

# POST-CONSTRUCTION STORMWATER MANAGEMENT REPORT

for

**283 Commerce Center - Building #1**

**Mount Joy Township, Lancaster County, Pennsylvania**

**January 3, 2023**

**Prepared for:**

**PDC Northeast LPIV, LLC  
6059 Allentown Boulevard, Suite 127  
Harrisburg, PA 17112  
717-649-9588**



## LANDWORKS CIVIL DESIGN, LLC

1195 Virginia Avenue  
York, PA 17403  
(717) 891-1195

## **TABLE OF CONTENTS**

### **SUBJECT**

INTRODUCTION & PROJECT DESCRIPTION.....	1
EXISTING SITE CONDITIONS.....	1
PREPARATION OF THE PLAN .....	2
SOIL TYPE CLASSIFICATION & DESCRIPTION.....	2
SOIL AND INFILTRATION TESTING.....	2
STORMWATER MANAGEMENT.....	3
PEAK DISCHARGE RATE.....	7
RUNOFF VOLUME.....	8
WATER QUALITY MANAGEMENT.....	9
SWM/BMP FACILITY DEWATERING.....	10
STORM SYSTEM CONVEYANCE DESIGN.....	10
SECONDARY WETLAND IMPACTS.....	11
OFFSITE DISCHARGE ANALYSIS.....	11

### **APPENDICES**

APPENDIX A – SITE LOCATION MAP

APPENDIX B – SOIL INFORMATION

APPENDIX C – STORMWATER MANAGEMENT CALCULATIONS

APPENDIX D – STORM SEWER CONVEYANCE DESIGN

APPENDIX E – DRAINAGE AREA EXHIBITS

**POST-CONSTRUCTION STORMWATER MANAGEMENT REPORT**  
**283 Commerce Center – Building #1**  
**Mount Joy Township, Lancaster County, Pennsylvania**

**INTRODUCTION & PROJECT DESCRIPTION**

The project site is located on the northeast side of Mount Pleasant Road (S.R. 4010) and west of Stauffer Road in Mount Joy Township, Lancaster County, Pennsylvania. See Appendix A for the Site Location Map (USGS Elizabethtown, PA Quadrangle) for the exact site location.

Land development entails the construction of one (1) warehouse / distribution center with an approximate building footprint of 1,006,880 square feet of gross floor area. Access to the site is proposed via two (2) driveways on Mount Pleasant Road. The northwest driveway is proposed for trucks and the southeast driveway is proposed for passenger vehicles. Development of the site will also include construction of truck courts, employee parking areas, trailer storage areas, site utilities, landscaping amenities, a stormwater collection, conveyance, and management system, and other related site improvements.

To provide appropriate vehicular access to the site from the nearby highway, Steel Way, which is an existing road with a dead-end cul-de-sac to the west of the site, will be modified to connect to Mount Pleasant Road across from the project's proposed northwest driveway. Additionally, the side of Mount Pleasant Road nearest to the site will be widened and reconstructed to current township standards.

Approximately 94 acres of the site and surrounding areas will be disturbed as part of this project. Pending receipt of all required project permits and approvals, it is expected that initial site construction will commence in 2023.

**EXISTING SITE CONDITIONS**

Over the past fifty years and up to the present, the subject property has been used for farming purposes with some wooded areas near steep slopes where farming isn't practical. The north side of the property is approximately defined by the headwaters of an Unnamed Tributary (UNT) to Little Chiques Creek, flowing from west to east. This UNT is identified as two separate streams (Stream 1 & Stream 3). Four (4) wetlands have also been delineated within the project area. These features are identified in the Water of the U.S. Delineation report prepared by ECS Mid-Atlantic, LLC. No disturbance will occur to any regulated areas (streams, wetlands, floodways) of the site.

Approximately 60% of the site is tributary to Streams 1 & 3. The remainder of the site flows to the south or east and leaves the site via overland flow. A more detailed description of the project's drainage areas is contained later within this report.

Ultimately, all stormwater is tributary to an UNT to Little Chiques Creek. All of the UNT to Little Chiques Creek have a Chapter 93 classification of Trout Stock Fishery, Migratory Fishes (TSF, MF)

for designated use and none for existing use, are impaired for Aquatic Life from Agriculture – Siltation, have attained uses of Fish Consumption and Recreational, and have a Total Maximum Daily Load caused by Siltation, Total Suspended Solids, and Turbidity.

## **PREPARATION OF THE PLAN**

The Post-Construction Stormwater Management Plan has been prepared in accordance with the requirements and recommendations of the Pennsylvania Department of Environmental Protection Best Management Practices (BMP) Manual, dated December 2006, Mount Joy Township Ordinances, and other acceptable engineering standards and practices. The report has been prepared as documentation that effective post-construction stormwater management controls are provided to control the rate, volume, and quality of stormwater leaving the project site. Implementation of the measures contained herein should provide effective stormwater management after the construction of the project.

The plan has been prepared by Landworks Civil Design, LLC, a professional engineering firm experienced in land development planning, site design, and stormwater analysis for a variety of development projects throughout Pennsylvania. It shall remain the responsibility of the permittee and any co-permittee to implement and monitor the plan in accordance with the approved plan and any permits and permit conditions issued and related thereto.

## **SOIL TYPE CLASSIFICATIONS & DESCRIPTIONS**

Based upon a review of United States Department of Agriculture, Soil Conservation Service Soil Survey for Lancaster County, Pennsylvania, the site is composed of the following soil types. Reference is made to Appendix B for a copy of the soils map of this area and their characteristics.

- AbB: Abbottstown Silt Loam, 3% to 8% Slopes, HSG D
- BdA: Bedington Silt Loam, 0% to 3% Slopes, HSG B
- BdB: Bedington Silt Loam, 3% to 8% Slopes, HSG B
- BdC: Bedington Silt Loam, 8% to 15% Slopes, HSG B
- BeD: Bedington Channery Silt Loam, 15% to 25% Slopes, HSG B
- Bm: Blairton Silt Loam, 3% to 10% Slopes, HSG C
- BuB: Bucks Silt Loam, 3% to 8% Slopes, HSG B
- BuC: Bucks Silt Loam, 8% to 15% Slopes, HSG B
- BuD: Bucks Silt Loam, 15% to 25% Slopes, HSG B
- LaD: Lansdale Loam, 15% to 25% Slopes, HSG B
- RaB: Readington Silt Loam, 3% to 8% Slopes, HSG C
- W: Water

## **SOIL AND INFILTRATION TESTING**

In August of 2022, a subsurface investigation was conducted by ECS-Mid Atlantic, LLC, on behalf of Landworks Civil Design, LLC. The purpose of the investigation was to complete a preliminary



evaluation of the underlying soils and bedrock in an effort to provide general recommendations and conclusions regarding development of the site. This investigation also included determining the feasibility of stormwater infiltration near potential SWM/BMP Facility locations. During the field investigations various test pits were excavated within or near each of the potential facilities to determine the suitability of the soils for stormwater infiltration. Infiltration tests were performed using a double-ring infiltrometer or percolation methods at each test pit location to determine an infiltration rate at or near the planned bottom elevation of potential infiltration BMPs at that time. The number of tests conducted, in accordance with the PA BMP Manual, was 4-6 tests per acre of bed area per basin.

In summary of the testing, infiltration rates were low across the site and no limiting zones were encountered. Due to the low infiltration rates, the use of traditional infiltration BMPs was not recommended for volume management. As such, the Managed Release Concept (MRC) design has been utilized for volume management on this project and will be discussed further herein.

A copy of the Geotechnical Report for Stormwater Management which includes various items such as a plan indicating the location of the test pits excavated on the site, an infiltration rate table, test pit logs, and recommendations for the project is included with this report.

