Location Map

Parcels

City Limits

Standardized ROW Widths

Town Roads - Local/County

Town Roads - State Hwy

N

THE CITY OF WATERTOWN
Opportunity runs through it.

City of Watertown Geographic Information System

Scale: 1 inch = 200 feet

SCALE BAR = 1"

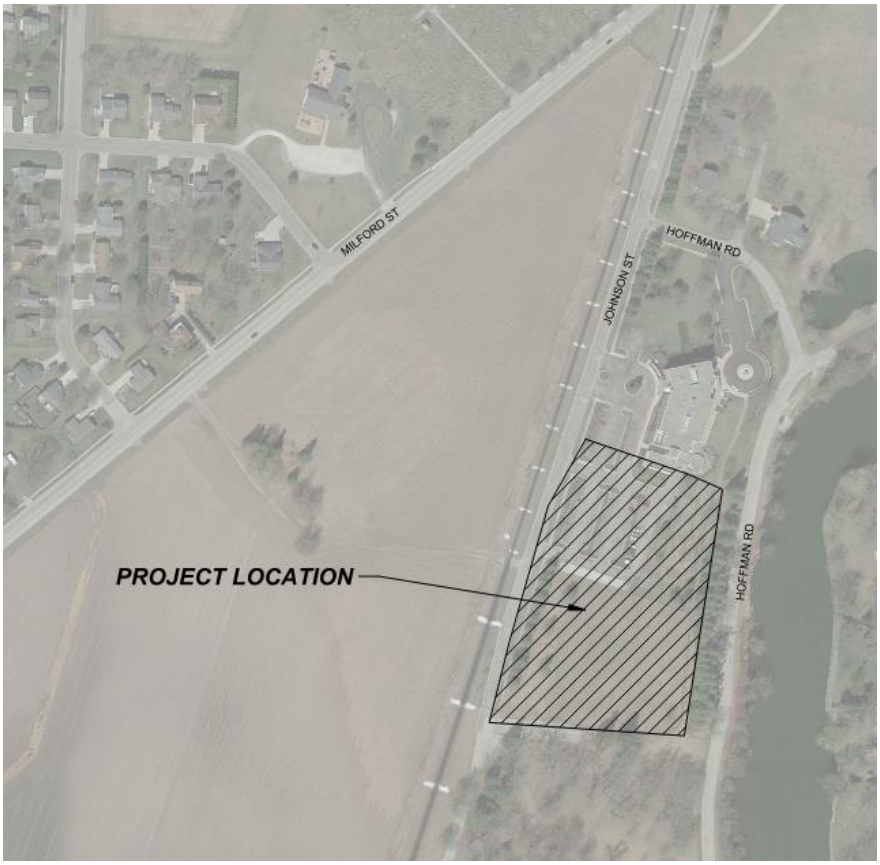
Printed on: February 21, 2024

Author: Private User

DISCLAIMER: This map is not a substitute for an actual field survey or onsite investigation.
The accuracy of this map is limited to the quality of the records from which it was assembled.
Other inherent inaccuracies occur during the compilation process.
City of Watertown makes no warranty whatsoever concerning this information.

STORMWATER MANAGEMENT REPORT

FOR



Watertown YMCA

Date: February 23, 2024

Prepared By: Harwood Engineering Consultants, Ltd.

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Project Number: 23-0049.00
Reviewed by: Brad Seubert

Introduction

The Watertown YMCA project is located south of the existing The Collective building located on Johnson Street in the City of Watertown, Wisconsin. This stormwater management report describes the practices that were used to meet the City of Watertown and the Wisconsin Department of Natural Resources (WDNR) stormwater management requirements.

An existing stormwater management report was approved by the City in 2022 for a small project on the north side of the property for The Collective building totaling roughly 1.1 acres. This current project will include those disturbed areas as well as the current disturbed areas to meet/match the same requirements as the 2022 stormwater management report.

Method of Analysis and Requirements

- Stormwater quantity management analysis was completed using HydroCAD-10.0 modeling software. Runoff curve numbers were determined from the NRCS tables within the TR-55 handbook. The rainfall events used in this analysis were based on the NRCS values for Jefferson County for 2-YR, 10-YR and 100-YR, 24-hour events (2.79 inches, 3.93 inches and 6.19 inches, respectively).
- Stormwater quality analysis was completed utilizing WinSLAMM V.10.5.0 The on-site water quality design was completed using the Madison rainfall files provided by WinSLAMM modeling software as well as the date ranges required by WDNR NR151.
- On-site storm sewer calculations were completed utilizing the Rational Method and Manning's equation, as well as, the design storm rainfall values per Atlas 14.
- The stormwater quantity requirements for this site are dictated by the City of Watertown and WDNR. This project is a re-development project which is exempt from quantity requirements.
- Stormwater quality requirements are dictated by the City of Watertown and require that this project achieve a reduction of 60% total suspended solids (TSS) from new parking and road areas as well as a 30% Phosphorus reduction for the whole site. The ***Water Quality Summary*** section summarizes the water quality methods and results on-site.

Soils Information

Soils on-site are mainly comprised of silty clay covered by a varying amount of topsoil. Refer to the ***Soils Section*** for Web soil survey information.

Pre-development Watershed Conditions (See Pre-development Conditions Exhibit)

The existing site is currently home to The Collective building and associated utilities and parking lots. An existing stormwater report has been approved by the City of Watertown in 2022 for redevelopment of this parcel. This included additions of sidewalks, repaving portions of the parking lots and adding a playground area. The south portion of the site drains to an existing dry pond and the north drains to existing storm sewer.

This report will analyze 6.691 acres of the site that was disturbed as part of the 2022 redevelopment as well as the current project. The existing site was analyzed as 3 drainage basins.

EX-1 includes the west and south portion of the site that was disturbed as part of the 2022 project as well as the current project. This includes greenspace and paved areas.

North Area – NT Disturbed includes a portion of the north side that was disturbed as part of the 2022 project. This includes greenspace and paved areas.

East Area – NT Disturbed includes a portion of the east side that was disturbed as part of the 2022 project. This includes paved and greenspace areas.

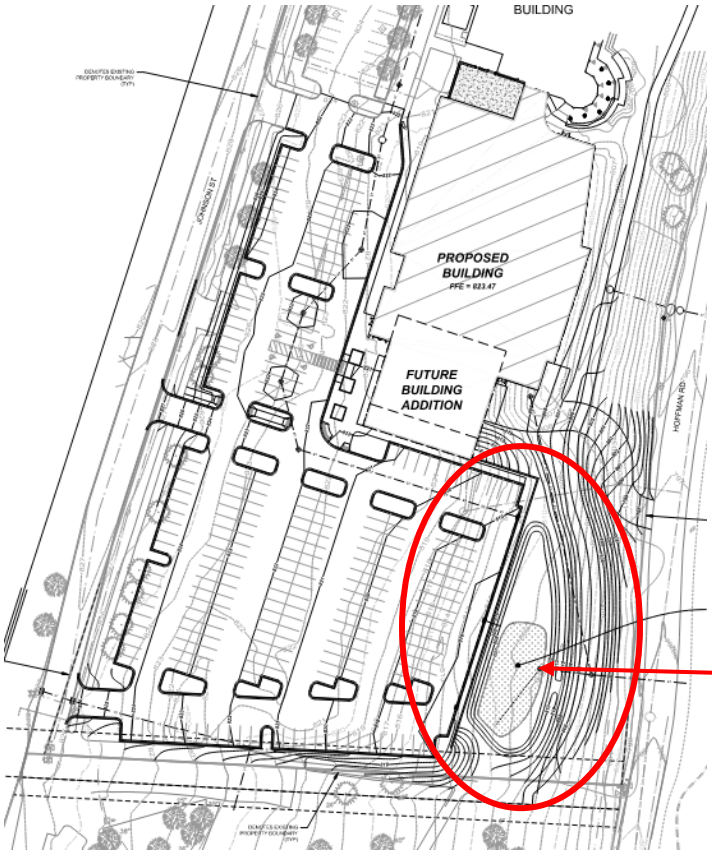
Pre-development Conditions Summary:

Sub-Area Name	Area (acres)	Curve Number	Time of Concentration (min)
EX-1	5.876	72	12.8
North Area	0.572	80	6.0
East Area	0.243	86	6.0
Total	6.691		

Proposed Watershed Conditions

The proposed site improvements include a building addition on the south side of the existing Collective building, totaling roughly 38,000 SF. Along with the building addition, the parking lots, access drive aisles and site utilities will be re-designed and constructed.

The proposed condition analyzes the same approximate 6.691 acres as the Pre-development conditions. One (1) Bio-retention basin will be constructed to manage a portion of the stormwater from the site. This will be located on the southeast portion of the site to provide the required water quality controls.



The site was split into 4 drainage areas as described below:

PR-1 includes the north, west and south portions of the site that are tributary to the bio-retention basin. This includes greenspace and paved areas.

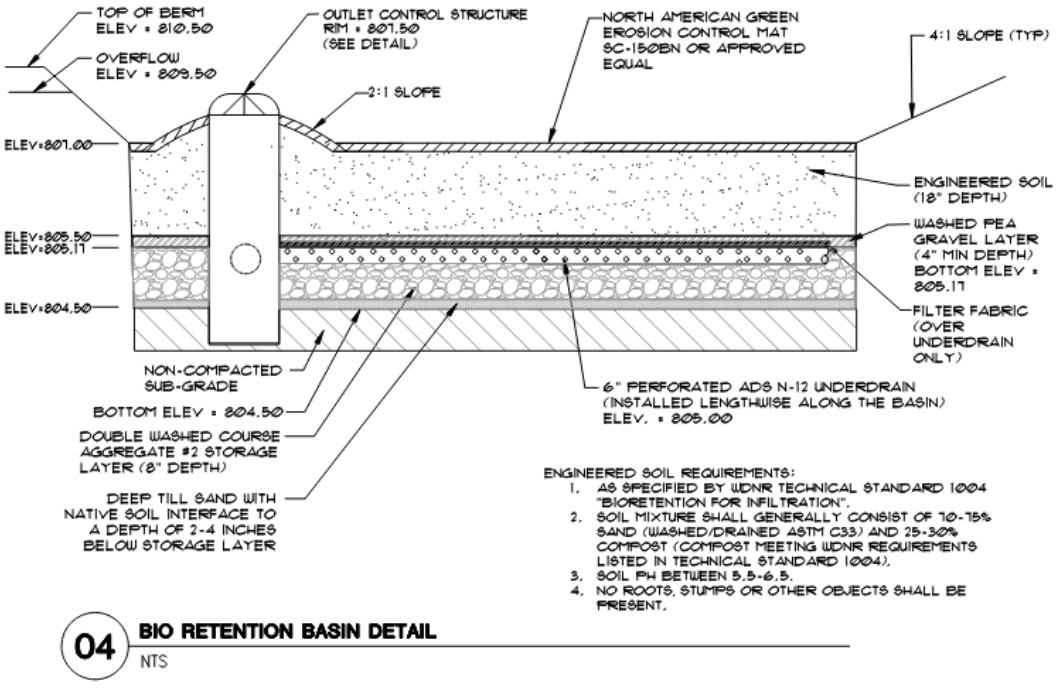
UD-1 includes the east portion of the site that has been disturbed and leaves the site undetained. This includes greenspace, paved and roof areas

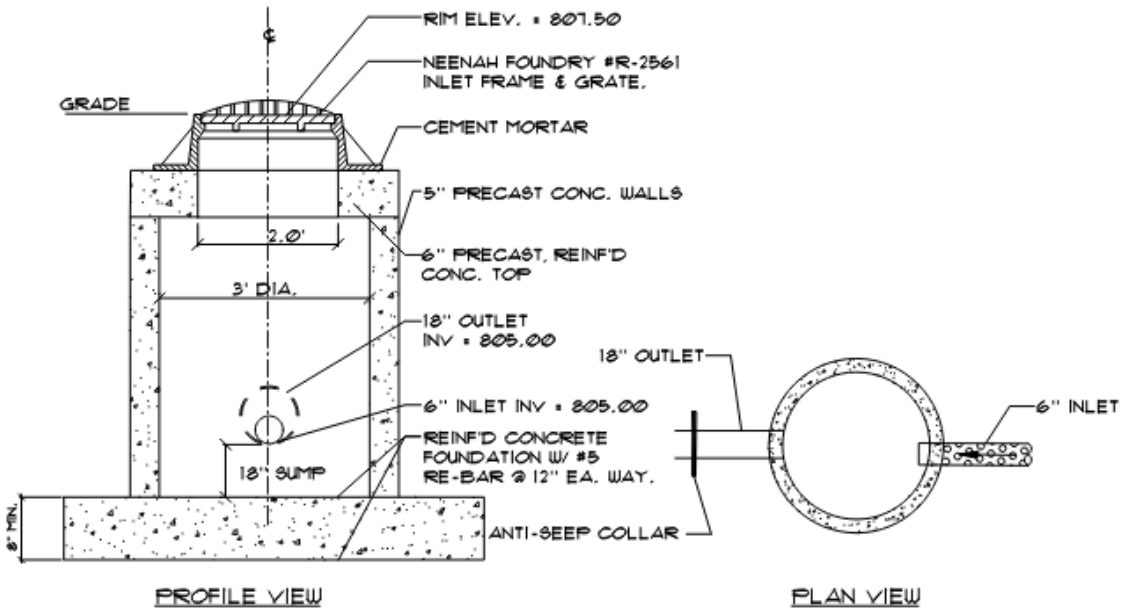
North Area NT Disturbed includes the north portion of the site that was disturbed as part of the 2022 project and leaves the site undetained. This includes paved and greenspace areas.

East Area NT Disturbed includes the east portion of the site that was disturbed as part of the 2022 project and leaves the site undetained. This includes paved and greenspace areas.

Proposed Conditions Summary:

Sub-Area Name	Area (acres)	Curve Number	Time of Concentration (min)
PR-1	4.053	89	6.0
UD-1	1.824	83	6.0
North Area	0.572	80	6.0
East Area	0.243	86	6.0
Total	6.691		





05 OUTLET CONTROL STRUCTURE
NTS

Proposed Basin 1 – Bio-Retention Basin:

Storm Event	Elevation	Release Rate (cfs)
2-yr	808.00	8.79
10-yr	808.40	13.86
100-yr	809.35	16.15

Water Quality and Analysis

The proposed redevelopment was modeled using the water quality software WinSLAMM (Ver. 10.5.0). The City of Watertown requires this redevelopment site to provide a 60% TSS reduction for new parking and roadway areas as well as a 30% Phosphorus reduction for the whole site.

The new pavement and roadway areas produce 1841 lbs of TSS. With 60% required to be removed, the total amount for the BMPs to be removed is 1104.6 lbs of TSS.

The proposed stormwater management feature for the site provides 1376 lbs of TSS removal which is greater than the 60% required.

The proposed stormwater management feature for the site removes approximately 46% phosphorus from the site which is greater than the 30% required.

See the ***Water Quality*** section for calculations that demonstrate that the site meets the 60% and 30% reduction goal.

Erosion Control Plan

Approximately 4.97 acres of the existing site will be disturbed for this project. The Erosion Control Plan shows the methods and locations proposed to stabilize the site during and after the development project.

Prior to initiating construction onsite, the silt filter fence and the construction entrance tracking pad shall be installed in an effort to minimize sediment travelling offsite.

Construction activities shall be staged, as much as possible, to limit the combined disturbed area.

Upon completing the grading and swales, the erosion control matting shall be installed. Silt fencing shall be maintained throughout the construction process and repaired and replaced as needed.

Sediment tracking shall be minimized to the maximum extent practicable. Roadways are to be swept of debris at the end of each work day, as needed.

Disturbed areas shall be stabilized as soon as grading is completed. Restoration and seeding methods shall follow the landscaping plans and municipal standards.

Dust control shall be maintained onsite with the use of a water truck if substantial dust becomes airborne.

During construction, the site shall be inspected by the contractor weekly and after every 0.5" or greater rainfall to evaluate the conditions of the erosion control practices and resolve any issues. The inspections shall be documented and maintained onsite and follow Wisconsin Department of Natural Resources Requirements

After the site work has been substantially completed and the areas have become stabilized, the stormwater management structure, catch basins, and inlets and outlets shall be inspected and cleaned if necessary to remove all sediment deposits transported during construction. After all areas have been stabilized, the temporary erosion control methods should be removed permanently.

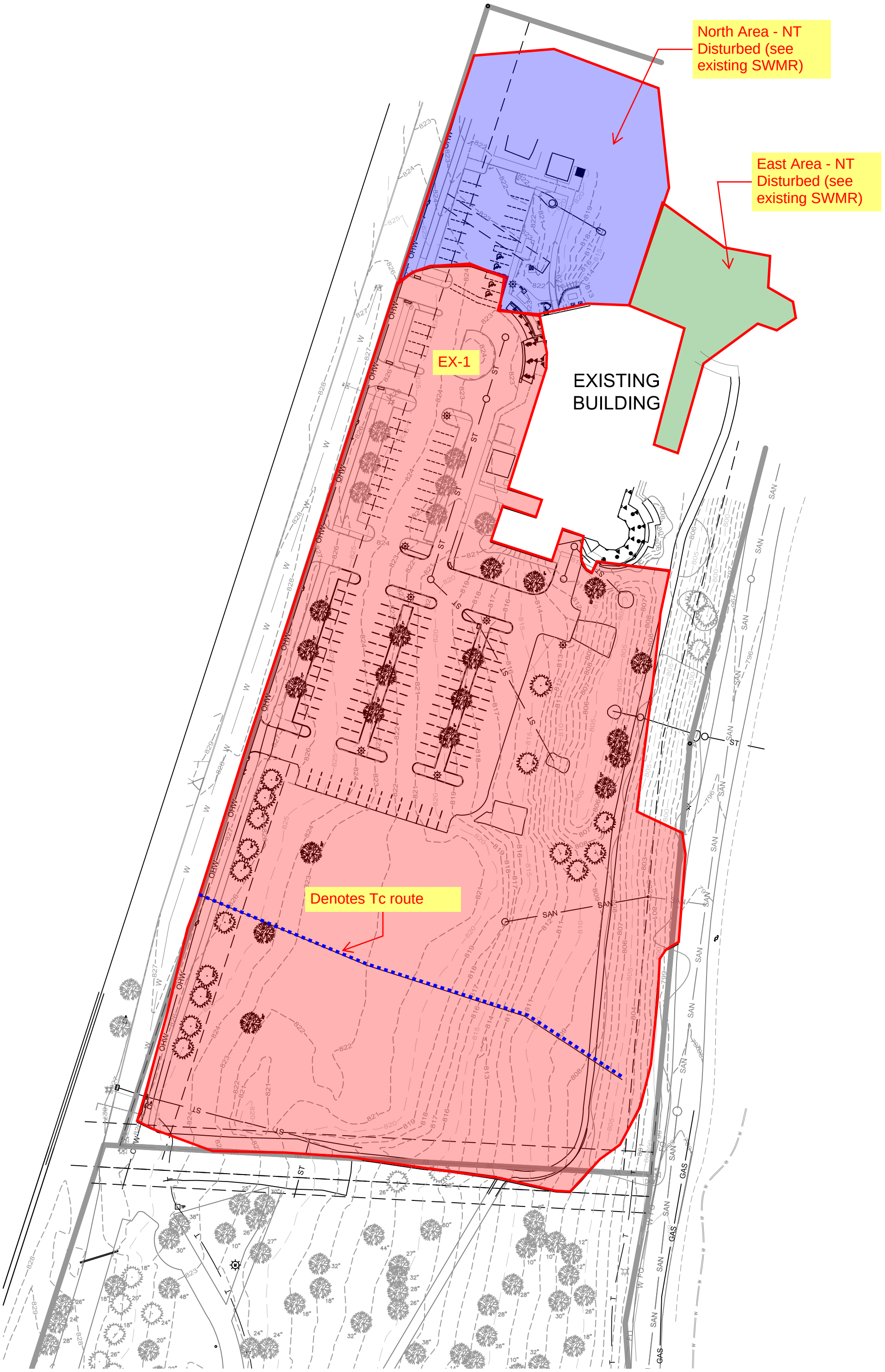
Operation and Maintenance

Culverts and inlets/outlets should be visually inspected after any large event and at a minimum of once per year. The outlet control structure should also be inspected after any large event, as well as, a minimum of twice per year (remove any debris that might create a blockage, including the grate on flared end section).

A copy of inspections performed, as well as, any preventative and/or required maintenance shall be logged and kept on site or with the property owner.

Conclusion

The proposed stormwater management features for the Watertown YMCA have been designed to meet the requirements of the Wisconsin Department of Natural Resources and the City of Watertown with respect to stormwater quantity, quality, and erosion control.



