EXHIBIT C

Stormwater Management Report

STORMWATER MANAGEMENT REPORT

For the Proposed:

0.99 MW SOLAR PHOTOVOLTAIC ARRAY

Located At:
250 Carter Street
Manchester, Connecticut

Prepared On:
January 15th, 2024

Prepared For:

TRITEC AMERICAS

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CT 25759

TABLE OF CONTENTS

INTRODUCTION 2
EXISTING SITE CONDITIONS 2
PROPOSED SITE CONDITIONS 2
STORMWATER MANAGEMENT 3
CT DEEP APPENDIX I DESIGN REGULATIONS/COMPLIANCE 5
SOIL EROSION & SEDIMENT CONTROL 6
CONCLUSION 7

LIST OF TABLES & CALCULATIONS

Table 1: Rainfall Data 3
Table 2: Existing Drainage Areas 4
Table 3: Proposed Drainage Areas 5
Table 4: Peak Flow Comparison Table 5

APPENDICES

APPENDIX A: FIGURES

- Property & Topographic Survey Map
  Prepared by Harry E. Cole & Son
- NRCS Soil Survey Map
- NRCS Saturated Hydraulic Conductivity Map
- Site Layout Plan (2.11)
- Existing Drainage Area Map (DA-1)
- Proposed Drainage Area Map (DA-2)

APPENDIX B: STORMWATER CALCULATIONS

- Hydrocad Reporting
  - Existing & Proposed Calcs for 2-, 25-, 50- & 100- yr storm events)
- Water Quality Volume Calculations
- NOAA Atlas Precipitation Data

INTRODUCTION

At the request of TRITEC Americas, LLC (Petitioner), Solli Engineering (Solli) has prepared this Stormwater Management Report to provide an analysis of the potential stormwater impacts associated with the proposed 0.99± megawatt (MW) alternating current (AC) ground-mounted solar electric generating facility (Project/Facility) located at 250 Carter Street, Manchester, Connecticut (Site). The proposed stormwater management plan outlined herein has been designed accordance with the following State of Connecticut guidelines as well as other applicable state and federal requirements and regulations:

- General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (Effective Date: December 31, 2020, Modification Date: November 25, 2022)
- Connecticut Stormwater Quality Manual (Publication Date: September 30, 2023, Effective Date: March 30, 2024)
- Connecticut Guidelines for Soil Erosion and Sediment Control (Publication Date: September 30, 2023, Effective Date: March 30, 2024)
- Connecticut Department of Transportation 2000 Drainage Manual
- CT DEEP Appendix I Stormwater Management at Solar Array Construction Projects

EXISTING SITE CONDITIONS

The Site consists of one (1) parcel totaling 41.08± acres located at 250 Carter Street, Manchester, Connecticut. The Site is bound by residential uses to the west, east, and south, and Carter Street to the north. The entire parcel is comprised of vacant land, consisting of wooded and wetland areas.

The Project area's topography gradually slopes between 7%-9% from the east property line of the site to the west. There are four (4) wetland areas located on the site. One (1) wetland is located in the southwest corner of the site, two (2) wetlands are located on the west side of the site and one (1) wetland bisects the north end of the site and runs somewhat parallel to Carter Street.

For more information regarding the Site, refer to the Property & Topographic Survey Map in Appendix A.

PROPOSED SITE CONDITIONS

The proposed Project area is 7.8± acres, within a wooded portion of the eastern region of the Site. Access to the Facility will be provided at the northeastern edge of the Site, from Carter Street, via a new 12' wide, 740'± long gravel road. The Project will be surrounded by a 7-ft tall chain link fence to provide adequate security measures.

Some work will be required within the 100' upland buffer area for northern wetland for access to the proposed project area. All other proposed work will remain outside of the 50' wetland buffer area for the other wetlands.

As currently designed, the proposed Facility will consist of 2,590 TrinaSolar TSM-DEG19C20 540W modules. The modules will be installed on a post-driven ground-mounted, single-axis tracking system, with no anticipated changes to the existing grades within the array, therefore the post-development site conditions will mimic the pre-development site conditions to the maximum extent possible. As discussed

later in this report, perimeter grassed swales with check dams and a proposed stormwater basin are proposed to assist in mitigating peak runoff flows, as well as to treat the Water Quality Volume (WQv) per CT DEEP requirements.

Approximately 1,100 square feet of unavoidable direct impact is proposed to inland wetlands and watercourses in order to construct an access drive from Carter Street to the developable portion of the property. A segment of stream is proposed to be piped to facilitate this crossing. Direct adverse impacts associated with the stream crossing will be minimized to the greatest extent practicable and the crossing will be designed in accordance with the *USACE Programmatic General Permit State of Connecticut* in regard to stream crossing BMPs. Due to the de-minimis level of impact and due to the BMPs provided during construction, the wetland and watercourse impacts associated with the stream crossing are permissible under the USACE General Permit State of Connecticut. The crossing will be accomplished by installing 40 linear feet of a 42-inch diameter high-density polyethylene pipe embedded 12 inches into the underlying streambed substrate through the narrowest segment of the wetland/stream onsite. A crossing such as this will maintain the main function of the wetland and watercourse system within the area of the proposed development, that being water conveyance.

For more information regarding the Project, refer to the Site Layout Plan (Sheet 2.11) in Appendix A.

STORMWATER MANAGEMENT

The Project will add approximately 11,115 square feet of impervious/gravel area. The proposed stormwater management design consists of a stormwater basin and multiple drainage swales providing adequate storage for the water quality volume (WQv) that will effectively clean and treat the stormwater runoff prior to discharging.

METHODOLOGY

A hydrologic analysis was performed using the HydroCAD stormwater modeling system computer program developed by HydroCAD Software Solutions, LLC. Hydrographs for each watershed were developed using the SCS Synthetic Unit Hydrograph Method with a Type III rainfall distribution.

Rainfall depths for the site were used for calculating the volumes and rates of runoff for this project. The depths were taken from the NOAA Atlas documents (Latitude: 41.7621º, Longitude: -72.4704º) and the rainfall values are listed in Table 1 below.

Table 1: Rainfall Data

Return Period (Storm Event)	24-hr Rainfall Depth (inches)
2-year	3.16
25-year	6.00
50-year	6.81
100-year	7.69

The drainage areas used in the calculations are illustrated on the Existing and Proposed Drainage Area Maps (DA-1 & DA-2). These maps and the corresponding Hydrocad output are attached in Appendices B. Utilizing CT DEEP Appendix I, this hydrologic analysis will reflect a reduction of the Hydrologic Soil Group ("HSG") present on-site by a half (1/2) step (e.g., half the difference between the runoff curve number for HSG A versus HSG B). This reduction, as indicated by CT DEEP, is intended to account for the compaction of soils that results from extensive machinery traffic during construction of the array. The

WQv for the site was calculated assuming that the gravel surfaces and concrete equipment pads are effectively impervious cover.

EXISTING CONDITIONS

Approximately 23.705 acres of Off-Site and On-Site area were analyzed for stormwater management purposes. The areas analyzed contain the contributing areas which directly impact and are impacted by the proposed redevelopment. Based on existing drainage patterns, two drainage areas are defined.

The 12.707-acre Existing Drainage Area 1 (EDA-1) was considered as the contributing drainage area for the proposed development. The runoff from EDA-1 flows from Blue Ridge Drive to the east, overland to the west through the Project area and continues to flow overland through the Site to the wetlands, streams, and the western property line.

The 10.998-acre Existing Drainage Area 2 (EDA-2) was considered as the contributing drainage area for the proposed wetland crossing. The runoff from EDA-2 flows from Carter Street to the east, overland to Blue Ridge Drive and into a storm drainage system which discharges into the northern wetland.

Table 2: Existing Drainage Areas

Drainage Area Label	Drainage Area	Curve Number	Time of Concentration
Existing Drainage Area 1 (EDA-1)	12.707 AC	77	11.7 Min.
Existing Drainage Area 2 (EDA-2)	10.998 AC	80	12.3 Min.

For more information regarding the existing drainage conditions of the project area refer to the Existing Drainage Area Map (DA-1) in Appendix A and the HydroCAD calculations in Appendix B.

PROPOSED CONDITIONS

The Project proposes grassed drainage swales with stone check dams to convey stormwater runoff to the proposed stormwater infiltration basin. A conservative infiltration rate of 1 in/hr is utilized per the NRCS Saturated Hydraulic Conductivity for soil type 46B. Based on the proposed drainage patterns, the 12.707-acre area was divided into two (2) contributing drainage areas, Proposed Drainage Area 1A (PDA-1A) and Proposed Drainage Area 1B (PDA-1B).

PDA-1A has a contributing drainage area of approximately 7.547 acres. Similar to existing conditions, runoff from PDA-1A flows from east to west overland and into the proposed basin. Runoff then passes through an outlet control structure before discharging through a flared end section and across a level spreader before flowing to the west.

PDA-1B has a contributing drainage area of approximately 5.160 acres, which flows overland from east to west.

PDA-2 remains the same as EDA-2 and was utilized to design the wetland crossing for the proposed access drive. A 42” HDPE pipe with flared ends, and embedded 12”, is proposed to convey the runoff beneath the access drive. The crossing has been designed to convey up to the 100-year design storm without overtopping the proposed access drive.

All proposed areas of disturbance within the solar array will be seeded with a Fuzz & Buzz Mix – ERNMX-147 or approved equal.

Table 3: Proposed Drainage Areas

Drainage Area Label	Drainage Area	Curve Number	Time of Concentration
Proposed Drainage Area 1 (PDA-1)	**12.707 AC**	-	-
Proposed Drainage Area 1A (PDA-1A)	7.547 AC	78	11.4 Min.
Proposed Drainage Area 1B (PDA-1B)	5.160 AC	77	11.5 Min.
Proposed Drainage Area 2 (PDA-2)	**10.998 AC**	**80**	**13.0 Min.**

For more information regarding the proposed stormwater management design refer to the Proposed Drainage Area Map (DA-2) in Appendix A; and the HydroCAD and WQv calculations in Appendix B.

As a result of the proposed stormwater management measures, the peak flows for the 2, 25, 50 and 100-year storm events are significantly reduced from existing conditions as shown in the chart below.

Table 4: Peak Flow Comparison Table

Peak Flow (cfs)			
Storm Event	**Total Drainage Areas**		**Percent Reduction in Peak Flow**
	EDA	**PDA**	
2-Year	12.91	6.30	51.2%
25-Year	38.73	22.80	41.1%
50-Year	46.54	26.88	42.2%
100-Year	55.09	34.87	36.7%

CT DEEP APPENDIX I DESIGN REGULATIONS/COMPLIANCE

The following identifies and details the regulations and proposed compliance measures within CT DEEP Appendix I that pertain specifically to civil, stormwater, and erosion control designs.

I. Design and construction requirements:

1. Roadways, gravel surfaces, transformer pads are considered effective impervious cover for the purposes of calculating the WQV. The proposed solar panels in the array that are within existing and post-construction slopes that are greater than 15% are considered impervious for the purposes of calculating the WQV. The remainder of the proposed solar panels that are proposed within existing and post-construction slopes that are less than 15% are not considered impervious cover for the purposes of calculating the WQV because the following have been met:

    a. Vegetative areas between the rows of solar panels have a width of 9 feet which is greater than the solar panel width of 7.8 feet.
    b. The post-development stormwater runoff volumes and peak flows will be less than that of the pre-development stormwater runoff due to the proposed grassed swales and stormwater management basin.
    c. The Project meets (iv) of this requirement as the plan includes specific engineered phased construction plans and detailed erosion control measures.
    d. The panels are spaced and provide a minimum height of 3 feet from the ground to provide growth of native vegetation.

2. Setback and buffer requirements have been met as follows:

a. No wetlands or waters are located within 100 feet of the proposed solar facility area. No solar panels are located within the 50-foot setback of any property boundary that is located downgradient of the construction activity.
b. There is a minimum of 50 feet between the limit of construction activity and downgradient wetlands.
c. There is a minimum of 10 feet between the construction activity associated with the installation of the access road and interconnection and downgradient wetlands.

3. The wetlands and water courses were originally delineated by Ian T. Cole on October 15, 2023. The location of delineated resources, as well as buffers, are shown on the Site Layout Plan (Sheet 2.11) in Appendix A.

II. Design requirements for post-construction stormwater management measures:

1. Post-construction stormwater control measures have been designed and will be constructed to provide permanent stabilization and non-erosive conveyance of runoff from the site.
2. The orientation of the panels follows the existing slopes on the site to the extent practicable.
3. The hydrologic analysis has been completed, as described above, with the following details:

a. The Project evaluated and will control the 2, 25, 50, and 100-year 24-hour rainfall events in accordance with the CT Stormwater Quality Manual. Maximum sheet flow was kept to 100 feet and shallow concentrated flows were calculated using velocity factors per NRCS Part 630 National Engineering Handbook Chapter 15. The proposed swales have been designed to convey and control stormwater from a 100-year, 24-hr rainfall event.
b. NRCS soil mapping was used for the stormwater design.
c. There are no areas where the grades will change by more than two (2) feet from existing conditions. With the modeled half-drop (1/2) in HSG for the facility area and the change in curve number associated with the ground cover change from existing to proposed conditions, there will be a decrease in post-development runoff in comparison to pre-development runoff.
d. Pre-and post-development drainage area maps & computations are provided in Appendices A and B.
e. The information above and herein demonstrates that the Project will have no net increase in peak flows, erosive velocities or volumes, or adverse impacts to downstream properties.

SOIL EROSION & SEDIMENT CONTROL

The proposed plans for soil erosion and sediment control prepared for this project have been developed in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, prepared by the Connecticut Council on Soil and Water Conservation in Collaboration with the Connecticut Department of Energy and Environmental Protection.

The soil erosion and sediment control measures that will be proposed as part of this project include geotextile silt fences with wings for areas less than 1 acre, compost filter socks, construction entrance, dust control measures, and a temporary sediment trap. The soil erosion and sediment control measures will be implemented in two (2) phases. Phase I measures are associated with the clearing, grubbing and installation

of the sediment trap and diversion swales. Phase II measures are associated with the remain clearing and grubbing, fine grading and installation of the modules, hardscape, and utilities infrastructure.

CONCLUSION

The stormwater management for the proposed Project has been designed such that the post-development peak discharges to the waters of the State of Connecticut for the 2-, 25-, 50-, and 100- year storm events are less than the pre-development peak discharges. In addition, the Project adheres to the regulations and guidelines presented by CT DEEP's Appendix I as described above. As a result, the proposed solar array will not result in any adverse conditions to the surrounding areas and properties.

APPENDICES

Appendix A – Figures

Appendix B – Stormwater Calculations

Appendix A – Figures

- Property & Topographic Survey Map

(Prepared by Harry E. Cole & Son)

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- NRCS Saturated Hydraulic Conductivity Map
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DRAWING NAME: P:\Land Projects\2379A-Solli Engineering, LLC-250 Carter Street, Manchester CT-Jacobson\2379A-Solli Engineering, LLC-250 Carter Street, Manchester CT.dwg, 2379A - Property & Topographic Survey Map.dwg, LAYOUT: Layout2-Survey Size D PLOT DATE: Nov 01, 2023 - 11:23am USER:KATHR

LEGEND

- = Existing utility pole
- = Existing light pole
- = Existing fire hydrant
- = Existing water valve
- = Existing gas valve
- = Existing underground pipe
- = Existing edge of pavement
- = Existing bituminous concrete lip curb
- = Existing well
- = Existing catch basin
- = Existing drainage manhole
- = Existing sanitary manhole
- = Existing utility box
- = Existing contour
- x000.0 = Existing spot elevation
- = Existing iron pin
- = Existing drill hole
- = Existing monument

SURVEY NOTES:

1. This map has been prepared pursuant to the Regulation of Connecticut State Agencies Sections 20-300b-1 through 20-300b-20 and the "Standards for Surveys and Maps in the State of Connecticut" as adopted by the Connecticut Association of Land Surveyors, Inc. on September 26, 1996.

2. Type of survey performed: Property & Topographic Survey

3. Boundary determination category: Resurvey

4. Class of accuracy:
   Horizontal: A-2
   Vertical: T-2

5. The intent of this map is to depict or note the position of boundaries with respect to: (A) locations of all boundary monumentation found or set; (B) Apparent improvements and features, including as a minimum: dwellings, barns, garages, sheds, driveways, roadways, surface utilities, visible bodies of water and swimming pools; (C) record easements and visible means of ingress and egress; (D) record and apparent means of ingress and egress; (E) lines of occupation, including as a minimum: fences, walls, hedges and yards; (F) deed restrictions pertaining to the location of buildings or other apparent improvements; (G) unresolved conflicts with record deed descriptions and maps; (H) all apparent boundary encroachments; and (I) monumentation required to be set at all corners created by a deflection angle of not less than 70 degrees between two consecutive courses at an intervals not to exceed 600 feet (180 meters) along the boundaries between said corners, except where natural or man-made monumentation defines or occupies the line.

6. Map References:

a.) "Resubdivision Amanda Drive Prepared for Dereksteth Homes, Amanda Drive, Manchester, Connecticut; Scale:1"=100'; Dated: October 26, 1999; Sheet 2 of 19 by Ed Lally and Associates Inc." Filed as Map 1257 at the M.L.R.

b.) "Plot Plan Birch Mountain II Prepared for Mary Catherine Development Company, Manchester, Connecticut; Scale:1"=40'; Dated: 1/30/89 by Design Professionals, Inc." Filed as Book M27, Page 60 at the M.L.R."

c.) "Resubdivision Amanda Drive Prepared for Dereksteth Homes, Amanda Drive, Manchester, Connecticut; Scale:1"=100'; Dated: October 26, 1999; Sheet 4 of 19 by Ed Lally and Associates Inc." Filed as Map 1259 at the M.L.R.

d.) "Map of Highland Estates, Birch Mountain Road & Carter Street, Manchester, Connecticut; Scale:1"=50'; Dated: March 23, 1967; Sheet 2 of 3 by Hayden L. Griswold, C.E." Filed as Book M13, Page 48 at the M.L.R."

e.) "Map of Highland Estates, Birch Mountain Road & Carter Street, Manchester, Connecticut; Scale:1"=50'; Dated: March 23, 1967; Sheet 3 of 3 by Hayden L. Griswold, C.E." Filed as Book M9, Page 36 at the M.L.R."

f.) "Boundary Survey Prepared for John Vontell, Existing Boundary and Features, 143 Carter Street, Manchester, Connecticut; Scale:1"=30'; Dated: May 22, 2014 by Rob Hellstrom Land Surveying LLC." Filed as Map 2311 in Drawer 16 at the M.L.R."

g) "Subdivision Plan Prepared for Robert C. Dennison, Carter Street, Manchester, Connecticut; Scale:1"=100'; Dated: 6/20/83; Last Revised: 6-21-1983 by Fuss & O'neill." Filed as Book M22, Page 49 at the M.L.R.

7. Per agreement with property owner no boundary corners were set by this survey unless noted hereon. All monumentation found is depicted or noted hereon.

8. Zone: RR

9. Total area: 1,789,597 Sq. Ft. - 41.08 Acres

10. Owner: Wells Jacobson & Margaret Jacobson

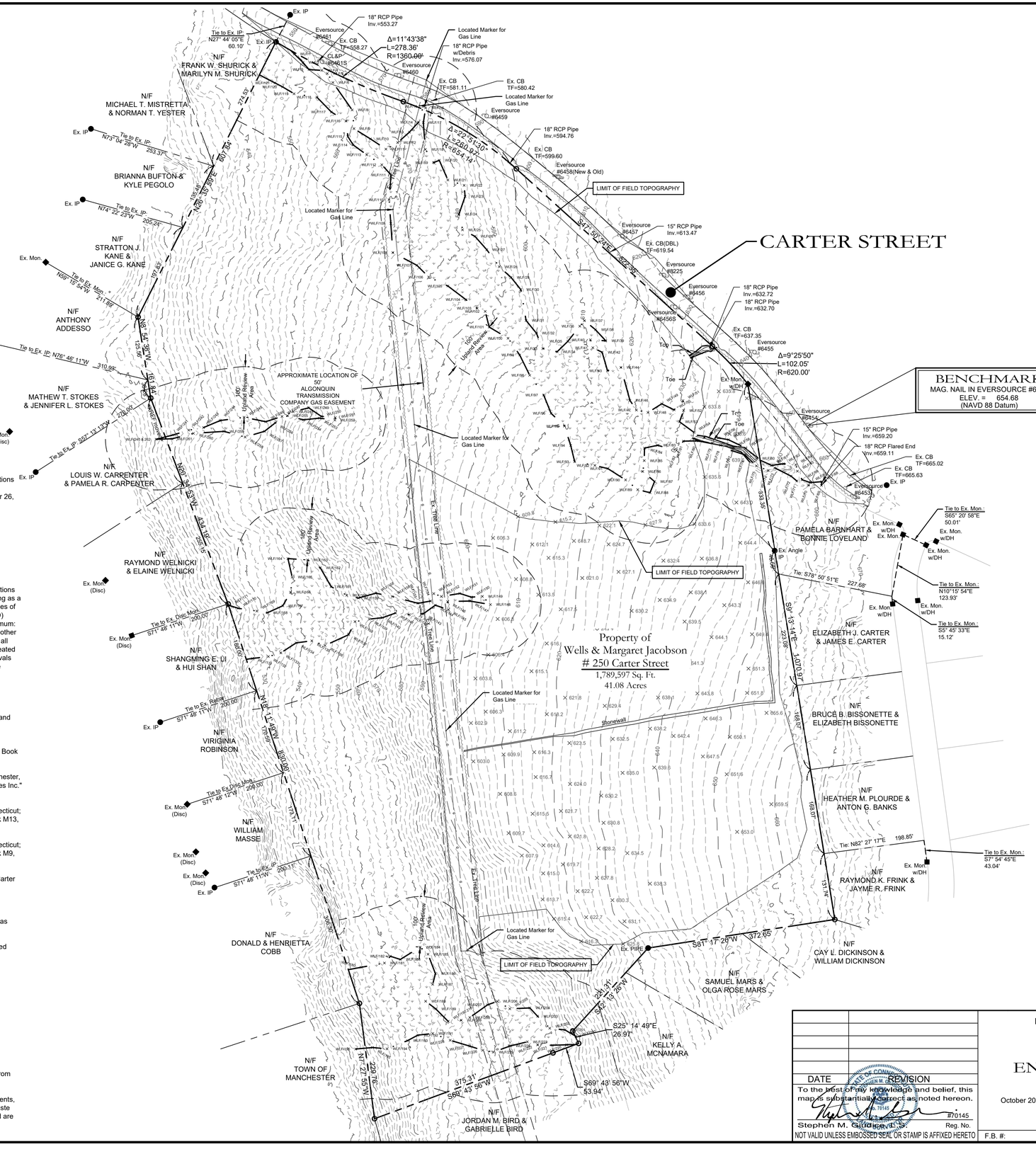
11. Town of Manchester Assessors Map #97 Lot #250

12. Filed in Volume 3397, Page 65 of the Town Clerk's office.

13. Contour interval is two(2) feet.

14. Existing contours generated from field topography. (Implemented with Aerial Topography from UCONN Base)

15. This survey does not include the location of any underground improvements or encroachments, subsurface utility lines or buried debris. Nor does it necessarily reflect the existence of any waste dumps or hazardous materials. The underground items depicted or noted are approximate and are not guaranteed. Notify "CALL BEFORE YOU DIG" 1-800-922-4455 prior to any excavation operations.


CARTER STREET
Property of
Wells & Margaret Jacobson
250 Carter Street
1,789,597 Sq. Ft.
41.08 Acres
BENCHMARK
MAG. NAIL IN EVERSOURCE #6454
ELEV. = 654.68
(NAVD 88 Datum)
Wetlands Depicted are Field Located as Flagged by Ian T. Cole, Professional Registered Soil Scientist/Wetland Scientist on October 15, 2023
NAD 83
N/F FRANK W. SHURICK & MARILYN M. SHURICK
N/F MICHAEL T. MISTRETTA & NORMAN T. YESTER
N/F BRIANNA BUFTON & KYLE PEGOLO
N/F STRATTON J. KANE & JANICE G. KANE
N/F ANTHONY ADDESSO
N/F MATHEW T. STOKES & JENNIFER L. STOKES
N/F LOUIS W. CARRENTER & PAMELA R. CARPENTER
N/F RAYMOND WELNICKI & ELAINE WELNICKI
N/F SHANGMING E. LI & HUI SHAN
N/F VIRIGINIA ROBINSON
N/F WILLIAM MASSE
N/F DONALD & HENRIETTA COBB
N/F TOWN OF MANCHESTER
N/F JORDAN M. BIRD & GABRIELLE BIRD
N/F KELLY A. MCNAMARA
N/F SAMUEL MARS & OLGA ROSE MARS
N/F CAY L. DICKINSON & WILLIAM DICKINSON
N/F RAYMOND K. FRINK & JAYME R. FRINK
N/F HEATHER M. PLOURDE & ANTON G. BANKS
N/F BRUCE B. BISSONETTE & ELIZABETH BISSONETTE
N/F ELIZABETH J. CARTER & JAMES E. CARTER
N/F PAMELA BARNHART & BONNIE LOVELAND
LIMIT OF FIELD TOPOGRAPHY
APPROXIMATE LOCATION OF 50' ALGONQUIN TRANSMISSION COMPANY GAS EASEMENT
Located Marker for Gas Line
Upland Review Area
Ex. Tree Line
Shorewall
Ex. Mon. (Disc)
Ex. IP
Ex. Mon. w/DH
Ex. PIPE
Ex. Angle IP
Eversource #6454
Eversource #6455
Eversource #6456
Eversource #6456S
Eversource #6457
Eversource #6458(New & Old)
Eversource #6459
Eversource #6460
Eversource #6461
Eversource #6461S
Eversource #8225
Ex. CB TF=558.27
Ex. CB TF=581.11
Ex. CB TF=580.42
Ex. CB TF=599.60
Ex. CB(DBL) TF=619.54
Ex. CB TF=637.35
Ex. CB TF=665.02
Ex. CB TF=665.63
18" RCP Pipe Inv.=553.27
18" RCP Pipe w/Debris Inv.=576.07
18" RCP Pipe Inv.=594.76
15" RCP Pipe Inv.=613.47
18" RCP Pipe Inv.=632.72
18" RCP Pipe Inv.=632.70
15" RCP Pipe Inv.=659.20
18" RCP Flared End Inv.=659.11
Δ=11°43'38" L=278.36' R=1360.00'
Δ=22°51'30" L=260.92' R=654.74'
Δ=9°25'50" L=102.05' R=620.00'
Toe
Tie to Ex. IP: N27° 44' 05"E 60.10'
Tie to Ex. IP: N73° 04' 28"W 253.37'
Tie to Ex. IP: N14° 22' 23"W 205.24'
Tie to Ex. Mon.: N59° 15' 34"W 211.88'
Tie to Ex. IP: N78° 46' 11"W 310.99'
Tie to Ex. IP: S07° 13' 11"W 179.00'
Tie to Ex. Disc Mon.: S71° 48' 11"W 200.00'
Tie to Ex. Disc Mon.: S71° 48' 12"W 200.00'
Tie to Ex. IP: S71° 48' 11"W 200.11'
Tie to Ex. Mon.: S65° 20' 58"E 50.01'
Tie to Ex. Mon.: N10° 15' 54"E 123.93'
Tie to Ex. Mon.: S5° 45' 33"E 15.12'
Tie to Ex. Mon.: S7° 54' 45"E 43.04'
Tie: S78° 50' 51"E 227.68'
Tie: N82° 27' 17"E 198.85'
N07° 54' 52"E 125.56'
N03° 35' 59"E 607.84'
S41° 50' 24"E 202.35'
S59° 13' 14"E 223.06'
S87° 17' 29"W 372.65'
S25° 14' 49"E 26.97'
S69° 43' 56"W 53.94'
S69° 43' 56"W 375.31'
N7° 27' 55"W 229.76'
N82° 36' 52"W 634.19'
N12° 14' 49"W 170.99'
N13° 14' 49"W 830.00'
N7° 14' 49"W 174.11'
S24° 31' 11" 13° 26"W
1470.97'
198.07'
133.74'
Ex. Mon. w/DH
Ex. Mon. (Disc)
Ex. IP
Ex. PIPE
Ex. Angle IP
Ex. Mon. w/DH
Ex. Mon. w/DH
Ex. Mon. w/DH

Appendix B – Stormwater Calculations

- Hydrology Calculations (2-, 25-, 50-, 100-year storm events)
- Water Quality Volume Calculations
- NOAA Atlas Precipitation Data

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.

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
Survey Area Data: Version 22, Sep 12, 2022

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
2	Ridgebury fine sandy loam, 0 to 3 percent slopes	D	7.7	3.1%
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	4.6	1.9%
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony	C/D	2.2	0.9%
13	Walpole sandy loam, 0 to 3 percent slopes	B/D	5.2	2.1%
20A	Ellington silt loam, 0 to 5 percent slopes	B	8.8	3.5%
33B	Hartford sandy loam, 3 to 8 percent slopes	A	9.0	3.6%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	A	14.1	5.7%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	2.7	1.1%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	C/D	20.5	8.2%
46C	Woodbridge fine sandy loam, 8 to 15 percent slopes, very stony	C/D	6.5	2.6%
55B	Watchaug fine sandy loam, 3 to 8 percent slopes	C	6.9	2.8%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	4.5	1.8%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	D	3.4	1.4%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	D	6.2	2.5%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	C	1.8	0.7%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
85B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony	C	22.2	8.9%
86C	Paxton and Montauk fine sandy loams, 3 to 15 percent slopes, extremely stony	C	99.6	39.9%
86D	Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony	C	17.9	7.2%
107	Limerick and Lim soils	B/D	3.6	1.5%
308	Udorthents, smoothed	C	2.0	0.8%
Totals for Area of Interest			**249.5**	**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.

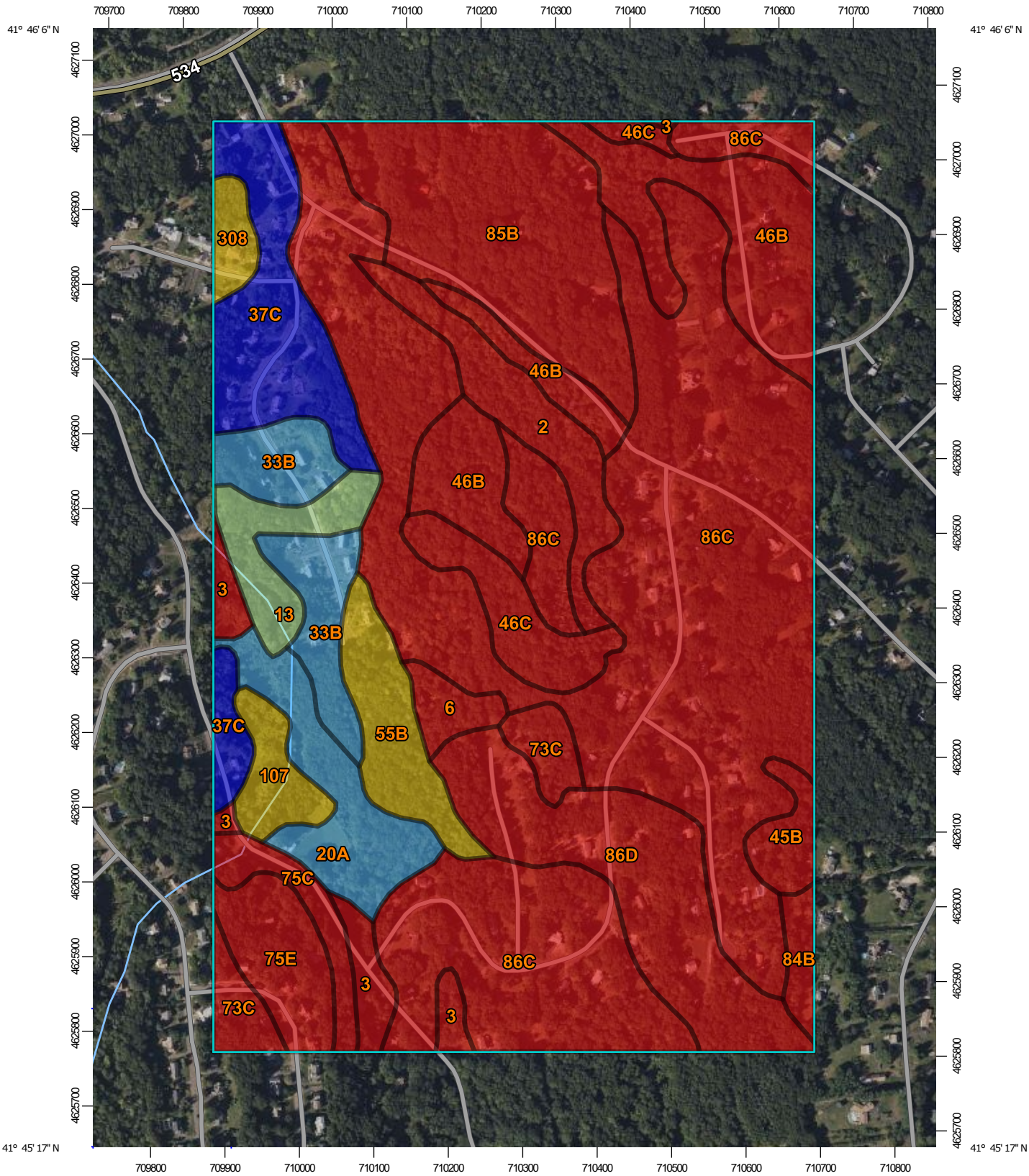
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Saturated Hydraulic Conductivity (Ksat)—State of Connecticut
(250 CARTER ST, MANCHESTER, CT)



Map Scale: 1:7,300 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

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

- <= 14.6650
- > 14.6650 and <= 29.1630
- > 29.1630 and <= 74.0018
- > 74.0018 and <= 99.8724
- > 99.8724 and <= 130.0626
- Not rated or not available

Soil Rating Lines

- <= 14.6650
- > 14.6650 and <= 29.1630
- > 29.1630 and <= 74.0018
- > 74.0018 and <= 99.8724
- > 99.8724 and <= 130.0626
- Not rated or not available

Soil Rating Points

- <= 14.6650
- > 14.6650 and <= 29.1630
- > 29.1630 and <= 74.0018
- > 74.0018 and <= 99.8724
- > 99.8724 and <= 130.0626
- Not rated or not available

Water Features

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.

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
Survey Area Data: Version 22, Sep 12, 2022

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.