## **STORMWATER MANAGEMENT**

The project has been designed in accordance with the requirements of Mount Joy Township's Stormwater Management Ordinance as well as the current Pennsylvania Department of Environmental Protection (PA DEP) peak rate requirements associated with the project's National Pollutant Discharge Elimination System (NPDES) Permit to assure that post-development peak runoff rates occasioned by the proposed development will be less than or equal to 100% of pre-development peak runoff rates in the 2, 5, 10, 25, 50, & 100-year storm events. See the Peak Discharge Rate heading located within this report for complete information.

Additionally, measures must also be taken in order to comply with runoff volume requirements of the township and the NPDES Permit, assuring that the total post-development runoff volume from a 2-year/24-hour storm event is less than or equal to that which is produced in a pre-development 2-year/24-hour event. See the Runoff Volume heading located within this report for complete information.

Further, water quality must be managed to reduce pollutants to less than pre-development levels for Total Suspended Solids (TSS), Total Phosphorous (TP), and Total Nitrates (NO<sub>3</sub>) for compliance with the NPDES Permit. See the Water Quality Management heading located within this report for complete information.

Approximately 1.29 acres of the disturbed area can be considered reconstruction areas under Chapter 102(g)(2)(i) & (ii) due to being either existing roadways being repaired and/or the construction of utility infrastructure. In both cases, existing conditions will be restored after construction and no stormwater management is required for these areas.

## **Watershed Areas**

The project area is comprised of nine (9) Watershed Areas and their associated Discharge Points, which are all ultimately tributary to Unnamed Tributaries (UNT) to Little Chiques Creek. Four (4) Stormwater Management Facilities and Landscape Restoration areas are BMPs proposed throughout the project to manage rate, volume, and water quality.

Watershed Area #1 is located at the northwest corner of the site and is the area directly tributary to headwaters of Stream 3. Discharge Point 001 is located at the confluence of Stream 1 and Stream 3. MRC #1, SWM/BMP Facility #2, and Landscape Restoration areas are proposed within this watershed for stormwater management.

Watershed Area #2 is located along the western property line of the site and is the area directly tributary to the headwaters of Stream 1 downstream of Wetland 1 and upstream of Stream 1. Discharge Point 002 is located at the headwaters of Stream 1. Landscape Restoration areas and an overall reduction in tributary area when comparing post-development to pre-development are proposed to manage stormwater within this watershed.

Watershed Area #3 is located in the south and southwest area of the site and also on the south side of Mount Pleasant Road and is directly tributary to Wetland 1, excluding the area from Wetland 2. This post-development area was designed to provide adequate hydrology to the wetland to maintain its uses. Discharge Point 002 is located at the downstream end of Wetland 2. MRC #3 and Landscape Restoration areas are proposed within this watershed for stormwater management.

Watershed Area #4 is located in the south area of the site is directly tributary to Wetland 2. Discharge Point 004 is the located at the downstream end of Wetland 1. This post-development area was designed to provide adequate hydrology to the wetland to maintain its uses. Landscape Restoration areas and an overall reduction in tributary area when comparing post-development to pre-development are proposed to manage stormwater within this watershed.

Watershed Area #5 is located along the south and east sides of the site along Mount Pleasant Road and Stauffer Road. Discharge Point 005 is an existing culvert under the Mount Pleasant Road which will be replaced as part of this project. Landscape Restoration areas and an overall reduction in tributary area when comparing post-development to pre-development are proposed to manage stormwater within this watershed.

Watershed Area #6 is located along the east area of the site. Discharge Point 006 is a broad shallow swale which leaves the site via overland flow. Landscape Restoration areas and an overall reduction in tributary area when comparing post-development to pre-development are proposed to manage stormwater within this watershed.

Watershed Area #7 is located along the east area of the site. Discharge Point 007 is a broad shallow swale which leaves the site via overland flow. Landscape Restoration areas and an overall reduction in tributary area when comparing post-development to pre-development are proposed to manage stormwater within this watershed.

Watershed Area #8 is located along the majority of the site’s north property line and is the area tributary to Stream 3 which isn’t part of the direct discharge in Watershed Areas #1 or #2. Discharge Point 008 is the most downstream end of Stream 3 which receives runoff from the disturbance of the project. Landscape Restoration areas and an overall reduction in tributary area when comparing post-development to pre-development are proposed to manage stormwater within this watershed.

Watershed Area #9 is the area involved in the reconstruction and extension of Steel Way in the southwest area of the overall project. Discharge Point 009 is an existing culvert under the cul-de-sac at the existing end of Steel Way. MRC #4 is proposed within this watershed for stormwater management.

The following tables summarize the pre-development and post-development watershed areas analyzed as part of the subject project. These areas can be seen graphically on the drainage area exhibits found in Appendix E of this report.

<b>SUMMARY OF WATERSHED AREAS (Acres)</b>			
<b>Pre-development</b>		<b>Post-development</b>	
<i>Watershed Area #1:</i>	6.52	Detained in MRC #1:	47.98
		Detained in SWM/BMP Facility #2:	7.54
		Undetained:	1.08
<i>Watershed Area #2:</i>	6.18	Undetained:	3.52
<i>Watershed Area #3:</i>	29.52	Detained in MRC #3:	9.81
		Undetained:	12.13
<i>Watershed Area #4:</i>	8.55	Undetained:	2.90
<i>Watershed Area #5:</i>	12.34	Undetained:	6.48
<i>Watershed Area #6:</i>	11.31	Undetained:	0.78
<i>Watershed Area #7:</i>	7.85	Undetained:	2.19
<i>Watershed Area #8:</i>	16.88	Undetained:	4.84
<i>Watershed Area #9:</i>	7.04	Detained in MRC #4:	6.29
		Undetained:	0.66
<b>Total:</b>	106.19*	<b>Total</b>	106.19*

\*Includes 13.48 acres of offsite area.

### **MRC #1, #3, & #4**

These facilities are designed as Managed Release Concept (MRC) BMPs combined with Bioretention Areas (BMP 6.4.5) which will slowly release stormwater over an extended period of time in order to mimic the base flow of existing conditions for storms up to and including the 2-year/24-hour event. Each facility is to be constructed with an engineered soil mixture which will provide filtration as stormwater is absorbed into the mixture. Stormwater will then flow into an underdrain and out of the facility. Further, the facilities are designed to prevent excessive ponding depth and maximize the available porosity in the provided soil mixture. By slowly releasing stormwater over extended periods, the volume is considered managed and can be deemed removed when analyzing volume at the downstream discharge points.

Specifics about each facility are as follows:

MRC #1: In larger storm events, this facility is designed to overflow into SWM/BMP Facility #2 through a spillway while also providing a controlled release directly to the discharge point. This combination of release allows for stormwater discharge more closely mimic pre-development conditions and provide proper hydrology to the stream.

MRC #3: This facility is designed to manage larger storm events entirely within its basin. An emergency spillway which will provide a minimum of one (1) foot of freeboard below the basin embankment assuming all other outlet devices are non-functioning.

MRC #4: This facility is designed to manage larger storm events entirely within its basin. An emergency outlet structure is proposed which will provide a minimum of one (1) foot of freeboard below the basin embankment assuming all other outlet devices are non-functioning.

### **SWM/BMP Facility #2**

This facility is designed as a Dry Extended Basin (6.6.3) and provides peak discharge rate control for larger storm events which overflow from MRC #1. Further the facility is designed with an emergency spillway which will provide a minimum of one (1) foot of freeboard below the basin embankment assuming all other outlet devices are non-functioning. Finally, the facility is designed to dewatering with 72 hours of the end of the storm event.