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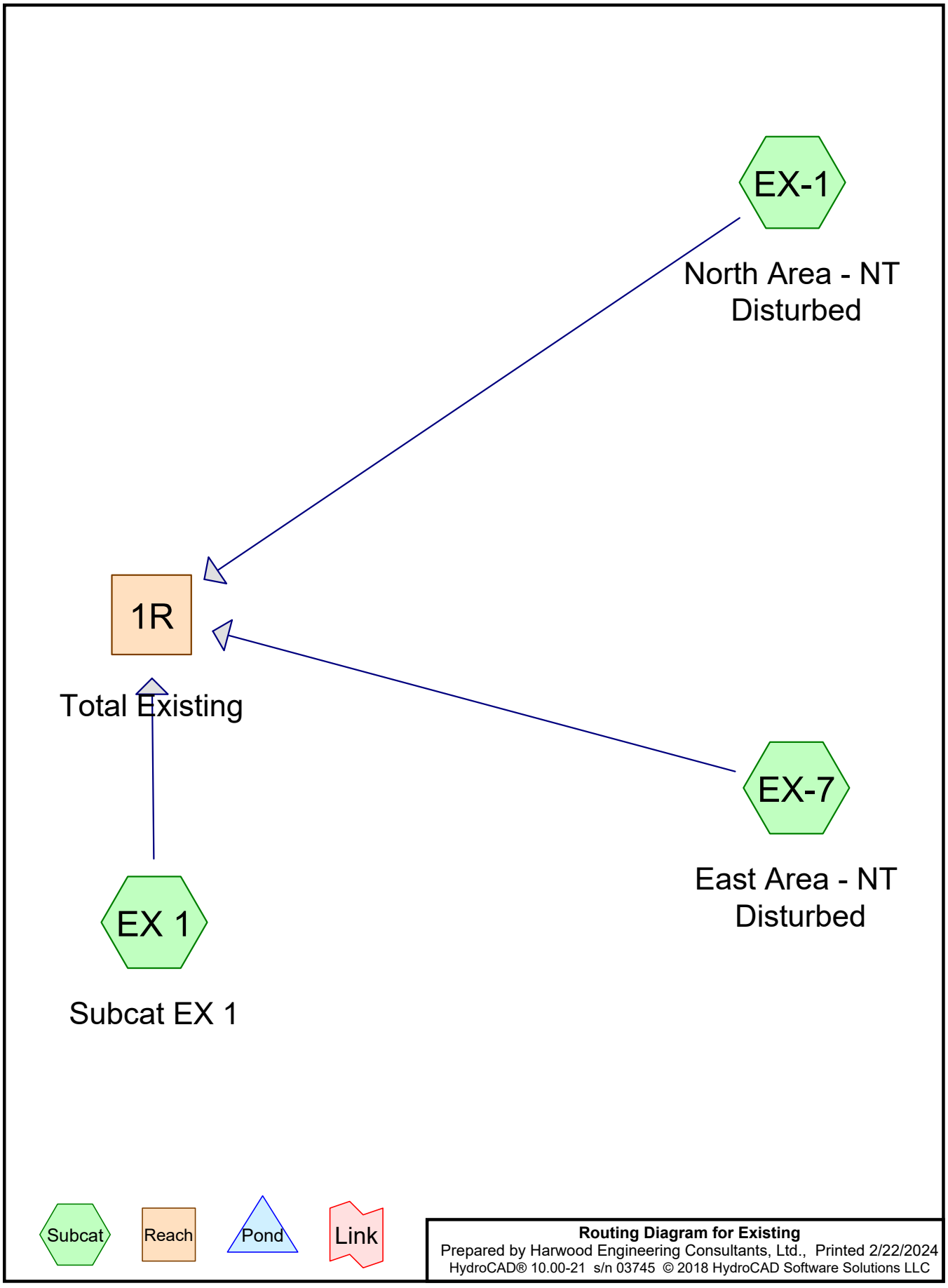
Watertown YMCA

Existing HydroCAD Map

North

Scale: 1" = 80'



Routing Diagram for Existing
Prepared by Harwood Engineering Consultants, Ltd., Printed 2/22/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.077	61	>75% Grass cover, Good, HSG B (EX 1)
0.543	74	>75% Grass cover, Good, HSG C (EX-1, EX-7)
1.432	98	Paved parking, HSG B (EX 1)
0.141	98	Paved parking, HSG C (EX-1, EX-7)
0.367	98	Sidewalks, Good, HSG B (EX 1)
0.131	98	Sidewalks, Good, HSG C (EX-1, EX-7)
6.691	**74**	**TOTAL AREA**

Time span=11.75-23.75 hrs, dt=0.01 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment EX 1: Subcat EX 1 Runoff Area=5.876 ac 30.62% Impervious Runoff Depth>0.62"
Flow Length=418' Tc=12.8 min CN=72 Runoff=4.54 cfs 0.302 af

Subcatchment EX-1: North Area - NT Runoff Area=0.572 ac 26.40% Impervious Runoff Depth>0.98"
Flow Length=139' Tc=6.0 min CN=80 Runoff=1.07 cfs 0.047 af

Subcatchment EX-7: East Area - NT Runoff Area=0.243 ac 49.79% Impervious Runoff Depth>1.29"
Tc=6.0 min CN=86 Runoff=0.63 cfs 0.026 af

Reach 1R: Total Existing Inflow=5.45 cfs 0.375 af
Outflow=5.45 cfs 0.375 af

Total Runoff Area = 6.691 ac Runoff Volume = 0.375 af Average Runoff Depth = 0.67"
69.04% Pervious = 4.620 ac 30.96% Impervious = 2.071 ac

Summary for Subcatchment EX 1: Subcat EX 1

[73] Warning: Peak may fall outside time span

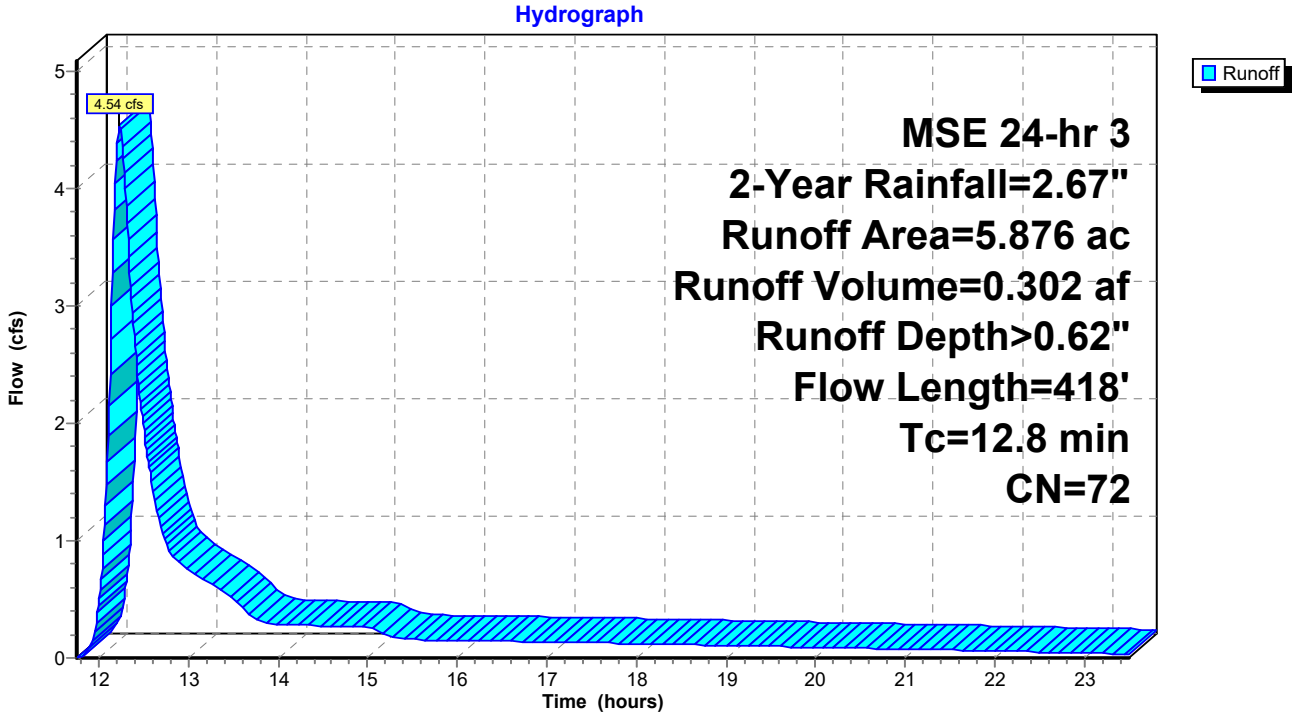
Runoff = 4.54 cfs @ 12.23 hrs, Volume= 0.302 af, Depth> 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.67"

Area (ac)	CN	Description
4.077	61	>75% Grass cover, Good, HSG B
1.432	98	Paved parking, HSG B
0.367	98	Sidewalks, Good, HSG B
5.876	72	Weighted Average
4.077		69.38% Pervious Area
1.799		30.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0435	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.4	318	0.0578	3.87		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.8	418	Total			

Subcatchment EX 1: Subcat EX 1



Summary for Subcatchment EX-1: North Area - NT Disturbed

[73] Warning: Peak may fall outside time span

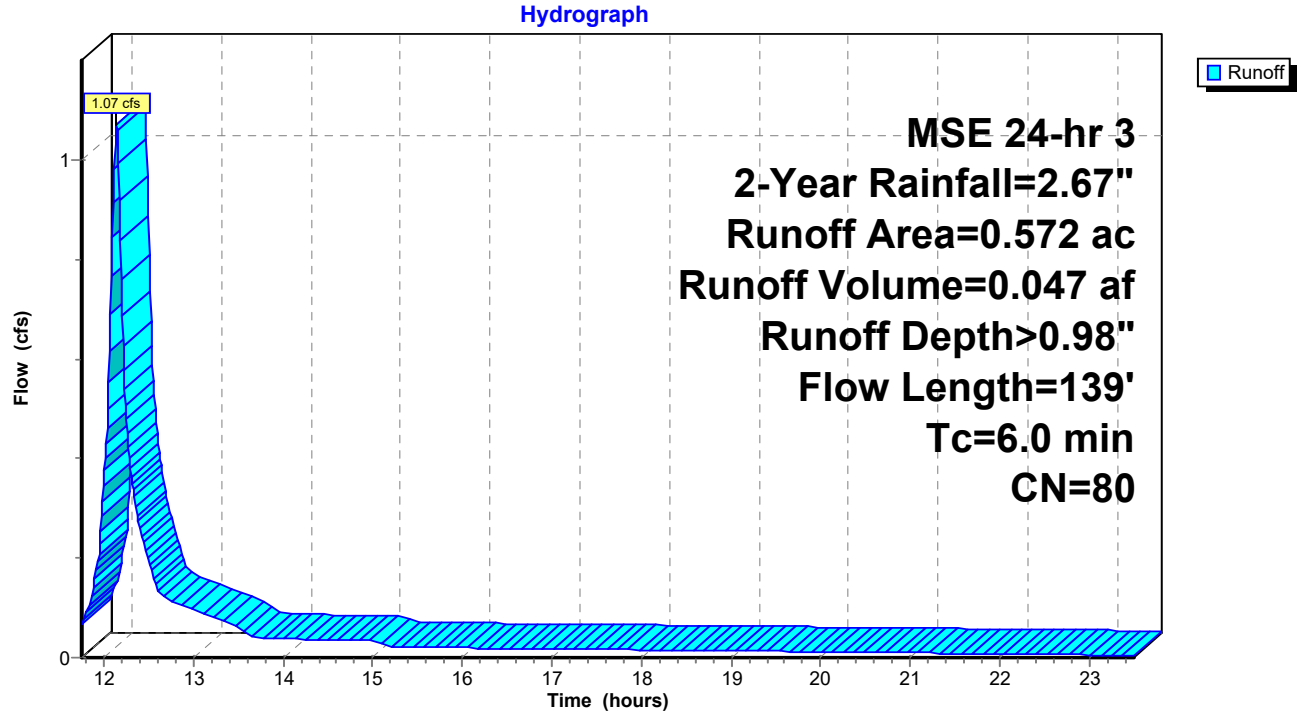
Runoff = 1.07 cfs @ 12.14 hrs, Volume= 0.047 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.67"

Area (ac)	CN	Description
0.421	74	>75% Grass cover, Good, HSG C
0.094	98	Paved parking, HSG C
0.030	98	Sidewalks, Good, HSG C
0.027	98	Sidewalks, Good, HSG C
0.572	80	Weighted Average
0.421		73.60% Pervious Area
0.151		26.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0196	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
0.4	39	0.0061	1.59		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	139	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: North Area - NT Disturbed



Summary for Subcatchment EX-7: East Area - NT Disturbed

[73] Warning: Peak may fall outside time span

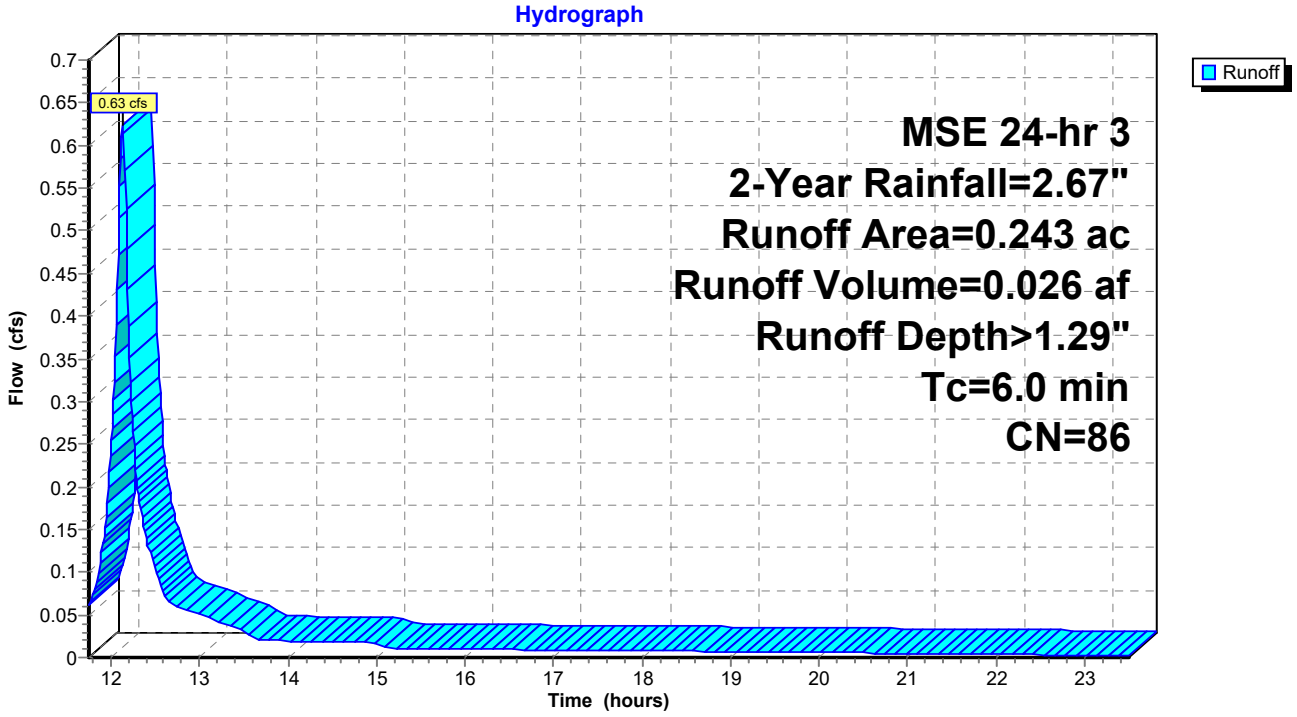
Runoff = 0.63 cfs @ 12.13 hrs, Volume= 0.026 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.67"

Area (ac)	CN	Description
0.122	74	>75% Grass cover, Good, HSG C
0.047	98	Paved parking, HSG C
0.060	98	Sidewalks, Good, HSG C
0.014	98	Sidewalks, Good, HSG C
0.243	86	Weighted Average
0.122		50.21% Pervious Area
0.121		49.79% Impervious Area

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

Subcatchment EX-7: East Area - NT Disturbed



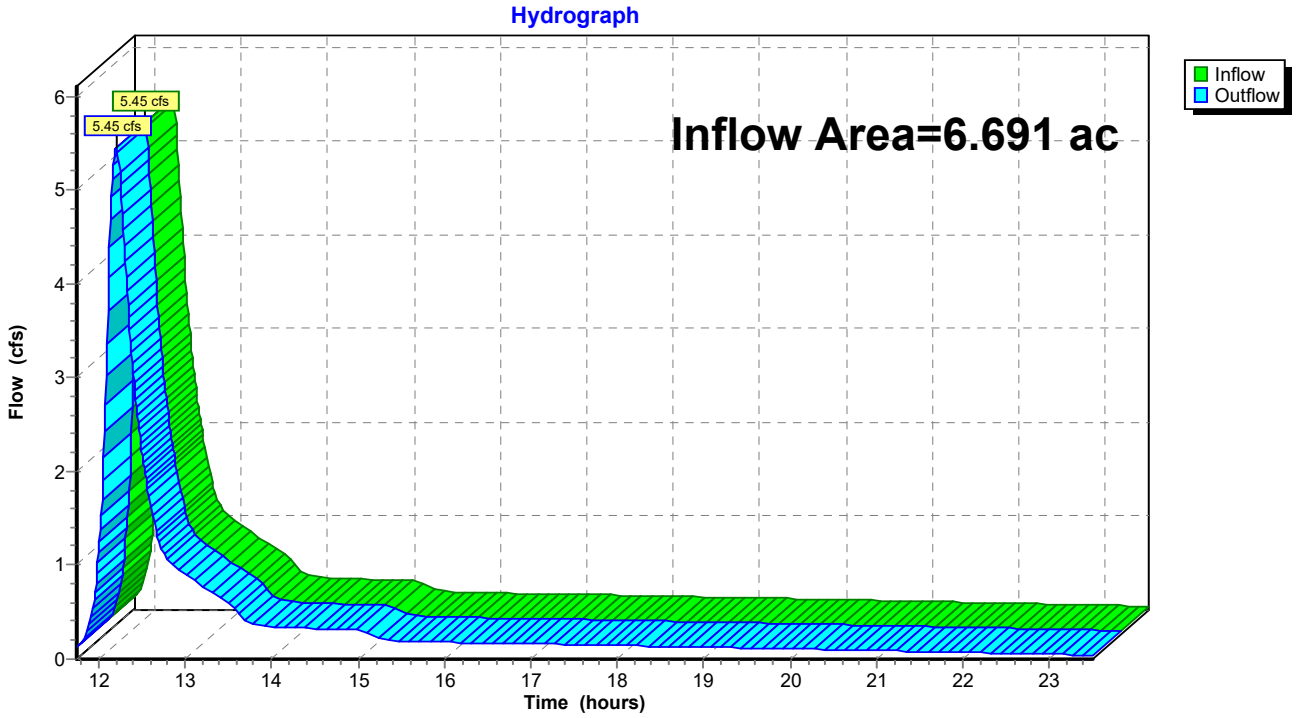
Summary for Reach 1R: Total Existing

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

Inflow Area = 6.691 ac, 30.96% Impervious, Inflow Depth > 0.67" for 2-Year event
Inflow = 5.45 cfs @ 12.21 hrs, Volume= 0.375 af
Outflow = 5.45 cfs @ 12.21 hrs, Volume= 0.375 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs

Reach 1R: Total Existing



Time span=11.75-23.75 hrs, dt=0.01 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment EX 1: Subcat EX 1 Runoff Area=5.876 ac 30.62% Impervious Runoff Depth>1.29"
Flow Length=418' Tc=12.8 min CN=72 Runoff=10.39 cfs 0.630 af

Subcatchment EX-1: North Area - NT Runoff Area=0.572 ac 26.40% Impervious Runoff Depth>1.75"
Flow Length=139' Tc=6.0 min CN=80 Runoff=1.98 cfs 0.083 af

Subcatchment EX-7: East Area - NT Runoff Area=0.243 ac 49.79% Impervious Runoff Depth>2.11"
Tc=6.0 min CN=86 Runoff=1.04 cfs 0.043 af

Reach 1R: Total Existing Inflow=12.11 cfs 0.757 af
Outflow=12.11 cfs 0.757 af

Total Runoff Area = 6.691 ac Runoff Volume = 0.757 af Average Runoff Depth = 1.36"
69.04% Pervious = 4.620 ac 30.96% Impervious = 2.071 ac

Summary for Subcatchment EX 1: Subcat EX 1

[73] Warning: Peak may fall outside time span

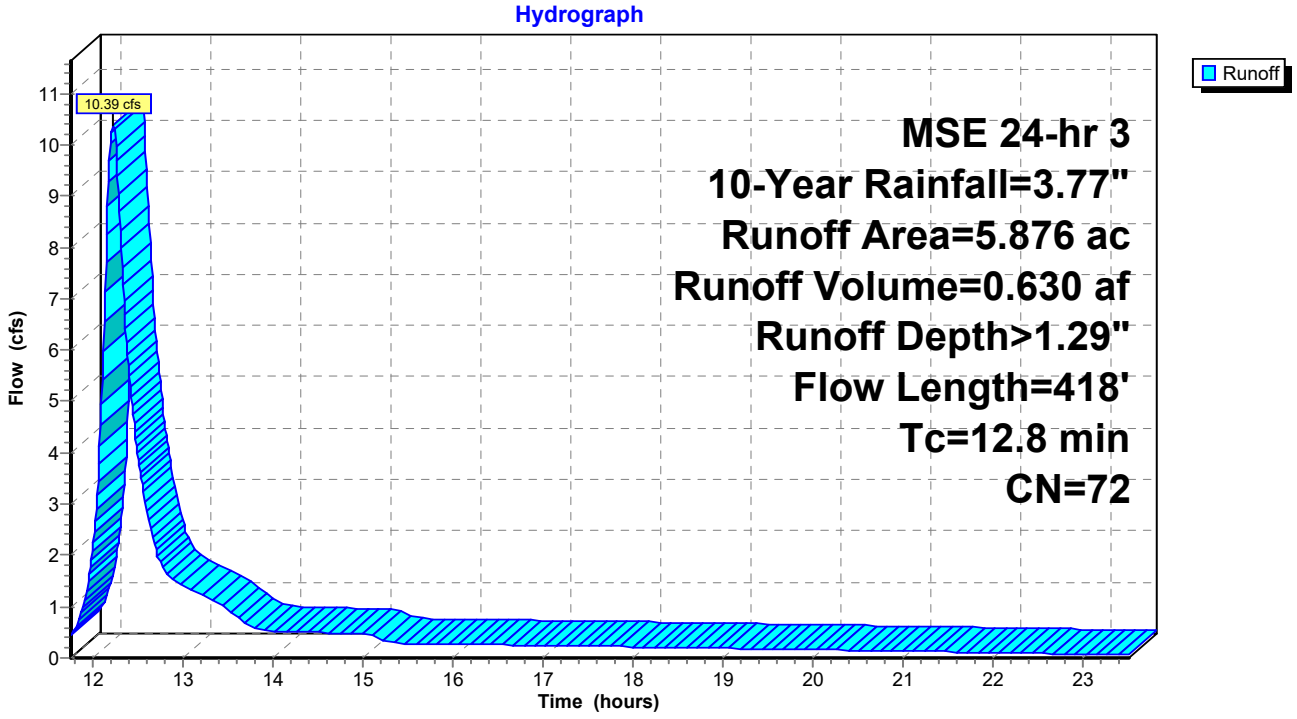
Runoff = 10.39 cfs @ 12.22 hrs, Volume= 0.630 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.77"

Area (ac)	CN	Description
4.077	61	>75% Grass cover, Good, HSG B
1.432	98	Paved parking, HSG B
0.367	98	Sidewalks, Good, HSG B
5.876	72	Weighted Average
4.077		69.38% Pervious Area
1.799		30.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0435	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.4	318	0.0578	3.87		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.8	418	Total			

Subcatchment EX 1: Subcat EX 1



Summary for Subcatchment EX-1: North Area - NT Disturbed

[73] Warning: Peak may fall outside time span

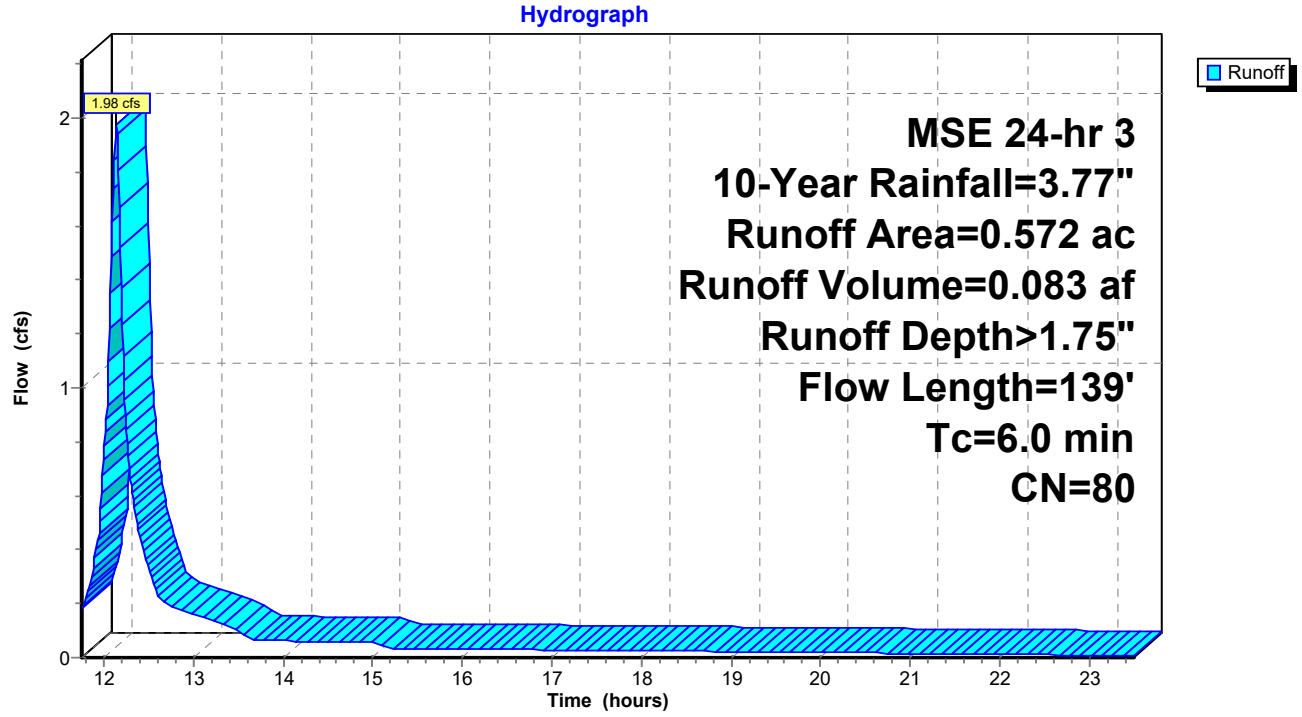
Runoff = 1.98 cfs @ 12.13 hrs, Volume= 0.083 af, Depth> 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.77"

