Windsor Solar One

445 River St
Windsor, Connecticut

PREPARED FOR

Verogy
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West Hartford, CT 06107

PREPARED BY

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October 11, 2023

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Project Summary

Project Description

The Petitioner, Verogy, is proposing to construct a ±3.0 MW solar farm on undeveloped farmland along with all associated utilities, access paths, fencing, and landscaping to support this use (the Project). When the Project reaches the end of its life cycle, the improvements constructed as part of this Project will be removed and the land will be restored in accordance with the decommissioning plan.

Site Description

The Project Site will be comprised on approximately ±15 acres north and east of River Street, (ID 039-126-0010 in Windsor, Connecticut (see Figure 1) on a portion of a larger 46 acre parcel. The site is bounded by River Street to the west and south, and by a recently constructed Amazon distribution facility to the north and east. The development site is all within the AG zone (Agricultural) and the surrounding parcels are zoned AA (Residential) to the west and south and I (Industrial) to the north and east.

The project area under existing conditions is actively farmed. There are delineated on-site wetland systems in proximity to the development area, mainly centered around the down gradient areas to the south, between the barns. This wetland system feeds into a stream to the south of the site that runs under River Street to Farmington River.

According to available soil mapping[1], the majority of soils on site are listed as Hydrologic Soil Group A. See Appendix B for NRCS Web Soil Survey output.

According to available CTDEEP Groundwater Classification maps, groundwater at the site is GA (see Appendix A). According to CTDEEP Aquifer Protection Area maps, the site is not listed as an Aquifer Protection Area (see Appendix A), and no Aquifer Protection Areas exist within the Town of Windsor.

[1] https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

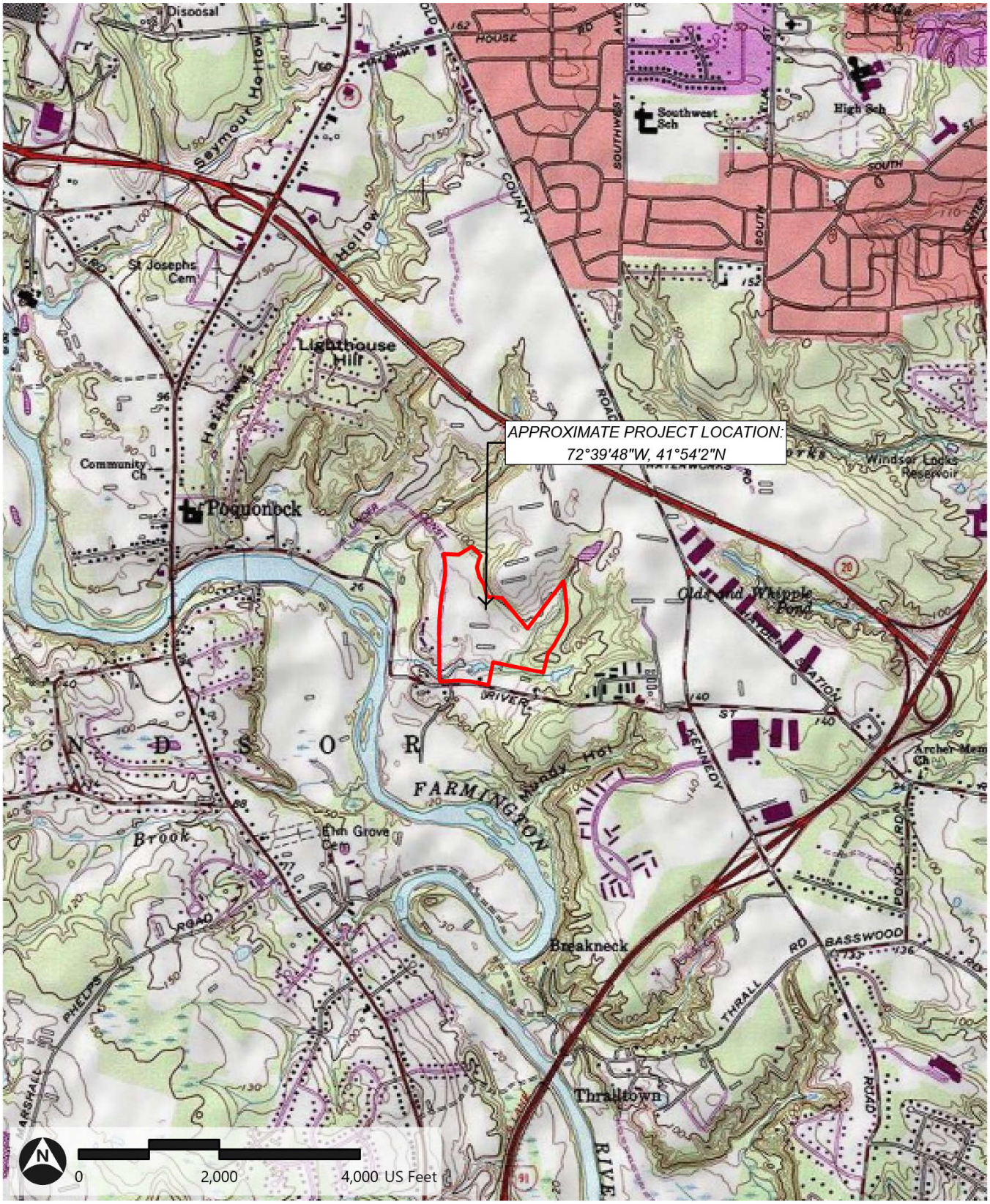
Methodology

The Project was designed to incorporate measures provided in the Connecticut Stormwater Quality Manual (CTDEEP 2004) as well as the CTDEEP Stormwater General Permit effective December 31, 2020. The conclusion of this analysis is that the proposed improvements will not increase the post-development peak runoff rates in comparison to existing predevelopment rates at any of the critical design points analyzed and stormwater quality leaving the site will be improved from existing conditions.

Figure 1: Site Location Map

Figure 1: USGS Site Location Map

Verogy | Windsor, Connecticut



Parcel Boundary

Path: \\Vhb\gis\proj\Wethersfield\43322.00 Verogy Windsor\Project\Verogy Windsor\Verogy Windsor.aprx (srao, 10/9/2023)

Source: USGS, VHB

2

Existing Drainage Conditions

Summary

Under existing conditions, runoff from the project area generally flows overland to the southwest before entering the wetlands and subsequently the stream that runs east-west. The Site is generally at its highest elevation in the north/ northeastern edge of the development area. The majority of the Project area is comprised of farm fields ranging in slopes between 0% and 5%.

Hydrologic Information

For the existing conditions hydrologic analysis, the Site contains three (3) watershed areas and one (1) design point, which has been identified as the tributary areas encompassing the Project limits where flow enters the southern watercourse system through the site. Table 1 provides a summary of the existing conditions hydrologic data. Figure 2 illustrates the existing drainage patterns on the Site. All portions of the Project area have been considered in the hydrologic analysis.

Drainage Area 1A- This ±22.3-acre area encompasses the majority of the Project as well as a portion of land to the north of the property that contributes to flow through the field. Untreated stormwater in this area generally flows over farm fields to the south into the wetlands.

Drainage Area 1B- This ±2.7-acre area includes a section of farm field on the east side of the Project above the largest farm barn. Untreated stormwater in this area generally flows over the farm field to the south/southwest into a low area south of the farmland, and eventually to the stream.

Drainage Area 1C- This ±0.5-acre area represents a small portion of the panels to the eastern extent of the array. Untreated stormwater in this area generally flows over the farm field to the south/southwest into a low area south of the farmland, and eventually to the stream.

Table 1 summarizes the key hydrologic parameters for each drainage area used in the existing conditions analysis.

Table 1 Existing Conditions Hydrologic Data

Drainage Area	*Discharge Location*	*Area (acres)*	*Curve Number*	*Time of Concentration (min)*
1A	Southern Stream	22.3	49	26
1B	Southern Stream	2.7	59	7
1C	Southern Stream	0.5	63	6

Figure 2: Existing Drainage Areas

Legend

SYMBOLS

X — DESIGN POINT

X — **DRAINAGE AREA DESIGNATION**

LINETYPES

DRAINAGE AREA BOUNDARY

HSG BOUNDARY

WETLAND BOUNDARY

TIME OF CONCENTRATION

0 100 200 Feet

vhb

Existing Drainage Conditions

Figure 2

445 River St
Windsor, CT

10/9/2023

3

Proposed Drainage Conditions

Summary

The Site has been designed to maintain existing topography and mimic existing drainage patterns to the maximum extents feasible. Across the majority of the proposed development areas, the Project proposes to install permanent turf-forming grasses to help stabilize the topsoil from erosion, sequester nutrients and pollutants, and lower runoff rates from the facility to the surrounding discharge points. Mature vegetation will be preserved to the maximum extents practicable and tree clearing is held to a minimum. As a result, the Project will have minimal impact to surrounding ecologically sensitive areas.

The only impervious surfaces proposed to be constructed are small concrete pads for utility equipment. Once operational, vehicular access to the Project will be limited to infrequent maintenance visits. The vegetated buffers held to the wetlands will provide adequate residence time and treatment capabilities for the de minimis amount of imperviousness of the project.

In accordance with CTDEEP Stormwater General Permit, it is not proposed to install solar panels within 100 feet of the southern wetland systems onsite, nor is it proposed to perform any land disturbance (i.e. tree clearing, grading, swales, stormwater basins, fences) within 50 feet of these systems.

Hydrologic Information

Natural drainage patterns will be maintained throughout the Site so that the proposed hydrologic conditions will closely match existing conditions. The proposed conditions analysis utilizes the same drainage area from existing conditions. In accordance with CTDEEP Stormwater General Permit, a reduction in Hydrologic Soil Group of half a step has been considered in the proposed conditions hydrologic model for developed portions of the site. No grading over a two-foot change is proposed that would require reducing HSG by a full step.

Drainage Area 1A- This ±22.3-acre area encompasses the majority of the Project as well as a portion of land to the north of the property that contributes to flow through the field. Stormwater in this area will flow over grass to the south into the wetlands.

Drainage Area 1B- This ±2.7-acre area includes a section of panels on the east side of the Project above the largest farm barn. Stormwater in this area will flow over grass to the southwest into the wetlands.

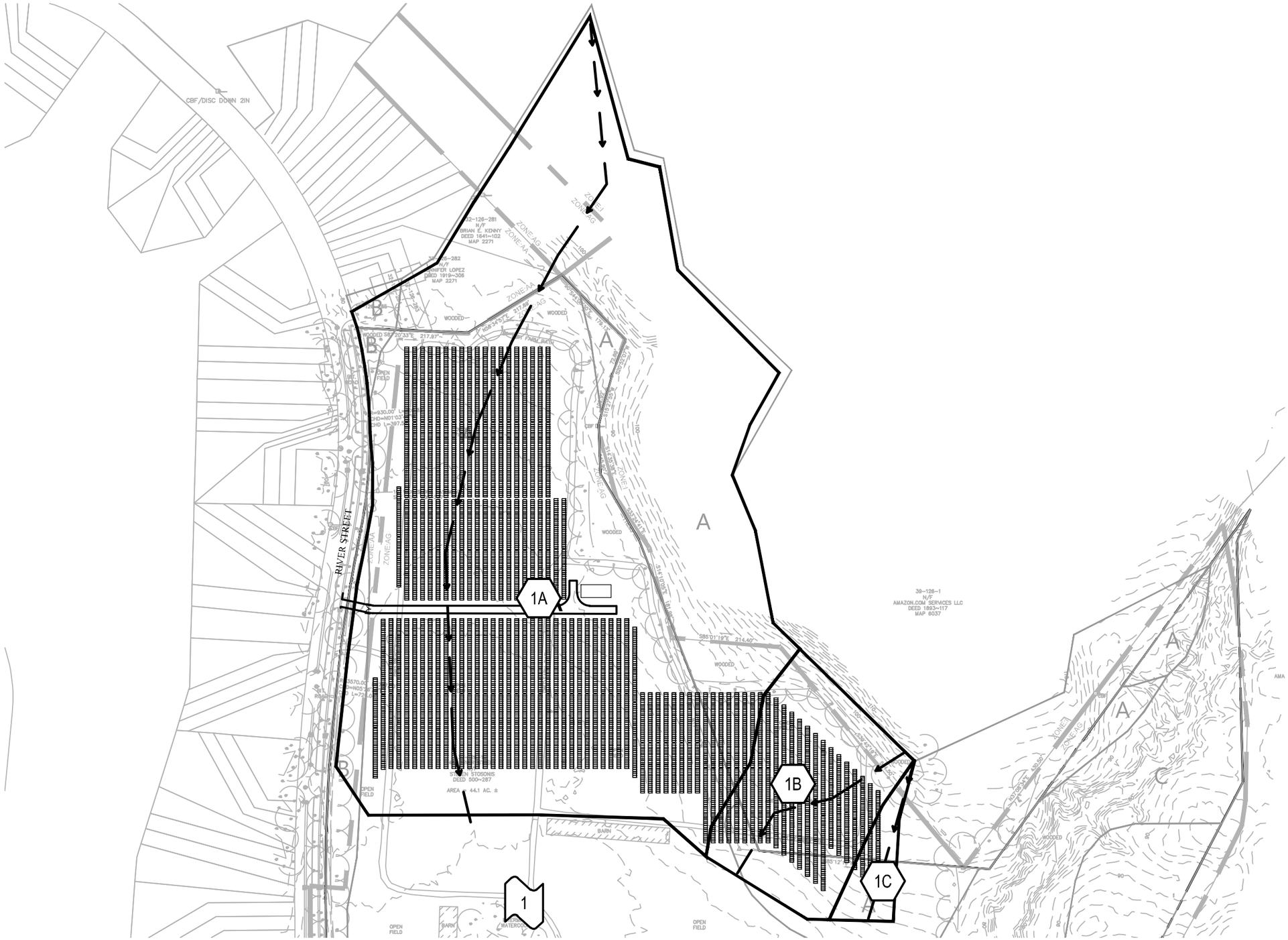
Drainage Area 1C- This ±0.5-acre area represents a small portion of the panels to the eastern extent of the array. Stormwater in this area will flow over grass to the southwest into the wetlands.

Table 2 summarizes the key hydrologic parameters for each drainage area used in the proposed conditions analysis. Only areas of the Site that are proposed to be disturbed by construction have been included in this drainage analysis, while portions of the Site unaffected by construction have been excluded.

Table 2 Proposed Conditions Hydrologic Data

Drainage Area	*Discharge Location*	*Area (acres)*	*Curve Number*	*Time of Concentration (min)*
1A	Southern Stream	22.3	48	33
1B	Southern Stream	2.7	56	8
1C	Southern Stream	0.5	63	7

Figure 3: Proposed Drainage Areas



Legend

SYMBOLS

DESIGN POINT

DRAINAGE AREA DESIGNATION

LINETYPES

DRAINAGE AREA BOUNDARY

HSG BOUNDARY

WETLAND BOUNDARY

TIME OF CONCENTRATION

0 100 200 Feet

vhb

Proposed Drainage Conditions

Figure 3

445 River St
Windsor, CT

10/9/2023

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Hydrologic Analysis

Hydrologic Analysis

The rainfall-runoff was evaluated for the 2-, 25-, 50-, and 100-year storm recurrence. Rainfall volumes used for this analysis were based on the National Weather Service NOAA Hydrometeorological Design Studies Center, Type III, 24—hour storm event for the Site. Rainfall depths were 3.20, 6.29, 7.16, and 8.12 inches respectively. Runoff coefficients for the pre- and post- development conditions provided in the tables below were determined using NRCS Technical Release 55 (TR-55) methodology as provided in the HydroCAD reports found in Appendix D.

In accordance with the guidance of CTDEEP Stormwater General Permit, the proposed conditions for development areas have been modelled with a loss of one-half class of Hydrologic Soil Group to conservatively estimate the effects of compaction during construction. The results of the pre- and post-development hydrologic models indicate that peak runoff rates from the Site will be reduced within all watersheds for all design storms by reducing curve numbers.

Due to the fact that no permanent stormwater basins were proposed as part of the project, no test pits were conducted on site. Because the majority of all 3 watersheds are comprised of well-drained soils, the need for stormwater collection and treatment beyond construction is not necessary.

Table 3 presents a summary of the existing and proposed conditions peak discharge rates.

Table 3 Peak Discharge Rates (cfs*)

Watershed	2-year	25-year	50-year	100-year
Design Point 1				
Existing	0.87	18.31	26.66	36.82
Proposed	0.53	14.56	21.65	30.37

* Expressed in cubic feet per second

Floodplain Information / Analysis

Based upon the most recent Federal Emergency Management Agency (FEMA) mapping (FEMA Flood Insurance Rate Map No. 09003C0218F dated September 26, 2008), the site does not contain listed Flood Hazard Areas (1% Annual Chance or greater, and floodway). No portions of the Project are proposed within a flood hazard area. This mapping is included in Appendix A.

Water Quality Volume

Water Quality Volume (WQV) is based upon the first inch of rainfall, or a 1-inch rainfall event, over the acreage of proposed impervious surfaces for the development. Neither the solar panels nor the concrete equipment pads will be subject to vehicular access nor will they produce any pollutants to stormwater runoff. The site will have vehicular travel infrequently upon completion of construction, and the brushy, forested buffer areas will provide residence and treatment time.

Water Quality Flow

Water Quality Flow (WQF) is a rate of stormwater runoff based upon the first inch of rainfall, or a 1-inch rainfall event. This regulation is generally followed for "flow-through" treatment devices. As the proposed development does not incorporate any "flow-through" water quality treatment devices, WQF is not applicable to this project.

Appendix A:

FEMA Flood Insurance Rate Map

NOAA Rainfall Depth Estimates

CTDEEP Groundwater Classification Map

FEMA Flood Insurance Rate Map

National Flood Hazard Layer FIRMette

FEMA

72°40'5"W 41°54'12"N

72°39'27"W 41°53'45"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/17/2023 at 3:32 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOAA Rainfall Depth Estimates

