DRAINAGE ANALYSIS

FOR

RiverWoods Phase II

Stone Quarry Drive
Durham, NH

Tax Map 209 Lot 33

July 23, 2025
Revised Through October 8, 2025

Prepared For:

RiverWoods Durham
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Altus Project 5440

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Section 1

Narrative

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PROJECT DESCRIPTION

RiverWoods Durham is proposing to construct a second phase on an undeveloped parcel adjacent to the existing RiverWoods continuing care retirement community campus in Durham, New Hampshire. The 22.5-acre property is identified as Assessor's Map 209, Lot 33 and is located in the Office Research District. The project site is primarily woodland with sections forested wetland. Access is from NH 108 via the existing Stone Quarry Drive.

The proposal includes two new age-restricted multi-family housing buildings, a community center and a maintenance garage together with associated accessways and parking areas, utilities and stormwater infrastructure. These measures will include four bioretention ponds and a section of porous pavement. Pretreatment will be provided by catch basins with deep sumps and grease hoods. This proposed stormwater management system will reduce peak flows and treat runoff from the site's impervious areas prior to leaving the site.

Site Soils

Michael Cuomo, NH soils scientist completed a site-specific soil survey (SSSS) for the project site. This survey indicates that the subject property can be broken into hydrologic soils groups (HSG) B, C and D. Test pits indicate that majority of the soils underlying the development area are comprised of clay. Information on soils in offsite areas was taken from a high intensity soil survey (HISS) done for the adjacent RiverWoods campus in 2018 and NRCS maps.

Pre-Development (Existing Conditions)

Runoff generally flows through and off the site in a southerly direction to three points of analysis. POA #1 is an existing culvert under Stone Quarry Drive that captures flow from the western corner of the parcel. POA #2 is an offsite wetland to which the majority of the site and some offsite areas are directed. This offsite area was included as it represents the confluence of two wetland systems and an area affected by the relocation of Stone Quarry Drive. POA #3 is the southern property line where an existing stream captures the southeast portion of the lot. The sites hydrology is characterized by five existing subcatchments as delineated on the accompanying "Pre-Development Watershed Plan".

Post-Development (Proposed Conditions)

The post-development conditions were analyzed at the same discharge points as the pre-development conditions as delineated on the accompanying "Post-Development Watershed Plan". Modifications to the delineated areas and associated ground cover were made to sub-

catchments to account for the proposed improvements to the property. As shown on the attached Post-Development Watershed Plan, the site was divided into forty post-development subcatchment areas. Site topography, existing features, proposed site improvements, proposed grading, drainage and erosion control measures are shown on the accompanying plan set. Recommended erosion control measures are based upon the December 2008 edition of the "*New Hampshire Stormwater Manual Volumes 1 through 3*" prepared by NHDES and Comprehensive Environmental, Inc. as amended.

CALCULATION METHODS

The drainage study was completed using the USDA SCS TR-20 Method within the HydroCAD Stormwater Modeling System. Reservoir routing was performed with the Dynamic Storage Indication method with automated calculation of tailwater conditions. A Type III 24-hour rainfall distribution was utilized in analyzing the data for the 2, 10 and 25 year - 24-hour storm events using rainfall data provided by the Northeast Regional Climate Center (NRCC). As the project site lies within a Coastal and Great Bay Community identified by NHDES Alteration of Terrain, all rainfall amounts were increased by 15% to account for potential future increases in rainfall due to climate change. A time span of 0 to 48 hours was analyzed at 0.01-hour increments. Design infiltration rates used in the analysis were taken from the corresponding test pit logs. Pond summaries for the 100-year storm event are also included in the proposed analysis.

Disclaimer

Altus Engineering, Inc. notes that stormwater modeling is limited in its capacity to precisely predict peak rates of runoff and flood elevations. Results should not be considered to represent actual storm events due to the number of variables and assumptions involved in the modeling effort. Surface roughness coefficients (n), entrance loss coefficients (ke), velocity factors (kv) and times of concentration (Tc) are based on subjective field observations and engineering judgment using available data. For design purposes, curve numbers (Cn) describe the average conditions. However, curve numbers will vary from storm to storm depending on the antecedent runoff conditions (ARC) including saturation and frozen ground. Also, higher water elevations than predicted by modeling could occur if drainage channels, closed drain systems or culverts are not maintained and/or become blocked by debris before and/or during a storm event as this will impact flow capacity of the structures. Structures should be re-evaluated if future changes occur within relevant drainage areas in order to assess any required design modifications.

Drainage Analysis

A complete summary of the drainage model is included in the appendix of this report. The following tables compare pre- and post-development peak rates and volumes at the Point of Analysis identified on the plans for the 1", 2, 10 and 25-year storm events:

Stormwater Modeling Summary
Peak Q (cfs) for Type III 24-Hour Storm Events

	1" Storm (1.00 inch)	2-Yr Storm (3.61 inch)	10-Yr Storm (5.47 inch)	25-Yr Storm (6.93 inch)
POA #1 (South to Culvert)				
Pre	0.01	2.40	4.26	5.12
Post	0.01	2.05	3.78	4.78
Change	**0.00**	**-0.35**	**-0.48**	**-0.34**
POA #2 (South to Wetland)				
Pre	0.05	15.07	27.12	34.48
Post	0.10	13.65	23.20	30.13
Change	**0.05**	**-1.42**	**-3.92**	**-4.35**
POA #3 (South to Wetland)				
Pre	0.00	6.43	16.14	24.80
Post	0.04	5.84	15.73	24.21
Change	**0.04**	**-0.59**	**-0.41**	**-0.59**

As the above table demonstrates, the proposed peak rates of runoff at the points of analysis will match or be decreased from the existing conditions for all analyzed storm events with the exception of the 1" event where the increases have been determined to be insignificant due to the fact that they total no more than 0.05 cfs and because decreases are shown in all larger storms. A decrease in the 1" storm is also not a requirement of the Town of Durham's Site Plan Regulations.

The following table demonstrates the pre- and post- volumes of runoff. As shown in the attached calculations, the use of porous pavement allows the infiltration of the town's requisite groundwater recharge volume which exceeds that required by the NHDES.

Stormwater Modeling Summary
Volume V (af) for Type III 24-Hour Storm Events

	1" Storm (1.00 inch)	2-Yr Storm (3.61 inch)	10-Yr Storm (5.47 inch)	25-Yr Storm (6.93 inch)
POA #1 (South to Culvert)				
Pre	0.004	0.215	0.448	0.650
Post	0.008	0.214	0.430	0.614
Change	**0.004**	**-0.001**	**-0.018**	**-0.036**
POA #2 (South to Wetland)				
Pre	0.038	2.198	4.597	6.679
Post	0.062	2.221	4.580	6.621
Change	**0.024**	**0.023**	**-0.017**	**-0.058**
POA #3 (South to Wetland)				
Pre	0.001	0.691	1.589	2.399
Post	0.064	0.968	1.989	2.885
Change	**0.063**	**0.277**	**0.400**	**0.486**

POLLUTANT REMOVAL

Based on the New Hampshire Stormwater Manual (Volume 2), the following pollutant removal rates would be expected from the implementation of the proposed stormwater BMPs:

BMP	Pollutant	Removal Efficiency
Deep Sump Catch Basin -		
	Total Suspended Solids (TSS)	15%
	Total Nitrogen (TN)	5%
	Total Phosphorus (TP)	5%
Bioretention Pond -		
	Total Suspended Solids (TSS)	90%
	Total Nitrogen (TN)	65%
	Total Phosphorus (TP)	65%
Porous Pavement -		
	Total Suspended Solids (TSS)	90%
	Total Nitrogen (TN)	60%
	Total Phosphorus (TP)	65%

CONCLUSION

This proposed development of property located on Stone Quarry Drive in Durham, New Hampshire will have minimal adverse effect on abutting properties and infrastructure as a result of stormwater runoff or siltation. Post-construction peak rates of runoff from the site will be at or lower than the existing conditions for all analyzed storm events with the insignificant exceptions noted above. The new stormwater management system will also provide appropriate treatment to and infiltration of runoff from the proposed impervious surfaces. Appropriate steps will be taken to properly mitigate erosion and sedimentation through the use of temporary and permanent Best Management Practices for sediment and erosion control, including deep sump catch basins with grease hoods, bioretention ponds and porous pavement.

Section 2

Aerial Photo and USGS Map

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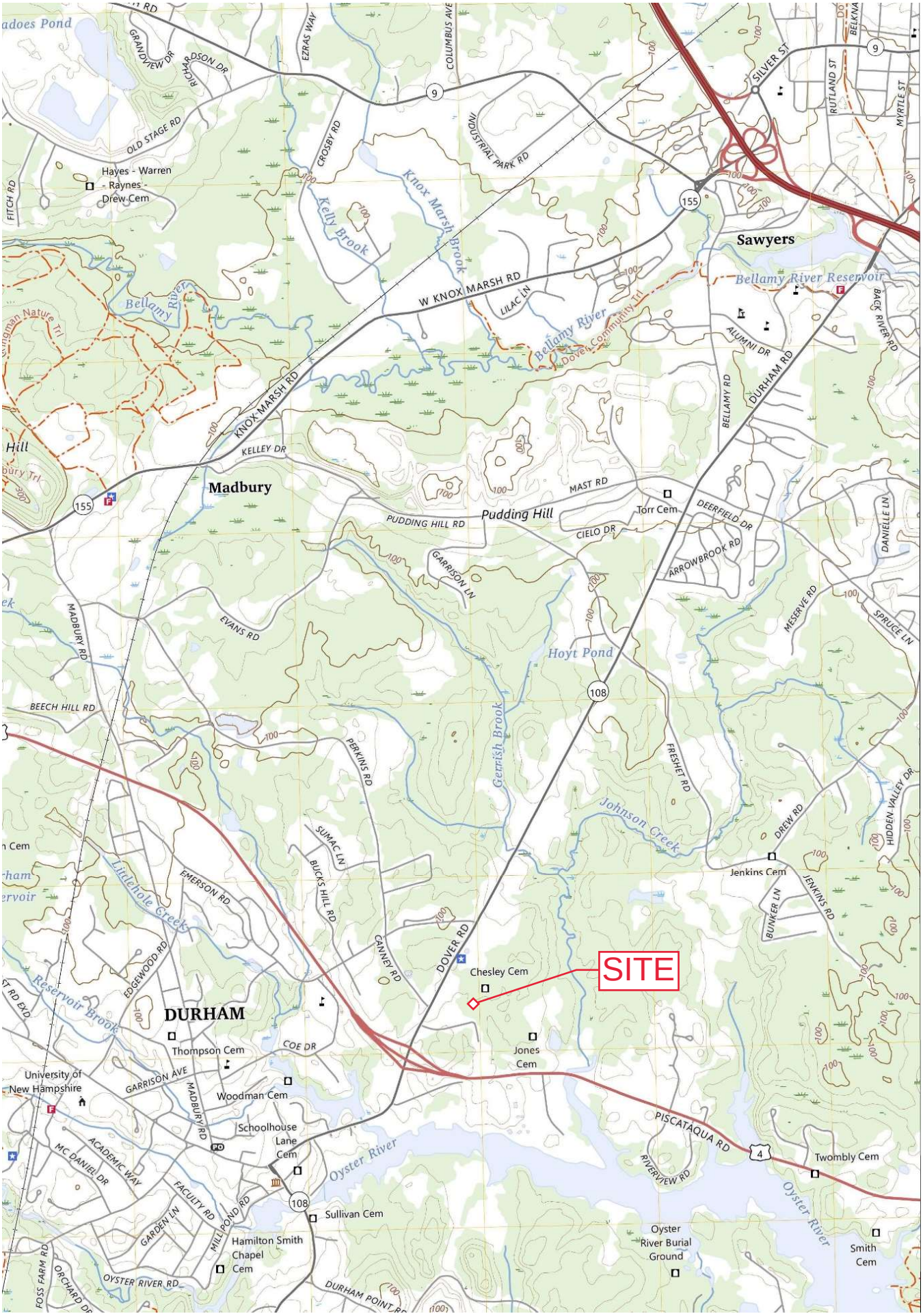
SITE


SITE
Madbury
Sawyers
DURHAM
Pudding Hill
Hoyt Pond
Bellamy River
Bellamy River Reservoir
Knox Marsh Brook
Kelly Brook
Johnson Creek
Gerrish Brook
Littlehole Creek
Reservoir Brook
Oyster River
Hayes - Warren - Raynes - Drew Cem
Torr Cem
Chesley Cem
Jones Cem
Jenkins Cem
Thompson Cem
Woodman Cem
Schoolhouse Lane Cem
Sullivan Cem
Hamilton Smith Chapel Cem
Oyster River Burial Ground
Twombly Cem
Smith Cem
University of New Hampshire
W KNOX MARSH RD
KNOX MARSH RD
PUDDING HILL RD
MAST RD
DOVER RD
PISCATAQUA RD
DURHAM RD
BELLAMY RD
SILVER ST
OLD STAGE RD
KELLEY DR
EVANS RD
MADBURY RD
BEECH HILL RD
PERKINS RD
FRESHET RD
DREW RD
JENKINS RD
GARRISON AVE
COE DR
OYSTER RIVER RD
DURHAM POINT RD
RIVERVIEW RD
ACADEMIC WAY
MC DANIEL DR
FACULTY RD
MILLPOND RD
GARDEN LN
EDGEWOOD RD
EMERSON RD
BUCKS HILL RD
CANNEY RD
SUMAC LN
GARRISON LN
CIELO DR
ARROWBROOK RD
DEERFIELD DR
ALUMNI DR
LILAC LN
INDUSTRIAL PARK RD
COLUMBUS AVE
EZRAS WAY
CROSBY RD
FITCH RD
GRANDVIEW DR
RICHARDSON DR
RUTLAND ST
MYRTLE ST
BACK RIVER RD
DANIELLE LN
MESERVE RD
SPRUCE LN
HIDDEN VALLEY DR
BUNKER LN
Dover Community Trl
155
108
9
4

Section 3

Drainage Calculations

Pre-Development
2-Year, 24-Hour Summary
10-Year, 24-Hour Complete
25-Year, 24-Hour Summary

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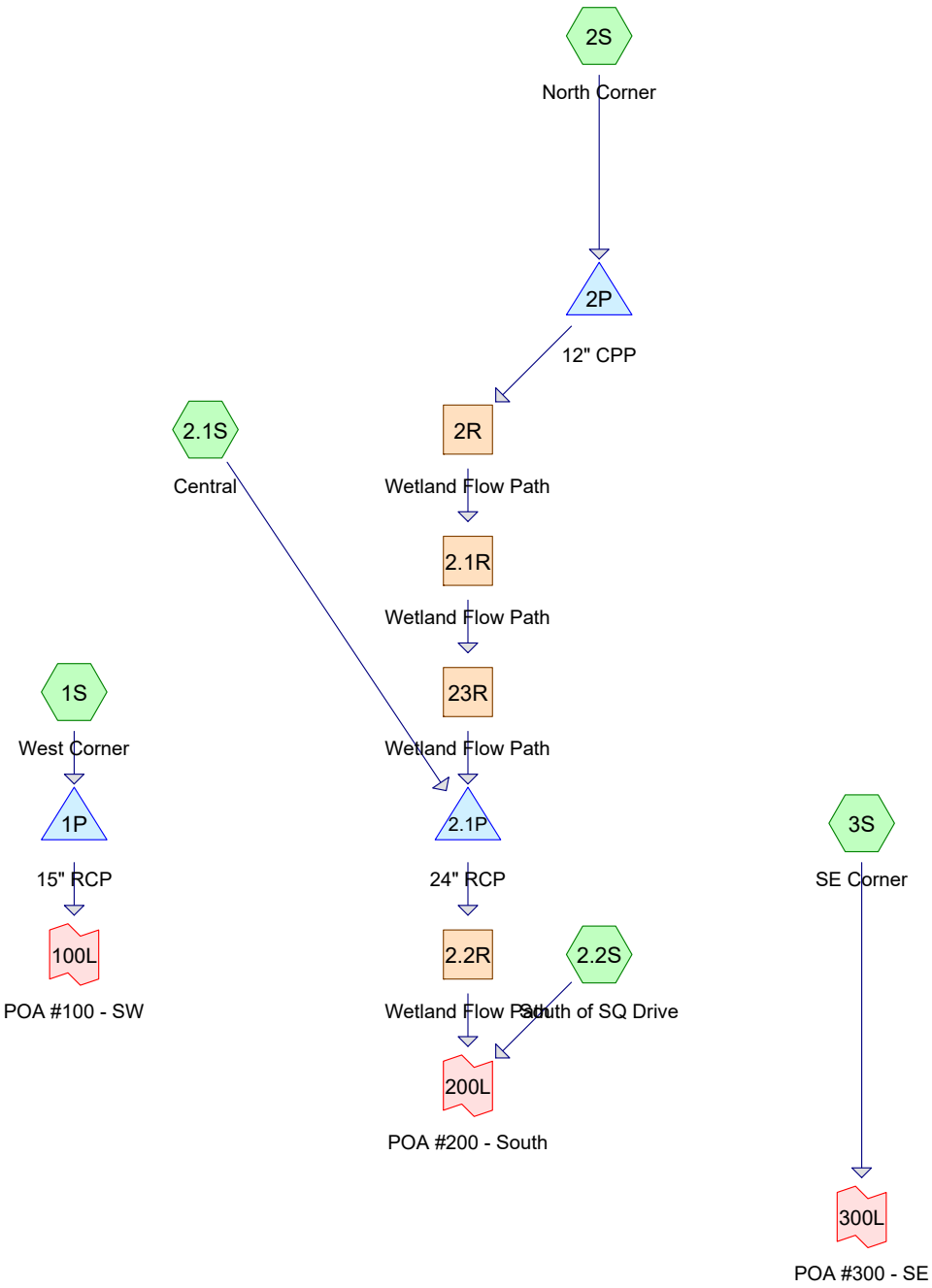


PRE-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 5440-Pre
Prepared by Altus Engineering, Inc., Printed 7/10/2025

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

Subcatchment 1S: West Corner Runoff Area=85,332 sf 8.89% Impervious Runoff Depth=0.02"
Flow Length=366' Tc=9.8 min CN=74 Runoff=0.01 cfs 0.004 af

Subcatchment 2.1S: Central Runoff Area=494,247 sf 8.83% Impervious Runoff Depth=0.02"
Flow Length=1,341' Tc=15.8 min CN=74 Runoff=0.04 cfs 0.022 af

Subcatchment 2.2S: South of SQ Drive Runoff Area=105,068 sf 10.77% Impervious Runoff Depth=0.05"
Flow Length=391' Tc=6.0 min CN=77 Runoff=0.03 cfs 0.010 af

Subcatchment 2S: North Corner Runoff Area=284,221 sf 6.78% Impervious Runoff Depth=0.01"
Tc=0.0 min CN=72 Runoff=0.01 cfs 0.007 af

Subcatchment 3S: SE Corner Runoff Area=373,920 sf 2.67% Impervious Runoff Depth=0.00"
Flow Length=1,149' Tc=15.9 min CN=68 Runoff=0.00 cfs 0.001 af

Reach 2.1R: Wetland Flow Path Avg. Flow Depth=0.02' Max Vel=0.23 fps Inflow=0.01 cfs 0.007 af
n=0.040 L=344.0' S=0.0075 '/' Capacity=54.59 cfs Outflow=0.01 cfs 0.007 af

Reach 2.2R: Wetland Flow Path Avg. Flow Depth=0.03' Max Vel=0.74 fps Inflow=0.04 cfs 0.028 af
n=0.040 L=263.0' S=0.0502 '/' Capacity=141.18 cfs Outflow=0.04 cfs 0.028 af

Reach 2R: Wetland Flow Path Avg. Flow Depth=0.01' Max Vel=0.57 fps Inflow=0.01 cfs 0.007 af
n=0.040 L=151.0' S=0.0446 '/' Capacity=133.09 cfs Outflow=0.01 cfs 0.007 af

Reach 23R: Wetland Flow Path Avg. Flow Depth=0.01' Max Vel=0.36 fps Inflow=0.01 cfs 0.007 af
n=0.040 L=131.0' S=0.0185 '/' Capacity=85.86 cfs Outflow=0.01 cfs 0.007 af

Pond 1P: 15" RCP Peak Elev=52.31' Storage=1 cf Inflow=0.01 cfs 0.004 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0037 '/' Outflow=0.01 cfs 0.004 af

Pond 2.1P: 24" RCP Peak Elev=47.65' Storage=8 cf Inflow=0.04 cfs 0.028 af
24.0" Round Culvert n=0.012 L=78.0' S=0.0135 '/' Outflow=0.04 cfs 0.028 af

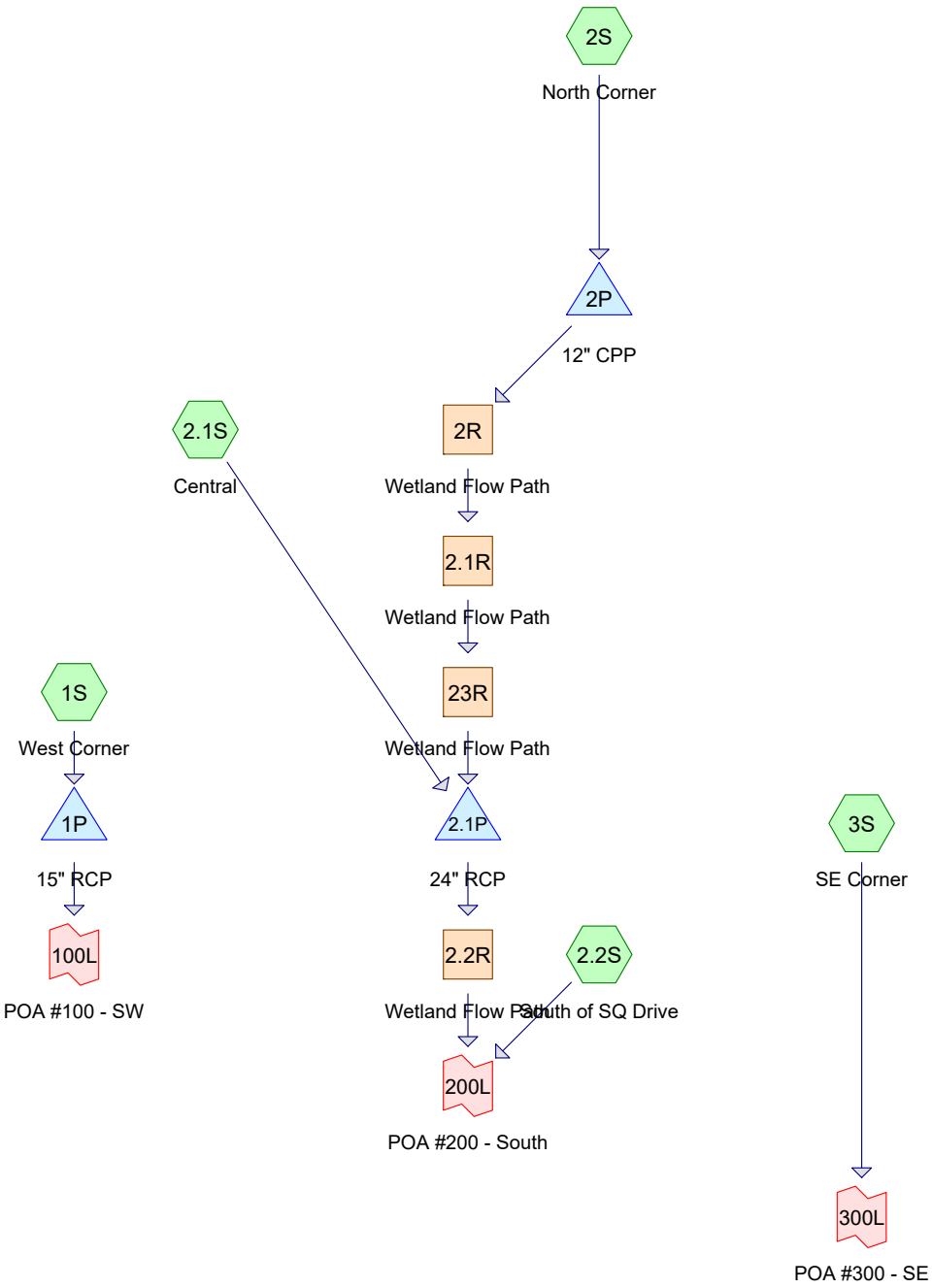
Pond 2P: 12" CPP Peak Elev=59.70' Storage=30 cf Inflow=0.01 cfs 0.007 af
Outflow=0.01 cfs 0.007 af

Link 100L: POA #100 - SW Inflow=0.01 cfs 0.004 af
Primary=0.01 cfs 0.004 af

Link 200L: POA #200 - South Inflow=0.05 cfs 0.038 af
Primary=0.05 cfs 0.038 af

Link 300L: POA #300 - SE Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Total Runoff Area = 30.826 ac Runoff Volume = 0.042 af Average Runoff Depth = 0.02"
93.16% Pervious = 28.718 ac 6.84% Impervious = 2.108 ac



PRE-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 5440-Pre
Prepared by Altus Engineering, Inc., Printed 7/9/2025

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

Subcatchment 1S: West Corner Runoff Area=85,332 sf 8.89% Impervious Runoff Depth=1.32"
Flow Length=366' Tc=9.8 min CN=74 Runoff=2.56 cfs 0.215 af

Subcatchment 2.1S: Central Runoff Area=494,247 sf 8.83% Impervious Runoff Depth=1.32"
Flow Length=1,341' Tc=15.8 min CN=74 Runoff=12.48 cfs 1.245 af

Subcatchment 2.2S: South of SQ Drive Runoff Area=105,068 sf 10.77% Impervious Runoff Depth=1.51"
Flow Length=391' Tc=6.0 min CN=77 Runoff=4.22 cfs 0.304 af

Subcatchment 2S: North Corner Runoff Area=284,221 sf 6.78% Impervious Runoff Depth=1.19"
Tc=0.0 min CN=72 Runoff=10.62 cfs 0.649 af

Subcatchment 3S: SE Corner Runoff Area=373,920 sf 2.67% Impervious Runoff Depth=0.97"
Flow Length=1,149' Tc=15.9 min CN=68 Runoff=6.43 cfs 0.691 af

Reach 2.1R: Wetland Flow Path Avg. Flow Depth=0.45' Max Vel=1.48 fps Inflow=2.22 cfs 0.649 af
n=0.040 L=344.0' S=0.0075 '/' Capacity=54.59 cfs Outflow=2.22 cfs 0.649 af

Reach 2.2R: Wetland Flow Path Avg. Flow Depth=0.68' Max Vel=4.79 fps Inflow=13.20 cfs 1.894 af
n=0.040 L=263.0' S=0.0502 '/' Capacity=141.18 cfs Outflow=13.19 cfs 1.894 af

Reach 2R: Wetland Flow Path Avg. Flow Depth=0.28' Max Vel=2.78 fps Inflow=2.23 cfs 0.649 af
n=0.040 L=151.0' S=0.0446 '/' Capacity=133.09 cfs Outflow=2.22 cfs 0.649 af

Reach 23R: Wetland Flow Path Avg. Flow Depth=0.35' Max Vel=2.04 fps Inflow=2.22 cfs 0.649 af
n=0.040 L=131.0' S=0.0185 '/' Capacity=85.86 cfs Outflow=2.22 cfs 0.649 af

Pond 1P: 15" RCP Peak Elev=53.20' Storage=137 cf Inflow=2.56 cfs 0.215 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0037 '/' Outflow=2.40 cfs 0.215 af

Pond 2.1P: 24" RCP Peak Elev=49.33' Storage=2,463 cf Inflow=14.47 cfs 1.894 af
24.0" Round Culvert n=0.012 L=78.0' S=0.0135 '/' Outflow=13.20 cfs 1.894 af

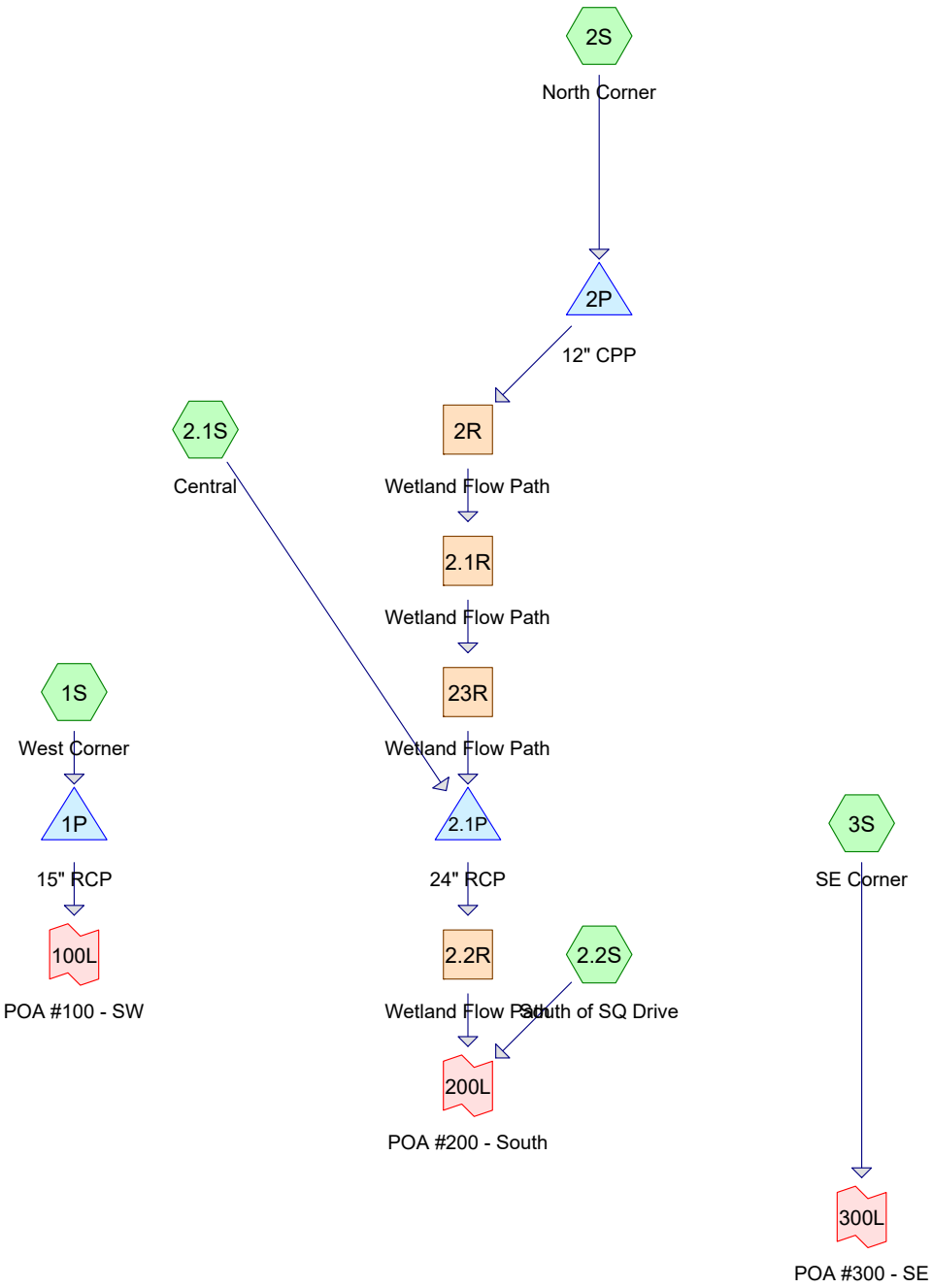
Pond 2P: 12" CPP Peak Elev=60.71' Storage=8,446 cf Inflow=10.62 cfs 0.649 af
Outflow=2.23 cfs 0.649 af

Link 100L: POA #100 - SW Inflow=2.40 cfs 0.215 af
Primary=2.40 cfs 0.215 af

Link 200L: POA #200 - South Inflow=15.07 cfs 2.198 af
Primary=15.07 cfs 2.198 af

Link 300L: POA #300 - SE Inflow=6.43 cfs 0.691 af
Primary=6.43 cfs 0.691 af

Total Runoff Area = 30.826 ac Runoff Volume = 3.103 af Average Runoff Depth = 1.21"
93.16% Pervious = 28.718 ac 6.84% Impervious = 2.108 ac



PRE-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 5440-Pre
Prepared by Altus Engineering, Inc., Printed 7/9/2025

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.039	61	>75% Grass cover, Good, HSG B (2.1S, 3S)
3.140	74	>75% Grass cover, Good, HSG C (1S, 2.1S, 2S, 3S)
0.087	80	>75% Grass cover, Good, HSG D (2.1S, 2S)
0.243	65	Brush, Good, HSG C (2.1S)
0.039	98	Paved parking, HSG B (2.1S, 3S)
1.406	98	Paved parking, HSG C (2.1S, 2.2S, 2S, 3S)
0.227	98	Paved parking, HSG D (2.1S, 2.2S, 2S)
0.174	98	Paved roads w/curbs & sewers, HSG C (1S)
0.261	98	Roofs, HSG C (2.1S, 2S)
2.232	55	Woods, Good, HSG B (1S, 2.1S, 2S, 3S)
19.669	70	Woods, Good, HSG C (1S, 2.1S, 2.2S, 2S, 3S)
3.308	77	Woods, Good, HSG D (2.1S, 2.2S, 2S)
30.826	**72**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.310	HSG B	1S, 2.1S, 2S, 3S
24.894	HSG C	1S, 2.1S, 2.2S, 2S, 3S
3.622	HSG D	2.1S, 2.2S, 2S
0.000	Other	
30.826		**TOTAL AREA**

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

Subcatchment 1S: West Corner Runoff Area=85,332 sf 8.89% Impervious Runoff Depth=2.74"
Flow Length=366' Tc=9.8 min CN=74 Runoff=5.53 cfs 0.448 af

Subcatchment 2.1S: Central Runoff Area=494,247 sf 8.83% Impervious Runoff Depth=2.74"
Flow Length=1,341' Tc=15.8 min CN=74 Runoff=26.96 cfs 2.595 af

Subcatchment 2.2S: South of SQ Drive Runoff Area=105,068 sf 10.77% Impervious Runoff Depth=3.02"
Flow Length=391' Tc=6.0 min CN=77 Runoff=8.55 cfs 0.607 af

Subcatchment 2S: North Corner Runoff Area=284,221 sf 6.78% Impervious Runoff Depth=2.57"
Tc=0.0 min CN=72 Runoff=23.92 cfs 1.395 af

Subcatchment 3S: SE Corner Runoff Area=373,920 sf 2.67% Impervious Runoff Depth=2.22"
Flow Length=1,149' Tc=15.9 min CN=68 Runoff=16.14 cfs 1.589 af

Reach 2.1R: Wetland Flow Path Avg. Flow Depth=1.19' Max Vel=2.53 fps Inflow=18.63 cfs 1.395 af
n=0.040 L=344.0' S=0.0075 '/' Capacity=54.59 cfs Outflow=16.73 cfs 1.395 af

Reach 2.2R: Wetland Flow Path Avg. Flow Depth=0.91' Max Vel=5.61 fps Inflow=24.09 cfs 3.990 af
n=0.040 L=263.0' S=0.0502 '/' Capacity=141.18 cfs Outflow=24.09 cfs 3.990 af

Reach 2R: Wetland Flow Path Avg. Flow Depth=0.83' Max Vel=5.02 fps Inflow=18.70 cfs 1.395 af
n=0.040 L=151.0' S=0.0446 '/' Capacity=133.09 cfs Outflow=18.63 cfs 1.395 af

Reach 23R: Wetland Flow Path Avg. Flow Depth=0.96' Max Vel=3.53 fps Inflow=16.73 cfs 1.395 af
n=0.040 L=131.0' S=0.0185 '/' Capacity=85.86 cfs Outflow=16.62 cfs 1.395 af

Pond 1P: 15" RCP Peak Elev=53.65' Storage=1,011 cf Inflow=5.53 cfs 0.448 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0037 '/' Outflow=4.26 cfs 0.448 af

Pond 2.1P: 24" RCP Peak Elev=51.11' Storage=18,912 cf Inflow=38.13 cfs 3.990 af
24.0" Round Culvert n=0.012 L=78.0' S=0.0135 '/' Outflow=24.09 cfs 3.990 af

Pond 2P: 12" CPP Peak Elev=60.93' Storage=11,719 cf Inflow=23.92 cfs 1.395 af
Outflow=18.70 cfs 1.395 af

Link 100L: POA #100 - SW Inflow=4.26 cfs 0.448 af
Primary=4.26 cfs 0.448 af

Link 200L: POA #200 - South Inflow=27.12 cfs 4.597 af
Primary=27.12 cfs 4.597 af

Link 300L: POA #300 - SE Inflow=16.14 cfs 1.589 af
Primary=16.14 cfs 1.589 af

Total Runoff Area = 30.826 ac Runoff Volume = 6.634 af Average Runoff Depth = 2.58"
93.16% Pervious = 28.718 ac 6.84% Impervious = 2.108 ac

Summary for Subcatchment 1S: West Corner

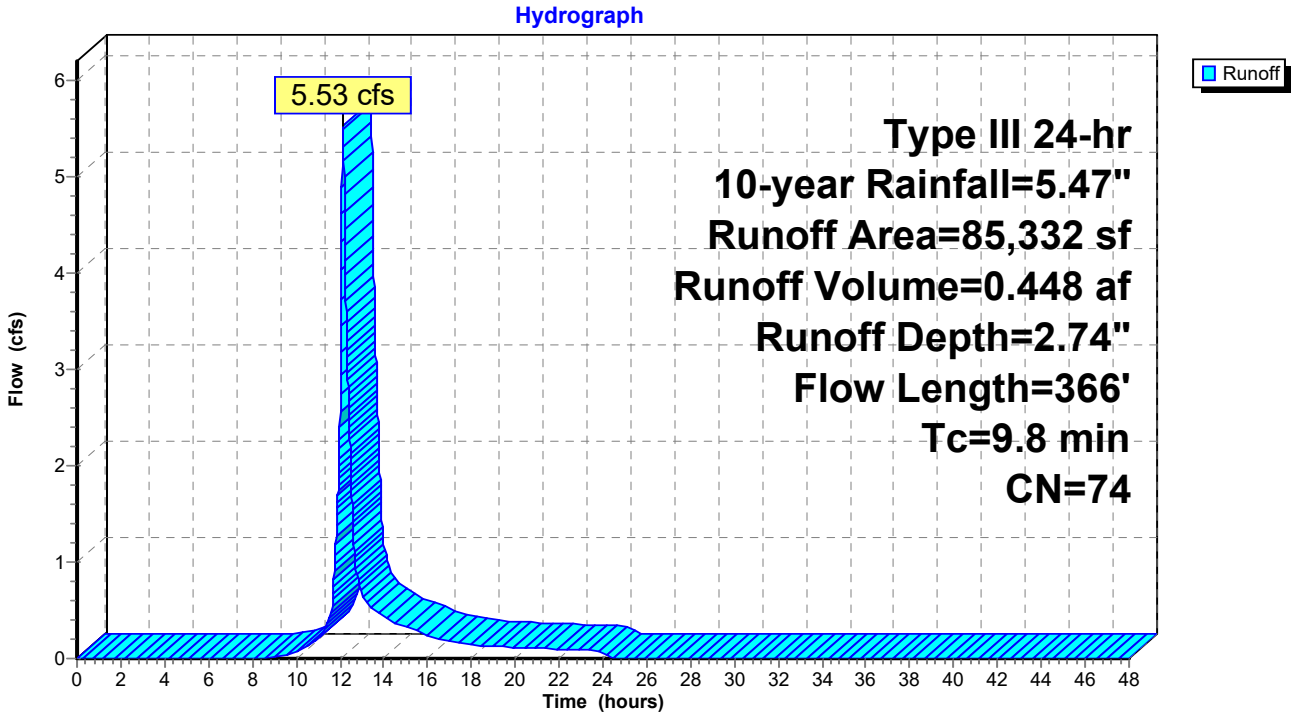
Runoff = 5.53 cfs @ 12.14 hrs, Volume= 0.448 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
7,590	98	Paved roads w/curbs & sewers, HSG C
37,391	74	>75% Grass cover, Good, HSG C
40,320	70	Woods, Good, HSG C
31	55	Woods, Good, HSG B
85,332	74	Weighted Average
77,742		91.11% Pervious Area
7,590		8.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	35	0.1071	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
1.6	129	0.0388	1.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	55	0.0909	1.51		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	147	0.0254	0.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	366	Total			

Subcatchment 1S: West Corner



Summary for Subcatchment 2.1S: Central

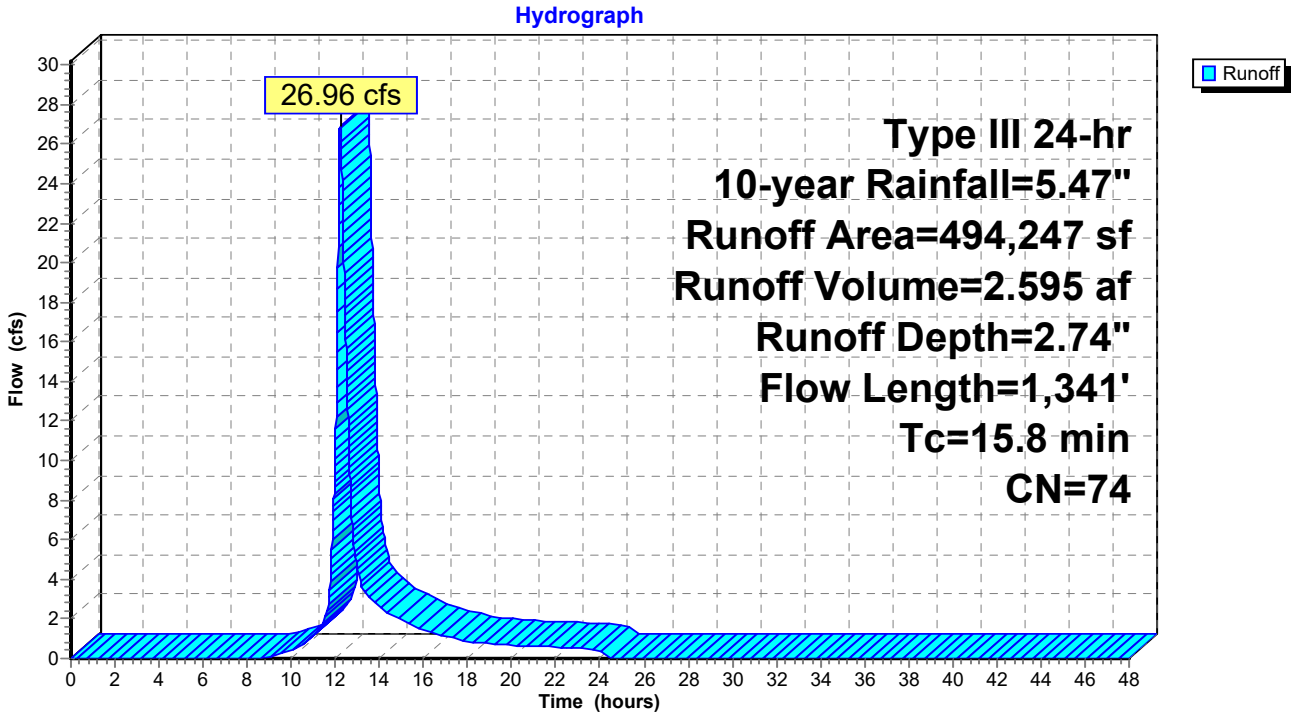
Runoff = 26.96 cfs @ 12.22 hrs, Volume= 2.595 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
4,537	98	Paved parking, HSG D
33,589	98	Paved parking, HSG C
5,448	98	Roofs, HSG C
49	98	Paved parking, HSG B
3,520	80	>75% Grass cover, Good, HSG D
69,745	77	Woods, Good, HSG D
10,593	65	Brush, Good, HSG C
71,371	74	>75% Grass cover, Good, HSG C
280,230	70	Woods, Good, HSG C
530	61	>75% Grass cover, Good, HSG B
14,635	55	Woods, Good, HSG B
494,247	74	Weighted Average
450,624		91.17% Pervious Area
43,623		8.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	35	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.61"
4.7	255	0.0165	0.90		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.0	132	0.0501	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	67	0.0313	2.85		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	89	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	289	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	474	0.0106	2.72	13.61	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.040 Winding stream, pools & shoals
15.8	1,341	Total			

Subcatchment 2.1S: Central



Summary for Subcatchment 2.2S: South of SQ Drive

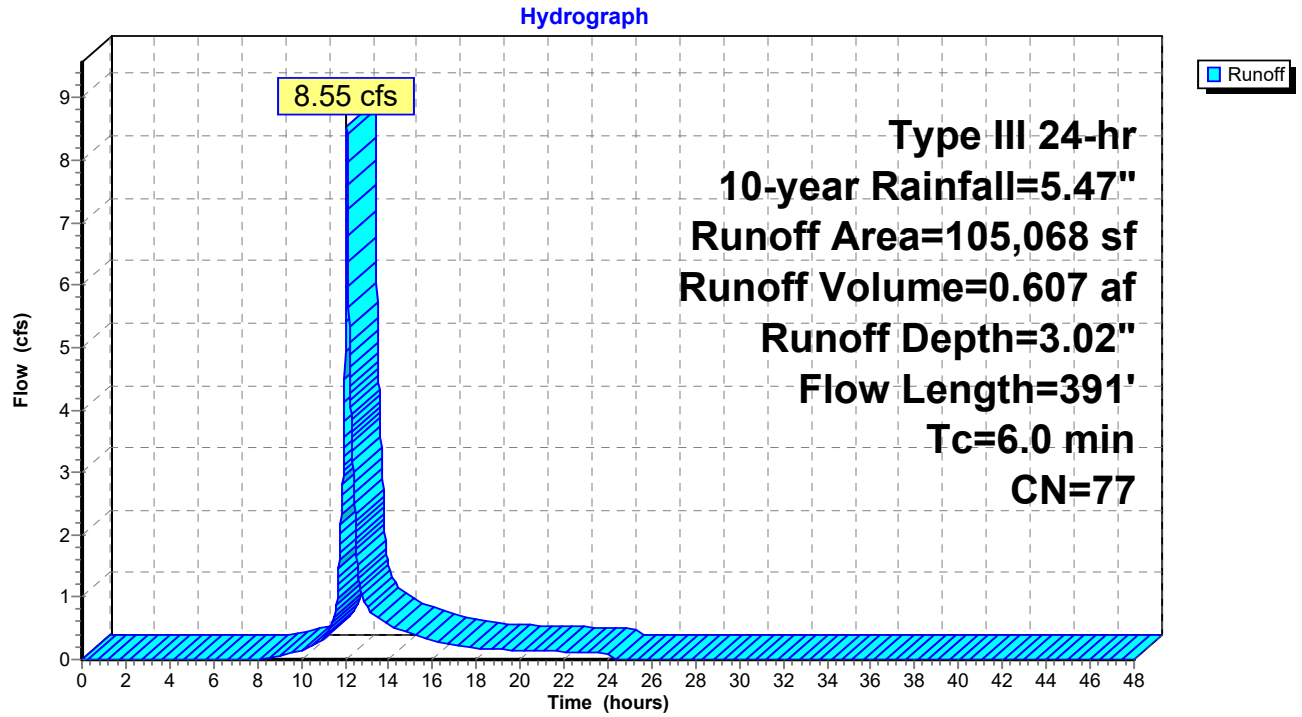
Runoff = 8.55 cfs @ 12.09 hrs, Volume= 0.607 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
5,341	98	Paved parking, HSG D
5,978	98	Paved parking, HSG C
53,584	77	Woods, Good, HSG D
40,165	70	Woods, Good, HSG C
105,068	77	Weighted Average
93,749		89.23% Pervious Area
11,319		10.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	19	0.0200	1.05		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.61"
1.4	118	0.0816	1.43		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	254	0.0502	5.93	29.63	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.040 Winding stream, pools & shoals
2.4	391	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 2.2S: South of SQ Drive



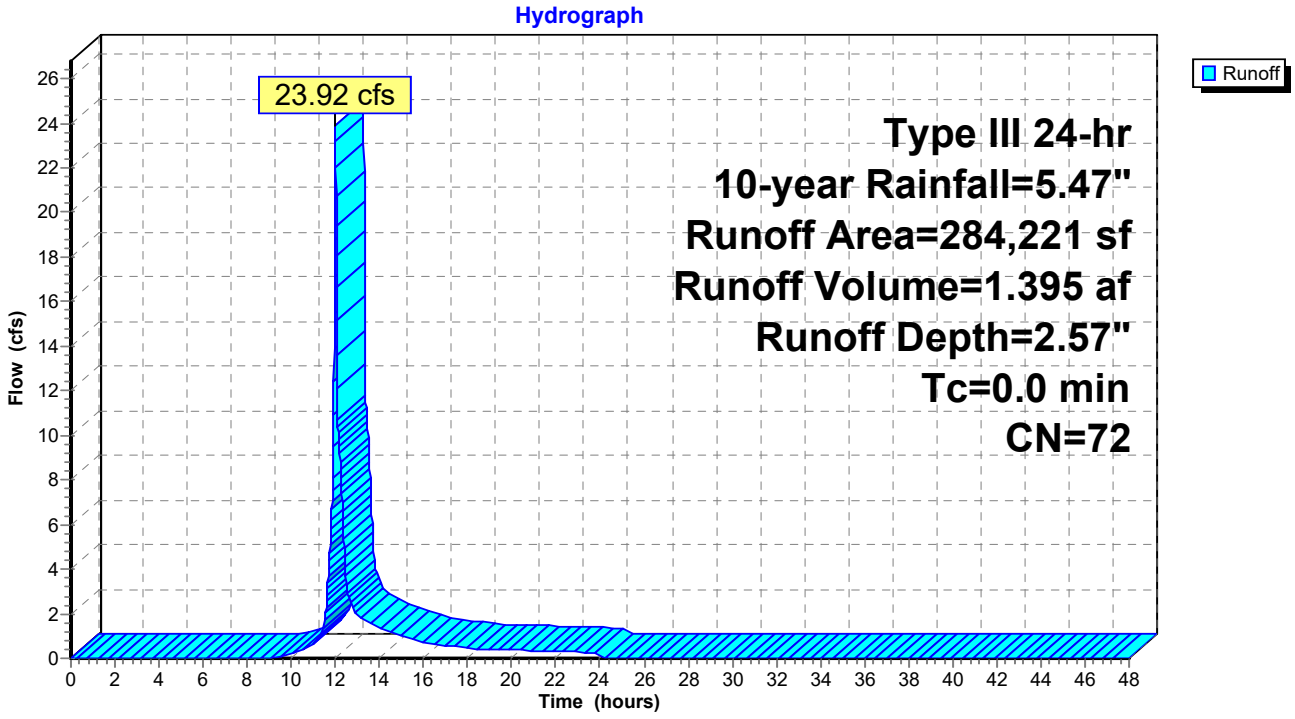
Summary for Subcatchment 2S: North Corner

Runoff = 23.92 cfs @ 12.00 hrs, Volume= 1.395 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
27	98	Paved parking, HSG D
13,324	98	Paved parking, HSG C
5,932	98	Roofs, HSG C
254	80	>75% Grass cover, Good, HSG D
20,767	77	Woods, Good, HSG D
21,632	74	>75% Grass cover, Good, HSG C
199,815	70	Woods, Good, HSG C
22,470	55	Woods, Good, HSG B
284,221	72	Weighted Average
264,938		93.22% Pervious Area
19,283		6.78% Impervious Area

Subcatchment 2S: North Corner



Summary for Subcatchment 3S: SE Corner

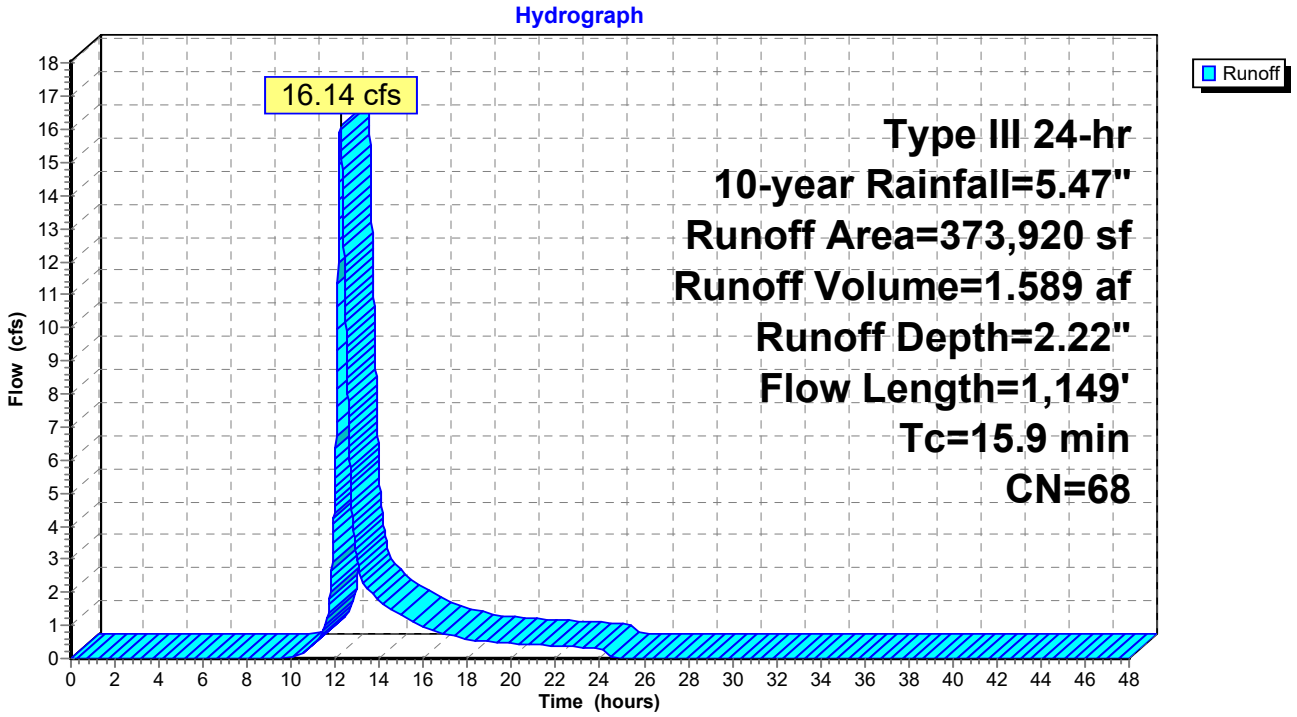
Runoff = 16.14 cfs @ 12.23 hrs, Volume= 1.589 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
8,365	98	Paved parking, HSG C
1,632	98	Paved parking, HSG B
6,383	74	>75% Grass cover, Good, HSG C
296,269	70	Woods, Good, HSG C
1,172	61	>75% Grass cover, Good, HSG B
60,099	55	Woods, Good, HSG B
373,920	68	Weighted Average
363,923		97.33% Pervious Area
9,997		2.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	90	0.1412	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
4.7	331	0.0554	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	331	0.0554	6.22	31.12	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.040 Winding stream, pools & shoals
1.8	397	0.0160	3.63	25.39	**Trap/Vee/Rect Channel Flow,** Bot.W=4.00' D=1.00' Z= 3.0 '/' Top.W=10.00' n= 0.040 Winding stream, pools & shoals
15.9	1,149	Total			

Subcatchment 3S: SE Corner



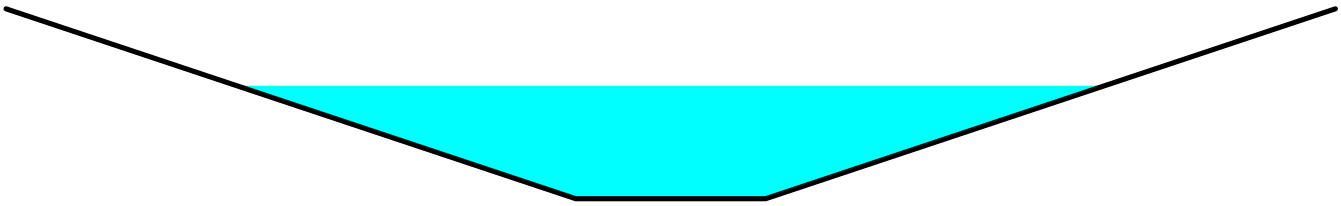
Summary for Reach 2.1R: Wetland Flow Path

Inflow Area = 6.525 ac, 6.78% Impervious, Inflow Depth = 2.57" for 10-year event
Inflow = 18.63 cfs @ 12.05 hrs, Volume= 1.395 af
Outflow = 16.73 cfs @ 12.09 hrs, Volume= 1.395 af, Atten= 10%, Lag= 2.1 min

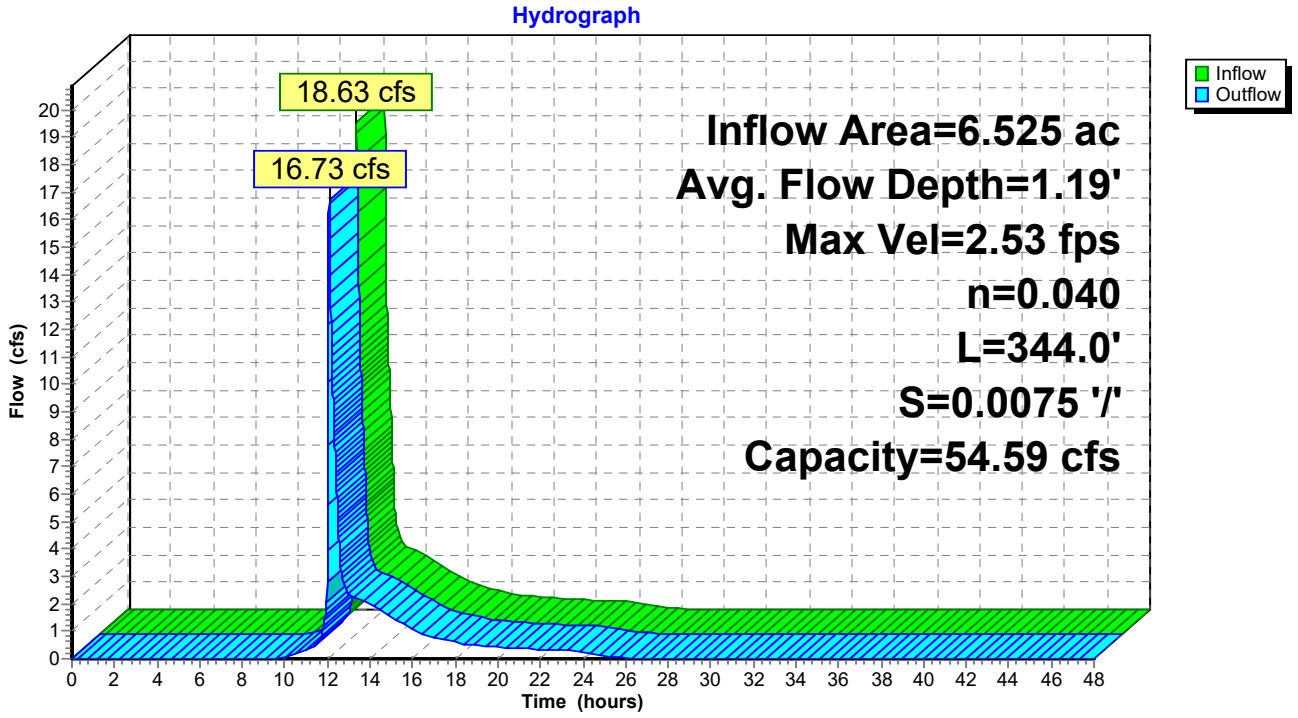
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.53 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 7.9 min

Peak Storage= 2,278 cf @ 12.09 hrs
Average Depth at Peak Storage= 1.19'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 54.59 cfs

2.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 344.0' Slope= 0.0075 '/'
Inlet Invert= 52.58', Outlet Invert= 50.00'



Reach 2.1R: Wetland Flow Path



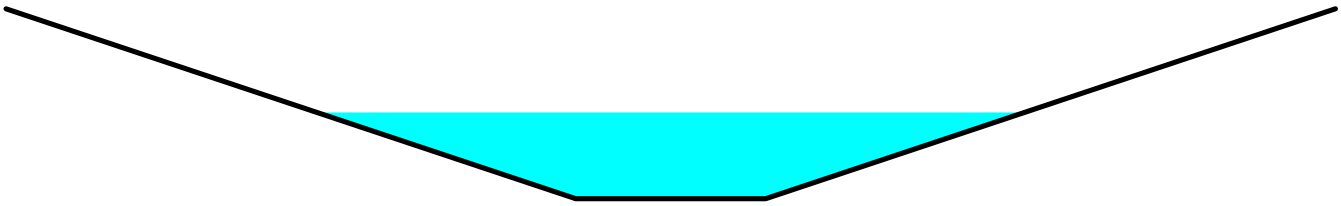
Summary for Reach 2.2R: Wetland Flow Path

Inflow Area = 17.871 ac, 8.08% Impervious, Inflow Depth = 2.68" for 10-year event
Inflow = 24.09 cfs @ 12.43 hrs, Volume= 3.990 af
Outflow = 24.09 cfs @ 12.44 hrs, Volume= 3.990 af, Atten= 0%, Lag= 0.6 min

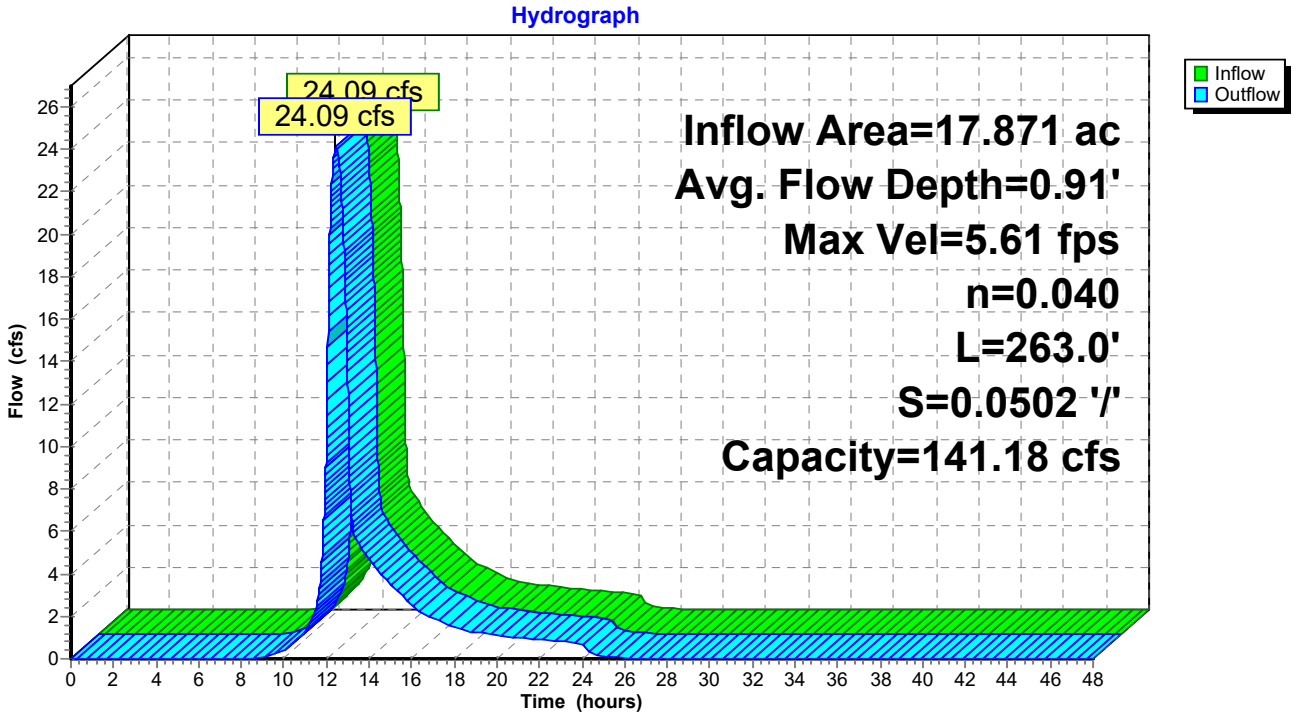
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.61 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.93 fps, Avg. Travel Time= 2.3 min

Peak Storage= 1,129 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.91'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 141.18 cfs

2.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 263.0' Slope= 0.0502 '/'
Inlet Invert= 46.52', Outlet Invert= 33.33'



Reach 2.2R: Wetland Flow Path



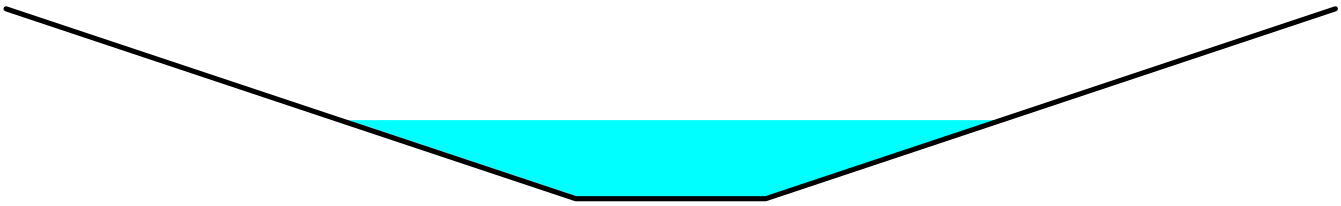
Summary for Reach 2R: Wetland Flow Path

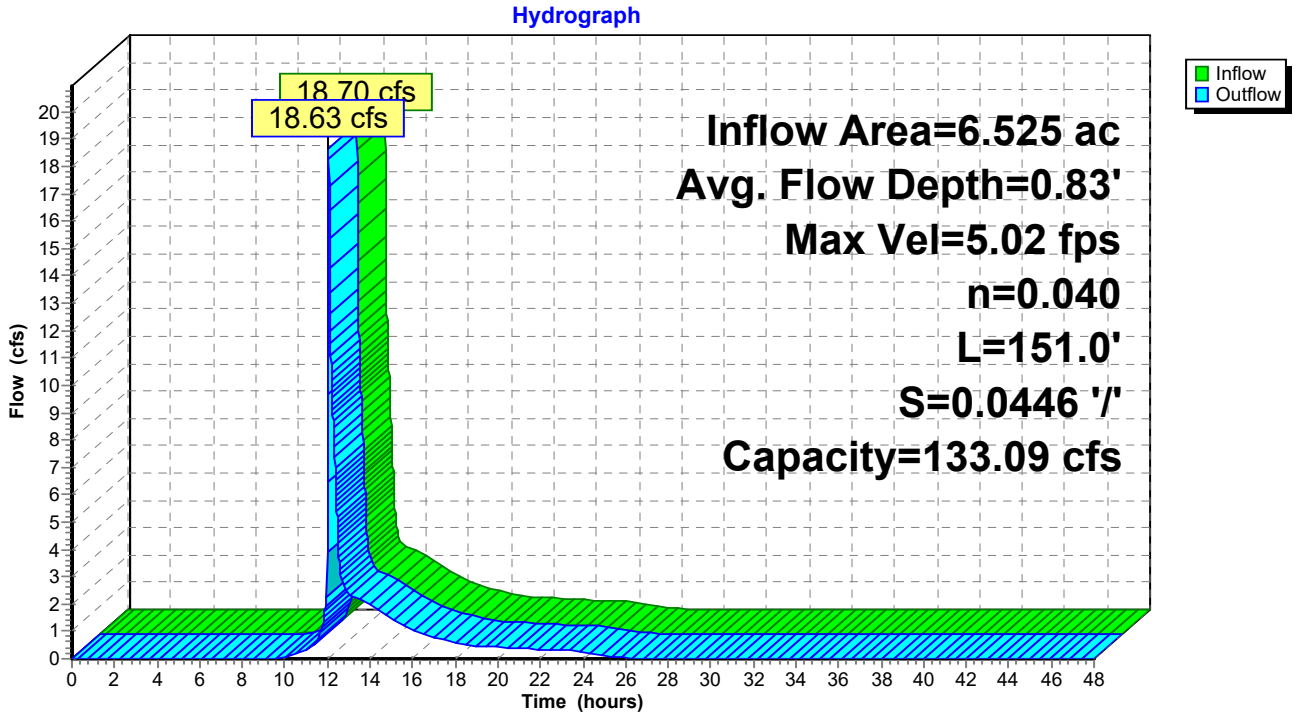
Inflow Area = 6.525 ac, 6.78% Impervious, Inflow Depth = 2.57" for 10-year event
Inflow = 18.70 cfs @ 12.05 hrs, Volume= 1.395 af
Outflow = 18.63 cfs @ 12.05 hrs, Volume= 1.395 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.02 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 1.7 min

Peak Storage= 560 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.83'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 133.09 cfs

2.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 151.0' Slope= 0.0446 '/'
Inlet Invert= 59.31', Outlet Invert= 52.58'





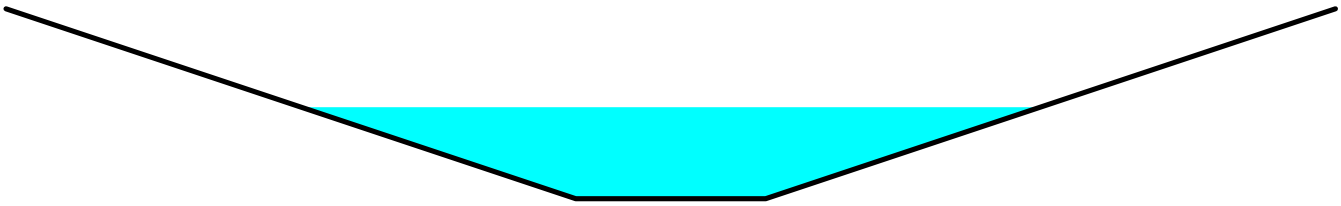
Summary for Reach 23R: Wetland Flow Path

Inflow Area = 6.525 ac, 6.78% Impervious, Inflow Depth = 2.57" for 10-year event
Inflow = 16.73 cfs @ 12.09 hrs, Volume= 1.395 af
Outflow = 16.62 cfs @ 12.10 hrs, Volume= 1.395 af, Atten= 1%, Lag= 0.5 min

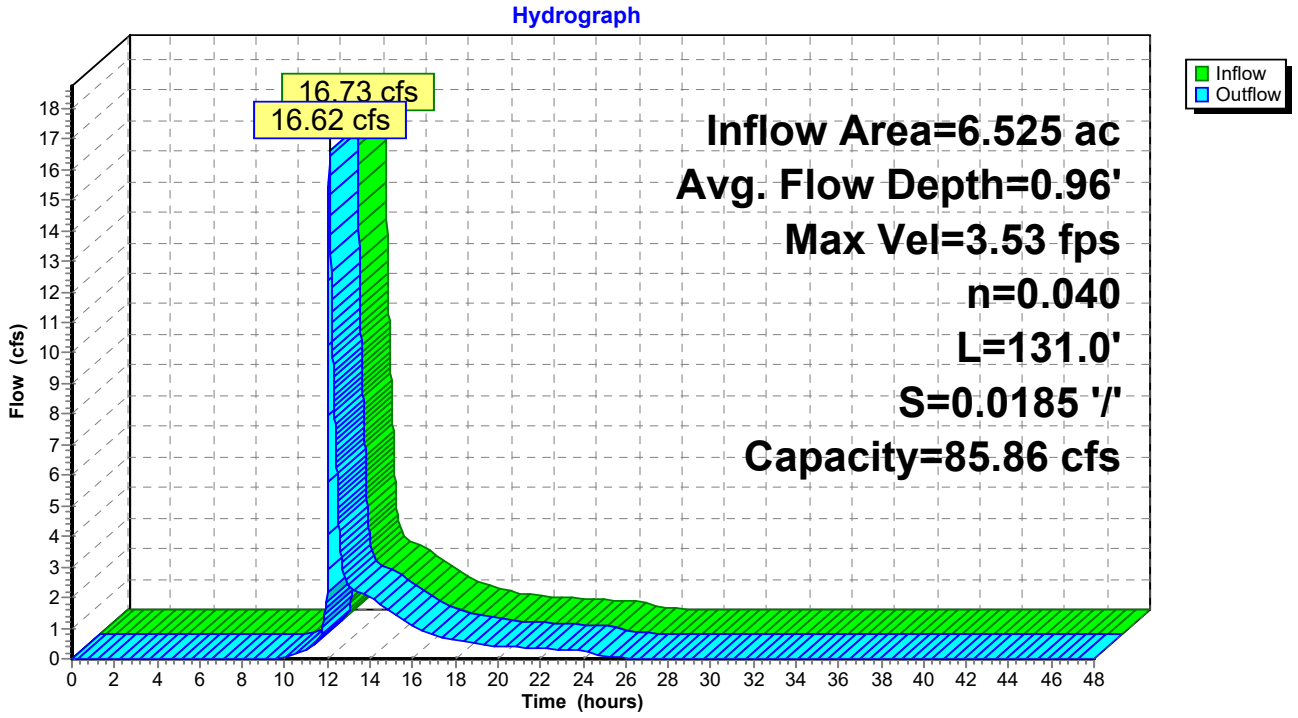
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.53 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 2.1 min

Peak Storage= 617 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.96'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 85.86 cfs

2.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 131.0' Slope= 0.0185 '/'
Inlet Invert= 50.00', Outlet Invert= 47.57'



Reach 23R: Wetland Flow Path



Summary for Pond 1P: 15" RCP

Inflow Area = 1.959 ac, 8.89% Impervious, Inflow Depth = 2.74" for 10-year event
Inflow = 5.53 cfs @ 12.14 hrs, Volume= 0.448 af
Outflow = 4.26 cfs @ 12.23 hrs, Volume= 0.448 af, Atten= 23%, Lag= 5.5 min
Primary = 4.26 cfs @ 12.23 hrs, Volume= 0.448 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.65' @ 12.23 hrs Surf.Area= 2,904 sf Storage= 1,011 cf

Plug-Flow detention time= 1.4 min calculated for 0.448 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (837.9 - 836.6)

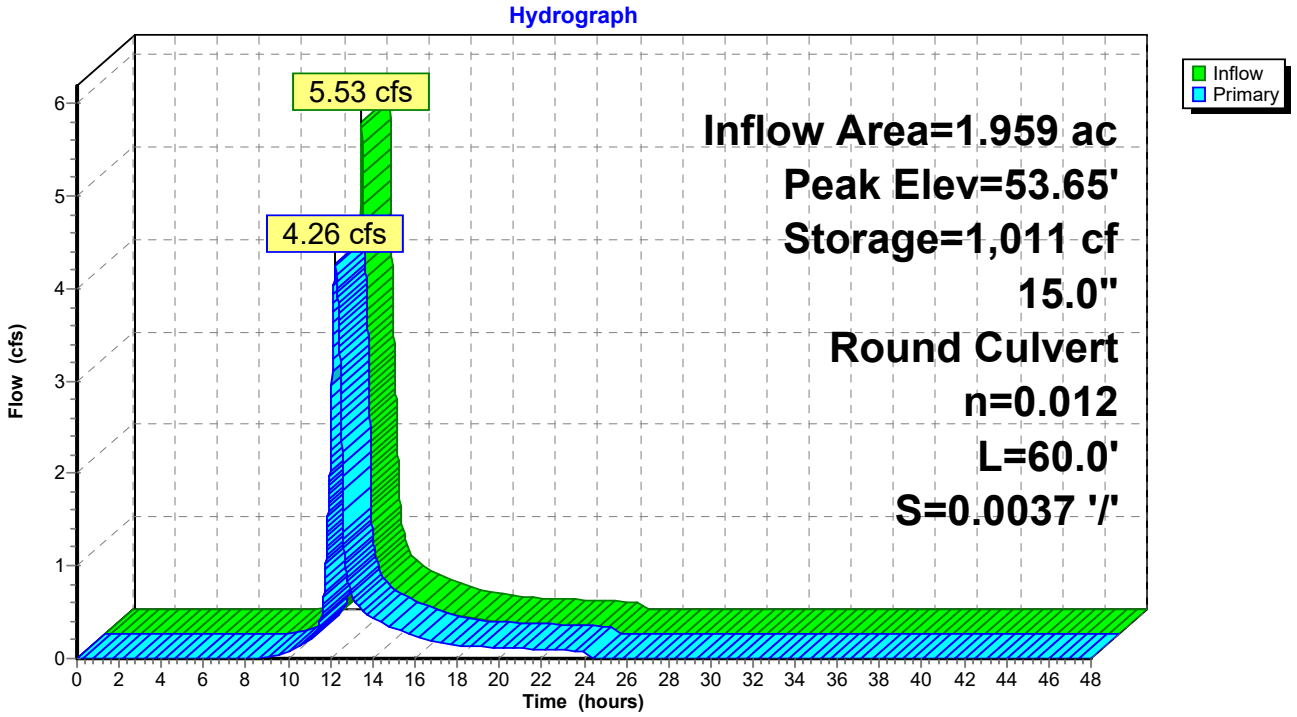
Volume	Invert	Avail.Storage	Storage Description
#1	52.26'	9,237 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.26	10	0	0
53.00	85	35	35
54.00	4,401	2,243	2,278
55.00	9,516	6,959	9,237

Device	Routing	Invert	Outlet Devices
#1	Primary	52.26'	**15.0" Round Culvert** L= 60.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 52.26' / 52.04' S= 0.0037 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=4.26 cfs @ 12.23 hrs HW=53.65' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 4.26 cfs @ 3.89 fps)

Pond 1P: 15" RCP



Summary for Pond 2.1P: 24" RCP

Inflow Area = 17.871 ac, 8.08% Impervious, Inflow Depth = 2.68" for 10-year event
Inflow = 38.13 cfs @ 12.19 hrs, Volume= 3.990 af
Outflow = 24.09 cfs @ 12.43 hrs, Volume= 3.990 af, Atten= 37%, Lag= 14.6 min
Primary = 24.09 cfs @ 12.43 hrs, Volume= 3.990 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.11' @ 12.43 hrs Surf.Area= 16,584 sf Storage= 18,912 cf

Plug-Flow detention time= 4.8 min calculated for 3.990 af (100% of inflow)
Center-of-Mass det. time= 4.7 min (861.2 - 856.5)

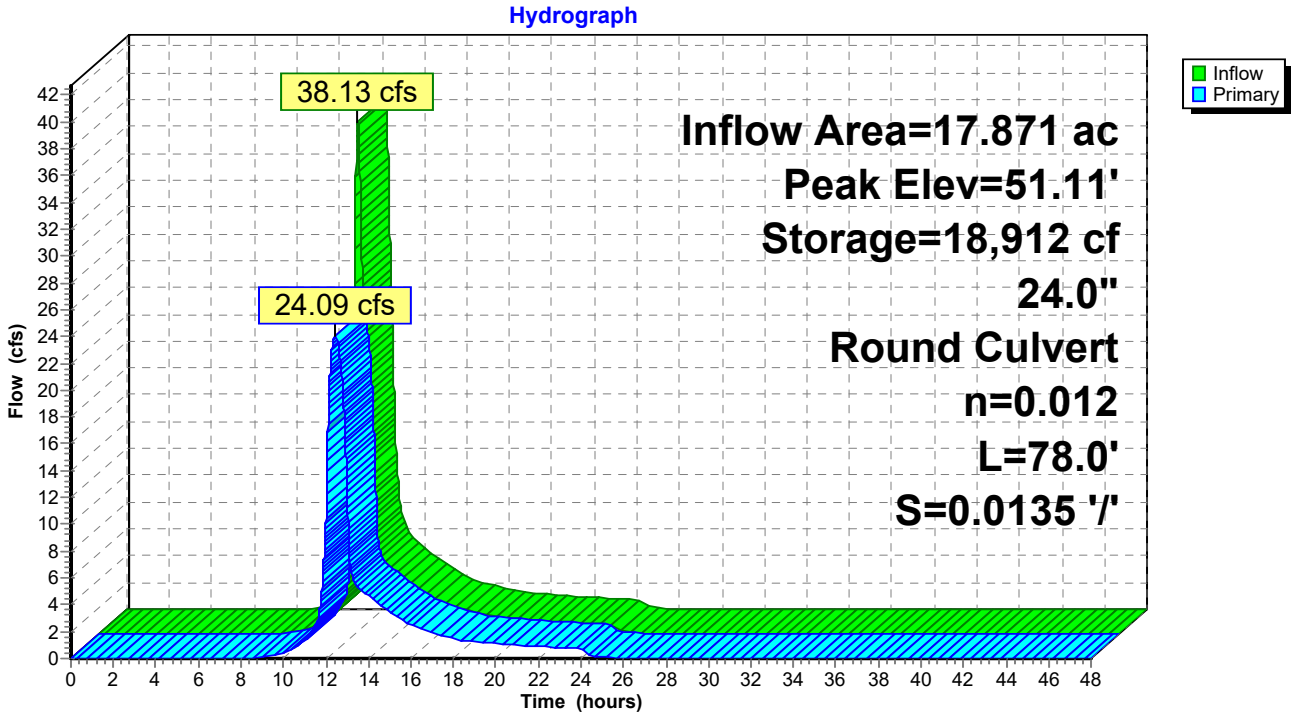
Volume	Invert	Avail.Storage	Storage Description
#1	47.57'	80,071 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.57	100	0	0
48.00	164	57	57
49.00	2,506	1,335	1,392
50.00	7,196	4,851	6,243
51.00	14,807	11,002	17,244
52.00	31,534	23,171	40,415
53.00	47,779	39,657	80,071

Device	Routing	Invert	Outlet Devices
#1	Primary	47.57'	**24.0" Round Culvert** L= 78.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 47.57' / 46.52' S= 0.0135 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=24.09 cfs @ 12.43 hrs HW=51.11' TW=47.43' (Dynamic Tailwater)
1=Culvert (Inlet Controls 24.09 cfs @ 7.67 fps)

Pond 2.1P: 24" RCP



Summary for Pond 2P: 12" CPP

Inflow Area = 6.525 ac, 6.78% Impervious, Inflow Depth = 2.57" for 10-year event
Inflow = 23.92 cfs @ 12.00 hrs, Volume= 1.395 af
Outflow = 18.70 cfs @ 12.05 hrs, Volume= 1.395 af, Atten= 22%, Lag= 2.6 min
Primary = 18.70 cfs @ 12.05 hrs, Volume= 1.395 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 60.93' @ 12.05 hrs Surf.Area= 15,490 sf Storage= 11,719 cf

Plug-Flow detention time= 44.2 min calculated for 1.395 af (100% of inflow)
Center-of-Mass det. time= 44.1 min (876.6 - 832.4)

