Exhibit F

STORMWATER MANAGEMENT MEMO

PROPOSED

OLD AMSTON ROAD FUEL CELL

POWER PLANT PROJECT

42 OLD AMSTON ROAD
COLCHESTER, CONNECTICUT
NEW LONDON COUNTY

Prepared for:

ReNew Developers, LLC
123 Salem Road
Colchester, CT 06415

Prepared by:

All-Points Technology Corporation, P.C.
567 Vauxhall Street Extension, Suite 311
Waterford, CT 06385

July 2022

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Introduction

At the request of ReNew Developers, LLC, All-Points Technology Corporation, P.C. ("APT") has undertaken analysis of and design to address stormwater impacts resulting from development of a fuel cell power plant facility with a combined output of approximately 4.99 megawatts (MW) alternating current (AC) herein referred to as Old Amston Road Fuel Cell Power Plant (the "Project") located off of Old Amston Road, in Colchester, Connecticut (the "Site").

The purpose of this report is to provide an analysis of the potential stormwater drainage impacts associated with the Project, as well as a description of the design to mitigate such potential stormwater drainage impacts. The design is intended to be in full compliance with the State and Town regulations while taking prevailing site conditions and practical factors into account.

Existing Site Conditions

The Site is located on one (1) privately-owned irregular shaped parcel that encompasses approximately 1.15 acres identified as 42 Old Amston Road. The Project will be entirely located within the eastern portion of the property within an existing short grass area, currently undeveloped. Project limit of disturbance is approximately 0.69± acre of the overall site area. See Appendix A for an Overall Site Plan.

The Project area's existing topography gradually slopes between 0.5%-1% down in a northeast to south/southwest direction, with ground elevations ranging from approximately 85 feet above mean sea level ("AMSL") on its northeast corner to approximately 79 feet AMSL on the southwest corner of the Site.

Developed Site Conditions

The Project will be constructed in the eastern portion of the Site, entirely within the existing short grass area. Access to the Project will be provided via one (1) new 15-foot-wide gravel drive off of an existing gravel access drive on the adjacent property at the eastern edge of the Site area. An additional 7-foot-wide gravel walking path is proposed that ties into the existing gravel drive as well. The Project includes the installation of fuel cell equipment and associated fencing, access road and utility and stormwater management features, within 0.69± acre of the Site. Due to the nature of the existing grass field, no clearing or grubbing is required for the development of the Project.

The proposed fuel cell equipment will be installed on concrete pads within a fenced gravel equipment compound. Fill & gravel will be imported to create the compound grades and the post-development site conditions will mimic the pre-developed site conditions. Any existing ground cover outside of the gravel compound that is disturbed during construction will be reseeded with New England semi-shade grass & forbs mix, or approved equal.

Stormwater Management

Analysis Methodology

The 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. Hydrographs were developed for the NOAA Atlas 14, Volume 10, Version 2 Precipitation 2-, 25-, 50-, and 100-year storm event with rainfall depths of 3.41, 6.25, 7.06, and 7.93 inches respectively.

The existing and proposed drainage areas used in the calculations are illustrated on the Existing and Proposed Drainage Area Maps (EDA-1 & PDA-1). These maps and the corresponding HydroCAD output are attached.

Existing Drainage Patterns

The proposed Project area drains generally from the northeast to the southwest, ultimately to a wetland system to the south of the Site. The Site was modeled to discharge at two (2) Analysis Points, "AP-1" associated with wetland system to the south and "AP-2" associated with an existing catch basin in Old Amston Road located to the northwest of the property. Peak discharges have been computed at the points of study for the 2-, 25-, 50-, and 100-year storm events.

The Project area soils identified by the United States Department of Agriculture (USDA) Natural Resources Conservation Service consists of map unit symbols 38E, 306 and 61B. 38E is classified as "Hinckley loamy sand, 15 to 45 percent slopes" and has a HSG rating of "A". 306 is classified as "Udorthents-Urban land complex" and has a HSG rating of "B". 61B is classified as "Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony" and has a HSG rating of "B". Specific details for each soil Map Unit Symbol are provided in Appendix B.

The pre-developed discharges at the Analysis Points are tabulated in Table 1.

Table 1

Analysis Point	**Pre-developed Peak Storm Runoff (Q), cubic feet per second (cfs)**			
	2-year	**25-year**	**50-year**	**100-year**
AP-1	2.31	6.08	7.19	8.40
AP-2	0.79	2.36	2.85	3.37

Proposed Drainage Patterns

The Project will require no clearing and grubbing for the installation of the fuel cell power plant facility. All disturbed areas outside of the fuel cell equipment compound, including necessary utilities and stormwater management features will be reseeded utilizing a New England semi-shade grass & forbs mix, or approved equal.

Hydrologically, the post-developed condition is designed to mimic the pre-developed condition. To manage the increase in post-development runoff due to the change in cover type within the fenced gravel compound limits, one (1) grass-lined stormwater management basin is proposed. Basin B-1 is located west and southwest of the fuel cell equipment compound. The fuel cell equipment compound has been graded to direct water to the basin. The basin has been designed to provide the required Water Quality Volume (WQV) needed for the proposed impervious surfaces associated with the gravel access drive and concrete equipment pads. Flow and volume control out of the basin is provided via a rip-rap lined overflow weir and level spreader. See attached calculations.

Since the proposed development mimics the existing conditions, the post-development condition was modeled using the same Analysis Point. Peak discharges have been computed at AP-1 & AP-2 for the 2-year, 25-year, 50-year, and 100-year storm events. The post-development discharges at AP-1 are tabulated in Table 2.

Table 2

Analysis Point	**Post-developed Peak Storm Runoff (Q), cubic feet per second (cfs)**			
	2-year	**25-year**	**50-year**	**100-year**
AP-1	0.34	4.92	6.04	7.21
AP-2	0.75	2.28	2.70	3.20

The reduction in runoff achieved by the post-development discharges in comparison with the pre-development discharges are tabulated in Table 3.

Table 3

Analysis Point	**Peak Storm Runoff (Q) Comparison Pre- and Post-, Percent Reduction**			
	2-year	**25-year**	**50-year**	**100-year**
AP-1	-85%	-19%	-16%	-14%
AP-2	-5%	-3%	-5%	-5%

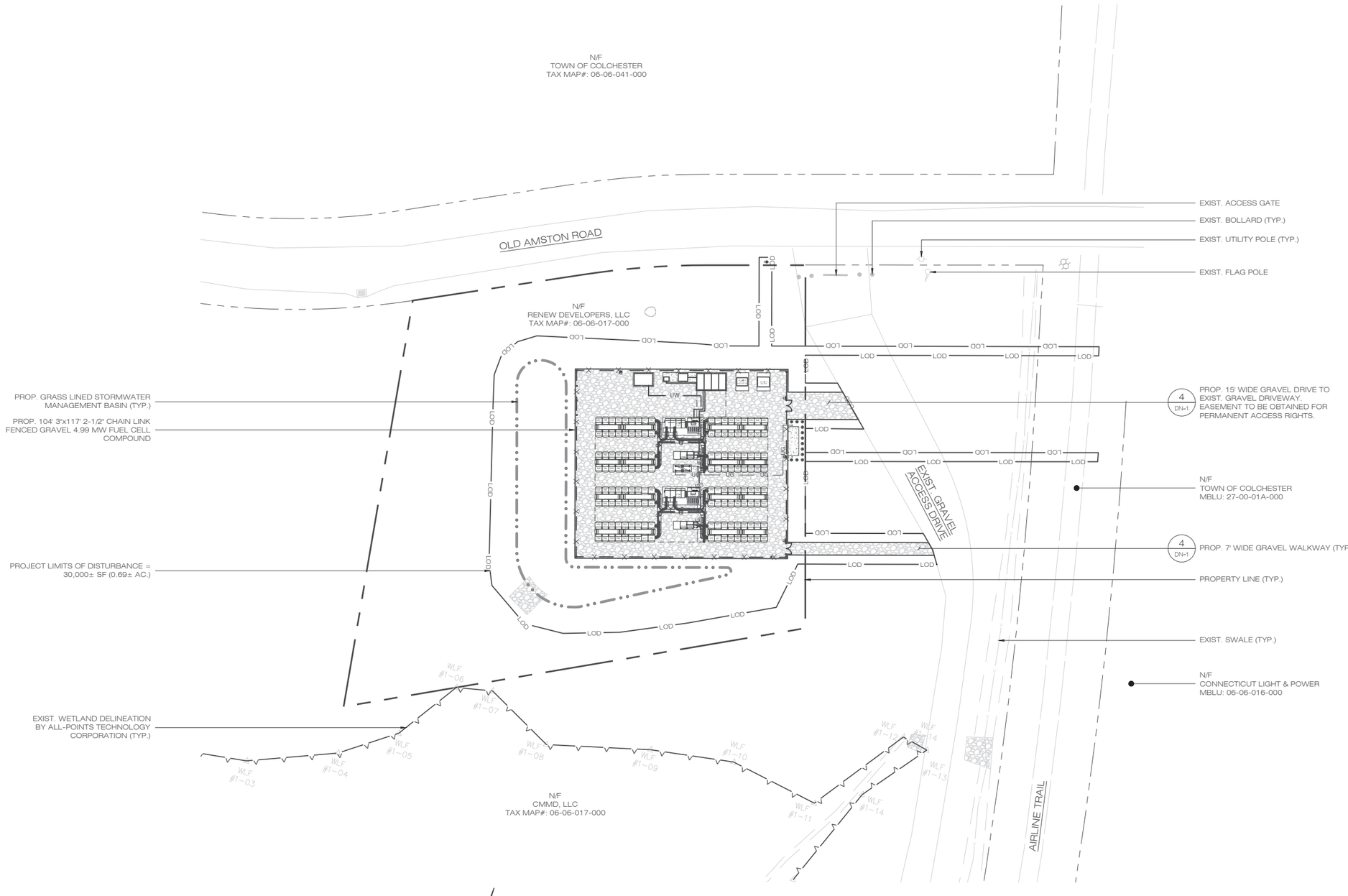
Sediment and Erosion Control During Construction

For drainage areas that are under 1.0-acre, sediment and erosion control will be provided by perimeter compost filter socks.

Conclusion

The stormwater management for the proposed site 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. As a result, the proposed fuel cell power plant facility will not result in any adverse conditions to the surrounding areas and properties.

APPENDIX A: OVERALL SITE PLAN



ReNew DEVELOPERS, LLC

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CSC PERMIT SET

NO	DATE	REVISION
0	07/19/22	FOR PERMIT: RCB
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: ROBERT C. BURNS, P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: RENEW DEVELOPERS, LLC
ADDRESS: 123 SALEM ROAD COLCHESTER, CT 06415

OLD AMSTON ROAD FUEL CELL POWER PLANT

SITE ADDRESS: 42 OLD AMSTON ROAD COLCHESTER, CT 06415

APT FILING NUMBER: CT716100

DRAWN BY: CSH

DATE: 07/19/22 CHECKED BY: RCB

SHEET TITLE:

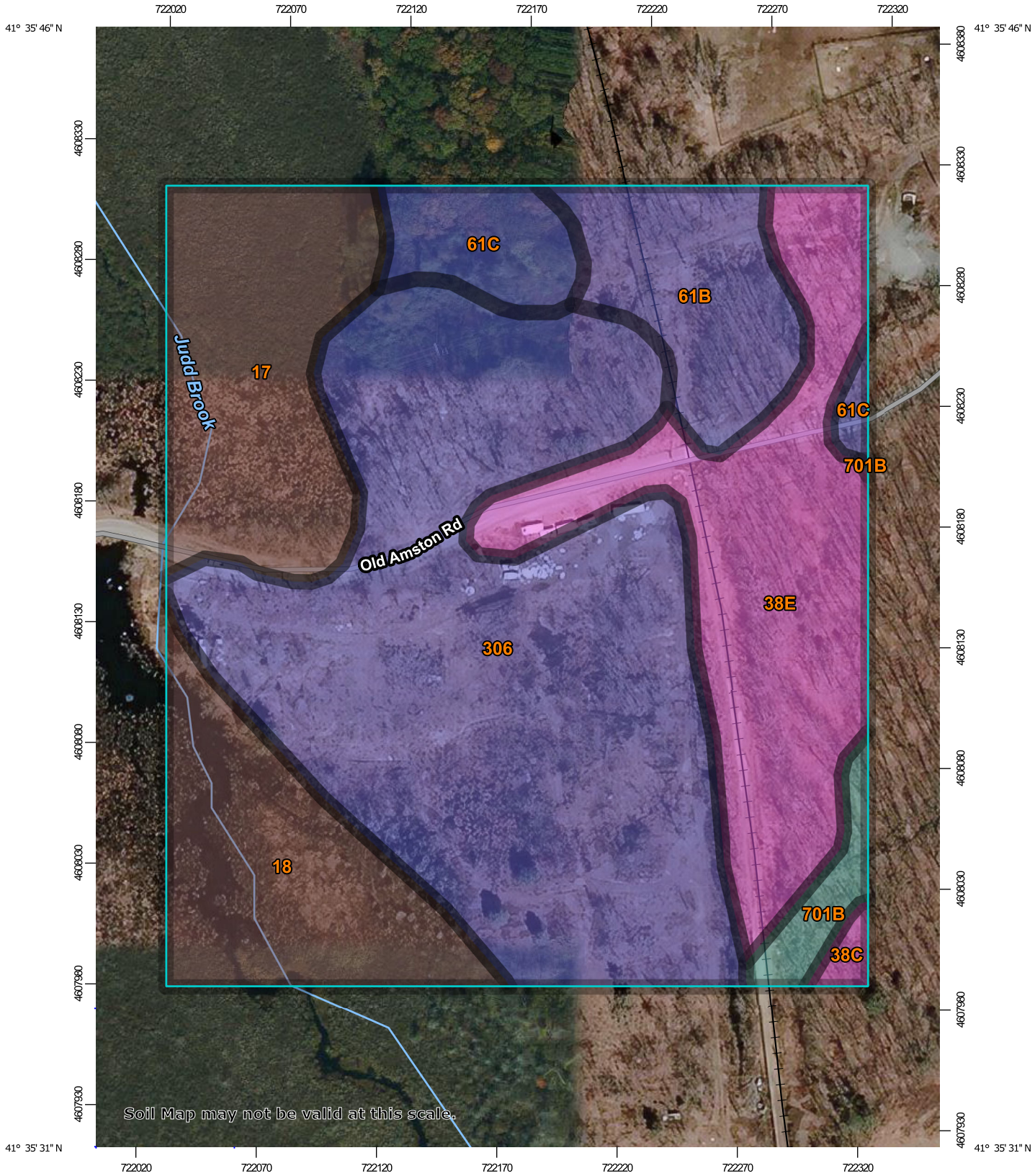
OVERALL LOCUS MAP

SHEET NUMBER:

OP-1

APPENDIX B: NRCS SOIL SURVEY

Hydrologic Soil Group—State of Connecticut
(Colchester_Old Amston)



Map Scale: 1:2,260 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Mar 20, 2019—Oct 25, 2020

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
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	B/D	3.1	12.7%
18	Catden and Freetown soils, 0 to 2 percent slopes	B/D	2.7	11.1%
38C	Hinckley loamy sand, 3 to 15 percent slopes	A	0.1	0.5%
38E	Hinckley loamy sand, 15 to 45 percent slopes	A	4.5	18.7%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	B	1.8	7.6%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	B	1.0	4.3%
306	Udorthents-Urban land complex	B	10.4	43.2%
701B	Ninigret fine sandy loam, 3 to 8 percent slopes	C	0.5	2.0%
Totals for Area of Interest			**24.0**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

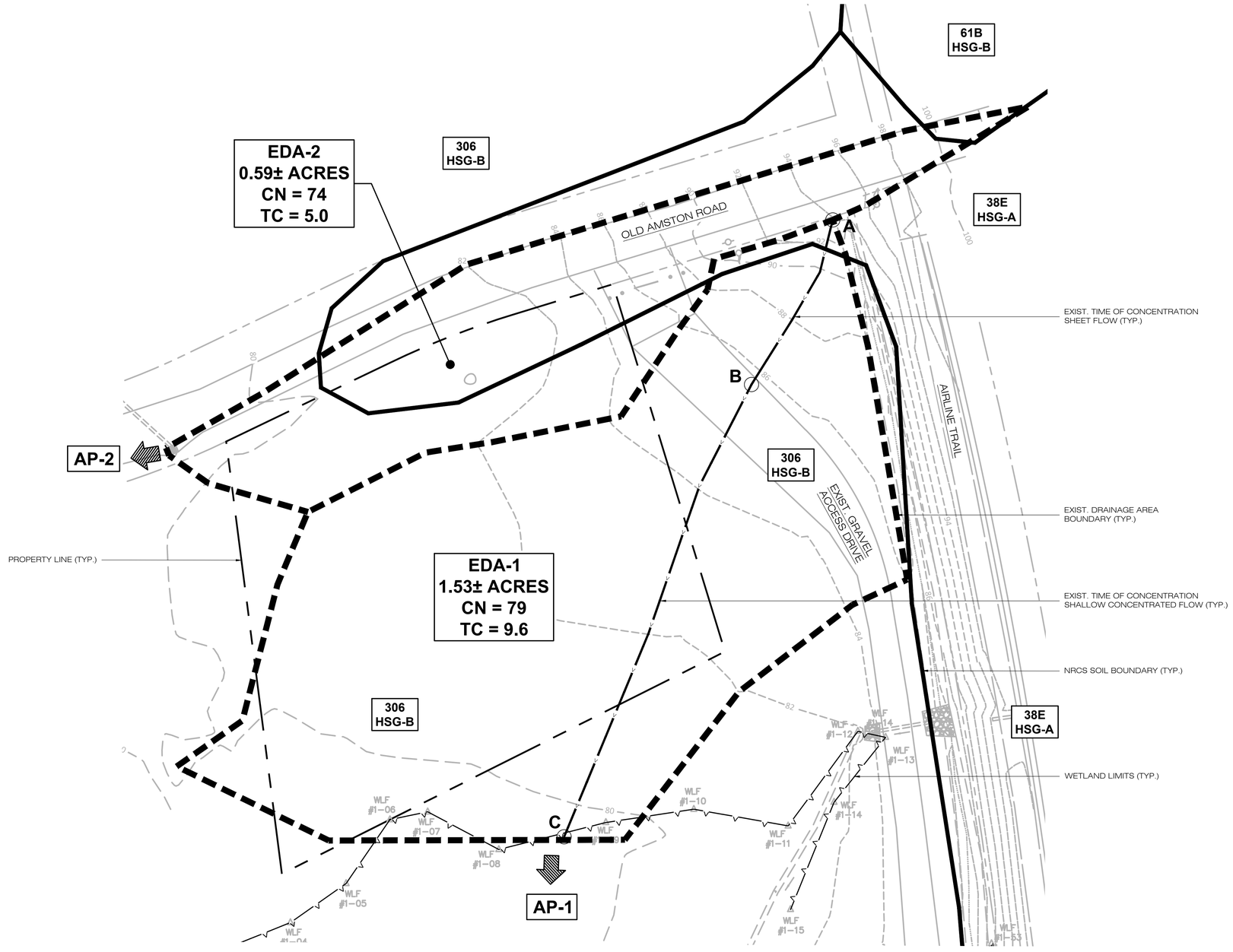
APPENDIX C: EXISTING DRAINAGE AREA MAP (EDA-1) & HYDROLOGIC COMPUTATION (HYDROCAD)

EXISTING DRAINAGE AREAS

	TOTAL AREA (ACRES)	COMPOSITE CN	TC (MINS.)
EDA-1	1.53	79	9.6
EDA-2	0.59	74	5.0

EXISTING CONDITION PEAK FLOWS

ANALYSIS POINT	2-YEAR (CFS)	25-YEAR (CFS)	50-YEAR (CFS)	100-YEAR (CFS)
AP-1	2.31	6.08	7.19	8.40
AP-2	0.79	2.36	2.85	3.37



1 EDA-1 **EXISTING DRAINAGE AREA MAP**
SCALE : 1" = 30'-0"

30 0 15 30 60
(IN FEET) 1 inch = 30 ft.

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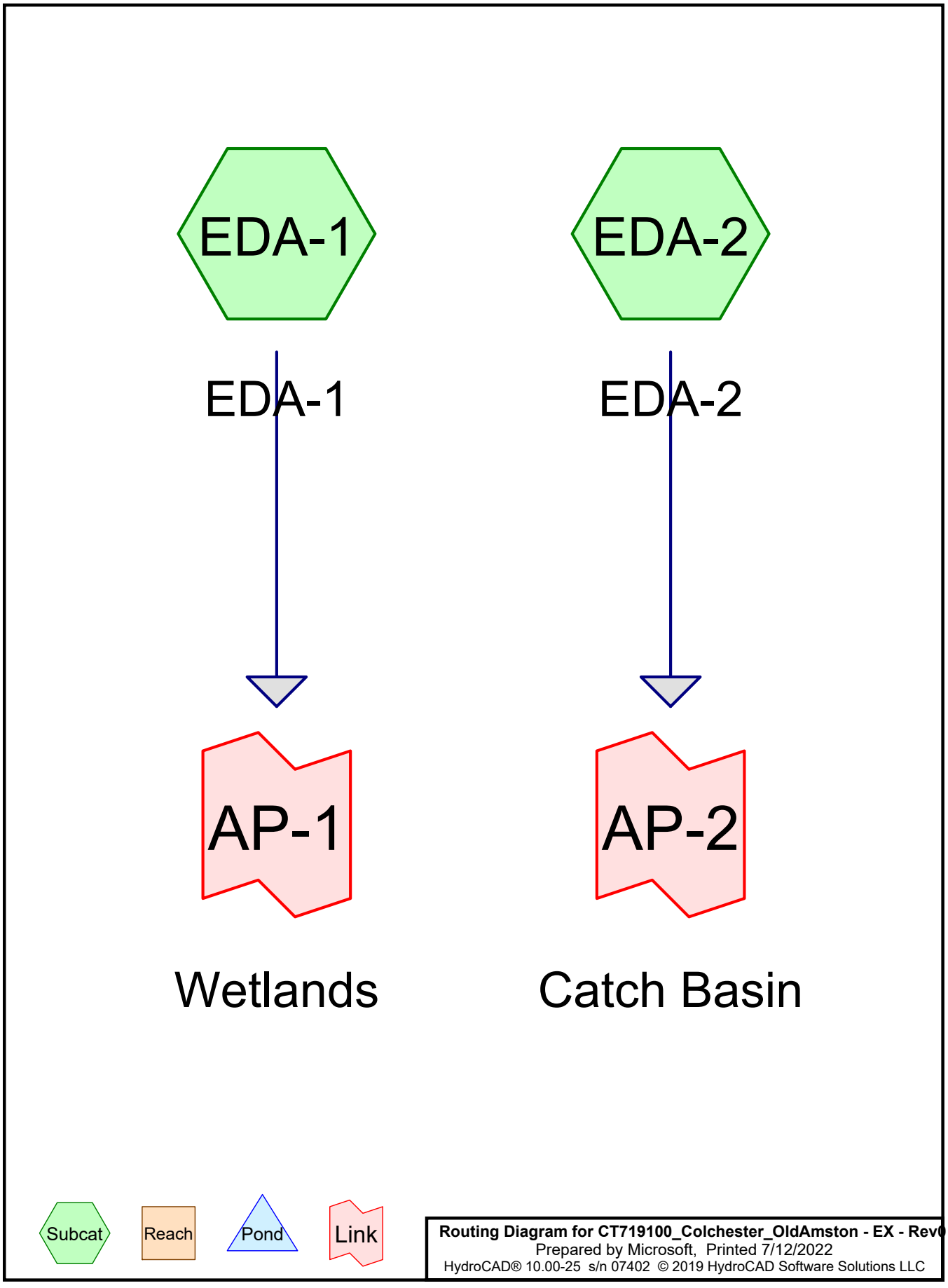
SHEET TITLE:
EXISTING DRAINAGE AREA MAP

SHEET NUMBER:
EDA-1



Routing Diagram for CT719100_Colchester_OldAmston - EX - Rev0
Prepared by Microsoft, Printed 7/12/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.165	49	50-75% Grass cover, Fair, HSG A (EDA-2)
0.211	69	50-75% Grass cover, Fair, HSG B (EDA-2)
0.015	68	<50% Grass cover, Poor, HSG A (EDA-1)
1.512	79	<50% Grass cover, Poor, HSG B (EDA-1)
0.026	96	Gravel surface, HSG A (EDA-2)
0.016	96	Gravel surface, HSG B (EDA-2)
0.166	98	Paved parking, HSG A (EDA-2)
0.009	98	Paved parking, HSG B (EDA-2)
2.120	**77**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.372	HSG A	EDA-1, EDA-2
1.748	HSG B	EDA-1, EDA-2
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.120		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.165	0.211	0.000	0.000	0.000	0.376	50-75% Grass cover, Fair	EDA-2
0.015	1.512	0.000	0.000	0.000	1.527	<50% Grass cover, Poor	EDA-1
0.026	0.016	0.000	0.000	0.000	0.042	Gravel surface	EDA-2
0.166	0.009	0.000	0.000	0.000	0.175	Paved parking	EDA-2
0.372	**1.748**	**0.000**	**0.000**	**0.000**	**2.120**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=1.527 ac 0.00% Impervious Runoff Depth=1.50"
Flow Length=355' Tc=9.6 min CN=79 Runoff=2.31 cfs 0.190 af

Subcatchment EDA-2: EDA-2 Runoff Area=0.593 ac 29.51% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=74 Runoff=0.79 cfs 0.058 af