NOAA Atlas 14, Volume 10, Version 3
Location name: Windsor, Connecticut, USA*
Latitude: 41.8996°, Longitude: -72.6628°
Elevation: 74 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.346** (0.265-0.451)	**0.416** (0.318-0.542)	**0.530** (0.405-0.694)	**0.624** (0.474-0.821)	**0.754** (0.556-1.04)	**0.852** (0.616-1.20)	**0.954** (0.673-1.39)	**1.07** (0.717-1.59)	**1.24** (0.799-1.91)	**1.37** (0.868-2.16)
10-min	**0.490** (0.376-0.639)	**0.589** (0.451-0.768)	**0.750** (0.572-0.982)	**0.884** (0.671-1.16)	**1.07** (0.788-1.47)	**1.21** (0.874-1.70)	**1.35** (0.953-1.97)	**1.52** (1.02-2.26)	**1.75** (1.13-2.70)	**1.94** (1.23-3.06)
15-min	**0.577** (0.442-0.751)	**0.693** (0.530-0.904)	**0.882** (0.673-1.16)	**1.04** (0.789-1.37)	**1.26** (0.927-1.73)	**1.42** (1.03-2.00)	**1.59** (1.12-2.32)	**1.78** (1.19-2.66)	**2.06** (1.33-3.18)	**2.28** (1.45-3.60)
30-min	**0.773** (0.592-1.01)	**0.934** (0.715-1.22)	**1.20** (0.914-1.57)	**1.42** (1.08-1.86)	**1.72** (1.26-2.36)	**1.94** (1.40-2.73)	**2.18** (1.54-3.18)	**2.44** (1.64-3.64)	**2.82** (1.83-4.36)	**3.13** (1.98-4.94)
60-min	**0.969** (0.742-1.26)	**1.18** (0.899-1.53)	**1.51** (1.15-1.98)	**1.79** (1.36-2.36)	**2.18** (1.60-2.99)	**2.46** (1.78-3.46)	**2.77** (1.95-4.04)	**3.11** (2.08-4.63)	**3.59** (2.32-5.54)	**3.98** (2.52-6.28)
2-hr	**1.25** (0.966-1.62)	**1.51** (1.16-1.96)	**1.93** (1.48-2.51)	**2.28** (1.74-2.98)	**2.76** (2.05-3.78)	**3.12** (2.28-4.37)	**3.50** (2.49-5.10)	**3.95** (2.66-5.85)	**4.61** (2.99-7.07)	**5.16** (3.28-8.08)
3-hr	**1.44** (1.12-1.86)	**1.74** (1.35-2.25)	**2.22** (1.71-2.88)	**2.62** (2.01-3.42)	**3.18** (2.37-4.34)	**3.59** (2.63-5.02)	**4.03** (2.88-5.87)	**4.56** (3.07-6.73)	**5.35** (3.48-8.18)	**6.03** (3.83-9.40)
6-hr	**1.81** (1.41-2.32)	**2.20** (1.71-2.82)	**2.82** (2.19-3.64)	**3.35** (2.58-4.33)	**4.06** (3.05-5.53)	**4.59** (3.39-6.40)	**5.17** (3.73-7.52)	**5.88** (3.97-8.63)	**6.97** (4.54-10.6)	**7.91** (5.04-12.3)
12-hr	**2.21** (1.74-2.82)	**2.72** (2.13-3.46)	**3.54** (2.76-4.53)	**4.23** (3.28-5.44)	**5.17** (3.91-7.00)	**5.86** (4.35-8.13)	**6.62** (4.81-9.60)	**7.57** (5.14-11.0)	**9.05** (5.92-13.7)	**10.3** (6.61-15.9)
24-hr	**2.56** (2.02-3.24)	**3.20** (2.52-4.05)	**4.24** (3.33-5.39)	**5.10** (3.98-6.52)	**6.29** (4.79-8.48)	**7.16** (5.36-9.90)	**8.12** (5.96-11.8)	**9.36** (6.37-13.6)	**11.3** (7.43-17.0)	**13.1** (8.39-20.0)
2-day	**2.85** (2.26-3.58)	**3.61** (2.86-4.54)	**4.86** (3.84-6.13)	**5.89** (4.63-7.47)	**7.31** (5.61-9.83)	**8.34** (6.30-11.5)	**9.50** (7.06-13.8)	**11.0** (7.55-15.9)	**13.6** (8.94-20.3)	**15.9** (10.2-24.1)
3-day	**3.11** (2.48-3.89)	**3.94** (3.14-4.94)	**5.32** (4.22-6.68)	**6.45** (5.09-8.16)	**8.02** (6.18-10.8)	**9.15** (6.94-12.6)	**10.4** (7.78-15.1)	**12.2** (8.32-17.5)	**15.0** (9.89-22.3)	**17.6** (11.3-26.6)
4-day	**3.35** (2.68-4.18)	**4.25** (3.39-5.31)	**5.72** (4.55-7.17)	**6.94** (5.49-8.75)	**8.62** (6.66-11.5)	**9.83** (7.48-13.5)	**11.2** (8.38-16.2)	**13.1** (8.95-18.7)	**16.1** (10.6-23.9)	**18.9** (12.2-28.5)
7-day	**4.03** (3.24-5.00)	**5.05** (4.06-6.28)	**6.73** (5.38-8.39)	**8.12** (6.46-10.2)	**10.0** (7.78-13.3)	**11.4** (8.72-15.6)	**13.0** (9.73-18.6)	**15.1** (10.4-21.5)	**18.5** (12.3-27.3)	**21.6** (14.0-32.4)
10-day	**4.70** (3.79-5.81)	**5.79** (4.66-7.17)	**7.57** (6.08-9.41)	**9.06** (7.22-11.3)	**11.1** (8.62-14.6)	**12.6** (9.60-17.1)	**14.2** (10.7-20.3)	**16.4** (11.3-23.3)	**20.0** (13.2-29.3)	**23.1** (15.0-34.6)
20-day	**6.79** (5.51-8.34)	**7.94** (6.44-9.76)	**9.82** (7.93-12.1)	**11.4** (9.14-14.1)	**13.5** (10.5-17.6)	**15.1** (11.5-20.2)	**16.8** (12.5-23.5)	**19.0** (13.2-26.7)	**22.4** (14.9-32.6)	**25.3** (16.4-37.6)
30-day	**8.57** (6.98-10.5)	**9.74** (7.93-11.9)	**11.7** (9.46-14.3)	**13.3** (10.7-16.4)	**15.4** (12.0-19.9)	**17.1** (13.0-22.5)	**18.8** (13.9-25.8)	**20.9** (14.5-29.2)	**23.9** (16.0-34.6)	**26.4** (17.2-39.1)
45-day	**10.8** (8.85-13.2)	**12.0** (9.82-14.7)	**14.0** (11.4-17.1)	**15.6** (12.7-19.3)	**17.9** (14.0-22.9)	**19.6** (15.0-25.6)	**21.4** (15.7-28.8)	**23.3** (16.3-32.4)	**25.8** (17.3-37.2)	**27.8** (18.2-41.0)
60-day	**12.7** (10.4-15.4)	**14.0** (11.4-17.0)	**16.0** (13.1-19.6)	**17.7** (14.4-21.8)	**20.1** (15.7-25.5)	**21.9** (16.7-28.4)	**23.7** (17.3-31.6)	**25.4** (17.8-35.2)	**27.6** (18.6-39.6)	**29.1** (19.0-42.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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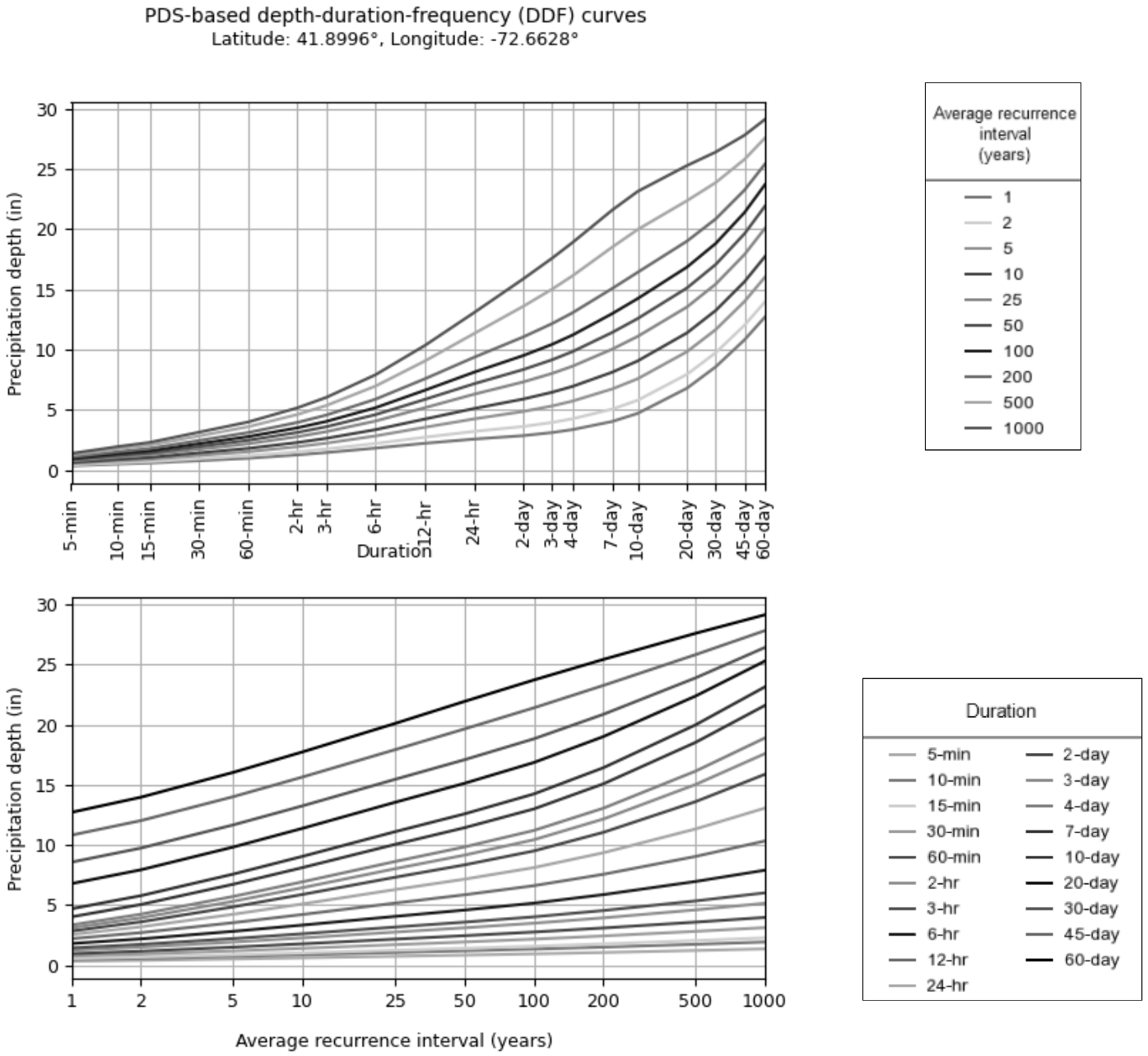
PF graphical



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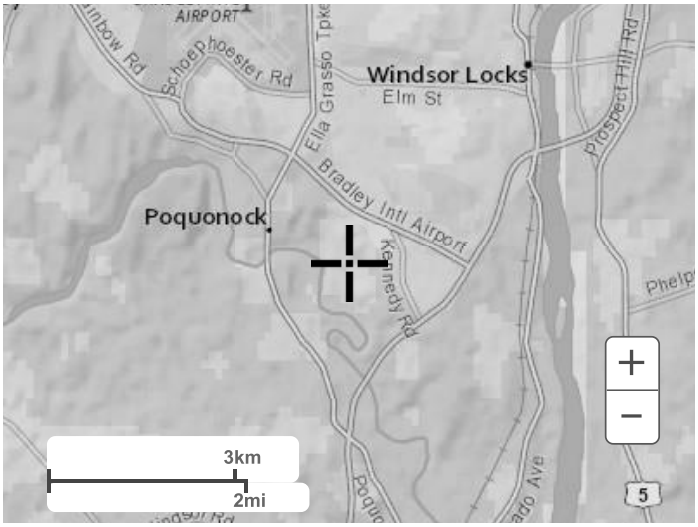
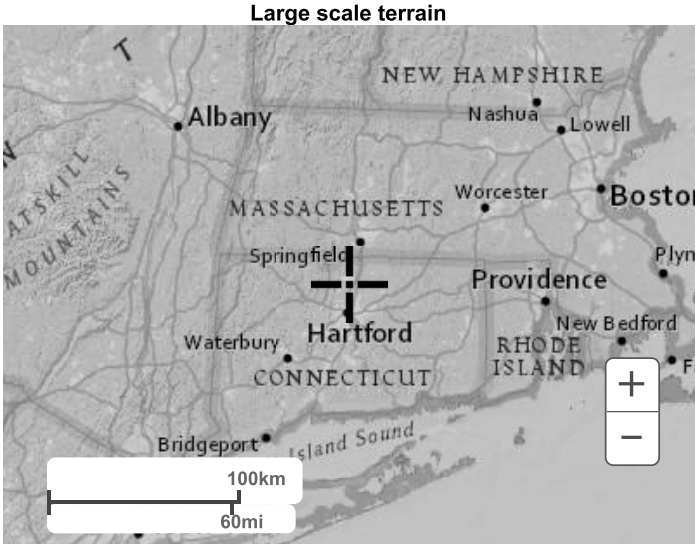
Maps & aerials

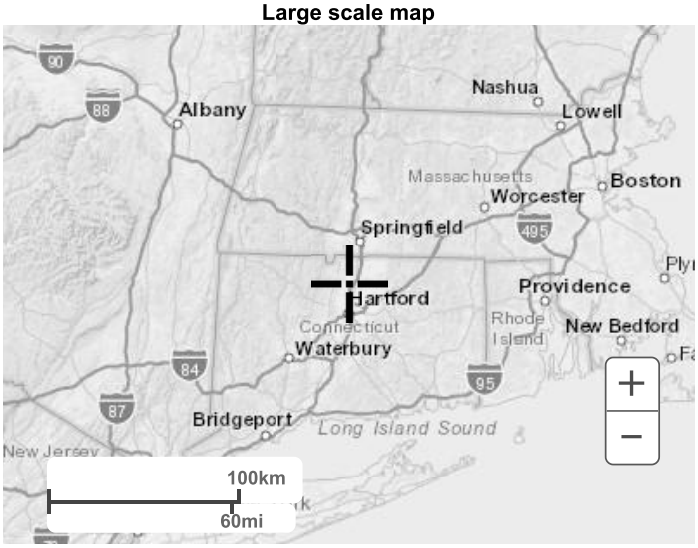
Small scale terrain



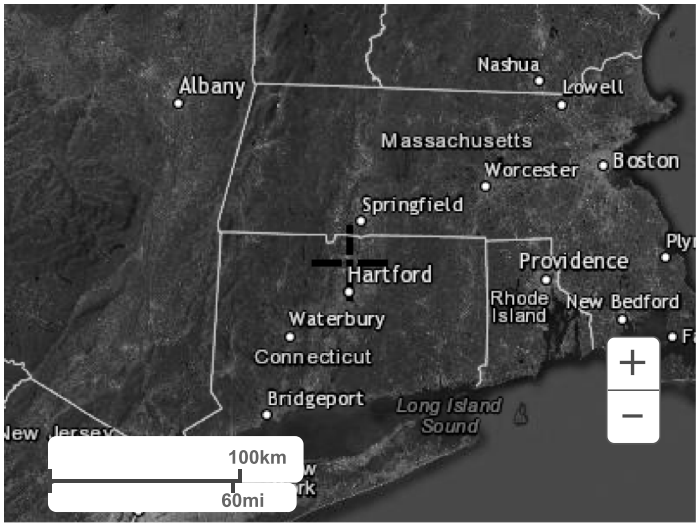
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

CTDEEP Groundwater Classification Map

WATER QUALITY CLASSIFICATIONS
WINDSOR, CT

SURFACE WATER QUALITY CLASSES

Polygon		Line	
(light blue fill)	A	(line)	A
(purple fill)	AA	(line)	AA
(yellow fill)	B, B*	(line)	B, B*
(cyan fill)	SA	(line)	SA
(orange fill)	SB	(line)	SB

NOTES:
Surface Water Classifications beginning with S refer to Coastal and Marine Surface Water.
B* is a subset of Class B where no direct wastewater discharges are allowed other than those consistent with Class AA, A and SA surface waters.

GROUND WATER QUALITY CLASSES

GA (white background)
GAA, GAAs
GA, GAA may not meet current standards
GB
GC

Area of Contribution to Public Supply Well

Final Aquifer Protection Area (Level A)
Major Basin Boundary

EXPLANATION

WATER QUALITY CLASSIFICATIONS (WQC) MAPS are one of the elements of the Water Quality Standards (WQS) for the State of Connecticut. The WQS are a part of Connecticut's clean water program and are essential for protecting and improving water quality. The WQS follow the principles of Connecticut's Clean Water Act which is in Chapter 446K of the Connecticut General Statutes. The WQS provide policy guidance in many areas, for example decisions on acceptable discharges to water resources, siting of landfills, remediation or prioritization of municipal sewerage system projects. The first two elements of the WQS are the Standards, which set an overall policy for management of water quality, and the Criteria, which are descriptive and numerical standards that describe the allowable parameters and goals for various water quality classifications. A discussion of these two elements is found in the Water Quality Standards document available on the CT DEEP website. The third element is the Classifications and the Water Quality Classification Maps which show the Classification assigned to each surface and groundwater resource throughout the State. The WQS are adopted using a public participation process. The WQC maps are also adopted using a public participation process but go through hearings separately from the Standards and Criteria hearings. Revision and adoption of the WQC data occurs in accordance with the public participation procedures contained in Section 22a-426 of the Connecticut General Statutes. Ground WQC is subject to Connecticut regulation and changes must be reviewed and adopted. All changes to the Surface WQC require an adoption process which is subject to federal review and approval in addition to CT regulation. The adoption dates for the WQC by major drainage basin are: Housatonic River, Hudson River and Southwest Coastal Basins - March 1999; Connecticut River and South Central Coastal Basins - February 1993; Thames River, Pawcatuck River and Southeast Coastal Basins - December 1986. Surface Water Classifications do not change after the adoption date until the next major revision. Ground Water Classifications may change after the adoption date under specific circumstances. The map may have more than one WQC adoption date because a town may be in more than one major drainage basin.

SURFACE WATERS in Connecticut are divided into freshwater classified as AA, A, B or B* and saline waters classified as SA or SB. Class AA designated uses are existing or proposed drinking water supplies; habitat for fish and other aquatic life and wildlife; recreation; and water supply for industry and agriculture. Class A designated uses are habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; navigation; and water supply for industry and agriculture. Class SA designated uses are habitat for marine fish, other aquatic life and wildlife; shellfish harvesting for direct human consumption; recreation; industrial water supply; and navigation. Class B designated uses are habitat for fish and aquatic life and wildlife; recreation; navigation; and industrial and agricultural water supply. Class B*, applicable to Candlewood Lake, is a subset of Class B and is identical in all ways to the designated uses, criteria and standards for Class B waters except for the restriction on direct discharges. Class SB designated uses are habitat for marine fish and aquatic life and wildlife; commercial shellfish harvesting; recreation; industrial water supply; and navigation.

Surface waters which are not specifically classified shall be considered as Class A or Class AA. Surface waters in GA ground water areas are assumed Class A or Class SA unless otherwise indicated. Surface waters in GAA ground water areas are assumed Class AA unless otherwise indicated.

On the WQC map a surface water quality goal of A is represented by blue colored water bodies. Surface water quality goal of AA is represented by purple colored water bodies. Surface water quality goal of B is represented by gold colored water bodies.

GROUND WATERS in Connecticut are classified as GAA, GA, GB and GC. Class GAA designated uses are existing or potential public supply of water suitable for drinking without treatment and baseflow for hydraulically-connected surface water bodies. The Class GAAs is a subclass of GAA for ground water that is tributary to a public water supply reservoir. The area of contribution to a public water supply well is represented by a 500-foot radius around the well and is assumed to be Class GAA unless otherwise classified. Class GA designated uses are existing private and potential public or private supplies of water suitable for drinking without treatment and baseflow for hydraulically-connected surface water bodies. All ground waters not specifically classified are considered as Class GA. Class GB designated uses are industrial process water and cooling waters and baseflow for hydraulically-connected water bodies and is presumed not suitable for human consumption without treatment. Class GC designated uses are assimilation of discharges authorized by the Commissioner pursuant to Section 22a-430 of the General Statutes.

On the WQC map GA is represented by white colored land areas. Class GAA and class GAAs are represented by blue colored land areas. The area of contribution to a public water supply well is shown by a blue cross-hatch overprint. A notation of GAA followed by a state abbreviation indicates a watershed that contributes to the public water supply for a state other than Connecticut. Class GA or Class GAA areas that currently may not be meeting the GA or GAA standards are represented on the WQC maps by tan colored land areas. Class GB is represented by green colored land areas. Class GC is represented by magenta colored land areas.

FINAL AQUIFER PROTECTION AREAS (Level A) are included on the WQC maps for informational purposes. These areas are anticipated to be reclassified GAA during the next major basin updates, subject to public participation. The Aquifer Protection Program helps protect Connecticut's public drinking water resources by delineating aquifer protection areas (also called wellhead protection areas) for public supply wells and establishing land use regulations within these areas. These areas represent the land area contributing ground water to active public water supply wells or well fields that serve more than 1000 people and are set in sand and gravel aquifers (stratified drift deposits).

DATA SOURCES

WATER QUALITY CLASSIFICATIONS DATA – Water quality classifications shown on this map are based on information from the following digital spatial datasets that are typically shown together – Ground Water Quality Classifications Poly, Surface Water Quality Classifications Line, and Surface Water Quality Classifications Poly. The map legend above reflects the content of these three data sources. These WQC data were initially compiled on 1:24,000-scale 7.5 minute USGS topographic quadrangle maps and later digitized at 1:24,000 scale. For example, the Surface Water Quality Classifications Line and Surface Water Quality Classifications Poly digital data assigns surface water quality classifications to water bodies such as rivers, streams, reservoirs, lakes, ponds and coves found in 1:24,000-scale hydrography data available from CT DEEP. The hydrography may not include all the waterbodies in Connecticut. The Ground Water Quality Classifications Poly data assigns ground water quality classifications, at 1:24,000 scale, to the remaining land areas in Connecticut.

AQUIFER PROTECTION AREA DATA – Aquifer Protection Areas shown on this map are from the Aquifer Protection Area digital dataset which contains polygon data intended to be used at 1:24,000 scale. The dataset contains regulated areas classified as Level A Aquifer Protection Area (Final) and Level B Aquifer Protection Area (Preliminary). The Level B areas are not shown on the WQC maps. The data was collected from 1991 to the present and is actively updated as Final area mapping replaces earlier Preliminary areas. The Aquifer Protection Areas are delineated by the individual water companies owning the well fields and submitted to the CT DEEP for approval. Preliminary mapping provides a general estimate of the area contributing ground water to the well field. Final mapping is based on extensive, site-specific, detailed modeling of the ground water flow system. CT DEEP may adjust Final area boundaries to be consistent with 1:24,000 scale topography and base map data where appropriate during the approval process.

MAJOR DRAINAGE BASIN DATA – Major drainage basins shown on this map are from Major Basin Line data developed by CT DEEP and intended to be used at 1:24,000 scale.

BASE MAP DATA - Based on data originally from 1:24,000-scale USGS 7.5 minute topographic quadrangle maps published between 1969 and 1992. It includes political boundaries, railroads, airports, hydrography, geographic names and geographic places. Streets and street names are from Tele Atlas® copyrighted data. Base map information is neither current nor complete.

RELATED INFORMATION
This map is intended to be printed at its original dimensions in order to maintain the 1:24,000 scale (1 inch = 2000 feet).
WATER QUALITY STANDARDS - Go to the CT DEEP website for a summary and the full text of the "Water Quality Standards" and for other information on water quality.
AQUIFER PROTECTION AREAS - Go to the CT DEEP website for more information.

ADOPTED DATES

Water Quality Standards
February 25, 2011

Thames River, Pawcatuck River and Southeast Coastal Basins: December 1986

Connecticut River and South Central Coastal Basins: February 1993

Housatonic River, Hudson River and Southwest Coastal Basins: March 1999

MAP LOCATION

MAJOR BASINS
1 Pawcatuck
2 Southeast Coast
3 Thames
4 Connecticut
5 South Central Coast
6 Housatonic
7 Southwest Coast
8 Hudson

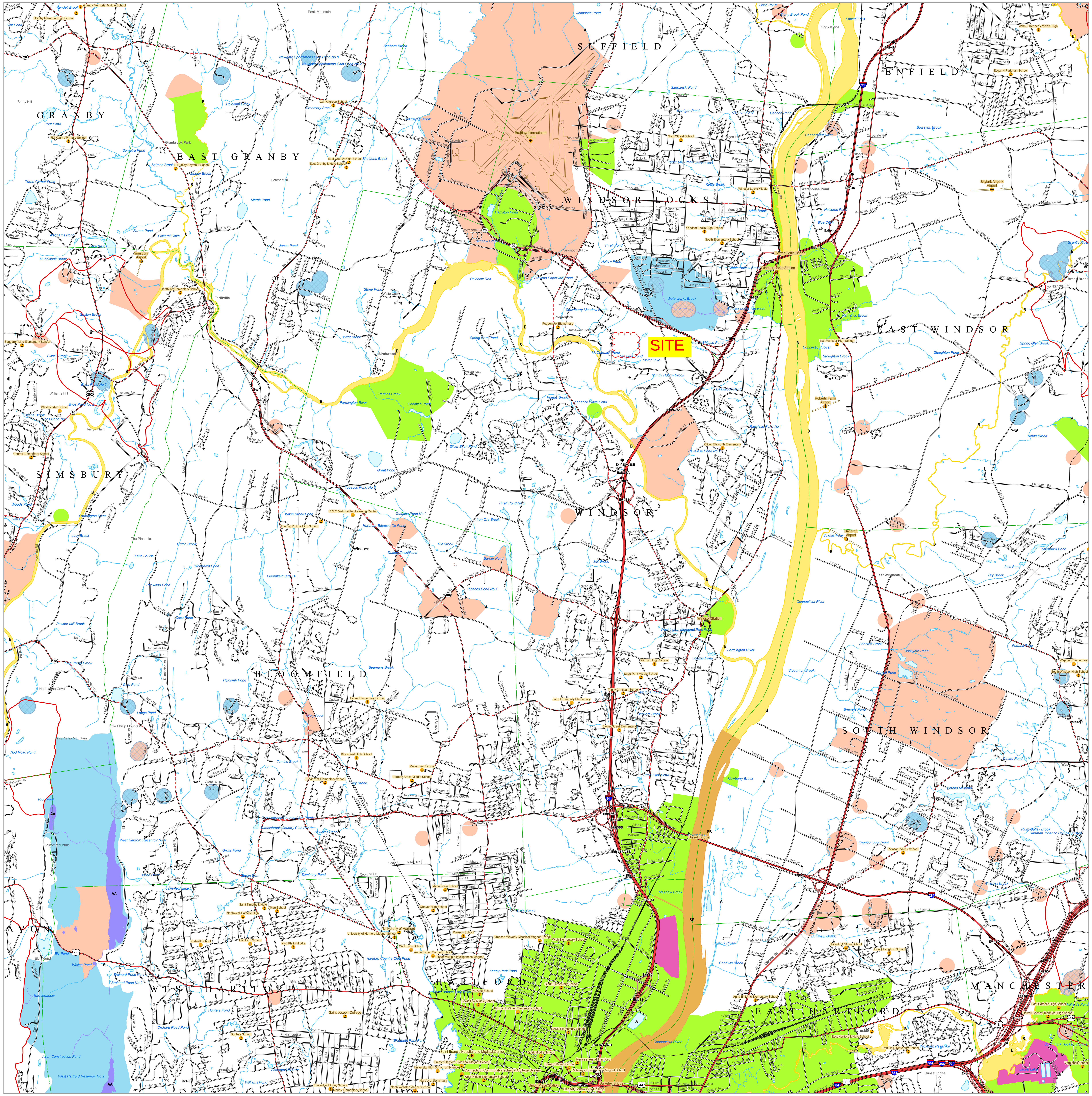
State Plane Coordinate System of 1983, Zone 3526
Lambert Conformal Conic Projection
North American Datum of 1983