MAP LEGEND

Streams and Canals

MAP INFORMATION

Saturated Hydraulic Conductivity (Ksat)

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
2	Ridgebury fine sandy loam, 0 to 3 percent slopes	4.8943	7.7	3.1%
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	8.3462	4.6	1.9%
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony	6.1657	2.2	0.9%
13	Walpole sandy loam, 0 to 3 percent slopes	74.0018	5.2	2.1%
20A	Ellington silt loam, 0 to 5 percent slopes	88.5574	8.8	3.5%
33B	Hartford sandy loam, 3 to 8 percent slopes	99.8724	9.0	3.6%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	130.0626	14.1	5.7%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	4.4534	2.7	1.1%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	7.1738	20.5	8.2%
46C	Woodbridge fine sandy loam, 8 to 15 percent slopes, very stony	7.5773	6.5	2.6%
55B	Watchaug fine sandy loam, 3 to 8 percent slopes	16.5646	6.9	2.8%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	14.6650	4.5	1.8%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	11.9384	3.4	1.4%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	11.9384	6.2	2.5%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	6.4882	1.8	0.7%

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
85B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony	7.5731	22.2	8.9%
86C	Paxton and Montauk fine sandy loams, 3 to 15 percent slopes, extremely stony	8.0482	99.6	39.9%
86D	Paxton and Montauk fine sandy loams, 15 to 35 percent slopes, extremely stony	8.0482	17.9	7.2%
107	Limerick and Lim soils	29.1630	3.6	1.5%
308	Udorthents, smoothed	21.7821	2.0	0.8%
Totals for Area of Interest			**249.5**	**100.0%**

Description

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Rating Options

Units of Measure: micrometers per second

Aggregation Method: Weighted Average

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): All Layers (Weighted Average)

PLANTING SCHEDULE

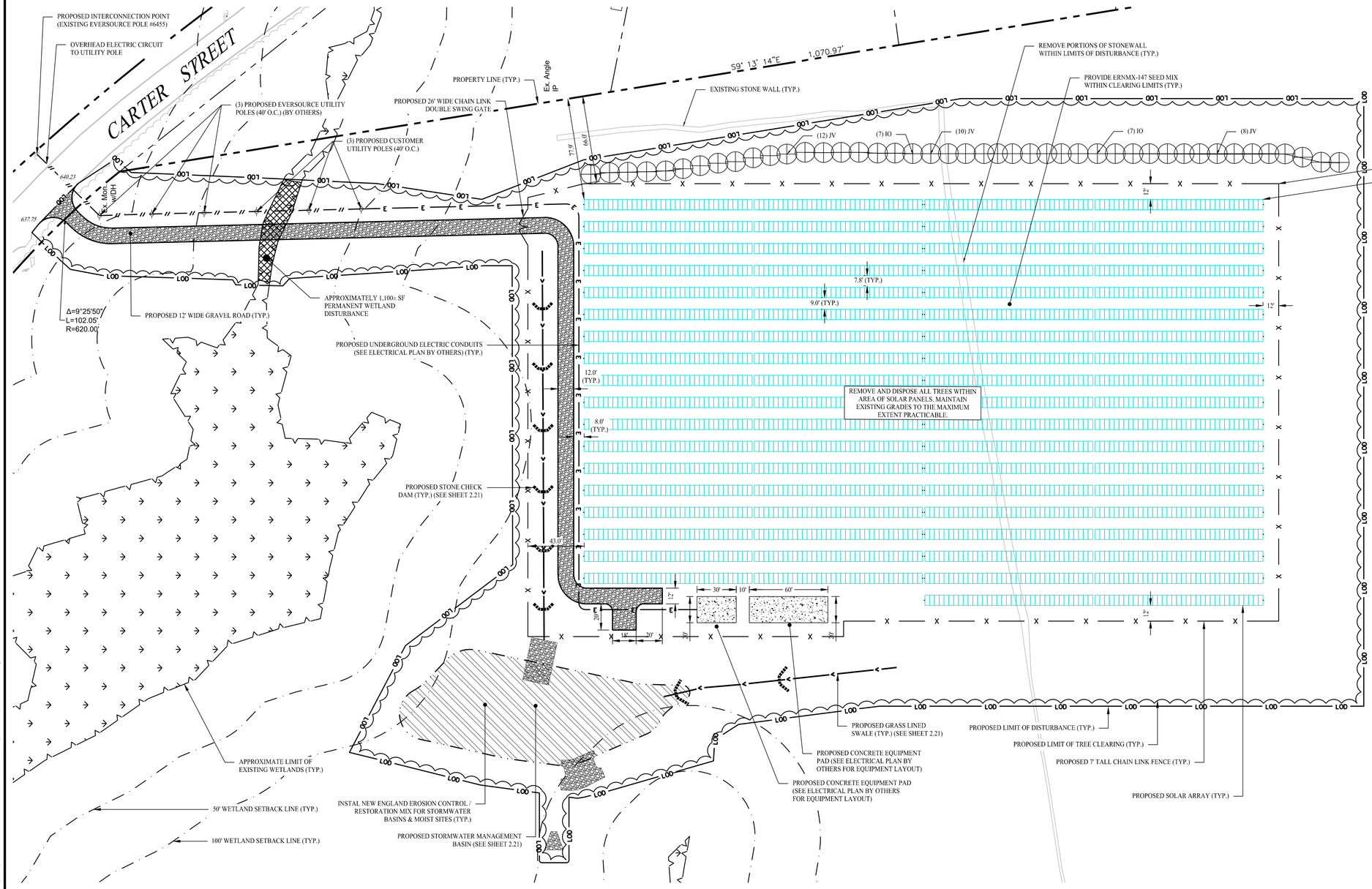
KEY	QTY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	COMMENTS
TREES						
IO	14	ILEX OPACA	AMERICAN HOLLY	B&B	7-8' HT	FULL, EXTRA HEAVY
JV	30	JUNIPERUS VIRGINIANA	EASTERN RED-CEDAR	B&B	7-8' HT	FULL, EXTRA HEAVY

SOLAR ARRAY SYSTEM INFORMATION

	TOTAL
SIZE DC	1.399 MW
SIZE AC	0.999 MW
INVERTER LOAD RATIO	1.40
MODULE TYPE	TRACKING TRINASOLAR TSM-540-DEG19C.20 (540W)
MODULE QUANTITY	2,590
INVERTER	SUNGROW SG125HV 125KW
INVERTER QUANTITY	8
UTILITY	EVERSOURCE

GENERAL NOTES

1. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION. NO CONSTRUCTION OR DEMOLITION SHALL BEGIN UNTIL FINAL APPROVAL OF THIS PLAN IS GRANTED.
2. ALL PROPOSED SITE WORK TO BE COMPLETED IN ACCORDANCE WITH ALL PERMITS, APPROVALS AND CONDITIONS OF APPROVALS ISSUED BY LOCAL, STATE AND/OR FEDERAL REVIEWING AGENCIES.
3. EXISTING BOUNDARY, TOPOGRAPHY AND SITE CONDITIONS INFORMATION TAKEN FROM A PLAN ENTITLED "PROPERTY & TOPOGRAPHIC SURVEY MAP PREPARED FOR SOLLI ENGINEERING, 250 CARTER STREET, MANCHESTER, CONNECTICUT," DATED OCTOBER 20, 2023, SCALE: 1"=100', BY HARRY E. COLE & SONS, 876 SOUTH MAIN STREET, PLANTSVILLE, CT 06479.
4. REFER TO THE EXISTING CONDITIONS MAP FOR THE ENTIRE PROPERTY BOUNDARY AND EXISTING CONDITIONS INFORMATION. THE PLAN HEREON DEPICTS A PORTION OF THE PROPERTY IN WHICH THE SITE WORK IS BEING PROPOSED.
5. THE SUBJECT PARCEL CONSISTS OF A TOTAL AREA OF APPROXIMATELY 41.08± ACRES, LOCATED IN THE RR ZONING DISTRICT IN THE TOWN OF MANCHESTER, CONNECTICUT.
6. WETLAND BOUNDARY DETERMINED AND LOCATED BY FIELD SURVEY BY WILLIAM KENNY ASSOCIATES ON JULY 26 & 27, 2023.
7. THE SITE IS NOT LOCATED WITHIN FEMA DESIGNATED FLOOD HAZARD AREA, AS DEPICTED ON F.I.R.M. MAP NUMBER 09003C0413F, WITH EFFECTIVE DATE SPETEMBER 26, 2008.
8. ALL CONSTRUCTION SHALL COMPLY WITH THE TOWN OF MANCHESTER, CONNECTICUT DEEP, AND CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS IN THE ABOVE REFERENCED INCREASING HIERARCHY. IF SPECIFICATIONS ARE IN CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL APPLY. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE OSHA, FEDERAL, STATE AND LOCAL REGULATIONS.
9. PRIOR TO DEMOLITION OR CONSTRUCTION, THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" 72 HOURS BEFORE THE COMMENCEMENT OF WORK AT "(800) 922-4455" AND VERIFY ALL UTILITY AND STORM DRAINAGE SYSTEM LOCATIONS. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE SYSTEMS HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY PROVIDER AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE SYSTEMS ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE SYSTEMS INCLUDING SERVICES.
10. SHOULD ANY UNCHARTED OR INCORRECTLY CHARTED, EXISTING PIPING OR OTHER UTILITY BE UNCOVERED DURING EXCAVATION, CONSULT THE CIVIL ENGINEER IMMEDIATELY FOR DIRECTIONS BEFORE PROCEEDING FURTHER WITH WORK IN THIS AREA.
11. THE OWNER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY ZONING PERMITS REQUIRED BY GOVERNMENT AGENCIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ALL LOCAL AND STATE PERMITS. THE CONTRACTOR SHALL POST ALL BONDS, PAY ALL FEES, PROVIDE PROOF OF INSURANCE AND PROVIDE TRAFFIC CONTROLS NECESSARY FOR THIS PROJECT.
12. THE CONTRACTOR SHALL RESTORE ANY DRAINAGE STRUCTURE, PIPE, UTILITY, PAVEMENT, CURBS, SIDEWALKS, LANDSCAPED AREAS OR SIGNAGE DISTURBED DURING CONSTRUCTION TO THEIR ORIGINAL CONDITION OR BETTER, AS APPROVED BY THE CIVIL ENGINEER OF RECORD. DURING CONSTRUCTION CONTRACTOR IS TO HAVE THE SITE MAINTAINED FREE OF ALL TRASH, LITTER, DEBRIS AND OVERGROWN VEGETATION.
13. THE OWNER SHALL BE RESPONSIBLE FOR MAINTAINING THE SITE FREE OF ALL TRASH, LITTER, DEBRIS AND OVERGROWN VEGETATION THROUGHOUT CONSTRUCTION.
14. ALTERNATIVE METHODS AND PRODUCTS OTHER THAN THOSE SPECIFIED MAY BE USED IF REVIEWED AND APPROVED BY THE OWNER, CIVIL ENGINEER, AND REGULATORY AGENCY PRIOR TO INSTALLATION DURING THE BIDDING PROCESS.



LEGEND

- PROPERTY LINE
- LIMIT OF WETLANDS
- UPLAND REVIEW AREA
- STORMWATER BASIN AREA
- 7' TALL CHAIN LINK FENCE
- TRINA 540W SOLAR MODULES
- UTILITY POLE
- OVERHEAD ELECTRIC LINE
- ELECTRIC CONDUIT
- LIMIT OF TREE CLEARING
- LIMIT OF DISTURBANCE
- GRASS LINED SWALE
- GRAVEL ACCESS DRIVE
- CONCRETE EQUIPMENT PAD
- WETLAND DISTURBANCE AREA
- STORMWATER BASIN
- EVERGREEN TREE

Rev. #:	Date	Description

Graphic Scale: 60 0 60 120

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 F: (203) 880-9695
11 Vanderbilt Ave, Norwood, MA 02062 T: (781) 352-8491 F: (203) 880-9695

Drawn By:	AWC
Checked By:	CJB
Approved By:	KMS
Project #:	23100101
Plan Date:	01/15/24
Scale:	1" = 60'

STATE OF CONNECTICUT KEVIN M. SOLLI 26759 LICENSED PROFESSIONAL ENGINEER

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SOLAR PHOTOVOLTAIC ARRAY

250 CARTER STREET
MANCHESTER, CONNECTICUT

Sheet Title:	Sheet #:
SITE LAYOUT PLAN	2.11

FOR PERMITTING ONLY

Jan 19, 2024 - 9:38am chendy
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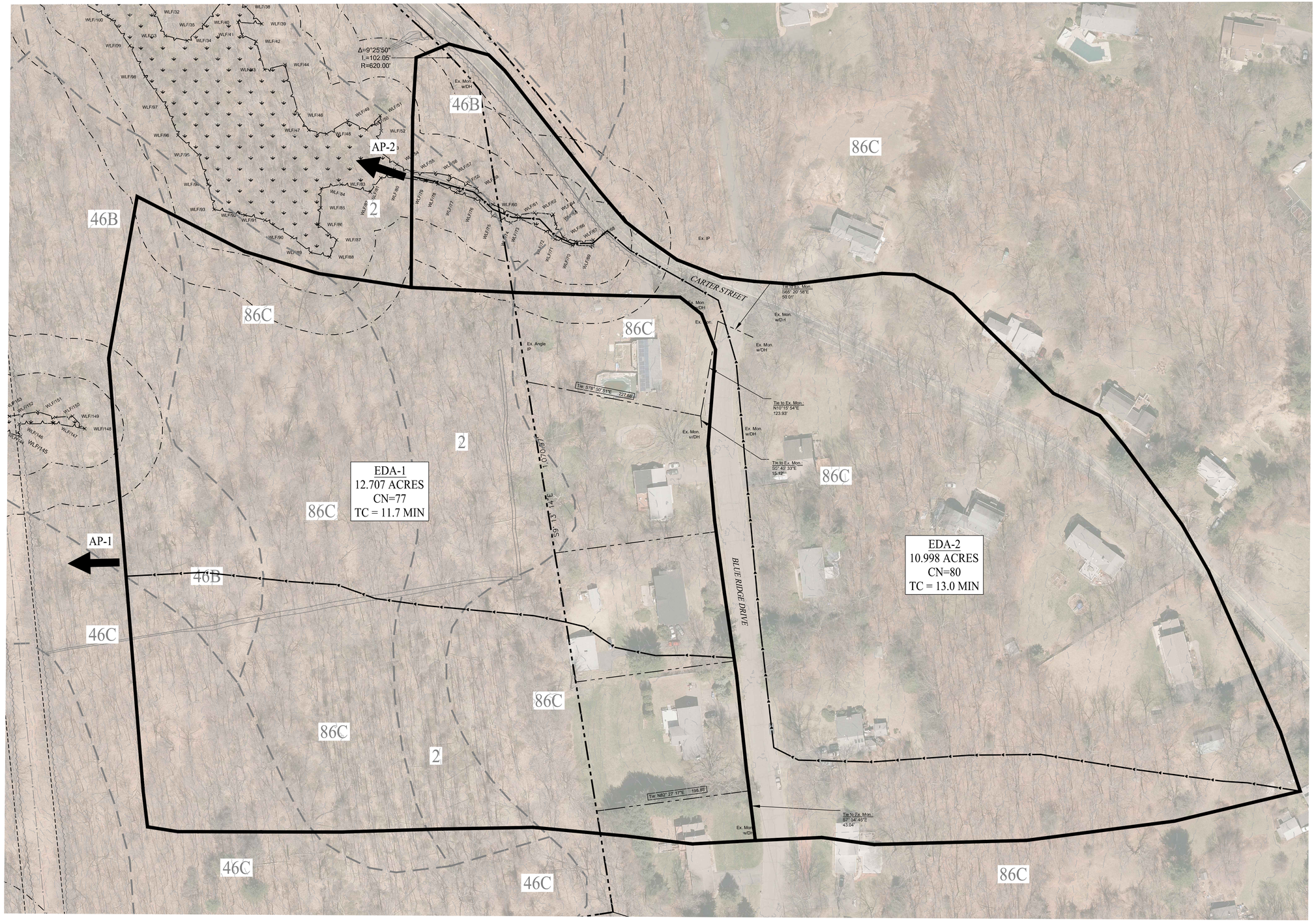

GENERAL NOTES

1. THE STORMWATER MANAGEMENT PLAN AND DESIGN IS INTENDED TO BE IN COMPLIANCE WITH THE CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION STORMWATER QUALITY MANUAL AND THE TOWN OF MANCHESTER, CONNECTICUT STORMWATER REGULATIONS.
2. STORMWATER RUNOFF ANALYSIS WAS CALCULATED USING THE SCS TR-55 METHODOLOGY.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- SOIL BOUNDARY
- LIMIT OF DRAINAGE AREA
- FLOW PATH

EXISTING CONDITIONS PEAK FLOWS

ANALYSIS POINT	2-YEAR (CFS)	25-YEAR (CFS)	50-YEAR (CFS)	100-YEAR (CFS)
AP-1	12.91	38.73	46.54	55.09
AP-2	12.85	35.47	42.16	49.46

Rev. #:	Date	Description

Graphic Scale: 60 0 60 120

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 F: (203) 880-9695
11 Vanderbilt Ave, Norwood, MA 02062 T: (781) 352-8491 F: (203) 880-9695

Drawn By:	CSH
Checked By:	EEL
Approved By:	KMS
Project #:	23100101
Plan Date:	01/15/24
Scale:	1" = 60'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SOLAR PHOTOVOLTAIC ARRAY

250 CARTER STREET
MANCHESTER, CONNECTICUT

Sheet Title: EXISTING DRAINAGE AREA MAP

Sheet #: DA-1

Jan 24, 2024 - 12:07pm Anthony
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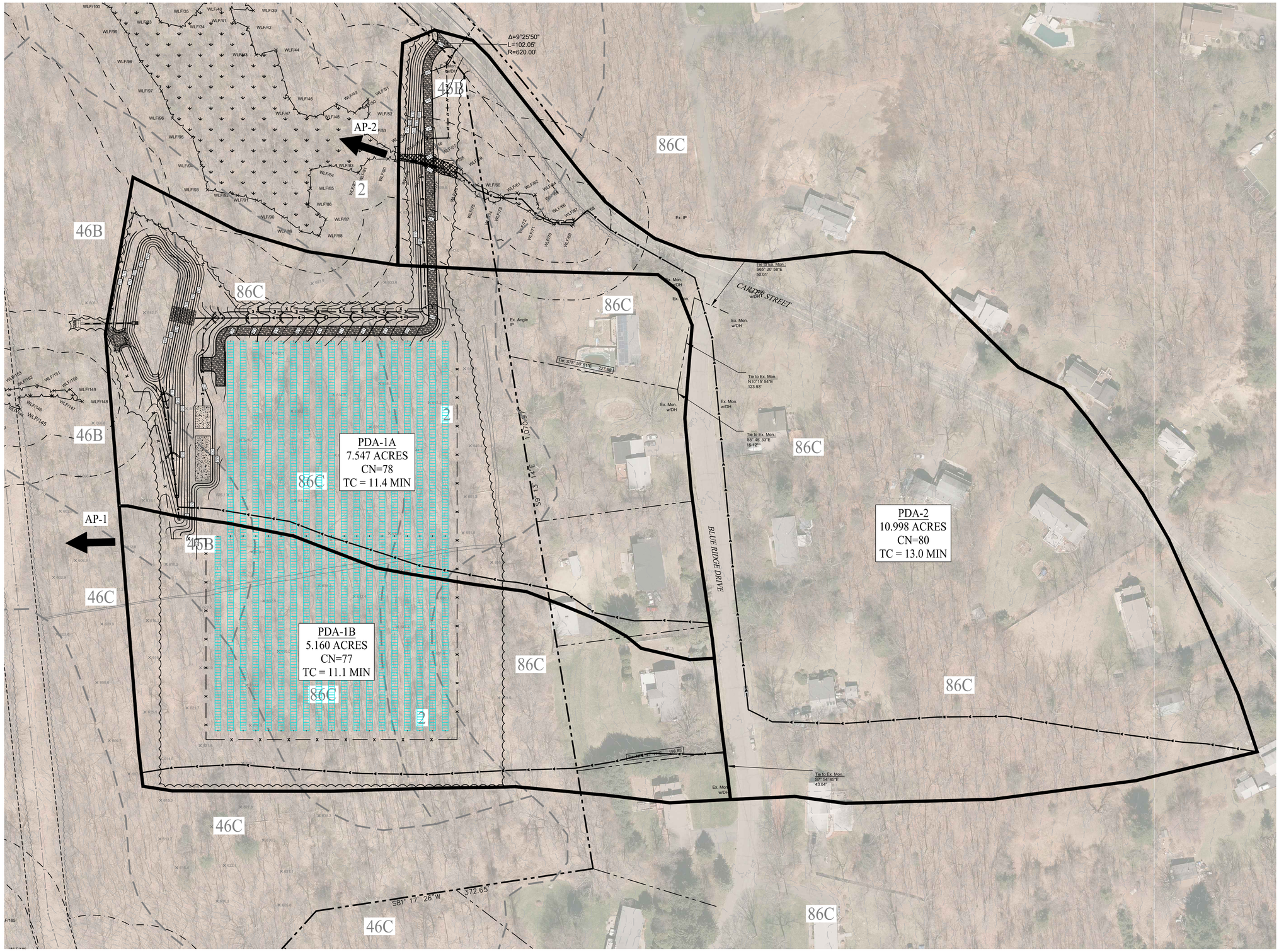


GENERAL NOTES

1. THE STORMWATER MANAGEMENT PLAN AND DESIGN IS INTENDED TO BE IN COMPLIANCE WITH THE CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION STORMWATER QUALITY MANUAL AND THE TOWN OF MANCHESTER, CONNECTICUT STORMWATER REGULATIONS.
2. STORMWATER RUNOFF ANALYSIS WAS CALCULATED USING THE SCS TR-55 METHODOLOGY.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- SOIL BOUNDARY
- LIMIT OF DRAINAGE AREA
- FLOW PATH

PROPOSED CONDITIONS PEAK FLOWS

ANALYSIS POINT	2-YEAR (CFS)	25-YEAR (CFS)	50-YEAR (CFS)	100-YEAR (CFS)
AP-1	6.30	22.80	26.88	34.87
AP-2	12.85	35.46	42.16	49.46

Rev. #:	Date	Description

Graphic Scale: 60 0 60 120

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 F: (203) 880-9695
11 Vanderbilt Ave, Norwood, MA 02062 T: (781) 352-8491 F: (203) 880-9695

Drawn By:	CSH
Checked By:	EEL
Approved By:	KMS
Project #:	23100101
Plan Date:	11/17/23
Scale:	1" = 60'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SOLAR PHOTOVOLTAIC ARRAY

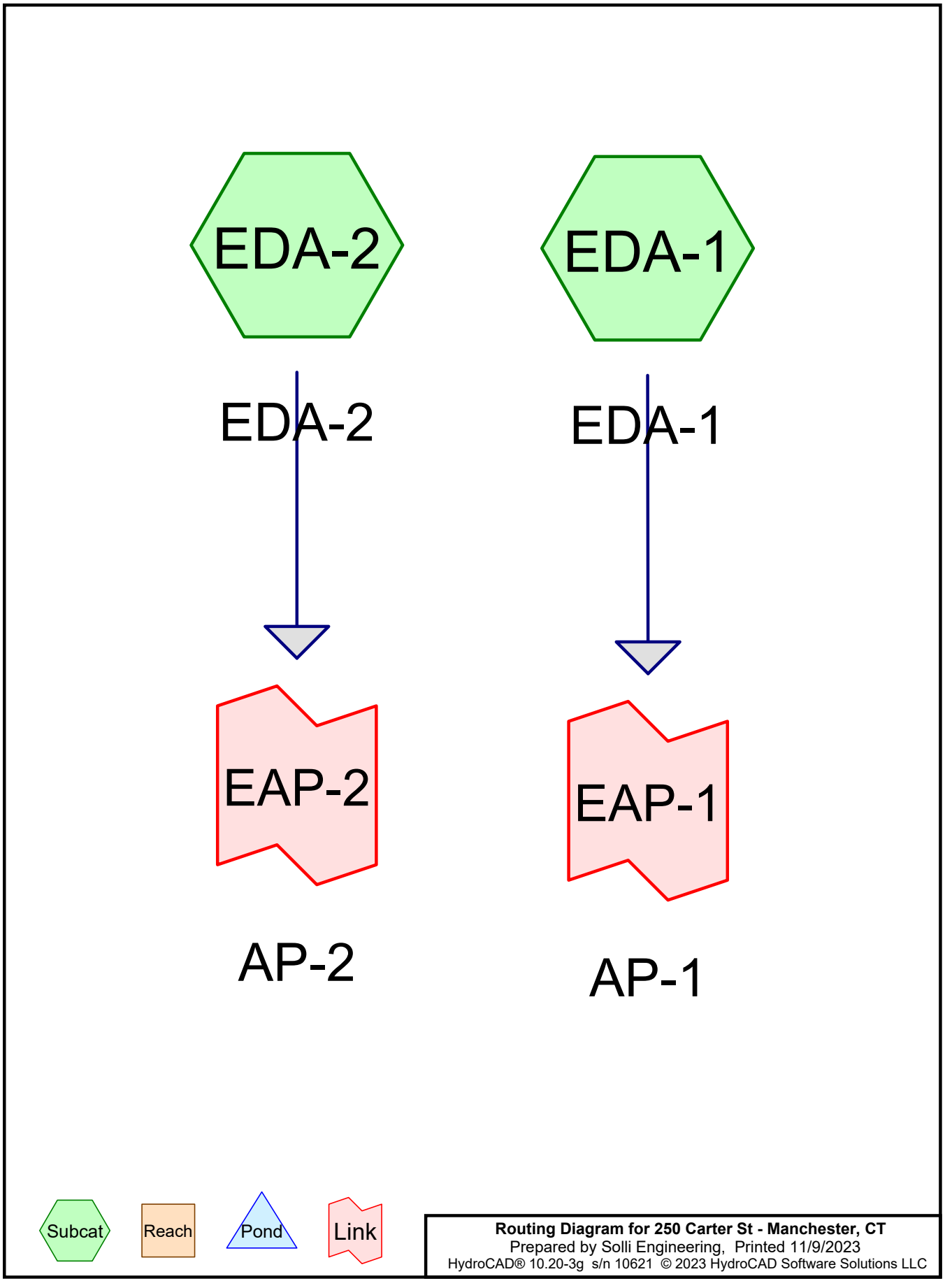
250 CARTER STREET
MANCHESTER, CONNECTICUT

Sheet Title:	Sheet #:
PROPOSED DRAINAGE AREA MAP	DA-2

Nov 09, 2023 - 4:29pm chendy
Z:\Shared\Company Files\SE Files\Project Data\2023\23100101 - 250 Carter Street - Manchester, CT\Cadd Data\23100101-DA-2.dwg

Appendix B – Stormwater Calculations

- Hydrology Calculations (2-, 25-, 50-, 100-year storm events)
- Water Quality Volume Calculations
- NOAA Atlas Precipitation Data



Routing Diagram for 250 Carter St - Manchester, CT
Prepared by Solli Engineering, Printed 11/9/2023
HydroCAD® 10.20-3g s/n 10621 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	NRCC 24-hr	D	Default	24.00	1	3.16	2
2	25-year	NRCC 24-hr	D	Default	24.00	1	6.00	2
3	50-year	NRCC 24-hr	D	Default	24.00	1	6.81	2
4	100-year	NRCC 24-hr	D	Default	24.00	1	7.69	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.575	79	1 acre lots, 20% imp, HSG C (EDA-1, EDA-2)
1.152	98	Paved roads w/curbs & sewers, HSG C (EDA-2)
0.135	98	Paved roads w/curbs & sewers, HSG D (EDA-2)
8.238	73	Woods, Fair, HSG C (EDA-1, EDA-2)
5.605	79	Woods, Fair, HSG D (EDA-1, EDA-2)
23.706	**78**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
17.965	HSG C	EDA-1, EDA-2
5.741	HSG D	EDA-1, EDA-2
0.000	Other	
23.706		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	8.575	0.000	0.000	8.575	1 acre lots, 20% imp	ED A-1 , ED A-2
0.000	0.000	1.152	0.135	0.000	1.288	Paved roads w/curbs & sewers	ED A-2
0.000	0.000	8.238	5.605	0.000	13.843	Woods, Fair	ED A-1 , ED A-2
0.000	**0.000**	**17.965**	**5.741**	**0.000**	**23.706**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	EDA-2	0.00	0.00	608.0	0.0444	0.011	0.0	15.0	0.0	

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=12.707 ac 4.56% Impervious Runoff Depth=1.18"
Flow Length=796' Tc=12.3 min CN=77 Runoff=12.91 cfs 1.253 af

Subcatchment EDA-2: EDA-2 Runoff Area=479,116 sf 22.03% Impervious Runoff Depth=1.37"
Flow Length=1,712' Tc=13.0 min CN=80 Runoff=12.85 cfs 1.257 af

Link EAP-1: AP-1 Inflow=12.91 cfs 1.253 af
Primary=12.91 cfs 1.253 af

Link EAP-2: AP-2 Inflow=12.85 cfs 1.257 af
Primary=12.85 cfs 1.257 af

Total Runoff Area = 23.706 ac Runoff Volume = 2.510 af Average Runoff Depth = 1.27"
87.33% Pervious = 20.703 ac 12.67% Impervious = 3.003 ac

Summary for Subcatchment EDA-1: EDA-1

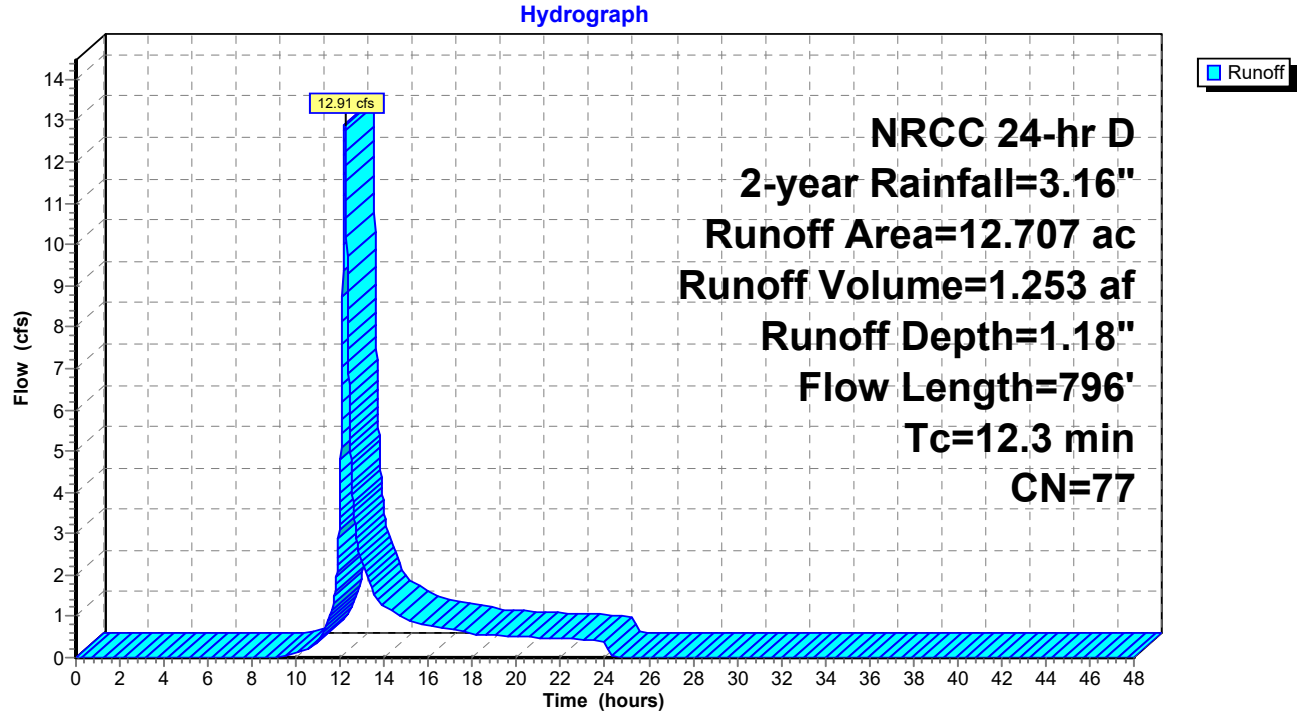
Runoff = 12.91 cfs @ 12.20 hrs, Volume= 1.253 af, Depth= 1.18"
Routed to Link EAP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-year Rainfall=3.16"

Area (ac)	CN	Description
2.898	79	1 acre lots, 20% imp, HSG C
5.274	73	Woods, Fair, HSG C
4.535	79	Woods, Fair, HSG D
12.707	77	Weighted Average
12.127		95.44% Pervious Area
0.580		4.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1100	0.33		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.1	128	0.0780	1.95		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.2	568	0.0933	1.53		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
12.3	796	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

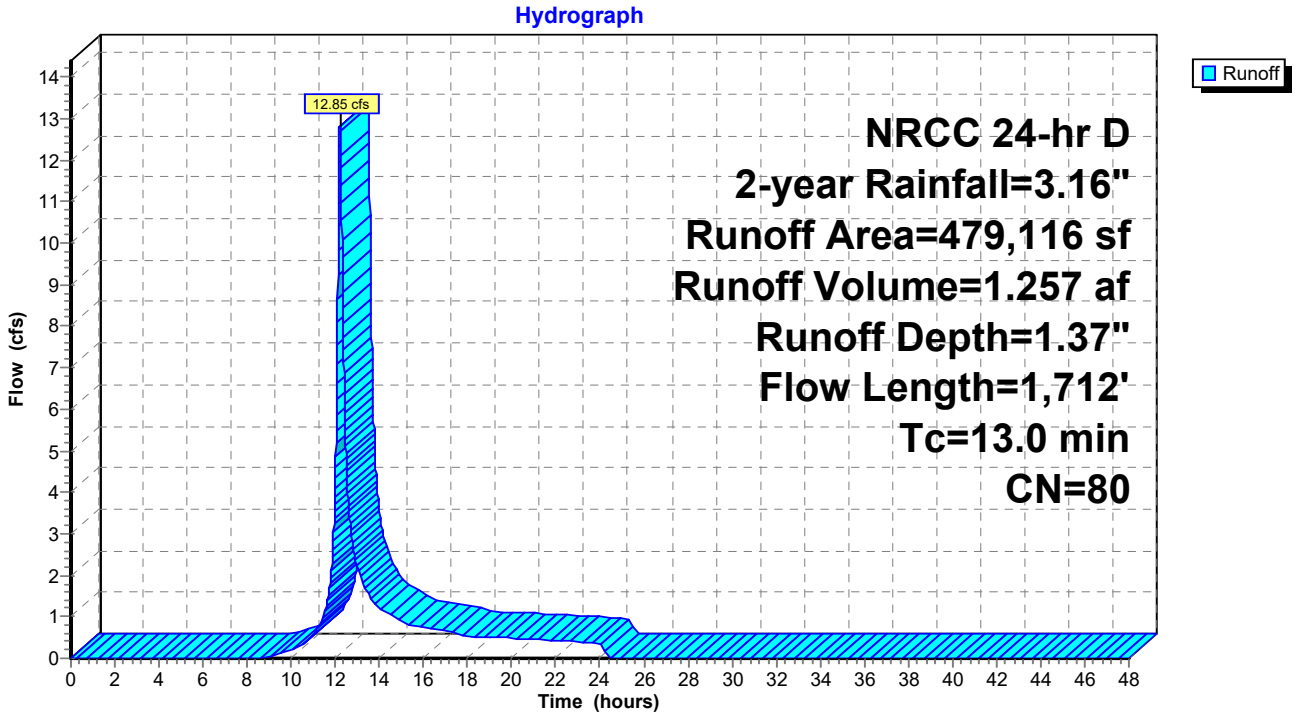
Runoff = 12.85 cfs @ 12.21 hrs, Volume= 1.257 af, Depth= 1.37"
Routed to Link EAP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-year Rainfall=3.16"

