Stantec

Memo

To:	City of Newton	From:	Karen Beighley Anna Jones Stantec
File:	Opal House 2 Life Newton	Date:	May 6, 2021

Reference: 2Life Newton – Stormwater Management Memo

Introduction

2Life Communities proposes to develop a 4.5-acre site located at the intersection of Nahanton and Winchester Street. The site is adjacent to the existing Coleman House building, a senior housing facility. The proposed improvements include a new senior housing building, a connector building to the existing Coleman House, utilities, and associated site amenities.

The site drains to two design points, one in Nahanton Street and one in Winchester Street. In order to mitigate potential impacts to resource areas, stormwater management systems are proposed and have been designed in accordance with the City of Newton's Requirements for On-Site Drainage (Stormwater Management) and the Massachusetts Department of Environmental Protection's *Stormwater Management Standards*.

The following memo summarizes how the project plans to comply with applicable standards.

Stormwater Standards

Standard 1 – Untreated Discharge

Standard 1 states that "no new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth."

New stormwater outfalls are proposed to accommodate the proposed development. All runoff directed to these stormwater outfalls will be treated prior to discharging by a series of deep sump hooded catch basins, water quality units, and subsurface detention systems. Each new outfall will be constructed with rip-rap energy dissipation aprons to control exiting velocities and prevent erosion to existing design points. Sizing calculations for the rip-rap energy dissipation aprons will be provided in the Stormwater Management Reports prepared for each specific lot or development area.

Therefore, the Project will comply with Standard 1.

Standard 2 – Peak Rate Attenuation

Standard 2 states that "stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates."

The proposed stormwater management systems are designed to attenuate the 2-, 10-, and 100-year 24-hour storm events. In doing so, the post-development peak discharge rates do not exceed the allowable peak discharges rates established as part of the overall parcel (master plan) analysis. A table of peak flow rates as currently designed is included below for reference.

Design Point		2-Year Storm (3.30")	10-Year Storm (5.20")	50-Year Storm (7.46")	100-Year Storm (8.94")
DP1	Existing Rate (cfs)	5.43	10.16	13.11	19.17
	Proposed Rate (cfs)	**4.99**	**9.28**	**11.58**	**15.63**
DP2	Existing Rate (cfs)	4.00	7.35	9.42	13.69
	Proposed Rate (cfs)	**3.65**	**6.58**	**8.38**	**12.10**

Therefore, the Project will comply with Standard 2.

Standard 3

Standard 3 states that the "loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook."

The project site is located entirely within areas with shallow depth to ledge, and therefore recharge cannot be provided. Borings on site will be completed to confirm groundwater levels, a draft is included as an attachment to this memo for reference.

Standard 4 – Water Quality

Standard 4 states that "Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids."

Standard 4 is met when a project complies with all of the following criteria:

1. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained.
2. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
3. Pre-treatment is provided in accordance with the Massachusetts Stormwater Handbook

The Project will provide a minimum of 80% TSS removal through water quality units. The final design will comply with minimum requirements.

Standard 5 – Land Uses with Higher Potential Pollutant Loads (LUHPPL)

Standard 5 states that "for land uses with higher potential pollutant loads [LUHPPL], source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable."

The Project does not exceed requirements and therefore is not considered a LUHPPL.

Therefore, the Project complies with Standard 5.

Standard 6 – Critical Areas

Standard 6 states that "Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook."

Critical areas include any one of the following, as defined by the Massachusetts Department of Environmental Protection:

- Outstanding Resource Waters
- Special Resource Waters
- Zone I Recharge Areas
- Zone II Recharge Areas
- Interim Wellhead Protection Areas
- Zone A Recharge Areas
- Bathing Beaches
- Cold-water Fisheries
- Shellfish Growing Areas

The proposed stormwater management system does not discharge near or to any of the above listed critical areas.

Therefore, the Project complies with Standard 6.

Standard 7 – Redevelopment Projects

Standard 7 states that "a redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions."

The Project is not considered to be a redevelopment and therefore, the Project complies with Standard 7.

Standard 8 – Erosion and Sediment Control Plan

Standard 8 states that "a plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented."

Sedimentation and erosion controls will be implemented during the construction of all phases of the Project. Land disturbance will be evaluated on a parcel by parcel basis and a Stormwater Pollution Prevention Plan (SWPPP) will be prepared for each parcel that involves a land disturbance greater than one acre.

Therefore, the Project will comply with Standard 8.

Standard 9 – Operation and Maintenance Plan

Standard 9 states that “a long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.”

An operation and maintenance plan for all Stormwater BMP’s will be provided in the Stormwater Management Report submitted to the Conservation Commission.

Therefore the Project will comply with Standard 9.

Standard 10

Standard 10 states that “all illicit discharges to the stormwater management system are prohibited.”

The Project will not allow illicit discharges to the stormwater management system. The final design will comply with the below Illicit Discharge Compliance Statement:

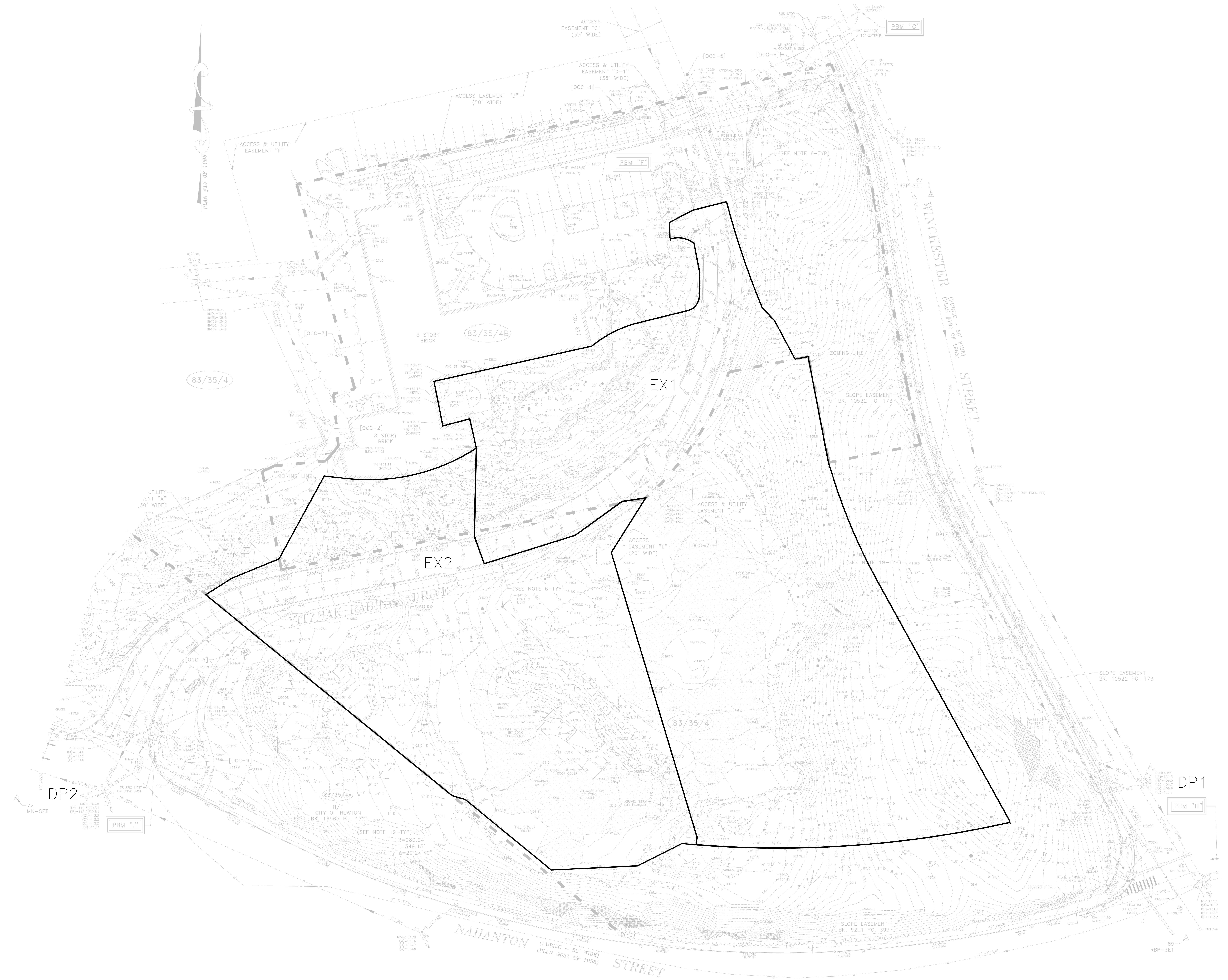
Illicit Discharge Compliance Statement

Per the requirements of Standard 10 of the Massachusetts Stormwater Management Standards, it shall be stated that no illicit discharges are proposed as part of the Vale project located in Woburn, Massachusetts, as described herein this stormwater report.

Therefore, the Project will comply with Standard 10.

May 6, 2021

Attachment A
Existing Watershed Map
& HydroCAD Calculations



01 05/05/2021 SPECIAL PERMIT

Stantec

Stantec Planning and Landscape Architectur
226 Causeway Street 6th Floor
Boston MA
02114-2155
Tel. (617) 523-8103
Fax. (617) 523-4333
www.stantec.com

PERKINS EASTMAN
1100 Liberty Avenue
Pittsburgh, PA 15222
T. +1 412 456 0900
F. +1 412 456 0906

Owner:
2 LIFE COMMUNITIES
30 Wallingford Road
Brighton, MA 02135

Construction Manager:
DELLBROOK
One Adams Place
859 Willard Street
Quincy, MA 02169

Civil / Site:
STANTEC
226 Causeway Street, 6th Floor
Boston, MA 02114

Structural:
VEITAS & VEITAS ENGINEERS, INC
639 Granite Street
Braintree, MA 02184

MEP consultant:
PETERSEN ENGINEERING, INC
127 Parrott Avenue
Portsmouth, NH 03801

PROJECT TITLE:

2LIFE - OPUS

677 WINCHESTER STREET
NEWTON, MA 02459

PROJECT No: 66571

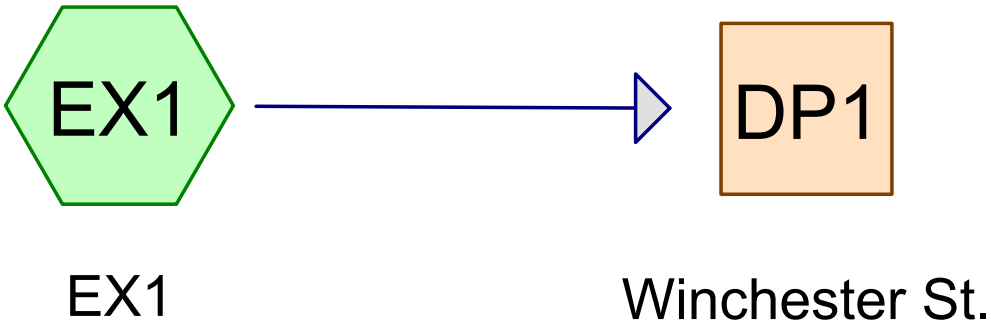
DRAWING TITLE:

EXISTING CONDITIONS WATERSHED MAP

SCALE:

SKC-100

ZONING REVIEW



EX1

Winchester St.

EX2

Nahanton St

Subcat Reach Pond Link

Routing Diagram for 20200317_Nahanton_Existing
Prepared by Stantec Consulting Ltd., Printed 5/6/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.786	96	Gravel surface, HSG D (EX1, EX2)
0.547	98	Paved parking, HSG D (EX1, EX2)
3.296	82	Woods/grass comb., Fair, HSG D (EX1, EX2)
4.628	**86**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
4.628	HSG D	EX1, EX2
0.000	Other	
4.628		**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
0.000	0.000	0.000	0.786	0.000	0.786	Gravel surface	EX1, EX2
0.000	0.000	0.000	0.547	0.000	0.547	Paved parking	EX1, EX2
0.000	0.000	0.000	3.296	0.000	3.296	Woods/grass comb., Fair	EX1, EX2
0.000	**0.000**	**0.000**	**4.628**	**0.000**	**4.628**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 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 EX1: EX1 Runoff Area=120,944 sf 10.82% Impervious Runoff Depth=1.92"
Flow Length=250' Tc=10.2 min CN=86 Runoff=5.43 cfs 0.445 af

Subcatchment EX2: EX2 Runoff Area=80,673 sf 13.31% Impervious Runoff Depth=2.00"
Flow Length=95' Tc=8.4 min CN=87 Runoff=4.00 cfs 0.309 af

Reach DP1: Winchester St. Inflow=5.43 cfs 0.445 af
Outflow=5.43 cfs 0.445 af

Reach DP2: Nahanton St Inflow=4.00 cfs 0.309 af
Outflow=4.00 cfs 0.309 af

Total Runoff Area = 4.628 ac Runoff Volume = 0.754 af Average Runoff Depth = 1.95"
88.18% Pervious = 4.081 ac 11.82% Impervious = 0.547 ac

Summary for Subcatchment EX1: EX1

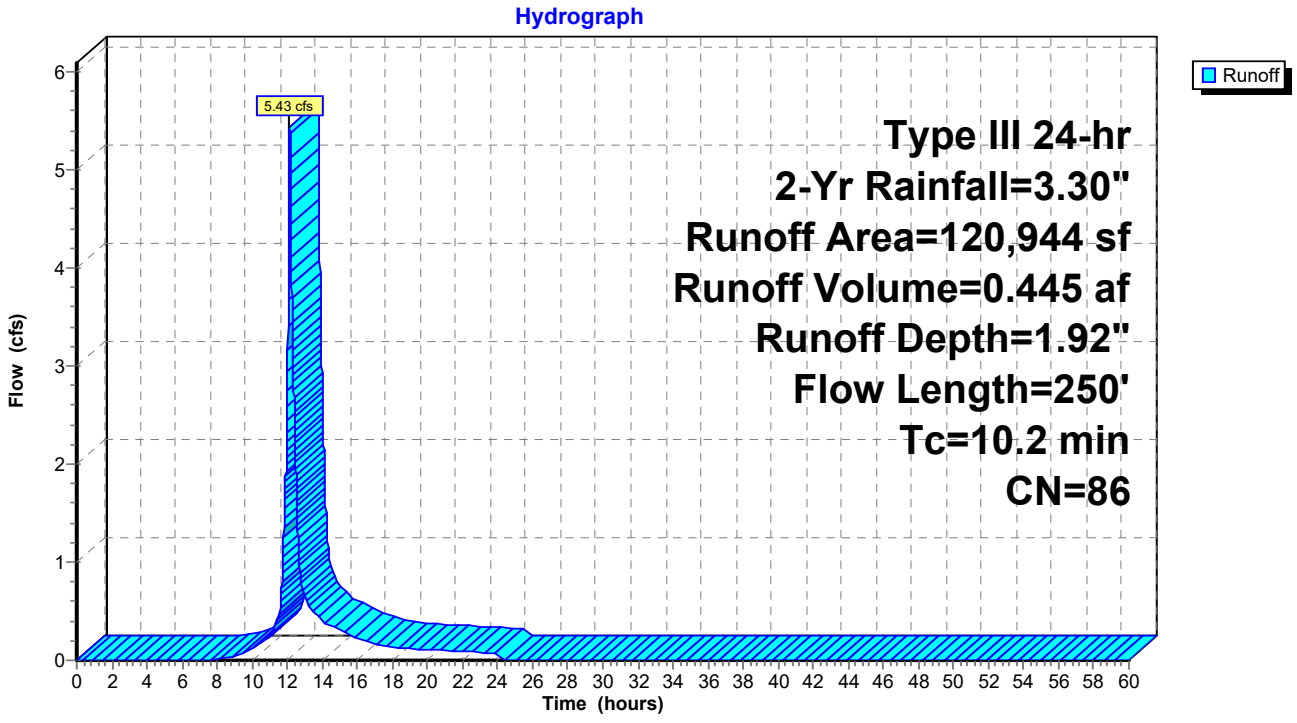
Runoff = 5.43 cfs @ 12.14 hrs, Volume= 0.445 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.30"

Area (sf)	CN	Description
13,091	98	Paved parking, HSG D
88,848	82	Woods/grass comb., Fair, HSG D
19,005	96	Gravel surface, HSG D
120,944	86	Weighted Average
107,853		89.18% Pervious Area
13,091		10.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, Sheet flow** Woods: Light underbrush n= 0.400 P2= 3.30"
1.8	200	0.1400	1.87		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
10.2	250	Total			

Subcatchment EX1: EX1



Summary for Subcatchment EX2: EX2

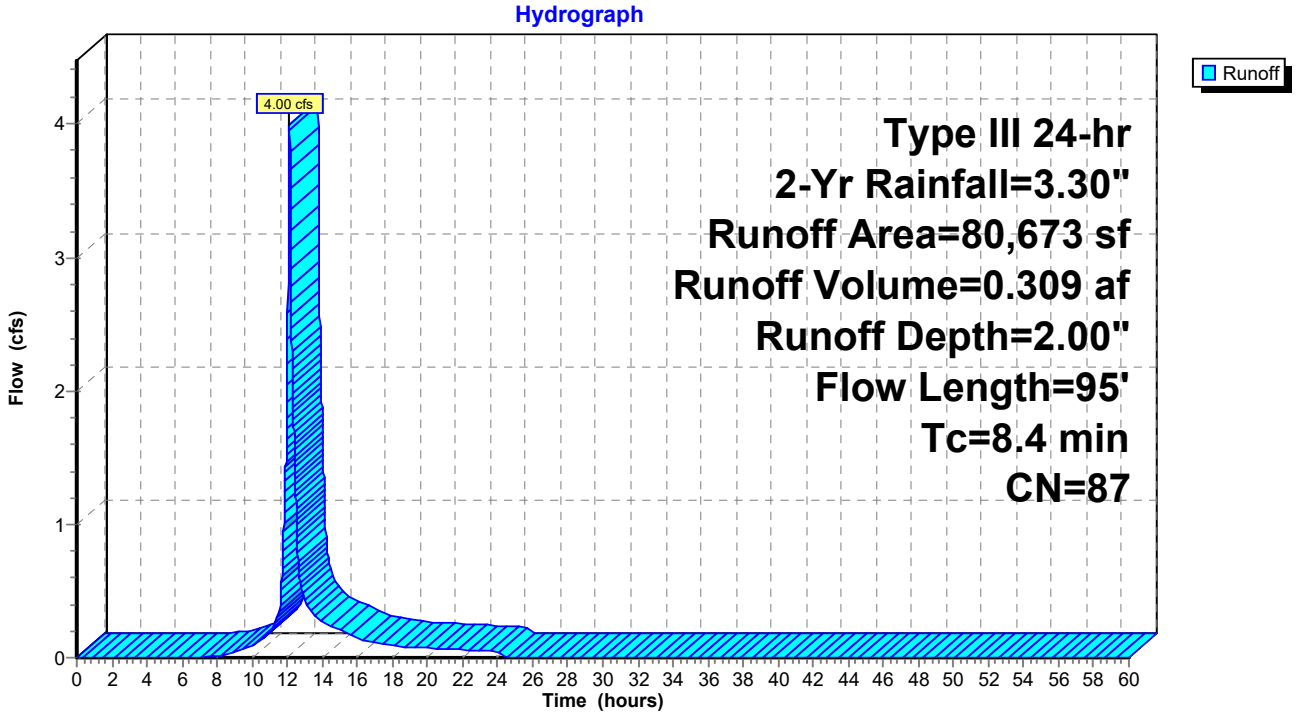
Runoff = 4.00 cfs @ 12.12 hrs, Volume= 0.309 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.30"

Area (sf)	CN	Description
10,741	98	Paved parking, HSG D
54,711	82	Woods/grass comb., Fair, HSG D
15,221	96	Gravel surface, HSG D
80,673	87	Weighted Average
69,932		86.69% Pervious Area
10,741		13.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	50	0.2200	0.39		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 3.30"
0.3	45	0.2000	2.24		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
6.0					**Direct Entry, to pavement**
8.4	95	Total			

Subcatchment EX2: EX2



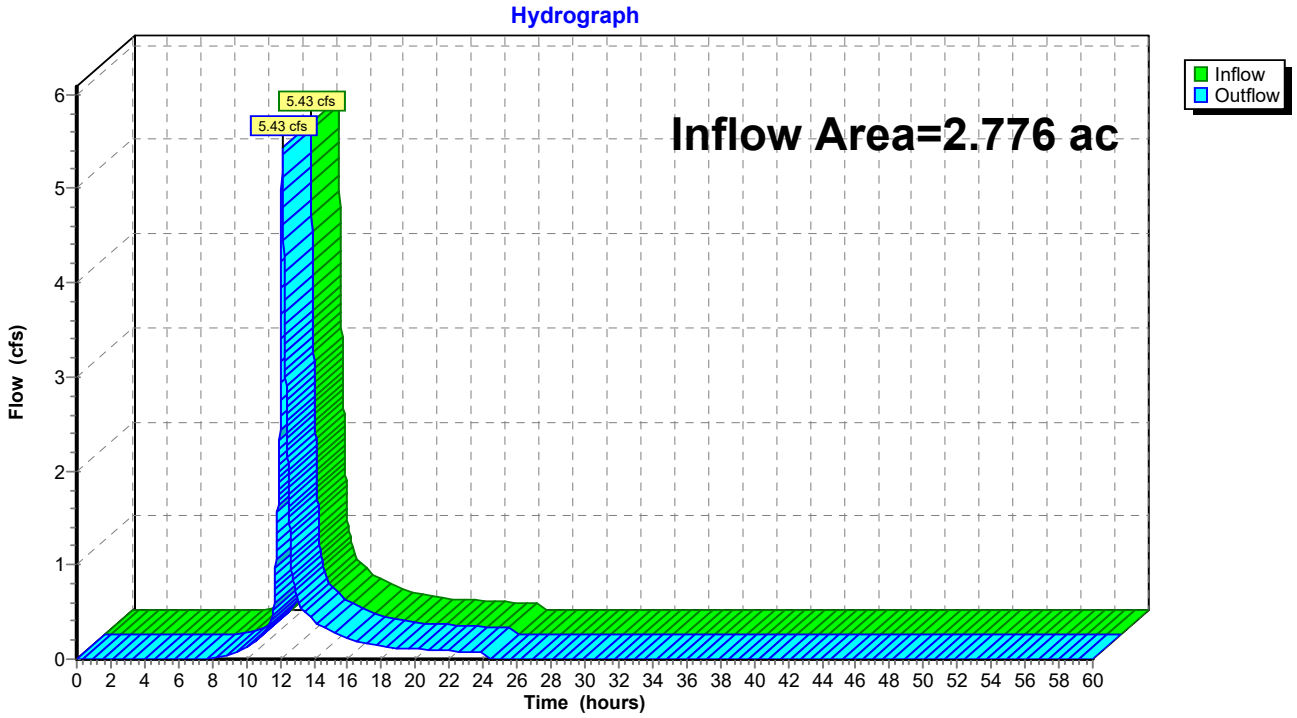
Summary for Reach DP1: Winchester St.

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

Inflow Area = 2.776 ac, 10.82% Impervious, Inflow Depth = 1.92" for 2-Yr event
Inflow = 5.43 cfs @ 12.14 hrs, Volume= 0.445 af
Outflow = 5.43 cfs @ 12.14 hrs, Volume= 0.445 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP1: Winchester St.



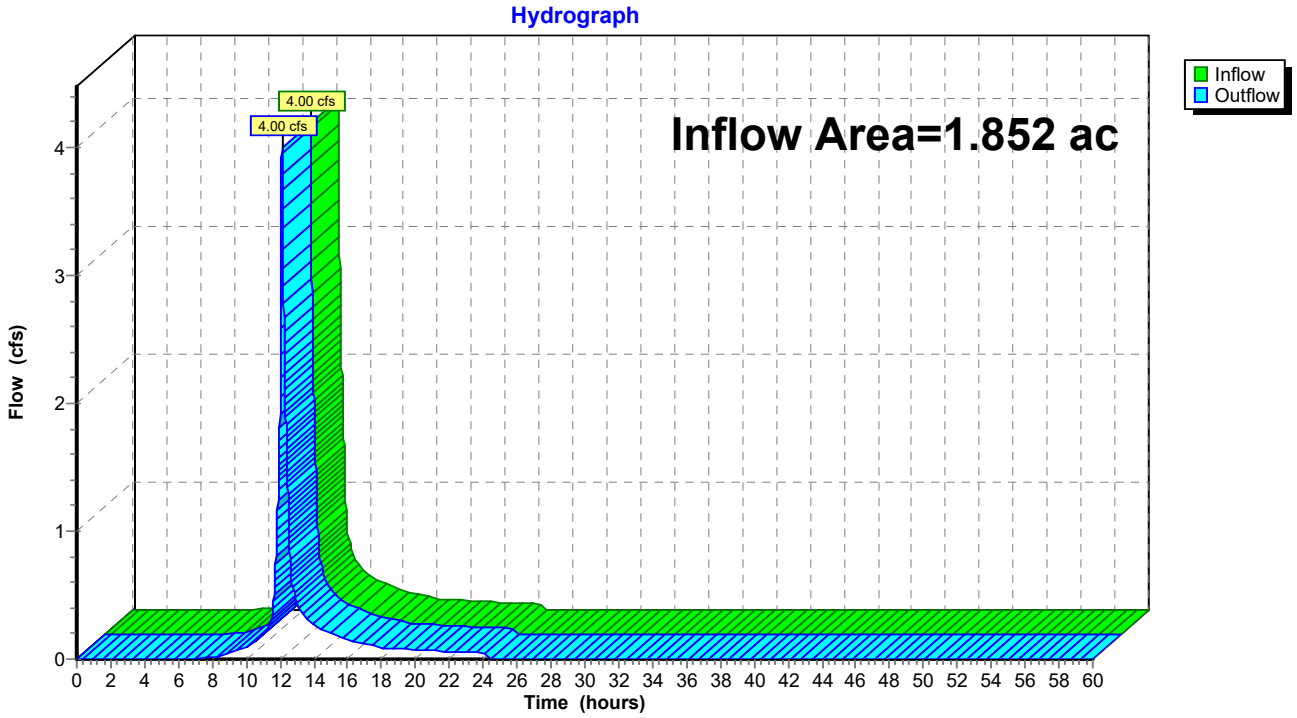
Summary for Reach DP2: Nahanton St

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

Inflow Area = 1.852 ac, 13.31% Impervious, Inflow Depth = 2.00" for 2-Yr event
Inflow = 4.00 cfs @ 12.12 hrs, Volume= 0.309 af
Outflow = 4.00 cfs @ 12.12 hrs, Volume= 0.309 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP2: Nahanton St



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 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 EX1: EX1 Runoff Area=120,944 sf 10.82% Impervious Runoff Depth=3.64"
Flow Length=250' Tc=10.2 min CN=86 Runoff=10.16 cfs 0.843 af

Subcatchment EX2: EX2 Runoff Area=80,673 sf 13.31% Impervious Runoff Depth=3.75"
Flow Length=95' Tc=8.4 min CN=87 Runoff=7.35 cfs 0.578 af

Reach DP1: Winchester St. Inflow=10.16 cfs 0.843 af
Outflow=10.16 cfs 0.843 af

Reach DP2: Nahanton St Inflow=7.35 cfs 0.578 af
Outflow=7.35 cfs 0.578 af

Total Runoff Area = 4.628 ac Runoff Volume = 1.422 af Average Runoff Depth = 3.69"
88.18% Pervious = 4.081 ac 11.82% Impervious = 0.547 ac

Summary for Subcatchment EX1: EX1

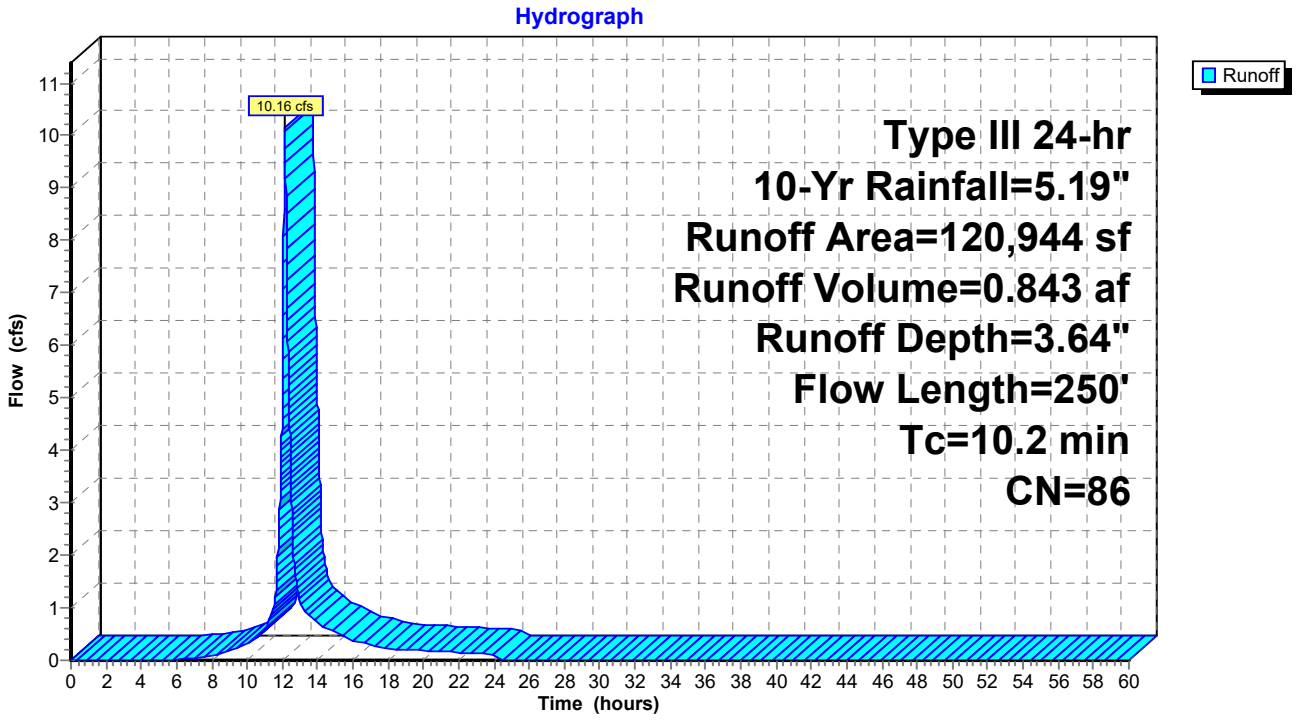
Runoff = 10.16 cfs @ 12.14 hrs, Volume= 0.843 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=5.19"

Area (sf)	CN	Description
13,091	98	Paved parking, HSG D
88,848	82	Woods/grass comb., Fair, HSG D
19,005	96	Gravel surface, HSG D
120,944	86	Weighted Average
107,853		89.18% Pervious Area
13,091		10.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, Sheet flow** Woods: Light underbrush n= 0.400 P2= 3.30"
1.8	200	0.1400	1.87		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
10.2	250	Total			

Subcatchment EX1: EX1



Summary for Subcatchment EX2: EX2

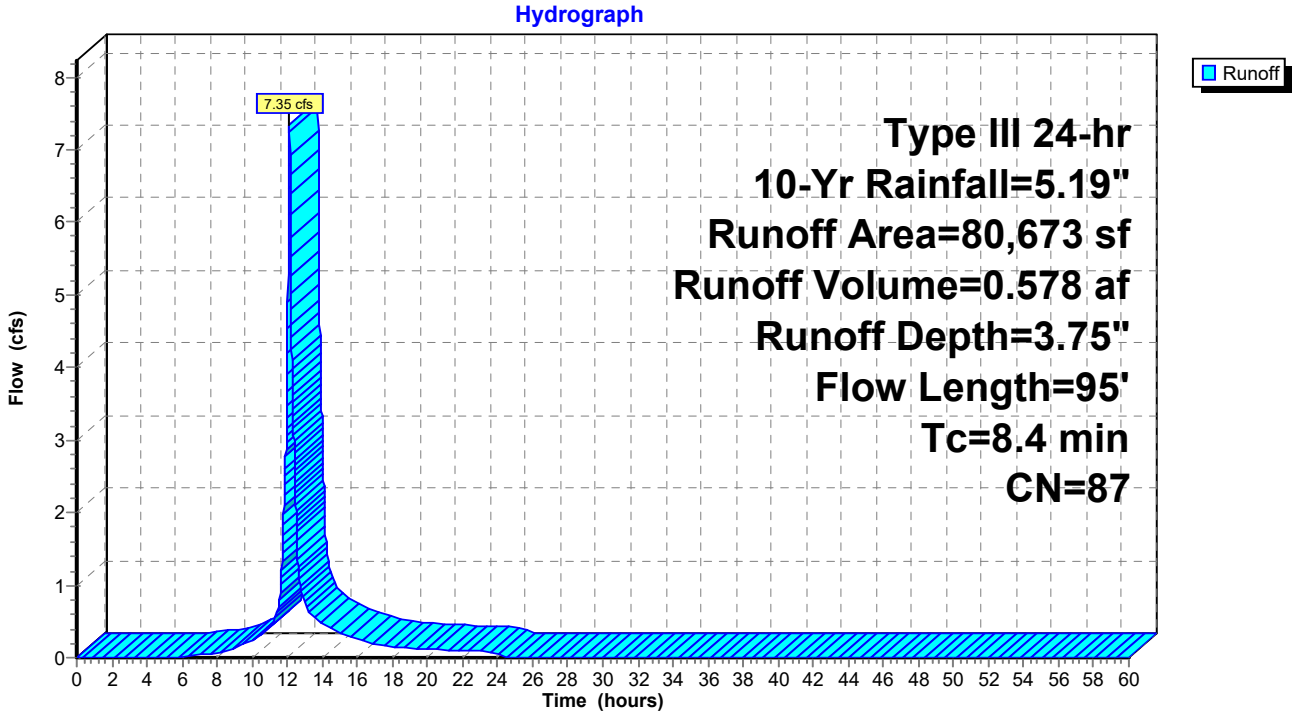
Runoff = 7.35 cfs @ 12.12 hrs, Volume= 0.578 af, Depth= 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=5.19"

Area (sf)	CN	Description
10,741	98	Paved parking, HSG D
54,711	82	Woods/grass comb., Fair, HSG D
15,221	96	Gravel surface, HSG D
80,673	87	Weighted Average
69,932		86.69% Pervious Area
10,741		13.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	50	0.2200	0.39		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 3.30"
0.3	45	0.2000	2.24		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
6.0					**Direct Entry, to pavement**
8.4	95	Total			

Subcatchment EX2: EX2



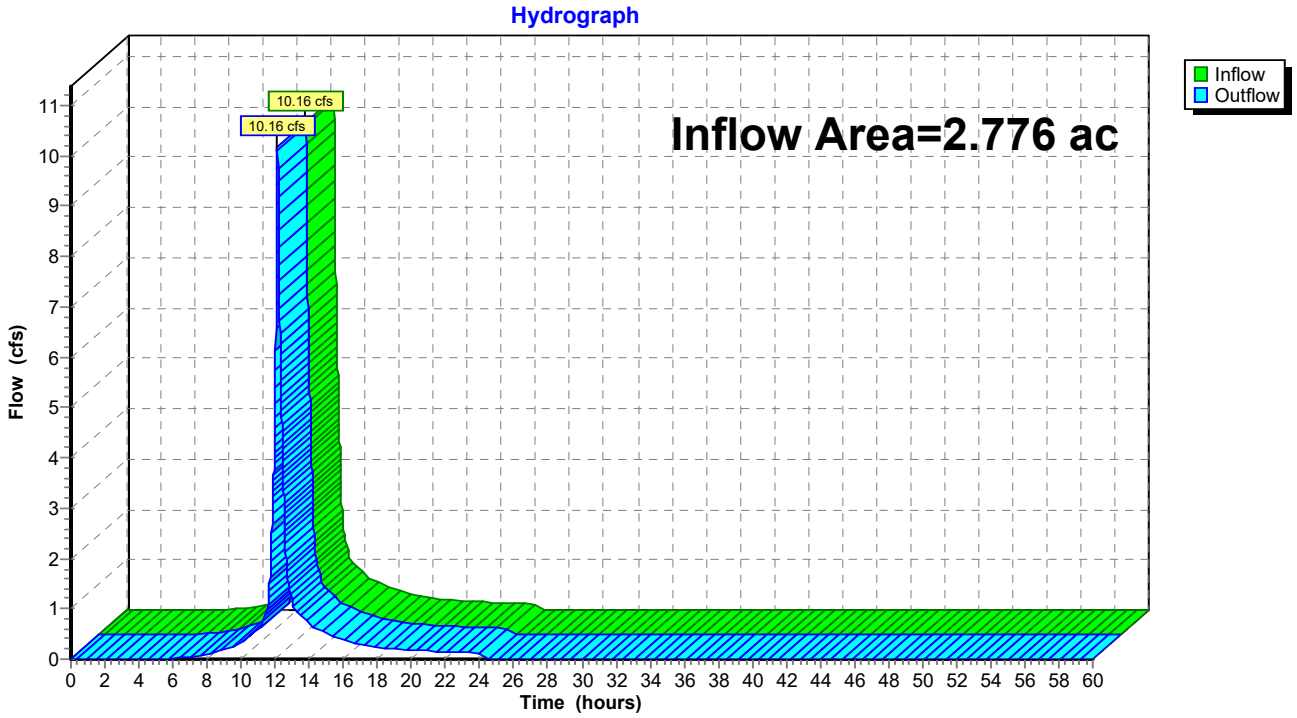
Summary for Reach DP1: Winchester St.