1 0.5 0 1 Miles
1000 0 1000 2000 3000 4000 5000 6000 7000 Feet
1 0.5 0 1 Kilometers
SCALE 1:24,000 (1 inch = 2000 feet) when map is printed at original size

STATE OF CONNECTICUT
DEPARTMENT OF
ENERGY & ENVIRONMENTAL PROTECTION
79 Elm Street
Hartford, CT 06106-5127

Map created by CT DEEP
October 2018

Map is not colorfast
Protect from light and moisture

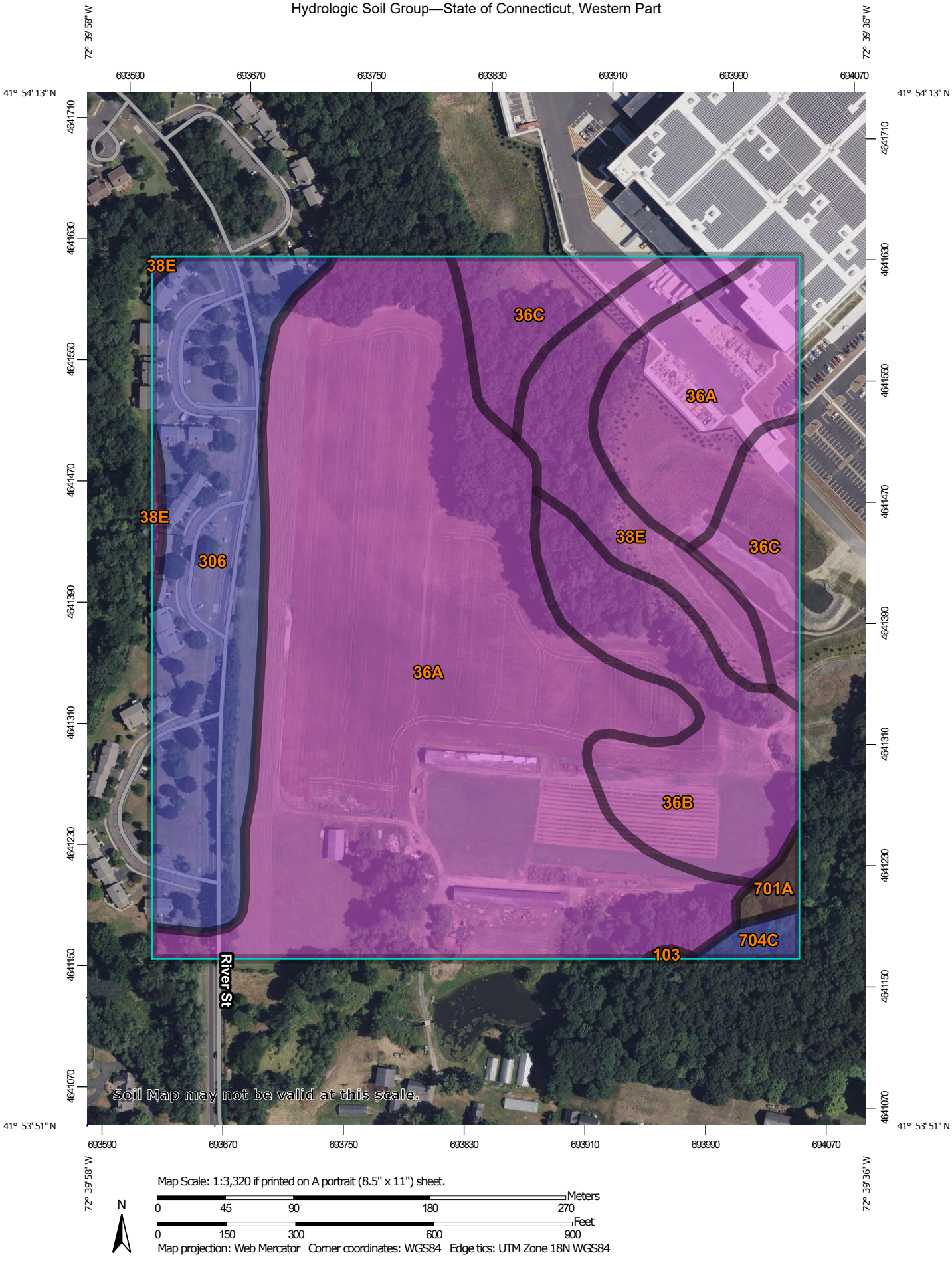


Appendix B:

NRCS Soil Survey Information

NRCS Soil Survey Information

Hydrologic Soil Group—State of Connecticut, Western Part



Map Scale: 1:3,320 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

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 Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 1:12,000.

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: State of Connecticut, Western Part
Survey Area Data: Version 1, Sep 15, 2023

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
36A	Windsor loamy sand, 0 to 3 percent slopes	A	28.3	57.4%
36B	Windsor loamy sand, 3 to 8 percent slopes	A	5.1	10.3%
36C	Windsor loamy sand, 8 to 15 percent slopes	A	3.6	7.4%
38E	Hinckley loamy sand, 15 to 45 percent slopes	A	3.6	7.3%
103	Rippowam fine sandy loam	B/D	0.0	0.1%
306	Udorthents-Urban land complex	B	7.9	16.1%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	B/D	0.3	0.7%
704C	Enfield silt loam, 8 to 15 percent slopes	B	0.4	0.8%
Totals for Area of Interest			**49.4**	**100.0%**

Description

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

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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

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

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

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

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C:

Erosion and Sedimentation Control Checklist
Long Term Stormwater Operation and Maintenance Measures

Erosion and Sedimentation Control Checklist

Windsor Solar One – Windsor, CT – 445 River St

Best Management Practices – Maintenance/ Evaluation Checklist

Construction Practices

Best Management Practice	Inspection Frequency	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/Repair Needed ☐yes ☐no (List Items)	Date of Cleaning/Repair	Performed by
Silt Fencing	Once per week or after a 0.5″ or greater storm event						
Compost Filter Sock	Once per week or after a 0.5″ or greater storm event						
Straw Wattles	Once per week or after a 0.5″ or greater storm event						
Stabilized Construction Exit	Once per week or after a 0.5″ or greater storm event						
Temporary Sediment Trap & Diversion Swales	Once per week or after a 0.5″ or greater storm event						
Vegetated Slope Stabilization	Once per week or after a 0.5″ or greater storm event						
Energy Dissipators	Once per week or after a 0.5″ or greater storm event						

Stormwater Control Manager _____

Long Term Stormwater Operation and Maintenance Measures

Windsor Solar One – Windsor, CT – 445 River St

Best Management Practices – Maintenance/ Evaluation Checklist

Long Term Practices

Best Management Practice	Inspection Frequency	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/Repair Needed ☐yes ☐no (List Items)	Date of Cleaning/Repair	Performed by
Trash/Litter	Routinely pick up and remove litter from entire property as required.						
Vegetated Areas	Inspect bi-annually. Replant bare areas upon identification.						

Stormwater Control Manager _____

Project Information

Site

Project Name:	Windsor Solar One
Address or Locus:	445 River Street
City, State & Zip:	Windsor, CT 06095

Developer

Client Name:	Windsor Solar One, LLC
Client Address:	150 Trumbull Street, 4th Floor
Client City, State & Zip:	Hartford, CT 06103
Client Telephone No.:	(860) 288-7215
Client Cell Phone:	(203) 814-6866
Client E-Mail:	bparsons@verogy.com

Site Supervisor

Site Manager Name:	To be determined
Site Manager Address:	
Site Manager City, State & Zip:	
Site Manager Telephone No.:	
Site Manager Cell Phone:	
Site Manager E-Mail:	

Appendix D:

Sediment Trap Sizing
HydroCAD: Existing Conditions
HydroCAD: Proposed Conditions

Sediment Trap Sizing

Sediment Trap Sizing
Windsor Solar One
September 2023

TST #	Tributary Acreage, ac	*(134 cy / acre)** Volume Required Below Top of Spillway, cf	Volume Provided in Permanent Basin Below Top of Spillway, cf
1A	11.0	39,798	63,990

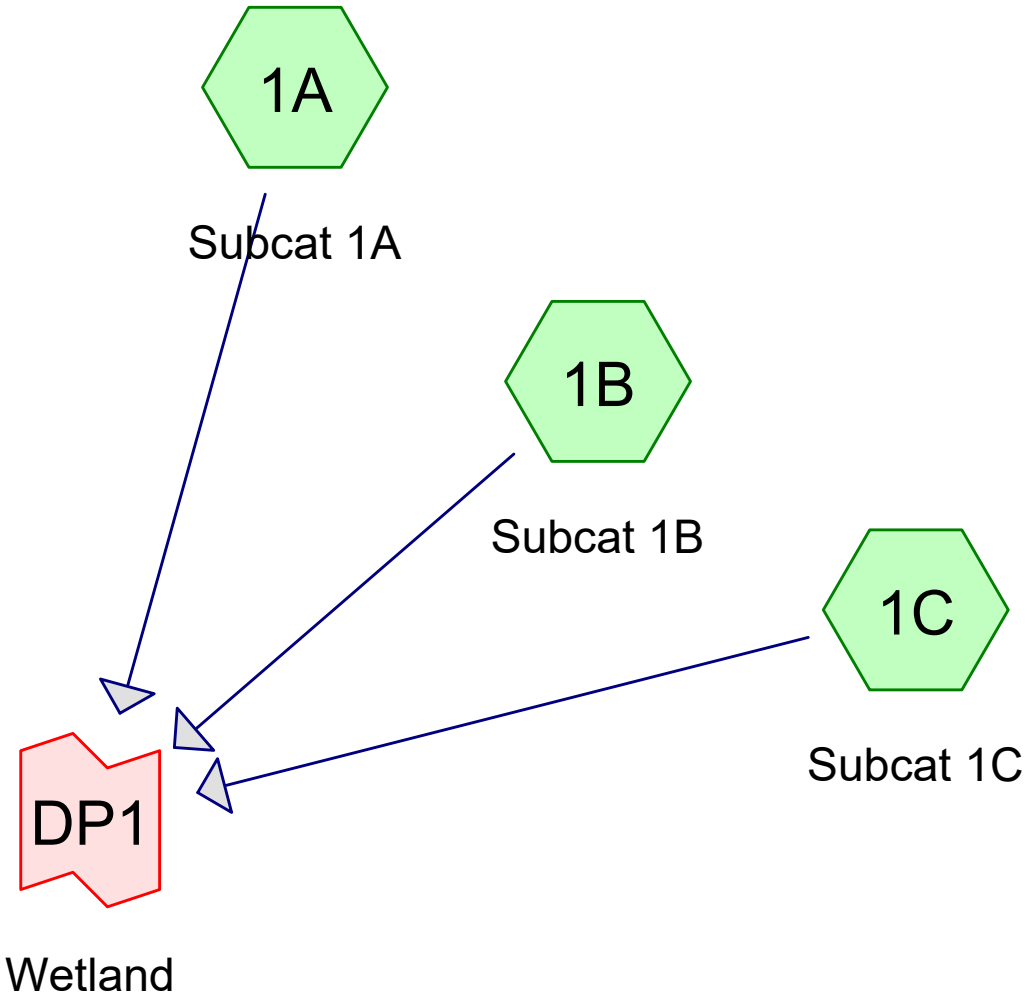
* Per 2002 Connecticut Guidelines for Soil Erosion and Sediment Control

Summary for Pond 1AP: (new Pond)

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	1.469 af	**170.00'W x 240.00'L x 1.50'H Prismatoid Z=3.0**

HydroCAD Analysis: Existing Conditions



Subcat Reach Pond Link

Routing Diagram for Existing Conditions
Prepared by VHB, Inc, Printed 10/24/2023

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2YR	Type III 24-hr		Default	24.00	1	3.20	2
2	25YR	Type III 24-hr		Default	24.00	1	6.29	2
3	50YR	Type III 24-hr		Default	24.00	1	7.16	2
4	100YR	Type III 24-hr		Default	24.00	1	8.12	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.139	72	Dirt roads, HSG A (1A)
0.014	82	Dirt roads, HSG B (1A)
1.801	30	Meadow, non-grazed, HSG A (1A)
0.330	39	Pasture/grassland/range, Good, HSG A (1A)
0.336	61	Pasture/grassland/range, Good, HSG B (1A)
14.279	64	Row crops, SR + CR, Good, HSG A (1A, 1B, 1C)
0.196	75	Row crops, SR + CR, Good, HSG B (1A)
8.249	30	Woods, Good, HSG A (1A, 1B, 1C)
0.325	55	Woods, Good, HSG B (1A)
25.669	**50**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
24.798	HSG A	1A, 1B, 1C
0.871	HSG B	1A
0.000	HSG C	
0.000	HSG D	
0.000	Other	
25.669		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.139	0.014	0.000	0.000	0.000	0.153	Dirt roads	1A
1.801	0.000	0.000	0.000	0.000	1.801	Meadow, non-grazed	1A
0.330	0.336	0.000	0.000	0.000	0.667	Pasture/grassland/range, Good	1A
14.279	0.196	0.000	0.000	0.000	14.475	Row crops, SR + CR, Good	1A, 1B, 1C
8.249	0.325	0.000	0.000	0.000	8.573	Woods, Good	1A, 1B, 1C
24.798	**0.871**	**0.000**	**0.000**	**0.000**	**25.669**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1A: Subcat 1A Runoff Area=22.256 ac 0.00% Impervious Runoff Depth>0.08"
Flow Length=1,550' Tc=25.8 min CN=49 Runoff=0.33 cfs 0.152 af

Subcatchment1B: Subcat 1B Runoff Area=2.732 ac 0.00% Impervious Runoff Depth>0.32"
Flow Length=450' Slope=0.0500 '/' Tc=6.8 min CN=59 Runoff=0.60 cfs 0.074 af

Subcatchment1C: Subcat 1C Runoff Area=0.681 ac 0.00% Impervious Runoff Depth>0.46"
Flow Length=350' Slope=0.0500 '/' Tc=6.0 min CN=63 Runoff=0.29 cfs 0.026 af

Link DP1: Wetland Inflow=0.87 cfs 0.251 af
Primary=0.87 cfs 0.251 af

Total Runoff Area = 25.669 ac Runoff Volume = 0.251 af Average Runoff Depth = 0.12"
100.00% Pervious = 25.669 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1A: Subcat 1A

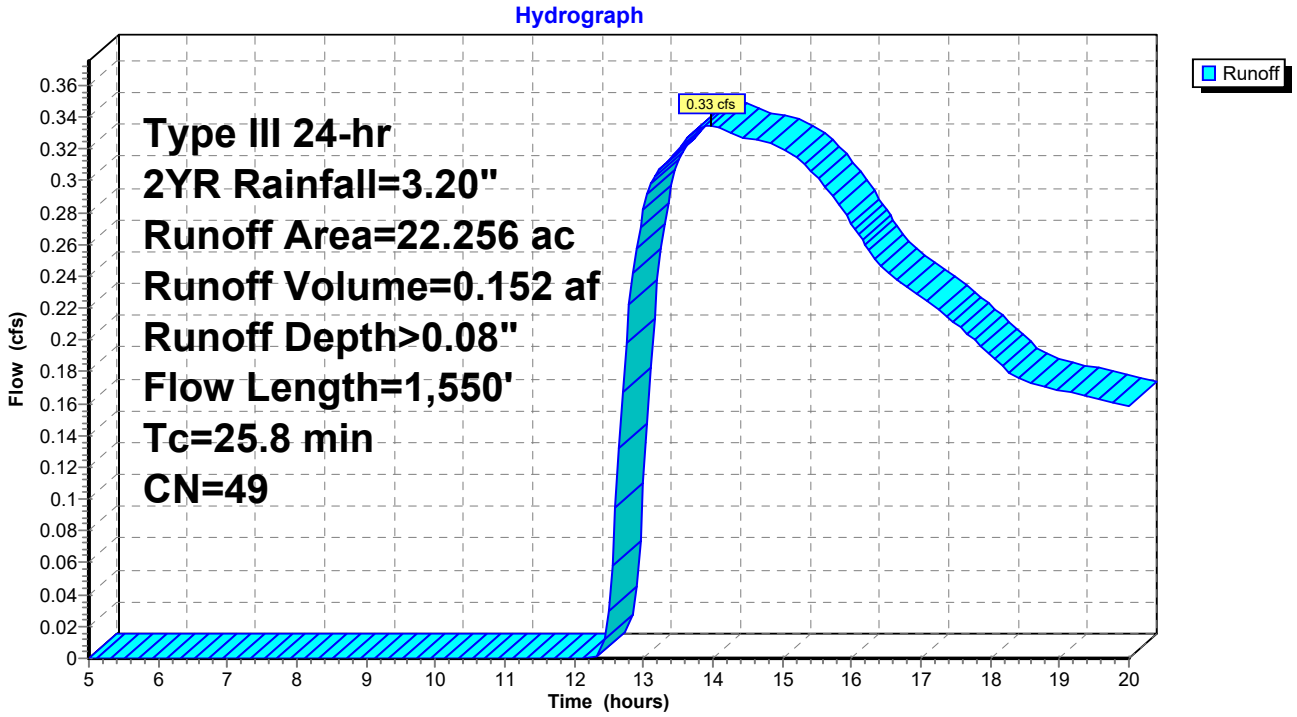
Runoff = 0.33 cfs @ 13.96 hrs, Volume= 0.152 af, Depth> 0.08"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (ac)	CN	Description
0.186	55	Woods, Good, HSG B
0.139	72	Dirt roads, HSG A
10.867	64	Row crops, SR + CR, Good, HSG A
0.330	39	Pasture/grassland/range, Good, HSG A
0.004	30	Woods, Good, HSG A
1.617	30	Woods, Good, HSG A
0.085	75	Row crops, SR + CR, Good, HSG B
0.016	55	Woods, Good, HSG B
0.014	82	Dirt roads, HSG B
0.110	75	Row crops, SR + CR, Good, HSG B
0.336	61	Pasture/grassland/range, Good, HSG B
0.429	64	Row crops, SR + CR, Good, HSG A
1.801	30	Meadow, non-grazed, HSG A
6.199	30	Woods, Good, HSG A
0.123	55	Woods, Good, HSG B
22.256	49	Weighted Average
22.256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
5.3	500	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.7	1,000	0.0100	1.00		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
25.8	1,550	Total			

Subcatchment 1A: Subcat 1A



Summary for Subcatchment 1B: Subcat 1B

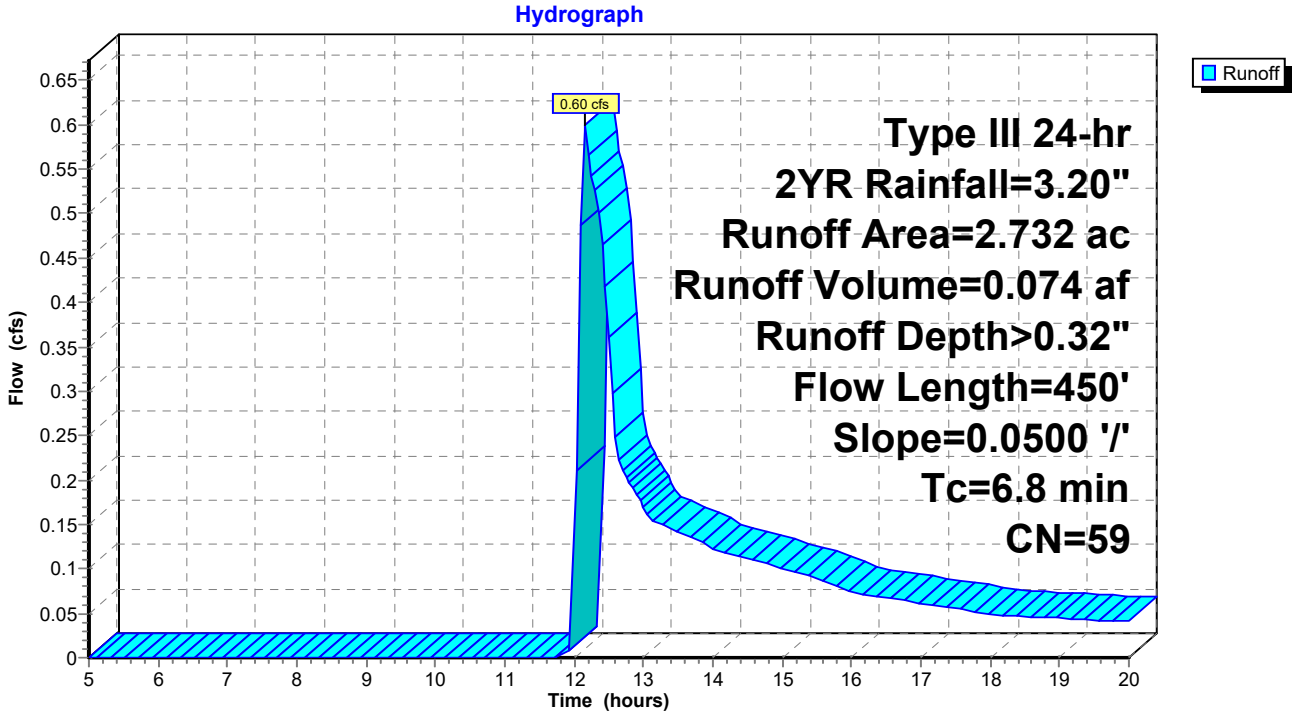
Runoff = 0.60 cfs @ 12.16 hrs, Volume= 0.074 af, Depth> 0.32"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (ac)	CN	Description
0.578	64	Row crops, SR + CR, Good, HSG A
0.114	64	Row crops, SR + CR, Good, HSG A
0.414	30	Woods, Good, HSG A
1.626	64	Row crops, SR + CR, Good, HSG A
2.732	59	Weighted Average
2.732		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
3.0	400	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.8	450	Total			