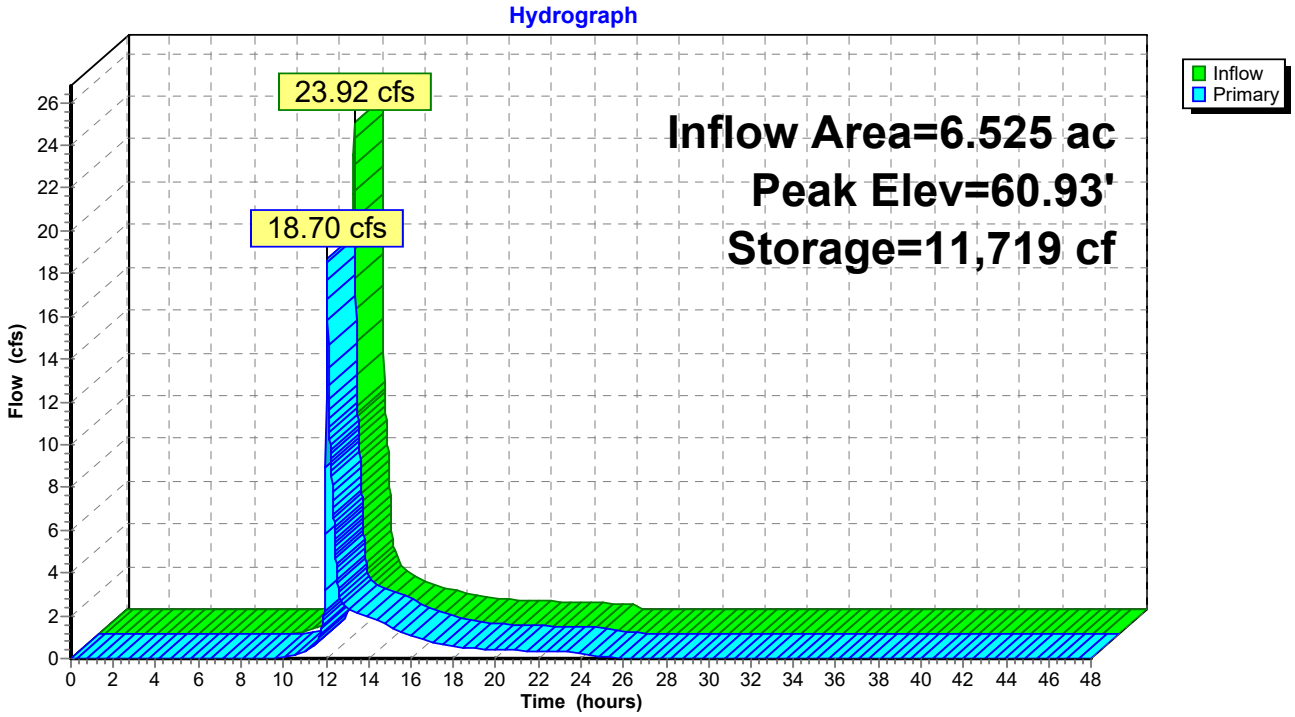
Volume	Invert	Avail.Storage	Storage Description
#1	59.65'	35,764 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.65	100	0	0
60.00	6,996	1,242	1,242
61.00	16,111	11,554	12,795
62.00	29,827	22,969	35,764

Device	Routing	Invert	Outlet Devices
#1	Primary	59.65'	**12.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.65' / 59.31' S= 0.0378 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Primary	60.75'	**87.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=18.66 cfs @ 12.05 hrs HW=60.93' TW=60.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.64 cfs @ 3.36 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 16.02 cfs @ 1.01 fps)

Pond 2P: 12" CPP

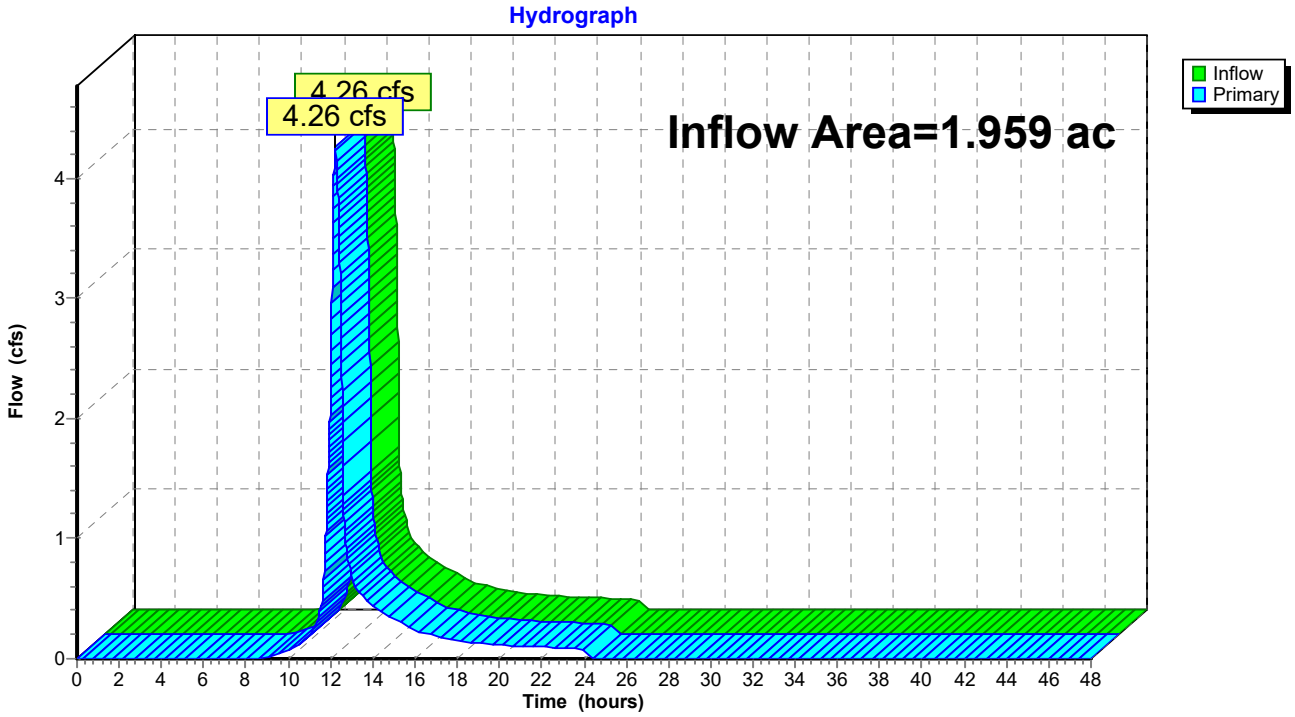


Summary for Link 100L: POA #100 - SW

Inflow Area = 1.959 ac, 8.89% Impervious, Inflow Depth = 2.74" for 10-year event
Inflow = 4.26 cfs @ 12.23 hrs, Volume= 0.448 af
Primary = 4.26 cfs @ 12.23 hrs, Volume= 0.448 af, Atten= 0%, Lag= 0.0 min

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

Link 100L: POA #100 - SW

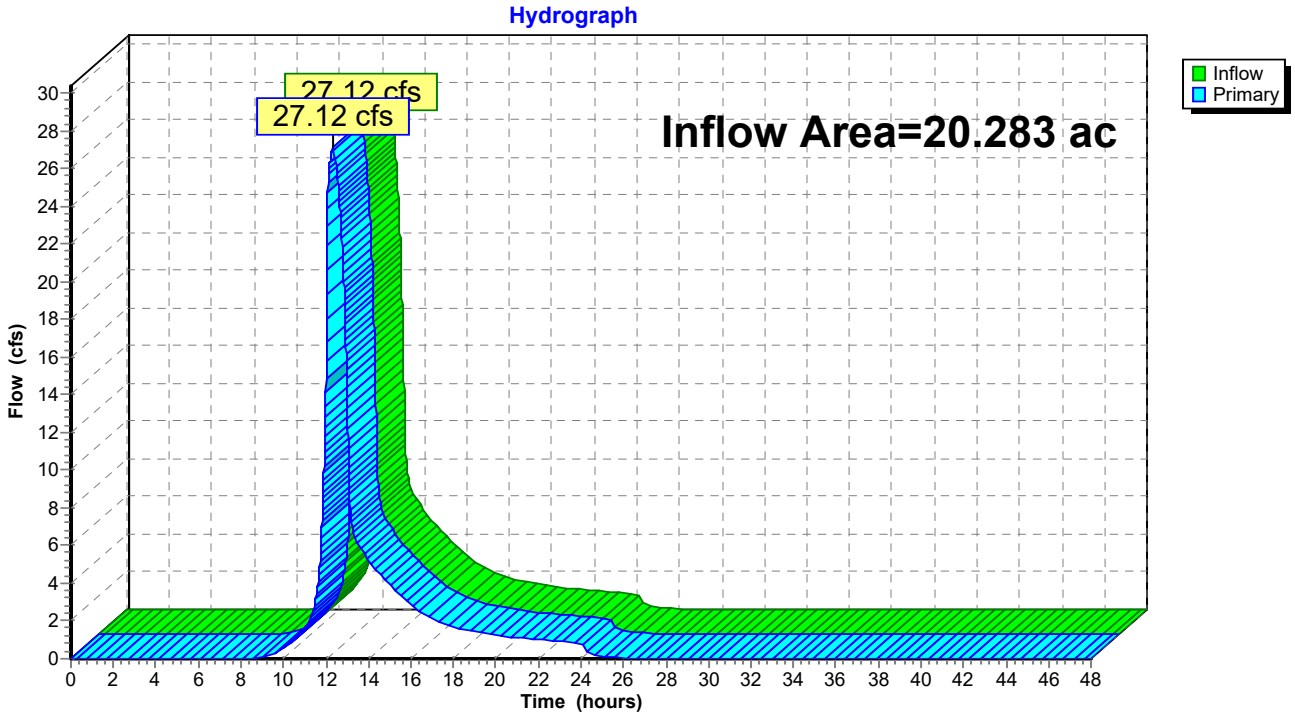


Summary for Link 200L: POA #200 - South

Inflow Area = 20.283 ac, 8.40% Impervious, Inflow Depth = 2.72" for 10-year event
Inflow = 27.12 cfs @ 12.34 hrs, Volume= 4.597 af
Primary = 27.12 cfs @ 12.34 hrs, Volume= 4.597 af, Atten= 0%, Lag= 0.0 min

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

Link 200L: POA #200 - South

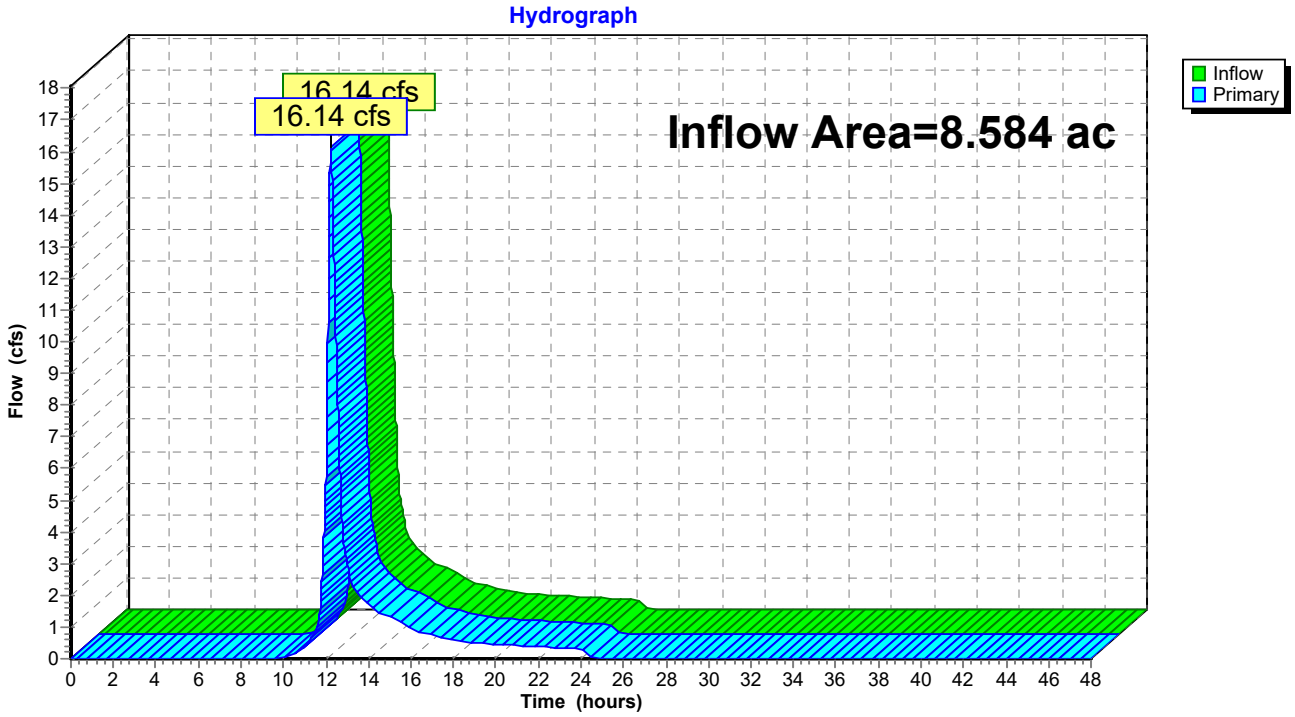


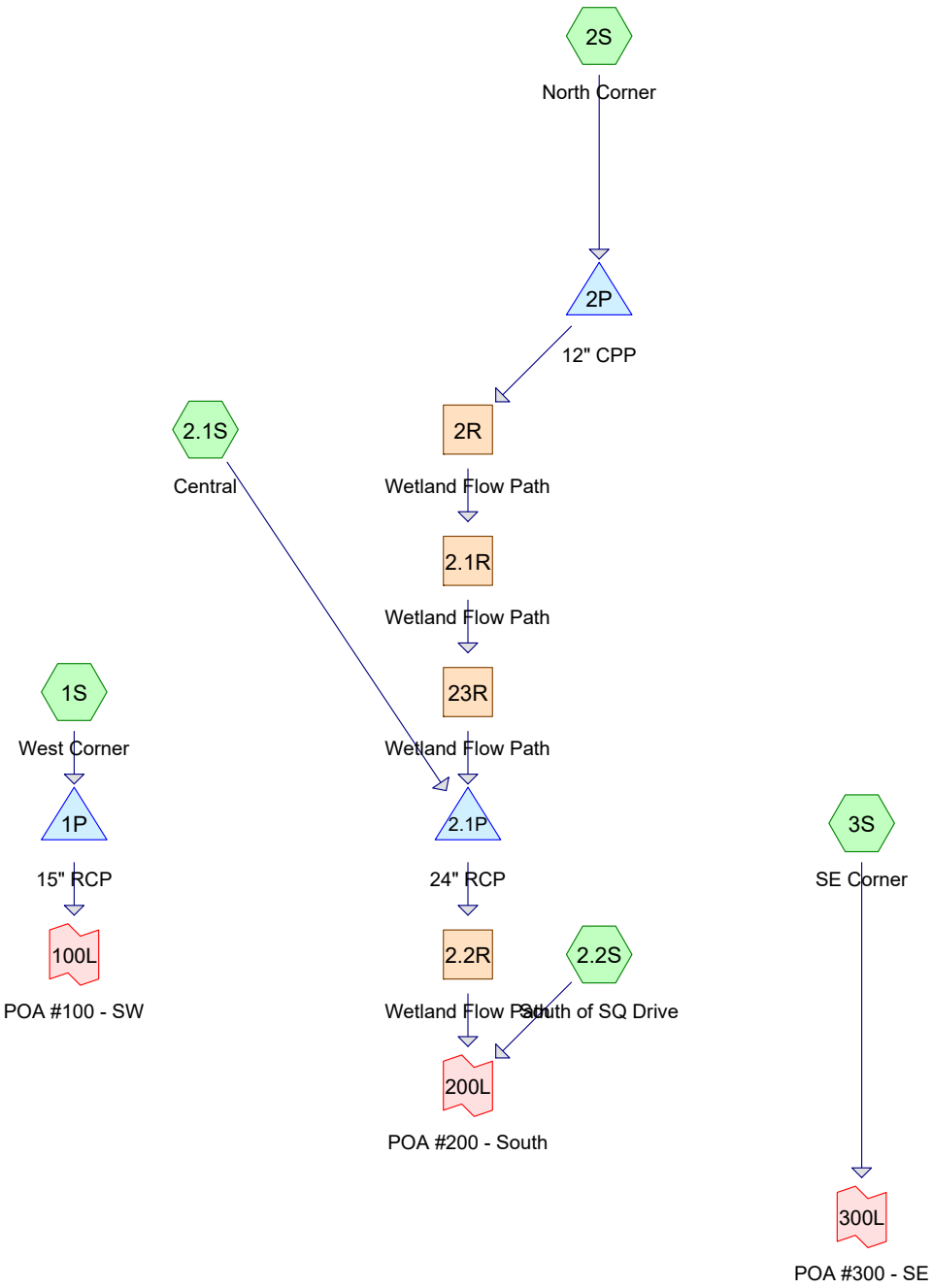
Summary for Link 300L: POA #300 - SE

Inflow Area = 8.584 ac, 2.67% Impervious, Inflow Depth = 2.22" for 10-year event
Inflow = 16.14 cfs @ 12.23 hrs, Volume= 1.589 af
Primary = 16.14 cfs @ 12.23 hrs, Volume= 1.589 af, Atten= 0%, Lag= 0.0 min

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

Link 300L: POA #300 - SE





PRE-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 5440-Pre
Prepared by Altus Engineering, Inc., Printed 7/9/2025

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

Subcatchment 1S: West Corner Runoff Area=85,332 sf 8.89% Impervious Runoff Depth=3.98"
Flow Length=366' Tc=9.8 min CN=74 Runoff=8.04 cfs 0.650 af

Subcatchment 2.1S: Central Runoff Area=494,247 sf 8.83% Impervious Runoff Depth=3.98"
Flow Length=1,341' Tc=15.8 min CN=74 Runoff=39.25 cfs 3.764 af

Subcatchment 2.2S: South of SQ Drive Runoff Area=105,068 sf 10.77% Impervious Runoff Depth=4.30"
Flow Length=391' Tc=6.0 min CN=77 Runoff=12.13 cfs 0.865 af

Subcatchment 2S: North Corner Runoff Area=284,221 sf 6.78% Impervious Runoff Depth=3.77"
Tc=0.0 min CN=72 Runoff=35.33 cfs 2.050 af

Subcatchment 3S: SE Corner Runoff Area=373,920 sf 2.67% Impervious Runoff Depth=3.35"
Flow Length=1,149' Tc=15.9 min CN=68 Runoff=24.80 cfs 2.399 af

Reach 2.1R: Wetland Flow Path Avg. Flow Depth=1.53' Max Vel=2.91 fps Inflow=31.17 cfs 2.050 af
n=0.040 L=344.0' S=0.0075 '/' Capacity=54.59 cfs Outflow=29.25 cfs 2.050 af

Reach 2.2R: Wetland Flow Path Avg. Flow Depth=0.98' Max Vel=5.85 fps Inflow=28.17 cfs 5.814 af
n=0.040 L=263.0' S=0.0502 '/' Capacity=141.18 cfs Outflow=28.17 cfs 5.814 af

Reach 2R: Wetland Flow Path Avg. Flow Depth=1.05' Max Vel=5.74 fps Inflow=31.29 cfs 2.050 af
n=0.040 L=151.0' S=0.0446 '/' Capacity=133.09 cfs Outflow=31.17 cfs 2.050 af

Reach 23R: Wetland Flow Path Avg. Flow Depth=1.25' Max Vel=4.08 fps Inflow=29.25 cfs 2.050 af
n=0.040 L=131.0' S=0.0185 '/' Capacity=85.86 cfs Outflow=29.14 cfs 2.050 af

Pond 1P: 15" RCP Peak Elev=54.02' Storage=2,363 cf Inflow=8.04 cfs 0.650 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0037 '/' Outflow=5.12 cfs 0.650 af

Pond 2.1P: 24" RCP Peak Elev=52.04' Storage=41,604 cf Inflow=55.24 cfs 5.814 af
24.0" Round Culvert n=0.012 L=78.0' S=0.0135 '/' Outflow=28.17 cfs 5.814 af

Pond 2P: 12" CPP Peak Elev=61.01' Storage=13,034 cf Inflow=35.33 cfs 2.050 af
Outflow=31.29 cfs 2.050 af

Link 100L: POA #100 - SW Inflow=5.12 cfs 0.650 af
Primary=5.12 cfs 0.650 af

Link 200L: POA #200 - South Inflow=34.48 cfs 6.679 af
Primary=34.48 cfs 6.679 af

Link 300L: POA #300 - SE Inflow=24.80 cfs 2.399 af
Primary=24.80 cfs 2.399 af

Total Runoff Area = 30.826 ac Runoff Volume = 9.728 af Average Runoff Depth = 3.79"
93.16% Pervious = 28.718 ac 6.84% Impervious = 2.108 ac

Section 4

Drainage Calculations

Post-Development
2-Year, 24-Hour Summary
10-Year, 24-Hour Complete
25-Year, 24-Hour Summary
100-Year, 24-Hour Pond Reports

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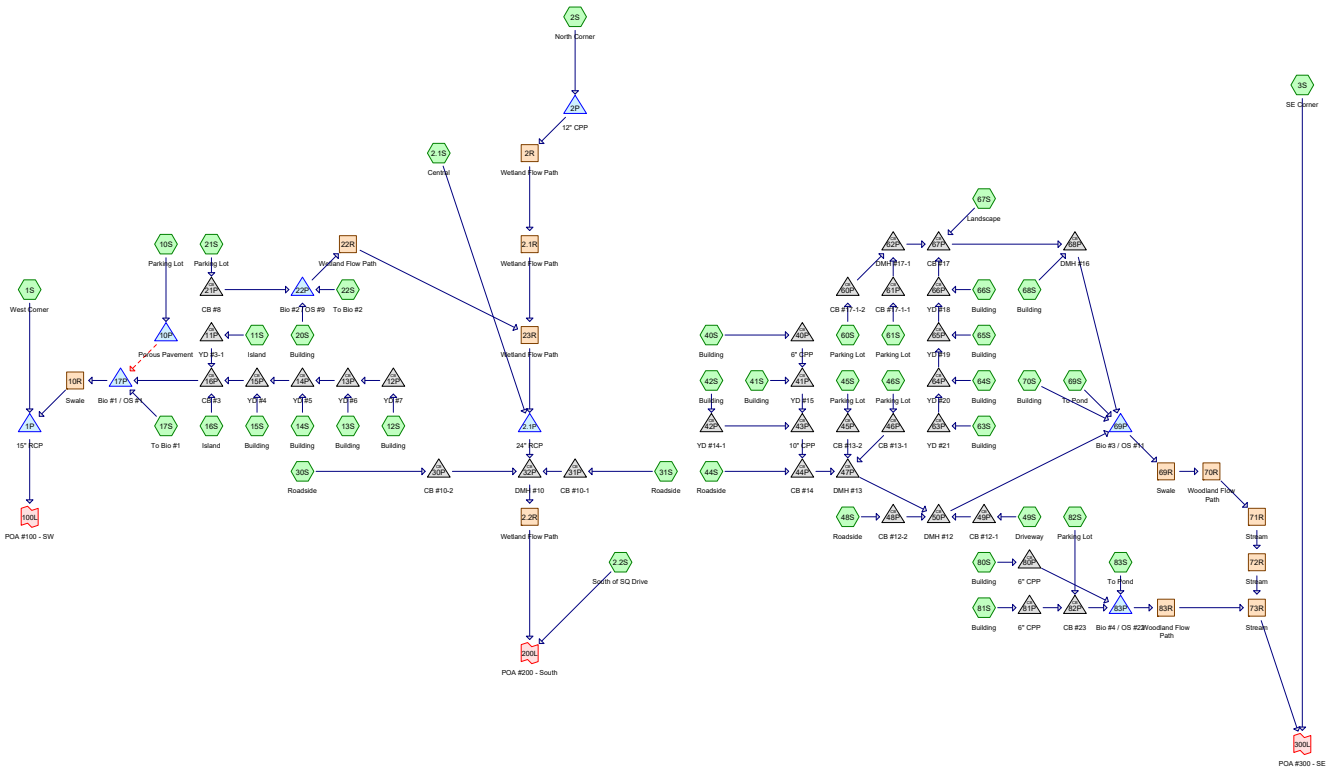


POST-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 5440-Post

Prepared by Altus Engineering, Inc., Printed 10/6/2025

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

Subcatchment 1S: West Corner Runoff Area=66,034 sf 9.68% Impervious Runoff Depth=0.03"
Flow Length=366' Tc=9.8 min CN=75 Runoff=0.01 cfs 0.004 af

Subcatchment 2.1S: Central Runoff Area=444,574 sf 8.10% Impervious Runoff Depth=0.02"
Flow Length=1,341' Tc=15.8 min CN=74 Runoff=0.03 cfs 0.020 af

Subcatchment 2.2S: South of SQ Drive Runoff Area=102,088 sf 10.13% Impervious Runoff Depth=0.05"
Flow Length=391' Tc=6.0 min CN=77 Runoff=0.03 cfs 0.009 af

Subcatchment 2S: North Corner Runoff Area=284,221 sf 6.78% Impervious Runoff Depth=0.01"
Tc=0.0 min CN=72 Runoff=0.01 cfs 0.007 af

Subcatchment 3S: SE Corner Runoff Area=306,834 sf 2.19% Impervious Runoff Depth=0.00"
Flow Length=1,149' Tc=15.9 min CN=68 Runoff=0.00 cfs 0.000 af

Subcatchment 10S: Parking Lot Runoff Area=10,182 sf 98.98% Impervious Runoff Depth>0.79"
Tc=790.0 min CN=98 Runoff=0.01 cfs 0.015 af

Subcatchment 11S: Island Runoff Area=588 sf 65.82% Impervious Runoff Depth=0.32"
Tc=6.0 min CN=90 Runoff=0.00 cfs 0.000 af

Subcatchment 12S: Building Runoff Area=1,878 sf 65.12% Impervious Runoff Depth=0.32"
Tc=6.0 min CN=90 Runoff=0.02 cfs 0.001 af

Subcatchment 13S: Building Runoff Area=1,349 sf 73.83% Impervious Runoff Depth=0.40"
Tc=6.0 min CN=92 Runoff=0.01 cfs 0.001 af

Subcatchment 14S: Building Runoff Area=1,021 sf 77.86% Impervious Runoff Depth=0.45"
Tc=6.0 min CN=93 Runoff=0.01 cfs 0.001 af

Subcatchment 15S: Building Runoff Area=1,376 sf 43.24% Impervious Runoff Depth=0.15"
Tc=6.0 min CN=84 Runoff=0.00 cfs 0.000 af

Subcatchment 16S: Island Runoff Area=928 sf 26.51% Impervious Runoff Depth=0.08"
Tc=6.0 min CN=80 Runoff=0.00 cfs 0.000 af

Subcatchment 17S: To Bio #1 Runoff Area=2,893 sf 0.28% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=74 Runoff=0.00 cfs 0.000 af

Subcatchment 20S: Building Runoff Area=9,168 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.19 cfs 0.014 af

Subcatchment 21S: Parking Lot Runoff Area=2,610 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment 22S: To Bio #2 Runoff Area=3,961 sf 0.00% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=74 Runoff=0.00 cfs 0.000 af

Subcatchment 30S: Roadside Runoff Area=8,230 sf 53.10% Impervious Runoff Depth=0.22"
Flow Length=204' Tc=6.0 min CN=87 Runoff=0.04 cfs 0.004 af

Subcatchment 31S: Roadside Runoff Area=7,135 sf 71.11% Impervious Runoff Depth=0.36"
Flow Length=143' Tc=6.0 min CN=91 Runoff=0.07 cfs 0.005 af

Subcatchment 40S: Building Runoff Area=3,066 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.06 cfs 0.005 af

Subcatchment 41S: Building Runoff Area=2,125 sf 90.78% Impervious Runoff Depth=0.63"
Tc=6.0 min CN=96 Runoff=0.04 cfs 0.003 af

Subcatchment 42S: Building Runoff Area=3,298 sf 74.41% Impervious Runoff Depth=0.40"
Tc=6.0 min CN=92 Runoff=0.04 cfs 0.003 af

Subcatchment 44S: Roadside Runoff Area=4,663 sf 40.92% Impervious Runoff Depth=0.15"
Tc=6.0 min CN=84 Runoff=0.01 cfs 0.001 af

Subcatchment 45S: Parking Lot Runoff Area=3,860 sf 71.71% Impervious Runoff Depth=0.36"
Tc=6.0 min CN=91 Runoff=0.04 cfs 0.003 af

Subcatchment 46S: Parking Lot Runoff Area=4,489 sf 73.25% Impervious Runoff Depth=0.40"
Tc=6.0 min CN=92 Runoff=0.05 cfs 0.003 af

Subcatchment 48S: Roadside Runoff Area=3,415 sf 55.67% Impervious Runoff Depth=0.25"
Tc=6.0 min CN=88 Runoff=0.02 cfs 0.002 af

Subcatchment 49S: Driveway Runoff Area=3,657 sf 83.78% Impervious Runoff Depth=0.45"
Tc=6.0 min CN=93 Runoff=0.04 cfs 0.003 af

Subcatchment 60S: Parking Lot Runoff Area=9,169 sf 78.55% Impervious Runoff Depth=0.45"
Flow Length=116' Tc=6.0 min CN=93 Runoff=0.11 cfs 0.008 af

Subcatchment 61S: Parking Lot Runoff Area=7,068 sf 91.98% Impervious Runoff Depth=0.63"
Flow Length=111' Tc=6.0 min CN=96 Runoff=0.12 cfs 0.009 af

Subcatchment 63S: Building Runoff Area=1,459 sf 65.52% Impervious Runoff Depth=0.32"
Tc=6.0 min CN=90 Runoff=0.01 cfs 0.001 af

Subcatchment 64S: Building Runoff Area=1,507 sf 81.22% Impervious Runoff Depth=0.45"
Tc=6.0 min CN=93 Runoff=0.02 cfs 0.001 af

Subcatchment 65S: Building Runoff Area=982 sf 80.86% Impervious Runoff Depth=0.45"
Tc=6.0 min CN=93 Runoff=0.01 cfs 0.001 af

Subcatchment 66S: Building Runoff Area=1,478 sf 44.79% Impervious Runoff Depth=0.11"
Tc=6.0 min CN=82 Runoff=0.00 cfs 0.000 af

Subcatchment 67S: Landscape Runoff Area=1,430 sf 23.15% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=70 Runoff=0.00 cfs 0.000 af

Subcatchment 68S: Building Runoff Area=1,370 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.03 cfs 0.002 af

Subcatchment 69S: To Pond Runoff Area=13,261 sf 1.69% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=68 Runoff=0.00 cfs 0.000 af

Subcatchment 70S: Building Runoff Area=6,906 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.010 af

Subcatchment 80S: Building Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.02 cfs 0.002 af

Subcatchment 81S: Building Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.02 cfs 0.002 af

Subcatchment 82S: Parking Lot Runoff Area=9,597 sf 90.39% Impervious Runoff Depth=0.56"
Flow Length=214' Tc=6.0 min CN=95 Runoff=0.15 cfs 0.010 af

Subcatchment 83S: To Pond Runoff Area=2,507 sf 0.00% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=74 Runoff=0.00 cfs 0.000 af

Reach 2.1R: Wetland Flow Path Avg. Flow Depth=0.02' Max Vel=0.23 fps Inflow=0.01 cfs 0.007 af
n=0.040 L=344.0' S=0.0075 '/' Capacity=54.59 cfs Outflow=0.01 cfs 0.007 af

Reach 2.2R: Wetland Flow Path Avg. Flow Depth=0.05' Max Vel=1.04 fps Inflow=0.11 cfs 0.052 af
n=0.040 L=263.0' S=0.0502 '/' Capacity=141.18 cfs Outflow=0.10 cfs 0.052 af

Reach 2R: Wetland Flow Path Avg. Flow Depth=0.01' Max Vel=0.57 fps Inflow=0.01 cfs 0.007 af
n=0.040 L=151.0' S=0.0446 '/' Capacity=133.09 cfs Outflow=0.01 cfs 0.007 af

Reach 10R: Swale Avg. Flow Depth=0.01' Max Vel=0.14 fps Inflow=0.00 cfs 0.004 af
n=0.035 L=44.0' S=0.0050 '/' Capacity=16.22 cfs Outflow=0.00 cfs 0.004 af

Reach 22R: Wetland Flow Path Avg. Flow Depth=0.00' Max Vel=0.42 fps Inflow=0.01 cfs 0.018 af
n=0.040 L=211.0' S=0.0245 '/' Capacity=392.58 cfs Outflow=0.01 cfs 0.018 af

Reach 23R: Wetland Flow Path Avg. Flow Depth=0.02' Max Vel=0.43 fps Inflow=0.02 cfs 0.024 af
n=0.040 L=131.0' S=0.0185 '/' Capacity=85.86 cfs Outflow=0.02 cfs 0.024 af

Reach 69R: Swale Avg. Flow Depth=0.03' Max Vel=0.25 fps Inflow=0.03 cfs 0.050 af
n=0.069 L=17.0' S=0.0147 '/' Capacity=14.11 cfs Outflow=0.03 cfs 0.050 af

Reach 70R: Woodland Flow Path Avg. Flow Depth=0.02' Max Vel=0.12 fps Inflow=0.03 cfs 0.050 af
n=0.400 L=57.0' S=0.1404 '/' Capacity=21.20 cfs Outflow=0.03 cfs 0.049 af

Reach 71R: Stream Avg. Flow Depth=0.02' Max Vel=0.67 fps Inflow=0.03 cfs 0.049 af
n=0.040 L=80.0' S=0.0554 '/' Capacity=31.12 cfs Outflow=0.03 cfs 0.049 af

Reach 72R: Stream Avg. Flow Depth=0.02' Max Vel=0.35 fps Inflow=0.03 cfs 0.049 af
n=0.040 L=88.0' S=0.0160 '/' Capacity=25.40 cfs Outflow=0.03 cfs 0.049 af

Reach 73R: Stream Avg. Flow Depth=0.03' Max Vel=0.41 fps Inflow=0.04 cfs 0.063 af
n=0.040 L=309.0' S=0.0160 '/' Capacity=25.38 cfs Outflow=0.04 cfs 0.063 af

Reach 83R: Woodland Flow Path Avg. Flow Depth=0.02' Max Vel=0.08 fps Inflow=0.01 cfs 0.014 af
n=0.400 L=122.0' S=0.0950 '/' Capacity=17.44 cfs Outflow=0.01 cfs 0.014 af

Pond 1P: 15" RCP Peak Elev=52.32' Storage=1 cf Inflow=0.01 cfs 0.008 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0037 '/' Outflow=0.01 cfs 0.008 af

Pond 2.1P: 24" RCP Peak Elev=47.66' Storage=9 cf Inflow=0.05 cfs 0.044 af
24.0" Round Culvert n=0.012 L=17.0' S=0.0135 '/' Outflow=0.05 cfs 0.044 af

Pond 2P: 12" CPP Peak Elev=59.70' Storage=30 cf Inflow=0.01 cfs 0.007 af
Outflow=0.01 cfs 0.007 af

Pond 10P: Porous Pavement Peak Elev=56.05' Storage=5 cf Inflow=0.01 cfs 0.015 af
Discarded=0.01 cfs 0.015 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.015 af

Pond 11P: YD #3-1 Peak Elev=57.21' Inflow=0.00 cfs 0.000 af
6.0" Round Culvert n=0.012 L=36.0' S=0.0050 '/' Outflow=0.00 cfs 0.000 af

Pond 12P: YD #7 Peak Elev=57.84' Inflow=0.02 cfs 0.001 af
8.0" Round Culvert n=0.012 L=52.0' S=0.0050 '/' Outflow=0.02 cfs 0.001 af

Pond 13P: YD #6 Peak Elev=57.43' Inflow=0.03 cfs 0.002 af
10.0" Round Culvert n=0.012 L=29.0' S=0.0052 '/' Outflow=0.03 cfs 0.002 af

Pond 14P: YD #5 Peak Elev=57.20' Inflow=0.04 cfs 0.003 af
10.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=0.04 cfs 0.003 af

Pond 15P: YD #4 Peak Elev=56.93' Inflow=0.05 cfs 0.003 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0050 '/' Outflow=0.05 cfs 0.003 af

Pond 16P: CB #3 Peak Elev=56.61' Inflow=0.05 cfs 0.004 af
12.0" Round Culvert n=0.012 L=45.0' S=0.0049 '/' Outflow=0.05 cfs 0.004 af

Pond 17P: Bio #1 / OS #1 Peak Elev=56.42' Storage=126 cf Inflow=0.05 cfs 0.004 af
Outflow=0.00 cfs 0.004 af

Pond 21P: CB #8 Peak Elev=58.16' Inflow=0.05 cfs 0.004 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=0.05 cfs 0.004 af

Pond 22P: Bio #2 / OS #9 Peak Elev=58.16' Storage=546 cf Inflow=0.24 cfs 0.018 af
Outflow=0.01 cfs 0.018 af

Pond 30P: CB #10-2 Peak Elev=52.75' Inflow=0.04 cfs 0.004 af
12.0" Round Culvert n=0.012 L=78.0' S=0.0397 '/' Outflow=0.04 cfs 0.004 af

Pond 31P: CB #10-1 Peak Elev=49.73' Inflow=0.07 cfs 0.005 af
12.0" Round Culvert n=0.012 L=2.0' S=0.0250 '/' Outflow=0.07 cfs 0.005 af

Pond 32P: DMH #10 Peak Elev=47.42' Inflow=0.11 cfs 0.052 af
24.0" Round Culvert n=0.012 L=57.0' S=0.0135 '/' Outflow=0.11 cfs 0.052 af

Pond 40P: 6" CPP Peak Elev=53.73' Inflow=0.06 cfs 0.005 af
6.0" Round Culvert n=0.012 L=174.0' S=0.0150 '/' Outflow=0.06 cfs 0.005 af

Pond 41P: YD #15 Peak Elev=50.97' Inflow=0.10 cfs 0.007 af
8.0" Round Culvert n=0.012 L=47.0' S=0.0149 '/' Outflow=0.10 cfs 0.007 af

Pond 42P: YD #14-1 Peak Elev=54.06' Inflow=0.04 cfs 0.003 af
6.0" Round Culvert n=0.012 L=158.0' S=0.0175 '/' Outflow=0.04 cfs 0.003 af

Pond 43P: 10" CPP Peak Elev=50.30' Inflow=0.13 cfs 0.010 af
8.0" Round Culvert n=0.012 L=33.0' S=0.0148 '/' Outflow=0.13 cfs 0.010 af

Pond 44P: CB #14 Peak Elev=49.27' Inflow=0.15 cfs 0.011 af
12.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/' Outflow=0.15 cfs 0.011 af

Pond 45P: CB #13-2 Peak Elev=49.34' Inflow=0.04 cfs 0.003 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0164 '/' Outflow=0.04 cfs 0.003 af

Pond 46P: CB #13-1 Peak Elev=49.10' Inflow=0.05 cfs 0.003 af
12.0" Round Culvert n=0.012 L=12.0' S=0.0050 '/' Outflow=0.05 cfs 0.003 af

Pond 47P: DMH #13 Peak Elev=49.05' Inflow=0.23 cfs 0.017 af
15.0" Round Culvert n=0.012 L=67.0' S=0.0040 '/' Outflow=0.23 cfs 0.017 af

Pond 48P: CB #12-2 Peak Elev=48.78' Inflow=0.02 cfs 0.002 af
12.0" Round Culvert n=0.012 L=6.0' S=0.0050 '/' Outflow=0.02 cfs 0.002 af

Pond 49P: CB #12-1 Peak Elev=49.02' Inflow=0.04 cfs 0.003 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0050 '/' Outflow=0.04 cfs 0.003 af

Pond 50P: DMH #12 Peak Elev=48.78' Inflow=0.29 cfs 0.022 af
15.0" Round Culvert n=0.012 L=103.0' S=0.0040 '/' Outflow=0.29 cfs 0.022 af

Pond 60P: CB #17-1-2 Peak Elev=50.60' Inflow=0.11 cfs 0.008 af
12.0" Round Culvert n=0.012 L=21.0' S=0.0052 '/' Outflow=0.11 cfs 0.008 af

Pond 61P: CB #17-1-1 Peak Elev=50.57' Inflow=0.12 cfs 0.009 af
12.0" Round Culvert n=0.012 L=3.0' S=0.0367 '/' Outflow=0.12 cfs 0.009 af

Pond 62P: DMH #17-1 Peak Elev=50.46' Inflow=0.23 cfs 0.016 af
12.0" Round Culvert n=0.012 L=25.0' S=0.0052 '/' Outflow=0.23 cfs 0.016 af

Pond 63P: YD #21 Peak Elev=51.76' Inflow=0.01 cfs 0.001 af
12.0" Round Culvert n=0.012 L=49.0' S=0.0049 '/' Outflow=0.01 cfs 0.001 af

Pond 64P: YD #20 Peak Elev=51.38' Inflow=0.03 cfs 0.002 af
10.0" Round Culvert n=0.012 L=35.0' S=0.0049 '/' Outflow=0.03 cfs 0.002 af

Pond 65P: YD #19 Peak Elev=51.12' Inflow=0.04 cfs 0.003 af
10.0" Round Culvert n=0.012 L=42.0' S=0.0050 '/' Outflow=0.04 cfs 0.003 af

Pond 66P: YD #18 Peak Elev=50.72' Inflow=0.04 cfs 0.003 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0509 '/' Outflow=0.04 cfs 0.003 af

Pond 67P: CB #17 Peak Elev=50.25' Inflow=0.27 cfs 0.020 af
12.0" Round Culvert n=0.012 L=74.0' S=0.0050 '/' Outflow=0.27 cfs 0.020 af

Pond 68P: DMH #16 Peak Elev=49.76' Inflow=0.30 cfs 0.022 af
12.0" Round Culvert n=0.012 L=90.0' S=0.0110 '/' Outflow=0.30 cfs 0.022 af

Pond 69P: Bio #3 / OS #11 Peak Elev=48.78' Storage=1,650 cf Inflow=0.74 cfs 0.054 af
Outflow=0.03 cfs 0.050 af

Pond 80P: 6" CPP Peak Elev=49.48' Inflow=0.02 cfs 0.002 af
6.0" Round Culvert n=0.012 L=111.0' S=0.0350 '/' Outflow=0.02 cfs 0.002 af

Pond 81P: 6" CPP Peak Elev=49.42' Inflow=0.02 cfs 0.002 af
6.0" Round Culvert n=0.012 L=85.0' S=0.0351 '/' Outflow=0.02 cfs 0.002 af

Pond 82P: CB #23 Peak Elev=46.28' Inflow=0.17 cfs 0.012 af
12.0" Round Culvert n=0.012 L=18.0' S=0.0194 '/' Outflow=0.17 cfs 0.012 af

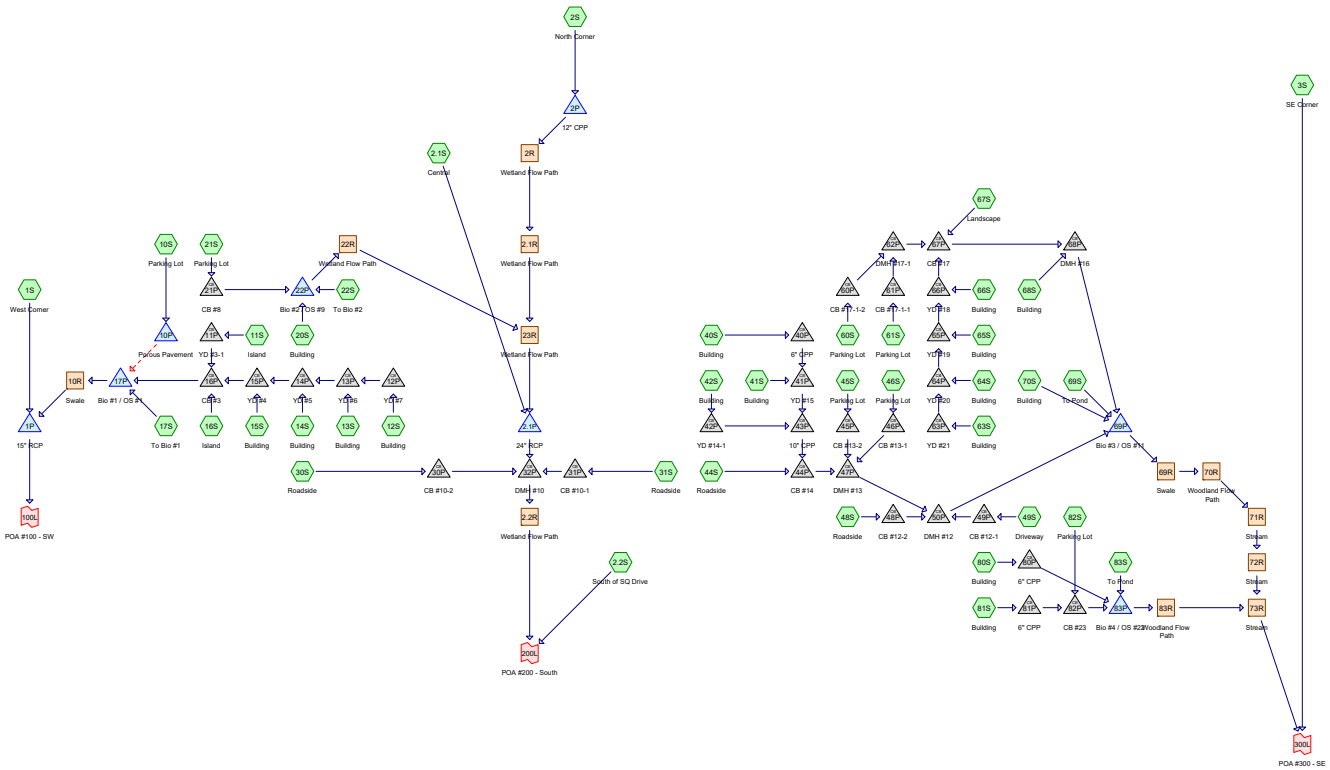
Pond 83P: Bio #4 / OS #22 Peak Elev=46.28' Storage=358 cf Inflow=0.19 cfs 0.014 af
Outflow=0.01 cfs 0.014 af

Link 100L: POA #100 - SW Inflow=0.01 cfs 0.008 af
Primary=0.01 cfs 0.008 af

Link 200L: POA #200 - South Inflow=0.10 cfs 0.062 af
Primary=0.10 cfs 0.062 af

Link 300L: POA #300 - SE Inflow=0.04 cfs 0.064 af
Primary=0.04 cfs 0.064 af

Total Runoff Area = 30.826 ac Runoff Volume = 0.154 af Average Runoff Depth = 0.06"
87.20% Pervious = 26.879 ac 12.80% Impervious = 3.947 ac



POST-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 5440-Post

Prepared by Altus Engineering, Inc., Printed 10/6/2025

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

Subcatchment 1S: West Corner Runoff Area=66,034 sf 9.68% Impervious Runoff Depth=1.38"
Flow Length=366' Tc=9.8 min CN=75 Runoff=2.10 cfs 0.174 af

Subcatchment 2.1S: Central Runoff Area=444,574 sf 8.10% Impervious Runoff Depth=1.32"
Flow Length=1,341' Tc=15.8 min CN=74 Runoff=11.22 cfs 1.120 af

Subcatchment 2.2S: South of SQ Drive Runoff Area=102,088 sf 10.13% Impervious Runoff Depth=1.51"
Flow Length=391' Tc=6.0 min CN=77 Runoff=4.10 cfs 0.295 af

Subcatchment 2S: North Corner Runoff Area=284,221 sf 6.78% Impervious Runoff Depth=1.19"
Tc=0.0 min CN=72 Runoff=10.62 cfs 0.649 af

Subcatchment 3S: SE Corner Runoff Area=306,834 sf 2.19% Impervious Runoff Depth=0.97"
Flow Length=1,149' Tc=15.9 min CN=68 Runoff=5.28 cfs 0.567 af

Subcatchment 10S: Parking Lot Runoff Area=10,182 sf 98.98% Impervious Runoff Depth>3.36"
Tc=790.0 min CN=98 Runoff=0.06 cfs 0.065 af

Subcatchment 11S: Island Runoff Area=588 sf 65.82% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=90 Runoff=0.04 cfs 0.003 af

Subcatchment 12S: Building Runoff Area=1,878 sf 65.12% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=90 Runoff=0.13 cfs 0.009 af

Subcatchment 13S: Building Runoff Area=1,349 sf 73.83% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=92 Runoff=0.10 cfs 0.007 af

Subcatchment 14S: Building Runoff Area=1,021 sf 77.86% Impervious Runoff Depth=2.84"
Tc=6.0 min CN=93 Runoff=0.08 cfs 0.006 af

Subcatchment 15S: Building Runoff Area=1,376 sf 43.24% Impervious Runoff Depth=2.03"
Tc=6.0 min CN=84 Runoff=0.08 cfs 0.005 af

Subcatchment 16S: Island Runoff Area=928 sf 26.51% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=80 Runoff=0.04 cfs 0.003 af

Subcatchment 17S: To Bio #1 Runoff Area=2,893 sf 0.28% Impervious Runoff Depth=1.32"
Tc=6.0 min CN=74 Runoff=0.10 cfs 0.007 af

Subcatchment 20S: Building Runoff Area=9,168 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.74 cfs 0.059 af

Subcatchment 21S: Parking Lot Runoff Area=2,610 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.017 af

Subcatchment 22S: To Bio #2 Runoff Area=3,961 sf 0.00% Impervious Runoff Depth=1.32"
Tc=6.0 min CN=74 Runoff=0.14 cfs 0.010 af

Subcatchment 30S: Roadside Runoff Area=8,230 sf 53.10% Impervious Runoff Depth=2.28"
Flow Length=204' Tc=6.0 min CN=87 Runoff=0.50 cfs 0.036 af

Subcatchment 31S: Roadside Runoff Area=7,135 sf 71.11% Impervious Runoff Depth=2.65"
Flow Length=143' Tc=6.0 min CN=91 Runoff=0.50 cfs 0.036 af

Subcatchment 40S: Building Runoff Area=3,066 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.25 cfs 0.020 af

Subcatchment 41S: Building Runoff Area=2,125 sf 90.78% Impervious Runoff Depth=3.15"
Tc=6.0 min CN=96 Runoff=0.17 cfs 0.013 af

Subcatchment 42S: Building Runoff Area=3,298 sf 74.41% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=92 Runoff=0.24 cfs 0.017 af

Subcatchment 44S: Roadside Runoff Area=4,663 sf 40.92% Impervious Runoff Depth=2.03"
Tc=6.0 min CN=84 Runoff=0.26 cfs 0.018 af

Subcatchment 45S: Parking Lot Runoff Area=3,860 sf 71.71% Impervious Runoff Depth=2.65"
Tc=6.0 min CN=91 Runoff=0.27 cfs 0.020 af

Subcatchment 46S: Parking Lot Runoff Area=4,489 sf 73.25% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=92 Runoff=0.32 cfs 0.024 af

Subcatchment 48S: Roadside Runoff Area=3,415 sf 55.67% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=88 Runoff=0.22 cfs 0.015 af

Subcatchment 49S: Driveway Runoff Area=3,657 sf 83.78% Impervious Runoff Depth=2.84"
Tc=6.0 min CN=93 Runoff=0.27 cfs 0.020 af

Subcatchment 60S: Parking Lot Runoff Area=9,169 sf 78.55% Impervious Runoff Depth=2.84"
Flow Length=116' Tc=6.0 min CN=93 Runoff=0.67 cfs 0.050 af

Subcatchment 61S: Parking Lot Runoff Area=7,068 sf 91.98% Impervious Runoff Depth=3.15"
Flow Length=111' Tc=6.0 min CN=96 Runoff=0.55 cfs 0.043 af

Subcatchment 63S: Building Runoff Area=1,459 sf 65.52% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=90 Runoff=0.10 cfs 0.007 af

Subcatchment 64S: Building Runoff Area=1,507 sf 81.22% Impervious Runoff Depth=2.84"
Tc=6.0 min CN=93 Runoff=0.11 cfs 0.008 af

Subcatchment 65S: Building Runoff Area=982 sf 80.86% Impervious Runoff Depth=2.84"
Tc=6.0 min CN=93 Runoff=0.07 cfs 0.005 af

Subcatchment 66S: Building Runoff Area=1,478 sf 44.79% Impervious Runoff Depth=1.87"
Tc=6.0 min CN=82 Runoff=0.07 cfs 0.005 af

Subcatchment 67S: Landscape Runoff Area=1,430 sf 23.15% Impervious Runoff Depth=1.08"
Tc=6.0 min CN=70 Runoff=0.04 cfs 0.003 af

Subcatchment 68S: Building Runoff Area=1,370 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Subcatchment 69S: To Pond Runoff Area=13,261 sf 1.69% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=68 Runoff=0.31 cfs 0.025 af

Subcatchment 70S: Building Runoff Area=6,906 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.56 cfs 0.045 af

Subcatchment 80S: Building Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Subcatchment 81S: Building Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Subcatchment 82S: Parking Lot Runoff Area=9,597 sf 90.39% Impervious Runoff Depth=3.05"
Flow Length=214' Tc=6.0 min CN=95 Runoff=0.74 cfs 0.056 af

Subcatchment 83S: To Pond Runoff Area=2,507 sf 0.00% Impervious Runoff Depth=1.32"
Tc=6.0 min CN=74 Runoff=0.09 cfs 0.006 af

Reach 2.1R: Wetland Flow Path Avg. Flow Depth=0.45' Max Vel=1.48 fps Inflow=2.22 cfs 0.649 af
n=0.040 L=344.0' S=0.0075 '/' Capacity=54.59 cfs Outflow=2.22 cfs 0.649 af

Reach 2.2R: Wetland Flow Path Avg. Flow Depth=0.65' Max Vel=4.66 fps Inflow=11.91 cfs 1.925 af
n=0.040 L=263.0' S=0.0502 '/' Capacity=141.18 cfs Outflow=11.91 cfs 1.925 af

Reach 2R: Wetland Flow Path Avg. Flow Depth=0.28' Max Vel=2.78 fps Inflow=2.23 cfs 0.649 af
n=0.040 L=151.0' S=0.0446 '/' Capacity=133.09 cfs Outflow=2.22 cfs 0.649 af

Reach 10R: Swale Avg. Flow Depth=0.05' Max Vel=0.38 fps Inflow=0.07 cfs 0.040 af
n=0.035 L=44.0' S=0.0050 '/' Capacity=16.22 cfs Outflow=0.07 cfs 0.040 af

Reach 22R: Wetland Flow Path Avg. Flow Depth=0.04' Max Vel=0.67 fps Inflow=0.29 cfs 0.085 af
n=0.040 L=211.0' S=0.0245 '/' Capacity=392.58 cfs Outflow=0.29 cfs 0.085 af

Reach 23R: Wetland Flow Path Avg. Flow Depth=0.38' Max Vel=2.11 fps Inflow=2.50 cfs 0.734 af
n=0.040 L=131.0' S=0.0185 '/' Capacity=85.86 cfs Outflow=2.50 cfs 0.734 af

Reach 69R: Swale Avg. Flow Depth=0.23' Max Vel=0.88 fps Inflow=0.95 cfs 0.324 af
n=0.069 L=17.0' S=0.0147 '/' Capacity=14.11 cfs Outflow=0.95 cfs 0.324 af

Reach 70R: Woodland Flow Path Avg. Flow Depth=0.19' Max Vel=0.42 fps Inflow=0.95 cfs 0.324 af
n=0.400 L=57.0' S=0.1404 '/' Capacity=21.20 cfs Outflow=0.95 cfs 0.324 af

Reach 71R: Stream Avg. Flow Depth=0.16' Max Vel=2.30 fps Inflow=0.95 cfs 0.324 af
n=0.040 L=80.0' S=0.0554 '/' Capacity=31.12 cfs Outflow=0.95 cfs 0.324 af

Reach 72R: Stream Avg. Flow Depth=0.16' Max Vel=1.30 fps Inflow=0.95 cfs 0.324 af
n=0.040 L=88.0' S=0.0160 '/' Capacity=25.40 cfs Outflow=0.95 cfs 0.324 af

Reach 73R: Stream Avg. Flow Depth=0.19' Max Vel=1.43 fps Inflow=1.27 cfs 0.401 af
n=0.040 L=309.0' S=0.0160 '/' Capacity=25.38 cfs Outflow=1.26 cfs 0.401 af

Reach 83R: Woodland Flow Path Avg. Flow Depth=0.11' Max Vel=0.25 fps Inflow=0.33 cfs 0.077 af
n=0.400 L=122.0' S=0.0950 '/' Capacity=17.44 cfs Outflow=0.32 cfs 0.077 af

Pond 1P: 15" RCP Peak Elev=53.11' Storage=73 cf Inflow=2.12 cfs 0.214 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0037 '/' Outflow=2.05 cfs 0.214 af

Pond 2.1P: 24" RCP Peak Elev=49.51' Storage=3,293 cf Inflow=13.44 cfs 1.853 af
24.0" Round Culvert n=0.012 L=17.0' S=0.0135 '/' Outflow=11.55 cfs 1.853 af

Pond 2P: 12" CPP Peak Elev=60.71' Storage=8,446 cf Inflow=10.62 cfs 0.649 af
Outflow=2.23 cfs 0.649 af

Pond 10P: Porous Pavement Peak Elev=56.57' Storage=573 cf Inflow=0.06 cfs 0.065 af
Discarded=0.03 cfs 0.065 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.065 af

Pond 11P: YD #3-1 Peak Elev=57.49' Inflow=0.04 cfs 0.003 af
6.0" Round Culvert n=0.012 L=36.0' S=0.0050 '/' Outflow=0.04 cfs 0.003 af

Pond 12P: YD #7 Peak Elev=57.99' Inflow=0.13 cfs 0.009 af
8.0" Round Culvert n=0.012 L=52.0' S=0.0050 '/' Outflow=0.13 cfs 0.009 af

Pond 13P: YD #6 Peak Elev=57.62' Inflow=0.22 cfs 0.016 af
10.0" Round Culvert n=0.012 L=29.0' S=0.0052 '/' Outflow=0.22 cfs 0.016 af

Pond 14P: YD #5 Peak Elev=57.49' Inflow=0.30 cfs 0.022 af
10.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=0.30 cfs 0.022 af

Pond 15P: YD #4 Peak Elev=57.49' Inflow=0.37 cfs 0.027 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0050 '/' Outflow=0.37 cfs 0.027 af

Pond 16P: CB #3 Peak Elev=57.49' Inflow=0.46 cfs 0.033 af
12.0" Round Culvert n=0.012 L=45.0' S=0.0049 '/' Outflow=0.46 cfs 0.033 af

Pond 17P: Bio #1 / OS #1 Peak Elev=57.49' Storage=933 cf Inflow=0.56 cfs 0.040 af
Outflow=0.07 cfs 0.040 af

Pond 21P: CB #8 Peak Elev=59.00' Inflow=0.21 cfs 0.017 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=0.21 cfs 0.017 af

Pond 22P: Bio #2 / OS #9 Peak Elev=59.00' Storage=1,828 cf Inflow=1.08 cfs 0.086 af
Outflow=0.29 cfs 0.085 af

Pond 30P: CB #10-2 Peak Elev=53.00' Inflow=0.50 cfs 0.036 af
12.0" Round Culvert n=0.012 L=78.0' S=0.0397 '/' Outflow=0.50 cfs 0.036 af

Pond 31P: CB #10-1 Peak Elev=50.00' Inflow=0.50 cfs 0.036 af
12.0" Round Culvert n=0.012 L=2.0' S=0.0250 '/' Outflow=0.50 cfs 0.036 af

Pond 32P: DMH #10 Peak Elev=48.92' Inflow=11.91 cfs 1.925 af
24.0" Round Culvert n=0.012 L=57.0' S=0.0135 '/' Outflow=11.91 cfs 1.925 af

Pond 40P: 6" CPP Peak Elev=53.89' Inflow=0.25 cfs 0.020 af
6.0" Round Culvert n=0.012 L=174.0' S=0.0150 '/' Outflow=0.25 cfs 0.020 af

Pond 41P: YD #15 Peak Elev=51.17' Inflow=0.41 cfs 0.033 af
8.0" Round Culvert n=0.012 L=47.0' S=0.0149 '/' Outflow=0.41 cfs 0.033 af

Pond 42P: YD #14-1 Peak Elev=54.26' Inflow=0.24 cfs 0.017 af
6.0" Round Culvert n=0.012 L=158.0' S=0.0175 '/' Outflow=0.24 cfs 0.017 af

Pond 43P: 10" CPP Peak Elev=50.86' Inflow=0.65 cfs 0.050 af
8.0" Round Culvert n=0.012 L=33.0' S=0.0148 '/' Outflow=0.65 cfs 0.050 af

Pond 44P: CB #14 Peak Elev=50.86' Inflow=0.90 cfs 0.068 af
12.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/' Outflow=0.90 cfs 0.068 af

Pond 45P: CB #13-2 Peak Elev=50.85' Inflow=0.27 cfs 0.020 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0164 '/' Outflow=0.27 cfs 0.019 af

Pond 46P: CB #13-1 Peak Elev=50.85' Inflow=0.32 cfs 0.024 af
12.0" Round Culvert n=0.012 L=12.0' S=0.0050 '/' Outflow=0.32 cfs 0.024 af

Pond 47P: DMH #13 Peak Elev=50.85' Inflow=1.49 cfs 0.111 af
15.0" Round Culvert n=0.012 L=67.0' S=0.0040 '/' Outflow=1.49 cfs 0.111 af

Pond 48P: CB #12-2 Peak Elev=50.85' Inflow=0.22 cfs 0.015 af
12.0" Round Culvert n=0.012 L=6.0' S=0.0050 '/' Outflow=0.22 cfs 0.015 af

Pond 49P: CB #12-1 Peak Elev=50.85' Inflow=0.27 cfs 0.020 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0050 '/' Outflow=0.27 cfs 0.020 af

Pond 50P: DMH #12 Peak Elev=50.85' Inflow=1.98 cfs 0.146 af
15.0" Round Culvert n=0.012 L=103.0' S=0.0040 '/' Outflow=1.98 cfs 0.146 af

Pond 60P: CB #17-1-2 Peak Elev=51.11' Inflow=0.67 cfs 0.050 af
12.0" Round Culvert n=0.012 L=21.0' S=0.0052 '/' Outflow=0.67 cfs 0.050 af

Pond 61P: CB #17-1-1 Peak Elev=51.08' Inflow=0.55 cfs 0.043 af
12.0" Round Culvert n=0.012 L=3.0' S=0.0367 '/' Outflow=0.55 cfs 0.043 af

Pond 62P: DMH #17-1 Peak Elev=51.04' Inflow=1.23 cfs 0.092 af
12.0" Round Culvert n=0.012 L=25.0' S=0.0052 '/' Outflow=1.23 cfs 0.092 af

Pond 63P: YD #21 Peak Elev=51.88' Inflow=0.10 cfs 0.007 af
12.0" Round Culvert n=0.012 L=49.0' S=0.0049 '/' Outflow=0.10 cfs 0.007 af

Pond 64P: YD #20 Peak Elev=51.56' Inflow=0.21 cfs 0.015 af
10.0" Round Culvert n=0.012 L=35.0' S=0.0049 '/' Outflow=0.21 cfs 0.015 af

Pond 65P: YD #19 Peak Elev=51.32' Inflow=0.28 cfs 0.021 af
10.0" Round Culvert n=0.012 L=42.0' S=0.0050 '/' Outflow=0.28 cfs 0.021 af

Pond 66P: YD #18 Peak Elev=51.00' Inflow=0.36 cfs 0.026 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0509 '/' Outflow=0.36 cfs 0.026 af

Pond 67P: CB #17 Peak Elev=50.89' Inflow=1.62 cfs 0.121 af
12.0" Round Culvert n=0.012 L=74.0' S=0.0050 '/' Outflow=1.62 cfs 0.121 af

Pond 68P: DMH #16 Peak Elev=50.86' Inflow=1.73 cfs 0.130 af
12.0" Round Culvert n=0.012 L=90.0' S=0.0110 '/' Outflow=1.73 cfs 0.130 af

Pond 69P: Bio #3 / OS #11 Peak Elev=50.85' Storage=7,761 cf Inflow=4.58 cfs 0.346 af
Outflow=0.95 cfs 0.324 af

Pond 80P: 6" CPP Peak Elev=49.58' Inflow=0.10 cfs 0.008 af
6.0" Round Culvert n=0.012 L=111.0' S=0.0350 '/' Outflow=0.10 cfs 0.008 af

Pond 81P: 6" CPP Peak Elev=49.52' Inflow=0.10 cfs 0.008 af
6.0" Round Culvert n=0.012 L=85.0' S=0.0351 '/' Outflow=0.10 cfs 0.008 af

Pond 82P: CB #23 Peak Elev=47.69' Inflow=0.84 cfs 0.064 af
12.0" Round Culvert n=0.012 L=18.0' S=0.0194 '/' Outflow=0.84 cfs 0.064 af

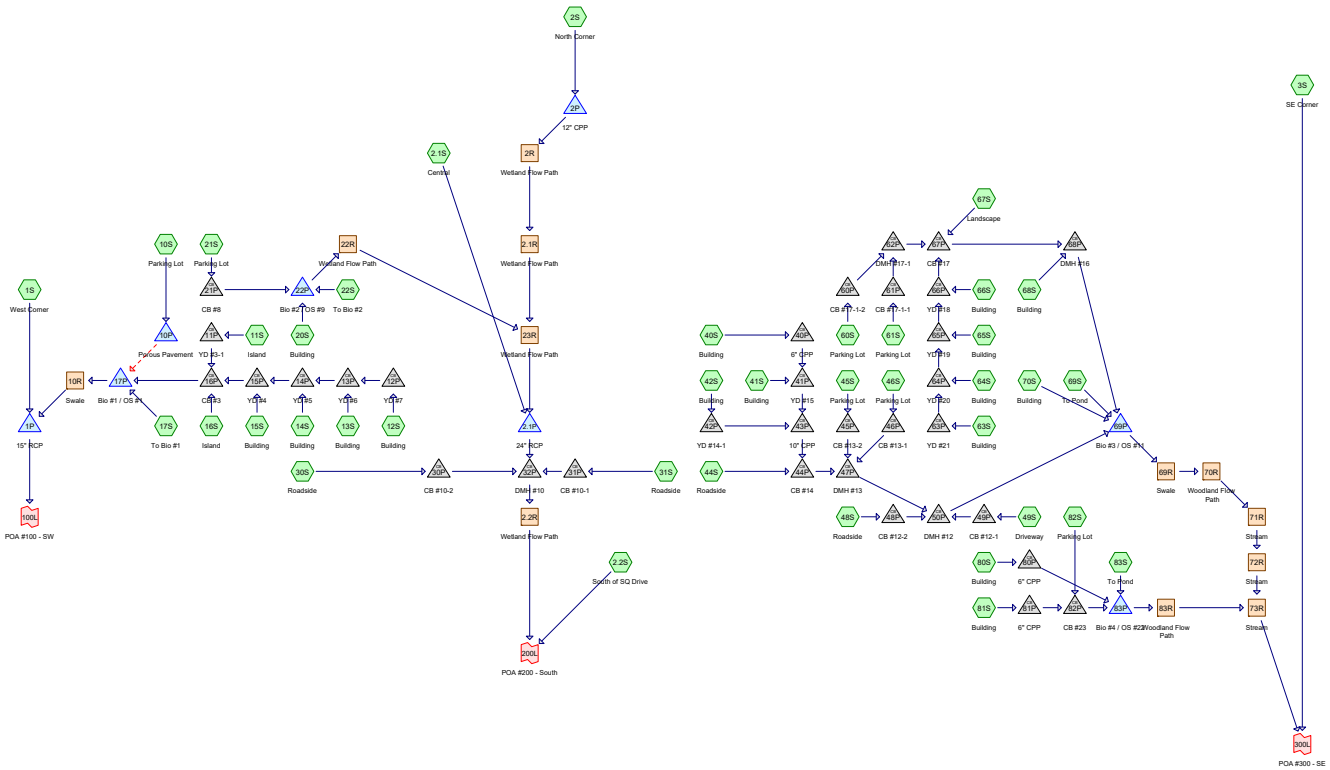
Pond 83P: Bio #4 / OS #22 Peak Elev=47.68' Storage=1,472 cf Inflow=1.02 cfs 0.078 af
Outflow=0.33 cfs 0.077 af

Link 100L: POA #100 - SW Inflow=2.05 cfs 0.214 af
Primary=2.05 cfs 0.214 af

Link 200L: POA #200 - South Inflow=13.65 cfs 2.221 af
Primary=13.65 cfs 2.221 af

Link 300L: POA #300 - SE Inflow=5.84 cfs 0.968 af
Primary=5.84 cfs 0.968 af

Total Runoff Area = 30.826 ac Runoff Volume = 3.493 af Average Runoff Depth = 1.36"
87.20% Pervious = 26.879 ac 12.80% Impervious = 3.947 ac



POST-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 5440-Post

Prepared by Altus Engineering, Inc., Printed 10/6/2025

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.269	61	>75% Grass cover, Good, HSG B (2.1S, 3S, 48S, 49S, 61S, 66S, 67S, 69S, 82S)
4.037	74	>75% Grass cover, Good, HSG C (1S, 2.1S, 2.2S, 2S, 3S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 22S, 30S, 31S, 41S, 42S, 44S, 45S, 46S, 48S, 49S, 60S, 61S, 63S, 64S, 65S, 66S, 69S, 82S, 83S)
0.107	80	>75% Grass cover, Good, HSG D (2.1S, 2.2S, 2S, 48S, 49S)
0.195	65	Brush, Good, HSG C (2.1S)
0.126	98	Paved parking, HSG B (2.1S, 3S, 49S, 61S, 67S, 69S, 82S)
2.508	98	Paved parking, HSG C (1S, 2.1S, 2.2S, 2S, 3S, 10S, 11S, 12S, 15S, 16S, 17S, 21S, 30S, 31S, 42S, 44S, 45S, 46S, 48S, 49S, 60S, 61S, 66S, 82S)
0.241	98	Paved parking, HSG D (2.1S, 2.2S, 2S, 3S, 48S, 49S)
0.035	98	Roofs, HSG B (66S, 68S, 70S)
1.037	98	Roofs, HSG C (2.1S, 2S, 11S, 12S, 13S, 14S, 15S, 20S, 21S, 40S, 41S, 42S, 48S, 63S, 64S, 65S, 66S, 68S, 70S, 80S, 81S)
1.880	55	Woods, Good, HSG B (1S, 2.1S, 2S, 3S)
17.117	70	Woods, Good, HSG C (1S, 2.1S, 2.2S, 2S, 3S, 60S)
3.274	77	Woods, Good, HSG D (2.1S, 2.2S, 2S)
30.826	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.310	HSG B	1S, 2.1S, 2S, 3S, 48S, 49S, 61S, 66S, 67S, 68S, 69S, 70S, 82S
24.894	HSG C	1S, 2.1S, 2.2S, 2S, 3S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 20S, 21S, 22S, 30S, 31S, 40S, 41S, 42S, 44S, 45S, 46S, 48S, 49S, 60S, 61S, 63S, 64S, 65S, 66S, 68S, 69S, 70S, 80S, 81S, 82S, 83S
3.622	HSG D	2.1S, 2.2S, 2S, 3S, 48S, 49S
0.000	Other	
30.826		**TOTAL AREA**

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

Subcatchment 1S: West Corner Runoff Area=66,034 sf 9.68% Impervious Runoff Depth=2.84"
Flow Length=366' Tc=9.8 min CN=75 Runoff=4.43 cfs 0.358 af

Subcatchment 2.1S: Central Runoff Area=444,574 sf 8.10% Impervious Runoff Depth=2.74"
Flow Length=1,341' Tc=15.8 min CN=74 Runoff=24.25 cfs 2.334 af

Subcatchment 2.2S: South of SQ Drive Runoff Area=102,088 sf 10.13% Impervious Runoff Depth=3.02"
Flow Length=391' Tc=6.0 min CN=77 Runoff=8.31 cfs 0.590 af

Subcatchment 2S: North Corner Runoff Area=284,221 sf 6.78% Impervious Runoff Depth=2.57"
Tc=0.0 min CN=72 Runoff=23.92 cfs 1.395 af

Subcatchment 3S: SE Corner Runoff Area=306,834 sf 2.19% Impervious Runoff Depth=2.22"
Flow Length=1,149' Tc=15.9 min CN=68 Runoff=13.24 cfs 1.304 af

Subcatchment 10S: Parking Lot Runoff Area=10,182 sf 98.98% Impervious Runoff Depth>5.20"
Tc=790.0 min CN=98 Runoff=0.09 cfs 0.101 af

Subcatchment 11S: Island Runoff Area=588 sf 65.82% Impervious Runoff Depth=4.33"
Tc=6.0 min CN=90 Runoff=0.07 cfs 0.005 af

Subcatchment 12S: Building Runoff Area=1,878 sf 65.12% Impervious Runoff Depth=4.33"
Tc=6.0 min CN=90 Runoff=0.21 cfs 0.016 af

Subcatchment 13S: Building Runoff Area=1,349 sf 73.83% Impervious Runoff Depth=4.55"
Tc=6.0 min CN=92 Runoff=0.16 cfs 0.012 af

Subcatchment 14S: Building Runoff Area=1,021 sf 77.86% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=93 Runoff=0.12 cfs 0.009 af

Subcatchment 15S: Building Runoff Area=1,376 sf 43.24% Impervious Runoff Depth=3.70"
Tc=6.0 min CN=84 Runoff=0.14 cfs 0.010 af

Subcatchment 16S: Island Runoff Area=928 sf 26.51% Impervious Runoff Depth=3.31"
Tc=6.0 min CN=80 Runoff=0.08 cfs 0.006 af

Subcatchment 17S: To Bio #1 Runoff Area=2,893 sf 0.28% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=74 Runoff=0.21 cfs 0.015 af

Subcatchment 20S: Building Runoff Area=9,168 sf 100.00% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=98 Runoff=1.13 cfs 0.092 af

Subcatchment 21S: Parking Lot Runoff Area=2,610 sf 100.00% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

Subcatchment 22S: To Bio #2 Runoff Area=3,961 sf 0.00% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=74 Runoff=0.29 cfs 0.021 af

Subcatchment 30S: Roadside Runoff Area=8,230 sf 53.10% Impervious Runoff Depth=4.01"
Flow Length=204' Tc=6.0 min CN=87 Runoff=0.87 cfs 0.063 af

Subcatchment 31S: Roadside Runoff Area=7,135 sf 71.11% Impervious Runoff Depth=4.44"
Flow Length=143' Tc=6.0 min CN=91 Runoff=0.81 cfs 0.061 af

Subcatchment 40S: Building Runoff Area=3,066 sf 100.00% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.031 af

Subcatchment 41S: Building Runoff Area=2,125 sf 90.78% Impervious Runoff Depth=5.00"
Tc=6.0 min CN=96 Runoff=0.26 cfs 0.020 af

Subcatchment 42S: Building Runoff Area=3,298 sf 74.41% Impervious Runoff Depth=4.55"
Tc=6.0 min CN=92 Runoff=0.38 cfs 0.029 af

Subcatchment 44S: Roadside Runoff Area=4,663 sf 40.92% Impervious Runoff Depth=3.70"
Tc=6.0 min CN=84 Runoff=0.46 cfs 0.033 af

Subcatchment 45S: Parking Lot Runoff Area=3,860 sf 71.71% Impervious Runoff Depth=4.44"
Tc=6.0 min CN=91 Runoff=0.44 cfs 0.033 af

Subcatchment 46S: Parking Lot Runoff Area=4,489 sf 73.25% Impervious Runoff Depth=4.55"
Tc=6.0 min CN=92 Runoff=0.52 cfs 0.039 af

Subcatchment 48S: Roadside Runoff Area=3,415 sf 55.67% Impervious Runoff Depth=4.12"
Tc=6.0 min CN=88 Runoff=0.37 cfs 0.027 af

Subcatchment 49S: Driveway Runoff Area=3,657 sf 83.78% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=93 Runoff=0.43 cfs 0.033 af

Subcatchment 60S: Parking Lot Runoff Area=9,169 sf 78.55% Impervious Runoff Depth=4.66"
Flow Length=116' Tc=6.0 min CN=93 Runoff=1.07 cfs 0.082 af

Subcatchment 61S: Parking Lot Runoff Area=7,068 sf 91.98% Impervious Runoff Depth=5.00"
Flow Length=111' Tc=6.0 min CN=96 Runoff=0.86 cfs 0.068 af

Subcatchment 63S: Building Runoff Area=1,459 sf 65.52% Impervious Runoff Depth=4.33"
Tc=6.0 min CN=90 Runoff=0.16 cfs 0.012 af

Subcatchment 64S: Building Runoff Area=1,507 sf 81.22% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=93 Runoff=0.18 cfs 0.013 af

Subcatchment 65S: Building Runoff Area=982 sf 80.86% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=93 Runoff=0.12 cfs 0.009 af

Subcatchment 66S: Building Runoff Area=1,478 sf 44.79% Impervious Runoff Depth=3.50"
Tc=6.0 min CN=82 Runoff=0.14 cfs 0.010 af

Subcatchment 67S: Landscape Runoff Area=1,430 sf 23.15% Impervious Runoff Depth=2.39"
Tc=6.0 min CN=70 Runoff=0.09 cfs 0.007 af

Subcatchment 68S: Building Runoff Area=1,370 sf 100.00% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 69S: To Pond Runoff Area=13,261 sf 1.69% Impervious Runoff Depth=2.22"
Tc=6.0 min CN=68 Runoff=0.78 cfs 0.056 af

Subcatchment 70S: Building Runoff Area=6,906 sf 100.00% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=98 Runoff=0.85 cfs 0.069 af

Subcatchment 80S: Building Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment 81S: Building Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment 82S: Parking Lot Runoff Area=9,597 sf 90.39% Impervious Runoff Depth=4.89"
Flow Length=214' Tc=6.0 min CN=95 Runoff=1.15 cfs 0.090 af

Subcatchment 83S: To Pond Runoff Area=2,507 sf 0.00% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=74 Runoff=0.18 cfs 0.013 af

Reach 2.1R: Wetland Flow Path Avg. Flow Depth=1.19' Max Vel=2.53 fps Inflow=18.63 cfs 1.395 af
n=0.040 L=344.0' S=0.0075 '/' Capacity=54.59 cfs Outflow=16.73 cfs 1.395 af

Reach 2.2R: Wetland Flow Path Avg. Flow Depth=0.81' Max Vel=5.28 fps Inflow=19.28 cfs 3.990 af
n=0.040 L=263.0' S=0.0502 '/' Capacity=141.18 cfs Outflow=19.04 cfs 3.990 af

Reach 2R: Wetland Flow Path Avg. Flow Depth=0.83' Max Vel=5.02 fps Inflow=18.70 cfs 1.395 af
n=0.040 L=151.0' S=0.0446 '/' Capacity=133.09 cfs Outflow=18.63 cfs 1.395 af

Reach 10R: Swale Avg. Flow Depth=0.11' Max Vel=0.64 fps Inflow=0.30 cfs 0.072 af
n=0.035 L=44.0' S=0.0050 '/' Capacity=16.22 cfs Outflow=0.30 cfs 0.072 af

Reach 22R: Wetland Flow Path Avg. Flow Depth=0.05' Max Vel=0.80 fps Inflow=0.44 cfs 0.137 af
n=0.040 L=211.0' S=0.0245 '/' Capacity=392.58 cfs Outflow=0.44 cfs 0.137 af

Reach 23R: Wetland Flow Path Avg. Flow Depth=0.97' Max Vel=3.54 fps Inflow=17.02 cfs 1.532 af
n=0.040 L=131.0' S=0.0185 '/' Capacity=85.86 cfs Outflow=16.91 cfs 1.532 af

Reach 69R: Swale Avg. Flow Depth=0.40' Max Vel=1.22 fps Inflow=2.52 cfs 0.560 af
n=0.069 L=17.0' S=0.0147 '/' Capacity=14.11 cfs Outflow=2.52 cfs 0.560 af

Reach 70R: Woodland Flow Path Avg. Flow Depth=0.33' Max Vel=0.57 fps Inflow=2.52 cfs 0.560 af
n=0.400 L=57.0' S=0.1404 '/' Capacity=21.20 cfs Outflow=2.52 cfs 0.560 af

Reach 71R: Stream Avg. Flow Depth=0.28' Max Vel=3.12 fps Inflow=2.52 cfs 0.560 af
n=0.040 L=80.0' S=0.0554 '/' Capacity=31.12 cfs Outflow=2.52 cfs 0.560 af

Reach 72R: Stream Avg. Flow Depth=0.29' Max Vel=1.81 fps Inflow=2.52 cfs 0.560 af
n=0.040 L=88.0' S=0.0160 '/' Capacity=25.40 cfs Outflow=2.52 cfs 0.559 af

Reach 73R: Stream Avg. Flow Depth=0.32' Max Vel=1.92 fps Inflow=3.01 cfs 0.686 af
n=0.040 L=309.0' S=0.0160 '/' Capacity=25.38 cfs Outflow=3.00 cfs 0.685 af

Reach 83R: Woodland Flow Path Avg. Flow Depth=0.15' Max Vel=0.29 fps Inflow=0.50 cfs 0.127 af
n=0.400 L=122.0' S=0.0950 '/' Capacity=17.44 cfs Outflow=0.49 cfs 0.126 af

Pond 1P: 15" RCP Peak Elev=53.53' Storage=682 cf Inflow=4.64 cfs 0.430 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0037 '/' Outflow=3.78 cfs 0.430 af

Pond 2.1P: 24" RCP Peak Elev=51.40' Storage=24,417 cf Inflow=35.88 cfs 3.867 af
24.0" Round Culvert n=0.012 L=17.0' S=0.0135 '/' Outflow=18.94 cfs 3.867 af

Pond 2P: 12" CPP Peak Elev=60.93' Storage=11,719 cf Inflow=23.92 cfs 1.395 af
Outflow=18.70 cfs 1.395 af

Pond 10P: Porous Pavement Peak Elev=57.53' Storage=1,632 cf Inflow=0.09 cfs 0.101 af
Discarded=0.04 cfs 0.097 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.097 af

Pond 11P: YD #3-1 Peak Elev=57.89' Inflow=0.07 cfs 0.005 af
6.0" Round Culvert n=0.012 L=36.0' S=0.0050 '/' Outflow=0.07 cfs 0.005 af

