

Stormwater Management System Report Addendum 1

**PLUMBERS SUPPLY COMPANY
PROPOSED OFFICE/WAREHOUSE FACILITY**

**FLAHERTY DRIVE
NEW BEDFORD, MASSACHUSETTS**

Prepared for:

Plumbers' Supply Company
429 Church Street
P.O. Box 51687
New Bedford, MA 02745

Prepared by:

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April 24, 2018
Project No. 2190

FIELD
ENGINEERING CO., INC.
CONSULTING ENGINEERS

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Section 1

Hydrologic Overview

1.1 Purpose for Addendum

The purpose of this Stormwater Management System Report-Addendum 1 is to present the updated Post-Development Hydrologic Analysis following modifications to the design that have been performed based on the The Commission's consulting review engineer comment letter dated April 13, 2018 and results of soil test pits performed on-site on April 20, 2018. Modifications to the design are further described in the response letter prepared by Field Engineering dated April 24, 2018.

1.2 Pre Development Hydrologic Summary

A summary of the previously submitted Pre-Development hydrologic conditions for the 2, 10, 25, and 100-year storm events is submitted in Table 1.3 below for comparison to the revised Post Development Hydrologic Calculations. The Pre-Development hydrologic conditions remain unchanged from the original Stormwater Management System Report dated March 16, 2018.

Table 1.2 – Pre-Development Hydrologic Summary

Storm Event	Analysis Point AP-1 Rate of Flow (c.f.s.)
2-year storm	16.65
10-year storm	33.09
25-year storm	44.29
100-year storm	64.99

1.3 Revised Post Development Hydrologic Summary

The Post Development Hydrologic Calculations have been revised to address the comments from the Conservation Commission's consulting engineer during their review of the Notice of Intent. Revisions included changes to the proposed extended detention/infiltration basin and elimination of the proposed roof drain infiltration trench from the attenuation calculations. In addition, the Subcatchment areas were slightly revised to account for the proposed edge drains being proposed along the perimeter of the project.

A summary of the post-development hydrologic conditions for the 2, 10, 25, and 100-year storm events is submitted in Table 13 below.

Table 1.3 – Post Development Hydrologic Summary

Storm Event	Analysis Point AP-1 Rate of Flow (c.f.s.)
2-year storm	13.05
10-year storm	29.19
25-year storm	40.12
100-year storm	54.21

A summary of the pre and post-development hydrologic conditions for the 2, 10, 25, and 100-year storm events is submitted in Table 1.5 below. Results shown as a “negative” represent a decrease in post development condition rates of runoff.

Table 1.5 – Pre-Post Development Hydrologic Results

Storm Event	Analysis Point AP-1 Rate of Flow
2-year storm	-21.6%
10-year storm	-11.8%
25-year storm	-9.4%
100-year storm	-16.6%

The hydrologic analysis indicates that the stormwater management system design for the site meets or reduces peak runoff rates for the 2, 10, 25, and 100-year, 24-hour, Type III storm events from the pre-developed levels at the subject analysis point. The analysis shows the proposed development of this project area will not result in an increase in the rates of runoff from the project site.

• **1.8 Post Construction Operation and Maintenance Plan**

Name and current address of the Applicant

Plumbers Supply Company, Inc.
429 Church Street
New Bedford, Massachusetts, 02745

Name and address of the Contractor of Record

To be determined and provided to Conservation Commission upon selection.

Plans of Record

Refer to Site Development Plans prepared for Raw Seafoods Inc. by Field Engineering and last dated 3/16/18 for locations of all BMP's on site as well as construction details of all BMP's. Refer to the Order of Conditions to be issued by the New Bedford Conservation Commission for additional information regarding the operation and maintenance of the stormwater management BMP's on site.

1. The contractor shall be responsible for the proper inspection and maintenance of all stormwater management facilities until such time as the Stormwater Management System is accepted by the Owner. Thereafter the Owner shall be responsible for the proper inspection and maintenance of the stormwater facilities in accordance with this Operation and Maintenance Plan as well as the continuing conditions of the Certificate of Compliance on the property.
2. All Structural Best Management Practices (BMP's) including the catch basins, and subsurface infiltration systems should be inspected after every major rainfall event exceeding 1.0-inch for the first 6 months after construction to ensure proper stabilization and construction.
3. Thereafter, regular BMP inspections should be conducted according to the following schedule:

<u>BMP Structure</u>	<u>Inspections per Year</u>
Deep Sump Catch Basins	4
Extended Detention/Infiltration Basins	2
Subsurface Recharge System	1

4. The owner shall maintain and submit to the Conservation Commission upon request a BMP Inspection Report following each site inspection as recommended above. The BMP Inspection report shall identify the Date of Inspection, the name and contact number of the responsible party, specific structures inspected, specific maintenance required and observations at a minimum, inspection reports should address the following conditions where applicable:
 1. Embankment Subsidence
 2. Erosion
 3. Cracking of Containment Berm
 4. Inlet/Outlet Conditions
 5. Sediment Accumulations
 6. Slope Stability

5. Accumulated silt and sediment should be removed four times a year for sediment forebays and grassed swale or more frequently if accumulated depth of sediment exceeds six inches at the proposed stone check dams. Accumulated silt and sediment should be removed at least once a year for deep sump catch basins or more frequently if accumulated depth of sediment exceeds six inches.
6. All removed sediments are to be properly disposed of at a location to be approved by the Board of Health. Transportation and disposal of sediments shall comply with all applicable local, state, and federal regulations.
7. The driveway and parking areas shall be swept at least twice per year including in the spring following snow melt.
8. The extended detention/infiltration basin, sediment forebays and all landscaped areas should be inspected for trash on a monthly basis. Any accumulated trash, litter and discarded materials shall be removed.
9. Snow will be stockpiled within and around areas which drain into the stormwater management system wherever practicable. Catch basin grates will be cleaned of snow and ice after all snowfall events. The discharge of snow directly into the wetland resource areas will be prohibited.
10. No disposal of materials will be permitted within the any of the stormwater management system BMP's. This prohibition applies to trash, fill material, construction debris, grass clippings, collected leaves, and cut branches.
11. The embankments, side slopes, and bottom areas of the extended detention/infiltration basin and sediment forebay areas shall be mowed at least twice annually to facilitate maintenance of the basin.
12. An Operation and Maintenance Inspection Form shall be developed and copies of the completed forms shall be compiled by the Owner. These forms shall be available for review by the Conservation Commission upon request.
13. The Owner shall contract with a maintenance company on an annual basis that will be responsible for the operation and maintenance of the stormwater management system. The contact information for this company shall be provided to the Conservation Commission for their files.
14. The storm water BMP's will be inspected annually during regularly scheduled mid-summer landscaping and weeding operations for invasive or unwanted plants. If invasive species are found, they will be physically uprooted and removed from the area.

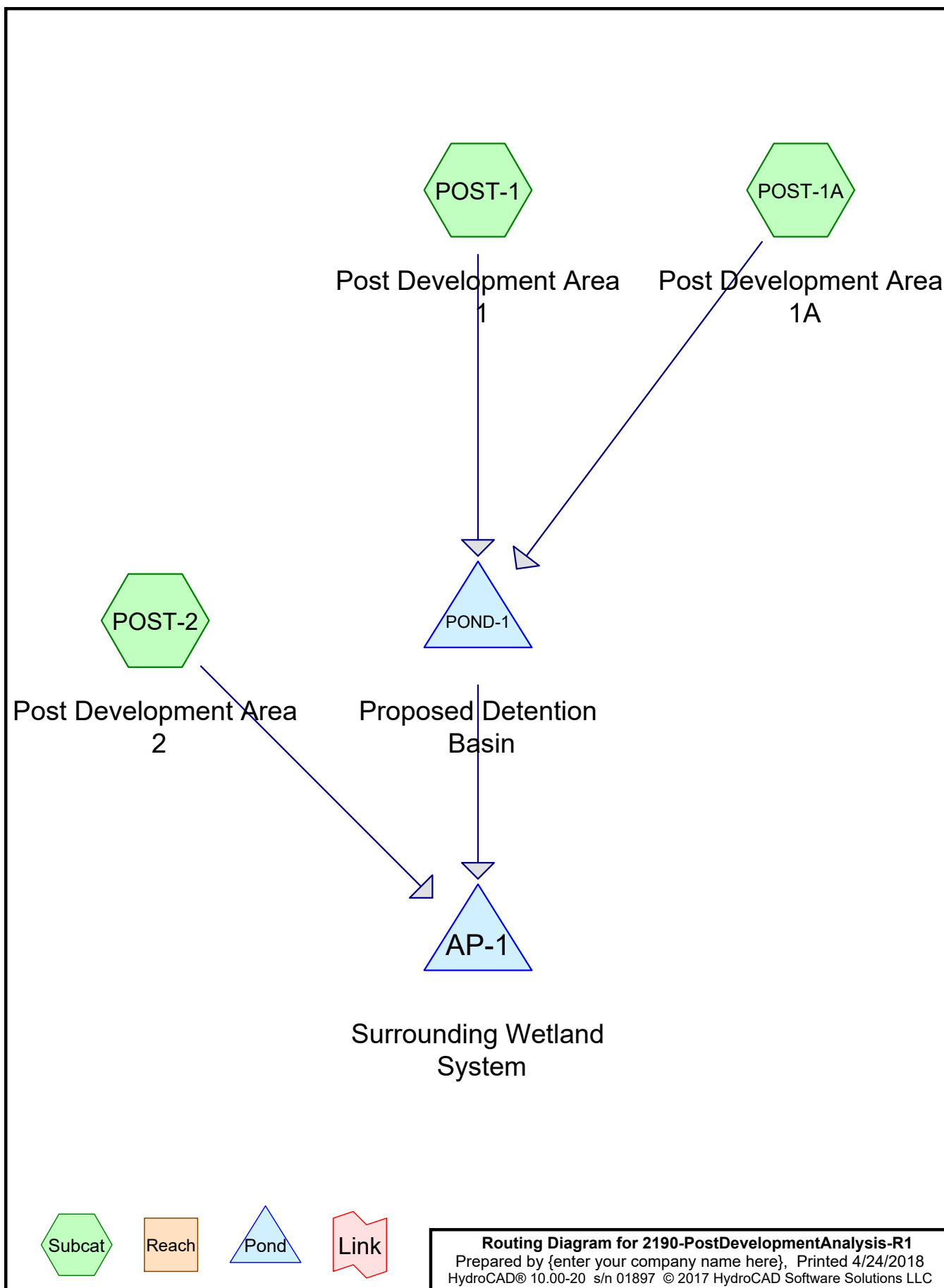
Invasive Species Control Plan (ISCP)

The owner will monitor the extended detention/infiltration basins and sediment forebays pursuant to the recommendations outlined in the USACE document titled "New England District Compensatory Mitigation Guidance" document, pages 24-26 section 4.f. Invasive Species.. Due to the proximity of the extended detention/infiltration system to the existing bordering vegetated wetland, the applicant has chosen a mechanical control method of removal. Invasive species will be removed by hand (pulling, mowing or excavating on-site). No chemical control will be utilized.

Special attention will be given to assure that none of the following invasive species populate the storm water BMP's: common reed (*Phragmites australis*), Purple loosestrife (*Lythrum salicaria*), Smooth and Common buckthorn (*Frangula alnus*, *Rhamnus carthartica*), Russian and Autumn olives (*Elaeagnus angustifolia* and *E. umbellata*), Multiflora rose (*Rosa multiflora*), Reed canary-grass (*Phalaris arundinacea*), and Japanese knotweed (*Fallopia japonica*).

