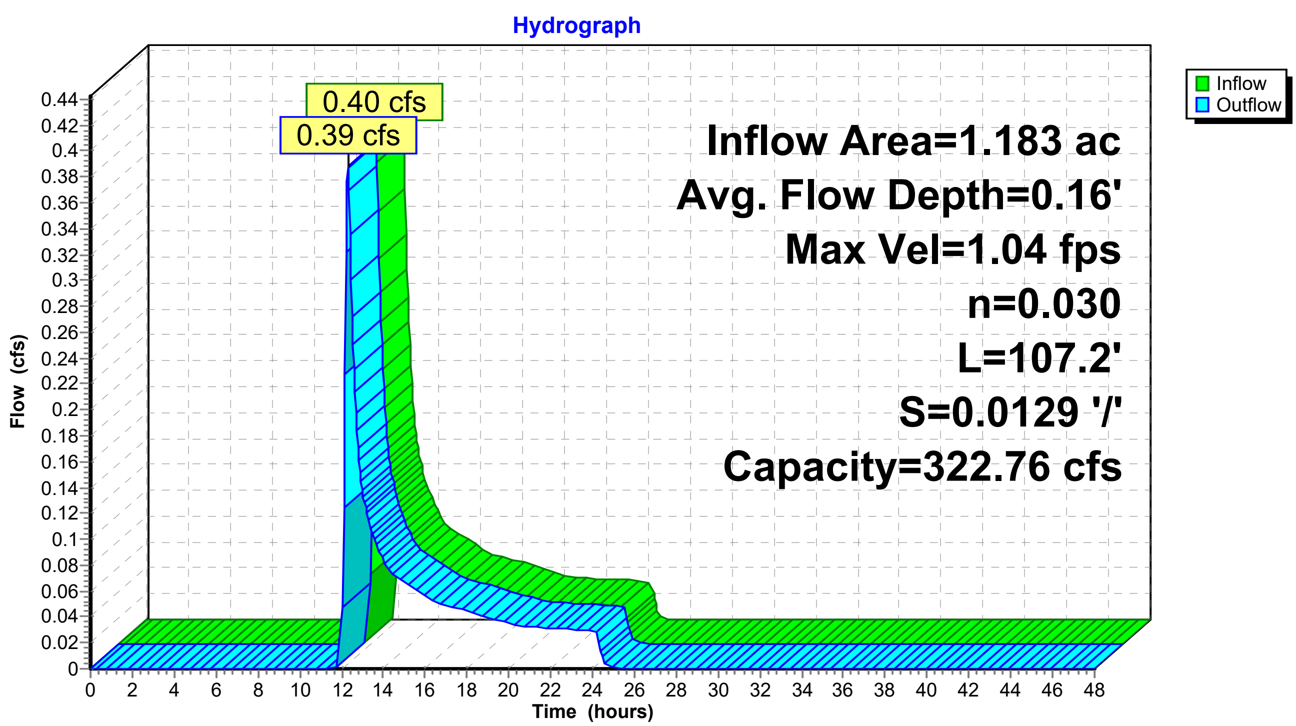
Reach TB-B4: TB-B4



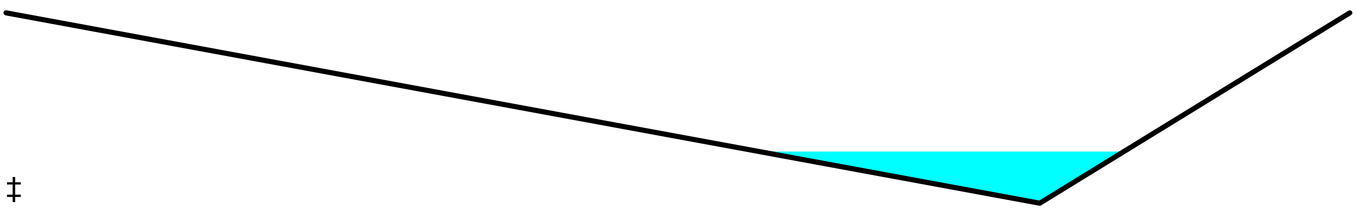
Summary for Reach TB-B5: TB-B5

Inflow Area = 5.613 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.41 cfs @ 12.42 hrs, Volume= 0.307 af
Outflow = 1.31 cfs @ 12.64 hrs, Volume= 0.307 af, Atten= 7%, Lag= 12.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.90 fps, Min. Travel Time= 6.8 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 13.5 min

Peak Storage= 538 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 42.51 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 778.8' Slope= 0.0170 '/'
Inlet Invert= 90.22', Outlet Invert= 77.00'



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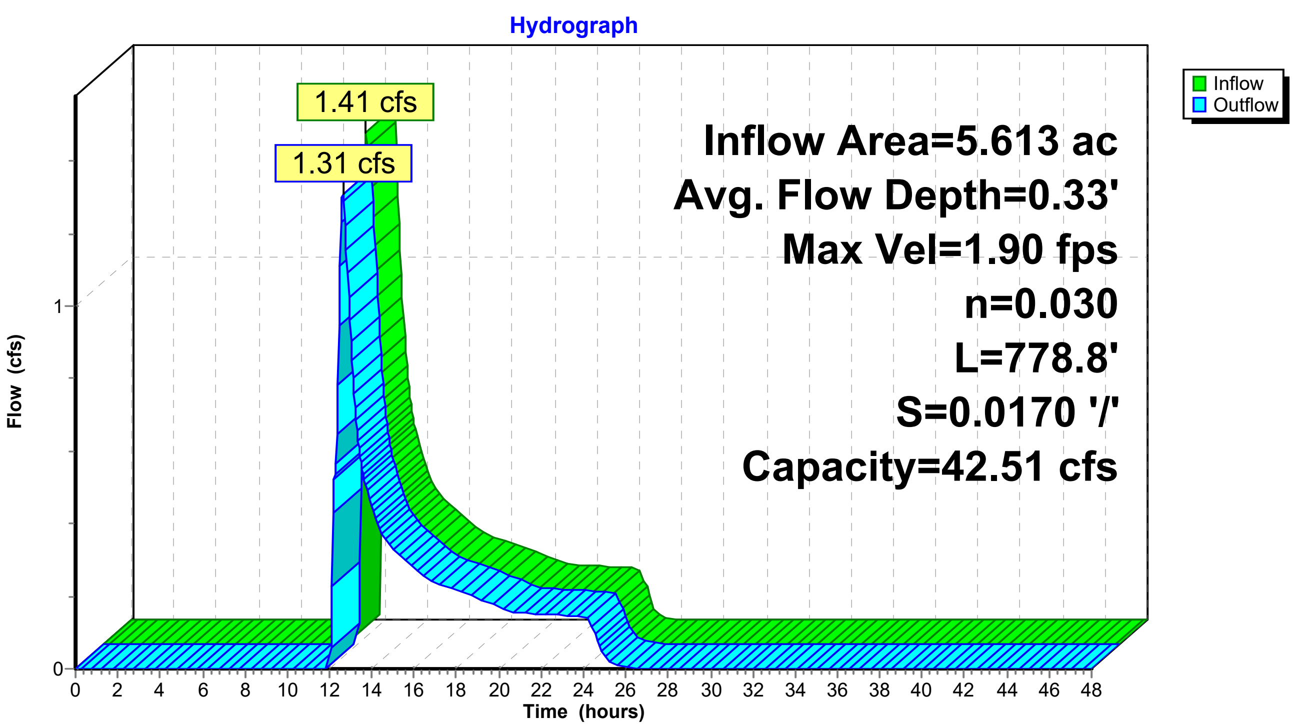
Reach TB-B5: TB-B5



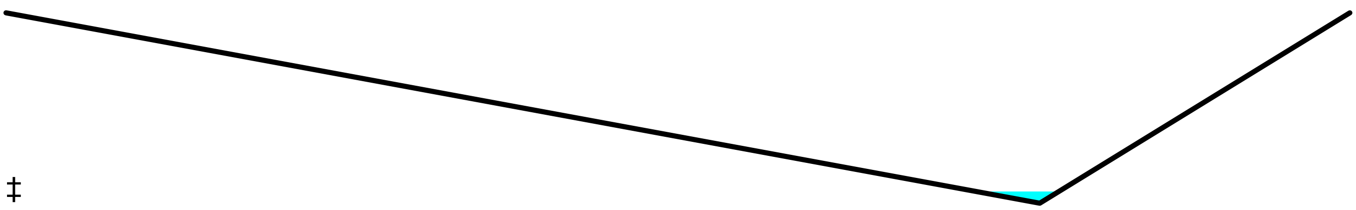
Summary for Reach TB-B6: TB-B6

Inflow Area = 0.031 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.03 cfs @ 11.95 hrs, Volume= 0.002 af
Outflow = 0.02 cfs @ 11.98 hrs, Volume= 0.002 af, Atten= 17%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.76 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.37 fps, Avg. Travel Time= 1.9 min

Peak Storage= 1 cf @ 11.96 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 46.14 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 42.5' Slope= 0.0200 '/'
Inlet Invert= 77.85', Outlet Invert= 77.00'



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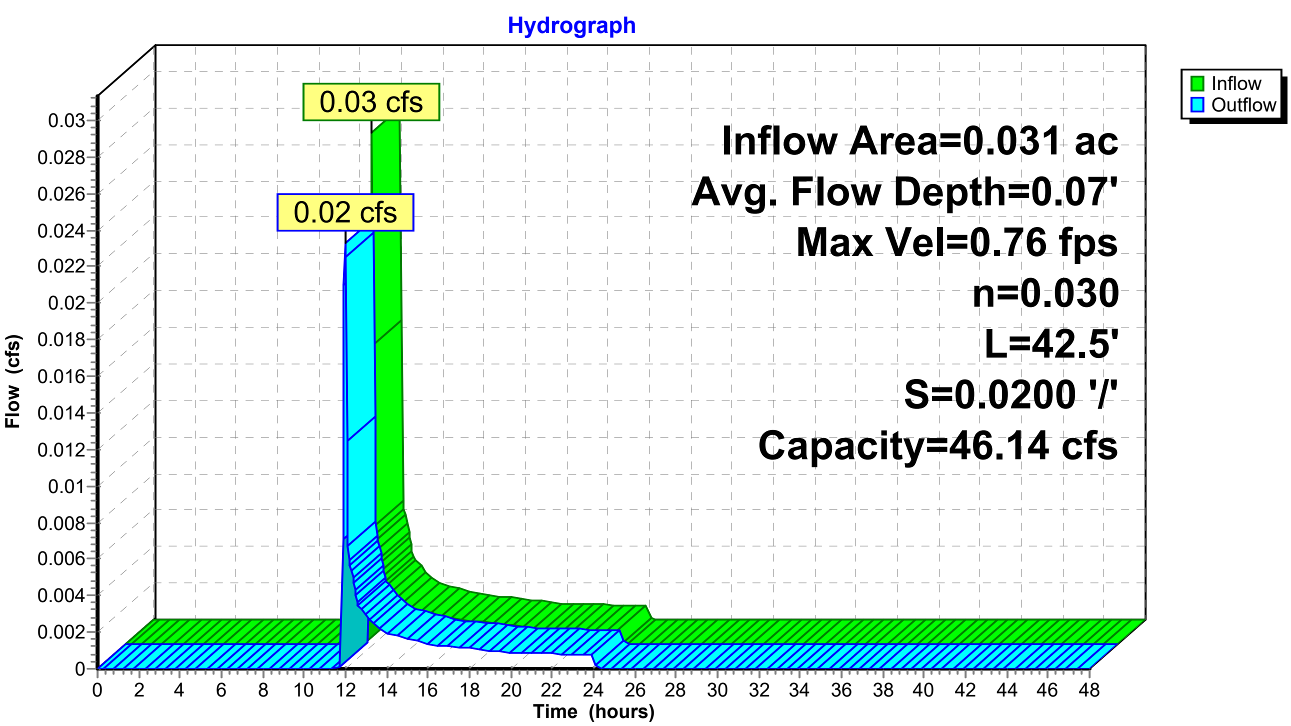
Reach TB-B6: TB-B6



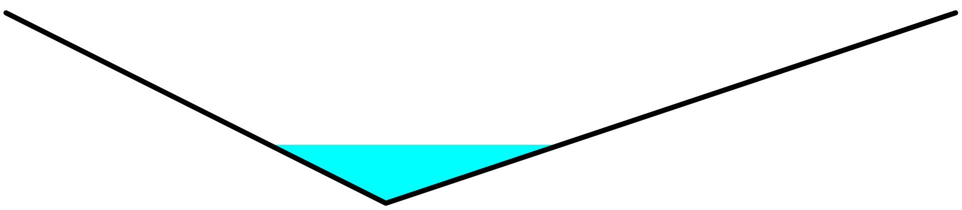
Summary for Reach TB-B7: TB-B7

Inflow Area = 0.994 ac, 0.00% Impervious, Inflow Depth = 2.11" for 25-yr,24-hr event
Inflow = 3.87 cfs @ 11.90 hrs, Volume= 0.174 af
Outflow = 3.06 cfs @ 12.01 hrs, Volume= 0.174 af, Atten= 21%, Lag= 6.3 min

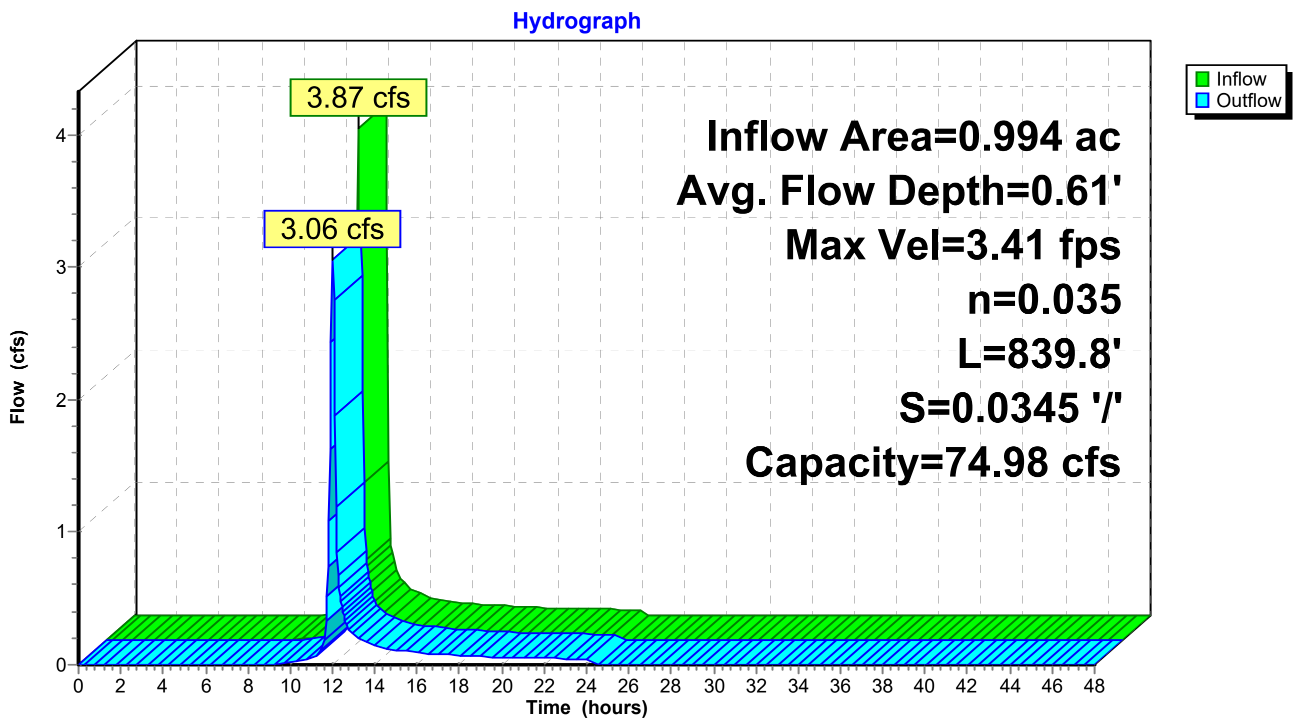
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.41 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 11.7 min

Peak Storage= 791 cf @ 11.94 hrs
Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 74.98 cfs

0.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 3.0 '/' Top Width= 10.00'
Length= 839.8' Slope= 0.0345 '/'
Inlet Invert= 88.00', Outlet Invert= 58.99'



Reach TB-B7: TB-B7



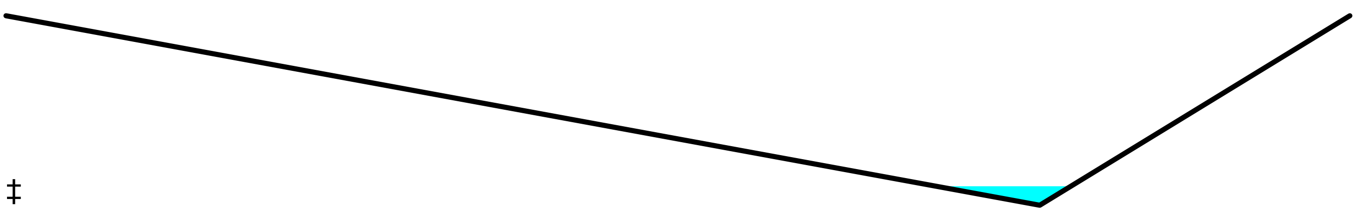
Summary for Reach TB-B8: TB-B8

Inflow Area = 0.128 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.11 cfs @ 11.96 hrs, Volume= 0.007 af
Outflow = 0.09 cfs @ 12.01 hrs, Volume= 0.007 af, Atten= 19%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.06 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 3.1 min

Peak Storage= 9 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 46.52 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 96.4' Slope= 0.0203 '/'
Inlet Invert= 60.95', Outlet Invert= 58.99'



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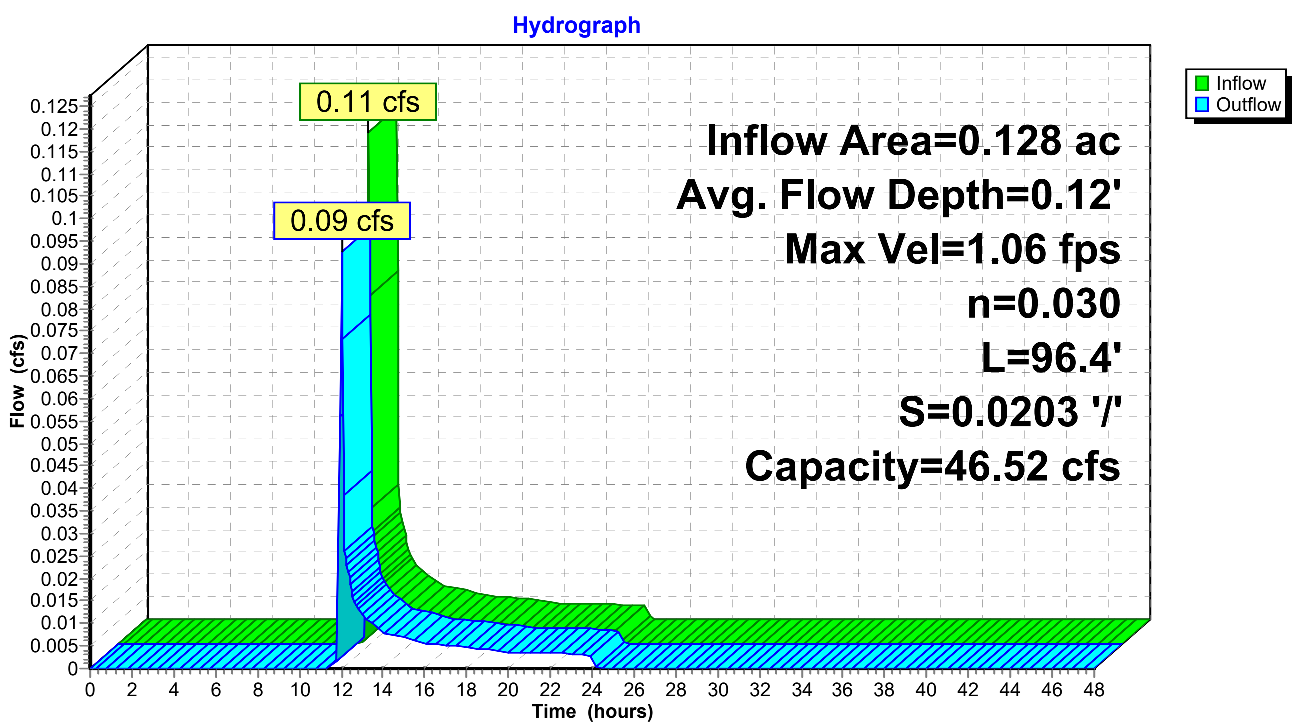
Reach TB-B8: TB-B8



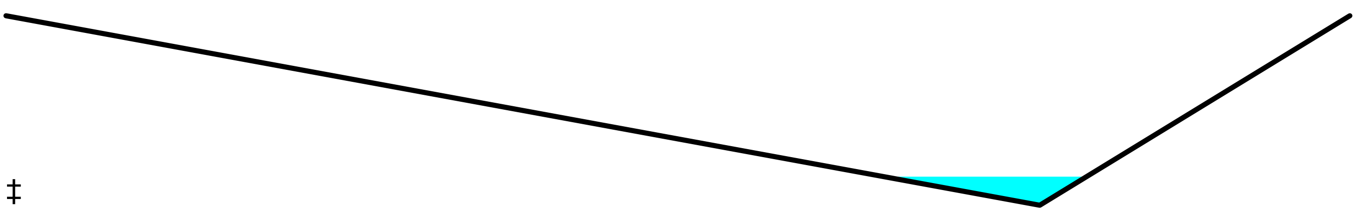
Summary for Reach TB-B9: TB-B9

Inflow Area = 0.480 ac, 0.00% Impervious, Inflow Depth = 0.72" for 25-yr,24-hr event
Inflow = 0.51 cfs @ 11.95 hrs, Volume= 0.029 af
Outflow = 0.26 cfs @ 12.15 hrs, Volume= 0.029 af, Atten= 50%, Lag= 11.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.29 fps, Min. Travel Time= 7.4 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 15.6 min

Peak Storage= 123 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 42.92 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 576.8' Slope= 0.0173 '/'
Inlet Invert= 66.98', Outlet Invert= 57.00'



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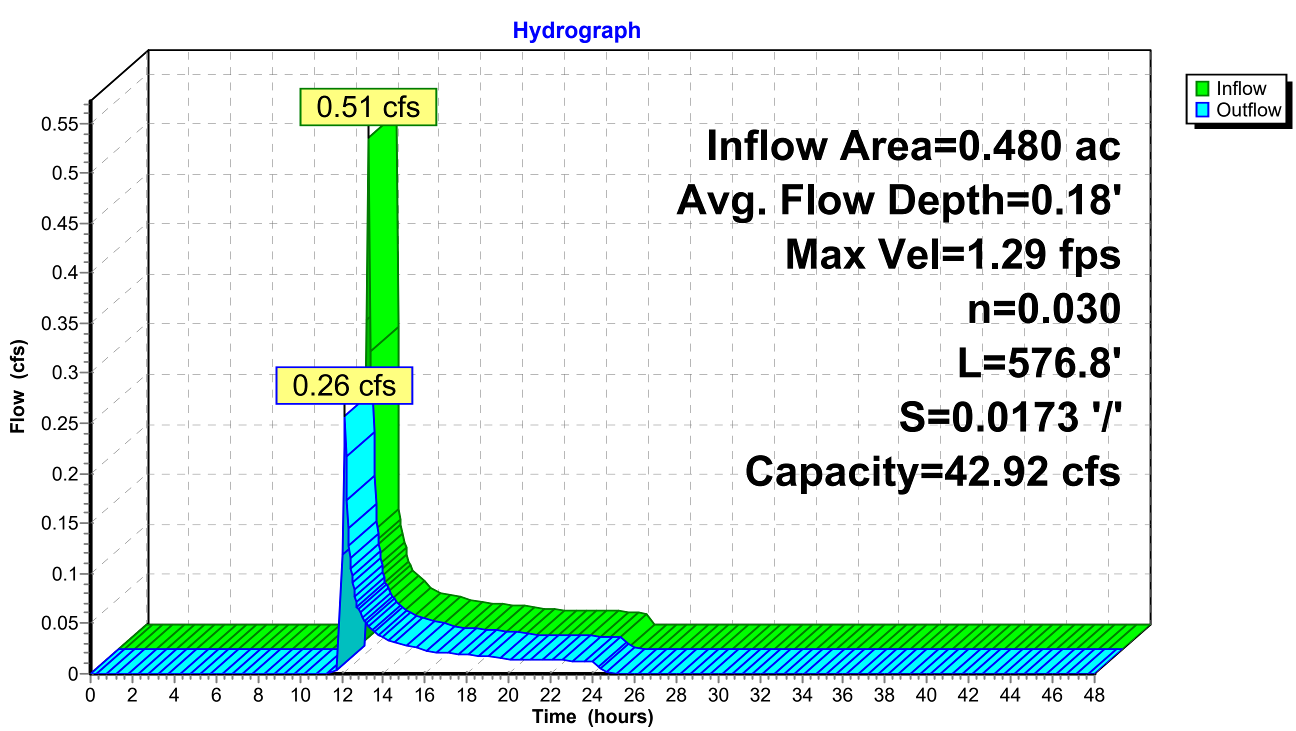
Reach TB-B9: TB-B9



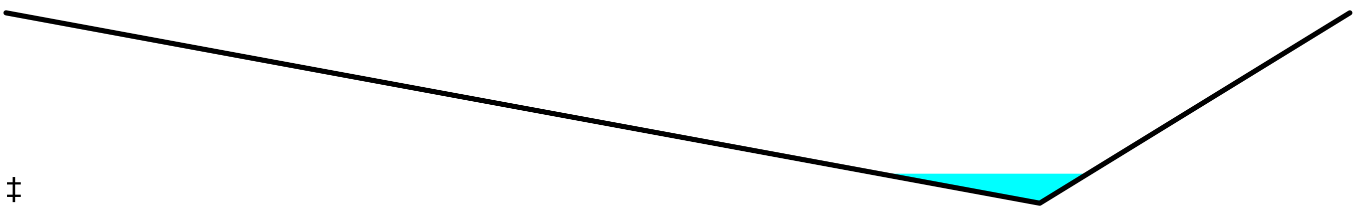
Summary for Reach TB-C1: TB-C1

Inflow Area = 0.424 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.34 cfs @ 11.97 hrs, Volume= 0.023 af
Outflow = 0.19 cfs @ 12.16 hrs, Volume= 0.023 af, Atten= 44%, Lag= 11.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.89 fps, Min. Travel Time= 6.8 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 13.9 min

Peak Storage= 81 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 28.67 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 360.0' Slope= 0.0077 '/'
Inlet Invert= 86.37', Outlet Invert= 83.59'



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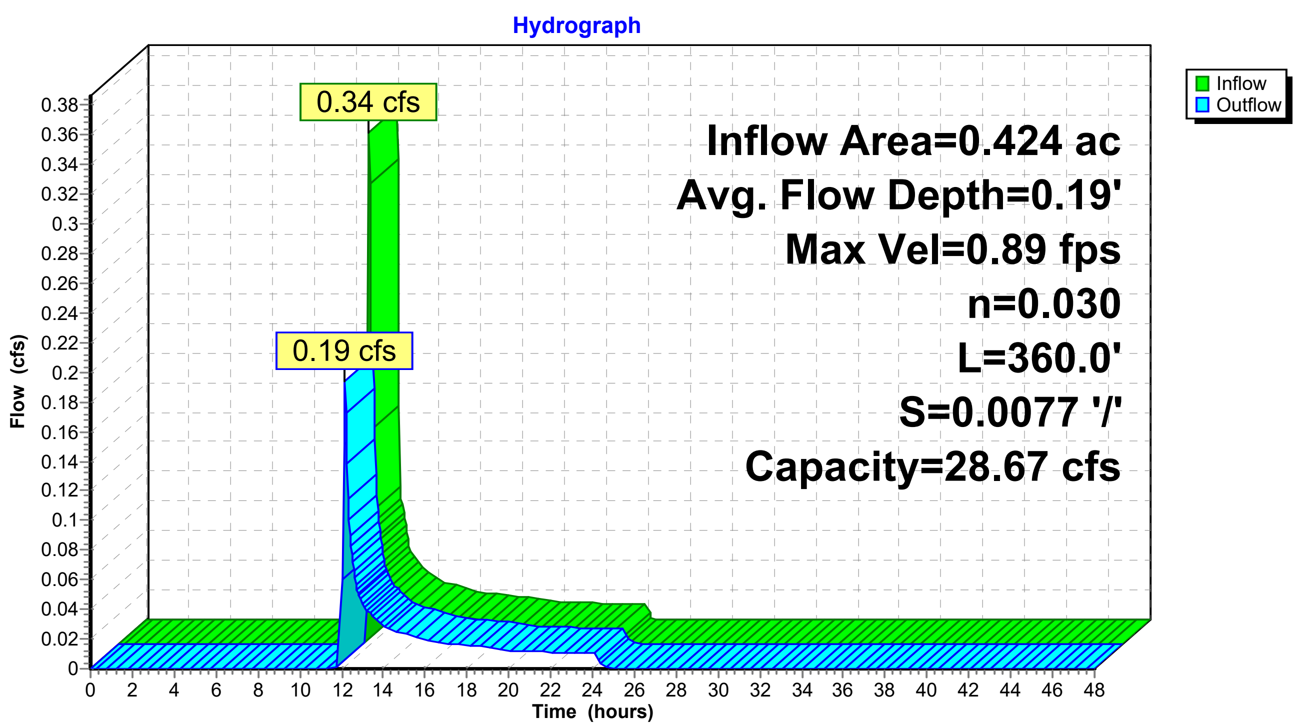
Reach TB-C1: TB-C1



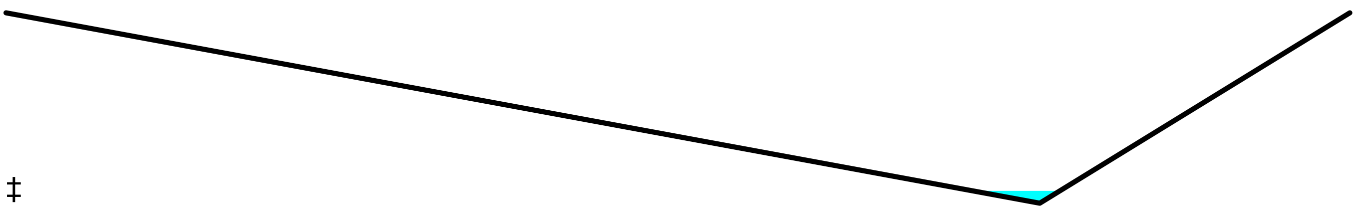
Summary for Reach TB-C2: TB-C2

Inflow Area = 0.037 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.03 cfs @ 11.94 hrs, Volume= 0.002 af
Outflow = 0.02 cfs @ 12.04 hrs, Volume= 0.002 af, Atten= 30%, Lag= 6.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.60 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 0.31 fps, Avg. Travel Time= 6.8 min

Peak Storage= 5 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 34.74 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 124.4' Slope= 0.0113 '/'
Inlet Invert= 85.00', Outlet Invert= 83.59'



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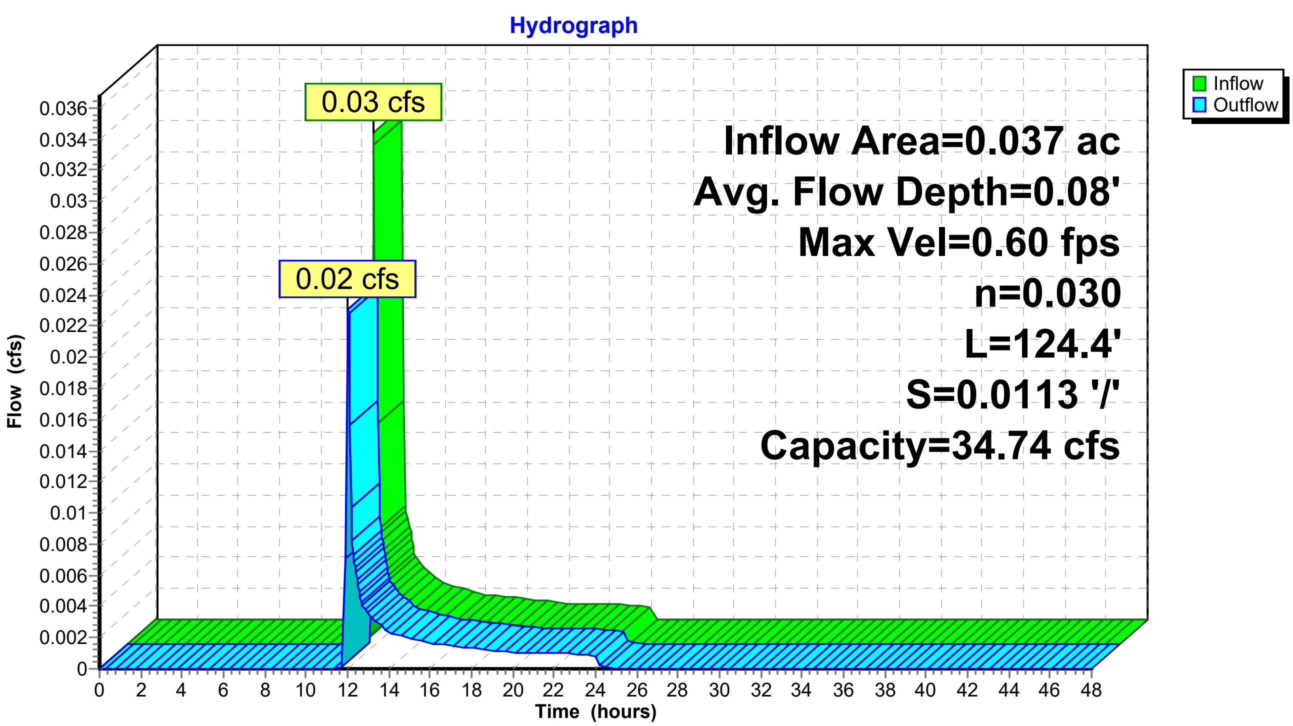
Reach TB-C2: TB-C2



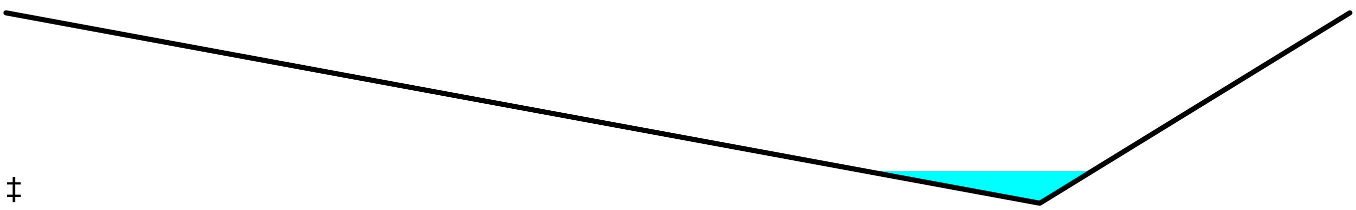
Summary for Reach TB-C3: TB-C3

Inflow Area = 0.551 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.49 cfs @ 11.95 hrs, Volume= 0.030 af
Outflow = 0.30 cfs @ 12.10 hrs, Volume= 0.030 af, Atten= 39%, Lag= 8.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.19 fps, Min. Travel Time= 4.8 min
Avg. Velocity = 0.57 fps, Avg. Travel Time= 10.0 min

Peak Storage= 92 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 36.18 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 338.3' Slope= 0.0123 '/'
Inlet Invert= 69.00', Outlet Invert= 64.84'



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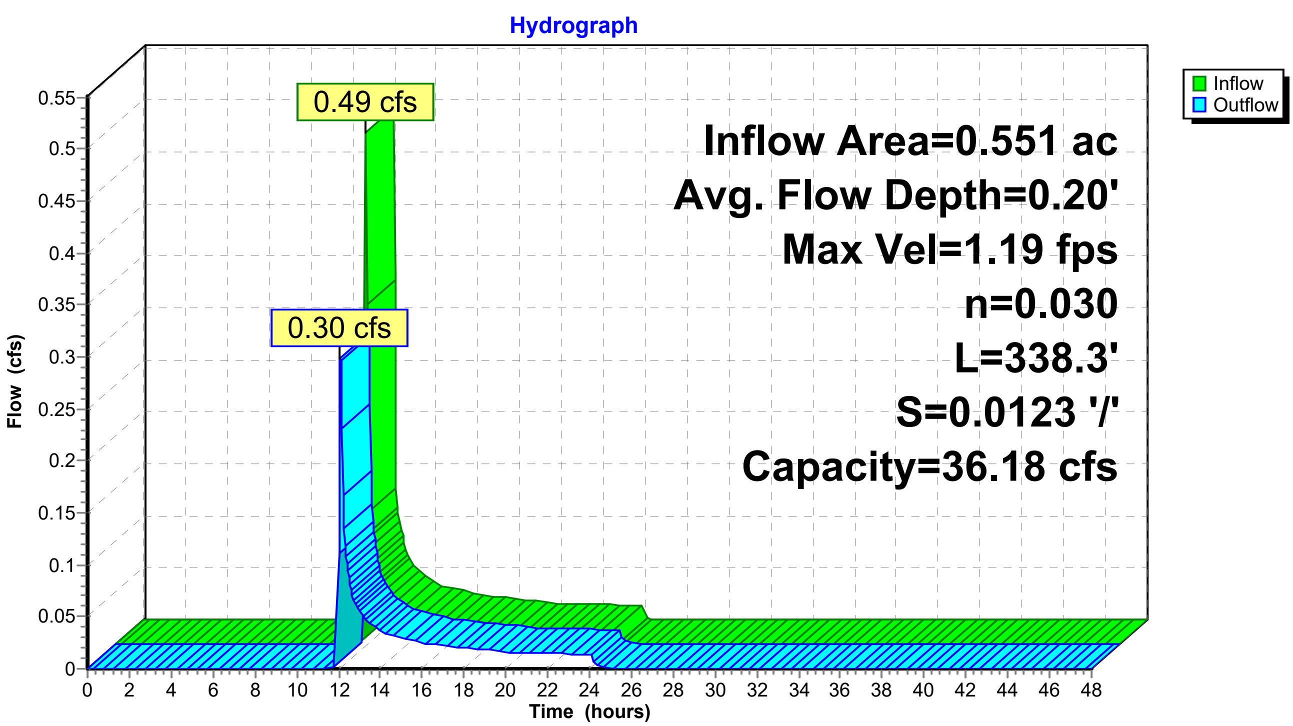
Reach TB-C3: TB-C3



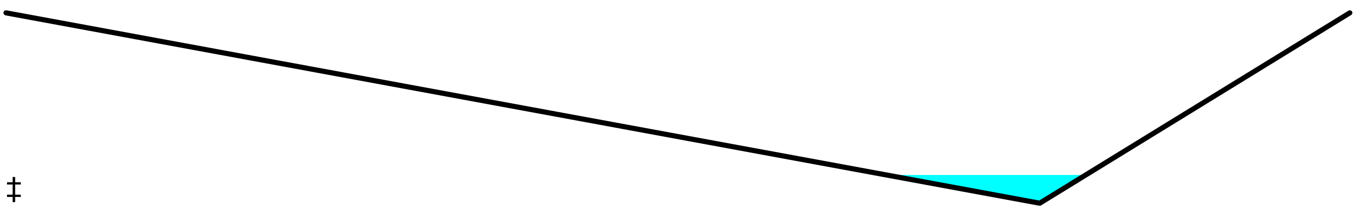
Summary for Reach TB-C4: TB-C4

Inflow Area = 0.311 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.28 cfs @ 11.95 hrs, Volume= 0.017 af
Outflow = 0.20 cfs @ 12.05 hrs, Volume= 0.017 af, Atten= 27%, Lag= 5.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.01 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 6.9 min

Peak Storage= 41 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 33.77 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 199.8' Slope= 0.0107 '/'
Inlet Invert= 66.98', Outlet Invert= 64.84'



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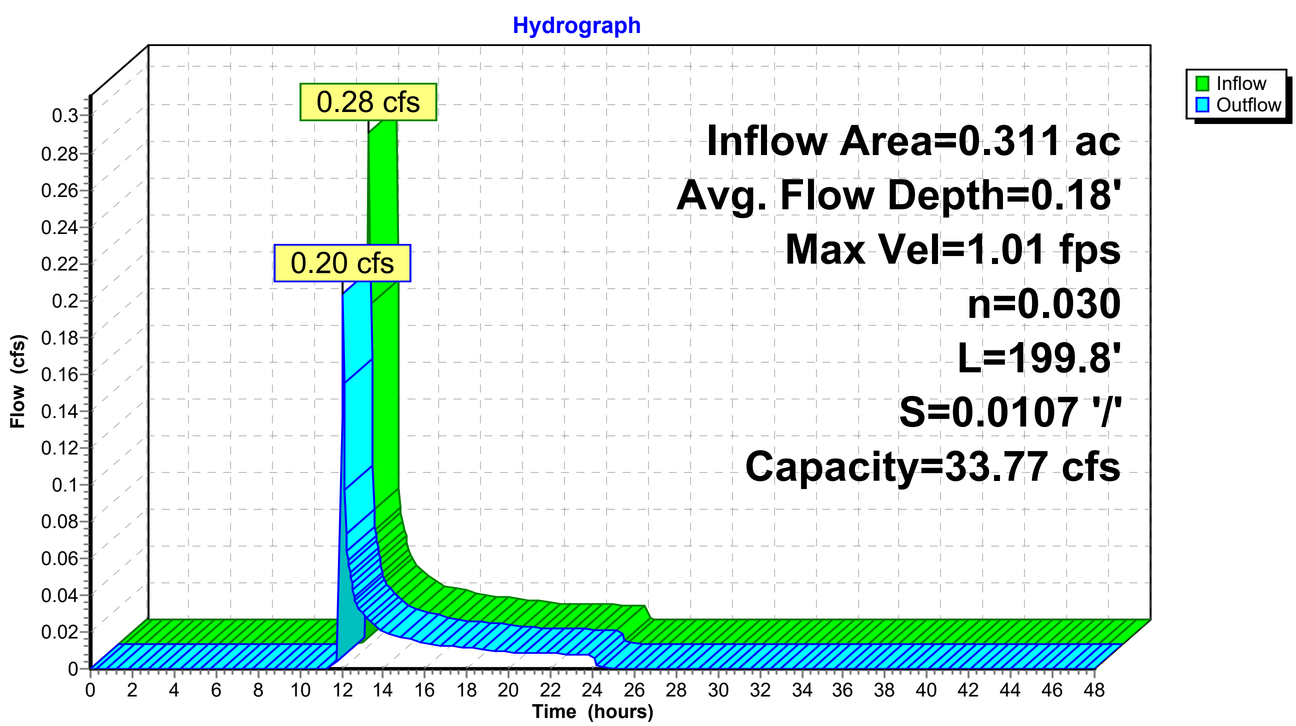
Reach TB-C4: TB-C4



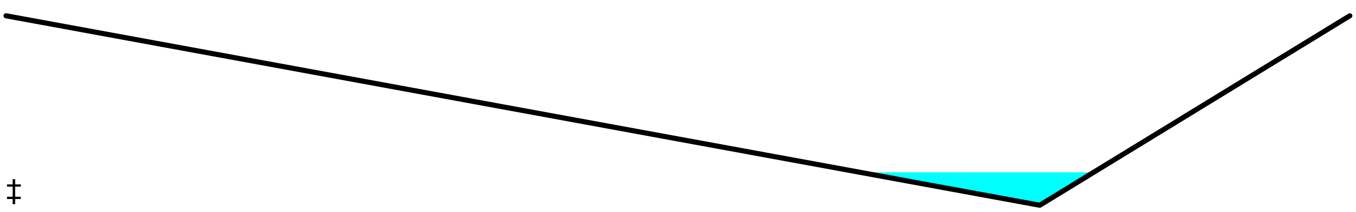
Summary for Reach TB-C5: TB-C5

Inflow Area = 0.521 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.47 cfs @ 11.95 hrs, Volume= 0.029 af
Outflow = 0.28 cfs @ 12.10 hrs, Volume= 0.029 af, Atten= 40%, Lag= 8.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.06 fps, Min. Travel Time= 5.0 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 10.4 min

Peak Storage= 89 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 31.94 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 315.2' Slope= 0.0096 '/'
Inlet Invert= 49.00', Outlet Invert= 45.98'



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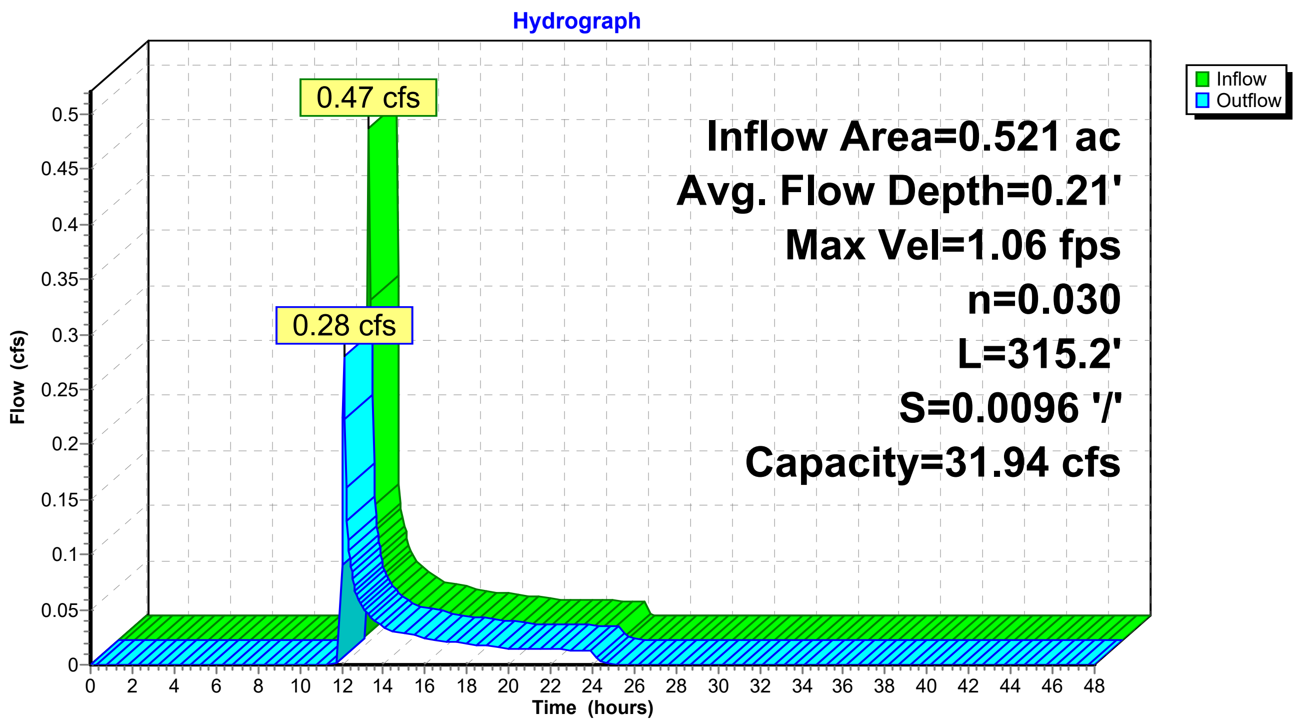
Reach TB-C5: TB-C5



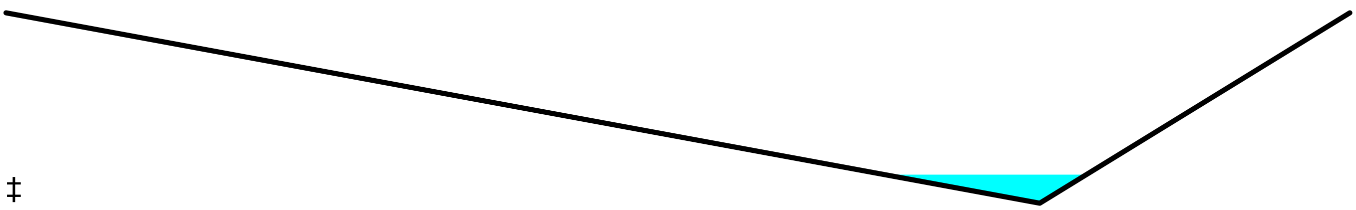
Summary for Reach TB-C6: TB-C6

Inflow Area = 0.313 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.28 cfs @ 11.95 hrs, Volume= 0.017 af
Outflow = 0.21 cfs @ 12.05 hrs, Volume= 0.017 af, Atten= 25%, Lag= 5.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.00 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 6.7 min

Peak Storage= 41 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 33.17 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 191.6' Slope= 0.0103 '/'
Inlet Invert= 47.96', Outlet Invert= 45.98'



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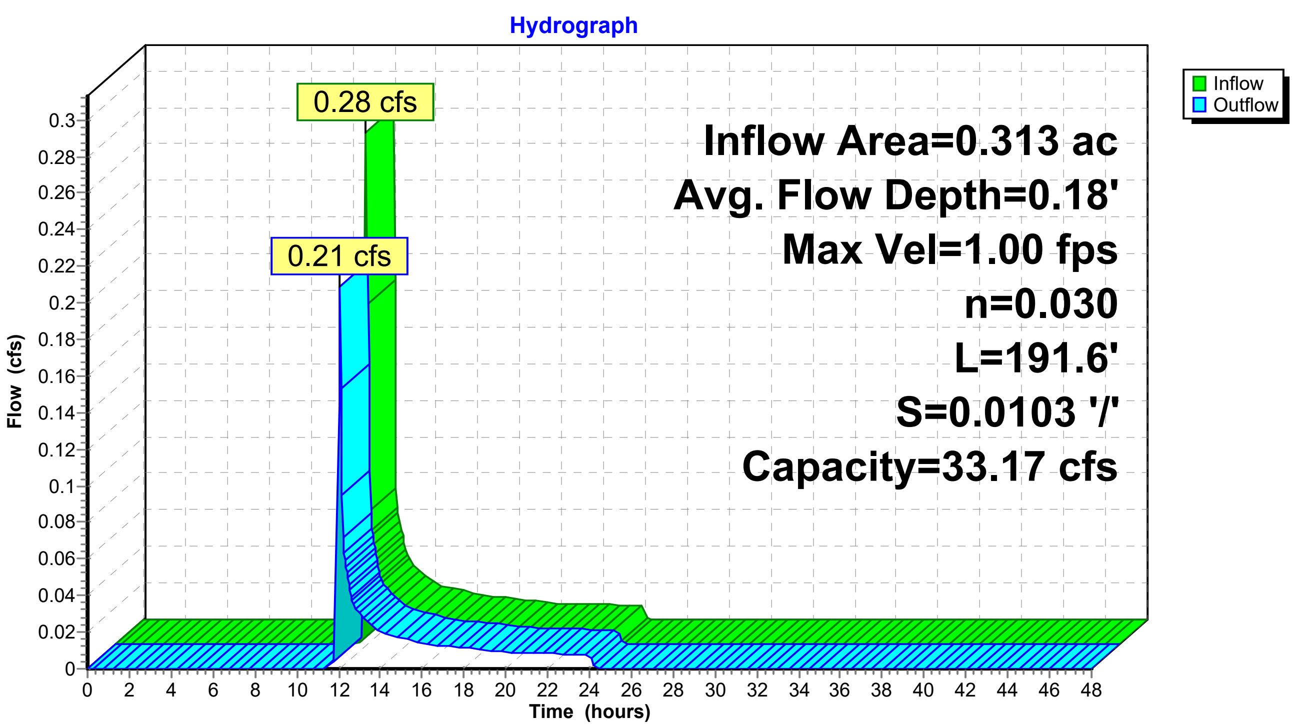
Reach TB-C6: TB-C6



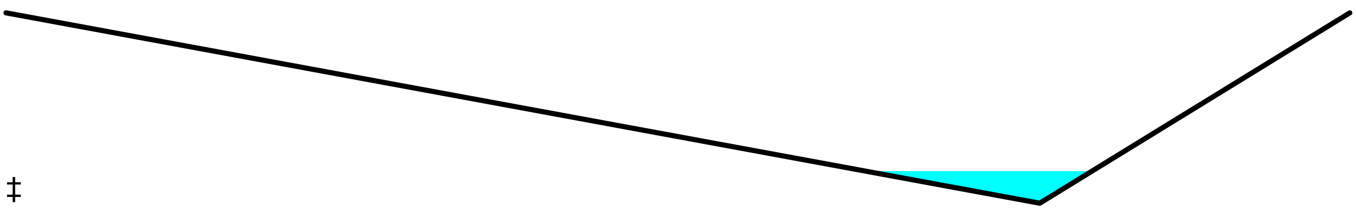
Summary for Reach TB-C7: TB-C7

Inflow Area = 0.481 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.43 cfs @ 11.95 hrs, Volume= 0.026 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 39%, Lag= 8.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.08 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 9.5 min

Peak Storage= 78 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 33.34 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 294.0' Slope= 0.0104 '/'
Inlet Invert= 31.99', Outlet Invert= 28.92'



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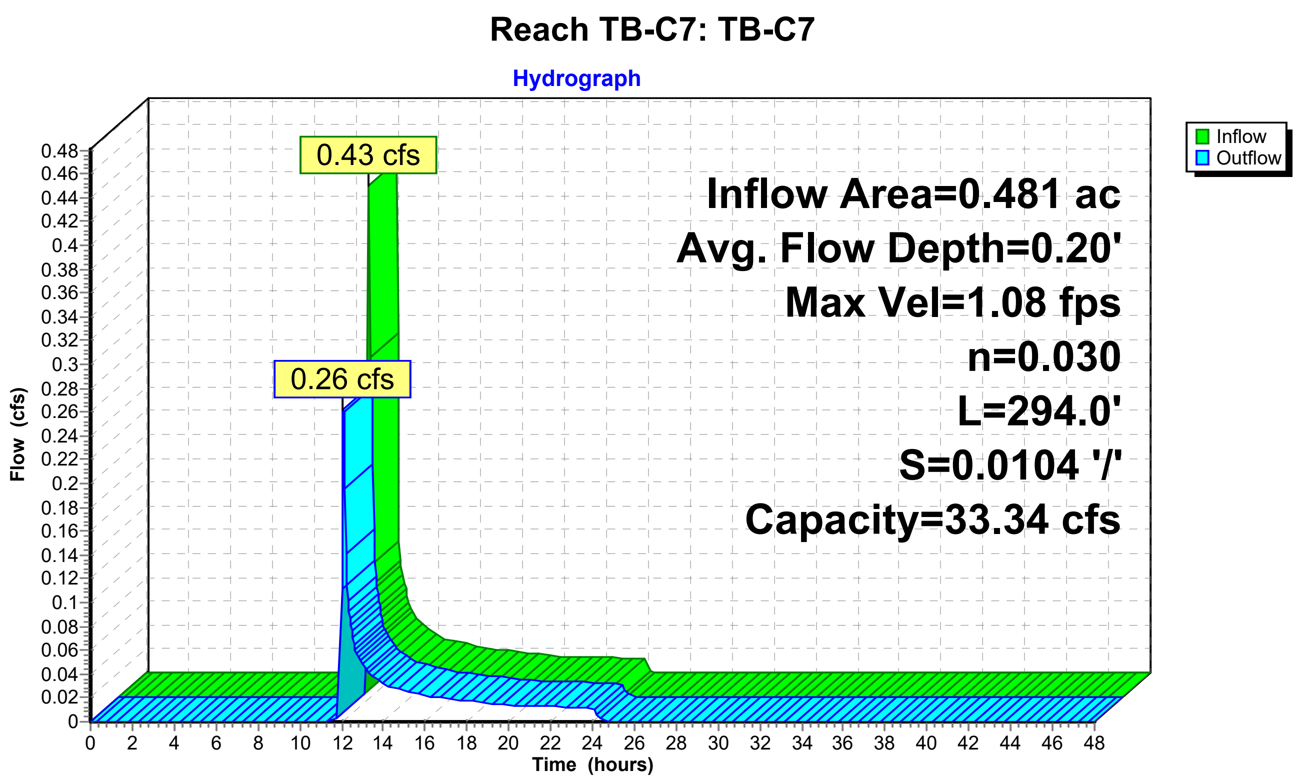


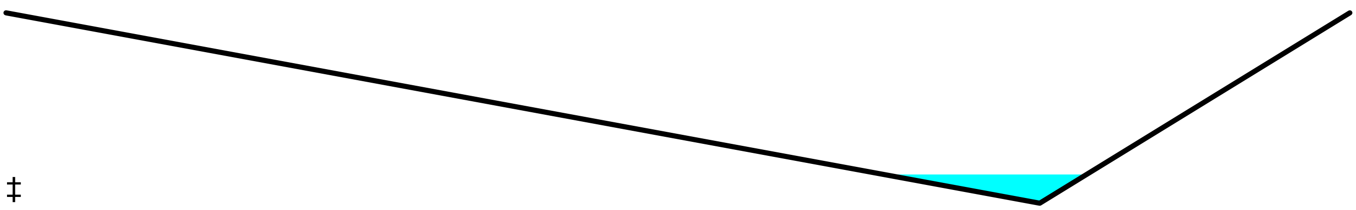
Summary for Reach TB-C8: TB-C8

Inflow Area = 0.300 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.27 cfs @ 11.95 hrs, Volume= 0.016 af
Outflow = 0.20 cfs @ 12.05 hrs, Volume= 0.016 af, Atten= 26%, Lag= 5.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.94 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.45 fps, Avg. Travel Time= 6.8 min

Peak Storage= 39 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 31.07 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 184.2' Slope= 0.0091 '/'
Inlet Invert= 30.59', Outlet Invert= 28.92'



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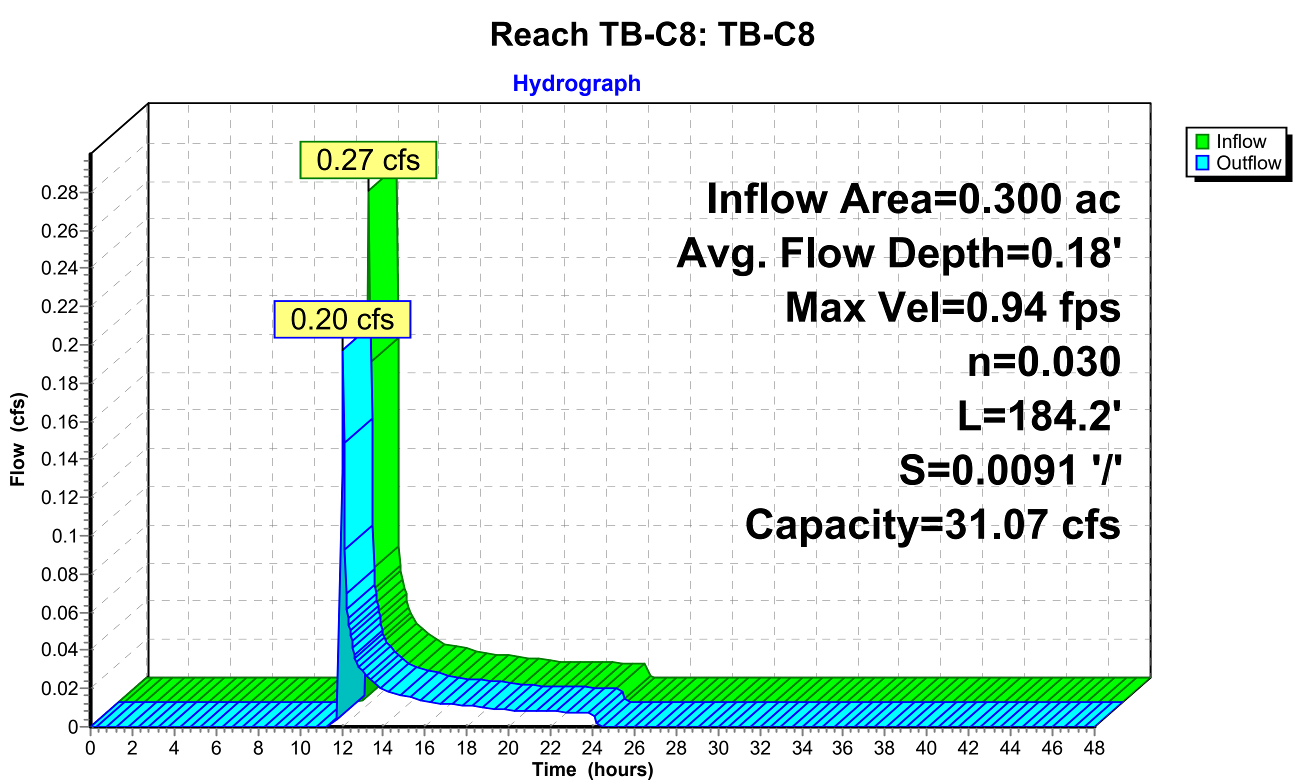


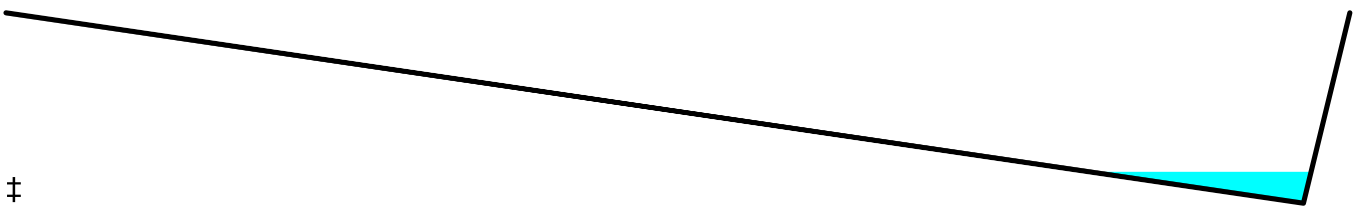
Summary for Reach TB-D1: TB-D1

Inflow Area = 1.779 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.64 cfs @ 12.21 hrs, Volume= 0.097 af
Outflow = 0.48 cfs @ 12.52 hrs, Volume= 0.097 af, Atten= 24%, Lag= 19.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.31 fps, Min. Travel Time= 10.2 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 21.3 min

Peak Storage= 296 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 58.81 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 187.2' Slope= 0.0004 '/'
Inlet Invert= 91.60', Outlet Invert= 91.52'



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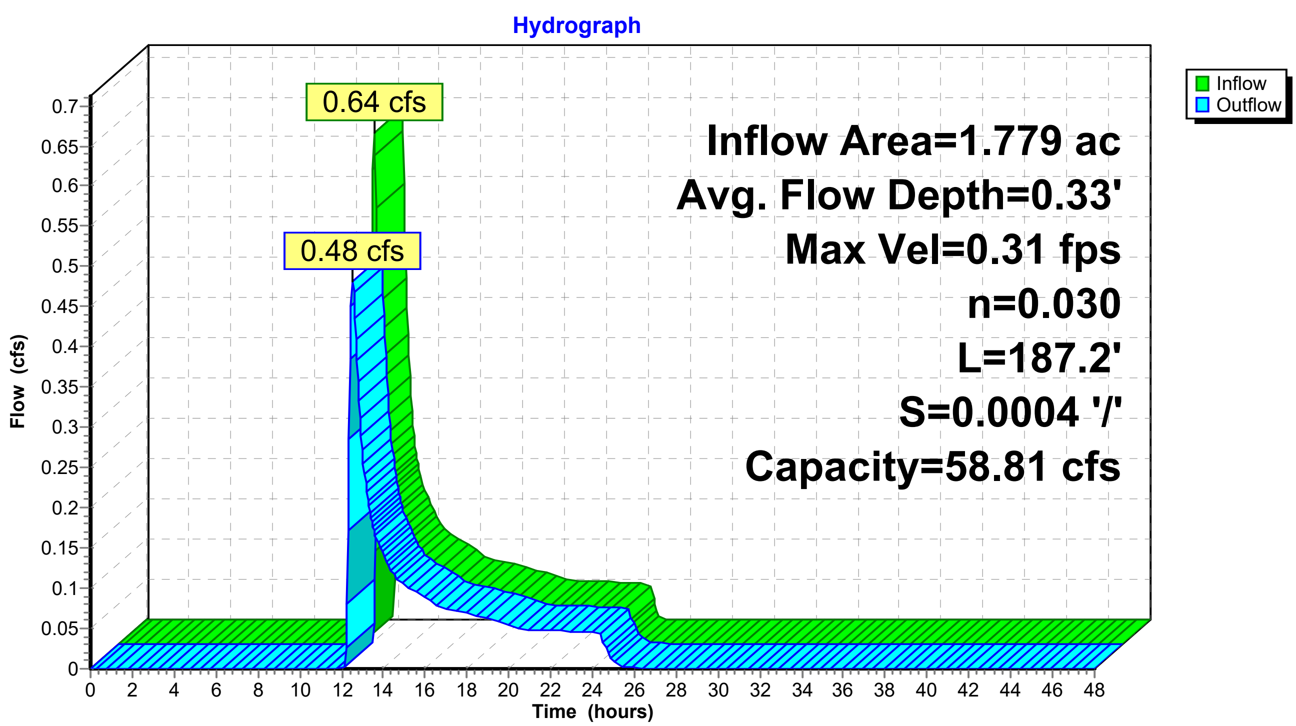
Reach TB-D1: TB-D1



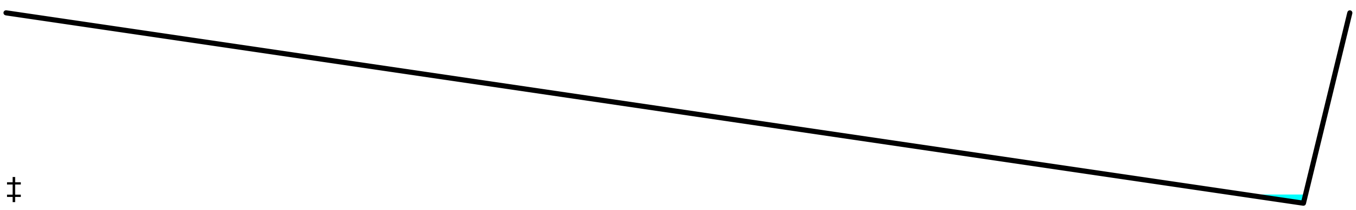
Summary for Reach TB-D2: TB-D2

Inflow Area = 0.104 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.06 cfs @ 12.06 hrs, Volume= 0.006 af
Outflow = 0.06 cfs @ 12.08 hrs, Volume= 0.006 af, Atten= 7%, Lag= 1.3 min

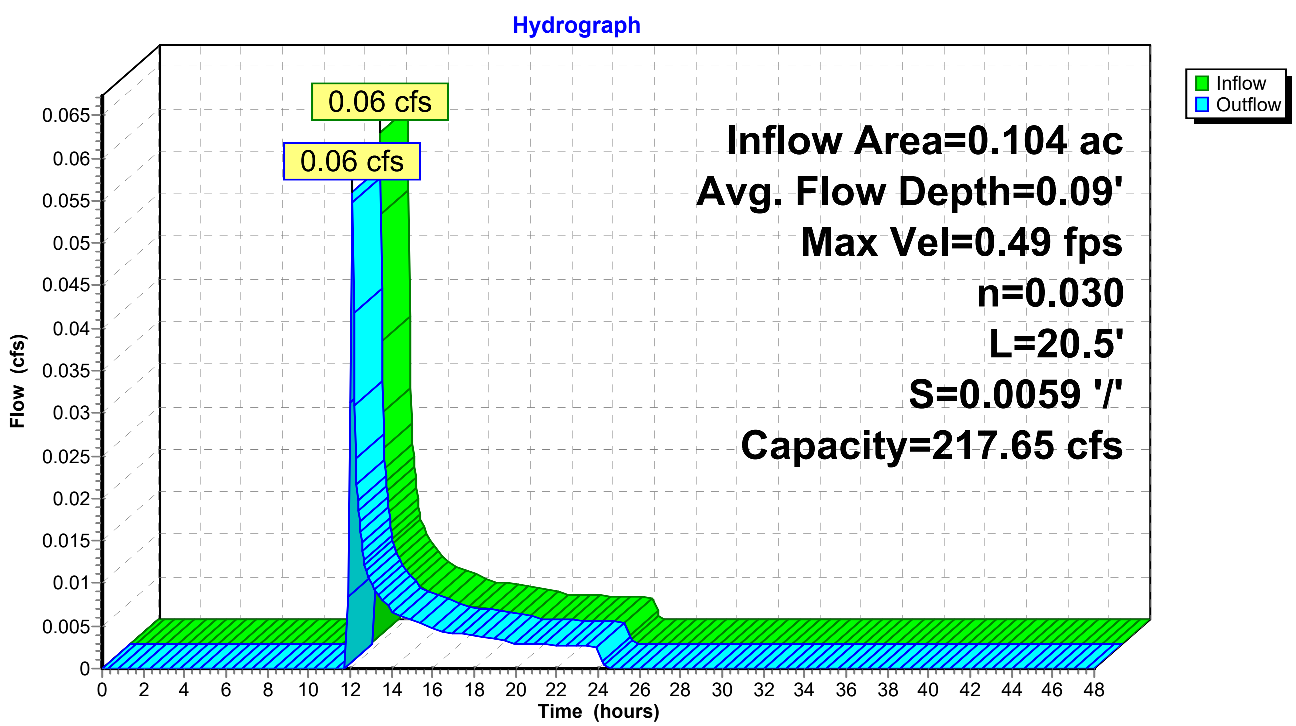
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.49 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.26 fps, Avg. Travel Time= 1.3 min

Peak Storage= 3 cf @ 12.06 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 217.65 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 20.5' Slope= 0.0059 '/'
Inlet Invert= 91.64', Outlet Invert= 91.52'



Reach TB-D2: TB-D2



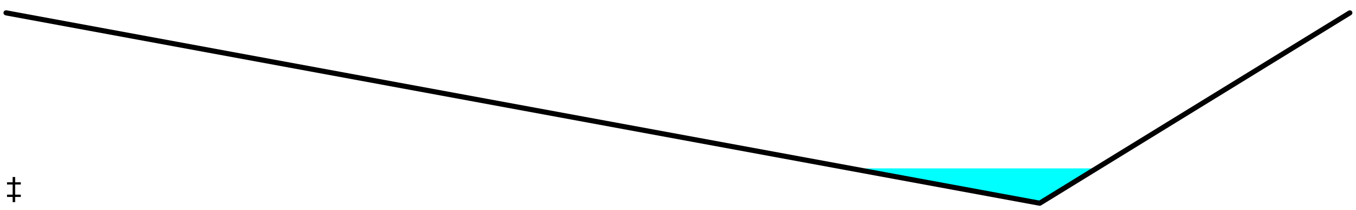
Summary for Reach TB-D3: TB-D3

Inflow Area = 1.129 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.67 cfs @ 12.05 hrs, Volume= 0.062 af
Outflow = 0.44 cfs @ 12.26 hrs, Volume= 0.062 af, Atten= 35%, Lag= 12.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.40 fps, Min. Travel Time= 7.2 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 14.5 min

Peak Storage= 190 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 40.71 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 606.3' Slope= 0.0156 '/'
Inlet Invert= 78.44', Outlet Invert= 69.00'



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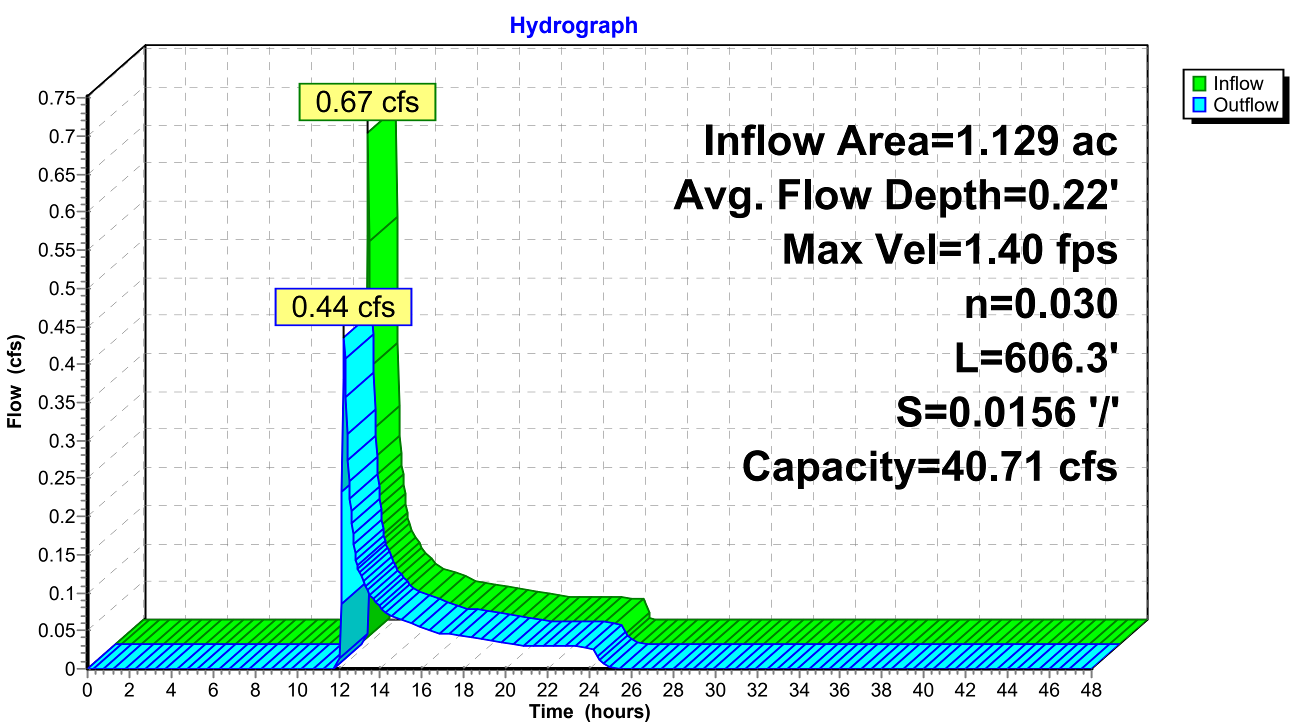
Reach TB-D3: TB-D3



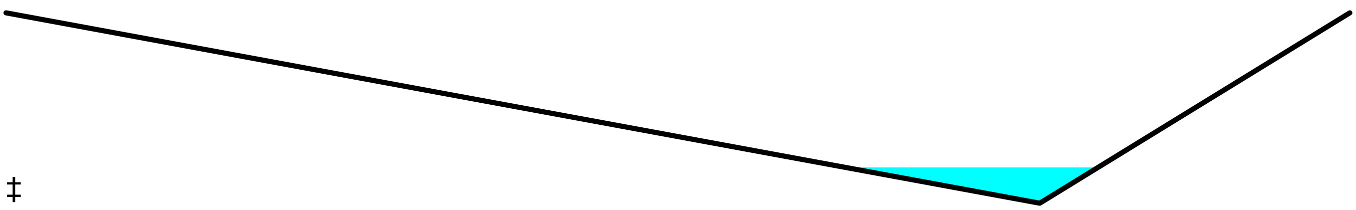
Summary for Reach TB-D4: TB-D4

Inflow Area = 1.014 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.90 cfs @ 11.96 hrs, Volume= 0.056 af
Outflow = 0.45 cfs @ 12.16 hrs, Volume= 0.056 af, Atten= 50%, Lag= 12.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.42 fps, Min. Travel Time= 7.6 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 15.8 min

Peak Storage= 213 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 41.14 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 646.0' Slope= 0.0159 '/'
Inlet Invert= 59.27', Outlet Invert= 49.00'



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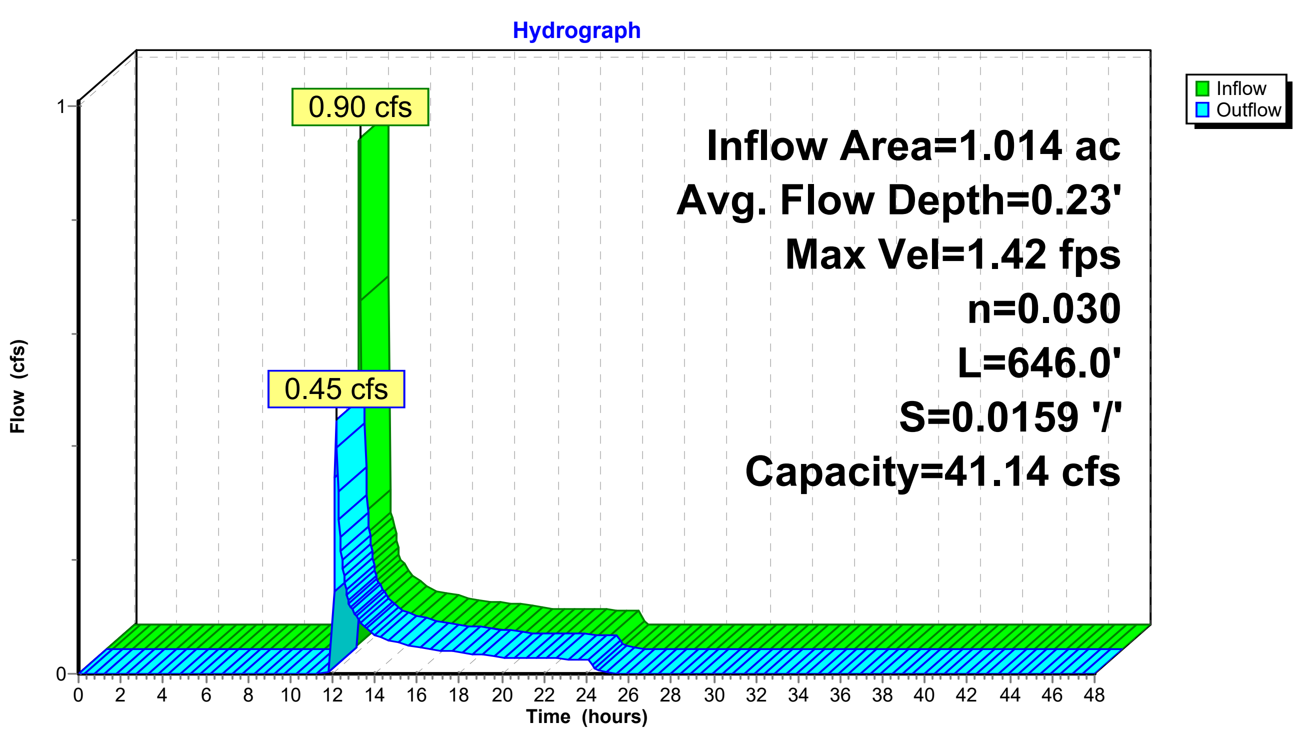
Reach TB-D4: TB-D4



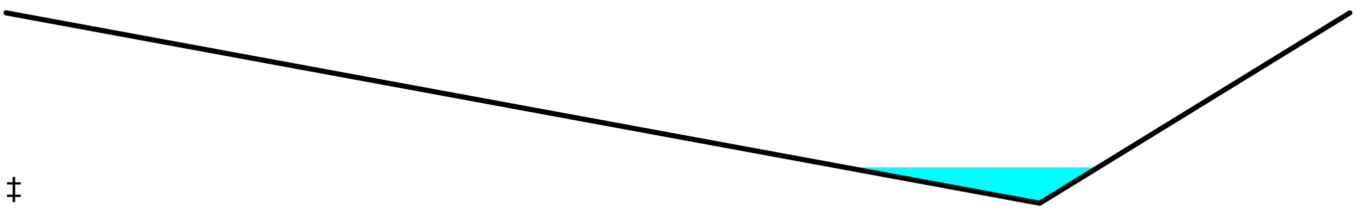
Summary for Reach TB-D5: TB-D5

Inflow Area = 1.049 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.94 cfs @ 11.95 hrs, Volume= 0.057 af
Outflow = 0.46 cfs @ 12.17 hrs, Volume= 0.057 af, Atten= 51%, Lag= 12.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.40 fps, Min. Travel Time= 8.1 min
Avg. Velocity = 0.67 fps, Avg. Travel Time= 17.1 min

Peak Storage= 228 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 40.31 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 683.3' Slope= 0.0153 '/'
Inlet Invert= 42.42', Outlet Invert= 31.99'