Pond 12P: YD #7 Peak Elev=58.07' Inflow=0.21 cfs 0.016 af
8.0" Round Culvert n=0.012 L=52.0' S=0.0050 '/' Outflow=0.21 cfs 0.016 af

Pond 13P: YD #6 Peak Elev=57.90' Inflow=0.37 cfs 0.027 af
10.0" Round Culvert n=0.012 L=29.0' S=0.0052 '/' Outflow=0.37 cfs 0.027 af

Pond 14P: YD #5 Peak Elev=57.90' Inflow=0.49 cfs 0.036 af
10.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=0.49 cfs 0.036 af

Pond 15P: YD #4 Peak Elev=57.89' Inflow=0.62 cfs 0.046 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0050 '/' Outflow=0.62 cfs 0.046 af

Pond 16P: CB #3 Peak Elev=57.89' Inflow=0.77 cfs 0.057 af
12.0" Round Culvert n=0.012 L=45.0' S=0.0049 '/' Outflow=0.77 cfs 0.057 af

Pond 17P: Bio #1 / OS #1 Peak Elev=57.89' Storage=1,367 cf Inflow=0.98 cfs 0.072 af
Outflow=0.30 cfs 0.072 af

Pond 21P: CB #8 Peak Elev=59.46' Inflow=0.32 cfs 0.026 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=0.32 cfs 0.026 af

Pond 22P: Bio #2 / OS #9 Peak Elev=59.46' Storage=2,731 cf Inflow=1.74 cfs 0.139 af
Outflow=0.44 cfs 0.137 af

Pond 30P: CB #10-2 Peak Elev=53.13' Inflow=0.87 cfs 0.063 af
12.0" Round Culvert n=0.012 L=78.0' S=0.0397 '/' Outflow=0.87 cfs 0.063 af

Pond 31P: CB #10-1 Peak Elev=50.14' Inflow=0.81 cfs 0.061 af
12.0" Round Culvert n=0.012 L=2.0' S=0.0250 '/' Outflow=0.81 cfs 0.061 af

Pond 32P: DMH #10 Peak Elev=49.91' Inflow=19.28 cfs 3.990 af
24.0" Round Culvert n=0.012 L=57.0' S=0.0135 '/' Outflow=19.28 cfs 3.990 af

Pond 40P: 6" CPP Peak Elev=53.99' Inflow=0.38 cfs 0.031 af
6.0" Round Culvert n=0.012 L=174.0' S=0.0150 '/' Outflow=0.38 cfs 0.031 af

Pond 41P: YD #15 Peak Elev=52.30' Inflow=0.63 cfs 0.051 af
8.0" Round Culvert n=0.012 L=47.0' S=0.0149 '/' Outflow=0.63 cfs 0.051 af

Pond 42P: YD #14-1 Peak Elev=54.36' Inflow=0.38 cfs 0.029 af
6.0" Round Culvert n=0.012 L=158.0' S=0.0175 '/' Outflow=0.38 cfs 0.029 af

Pond 43P: 10" CPP Peak Elev=52.16' Inflow=1.02 cfs 0.080 af
8.0" Round Culvert n=0.012 L=33.0' S=0.0148 '/' Outflow=1.02 cfs 0.080 af

Pond 44P: CB #14 Peak Elev=51.85' Inflow=1.48 cfs 0.113 af
12.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/' Outflow=1.48 cfs 0.113 af

Pond 45P: CB #13-2 Peak Elev=51.76' Inflow=0.44 cfs 0.033 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0164 '/' Outflow=0.44 cfs 0.033 af

Pond 46P: CB #13-1 Peak Elev=51.76' Inflow=0.52 cfs 0.039 af
12.0" Round Culvert n=0.012 L=12.0' S=0.0050 '/' Outflow=0.52 cfs 0.039 af

Pond 47P: DMH #13 Peak Elev=51.76' Inflow=2.43 cfs 0.185 af
15.0" Round Culvert n=0.012 L=67.0' S=0.0040 '/' Outflow=2.43 cfs 0.185 af

Pond 48P: CB #12-2 Peak Elev=51.74' Inflow=0.37 cfs 0.027 af
12.0" Round Culvert n=0.012 L=6.0' S=0.0050 '/' Outflow=0.37 cfs 0.027 af

Pond 49P: CB #12-1 Peak Elev=51.74' Inflow=0.43 cfs 0.033 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0050 '/' Outflow=0.43 cfs 0.033 af

Pond 50P: DMH #12 Peak Elev=51.73' Inflow=3.23 cfs 0.244 af
15.0" Round Culvert n=0.012 L=103.0' S=0.0040 '/' Outflow=3.23 cfs 0.244 af

Pond 60P: CB #17-1-2 Peak Elev=52.78' Inflow=1.07 cfs 0.082 af
12.0" Round Culvert n=0.012 L=21.0' S=0.0052 '/' Outflow=1.07 cfs 0.082 af

Pond 61P: CB #17-1-1 Peak Elev=52.76' Inflow=0.86 cfs 0.068 af
12.0" Round Culvert n=0.012 L=3.0' S=0.0367 '/' Outflow=0.86 cfs 0.068 af

Pond 62P: DMH #17-1 Peak Elev=52.71' Inflow=1.93 cfs 0.149 af
12.0" Round Culvert n=0.012 L=25.0' S=0.0052 '/' Outflow=1.93 cfs 0.149 af

Pond 63P: YD #21 Peak Elev=52.54' Inflow=0.16 cfs 0.012 af
12.0" Round Culvert n=0.012 L=49.0' S=0.0049 '/' Outflow=0.16 cfs 0.012 af

Pond 64P: YD #20 Peak Elev=52.54' Inflow=0.34 cfs 0.026 af
10.0" Round Culvert n=0.012 L=35.0' S=0.0049 '/' Outflow=0.34 cfs 0.026 af

Pond 65P: YD #19 Peak Elev=52.53' Inflow=0.45 cfs 0.034 af
10.0" Round Culvert n=0.012 L=42.0' S=0.0050 '/' Outflow=0.45 cfs 0.034 af

Pond 66P: YD #18 Peak Elev=52.50' Inflow=0.59 cfs 0.044 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0509 '/' Outflow=0.59 cfs 0.044 af

Pond 67P: CB #17 Peak Elev=52.48' Inflow=2.62 cfs 0.200 af
12.0" Round Culvert n=0.012 L=74.0' S=0.0050 '/' Outflow=2.62 cfs 0.200 af

Pond 68P: DMH #16 Peak Elev=51.94' Inflow=2.78 cfs 0.214 af
12.0" Round Culvert n=0.012 L=90.0' S=0.0110 '/' Outflow=2.78 cfs 0.214 af

Pond 69P: Bio #3 / OS #11 Peak Elev=51.69' Storage=11,307 cf Inflow=7.64 cfs 0.583 af
Outflow=2.52 cfs 0.560 af

Pond 80P: 6" CPP Peak Elev=49.62' Inflow=0.15 cfs 0.012 af
6.0" Round Culvert n=0.012 L=111.0' S=0.0350 '/' Outflow=0.15 cfs 0.012 af

Pond 81P: 6" CPP Peak Elev=49.56' Inflow=0.15 cfs 0.012 af
6.0" Round Culvert n=0.012 L=85.0' S=0.0351 '/' Outflow=0.15 cfs 0.012 af

Pond 82P: CB #23 Peak Elev=48.31' Inflow=1.30 cfs 0.102 af
12.0" Round Culvert n=0.012 L=18.0' S=0.0194 '/' Outflow=1.30 cfs 0.102 af

Pond 83P: Bio #4 / OS #22 Peak Elev=48.30' Storage=2,220 cf Inflow=1.63 cfs 0.127 af
Outflow=0.50 cfs 0.127 af

Link 100L: POA #100 - SW Inflow=3.78 cfs 0.430 af
Primary=3.78 cfs 0.430 af

Link 200L: POA #200 - South Inflow=23.20 cfs 4.580 af
Primary=23.20 cfs 4.580 af

Link 300L: POA #300 - SE Inflow=15.73 cfs 1.989 af
Primary=15.73 cfs 1.989 af

Total Runoff Area = 30.826 ac Runoff Volume = 7.127 af Average Runoff Depth = 2.77"
87.20% Pervious = 26.879 ac 12.80% Impervious = 3.947 ac

Summary for Subcatchment 1S: West Corner

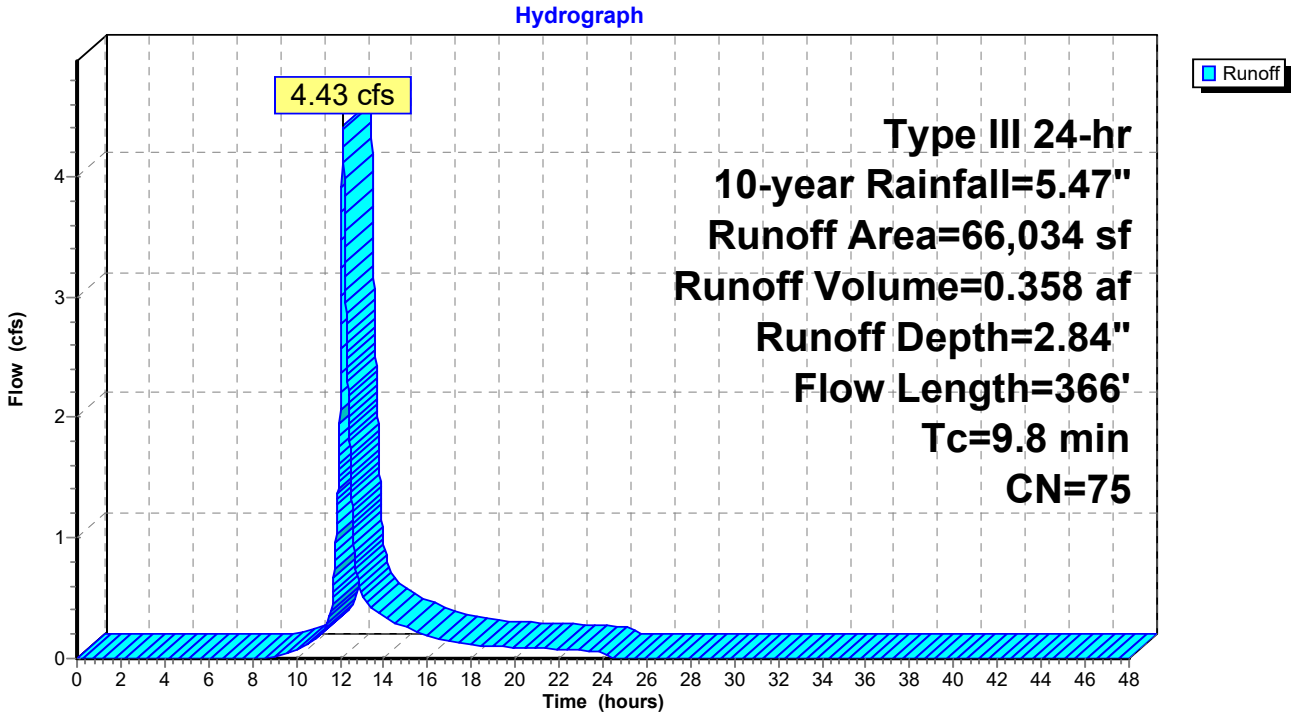
Runoff = 4.43 cfs @ 12.14 hrs, Volume= 0.358 af, Depth= 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
6,392	98	Paved parking, HSG C
35,003	74	>75% Grass cover, Good, HSG C
24,608	70	Woods, Good, HSG C
31	55	Woods, Good, HSG B
66,034	75	Weighted Average
59,642		90.32% Pervious Area
6,392		9.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	35	0.1071	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
1.6	129	0.0388	1.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	55	0.0909	1.51		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	147	0.0254	0.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	366	Total			

Subcatchment 1S: West Corner



Summary for Subcatchment 2.1S: Central

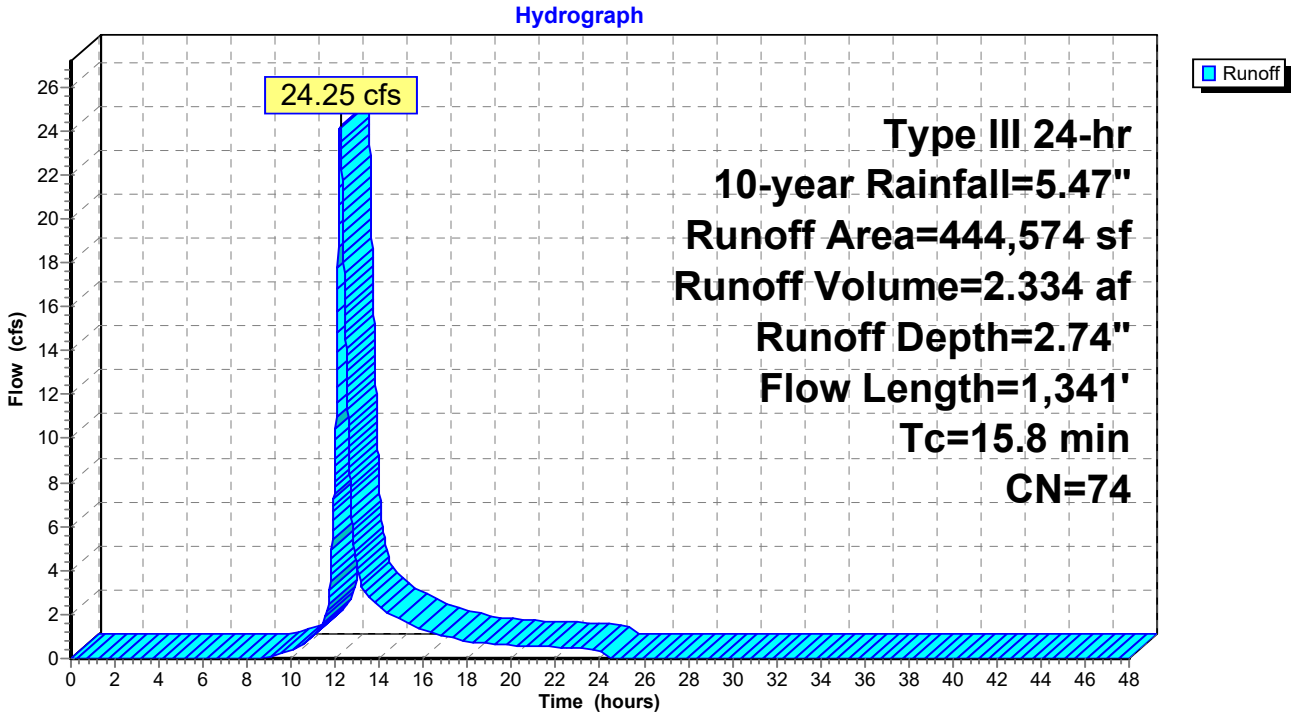
Runoff = 24.25 cfs @ 12.22 hrs, Volume= 2.334 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
4,537	98	Paved parking, HSG D
25,978	98	Paved parking, HSG C
5,448	98	Roofs, HSG C
49	98	Paved parking, HSG B
3,520	80	>75% Grass cover, Good, HSG D
69,745	77	Woods, Good, HSG D
8,483	65	Brush, Good, HSG C
65,701	74	>75% Grass cover, Good, HSG C
248,205	70	Woods, Good, HSG C
530	61	>75% Grass cover, Good, HSG B
12,378	55	Woods, Good, HSG B
444,574	74	Weighted Average
408,562		91.90% Pervious Area
36,012		8.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	35	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.61"
4.7	255	0.0165	0.90		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.0	132	0.0501	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	67	0.0313	2.85		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	89	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	289	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	474	0.0106	2.72	13.61	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.040 Winding stream, pools & shoals
15.8	1,341	Total			

Subcatchment 2.1S: Central



Summary for Subcatchment 2.2S: South of SQ Drive

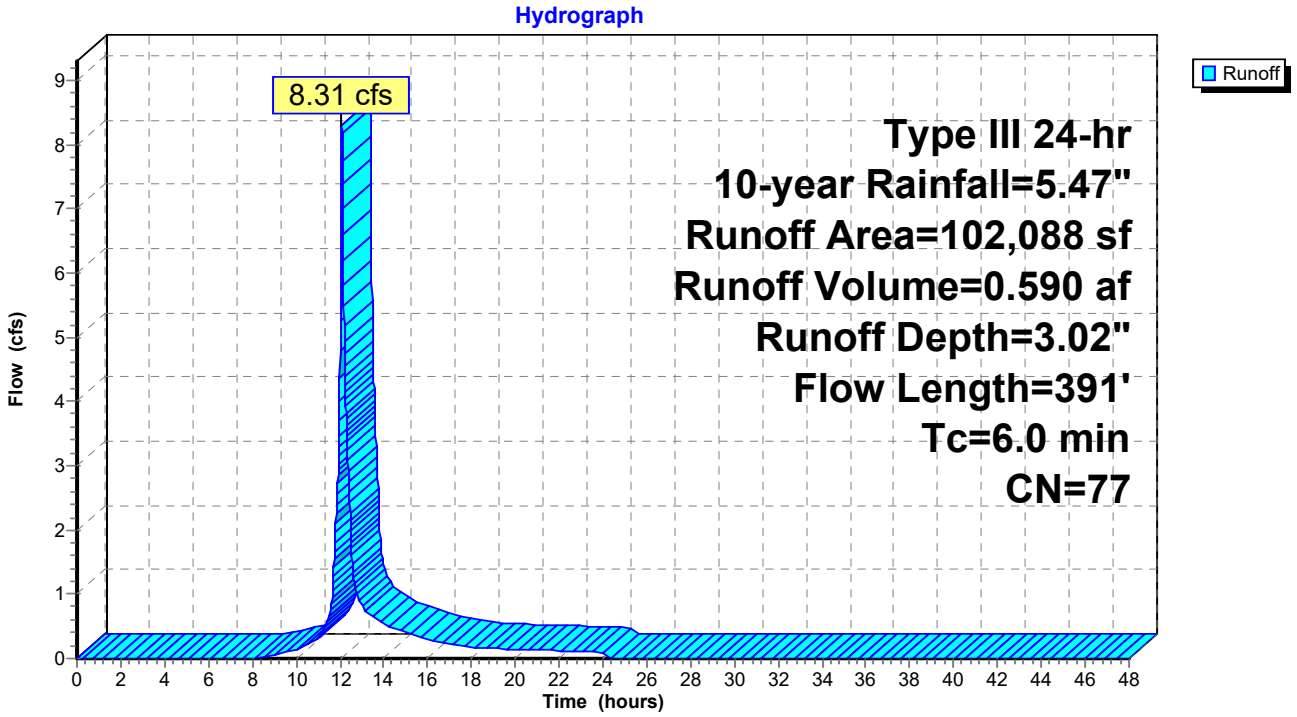
Runoff = 8.31 cfs @ 12.09 hrs, Volume= 0.590 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
4,776	98	Paved parking, HSG D
5,561	98	Paved parking, HSG C
639	80	>75% Grass cover, Good, HSG D
52,111	77	Woods, Good, HSG D
1,323	74	>75% Grass cover, Good, HSG C
37,678	70	Woods, Good, HSG C
102,088	77	Weighted Average
91,751		89.87% Pervious Area
10,337		10.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	19	0.0200	1.05		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.61"
1.4	118	0.0816	1.43		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	254	0.0502	5.93	29.63	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.040 Winding stream, pools & shoals
2.4	391	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 2.2S: South of SQ Drive



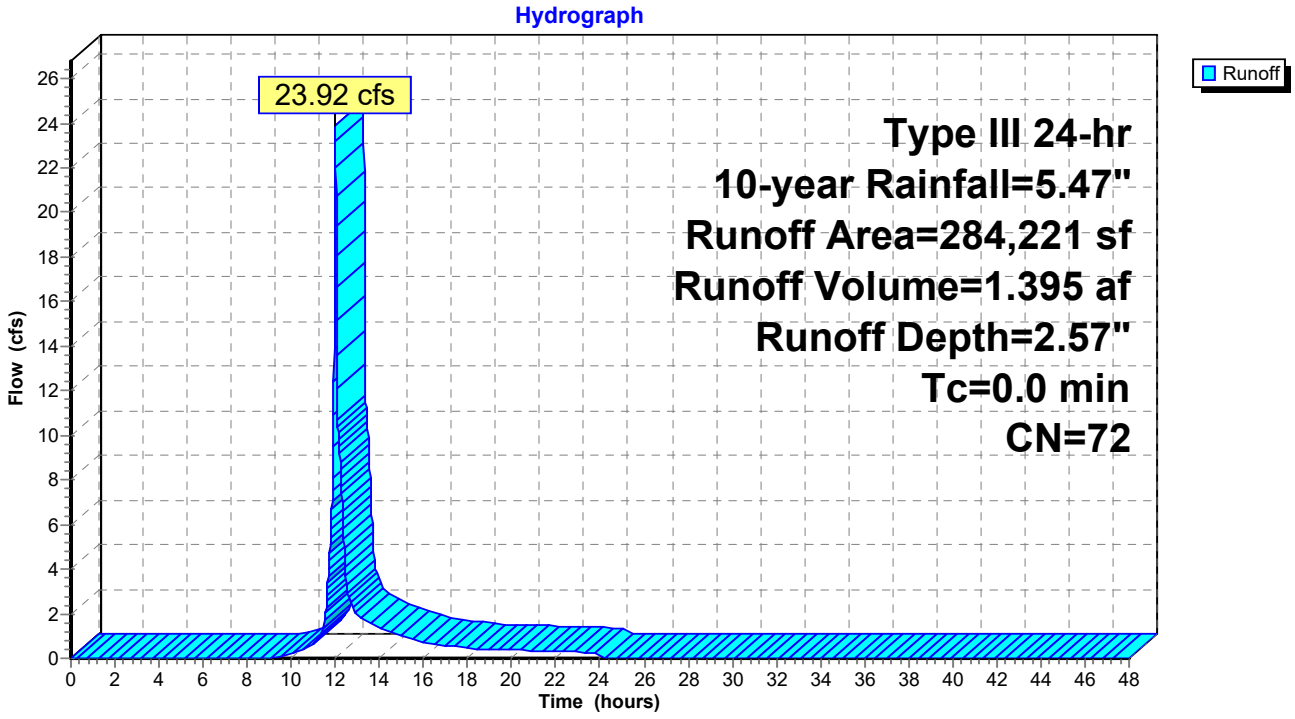
Summary for Subcatchment 2S: North Corner

Runoff = 23.92 cfs @ 12.00 hrs, Volume= 1.395 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
27	98	Paved parking, HSG D
13,324	98	Paved parking, HSG C
5,932	98	Roofs, HSG C
254	80	>75% Grass cover, Good, HSG D
20,767	77	Woods, Good, HSG D
21,632	74	>75% Grass cover, Good, HSG C
199,815	70	Woods, Good, HSG C
22,470	55	Woods, Good, HSG B
284,221	72	Weighted Average
264,938		93.22% Pervious Area
19,283		6.78% Impervious Area

Subcatchment 2S: North Corner



Summary for Subcatchment 3S: SE Corner

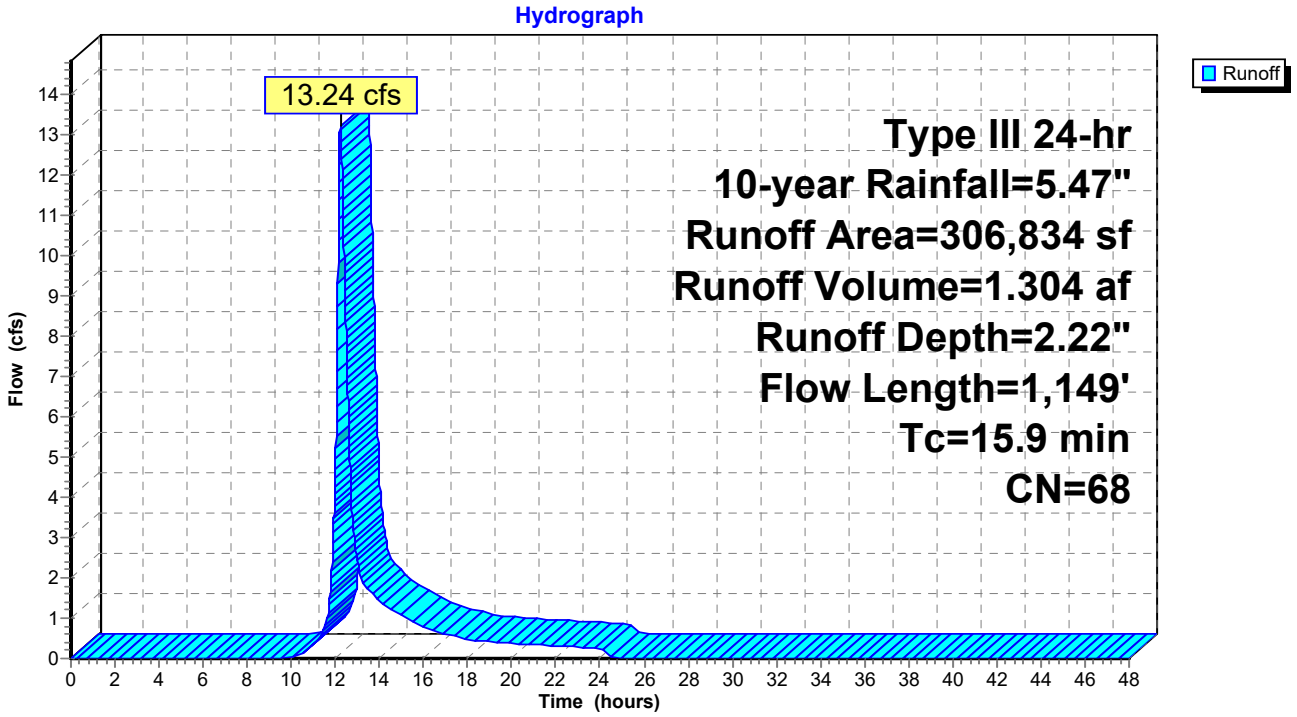
Runoff = 13.24 cfs @ 12.23 hrs, Volume= 1.304 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
223	98	Paved parking, HSG D
5,324	98	Paved parking, HSG C
1,176	98	Paved parking, HSG B
16,453	74	>75% Grass cover, Good, HSG C
234,823	70	Woods, Good, HSG C
1,816	61	>75% Grass cover, Good, HSG B
47,019	55	Woods, Good, HSG B
306,834	68	Weighted Average
300,111		97.81% Pervious Area
6,723		2.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	90	0.1412	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
4.7	331	0.0554	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	331	0.0554	6.22	31.12	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.040 Winding stream, pools & shoals
1.8	397	0.0160	3.63	25.39	**Trap/Vee/Rect Channel Flow,** Bot.W=4.00' D=1.00' Z= 3.0 '/' Top.W=10.00' n= 0.040 Winding stream, pools & shoals
15.9	1,149	Total			

Subcatchment 3S: SE Corner



Summary for Subcatchment 10S: Parking Lot

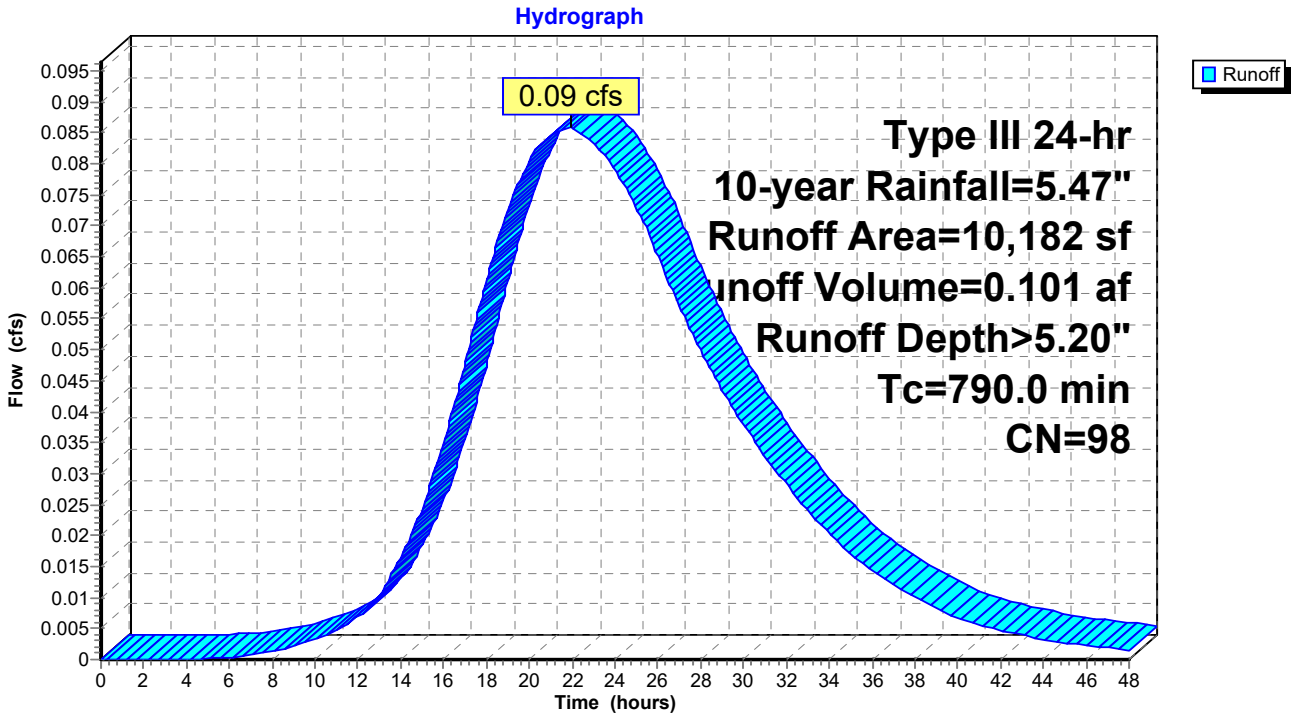
Runoff = 0.09 cfs @ 21.94 hrs, Volume= 0.101 af, Depth> 5.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
10,078	98	Paved parking, HSG C
104	74	>75% Grass cover, Good, HSG C
10,182	98	Weighted Average
104		1.02% Pervious Area
10,078		98.98% Impervious Area

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

Subcatchment 10S: Parking Lot



Summary for Subcatchment 11S: Island

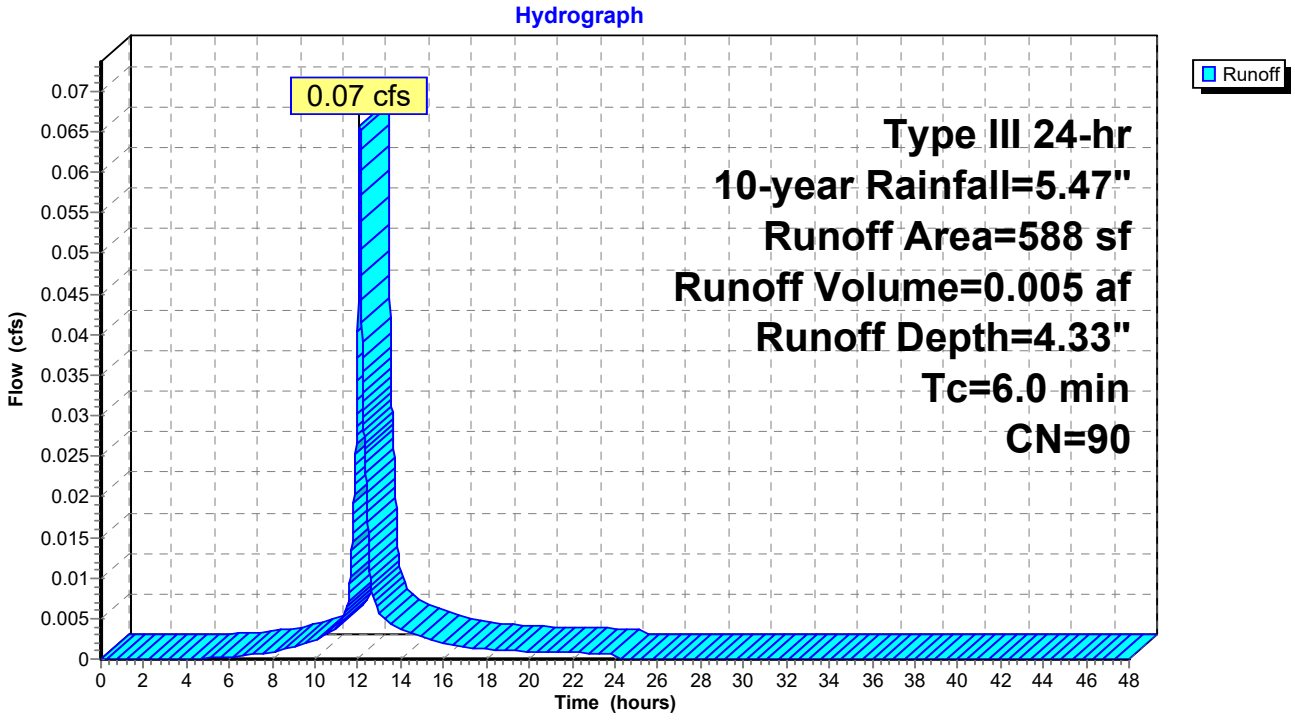
Runoff = 0.07 cfs @ 12.08 hrs, Volume= 0.005 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
321	98	Roofs, HSG C
66	98	Paved parking, HSG C
201	74	>75% Grass cover, Good, HSG C
588	90	Weighted Average
201		34.18% Pervious Area
387		65.82% Impervious Area

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

Subcatchment 11S: Island



Summary for Subcatchment 12S: Building

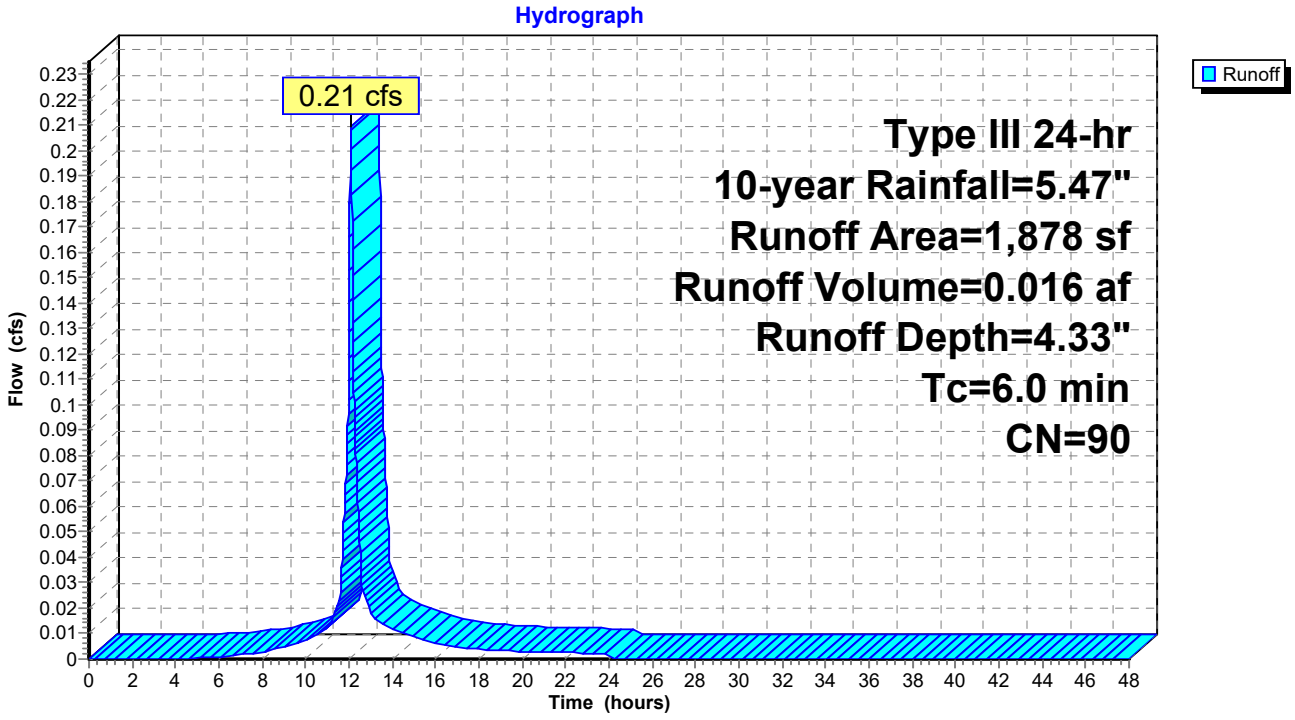
Runoff = 0.21 cfs @ 12.08 hrs, Volume= 0.016 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
1,171	98	Roofs, HSG C
52	98	Paved parking, HSG C
655	74	>75% Grass cover, Good, HSG C
1,878	90	Weighted Average
655		34.88% Pervious Area
1,223		65.12% Impervious Area

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

Subcatchment 12S: Building



Summary for Subcatchment 13S: Building

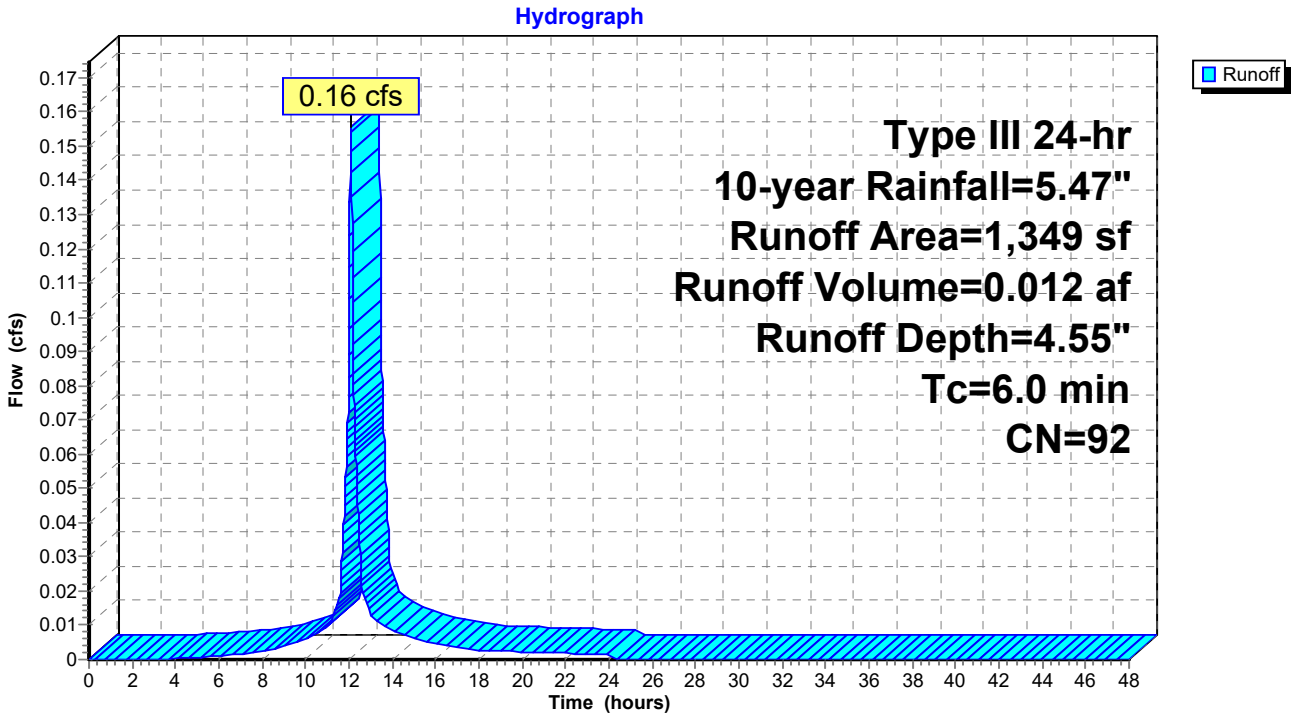
Runoff = 0.16 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
996	98	Roofs, HSG C
353	74	>75% Grass cover, Good, HSG C
1,349	92	Weighted Average
353		26.17% Pervious Area
996		73.83% Impervious Area

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

Subcatchment 13S: Building



Summary for Subcatchment 14S: Building

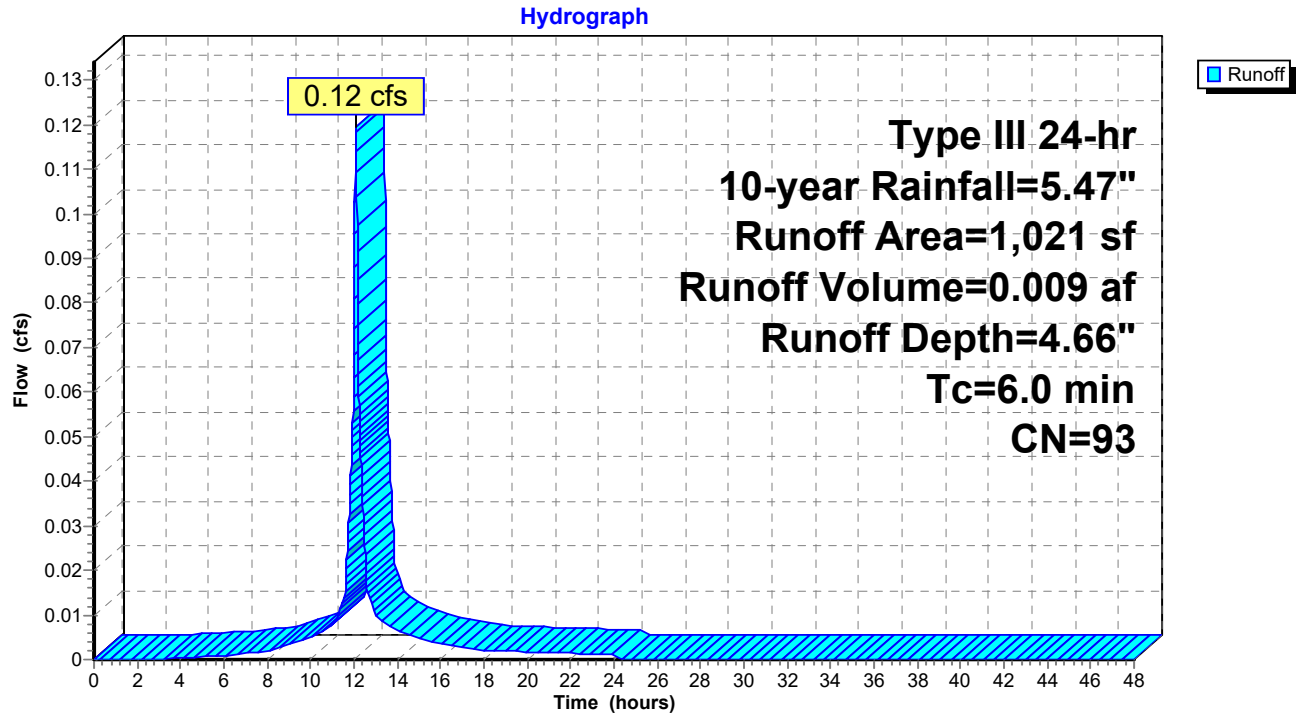
Runoff = 0.12 cfs @ 12.08 hrs, Volume= 0.009 af, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
795	98	Roofs, HSG C
226	74	>75% Grass cover, Good, HSG C
1,021	93	Weighted Average
226		22.14% Pervious Area
795		77.86% Impervious Area

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

Subcatchment 14S: Building



Summary for Subcatchment 15S: Building

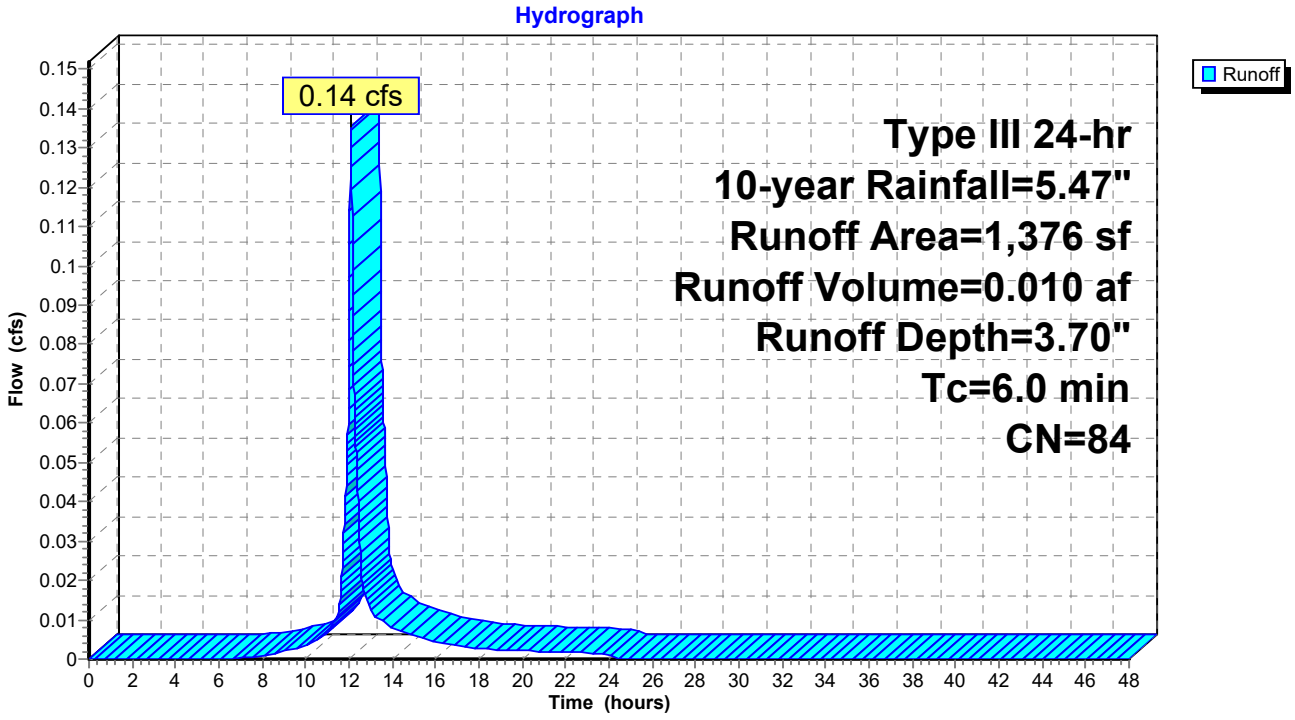
Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
484	98	Roofs, HSG C
111	98	Paved parking, HSG C
781	74	>75% Grass cover, Good, HSG C
1,376	84	Weighted Average
781		56.76% Pervious Area
595		43.24% Impervious Area

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

Subcatchment 15S: Building



Summary for Subcatchment 16S: Island

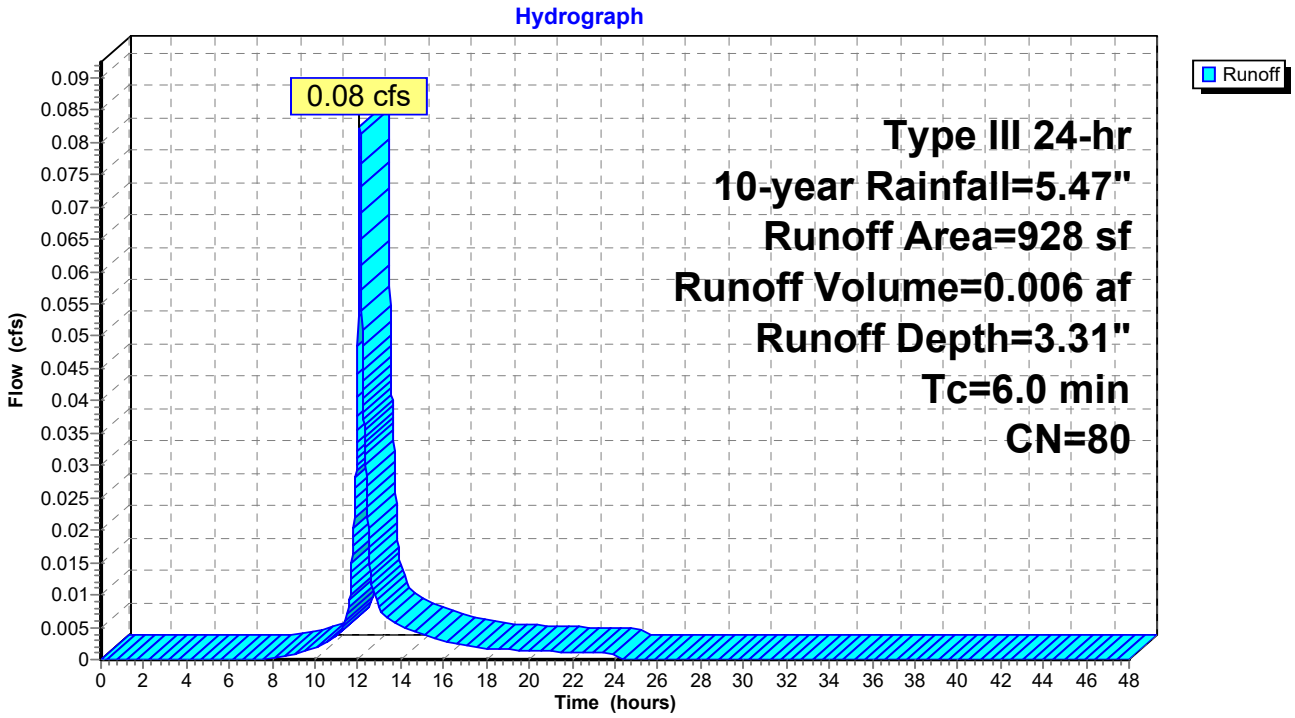
Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
246	98	Paved parking, HSG C
682	74	>75% Grass cover, Good, HSG C
928	80	Weighted Average
682		73.49% Pervious Area
246		26.51% Impervious Area

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

Subcatchment 16S: Island



Summary for Subcatchment 17S: To Bio #1

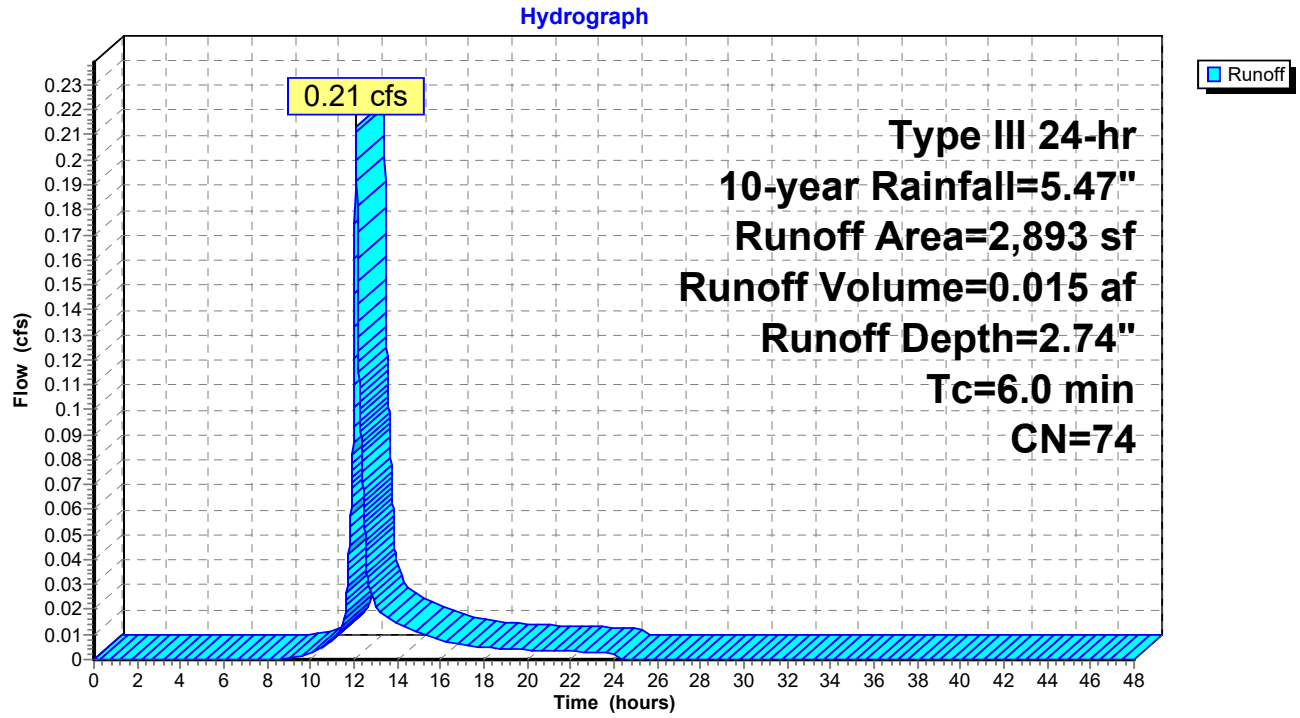
Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
8	98	Paved parking, HSG C
2,885	74	>75% Grass cover, Good, HSG C
2,893	74	Weighted Average
2,885		99.72% Pervious Area
8		0.28% Impervious Area

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

Subcatchment 17S: To Bio #1



Summary for Subcatchment 20S: Building

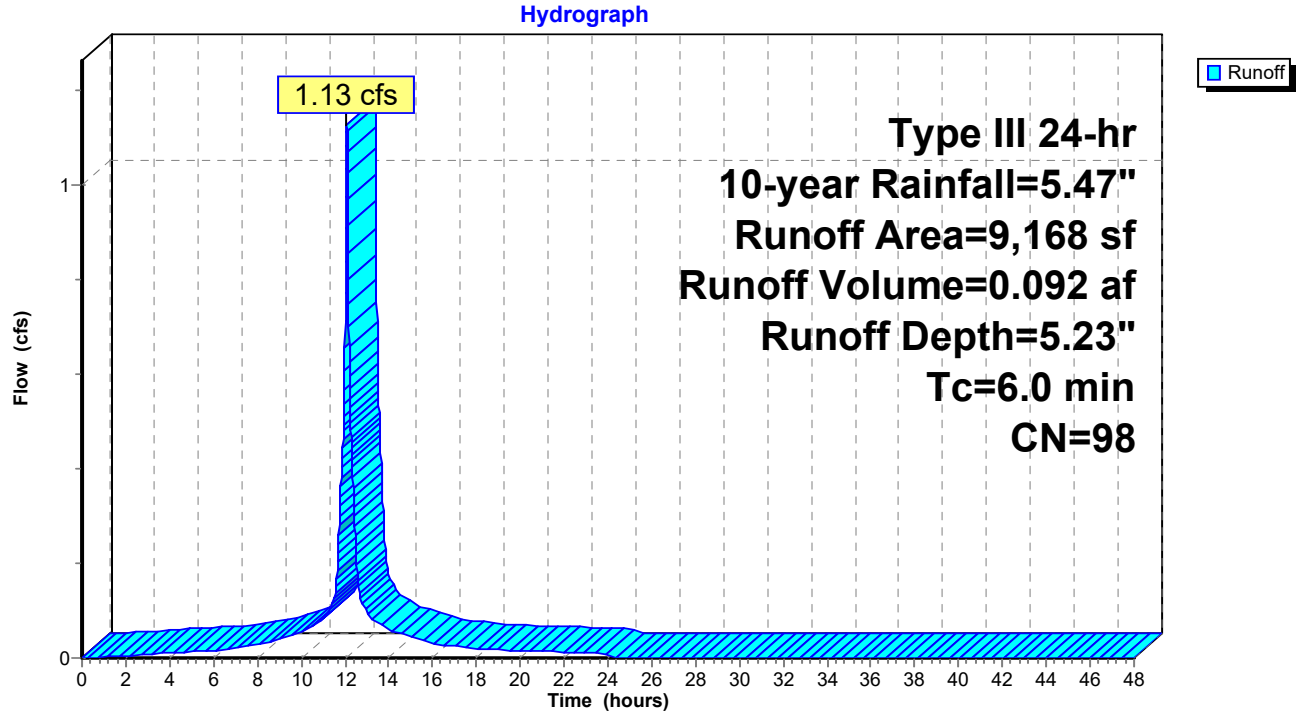
Runoff = 1.13 cfs @ 12.08 hrs, Volume= 0.092 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
9,168	98	Roofs, HSG C
9,168		100.00% Impervious Area

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

Subcatchment 20S: Building



Summary for Subcatchment 21S: Parking Lot

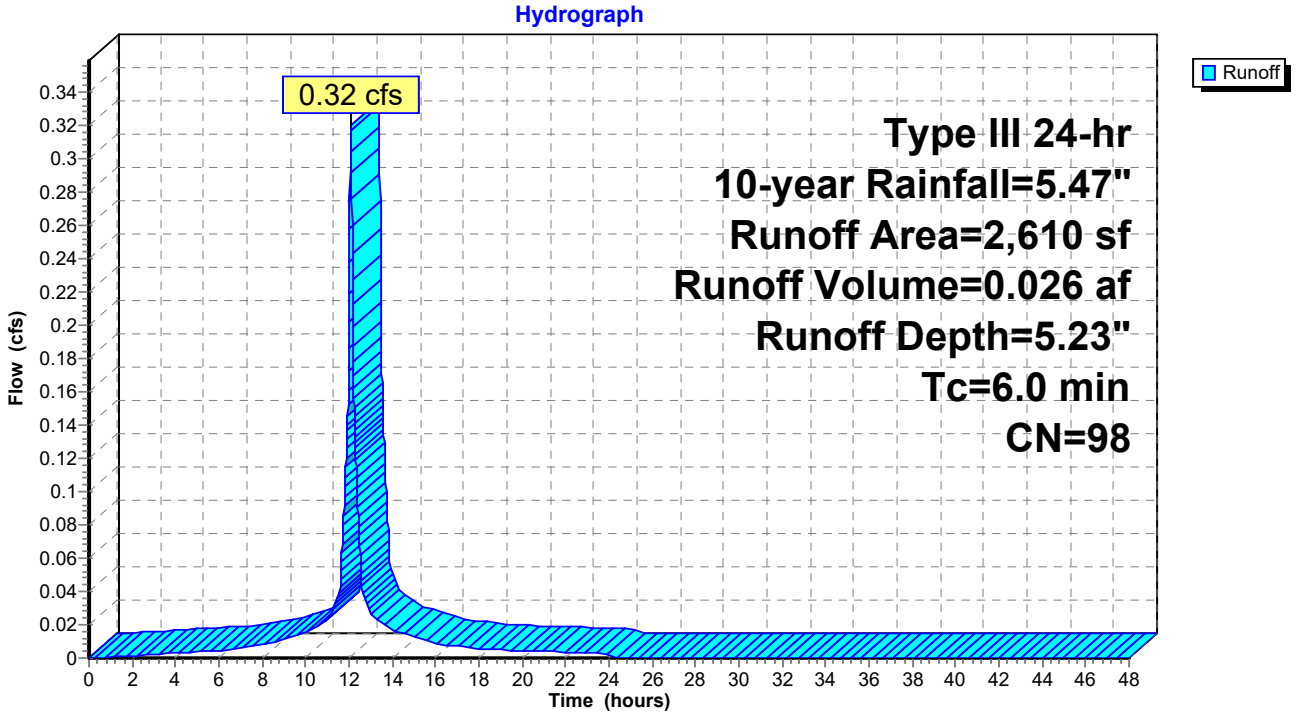
Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
331	98	Roofs, HSG C
2,279	98	Paved parking, HSG C
2,610	98	Weighted Average
2,610		100.00% Impervious Area

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

Subcatchment 21S: Parking Lot



Summary for Subcatchment 22S: To Bio #2

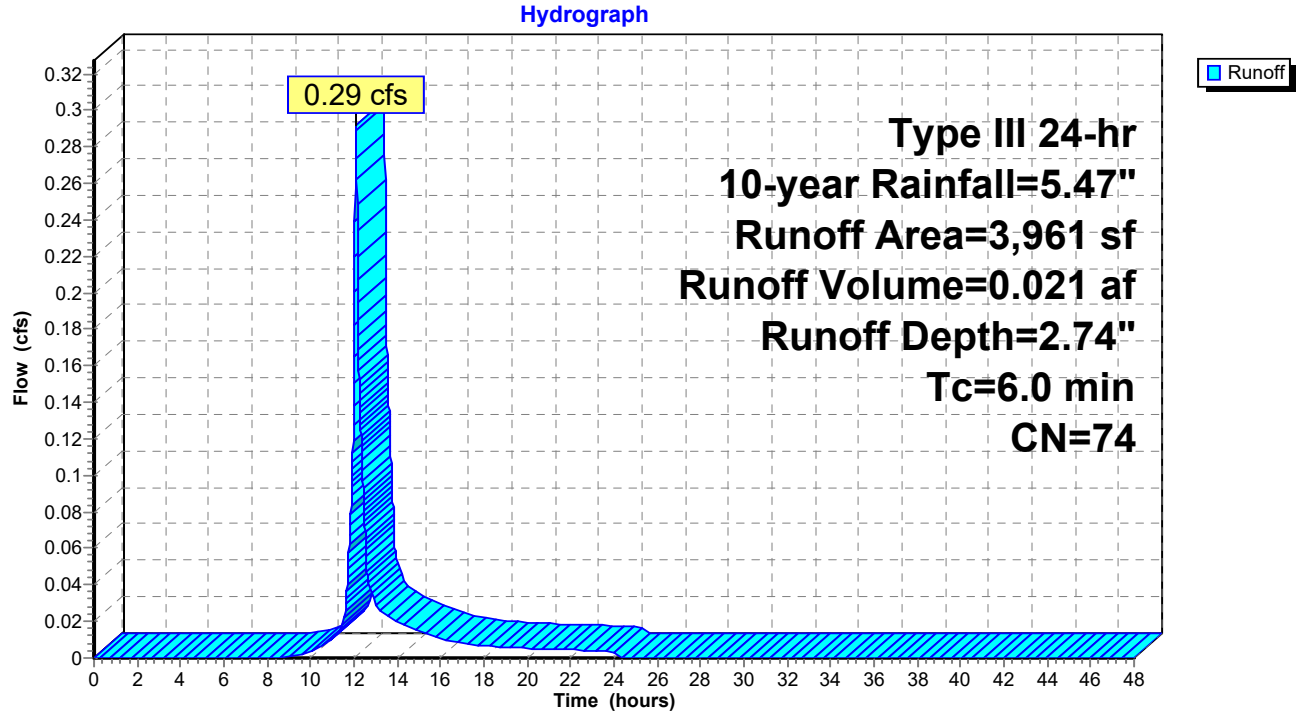
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
3,961	74	>75% Grass cover, Good, HSG C
3,961		100.00% Pervious Area

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

Subcatchment 22S: To Bio #2



Summary for Subcatchment 30S: Roadside

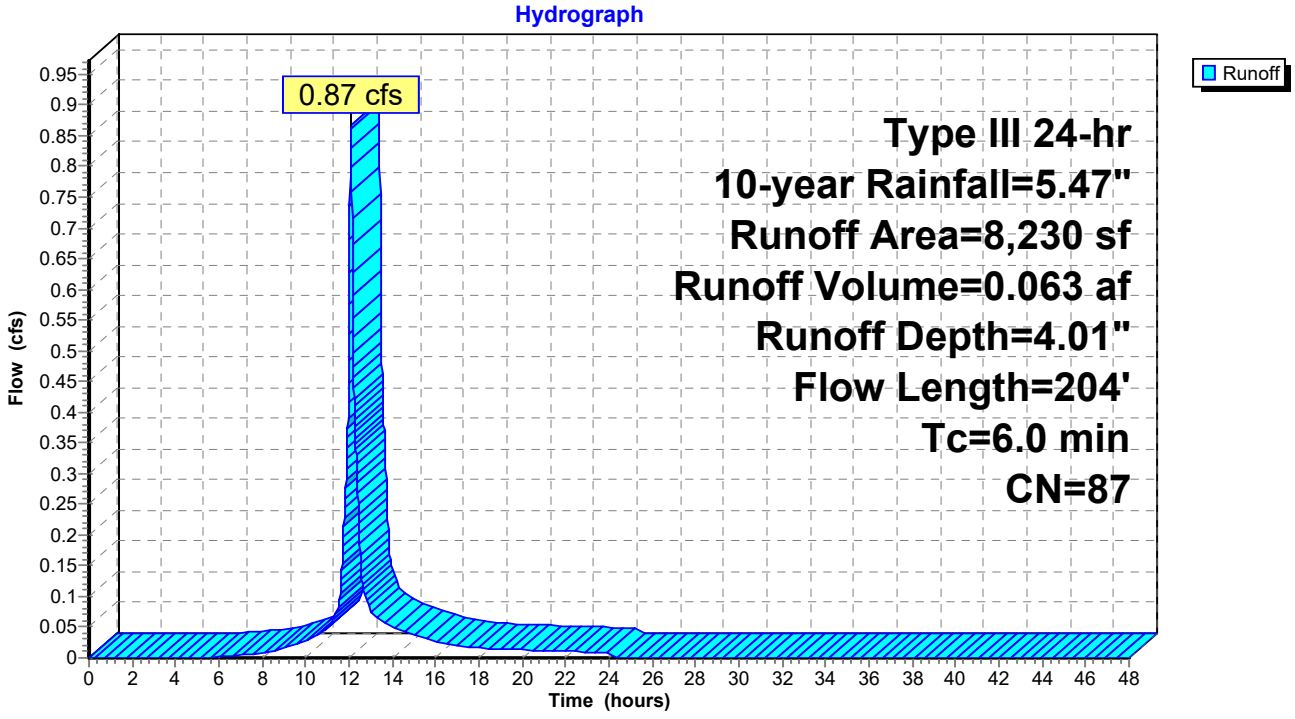
Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.063 af, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
4,370	98	Paved parking, HSG C
3,860	74	>75% Grass cover, Good, HSG C
8,230	87	Weighted Average
3,860		46.90% Pervious Area
4,370		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	19	0.0200	1.05		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.61"
2.9	185	0.0235	1.07		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.2	204	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 30S: Roadside



Summary for Subcatchment 31S: Roadside

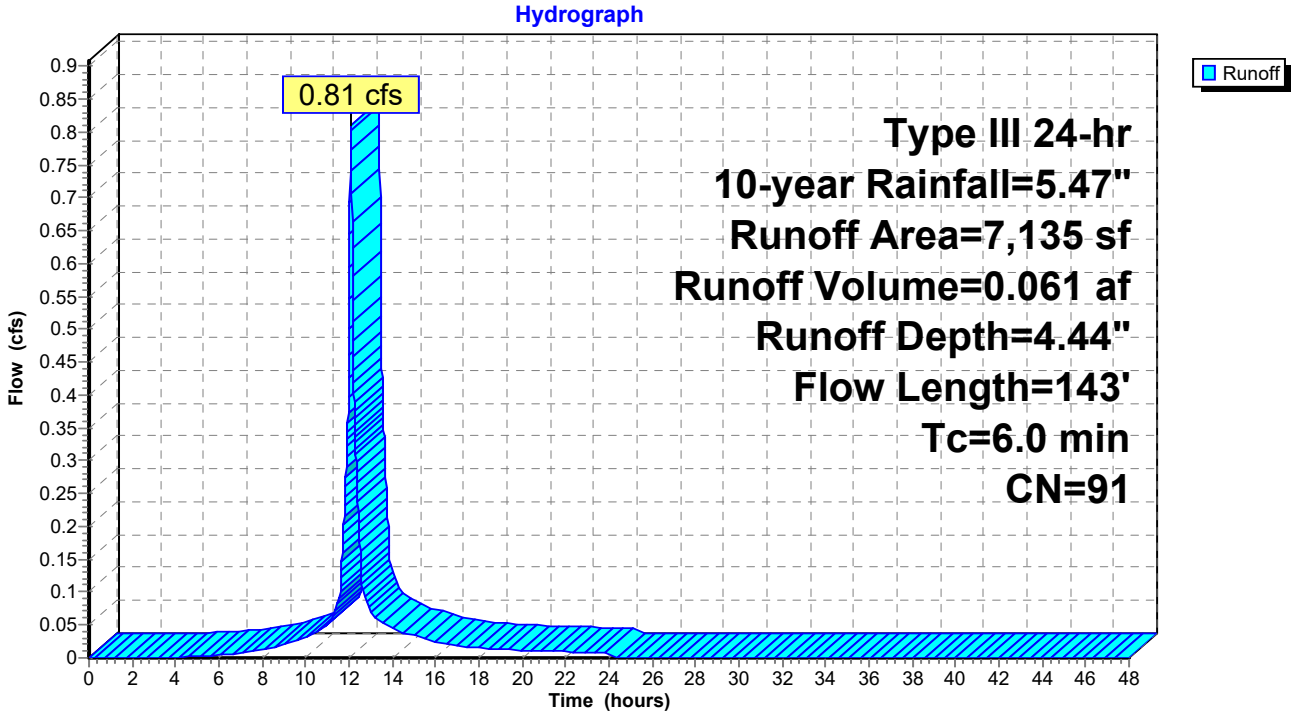
Runoff = 0.81 cfs @ 12.08 hrs, Volume= 0.061 af, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
5,074	98	Paved parking, HSG C
2,061	74	>75% Grass cover, Good, HSG C
7,135	91	Weighted Average
2,061		28.89% Pervious Area
5,074		71.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	17	0.0200	1.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.61"
3.0	126	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.3	143	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 31S: Roadside



Summary for Subcatchment 40S: Building

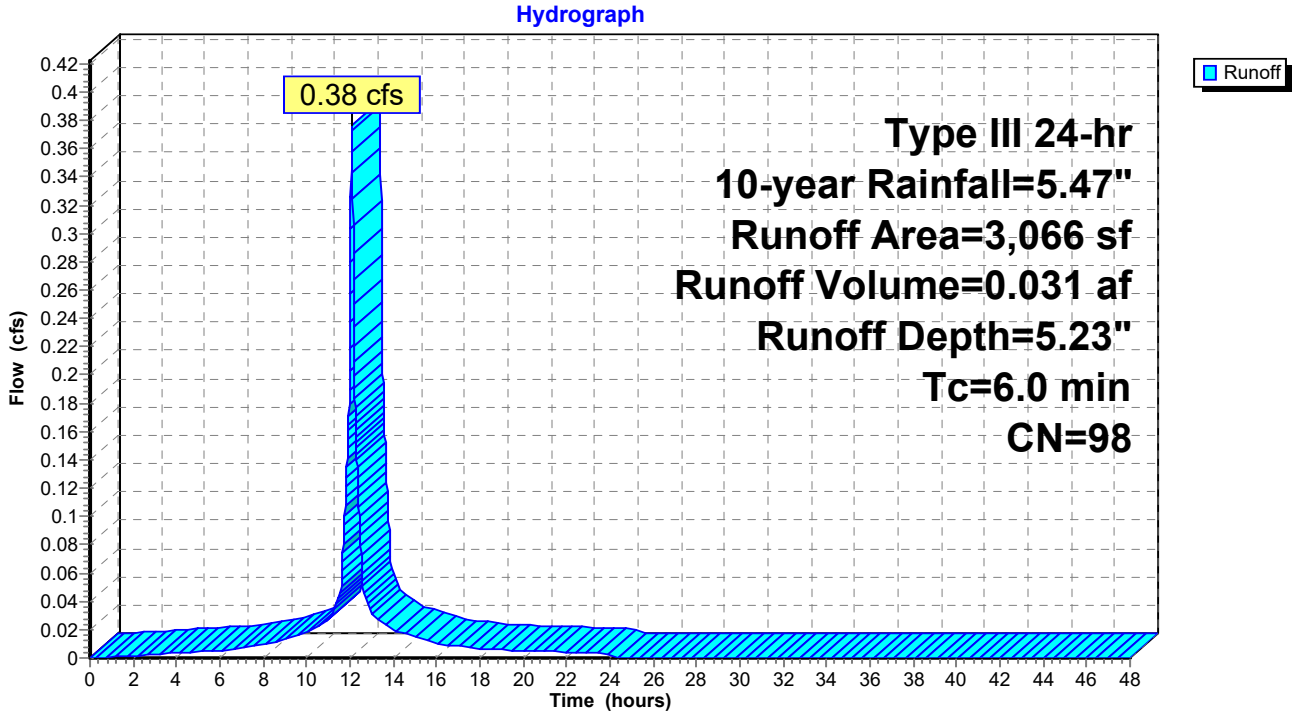
Runoff = 0.38 cfs @ 12.08 hrs, Volume= 0.031 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
3,066	98	Roofs, HSG C
3,066		100.00% Impervious Area

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

Subcatchment 40S: Building



Summary for Subcatchment 41S: Building

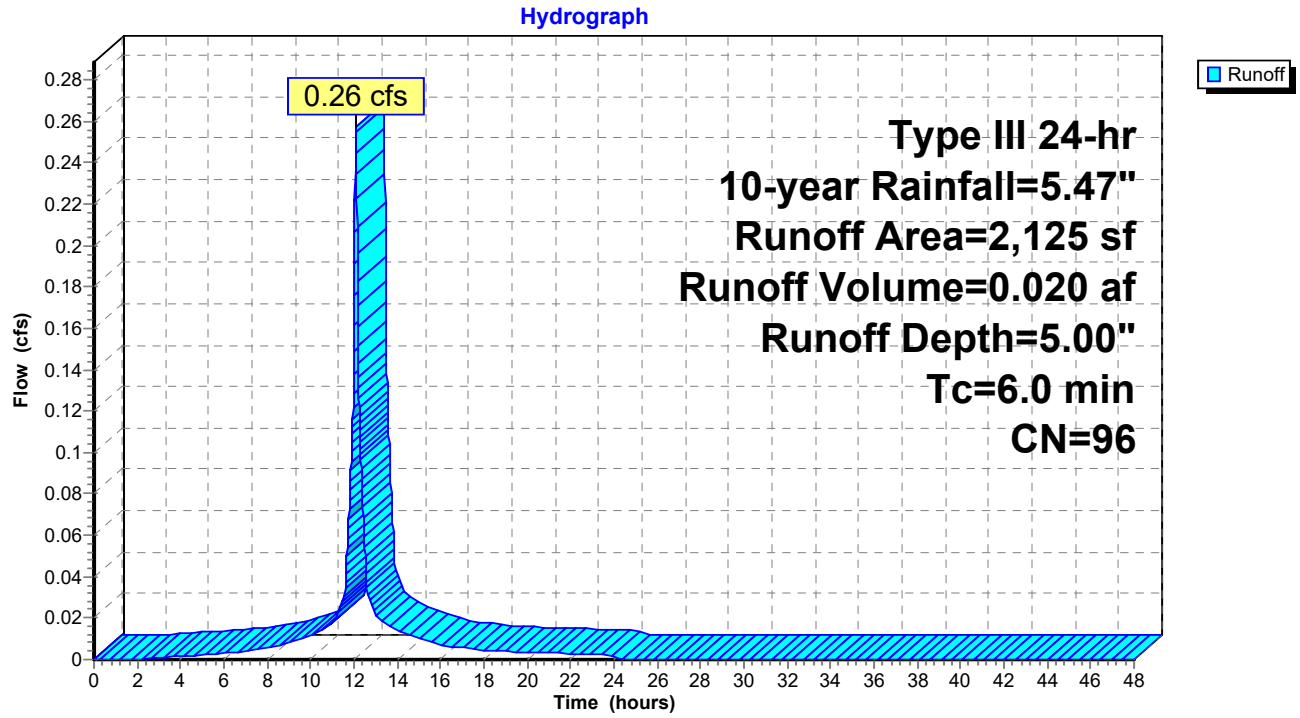
Runoff = 0.26 cfs @ 12.08 hrs, Volume= 0.020 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
1,929	98	Roofs, HSG C
196	74	>75% Grass cover, Good, HSG C
2,125	96	Weighted Average
196		9.22% Pervious Area
1,929		90.78% Impervious Area

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

Subcatchment 41S: Building



Summary for Subcatchment 42S: Building

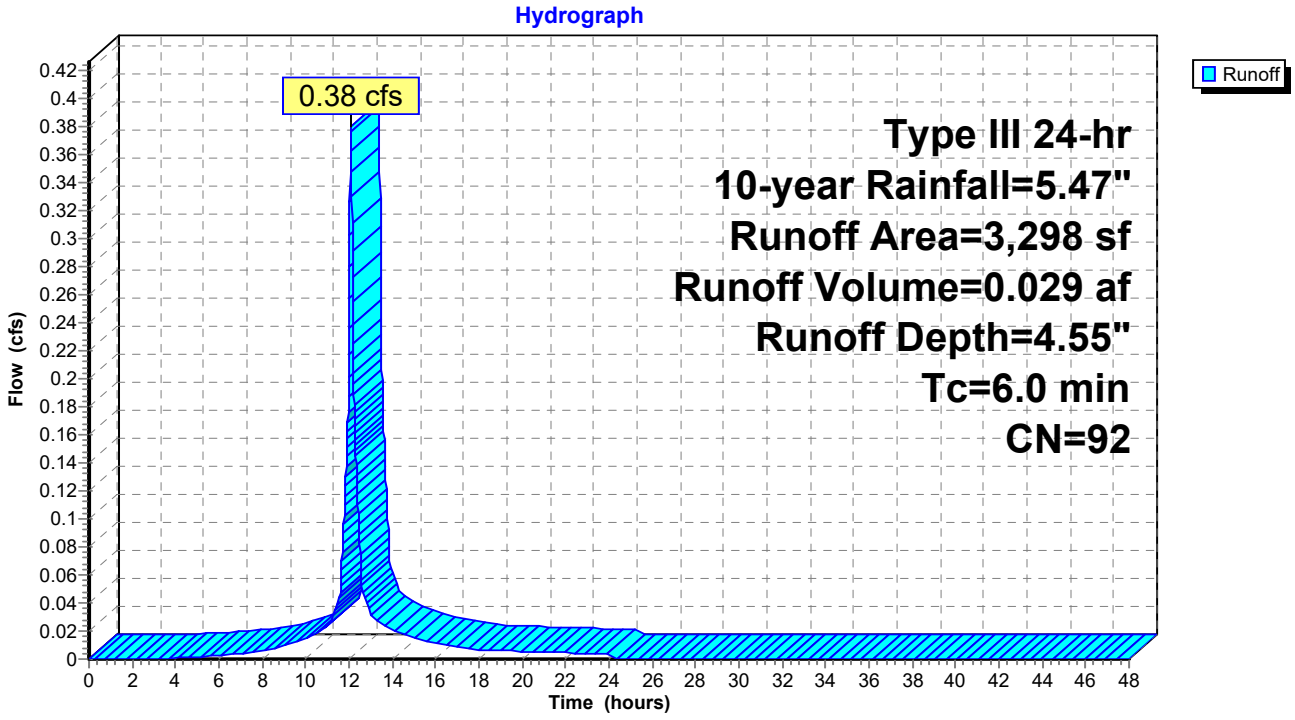
Runoff = 0.38 cfs @ 12.08 hrs, Volume= 0.029 af, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
292	98	Paved parking, HSG C
2,162	98	Roofs, HSG C
844	74	>75% Grass cover, Good, HSG C
3,298	92	Weighted Average
844		25.59% Pervious Area
2,454		74.41% Impervious Area

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

Subcatchment 42S: Building



Summary for Subcatchment 44S: Roadside

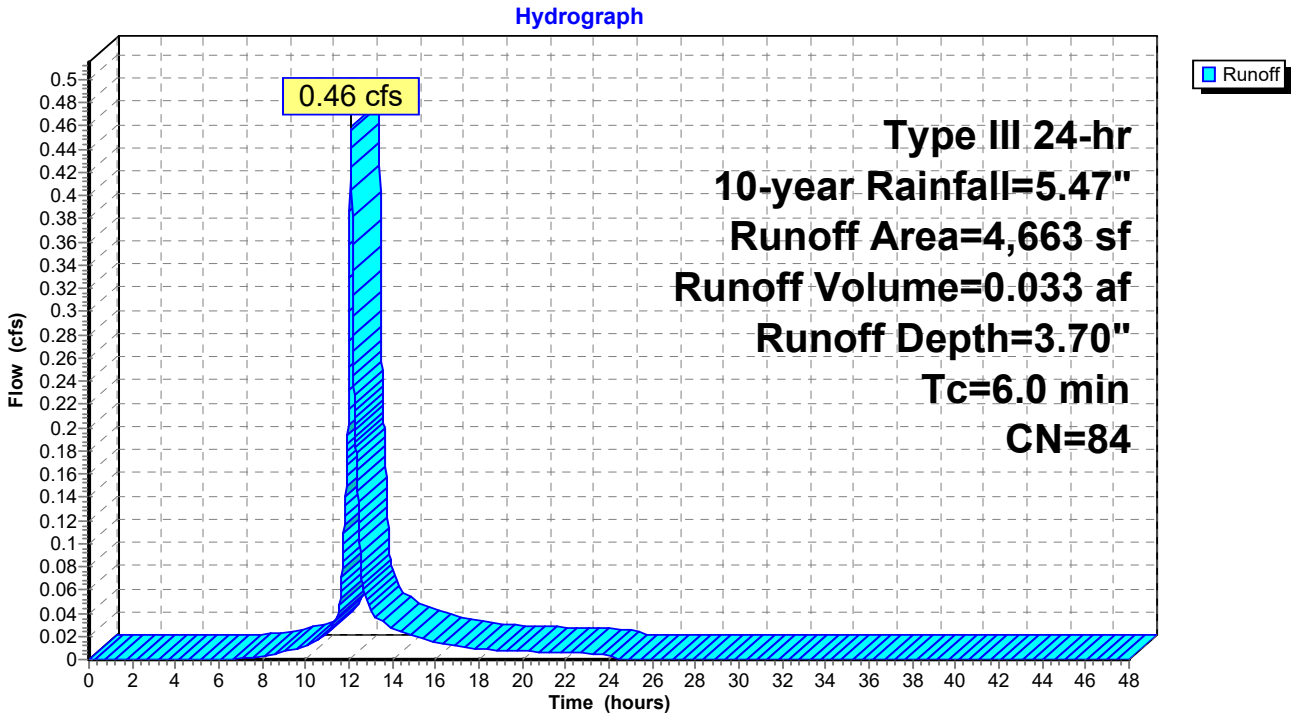
Runoff = 0.46 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
1,908	98	Paved parking, HSG C
2,755	74	>75% Grass cover, Good, HSG C
4,663	84	Weighted Average
2,755		59.08% Pervious Area
1,908		40.92% Impervious Area