Section 2

Revised Post Development Hydrologic Analysis



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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
407,555	74	>75% Grass cover, Good, HSG C (POST-1, POST-2)
244,724	98	Paved roads w/curbs & sewers, HSG C (POST-1)
156,685	98	Roofs, HSG C (POST-1A)
297,385	70	Woods, Good, HSG C (POST-2)
1,106,349	82	TOTAL AREA

2190-PostDevelopmentAnalysis-R1

Type III 24-hr 2 YR Rainfall=3.50"

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST-1: Post

Runoff Area=331,747 sf 73.77% Impervious Runoff Depth=2.64"
Flow Length=825' Tc=18.4 min CN=92 Runoff=16.06 cfs 72,894 cf

Subcatchment POST-1A: Post

Runoff Area=156,685 sf 100.00% Impervious Runoff Depth=3.27"
Tc=6.0 min CN=98 Runoff=12.23 cfs 42,651 cf

Subcatchment POST-2: Post Development

Runoff Area=617,917 sf 0.00% Impervious Runoff Depth=1.12"
Flow Length=780' Tc=22.3 min CN=72 Runoff=11.27 cfs 57,719 cf

Pond AP-1: Surrounding Wetland System

Inflow=13.05 cfs 111,165 cf
Primary=13.05 cfs 111,165 cf

Pond POND-1: Proposed Detention Basin

Peak Elev=81.23' Storage=57,713 cf Inflow=23.02 cfs 115,545 cf
Discarded=0.99 cfs 62,104 cf Primary=4.04 cfs 53,446 cf Outflow=5.03 cfs 115,550 cf

Total Runoff Area = 1,106,349 sf Runoff Volume = 173,264 cf Average Runoff Depth = 1.88"
63.72% Pervious = 704,940 sf 36.28% Impervious = 401,409 sf

2190-PostDevelopmentAnalysis-R1

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Type III 24-hr 2 YR Rainfall=3.50"

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Summary for Subcatchment POST-1: Post Development Area 1

Runoff = 16.06 cfs @ 12.24 hrs, Volume= 72,894 cf, Depth= 2.64"

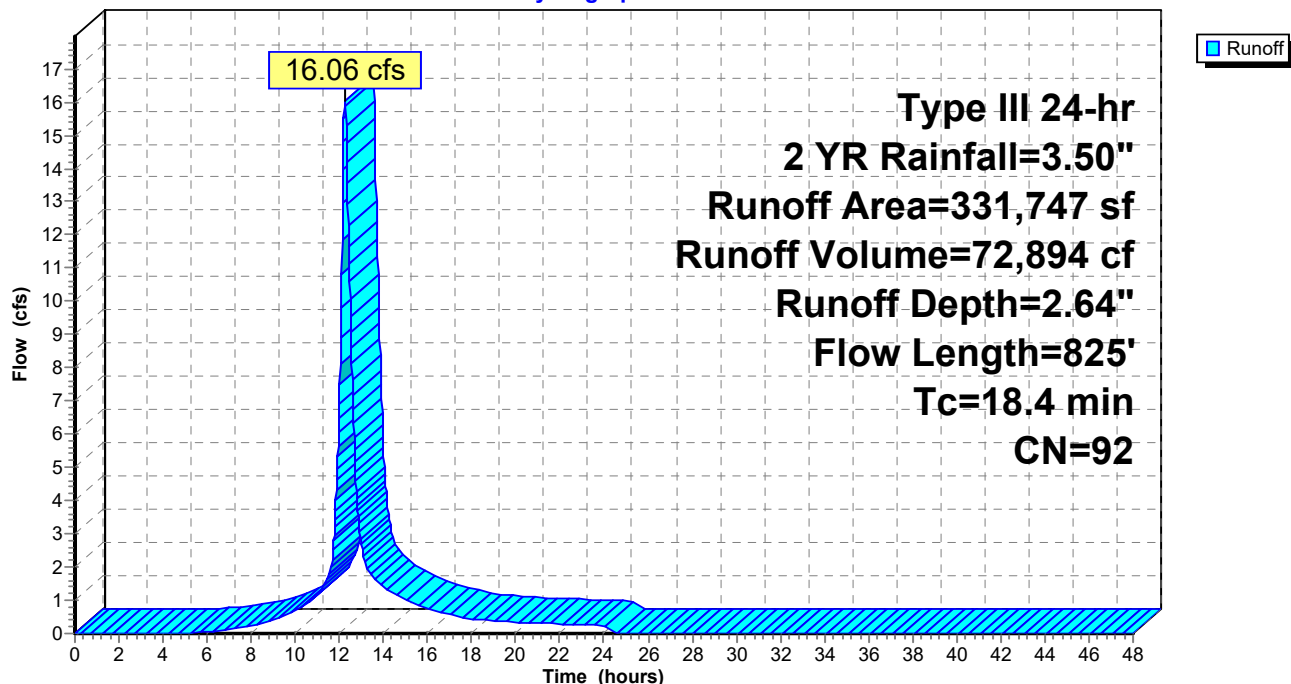
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 YR Rainfall=3.50"

Area (sf)	CN	Description
244,724	98	Paved roads w/curbs & sewers, HSG C
87,023	74	>75% Grass cover, Good, HSG C
331,747	92	Weighted Average
87,023		26.23% Pervious Area
244,724		73.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	100	0.0100	1.61		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	25	0.2400	7.89		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
1.7	650	0.0080	6.44	20.23	Pipe Channel, D-E 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
18.4	825	Total			

Subcatchment POST-1: Post Development Area 1

Hydrograph



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Type III 24-hr 2 YR Rainfall=3.50"

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Summary for Subcatchment POST-1A: Post Development Area 1A

Runoff = 12.23 cfs @ 12.08 hrs, Volume= 42,651 cf, Depth= 3.27"

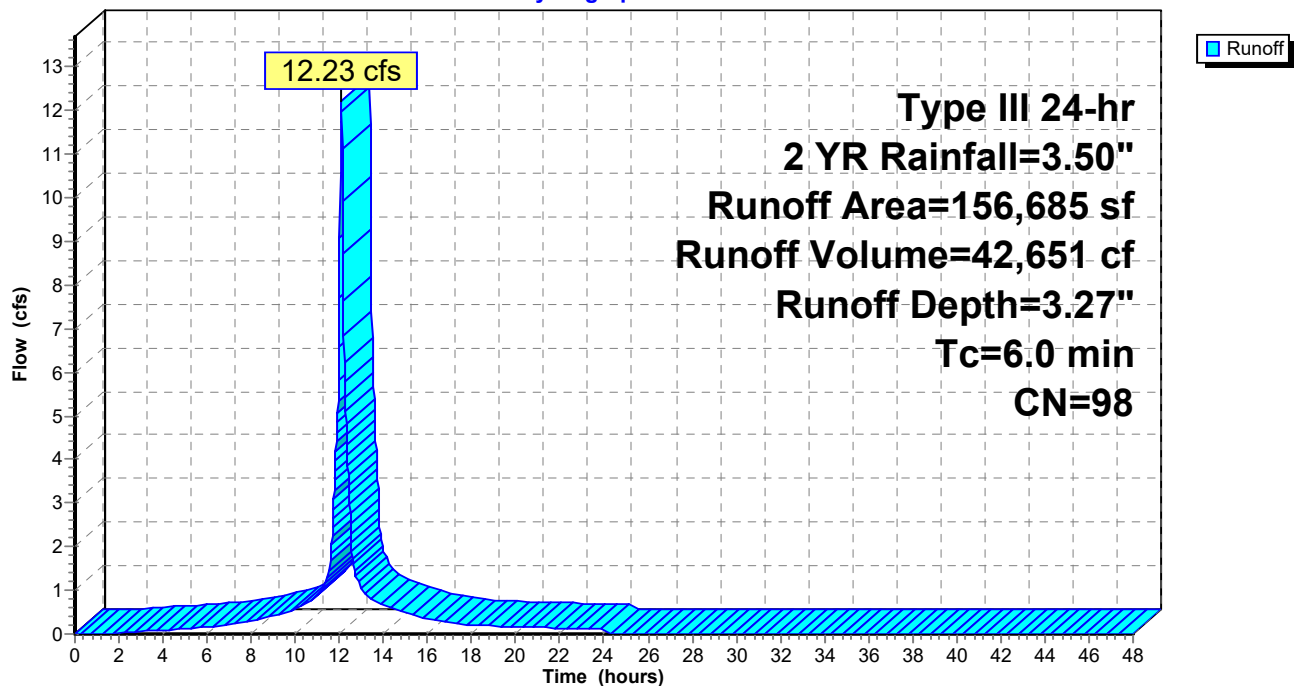
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 YR Rainfall=3.50"

Area (sf)	CN	Description
156,685	98	Roofs, HSG C
156,685		100.00% Impervious Area

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

Subcatchment POST-1A: Post Development Area 1A

Hydrograph



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Type III 24-hr 2 YR Rainfall=3.50"

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Summary for Subcatchment POST-2: Post Development Area 2

Runoff = 11.27 cfs @ 12.33 hrs, Volume= 57,719 cf, Depth= 1.12"

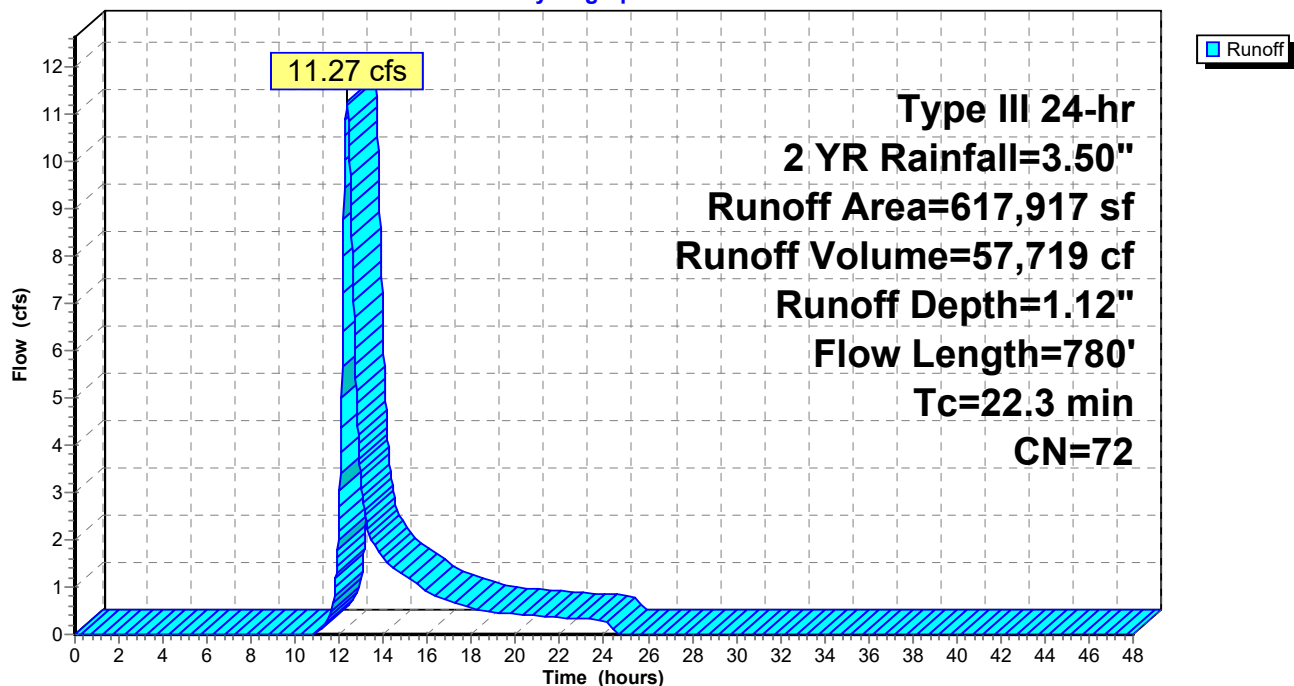
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 YR Rainfall=3.50"

Area (sf)	CN	Description
320,532	74	>75% Grass cover, Good, HSG C
297,385	70	Woods, Good, HSG C
617,917	72	Weighted Average
617,917		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	50	0.0080	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.50"
5.3	730	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
22.3	780	Total			

Subcatchment POST-2: Post Development Area 2

Hydrograph

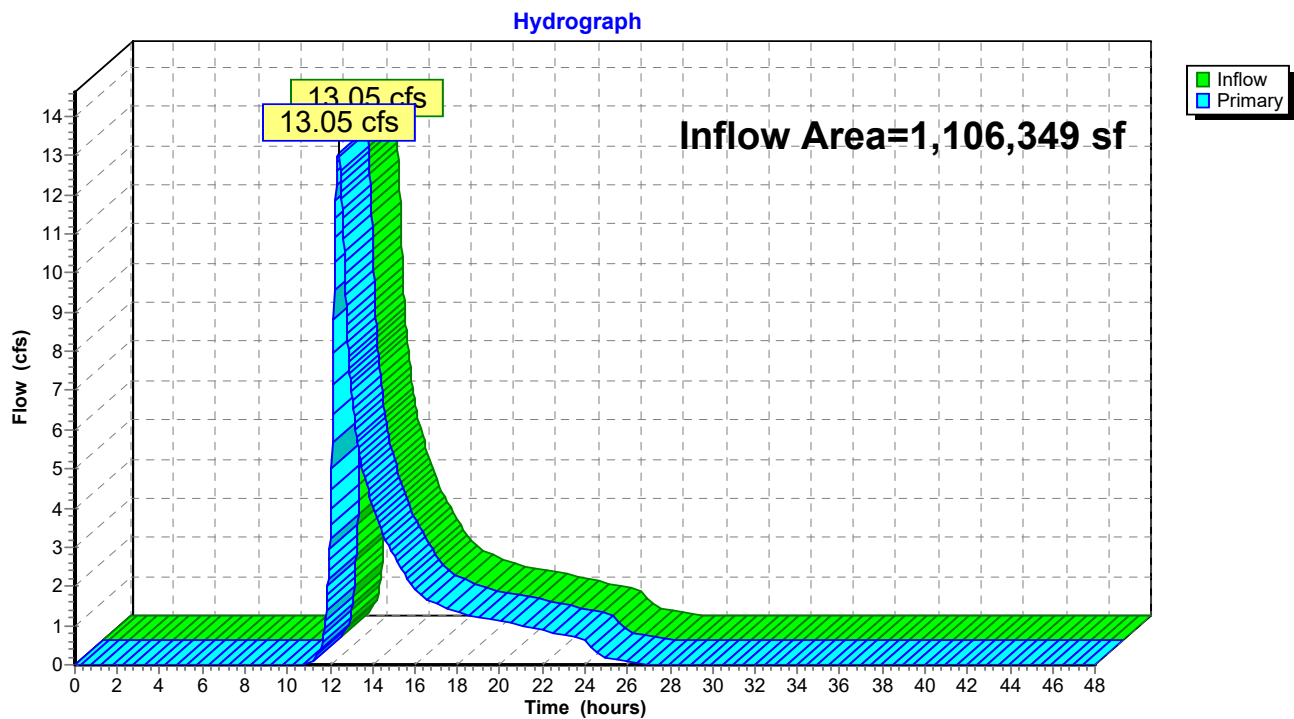


Summary for Pond AP-1: Surrounding Wetland System

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

Inflow Area = 1,106,349 sf, 36.28% Impervious, Inflow Depth = 1.21" for 2 YR event
Inflow = 13.05 cfs @ 12.39 hrs, Volume= 111,165 cf
Primary = 13.05 cfs @ 12.39 hrs, Volume= 111,165 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Pond AP-1: Surrounding Wetland System