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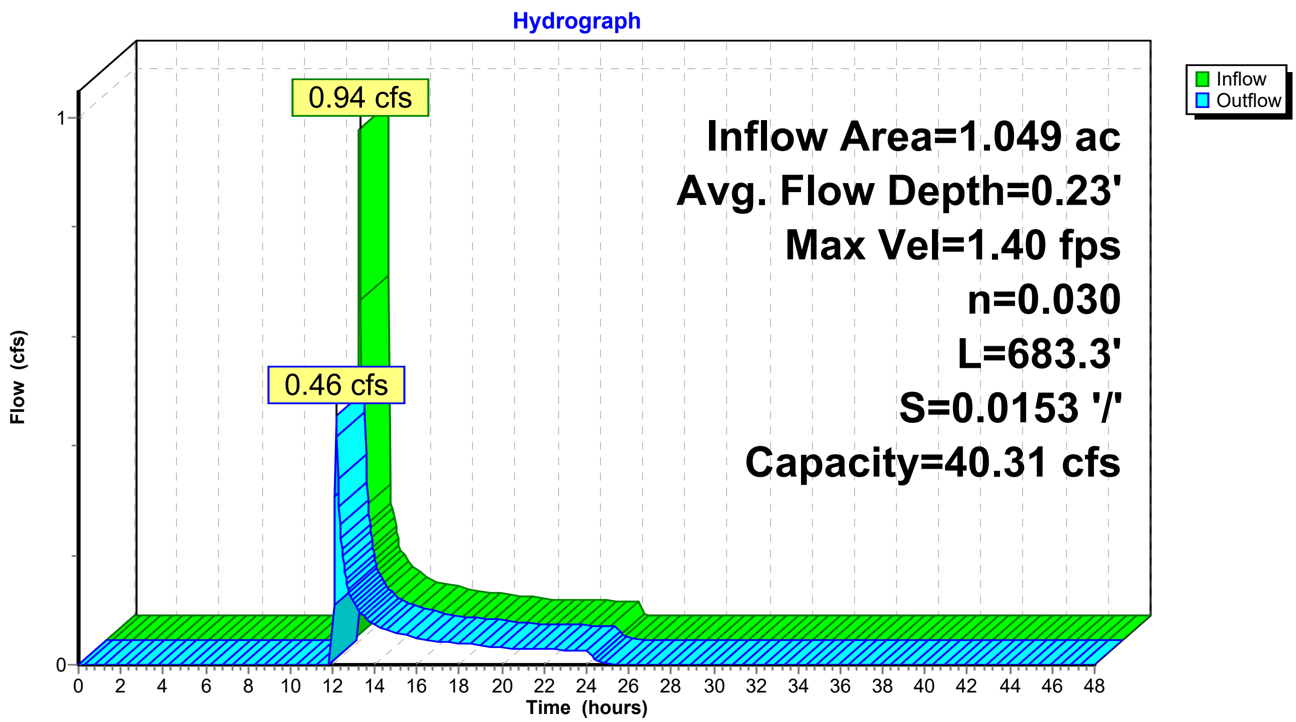
Reach TB-D5: TB-D5

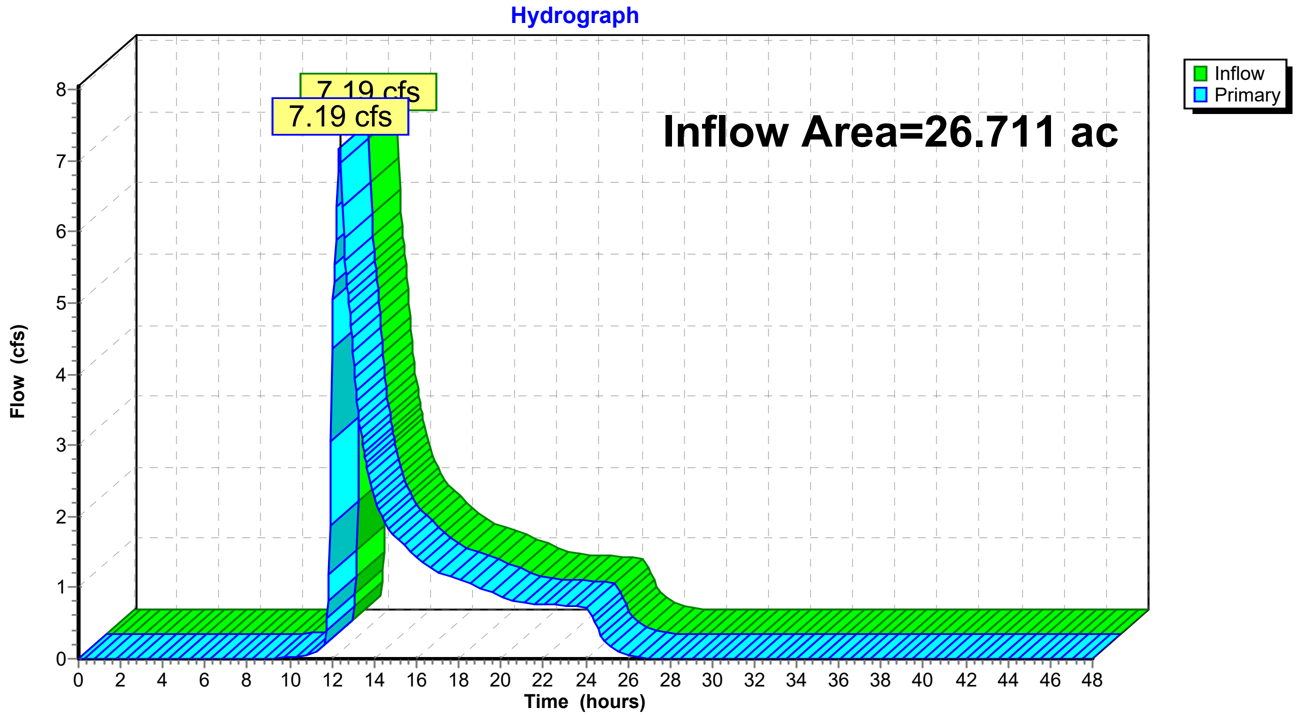


Summary for Link Link 1: Into NE Basin

Inflow Area =	26.711 ac,	0.00% Impervious,	Inflow Depth = 0.78"	for 25-yr,24-hr event	
Inflow =	7.19 cfs @	12.37 hrs,	Volume=	1.739 af	
Primary =	7.19 cfs @	12.37 hrs,	Volume=	1.739 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link Link 1: Into NE Basin



Summary for Subcatchment SC-E1: SC-E1

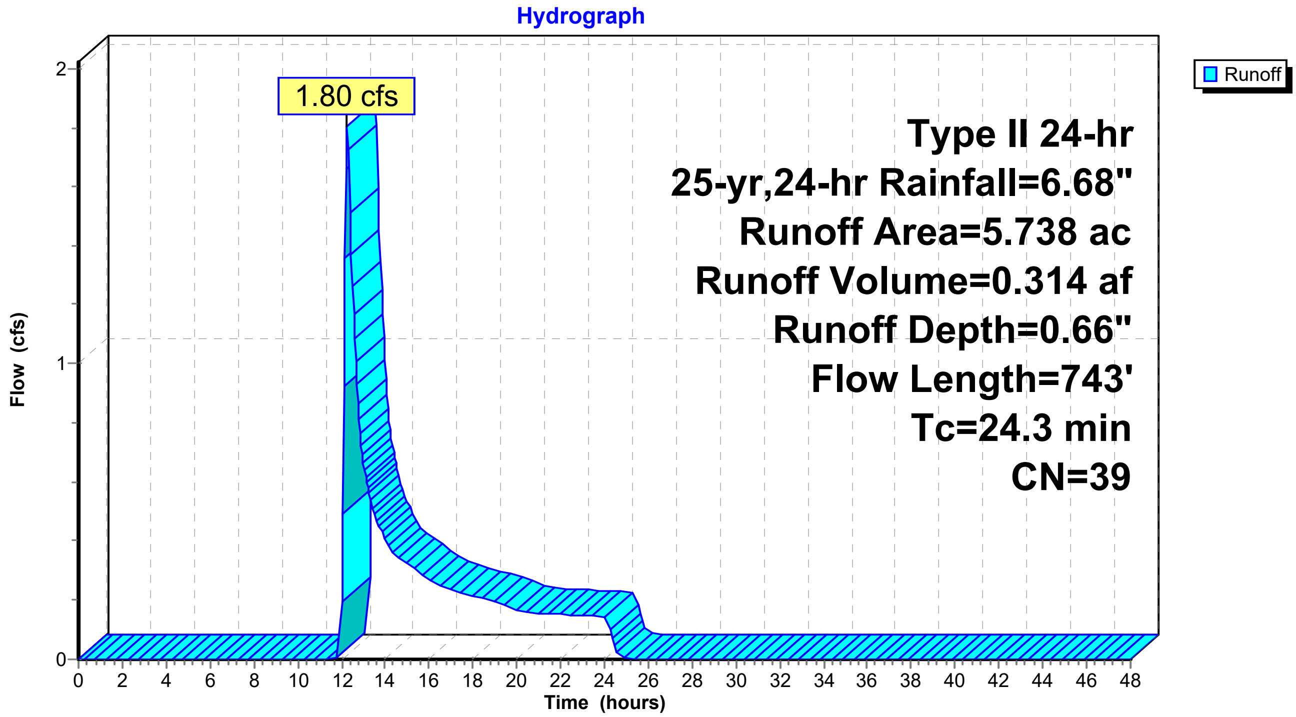
Runoff = 1.80 cfs @ 12.27 hrs, Volume= 0.314 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
5.738	39	>75% Grass cover, Good, HSG A
5.738		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0136	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
13.2	643	0.0134	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
24.3	743	Total			

Subcatchment SC-E1: SC-E1



Summary for Subcatchment SC-E2: SC-E2

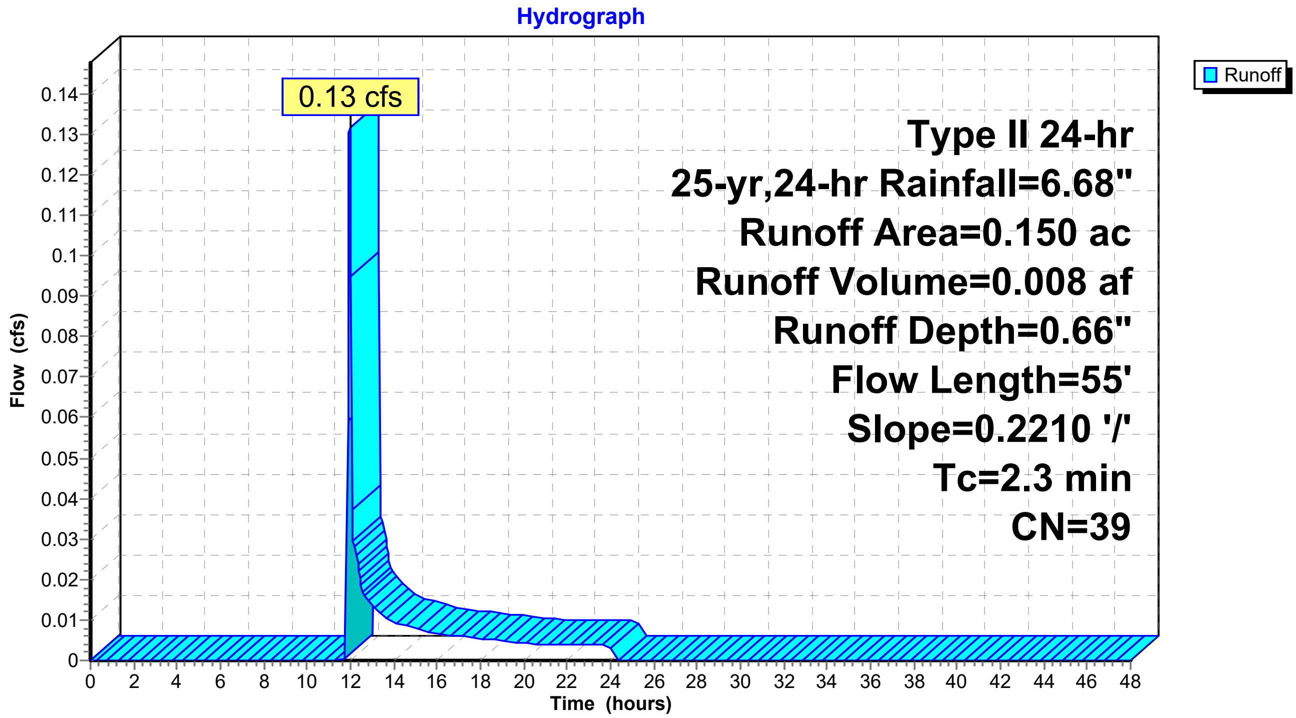
Runoff = 0.13 cfs @ 11.96 hrs, Volume= 0.008 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.150	39	>75% Grass cover, Good, HSG A
0.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	55	0.2210	0.41		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-E2: SC-E2



Summary for Subcatchment SC-E3: SC-E3

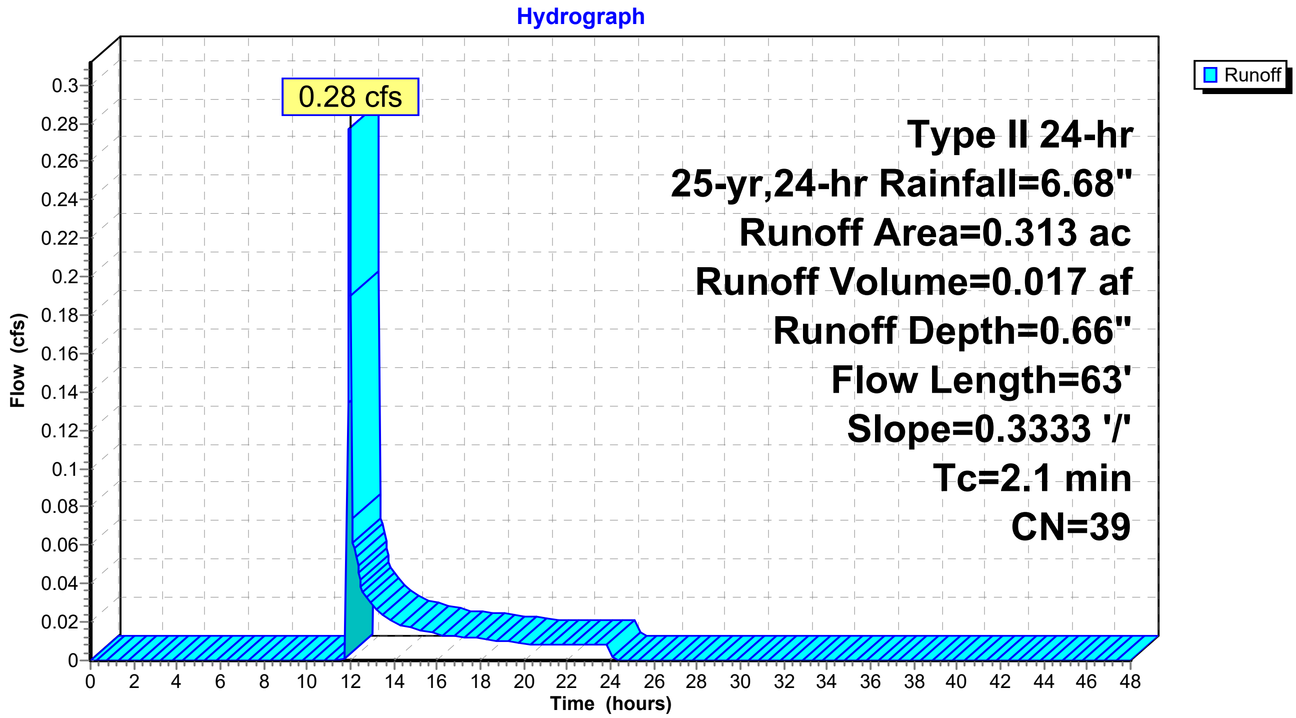
Runoff = 0.28 cfs @ 11.96 hrs, Volume= 0.017 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.313	39	>75% Grass cover, Good, HSG A
0.313		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	63	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-E3: SC-E3



Summary for Subcatchment SC-E4: SC-E4

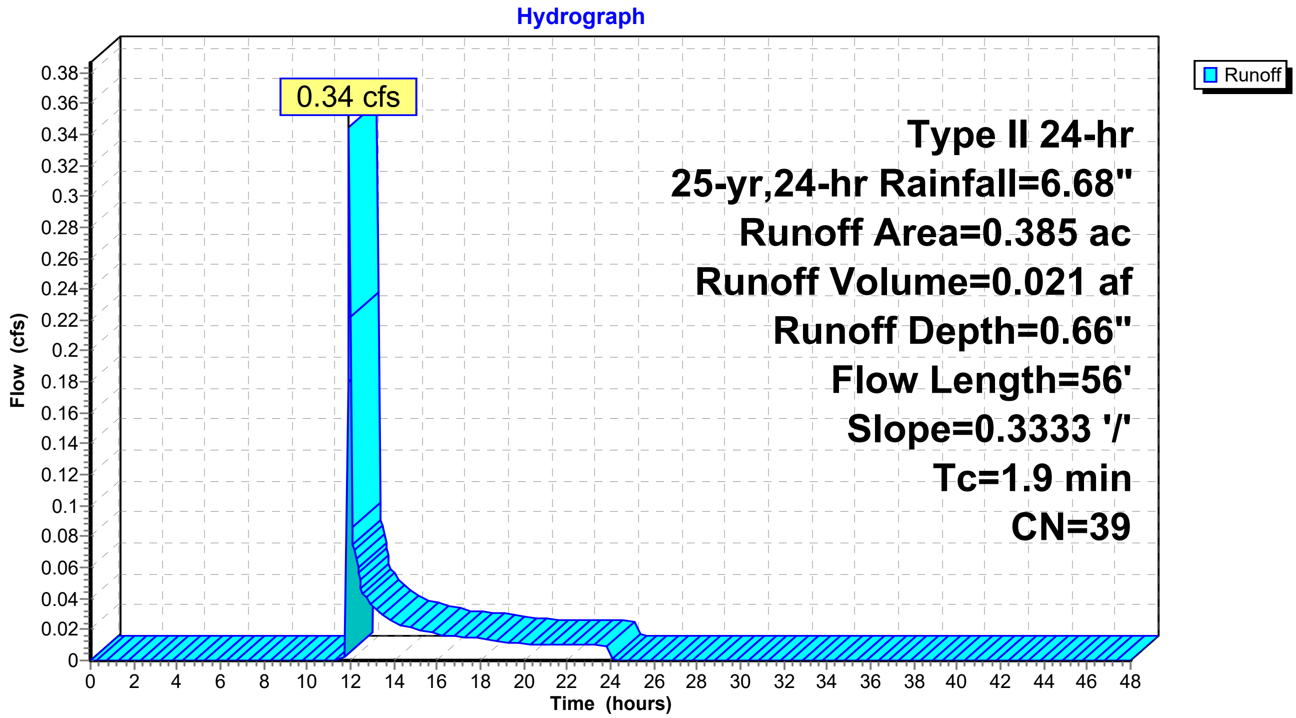
Runoff = 0.34 cfs @ 11.95 hrs, Volume= 0.021 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.385	39	>75% Grass cover, Good, HSG A
0.385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	56	0.3333	0.48		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-E4: SC-E4



Summary for Subcatchment SC-E5: SC-E5

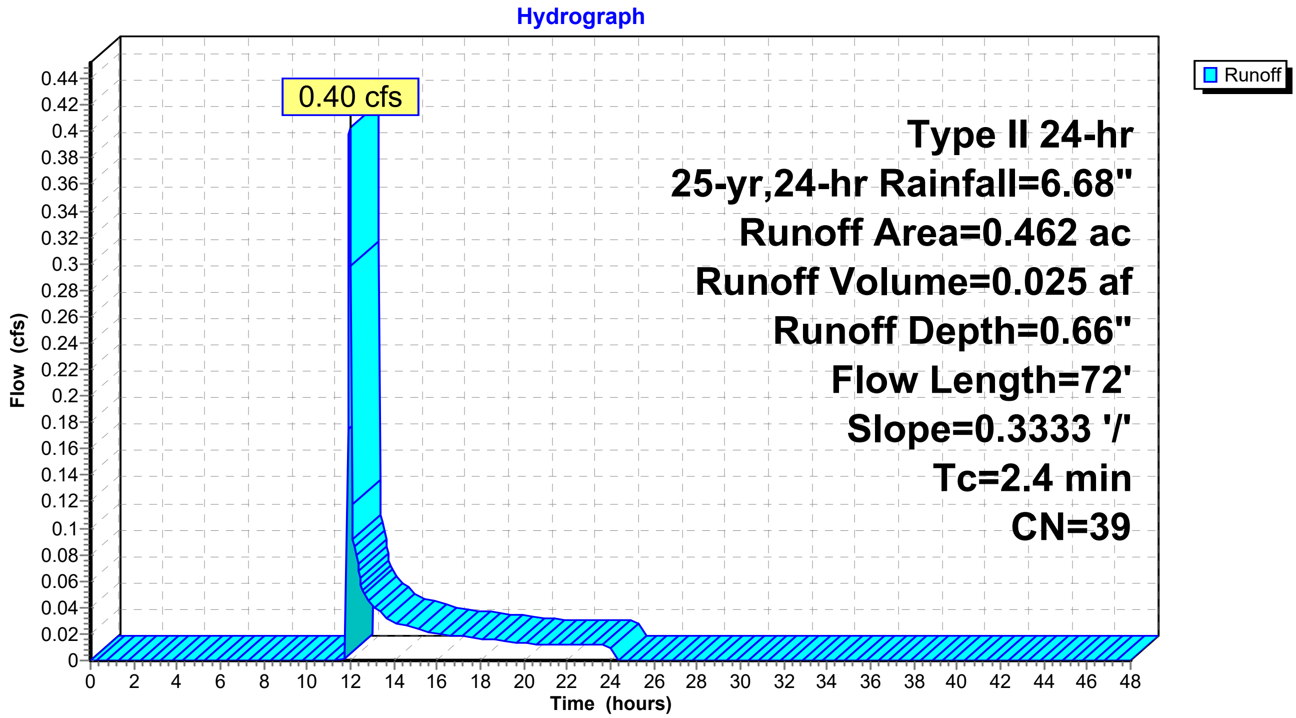
Runoff = 0.40 cfs @ 11.96 hrs, Volume= 0.025 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.462	39	>75% Grass cover, Good, HSG A
0.462		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	72	0.3333	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-E5: SC-E5



Summary for Subcatchment SC-E6: SC-E6

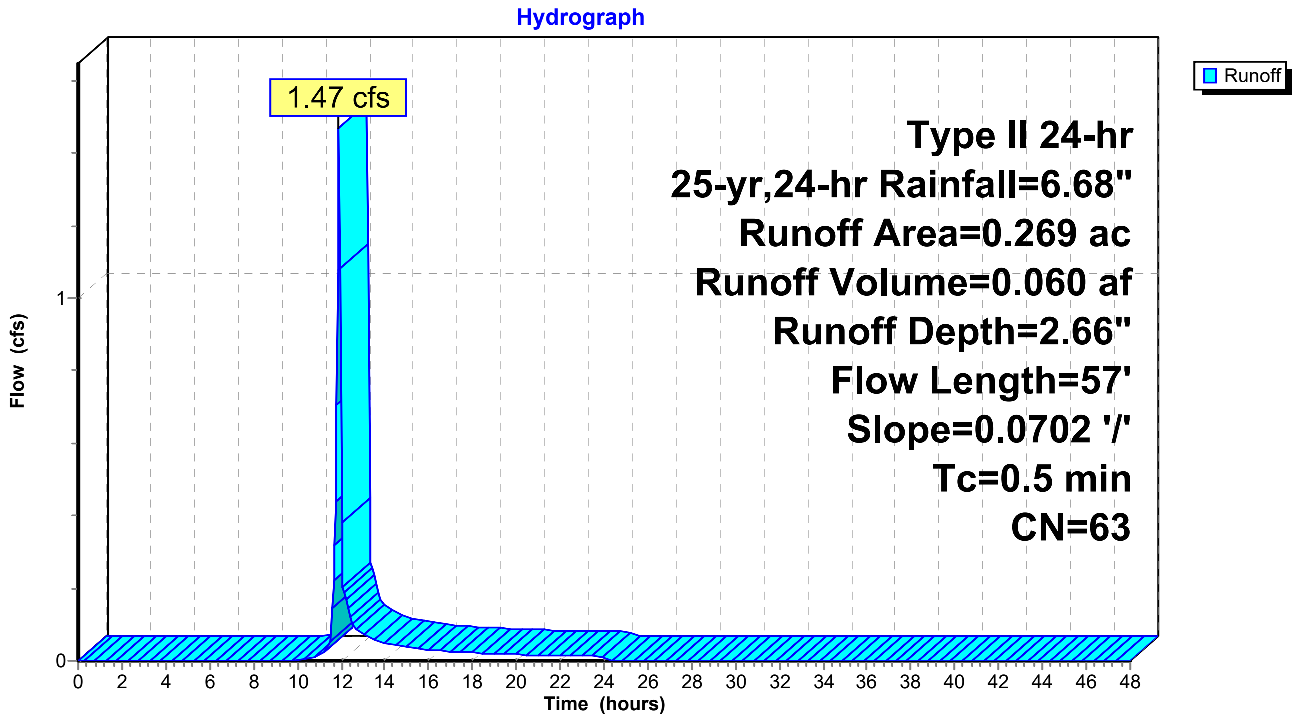
Runoff = 1.47 cfs @ 11.90 hrs, Volume= 0.060 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.092	39	>75% Grass cover, Good, HSG A
0.177	76	Gravel roads, HSG A
0.269	63	Weighted Average
0.269		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	57	0.0702	2.09		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-E6: SC-E6



Summary for Subcatchment SC-E7: SC-E7

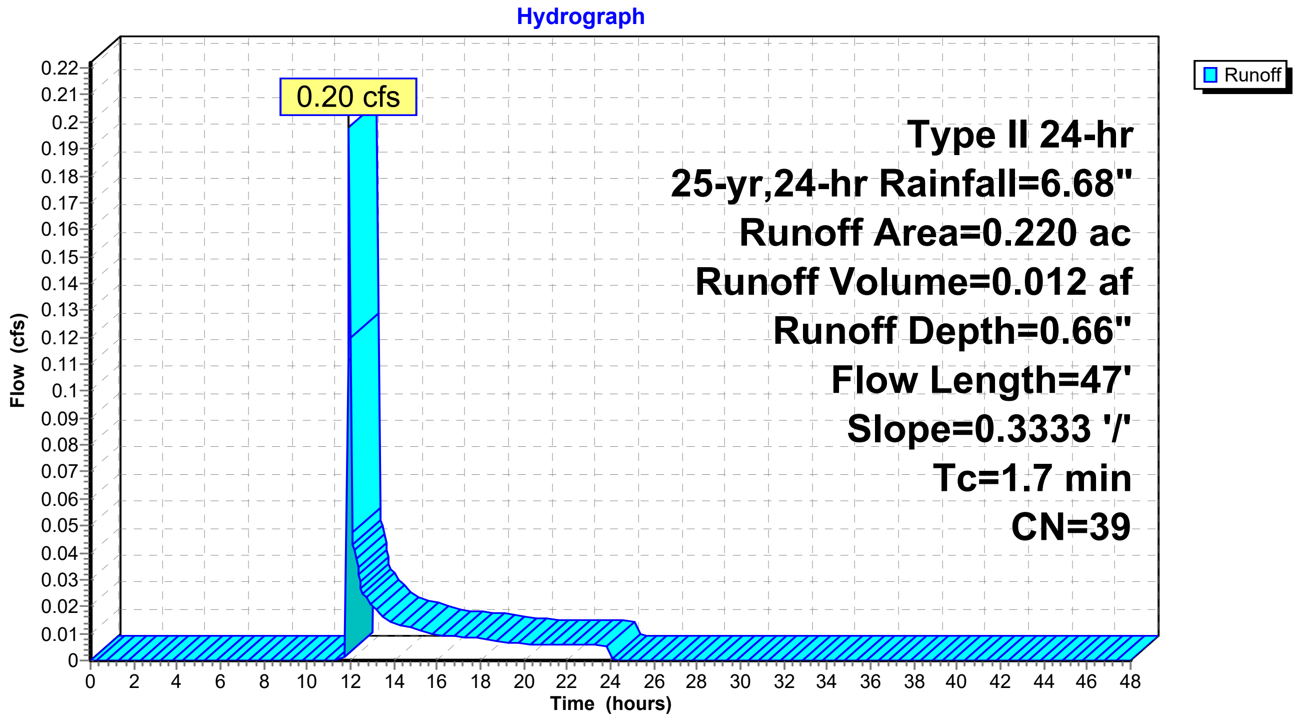
Runoff = 0.20 cfs @ 11.95 hrs, Volume= 0.012 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.220	39	>75% Grass cover, Good, HSG A
0.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	47	0.3333	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-E7: SC-E7



Summary for Subcatchment SC-E8: SC-E8

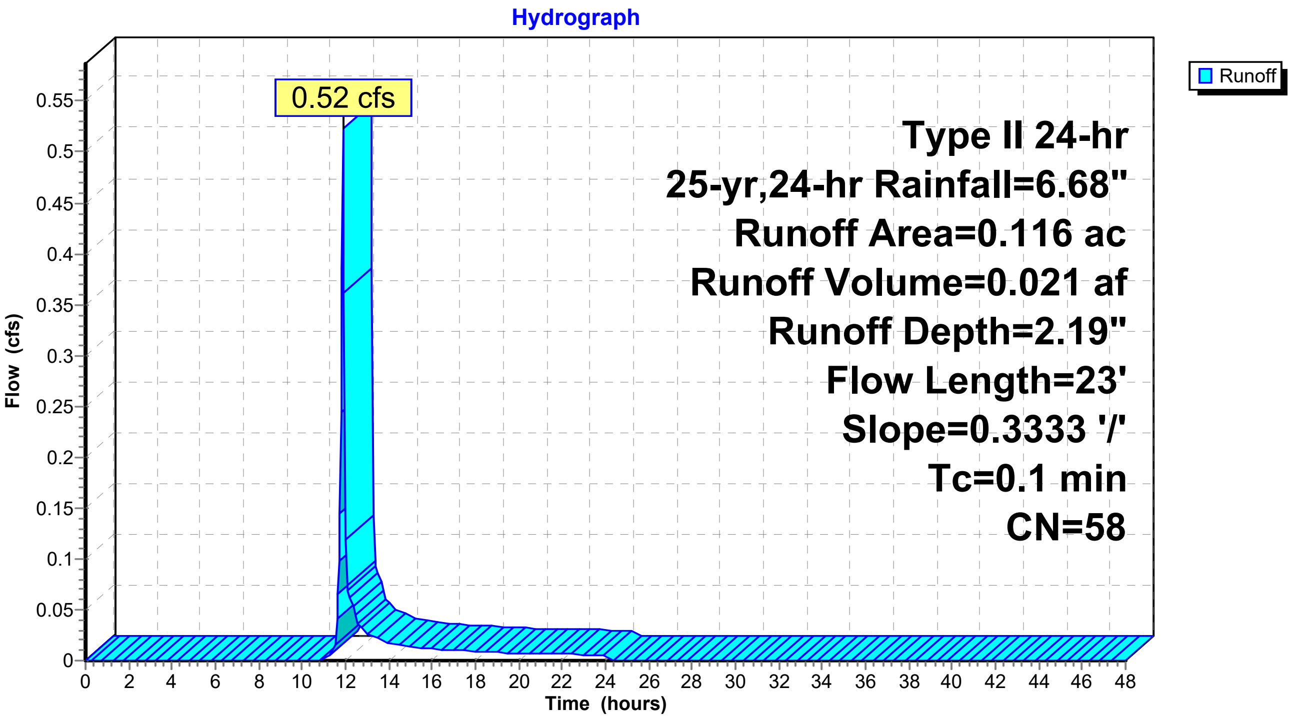
Runoff = 0.52 cfs @ 11.90 hrs, Volume= 0.021 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.057	39	>75% Grass cover, Good, HSG A
0.059	76	Gravel roads, HSG A
0.116	58	Weighted Average
0.116		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	23	0.3333	3.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-E8: SC-E8



Summary for Subcatchment SC-F1: SC-F1

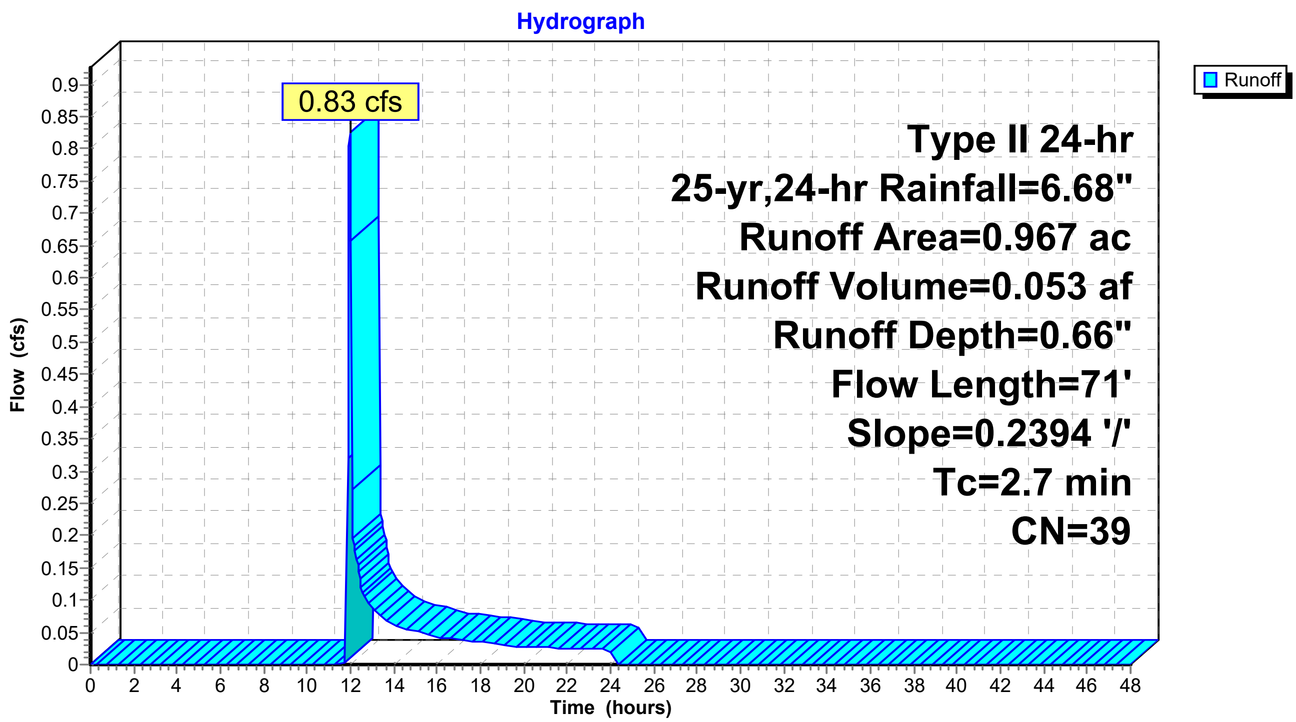
Runoff = 0.83 cfs @ 11.96 hrs, Volume= 0.053 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.967	39	>75% Grass cover, Good, HSG A
0.967		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	71	0.2394	0.44		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-F1: SC-F1



Summary for Subcatchment SC-F2: SC-F2

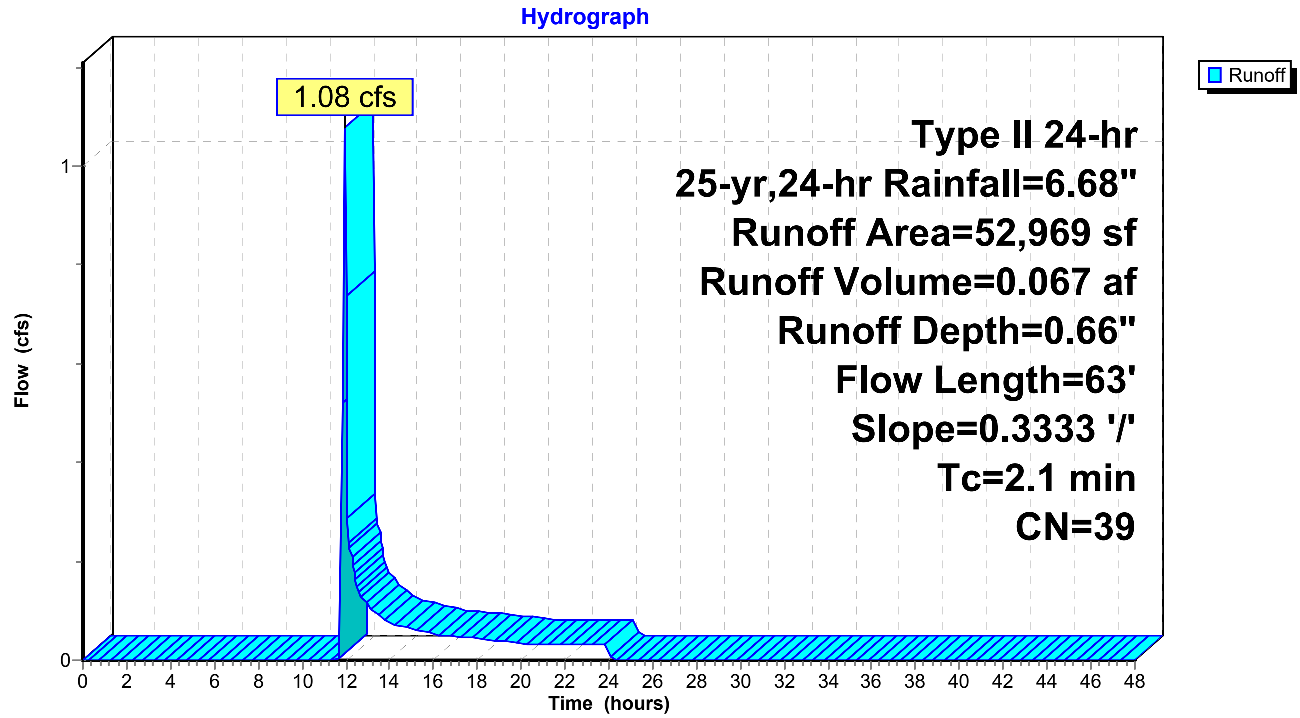
Runoff = 1.08 cfs @ 11.96 hrs, Volume= 0.067 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
52,969	39	>75% Grass cover, Good, HSG A
52,969		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	63	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-F2: SC-F2



Summary for Subcatchment SC-F3: SC-F3

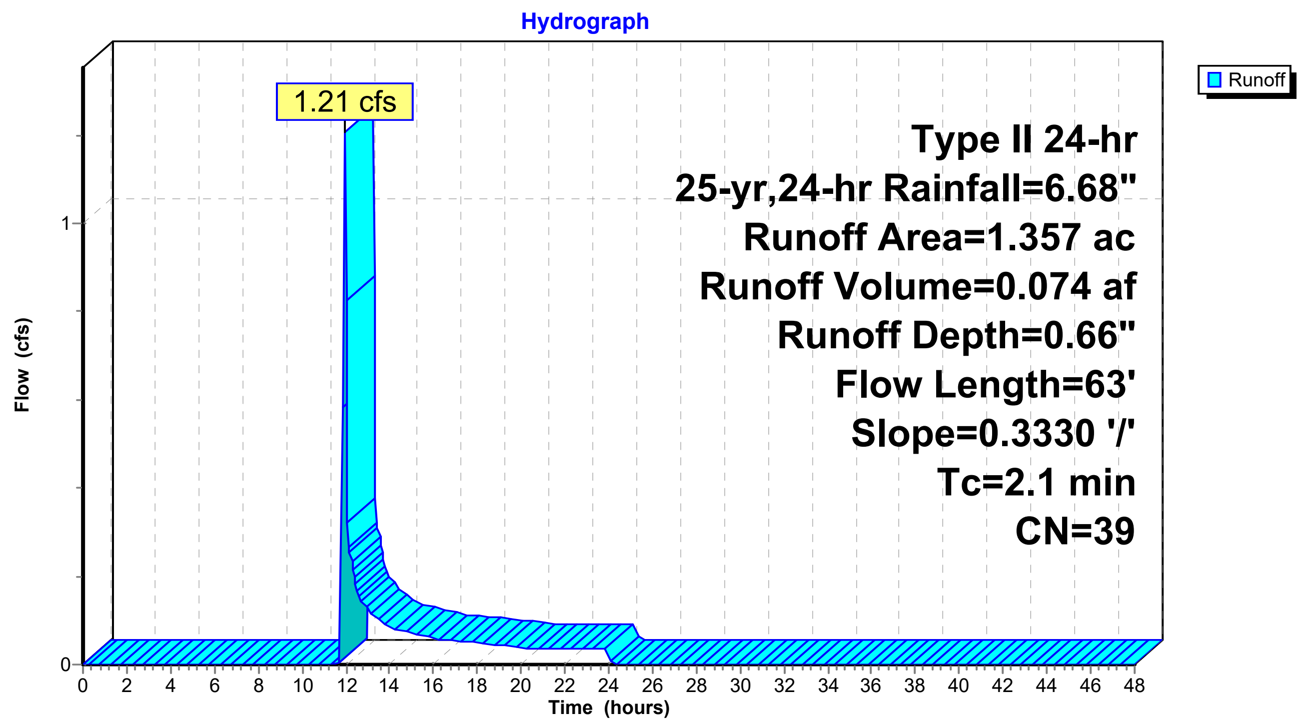
Runoff = 1.21 cfs @ 11.96 hrs, Volume= 0.074 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.357	39	>75% Grass cover, Good, HSG A
1.357		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	63	0.3330	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-F3: SC-F3



Summary for Subcatchment SC-F4: SC-F4

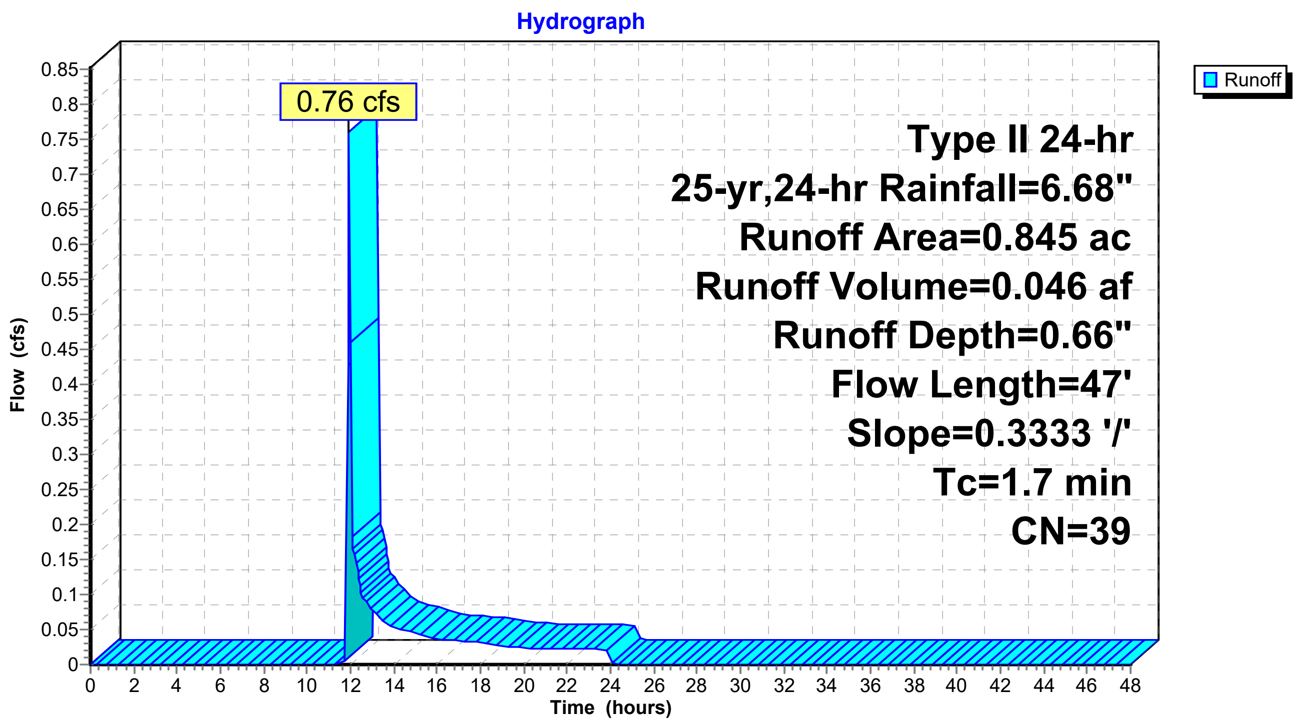
Runoff = 0.76 cfs @ 11.95 hrs, Volume= 0.046 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.845	39	>75% Grass cover, Good, HSG A
0.845		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	47	0.3333	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-F4: SC-F4



Summary for Subcatchment SC-F5: SC-F5

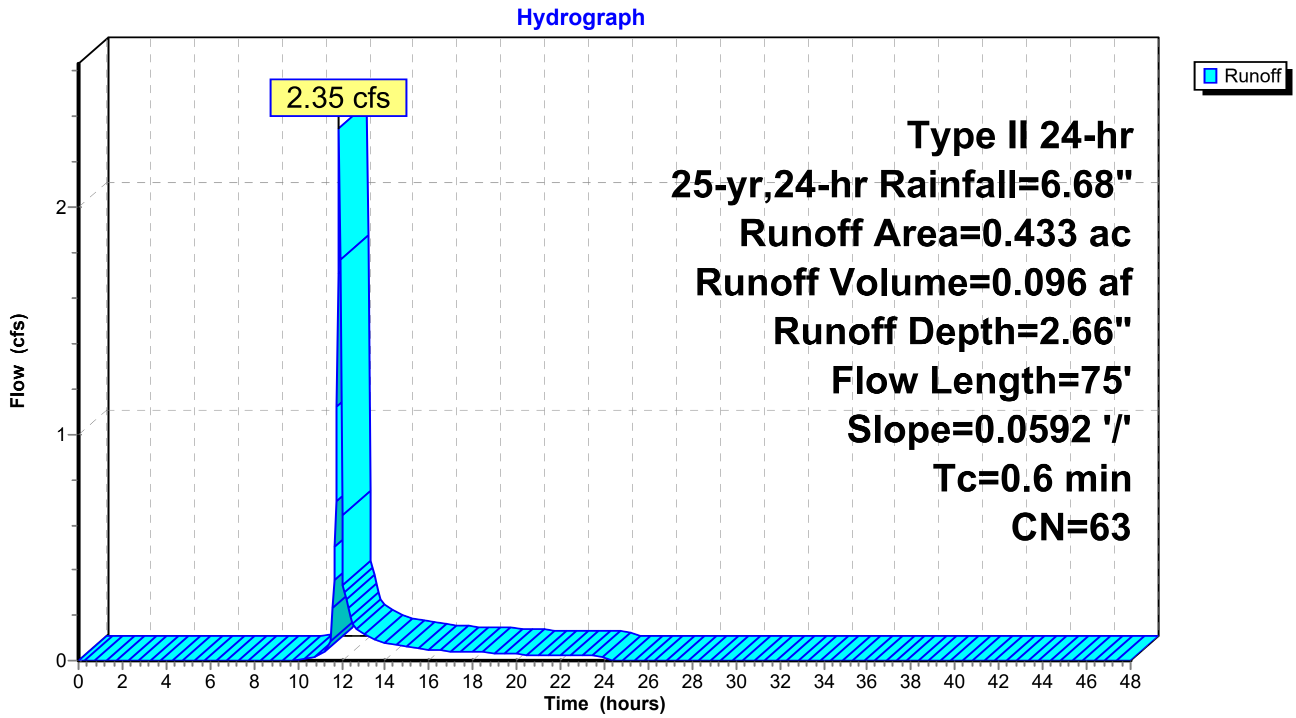
Runoff = 2.35 cfs @ 11.90 hrs, Volume= 0.096 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.156	39	>75% Grass cover, Good, HSG A
0.277	76	Gravel roads, HSG A
0.433	63	Weighted Average
0.433		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	75	0.0592	2.07		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-F5: SC-F5



Summary for Subcatchment SC-G1: SC-G1

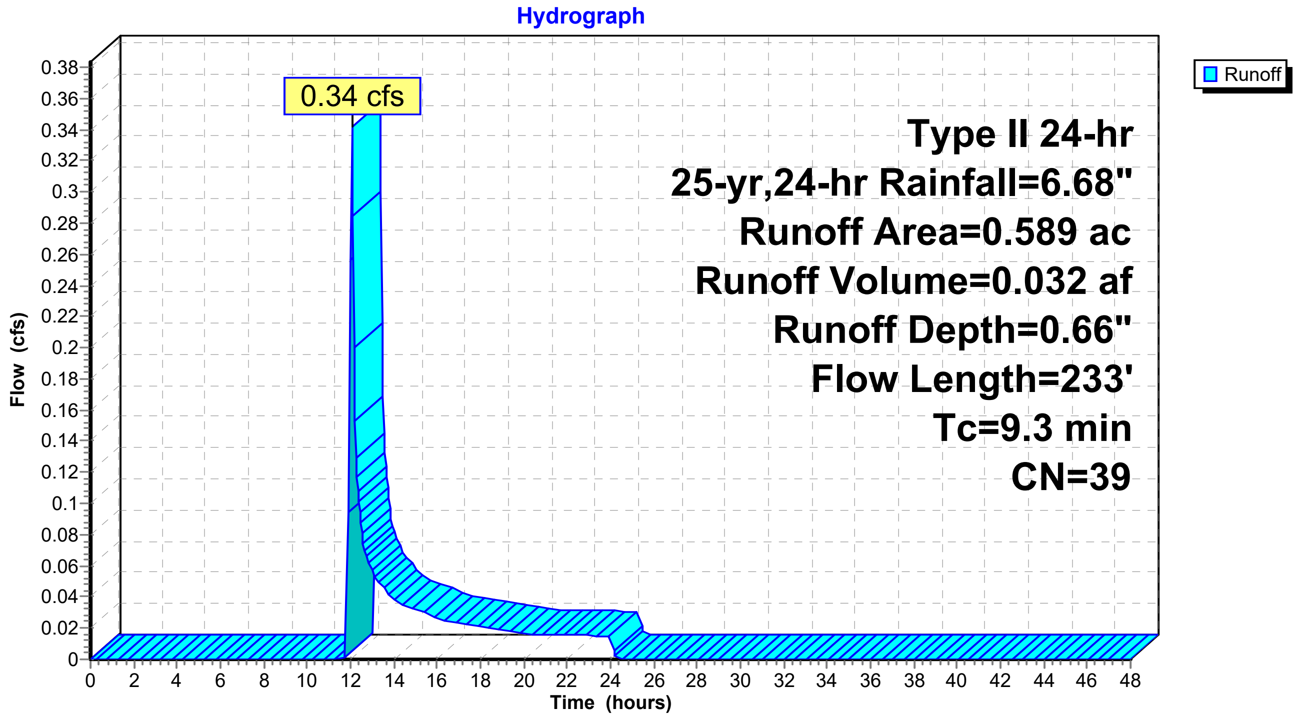
Runoff = 0.34 cfs @ 12.05 hrs, Volume= 0.032 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.589	39	>75% Grass cover, Good, HSG A
0.589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0272	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.9	133	0.1372	2.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.3	233	Total			

Subcatchment SC-G1: SC-G1



Summary for Subcatchment SC-G10: SC-G10

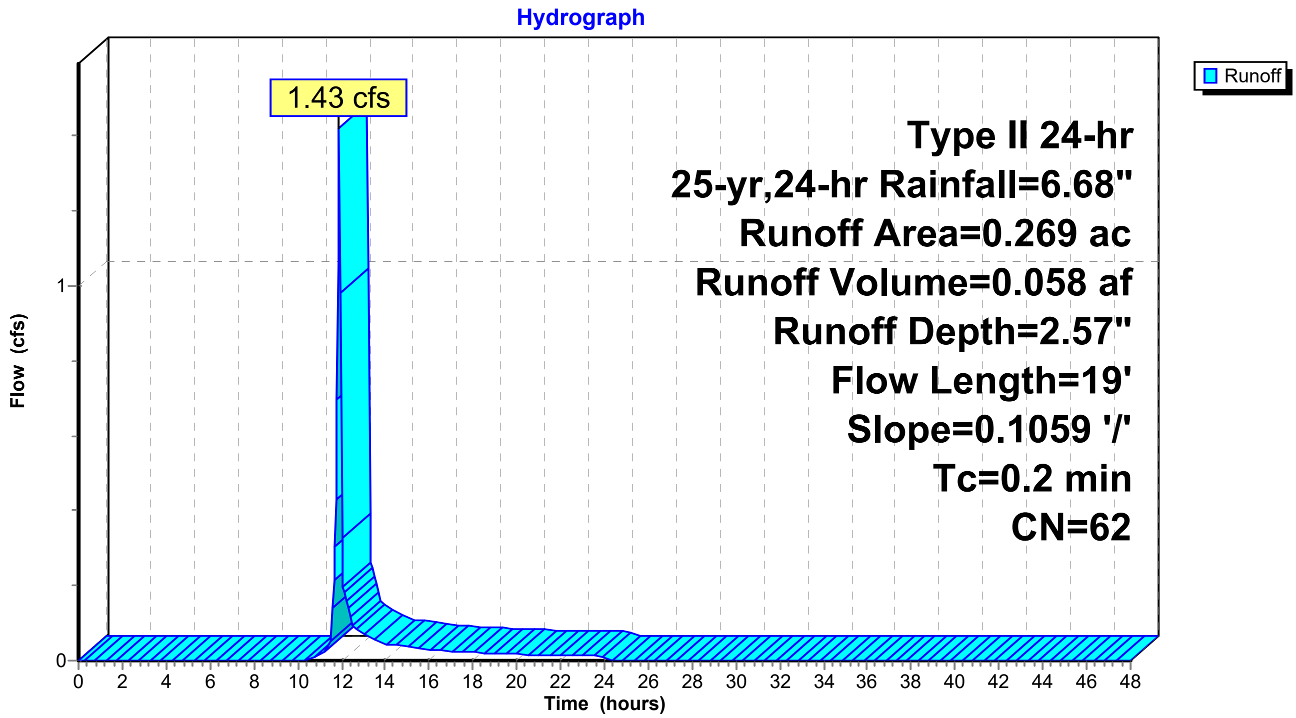
Runoff = 1.43 cfs @ 11.90 hrs, Volume= 0.058 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.099	39	>75% Grass cover, Good, HSG A
0.170	76	Gravel roads, HSG A
0.269	62	Weighted Average
0.269		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	19	0.1059	1.98		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-G10: SC-G10



Summary for Subcatchment SC-G2: SC-G2

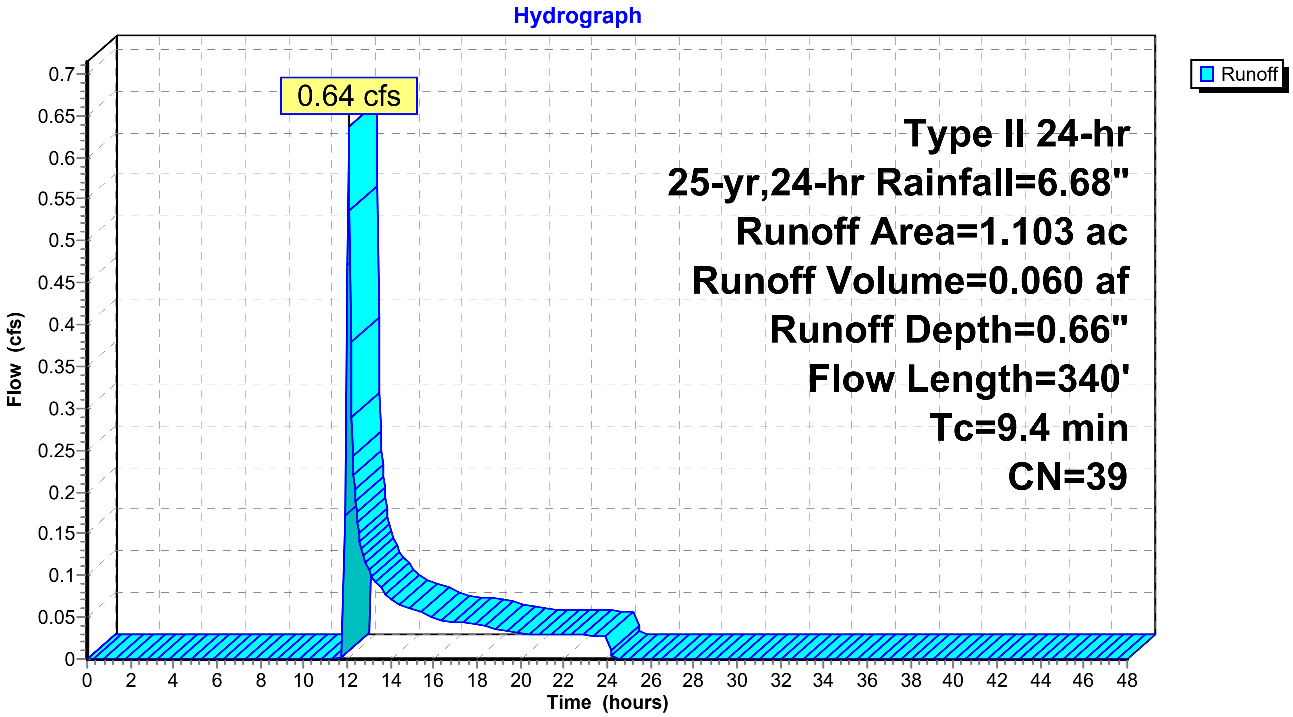
Runoff = 0.64 cfs @ 12.06 hrs, Volume= 0.060 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.103	39	>75% Grass cover, Good, HSG A
1.103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0426	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.4	240	0.0568	1.67		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.4	340	Total			

Subcatchment SC-G2: SC-G2



Summary for Subcatchment SC-G3: SC-G3

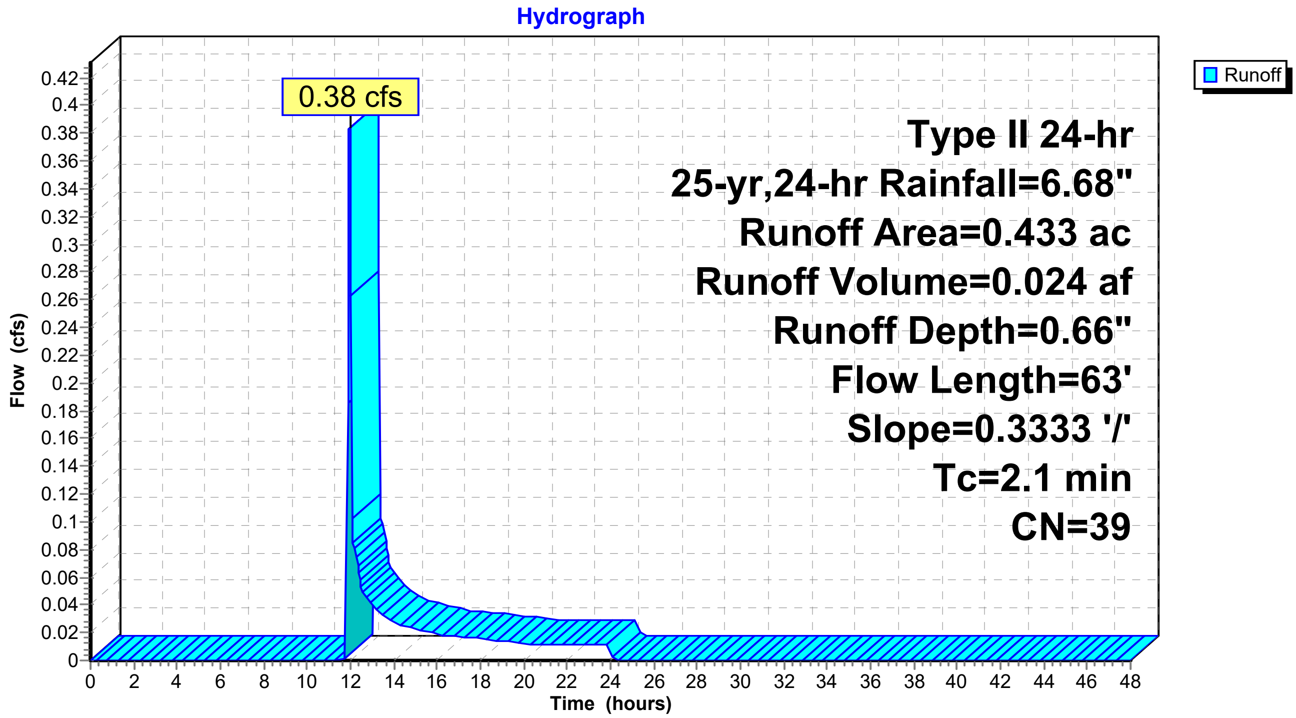
Runoff = 0.38 cfs @ 11.96 hrs, Volume= 0.024 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.433	39	>75% Grass cover, Good, HSG A
0.433		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	63	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-G3: SC-G3



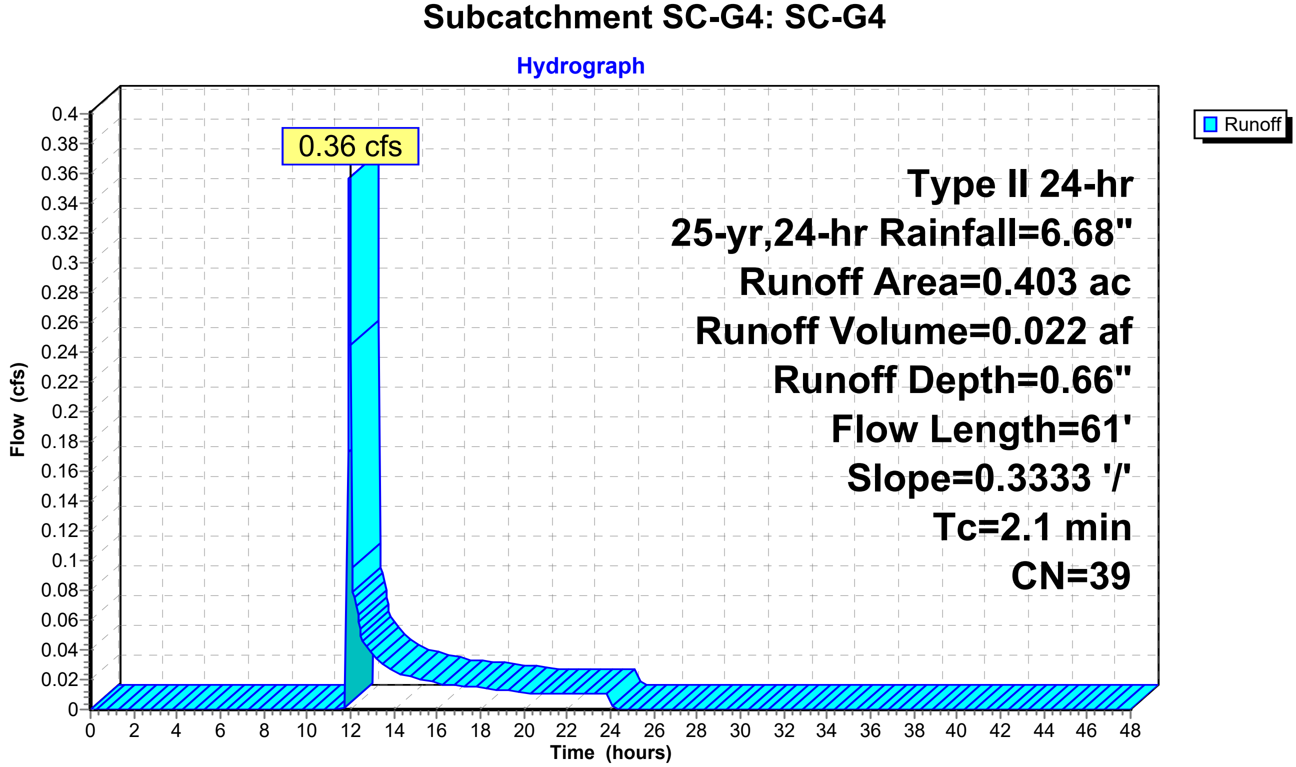
Summary for Subcatchment SC-G4: SC-G4

Runoff = 0.36 cfs @ 11.96 hrs, Volume= 0.022 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.403	39	>75% Grass cover, Good, HSG A
0.403		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"



Summary for Subcatchment SC-G5: SC-G5

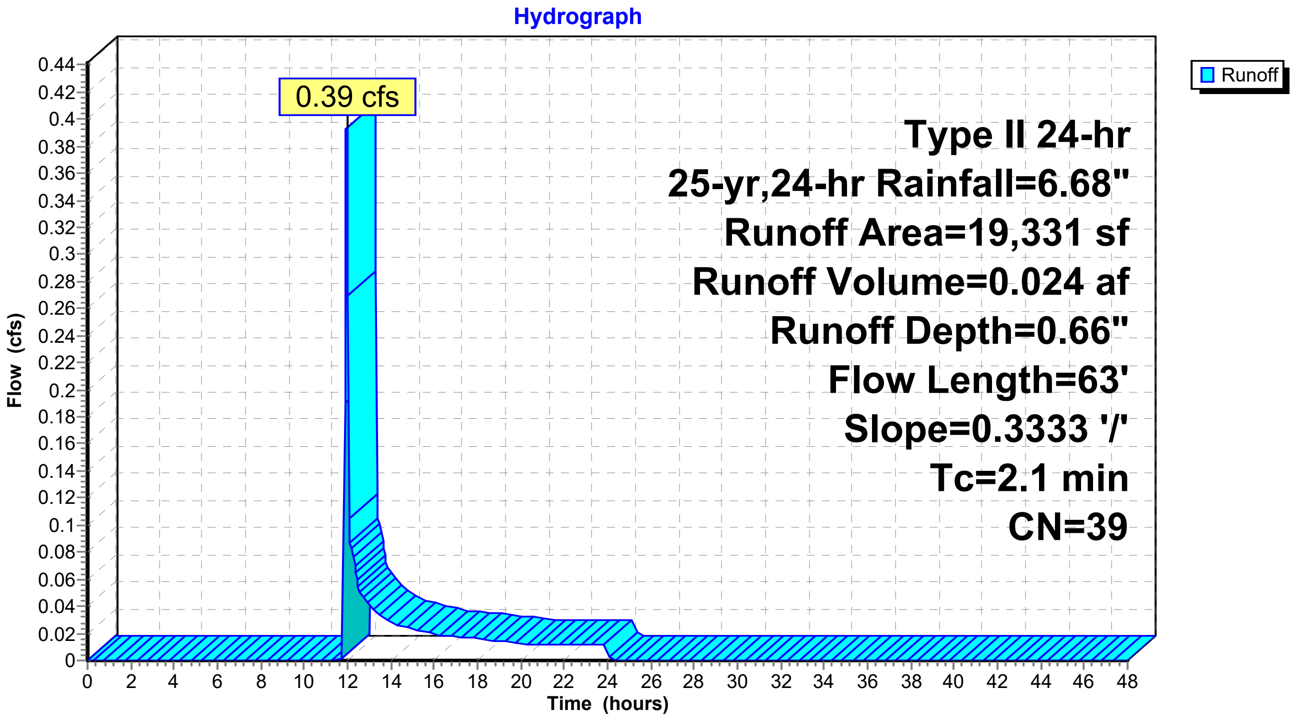
Runoff = 0.39 cfs @ 11.96 hrs, Volume= 0.024 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
19,331	39	>75% Grass cover, Good, HSG A
19,331		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	63	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-G5: SC-G5



Summary for Subcatchment SC-G6: SC-G6

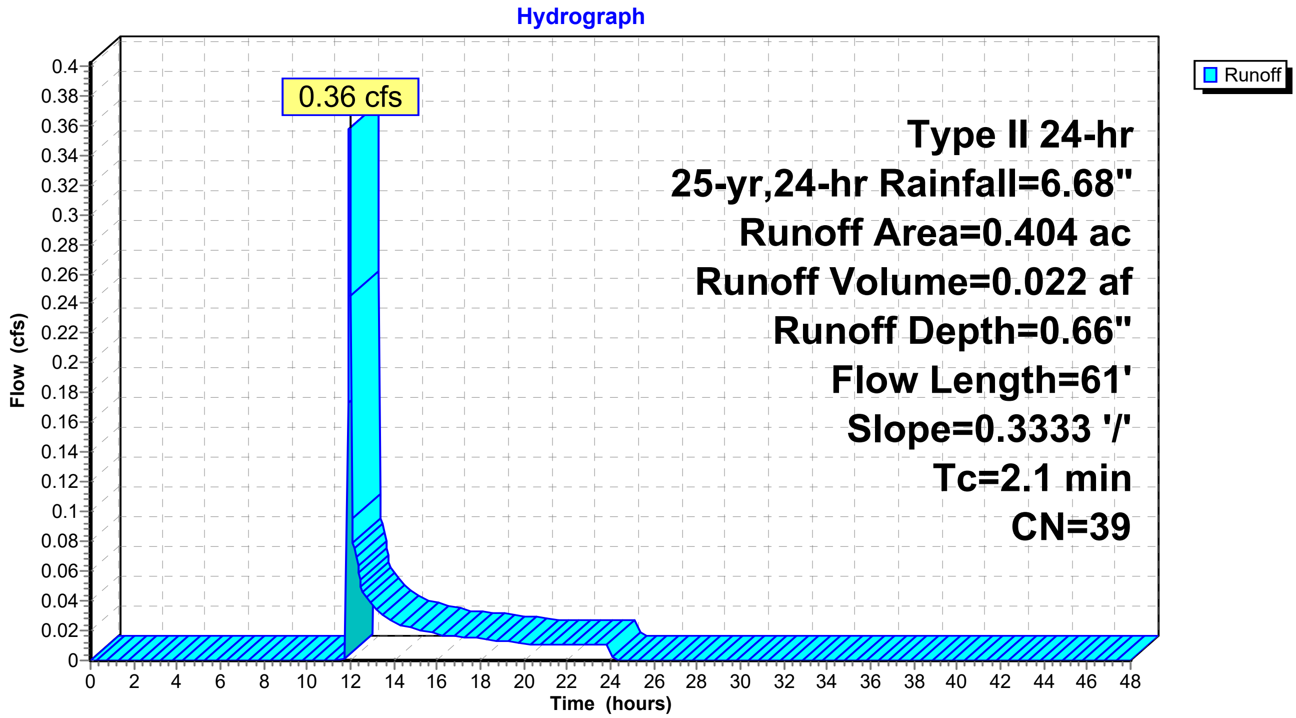
Runoff = 0.36 cfs @ 11.96 hrs, Volume= 0.022 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.404	39	>75% Grass cover, Good, HSG A
0.404		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-G6: SC-G6



Summary for Subcatchment SC-G7: SC-G7

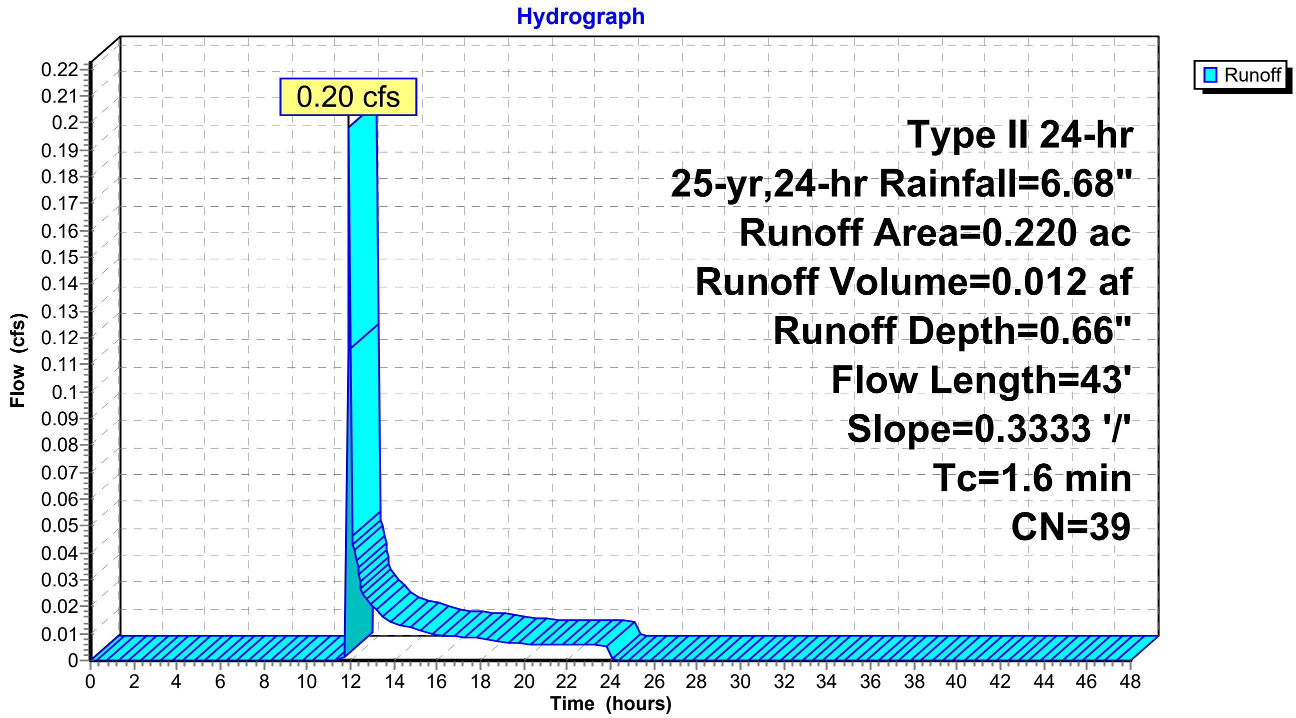
Runoff = 0.20 cfs @ 11.95 hrs, Volume= 0.012 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.220	39	>75% Grass cover, Good, HSG A
0.220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	43	0.3333	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-G7: SC-G7



Summary for Subcatchment SC-G8: SC-G8

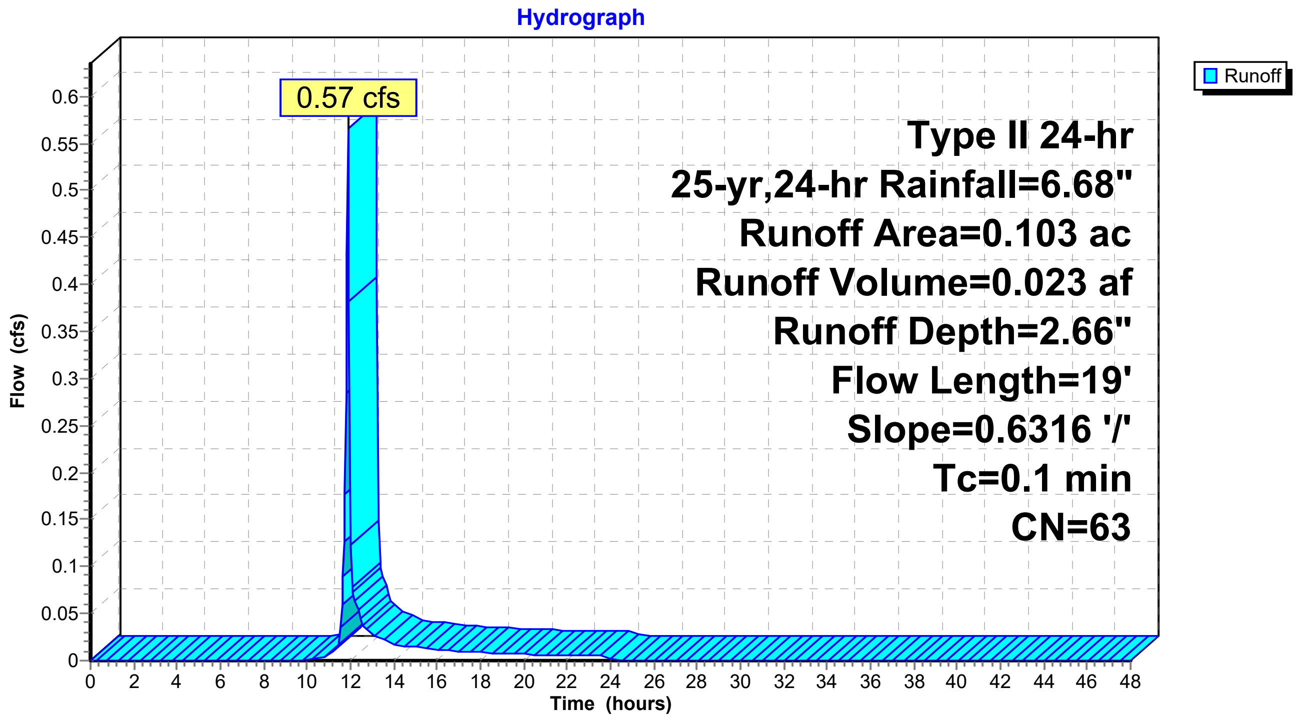
Runoff = 0.57 cfs @ 11.90 hrs, Volume= 0.023 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.037	39	>75% Grass cover, Good, HSG A
0.066	76	Gravel roads, HSG A
0.103	63	Weighted Average
0.103		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	19	0.6316	4.05		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-G8: SC-G8



Summary for Subcatchment SC-G9: SC-G9

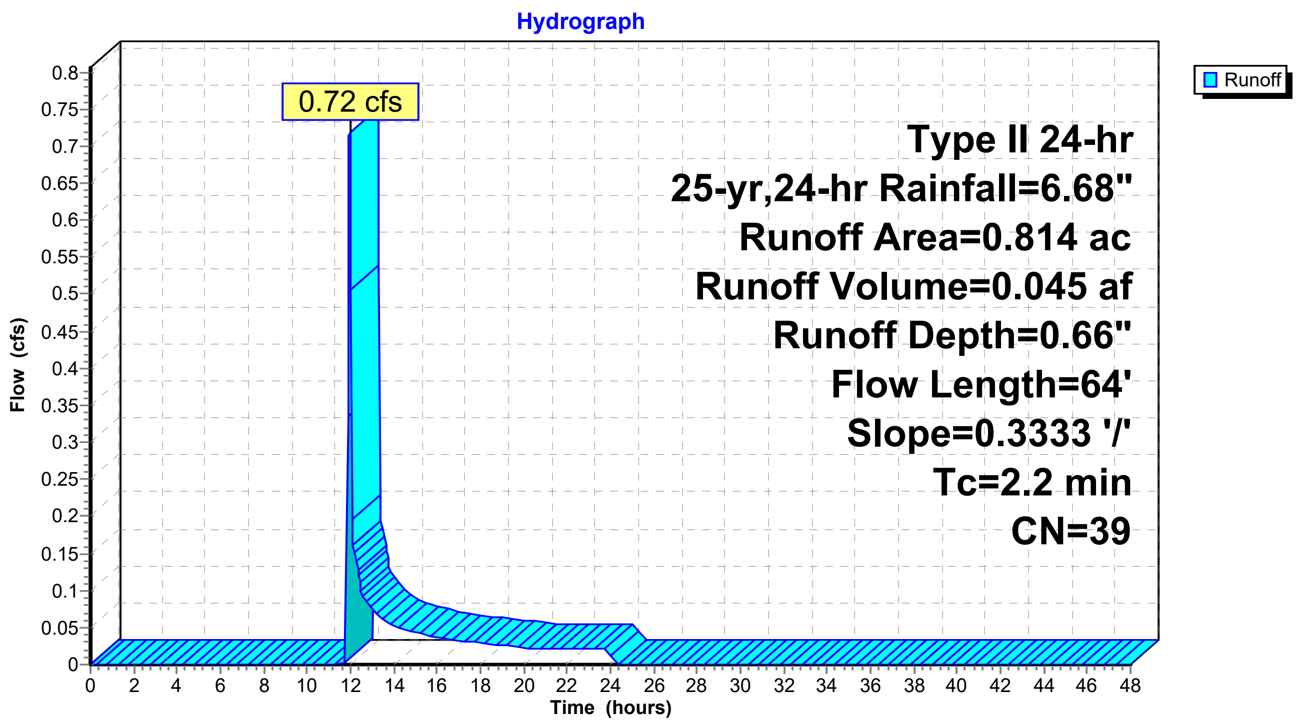
Runoff = 0.72 cfs @ 11.96 hrs, Volume= 0.045 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.814	39	>75% Grass cover, Good, HSG A
0.814		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	64	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-G9: SC-G9