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

Subcatchment 44S: Roadside



Summary for Subcatchment 45S: Parking Lot

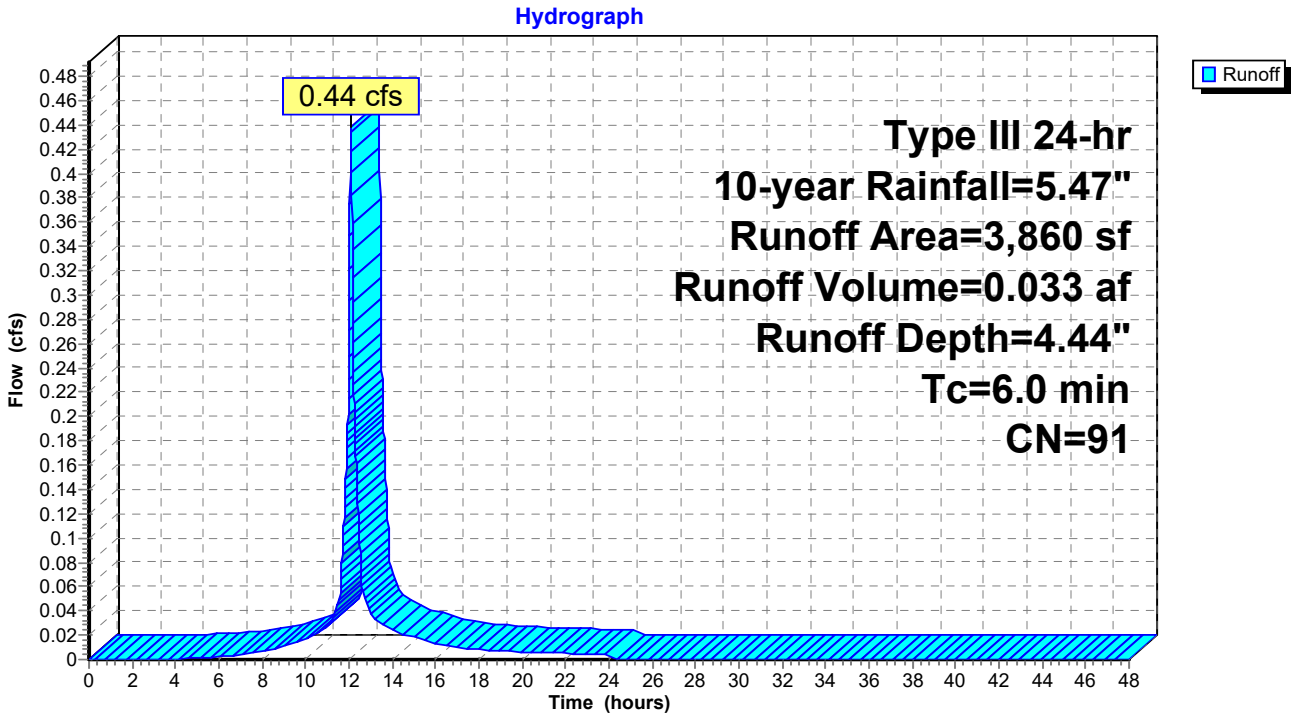
Runoff = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
2,768	98	Paved parking, HSG C
1,092	74	>75% Grass cover, Good, HSG C
3,860	91	Weighted Average
1,092		28.29% Pervious Area
2,768		71.71% Impervious Area

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

Subcatchment 45S: Parking Lot



Summary for Subcatchment 46S: Parking Lot

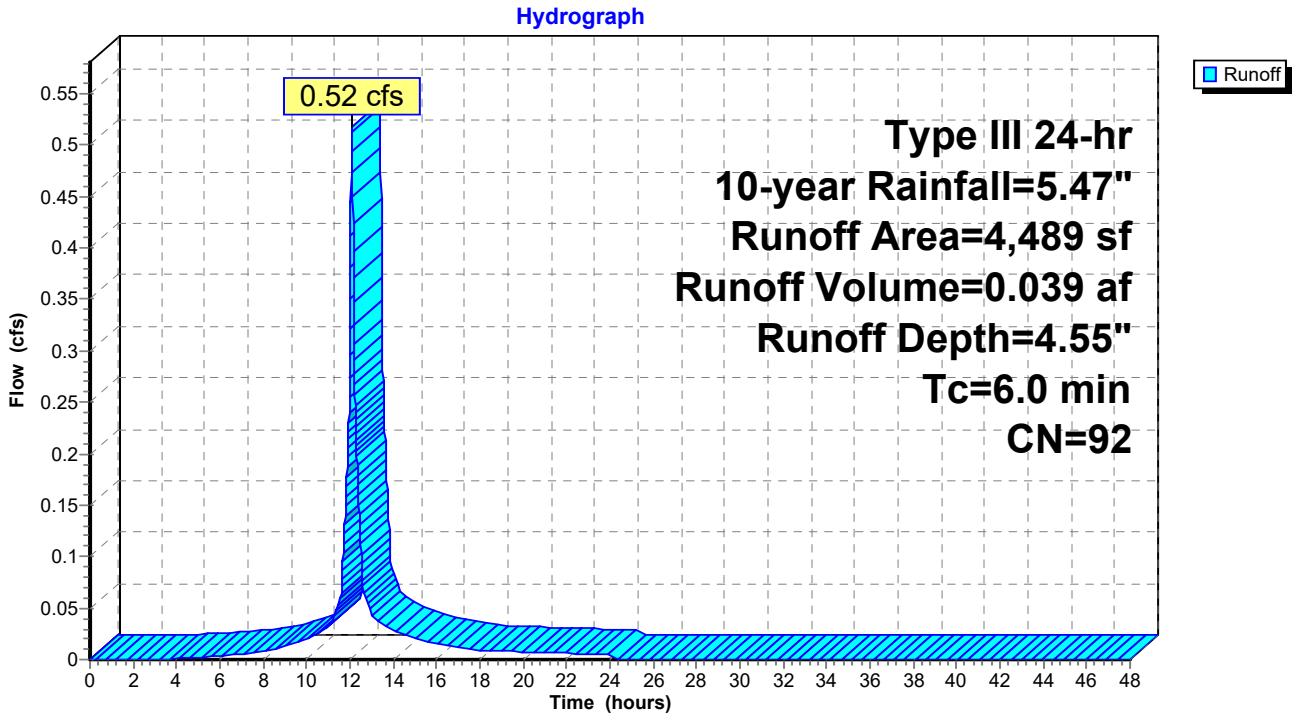
Runoff = 0.52 cfs @ 12.08 hrs, Volume= 0.039 af, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
3,288	98	Paved parking, HSG C
1,201	74	>75% Grass cover, Good, HSG C
4,489	92	Weighted Average
1,201		26.75% Pervious Area
3,288		73.25% Impervious Area

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

Subcatchment 46S: Parking Lot



Summary for Subcatchment 48S: Roadside

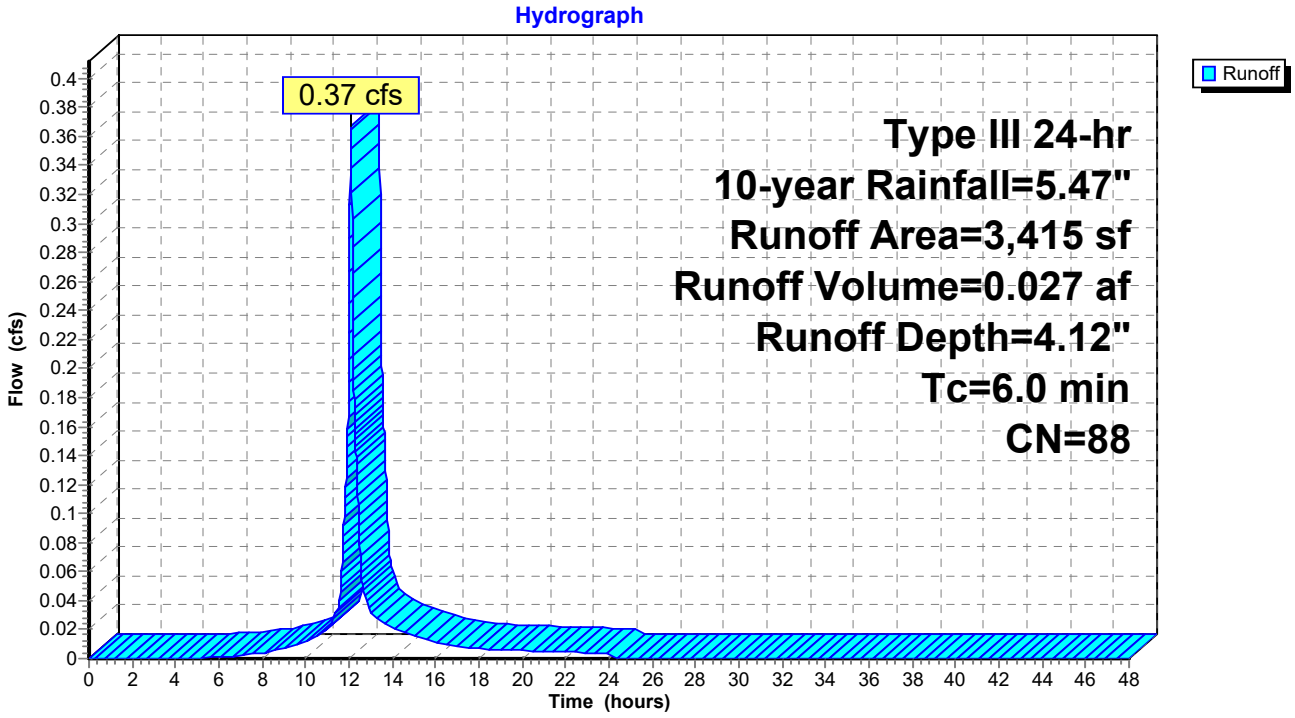
Runoff = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
245	98	Paved parking, HSG D
1,051	98	Paved parking, HSG C
605	98	Roofs, HSG C
229	80	>75% Grass cover, Good, HSG D
1,268	74	>75% Grass cover, Good, HSG C
17	61	>75% Grass cover, Good, HSG B
3,415	88	Weighted Average
1,514		44.33% Pervious Area
1,901		55.67% Impervious Area

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

Subcatchment 48S: Roadside



Summary for Subcatchment 49S: Driveway

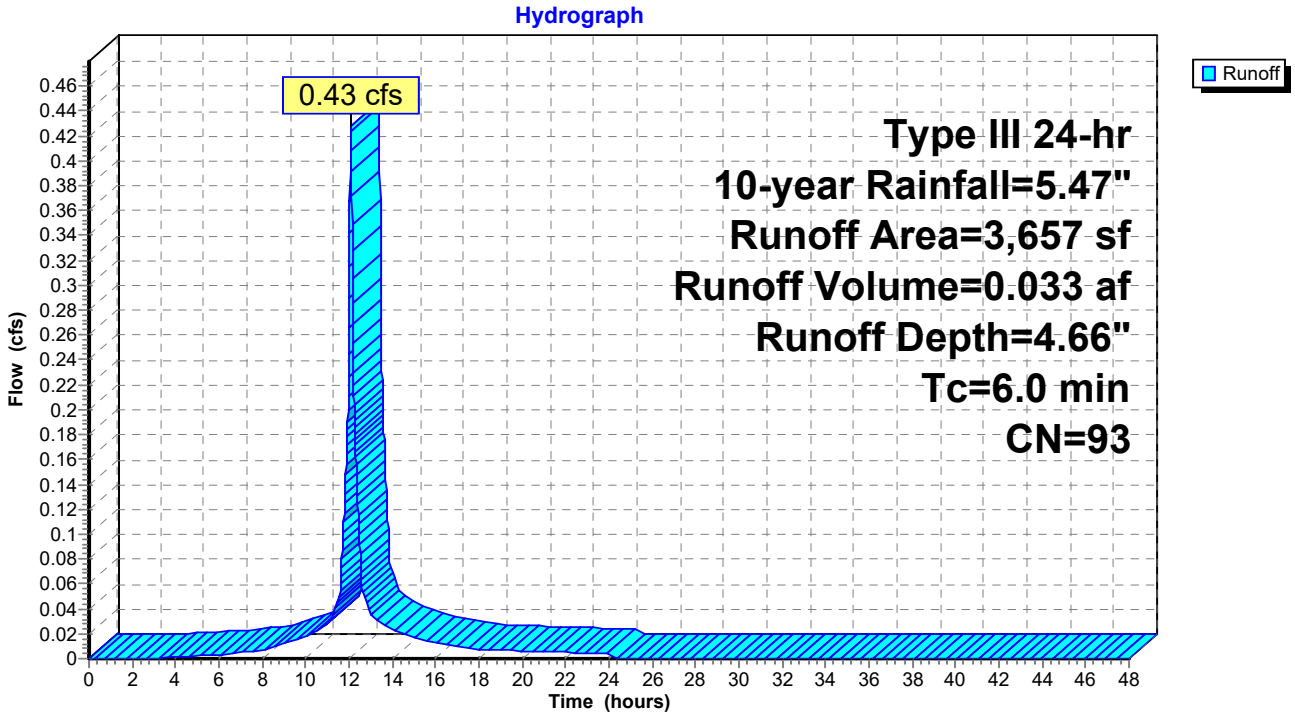
Runoff = 0.43 cfs @ 12.08 hrs, Volume= 0.033 af, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
700	98	Paved parking, HSG D
1,047	98	Paved parking, HSG C
1,317	98	Paved parking, HSG B
4	80	>75% Grass cover, Good, HSG D
174	74	>75% Grass cover, Good, HSG C
415	61	>75% Grass cover, Good, HSG B
3,657	93	Weighted Average
593		16.22% Pervious Area
3,064		83.78% Impervious Area

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

Subcatchment 49S: Driveway



Summary for Subcatchment 60S: Parking Lot

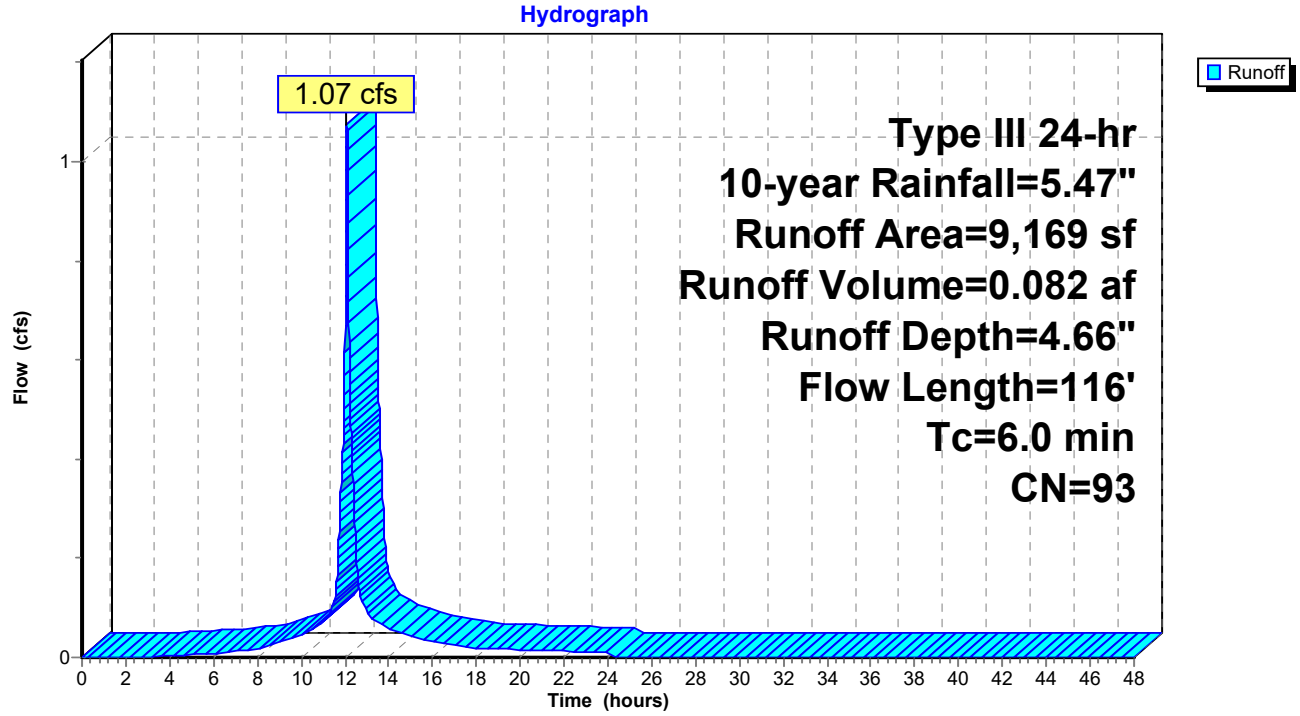
Runoff = 1.07 cfs @ 12.08 hrs, Volume= 0.082 af, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
7,202	98	Paved parking, HSG C
1,482	74	>75% Grass cover, Good, HSG C
485	70	Woods, Good, HSG C
9,169	93	Weighted Average
1,967		21.45% Pervious Area
7,202		78.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	24	0.0200	1.10		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.61"
0.8	92	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	116	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 60S: Parking Lot



Summary for Subcatchment 61S: Parking Lot

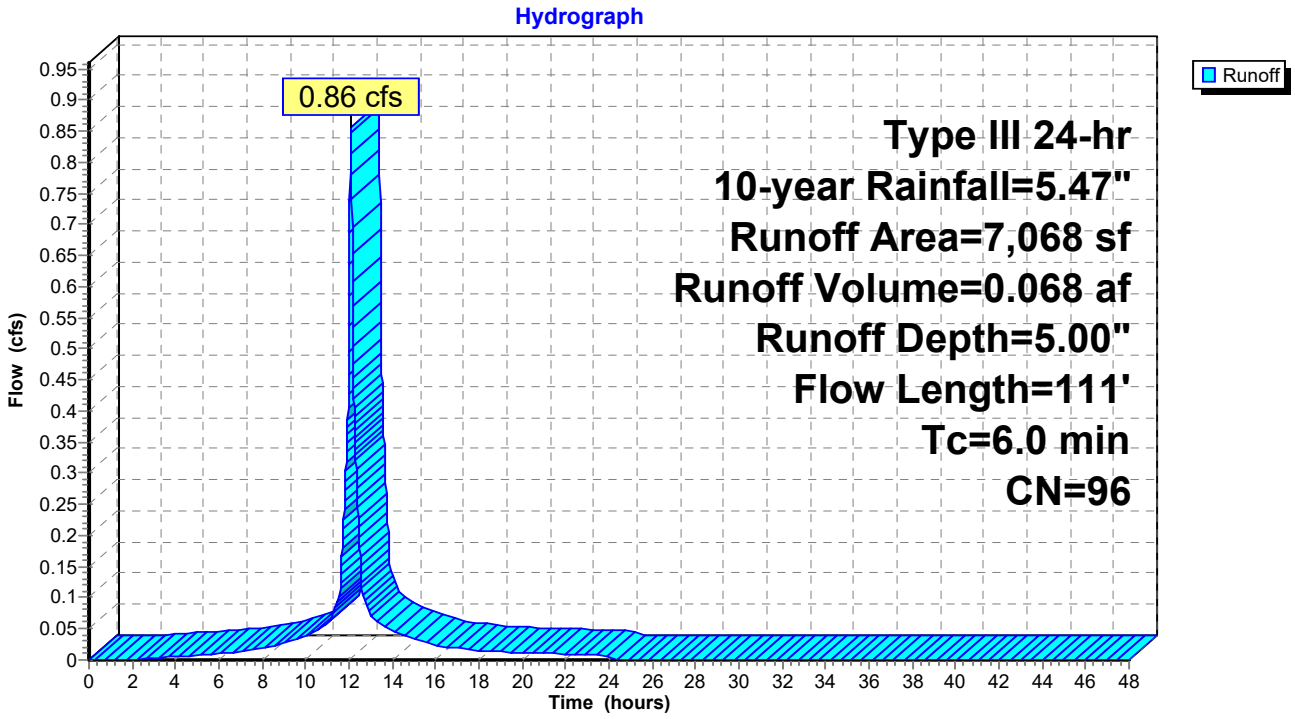
Runoff = 0.86 cfs @ 12.08 hrs, Volume= 0.068 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
4,574	98	Paved parking, HSG C
1,927	98	Paved parking, HSG B
335	74	>75% Grass cover, Good, HSG C
232	61	>75% Grass cover, Good, HSG B
7,068	96	Weighted Average
567		8.02% Pervious Area
6,501		91.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	24	0.0200	1.10		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.61"
0.7	87	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.1	111	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 61S: Parking Lot



Summary for Subcatchment 63S: Building

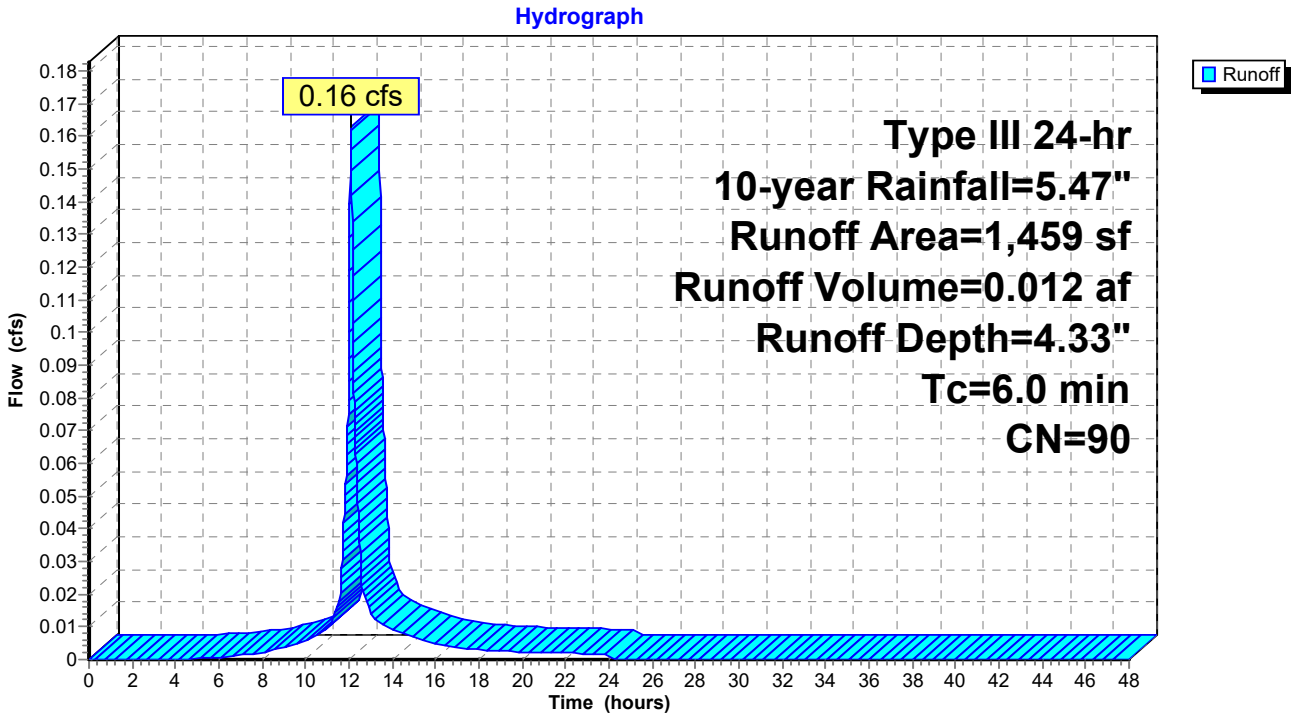
Runoff = 0.16 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
956	98	Roofs, HSG C
503	74	>75% Grass cover, Good, HSG C
1,459	90	Weighted Average
503		34.48% Pervious Area
956		65.52% Impervious Area

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

Subcatchment 63S: Building



Summary for Subcatchment 64S: Building

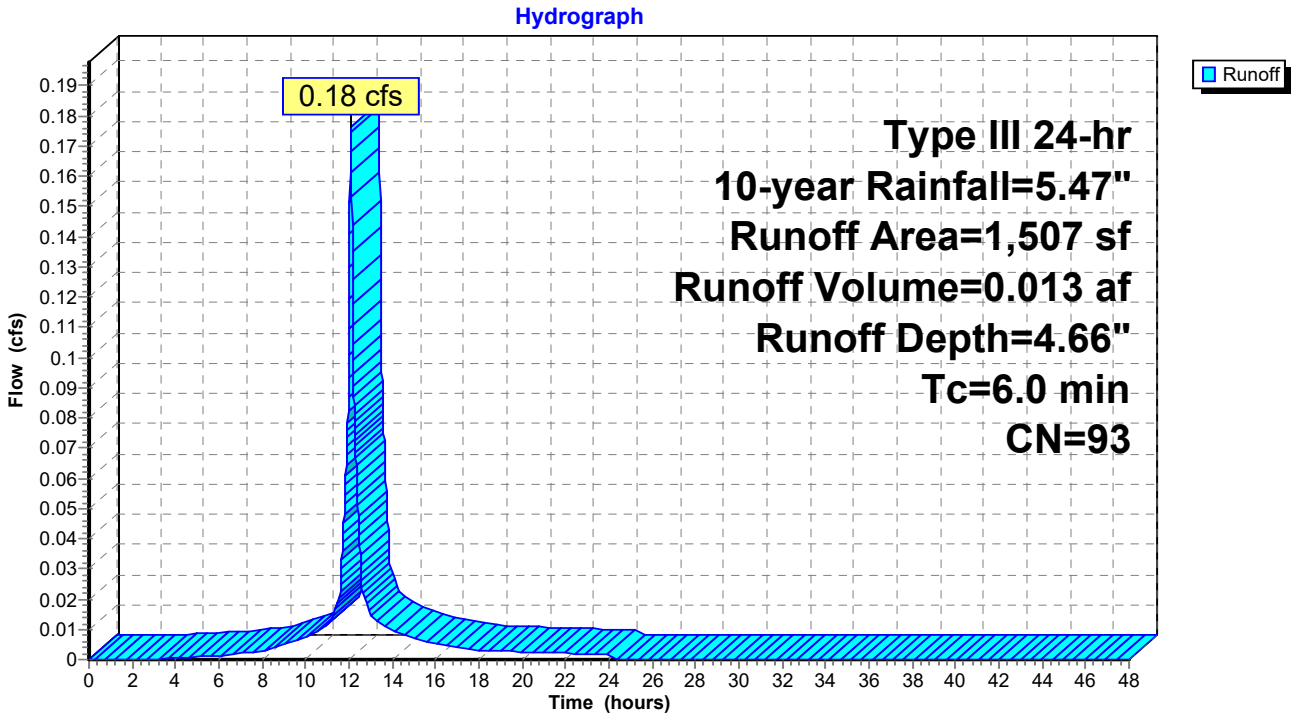
Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.013 af, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
1,224	98	Roofs, HSG C
283	74	>75% Grass cover, Good, HSG C
1,507	93	Weighted Average
283		18.78% Pervious Area
1,224		81.22% Impervious Area

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

Subcatchment 64S: Building



Summary for Subcatchment 65S: Building

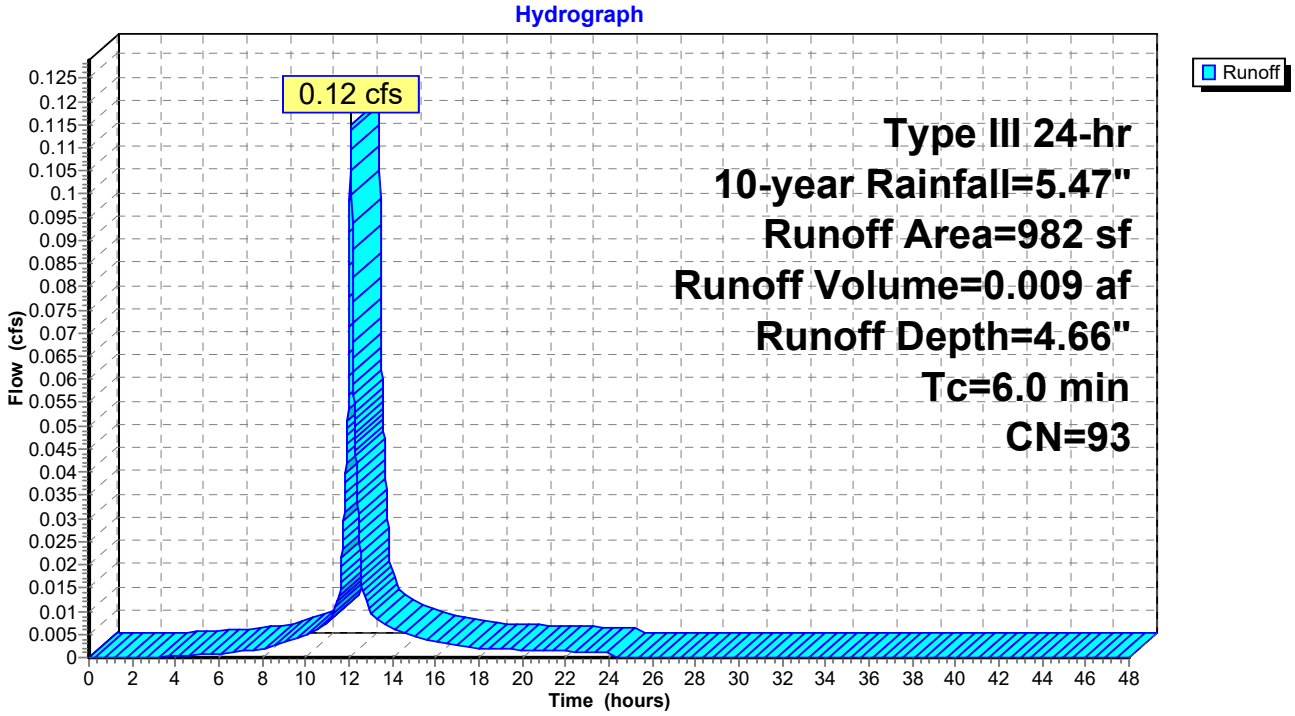
Runoff = 0.12 cfs @ 12.08 hrs, Volume= 0.009 af, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
794	98	Roofs, HSG C
188	74	>75% Grass cover, Good, HSG C
982	93	Weighted Average
188		19.14% Pervious Area
794		80.86% Impervious Area

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

Subcatchment 65S: Building



Summary for Subcatchment 66S: Building

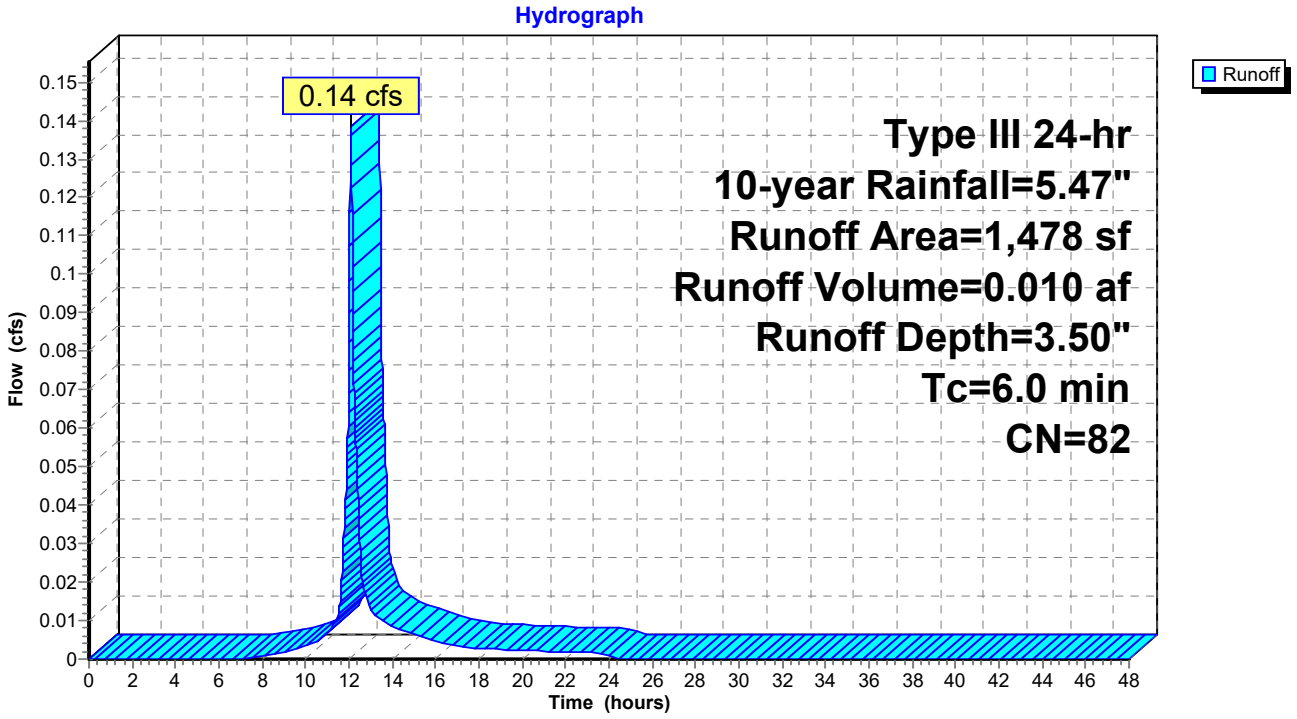
Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
25	98	Paved parking, HSG C
161	98	Roofs, HSG C
476	98	Roofs, HSG B
486	74	>75% Grass cover, Good, HSG C
330	61	>75% Grass cover, Good, HSG B
1,478	82	Weighted Average
816		55.21% Pervious Area
662		44.79% Impervious Area

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

Subcatchment 66S: Building



Summary for Subcatchment 67S: Landscape

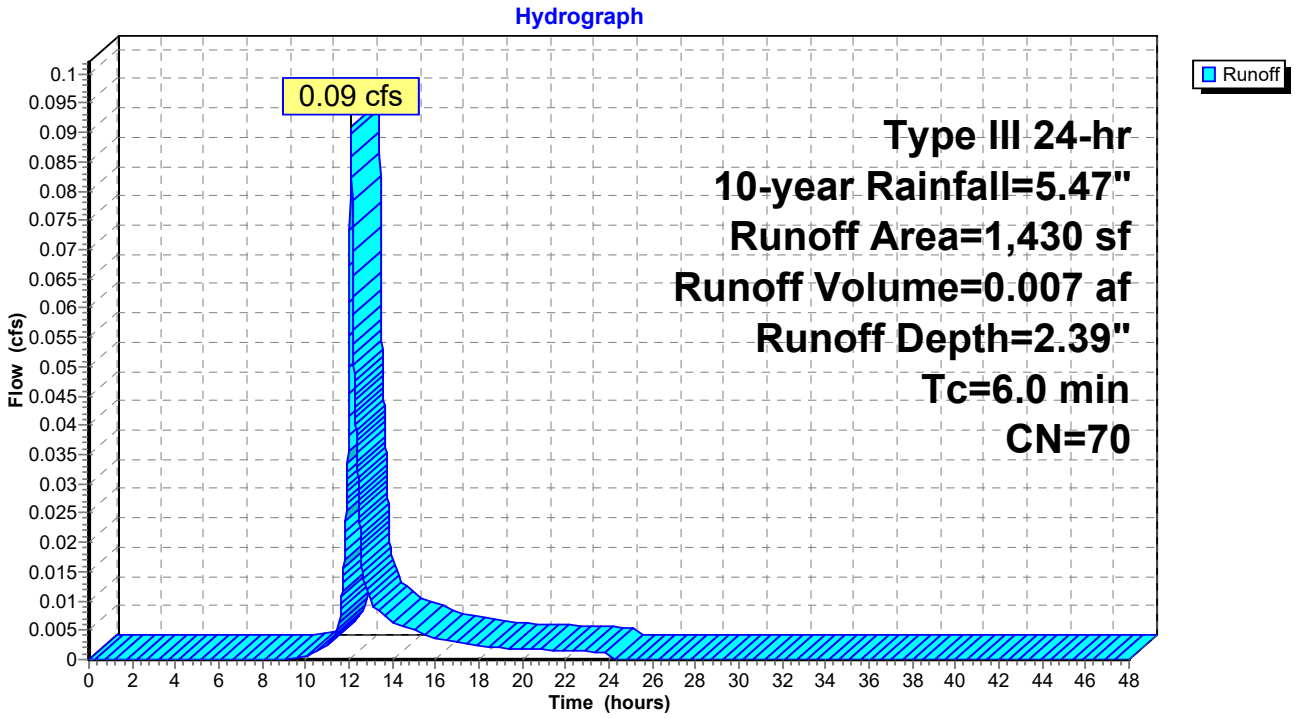
Runoff = 0.09 cfs @ 12.09 hrs, Volume= 0.007 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
331	98	Paved parking, HSG B
1,099	61	>75% Grass cover, Good, HSG B
1,430	70	Weighted Average
1,099		76.85% Pervious Area
331		23.15% Impervious Area

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

Subcatchment 67S: Landscape



Summary for Subcatchment 68S: Building

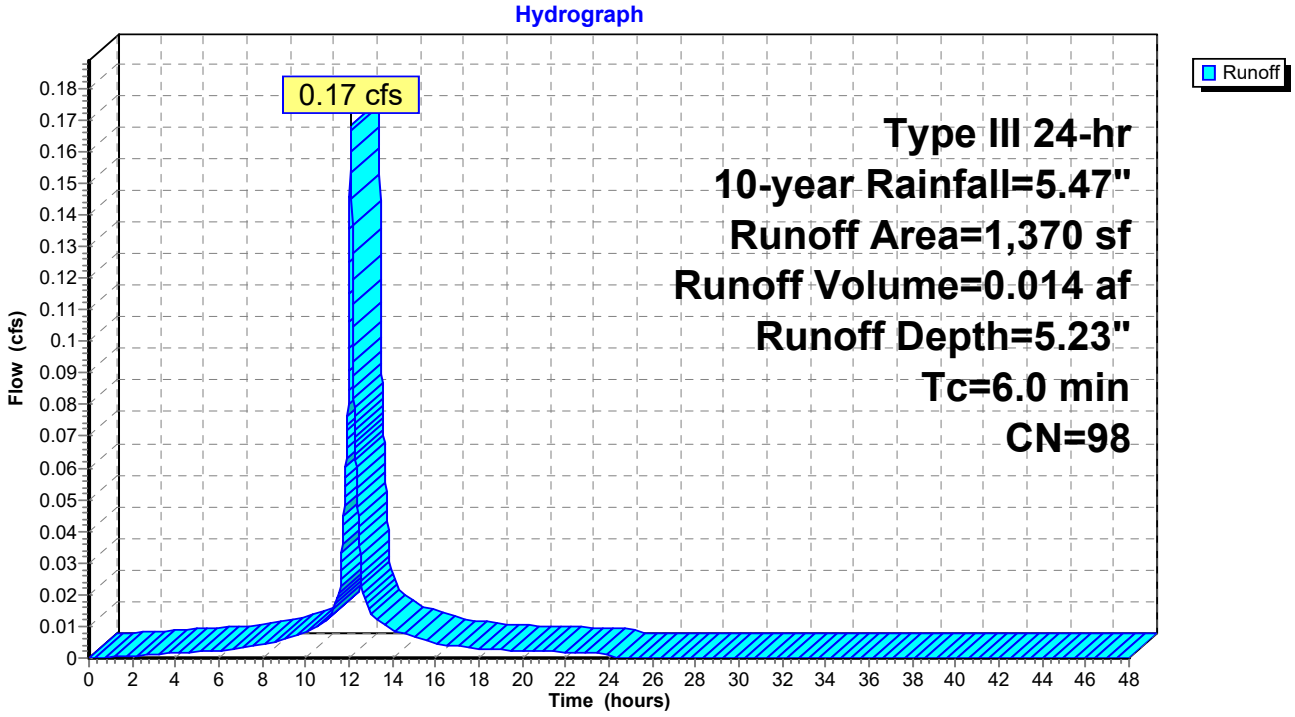
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.014 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
424	98	Roofs, HSG C
946	98	Roofs, HSG B
1,370	98	Weighted Average
1,370		100.00% Impervious Area

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

Subcatchment 68S: Building



Summary for Subcatchment 69S: To Pond

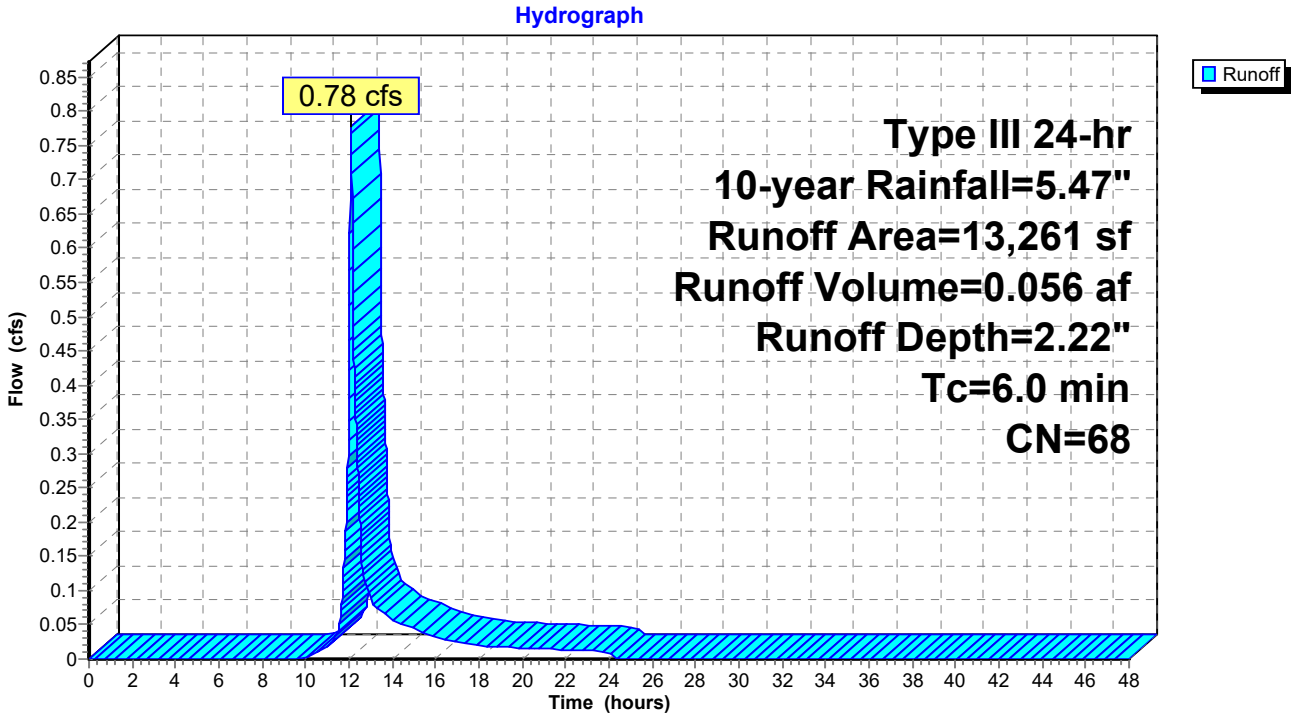
Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
224	98	Paved parking, HSG B
6,374	74	>75% Grass cover, Good, HSG C
6,663	61	>75% Grass cover, Good, HSG B
13,261	68	Weighted Average
13,037		98.31% Pervious Area
224		1.69% Impervious Area

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

Subcatchment 69S: To Pond



Summary for Subcatchment 70S: Building

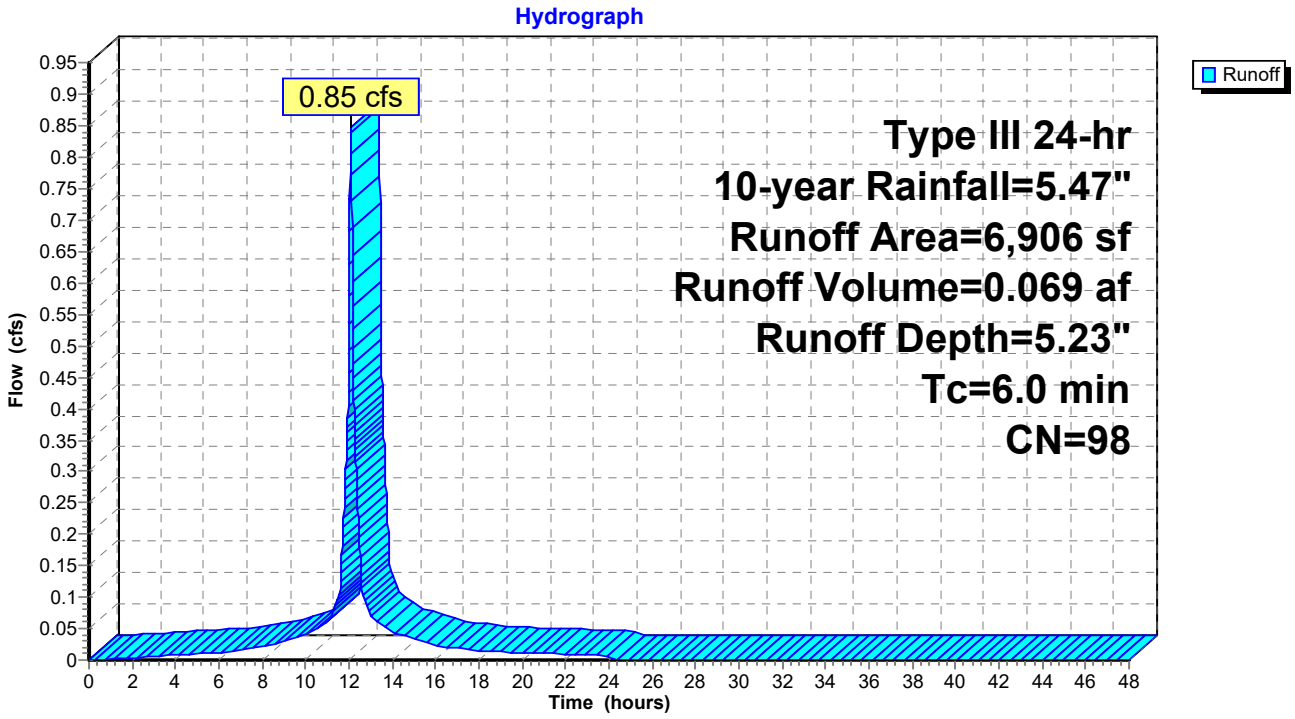
Runoff = 0.85 cfs @ 12.08 hrs, Volume= 0.069 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
6,802	98	Roofs, HSG C
104	98	Roofs, HSG B
6,906	98	Weighted Average
6,906		100.00% Impervious Area

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

Subcatchment 70S: Building



Summary for Subcatchment 80S: Building

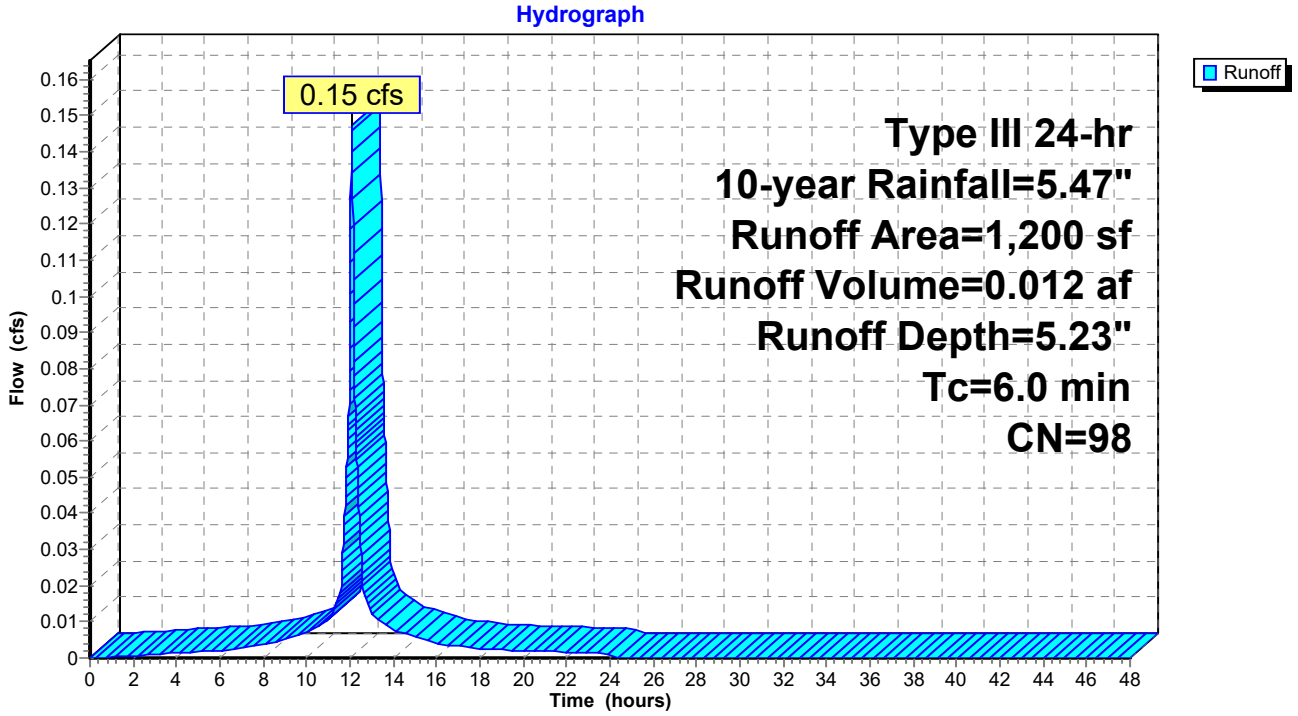
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
1,200	98	Roofs, HSG C
1,200		100.00% Impervious Area

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

Subcatchment 80S: Building



Summary for Subcatchment 81S: Building

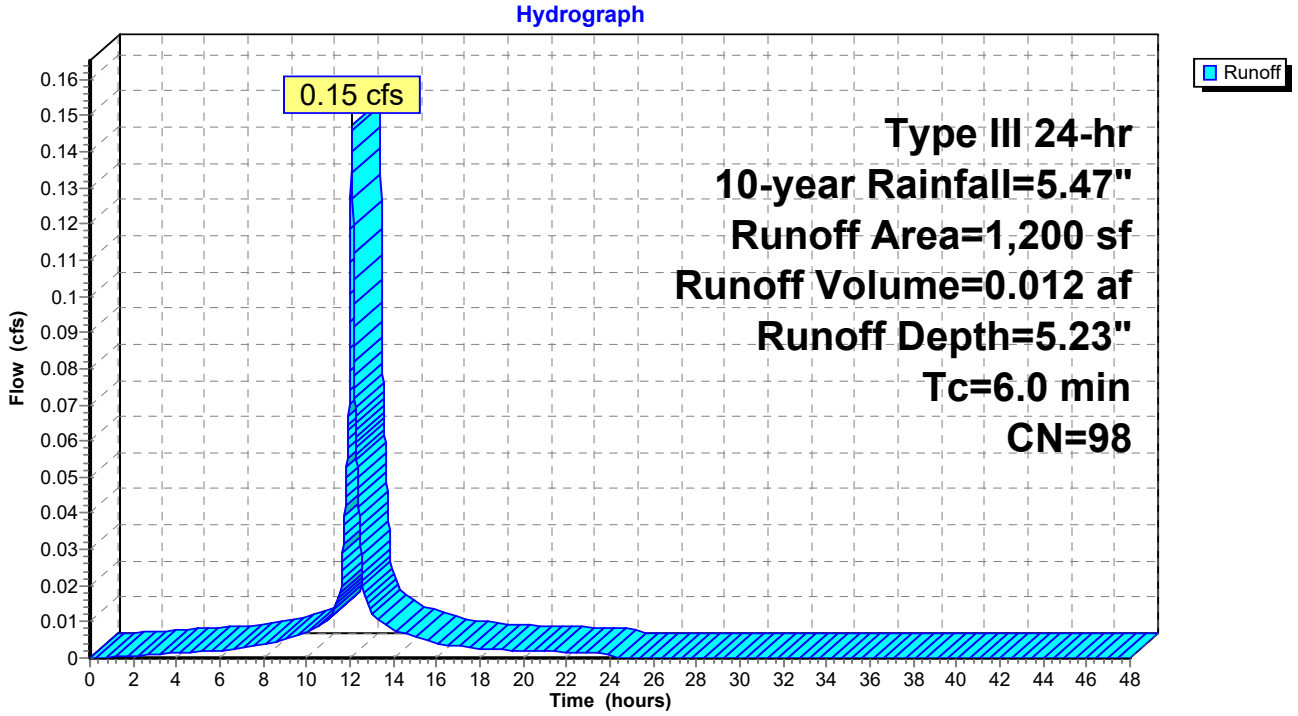
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
1,200	98	Roofs, HSG C
1,200		100.00% Impervious Area

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

Subcatchment 81S: Building



Summary for Subcatchment 82S: Parking Lot

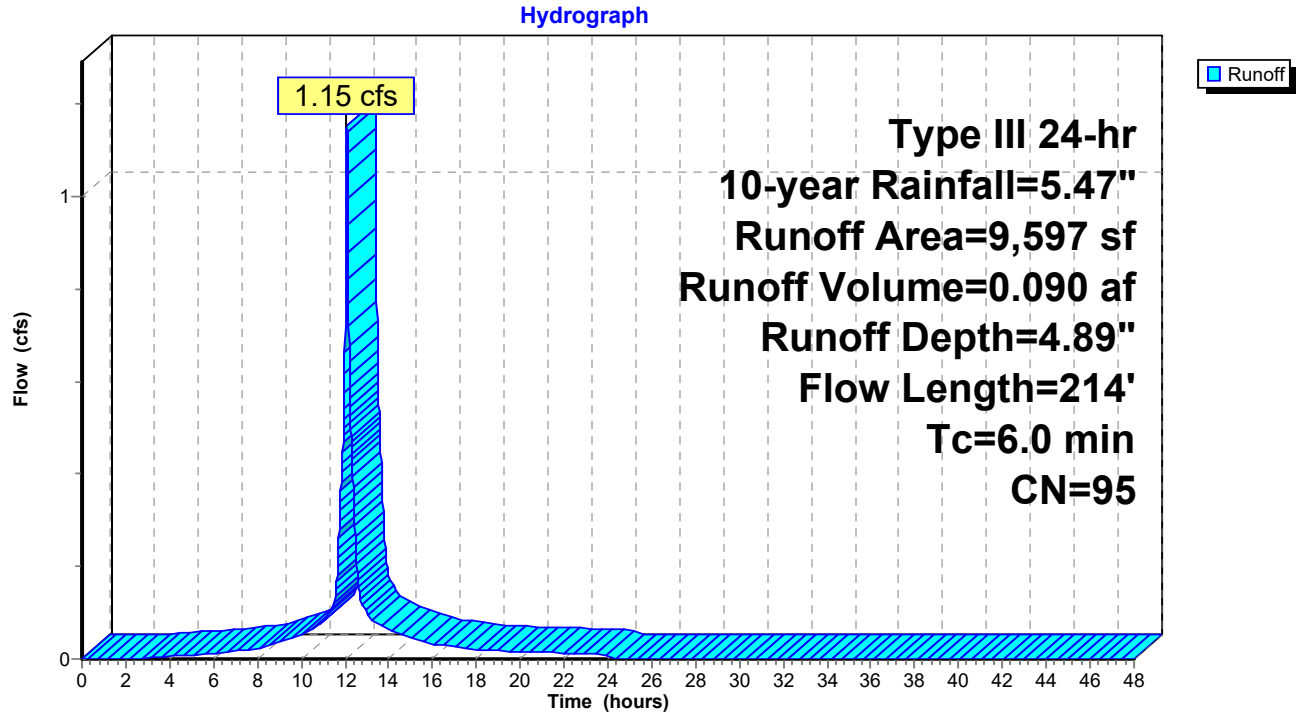
Runoff = 1.15 cfs @ 12.08 hrs, Volume= 0.090 af, Depth= 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
8,215	98	Paved parking, HSG C
460	98	Paved parking, HSG B
302	74	>75% Grass cover, Good, HSG C
620	61	>75% Grass cover, Good, HSG B
9,597	95	Weighted Average
922		9.61% Pervious Area
8,675		90.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	29	0.0631	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.61"
0.4	95	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	90	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.3	214	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 82S: Parking Lot



Summary for Subcatchment 83S: To Pond

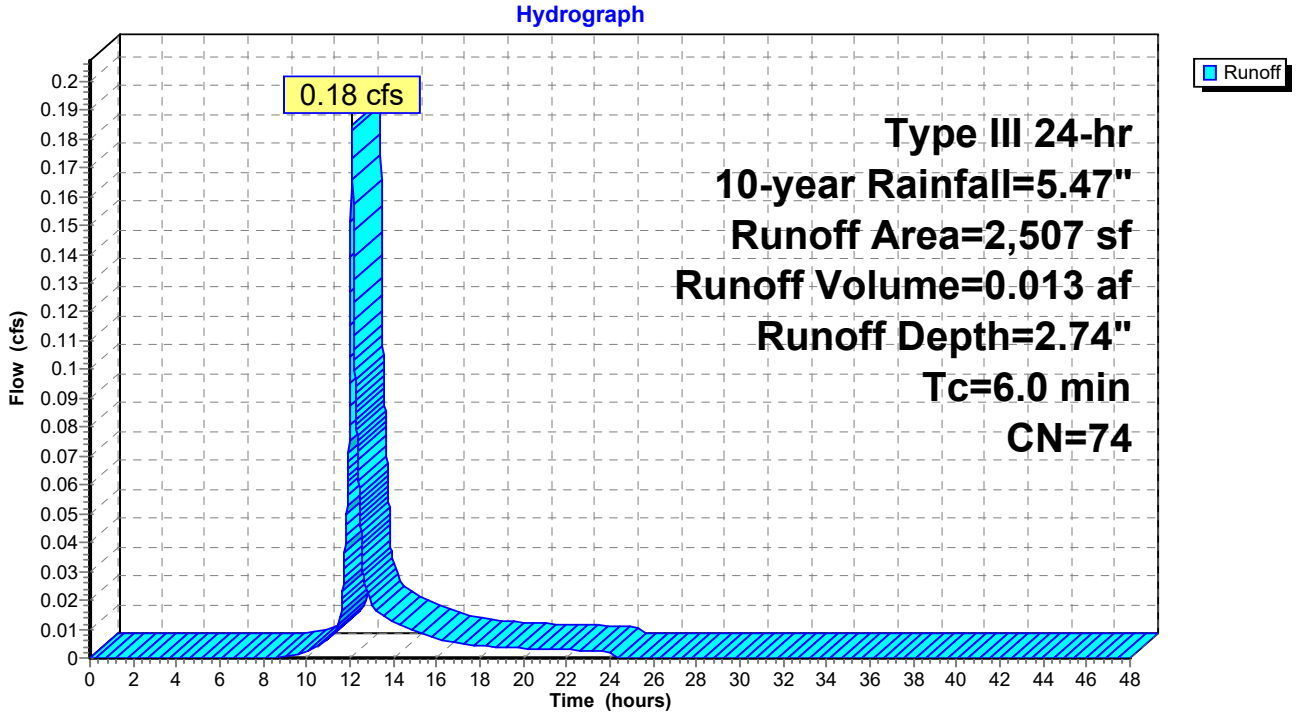
Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=5.47"

Area (sf)	CN	Description
2,507	74	>75% Grass cover, Good, HSG C
2,507		100.00% Pervious Area

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

Subcatchment 83S: To Pond



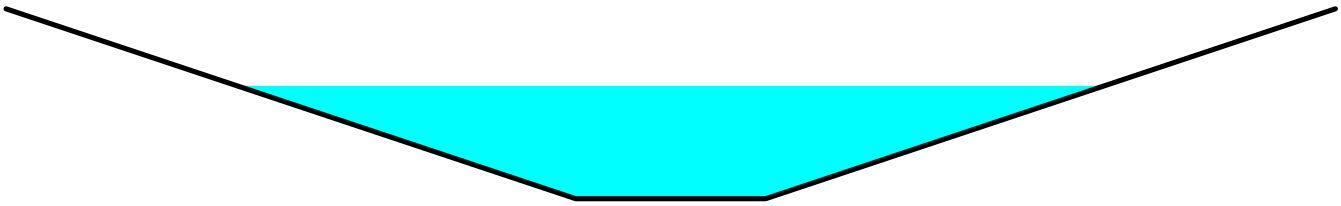
Summary for Reach 2.1R: Wetland Flow Path

Inflow Area = 6.525 ac, 6.78% Impervious, Inflow Depth = 2.57" for 10-year event
Inflow = 18.63 cfs @ 12.05 hrs, Volume= 1.395 af
Outflow = 16.73 cfs @ 12.09 hrs, Volume= 1.395 af, Atten= 10%, Lag= 2.1 min

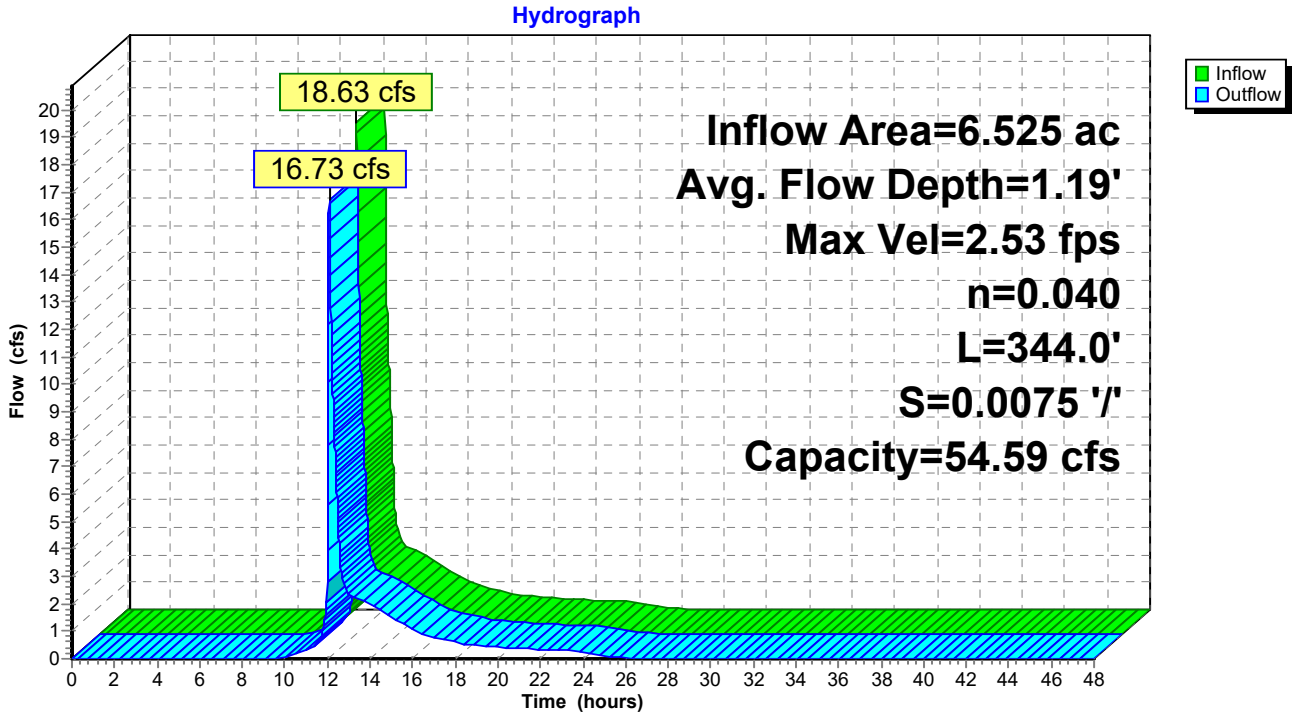
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.53 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 7.9 min

Peak Storage= 2,278 cf @ 12.09 hrs
Average Depth at Peak Storage= 1.19'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 54.59 cfs

2.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 344.0' Slope= 0.0075 '/'
Inlet Invert= 52.58', Outlet Invert= 50.00'



Reach 2.1R: Wetland Flow Path



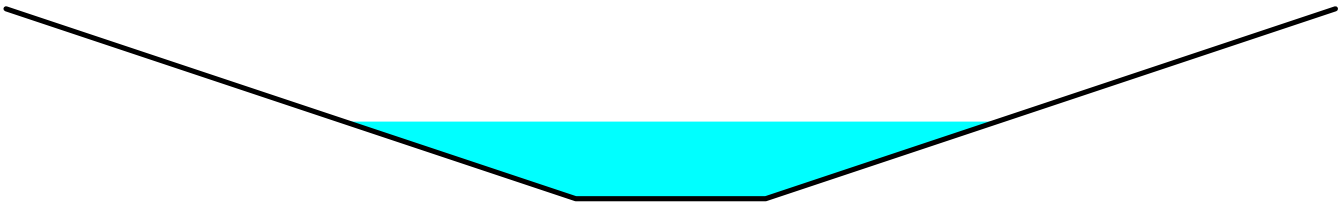
Summary for Reach 2.2R: Wetland Flow Path

Inflow Area = 17.445 ac, 10.07% Impervious, Inflow Depth > 2.74" for 10-year event
Inflow = 19.28 cfs @ 12.48 hrs, Volume= 3.990 af
Outflow = 19.04 cfs @ 12.48 hrs, Volume= 3.990 af, Atten= 1%, Lag= 0.1 min

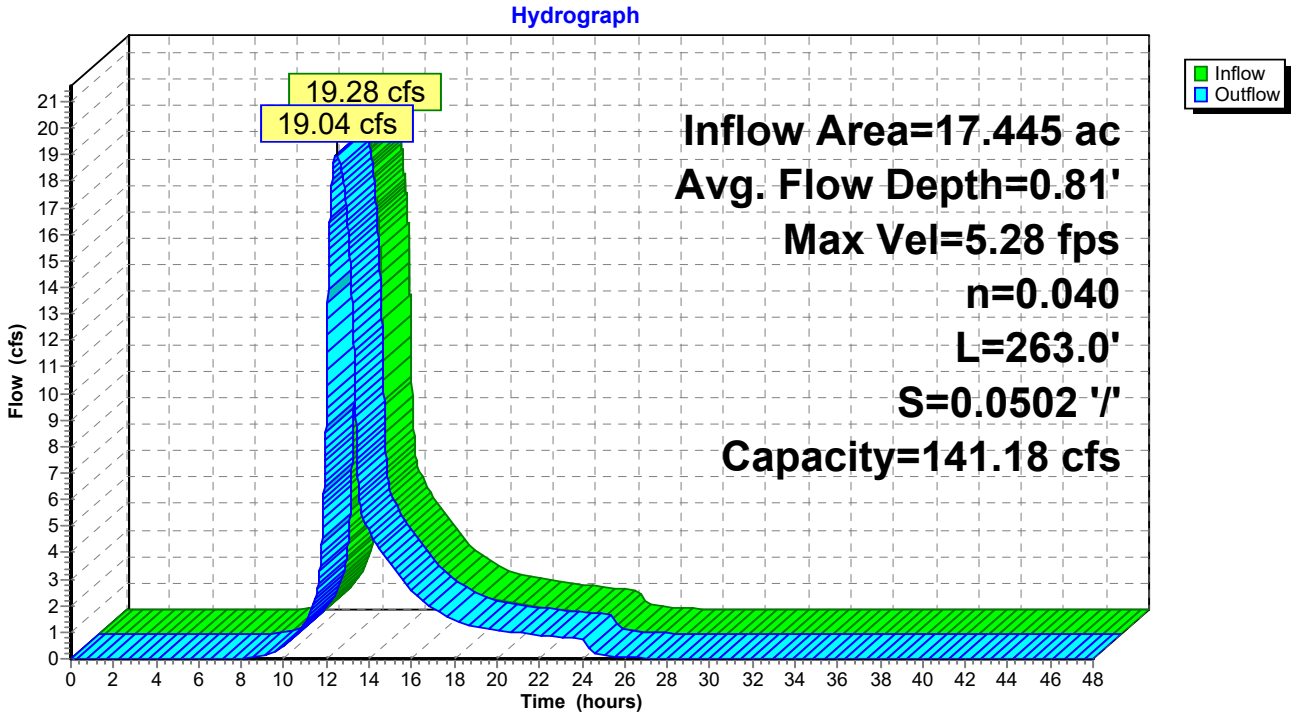
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.28 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 3.2 min

Peak Storage= 949 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 141.18 cfs

2.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 263.0' Slope= 0.0502 '/'
Inlet Invert= 46.52', Outlet Invert= 33.33'



Reach 2.2R: Wetland Flow Path



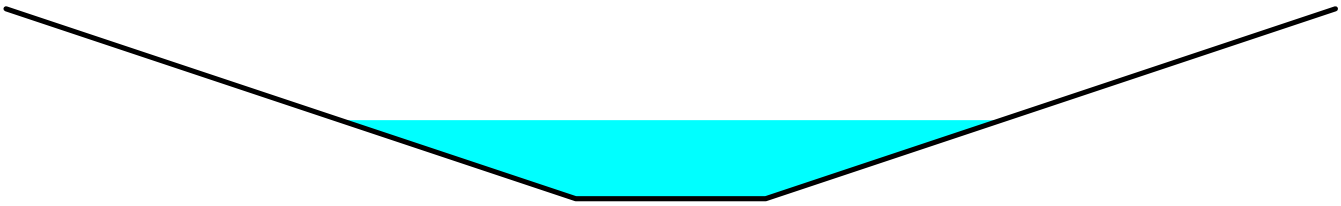
Summary for Reach 2R: Wetland Flow Path

Inflow Area = 6.525 ac, 6.78% Impervious, Inflow Depth = 2.57" for 10-year event
Inflow = 18.70 cfs @ 12.05 hrs, Volume= 1.395 af
Outflow = 18.63 cfs @ 12.05 hrs, Volume= 1.395 af, Atten= 0%, Lag= 0.4 min

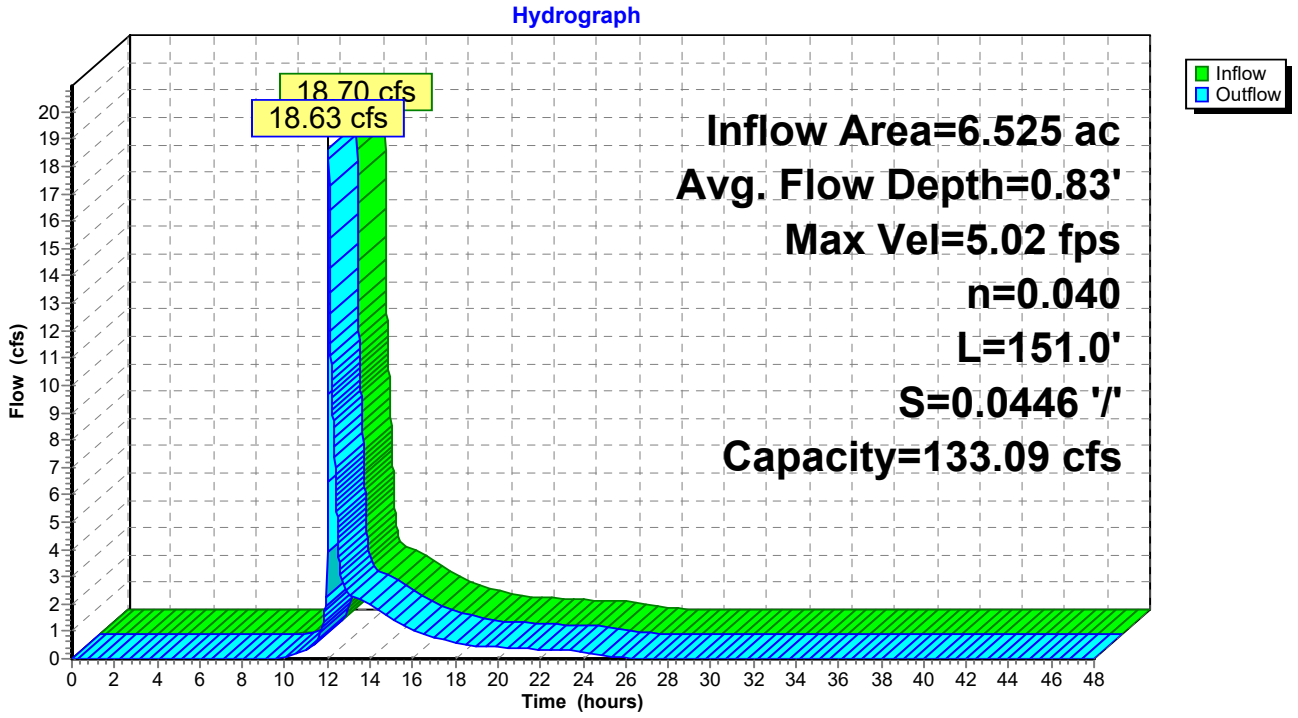
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.02 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 1.7 min

Peak Storage= 560 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.83'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 133.09 cfs

2.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 151.0' Slope= 0.0446 '/'
Inlet Invert= 59.31', Outlet Invert= 52.58'



Reach 2R: Wetland Flow Path



Summary for Reach 10R: Swale

Inflow Area = 0.230 ac, 42.36% Impervious, Inflow Depth > 3.73" for 10-year event
Inflow = 0.30 cfs @ 12.42 hrs, Volume= 0.072 af
Outflow = 0.30 cfs @ 12.43 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.7 min

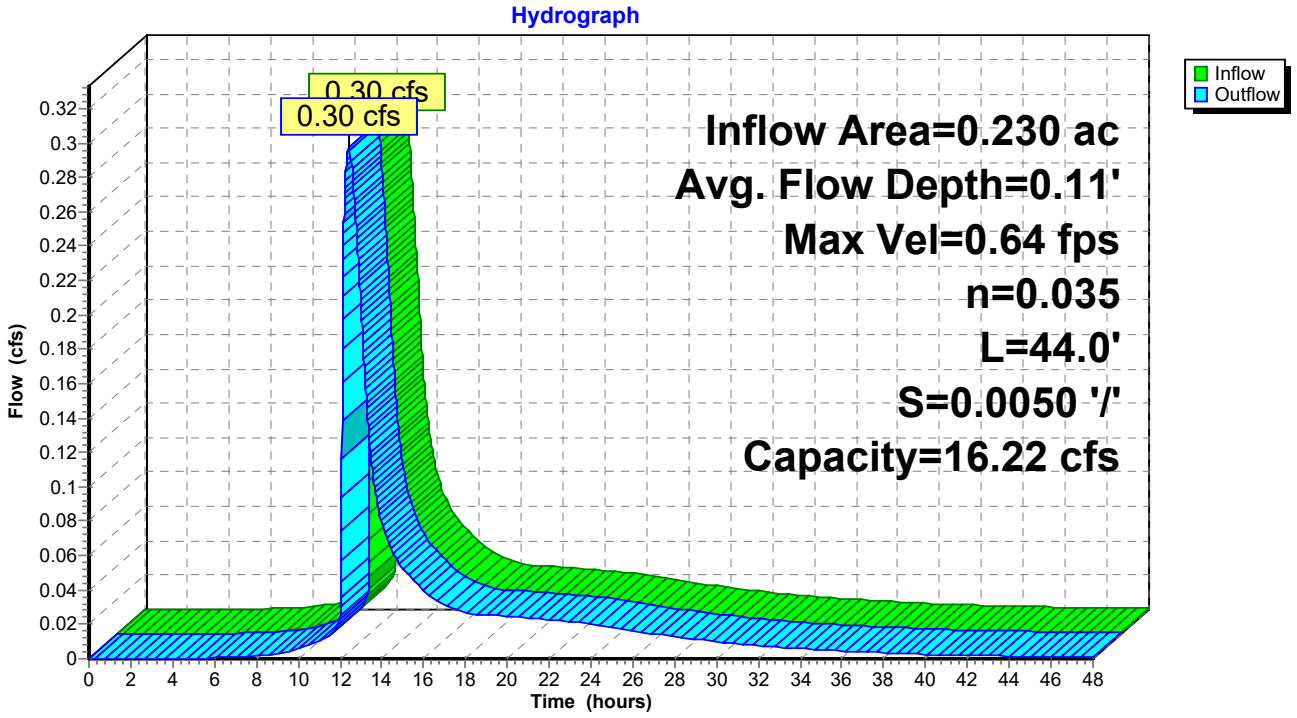
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.64 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.20 fps, Avg. Travel Time= 3.7 min

Peak Storage= 20 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 16.22 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 44.0' Slope= 0.0050 '/'
Inlet Invert= 53.60', Outlet Invert= 53.38'

‡

Reach 10R: Swale



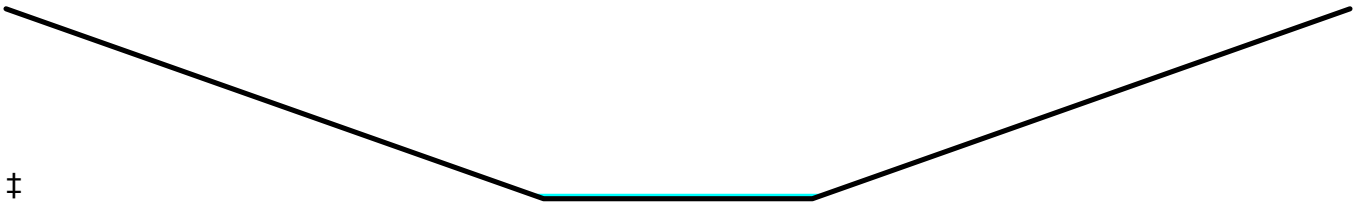
Summary for Reach 22R: Wetland Flow Path

Inflow Area = 0.361 ac, 74.83% Impervious, Inflow Depth > 4.56" for 10-year event
Inflow = 0.44 cfs @ 12.46 hrs, Volume= 0.137 af
Outflow = 0.44 cfs @ 12.51 hrs, Volume= 0.137 af, Atten= 0%, Lag= 3.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.80 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 0.44 fps, Avg. Travel Time= 8.0 min

Peak Storage= 116 cf @ 12.51 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 2.00' Flow Area= 60.0 sf, Capacity= 392.58 cfs

10.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 10.0 '/' Top Width= 50.00'
Length= 211.0' Slope= 0.0245 '/'
Inlet Invert= 55.16', Outlet Invert= 50.00'



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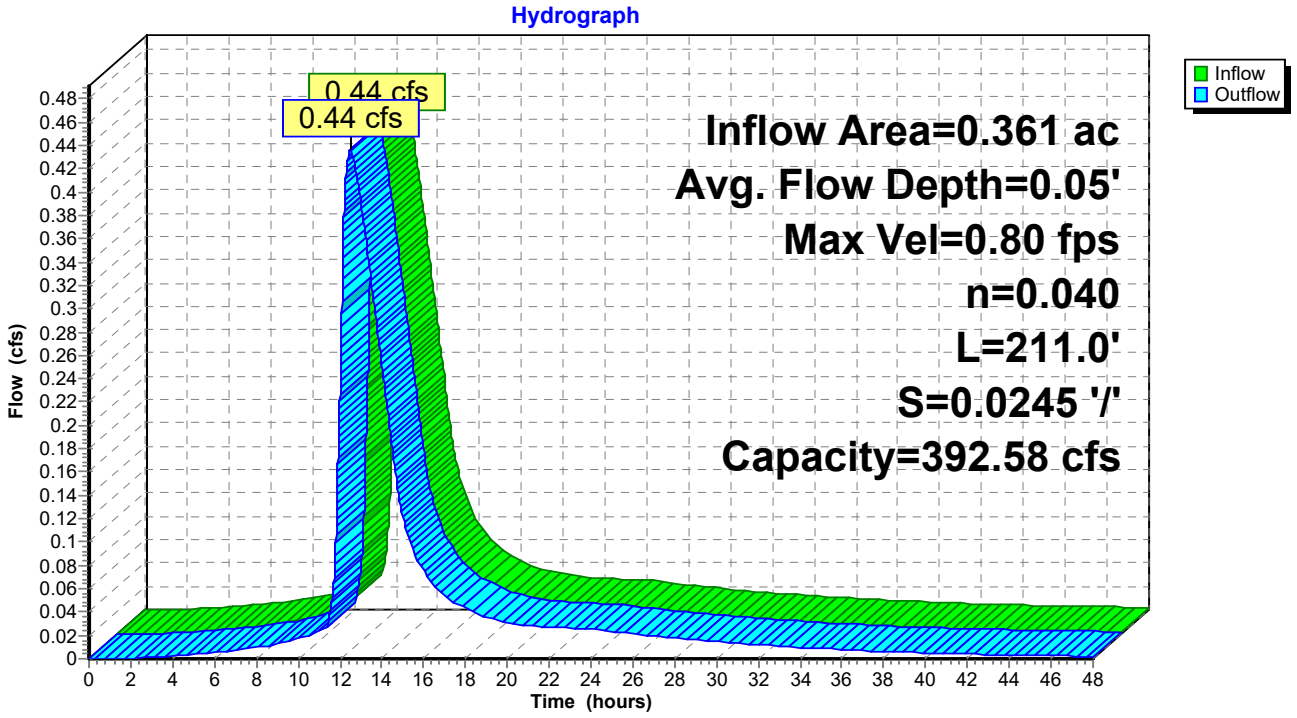
Reach 22R: Wetland Flow Path



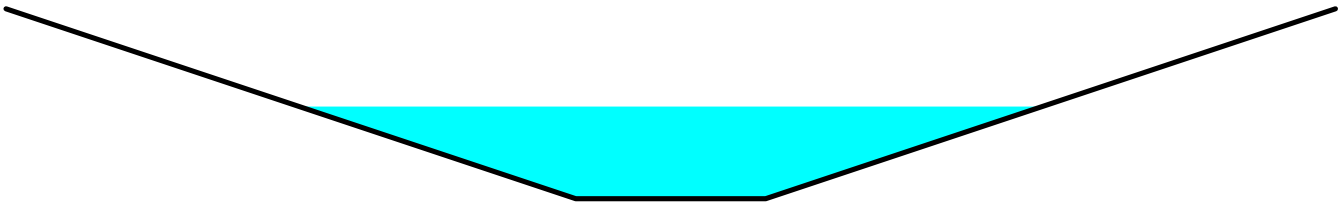
Summary for Reach 23R: Wetland Flow Path

Inflow Area = 6.886 ac, 10.36% Impervious, Inflow Depth > 2.67" for 10-year event
Inflow = 17.02 cfs @ 12.09 hrs, Volume= 1.532 af
Outflow = 16.91 cfs @ 12.10 hrs, Volume= 1.532 af, Atten= 1%, Lag= 0.5 min