### **Landscape Restoration:**

The project proposes Landscape Restoration (BMP 6.7.2) in the open areas around the perimeter of the site. These areas will be planted with native species of vegetation that, after establishment, do not require any significant maintenance by fertilizers, herbicides, pesticides, or any other chemicals. Further, this area is proposed to be mowed only twice per year. This will allow for the establishment of tall, deep-rooted vegetation which will facilitate absorption of runoff and other pollutants. When compared to traditional turf grasses, which require continuing maintenance through maintenance and application of chemicals, the landscape restoration area provides a self-

credit by reducing the volume and improving the quality of stormwater runoff. These areas are identified as “meadow” in all post-development calculations.

### **PEAK DISCHARGE RATE**

The following tables summarize the pre-development and post-development peak discharge rates within each on-site watershed analyzed as part of the subject project. Given the size of the watershed areas involved, the analysis was conducted using the Soil-Cover-Complex Method (TR-20), the NOAA Type II rainfall distribution, and HydroCAD Version 10.0 methodologies for the 2, 5, 10, 25, 50 & 100-year storm events. The 24-hour storm duration precipitation depths used for stormwater management analysis were obtained from the National Oceanic and Atmospheric Administration (NOAA) website for the Mount Joy Township, PA station. A printout copy of this rainfall data can be found as a reference within Appendix C of this report.

In accordance with Mount Joy Township’s Stormwater Management Ordinance for peak discharge rate calculations, all pre-development runoff curve numbers are based on actual land use assuming good land conditions. All offsite post-development runoff curve numbers are based on actual land use assuming poor land conditions.

Peak discharge rates for each watershed are summarized below.

<b>Watershed Area #1 (DP 001)</b>	<b>Design Year Storm Event</b>					
<b>Discharge Rates: cubic feet per second (cfs)</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>
Pre-Dev. discharge at POI:	11.32	17.41	22.97	31.68	39.49	48.35
Post-Dev. combined routed discharge at POI:	6.97	14.92	21.05	27.78	31.06	45.60
<b>Net change in discharge at POI:</b>	<b>-4.35</b>	<b>-2.49</b>	<b>-1.92</b>	<b>-3.90</b>	<b>-8.43</b>	<b>-2.75</b>

<b>Watershed Area #2 (DP 002)</b>	<b>Design Year Storm Event</b>					
<b>Discharge Rates: cubic feet per second (cfs)</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>
Pre-Dev. discharge at POI:	7.76	11.80	15.46	21.18	26.30	32.15
Post-Dev. combined routed discharge at POI:	2.60	5.28	7.98	12.51	16.81	21.90
<b>Net change in discharge at POI:</b>	<b>-5.16</b>	<b>-6.52</b>	<b>-7.48</b>	<b>-8.67</b>	<b>-9.49</b>	<b>-10.25</b>

<b>Watershed Area #3 (DP 003)</b>	<b>Design Year Storm Event</b>					
<b>Discharge Rates: cubic feet per second (cfs)</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>
Pre-Dev. discharge at POI:	29.53	44.62	58.49	80.44	100.25	122.88
Post-Dev. combined routed discharge at POI:	14.93	25.18	35.09	51.34	66.52	84.31
<b>Net change in discharge at POI:</b>	<b>-14.60</b>	<b>-19.44</b>	<b>-23.40</b>	<b>-29.10</b>	<b>-33.73</b>	<b>-38.57</b>

<b>Watershed Area #4 (DP 004)</b>	<b>Design Year Storm Event</b>					
<b>Discharge Rates: cubic feet per second (cfs)</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>
Pre-Dev. discharge at POI:	8.89	13.54	17.77	24.40	30.35	37.10
Post-Dev. combined routed discharge at POI:	2.90	5.37	7.78	11.77	15.49	19.84
<b>Net change in discharge at POI:</b>	<b>-5.99</b>	<b>-8.17</b>	<b>-9.99</b>	<b>-12.63</b>	<b>-14.86</b>	<b>-17.26</b>

<b>Watershed Area #5 (DP 005)</b>	<b>Design Year Storm Event</b>					
<b>Discharge Rates: cubic feet per second (cfs)</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>
Pre-Dev. discharge at POI:	15.30	23.60	31.16	43.02	53.66	65.72
Post-Dev. combined routed discharge at POI:	7.04	12.16	17.19	25.58	33.49	42.81
<b>Net change in discharge at POI:</b>	<b>-8.26</b>	<b>-11.44</b>	<b>-13.97</b>	<b>-17.44</b>	<b>-20.17</b>	<b>-22.91</b>

<b>Watershed Area #6 (DP 006)</b>	<b>Design Year Storm Event</b>					
<b>Discharge Rates: cubic feet per second (cfs)</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>
Pre-Dev. discharge at POI:	11.89	18.88	25.30	35.52	44.74	55.26
Post-Dev. combined routed discharge at POI:	0.21	0.67	1.16	2.04	2.90	3.95
<b>Net change in discharge at POI:</b>	<b>-11.68</b>	<b>-18.21</b>	<b>-24.14</b>	<b>-33.48</b>	<b>-41.84</b>	<b>-51.31</b>

<b>Watershed Area #7 (DP 007)</b>	<b>Design Year Storm Event</b>					
<b>Discharge Rates: cubic feet per second (cfs)</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>
Pre-Dev. discharge at POI:	11.33	17.85	23.83	33.27	41.76	51.40
Post-Dev. combined routed discharge at POI:	0.59	1.87	3.26	5.73	8.14	11.07
<b>Net change in discharge at POI:</b>	<b>-10.74</b>	<b>-15.98</b>	<b>-20.57</b>	<b>-27.54</b>	<b>-33.62</b>	<b>-40.33</b>

<b>Watershed Area #8 (DP 008)</b>	<b>Design Year Storm Event</b>					
<b>Discharge Rates: cubic feet per second (cfs)</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>
Pre-Dev. discharge at POI:	18.68	30.25	41.45	59.67	76.44	95.86
Post-Dev. combined routed discharge at POI:	2.76	6.09	9.52	15.39	21.03	27.76
<b>Net change in discharge at POI:</b>	<b>-15.92</b>	<b>-24.16</b>	<b>-31.93</b>	<b>-44.28</b>	<b>-55.41</b>	<b>-68.10</b>

<b>Watershed Area #9 (DP 009)</b>	<b>Design Year Storm Event</b>					
<b>Discharge Rates: cubic feet per second (cfs)</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>
Pre-Dev. discharge at POI:	4.67	8.17	11.75	17.79	23.51	30.26
Post-Dev. combined routed discharge at POI:	1.04	1.93	2.66	6.23	16.55	19.67
<b>Net change in discharge at POI:</b>	<b>-3.63</b>	<b>-6.24</b>	<b>-9.09</b>	<b>-11.56</b>	<b>-6.96</b>	<b>-10.59</b>

## **RUNOFF VOLUME**

Runoff volume calculations for the site have been performed utilizing the DEP PCSM Spreadsheet. For pre-development runoff coefficients, all impervious areas have been considered to be 80% impervious and 20% meadow and all other non-forested areas have been considered to be meadow.