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

Inflow Area = 2.776 ac, 10.82% Impervious, Inflow Depth = 3.64" for 10-Yr event
Inflow = 10.16 cfs @ 12.14 hrs, Volume= 0.843 af
Outflow = 10.16 cfs @ 12.14 hrs, Volume= 0.843 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP1: Winchester St.



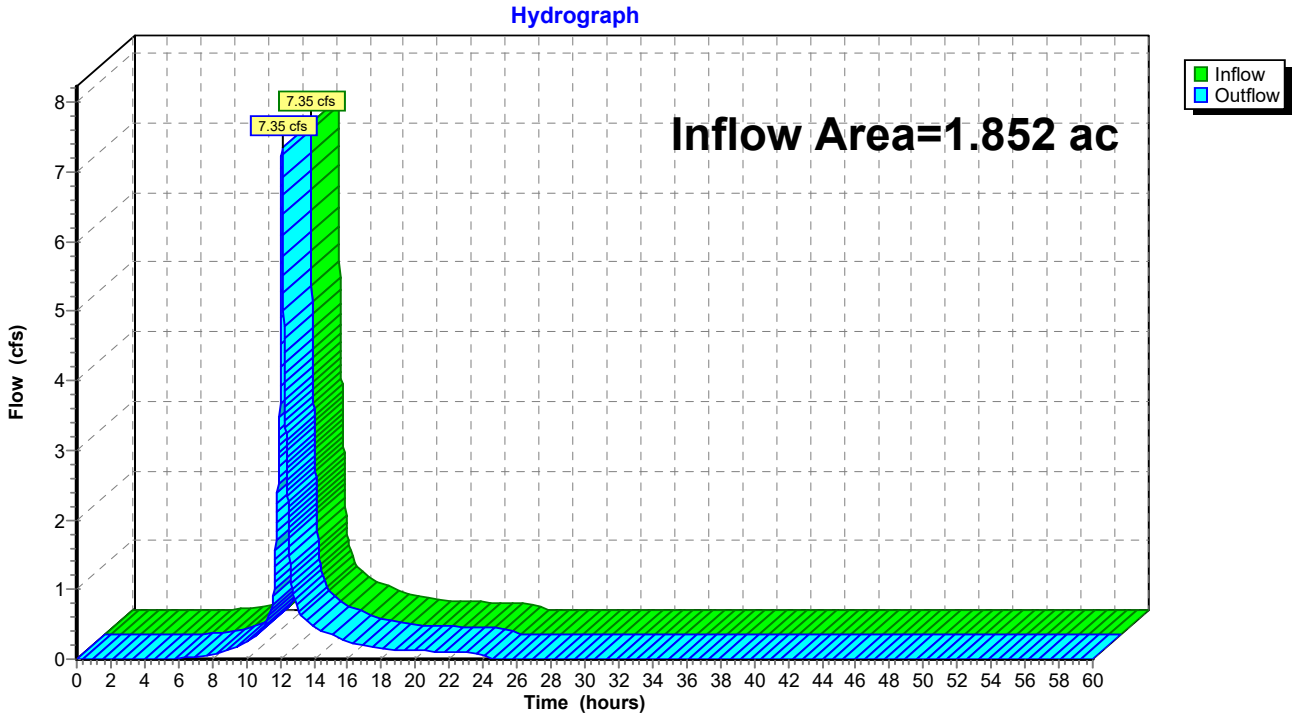
Summary for Reach DP2: Nahanton St

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

Inflow Area = 1.852 ac, 13.31% Impervious, Inflow Depth = 3.75" for 10-Yr event
Inflow = 7.35 cfs @ 12.12 hrs, Volume= 0.578 af
Outflow = 7.35 cfs @ 12.12 hrs, Volume= 0.578 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP2: Nahanton St



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 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 EX1: EX1 Runoff Area=120,944 sf 10.82% Impervious Runoff Depth=4.75"
Flow Length=250' Tc=10.2 min CN=86 Runoff=13.11 cfs 1.100 af

Subcatchment EX2: EX2 Runoff Area=80,673 sf 13.31% Impervious Runoff Depth=4.86"
Flow Length=95' Tc=8.4 min CN=87 Runoff=9.42 cfs 0.750 af

Reach DP1: Winchester St. Inflow=13.11 cfs 1.100 af
Outflow=13.11 cfs 1.100 af

Reach DP2: Nahanton St Inflow=9.42 cfs 0.750 af
Outflow=9.42 cfs 0.750 af

Total Runoff Area = 4.628 ac Runoff Volume = 1.850 af Average Runoff Depth = 4.80"
88.18% Pervious = 4.081 ac 11.82% Impervious = 0.547 ac

Summary for Subcatchment EX1: EX1

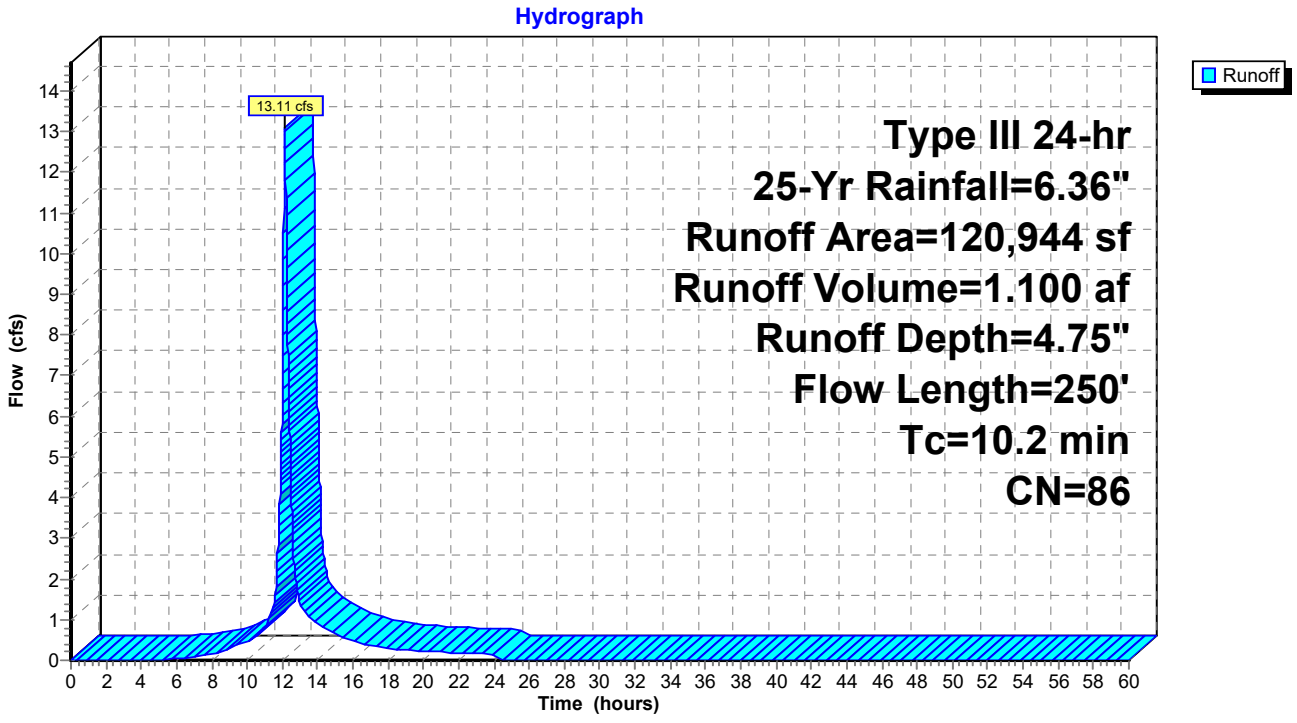
Runoff = 13.11 cfs @ 12.14 hrs, Volume= 1.100 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Yr Rainfall=6.36"

Area (sf)	CN	Description
13,091	98	Paved parking, HSG D
88,848	82	Woods/grass comb., Fair, HSG D
19,005	96	Gravel surface, HSG D
120,944	86	Weighted Average
107,853		89.18% Pervious Area
13,091		10.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, Sheet flow** Woods: Light underbrush n= 0.400 P2= 3.30"
1.8	200	0.1400	1.87		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
10.2	250	Total			

Subcatchment EX1: EX1



Summary for Subcatchment EX2: EX2

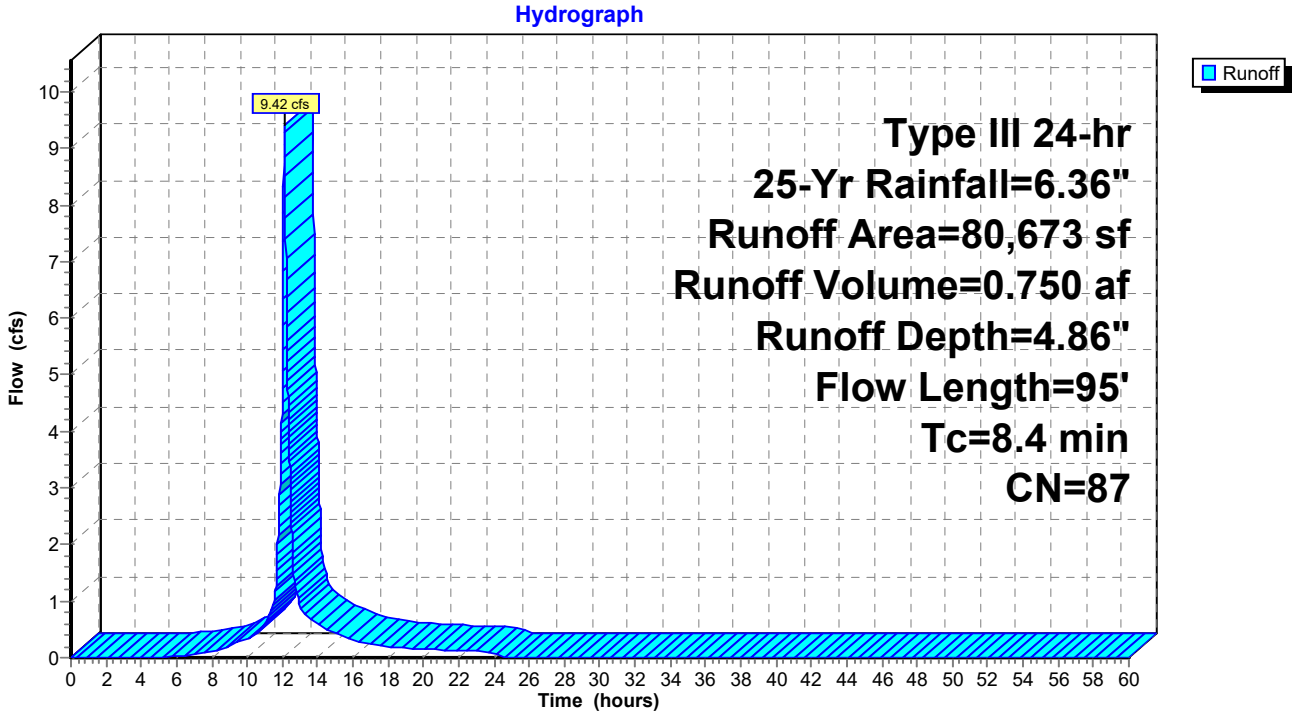
Runoff = 9.42 cfs @ 12.12 hrs, Volume= 0.750 af, Depth= 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Yr Rainfall=6.36"

Area (sf)	CN	Description
10,741	98	Paved parking, HSG D
54,711	82	Woods/grass comb., Fair, HSG D
15,221	96	Gravel surface, HSG D
80,673	87	Weighted Average
69,932		86.69% Pervious Area
10,741		13.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	50	0.2200	0.39		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 3.30"
0.3	45	0.2000	2.24		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
6.0					**Direct Entry, to pavement**
8.4	95	Total			

Subcatchment EX2: EX2



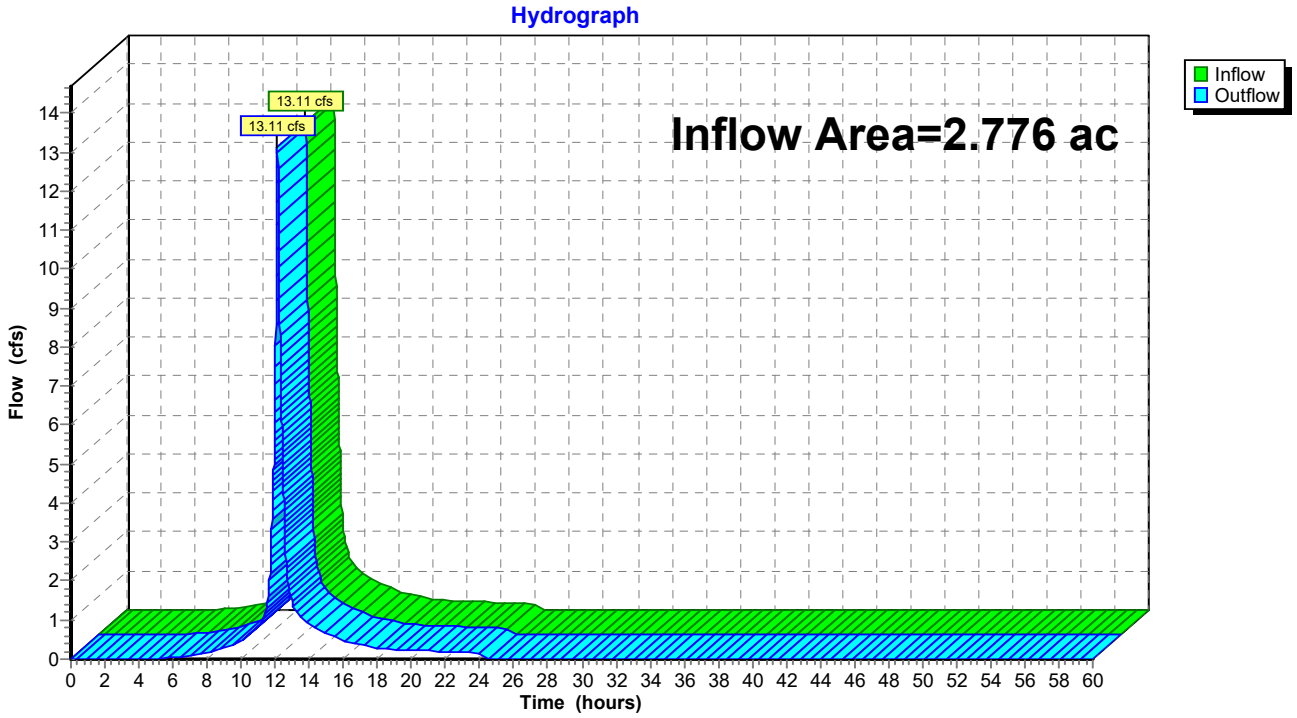
Summary for Reach DP1: Winchester St.

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

Inflow Area = 2.776 ac, 10.82% Impervious, Inflow Depth = 4.75" for 25-Yr event
Inflow = 13.11 cfs @ 12.14 hrs, Volume= 1.100 af
Outflow = 13.11 cfs @ 12.14 hrs, Volume= 1.100 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP1: Winchester St.



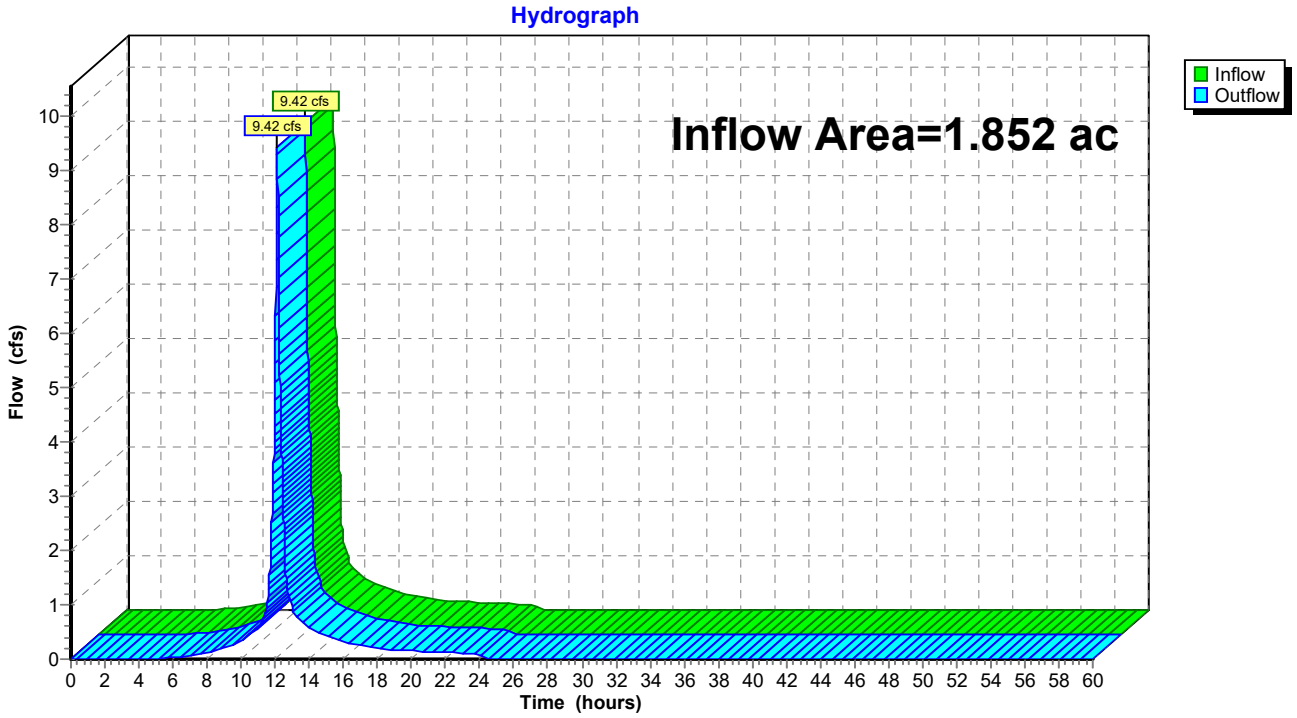
Summary for Reach DP2: Nahanton St

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

Inflow Area = 1.852 ac, 13.31% Impervious, Inflow Depth = 4.86" for 25-Yr event
Inflow = 9.42 cfs @ 12.12 hrs, Volume= 0.750 af
Outflow = 9.42 cfs @ 12.12 hrs, Volume= 0.750 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP2: Nahanton St



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 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 EX1: EX1 Runoff Area=120,944 sf 10.82% Impervious Runoff Depth=7.09"
Flow Length=250' Tc=10.2 min CN=86 Runoff=19.17 cfs 1.640 af

Subcatchment EX2: EX2 Runoff Area=80,673 sf 13.31% Impervious Runoff Depth=7.21"
Flow Length=95' Tc=8.4 min CN=87 Runoff=13.69 cfs 1.113 af

Reach DP1: Winchester St. Inflow=19.17 cfs 1.640 af
Outflow=19.17 cfs 1.640 af

Reach DP2: Nahanton St Inflow=13.69 cfs 1.113 af
Outflow=13.69 cfs 1.113 af

Total Runoff Area = 4.628 ac Runoff Volume = 2.753 af Average Runoff Depth = 7.14"
88.18% Pervious = 4.081 ac 11.82% Impervious = 0.547 ac

Summary for Subcatchment EX1: EX1

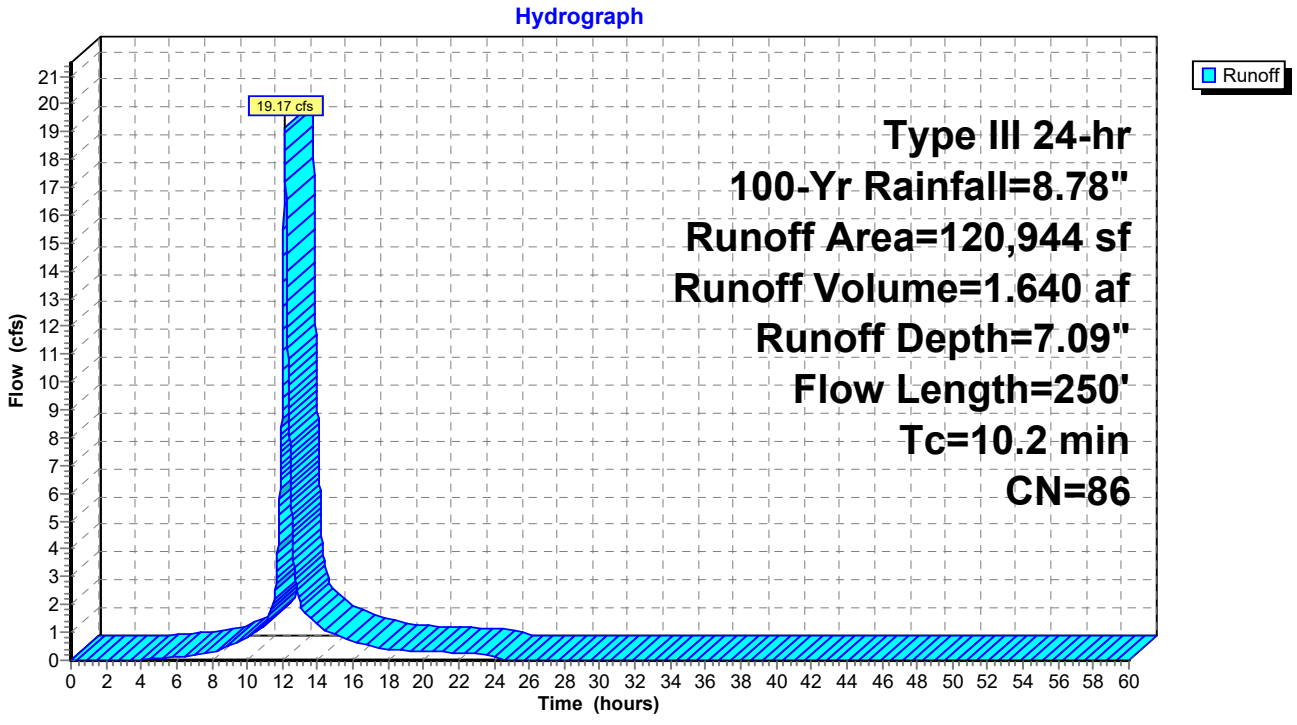
Runoff = 19.17 cfs @ 12.14 hrs, Volume= 1.640 af, Depth= 7.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Yr Rainfall=8.78"

Area (sf)	CN	Description
13,091	98	Paved parking, HSG D
88,848	82	Woods/grass comb., Fair, HSG D
19,005	96	Gravel surface, HSG D
120,944	86	Weighted Average
107,853		89.18% Pervious Area
13,091		10.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, Sheet flow** Woods: Light underbrush n= 0.400 P2= 3.30"
1.8	200	0.1400	1.87		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
10.2	250	Total			

Subcatchment EX1: EX1



Summary for Subcatchment EX2: EX2

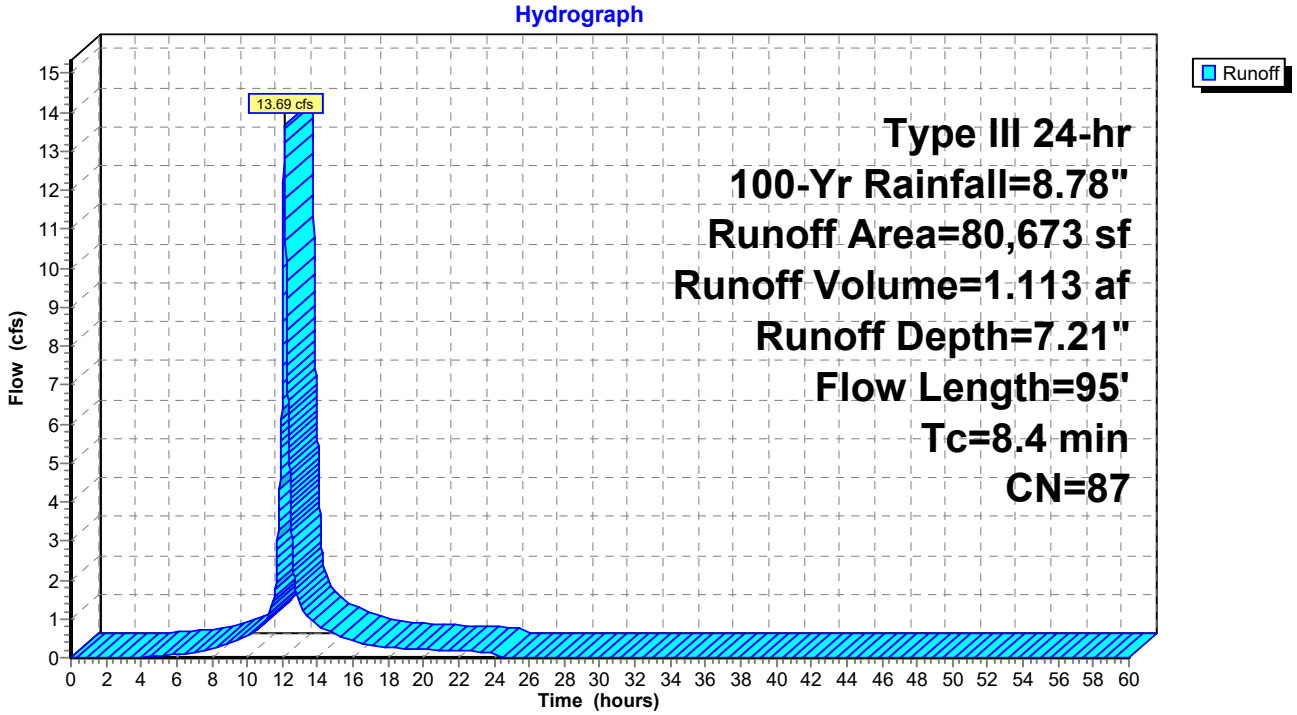
Runoff = 13.69 cfs @ 12.11 hrs, Volume= 1.113 af, Depth= 7.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Yr Rainfall=8.78"

Area (sf)	CN	Description
10,741	98	Paved parking, HSG D
54,711	82	Woods/grass comb., Fair, HSG D
15,221	96	Gravel surface, HSG D
80,673	87	Weighted Average
69,932		86.69% Pervious Area
10,741		13.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	50	0.2200	0.39		**Sheet Flow, sheet flow** Grass: Short n= 0.150 P2= 3.30"
0.3	45	0.2000	2.24		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
6.0					**Direct Entry, to pavement**
8.4	95	Total			

Subcatchment EX2: EX2



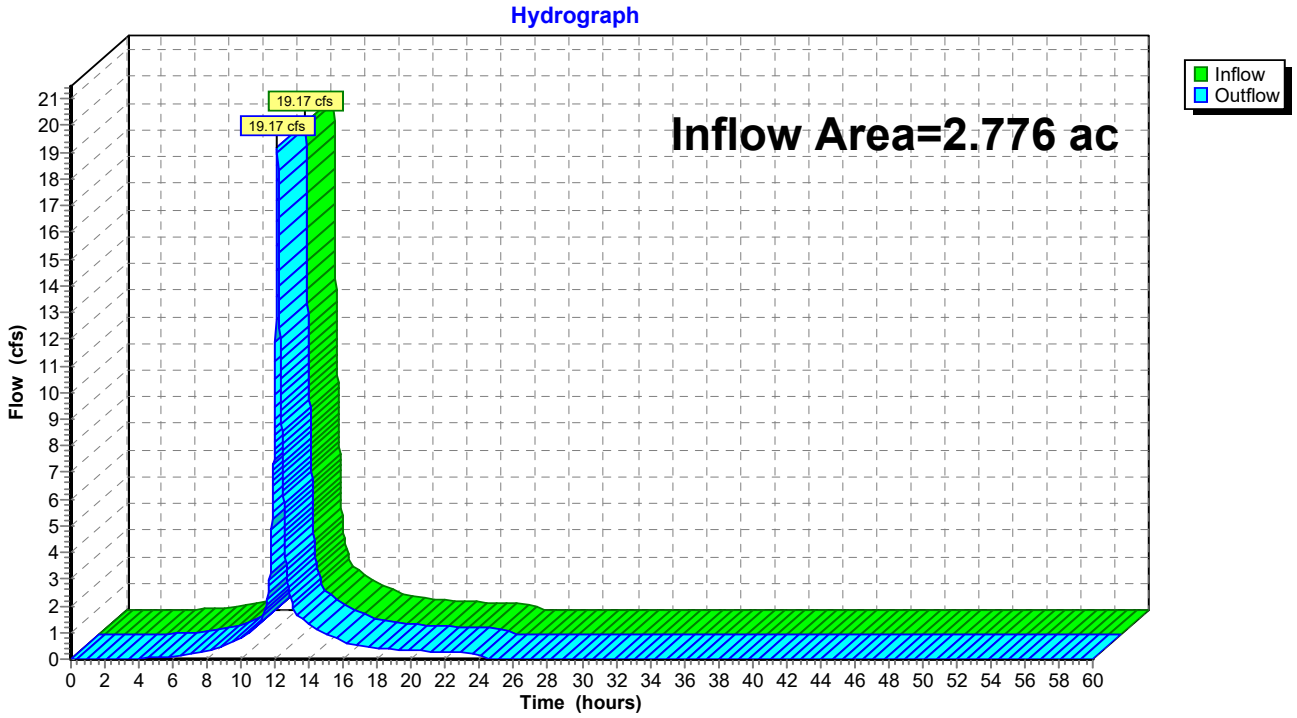
Summary for Reach DP1: Winchester St.