Summary for Subcatchment SC-H1: SC-H1

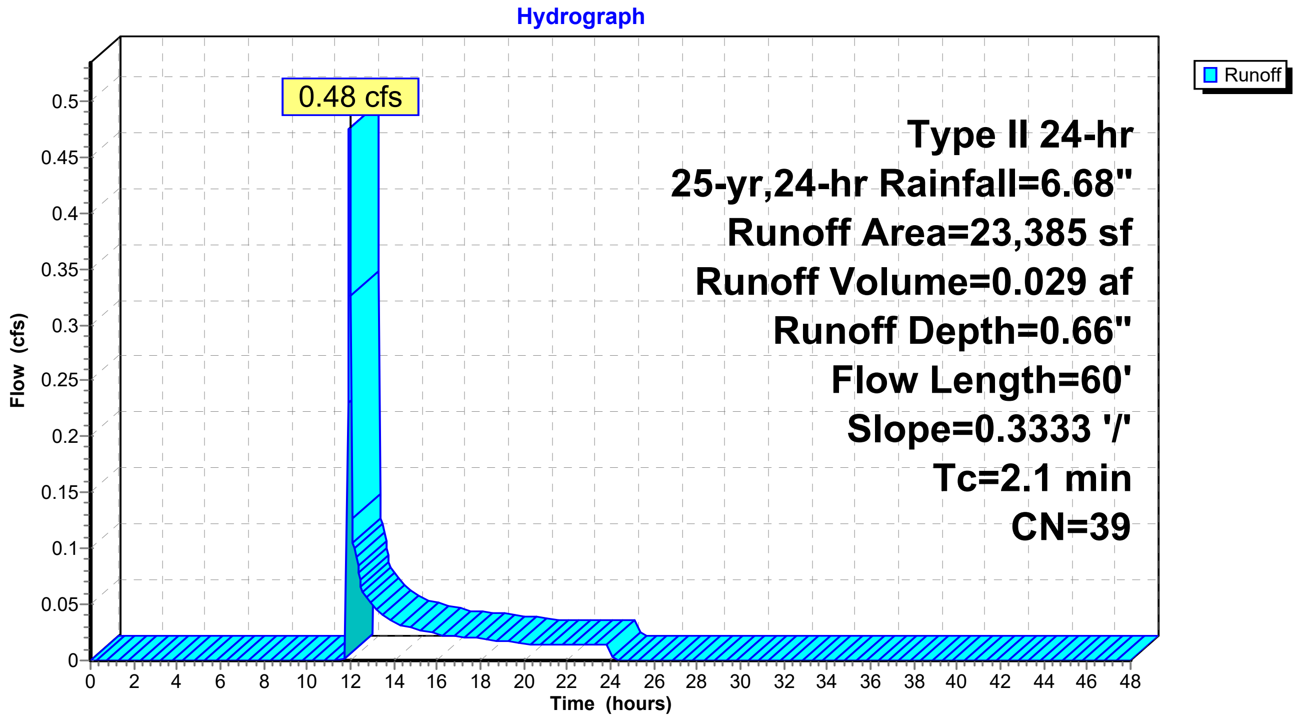
Runoff = 0.48 cfs @ 11.96 hrs, Volume= 0.029 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
23,385	39	>75% Grass cover, Good, HSG A
23,385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	60	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H1: SC-H1



Summary for Subcatchment SC-H10: SC-H10

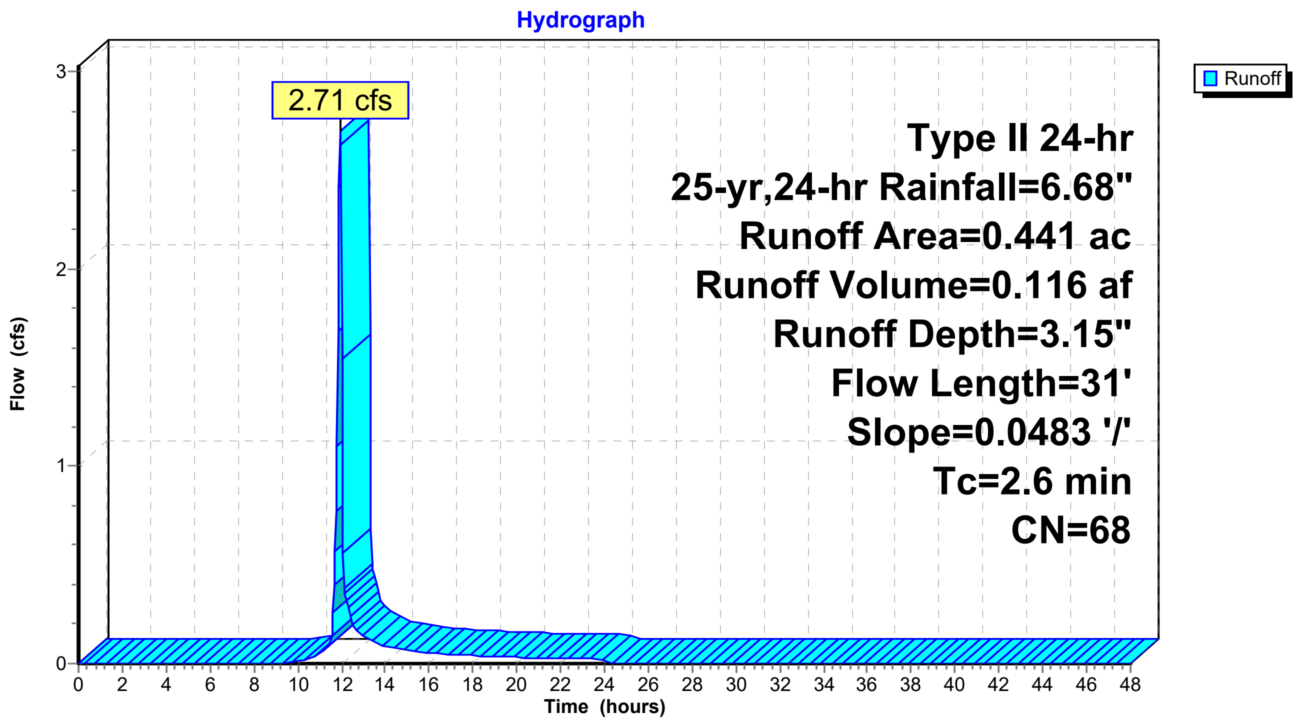
Runoff = 2.71 cfs @ 11.93 hrs, Volume= 0.116 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.154	39	>75% Grass cover, Good, HSG A
0.287	83	Paved roads w/open ditches, 50% imp, HSG A
0.441	68	Weighted Average
0.297		67.46% Pervious Area
0.143		32.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	31	0.0483	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H10: SC-H10



Summary for Subcatchment SC-H2: SC-H2

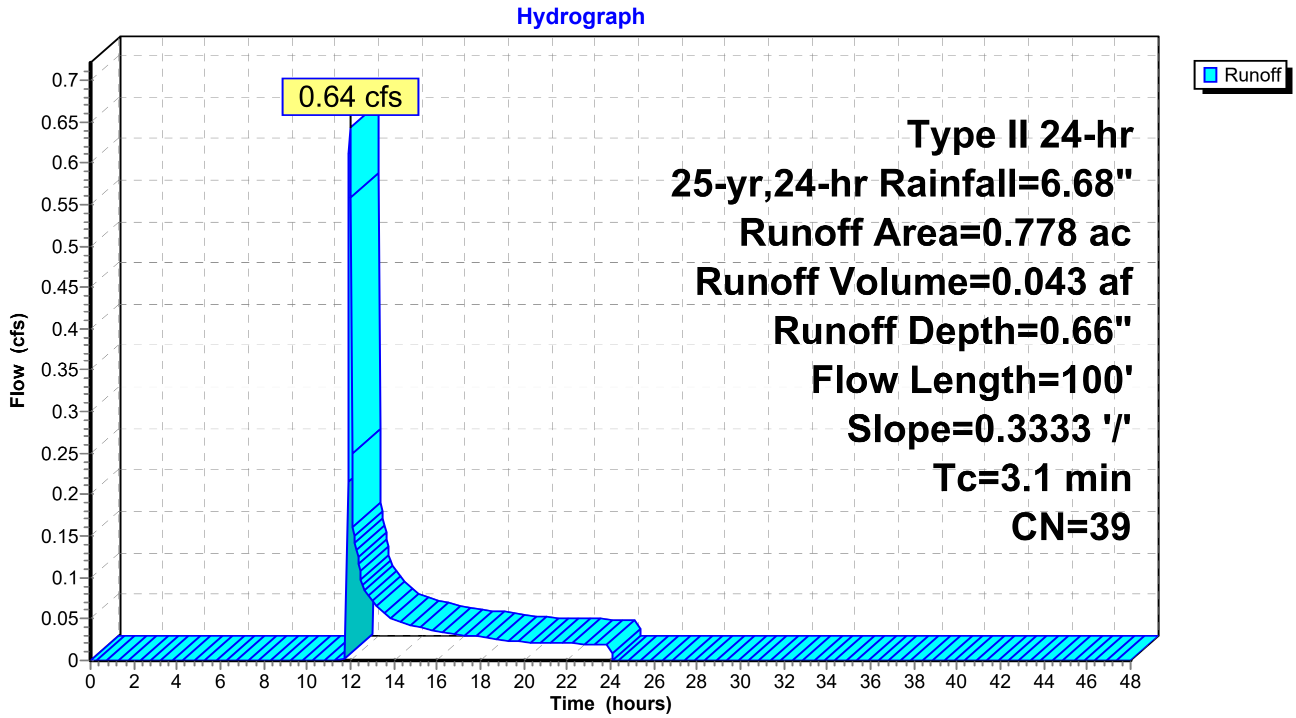
Runoff = 0.64 cfs @ 11.97 hrs, Volume= 0.043 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.778	39	>75% Grass cover, Good, HSG A
0.778		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	100	0.3333	0.54		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H2: SC-H2



Summary for Subcatchment SC-H3: SC-H3

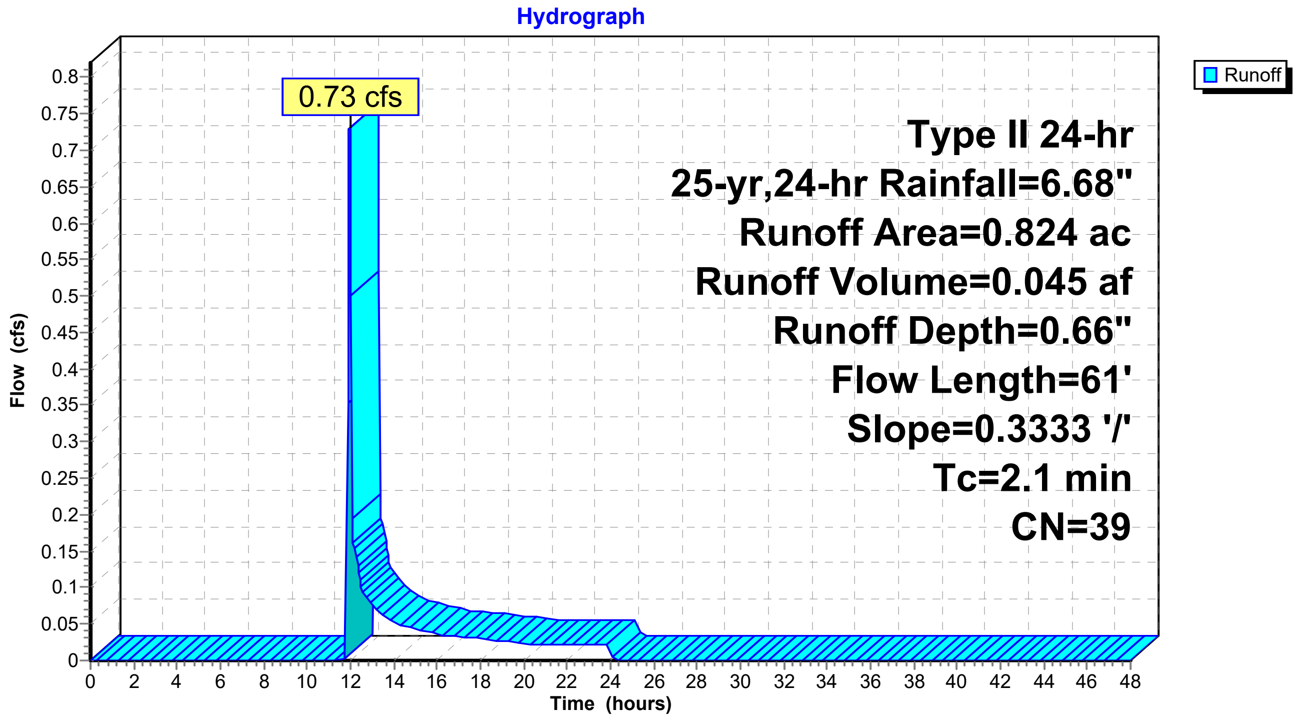
Runoff = 0.73 cfs @ 11.96 hrs, Volume= 0.045 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.824	39	>75% Grass cover, Good, HSG A
0.824		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow, .** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H3: SC-H3



Summary for Subcatchment SC-H4: SC-H4

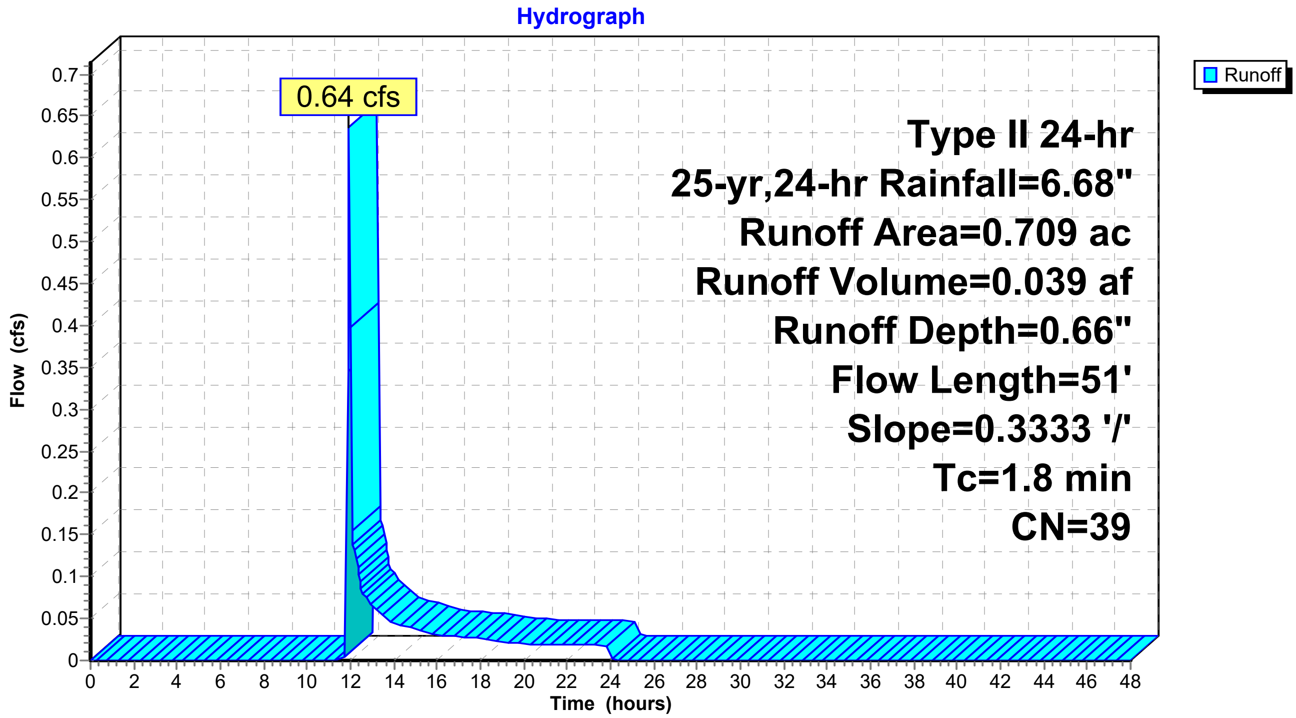
Runoff = 0.64 cfs @ 11.95 hrs, Volume= 0.039 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.709	39	>75% Grass cover, Good, HSG A
0.709		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	51	0.3333	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H4: SC-H4



Summary for Subcatchment SC-H5: SC-H5

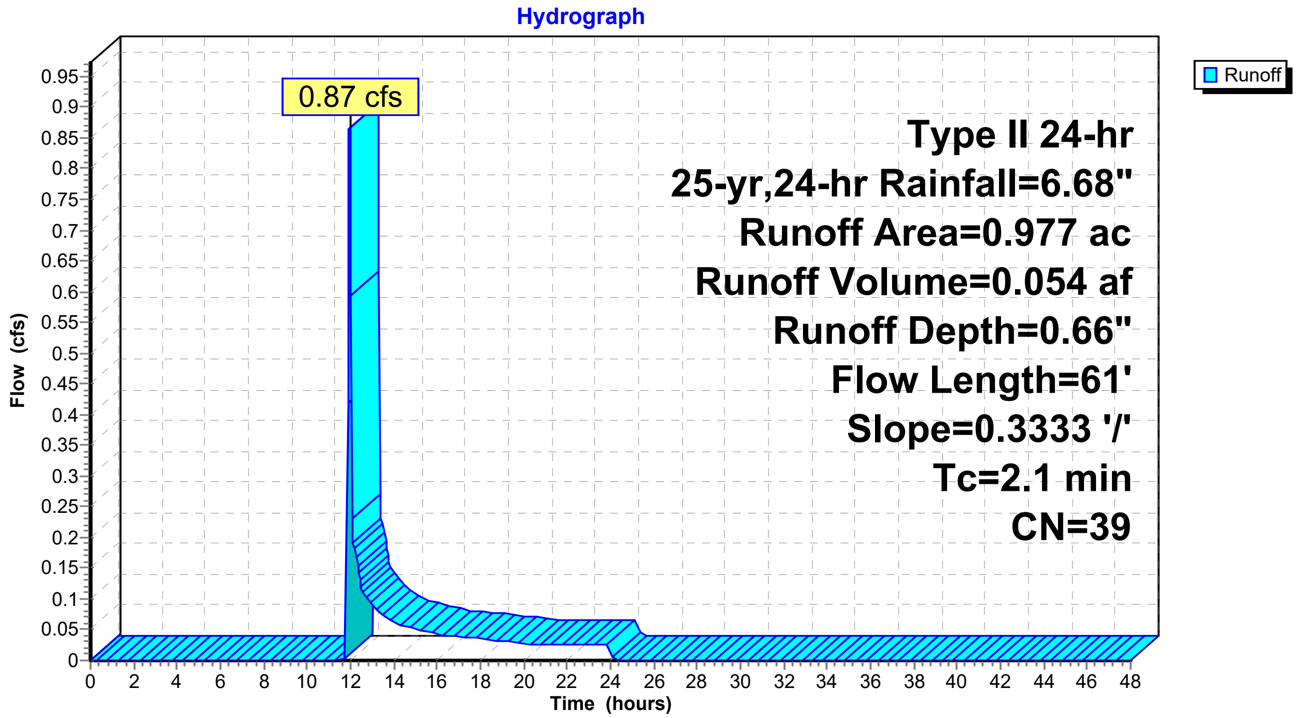
Runoff = 0.87 cfs @ 11.96 hrs, Volume= 0.054 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.977	39	>75% Grass cover, Good, HSG A
0.977		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H5: SC-H5



Summary for Subcatchment SC-H6: SC-H6

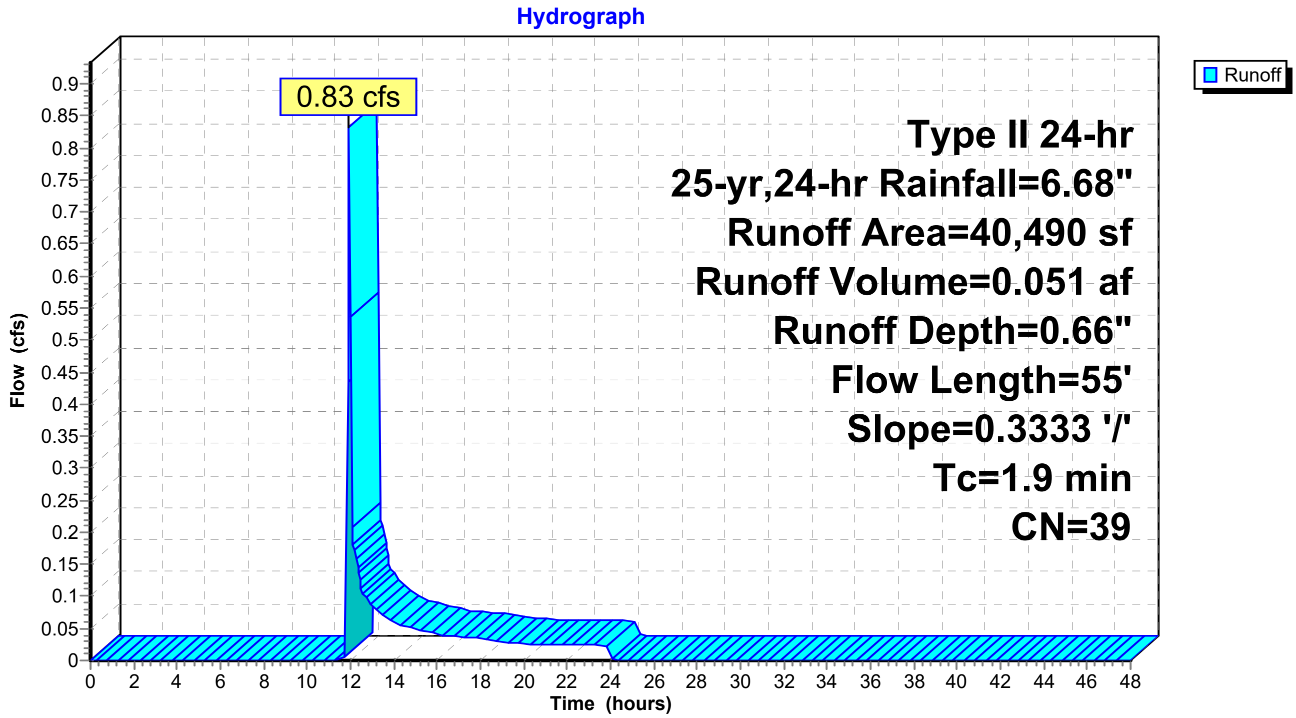
Runoff = 0.83 cfs @ 11.95 hrs, Volume= 0.051 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
40,490	39	>75% Grass cover, Good, HSG A
40,490		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	55	0.3333	0.48		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H6: SC-H6



Summary for Subcatchment SC-H7: SC-H7

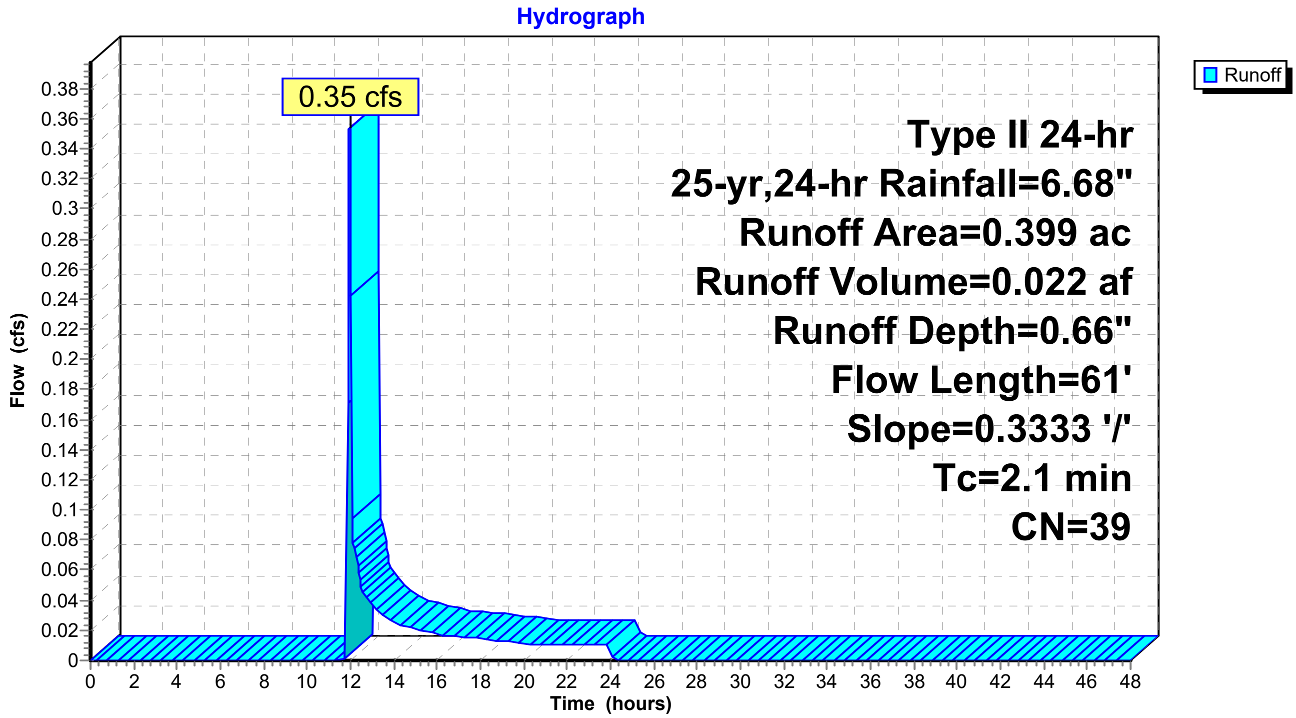
Runoff = 0.35 cfs @ 11.96 hrs, Volume= 0.022 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.399	39	>75% Grass cover, Good, HSG A
0.399		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H7: SC-H7



Summary for Subcatchment SC-H8: SC-H8

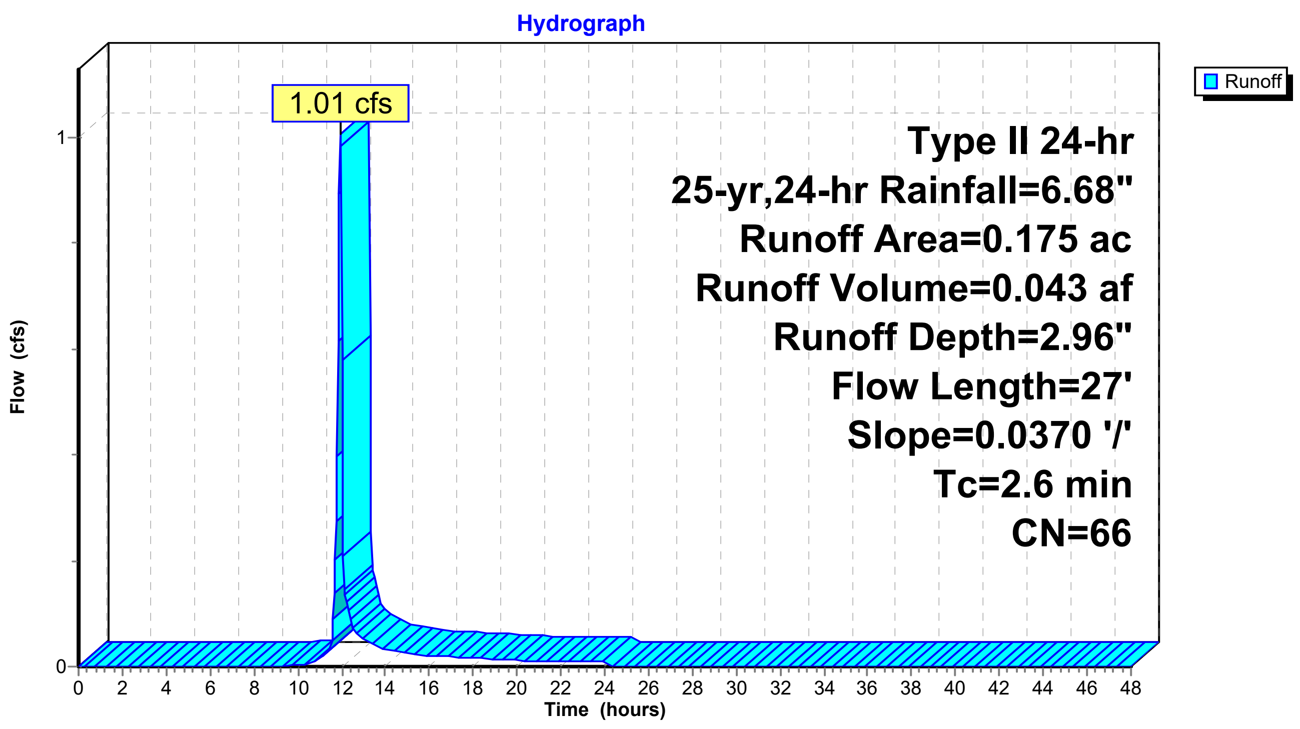
Runoff = 1.01 cfs @ 11.93 hrs, Volume= 0.043 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

	Area (ac)	CN	Description
	0.055	39	>75% Grass cover, Good, HSG A
	0.082	76	Gravel roads, HSG A
*	0.038	83	Paved roads w/open ditches, 50% imp, HSG A
	0.175	66	Weighted Average
	0.156		89.14% Pervious Area
	0.019		10.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	27	0.0370	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H8: SC-H8



Summary for Subcatchment SC-H9: SC-H9

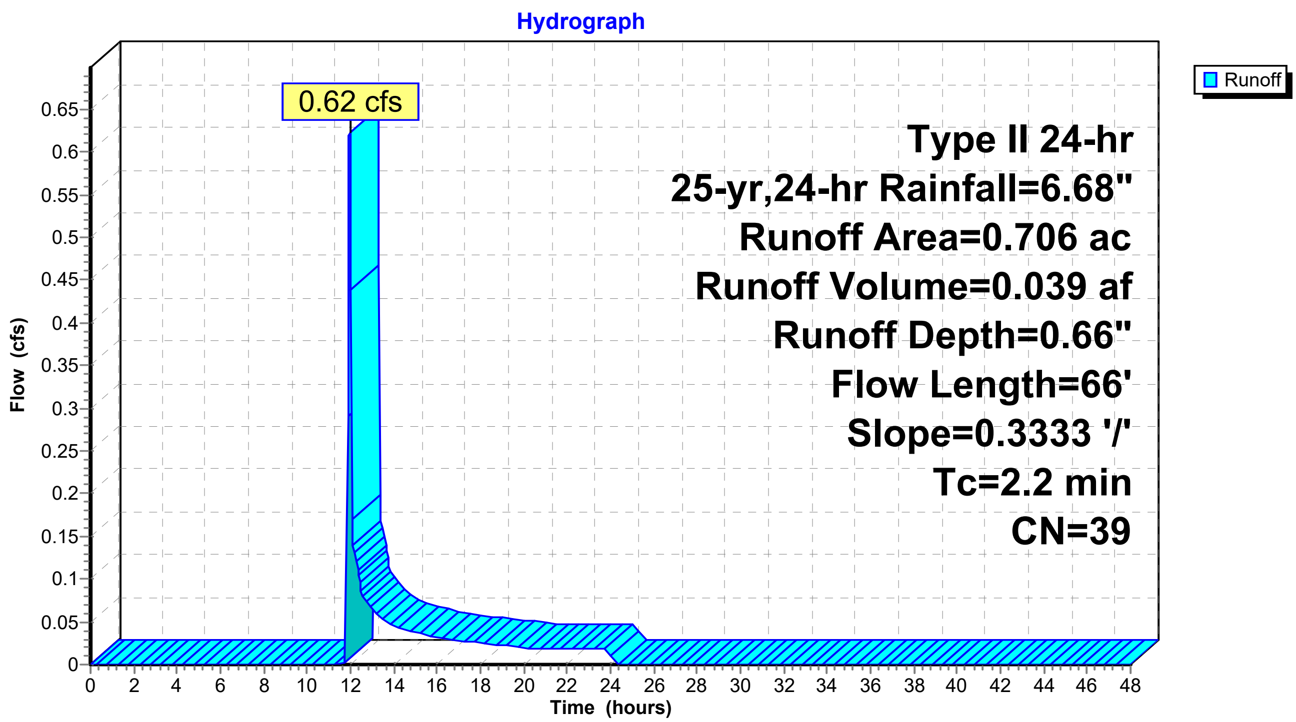
Runoff = 0.62 cfs @ 11.96 hrs, Volume= 0.039 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.706	39	>75% Grass cover, Good, HSG A
0.706		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	66	0.3333	0.50		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-H9: SC-H9



Summary for Subcatchment SC-I1: SC-I1

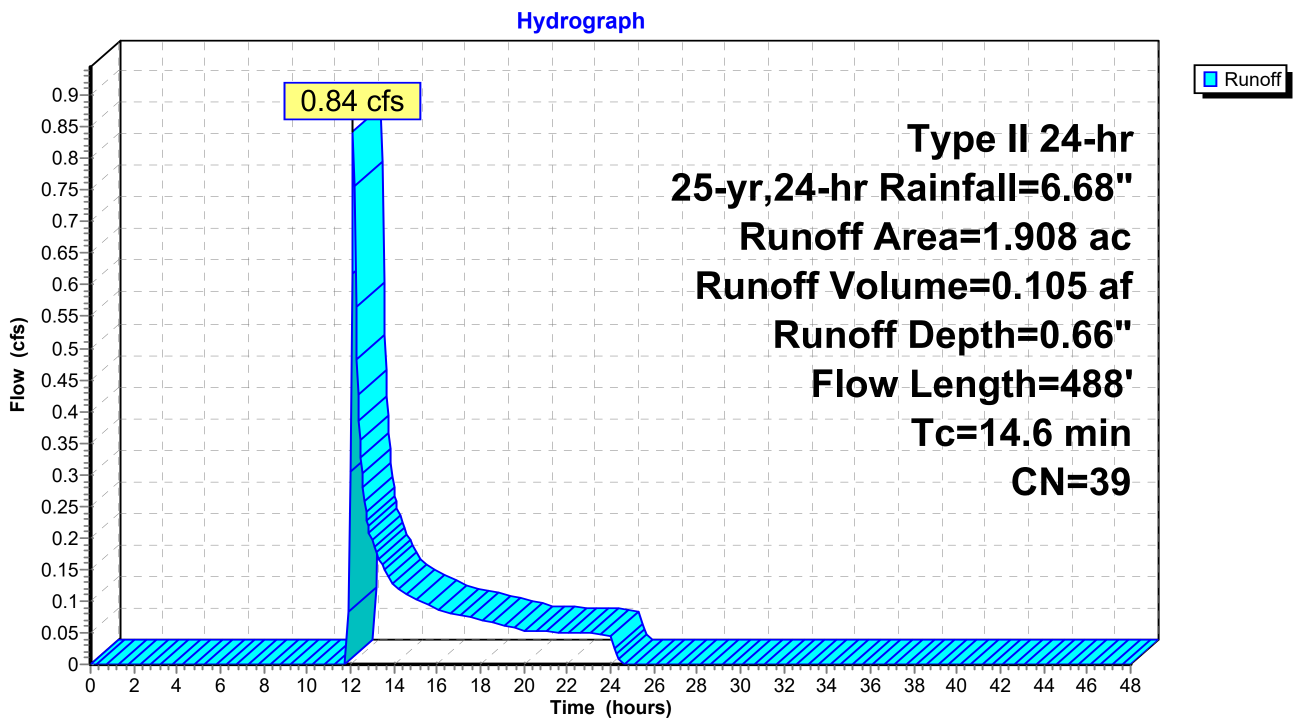
Runoff = 0.84 cfs @ 12.12 hrs, Volume= 0.105 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.908	39	>75% Grass cover, Good, HSG A
1.908		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0427	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
7.6	388	0.0147	0.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.6	488	Total			

Subcatchment SC-I1: SC-I1



Summary for Subcatchment SC-I2: SC-I2

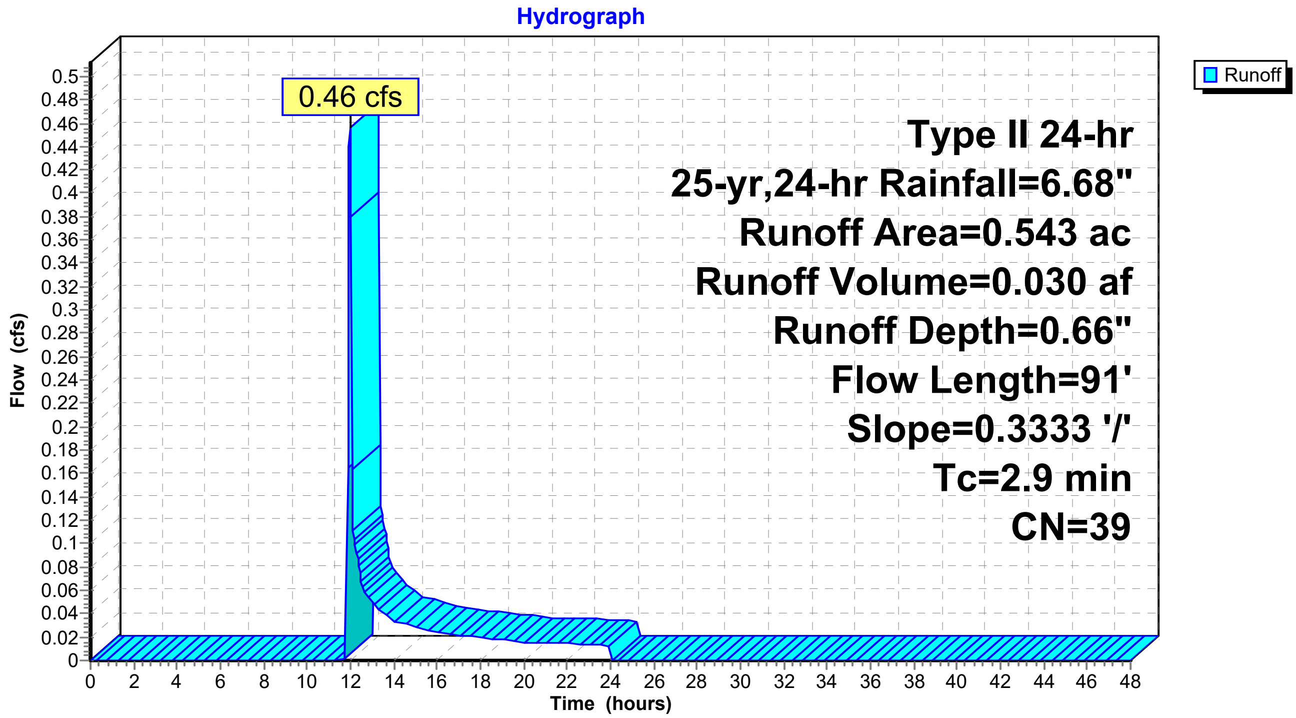
Runoff = 0.46 cfs @ 11.97 hrs, Volume= 0.030 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.543	39	>75% Grass cover, Good, HSG A
0.543		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	91	0.3333	0.53		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-I2: SC-I2



Summary for Subcatchment SC-I3: SC-I3

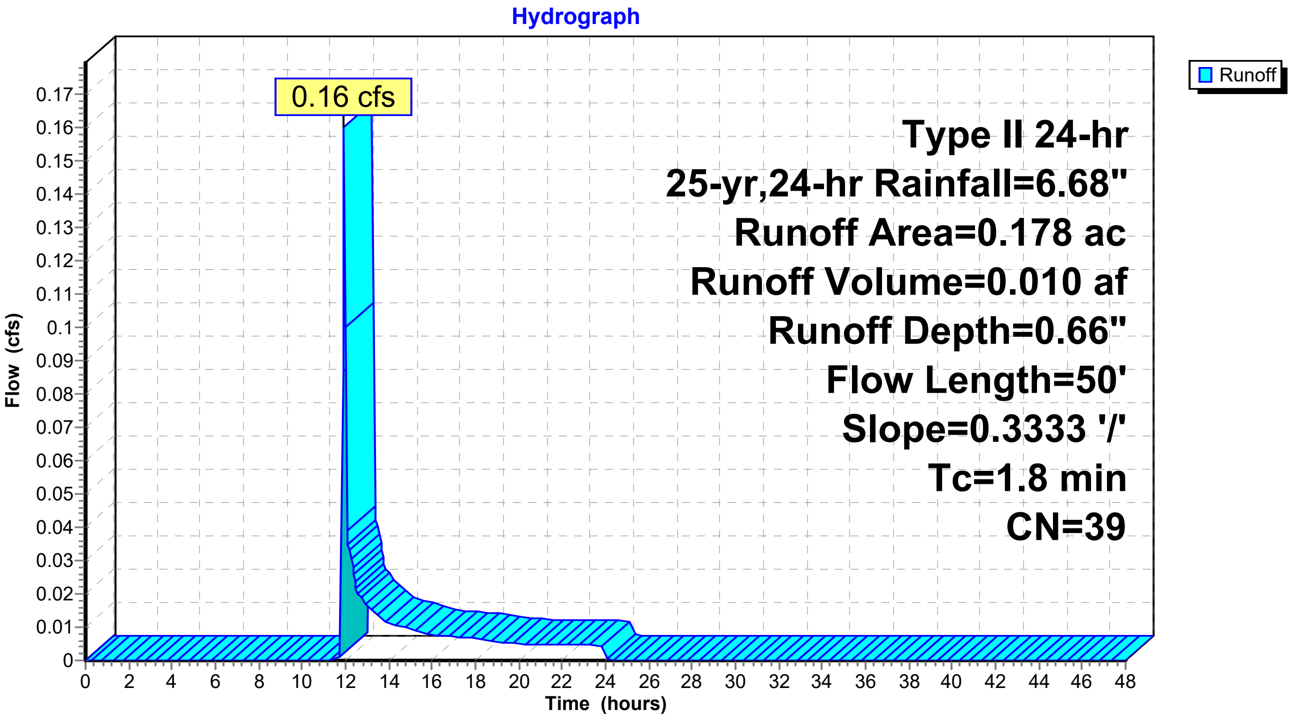
Runoff = 0.16 cfs @ 11.95 hrs, Volume= 0.010 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.178	39	>75% Grass cover, Good, HSG A
0.178		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	50	0.3333	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-I3: SC-I3



Summary for Subcatchment SC-I4: SC-I4

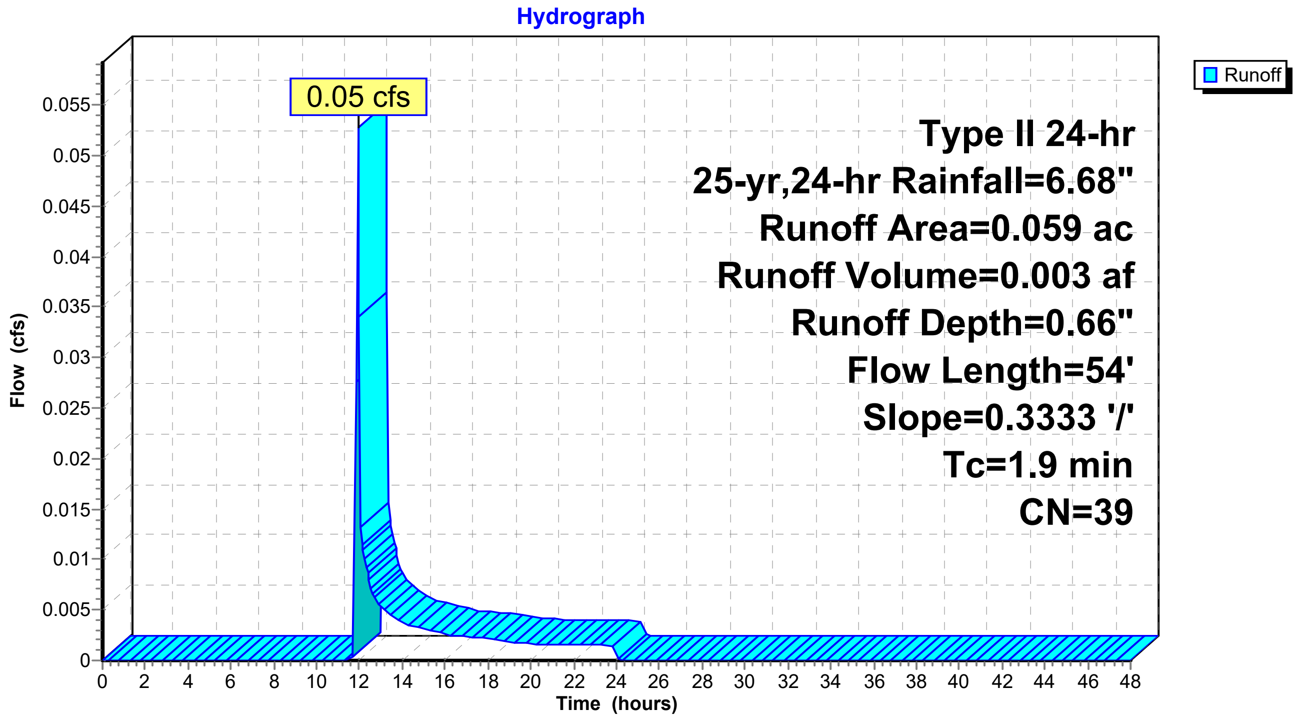
Runoff = 0.05 cfs @ 11.95 hrs, Volume= 0.003 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.059	39	>75% Grass cover, Good, HSG A
0.059		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	54	0.3333	0.48		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-I4: SC-I4



Summary for Subcatchment SC-I5: SC-I5

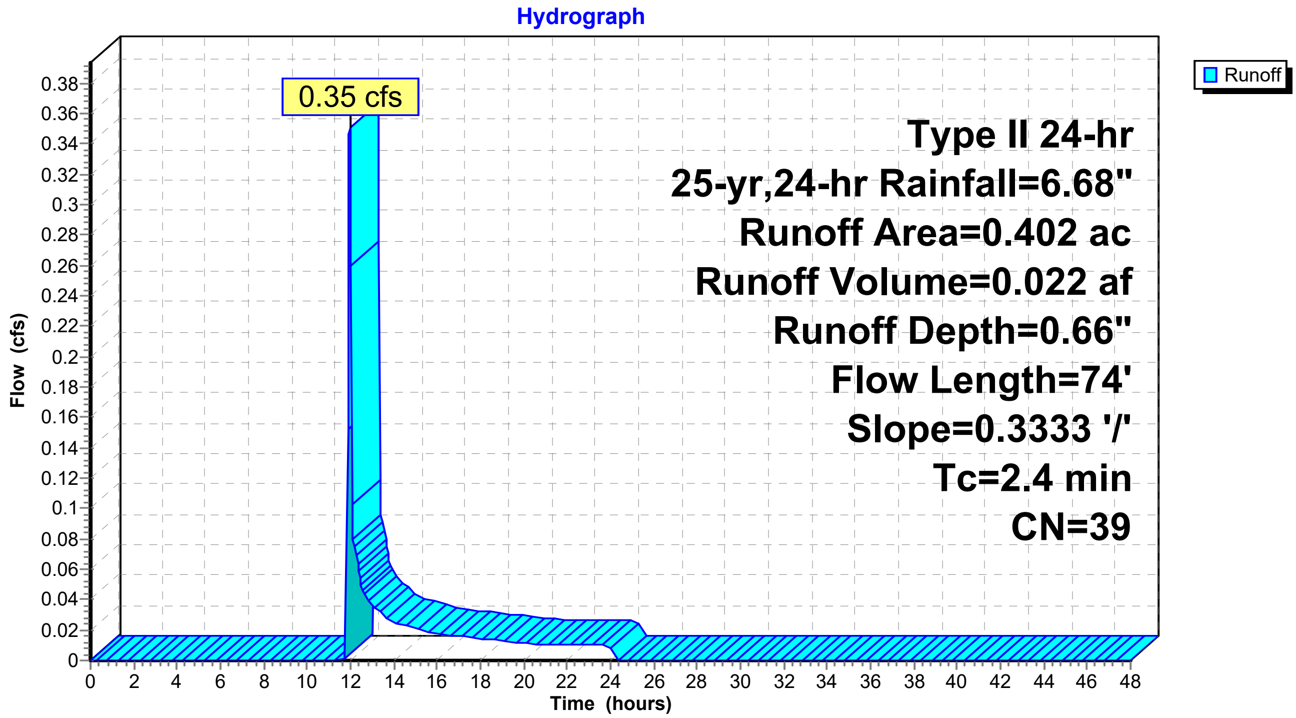
Runoff = 0.35 cfs @ 11.96 hrs, Volume= 0.022 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.402	39	>75% Grass cover, Good, HSG A
0.402		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	74	0.3333	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-I5: SC-I5



Summary for Subcatchment SC-I6: SC-I6

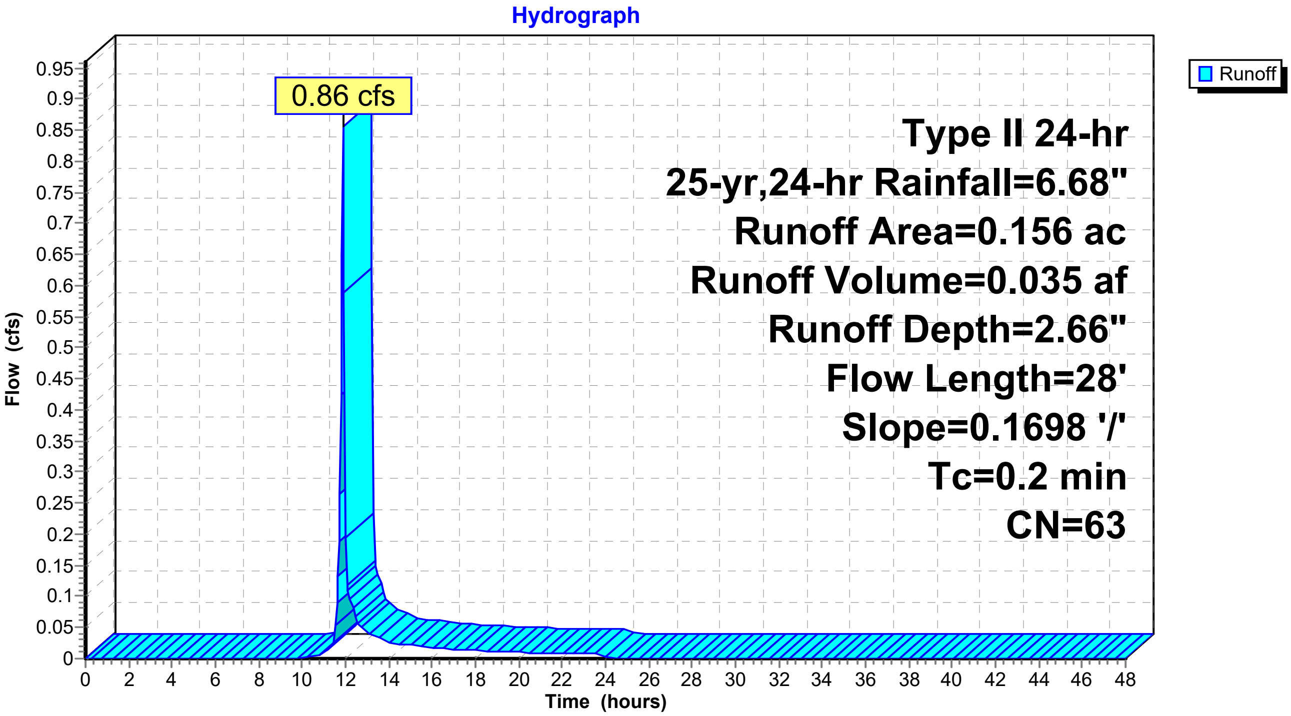
Runoff = 0.86 cfs @ 11.90 hrs, Volume= 0.035 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.071	39	>75% Grass cover, Good, HSG A
0.085	83	Paved roads w/open ditches, 50% imp, HSG A
0.156	63	Weighted Average
0.114		72.76% Pervious Area
0.042		27.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	28	0.1698	2.59		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-I6: SC-I6



Summary for Subcatchment SC-J1: SC-J1

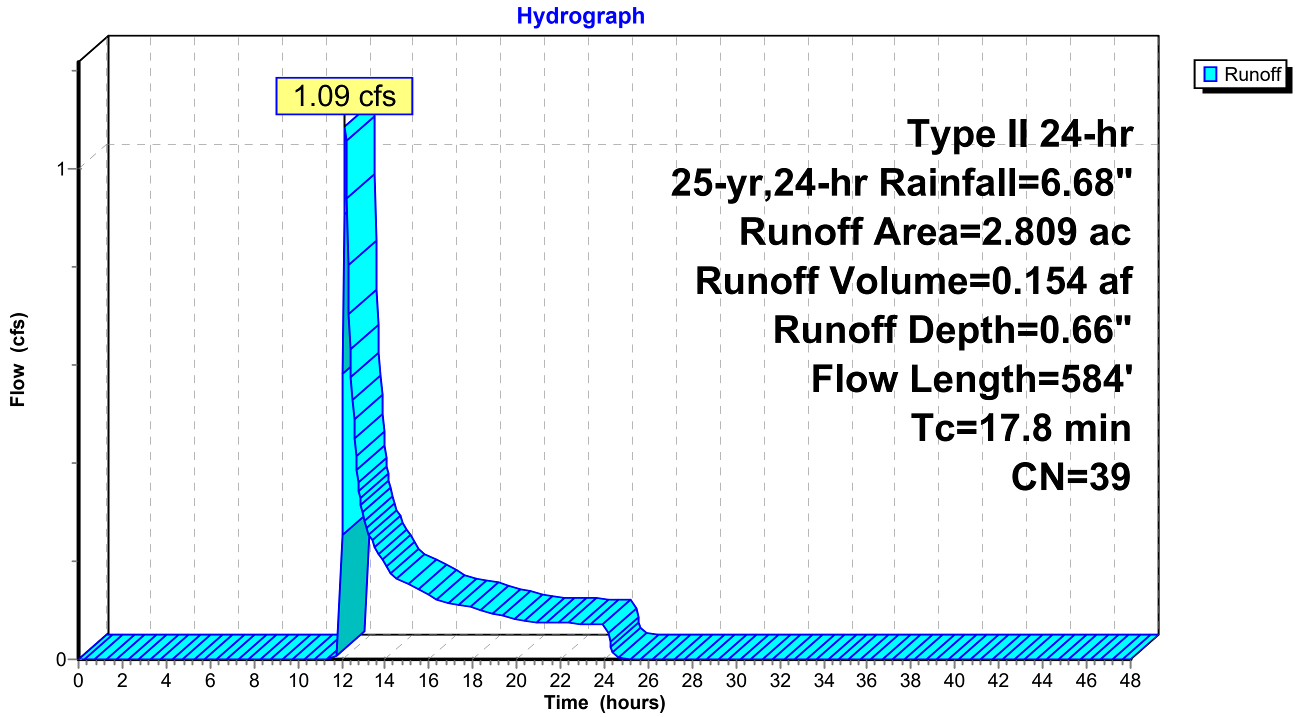
Runoff = 1.09 cfs @ 12.17 hrs, Volume= 0.154 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
2.809	39	>75% Grass cover, Good, HSG A
2.809		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0230	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
8.8	484	0.0172	0.92		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.8	584	Total			

Subcatchment SC-J1: SC-J1



Summary for Subcatchment SC-J2: SC-J2

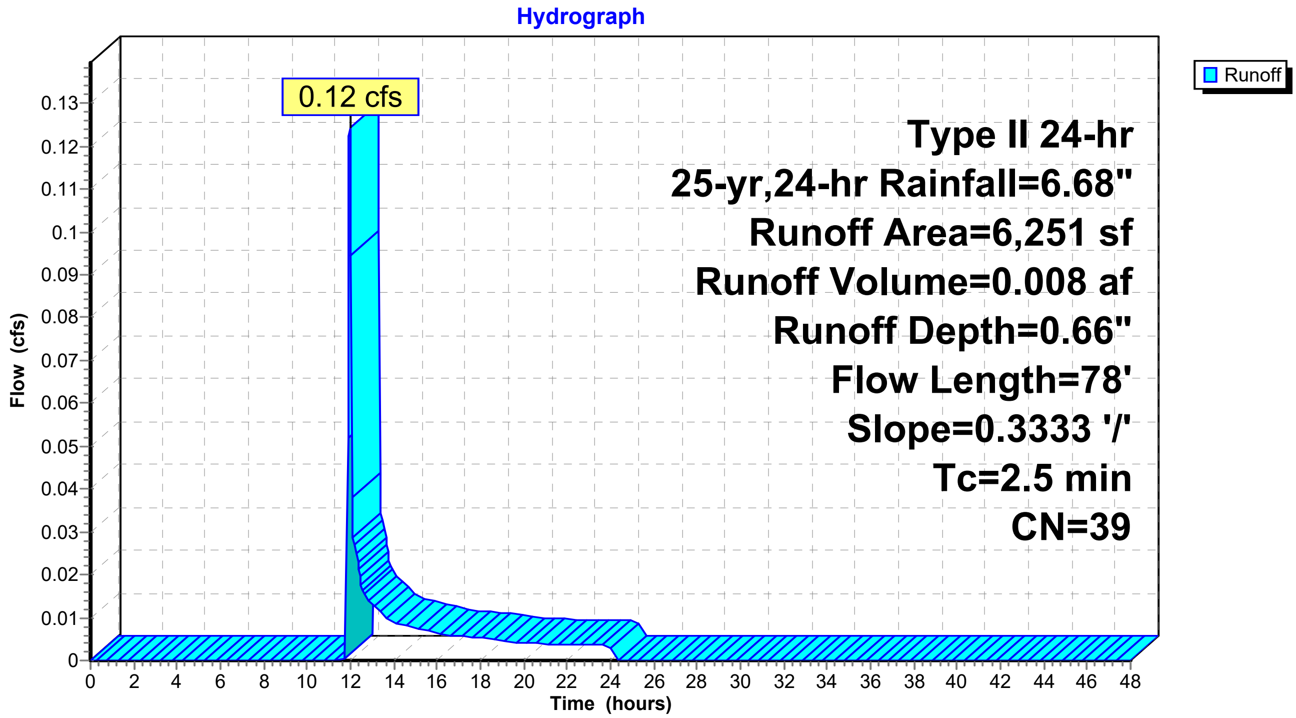
Runoff = 0.12 cfs @ 11.96 hrs, Volume= 0.008 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
6,251	39	>75% Grass cover, Good, HSG A
6,251		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	78	0.3333	0.51		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-J2: SC-J2



Summary for Subcatchment SC-J3: SC-J3

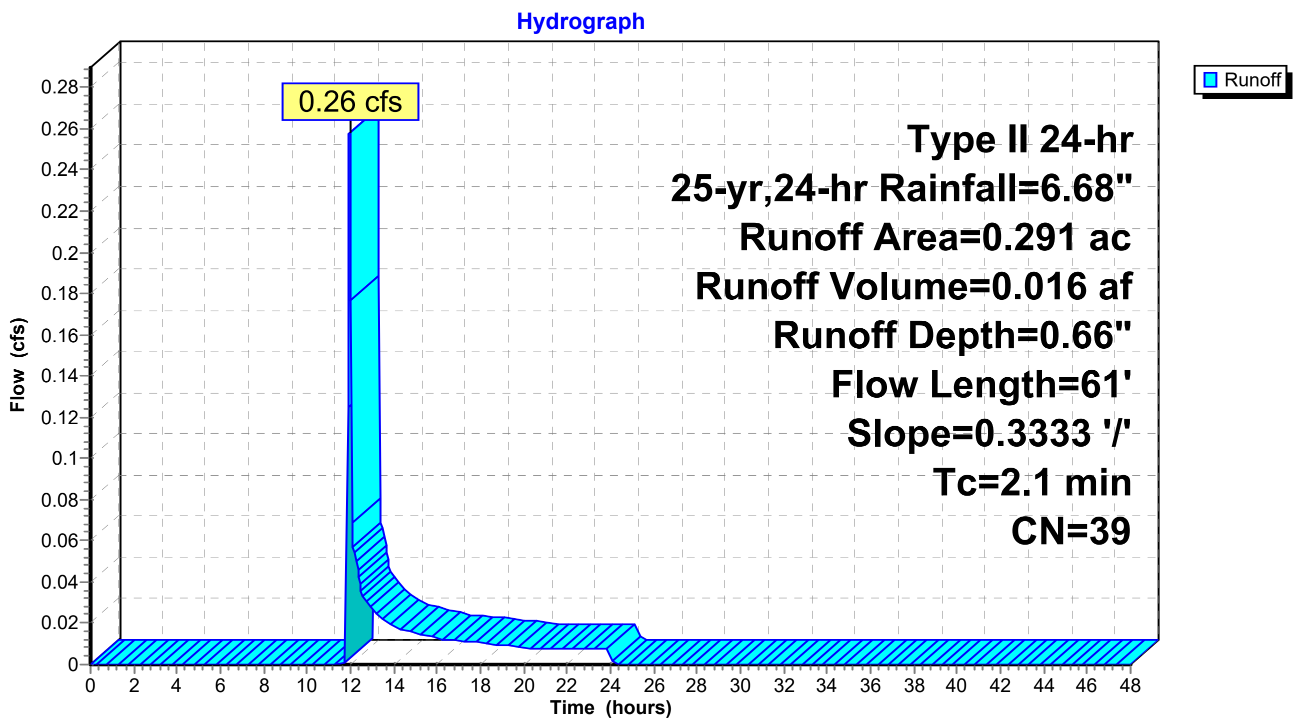
Runoff = 0.26 cfs @ 11.96 hrs, Volume= 0.016 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.291	39	>75% Grass cover, Good, HSG A
0.291		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-J3: SC-J3



Summary for Subcatchment SC-J4: SC-J4

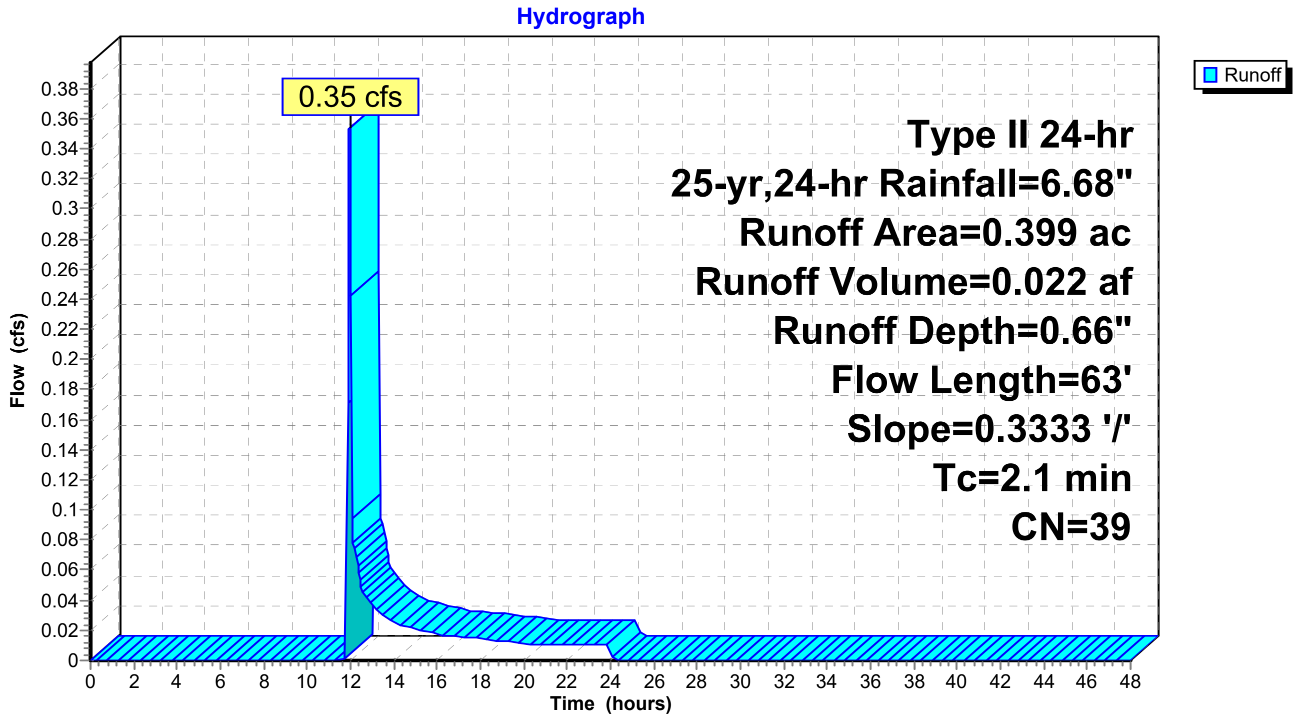
Runoff = 0.35 cfs @ 11.96 hrs, Volume= 0.022 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.399	39	>75% Grass cover, Good, HSG A
0.399		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	63	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-J4: SC-J4



Summary for Subcatchment SC-J5: SC-J5

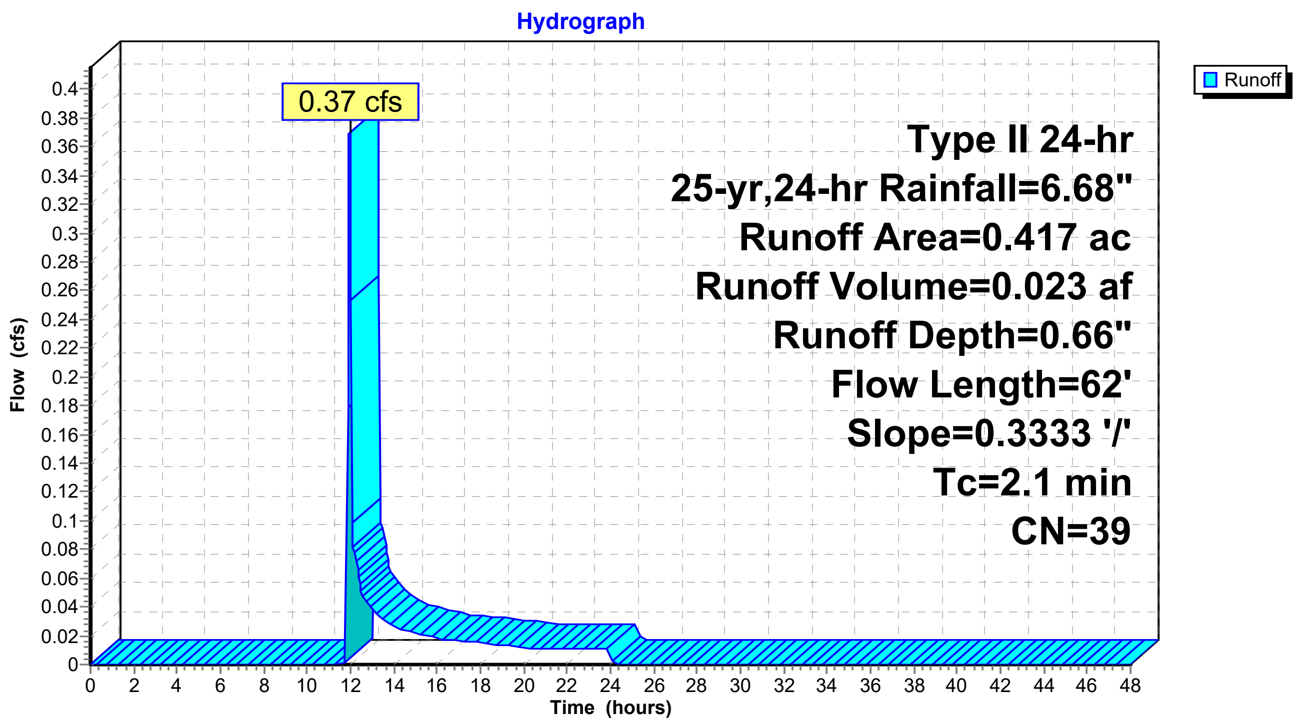
Runoff = 0.37 cfs @ 11.96 hrs, Volume= 0.023 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.417	39	>75% Grass cover, Good, HSG A
0.417		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	62	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-J5: SC-J5



Summary for Subcatchment SC-J6: SC-J6

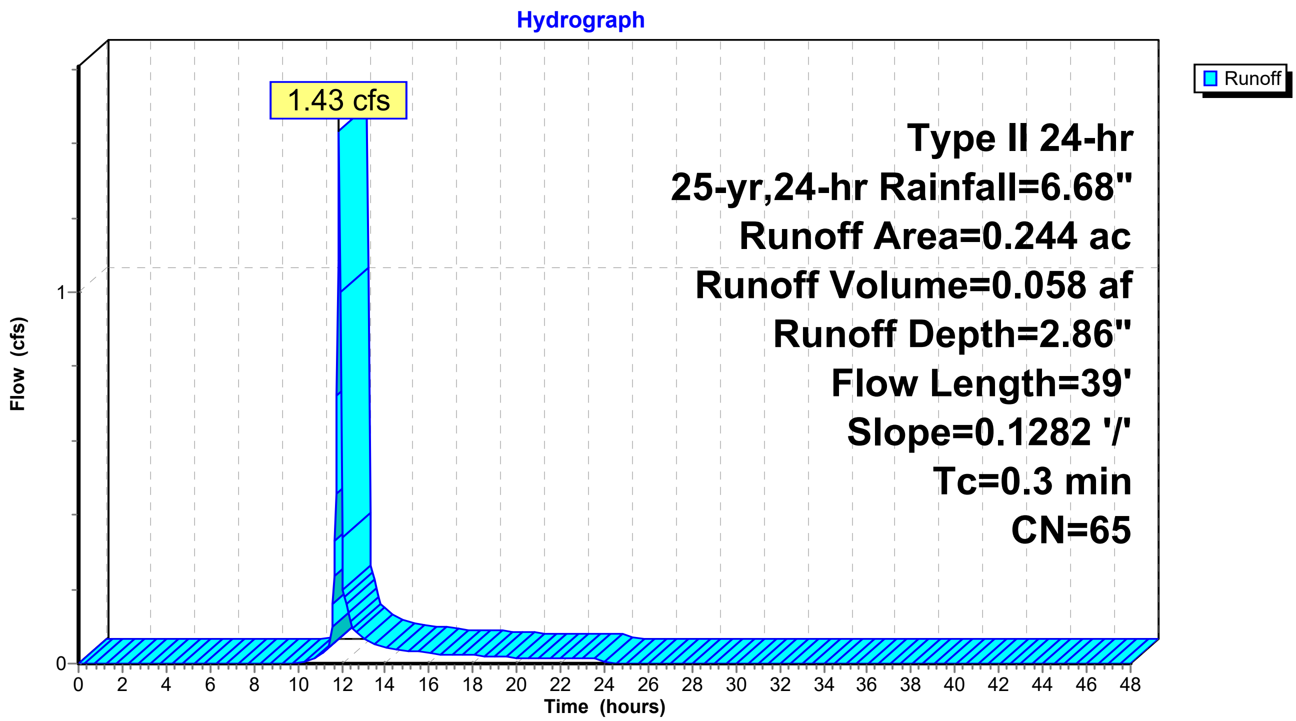
Runoff = 1.43 cfs @ 11.90 hrs, Volume= 0.058 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.098	39	>75% Grass cover, Good, HSG A
0.146	83	Paved roads w/open ditches, 50% imp, HSG A
0.244	65	Weighted Average
0.171		70.08% Pervious Area
0.073		29.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	39	0.1282	2.47		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-J6: SC-J6



Summary for Subcatchment SC-K1: SC-K1

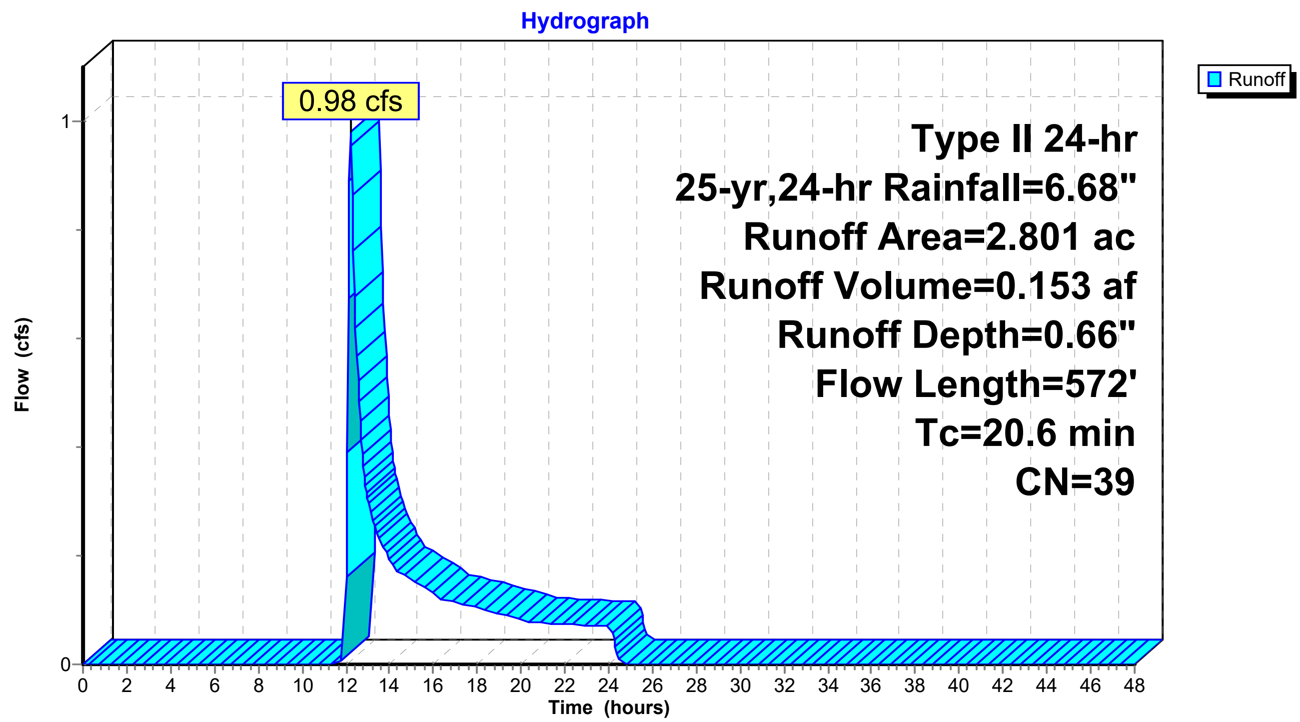
Runoff = 0.98 cfs @ 12.21 hrs, Volume= 0.153 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
2.801	39	>75% Grass cover, Good, HSG A
2.801		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
8.1	472	0.0191	0.97		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.6	572	Total			

Subcatchment SC-K1: SC-K1



Summary for Subcatchment SC-K10: SC-K10

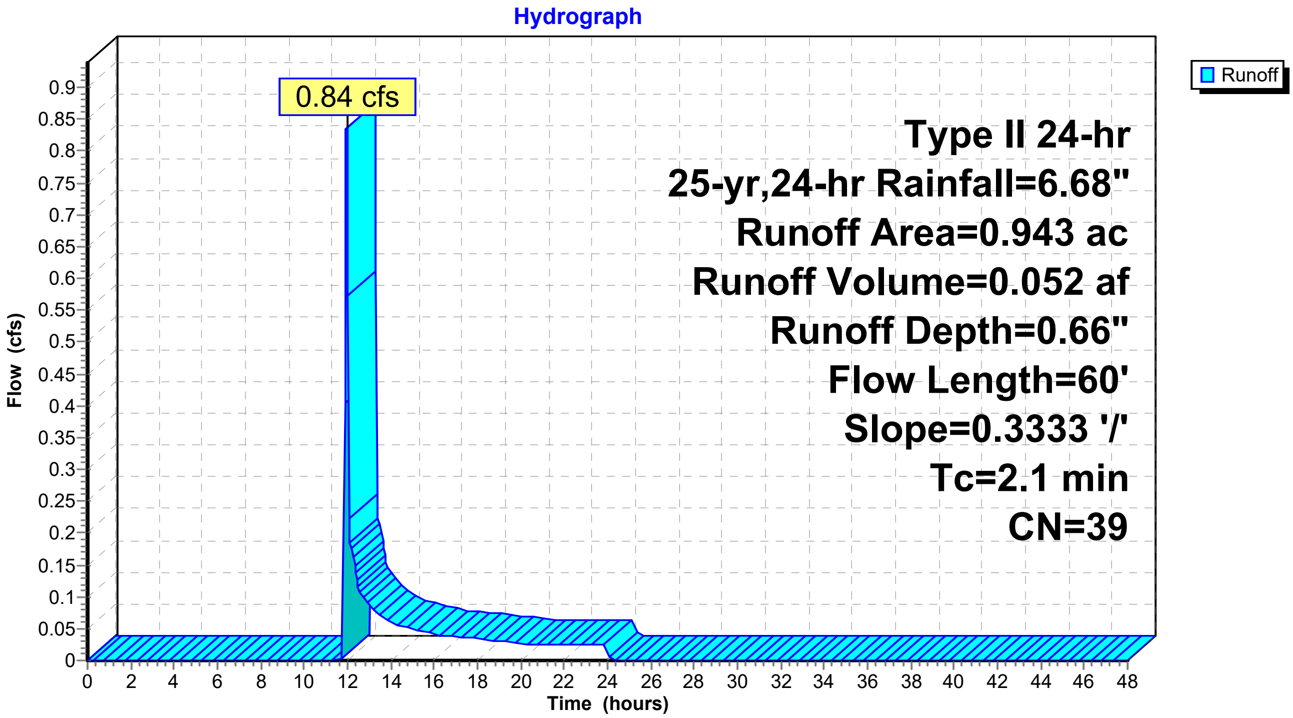
Runoff = 0.84 cfs @ 11.96 hrs, Volume= 0.052 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.943	39	>75% Grass cover, Good, HSG A
0.943		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	60	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-K10: SC-K10



Summary for Subcatchment SC-K11: SC-K11

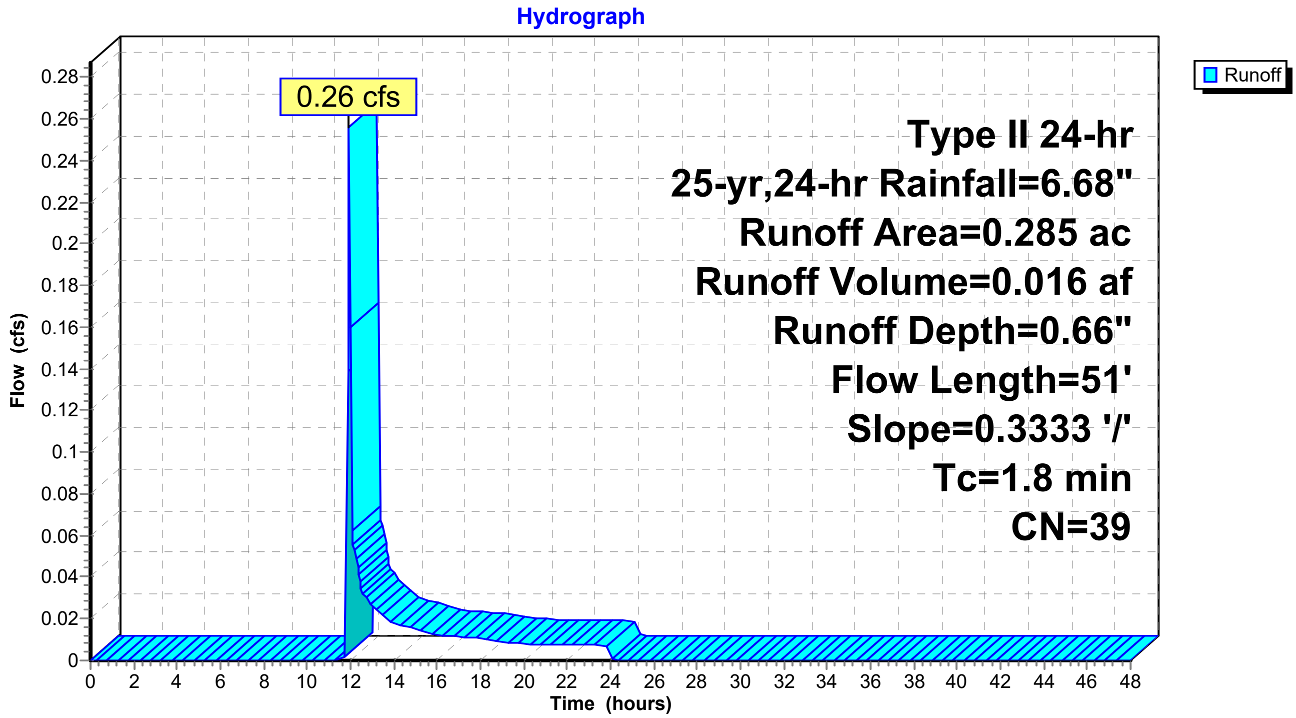
Runoff = 0.26 cfs @ 11.95 hrs, Volume= 0.016 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.285	39	>75% Grass cover, Good, HSG A
0.285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	51	0.3333	0.47		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-K11: SC-K11