Subcatchment 1B: Subcat 1B



Summary for Subcatchment 1C: Subcat 1C

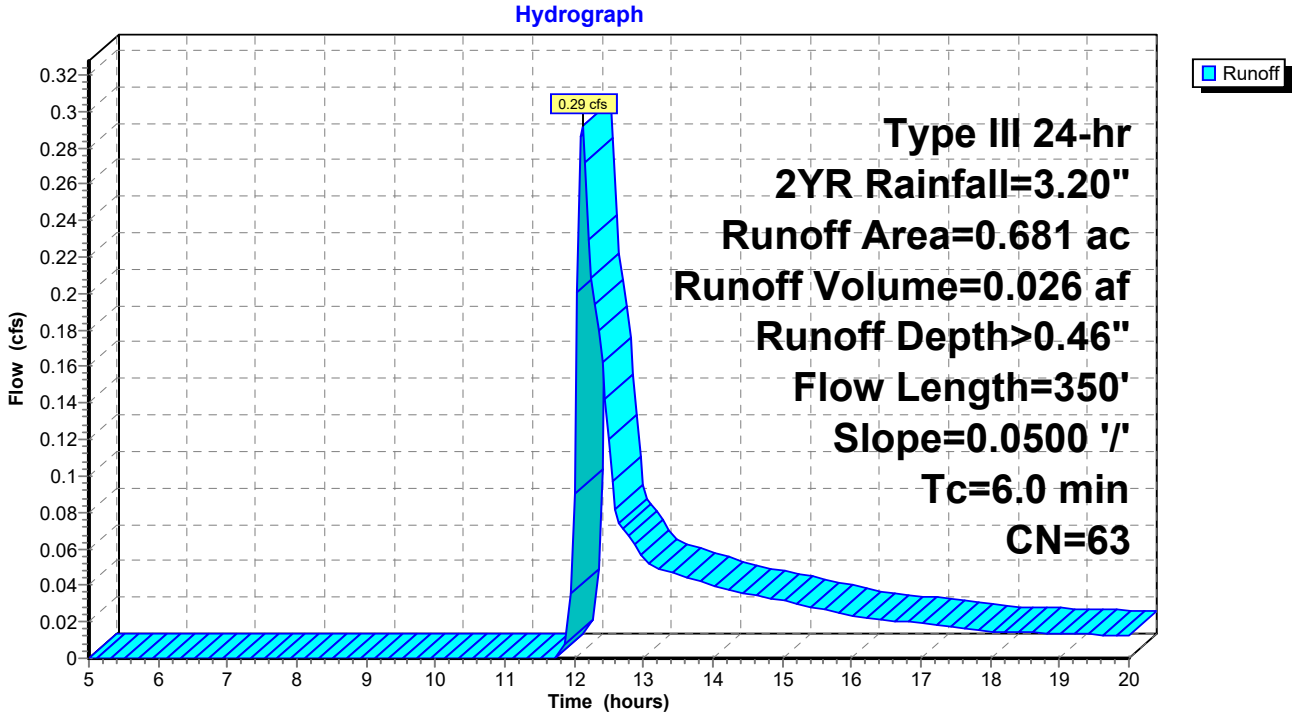
Runoff = 0.29 cfs @ 12.12 hrs, Volume= 0.026 af, Depth> 0.46"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (ac)	CN	Description
0.389	64	Row crops, SR + CR, Good, HSG A
0.016	30	Woods, Good, HSG A
0.276	64	Row crops, SR + CR, Good, HSG A
0.681	63	Weighted Average
0.681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
2.2	300	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.0	350	Total			

Subcatchment 1C: Subcat 1C

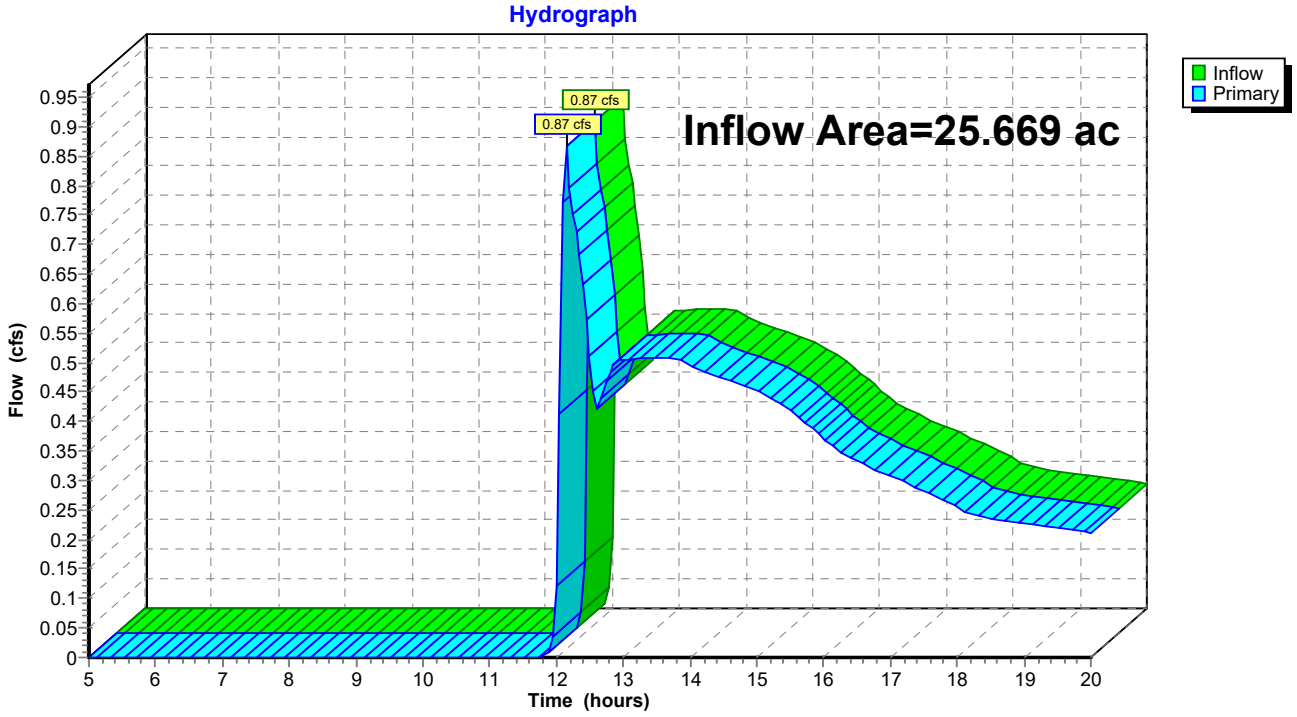


Summary for Link DP1: Wetland

Inflow Area = 25.669 ac, 0.00% Impervious, Inflow Depth > 0.12" for 2YR event
Inflow = 0.87 cfs @ 12.15 hrs, Volume= 0.251 af
Primary = 0.87 cfs @ 12.15 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3P

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1: Wetland



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1A: Subcat 1A Runoff Area=22.256 ac 0.00% Impervious Runoff Depth>1.07"
Flow Length=1,550' Tc=25.8 min CN=49 Runoff=15.29 cfs 1.977 af

Subcatchment1B: Subcat 1B Runoff Area=2.732 ac 0.00% Impervious Runoff Depth>1.85"
Flow Length=450' Slope=0.0500 '/' Tc=6.8 min CN=59 Runoff=5.90 cfs 0.420 af

Subcatchment1C: Subcat 1C Runoff Area=0.681 ac 0.00% Impervious Runoff Depth>2.19"
Flow Length=350' Slope=0.0500 '/' Tc=6.0 min CN=63 Runoff=1.82 cfs 0.124 af

Link DP1: Wetland Inflow=18.31 cfs 2.522 af
Primary=18.31 cfs 2.522 af

Total Runoff Area = 25.669 ac Runoff Volume = 2.522 af Average Runoff Depth = 1.18"
100.00% Pervious = 25.669 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1A: Subcat 1A

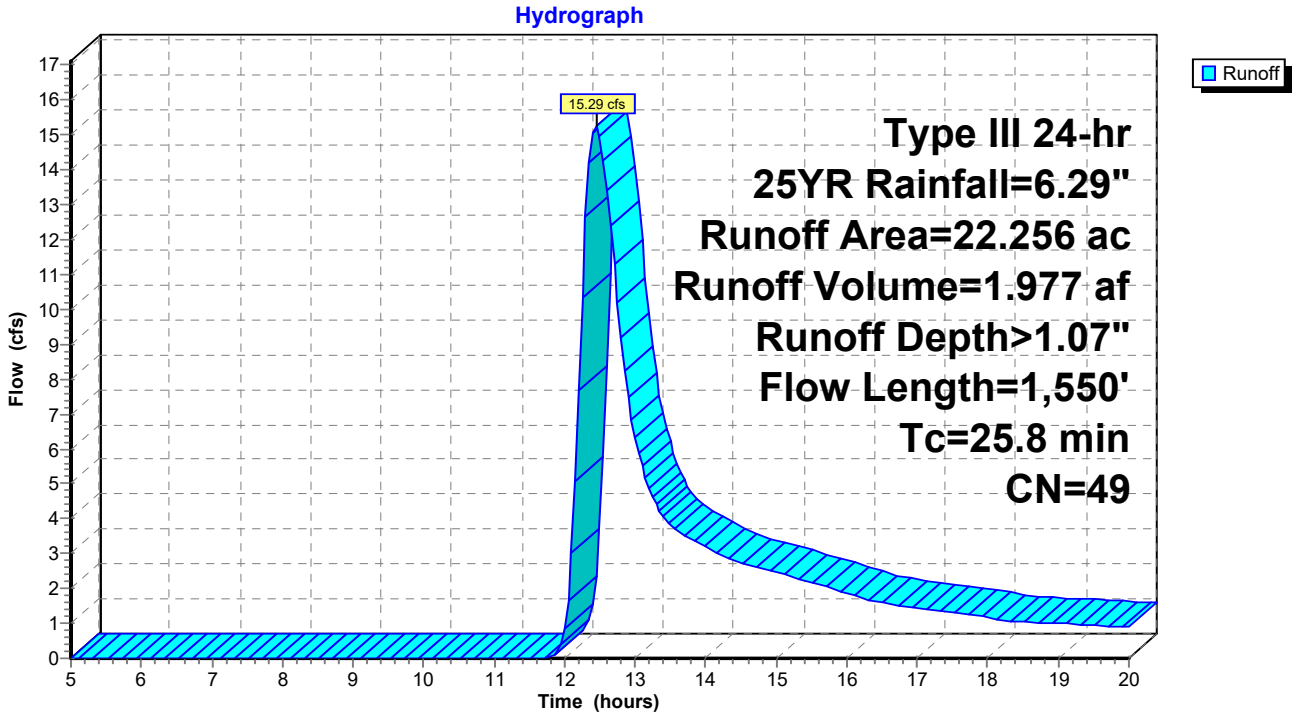
Runoff = 15.29 cfs @ 12.44 hrs, Volume= 1.977 af, Depth> 1.07"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.29"

Area (ac)	CN	Description
0.186	55	Woods, Good, HSG B
0.139	72	Dirt roads, HSG A
10.867	64	Row crops, SR + CR, Good, HSG A
0.330	39	Pasture/grassland/range, Good, HSG A
0.004	30	Woods, Good, HSG A
1.617	30	Woods, Good, HSG A
0.085	75	Row crops, SR + CR, Good, HSG B
0.016	55	Woods, Good, HSG B
0.014	82	Dirt roads, HSG B
0.110	75	Row crops, SR + CR, Good, HSG B
0.336	61	Pasture/grassland/range, Good, HSG B
0.429	64	Row crops, SR + CR, Good, HSG A
1.801	30	Meadow, non-grazed, HSG A
6.199	30	Woods, Good, HSG A
0.123	55	Woods, Good, HSG B
22.256	49	Weighted Average
22.256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
5.3	500	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.7	1,000	0.0100	1.00		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
25.8	1,550	Total			

Subcatchment 1A: Subcat 1A



Summary for Subcatchment 1B: Subcat 1B

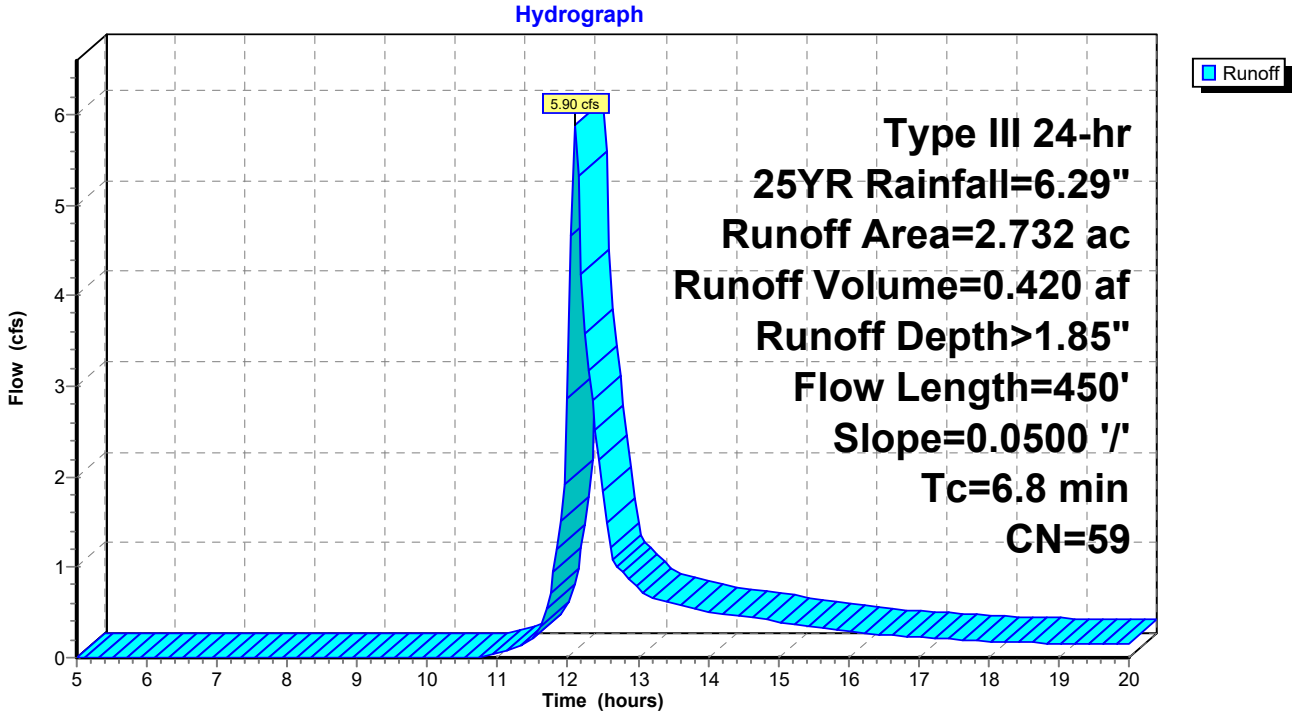
Runoff = 5.90 cfs @ 12.11 hrs, Volume= 0.420 af, Depth> 1.85"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.29"

Area (ac)	CN	Description
0.578	64	Row crops, SR + CR, Good, HSG A
0.114	64	Row crops, SR + CR, Good, HSG A
0.414	30	Woods, Good, HSG A
1.626	64	Row crops, SR + CR, Good, HSG A
2.732	59	Weighted Average
2.732		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
3.0	400	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.8	450	Total			

Subcatchment 1B: Subcat 1B



Summary for Subcatchment 1C: Subcat 1C

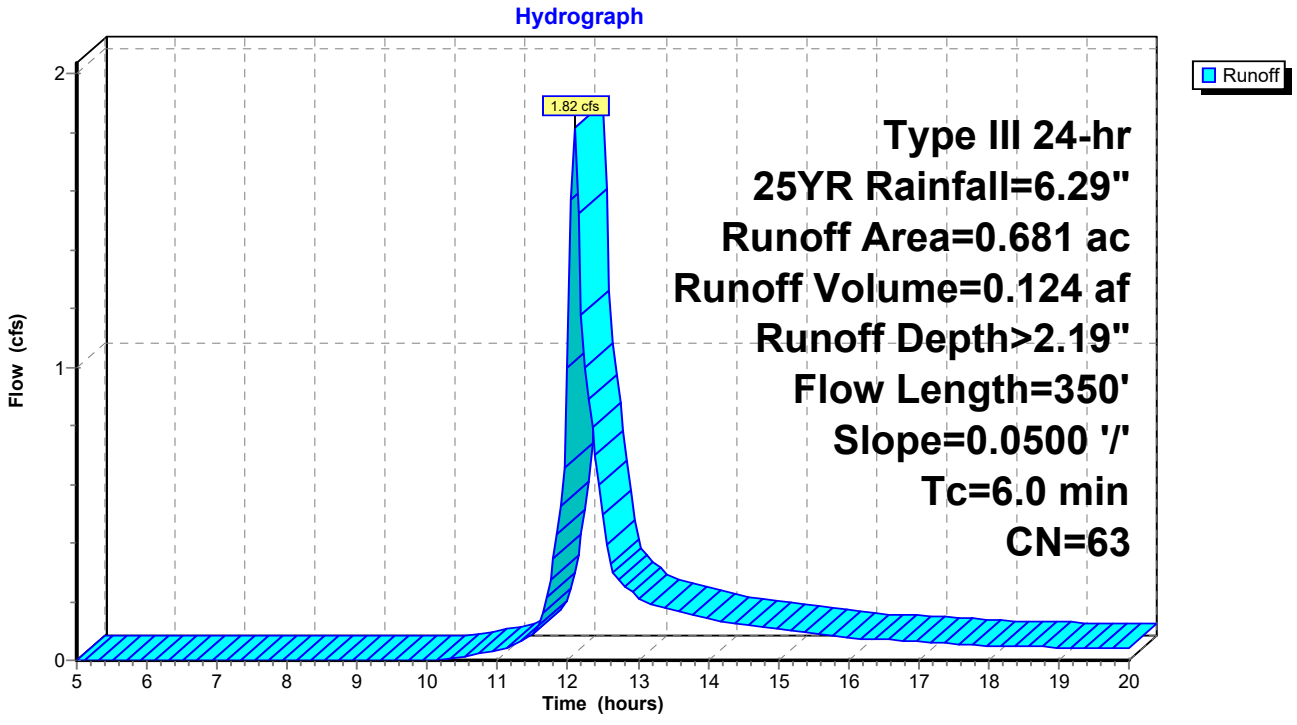
Runoff = 1.82 cfs @ 12.10 hrs, Volume= 0.124 af, Depth> 2.19"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR Rainfall=6.29"

Area (ac)	CN	Description
0.389	64	Row crops, SR + CR, Good, HSG A
0.016	30	Woods, Good, HSG A
0.276	64	Row crops, SR + CR, Good, HSG A
0.681	63	Weighted Average
0.681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
2.2	300	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.0	350	Total			

Subcatchment 1C: Subcat 1C

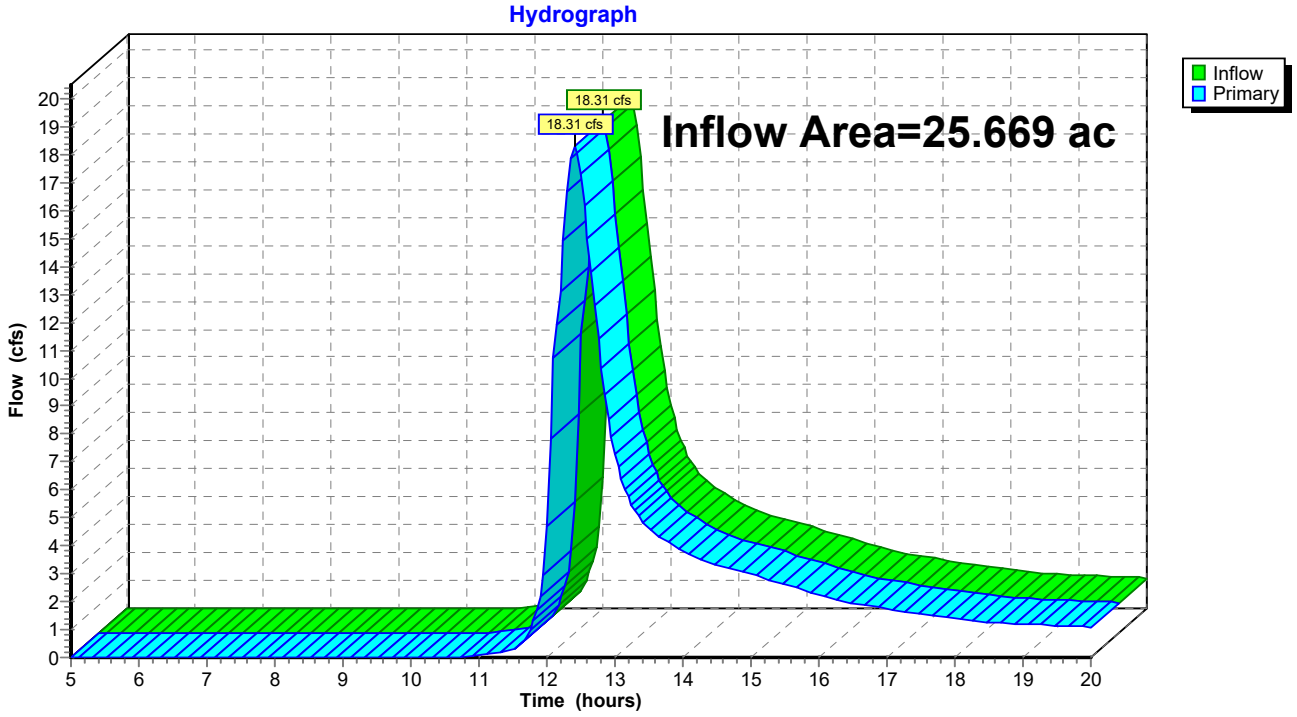


Summary for Link DP1: Wetland

Inflow Area = 25.669 ac, 0.00% Impervious, Inflow Depth > 1.18" for 25YR event
Inflow = 18.31 cfs @ 12.41 hrs, Volume= 2.522 af
Primary = 18.31 cfs @ 12.41 hrs, Volume= 2.522 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3P

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1: Wetland



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1A: Subcat 1A Runoff Area=22.256 ac 0.00% Impervious Runoff Depth>1.48"
Flow Length=1,550' Tc=25.8 min CN=49 Runoff=22.65 cfs 2.746 af

Subcatchment1B: Subcat 1B Runoff Area=2.732 ac 0.00% Impervious Runoff Depth>2.40"
Flow Length=450' Slope=0.0500 '/' Tc=6.8 min CN=59 Runoff=7.79 cfs 0.546 af

Subcatchment1C: Subcat 1C Runoff Area=0.681 ac 0.00% Impervious Runoff Depth>2.79"
Flow Length=350' Slope=0.0500 '/' Tc=6.0 min CN=63 Runoff=2.34 cfs 0.158 af

Link DP1: Wetland Inflow=26.66 cfs 3.450 af
Primary=26.66 cfs 3.450 af

Total Runoff Area = 25.669 ac Runoff Volume = 3.450 af Average Runoff Depth = 1.61"
100.00% Pervious = 25.669 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1A: Subcat 1A