2190-PostDevelopmentAnalysis-R1

Type III 24-hr 2 YR Rainfall=3.50"

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Summary for Pond POND-1: Proposed Detention Basin

Inflow Area = 488,432 sf, 82.18% Impervious, Inflow Depth = 2.84" for 2 YR event
 Inflow = 23.02 cfs @ 12.12 hrs, Volume= 115,545 cf
 Outflow = 5.03 cfs @ 12.81 hrs, Volume= 115,550 cf, Atten= 78%, Lag= 41.1 min
 Discarded = 0.99 cfs @ 12.81 hrs, Volume= 62,104 cf
 Primary = 4.04 cfs @ 12.81 hrs, Volume= 53,446 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 81.23' @ 12.81 hrs Surf.Area= 41,904 sf Storage= 57,713 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 294.7 min (1,081.7 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	79.00'	162,053 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
79.00	8,252	0	0
80.00	23,546	15,899	15,899
81.00	41,098	32,322	48,221
82.00	44,624	42,861	91,082
83.00	48,206	46,415	137,497
83.50	50,018	24,556	162,053

Device	Routing	Invert	Outlet Devices
#1	Primary	79.00'	18.0" Round Culvert L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.00' / 77.50' S= 0.0536 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Device 1	79.75'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	80.85'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	79.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.99 cfs @ 12.81 hrs HW=81.23' (Free Discharge)

↑**4=Exfiltration** (Exfiltration Controls 0.99 cfs)

Primary OutFlow Max=4.04 cfs @ 12.81 hrs HW=81.23' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 4.04 cfs of 10.35 cfs potential flow)

↑**2=Orifice/Grate** (Orifice Controls 1.05 cfs @ 5.34 fps)

↑**3=Sharp-Crested Rectangular Weir** (Weir Controls 2.99 cfs @ 2.01 fps)

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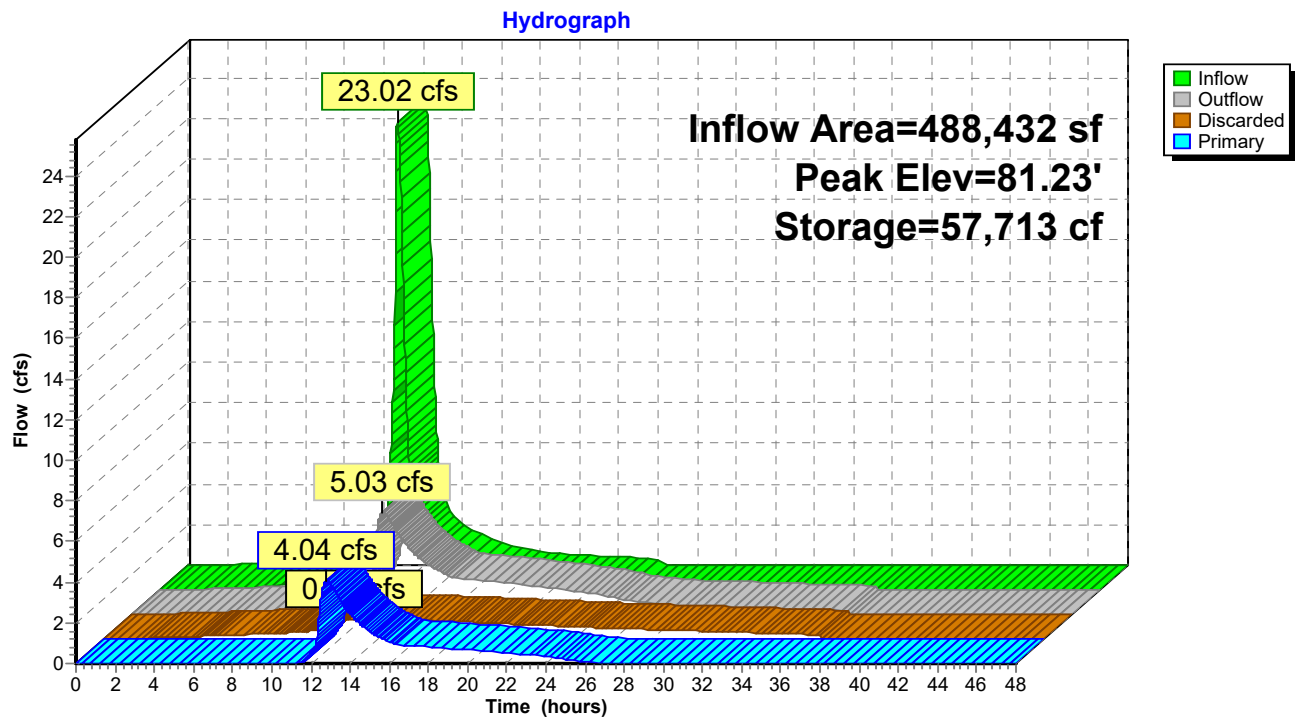
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Type III 24-hr 2 YR Rainfall=3.50"

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Pond POND-1: Proposed Detention Basin



2190-PostDevelopmentAnalysis-R1*Type III 24-hr 10 YR Rainfall=4.80"*

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST-1: PostRunoff Area=331,747 sf 73.77% Impervious Runoff Depth=3.89"
Flow Length=825' Tc=18.4 min CN=92 Runoff=23.28 cfs 107,655 cf**Subcatchment POST-1A: Post**Runoff Area=156,685 sf 100.00% Impervious Runoff Depth=4.56"
Tc=6.0 min CN=98 Runoff=16.86 cfs 59,586 cf**Subcatchment POST-2: Post Development**Runoff Area=617,917 sf 0.00% Impervious Runoff Depth=2.05"
Flow Length=780' Tc=22.3 min CN=72 Runoff=21.55 cfs 105,304 cf**Pond AP-1: Surrounding Wetland System**Inflow=29.19 cfs 202,971 cf
Primary=29.19 cfs 202,971 cf**Pond POND-1: Proposed Detention Basin**Peak Elev=81.67' Storage=76,433 cf Inflow=32.79 cfs 167,241 cf
Discarded=1.03 cfs 69,578 cf Primary=10.49 cfs 97,668 cf Outflow=11.52 cfs 167,246 cf**Total Runoff Area = 1,106,349 sf Runoff Volume = 272,545 cf Average Runoff Depth = 2.96"**
63.72% Pervious = 704,940 sf 36.28% Impervious = 401,409 sf

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Type III 24-hr 10 YR Rainfall=4.80"

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Summary for Subcatchment POST-1: Post Development Area 1

Runoff = 23.28 cfs @ 12.24 hrs, Volume= 107,655 cf, Depth= 3.89"

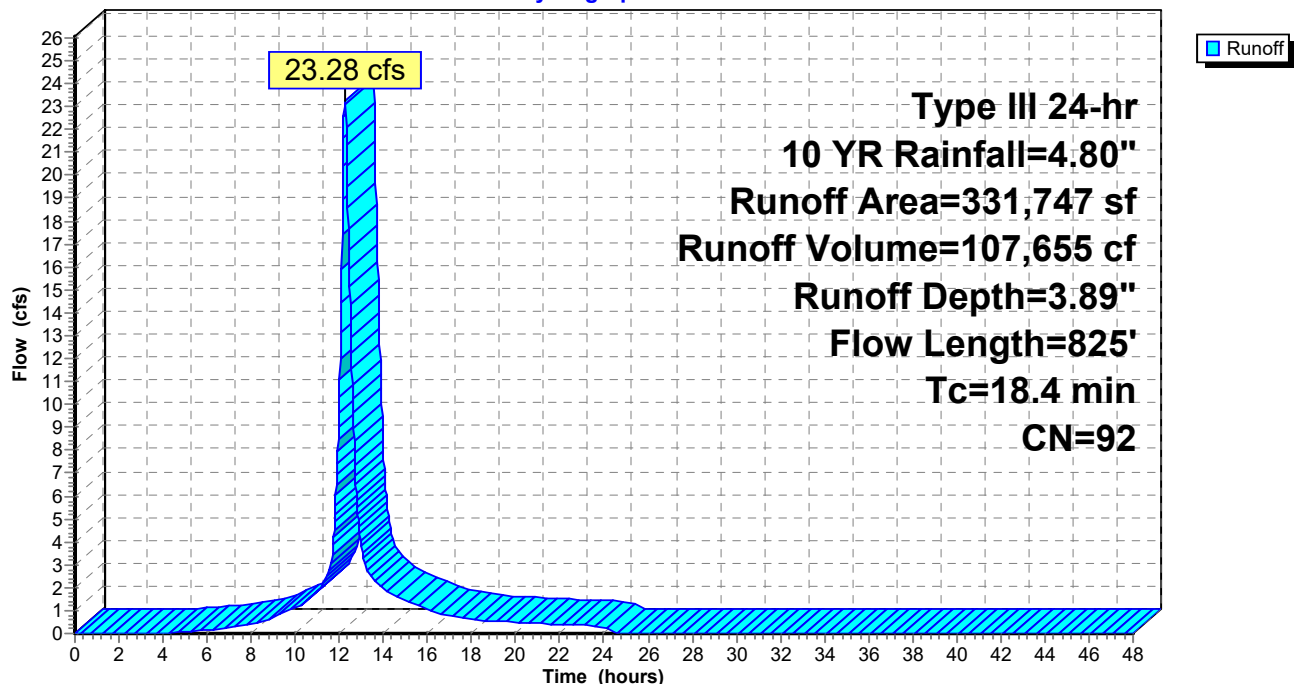
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
244,724	98	Paved roads w/curbs & sewers, HSG C
87,023	74	>75% Grass cover, Good, HSG C
331,747	92	Weighted Average
87,023		26.23% Pervious Area
244,724		73.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	100	0.0100	1.61		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	25	0.2400	7.89		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
1.7	650	0.0080	6.44	20.23	Pipe Channel, D-E 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
18.4	825	Total			

Subcatchment POST-1: Post Development Area 1

Hydrograph



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Type III 24-hr 10 YR Rainfall=4.80"

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Summary for Subcatchment POST-1A: Post Development Area 1A

Runoff = 16.86 cfs @ 12.08 hrs, Volume= 59,586 cf, Depth= 4.56"