Area (sf)	CN	Description
247,300	79	1 acre lots, 20% imp, HSG C
129,102	73	Woods, Fair, HSG C
46,629	79	Woods, Fair, HSG D
50,194	98	Paved roads w/curbs & sewers, HSG C
5,891	98	Paved roads w/curbs & sewers, HSG D
479,116	80	Weighted Average
373,571		77.97% Pervious Area
105,545		22.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.9	585	0.1094	1.65		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	167	0.0240	3.14		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.8	608	0.0444	13.11	16.09	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	252	0.1071	26.20	487.30	**Channel Flow, E-F** Area= 18.6 sf Perim= 11.9' r= 1.56' n= 0.025 Earth, clean & winding
13.0	1,712	Total			

Subcatchment EDA-2: EDA-2

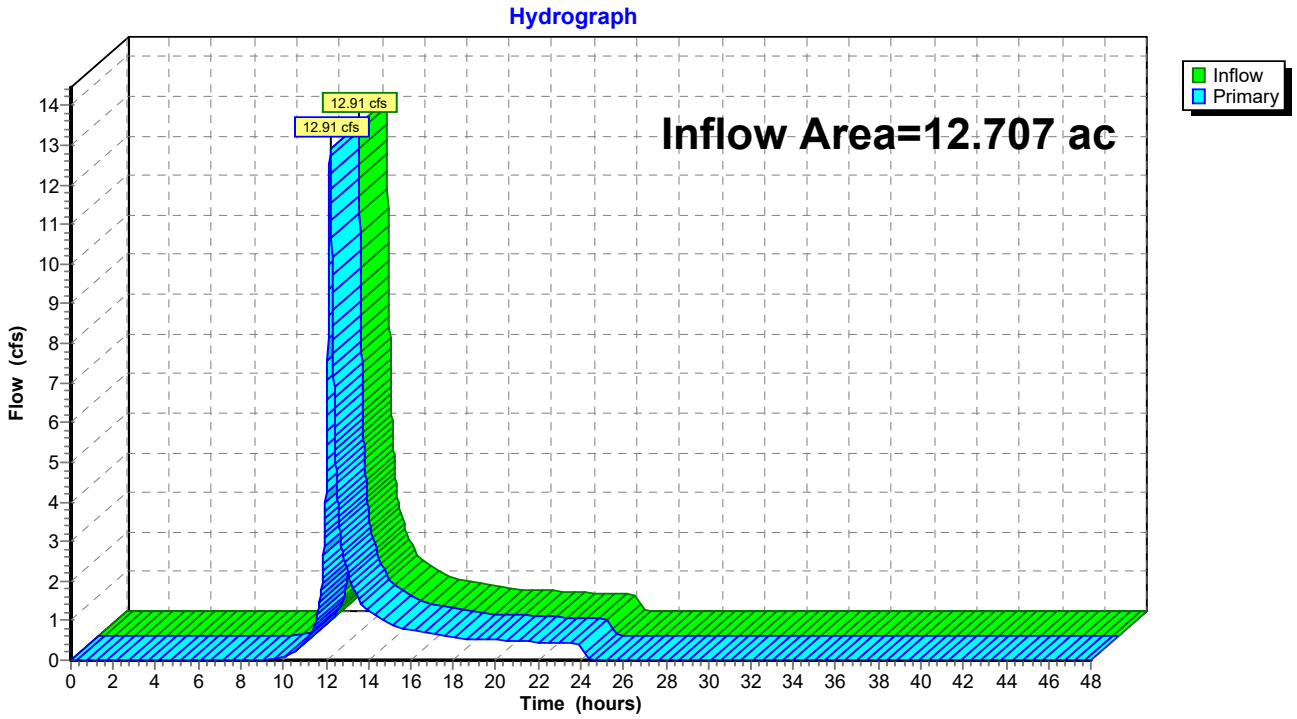


Summary for Link EAP-1: AP-1

Inflow Area = 12.707 ac, 4.56% Impervious, Inflow Depth = 1.18" for 2-year event
Inflow = 12.91 cfs @ 12.20 hrs, Volume= 1.253 af
Primary = 12.91 cfs @ 12.20 hrs, Volume= 1.253 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link EAP-1: AP-1

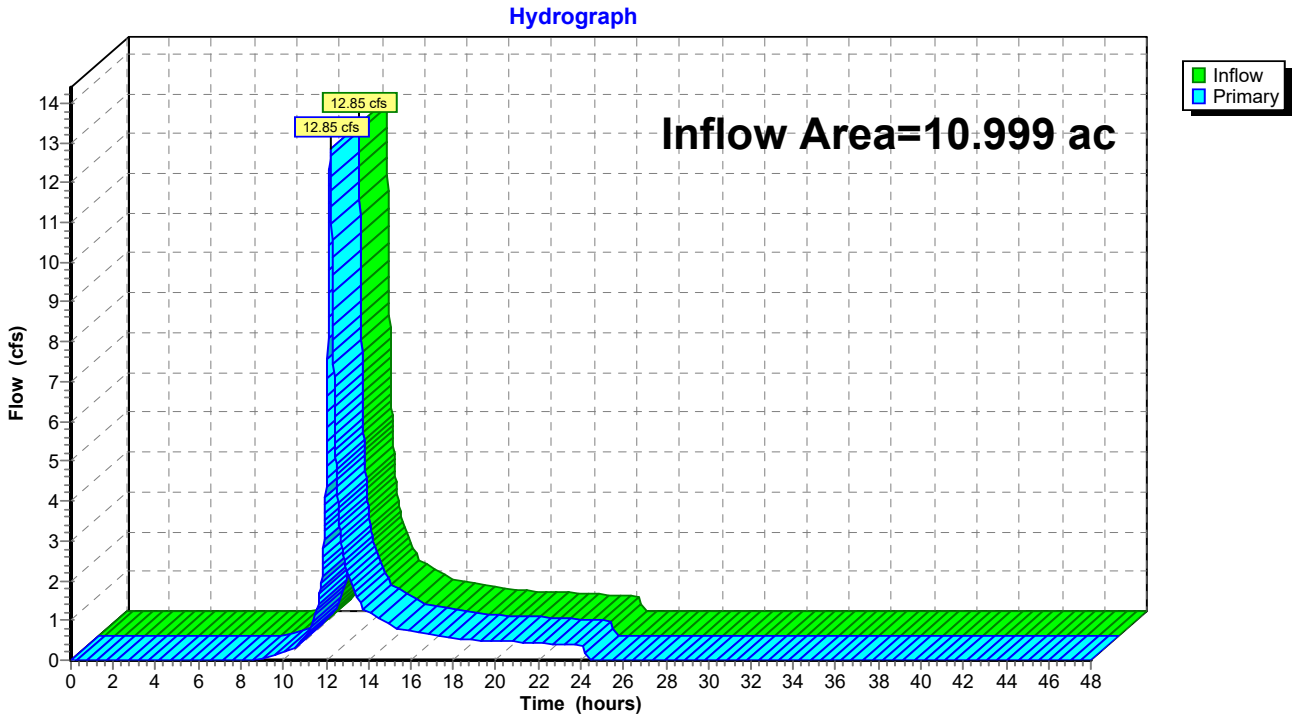


Summary for Link EAP-2: AP-2

Inflow Area = 10.999 ac, 22.03% Impervious, Inflow Depth = 1.37" for 2-year event
Inflow = 12.85 cfs @ 12.21 hrs, Volume= 1.257 af
Primary = 12.85 cfs @ 12.21 hrs, Volume= 1.257 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link EAP-2: AP-2



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=12.707 ac 4.56% Impervious Runoff Depth=3.48"
Flow Length=796' Tc=12.3 min CN=77 Runoff=38.73 cfs 3.684 af

Subcatchment EDA-2: EDA-2 Runoff Area=479,116 sf 22.03% Impervious Runoff Depth=3.78"
Flow Length=1,712' Tc=13.0 min CN=80 Runoff=35.47 cfs 3.466 af

Link EAP-1: AP-1 Inflow=38.73 cfs 3.684 af
Primary=38.73 cfs 3.684 af

Link EAP-2: AP-2 Inflow=35.47 cfs 3.466 af
Primary=35.47 cfs 3.466 af

Total Runoff Area = 23.706 ac Runoff Volume = 7.150 af Average Runoff Depth = 3.62"
87.33% Pervious = 20.703 ac 12.67% Impervious = 3.003 ac

Summary for Subcatchment EDA-1: EDA-1

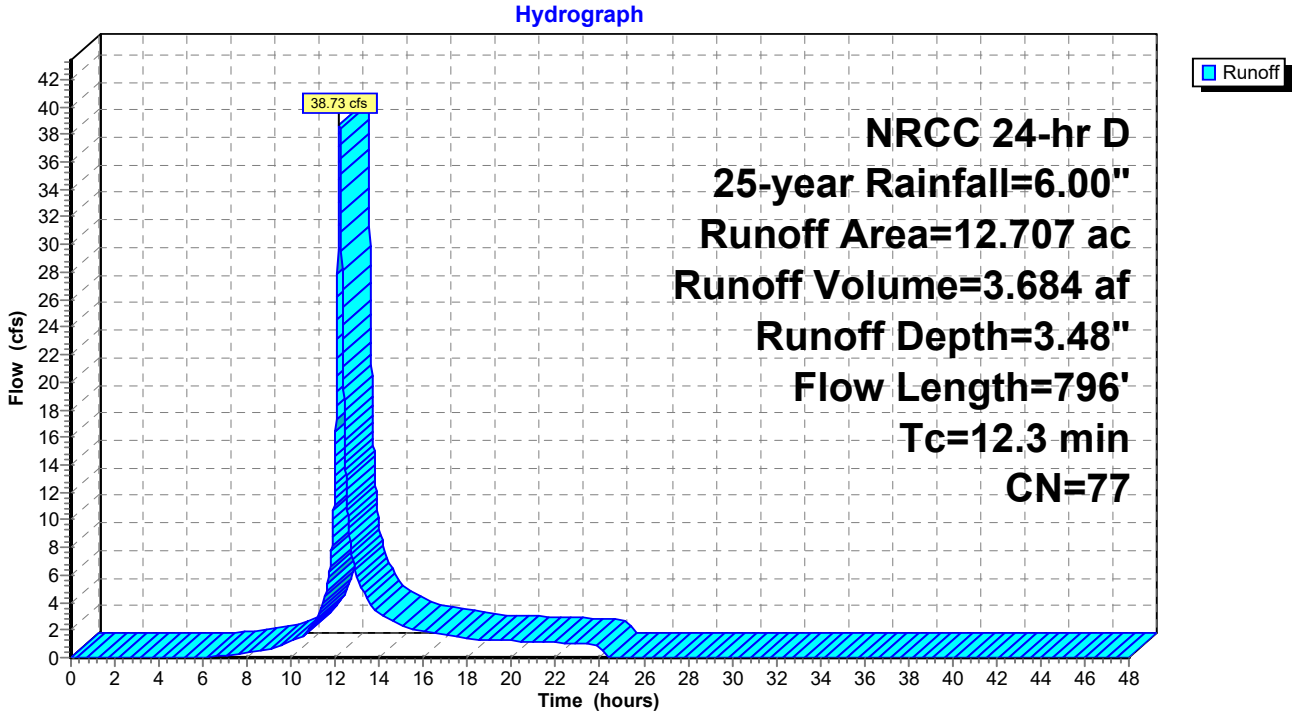
Runoff = 38.73 cfs @ 12.20 hrs, Volume= 3.684 af, Depth= 3.48"
Routed to Link EAP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-year Rainfall=6.00"

Area (ac)	CN	Description
2.898	79	1 acre lots, 20% imp, HSG C
5.274	73	Woods, Fair, HSG C
4.535	79	Woods, Fair, HSG D
12.707	77	Weighted Average
12.127		95.44% Pervious Area
0.580		4.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1100	0.33		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.1	128	0.0780	1.95		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.2	568	0.0933	1.53		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
12.3	796	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

[47] Hint: Peak is 220% of capacity of segment #4

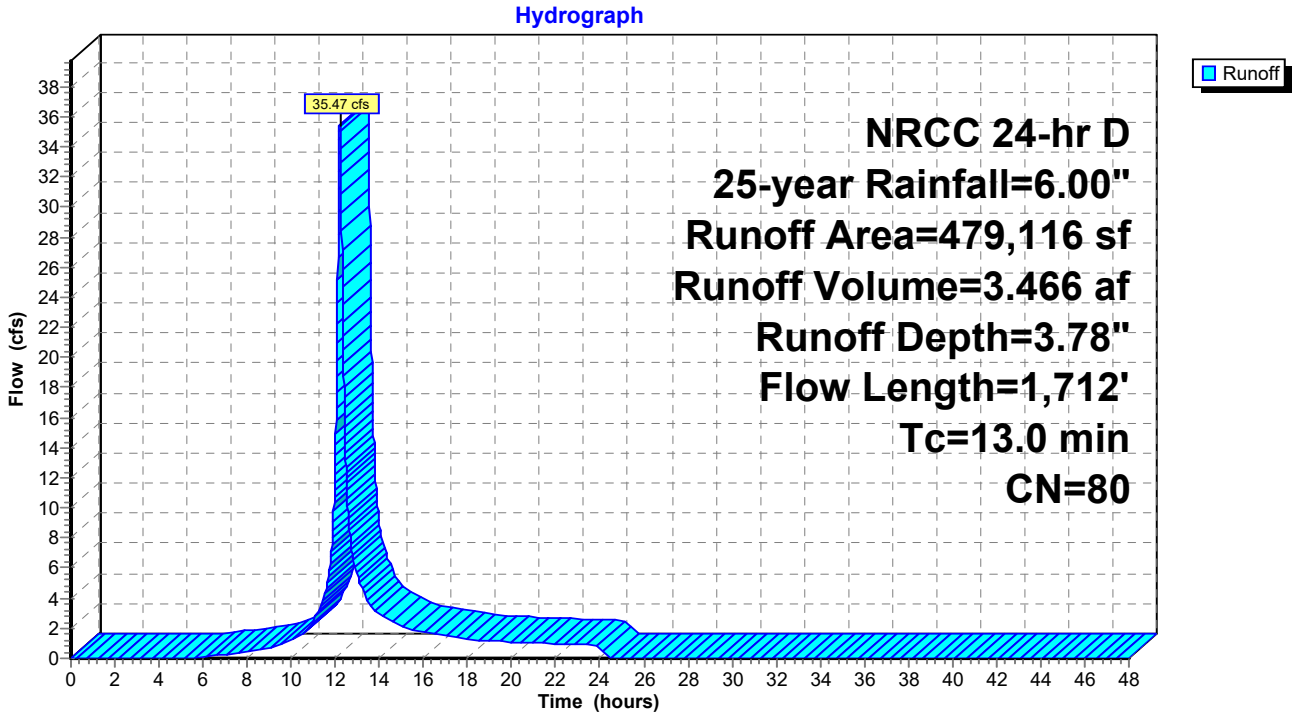
Runoff = 35.47 cfs @ 12.21 hrs, Volume= 3.466 af, Depth= 3.78"
Routed to Link EAP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-year Rainfall=6.00"

Area (sf)	CN	Description
247,300	79	1 acre lots, 20% imp, HSG C
129,102	73	Woods, Fair, HSG C
46,629	79	Woods, Fair, HSG D
50,194	98	Paved roads w/curbs & sewers, HSG C
5,891	98	Paved roads w/curbs & sewers, HSG D
479,116	80	Weighted Average
373,571		77.97% Pervious Area
105,545		22.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.9	585	0.1094	1.65		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	167	0.0240	3.14		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.8	608	0.0444	13.11	16.09	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	252	0.1071	26.20	487.30	**Channel Flow, E-F** Area= 18.6 sf Perim= 11.9' r= 1.56' n= 0.025 Earth, clean & winding
13.0	1,712	Total			

Subcatchment EDA-2: EDA-2

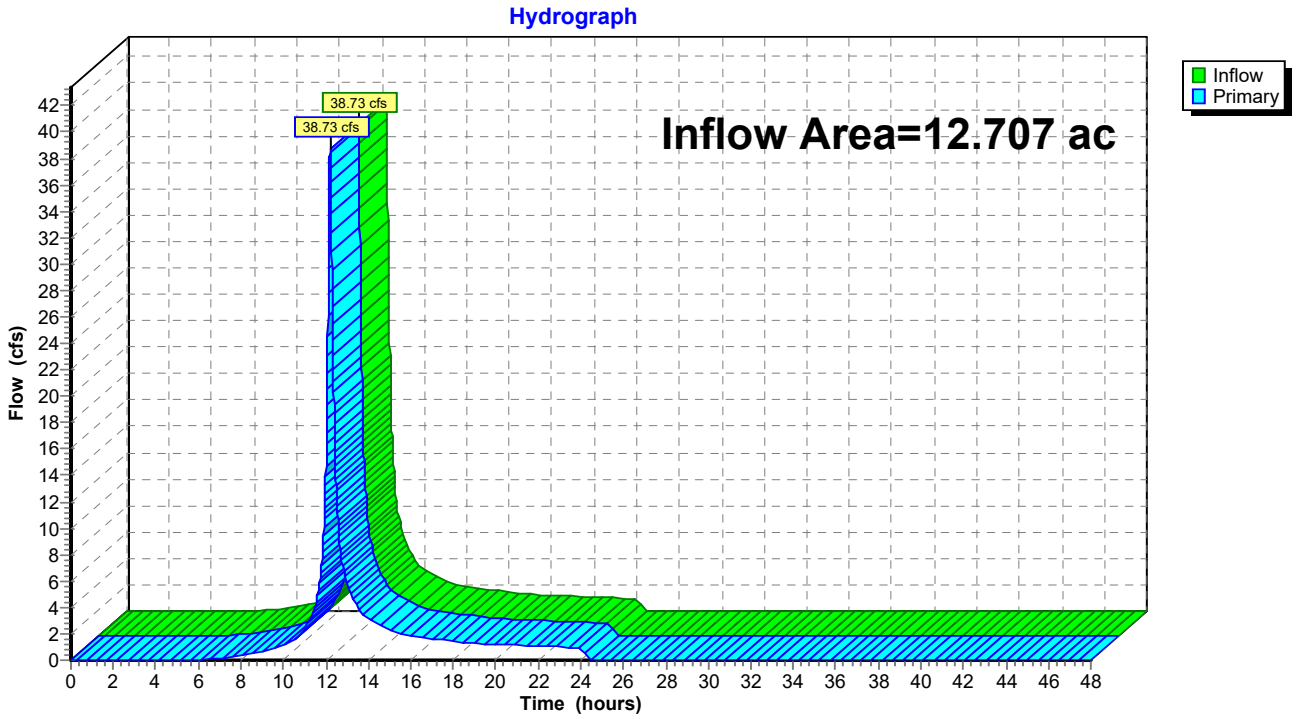


Summary for Link EAP-1: AP-1

Inflow Area = 12.707 ac, 4.56% Impervious, Inflow Depth = 3.48" for 25-year event
Inflow = 38.73 cfs @ 12.20 hrs, Volume= 3.684 af
Primary = 38.73 cfs @ 12.20 hrs, Volume= 3.684 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link EAP-1: AP-1

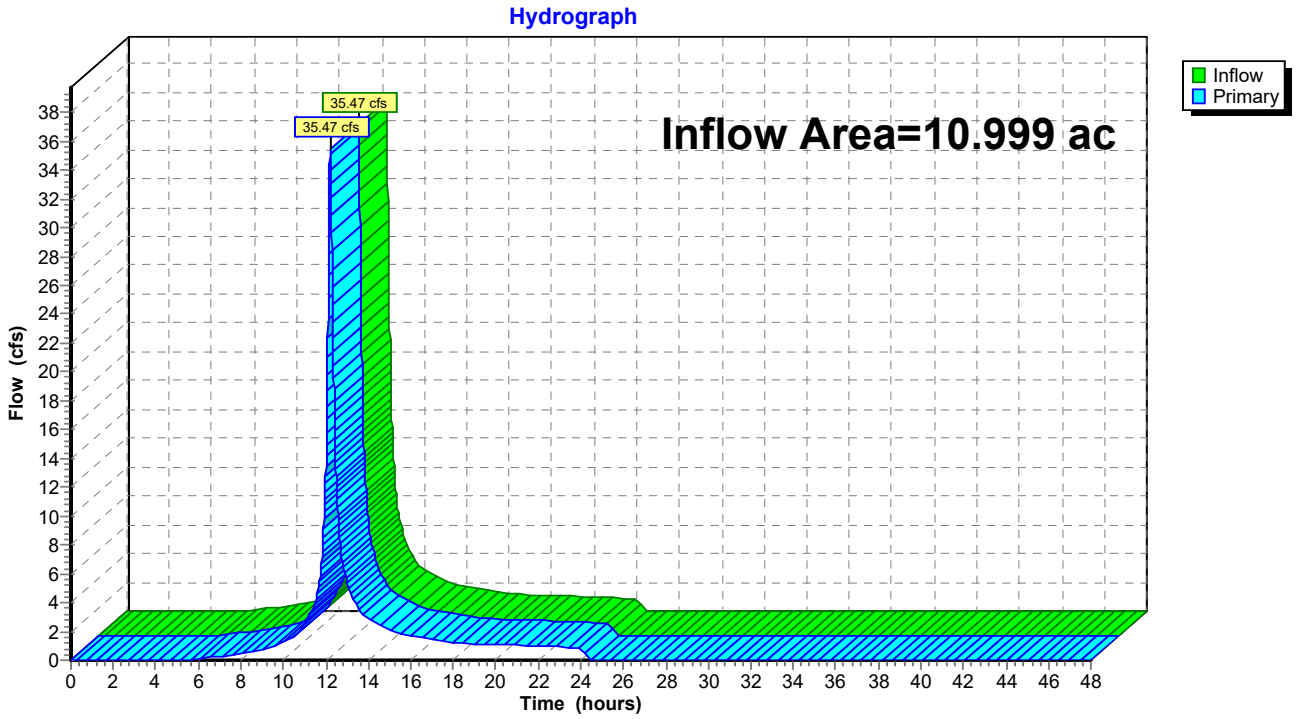


Summary for Link EAP-2: AP-2

Inflow Area = 10.999 ac, 22.03% Impervious, Inflow Depth = 3.78" for 25-year event
Inflow = 35.47 cfs @ 12.21 hrs, Volume= 3.466 af
Primary = 35.47 cfs @ 12.21 hrs, Volume= 3.466 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link EAP-2: AP-2



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=12.707 ac 4.56% Impervious Runoff Depth=4.20"
Flow Length=796' Tc=12.3 min CN=77 Runoff=46.54 cfs 4.443 af

Subcatchment EDA-2: EDA-2 Runoff Area=479,116 sf 22.03% Impervious Runoff Depth=4.52"
Flow Length=1,712' Tc=13.0 min CN=80 Runoff=42.16 cfs 4.142 af

Link EAP-1: AP-1 Inflow=46.54 cfs 4.443 af
Primary=46.54 cfs 4.443 af

Link EAP-2: AP-2 Inflow=42.16 cfs 4.142 af
Primary=42.16 cfs 4.142 af

Total Runoff Area = 23.706 ac Runoff Volume = 8.585 af Average Runoff Depth = 4.35"
87.33% Pervious = 20.703 ac 12.67% Impervious = 3.003 ac

Summary for Subcatchment EDA-1: EDA-1

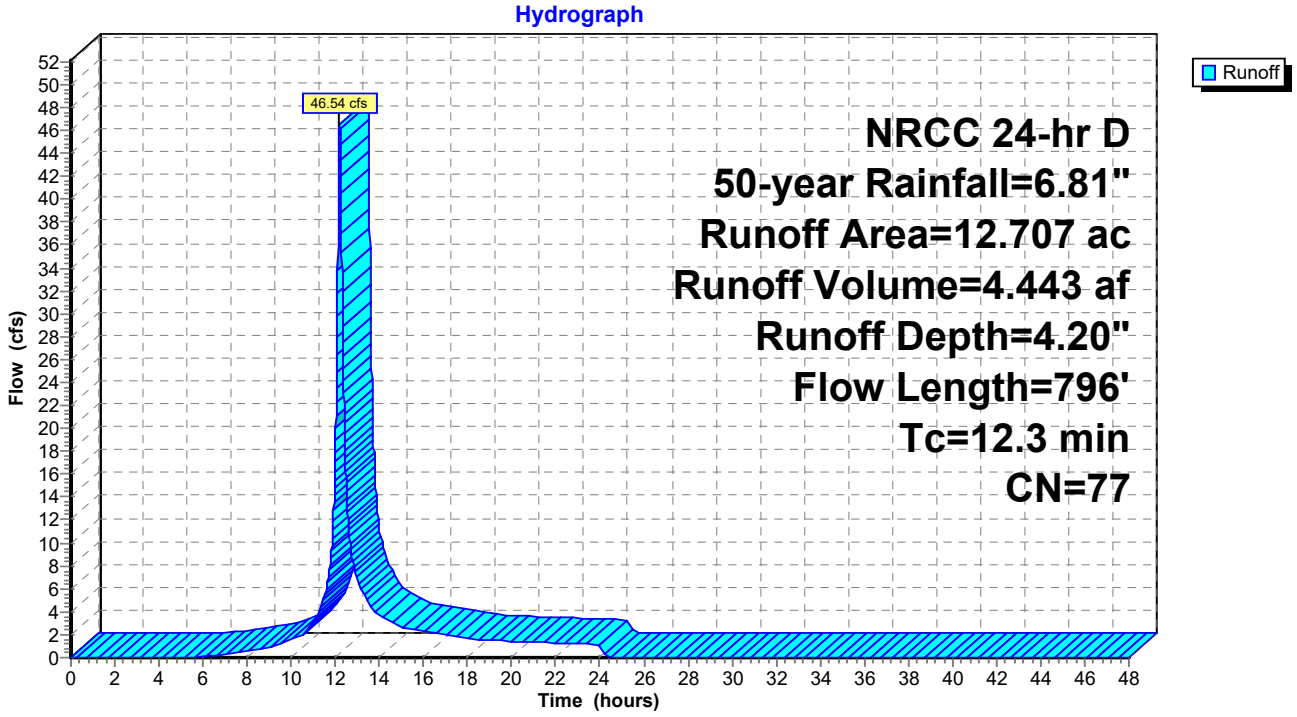
Runoff = 46.54 cfs @ 12.20 hrs, Volume= 4.443 af, Depth= 4.20"
Routed to Link EAP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 50-year Rainfall=6.81"

Area (ac)	CN	Description
2.898	79	1 acre lots, 20% imp, HSG C
5.274	73	Woods, Fair, HSG C
4.535	79	Woods, Fair, HSG D
12.707	77	Weighted Average
12.127		95.44% Pervious Area
0.580		4.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1100	0.33		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.1	128	0.0780	1.95		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.2	568	0.0933	1.53		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
12.3	796	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

[47] Hint: Peak is 262% of capacity of segment #4

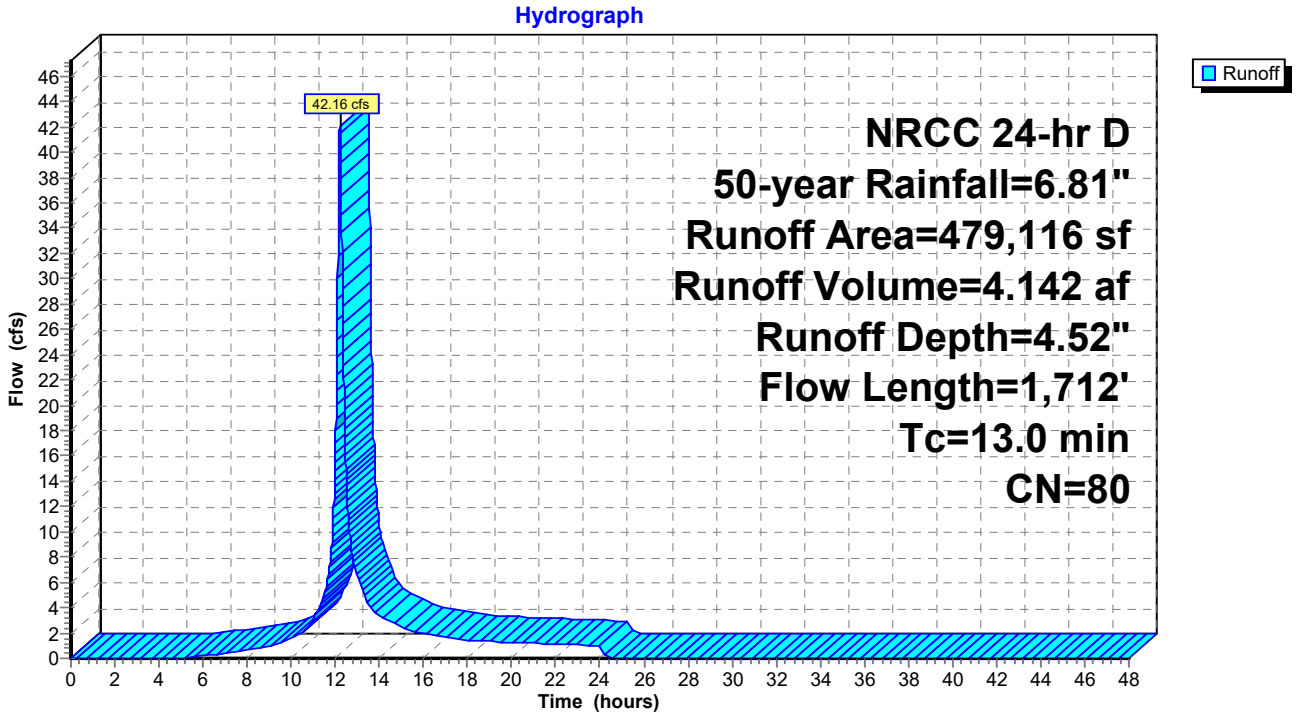
Runoff = 42.16 cfs @ 12.21 hrs, Volume= 4.142 af, Depth= 4.52"
Routed to Link EAP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 50-year Rainfall=6.81"

Area (sf)	CN	Description
247,300	79	1 acre lots, 20% imp, HSG C
129,102	73	Woods, Fair, HSG C
46,629	79	Woods, Fair, HSG D
50,194	98	Paved roads w/curbs & sewers, HSG C
5,891	98	Paved roads w/curbs & sewers, HSG D
479,116	80	Weighted Average
373,571		77.97% Pervious Area
105,545		22.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.9	585	0.1094	1.65		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	167	0.0240	3.14		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.8	608	0.0444	13.11	16.09	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	252	0.1071	26.20	487.30	**Channel Flow, E-F** Area= 18.6 sf Perim= 11.9' r= 1.56' n= 0.025 Earth, clean & winding
13.0	1,712	Total			

Subcatchment EDA-2: EDA-2

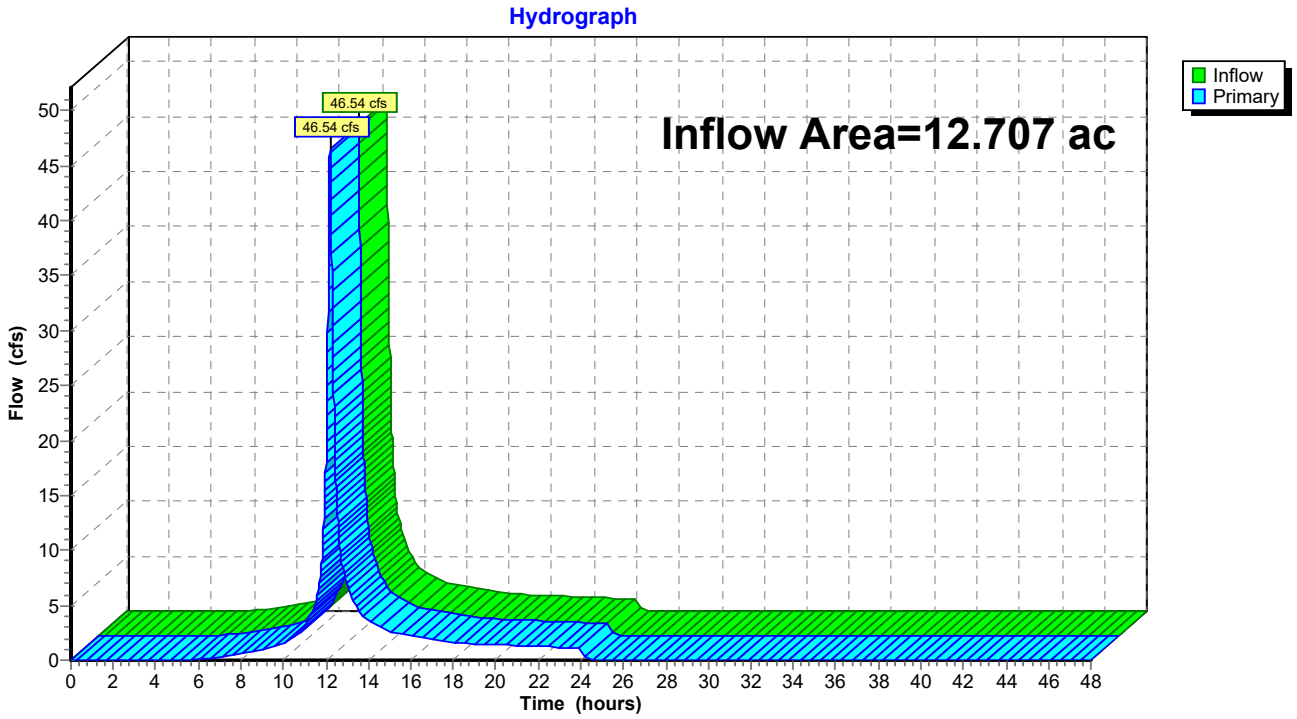


Summary for Link EAP-1: AP-1

Inflow Area = 12.707 ac, 4.56% Impervious, Inflow Depth = 4.20" for 50-year event
Inflow = 46.54 cfs @ 12.20 hrs, Volume= 4.443 af
Primary = 46.54 cfs @ 12.20 hrs, Volume= 4.443 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link EAP-1: AP-1