Link AP-1: Wetlands Inflow=2.31 cfs 0.190 af
Primary=2.31 cfs 0.190 af

Link AP-2: Catch Basin Inflow=0.79 cfs 0.058 af
Primary=0.79 cfs 0.058 af

Total Runoff Area = 2.120 ac Runoff Volume = 0.249 af Average Runoff Depth = 1.41"
91.75% Pervious = 1.945 ac 8.25% Impervious = 0.175 ac

Summary for Subcatchment EDA-1: EDA-1

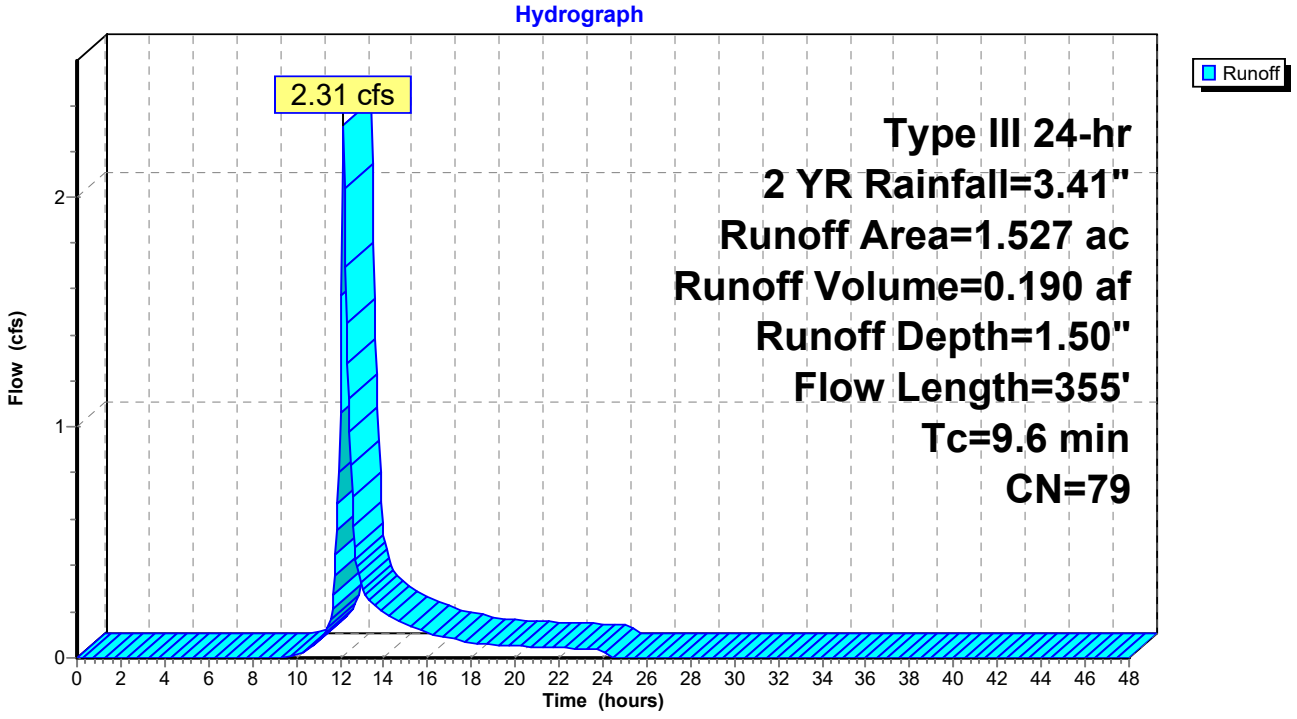
Runoff = 2.31 cfs @ 12.14 hrs, Volume= 0.190 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.41"

Area (ac)	CN	Description
0.015	68	<50% Grass cover, Poor, HSG A
0.459	79	<50% Grass cover, Poor, HSG B
1.053	79	<50% Grass cover, Poor, HSG B
1.527	79	Weighted Average
1.527		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.18"
4.0	255	0.0235	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.6	355	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

[49] Hint: Tc<2dt may require smaller dt

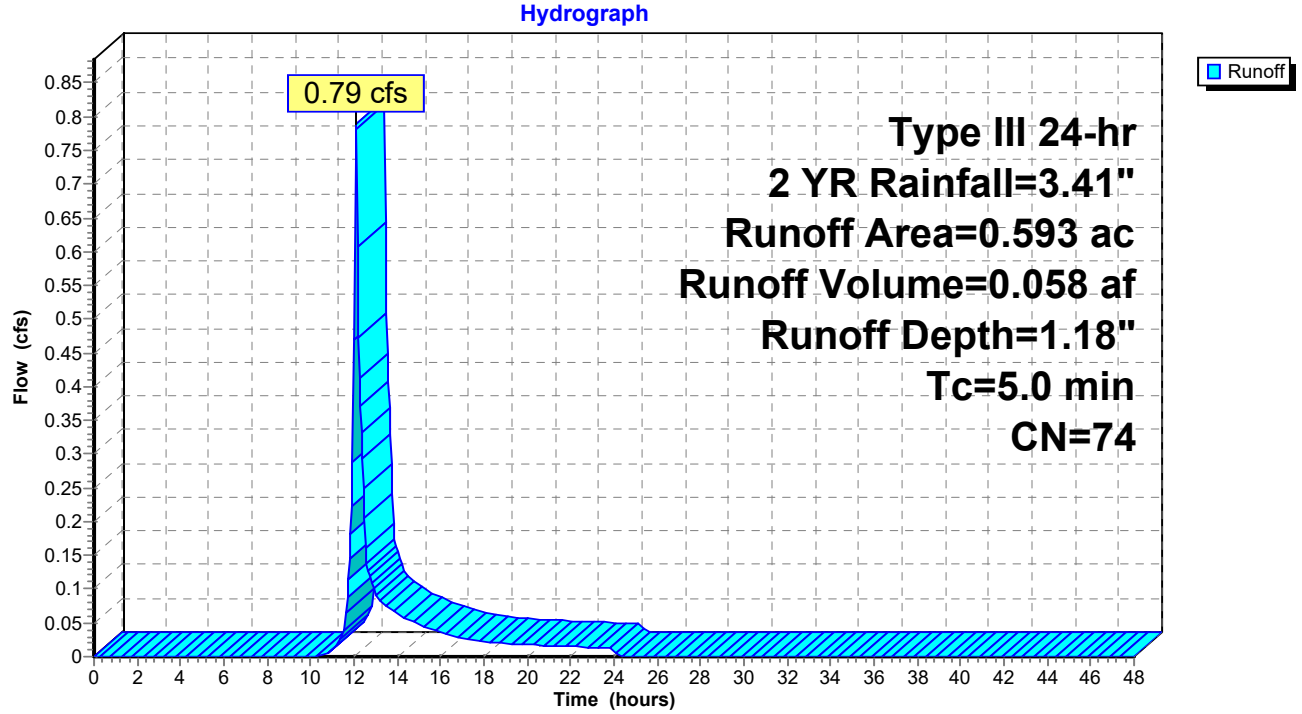
Runoff = 0.79 cfs @ 12.09 hrs, Volume= 0.058 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.41"

Area (ac)	CN	Description
0.166	98	Paved parking, HSG A
0.026	96	Gravel surface, HSG A
0.165	49	50-75% Grass cover, Fair, HSG A
0.009	98	Paved parking, HSG B
0.016	96	Gravel surface, HSG B
0.211	69	50-75% Grass cover, Fair, HSG B
0.593	74	Weighted Average
0.418		70.49% Pervious Area
0.175		29.51% Impervious Area

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

Subcatchment EDA-2: EDA-2

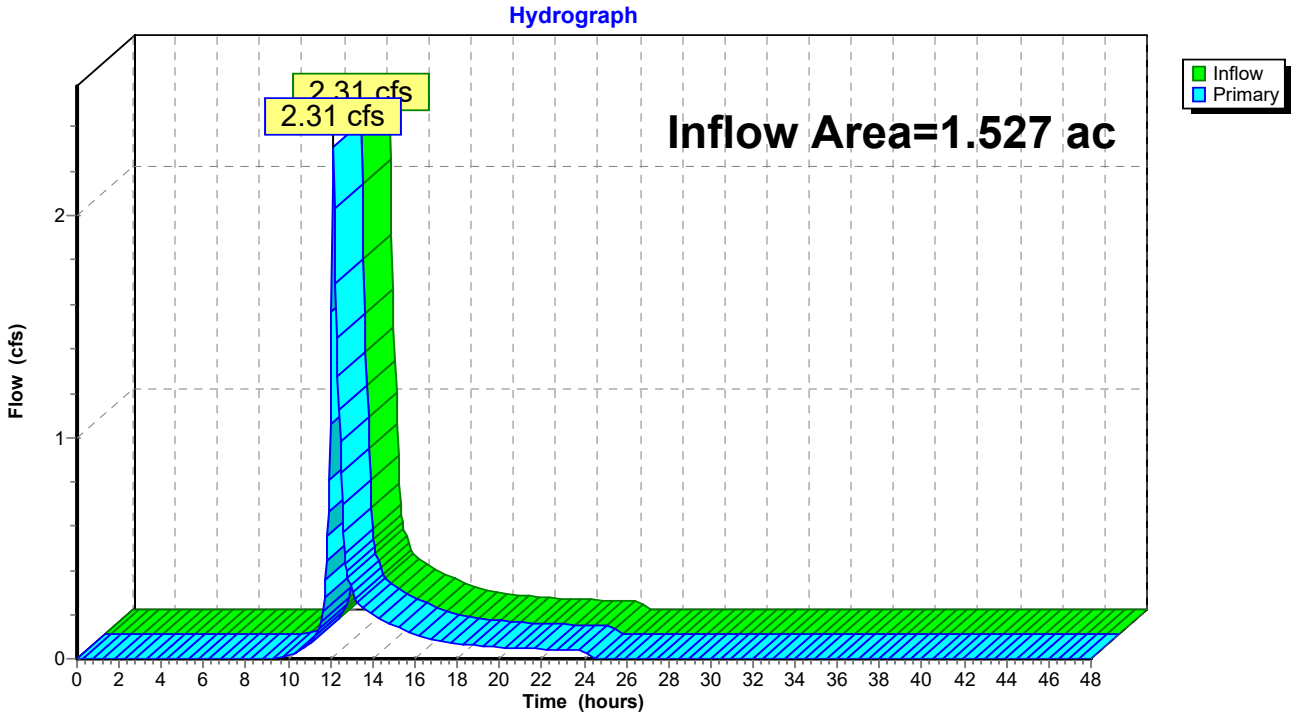


Summary for Link AP-1: Wetlands

Inflow Area = 1.527 ac, 0.00% Impervious, Inflow Depth = 1.50" for 2 YR event
Inflow = 2.31 cfs @ 12.14 hrs, Volume= 0.190 af
Primary = 2.31 cfs @ 12.14 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.0 min

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

Link AP-1: Wetlands

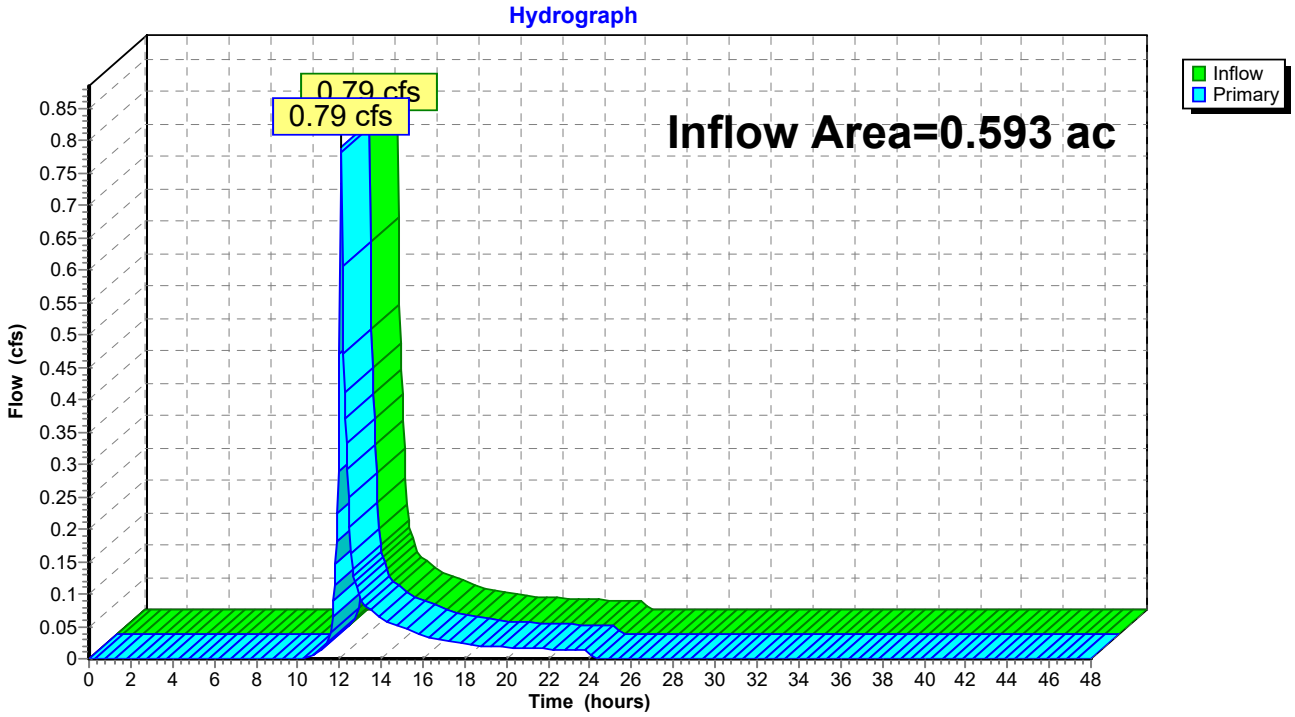


Summary for Link AP-2: Catch Basin

Inflow Area = 0.593 ac, 29.51% Impervious, Inflow Depth = 1.18" for 2 YR event
Inflow = 0.79 cfs @ 12.09 hrs, Volume= 0.058 af
Primary = 0.79 cfs @ 12.09 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

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

Link AP-2: Catch Basin



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=1.527 ac 0.00% Impervious Runoff Depth=3.90"
Flow Length=355' Tc=9.6 min CN=79 Runoff=6.08 cfs 0.497 af

Subcatchment EDA-2: EDA-2 Runoff Area=0.593 ac 29.51% Impervious Runoff Depth=3.40"
Tc=5.0 min CN=74 Runoff=2.36 cfs 0.168 af

Link AP-1: Wetlands Inflow=6.08 cfs 0.497 af
Primary=6.08 cfs 0.497 af

Link AP-2: Catch Basin Inflow=2.36 cfs 0.168 af
Primary=2.36 cfs 0.168 af

Total Runoff Area = 2.120 ac Runoff Volume = 0.665 af Average Runoff Depth = 3.76"
91.75% Pervious = 1.945 ac 8.25% Impervious = 0.175 ac

Summary for Subcatchment EDA-1: EDA-1

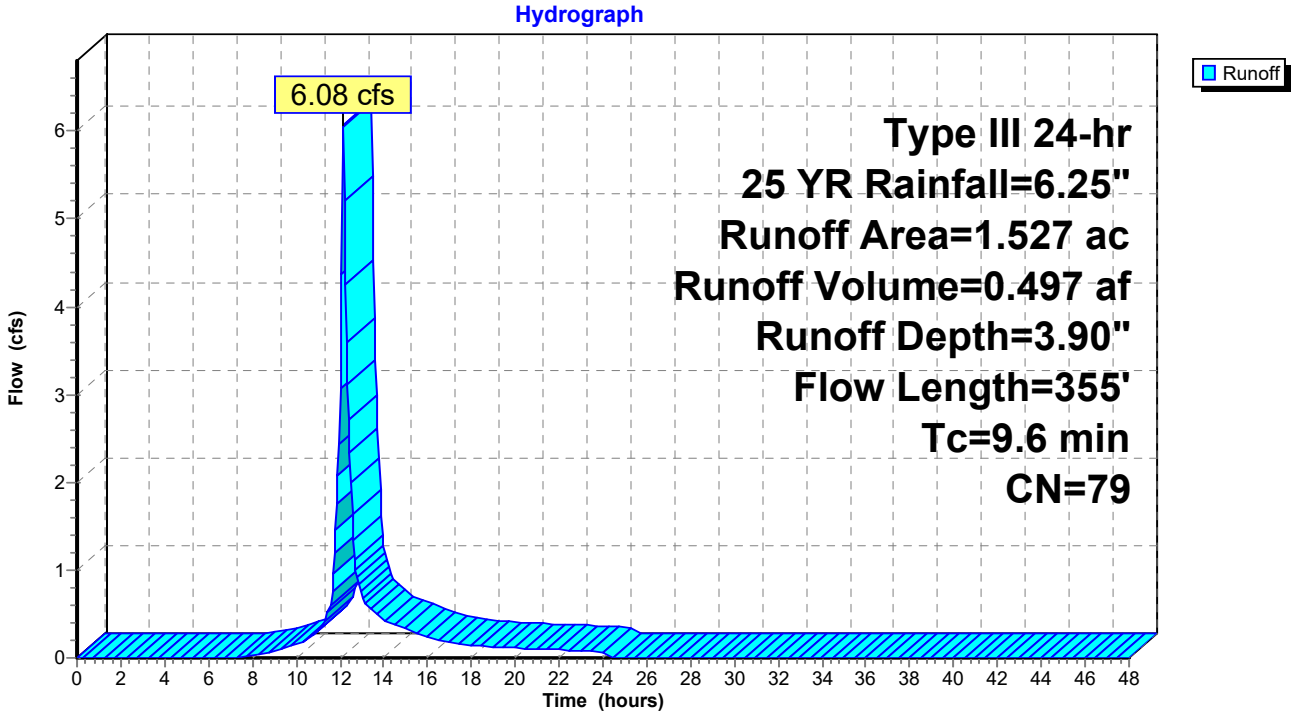
Runoff = 6.08 cfs @ 12.14 hrs, Volume= 0.497 af, Depth= 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.25"

Area (ac)	CN	Description
0.015	68	<50% Grass cover, Poor, HSG A
0.459	79	<50% Grass cover, Poor, HSG B
1.053	79	<50% Grass cover, Poor, HSG B
1.527	79	Weighted Average
1.527		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.18"
4.0	255	0.0235	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.6	355	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

[49] Hint: Tc<2dt may require smaller dt

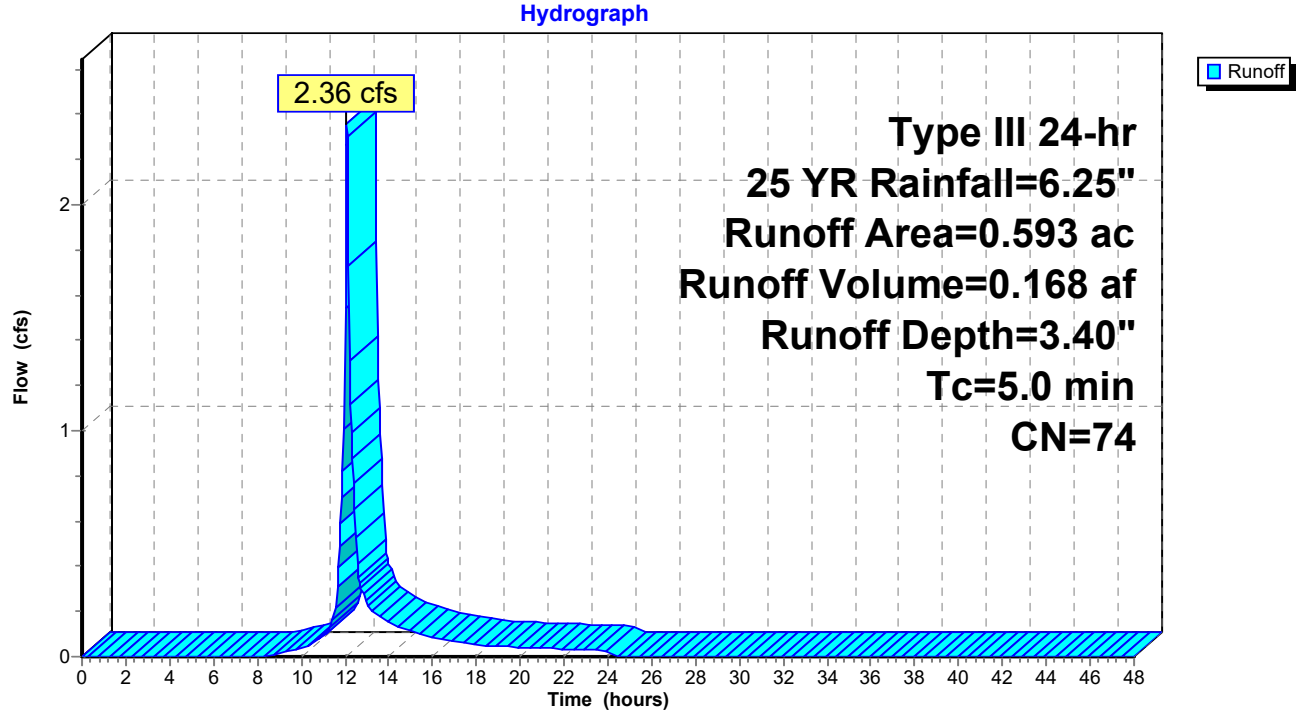
Runoff = 2.36 cfs @ 12.08 hrs, Volume= 0.168 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.25"

Area (ac)	CN	Description
0.166	98	Paved parking, HSG A
0.026	96	Gravel surface, HSG A
0.165	49	50-75% Grass cover, Fair, HSG A
0.009	98	Paved parking, HSG B
0.016	96	Gravel surface, HSG B
0.211	69	50-75% Grass cover, Fair, HSG B
0.593	74	Weighted Average
0.418		70.49% Pervious Area
0.175		29.51% Impervious Area

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

Subcatchment EDA-2: EDA-2

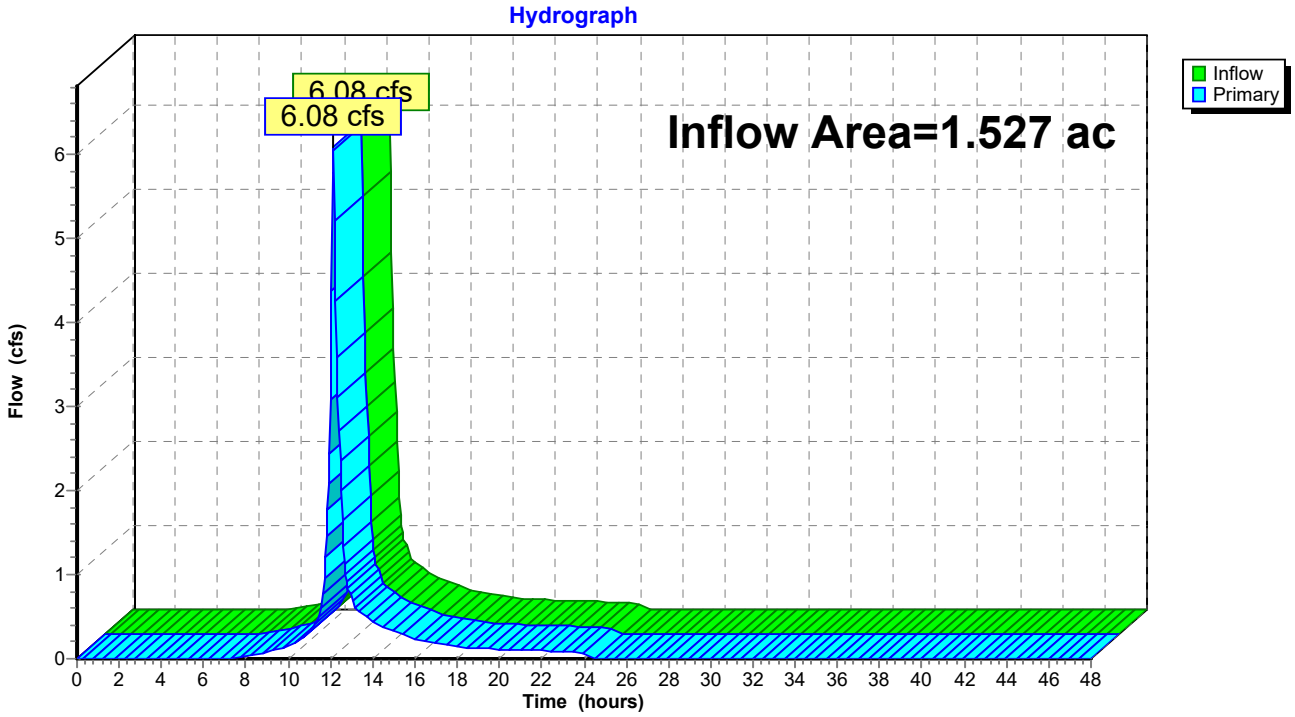


Summary for Link AP-1: Wetlands

Inflow Area = 1.527 ac, 0.00% Impervious, Inflow Depth = 3.90" for 25 YR event
Inflow = 6.08 cfs @ 12.14 hrs, Volume= 0.497 af
Primary = 6.08 cfs @ 12.14 hrs, Volume= 0.497 af, Atten= 0%, Lag= 0.0 min