Summary for Subcatchment SC-K12: SC-K12

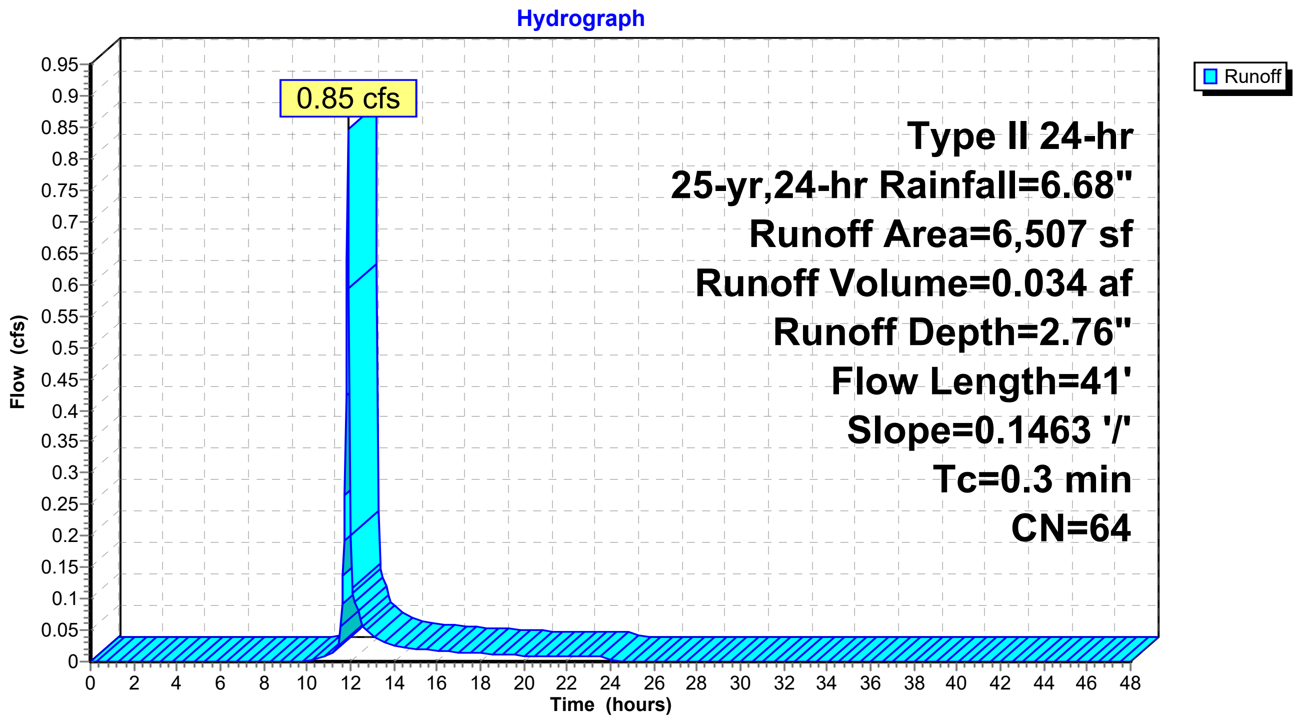
Runoff = 0.85 cfs @ 11.90 hrs, Volume= 0.034 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
2,632	39	>75% Grass cover, Good, HSG A
1,545	76	Gravel roads, HSG A
2,330	83	Paved roads w/open ditches, 50% imp, HSG A
6,507	64	Weighted Average
5,342		82.10% Pervious Area
1,165		17.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	41	0.1463	2.63		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-K12: SC-K12



Summary for Subcatchment SC-K13: SC-K13

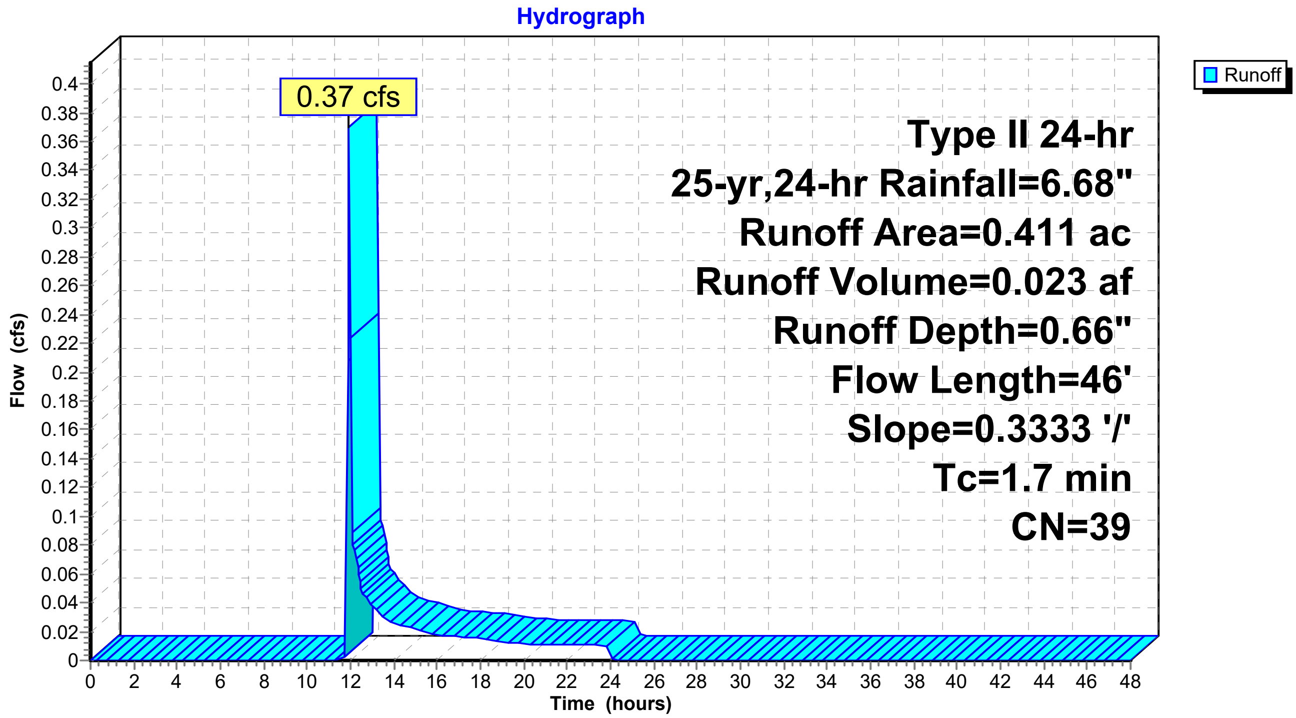
Runoff = 0.37 cfs @ 11.95 hrs, Volume= 0.023 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.411	39	>75% Grass cover, Good, HSG A
0.411		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	46	0.3333	0.46		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-K13: SC-K13



Summary for Subcatchment SC-K14: SC-K14

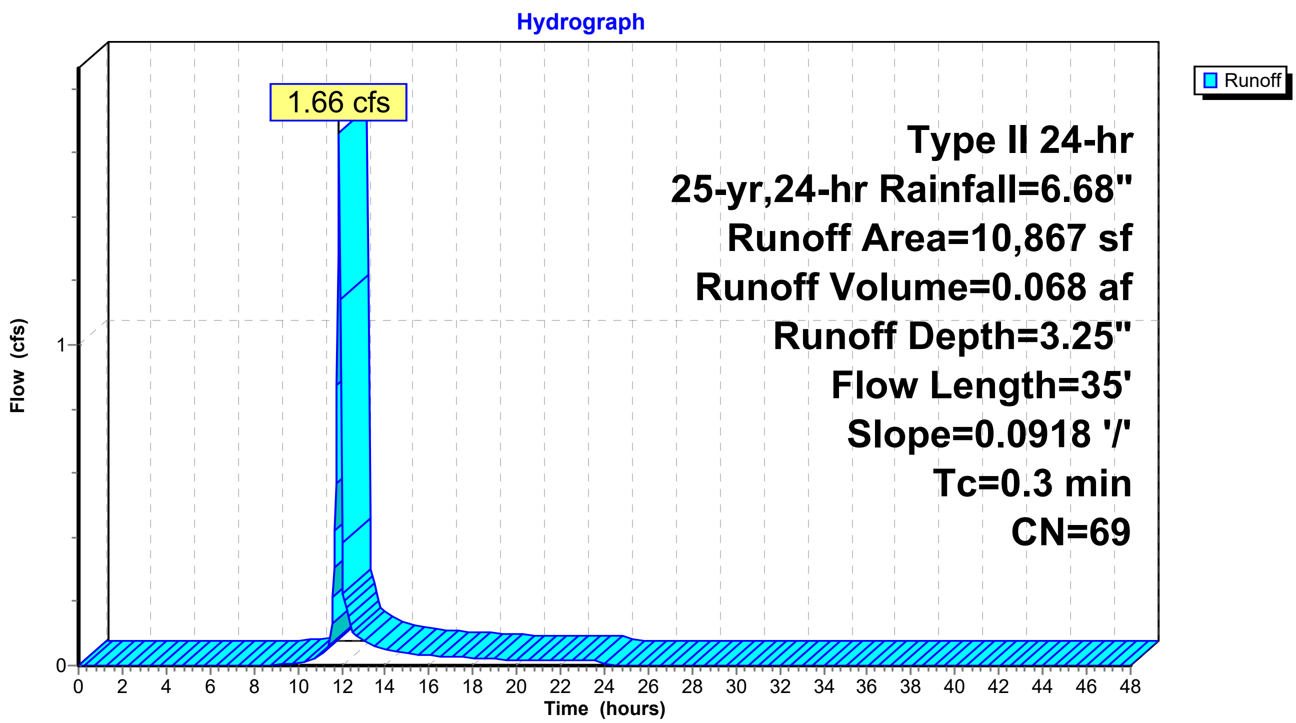
Runoff = 1.66 cfs @ 11.90 hrs, Volume= 0.068 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
2,193	39	>75% Grass cover, Good, HSG A
8,674	76	Gravel roads, HSG A
10,867	69	Weighted Average
10,867		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	35	0.0918	2.11		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment SC-K14: SC-K14



Summary for Subcatchment SC-K2: SC-K2

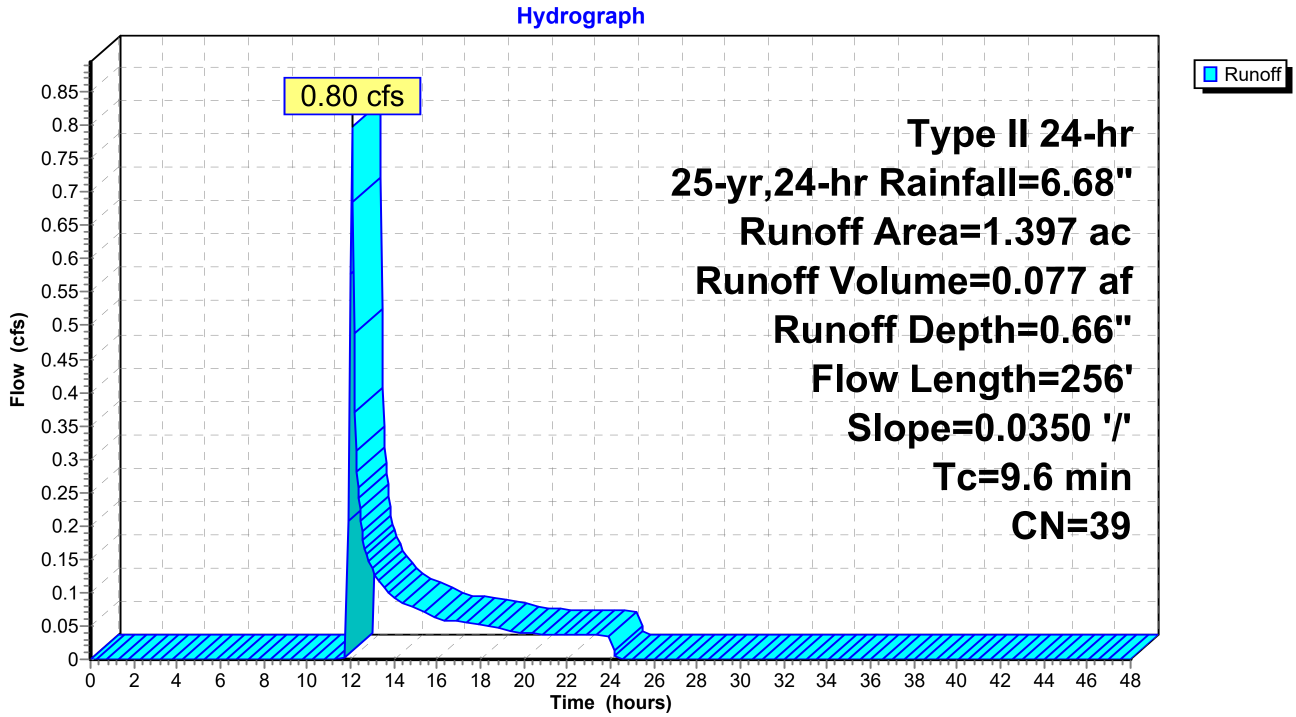
Runoff = 0.80 cfs @ 12.06 hrs, Volume= 0.077 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.397	39	>75% Grass cover, Good, HSG A
1.397		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0350	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.0	156	0.0350	1.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.6	256	Total			

Subcatchment SC-K2: SC-K2



Summary for Subcatchment SC-K3: SC-K3

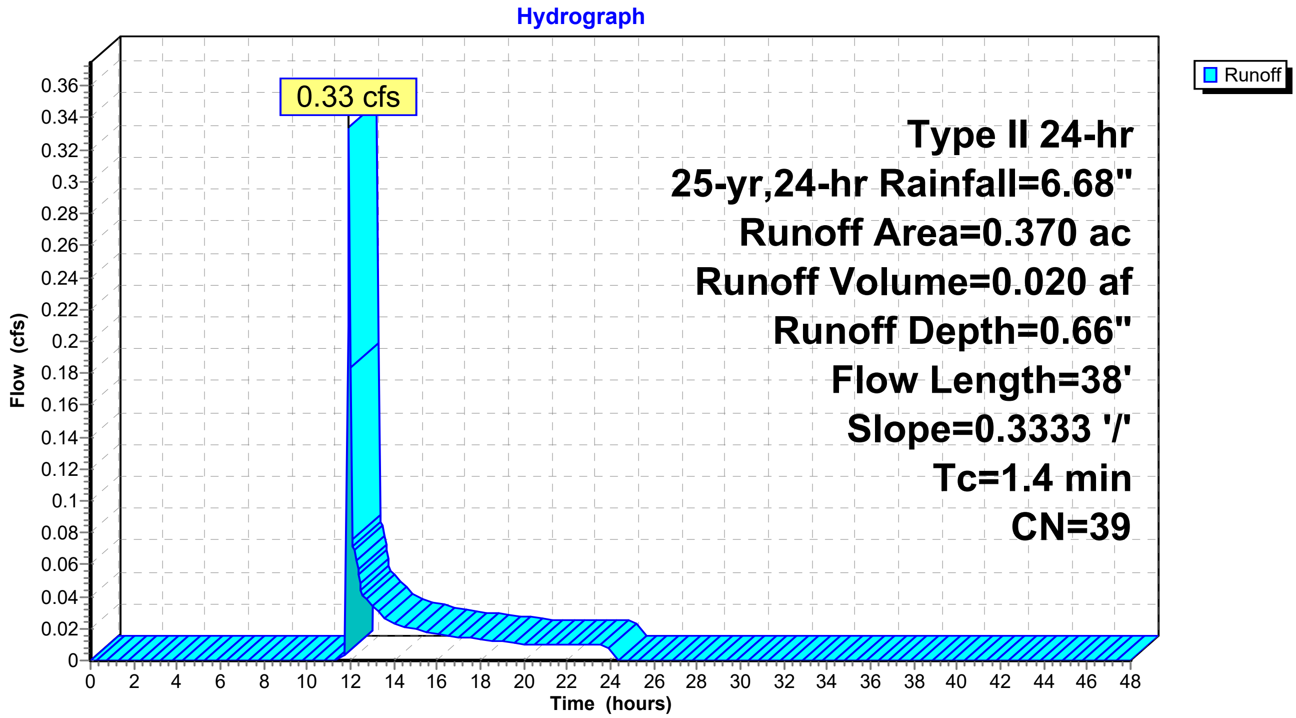
Runoff = 0.33 cfs @ 11.95 hrs, Volume= 0.020 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.370	39	>75% Grass cover, Good, HSG A
0.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	38	0.3333	0.45		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-K3: SC-K3



Summary for Subcatchment SC-K4: SC-K4

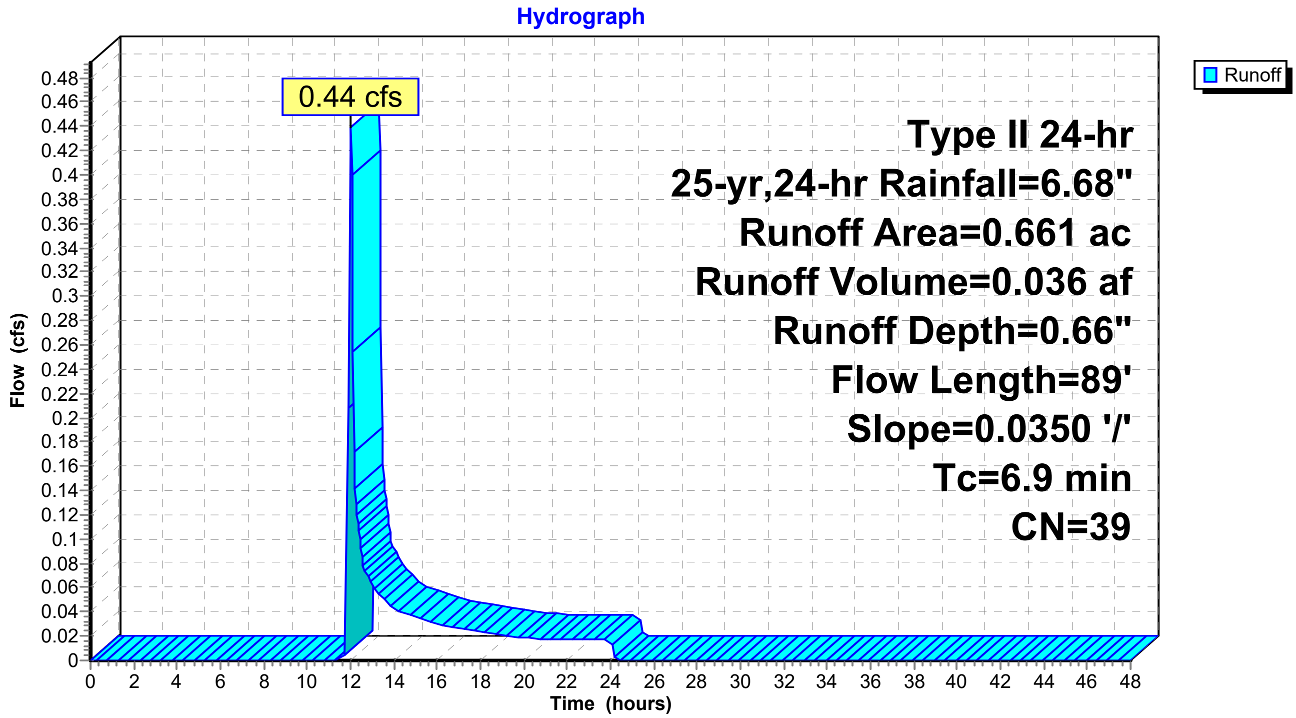
Runoff = 0.44 cfs @ 12.02 hrs, Volume= 0.036 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.661	39	>75% Grass cover, Good, HSG A
0.661		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	89	0.0350	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-K4: SC-K4



Summary for Subcatchment SC-K5: SC-K5

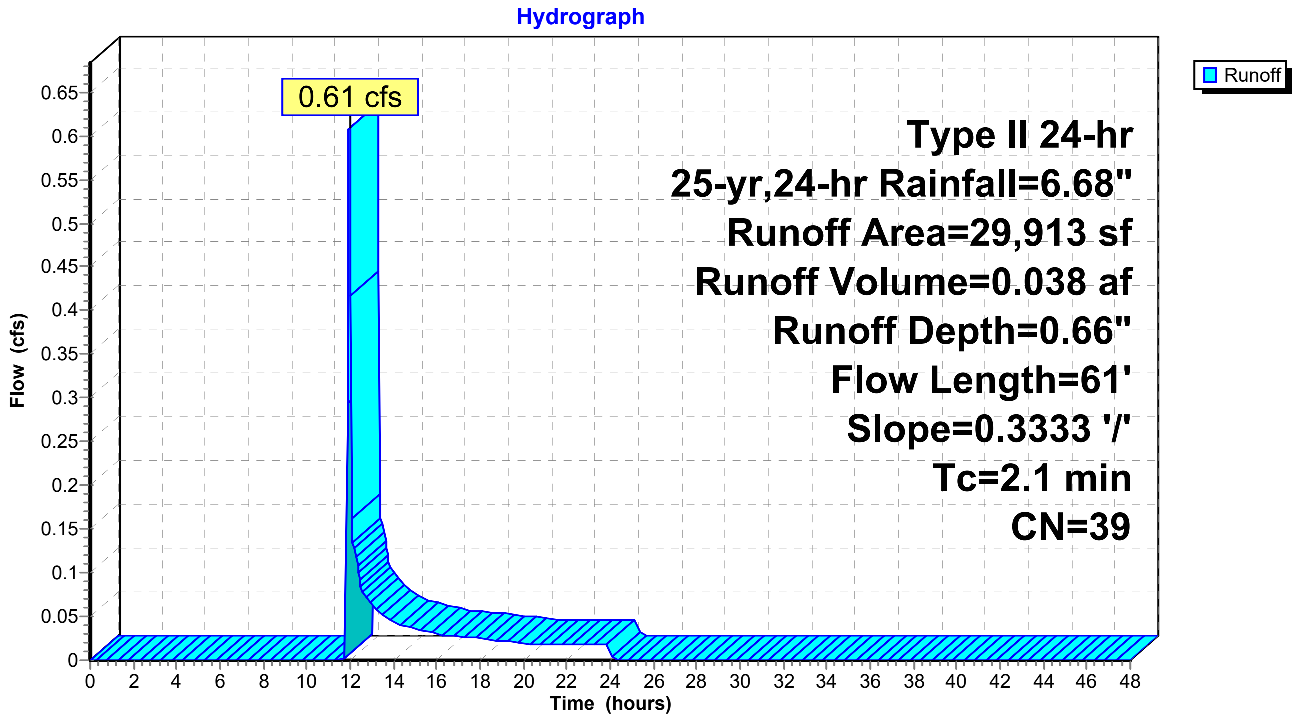
Runoff = 0.61 cfs @ 11.96 hrs, Volume= 0.038 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
29,913	39	>75% Grass cover, Good, HSG A
29,913		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-K5: SC-K5



Summary for Subcatchment SC-K6: SC-K6

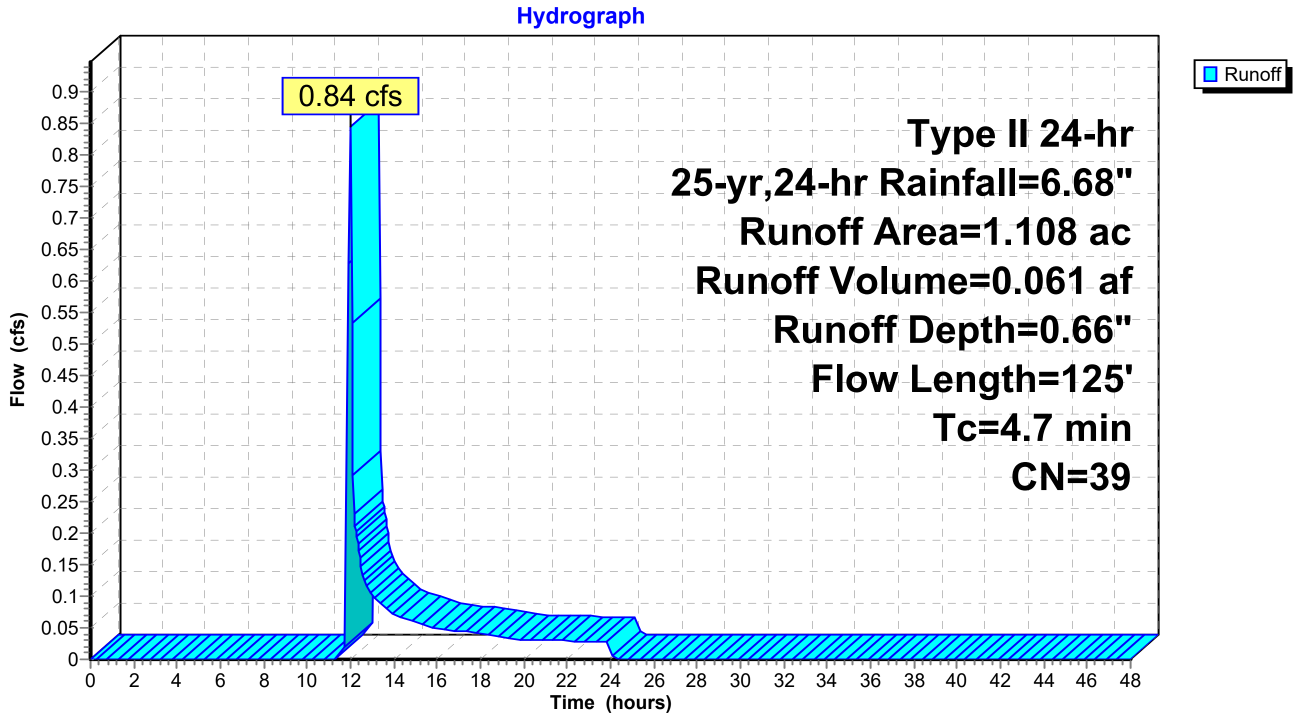
Runoff = 0.84 cfs @ 12.00 hrs, Volume= 0.061 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.108	39	>75% Grass cover, Good, HSG A
1.108		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.1250	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.1	25	0.3333	4.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	125	Total			

Subcatchment SC-K6: SC-K6



Summary for Subcatchment SC-K7: SC-K7

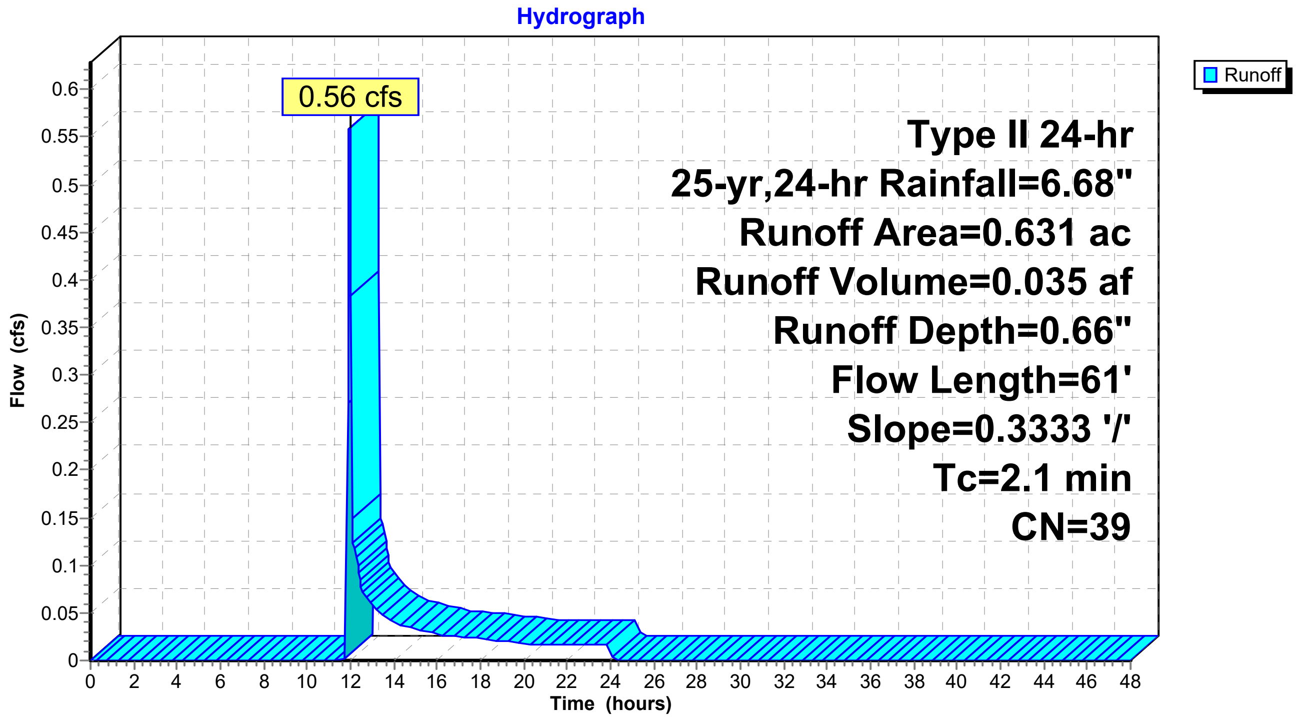
Runoff = 0.56 cfs @ 11.96 hrs, Volume= 0.035 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.631	39	>75% Grass cover, Good, HSG A
0.631		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-K7: SC-K7



Summary for Subcatchment SC-K8: SC-K8

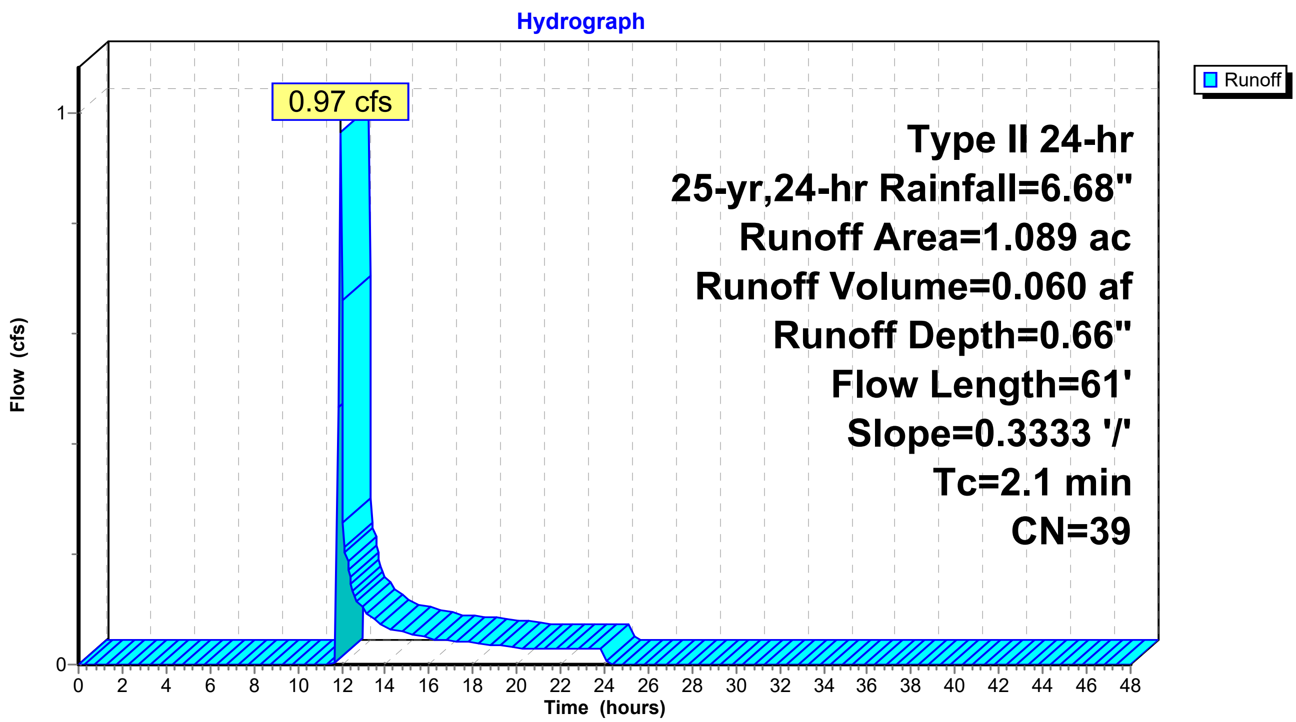
Runoff = 0.97 cfs @ 11.96 hrs, Volume= 0.060 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
1.089	39	>75% Grass cover, Good, HSG A
1.089		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-K8: SC-K8



Summary for Subcatchment SC-K9: SC-K9

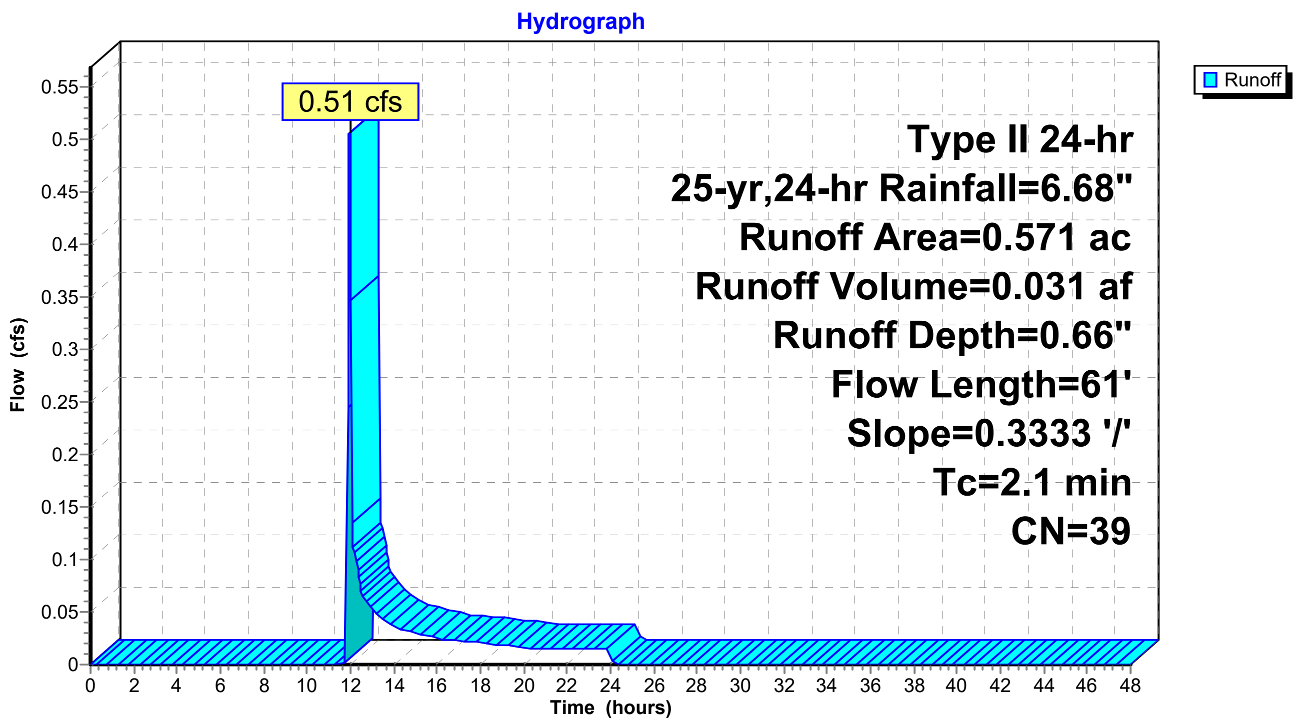
Runoff = 0.51 cfs @ 11.96 hrs, Volume= 0.031 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.571	39	>75% Grass cover, Good, HSG A
0.571		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	61	0.3333	0.49		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-K9: SC-K9



Summary for Subcatchment SC-NE1: SC-NE1

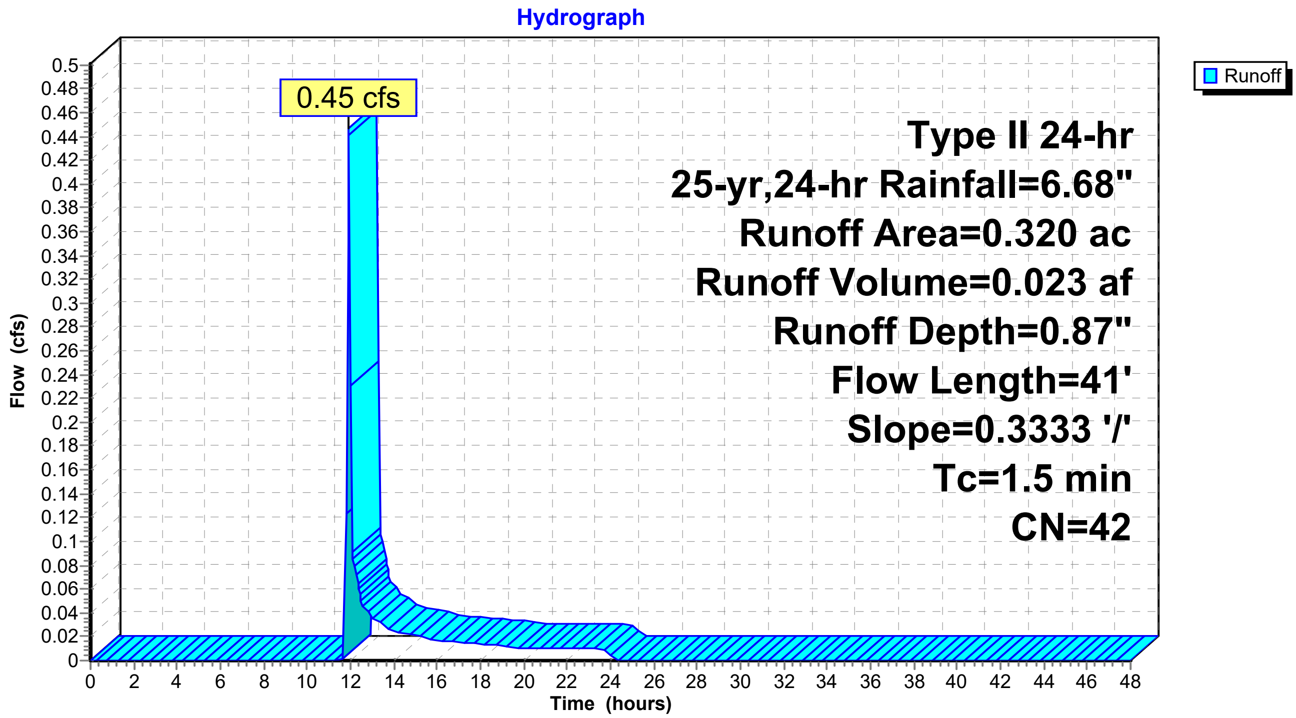
Runoff = 0.45 cfs @ 11.94 hrs, Volume= 0.023 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.296	39	>75% Grass cover, Good, HSG A
0.024	76	Gravel roads, HSG A
0.320	42	Weighted Average
0.320		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	41	0.3333	0.45		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-NE1: SC-NE1



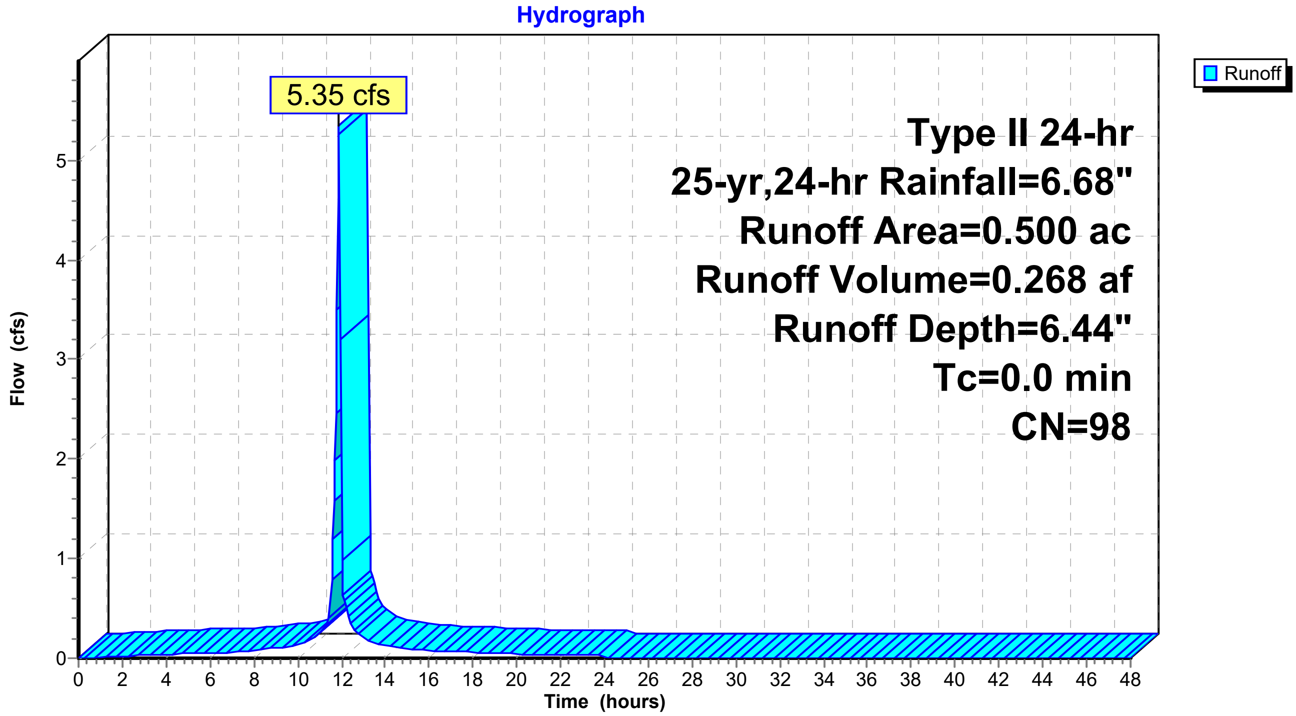
Summary for Subcatchment SC-NE2: SC-NE2

Runoff = 5.35 cfs @ 11.89 hrs, Volume= 0.268 af, Depth= 6.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.500	98	Water Surface, 0% imp, HSG A
0.500		100.00% Pervious Area

Subcatchment SC-NE2: SC-NE2



Summary for Subcatchment SC-NE3: SC-NE3

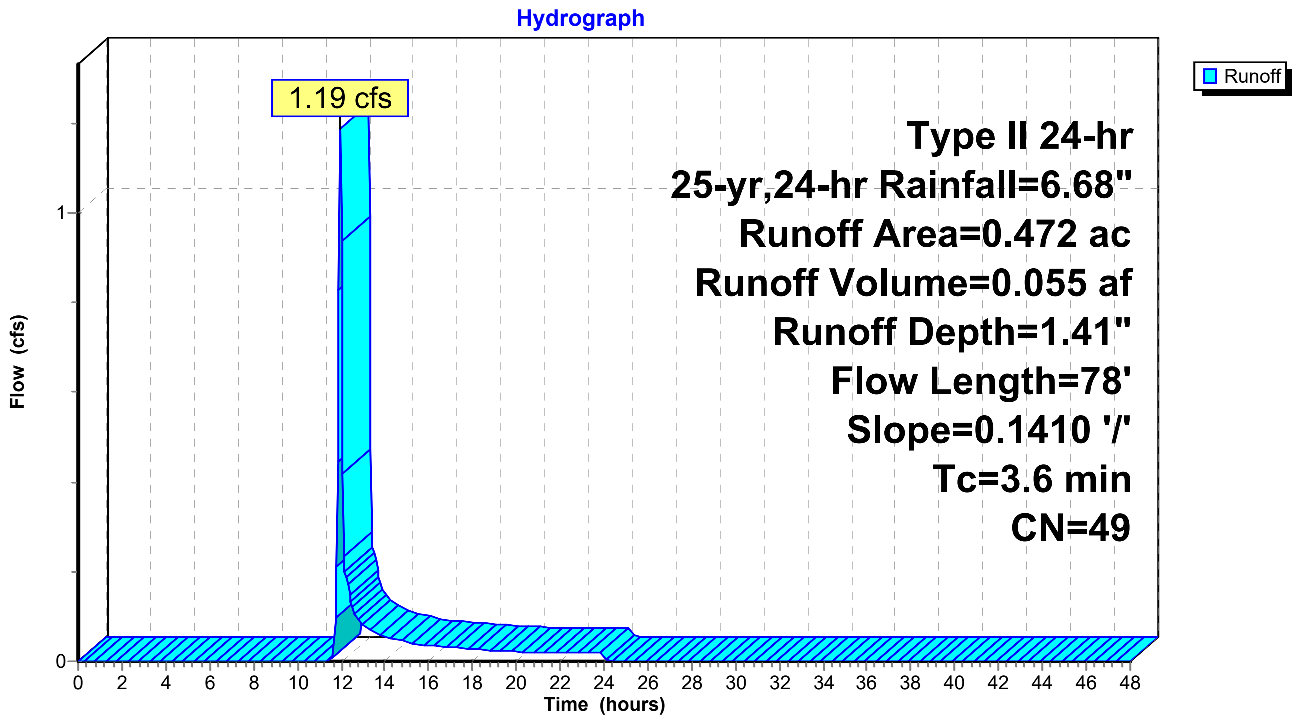
Runoff = 1.19 cfs @ 11.95 hrs, Volume= 0.055 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.358	39	>75% Grass cover, Good, HSG A
0.044	76	Gravel roads, HSG A
0.070	83	Paved roads w/open ditches, 50% imp, HSG A
0.472	49	Weighted Average
0.437		92.58% Pervious Area
0.035		7.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	78	0.1410	0.36		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-NE3: SC-NE3



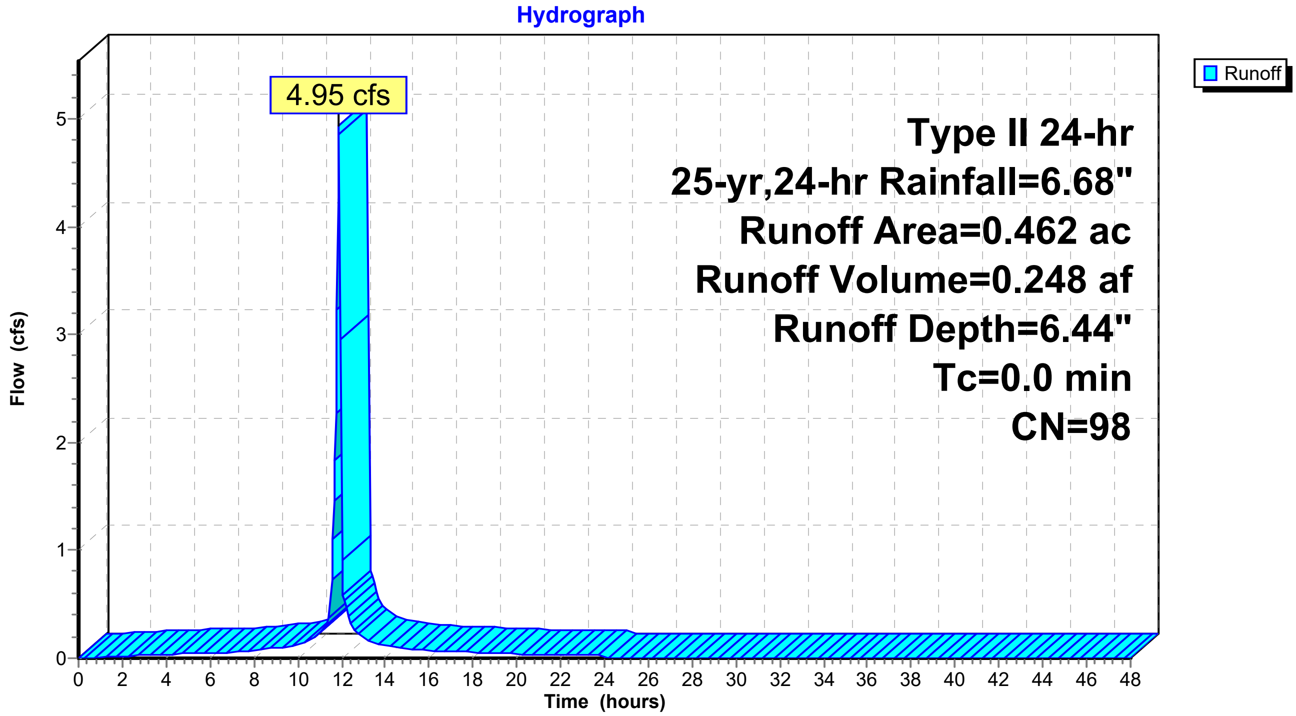
Summary for Subcatchment SC-NE4: SC-NE4

Runoff = 4.95 cfs @ 11.89 hrs, Volume= 0.248 af, Depth= 6.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.462	98	Water Surface, 0% imp, HSG A
0.462		100.00% Pervious Area

Subcatchment SC-NE4: SC-NE4



Summary for Subcatchment SC-NE5: SC-NE5

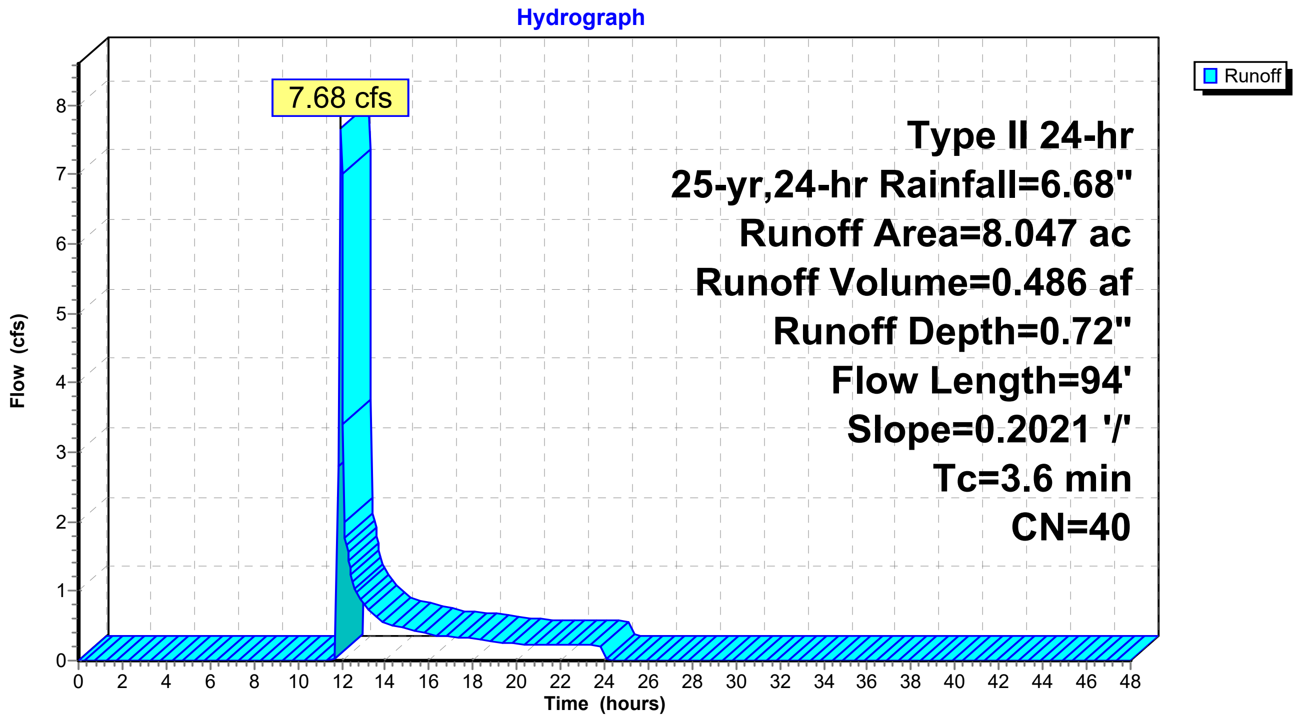
Runoff = 7.68 cfs @ 11.97 hrs, Volume= 0.486 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
7.764	39	>75% Grass cover, Good, HSG A
0.283	76	Gravel roads, HSG A
8.047	40	Weighted Average
8.047		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	94	0.2021	0.44		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-NE5: SC-NE5



Summary for Subcatchment SC-SW1: SC-SW1

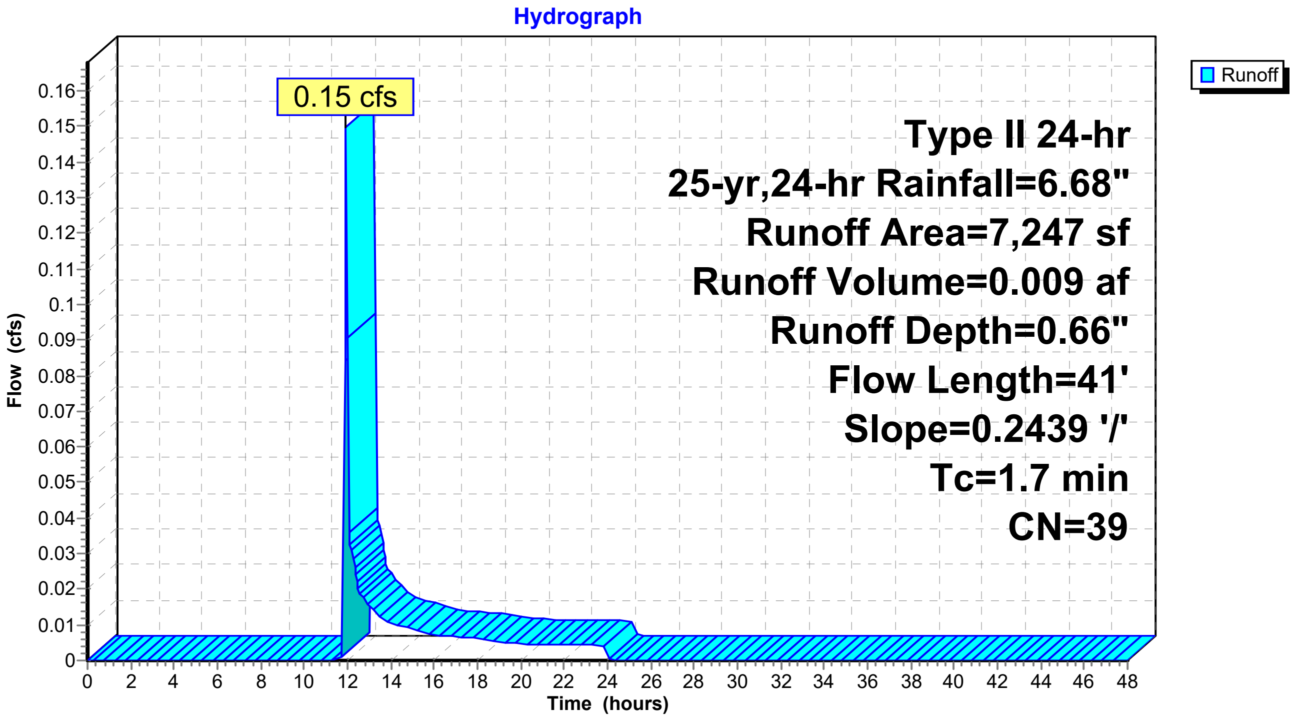
Runoff = 0.15 cfs @ 11.95 hrs, Volume= 0.009 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
7,247	39	>75% Grass cover, Good, HSG A
7,247		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	41	0.2439	0.40		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-SW1: SC-SW1



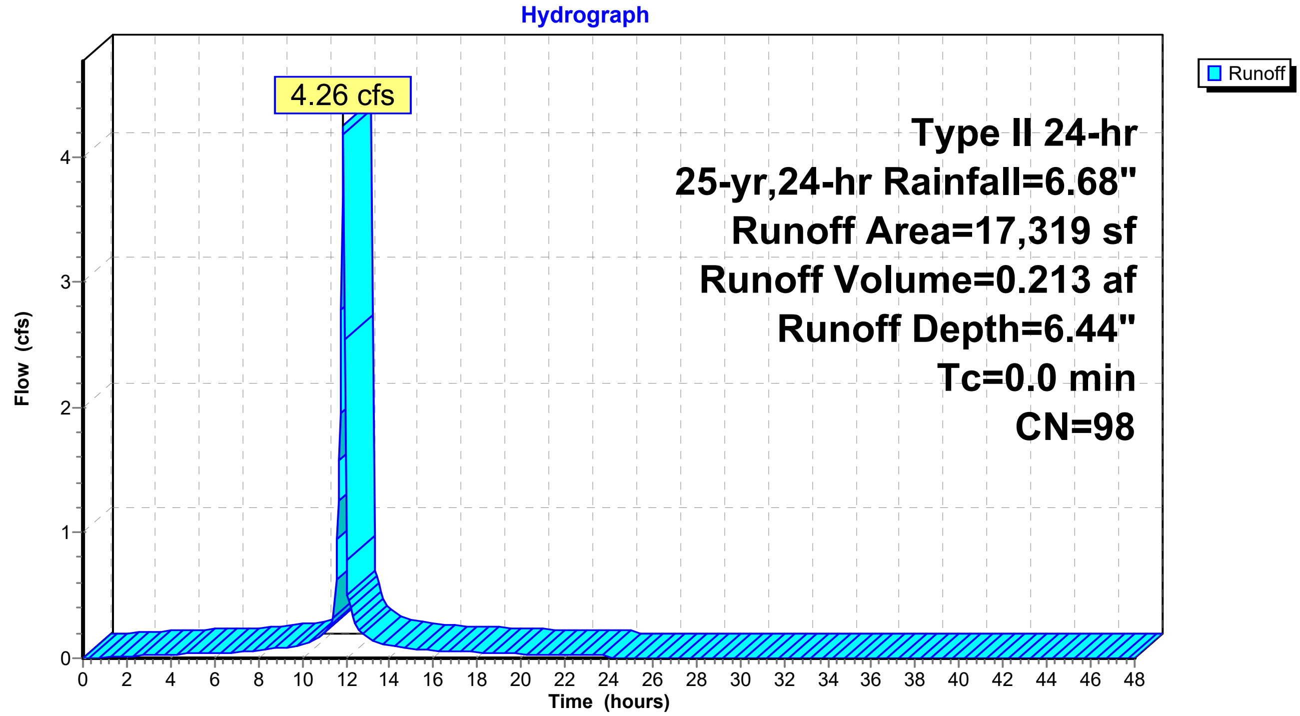
Summary for Subcatchment SC-SW2: SC-SW2

Runoff = 4.26 cfs @ 11.89 hrs, Volume= 0.213 af, Depth= 6.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (sf)	CN	Description
17,319	98	Water Surface, 0% imp, HSG A
17,319		100.00% Pervious Area

Subcatchment SC-SW2: SC-SW2



Summary for Subcatchment SC-SW3: SC-SW3

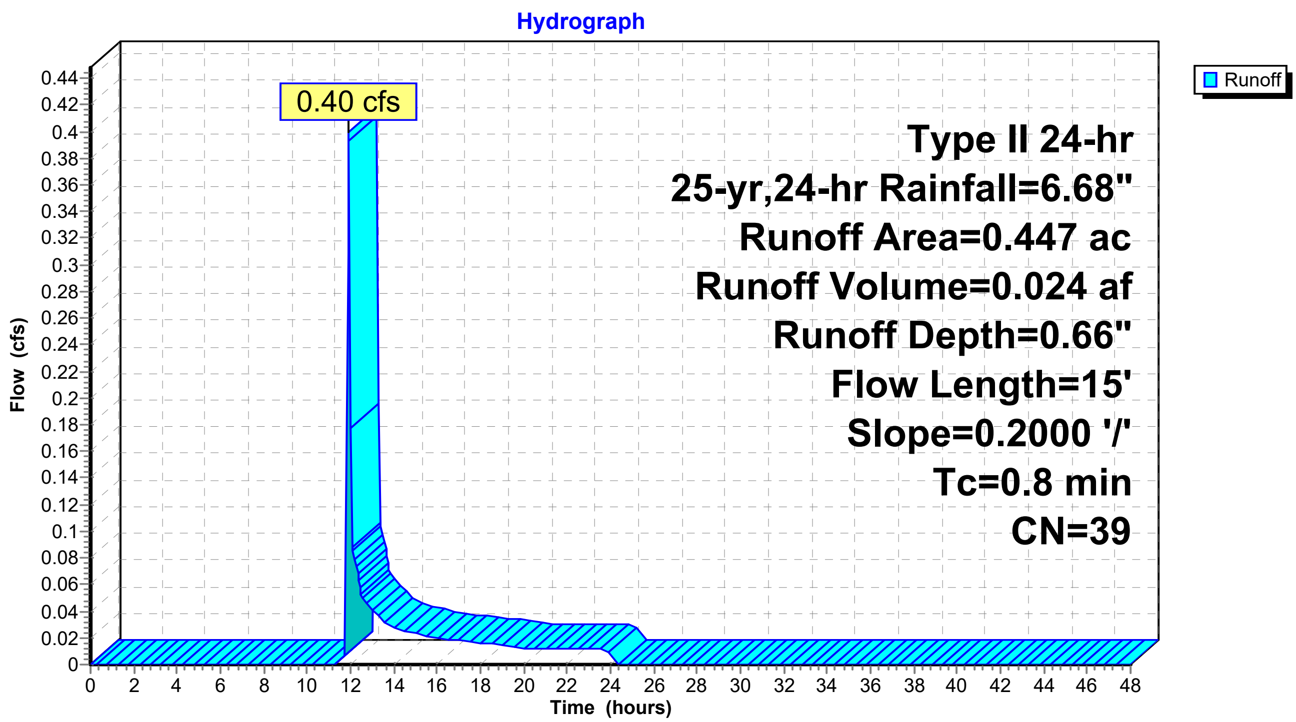
Runoff = 0.40 cfs @ 11.94 hrs, Volume= 0.024 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
0.447	39	>75% Grass cover, Good, HSG A
0.447		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	15	0.2000	0.30		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"

Subcatchment SC-SW3: SC-SW3



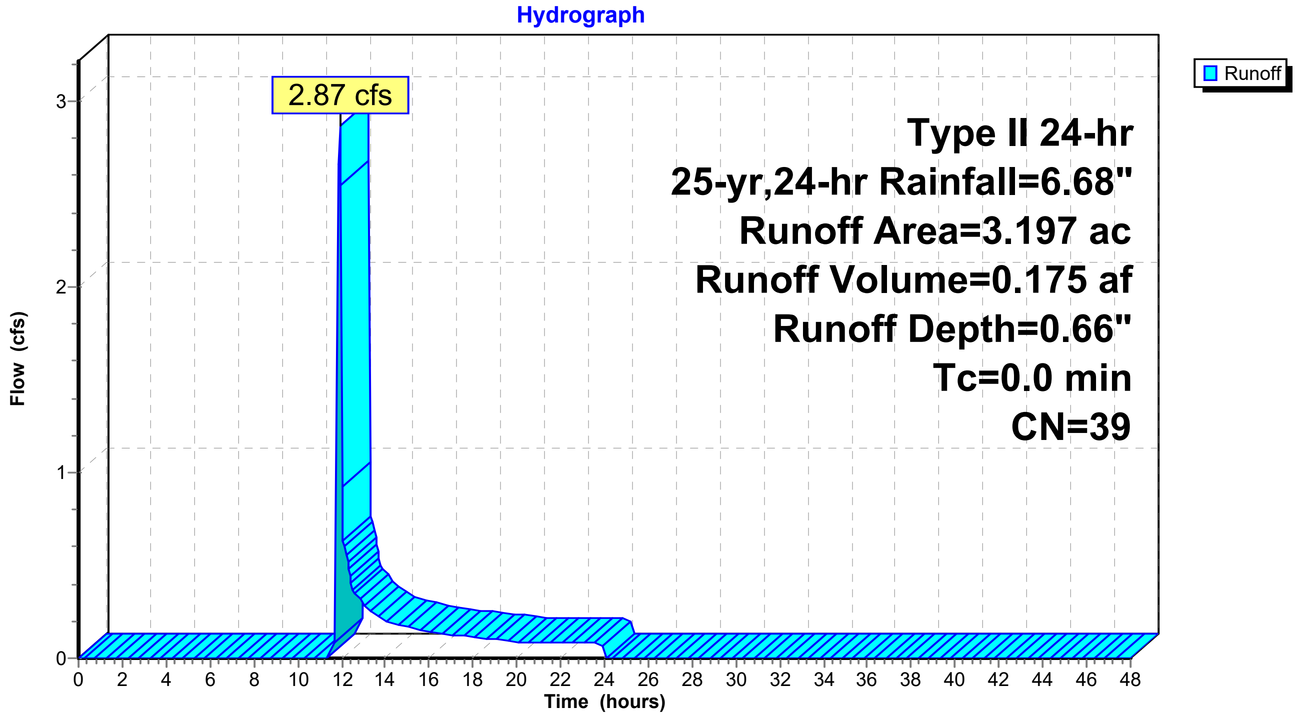
Summary for Subcatchment SC-SW4: SC-SW4

Runoff = 2.87 cfs @ 11.92 hrs, Volume= 0.175 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24-hr Rainfall=6.68"

Area (ac)	CN	Description
3.197	39	>75% Grass cover, Good, HSG A
3.197		100.00% Pervious Area

Subcatchment SC-SW4: SC-SW4



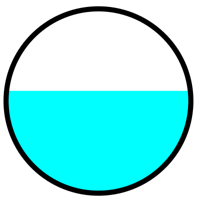
Summary for Reach C-1: C-1

Inflow Area = 30.159 ac, 1.01% Impervious, Inflow Depth = 0.79" for 25-yr,24-hr event
Inflow = 12.08 cfs @ 12.17 hrs, Volume= 1.988 af
Outflow = 12.03 cfs @ 12.17 hrs, Volume= 1.988 af, Atten= 0%, Lag= 0.4 min

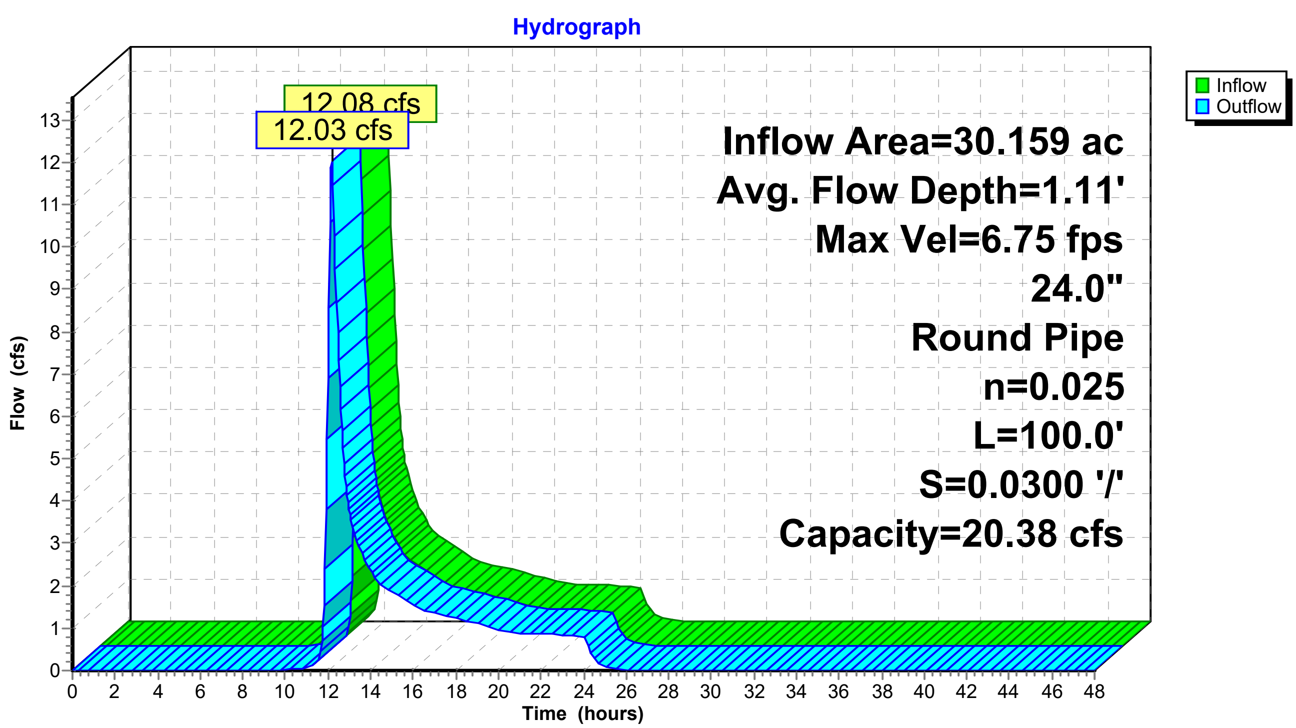
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.75 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.79 fps, Avg. Travel Time= 0.6 min

Peak Storage= 179 cf @ 12.17 hrs
Average Depth at Peak Storage= 1.11'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 20.38 cfs

24.0" Round Pipe
n= 0.025 Corrugated metal
Length= 100.0' Slope= 0.0300 '/'
Inlet Invert= 11.80', Outlet Invert= 8.80'



Reach C-1: C-1



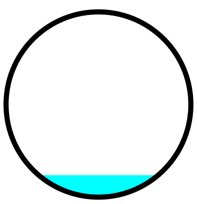
Summary for Reach C-2: C-2

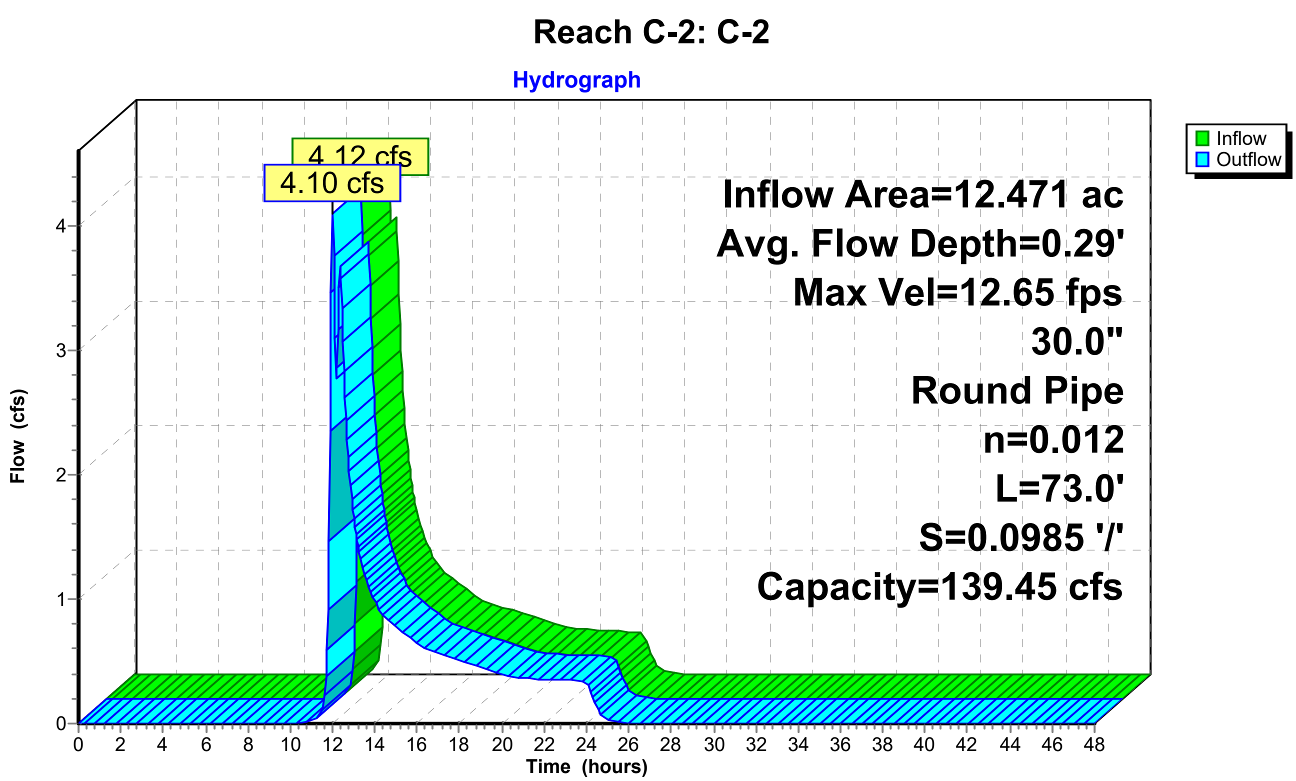
Inflow Area = 12.471 ac, 0.00% Impervious, Inflow Depth = 0.78" for 25-yr,24-hr event
Inflow = 4.12 cfs @ 12.01 hrs, Volume= 0.815 af
Outflow = 4.10 cfs @ 12.01 hrs, Volume= 0.815 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.65 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.88 fps, Avg. Travel Time= 0.2 min

Peak Storage= 24 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 139.45 cfs

30.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 73.0' Slope= 0.0985 '/'
Inlet Invert= 23.24', Outlet Invert= 16.05'





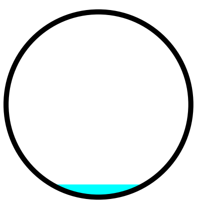
Summary for Reach LP-10A: LP-10A

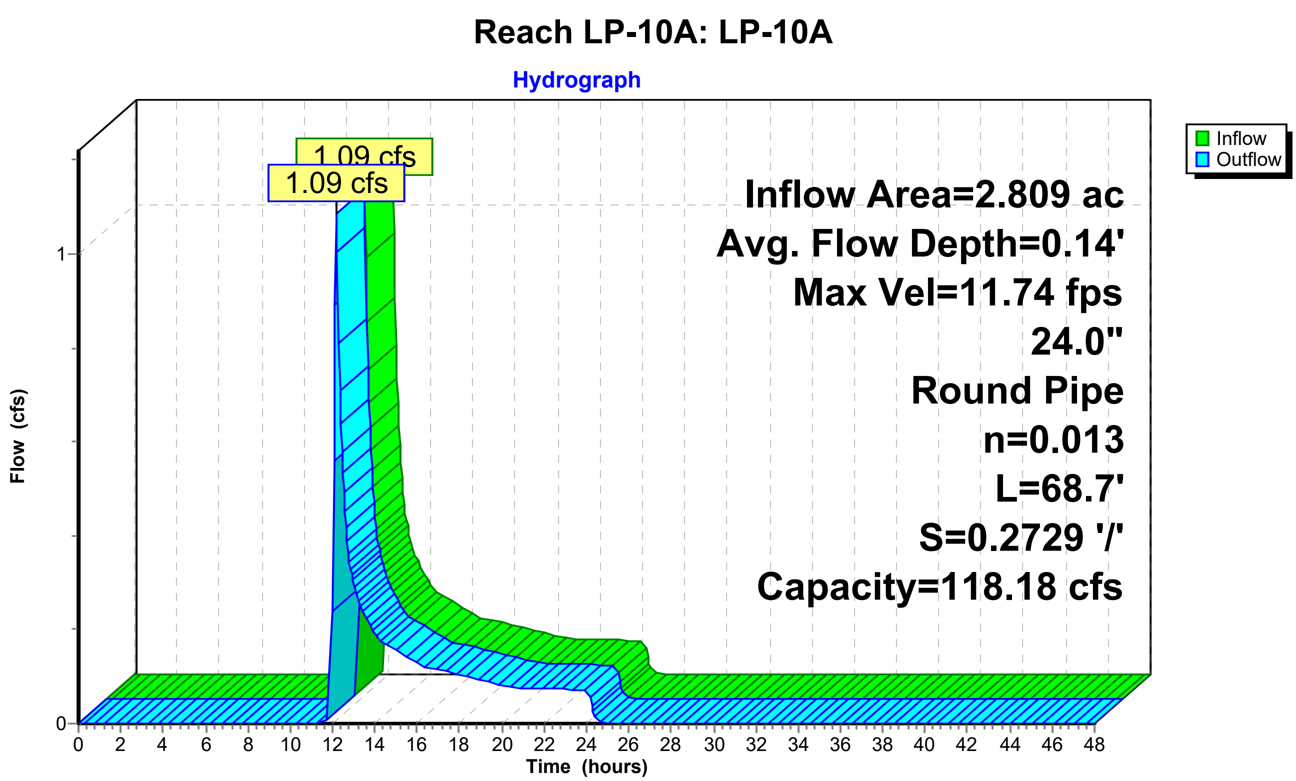
Inflow Area = 2.809 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.09 cfs @ 12.17 hrs, Volume= 0.154 af
Outflow = 1.09 cfs @ 12.17 hrs, Volume= 0.154 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.74 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.05 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 118.18 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 68.7' Slope= 0.2729 '/'
Inlet Invert= 89.61', Outlet Invert= 70.86'





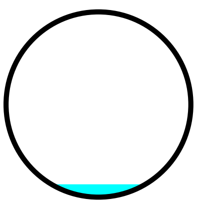
Summary for Reach LP-10B: LP-10B

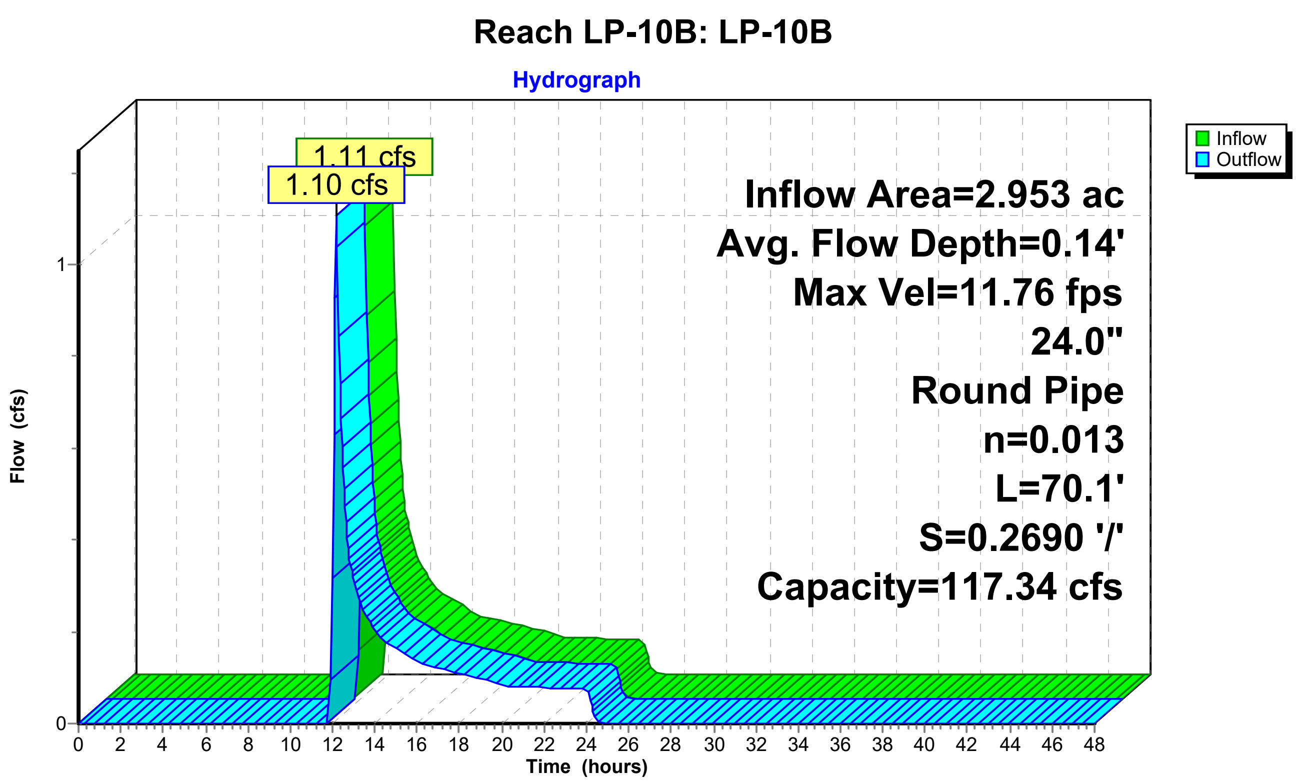
Inflow Area = 2.953 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.11 cfs @ 12.17 hrs, Volume= 0.162 af
Outflow = 1.10 cfs @ 12.18 hrs, Volume= 0.162 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.76 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.09 fps, Avg. Travel Time= 0.2 min

Peak Storage= 7 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 117.34 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 70.1' Slope= 0.2690 '/'
Inlet Invert= 70.86', Outlet Invert= 52.00'