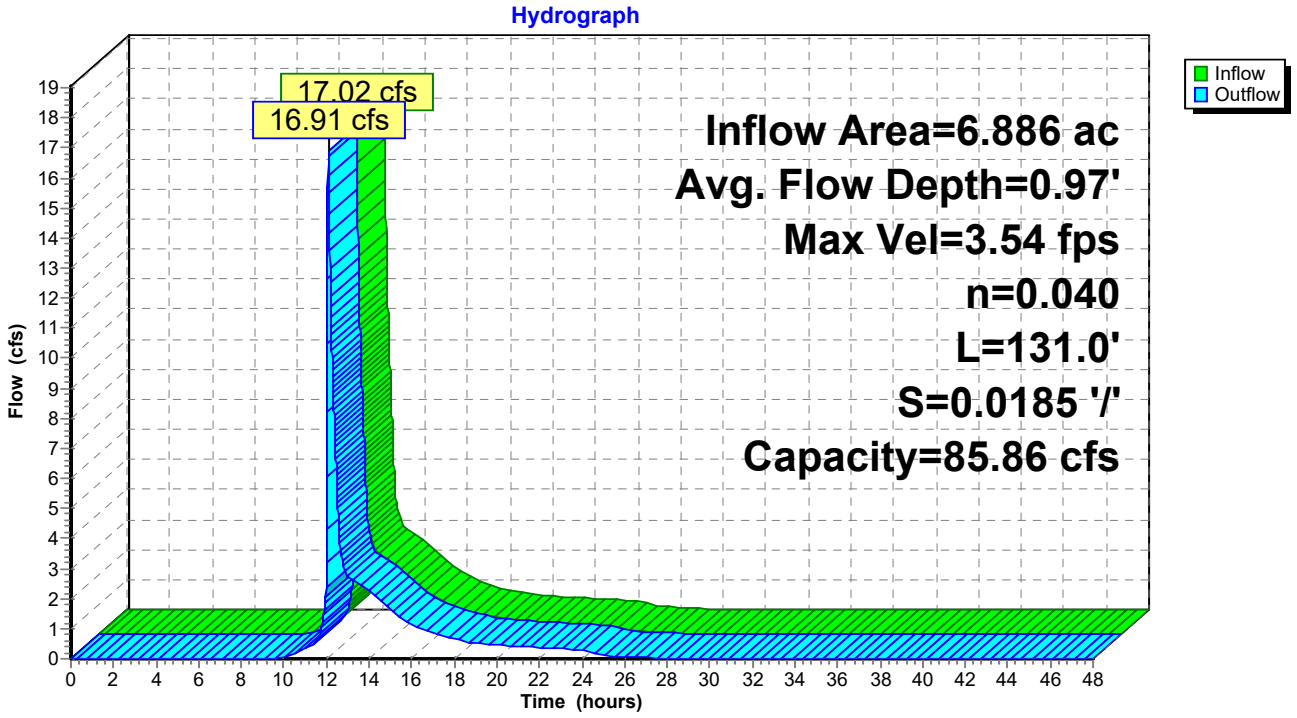
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.54 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 2.9 min

Peak Storage= 625 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.97'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 85.86 cfs

2.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 131.0' Slope= 0.0185 '/'
Inlet Invert= 50.00', Outlet Invert= 47.57'



Reach 23R: Wetland Flow Path



Summary for Reach 69R: Swale

Inflow Area = 1.681 ac, 63.59% Impervious, Inflow Depth > 4.00" for 10-year event
Inflow = 2.52 cfs @ 12.38 hrs, Volume= 0.560 af
Outflow = 2.52 cfs @ 12.38 hrs, Volume= 0.560 af, Atten= 0%, Lag= 0.2 min

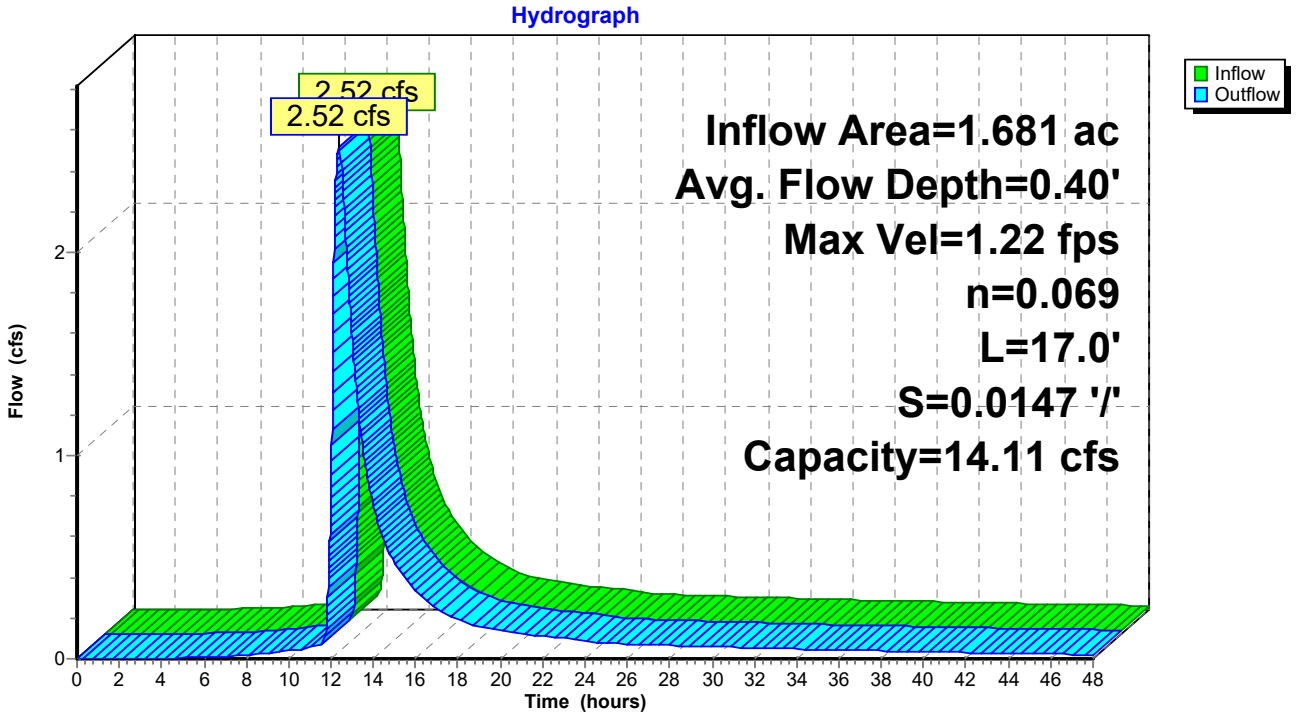
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.22 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.34 fps, Avg. Travel Time= 0.8 min

Peak Storage= 35 cf @ 12.38 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 14.11 cfs

4.00' x 1.00' deep channel, n= 0.069 Riprap, 6-inch
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 17.0' Slope= 0.0147 '/'
Inlet Invert= 45.25', Outlet Invert= 45.00'

‡

Reach 69R: Swale



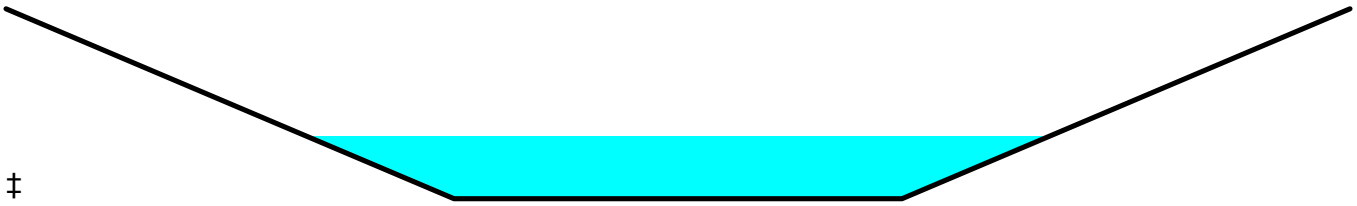
Summary for Reach 70R: Woodland Flow Path

Inflow Area = 1.681 ac, 63.59% Impervious, Inflow Depth > 4.00" for 10-year event
Inflow = 2.52 cfs @ 12.38 hrs, Volume= 0.560 af
Outflow = 2.52 cfs @ 12.40 hrs, Volume= 0.560 af, Atten= 0%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.57 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 5.8 min

Peak Storage= 250 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 21.20 cfs

10.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 10.0 '/' Top Width= 30.00'
Length= 57.0' Slope= 0.1404 '/'
Inlet Invert= 45.00', Outlet Invert= 37.00'



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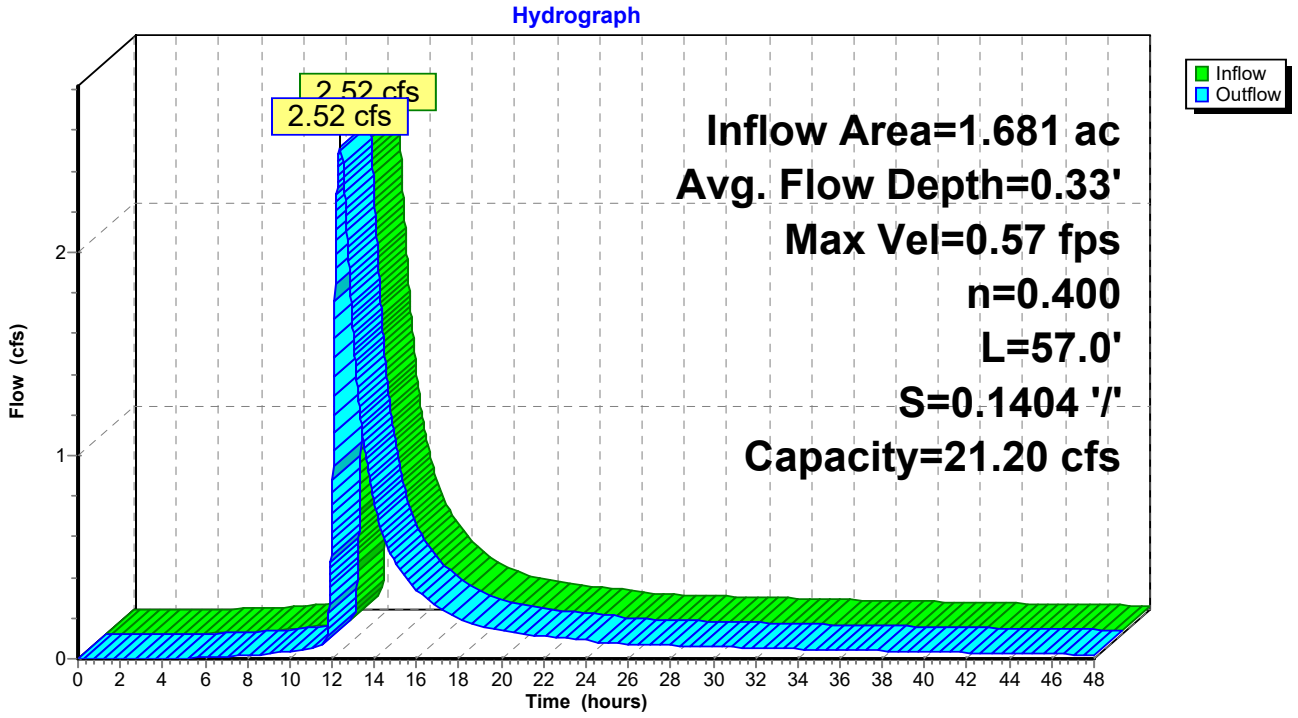
Reach 70R: Woodland Flow Path



Summary for Reach 71R: Stream

Inflow Area = 1.681 ac, 63.59% Impervious, Inflow Depth > 4.00" for 10-year event
Inflow = 2.52 cfs @ 12.40 hrs, Volume= 0.560 af
Outflow = 2.52 cfs @ 12.41 hrs, Volume= 0.560 af, Atten= 0%, Lag= 0.3 min

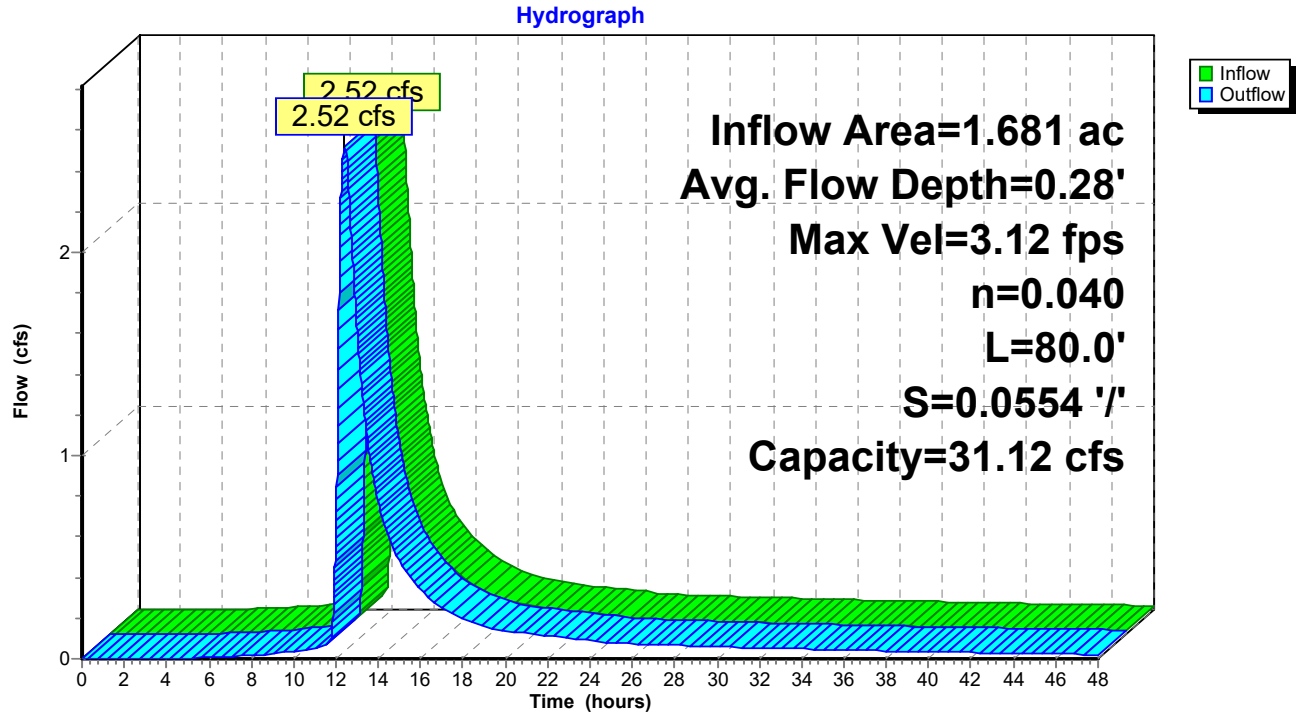
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.12 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 1.4 min

Peak Storage= 65 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 31.12 cfs

2.00' x 1.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 80.0' Slope= 0.0554 '/'
Inlet Invert= 37.00', Outlet Invert= 32.57'

‡

Reach 71R: Stream



Summary for Reach 72R: Stream

Inflow Area = 1.681 ac, 63.59% Impervious, Inflow Depth > 4.00" for 10-year event
Inflow = 2.52 cfs @ 12.41 hrs, Volume= 0.560 af
Outflow = 2.52 cfs @ 12.42 hrs, Volume= 0.559 af, Atten= 0%, Lag= 0.6 min

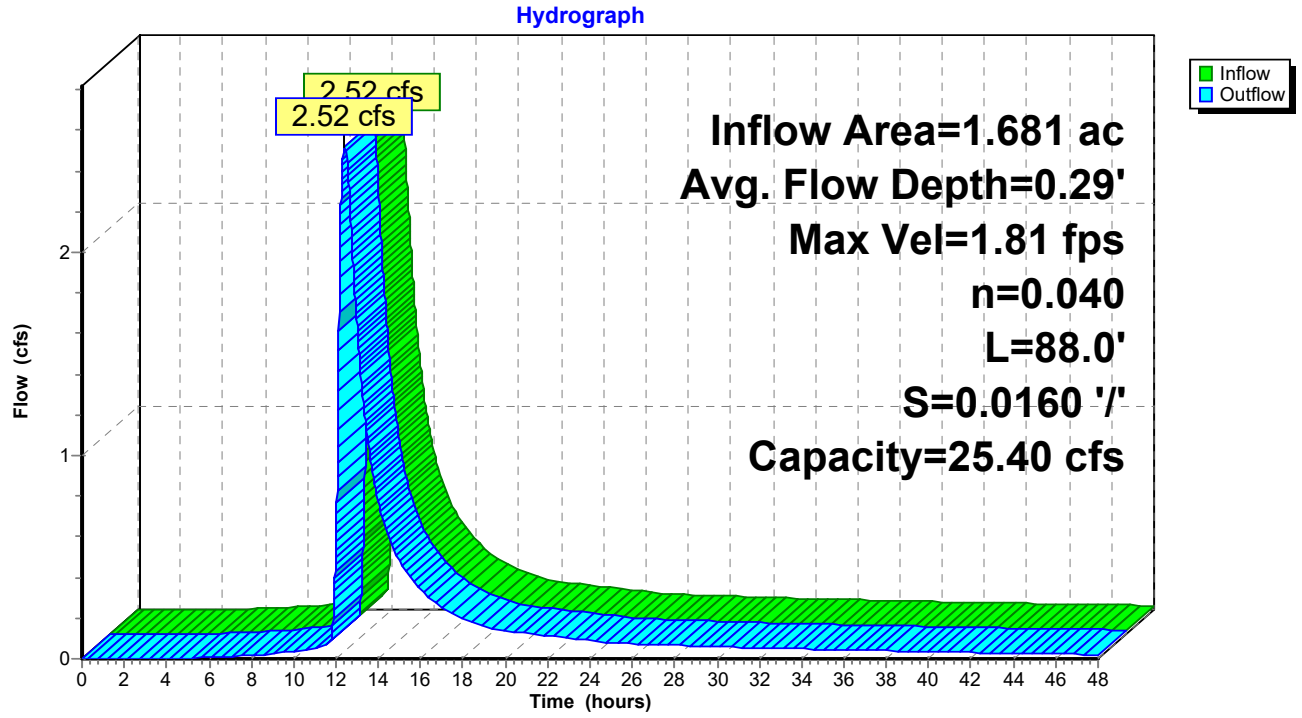
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.81 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 2.9 min

Peak Storage= 122 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 25.40 cfs

4.00' x 1.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 88.0' Slope= 0.0160 '/'
Inlet Invert= 32.57', Outlet Invert= 31.16'

‡

Reach 72R: Stream



Summary for Reach 73R: Stream

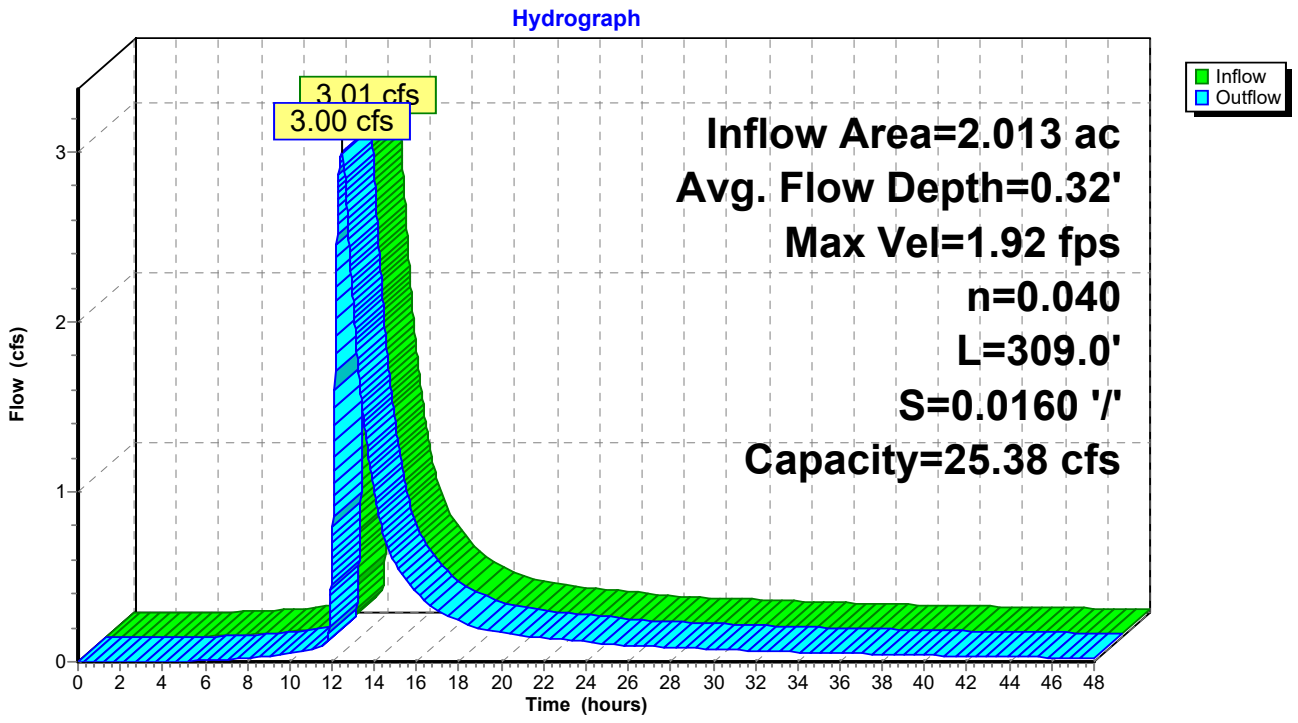
Inflow Area = 2.013 ac, 65.70% Impervious, Inflow Depth > 4.09" for 10-year event
Inflow = 3.01 cfs @ 12.42 hrs, Volume= 0.686 af
Outflow = 3.00 cfs @ 12.45 hrs, Volume= 0.685 af, Atten= 0%, Lag= 1.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.92 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 9.5 min

Peak Storage= 483 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 25.38 cfs

4.00' x 1.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 309.0' Slope= 0.0160 '/'
Inlet Invert= 31.16', Outlet Invert= 26.22'

‡



Summary for Reach 83R: Woodland Flow Path

Inflow Area = 0.333 ac, 76.36% Impervious, Inflow Depth > 4.56" for 10-year event
Inflow = 0.50 cfs @ 12.40 hrs, Volume= 0.127 af
Outflow = 0.49 cfs @ 12.49 hrs, Volume= 0.126 af, Atten= 1%, Lag= 5.4 min

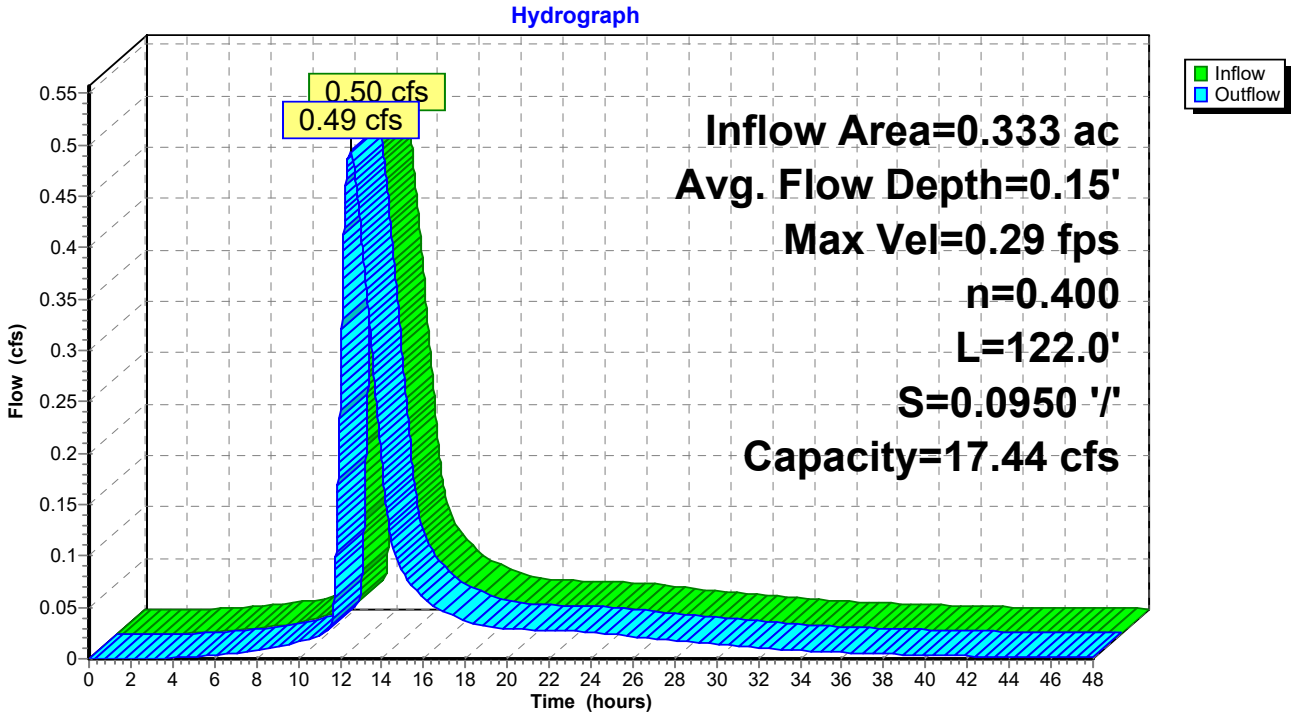
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.29 fps, Min. Travel Time= 6.9 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 23.6 min

Peak Storage= 205 cf @ 12.49 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 17.44 cfs

10.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 10.0 '/' Top Width= 30.00'
Length= 122.0' Slope= 0.0950 '/'
Inlet Invert= 42.75', Outlet Invert= 31.16'

‡

Reach 83R: Woodland Flow Path



Summary for Pond 1P: 15" RCP

Inflow Area = 1.746 ac, 13.99% Impervious, Inflow Depth > 2.95" for 10-year event
Inflow = 4.64 cfs @ 12.14 hrs, Volume= 0.430 af
Outflow = 3.78 cfs @ 12.22 hrs, Volume= 0.430 af, Atten= 18%, Lag= 4.9 min
Primary = 3.78 cfs @ 12.22 hrs, Volume= 0.430 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.53' @ 12.22 hrs Surf.Area= 2,365 sf Storage= 682 cf

Plug-Flow detention time= 1.0 min calculated for 0.430 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (874.1 - 873.1)

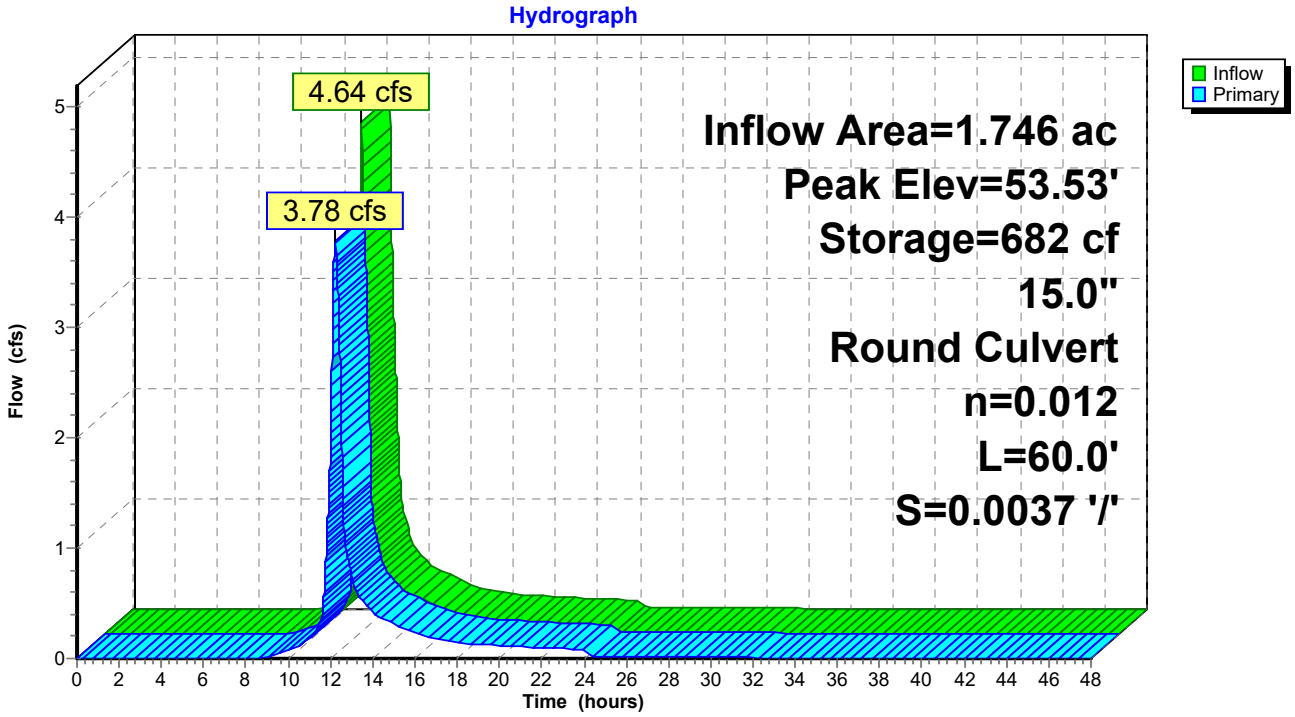
Volume	Invert	Avail.Storage	Storage Description
#1	52.26'	9,237 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.26	10	0	0
53.00	85	35	35
54.00	4,401	2,243	2,278
55.00	9,516	6,959	9,237

Device	Routing	Invert	Outlet Devices
#1	Primary	52.26'	**15.0" Round Culvert** L= 60.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 52.26' / 52.04' S= 0.0037 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=3.78 cfs @ 12.22 hrs HW=53.53' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 3.78 cfs @ 3.78 fps)

Pond 1P: 15" RCP



Summary for Pond 2.1P: 24" RCP

Inflow Area = 17.092 ac, 9.01% Impervious, Inflow Depth = 2.71" for 10-year event
Inflow = 35.88 cfs @ 12.18 hrs, Volume= 3.867 af
Outflow = 18.94 cfs @ 12.54 hrs, Volume= 3.867 af, Atten= 47%, Lag= 21.7 min
Primary = 18.94 cfs @ 12.54 hrs, Volume= 3.867 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.40' @ 12.51 hrs Surf.Area= 21,429 sf Storage= 24,417 cf

Plug-Flow detention time= 7.9 min calculated for 3.866 af (100% of inflow)
Center-of-Mass det. time= 7.9 min (870.7 - 862.8)

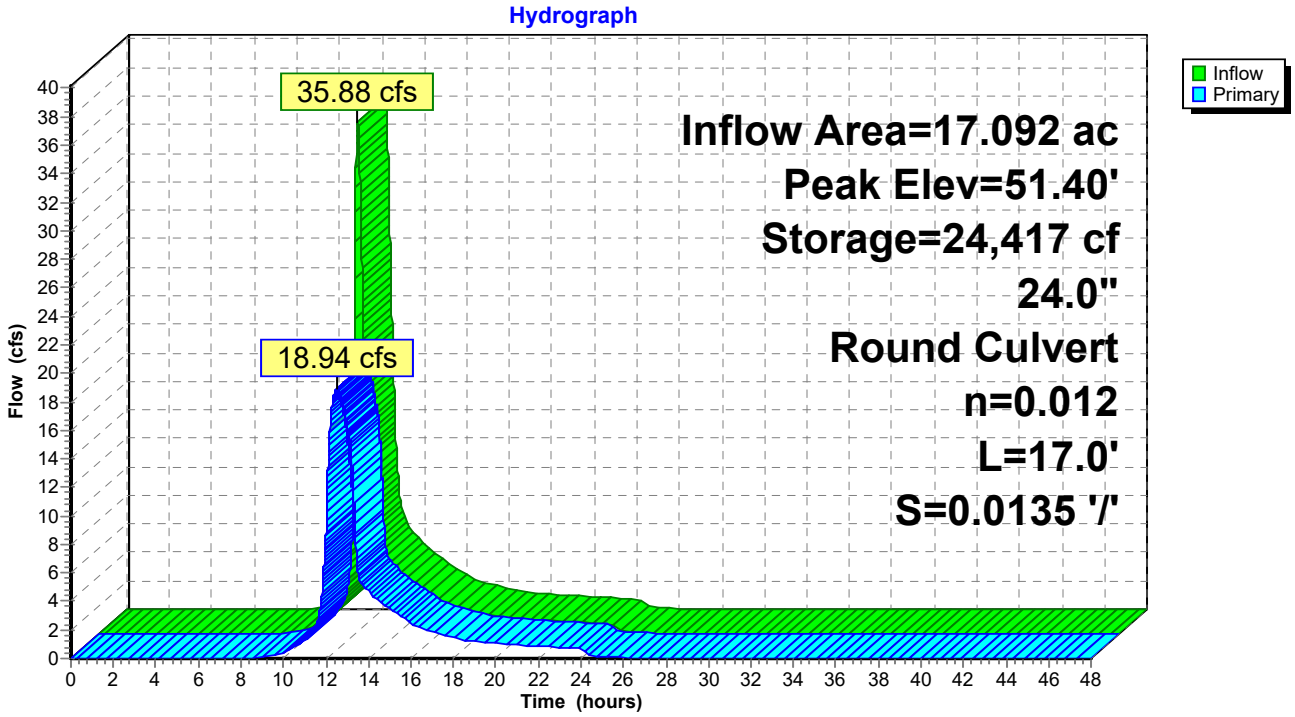
Volume	Invert	Avail.Storage	Storage Description
#1	47.57'	80,071 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.57	100	0	0
48.00	164	57	57
49.00	2,506	1,335	1,392
50.00	7,196	4,851	6,243
51.00	14,807	11,002	17,244
52.00	31,534	23,171	40,415
53.00	47,779	39,657	80,071

Device	Routing	Invert	Outlet Devices
#1	Primary	47.57'	**24.0" Round Culvert** L= 17.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 47.57' / 47.34' S= 0.0135 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=18.42 cfs @ 12.54 hrs HW=51.39' TW=49.91' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 18.42 cfs @ 5.86 fps)

Pond 2.1P: 24" RCP



Summary for Pond 2P: 12" CPP

Inflow Area = 6.525 ac, 6.78% Impervious, Inflow Depth = 2.57" for 10-year event
Inflow = 23.92 cfs @ 12.00 hrs, Volume= 1.395 af
Outflow = 18.70 cfs @ 12.05 hrs, Volume= 1.395 af, Atten= 22%, Lag= 2.6 min
Primary = 18.70 cfs @ 12.05 hrs, Volume= 1.395 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 60.93' @ 12.05 hrs Surf.Area= 15,490 sf Storage= 11,719 cf

Plug-Flow detention time= 44.2 min calculated for 1.395 af (100% of inflow)
Center-of-Mass det. time= 44.1 min (876.6 - 832.4)

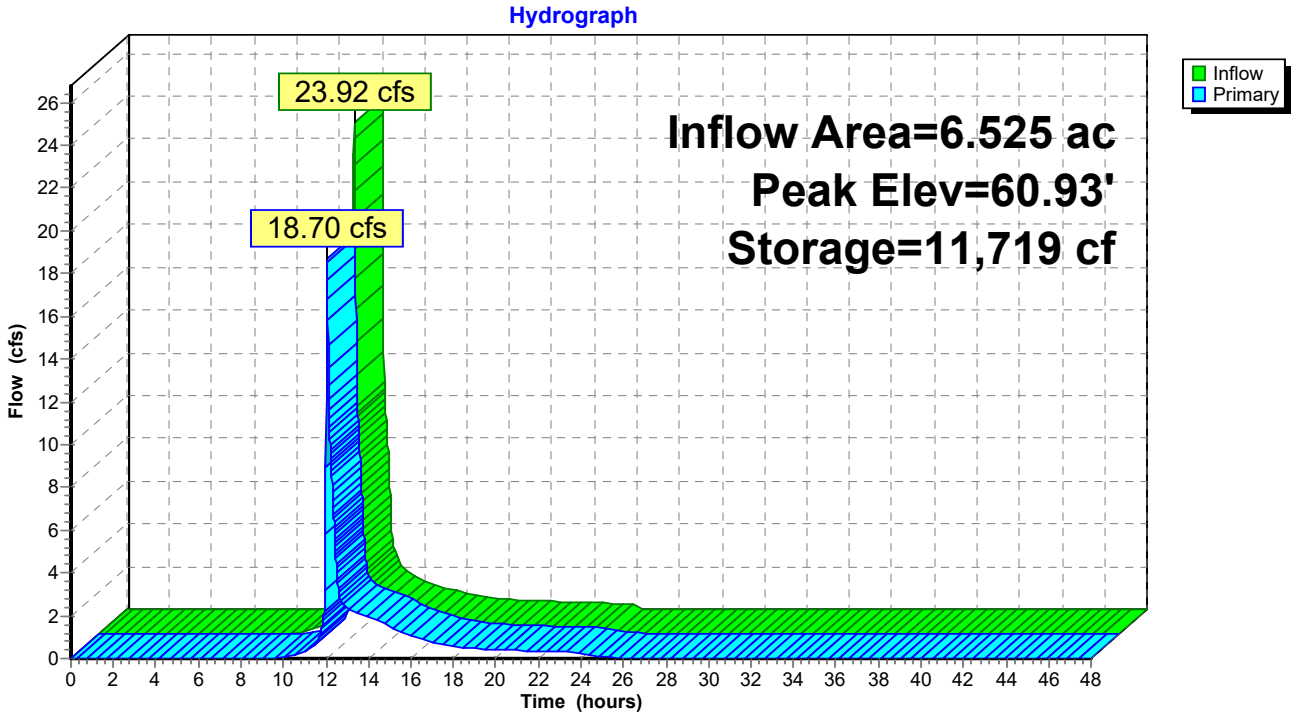
Volume	Invert	Avail.Storage	Storage Description
#1	59.65'	35,764 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.65	100	0	0
60.00	6,996	1,242	1,242
61.00	16,111	11,554	12,795
62.00	29,827	22,969	35,764

Device	Routing	Invert	Outlet Devices
#1	Primary	59.65'	**12.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.65' / 59.31' S= 0.0378 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Primary	60.75'	**87.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=18.66 cfs @ 12.05 hrs HW=60.93' TW=60.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.64 cfs @ 3.36 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 16.02 cfs @ 1.01 fps)

Pond 2P: 12" CPP



Summary for Pond 10P: Porous Pavement

Inflow Area = 0.234 ac, 98.98% Impervious, Inflow Depth > 5.20" for 10-year event
Inflow = 0.09 cfs @ 21.94 hrs, Volume= 0.101 af
Outflow = 0.04 cfs @ 30.54 hrs, Volume= 0.097 af, Atten= 59%, Lag= 515.6 min
Discarded = 0.04 cfs @ 30.54 hrs, Volume= 0.097 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 57.53' @ 30.54 hrs Surf.Area= 2,761 sf Storage= 1,632 cf
Flood Elev= 59.55' Surf.Area= 2,761 sf Storage= 2,808 cf

Plug-Flow detention time= 434.2 min calculated for 0.097 af (95% of inflow)
Center-of-Mass det. time= 386.3 min (1,842.4 - 1,456.2)

Volume	Invert	Avail.Storage	Storage Description
#1	56.05'	3,513 cf	**Custom Stage Data (Conic)** Listed below

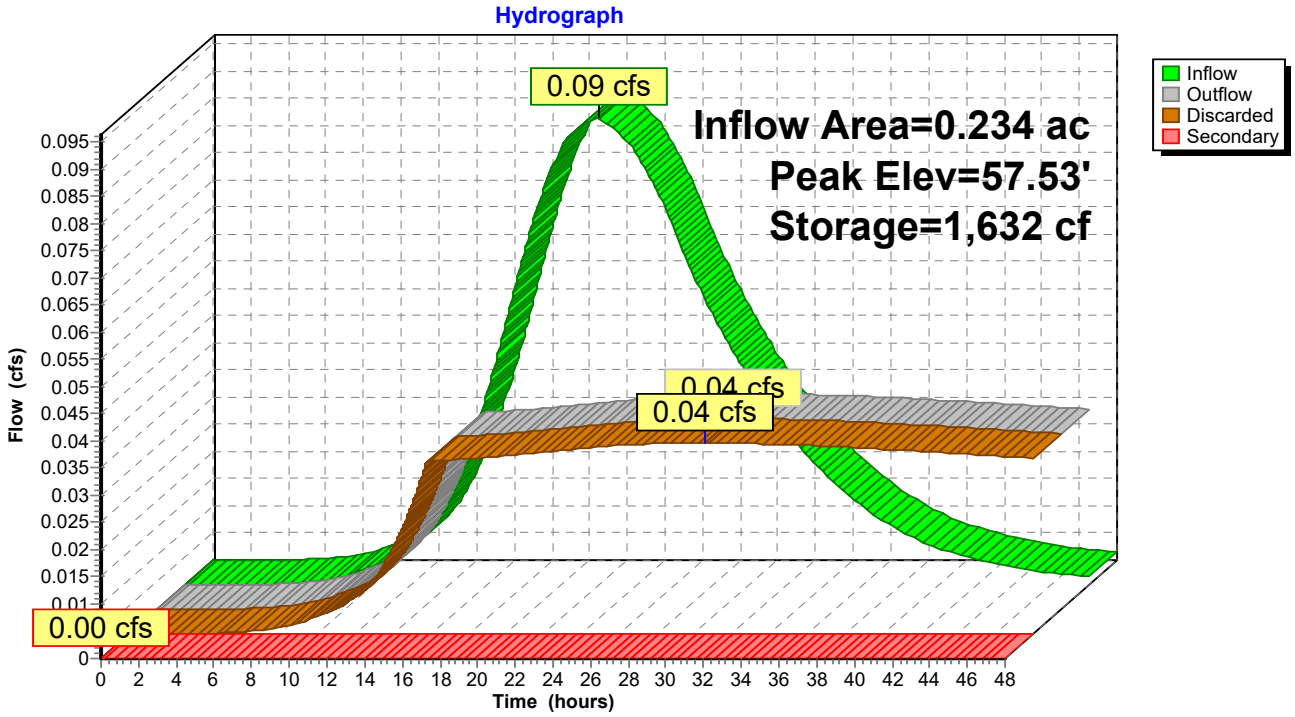
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.05	2,761	0.0	0	0	2,761
57.30	2,761	40.0	1,381	1,381	2,994
57.55	2,761	40.0	276	1,657	3,040
58.55	2,761	5.0	138	1,795	3,227
59.22	2,761	40.0	740	2,535	3,351
59.55	2,761	30.0	273	2,808	3,413
60.00	624	100.0	705	3,513	5,551

Device	Routing	Invert	Outlet Devices
#1	Discarded	56.05'	**0.500 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Secondary	56.34'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 56.34' / 56.25' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	59.55'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 30.54 hrs HW=57.53' (Free Discharge)
↑└**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=56.05' TW=56.25' (Dynamic Tailwater)
↑└**2=Culvert** (Controls 0.00 cfs)
↑└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 10P: Porous Pavement



Summary for Pond 11P: YD #3-1

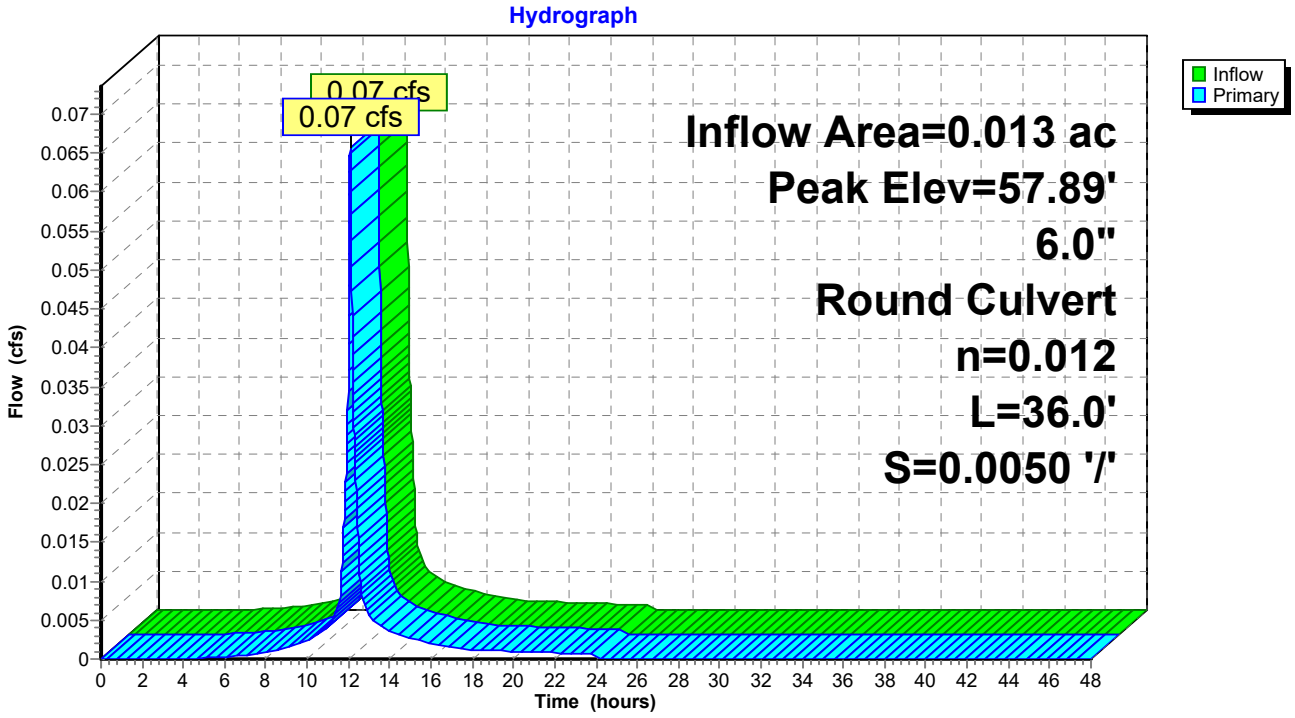
Inflow Area = 0.013 ac, 65.82% Impervious, Inflow Depth = 4.33" for 10-year event
Inflow = 0.07 cfs @ 12.08 hrs, Volume= 0.005 af
Outflow = 0.07 cfs @ 12.08 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Primary = 0.07 cfs @ 12.08 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 57.89' @ 12.43 hrs
Flood Elev= 60.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.16'	**6.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.16' / 56.98' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=57.59' TW=57.60' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond 11P: YD #3-1



Summary for Pond 12P: YD #7

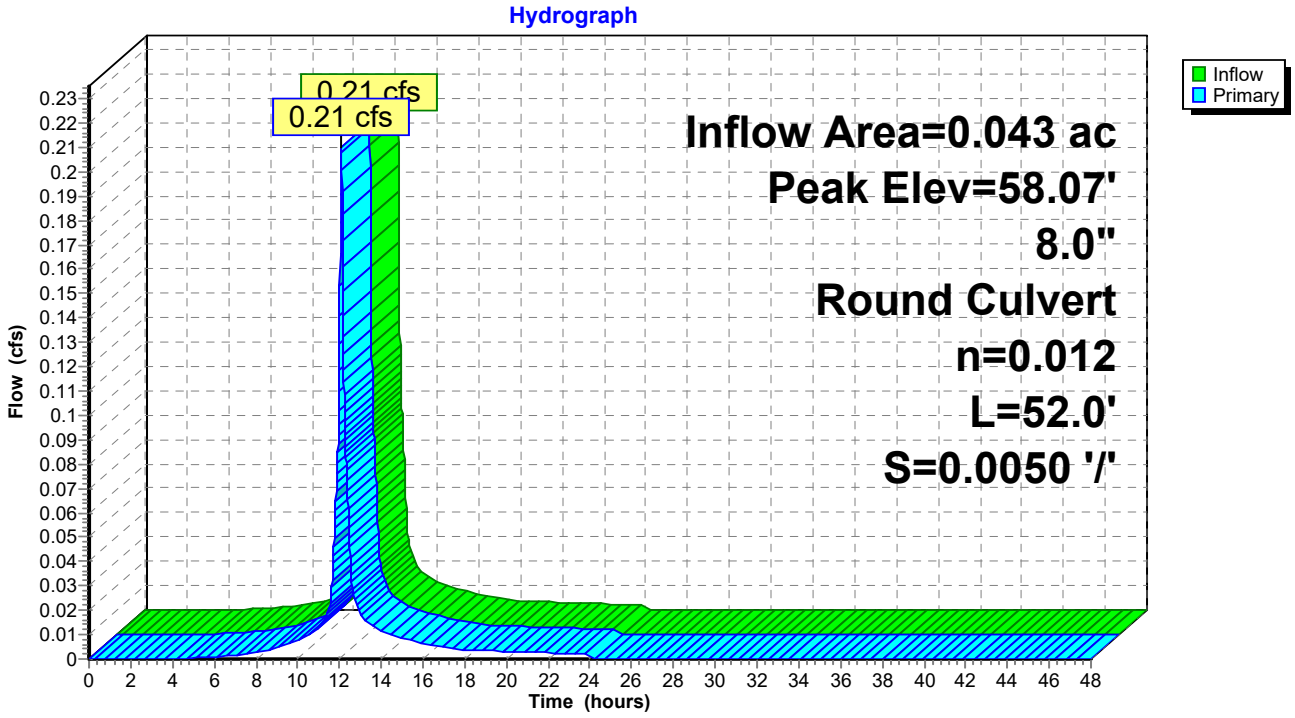
Inflow Area = 0.043 ac, 65.12% Impervious, Inflow Depth = 4.33" for 10-year event
Inflow = 0.21 cfs @ 12.08 hrs, Volume= 0.016 af
Outflow = 0.21 cfs @ 12.08 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.08 hrs, Volume= 0.016 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 58.07' @ 12.10 hrs
Flood Elev= 59.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.76'	**8.0" Round Culvert** L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.76' / 57.50' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.20 cfs @ 12.08 hrs HW=58.07' TW=57.79' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.20 cfs @ 1.91 fps)

Pond 12P: YD #7



Summary for Pond 13P: YD #6

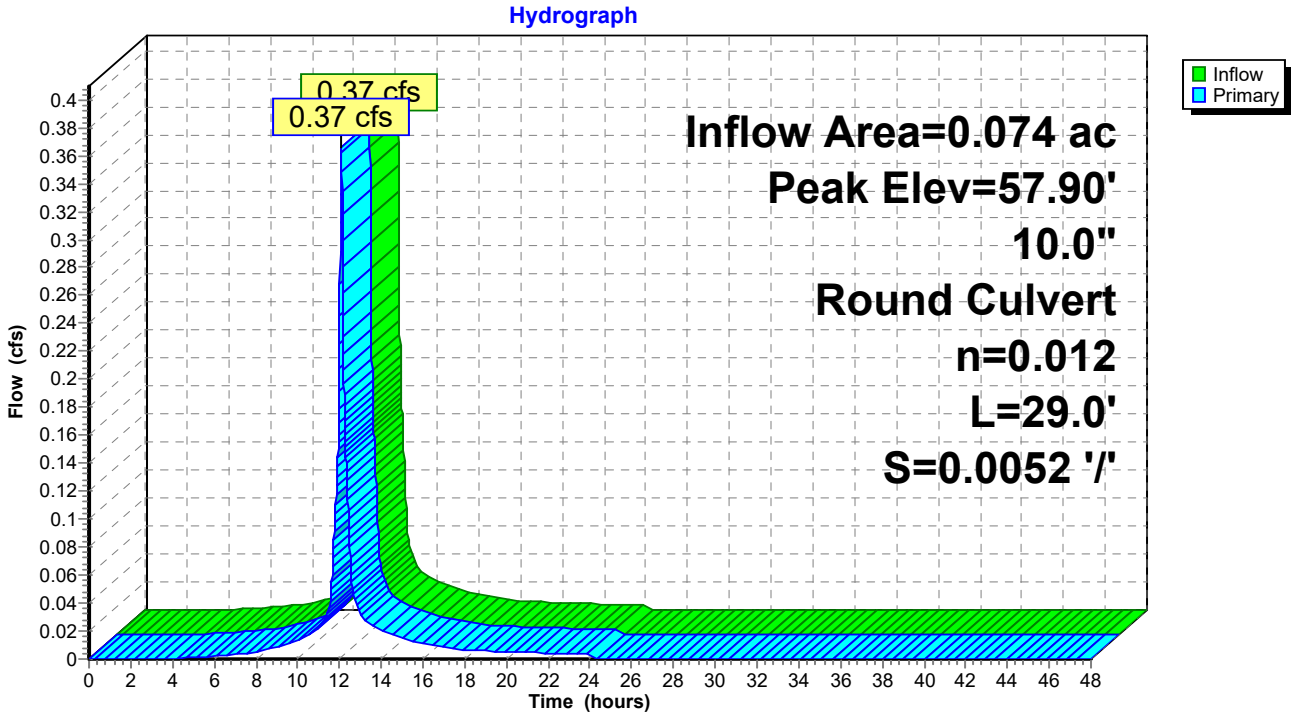
Inflow Area = 0.074 ac, 68.76% Impervious, Inflow Depth = 4.42" for 10-year event
Inflow = 0.37 cfs @ 12.08 hrs, Volume= 0.027 af
Outflow = 0.37 cfs @ 12.08 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
Primary = 0.37 cfs @ 12.08 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 57.90' @ 12.42 hrs
Flood Elev= 60.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.33'	**10.0" Round Culvert** L= 29.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.33' / 57.18' S= 0.0052 '/' Cc= 0.900 n= 0.012, Flow Area= 0.55 sf

Primary OutFlow Max=0.33 cfs @ 12.08 hrs HW=57.79' TW=57.69' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.33 cfs @ 1.56 fps)

Pond 13P: YD #6



Summary for Pond 14P: YD #5

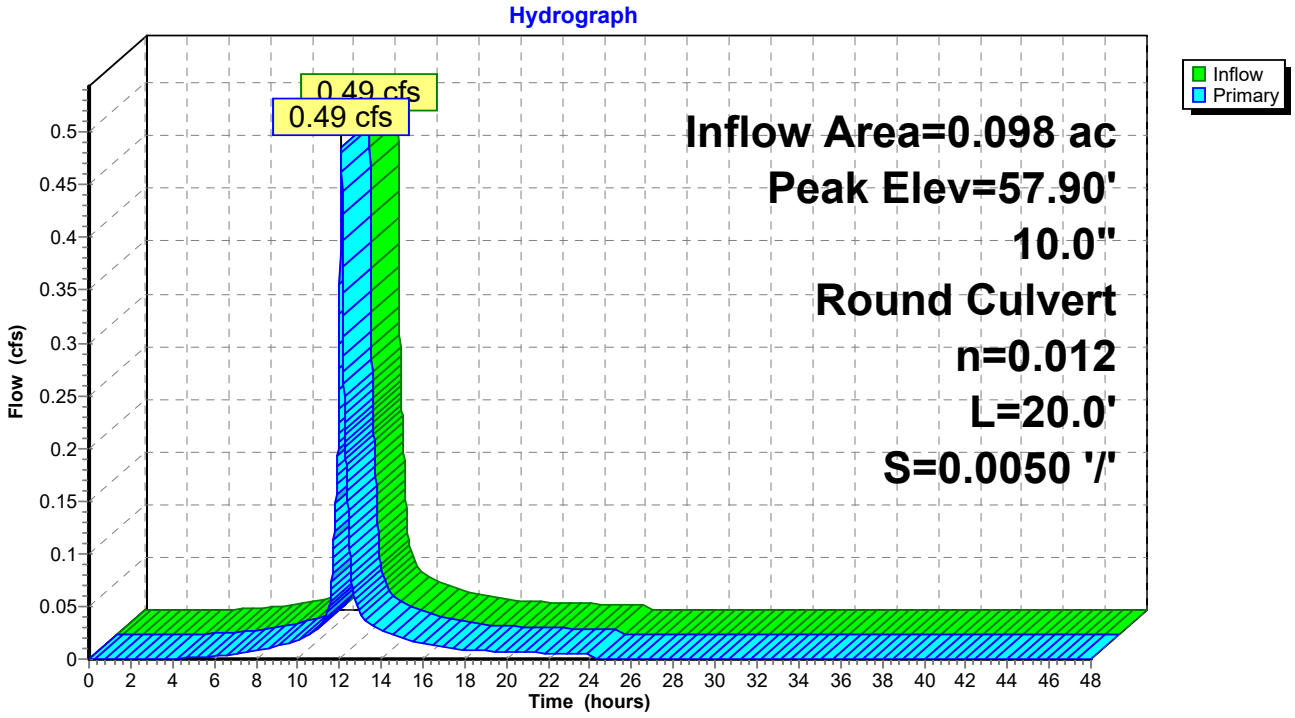
Inflow Area = 0.098 ac, 70.95% Impervious, Inflow Depth = 4.48" for 10-year event
Inflow = 0.49 cfs @ 12.08 hrs, Volume= 0.036 af
Outflow = 0.49 cfs @ 12.08 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.08 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 57.90' @ 12.42 hrs
Flood Elev= 60.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.08'	**10.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.08' / 56.98' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.55 sf

Primary OutFlow Max=0.40 cfs @ 12.08 hrs HW=57.69' TW=57.63' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.40 cfs @ 1.31 fps)

Pond 14P: YD #5



Summary for Pond 15P: YD #4

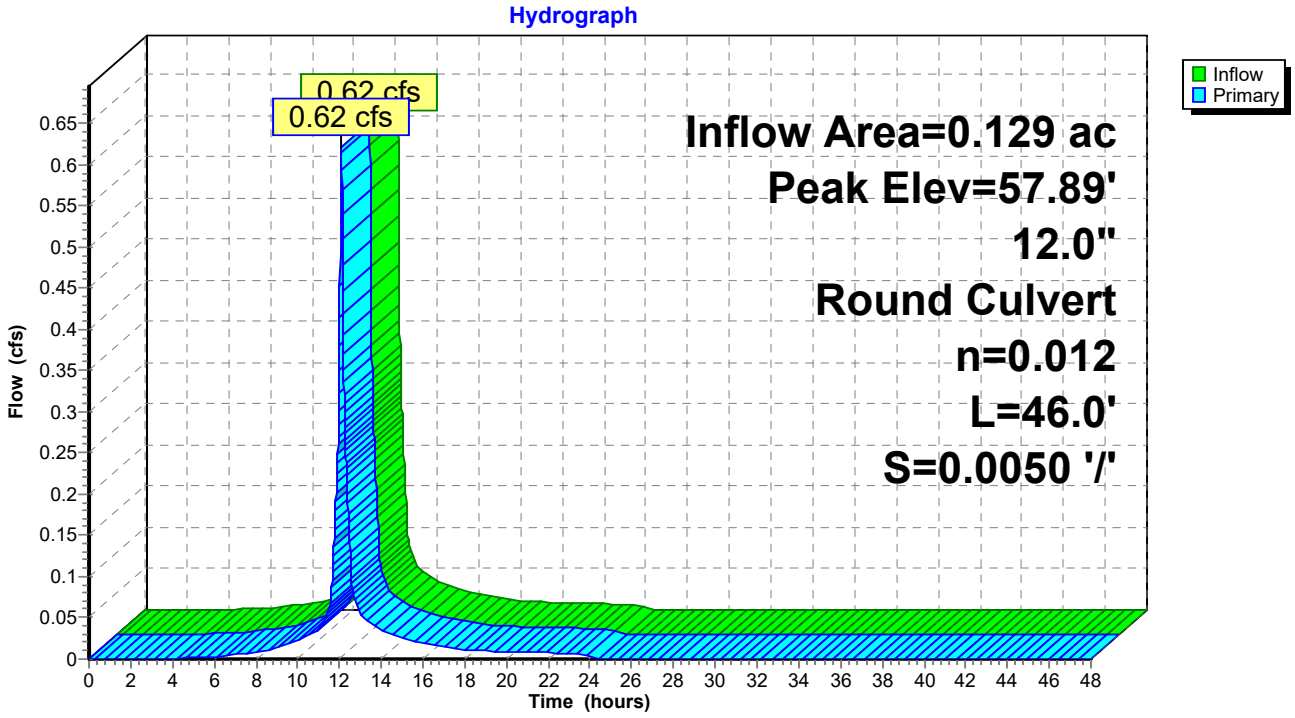
Inflow Area = 0.129 ac, 64.17% Impervious, Inflow Depth = 4.29" for 10-year event
Inflow = 0.62 cfs @ 12.08 hrs, Volume= 0.046 af
Outflow = 0.62 cfs @ 12.08 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min
Primary = 0.62 cfs @ 12.08 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 57.89' @ 12.42 hrs
Flood Elev= 60.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	56.81'	**12.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 56.81' / 56.58' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.44 cfs @ 12.08 hrs HW=57.63' TW=57.60' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.44 cfs @ 0.87 fps)

Pond 15P: YD #4



Summary for Pond 16P: CB #3

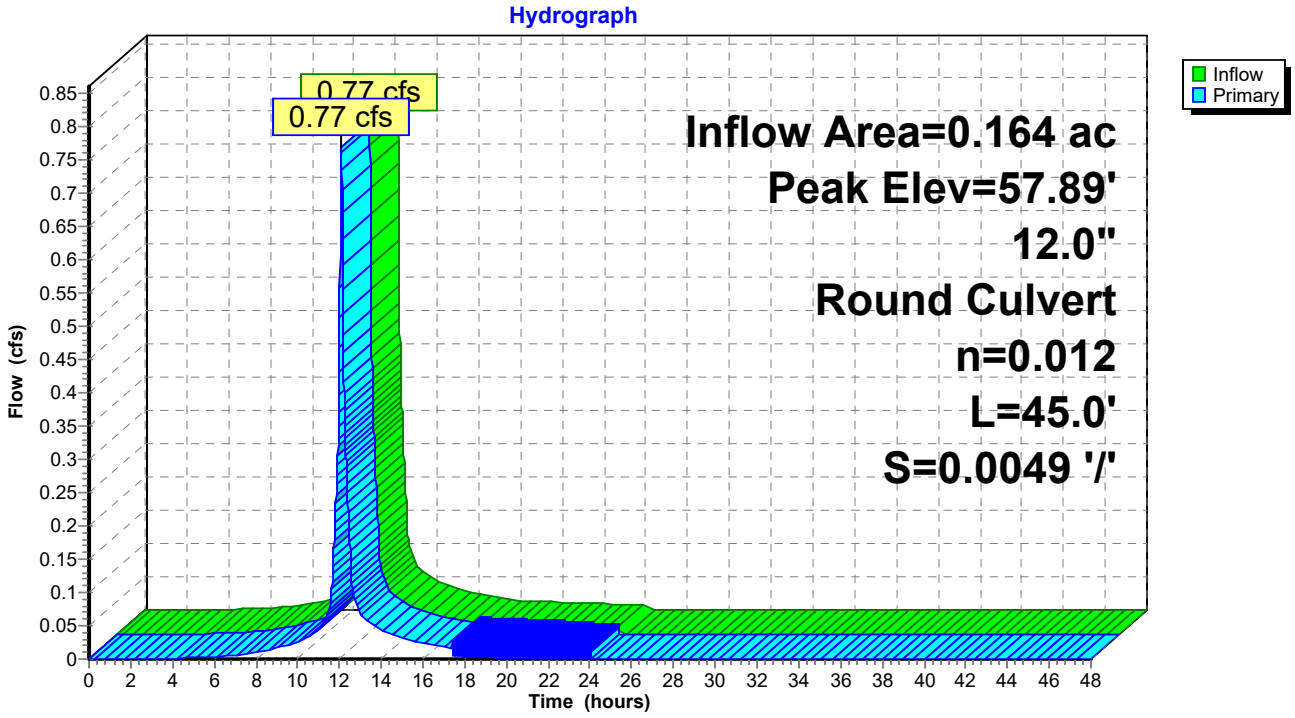
Inflow Area = 0.164 ac, 59.41% Impervious, Inflow Depth = 4.17" for 10-year event
Inflow = 0.77 cfs @ 12.09 hrs, Volume= 0.057 af
Outflow = 0.77 cfs @ 12.09 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 12.09 hrs, Volume= 0.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 57.89' @ 12.42 hrs
Flood Elev= 61.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	56.48'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 56.48' / 56.26' S= 0.0049 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.45 cfs @ 12.09 hrs HW=57.60' TW=57.59' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.45 cfs @ 0.63 fps)

Pond 16P: CB #3



Summary for Pond 17P: Bio #1 / OS #1

Inflow Area = 0.230 ac, 42.36% Impervious, Inflow Depth = 3.76" for 10-year event
Inflow = 0.98 cfs @ 12.09 hrs, Volume= 0.072 af
Outflow = 0.30 cfs @ 12.42 hrs, Volume= 0.072 af, Atten= 70%, Lag= 19.8 min
Primary = 0.30 cfs @ 12.42 hrs, Volume= 0.072 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 56.25' Surf.Area= 487 sf Storage= 37 cf
Peak Elev= 57.89' @ 12.42 hrs Surf.Area= 1,182 sf Storage= 1,367 cf (1,331 cf above start)
Flood Elev= 59.25' Surf.Area= 1,950 sf Storage= 3,480 cf (3,444 cf above start)

Plug-Flow detention time= 283.6 min calculated for 0.071 af (98% of inflow)
Center-of-Mass det. time= 266.2 min (1,065.8 - 799.6)

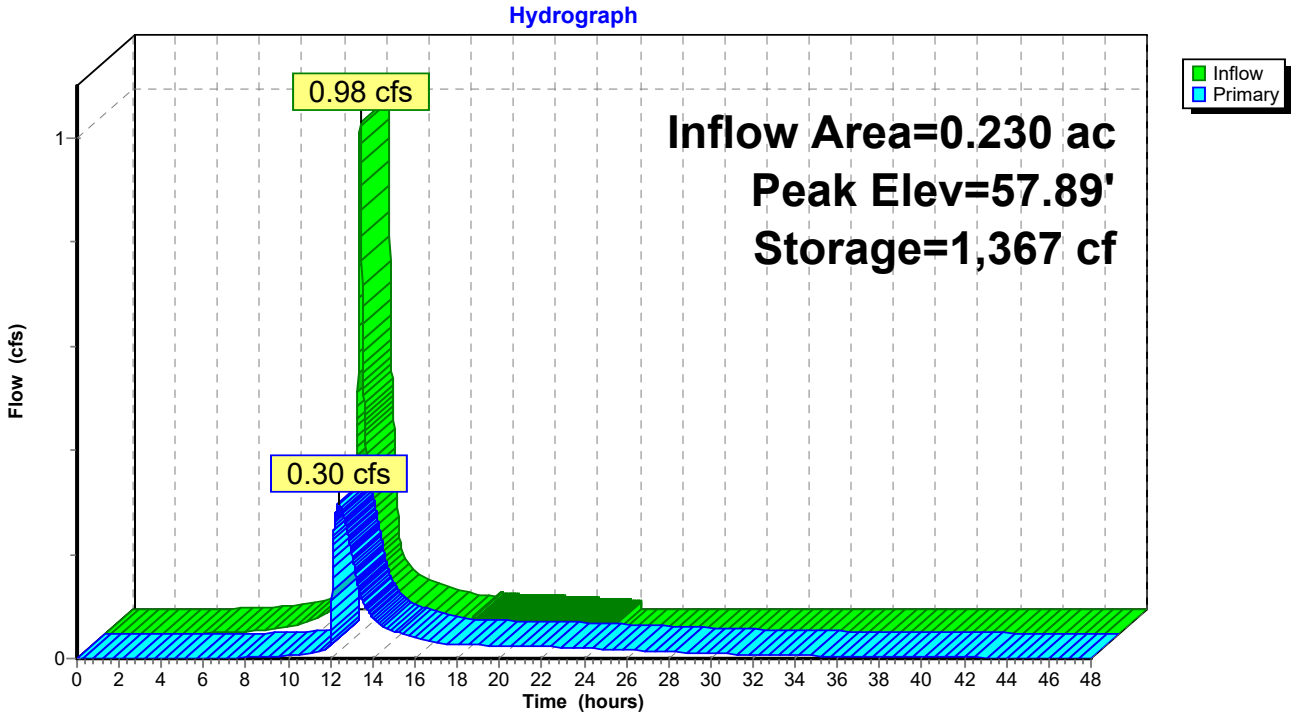
Volume	Invert	Avail.Storage	Storage Description
#1	54.75'	3,480 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.75	487	0.0	0	0	487
56.25	487	5.0	37	37	604
57.00	774	100.0	469	505	899
58.00	1,239	100.0	997	1,503	1,377
59.00	1,797	100.0	1,509	3,012	1,952
59.25	1,950	100.0	468	3,480	2,110

Device	Routing	Invert	Outlet Devices
#1	Primary	53.75'	**15.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.75' / 53.60' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	53.75'	**4.0" Vert. Underdrain** C= 0.600
#3	Device 2	56.25'	**2.500 in/hr Exfiltration throiugh Media over Wetted area above 56.25'** Excluded Wetted area = 604 sf Phase-In= 0.01'
#4	Device 1	57.35'	**4.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	58.75'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.30 cfs @ 12.42 hrs HW=57.89' TW=53.71' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.30 cfs of 11.08 cfs potential flow)
  - **2=Underdrain** (Passes 0.04 cfs of 0.84 cfs potential flow)
    - **3=Exfiltration throiugh Media** (Exfiltration Controls 0.04 cfs)
  - **4=Orifice/Grate** (Orifice Controls 0.26 cfs @ 2.93 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Pond 17P: Bio #1 / OS #1



Summary for Pond 21P: CB #8

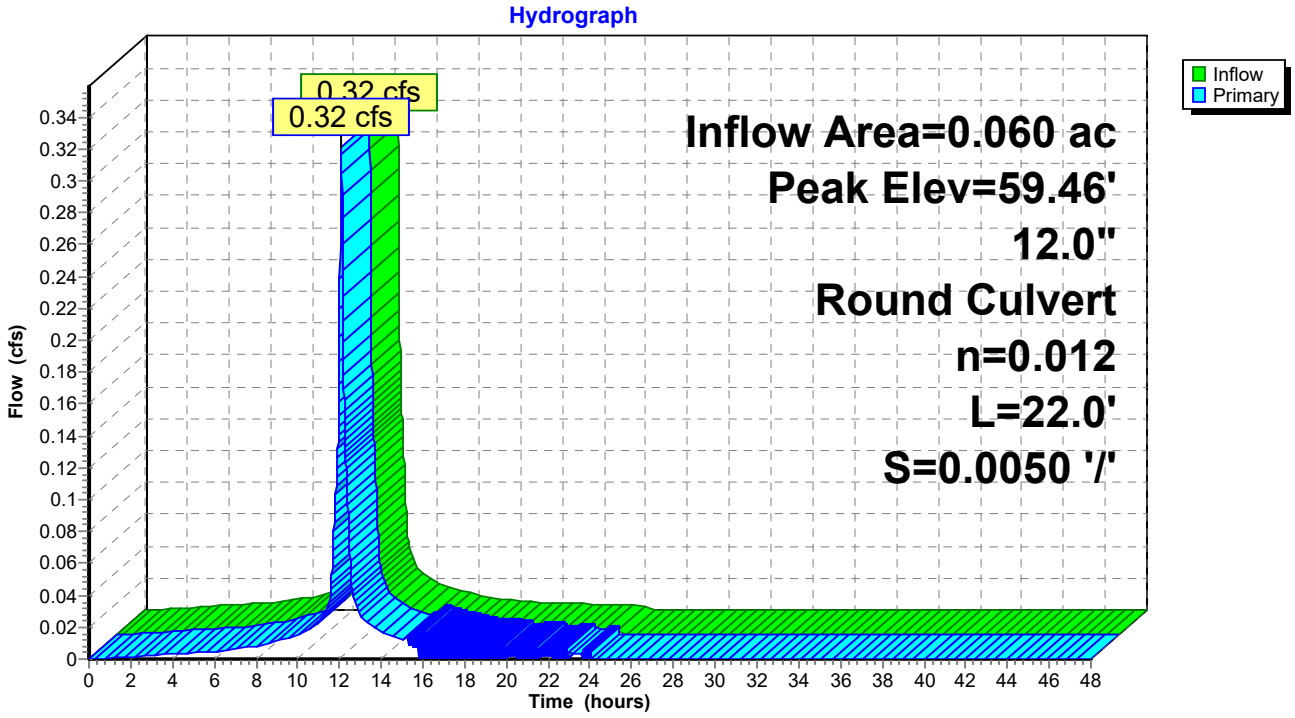
Inflow Area = 0.060 ac,100.00% Impervious, Inflow Depth = 5.23" for 10-year event
Inflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 59.46' @ 12.47 hrs
Flood Elev= 60.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.86'	**12.0" Round Culvert** L= 22.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.86' / 57.75' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=59.12' TW=59.14' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond 21P: CB #8



Summary for Pond 22P: Bio #2 / OS #9

Inflow Area = 0.361 ac, 74.83% Impervious, Inflow Depth = 4.61" for 10-year event
Inflow = 1.74 cfs @ 12.08 hrs, Volume= 0.139 af
Outflow = 0.44 cfs @ 12.46 hrs, Volume= 0.137 af, Atten= 75%, Lag= 22.4 min
Primary = 0.44 cfs @ 12.46 hrs, Volume= 0.137 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 57.75' Surf.Area= 1,027 sf Storage= 77 cf
Peak Elev= 59.46' @ 12.46 hrs Surf.Area= 2,116 sf Storage= 2,731 cf (2,654 cf above start)
Flood Elev= 60.00' Surf.Area= 2,511 sf Storage= 3,983 cf (3,906 cf above start)

Plug-Flow detention time= 262.9 min calculated for 0.136 af (98% of inflow)
Center-of-Mass det. time= 240.1 min (999.6 - 759.5)

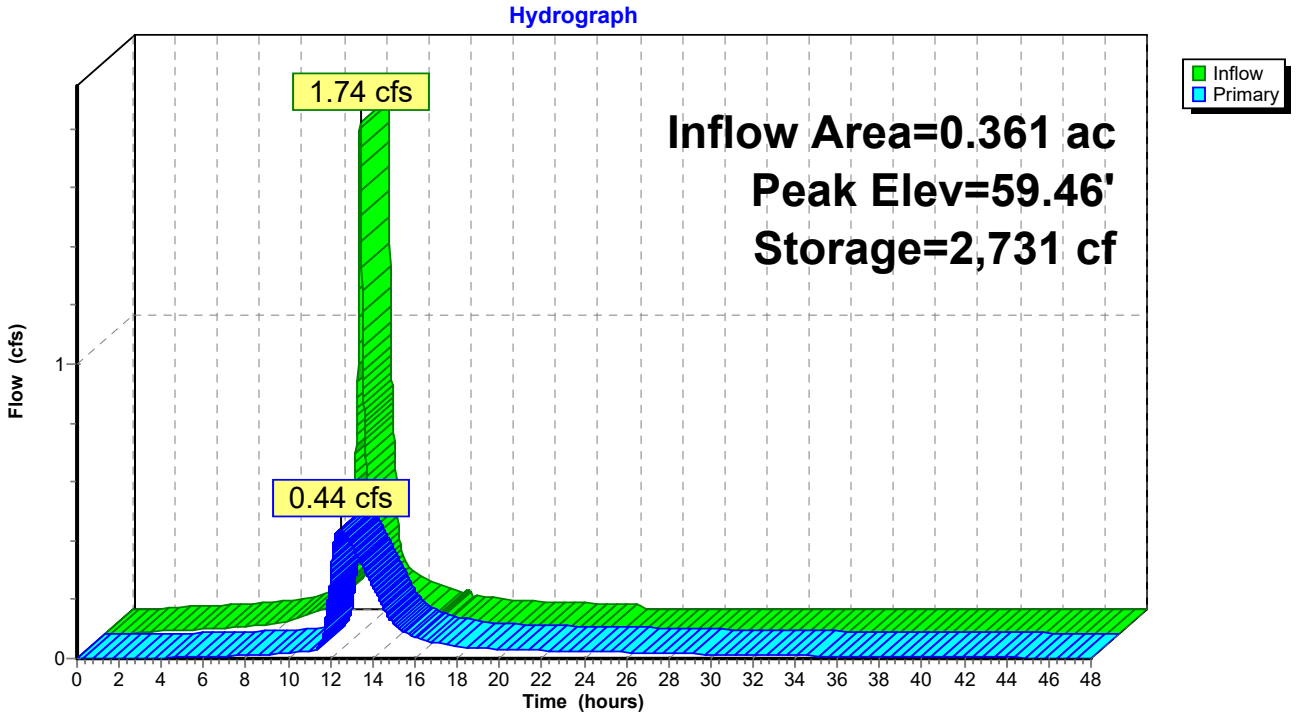
Volume	Invert	Avail.Storage	Storage Description
#1	56.25'	3,983 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.25	1,027	0.0	0	0	1,027
57.75	1,027	5.0	77	77	1,197
58.00	1,175	100.0	275	352	1,348
59.00	1,809	100.0	1,481	1,833	1,997
60.00	2,511	100.0	2,150	3,983	2,718

Device	Routing	Invert	Outlet Devices
#1	Primary	55.25'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 55.25' / 55.16' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	55.25'	**4.0" Vert. Underdrain** C= 0.600
#3	Device 2	57.75'	**2.500 in/hr Exfiltration through Media over Wetted area above 57.75'** Excluded Wetted area = 1,197 sf Phase-In= 0.01'
#4	Device 1	58.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	59.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.44 cfs @ 12.46 hrs HW=59.46' TW=55.21' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.44 cfs of 11.19 cfs potential flow)
  - **2=Underdrain** (Passes 0.06 cfs of 0.84 cfs potential flow)
    - **3=Exfiltration through Media** (Exfiltration Controls 0.06 cfs)
  - **4=Orifice/Grate** (Orifice Controls 0.37 cfs @ 4.28 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Pond 22P: Bio #2 / OS #9



Summary for Pond 30P: CB #10-2

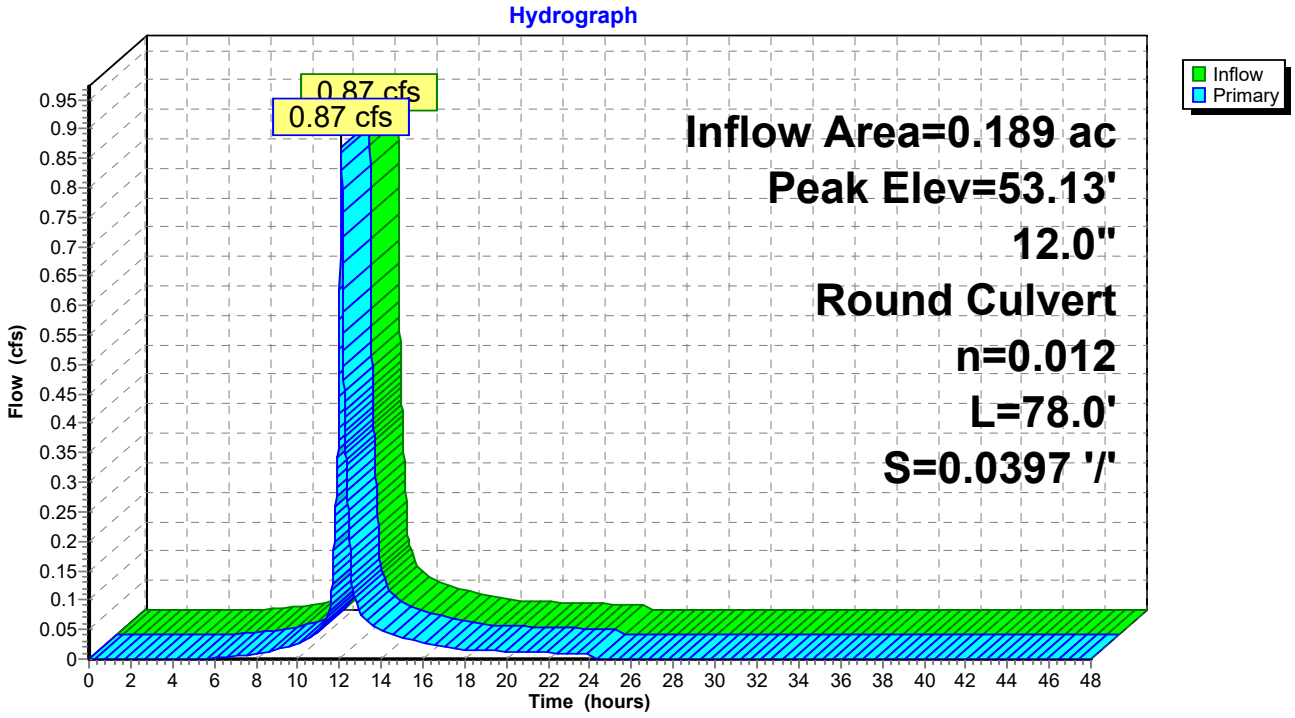
Inflow Area = 0.189 ac, 53.10% Impervious, Inflow Depth = 4.01" for 10-year event
Inflow = 0.87 cfs @ 12.09 hrs, Volume= 0.063 af
Outflow = 0.87 cfs @ 12.09 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min
Primary = 0.87 cfs @ 12.09 hrs, Volume= 0.063 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.13' @ 12.09 hrs
Flood Elev= 56.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	52.65'	**12.0" Round Culvert** L= 78.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 52.65' / 49.55' S= 0.0397 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.87 cfs @ 12.09 hrs HW=53.13' TW=49.22' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.87 cfs @ 2.35 fps)