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

Link AP-1: Wetlands

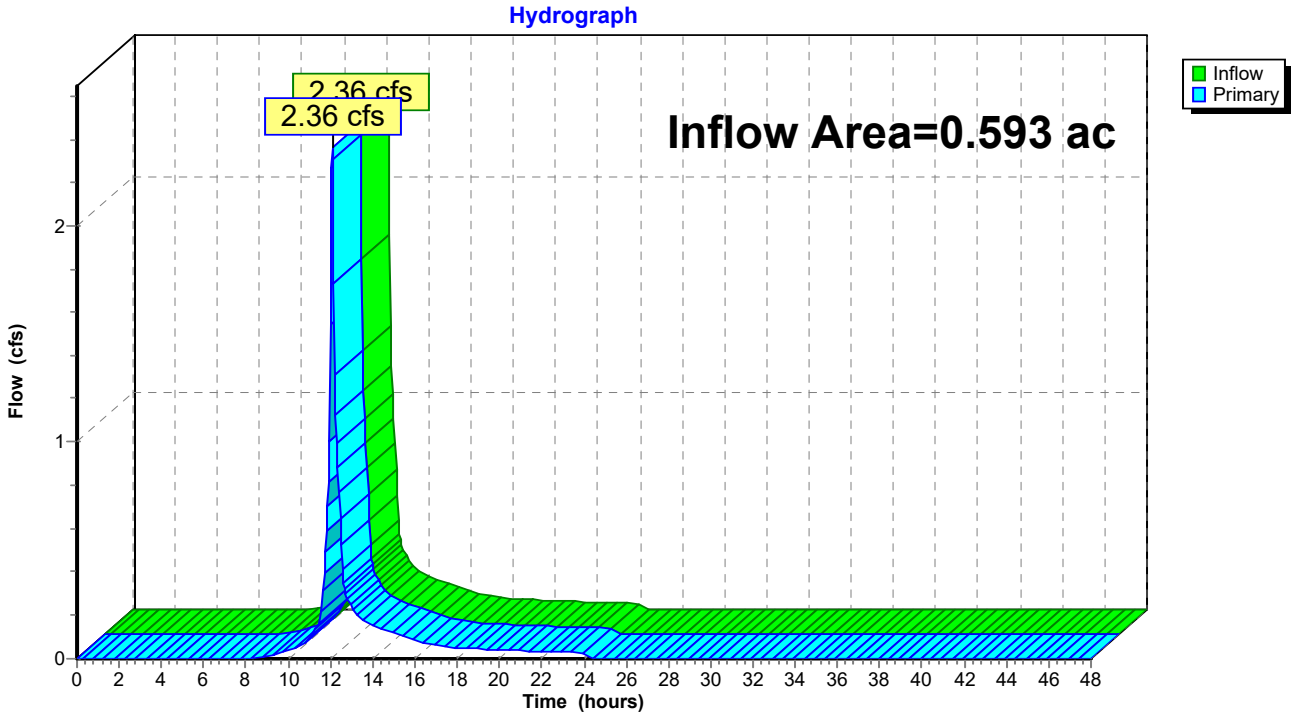


Summary for Link AP-2: Catch Basin

Inflow Area = 0.593 ac, 29.51% Impervious, Inflow Depth = 3.40" for 25 YR event
Inflow = 2.36 cfs @ 12.08 hrs, Volume= 0.168 af
Primary = 2.36 cfs @ 12.08 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min

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

Link AP-2: Catch Basin



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=1.527 ac 0.00% Impervious Runoff Depth=4.64"
Flow Length=355' Tc=9.6 min CN=79 Runoff=7.19 cfs 0.590 af

Subcatchment EDA-2: EDA-2 Runoff Area=0.593 ac 29.51% Impervious Runoff Depth=4.09"
Tc=5.0 min CN=74 Runoff=2.85 cfs 0.202 af

Link AP-1: Wetlands Inflow=7.19 cfs 0.590 af
Primary=7.19 cfs 0.590 af

Link AP-2: Catch Basin Inflow=2.85 cfs 0.202 af
Primary=2.85 cfs 0.202 af

Total Runoff Area = 2.120 ac Runoff Volume = 0.793 af Average Runoff Depth = 4.49"
91.75% Pervious = 1.945 ac 8.25% Impervious = 0.175 ac

Summary for Subcatchment EDA-1: EDA-1

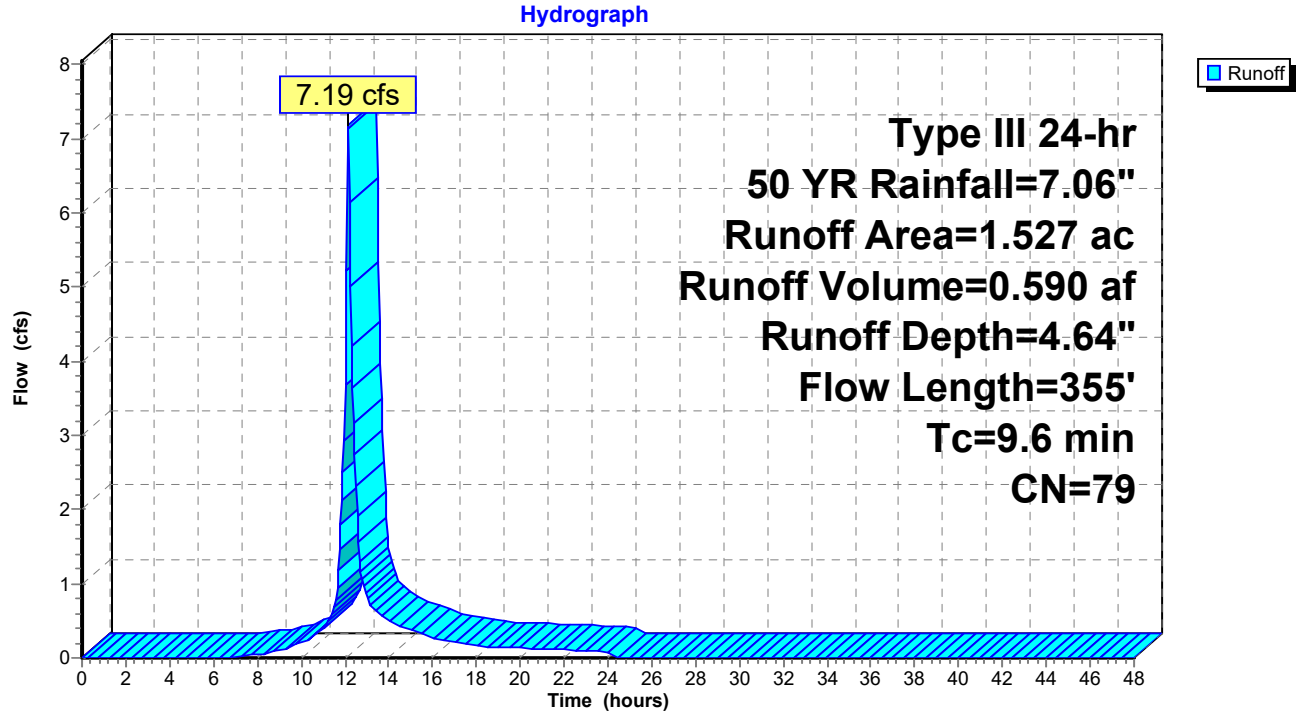
Runoff = 7.19 cfs @ 12.14 hrs, Volume= 0.590 af, Depth= 4.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.06"

Area (ac)	CN	Description
0.015	68	<50% Grass cover, Poor, HSG A
0.459	79	<50% Grass cover, Poor, HSG B
1.053	79	<50% Grass cover, Poor, HSG B
1.527	79	Weighted Average
1.527		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.18"
4.0	255	0.0235	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.6	355	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

[49] Hint: Tc<2dt may require smaller dt

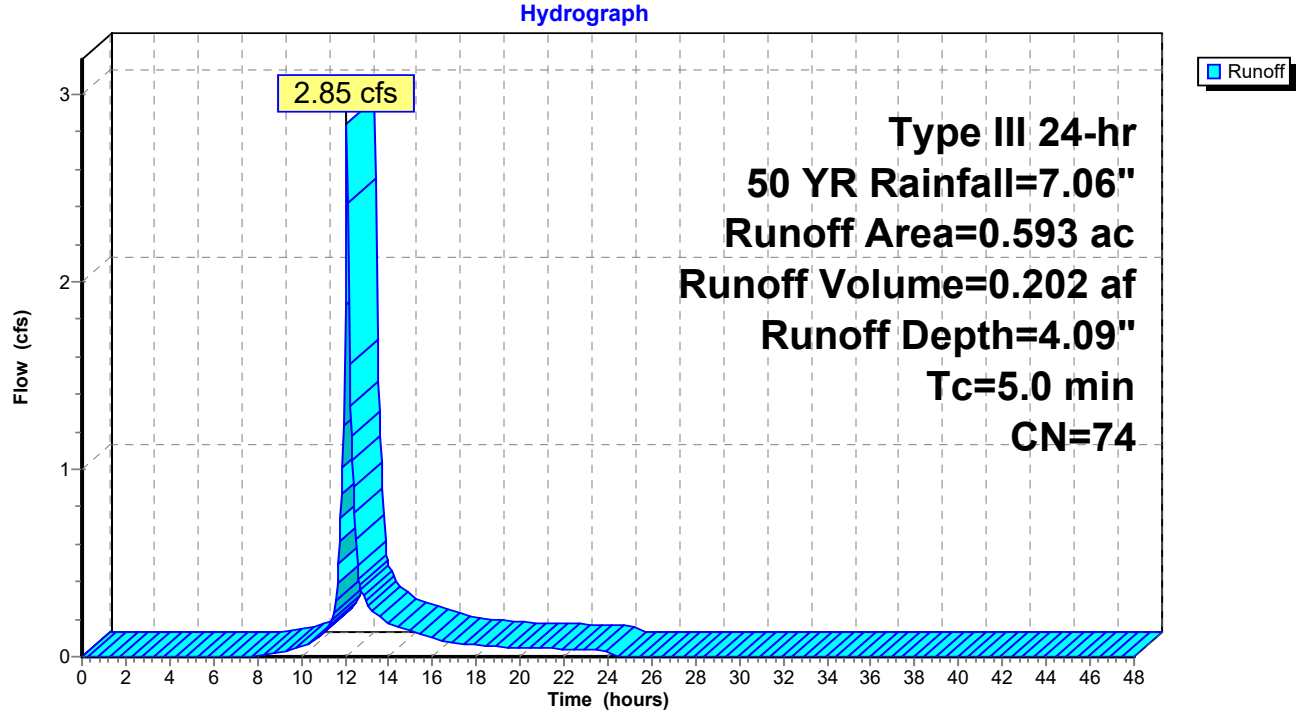
Runoff = 2.85 cfs @ 12.08 hrs, Volume= 0.202 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.06"

Area (ac)	CN	Description
0.166	98	Paved parking, HSG A
0.026	96	Gravel surface, HSG A
0.165	49	50-75% Grass cover, Fair, HSG A
0.009	98	Paved parking, HSG B
0.016	96	Gravel surface, HSG B
0.211	69	50-75% Grass cover, Fair, HSG B
0.593	74	Weighted Average
0.418		70.49% Pervious Area
0.175		29.51% Impervious Area

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

Subcatchment EDA-2: EDA-2

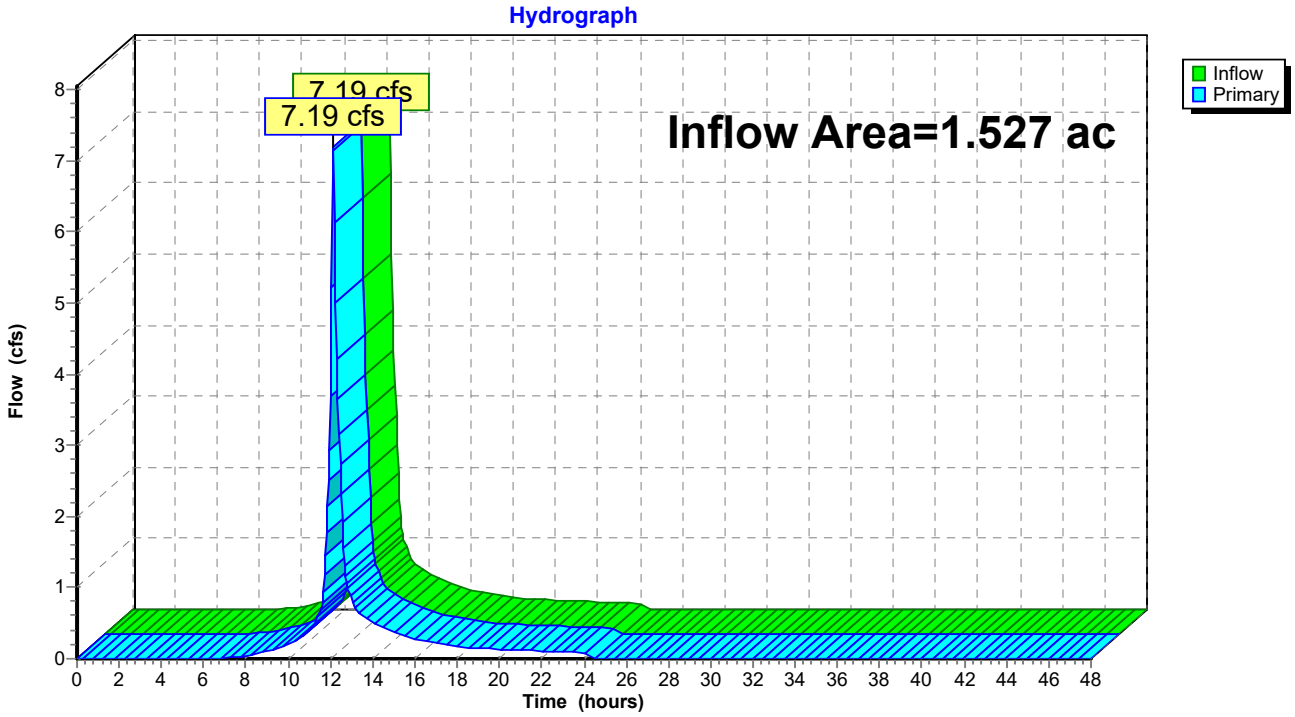


Summary for Link AP-1: Wetlands

Inflow Area = 1.527 ac, 0.00% Impervious, Inflow Depth = 4.64" for 50 YR event
Inflow = 7.19 cfs @ 12.14 hrs, Volume= 0.590 af
Primary = 7.19 cfs @ 12.14 hrs, Volume= 0.590 af, Atten= 0%, Lag= 0.0 min

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

Link AP-1: Wetlands

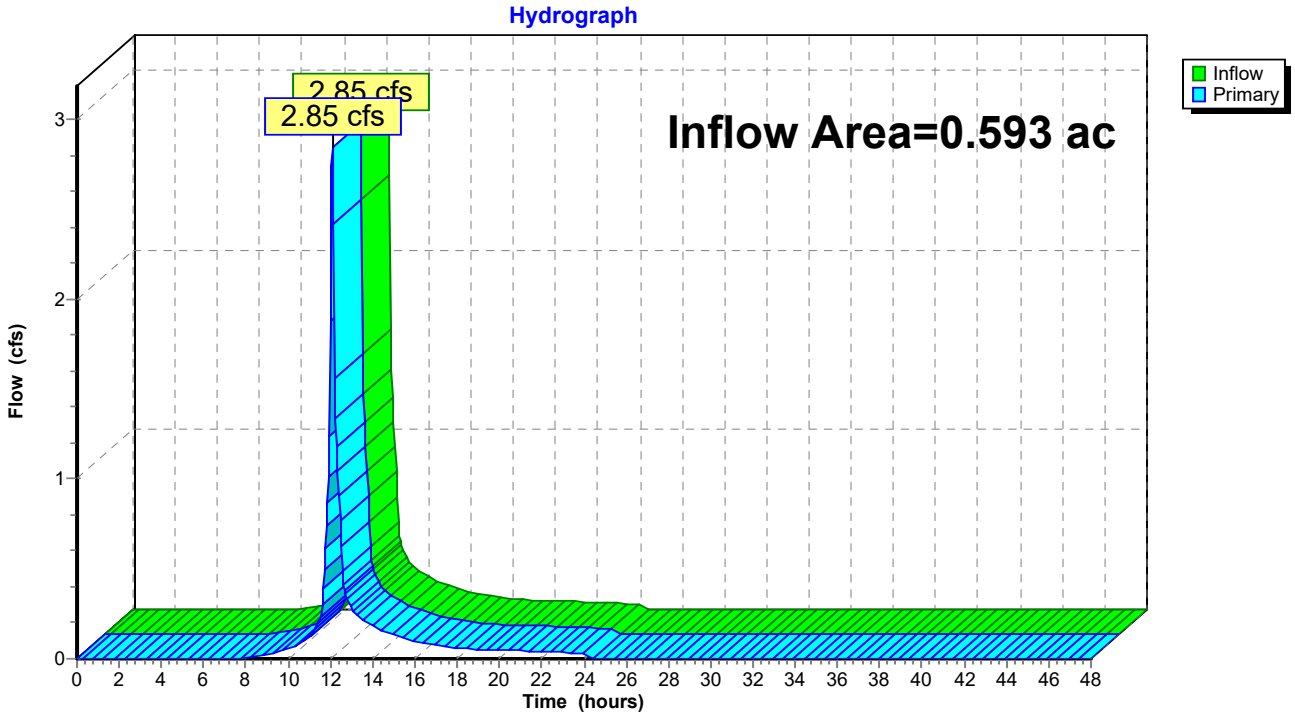


Summary for Link AP-2: Catch Basin

Inflow Area = 0.593 ac, 29.51% Impervious, Inflow Depth = 4.09" for 50 YR event
Inflow = 2.85 cfs @ 12.08 hrs, Volume= 0.202 af
Primary = 2.85 cfs @ 12.08 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min

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

Link AP-2: Catch Basin



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=1.527 ac 0.00% Impervious Runoff Depth=5.44"
Flow Length=355' Tc=9.6 min CN=79 Runoff=8.40 cfs 0.693 af

Subcatchment EDA-2: EDA-2 Runoff Area=0.593 ac 29.51% Impervious Runoff Depth=4.86"
Tc=5.0 min CN=74 Runoff=3.37 cfs 0.240 af

Link AP-1: Wetlands Inflow=8.40 cfs 0.693 af
Primary=8.40 cfs 0.693 af

Link AP-2: Catch Basin Inflow=3.37 cfs 0.240 af
Primary=3.37 cfs 0.240 af

Total Runoff Area = 2.120 ac Runoff Volume = 0.933 af Average Runoff Depth = 5.28"
91.75% Pervious = 1.945 ac 8.25% Impervious = 0.175 ac

Summary for Subcatchment EDA-1: EDA-1

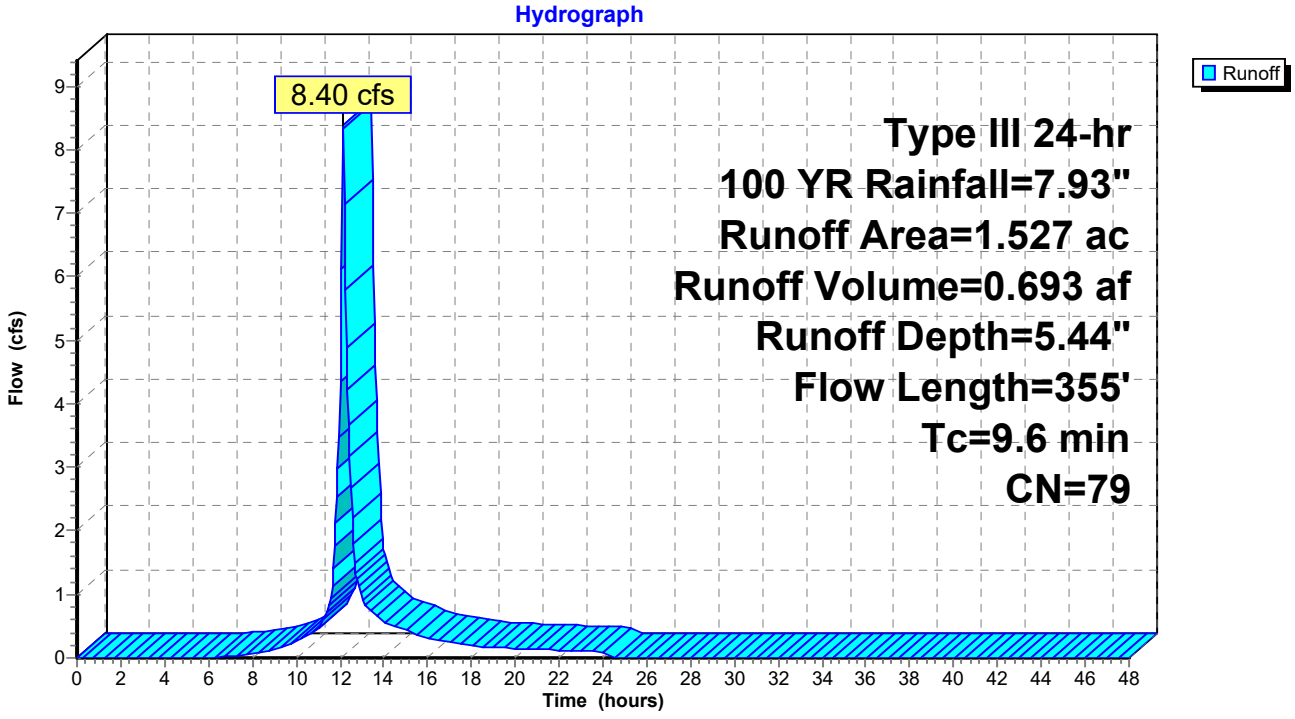
Runoff = 8.40 cfs @ 12.14 hrs, Volume= 0.693 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.93"

Area (ac)	CN	Description
0.015	68	<50% Grass cover, Poor, HSG A
0.459	79	<50% Grass cover, Poor, HSG B
1.053	79	<50% Grass cover, Poor, HSG B
1.527	79	Weighted Average
1.527		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.18"
4.0	255	0.0235	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.6	355	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

[49] Hint: Tc<2dt may require smaller dt

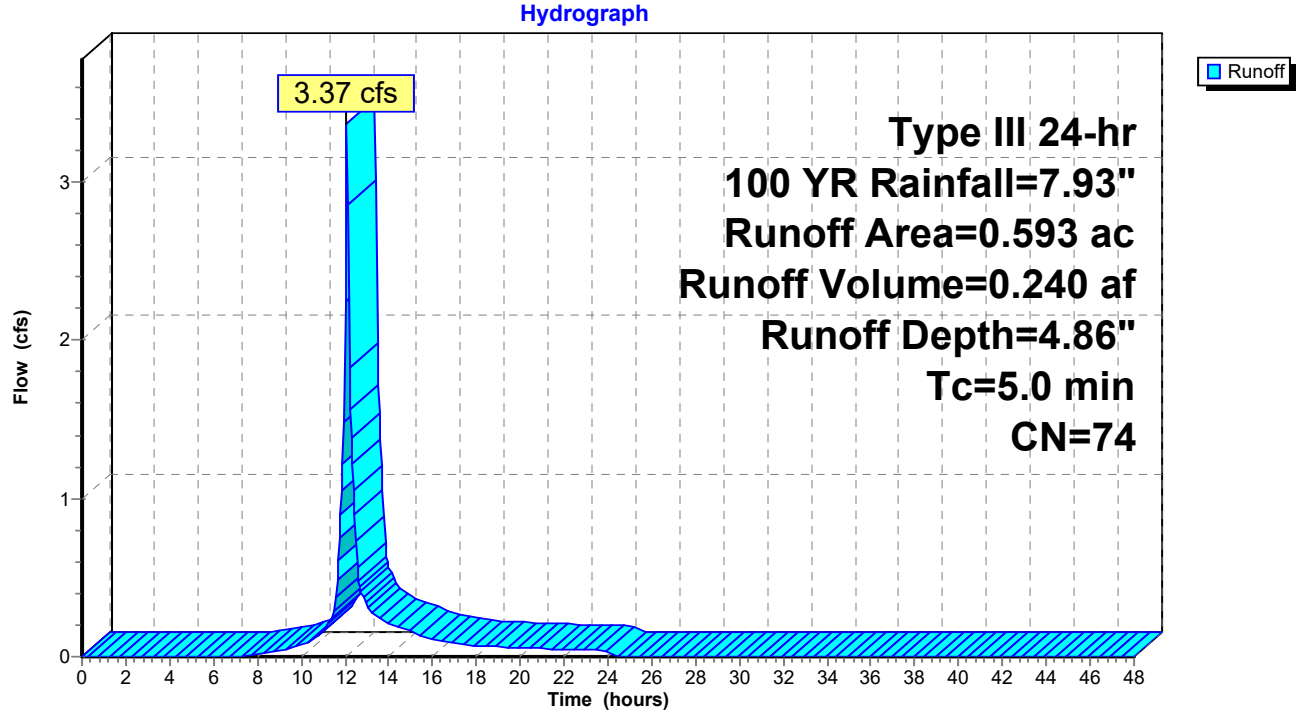
Runoff = 3.37 cfs @ 12.08 hrs, Volume= 0.240 af, Depth= 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.93"

Area (ac)	CN	Description
0.166	98	Paved parking, HSG A
0.026	96	Gravel surface, HSG A
0.165	49	50-75% Grass cover, Fair, HSG A
0.009	98	Paved parking, HSG B
0.016	96	Gravel surface, HSG B
0.211	69	50-75% Grass cover, Fair, HSG B
0.593	74	Weighted Average
0.418		70.49% Pervious Area
0.175		29.51% Impervious Area