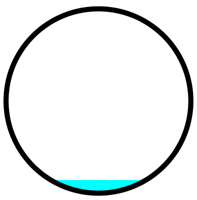
Summary for Reach LP-10C: LP-10C

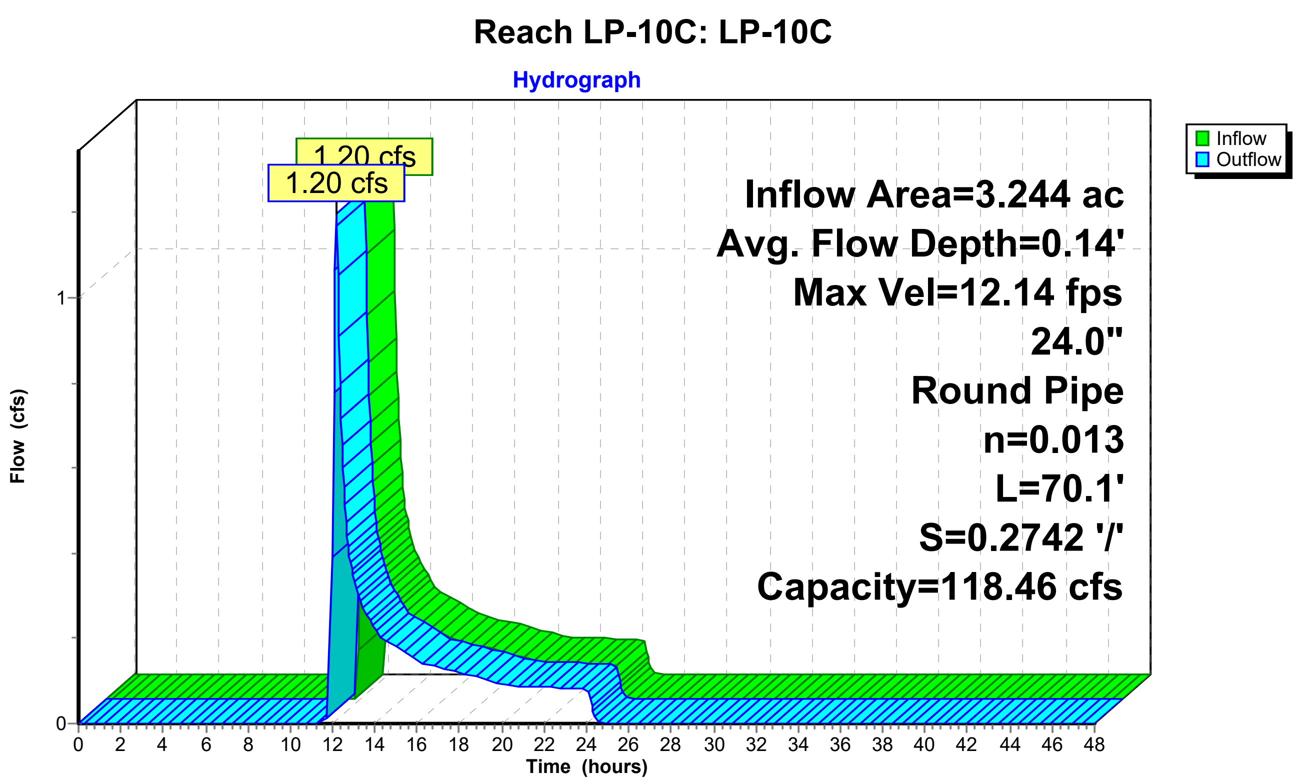
Inflow Area = 3.244 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.20 cfs @ 12.17 hrs, Volume= 0.178 af
Outflow = 1.20 cfs @ 12.17 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.14 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.30 fps, Avg. Travel Time= 0.2 min

Peak Storage= 7 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 118.46 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 70.1' Slope= 0.2742 '/'
Inlet Invert= 52.00', Outlet Invert= 32.78'





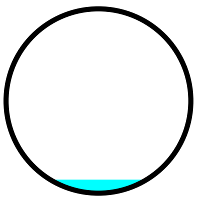
Summary for Reach LP-10D: LP-10D

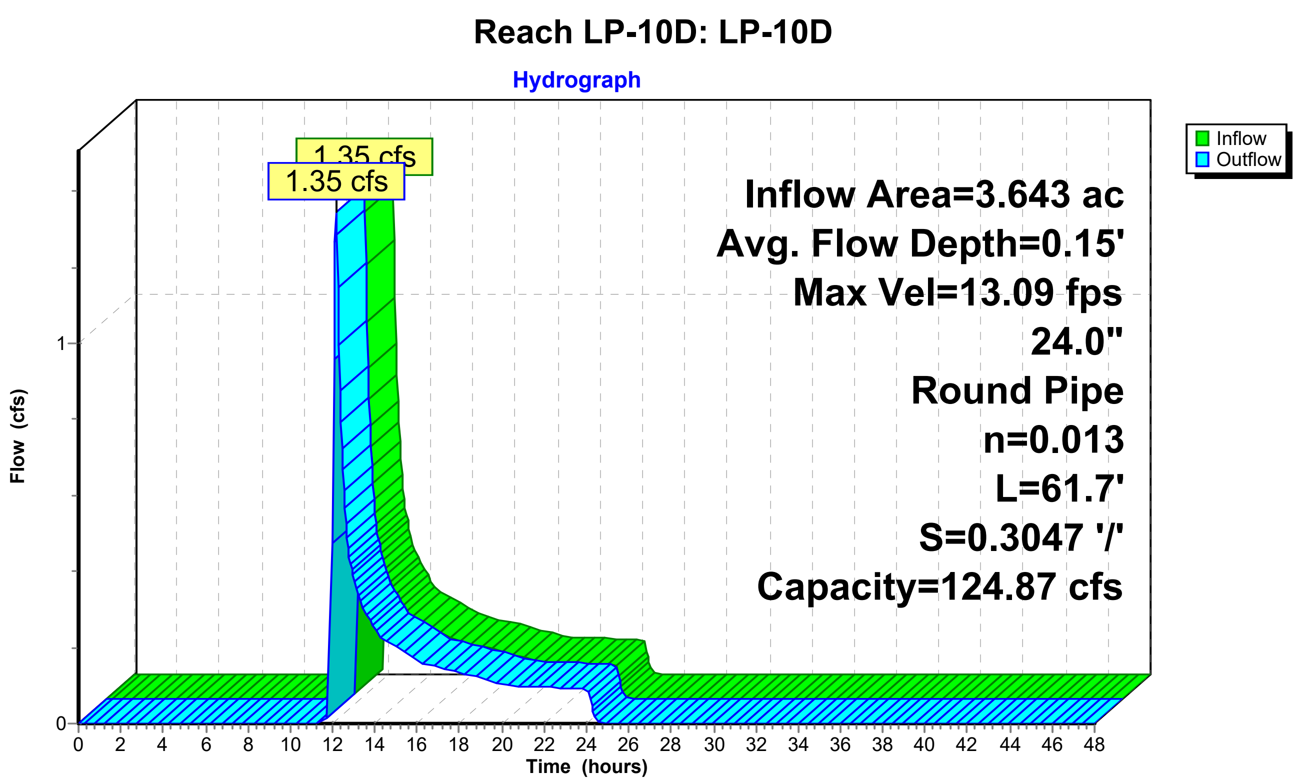
Inflow Area = 3.643 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.35 cfs @ 12.15 hrs, Volume= 0.200 af
Outflow = 1.35 cfs @ 12.15 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.09 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.76 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 124.87 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 61.7' Slope= 0.3047 '/'
Inlet Invert= 32.78', Outlet Invert= 13.98'





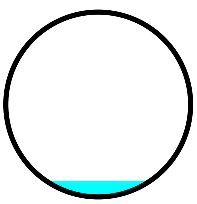
Summary for Reach LP-11A: LP-11A

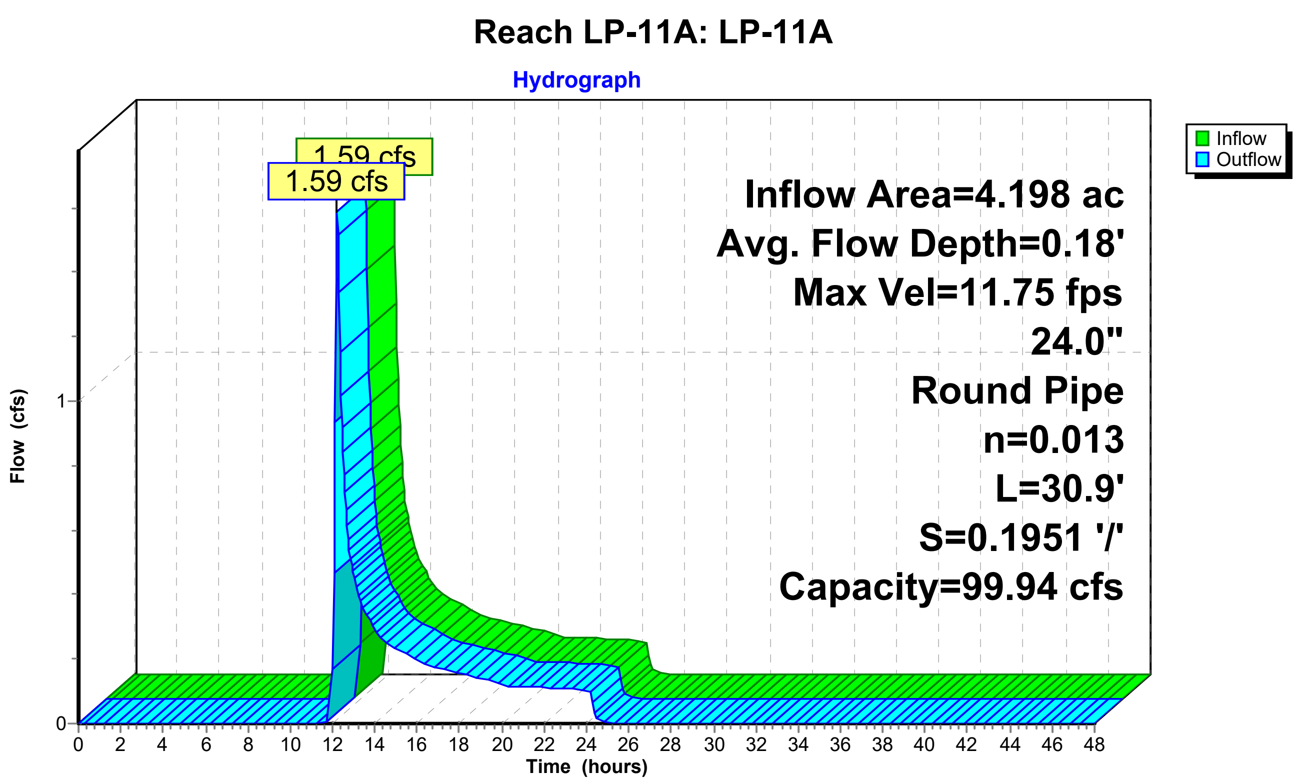
Inflow Area = 4.198 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.59 cfs @ 12.21 hrs, Volume= 0.230 af
Outflow = 1.59 cfs @ 12.21 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.75 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 5.92 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 99.94 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 30.9' Slope= 0.1951 '/'
Inlet Invert= 90.05', Outlet Invert= 84.02'





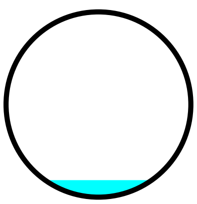
Summary for Reach LP-11B: LP-11B

Inflow Area = 5.229 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 2.00 cfs @ 12.20 hrs, Volume= 0.286 af
Outflow = 2.00 cfs @ 12.20 hrs, Volume= 0.286 af, Atten= 0%, Lag= 0.1 min

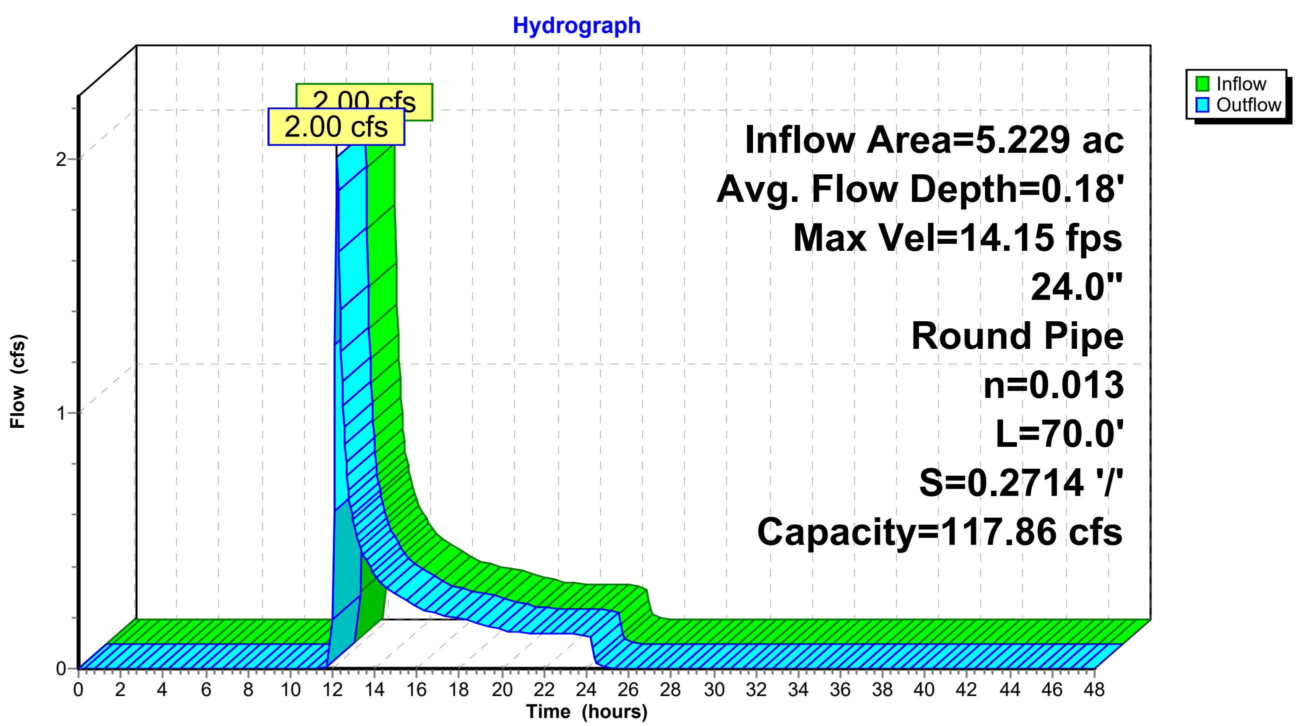
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.15 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.02 fps, Avg. Travel Time= 0.2 min

Peak Storage= 10 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 117.86 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 70.0' Slope= 0.2714 '/'
Inlet Invert= 84.00', Outlet Invert= 65.00'



Reach LP-11B: LP-11B



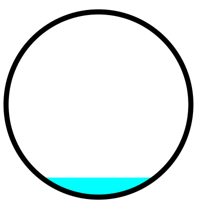
Summary for Reach LP-11C: LP-11C

Inflow Area = 7.024 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 2.71 cfs @ 12.19 hrs, Volume= 0.385 af
Outflow = 2.70 cfs @ 12.19 hrs, Volume= 0.385 af, Atten= 0%, Lag= 0.2 min

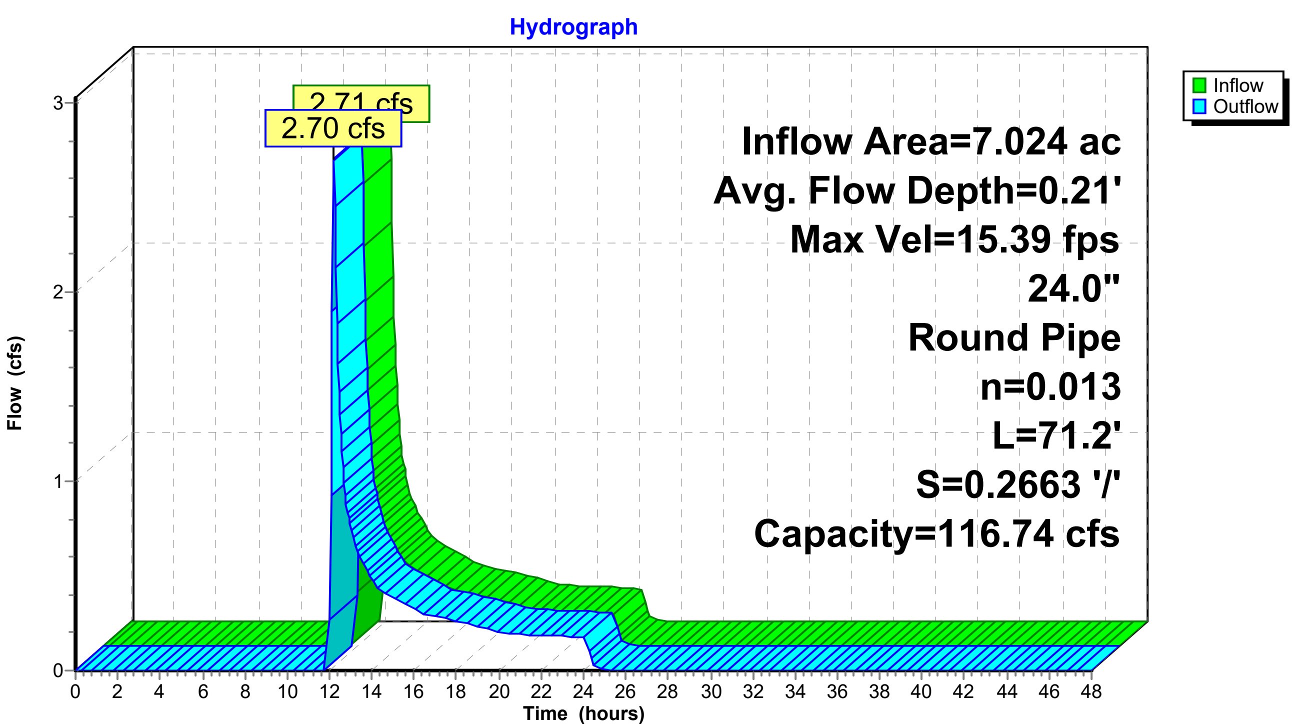
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 15.39 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.45 fps, Avg. Travel Time= 0.2 min

Peak Storage= 13 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 116.74 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 71.2' Slope= 0.2663 '/'
Inlet Invert= 65.00', Outlet Invert= 46.04'



Reach LP-11C: LP-11C



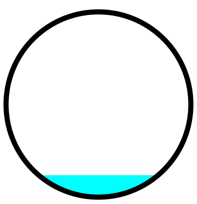
Summary for Reach LP-11D: LP-11D

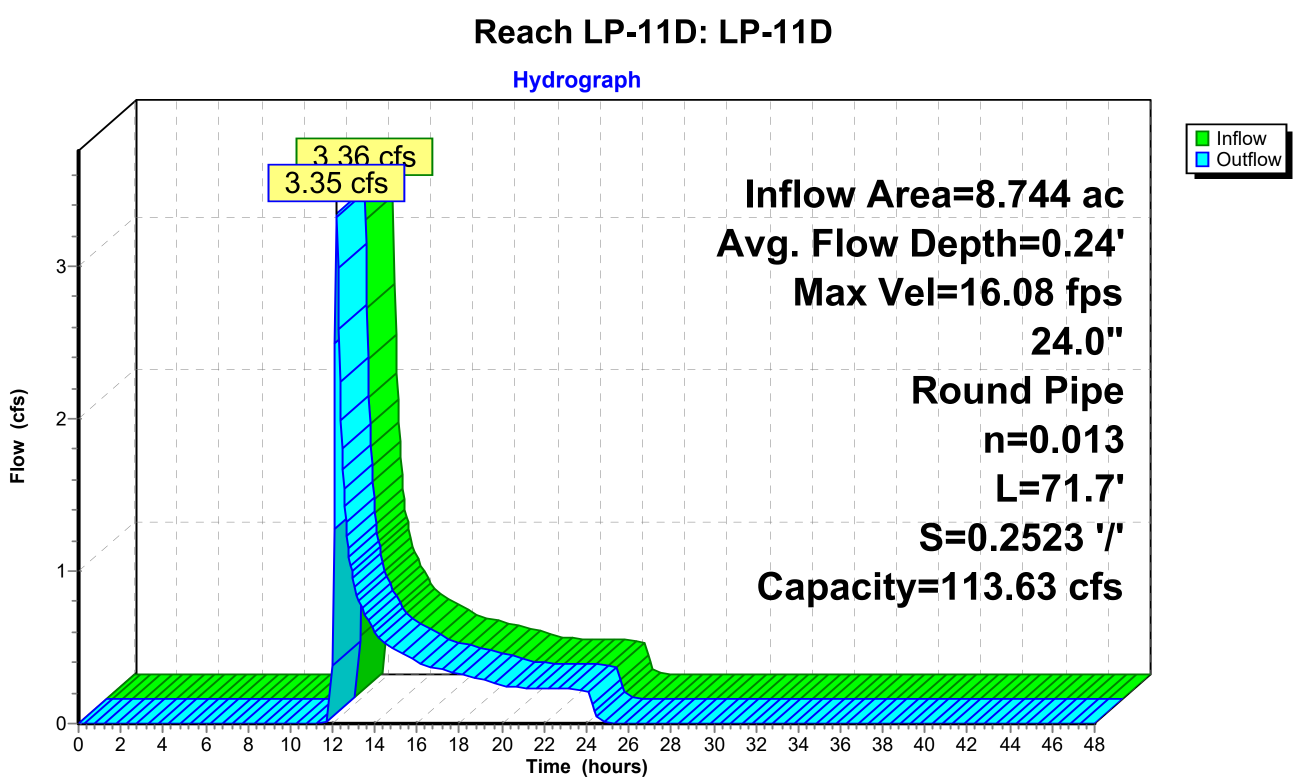
Inflow Area = 8.744 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 3.36 cfs @ 12.18 hrs, Volume= 0.479 af
Outflow = 3.35 cfs @ 12.18 hrs, Volume= 0.479 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 16.08 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.67 fps, Avg. Travel Time= 0.2 min

Peak Storage= 15 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 113.63 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 71.7' Slope= 0.2523 '/'
Inlet Invert= 46.00', Outlet Invert= 27.91'





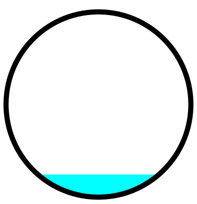
Summary for Reach LP-11E: LP-11E

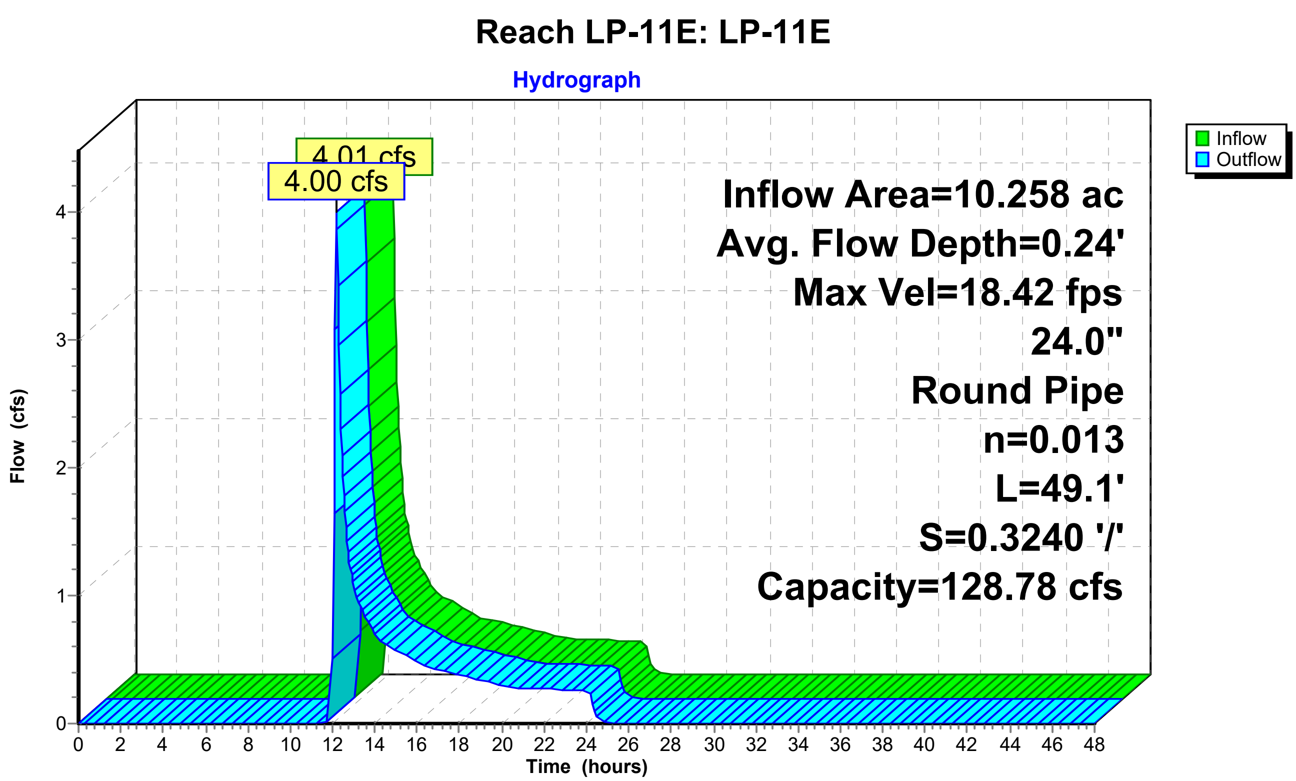
Inflow Area = 10.258 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 4.01 cfs @ 12.17 hrs, Volume= 0.562 af
Outflow = 4.00 cfs @ 12.17 hrs, Volume= 0.562 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 18.42 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 8.73 fps, Avg. Travel Time= 0.1 min

Peak Storage= 11 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 128.78 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 49.1' Slope= 0.3240 '/'
Inlet Invert= 27.91', Outlet Invert= 12.00'





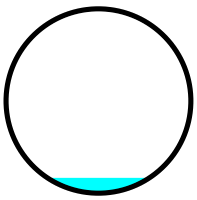
Summary for Reach LP-5A: LP-5A

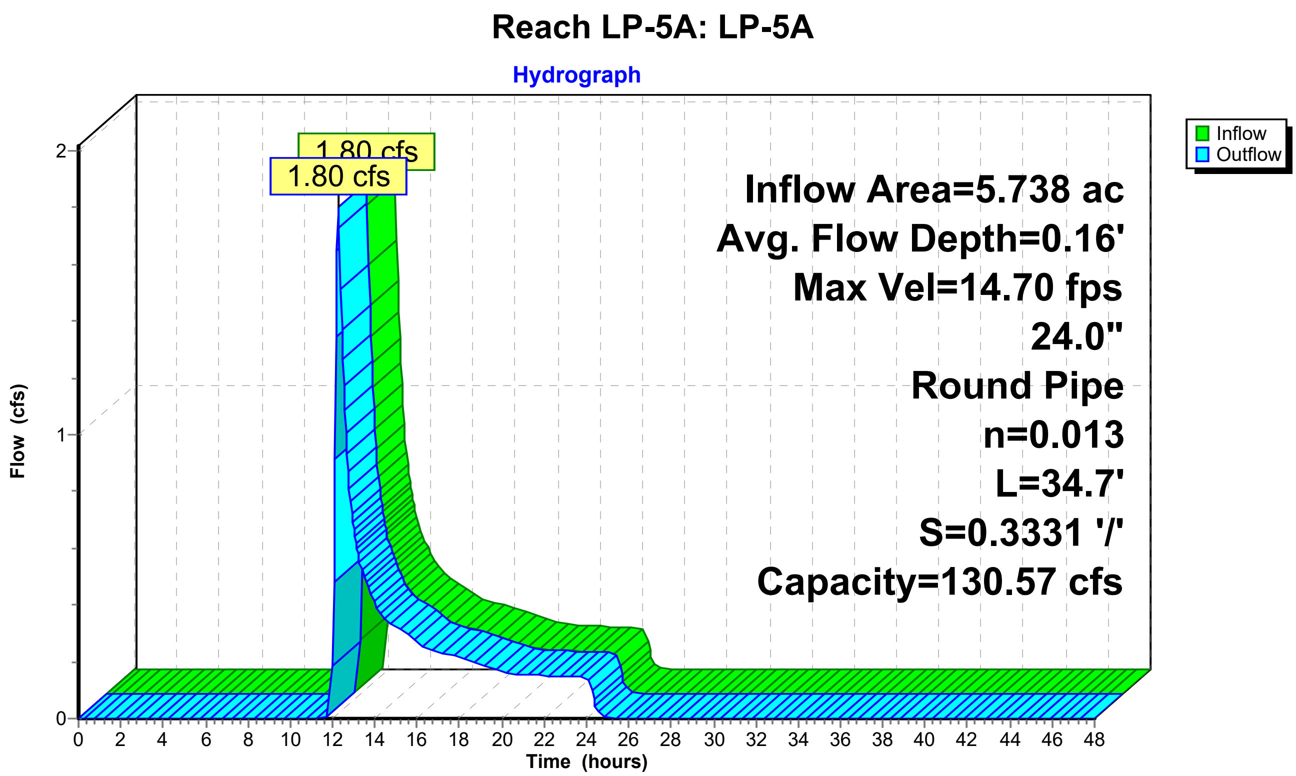
Inflow Area = 5.738 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.80 cfs @ 12.27 hrs, Volume= 0.314 af
Outflow = 1.80 cfs @ 12.27 hrs, Volume= 0.314 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.70 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 7.93 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 130.57 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 34.7' Slope= 0.3331 '/'
Inlet Invert= 90.00', Outlet Invert= 78.44'





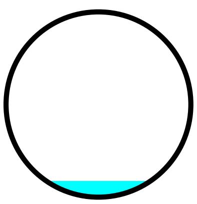
Summary for Reach LP-5B: LP-5B

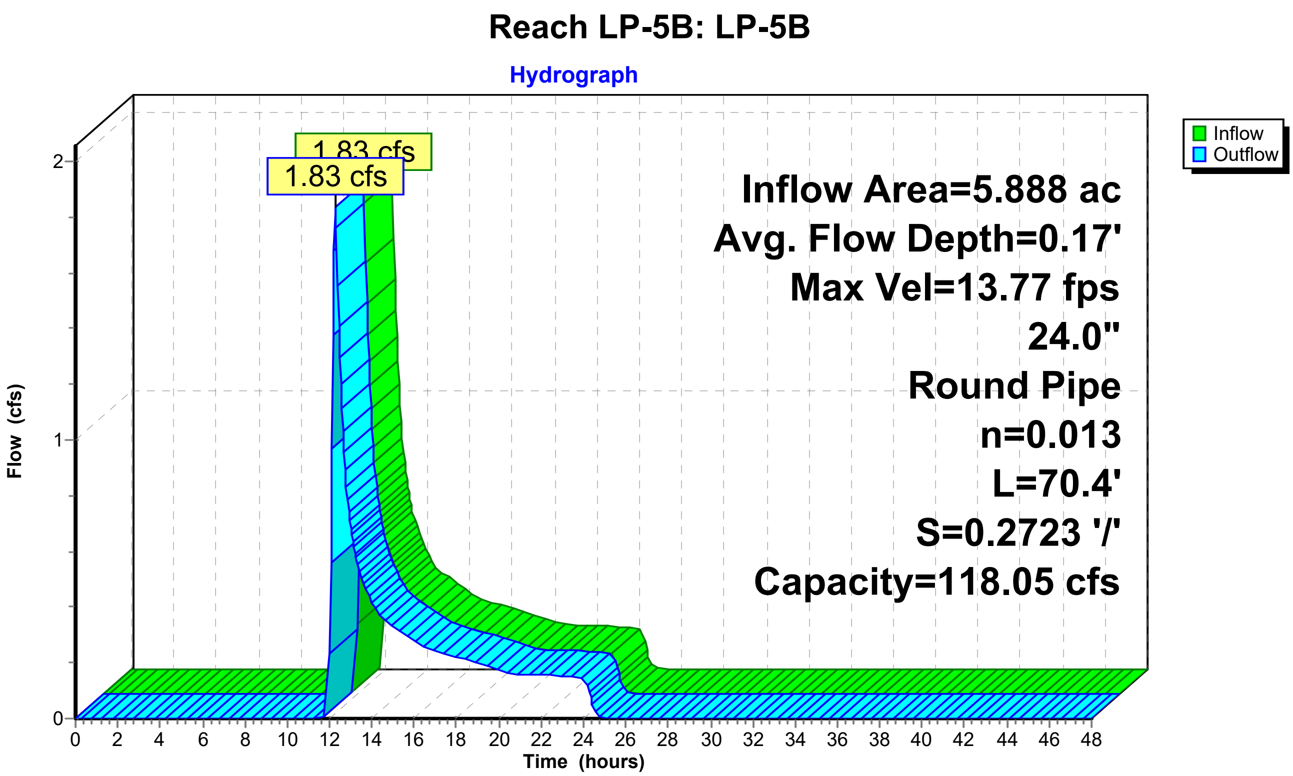
Inflow Area = 5.888 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.83 cfs @ 12.27 hrs, Volume= 0.323 af
Outflow = 1.83 cfs @ 12.27 hrs, Volume= 0.323 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.77 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.44 fps, Avg. Travel Time= 0.2 min

Peak Storage= 9 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 118.05 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 70.4' Slope= 0.2723 '/'
Inlet Invert= 78.44', Outlet Invert= 59.27'





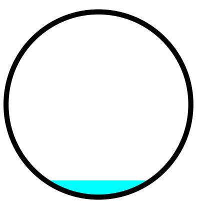
Summary for Reach LP-5C: LP-5C

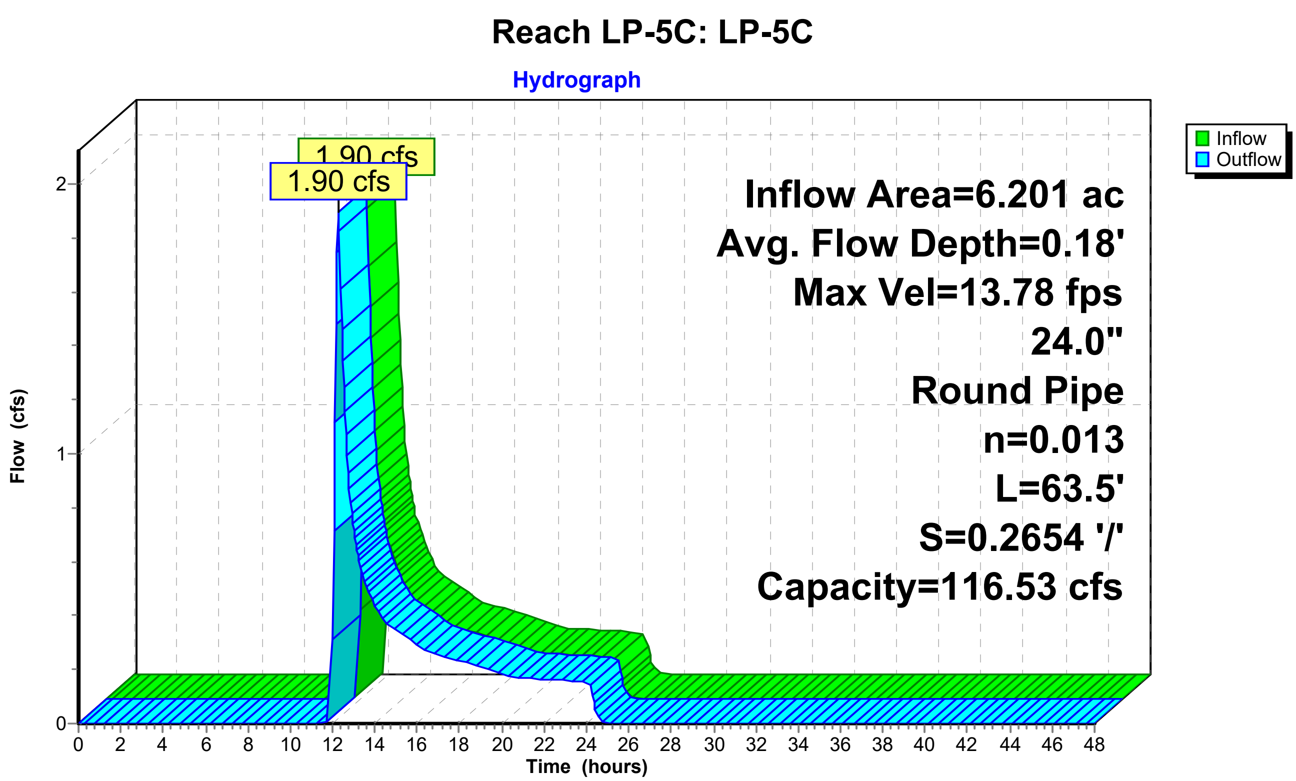
Inflow Area = 6.201 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.90 cfs @ 12.27 hrs, Volume= 0.340 af
Outflow = 1.90 cfs @ 12.27 hrs, Volume= 0.340 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.78 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.48 fps, Avg. Travel Time= 0.1 min

Peak Storage= 9 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 116.53 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 63.5' Slope= 0.2654 '/'
Inlet Invert= 59.27', Outlet Invert= 42.42'





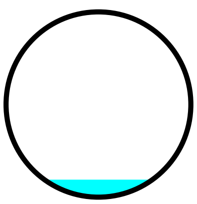
Summary for Reach LP-5D: LP-5D

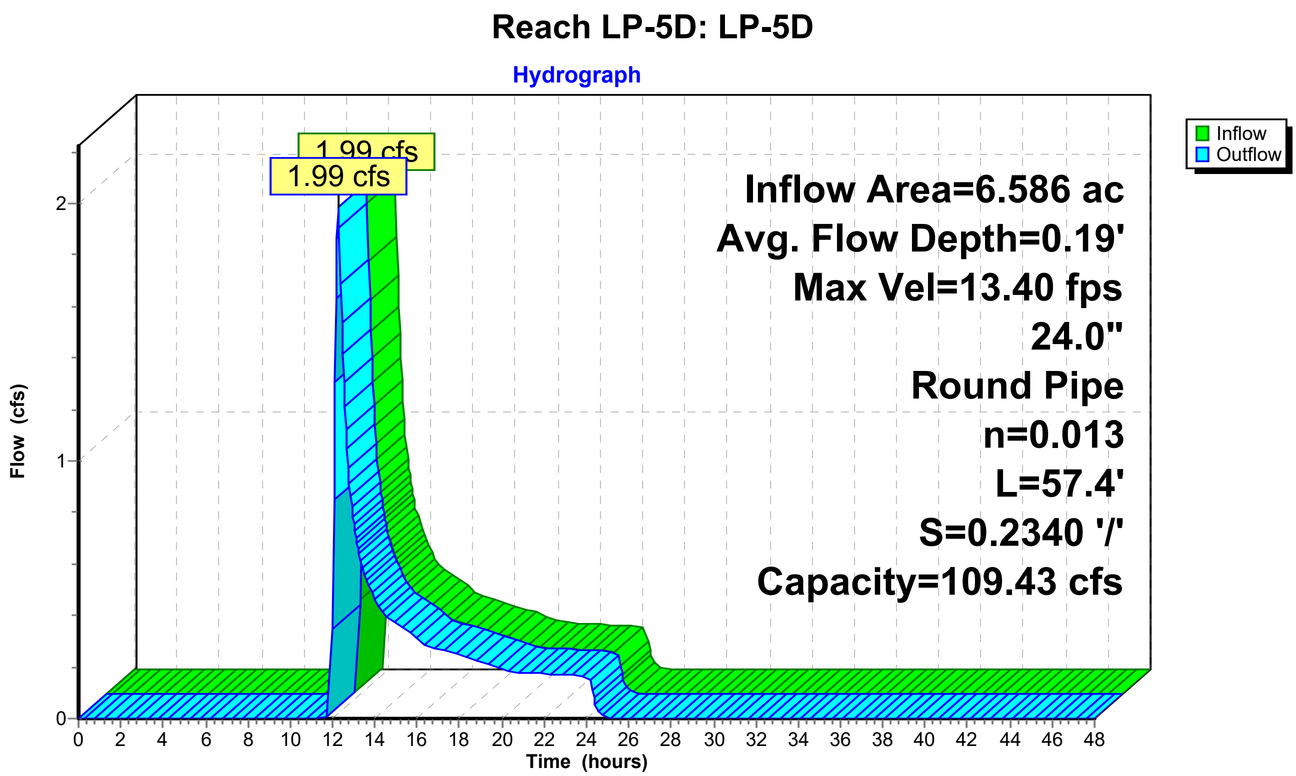
Inflow Area = 6.586 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.99 cfs @ 12.27 hrs, Volume= 0.361 af
Outflow = 1.99 cfs @ 12.27 hrs, Volume= 0.361 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.40 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.26 fps, Avg. Travel Time= 0.1 min

Peak Storage= 9 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 109.43 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 57.4' Slope= 0.2340 '/'
Inlet Invert= 42.42', Outlet Invert= 28.99'





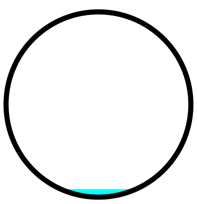
Summary for Reach LP-6A: LP-6A

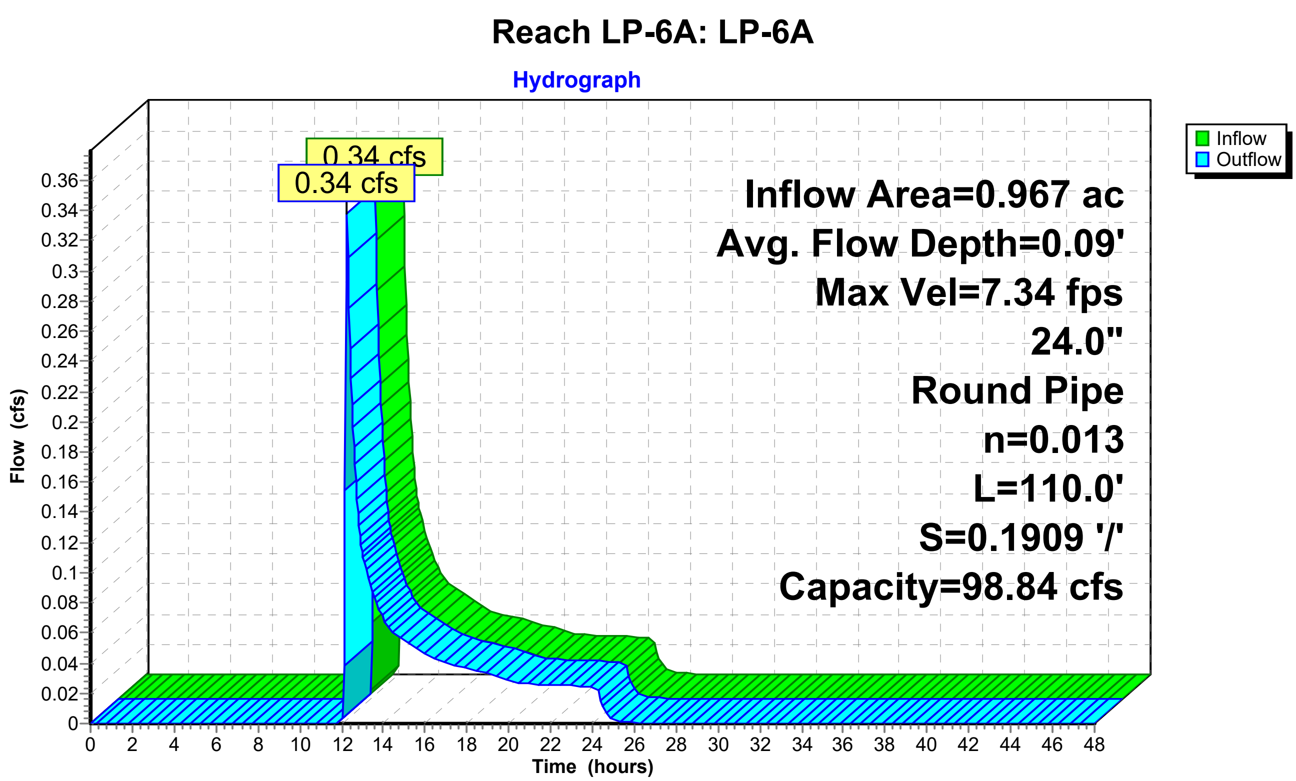
Inflow Area = 0.967 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.34 cfs @ 12.25 hrs, Volume= 0.053 af
Outflow = 0.34 cfs @ 12.26 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.34 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.86 fps, Avg. Travel Time= 0.5 min

Peak Storage= 5 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 98.84 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 110.0' Slope= 0.1909 '/'
Inlet Invert= 73.00', Outlet Invert= 52.00'





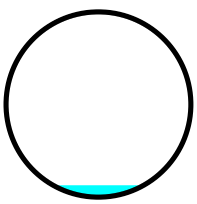
Summary for Reach LP-6B: LP-6B

Inflow Area = 2.183 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.76 cfs @ 12.25 hrs, Volume= 0.120 af
Outflow = 0.76 cfs @ 12.25 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.4 min

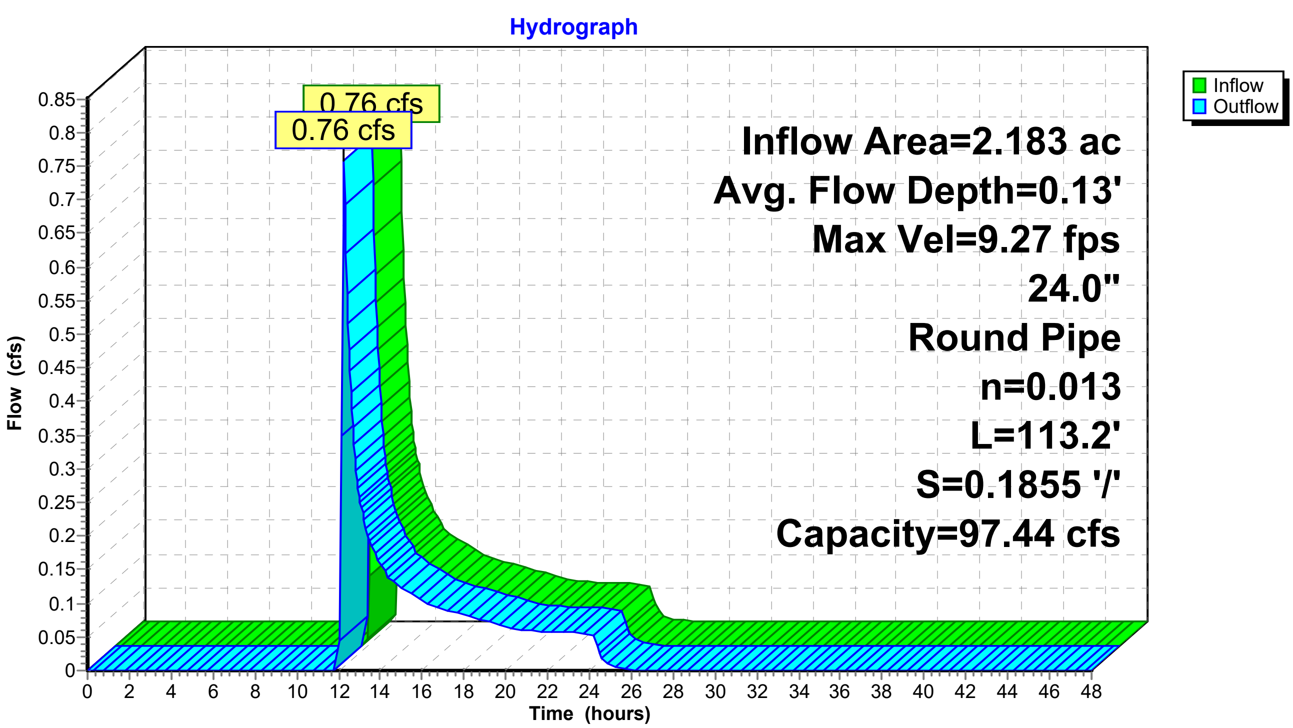
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.27 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.60 fps, Avg. Travel Time= 0.4 min

Peak Storage= 9 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 97.44 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 113.2' Slope= 0.1855 '/'
Inlet Invert= 52.00', Outlet Invert= 31.00'



Reach LP-6B: LP-6B



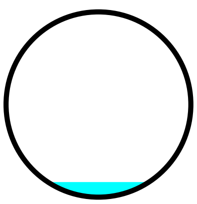
Summary for Reach LP-6C: LP-6C

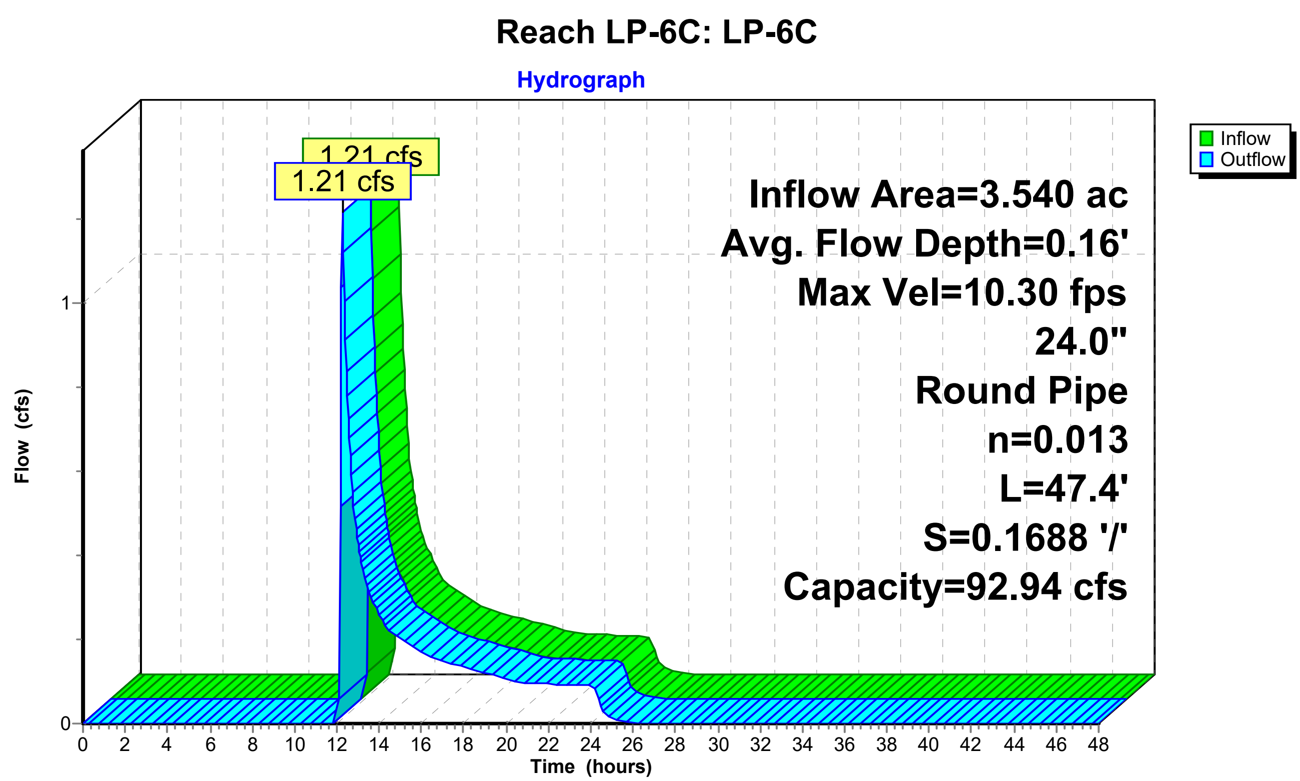
Inflow Area = 3.540 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.21 cfs @ 12.26 hrs, Volume= 0.194 af
Outflow = 1.21 cfs @ 12.26 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.30 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.01 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 92.94 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 47.4' Slope= 0.1688 '/'
Inlet Invert= 31.00', Outlet Invert= 23.00'





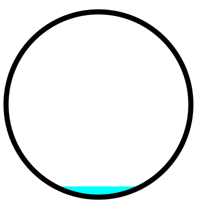
Summary for Reach LP-7A: LP-7A

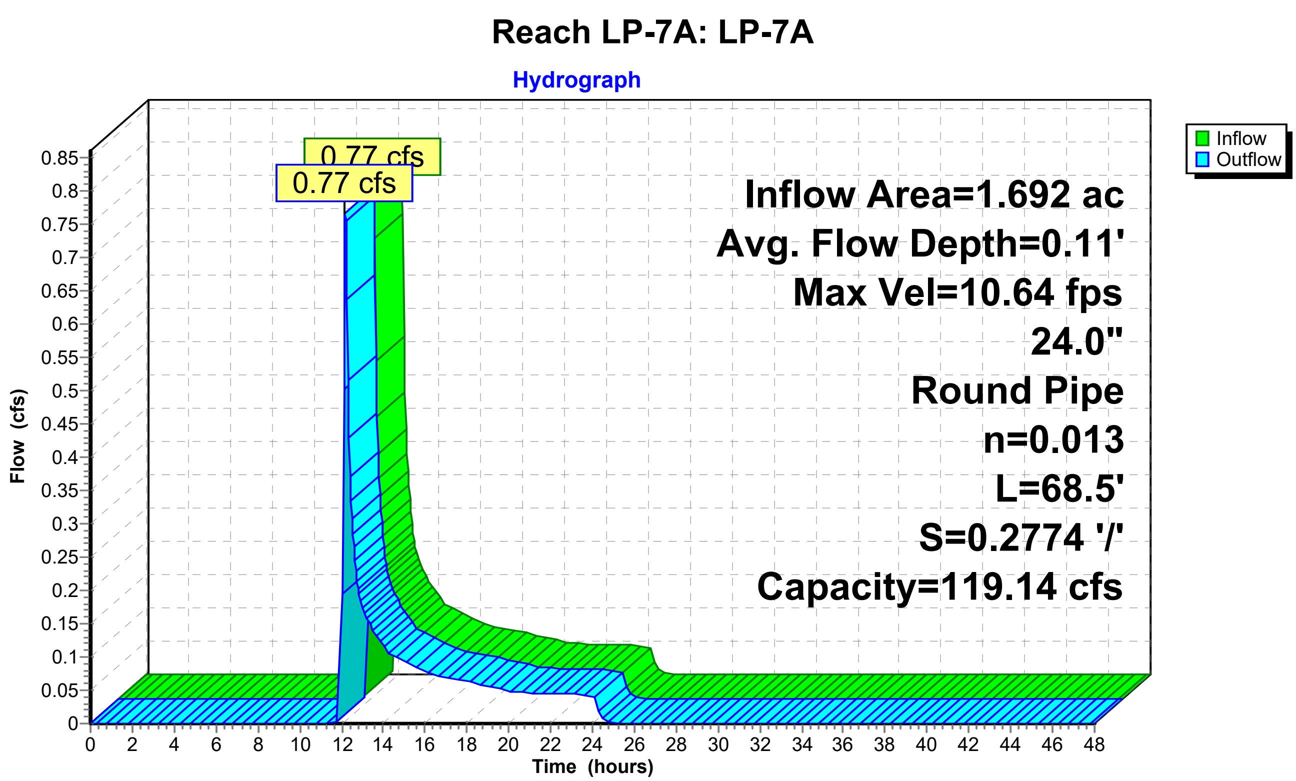
Inflow Area = 1.692 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.77 cfs @ 12.18 hrs, Volume= 0.093 af
Outflow = 0.77 cfs @ 12.18 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.64 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.26 fps, Avg. Travel Time= 0.2 min

Peak Storage= 5 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 119.14 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 68.5' Slope= 0.2774 '/'
Inlet Invert= 79.00', Outlet Invert= 60.00'





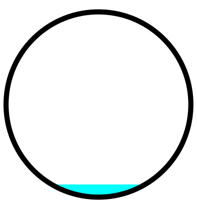
Summary for Reach LP-7B: LP-7B

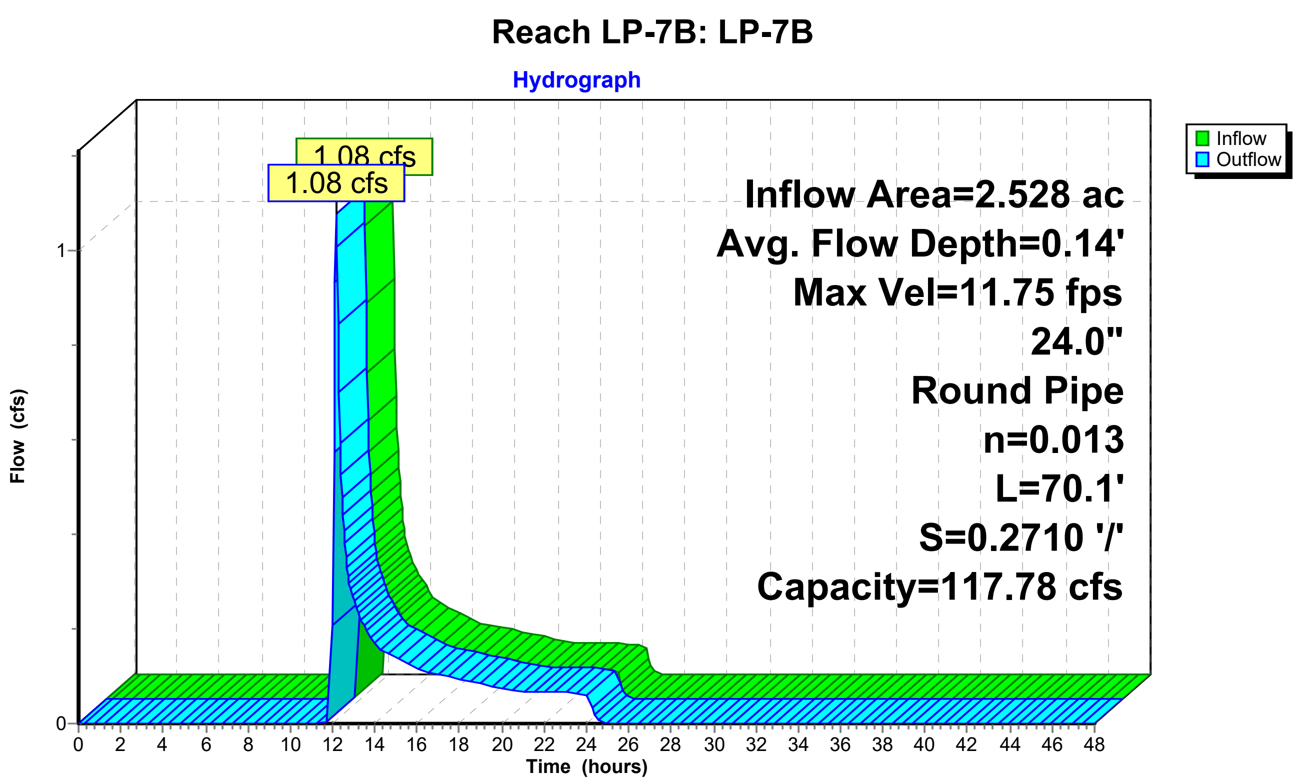
Inflow Area = 2.528 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.08 cfs @ 12.16 hrs, Volume= 0.138 af
Outflow = 1.08 cfs @ 12.16 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.75 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.77 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 117.78 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 70.1' Slope= 0.2710 '/'
Inlet Invert= 60.00', Outlet Invert= 41.00'





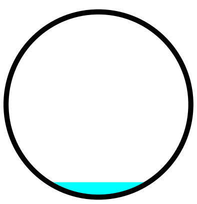
Summary for Reach LP-7C: LP-7C

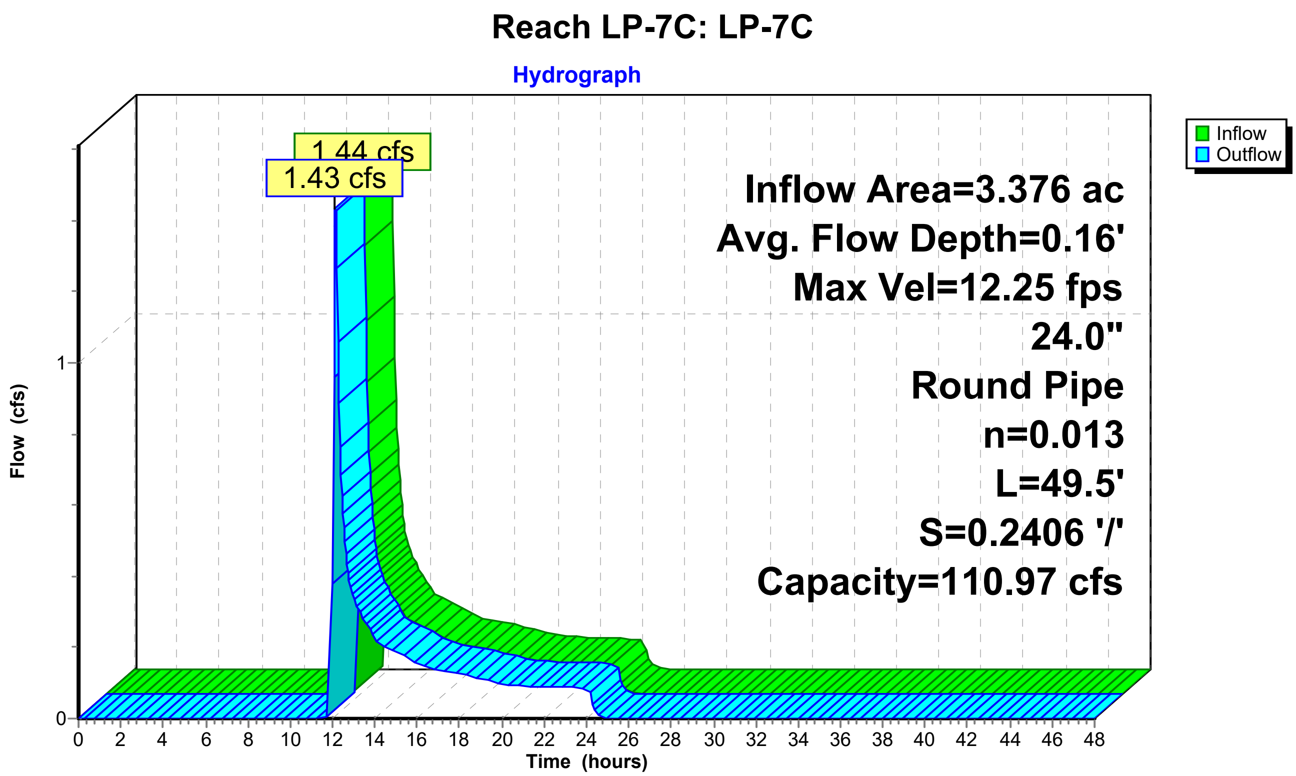
Inflow Area = 3.376 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.44 cfs @ 12.13 hrs, Volume= 0.185 af
Outflow = 1.43 cfs @ 12.14 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.25 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.98 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 110.97 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 49.5' Slope= 0.2406 '/'
Inlet Invert= 41.00', Outlet Invert= 29.09'





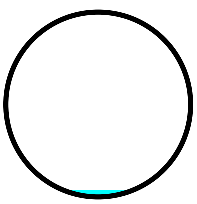
Summary for Reach LP-8A: LP-8A

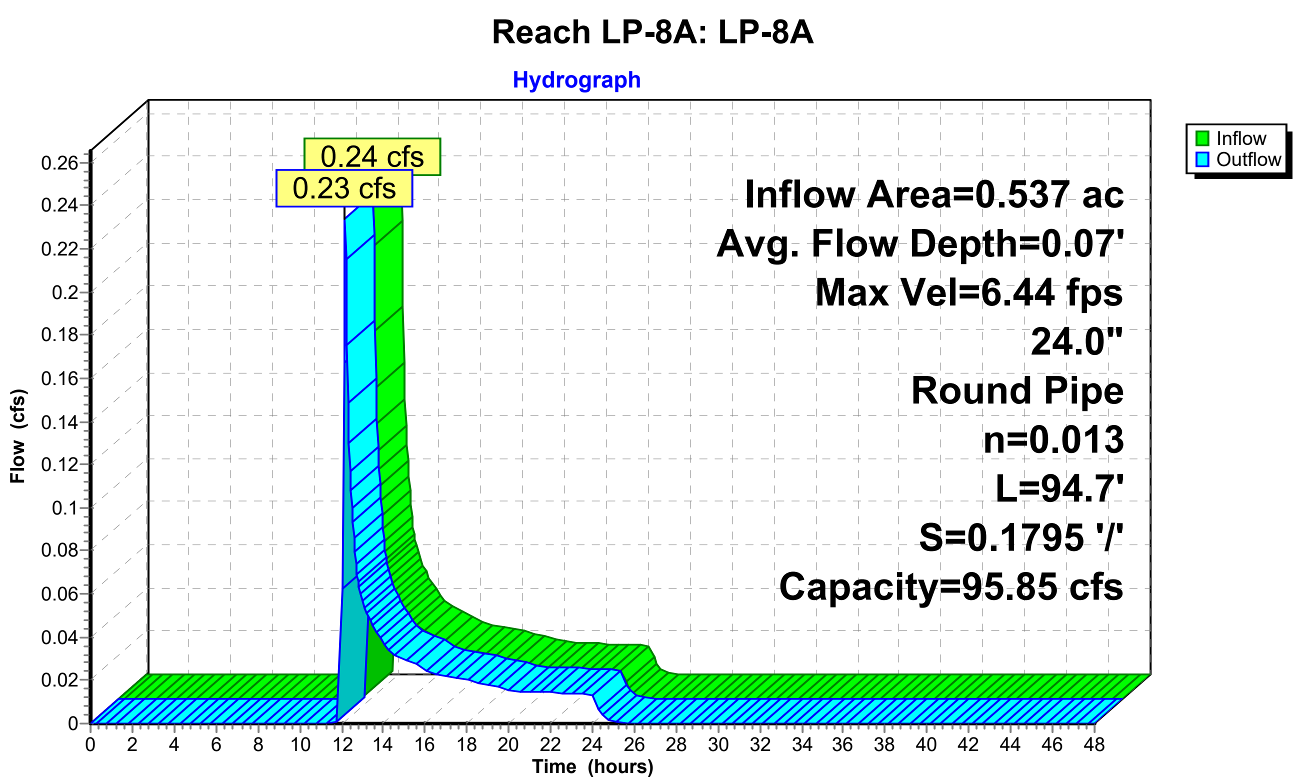
Inflow Area = 0.537 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.24 cfs @ 12.16 hrs, Volume= 0.029 af
Outflow = 0.23 cfs @ 12.17 hrs, Volume= 0.029 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.44 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.23 fps, Avg. Travel Time= 0.5 min

Peak Storage= 3 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 95.85 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 94.7' Slope= 0.1795 '/'
Inlet Invert= 76.00', Outlet Invert= 59.00'





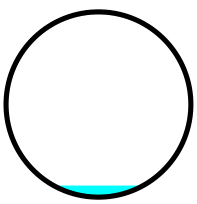
Summary for Reach LP-8B: LP-8B

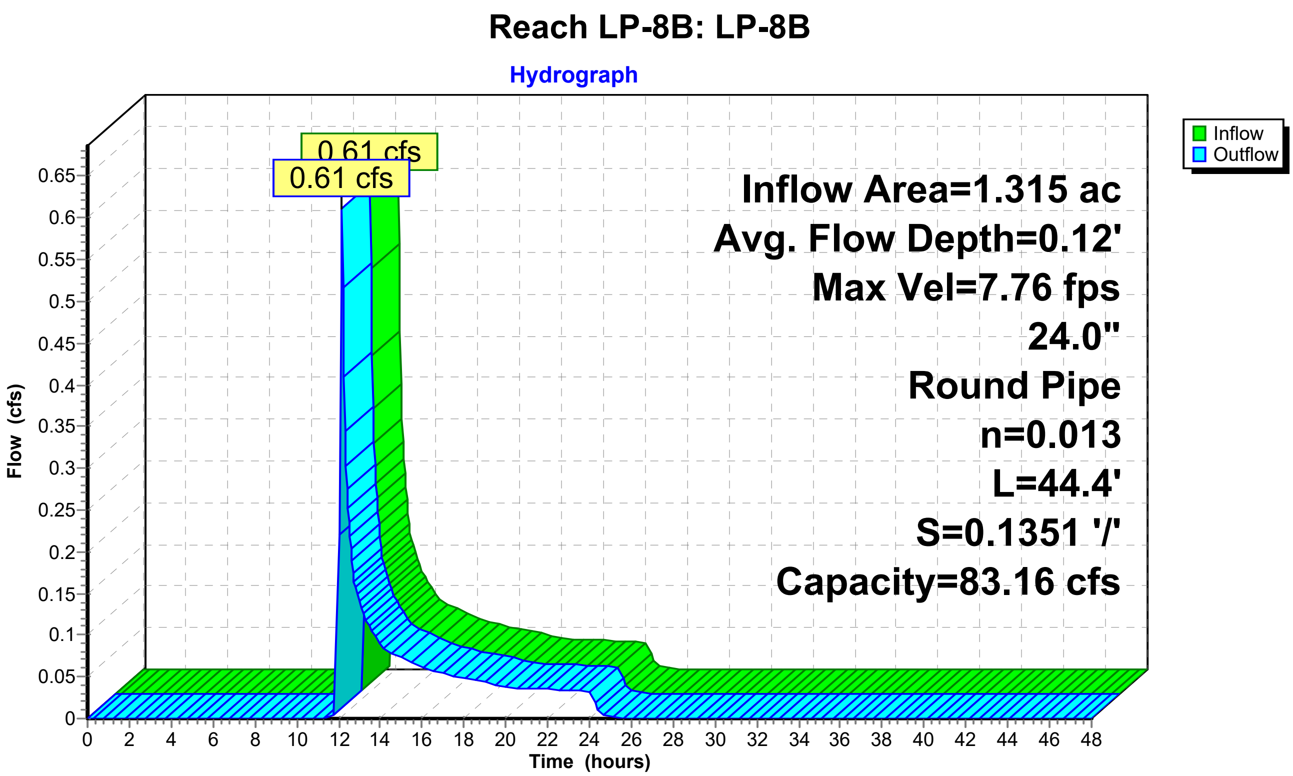
Inflow Area = 1.315 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.61 cfs @ 12.15 hrs, Volume= 0.072 af
Outflow = 0.61 cfs @ 12.15 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.76 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.71 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 83.16 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 44.4' Slope= 0.1351 '/'
Inlet Invert= 59.00', Outlet Invert= 53.00'





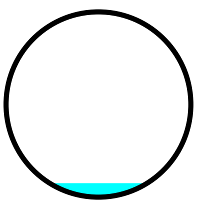
Summary for Reach LP-8C: LP-8C

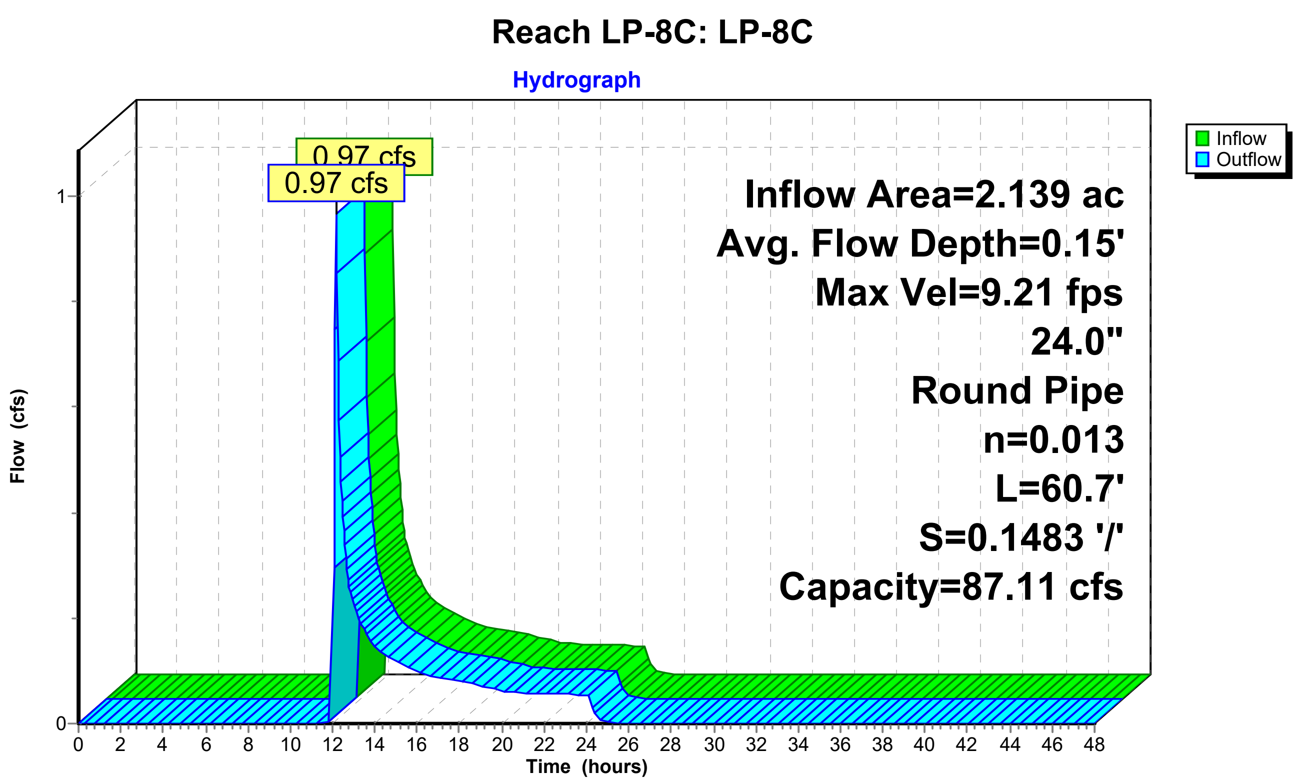
Inflow Area = 2.139 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.97 cfs @ 12.16 hrs, Volume= 0.117 af
Outflow = 0.97 cfs @ 12.16 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.21 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.32 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 87.11 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 60.7' Slope= 0.1483 '/'
Inlet Invert= 53.00', Outlet Invert= 44.00'





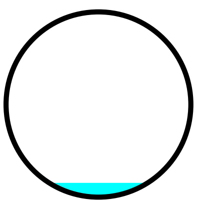
Summary for Reach LP-8D: LP-8D

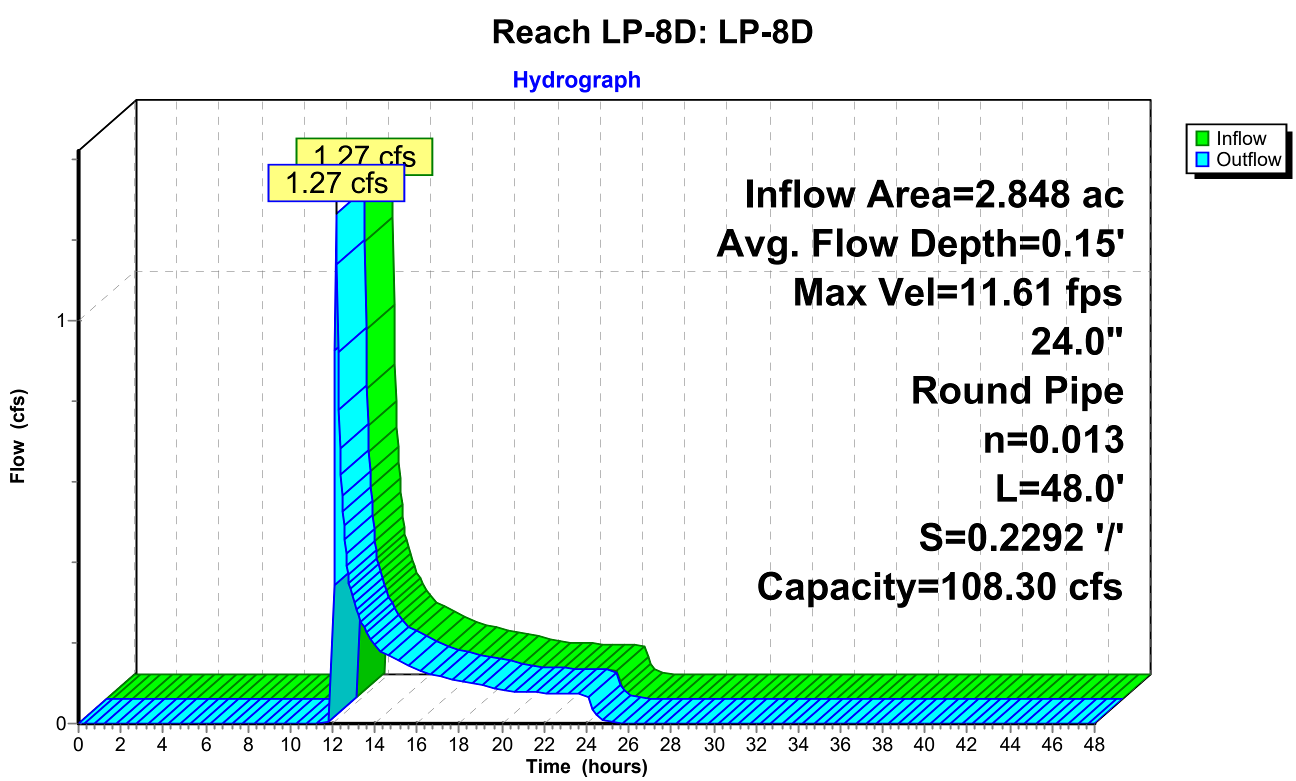
Inflow Area = 2.848 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.27 cfs @ 12.16 hrs, Volume= 0.156 af
Outflow = 1.27 cfs @ 12.16 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.61 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.46 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 108.30 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 48.0' Slope= 0.2292 '/'
Inlet Invert= 44.00', Outlet Invert= 33.00'





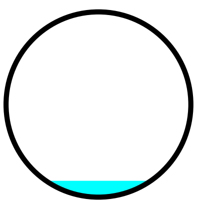
Summary for Reach LP-8E: LP-8E

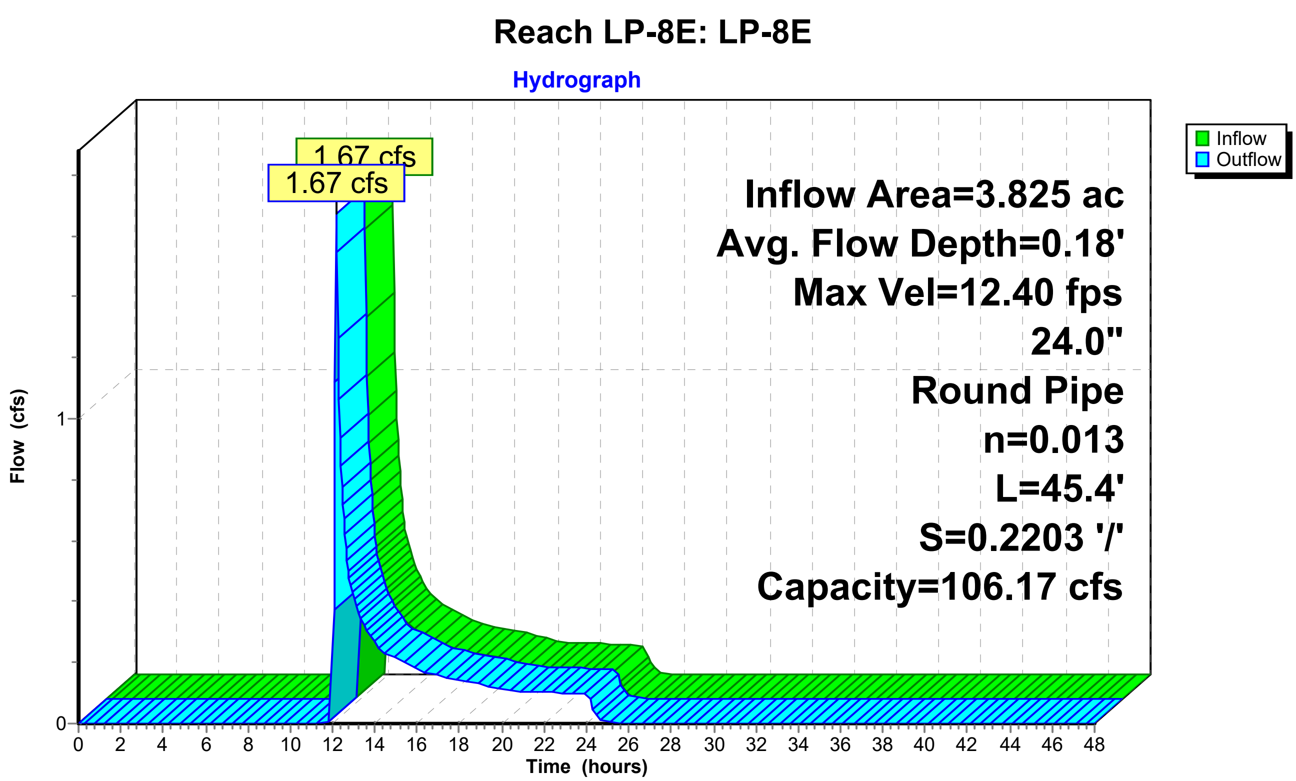
Inflow Area = 3.825 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.67 cfs @ 12.17 hrs, Volume= 0.210 af
Outflow = 1.67 cfs @ 12.17 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.40 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.81 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 106.17 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 45.4' Slope= 0.2203 '/'
Inlet Invert= 33.00', Outlet Invert= 23.00'





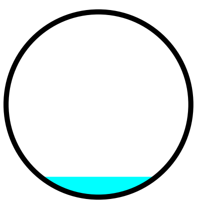
Summary for Reach LP-8F: LP-8F

Inflow Area = 4.754 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 2.03 cfs @ 12.17 hrs, Volume= 0.260 af
Outflow = 2.02 cfs @ 12.17 hrs, Volume= 0.260 af, Atten= 0%, Lag= 0.1 min