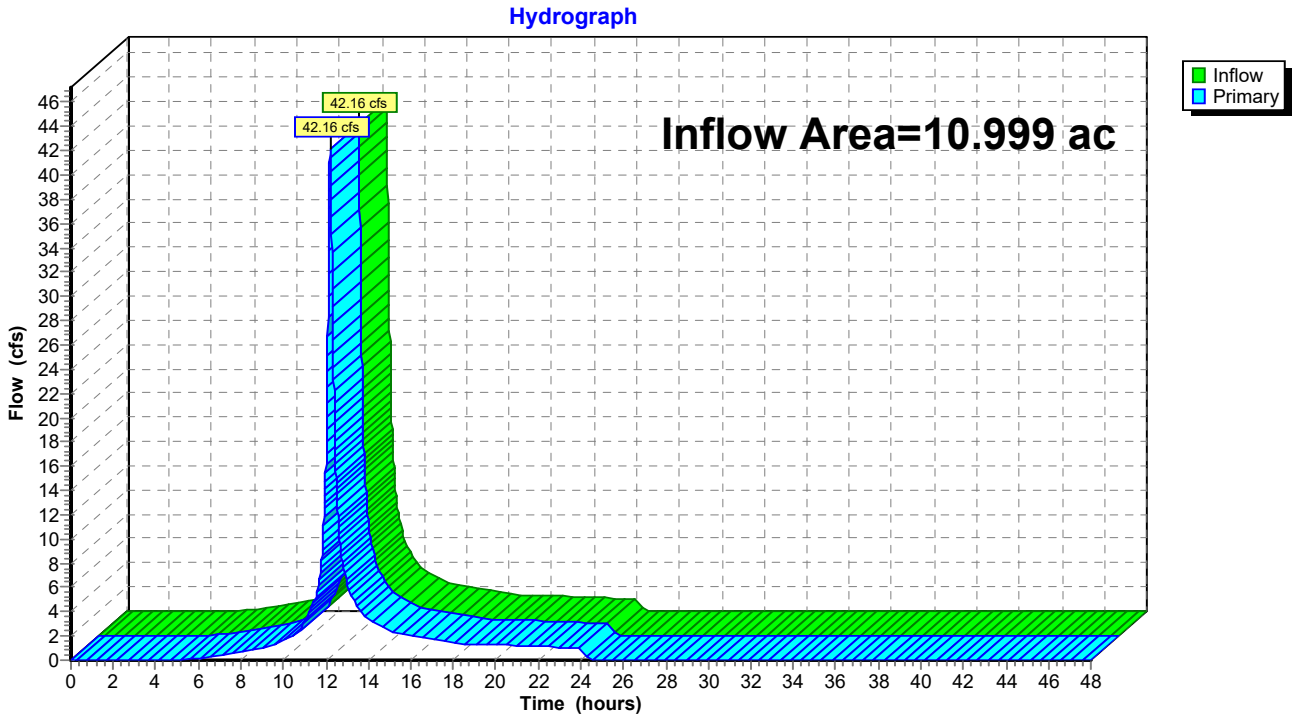


Summary for Link EAP-2: AP-2

Inflow Area = 10.999 ac, 22.03% Impervious, Inflow Depth = 4.52" for 50-year event
Inflow = 42.16 cfs @ 12.21 hrs, Volume= 4.142 af
Primary = 42.16 cfs @ 12.21 hrs, Volume= 4.142 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link EAP-2: AP-2



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=12.707 ac 4.56% Impervious Runoff Depth=4.99"
Flow Length=796' Tc=12.3 min CN=77 Runoff=55.09 cfs 5.285 af

Subcatchment EDA-2: EDA-2 Runoff Area=479,116 sf 22.03% Impervious Runoff Depth=5.33"
Flow Length=1,712' Tc=13.0 min CN=80 Runoff=49.46 cfs 4.890 af

Link EAP-1: AP-1 Inflow=55.09 cfs 5.285 af
Primary=55.09 cfs 5.285 af

Link EAP-2: AP-2 Inflow=49.46 cfs 4.890 af
Primary=49.46 cfs 4.890 af

Total Runoff Area = 23.706 ac Runoff Volume = 10.175 af Average Runoff Depth = 5.15"
87.33% Pervious = 20.703 ac 12.67% Impervious = 3.003 ac

Summary for Subcatchment EDA-1: EDA-1

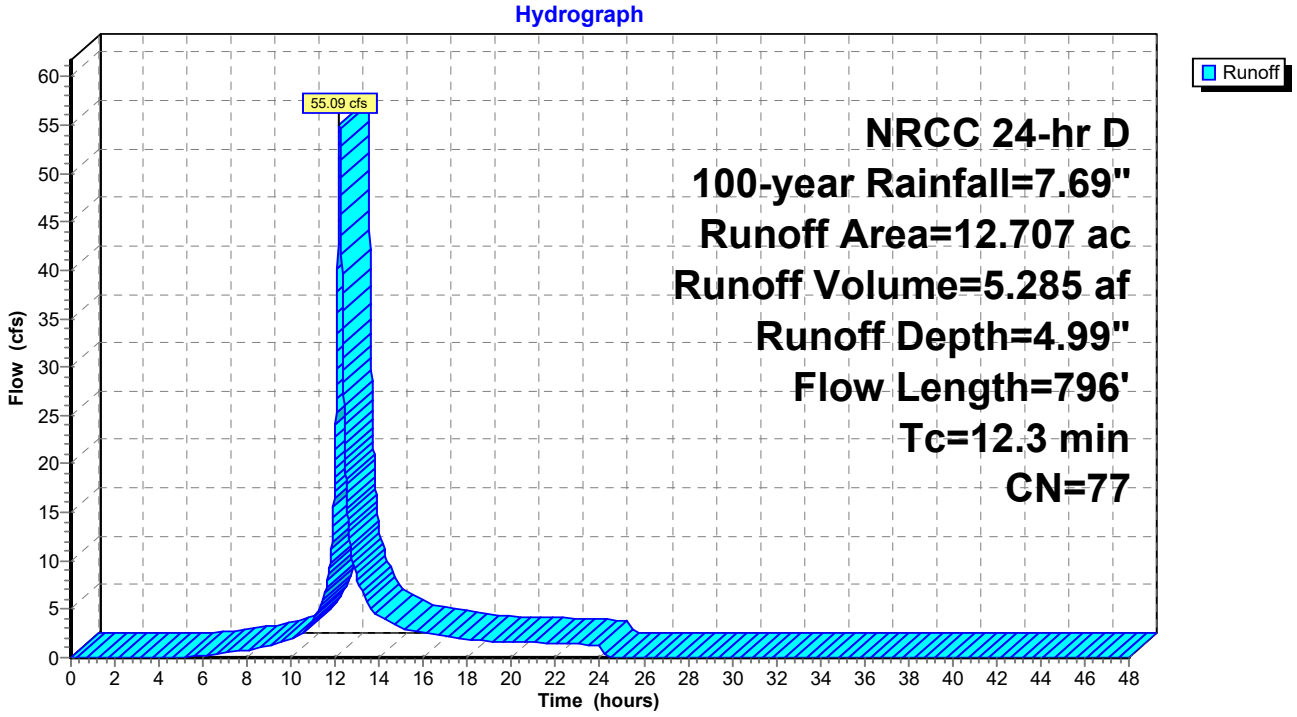
Runoff = 55.09 cfs @ 12.20 hrs, Volume= 5.285 af, Depth= 4.99"
Routed to Link EAP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-year Rainfall=7.69"

Area (ac)	CN	Description
2.898	79	1 acre lots, 20% imp, HSG C
5.274	73	Woods, Fair, HSG C
4.535	79	Woods, Fair, HSG D
12.707	77	Weighted Average
12.127		95.44% Pervious Area
0.580		4.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1100	0.33		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.1	128	0.0780	1.95		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.2	568	0.0933	1.53		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
12.3	796	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

[47] Hint: Peak is 307% of capacity of segment #4

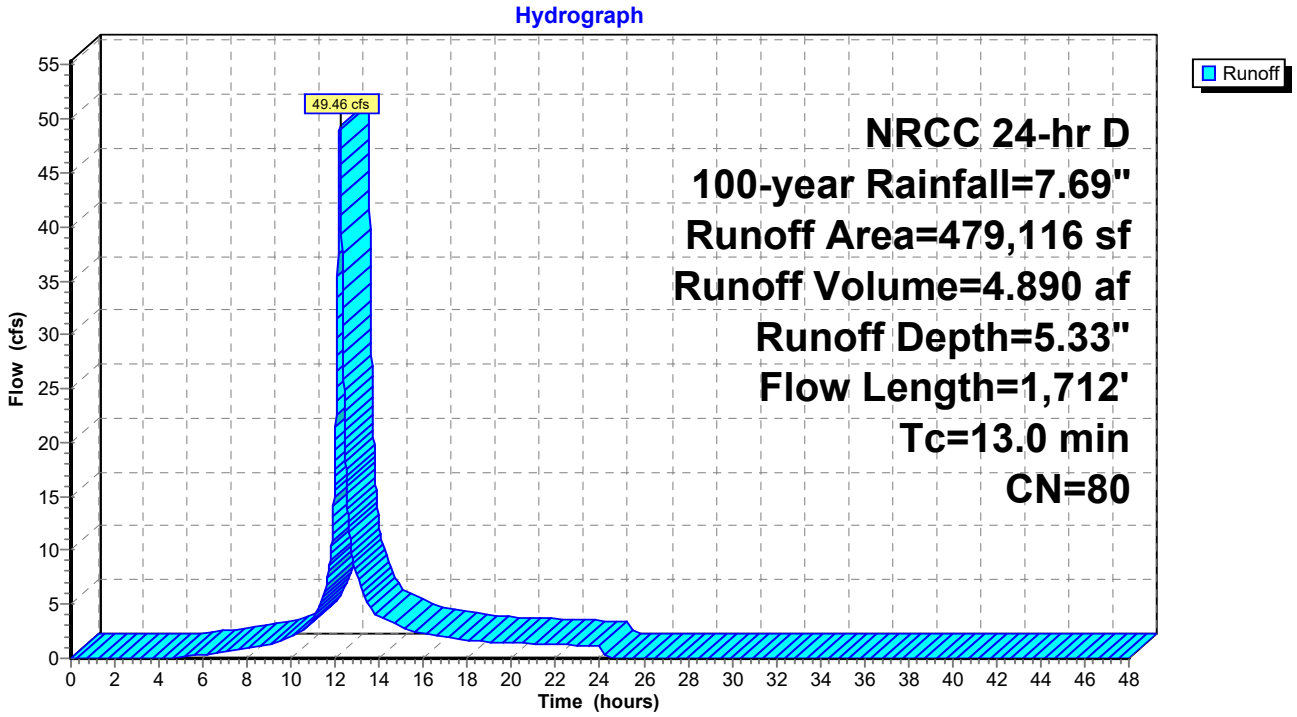
Runoff = 49.46 cfs @ 12.21 hrs, Volume= 4.890 af, Depth= 5.33"
Routed to Link EAP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-year Rainfall=7.69"

Area (sf)	CN	Description
247,300	79	1 acre lots, 20% imp, HSG C
129,102	73	Woods, Fair, HSG C
46,629	79	Woods, Fair, HSG D
50,194	98	Paved roads w/curbs & sewers, HSG C
5,891	98	Paved roads w/curbs & sewers, HSG D
479,116	80	Weighted Average
373,571		77.97% Pervious Area
105,545		22.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.9	585	0.1094	1.65		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	167	0.0240	3.14		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.8	608	0.0444	13.11	16.09	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	252	0.1071	26.20	487.30	**Channel Flow, E-F** Area= 18.6 sf Perim= 11.9' r= 1.56' n= 0.025 Earth, clean & winding
13.0	1,712	Total			

Subcatchment EDA-2: EDA-2

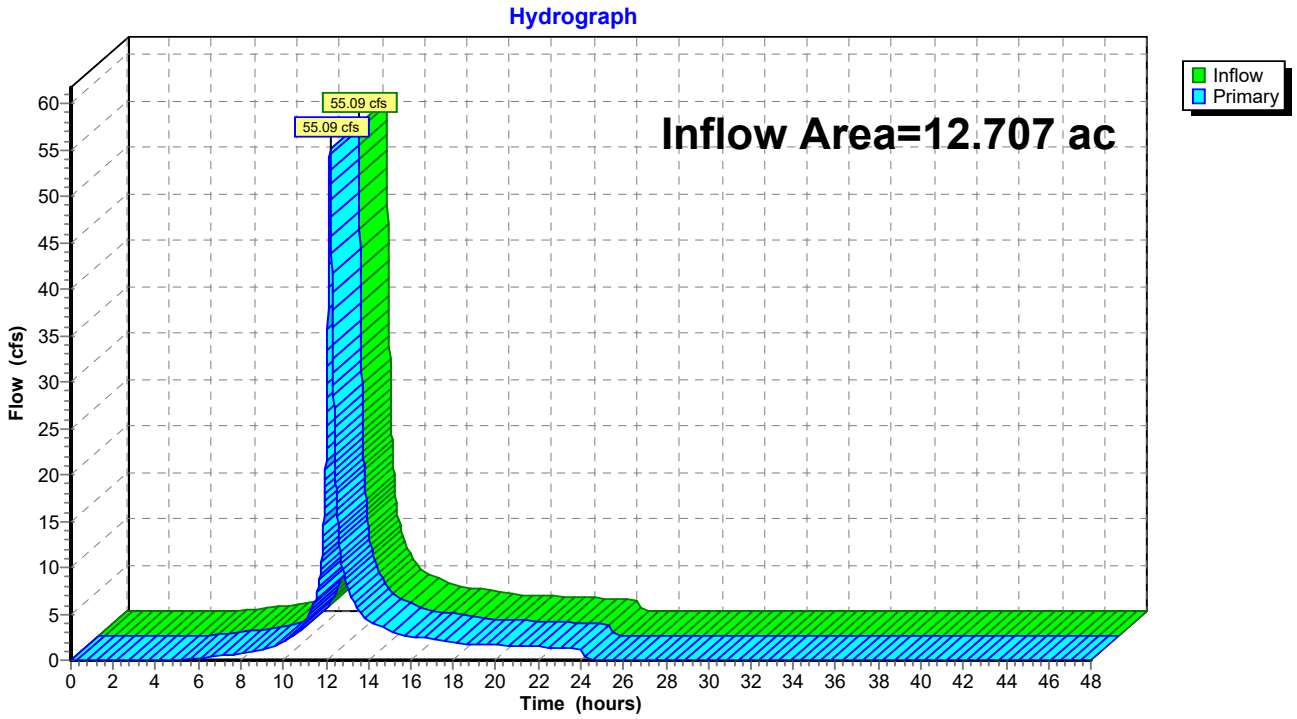


Summary for Link EAP-1: AP-1

Inflow Area = 12.707 ac, 4.56% Impervious, Inflow Depth = 4.99" for 100-year event
Inflow = 55.09 cfs @ 12.20 hrs, Volume= 5.285 af
Primary = 55.09 cfs @ 12.20 hrs, Volume= 5.285 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link EAP-1: AP-1

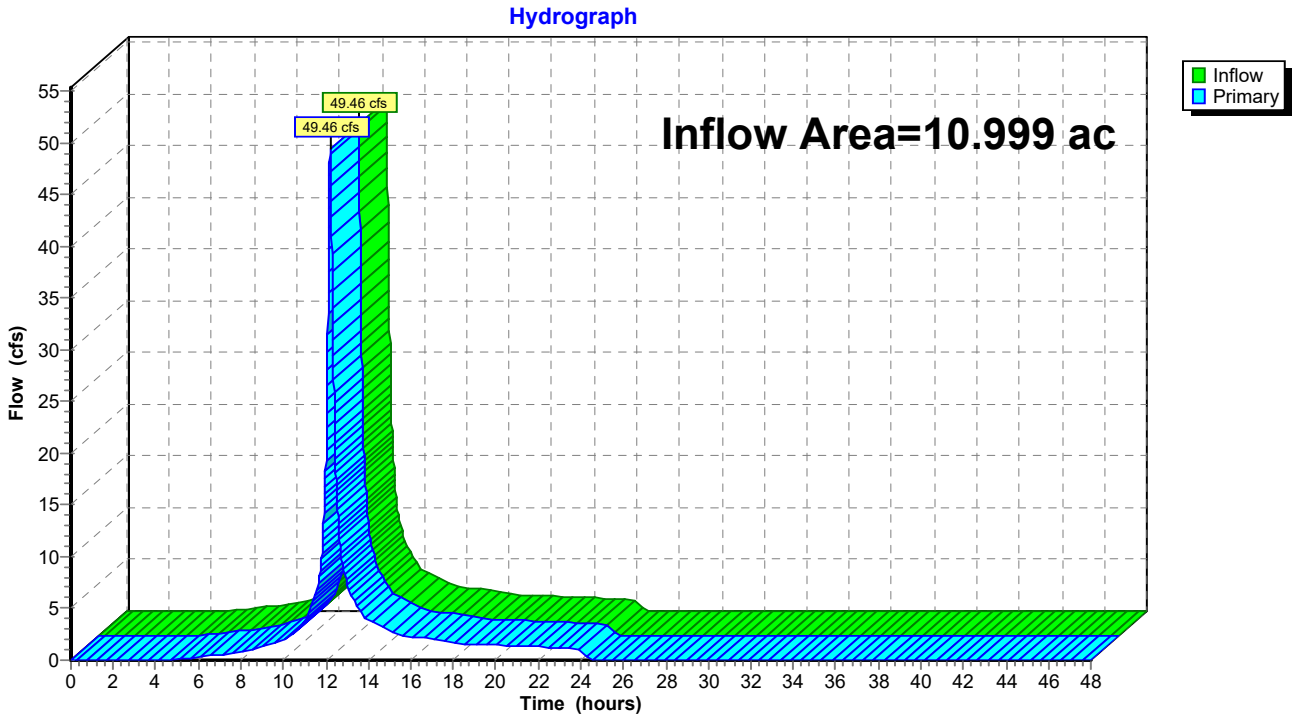


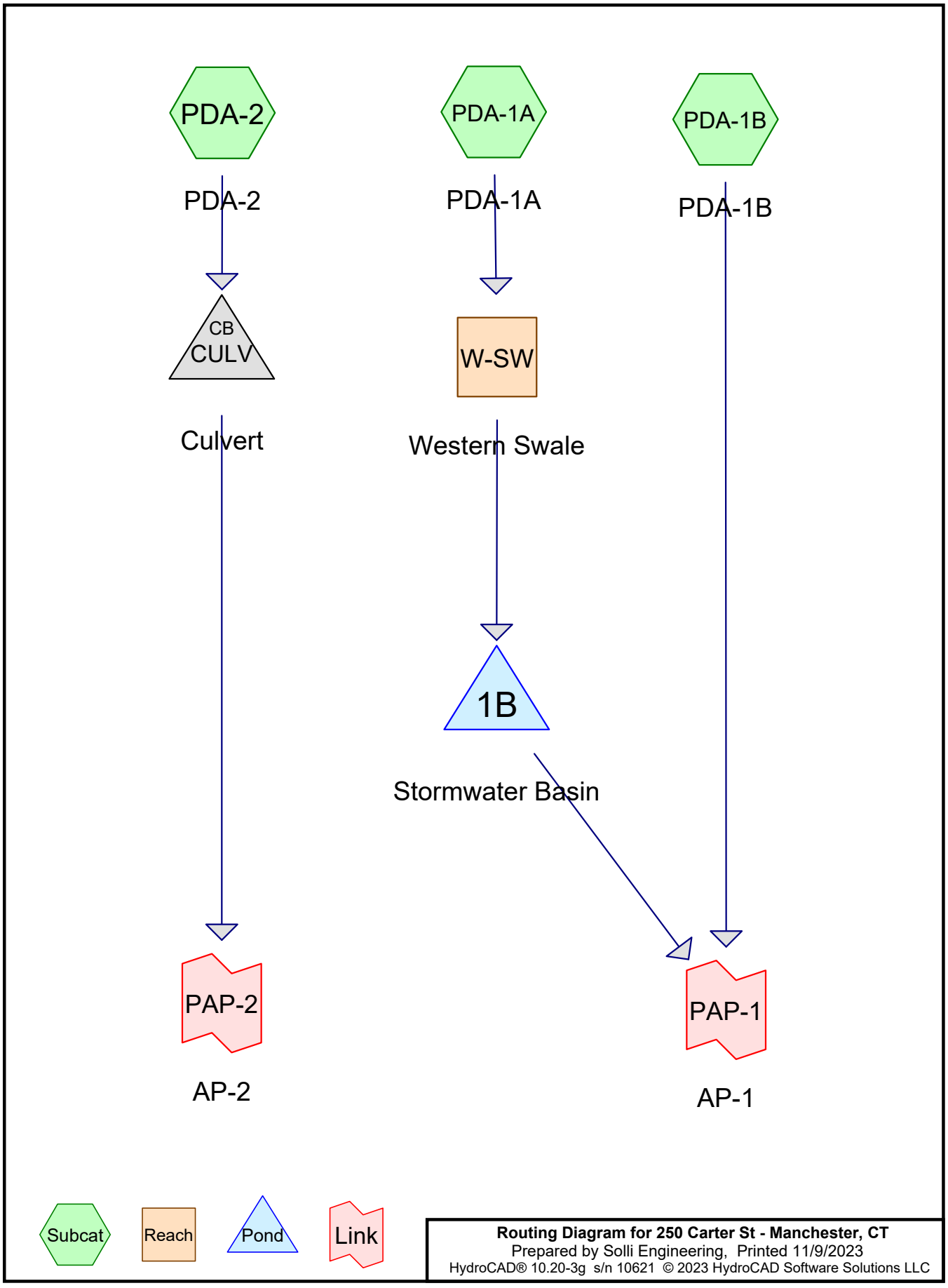
Summary for Link EAP-2: AP-2

Inflow Area = 10.999 ac, 22.03% Impervious, Inflow Depth = 5.33" for 100-year event
Inflow = 49.46 cfs @ 12.21 hrs, Volume= 4.890 af
Primary = 49.46 cfs @ 12.21 hrs, Volume= 4.890 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link EAP-2: AP-2





Routing Diagram for 250 Carter St - Manchester, CT
Prepared by Solli Engineering, Printed 11/9/2023
HydroCAD® 10.20-3g s/n 10621 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	NRCC 24-hr	D	Default	24.00	1	3.16	2
2	25-year	NRCC 24-hr	D	Default	24.00	1	6.00	2
3	50-year	NRCC 24-hr	D	Default	24.00	1	6.81	2
4	100-year	NRCC 24-hr	D	Default	24.00	1	7.69	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.573	79	1 acre lots, 20% imp, HSG C (PDA-1A, PDA-1B, PDA-2)
0.247	70	Brush, Fair, HSG C (PDA-1B)
0.413	77	Brush, Fair, HSG D (PDA-1B)
0.127	96	Gravel surface, HSG D (PDA-1A)
0.414	71	Meadow, non-grazed, HSG C (PDA-1A)
5.970	78	Meadow, non-grazed, HSG D (PDA-1A, PDA-1B)
0.041	98	Paved parking, HSG D (PDA-1A)
1.152	98	Paved roads w/curbs & sewers, HSG C (PDA-2)
0.135	98	Paved roads w/curbs & sewers, HSG D (PDA-2)
4.443	73	Woods, Fair, HSG C (PDA-1A, PDA-1B, PDA-2)
2.190	79	Woods, Fair, HSG D (PDA-1A, PDA-1B, PDA-2)
23.705	**79**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
14.829	HSG C	PDA-1A, PDA-1B, PDA-2
8.876	HSG D	PDA-1A, PDA-1B, PDA-2
0.000	Other	
23.705		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	8.573	0.000	0.000	8.573	1 acre lots, 20% imp	PD A-1 A, PD A-1 B, PD A-2
0.000	0.000	0.247	0.413	0.000	0.660	Brush, Fair	PD A-1 B
0.000	0.000	0.000	0.127	0.000	0.127	Gravel surface	PD A-1 A
0.000	0.000	0.414	5.970	0.000	6.384	Meadow, non-grazed	PD A-1 A, PD A-1 B
0.000	0.000	0.000	0.041	0.000	0.041	Paved parking	PD A-1 A
0.000	0.000	1.152	0.135	0.000	1.287	Paved roads w/curbs & sewers	PD A-2
0.000	0.000	4.443	2.190	0.000	6.633	Woods, Fair	PD A-1 A, PD A-1 B, PD A-2
0.000	**0.000**	**14.829**	**8.876**	**0.000**	**23.705**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	PDA-2	0.00	0.00	608.0	0.0444	0.011	0.0	15.0	0.0	
2	1B	606.00	605.00	65.0	0.0154	0.013	0.0	18.0	0.0	
3	CULV	637.00	633.00	40.0	0.1000	0.013	0.0	42.0	12.0	

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1A: PDA-1A Runoff Area=7.547 ac 5.42% Impervious Runoff Depth=1.24"
Flow Length=913' Tc=11.4 min CN=78 Runoff=8.35 cfs 0.782 af

Subcatchment PDA-1B: PDA-1B Runoff Area=5.160 ac 4.09% Impervious Runoff Depth=1.18"
Flow Length=780' Tc=11.5 min CN=77 Runoff=5.38 cfs 0.509 af

Subcatchment PDA-2: PDA-2 Runoff Area=10.998 ac 22.03% Impervious Runoff Depth=1.37"
Flow Length=1,712' Tc=13.0 min CN=80 Runoff=12.85 cfs 1.257 af

Reach W-SW: Western Swale Avg. Flow Depth=0.38' Max Vel=3.99 fps Inflow=8.35 cfs 0.782 af
n=0.030 L=180.0' S=0.0333 '/' Capacity=241.15 cfs Outflow=8.31 cfs 0.782 af

Pond 1B: Stormwater Basin Peak Elev=607.35' Storage=9,329 cf Inflow=8.31 cfs 0.782 af
Discarded=0.19 cfs 0.284 af Primary=2.80 cfs 0.498 af Outflow=2.99 cfs 0.782 af

Pond CULV: Culvert Peak Elev=639.12' Inflow=12.85 cfs 1.257 af
42.0" Round Culvert w/ 12.0" inside fill n=0.013 L=40.0' S=0.1000 '/' Outflow=12.85 cfs 1.257 af

Link PAP-1: AP-1 Inflow=6.30 cfs 1.007 af
Primary=6.30 cfs 1.007 af

Link PAP-2: AP-2 Inflow=12.85 cfs 1.257 af
Primary=12.85 cfs 1.257 af

Total Runoff Area = 23.705 ac Runoff Volume = 2.548 af Average Runoff Depth = 1.29"
87.16% Pervious = 20.662 ac 12.84% Impervious = 3.043 ac

Summary for Subcatchment PDA-1A: PDA-1A

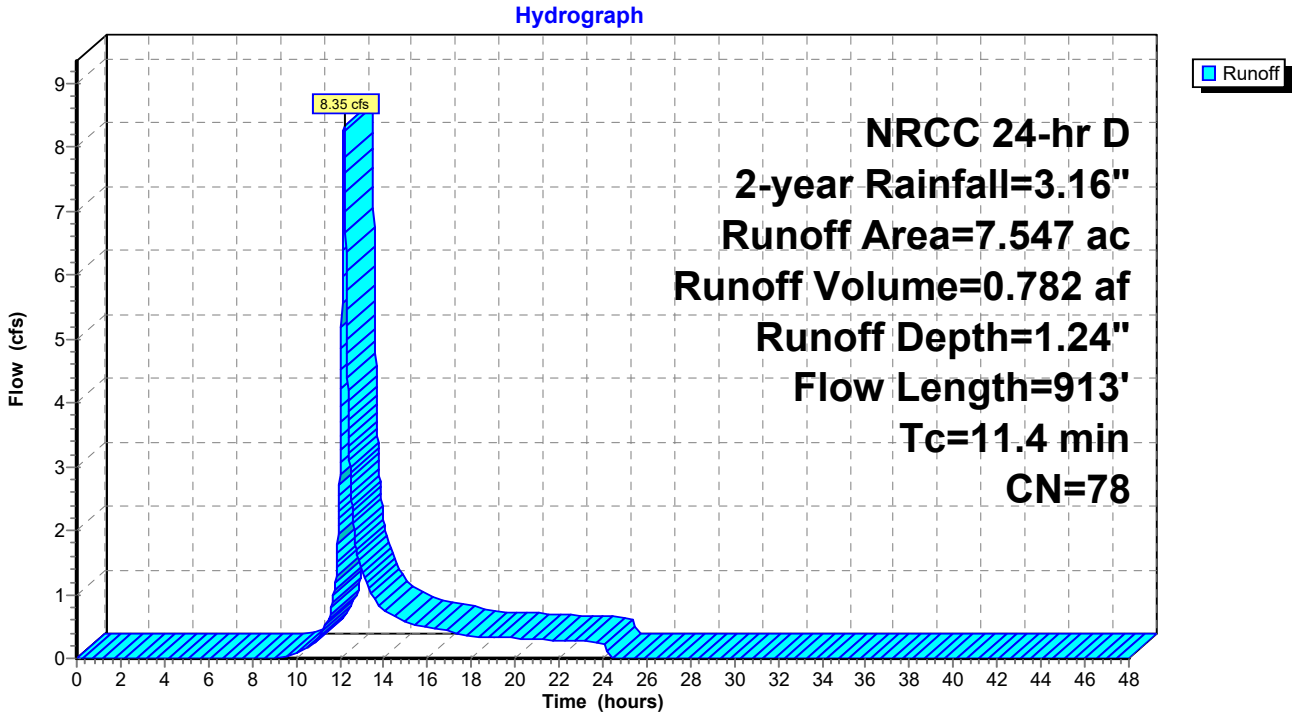
Runoff = 8.35 cfs @ 12.19 hrs, Volume= 0.782 af, Depth= 1.24"
Routed to Reach W-SW : Western Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-year Rainfall=3.16"

Area (ac)	CN	Description
1.842	79	1 acre lots, 20% imp, HSG C
1.043	73	Woods, Fair, HSG C
1.060	79	Woods, Fair, HSG D
0.414	71	Meadow, non-grazed, HSG C
3.020	78	Meadow, non-grazed, HSG D
0.127	96	Gravel surface, HSG D
0.041	98	Paved parking, HSG D
7.547	78	Weighted Average
7.138		94.58% Pervious Area
0.409		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1100	0.33		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.1	128	0.0780	1.95		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.6	55	0.1091	1.65		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
3.6	450	0.0899	2.10		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
1.1	180	0.0333	2.74		**Shallow Concentrated Flow, E-F** Grassed Waterway Kv= 15.0 fps
11.4	913	Total			

Subcatchment PDA-1A: PDA-1A



Summary for Subcatchment PDA-1B: PDA-1B

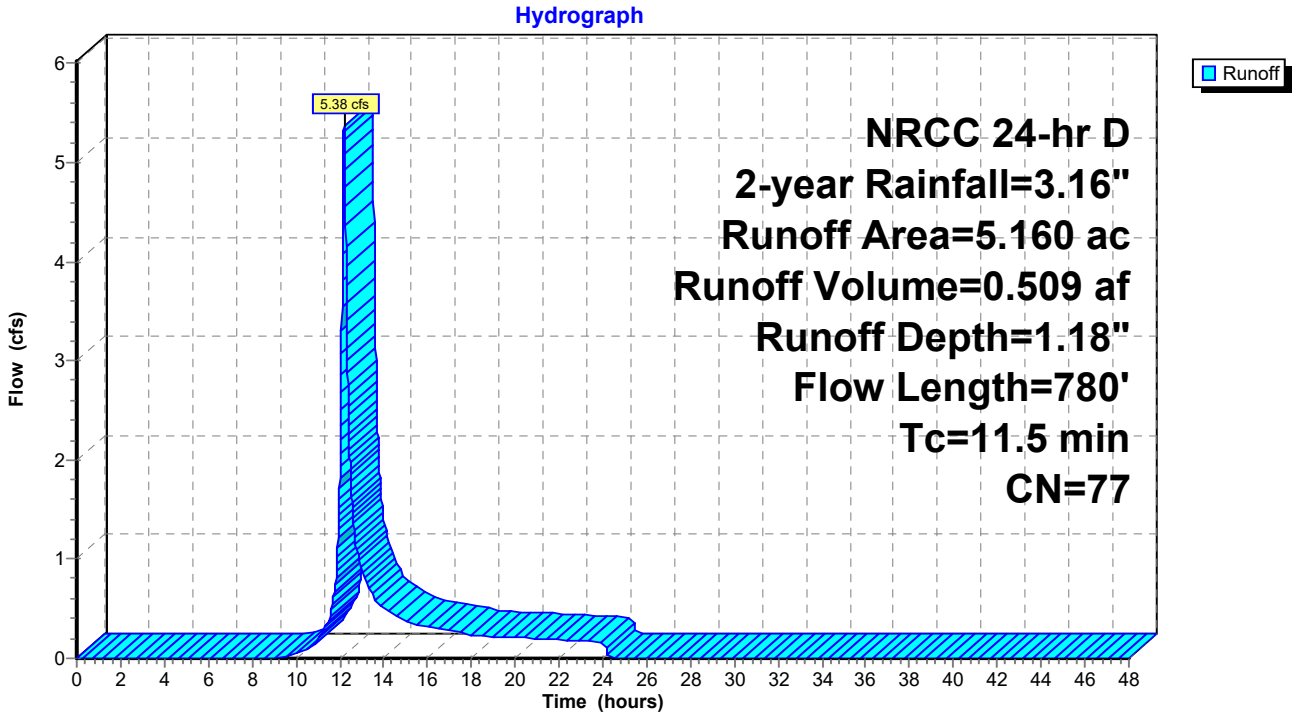
Runoff = 5.38 cfs @ 12.20 hrs, Volume= 0.509 af, Depth= 1.18"
Routed to Link PAP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-year Rainfall=3.16"

Area (ac)	CN	Description
1.054	79	1 acre lots, 20% imp, HSG C
0.436	73	Woods, Fair, HSG C
0.060	79	Woods, Fair, HSG D
0.247	70	Brush, Fair, HSG C
0.413	77	Brush, Fair, HSG D
2.950	78	Meadow, non-grazed, HSG D
5.160	77	Weighted Average
4.949		95.91% Pervious Area
0.211		4.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1300	0.36		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
0.7	102	0.1078	2.30		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.1	578	0.0986	1.57		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
11.5	780	Total			