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

Subcatchment EDA-2: EDA-2

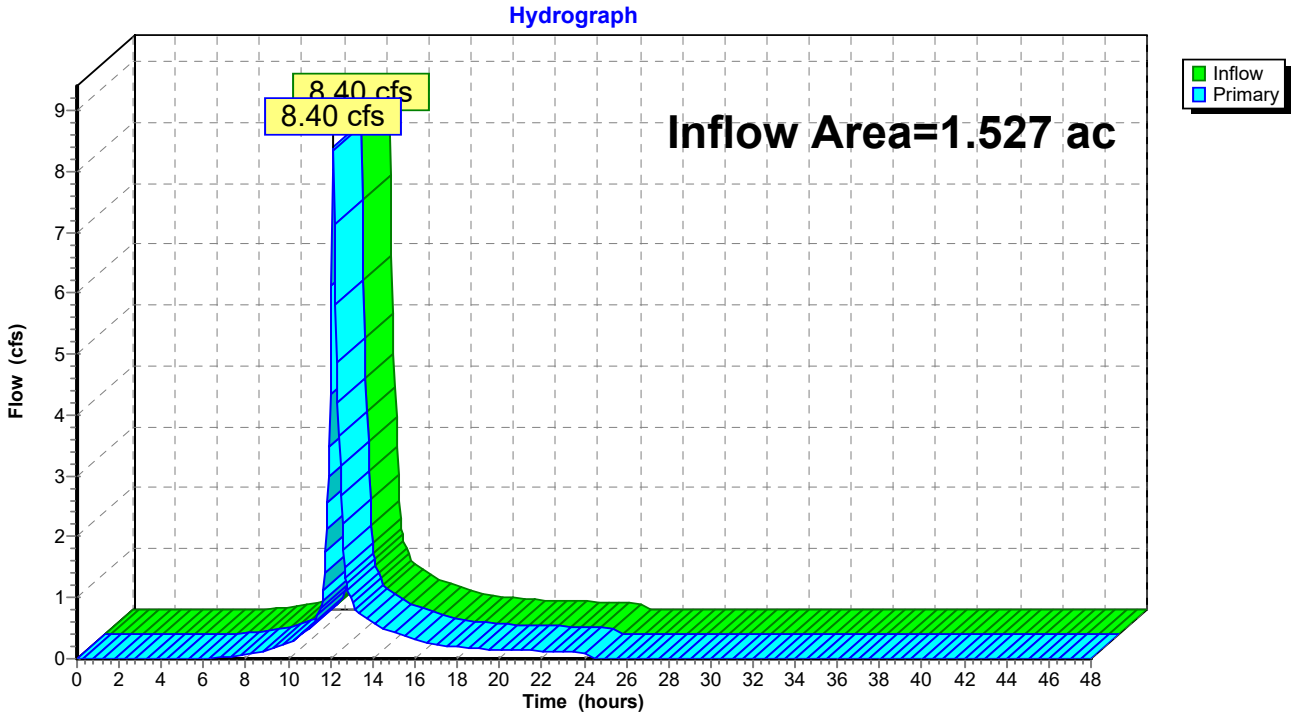


Summary for Link AP-1: Wetlands

Inflow Area = 1.527 ac, 0.00% Impervious, Inflow Depth = 5.44" for 100 YR event
Inflow = 8.40 cfs @ 12.14 hrs, Volume= 0.693 af
Primary = 8.40 cfs @ 12.14 hrs, Volume= 0.693 af, Atten= 0%, Lag= 0.0 min

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

Link AP-1: Wetlands

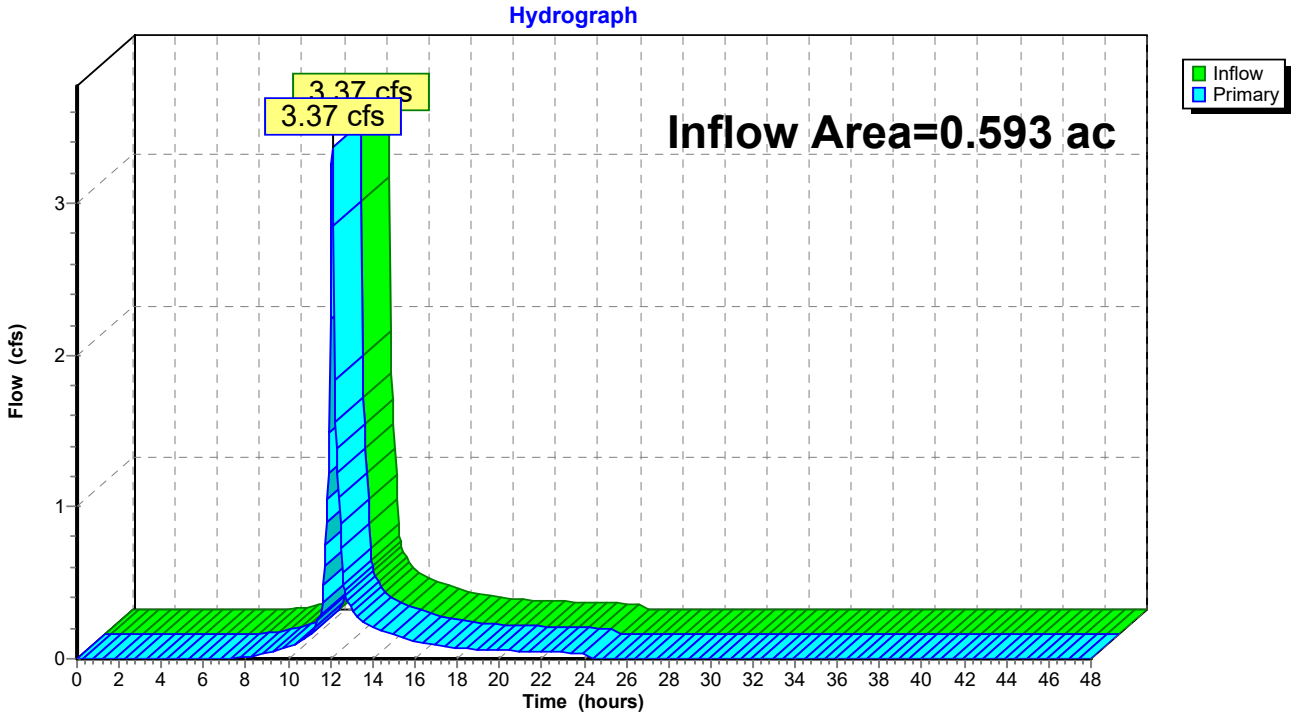


Summary for Link AP-2: Catch Basin

Inflow Area = 0.593 ac, 29.51% Impervious, Inflow Depth = 4.86" for 100 YR event
Inflow = 3.37 cfs @ 12.08 hrs, Volume= 0.240 af
Primary = 3.37 cfs @ 12.08 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.0 min

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

Link AP-2: Catch Basin



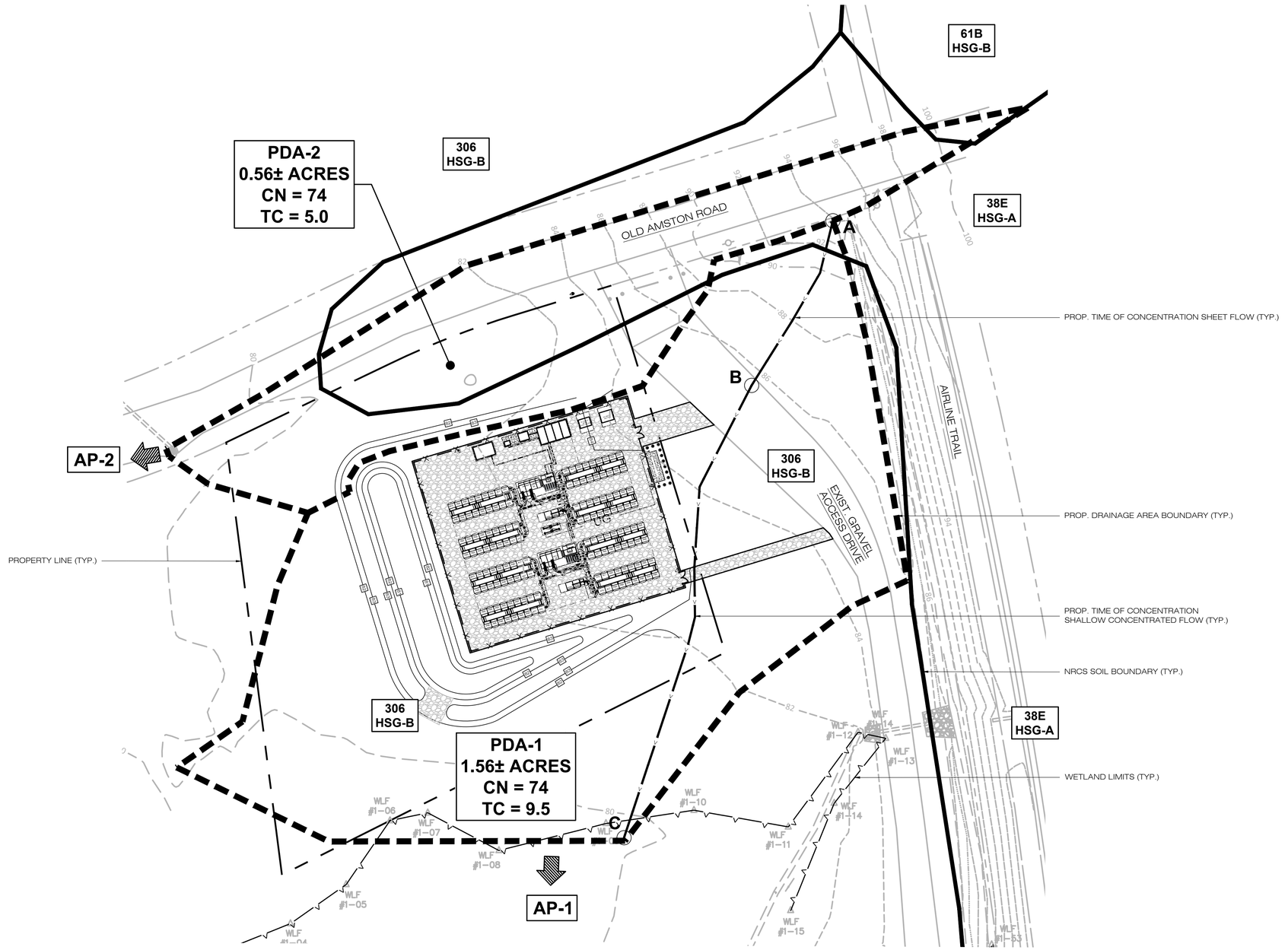
APPENDIX D: PROPOSED DRAINAGE AREA MAP (PDA-1) & HYDROLOGIC COMPUTATION (HYDROCAD)

PROPOSED DRAINAGE AREAS

	TOTAL AREA (ACRES)	COMPOSITE CN	TC (MINS.)
PDA-1	1.56	74	9.5
PDA-2	0.56	74	5.0

PROPOSED CONDITION PEAK FLOWS

ANALYSIS POINT	2-YEAR (CFS)	25-YEAR (CFS)	50-YEAR (CFS)	100-YEAR (CFS)
AP-1	0.34	4.92	6.04	7.21
AP-2	0.75	2.28	2.70	3.20



1 PDA-1 **PROPOSED DRAINAGE AREA MAP**
SCALE : 1" = 30'-0"

30 0 15 30 60
(IN FEET) 1 inch = 30 ft.

ReNew DEVELOPERS, LLC
14 CHESTNUT HILL ROAD
COLCHESTER, CT 06415
OFFICE: (860) 303-5726

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CSC PERMIT SET

NO	DATE	REVISION
0	07/14/22	FOR REVIEW: RCB
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: ROBERT C. BURNS, P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: RENEW DEVELOPERS, LLC
ADDRESS: 14 CHESTNUT HILL ROAD COLCHESTER, CT 06415

OLD AMSTON ROAD FUEL CELL POWER PLANT

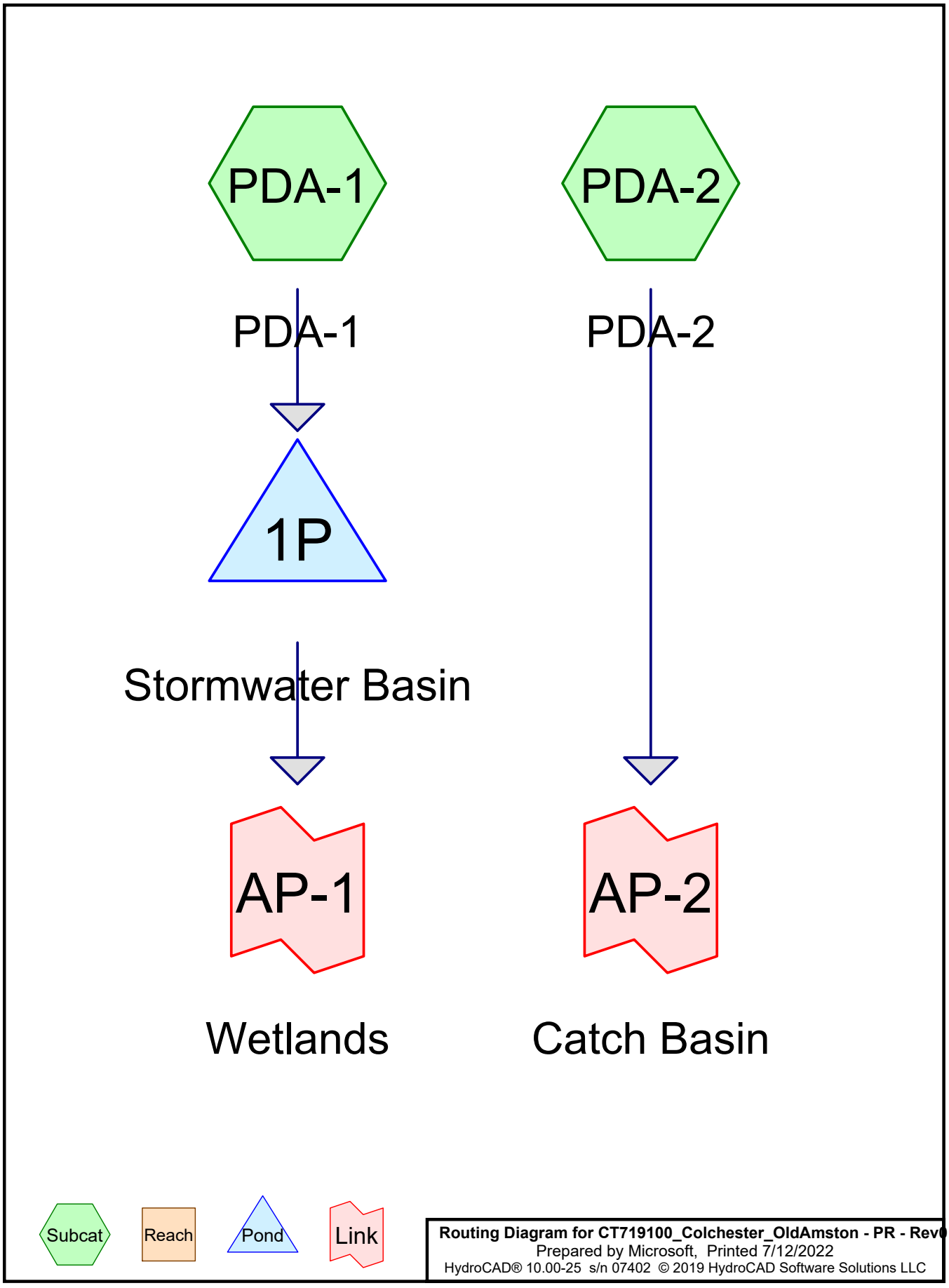
SITE ADDRESS: 42 OLD AMSTON ROAD COLCHESTER, CT 06415

APT FILING NUMBER: CT716100

DRAWN BY: CSH
DATE: 07/14/22
CHECKED BY: RCB

SHEET TITLE:
PROPOSED DRAINAGE AREA MAP

SHEET NUMBER:
PDA-1



Routing Diagram for CT719100_Colchester_OldAmston - PR - Rev0
Prepared by Microsoft, Printed 7/12/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.180	49	50-75% Grass cover, Fair, HSG A (PDA-1, PDA-2)
1.418	69	50-75% Grass cover, Fair, HSG B (PDA-1, PDA-2)
0.026	96	Gravel surface, HSG A (PDA-2)
0.226	96	Gravel surface, HSG B (PDA-1, PDA-2)
0.166	98	Paved parking, HSG A (PDA-2)
0.009	98	Paved parking, HSG B (PDA-2)
0.095	98	Unconnected pavement, HSG B (PDA-1)
2.120	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.372	HSG A	PDA-1, PDA-2
1.748	HSG B	PDA-1, PDA-2
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.120		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.180	1.418	0.000	0.000	0.000	1.598	50-75% Grass cover, Fair	PDA-1, PDA-2
0.026	0.226	0.000	0.000	0.000	0.252	Gravel surface	PDA-1, PDA-2
0.166	0.009	0.000	0.000	0.000	0.175	Paved parking	PDA-2
0.000	0.095	0.000	0.000	0.000	0.095	Unconnected pavement	PDA-1
0.372	**1.748**	**0.000**	**0.000**	**0.000**	**2.120**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=1.557 ac 6.10% Impervious Runoff Depth=1.12"
Flow Length=348' Tc=9.5 min UI Adjusted CN=73 Runoff=1.70 cfs 0.145 af

Subcatchment PDA-2: PDA-2 Runoff Area=0.563 ac 31.08% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=74 Runoff=0.75 cfs 0.055 af

Pond 1P: Stormwater Basin Peak Elev=82.05' Storage=2,792 cf Inflow=1.70 cfs 0.145 af
Outflow=0.34 cfs 0.085 af

Link AP-1: Wetlands Inflow=0.34 cfs 0.085 af
Primary=0.34 cfs 0.085 af

Link AP-2: Catch Basin Inflow=0.75 cfs 0.055 af
Primary=0.75 cfs 0.055 af

Total Runoff Area = 2.120 ac Runoff Volume = 0.201 af Average Runoff Depth = 1.14"
87.26% Pervious = 1.850 ac 12.74% Impervious = 0.270 ac

Summary for Subcatchment PDA-1: PDA-1

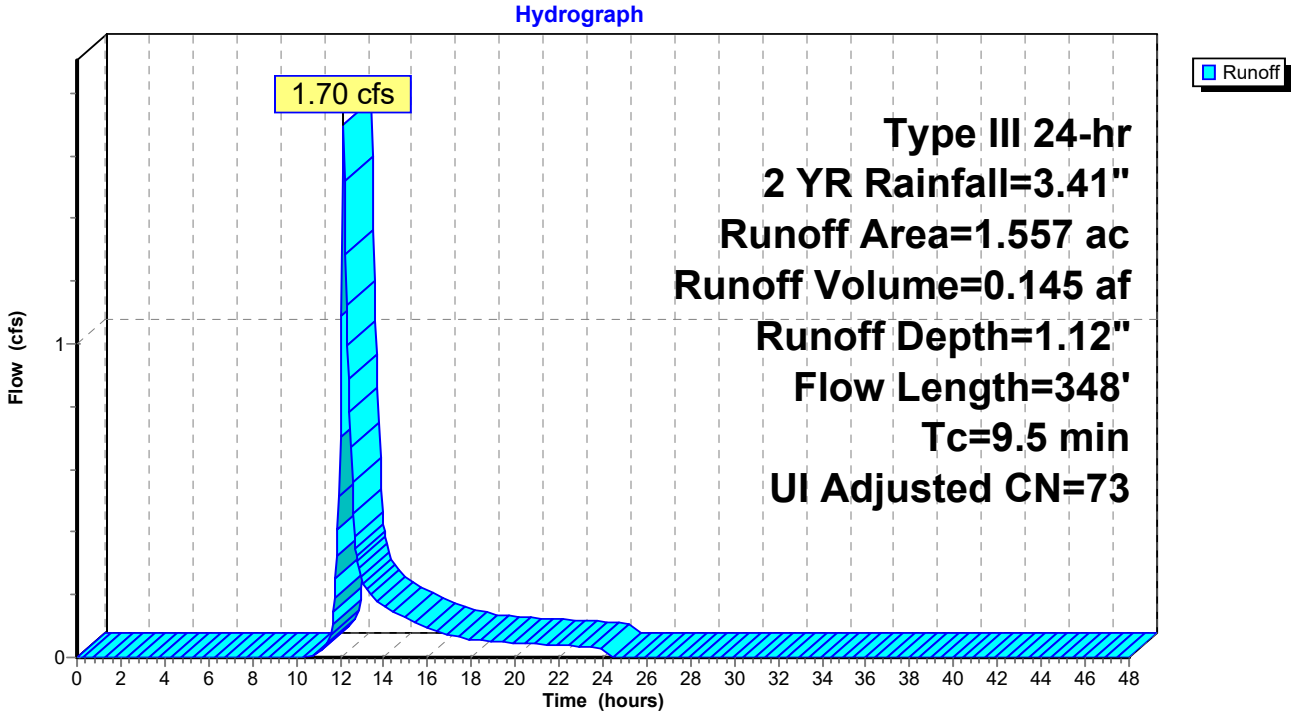
Runoff = 1.70 cfs @ 12.15 hrs, Volume= 0.145 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.41"

Area (ac)	CN	Adj	Description
0.015	49		50-75% Grass cover, Fair, HSG A
0.210	96		Gravel surface, HSG B
1.237	69		50-75% Grass cover, Fair, HSG B
0.095	98		Unconnected pavement, HSG B
1.557	74	73	Weighted Average, UI Adjusted
1.462			93.90% Pervious Area
0.095			6.10% Impervious Area
0.095			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.18"
3.9	248	0.0235	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.5	348	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-2: PDA-2

[49] Hint: Tc<2dt may require smaller dt

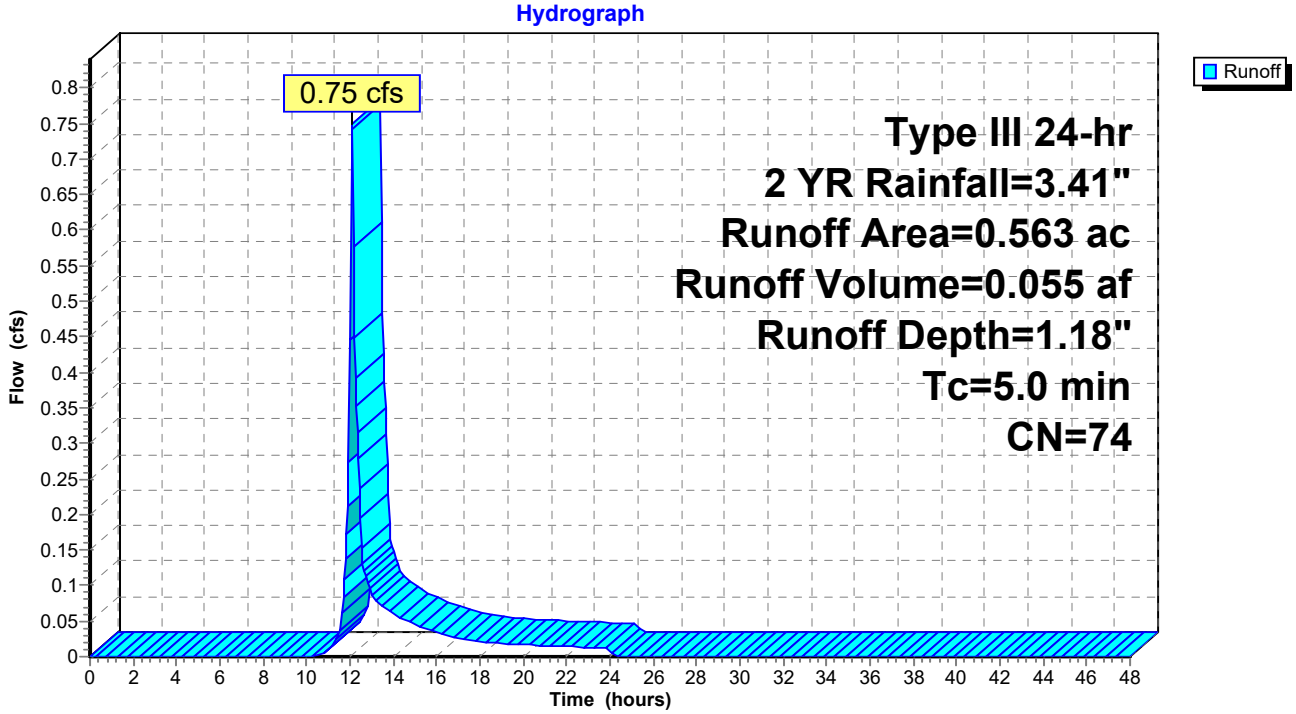
Runoff = 0.75 cfs @ 12.09 hrs, Volume= 0.055 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.41"

Area (ac)	CN	Description
0.166	98	Paved parking, HSG A
0.026	96	Gravel surface, HSG A
0.165	49	50-75% Grass cover, Fair, HSG A
0.009	98	Paved parking, HSG B
0.016	96	Gravel surface, HSG B
0.181	69	50-75% Grass cover, Fair, HSG B
0.563	74	Weighted Average
0.388		68.92% Pervious Area
0.175		31.08% Impervious Area

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

Subcatchment PDA-2: PDA-2



Summary for Pond 1P: Stormwater Basin

Inflow Area = 1.557 ac, 6.10% Impervious, Inflow Depth = 1.12" for 2 YR event
Inflow = 1.70 cfs @ 12.15 hrs, Volume= 0.145 af
Outflow = 0.34 cfs @ 12.72 hrs, Volume= 0.085 af, Atten= 80%, Lag= 34.1 min
Primary = 0.34 cfs @ 12.72 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 82.05' @ 12.72 hrs Surf.Area= 3,310 sf Storage= 2,792 cf

Plug-Flow detention time= 231.3 min calculated for 0.085 af (58% of inflow)
Center-of-Mass det. time= 108.7 min (973.2 - 864.6)