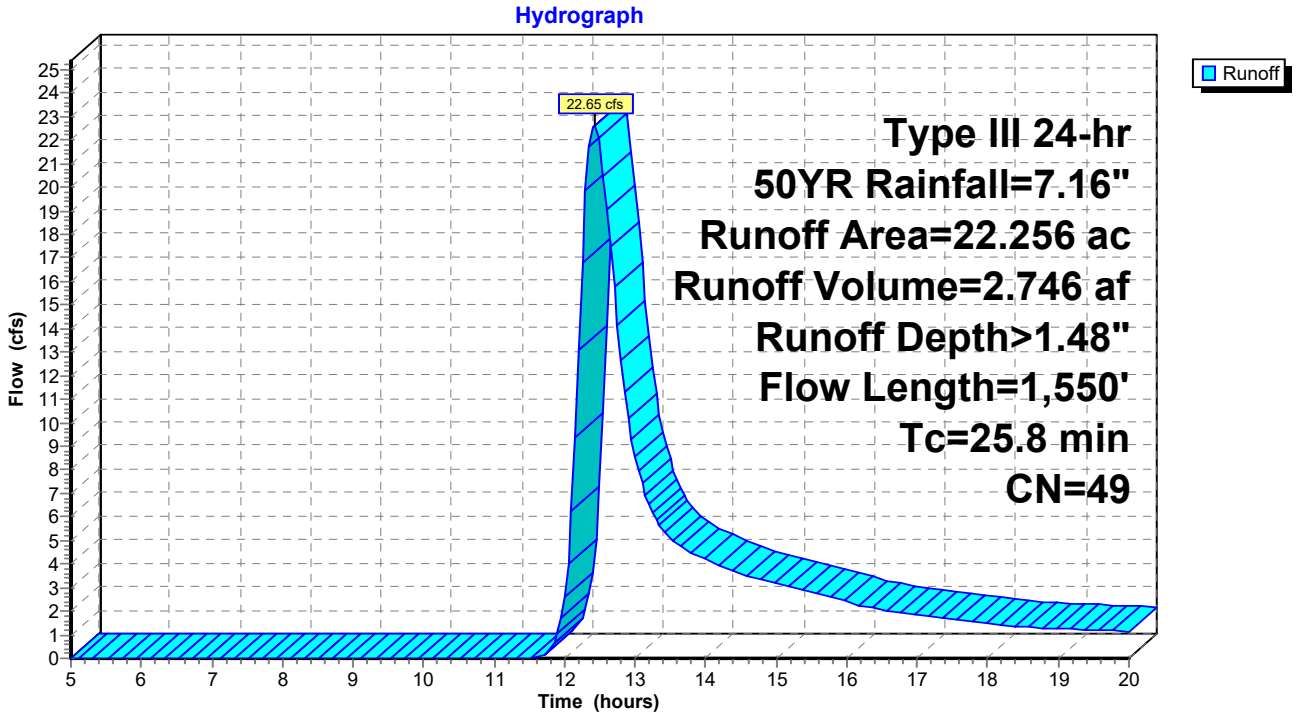
Runoff = 22.65 cfs @ 12.42 hrs, Volume= 2.746 af, Depth> 1.48"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50YR Rainfall=7.16"

Area (ac)	CN	Description
0.186	55	Woods, Good, HSG B
0.139	72	Dirt roads, HSG A
10.867	64	Row crops, SR + CR, Good, HSG A
0.330	39	Pasture/grassland/range, Good, HSG A
0.004	30	Woods, Good, HSG A
1.617	30	Woods, Good, HSG A
0.085	75	Row crops, SR + CR, Good, HSG B
0.016	55	Woods, Good, HSG B
0.014	82	Dirt roads, HSG B
0.110	75	Row crops, SR + CR, Good, HSG B
0.336	61	Pasture/grassland/range, Good, HSG B
0.429	64	Row crops, SR + CR, Good, HSG A
1.801	30	Meadow, non-grazed, HSG A
6.199	30	Woods, Good, HSG A
0.123	55	Woods, Good, HSG B
22.256	49	Weighted Average
22.256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
5.3	500	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.7	1,000	0.0100	1.00		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
25.8	1,550	Total			

Subcatchment 1A: Subcat 1A



Summary for Subcatchment 1B: Subcat 1B

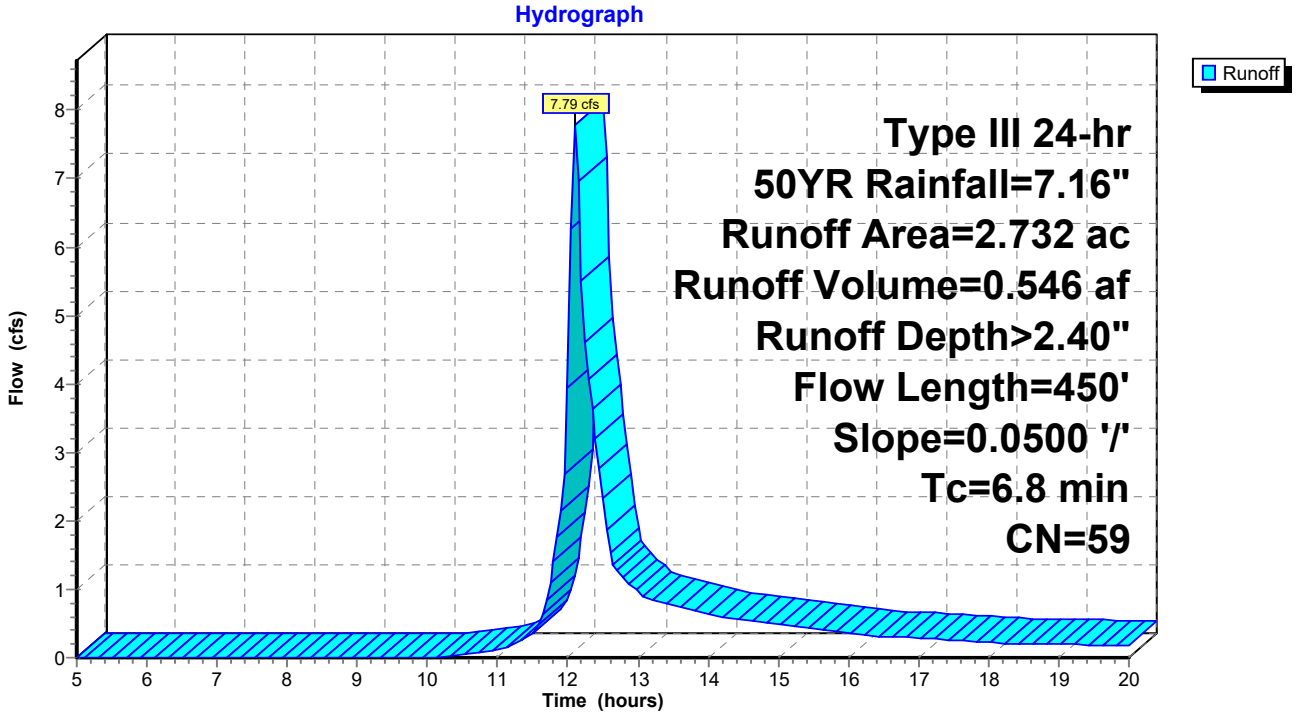
Runoff = 7.79 cfs @ 12.11 hrs, Volume= 0.546 af, Depth> 2.40"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50YR Rainfall=7.16"

Area (ac)	CN	Description
0.578	64	Row crops, SR + CR, Good, HSG A
0.114	64	Row crops, SR + CR, Good, HSG A
0.414	30	Woods, Good, HSG A
1.626	64	Row crops, SR + CR, Good, HSG A
2.732	59	Weighted Average
2.732		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
3.0	400	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.8	450	Total			

Subcatchment 1B: Subcat 1B



Summary for Subcatchment 1C: Subcat 1C

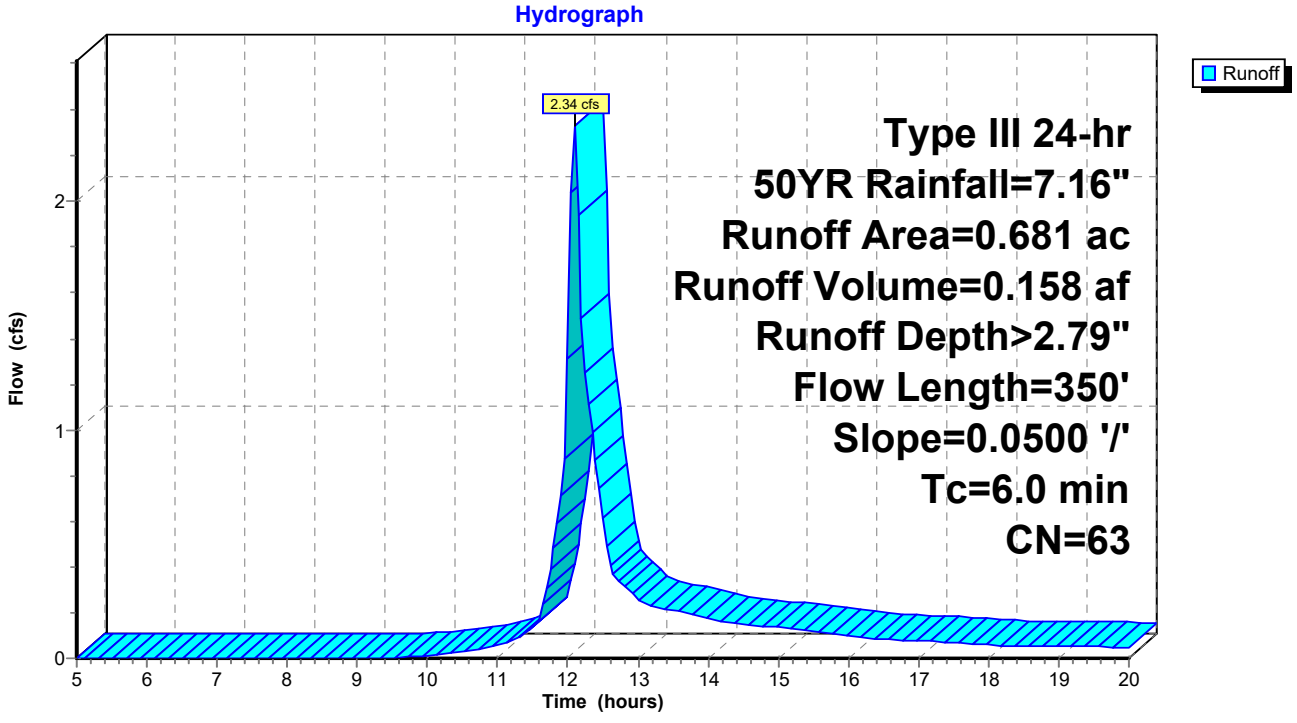
Runoff = 2.34 cfs @ 12.10 hrs, Volume= 0.158 af, Depth> 2.79"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50YR Rainfall=7.16"

Area (ac)	CN	Description
0.389	64	Row crops, SR + CR, Good, HSG A
0.016	30	Woods, Good, HSG A
0.276	64	Row crops, SR + CR, Good, HSG A
0.681	63	Weighted Average
0.681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
2.2	300	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.0	350	Total			

Subcatchment 1C: Subcat 1C

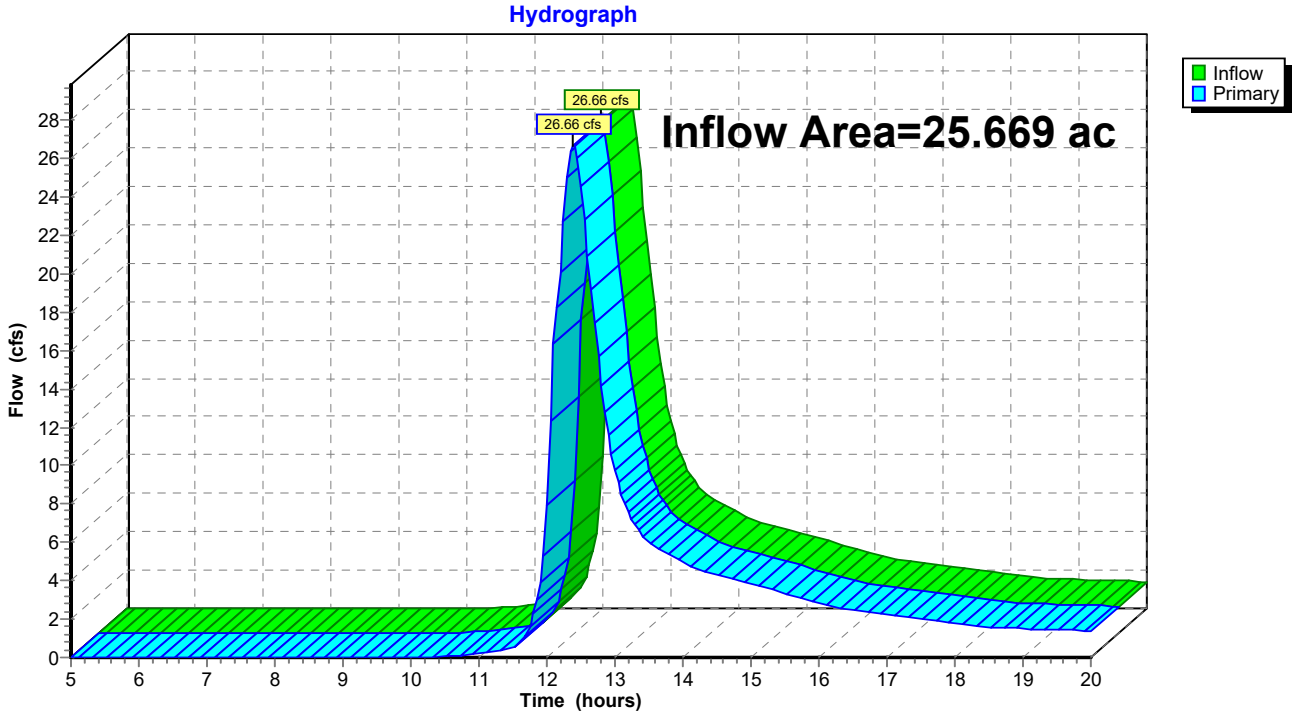


Summary for Link DP1: Wetland

Inflow Area = 25.669 ac, 0.00% Impervious, Inflow Depth > 1.61" for 50YR event
Inflow = 26.66 cfs @ 12.39 hrs, Volume= 3.450 af
Primary = 26.66 cfs @ 12.39 hrs, Volume= 3.450 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3P

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1: Wetland



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1A: Subcat 1A Runoff Area=22.256 ac 0.00% Impervious Runoff Depth>1.99"
Flow Length=1,550' Tc=25.8 min CN=49 Runoff=31.66 cfs 3.686 af

Subcatchment1B: Subcat 1B Runoff Area=2.732 ac 0.00% Impervious Runoff Depth>3.05"
Flow Length=450' Slope=0.0500 '/' Tc=6.8 min CN=59 Runoff=10.00 cfs 0.694 af

Subcatchment1C: Subcat 1C Runoff Area=0.681 ac 0.00% Impervious Runoff Depth>3.48"
Flow Length=350' Slope=0.0500 '/' Tc=6.0 min CN=63 Runoff=2.93 cfs 0.198 af

Link DP1: Wetland Inflow=36.82 cfs 4.577 af
Primary=36.82 cfs 4.577 af

Total Runoff Area = 25.669 ac Runoff Volume = 4.577 af Average Runoff Depth = 2.14"
100.00% Pervious = 25.669 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1A: Subcat 1A

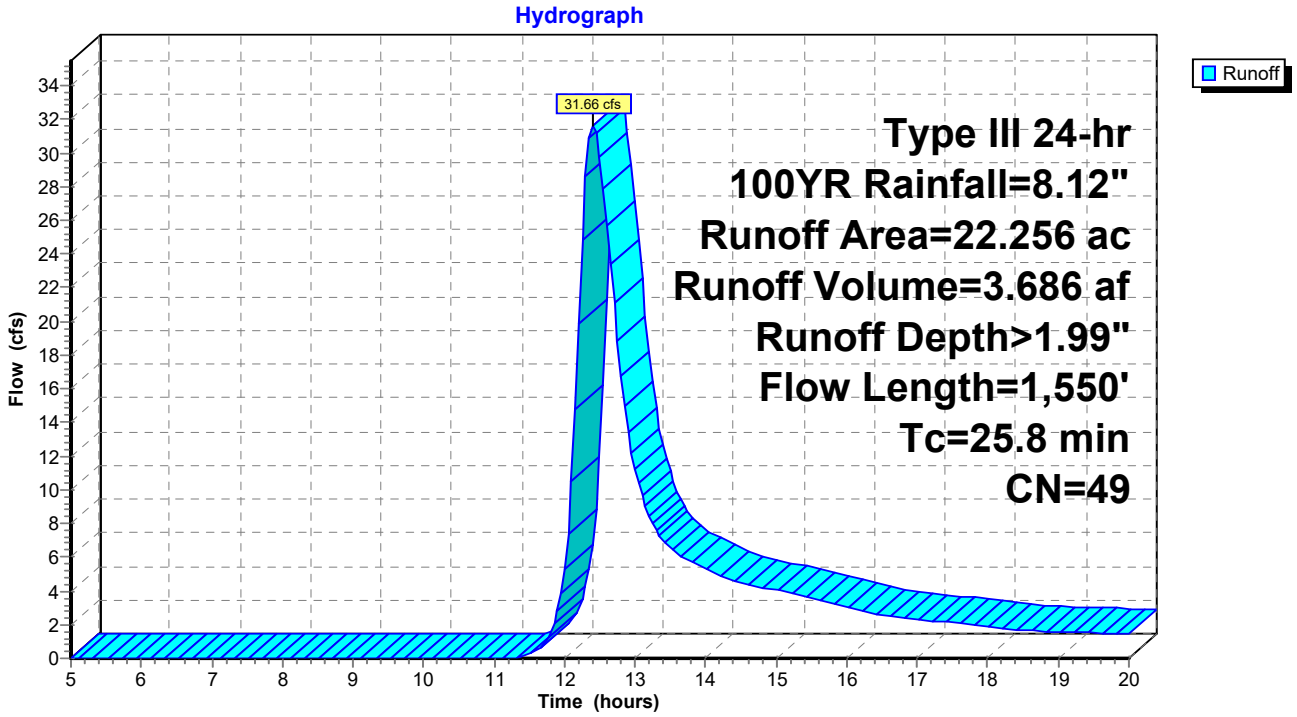
Runoff = 31.66 cfs @ 12.41 hrs, Volume= 3.686 af, Depth> 1.99"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=8.12"

Area (ac)	CN	Description
0.186	55	Woods, Good, HSG B
0.139	72	Dirt roads, HSG A
10.867	64	Row crops, SR + CR, Good, HSG A
0.330	39	Pasture/grassland/range, Good, HSG A
0.004	30	Woods, Good, HSG A
1.617	30	Woods, Good, HSG A
0.085	75	Row crops, SR + CR, Good, HSG B
0.016	55	Woods, Good, HSG B
0.014	82	Dirt roads, HSG B
0.110	75	Row crops, SR + CR, Good, HSG B
0.336	61	Pasture/grassland/range, Good, HSG B
0.429	64	Row crops, SR + CR, Good, HSG A
1.801	30	Meadow, non-grazed, HSG A
6.199	30	Woods, Good, HSG A
0.123	55	Woods, Good, HSG B
22.256	49	Weighted Average
22.256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
5.3	500	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.7	1,000	0.0100	1.00		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
25.8	1,550	Total			

Subcatchment 1A: Subcat 1A



Summary for Subcatchment 1B: Subcat 1B

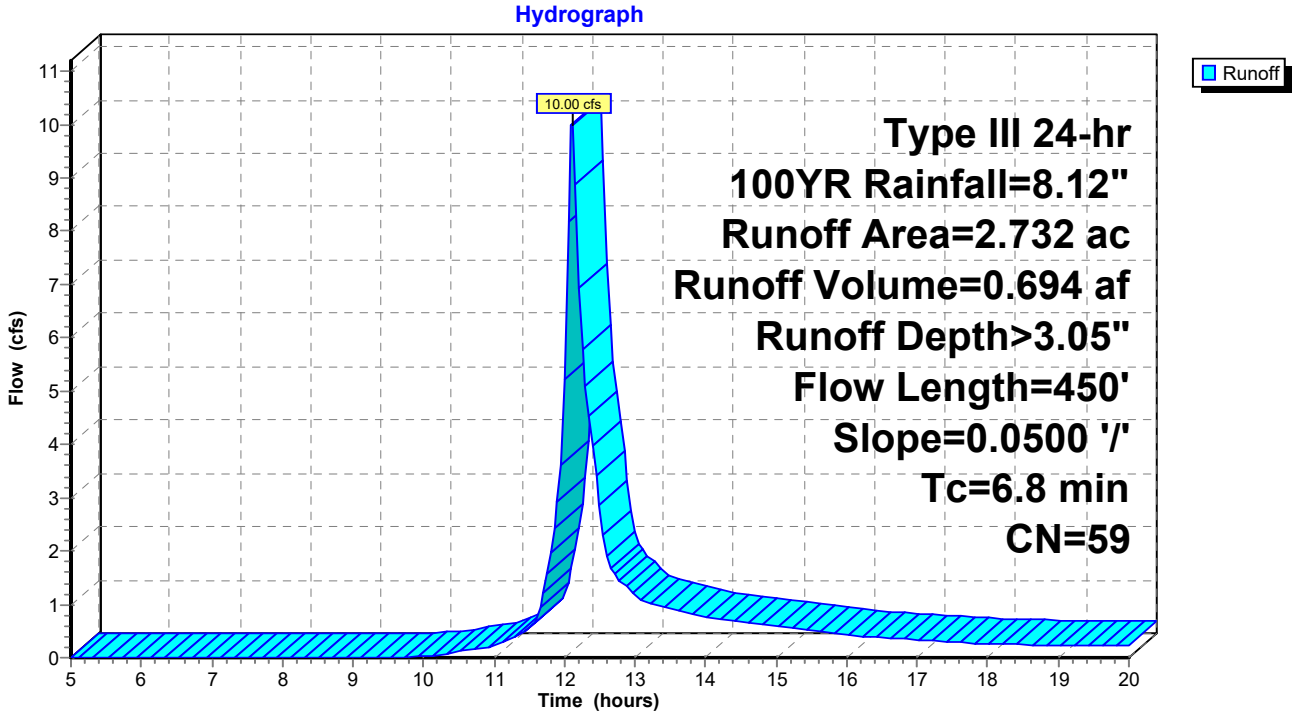
Runoff = 10.00 cfs @ 12.11 hrs, Volume= 0.694 af, Depth> 3.05"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=8.12"

Area (ac)	CN	Description
0.578	64	Row crops, SR + CR, Good, HSG A
0.114	64	Row crops, SR + CR, Good, HSG A
0.414	30	Woods, Good, HSG A
1.626	64	Row crops, SR + CR, Good, HSG A
2.732	59	Weighted Average
2.732		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
3.0	400	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.8	450	Total			