Subcatchment PDA-1B: PDA-1B



Summary for Subcatchment PDA-2: PDA-2

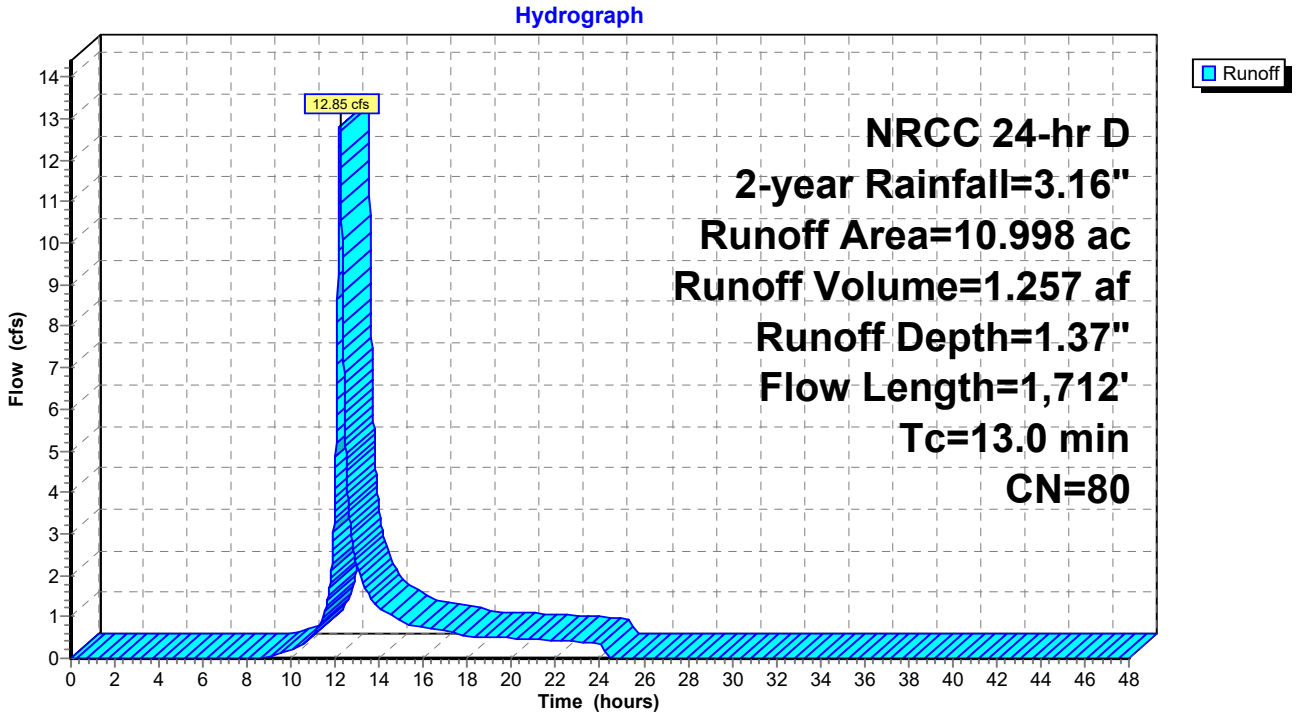
Runoff = 12.85 cfs @ 12.21 hrs, Volume= 1.257 af, Depth= 1.37"
Routed to Pond CULV : Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-year Rainfall=3.16"

Area (ac)	CN	Description
5.677	79	1 acre lots, 20% imp, HSG C
2.964	73	Woods, Fair, HSG C
1.070	79	Woods, Fair, HSG D
1.152	98	Paved roads w/curbs & sewers, HSG C
0.135	98	Paved roads w/curbs & sewers, HSG D
10.998	80	Weighted Average
8.576		77.97% Pervious Area
2.422		22.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.9	585	0.1094	1.65		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	167	0.0240	3.14		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.8	608	0.0444	13.11	16.09	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	252	0.1071	26.20	487.30	**Channel Flow, E-F** Area= 18.6 sf Perim= 11.9' r= 1.56' n= 0.025 Earth, clean & winding
13.0	1,712	Total			

Subcatchment PDA-2: PDA-2



Summary for Reach W-SW: Western Swale

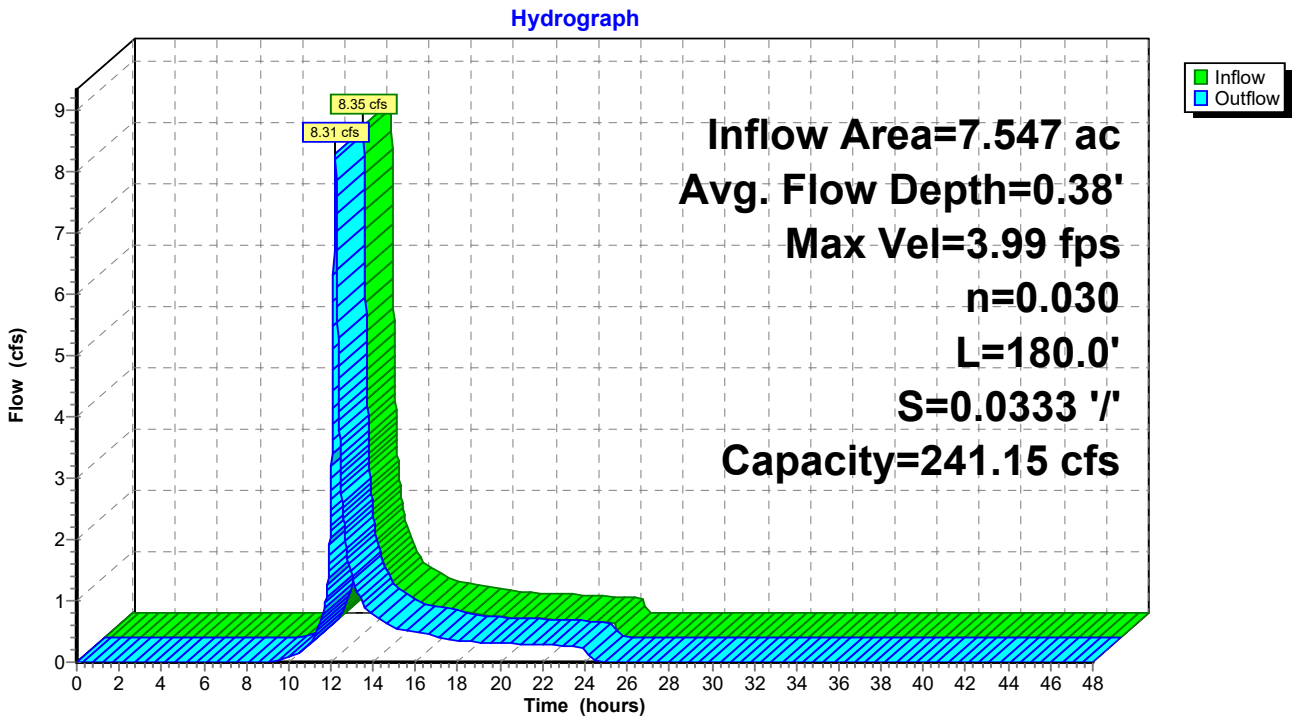
Inflow Area = 7.547 ac, 5.42% Impervious, Inflow Depth = 1.24" for 2-year event
Inflow = 8.35 cfs @ 12.19 hrs, Volume= 0.782 af
Outflow = 8.31 cfs @ 12.22 hrs, Volume= 0.782 af, Atten= 1%, Lag= 1.2 min
Routed to Pond 1B : Stormwater Basin

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.99 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 2.1 min

Peak Storage= 375 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 7.03'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 241.15 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 20.00'
Length= 180.0' Slope= 0.0333 '/'
Inlet Invert= 616.00', Outlet Invert= 610.00'

‡



Summary for Pond 1B: Stormwater Basin

Inflow Area = 7.547 ac, 5.42% Impervious, Inflow Depth = 1.24" for 2-year event
Inflow = 8.31 cfs @ 12.22 hrs, Volume= 0.782 af
Outflow = 2.99 cfs @ 12.49 hrs, Volume= 0.782 af, Atten= 64%, Lag= 16.2 min
Discarded = 0.19 cfs @ 12.49 hrs, Volume= 0.284 af
Primary = 2.80 cfs @ 12.49 hrs, Volume= 0.498 af
Routed to Link PAP-1 : AP-1

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 607.35' @ 12.49 hrs Surf.Area= 7,760 sf Storage= 9,329 cf

Plug-Flow detention time= 138.8 min calculated for 0.782 af (100% of inflow)
Center-of-Mass det. time= 138.7 min (1,025.6 - 886.9)

Volume	Invert	Avail.Storage	Storage Description
#1	606.00'	46,881 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

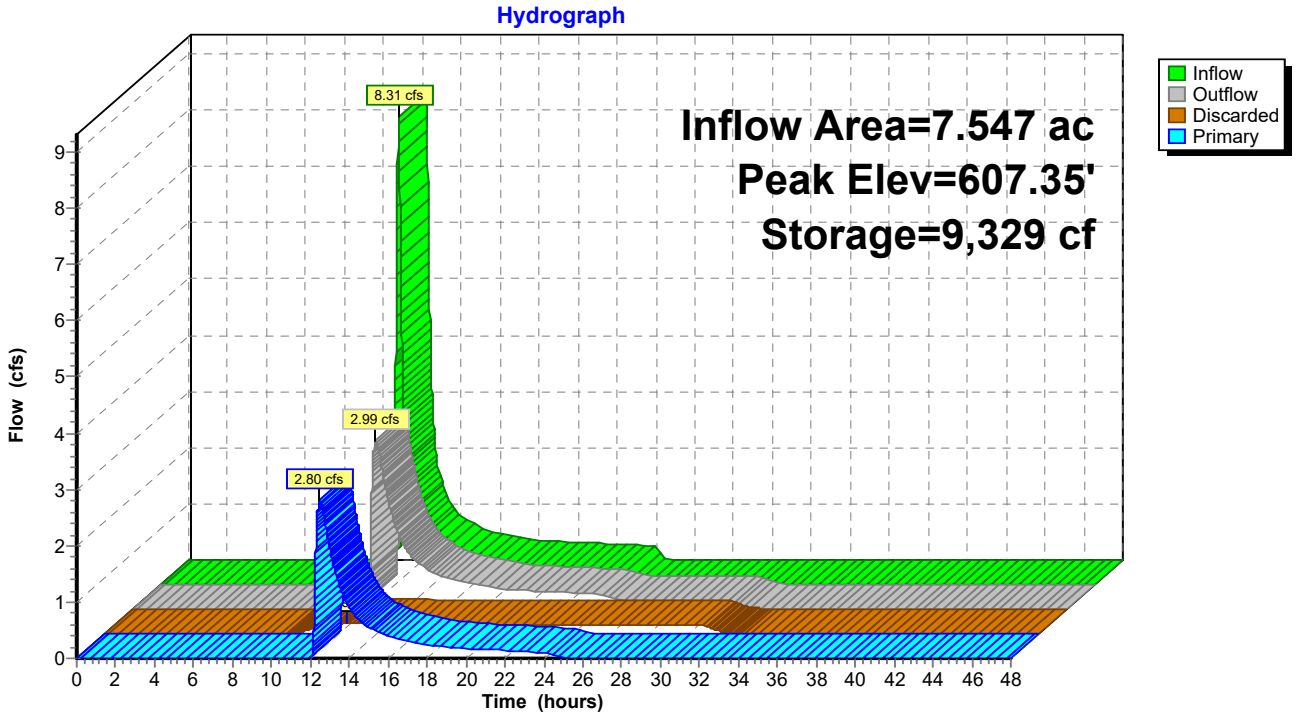
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
606.00	6,070	399.3	0	0	6,070
607.00	7,308	426.5	6,679	6,679	7,905
608.00	8,627	453.0	7,958	14,638	9,811
609.00	10,015	472.0	9,312	23,950	11,284
610.00	11,459	490.8	10,729	34,679	12,802
611.00	12,960	509.6	12,202	46,881	14,380

Device	Routing	Invert	Outlet Devices
#1	Primary	606.00'	**18.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 606.00' / 605.00' S= 0.0154 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	606.50'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	609.50'	**36.0" x 18.0" Horiz. Oriface/Grate Outlet** C= 0.600 Limited to weir flow at low heads
#4	Primary	609.50'	**16.0' long + 3.0 '/' SideZ x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63
#5	Discarded	606.00'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 590.00'

Discarded OutFlow Max=0.19 cfs @ 12.49 hrs HW=607.35' (Free Discharge)
└**5=Exfiltration** (Controls 0.19 cfs)

Primary OutFlow Max=2.80 cfs @ 12.49 hrs HW=607.35' (Free Discharge)
└**1=Culvert** (Passes 2.80 cfs of 6.64 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 2.80 cfs @ 3.14 fps)
  └**3=Oriface/Grate Outlet** (Controls 0.00 cfs)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1B: Stormwater Basin



Summary for Pond CULV: Culvert

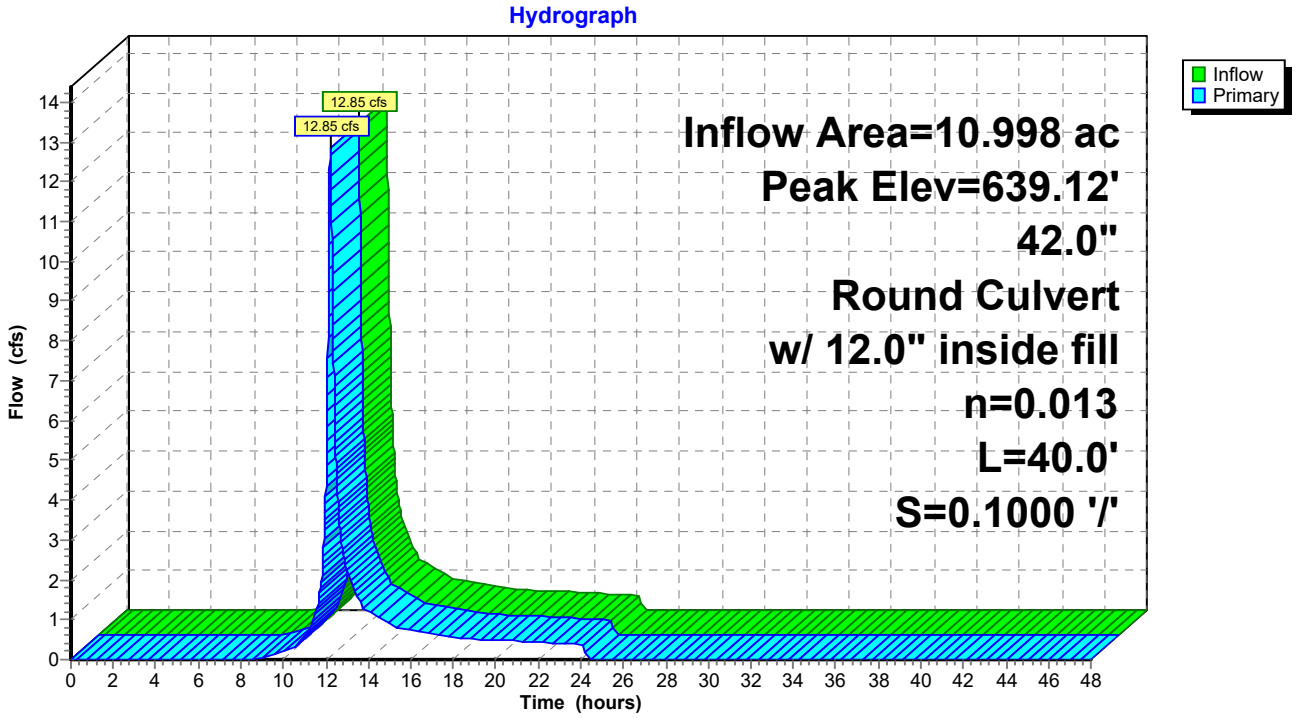
Inflow Area = 10.998 ac, 22.03% Impervious, Inflow Depth = 1.37" for 2-year event
Inflow = 12.85 cfs @ 12.21 hrs, Volume= 1.257 af
Outflow = 12.85 cfs @ 12.21 hrs, Volume= 1.257 af, Atten= 0%, Lag= 0.0 min
Primary = 12.85 cfs @ 12.21 hrs, Volume= 1.257 af
Routed to Link PAP-2 : AP-2

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 639.12' @ 12.21 hrs
Flood Elev= 643.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	638.00'	**42.0" Round Culvert w/ 12.0" inside fill** L= 40.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 637.00' / 633.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.35 sf

Primary OutFlow Max=12.84 cfs @ 12.21 hrs HW=639.12' TW=634.00' (Fixed TW Elev= 634.00')
1=Culvert (Inlet Controls 12.84 cfs @ 3.37 fps)

Pond CULV: Culvert

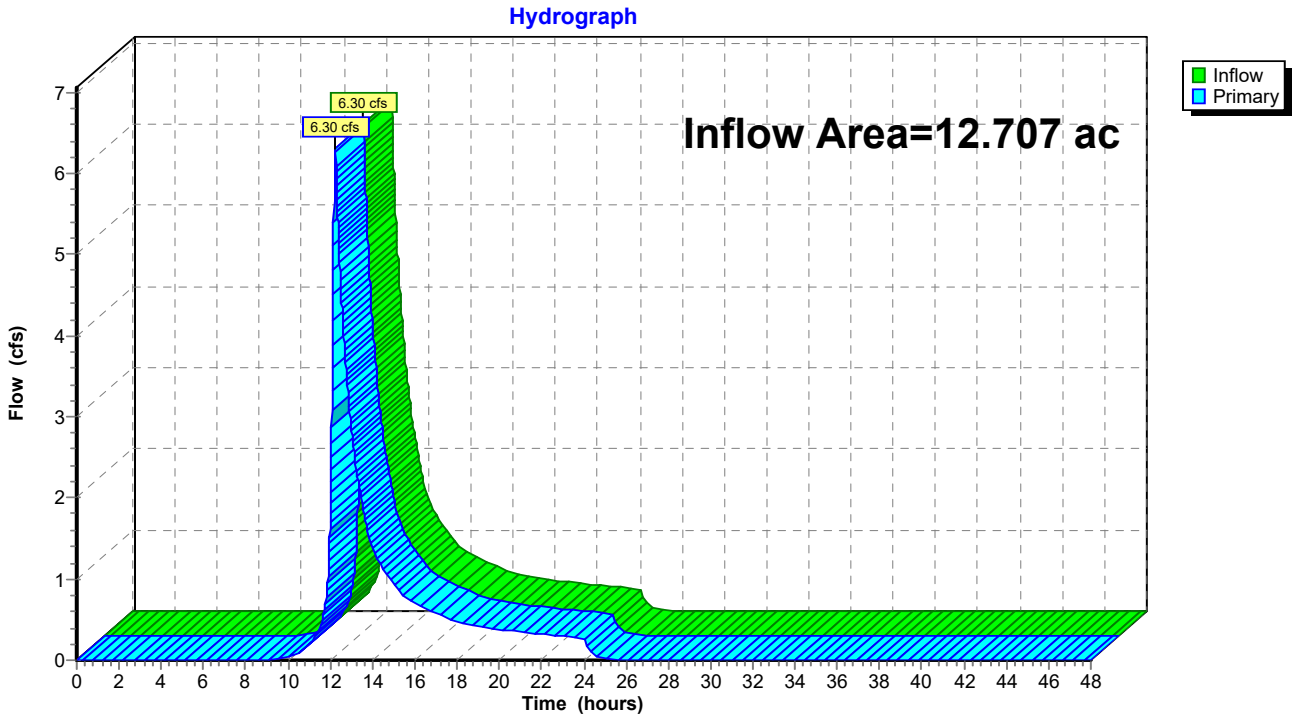


Summary for Link PAP-1: AP-1

Inflow Area = 12.707 ac, 4.88% Impervious, Inflow Depth = 0.95" for 2-year event
Inflow = 6.30 cfs @ 12.23 hrs, Volume= 1.007 af
Primary = 6.30 cfs @ 12.23 hrs, Volume= 1.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link PAP-1: AP-1

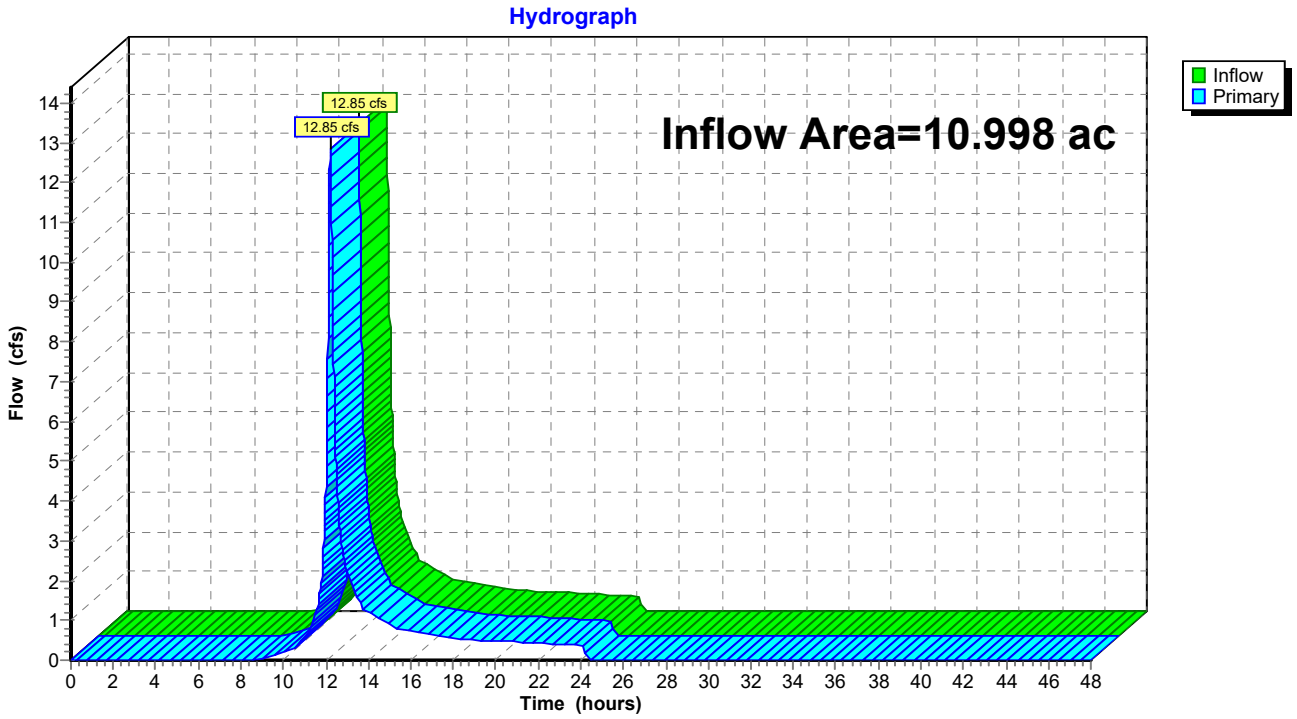


Summary for Link PAP-2: AP-2

Inflow Area = 10.998 ac, 22.03% Impervious, Inflow Depth = 1.37" for 2-year event
Inflow = 12.85 cfs @ 12.21 hrs, Volume= 1.257 af
Primary = 12.85 cfs @ 12.21 hrs, Volume= 1.257 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link PAP-2: AP-2



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1A: PDA-1A Runoff Area=7.547 ac 5.42% Impervious Runoff Depth=3.58"
Flow Length=913' Tc=11.4 min CN=78 Runoff=24.30 cfs 2.251 af

Subcatchment PDA-1B: PDA-1B Runoff Area=5.160 ac 4.09% Impervious Runoff Depth=3.48"
Flow Length=780' Tc=11.5 min CN=77 Runoff=16.10 cfs 1.496 af

Subcatchment PDA-2: PDA-2 Runoff Area=10.998 ac 22.03% Impervious Runoff Depth=3.78"
Flow Length=1,712' Tc=13.0 min CN=80 Runoff=35.46 cfs 3.466 af

Reach W-SW: Western Swale Avg. Flow Depth=0.67' Max Vel=5.45 fps Inflow=24.30 cfs 2.251 af
n=0.030 L=180.0' S=0.0333 '/' Capacity=241.15 cfs Outflow=24.25 cfs 2.251 af

Pond 1B: Stormwater Basin Peak Elev=609.17' Storage=25,642 cf Inflow=24.25 cfs 2.251 af
Discarded=0.27 cfs 0.354 af Primary=8.44 cfs 1.897 af Outflow=8.72 cfs 2.251 af

Pond CULV: Culvert Peak Elev=640.25' Inflow=35.46 cfs 3.466 af
42.0" Round Culvert w/ 12.0" inside fill n=0.013 L=40.0' S=0.1000 '/' Outflow=35.46 cfs 3.466 af

Link PAP-1: AP-1 Inflow=22.80 cfs 3.393 af
Primary=22.80 cfs 3.393 af

Link PAP-2: AP-2 Inflow=35.46 cfs 3.466 af
Primary=35.46 cfs 3.466 af

Total Runoff Area = 23.705 ac Runoff Volume = 7.212 af Average Runoff Depth = 3.65"
87.16% Pervious = 20.662 ac 12.84% Impervious = 3.043 ac

Summary for Subcatchment PDA-1A: PDA-1A

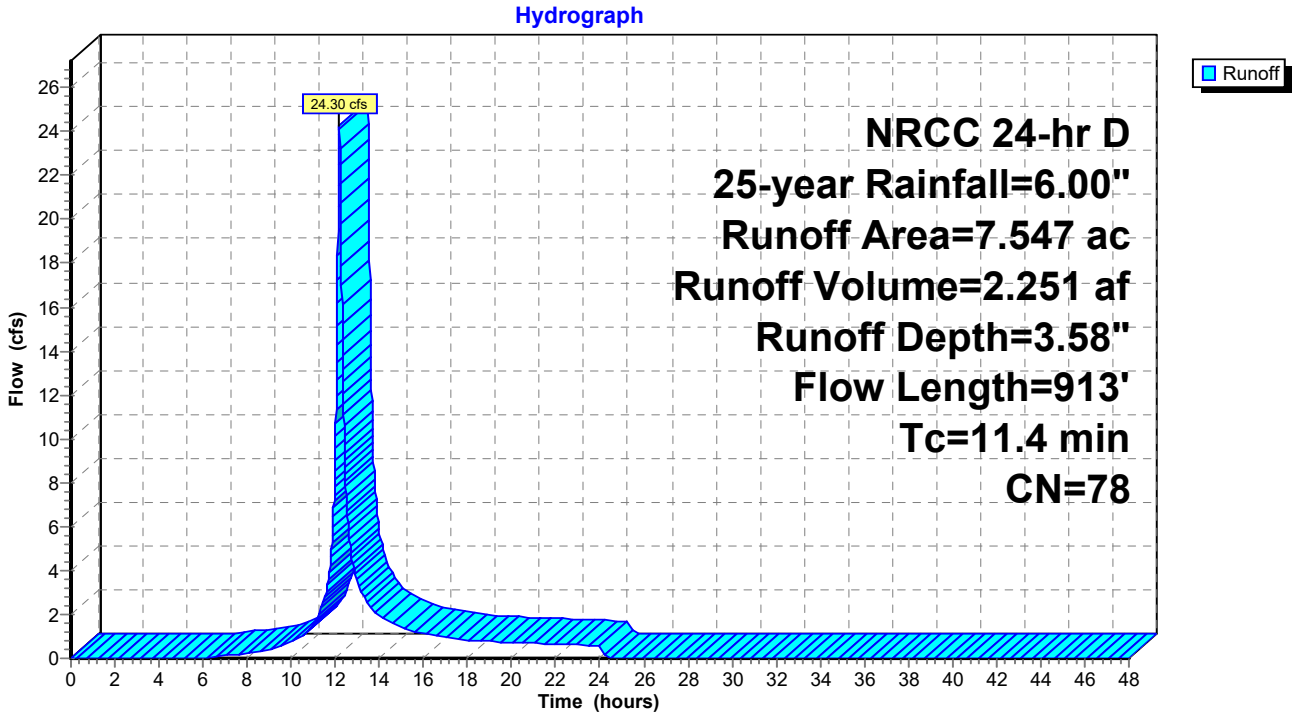
Runoff = 24.30 cfs @ 12.19 hrs, Volume= 2.251 af, Depth= 3.58"
Routed to Reach W-SW : Western Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-year Rainfall=6.00"

Area (ac)	CN	Description
1.842	79	1 acre lots, 20% imp, HSG C
1.043	73	Woods, Fair, HSG C
1.060	79	Woods, Fair, HSG D
0.414	71	Meadow, non-grazed, HSG C
3.020	78	Meadow, non-grazed, HSG D
0.127	96	Gravel surface, HSG D
0.041	98	Paved parking, HSG D
7.547	78	Weighted Average
7.138		94.58% Pervious Area
0.409		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1100	0.33		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.1	128	0.0780	1.95		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.6	55	0.1091	1.65		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
3.6	450	0.0899	2.10		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
1.1	180	0.0333	2.74		**Shallow Concentrated Flow, E-F** Grassed Waterway Kv= 15.0 fps
11.4	913	Total			

Subcatchment PDA-1A: PDA-1A



Summary for Subcatchment PDA-1B: PDA-1B

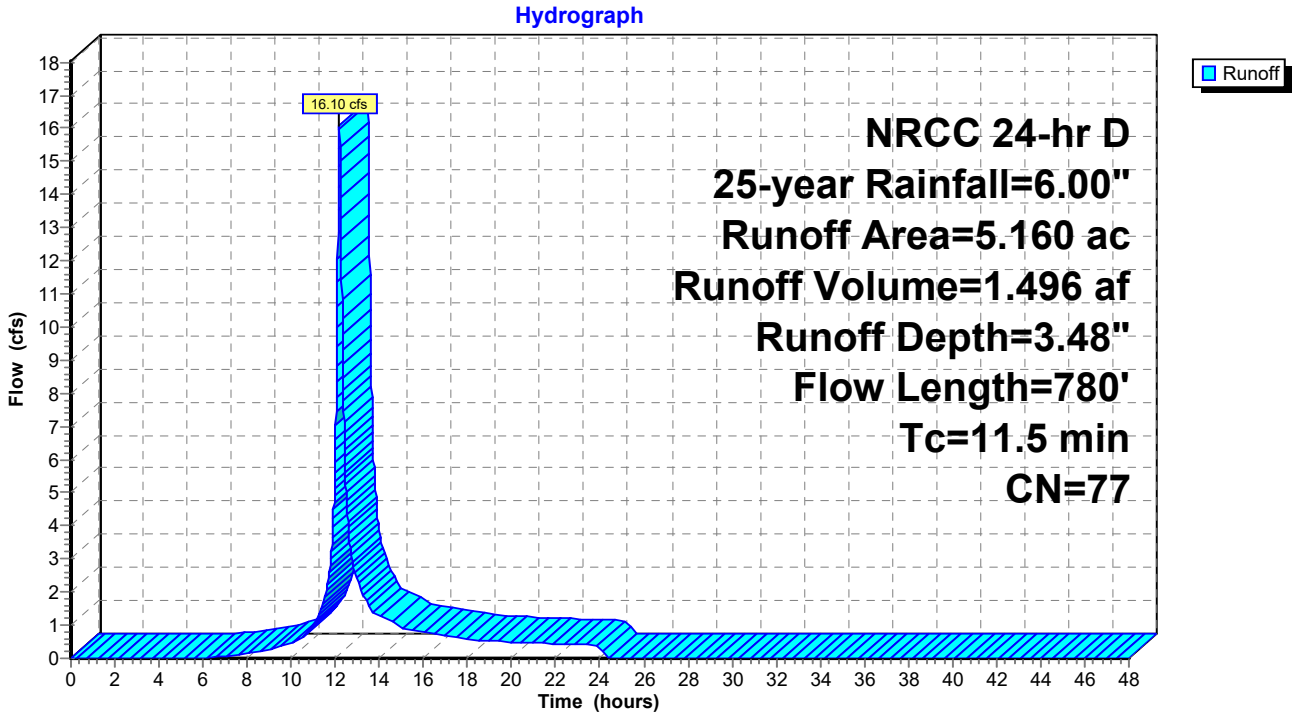
Runoff = 16.10 cfs @ 12.19 hrs, Volume= 1.496 af, Depth= 3.48"
Routed to Link PAP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-year Rainfall=6.00"

Area (ac)	CN	Description
1.054	79	1 acre lots, 20% imp, HSG C
0.436	73	Woods, Fair, HSG C
0.060	79	Woods, Fair, HSG D
0.247	70	Brush, Fair, HSG C
0.413	77	Brush, Fair, HSG D
2.950	78	Meadow, non-grazed, HSG D
5.160	77	Weighted Average
4.949		95.91% Pervious Area
0.211		4.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1300	0.36		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
0.7	102	0.1078	2.30		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.1	578	0.0986	1.57		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
11.5	780	Total			

Subcatchment PDA-1B: PDA-1B



Summary for Subcatchment PDA-2: PDA-2

[47] Hint: Peak is 220% of capacity of segment #4

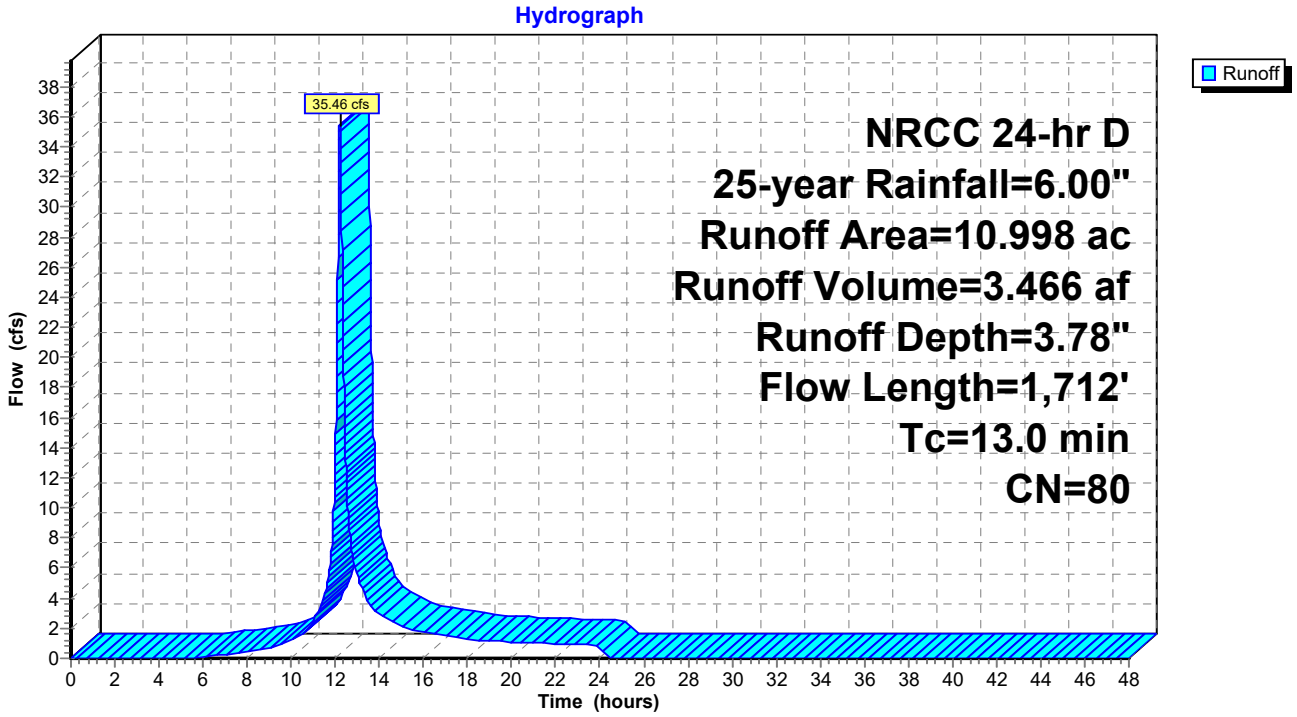
Runoff = 35.46 cfs @ 12.21 hrs, Volume= 3.466 af, Depth= 3.78"
Routed to Pond CULV : Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-year Rainfall=6.00"