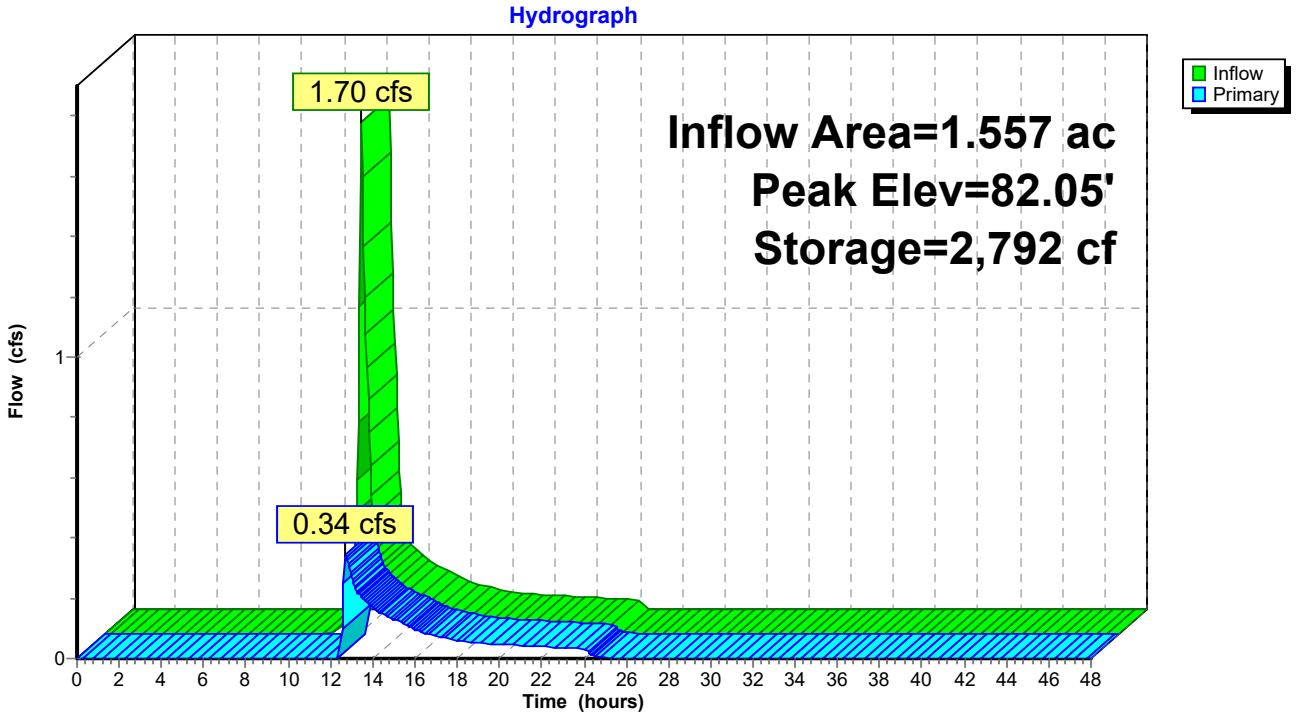
Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	6,552 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
81.00	2,060	332.0	0	0	2,060
82.00	3,248	397.7	2,632	2,632	5,892
83.00	4,633	463.4	3,920	6,552	10,415

Device	Routing	Invert	Outlet Devices
#1	Primary	82.00'	**12.0' long 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

Primary OutFlow Max=0.34 cfs @ 12.72 hrs HW=82.05' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.34 cfs @ 0.58 fps)

Pond 1P: Stormwater Basin

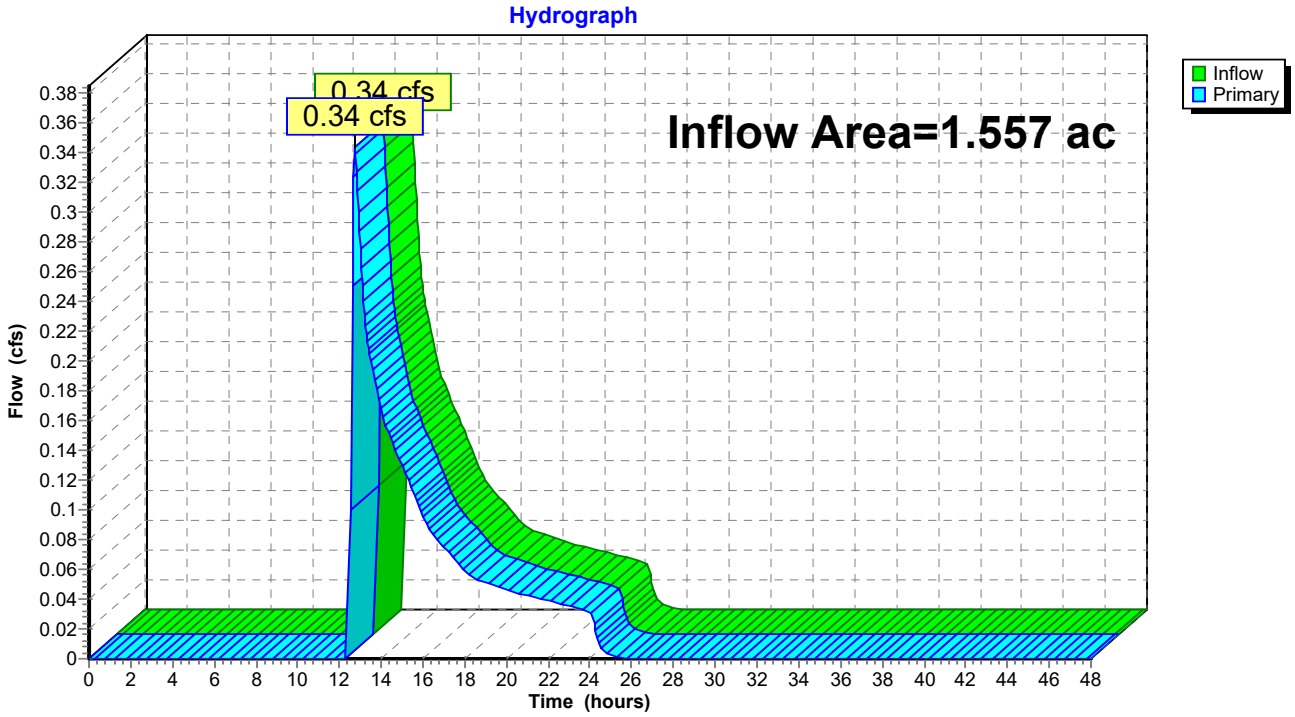


Summary for Link AP-1: Wetlands

Inflow Area = 1.557 ac, 6.10% Impervious, Inflow Depth = 0.65" for 2 YR event
Inflow = 0.34 cfs @ 12.72 hrs, Volume= 0.085 af
Primary = 0.34 cfs @ 12.72 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

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

Link AP-1: Wetlands

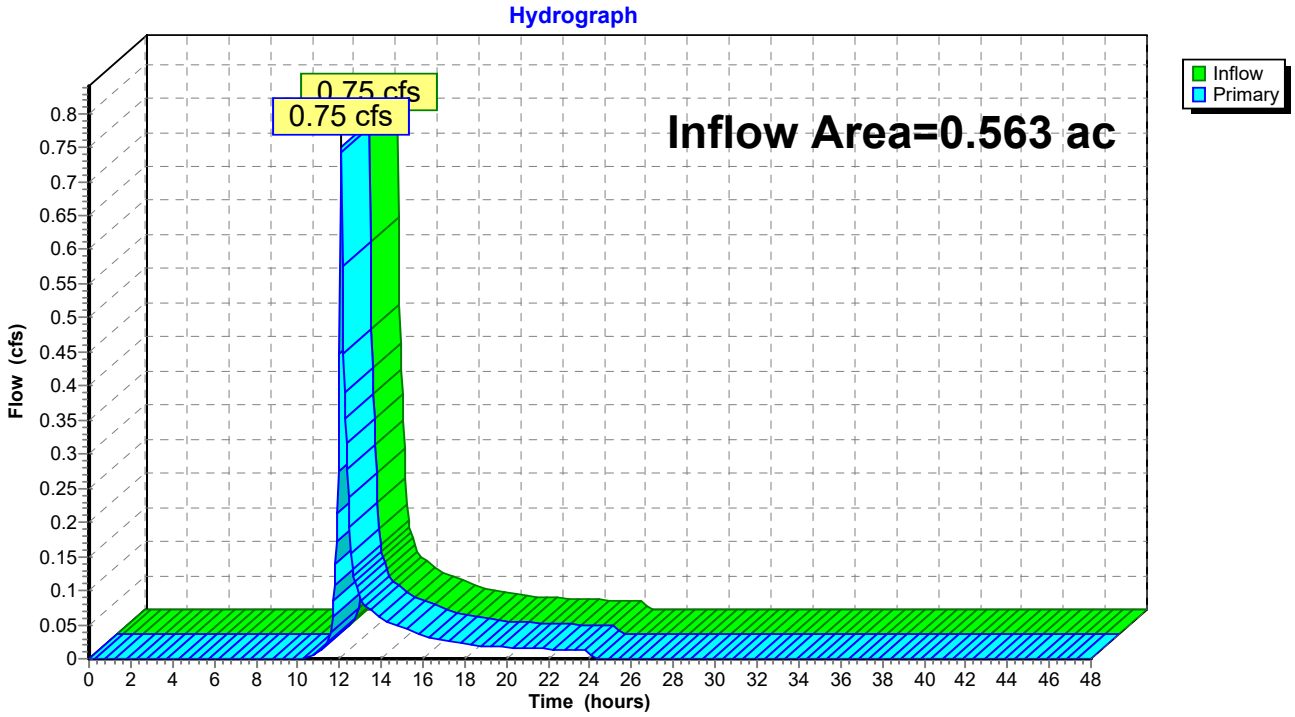


Summary for Link AP-2: Catch Basin

Inflow Area = 0.563 ac, 31.08% Impervious, Inflow Depth = 1.18" for 2 YR event
Inflow = 0.75 cfs @ 12.09 hrs, Volume= 0.055 af
Primary = 0.75 cfs @ 12.09 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min

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

Link AP-2: Catch Basin



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=1.557 ac 6.10% Impervious Runoff Depth=3.30"
Flow Length=348' Tc=9.5 min UI Adjusted CN=73 Runoff=5.26 cfs 0.428 af

Subcatchment PDA-2: PDA-2 Runoff Area=0.563 ac 31.08% Impervious Runoff Depth=3.40"
Tc=5.0 min CN=74 Runoff=2.24 cfs 0.159 af

Pond 1P: Stormwater Basin Peak Elev=82.29' Storage=3,620 cf Inflow=5.26 cfs 0.428 af
Outflow=4.92 cfs 0.367 af

Link AP-1: Wetlands Inflow=4.92 cfs 0.367 af
Primary=4.92 cfs 0.367 af

Link AP-2: Catch Basin Inflow=2.24 cfs 0.159 af
Primary=2.24 cfs 0.159 af

Total Runoff Area = 2.120 ac Runoff Volume = 0.587 af Average Runoff Depth = 3.32"
87.26% Pervious = 1.850 ac 12.74% Impervious = 0.270 ac

Summary for Subcatchment PDA-1: PDA-1

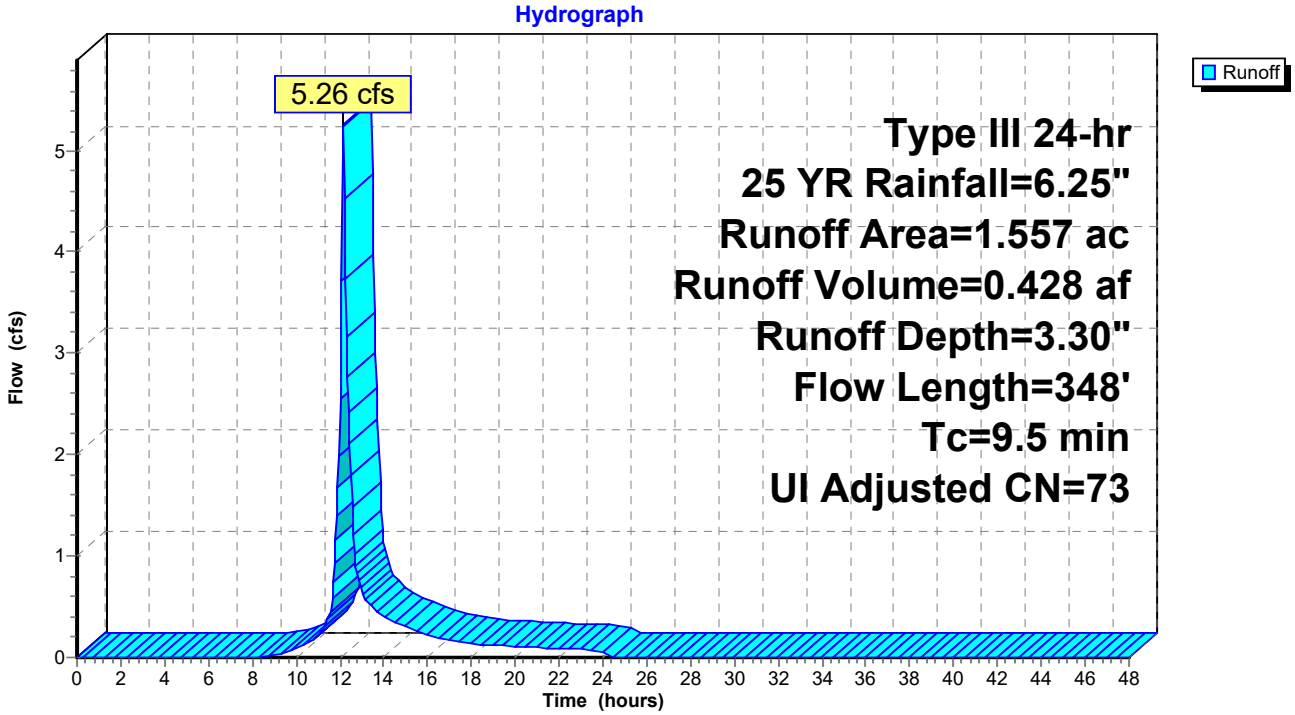
Runoff = 5.26 cfs @ 12.14 hrs, Volume= 0.428 af, Depth= 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.25"

Area (ac)	CN	Adj	Description
0.015	49		50-75% Grass cover, Fair, HSG A
0.210	96		Gravel surface, HSG B
1.237	69		50-75% Grass cover, Fair, HSG B
0.095	98		Unconnected pavement, HSG B
1.557	74	73	Weighted Average, UI Adjusted
1.462			93.90% Pervious Area
0.095			6.10% Impervious Area
0.095			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.18"
3.9	248	0.0235	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.5	348	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-2: PDA-2

[49] Hint: Tc<2dt may require smaller dt

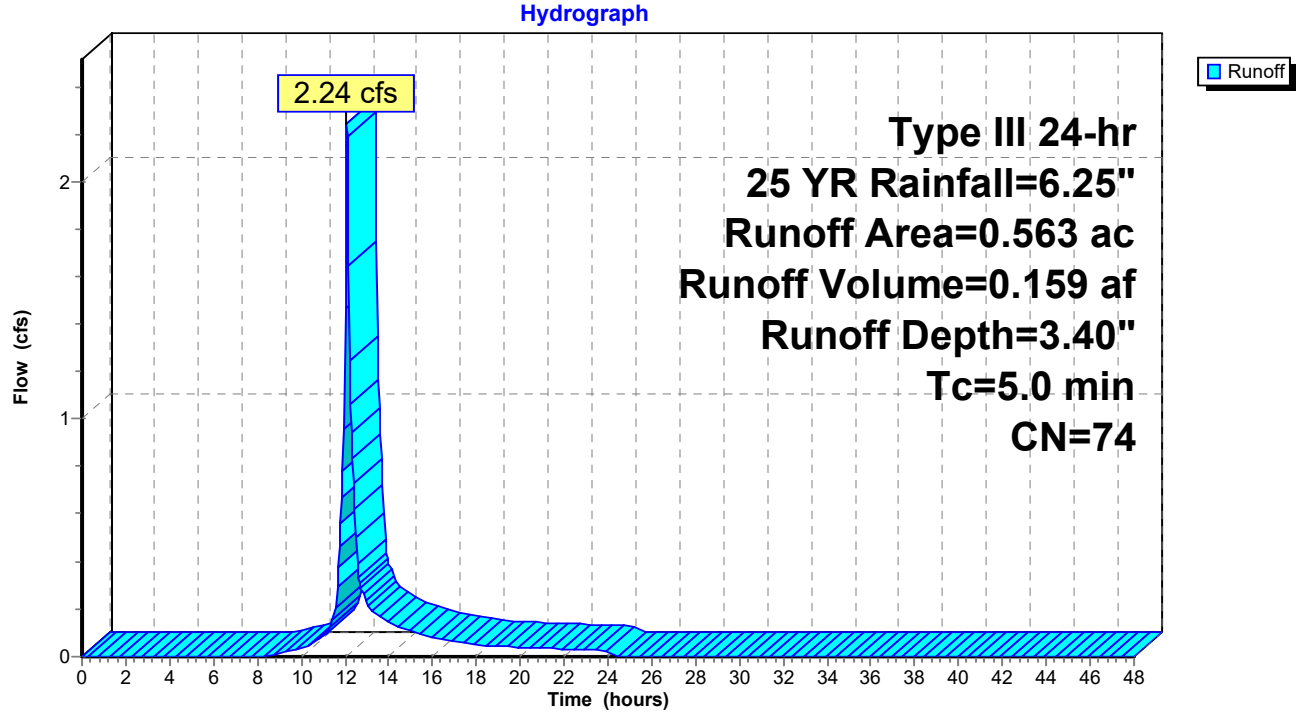
Runoff = 2.24 cfs @ 12.08 hrs, Volume= 0.159 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.25"

Area (ac)	CN	Description
0.166	98	Paved parking, HSG A
0.026	96	Gravel surface, HSG A
0.165	49	50-75% Grass cover, Fair, HSG A
0.009	98	Paved parking, HSG B
0.016	96	Gravel surface, HSG B
0.181	69	50-75% Grass cover, Fair, HSG B
0.563	74	Weighted Average
0.388		68.92% Pervious Area
0.175		31.08% Impervious Area

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

Subcatchment PDA-2: PDA-2



Summary for Pond 1P: Stormwater Basin

Inflow Area = 1.557 ac, 6.10% Impervious, Inflow Depth = 3.30" for 25 YR event
Inflow = 5.26 cfs @ 12.14 hrs, Volume= 0.428 af
Outflow = 4.92 cfs @ 12.18 hrs, Volume= 0.367 af, Atten= 7%, Lag= 2.5 min
Primary = 4.92 cfs @ 12.18 hrs, Volume= 0.367 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 82.29' @ 12.18 hrs Surf.Area= 3,622 sf Storage= 3,620 cf

Plug-Flow detention time= 94.5 min calculated for 0.367 af (86% of inflow)
Center-of-Mass det. time= 32.4 min (865.0 - 832.5)

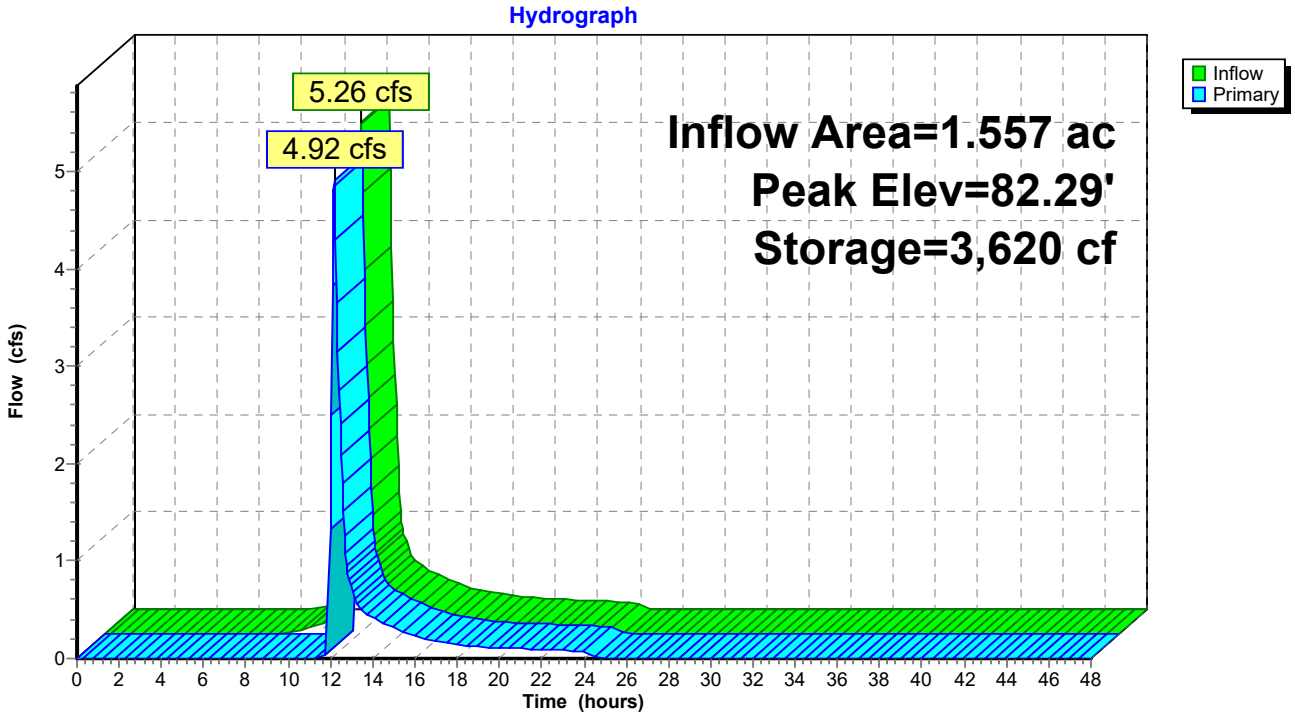
Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	6,552 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
81.00	2,060	332.0	0	0	2,060
82.00	3,248	397.7	2,632	2,632	5,892
83.00	4,633	463.4	3,920	6,552	10,415

Device	Routing	Invert	Outlet Devices
#1	Primary	82.00'	**12.0' long 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

Primary OutFlow Max=4.84 cfs @ 12.18 hrs HW=82.28' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 4.84 cfs @ 1.42 fps)

Pond 1P: Stormwater Basin

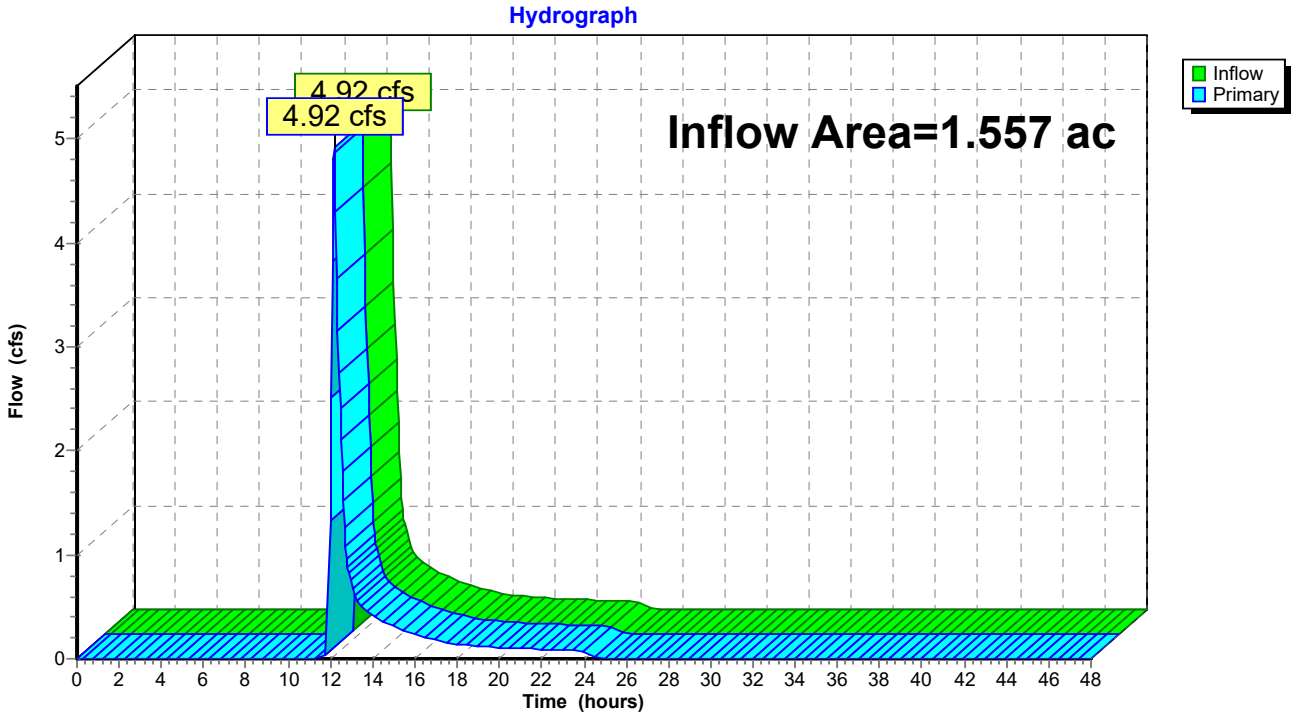


Summary for Link AP-1: Wetlands

Inflow Area = 1.557 ac, 6.10% Impervious, Inflow Depth = 2.83" for 25 YR event
Inflow = 4.92 cfs @ 12.18 hrs, Volume= 0.367 af
Primary = 4.92 cfs @ 12.18 hrs, Volume= 0.367 af, Atten= 0%, Lag= 0.0 min