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

Inflow Area = 2.776 ac, 10.82% Impervious, Inflow Depth = 7.09" for 100-Yr event
Inflow = 19.17 cfs @ 12.14 hrs, Volume= 1.640 af
Outflow = 19.17 cfs @ 12.14 hrs, Volume= 1.640 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP1: Winchester St.



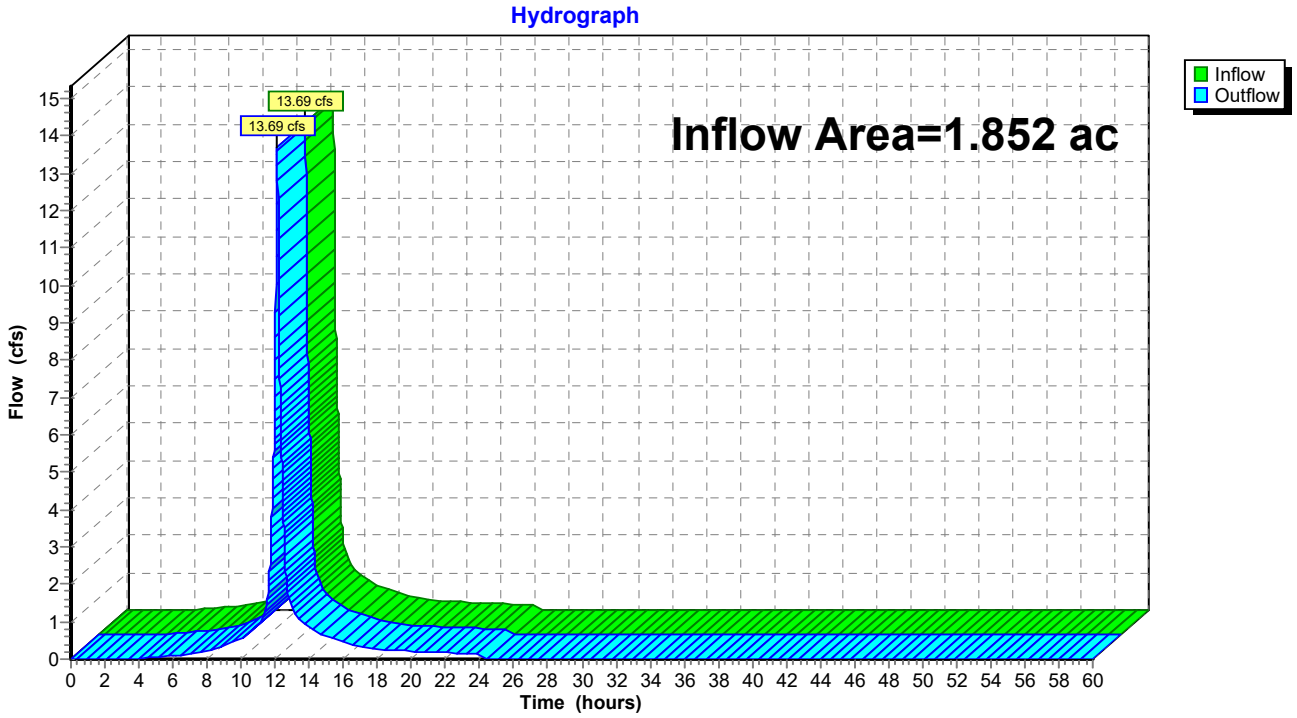
Summary for Reach DP2: Nahanton St

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

Inflow Area = 1.852 ac, 13.31% Impervious, Inflow Depth = 7.21" for 100-Yr event
Inflow = 13.69 cfs @ 12.11 hrs, Volume= 1.113 af
Outflow = 13.69 cfs @ 12.11 hrs, Volume= 1.113 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP2: Nahanton St



May 6, 2021

Attachment B
Proposed Watershed Map
& HydroCAD Calculations

NO.	DATE	REVISION
01	05/05/2021	SPECIAL PERMIT

SEAL

Stantec

Stantec Planning and Landscape Architecture P.C.
226 Causeway Street 6th Floor
Boston MA
02114-2155
Tel. (617) 523-8103
Fax. (617) 523-4333
www.stantec.com

PERKINS EASTMAN
1100 Liberty Avenue
Pittsburgh, PA 15222
T. +1 412 456 0900
F. +1 412 456 0906

Owner:
2 LIFE COMMUNITIES
30 Wallingford Road
Brighton, MA 02135

Construction Manager:
DELLBROOK
One Adams Place
859 Willard Street
Quincy, MA 02169

Civil / Site:
STANTEC
226 Causeway Street, 6th Floor
Boston, MA 02114

Structural:
VEITAS & VEITAS ENGINEERS, INC
639 Granite Street
Braintree, MA 02184

MEP consultant:
PETERSEN ENGINEERING, INC
127 Parrott Avenue
Portsmouth, NH 03801

PROJECT TITLE:

2LIFE - OPUS

677 WINCHESTER STREET
NEWTON, MA 02459

PROJECT No: 66571

DRAWING TITLE:

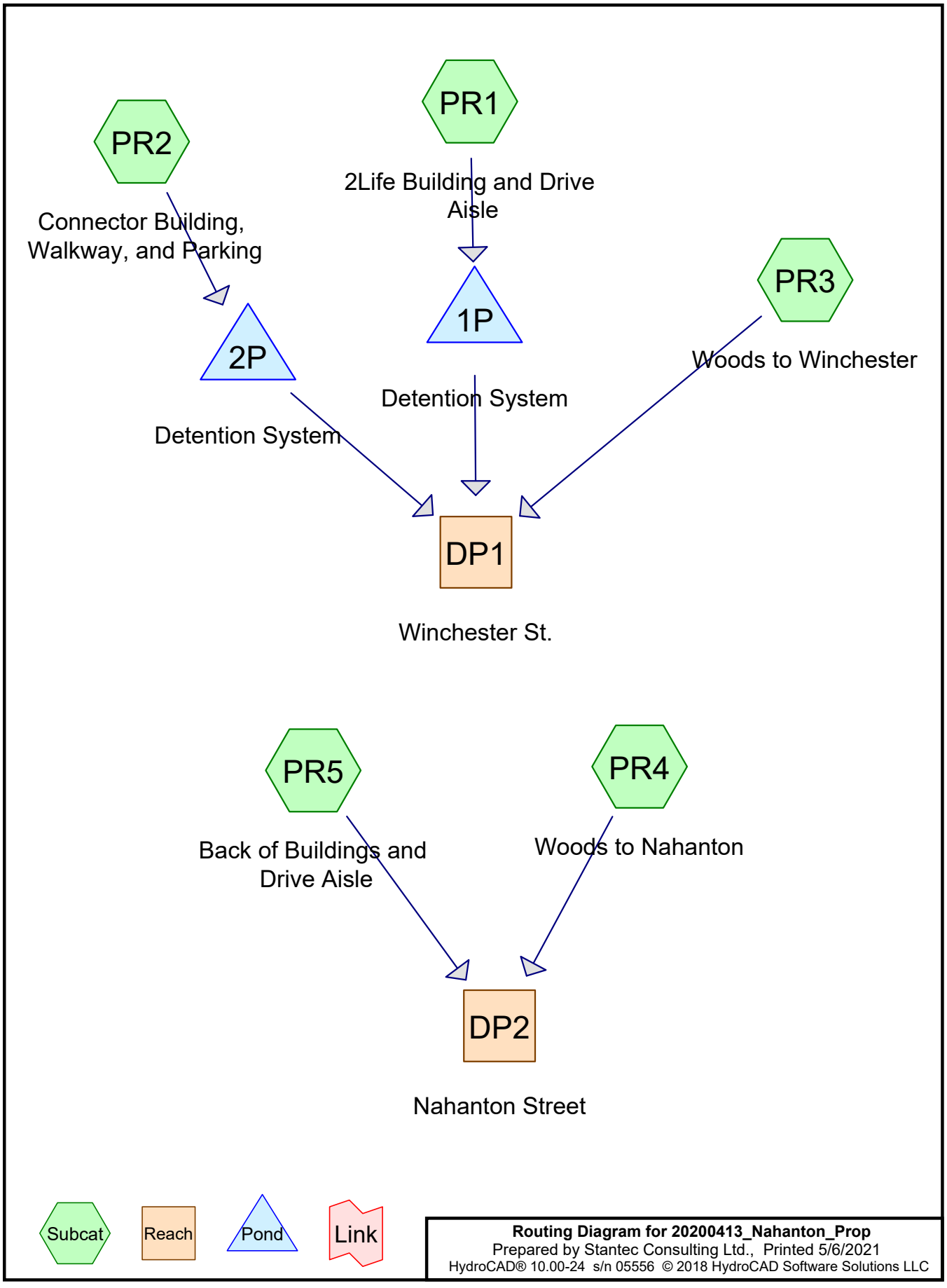
PROPOSED CONDITIONS WATERSHED MAP

SCALE:

SKC-200

ZONING REVIEW

3/03/2021



Routing Diagram for 20200413_Nahanton_Prop
Prepared by Stantec Consulting Ltd., Printed 5/6/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.267	80	>75% Grass cover, Good, HSG D (PR1, PR2, PR5)
2.819	98	Paved parking, HSG D (PR1, PR2, PR5)
0.543	82	Woods/grass comb., Fair, HSG D (PR3, PR4)
4.628	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
4.628	HSG D	PR1, PR2, PR3, PR4, PR5
0.000	Other	
4.628		**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
0.000	0.000	0.000	1.267	0.000	1.267	>75% Grass cover, Good	PR1, PR2, PR5
0.000	0.000	0.000	2.819	0.000	2.819	Paved parking	PR1, PR2, PR5
0.000	0.000	0.000	0.543	0.000	0.543	Woods/grass comb., Fair	PR3, PR4
0.000	**0.000**	**0.000**	**4.628**	**0.000**	**4.628**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	129.25	129.00	12.0	0.0208	0.013	10.0	0.0	0.0
2	1P	131.20	131.00	2.0	0.1000	0.012	12.0	0.0	0.0
3	2P	146.25	146.00	20.0	0.0125	0.013	12.0	0.0	0.0

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 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 PR1: 2Life Building and Runoff Area=86,779 sf 81.89% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=95 Runoff=6.05 cfs 0.455 af

Subcatchment PR2: Connector Building, Runoff Area=37,718 sf 81.20% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=95 Runoff=2.63 cfs 0.198 af

Subcatchment PR3: Woods to Winchester Runoff Area=10,203 sf 0.00% Impervious Runoff Depth=1.62"
Flow Length=165' Tc=7.4 min CN=82 Runoff=0.42 cfs 0.032 af

Subcatchment PR4: Woods to Nahanton Runoff Area=13,430 sf 0.00% Impervious Runoff Depth=1.62"
Tc=6.0 min CN=82 Runoff=0.58 cfs 0.042 af

Subcatchment PR5: Back of Buildings and Runoff Area=53,487 sf 39.48% Impervious Runoff Depth=2.00"
Tc=6.0 min CN=87 Runoff=2.88 cfs 0.205 af

Reach DP1: Winchester St. Inflow=4.99 cfs 0.660 af
Outflow=4.99 cfs 0.660 af

Reach DP2: Nahanton Street Inflow=3.46 cfs 0.247 af
Outflow=3.46 cfs 0.247 af

Pond 1P: Detention System Peak Elev=131.03' Storage=0.094 af Inflow=6.05 cfs 0.455 af
Outflow=3.07 cfs 0.444 af

Pond 2P: Detention System Peak Elev=146.98' Storage=0.053 af Inflow=2.63 cfs 0.198 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0125 '/' Outflow=1.62 cfs 0.184 af

Total Runoff Area = 4.628 ac Runoff Volume = 0.931 af Average Runoff Depth = 2.41"
39.09% Pervious = 1.809 ac 60.91% Impervious = 2.819 ac

Summary for Subcatchment PR1: 2Life Building and Drive Aisle

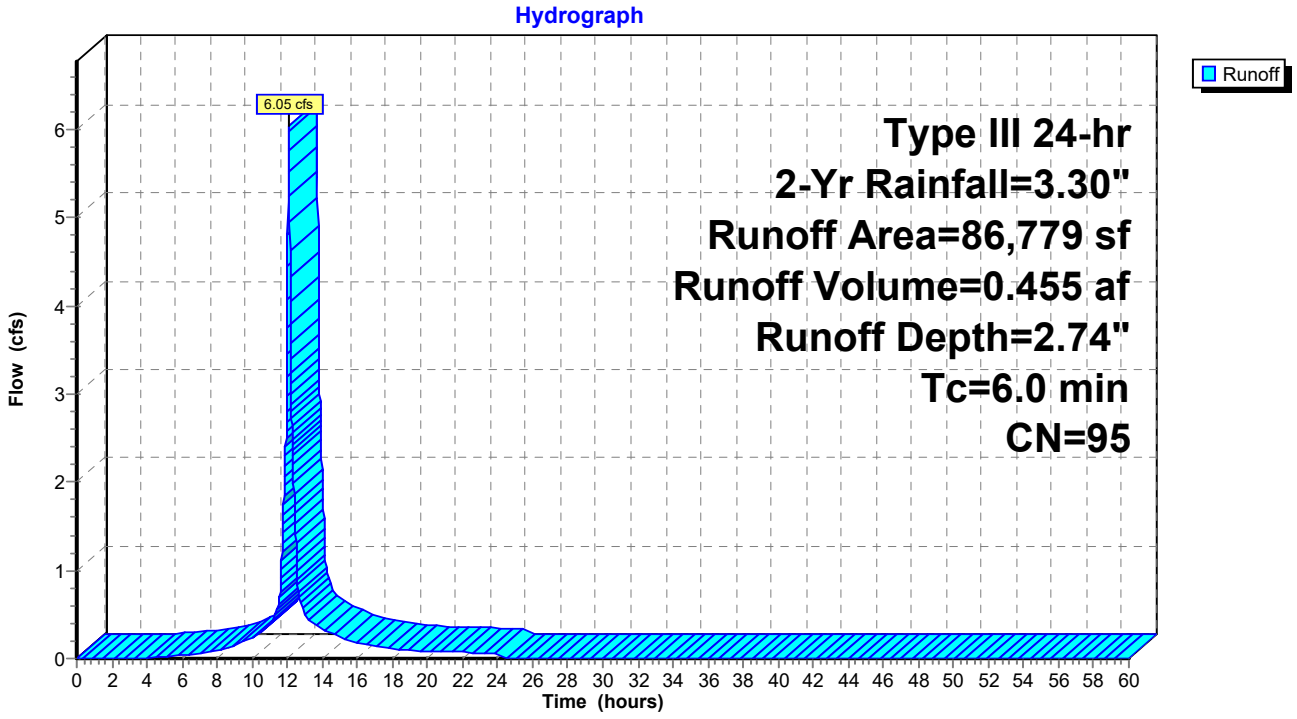
Runoff = 6.05 cfs @ 12.08 hrs, Volume= 0.455 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.30"

Area (sf)	CN	Description
71,061	98	Paved parking, HSG D
15,718	80	>75% Grass cover, Good, HSG D
86,779	95	Weighted Average
15,718		18.11% Pervious Area
71,061		81.89% Impervious Area

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

Subcatchment PR1: 2Life Building and Drive Aisle



Summary for Subcatchment PR2: Connector Building, Walkway, and Parking

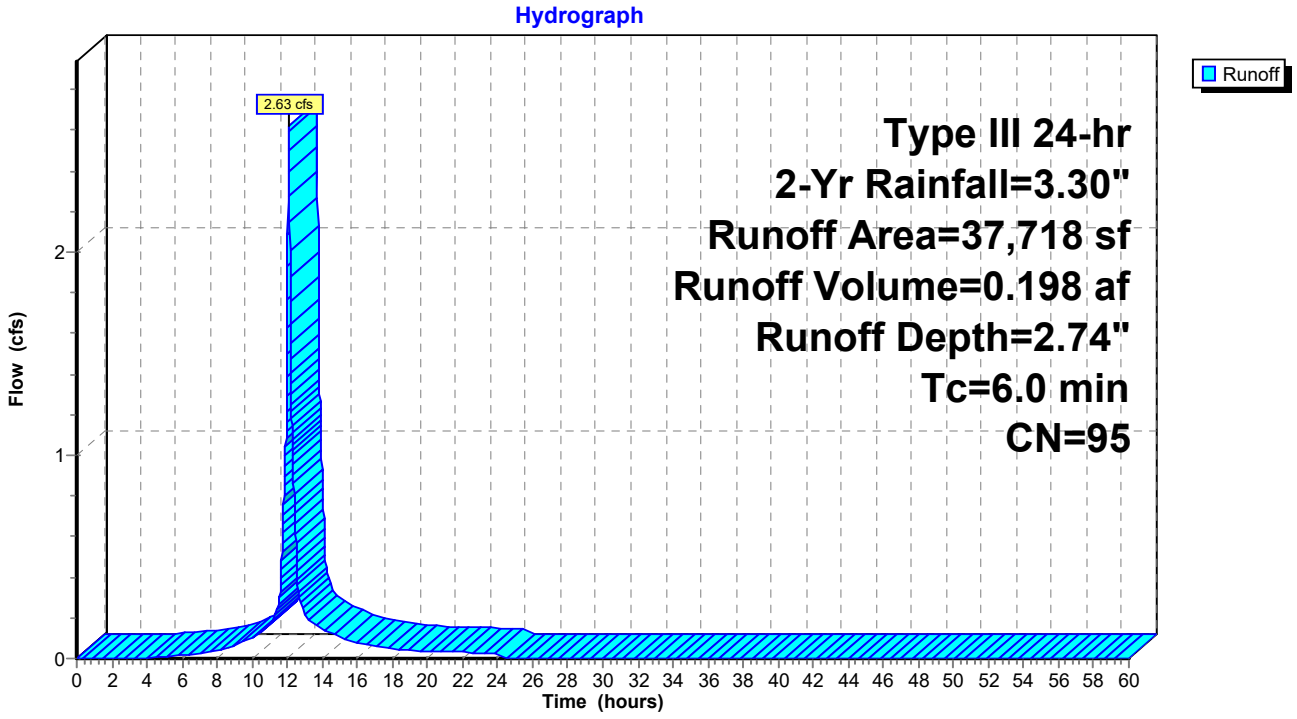
Runoff = 2.63 cfs @ 12.08 hrs, Volume= 0.198 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.30"

Area (sf)	CN	Description
30,626	98	Paved parking, HSG D
7,092	80	>75% Grass cover, Good, HSG D
37,718	95	Weighted Average
7,092		18.80% Pervious Area
30,626		81.20% Impervious Area

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

Subcatchment PR2: Connector Building, Walkway, and Parking



Summary for Subcatchment PR3: Woods to Winchester

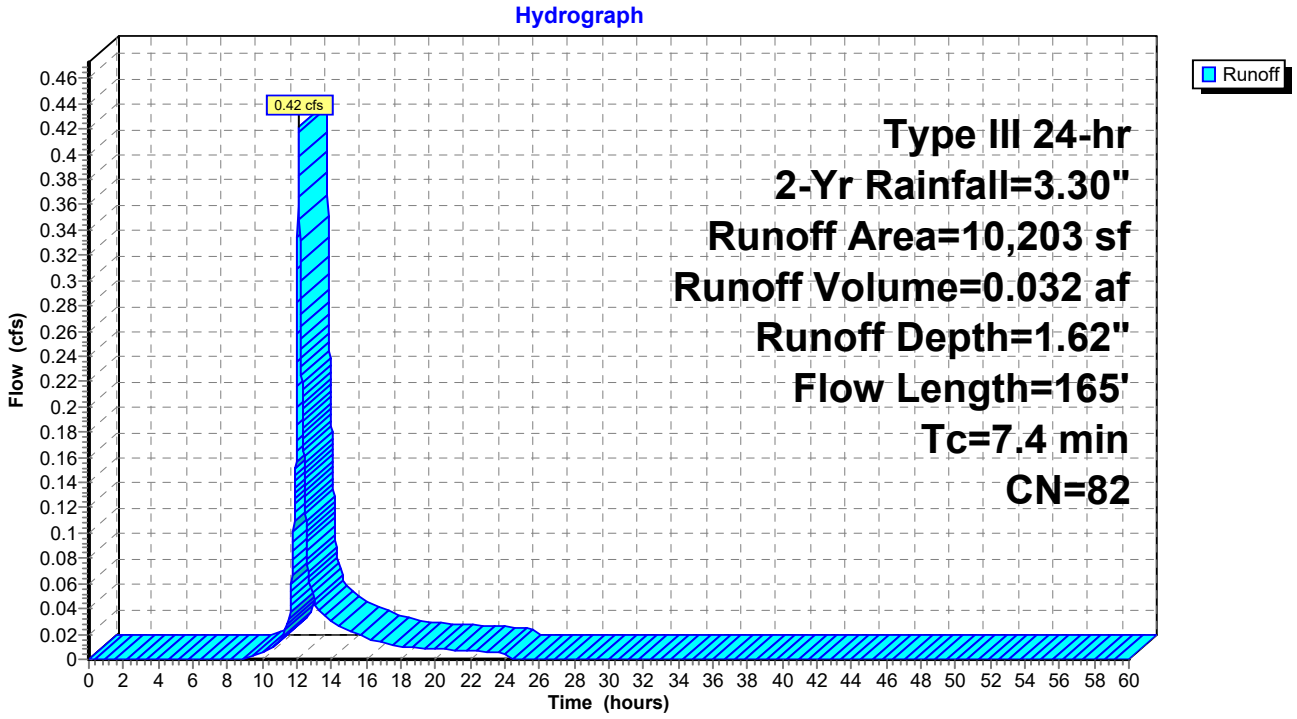
Runoff = 0.42 cfs @ 12.11 hrs, Volume= 0.032 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.30"

Area (sf)	CN	Description
10,203	82	Woods/grass comb., Fair, HSG D
10,203		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	50	0.1000	0.13		**Sheet Flow, sheet flow** Woods: Light underbrush n= 0.400 P2= 3.30"
1.0	115	0.1400	1.87		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
7.4	165	Total			

Subcatchment PR3: Woods to Winchester



Summary for Subcatchment PR4: Woods to Nahanton

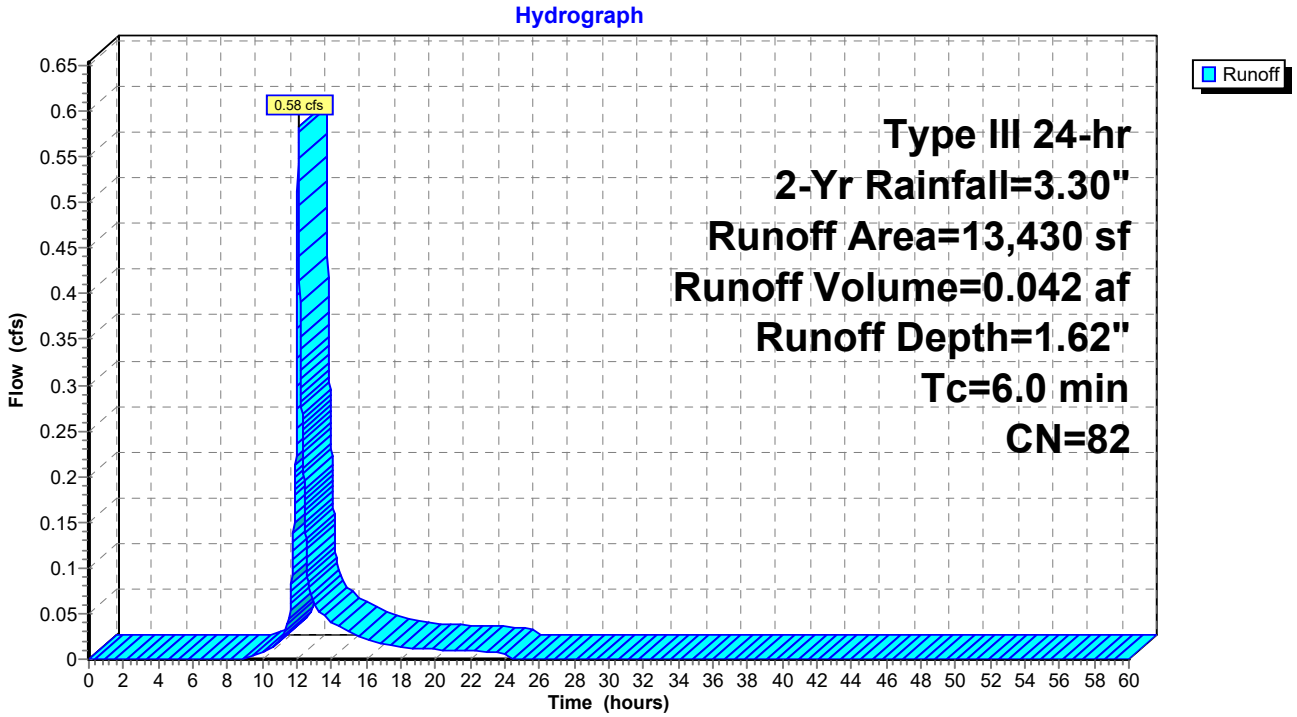
Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.30"

Area (sf)	CN	Description
13,430	82	Woods/grass comb., Fair, HSG D
13,430		100.00% Pervious Area

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

Subcatchment PR4: Woods to Nahanton



Summary for Subcatchment PR5: Back of Buildings and Drive Aisle

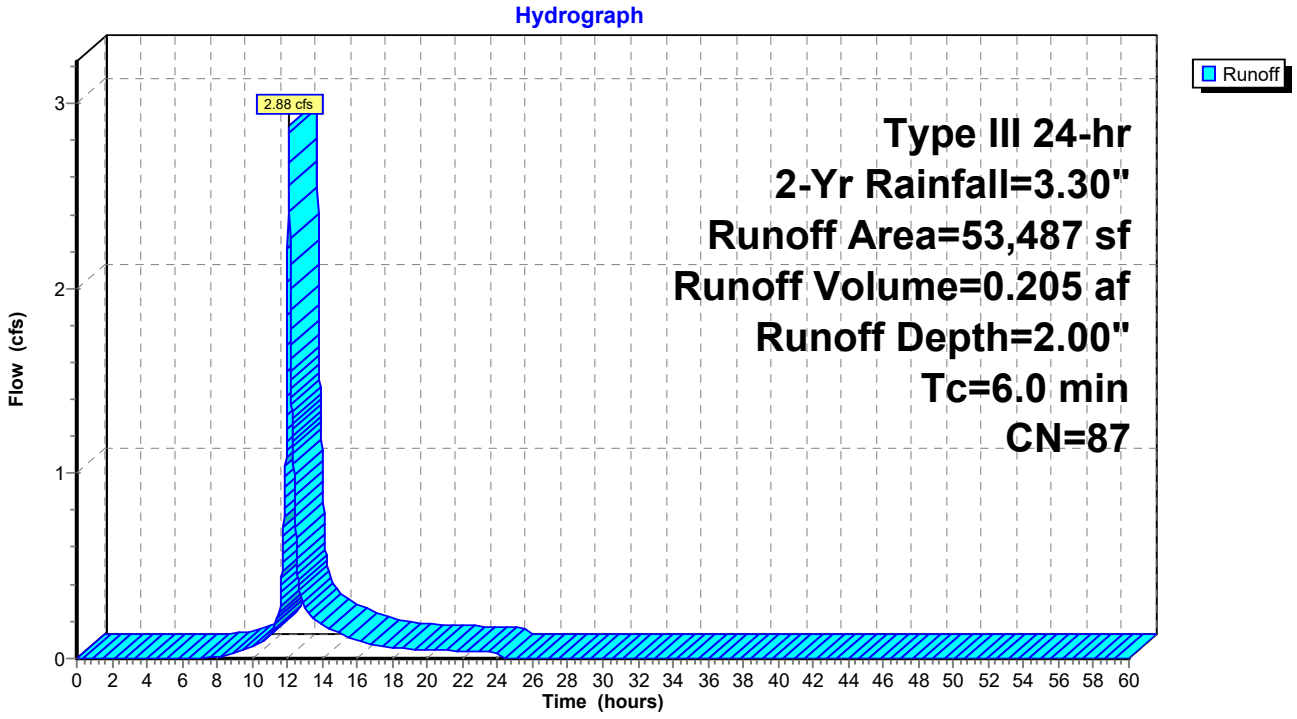
Runoff = 2.88 cfs @ 12.09 hrs, Volume= 0.205 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.30"

Area (sf)	CN	Description
21,115	98	Paved parking, HSG D
32,372	80	>75% Grass cover, Good, HSG D
53,487	87	Weighted Average
32,372		60.52% Pervious Area
21,115		39.48% Impervious Area

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

Subcatchment PR5: Back of Buildings and Drive Aisle



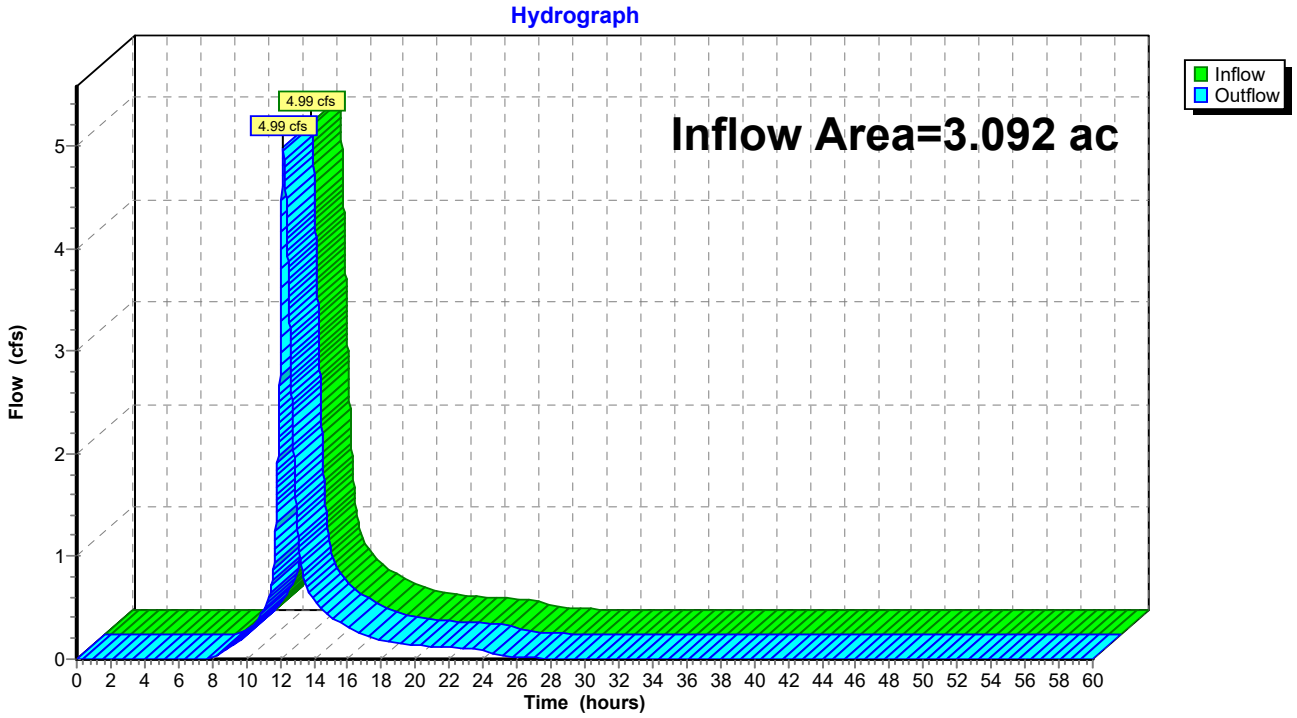
Summary for Reach DP1: Winchester St.

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

Inflow Area = 3.092 ac, 75.49% Impervious, Inflow Depth = 2.56" for 2-Yr event
Inflow = 4.99 cfs @ 12.18 hrs, Volume= 0.660 af
Outflow = 4.99 cfs @ 12.18 hrs, Volume= 0.660 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP1: Winchester St.