Area (ac)	CN	Description
5.677	79	1 acre lots, 20% imp, HSG C
2.964	73	Woods, Fair, HSG C
1.070	79	Woods, Fair, HSG D
1.152	98	Paved roads w/curbs & sewers, HSG C
0.135	98	Paved roads w/curbs & sewers, HSG D
10.998	80	Weighted Average
8.576		77.97% Pervious Area
2.422		22.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.9	585	0.1094	1.65		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	167	0.0240	3.14		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.8	608	0.0444	13.11	16.09	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	252	0.1071	26.20	487.30	**Channel Flow, E-F** Area= 18.6 sf Perim= 11.9' r= 1.56' n= 0.025 Earth, clean & winding
13.0	1,712	Total			

Subcatchment PDA-2: PDA-2



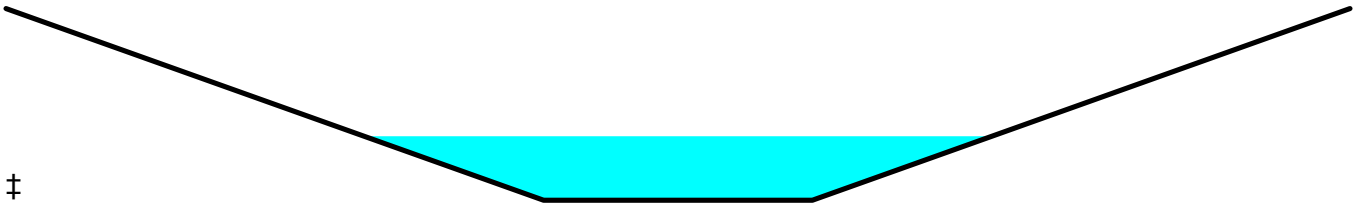
Summary for Reach W-SW: Western Swale

Inflow Area = 7.547 ac, 5.42% Impervious, Inflow Depth = 3.58" for 25-year event
Inflow = 24.30 cfs @ 12.19 hrs, Volume= 2.251 af
Outflow = 24.25 cfs @ 12.21 hrs, Volume= 2.251 af, Atten= 0%, Lag= 0.9 min
Routed to Pond 1B : Stormwater Basin

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.45 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.88 fps, Avg. Travel Time= 1.6 min

Peak Storage= 801 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.67' , Surface Width= 9.34'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 241.15 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 20.00'
Length= 180.0' Slope= 0.0333 '/'
Inlet Invert= 616.00', Outlet Invert= 610.00'



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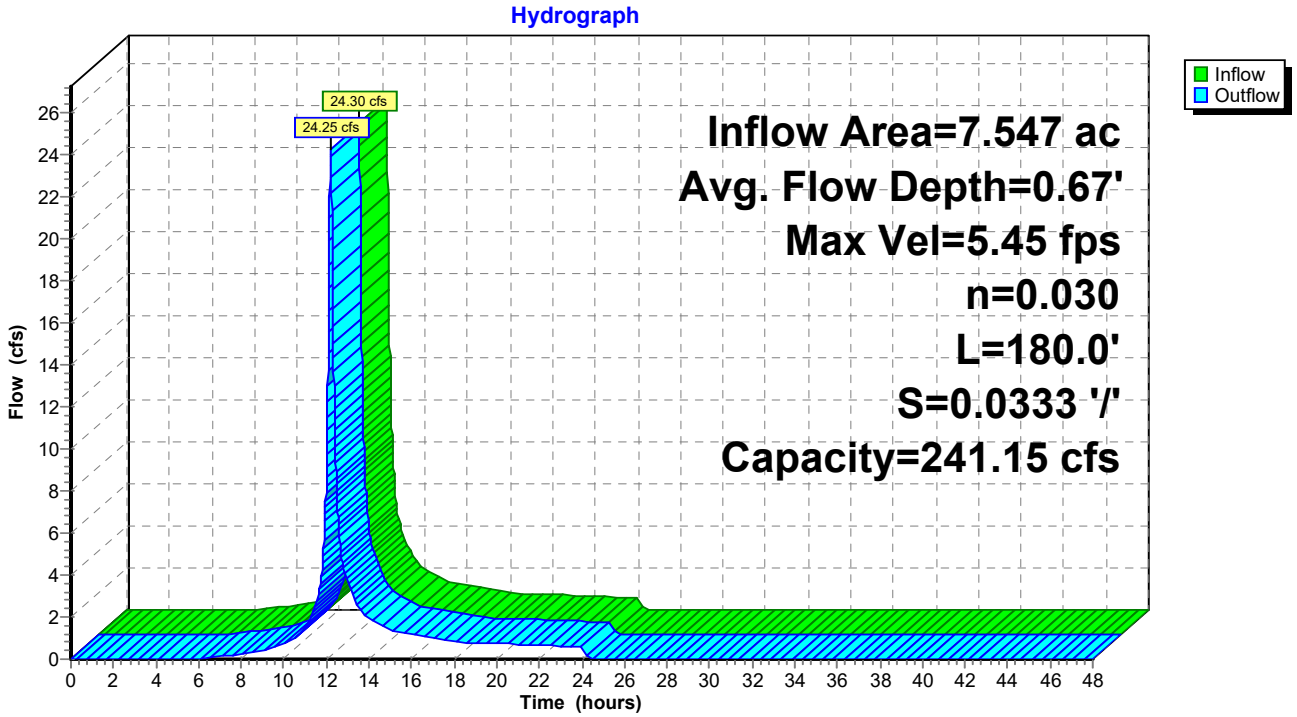
Reach W-SW: Western Swale



Summary for Pond 1B: Stormwater Basin

Inflow Area = 7.547 ac, 5.42% Impervious, Inflow Depth = 3.58" for 25-year event
Inflow = 24.25 cfs @ 12.21 hrs, Volume= 2.251 af
Outflow = 8.72 cfs @ 12.46 hrs, Volume= 2.251 af, Atten= 64%, Lag= 15.1 min
Discarded = 0.27 cfs @ 12.46 hrs, Volume= 0.354 af
Primary = 8.44 cfs @ 12.46 hrs, Volume= 1.897 af
Routed to Link PAP-1 : AP-1

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 609.17' @ 12.46 hrs Surf.Area= 10,249 sf Storage= 25,642 cf

Plug-Flow detention time= 79.1 min calculated for 2.250 af (100% of inflow)
Center-of-Mass det. time= 79.2 min (926.1 - 846.9)

Volume	Invert	Avail.Storage	Storage Description
#1	606.00'	46,881 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

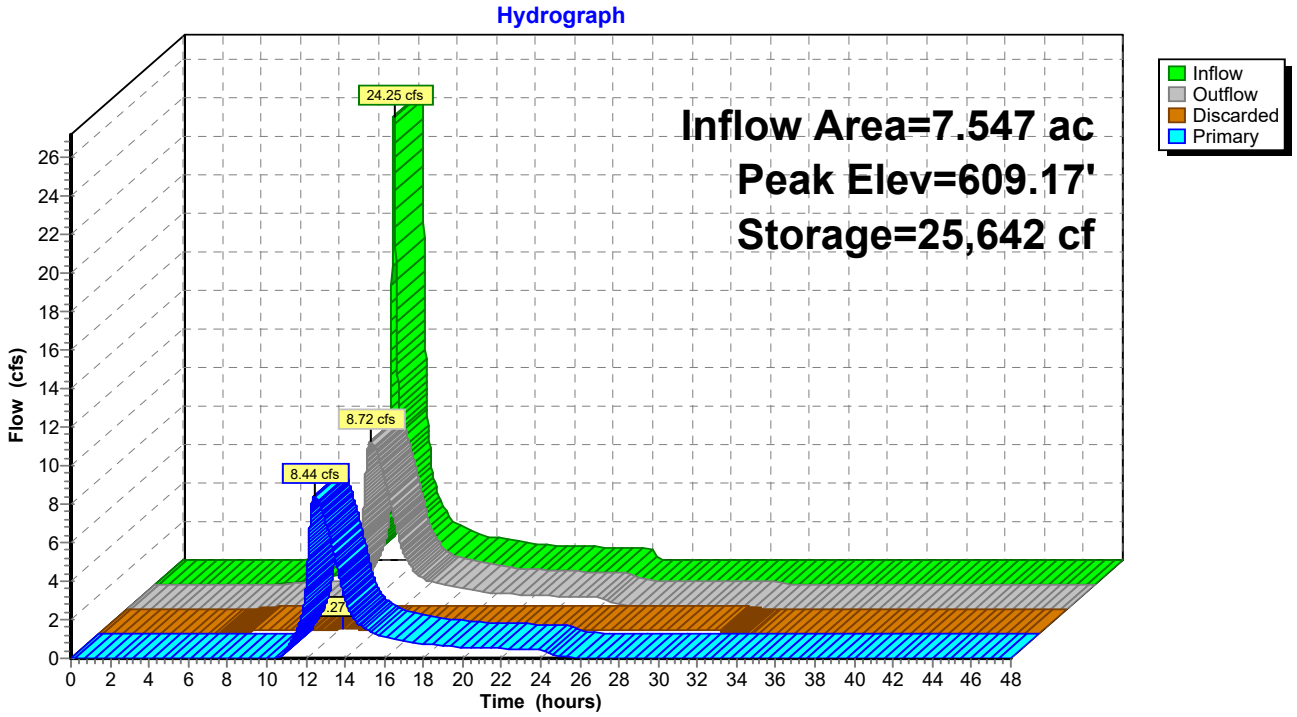
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
606.00	6,070	399.3	0	0	6,070
607.00	7,308	426.5	6,679	6,679	7,905
608.00	8,627	453.0	7,958	14,638	9,811
609.00	10,015	472.0	9,312	23,950	11,284
610.00	11,459	490.8	10,729	34,679	12,802
611.00	12,960	509.6	12,202	46,881	14,380

Device	Routing	Invert	Outlet Devices
#1	Primary	606.00'	**18.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 606.00' / 605.00' S= 0.0154 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	606.50'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	609.50'	**36.0" x 18.0" Horiz. Oriface/Grate Outlet** C= 0.600 Limited to weir flow at low heads
#4	Primary	609.50'	**16.0' long + 3.0 '/' SideZ x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63
#5	Discarded	606.00'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 590.00'

Discarded OutFlow Max=0.27 cfs @ 12.46 hrs HW=609.17' (Free Discharge)
└**5=Exfiltration** (Controls 0.27 cfs)

Primary OutFlow Max=8.44 cfs @ 12.46 hrs HW=609.17' (Free Discharge)
└**1=Culvert** (Passes 8.44 cfs of 13.23 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 8.44 cfs @ 6.88 fps)
  └**3=Oriface/Grate Outlet** (Controls 0.00 cfs)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1B: Stormwater Basin



Summary for Pond CULV: Culvert

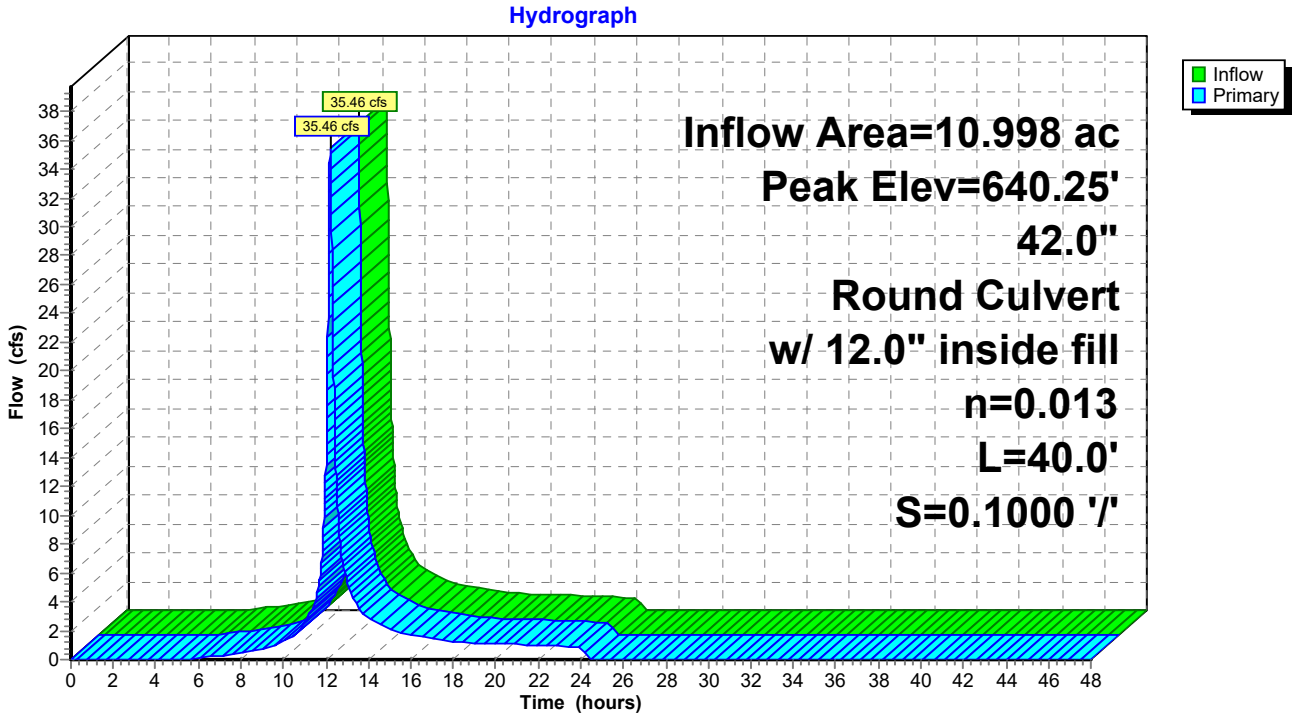
Inflow Area = 10.998 ac, 22.03% Impervious, Inflow Depth = 3.78" for 25-year event
Inflow = 35.46 cfs @ 12.21 hrs, Volume= 3.466 af
Outflow = 35.46 cfs @ 12.21 hrs, Volume= 3.466 af, Atten= 0%, Lag= 0.0 min
Primary = 35.46 cfs @ 12.21 hrs, Volume= 3.466 af
Routed to Link PAP-2 : AP-2

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 640.25' @ 12.21 hrs
Flood Elev= 643.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	638.00'	**42.0" Round Culvert w/ 12.0" inside fill** L= 40.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 637.00' / 633.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.35 sf

Primary OutFlow Max=35.43 cfs @ 12.21 hrs HW=640.25' TW=634.00' (Fixed TW Elev= 634.00')
1=Culvert (Inlet Controls 35.43 cfs @ 5.03 fps)

Pond CULV: Culvert

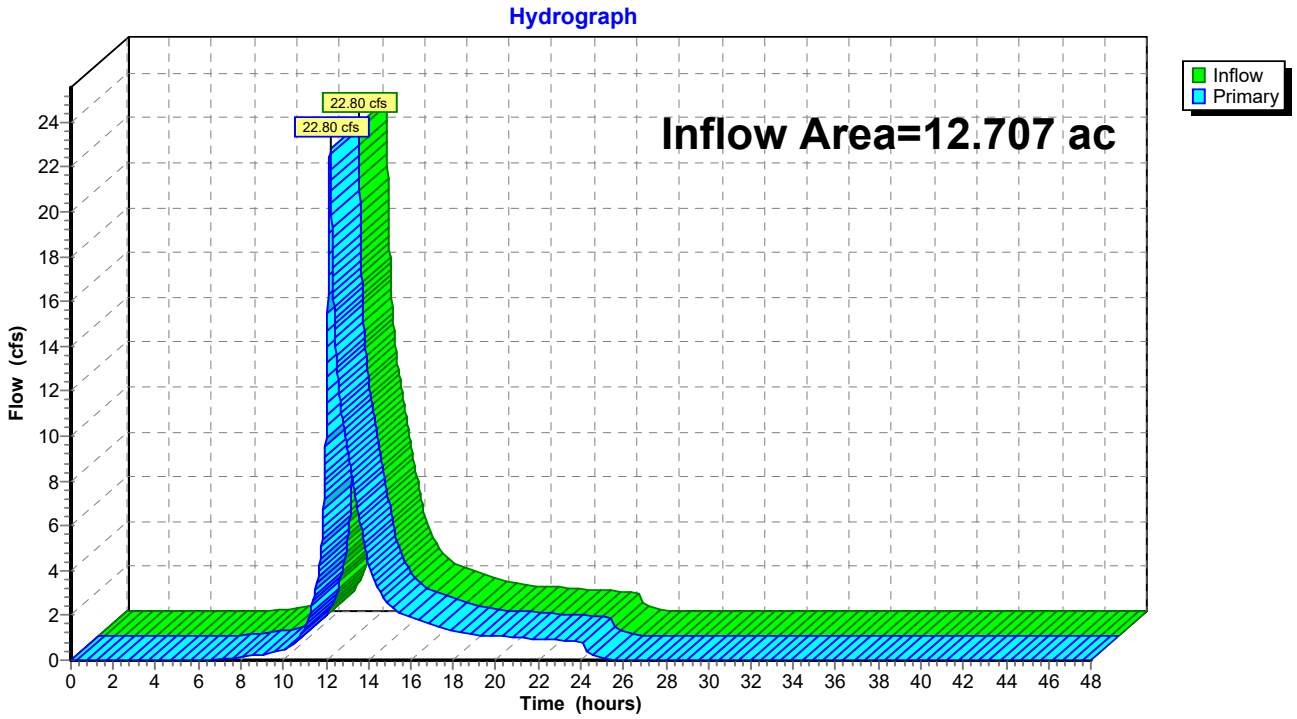


Summary for Link PAP-1: AP-1

Inflow Area = 12.707 ac, 4.88% Impervious, Inflow Depth = 3.20" for 25-year event
Inflow = 22.80 cfs @ 12.20 hrs, Volume= 3.393 af
Primary = 22.80 cfs @ 12.20 hrs, Volume= 3.393 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link PAP-1: AP-1

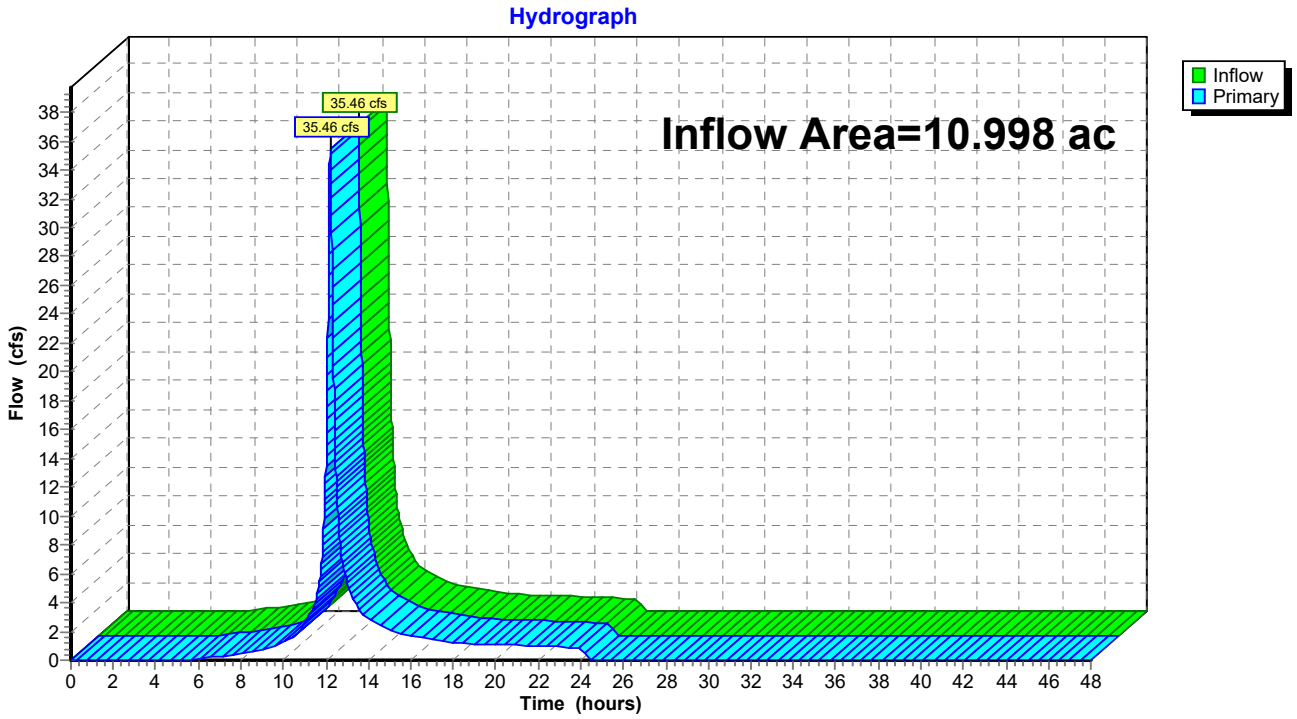


Summary for Link PAP-2: AP-2

Inflow Area = 10.998 ac, 22.03% Impervious, Inflow Depth = 3.78" for 25-year event
Inflow = 35.46 cfs @ 12.21 hrs, Volume= 3.466 af
Primary = 35.46 cfs @ 12.21 hrs, Volume= 3.466 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link PAP-2: AP-2



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1A: PDA-1A Runoff Area=7.547 ac 5.42% Impervious Runoff Depth=4.30"
Flow Length=913' Tc=11.4 min CN=78 Runoff=29.08 cfs 2.706 af

Subcatchment PDA-1B: PDA-1B Runoff Area=5.160 ac 4.09% Impervious Runoff Depth=4.20"
Flow Length=780' Tc=11.5 min CN=77 Runoff=19.35 cfs 1.804 af

Subcatchment PDA-2: PDA-2 Runoff Area=10.998 ac 22.03% Impervious Runoff Depth=4.52"
Flow Length=1,712' Tc=13.0 min CN=80 Runoff=42.16 cfs 4.142 af

Reach W-SW: Western Swale Avg. Flow Depth=0.73' Max Vel=5.73 fps Inflow=29.08 cfs 2.706 af
n=0.030 L=180.0' S=0.0333 '/' Capacity=241.15 cfs Outflow=29.02 cfs 2.706 af

Pond 1B: Stormwater Basin Peak Elev=609.60' Storage=30,245 cf Inflow=29.02 cfs 2.706 af
Discarded=0.29 cfs 0.369 af Primary=11.70 cfs 2.337 af Outflow=11.99 cfs 2.706 af

Pond CULV: Culvert Peak Elev=640.61' Inflow=42.16 cfs 4.142 af
42.0" Round Culvert w/ 12.0" inside fill n=0.013 L=40.0' S=0.1000 '/' Outflow=42.16 cfs 4.142 af

Link PAP-1: AP-1 Inflow=26.88 cfs 4.141 af
Primary=26.88 cfs 4.141 af

Link PAP-2: AP-2 Inflow=42.16 cfs 4.142 af
Primary=42.16 cfs 4.142 af

Total Runoff Area = 23.705 ac Runoff Volume = 8.652 af Average Runoff Depth = 4.38"
87.16% Pervious = 20.662 ac 12.84% Impervious = 3.043 ac

Summary for Subcatchment PDA-1A: PDA-1A

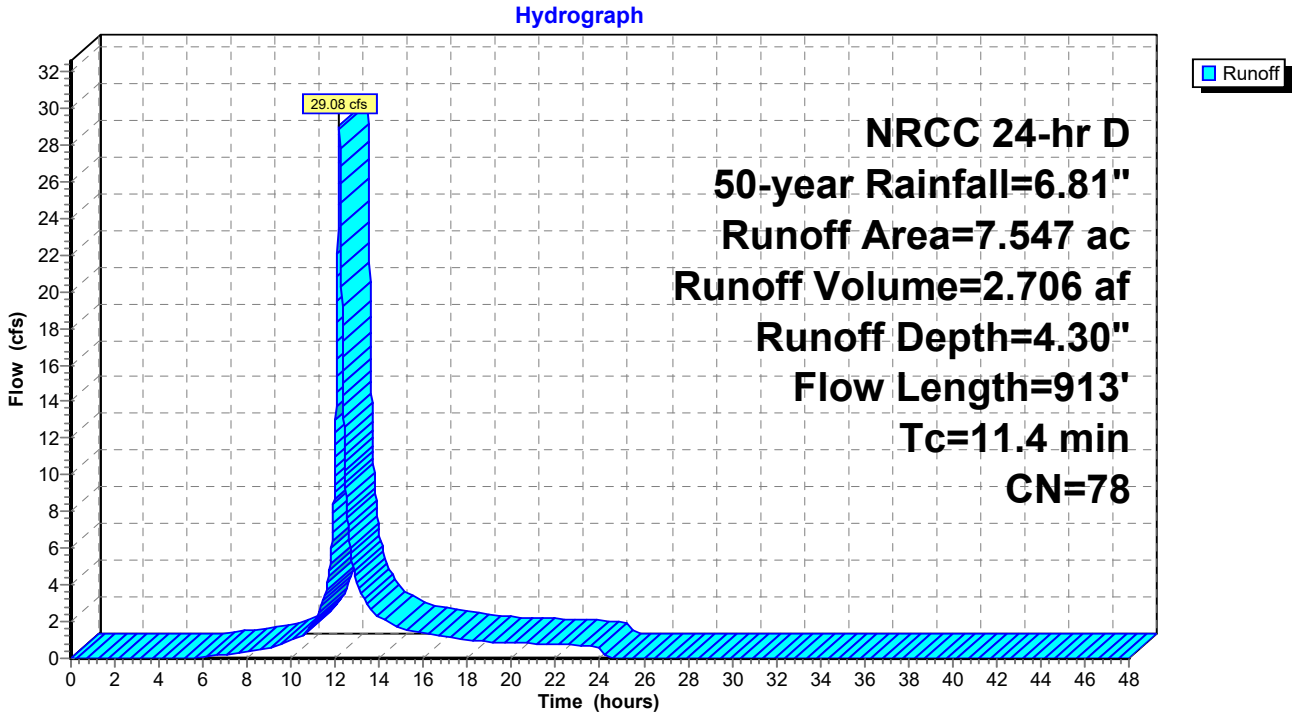
Runoff = 29.08 cfs @ 12.19 hrs, Volume= 2.706 af, Depth= 4.30"
Routed to Reach W-SW : Western Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 50-year Rainfall=6.81"

Area (ac)	CN	Description
1.842	79	1 acre lots, 20% imp, HSG C
1.043	73	Woods, Fair, HSG C
1.060	79	Woods, Fair, HSG D
0.414	71	Meadow, non-grazed, HSG C
3.020	78	Meadow, non-grazed, HSG D
0.127	96	Gravel surface, HSG D
0.041	98	Paved parking, HSG D
7.547	78	Weighted Average
7.138		94.58% Pervious Area
0.409		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1100	0.33		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.1	128	0.0780	1.95		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.6	55	0.1091	1.65		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
3.6	450	0.0899	2.10		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
1.1	180	0.0333	2.74		**Shallow Concentrated Flow, E-F** Grassed Waterway Kv= 15.0 fps
11.4	913	Total			

Subcatchment PDA-1A: PDA-1A



Summary for Subcatchment PDA-1B: PDA-1B

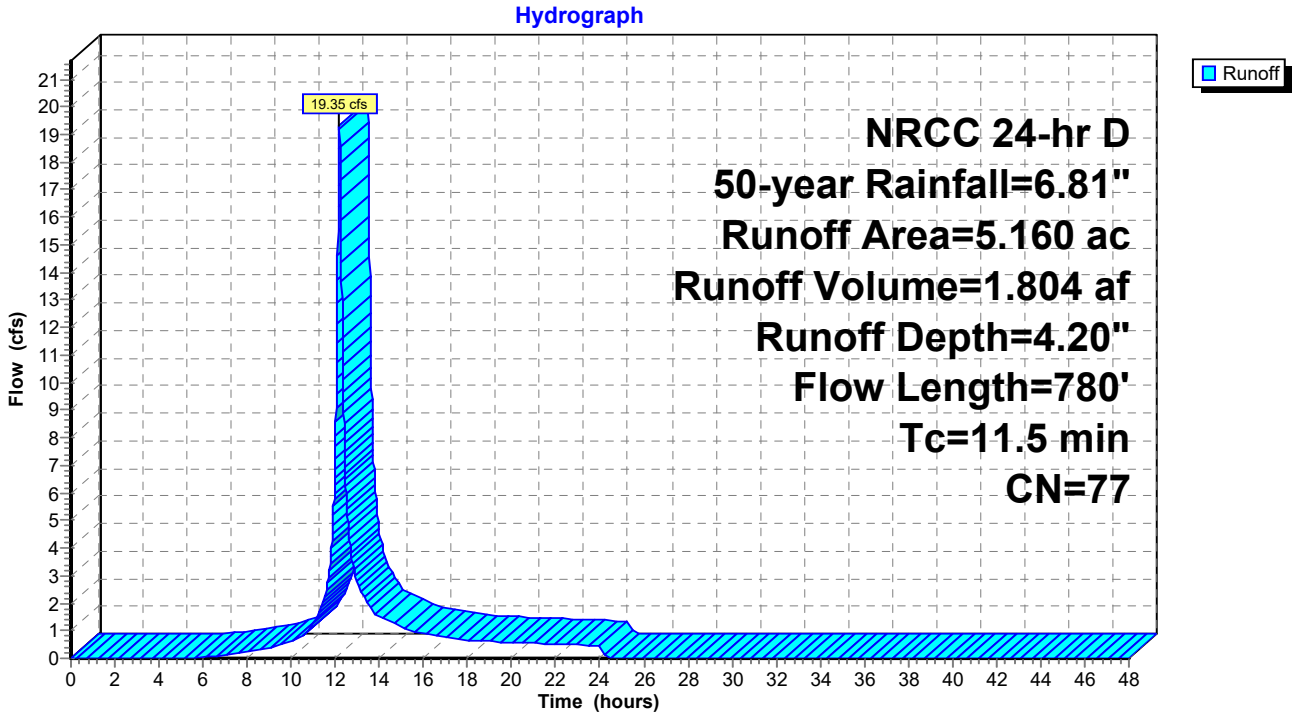
Runoff = 19.35 cfs @ 12.19 hrs, Volume= 1.804 af, Depth= 4.20"
Routed to Link PAP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 50-year Rainfall=6.81"

Area (ac)	CN	Description
1.054	79	1 acre lots, 20% imp, HSG C
0.436	73	Woods, Fair, HSG C
0.060	79	Woods, Fair, HSG D
0.247	70	Brush, Fair, HSG C
0.413	77	Brush, Fair, HSG D
2.950	78	Meadow, non-grazed, HSG D
5.160	77	Weighted Average
4.949		95.91% Pervious Area
0.211		4.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1300	0.36		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
0.7	102	0.1078	2.30		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.1	578	0.0986	1.57		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
11.5	780	Total			

Subcatchment PDA-1B: PDA-1B



Summary for Subcatchment PDA-2: PDA-2

[47] Hint: Peak is 262% of capacity of segment #4

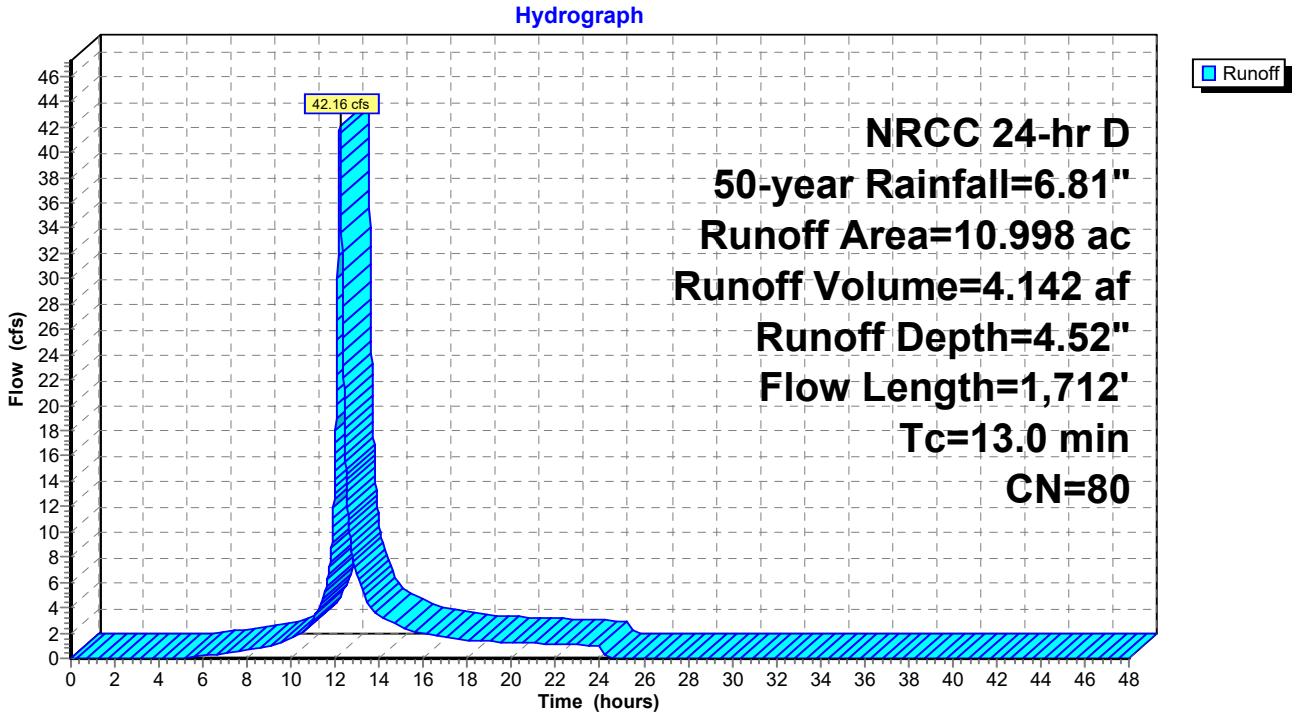
Runoff = 42.16 cfs @ 12.21 hrs, Volume= 4.142 af, Depth= 4.52"
Routed to Pond CULV : Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 50-year Rainfall=6.81"

Area (ac)	CN	Description
5.677	79	1 acre lots, 20% imp, HSG C
2.964	73	Woods, Fair, HSG C
1.070	79	Woods, Fair, HSG D
1.152	98	Paved roads w/curbs & sewers, HSG C
0.135	98	Paved roads w/curbs & sewers, HSG D
10.998	80	Weighted Average
8.576		77.97% Pervious Area
2.422		22.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.9	585	0.1094	1.65		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	167	0.0240	3.14		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.8	608	0.0444	13.11	16.09	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	252	0.1071	26.20	487.30	**Channel Flow, E-F** Area= 18.6 sf Perim= 11.9' r= 1.56' n= 0.025 Earth, clean & winding
13.0	1,712	Total			