<b>RUNOFF VOLUME CALCULATIONS</b>									
Watershed Area	#1	#2	#3	#4	#5	#6	#7	#8	#9
Pre-Dev. Volume (ft <sup>3</sup> )	8,215	8,998	47,366	9,188	21,357	10,976	7,619	17,831	5,704
Post-Dev. Volume (ft <sup>3</sup> )	419,254	4,831	59,363	685	21,336	757	2,121	7,450	12,882
Volume Change (ft <sup>3</sup> )	411,039	-4,168	11,996	-8,503	-21	-10,219	-5,497	-10,381	7,178
MRC Credit (ft <sup>3</sup> ) (Facility #)	342,841 (#1)	N/A	21,434 (#3)	N/A	N/A	N/A	N/A	N/A	6,150 (#4)
Infiltration Credit (ft <sup>3</sup> ) (Facility #)	6,847 (#1)	N/A	1,982 (#3)	N/A	N/A	N/A	N/A	N/A	1,108 (#4)
ET Credit (ft <sup>3</sup> ) (Facility #)	57,744 (#1) 7,658 (#2)	N/A	0	N/A	N/A	N/A	N/A	N/A	0
Total Volume Credits (ft <sup>3</sup> )	415,090	N/A	23,416	N/A	N/A	N/A	N/A	N/A	7,258
Net Volume Difference (ft <sup>3</sup> )	-4,051	-4,168	-11,420	-8,503	-21	-10,219	-5,497	-10,381	-80

## **WATER QUALITY MANAGEMENT**

As required by the NPDES permitting process for the project, water quality best management practices have been incorporated into the design of the on-site stormwater management. Water quality impacts will be mitigated through the use of Managed Release Concept BMPs, a Dry Extended Detention Basin, Landscape Restoration areas, and reductions in drainage area.

The Landscape Restoration areas proposed around the exterior portion of the site will minimize water quality impacts to areas in which stormwater cannot be captured or an area that does not need to be maintained as lawn. These areas will be planted with native species of vegetation and will allow for the establishment of tall, deep-rooted vegetation which will facilitate absorption of pollutants. Further, when compared to traditional turf grasses, which require significant maintenance and the use of various herbicides, fertilizers, and pesticides, the landscape restoration area only requires mowing twice a year and no chemicals.

In compliance with the Total Maximum Daily Load (TMDL) for Little Chiques Creek which is caused primarily by siltation runoff from agricultural uses, the proposed project utilizes the previously described BMPs to the greatest extent practicable to reduce siltation from the site. Specifically, each facility will capture the majority of siltation generated from the site. Further, stormwater will be filtrated through the provided soil mixture of each MRC. These BMPs combined will significantly reduce siltation runoff compared to the existing agricultural use.



Water quality impacts at each discharge point are described below.

<b>WATER QUALITY CALCULATIONS</b>									
Watershed Area	Pre-Development (lbs)			Post-Development (lbs)			Net Change (lbs)		
	TSS	TP	TN	TSS	TP	TN	TSS	TP	TN
#1	25.03	0.11	1.18	6.14	0.03	0.33	<b>-18.89</b>	<b>-0.08</b>	<b>-0.85</b>
#2	27.42	0.12	1.29	11.05	0.05	0.59	<b>-16.37</b>	<b>-0.07</b>	<b>-0.70</b>
#3	159.98	0.72	6.51	109.30	0.48	3.64	<b>-50.68</b>	<b>-0.24</b>	<b>-2.87</b>
#4	30.76	0.14	1.28	1.54	0.01	0.08	<b>-29.22</b>	<b>-0.13</b>	<b>-1.19</b>
#5	68.78	0.31	3.01	59.00	0.26	2.14	<b>-9.78</b>	<b>-0.05</b>	<b>-0.87</b>
#6	33.45	0.15	1.58	1.73	0.01	0.09	<b>-31.71</b>	<b>-0.14</b>	<b>-1.48</b>
#7	23.22	0.10	1.09	4.86	0.02	0.26	<b>-18.36</b>	<b>-0.08</b>	<b>-0.83</b>
#8	53.56	0.23	2.31	17.06	0.08	0.91	<b>-36.50</b>	<b>-0.14</b>	<b>-1.40</b>
#9	38.27	0.10	0.93	8.09	0.03	0.20	<b>-30.18</b>	<b>-0.07</b>	<b>-0.73</b>

### **SWM/BMP FACILITY DEWATERING**

Each SWM/BMP Facility has been designed to dewater the facility within 72 hours of the end of the storm event, or 96 hours from the beginning of the event.

Dewatering times for the 100-year storm event are described in the below table. All times referenced are from the beginning of the storm event. In the case of the MRC facilities, the dewatering time is to the facility's surface.

Facility #	Time to Dewater (Hours)
1	94
2	96*
3	52
4	40

\*At 96 hours there will less than one inch (1") of stormwater in SWM/BMP Facility #2. While infiltration is not planned in this facility, it is not prevented, and the remaining amount of stormwater will leave the facility through infiltration or evapotranspiration.

### **STORM SYSTEM CONVEYANCE DESIGN**

In order to meet the requirements of Mount Joy Township's Stormwater Management Ordinance and provide adequate conveyance to the proposed on-site stormwater management facilities, the on-site stormwater collection and conveyance system (i.e., inlets, piping, swales, etc.) has been designed to collect and convey a 25-year storm event without surcharging inlets. Further, the



system has been designed for the 100-year storm to be conveyed to the appropriate destination, without overtopping curbs or bypassing basins.

Given the size of the subdrainage areas associated with this site, the Rational Method ( $Q = CiA$ ) was utilized whereby the rainfall intensity ( $i$ ) is based upon the NOAA intensity-duration-frequency (IDF) rainfall data for the Mount Joy Township, PA station. A minimum time of concentration of five (5) minutes was used to each inlet or other structure. The storm system design information, pipe capacity calculations and all other design information is contained in Appendix D of this report. A drainage area exhibit depicting the subdrainage watershed areas used in these collection and conveyance calculations can be found in Appendix E of this report.

## **SECONDARY WETLAND IMPACTS**

As part of the NPDES Permit for this project, the remaining wetlands must be analyzed for potential secondary impacts.

There are four wetlands located near the project site. The locations of Discharge Points 003 & 004 were specifically chosen to properly analyze Wetlands 1 & 2 and the results are summarized in the above sections of the report. Wetlands 3 & 4 are located within the floodway of Stream 3 and will continue to be provided hydrology from overflow from the stream.