Area (ac)	CN	Description
0.421	74	>75% Grass cover, Good, HSG C
0.094	98	Paved parking, HSG C
0.030	98	Sidewalks, Good, HSG C
0.027	98	Sidewalks, Good, HSG C
0.572	80	Weighted Average
0.421		73.60% Pervious Area
0.151		26.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0196	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
0.4	39	0.0061	1.59		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	139	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: North Area - NT Disturbed



Summary for Subcatchment EX-7: East Area - NT Disturbed

[73] Warning: Peak may fall outside time span

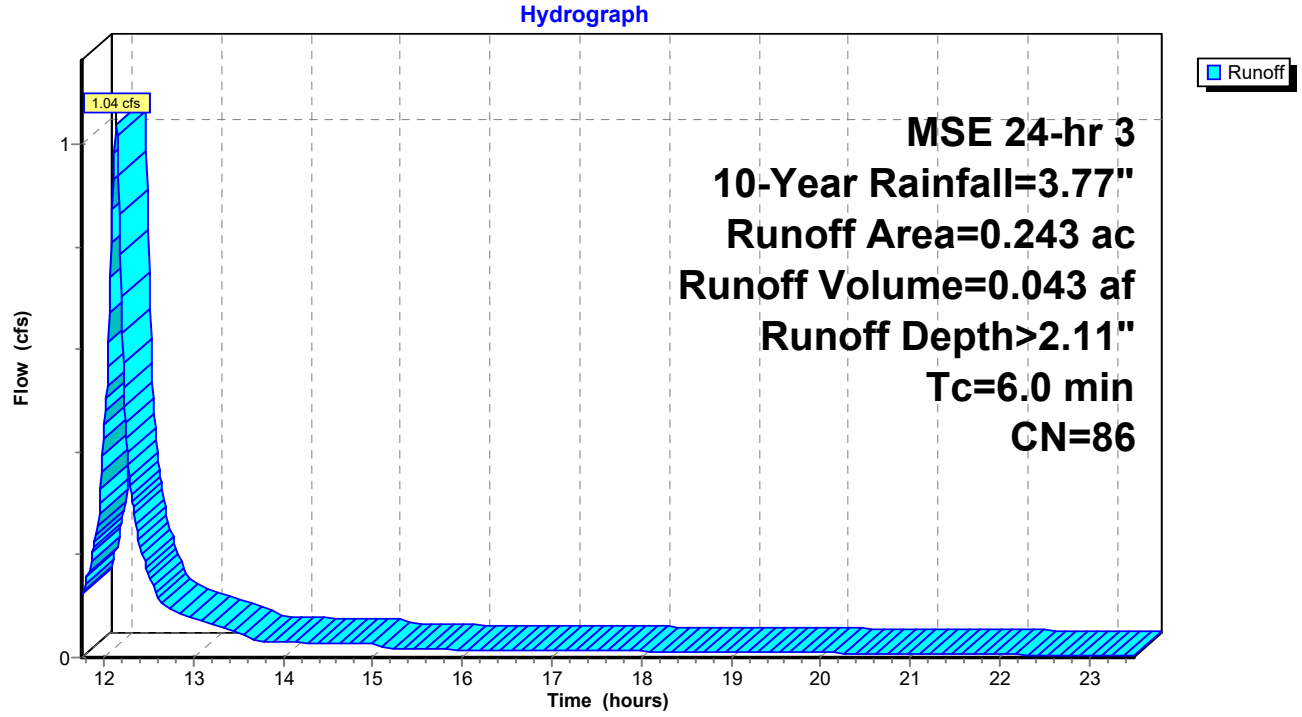
Runoff = 1.04 cfs @ 12.13 hrs, Volume= 0.043 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.77"

Area (ac)	CN	Description
0.122	74	>75% Grass cover, Good, HSG C
0.047	98	Paved parking, HSG C
0.060	98	Sidewalks, Good, HSG C
0.014	98	Sidewalks, Good, HSG C
0.243	86	Weighted Average
0.122		50.21% Pervious Area
0.121		49.79% Impervious Area

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

Subcatchment EX-7: East Area - NT Disturbed



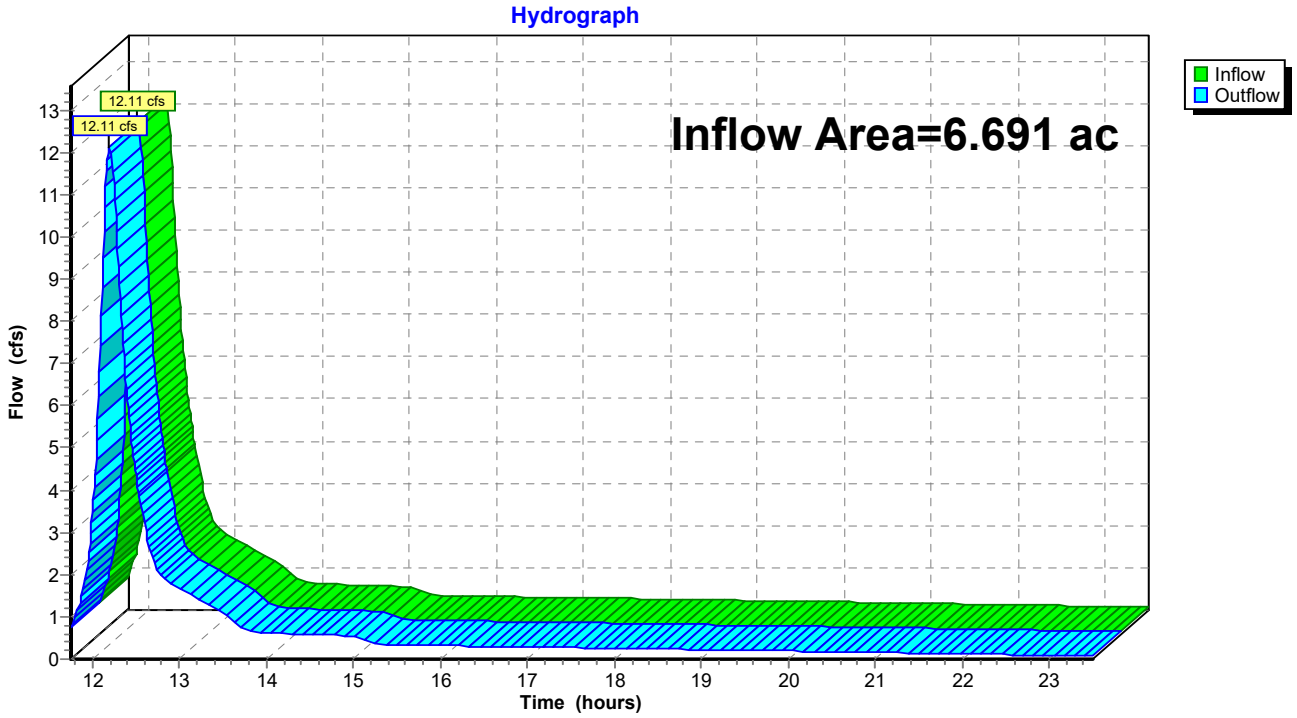
Summary for Reach 1R: Total Existing

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

Inflow Area = 6.691 ac, 30.96% Impervious, Inflow Depth > 1.36" for 10-Year event
Inflow = 12.11 cfs @ 12.19 hrs, Volume= 0.757 af
Outflow = 12.11 cfs @ 12.19 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs

Reach 1R: Total Existing



Time span=11.75-23.75 hrs, dt=0.01 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment EX 1: Subcat EX 1 Runoff Area=5.876 ac 30.62% Impervious Runoff Depth>2.80"
Flow Length=418' Tc=12.8 min CN=72 Runoff=23.99 cfs 1.370 af

Subcatchment EX-1: North Area - NT Runoff Area=0.572 ac 26.40% Impervious Runoff Depth>3.34"
Flow Length=139' Tc=6.0 min CN=80 Runoff=3.87 cfs 0.159 af

Subcatchment EX-7: East Area - NT Runoff Area=0.243 ac 49.79% Impervious Runoff Depth>3.73"
Tc=6.0 min CN=86 Runoff=1.86 cfs 0.076 af

Reach 1R: Total Existing Inflow=27.42 cfs 1.605 af
Outflow=27.42 cfs 1.605 af

Total Runoff Area = 6.691 ac Runoff Volume = 1.605 af Average Runoff Depth = 2.88"
69.04% Pervious = 4.620 ac 30.96% Impervious = 2.071 ac

Summary for Subcatchment EX 1: Subcat EX 1

[73] Warning: Peak may fall outside time span

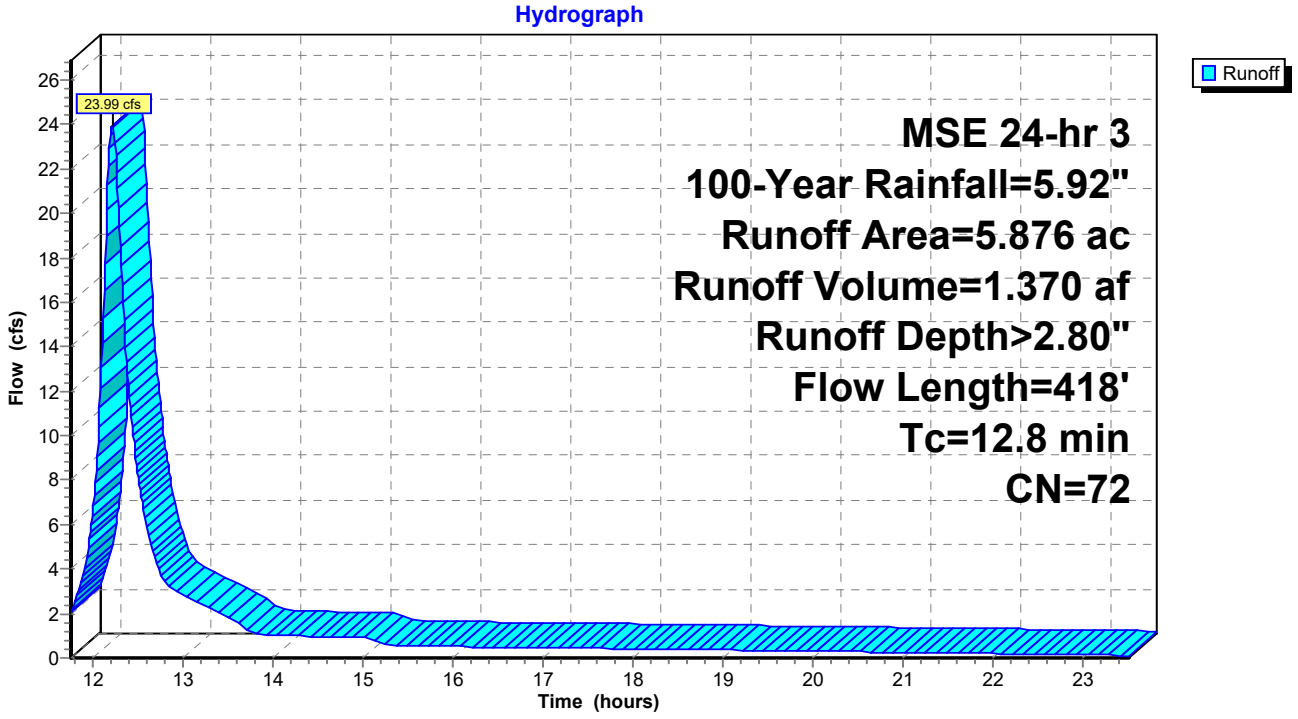
Runoff = 23.99 cfs @ 12.21 hrs, Volume= 1.370 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=5.92"

Area (ac)	CN	Description
4.077	61	>75% Grass cover, Good, HSG B
1.432	98	Paved parking, HSG B
0.367	98	Sidewalks, Good, HSG B
5.876	72	Weighted Average
4.077		69.38% Pervious Area
1.799		30.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0435	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.4	318	0.0578	3.87		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.8	418	Total			

Subcatchment EX 1: Subcat EX 1



Summary for Subcatchment EX-1: North Area - NT Disturbed

[73] Warning: Peak may fall outside time span

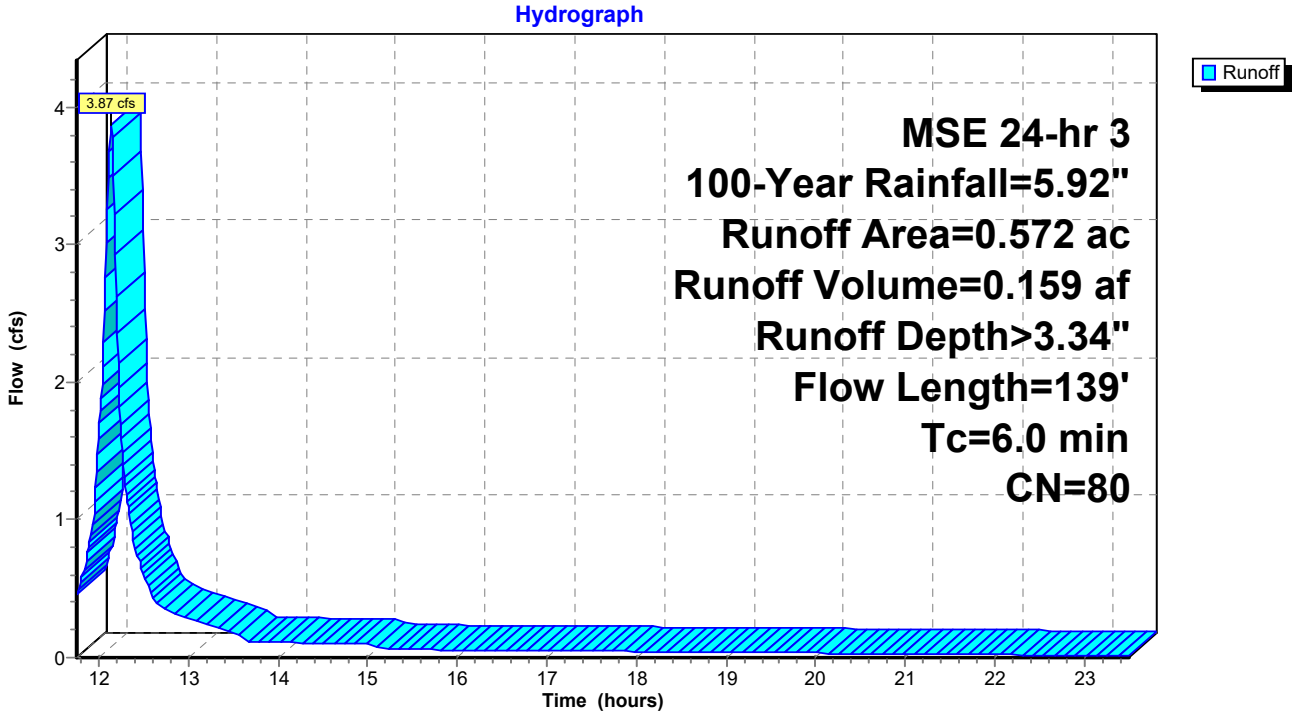
Runoff = 3.87 cfs @ 12.13 hrs, Volume= 0.159 af, Depth> 3.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=5.92"

Area (ac)	CN	Description
0.421	74	>75% Grass cover, Good, HSG C
0.094	98	Paved parking, HSG C
0.030	98	Sidewalks, Good, HSG C
0.027	98	Sidewalks, Good, HSG C
0.572	80	Weighted Average
0.421		73.60% Pervious Area
0.151		26.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0196	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
0.4	39	0.0061	1.59		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	139	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: North Area - NT Disturbed



Summary for Subcatchment EX-7: East Area - NT Disturbed

[73] Warning: Peak may fall outside time span

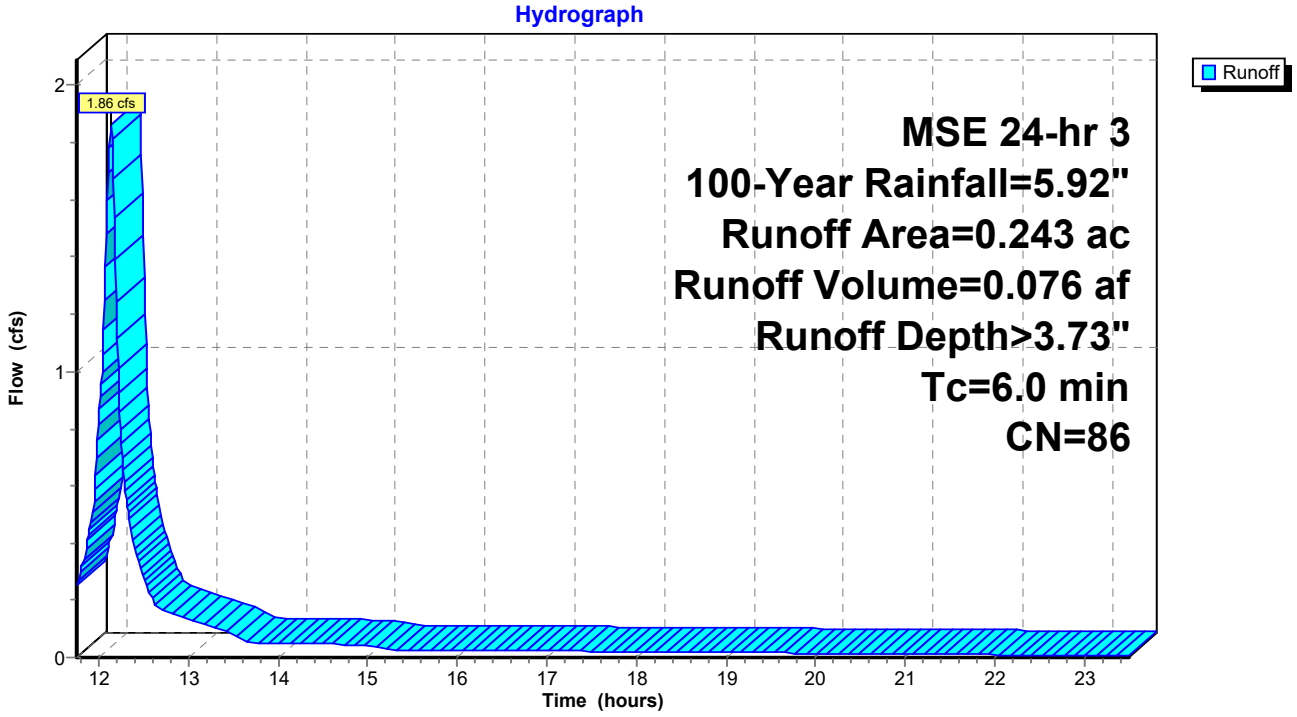
Runoff = 1.86 cfs @ 12.13 hrs, Volume= 0.076 af, Depth> 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=5.92"

Area (ac)	CN	Description
0.122	74	>75% Grass cover, Good, HSG C
0.047	98	Paved parking, HSG C
0.060	98	Sidewalks, Good, HSG C
0.014	98	Sidewalks, Good, HSG C
0.243	86	Weighted Average
0.122		50.21% Pervious Area
0.121		49.79% Impervious Area