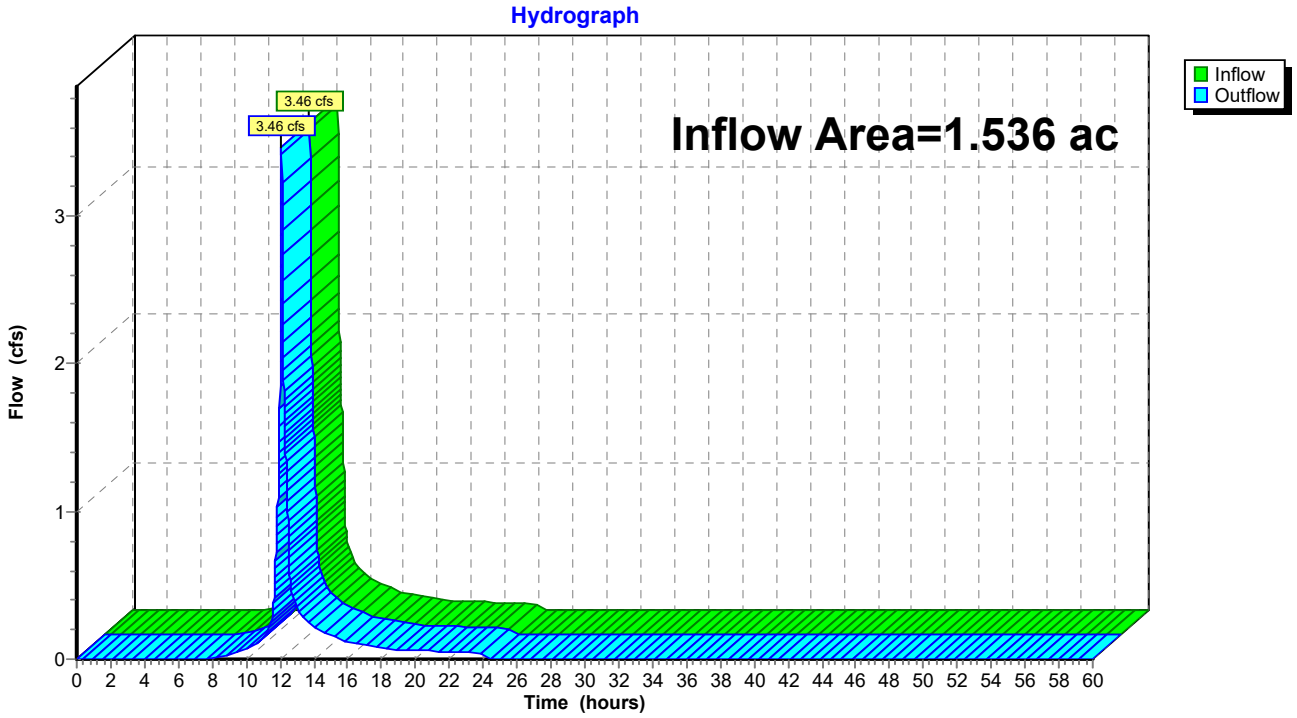
Summary for Reach DP2: Nahanton Street

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

Inflow Area = 1.536 ac, 31.55% Impervious, Inflow Depth = 1.93" for 2-Yr event
Inflow = 3.46 cfs @ 12.09 hrs, Volume= 0.247 af
Outflow = 3.46 cfs @ 12.09 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP2: Nahanton Street



Summary for Pond 1P: Detention System

Inflow Area = 1.992 ac, 81.89% Impervious, Inflow Depth = 2.74" for 2-Yr event
Inflow = 6.05 cfs @ 12.08 hrs, Volume= 0.455 af
Outflow = 3.07 cfs @ 12.22 hrs, Volume= 0.444 af, Atten= 49%, Lag= 8.4 min
Primary = 3.07 cfs @ 12.22 hrs, Volume= 0.444 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 131.03' @ 12.22 hrs Surf.Area= 0.055 ac Storage= 0.094 af
Flood Elev= 133.00' Surf.Area= 0.055 ac Storage= 0.184 af

Plug-Flow detention time= 55.4 min calculated for 0.444 af (97% of inflow)
Center-of-Mass det. time= 40.1 min (820.2 - 780.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	129.00'	0.000 af	**55.17'W x 43.19'L x 5.67'H Field A** 0.310 af Overall - 0.310 af Embedded = 0.000 af x 40.0% Voids
#2A	129.00'	0.231 af	**StormTrap ST1 SingleTrap 5-0** x 24 Inside #1 Inside= 82.7"W x 60.0"H => 29.76 sf x 14.06'L = 418.5 cf Outside= 82.7"W x 68.0"H => 39.08 sf x 14.06'L = 549.5 cf 24 Chambers in 8 Rows 55.17' x 42.19' Core + 0.00' x 0.50' Border = 55.17' x 43.19' System
		0.231 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	129.25'	**10.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 129.25' / 129.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Primary	131.20'	**12.0" Round Culvert** L= 2.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.20' / 131.00' S= 0.1000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.07 cfs @ 12.22 hrs HW=131.03' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.07 cfs @ 5.62 fps)
└**2=Culvert** (Controls 0.00 cfs)

Pond 1P: Detention System - Chamber Wizard Field A

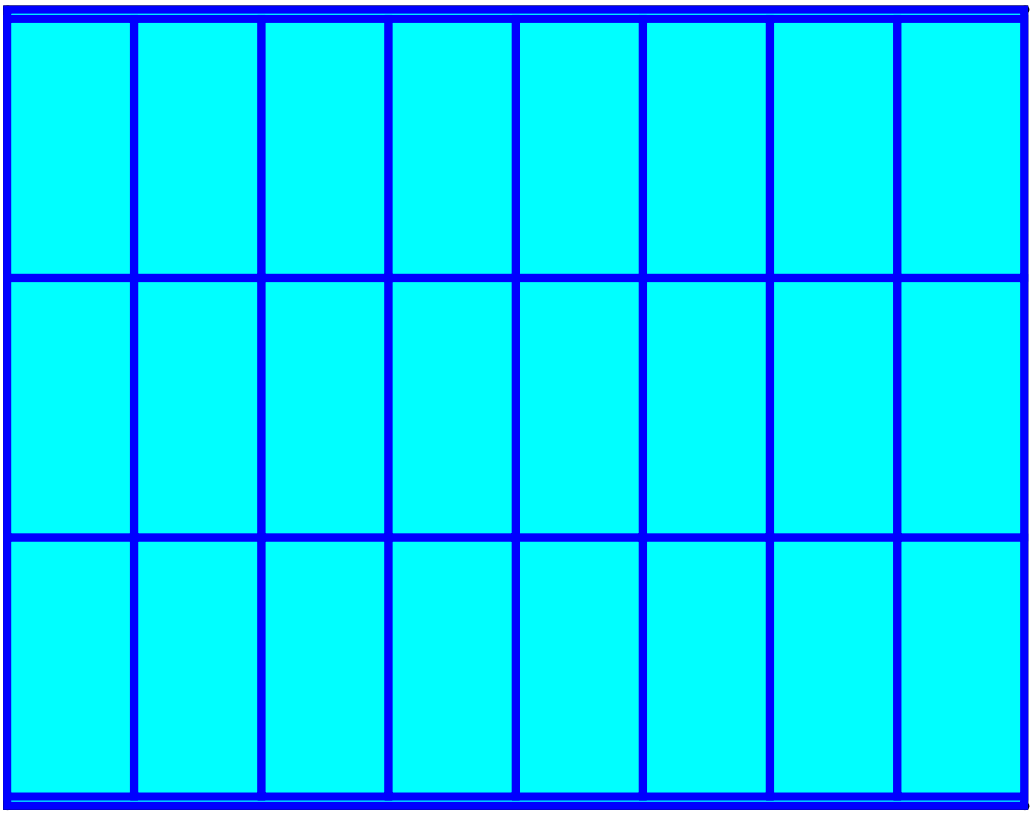
Chamber Model = StormTrap ST1 SingleTrap 5-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 60.0"H => 29.76 sf x 14.06'L = 418.5 cf
Outside= 82.7"W x 68.0"H => 39.08 sf x 14.06'L = 549.5 cf

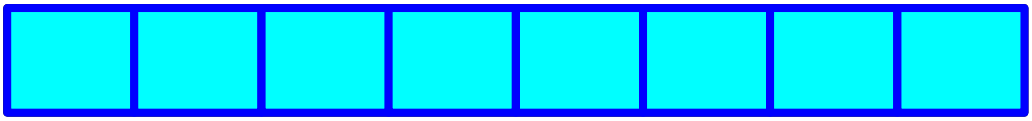
3 Chambers/Row x 14.06' Long = 42.19' Row Length +6.0" Border x 2 = 43.19' Base Length
8 Rows x 82.7" Wide = 55.17' Base Width
68.0" Chamber Height = 5.67' Field Height

24 Chambers x 418.5 cf = 10,044.0 cf Chamber Storage
24 Chambers x 549.5 cf + 312.6 cf Border = 13,500.9 cf Displacement

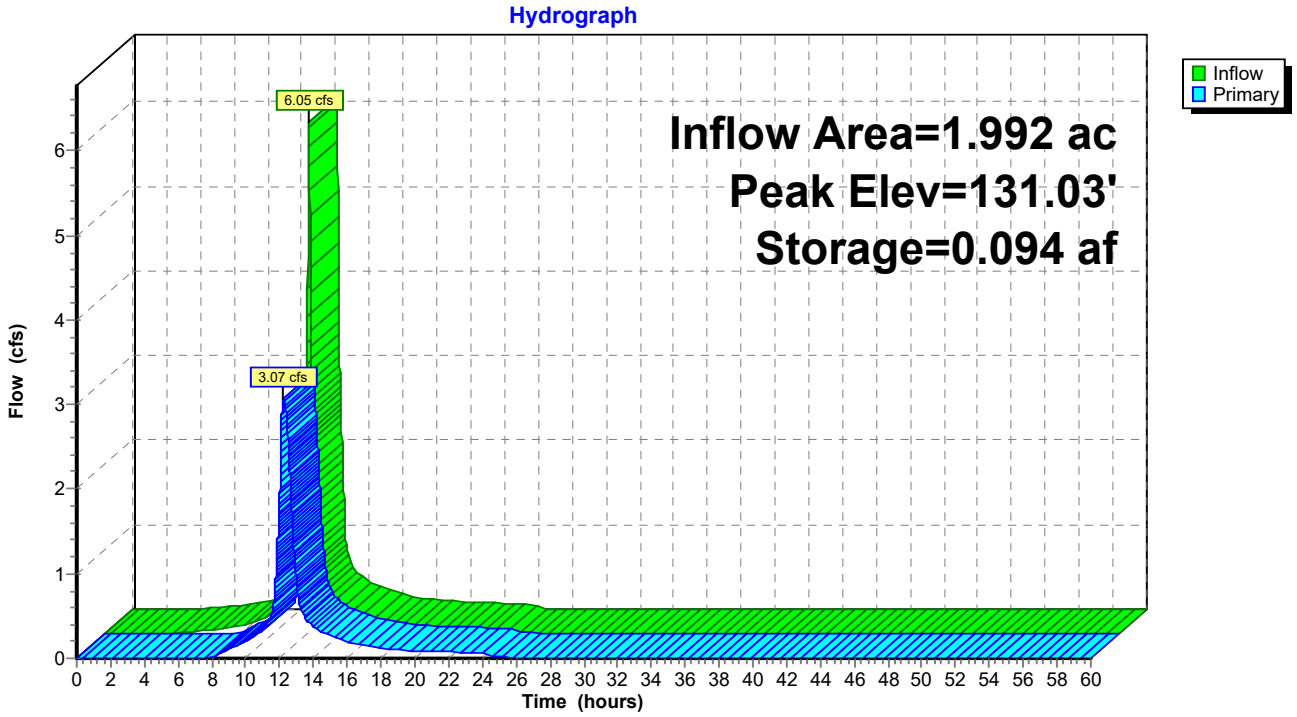
Chamber Storage = 10,044.0 cf = 0.231 af
Overall Storage Efficiency = 74.4%
Overall System Size = 43.19' x 55.17' x 5.67'

24 Chambers (plus border)
500.0 cy Field





Pond 1P: Detention System



Summary for Pond 2P: Detention System

[58] Hint: Peaked 6.98' above defined flood level

Inflow Area = 0.866 ac, 81.20% Impervious, Inflow Depth = 2.74" for 2-Yr event
Inflow = 2.63 cfs @ 12.08 hrs, Volume= 0.198 af
Outflow = 1.62 cfs @ 12.18 hrs, Volume= 0.184 af, Atten= 38%, Lag= 5.9 min
Primary = 1.62 cfs @ 12.18 hrs, Volume= 0.184 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 146.98' @ 12.18 hrs Surf.Area= 0.063 ac Storage= 0.053 af
Flood Elev= 140.00' Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 106.1 min calculated for 0.184 af (93% of inflow)
Center-of-Mass det. time= 69.7 min (849.7 - 780.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	146.00'	0.000 af	**48.27'W x 57.25'L x 2.67'H Field A** 0.169 af Overall - 0.169 af Embedded = 0.000 af x 40.0% Voids
#2A	146.00'	0.107 af	**StormTrap ST1 SingleTrap 2-0** x 28 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 28 Chambers in 7 Rows 48.27' x 56.25' Core + 0.00' x 0.50' Border = 48.27' x 57.25' System
		0.107 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	146.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 146.25' / 146.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.62 cfs @ 12.18 hrs HW=146.98' (Free Discharge)
1=Culvert (Barrel Controls 1.62 cfs @ 3.66 fps)

Pond 2P: Detention System - Chamber Wizard Field A

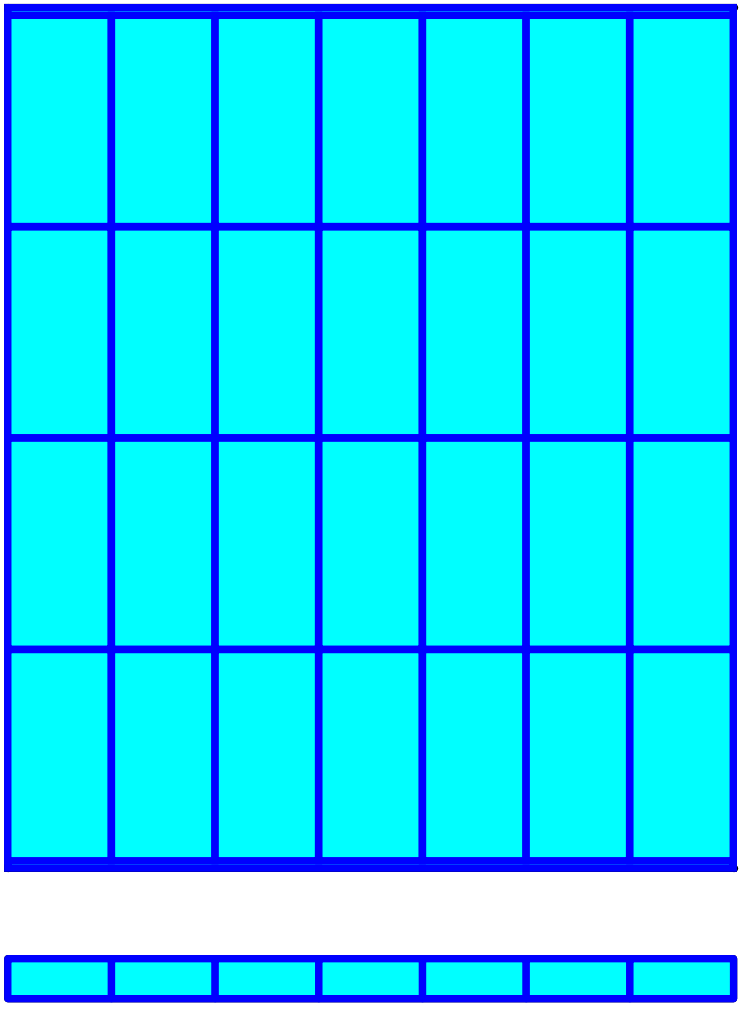
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

4 Chambers/Row x 14.06' Long = 56.25' Row Length +6.0" Border x 2 = 57.25' Base Length
7 Rows x 82.7" Wide = 48.27' Base Width
32.0" Chamber Height = 2.67' Field Height

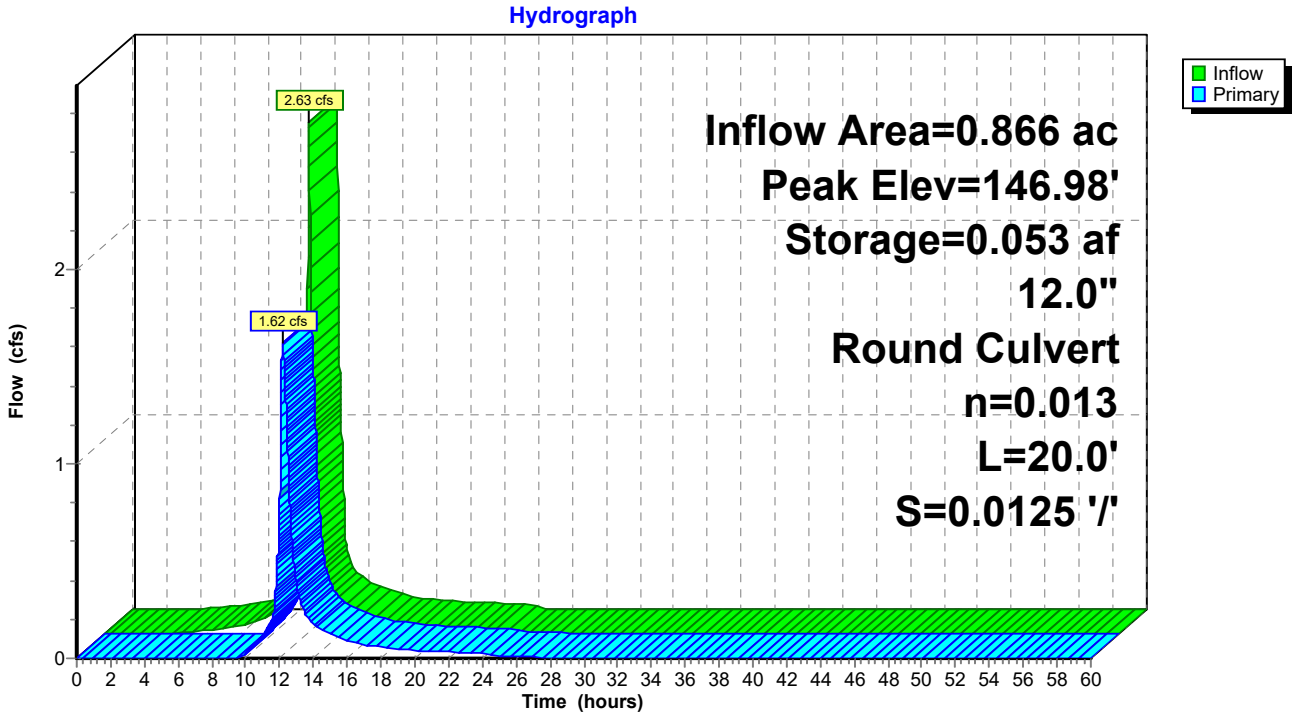
28 Chambers x 166.5 cf = 4,662.0 cf Chamber Storage
28 Chambers x 258.6 cf + 128.7 cf Border = 7,369.3 cf Displacement

Chamber Storage = 4,662.0 cf = 0.107 af
Overall Storage Efficiency = 63.3%
Overall System Size = 57.25' x 48.27' x 2.67'

28 Chambers (plus border)
272.9 cy Field



Pond 2P: Detention System



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 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 PR1: 2Life Building and Runoff Area=86,779 sf 81.89% Impervious Runoff Depth=4.61"
Tc=6.0 min CN=95 Runoff=9.86 cfs 0.765 af

Subcatchment PR2: Connector Building, Runoff Area=37,718 sf 81.20% Impervious Runoff Depth=4.61"
Tc=6.0 min CN=95 Runoff=4.29 cfs 0.332 af

Subcatchment PR3: Woods to Winchester Runoff Area=10,203 sf 0.00% Impervious Runoff Depth=3.25"
Flow Length=165' Tc=7.4 min CN=82 Runoff=0.85 cfs 0.063 af

Subcatchment PR4: Woods to Nahanton Runoff Area=13,430 sf 0.00% Impervious Runoff Depth=3.25"
Tc=6.0 min CN=82 Runoff=1.17 cfs 0.083 af

Subcatchment PR5: Back of Buildings and Runoff Area=53,487 sf 39.48% Impervious Runoff Depth=3.75"
Tc=6.0 min CN=87 Runoff=5.29 cfs 0.383 af

Reach DP1: Winchester St. Inflow=9.28 cfs 1.136 af
Outflow=9.28 cfs 1.136 af

Reach DP2: Nahanton Street Inflow=6.46 cfs 0.467 af
Outflow=6.46 cfs 0.467 af

Pond 1P: Detention System Peak Elev=132.07' Storage=0.141 af Inflow=9.86 cfs 0.765 af
Outflow=5.88 cfs 0.753 af

Pond 2P: Detention System Peak Elev=147.31' Storage=0.070 af Inflow=4.29 cfs 0.332 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0125 '/' Outflow=2.75 cfs 0.319 af

Total Runoff Area = 4.628 ac Runoff Volume = 1.628 af Average Runoff Depth = 4.22"
39.09% Pervious = 1.809 ac 60.91% Impervious = 2.819 ac

Summary for Subcatchment PR1: 2Life Building and Drive Aisle

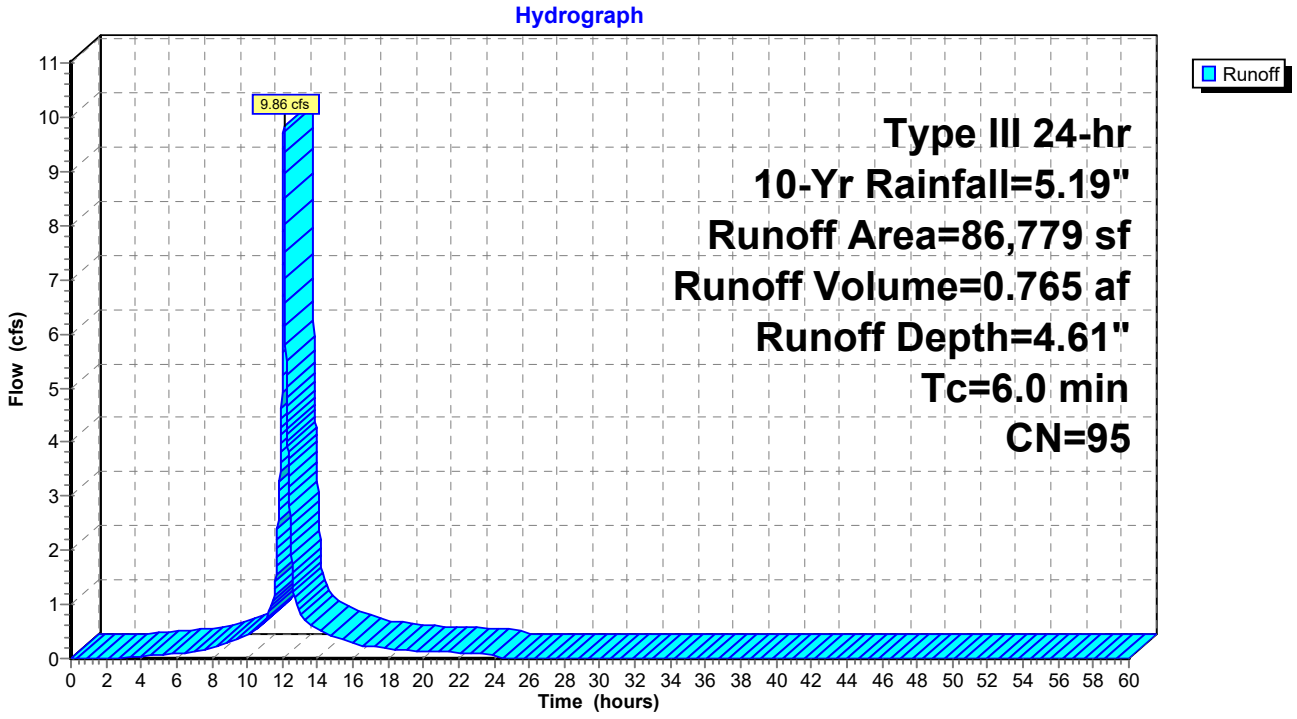
Runoff = 9.86 cfs @ 12.08 hrs, Volume= 0.765 af, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=5.19"

Area (sf)	CN	Description
71,061	98	Paved parking, HSG D
15,718	80	>75% Grass cover, Good, HSG D
86,779	95	Weighted Average
15,718		18.11% Pervious Area
71,061		81.89% Impervious Area

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

Subcatchment PR1: 2Life Building and Drive Aisle



Summary for Subcatchment PR2: Connector Building, Walkway, and Parking

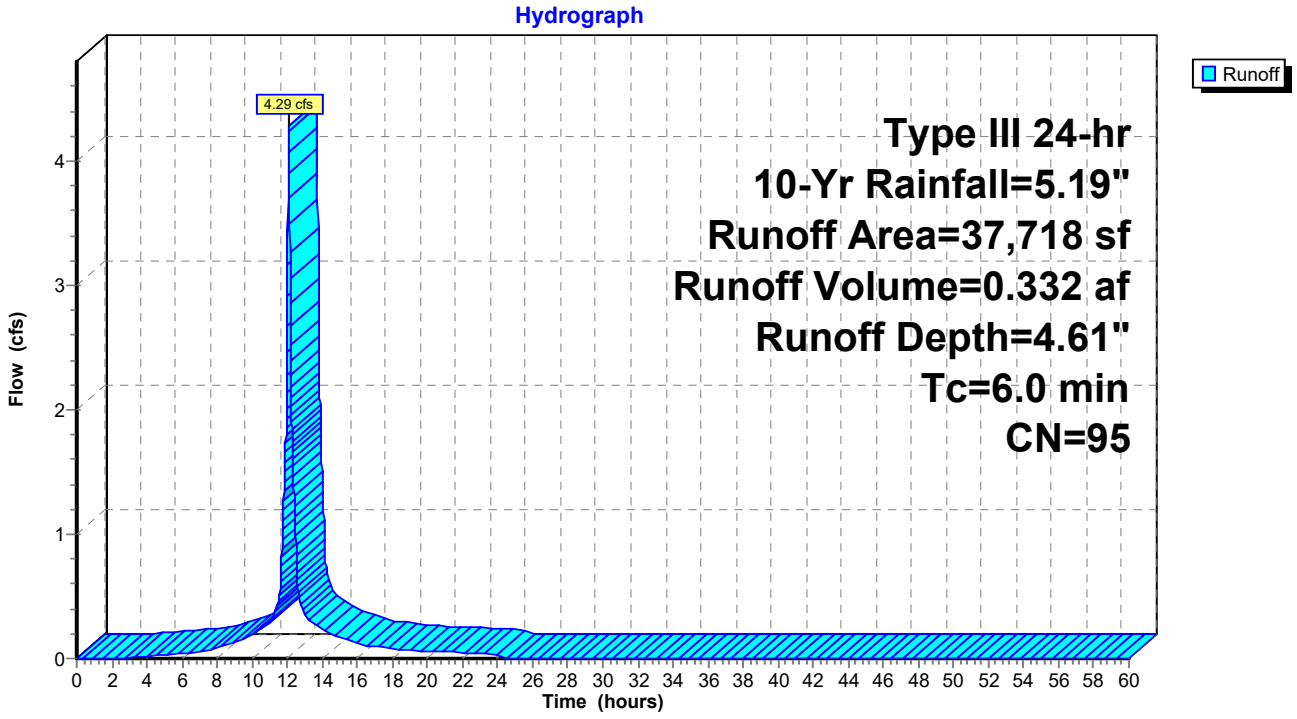
Runoff = 4.29 cfs @ 12.08 hrs, Volume= 0.332 af, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=5.19"

Area (sf)	CN	Description
30,626	98	Paved parking, HSG D
7,092	80	>75% Grass cover, Good, HSG D
37,718	95	Weighted Average
7,092		18.80% Pervious Area
30,626		81.20% Impervious Area

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

Subcatchment PR2: Connector Building, Walkway, and Parking



Summary for Subcatchment PR3: Woods to Winchester

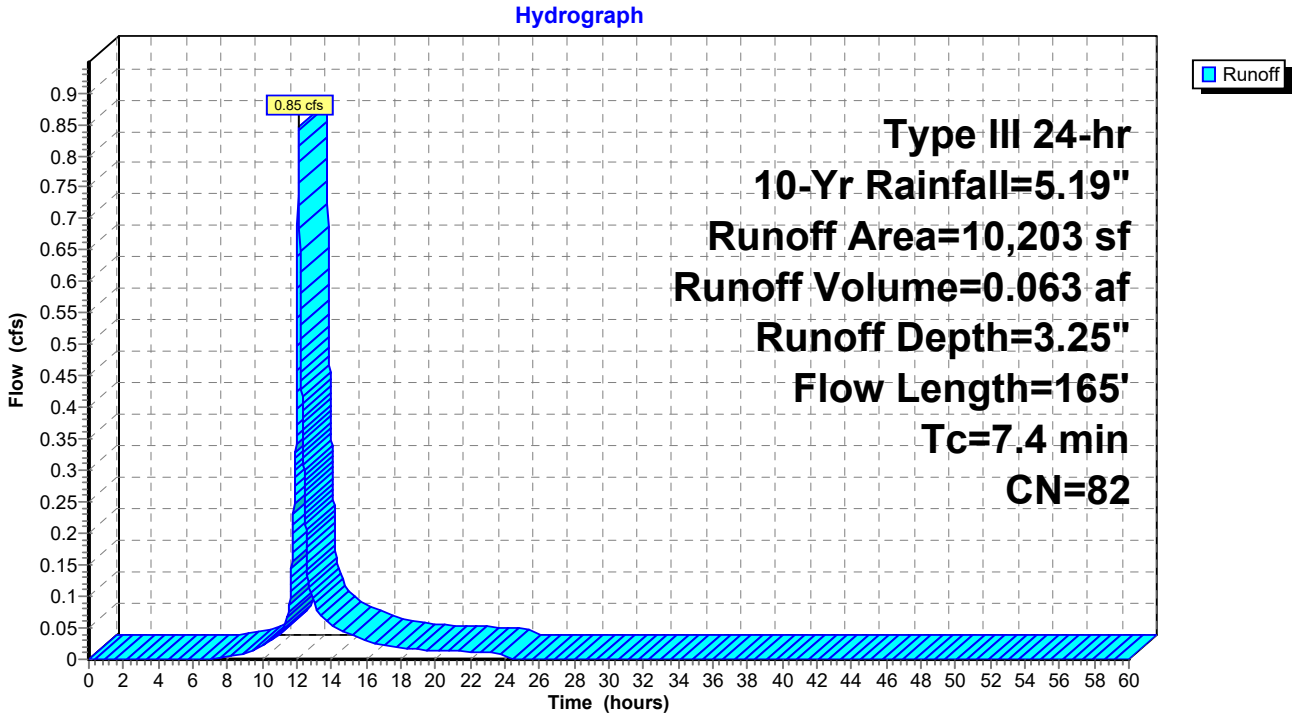
Runoff = 0.85 cfs @ 12.11 hrs, Volume= 0.063 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=5.19"

Area (sf)	CN	Description
10,203	82	Woods/grass comb., Fair, HSG D
10,203		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	50	0.1000	0.13		**Sheet Flow, sheet flow** Woods: Light underbrush n= 0.400 P2= 3.30"
1.0	115	0.1400	1.87		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
7.4	165	Total			

Subcatchment PR3: Woods to Winchester



Summary for Subcatchment PR4: Woods to Nahanton

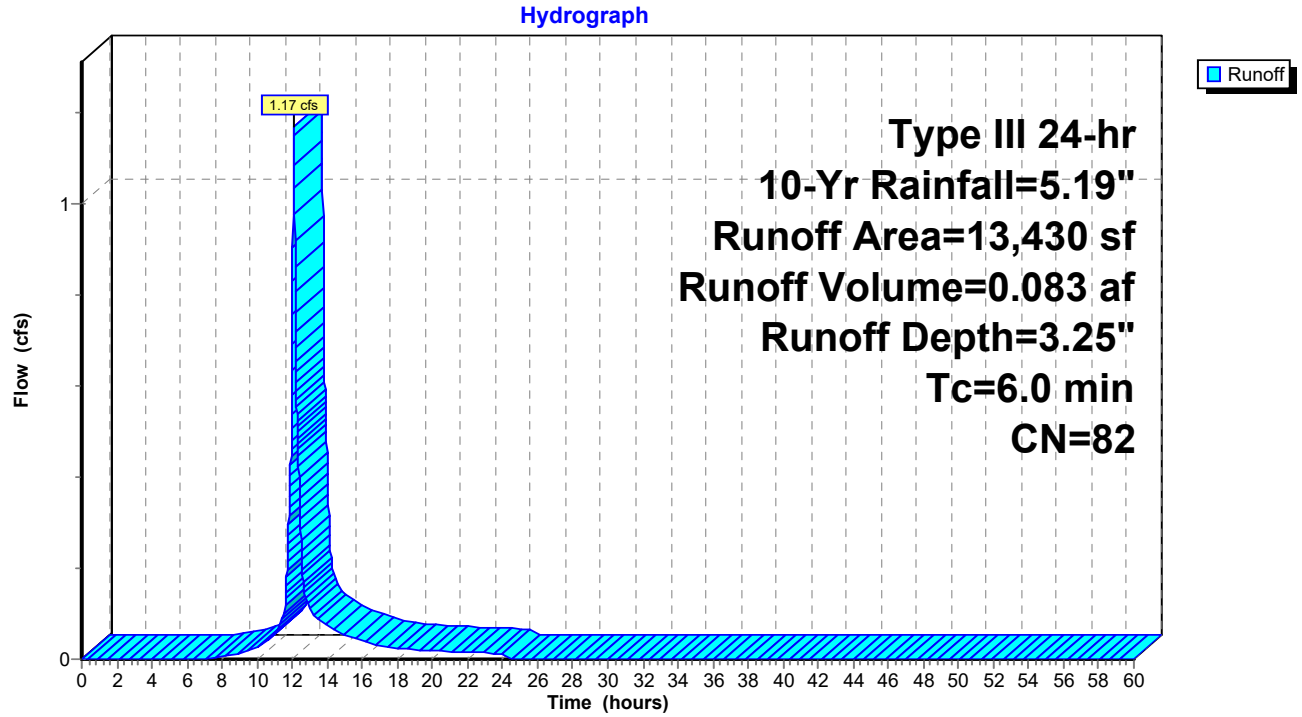
Runoff = 1.17 cfs @ 12.09 hrs, Volume= 0.083 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=5.19"