Pond 30P: CB #10-2



Summary for Pond 31P: CB #10-1

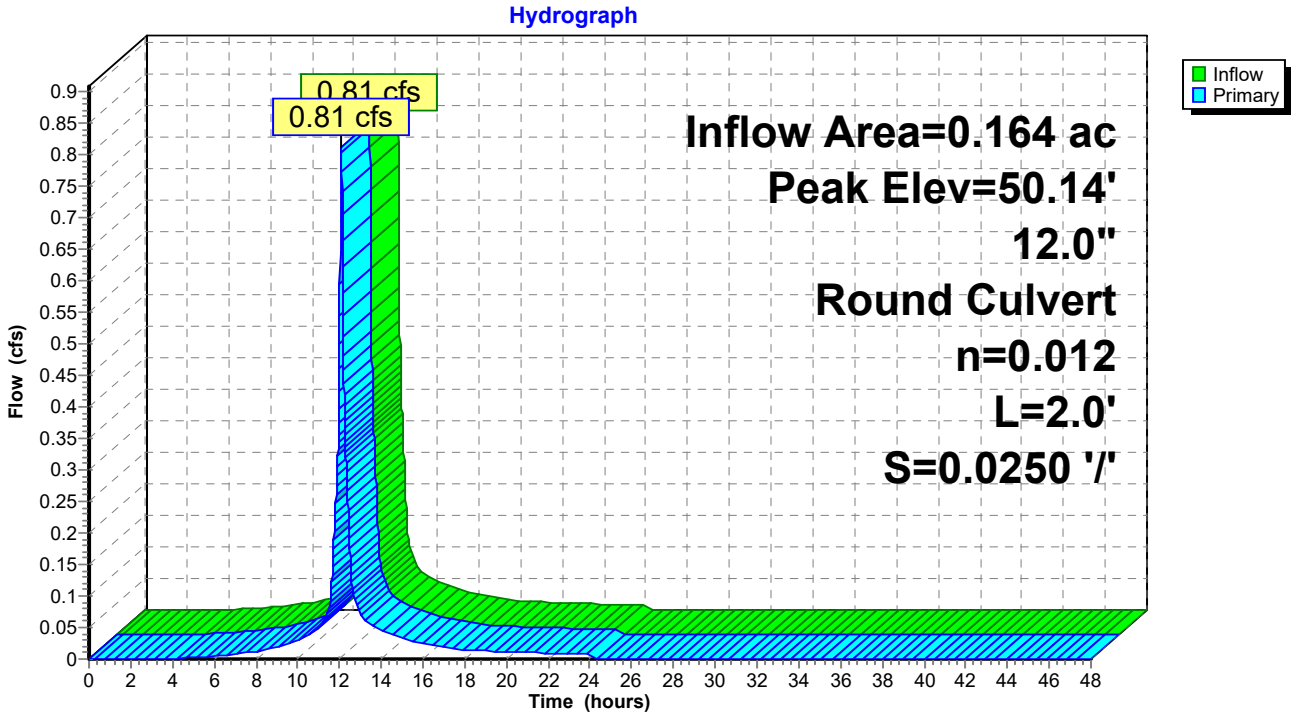
Inflow Area = 0.164 ac, 71.11% Impervious, Inflow Depth = 4.44" for 10-year event
Inflow = 0.81 cfs @ 12.08 hrs, Volume= 0.061 af
Outflow = 0.81 cfs @ 12.08 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.81 cfs @ 12.08 hrs, Volume= 0.061 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 50.14' @ 12.08 hrs
Flood Elev= 53.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.60'	**12.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.60' / 49.55' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.81 cfs @ 12.08 hrs HW=50.13' TW=49.21' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.81 cfs @ 2.75 fps)

Pond 31P: CB #10-1



Summary for Pond 32P: DMH #10

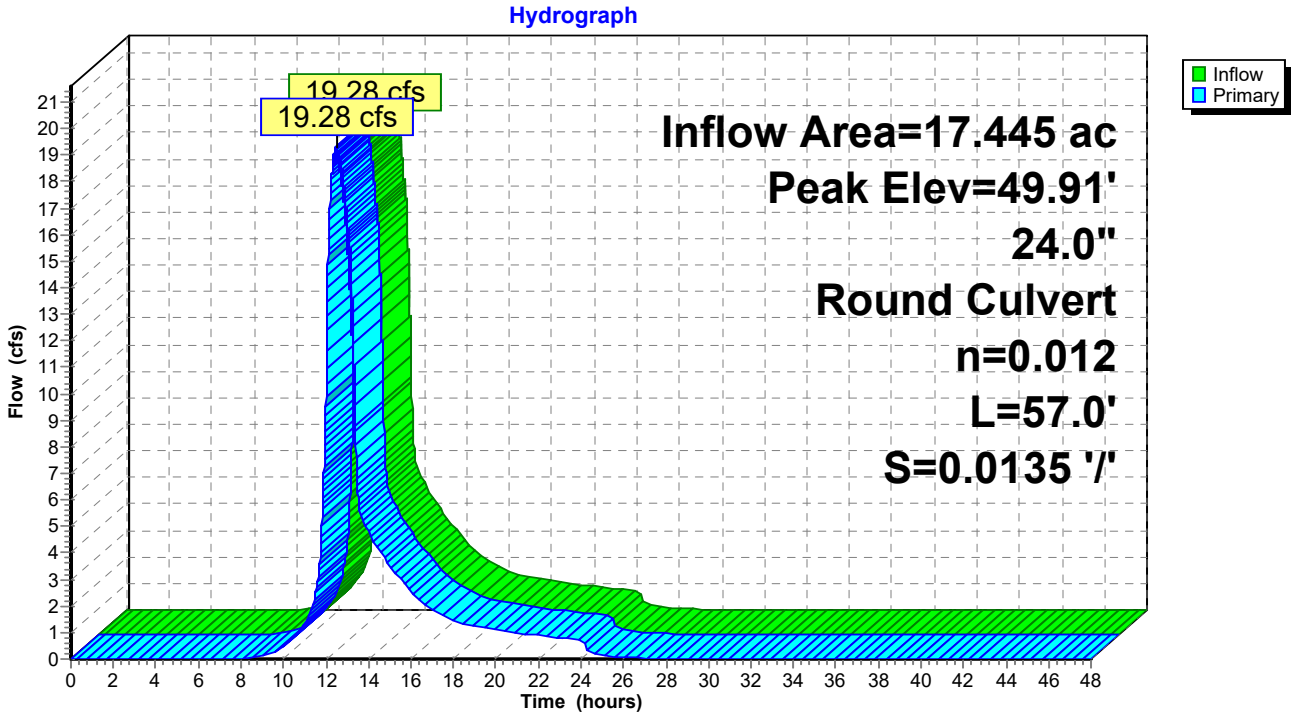
Inflow Area = 17.445 ac, 10.07% Impervious, Inflow Depth > 2.74" for 10-year event
Inflow = 19.28 cfs @ 12.48 hrs, Volume= 3.990 af
Outflow = 19.28 cfs @ 12.48 hrs, Volume= 3.990 af, Atten= 0%, Lag= 0.0 min
Primary = 19.28 cfs @ 12.48 hrs, Volume= 3.990 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 49.91' @ 12.48 hrs
Flood Elev= 53.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.29'	**24.0" Round Culvert** L= 57.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.29' / 46.52' S= 0.0135 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=19.28 cfs @ 12.48 hrs HW=49.91' TW=47.33' (Dynamic Tailwater)
1=Culvert (Inlet Controls 19.28 cfs @ 6.14 fps)

Pond 32P: DMH #10



Summary for Pond 40P: 6" CPP

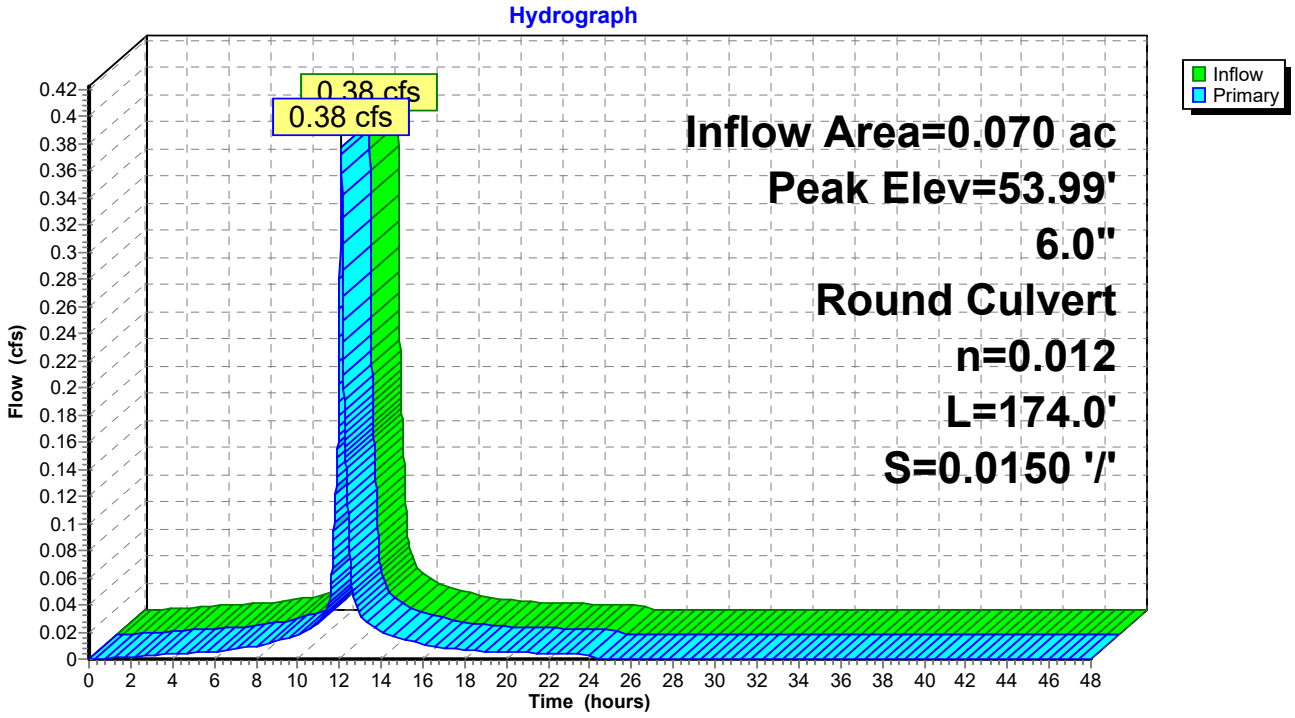
Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 5.23" for 10-year event
Inflow = 0.38 cfs @ 12.08 hrs, Volume= 0.031 af
Outflow = 0.38 cfs @ 12.08 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 12.08 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 53.99' @ 12.08 hrs
Flood Elev= 56.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	53.58'	**6.0" Round Culvert** L= 174.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.58' / 50.97' S= 0.0150 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Primary OutFlow Max=0.38 cfs @ 12.08 hrs HW=53.99' TW=52.05' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.38 cfs @ 2.18 fps)

Pond 40P: 6" CPP



Summary for Pond 41P: YD #15

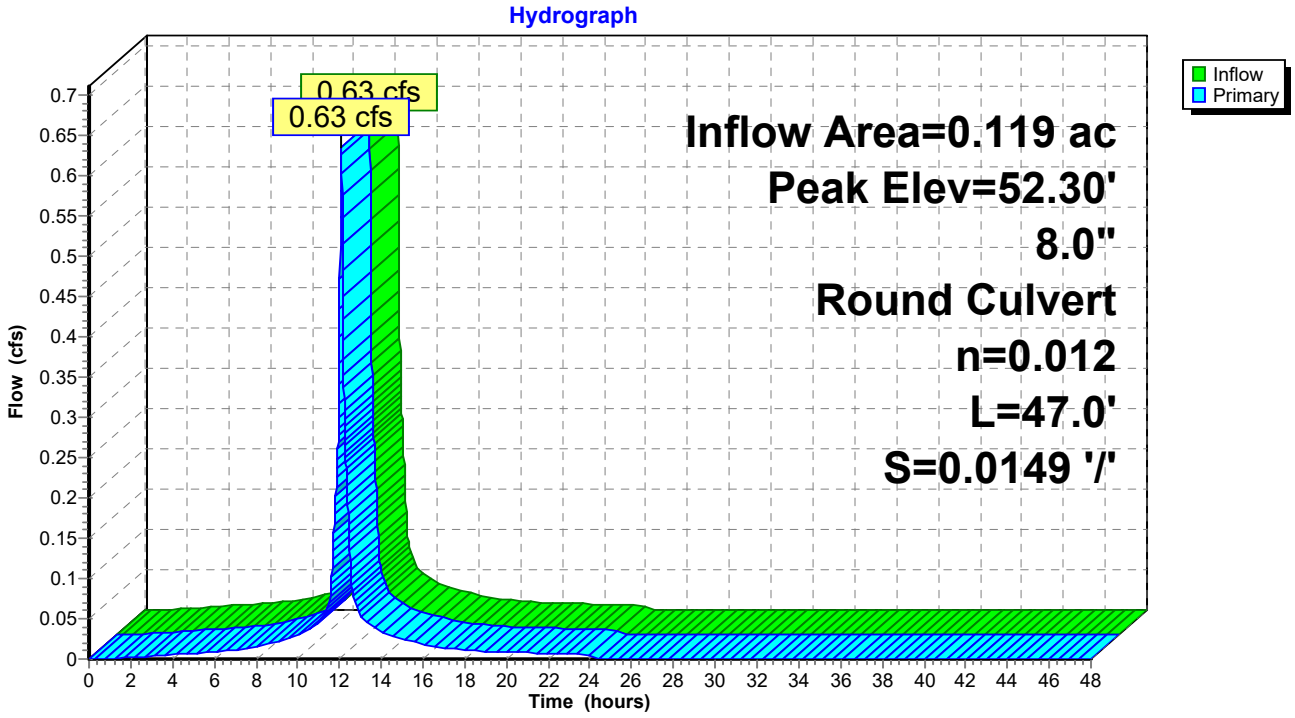
Inflow Area = 0.119 ac, 96.22% Impervious, Inflow Depth = 5.14" for 10-year event
Inflow = 0.63 cfs @ 12.08 hrs, Volume= 0.051 af
Outflow = 0.63 cfs @ 12.08 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min
Primary = 0.63 cfs @ 12.08 hrs, Volume= 0.051 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.30' @ 12.12 hrs
Flood Elev= 55.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.80'	**8.0" Round Culvert** L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.80' / 50.10' S= 0.0149 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.40 cfs @ 12.08 hrs HW=52.05' TW=51.97' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.40 cfs @ 1.15 fps)

Pond 41P: YD #15



Summary for Pond 42P: YD #14-1

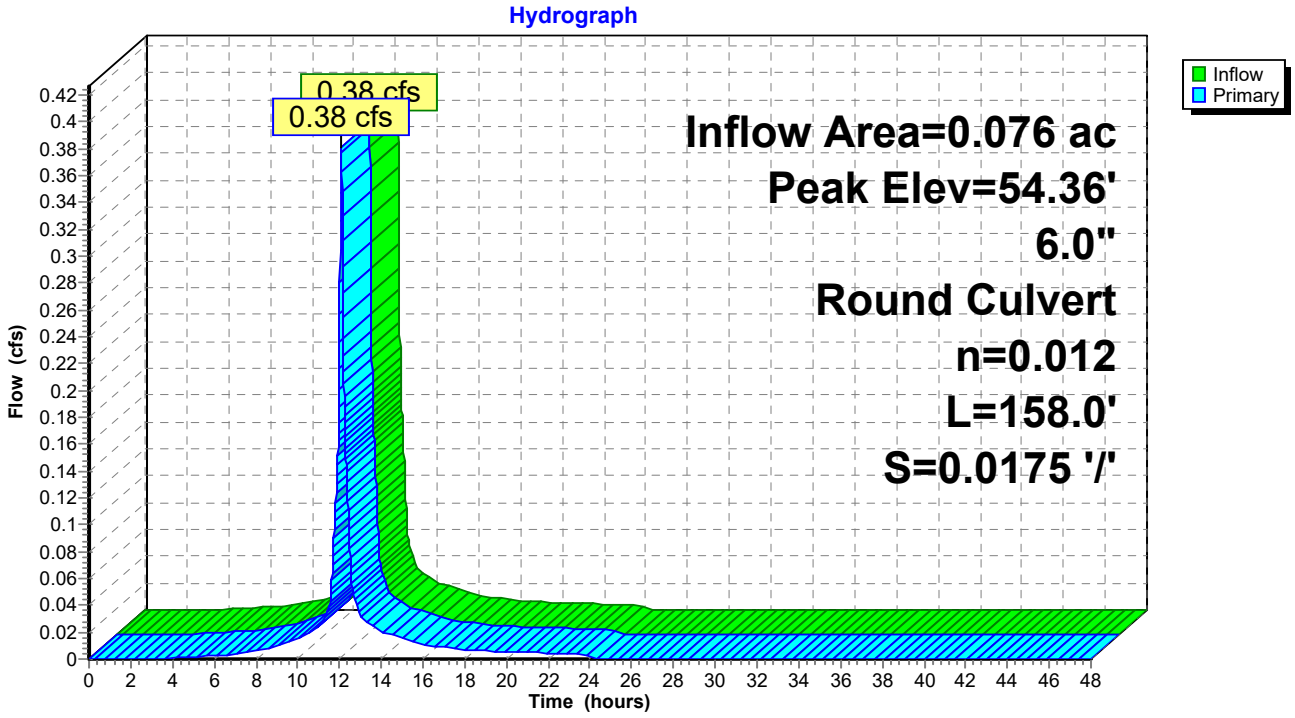
Inflow Area = 0.076 ac, 74.41% Impervious, Inflow Depth = 4.55" for 10-year event
Inflow = 0.38 cfs @ 12.08 hrs, Volume= 0.029 af
Outflow = 0.38 cfs @ 12.08 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 12.08 hrs, Volume= 0.029 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 54.36' @ 12.08 hrs
Flood Elev= 56.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	53.95'	**6.0" Round Culvert** L= 158.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.95' / 51.19' S= 0.0175 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Primary OutFlow Max=0.38 cfs @ 12.08 hrs HW=54.36' TW=51.98' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.38 cfs @ 2.19 fps)

Pond 42P: YD #14-1



Summary for Pond 43P: 10" CPP

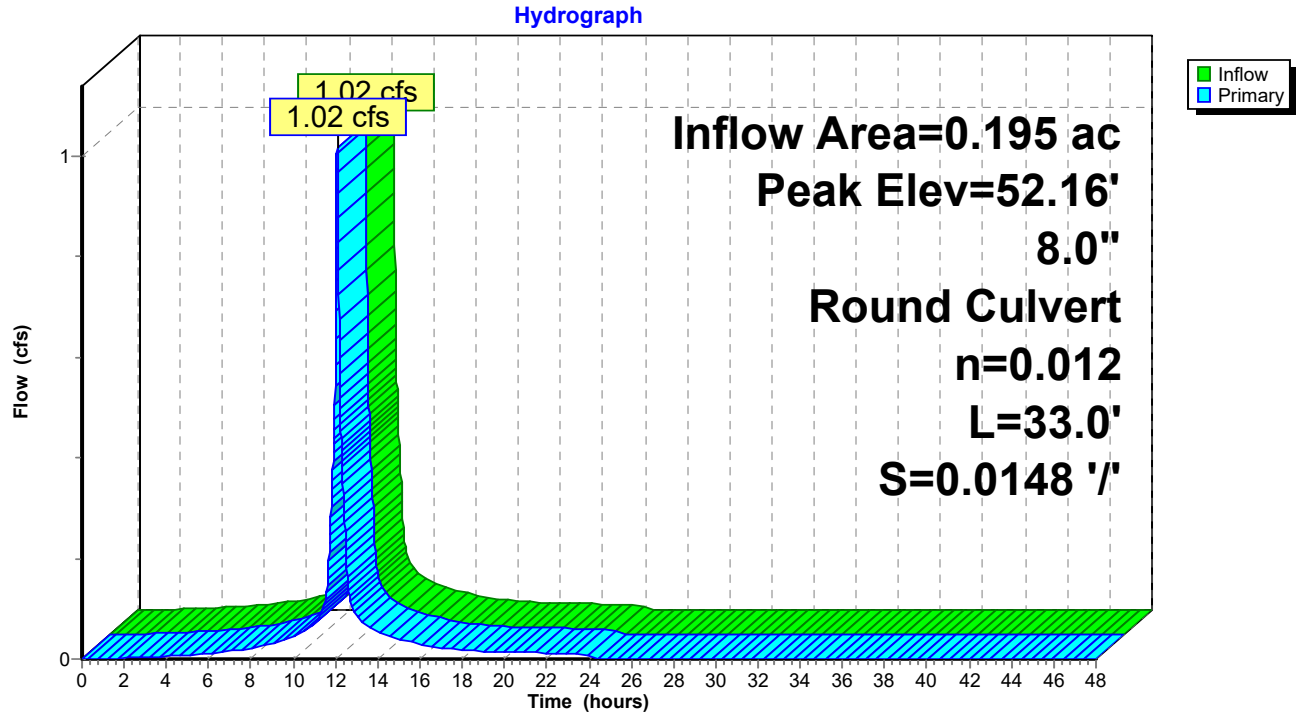
Inflow Area = 0.195 ac, 87.75% Impervious, Inflow Depth = 4.91" for 10-year event
Inflow = 1.02 cfs @ 12.08 hrs, Volume= 0.080 af
Outflow = 1.02 cfs @ 12.08 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 12.08 hrs, Volume= 0.080 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.16' @ 12.12 hrs
Flood Elev= 56.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.10'	**8.0" Round Culvert** L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.10' / 49.61' S= 0.0148 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.89 cfs @ 12.08 hrs HW=51.98' TW=51.67' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.89 cfs @ 2.55 fps)

Pond 43P: 10" CPP



Summary for Pond 44P: CB #14

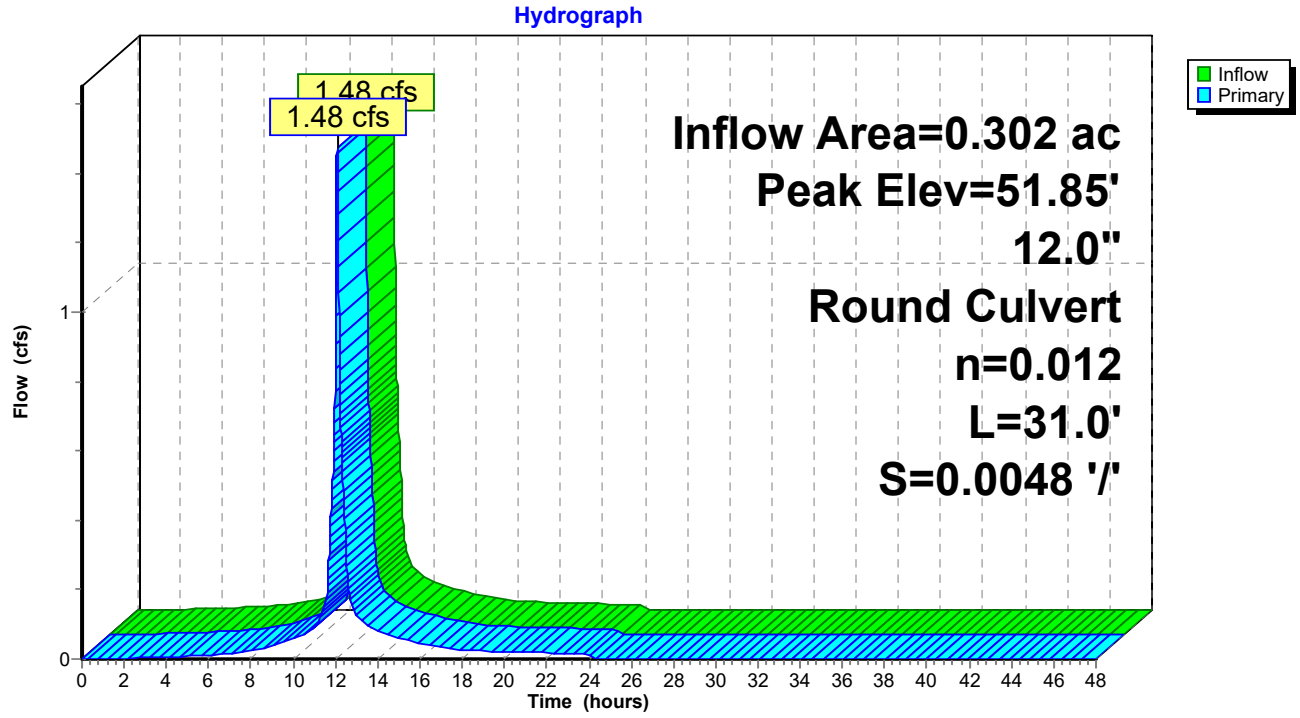
Inflow Area = 0.302 ac, 71.15% Impervious, Inflow Depth = 4.48" for 10-year event
Inflow = 1.48 cfs @ 12.08 hrs, Volume= 0.113 af
Outflow = 1.48 cfs @ 12.08 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min
Primary = 1.48 cfs @ 12.08 hrs, Volume= 0.113 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.85' @ 12.13 hrs
Flood Elev= 54.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.05'	**12.0" Round Culvert** L= 31.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.05' / 48.90' S= 0.0048 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.05 cfs @ 12.08 hrs HW=51.68' TW=51.60' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 1.05 cfs @ 1.34 fps)

Pond 44P: CB #14



Summary for Pond 45P: CB #13-2

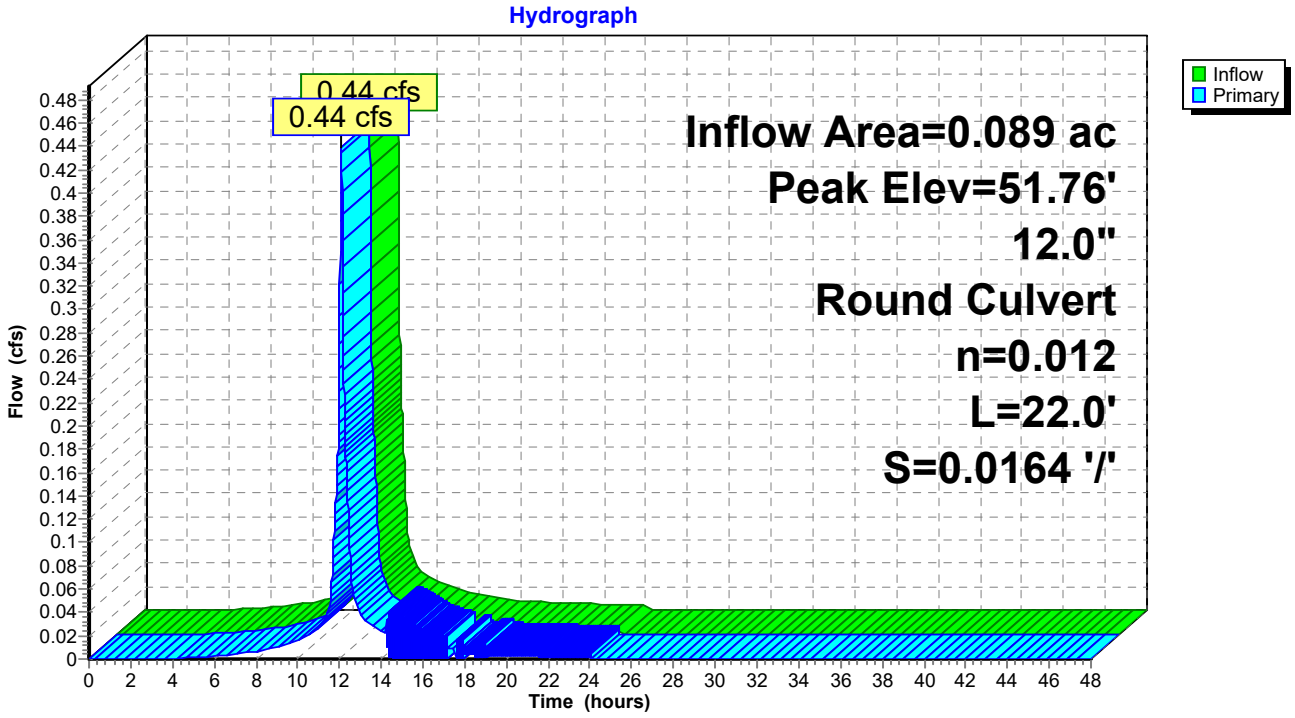
Inflow Area = 0.089 ac, 71.71% Impervious, Inflow Depth = 4.44" for 10-year event
Inflow = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af
Outflow = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.76' @ 12.34 hrs
Flood Elev= 54.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.25'	**12.0" Round Culvert** L= 22.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.25' / 48.89' S= 0.0164 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=51.54' TW=51.60' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Pond 45P: CB #13-2



Summary for Pond 46P: CB #13-1

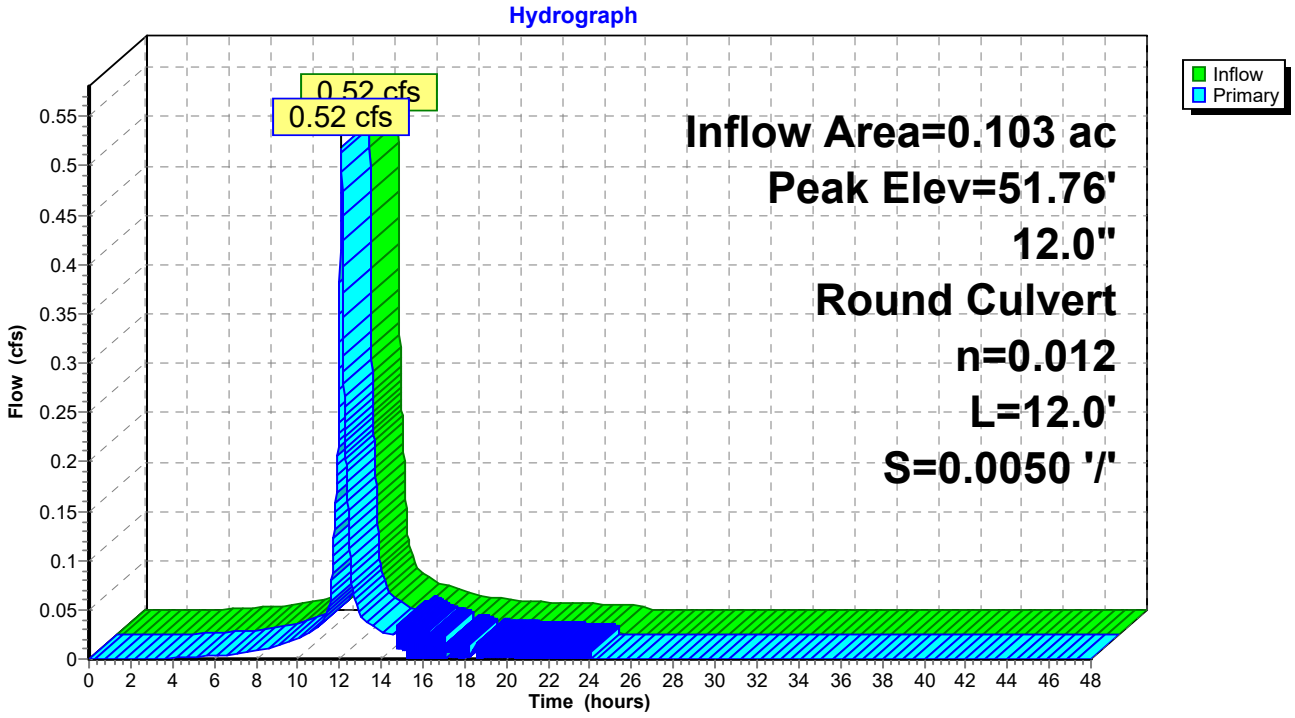
Inflow Area = 0.103 ac, 73.25% Impervious, Inflow Depth = 4.55" for 10-year event
Inflow = 0.52 cfs @ 12.08 hrs, Volume= 0.039 af
Outflow = 0.52 cfs @ 12.08 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.08 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.76' @ 12.14 hrs
Flood Elev= 54.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.95'	**12.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.95' / 48.89' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=51.55' TW=51.60' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Pond 46P: CB #13-1



Summary for Pond 47P: DMH #13

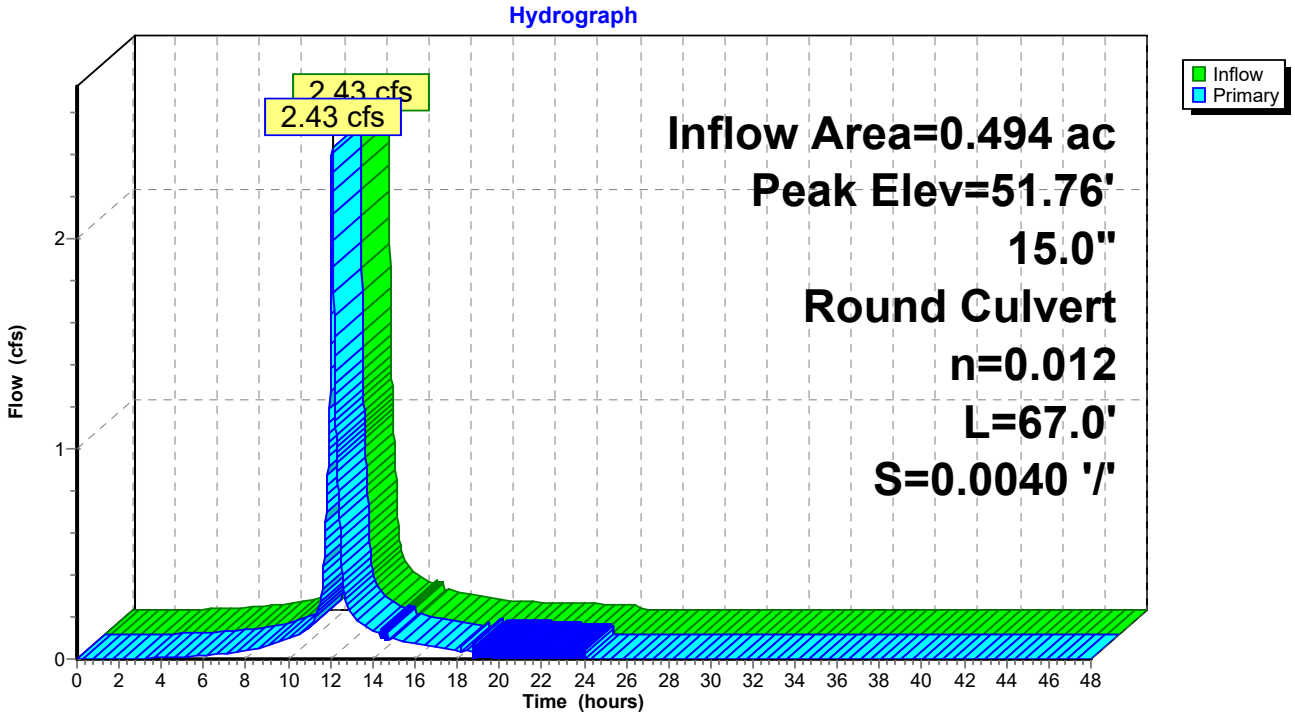
Inflow Area = 0.494 ac, 71.69% Impervious, Inflow Depth = 4.49" for 10-year event
Inflow = 2.43 cfs @ 12.08 hrs, Volume= 0.185 af
Outflow = 2.43 cfs @ 12.08 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.0 min
Primary = 2.43 cfs @ 12.08 hrs, Volume= 0.185 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.76' @ 12.33 hrs
Flood Elev= 54.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.79'	**15.0" Round Culvert** L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.79' / 48.52' S= 0.0040 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.95 cfs @ 12.08 hrs HW=51.60' TW=51.49' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.95 cfs @ 1.59 fps)

Pond 47P: DMH #13



Summary for Pond 48P: CB #12-2

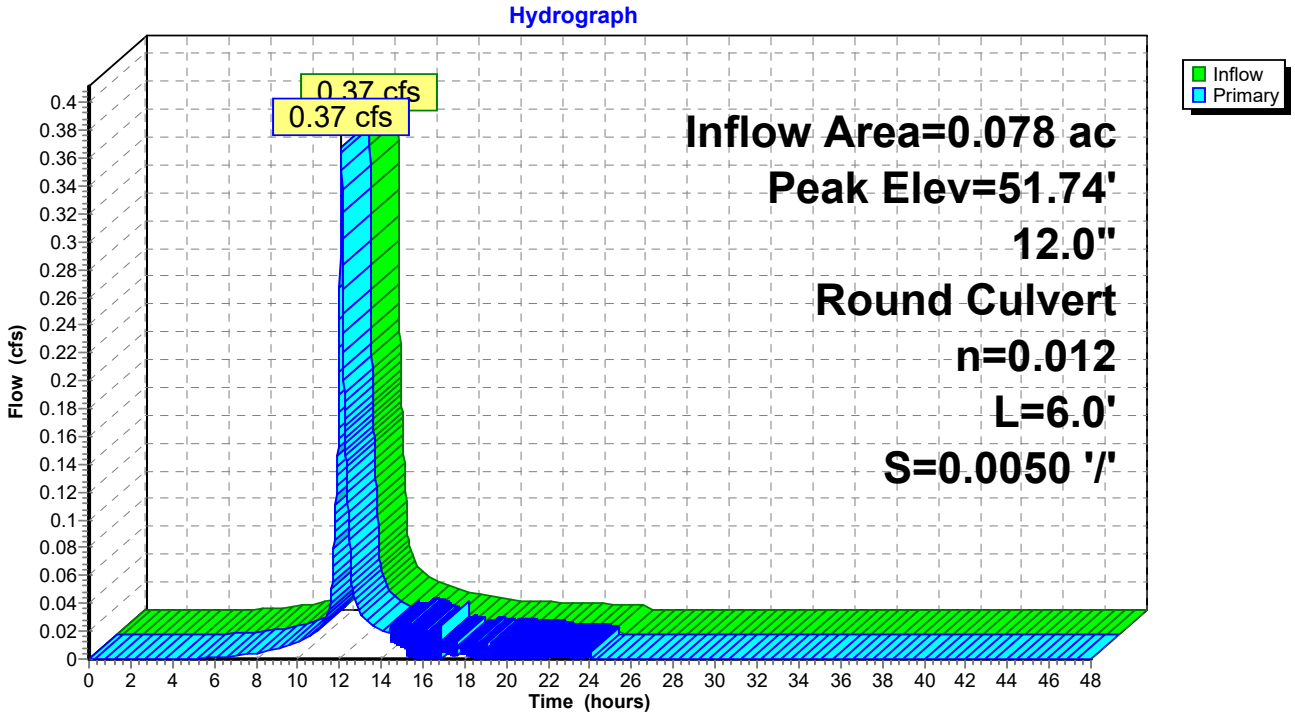
Inflow Area = 0.078 ac, 55.67% Impervious, Inflow Depth = 4.12" for 10-year event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af
Outflow = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
Primary = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.74' @ 12.35 hrs
Flood Elev= 52.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.70'	**12.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.70' / 48.67' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=51.45' TW=51.50' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond 48P: CB #12-2



Summary for Pond 49P: CB #12-1

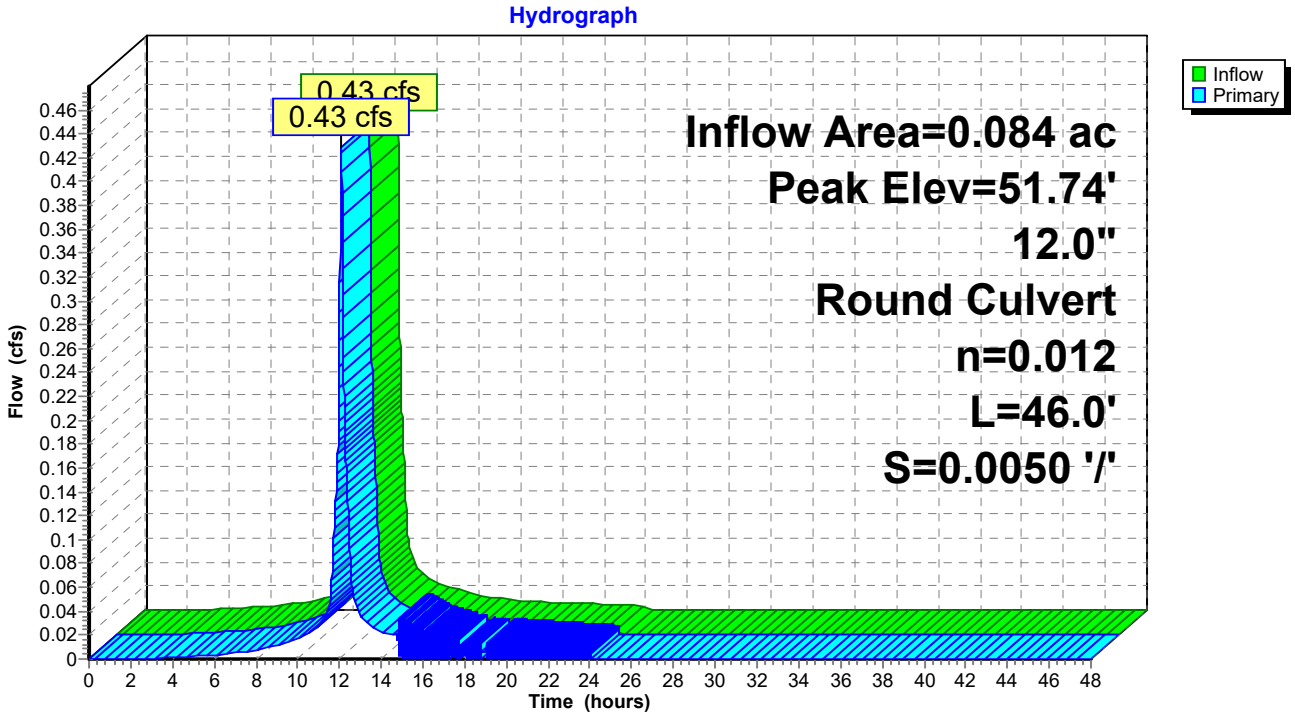
Inflow Area = 0.084 ac, 83.78% Impervious, Inflow Depth = 4.66" for 10-year event
Inflow = 0.43 cfs @ 12.08 hrs, Volume= 0.033 af
Outflow = 0.43 cfs @ 12.08 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.08 hrs, Volume= 0.033 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.74' @ 12.35 hrs
Flood Elev= 52.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.90'	**12.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.90' / 48.67' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=51.44' TW=51.49' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond 49P: CB #12-1



Summary for Pond 50P: DMH #12

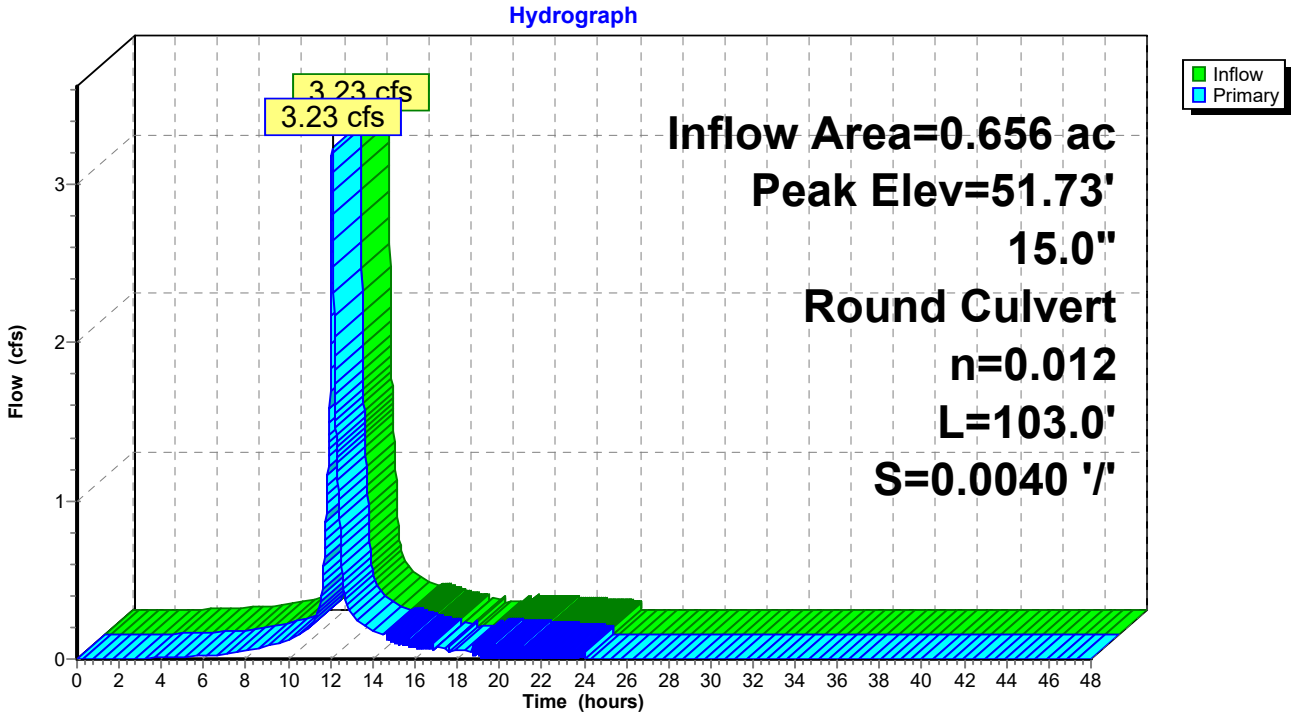
Inflow Area = 0.656 ac, 71.32% Impervious, Inflow Depth = 4.46" for 10-year event
Inflow = 3.23 cfs @ 12.08 hrs, Volume= 0.244 af
Outflow = 3.23 cfs @ 12.08 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min
Primary = 3.23 cfs @ 12.08 hrs, Volume= 0.244 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.73' @ 12.34 hrs
Flood Elev= 54.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.42'	**15.0" Round Culvert** L= 103.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.42' / 48.01' S= 0.0040 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.98 cfs @ 12.08 hrs HW=51.49' TW=51.17' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 2.98 cfs @ 2.43 fps)

Pond 50P: DMH #12



Summary for Pond 60P: CB #17-1-2

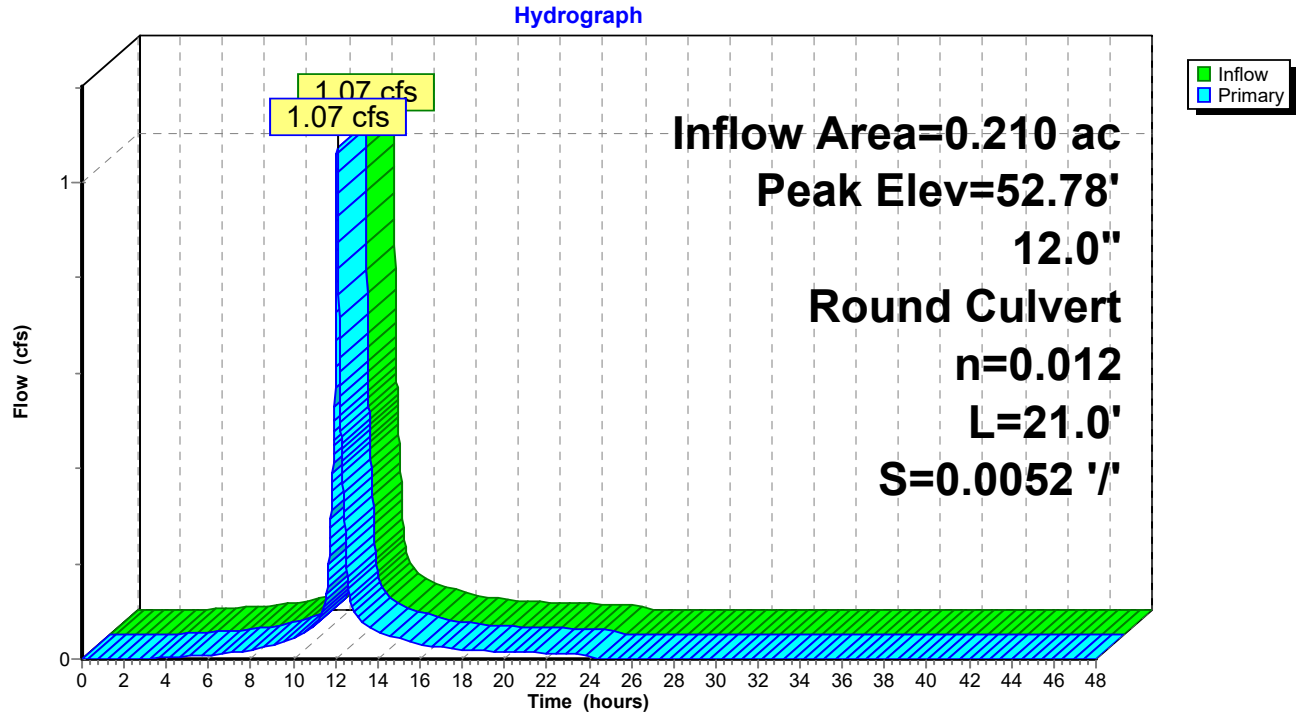
Inflow Area = 0.210 ac, 78.55% Impervious, Inflow Depth = 4.66" for 10-year event
Inflow = 1.07 cfs @ 12.08 hrs, Volume= 0.082 af
Outflow = 1.07 cfs @ 12.08 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min
Primary = 1.07 cfs @ 12.08 hrs, Volume= 0.082 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.78' @ 12.12 hrs
Flood Elev= 54.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.40'	**12.0" Round Culvert** L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.40' / 50.29' S= 0.0052 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=52.50' TW=52.56' (Dynamic Tailwater)
↳**1=Culvert** (Controls 0.00 cfs)

Pond 60P: CB #17-1-2



Summary for Pond 61P: CB #17-1-1

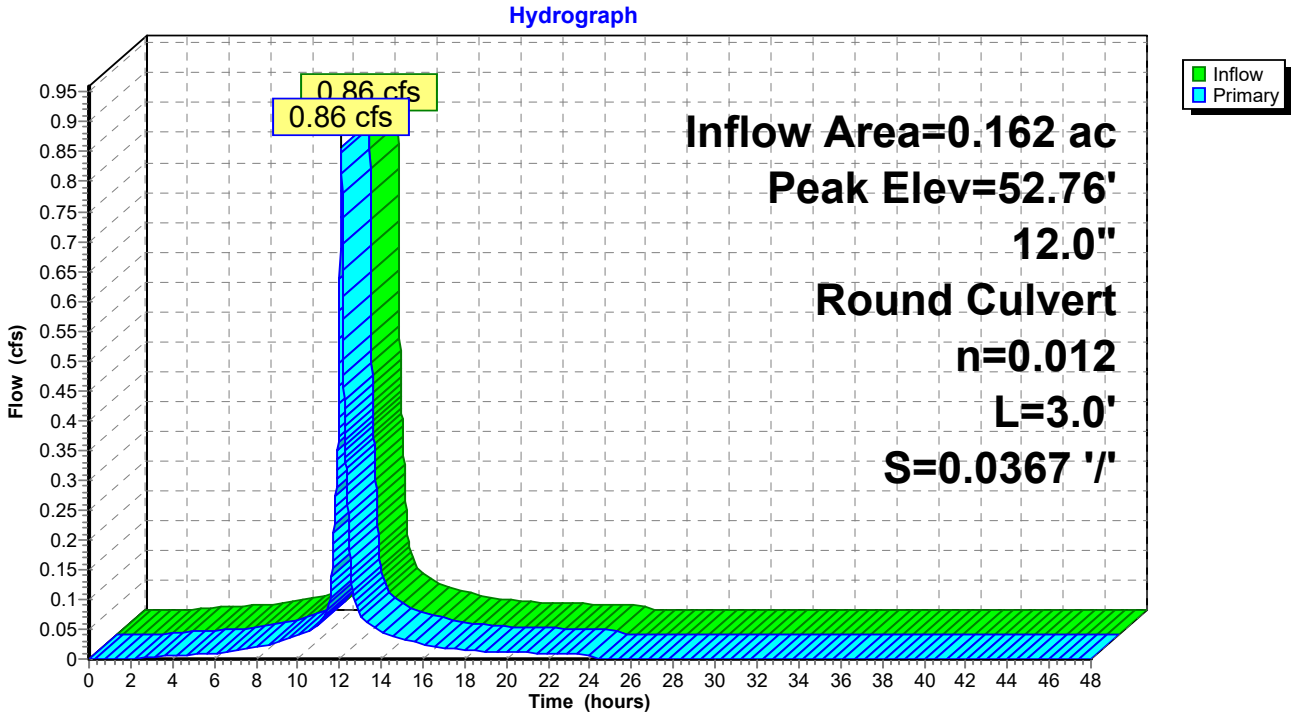
Inflow Area = 0.162 ac, 91.98% Impervious, Inflow Depth = 5.00" for 10-year event
Inflow = 0.86 cfs @ 12.08 hrs, Volume= 0.068 af
Outflow = 0.86 cfs @ 12.08 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.08 hrs, Volume= 0.068 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.76' @ 12.12 hrs
Flood Elev= 54.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.40'	**12.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.40' / 50.29' S= 0.0367 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=52.46' TW=52.55' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Pond 61P: CB #17-1-1



Summary for Pond 62P: DMH #17-1

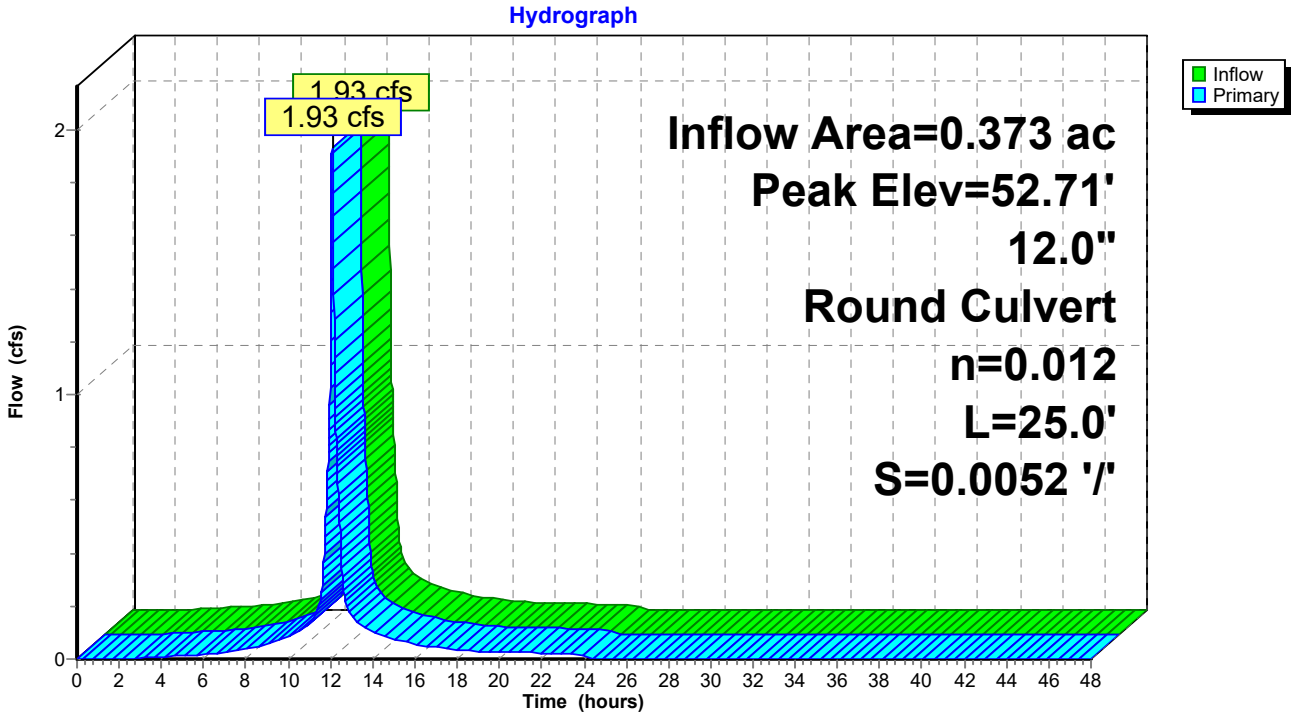
Inflow Area = 0.373 ac, 84.39% Impervious, Inflow Depth = 4.81" for 10-year event
Inflow = 1.93 cfs @ 12.08 hrs, Volume= 0.149 af
Outflow = 1.93 cfs @ 12.08 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min
Primary = 1.93 cfs @ 12.08 hrs, Volume= 0.149 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.71' @ 12.11 hrs
Flood Elev= 54.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.19'	**12.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.19' / 50.06' S= 0.0052 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.52 cfs @ 12.08 hrs HW=52.56' TW=52.40' (Dynamic Tailwater)
↳**1=Culvert** (Inlet Controls 1.52 cfs @ 1.93 fps)

Pond 62P: DMH #17-1



Summary for Pond 63P: YD #21

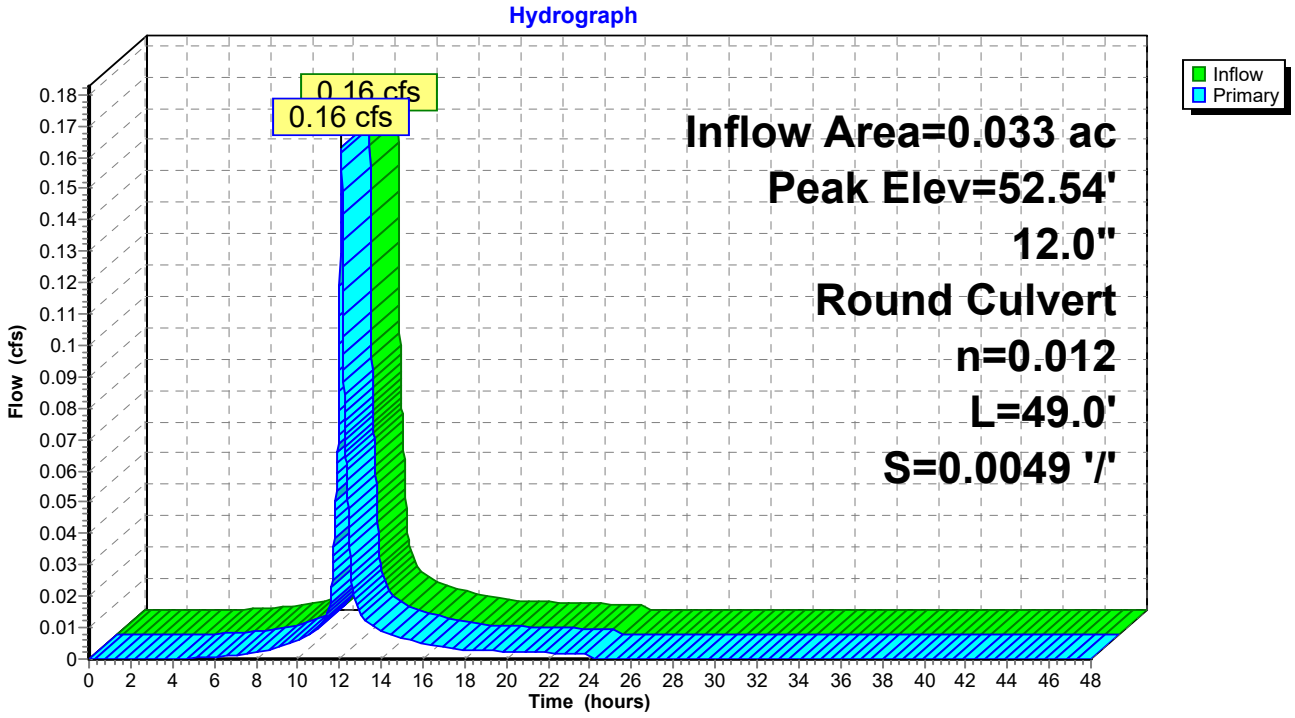
Inflow Area = 0.033 ac, 65.52% Impervious, Inflow Depth = 4.33" for 10-year event
Inflow = 0.16 cfs @ 12.08 hrs, Volume= 0.012 af
Outflow = 0.16 cfs @ 12.08 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.08 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.54' @ 12.14 hrs
Flood Elev= 55.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.70'	**12.0" Round Culvert** L= 49.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.70' / 51.46' S= 0.0049 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=52.03' TW=52.10' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Pond 63P: YD #21



Summary for Pond 64P: YD #20

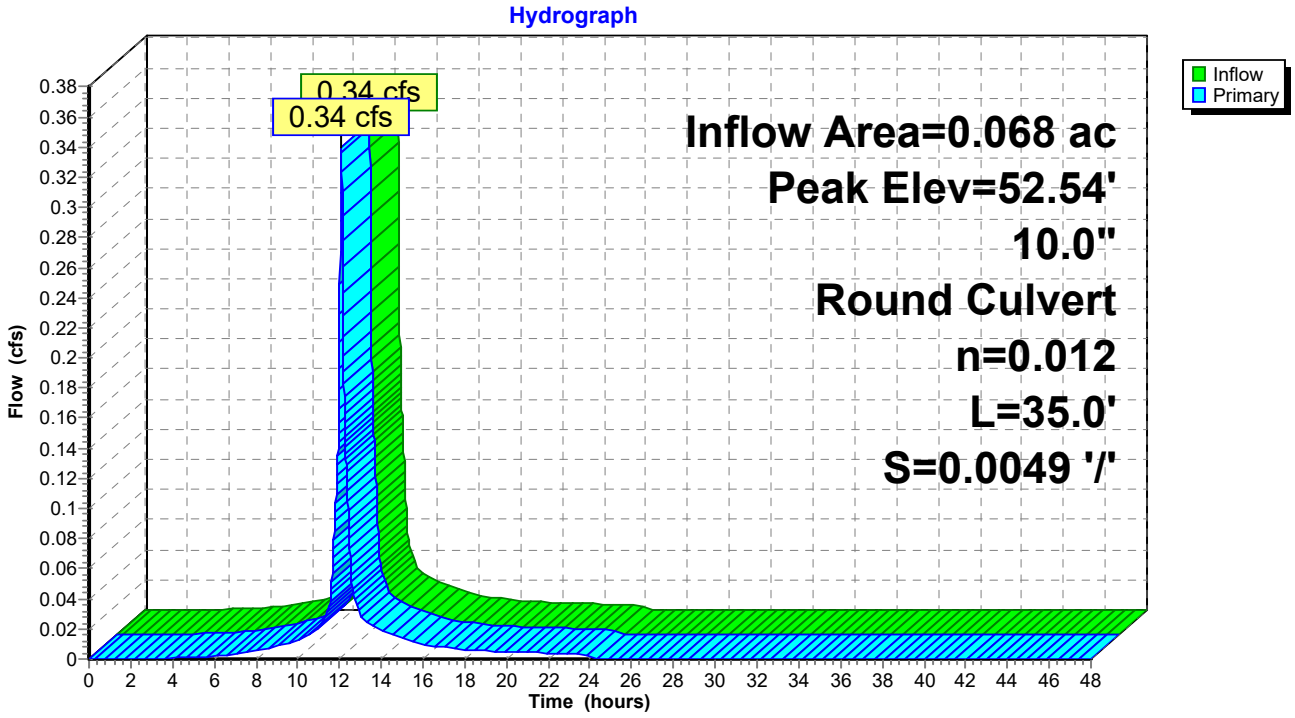
Inflow Area = 0.068 ac, 73.50% Impervious, Inflow Depth = 4.50" for 10-year event
Inflow = 0.34 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.34 cfs @ 12.08 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.08 hrs, Volume= 0.026 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.54' @ 12.13 hrs
Flood Elev= 55.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.28'	**10.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.28' / 51.11' S= 0.0049 '/' Cc= 0.900 n= 0.012, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=52.09' TW=52.23' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Pond 64P: YD #20



Summary for Pond 65P: YD #19

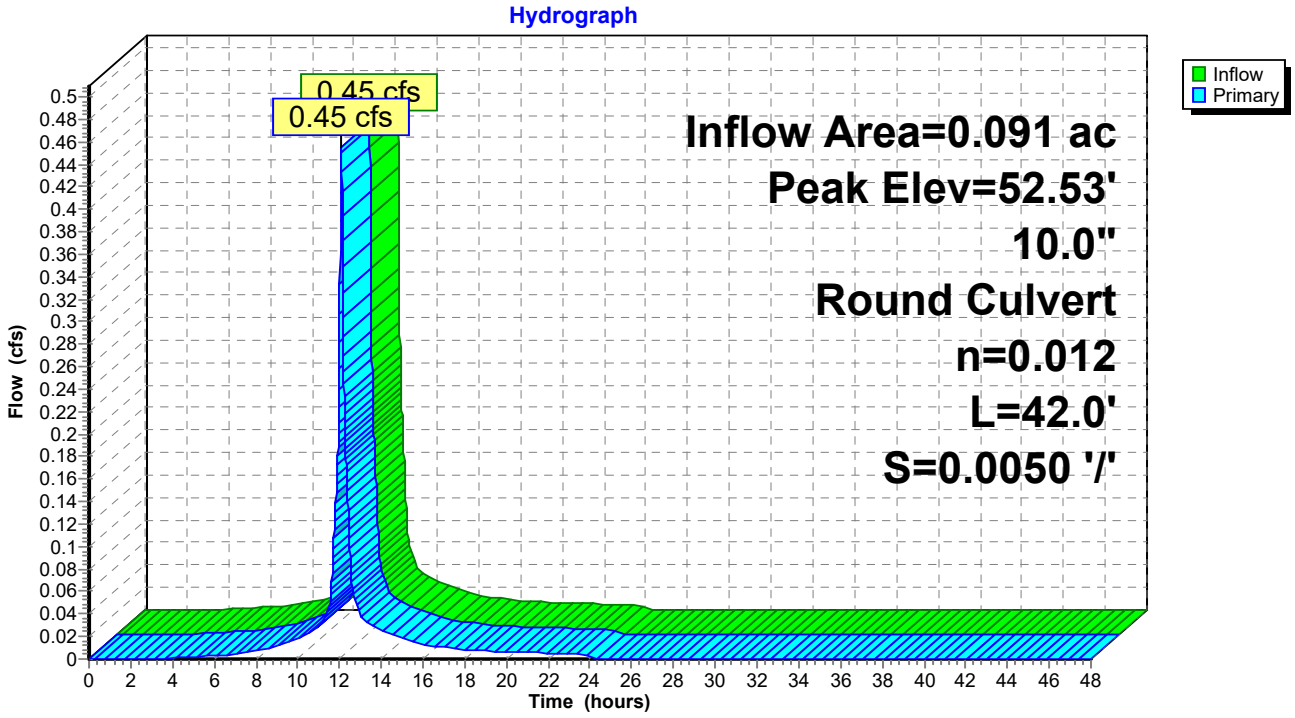
Inflow Area = 0.091 ac, 75.33% Impervious, Inflow Depth = 4.54" for 10-year event
Inflow = 0.45 cfs @ 12.08 hrs, Volume= 0.034 af
Outflow = 0.45 cfs @ 12.08 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 0.45 cfs @ 12.08 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.53' @ 12.12 hrs
Flood Elev= 56.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.00'	**10.0" Round Culvert** L= 42.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.00' / 50.79' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=52.23' TW=52.33' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond 65P: YD #19



Summary for Pond 66P: YD #18

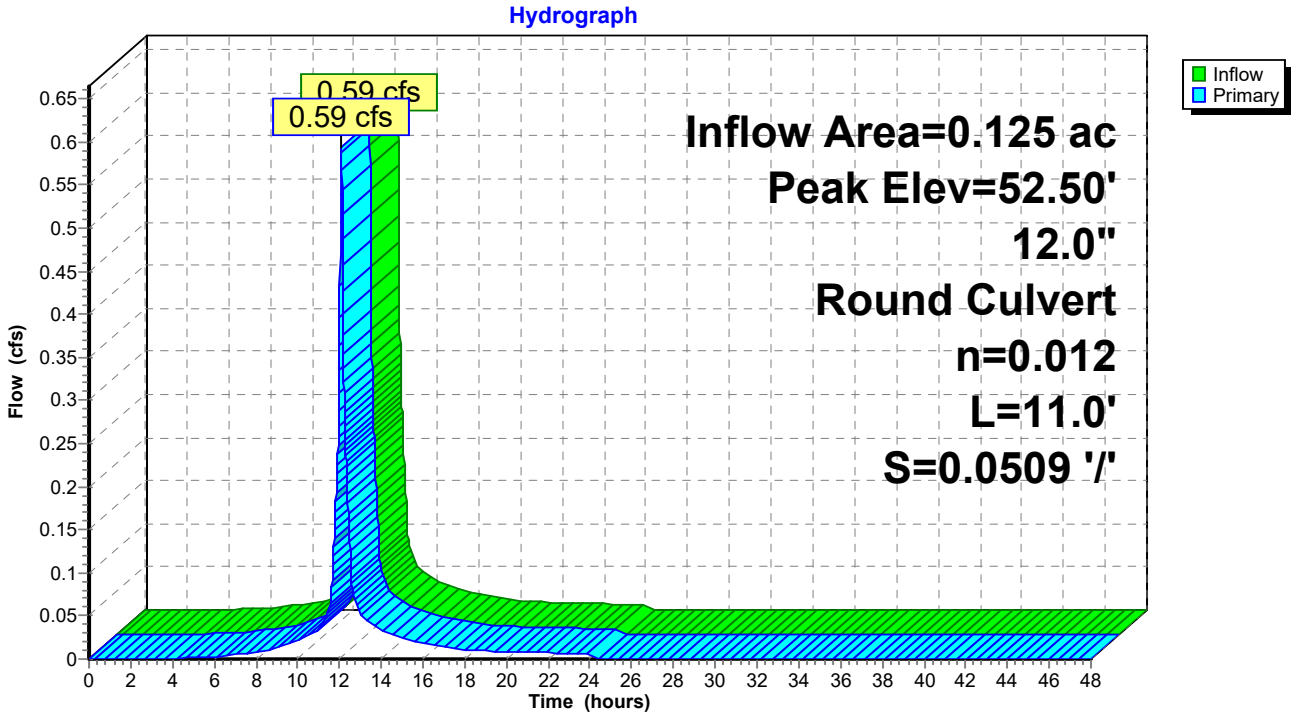
Inflow Area = 0.125 ac, 67.01% Impervious, Inflow Depth = 4.26" for 10-year event
Inflow = 0.59 cfs @ 12.09 hrs, Volume= 0.044 af
Outflow = 0.59 cfs @ 12.09 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min
Primary = 0.59 cfs @ 12.09 hrs, Volume= 0.044 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.50' @ 12.11 hrs
Flood Elev= 55.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.62'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.62' / 50.06' S= 0.0509 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=52.34' TW=52.41' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond 66P: YD #18



Summary for Pond 67P: CB #17

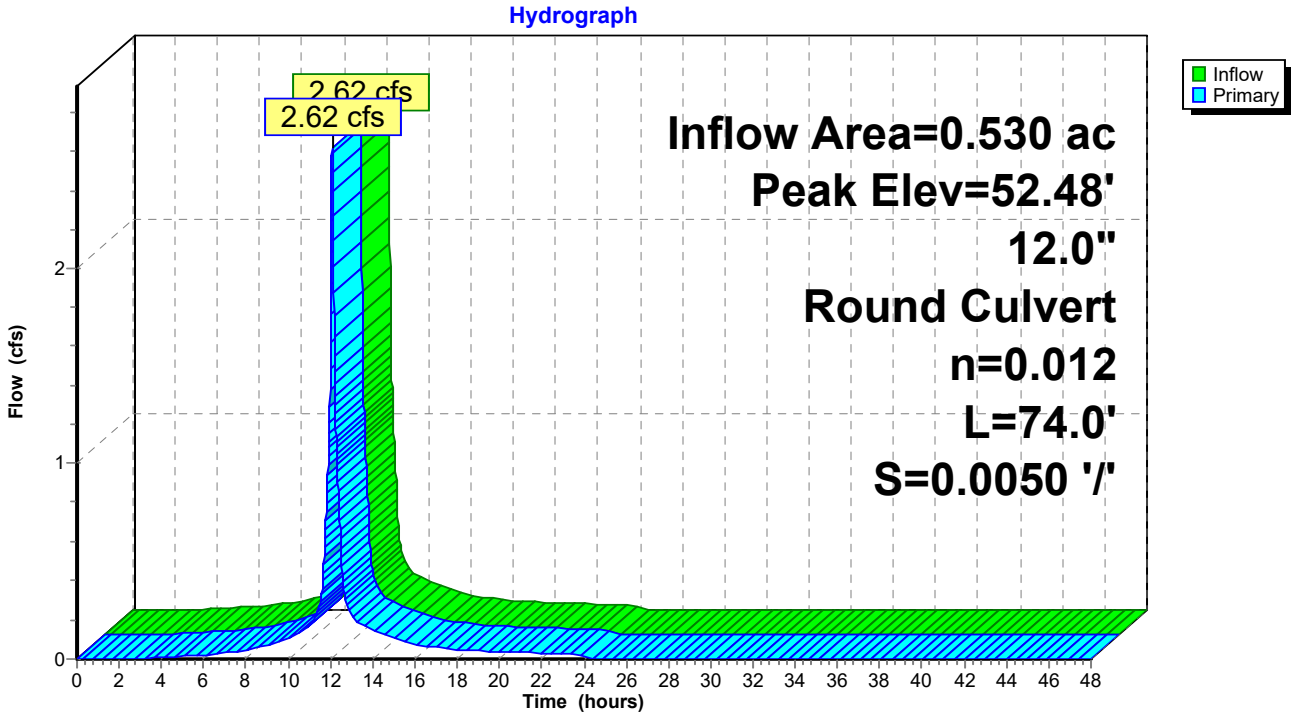
Inflow Area = 0.530 ac, 76.52% Impervious, Inflow Depth = 4.53" for 10-year event
Inflow = 2.62 cfs @ 12.08 hrs, Volume= 0.200 af
Outflow = 2.62 cfs @ 12.08 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min
Primary = 2.62 cfs @ 12.08 hrs, Volume= 0.200 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 52.48' @ 12.10 hrs
Flood Elev= 55.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.96'	**12.0" Round Culvert** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.96' / 49.59' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.46 cfs @ 12.08 hrs HW=52.40' TW=51.87' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 2.46 cfs @ 3.13 fps)

Pond 67P: CB #17



Summary for Pond 68P: DMH #16

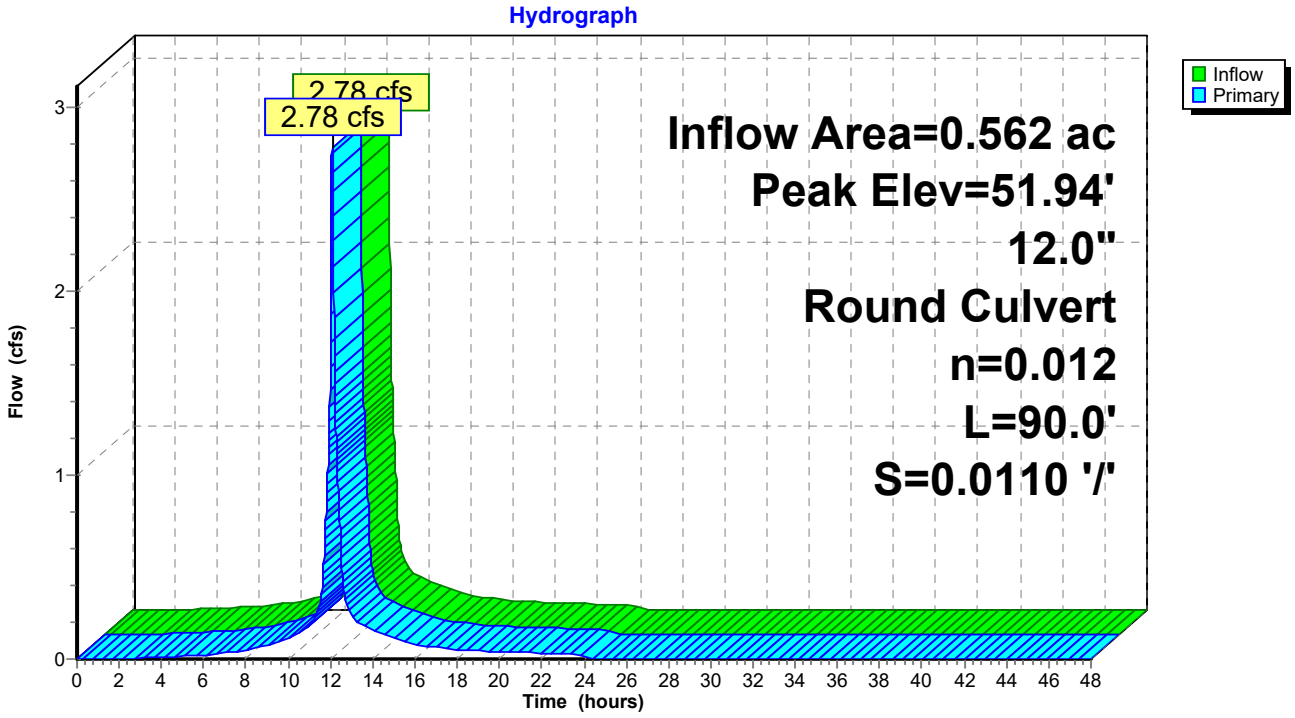
Inflow Area = 0.562 ac, 77.83% Impervious, Inflow Depth = 4.57" for 10-year event
Inflow = 2.78 cfs @ 12.08 hrs, Volume= 0.214 af
Outflow = 2.78 cfs @ 12.08 hrs, Volume= 0.214 af, Atten= 0%, Lag= 0.0 min
Primary = 2.78 cfs @ 12.08 hrs, Volume= 0.214 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 51.94' @ 12.11 hrs
Flood Elev= 56.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.49'	**12.0" Round Culvert** L= 90.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.49' / 48.50' S= 0.0110 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.08 hrs HW=51.87' TW=51.17' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 2.68 cfs @ 3.41 fps)

Pond 68P: DMH #16



Summary for Pond 69P: Bio #3 / OS #11

Inflow Area = 1.681 ac, 63.59% Impervious, Inflow Depth = 4.16" for 10-year event
Inflow = 7.64 cfs @ 12.09 hrs, Volume= 0.583 af
Outflow = 2.52 cfs @ 12.38 hrs, Volume= 0.560 af, Atten= 67%, Lag= 17.7 min
Primary = 2.52 cfs @ 12.38 hrs, Volume= 0.560 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 48.00' Surf.Area= 1,706 sf Storage= 128 cf
Peak Elev= 51.69' @ 12.38 hrs Surf.Area= 4,603 sf Storage= 11,307 cf (11,179 cf above start)
Flood Elev= 53.00' Surf.Area= 6,019 sf Storage= 18,236 cf (18,109 cf above start)

Plug-Flow detention time= 299.9 min calculated for 0.557 af (95% of inflow)
Center-of-Mass det. time= 270.6 min (1,050.4 - 779.8)

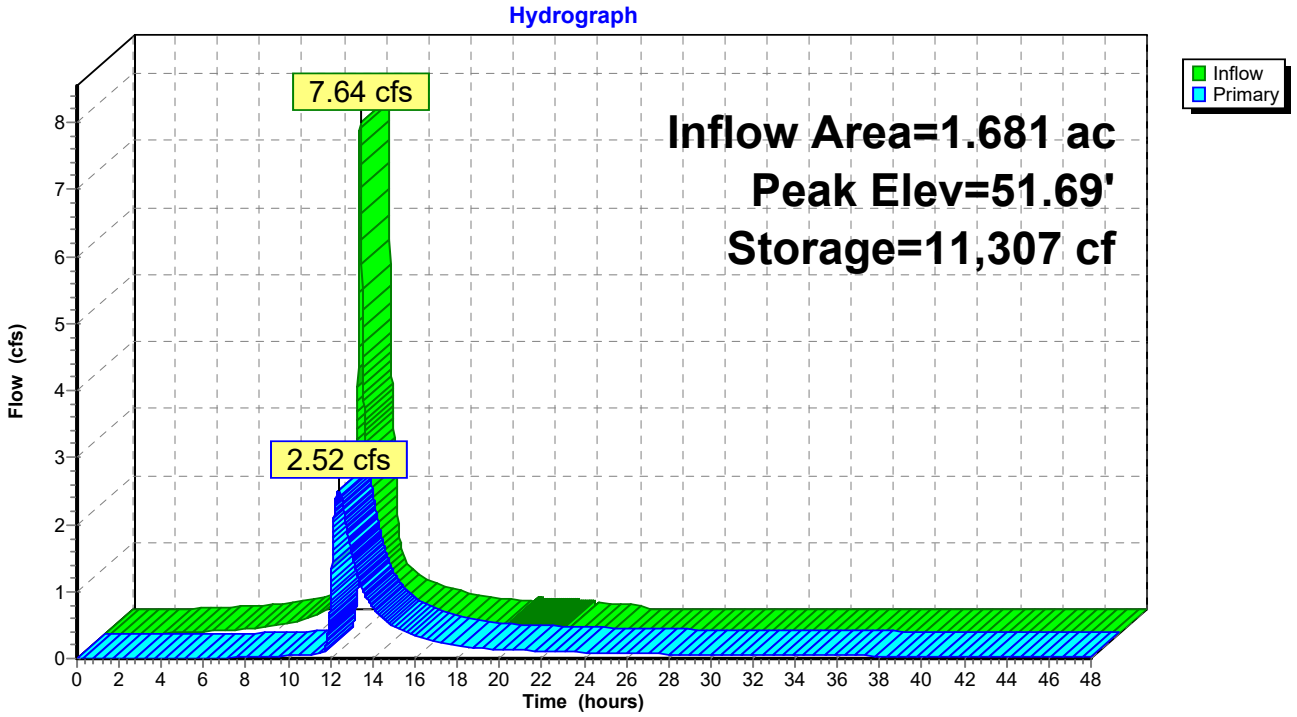
Volume	Invert	Avail.Storage	Storage Description
#1	46.50'	18,236 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
46.50	1,706	0.0	0	0	1,706
48.00	1,706	5.0	128	128	1,926
49.00	2,381	100.0	2,034	2,162	2,619
50.00	3,056	100.0	2,711	4,874	3,319
51.00	3,935	100.0	3,486	8,360	4,223
52.00	4,918	100.0	4,417	12,777	5,233
53.00	6,019	100.0	5,459	18,236	6,365

Device	Routing	Invert	Outlet Devices
#1	Primary	45.50'	**18.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.50' / 45.25' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	45.50'	**4.0" Vert. Underdrain** C= 0.600
#3	Device 2	48.00'	**2.400 in/hr Exfiltration through Media over Wetted area above 48.00'** Excluded Wetted area = 1,926 sf Phase-In= 0.01'
#4	Device 1	50.00'	**4.0" W x 30.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	52.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.52 cfs @ 12.38 hrs HW=51.69' TW=45.65' (Dynamic Tailwater)
- **1=Culvert** (Passes 2.52 cfs of 19.85 cfs potential flow)
  - **2=Underdrain** (Passes 0.17 cfs of 1.03 cfs potential flow)
    - **3=Exfiltration through Media** (Exfiltration Controls 0.17 cfs)
  - **4=Orifice/Grate** (Orifice Controls 2.35 cfs @ 4.17 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Pond 69P: Bio #3 / OS #11