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

Subcatchment EX-7: East Area - NT Disturbed



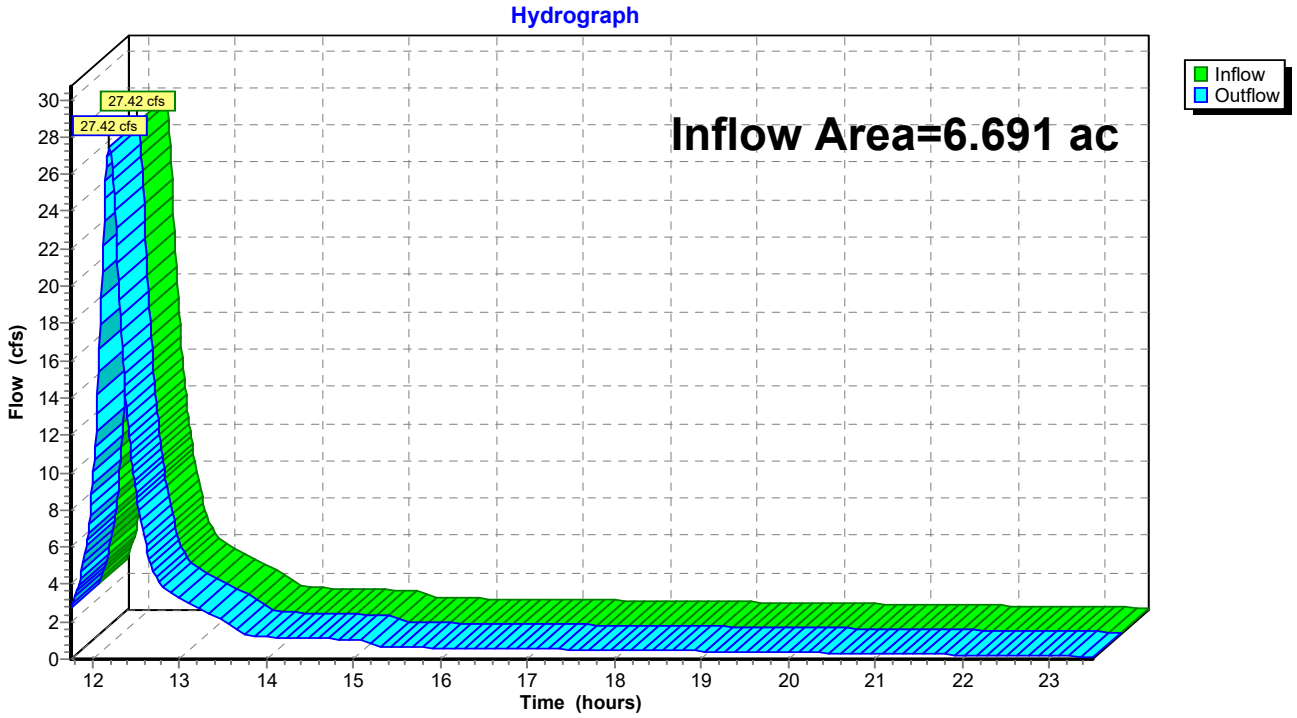
Summary for Reach 1R: Total Existing

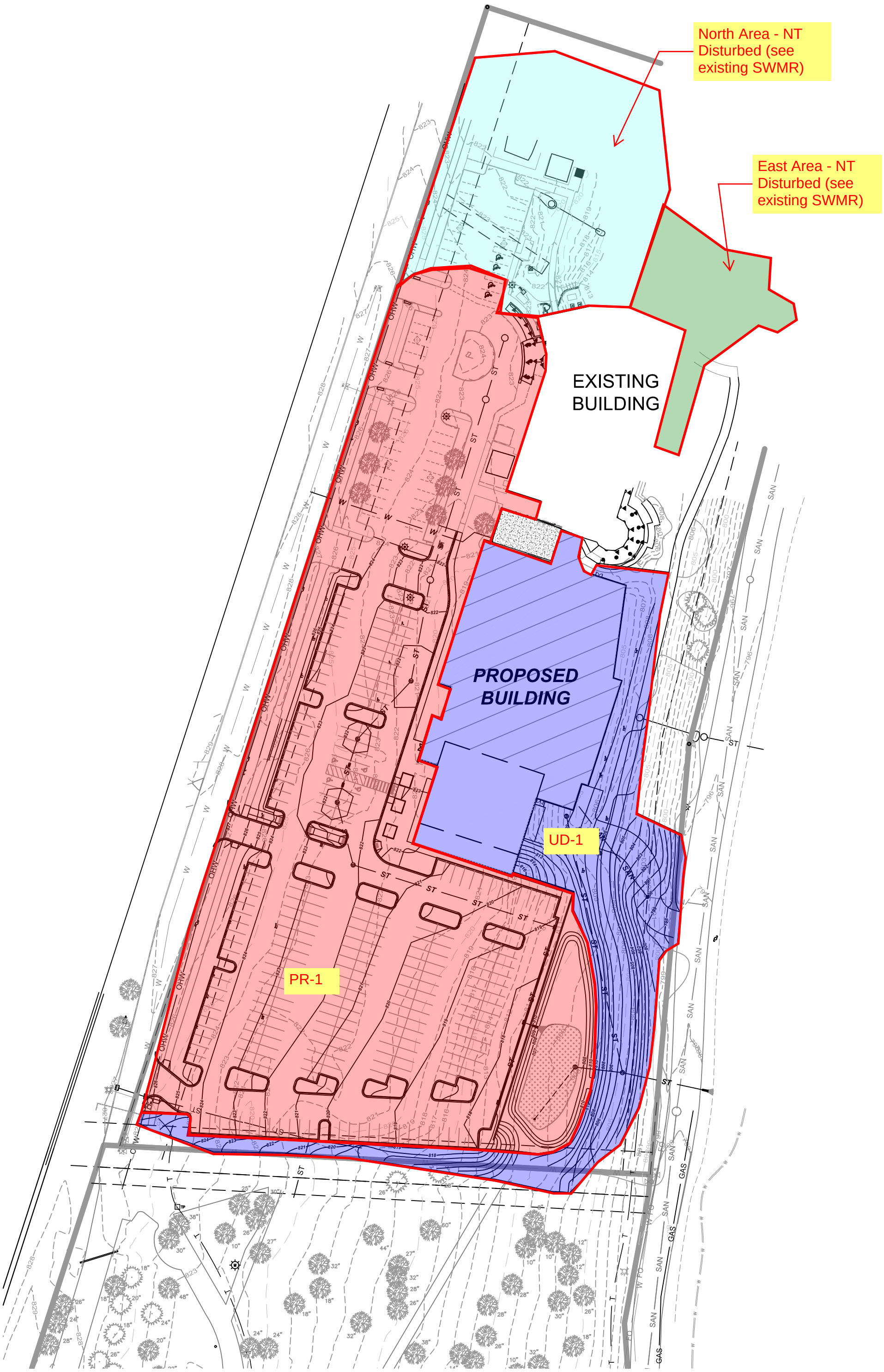
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.691 ac, 30.96% Impervious, Inflow Depth > 2.88" for 100-Year event
Inflow = 27.42 cfs @ 12.19 hrs, Volume= 1.605 af
Outflow = 27.42 cfs @ 12.19 hrs, Volume= 1.605 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 11.75-23.75 hrs, dt= 0.01 hrs

Reach 1R: Total Existing





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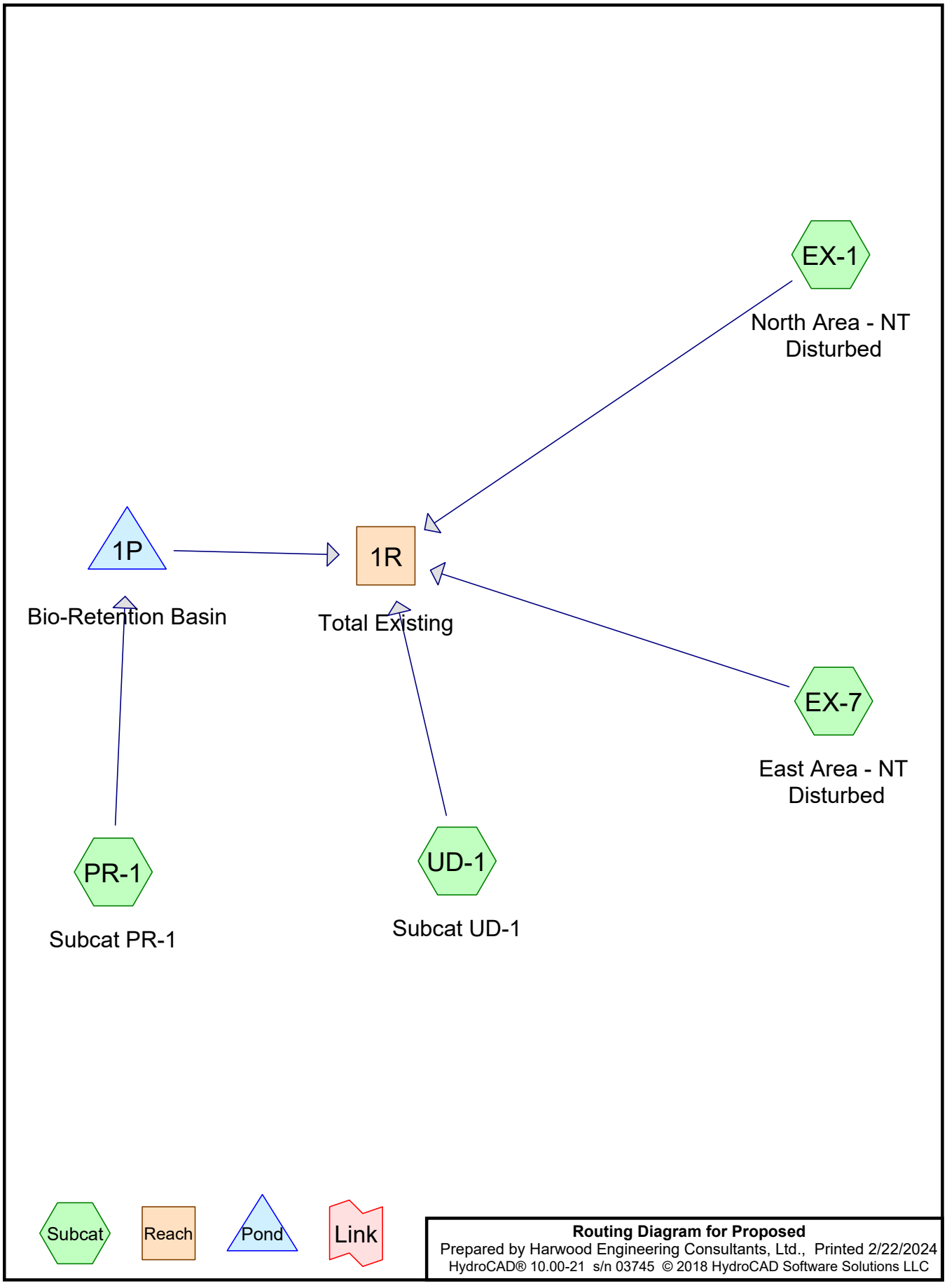
Watertown YMCA

Proposed HydroCAD Map

North

Scale: 1" = 80'



Routing Diagram for Proposed

Prepared by Harwood Engineering Consultants, Ltd., Printed 2/22/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.731	61	>75% Grass cover, Good, HSG B (PR-1, UD-1)
0.543	74	>75% Grass cover, Good, HSG C (EX-1, EX-7)
2.840	98	Paved parking, HSG B (PR-1, UD-1)
0.141	98	Paved parking, HSG C (EX-1, EX-7)
0.887	98	Roofs, HSG B (PR-1, UD-1)
0.418	98	Sidewalks, Good, HSG B (PR-1, UD-1)
0.131	98	Sidewalks, Good, HSG C (EX-1, EX-7)
6.691	**86**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment EX-1: North Area - NT Runoff Area=0.572 ac 26.40% Impervious Runoff Depth>1.09"
Flow Length=139' Tc=6.0 min CN=80 Runoff=1.17 cfs 0.052 af

Subcatchment EX-7: East Area - NT Runoff Area=0.243 ac 49.79% Impervious Runoff Depth>1.48"
Tc=6.0 min CN=86 Runoff=0.67 cfs 0.030 af

Subcatchment PR-1: Subcat PR-1 Runoff Area=4.052 ac 75.23% Impervious Runoff Depth>1.71"
Tc=0.0 min CN=89 Runoff=14.82 cfs 0.578 af

Subcatchment UD-1: Subcat UD-1 Runoff Area=1.824 ac 60.10% Impervious Runoff Depth>1.28"
Tc=0.0 min CN=83 Runoff=5.28 cfs 0.195 af

Reach 1R: Total Existing Inflow=15.14 cfs 0.838 af
Outflow=15.14 cfs 0.838 af

Pond 1P: Bio-Retention Basin Peak Elev=808.00' Storage=7,993 cf Inflow=14.82 cfs 0.578 af
Outflow=8.79 cfs 0.561 af

Total Runoff Area = 6.691 ac Runoff Volume = 0.854 af Average Runoff Depth = 1.53"
33.99% Pervious = 2.274 ac 66.01% Impervious = 4.417 ac

Summary for Subcatchment EX-1: North Area - NT Disturbed

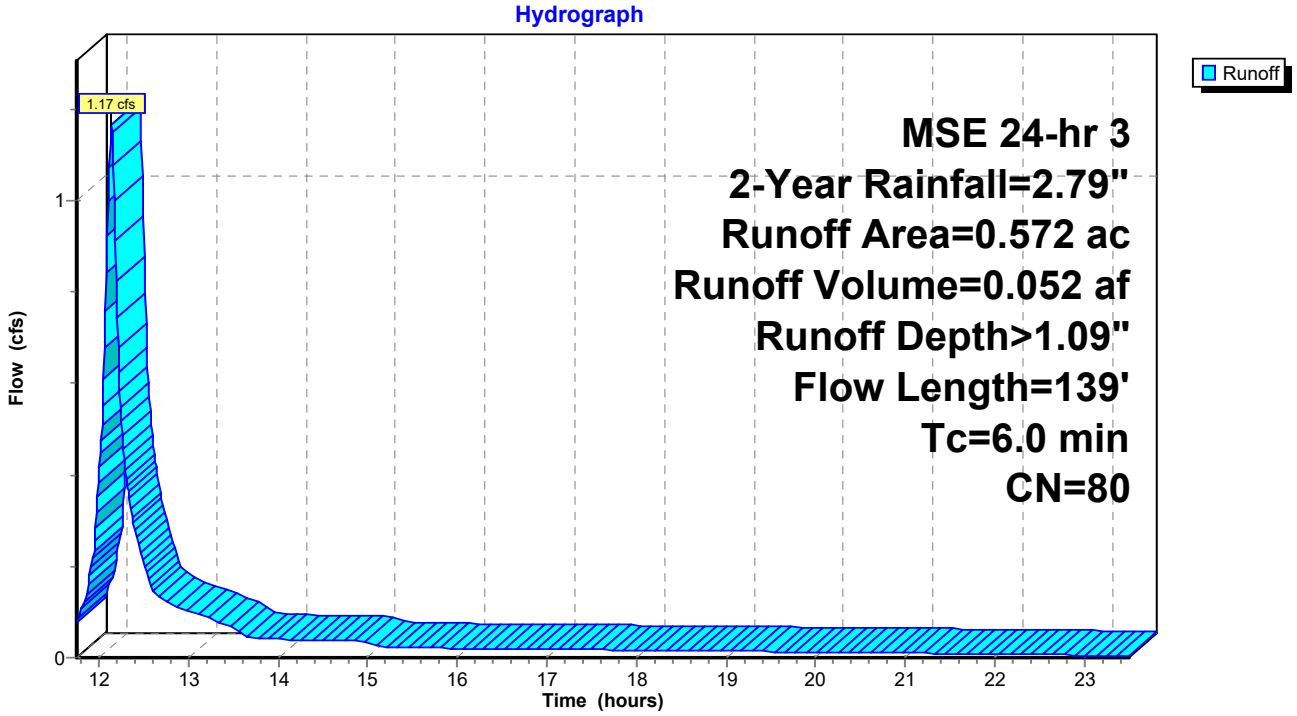
Runoff = 1.17 cfs @ 12.14 hrs, Volume= 0.052 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.79"

Area (ac)	CN	Description
0.421	74	>75% Grass cover, Good, HSG C
0.094	98	Paved parking, HSG C
0.030	98	Sidewalks, Good, HSG C
0.027	98	Sidewalks, Good, HSG C
0.572	80	Weighted Average
0.421		73.60% Pervious Area
0.151		26.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0196	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
0.4	39	0.0061	1.59		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	139	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: North Area - NT Disturbed



Summary for Subcatchment EX-7: East Area - NT Disturbed

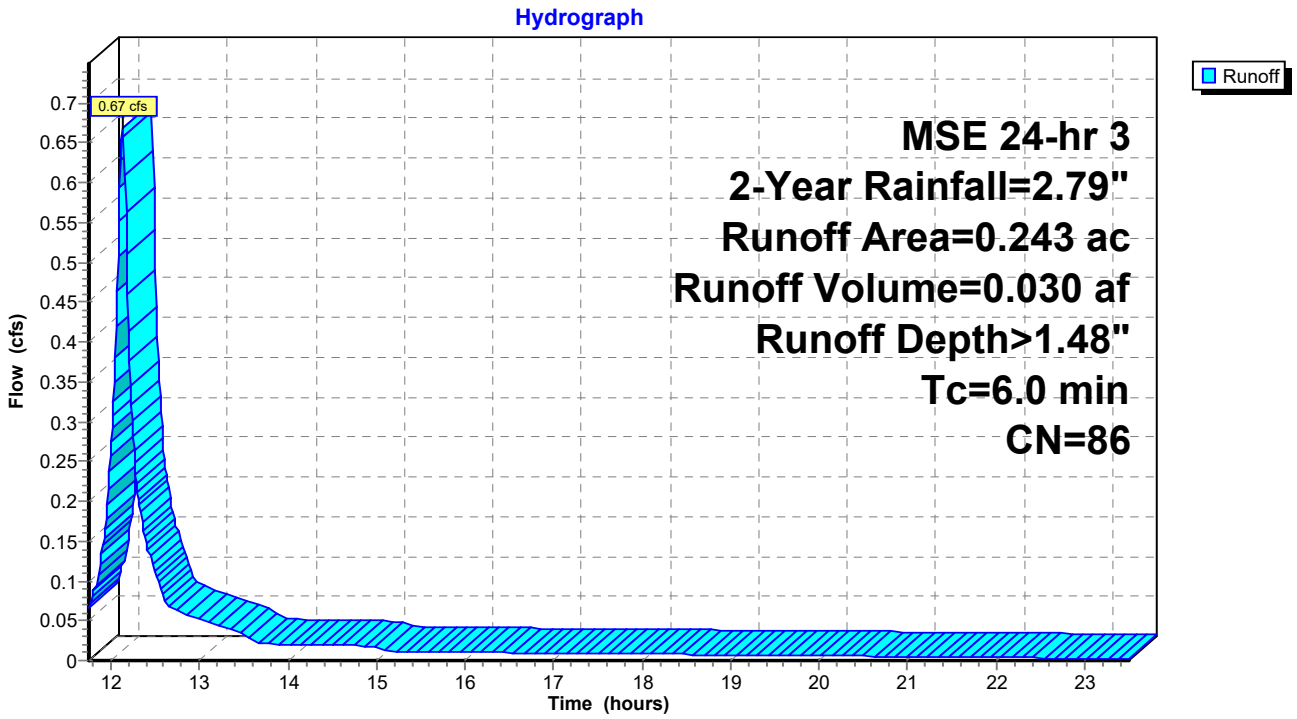
Runoff = 0.67 cfs @ 12.13 hrs, Volume= 0.030 af, Depth> 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.79"

Area (ac)	CN	Description
0.122	74	>75% Grass cover, Good, HSG C
0.047	98	Paved parking, HSG C
0.060	98	Sidewalks, Good, HSG C
0.014	98	Sidewalks, Good, HSG C
0.243	86	Weighted Average
0.122		50.21% Pervious Area
0.121		49.79% Impervious Area

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

Subcatchment EX-7: East Area - NT Disturbed



Summary for Subcatchment PR-1: Subcat PR-1

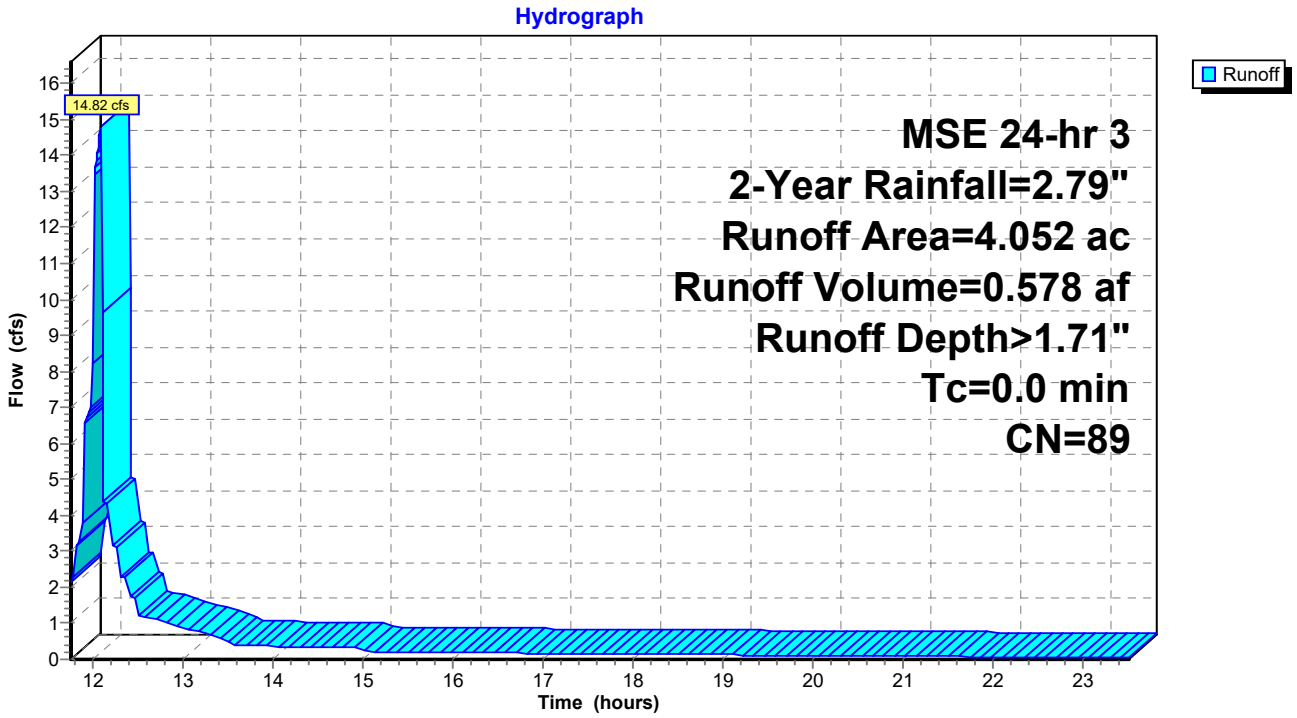
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.82 cfs @ 12.09 hrs, Volume= 0.578 af, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.79"

Area (ac)	CN	Description
1.004	61	>75% Grass cover, Good, HSG B
2.713	98	Paved parking, HSG B
0.010	98	Roofs, HSG B
0.326	98	Sidewalks, Good, HSG B
4.052	89	Weighted Average
1.004		24.77% Pervious Area
3.048		75.23% Impervious Area

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment UD-1: Subcat UD-1

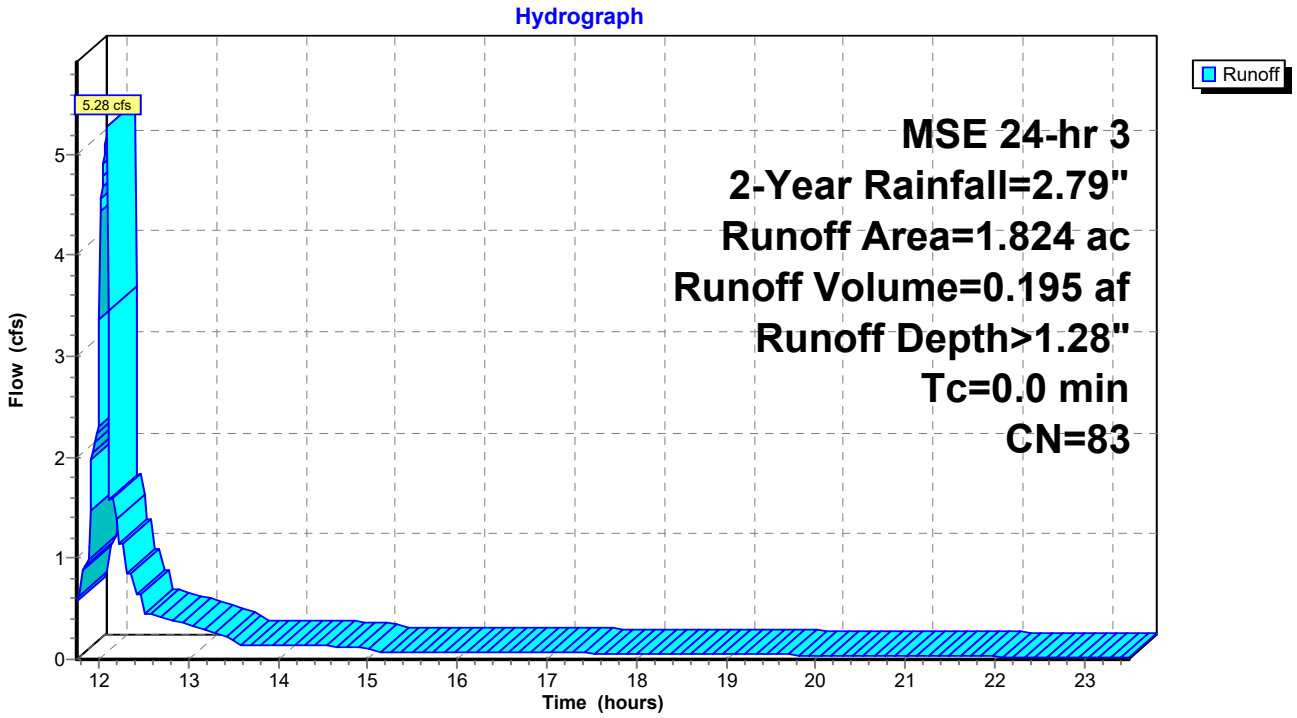
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 5.28 cfs @ 12.09 hrs, Volume= 0.195 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.79"