## **OFFSITE DISCAHRGE ANALYSIS**

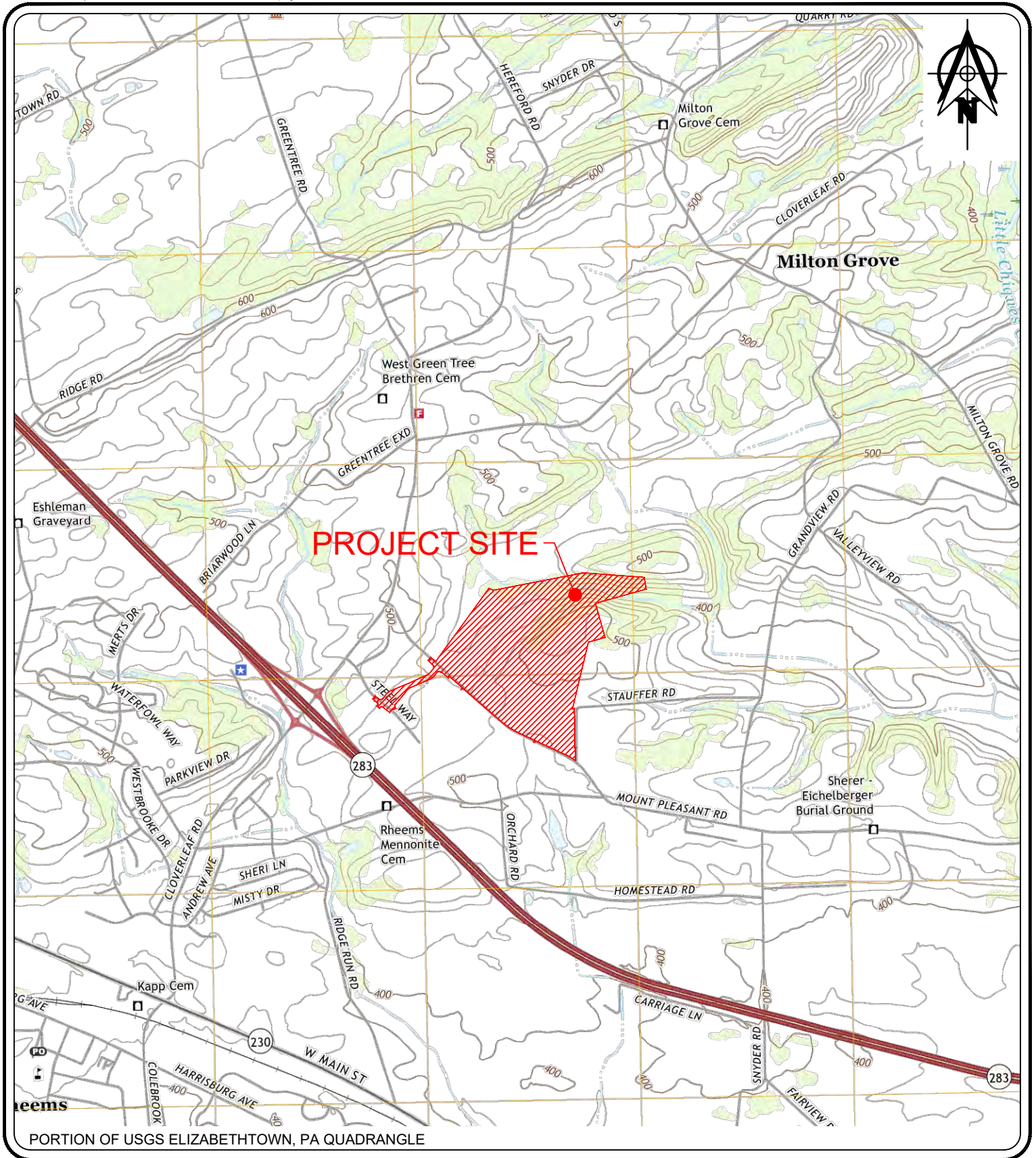
The summaries included throughout this report demonstrate how peak discharge rate, runoff volume, and water quality compliance is achieved for the project's Discharge Points 001-009. The following table briefly summarizes how a stable flowpath is provided from each discharge point to the receiving waters.

Discharge Point	Notes
001	MRC #1 & SWM/BMP Facility #2 discharge immediately outside of the floodway for Stream 3 at rates less than or equal to pre-development rates. Therefore, as no evidence of existing erosion was found, no erosion will occur post-development.
002	The post-development area is reduced from the pre-development area and no concentrated stormwater discharge is proposed to this discharge point.
003	MRC #3 discharges above Wetland 1 at a discharge rate less than or equal to pre-development rates. Therefore, as no evidence of existing erosion was found, no erosion will occur post-development.
004	The post-development area is reduced from the pre-development area and no concentrated stormwater discharge is proposed to this discharge point.
005	An existing culvert is being replaced as part of this project and no evidence of existing erosion was found downstream of this culvert. The post-development discharge rates are less than the pre-development discharge rates and therefore, no erosion will occur.

006	The post-development area is reduced from the pre-development area and no concentrated stormwater discharge is proposed to this discharge point.
007	The post-development area is reduced from the pre-development area and no concentrated stormwater discharge is proposed to this discharge point.
008	The post-development area is reduced from the pre-development area and no concentrated stormwater discharge is proposed to this discharge point.
009	MRC #4 discharges into an area upstream of an existing culvert. The proposed rip-rap apron will provide a stable flowpath from the facility discharge to the existing culvert.

An Offsite Discharge Map is included in Appendix E of this report which graphically depicts the discharge points and their downstream flowpaths to the receiving waters.

**APPENDIX A**  
**SITE LOCATION MAP**



PORTION OF USGS ELIZABETHTOWN, PA QUADRANGLE



**LANDWORKS**  
 CIVIL DESIGN, LLC  
 consulting engineers

1195 VIRGINIA AVENUE YORK, PA 17403  
 p (717) 891-1195 www.landworkscd.com

**SITE LOCATION MAP**  
 FOR  
**283 COMMERCE CENTER - BUILDING #1**  
 FOR  
 PDC NORTHEAST LPV, LLC  
 MOUNT JOY TOWNSHIP LANCASTER COUNTY, PENNSYLVANIA

**PROJECT NO.**  
 22-0123-005  
**DATE:** 01/03/23  
**SCALE:** 1" = 2000'  
**SHEET**  
 1 of 1

**APPENDIX B**  
**SOIL INFORMATION**





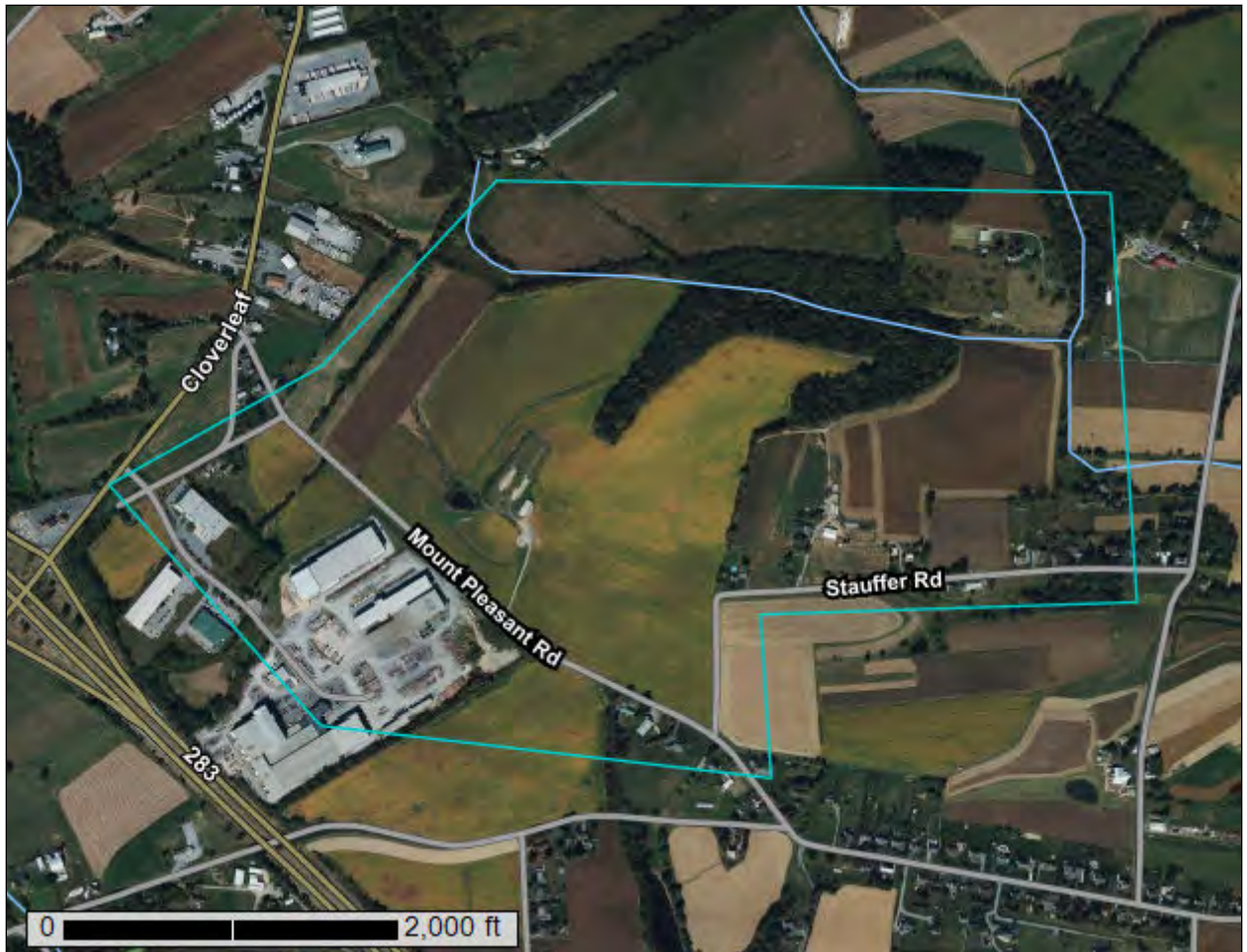
United States  
Department of  
Agriculture