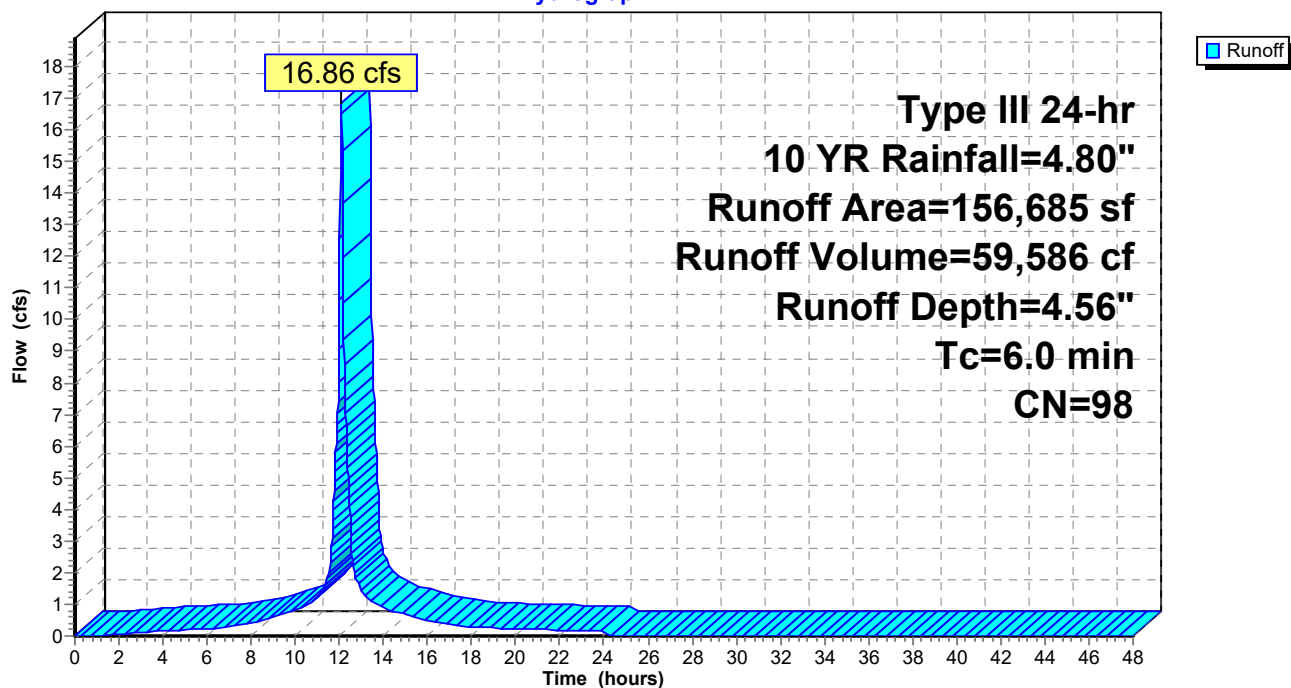
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
156,685	98	Roofs, HSG C
156,685		100.00% Impervious Area

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

Subcatchment POST-1A: Post Development Area 1A

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Type III 24-hr 10 YR Rainfall=4.80"

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Summary for Subcatchment POST-2: Post Development Area 2

Runoff = 21.55 cfs @ 12.32 hrs, Volume= 105,304 cf, Depth= 2.05"

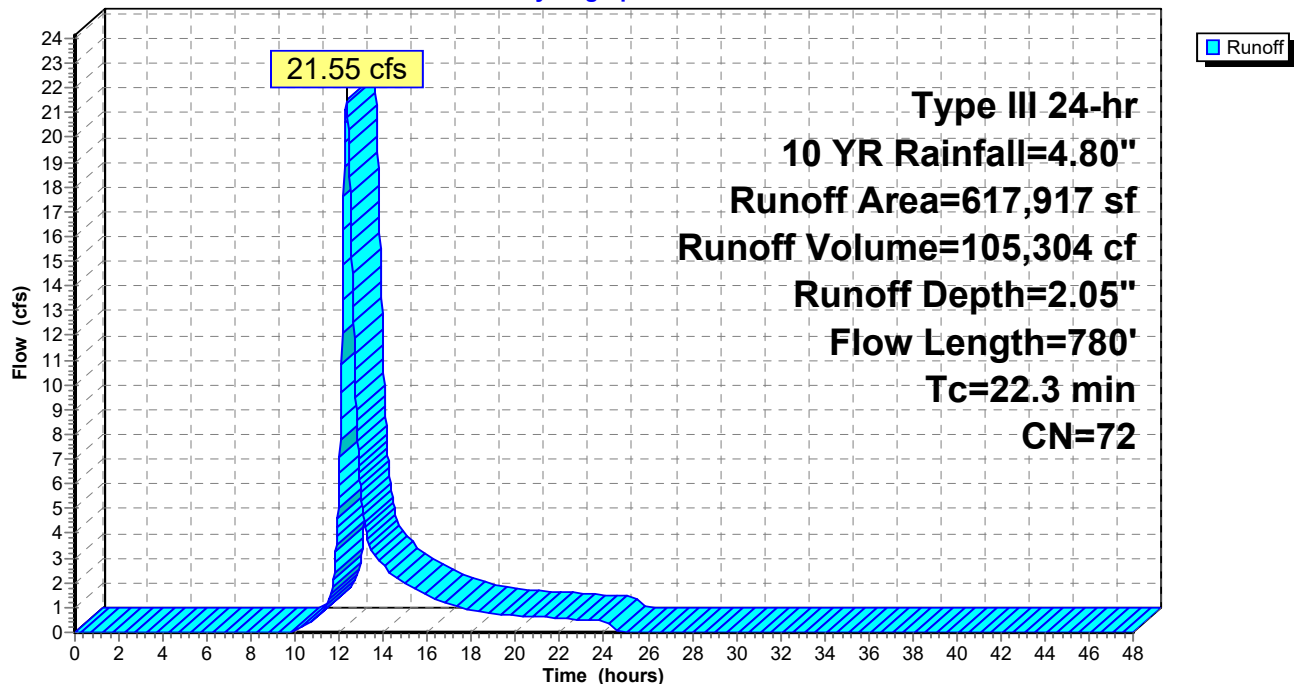
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
320,532	74	>75% Grass cover, Good, HSG C
297,385	70	Woods, Good, HSG C
617,917	72	Weighted Average
617,917		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	50	0.0080	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.50"
5.3	730	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
22.3	780	Total			

Subcatchment POST-2: Post Development Area 2

Hydrograph



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Type III 24-hr 10 YR Rainfall=4.80"

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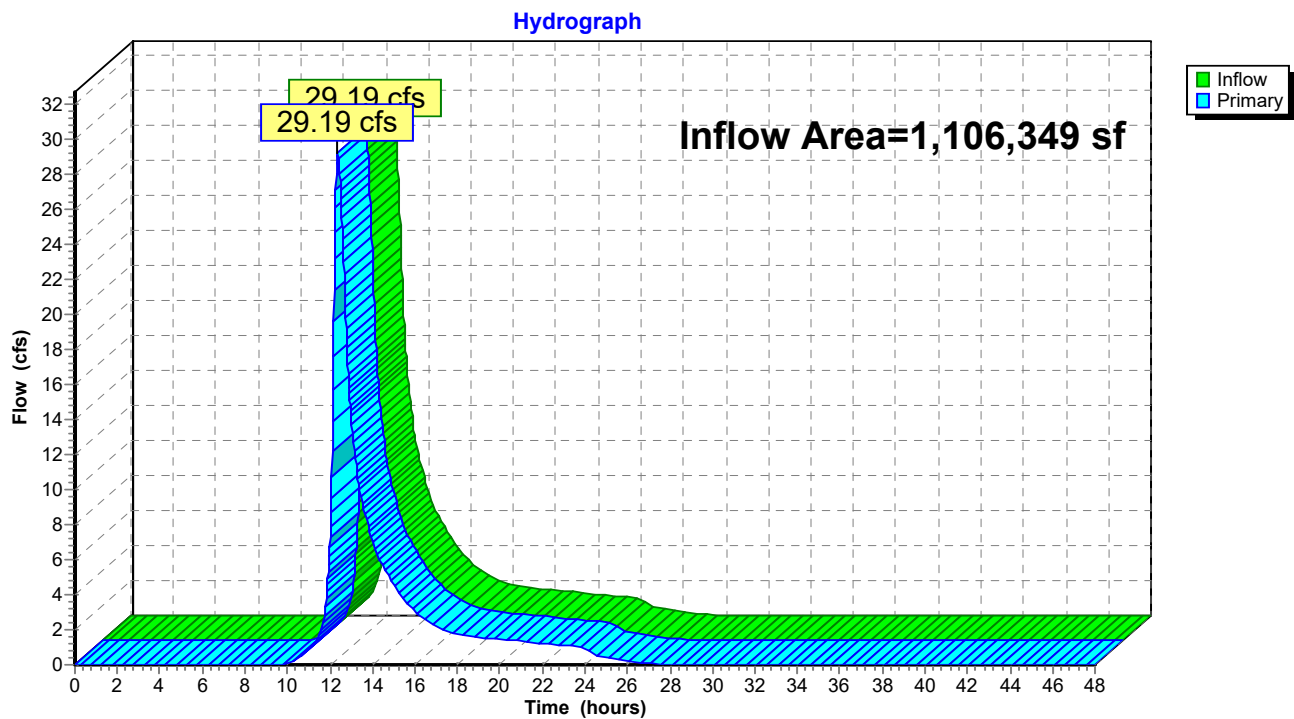
Summary for Pond AP-1: Surrounding Wetland System

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

Inflow Area = 1,106,349 sf, 36.28% Impervious, Inflow Depth = 2.20" for 10 YR event
Inflow = 29.19 cfs @ 12.37 hrs, Volume= 202,971 cf
Primary = 29.19 cfs @ 12.37 hrs, Volume= 202,971 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Pond AP-1: Surrounding Wetland System



2190-PostDevelopmentAnalysis-R1

Type III 24-hr 10 YR Rainfall=4.80"

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Summary for Pond POND-1: Proposed Detention Basin

Inflow Area = 488,432 sf, 82.18% Impervious, Inflow Depth = 4.11" for 10 YR event
 Inflow = 32.79 cfs @ 12.13 hrs, Volume= 167,241 cf
 Outflow = 11.52 cfs @ 12.63 hrs, Volume= 167,246 cf, Atten= 65%, Lag= 30.0 min
 Discarded = 1.03 cfs @ 12.63 hrs, Volume= 69,578 cf
 Primary = 10.49 cfs @ 12.63 hrs, Volume= 97,668 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 81.67' @ 12.63 hrs Surf.Area= 43,451 sf Storage= 76,433 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 247.6 min (1,026.4 - 778.8)

Volume	Invert	Avail.Storage	Storage Description
#1	79.00'	162,053 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
79.00	8,252	0	0
80.00	23,546	15,899	15,899
81.00	41,098	32,322	48,221
82.00	44,624	42,861	91,082
83.00	48,206	46,415	137,497
83.50	50,018	24,556	162,053

Device	Routing	Invert	Outlet Devices
#1	Primary	79.00'	18.0" Round Culvert L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.00' / 77.50' S= 0.0536 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Device 1	79.75'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	80.85'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	79.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.03 cfs @ 12.63 hrs HW=81.67' (Free Discharge)

↑**4=Exfiltration** (Exfiltration Controls 1.03 cfs)

Primary OutFlow Max=10.49 cfs @ 12.63 hrs HW=81.67' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 10.49 cfs of 11.78 cfs potential flow)

↑**2=Orifice/Grate** (Orifice Controls 1.22 cfs @ 6.22 fps)

↑**3=Sharp-Crested Rectangular Weir** (Weir Controls 9.27 cfs @ 2.96 fps)

2190-PostDevelopmentAnalysis-R1

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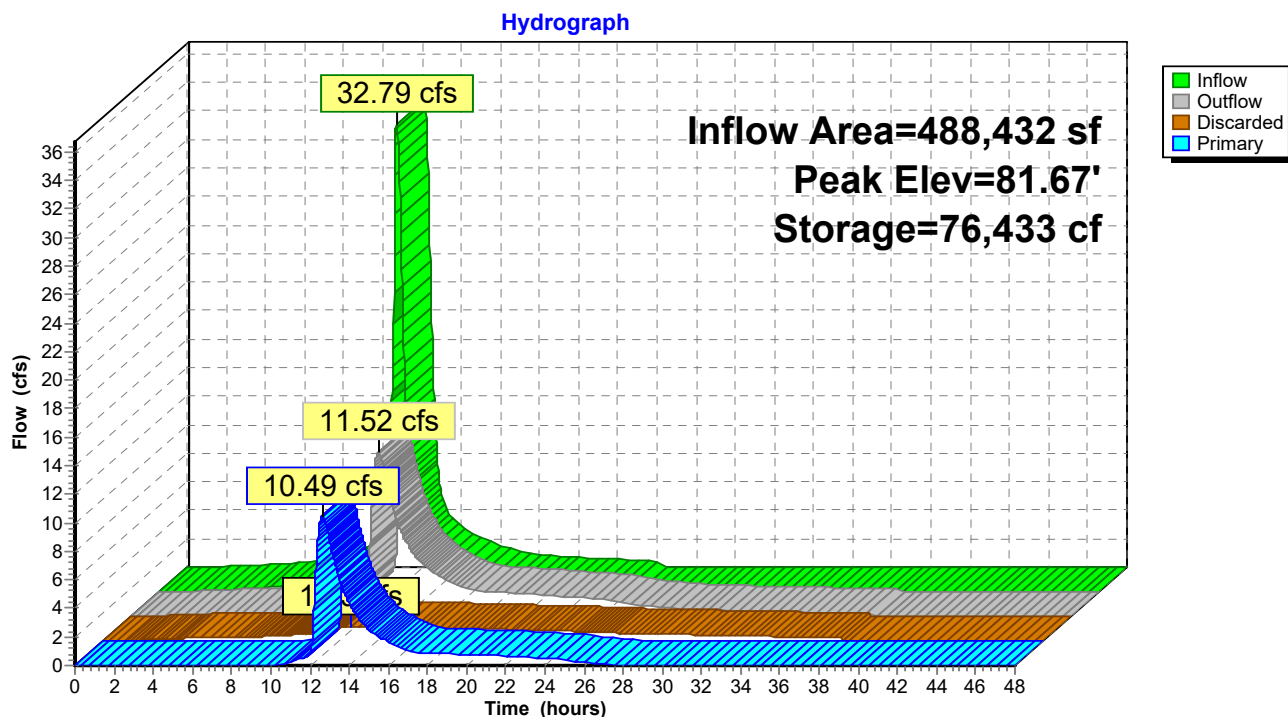
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Type III 24-hr 10 YR Rainfall=4.80"