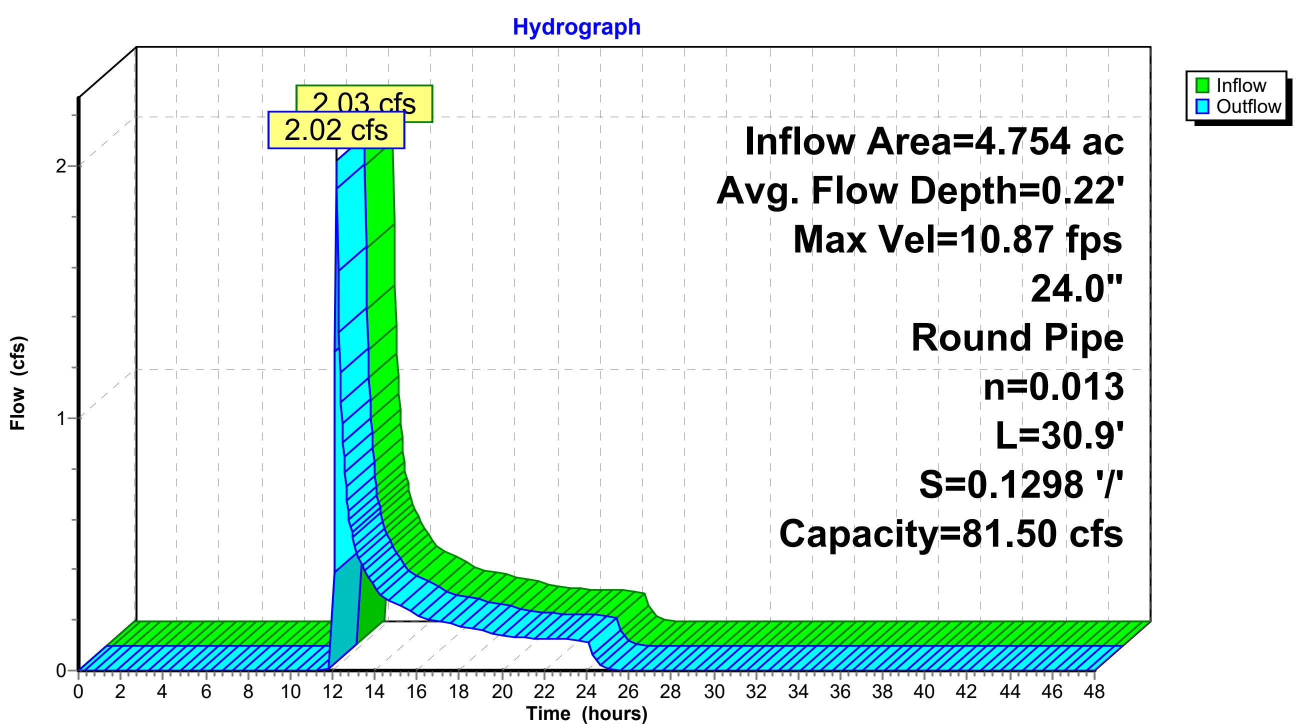
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.87 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 5.03 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 81.50 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 30.9' Slope= 0.1298 '/'
Inlet Invert= 23.00', Outlet Invert= 18.99'



Reach LP-8F: LP-8F



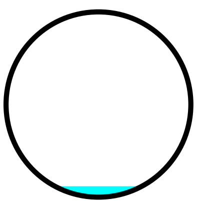
Summary for Reach LP-9A: LP-9A

Inflow Area = 1.908 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.84 cfs @ 12.12 hrs, Volume= 0.105 af
Outflow = 0.83 cfs @ 12.13 hrs, Volume= 0.105 af, Atten= 2%, Lag= 0.2 min

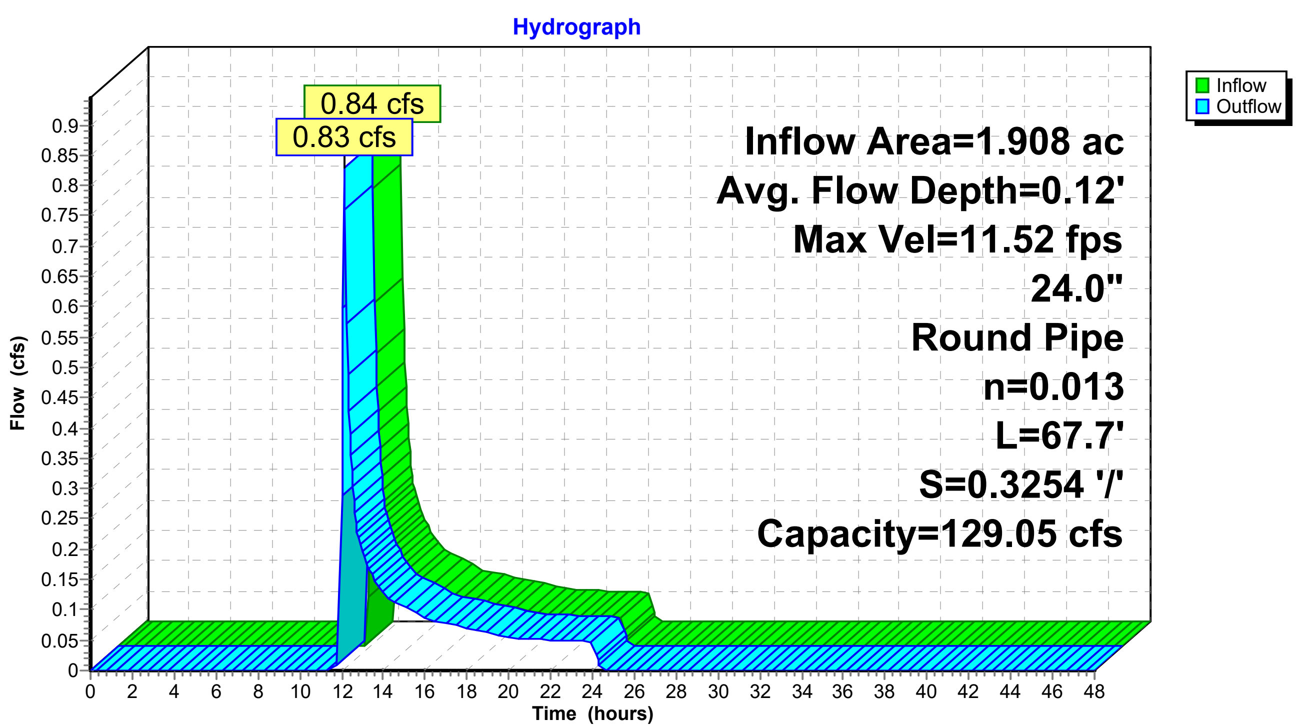
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.52 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.84 fps, Avg. Travel Time= 0.2 min

Peak Storage= 5 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 129.05 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 67.7' Slope= 0.3254 '/'
Inlet Invert= 90.00', Outlet Invert= 67.97'



Reach LP-9A: LP-9A



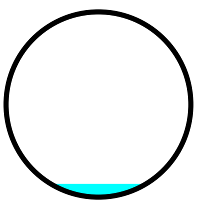
Summary for Reach LP-9B: LP-9B

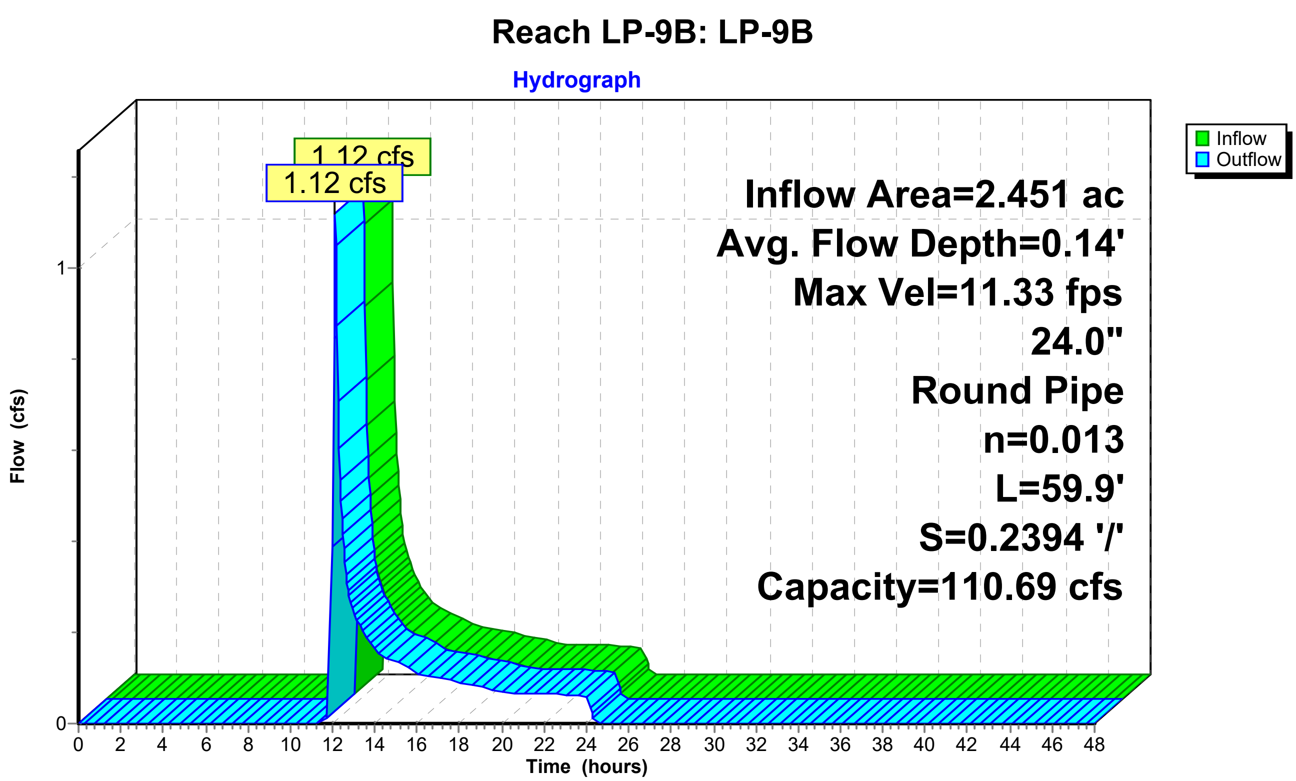
Inflow Area = 2.451 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.12 cfs @ 12.11 hrs, Volume= 0.134 af
Outflow = 1.12 cfs @ 12.12 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.33 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.54 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 110.69 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 59.9' Slope= 0.2394 '/'
Inlet Invert= 67.97', Outlet Invert= 53.63'





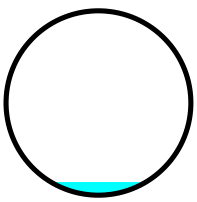
Summary for Reach LP-9C: LP-9C

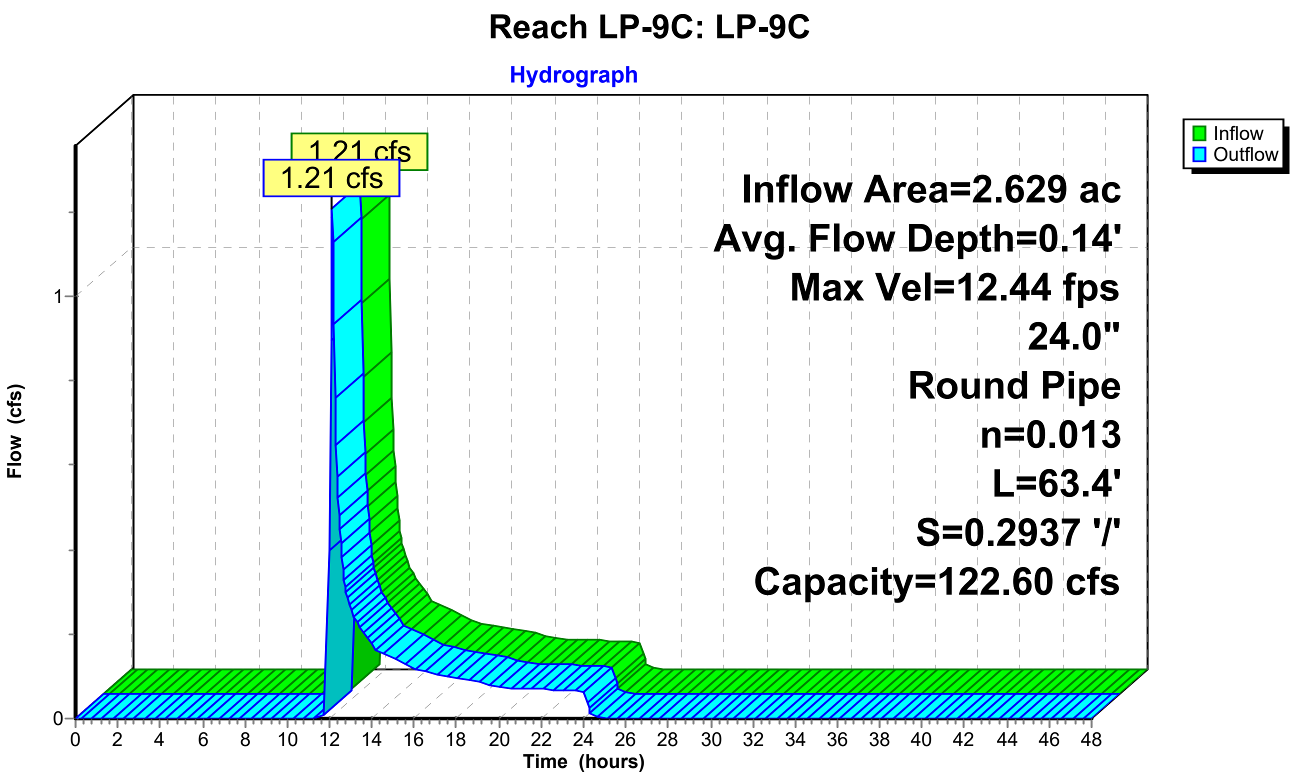
Inflow Area = 2.629 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.21 cfs @ 12.11 hrs, Volume= 0.144 af
Outflow = 1.21 cfs @ 12.12 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.44 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.06 fps, Avg. Travel Time= 0.2 min

Peak Storage= 6 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 122.60 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 63.4' Slope= 0.2937 '/'
Inlet Invert= 53.63', Outlet Invert= 35.01'





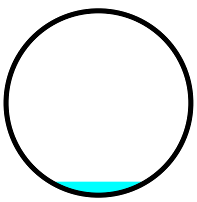
Summary for Reach LP-9D: LP-9D

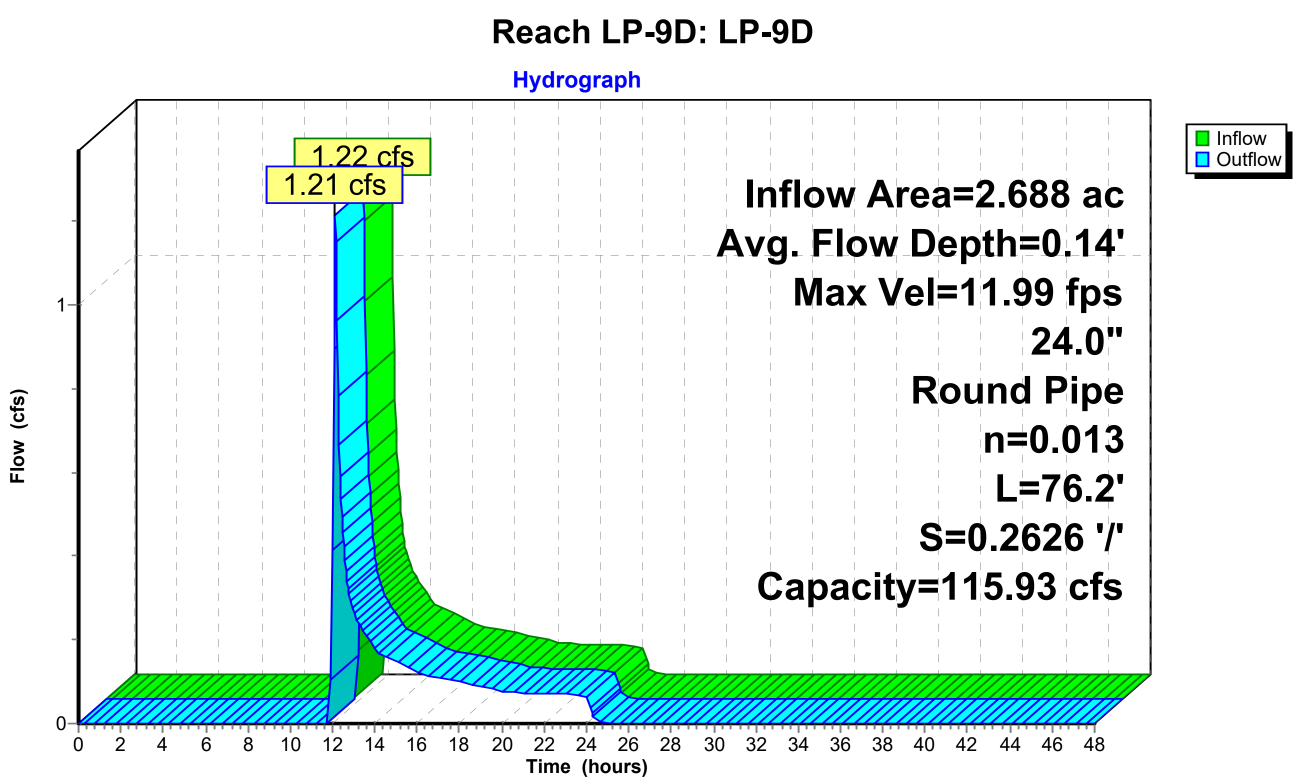
Inflow Area = 2.688 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.22 cfs @ 12.12 hrs, Volume= 0.147 af
Outflow = 1.21 cfs @ 12.12 hrs, Volume= 0.147 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.99 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.85 fps, Avg. Travel Time= 0.2 min

Peak Storage= 8 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 115.93 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 76.2' Slope= 0.2626 '/'
Inlet Invert= 35.01', Outlet Invert= 15.00'





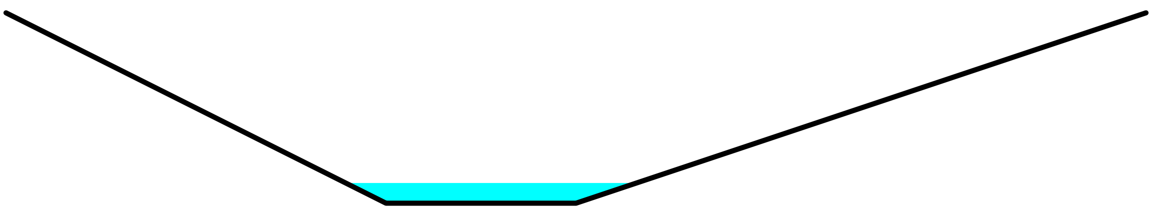
Summary for Reach PC-10: PC-10

Inflow Area = 4.782 ac, 0.00% Impervious, Inflow Depth = 0.81" for 25-yr,24-hr event
Inflow = 2.43 cfs @ 11.93 hrs, Volume= 0.322 af
Outflow = 2.24 cfs @ 12.01 hrs, Volume= 0.322 af, Atten= 8%, Lag= 4.4 min

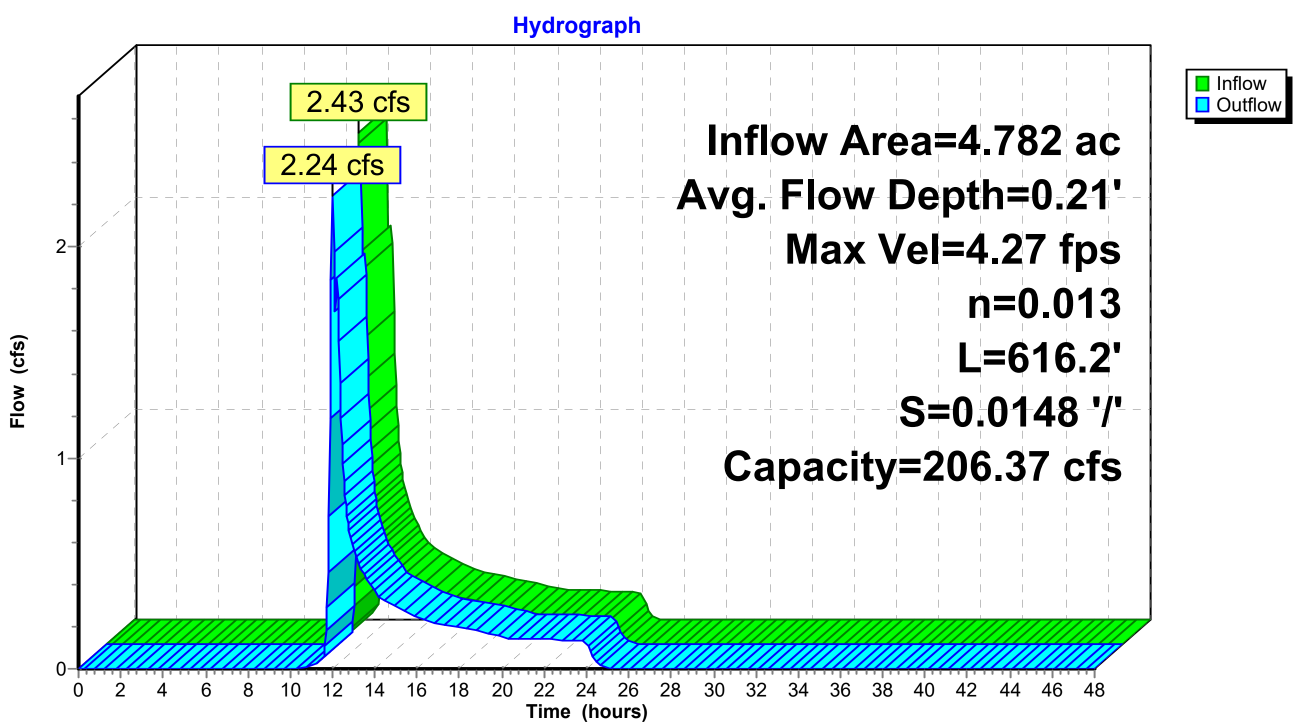
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.27 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.79 fps, Avg. Travel Time= 5.7 min

Peak Storage= 331 cf @ 11.96 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 206.37 cfs

2.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 12.00'
Length= 616.2' Slope= 0.0148 '/'
Inlet Invert= 29.09', Outlet Invert= 20.00'



Reach PC-10: PC-10



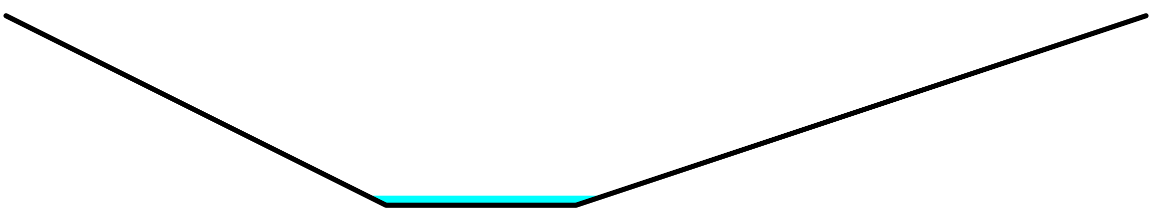
Summary for Reach PC-11: PC-11

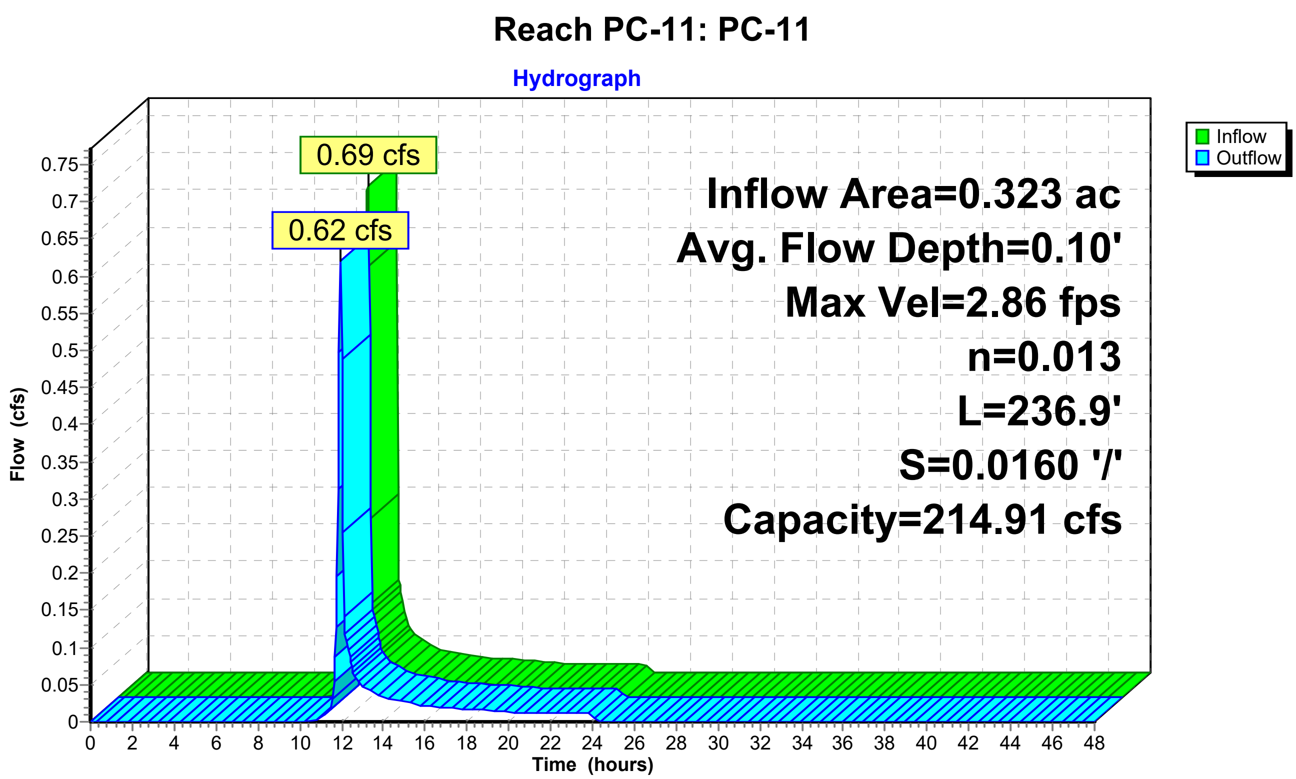
Inflow Area = 0.323 ac, 0.00% Impervious, Inflow Depth = 1.30" for 25-yr,24-hr event
Inflow = 0.69 cfs @ 11.91 hrs, Volume= 0.035 af
Outflow = 0.62 cfs @ 11.95 hrs, Volume= 0.035 af, Atten= 10%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.86 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 3.6 min

Peak Storage= 54 cf @ 11.93 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 214.91 cfs

2.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 12.00'
Length= 236.9' Slope= 0.0160 '/'
Inlet Invert= 32.88', Outlet Invert= 29.09'





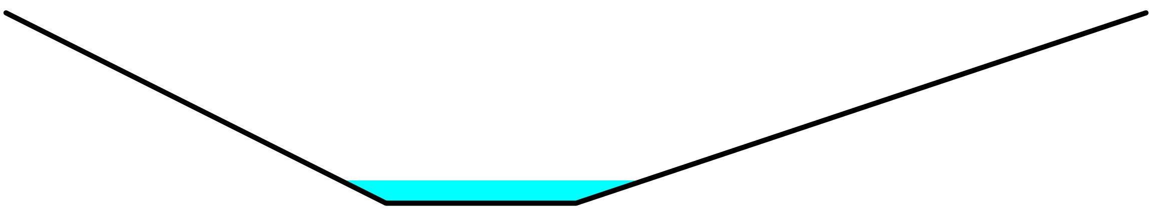
Summary for Reach PC-12: PC-12

Inflow Area = 4.818 ac, 0.00% Impervious, Inflow Depth = 0.84" for 25-yr,24-hr event
Inflow = 2.84 cfs @ 11.92 hrs, Volume= 0.336 af
Outflow = 2.24 cfs @ 12.02 hrs, Volume= 0.336 af, Atten= 21%, Lag= 6.5 min

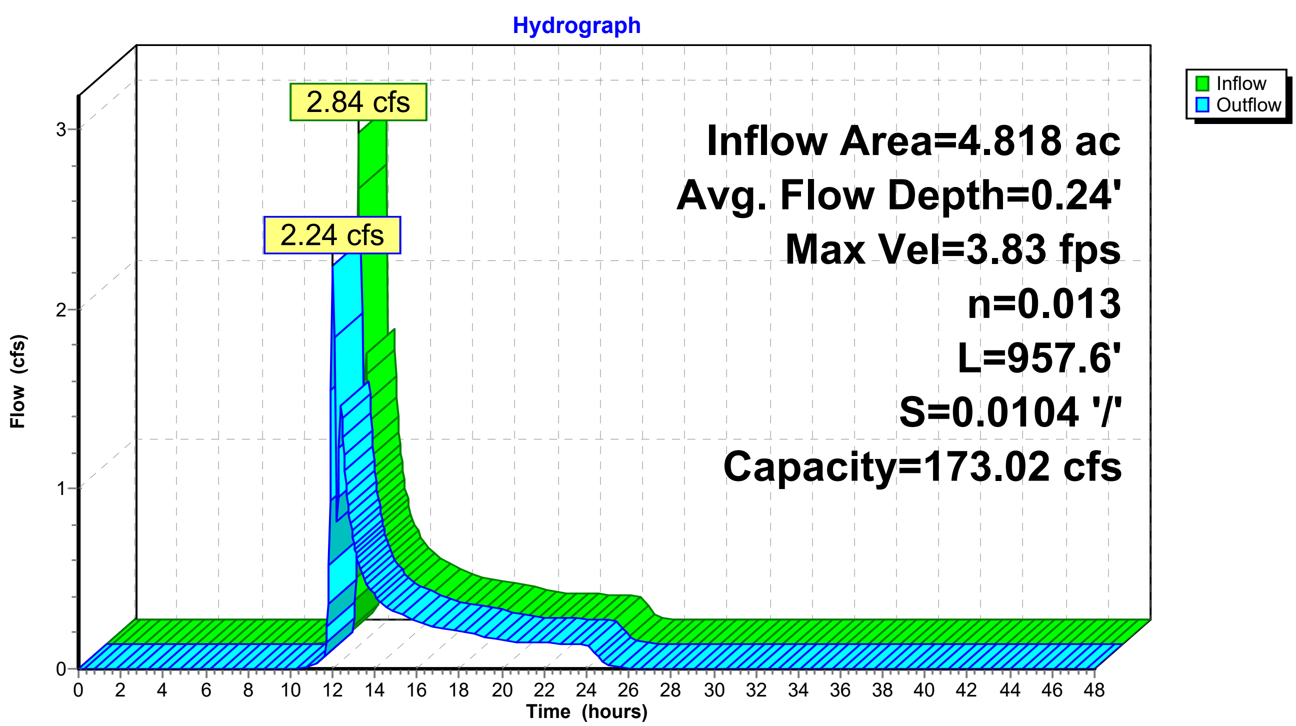
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.83 fps, Min. Travel Time= 4.2 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 10.7 min

Peak Storage= 596 cf @ 11.95 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 173.02 cfs

2.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 12.00'
Length= 957.6' Slope= 0.0104 '/'
Inlet Invert= 32.93', Outlet Invert= 23.00'



Reach PC-12: PC-12



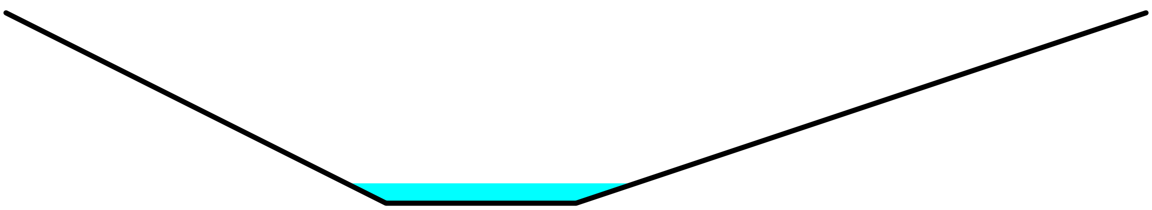
Summary for Reach PC-13: PC-13

Inflow Area = 7.653 ac, 0.00% Impervious, Inflow Depth = 0.75" for 25-yr,24-hr event
Inflow = 2.33 cfs @ 12.26 hrs, Volume= 0.479 af
Outflow = 2.30 cfs @ 12.30 hrs, Volume= 0.479 af, Atten= 1%, Lag= 2.5 min

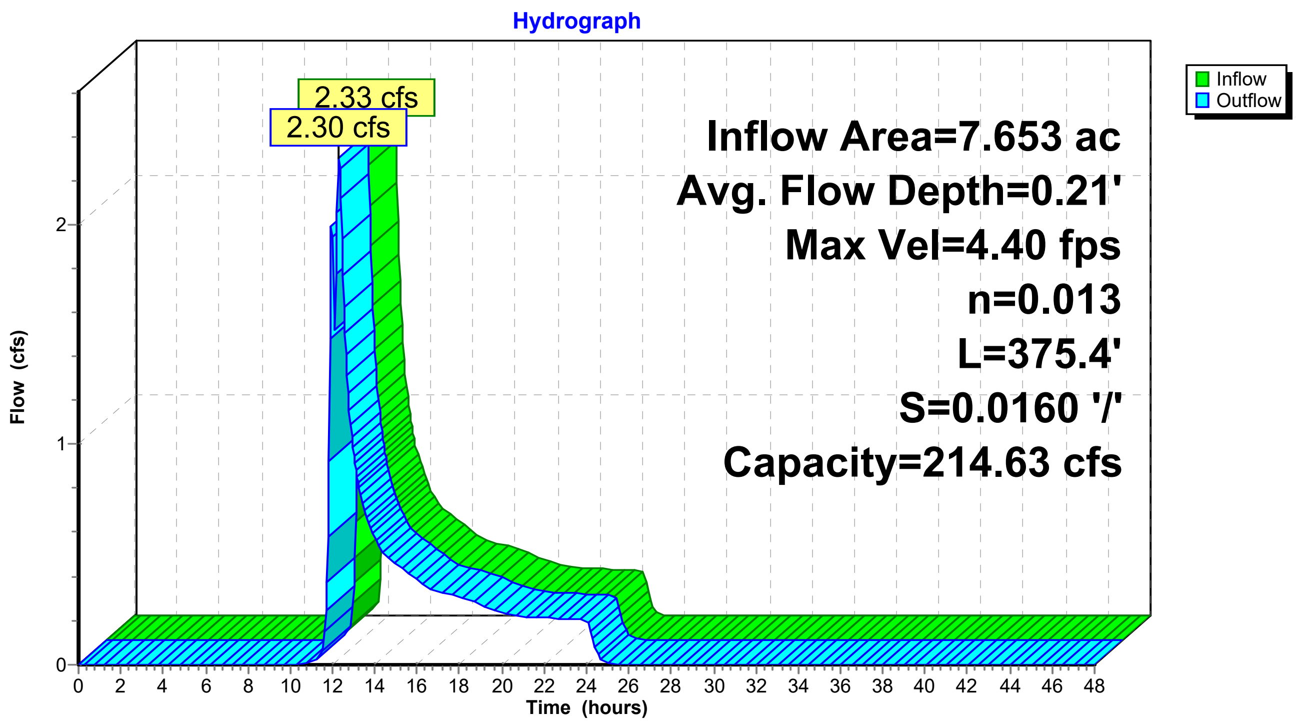
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.40 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 2.14 fps, Avg. Travel Time= 2.9 min

Peak Storage= 198 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 214.63 cfs

2.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 12.00'
Length= 375.4' Slope= 0.0160 '/'
Inlet Invert= 28.99', Outlet Invert= 23.00'



Reach PC-13: PC-13



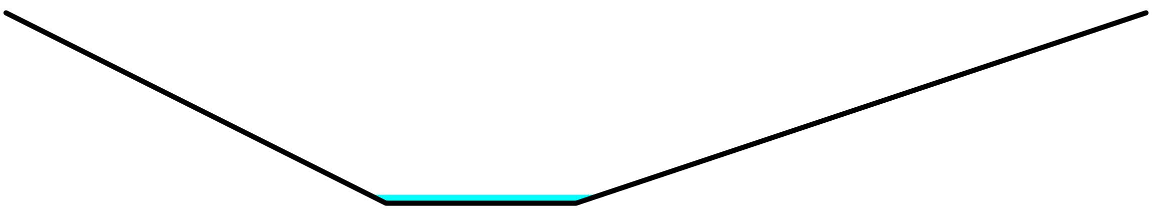
Summary for Reach PC-14: PC-14

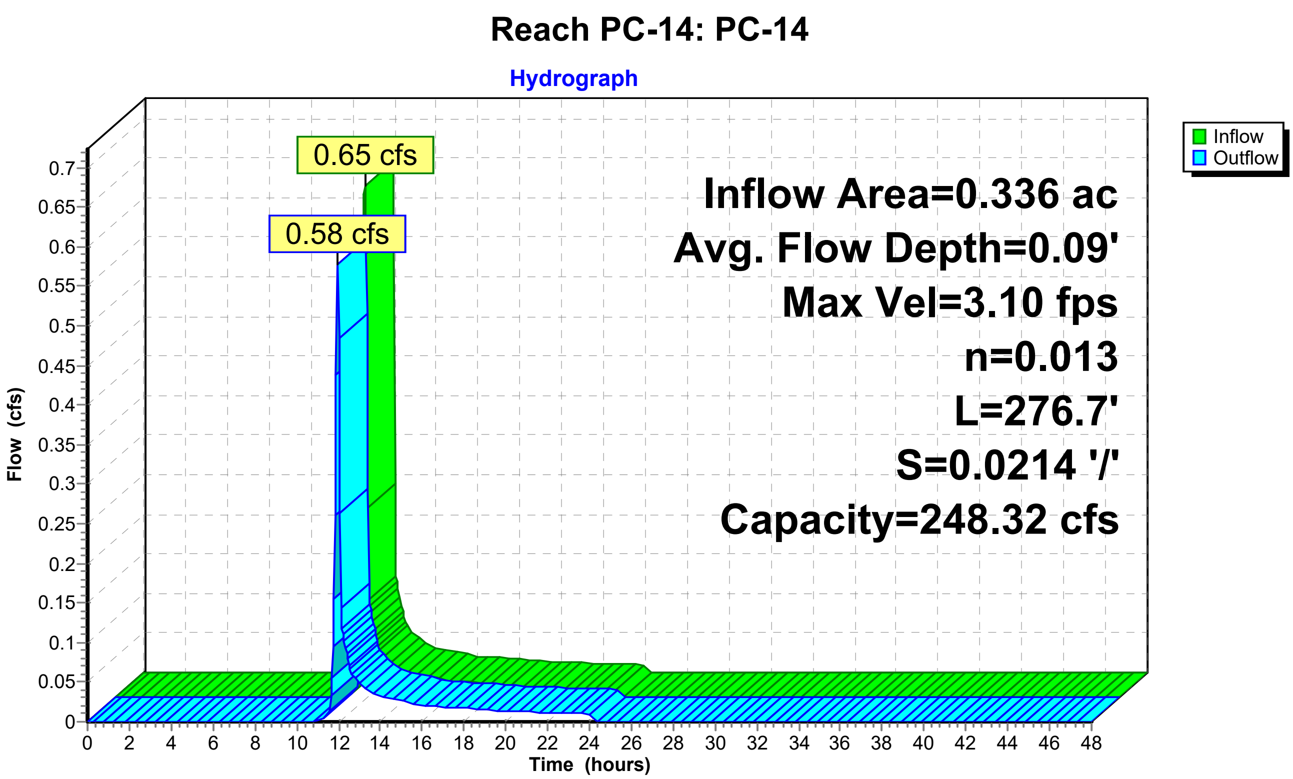
Inflow Area = 0.336 ac, 0.00% Impervious, Inflow Depth = 1.19" for 25-yr,24-hr event
Inflow = 0.65 cfs @ 11.91 hrs, Volume= 0.033 af
Outflow = 0.58 cfs @ 11.95 hrs, Volume= 0.033 af, Atten= 10%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.10 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 3.7 min

Peak Storage= 55 cf @ 11.93 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 248.32 cfs

2.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 12.00'
Length= 276.7' Slope= 0.0214 '/'
Inlet Invert= 34.90', Outlet Invert= 28.99'





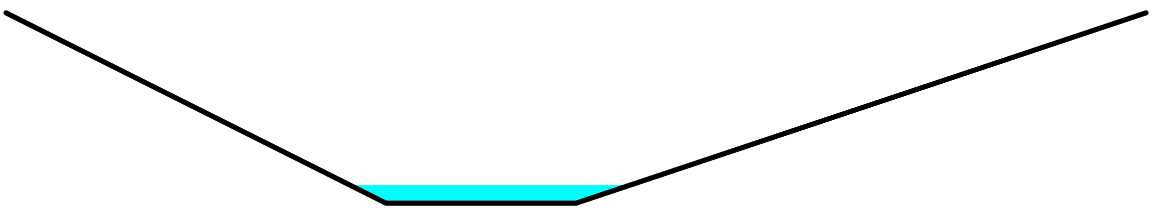
Summary for Reach PC-5: PC-5

Inflow Area = 1.095 ac, 2.44% Impervious, Inflow Depth = 1.54" for 25-yr,24-hr event
Inflow = 2.21 cfs @ 11.95 hrs, Volume= 0.140 af
Outflow = 2.12 cfs @ 11.98 hrs, Volume= 0.140 af, Atten= 4%, Lag= 1.6 min

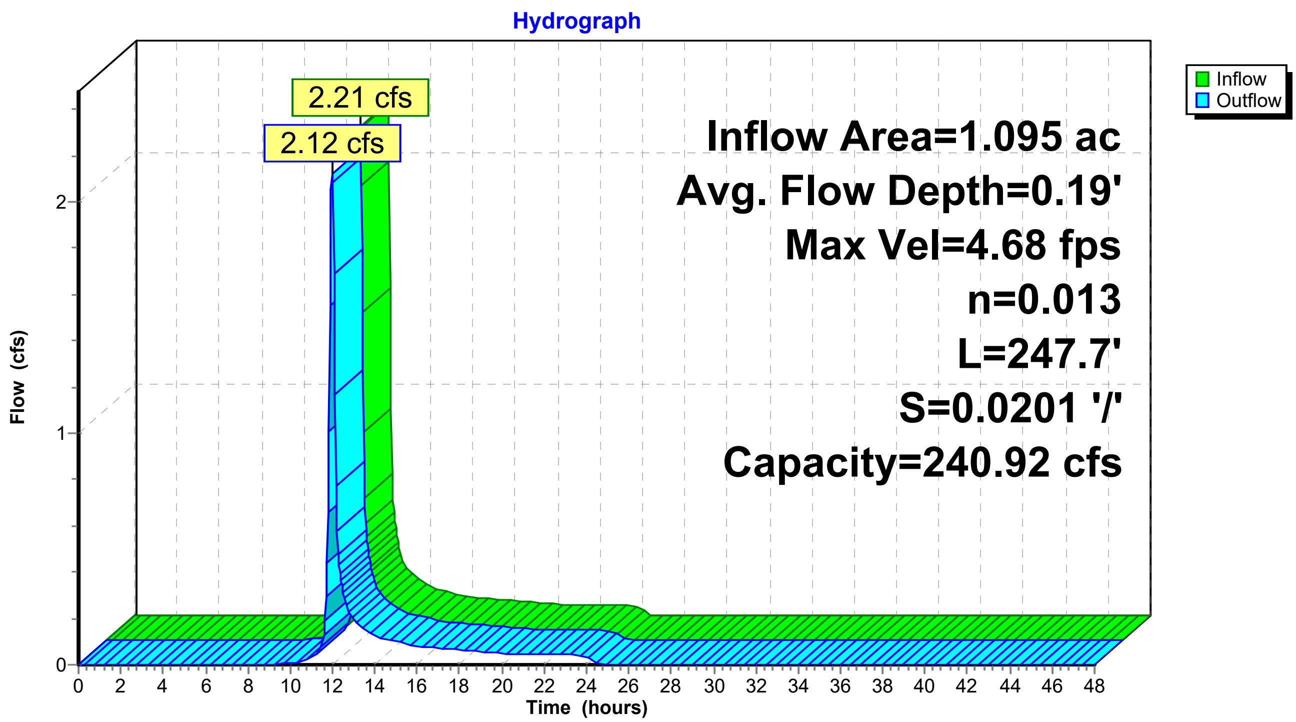
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.68 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 2.9 min

Peak Storage= 117 cf @ 11.96 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 240.92 cfs

2.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 12.00'
Length= 247.7' Slope= 0.0201 '/'
Inlet Invert= 16.98', Outlet Invert= 12.00'



Reach PC-5: PC-5



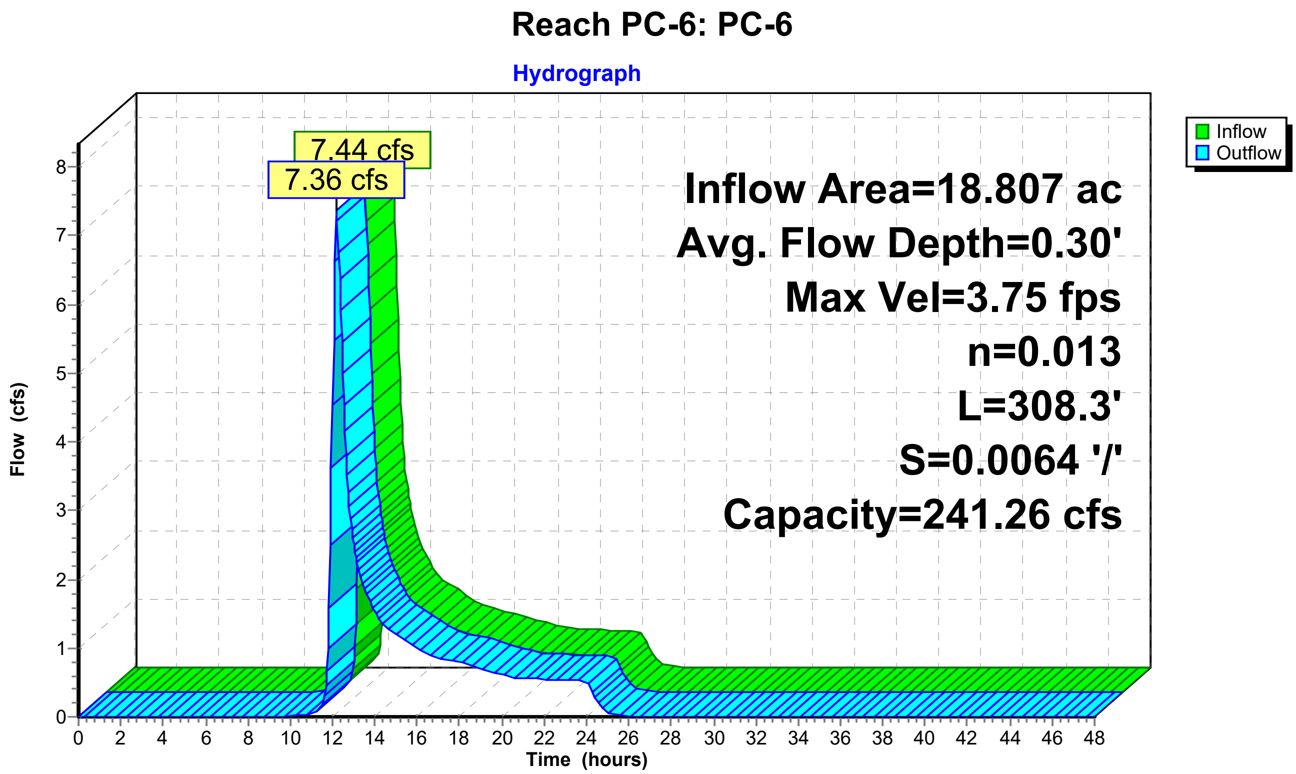
Summary for Reach PC-6: PC-6

Inflow Area = 18.807 ac, 1.48% Impervious, Inflow Depth = 0.82" for 25-yr,24-hr event
Inflow = 7.44 cfs @ 12.13 hrs, Volume= 1.286 af
Outflow = 7.36 cfs @ 12.18 hrs, Volume= 1.286 af, Atten= 1%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.75 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.42 fps, Avg. Travel Time= 3.6 min

Peak Storage= 613 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 241.26 cfs

6.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 16.00'
Length= 308.3' Slope= 0.0064 '/'
Inlet Invert= 13.98', Outlet Invert= 12.00'



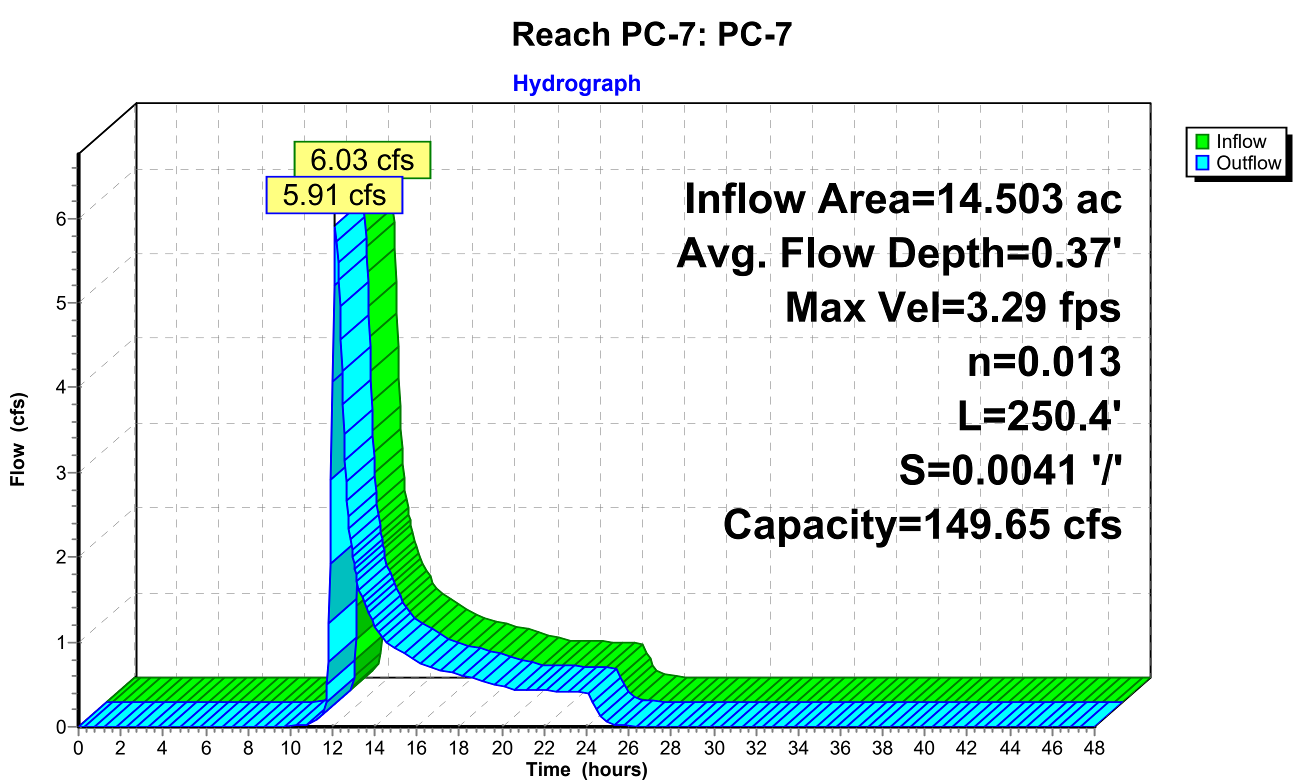
Summary for Reach PC-7: PC-7

Inflow Area = 14.503 ac, 1.41% Impervious, Inflow Depth = 0.83" for 25-yr,24-hr event
Inflow = 6.03 cfs @ 12.07 hrs, Volume= 1.006 af
Outflow = 5.91 cfs @ 12.12 hrs, Volume= 1.006 af, Atten= 2%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.29 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 3.3 min

Peak Storage= 454 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 149.65 cfs

4.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 14.00'
Length= 250.4' Slope= 0.0041 '/'
Inlet Invert= 15.00', Outlet Invert= 13.98'



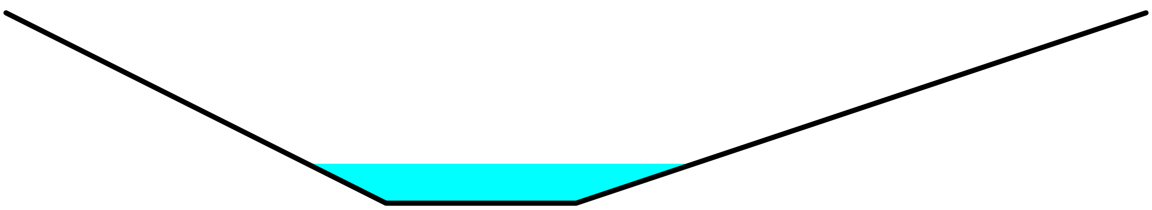
Summary for Reach PC-8: PC-8

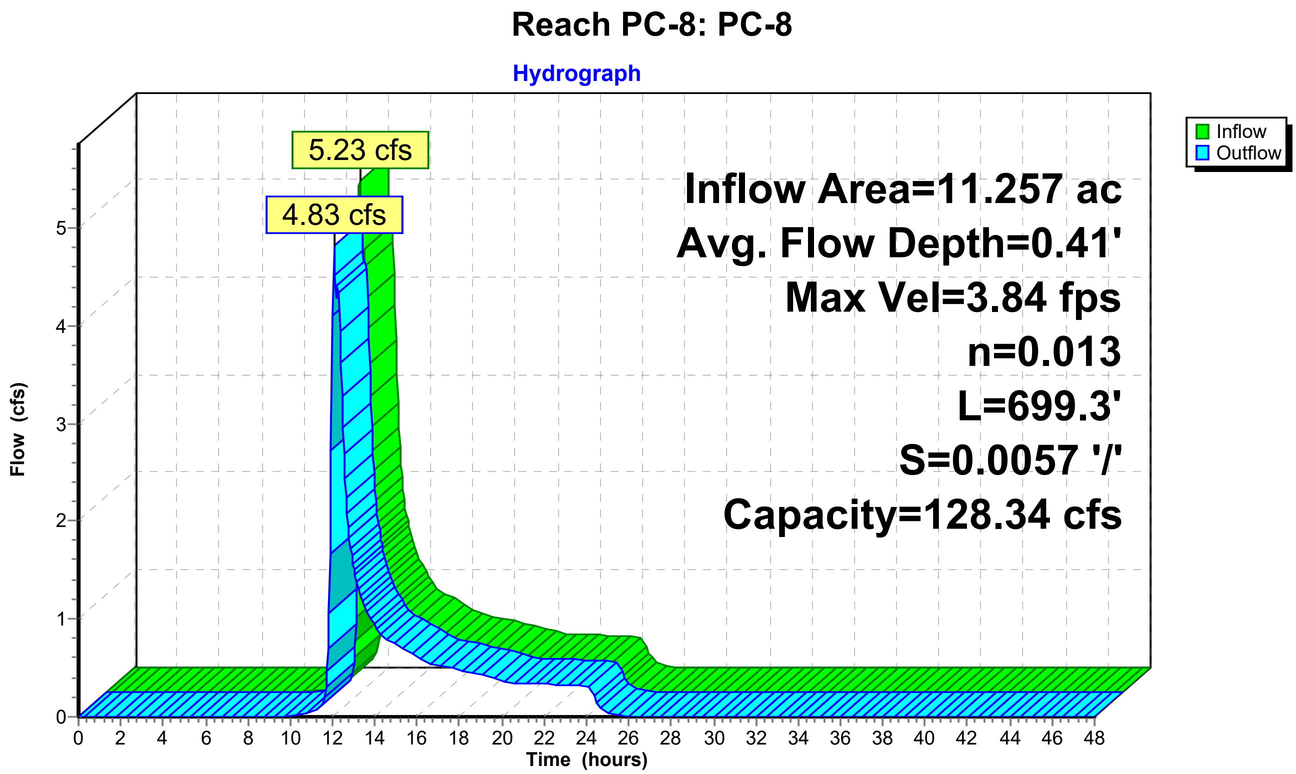
Inflow Area = 11.257 ac, 1.44% Impervious, Inflow Depth = 0.85" for 25-yr,24-hr event
Inflow = 5.23 cfs @ 11.96 hrs, Volume= 0.802 af
Outflow = 4.83 cfs @ 12.06 hrs, Volume= 0.802 af, Atten= 8%, Lag= 5.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.84 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 7.4 min

Peak Storage= 879 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 128.34 cfs

2.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 12.00'
Length= 699.3' Slope= 0.0057 '/'
Inlet Invert= 18.99', Outlet Invert= 15.00'





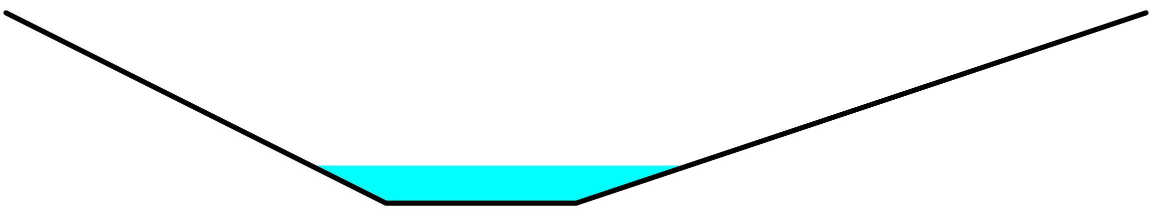
Summary for Reach PC-9: PC-9

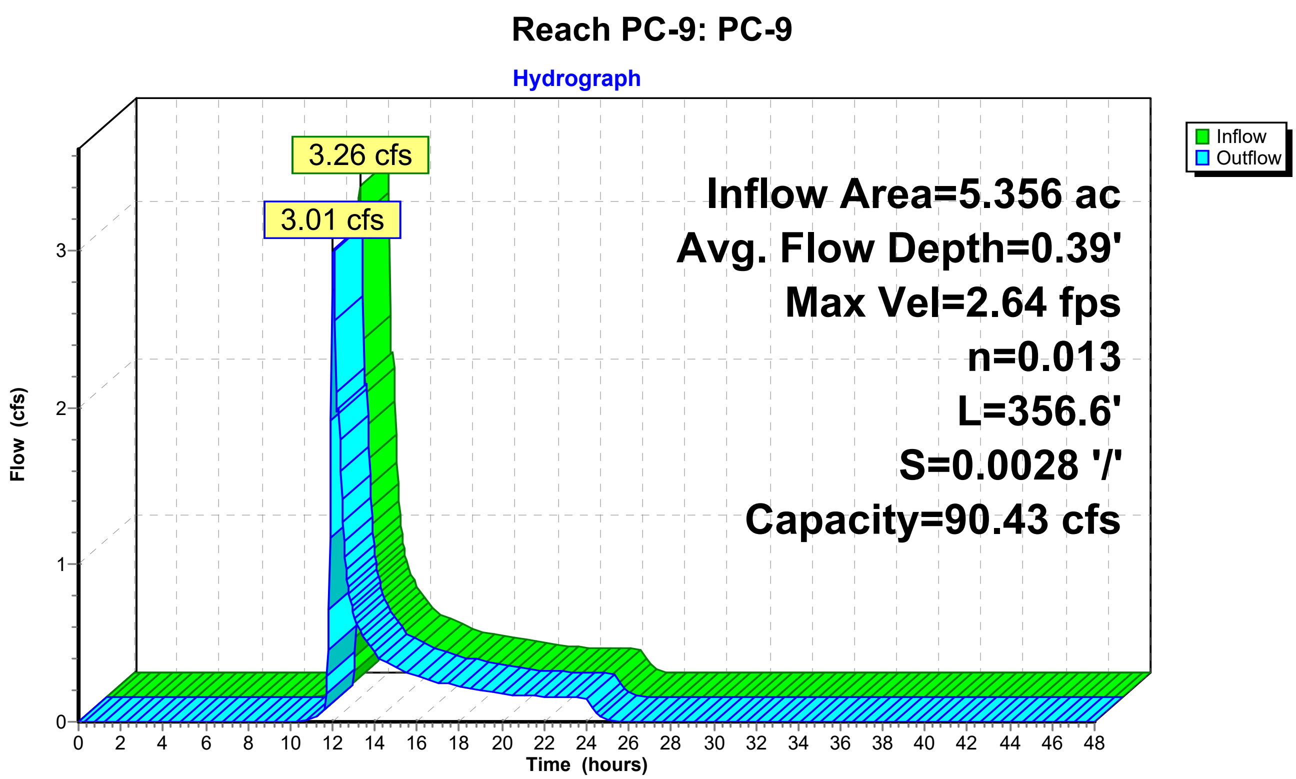
Inflow Area = 5.356 ac, 0.35% Impervious, Inflow Depth = 0.87" for 25-yr,24-hr event
Inflow = 3.26 cfs @ 11.97 hrs, Volume= 0.387 af
Outflow = 3.01 cfs @ 12.04 hrs, Volume= 0.387 af, Atten= 8%, Lag= 4.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.64 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 5.8 min

Peak Storage= 420 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 90.43 cfs

2.00' x 2.00' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 2.0 3.0 '/' Top Width= 12.00'
Length= 356.6' Slope= 0.0028 '/'
Inlet Invert= 20.00', Outlet Invert= 18.99'





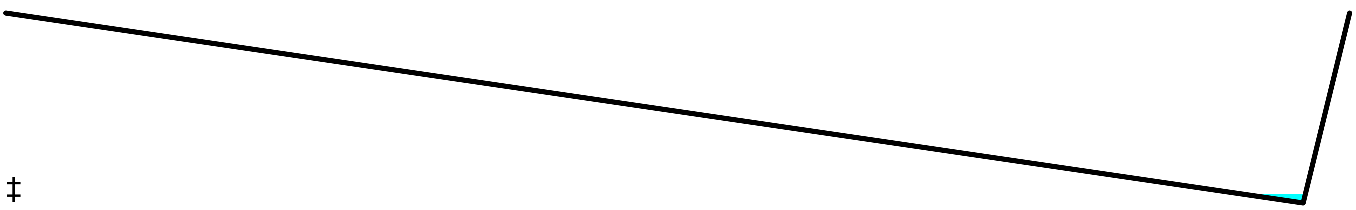
Summary for Reach TB-E1: TB-E1

Inflow Area = 0.150 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.13 cfs @ 11.96 hrs, Volume= 0.008 af
Outflow = 0.10 cfs @ 12.06 hrs, Volume= 0.008 af, Atten= 26%, Lag= 6.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.76 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 6.3 min

Peak Storage= 20 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 331.16 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 149.8' Slope= 0.0136 '/'
Inlet Invert= 80.47', Outlet Invert= 78.44'



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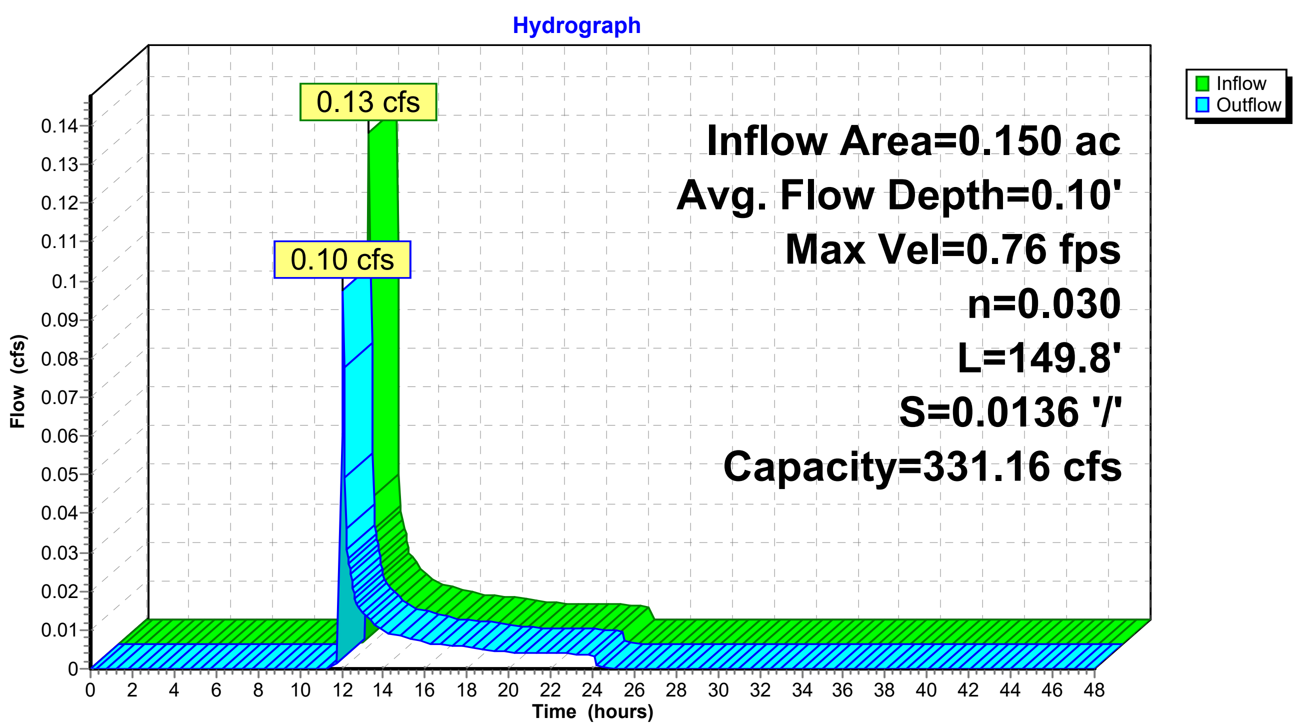
Reach TB-E1: TB-E1



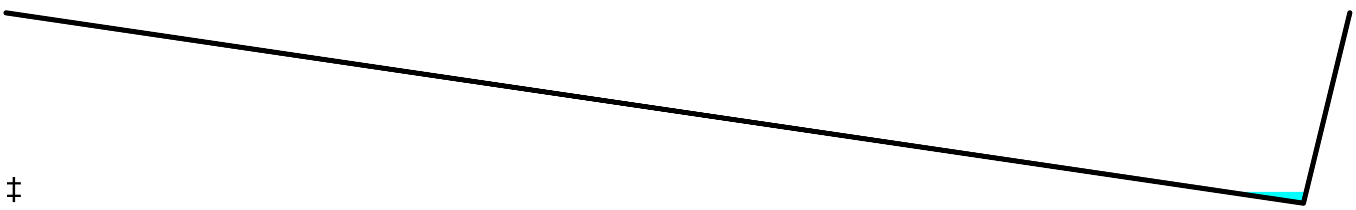
Summary for Reach TB-E2: TB-E2

Inflow Area = 0.313 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.28 cfs @ 11.96 hrs, Volume= 0.017 af
Outflow = 0.18 cfs @ 12.07 hrs, Volume= 0.017 af, Atten= 34%, Lag= 6.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.96 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 0.49 fps, Avg. Travel Time= 7.7 min

Peak Storage= 47 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 364.89 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 226.1' Slope= 0.0165 '/'
Inlet Invert= 62.99', Outlet Invert= 59.27'



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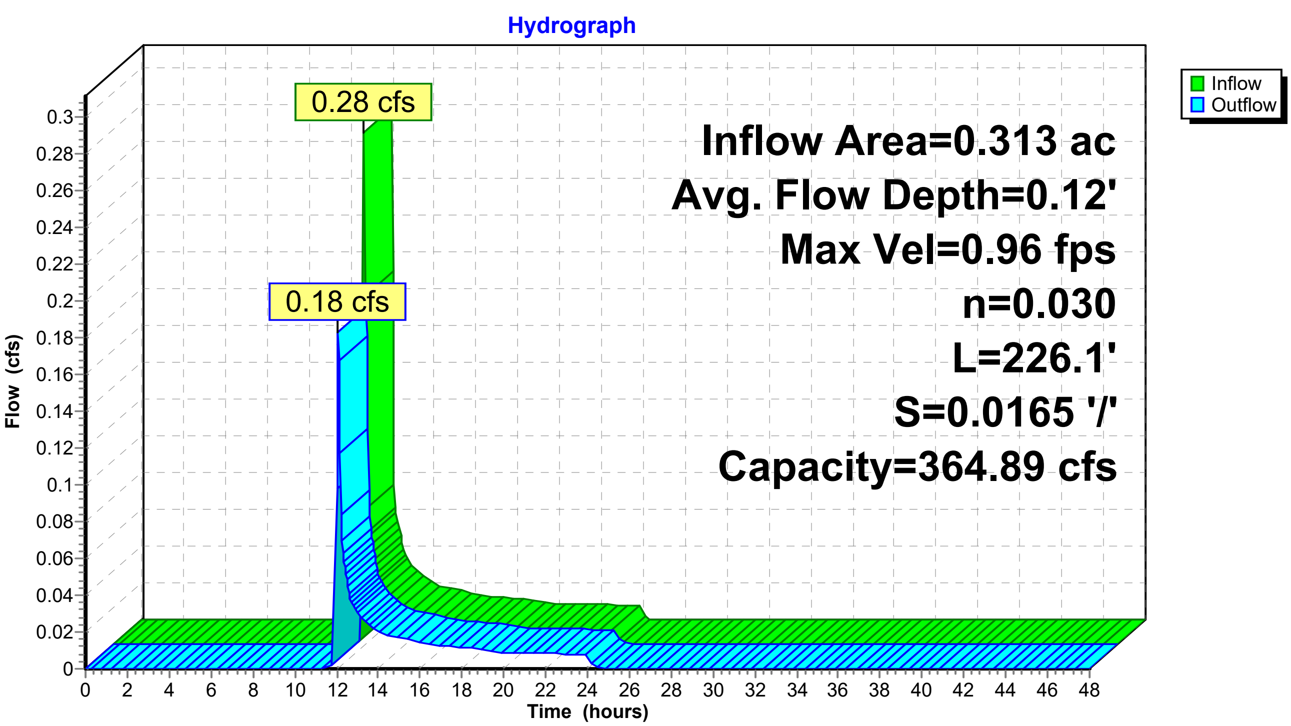
Reach TB-E2: TB-E2



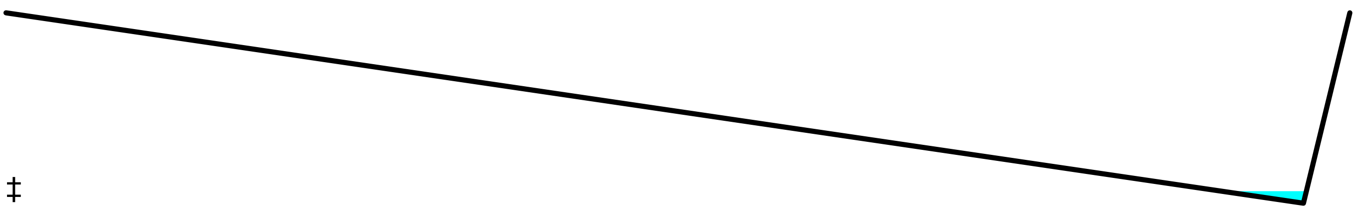
Summary for Reach TB-E3: TB-E3

Inflow Area = 0.385 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.34 cfs @ 11.95 hrs, Volume= 0.021 af
Outflow = 0.21 cfs @ 12.10 hrs, Volume= 0.021 af, Atten= 40%, Lag= 9.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.94 fps, Min. Travel Time= 5.2 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 10.2 min

Peak Storage= 68 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 344.24 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 295.7' Slope= 0.0146 '/'
Inlet Invert= 46.75', Outlet Invert= 42.42'



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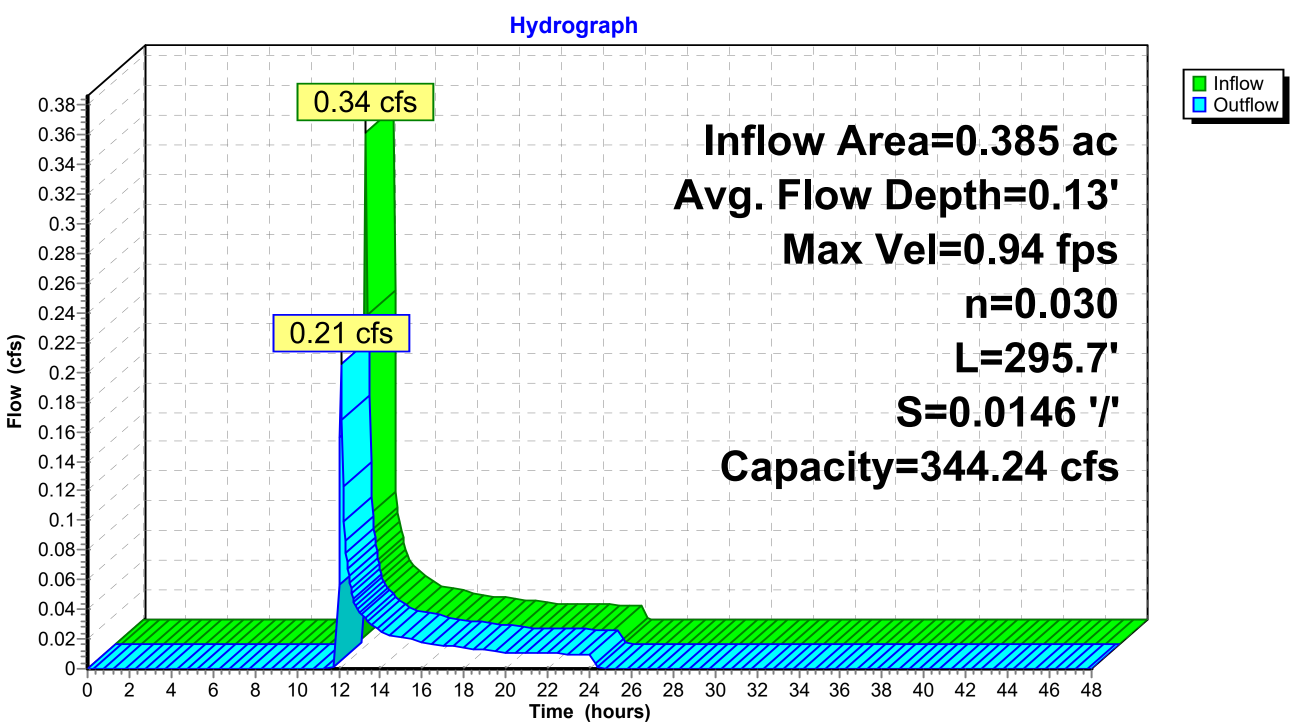
Reach TB-E3: TB-E3



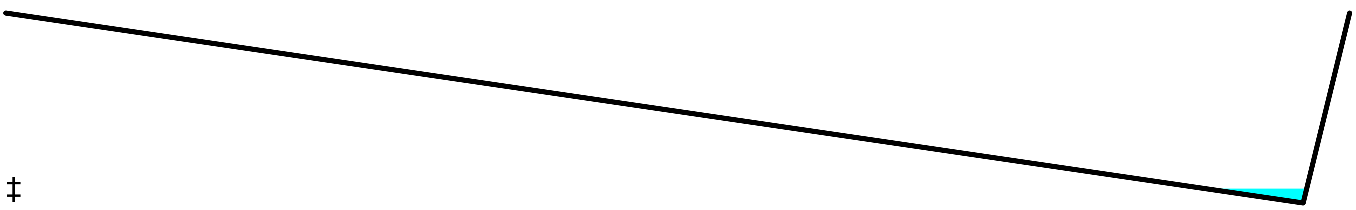
Summary for Reach TB-F1: TB-F1

Inflow Area = 0.967 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.83 cfs @ 11.96 hrs, Volume= 0.053 af
Outflow = 0.34 cfs @ 12.25 hrs, Volume= 0.053 af, Atten= 59%, Lag= 17.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.05 fps, Min. Travel Time= 11.3 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 21.5 min

Peak Storage= 235 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 338.81 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 707.8' Slope= 0.0142 '/'
Inlet Invert= 83.04', Outlet Invert= 73.00'



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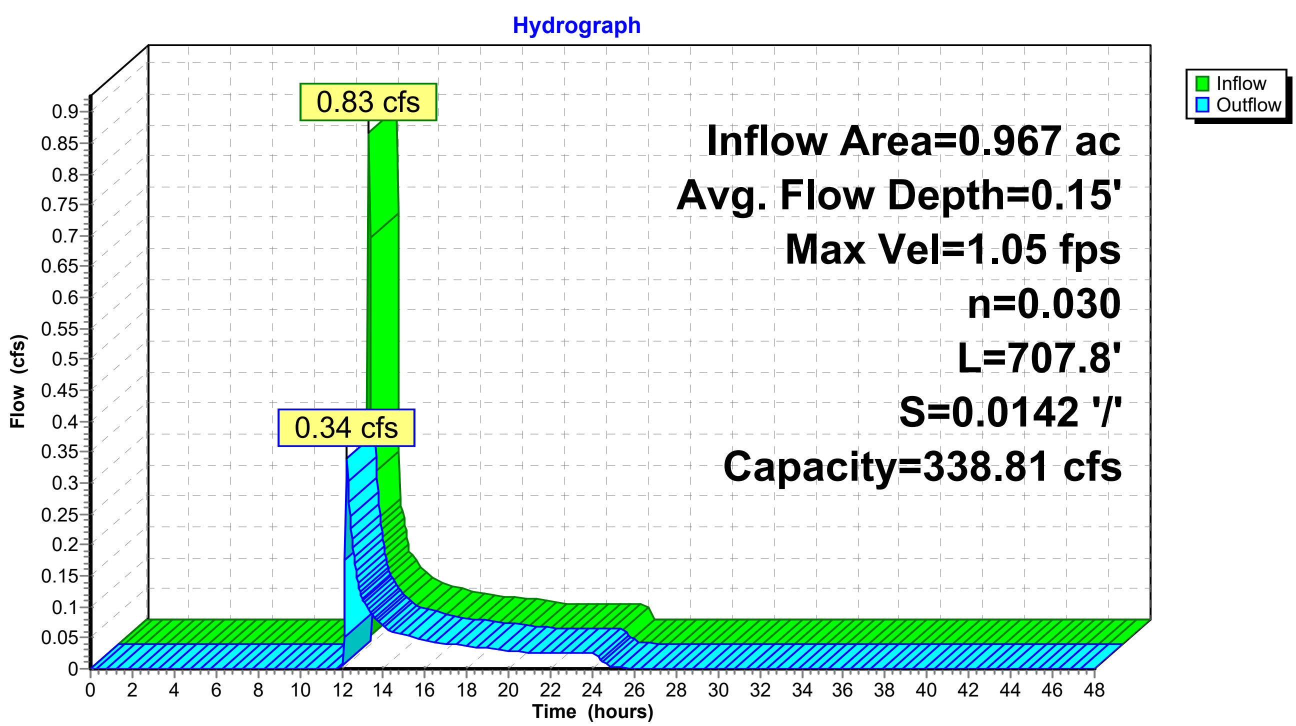
Reach TB-F1: TB-F1



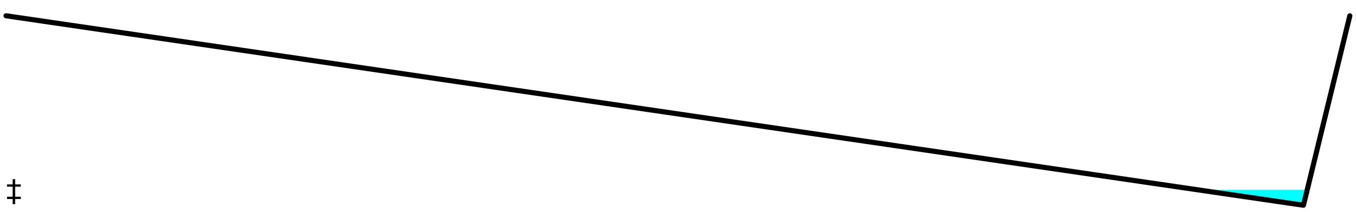
Summary for Reach TB-F2: TB-F2

Inflow Area = 1.216 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.08 cfs @ 11.96 hrs, Volume= 0.067 af
Outflow = 0.42 cfs @ 12.24 hrs, Volume= 0.067 af, Atten= 61%, Lag= 17.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.14 fps, Min. Travel Time= 11.5 min
Avg. Velocity = 0.59 fps, Avg. Travel Time= 22.3 min

Peak Storage= 298 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 351.95 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 785.3' Slope= 0.0153 '/'
Inlet Invert= 64.02', Outlet Invert= 52.00'