**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 Lancaster County, Pennsylvania







## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AbB	Abbottstown silt loam, 3 to 8 percent slopes	13.2	3.8%
BdA	Bedington silt loam, 0 to 3 percent slopes	5.0	1.4%
BdB	Bedington silt loam, 3 to 8 percent slopes	119.7	34.5%
BdC	Bedington silt loam, 8 to 15 percent slopes	39.6	11.4%
BeD	Bedington channery silt loam, 15 to 25 percent slopes	78.1	22.5%
Bm	Blairton silt loam, 3 to 10 percent slopes	14.7	4.2%
BuB	Bucks silt loam, 3 to 8 percent slopes	18.9	5.4%
BuC	Bucks silt loam, 8 to 15 percent slopes	21.0	6.0%
BuD	Bucks silt loam, 15 to 25 percent slopes	2.4	0.7%
LaB	Lansdale loam, 3 to 8 percent slopes	10.7	3.1%
LaD	Lansdale loam, 15 to 25 percent slopes	4.4	1.3%
RaB	Readington silt loam, 3 to 8 percent slopes	17.3	5.0%
UaB	Ungers loam, 3 to 8 percent slopes	1.8	0.5%
UaD	Ungers loam, 15 to 25 percent slopes	0.2	0.1%
W	Water	0.3	0.1%
<b>Totals for Area of Interest</b>		<b>347.6</b>	<b>100.0%</b>



## Lancaster County, Pennsylvania

### AbB—Abbottstown silt loam, 3 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2v7gd

*Elevation:* 130 to 660 feet

*Mean annual precipitation:* 40 to 48 inches

*Mean annual air temperature:* 52 to 57 degrees F

*Frost-free period:* 190 to 210 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Abbottstown and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Abbottstown

##### Setting

*Landform:* Hillslopes

*Landform position (two-dimensional):* Footslope, toeslope

*Landform position (three-dimensional):* Head slope, base slope

*Down-slope shape:* Concave, linear

*Across-slope shape:* Linear, concave

*Parent material:* Acid reddish brown residuum weathered from shale and siltstone

##### Typical profile

*Ap - 0 to 10 inches:* silt loam

*Bt - 10 to 20 inches:* silt loam

*Bx - 20 to 39 inches:* channery silt loam

*BCg - 39 to 48 inches:* channery silt loam

*R - 48 to 58 inches:* bedrock

##### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* 18 to 22 inches to fragipan; 40 to 60 inches to lithic bedrock

*Drainage class:* Somewhat poorly drained

*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 6 to 18 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 3.7 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3w

**Hydrologic Soil Group: D**

*Ecological site:* F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest

**Hydric soil rating: No**

## Minor Components

### Penn

*Percent of map unit:* 5 percent  
*Landform:* Hillslopes  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Nose slope, side slope  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Linear, convex  
*Hydric soil rating:* No

### Croton

*Percent of map unit:* 5 percent  
*Landform:* Depressions  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Concave, linear  
*Across-slope shape:* Linear, concave  
*Hydric soil rating:* Yes

### Klinesville

*Percent of map unit:* 5 percent  
*Landform:* Hills  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Linear, convex  
*Hydric soil rating:* No

## BdA—Bedington silt loam, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 16r1  
*Elevation:* 300 to 2,900 feet  
*Mean annual precipitation:* 30 to 60 inches  
*Mean annual air temperature:* 45 to 59 degrees F  
*Frost-free period:* 110 to 200 days  
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Bedington and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Bedington

#### Setting

*Landform:* Hillslopes  
*Landform position (two-dimensional):* Shoulder  
*Landform position (three-dimensional):* Side slope

## Custom Soil Resource Report

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear, convex

*Parent material:* Residuum weathered from shale and siltstone

### Typical profile

*Ap - 0 to 9 inches:* silt loam

*BE - 9 to 12 inches:* channery silt loam

*Bt - 12 to 60 inches:* very channery loam

*C - 60 to 77 inches:* extremely channery silt loam

### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* 60 to 120 inches to lithic bedrock

*Drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.60 to 2.00 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:* Moderate (about 8.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 1

**Hydrologic Soil Group: B**

*Ecological site:* F148XY026PA - Moist, High Base-Saturation, Upland, Mixed Oak  
- Hickory - Conifer Forest

**Hydric soil rating: No**

### Minor Components

#### Blairton

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### Clymer

*Percent of map unit:* 2 percent

*Hydric soil rating:* No

#### Duffield

*Percent of map unit:* 2 percent

*Hydric soil rating:* No

#### Hagerstown

*Percent of map unit:* 1 percent

*Hydric soil rating:* No

## **BdB—Bedington silt loam, 3 to 8 percent slopes**

### Map Unit Setting

*National map unit symbol:* 16r2

## Custom Soil Resource Report

*Elevation:* 300 to 1,500 feet  
*Mean annual precipitation:* 35 to 50 inches  
*Mean annual air temperature:* 45 to 57 degrees F  
*Frost-free period:* 140 to 217 days  
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Bedington and similar soils:* 75 percent  
*Minor components:* 25 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Bedington

#### Setting

*Landform:* Hillslopes  
*Landform position (two-dimensional):* Shoulder  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Convex, linear  
*Parent material:* Residuum weathered from shale and siltstone

#### Typical profile

*H1 - 0 to 10 inches:* silt loam  
*H2 - 10 to 47 inches:* channery silty clay loam  
*H3 - 47 to 63 inches:* very channery clay loam  
*R - 63 to 67 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 3 to 8 percent  
*Depth to restrictive feature:* 48 to 99 inches to lithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 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:* Moderate (about 7.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
**Hydrologic Soil Group: B**  
*Ecological site:* F147XY002PA - Mixed Sedimentary Upland, F148XY026PA - Moist, High Base-Saturation, Upland, Mixed Oak - Hickory - Conifer Forest  
**Hydric soil rating: No**

### Minor Components

#### Berks

*Percent of map unit:* 10 percent  
*Hydric soil rating:* No

#### Edom

*Percent of map unit:* 5 percent  
*Landform:* Hillslopes  
*Landform position (two-dimensional):* Backslope

## Custom Soil Resource Report

*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### **Hartleton**

*Percent of map unit:* 5 percent  
*Landform:* — error in exists on —  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Concave, linear  
*Across-slope shape:* Linear, concave  
*Hydric soil rating:* No

### **Watson**

*Percent of map unit:* 5 percent  
*Landform:* Valley sides  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

## **BdC—Bedington silt loam, 8 to 15 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 16r3  
*Elevation:* 300 to 1,500 feet  
*Mean annual precipitation:* 35 to 50 inches  
*Mean annual air temperature:* 45 to 57 degrees F  
*Frost-free period:* 140 to 217 days  
*Farmland classification:* Farmland of statewide importance