Summary for Pond 80P: 6" CPP

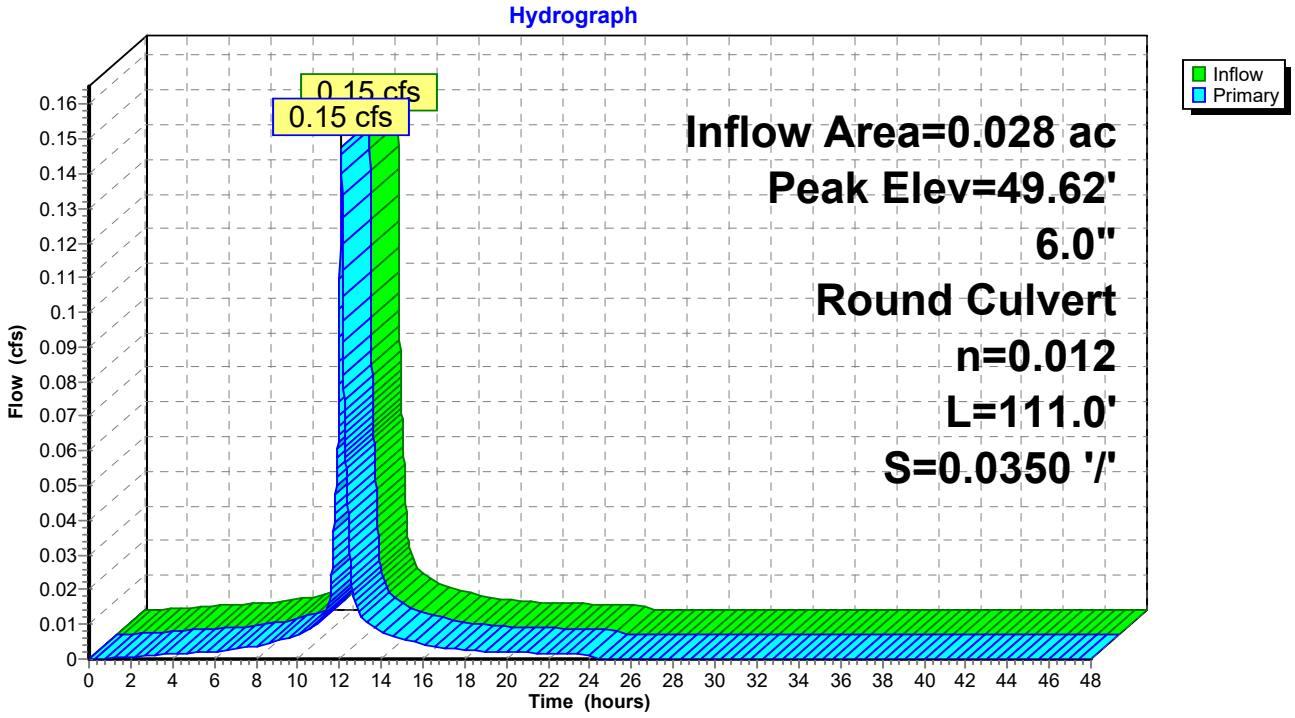
Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 5.23" for 10-year event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af
Outflow = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
Primary = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 49.62' @ 12.08 hrs
Flood Elev= 52.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.39'	**6.0" Round Culvert** L= 111.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.39' / 45.50' S= 0.0350 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Primary OutFlow Max=0.15 cfs @ 12.08 hrs HW=49.62' TW=47.91' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.15 cfs @ 1.64 fps)

Pond 80P: 6" CPP



Summary for Pond 81P: 6" CPP

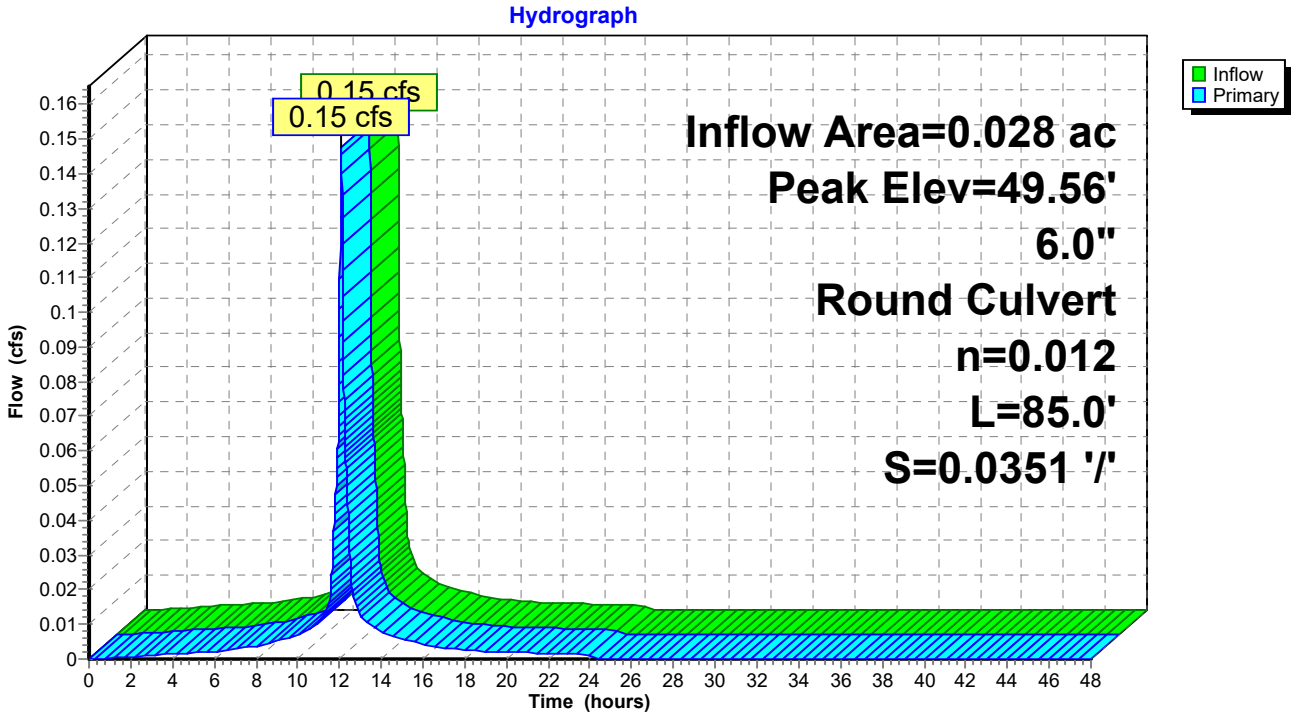
Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 5.23" for 10-year event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af
Outflow = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
Primary = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 49.56' @ 12.08 hrs
Flood Elev= 52.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.33'	**6.0" Round Culvert** L= 85.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.33' / 46.35' S= 0.0351 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Primary OutFlow Max=0.15 cfs @ 12.08 hrs HW=49.56' TW=47.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.15 cfs @ 1.64 fps)

Pond 81P: 6" CPP



Summary for Pond 82P: CB #23

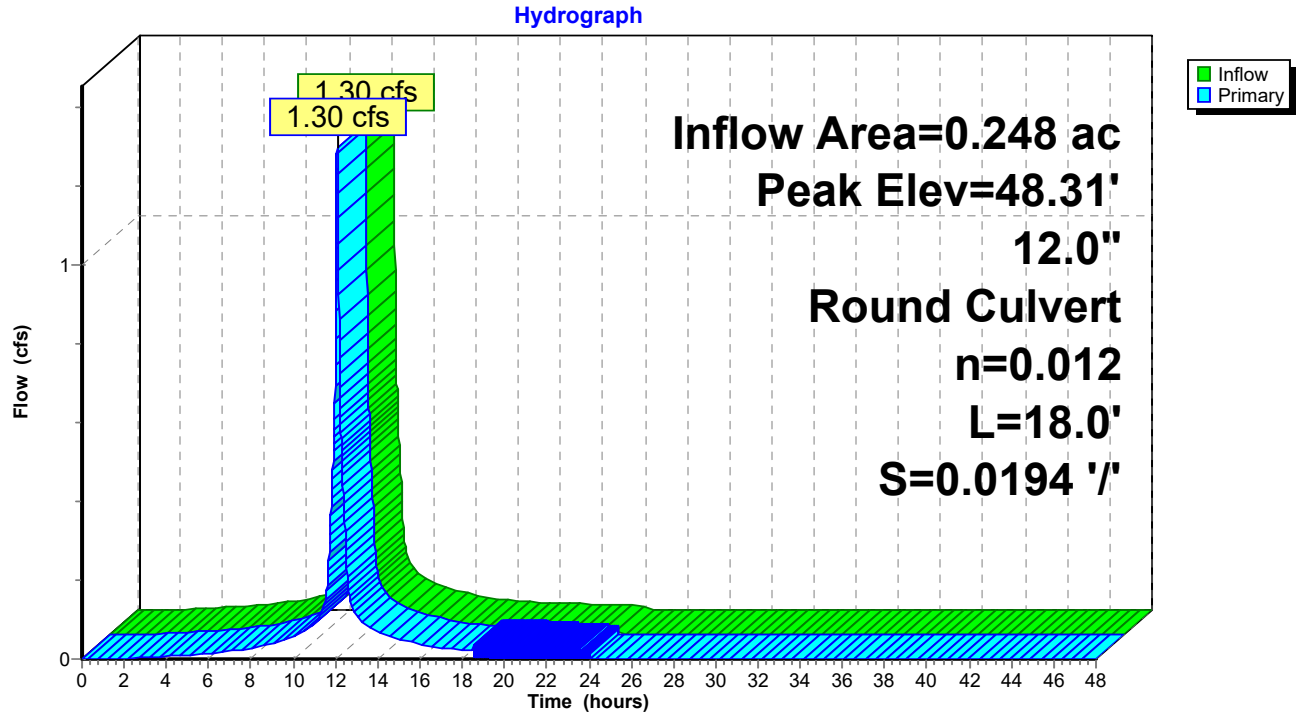
Inflow Area = 0.248 ac, 91.46% Impervious, Inflow Depth = 4.92" for 10-year event
Inflow = 1.30 cfs @ 12.08 hrs, Volume= 0.102 af
Outflow = 1.30 cfs @ 12.08 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min
Primary = 1.30 cfs @ 12.08 hrs, Volume= 0.102 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 48.31' @ 12.39 hrs
Flood Elev= 49.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.85'	**12.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.85' / 45.50' S= 0.0194 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.07 cfs @ 12.08 hrs HW=47.99' TW=47.91' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.07 cfs @ 1.36 fps)

Pond 82P: CB #23



Summary for Pond 83P: Bio #4 / OS #22

Inflow Area = 0.333 ac, 76.36% Impervious, Inflow Depth = 4.57" for 10-year event
Inflow = 1.63 cfs @ 12.08 hrs, Volume= 0.127 af
Outflow = 0.50 cfs @ 12.40 hrs, Volume= 0.127 af, Atten= 70%, Lag= 18.9 min
Primary = 0.50 cfs @ 12.40 hrs, Volume= 0.127 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 45.50' Surf.Area= 315 sf Storage= 24 cf
Peak Elev= 48.30' @ 12.40 hrs Surf.Area= 1,352 sf Storage= 2,220 cf (2,196 cf above start)
Flood Elev= 49.00' Surf.Area= 1,695 sf Storage= 3,283 cf (3,260 cf above start)

Plug-Flow detention time= 216.3 min calculated for 0.126 af (99% of inflow)
Center-of-Mass det. time= 208.5 min (977.7 - 769.2)

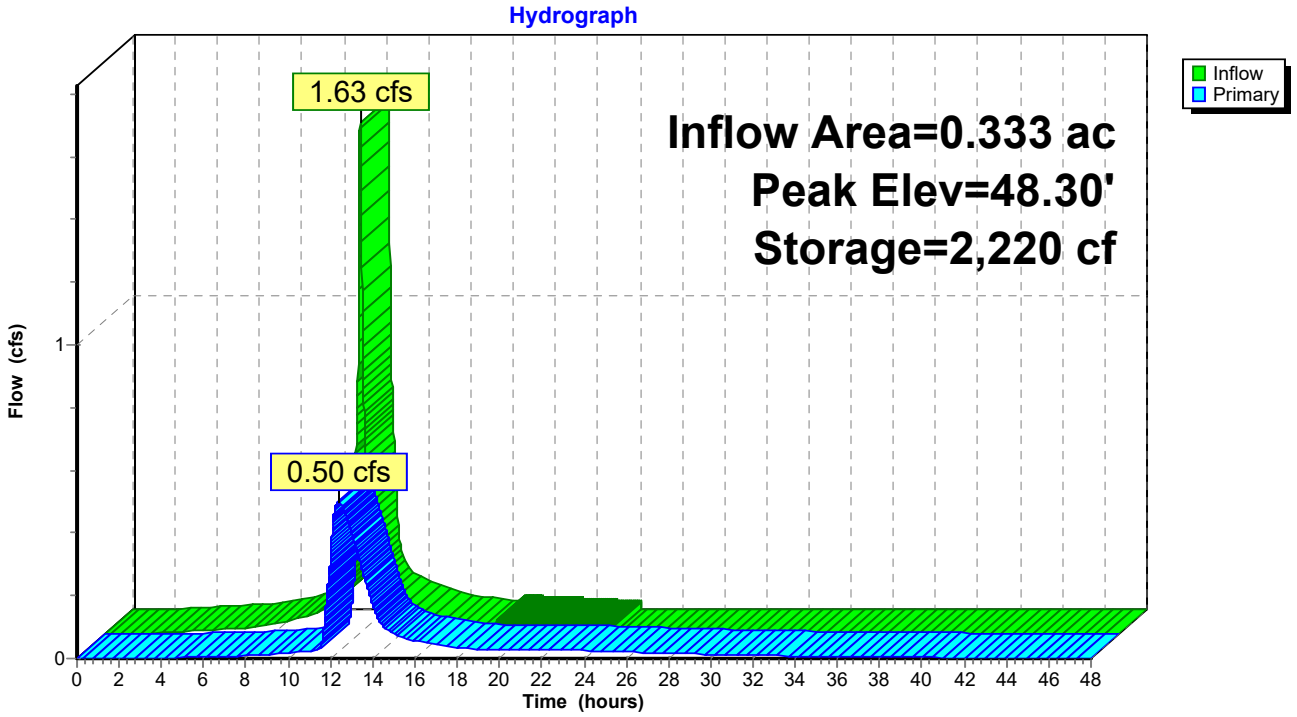
Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	3,283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	315	0.0	0	0
45.50	315	5.0	24	24
46.00	455	100.0	193	216
47.00	789	100.0	622	838
48.00	1,203	100.0	996	1,834
49.00	1,695	100.0	1,449	3,283

Device	Routing	Invert	Outlet Devices
#1	Primary	43.00'	**15.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.00' / 42.85' S= 0.0058 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	43.00'	**4.0" Vert. Underdrain** C= 0.600
#3	Device 2	45.50'	**2.500 in/hr Exfiltration through Media over Surface area above 45.50'** Excluded Surface area = 315 sf Phase-In= 0.01'
#4	Device 1	47.05'	**4.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	48.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.50 cfs @ 12.40 hrs HW=48.30' TW=42.90' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.50 cfs of 12.78 cfs potential flow)
  - **2=Underdrain** (Passes 0.06 cfs of 0.95 cfs potential flow)
    - **3=Exfiltration through Media** (Exfiltration Controls 0.06 cfs)
  - **4=Orifice/Grate** (Orifice Controls 0.44 cfs @ 5.02 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Pond 83P: Bio #4 / OS #22

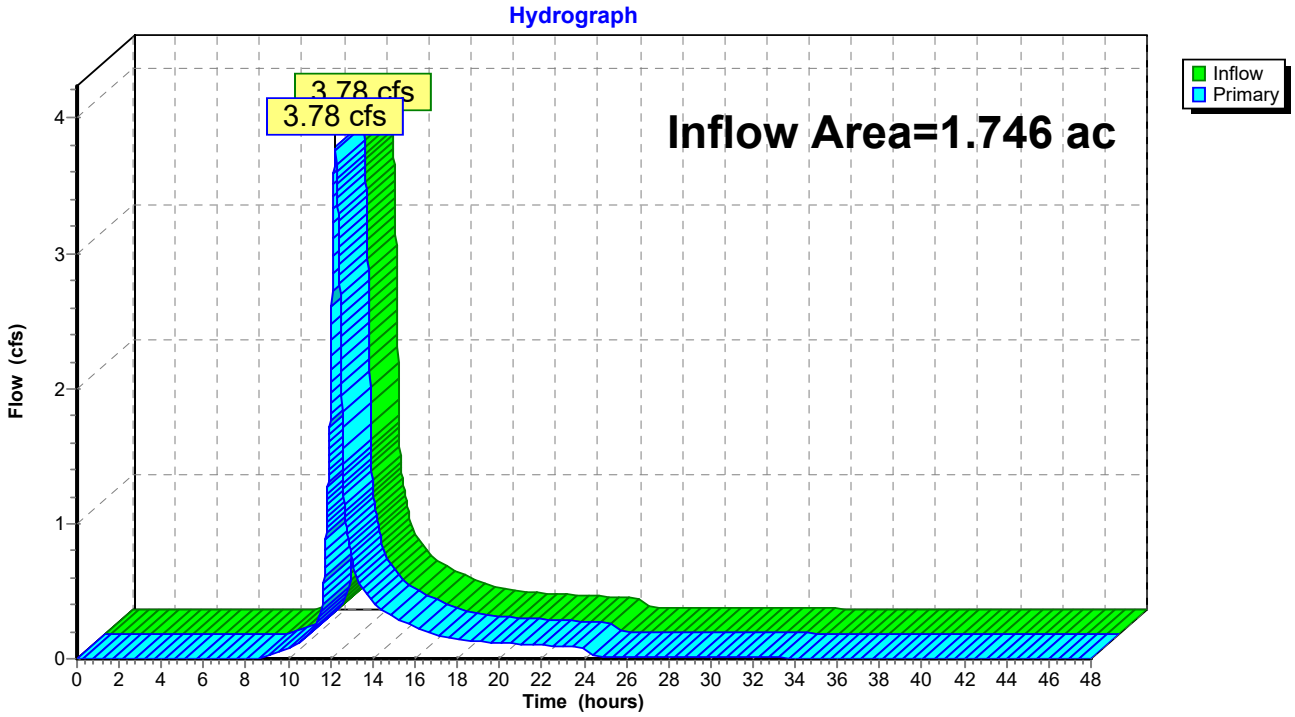


Summary for Link 100L: POA #100 - SW

Inflow Area = 1.746 ac, 13.99% Impervious, Inflow Depth > 2.95" for 10-year event
Inflow = 3.78 cfs @ 12.22 hrs, Volume= 0.430 af
Primary = 3.78 cfs @ 12.22 hrs, Volume= 0.430 af, Atten= 0%, Lag= 0.0 min

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

Link 100L: POA #100 - SW

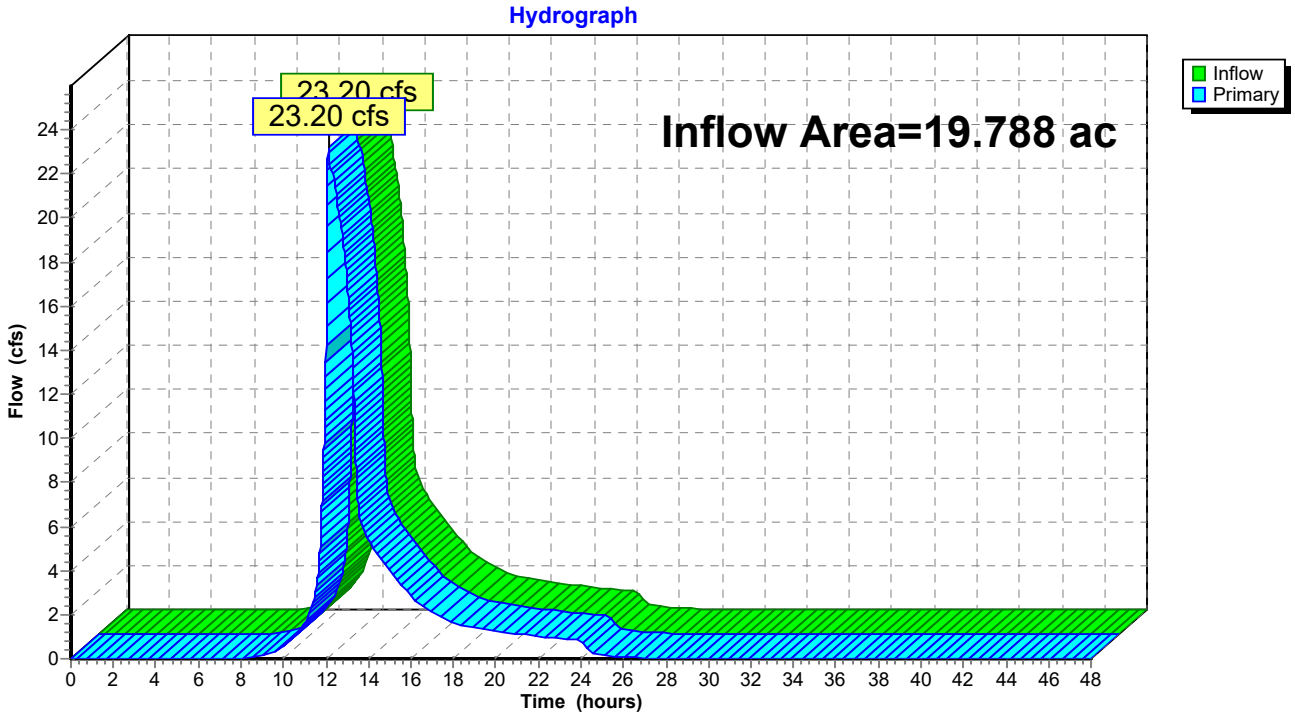


Summary for Link 200L: POA #200 - South

Inflow Area = 19.788 ac, 10.08% Impervious, Inflow Depth = 2.78" for 10-year event
Inflow = 23.20 cfs @ 12.12 hrs, Volume= 4.580 af
Primary = 23.20 cfs @ 12.12 hrs, Volume= 4.580 af, Atten= 0%, Lag= 0.0 min

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

Link 200L: POA #200 - South

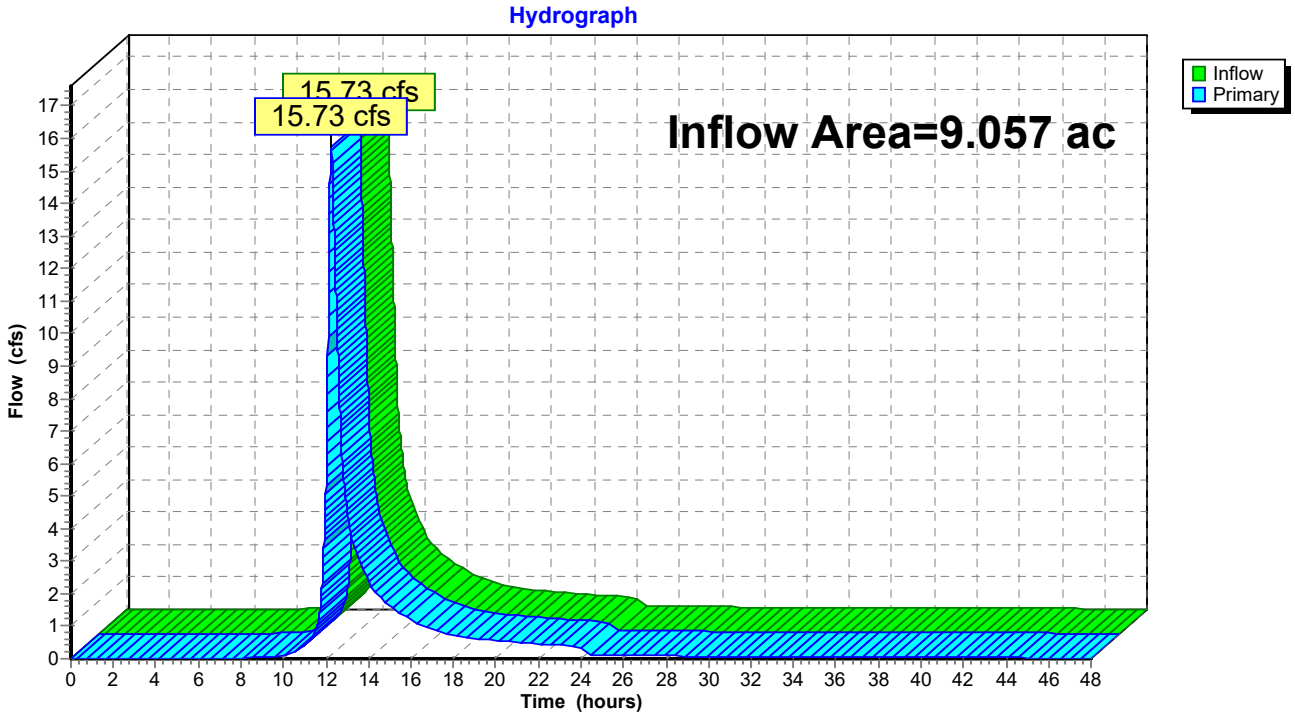


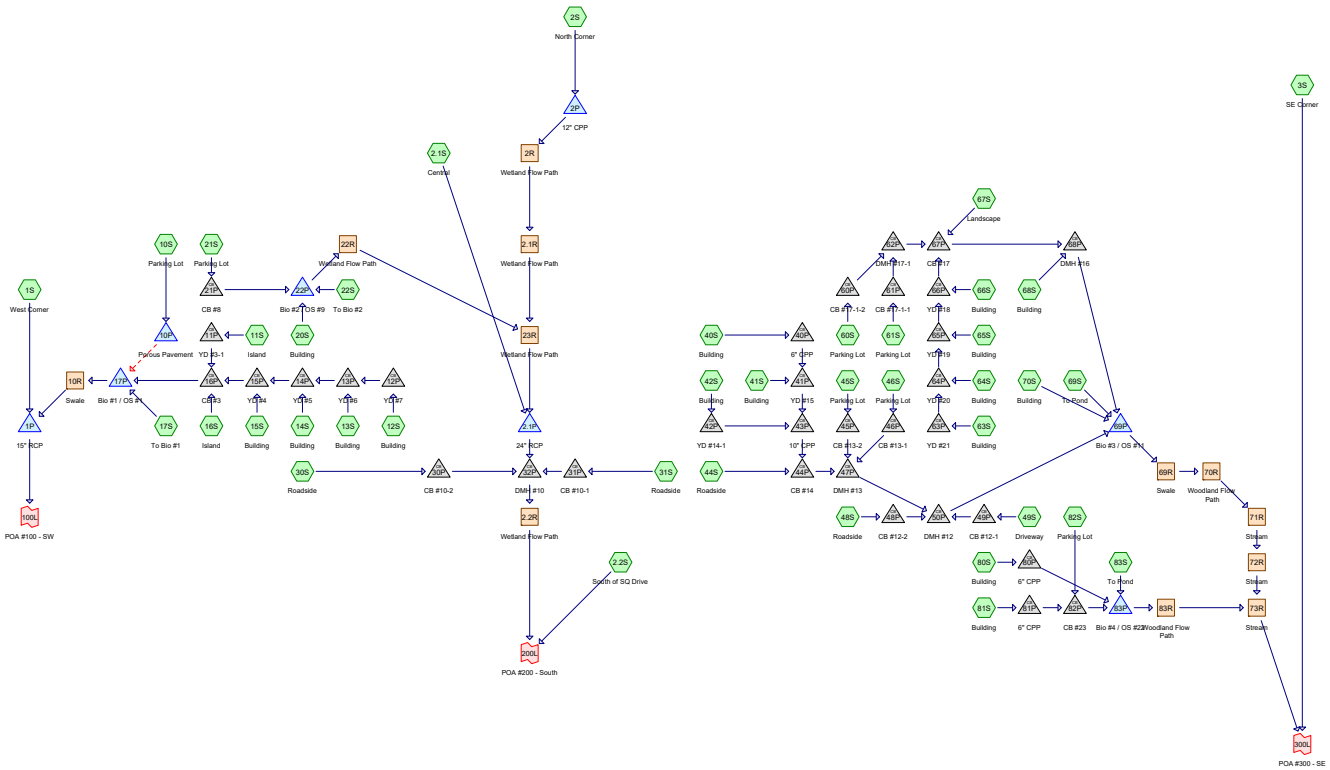
Summary for Link 300L: POA #300 - SE

Inflow Area = 9.057 ac, 16.31% Impervious, Inflow Depth > 2.64" for 10-year event
Inflow = 15.73 cfs @ 12.24 hrs, Volume= 1.989 af
Primary = 15.73 cfs @ 12.24 hrs, Volume= 1.989 af, Atten= 0%, Lag= 0.0 min

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

Link 300L: POA #300 - SE





POST-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 5440-Post

Prepared by Altus Engineering, Inc., Printed 10/6/2025

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

Subcatchment 1S: West Corner Runoff Area=66,034 sf 9.68% Impervious Runoff Depth=4.09"
Flow Length=366' Tc=9.8 min CN=75 Runoff=6.39 cfs 0.516 af

Subcatchment 2.1S: Central Runoff Area=444,574 sf 8.10% Impervious Runoff Depth=3.98"
Flow Length=1,341' Tc=15.8 min CN=74 Runoff=35.31 cfs 3.386 af

Subcatchment 2.2S: South of SQ Drive Runoff Area=102,088 sf 10.13% Impervious Runoff Depth=4.30"
Flow Length=391' Tc=6.0 min CN=77 Runoff=11.79 cfs 0.840 af

Subcatchment 2S: North Corner Runoff Area=284,221 sf 6.78% Impervious Runoff Depth=3.77"
Tc=0.0 min CN=72 Runoff=35.33 cfs 2.050 af

Subcatchment 3S: SE Corner Runoff Area=306,834 sf 2.19% Impervious Runoff Depth=3.35"
Flow Length=1,149' Tc=15.9 min CN=68 Runoff=20.35 cfs 1.969 af

Subcatchment 10S: Parking Lot Runoff Area=10,182 sf 98.98% Impervious Runoff Depth>6.65"
Tc=790.0 min CN=98 Runoff=0.11 cfs 0.130 af

Subcatchment 11S: Island Runoff Area=588 sf 65.82% Impervious Runoff Depth=5.75"
Tc=6.0 min CN=90 Runoff=0.09 cfs 0.006 af

Subcatchment 12S: Building Runoff Area=1,878 sf 65.12% Impervious Runoff Depth=5.75"
Tc=6.0 min CN=90 Runoff=0.27 cfs 0.021 af

Subcatchment 13S: Building Runoff Area=1,349 sf 73.83% Impervious Runoff Depth=5.99"
Tc=6.0 min CN=92 Runoff=0.20 cfs 0.015 af

Subcatchment 14S: Building Runoff Area=1,021 sf 77.86% Impervious Runoff Depth=6.10"
Tc=6.0 min CN=93 Runoff=0.15 cfs 0.012 af

Subcatchment 15S: Building Runoff Area=1,376 sf 43.24% Impervious Runoff Depth=5.07"
Tc=6.0 min CN=84 Runoff=0.18 cfs 0.013 af

Subcatchment 16S: Island Runoff Area=928 sf 26.51% Impervious Runoff Depth=4.63"
Tc=6.0 min CN=80 Runoff=0.11 cfs 0.008 af

Subcatchment 17S: To Bio #1 Runoff Area=2,893 sf 0.28% Impervious Runoff Depth=3.98"
Tc=6.0 min CN=74 Runoff=0.31 cfs 0.022 af

Subcatchment 20S: Building Runoff Area=9,168 sf 100.00% Impervious Runoff Depth=6.69"
Tc=6.0 min CN=98 Runoff=1.43 cfs 0.117 af

Subcatchment 21S: Parking Lot Runoff Area=2,610 sf 100.00% Impervious Runoff Depth=6.69"
Tc=6.0 min CN=98 Runoff=0.41 cfs 0.033 af

Subcatchment 22S: To Bio #2 Runoff Area=3,961 sf 0.00% Impervious Runoff Depth=3.98"
Tc=6.0 min CN=74 Runoff=0.42 cfs 0.030 af

Subcatchment 30S: Roadside Runoff Area=8,230 sf 53.10% Impervious Runoff Depth=5.41"
Flow Length=204' Tc=6.0 min CN=87 Runoff=1.15 cfs 0.085 af

Subcatchment 31S: Roadside Runoff Area=7,135 sf 71.11% Impervious Runoff Depth=5.87"
Flow Length=143' Tc=6.0 min CN=91 Runoff=1.06 cfs 0.080 af

Subcatchment 40S: Building Runoff Area=3,066 sf 100.00% Impervious Runoff Depth=6.69"
Tc=6.0 min CN=98 Runoff=0.48 cfs 0.039 af

Subcatchment 41S: Building Runoff Area=2,125 sf 90.78% Impervious Runoff Depth=6.45"
Tc=6.0 min CN=96 Runoff=0.33 cfs 0.026 af

Subcatchment 42S: Building Runoff Area=3,298 sf 74.41% Impervious Runoff Depth=5.99"
Tc=6.0 min CN=92 Runoff=0.49 cfs 0.038 af

Subcatchment 44S: Roadside Runoff Area=4,663 sf 40.92% Impervious Runoff Depth=5.07"
Tc=6.0 min CN=84 Runoff=0.62 cfs 0.045 af

Subcatchment 45S: Parking Lot Runoff Area=3,860 sf 71.71% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=91 Runoff=0.57 cfs 0.043 af

Subcatchment 46S: Parking Lot Runoff Area=4,489 sf 73.25% Impervious Runoff Depth=5.99"
Tc=6.0 min CN=92 Runoff=0.67 cfs 0.051 af

Subcatchment 48S: Roadside Runoff Area=3,415 sf 55.67% Impervious Runoff Depth=5.53"
Tc=6.0 min CN=88 Runoff=0.49 cfs 0.036 af

Subcatchment 49S: Driveway Runoff Area=3,657 sf 83.78% Impervious Runoff Depth=6.10"
Tc=6.0 min CN=93 Runoff=0.55 cfs 0.043 af

Subcatchment 60S: Parking Lot Runoff Area=9,169 sf 78.55% Impervious Runoff Depth=6.10"
Flow Length=116' Tc=6.0 min CN=93 Runoff=1.39 cfs 0.107 af

Subcatchment 61S: Parking Lot Runoff Area=7,068 sf 91.98% Impervious Runoff Depth=6.45"
Flow Length=111' Tc=6.0 min CN=96 Runoff=1.09 cfs 0.087 af

Subcatchment 63S: Building Runoff Area=1,459 sf 65.52% Impervious Runoff Depth=5.75"
Tc=6.0 min CN=90 Runoff=0.21 cfs 0.016 af

Subcatchment 64S: Building Runoff Area=1,507 sf 81.22% Impervious Runoff Depth=6.10"
Tc=6.0 min CN=93 Runoff=0.23 cfs 0.018 af

Subcatchment 65S: Building Runoff Area=982 sf 80.86% Impervious Runoff Depth=6.10"
Tc=6.0 min CN=93 Runoff=0.15 cfs 0.011 af

Subcatchment 66S: Building Runoff Area=1,478 sf 44.79% Impervious Runoff Depth=4.85"
Tc=6.0 min CN=82 Runoff=0.19 cfs 0.014 af

Subcatchment 67S: Landscape Runoff Area=1,430 sf 23.15% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=70 Runoff=0.14 cfs 0.010 af

Subcatchment 68S: Building Runoff Area=1,370 sf 100.00% Impervious Runoff Depth=6.69"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment 69S: To Pond Runoff Area=13,261 sf 1.69% Impervious Runoff Depth=3.35"
Tc=6.0 min CN=68 Runoff=1.19 cfs 0.085 af

Subcatchment 70S: Building Runoff Area=6,906 sf 100.00% Impervious Runoff Depth=6.69"
Tc=6.0 min CN=98 Runoff=1.08 cfs 0.088 af

Subcatchment 80S: Building Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=6.69"
Tc=6.0 min CN=98 Runoff=0.19 cfs 0.015 af

Subcatchment 81S: Building Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=6.69"
Tc=6.0 min CN=98 Runoff=0.19 cfs 0.015 af

Subcatchment 82S: Parking Lot Runoff Area=9,597 sf 90.39% Impervious Runoff Depth=6.34"
Flow Length=214' Tc=6.0 min CN=95 Runoff=1.47 cfs 0.116 af

Subcatchment 83S: To Pond Runoff Area=2,507 sf 0.00% Impervious Runoff Depth=3.98"
Tc=6.0 min CN=74 Runoff=0.27 cfs 0.019 af

Reach 2.1R: Wetland Flow Path Avg. Flow Depth=1.53' Max Vel=2.91 fps Inflow=31.17 cfs 2.050 af
n=0.040 L=344.0' S=0.0075 '/' Capacity=54.59 cfs Outflow=29.25 cfs 2.050 af

Reach 2.2R: Wetland Flow Path Avg. Flow Depth=0.86' Max Vel=5.46 fps Inflow=23.05 cfs 5.780 af
n=0.040 L=263.0' S=0.0502 '/' Capacity=141.18 cfs Outflow=21.61 cfs 5.780 af

Reach 2R: Wetland Flow Path Avg. Flow Depth=1.05' Max Vel=5.74 fps Inflow=31.29 cfs 2.050 af
n=0.040 L=151.0' S=0.0446 '/' Capacity=133.09 cfs Outflow=31.17 cfs 2.050 af

Reach 10R: Swale Avg. Flow Depth=0.13' Max Vel=0.72 fps Inflow=0.40 cfs 0.098 af
n=0.035 L=44.0' S=0.0050 '/' Capacity=16.22 cfs Outflow=0.40 cfs 0.098 af

Reach 22R: Wetland Flow Path Avg. Flow Depth=0.09' Max Vel=1.11 fps Inflow=1.15 cfs 0.179 af
n=0.040 L=211.0' S=0.0245 '/' Capacity=392.58 cfs Outflow=1.09 cfs 0.179 af

Reach 23R: Wetland Flow Path Avg. Flow Depth=1.25' Max Vel=4.09 fps Inflow=29.59 cfs 2.229 af
n=0.040 L=131.0' S=0.0185 '/' Capacity=85.86 cfs Outflow=29.49 cfs 2.229 af

Reach 69R: Swale Avg. Flow Depth=0.49' Max Vel=1.37 fps Inflow=3.70 cfs 0.752 af
n=0.069 L=17.0' S=0.0147 '/' Capacity=14.11 cfs Outflow=3.70 cfs 0.752 af

Reach 70R: Woodland Flow Path Avg. Flow Depth=0.41' Max Vel=0.64 fps Inflow=3.70 cfs 0.752 af
n=0.400 L=57.0' S=0.1404 '/' Capacity=21.20 cfs Outflow=3.70 cfs 0.752 af

Reach 71R: Stream Avg. Flow Depth=0.35' Max Vel=3.49 fps Inflow=3.70 cfs 0.752 af
n=0.040 L=80.0' S=0.0554 '/' Capacity=31.12 cfs Outflow=3.70 cfs 0.752 af

Reach 72R: Stream Avg. Flow Depth=0.36' Max Vel=2.05 fps Inflow=3.70 cfs 0.752 af
n=0.040 L=88.0' S=0.0160 '/' Capacity=25.40 cfs Outflow=3.70 cfs 0.751 af

Reach 73R: Stream Avg. Flow Depth=0.40' Max Vel=2.19 fps Inflow=4.56 cfs 0.917 af
n=0.040 L=309.0' S=0.0160 '/' Capacity=25.38 cfs Outflow=4.54 cfs 0.917 af

Reach 83R: Woodland Flow Path Avg. Flow Depth=0.20' Max Vel=0.36 fps Inflow=0.97 cfs 0.166 af
n=0.400 L=122.0' S=0.0950 '/' Capacity=17.44 cfs Outflow=0.87 cfs 0.166 af

Pond 1P: 15" RCP Peak Elev=53.83' Storage=1,591 cf Inflow=6.73 cfs 0.614 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0037 '/' Outflow=4.78 cfs 0.614 af

Pond 2.1P: 24" RCP Peak Elev=52.31' Storage=51,030 cf Inflow=52.10 cfs 5.615 af
24.0" Round Culvert n=0.012 L=17.0' S=0.0135 '/' Outflow=22.79 cfs 5.615 af

Pond 2P: 12" CPP Peak Elev=61.01' Storage=13,034 cf Inflow=35.33 cfs 2.050 af
Outflow=31.29 cfs 2.050 af

Pond 10P: Porous Pavement Peak Elev=59.19' Storage=2,502 cf Inflow=0.11 cfs 0.130 af
Discarded=0.04 cfs 0.105 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.105 af

Pond 11P: YD #3-1 Peak Elev=58.23' Inflow=0.09 cfs 0.006 af
6.0" Round Culvert n=0.012 L=36.0' S=0.0050 '/' Outflow=0.09 cfs 0.006 af

Pond 12P: YD #7 Peak Elev=58.25' Inflow=0.27 cfs 0.021 af
8.0" Round Culvert n=0.012 L=52.0' S=0.0050 '/' Outflow=0.27 cfs 0.021 af

Pond 13P: YD #6 Peak Elev=58.24' Inflow=0.48 cfs 0.036 af
10.0" Round Culvert n=0.012 L=29.0' S=0.0052 '/' Outflow=0.48 cfs 0.036 af

Pond 14P: YD #5 Peak Elev=58.23' Inflow=0.63 cfs 0.048 af
10.0" Round Culvert n=0.012 L=20.0' S=0.0050 '/' Outflow=0.63 cfs 0.048 af

Pond 15P: YD #4 Peak Elev=58.23' Inflow=0.81 cfs 0.061 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0050 '/' Outflow=0.81 cfs 0.061 af

Pond 16P: CB #3 Peak Elev=58.22' Inflow=1.01 cfs 0.076 af
12.0" Round Culvert n=0.012 L=45.0' S=0.0049 '/' Outflow=1.01 cfs 0.076 af

Pond 17P: Bio #1 / OS #1 Peak Elev=58.22' Storage=1,786 cf Inflow=1.32 cfs 0.098 af
Outflow=0.40 cfs 0.098 af

Pond 21P: CB #8 Peak Elev=59.59' Inflow=0.41 cfs 0.033 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0050 '/' Outflow=0.41 cfs 0.033 af

Pond 22P: Bio #2 / OS #9 Peak Elev=59.59' Storage=3,010 cf Inflow=2.26 cfs 0.181 af
Outflow=1.15 cfs 0.179 af

Pond 30P: CB #10-2 Peak Elev=53.21' Inflow=1.15 cfs 0.085 af
12.0" Round Culvert n=0.012 L=78.0' S=0.0397 '/' Outflow=1.15 cfs 0.085 af

Pond 31P: CB #10-1 Peak Elev=50.61' Inflow=1.06 cfs 0.080 af
12.0" Round Culvert n=0.012 L=2.0' S=0.0250 '/' Outflow=1.06 cfs 0.080 af

Pond 32P: DMH #10 Peak Elev=50.61' Inflow=23.05 cfs 5.780 af
24.0" Round Culvert n=0.012 L=57.0' S=0.0135 '/' Outflow=23.05 cfs 5.780 af

Pond 40P: 6" CPP Peak Elev=54.65' Inflow=0.48 cfs 0.039 af
6.0" Round Culvert n=0.012 L=174.0' S=0.0150 '/' Outflow=0.48 cfs 0.039 af

Pond 41P: YD #15 Peak Elev=53.63' Inflow=0.81 cfs 0.065 af
8.0" Round Culvert n=0.012 L=47.0' S=0.0149 '/' Outflow=0.81 cfs 0.065 af

Pond 42P: YD #14-1 Peak Elev=54.49' Inflow=0.49 cfs 0.038 af
6.0" Round Culvert n=0.012 L=158.0' S=0.0175 '/' Outflow=0.49 cfs 0.038 af

Pond 43P: 10" CPP Peak Elev=53.38' Inflow=1.30 cfs 0.103 af
8.0" Round Culvert n=0.012 L=33.0' S=0.0148 '/' Outflow=1.30 cfs 0.103 af

Pond 44P: CB #14 Peak Elev=52.83' Inflow=1.92 cfs 0.149 af
12.0" Round Culvert n=0.012 L=31.0' S=0.0048 '/' Outflow=1.92 cfs 0.149 af

Pond 45P: CB #13-2 Peak Elev=52.63' Inflow=0.57 cfs 0.043 af
12.0" Round Culvert n=0.012 L=22.0' S=0.0164 '/' Outflow=0.57 cfs 0.043 af

Pond 46P: CB #13-1 Peak Elev=52.64' Inflow=0.67 cfs 0.051 af
12.0" Round Culvert n=0.012 L=12.0' S=0.0050 '/' Outflow=0.67 cfs 0.051 af

Pond 47P: DMH #13 Peak Elev=52.61' Inflow=3.17 cfs 0.243 af
15.0" Round Culvert n=0.012 L=67.0' S=0.0040 '/' Outflow=3.17 cfs 0.243 af

Pond 48P: CB #12-2 Peak Elev=52.38' Inflow=0.49 cfs 0.036 af
12.0" Round Culvert n=0.012 L=6.0' S=0.0050 '/' Outflow=0.49 cfs 0.036 af

Pond 49P: CB #12-1 Peak Elev=52.39' Inflow=0.55 cfs 0.043 af
12.0" Round Culvert n=0.012 L=46.0' S=0.0050 '/' Outflow=0.55 cfs 0.043 af

Pond 50P: DMH #12 Peak Elev=52.37' Inflow=4.20 cfs 0.322 af
15.0" Round Culvert n=0.012 L=103.0' S=0.0040 '/' Outflow=4.20 cfs 0.322 af

Pond 60P: CB #17-1-2 Peak Elev=54.43' Inflow=1.39 cfs 0.107 af
12.0" Round Culvert n=0.012 L=21.0' S=0.0052 '/' Outflow=1.39 cfs 0.107 af

Pond 61P: CB #17-1-1 Peak Elev=54.38' Inflow=1.09 cfs 0.087 af
12.0" Round Culvert n=0.012 L=3.0' S=0.0367 '/' Outflow=1.09 cfs 0.087 af

Pond 62P: DMH #17-1 Peak Elev=54.31' Inflow=2.48 cfs 0.194 af
12.0" Round Culvert n=0.012 L=25.0' S=0.0052 '/' Outflow=2.48 cfs 0.194 af

Pond 63P: YD #21 Peak Elev=54.02' Inflow=0.21 cfs 0.016 af
12.0" Round Culvert n=0.012 L=49.0' S=0.0049 '/' Outflow=0.21 cfs 0.016 af

Pond 64P: YD #20 Peak Elev=54.02' Inflow=0.44 cfs 0.034 af
10.0" Round Culvert n=0.012 L=35.0' S=0.0049 '/' Outflow=0.44 cfs 0.034 af

Pond 65P: YD #19 Peak Elev=53.99' Inflow=0.59 cfs 0.045 af
10.0" Round Culvert n=0.012 L=42.0' S=0.0050 '/' Outflow=0.59 cfs 0.045 af

Pond 66P: YD #18 Peak Elev=53.95' Inflow=0.78 cfs 0.059 af
12.0" Round Culvert n=0.012 L=11.0' S=0.0509 '/' Outflow=0.78 cfs 0.059 af

Pond 67P: CB #17 Peak Elev=53.91' Inflow=3.39 cfs 0.263 af
12.0" Round Culvert n=0.012 L=74.0' S=0.0050 '/' Outflow=3.39 cfs 0.263 af

Pond 68P: DMH #16 Peak Elev=52.96' Inflow=3.61 cfs 0.280 af
12.0" Round Culvert n=0.012 L=90.0' S=0.0110 '/' Outflow=3.61 cfs 0.280 af

Pond 69P: Bio #3 / OS #11 Peak Elev=52.21' Storage=13,815 cf Inflow=10.08 cfs 0.776 af
Outflow=3.70 cfs 0.752 af

Pond 80P: 6" CPP Peak Elev=49.66' Inflow=0.19 cfs 0.015 af
6.0" Round Culvert n=0.012 L=111.0' S=0.0350 '/' Outflow=0.19 cfs 0.015 af

Pond 81P: 6" CPP Peak Elev=49.60' Inflow=0.19 cfs 0.015 af
6.0" Round Culvert n=0.012 L=85.0' S=0.0351 '/' Outflow=0.19 cfs 0.015 af

Pond 82P: CB #23 Peak Elev=48.60' Inflow=1.66 cfs 0.132 af
12.0" Round Culvert n=0.012 L=18.0' S=0.0194 '/' Outflow=1.66 cfs 0.132 af

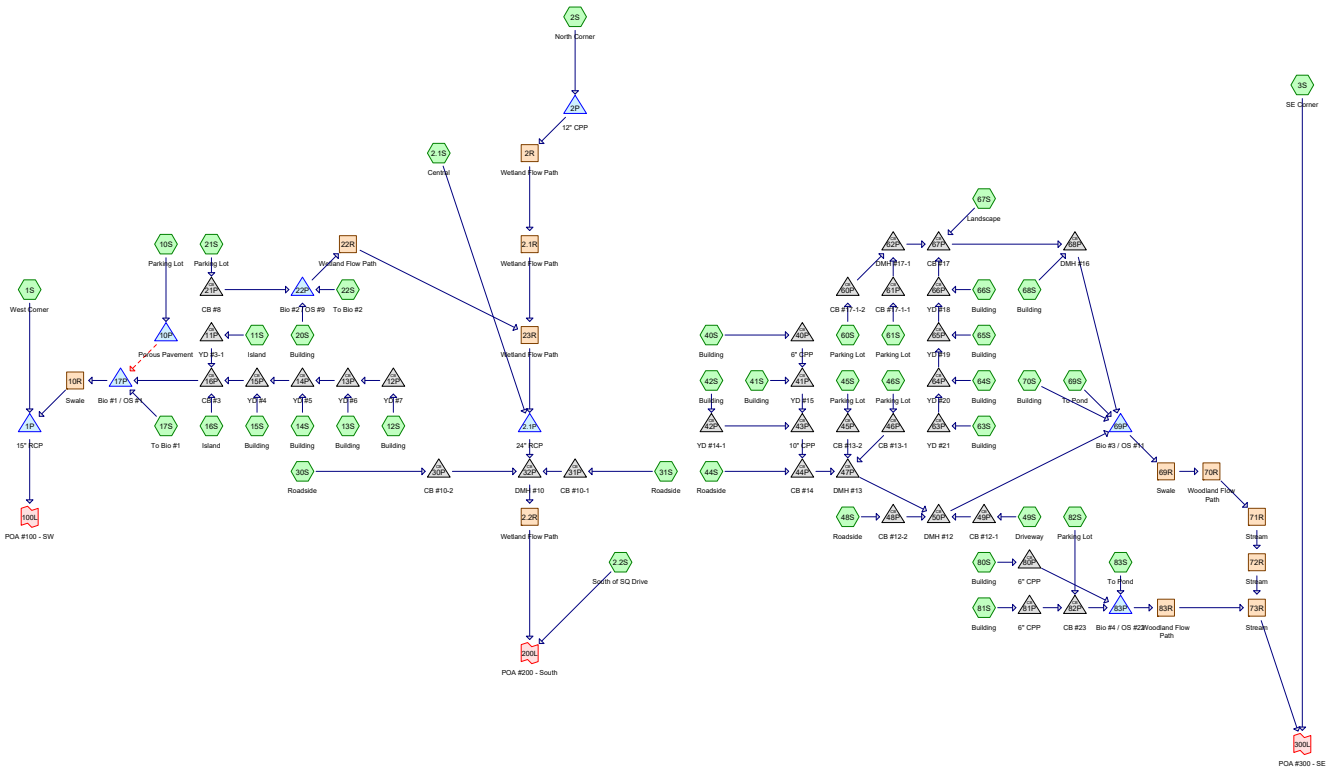
Pond 83P: Bio #4 / OS #22 Peak Elev=48.56' Storage=2,590 cf Inflow=2.12 cfs 0.166 af
Outflow=0.97 cfs 0.166 af

Link 100L: POA #100 - SW Inflow=4.78 cfs 0.614 af
Primary=4.78 cfs 0.614 af

Link 200L: POA #200 - South Inflow=30.13 cfs 6.621 af
Primary=30.13 cfs 6.621 af

Link 300L: POA #300 - SE Inflow=24.21 cfs 2.885 af
Primary=24.21 cfs 2.885 af

Total Runoff Area = 30.826 ac Runoff Volume = 10.277 af Average Runoff Depth = 4.00"
87.20% Pervious = 26.879 ac 12.80% Impervious = 3.947 ac



POST-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 5440-Post

Prepared by Altus Engineering, Inc., Printed 10/6/2025

Summary for Pond 17P: Bio #1 / OS #1

Inflow Area = 0.230 ac, 42.36% Impervious, Inflow Depth = 10.03" for 100-year event
Inflow = 2.03 cfs @ 12.08 hrs, Volume= 0.193 af
Outflow = 0.66 cfs @ 12.38 hrs, Volume= 0.190 af, Atten= 67%, Lag= 17.7 min
Primary = 0.66 cfs @ 12.38 hrs, Volume= 0.190 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 56.25' Surf.Area= 487 sf Storage= 37 cf
Peak Elev= 58.78' @ 12.38 hrs Surf.Area= 1,664 sf Storage= 2,627 cf (2,591 cf above start)
Flood Elev= 59.25' Surf.Area= 1,950 sf Storage= 3,480 cf (3,444 cf above start)

Plug-Flow detention time= 193.7 min calculated for 0.190 af (98% of inflow)
Center-of-Mass det. time= 175.7 min (1,126.1 - 950.4)

Volume	Invert	Avail.Storage	Storage Description
#1	54.75'	3,480 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.75	487	0.0	0	0	487
56.25	487	5.0	37	37	604
57.00	774	100.0	469	505	899
58.00	1,239	100.0	997	1,503	1,377
59.00	1,797	100.0	1,509	3,012	1,952
59.25	1,950	100.0	468	3,480	2,110

Device	Routing	Invert	Outlet Devices
#1	Primary	53.75'	**15.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.75' / 53.60' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	53.75'	**4.0" Vert. Underdrain** C= 0.600
#3	Device 2	56.25'	**2.500 in/hr Exfiltration throiugh Media over Wetted area above 56.25'** Excluded Wetted area = 604 sf Phase-In= 0.01'
#4	Device 1	57.35'	**4.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	58.75'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.66 cfs @ 12.38 hrs HW=58.78' TW=53.77' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.66 cfs of 12.40 cfs potential flow)
  - **2=Underdrain** (Passes 0.07 cfs of 0.93 cfs potential flow)
    - **3=Exfiltration throiugh Media** (Exfiltration Controls 0.07 cfs)
  - **4=Orifice/Grate** (Orifice Controls 0.47 cfs @ 5.41 fps)
  - **5=Orifice/Grate** (Weir Controls 0.12 cfs @ 0.54 fps)

Summary for Pond 22P: Bio #2 / OS #9

Inflow Area = 0.361 ac, 74.83% Impervious, Inflow Depth = 8.94" for 100-year event
Inflow = 3.35 cfs @ 12.08 hrs, Volume= 0.269 af
Outflow = 2.92 cfs @ 12.13 hrs, Volume= 0.268 af, Atten= 13%, Lag= 2.7 min
Primary = 2.92 cfs @ 12.13 hrs, Volume= 0.268 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 57.75' Surf.Area= 1,027 sf Storage= 77 cf
Peak Elev= 59.70' @ 12.13 hrs Surf.Area= 2,291 sf Storage= 3,273 cf (3,196 cf above start)
Flood Elev= 60.00' Surf.Area= 2,511 sf Storage= 3,983 cf (3,906 cf above start)

Plug-Flow detention time= 168.2 min calculated for 0.266 af (99% of inflow)
Center-of-Mass det. time= 155.5 min (907.2 - 751.7)

Volume	Invert	Avail.Storage	Storage Description
#1	56.25'	3,983 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.25	1,027	0.0	0	0	1,027
57.75	1,027	5.0	77	77	1,197
58.00	1,175	100.0	275	352	1,348
59.00	1,809	100.0	1,481	1,833	1,997
60.00	2,511	100.0	2,150	3,983	2,718

Device	Routing	Invert	Outlet Devices
#1	Primary	55.25'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 55.25' / 55.16' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	55.25'	**4.0" Vert. Underdrain** C= 0.600
#3	Device 2	57.75'	**2.500 in/hr Exfiltration through Media over Wetted area above 57.75'** Excluded Wetted area = 1,197 sf Phase-In= 0.01'
#4	Device 1	58.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	59.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.92 cfs @ 12.13 hrs HW=59.70' TW=55.31' (Dynamic Tailwater)
- **1=Culvert** (Passes 2.92 cfs of 11.56 cfs potential flow)
  - **2=Underdrain** (Passes 0.07 cfs of 0.87 cfs potential flow)
    - **3=Exfiltration through Media** (Exfiltration Controls 0.07 cfs)
  - **4=Orifice/Grate** (Orifice Controls 0.43 cfs @ 4.90 fps)
  - **5=Orifice/Grate** (Weir Controls 2.41 cfs @ 1.48 fps)

Summary for Pond 69P: Bio #3 / OS #11

Inflow Area = 1.681 ac, 63.59% Impervious, Inflow Depth = 8.44" for 100-year event
Inflow = 15.15 cfs @ 12.08 hrs, Volume= 1.181 af
Outflow = 10.39 cfs @ 12.17 hrs, Volume= 1.157 af, Atten= 31%, Lag= 5.0 min
Primary = 10.39 cfs @ 12.17 hrs, Volume= 1.157 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 48.00' Surf.Area= 1,706 sf Storage= 128 cf
Peak Elev= 52.72' @ 12.17 hrs Surf.Area= 5,702 sf Storage= 16,606 cf (16,478 cf above start)
Flood Elev= 53.00' Surf.Area= 6,019 sf Storage= 18,236 cf (18,109 cf above start)

Plug-Flow detention time= 181.4 min calculated for 1.154 af (98% of inflow)
Center-of-Mass det. time= 165.0 min (931.7 - 766.8)

Volume	Invert	Avail.Storage	Storage Description
#1	46.50'	18,236 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
46.50	1,706	0.0	0	0	1,706
48.00	1,706	5.0	128	128	1,926
49.00	2,381	100.0	2,034	2,162	2,619
50.00	3,056	100.0	2,711	4,874	3,319
51.00	3,935	100.0	3,486	8,360	4,223
52.00	4,918	100.0	4,417	12,777	5,233
53.00	6,019	100.0	5,459	18,236	6,365

Device	Routing	Invert	Outlet Devices
#1	Primary	45.50'	**18.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.50' / 45.25' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	45.50'	**4.0" Vert. Underdrain** C= 0.600
#3	Device 2	48.00'	**2.400 in/hr Exfiltration through Media over Wetted area above 48.00'** Excluded Wetted area = 1,926 sf Phase-In= 0.01'
#4	Device 1	50.00'	**4.0" W x 30.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	52.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.37 cfs @ 12.17 hrs HW=52.72' TW=46.10' (Dynamic Tailwater)
- **1=Culvert** (Passes 10.37 cfs of 21.65 cfs potential flow)
  - **2=Underdrain** (Passes 0.23 cfs of 1.08 cfs potential flow)
    - **3=Exfiltration through Media** (Exfiltration Controls 0.23 cfs)
  - **4=Orifice/Grate** (Orifice Controls 4.69 cfs @ 5.63 fps)
  - **5=Orifice/Grate** (Weir Controls 5.45 cfs @ 1.54 fps)

Summary for Pond 83P: Bio #4 / OS #22

Inflow Area = 0.333 ac, 76.36% Impervious, Inflow Depth = 8.94" for 100-year event
Inflow = 3.12 cfs @ 12.08 hrs, Volume= 0.248 af
Outflow = 2.77 cfs @ 12.13 hrs, Volume= 0.248 af, Atten= 11%, Lag= 2.5 min
Primary = 2.77 cfs @ 12.13 hrs, Volume= 0.248 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 45.50' Surf.Area= 315 sf Storage= 24 cf
Peak Elev= 48.69' @ 12.13 hrs Surf.Area= 1,543 sf Storage= 2,783 cf (2,759 cf above start)
Flood Elev= 49.00' Surf.Area= 1,695 sf Storage= 3,283 cf (3,260 cf above start)

Plug-Flow detention time= 141.4 min calculated for 0.247 af (100% of inflow)
Center-of-Mass det. time= 137.0 min (894.3 - 757.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	3,283 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.00	315	0.0	0	0
45.50	315	5.0	24	24
46.00	455	100.0	193	216
47.00	789	100.0	622	838
48.00	1,203	100.0	996	1,834
49.00	1,695	100.0	1,449	3,283

Device	Routing	Invert	Outlet Devices
#1	Primary	43.00'	**15.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.00' / 42.85' S= 0.0058 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	43.00'	**4.0" Vert. Underdrain** C= 0.600
#3	Device 2	45.50'	**2.500 in/hr Exfiltration through Media over Surface area above 45.50'** Excluded Surface area = 315 sf Phase-In= 0.01'
#4	Device 1	47.05'	**4.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	48.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.76 cfs @ 12.13 hrs HW=48.69' TW=43.05' (Dynamic Tailwater)
- **1=Culvert** (Passes 2.76 cfs of 13.30 cfs potential flow)
  - **2=Underdrain** (Passes 0.07 cfs of 0.99 cfs potential flow)
    - **3=Exfiltration through Media** (Exfiltration Controls 0.07 cfs)
  - **4=Orifice/Grate** (Orifice Controls 0.51 cfs @ 5.85 fps)
  - **5=Orifice/Grate** (Weir Controls 2.18 cfs @ 1.43 fps)

Section 5

Precipitation Table

ALTUS ENGINEERING

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point	
Smoothing	Yes
State	New Hampshire
Location	New Hampshire, United States
Latitude	43.141 degrees North
Longitude	70.907 degrees West
Elevation	10 feet
Date/Time	Tue Apr 15 2025 15:34:24 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.03	1yr	0.70	0.98	1.21	1.55	2.00	2.61	2	2.31	2.74	3.14	3.87	4.44	1yr
2yr	0.32	0.49	0.61	0.81	1.01	1.29	2yr	0.88	1.17	1.50	1.91	2.45	3.14	3	2.78	3.35	3.85	4.58	5.21	2yr
5yr	0.37	0.57	0.72	0.96	1.23	1.58	5yr	1.06	1.44	1.85	2.39	3.08	3.98	4	3.52	4.30	4.91	5.80	6.56	5yr
10yr	0.40	0.63	0.80	1.09	1.42	1.85	10yr	1.22	1.69	2.18	2.83	3.67	4.76	5	4.21	5.19	5.91	6.93	7.81	10yr
25yr	0.46	0.74	0.94	1.29	1.72	2.27	25yr	1.48	2.09	2.70	3.53	4.62	6.03	6	5.34	6.66	7.55	8.78	9.83	25yr
50yr	0.51	0.83	1.06	1.48	1.99	2.66	50yr	1.72	2.46	3.18	4.19	5.51	7.22	8	6.39	8.05	9.09	10.51	11.72	50yr
100yr	0.58	0.93	1.20	1.70	2.31	3.12	100yr	2.00	2.89	3.74	4.97	6.56	8.64	1	7.65	9.73	10.94	12.58	13.96	100yr
200yr	0.64	1.04	1.35	1.94	2.69	3.66	200yr	2.32	3.40	4.42	5.90	7.83	10.35	12.24	200yr	9.16	11.77	13.18	15.07	16.65	200yr
500yr	0.75	1.24	1.61	2.34	3.29	4.52	500yr	2.84	4.22	5.49	7.39	9.88	13.15	15.74	500yr	11.64	15.14	16.87	19.14	21.03	500yr

+15%
3.61
5.47
6.93
8.30
9.94

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.60	0.74	0.90	1yr	0.64	0.88	0.91	1.27	1.58	2.06	2.50	1yr	1.82	2.41	2.90	3.27	4.00	1yr
2yr	0.31	0.49	0.60	0.81	1.00	1.18	2yr	0.86	1.16	1.36	1.83	2.36	3.04	3.39	2yr	2.69	3.26	3.74	4.46	5.05	2yr
5yr	0.35	0.54	0.67	0.91	1.16	1.40	5yr	1.00	1.37	1.61	2.15	2.78	3.72	4.13	5yr	3.29	3.98	4.60	5.43	6.14	5yr
10yr	0.38	0.59	0.73	1.02	1.32	1.60	10yr	1.14	1.56	1.82	2.45	3.13	4.30	4.81	10yr	3.80	4.63	5.34	6.29	7.07	10yr
25yr	0.44	0.66	0.83	1.18	1.55	1.91	25yr	1.34	1.87	2.11	2.84	3.65	4.98	5.85	25yr	4.41	5.63	6.53	7.66	8.54	25yr
50yr	0.48	0.73	0.91	1.31	1.76	2.18	50yr	1.52	2.13	2.36	3.20	4.10	5.70	6.77	50yr	5.05	6.51	7.60	8.87	9.83	50yr
100yr	0.54	0.81	1.02	1.47	2.02	2.50	100yr	1.74	2.44	2.64	3.58	4.58	6.51	7.84	100yr	5.76	7.54	8.86	10.29	11.30	100yr
200yr	0.60	0.90	1.14	1.65	2.29	2.86	200yr	1.98	2.79	2.94	4.01	5.12	7.43	9.08	200yr	6.57	8.73	10.33	11.94	13.02	200yr
500yr	0.70	1.04	1.33	1.94	2.75	3.44	500yr	2.38	3.36	3.41	4.64	5.95	8.82	11.01	500yr	7.80	10.59	12.66	14.55	15.64	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.88	1.08	1yr	0.76	1.05	1.24	1.75	2.22	2.86	3.05	1yr	2.53	2.93	3.40	4.20	4.80	1yr
2yr	0.33	0.51	0.62	0.85	1.04	1.25	2yr	0.90	1.22	1.47	1.96	2.51	3.28	3.59	2yr	2.90	3.45	3.96	4.72	5.42	2yr
5yr	0.39	0.60	0.75	1.03	1.31	1.58	5yr	1.13	1.55	1.86	2.50	3.20	4.24	4.79	5yr	3.75	4.61	5.24	6.18	6.95	5yr
10yr	0.46	0.70	0.87	1.21	1.57	1.92	10yr	1.35	1.88	2.23	3.05	3.86	5.22	5.97	10yr	4.62	5.75	6.53	7.59	8.48	10yr
25yr	0.55	0.84	1.05	1.50	1.97	2.48	25yr	1.70	2.42	2.88	3.97	4.95	7.11	8.00	25yr	6.29	7.70	8.67	9.98	11.05	25yr
50yr	0.64	0.97	1.21	1.74	2.34	3.00	50yr	2.02	2.93	3.49	4.85	6.01	8.81	10.00	50yr	7.79	9.62	10.77	12.26	13.51	50yr
100yr	0.74	1.12	1.41	2.03	2.79	3.62	100yr	2.41	3.54	4.24	5.93	7.31	10.91	12.50	100yr	9.65	12.02	13.36	15.09	16.54	100yr
200yr	0.86	1.30	1.64	2.38	3.32	4.39	200yr	2.86	4.29	5.15	7.26	8.87	13.55	15.65	200yr	11.99	15.05	16.59	18.56	20.27	200yr
500yr	1.05	1.57	2.01	2.93	4.16	5.64	500yr	3.59	5.52	6.65	9.52	11.49	18.09	21.05	500yr	16.01	20.24	22.09	24.44	26.53	500yr

Section 6

NRCS Soils Report
Site Specific Soil Survey
Geotechnical Report

ALTUS
ENGINEERING

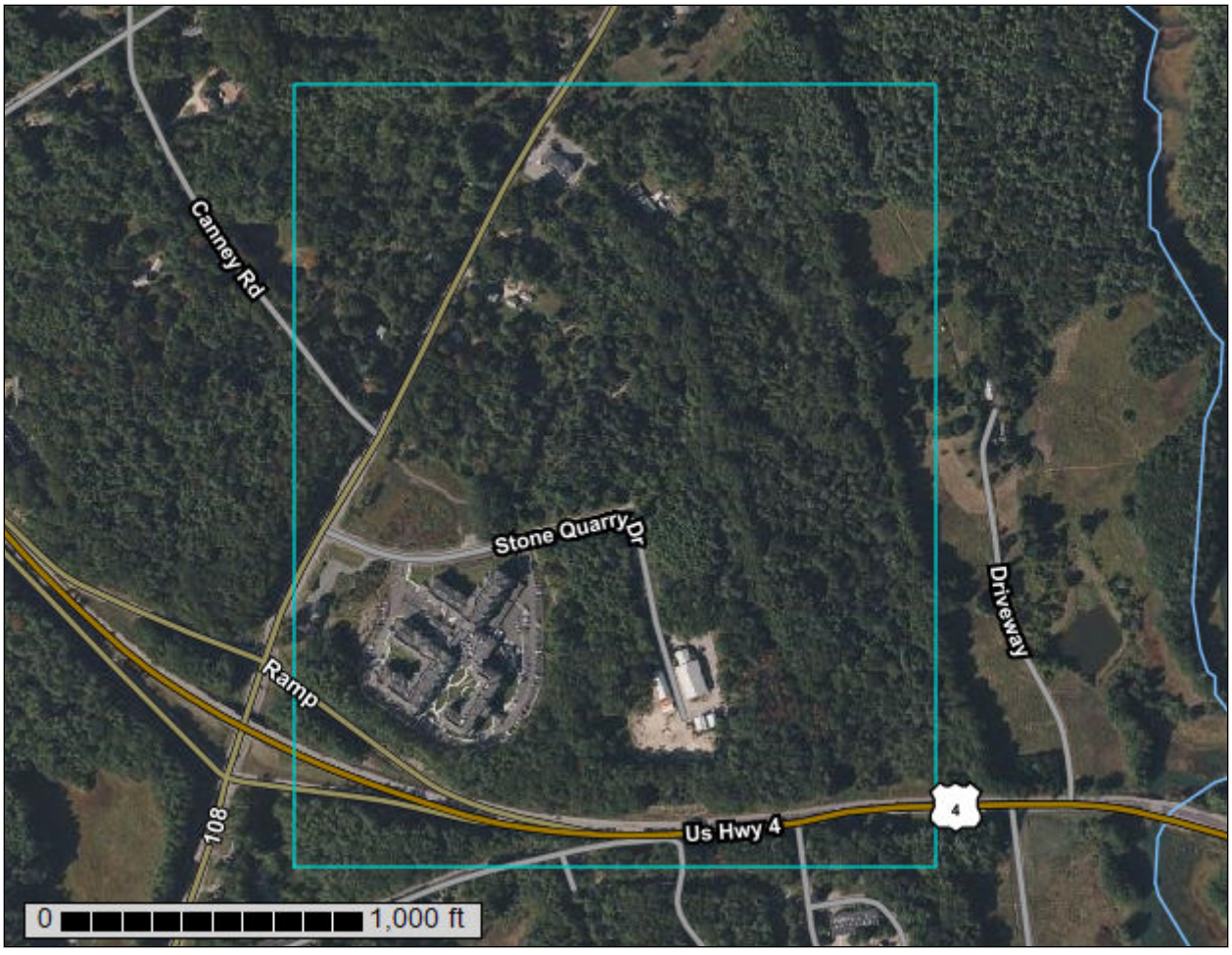
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Strafford County, New Hampshire



April 15, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:5,030 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 25, Sep 3, 2024

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BzB	Buxton silt loam, 3 to 8 percent slopes	45.4	35.7%
GlC	Gloucester fine sandy loam, 8 to 15 percent slopes	0.9	0.7%
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	36.0	28.3%
HdC	Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	0.7	0.6%
ScA	Scantic silt loam, 0 to 3 percent slopes	36.3	28.5%
ScB	Scantic silt loam, 3 to 8 percent slopes	3.0	2.3%
SfC	Suffield silt loam, 8 to 15 percent slopes	4.2	3.3%
Ta	Tidal marsh	0.0	0.0%
W	Water	0.8	0.6%
Totals for Area of Interest		**127.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the

scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Strafford County, New Hampshire

BzB—Buxton silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d6p
Elevation: 0 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Buxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buxton

Setting

Parent material: Glaciomarine

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 28 inches: silty clay loam
H3 - 28 to 43 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain
Hydric soil rating: No

Minor Components

Elmwood

Percent of map unit: 10 percent
Hydric soil rating: No

Not named

Percent of map unit: 5 percent
Hydric soil rating: No

GIC—Gloucester fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9d74
Elevation: 20 to 970 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Gloucester and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gloucester

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 28 inches: very gravelly loamy sand
H3 - 28 to 40 inches: very gravelly coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F144AY032NH - Dry Till Uplands
Hydric soil rating: No

Minor Components

Not named pan

Percent of map unit: 5 percent
Hydric soil rating: No

Hollis
Percent of map unit: 5 percent
Hydric soil rating: No

Acton
Percent of map unit: 5 percent
Hydric soil rating: No

HcB—Hollis-Charlton fine sandy loams, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9d7j
Elevation: 0 to 1,020 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition
Hollis and similar soils: 55 percent
Charlton and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting
Parent material: Till

Typical profile
H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Parent material: Till

Typical profile

H1 - 0 to 13 inches: fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 5 percent
Hydric soil rating: No

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

HdC—Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9d7n
Elevation: 0 to 1,200 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis and similar soils: 40 percent
Charlton and similar soils: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: very stony fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Parent material: Till

Typical profile

H1 - 0 to 13 inches: very stony fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Not named

Percent of map unit: 10 percent
Hydric soil rating: No

Woodbridge

Percent of map unit: 5 percent
Hydric soil rating: No

Sutton

Percent of map unit: 5 percent
Hydric soil rating: No

ScA—Scantic silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9d8s
Elevation: 0 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Scantic and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scantic

Setting

Landform: Marine terraces

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 23 inches: silty clay loam
H3 - 23 to 40 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Minor Components

Swanton

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

Not named wet

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

Biddeford

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

ScB—Scantic silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d8t
Elevation: 0 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Scantic and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scantic

Setting

Landform: Marine terraces

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 23 inches: silty clay loam
H3 - 23 to 40 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Minor Components

Swanton

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

Not named wet

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

SfC—Suffield silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9d8v
Elevation: 0 to 250 feet
Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Suffield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Suffield

Typical profile

H1 - 0 to 19 inches: silt loam
H2 - 19 to 28 inches: silt loam
H3 - 28 to 41 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY017NH - Well Drained Lake Plain
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 9 percent
Hydric soil rating: No

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Hydric soil rating: No

Ta—Tidal marsh

Map Unit Setting

National map unit symbol: 9d92
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Tidal marsh: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tidal Marsh

Setting

Landform: Marshes

Typical profile

H1 - 0 to 12 inches: peat
H2 - 12 to 46 inches: mucky peat
H3 - 46 to 50 inches: silt loam
H4 - 50 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 1 percent
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.60 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 32.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 14.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydric soil rating: Yes

Minor Components

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: No

W—Water

Map Unit Composition

Water (less than 40 acres): 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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Erik Saari, Vice President
Altus Engineering, Inc.
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24 February 2024

Dear Mr. Saari;

This report is in reference to the 22.5 acre undeveloped parcel located north of Stone Quarry Drive and east of Route 108 in Durham, NH. This is identified by the town as map 209, lot 33 and is owned by Riverwoods, Durham. A Site Specific Soil Map was prepared for this property in February 2024 to assist you in planning and permitting a residential development served by municipal sewer and water service. There were a few patches of thin snow and the wetlands were mostly iced over when this work was done.

This report is a component of the Site Specific Soil Survey and must be submitted with it for regulatory review. The both comply with *'Site Specific Soil Mapping Standards for New Hampshire and Vermont'*, SSSNNE Special Publication No.3 version 7.0, July 2021.

The Soil Survey is comprised of two components: a soil map and this report. The soil map is made by traversing the property and observing the soil at locations thought to be representative of the landform. Because soil is highly variable, it is not possible to represent every soil variation on a soil map. The soil map is a simplified two-dimensional interpretation of the complex three dimensional soil-landscape relationship. Standards allow for inclusions of soils other than those named in the soil map unit label, so long as dissimilar inclusions do not exceed 25% of the map unit. Boundaries between different soils are shown as lines on the soil map, but are generally diffuse transition zones.

Soil names were selected using best fit with soils already researched in detail and listed in the *'New Hampshire State-Wide Numerical Soils Legend'* issued in 2011 by the USDA Natural Resource Conservation Service. The map unit design and the interpretations of soil properties in this report are specific to this site and were selected considering the proposed use. Therefore, the interpretations and limitation information in this report may be insufficient for some other uses. Hydrologic soil groups were assigned using *'KSAT Values for New Hampshire Soils'* SSSNNE Special Publication No. 5, September 2009.

Twenty eight test pits were dug with an excavator and are the primary basis of this soil survey. Other soil observations were made with a soil auger, and two were recorded in detail to document the wetland soils. The test pit data and soil observations are attached at the rear of this report. Eight soil types were identified on this property and are described below. The regulated wetland boundaries were previously flagged and have been survey located.

Map Unit: 29
Soil Name: Woodbridge
Drainage class: moderately well drained.
Parent material: basal till.
Texture range: fine sandy loam and sandy loam.
Described in: test pit MC6.
Landscape position: upland sideslopes.
Landform: gently rolling to steep.
Slope range: 1 to 25%.
Bedrock class: very deep (more than 60").
Hydrologic group: C.
Flood hazard: none.
Inclusions: test pit MC12 is a non limiting inclusion in which the firm subsoil occurs deeper than is typical.
Use and management: land uses are slightly limited by the presence of basal till, which causes the ground water to perch after rain events and snow melt. This limitation can be overcome by appropriate grading and drainage.

Map Unit: 32
Soil Name: Boxford
Drainage class: moderately well drained.
Parent material: marine.
Texture range: silt loam over silty clay loam.
Described in: test pit MC10.
Landscape position: gently rolling uplands.
Landform: terraces.
Slope range: 1 to 15%.

Bedrock class: very deep (more than 60").
Hydrologic group: C.
Flood hazard: none.
Inclusions: test pit MC2 is a limiting inclusion of Boxford-like soils with bedrock between 48 and 60 inches deep. Test pit MC4 is a non-limiting inclusion of Boxford-like soils underlain by glacial till.
Use and management: land uses are limited by seasonal wetness close to the surface. These are not wetland soils and may be drained or filled to overcome this limitation. Boxford soils are highly erodible and difficult to revegetate. These soils have low bearing strength when saturated.

Map Unit: 33
Soil Name: Scitico
Drainage class: poorly drained.
Parent material: marine.
Texture range: silt loam over silty clay loam.
Described in: soil observation A.
Landscape position: nearly level to gently sloping wetlands.
Landform: glacial deltas, bays.
Slope range: 1 to 8%.
Bedrock class: very deep (more than 60").
Hydrologic group: C.
Flood hazard: undefined flood hazard may exist along small stream channels.
Inclusions: Scitico map units include small stream channels, which are limiting inclusions. Scitico map units include small areas with stony and bouldery surface layers, which is not typical. Limited historical ditching and filling for trails has occurred.
Use and management: land uses are limited by frequent saturation to the surface, low bearing strength, and fine textures, which makes it difficult to work the soil when wet. These are regulated wetlands and may be not be drained or filled without permits.

Map Unit: 42
Soil Name: Canton
Drainage class: well drained.
Parent material: loose glacial till.
Texture range: fine sandy loam over loamy sand.
Described in: test pit MC1.
Landscape position: upland.
Landform: ground moraine.
Slope range: 1-15%.
Bedrock class: very deep (more than 60").
Hydrologic group: B.
Flood hazard: none.
Inclusions: none observed.
Use and management: this soil presents no limitations to development.

Map Unit: 85

Soil Name: Hollis

Drainage class: somewhat excessively drained.
Parent material: loose glacial till.
Texture range: fine sandy loam.
Described in: test pit MC15.
Landscape position: rolling upland.
Landform: scoured ridges.
Slope range: 8 to 25%.
Bedrock class: shallow (10-20”).
Hydrologic group: D.
Flood hazard: none.
Inclusions: bedrock outcroppings are found in this map unit and are a limiting inclusion.
Use and management: land uses are limited by bedrock 0 to 20 inches from the soil surface, which can be overcome by blasting and filling.

Map Unit: 89

Soil Name: Chatfield

Drainage class: well drained.
Parent material: loose glacial till.
Texture range: fine sandy loam.
Described in: test pit MC8.
Landscape position: upland.
Landform: scoured ridges.
Slope range: 1 to 8%.
Bedrock class: moderately deep (20-40”).
Hydrologic group: B.
Flood hazard: none.
Inclusions: none noted.
Use and management: land uses are limited by bedrock 20 to 40 inches from the soil surface, which can be overcome by blasting and filling.

Map Unit: 134

Soil Name: Maybid

Drainage class: very poorly drained.
Parent material: marine.
Texture range: silt loam over silty clay loam.
Described in: soil observation B.
Landscape position: lowland wetlands.
Landform: deltas, bays.
Slope range: 0 to 1%.
Bedrock class: very deep (more than 60").
Hydrologic group: D.
Flood hazard: undefined flood hazard may exist.
Inclusions: none noted.

Use and management: Land uses are very limited by long periods of saturation to the surface, low bearing strength, and fine soil texture. These are regulated wetlands and may be not be drained or filled without permits.

Map Unit: 953

Soil Name: Boxford SPD

The Boxford SPD (SPD for 'somewhat poorly drained') is very similar to the Boxford soils, which are moderately well drained.
Drainage class: somewhat poorly drained.
Parent material: marine.
Texture range: silt loam over silty clay loam.
Described in: test pit MC3.
Landscape position: lowland.
Landform: terrace.
Slope range: 1 to more than 25%.
Bedrock class: very deep (more than 60").
Hydrologic group: C.
Flood hazard: none.
Inclusions: test pits MC17 and MC27 are Boxford SPD non-limiting variants which are underlain by firm glacial till. Test pit MC26 found bedrock between 48 and 60 inches, which is limiting for some land uses.

Test pits MC22, MC23, and MC24 show a non-limiting inclusion with a thin layer of fill over subsoils typical to Boxford SPD and Boxford soils. This inclusion appears widespread in the south west corner of the property, but could not be accurately separated as a map unit. It was included in the Boxford SPD because it is also somewhat poorly drained. Other areas of Boxford SPD map units are covered with debris from past human occupation, such as broken concrete and brick piles.

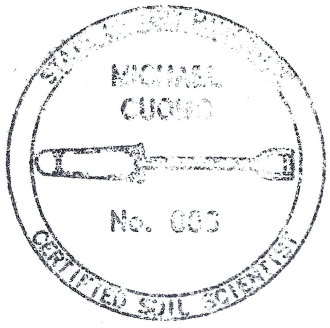
Use and management: land uses are limited by seasonal wetness close to the surface. These are not wetland soils and may be drained or filled to overcome this limitation. Boxford SPD soils are highly erodible and difficult to revegetate. These soils have low bearing strength when saturated.

Please call if you have questions regarding this work.

Sincerely,

Michael Cuomo

Michael Cuomo
NH Certified Soil Scientist #6



The following must appear on the soil map

Site Specific Soil Map Legend

MAP SYMBOL	SOIL NAME	HYDROLOGIC SOIL GROUP	DRAINAGE CLASS
29	Woodbridge	C	moderately well drained
32	Boxford	C	moderately well drained
33	Scitico	C	poorly drained
42	Canton	B	well drained
85	Hollis	D	somewhat excessively drained
89	Chatfield	B	well drained
134	Maybid	D	very poorly drained
953	Boxford SPD	C	somewhat poorly drained

The letter at the end of the soil map unit label is the slope class.
This represents the predominant slope of the map unit.