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Pond POND-1: Proposed Detention Basin



2190-PostDevelopmentAnalysis-R1

Type III 24-hr 25 YR Rainfall=5.60"

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST-1: Post

Runoff Area=331,747 sf 73.77% Impervious Runoff Depth=4.68"
Flow Length=825' Tc=18.4 min CN=92 Runoff=27.69 cfs 129,288 cf

Subcatchment POST-1A: Post

Runoff Area=156,685 sf 100.00% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=19.70 cfs 70,016 cf

Subcatchment POST-2: Post Development

Runoff Area=617,917 sf 0.00% Impervious Runoff Depth=2.67"
Flow Length=780' Tc=22.3 min CN=72 Runoff=28.41 cfs 137,458 cf

Pond AP-1: Surrounding Wetland System

Inflow=40.12 cfs 263,308 cf
Primary=40.12 cfs 263,308 cf

Pond POND-1: Proposed Detention Basin

Peak Elev=81.94' Storage=88,426 cf Inflow=38.77 cfs 199,304 cf
Discarded=1.05 cfs 73,458 cf Primary=12.59 cfs 125,850 cf Outflow=13.64 cfs 199,309 cf

Total Runoff Area = 1,106,349 sf Runoff Volume = 336,762 cf Average Runoff Depth = 3.65"
63.72% Pervious = 704,940 sf 36.28% Impervious = 401,409 sf

2190-PostDevelopmentAnalysis-R1

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Type III 24-hr 25 YR Rainfall=5.60"

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Summary for Subcatchment POST-1: Post Development Area 1

Runoff = 27.69 cfs @ 12.24 hrs, Volume= 129,288 cf, Depth= 4.68"

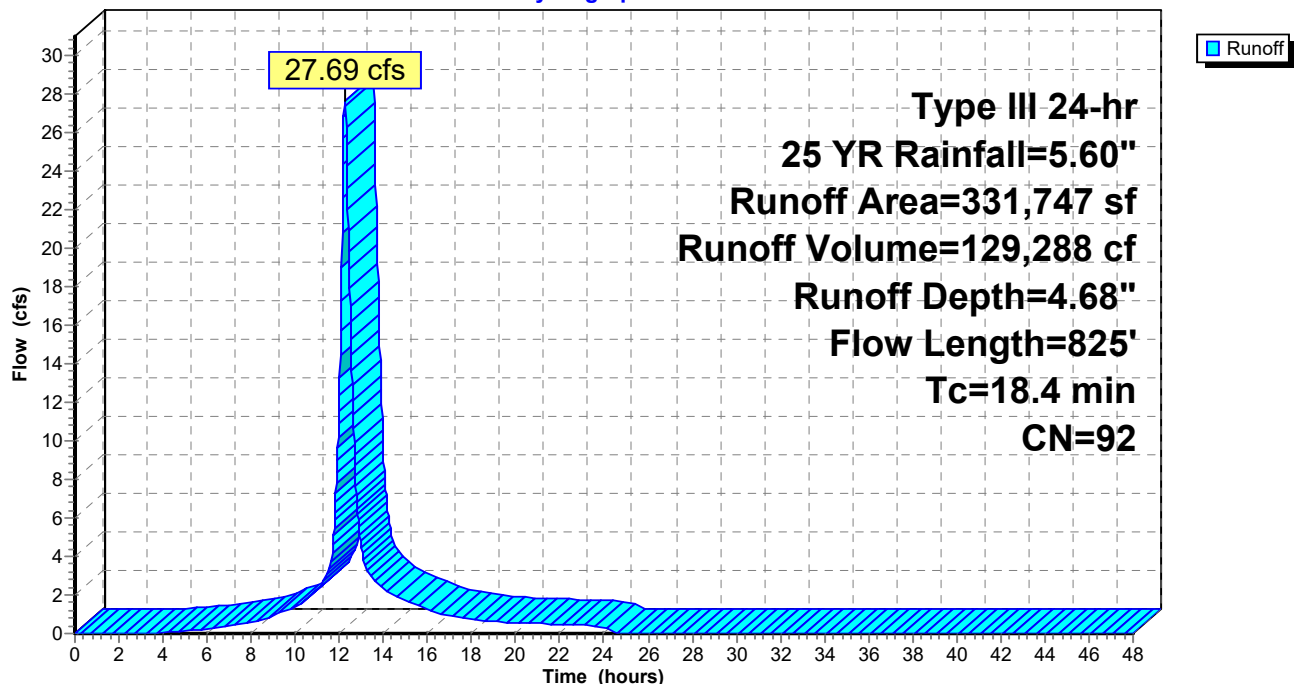
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 YR Rainfall=5.60"

Area (sf)	CN	Description
244,724	98	Paved roads w/curbs & sewers, HSG C
87,023	74	>75% Grass cover, Good, HSG C
331,747	92	Weighted Average
87,023		26.23% Pervious Area
244,724		73.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	100	0.0100	1.61		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	25	0.2400	7.89		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
1.7	650	0.0080	6.44	20.23	Pipe Channel, D-E 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
18.4	825	Total			

Subcatchment POST-1: Post Development Area 1

Hydrograph



2190-PostDevelopmentAnalysis-R1

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Type III 24-hr 25 YR Rainfall=5.60"

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Summary for Subcatchment POST-1A: Post Development Area 1A

Runoff = 19.70 cfs @ 12.08 hrs, Volume= 70,016 cf, Depth= 5.36"

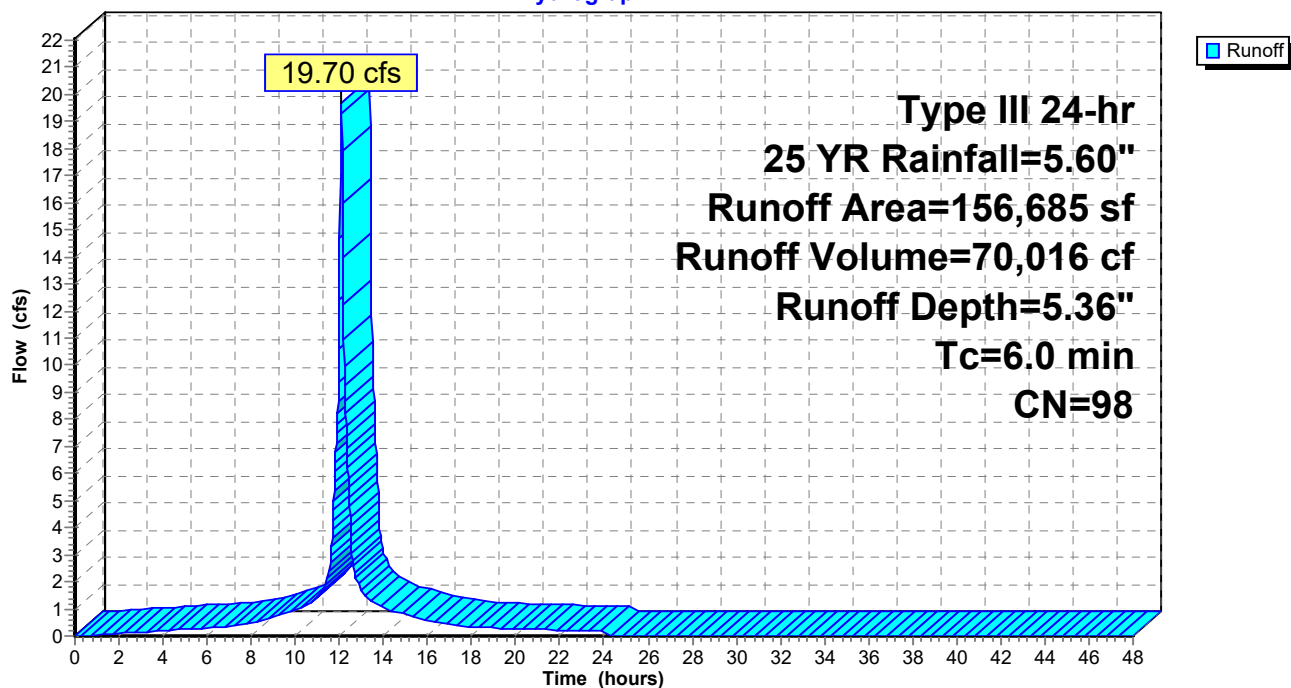
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 YR Rainfall=5.60"

Area (sf)	CN	Description
156,685	98	Roofs, HSG C
156,685		100.00% Impervious Area

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

Subcatchment POST-1A: Post Development Area 1A

Hydrograph



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Type III 24-hr 25 YR Rainfall=5.60"

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Summary for Subcatchment POST-2: Post Development Area 2

Runoff = 28.41 cfs @ 12.32 hrs, Volume= 137,458 cf, Depth= 2.67"

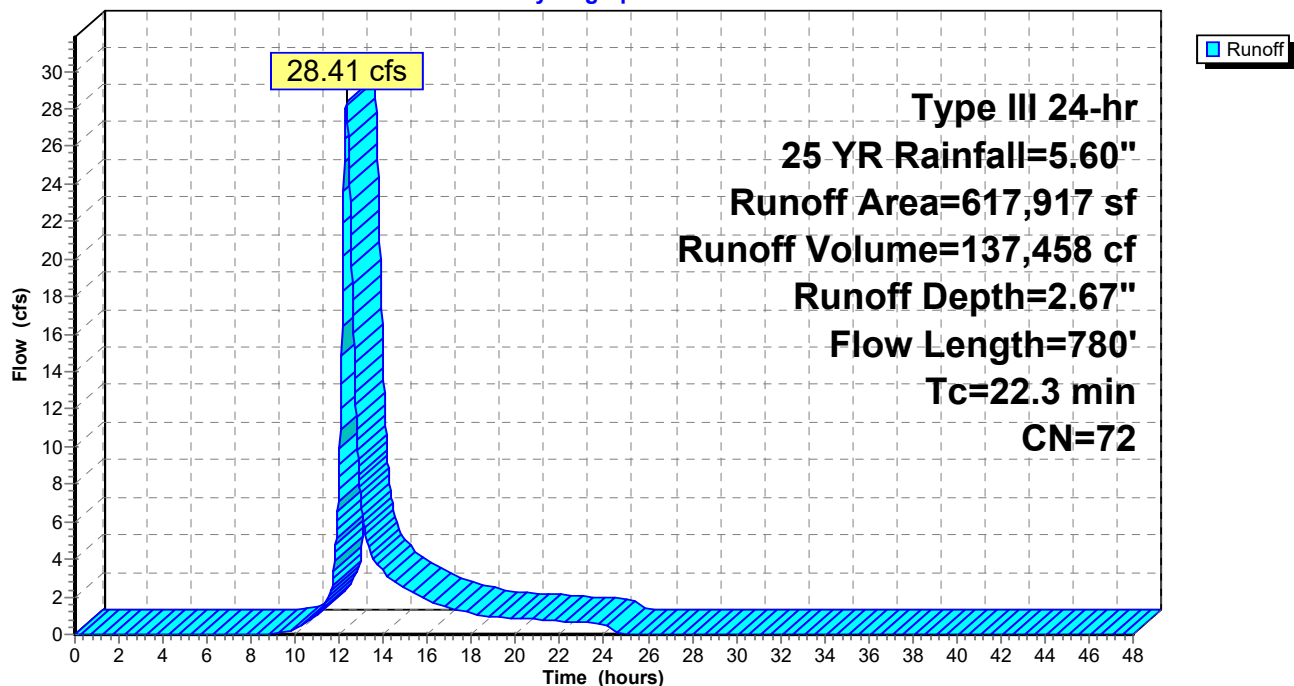
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 YR Rainfall=5.60"

Area (sf)	CN	Description
320,532	74	>75% Grass cover, Good, HSG C
297,385	70	Woods, Good, HSG C
617,917	72	Weighted Average
617,917		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	50	0.0080	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.50"
5.3	730	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
22.3	780	Total			