Subcatchment PDA-2: PDA-2



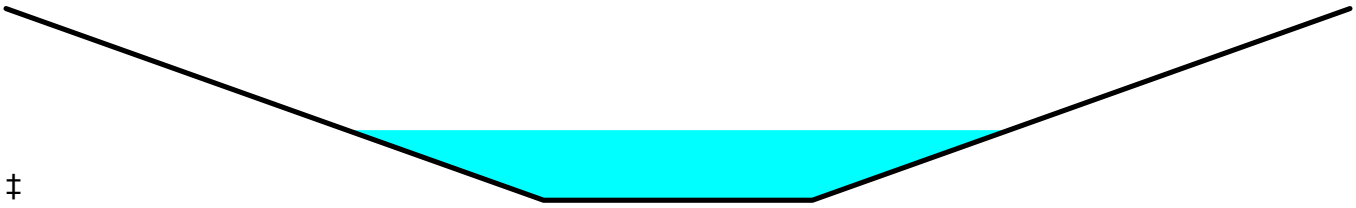
Summary for Reach W-SW: Western Swale

Inflow Area = 7.547 ac, 5.42% Impervious, Inflow Depth = 4.30" for 50-year event
Inflow = 29.08 cfs @ 12.19 hrs, Volume= 2.706 af
Outflow = 29.02 cfs @ 12.20 hrs, Volume= 2.706 af, Atten= 0%, Lag= 0.9 min
Routed to Pond 1B : Stormwater Basin

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.73 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.98 fps, Avg. Travel Time= 1.5 min

Peak Storage= 911 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.73' , Surface Width= 9.85'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 241.15 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 20.00'
Length= 180.0' Slope= 0.0333 '/'
Inlet Invert= 616.00', Outlet Invert= 610.00'



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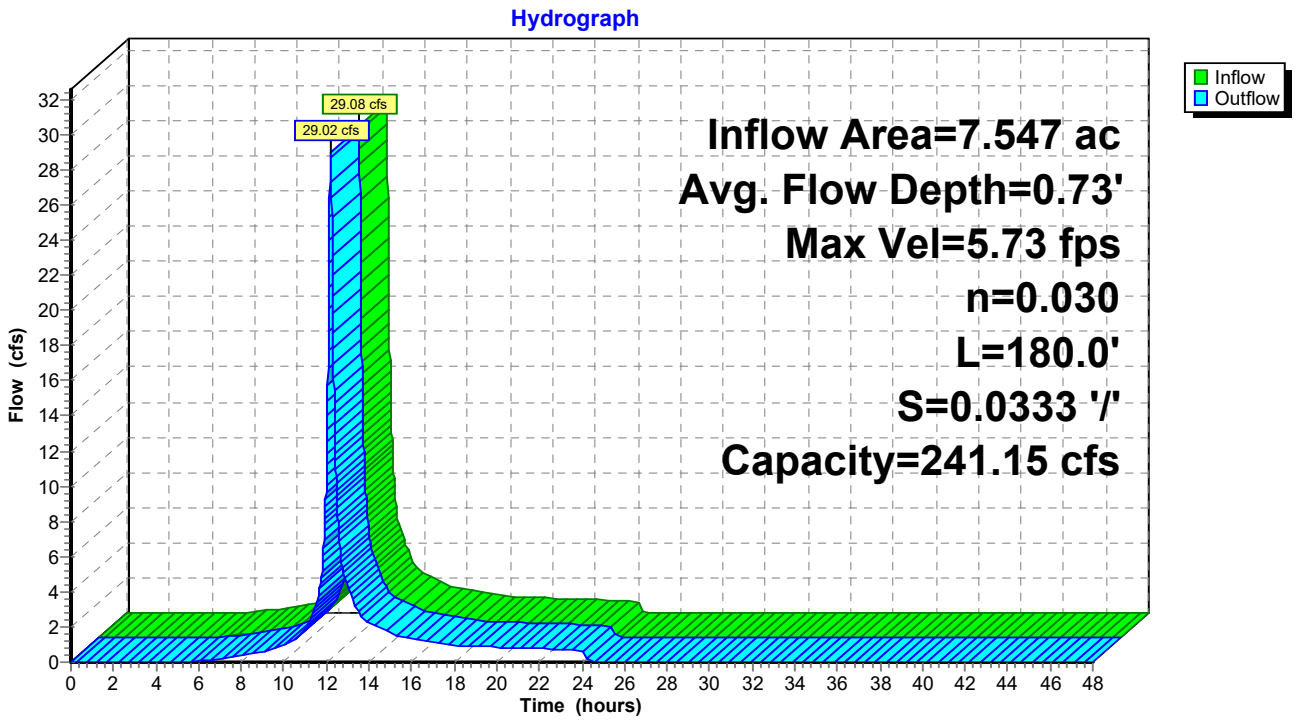


Summary for Pond 1B: Stormwater Basin

Inflow Area = 7.547 ac, 5.42% Impervious, Inflow Depth = 4.30" for 50-year event
Inflow = 29.02 cfs @ 12.20 hrs, Volume= 2.706 af
Outflow = 11.99 cfs @ 12.42 hrs, Volume= 2.706 af, Atten= 59%, Lag= 12.9 min
Discarded = 0.29 cfs @ 12.42 hrs, Volume= 0.369 af
Primary = 11.70 cfs @ 12.42 hrs, Volume= 2.337 af
Routed to Link PAP-1 : AP-1

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 609.60' @ 12.42 hrs Surf.Area= 10,874 sf Storage= 30,245 cf

Plug-Flow detention time= 73.8 min calculated for 2.706 af (100% of inflow)
Center-of-Mass det. time= 73.9 min (913.9 - 840.0)

Volume	Invert	Avail.Storage	Storage Description
#1	606.00'	46,881 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

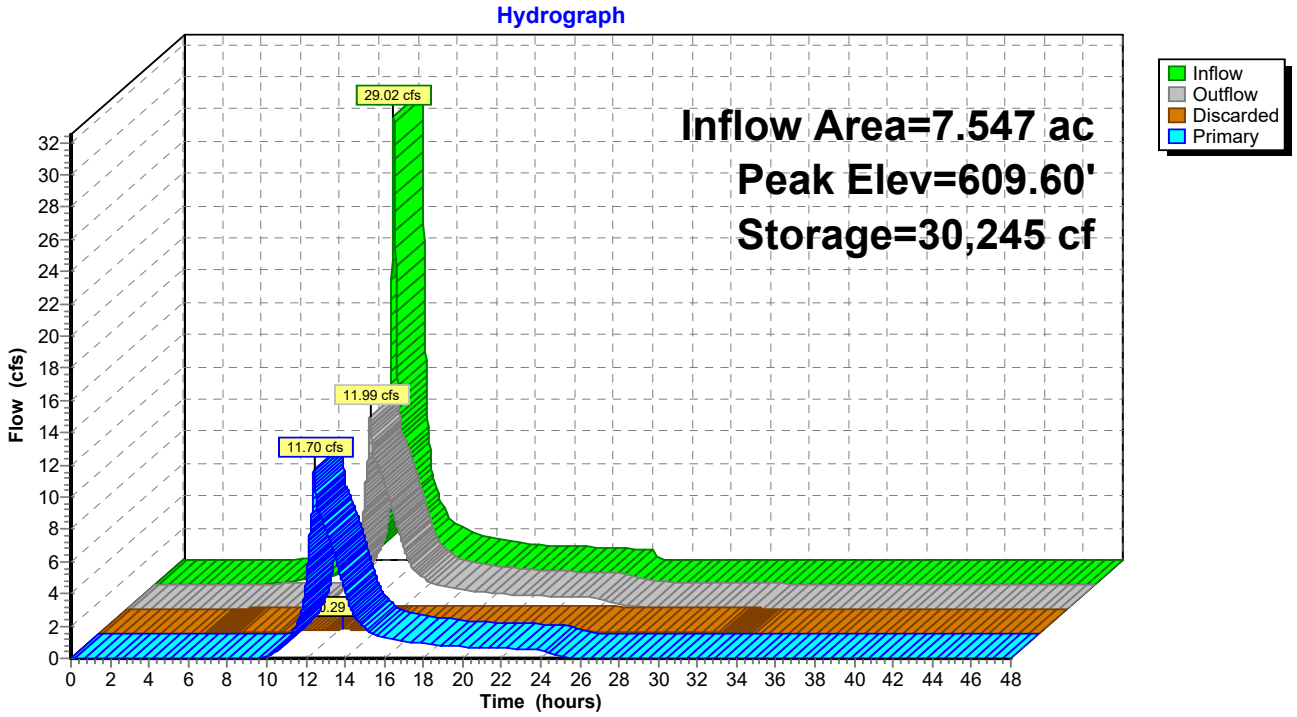
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
606.00	6,070	399.3	0	0	6,070
607.00	7,308	426.5	6,679	6,679	7,905
608.00	8,627	453.0	7,958	14,638	9,811
609.00	10,015	472.0	9,312	23,950	11,284
610.00	11,459	490.8	10,729	34,679	12,802
611.00	12,960	509.6	12,202	46,881	14,380

Device	Routing	Invert	Outlet Devices
#1	Primary	606.00'	**18.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 606.00' / 605.00' S= 0.0154 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	606.50'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	609.50'	**36.0" x 18.0" Horiz. Oriface/Grate Outlet** C= 0.600 Limited to weir flow at low heads
#4	Primary	609.50'	**16.0' long + 3.0 '/' SideZ x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63
#5	Discarded	606.00'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 590.00'

Discarded OutFlow Max=0.29 cfs @ 12.42 hrs HW=609.60' (Free Discharge)
└**5=Exfiltration** (Controls 0.29 cfs)

Primary OutFlow Max=11.68 cfs @ 12.42 hrs HW=609.60' (Free Discharge)
└**1=Culvert** (Passes 10.27 cfs of 14.37 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 9.30 cfs @ 7.58 fps)
  └**3=Oriface/Grate Outlet** (Weir Controls 0.97 cfs @ 1.05 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 1.41 cfs @ 0.84 fps)

Pond 1B: Stormwater Basin



Summary for Pond CULV: Culvert

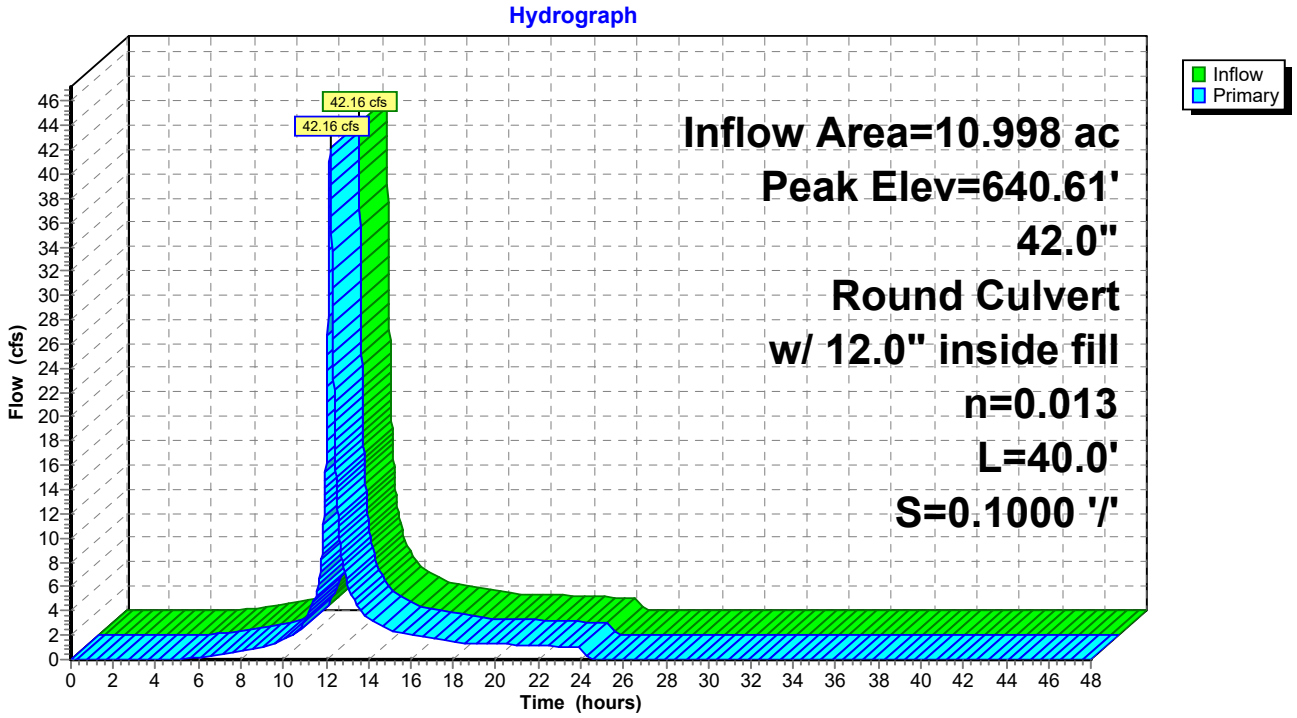
Inflow Area = 10.998 ac, 22.03% Impervious, Inflow Depth = 4.52" for 50-year event
Inflow = 42.16 cfs @ 12.21 hrs, Volume= 4.142 af
Outflow = 42.16 cfs @ 12.21 hrs, Volume= 4.142 af, Atten= 0%, Lag= 0.0 min
Primary = 42.16 cfs @ 12.21 hrs, Volume= 4.142 af
Routed to Link PAP-2 : AP-2

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 640.61' @ 12.21 hrs
Flood Elev= 643.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	638.00'	**42.0" Round Culvert w/ 12.0" inside fill** L= 40.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 637.00' / 633.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.35 sf

Primary OutFlow Max=42.11 cfs @ 12.21 hrs HW=640.61' TW=634.00' (Fixed TW Elev= 634.00')
1=Culvert (Inlet Controls 42.11 cfs @ 5.73 fps)

Pond CULV: Culvert

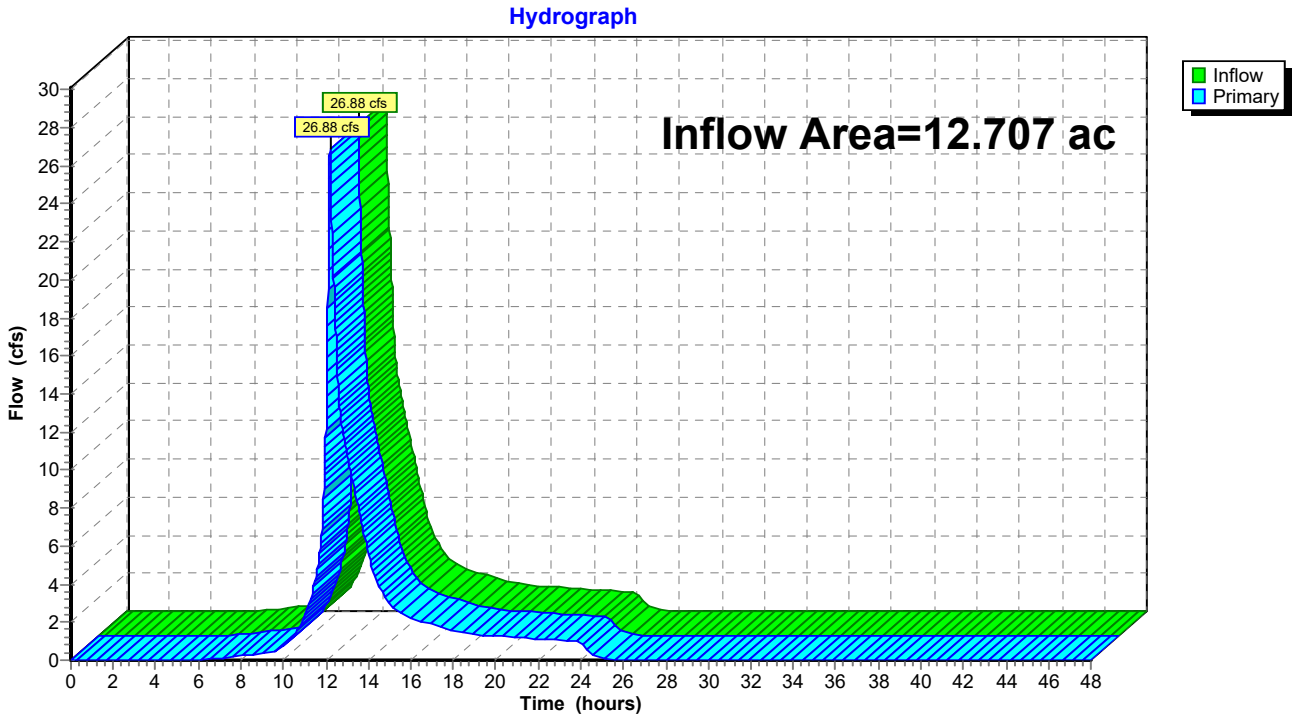


Summary for Link PAP-1: AP-1

Inflow Area = 12.707 ac, 4.88% Impervious, Inflow Depth = 3.91" for 50-year event
Inflow = 26.88 cfs @ 12.20 hrs, Volume= 4.141 af
Primary = 26.88 cfs @ 12.20 hrs, Volume= 4.141 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link PAP-1: AP-1

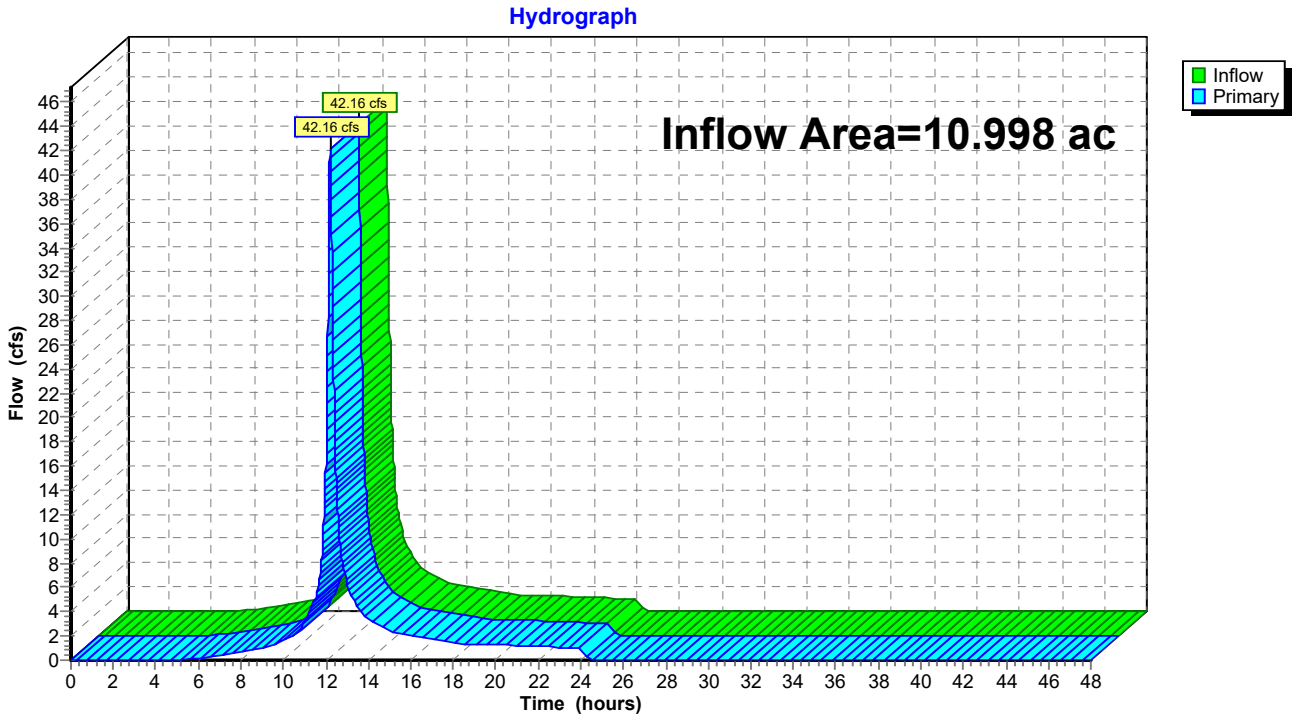


Summary for Link PAP-2: AP-2

Inflow Area = 10.998 ac, 22.03% Impervious, Inflow Depth = 4.52" for 50-year event
Inflow = 42.16 cfs @ 12.21 hrs, Volume= 4.142 af
Primary = 42.16 cfs @ 12.21 hrs, Volume= 4.142 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link PAP-2: AP-2



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1A: PDA-1A Runoff Area=7.547 ac 5.42% Impervious Runoff Depth=5.11"
Flow Length=913' Tc=11.4 min CN=78 Runoff=34.32 cfs 3.211 af

Subcatchment PDA-1B: PDA-1B Runoff Area=5.160 ac 4.09% Impervious Runoff Depth=4.99"
Flow Length=780' Tc=11.5 min CN=77 Runoff=22.90 cfs 2.146 af

Subcatchment PDA-2: PDA-2 Runoff Area=10.998 ac 22.03% Impervious Runoff Depth=5.33"
Flow Length=1,712' Tc=13.0 min CN=80 Runoff=49.46 cfs 4.890 af

Reach W-SW: Western Swale Avg. Flow Depth=0.79' Max Vel=6.00 fps Inflow=34.32 cfs 3.211 af
n=0.030 L=180.0' S=0.0333 '/' Capacity=241.15 cfs Outflow=34.24 cfs 3.211 af

Pond 1B: Stormwater Basin Peak Elev=609.78' Storage=32,224 cf Inflow=34.24 cfs 3.211 af
Discarded=0.30 cfs 0.383 af Primary=20.74 cfs 2.828 af Outflow=21.04 cfs 3.211 af

Pond CULV: Culvert Peak Elev=641.12' Inflow=49.46 cfs 4.890 af
42.0" Round Culvert w/ 12.0" inside fill n=0.013 L=40.0' S=0.1000 '/' Outflow=49.46 cfs 4.890 af

Link PAP-1: AP-1 Inflow=34.87 cfs 4.974 af
Primary=34.87 cfs 4.974 af

Link PAP-2: AP-2 Inflow=49.46 cfs 4.890 af
Primary=49.46 cfs 4.890 af

Total Runoff Area = 23.705 ac Runoff Volume = 10.246 af Average Runoff Depth = 5.19"
87.16% Pervious = 20.662 ac 12.84% Impervious = 3.043 ac

Summary for Subcatchment PDA-1A: PDA-1A

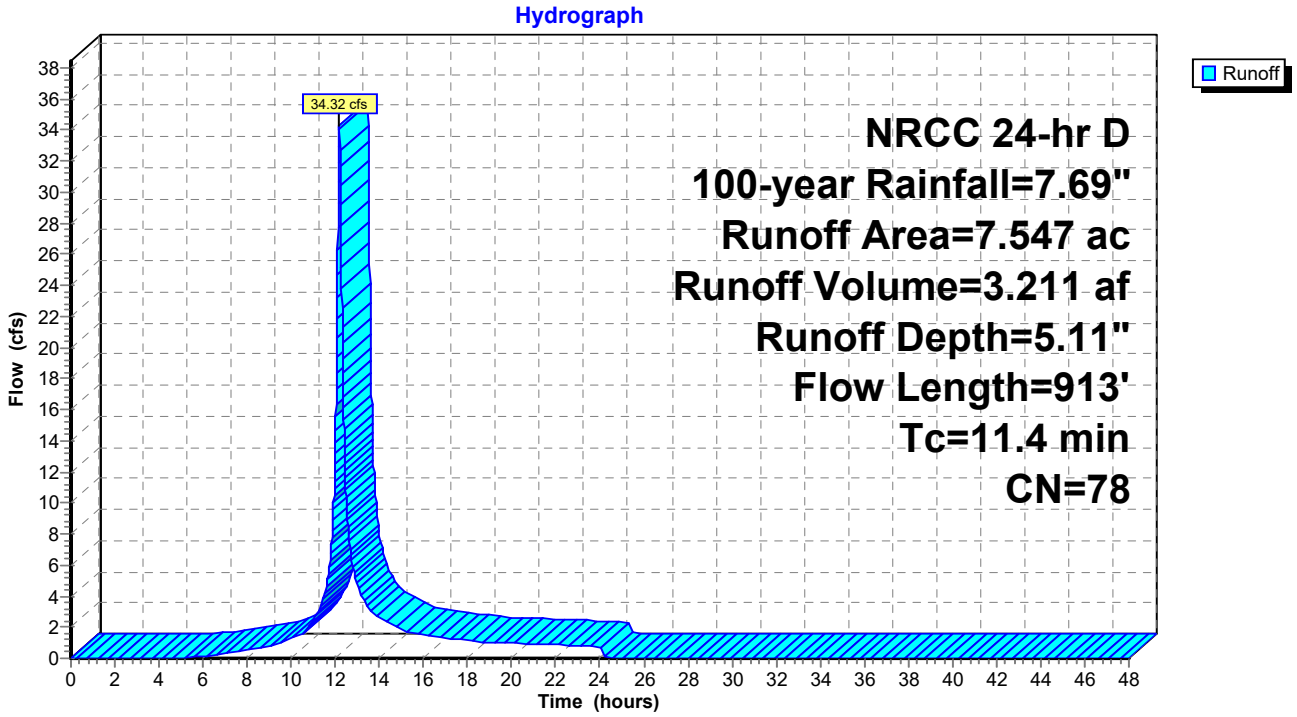
Runoff = 34.32 cfs @ 12.19 hrs, Volume= 3.211 af, Depth= 5.11"
Routed to Reach W-SW : Western Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-year Rainfall=7.69"

Area (ac)	CN	Description
1.842	79	1 acre lots, 20% imp, HSG C
1.043	73	Woods, Fair, HSG C
1.060	79	Woods, Fair, HSG D
0.414	71	Meadow, non-grazed, HSG C
3.020	78	Meadow, non-grazed, HSG D
0.127	96	Gravel surface, HSG D
0.041	98	Paved parking, HSG D
7.547	78	Weighted Average
7.138		94.58% Pervious Area
0.409		5.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1100	0.33		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.1	128	0.0780	1.95		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.6	55	0.1091	1.65		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
3.6	450	0.0899	2.10		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
1.1	180	0.0333	2.74		**Shallow Concentrated Flow, E-F** Grassed Waterway Kv= 15.0 fps
11.4	913	Total			

Subcatchment PDA-1A: PDA-1A



Summary for Subcatchment PDA-1B: PDA-1B

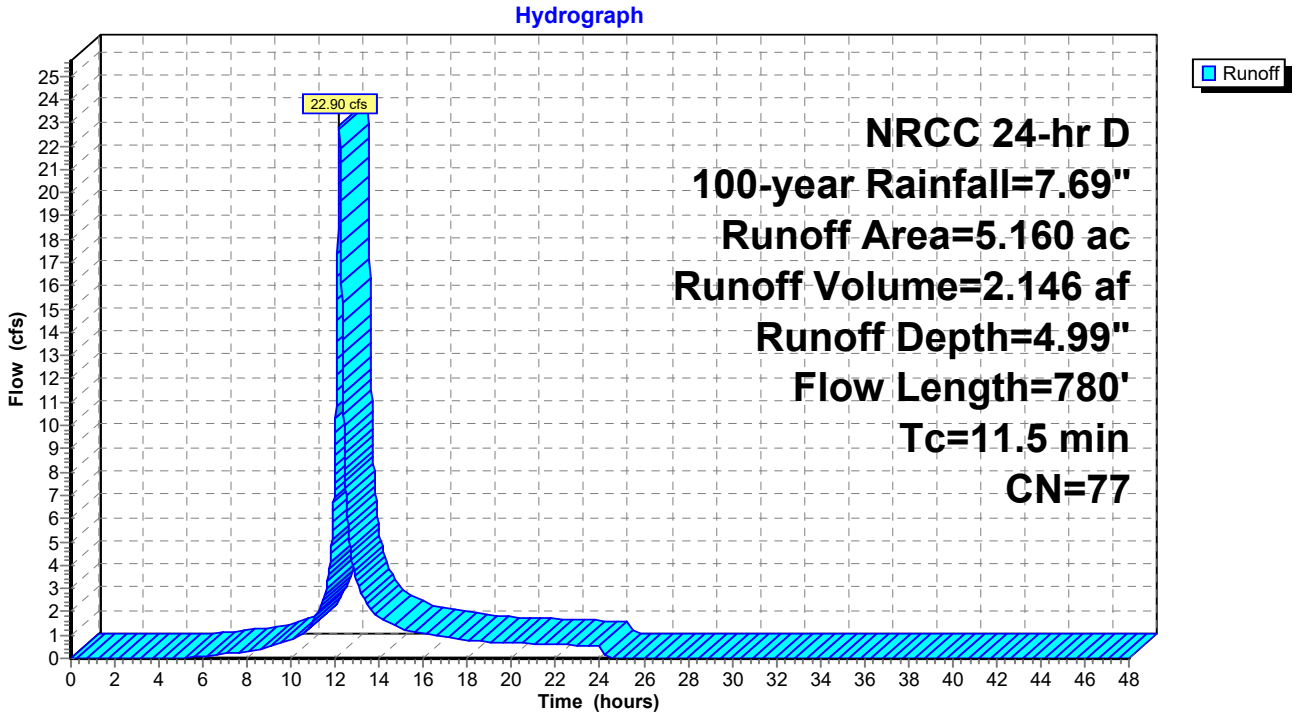
Runoff = 22.90 cfs @ 12.19 hrs, Volume= 2.146 af, Depth= 4.99"
Routed to Link PAP-1 : AP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-year Rainfall=7.69"

Area (ac)	CN	Description
1.054	79	1 acre lots, 20% imp, HSG C
0.436	73	Woods, Fair, HSG C
0.060	79	Woods, Fair, HSG D
0.247	70	Brush, Fair, HSG C
0.413	77	Brush, Fair, HSG D
2.950	78	Meadow, non-grazed, HSG D
5.160	77	Weighted Average
4.949		95.91% Pervious Area
0.211		4.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	100	0.1300	0.36		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
0.7	102	0.1078	2.30		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.1	578	0.0986	1.57		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
11.5	780	Total			

Subcatchment PDA-1B: PDA-1B



Summary for Subcatchment PDA-2: PDA-2

[47] Hint: Peak is 307% of capacity of segment #4

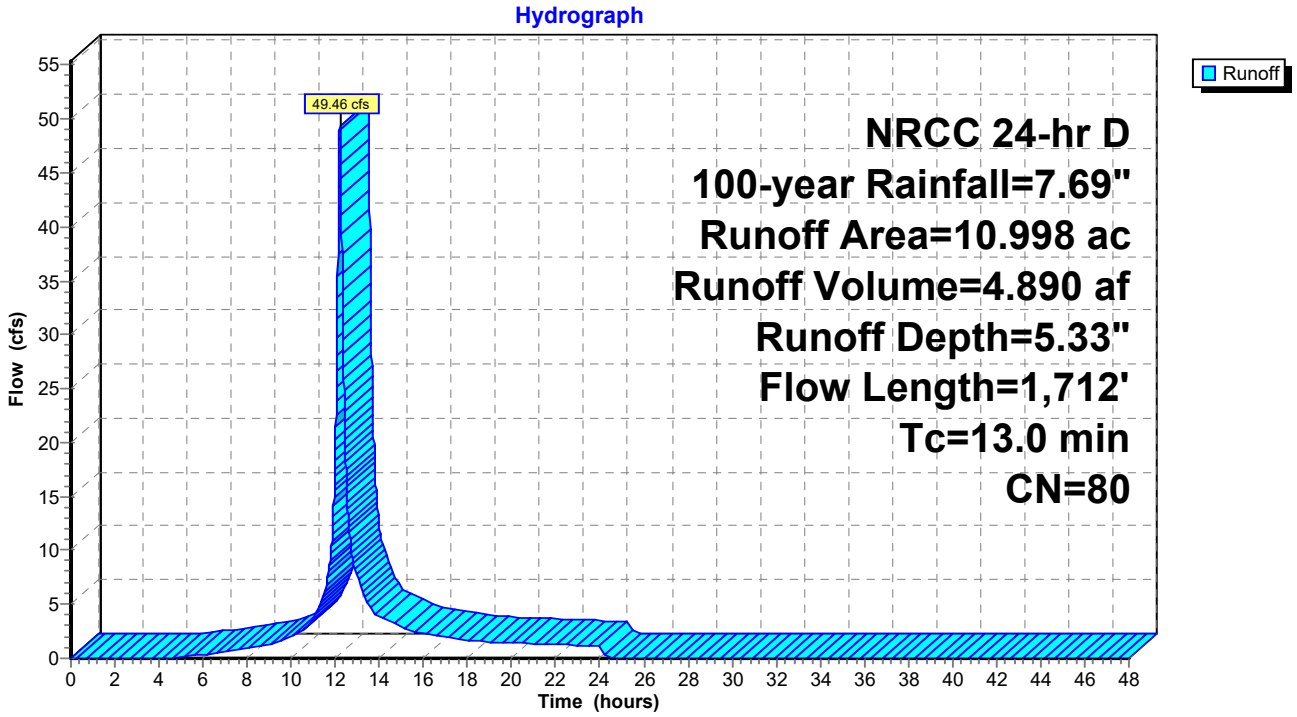
Runoff = 49.46 cfs @ 12.21 hrs, Volume= 4.890 af, Depth= 5.33"
Routed to Pond CULV : Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-year Rainfall=7.69"

Area (ac)	CN	Description
5.677	79	1 acre lots, 20% imp, HSG C
2.964	73	Woods, Fair, HSG C
1.070	79	Woods, Fair, HSG D
1.152	98	Paved roads w/curbs & sewers, HSG C
0.135	98	Paved roads w/curbs & sewers, HSG D
10.998	80	Weighted Average
8.576		77.97% Pervious Area
2.422		22.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.9	585	0.1094	1.65		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	167	0.0240	3.14		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.8	608	0.0444	13.11	16.09	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	252	0.1071	26.20	487.30	**Channel Flow, E-F** Area= 18.6 sf Perim= 11.9' r= 1.56' n= 0.025 Earth, clean & winding
13.0	1,712	Total			