Slope Class
A 0-1%
B 1-8%
C 8-15%
D 15-25%
E +25%

This map is within the technical standards of the National Cooperative Soil Survey. It is a special purpose product intended for development planning and engineering interpretations. It was produced by a professional soil scientist, and is not a product of the USDA Natural Resources Conservation Service. There is a report that accompanies this map.

Michael Cuomo
NH Cert. Soil Scientist #6
February 2024

Michael Cuomo, Soil Scientist
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207 363 4532
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TEST PIT DATA

Client: Altus Engineering
Location: Stone Quarry Drive, Durham, NH
Date: 12 and 14 February 2024

Test Pit Number: MC1

Depth	Description
3"	Forest litter.
0-8"	Dark brown (10YR 3/3) fine sandy loam, granular, friable.
8-18"	Brownish yellow (10YR 6/6) fine sandy loam, blocky, friable.
18-60"	Light yellowish brown (2.5Y 6/3) loamy sand, blocky, friable.

Depth to Seasonal High Water Table: none
Observed water: none
Depth to bedrock: none
Soil name: Canton

Test Pit Number: MC2

Depth	Description
2"	Forest litter.
0-10"	Dark yellowish brown (10YR 3/4) silt loam, granular, friable.
10-15"	Yellowish brown (10YR 5/6) silt loam, blocky, friable.
15-24"	Olive brown (2.5Y 4/3) silt loam, blocky, friable, redox.
24-50	Olive (5Y 4/3) silty clay loam, massive, firm, redox.
50"+	Bedrock.

Depth to Seasonal High Water Table: 15"
Observed water: none
Depth to bedrock: 50"
Soil name: Boxford variant

Test Pit Number: MC3

Depth	Description
3"	Forest litter.
0-8"	Dark olive brown (2.5Y 3/3) silt loam, granular, friable.
8-10"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
10-14"	Light yellowish brown (2.5Y 6/4) silt loam, blocky, friable, redox.
14-54	Olive (5Y 5/3) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 10"
Observed water: 12"
Depth to bedrock: none
Soil name: Boxford SPD
Percolation test: 22 minutes/inch at 9" depth

Test Pit Number: MC4

Depth	Description
2"	Forest litter.
0-8"	Dark brown (10YR 3/3) silt loam, granular, friable.
8-15"	Yellowish brown (10YR 5/6) silt loam, blocky, friable.
15-19"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable, redox.
19-40"	Grayish brown (5Y 5/2) silty clay loam, massive, firm, redox.
40-60"	Olive brown (2.5Y 4/4) stony fine sandy loam, massive, friable, redox.

Depth to Seasonal High Water Table: 15"
Observed water: 18"
Depth to bedrock: none
Soil name: Boxford variant

Test Pit Number: MC5

Depth	Description
3"	Forest litter.
0-7"	Dark brown (10YR 3/3) fine sandy loam, granular, friable.
7-12"	Brownish yellow (10YR 6/6) fine sandy loam, blocky, friable.
12-24"	Light olive brown (2.5Y 5/6) loamy sand, blocky, friable.
24-60"	Light yellowish brown (2.5Y 6/3) loamy sand, blocky, friable.

Depth to Seasonal High Water Table: none
Observed water: none
Depth to bedrock: none
Soil name: Canton

Test Pit Number: MC6

Depth	Description
3"	Forest litter.
0-8"	Dark brown (10YR 3/3) stony fine sandy loam, granular, friable.
8-16"	Yellowish brown (10YR 5/4) stony fine sandy loam, blocky, friable.
16-21"	Yellowish brown (10YR 5/6) stony sandy loam, blocky, friable.
21-55"	Light olive brown (2.5Y 5/4) stony sandy loam, massive, firm, redox.

Depth to Seasonal High Water Table: 21"
Observed water: 50"
Depth to bedrock: none
Soil name: Woodbridge

Test Pit Number: MC7

Depth	Description
1"	Forest litter.
0-9"	Very dark grayish brown (2.5Y 3/2) silt loam, granular, friable.
9-12"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
12-16"	Light yellowish brown (2.5Y 6/3) silt loam, blocky, friable, redox.
16-60	Olive gray (5Y 5/2) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 12"
Observed water: none
Depth to bedrock: none
Soil name: Boxford SPD

Test Pit Number: MC8

Depth	Description
3"	Forest litter.
0-8"	Very dark brown (10YR 2/2) fine sandy loam, granular, friable.
8-25"	Dark yellowish brown (10YR 4/6) stony fine sandy loam, blocky, friable.
25-30"	Light yellowish brown (2.5Y 6/4) stony fine sandy loam, blocky, friable.

Depth to Seasonal High Water Table: none
Observed water: none
Depth to bedrock: 30"
Soil name: Chatfield
Percolation test: 10 minutes/inch at 16" depth

Test Pit Number: MC9

Depth	Description
2"	Forest litter.
0-6"	Dark brown (10YR 3/3) stony fine sandy loam, granular, friable.
6-21"	Brownish yellow (10YR 6/6) stony fine sandy loam, blocky, friable.
21-55"	Light yellowish brown (2.5Y 6/4) loamy sand, blocky, friable.

Depth to Seasonal High Water Table: none
Observed water: none
Depth to bedrock: none
Soil name: Canton

Test Pit Number: MC10

Depth	Description
0-14"	Very dark grayish brown (10YR 3/2) silt loam, granular, friable.
14-20"	Yellowish brown (10YR 5/6) silt loam, blocky, friable.
20-25"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable, redox.
25-56"	Olive (5Y 4/3) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 20"
Observed water: 25"
Depth to bedrock: none
Soil name: Boxford

Test Pit Number: MC11

Depth	Description
1"	Forest litter.
0-8"	Very dark grayish brown (2.5Y 3/2) silt loam, granular, friable.
8-10"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
10-17"	Light yellowish brown (2.5Y 6/3) silt loam, blocky, friable, redox.
17-60"	Olive (5Y 5/3) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 10"
Observed water: none
Depth to bedrock: none
Soil name: Boxford SPD

Test Pit Number: MC12

Depth	Description
2"	Forest litter.
0-14"	Very dark brown (10YR 2/2) fine sandy loam, granular, friable.
14-28"	Yellowish brown (10YR 5/6) fine sandy loam, blocky, friable.
28-44"	Olive brown (2.5Y 4/4) stony fine sandy loam, blocky, friable, redox.
44-60"	Olive brown (2.5Y 4/3) stony fine sandy loam, massive, firm, redox.

Depth to Seasonal High Water Table: 28"
Observed water: 40"
Depth to bedrock: none
Soil name: Woodbridge variant

Test Pit Number: MC13

Depth	Description
2"	Forest litter.
0-9"	Very dark grayish brown (10YR 3/2) stony fine sandy loam, granular, friable.
9-16"	Dark yellowish brown (10YR 4/6) stony fine sandy loam, blocky, friable.
16-24"	Light yellowish brown (2.5Y 6/4) stony fine sandy loam, blocky, friable, redox.
24-60"	Olive brown (2.5Y 4/4) stony sandy loam, massive, firm, redox.

Depth to Seasonal High Water Table: 16"
Observed water: 24"
Depth to bedrock: none
Soil name: Woodbridge
Percolation test: 12 minutes/inch at 15" depth

Test Pit Number: MC14

Depth	Description
1"	Forest litter.
0-9"	Very dark grayish brown (2.5Y 3/2) silt loam, granular, friable.
9-12"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable, redox.
12-20"	Olive brown (2.5Y 4/3) silt loam, blocky, firm, redox.
20-60"	Olive gray (5Y 5/2) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 9"
Observed water: 18"
Depth to bedrock: none
Soil name: Boxford SPD

Test Pit Number: MC15

Depth	Description
1"	Forest litter.
0-8"	Very dark grayish brown (10YR 3/2) bouldery fine sandy loam, granular, friable.
8-20"	Yellowish brown (10YR 5/6) bouldery fine sandy loam, blocky, friable.
20"+	Bedrock.

Depth to Seasonal High Water Table: none
Observed water: none
Depth to bedrock: 20"
Soil name: Hollis

Test Pit Number: MC16

Depth	Description
1"	Forest litter.
0-8"	Very dark grayish brown (2.5Y 3/2) silt loam, granular, friable.
8-12"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
12-16"	Olive brown (2.5Y 4/4) silt loam, blocky, friable, redox.
16-60"	Olive gray (5Y 5/2) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 12"
Observed water: none
Depth to bedrock: none
Soil name: Boxford SPD

Test Pit Number: MC17

Depth	Description
1"	Forest litter.
0-9"	Dark brown (10YR 3/3) silt loam, granular, friable.
9-11"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
11-13"	Olive brown (2.5Y 4/4) silt loam, blocky, friable, redox.
13-32"	Olive gray (5Y 5/2) silty clay loam, massive, firm, redox.
32-60"	Olive brown (2.5Y 4/4) stony fine sandy loam, massive, firm, redox.

Depth to Seasonal High Water Table: 11"
Observed water: 34"
Depth to bedrock: none
Soil name: Boxford SPD variant

Test Pit Number: MC18

Depth	Description
2"	Forest litter.
0-9"	Dark brown (10YR 3/3) fine sandy loam, granular, friable.
9-24"	Yellowish brown (10YR 5/6) fine sandy loam, blocky, friable.
24-66"	Light olive brown (2.5Y 5/4) stony fine sandy loam, blocky, friable, redox.

Depth to Seasonal High Water Table: 24"
Observed water: none
Depth to bedrock: none
Soil name: Woodbridge

Test Pit Number: MC19

Depth	Description
0-11"	Very dark grayish brown (10YR 3/2) very fine sandy loam, granular, friable.
11-19"	Strong brown (7.5YR 5/6) very fine sandy loam, blocky, friable.
19-22"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable, redox.
22-56"	Olive (5Y 4/4) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 19"
Observed water: 50"
Depth to bedrock: none
Soil name: Boxford

Test Pit Number: MC20

Depth	Description
1"	Forest litter.
0-9"	Very dark grayish brown (10YR 3/2) silt loam, granular, friable.
9-11"	Olive brown (2.5Y 4/4) silt loam, blocky, friable, redox.
11-18"	Grayish brown (2.5Y 5/2) silt loam, blocky, friable, redox.
18-60"	Olive gray (5Y 5/2) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 9"
Observed water: 30"
Depth to bedrock: none
Soil name: Boxford SPD

Test Pit Number: MC21

Depth	Description
1"	Forest litter.
0-6"	Dark brown (10YR 3/3) silt loam, granular, friable.
6-11"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
11-16"	Grayish brown (2.5Y 5/2) silt loam, blocky, friable, redox.
16-55"	Olive (5Y 4/3) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 11"
Observed water: 20"
Depth to bedrock: none
Soil name: Boxford SPD
Percolation test: 58 minutes/inch at 10" depth

Test Pit Number: MC22

Depth	Description
0-6"	Dark olive brown (2.5Y 3/3) fine sandy loam fill, massive, friable.
6-15"	Light yellowish brown (2.5Y 6/3) gravelly loamy sand fill, massive, friable.
15-24"	Dark grayish brown (2.5Y 4/2) silt loam, blocky, friable, redox.
24-55"	Olive (5Y 4/4) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 15"
Observed water: none
Depth to bedrock: none
Soil name: Excavated and filled over Boxford or Boxford SPD

Test Pit Number: MC23

Depth	Description
0-8"	Dark brown (10YR 3/3) fine sandy loam fill, granular, friable.
8-12"	Light yellowish brown (2.5Y 6/3) gravelly loamy sand fill, massive, friable.
12-20"	Light yellowish brown (2.5Y 6/4) silty clay loam, blocky, firm, redox.
20-58"	Olive (5Y 4/4) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 12"
Observed water: none
Depth to bedrock: none
Soil name: Excavated and filled over Boxford or Boxford SPD

Test Pit Number: MC24

Depth	Description
0-7"	Very dark grayish brown (10YR 3/2) fine sandy loam fill, granular, friable.
7-14"	Light yellowish brown (2.5Y 6/3) gravelly loamy sand fill, massive, friable.
14-16"	Very dark grayish brown (10YR 3/2) silt loam, massive, friable.
16-19"	Light olive brown (2.5Y 5/3) silt loam, blocky, friable, redox.
19-60"	Olive (5Y 4/4) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 16"
Observed water: none
Depth to bedrock: none
Soil name: Excavated and filled over Boxford or Boxford SPD

Test Pit Number: MC25

Depth	Description
2"	Forest litter.
0-9"	Dark brown (10YR 3/3) stony fine sandy loam, granular, friable.
9-24"	Dark yellowish brown (10YR 4/6) stony fine sandy loam, blocky, friable.
24-40"	Light yellowish brown (10YR 6/4) stony loamy sand, blocky, friable.
40-60"	Pale brown (2.5Y 7/3) stony loamy sand, massive, friable.

Depth to Seasonal High Water Table: none
Observed water: none
Depth to bedrock: none
Soil name: Canton

Test Pit Number: MC26

Depth	Description
1"	Forest litter.
0-14"	Very dark grayish brown (2.5Y 3/2) silt loam, granular, friable.
14-19"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable, redox.
19-30"	Olive brown (2.5Y 4/4) silty clay loam, blocky, firm, redox.
30-50"	Olive brown (2.5Y 4/3) stony fine sandy loam, massive, firm, redox.
50"+	Bedrock

Depth to Seasonal High Water Table: 14"
Observed water: 36"
Depth to bedrock: 50"
Soil name: Boxford SPD variant

Test Pit Number: MC27

Depth	Description
1"	Forest litter
0-10"	Very dark grayish brown (10YR 3/2) silt loam, granular, friable.
10-20"	Yellowish brown (10YR 5/6) silt loam, blocky, friable.
20-30"	Light olive brown (2.5Y 5/3) silty clay loam, massive, firm, redox.
30-50"	Light olive brown (2.5Y 5/4) stony fine sandy loam, massive, firm, redox.
50"+	Bedrock.

Depth to Seasonal High Water Table: 20"
Observed water: none
Depth to bedrock: 50"
Soil name: Boxford variant

Test Pit Number: MC28

Depth	Description
1"	Forest litter.
0-6"	Very dark grayish brown (2.5Y 3/2) silt loam, granular, friable.
6-8"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
8-11"	Grayish brown (2.5Y 5/2) silt loam, blocky, friable, redox.
11-60"	Olive (5Y 4/3) silty clay loam, blocky, firm, redox.

Depth to Seasonal High Water Table: 8"
Observed water: 30"
Depth to bedrock: none
Soil name: Boxford SPD

Soil Observation A (with hand tools)

Depth	Description
1"	Forest litter.
0-10"	Dark olive brown (2.5Y 3/3) silt loam, granular, friable, redox.
10-14"	Light brownish gray (2.5Y 6/2) silt loam, blocky, friable, redox.
14-19"	Olive brown (2.5Y 4/3) silt loam, blocky, friable, redox.
19-40"	Olive (5Y 4/3) silty clay loam, blocky, firm, redox.

Depth to Seasonal High Water Table: surface
Observed water: 12"
Depth to bedrock: none
Soil name: Scitico

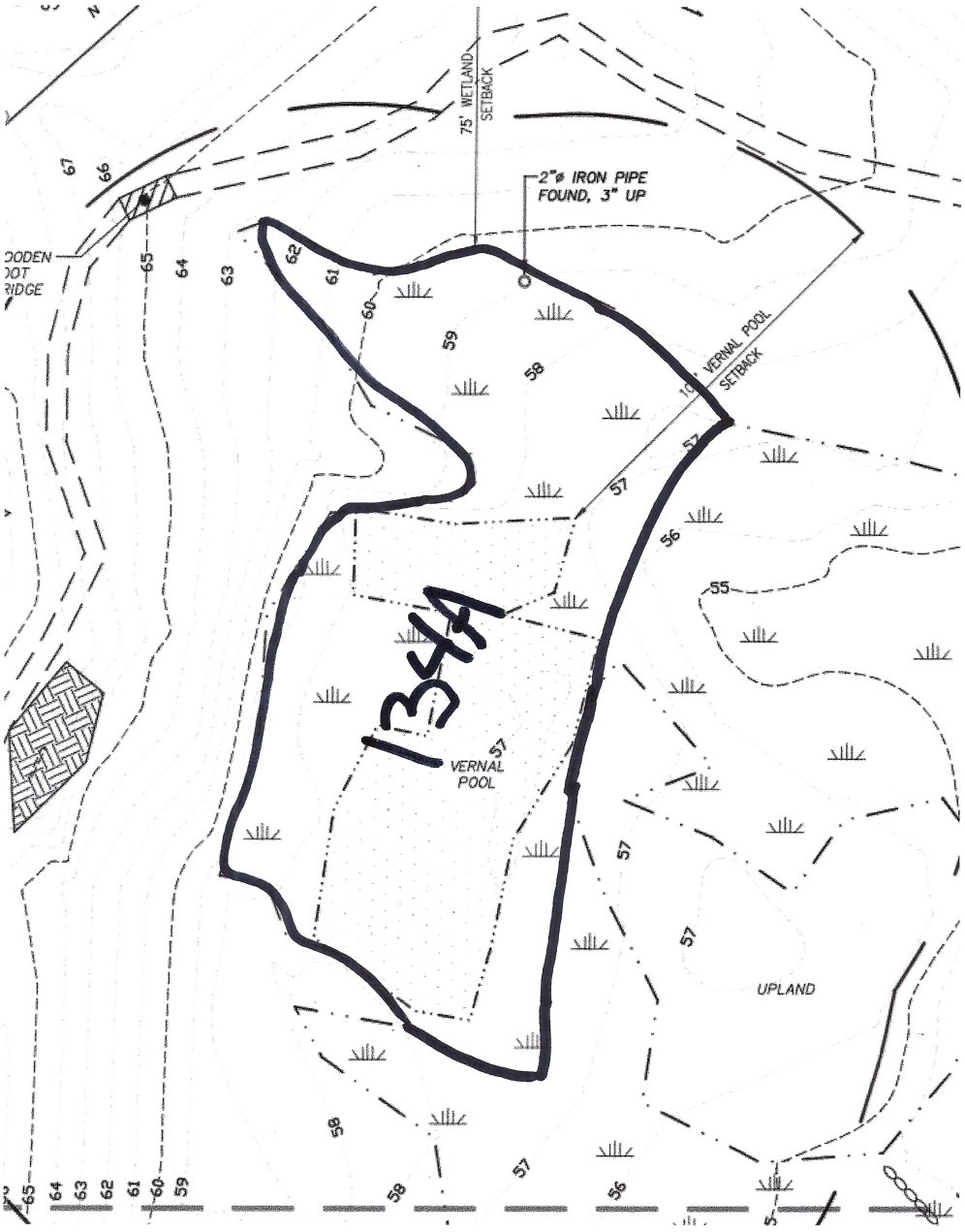
Soil Observation B (with hand tools)

Depth	Description
1"	Forest litter.
0-6"	Black (2.5Y 2/1) silt loam, granular, friable, redox.
6-10"	Light brownish gray (2.5Y 6/2) silt loam, blocky, friable, redox.
10-15"	Dark grayish brown (2.5Y 4/2) silt loam, blocky, friable, redox.
15-20"	Olive gray (5Y 5/2) silt loam, blocky, firm, redox.
20-40"	Olive (5Y 4/3) silty clay loam, blocky, firm, redox.

Depth to Seasonal High Water Table: surface
Observed water: 9"
Depth to bedrock: none
Soil name: Maybid


see correction sheet
29C
953B
MC14
MC15
29B
85D
33B
MC17
29B
MC13
32B
MC16
134A
42C
MC18
29C
MC12
MC27
33B
953B
134A
32B
MC9
MC10
42B
85C
MC26
MC28
953B
33B
MC11
953C
134A
953B
MC20
MC8
33B
42C
MC25
134A
MC6
953E
963C
MC23
132B
MC3
MC7
953B
953B
MC24
MC22
MC21
MC4
32B
953C
33B
953D
MC5
953B
33B
953C
42C
32C
TEST PIT "MC#"

THIS SHOWS THE CORRECT CONFIGURATION OF THIS MAP UNIT



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TEST PIT DATA

Client: Altus Engineering
Location: Stone Quarry Drive, Durham, NH
Date: 12 June 2025

Test Pit Number: A1

Depth	Description
0-9”	Dark brown (10YR 3/3) silt loam, granular, friable.
9-12”	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
12-19”	Light olive brown (2.5Y 5/3) silt loam, blocky, friable, redox.
19-75”	Olive (5Y 4/3) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 12”
Depth to Bedrock: none
Observed Water: none
Estimated percolation rate: 60 min./inch

Test Pit Number: A2

Depth	Description
0-15”	Very dark grayish brown (10YR 3/2) very fine sandy loam, granular, friable.
15-17”	Reddish yellow (7.5YR 6/6) very fine sandy loam, blocky, friable.
17-25”	Light olive brown (2.5Y 5/4) very fine sandy loam, blocky, friable, redox.
25-80”	Olive (5Y 4/4) silt loam, massive, firm, redox.

Depth to Seasonal High Water Table: 17”
Depth to Bedrock: none
Observed Water: 20”
Estimated percolation rate: 60 min./inch

Test Pit Number: A3

Depth	Description
0-9”	Dark olive brown (2.5Y 3/3) silt loam, granular, friable.
9-14”	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
14-24”	Olive (5Y 4/4) silt loam, blocky, friable, redox.
24-60”	Olive (5Y 4/3) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 14”
Depth to Bedrock: none
Observed Water: none
Estimated percolation rate: 60 min./inch

Test Pit Number: A4

Depth	Description
0-10”	Very dark grayish brown (2.5Y 3/2) silt loam fill, granular, friable.
10-14”	Light yellowish brown (2.5Y 6/4) loamy sand fill, massive, friable.
14-16”	Very dark grayish brown (2.5Y 3/2) silt loam, granular, friable, redox.
16-20”	Olive gray (5Y 5/2) silt loam, blocky, friable, redox.
20-66”	Olive (5Y 4/3) silty clay loam, massive, firm, redox.

Depth to Seasonal High Water Table: 14”
Depth to Bedrock: none
Observed Water: 55”
Estimated percolation rate: 60 min./inch

Test Pit Number: A5

Depth	Description
0-8”	Very dark grayish brown (10YR 3/3) silt loam, granular, friable.
8-12”	Light olive brown (2.5Y 5/4) silt loam, blocky, friable.
12-19”	Light olive brown (2.5Y 5/3) silt loam, blocky, friable, redox.
19-48”	Olive (5Y 4/3) silty clay loam, massive, firm, redox.
48-72”	Olive brown (2.5Y 4/4) stony fine sandy loam, massive, friable, redox.
72-86”	Olive brown (2.5Y 4/4) stony loamy sand, massive, friable, redox.

Depth to Seasonal High Water Table: 12”
Depth to Bedrock: none
Observed Water: 60”
Estimated percolation rate: 60 min./inch

Test Pit Number: A6

Depth	Description
0-9”	Very dark grayish brown (10YR 3/3) fine sandy loam, granular, friable.
9-16”	Brownish yellow (10YR 6/6) fine sandy loam, blocky, friable.
16-84”	Light yellowish brown (2.5Y 6/4) loamy sand, blocky, friable.
84-96“	Light olive brown (2.5Y 5/4) loamy sand, blocky, friable, redox.

Depth to Seasonal High Water Table: 84”
Depth to Bedrock: none
Observed Water: none
Estimated percolation rate: 4 to 6 min./inch

Section 7

BMP and Riprap Sizing Calculations

ALTUS
ENGINEERING

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.08)

Type/Node Name: **Bioretention Pond #1 (HydroCAD Node #17P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

x		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.08(a).	
0.23	ac	A = Area draining to the practice	
0.10	ac	A_I = Impervious area draining to the practice	
0.42	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.43	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.10	ac-in	WQV= 1" x Rv x A	
359	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
90	cf	25% x WQV (check calc for sediment forebay volume)	
269	cf	75% x WQV (check calc for surface sand filter volume)	
CB		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
56.80	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.01	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
19.92	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
54.75	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
53.75	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
57.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
51.75	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
3.00	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
(2.25)	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
58.50	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
59.25	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
1,054	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	C-15	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet	L1 & L2	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet	C-14	Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

System is lined, SHWT not relevant

Stage-Area-Storage for Pond 17P: Bio #1

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
54.75	487	487	0
54.85	487	495	2
54.95	487	503	5
55.05	487	510	7
55.15	487	518	10
55.25	487	526	12
55.35	487	534	15
55.45	487	542	17
55.55	487	550	19
55.65	487	557	22
55.75	487	565	24
55.85	487	573	27
55.95	487	581	29
56.05	487	589	32
56.15	487	597	34
56.25	487	604	37
56.35	521	640	87
56.45	557	676	141
56.55	594	714	198
56.65	632	753	260
56.75	671	793	325
56.85	711	835	394
56.95	753	877	467
57.05	795	920	544
57.15	837	964	626
57.25	880	1,008	712
57.35	924	1,054	802
57.45	970	1,100	897
57.55	1,016	1,148	996
57.65	1,064	1,197	1,100
57.75	1,113	1,247	1,209
57.85	1,162	1,298	1,323
57.95	1,213	1,351	1,441
58.05	1,264	1,403	1,565
58.15	1,316	1,457	1,694
58.25	1,369	1,511	1,829
58.35	1,423	1,566	1,968
58.45	1,477	1,623	2,113
58.55	1,533	1,680	2,264
58.65	1,590	1,739	2,420
58.75	1,648	1,798	2,582
58.85	1,707	1,859	2,749
58.95	1,767	1,921	2,923
59.05	1,827	1,983	3,103
59.15	1,888	2,046	3,288
59.25	**1,950**	**2,110**	**3,480**

WQV = 359 cf
Ewqv = 56.80

Available
WQV=1,054cf

Stage-Discharge for Pond 17P: Bio #1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
54.75	0.00	57.40	0.03
54.80	0.00	57.45	0.05
54.85	0.00	57.50	0.08
54.90	0.00	57.55	0.11
54.95	0.00	57.60	0.15
55.00	0.00	57.65	0.19
55.05	0.00	57.70	0.22
55.10	0.00	57.75	0.24
55.15	0.00	57.80	0.26
55.20	0.00	57.85	0.28
55.25	0.00	57.90	0.30
55.30	0.00	57.95	0.32
55.35	0.00	58.00	0.34
55.40	0.00	58.05	0.35
55.45	0.00	58.10	0.37
55.50	0.00	58.15	0.38
55.55	0.00	58.20	0.40
55.60	0.00	58.25	0.41
55.65	0.00	58.30	0.43
55.70	0.00	58.35	0.44
55.75	0.00	58.40	0.45
55.80	0.00	58.45	0.46
55.85	0.00	58.50	0.48
55.90	0.00	58.55	0.49
55.95	0.00	58.60	0.50
56.00	0.00	58.65	0.51
56.05	0.00	58.70	0.52
56.10	0.00	58.75	0.54
56.15	0.00	58.80	0.84
56.20	0.00	58.85	1.39
56.25	0.00	58.90	2.09
56.30	0.00	58.95	2.92
56.35	0.00	59.00	3.86
56.40	0.00	59.05	4.90
56.45	0.00	59.10	6.03
56.50	0.01	59.15	7.24
56.55	0.01	59.20	8.53
56.60	0.01	59.25	**9.89**
56.65	0.01		
56.70	0.01		
56.75	0.01		
56.80	0.01		
56.85	0.01		
56.90	0.01		
56.95	0.02		
57.00	0.02		
57.05	0.02		
57.10	0.02		
57.15	0.02		
57.20	0.02		
57.25	0.02		
57.30	0.02		
57.35	0.03		

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.08)

Type/Node Name: **Bioretention Pond #2 (HydroCAD Node #22P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

x		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.08(a).	
0.36	ac	A = Area draining to the practice	
0.27	ac	A_I = Impervious area draining to the practice	
0.75	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.73	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.26	ac-in	WQV= 1" x Rv x A	
947	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
237	cf	25% x WQV (check calc for sediment forebay volume)	
711	cf	75% x WQV (check calc for surface sand filter volume)	
CB		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
58.45	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.02	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
26.32	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
56.25	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
55.25	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
55.08	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
50.75	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
5.50	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.17	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
59.65	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
60.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
1,000	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	C-15	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet	L1 & L2	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 22P: Bio #2

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
56.25	1,027	1,027	0
56.35	1,027	1,038	5
56.45	1,027	1,050	10
56.55	1,027	1,061	15
56.65	1,027	1,072	21
56.75	1,027	1,084	26
56.85	1,027	1,095	31
56.95	1,027	1,107	36
57.05	1,027	1,118	41
57.15	1,027	1,129	46
57.25	1,027	1,141	51
57.35	1,027	1,152	56
57.45	1,027	1,163	62
57.55	1,027	1,175	67
57.65	1,027	1,186	72
57.75	1,027	1,197	77
57.85	1,085	1,257	183
57.95	1,145	1,317	294
58.05	1,203	1,377	412
58.15	1,261	1,437	535
58.25	1,321	1,497	664
58.35	1,381	1,559	799
58.45	1,443	1,623	940
58.55	1,507	1,688	1,088
58.65	1,572	1,754	1,242
58.75	1,638	1,822	1,402
58.85	1,705	1,891	1,569
58.95	1,774	1,961	1,743
59.05	1,841	2,030	1,924
59.15	1,907	2,097	2,111
59.25	1,974	2,166	2,305
59.35	2,042	2,236	2,506
59.45	2,111	2,307	2,714
59.55	2,181	2,379	2,928
59.65	2,252	2,452	3,150
59.75	2,325	2,526	3,379
59.85	2,398	2,602	3,615
59.95	**2,473**	**2,679**	**3,859**

WQV = 947 cf
Ewqv = 58.45
Lowest Outlet = 58.50
Available WQV = 1,000 cf

Stage-Discharge for Pond 22P: Bio #2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
56.25	0.00	57.31	0.00	58.37	0.02	59.43	0.43
56.27	0.00	57.33	0.00	58.39	0.02	59.45	0.44
56.29	0.00	57.35	0.00	58.41	0.02	59.47	0.44
56.31	0.00	57.37	0.00	58.43	0.02	59.49	0.45
56.33	0.00	57.39	0.00	58.45	0.02	Qwqv = 0.02 cfs	
56.35	0.00	57.41	0.00	58.47	0.03		
56.37	0.00	57.43	0.00	58.49	0.03	59.55	0.76
56.39	0.00	57.45	0.00	58.51	0.03	59.57	0.95
56.41	0.00	57.47	0.00	58.53	0.03	59.59	1.18
56.43	0.00	57.49	0.00	58.55	0.03	59.61	1.43
56.45	0.00	57.51	0.00	58.57	0.04	59.63	1.71
56.47	0.00	57.53	0.00	58.59	0.05	59.65	2.01
56.49	0.00	57.55	0.00	58.61	0.06	59.67	2.33
56.51	0.00	57.57	0.00	58.63	0.07	59.69	2.67
56.53	0.00	57.59	0.00	58.65	0.08	59.71	3.02
56.55	0.00	57.61	0.00	58.67	0.10	59.73	3.39
56.57	0.00	57.63	0.00	58.69	0.11	59.75	3.78
56.59	0.00	57.65	0.00	58.71	0.12	59.77	4.19
56.61	0.00	57.67	0.00	58.73	0.14	59.79	4.61
56.63	0.00	57.69	0.00	58.75	0.16	59.81	5.04
56.65	0.00	57.71	0.00	58.77	0.17	59.83	5.49
56.67	0.00	57.73	0.00	58.79	0.19	59.85	5.96
56.69	0.00	57.75	0.00	58.81	0.20	59.87	6.43
56.71	0.00	57.77	0.00	58.83	0.21	59.89	6.92
56.73	0.00	57.79	0.00	58.85	0.22	59.91	7.42
56.75	0.00	57.81	0.00	58.87	0.23	59.93	7.93
56.77	0.00	57.83	0.00	58.89	0.24	59.95	8.46
56.79	0.00	57.85	0.00	58.91	0.25	59.97	9.00
56.81	0.00	57.87	0.00	58.93	0.26	59.99	**9.54**
56.83	0.00	57.89	0.00	58.95	0.27		
56.85	0.00	57.91	0.01	58.97	0.28		
56.87	0.00	57.93	0.01	58.99	0.28		
56.89	0.00	57.95	0.01	59.01	0.29		
56.91	0.00	57.97	0.01	59.03	0.30		
56.93	0.00	57.99	0.01	59.05	0.31		
56.95	0.00	58.01	0.01	59.07	0.32		
56.97	0.00	58.03	0.01	59.09	0.32		
56.99	0.00	58.05	0.01	59.11	0.33		
57.01	0.00	58.07	0.01	59.13	0.34		
57.03	0.00	58.09	0.01	59.15	0.34		
57.05	0.00	58.11	0.01	59.17	0.35		
57.07	0.00	58.13	0.01	59.19	0.36		
57.09	0.00	58.15	0.01	59.21	0.36		
57.11	0.00	58.17	0.01	59.23	0.37		
57.13	0.00	58.19	0.02	59.25	0.38		
57.15	0.00	58.21	0.02	59.27	0.38		
57.17	0.00	58.23	0.02	59.29	0.39		
57.19	0.00	58.25	0.02	59.31	0.40		
57.21	0.00	58.27	0.02	59.33	0.40		
57.23	0.00	58.29	0.02	59.35	0.41		
57.25	0.00	58.31	0.02	59.37	0.41		
57.27	0.00	58.33	0.02	59.39	0.42		
57.29	0.00	58.35	0.02	59.41	0.42		

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.08)

Type/Node Name: **Bioretention Pond #3 (HydroCAD Node #69P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

x		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.08(a).	
1.68	ac	A = Area draining to the practice	
1.07	ac	A_I = Impervious area draining to the practice	
0.64	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.62	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.05	ac-in	WQV= 1" x Rv x A	
3,797	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
949	cf	25% x WQV (check calc for sediment forebay volume)	
2,848	cf	75% x WQV (check calc for surface sand filter volume)	
CB		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
49.63	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.06	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
35.16	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
46.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
45.50	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
49.50	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
48.50	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
(2.00)	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
(3.00)	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
52.57	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
53.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
4,799	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	C-15	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet	L1 & L2	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

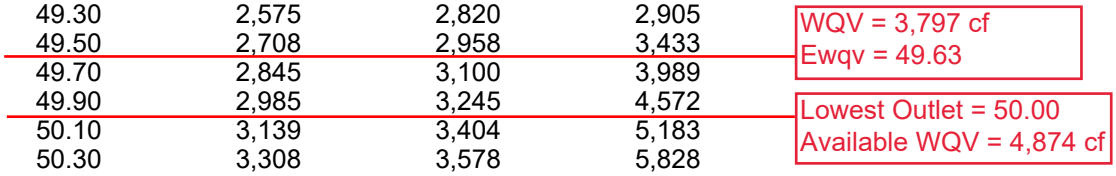
3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

System is lined, SHWT not relevant

Stage-Area-Storage for Pond 69P: Bio #3 / OS #11

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
46.50	1,706	1,706	0
46.70	1,706	1,735	17
46.90	1,706	1,765	34
47.10	1,706	1,794	51
47.30	1,706	1,823	68
47.50	1,706	1,852	85
47.70	1,706	1,882	102
47.90	1,706	1,911	119
48.10	1,768	1,990	302
48.30	1,897	2,122	668
48.50	2,029	2,258	1,061
48.70	2,167	2,399	1,480
48.90	2,308	2,545	1,928
49.10	2,445	2,685	2,403
49.30	2,575	2,820	2,905
49.50	2,708	2,958	3,433
49.70	2,845	3,100	3,989
49.90	2,985	3,245	4,572
50.10	3,139	3,404	5,183
50.30	3,308	3,578	5,828
50.50	3,482	3,757	6,507
50.70	3,660	3,940	7,221
50.90	3,842	4,127	7,971
51.10	4,028	4,319	8,758
51.30	4,218	4,514	9,583
51.50	4,413	4,714	10,446
51.70	4,612	4,918	11,348
51.90	4,815	5,127	12,291
52.10	5,023	5,341	13,274
52.30	5,237	5,561	14,300
52.50	5,455	5,785	15,369
52.70	5,677	6,014	16,482
52.90	**5,904**	**6,247**	**17,640**



Stage-Discharge for Pond 69P: Bio #3 / OS #11

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
46.50	0.00	48.62	0.02	50.74	0.80	52.86	16.48
46.54	0.00	48.66	0.02	50.78	0.85	52.90	18.49
46.58	0.00	48.70	0.03	50.82	0.91	52.94	20.59
46.62	0.00	48.74	0.03	50.86	0.97	52.98	**22.07**
46.66	0.00	48.78	0.03	50.90	1.04		
46.70	0.00	48.82	0.03	50.94	1.10		
46.74	0.00	48.86	0.03	50.98	1.16		
46.78	0.00	48.90	0.03	51.02	1.23		
46.82	0.00	48.94	0.04	51.06	1.30		
46.86	0.00	48.98	0.04	51.10	1.37		
46.90	0.00	49.02	0.04	51.14	1.44		
46.94	0.00	49.06	0.04	51.18	1.51		
46.98	0.00	49.10	0.04	51.22	1.58		
47.02	0.00	49.14	0.04	51.26	1.65		
47.06	0.00	49.18	0.05	51.30	1.73		
47.10	0.00	49.22	0.05	51.34	1.81		
47.14	0.00	49.26	0.05	51.38	1.88		
47.18	0.00	49.30	0.05	51.42	1.96		
47.22	0.00	49.34	0.05	51.46	2.04		
47.26	0.00	49.38	0.05	51.50	2.12		
47.30	0.00	49.42	0.05	51.54	2.20		
47.34	0.00	49.46	0.06	51.58	2.28		
47.38	0.00	49.50	0.06	51.62	2.37		
47.42	0.00	49.54	0.06	51.66	2.45		
47.46	0.00	49.58	0.06	51.70	2.54		
47.50	0.00	49.62	0.06	Qwqv = 0.06 cfs			
47.54	0.00	49.66	0.06				
47.58	0.00	49.70	0.07	51.82	2.80		
47.62	0.00	49.74	0.07	51.86	2.89		
47.66	0.00	49.78	0.07	51.90	2.98		
47.70	0.00	49.82	0.07	51.94	3.07		
47.74	0.00	49.86	0.07	51.98	3.16		
47.78	0.00	49.90	0.07	52.02	3.26		
47.82	0.00	49.94	0.07	52.06	3.35		
47.86	0.00	49.98	0.08	52.10	3.45		
47.90	0.00	50.02	0.08	52.14	3.54		
47.94	0.00	50.06	0.10	52.18	3.64		
47.98	0.00	50.10	0.12	52.22	3.74		
48.02	0.00	50.14	0.14	52.26	3.83		
48.06	0.00	50.18	0.17	52.30	3.93		
48.10	0.00	50.22	0.20	52.34	4.03		
48.14	0.01	50.26	0.23	52.38	4.14		
48.18	0.01	50.30	0.27	52.42	4.24		
48.22	0.01	50.34	0.31	52.46	4.34		
48.26	0.01	50.38	0.35	52.50	4.44		
48.30	0.01	50.42	0.39	52.54	4.96		
48.34	0.01	50.46	0.43	52.58	5.81		
48.38	0.01	50.50	0.48	52.62	6.89		
48.42	0.02	50.54	0.53	52.66	8.15		
48.46	0.02	50.58	0.58	52.70	9.56		
48.50	0.02	50.62	0.63	52.74	11.11		
48.54	0.02	50.66	0.68	52.78	12.79		
48.58	0.02	50.70	0.74	52.82	14.58		

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.08)

Type/Node Name: **Bioretention Pond #4 (HydroCAD Node #83P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

x		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.08(a).	
0.33	ac	A = Area draining to the practice	
0.25	ac	A_I = Impervious area draining to the practice	
0.76	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.73	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.24	ac-in	WQV= 1" x Rv x A	
877	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
219	cf	25% x WQV (check calc for sediment forebay volume)	
657	cf	75% x WQV (check calc for surface sand filter volume)	
CB		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
47.05	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.03	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
16.23	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
44.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
43.00	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
43.75	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
37.58	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
6.42	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
0.25	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
48.63	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
49.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
833	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
873	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	C-15	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet	L1 & L2	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

System is lined, SHWT not relevant

Stage-Area-Storage for Pond 83P: Bio #4 / OS #22

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
44.00	315	0
44.05	315	1
44.10	315	2
44.15	315	2
44.20	315	3
44.25	315	4
44.30	315	5
44.35	315	6
44.40	315	6
44.45	315	7
44.50	315	8
44.55	315	9
44.60	315	9
44.65	315	10
44.70	315	11
44.75	315	12
44.80	315	13
44.85	315	13
44.90	315	14
44.95	315	15
45.00	315	16
45.05	315	17
45.10	315	17
45.15	315	18
45.20	315	19
45.25	315	20
45.30	315	20
45.35	315	21
45.40	315	22
45.45	315	23
45.50	315	24
45.55	329	40
45.60	343	57
45.65	357	74
45.70	371	92
45.75	385	111
45.80	399	131
45.85	413	151
45.90	427	172
45.95	441	194
46.00	455	216
46.05	472	239
46.10	488	263
46.15	505	288
46.20	522	314
46.25	539	340
46.30	555	368
46.35	572	396
46.40	589	425
46.45	605	455
46.50	622	485
46.55	639	517
46.60	655	549
46.65	672	582
46.70	689	616
46.75	706	651
46.80	722	687
46.85	739	724
46.90	756	761
46.95	772	799
47.00	789	838
47.05	810	878
47.10	830	919
47.15	851	961
47.20	872	1,004
47.25	893	1,048
47.30	913	1,093
47.35	934	1,140
47.40	955	1,187
47.45	975	1,235
47.50	996	1,284
47.55	1,017	1,335
47.60	1,037	1,386
47.65	1,058	1,438
47.70	1,079	1,492
47.75	1,100	1,546
47.80	1,120	1,602
47.85	1,141	1,658
47.90	1,162	1,716
47.95	1,182	1,774
48.00	1,203	1,834
48.05	1,228	1,895
48.10	1,252	1,957
48.15	1,277	2,020
48.20	1,301	2,085
48.25	1,326	2,150
48.30	1,351	2,217
48.35	1,375	2,285
48.40	1,400	2,355
48.45	1,424	2,425
48.50	1,449	2,497
48.55	1,474	2,570
48.60	1,498	2,644
48.65	1,523	2,720
48.70	1,547	2,797
48.75	1,572	2,875
48.80	1,597	2,954
48.85	1,621	3,034
48.90	1,646	3,116
48.95	1,670	3,199
49.00	**1,695**	**3,283**

WQV = 877 cf
Ewqv = 47.05
Lowest Outlet = 47.05
Available WQV = 878 cf

Stage-Discharge for Pond 83P: Bio #4 / OS #22

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
44.00	0.00	46.65	0.02
44.05	0.00	46.70	0.02
44.10	0.00	46.75	0.02
44.15	0.00	46.80	0.02
44.20	0.00	46.85	0.02
44.25	0.00	46.90	0.03
44.30	0.00	46.95	0.03
44.35	0.00	47.00	0.03
44.40	0.00	47.05	0.03
44.45	0.00	47.10	0.04
44.50	0.00	47.15	0.05
44.55	0.00	47.20	0.08
44.60	0.00	47.25	0.12
44.65	0.00	47.30	0.15
44.70	0.00	47.35	0.19
44.75	0.00	47.40	0.22
44.80	0.00	47.45	0.24
44.85	0.00	47.50	0.26
44.90	0.00	47.55	0.28
44.95	0.00	47.60	0.30
45.00	0.00	47.65	0.32
45.05	0.00	47.70	0.34
45.10	0.00	47.75	0.35
45.15	0.00	47.80	0.37
45.20	0.00	47.85	0.38
45.25	0.00	47.90	0.40
45.30	0.00	47.95	0.41
45.35	0.00	48.00	0.42
45.40	0.00	48.05	0.44
45.45	0.00	48.10	0.45
45.50	0.00	48.15	0.46
45.55	0.00	48.20	0.47
45.60	0.00	48.25	0.49
45.65	0.00	48.30	0.50
45.70	0.00	48.35	0.51
45.75	0.00	48.40	0.52
45.80	0.00	48.45	0.53
45.85	0.01	48.50	0.54
45.90	0.01	48.55	0.84
45.95	0.01	48.60	1.39
46.00	0.01	48.65	2.09
46.05	0.01	48.70	2.92
46.10	0.01	48.75	3.86
46.15	0.01	48.80	4.90
46.20	0.01	48.85	6.03
46.25	0.01	48.90	7.24
46.30	0.01	48.95	8.53
46.35	0.01	49.00	**9.89**
46.40	0.02		
46.45	0.02		
46.50	0.02		
46.55	0.02		
46.60	0.02		

Qwqv = 0.03 cfs

Stage-Area-Storage for Pond 10P: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
0.00	**2,761**	2,761	0
0.10	2,761	2,780	110
0.20	2,761	2,798	221
0.30	2,761	2,817	331
0.40	2,761	2,836	442
0.50	2,761	2,854	552
0.60	2,761	2,873	663
0.70	2,761	2,891	773
0.80	2,761	2,910	884
0.90	2,761	2,929	994
1.00	2,761	2,947	1,104
1.10	2,761	2,966	1,215
1.20	2,761	2,985	1,325
1.30	2,761	3,003	1,436
1.40	2,761	3,022	1,546
1.50	2,761	3,040	1,657
1.60	2,761	3,059	1,670
1.70	2,761	3,078	1,684
1.80	2,761	3,096	1,698
1.90	2,761	3,115	1,712
2.00	2,761	3,134	1,726
2.10	2,761	3,152	1,739
2.20	2,761	3,171	1,753
2.30	2,761	3,189	1,767
2.40	2,761	3,208	1,781
2.50	2,761	3,227	1,795
2.60	2,761	3,245	1,905
2.70	2,761	3,264	2,016
2.80	2,761	3,283	2,126
2.90	2,761	3,301	2,236
3.00	2,761	3,320	2,347
3.10	2,761	3,338	2,457
3.20	2,761	3,357	2,559
3.30	2,761	3,376	2,642
3.40	2,761	3,394	2,725
3.50	2,761	**3,413**	**2,808**

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.08)

Type/Node Name: **Porous Pavement (HydroCAD Node #10P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

x		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.08(a).	
0.23	ac	A = Area draining to the practice	
0.23	ac	A_I = Impervious area draining to the practice	
0.99	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.94	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.22	ac-in	WQV= 1" x Rv x A	
800	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
200	cf	25% x WQV (check calc for sediment forebay volume)	
600	cf	75% x WQV (check calc for surface sand filter volume)	
CB		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
2,761	sf	A_{SA} = Surface area of the practice	
0.50	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
7.0	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
-	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
-	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
	ft	Elevation of the top of the practice	
-		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
Asphalt		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
0.1	acres	A_{SA} = Surface area of the pervious pavement	
3.9	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
12.0	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet	C-15	Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

2,808 cf storage provided

GROUNDWATER RECHARGE VOLUME (GRV)
(Env-Wq 1504.12)

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.12	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
1.70	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
0.01	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.11	inches	Rd = Weighted groundwater recharge depth	
0.2	ac-in	GRV = AI * Rd	
726	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	
	N	Is a stage-storage table attached showing that the GRV can be stored below the lowest invert of the outlet structure (if applicable)? Multiple stormwater control measures may be used to meet the GRV requirements.	

Provide calculations/discussion below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

2,808 cf provided in porous pavement

Stage strorage table NA (no outlet structure)

Water Quaity Volume Calculations
Town of Durham, New Hampshire

Project #: 5540
Date: 10/6/2025

HSG	Area (ac)	Ratio	WQV		
A	0.00	1	0.000	in	GRV
B	0.12	0.75	0.090	in	GRV
C	1.70	0.4	0.680	in	GRV
D	0.01	0.16	0.002	in	GRV
			0.772	ac-in	Total GRV = Al*Rd
			2803.12	cf	GRV Conversion (ac-in x 43560sf/ac x 1'/12")
			0.064	af	

2,808 cf (0.064 cf) storage provided in porous pavement

ALTUS
ENGINEERING

RIPRAP CALCULATIONS

Location: Bio #1, 15" Culvert (HydroCAD Pond #17P)

Project: 5440 Date: 10/6/2025 By: EBS

La	Apron Length, Ft.	Calculated
Tw	**Tailwater, Ft.**	**0.1**
Q	**Flow, 10 Yr Storm, CFS**	**0.3**
D50	Median Stone Dia., Ft.	Calculated
D	Depth of Stone, In	Calculated
Do	**Pipe Diameter, Ft**	**1.25**
W1	Width @ Start, Ft.	Calculated
W2	Width @ End, Ft	Calculated
W	**Width of Channel**	**4**

W1:

3(Do)= 3.75 Ft.

Width @ Start: 4 Ft.

D50: $\frac{0.02(Q)^{4/3}}{Tw(Do)}$

D50= 0.03 Ft.

or 0.4 In.

Median Stone Size: 6 In.

D: 2.25*D50

Depth of Riprap: 14 In.

La: If Tw<= Do/2:

Do/2= 0.625 Ft.

Tw= 0.1 Ft.

$La=1.8Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+La

If Tw>Do/2:

$La=3Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+0.4La

Length of Apron: 10 Ft.

Width @ End: 4 Ft.

ALTUS ENGINEERING

RIPRAP CALCULATIONS

Location: Bio #2, 15" Culvert (HydroCAD Pond #22P)

Project: 5440 Date: 10/6/2025 By: EBS

La	Apron Length, Ft.	Calculated
Tw	**Tailwater, Ft.**	**0.1**
Q	**Flow, 10 Yr Storm, CFS**	**0.44**
D50	Median Stone Dia., Ft.	Calculated
D	Depth of Stone, In	Calculated
Do	**Pipe Diameter, Ft**	**1.25**
W1	Width @ Start, Ft.	Calculated
W2	Width @ End, Ft	Calculated
W	**Width of Channel**	**4**

W1:

3(Do)= 3.75 Ft.

Width @ Start: 4 Ft.

D50: $\frac{0.02(Q)^{4/3}}{Tw(Do)}$

D50= 0.11 Ft.

or 1.3 In.

Median Stone Size: 6 In.

D: 2.25*D50

Depth of Riprap: 14 In.

La: If Tw<= Do/2:

Do/2= 0.625 Ft.

Tw= 0.05 Ft.

$La=1.8Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+La

If Tw>Do/2:

$La=3Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+0.4La

Length of Apron: 10 Ft.

Width @ End: 4 Ft.

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RIPRAP CALCULATIONS

Location: DMH #12, 15" Culvert (HydroCAD Pond #50P)

Project: 5440 Date: 10/6/2025 By: EBS

La	Apron Length, Ft.	Calculated
Tw	**Tailwater, Ft.**	**3.2**
Q	**Flow, 10 Yr Storm, CFS**	**3.23**
D50	Median Stone Dia., Ft.	Calculated
D	Depth of Stone, In	Calculated
Do	**Pipe Diameter, Ft**	**1.25**
W1	Width @ Start, Ft.	Calculated
W2	Width @ End, Ft	Calculated
W	**Width of Channel**	**4**

W1:

3(Do)= 3.75 Ft.

Width @ Start: 4 Ft.

D50: $\frac{0.02(Q)^{4/3}}{Tw(Do)}$

D50= 0.02 Ft.

or 0.3 In.

Median Stone Size: 6 In.

D: 2.25*D50

Depth of Riprap: 14 In.

La: If Tw<= Do/2:

Do/2= 0.625 Ft.

Tw= 3.15 Ft.

$La=1.8Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+La

If Tw>Do/2:

$La=3Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+0.4La

Length of Apron: 16 Ft.

Width @ End: 4 Ft.

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RIPRAP CALCULATIONS

Location: Bio #3, 18" Culvert (HydroCAD Pond #69P)

Project: 5440 Date: 10/6/2025 By: EBS

La	Apron Length, Ft.	Calculated
Tw	**Tailwater, Ft.**	**0.4**
Q	**Flow, 10 Yr Storm, CFS**	**2.52**
D50	Median Stone Dia., Ft.	Calculated
D	Depth of Stone, In	Calculated
Do	**Pipe Diameter, Ft**	**1.50**
W1	Width @ Start, Ft.	Calculated
W2	Width @ End, Ft	Calculated
W	**Width of Channel**	**4**

W1:

3(Do)= 4.5 Ft.

Width @ Start: 5 Ft.

D50: $\frac{0.02(Q)^{4/3}}{Tw(Do)}$

D50= 0.11 Ft.

or 1.4 In.

Median Stone Size: 6 In.

D: 2.25*D50

Depth of Riprap: 14 In.

La: If Tw<= Do/2:

Do/2= 0.75 Ft.

Tw= 0.4 Ft.

$La=1.8Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+La

If Tw>Do/2:

$La=3Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+0.4La

Length of Apron: 13 Ft.

Width @ End: 4 Ft.

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RIPRAP CALCULATIONS

Location: Bio #4, 15" Culvert (HydroCAD Pond #83P)

Project: 5440 Date: 10/6/2025 By: EBS

La	Apron Length, Ft.	Calculated
Tw	**Tailwater, Ft.**	**0.1**
Q	**Flow, 10 Yr Storm, CFS**	**0.5**
D50	Median Stone Dia., Ft.	Calculated
D	Depth of Stone, In	Calculated
Do	**Pipe Diameter, Ft**	**1.25**
W1	Width @ Start, Ft.	Calculated
W2	Width @ End, Ft	Calculated
W	**Width of Channel**	**4**

W1:

3(Do)= 3.75 Ft.

Width @ Start: 4 Ft.

D50: $\frac{0.02(Q)^{4/3}}{Tw(Do)}$

D50= 0.06 Ft.

or 0.8 In.

Median Stone Size: 6 In.

D: 2.25*D50

Depth of Riprap: 14 In.

La: If Tw<= Do/2:

Do/2= 0.625 Ft.

Tw= 0.1 Ft.

$La=1.8Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+La

If Tw>Do/2:

$La=3Q/Do^{3/2} + 7Do$

and W2=width of channel

or

W2=3Do+0.4La

Length of Apron: 10 Ft.

Width @ End: 4 Ft.

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LEVEL SPREADER CALCULATIONS

Location: Bio #3 Outfall (Reach #70R)

Project: 5440 Date: 10/6/2025 By: EBS

Based on Maine Volume III BMP's Technical Design Manual

Level Spreader Length based on 10-Year 24-Hour storm at 0.25 cfs per foot.

10-Year Peak Rate:	2.52	cfs

Required Length:	**10.08 feet**

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LEVEL SPREADER CALCULATIONS

Location: Bio #4 Outfall (Reach #83R)

Project: 5440 Date: 10/6/2025 By: EBS

Based on Maine Volume III BMP's Technical Design Manual

Level Spreader Length based on 10-Year 24-Hour storm at 0.25 cfs per foot.

10-Year Peak Rate:	0.49	cfs

Required Length:	**1.96 feet**

ALTUS ENGINEERING

Section 8

Stormwater Operations & Maintenance Plan Inspection Form
Stormwater Management Plan

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STORMWATER INSPECTION AND MAINTENANCE MANUAL

RiverWoods Phase II
Assessor's Map 209, Lot 33

OWNER:
RiverWoods Company at Durham
14 Stone Quarry Drive
Durham, NH 03824

Proper inspection, maintenance, and repair are key elements in maintaining a successful stormwater management program on a developed property. Routine inspections ensure permit compliance and reduce the potential for deterioration of infrastructure or reduced water quality. The following responsible parties shall be in charge of managing the stormwater facilities:

RESPONSIBLE PARTIES:

Owner:	*RiverWoods Durham*		*(603) 590-4001*
	Name	*Company*	*Phone*
Inspection:	*RiverWoods Durham*		*(603) 590-4001*
	Name	*Company*	*Phone*
Maintenance:	*RiverWoods Durham*		*(603) 590-4001*
	Name	*Company*	*Phone*

NOTES:

Written inspection forms and maintenance logs shall be completed yearly by a qualified inspector retained the owner or assigns on or before January 31st of each year and a copy retained at the site's business office.

Photographs of each stormwater BMP are to be taken at each inspection and submitted with the annual inspection reports.

Inspection and maintenance responsibilities shall transfer to any future property owner(s).

This manual shall be updated as needed to reflect any changes related to any transfer of ownership and/or any delegation of inspection and maintenance responsibilities to another entity

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BIORETENTION PONDS (AKA RAINGARDENS)

Function – Bioretention ponds provide treatment to runoff prior to directing it to stormwater systems by filtering sediment and suspended solids, trapping them in the bottom of the garden and in the filter media itself. Additional treatment is provided by the native water-tolerant vegetation which removes nutrients and other pollutants through bio-uptake. Stormwater detention and infiltration can also be provided as the filtering process slows runoff, decreases the peak rate of discharge and promotes groundwater recharge.

Bioretention ponds shall be managed (Per AGR 3800 and RSA 430:53) to: prevent and control the spread of invasive plant, insect, and fungal species; minimize the adverse environmental and economic effects invasive species cause to agriculture, forests, wetlands, wildlife, and other natural resources of the state; and protect the public from potential health problems attributed to certain invasive species.

Maintenance

- Inspect annually and after significant rainfall events.
- If a raingarden does not completely drain within 72-hours following a rainfall event, then a qualified professional shall be retained to assess the condition of the facility to determine measures required to restore its filtration and/or infiltration function(s), including but not limited to removal of accumulated sediments and/or replacement or reconstruction of the filter media. Filter media shall be replaced with material matching the specification on the design drawings or the NHDES Stormwater Manual.
- Replace any riprap dislodged from spillways, inlets and outlets.
- Remove any obstructions, litter and accumulated sediment or debris as warranted but no less than once a year.
- Mowing of any grassed area in or adjacent to a raingarden, including its berm, shall be performed at least twice per year (when areas are not inundated) to keep the vegetation in vigorous condition. The cut grass shall be removed to prevent the decaying organic litter from clogging the filter media or choking other vegetation.
- Select vegetation should be maintained in healthy condition. This may include pruning, removal and replacement of dead or diseased vegetation.
- Remove any invasive species, Per AGR 3800 and RSA 430:53.
- Remove any hard wood growth from raingardens.

CULVERTS AND DRAINAGE PIPES

Function – Culverts and drainage pipes convey stormwater away from buildings, walkways, and parking areas and to surface waters or closed drainage systems.

Maintenance

- Culverts and drainage pipes shall be inspected semi-annually, or more often as needed, for accumulation of debris and structural integrity. Leaves and other debris shall be removed from the inlet and outlet to insure the functionality of drainage structures. Debris shall be disposed of on site where it will not concentrate back at the drainage structures or at a solid waste disposal facility.
- Riprap Areas - Culvert outlets and inlets shall be inspected during annual maintenance and operations for erosion and scour. If scour or creek erosion is identified, the outlet owner shall take appropriate means to prevent further erosion. Increased lengths of riprap may require a NHDES Permit and/or local permit.

DEEP SUMP CATCH BASINS

Function – Catch basins collect stormwater, primarily from paved surfaces and roofs. Stormwater from paved areas often contains sediment and contaminants. Catch basin sumps serve to trap sediment, trace metals, nutrients and debris. Hooded catch basins trap hydrocarbons and floating debris.

Maintenance

- Remove leaves and debris from structure grates on an as-needed basis.
- Sumps shall be inspected and cleaned annually and any removed sediment and debris shall be disposed of at a solid waste disposal facility.

RIP RAP OUTLETS, SWALES, LEVEL SPREADERS AND BUFFERS

Function – Rip rap outlets slow the velocity of runoff, minimizing erosion and maximizing the treatment capabilities of associated buffers. Vegetated buffers, either forested or meadow, slow runoff which promotes and reduces peak rates of runoff. The reduced velocities and the presence of vegetation encourage the filtration of sediment and the limited bio-uptake of nutrients.

Maintenance

- Inspect riprap, level spreaders and buffers at least annually for signs of erosion, sediment buildup, or vegetation loss.
- Inspect level for signs of condensed flows. Level spreader and rip rap shall be maintained to disperse flows evenly over level spreader.
- If a meadow buffer, provide periodic mowing as needed to maintain a healthy stand of herbaceous vegetation.
- If a forested buffer, then the buffer should be maintained in an undisturbed condition, unless erosion occurs.
- If erosion of the buffer (forested or meadow) occurs, eroded areas should be repaired and replanted with vegetation similar to the remaining buffer. Corrective action should include eliminating the source of the erosion problem and may require retrofit or reconstruction of the level spreader.
- Remove debris and accumulated sediment and dispose of properly.

LANDSCAPED AREAS - FERTILIZER MANAGEMENT

Function – Fertilizer management involves controlling the rate, timing and method of fertilizer application so that the nutrients are taken up by the plants thereby reducing the chance of polluting the surface and ground waters. Fertilizer management can be effective in reducing the amounts of phosphorus and nitrogen in runoff from landscaped areas, particularly lawns.

Maintenance

- Have the soil tested by your landscaper or local Soil Conservation Service for nutrient requirements and follow the recommendations.
- Do not apply fertilizer to frozen ground.
- Clean up any fertilizer spills.
- Do not allow fertilizer to be broadcast into water bodies.
- When fertilizing a lawn, water thoroughly, but do not create a situation where water runs off the surface of the lawn.

LANDSCAPED AREAS - LITTER CONTROL

Function – Landscaped areas tend to filter debris and contaminates that may block drainage systems and pollute the surface and ground waters.

Maintenance

- Litter Control and lawn maintenance involves removing litter such as trash, leaves, lawn clippings, pet wastes, oil and chemicals from streets, parking lots, and lawns before materials are transported into surface waters.
- Litter control shall be implemented as part of the grounds maintenance program.

VEGETATIVE SWALES

Function – Vegetative swales filter sediment from stormwater, promote infiltration, and the uptake of contaminates. They are designed to treat runoff and dispose of it safely into the natural drainage system.

Maintenance

- Timely maintenance is important to keep a swale in good working condition. Mowing of grassed swales shall be monthly to keep the vegetation in vigorous condition. The cut vegetation shall be removed to prevent the decaying organic litter from adding pollutants to the discharge from the swale.
- Fertilizing shall be bi-annual or as recommended from soil testing.
- Inspect swales following significant rainfall events.
- Woody vegetation shall not be allowed to become established in the swales or rock riprap outlet protection and if present shall be removed.
- Accumulated debris disrupts flow and leads to clogging and erosion. Remove debris and litter as necessary.
- Inspect for eroded areas. Determine cause of erosion and correct deficiency as required. Monitor repaired areas.

POROUS PAVEMENT

Function – Porous pavement is designed to capture rainwater runoff containing suspended solids, nutrients and pollutants. Proper maintenance of porous pavement is crucial for ensuring its longevity and functionality to infiltrate runoff.

Maintenance

- Signs shall be installed indicating the location of porous pavement and the special maintenance required.
- New porous pavement shall be inspected several times in the first month after construction and at least annually thereafter. Inspections shall be conducted after major storms to check for surface ponding that might indicate possible clogging.
- Inspect annually for pavement deterioration or spalling.
- Vacuum sweeping shall be performed 2-4 times a year. Power washing may be required prior to vacuum sweeping to dislodge trapped particles.
- Sand and abrasives shall not be used for winter maintenance, as they will clog the pores; de-icing materials shall be used instead.
- Never reseal or repave with impermeable materials. If the porous pavement is damaged, it can be repaired using conventional, non-porous patching mixes as long as the cumulative area repaired does not exceed 10 percent of the paved area.

CONTROL OF INVASIVE PLANTS

Function – Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

Maintenance

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described in the attached "Methods for Disposing Non-Native Invasive Plants" prepared by the UNH Cooperative Extension.

STREET/PARKING LOT SWEEPING (NON-POROUS PAVEMENT)

Function – Parking lots accumulate sand and debris. Street sweeping removes the sand and debris, which lowers transport of sediment and pollutants the stormwater systems and into the environment.

Maintenance

- A regular periodic cleaning schedule is recommended. The more frequent, the greater the sediment and pollutant removal. Regular cleaning of paved areas reduces the frequency of cleaning catch basins and drainage systems. It is recommended that the parking lots and access ways shall be swept at least once a month during winter months.

GENERAL CLEAN UP

- Upon completion of the project, the contractor shall remove all temporary stormwater structures (i.e., temporary stone check dams, silt fence, temporary diversion swales, catch basin inlet filter, etc.). Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform to the existing grade, prepared, and seeded. Remove any sediment in catch basins and clean drain pipes that may have accumulated during construction.
- Once in operation, all paved areas of the site should be swept at least once annually at the end of winter/early spring prior to significant spring rains.

APPPENDIX

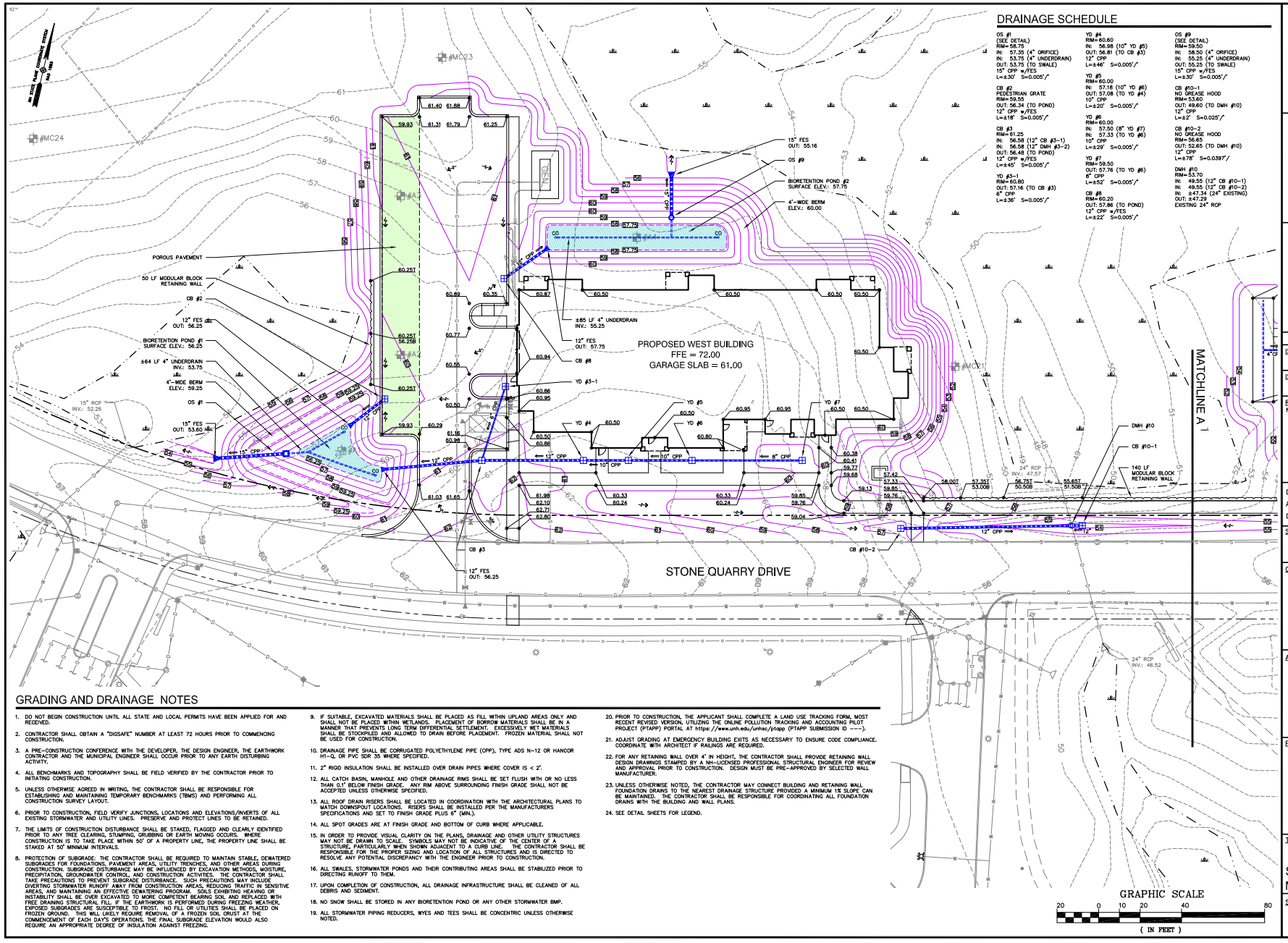
A. Stormwater System Operations and Maintenance Report
B. Site Grading and Drainage Plan

STORM WATER SYSTEM OPERATION AND MAINTENANCE REPORT

General Information			
Project Name			
Owner			
Inspector's Name(s)			
Inspector's Contact Information			
Date of Inspection		**Start Time:**	**End Time:**
Type of Inspection: ☐ Annual Report ☐ Post-storm event ☐ Due to a discharge of significant amounts of sediment			
Notes:			

General Site Questions and Discharges of Significant Amounts of Sediment			
Subject		**Status**	**Notes**
A discharge of significant amounts of sediment may be indicated by (but is not limited to) observations of the following. Note whether any are observed during this inspection:			*Notes/ Action taken:*
1	Do the current site conditions reflect the attached site plan?	❑Yes ❑No	
2	Is the site permanently stabilized, temporary erosion and sediment controls are removed, and stormwater discharges from construction activity are eliminated?	❑Yes ❑No	
3	Is there evidence of the discharge of significant amounts of sediment to surface waters, or conveyance systems leading to surface waters?	❑Yes ❑No	

Permit Coverage and Plans				
#	**BMP/Facility**	**Inspected**	**Corrective Action Needed and Notes**	**Date Corrected**
	Catch Basins and Yard Drains	❑Yes ❑No		
	Drainage Pipes	❑Yes ❑No		
	Porous Pavement	❑Yes ❑No		
	Riprap Aprons	❑Yes ❑No		
	Site Vegetation	❑Yes ❑No		
	Bioretention Ponds	❑Yes ❑No		
		❑Yes ❑No		
		❑Yes ❑No		



GRADING AND DRAINAGE NOTES

1. DO NOT BEGIN CONSTRUCTION UNTIL ALL STATE AND LOCAL PERMITS HAVE BEEN APPLIED FOR AND RECEIVED.
2. CONTRACTOR SHALL OBTAIN A "DIGSAFE" NUMBER AT LEAST 72 HOURS PRIOR TO COMMENCING CONSTRUCTION.
3. A PRE-CONSTRUCTION CONFERENCE WITH THE DEVELOPER, THE DESIGN ENGINEER, THE EARTHWORK CONTRACTOR AND THE MUNICIPAL ENGINEER SHALL OCCUR PRIOR TO ANY EARTH DISTURBING ACTIVITY.
4. ALL BENCHMARKS AND TOPOGRAPHY SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO INITIATING CONSTRUCTION.
5. UNLESS OTHERWISE AGREED IN WRITING, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING TEMPORARY BENCHMARKS (TBMS) AND PERFORMING ALL CONSTRUCTION SURVEY LAYOUT.
6. PRIOR TO CONSTRUCTION, FIELD VERIFY JUNCTIONS, LOCATIONS AND ELEVATIONS/INVERTS OF ALL EXISTING STORMWATER AND UTILITY LINES. PRESERVE AND PROTECT LINES TO BE RETAINED.
7. THE LIMITS OF CONSTRUCTION DISTURBANCE SHALL BE STAKED, FLAGGED AND CLEARLY IDENTIFIED PRIOR TO ANY TREE CLEARING, STUMPING, GRUBBING OR EARTH MOVING OCCURS. WHERE CONSTRUCTION IS TO TAKE PLACE WITHIN 50' OF A PROPERTY LINE, THE PROPERTY LINE SHALL BE STAKED AT 50' MINIMUM INTERVALS.
8. PROTECTION OF SUBGRADE: THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN STABLE, DEWATERED SUBGRADES FOR FOUNDATIONS, PAVEMENT AREAS, UTILITY TRENCHES, AND OTHER AREAS DURING CONSTRUCTION. SUBGRADE DISTURBANCE MAY BE INFLUENCED BY EXCAVATION METHODS, MOISTURE, PRECIPITATION, GROUNDWATER CONTROL, AND CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT SUBGRADE DISTURBANCE. SUCH PRECAUTIONS MAY INCLUDE DIVERTING STORMWATER RUNOFF AWAY FROM CONSTRUCTION AREAS, REDUCING TRAFFIC IN SENSITIVE AREAS, AND MAINTAINING AN EFFECTIVE DEWATERING PROGRAM. SOILS EXHIBITING HEAVING OR INSTABILITY SHALL BE OVER EXCAVATED TO MORE COMPETENT BEARING SOIL AND REPLACED WITH FREE DRAINING STRUCTURAL FILL IF THE EARTHWORK IS PERFORMED DURING FREEZING WEATHER, EXPOSED SUBGRADES ARE SUSCEPTIBLE TO FROST. NO FILL OR UTILITIES SHALL BE PLACED ON FROZEN GROUND. THIS WILL LIKELY REQUIRE REMOVAL OF A FROZEN SOIL CRUST AT THE COMMENCEMENT OF EACH DAY'S OPERATIONS. THE FINAL SUBGRADE ELEVATION WOULD ALSO REQUIRE AN APPROPRIATE DEGREE OF INSULATION AGAINST FREEZING.
9. IF SUITABLE, EXCAVATED MATERIALS SHALL BE PLACED AS FILL WITHIN UPLAND AREAS ONLY AND SHALL NOT BE PLACED WITHIN WETLANDS. PLACEMENT OF BORROW MATERIALS SHALL BE IN A MANNER THAT PREVENTS LONG TERM DIFFERENTIAL SETTLEMENT. EXCESSIVELY WET MATERIALS SHALL BE STOCKPILED AND ALLOWED TO DRAIN BEFORE PLACEMENT. FROZEN MATERIAL SHALL NOT BE USED FOR CONSTRUCTION.
10. DRAINAGE PIPE SHALL BE CORRUGATED POLYETHYLENE PIPE (CPP), TYPE ADS N-12 OR HANCOR H1-Q, OR PVC SDR 35 WHERE SPECIFIED.
11. 2" RIGID INSULATION SHALL BE INSTALLED OVER DRAIN PIPES WHERE COVER IS < 2'.
12. ALL CATCH BASIN, MANHOLE AND OTHER DRAINAGE RIMS SHALL BE SET FLUSH WITH OR NO LESS THAN 0.1' BELOW FINISH GRADE. ANY RIM ABOVE SURROUNDING FINISH GRADE SHALL NOT BE ACCEPTED UNLESS OTHERWISE SPECIFIED.
13. ALL ROOF DRAIN RISERS SHALL BE LOCATED IN COORDINATION WITH THE ARCHITECTURAL PLANS TO MATCH DOWNSPOUT LOCATIONS. RISERS SHALL BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS AND SET TO FINISH GRADE PLUS 6" (MIN.).
14. ALL SPOT GRADES ARE AT FINISH GRADE AND BOTTOM OF CURB WHERE APPLICABLE.
15. IN ORDER TO PROVIDE VISUAL CLARITY ON THE PLANS, DRAINAGE AND OTHER UTILITY STRUCTURES MAY NOT BE DRAWN TO SCALE. SYMBOLS MAY NOT BE INDICATIVE OF THE CENTER OF A STRUCTURE, PARTICULARLY WHEN SHOWN ADJACENT TO A CURB LINE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER SIZING AND LOCATION OF ALL STRUCTURES AND IS DIRECTED TO RESOLVE ANY POTENTIAL DISCREPANCY WITH THE ENGINEER PRIOR TO CONSTRUCTION.
16. ALL SWALES, STORMWATER PONDS AND THEIR CONTRIBUTING AREAS SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
17. UPON COMPLETION OF CONSTRUCTION, ALL DRAINAGE INFRASTRUCTURE SHALL BE CLEANED OF ALL DEBRIS AND SEDIMENT.
18. NO SNOW SHALL BE STORED IN ANY BIORETENTION POND OR ANY OTHER STORMWATER BMP.
19. ALL STORMWATER PIPING REDUCERS, WYES AND TEES SHALL BE CONCENTRIC UNLESS OTHERWISE NOTED.
20. PRIOR TO CONSTRUCTION, THE APPLICANT SHALL COMPLETE A LAND USE TRACKING FORM, MOST RECENT REVISED VERSION, UTILIZING THE ONLINE POLLUTION TRACKING AND ACCOUNTING PILOT PROJECT (PTAPP) PORTAL AT https://www.unh.edu/unhsc/ptapp (PTAPP SUBMISSION ID ----).
21. ADJUST GRADING AT EMERGENCY BUILDING EXITS AS NECESSARY TO ENSURE CODE COMPLIANCE. COORDINATE WITH ARCHITECT IF RAILINGS ARE REQUIRED.
22. FOR ANY RETAINING WALL OVER 4' IN HEIGHT, THE CONTRACTOR SHALL PROVIDE RETAINING WALL DESIGN DRAWINGS STAMPED BY A NH-LICENSED PROFESSIONAL STRUCTURAL ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. DESIGN MUST BE PRE-APPROVED BY SELECTED WALL MANUFACTURER.
23. UNLESS OTHERWISE NOTED, THE CONTRACTOR MAY CONNECT BUILDING AND RETAINING WALL FOUNDATION DRAINS TO THE NEAREST DRAINAGE STRUCTURE PROVIDED A MINIMUM 1% SLOPE CAN BE MAINTAINED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL FOUNDATION DRAINS WITH THE BUILDING AND WALL PLANS.
24. SEE DETAIL SHEETS FOR LEGEND.

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1	REVISED PER COMMENTS	EBS	10/08/25

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APPROVED BY: EBS
DRAWING FILE: 5440-SITE.dwg

SCALE:
24" x 36" - 1" = 20'
11" x 17" - 1" = NTS

OWNER:
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DURHAM, NH 03824

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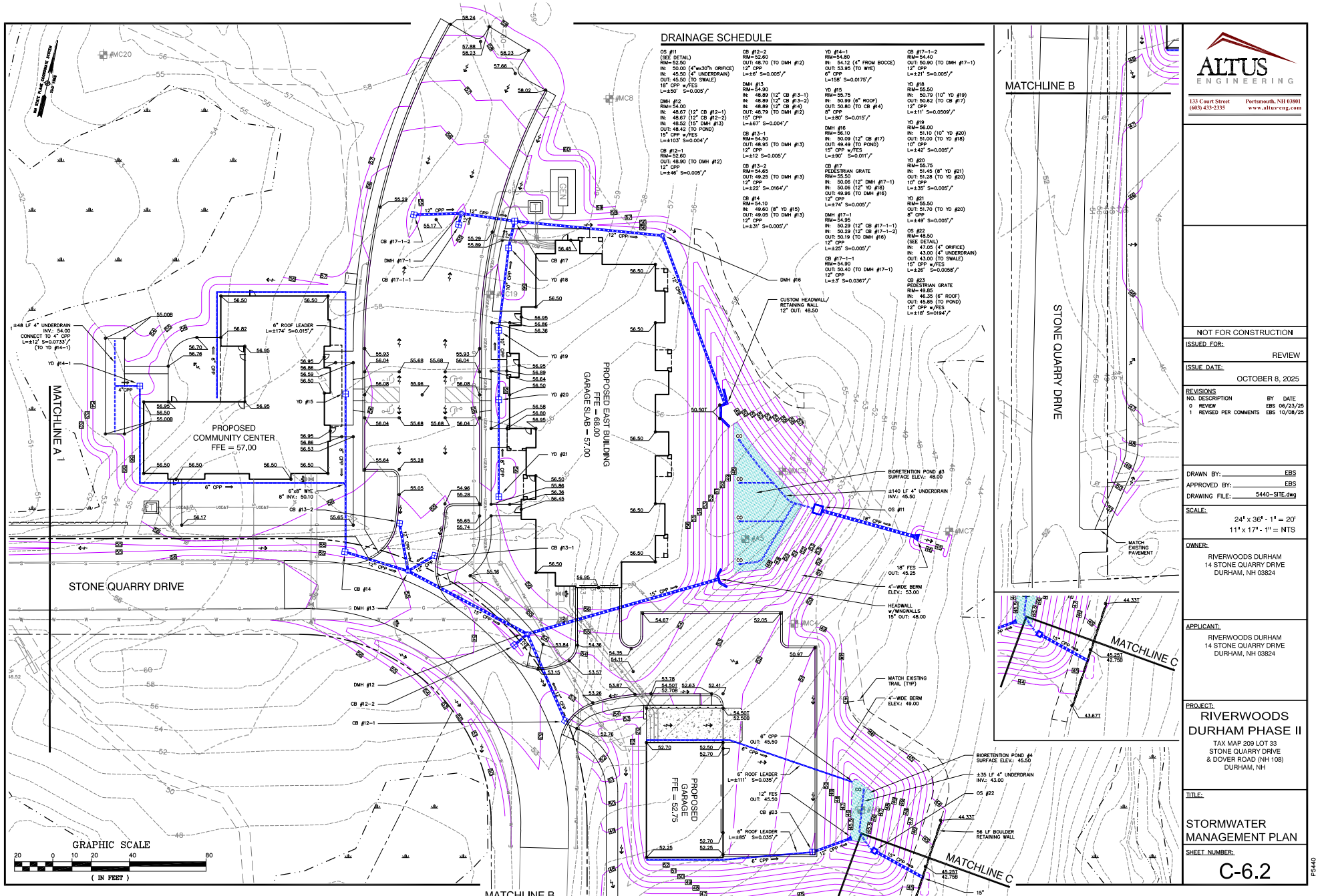
RIVERWOODS DURHAM
14 STONE QUARRY DRIVE
DURHAM, NH 03824

PROJECT:
RIVERWOODS DURHAM PHASE II
TAX MAP 209 LOT 33
STONE QUARRY DRIVE
& DOVER ROAD (NH 108)
DURHAM, NH

TITLE:
STORMWATER MANAGEMENT PLAN

SHEET NUMBER:
C-6.1

P5440



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P5440

Section 9

Watershed Plans

Pre-Development Drainage Plan
Pre-Development Soils Plan
Post-Development Drainage Plan
Post-Development Soils Plan

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GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- WATERSHED BOUNDARY
- Tc PATH
- REACH PATH
- PROPOSED GROUND SLOPE DIRECTION
- SOIL BOUNDARY
- 299B — SOIL DESIGNATION
- SOILS – HSG A
- SOILS – HSG B
- SOILS – HSG C
- SOILS – HSG D
- SOILS – IMPERVIOUS
- SOILS – WATER
- 1 1 1 — SUBCATCHMENT/POND/REACH
- POA — POINT OF ANALYSIS

NH STATE PLANE COORDINATE SYSTEM NAD 1983

1 2 2 2 2.1 2.1 2.1 2.2 2.3 3 1 1

POA 100

POA 200

POA 300

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DURHAM, NH

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PRE-DEVELOPMENT WATERSHED AND SOILS PLAN

SHEET NUMBER:
WS-1.2

P5440

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POA 100

POA 200

POA 300

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