Area (sf)	CN	Description
13,430	82	Woods/grass comb., Fair, HSG D
13,430		100.00% Pervious Area

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

Subcatchment PR4: Woods to Nahanton



Summary for Subcatchment PR5: Back of Buildings and Drive Aisle

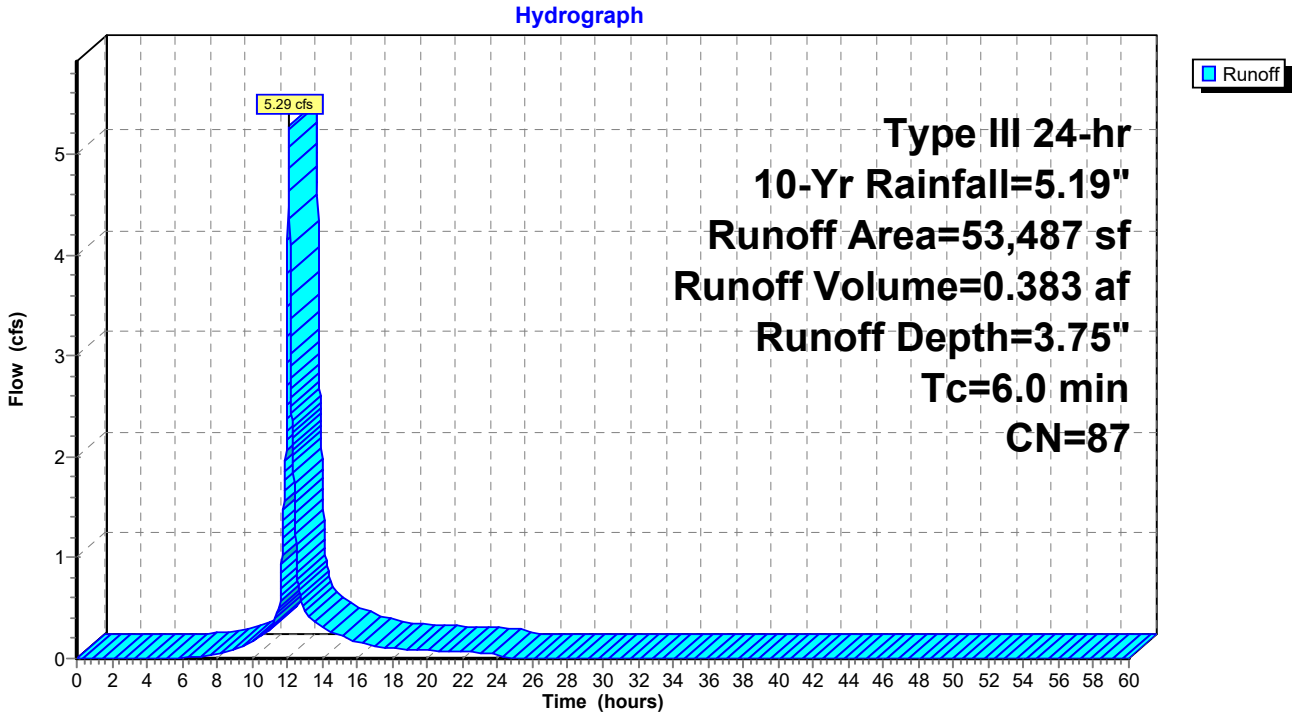
Runoff = 5.29 cfs @ 12.09 hrs, Volume= 0.383 af, Depth= 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=5.19"

Area (sf)	CN	Description
21,115	98	Paved parking, HSG D
32,372	80	>75% Grass cover, Good, HSG D
53,487	87	Weighted Average
32,372		60.52% Pervious Area
21,115		39.48% Impervious Area

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

Subcatchment PR5: Back of Buildings and Drive Aisle



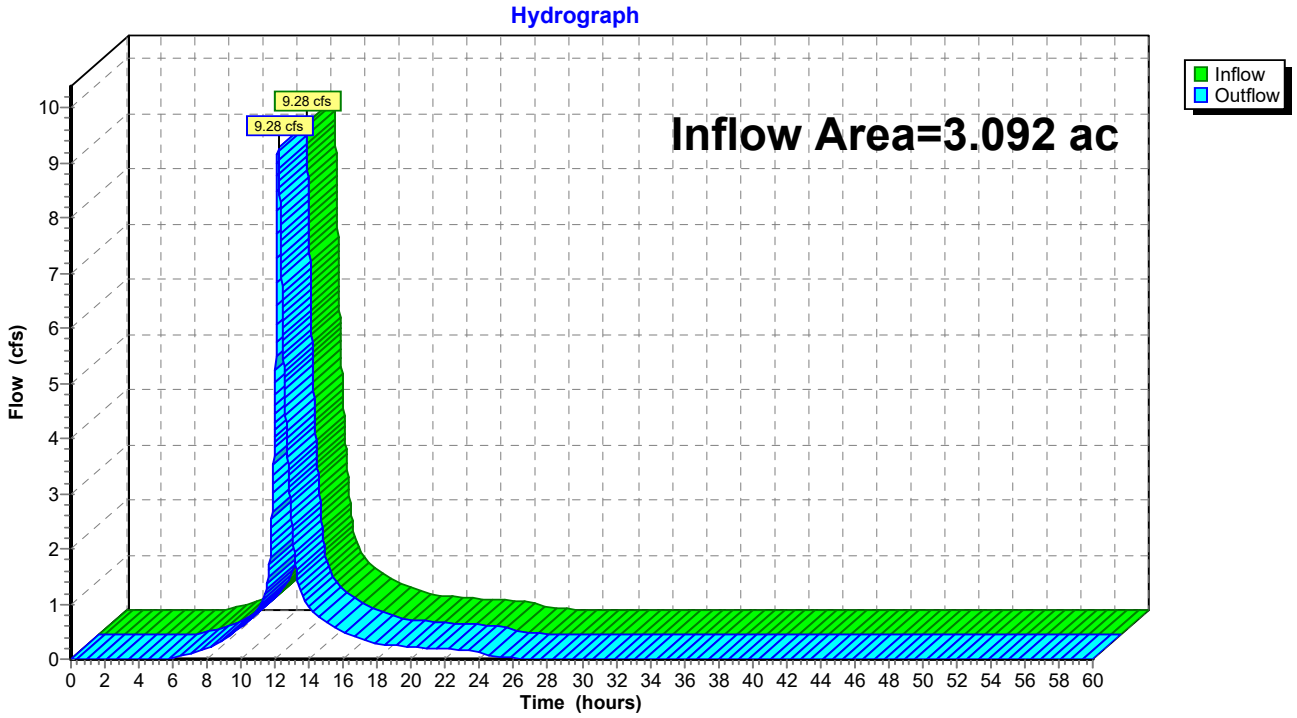
Summary for Reach DP1: Winchester St.

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

Inflow Area = 3.092 ac, 75.49% Impervious, Inflow Depth = 4.41" for 10-Yr event
Inflow = 9.28 cfs @ 12.17 hrs, Volume= 1.136 af
Outflow = 9.28 cfs @ 12.17 hrs, Volume= 1.136 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP1: Winchester St.



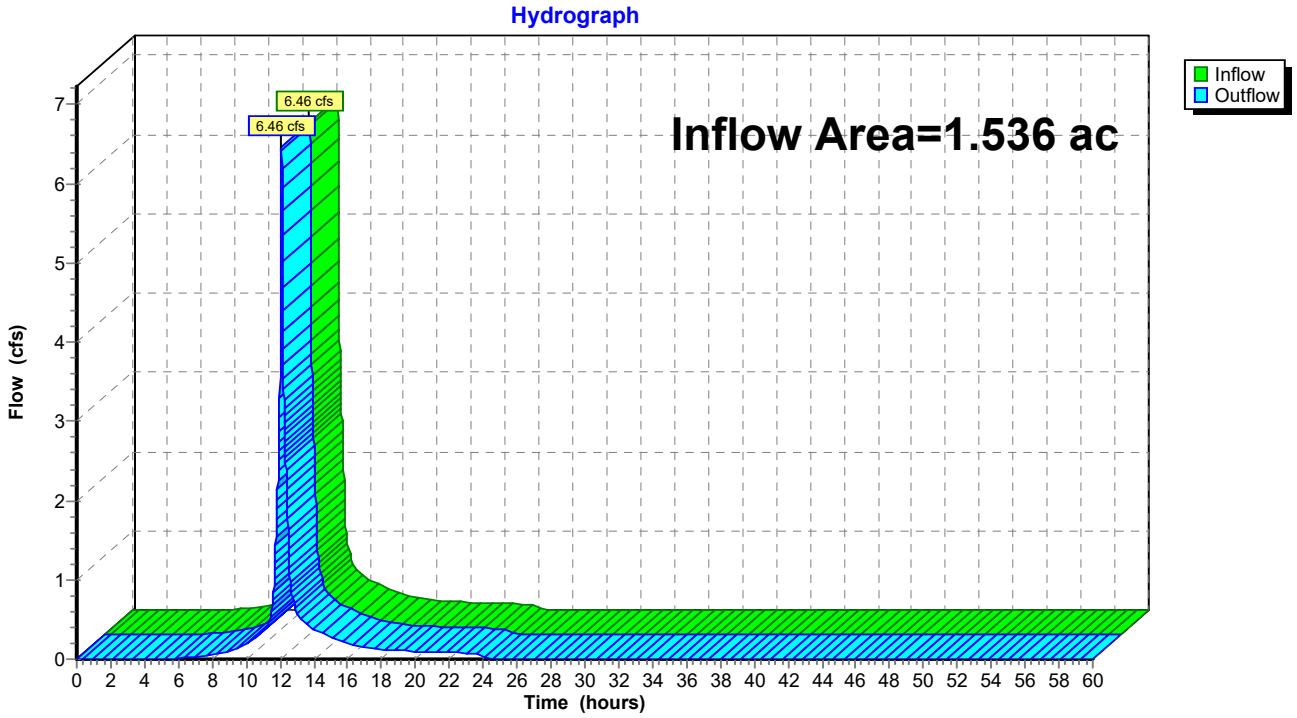
Summary for Reach DP2: Nahanton Street

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

Inflow Area = 1.536 ac, 31.55% Impervious, Inflow Depth = 3.65" for 10-Yr event
Inflow = 6.46 cfs @ 12.09 hrs, Volume= 0.467 af
Outflow = 6.46 cfs @ 12.09 hrs, Volume= 0.467 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP2: Nahanton Street



Summary for Pond 1P: Detention System

Inflow Area = 1.992 ac, 81.89% Impervious, Inflow Depth = 4.61" for 10-Yr event
Inflow = 9.86 cfs @ 12.08 hrs, Volume= 0.765 af
Outflow = 5.88 cfs @ 12.19 hrs, Volume= 0.753 af, Atten= 40%, Lag= 6.3 min
Primary = 5.88 cfs @ 12.19 hrs, Volume= 0.753 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 132.07' @ 12.19 hrs Surf.Area= 0.055 ac Storage= 0.141 af
Flood Elev= 133.00' Surf.Area= 0.055 ac Storage= 0.184 af

Plug-Flow detention time= 42.7 min calculated for 0.753 af (98% of inflow)
Center-of-Mass det. time= 33.2 min (800.4 - 767.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	129.00'	0.000 af	**55.17'W x 43.19'L x 5.67'H Field A** 0.310 af Overall - 0.310 af Embedded = 0.000 af x 40.0% Voids
#2A	129.00'	0.231 af	**StormTrap ST1 SingleTrap 5-0** x 24 Inside #1 Inside= 82.7"W x 60.0"H => 29.76 sf x 14.06'L = 418.5 cf Outside= 82.7"W x 68.0"H => 39.08 sf x 14.06'L = 549.5 cf 24 Chambers in 8 Rows 55.17' x 42.19' Core + 0.00' x 0.50' Border = 55.17' x 43.19' System
		0.231 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	129.25'	**10.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 129.25' / 129.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Primary	131.20'	**12.0" Round Culvert** L= 2.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.20' / 131.00' S= 0.1000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.88 cfs @ 12.19 hrs HW=132.07' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.07 cfs @ 7.46 fps)
└**2=Culvert** (Inlet Controls 1.81 cfs @ 2.50 fps)

Pond 1P: Detention System - Chamber Wizard Field A

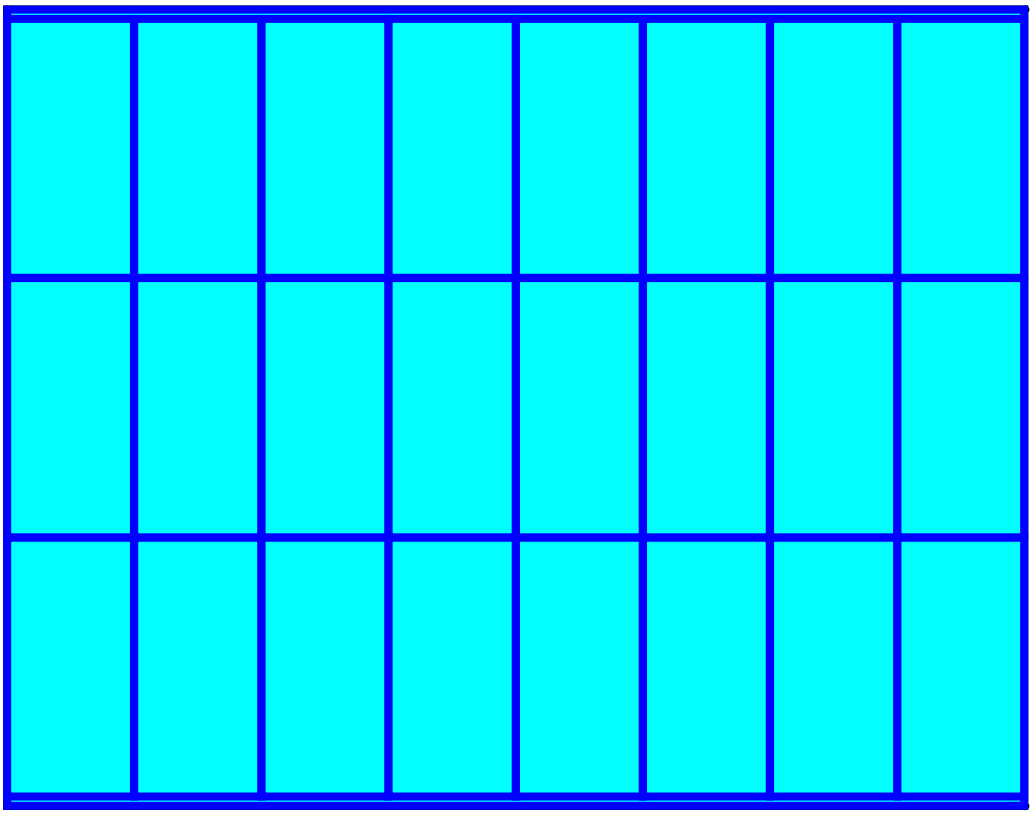
Chamber Model = StormTrap ST1 SingleTrap 5-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 60.0"H => 29.76 sf x 14.06'L = 418.5 cf
Outside= 82.7"W x 68.0"H => 39.08 sf x 14.06'L = 549.5 cf

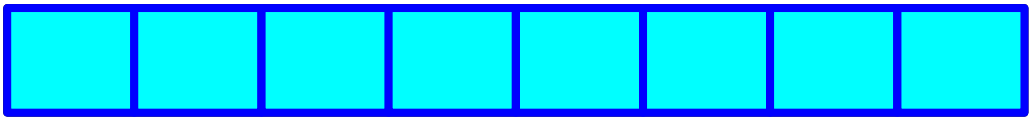
3 Chambers/Row x 14.06' Long = 42.19' Row Length +6.0" Border x 2 = 43.19' Base Length
8 Rows x 82.7" Wide = 55.17' Base Width
68.0" Chamber Height = 5.67' Field Height

24 Chambers x 418.5 cf = 10,044.0 cf Chamber Storage
24 Chambers x 549.5 cf + 312.6 cf Border = 13,500.9 cf Displacement

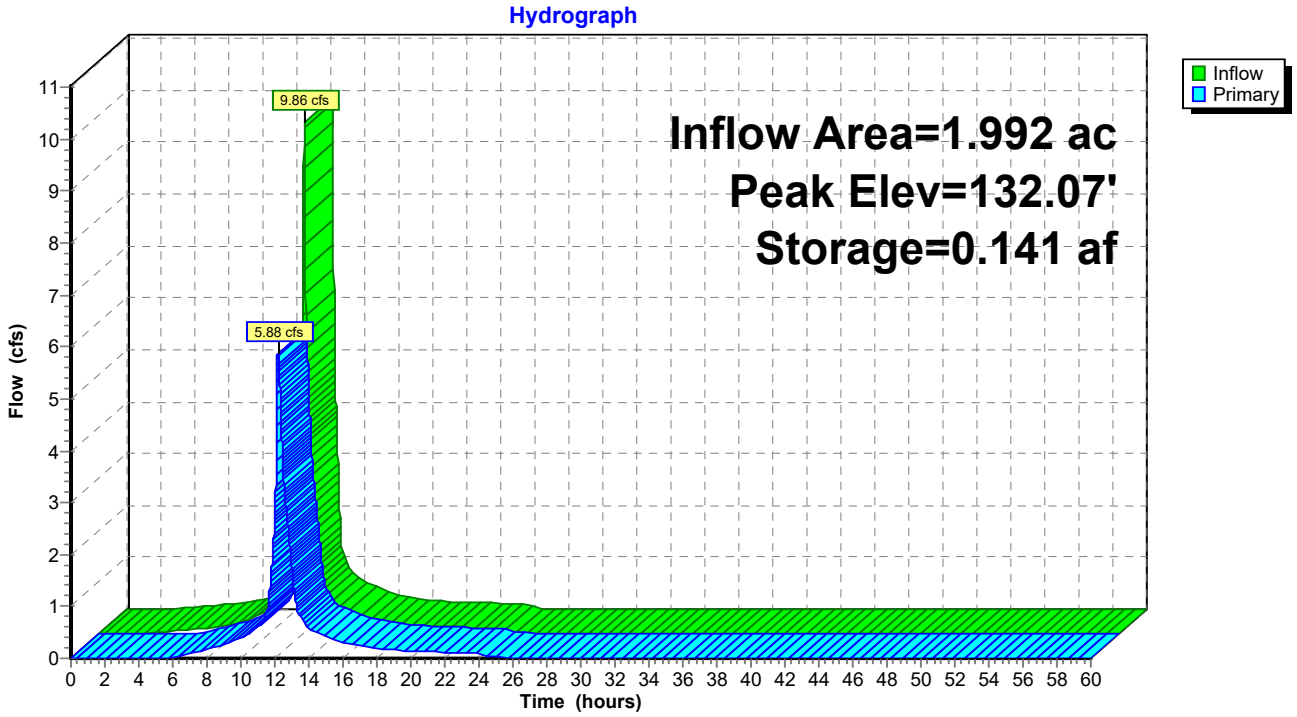
Chamber Storage = 10,044.0 cf = 0.231 af
Overall Storage Efficiency = 74.4%
Overall System Size = 43.19' x 55.17' x 5.67'

24 Chambers (plus border)
500.0 cy Field





Pond 1P: Detention System



Summary for Pond 2P: Detention System

[58] Hint: Peaked 7.31' above defined flood level

Inflow Area = 0.866 ac, 81.20% Impervious, Inflow Depth = 4.61" for 10-Yr event
Inflow = 4.29 cfs @ 12.08 hrs, Volume= 0.332 af
Outflow = 2.75 cfs @ 12.18 hrs, Volume= 0.319 af, Atten= 36%, Lag= 5.5 min
Primary = 2.75 cfs @ 12.18 hrs, Volume= 0.319 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 147.31' @ 12.18 hrs Surf.Area= 0.063 ac Storage= 0.070 af
Flood Elev= 140.00' Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 78.5 min calculated for 0.319 af (96% of inflow)
Center-of-Mass det. time= 54.9 min (822.2 - 767.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	146.00'	0.000 af	**48.27'W x 57.25'L x 2.67'H Field A** 0.169 af Overall - 0.169 af Embedded = 0.000 af x 40.0% Voids
#2A	146.00'	0.107 af	**StormTrap ST1 SingleTrap 2-0** x 28 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 28 Chambers in 7 Rows 48.27' x 56.25' Core + 0.00' x 0.50' Border = 48.27' x 57.25' System
		0.107 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	146.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 146.25' / 146.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.74 cfs @ 12.18 hrs HW=147.31' (Free Discharge)
1=Culvert (Barrel Controls 2.74 cfs @ 4.09 fps)

Pond 2P: Detention System - Chamber Wizard Field A

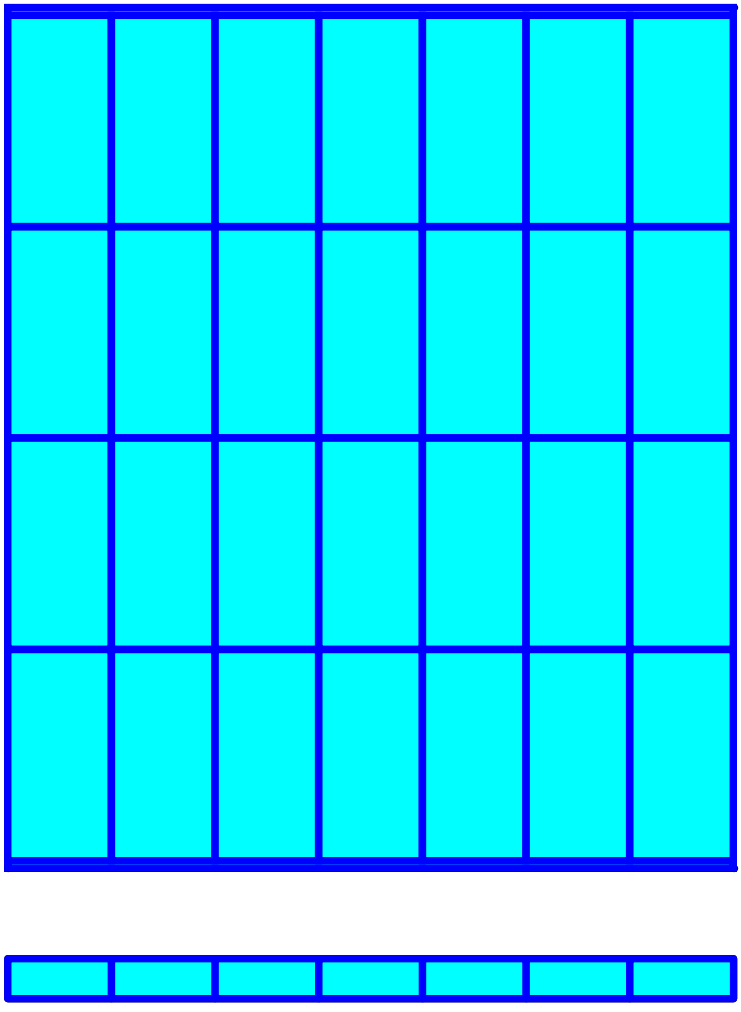
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

4 Chambers/Row x 14.06' Long = 56.25' Row Length +6.0" Border x 2 = 57.25' Base Length
7 Rows x 82.7" Wide = 48.27' Base Width
32.0" Chamber Height = 2.67' Field Height

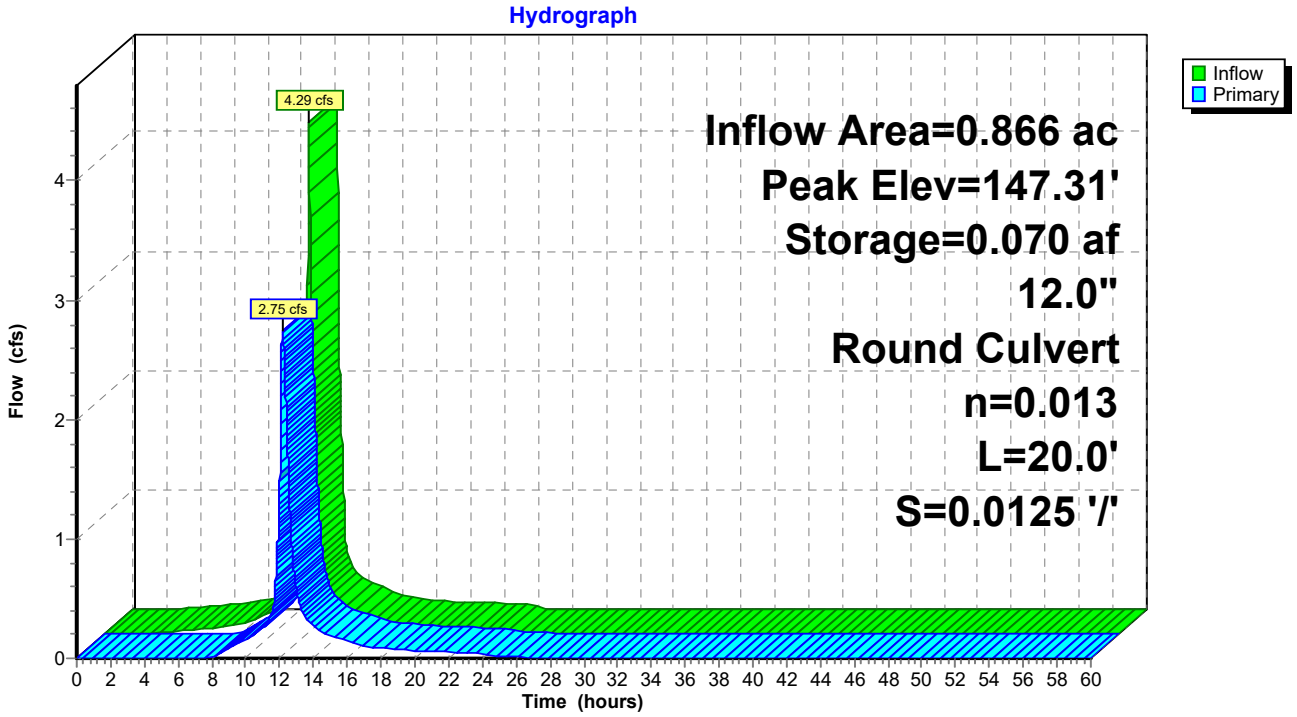
28 Chambers x 166.5 cf = 4,662.0 cf Chamber Storage
28 Chambers x 258.6 cf + 128.7 cf Border = 7,369.3 cf Displacement

Chamber Storage = 4,662.0 cf = 0.107 af
Overall Storage Efficiency = 63.3%
Overall System Size = 57.25' x 48.27' x 2.67'

28 Chambers (plus border)
272.9 cy Field



Pond 2P: Detention System



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 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 PR1: 2Life Building and Runoff Area=86,779 sf 81.89% Impervious Runoff Depth=5.77"
Tc=6.0 min CN=95 Runoff=12.20 cfs 0.958 af

Subcatchment PR2: Connector Building, Runoff Area=37,718 sf 81.20% Impervious Runoff Depth=5.77"
Tc=6.0 min CN=95 Runoff=5.30 cfs 0.416 af

Subcatchment PR3: Woods to Winchester Runoff Area=10,203 sf 0.00% Impervious Runoff Depth=4.32"
Flow Length=165' Tc=7.4 min CN=82 Runoff=1.12 cfs 0.084 af

Subcatchment PR4: Woods to Nahanton Runoff Area=13,430 sf 0.00% Impervious Runoff Depth=4.32"
Tc=6.0 min CN=82 Runoff=1.54 cfs 0.111 af

Subcatchment PR5: Back of Buildings and Runoff Area=53,487 sf 39.48% Impervious Runoff Depth=4.86"
Tc=6.0 min CN=87 Runoff=6.78 cfs 0.498 af

Reach DP1: Winchester St. Inflow=11.58 cfs 1.433 af
Outflow=11.58 cfs 1.433 af

Reach DP2: Nahanton Street Inflow=8.32 cfs 0.609 af
Outflow=8.32 cfs 0.609 af

Pond 1P: Detention System Peak Elev=132.64' Storage=0.168 af Inflow=12.20 cfs 0.958 af
Outflow=7.42 cfs 0.946 af

Pond 2P: Detention System Peak Elev=147.52' Storage=0.081 af Inflow=5.30 cfs 0.416 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0125 '/' Outflow=3.28 cfs 0.403 af

Total Runoff Area = 4.628 ac Runoff Volume = 2.067 af Average Runoff Depth = 5.36"
39.09% Pervious = 1.809 ac 60.91% Impervious = 2.819 ac

Summary for Subcatchment PR1: 2Life Building and Drive Aisle

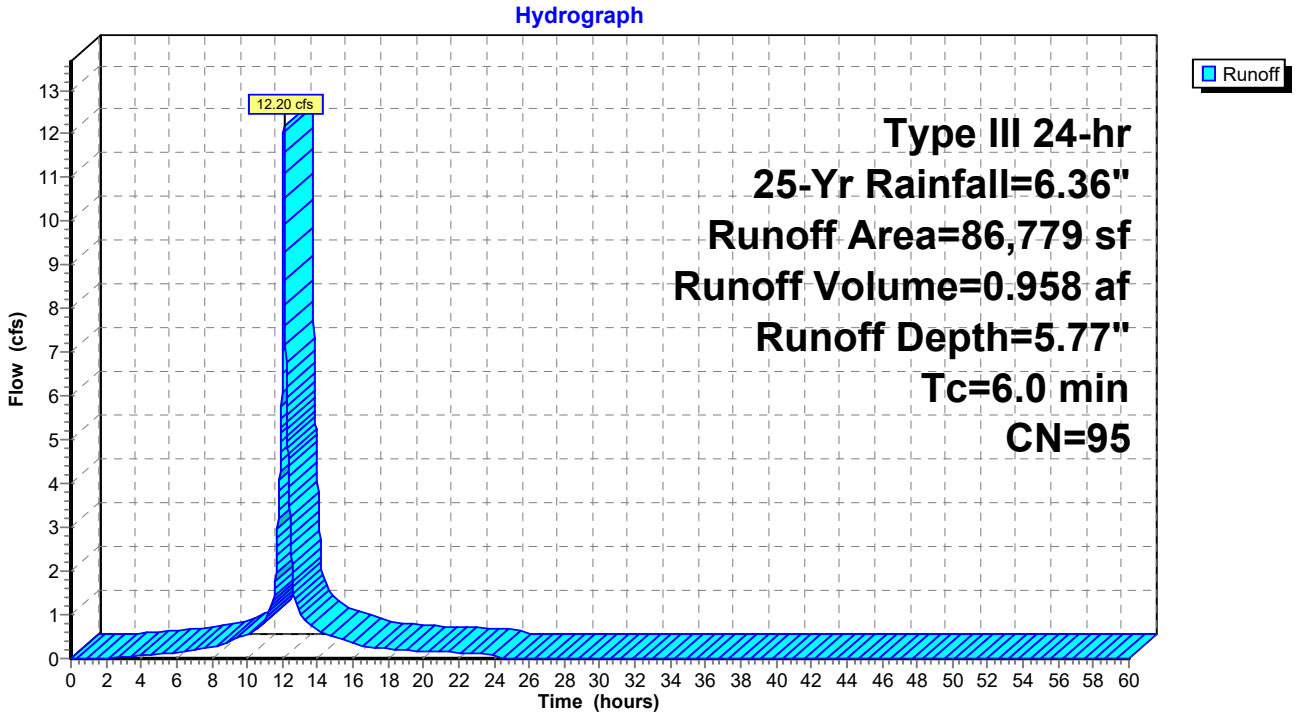
Runoff = 12.20 cfs @ 12.08 hrs, Volume= 0.958 af, Depth= 5.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Yr Rainfall=6.36"

Area (sf)	CN	Description
71,061	98	Paved parking, HSG D
15,718	80	>75% Grass cover, Good, HSG D
86,779	95	Weighted Average
15,718		18.11% Pervious Area
71,061		81.89% Impervious Area