Area (ac)	CN	Description
0.728	61	>75% Grass cover, Good, HSG B
0.127	98	Paved parking, HSG B
0.877	98	Roofs, HSG B
0.092	98	Sidewalks, Good, HSG B
1.824	83	Weighted Average
0.728		39.90% Pervious Area
1.096		60.10% Impervious Area

Subcatchment UD-1: Subcat UD-1



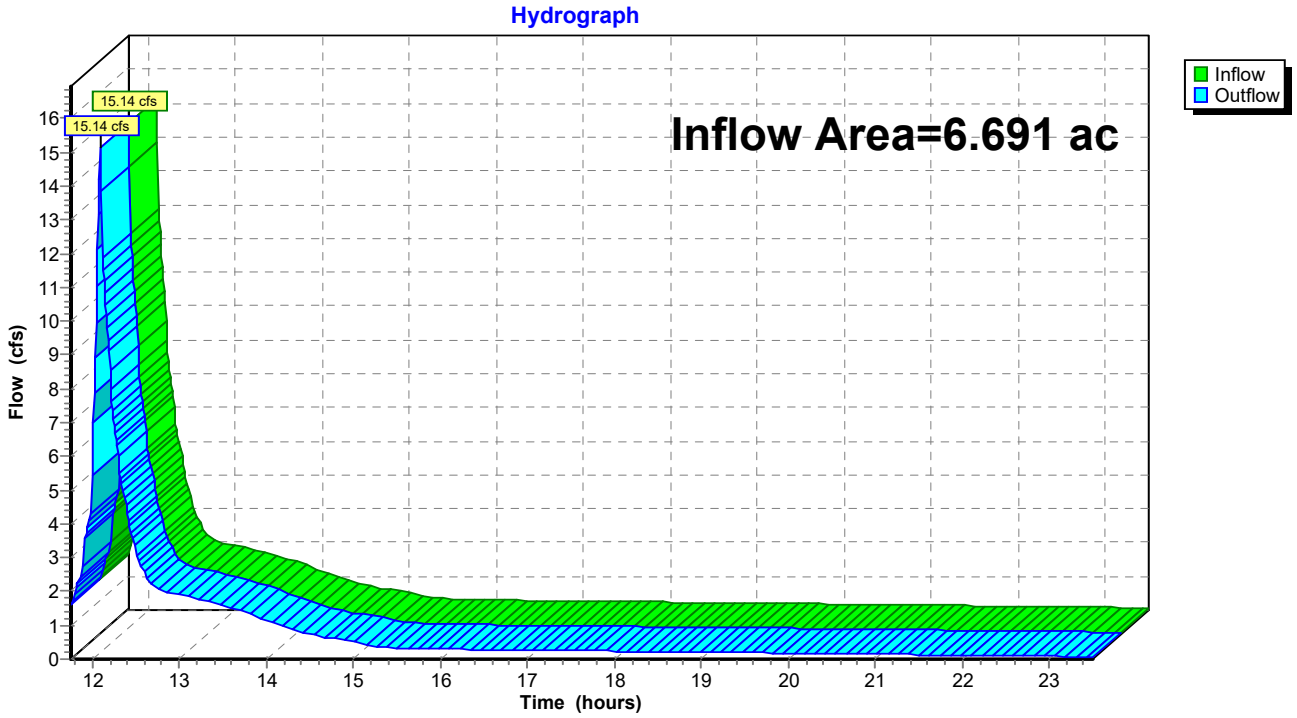
Summary for Reach 1R: Total Existing

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

Inflow Area = 6.691 ac, 66.01% Impervious, Inflow Depth > 1.50" for 2-Year event
Inflow = 15.14 cfs @ 12.09 hrs, Volume= 0.838 af
Outflow = 15.14 cfs @ 12.09 hrs, Volume= 0.838 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: Total Existing



Summary for Pond 1P: Bio-Retention Basin

Inflow Area = 4.052 ac, 75.23% Impervious, Inflow Depth > 1.71" for 2-Year event
Inflow = 14.82 cfs @ 12.09 hrs, Volume= 0.578 af
Outflow = 8.79 cfs @ 12.10 hrs, Volume= 0.561 af, Atten= 41%, Lag= 0.7 min
Primary = 8.79 cfs @ 12.10 hrs, Volume= 0.561 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 808.00' @ 12.10 hrs Surf.Area= 7,156 sf Storage= 7,993 cf

Plug-Flow detention time= 45.9 min calculated for 0.561 af (97% of inflow)
Center-of-Mass det. time= 30.2 min (820.6 - 790.4)

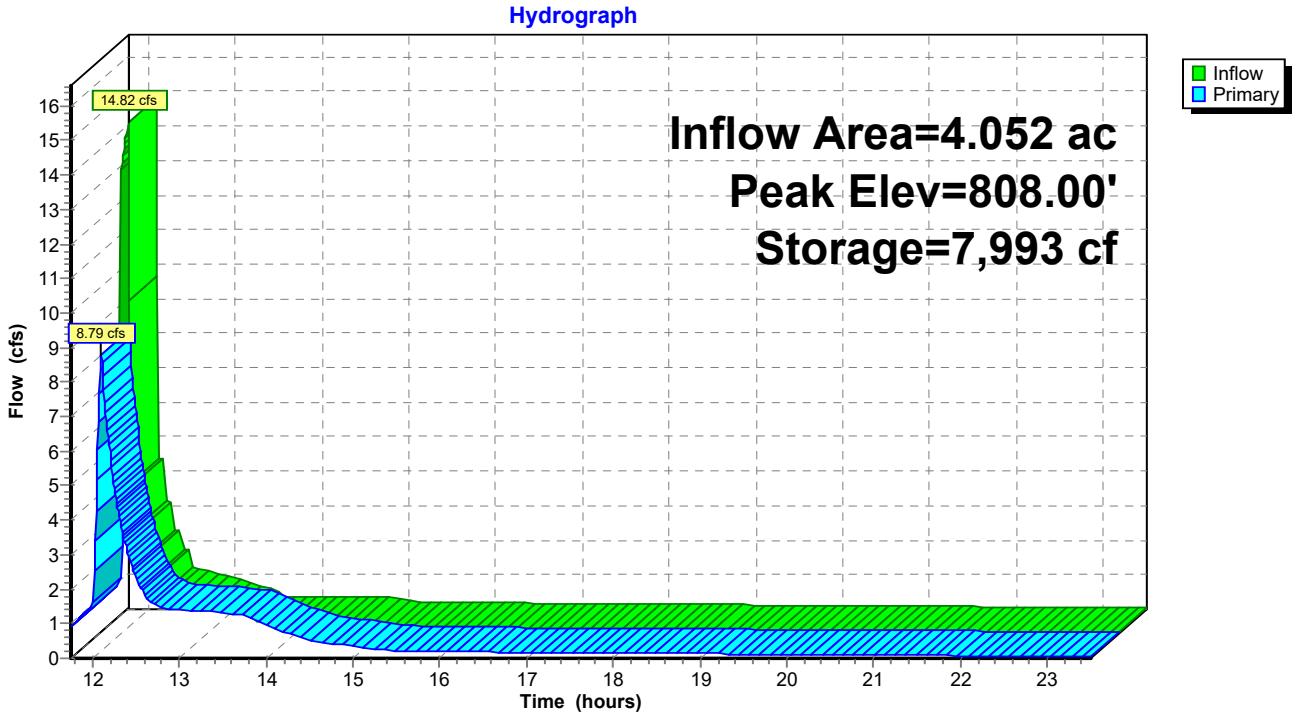
Volume	Invert	Avail.Storage	Storage Description
#1	804.49'	30,111 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
804.49	3,588	0.0	0	0
804.50	3,588	33.0	12	12
805.50	3,588	33.0	1,184	1,196
805.51	3,588	27.0	10	1,206
807.00	3,588	27.0	1,443	2,649
807.01	3,588	100.0	36	2,685
808.00	7,163	100.0	5,322	8,007
809.00	8,431	100.0	7,797	15,804
810.00	9,756	100.0	9,094	24,897
810.50	11,099	100.0	5,214	30,111

Device	Routing	Invert	Outlet Devices
#1	Primary	805.00'	**18.0" Round Culvert** L= 123.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.00' / 791.00' S= 0.1138 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Primary	809.50'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Device 1	805.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	807.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=8.74 cfs @ 12.10 hrs HW=808.00' (Free Discharge)
- **1=Culvert** (Passes 8.74 cfs of 12.75 cfs potential flow)
  - **3=Orifice/Grate** (Orifice Controls 1.57 cfs @ 7.98 fps)
  - **4=Orifice/Grate** (Weir Controls 7.18 cfs @ 2.30 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Bio-Retention Basin



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment EX-1: North Area - NT Runoff Area=0.572 ac 26.40% Impervious Runoff Depth>1.98"
Flow Length=139' Tc=6.0 min CN=80 Runoff=2.11 cfs 0.095 af

Subcatchment EX-7: East Area - NT Runoff Area=0.243 ac 49.79% Impervious Runoff Depth>2.48"
Tc=6.0 min CN=86 Runoff=1.10 cfs 0.050 af

Subcatchment PR-1: Subcat PR-1 Runoff Area=4.052 ac 75.23% Impervious Runoff Depth>2.76"
Tc=0.0 min CN=89 Runoff=22.92 cfs 0.931 af

Subcatchment UD-1: Subcat UD-1 Runoff Area=1.824 ac 60.10% Impervious Runoff Depth>2.23"
Tc=0.0 min CN=83 Runoff=8.84 cfs 0.338 af

Reach 1R: Total Existing Inflow=25.52 cfs 1.397 af
Outflow=25.52 cfs 1.397 af

Pond 1P: Bio-Retention Basin Peak Elev=808.40' Storage=10,988 cf Inflow=22.92 cfs 0.931 af
Outflow=13.86 cfs 0.914 af

Total Runoff Area = 6.691 ac Runoff Volume = 1.414 af Average Runoff Depth = 2.54"
33.99% Pervious = 2.274 ac 66.01% Impervious = 4.417 ac

Summary for Subcatchment EX-1: North Area - NT Disturbed

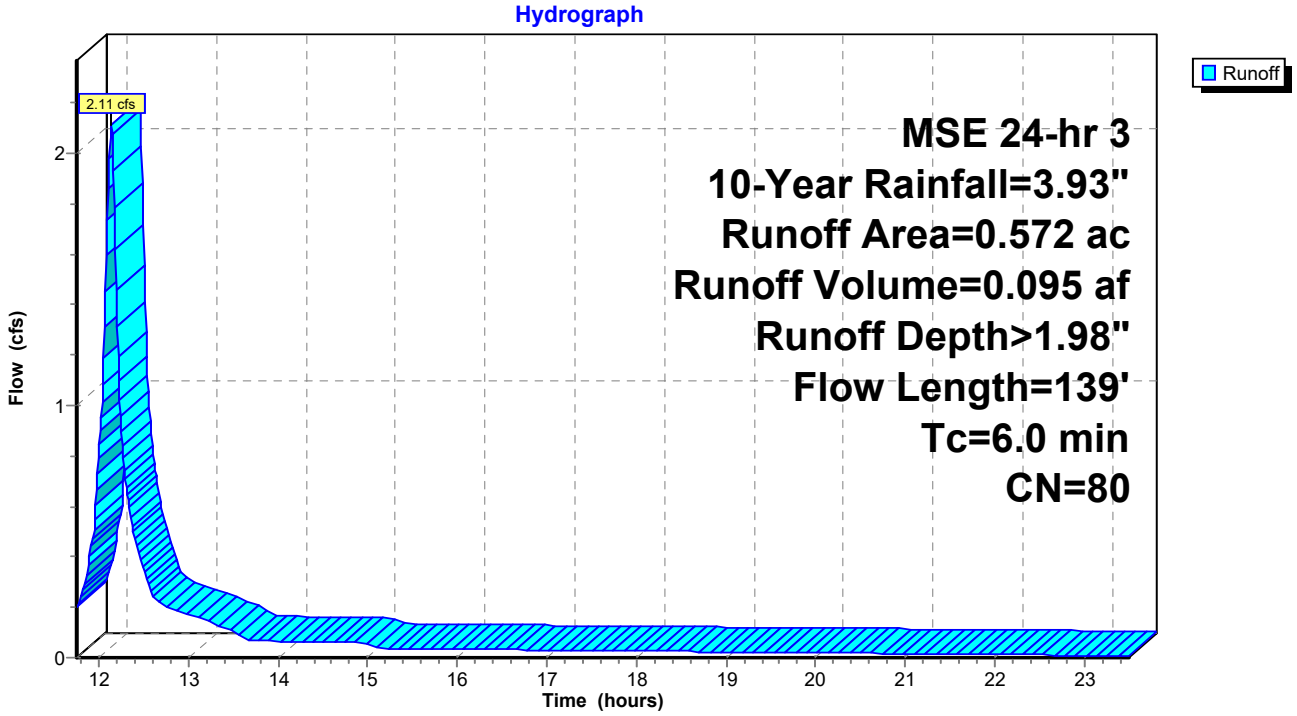
Runoff = 2.11 cfs @ 12.13 hrs, Volume= 0.095 af, Depth> 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.93"

Area (ac)	CN	Description
0.421	74	>75% Grass cover, Good, HSG C
0.094	98	Paved parking, HSG C
0.030	98	Sidewalks, Good, HSG C
0.027	98	Sidewalks, Good, HSG C
0.572	80	Weighted Average
0.421		73.60% Pervious Area
0.151		26.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0196	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
0.4	39	0.0061	1.59		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	139	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: North Area - NT Disturbed



Summary for Subcatchment EX-7: East Area - NT Disturbed

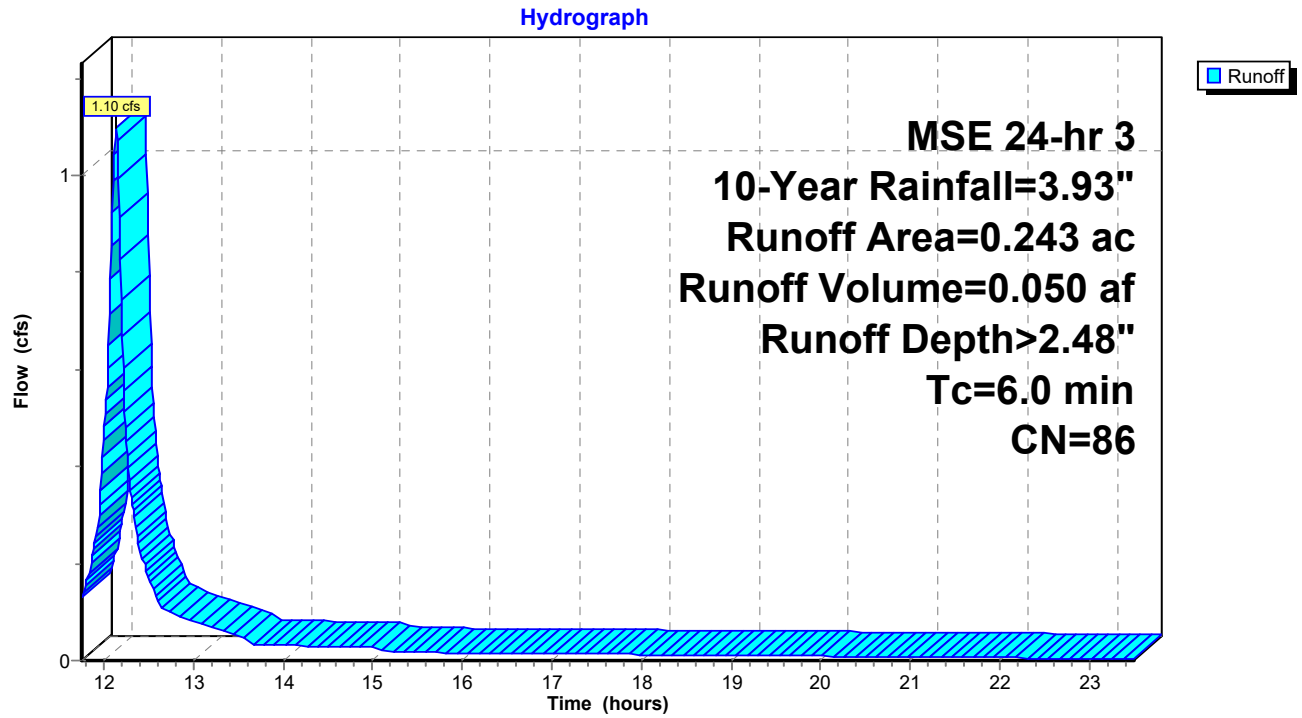
Runoff = 1.10 cfs @ 12.13 hrs, Volume= 0.050 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.93"

Area (ac)	CN	Description
0.122	74	>75% Grass cover, Good, HSG C
0.047	98	Paved parking, HSG C
0.060	98	Sidewalks, Good, HSG C
0.014	98	Sidewalks, Good, HSG C
0.243	86	Weighted Average
0.122		50.21% Pervious Area
0.121		49.79% Impervious Area

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

Subcatchment EX-7: East Area - NT Disturbed



Summary for Subcatchment PR-1: Subcat PR-1

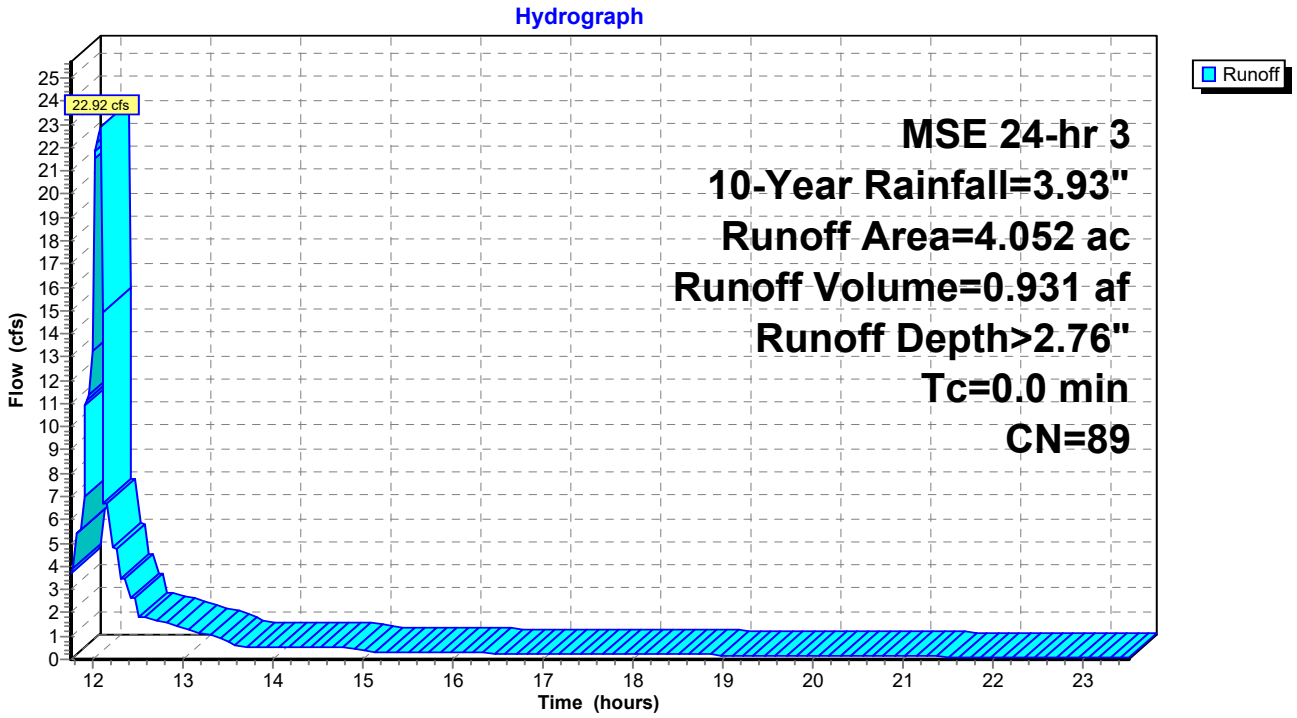
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 22.92 cfs @ 12.09 hrs, Volume= 0.931 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.93"

Area (ac)	CN	Description
1.004	61	>75% Grass cover, Good, HSG B
2.713	98	Paved parking, HSG B
0.010	98	Roofs, HSG B
0.326	98	Sidewalks, Good, HSG B
4.052	89	Weighted Average
1.004		24.77% Pervious Area
3.048		75.23% Impervious Area

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment UD-1: Subcat UD-1

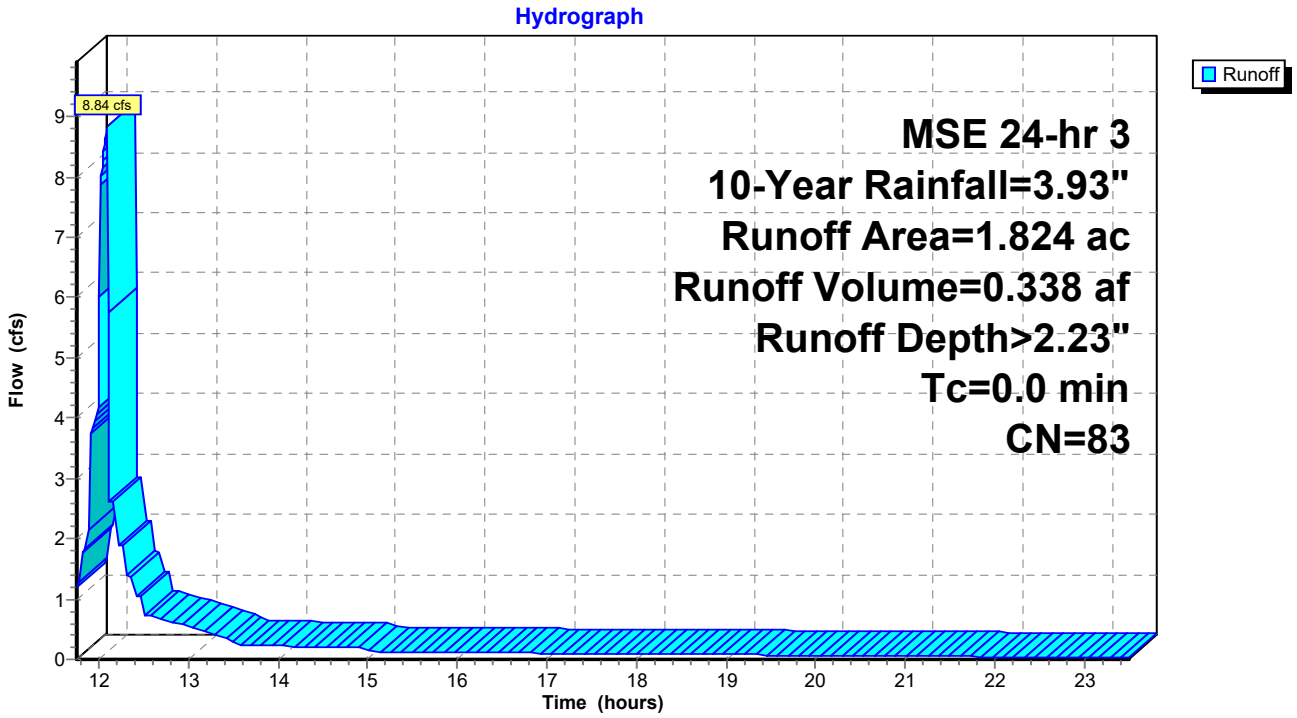
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 8.84 cfs @ 12.09 hrs, Volume= 0.338 af, Depth> 2.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=3.93"