Subcatchment POST-2: Post Development Area 2

Hydrograph

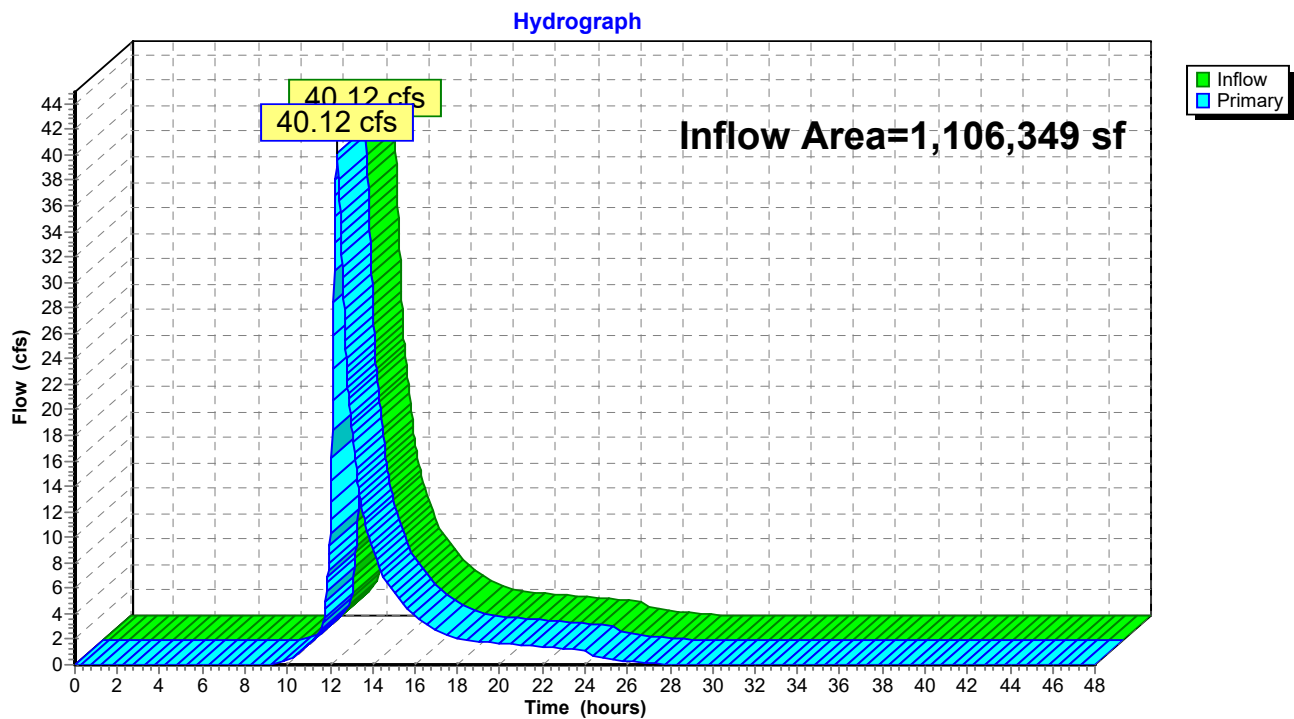


Summary for Pond AP-1: Surrounding Wetland System

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

Inflow Area = 1,106,349 sf, 36.28% Impervious, Inflow Depth = 2.86" for 25 YR event
Inflow = 40.12 cfs @ 12.34 hrs, Volume= 263,308 cf
Primary = 40.12 cfs @ 12.34 hrs, Volume= 263,308 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Pond AP-1: Surrounding Wetland System

2190-PostDevelopmentAnalysis-R1

Type III 24-hr 25 YR Rainfall=5.60"

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Summary for Pond POND-1: Proposed Detention Basin

Inflow Area = 488,432 sf, 82.18% Impervious, Inflow Depth = 4.90" for 25 YR event
 Inflow = 38.77 cfs @ 12.13 hrs, Volume= 199,304 cf
 Outflow = 13.64 cfs @ 12.62 hrs, Volume= 199,309 cf, Atten= 65%, Lag= 29.9 min
 Discarded = 1.05 cfs @ 12.62 hrs, Volume= 73,458 cf
 Primary = 12.59 cfs @ 12.62 hrs, Volume= 125,850 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 81.94' @ 12.62 hrs Surf.Area= 44,414 sf Storage= 88,426 cf

Plug-Flow detention time= 228.9 min calculated for 199,226 cf (100% of inflow)
 Center-of-Mass det. time= 229.1 min (1,004.2 - 775.1)

Volume	Invert	Avail.Storage	Storage Description
#1	79.00'	162,053 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
79.00	8,252	0	0
80.00	23,546	15,899	15,899
81.00	41,098	32,322	48,221
82.00	44,624	42,861	91,082
83.00	48,206	46,415	137,497
83.50	50,018	24,556	162,053

Device	Routing	Invert	Outlet Devices
#1	Primary	79.00'	18.0" Round Culvert L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.00' / 77.50' S= 0.0536 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Device 1	79.75'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	80.85'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	79.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.05 cfs @ 12.62 hrs HW=81.94' (Free Discharge)

↑**4=Exfiltration** (Exfiltration Controls 1.05 cfs)

Primary OutFlow Max=12.59 cfs @ 12.62 hrs HW=81.94' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 12.59 cfs @ 7.13 fps)

↑**2=Orifice/Grate** (Passes < 1.32 cfs potential flow)

↑**3=Sharp-Crested Rectangular Weir** (Passes < 14.08 cfs potential flow)

2190-PostDevelopmentAnalysis-R1

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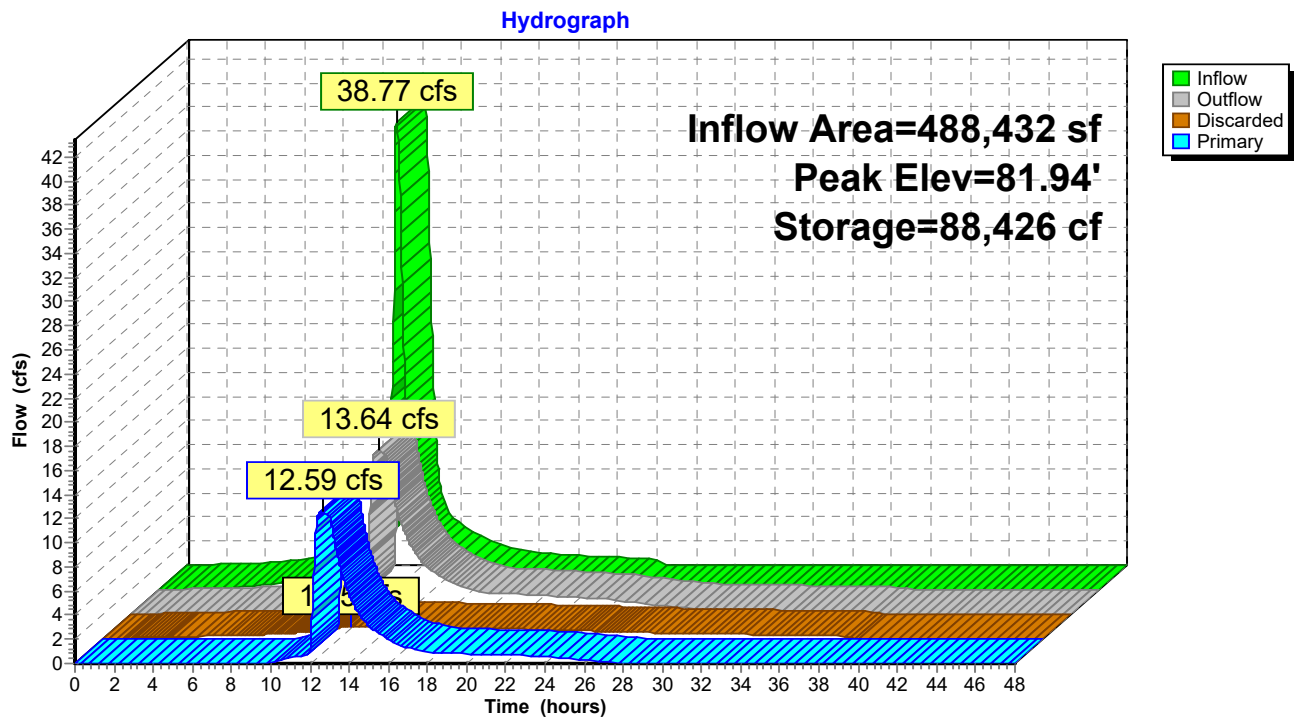
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Type III 24-hr 25 YR Rainfall=5.60"

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Pond POND-1: Proposed Detention Basin



2190-PostDevelopmentAnalysis-R1*Type III 24-hr 100 YR Rainfall=7.00"*

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Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST-1: PostRunoff Area=331,747 sf 73.77% Impervious Runoff Depth=6.05"
Flow Length=825' Tc=18.4 min CN=92 Runoff=35.35 cfs 167,388 cf**Subcatchment POST-1A: Post**Runoff Area=156,685 sf 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=24.67 cfs 88,278 cf**Subcatchment POST-2: Post Development**Runoff Area=617,917 sf 0.00% Impervious Runoff Depth=3.83"
Flow Length=780' Tc=22.3 min CN=72 Runoff=41.02 cfs 197,170 cf**Pond AP-1: Surrounding Wetland System**Inflow=54.21 cfs 373,225 cf
Primary=54.21 cfs 373,225 cf**Pond POND-1: Proposed Detention**Peak Elev=82.49' Storage=113,452 cf Inflow=49.19 cfs 255,666 cf
Discarded=1.10 cfs 79,615 cf Primary=14.09 cfs 176,055 cf Outflow=15.18 cfs 255,669 cf**Total Runoff Area = 1,106,349 sf Runoff Volume = 452,836 cf Average Runoff Depth = 4.91"**
63.72% Pervious = 704,940 sf 36.28% Impervious = 401,409 sf

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Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Subcatchment POST-1: Post Development Area 1

Runoff = 35.35 cfs @ 12.24 hrs, Volume= 167,388 cf, Depth= 6.05"

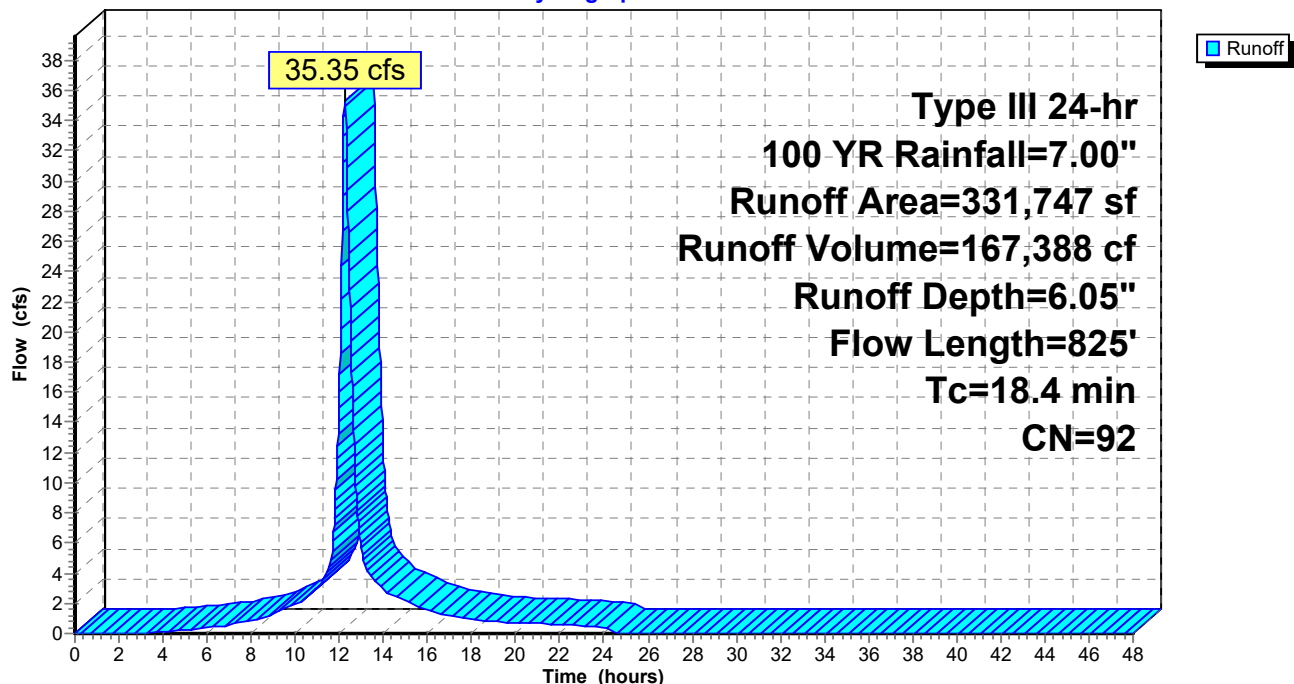
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
244,724	98	Paved roads w/curbs & sewers, HSG C
87,023	74	>75% Grass cover, Good, HSG C
331,747	92	Weighted Average
87,023		26.23% Pervious Area
244,724		73.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	50	0.0100	0.05		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	100	0.0100	1.61		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	25	0.2400	7.89		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
1.7	650	0.0080	6.44	20.23	Pipe Channel, D-E 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
18.4	825	Total			

Subcatchment POST-1: Post Development Area 1

Hydrograph



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Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Subcatchment POST-1A: Post Development Area 1A

Runoff = 24.67 cfs @ 12.08 hrs, Volume= 88,278 cf, Depth= 6.76"