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

Subcatchment PR1: 2Life Building and Drive Aisle



Summary for Subcatchment PR2: Connector Building, Walkway, and Parking

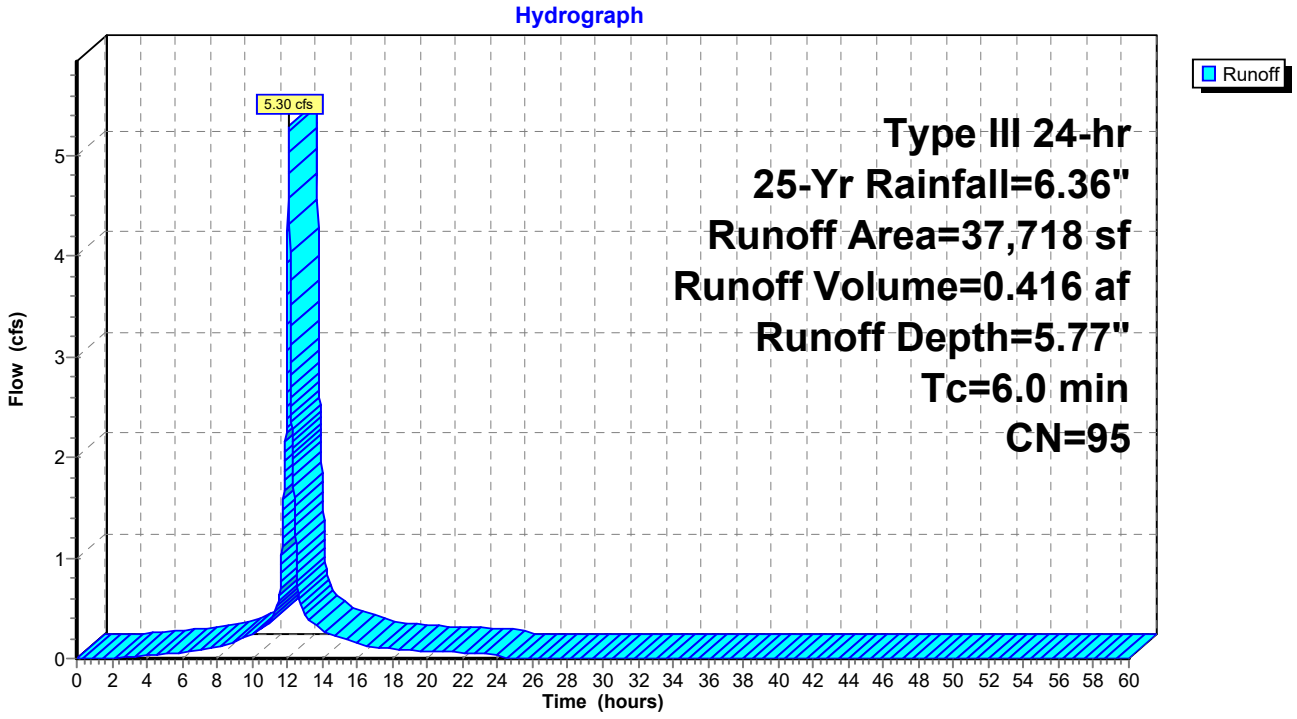
Runoff = 5.30 cfs @ 12.08 hrs, Volume= 0.416 af, Depth= 5.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Yr Rainfall=6.36"

Area (sf)	CN	Description
30,626	98	Paved parking, HSG D
7,092	80	>75% Grass cover, Good, HSG D
37,718	95	Weighted Average
7,092		18.80% Pervious Area
30,626		81.20% Impervious Area

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

Subcatchment PR2: Connector Building, Walkway, and Parking



Summary for Subcatchment PR3: Woods to Winchester

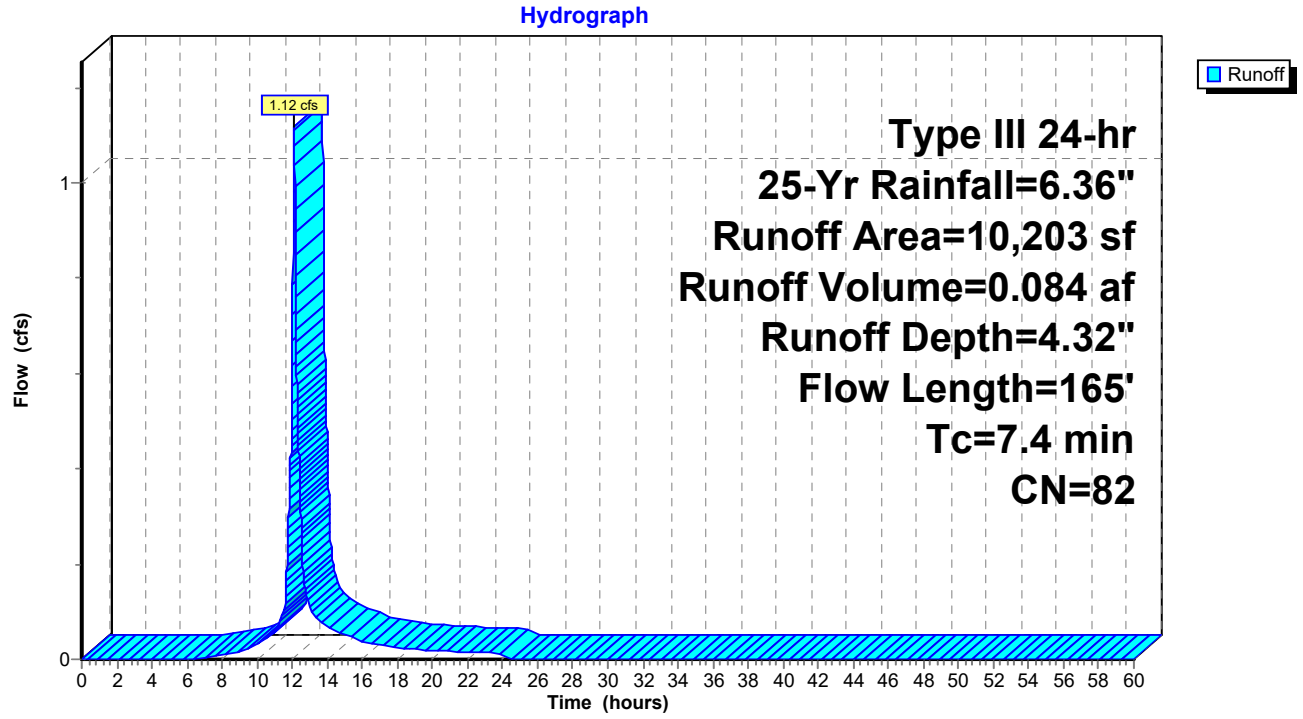
Runoff = 1.12 cfs @ 12.10 hrs, Volume= 0.084 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Yr Rainfall=6.36"

Area (sf)	CN	Description
10,203	82	Woods/grass comb., Fair, HSG D
10,203		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	50	0.1000	0.13		**Sheet Flow, sheet flow** Woods: Light underbrush n= 0.400 P2= 3.30"
1.0	115	0.1400	1.87		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
7.4	165	Total			

Subcatchment PR3: Woods to Winchester



Summary for Subcatchment PR4: Woods to Nahanton

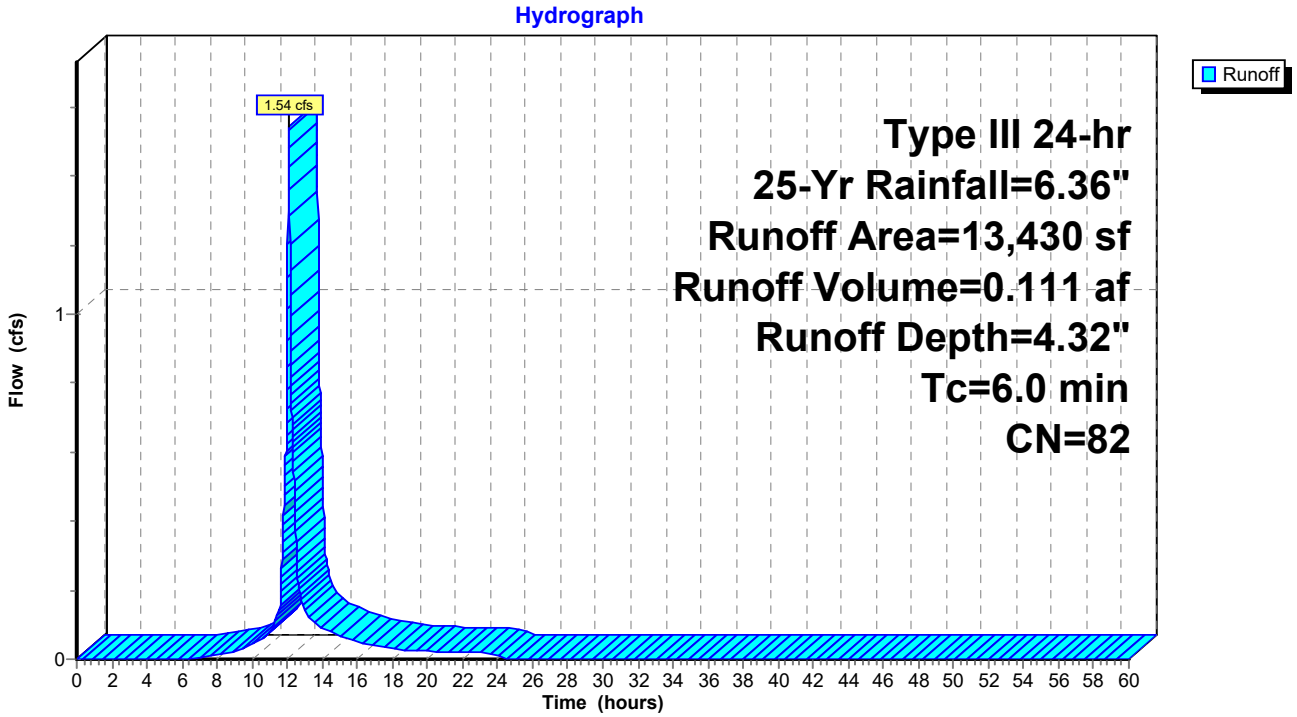
Runoff = 1.54 cfs @ 12.09 hrs, Volume= 0.111 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Yr Rainfall=6.36"

Area (sf)	CN	Description
13,430	82	Woods/grass comb., Fair, HSG D
13,430		100.00% Pervious Area

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

Subcatchment PR4: Woods to Nahanton



Summary for Subcatchment PR5: Back of Buildings and Drive Aisle

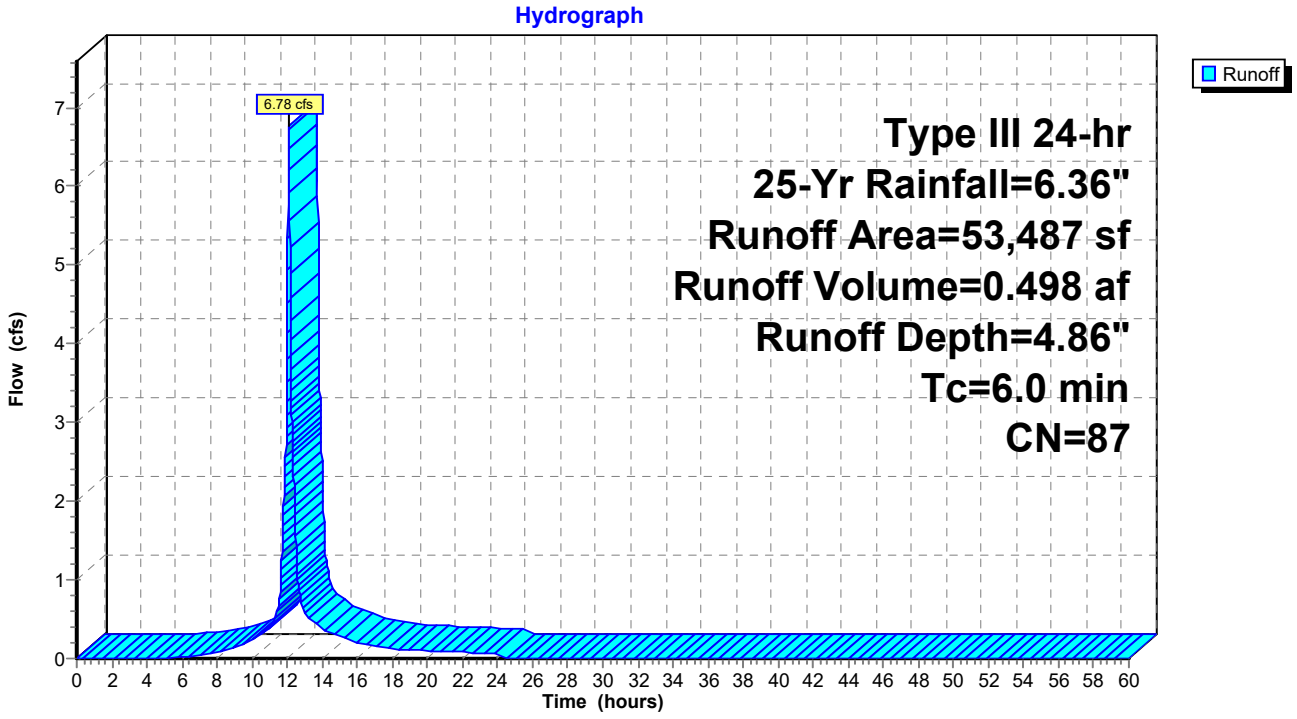
Runoff = 6.78 cfs @ 12.09 hrs, Volume= 0.498 af, Depth= 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Yr Rainfall=6.36"

Area (sf)	CN	Description
21,115	98	Paved parking, HSG D
32,372	80	>75% Grass cover, Good, HSG D
53,487	87	Weighted Average
32,372		60.52% Pervious Area
21,115		39.48% Impervious Area

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

Subcatchment PR5: Back of Buildings and Drive Aisle



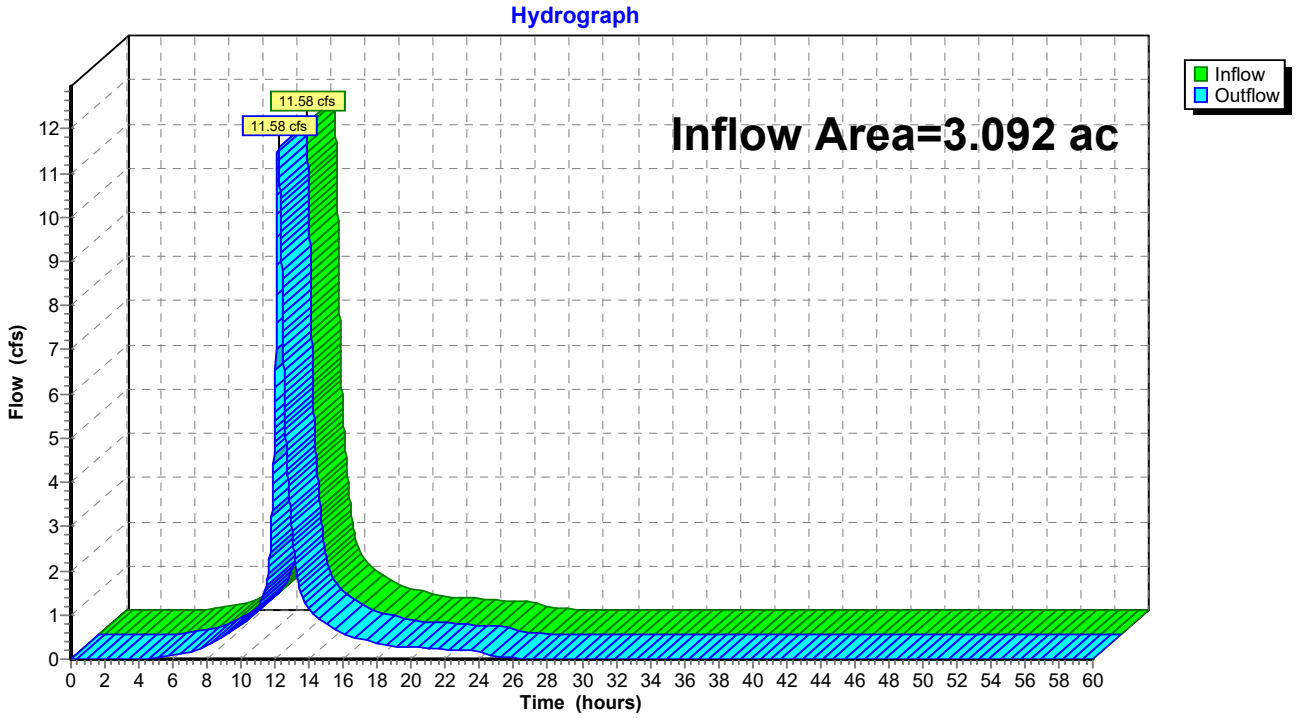
Summary for Reach DP1: Winchester St.

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

Inflow Area = 3.092 ac, 75.49% Impervious, Inflow Depth = 5.56" for 25-Yr event
Inflow = 11.58 cfs @ 12.17 hrs, Volume= 1.433 af
Outflow = 11.58 cfs @ 12.17 hrs, Volume= 1.433 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP1: Winchester St.



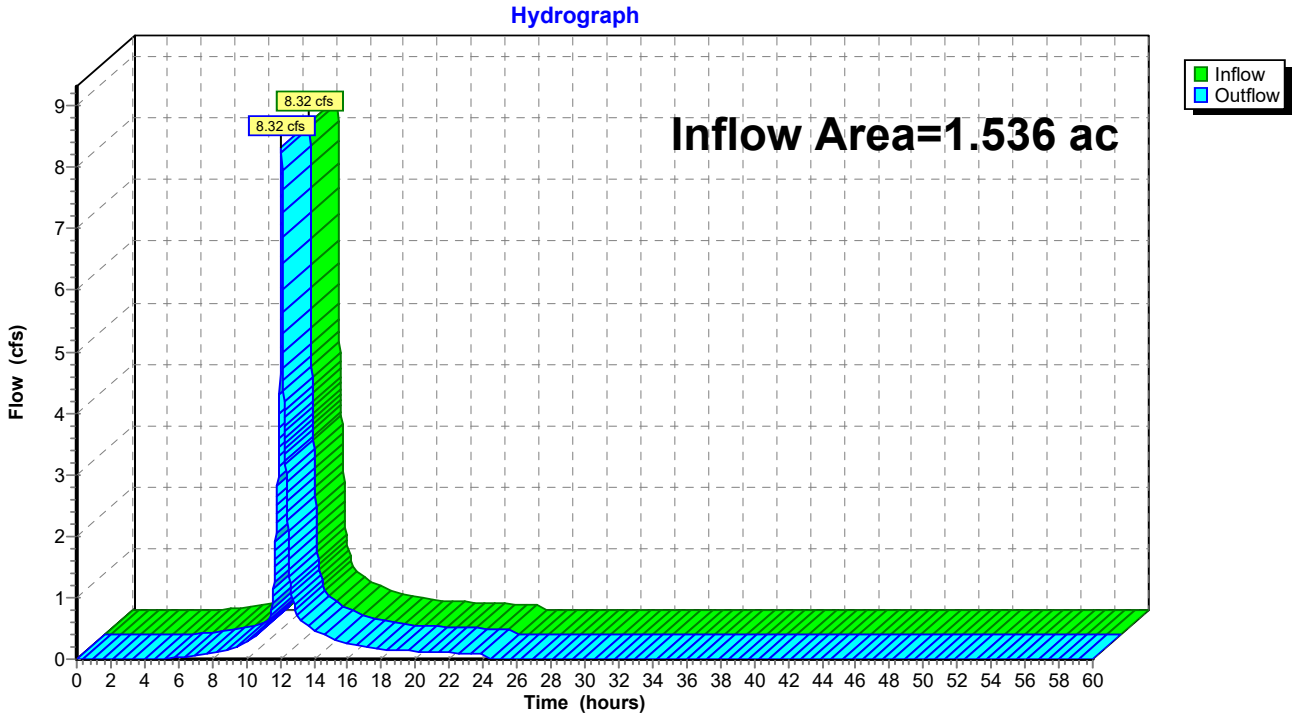
Summary for Reach DP2: Nahanton Street

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

Inflow Area = 1.536 ac, 31.55% Impervious, Inflow Depth = 4.75" for 25-Yr event
Inflow = 8.32 cfs @ 12.09 hrs, Volume= 0.609 af
Outflow = 8.32 cfs @ 12.09 hrs, Volume= 0.609 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP2: Nahanton Street



Summary for Pond 1P: Detention System

Inflow Area = 1.992 ac, 81.89% Impervious, Inflow Depth = 5.77" for 25-Yr event
Inflow = 12.20 cfs @ 12.08 hrs, Volume= 0.958 af
Outflow = 7.42 cfs @ 12.18 hrs, Volume= 0.946 af, Atten= 39%, Lag= 6.0 min
Primary = 7.42 cfs @ 12.18 hrs, Volume= 0.946 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 132.64' @ 12.18 hrs Surf.Area= 0.055 ac Storage= 0.168 af
Flood Elev= 133.00' Surf.Area= 0.055 ac Storage= 0.184 af

Plug-Flow detention time= 38.0 min calculated for 0.946 af (99% of inflow)
Center-of-Mass det. time= 30.3 min (792.5 - 762.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	129.00'	0.000 af	**55.17'W x 43.19'L x 5.67'H Field A** 0.310 af Overall - 0.310 af Embedded = 0.000 af x 40.0% Voids
#2A	129.00'	0.231 af	**StormTrap ST1 SingleTrap 5-0** x 24 Inside #1 Inside= 82.7"W x 60.0"H => 29.76 sf x 14.06'L = 418.5 cf Outside= 82.7"W x 68.0"H => 39.08 sf x 14.06'L = 549.5 cf 24 Chambers in 8 Rows 55.17' x 42.19' Core + 0.00' x 0.50' Border = 55.17' x 43.19' System
		0.231 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	129.25'	**10.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 129.25' / 129.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Primary	131.20'	**12.0" Round Culvert** L= 2.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.20' / 131.00' S= 0.1000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=7.42 cfs @ 12.18 hrs HW=132.64' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.53 cfs @ 8.30 fps)
└**2=Culvert** (Inlet Controls 2.89 cfs @ 3.68 fps)

Pond 1P: Detention System - Chamber Wizard Field A

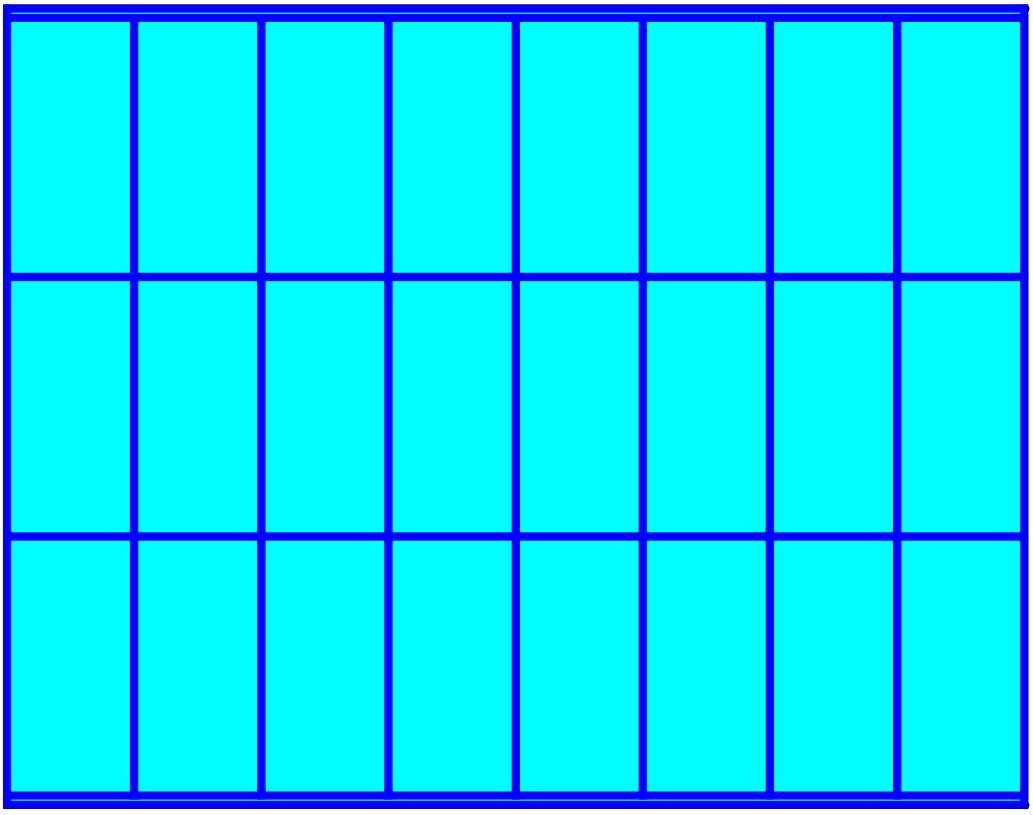
Chamber Model = StormTrap ST1 SingleTrap 5-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 60.0"H => 29.76 sf x 14.06'L = 418.5 cf
Outside= 82.7"W x 68.0"H => 39.08 sf x 14.06'L = 549.5 cf

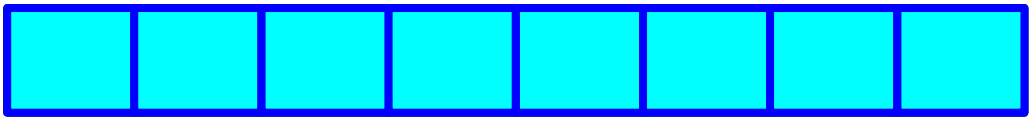
3 Chambers/Row x 14.06' Long = 42.19' Row Length +6.0" Border x 2 = 43.19' Base Length
8 Rows x 82.7" Wide = 55.17' Base Width
68.0" Chamber Height = 5.67' Field Height

24 Chambers x 418.5 cf = 10,044.0 cf Chamber Storage
24 Chambers x 549.5 cf + 312.6 cf Border = 13,500.9 cf Displacement

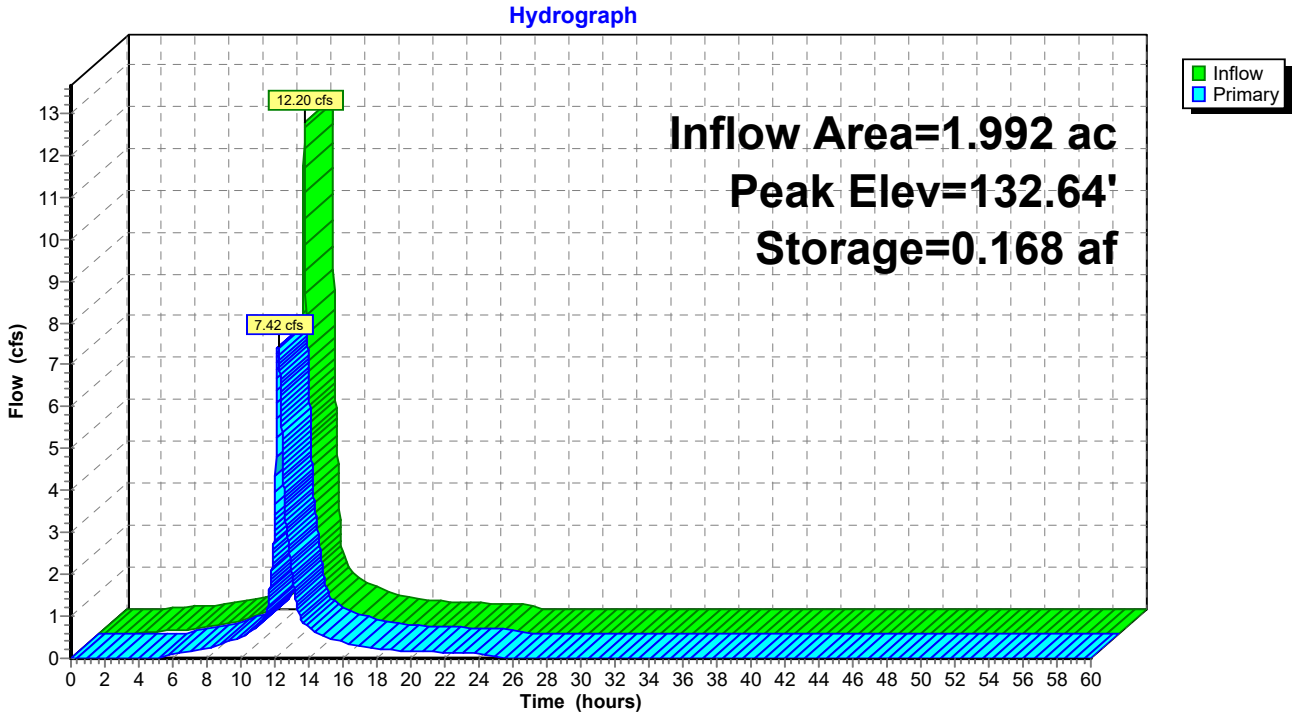
Chamber Storage = 10,044.0 cf = 0.231 af
Overall Storage Efficiency = 74.4%
Overall System Size = 43.19' x 55.17' x 5.67'

24 Chambers (plus border)
500.0 cy Field





Pond 1P: Detention System



Summary for Pond 2P: Detention System

[58] Hint: Peaked 7.52' above defined flood level

Inflow Area = 0.866 ac, 81.20% Impervious, Inflow Depth = 5.77" for 25-Yr event
Inflow = 5.30 cfs @ 12.08 hrs, Volume= 0.416 af
Outflow = 3.28 cfs @ 12.18 hrs, Volume= 0.403 af, Atten= 38%, Lag= 5.9 min
Primary = 3.28 cfs @ 12.18 hrs, Volume= 0.403 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 147.52' @ 12.18 hrs Surf.Area= 0.063 ac Storage= 0.081 af
Flood Elev= 140.00' Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 69.3 min calculated for 0.403 af (97% of inflow)
Center-of-Mass det. time= 49.6 min (811.8 - 762.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	146.00'	0.000 af	**48.27'W x 57.25'L x 2.67'H Field A** 0.169 af Overall - 0.169 af Embedded = 0.000 af x 40.0% Voids
#2A	146.00'	0.107 af	**StormTrap ST1 SingleTrap 2-0** x 28 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 28 Chambers in 7 Rows 48.27' x 56.25' Core + 0.00' x 0.50' Border = 48.27' x 57.25' System
		0.107 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	146.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 146.25' / 146.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.28 cfs @ 12.18 hrs HW=147.52' (Free Discharge)
1=Culvert (Barrel Controls 3.28 cfs @ 4.25 fps)

Pond 2P: Detention System - Chamber Wizard Field A

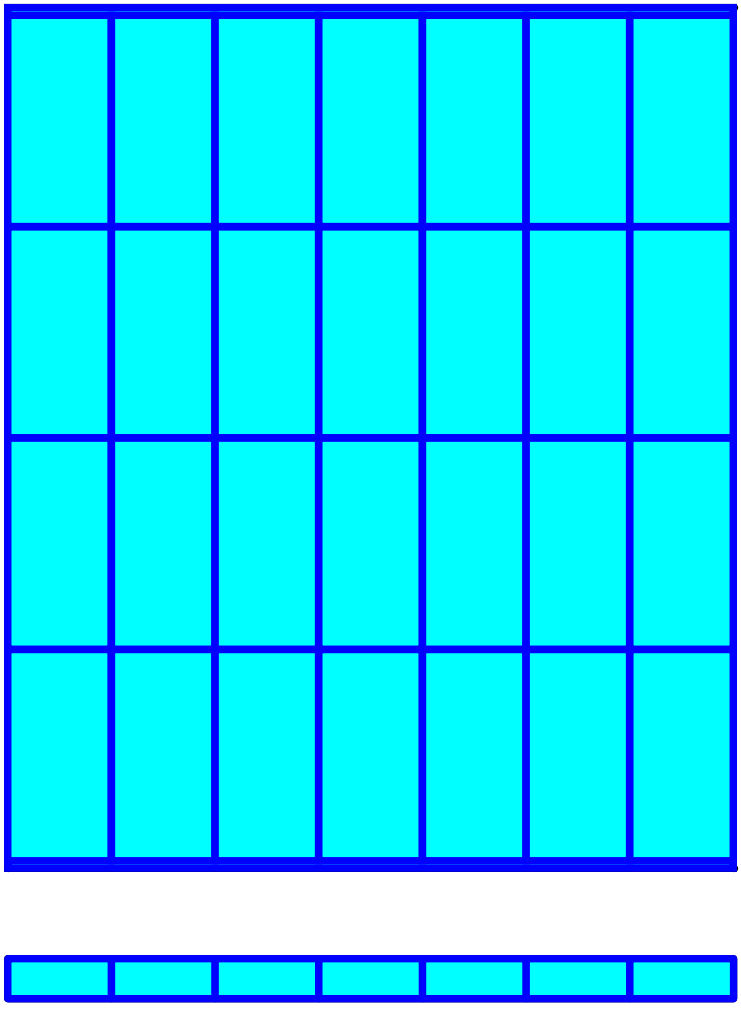
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

4 Chambers/Row x 14.06' Long = 56.25' Row Length +6.0" Border x 2 = 57.25' Base Length
7 Rows x 82.7" Wide = 48.27' Base Width
32.0" Chamber Height = 2.67' Field Height

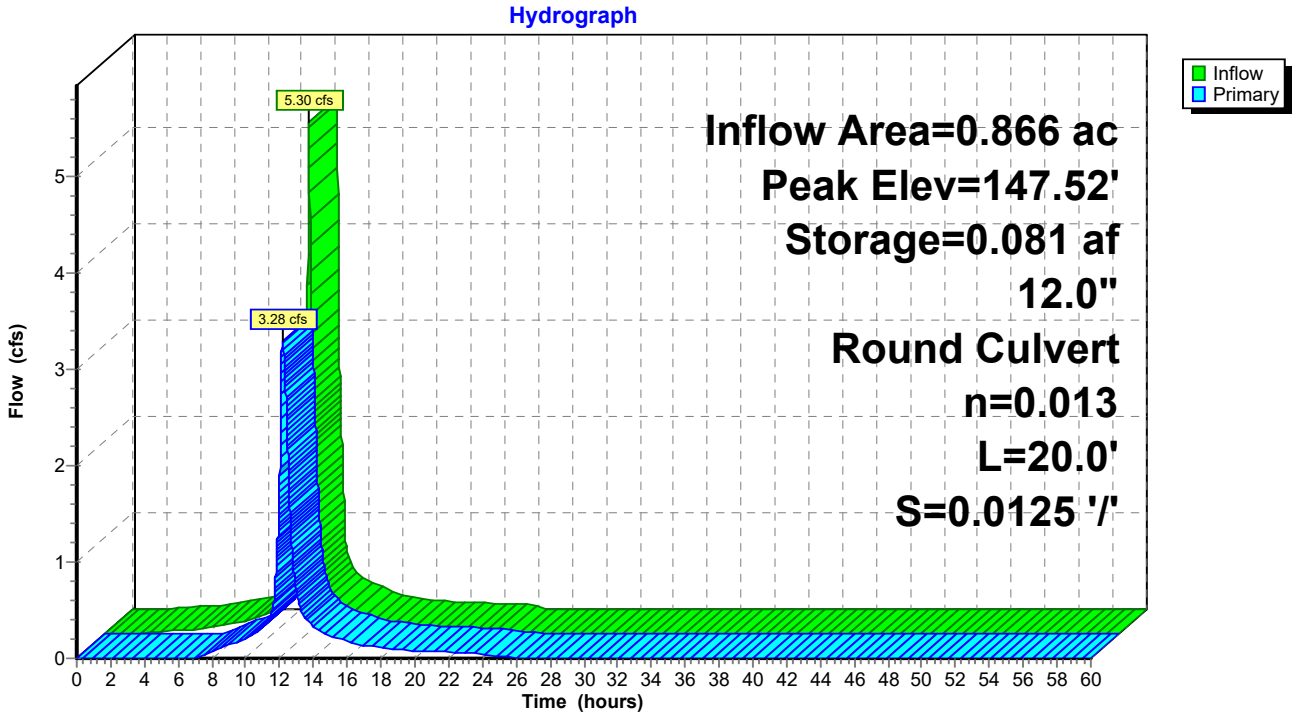
28 Chambers x 166.5 cf = 4,662.0 cf Chamber Storage
28 Chambers x 258.6 cf + 128.7 cf Border = 7,369.3 cf Displacement