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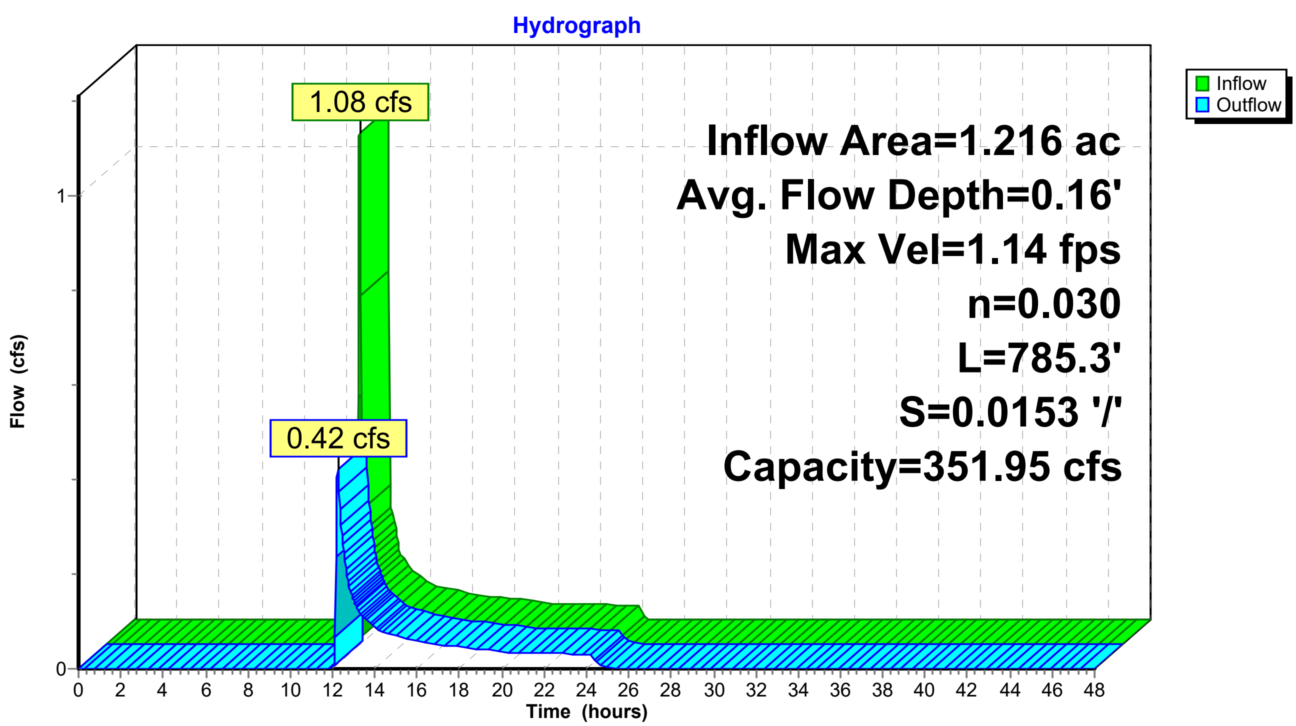
Reach TB-F2: TB-F2



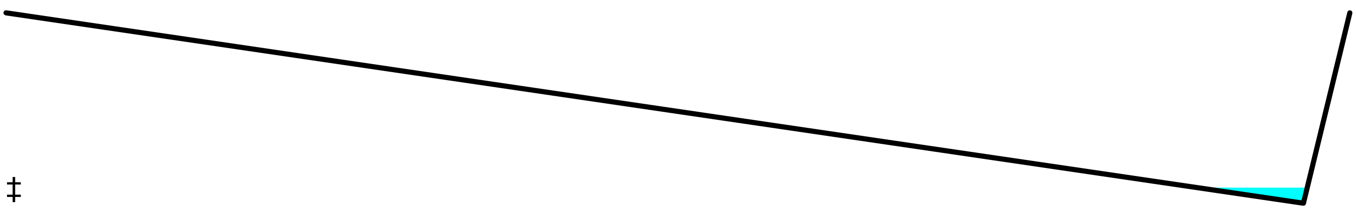
Summary for Reach TB-F3: TB-F3

Inflow Area = 1.357 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 1.21 cfs @ 11.96 hrs, Volume= 0.074 af
Outflow = 0.46 cfs @ 12.26 hrs, Volume= 0.074 af, Atten= 62%, Lag= 18.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.18 fps, Min. Travel Time= 12.4 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 24.0 min

Peak Storage= 341 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 360.33 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 872.6' Slope= 0.0160 '/'
Inlet Invert= 45.00', Outlet Invert= 31.00'



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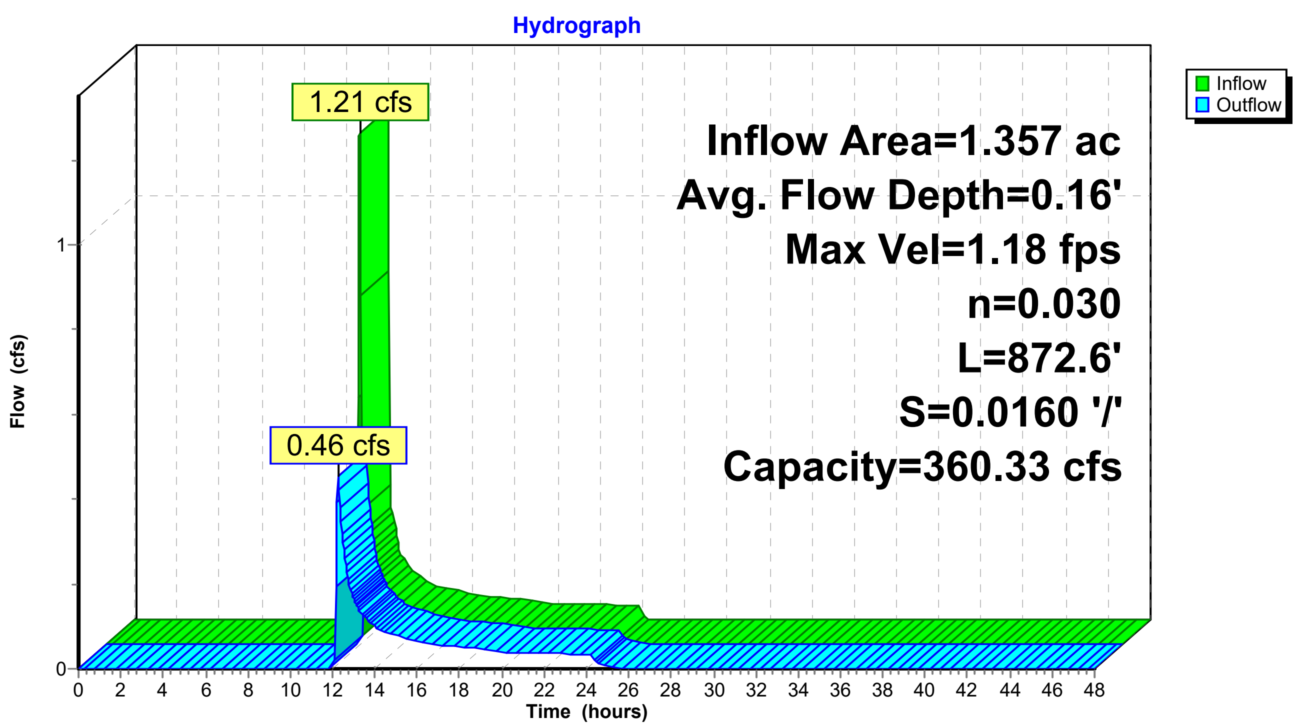
Reach TB-F3: TB-F3



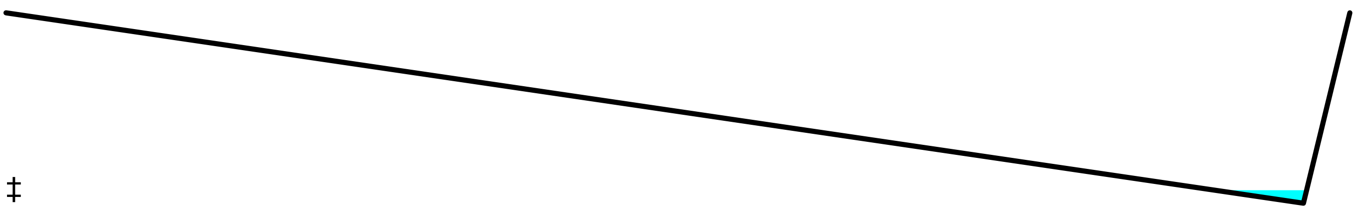
Summary for Reach TB-G1: TB-G1

Inflow Area = 0.589 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.34 cfs @ 12.05 hrs, Volume= 0.032 af
Outflow = 0.26 cfs @ 12.20 hrs, Volume= 0.032 af, Atten= 24%, Lag= 8.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.01 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 8.2 min

Peak Storage= 73 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 349.27 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 268.0' Slope= 0.0151 '/'
Inlet Invert= 83.04', Outlet Invert= 79.00'



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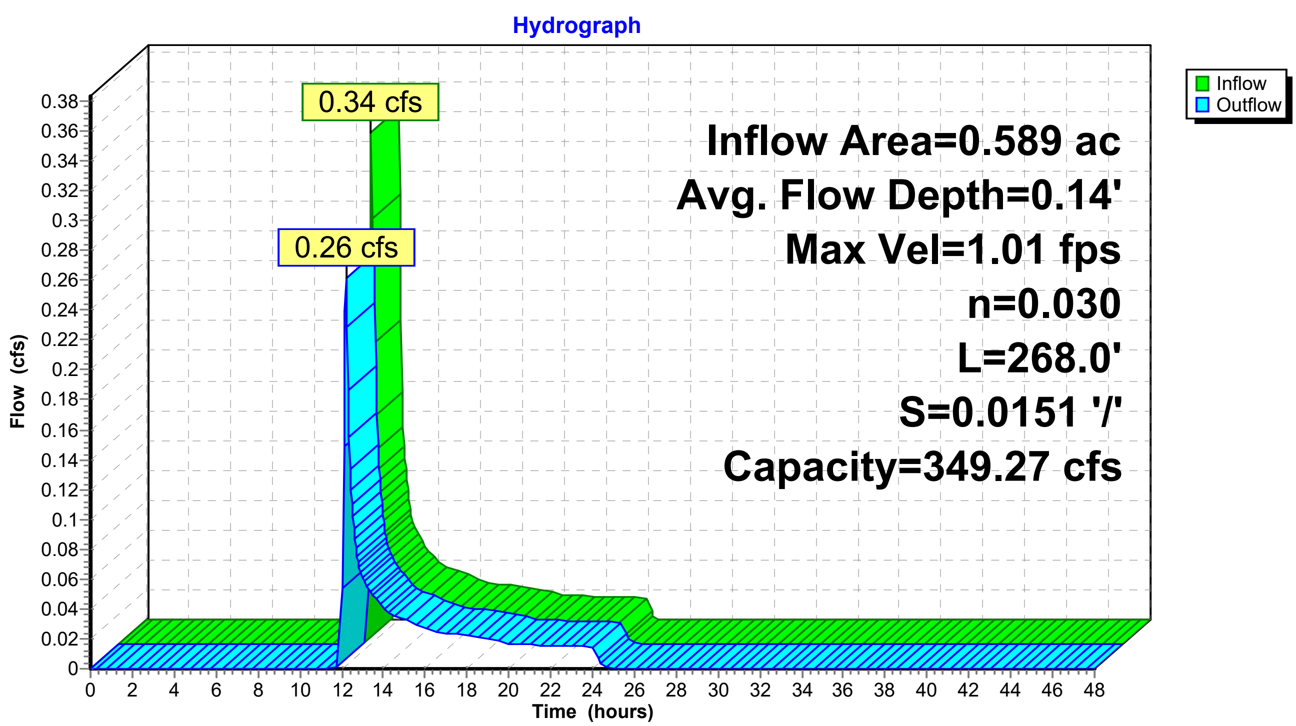
Reach TB-G1: TB-G1



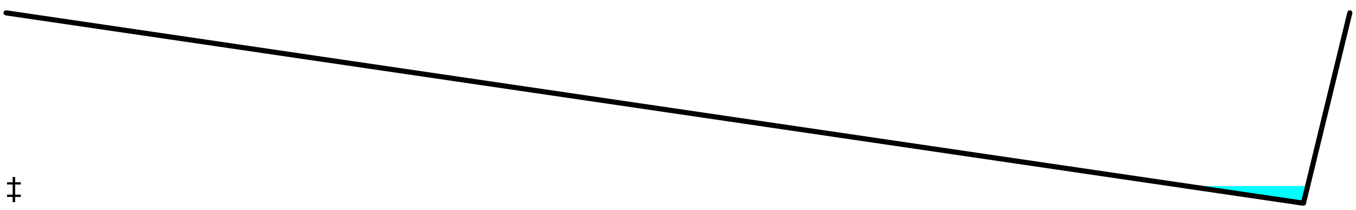
Summary for Reach TB-G2: TB-G2

Inflow Area = 1.103 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.64 cfs @ 12.06 hrs, Volume= 0.060 af
Outflow = 0.52 cfs @ 12.17 hrs, Volume= 0.060 af, Atten= 18%, Lag= 6.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.15 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.60 fps, Avg. Travel Time= 7.0 min

Peak Storage= 117 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 331.20 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 250.1' Slope= 0.0136 '/'
Inlet Invert= 82.39', Outlet Invert= 79.00'



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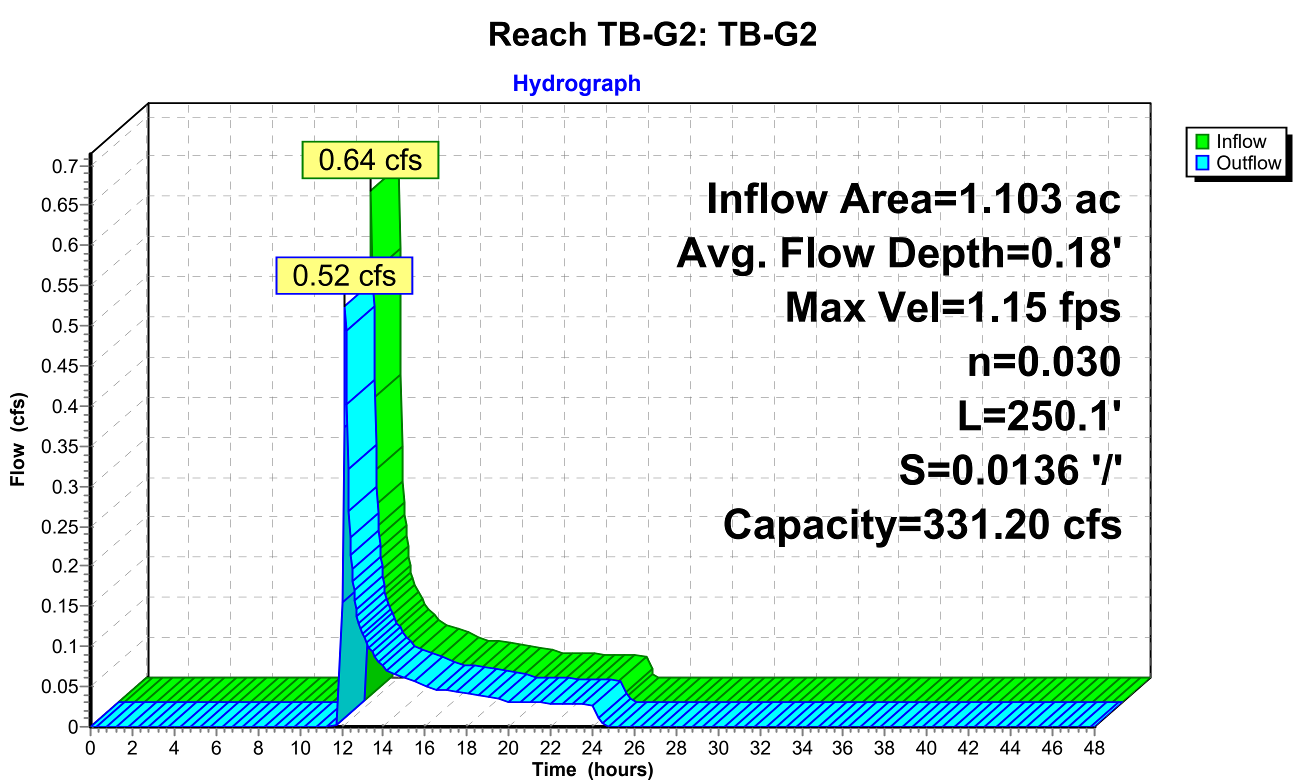


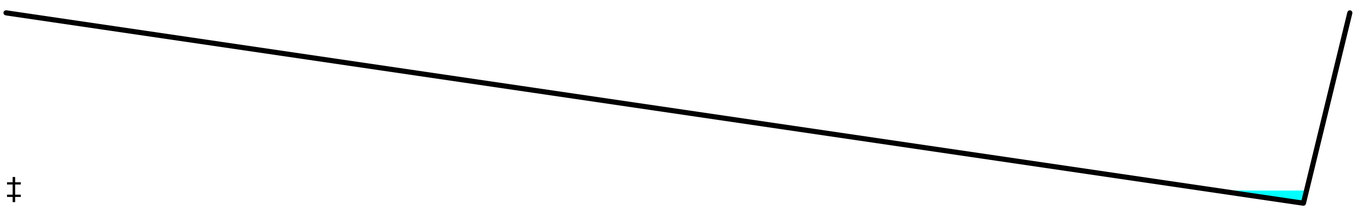
Summary for Reach TB-G3: TB-G3

Inflow Area = 0.433 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.38 cfs @ 11.96 hrs, Volume= 0.024 af
Outflow = 0.24 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 39%, Lag= 8.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.99 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.50 fps, Avg. Travel Time= 9.0 min

Peak Storage= 70 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 346.73 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 270.6' Slope= 0.0149 '/'
Inlet Invert= 64.02', Outlet Invert= 60.00'



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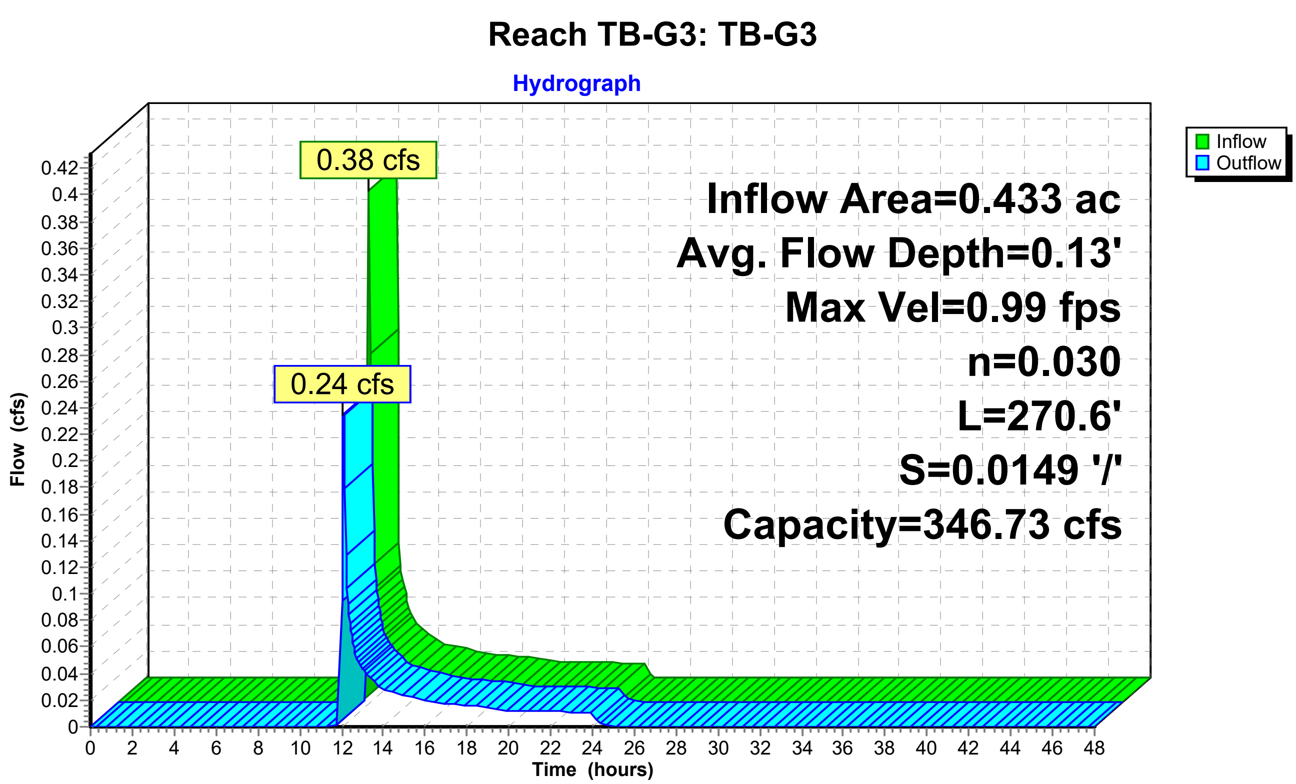


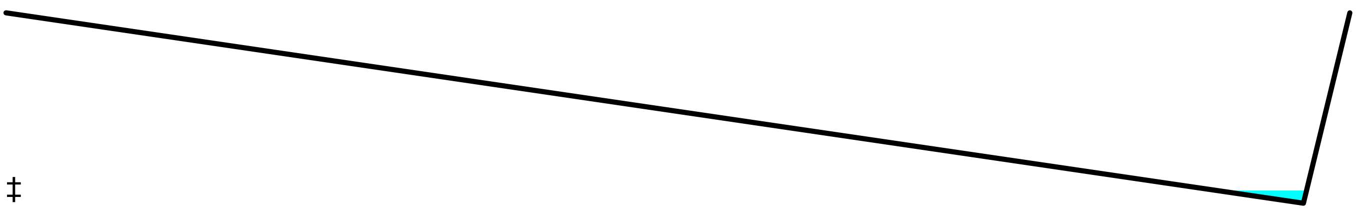
Summary for Reach TB-G4: TB-G4

Inflow Area = 0.403 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.36 cfs @ 11.96 hrs, Volume= 0.022 af
Outflow = 0.22 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 38%, Lag= 7.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.95 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 8.7 min

Peak Storage= 64 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 336.60 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 250.7' Slope= 0.0140 '/'
Inlet Invert= 63.51', Outlet Invert= 60.00'



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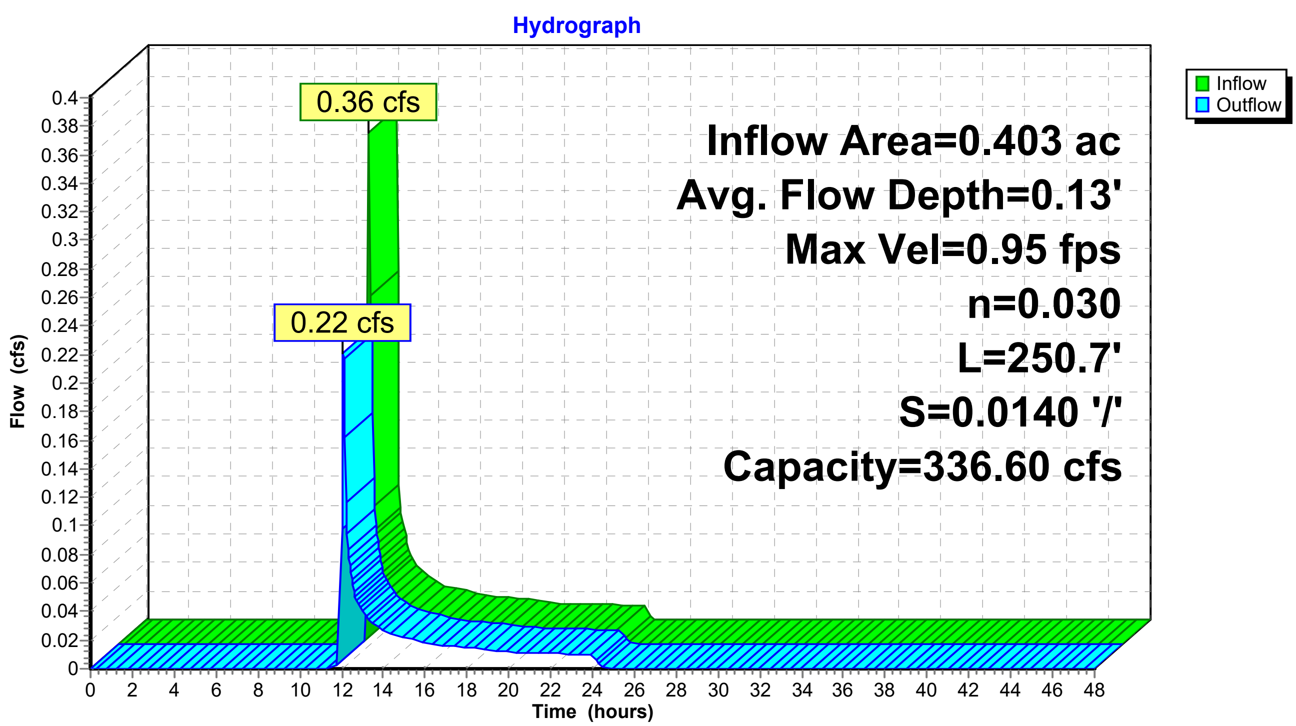
Reach TB-G4: TB-G4



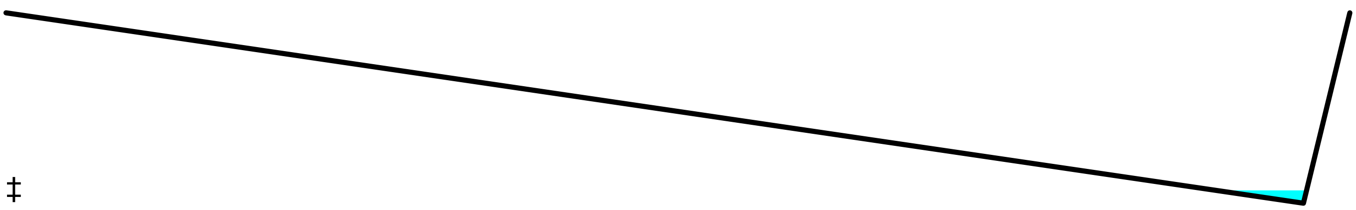
Summary for Reach TB-G5: TB-G5

Inflow Area = 0.444 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.39 cfs @ 11.96 hrs, Volume= 0.024 af
Outflow = 0.24 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 39%, Lag= 8.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.99 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.50 fps, Avg. Travel Time= 9.1 min

Peak Storage= 73 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 344.15 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 273.3' Slope= 0.0146 '/'
Inlet Invert= 45.00', Outlet Invert= 41.00'



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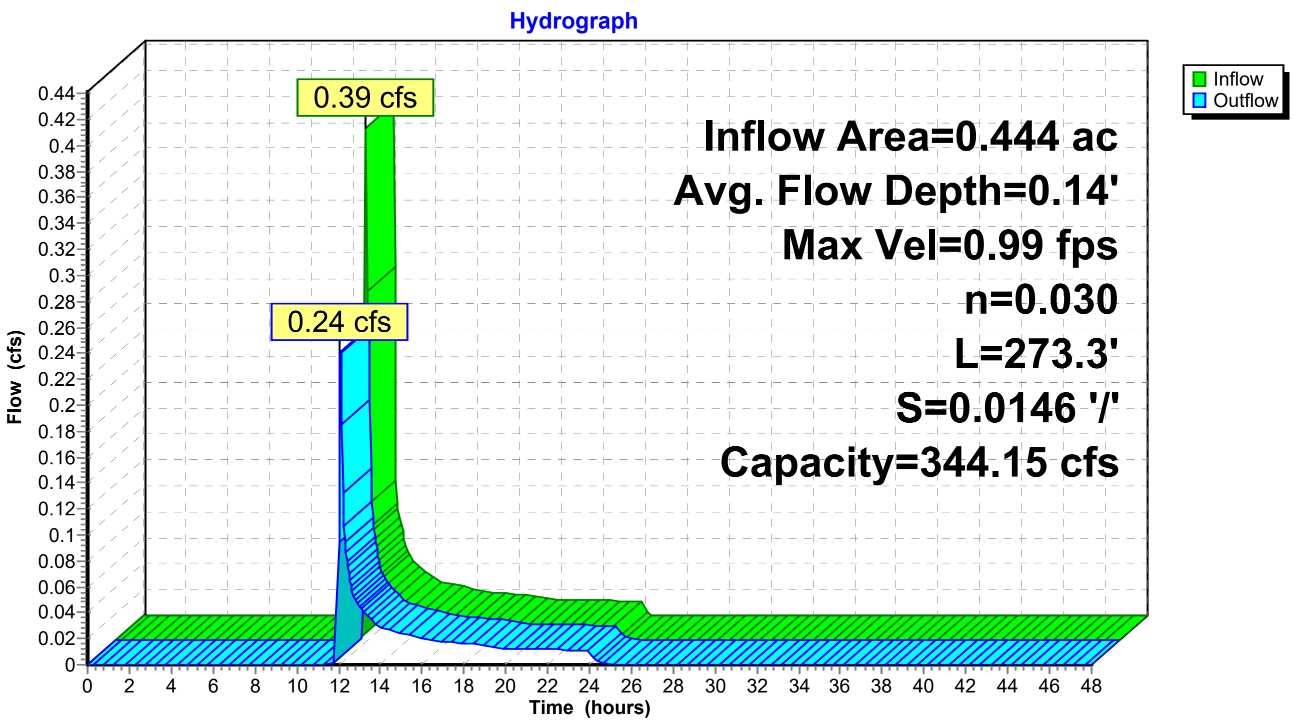
Reach TB-G5: TB-G5



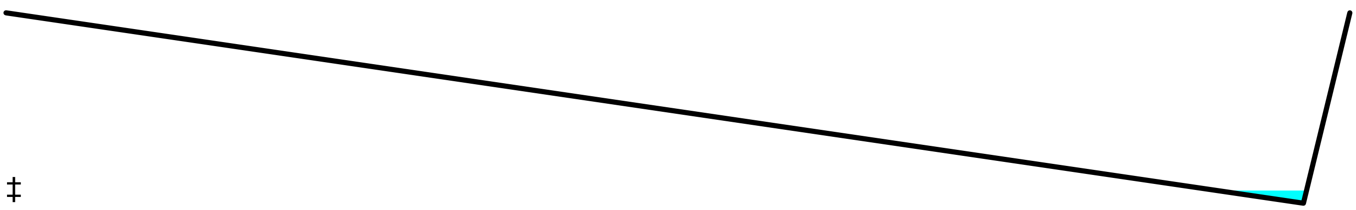
Summary for Reach TB-G6: TB-G6

Inflow Area = 0.404 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.36 cfs @ 11.96 hrs, Volume= 0.022 af
Outflow = 0.22 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 39%, Lag= 7.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.95 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 8.7 min

Peak Storage= 64 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 336.07 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 251.5' Slope= 0.0140 '/'
Inlet Invert= 44.51', Outlet Invert= 41.00'



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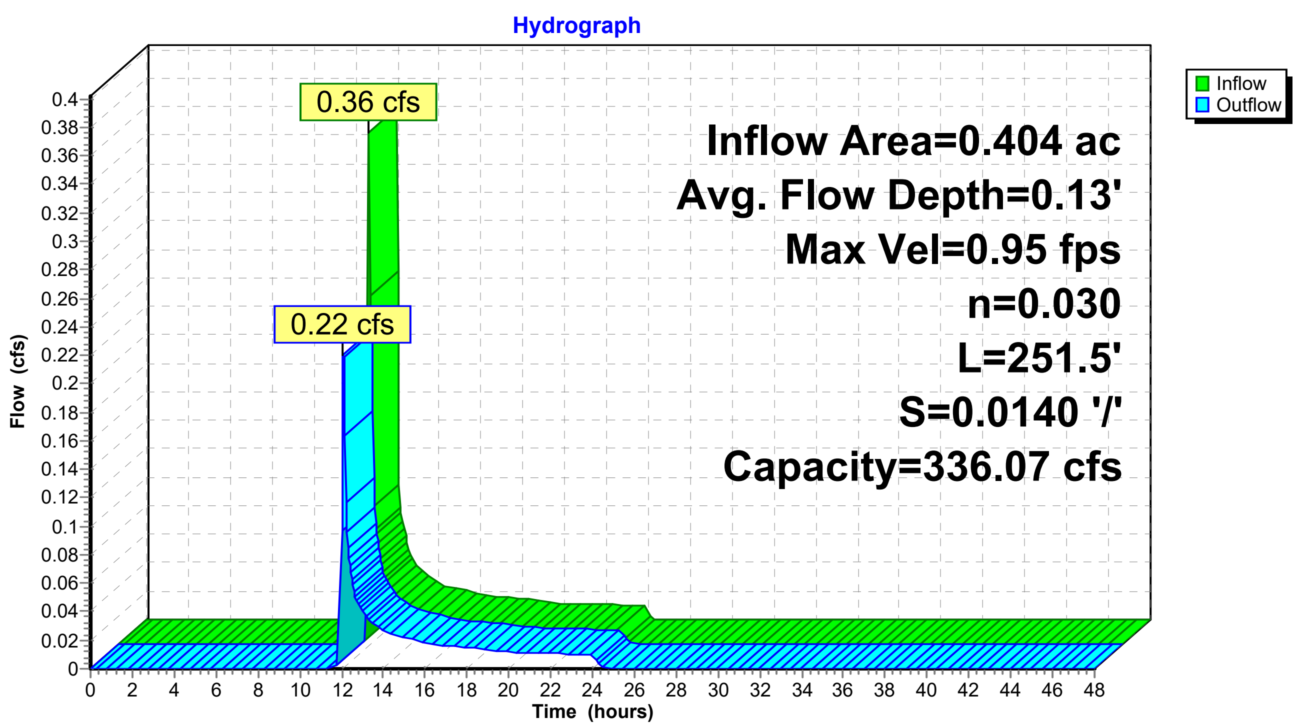
Reach TB-G6: TB-G6



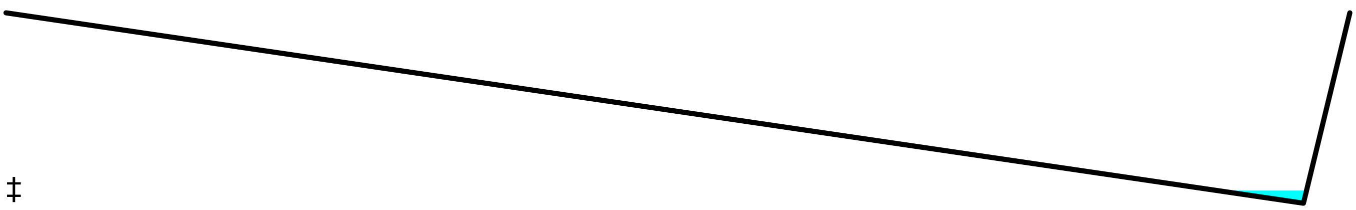
Summary for Reach TB-H1: TB-H1

Inflow Area = 0.537 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.48 cfs @ 11.96 hrs, Volume= 0.029 af
Outflow = 0.24 cfs @ 12.16 hrs, Volume= 0.029 af, Atten= 50%, Lag= 12.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.96 fps, Min. Travel Time= 7.6 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 14.4 min

Peak Storage= 113 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 343.09 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 439.3' Slope= 0.0145 '/'
Inlet Invert= 82.39', Outlet Invert= 76.00'



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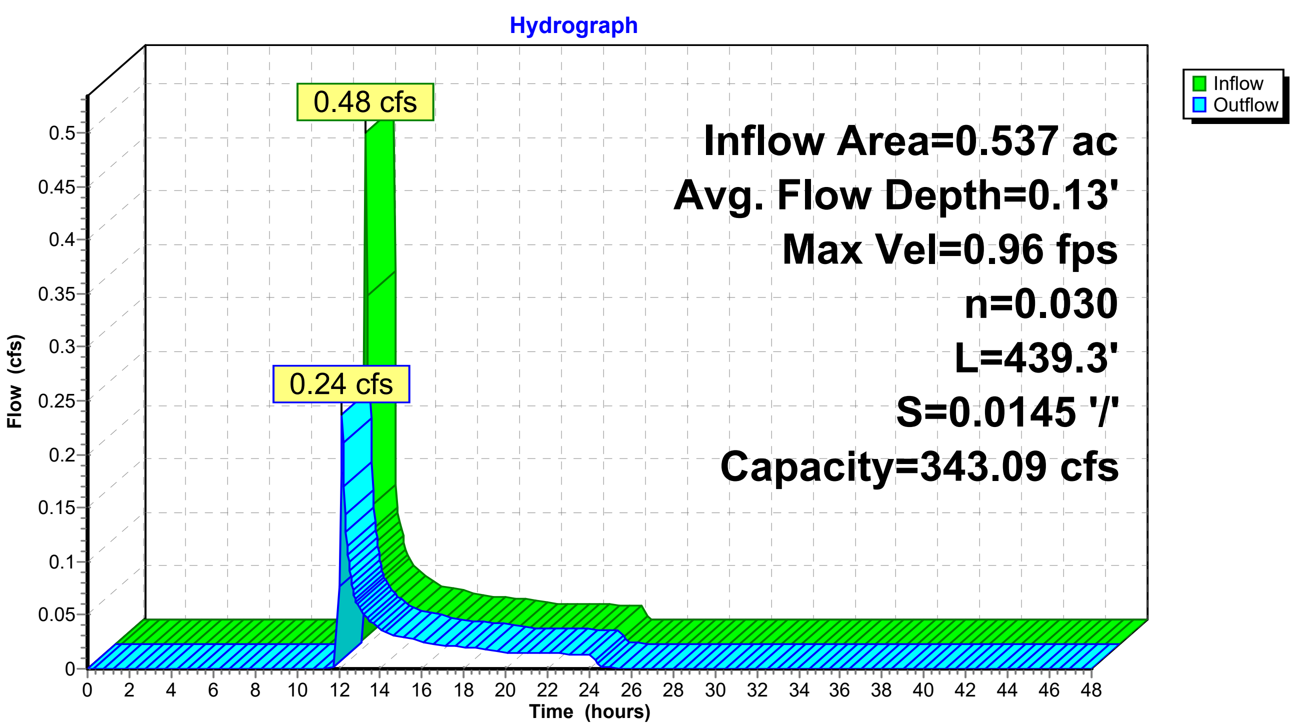
Reach TB-H1: TB-H1



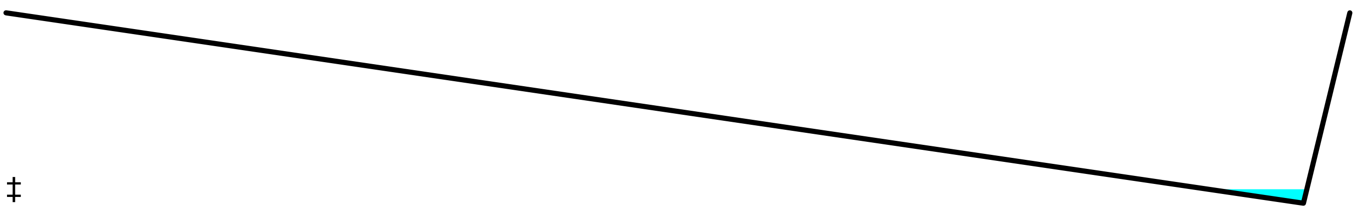
Summary for Reach TB-H2: TB-H2

Inflow Area = 0.778 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.64 cfs @ 11.97 hrs, Volume= 0.043 af
Outflow = 0.39 cfs @ 12.13 hrs, Volume= 0.043 af, Atten= 40%, Lag= 9.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.23 fps, Min. Travel Time= 6.0 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 11.5 min

Peak Storage= 139 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 406.40 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 440.0' Slope= 0.0204 '/'
Inlet Invert= 67.98', Outlet Invert= 59.00'



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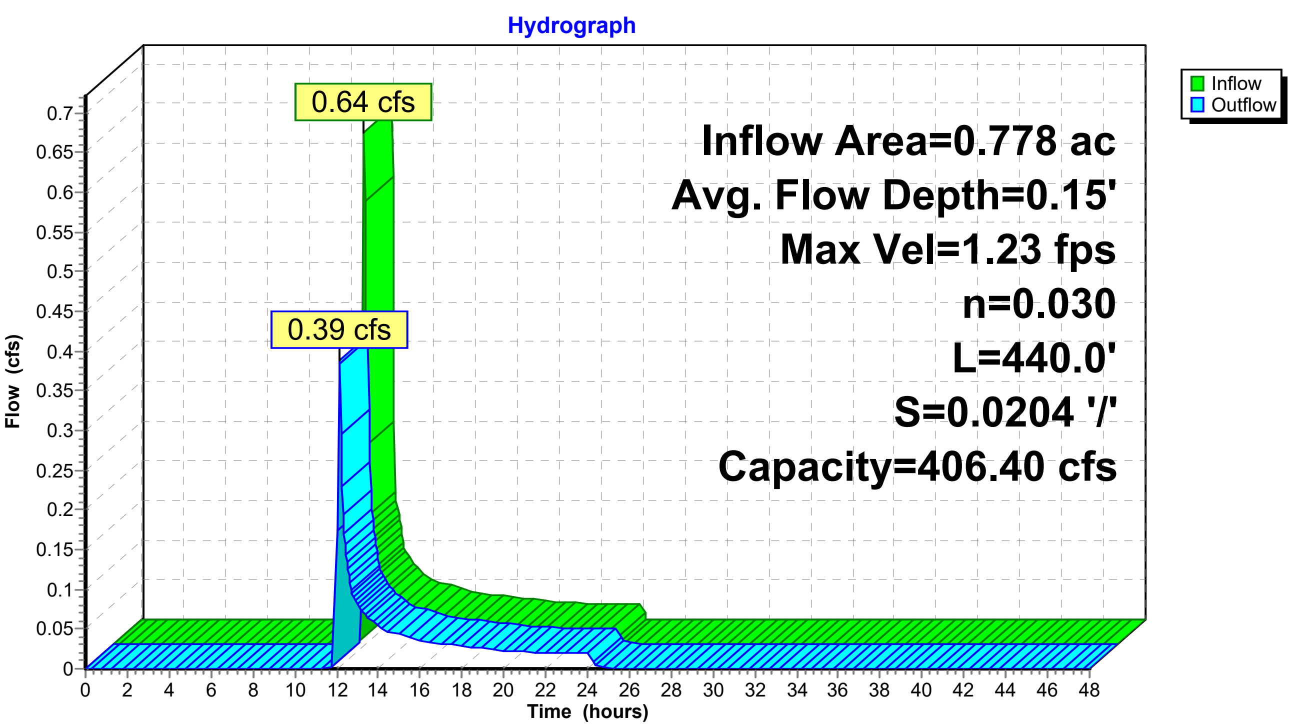
Reach TB-H2: TB-H2



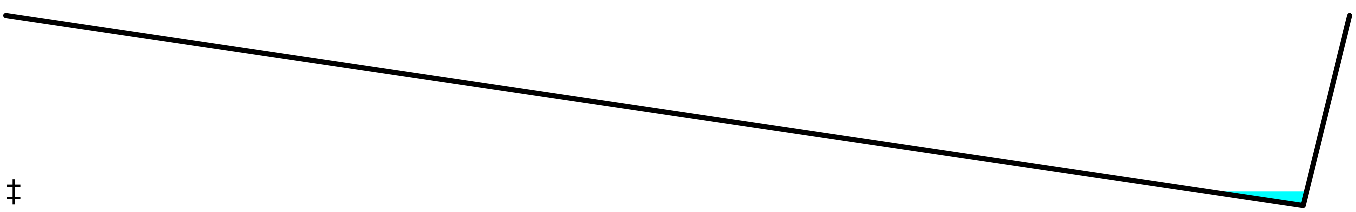
Summary for Reach TB-H3: TB-H3

Inflow Area = 0.824 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.73 cfs @ 11.96 hrs, Volume= 0.045 af
Outflow = 0.36 cfs @ 12.16 hrs, Volume= 0.045 af, Atten= 51%, Lag= 12.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.18 fps, Min. Travel Time= 7.8 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 15.0 min

Peak Storage= 176 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 391.72 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 554.3' Slope= 0.0190 '/'
Inlet Invert= 63.51', Outlet Invert= 53.00'



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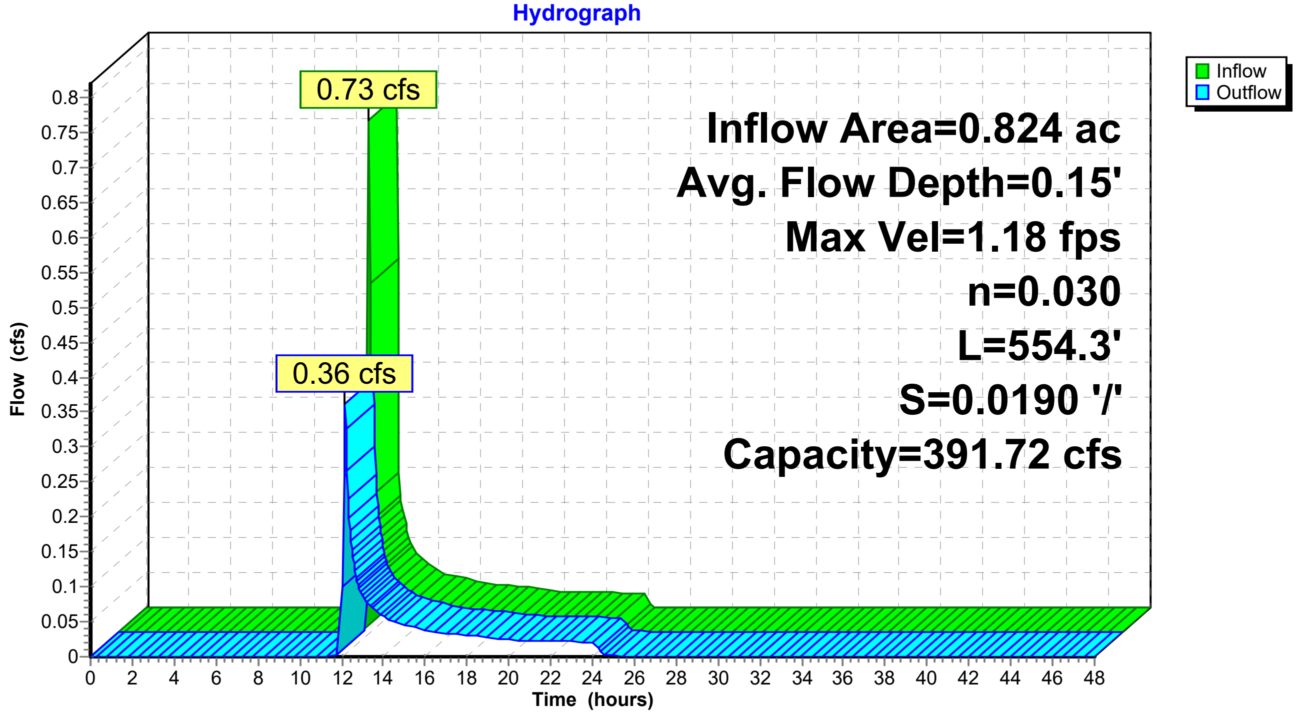
Reach TB-H3: TB-H3



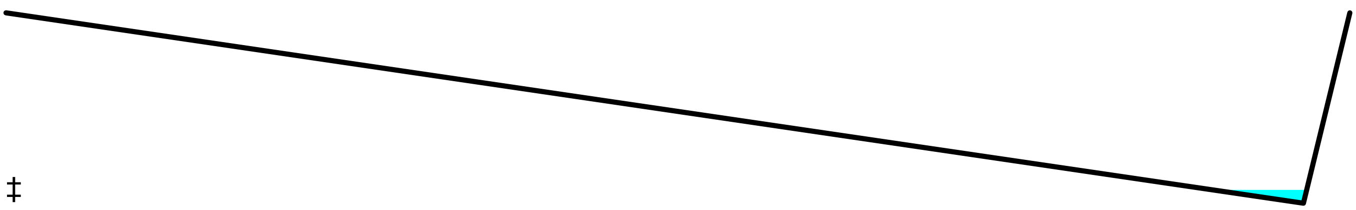
Summary for Reach TB-H4: TB-H4

Inflow Area = 0.709 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.64 cfs @ 11.95 hrs, Volume= 0.039 af
Outflow = 0.31 cfs @ 12.17 hrs, Volume= 0.039 af, Atten= 52%, Lag= 12.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.11 fps, Min. Travel Time= 8.4 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 15.8 min

Peak Storage= 156 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 381.89 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 554.9' Slope= 0.0180 '/'
Inlet Invert= 54.00', Outlet Invert= 44.00'



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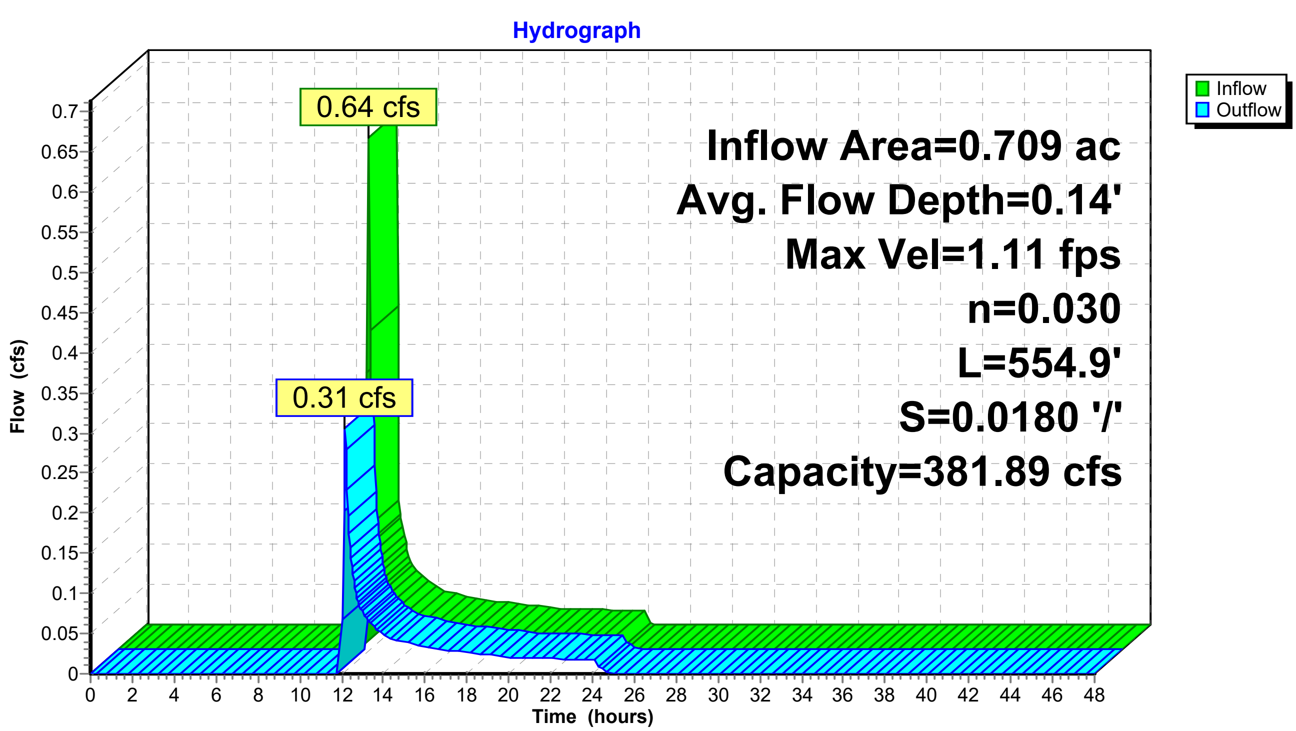
Reach TB-H4: TB-H4



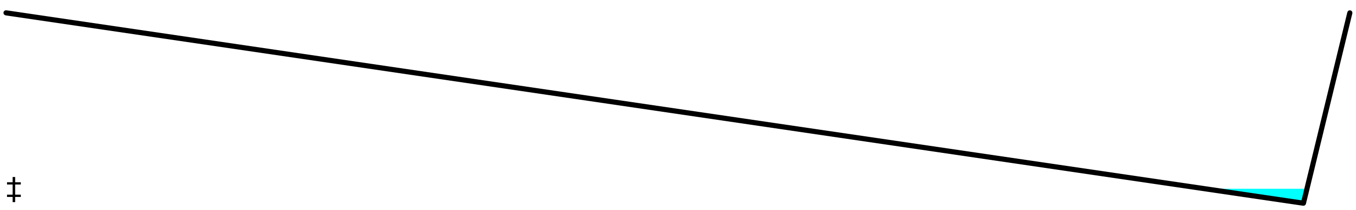
Summary for Reach TB-H5: TB-H5

Inflow Area = 0.977 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.87 cfs @ 11.96 hrs, Volume= 0.054 af
Outflow = 0.40 cfs @ 12.18 hrs, Volume= 0.054 af, Atten= 54%, Lag= 13.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.19 fps, Min. Travel Time= 8.8 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 17.0 min

Peak Storage= 213 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 384.21 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 631.0' Slope= 0.0182 '/'
Inlet Invert= 44.51', Outlet Invert= 33.00'



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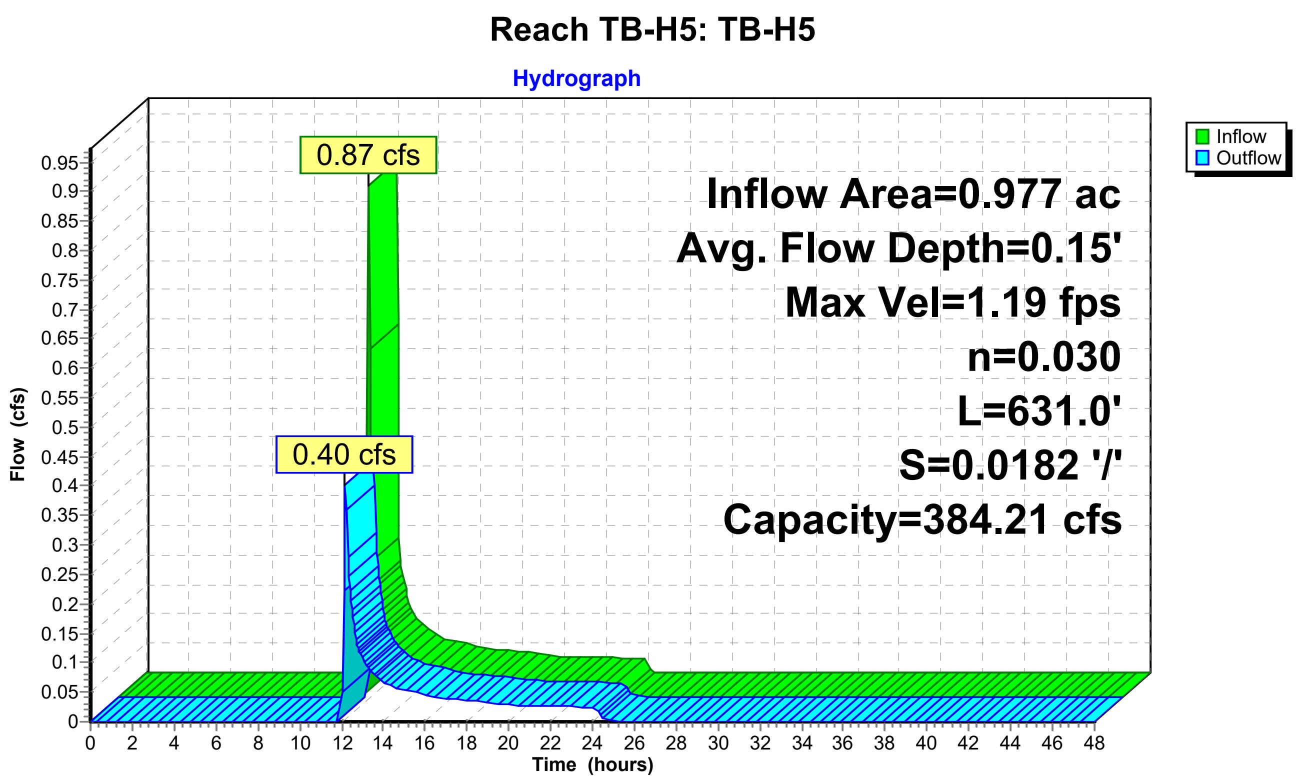


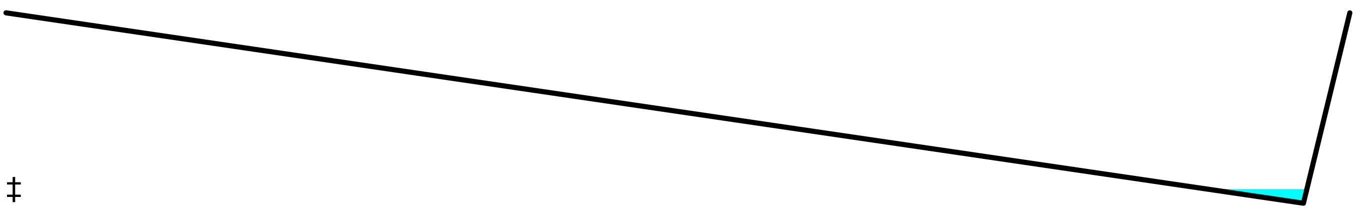
Summary for Reach TB-H6: TB-H6

Inflow Area = 0.930 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.83 cfs @ 11.95 hrs, Volume= 0.051 af
Outflow = 0.36 cfs @ 12.20 hrs, Volume= 0.051 af, Atten= 56%, Lag= 14.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.16 fps, Min. Travel Time= 9.5 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 18.2 min

Peak Storage= 210 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 382.67 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 663.7' Slope= 0.0181 '/'
Inlet Invert= 35.01', Outlet Invert= 23.00'



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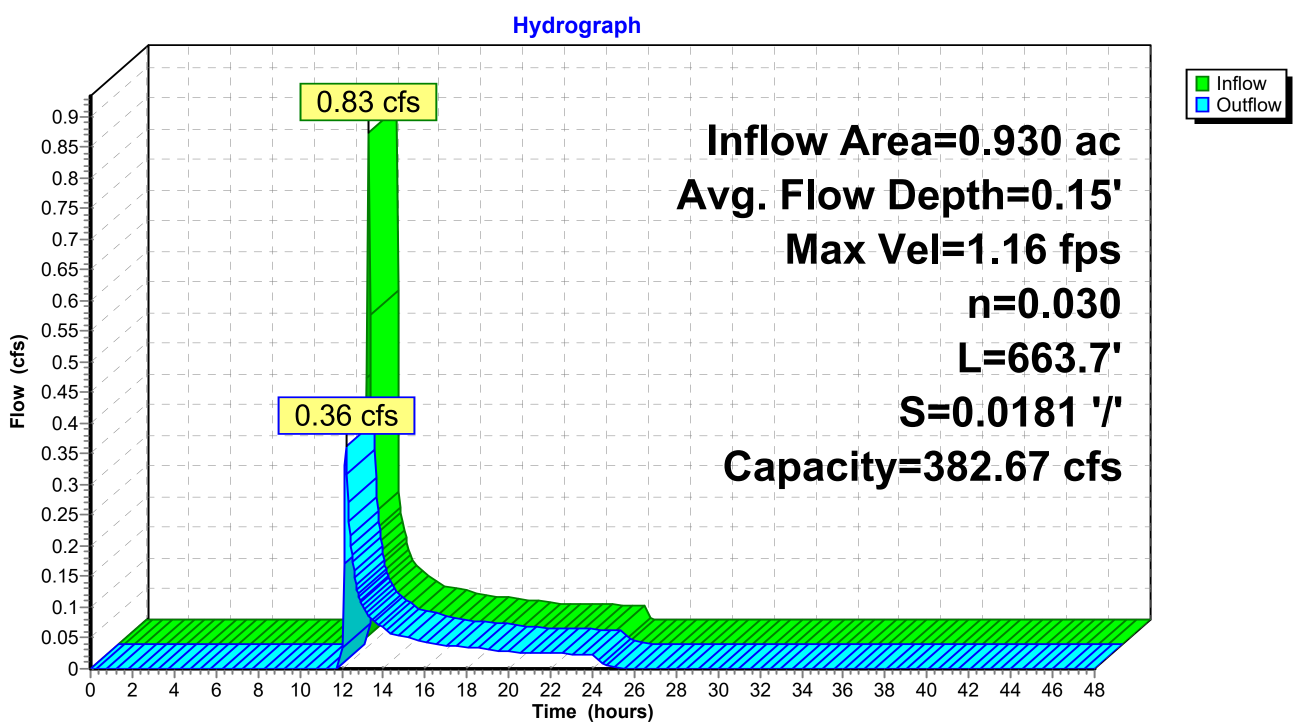
Reach TB-H6: TB-H6



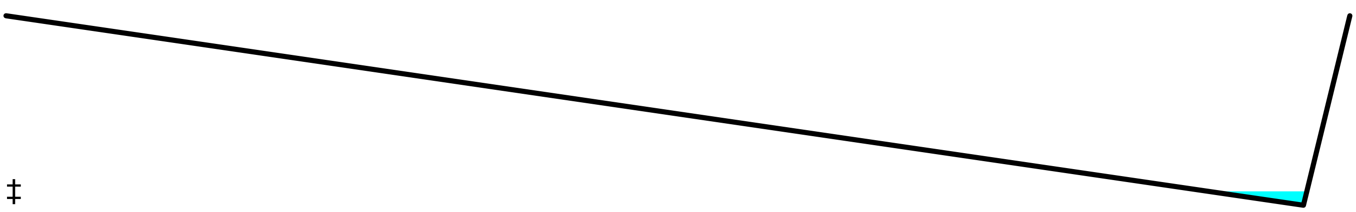
Summary for Reach TB-I1: TB-I1

Inflow Area = 0.543 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.46 cfs @ 11.97 hrs, Volume= 0.030 af
Outflow = 0.30 cfs @ 12.09 hrs, Volume= 0.030 af, Atten= 34%, Lag= 7.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.06 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 8.0 min

Peak Storage= 80 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 354.34 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 259.1' Slope= 0.0155 '/'
Inlet Invert= 71.99', Outlet Invert= 67.97'



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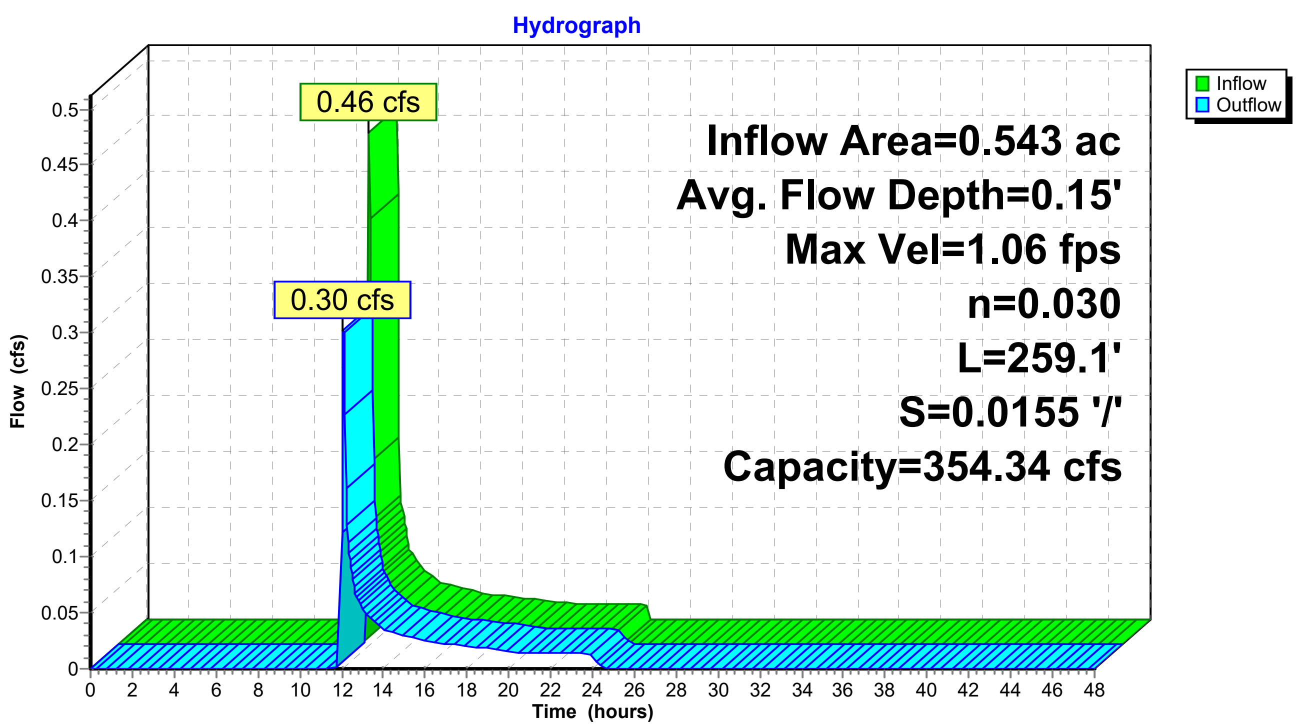
Reach TB-I1: TB-I1



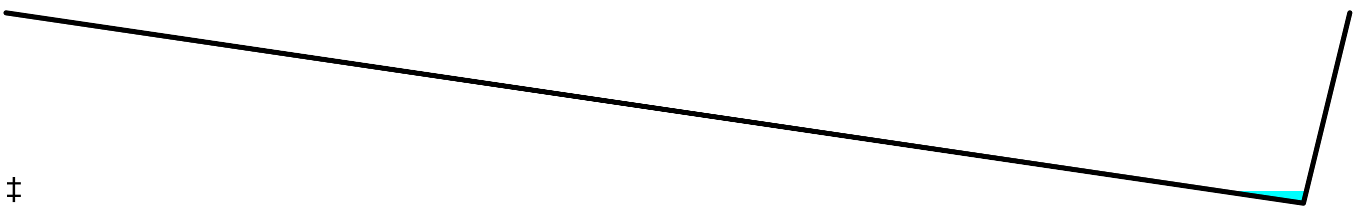
Summary for Reach TB-I2: TB-I2

Inflow Area = 0.178 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.16 cfs @ 11.95 hrs, Volume= 0.010 af
Outflow = 0.10 cfs @ 12.10 hrs, Volume= 0.010 af, Atten= 40%, Lag= 8.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.43 fps, Min. Travel Time= 5.0 min
Avg. Velocity = 0.22 fps, Avg. Travel Time= 9.8 min

Peak Storage= 31 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 153.31 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 127.4' Slope= 0.0029 '/'
Inlet Invert= 54.00', Outlet Invert= 53.63'



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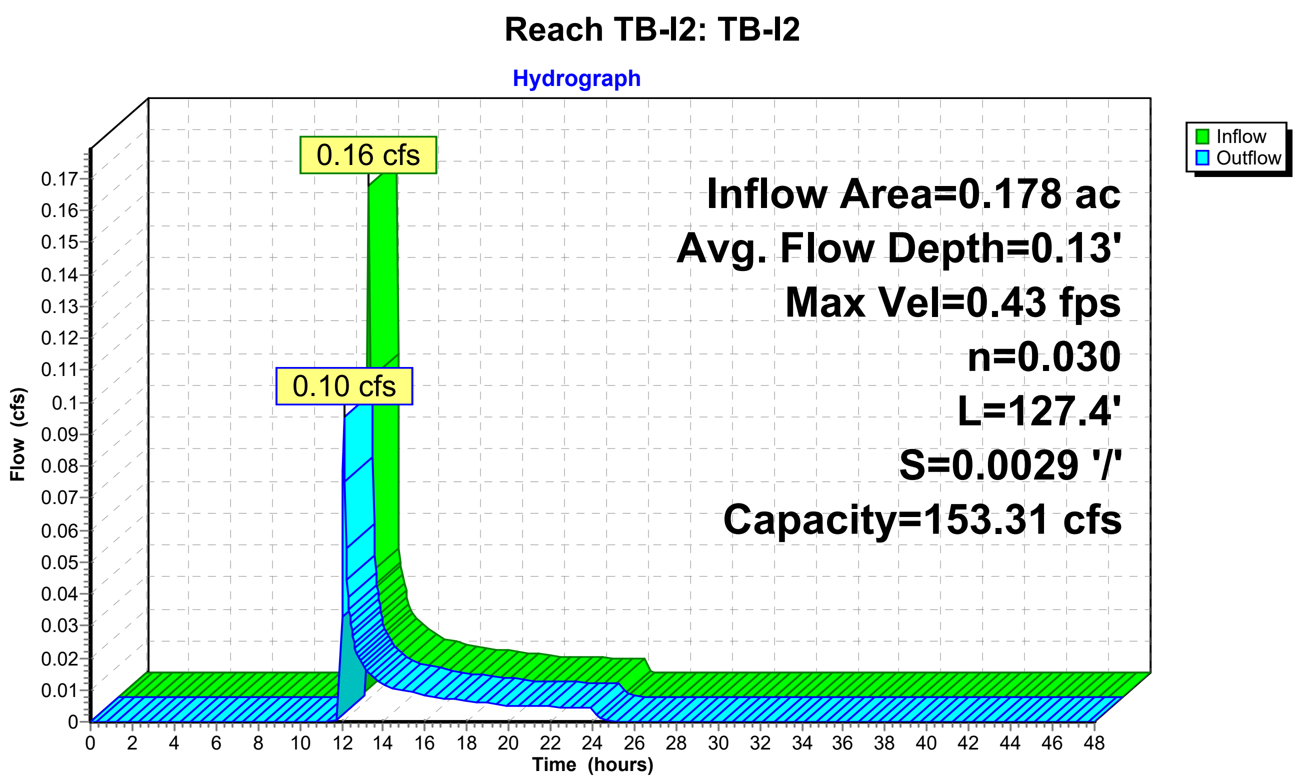


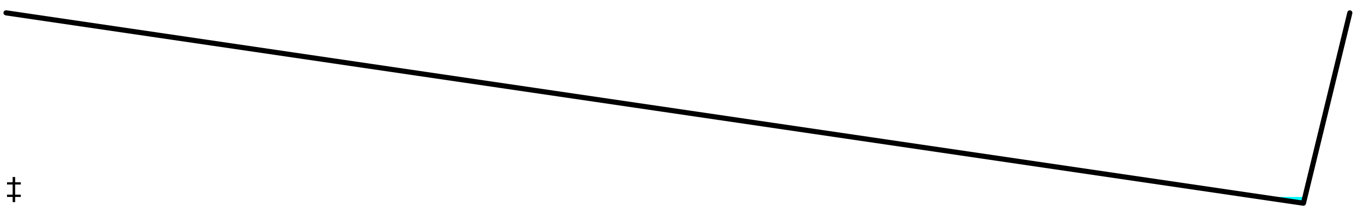
Summary for Reach TB-I3: TB-I3

Inflow Area = 0.059 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.05 cfs @ 11.95 hrs, Volume= 0.003 af
Outflow = 0.04 cfs @ 11.99 hrs, Volume= 0.003 af, Atten= 16%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.79 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 1.8 min

Peak Storage= 3 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 442.27 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 42.2' Slope= 0.0242 '/'
Inlet Invert= 36.03', Outlet Invert= 35.01'



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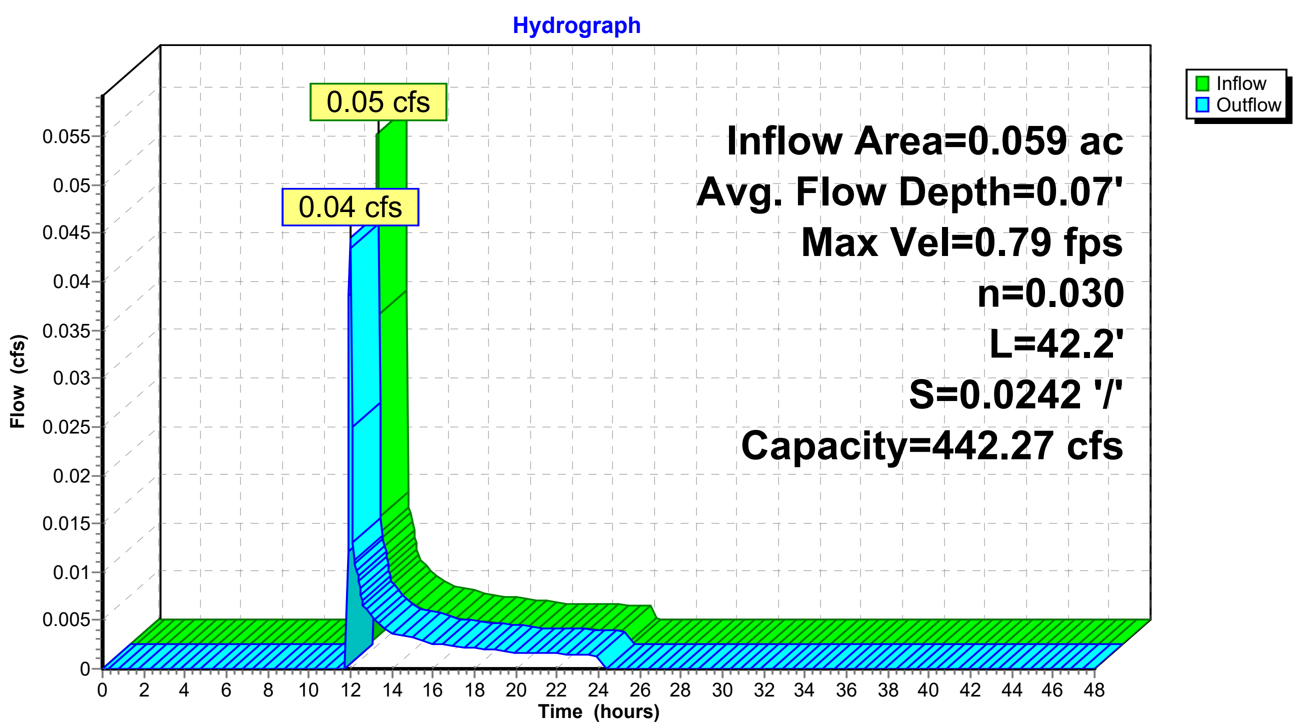
Reach TB-I3: TB-I3



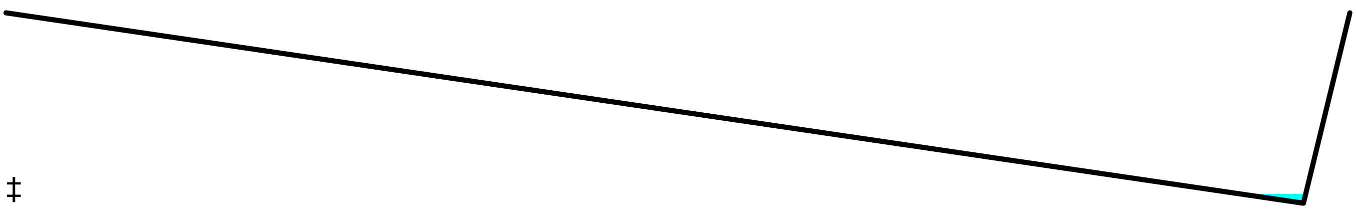
Summary for Reach TB-J1: TB-J1

Inflow Area = 0.144 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.12 cfs @ 11.96 hrs, Volume= 0.008 af
Outflow = 0.10 cfs @ 12.02 hrs, Volume= 0.008 af, Atten= 20%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.79 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.40 fps, Avg. Travel Time= 3.3 min

Peak Storage= 11 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 339.37 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 79.4' Slope= 0.0142 '/'
Inlet Invert= 71.99', Outlet Invert= 70.86'



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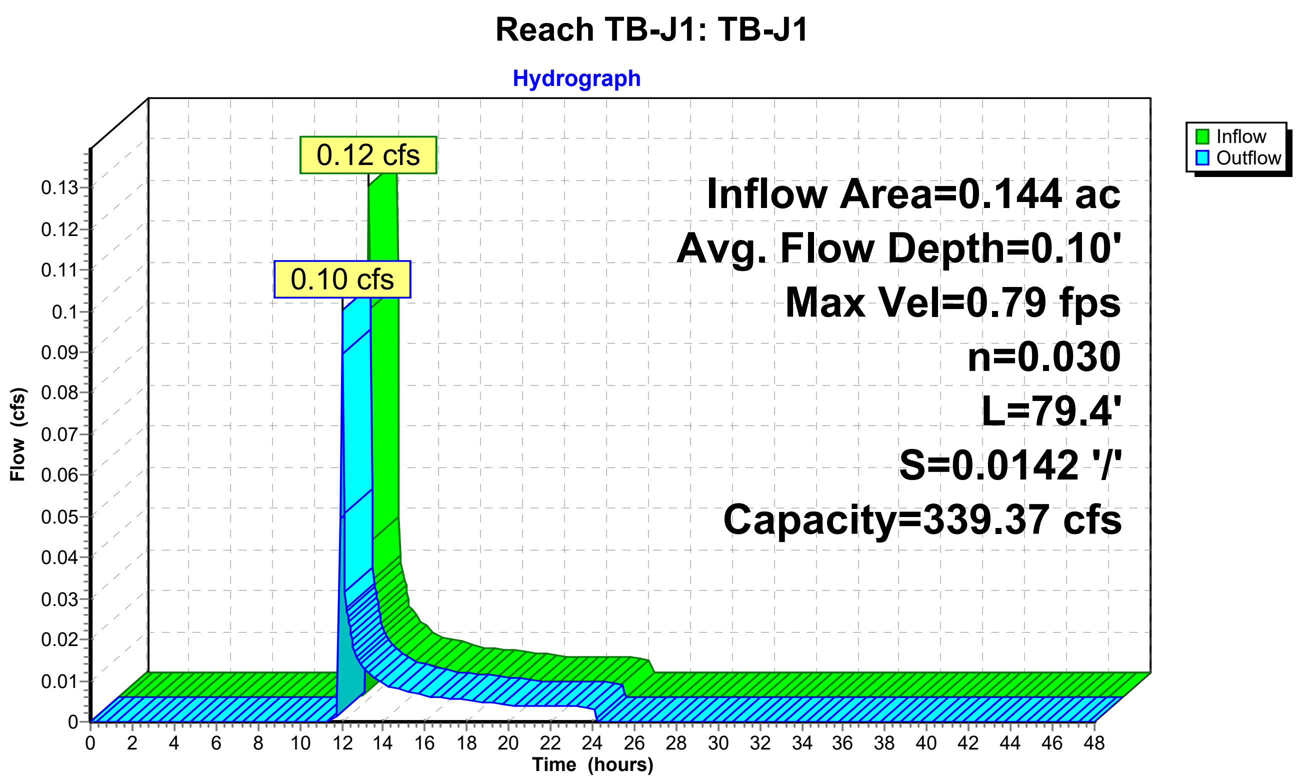


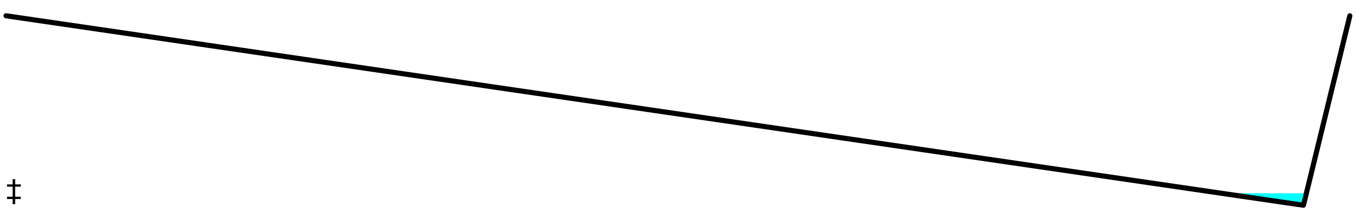
Summary for Reach TB-J2: TB-J2

Inflow Area = 0.291 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.26 cfs @ 11.96 hrs, Volume= 0.016 af
Outflow = 0.17 cfs @ 12.07 hrs, Volume= 0.016 af, Atten= 33%, Lag= 6.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.81 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 0.41 fps, Avg. Travel Time= 7.6 min

Peak Storage= 42 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 295.10 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 184.0' Slope= 0.0108 '/'
Inlet Invert= 53.98', Outlet Invert= 52.00'