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

Link AP-1: Wetlands

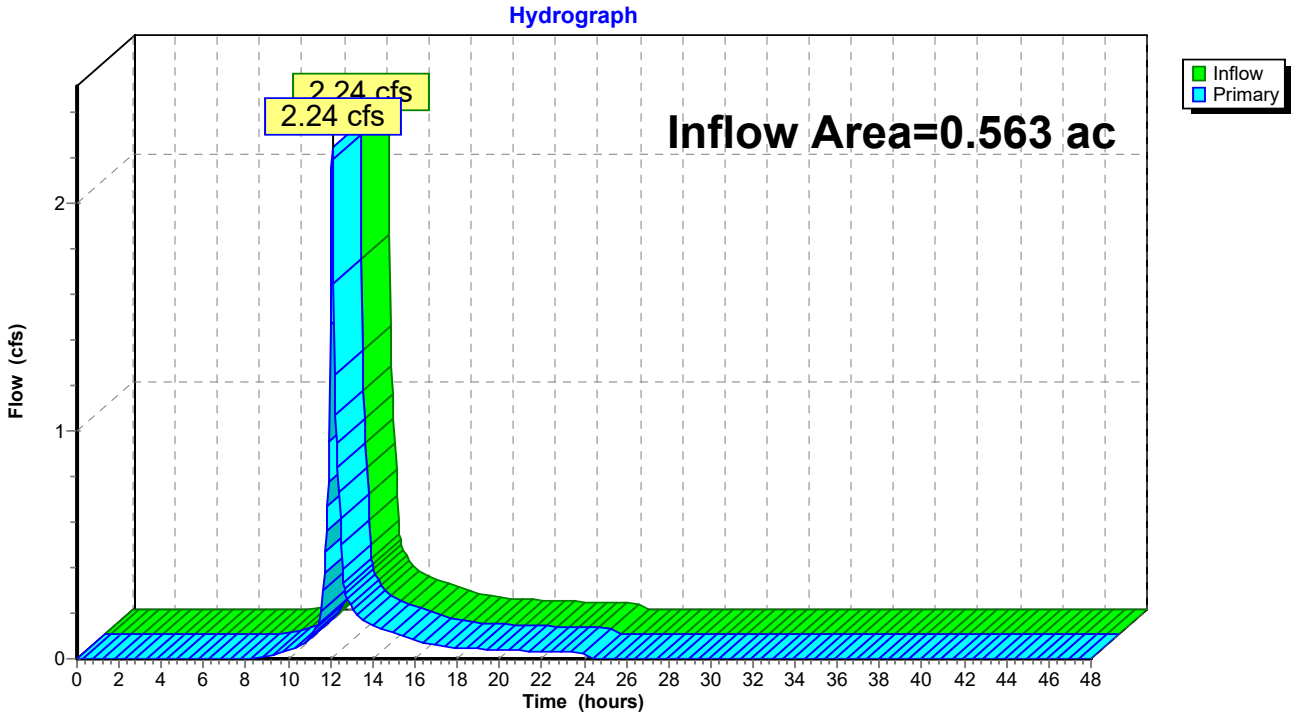


Summary for Link AP-2: Catch Basin

Inflow Area = 0.563 ac, 31.08% Impervious, Inflow Depth = 3.40" for 25 YR event
Inflow = 2.24 cfs @ 12.08 hrs, Volume= 0.159 af
Primary = 2.24 cfs @ 12.08 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min

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

Link AP-2: Catch Basin



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=1.557 ac 6.10% Impervious Runoff Depth=3.99"
Flow Length=348' Tc=9.5 min UI Adjusted CN=73 Runoff=6.36 cfs 0.517 af

Subcatchment PDA-2: PDA-2 Runoff Area=0.563 ac 31.08% Impervious Runoff Depth=4.09"
Tc=5.0 min CN=74 Runoff=2.70 cfs 0.192 af

Pond 1P: Stormwater Basin Peak Elev=82.33' Storage=3,772 cf Inflow=6.36 cfs 0.517 af
Outflow=6.04 cfs 0.457 af

Link AP-1: Wetlands Inflow=6.04 cfs 0.457 af
Primary=6.04 cfs 0.457 af

Link AP-2: Catch Basin Inflow=2.70 cfs 0.192 af
Primary=2.70 cfs 0.192 af

Total Runoff Area = 2.120 ac Runoff Volume = 0.709 af Average Runoff Depth = 4.02"
87.26% Pervious = 1.850 ac 12.74% Impervious = 0.270 ac

Summary for Subcatchment PDA-1: PDA-1

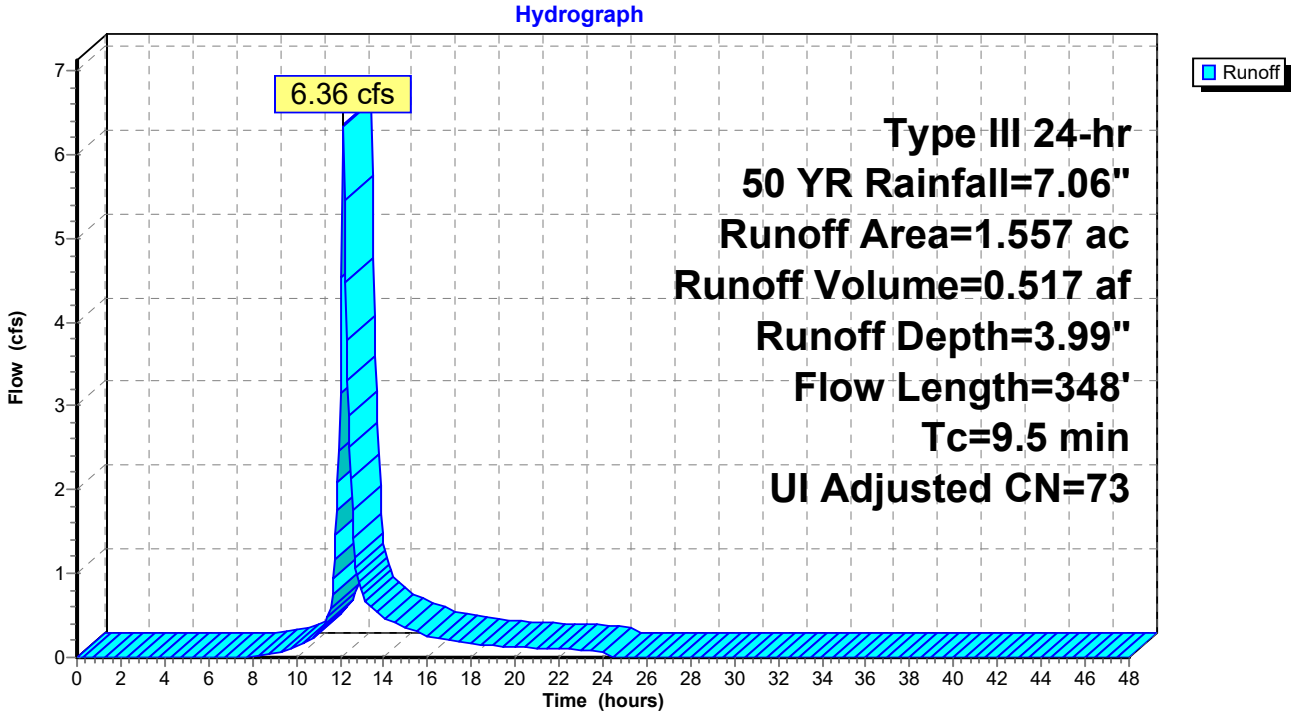
Runoff = 6.36 cfs @ 12.14 hrs, Volume= 0.517 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.06"

Area (ac)	CN	Adj	Description
0.015	49		50-75% Grass cover, Fair, HSG A
0.210	96		Gravel surface, HSG B
1.237	69		50-75% Grass cover, Fair, HSG B
0.095	98		Unconnected pavement, HSG B
1.557	74	73	Weighted Average, UI Adjusted
1.462			93.90% Pervious Area
0.095			6.10% Impervious Area
0.095			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.18"
3.9	248	0.0235	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.5	348	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-2: PDA-2

[49] Hint: Tc<2dt may require smaller dt

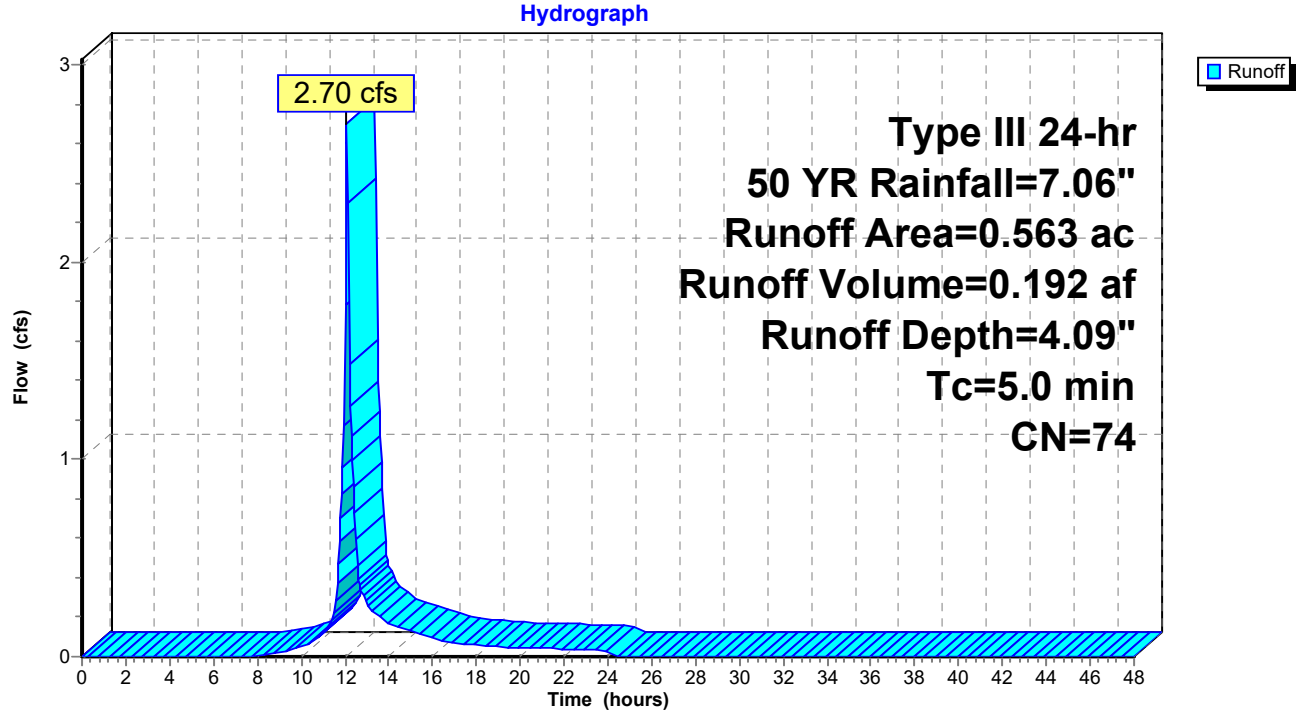
Runoff = 2.70 cfs @ 12.08 hrs, Volume= 0.192 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.06"

Area (ac)	CN	Description
0.166	98	Paved parking, HSG A
0.026	96	Gravel surface, HSG A
0.165	49	50-75% Grass cover, Fair, HSG A
0.009	98	Paved parking, HSG B
0.016	96	Gravel surface, HSG B
0.181	69	50-75% Grass cover, Fair, HSG B
0.563	74	Weighted Average
0.388		68.92% Pervious Area
0.175		31.08% Impervious Area

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

Subcatchment PDA-2: PDA-2



Summary for Pond 1P: Stormwater Basin

Inflow Area = 1.557 ac, 6.10% Impervious, Inflow Depth = 3.99" for 50 YR event
Inflow = 6.36 cfs @ 12.14 hrs, Volume= 0.517 af
Outflow = 6.04 cfs @ 12.17 hrs, Volume= 0.457 af, Atten= 5%, Lag= 2.2 min
Primary = 6.04 cfs @ 12.17 hrs, Volume= 0.457 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 82.33' @ 12.17 hrs Surf.Area= 3,677 sf Storage= 3,772 cf

Plug-Flow detention time= 83.8 min calculated for 0.457 af (88% of inflow)
Center-of-Mass det. time= 28.8 min (855.8 - 827.1)

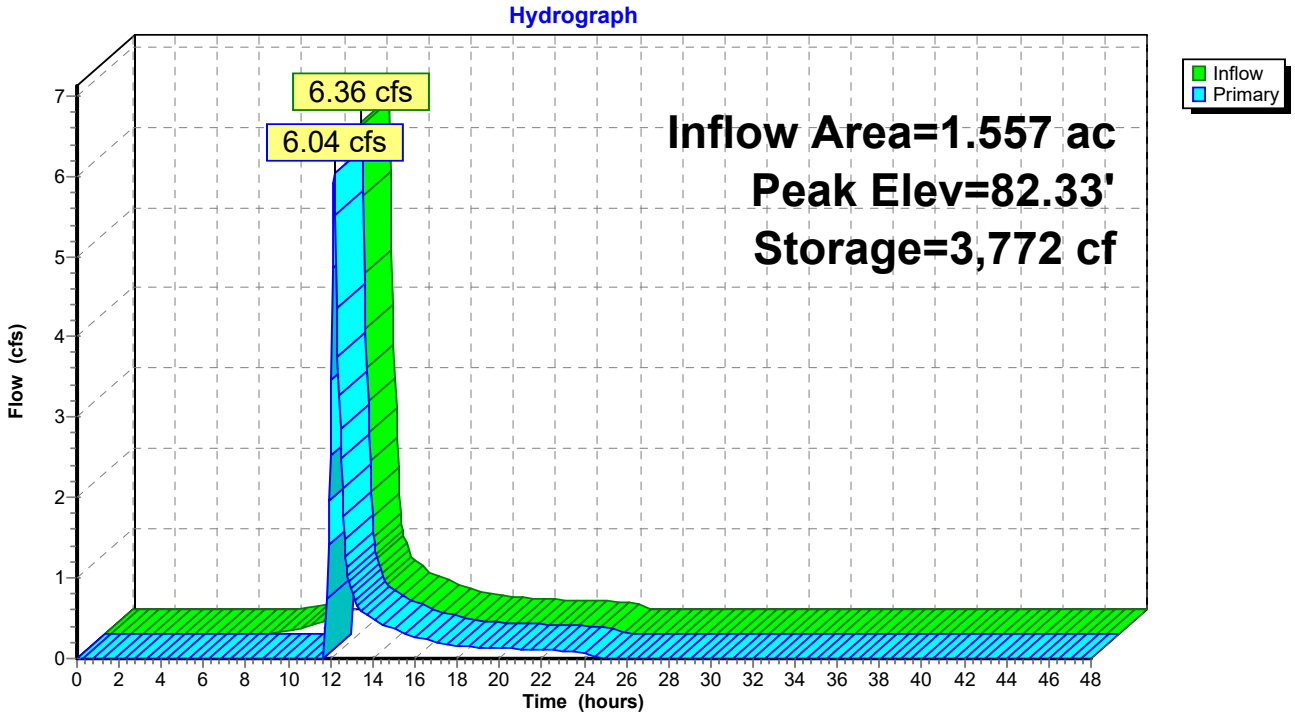
Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	6,552 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
81.00	2,060	332.0	0	0	2,060
82.00	3,248	397.7	2,632	2,632	5,892
83.00	4,633	463.4	3,920	6,552	10,415

Device	Routing	Invert	Outlet Devices
#1	Primary	82.00'	**12.0' long 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

Primary OutFlow Max=5.90 cfs @ 12.17 hrs HW=82.32' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.90 cfs @ 1.51 fps)

Pond 1P: Stormwater Basin

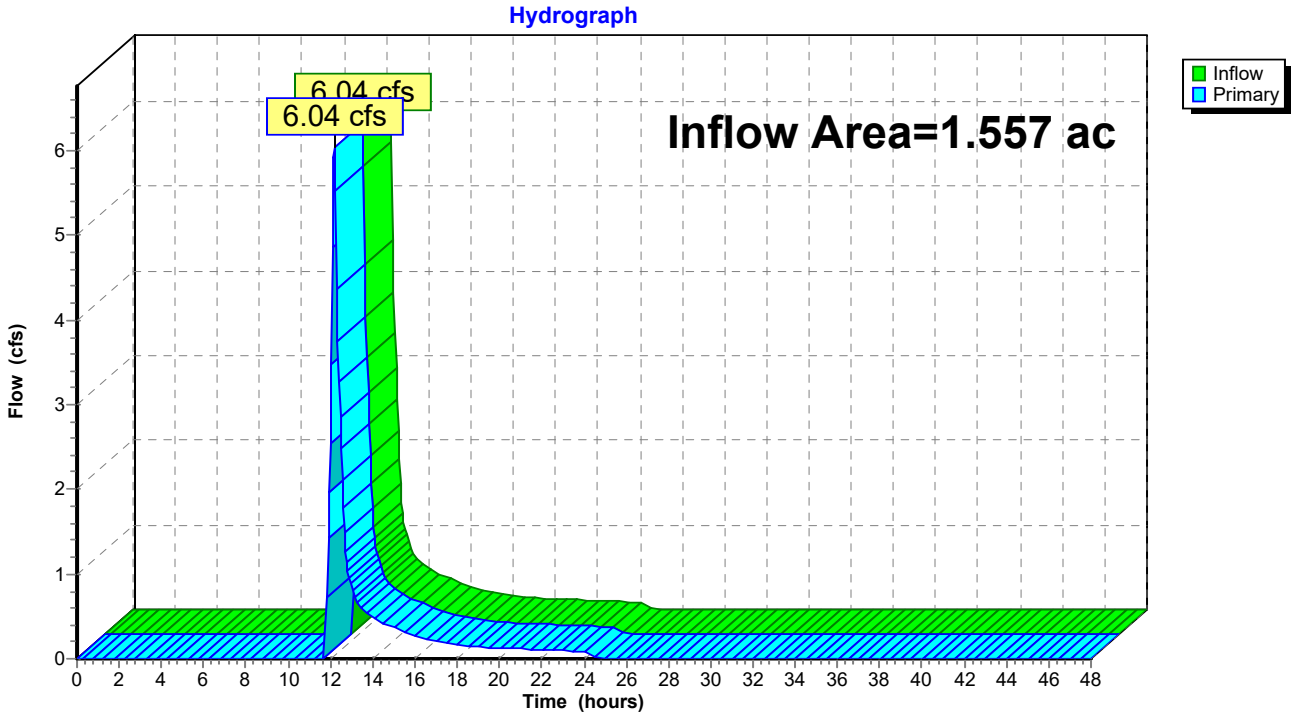


Summary for Link AP-1: Wetlands

Inflow Area = 1.557 ac, 6.10% Impervious, Inflow Depth = 3.52" for 50 YR event
Inflow = 6.04 cfs @ 12.17 hrs, Volume= 0.457 af
Primary = 6.04 cfs @ 12.17 hrs, Volume= 0.457 af, Atten= 0%, Lag= 0.0 min

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

Link AP-1: Wetlands

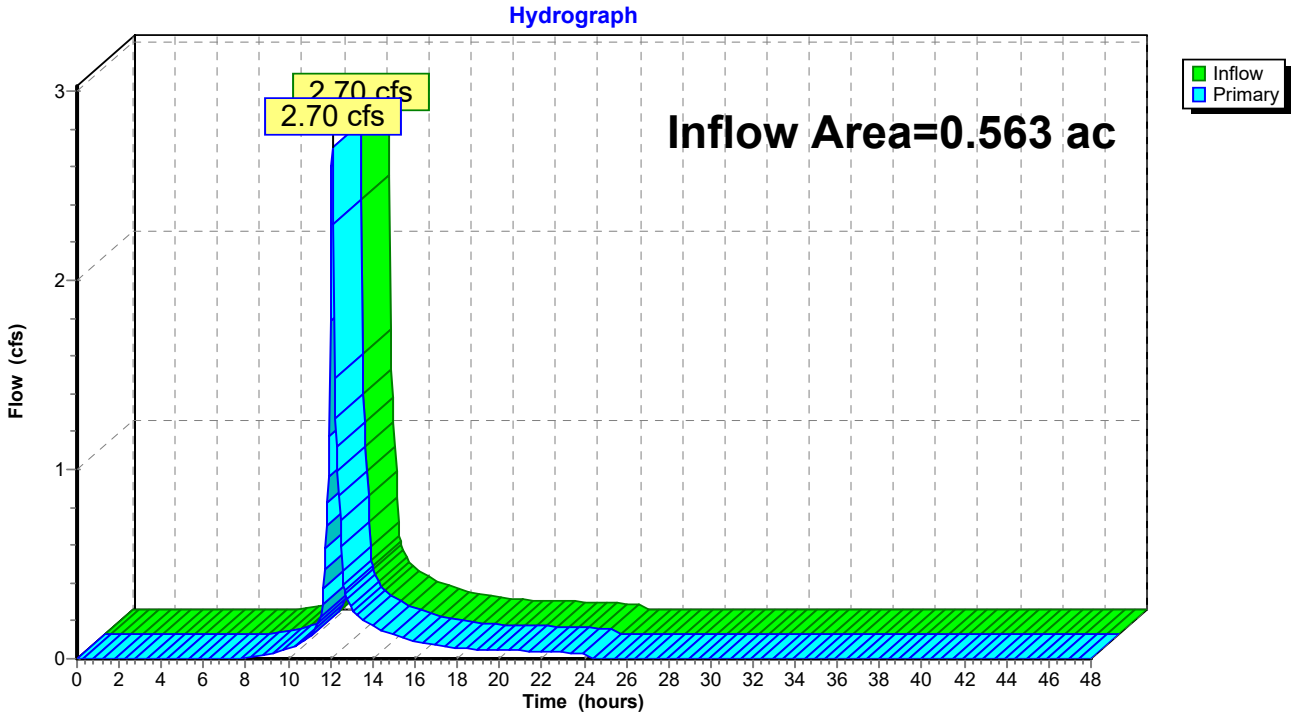


Summary for Link AP-2: Catch Basin

Inflow Area = 0.563 ac, 31.08% Impervious, Inflow Depth = 4.09" for 50 YR event
Inflow = 2.70 cfs @ 12.08 hrs, Volume= 0.192 af
Primary = 2.70 cfs @ 12.08 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min

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

Link AP-2: Catch Basin



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=1.557 ac 6.10% Impervious Runoff Depth=4.75"
Flow Length=348' Tc=9.5 min UI Adjusted CN=73 Runoff=7.57 cfs 0.616 af

Subcatchment PDA-2: PDA-2 Runoff Area=0.563 ac 31.08% Impervious Runoff Depth=4.86"
Tc=5.0 min CN=74 Runoff=3.20 cfs 0.228 af

Pond 1P: Stormwater Basin Peak Elev=82.37' Storage=3,924 cf Inflow=7.57 cfs 0.616 af
Outflow=7.21 cfs 0.556 af

Link AP-1: Wetlands Inflow=7.21 cfs 0.556 af
Primary=7.21 cfs 0.556 af

Link AP-2: Catch Basin Inflow=3.20 cfs 0.228 af
Primary=3.20 cfs 0.228 af

Total Runoff Area = 2.120 ac Runoff Volume = 0.844 af Average Runoff Depth = 4.78"
87.26% Pervious = 1.850 ac 12.74% Impervious = 0.270 ac

Summary for Subcatchment PDA-1: PDA-1

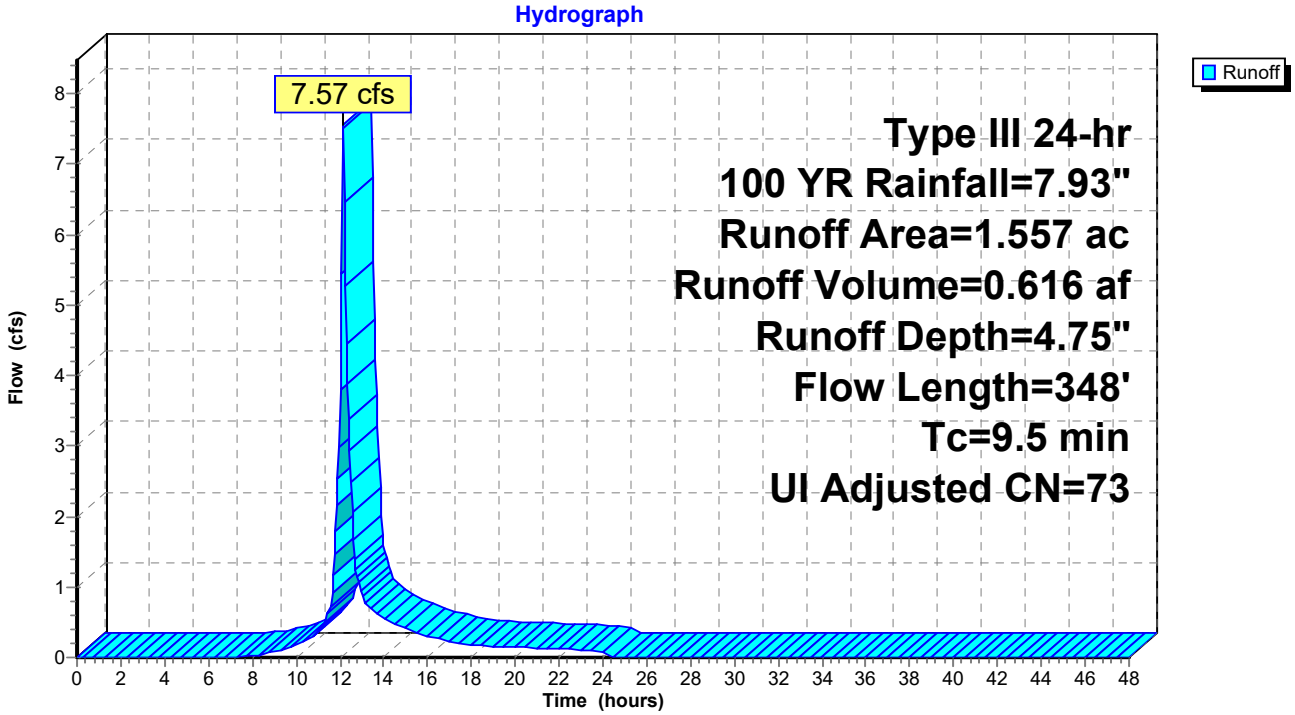
Runoff = 7.57 cfs @ 12.14 hrs, Volume= 0.616 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.93"