Chamber Storage = 4,662.0 cf = 0.107 af
Overall Storage Efficiency = 63.3%
Overall System Size = 57.25' x 48.27' x 2.67'

28 Chambers (plus border)
272.9 cy Field



Pond 2P: Detention System



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 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 PR1: 2Life Building and Runoff Area=86,779 sf 81.89% Impervious Runoff Depth=8.18"
Tc=6.0 min CN=95 Runoff=17.00 cfs 1.358 af

Subcatchment PR2: Connector Building, Runoff Area=37,718 sf 81.20% Impervious Runoff Depth=8.18"
Tc=6.0 min CN=95 Runoff=7.39 cfs 0.590 af

Subcatchment PR3: Woods to Winchester Runoff Area=10,203 sf 0.00% Impervious Runoff Depth=6.60"
Flow Length=165' Tc=7.4 min CN=82 Runoff=1.68 cfs 0.129 af

Subcatchment PR4: Woods to Nahanton Runoff Area=13,430 sf 0.00% Impervious Runoff Depth=6.60"
Tc=6.0 min CN=82 Runoff=2.32 cfs 0.170 af

Subcatchment PR5: Back of Buildings and Runoff Area=53,487 sf 39.48% Impervious Runoff Depth=7.21"
Tc=6.0 min CN=87 Runoff=9.84 cfs 0.738 af

Reach DP1: Winchester St. Inflow=15.63 cfs 2.052 af
Outflow=15.63 cfs 2.052 af

Reach DP2: Nahanton Street Inflow=12.16 cfs 0.907 af
Outflow=12.16 cfs 0.907 af

Pond 1P: Detention System Peak Elev=133.93' Storage=0.227 af Inflow=17.00 cfs 1.358 af
Outflow=9.87 cfs 1.346 af

Pond 2P: Detention System Peak Elev=148.18' Storage=0.107 af Inflow=7.39 cfs 0.590 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0125 '/' Outflow=4.52 cfs 0.577 af

Total Runoff Area = 4.628 ac Runoff Volume = 2.984 af Average Runoff Depth = 7.74"
39.09% Pervious = 1.809 ac 60.91% Impervious = 2.819 ac

Summary for Subcatchment PR1: 2Life Building and Drive Aisle

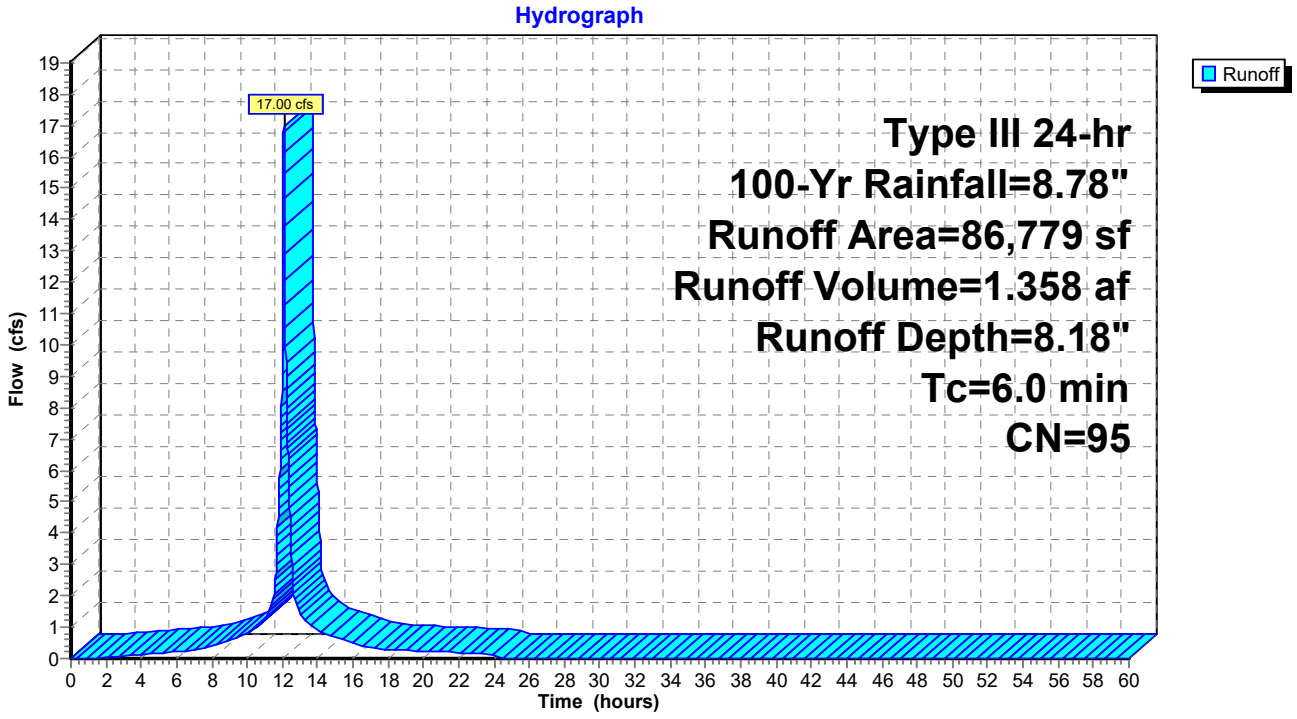
Runoff = 17.00 cfs @ 12.08 hrs, Volume= 1.358 af, Depth= 8.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Yr Rainfall=8.78"

Area (sf)	CN	Description
71,061	98	Paved parking, HSG D
15,718	80	>75% Grass cover, Good, HSG D
86,779	95	Weighted Average
15,718		18.11% Pervious Area
71,061		81.89% Impervious Area

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

Subcatchment PR1: 2Life Building and Drive Aisle



Summary for Subcatchment PR2: Connector Building, Walkway, and Parking

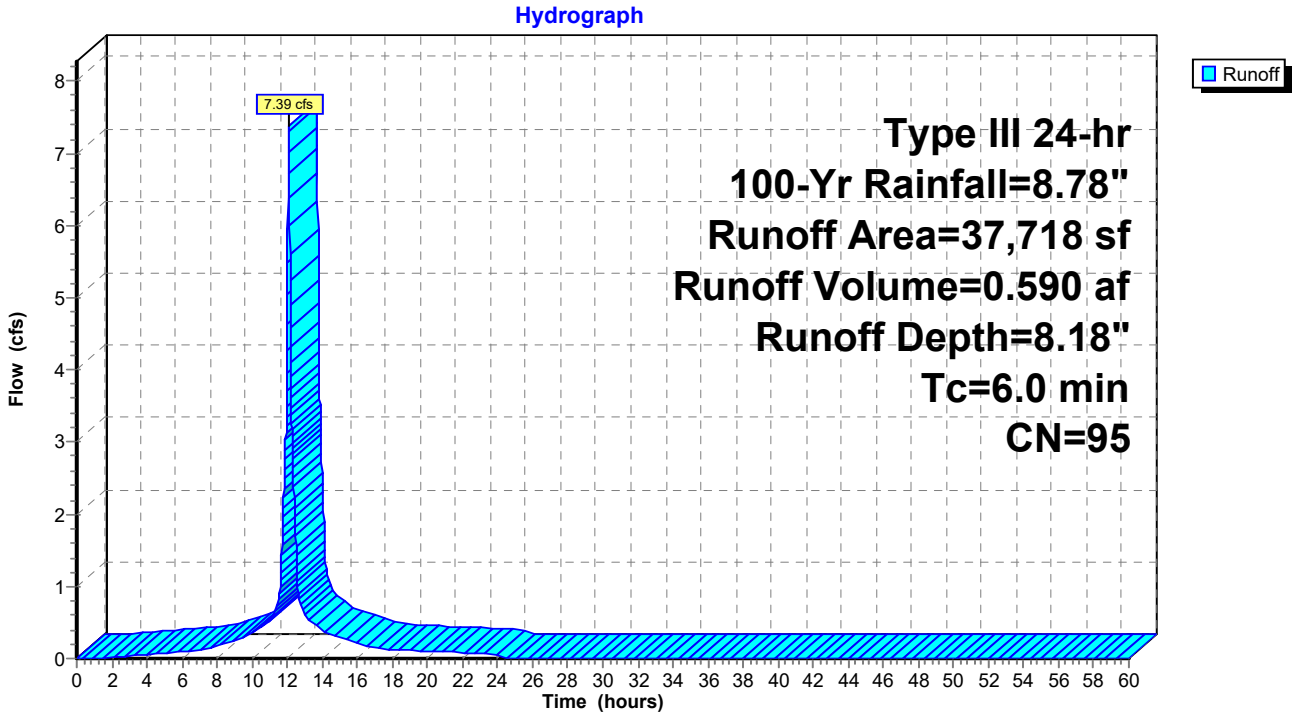
Runoff = 7.39 cfs @ 12.08 hrs, Volume= 0.590 af, Depth= 8.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Yr Rainfall=8.78"

Area (sf)	CN	Description
30,626	98	Paved parking, HSG D
7,092	80	>75% Grass cover, Good, HSG D
37,718	95	Weighted Average
7,092		18.80% Pervious Area
30,626		81.20% Impervious Area

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

Subcatchment PR2: Connector Building, Walkway, and Parking



Summary for Subcatchment PR3: Woods to Winchester

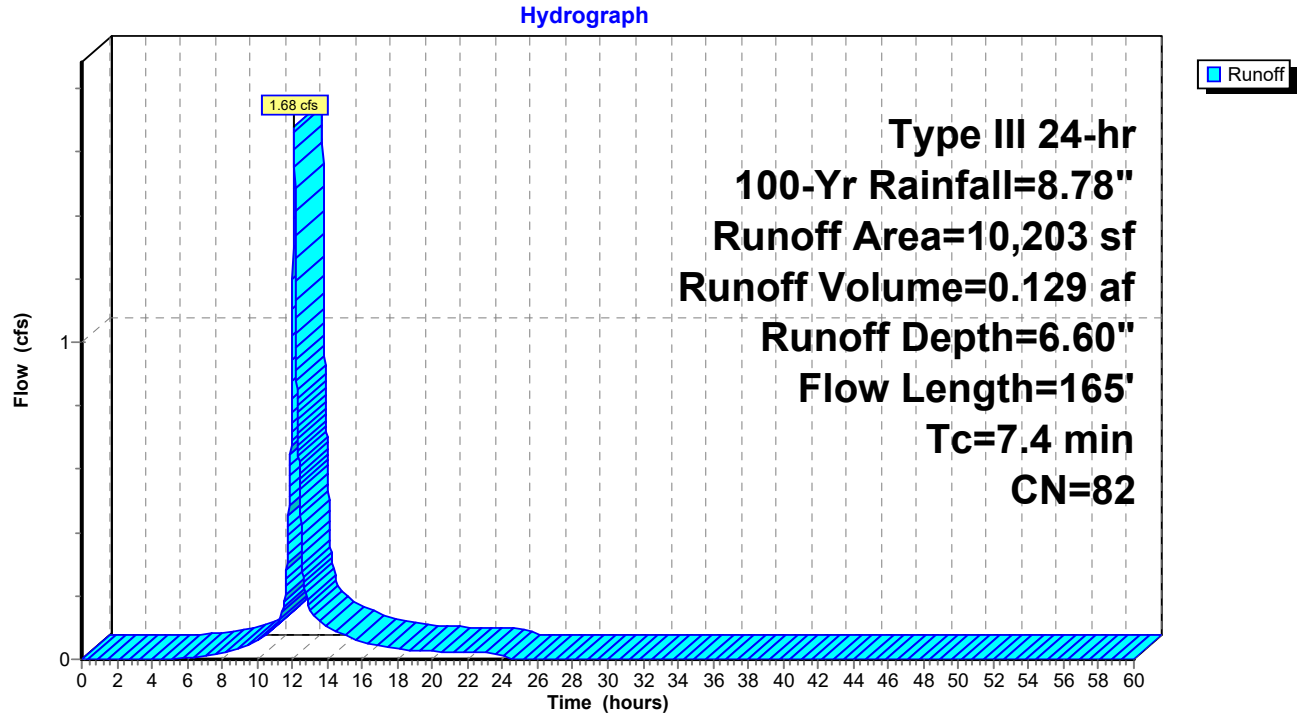
Runoff = 1.68 cfs @ 12.10 hrs, Volume= 0.129 af, Depth= 6.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Yr Rainfall=8.78"

Area (sf)	CN	Description
10,203	82	Woods/grass comb., Fair, HSG D
10,203		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	50	0.1000	0.13		**Sheet Flow, sheet flow** Woods: Light underbrush n= 0.400 P2= 3.30"
1.0	115	0.1400	1.87		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
7.4	165	Total			

Subcatchment PR3: Woods to Winchester



Summary for Subcatchment PR4: Woods to Nahanton

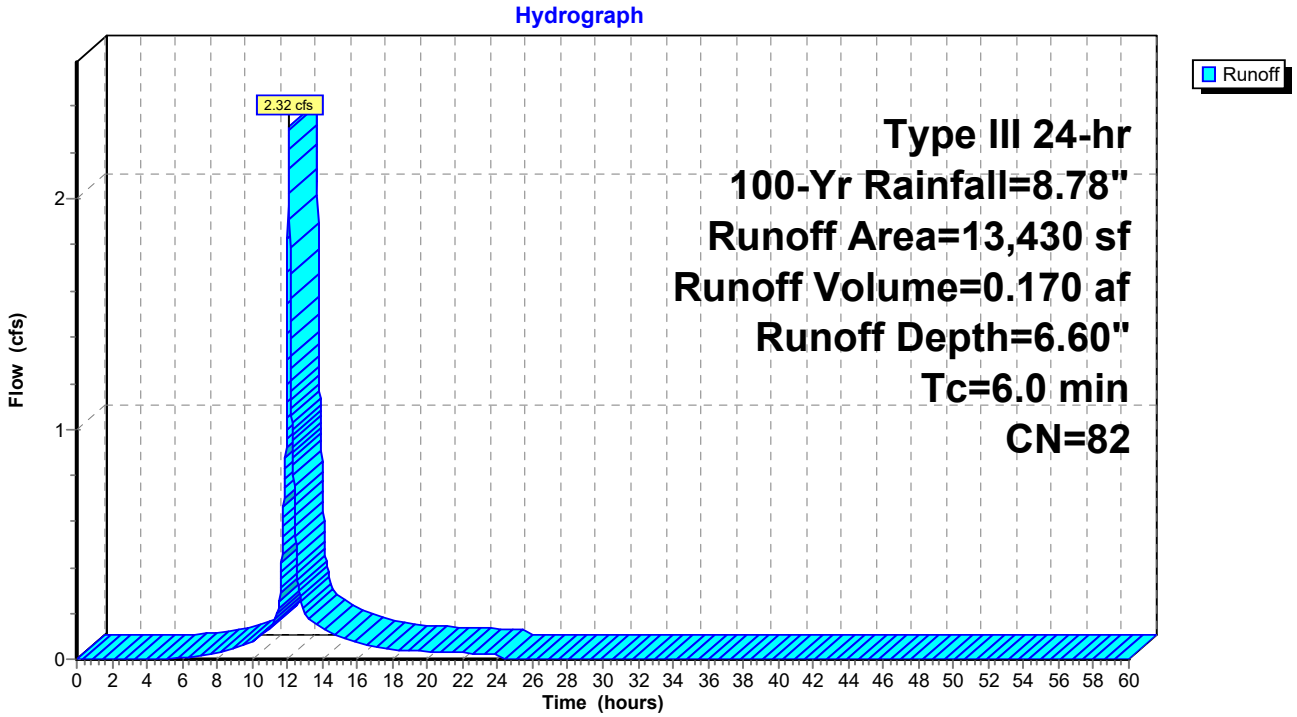
Runoff = 2.32 cfs @ 12.09 hrs, Volume= 0.170 af, Depth= 6.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Yr Rainfall=8.78"

Area (sf)	CN	Description
13,430	82	Woods/grass comb., Fair, HSG D
13,430		100.00% Pervious Area

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

Subcatchment PR4: Woods to Nahanton



Summary for Subcatchment PR5: Back of Buildings and Drive Aisle

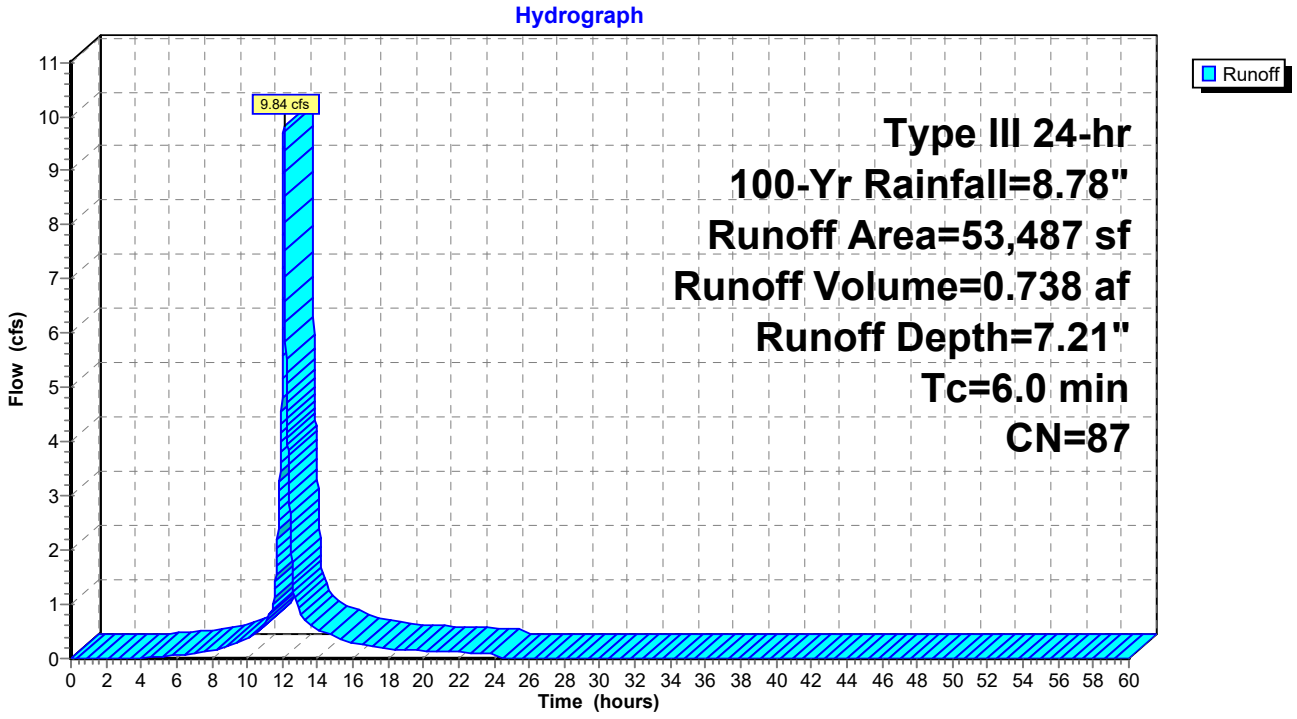
Runoff = 9.84 cfs @ 12.08 hrs, Volume= 0.738 af, Depth= 7.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Yr Rainfall=8.78"

Area (sf)	CN	Description
21,115	98	Paved parking, HSG D
32,372	80	>75% Grass cover, Good, HSG D
53,487	87	Weighted Average
32,372		60.52% Pervious Area
21,115		39.48% Impervious Area

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

Subcatchment PR5: Back of Buildings and Drive Aisle



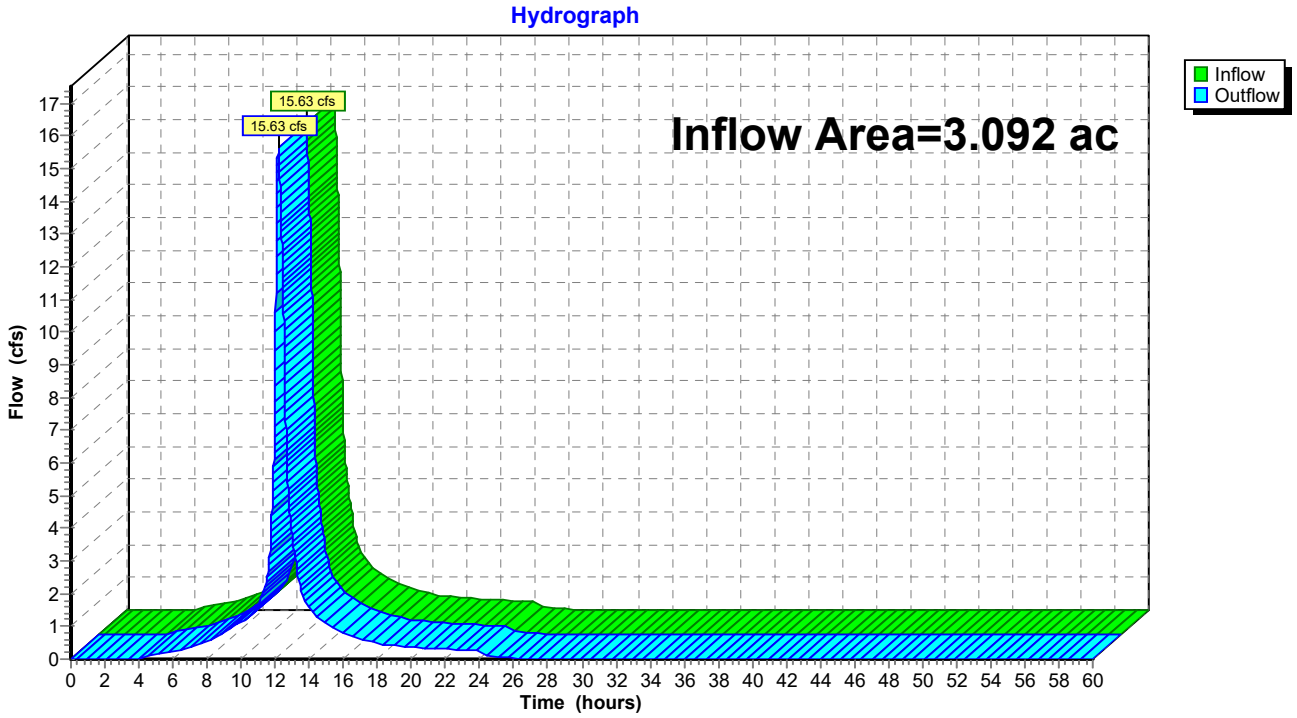
Summary for Reach DP1: Winchester St.

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

Inflow Area = 3.092 ac, 75.49% Impervious, Inflow Depth = 7.96" for 100-Yr event
Inflow = 15.63 cfs @ 12.18 hrs, Volume= 2.052 af
Outflow = 15.63 cfs @ 12.18 hrs, Volume= 2.052 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP1: Winchester St.



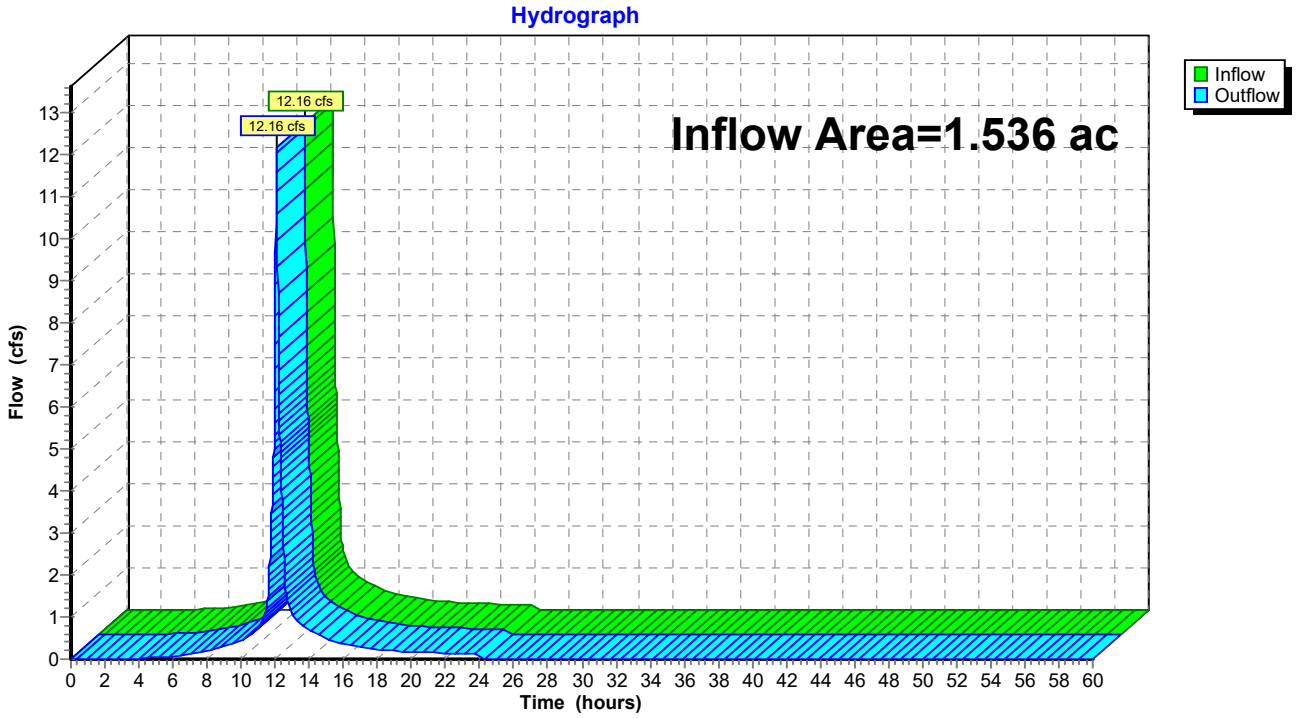
Summary for Reach DP2: Nahanton Street

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

Inflow Area = 1.536 ac, 31.55% Impervious, Inflow Depth = 7.09" for 100-Yr event
Inflow = 12.16 cfs @ 12.08 hrs, Volume= 0.907 af
Outflow = 12.16 cfs @ 12.08 hrs, Volume= 0.907 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach DP2: Nahanton Street



Summary for Pond 1P: Detention System

[58] Hint: Peaked 0.93' above defined flood level

Inflow Area = 1.992 ac, 81.89% Impervious, Inflow Depth = 8.18" for 100-Yr event
Inflow = 17.00 cfs @ 12.08 hrs, Volume= 1.358 af
Outflow = 9.87 cfs @ 12.19 hrs, Volume= 1.346 af, Atten= 42%, Lag= 6.5 min
Primary = 9.87 cfs @ 12.19 hrs, Volume= 1.346 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 133.93' @ 12.19 hrs Surf.Area= 0.055 ac Storage= 0.227 af
Flood Elev= 133.00' Surf.Area= 0.055 ac Storage= 0.184 af

Plug-Flow detention time= 32.2 min calculated for 1.346 af (99% of inflow)
Center-of-Mass det. time= 26.7 min (781.8 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	129.00'	0.000 af	**55.17'W x 43.19'L x 5.67'H Field A** 0.310 af Overall - 0.310 af Embedded = 0.000 af x 40.0% Voids
#2A	129.00'	0.231 af	**StormTrap ST1 SingleTrap 5-0** x 24 Inside #1 Inside= 82.7"W x 60.0"H => 29.76 sf x 14.06'L = 418.5 cf Outside= 82.7"W x 68.0"H => 39.08 sf x 14.06'L = 549.5 cf 24 Chambers in 8 Rows 55.17' x 42.19' Core + 0.00' x 0.50' Border = 55.17' x 43.19' System
		0.231 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	129.25'	**10.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 129.25' / 129.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Primary	131.20'	**12.0" Round Culvert** L= 2.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.20' / 131.00' S= 0.1000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=9.87 cfs @ 12.19 hrs HW=133.93' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.42 cfs @ 9.94 fps)
└—**2=Culvert** (Inlet Controls 4.45 cfs @ 5.67 fps)

Pond 1P: Detention System - Chamber Wizard Field A

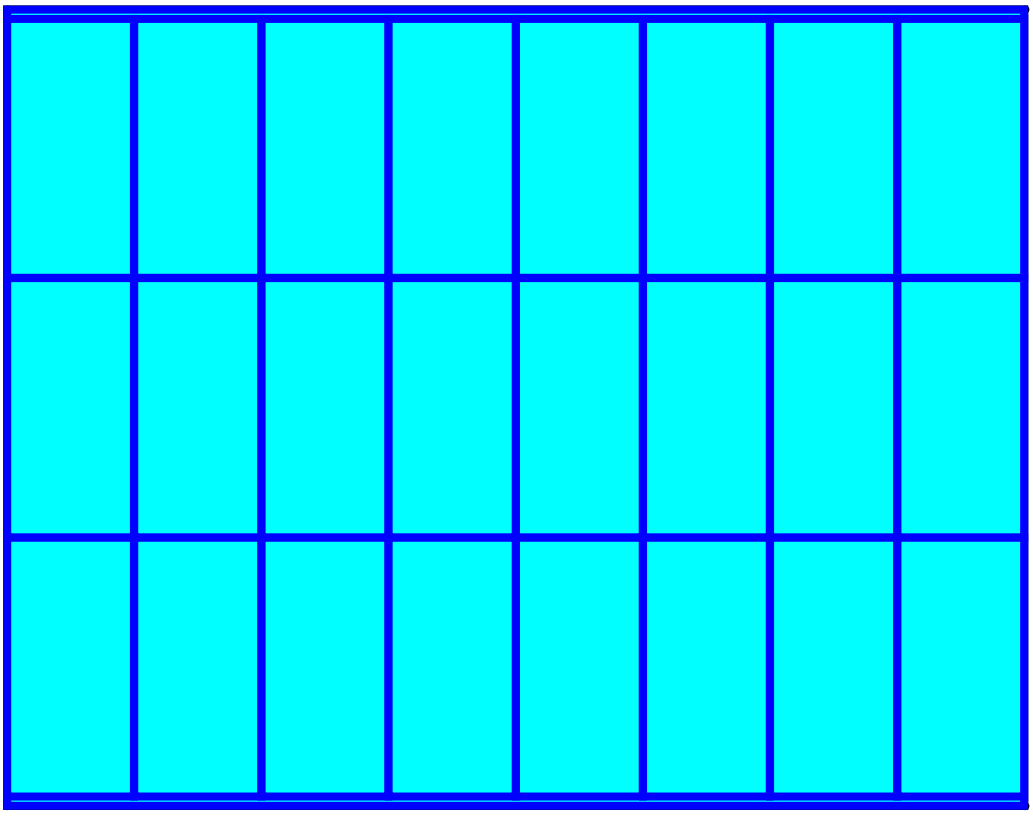
Chamber Model = StormTrap ST1 SingleTrap 5-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 60.0"H => 29.76 sf x 14.06'L = 418.5 cf
Outside= 82.7"W x 68.0"H => 39.08 sf x 14.06'L = 549.5 cf

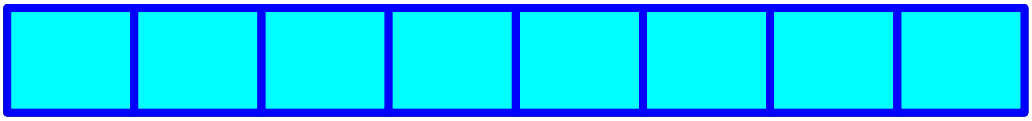
3 Chambers/Row x 14.06' Long = 42.19' Row Length +6.0" Border x 2 = 43.19' Base Length
8 Rows x 82.7" Wide = 55.17' Base Width
68.0" Chamber Height = 5.67' Field Height