### **Map Unit Composition**

*Bedington and similar soils:* 75 percent  
*Minor components:* 25 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Bedington**

#### **Setting**

*Landform:* Hillslopes  
*Landform position (two-dimensional):* Shoulder  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Linear, convex  
*Parent material:* Residuum weathered from shale and siltstone

#### **Typical profile**

*H1 - 0 to 10 inches:* silt loam  
*H2 - 10 to 47 inches:* channery silty clay loam

## Custom Soil Resource Report

*H3 - 47 to 63 inches: very channery clay loam*

*R - 63 to 67 inches: weathered bedrock*

### Properties and qualities

*Slope: 8 to 15 percent*

*Depth to restrictive feature: 48 to 99 inches to lithic bedrock*

*Drainage class: Well drained*

*Runoff class: Medium*

*Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high  
(0.60 to 2.00 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: Moderate (about 7.7 inches)*

### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 3e*

**Hydrologic Soil Group: B**

*Ecological site: F147XY002PA - Mixed Sedimentary Upland, F148XY026PA -  
Moist, High Base-Saturation, Upland, Mixed Oak - Hickory - Conifer Forest*

**Hydric soil rating: No**

### Minor Components

#### Berks

*Percent of map unit: 10 percent*

*Hydric soil rating: No*

#### Edom

*Percent of map unit: 5 percent*

*Landform: Hillslopes*

*Landform position (two-dimensional): Backslope*

*Landform position (three-dimensional): Side slope*

*Down-slope shape: Convex*

*Across-slope shape: Convex*

*Hydric soil rating: No*

#### Watson

*Percent of map unit: 5 percent*

*Landform: Valley sides*

*Landform position (two-dimensional): Footslope*

*Landform position (three-dimensional): Base slope*

*Down-slope shape: Linear*

*Across-slope shape: Linear*

*Hydric soil rating: No*

#### Hartleton

*Percent of map unit: 5 percent*

*Landform: — error in exists on —*

*Landform position (two-dimensional): Shoulder, backslope*

*Landform position (three-dimensional): Side slope*

*Down-slope shape: Concave, linear*

*Across-slope shape: Linear, concave*

*Hydric soil rating: No*

## **BeD—Bedington channery silt loam, 15 to 25 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 16r4  
*Elevation:* 300 to 1,600 feet  
*Mean annual precipitation:* 35 to 50 inches  
*Mean annual air temperature:* 45 to 57 degrees F  
*Frost-free period:* 120 to 214 days  
*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Bedington and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Bedington**

#### **Setting**

*Landform:* Hills  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Nose slope, side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Parent material:* Acid residuum weathered from sedimentary rock

#### **Typical profile**

*H1 - 0 to 9 inches:* channery silt loam  
*H2 - 9 to 29 inches:* channery silty clay loam  
*H3 - 29 to 72 inches:* very channery silt loam

#### **Properties and qualities**

*Slope:* 15 to 25 percent  
*Depth to restrictive feature:* 60 to 80 inches to lithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 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:* Moderate (about 6.9 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
**Hydrologic Soil Group: B**  
*Ecological site:* F147XY002PA - Mixed Sedimentary Upland, F148XY026PA - Moist, High Base-Saturation, Upland, Mixed Oak - Hickory - Conifer Forest  
**Hydric soil rating: No**

**Minor Components**

**Comly**

*Percent of map unit: 7 percent*  
*Hydric soil rating: No*

**Berks**

*Percent of map unit: 5 percent*  
*Hydric soil rating: No*

**Weikert**

*Percent of map unit: 3 percent*  
*Hydric soil rating: No*

**Bm—Blairton silt loam, 3 to 10 percent slopes**

**Map Unit Setting**

*National map unit symbol: 16r5*  
*Elevation: 300 to 1,500 feet*  
*Mean annual precipitation: 35 to 50 inches*  
*Mean annual air temperature: 45 to 57 degrees F*  
*Frost-free period: 120 to 200 days*  
*Farmland classification: Farmland of statewide importance*

**Map Unit Composition**

*Blairton and similar soils: 90 percent*  
*Minor components: 10 percent*  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Blairton**

**Setting**

*Landform: Depressions*  
*Landform position (two-dimensional): Backslope*  
*Landform position (three-dimensional): Head slope*  
*Down-slope shape: Concave*  
*Across-slope shape: Concave*  
*Parent material: Local silty colluvium derived from shale and siltstone over acid silty residuum weathered from shale and siltstone*

**Typical profile**

*Ap - 0 to 10 inches: silt loam*  
*Bt - 10 to 35 inches: channery silty clay loam*  
*Cg - 35 to 39 inches: very channery loam*  
*R - 39 to 43 inches: bedrock*

**Properties and qualities**

*Slope: 3 to 10 percent*  
*Depth to restrictive feature: 20 to 40 inches to paralithic bedrock*  
*Drainage class: Moderately well drained*  
*Runoff class: Medium*



## Custom Soil Resource Report

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)

*Depth to water table:* About 6 to 36 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 4.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3w

**Hydrologic Soil Group: C/D**

*Ecological site:* F148XY024PA - Moist, Piedmont - felsic, Upland, Mixed Oak - Hardwood - Conifer Forest

**Hydric soil rating: No**

### Minor Components

#### Poorly drained areas

*Percent of map unit:* 5 percent

*Landform:* Depressions

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

#### Ungers

*Percent of map unit:* 2 percent

*Hydric soil rating:* No

#### Bucks

*Percent of map unit:* 2 percent

*Landform:* Hillslopes

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Interfluve, side slope

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear, convex

*Hydric soil rating:* No

#### Bedington

*Percent of map unit:* 1 percent

*Hydric soil rating:* No

## BuB—Bucks silt loam, 3 to 8 percent slopes

### Map Unit Setting

*National map unit symbol:* l6rd

*Elevation:* 300 to 1,500 feet

*Mean annual precipitation:* 36 to 50 inches

*Mean annual air temperature:* 46 to 57 degrees F

*Frost-free period:* 150 to 200 days

## Custom Soil Resource Report

*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Bucks and similar soils:* 90 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Bucks

#### Setting

*Landform:* Hillslopes

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Interfluve, side slope

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear, convex

*Parent material:* Silt mantle over residuum weathered from sandstone and siltstone

#### Typical profile

*Ap - 0 to 6 inches:* silt loam

*Bt - 6 to 30 inches:* silty clay loam

*C - 30 to 52 inches:* very gravelly silty clay loam

*R - 52 to 56 inches:* bedrock

#### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* 40 to 72 inches to lithic bedrock

*Drainage class:* Well drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.20 to 2.00 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:* Moderate (about 8.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

**Hydrologic Soil Group: B**

*Ecological site:* F148XY022PA - Dry, Triassic, Upland, Mixed Oak Heath / Oak-Pine Woodland

**Hydric soil rating: No**

### Minor Components

#### Readington

*Percent of map unit:* 5 percent

*Landform:* Hillslopes

*Landform position (two-dimensional):* Backslope, footslope

*Landform position (three-dimensional):* Head slope, side slope, base slope

*Down-slope shape:* Concave, linear

*Across-slope shape:* Concave, linear

*Hydric soil rating:* No

#### Lehigh

*Percent of map unit:* 2 percent

## Custom Soil Resource Report

*Landform:* Hillsides

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Concave, linear

*Across-slope shape:* Linear, concave

*Hydric soil rating:* No

### **Ungers**

*Percent of map unit:* 2 percent

*Hydric soil rating:* No

### **Lansdale**

*Percent of map unit:* 1 percent

*Landform:* Hillsides

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

## **BuC—Bucks silt loam, 8 to 15 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 16rf

*Elevation:* 300 to 1,500 feet

*Mean annual precipitation:* 36 to 50 inches

*Mean annual air temperature:* 46 to 57 degrees F

*Frost-free period:* 150 to 200 days

*Farmland classification:* Farmland of statewide importance

### **Map Unit Composition**

*Bucks and similar soils:* 90 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Bucks**