Area (ac)	CN	Adj	Description
0.015	49		50-75% Grass cover, Fair, HSG A
0.210	96		Gravel surface, HSG B
1.237	69		50-75% Grass cover, Fair, HSG B
0.095	98		Unconnected pavement, HSG B
1.557	74	73	Weighted Average, UI Adjusted
1.462			93.90% Pervious Area
0.095			6.10% Impervious Area
0.095			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.0800	0.30		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.18"
3.9	248	0.0235	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.5	348	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-2: PDA-2

[49] Hint: Tc<2dt may require smaller dt

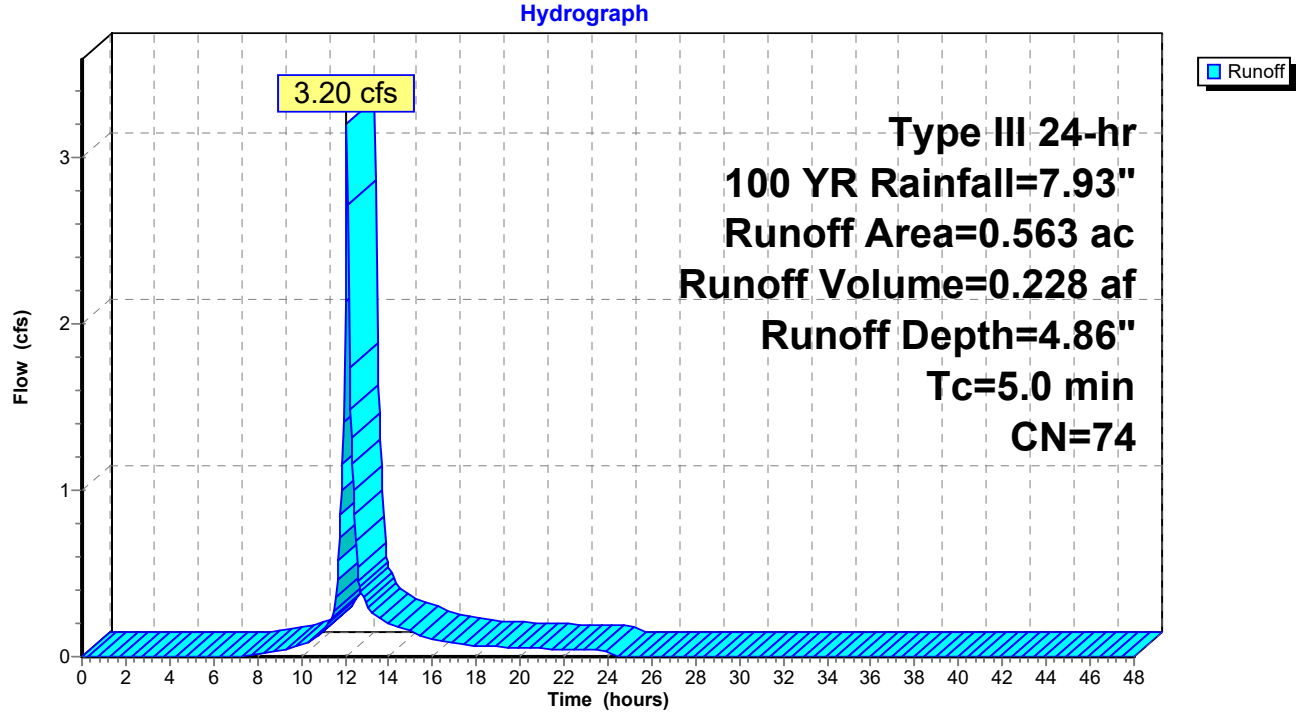
Runoff = 3.20 cfs @ 12.08 hrs, Volume= 0.228 af, Depth= 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.93"

Area (ac)	CN	Description
0.166	98	Paved parking, HSG A
0.026	96	Gravel surface, HSG A
0.165	49	50-75% Grass cover, Fair, HSG A
0.009	98	Paved parking, HSG B
0.016	96	Gravel surface, HSG B
0.181	69	50-75% Grass cover, Fair, HSG B
0.563	74	Weighted Average
0.388		68.92% Pervious Area
0.175		31.08% Impervious Area

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

Subcatchment PDA-2: PDA-2



Summary for Pond 1P: Stormwater Basin

Inflow Area = 1.557 ac, 6.10% Impervious, Inflow Depth = 4.75" for 100 YR event
Inflow = 7.57 cfs @ 12.14 hrs, Volume= 0.616 af
Outflow = 7.21 cfs @ 12.17 hrs, Volume= 0.556 af, Atten= 5%, Lag= 2.1 min
Primary = 7.21 cfs @ 12.17 hrs, Volume= 0.556 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 82.37' @ 12.17 hrs Surf.Area= 3,733 sf Storage= 3,924 cf

Plug-Flow detention time= 74.7 min calculated for 0.556 af (90% of inflow)
Center-of-Mass det. time= 26.3 min (848.3 - 822.1)

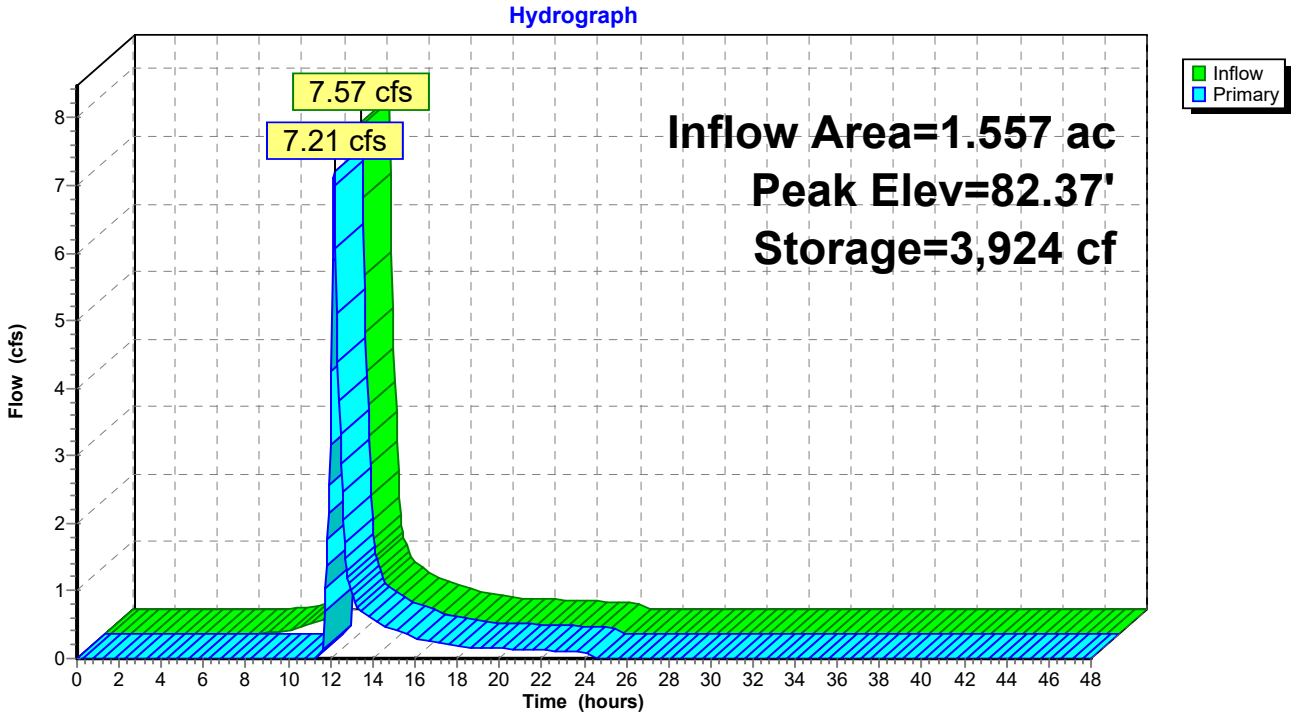
Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	6,552 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
81.00	2,060	332.0	0	0	2,060
82.00	3,248	397.7	2,632	2,632	5,892
83.00	4,633	463.4	3,920	6,552	10,415

Device	Routing	Invert	Outlet Devices
#1	Primary	82.00'	**12.0' long 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

Primary OutFlow Max=7.06 cfs @ 12.17 hrs HW=82.37' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 7.06 cfs @ 1.61 fps)

Pond 1P: Stormwater Basin

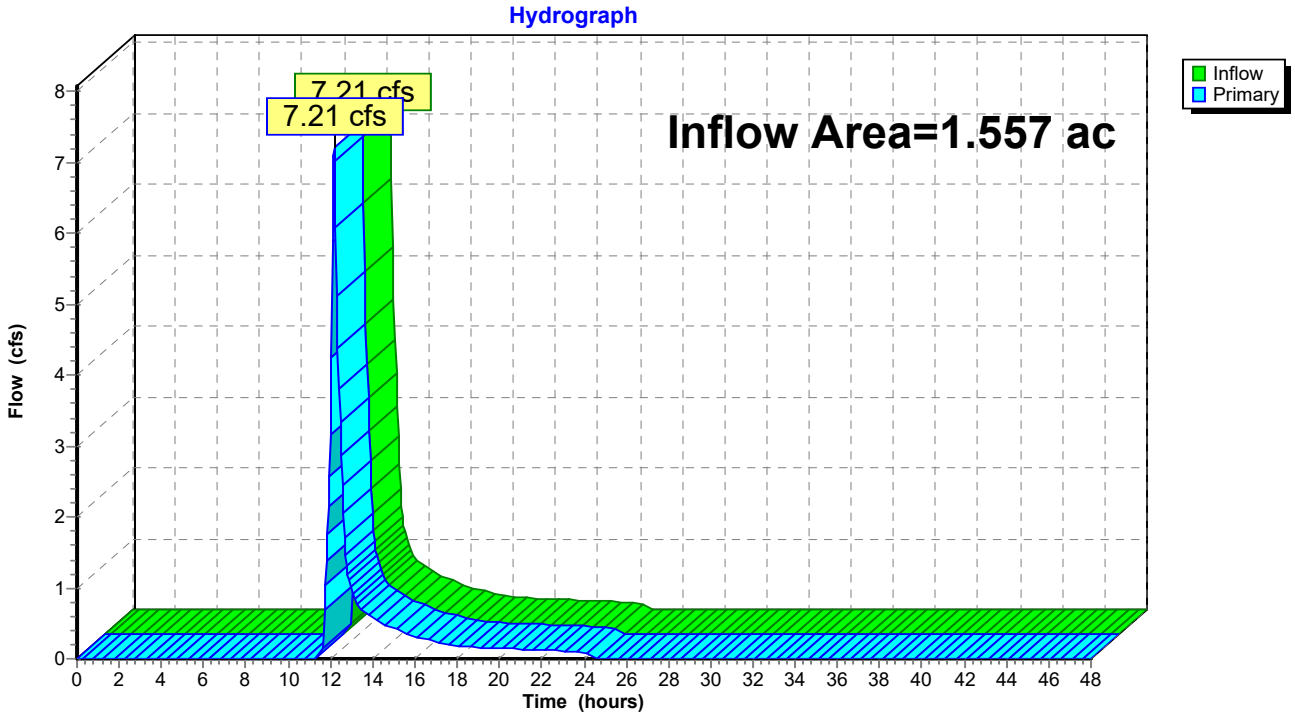


Summary for Link AP-1: Wetlands

Inflow Area = 1.557 ac, 6.10% Impervious, Inflow Depth = 4.28" for 100 YR event
Inflow = 7.21 cfs @ 12.17 hrs, Volume= 0.556 af
Primary = 7.21 cfs @ 12.17 hrs, Volume= 0.556 af, Atten= 0%, Lag= 0.0 min

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

Link AP-1: Wetlands

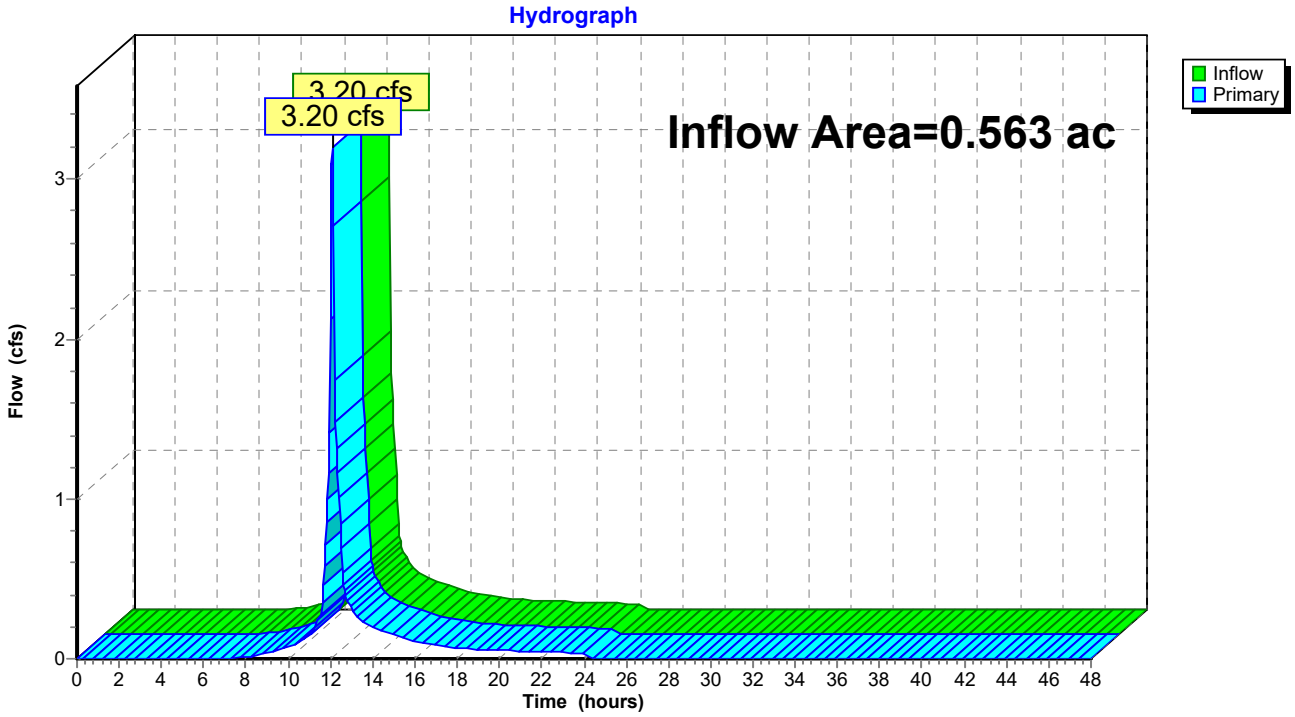


Summary for Link AP-2: Catch Basin

Inflow Area = 0.563 ac, 31.08% Impervious, Inflow Depth = 4.86" for 100 YR event
Inflow = 3.20 cfs @ 12.08 hrs, Volume= 0.228 af
Primary = 3.20 cfs @ 12.08 hrs, Volume= 0.228 af, Atten= 0%, Lag= 0.0 min

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

Link AP-2: Catch Basin



APPENDIX E: WATER QUALITY VOLUME CALCULATIONS

WATER QUALITY VOLUME CALCULATIONS
FOR
OLD AMSTON ROAD FUEL CELL POWER PLANT
42 OLD AMSTON ROAD, COLCHESTER, CT

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

where:
WQV = water quality volume (ac-ft)
R = volumetric runoff coefficien = 0.05+0.009(I)
I = percent impervious cover
A = site area in acres

$V = WQV + ((P)(A_b)/12)$

V=required basin storage volume (ac-ft)
WQV=Water Quality Volume (ac-ft)
P= design water quality precipitation (in)
A_b=basin surface area (ac)

	Area (ac)	Pervious (ac)	Imperv. (ac)	I	R	WQV (ac-ft)	P (in)	Ab (ac)	V (ac-ft)	Total V Req. (cf)	V Provided (cf)
Overall Site	2.12	1.87	0.25	12%	0.16	0.03	n/a	n/a	n/a	1,211.33	-
B-1	1.56	1.26	0.31	20%	0.23	0.03	1	0.266531	0.05	2,247.08	2,632.00

Overal Total V Required = 2,247.08 cf
Overal Total V Provided = 2,632.00 cf

Stage-Area-Storage for Pond 1P: Stormwater Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
81.00	2,060	0
81.02	2,081	41
81.04	2,102	83
81.06	2,124	126
81.08	2,145	168
81.10	2,167	211
81.12	2,188	255
81.14	2,210	299
81.16	2,232	343
81.18	2,254	388
81.20	2,276	433
81.22	2,298	479
81.24	2,321	525
81.26	2,343	572
81.28	2,365	619
81.30	2,388	667
81.32	2,411	715
81.34	2,434	763
81.36	2,457	812
81.38	2,480	861
81.40	2,503	911
81.42	2,526	961
81.44	2,550	1,012
81.46	2,573	1,063
81.48	2,597	1,115
81.50	2,620	1,167
81.52	2,644	1,220
81.54	2,668	1,273
81.56	2,692	1,327
81.58	2,716	1,381
81.60	2,740	1,435
81.62	2,765	1,490
81.64	2,789	1,546
81.66	2,814	1,602
81.68	2,839	1,658
81.70	2,863	1,715
81.72	2,888	1,773
81.74	2,913	1,831
81.76	2,938	1,890
81.78	2,964	1,949
81.80	2,989	2,008
81.82	3,014	2,068
81.84	3,040	2,129
81.86	3,065	2,190
81.88	3,091	2,251
81.90	3,117	2,313
81.92	3,143	2,376
81.94	3,169	2,439
81.96	3,195	2,503
81.98	3,222	2,567
82.00	3,248	2,632
82.02	3,273	2,697
82.04	3,299	2,762
82.06	3,324	2,829
82.08	3,350	2,895
82.10	3,375	2,963
82.12	3,401	3,030
82.14	3,427	3,099
82.16	3,453	3,168
82.18	3,479	3,237
82.20	3,505	3,307
82.22	3,532	3,377
82.24	3,558	3,448
82.26	3,585	3,519
82.28	3,611	3,591
82.30	3,638	3,664
82.32	3,665	3,737
82.34	3,691	3,810
82.36	3,718	3,885
82.38	3,745	3,959
82.40	3,773	4,034
82.42	3,800	4,110
82.44	3,827	4,186
82.46	3,855	4,263
82.48	3,882	4,341
82.50	3,910	4,418
82.52	3,938	4,497
82.54	3,965	4,576
82.56	3,993	4,656
82.58	4,021	4,736
82.60	4,050	4,816
82.62	4,078	4,898
82.64	4,106	4,980
82.66	4,135	5,062
82.68	4,163	5,145
82.70	4,192	5,228
82.72	4,220	5,313
82.74	4,249	5,397
82.76	4,278	5,483
82.78	4,307	5,568
82.80	4,336	5,655
82.82	4,366	5,742
82.84	4,395	5,829
82.86	4,424	5,918
82.88	4,454	6,006
82.90	4,483	6,096
82.92	4,513	6,186
82.94	4,543	6,276
82.96	4,573	6,367
82.98	4,603	6,459
83.00	**4,633**	**6,552**

Weir set at 82.00', volume provided = 2,632 cf

APPENDIX F: NOAA ATLAS 14 PRECIPITATION FREQUENCY TABLE

NOAA Atlas 14, Volume 10, Version 3
Location name: Colchester, Connecticut, USA*
Latitude: 41.594°, Longitude: -72.3339°
Elevation: 409.51 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	**0.337** (0.260-0.429)	**0.406** (0.313-0.517)	**0.519** (0.399-0.664)	**0.613** (0.468-0.788)	**0.743** (0.550-0.991)	**0.840** (0.611-1.14)	**0.942** (0.666-1.32)	**1.06** (0.710-1.51)	**1.22** (0.791-1.80)	**1.36** (0.860-2.04)
10-min	**0.477** (0.368-0.607)	**0.575** (0.443-0.733)	**0.735** (0.565-0.939)	**0.869** (0.663-1.11)	**1.05** (0.779-1.40)	**1.19** (0.865-1.62)	**1.34** (0.944-1.88)	**1.50** (1.01-2.14)	**1.73** (1.12-2.56)	**1.93** (1.22-2.89)
15-min	**0.561** (0.433-0.714)	**0.677** (0.521-0.862)	**0.866** (0.664-1.11)	**1.02** (0.780-1.31)	**1.24** (0.917-1.65)	**1.40** (1.02-1.91)	**1.57** (1.11-2.21)	**1.76** (1.18-2.52)	**2.04** (1.32-3.01)	**2.26** (1.43-3.40)
30-min	**0.770** (0.594-0.980)	**0.929** (0.715-1.18)	**1.19** (0.911-1.52)	**1.40** (1.07-1.80)	**1.70** (1.26-2.27)	**1.92** (1.40-2.61)	**2.15** (1.52-3.03)	**2.42** (1.62-3.46)	**2.79** (1.81-4.12)	**3.10** (1.96-4.66)
60-min	**0.979** (0.755-1.25)	**1.18** (0.909-1.50)	**1.51** (1.16-1.93)	**1.78** (1.36-2.29)	**2.16** (1.60-2.88)	**2.44** (1.77-3.32)	**2.74** (1.94-3.85)	**3.07** (2.06-4.39)	**3.55** (2.30-5.23)	**3.94** (2.49-5.92)
2-hr	**1.27** (0.987-1.61)	**1.53** (1.18-1.93)	**1.94** (1.50-2.46)	**2.28** (1.75-2.91)	**2.75** (2.06-3.66)	**3.11** (2.28-4.21)	**3.48** (2.49-4.89)	**3.92** (2.64-5.57)	**4.58** (2.97-6.70)	**5.13** (3.25-7.63)
3-hr	**1.48** (1.15-1.86)	**1.77** (1.38-2.23)	**2.24** (1.74-2.83)	**2.63** (2.03-3.35)	**3.17** (2.38-4.20)	**3.58** (2.63-4.83)	**4.01** (2.88-5.61)	**4.52** (3.05-6.39)	**5.29** (3.44-7.71)	**5.95** (3.78-8.81)
6-hr	**1.89** (1.49-2.37)	**2.26** (1.77-2.84)	**2.86** (2.24-3.60)	**3.36** (2.61-4.25)	**4.05** (3.06-5.33)	**4.56** (3.38-6.12)	**5.11** (3.69-7.10)	**5.76** (3.91-8.08)	**6.75** (4.41-9.76)	**7.60** (4.85-11.2)
12-hr	**2.38** (1.88-2.97)	**2.85** (2.25-3.55)	**3.62** (2.85-4.51)	**4.25** (3.33-5.33)	**5.13** (3.89-6.69)	**5.78** (4.30-7.69)	**6.47** (4.69-8.92)	**7.30** (4.97-10.2)	**8.53** (5.59-12.2)	**9.57** (6.13-13.9)
24-hr	**2.82** (2.25-3.49)	**3.41** (2.71-4.22)	**4.37** (3.46-5.42)	**5.16** (4.06-6.43)	**6.25** (4.77-8.11)	**7.06** (5.29-9.34)	**7.93** (5.79-10.9)	**8.97** (6.14-12.4)	**10.5** (6.93-15.0)	**11.9** (7.63-17.1)
2-day	**3.17** (2.54-3.89)	**3.87** (3.10-4.76)	**5.02** (4.01-6.19)	**5.98** (4.74-7.40)	**7.29** (5.62-9.42)	**8.26** (6.24-10.9)	**9.32** (6.87-12.7)	**10.6** (7.30-14.6)	**12.6** (8.33-17.8)	**14.4** (9.26-20.6)
3-day	**3.43** (2.77-4.20)	**4.20** (3.38-5.15)	**5.46** (4.38-6.71)	**6.51** (5.19-8.03)	**7.95** (6.14-10.2)	**9.00** (6.83-11.8)	**10.2** (7.52-13.9)	**11.6** (7.98-15.8)	**13.8** (9.14-19.4)	**15.8** (10.2-22.4)
4-day	**3.68** (2.98-4.49)	**4.50** (3.63-5.50)	**5.84** (4.69-7.15)	**6.94** (5.55-8.54)	**8.47** (6.57-10.9)	**9.59** (7.30-12.6)	**10.8** (8.02-14.7)	**12.3** (8.52-16.8)	**14.7** (9.74-20.6)	**16.8** (10.8-23.8)
7-day	**4.38** (3.56-5.32)	**5.30** (4.30-6.43)	**6.79** (5.49-8.27)	**8.03** (6.46-9.82)	**9.74** (7.58-12.4)	**11.0** (8.39-14.3)	**12.4** (9.19-16.7)	**14.0** (9.72-19.0)	**16.6** (11.0-23.1)	**18.9** (12.2-26.6)
10-day	**5.08** (4.15-6.15)	**6.05** (4.93-7.32)	**7.63** (6.20-9.27)	**8.95** (7.22-10.9)	**10.8** (8.40-13.6)	**12.1** (9.25-15.6)	**13.5** (10.1-18.1)	**15.3** (10.6-20.5)	**17.9** (11.9-24.7)	**20.2** (13.1-28.3)
20-day	**7.26** (5.97-8.73)	**8.30** (6.82-9.99)	**10.0** (8.19-12.1)	**11.4** (9.29-13.8)	**13.4** (10.5-16.7)	**14.8** (11.4-18.9)	**16.4** (12.1-21.4)	**18.1** (12.6-24.0)	**20.5** (13.7-28.0)	**22.4** (14.6-31.2)
30-day	**9.10** (7.52-10.9)	**10.2** (8.39-12.2)	**11.9** (9.81-14.3)	**13.4** (10.9-16.2)	**15.4** (12.1-19.1)	**16.9** (13.0-21.3)	**18.5** (13.6-23.9)	**20.1** (14.1-26.6)	**22.3** (15.0-30.3)	**23.9** (15.6-33.1)
45-day	**11.4** (9.44-13.6)	**12.5** (10.4-14.9)	**14.3** (11.8-17.1)	**15.8** (13.0-19.0)	**17.9** (14.1-22.1)	**19.5** (15.0-24.4)	**21.1** (15.5-26.9)	**22.6** (15.9-29.8)	**24.5** (16.5-33.1)	**25.8** (16.9-35.5)
60-day	**13.3** (11.1-15.8)	**14.4** (12.0-17.2)	**16.3** (13.5-19.5)	**17.9** (14.7-21.4)	**20.0** (15.8-24.5)	**21.7** (16.7-27.0)	**23.3** (17.2-29.5)	**24.8** (17.5-32.5)	**26.5** (17.9-35.6)	**27.6** (18.1-37.8)

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

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

Please refer to NOAA Atlas 14 document for more information.