Subcatchment 1B: Subcat 1B



Summary for Subcatchment 1C: Subcat 1C

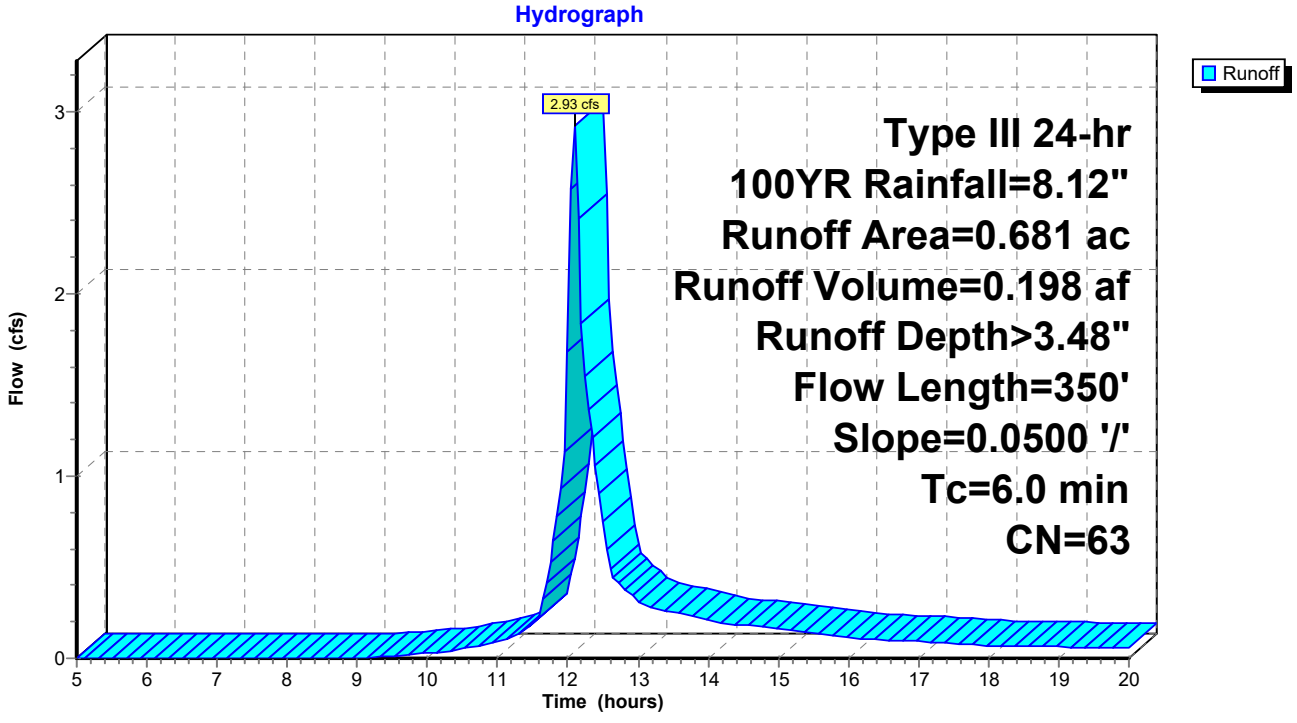
Runoff = 2.93 cfs @ 12.10 hrs, Volume= 0.198 af, Depth> 3.48"
Routed to Link DP1 : Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR Rainfall=8.12"

Area (ac)	CN	Description
0.389	64	Row crops, SR + CR, Good, HSG A
0.016	30	Woods, Good, HSG A
0.276	64	Row crops, SR + CR, Good, HSG A
0.681	63	Weighted Average
0.681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.36"
2.2	300	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.0	350	Total			

Subcatchment 1C: Subcat 1C

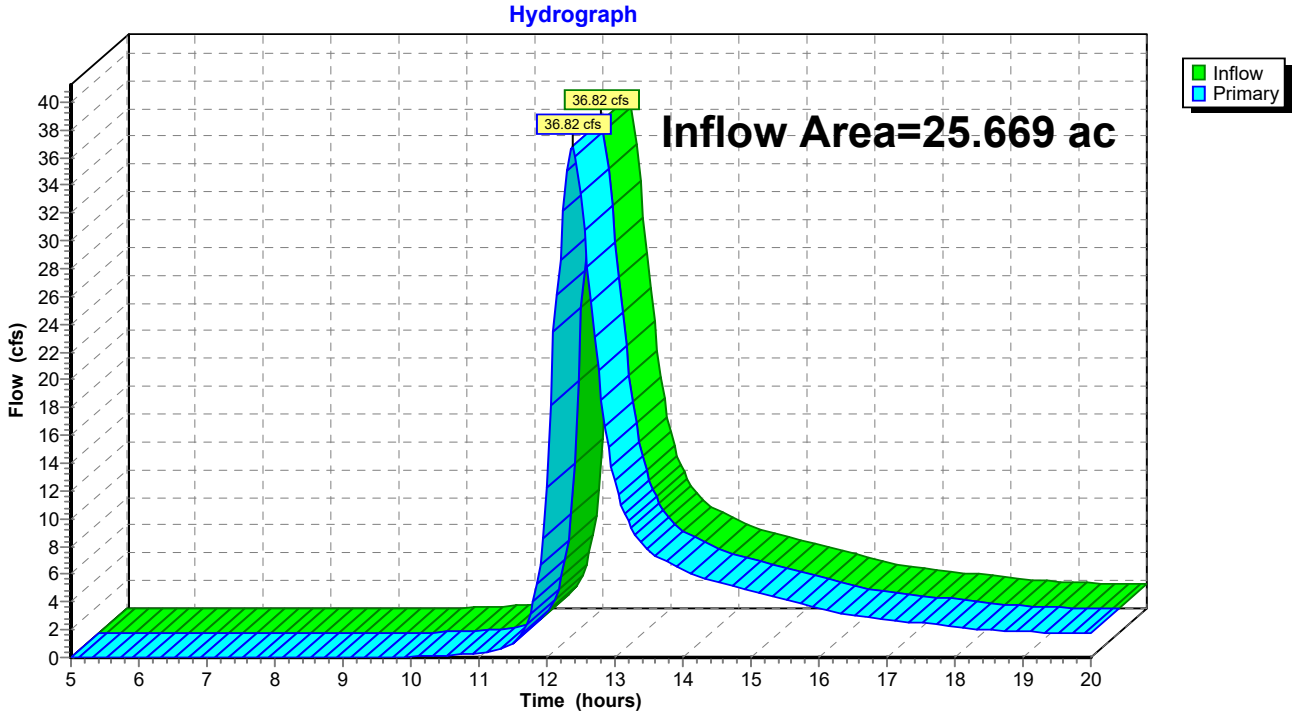


Summary for Link DP1: Wetland

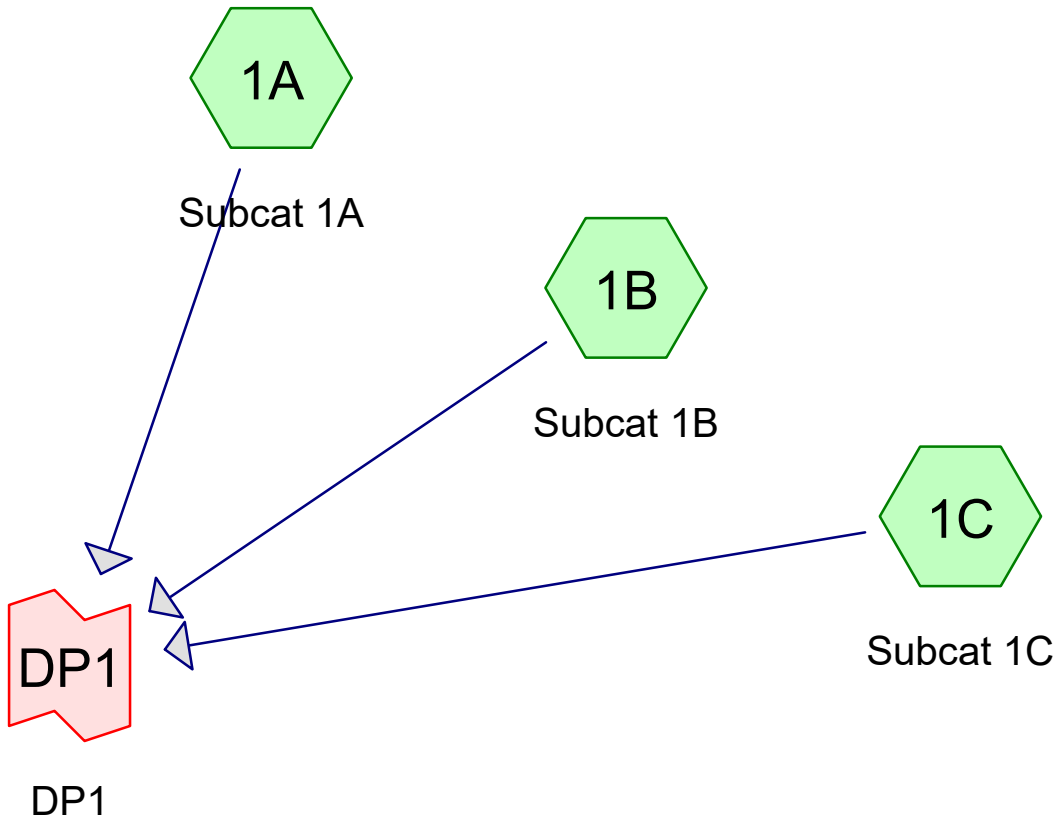
Inflow Area = 25.669 ac, 0.00% Impervious, Inflow Depth > 2.14" for 100YR event
Inflow = 36.82 cfs @ 12.38 hrs, Volume= 4.577 af
Primary = 36.82 cfs @ 12.38 hrs, Volume= 4.577 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3P

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1: Wetland



HydroCAD Analysis: Proposed Conditions



Subcat Reach Pond Link

Routing Diagram for Proposed Conditions
Prepared by VHB, Inc, Printed 10/24/2023

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.20	2
2	25-year	Type III 24-hr		Default	24.00	1	6.29	2
3	50-year	Type III 24-hr		Default	24.00	1	7.16	2
4	100-year	Type III 24-hr		Default	24.00	1	8.12	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
13.002	59	50-75% Grass cover, Fair, HSG A-B (1A, 1B, 1C)
2.083	39	>75% Grass cover, Good, HSG A (1A)
0.205	76	Gravel roads, HSG A (1A)
0.141	85	Gravel roads, HSG B (1A)
0.005	58	Meadow, non-grazed, HSG B (1A)
0.677	64	Row crops, SR + CR, Good, HSG A (1A, 1B, 1C)
0.966	67	Row crops, straight row, Good, HSG A (1A, 1C)
0.400	78	Row crops, straight row, Good, HSG B (1A)
8.052	30	Woods, Good, HSG A (1A, 1B, 1C)
0.139	55	Woods, Good, HSG B (1A)
25.670	**49**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
24.985	HSG A	1A, 1B, 1C
0.685	HSG B	1A
0.000	HSG C	
0.000	HSG D	
0.000	Other	
25.670		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
13.002	0.000	0.000	0.000	0.000	13.002	50-75% Grass cover, Fair	1A, 1B, 1C
2.083	0.000	0.000	0.000	0.000	2.083	>75% Grass cover, Good	1A
0.205	0.141	0.000	0.000	0.000	0.346	Gravel roads	1A
0.000	0.005	0.000	0.000	0.000	0.005	Meadow, non-grazed	1A
0.677	0.000	0.000	0.000	0.000	0.677	Row crops, SR + CR, Good	1A, 1B, 1C
0.966	0.400	0.000	0.000	0.000	1.366	Row crops, straight row, Good	1A, 1C
8.052	0.139	0.000	0.000	0.000	8.191	Woods, Good	1A, 1B, 1C
24.985	**0.685**	**0.000**	**0.000**	**0.000**	**25.670**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1A: Subcat 1A Runoff Area=22.256 ac 0.00% Impervious Runoff Depth>0.07"
Flow Length=1,550' Tc=33.0 min CN=48 Runoff=0.27 cfs 0.121 af

Subcatchment1B: Subcat 1B Runoff Area=2.732 ac 0.00% Impervious Runoff Depth>0.24"
Flow Length=450' Slope=0.0500 '/' Tc=8.2 min CN=56 Runoff=0.33 cfs 0.054 af

Subcatchment1C: Subcat 1C Runoff Area=0.682 ac 0.00% Impervious Runoff Depth>0.46"
Flow Length=350' Slope=0.0500 '/' Tc=7.1 min CN=63 Runoff=0.28 cfs 0.026 af

Link DP1: DP1 Inflow=0.53 cfs 0.201 af
Primary=0.53 cfs 0.201 af

Total Runoff Area = 25.670 ac Runoff Volume = 0.201 af Average Runoff Depth = 0.09"
100.00% Pervious = 25.670 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1A: Subcat 1A

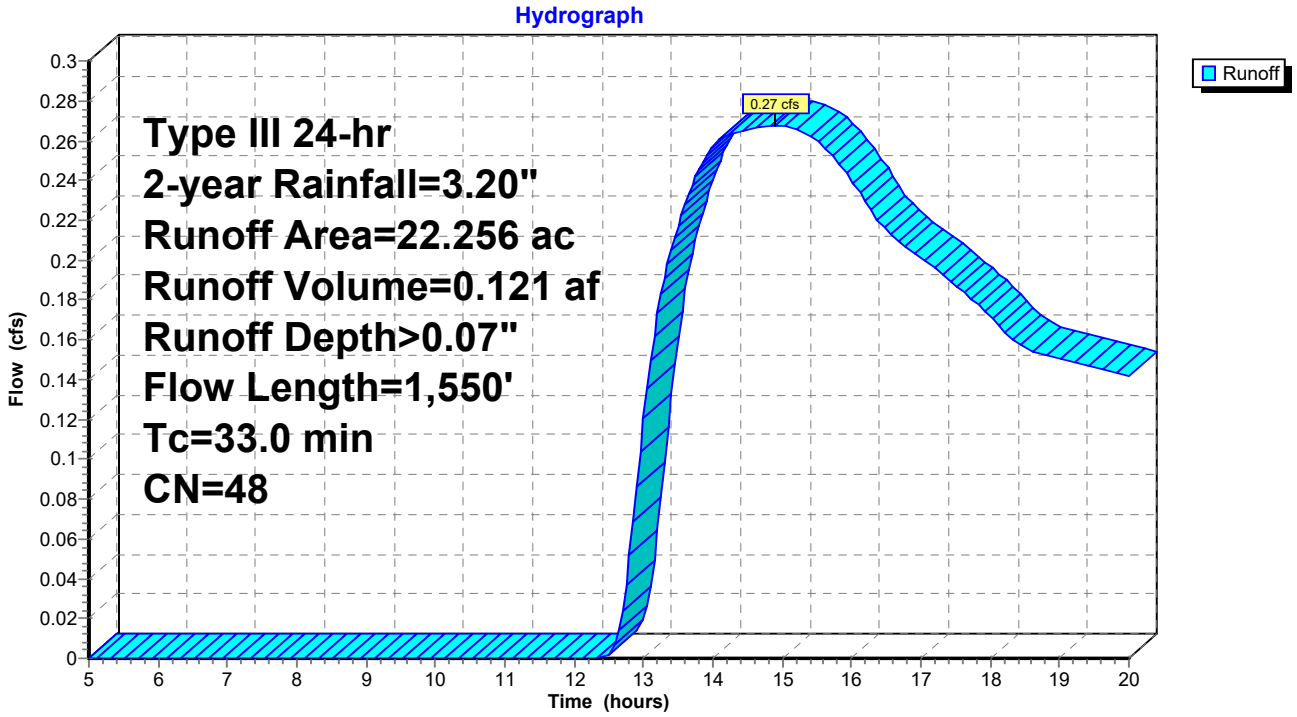
Runoff = 0.27 cfs @ 14.89 hrs, Volume= 0.121 af, Depth> 0.07"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (ac)	CN	Description
	0.205	76	Gravel roads, HSG A
	0.141	85	Gravel roads, HSG B
*	11.000	59	50-75% Grass cover, Fair, HSG A-B
	0.005	58	Meadow, non-grazed, HSG B
	0.005	64	Row crops, SR + CR, Good, HSG A
	0.656	67	Row crops, straight row, Good, HSG A
	0.400	78	Row crops, straight row, Good, HSG B
	7.622	30	Woods, Good, HSG A
	0.139	55	Woods, Good, HSG B
	2.083	39	>75% Grass cover, Good, HSG A
	22.256	48	Weighted Average
	22.256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
5.3	500	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.8	1,000	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.0	1,550	Total			

Subcatchment 1A: Subcat 1A



Summary for Subcatchment 1B: Subcat 1B

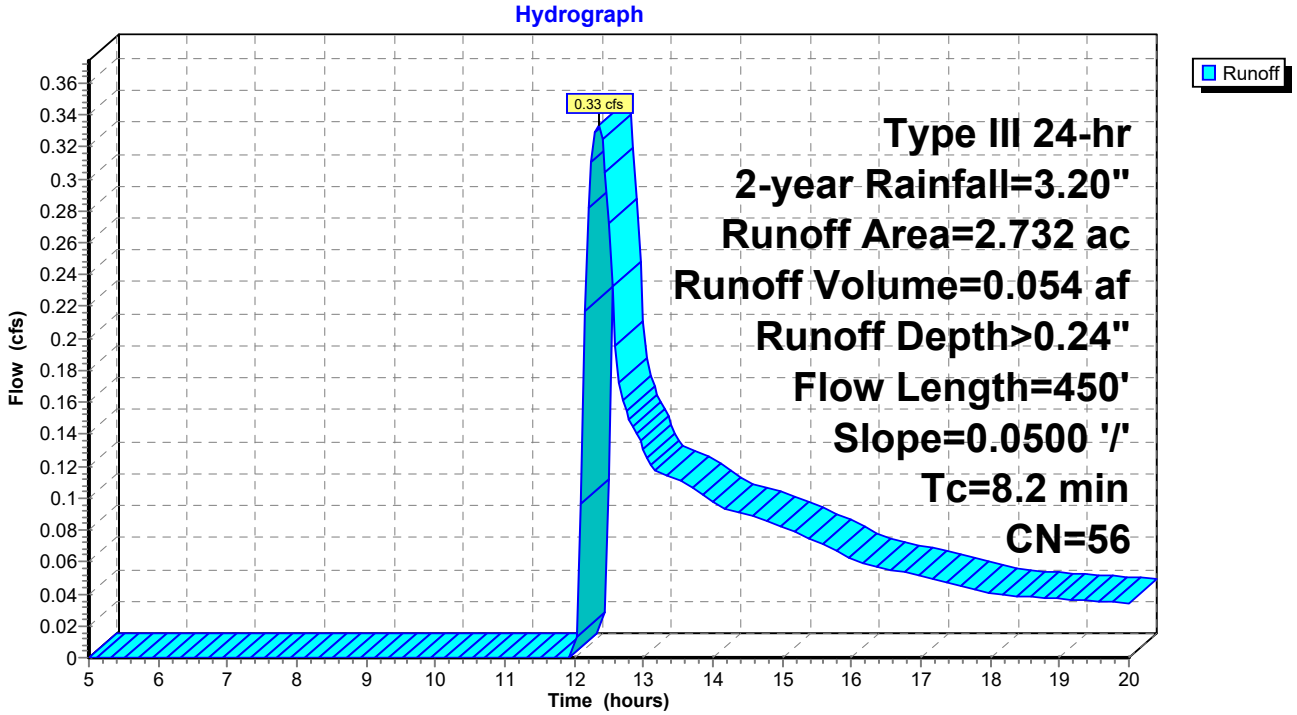
Runoff = 0.33 cfs @ 12.34 hrs, Volume= 0.054 af, Depth> 0.24"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (ac)	CN	Description
*	1.784	59	50-75% Grass cover, Fair, HSG A-B
	0.534	64	Row crops, SR + CR, Good, HSG A
	0.000	67	Row crops, straight row, Good, HSG A
	0.414	30	Woods, Good, HSG A
	2.732	56	Weighted Average
	2.732		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
4.3	400	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.2	450	Total			

Subcatchment 1B: Subcat 1B



Summary for Subcatchment 1C: Subcat 1C

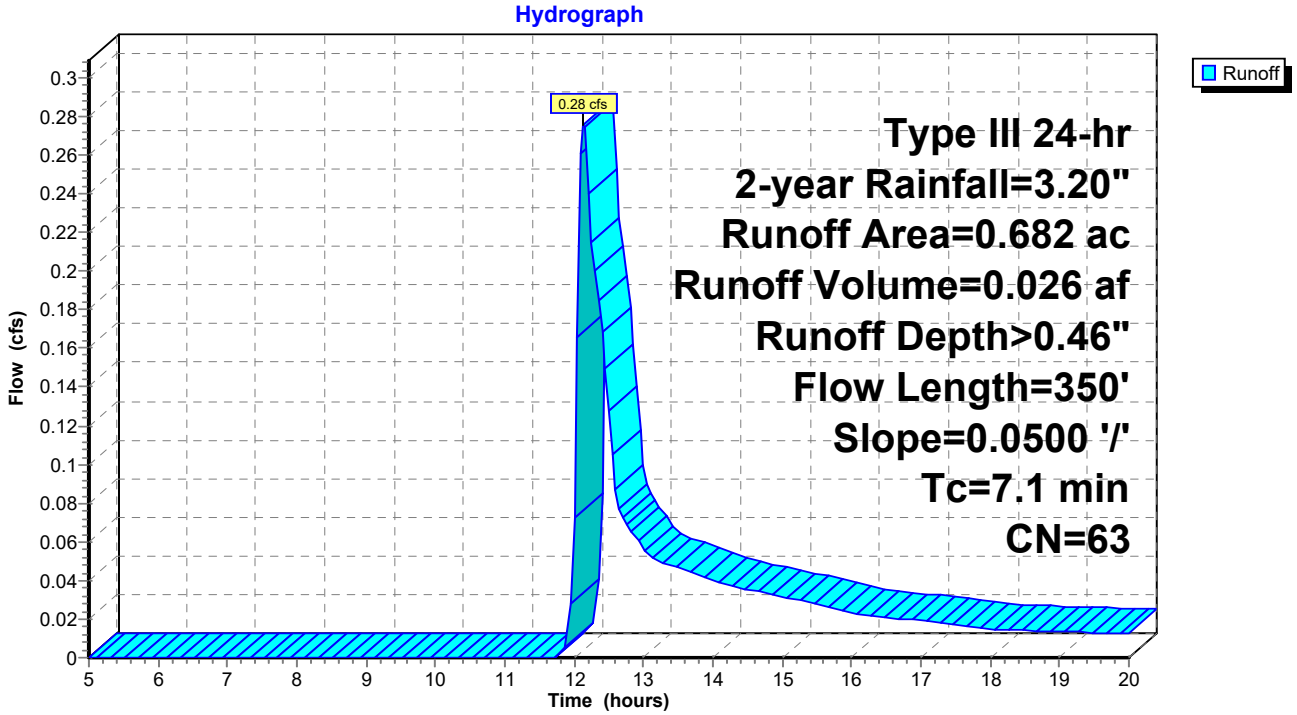
Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.026 af, Depth> 0.46"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (ac)	CN	Description
*	0.218	59	50-75% Grass cover, Fair, HSG A-B
	0.138	64	Row crops, SR + CR, Good, HSG A
	0.310	67	Row crops, straight row, Good, HSG A
	0.016	30	Woods, Good, HSG A
	0.682	63	Weighted Average
	0.682		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.2	300	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	350	Total			