Area (ac)	CN	Description
0.728	61	>75% Grass cover, Good, HSG B
0.127	98	Paved parking, HSG B
0.877	98	Roofs, HSG B
0.092	98	Sidewalks, Good, HSG B
1.824	83	Weighted Average
0.728		39.90% Pervious Area
1.096		60.10% Impervious Area

Subcatchment UD-1: Subcat UD-1



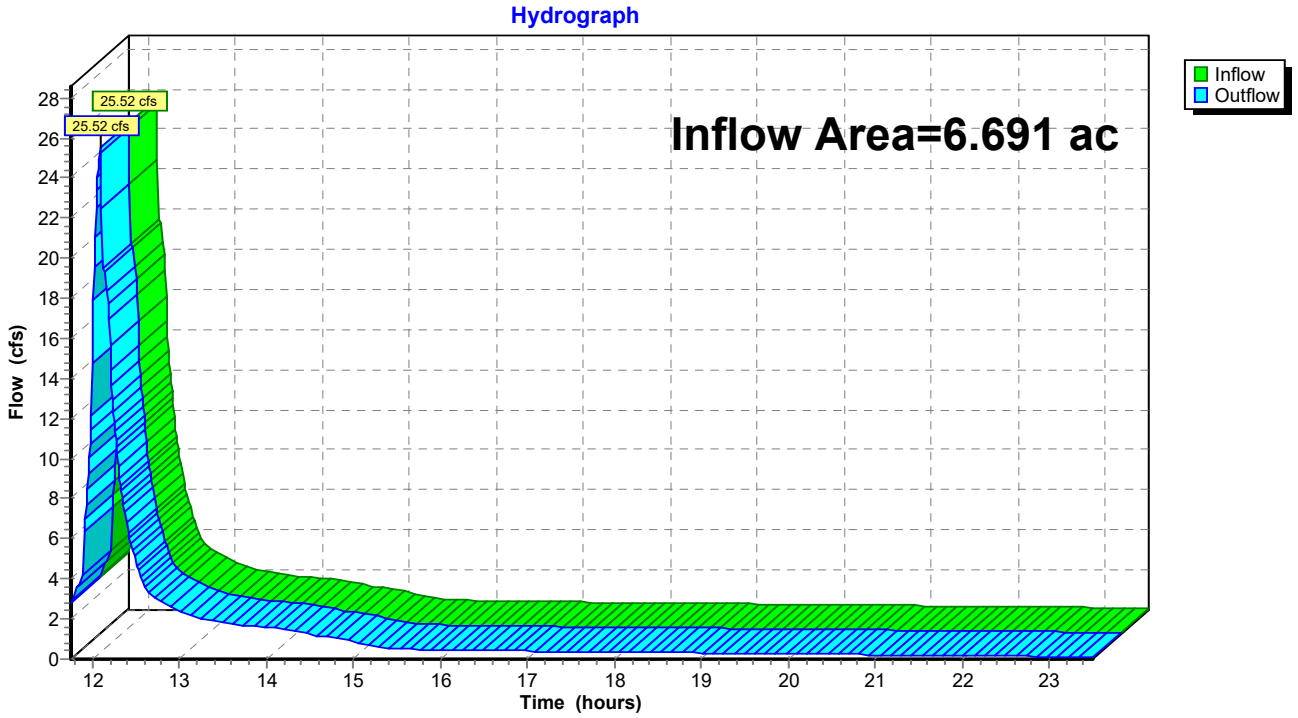
Summary for Reach 1R: Total Existing

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

Inflow Area = 6.691 ac, 66.01% Impervious, Inflow Depth > 2.51" for 10-Year event
Inflow = 25.52 cfs @ 12.09 hrs, Volume= 1.397 af
Outflow = 25.52 cfs @ 12.09 hrs, Volume= 1.397 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: Total Existing



Summary for Pond 1P: Bio-Retention Basin

Inflow Area = 4.052 ac, 75.23% Impervious, Inflow Depth > 2.76" for 10-Year event
Inflow = 22.92 cfs @ 12.09 hrs, Volume= 0.931 af
Outflow = 13.86 cfs @ 12.10 hrs, Volume= 0.914 af, Atten= 40%, Lag= 0.7 min
Primary = 13.86 cfs @ 12.10 hrs, Volume= 0.914 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 808.40' @ 12.10 hrs Surf.Area= 7,673 sf Storage= 10,988 cf

Plug-Flow detention time= 36.6 min calculated for 0.913 af (98% of inflow)
Center-of-Mass det. time= 25.9 min (806.7 - 780.8)

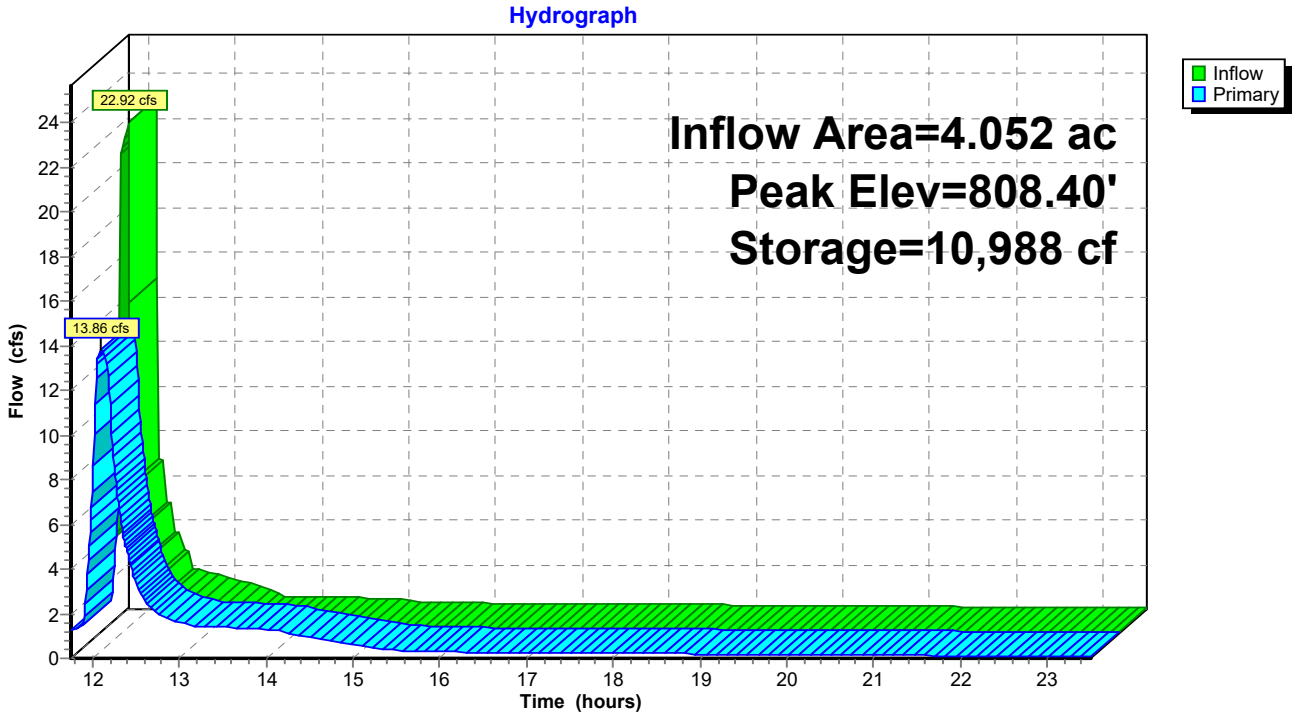
Volume	Invert	Avail.Storage	Storage Description
#1	804.49'	30,111 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
804.49	3,588	0.0	0	0
804.50	3,588	33.0	12	12
805.50	3,588	33.0	1,184	1,196
805.51	3,588	27.0	10	1,206
807.00	3,588	27.0	1,443	2,649
807.01	3,588	100.0	36	2,685
808.00	7,163	100.0	5,322	8,007
809.00	8,431	100.0	7,797	15,804
810.00	9,756	100.0	9,094	24,897
810.50	11,099	100.0	5,214	30,111

Device	Routing	Invert	Outlet Devices
#1	Primary	805.00'	**18.0" Round Culvert** L= 123.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.00' / 791.00' S= 0.1138 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Primary	809.50'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Device 1	805.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	807.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=13.85 cfs @ 12.10 hrs HW=808.40' (Free Discharge)
- **1=Culvert** (Inlet Controls 13.85 cfs @ 7.84 fps)
  - **3=Orifice/Grate** (Passes < 1.68 cfs potential flow)
  - **4=Orifice/Grate** (Passes < 14.35 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Bio-Retention Basin



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment EX-1: North Area - NT Runoff Area=0.572 ac 26.40% Impervious Runoff Depth>3.95"
Flow Length=139' Tc=6.0 min CN=80 Runoff=4.12 cfs 0.188 af

Subcatchment EX-7: East Area - NT Runoff Area=0.243 ac 49.79% Impervious Runoff Depth>4.59"
Tc=6.0 min CN=86 Runoff=1.97 cfs 0.093 af

Subcatchment PR-1: Subcat PR-1 Runoff Area=4.052 ac 75.23% Impervious Runoff Depth>4.92"
Tc=0.0 min CN=89 Runoff=38.85 cfs 1.661 af

Subcatchment UD-1: Subcat UD-1 Runoff Area=1.824 ac 60.10% Impervious Runoff Depth>4.27"
Tc=0.0 min CN=83 Runoff=16.07 cfs 0.649 af

Reach 1R: Total Existing Inflow=37.64 cfs 2.573 af
Outflow=37.64 cfs 2.573 af

Pond 1P: Bio-Retention Basin Peak Elev=809.35' Storage=18,866 cf Inflow=38.85 cfs 1.661 af
Outflow=16.15 cfs 1.643 af

Total Runoff Area = 6.691 ac Runoff Volume = 2.591 af Average Runoff Depth = 4.65"
33.99% Pervious = 2.274 ac 66.01% Impervious = 4.417 ac

Summary for Subcatchment EX-1: North Area - NT Disturbed

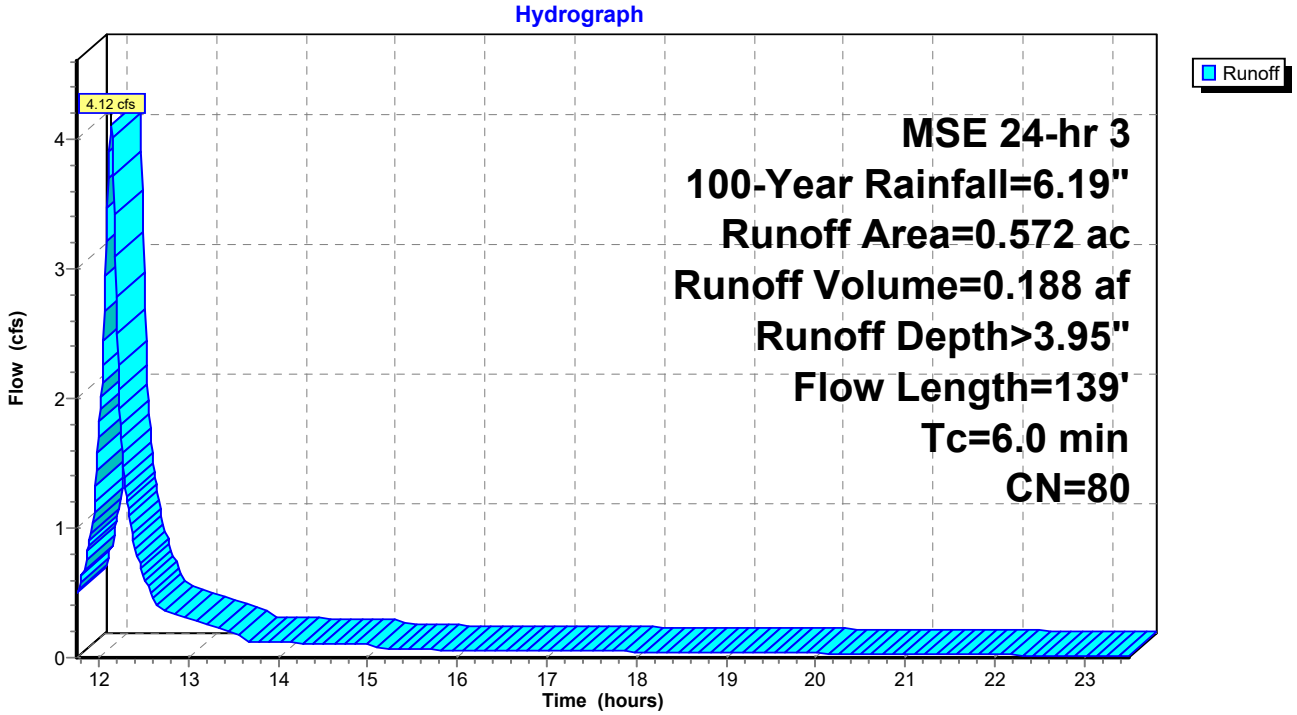
Runoff = 4.12 cfs @ 12.13 hrs, Volume= 0.188 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.19"

Area (ac)	CN	Description
0.421	74	>75% Grass cover, Good, HSG C
0.094	98	Paved parking, HSG C
0.030	98	Sidewalks, Good, HSG C
0.027	98	Sidewalks, Good, HSG C
0.572	80	Weighted Average
0.421		73.60% Pervious Area
0.151		26.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0196	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
0.4	39	0.0061	1.59		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	139	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: North Area - NT Disturbed



Summary for Subcatchment EX-7: East Area - NT Disturbed

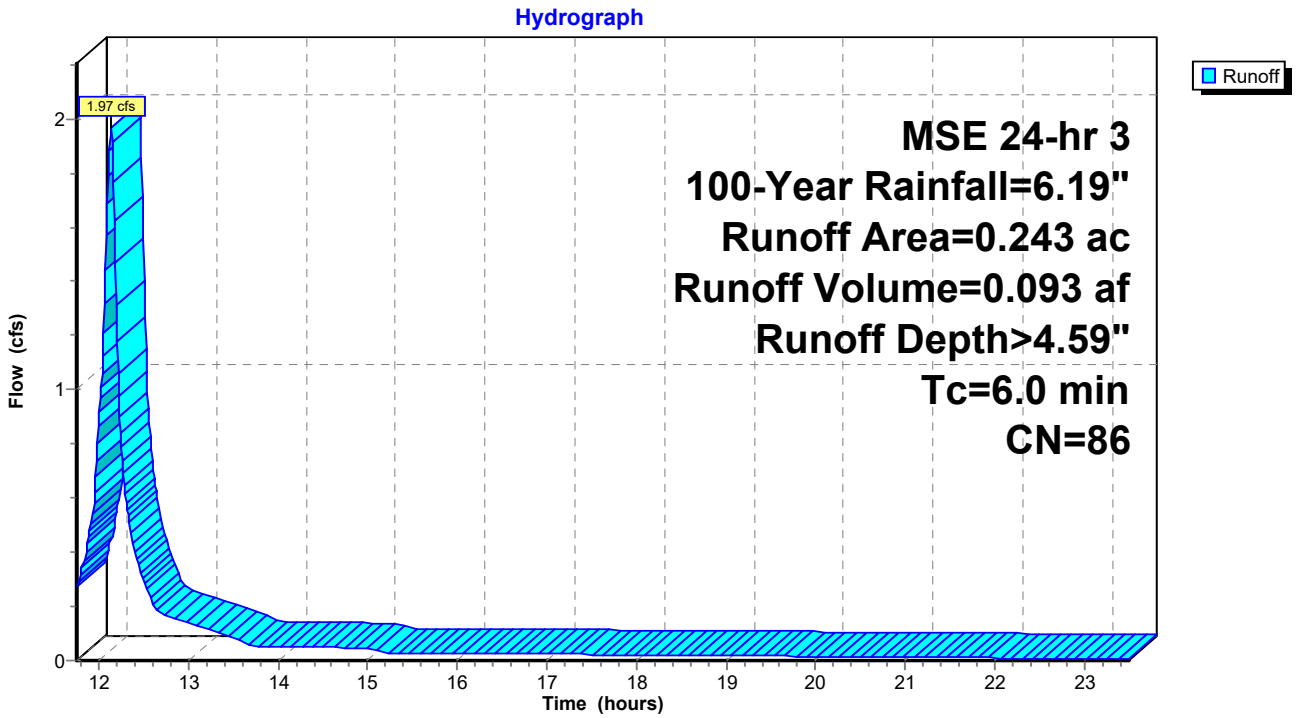
Runoff = 1.97 cfs @ 12.13 hrs, Volume= 0.093 af, Depth> 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.19"

Area (ac)	CN	Description
0.122	74	>75% Grass cover, Good, HSG C
0.047	98	Paved parking, HSG C
0.060	98	Sidewalks, Good, HSG C
0.014	98	Sidewalks, Good, HSG C
0.243	86	Weighted Average
0.122		50.21% Pervious Area
0.121		49.79% Impervious Area

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

Subcatchment EX-7: East Area - NT Disturbed



Summary for Subcatchment PR-1: Subcat PR-1

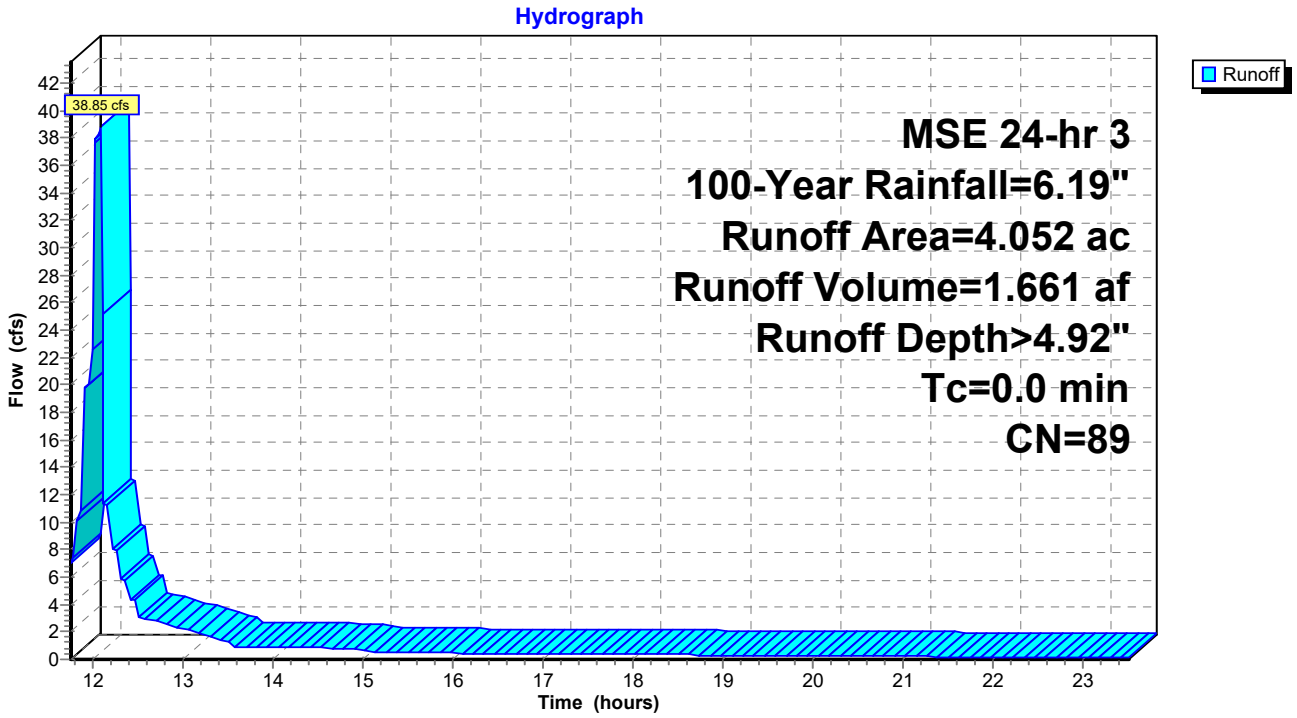
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 38.85 cfs @ 12.09 hrs, Volume= 1.661 af, Depth> 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.19"

Area (ac)	CN	Description
1.004	61	>75% Grass cover, Good, HSG B
2.713	98	Paved parking, HSG B
0.010	98	Roofs, HSG B
0.326	98	Sidewalks, Good, HSG B
4.052	89	Weighted Average
1.004		24.77% Pervious Area
3.048		75.23% Impervious Area

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment UD-1: Subcat UD-1

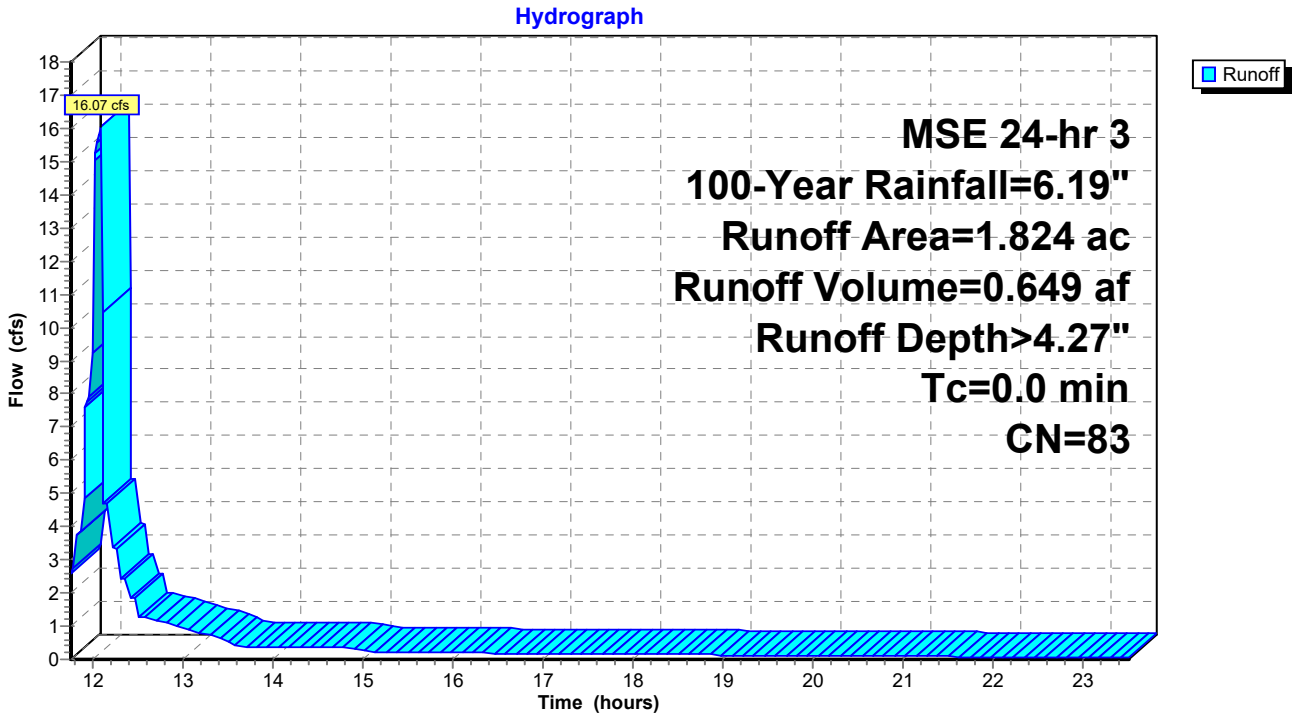
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 16.07 cfs @ 12.09 hrs, Volume= 0.649 af, Depth> 4.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=6.19"