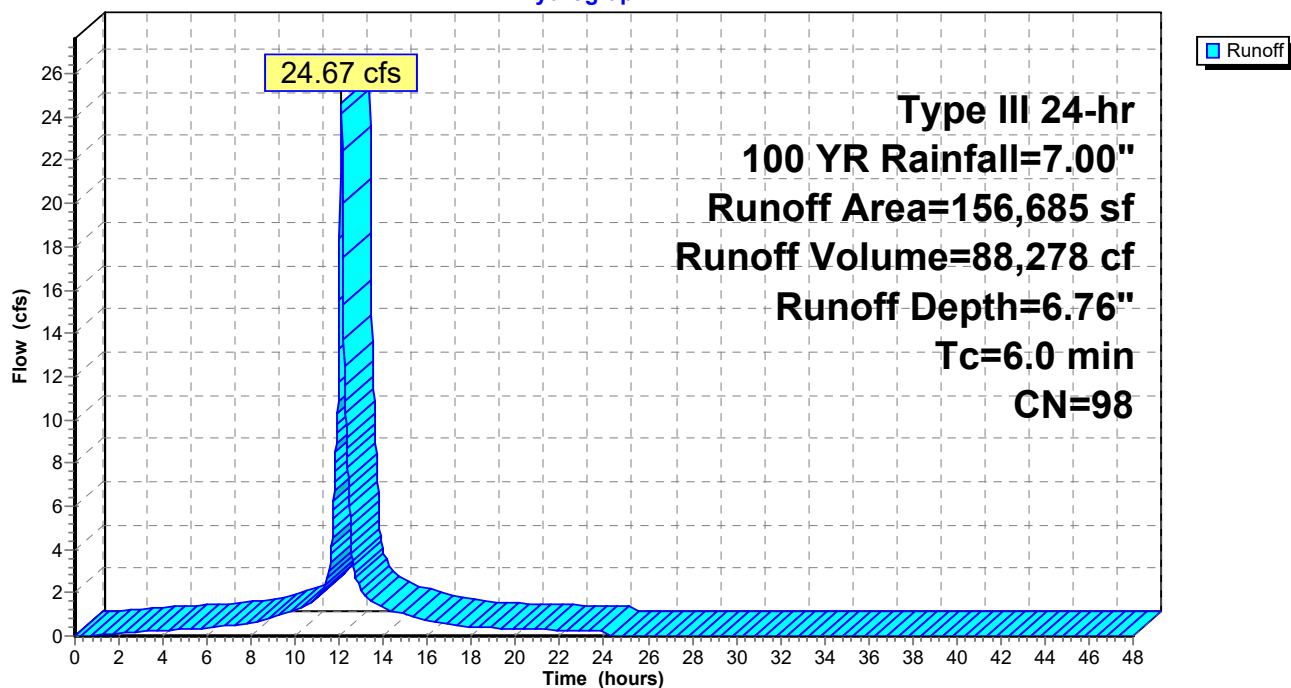
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
156,685	98	Roofs, HSG C
156,685		100.00% Impervious Area

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

Subcatchment POST-1A: Post Development Area 1A

Hydrograph



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Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Subcatchment POST-2: Post Development Area 2

Runoff = 41.02 cfs @ 12.31 hrs, Volume= 197,170 cf, Depth= 3.83"

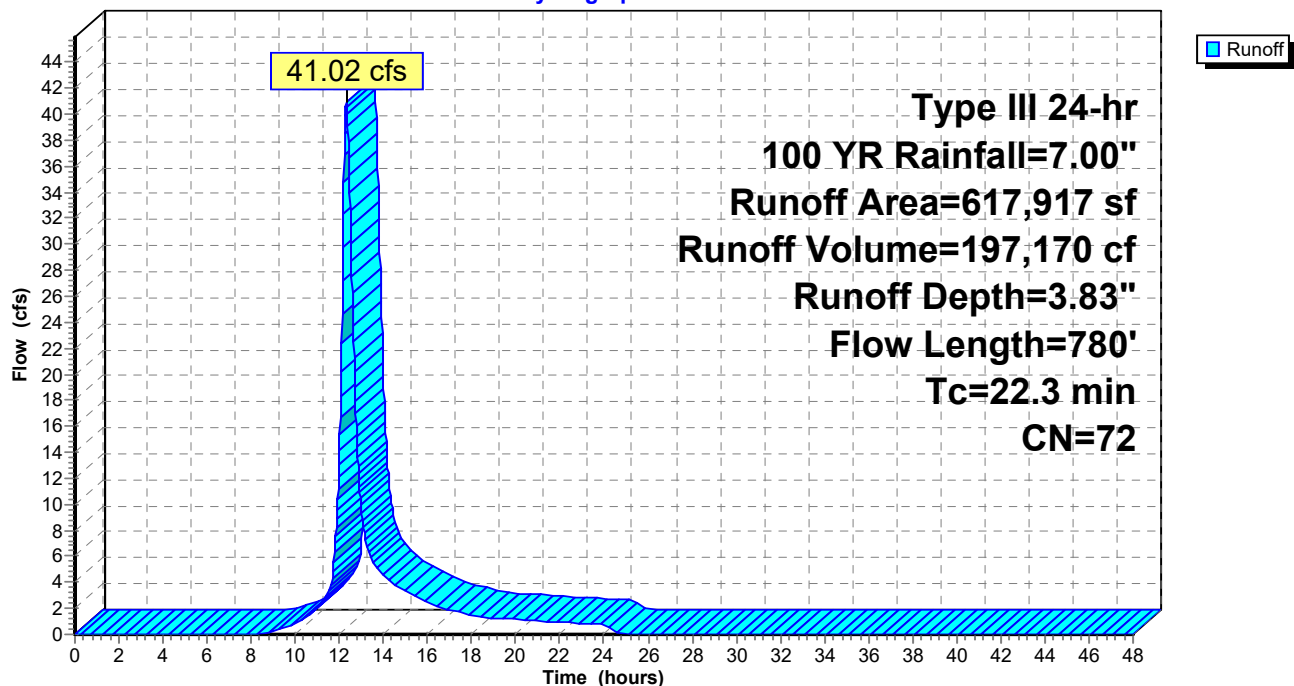
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
320,532	74	>75% Grass cover, Good, HSG C
297,385	70	Woods, Good, HSG C
617,917	72	Weighted Average
617,917		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	50	0.0080	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.50"
5.3	730	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
22.3	780	Total			

Subcatchment POST-2: Post Development Area 2

Hydrograph

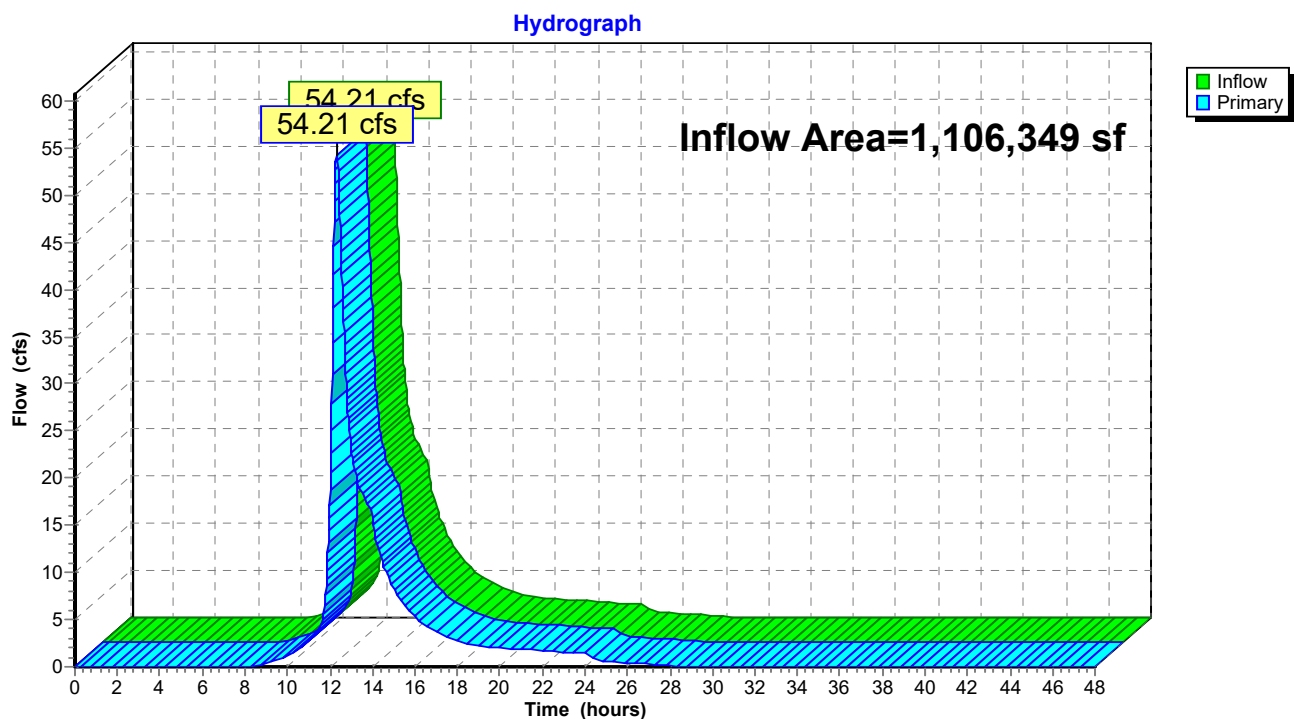


Summary for Pond AP-1: Surrounding Wetland System

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

Inflow Area = 1,106,349 sf, 36.28% Impervious, Inflow Depth = 4.05" for 100 YR event
Inflow = 54.21 cfs @ 12.32 hrs, Volume= 373,225 cf
Primary = 54.21 cfs @ 12.32 hrs, Volume= 373,225 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Pond AP-1: Surrounding Wetland System

2190-PostDevelopmentAnalysis-R1

Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Pond POND-1: Proposed Detention Basin

Inflow Area = 488,432 sf, 82.18% Impervious, Inflow Depth = 6.28" for 100 YR event
 Inflow = 49.19 cfs @ 12.13 hrs, Volume= 255,666 cf
 Outflow = 15.18 cfs @ 12.67 hrs, Volume= 255,669 cf, Atten= 69%, Lag= 32.4 min
 Discarded = 1.10 cfs @ 12.67 hrs, Volume= 79,615 cf
 Primary = 14.09 cfs @ 12.67 hrs, Volume= 176,055 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
 Peak Elev= 82.49' @ 12.67 hrs Surf.Area= 46,385 sf Storage= 113,452 cf

Plug-Flow detention time= 211.1 min calculated for 255,563 cf (100% of inflow)
 Center-of-Mass det. time= 211.4 min (981.4 - 770.0)

Volume	Invert	Avail.Storage	Storage Description
#1	79.00'	162,053 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
79.00	8,252	0	0
80.00	23,546	15,899	15,899
81.00	41,098	32,322	48,221
82.00	44,624	42,861	91,082
83.00	48,206	46,415	137,497
83.50	50,018	24,556	162,053

Device	Routing	Invert	Outlet Devices
#1	Primary	79.00'	18.0" Round Culvert L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 79.00' / 77.50' S= 0.0536 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Device 1	79.75'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	80.85'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	79.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.10 cfs @ 12.67 hrs HW=82.49' (Free Discharge)

↑**4=Exfiltration** (Exfiltration Controls 1.10 cfs)

Primary OutFlow Max=14.09 cfs @ 12.67 hrs HW=82.49' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 14.09 cfs @ 7.97 fps)

↑**2=Orifice/Grate** (Passes < 1.49 cfs potential flow)

↑**3=Sharp-Crested Rectangular Weir** (Passes < 25.25 cfs potential flow)

2190-PostDevelopmentAnalysis-R1

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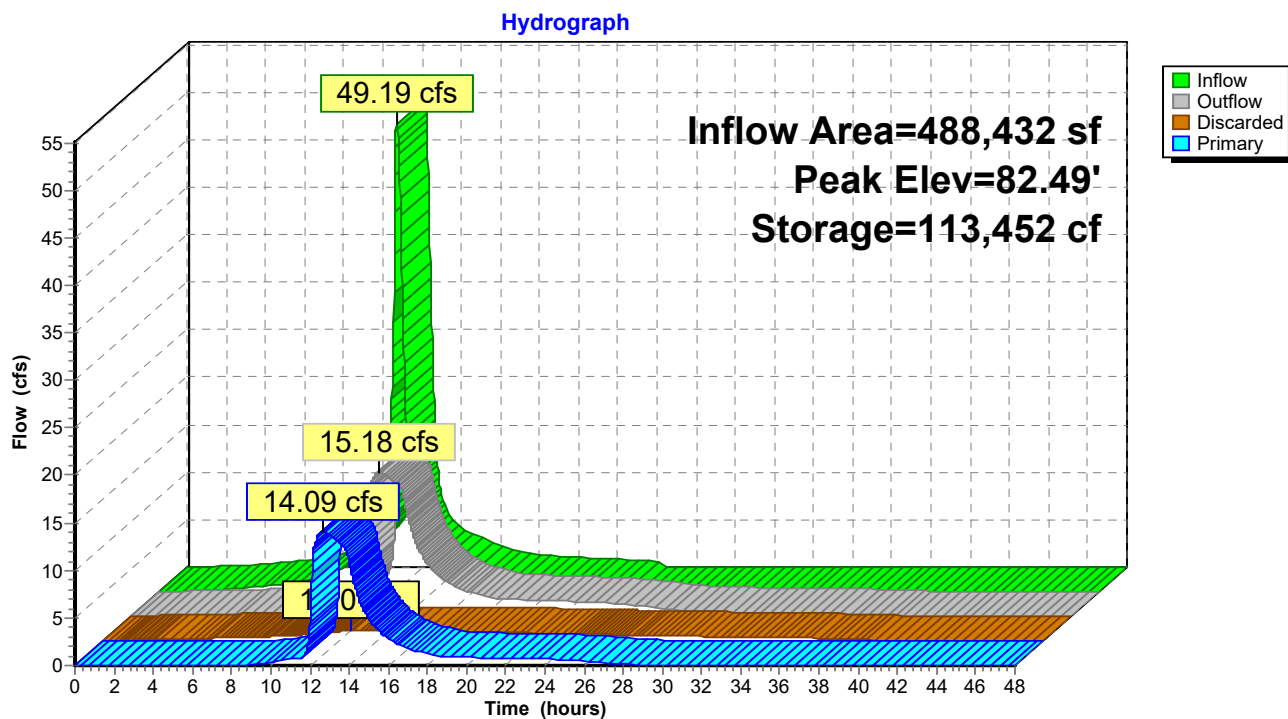
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Type III 24-hr 100 YR Rainfall=7.00"

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Pond POND-1: Proposed Detention Basin



Section 3

Supplemental Data

FIELD ENGINEERING, INC.