24 Chambers x 418.5 cf = 10,044.0 cf Chamber Storage
24 Chambers x 549.5 cf + 312.6 cf Border = 13,500.9 cf Displacement

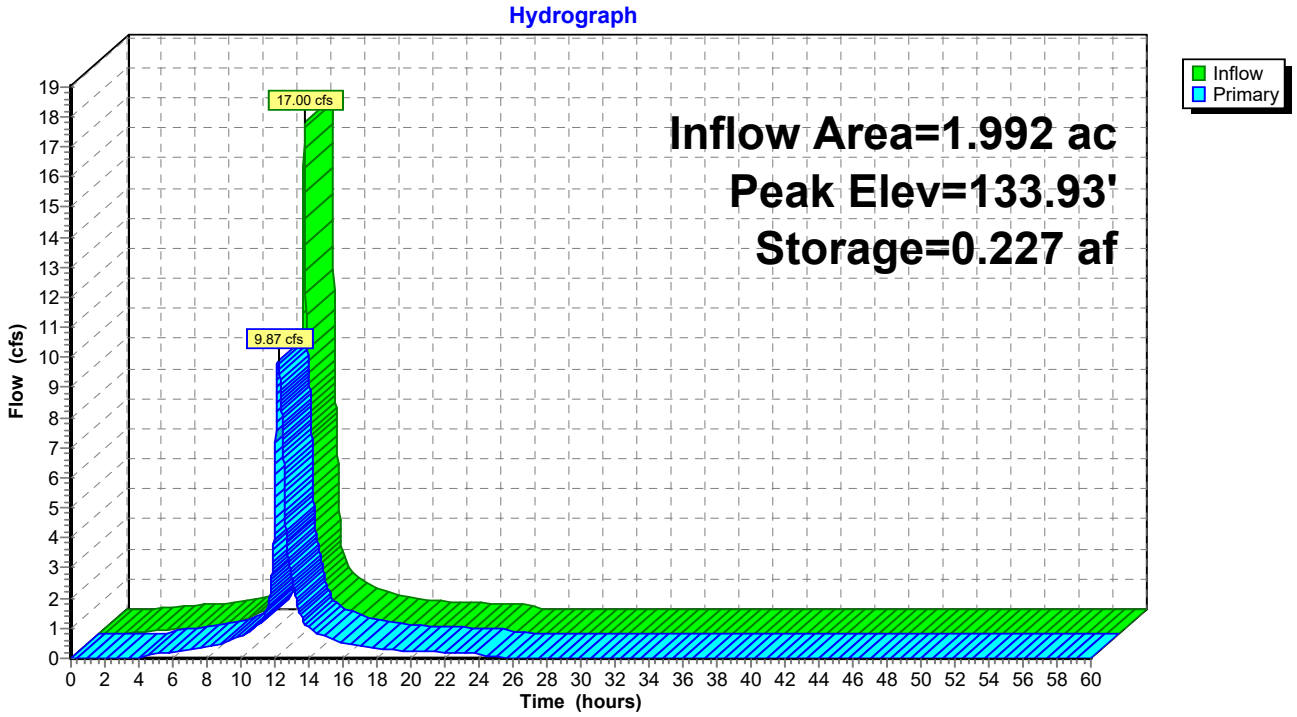
Chamber Storage = 10,044.0 cf = 0.231 af
Overall Storage Efficiency = 74.4%
Overall System Size = 43.19' x 55.17' x 5.67'

24 Chambers (plus border)
500.0 cy Field





Pond 1P: Detention System



Summary for Pond 2P: Detention System

[58] Hint: Peaked 8.18' above defined flood level

Inflow Area = 0.866 ac, 81.20% Impervious, Inflow Depth = 8.18" for 100-Yr event
Inflow = 7.39 cfs @ 12.08 hrs, Volume= 0.590 af
Outflow = 4.52 cfs @ 12.18 hrs, Volume= 0.577 af, Atten= 39%, Lag= 6.0 min
Primary = 4.52 cfs @ 12.18 hrs, Volume= 0.577 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 148.18' @ 12.18 hrs Surf.Area= 0.063 ac Storage= 0.107 af
Flood Elev= 140.00' Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 56.7 min calculated for 0.577 af (98% of inflow)
Center-of-Mass det. time= 42.5 min (797.6 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	146.00'	0.000 af	**48.27'W x 57.25'L x 2.67'H Field A** 0.169 af Overall - 0.169 af Embedded = 0.000 af x 40.0% Voids
#2A	146.00'	0.107 af	**StormTrap ST1 SingleTrap 2-0** x 28 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 28 Chambers in 7 Rows 48.27' x 56.25' Core + 0.00' x 0.50' Border = 48.27' x 57.25' System
		0.107 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	146.25'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 146.25' / 146.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.48 cfs @ 12.18 hrs HW=148.15' (Free Discharge)
1=Culvert (Inlet Controls 4.48 cfs @ 5.71 fps)

Pond 2P: Detention System - Chamber Wizard Field A

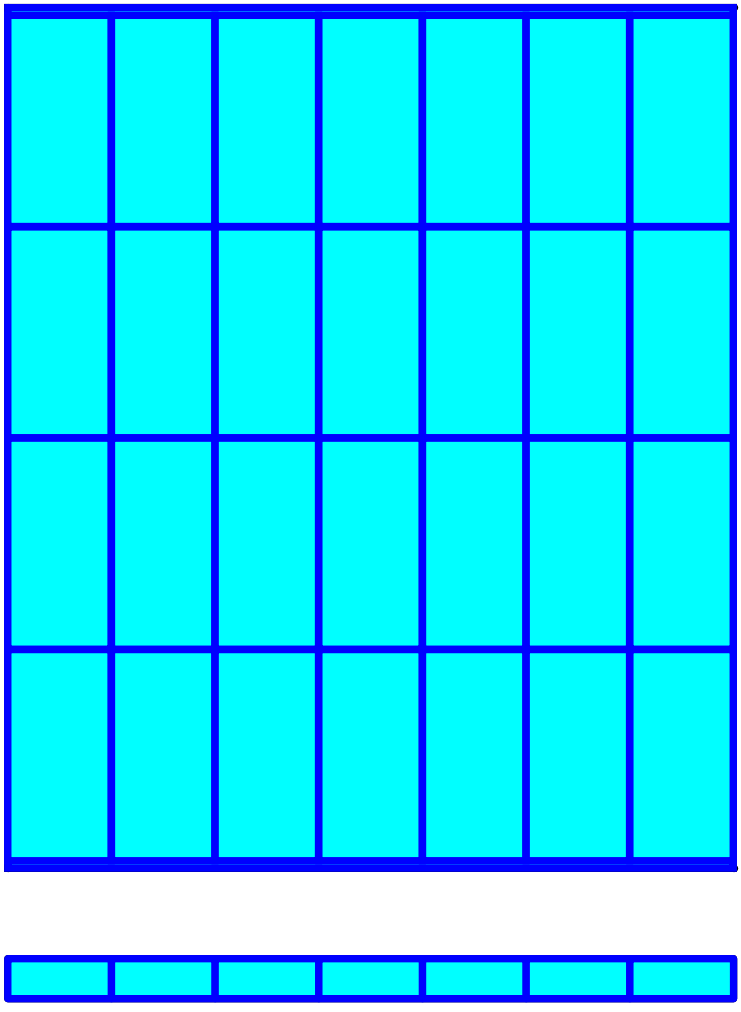
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

4 Chambers/Row x 14.06' Long = 56.25' Row Length +6.0" Border x 2 = 57.25' Base Length
7 Rows x 82.7" Wide = 48.27' Base Width
32.0" Chamber Height = 2.67' Field Height

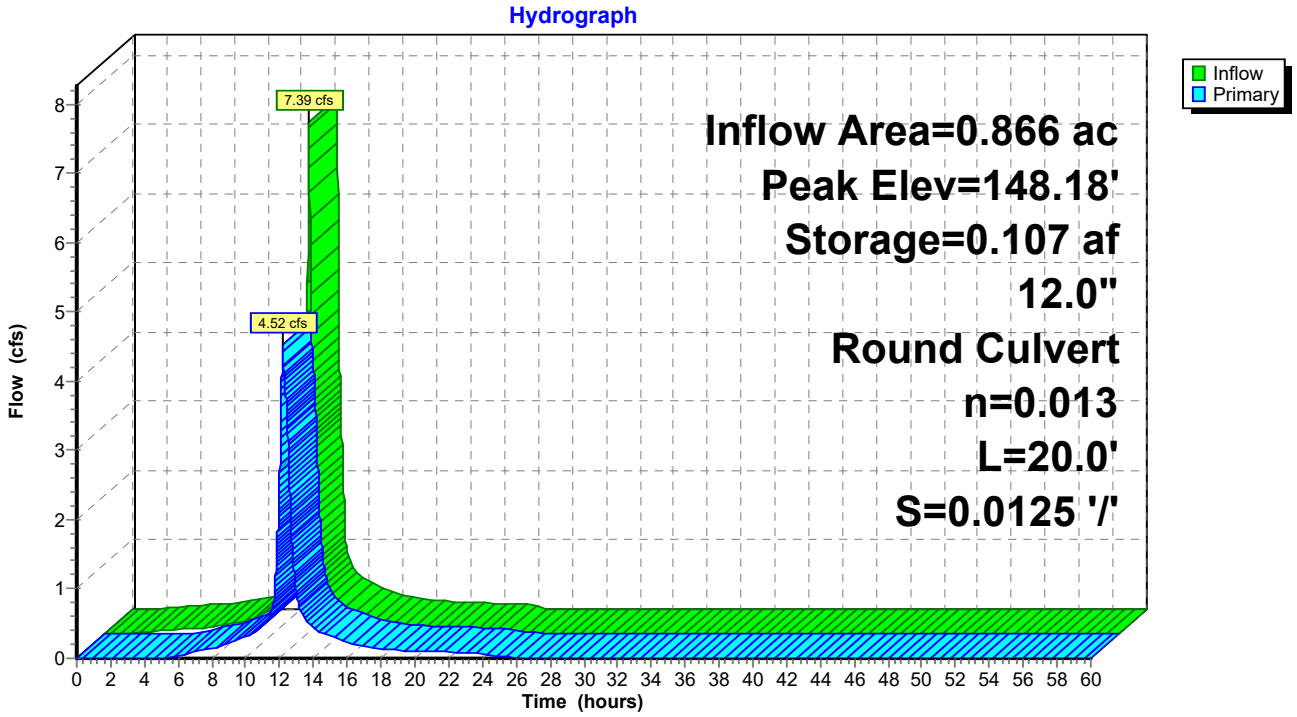
28 Chambers x 166.5 cf = 4,662.0 cf Chamber Storage
28 Chambers x 258.6 cf + 128.7 cf Border = 7,369.3 cf Displacement

Chamber Storage = 4,662.0 cf = 0.107 af
Overall Storage Efficiency = 63.3%
Overall System Size = 57.25' x 48.27' x 2.67'

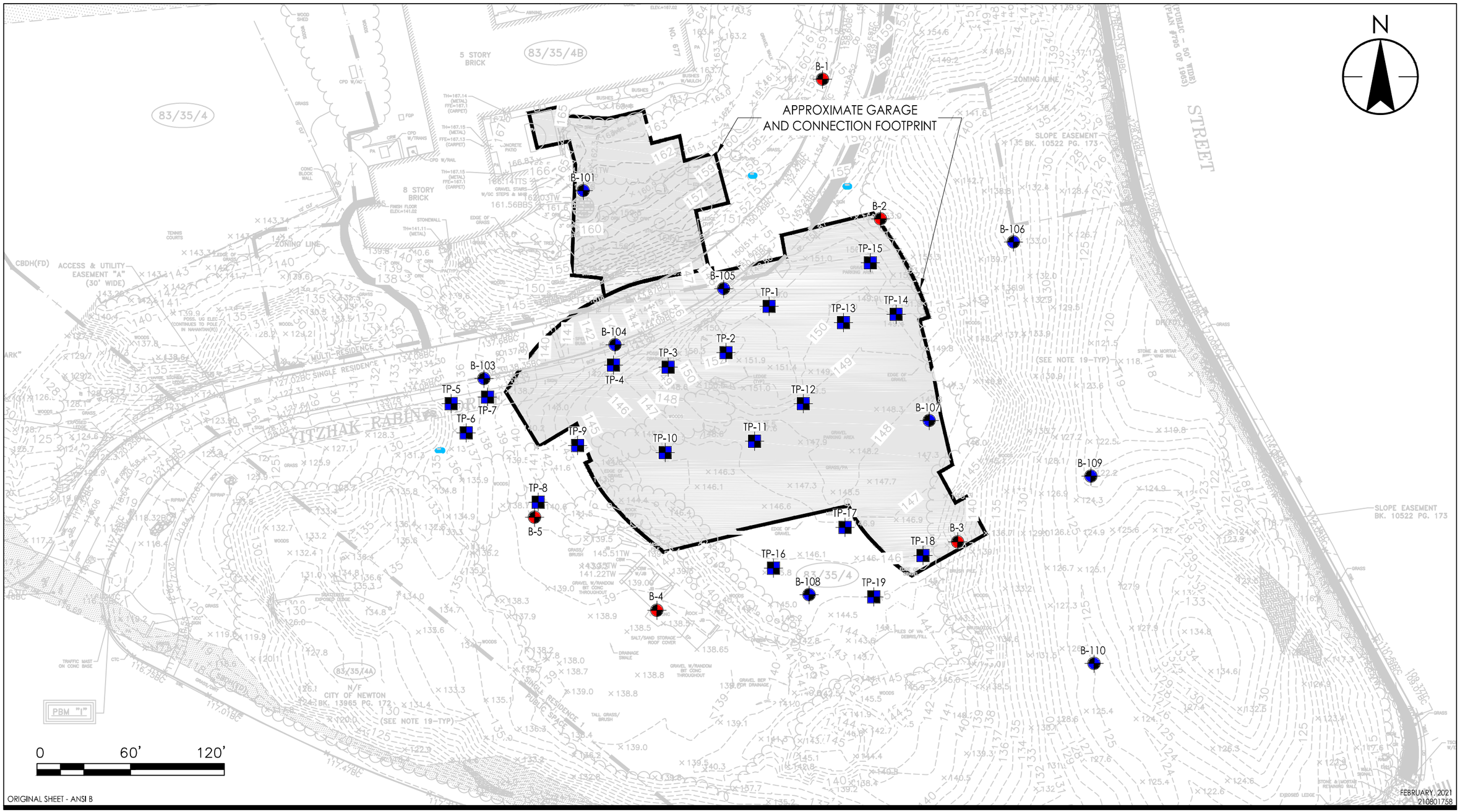
28 Chambers (plus border)
272.9 cy Field



Pond 2P: Detention System



Attachment C
Draft Boring Logs



Stantec

65 NETWORK DRIVE
BURLINGTON, MA
www.stantec.com

Legend

B-1 — Location and designation of 2016 test boring

B-101 — Location and designation of 2016 test boring

TP-1 — Location and designation of 2016 test pit

Notes

1) Preliminary test borings and probes were drilled by New England Boring of Derry, New Hampshire on August 10 and August 11, 2016 under supervision of Stantec personnel.
2) Supplemental test borings and test pits were drilled by New England Boring of Derry New Hampshire on October 14 through October 16, 2020 and on November 4, 2020 under supervision of Stantec personnel.
3) Test borings, probes, and test pits were located by taping from existing site features.

Client/Project

JEWISH COMMUNITY HOUSING FOR THE ELDERLY
677 WINCHESTER STREET
NEWTON, MA

Figure No.

2

Title

EXPLORATION LOCATION PLAN

Stantec

BOREHOLE LOG

B-101

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street, Newton, MA**

EXPLORATION DATE **10/15/2020 to 10/15/2020**

WATER LEVEL **6**

PROJECT No. **195687046**

EXPLORATION No. **B-101**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading
	162.0				in.			
0	161.9	Medium dense, dark brown, medium to fine SAND, some silt. -TOPSOIL-	SS	1	9	3 7 8 12	15	
	160.0	Medium dense, brown, medium to fine SAND, and coarse to fine gravel, little silt. -SAND DEPOSIT-	SS	2	16	13 24 44 50	73	
	158.0	Very dense, gray/light brown, coarse to fine SAND, and coarse to fine gravel, little silt.	SS	3	15	32 50 52 45	102	
5	156.0	Very dense, brown, coarse to fine SAND, and coarse to fine gravel, little silt. -GLACIAL TILL-	SS	4	18	80 51 47 50	98	
	154.0	Very dense, brown, coarse to fine SAND, some coarse to fine gravel, some silt.						
	153.0		SS	5	5	14 10 13 12	23	
10	151.0	Medium dense, brown, medium to fine SAND, little silt, trace coarse to fine gravel.						
	149.5							
	148.0	Roller bit on bedrock at 12.5 feet.						
15		Core Run 1: 14' - 19' Hard, fresh, gray, fine grained ARGILLITE, with low angle to vertical rough, close, tight to open joints. Recovery: 56in (93%) RQD: 9in (15%)	C	1	56	min/ft 4 5 5 4 6		
	143.0	Core Run 2: 19' - 24'						
20		Hard, fresh, gray, fine grained ARGILLITE, with low angle to vertical rough, close, tight to open joints.	C	2	56	min/ft 5 6 6		

Undrained Shear Strength - tsf (1, 2, 3, 4)

Water Content & Atterberg Limits (W_P, W, W_L)

Dynamic Penetration Test, blows/foot

Standard Penetration Test, blows/foot

10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley

Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

STN13-GEO-I-VOC NEWTON_2LIFE_2020.GPJ JW NHP.GDT 2/25/21

Stantec

BOREHOLE LOG

B-101

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street, Newton, MA**

EXPLORATION DATE **10/15/2020 to 10/15/2020**

WATER LEVEL **6**

PROJECT No. **195687046**

EXPLORATION No. **B-101**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading
							in.			
		Recovery: 56in (93%) RQD: 16in (27%)						5 5		
	138.0	Boring terminated at 24 feet in bedrock.								

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley

Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Stantec

BOREHOLE LOG

B-103

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street, Newton, MA**

EXPLORATION DATE **10/16/2020 to 10/16/2020**

WATER LEVEL **7**

PROJECT No. **195687046**

EXPLORATION No. **B-103**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading
	138.5						in.			
0	138.2	Dense, dark brown, medium to fine SAND, and silt, trace fine gravel. -TOPSOIL-			SS	1	16	3 11 19 27	30	
	136.5	Dense, tan/brown, coarse to fine SAND, some coarse to fine gravel, little silt. 3" cobble in sample. Very dense, light brown, fine sand, little silt, trace coarse sand.			SS	2	10	48 30 31 28	61	
	134.5	-FILL- Medium dense, gray, fine SAND, trace roots.			SS	3	12	15 14 15 20	29	
5	132.5	Very dense, light brown, coarse to fine SAND, some coarse to fine gravel, little silt.		▽	SS	4	18	33 60 68 60	128	
	130.5	-GLACIAL TILL-								
	129.5	Very dense, light brown/gray, coarse to fine SAND, some coarse to fine gravel, little silt.			SS	5	13	27 45 75 100/5"	120	
10	127.5	Occasional cobbles from 11' to 14'.								
	124.5	Very dense, brown, fine SAND, and silt, little decomposed rock.			SS	6	11	30 45 40 55	95	
15	122.5									
	121.5	Casing refusal at 17 feet.								
	120.5	Roller but through rock from 17 to 19 feet.								
	119.5	Boring terminated at 19 feet in probable bedrock.								
20										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley

Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC NEWTON_2LIFE_2020.GPJ JW NHP.GDT 2/25/21

Stantec

BOREHOLE LOG

B-104

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street, Newton, MA**

EXPLORATION DATE **10/16/2020 to 10/16/2020**

WATER LEVEL **NE**

PROJECT No. **195687046**

EXPLORATION No. **B-104**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading
	143.5						in.			
0		Dense, dark brown, medium to fine SAND, and silt, trace coarse to fine gravel. -TOPSOIL-			SS	1	10	4 10 30 30	40	
	141.5	Very dense, light brown/gray, coarse to fine SAND, little silt, little gravel. -GLACIAL TILL-			SS	2	14	70 55 45 40	100	
	139.5	Very dense, grayish brown, fine SAND, and silt, little coarse to fine gravel.			SS	3	7	38 33 33 38	66	
5	137.5	Very dense, brown, medium to fine SAND, some silt, trace coarse to fine gravel.			SS	4	15	37 75 100/1"	R	
	136.5	Roller bit on bedrock at 7 feet.								
	134.5	Core Run 1: 9' - 14'								
10		Hard, fresh, gray, fine grained ARGILLITE, with low angle to vertical rough, close, tight to open joints. Recovery: 60in (100%) RQD: 8in (13%)			C	1		min/ft 2.5 3.5 3.5 5 5		
	129.5	Boring terminated at 14 feet in bedrock.								
15										
20										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley

Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC NEWTON_2LIFE_2020.GPJ JW NHP.GDT 2/25/21

Stantec

BOREHOLE LOG

B-105

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street, Newton, MA**

EXPLORATION DATE **10/16/2020 to 10/16/2020**

WATER LEVEL **NE**

PROJECT No. **195687046**

EXPLORATION No. **B-105**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading
	148.5						in.			
0		Conduct B-105 as probe.								
5										
	139.5	Probe refusal at 9 feet on boulder or berock.								
10										
15										
20										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley

Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC NEWTON_2LIFE_2020.GPJ JW NHP.GDT 2/25/21

Stantec

BOREHOLE LOG

B-106

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street, Newton, MA**

EXPLORATION DATE **10/15/2020 to 10/15/2020**

WATER LEVEL **NE**

PROJECT No. **195687046**

EXPLORATION No. **B-106**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading
	134.0						in.			
0		Loose, brown, fine SAND, and silt, trace roots. -SAND DEPOSIT-			SS	1	8	3 1 3 6	4	
	132.0									
	131.7	Occasional cobbles.								
		Very dense, brown/gray, coarse to fine SAND, some coarse to fine gravel, little silt.			SS	2	16	13 20 42 70	62	
	130.0	-GLACIAL TILL-								
	129.7	No recovery.			SS	3	0	100/4"	R	
5		Roller bit through rock from 4.5 to 6.5 feet.								
	127.5									
		Boring terminated at 6.5 feet on probable bedrock.								
10										
15										
20										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley

Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC NEWTON_2LIFE_2020.GPJ JW NHP.GDT 2/25/21

Stantec

BOREHOLE LOG

B-107

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street, Newton, MA**

EXPLORATION DATE **10/14/2020 to 10/14/2020**

WATER LEVEL **NE**

PROJECT No. **195687046**

EXPLORATION No. **B-107**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	PID Reading
	147.5						in.			
0		Very dense, brown, coarse to fine SAND, some silt, little coarse to fine gravel. -FILL-			SS	1	12	8 26 50 55	76	
	145.5	Very dense, gray/brown, medium to fine SAND, little silt, little fine gravel.			SS	2	16	80 60 67 95	127	
	144.3	Very dense, brown, coarse to fine SAND, some silt. -GLACIAL TILL-			SS	3	4	100/3"	R	
	143.5	Very dense, grayish brown, medium to fine SAND, some silt, some coarse to fine gravel.								
5	143.1	Roller bit on bedrock at 4.5 feet.								
	141.5	Core Run 1: 6' - 10'								
		Hard, fresh, gray, fine grained ARGILLITE, with low angle to vertical rough, close, tight to open joints.			C	1	46	min/ft 3 4 3 3		
		Recovery: 46in (96%) RQD: 0in (0%)								
10	137.5	Barrel jam at 4 feet.								
		Core Run 2: 10' - 15'								
		Hard, fresh, gray, fine grained ARGILLITE, with low angle to vertical rough, close, tight to open joints.			C	2				
		Recovery: 60in (100%) RQD: 10in (17%)								
15	132.5	Boring terminated at 15 feet in bedrock.								
20										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley

Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC NEWTON_2LIFE_2020.GPJ JW NHP.GDT 2/25/21

Stantec

BOREHOLE LOG

B-108

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street, Newton, MA**

EXPLORATION DATE **10/15/2020 to 10/15/2020**

WATER LEVEL **NE**

PROJECT No. **195687046**

EXPLORATION No. **B-108**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	PID Reading
	122.5						in.			
0		Very dense, light brown/gray, coarse to fine SAND, little silt, little coarse to fine gravel. -FILL-			SS	1	14	15 27 25 75	52	
	120.5									
	120.0	Very dense, light brown/gray, coarse to fine SAND, little silt, little coarse to fine gravel.			SS	2	6	100/6"	R	
	119.0	Roller bit on weathered bedrock at 2.5 feet.								
	118.5	Roller bit cutting harder at 3.5 feet.								
		Occational fractures in bedrock from 4 to 5 feet.								
5	117.5	Losing all water in fractures.								
		Boring terminated at 5 feet in probable bedrock.								
10										
15										
20										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley

Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC NEWTON_2LIFE_2020.GPJ JW NHP.GDT 2/25/21

Stantec BOREHOLE LOG B-109

CLIENT 2 Life Communities
LOCATION 677 Winchester Street, Newton, MA
EXPLORATION DATE 10/14/2020 to 10/14/2020
WATER LEVEL 6

PROJECT No. 195687046
EXPLORATION No. B-109
DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	PID Reading
	125.0						in.			
0	124.7	Loose, dark brown, fine SAND, and silt, trace roots. -TOPSOIL-			SS	1	13	2 4 5 11	9	
	123.0	Loose, tan, fine SAND, trace silt. -SAND DEPOSIT-								
	121.0	Dense, tan, fine SAND, trace silt.			SS	2	12	13 16 33 70	49	
5	119.0	Very dense, brown, coarse to fine SAND, little silt, little coarse to fine gravel.		▽	SS	3	10	37 80 85 55	165	
	118.1	Very dense, brown, coarse to fine SAND, some silt, some coarse to fine gravel.			SS	4	8	87 100/5"	R	
	117.0	-GLACIAL TILL-								
	116.0	Very dense, brown, coarse to fine SAND, some silt, some coarse to fine gravel.			SS	5	9	50 50 100/4"	R	
10	114.6									
	111.0	Very dense, grayish brown, coarse to fine SAND, some silt, some coarse to fine gravel.			SS	6	12	37 45 40 100/3"	85	
15	109.3	Boring terminated at 15.75 feet, sampler refusal.								
20										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC NEWTON_2LIFE_2020.GPJ JW NHP.GDT 2/25/21

Stantec

BOREHOLE LOG

B-110

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street, Newton, MA**

EXPLORATION DATE **10/14/2020 to 10/14/2020**

WATER LEVEL **11**

PROJECT No. **195687046**

EXPLORATION No. **B-110**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SPT blows / 6"	SPT N-Value	PID Reading
0		Medium dense, dark brown fine SAND, and silt.								
		Medium dense, tan, fine SAND, little silt. -SAND DEPOSIT-			SS	1	12	4 4 8 8	12	
		Very dense, gray, fine SAND, little silt, little coarse to fine gravel, little coarse sand.			SS	2	13	14 31 41 50	72	
5		Very dense, grayish brown, coarse to fine SAND, some coarse to fine gravel, little silt. -GLACIAL TILL-			SS	3	11	25 35 38 45	73	
		Very dense, grayish brown, coarse to fine SAND, some silt, some coarse to fine gravel.			SS	4	8	85 100/4"	R	
10		Very dense, grayish brown, coarse to fine SAND, some silt, some coarse to fine gravel.		▽	SS	5	10	38 45 48 45	93	
15		Very dense, grayish brown, coarse to fine SAND, some silt, some coarse to fine gravel.			SS	6	8	32 33 35 43	68	
		Boring terminated at 16 feet, no refusal.								
20										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring- Derry, NH; Supervisor: Brian Foley

Rig Type: Mobile B53 ATV Rig; Hammer: Safety Hammer; 4" diam. Drive and Wash, 2" Split Spoon Sampler

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC NEWTON_2LIFE_2020.GPJ JW NHP.GDT 2/25/21

Stantec

TEST PIT LOG

TP-1

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **10-15-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-1**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
	150.50						
0	150.0	Surficial layer of topsoil. -TOPSOIL- Brown medium to fine SAND, some silt, with frequent cobbles. -FILL-					
	147.7	Test pit terminated at 2.8 feet on bedrock.					
5							
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-2

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **10-16-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-2**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	152.00						
	151.5	Surficial layer of topsoil. -TOPSOIL-					
		Gray medium to fine SAND, little silt.					
	150.5	-FILL-					
		Test pit terminated at 1.5 feet on bedrock.					
5							
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-3

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **10-16-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-3**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	149.40						
	148.9	Surficial layer of topsoil. -TOPSOIL-					
		Brown medium to fine SAND, some gravel. -FILL-					
	146.2	Test pit terminated at 3.25 feet on bedrock. Bedrock drops off to the north.					
5							
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-4

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-4**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	144.50						
		Surficial layer of topsoil. -TOPSOIL-					
	143.2	Grayish brown, medium to fine SAND, some gravel, some silt.					
	142.3	-GLACIAL TILL-					
		Test pit terminated at 2.25 feet in glacial till.					
5							
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-5

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-5**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
	136.00						
0		Surficial layer of topsoil. -TOPSOIL-					
	135.0						
		Grayish brown medium to fine SILTY SAND with frequent cobbles.					
	134.0	-GLACIAL TILL-					
		Highly fractured blasted bedrock. West side of test pit has increased amounts of blasted bedrock.					
	133.0						
		Test pit terminated at 3 feet in blasted bedrock.					
5							
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-6

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-6**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
	137.00						
0		Surficial layer of topsoil. -TOPSOIL-					
	136.0						
		Highly fractured blasted bedrock.					
	134.0						
		Test pit terminated at 3 feet in blasted bedrock.					
5							
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-7

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-7**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	138.00						
		Surficial layer of topsoil. -TOPSOIL-					
	137.0	Sandy GRAVEL and COBBLES. -BLAST ROCK FILL-					
	134.0	Light tan fine SAND, little coarse to fine gravel, some silt, trace roots. -SAND DEPOSIT-					
5	133.0	Test pit terminated at 5 feet in natural sand deposit.					
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-8

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-8**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	140.50						
	140.0	Surficial layer of topsoil. -TOPSOIL-					
		Sandy GRAVEL, COBBLES, and BOULDERS, trace brick. -BLAST ROCK FILL-					
5							
	133.5	Light brown/tan coarse to fine SAND, some silt, little coarse to fine gravel.					
	132.5	-GLACIAL TILL-					
		Test pit terminated at 8 feet on bedrock.					
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-9

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-9**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	143.50						
	143.0	Surficial layer of topsoil. -TOPSOIL-					
		Sandy GRAVEL, COBBLES, and BOULDERS, trace brick. -BLAST ROCK FILL-					
5							
	136.5	Light brown/tan coarse to fine SAND, some silt, little coarse to fine gravel.					
	135.5	-GLACIAL TILL-					
		Test pit terminated at 8 feet on bedrock.					
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-10

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-10**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	146.20						
	145.7	Surficial layer of topsoil. -TOPSOIL-					
		Sandy GRAVEL and COBBLES. -BLAST ROCK FILL-					
	141.7						
5	141.2	Light brown/tan coarse to fine SAND, some silt, little coarse to fine gravel. -GLACIAL TILL- Test pit terminated at 5 feet on bedrock.					
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-11

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-11**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	147.50						
	147.0	Surficial layer of topsoil. -TOPSOIL-					
		Test pit terminated at 0.5 feet on bedrock.					

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-12

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-12**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	148.80						
		Sandy GRAVEL, COBBLES, and BOULDERS. -BLAST ROCK FILL-					
5	142.8	Test pit terminated at 6 feet on bedrock. Bedrock is 2 feet below ground surface on west end of test pit and drops to 6 feet below ground surface.					
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-13

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-13**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	149.60						
		BOULDERS, GRAVEL and COBBLES, little sand. Boulders up to 4 feet long. -BLAST ROCK FILL-					
5	144.6	Brown medium to fine SAND, some silt, some coarse to fine gravel, few cobbles. -FILL-					
	141.6	Test pit terminated at 8 feet on bedrock.					
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-14

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-14**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	150.50						
		Surficial layer of topsoil. -TOPSOIL-					
	149.5	Test pit terminated at 1 foot on bedrock.					
5							
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-15

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-15**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
	151.00						
0	150.8	Surficial layer of topsoil. -TOPSOIL-					
		Brown medium to fine SAND, little gravel, little silt. -FILL-					
	148.0	Test pit terminated at 3 feet on bedrock.					
5							
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-16

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-16**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
0	146.00	BOULDERS, COBBLES, and GRAVEL, little sand. Boulders up to 3.5 feet long. -BLAST ROCK FILL-					
5	140.0	Yellow blasting wire at 6 feet.					
	139.0	Test pit terminated at 7 feet on bedrock.					
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-17

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-17**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
	146.80						
0	146.3	Surficial layer of topsoil. -TOPSOIL-					
		Test pit terminated at 0.5 feet on bedrock.					

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-18

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-18**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
	146.00						
0		Brown medium to fine SAND, some gravel, little silt. -FILL-					
	143.0	Test pit terminated at 3 feet on bedrock.					
5							
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4

Stantec

TEST PIT LOG

TP-19

CLIENT **2 Life Communities**

LOCATION **677 Winchester Street Newton, MA**

DATES: DUG **11-04-2020** WATER LEVEL **NE**

PROJECT No. **195687046**

TEST PIT No. **TP-19**

DATUM

DEPTH (ft)	ELEVATION (ft)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	TYPE	NUMBER	REMARKS
	145.00						
0		Brown medium to fine SAND, some silt, some coarse to fine gravel. -FILL-					
	142.0						
		Grayish brown coarse to fine SAND, some silt, some coarse to fine gravel, trace cobbles. -GLACIAL TILL-					
5							
	138.5						
		Test pit terminated at 6.5 feet on bedrock.					
10							
15							

Contractor: New England Boring- Derry, NH; Supervisor: Brian Foley
Rig Type: Kubota KX080-4