Area (ac)	CN	Description
0.728	61	>75% Grass cover, Good, HSG B
0.127	98	Paved parking, HSG B
0.877	98	Roofs, HSG B
0.092	98	Sidewalks, Good, HSG B
1.824	83	Weighted Average
0.728		39.90% Pervious Area
1.096		60.10% Impervious Area

Subcatchment UD-1: Subcat UD-1



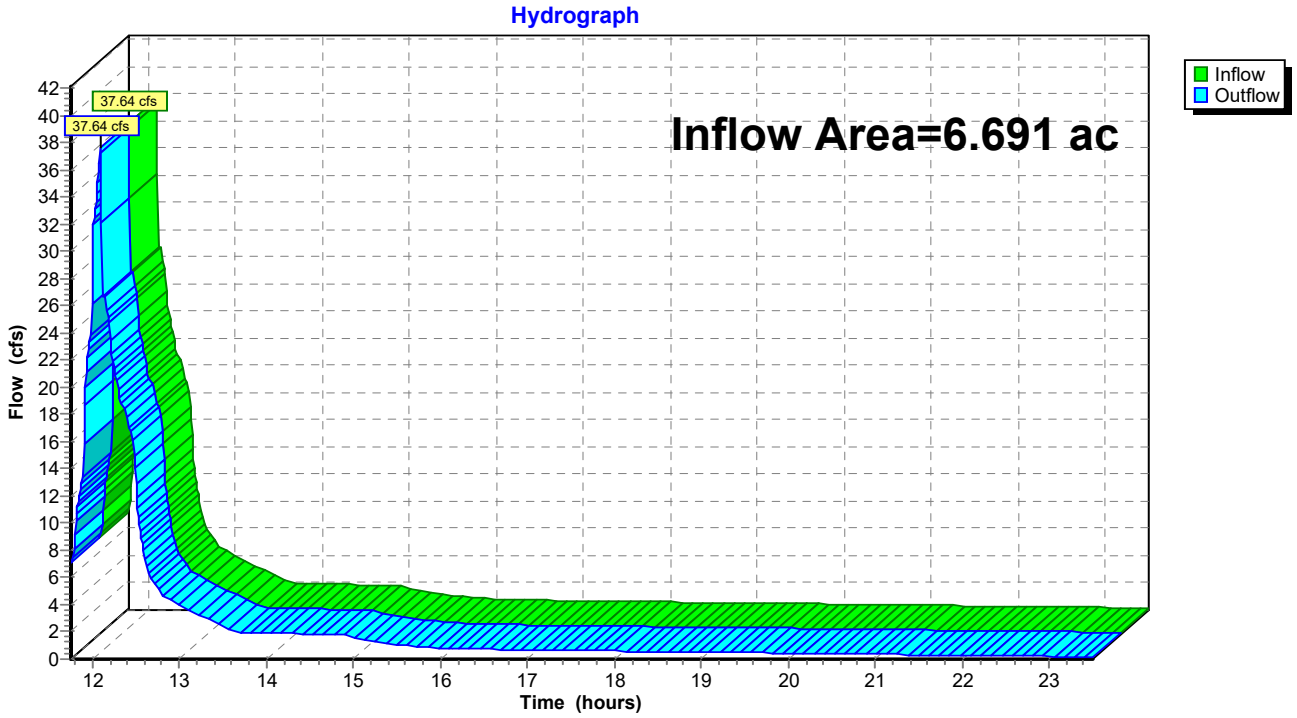
Summary for Reach 1R: Total Existing

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

Inflow Area = 6.691 ac, 66.01% Impervious, Inflow Depth > 4.61" for 100-Year event
Inflow = 37.64 cfs @ 12.09 hrs, Volume= 2.573 af
Outflow = 37.64 cfs @ 12.09 hrs, Volume= 2.573 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: Total Existing



Summary for Pond 1P: Bio-Retention Basin

Inflow Area = 4.052 ac, 75.23% Impervious, Inflow Depth > 4.92" for 100-Year event
Inflow = 38.85 cfs @ 12.09 hrs, Volume= 1.661 af
Outflow = 16.15 cfs @ 12.11 hrs, Volume= 1.643 af, Atten= 58%, Lag= 1.1 min
Primary = 16.15 cfs @ 12.11 hrs, Volume= 1.643 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 809.35' @ 12.11 hrs Surf.Area= 8,899 sf Storage= 18,866 cf

Plug-Flow detention time= 30.1 min calculated for 1.642 af (99% of inflow)
Center-of-Mass det. time= 23.5 min (792.9 - 769.4)

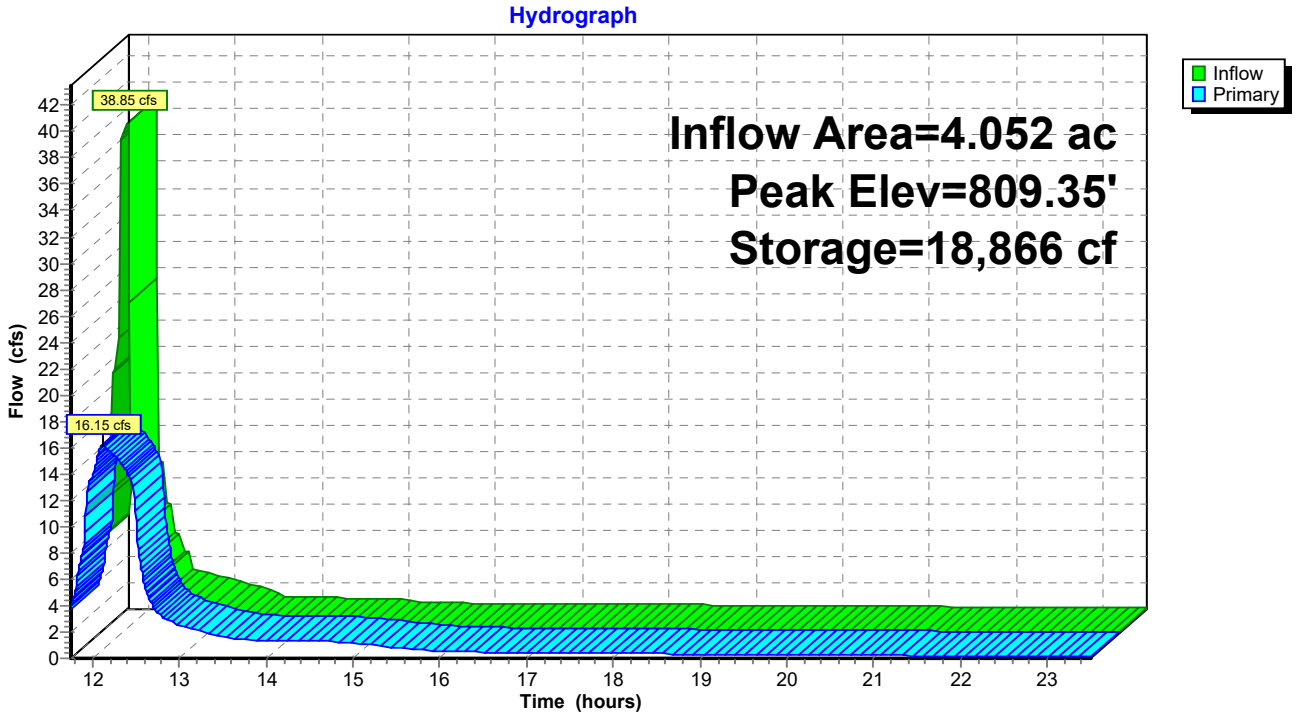
Volume	Invert	Avail.Storage	Storage Description
#1	804.49'	30,111 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
804.49	3,588	0.0	0	0
804.50	3,588	33.0	12	12
805.50	3,588	33.0	1,184	1,196
805.51	3,588	27.0	10	1,206
807.00	3,588	27.0	1,443	2,649
807.01	3,588	100.0	36	2,685
808.00	7,163	100.0	5,322	8,007
809.00	8,431	100.0	7,797	15,804
810.00	9,756	100.0	9,094	24,897
810.50	11,099	100.0	5,214	30,111

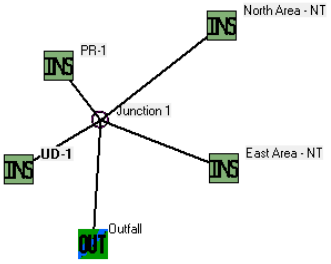
Device	Routing	Invert	Outlet Devices
#1	Primary	805.00'	**18.0" Round Culvert** L= 123.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.00' / 791.00' S= 0.1138 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Primary	809.50'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Device 1	805.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	807.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=16.15 cfs @ 12.11 hrs HW=809.35' (Free Discharge)
- **1=Culvert** (Inlet Controls 16.15 cfs @ 9.14 fps)
  - **3=Orifice/Grate** (Passes < 1.91 cfs potential flow)
  - **4=Orifice/Grate** (Passes < 20.58 cfs potential flow)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Bio-Retention Basin



Data file name: X:\2023\230049.00 Watertown YMCA\Disciplines\Civil\Engineering\Stormwater\SLAMM\Proposed Pavement Only.mdb
WinSLAMM Version 10.5.0
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 02-22-2024 Time: 15:46:40
Site information:



LU# 1 - Institutional: PR-1 Total area (ac): 2.713
13 - Paved Parking 1: 2.713 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Institutional: North Area - NT Total area (ac): 0.094
13 - Paved Parking 1: 0.094 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Institutional: East Area - NT Total area (ac): 0.047
13 - Paved Parking 1: 0.047 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 4 - Institutional: UD-1 Total area (ac): 0.127
13 - Paved Parking 1: 0.127 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

File Name:
X:\2023\230049.00 Watertown YMCA\Disciplines\Civil\Engineering\Stormwater\SLAMM\Proposed Pavement Only.mdb

Outfall Output Summary

	Runoff Volume (cu. ft.)	Percent Runoff Reduction	Runoff Coefficient (Rv)	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of All Land Uses without Controls	226869		0.65	130.0	1841	
Outfall Total with Controls	226870	0.00 %	0.65	130.0	1841	0.00 %
Current File Output: Annualized Total After Outfall Controls	227493	Years in Model Run:	1.00		1846	

Pollutant	Concentration - No Controls	Concentration - With Controls	Concentration Units	Pollutant Yield - No Controls	Pollutant Yield - With Controls	Pollutant Yield Units	Percent Yield Reduction
Particulate Solids	130.0	130.0	mg/L	1841	1841	lbs	0.00 %
Particulate Phosphorus	0.1850	0.1850	mg/L	2.620	2.620	lbs	0.00 %

Print Output Summary to .csv File
Print Output Summary to Text File
Print Output Summary to Printer

Total Area Modeled (ac): 2.981

Total Control Practice Costs

Capital Cost	N/A
Land Cost	N/A
Annual Maintenance Cost	N/A
Present Value of All Costs	N/A
Annualized Value of All Costs	N/A

Perform Outfall Flow Duration Curve Calculations

Receiving Water Impacts Due To Stormwater Runoff

(CWP Impervious Cover Model)

	Calculated Rv	Approximate Urban Stream Classification
Without Controls	0.65	Poor
With Controls	0.65	Poor

The new pavement produces 1841 lbs of TSS. The stormwater basin must remove at least 60% of the 1841 lbs which is 1104.6 lbs

Data file name: X:\2023\230049.00 Watertown YMCA\Disciplines\Civil\Engineering\Stormwater\SLAMM\Proposed.mdb
WinSLAMM Version 10.5.0
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 02-22-2024 Time: 15:50:50
Site information:

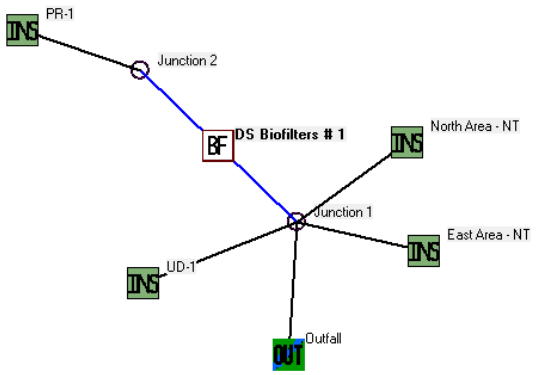
LU# 1 - Institutional: PR-1 Total area (ac): 4.053
1 - Roofs 1: 0.010 ac. Flat Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 2.713 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.326 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 1.004 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Institutional: North Area - NT Total area (ac): 0.572
13 - Paved Parking 1: 0.094 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.030 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.027 ac. Disconnected Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.421 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Institutional: East Area - NT Total area (ac): 0.243
13 - Paved Parking 1: 0.047 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.074 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.122 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 4 - Institutional: UD-1 Total area (ac): 1.824
1 - Roofs 1: 0.877 ac. Flat Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.127 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.092 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.728 ac. Normal Silty PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Biofilter CP# 1 (DS) - DS Biofilters # 1
1. Top area (square feet) = 11099
2. Bottom aea (square feet) = 3588
3. Depth (ft): 6
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.5
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 1
10. Porosity of rock filled volume = 0.33
11. Engineered soil infiltration rate: 3.6
12. Engineered soil depth (ft) = 1.5
13. Engineered soil porosity = 0.27
14. Percent solids reduction due to flow through engineered soil = 80
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0
Soil Data Soil Type Fraction in Eng. Soil
User-Defined Media Type 1.000
Biofilter Outlet/Discharge Characteristics:
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 5
2. Weir crest width (ft): 5
3. Height of datum to bottom of weir opening: 5
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 2
2. Stand pipe height above datum (ft): 3
Outlet type: Drain Tile/Underdrain
1. Underdrain outlet diameter (ft): 0.5
2. Invert elevation above datum (ft): 0.5
3. Number of underdrain outlets: 1



Proposed SLAMM

Biofiltration Control Device

Drainage System Control Practice

Device Properties	Biofilter Number 1
Top Area (sf)	11099
Bottom Area (sf)	3588
Total Depth (ft)	6.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.500
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0.001-1)	1.000
Infil. Rate Fraction-Sides (0.001-1)	1.000
Rock Filled Depth (ft)	1.00
Rock Fill Porosity (0-1)	0.33
Engineered Media Type	Media Data
Engineered Media Infiltration Rate	3.60
Engineered Media Infiltration Rate COV	N/A
Engineered Media Depth (ft)	1.50
Engineered Media Porosity (0-1)	0.27
Percent solids reduction due to Engineered Media (0 -100)	80.00
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Upstream Drainage System	1

Activate Pipe or Box Storage — Pipe — Box

Diameter (ft)	
Length (ft)	
Within Biofilter (check if Yes)	
Perforated (check if Yes)	
Bottom Elevation (ft above datum)	
Discharge Orifice Diameter (ft)	

Select Native Soil Infiltration Rate

- Sand - 8 in/hr
- Loamy sand - 2.5 in/hr
- Sandy loam - 1.0 in/hr
- Loam - 0.5 in/hr
- Silt loam - 0.3 in/hr
- Sandy silt loam - 0.2 in/hr
- Clay loam - 0.1 in/hr
- Silty clay loam - 0.05 in/hr
- Sandy clay - 0.05 in/hr
- Silty clay - 0.04 in/hr
- Clay - 0.02 in/hr
- Rain Barrel/Cistern - 0.00 in/hr

Use Random Number Generation to Account for Infiltration Rate Uncertainty

Copy Biofilter Data

Paste Biofilter Data

Add **Sharp Crested Weir**

Weir Length (ft)	
Height from datum to bottom of weir opening (ft)	

Remove **Broad Crested Weir-Reqrd**

Weir crest length (ft)	5.00
Weir crest width (ft)	5.00
Height from datum to bottom of weir opening (ft)	5.00

Remove **Vertical Stand Pipe**

Pipe diameter (ft)	2.00
Height above datum (ft)	3.00

Add **Surface Discharge Pipe**

Pipe Diameter (ft)	
Invert elevation above datum (ft)	
Number of pipes at invert elev.	

Remove **Drain Tile/Underdrain**

Pipe Diameter (ft)	0.50
Invert elevation above datum (ft)	0.50
Number of pipes at invert elev.	1

Add **Other Outlet**

Stage Number	Stage (ft)	Other Outflow Rate (cfs)
1		
2		
3		
4		
5		

Add **Evapotranspiration**

Soil porosity (saturation moisture content, 0-1)	
Soil field moisture capacity (0-1)	
Permanent wilting point (0-1)	
Supplemental irrigation used?	☐
Fraction of available capacity when irrigation starts (0-1)	
Fraction of available capacity when irrigation stops (0-1)	

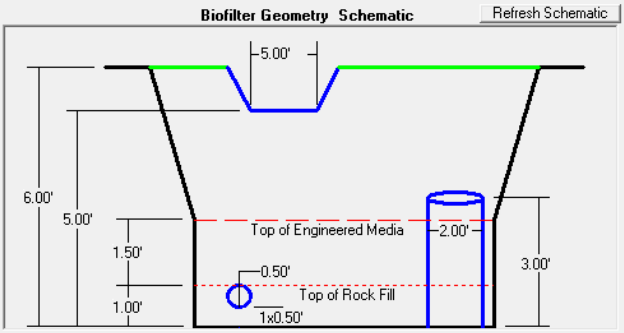
Evaporation Add

Month	Evapotrans-piration (in/day)	Evaporation (in/day)
Jan		
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		
Oct		
Nov		
Dec		

Plant Types

	1	2	3	4
Fraction of biofilter that is vegetated				
Plant type				
Root depth (ft)				
ET Crop Adjustment Factor				

Biofilter Geometry Schematic Refresh Schematic



Estimated Surface Drain Time = 1.67 hrs.

Save or Delete Biofilter Data to Database File

Get Biofilter Data From Database File

Press 'F1' for Help

To Delete This Practice, Right Mouse Click on Icon and Select Delete

Cancel Continue

Control Practice # : 1 CP Index # : 1

File Name:

X:\2023\230049.00 Watertown YMCA\Disciplines\Civil\Engineering\Stormwater\SLAMM\Proposed.mdb

Outfall Output Summary

	Runoff Volume (cu. ft.)	Percent Runoff Reduction	Runoff Coefficient (Rv)	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of All Land Uses without Controls	352459		0.45	108.1	2377	
Outfall Total with Controls	260236	26.17 %	0.33	61.60	1001	57.89 %
Current File Output: Annualized Total After Outfall Controls	260951	Years in Model Run:	1.00		1003	

Pollutant	Concen-tration - No Controls	Concen-tration - With Controls	Concen-tration Units	Pollutant Yield - No Controls	Pollutant Yield - With Controls	Pollutant Yield Units	Percent Yield Reduction
Particulate Solids	108.1	61.60	mg/L	2377	1001	lbs	57.89 %
Particulate Phosphorus	0.2185	0.1593	mg/L	4.807	2.588	lbs	46.16 %

Print Output Summary to .csv File

Print Output Summary to Text File

Print Output Summary to Printer

Total Area Modeled (ac) 6.692

A biofilter will clog. Review biofilter control practice summary tab to determine which biofilter it is.

Total Control Practice Costs

Capital Cost	N/A
Land Cost	N/A
Annual Maintenance Cost	N/A
Present Value of All Costs	N/A
Annualized Value of All Costs	N/A

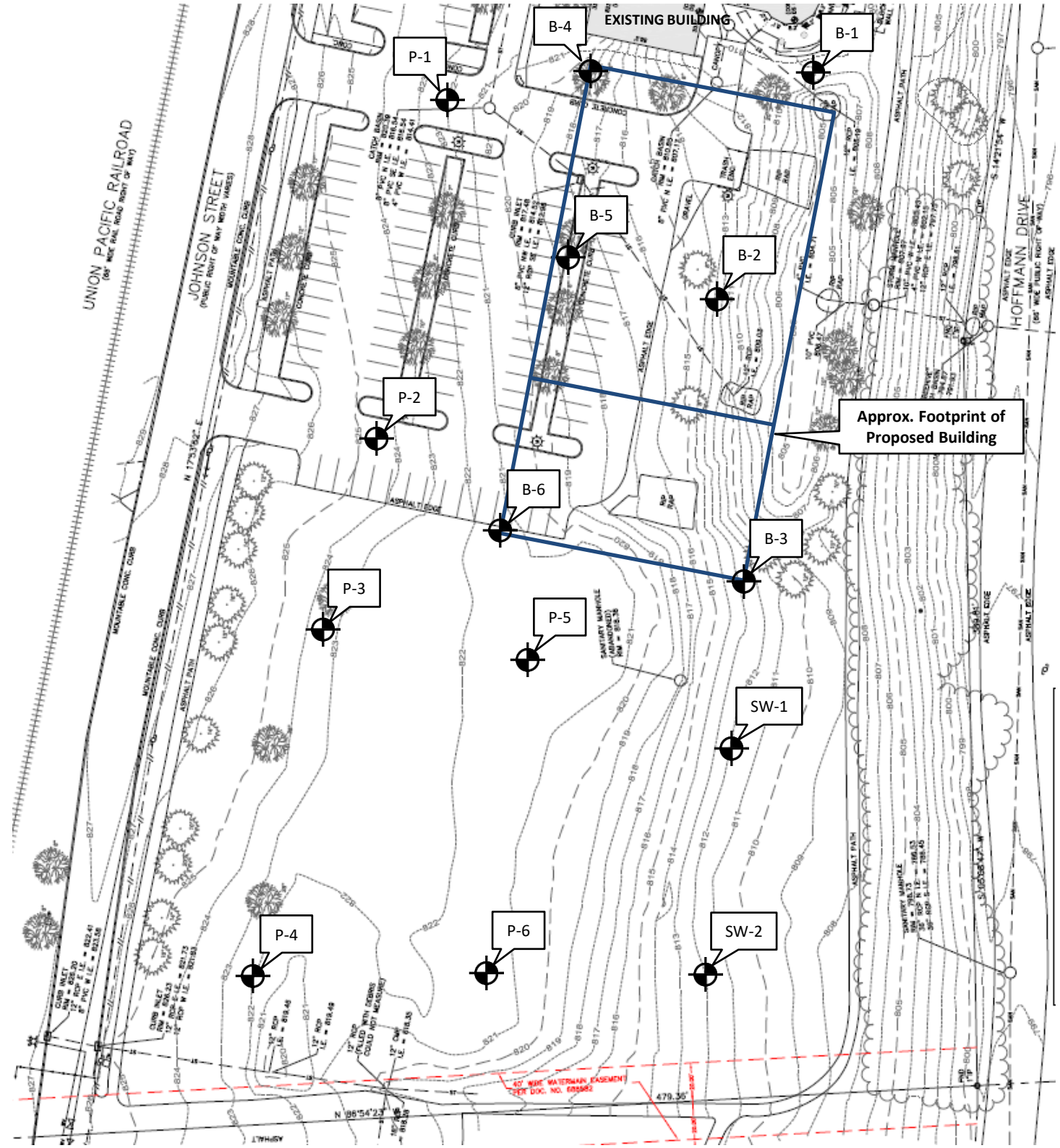
Perform Outfall Flow Duration Curve Calculations

Receiving Water Impacts Due To Stormwater Runoff

(CWP Impervious Cover Model)

	Calculated Rv	Approximate Urban Stream Classification
Without Controls	0.45	Poor
With Controls	0.33	Poor

The stormwater basin removes a total of 1376 lbs of TSS which is greater than the 1104.6 lbs required. It also removes a total of 46.16% phosphorus which is greater than the 30% required.