Subcatchment PDA-2: PDA-2



Summary for Reach W-SW: Western Swale

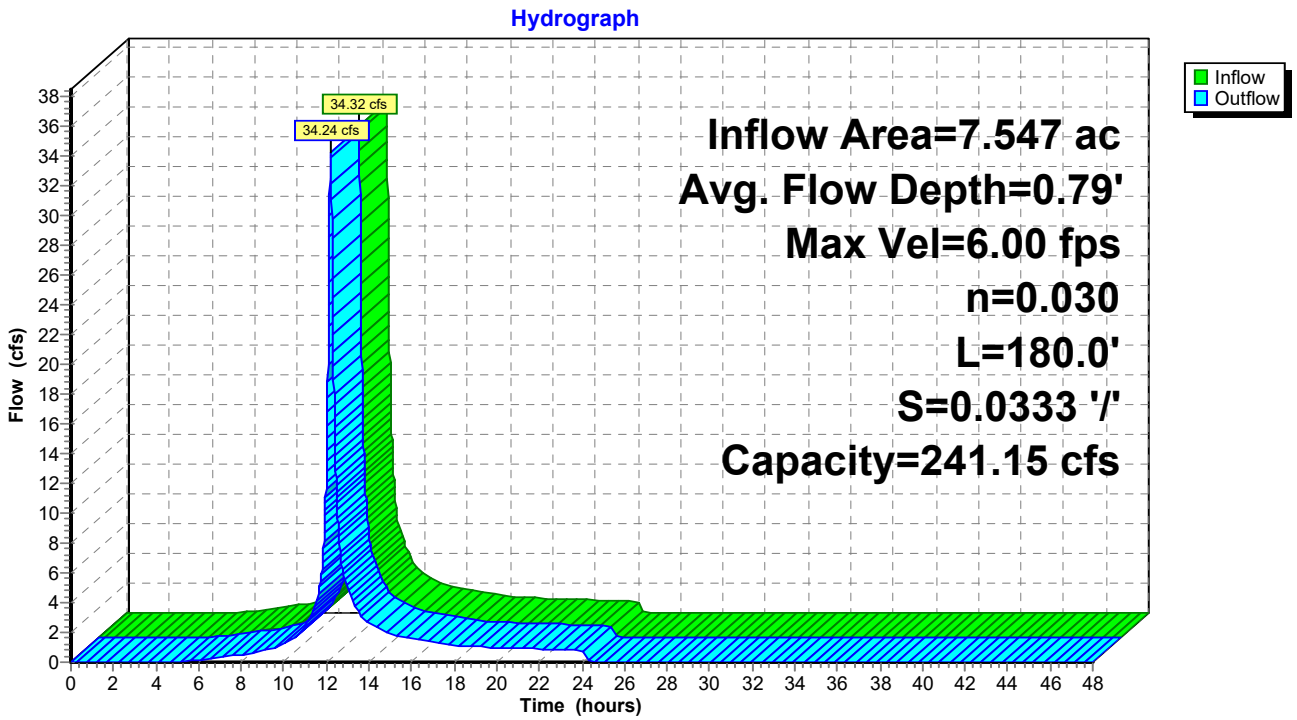
Inflow Area = 7.547 ac, 5.42% Impervious, Inflow Depth = 5.11" for 100-year event
Inflow = 34.32 cfs @ 12.19 hrs, Volume= 3.211 af
Outflow = 34.24 cfs @ 12.20 hrs, Volume= 3.211 af, Atten= 0%, Lag= 0.9 min
Routed to Pond 1B : Stormwater Basin

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.00 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.07 fps, Avg. Travel Time= 1.4 min

Peak Storage= 1,027 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.79' , Surface Width= 10.36'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 241.15 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 20.00'
Length= 180.0' Slope= 0.0333 '/'
Inlet Invert= 616.00', Outlet Invert= 610.00'

‡



Summary for Pond 1B: Stormwater Basin

Inflow Area = 7.547 ac, 5.42% Impervious, Inflow Depth = 5.11" for 100-year event
Inflow = 34.24 cfs @ 12.20 hrs, Volume= 3.211 af
Outflow = 21.04 cfs @ 12.33 hrs, Volume= 3.211 af, Atten= 39%, Lag= 7.5 min
Discarded = 0.30 cfs @ 12.33 hrs, Volume= 0.383 af
Primary = 20.74 cfs @ 12.33 hrs, Volume= 2.828 af
Routed to Link PAP-1 : AP-1

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 609.78' @ 12.33 hrs Surf.Area= 11,137 sf Storage= 32,224 cf

Plug-Flow detention time= 67.7 min calculated for 3.211 af (100% of inflow)
Center-of-Mass det. time= 67.7 min (901.2 - 833.6)

Volume	Invert	Avail.Storage	Storage Description
#1	606.00'	46,881 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

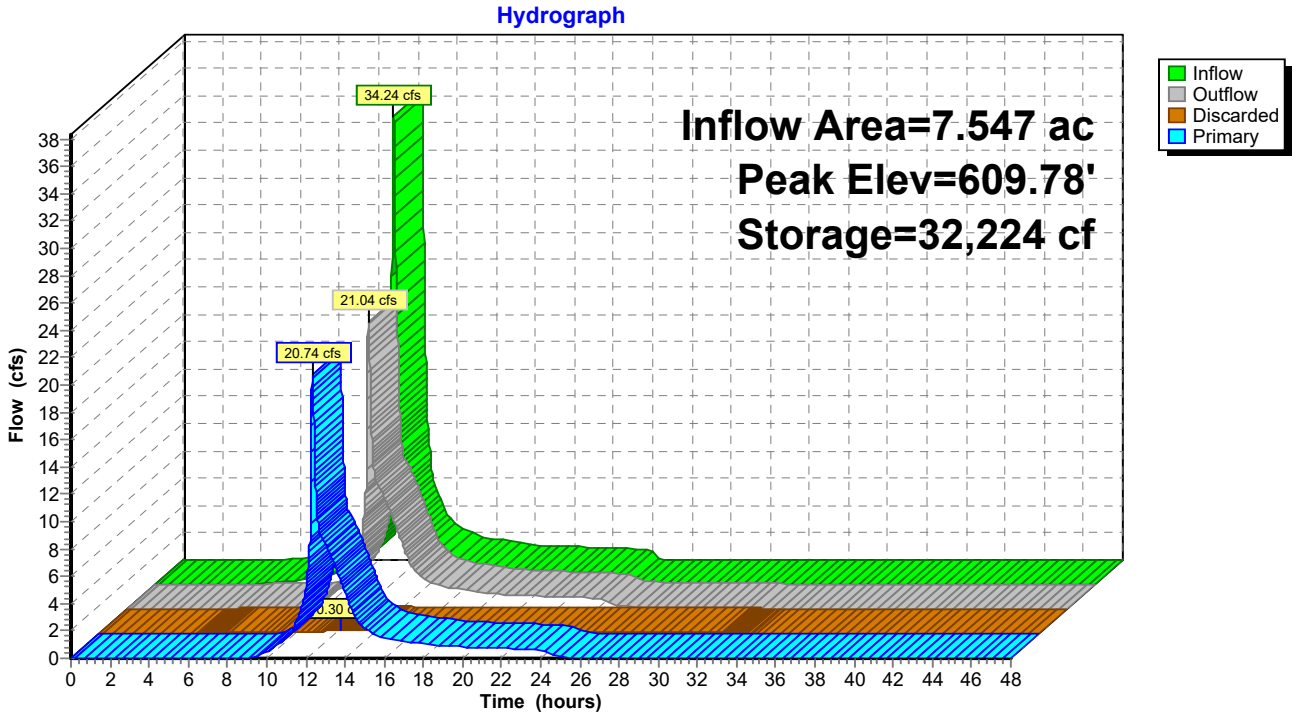
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
606.00	6,070	399.3	0	0	6,070
607.00	7,308	426.5	6,679	6,679	7,905
608.00	8,627	453.0	7,958	14,638	9,811
609.00	10,015	472.0	9,312	23,950	11,284
610.00	11,459	490.8	10,729	34,679	12,802
611.00	12,960	509.6	12,202	46,881	14,380

Device	Routing	Invert	Outlet Devices
#1	Primary	606.00'	**18.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 606.00' / 605.00' S= 0.0154 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	606.50'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	609.50'	**36.0" x 18.0" Horiz. Oriface/Grate Outlet** C= 0.600 Limited to weir flow at low heads
#4	Primary	609.50'	**16.0' long + 3.0 '/' SideZ x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63
#5	Discarded	606.00'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 590.00'

Discarded OutFlow Max=0.30 cfs @ 12.33 hrs HW=609.78' (Free Discharge)
└**5=Exfiltration** (Controls 0.30 cfs)

Primary OutFlow Max=20.69 cfs @ 12.33 hrs HW=609.78' (Free Discharge)
└**1=Culvert** (Passes 14.05 cfs of 14.82 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 9.63 cfs @ 7.85 fps)
└**3=Oriface/Grate Outlet** (Weir Controls 4.42 cfs @ 1.74 fps)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 6.64 cfs @ 1.40 fps)

Pond 1B: Stormwater Basin



Summary for Pond CULV: Culvert

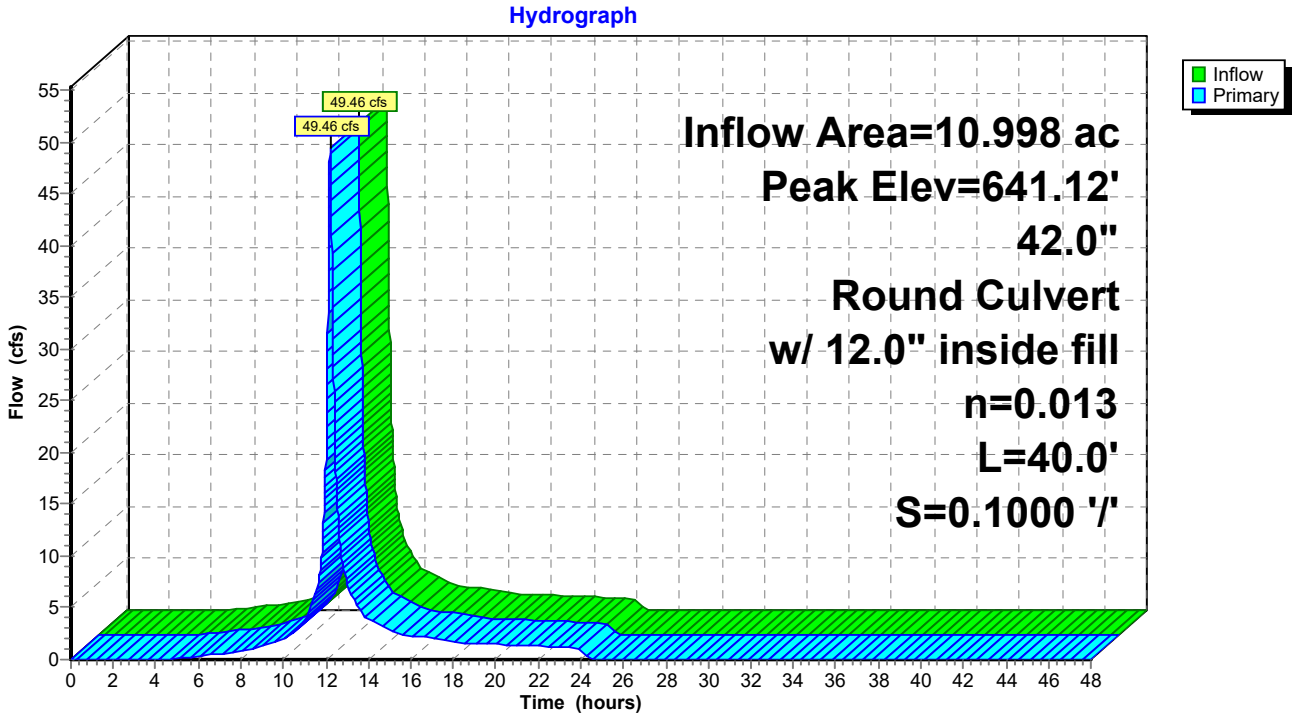
Inflow Area = 10.998 ac, 22.03% Impervious, Inflow Depth = 5.33" for 100-year event
Inflow = 49.46 cfs @ 12.21 hrs, Volume= 4.890 af
Outflow = 49.46 cfs @ 12.21 hrs, Volume= 4.890 af, Atten= 0%, Lag= 0.0 min
Primary = 49.46 cfs @ 12.21 hrs, Volume= 4.890 af
Routed to Link PAP-2 : AP-2

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 641.12' @ 12.21 hrs
Flood Elev= 643.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	638.00'	**42.0" Round Culvert w/ 12.0" inside fill** L= 40.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 637.00' / 633.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.35 sf

Primary OutFlow Max=49.40 cfs @ 12.21 hrs HW=641.12' TW=634.00' (Fixed TW Elev= 634.00')
1=Culvert (Inlet Controls 49.40 cfs @ 6.72 fps)

Pond CULV: Culvert

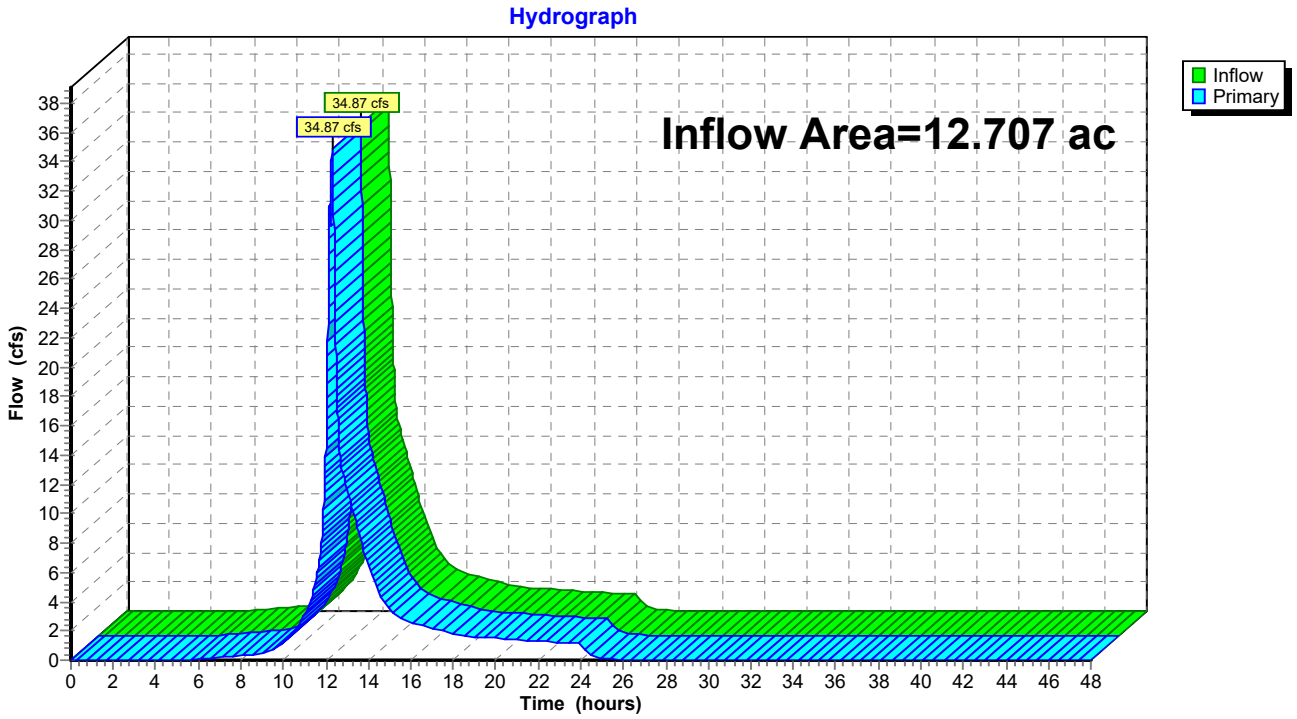


Summary for Link PAP-1: AP-1

Inflow Area = 12.707 ac, 4.88% Impervious, Inflow Depth = 4.70" for 100-year event
Inflow = 34.87 cfs @ 12.30 hrs, Volume= 4.974 af
Primary = 34.87 cfs @ 12.30 hrs, Volume= 4.974 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link PAP-1: AP-1

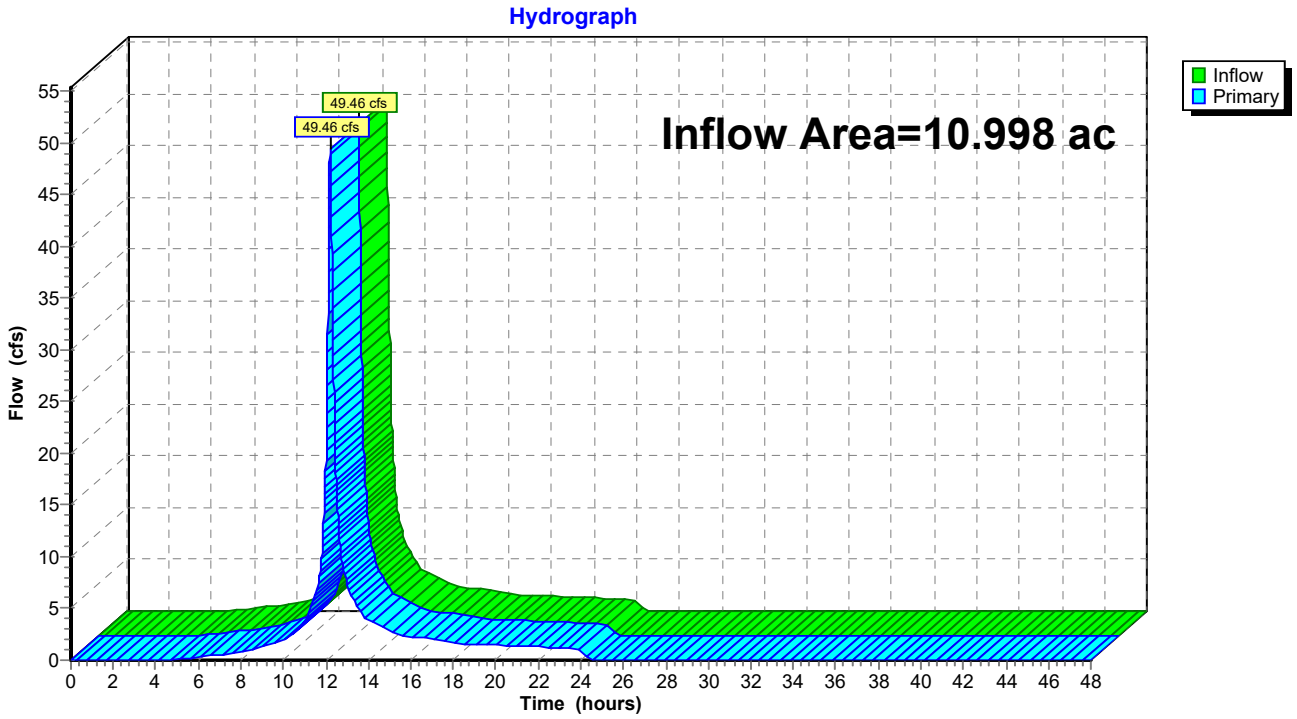


Summary for Link PAP-2: AP-2

Inflow Area = 10.998 ac, 22.03% Impervious, Inflow Depth = 5.33" for 100-year event
Inflow = 49.46 cfs @ 12.21 hrs, Volume= 4.890 af
Primary = 49.46 cfs @ 12.21 hrs, Volume= 4.890 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link PAP-2: AP-2



WATER QUALITY VOLUME (WQV) COMPUTATIONS FOR PDA-1A

Project: Proposed Solar Photovoltaic Array
Location: 250 Carter St., Manchester, CT
Date: 10/13/23

Water Quality Volume Calculations:

$$WQV = \frac{(1")(R)(A)}{12}$$

Where:
WQV = water quality volume (ac-ft)
R = volumentric runoff coefficient = 0.05+0.009(I)
I = percent impervious cover (see below)
A = site area in acres

$$I = \frac{A_{IMP}}{A_{TOT}} \times 100$$

Where:
I = percent impervious cover
A_{IMP} = area of impervious cover
A_{TOT} = total area of watershed

Watershed Description:	PDA-1A to B-1			
Area of impervious coverage, A_{IMP}	0.26	Acres		
Total area of watershed, A_{TOT}	11.40	Acres		
Percent impverious cover, I	2.28	%		
Volumentric runoff coefficient, R	0.07			
Water Quality Volume, WQV	0.067	ac-ft	2,919	cf

NOAA Atlas 14, Volume 10, Version 3
Location name: Town of Manchester, Connecticut, USA*
Latitude: 41.7621°, Longitude: -72.4704°
Elevation: m/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	0.331 (0.255-0.427)	0.403 (0.310-0.520)	0.520 (0.399-0.674)	0.617 (0.471-0.805)	0.751 (0.556-1.02)	0.851 (0.620-1.18)	0.957 (0.677-1.38)	1.08 (0.722-1.58)	1.25 (0.808-1.90)	1.39 (0.881-2.16)
10-min	0.469 (0.362-0.605)	0.570 (0.439-0.737)	0.736 (0.565-0.955)	0.873 (0.666-1.14)	1.06 (0.788-1.45)	1.21 (0.877-1.68)	1.36 (0.960-1.96)	1.53 (1.02-2.24)	1.77 (1.15-2.69)	1.97 (1.25-3.06)
15-min	0.552 (0.425-0.712)	0.671 (0.517-0.867)	0.866 (0.665-1.12)	1.03 (0.785-1.34)	1.25 (0.927-1.70)	1.42 (1.03-1.97)	1.60 (1.13-2.30)	1.80 (1.20-2.64)	2.08 (1.35-3.17)	2.32 (1.47-3.60)
30-min	0.746 (0.575-0.963)	0.907 (0.699-1.17)	1.17 (0.899-1.52)	1.39 (1.06-1.81)	1.69 (1.25-2.30)	1.92 (1.40-2.67)	2.16 (1.53-3.11)	2.43 (1.63-3.57)	2.82 (1.82-4.28)	3.14 (1.98-4.87)
60-min	0.940 (0.725-1.21)	1.14 (0.881-1.48)	1.48 (1.13-1.92)	1.75 (1.34-2.29)	2.13 (1.58-2.90)	2.42 (1.76-3.36)	2.72 (1.92-3.92)	3.06 (2.05-4.50)	3.55 (2.30-5.40)	3.95 (2.50-6.13)
2-hr	1.21 (0.941-1.56)	1.47 (1.14-1.89)	1.88 (1.45-2.43)	2.23 (1.71-2.89)	2.70 (2.02-3.67)	3.06 (2.24-4.24)	3.44 (2.46-4.96)	3.89 (2.62-5.69)	4.57 (2.97-6.92)	5.15 (3.27-7.94)
3-hr	1.40 (1.09-1.79)	1.69 (1.31-2.17)	2.16 (1.68-2.78)	2.56 (1.97-3.31)	3.10 (2.32-4.20)	3.50 (2.58-4.86)	3.94 (2.83-5.69)	4.47 (3.01-6.51)	5.28 (3.43-7.96)	5.98 (3.80-9.18)
6-hr	1.77 (1.38-2.25)	2.14 (1.67-2.72)	2.74 (2.13-3.50)	3.23 (2.50-4.16)	3.92 (2.95-5.29)	4.42 (3.28-6.11)	4.98 (3.60-7.16)	5.66 (3.83-8.20)	6.71 (4.38-10.0)	7.62 (4.86-11.6)
12-hr	2.18 (1.72-2.77)	2.65 (2.08-3.36)	3.42 (2.67-4.35)	4.05 (3.15-5.18)	4.92 (3.72-6.60)	5.56 (4.14-7.63)	6.26 (4.55-8.95)	7.12 (4.84-10.3)	8.44 (5.52-12.6)	9.58 (6.13-14.5)
24-hr	2.57 (2.03-3.24)	3.16 (2.49-3.98)	4.12 (3.24-5.21)	4.91 (3.84-6.25)	6.00 (4.57-8.02)	6.81 (5.09-9.30)	7.69 (5.62-11.0)	8.79 (5.99-12.6)	10.5 (6.88-15.5)	12.0 (7.68-18.0)
2-day	2.90 (2.30-3.64)	3.61 (2.87-4.54)	4.78 (3.78-6.02)	5.75 (4.52-7.28)	7.08 (5.42-9.44)	8.06 (6.07-11.0)	9.14 (6.75-13.0)	10.5 (7.20-15.0)	12.8 (8.40-18.7)	14.7 (9.49-22.0)
3-day	3.15 (2.51-3.94)	3.93 (3.13-4.92)	5.22 (4.14-6.55)	6.28 (4.95-7.93)	7.74 (5.95-10.3)	8.81 (6.66-12.0)	10.0 (7.41-14.2)	11.6 (7.91-16.4)	14.0 (9.26-20.5)	16.3 (10.5-24.2)
4-day	3.38 (2.70-4.21)	4.21 (3.36-5.26)	5.57 (4.43-6.98)	6.70 (5.30-8.44)	8.26 (6.36-11.0)	9.40 (7.12-12.8)	10.7 (7.92-15.1)	12.3 (8.44-17.4)	15.0 (9.88-21.8)	17.3 (11.2-25.7)
7-day	3.99 (3.20-4.96)	4.93 (3.95-6.13)	6.46 (5.15-8.05)	7.72 (6.13-9.68)	9.47 (7.31-12.5)	10.7 (8.15-14.5)	12.2 (9.03-17.1)	14.0 (9.62-19.6)	16.9 (11.2-24.4)	19.4 (12.6-28.6)
10-day	4.62 (3.71-5.72)	5.61 (4.50-6.96)	7.22 (5.78-8.99)	8.57 (6.82-10.7)	10.4 (8.05-13.6)	11.8 (8.94-15.8)	13.3 (9.83-18.5)	15.1 (10.4-21.2)	18.1 (12.0-26.1)	20.6 (13.4-30.3)
20-day	6.61 (5.35-8.15)	7.67 (6.20-9.47)	9.40 (7.57-11.6)	10.8 (8.67-13.5)	12.8 (9.92-16.6)	14.3 (10.8-18.8)	15.9 (11.7-21.6)	17.7 (12.3-24.5)	20.3 (13.5-29.1)	22.5 (14.7-32.8)
30-day	8.32 (6.75-10.2)	9.40 (7.62-11.6)	11.2 (9.03-13.8)	12.7 (10.2-15.7)	14.7 (11.4-18.8)	16.2 (12.3-21.2)	17.8 (13.0-24.0)	19.5 (13.6-26.9)	21.9 (14.6-31.1)	23.7 (15.5-34.5)
45-day	10.5 (8.51-12.8)	11.6 (9.41-14.2)	13.4 (10.9-16.5)	14.9 (12.0-18.4)	17.0 (13.2-21.7)	18.6 (14.1-24.1)	20.2 (14.8-26.9)	21.8 (15.3-30.0)	23.9 (16.0-33.8)	25.4 (16.6-36.6)
60-day	12.3 (10.0-15.0)	13.4 (10.9-16.4)	15.3 (12.4-18.8)	16.8 (13.6-20.8)	19.0 (14.8-24.1)	20.7 (15.7-26.6)	22.3 (16.2-29.4)	23.8 (16.7-32.6)	25.6 (17.2-36.2)	26.9 (17.6-38.8)

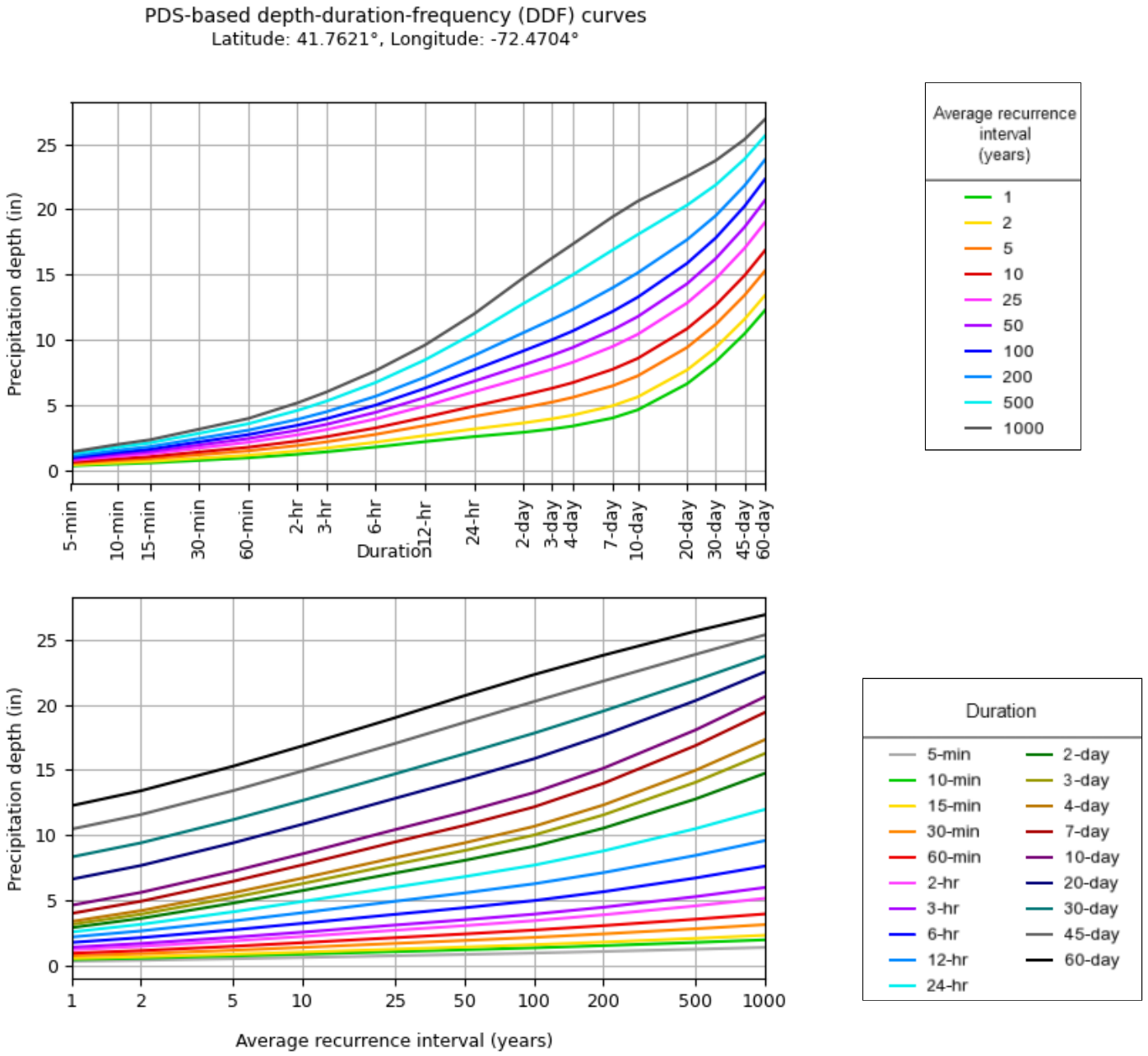
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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.

Back to Top

PF graphical

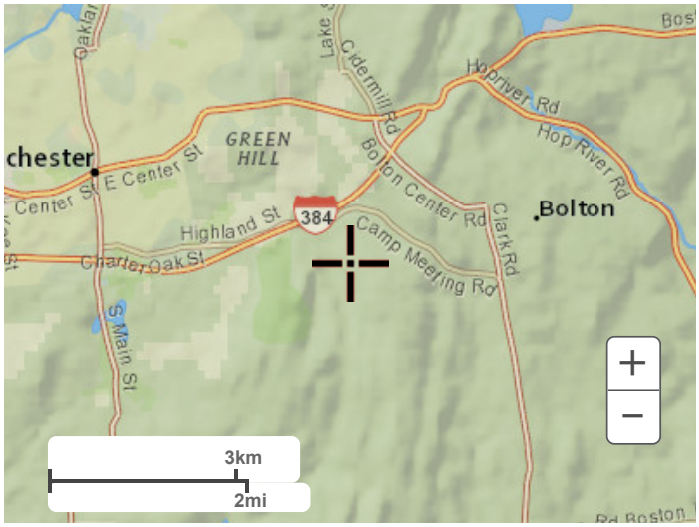


NOAA Atlas 14, Volume 10, Version 3 Created (GMT): Tue Sep 26 13:51:21 2023

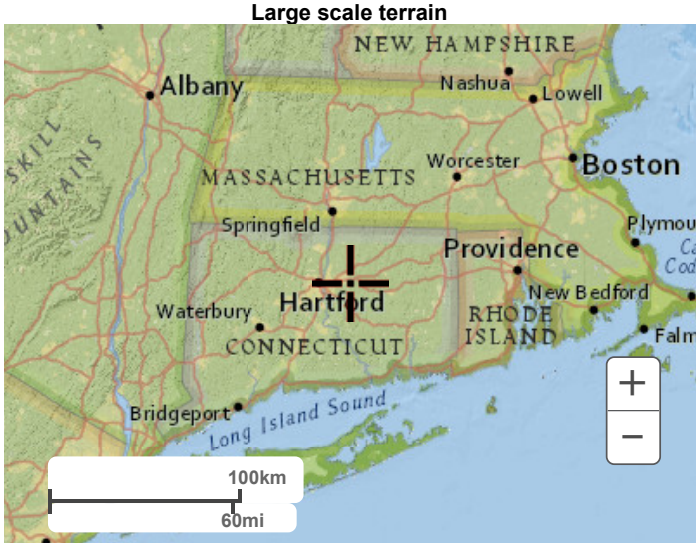
Back to Top

Maps & aerials

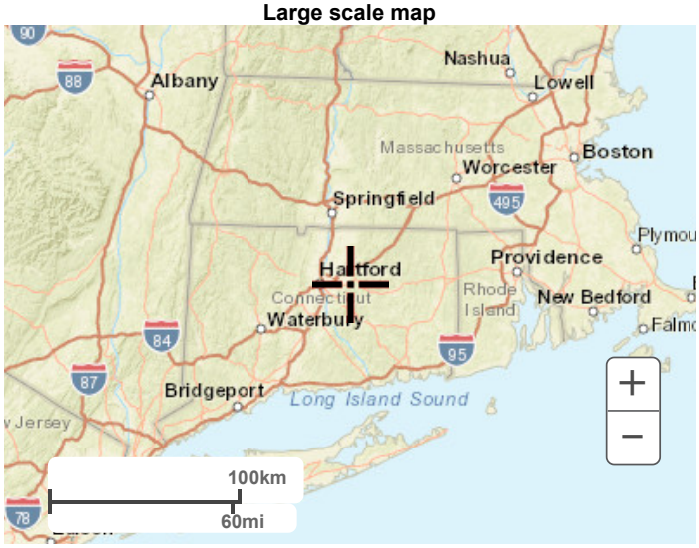
Small scale terrain



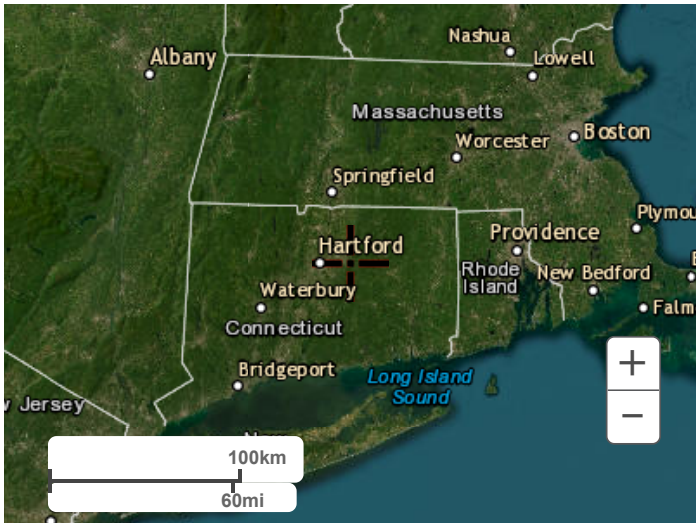
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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