Subcatchment 1C: Subcat 1C

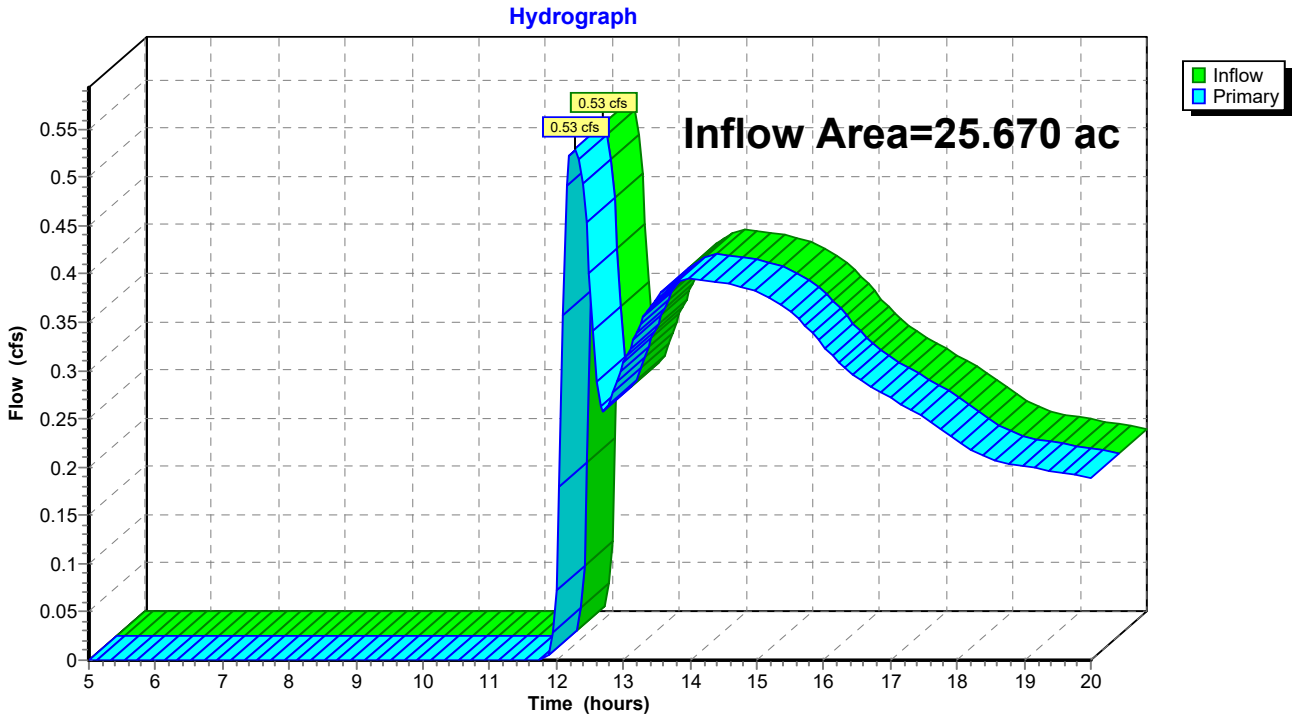


Summary for Link DP1: DP1

Inflow Area = 25.670 ac, 0.00% Impervious, Inflow Depth > 0.09" for 2-year event
Inflow = 0.53 cfs @ 12.29 hrs, Volume= 0.201 af
Primary = 0.53 cfs @ 12.29 hrs, Volume= 0.201 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1: DP1



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1A: Subcat 1A Runoff Area=22.256 ac 0.00% Impervious Runoff Depth>0.99"
Flow Length=1,550' Tc=33.0 min CN=48 Runoff=12.57 cfs 1.840 af

Subcatchment1B: Subcat 1B Runoff Area=2.732 ac 0.00% Impervious Runoff Depth>1.60"
Flow Length=450' Slope=0.0500 '/' Tc=8.2 min CN=56 Runoff=4.69 cfs 0.365 af

Subcatchment1C: Subcat 1C Runoff Area=0.682 ac 0.00% Impervious Runoff Depth>2.19"
Flow Length=350' Slope=0.0500 '/' Tc=7.1 min CN=63 Runoff=1.76 cfs 0.124 af

Link DP1: DP1 Inflow=14.56 cfs 2.329 af
Primary=14.56 cfs 2.329 af

Total Runoff Area = 25.670 ac Runoff Volume = 2.329 af Average Runoff Depth = 1.09"
100.00% Pervious = 25.670 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1A: Subcat 1A

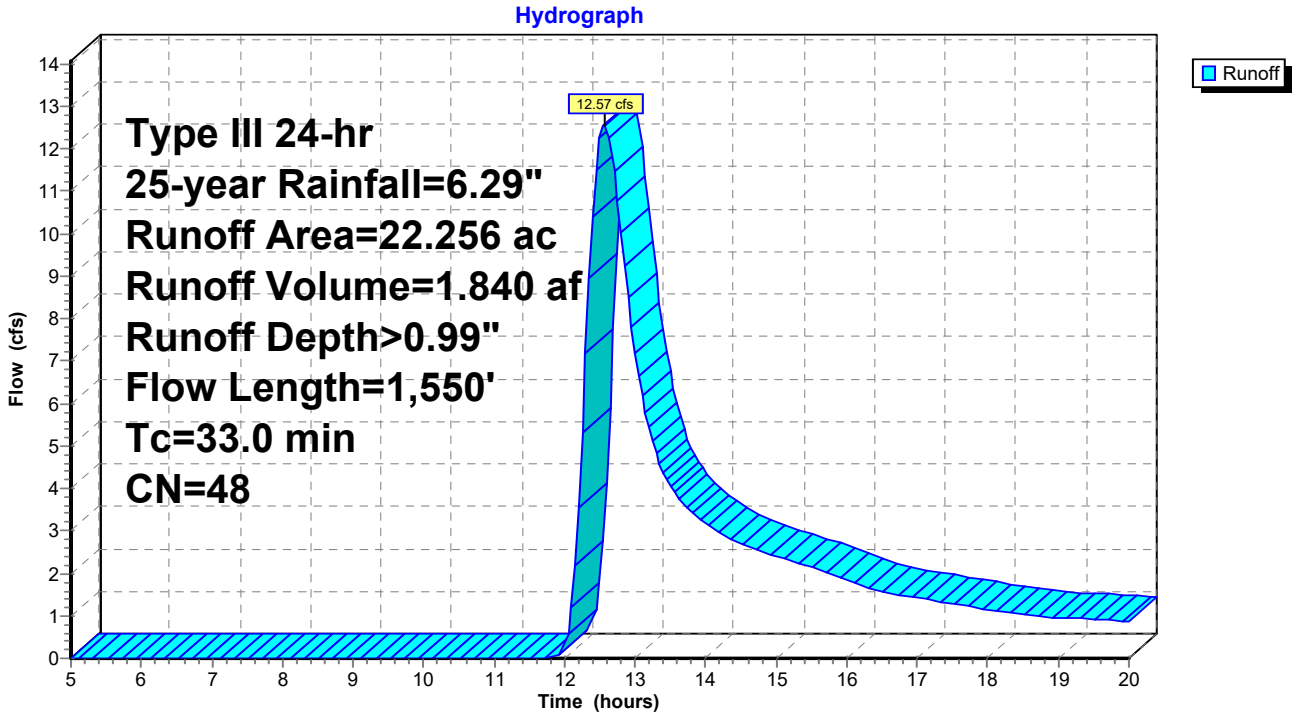
Runoff = 12.57 cfs @ 12.57 hrs, Volume= 1.840 af, Depth> 0.99"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.29"

	Area (ac)	CN	Description
	0.205	76	Gravel roads, HSG A
	0.141	85	Gravel roads, HSG B
*	11.000	59	50-75% Grass cover, Fair, HSG A-B
	0.005	58	Meadow, non-grazed, HSG B
	0.005	64	Row crops, SR + CR, Good, HSG A
	0.656	67	Row crops, straight row, Good, HSG A
	0.400	78	Row crops, straight row, Good, HSG B
	7.622	30	Woods, Good, HSG A
	0.139	55	Woods, Good, HSG B
	2.083	39	>75% Grass cover, Good, HSG A
	22.256	48	Weighted Average
	22.256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
5.3	500	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.8	1,000	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.0	1,550	Total			

Subcatchment 1A: Subcat 1A



Summary for Subcatchment 1B: Subcat 1B

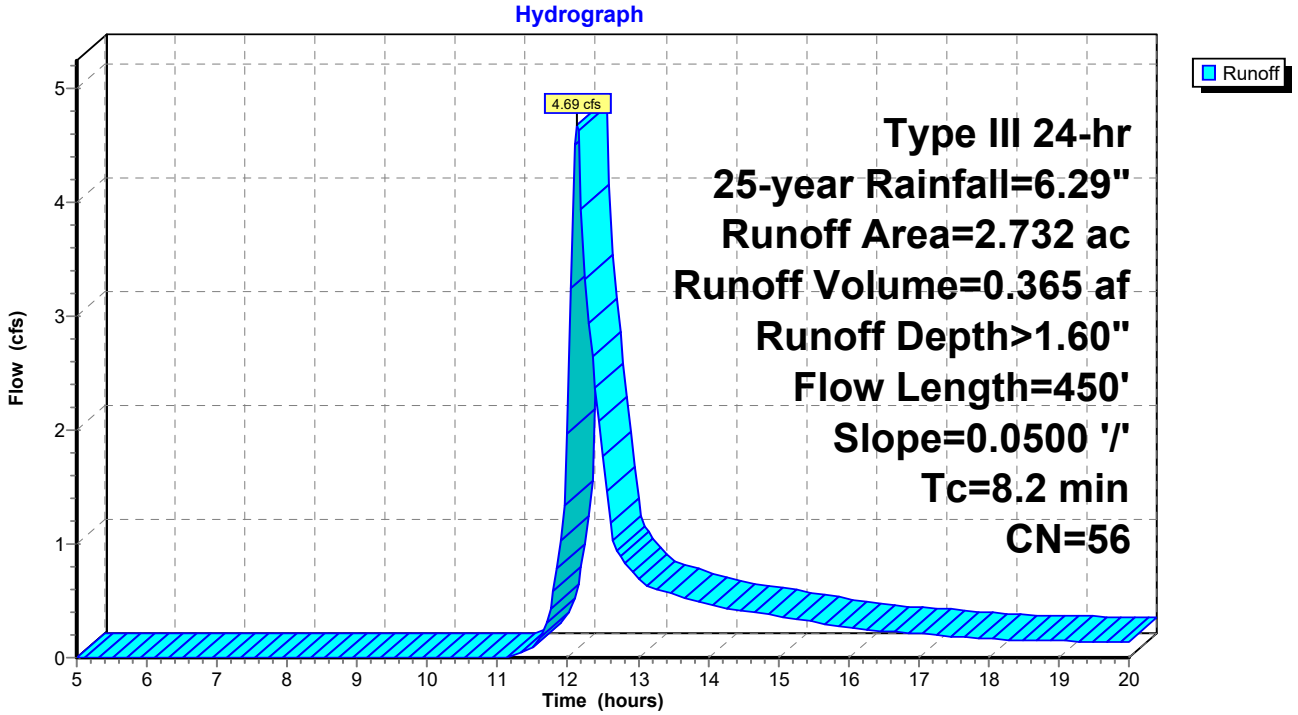
Runoff = 4.69 cfs @ 12.13 hrs, Volume= 0.365 af, Depth> 1.60"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.29"

	Area (ac)	CN	Description
*	1.784	59	50-75% Grass cover, Fair, HSG A-B
	0.534	64	Row crops, SR + CR, Good, HSG A
	0.000	67	Row crops, straight row, Good, HSG A
	0.414	30	Woods, Good, HSG A
	2.732	56	Weighted Average
	2.732		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
4.3	400	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.2	450	Total			

Subcatchment 1B: Subcat 1B



Summary for Subcatchment 1C: Subcat 1C

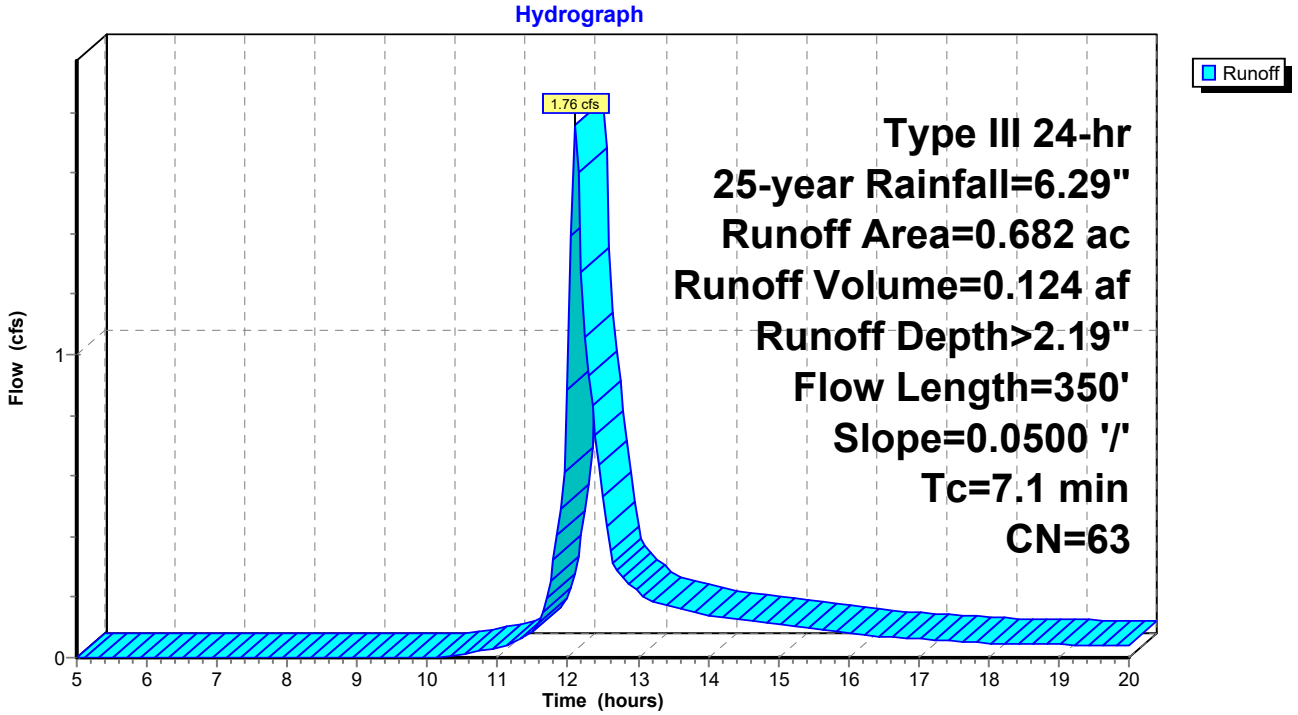
Runoff = 1.76 cfs @ 12.11 hrs, Volume= 0.124 af, Depth> 2.19"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=6.29"

	Area (ac)	CN	Description
*	0.218	59	50-75% Grass cover, Fair, HSG A-B
	0.138	64	Row crops, SR + CR, Good, HSG A
	0.310	67	Row crops, straight row, Good, HSG A
	0.016	30	Woods, Good, HSG A
	0.682	63	Weighted Average
	0.682		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.2	300	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	350	Total			

Subcatchment 1C: Subcat 1C

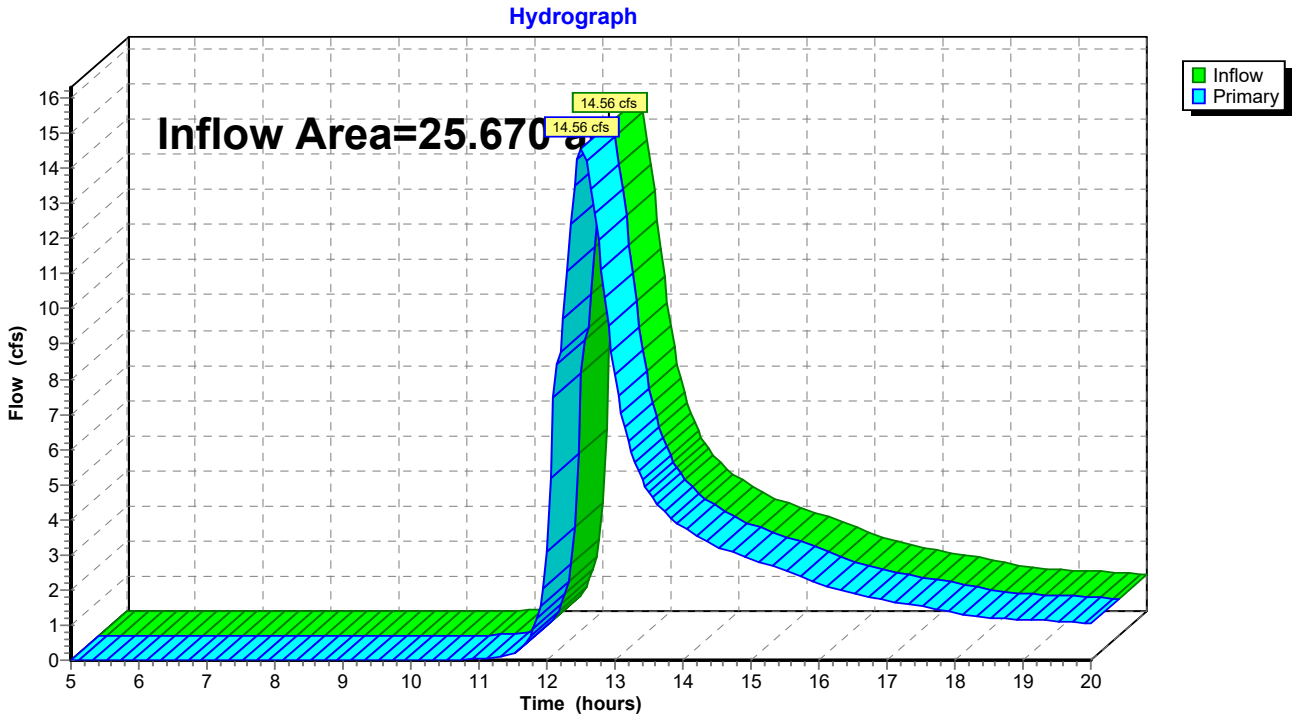


Summary for Link DP1: DP1

Inflow Area = 25.670 ac, 0.00% Impervious, Inflow Depth > 1.09" for 25-year event
Inflow = 14.56 cfs @ 12.51 hrs, Volume= 2.329 af
Primary = 14.56 cfs @ 12.51 hrs, Volume= 2.329 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1: DP1



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1A: Subcat 1A Runoff Area=22.256 ac 0.00% Impervious Runoff Depth>1.39"
Flow Length=1,550' Tc=33.0 min CN=48 Runoff=18.87 cfs 2.579 af

Subcatchment1B: Subcat 1B Runoff Area=2.732 ac 0.00% Impervious Runoff Depth>2.12"
Flow Length=450' Slope=0.0500 '/' Tc=8.2 min CN=56 Runoff=6.36 cfs 0.482 af

Subcatchment1C: Subcat 1C Runoff Area=0.682 ac 0.00% Impervious Runoff Depth>2.78"
Flow Length=350' Slope=0.0500 '/' Tc=7.1 min CN=63 Runoff=2.26 cfs 0.158 af

Link DP1: DP1 Inflow=21.65 cfs 3.220 af
Primary=21.65 cfs 3.220 af

Total Runoff Area = 25.670 ac Runoff Volume = 3.220 af Average Runoff Depth = 1.51"
100.00% Pervious = 25.670 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1A: Subcat 1A

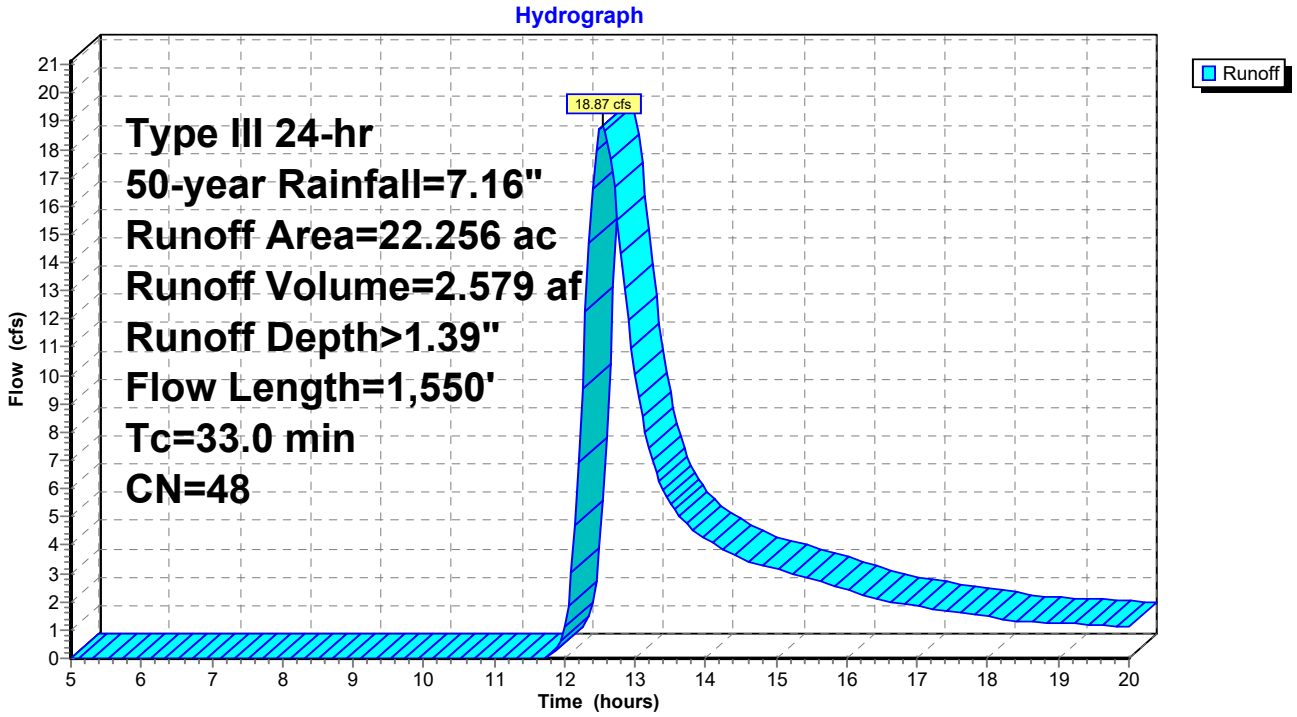
Runoff = 18.87 cfs @ 12.54 hrs, Volume= 2.579 af, Depth> 1.39"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.16"

	Area (ac)	CN	Description
	0.205	76	Gravel roads, HSG A
	0.141	85	Gravel roads, HSG B
*	11.000	59	50-75% Grass cover, Fair, HSG A-B
	0.005	58	Meadow, non-grazed, HSG B
	0.005	64	Row crops, SR + CR, Good, HSG A
	0.656	67	Row crops, straight row, Good, HSG A
	0.400	78	Row crops, straight row, Good, HSG B
	7.622	30	Woods, Good, HSG A
	0.139	55	Woods, Good, HSG B
	2.083	39	>75% Grass cover, Good, HSG A
	22.256	48	Weighted Average
	22.256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
5.3	500	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.8	1,000	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.0	1,550	Total			