Legend

Bx — Denotes Approximate Boring Location and Number

GRAPHIC SCALE
30 0 60
(IN FEET)

N

Notes

1. Soil borings performed by J&J Soil Testing, Ltd. between 9-15 and 9-20-23.
2. Base map provided by Harwood.
3. Boring locations are approximate. Offsets from locations shown (if any) are described on the individual boring logs.

Job No. CM23167	**CGC, Inc.**	**SOIL BORING LOCATION EXHIBIT** **Proposed Watertown Building Dev.** **Johnson Street** **Watertown, Wisconsin**
Date: 11-6-23		

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **B-1**
Surface Elevation (ft) **809±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 5" Black Clayey Topsoil					
1	■	3	M	100/ 6"		FILL: Dark Brown Sandy, Gravelly Silt		3.0			
						Very Dense, Light Brown SILT; Little Sand and Gravel (ML)					
2	■	8	M	100/ 12"	5						
						Very Dense, Light Brown SILT; Little Fine Sand (ML)					
3	■	10	W	100/ 11"							
						Very Dense, Gray SILT; Little Fine Sand (ML)					
4	■	13	M	100/ 15"	10						
						Very Dense, Gray SILT; Little Sand and Gravel, Few Cobbles/Boulders (ML)					
5	■	8	VM	100/ 11"	15						
6	■	0	-	30/ 0"	20	End of Boring & Auger Refusal at 21 ft Backfilled with Bentonite Chips					
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **6.0'±** Upon Completion of Drilling **12.0'**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/20/23** End **9/20/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **B-2**
Surface Elevation (ft) **813±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 12" Black Clayey Topsoil					
1A/B		18	M	17		Medium Dense, Brown SAND; Little Silt, Trace Clay and Gravel (SP-SM)		6.4			
						Medium Dense, Light Brown and Gray Mottled SILT; Little Sand and Gravel (ML)					
2		18	VM	16							
					5						
3		18	M	37		Dense to Very Dense, Light Brown SILT; Little Sand and Gravel, Few Sand Seams/Layers (ML)					
4		18	M	63							
					10						
					▽						
5A/B		18	W	43							
					15	Dense to Very Dense, Gray SILT; Little Sand and Gravel, Few Sand Seams/Layers (ML)					
6		12	W/M	61	▼						
					20						
7		6	M	100/6"							
					25	End of Boring at 25 ft Backfilled with Bentonite Chips					
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽	**12.0'±**	Upon Completion of Drilling		**19.0'**
Time After Drilling				
Depth to Water				▼
Depth to Cave in				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/20/23** End **9/20/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **B-3**
Surface Elevation (ft) **813±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 18" Black Clayey Topsoil					
1		18	M	25		FILL: Brown Silty Sand, Trace Gravel		6.8			
2A/B		18	M	20		Medium Dense, Brown SAND; Little Silt, Trace Clay and Gravel (SP-SM)					
					5	Medium Dense to Dense, Light Brown and Gray Mottled SILT; Trace Sand and Gravel (ML)					
3		18	W/M	18							
4		18	M	67							
					10						
5		18	M/W	39		Dense to Very Dense, Gray SILT; Little Sand and Gravel (ML)					
					15						
6		14	W	42							
					20						
7		14	M	100/ 14"							
					25	End of Boring at 25 ft Backfilled with Bentonite Chips					
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **6.0'±** Upon Completion of Drilling **12.0'**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/20/23** End **9/20/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **B-4**
Surface Elevation (ft) **819±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 11" Black Clayey Topsoil					
1A/B		18	M	18		FILL: Light Brown Silt, Trace Sand and Gravel					
						Medium Dense, Brown SAND; Little Silt, Trace Clay and Gravel (SP-SM)					
2		12	M	30		Medium Dense, Light Brown SILT; Trace to Little Sand and Gravel, Trace Clay (ML)					
					5						
3		18	M	22							
					▽						
4		16	W/M	100/ 16"		Very Dense, Light Brown SILT; Little Sand and Gravel (ML)		8.2			
					10						
						Very Dense, Gray SILT; Little Sand and Gravel (ML)					
5		14	M	100/ 14"							
					15						
					▼	Very Dense, Light Brown SILT; Little Sand and Gravel (ML)					
6		15	W	100/ 15"							
					20						
						Very Dense, Gray SILT; Little Sand and Gravel (ML)					
7		4	M	100/ 4"							
					25						
						End of Boring at 25 ft Backfilled with Bentonite Chips					
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **8.0'±** Upon Completion of Drilling **17.0'**
Time After Drilling **(perched)**
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/20/23** End **9/20/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **B-5**
Surface Elevation (ft) **819±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 9" Black Clayey Topsoil					
1		18	M	19		Medium Dense, Brown Clayey SAND; Trace Gravel (SC)					
2		18	M	21	5	Medium Dense, Light Brown and Gray Mottled SILT; Trace Sand and Gravel (ML)					
3		18	M	25		Medium Dense to Very Dense, Light Brown SILT; Little Sand and Gravel (ML)		8.2			
4		18	M	27							
					10						
5		15	M	100/ 15"							
6		12	W	100/ 12"		Very Dense, Light Brown SAND; Trace Silt and Gravel (SP)					
					15	Very Dense, Light Brown SILT; Little Sand and Gravel (ML)					
7		6	M	100/ 6"							
					20						
						Very Dense, Gray SILT; Little Sand and Gravel (ML)					
8		7	VM	100/ 7"							
					25	End of Boring at 25 ft Backfilled with Bentonite Chips					
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **13.5'±** Upon Completion of Drilling **10.0'**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/18/23** End **9/20/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **B-6**
Surface Elevation (ft) **821±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 4" Dark Brown Clayey Topsoil					
1		2	M	100/5"		FILL: Brown Sandy SILT; Trace Gravel					
						FILL: Brown Silty CLAY; Little Sand, Trace Gravel					
2A/B		12	M	19		Medium Dense, Light Brown and Gray Mottled Sandy SILT; Trace Gravel (ML)					
					5						
3		18	VM	8		Loose to Medium Dense, Light Brown SILT; Trace to Little Sand and Gravel, Few Clay Seams, Few Cobbles/Boulders (ML)	(0.75-1.25)				
					▽						
4		13	W	22				11.8			
					10						
					▼						
						Dense to Medium Dense, Light Brown SILT; Little Sand and Gravel (ML)					
5		18	M	70							
					15						
6		16	M/W/M	100/16"							
					20						
7		12	W	14							
					25	End of Boring at 25 ft Backfilled with Bentonite Chips					
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **8.0'±** Upon Completion of Drilling **11.0'**
Time After Drilling **(perched)**
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/18/23** End **9/18/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **P-1**
Surface Elevation (ft) **822±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						4.5" ASPHALT over 8" CRUSHED STONE BASE COURSE					
1	■	18	M	14		FILL: Dark Brown Sandy Clay, Trace to Little Gravel	(4.5+)	10.5			
2A/B	■	18	M	27		Medium Dense, Brown Silty SAND; Trace Gravel (SM)					
					5						
3	■	18	M	27		Stiff, Brown Mottled Silty CLAY; Little Sand, Trace Gravel (CL-ML)					
						Medium Dense to Very Dense, Light Brown SILT; Trace to Little Sand and Gravel, Trace Clay (ML)					
4	■	10	M	58 ▽							
					10	End of Boring at 10 ft Backfilled with Soil Cuttings					
					15						
					20						
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **9.0'±** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/18/23** End **9/18/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **P-2**
Surface Elevation (ft) **824.5±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						3.5" ASPHALT over 5.5" CRUSHED STONE BASE COURSE					
1A/B	■	16	M	13		FILL: Brown Sandy Silt, Trace Gravel		10.6			
						Black to Dark Gray Sandy CLAY; with Organics (OL) (BURIED TOPSOIL)					
2A/B	■	18	M	11			(2.0)				
					5	Stiff, Brown Sandy CLAY; Trace to Little Gravel (CL)					
3	■	18	W	39	▽	Medium Dense to Dense, Brown to Light Brown Sandy SILT; Trace Gravel (ML)					
4	■	18	M	24							
					10	End of Boring at 10 ft Backfilled with Soil Cuttings					
					15						
					20						
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **6.0'±** Upon Completion of Drilling **NW**
Time After Drilling **(perched)**
Depth to Water
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/18/23** End **9/18/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **P-3**
Surface Elevation (ft) **823.5±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						11" Black Clayey TOPSOIL					
1A/B		13	M	34		Hard, Brown Sandy CLAY; Trace to Little Gravel (CL)	(4.5+)	13.6			
						Medium Dense to Very Dense, Light Brown SILT; Little Sand and Gravel (ML)					
2		12	M	27							
					5						
3		15	M	64							
4		12	M	100/ 13"							
					10	End of Boring at 10 ft Backfilled with Soil Cuttings					
					15						
					20						
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/18/23** End **9/18/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **P-4**
Surface Elevation (ft) **822±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						9" Black Clayey TOPSOIL					
1A/B	■	14	M	13		Very Stiff, Brown Mottled Lean CLAY; Trace Sand and Gravel (CL)		18.4			
						Medium Dense, Light Brown and Gray Mottled Sandy SILT; Trace Gravel (ML)					
2	■	18	M	22							
					5						
3	■	18	M	17		Medium Dense to Very Dense, Light Brown Sandy SILT; Trace Gravel (ML)					
4	■	12	M/W	100/ 15" ▽							
					10	End of Boring at 10 ft Backfilled with Soil Cuttings					
					15						
					20						
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **9.0'±** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/18/23** End **9/18/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **P-5**
Surface Elevation (ft) **821.5±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 3" Black Clayey Topsoil					
1	■	16	M	24		FILL: Light Brown Sand, Trace to Little Silt and Gravel		2.8			
2	■	18	M	9							
					5						
						FILL: Mix of Dark Brown Sandy Clay and Topsoil, Trace Gravel					
3A/B	■	18	M	11			(2.0)				
						Dark Brown to Black Sandy CLAY; with Organics (OL) (BURIED TOPSOIL)					
4	■	3	M	15		Medium Dense, Light Brown and Gray Mottled Sandy SILT; Trace Gravel (ML)					
					10	End of Boring at 10 ft Backfilled with Soil Cuttings					
					15						
					20						
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/18/23** End **9/18/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **P-6**
Surface Elevation (ft) **821.5±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 3" Black Clayey Topsoil					
1A/B		18	M	20		FILL: Brown Sandy Silt, Trace Gravel , Little Intermixed Topsoil		5.1			
						FILL: Brown Lean Clay, Trace Sand and Gravel					
2A/B		18	M	10		Black Sandy CLAY; with Organics (OL) (BURIED TOPSOIL)					
					5	Medium Dense, Brown Silty SAND; Trace Gravel and Clay (SM)					
3		18	M	38		Dense, Light Brown and Gray Mottled SILT; Trace to Little Sand and Gravel, Few Clay Seams (ML)	(3.5)				
						Medium Dense, Light Brown Sandy SILT; Trace Gravel (ML)					
4		18	M	21	10	End of Boring at 10 ft Backfilled with Soil Cuttings					
					15						
					20						
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/18/23** End **9/18/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **SW-1**
Surface Elevation (ft) **812±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 18" Black Clayey Topsoil					
1A/B	■	14	M	20		FILL: Brown Silty Sand and Sandy Silt, Trace Gravel		8.0			
						Hard, Brown Lean CLAY; Trace Sand and Gravel (CL)					
2A/B	■	18	M	9			(4.5+)				
					5	Loose, Brown SAND; Little Silt, Trace Clay and Gravel (SP-SM)					
3	■	18	M	14		Very Stiff to Hard, Light Brown and Gray Mottled Silty CLAY; Trace Fine Sand (CL-ML)	(3.0)				
4	■	18	M	26			(4.5+)				
					10	Medium Dense, Gray SILT; Little Fine Sand (ML)					
5	■	18	M	25							
					▽						
6	■	18	W	34							
					15	End of Boring at 15 ft Backfilled with Bentonite Chips					
					20						
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **13.0'±** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/15/23** End **9/15/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Watertown Building Development**
Johnson Street
Location **Watertown, Wisconsin**

Boring No. **SW-2**
Surface Elevation (ft) **812±**
Job No. **CM23167**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						17" Black Clayey TOPSOIL					
1A/B		16	M	11		Hard, Dark Brown to Brown Lean CLAY; Trace Sand and Gravel (CL)		13.6			
2A/B		15	M/W	25	▽	Medium Dense to Dense, Light Brown and Gray Mottled SILT; Little Fine Sand, Trace Gravel (ML)					
					5						
3		18	M	16							
4		18	M	33							
					10						
5		10	M	54		Dense, Gray SILT; Little Fine Sand (ML)					
6		18	M	44							
					15	End of Boring at 15 ft Backfilled with Bentonite Chips					
					20						
					25						
					30						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **4.0'±**	Upon Completion of Drilling **NW**			
Time After Drilling **(perched)**				
Depth to Water				▼
Depth to Cave in				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **9/15/23** End **9/15/23**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **TAC**
Drill Method **2.25" HSA**

Wisconsin Department of Commerce
Division of Safety and Buildings

SOIL AND SITE EVALUATION - STORM

In accordance with SPS 382.365, 385, Wis. Adm. Code, and WDNR Standard 1002

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s.15.04 (1) (m)).

County	Jefferson
Parcel I.D.	291-0815-0544-004
Review by	**Date**

Property Owner		**Property Location**	600 Hoffman Road / 672 Johnson Street
Watertown Collective, LLC		**Govt. Lot**	SE 1/4, SE 1/4, S5 T8N R 15 E
Property Owner's Mailing Address		**Lot #**	**Block #** / **Subd. Name or CSM#**
600 E. Main Street, Suite 200		--	-- / --
City	**State** / **Zip Code** / **Phone Number**	[X] **City** [ ] **Village** [ ] **Town**	**Nearest Road**
Watertown	WI / 53094	Watertown	Johnson Street

Drainage area: _____ [ ] **sq. ft.** [ ] **acres**

Test Site Suitable for (check all that apply) [ ] **Site not suitable**

[ ] **Bioretention** [ ] **Subsurface Dispersal System**

[ ] **Reuse** [ ] **Irrigation** [ ] **Other** _____

Hydraulic Application Test Method

[X] **Morphological Evaluation**

[ ] **Double-Ring Infiltrometer**

[ ] **Other (Specify)**_____

Soil Moisture

Date of soil borings: 9/15/23

USDA-NRCS WETS Value:

[ ] **Dry = 1**

[X] **Normal = 2**

[ ] **Wet = 3**

SW-1 **Obs. #** [X] **Boring** [ ] **Pit** **Ground Surface Elev.** 812± **ft** **Elevation of limiting factor** 806.5± **ft**

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr
1	0-18	10YR3/2	--	SIL*	0,m	mfi	a	<5	80	0.13
2	18-36	10YR4/4	--	LS*	0,sg	mfr	a	<5	20	1.63
3	36-48	10YR4/4	--	C	0,m	mvfi	g	<5	90	0.07
4	48-66	10YR3/3	--	SL	0,sg	mfr	g	<5	20	0.50
5	66-126	10YR6/4	c,2,f 10YR7/2	CL	0,m	mfi	g	<5	70	0.03
6	126-180	10YR6/1	--	L	0,m	mvfi	g	<5	60	0.24

Comments: * FILL Groundwater at 13 ft

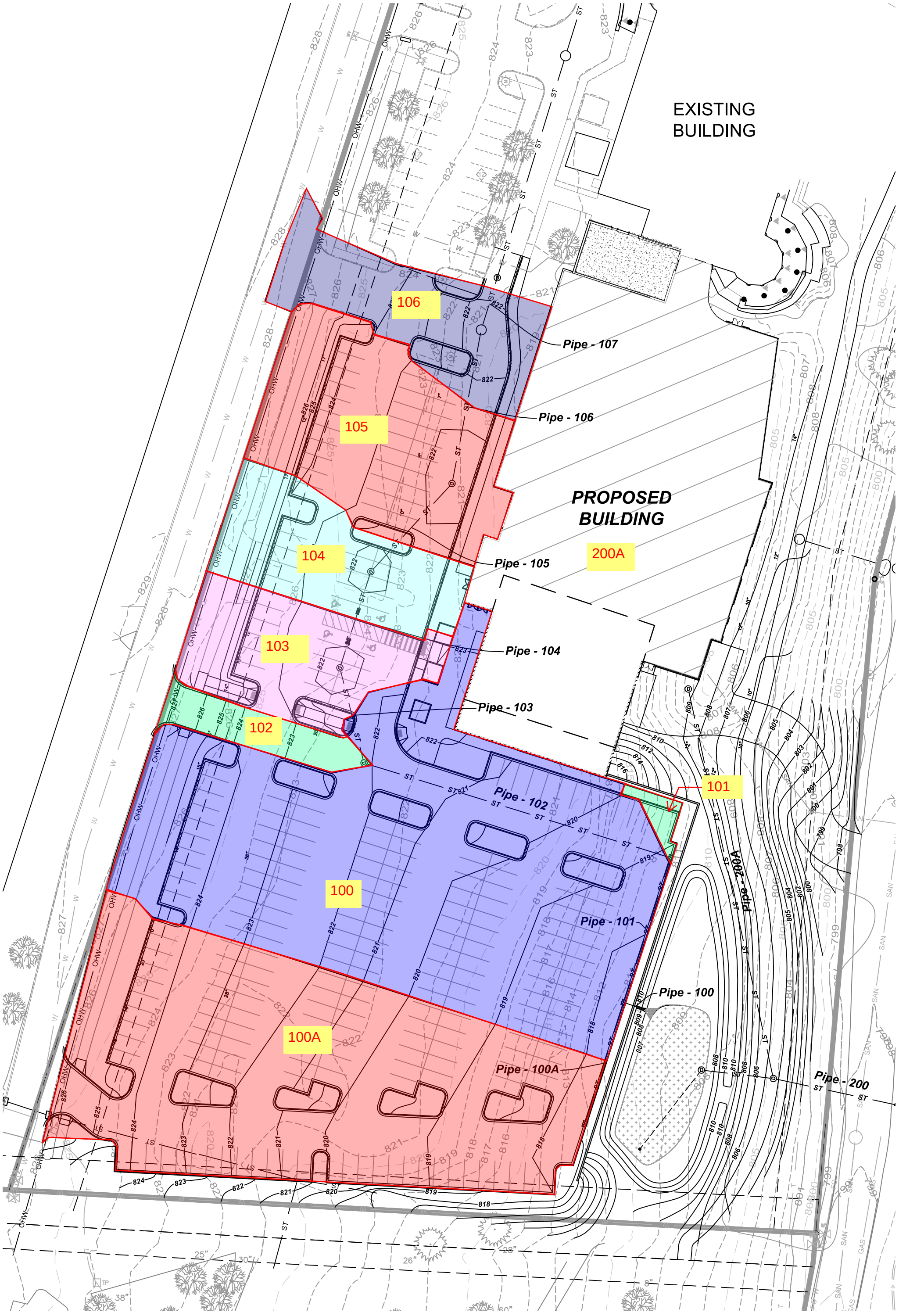
SW-2 **Obs. #** [X] **Boring** [ ] **Pit** **Ground Surface Elev.** 812± **ft** **Elevation of limiting factor** 809± **ft**

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr
1	0-17	10YR2/2	--	SIL	0,m	mfi	g	<5	80	0.13
2	17-36	10YR4/3 & 10YR3/2	--	SIC	0,m	mvfi	g	<5	90	0.07
3	36-126	10YR6/4	c,2,f 10YR7/2	L	0,m	mfi	g	<5	60	0.24
4	126-180	10YR6/2	--	SIL	0,m	mfi	g	<5	80	0.13

Comments: Wet soil at 4 ft

CST/PSS Name (Please Print)	Signature	CST Number
Paul J. Giese, CST	Paul J. Giese	SP-030800004
Address	**Date Evaluation Conducted**	**Telephone Number**
336 S. Curtis Road, West Allis, WI 53214	10/17/23	(414) 443-2000

SBD-10793 (R.01/17)



HARWOOD
255 N 21st Street, Milwaukee, WI 53233 | 414-475-5554

Watertown YMCA

Storm Areas

North

Scale: 1" = 50'

HARWOOD
255 N 21st Street, Milwaukee, WI 53233 | 414-475-5554

Storm Sewer Calculations

Project: Watertown YMCA

Date: 2/16/2024

Design Storm: 10 Year

Pipe	Drainage Area (AC)	Runoff Coeffcient	Tc (min)	i (in/hr)	Incremental Q (cfs)	Pipe Slope (%)	Pipe Size (in)	Capacity Full (cfs)	Capacity Full (GPM)	Total Q (csf)	Flow Rate (GPM)	Pipe n Value	Comments
107					1.96	1.55	8	1.96	880	1.96	880	0.010	Existing Pipe flowing full
106	0.203	0.80	6.00	6.88	1.11	1.00	12	3.56	1598	3.07	1379	0.013	
105	0.338	0.74	6.00	6.88	1.72	1.00	15	6.46	2899	4.79	2151	0.013	
104	0.201	0.74	6.00	6.88	1.03	1.00	15	6.46	2899	5.82	2612	0.013	
103	0.204	0.75	6.00	6.88	1.06	1.00	18	10.50	4712	6.88	3086	0.013	
102	0.06	0.90	6.00	6.88	0.37	1.00	18	10.50	4712	7.25	3253	0.013	
101	0.014	0.90	6.00	6.88	0.09	1.00	18	10.50	4712	7.33	3292	0.013	
100A	0.858	0.82	6.00	6.88	4.83	1.00	15	6.46	2899	4.83	2169	0.013	
100	1.051	0.82	6.00	6.88	5.94	2.00	21	22.40	10053	18.11	8128	0.013	
201		#DIV/0!	6.00	6.88	14.15	5.51	18	24.65	11063	14.15	6351	2.013	10 year flow from basin
200A		#DIV/0!	6.00	6.88	3.69	1.00	15	6.46	2899	3.69	1656	3.013	GPM from Plumber
200					0.00	8.77	21	46.91	21053	17.84	8007	4.013	