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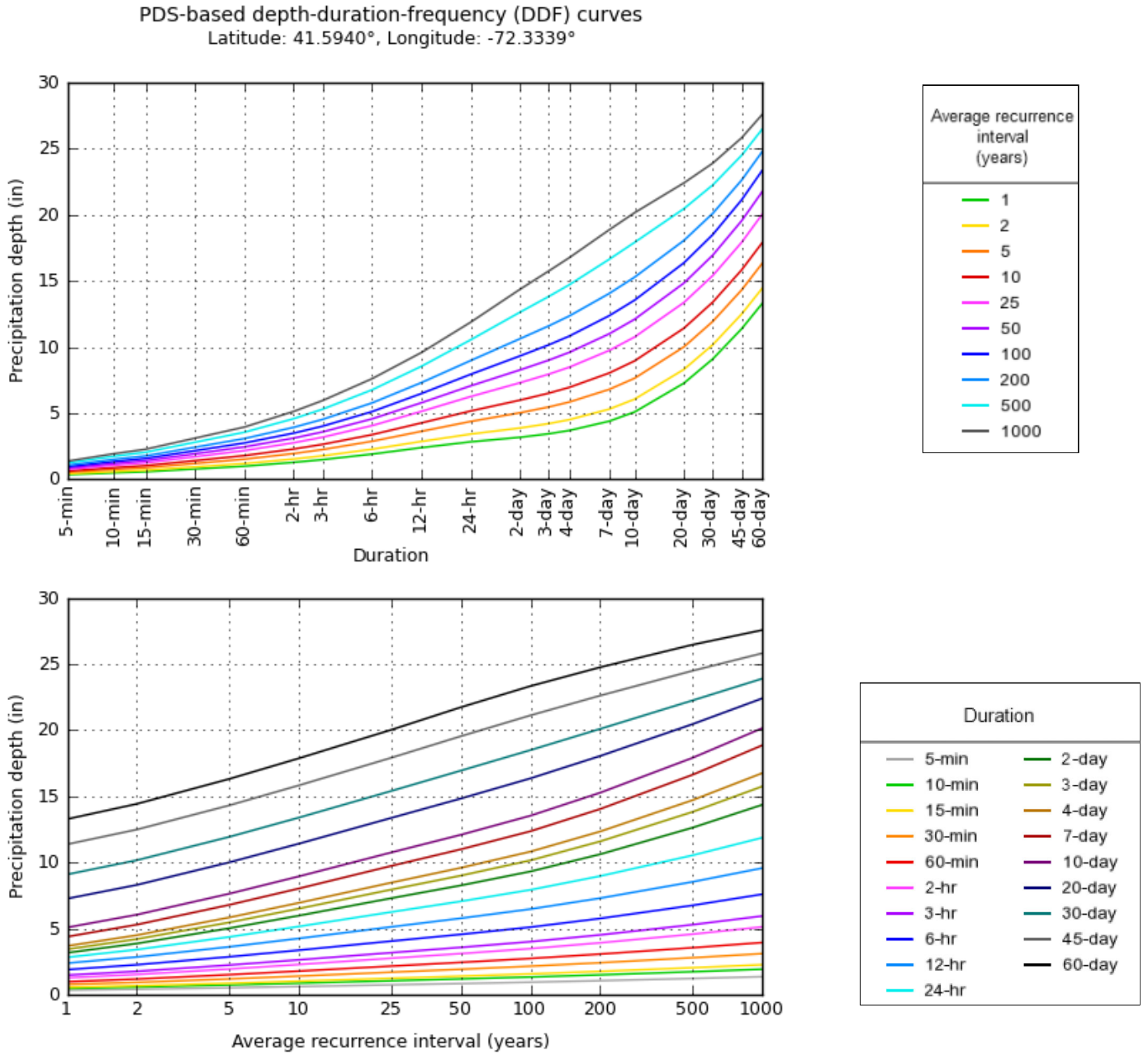
PF graphical



NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Thu Apr 7 11:13:29 2022

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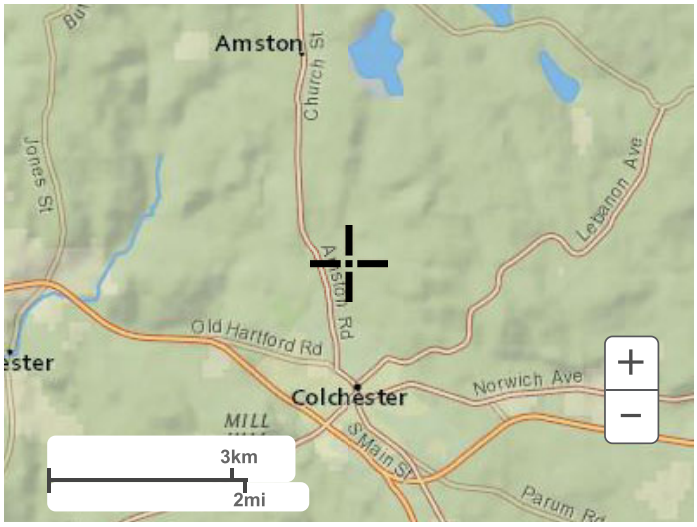
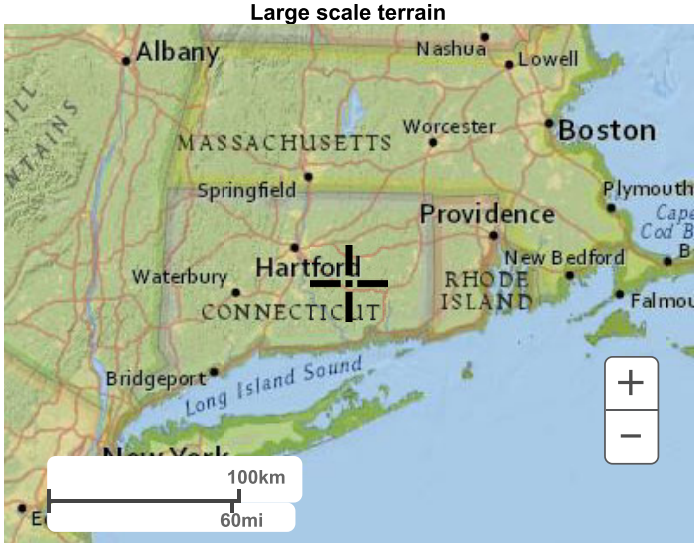
Maps & aerials

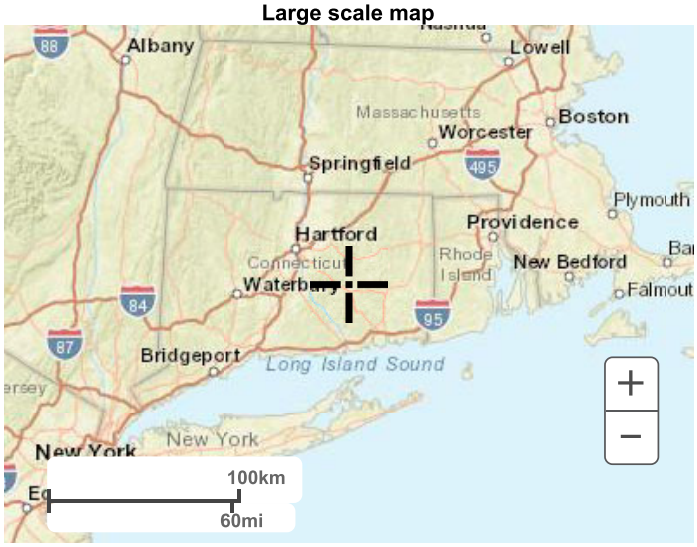
Small scale terrain



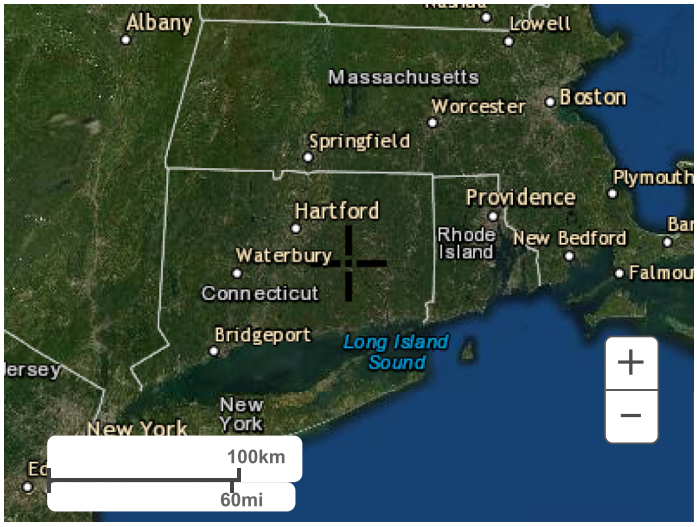
Large scale terrain



Large scale map



Large scale aerial



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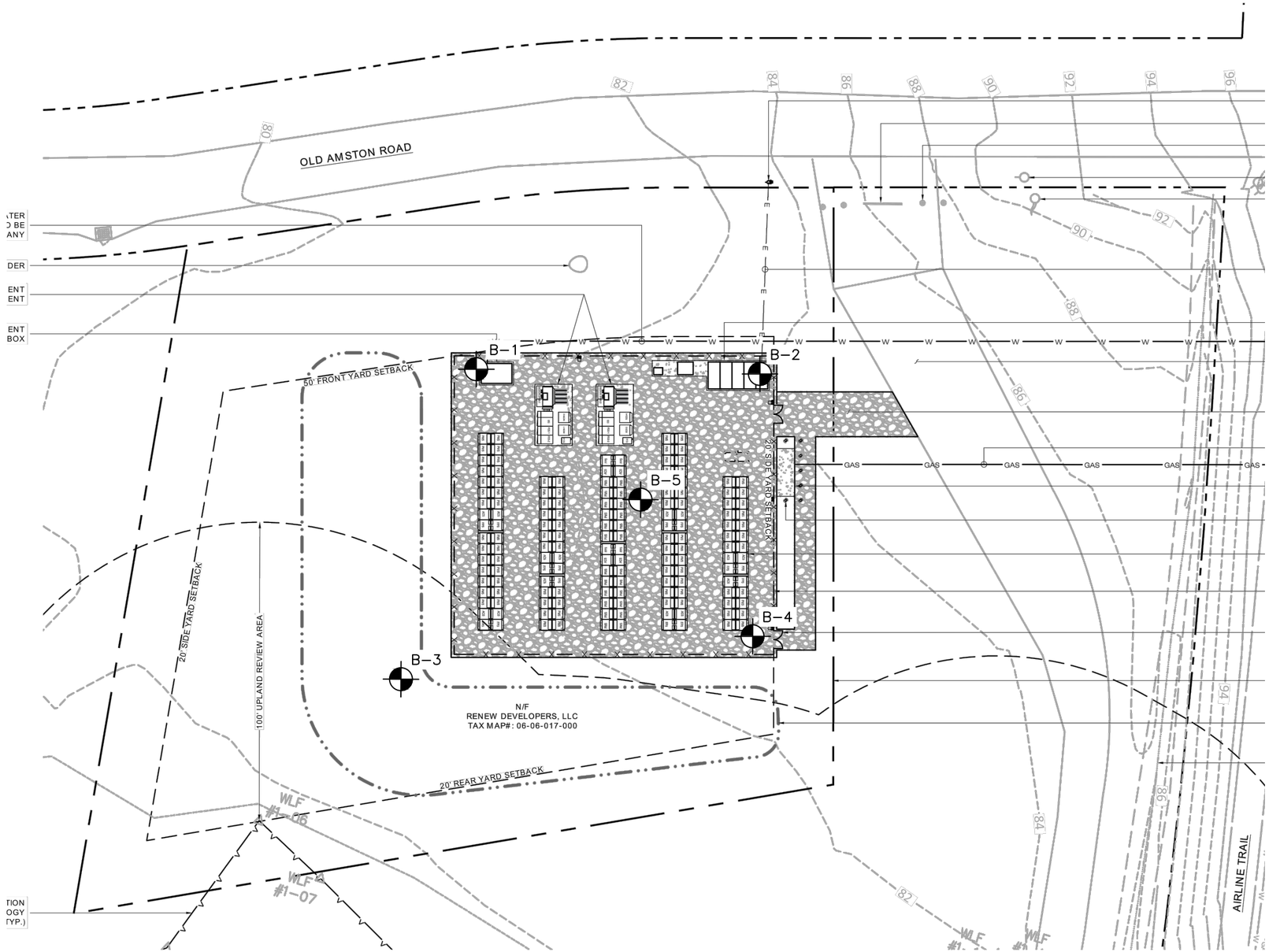
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX G: TEST PIT LOCATION SKETCH



LEGEND

B–1 — TEST BORING NO. AND LOCATION BY DOWN TO EARTH CONSULTING, LLC

NOTES:
1) BASE MAP DEVELOPED FROM AN ELECTRONIC FILE PREPARED BY ALL–POINTS TECHNOLOGY CORPORATION, P.C., ENTITLED 'CONCEPT PLAN'. SHEET NUMBER: CP–1. DATED MARCH 30, 2022. ORIGINAL SCALE 1":20'.
2) BORINGS WERE COMPLETED BY ASSOCIATED BORINGS COMPANY, INC. AND OBSERVED BY DOWN TO EARTH CONSULTING, LLC.
3) THE LOCATIONS OF THE EXPLORATIONS WERE DETERMINED BY TAPING AND VISUAL ESTIMATES FROM EXISTING SITE FEATURES. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

DESIGNED BY OTHERS						
DRAWN BY MF						
CHECKED BY TJO						
APPROVED BY RPJ	NO.	DATE	REVISIONS	DRWN.	CHKD	APPVD

SCALE 1" = 40'
40 20 0 40

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING
122 CHURCH STREET
NAUGATUCK, CONNECTICUT 06770

PROJECT
PROPOSED FUEL CELL DEVELOPMENT
42 OLD AMSTON ROAD
COLCHESTER, CONNECTICUT

DWG. TITLE.
SITE AND EXPLORATION LOCATION PLAN

FILE NO. 0032–062.00
SCALE AS NOTED
DATE 4/12/2022
FIGURE NO. 2

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED FUEL CELL DEVELOPMENT
42 OLD AMSTON ROAD
COLCHESTER, CONNECTICUT

BORING NO. B-1
SHEET 1 of 1
FILE NO. 0032-062.00
CHKD. BY RPJ

Boring Co.	Associated Borings Company	Boring Location	See Boring Location Plan		
Driller	Jaime Lloret	Ground Surface El.	82±	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/8/2022	Date End	4/8/2022

Hammer Type:	Cathead Operated Donut Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted CME 45
Drilling Method:	2.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/8/22	-	10	-	Wet Sample
4/8/22	4:00 PM	3	79±	End of Drilling

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1								
2								
3								FILL
4		S-1	7/24	3 to 5	9-13-10-29		Medium dense, brown to black, fine to coarse SAND, some fine to coarse Gravel, some Silt, trace Plastic fragments	
5								
6		S-2	11/24	5 to 7	11-8-5-16		Medium dense, dark gray to gray, fine to coarse SAND, some Silt, trace fine Gravel	
7								SAND
8		S-3	10/24	7 to 9	13-16-23-13		Dense, gray to brown, fine to coarse SAND, some fine to coarse Gravel, some Silt	
9								
10								
11		S-4	10/24	10 to 12	15-40-51-50		Very dense, brown, fine to coarse SAND, some fine to coarse Gravel, some Silt	
12								
13							END OF EXPLORATION AT 12 FEET BELOW GROUND SURFACE	
14								
15								
16								
17								
18								
19								
20								
21								
22								
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40								

SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED FUEL CELL DEVELOPMENT
42 OLD AMSTON ROAD
COLCHESTER, CONNECTICUT

BORING NO. B-2
SHEET 1 of 1
FILE NO. 0032-062.00
CHKD. BY RPJ

Boring Co.	Associated Borings Company	Boring Location	See Boring Location Plan		
Driller	Jaime Lloret	Ground Surface El.	84±	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/8/2022	Date End	4/8/2022

Hammer Type:	Cathead Operated Donut Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted CME 45
Drilling Method:	2.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/8/22	-	10	-	Wet Sample

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1								
2								FILL
3								
4		S-1	12/24	3 to 5	6-10-15-15		Medium dense, gray to brown, fine to coarse SAND, some fine to coarse Gravel, some Silt	
5								
6		S-2	11/24	5 to 7	9-15-25-39		Dense, brown, fine to coarse SAND, some Silt, little fine to coarse Gravel	
7								
8								SAND
9								
10								
11		S-3	11/24	10 to 12	9-13-12-10		Medium dense, brown, fine to coarse SAND, some Silt, little fine to coarse Gravel	
12								
13							END OF EXPLORATION AT 12 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED FUEL CELL DEVELOPMENT
42 OLD AMSTON ROAD
COLCHESTER, CONNECTICUT

BORING NO. B-3
SHEET 1 of 1
FILE NO. 0032-062.00
CHKD. BY RPJ

Boring Co.	Associated Borings Company	Boring Location	See Boring Location Plan		
Driller	Jaime Lloret	Ground Surface El.	81±	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/8/2022	Date End	4/8/2022

Hammer Type:	Cathead Operated Donut Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted CME 45
Drilling Method:	2.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/8/22	-	10	-	Wet Sample
4/8/22	4:00 PM	2	79±	End of Drilling

DEPTH	Casing Blows (ft)	Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1								
2		S-1	4/9	1 to 1.8	12-65/3"		Very dense, brown, fine to coarse SAND, some Silt, little fine to coarse Gravel	FILL
3								
4		S-2	5/24	3 to 5	8-8-3-2		Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, little Silt, with coarse gravel fragments at sample tip	
5								SILT
6		S-3	1/24	5 to 7	1-2-5-6		Loose, gray, SILT and fine to coarse SAND, some fine to coarse Gravel	
7								
8		S-4	6/24	7 to 9	10-7-6-7		Medium dense, gray, fine to coarse SAND, some fine to coarse Gravel, some Silt	SAND
9								
10								
11		S-5	6/24	10 to 12	12-14-24-42		Dense, brown/gray, fine to coarse SAND, some Silt, some fine to coarse Gravel	
12								
13							END OF EXPLORATION AT 12 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED FUEL CELL DEVELOPMENT
42 OLD AMSTON ROAD
COLCHESTER, CONNECTICUT

BORING NO. B-4
SHEET 1 of 1
FILE NO. 0032-062.00
CHKD. BY RPJ

Boring Co.	Associated Borings Company	Boring Location	See Boring Location Plan		
Driller	Jaime Lloret	Ground Surface El.	83±	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/8/2022	Date End	4/8/2022

Hammer Type:	Cathead Operated Donut Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted CME 45
Drilling Method:	2.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/8/22	-	10	-	Wet Sample

DEPTH	Casing Blows (ft)	Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1								
2								FILL
3		S-1	4/24	2 to 4	3-5-3-2		Loose, brown, fine to coarse SAND, little Silt, little fine to coarse Gravel	
4								
5								SILT
6		S-2	10/24	5 to 7	1-6-9-11		Medium dense, black to gray to brown, SILT and fine to coarse SAND, trace fine Gravel	
7								SAND
8		S-3	11/24	7 to 9	13-16-27-50		Dense, brown, fine to coarse SAND, some fine to coarse Gravel, some Silt	
9								
10								
11		S-4	10/24	10 to 12	19-19-17-23		Dense, brown, fine to coarse SAND, some Silt, some fine to coarse Gravel	
12								
13							END OF EXPLORATION AT 12 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
5 to 10 - Loose	3 to 4 - Soft	Little = 10 to 20%	2. ST denotes 3-inch O.D. undisturbed sample.	8. WR denotes weight of rods
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	Some = 20 to 35%	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	And = 35 to 50%	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Auger refusal encountered at about 12 feet below grade on inferred boulder. Boring relocated 3 feet east.
4) Auger refusal encountered again at 12 feet below grade on inferred boulder.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

PROJECT
PROPOSED FUEL CELL DEVELOPMENT
42 OLD AMSTON ROAD
COLCHESTER, CONNECTICUT

BORING NO. B-5
SHEET 1 of 1
FILE NO. 0032-062.00
CHKD. BY RPJ

Boring Co.	Associated Borings Company	Boring Location	See Boring Location Plan		
Driller	Jaime Lloret	Ground Surface El.	83±	Datum	Not Available
Logged By	Mateusz Fekieta	Date Start	4/8/2022	Date End	4/8/2022

Hammer Type:	Cathead Operated Donut Hammer
Sampler Size:	1-3/8" I.D. Split Spoon
Type Drill Rig:	Truck Mounted CME 45
Drilling Method:	2.25-inch I.D. Hollow-Stem Augers

Groundwater Readings (from ground surface)

Date	Time	Depth (ft)	Elev.	Stabilization Time
4/8/22	-	10	-	Wet Sample

DEPTH	Casing Blows (ft)	Type & No.	REC/PEN (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	Core Time (min./ft)	SAMPLE DESCRIPTION	STRATA
1								
2		S-1	12/24	1 to 3	9-12-17-12		Medium dense, brown, fine to coarse SAND, some Silt, little fine to coarse Gravel	FILL
3								
4		S-2	3/24	3 to 5	6-13-17-7		Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, little Silt	
5								
6		S-3	3/24	5 to 7	4-2-3-5		Loose, gray, fine to coarse SAND, some fine to coarse Gravel, some Silt	SAND
7								
8		S-4	9/24	7 to 9	8-9-8-17		Medium dense, gray, fine to coarse SAND, some fine to coarse Gravel, some Silt	
9								
10								
11		S-5	9/24	10 to 12	12-26-20-22		Dense, brown, fine to coarse SAND, some Silt, some fine to coarse Gravel	
12								
13								
14								
15								
16		S-6	10/12	15 to 16	34-65/6"		Very dense, gray, fine to medium SAND and SILT, trace fine Gravel	
17								
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19								
20							END OF EXPLORATION AT 19 FEET BELOW GROUND SURFACE	
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SPT N-Values	SPT N-Values	Proportions	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	Trace = 0 to 10%	1. S denotes split-barrel sampler.	7. WH denotes weight of hammer
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Over 50 - Very Dense	16 to 30 - Very Stiff		5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard		6. SPT denotes Standard Penetration Test.	12. C denotes core run number.

FIELD NOTES: 1) Stratification lines represent approximate boundaries between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations may occur due to other factors.
3) Cobbles and/or boulders were inferred based on observed auger chatter from about 12.5 to 19 feet below grade.
4) Auger refusal at about 19 feet below grade on inferred boulder or possible bedrock.

DOWN TO EARTH CONSULTING, LLC
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERING

Test Boring Falling Head Test
Proposed Fuel Cell Development
Old Amston Road
Colchester, CT
File No. 0032-062.00

Test Location: B-3
Test Type: Falling Head
Date: 4/7/2022

Driller: Jaime Lloret
Engineer: M. Fekieta
Weather: Cloudy 40s/50s

Ground surface El.: 81± (ft.)
Top of Casing El.: 81.7± (ft.)
Bottom of Casing El.: 79± (ft.)

Depth to Bottom of Casing: 3.7 (ft.)

Inside Casing Diameter: 3.88 (in.)

Hydraulic Conductivity (Kv) = π [D {Ln (h1/h2) }] / 11 (t2-t1)

Elapsed Time (min.)	t2 - t1 (min.)	DTW (in.)	h1 (in.)	h2 (in.)	ln(h1/h2)	Kv (in/min)	Kv (cm/sec)	Kv (in/hr)
15	15	0.03	44.4	44.4	0.0007	5.2E-05	2.2E-06	3.1E-03
35	20	0.09	44.4	44.3	0.0014	7.8E-05	3.3E-06	4.7E-03
60	25	0.31	44.3	44.1	0.0049	2.2E-04	9.3E-06	1.3E-02
90	30	0.50	44.1	43.9	0.0043	1.6E-04	6.7E-06	9.4E-03
120	30	0.75	43.9	43.7	0.0057	2.1E-04	8.9E-06	1.3E-02
150	30	1.00	43.7	43.4	0.0057	2.1E-04	9.0E-06	1.3E-02
180	30	1.25	43.4	43.2	0.0058	2.1E-04	9.0E-06	1.3E-02