Subcatchment 1A: Subcat 1A



Summary for Subcatchment 1B: Subcat 1B

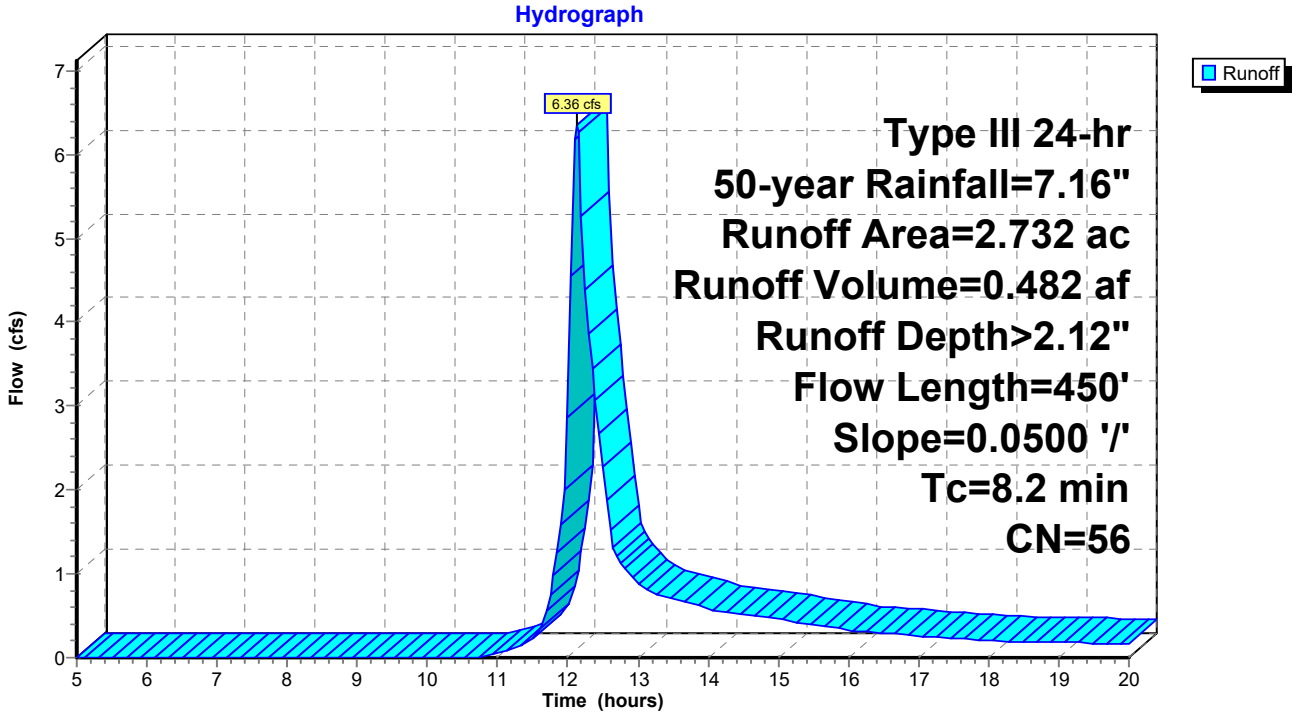
Runoff = 6.36 cfs @ 12.13 hrs, Volume= 0.482 af, Depth> 2.12"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.16"

	Area (ac)	CN	Description
*	1.784	59	50-75% Grass cover, Fair, HSG A-B
	0.534	64	Row crops, SR + CR, Good, HSG A
	0.000	67	Row crops, straight row, Good, HSG A
	0.414	30	Woods, Good, HSG A
	2.732	56	Weighted Average
	2.732		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
4.3	400	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.2	450	Total			

Subcatchment 1B: Subcat 1B



Summary for Subcatchment 1C: Subcat 1C

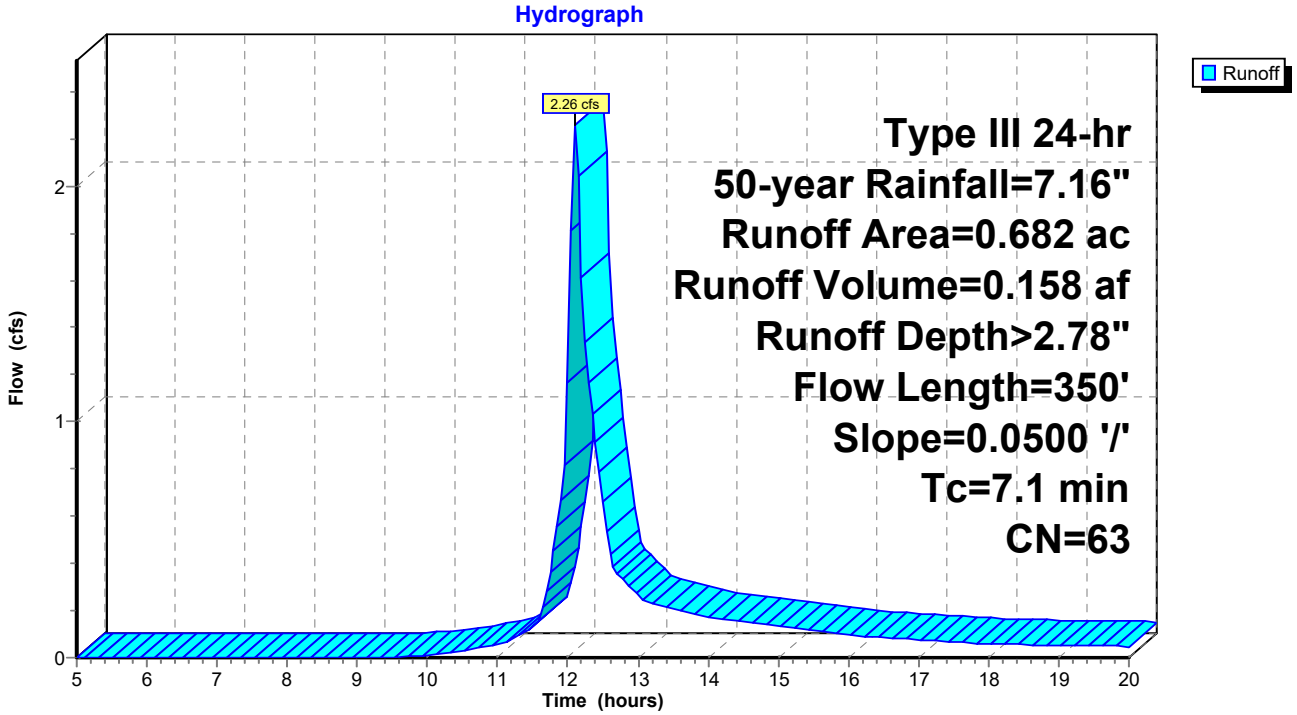
Runoff = 2.26 cfs @ 12.11 hrs, Volume= 0.158 af, Depth> 2.78"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=7.16"

	Area (ac)	CN	Description
*	0.218	59	50-75% Grass cover, Fair, HSG A-B
	0.138	64	Row crops, SR + CR, Good, HSG A
	0.310	67	Row crops, straight row, Good, HSG A
	0.016	30	Woods, Good, HSG A
	0.682	63	Weighted Average
	0.682		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.2	300	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	350	Total			

Subcatchment 1C: Subcat 1C

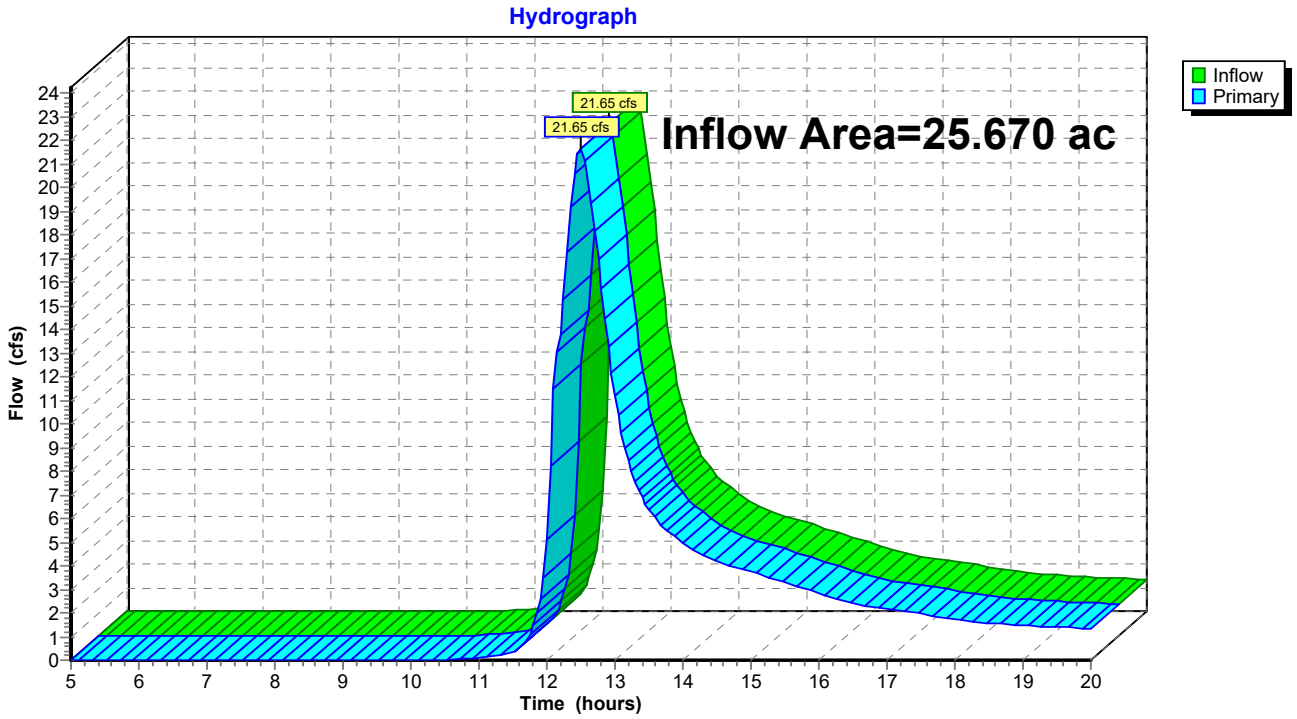


Summary for Link DP1: DP1

Inflow Area = 25.670 ac, 0.00% Impervious, Inflow Depth > 1.51" for 50-year event
Inflow = 21.65 cfs @ 12.49 hrs, Volume= 3.220 af
Primary = 21.65 cfs @ 12.49 hrs, Volume= 3.220 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1: DP1



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1A: Subcat 1A Runoff Area=22.256 ac 0.00% Impervious Runoff Depth>1.88"
Flow Length=1,550' Tc=33.0 min CN=48 Runoff=26.69 cfs 3.488 af

Subcatchment1B: Subcat 1B Runoff Area=2.732 ac 0.00% Impervious Runoff Depth>2.73"
Flow Length=450' Slope=0.0500 '/' Tc=8.2 min CN=56 Runoff=8.42 cfs 0.621 af

Subcatchment1C: Subcat 1C Runoff Area=0.682 ac 0.00% Impervious Runoff Depth>3.48"
Flow Length=350' Slope=0.0500 '/' Tc=7.1 min CN=63 Runoff=2.84 cfs 0.198 af

Link DP1: DP1 Inflow=30.37 cfs 4.307 af
Primary=30.37 cfs 4.307 af

Total Runoff Area = 25.670 ac Runoff Volume = 4.307 af Average Runoff Depth = 2.01"
100.00% Pervious = 25.670 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1A: Subcat 1A

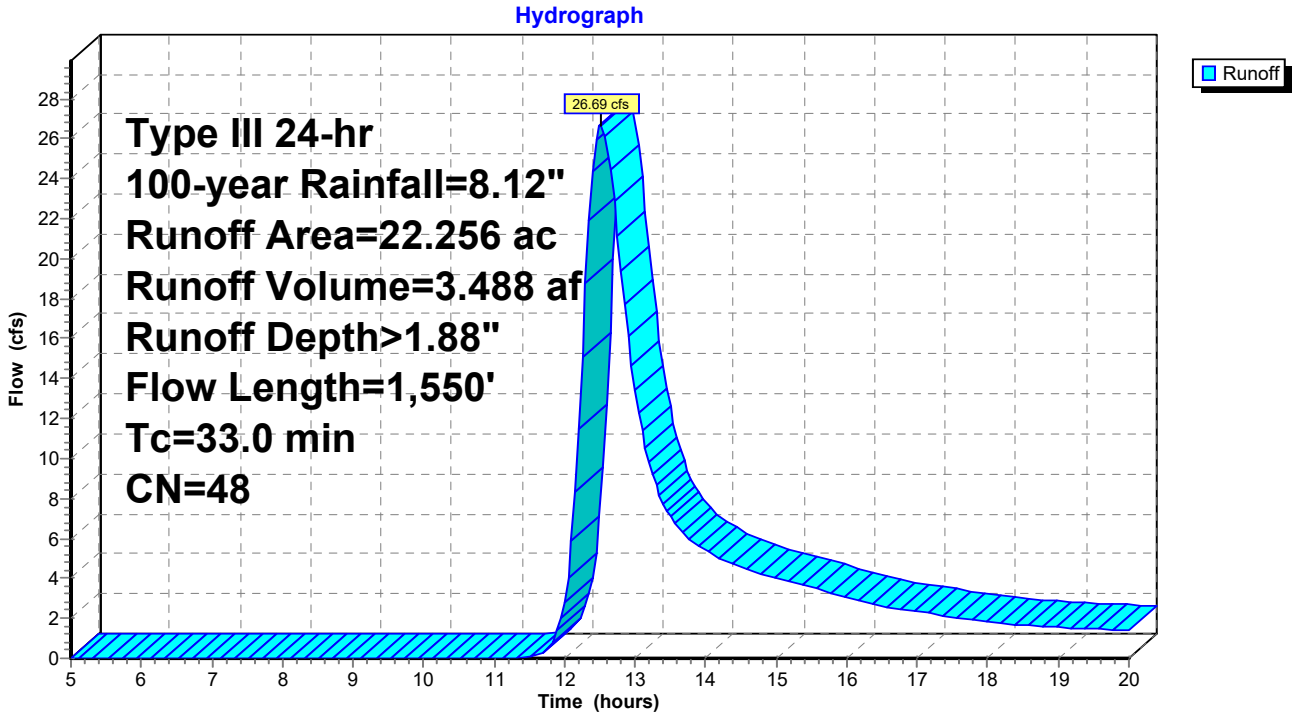
Runoff = 26.69 cfs @ 12.52 hrs, Volume= 3.488 af, Depth> 1.88"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.12"

	Area (ac)	CN	Description
	0.205	76	Gravel roads, HSG A
	0.141	85	Gravel roads, HSG B
*	11.000	59	50-75% Grass cover, Fair, HSG A-B
	0.005	58	Meadow, non-grazed, HSG B
	0.005	64	Row crops, SR + CR, Good, HSG A
	0.656	67	Row crops, straight row, Good, HSG A
	0.400	78	Row crops, straight row, Good, HSG B
	7.622	30	Woods, Good, HSG A
	0.139	55	Woods, Good, HSG B
	2.083	39	>75% Grass cover, Good, HSG A
	22.256	48	Weighted Average
	22.256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
5.3	500	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.8	1,000	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.0	1,550	Total			

Subcatchment 1A: Subcat 1A



Summary for Subcatchment 1B: Subcat 1B

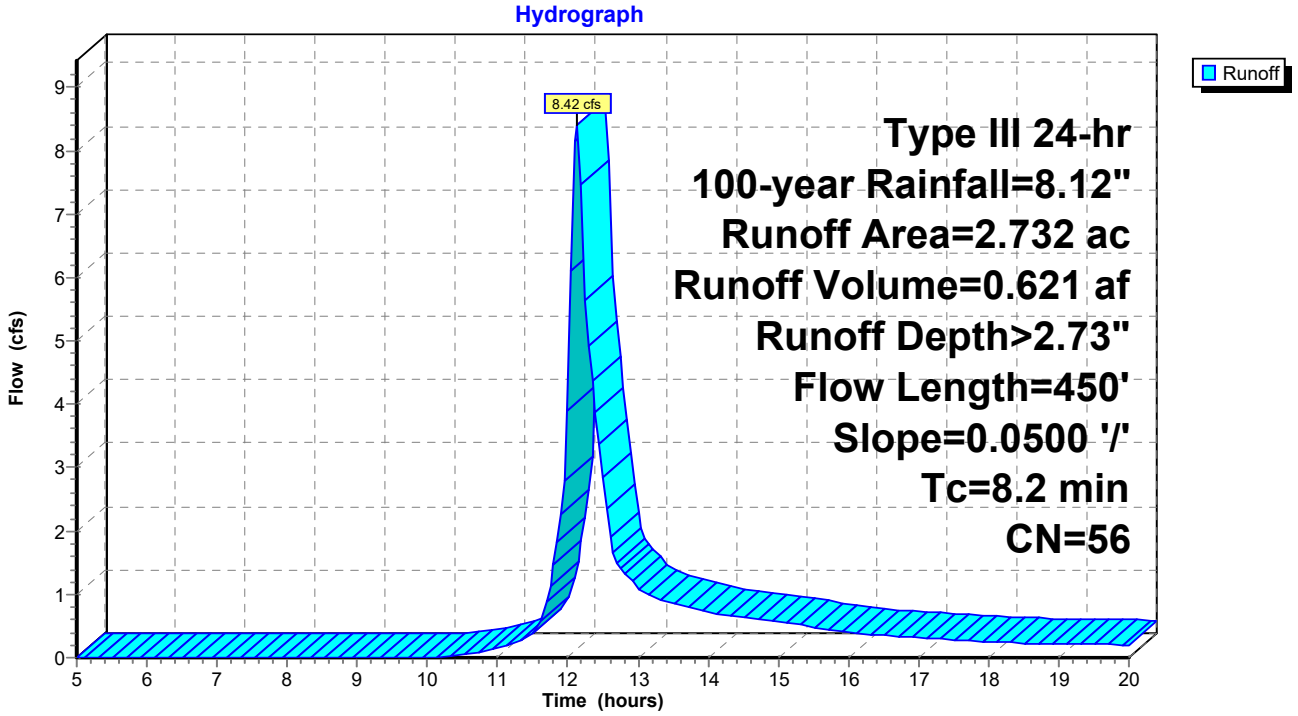
Runoff = 8.42 cfs @ 12.12 hrs, Volume= 0.621 af, Depth> 2.73"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.12"

	Area (ac)	CN	Description
*	1.784	59	50-75% Grass cover, Fair, HSG A-B
	0.534	64	Row crops, SR + CR, Good, HSG A
	0.000	67	Row crops, straight row, Good, HSG A
	0.414	30	Woods, Good, HSG A
	2.732	56	Weighted Average
	2.732		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
4.3	400	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.2	450	Total			

Subcatchment 1B: Subcat 1B



Summary for Subcatchment 1C: Subcat 1C

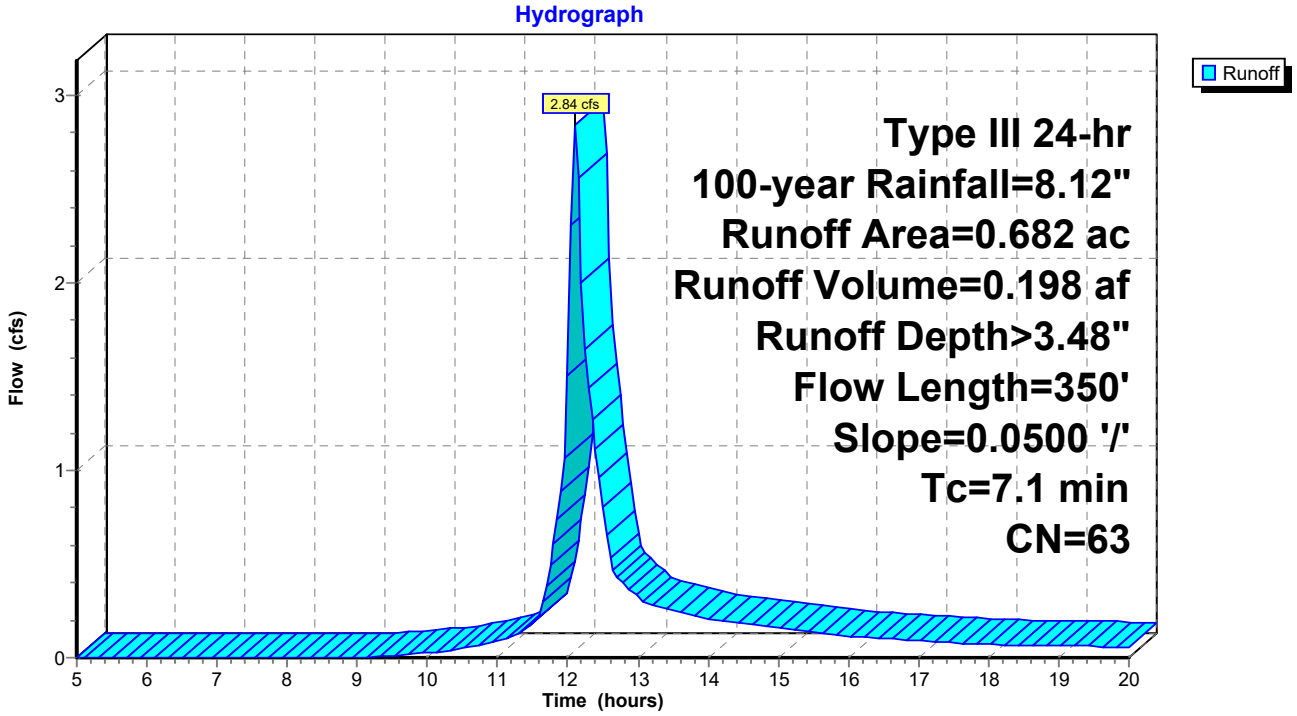
Runoff = 2.84 cfs @ 12.11 hrs, Volume= 0.198 af, Depth> 3.48"
Routed to Link DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=8.12"

	Area (ac)	CN	Description
*	0.218	59	50-75% Grass cover, Fair, HSG A-B
	0.138	64	Row crops, SR + CR, Good, HSG A
	0.310	67	Row crops, straight row, Good, HSG A
	0.016	30	Woods, Good, HSG A
	0.682	63	Weighted Average
	0.682		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.2	300	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.1	350	Total			

Subcatchment 1C: Subcat 1C



Summary for Link DP1: DP1

Inflow Area = 25.670 ac, 0.00% Impervious, Inflow Depth > 2.01" for 100-year event
Inflow = 30.37 cfs @ 12.48 hrs, Volume= 4.307 af
Primary = 30.37 cfs @ 12.48 hrs, Volume= 4.307 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1: DP1