MATTAPOISETT, MA

RECHARGE VOLUME CALCULATIONS

Client:	PLUMBERS SUPPLY COMPANY, INC.	Job No.	2190
Project:	PROPOSED OFFICE/WAREHOUSE	Date:	3/20/2018 Rev 4/24/18
Location:	FLAHERTY DRIVE EXTENSION	Design by:	R. RICCIO

RECHARGE VOLUME CALCULATIONS

HYDROLOGIC SOIL GROUP	C
UNIT VOLUME (in.) =	0.25
IMPERVIOUS AREA (s.f.) =	401,409
RECHARGE VOLUME (cu.ft.) =	8,363

AVAILABLE VOLUME CALCULATION (POND-1)

ELEV (ft.)	AREA (s.f.)	VOL (cu.ft.)	CUM. VOL (cu.ft.)	CUM. VOL (ac.ft.)
**	**			
79.0	8,110.0	0.0	0.0	0.000
79.75	19,687.0	10,423.9	10,423.9	0.239
RECHARGE VOLUME PROVIDED			10,423.9	0.239
RECHARGE VOLUME REQUIRED			8,362.7	0.192

DRAWDOWN TIME CALCULATION

DRAWDOWN TIME=(REQ.RECH. VOL.)/(DES. INFILTRATION RATE "K"*BOTTOM AREA)

RECHARGE VOLUME PROVIDED (CF)=	10,423.9	
DESIGN INFILTRATION RATE (IN/HR)=	1.0	
BOTTOM AREA(SF)=	8,110.0	
DRAWDOWN TIME (HRS)=	15.1	OK

FIELD ENGINEERING, INC.

MATTAPOISETT, MA

WATER QUALITY VOLUME CALCULATIONS

Client:	PLUMBERS SUPPLY COMPANY, INC.	Job No.	2190
Project:	PROPOSED OFFICE/WAREHOUSE	Date:	3/20/2018 Rev 4/24/18
Location:	FLAHERTY DRIVE EXTENSION	Design by:	R. RICCIO

REQUIRED WATER QUALITY VOLUME-POST-1

UNIT VOLUME (in.) =	1.00
IMPERVIOUS AREA (s.f.) =	226,004
WATER QUALITY VOLUME (cu.ft.) =	18,834

AVAILABLE VOLUME CALCULATION (POND-1)

ELEV (ft.)	AREA (s.f.)	VOL (cu.ft.)	CUM. VOL (cu.ft.)	CUM. VOL (ac.ft.)
**	**			
79.0	8,252.0	0.0	0.0	0.000
80.00	23,546.0	15,899.0	15,899.0	0.365
81.00	41,098.0	32,322.0	48,221.0	1.107

WATER QUALITY VOLUME PROVIDED =	48,221.0	1.107	
WATER QUALITY VOLUME REQUIRED =	18,833.7	0.432	OK

FIELD ENGINEERING, INC.

MATTAPOISETT, MA

SEDIMENT FOREBAY SIZING CALCULATION

Client:	PLUMBERS SUPPLY COMPANY, INC.	Job No.	2190
Project:	PROPOSED OFFICE/WAREHOUSE	Date:	3/20/2018 Rev 4/24/18
Location:	FLAHERTY DRIVE EXTENSION	Design by:	R. RICCIO

REQUIRED SEDIMENT FOREBAY SIZING-DETENTION BASIN 1

TOTAL CONTRIBUTING AREA (acre) =	12.2
MINIMUM FOREBAY SIZE (in. per acre) =	0.10
FOREBAY REQUIRED CAPACITY (cu. ft.) =	4,429

AVAILABLE VOLUME CALCULATION- FOREBAY 1

ELEV (ft.)	AREA (s.f.)	VOL (cu.ft.)	CUM. VOL (cu.ft.)	CUM. VOL (ac.ft.)
**	**			
81.0	5,787.0	0.0	0.0	0.000
82.5	7,100.0	9,665.3	9,665.3	0.222

AVAILABLE VOLUME CALCULATION-FOREBAY 2

ELEV (ft.)	AREA (s.f.)	VOL (cu.ft.)	CUM. VOL (cu.ft.)	CUM. VOL (ac.ft.)
**	**			
80.0	2,850.0	0.0	0.0	0.000
82.0	5,041.0	7,891.0	7,891.0	0.181

FOREBAY VOLUME PROVIDED	17,556.3	0.403	
FOREBAY VOLUME REQUIRED	4,428.6	0.102	OK

FIELD ENGINEERING CO., INC.

MATTAPOISETT, MA

STORM DRAINAGE DESIGN DATA
Rational Method Q=CIA
Design Storm 100 YEAR

Client: Plumbers Supply Co. Job No: 2190
Project: Proposed Site Development Date: 3/20/2018 Rev 4/24/18
Location: Flaherty Drive, NBBP Cal By: R. Riccio

NOTE: Data entry columns headed by double asterisk. **

From MH	Inv. Elev.	To MH	Inv. Elev.	Length (ft)	Slope (%)	Area Inc. (ac.)	Area Total (ac.)	Runoff Inc. "C"	Coef. Ave. "C"	Int. (in/hr) "I"	Inlet Time (min)	Pipe Time (min)	Total Time (min)	Flow Inc. (cfs)	Flow Total (cfs)	Pipe Dia. (in)	"n"	Slope (ft/ft)	Flow Full (cfs)	Vel. Full (ft/s)
**	**	**	**	**		**		**		**	**					**	**			
CB1	95.00	DMH1	94.00	52	1.92%	0.32	0.32	0.76	0.76	7.5	5.00	0.12	5.00	1.82	1.82	12	0.011	0.0192	5.80	7.39
**	**	**	**	**		**		**		**	**					**	**			
YD1	89.50	DMH1	88.50	50	2.00%	0.22	0.22	0.70	0.70	7.5	5.00	0.11	5.00	1.16	1.16	12	0.011	0.0200	5.92	7.54
**	**	**	**	**		**		**		**	**					**	**			
DMH1	88.40	DMH2	87.50	40	2.25%	0.00	0.54	0.00	0.74	7.5	5.00	0.08	5.12	0.00	2.98	12	0.011	0.0225	6.28	7.99
**	**	**	**	**		**		**		**	**					**	**			
DMH2	87.40	DMH5	85.35	115	1.78%	0.00	0.54	0.00	0.74	7.5	0.00	0.27	5.20	0.00	2.98	12	0.011	0.0178	5.59	7.12
**	**	**	**	**		**		**		**	**					**	**			
DCB2	87.75	DMH3	87.65	5	2.00%	0.33	0.33	0.75	0.75	7.5	5.00	0.01	5.01	1.86	1.86	12	0.011	0.0200	5.92	7.54
**	**	**	**	**		**		**		**	**					**	**			
RD	88.50	DMH3	87.65	40	2.12%	0.33	0.33	0.90	0.90	7.5	5.00	0.09	5.00	2.23	2.23	12	0.011	0.0212	6.10	7.77
**	**	**	**	**		**		**		**	**					**	**			
DMH3	87.40	DMH4	86.50	122	0.74%	0.00	0.66	0.00	0.83	7.5	5.00	0.38	5.38	0.00	4.08	15	0.011	0.0074	6.52	5.31
**	**	**	**	**		**		**		**	**					**	**			
DCB3	87.00	DMH4	86.90	5	2.00%	0.76	0.76	0.85	0.85	7.5	5.00	0.01	5.00	4.85	4.85	12	0.011	0.0200	5.92	7.54
**	**	**	**	**		**		**		**	**					**	**			
RD	88.50	DMH4	87.50	65	1.54%	0.14	0.14	0.90	0.90	7.5	5.00	0.16	5.00	0.95	0.95	12	0.011	0.0154	5.19	6.61
**	**	**	**	**		**		**		**	**					**	**			
DMH4	86.25	DMH5	84.85	200	0.70%	0.00	1.56	0.00	0.84	7.3	0.00	0.57	5.95	0.00	9.61	18	0.011	0.0070	10.32	5.84
**	**	**	**	**		**		**		**	**					**	**			
YD2	85.75	DMH5	85.35	72	0.56%	0.27	0.27	0.47	0.47	7.5	5.00	0.30	5.00	0.95	0.95	12	0.011	0.0056	3.12	3.97
**	**	**	**	**		**		**		**	**					**	**			
DMH5	84.35	DMH6	83.70	92	0.71%	0.00	2.37	0.00	0.78	7.2	5.00	0.22	6.17	0.00	13.25	24	0.011	0.0071	22.34	7.11
**	**	**	**	**		**		**		**	**					**	**			
CB4	88.00	DMH6	87.90	5	2.00%	0.56	0.56	0.71	0.71	7.5	5.00	0.01	5.00	2.98	2.98	12	0.011	0.0200	5.92	7.54
**	**	**	**	**		**		**		**	**					**	**			
DMH6	83.60	DMH7	82.20	318	0.44%	0.00	2.93	0.00	0.76	6.9	0.00	0.94	7.11	0.00	15.44	24	0.011	0.0044	17.63	5.61
**	**	**	**	**		**		**		**	**					**	**			
CB5	84.00	DMH7	83.50	22	2.27%	0.54	0.54	0.64	0.64	7.0	5.00	0.05	5.00	2.42	2.42	12	0.011	0.0227	6.31	8.03
**	**	**	**	**		**		**		**	**					**	**			
DMH7	81.70	DMH8	81.50	51	0.39%	0.00	3.47	0.00	0.74	6.9	0.00	0.14	7.25	0.00	17.83	30	0.011	0.0039	30.18	6.15
**	**	**	**	**		**		**		**	**					**	**			
DMH8	81.50	FE	81.00	143	0.35%	0.00	3.47	0.00	0.74	6.9	0.00	0.41	7.39	0.00	17.83	30	0.011	0.0035	28.49	5.80

FIELD ENGINEERING CO., INC.

MATTAPOISETT, MA

STORM DRAINAGE DESIGN DATA

Rational Method Q=CIA

Design Storm 100 YEAR

Client: Plumbers Supply Co. Job No: 2190
 Project: Proposed Site Development Date: 3/20/2018 Rev 4/24/18
 Location: Flaherty Drive, NBBP Cal By: R. Riccio

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**	**	**	**	**		**		**		**	**					**	**			
DCB6	81.20	FE	81.00	11	1.82%	1.17	1.17	0.88	0.88	7.5	5.00	0.02	5.00	7.72	7.72	15	0.011	0.0182	10.23	8.34
**	**	**	**	**		**		**		**	**					**	**			
DCB7	81.20	FE	81.00	11	1.82%	1.71	1.71	0.75	0.75	7.5	5.00	0.02	5.00	9.62	9.62	15	0.011	0.0182	10.23	8.34
**	**	**	**	**		**		**		**	**					**	**			
DCB8	81.00	FE	80.00	47	2.13%	1.13	1.13	0.58	0.58	7.5	5.00	0.09	5.00	4.92	4.92	15	0.011	0.0213	11.07	9.02
**	**	**	**	**		**		**		**	**					**	**			

Appendix A

Updated Post Development Watershed Plan