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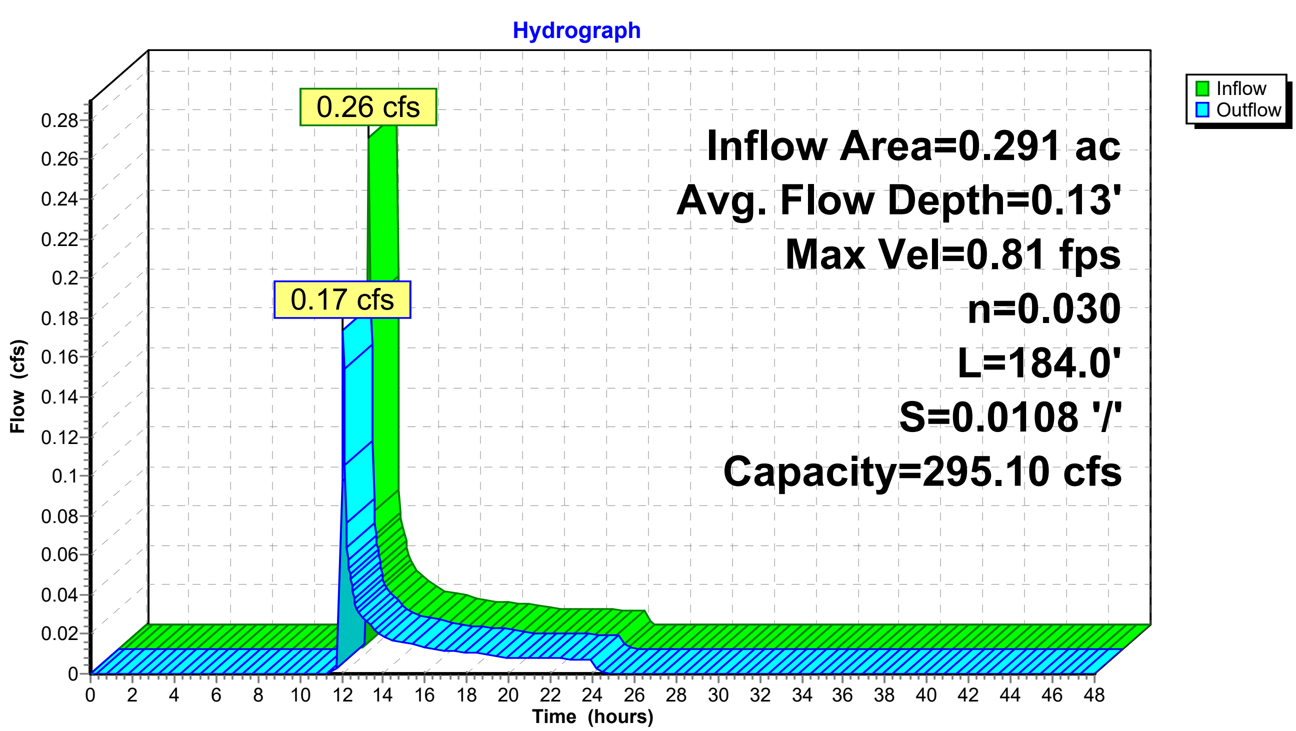
Reach TB-J2: TB-J2



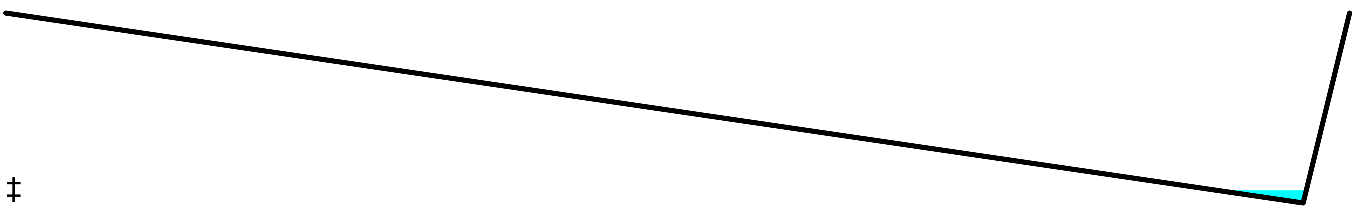
Summary for Reach TB-J3: TB-J3

Inflow Area = 0.399 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.35 cfs @ 11.96 hrs, Volume= 0.022 af
Outflow = 0.22 cfs @ 12.08 hrs, Volume= 0.022 af, Atten= 38%, Lag= 7.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.94 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 0.47 fps, Avg. Travel Time= 8.5 min

Peak Storage= 62 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 330.56 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 240.7' Slope= 0.0135 '/'
Inlet Invert= 36.03', Outlet Invert= 32.78'



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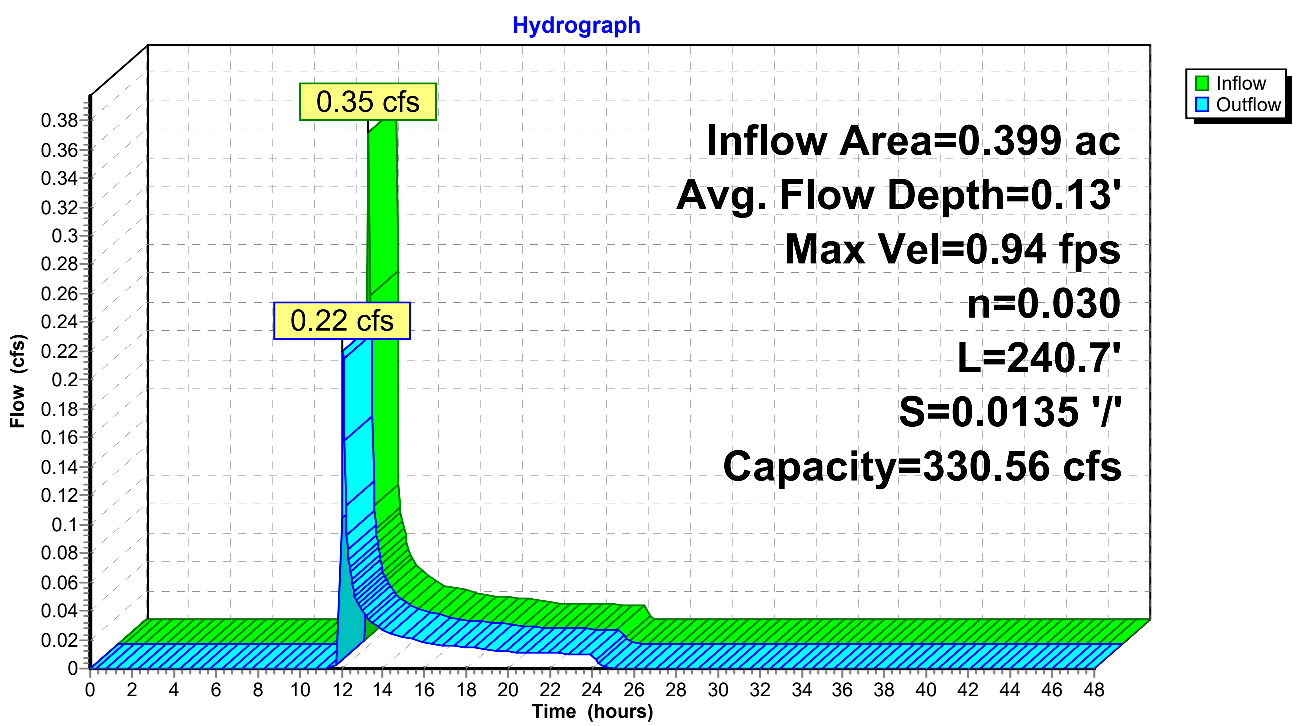
Reach TB-J3: TB-J3



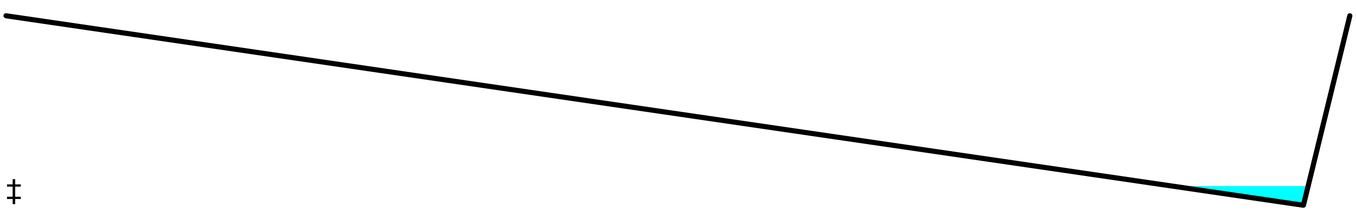
Summary for Reach TB-K1: TB-K1

Inflow Area = 1.397 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.80 cfs @ 12.06 hrs, Volume= 0.077 af
Outflow = 0.61 cfs @ 12.21 hrs, Volume= 0.077 af, Atten= 24%, Lag= 9.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.04 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 9.5 min

Peak Storage= 183 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 2.00' Flow Area= 58.0 sf, Capacity= 279.09 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 28.0 1.0 '/' Top Width= 58.00'
Length= 306.5' Slope= 0.0096 '/'
Inlet Invert= 93.00', Outlet Invert= 90.05'



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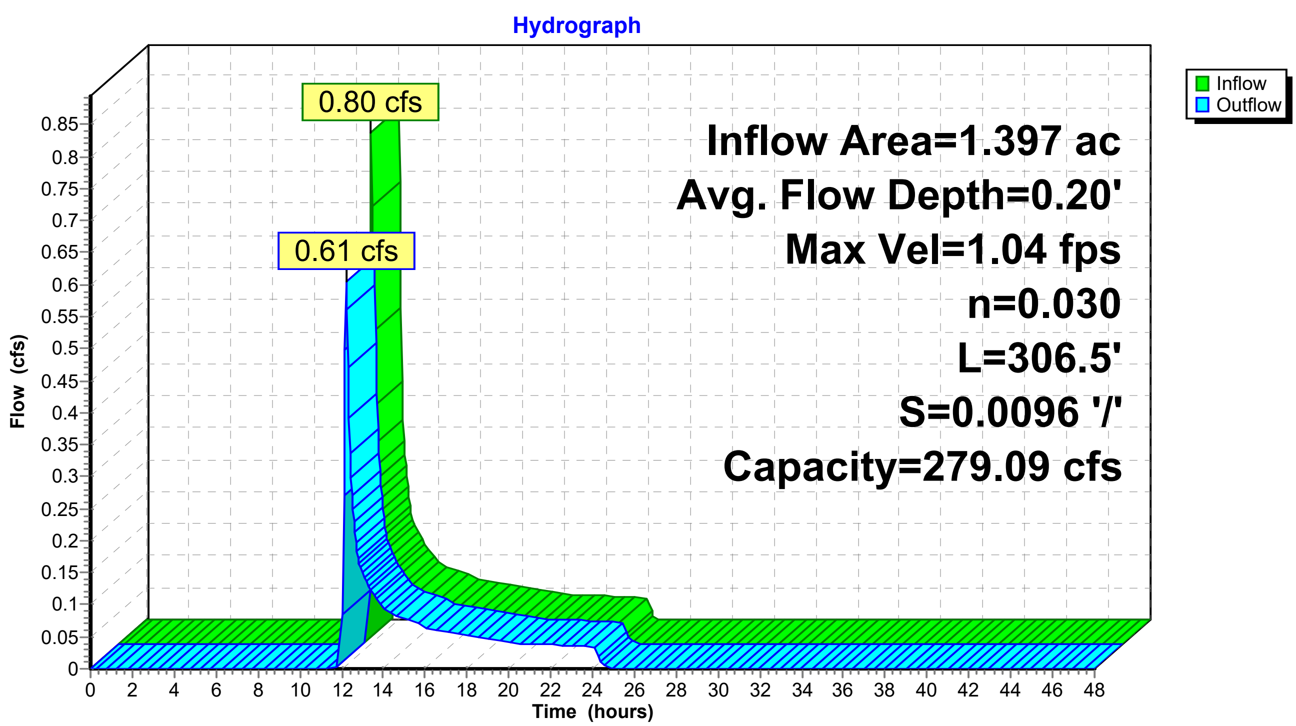
Reach TB-K1: TB-K1



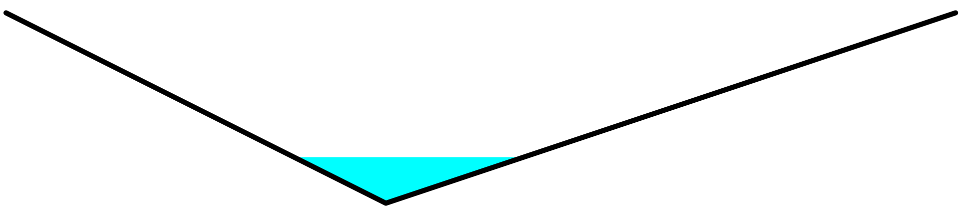
Summary for Reach TB-K10: TB-K10

Inflow Area = 0.660 ac, 0.00% Impervious, Inflow Depth = 1.64" for 25-yr,24-hr event
Inflow = 1.87 cfs @ 11.91 hrs, Volume= 0.090 af
Outflow = 1.60 cfs @ 11.99 hrs, Volume= 0.090 af, Atten= 14%, Lag= 5.3 min

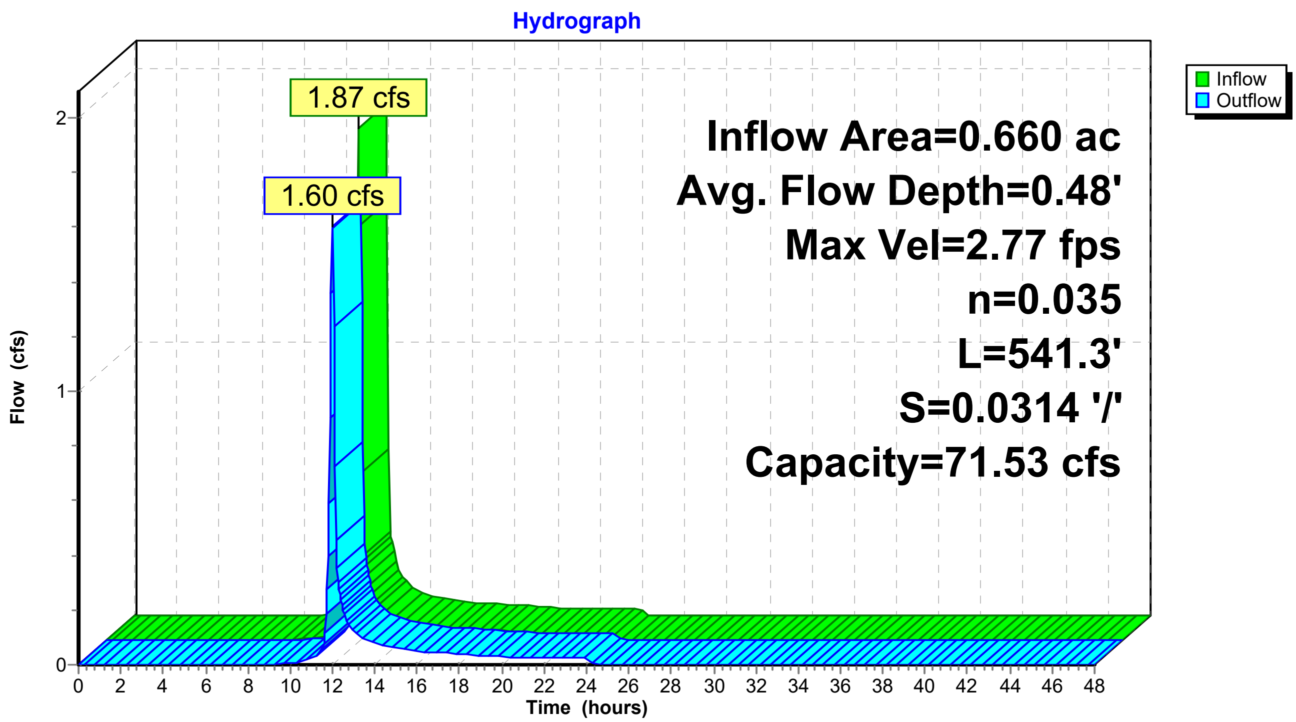
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 8.7 min

Peak Storage= 317 cf @ 11.94 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 71.53 cfs

0.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 3.0 '/' Top Width= 10.00'
Length= 541.3' Slope= 0.0314 '/'
Inlet Invert= 34.00', Outlet Invert= 16.98'



Reach TB-K10: TB-K10



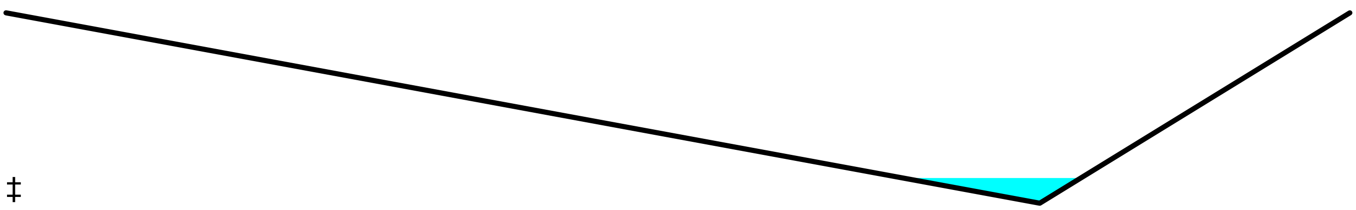
Summary for Reach TB-K2: TB-K2

Inflow Area = 0.370 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.33 cfs @ 11.95 hrs, Volume= 0.020 af
Outflow = 0.17 cfs @ 12.12 hrs, Volume= 0.020 af, Atten= 48%, Lag= 10.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.12 fps, Min. Travel Time= 6.7 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 13.6 min

Peak Storage= 74 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 40.66 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 455.3' Slope= 0.0155 '/'
Inlet Invert= 91.07', Outlet Invert= 84.00'



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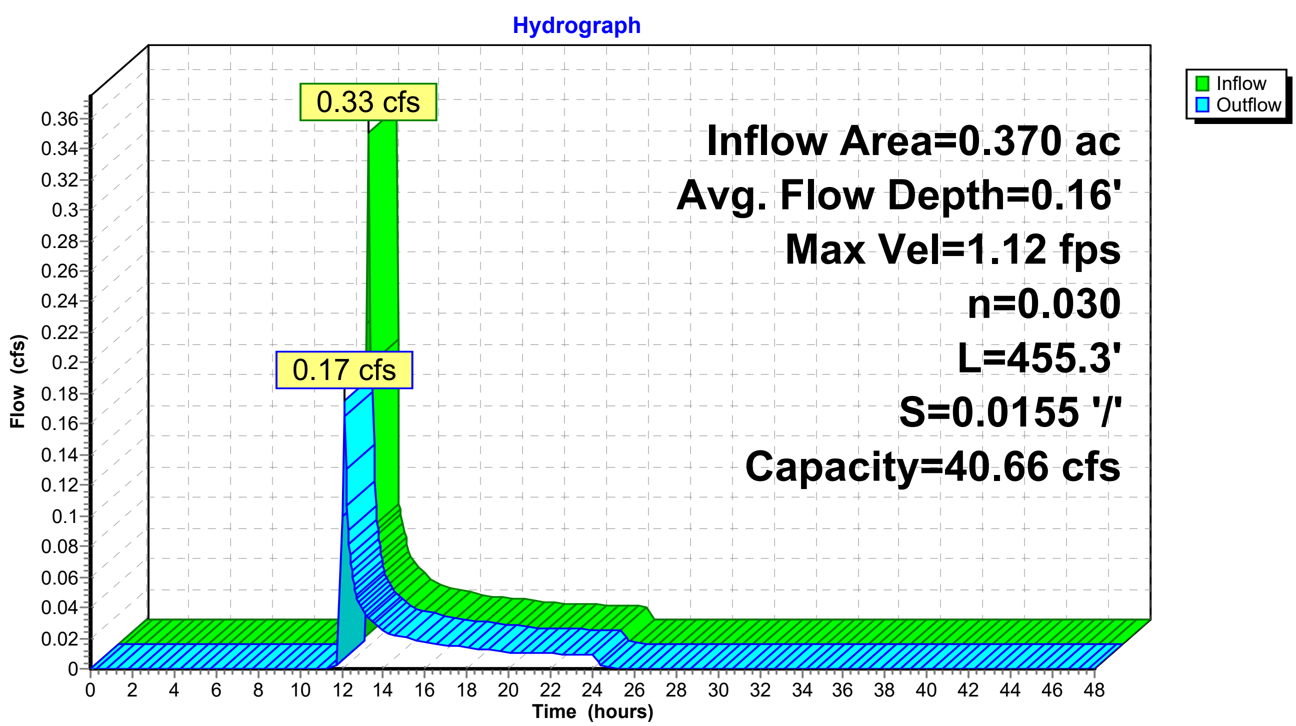
Reach TB-K2: TB-K2



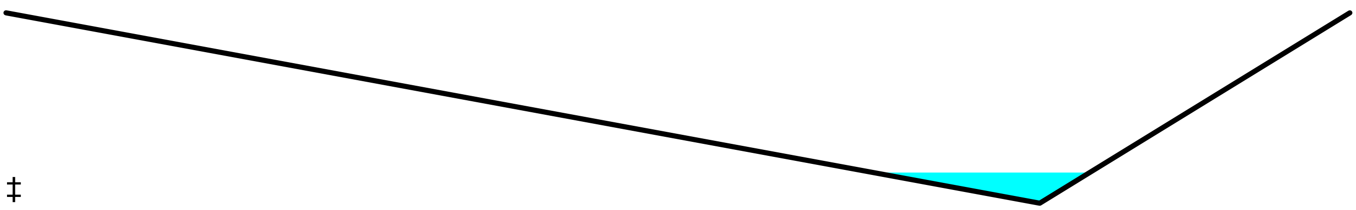
Summary for Reach TB-K3: TB-K3

Inflow Area = 0.661 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.44 cfs @ 12.02 hrs, Volume= 0.036 af
Outflow = 0.31 cfs @ 12.17 hrs, Volume= 0.036 af, Atten= 29%, Lag= 9.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.30 fps, Min. Travel Time= 5.1 min
Avg. Velocity = 0.65 fps, Avg. Travel Time= 10.1 min

Peak Storage= 96 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 41.33 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 395.7' Slope= 0.0160 '/'
Inlet Invert= 90.35', Outlet Invert= 84.00'



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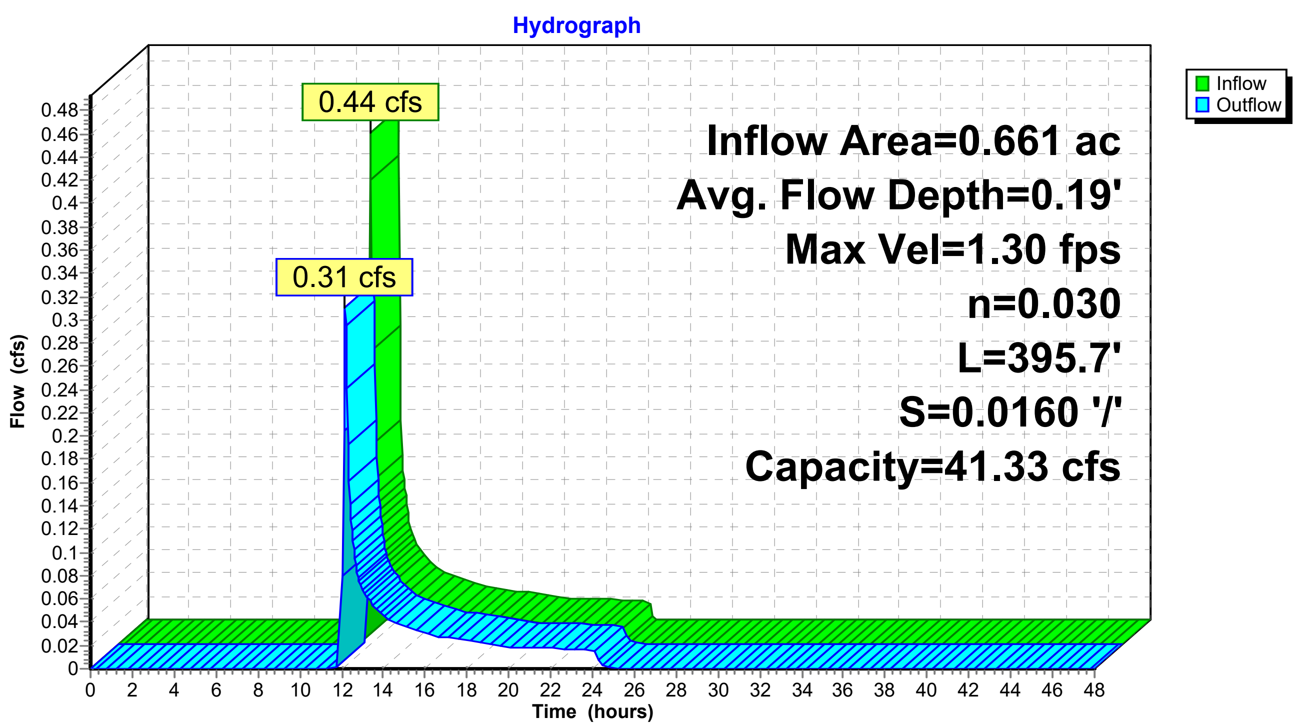
Reach TB-K3: TB-K3



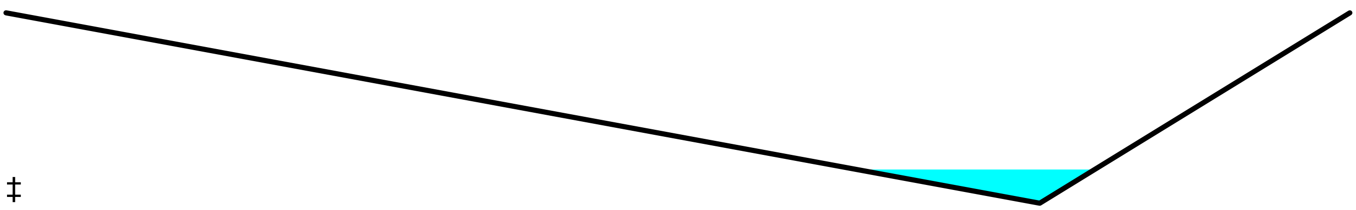
Summary for Reach TB-K4: TB-K4

Inflow Area = 0.687 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.61 cfs @ 11.96 hrs, Volume= 0.038 af
Outflow = 0.37 cfs @ 12.11 hrs, Volume= 0.038 af, Atten= 40%, Lag= 9.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.30 fps, Min. Travel Time= 5.3 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 11.2 min

Peak Storage= 122 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 38.75 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 415.5' Slope= 0.0141 '/'
Inlet Invert= 70.86', Outlet Invert= 65.00'



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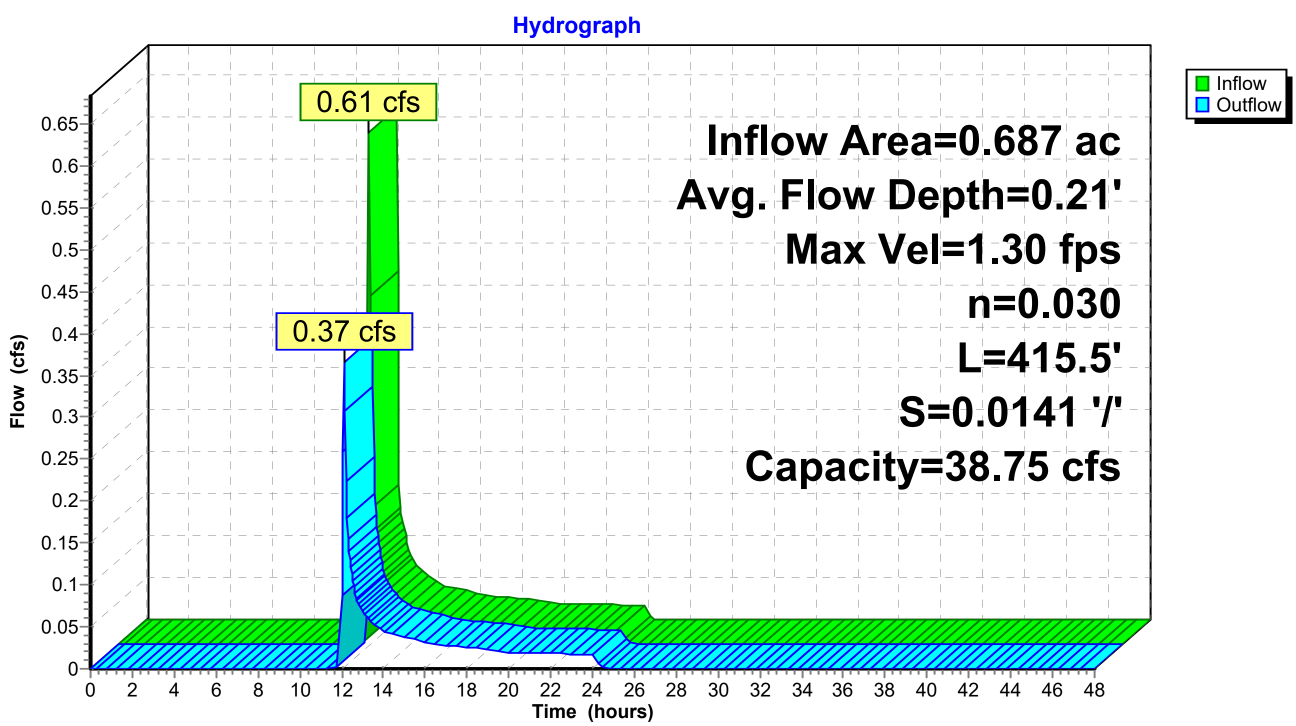
Reach TB-K4: TB-K4



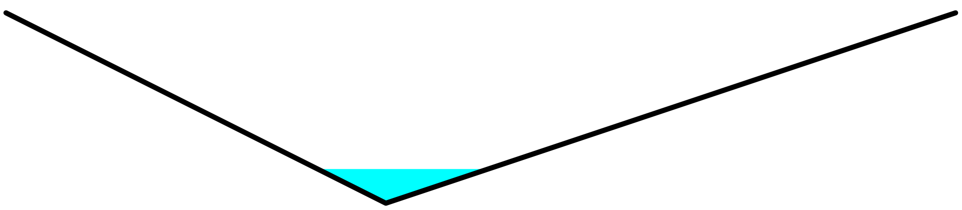
Summary for Reach TB-K5: TB-K5

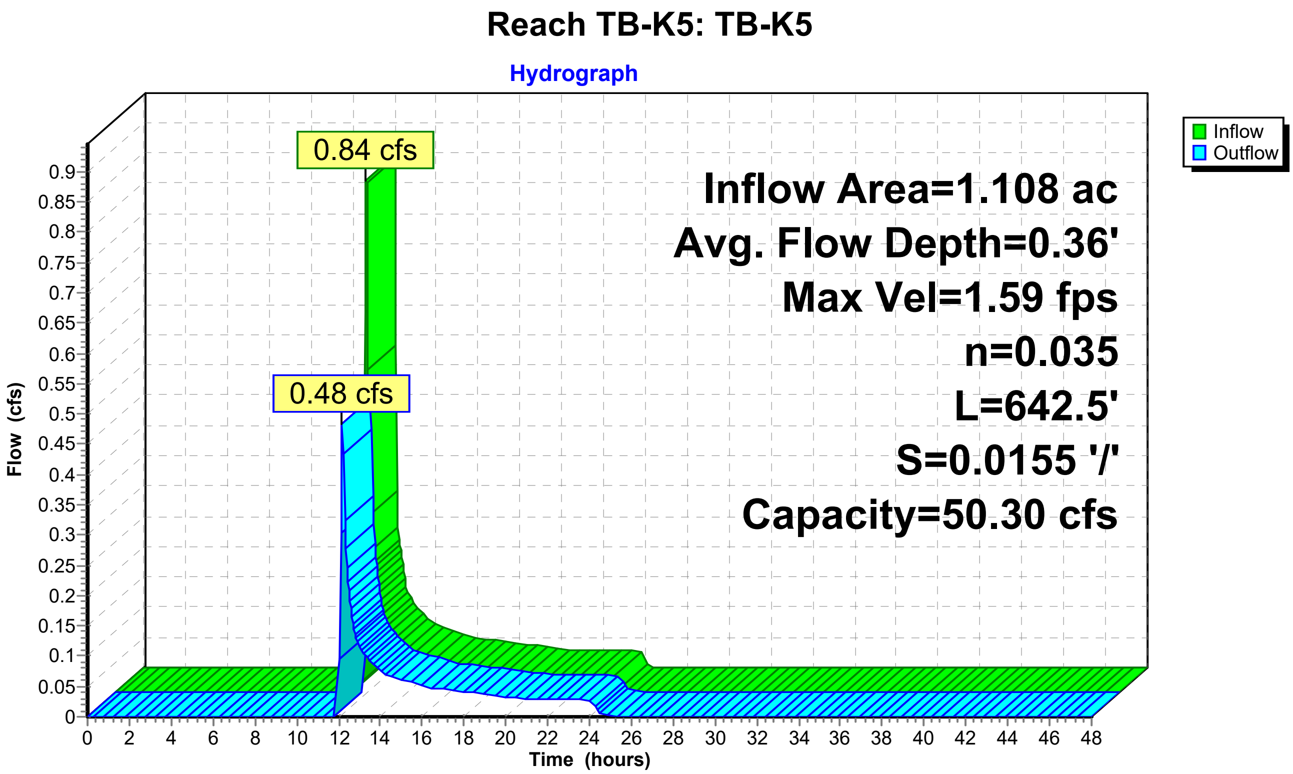
Inflow Area = 1.108 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.84 cfs @ 12.00 hrs, Volume= 0.061 af
Outflow = 0.48 cfs @ 12.18 hrs, Volume= 0.061 af, Atten= 43%, Lag= 10.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.59 fps, Min. Travel Time= 6.7 min
Avg. Velocity = 0.77 fps, Avg. Travel Time= 13.9 min

Peak Storage= 206 cf @ 12.06 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 50.30 cfs

0.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 3.0 '/' Top Width= 10.00'
Length= 642.5' Slope= 0.0155 '/'
Inlet Invert= 74.99', Outlet Invert= 65.00'





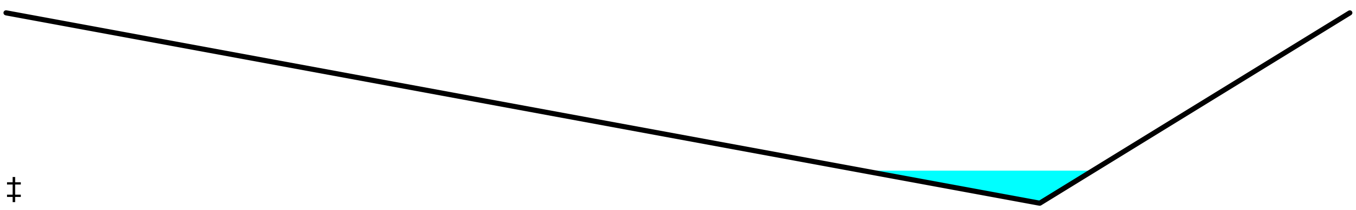
Summary for Reach TB-K6: TB-K6

Inflow Area = 0.631 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.56 cfs @ 11.96 hrs, Volume= 0.035 af
Outflow = 0.34 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 39%, Lag= 8.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.36 fps, Min. Travel Time= 4.7 min
Avg. Velocity = 0.65 fps, Avg. Travel Time= 9.7 min

Peak Storage= 104 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 41.41 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 379.3' Slope= 0.0161 '/'
Inlet Invert= 52.11', Outlet Invert= 46.00'



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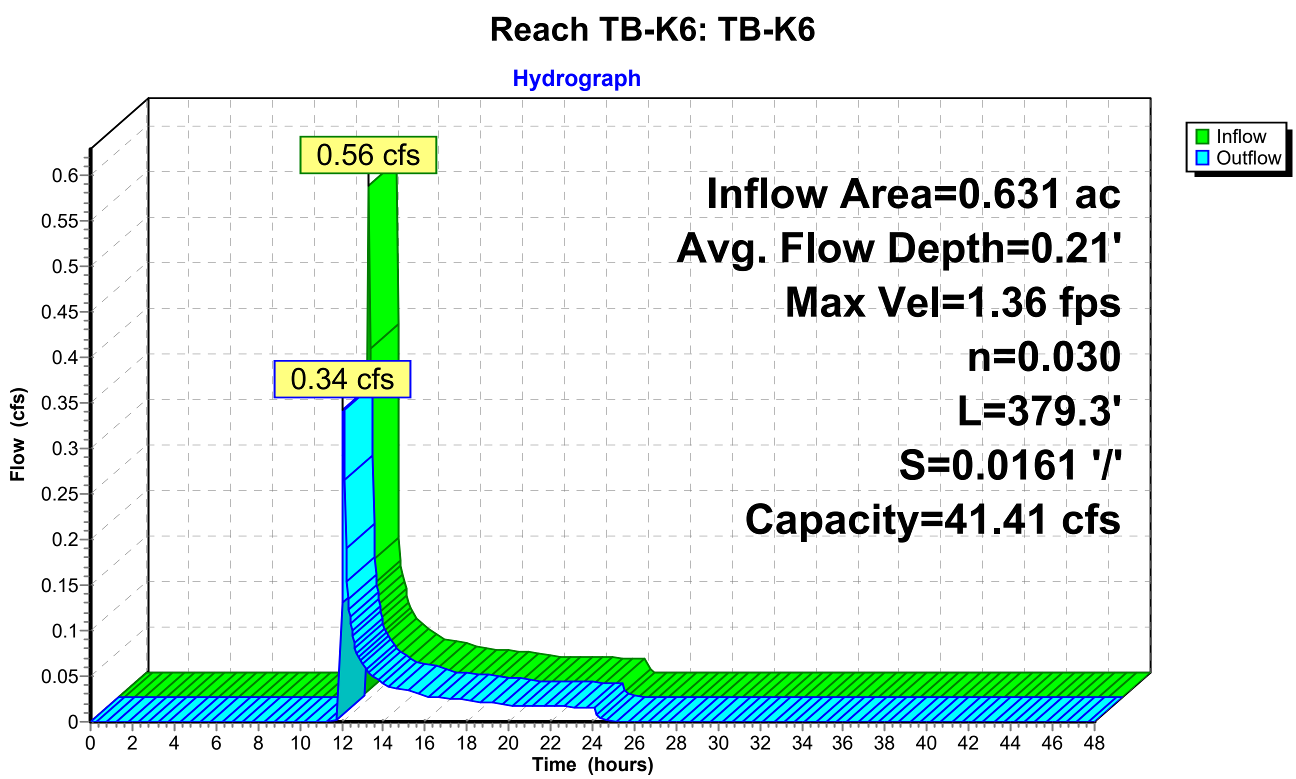


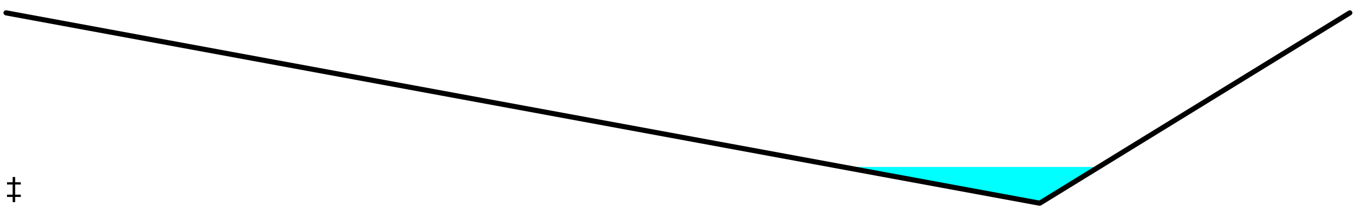
Summary for Reach TB-K7: TB-K7

Inflow Area = 1.089 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.97 cfs @ 11.96 hrs, Volume= 0.060 af
Outflow = 0.47 cfs @ 12.17 hrs, Volume= 0.060 af, Atten= 51%, Lag= 12.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.42 fps, Min. Travel Time= 8.2 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 17.2 min

Peak Storage= 236 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 40.81 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 700.0' Slope= 0.0156 '/'
Inlet Invert= 56.95', Outlet Invert= 46.00'



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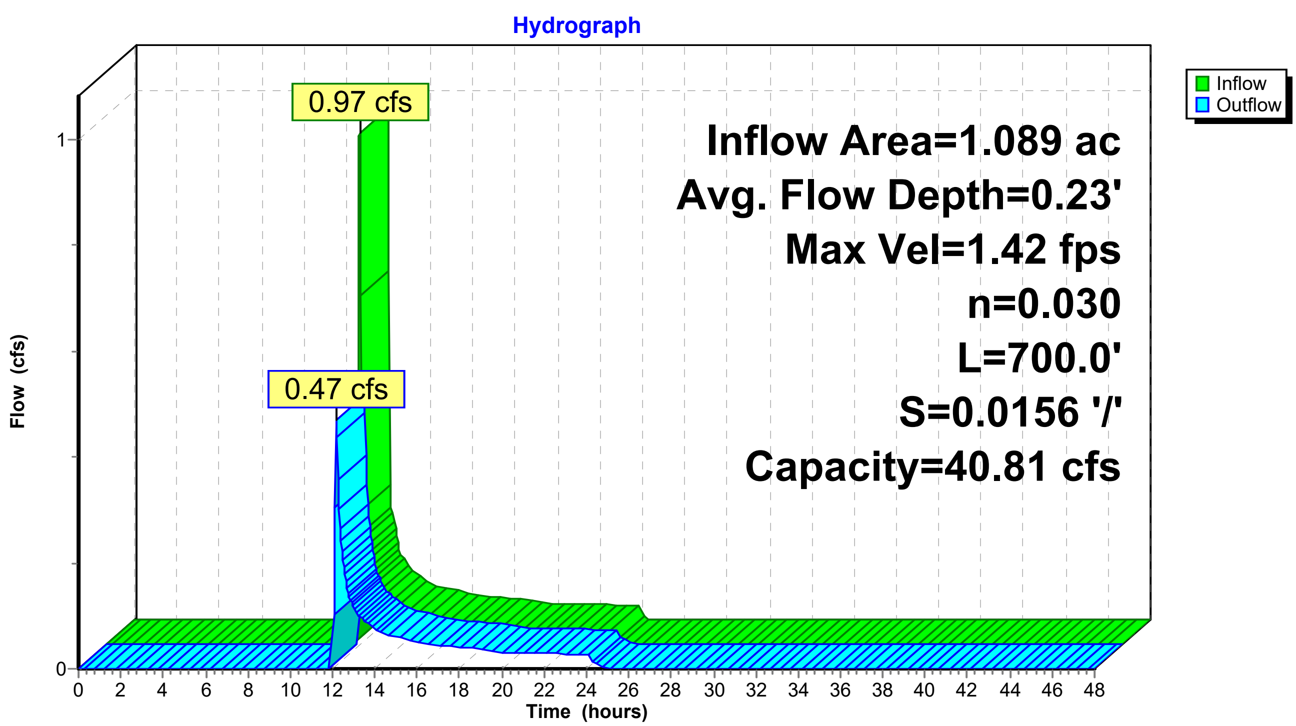
Reach TB-K7: TB-K7



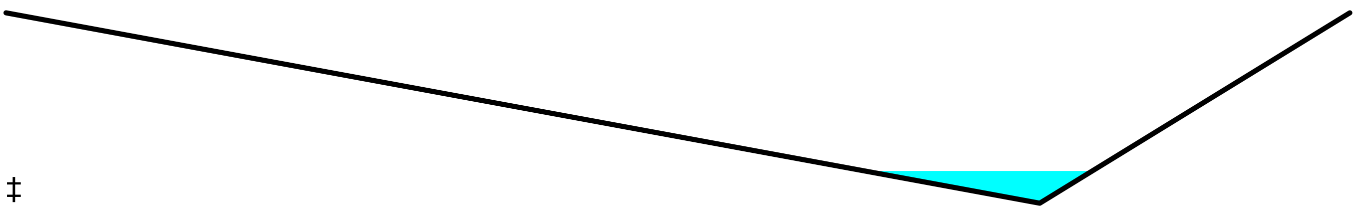
Summary for Reach TB-K8: TB-K8

Inflow Area = 0.571 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.51 cfs @ 11.96 hrs, Volume= 0.031 af
Outflow = 0.31 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 39%, Lag= 8.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.27 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 9.4 min

Peak Storage= 92 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 38.86 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 343.3' Slope= 0.0142 '/'
Inlet Invert= 32.78', Outlet Invert= 27.91'



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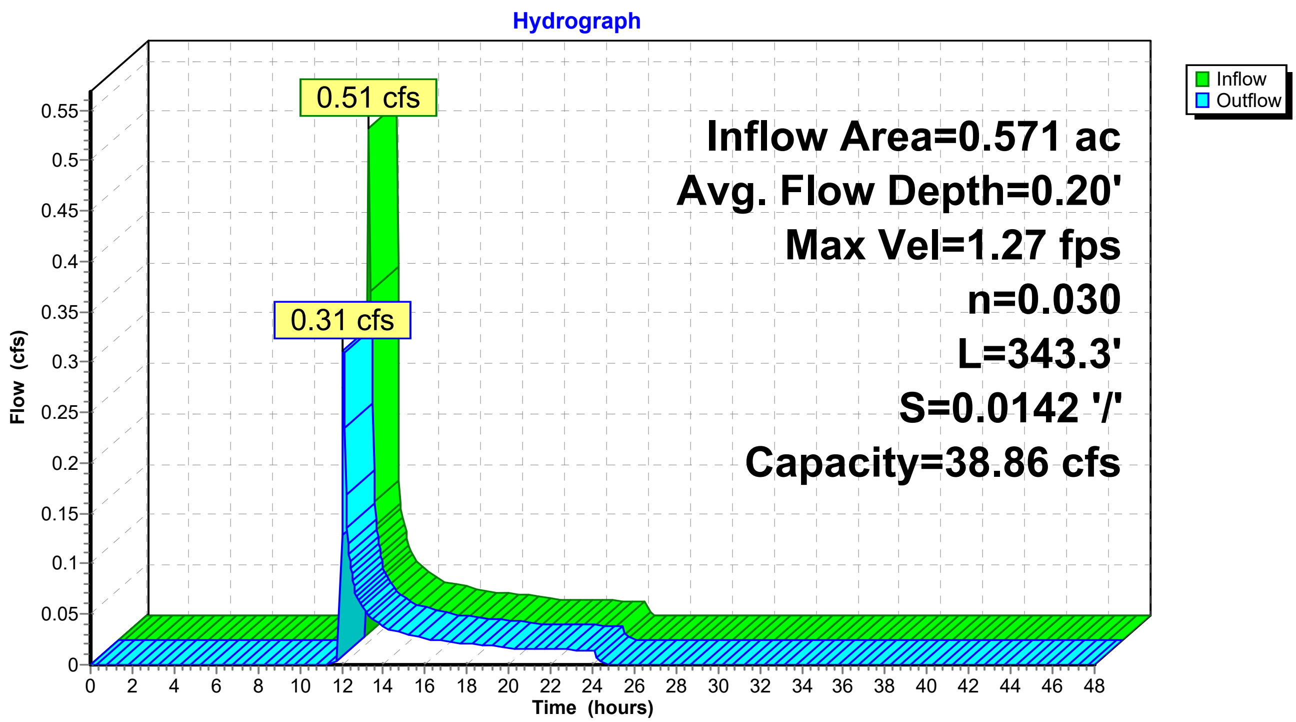
Reach TB-K8: TB-K8



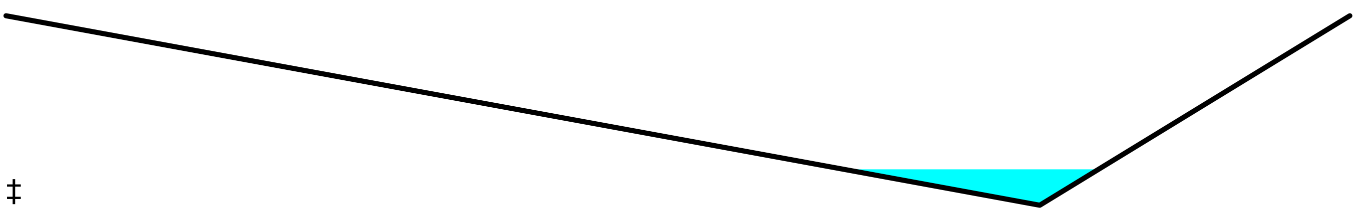
Summary for Reach TB-K9: TB-K9

Inflow Area = 0.943 ac, 0.00% Impervious, Inflow Depth = 0.66" for 25-yr,24-hr event
Inflow = 0.84 cfs @ 11.96 hrs, Volume= 0.052 af
Outflow = 0.42 cfs @ 12.16 hrs, Volume= 0.052 af, Atten= 50%, Lag= 12.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.30 fps, Min. Travel Time= 7.5 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 15.8 min

Peak Storage= 198 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.20' Flow Area= 9.4 sf, Capacity= 37.52 cfs

0.00' x 1.20' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 3.0 '/' Top Width= 15.60'
Length= 590.7' Slope= 0.0132 '/'
Inlet Invert= 35.72', Outlet Invert= 27.91'



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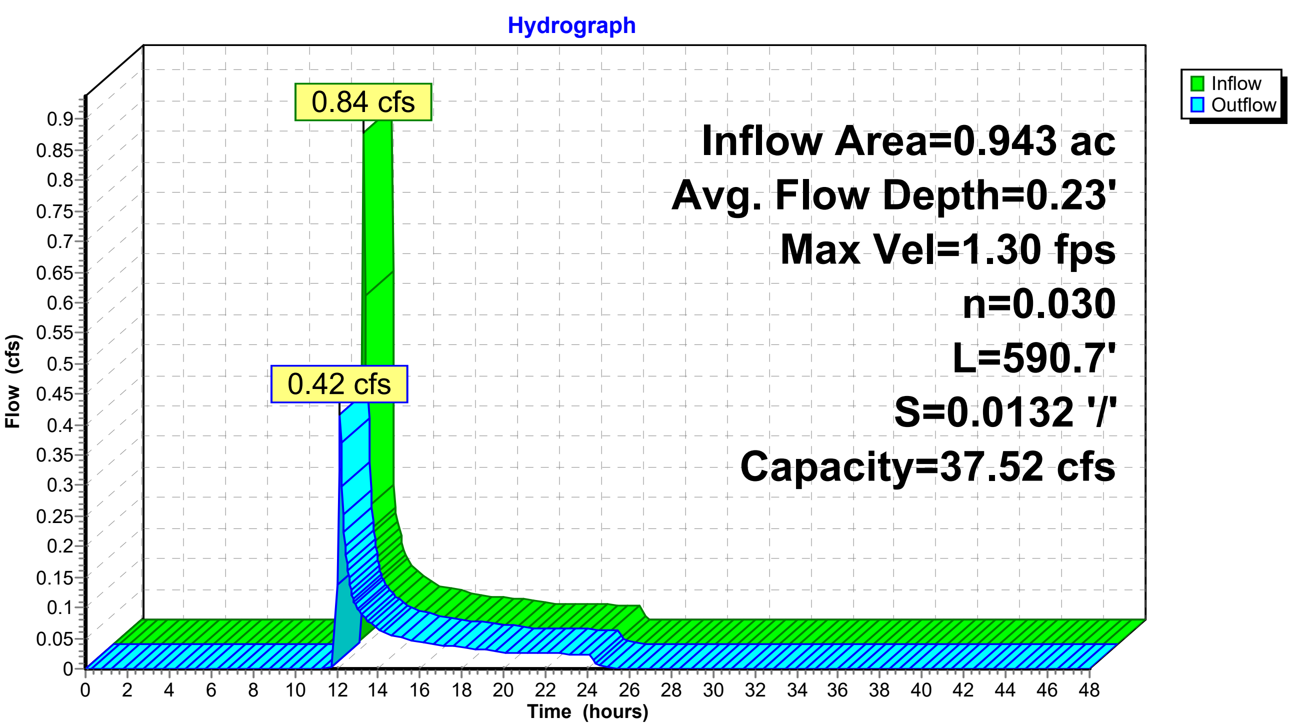
Reach TB-K9: TB-K9



Summary for Pond EF: East Forebay

Inflow Area = 27.531 ac, 0.00% Impervious, Inflow Depth = 0.88" for 25-yr,24-hr event
Inflow = 7.65 cfs @ 12.36 hrs, Volume= 2.030 af
Outflow = 7.17 cfs @ 12.45 hrs, Volume= 2.030 af, Atten= 6%, Lag= 5.4 min
Primary = 7.17 cfs @ 12.45 hrs, Volume= 2.030 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 7.00' Surf.Area= 21,422 sf Storage= 38,776 cf
Peak Elev= 7.22' @ 12.45 hrs Surf.Area= 21,801 sf Storage= 43,625 cf (4,849 cf above start)

Plug-Flow detention time= 340.7 min calculated for 1.139 af (56% of inflow)
Center-of-Mass det. time= 17.2 min (941.6 - 924.4)

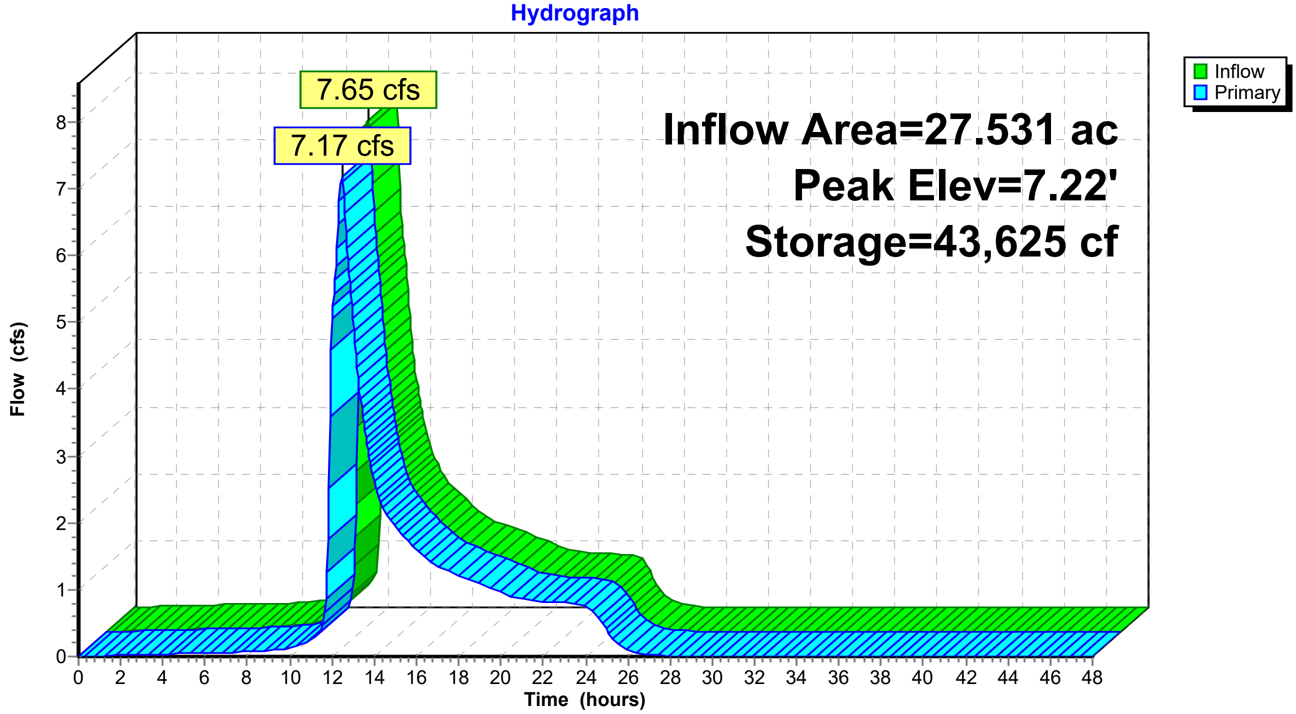
Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	111,542 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5.00	16,828	0	0
6.00	19,651	18,240	18,240
7.00	21,422	20,537	38,776
8.00	23,109	22,266	61,042
9.00	24,775	23,942	84,984
10.00	28,341	26,558	111,542

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	**Asymmetrical Weir, C= 3.27** Offset (feet) 0.00 9.00 29.00 38.00 Height (feet) 3.00 0.00 0.00 3.00

Primary OutFlow Max=7.13 cfs @ 12.45 hrs HW=7.22' (Free Discharge)
└─**1=Asymmetrical Weir** (Weir Controls 7.13 cfs @ 1.49 fps)

Pond EF: East Forebay



Summary for Pond NE Basin: NE Basin

Inflow Area = 66.671 ac, 0.51% Impervious, Inflow Depth = 0.87" for 25-yr,24-hr event
Inflow = 20.52 cfs @ 11.99 hrs, Volume= 4.808 af
Outflow = 17.48 cfs @ 12.48 hrs, Volume= 4.808 af, Atten= 15%, Lag= 29.3 min
Discarded = 17.48 cfs @ 12.48 hrs, Volume= 4.807 af
Primary = 0.00 cfs @ 12.48 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 5.06' @ 12.48 hrs Surf.Area= 243,096 sf Storage= 14,349 cf

Plug-Flow detention time= 13.7 min calculated for 4.803 af (100% of inflow)
Center-of-Mass det. time= 13.7 min (945.1 - 931.5)

Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	1,399,154 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

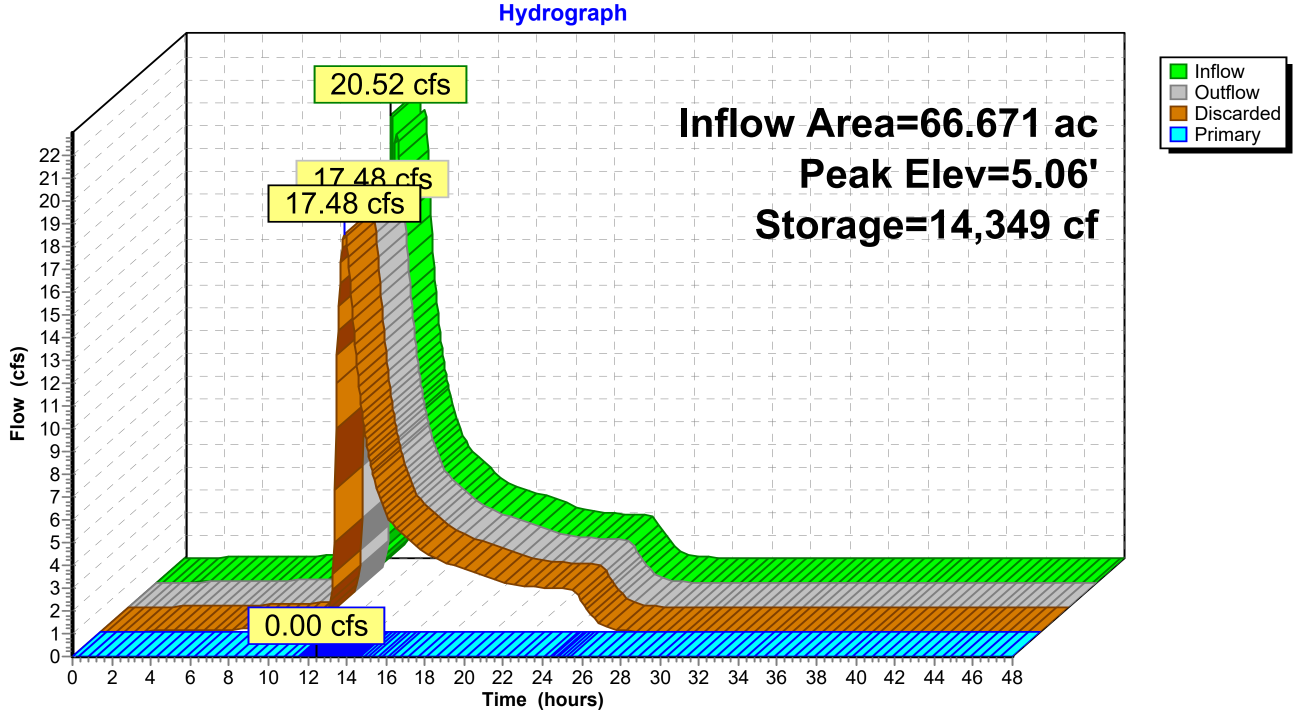
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5.00	241,617	0	0
6.00	266,595	254,106	254,106
7.00	275,843	271,219	525,325
8.00	286,099	280,971	806,296
9.00	296,412	291,256	1,097,552
10.00	306,793	301,603	1,399,154

Device	Routing	Invert	Outlet Devices
#1	Primary	5.00'	**0.113 cfs Constant Flow/Skimmer** Phase-In= 5.00'
#2	Discarded	5.00'	**2.970 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 4.00'

Discarded OutFlow Max=17.70 cfs @ 12.48 hrs HW=5.06' (Free Discharge)
└─**2=Exfiltration** (Controls 17.70 cfs)

Primary OutFlow Max=0.00 cfs @ 12.48 hrs HW=5.06' (Free Discharge)
└─**1=Constant Flow/Skimmer** (Constant Controls 0.00 cfs)

Pond NE Basin: NE Basin



Summary for Pond SW Basin: SW Basin

Inflow Area =	16.679 ac,	0.00% Impervious,	Inflow Depth = 0.89"	for 25-yr,24-hr event	
Inflow =	8.28 cfs @	11.94 hrs,	Volume=	1.237 af	
Outflow =	4.98 cfs @	12.12 hrs,	Volume=	1.237 af,	Atten= 40%, Lag= 10.7 min
Discarded =	4.98 cfs @	12.12 hrs,	Volume=	1.237 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 15.03' @ 12.12 hrs Surf.Area= 129,930 sf Storage= 3,448 cf

Plug-Flow detention time= 11.5 min calculated for 1.236 af (100% of inflow)
Center-of-Mass det. time= 11.5 min (921.9 - 910.4)

Volume	Invert	Avail.Storage	Storage Description
#1	15.00'	706,412 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

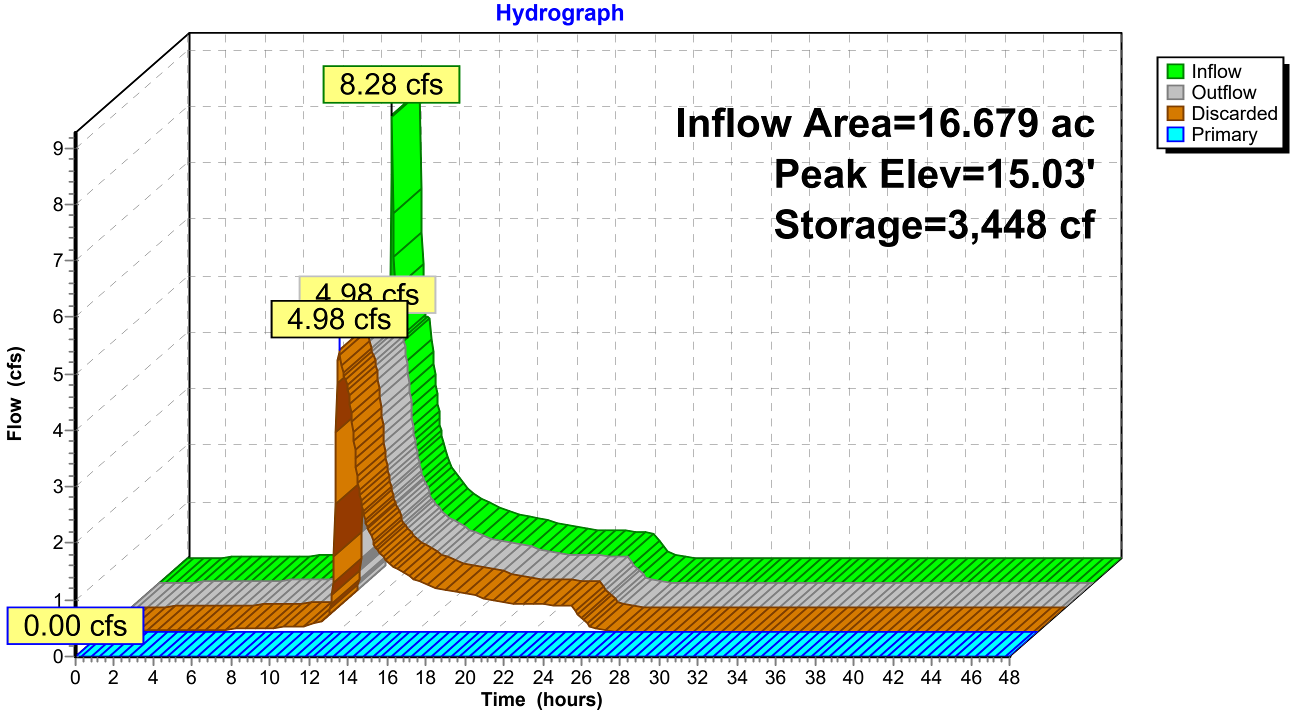
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.00	129,810	0	0
16.00	134,325	132,068	132,068
17.00	138,901	136,613	268,681
18.00	143,540	141,221	409,901
19.00	148,240	145,890	555,791
20.00	153,002	150,621	706,412

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	**Asymmetrical Weir, C= 3.27** Offset (feet) 0.00 6.00 16.00 22.00 Height (feet) 2.00 0.00 0.00 2.00
#2	Discarded	15.00'	**2.970 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 14.00'

Discarded OutFlow Max=9.17 cfs @ 12.12 hrs HW=15.03' (Free Discharge)
└─**2=Exfiltration** (Controls 9.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=15.00' (Free Discharge)
└─**1=Asymmetrical Weir** (Controls 0.00 cfs)

Pond SW Basin: SW Basin



Summary for Pond SWF: Southwest Forebay

Inflow Area = 13.035 ac, 0.00% Impervious, Inflow Depth = 0.96" for 25-yr,24-hr event
Inflow = 6.70 cfs @ 11.91 hrs, Volume= 1.038 af
Outflow = 5.46 cfs @ 11.99 hrs, Volume= 1.038 af, Atten= 19%, Lag= 4.4 min
Primary = 5.46 cfs @ 11.99 hrs, Volume= 1.038 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 17.00' Surf.Area= 16,959 sf Storage= 30,840 cf
Peak Elev= 17.13' @ 11.99 hrs Surf.Area= 17,166 sf Storage= 33,012 cf (2,172 cf above start)

Plug-Flow detention time= 512.3 min calculated for 0.330 af (32% of inflow)
Center-of-Mass det. time= 9.6 min (906.0 - 896.4)

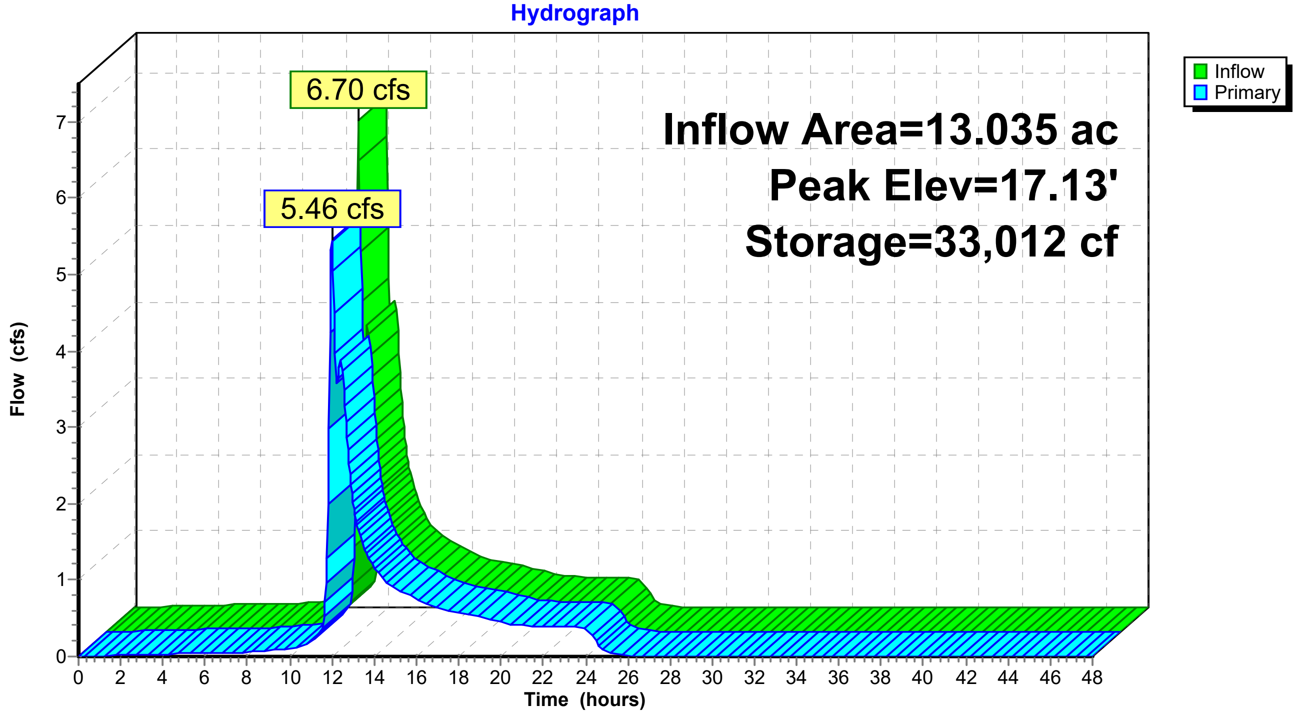
Volume	Invert	Avail.Storage	Storage Description
#1	15.00'	89,207 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.00	13,915	0	0
16.00	15,403	14,659	14,659
17.00	16,959	16,181	30,840
18.00	18,585	17,772	48,612
19.00	20,280	19,433	68,045
20.00	22,044	21,162	89,207

Device	Routing	Invert	Outlet Devices
#1	Primary	17.00'	**Asymmetrical Weir, C= 3.27** Offset (feet) 0.00 4.00 40.00 44.00 Height (feet) 2.00 0.00 0.00 2.00

Primary OutFlow Max=5.32 cfs @ 11.99 hrs HW=17.13' (Free Discharge)
└─**1=Asymmetrical Weir** (Weir Controls 5.32 cfs @ 1.15 fps)

Pond SWF: Southwest Forebay



Summary for Pond WF: West Forebay

Inflow Area = 31.093 ac, 1.09% Impervious, Inflow Depth = 0.88" for 25-yr,24-hr event
Inflow = 12.72 cfs @ 12.17 hrs, Volume= 2.292 af
Outflow = 11.96 cfs @ 12.24 hrs, Volume= 2.292 af, Atten= 6%, Lag= 4.3 min
Primary = 11.96 cfs @ 12.24 hrs, Volume= 2.292 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 7.00' Surf.Area= 20,143 sf Storage= 35,775 cf
Peak Elev= 7.22' @ 12.24 hrs Surf.Area= 20,484 sf Storage= 40,144 cf (4,369 cf above start)

Plug-Flow detention time= 267.3 min calculated for 1.469 af (64% of inflow)
Center-of-Mass det. time= 9.9 min (923.0 - 913.1)

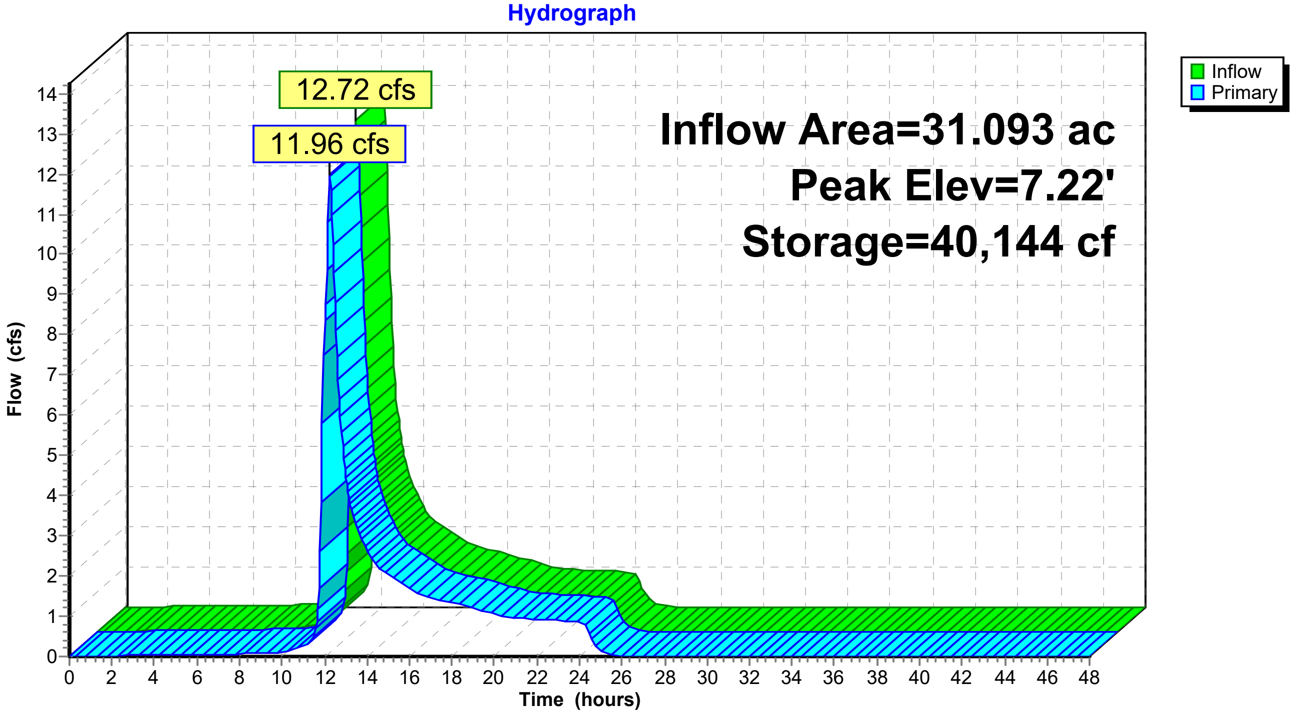
Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	103,190 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5.00	13,918	0	0
6.00	18,744	16,331	16,331
7.00	20,143	19,444	35,775
8.00	21,730	20,937	56,711
9.00	23,191	22,461	79,172
10.00	24,846	24,019	103,190

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	**Spillway, C= 3.27** Offset (feet) 0.00 9.00 45.00 54.00 Height (feet) 3.00 0.00 0.00 3.00

Primary OutFlow Max=11.88 cfs @ 12.24 hrs HW=7.21' (Free Discharge)
1=Spillway (Weir Controls 11.88 cfs @ 1.48 fps)

Pond WF: West Forebay

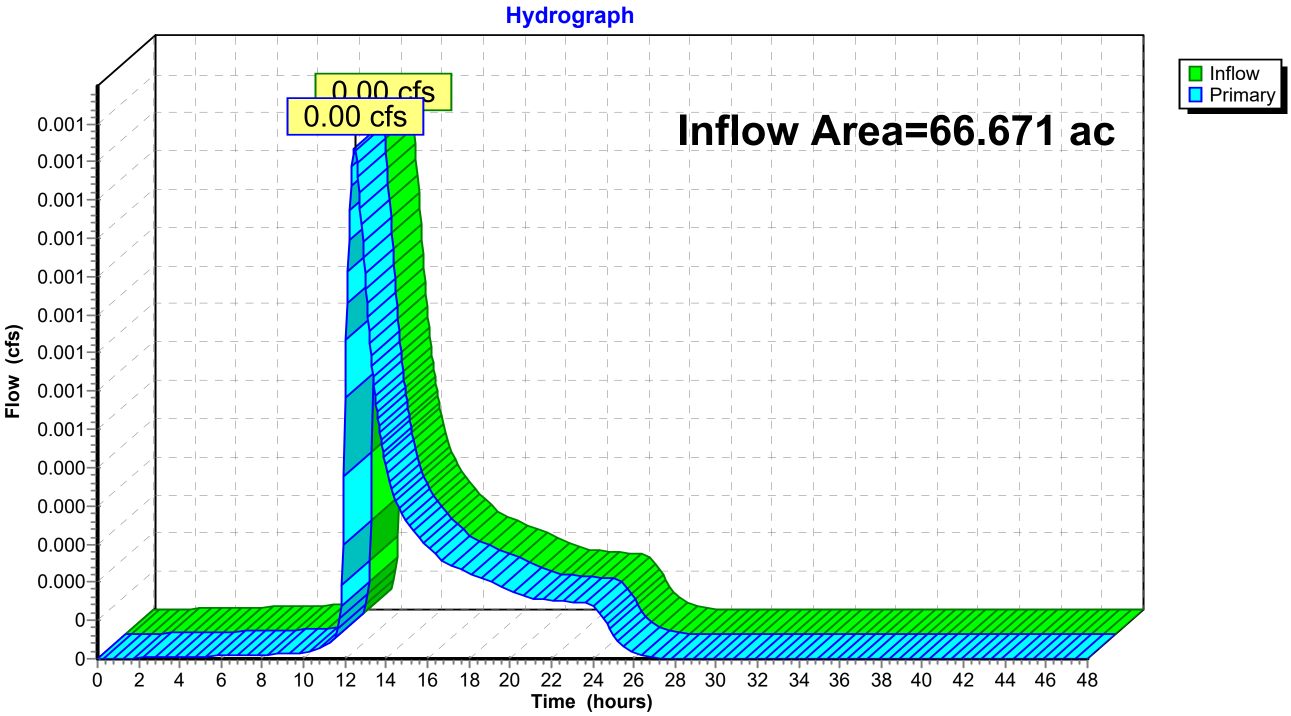


Summary for Link DP-1: Discharge Point 1

Inflow Area = 66.671 ac, 0.51% Impervious, Inflow Depth = 0.00" for 25-yr,24-hr event
Inflow = 0.00 cfs @ 12.48 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 12.48 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-1: Discharge Point 1

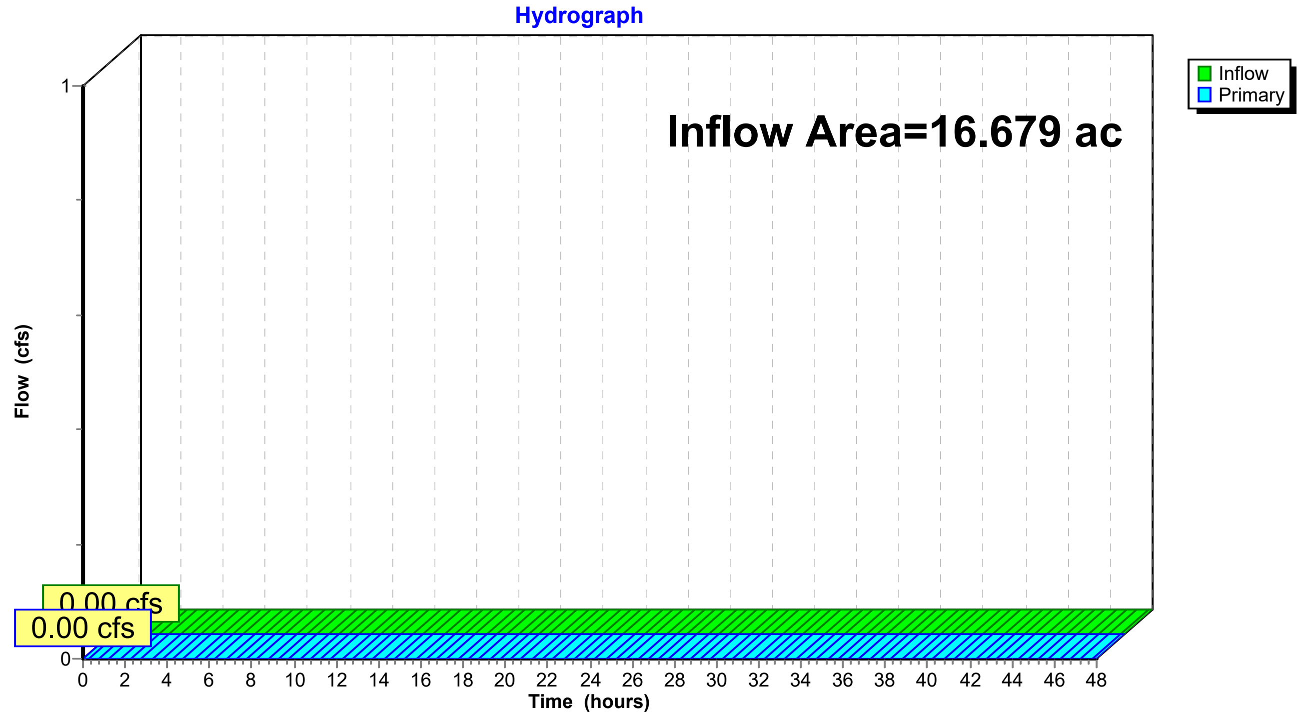


Summary for Link DP-2: Discharge Point 2

Inflow Area = 16.679 ac, 0.00% Impervious, Inflow Depth = 0.00" for 25-yr,24-hr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP-2: Discharge Point 2



Summary for Link Link 1: Into NE Basin

Inflow Area = 26.711 ac, 0.00% Impervious, Inflow Depth = 0.78" for 25-yr,24-hr event
Inflow = 7.19 cfs @ 12.37 hrs, Volume= 1.739 af
Primary = 7.19 cfs @ 12.37 hrs, Volume= 1.739 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

25-yr,24-hr Inflow Imported from Indian River Landfil (ABCD)~Link Link 1.hce

Link Link 1: Into NE Basin