#### **Setting**

*Landform:* Hillslopes

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Interfluve, side slope

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear, convex

*Parent material:* Silt mantle over residuum weathered from sandstone and siltstone

#### **Typical profile**

*Ap - 0 to 6 inches:* silt loam

*Bt - 6 to 30 inches:* silty clay loam

*C - 30 to 52 inches:* very gravelly silty clay loam

*R - 52 to 56 inches:* bedrock

## Custom Soil Resource Report

### Properties and qualities

*Slope:* 8 to 15 percent  
*Depth to restrictive feature:* 40 to 72 inches to lithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.20 to 2.00 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:* Moderate (about 8.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3e  
**Hydrologic Soil Group: B**  
*Ecological site:* F148XY022PA - Dry, Triassic, Upland, Mixed Oak Heath / Oak-Pine Woodland  
**Hydric soil rating: No**

### Minor Components

#### Readington

*Percent of map unit:* 5 percent  
*Landform:* Hillslopes  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Head slope, side slope, base slope  
*Down-slope shape:* Concave, linear  
*Across-slope shape:* Concave, linear  
*Hydric soil rating:* No

#### Ungers

*Percent of map unit:* 2 percent  
*Hydric soil rating:* No

#### Lehigh

*Percent of map unit:* 2 percent  
*Landform:* Hillsides  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Concave, linear  
*Across-slope shape:* Linear, concave  
*Hydric soil rating:* No

#### Lansdale

*Percent of map unit:* 1 percent  
*Landform:* Hillsides  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

## **BuD—Bucks silt loam, 15 to 25 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 16rg  
*Elevation:* 300 to 1,500 feet  
*Mean annual precipitation:* 36 to 50 inches  
*Mean annual air temperature:* 46 to 57 degrees F  
*Frost-free period:* 150 to 200 days  
*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Bucks and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Bucks**

#### **Setting**

*Landform:* Hillslopes  
*Landform position (two-dimensional):* Summit, shoulder  
*Landform position (three-dimensional):* Interfluve, side slope  
*Down-slope shape:* Convex, linear  
*Across-slope shape:* Linear, convex  
*Parent material:* Silt mantle over residuum weathered from sandstone and siltstone

#### **Typical profile**

*Ap - 0 to 6 inches:* silt loam  
*Bt - 6 to 30 inches:* silty clay loam  
*C - 30 to 52 inches:* very gravelly silty clay loam  
*R - 52 to 56 inches:* bedrock

#### **Properties and qualities**

*Slope:* 15 to 25 percent  
*Depth to restrictive feature:* 40 to 72 inches to lithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.20 to 2.00 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:* Moderate (about 8.3 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
**Hydrologic Soil Group: B**  
*Ecological site:* F148XY022PA - Dry, Triassic, Upland, Mixed Oak Heath / Oak-Pine Woodland

**Hydric soil rating: No**

**Minor Components**

**Readington**

*Percent of map unit: 5 percent*

*Landform: Hillslopes*

*Landform position (two-dimensional): Backslope, footslope*

*Landform position (three-dimensional): Head slope, side slope, base slope*

*Down-slope shape: Concave, linear*

*Across-slope shape: Concave, linear*

*Hydric soil rating: No*

**Lehigh**

*Percent of map unit: 2 percent*

*Landform: Hillsides*

*Landform position (two-dimensional): Summit, shoulder, backslope*

*Landform position (three-dimensional): Side slope*

*Down-slope shape: Concave, linear*

*Across-slope shape: Linear, concave*

*Hydric soil rating: No*

**Ungers**

*Percent of map unit: 2 percent*

*Hydric soil rating: No*

**Lansdale**

*Percent of map unit: 1 percent*

*Landform: Hillsides*

*Landform position (two-dimensional): Summit, shoulder, backslope*

*Landform position (three-dimensional): Side slope*

*Down-slope shape: Convex*

*Across-slope shape: Convex*

*Hydric soil rating: No*

**LaB—Lansdale loam, 3 to 8 percent slopes**

**Map Unit Setting**

*National map unit symbol: l6sk*

*Elevation: 70 to 1,000 feet*

*Mean annual precipitation: 40 to 55 inches*

*Mean annual air temperature: 48 to 55 degrees F*

*Frost-free period: 160 to 200 days*

*Farmland classification: All areas are prime farmland*

**Map Unit Composition**

*Lansdale and similar soils: 92 percent*

*Minor components: 8 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Description of Lansdale

### Setting

*Landform:* Hillsides

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Residuum weathered from sandstone and/or residuum weathered from conglomerate

### Typical profile

*Ap - 0 to 8 inches:* loam

*Bt - 8 to 34 inches:* channery sandy loam

*C - 34 to 46 inches:* channery sandy loam

*R - 46 to 50 inches:* bedrock

### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* 42 to 60 inches to lithic bedrock

*Drainage class:* Well drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 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 6.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

**Hydrologic Soil Group: B**

*Ecological site:* F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest

**Hydric soil rating: No**

## Minor Components

### Reaville

*Percent of map unit:* 8 percent

*Landform:* Hillslopes

*Landform position (two-dimensional):* Summit, footslope

*Landform position (three-dimensional):* Interfluve, base slope

*Down-slope shape:* Concave, linear

*Across-slope shape:* Concave, linear

*Hydric soil rating:* No

## LaD—Lansdale loam, 15 to 25 percent slopes

### Map Unit Setting

*National map unit symbol:* 16sm  
*Elevation:* 70 to 1,000 feet  
*Mean annual precipitation:* 40 to 55 inches  
*Mean annual air temperature:* 48 to 55 degrees F  
*Frost-free period:* 160 to 200 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Lansdale and similar soils:* 92 percent  
*Minor components:* 8 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Lansdale

#### Setting

*Landform:* Hillsides  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from sandstone and/or residuum weathered from conglomerate

#### Typical profile

*Ap - 0 to 8 inches:* loam  
*Bt - 8 to 34 inches:* channery sandy loam  
*C - 34 to 46 inches:* channery sandy loam  
*R - 46 to 50 inches:* bedrock

#### Properties and qualities

*Slope:* 15 to 25 percent  
*Depth to restrictive feature:* 42 to 60 inches to lithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 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 6.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
**Hydrologic Soil Group: B**  
*Ecological site:* F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest



**Hydric soil rating: No**

**Minor Components**

**Reaville**

*Percent of map unit: 8 percent*  
*Landform: Hillslopes*  
*Landform position (two-dimensional): Summit, footslope*  
*Landform position (three-dimensional): Interfluve, base slope*  
*Down-slope shape: Concave, linear*  
*Across-slope shape: Concave, linear*  
*Hydric soil rating: No*

**RaB—Readington silt loam, 3 to 8 percent slopes**

**Map Unit Setting**

*National map unit symbol: 2w05x*  
*Elevation: 70 to 950 feet*  
*Mean annual precipitation: 38 to 55 inches*  
*Mean annual air temperature: 43 to 57 degrees F*  
*Frost-free period: 170 to 240 days*  
*Farmland classification: Farmland of statewide importance*

**Map Unit Composition**

*Readington and similar soils: 85 percent*  
*Minor components: 15 percent*  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Readington**

**Setting**

*Landform: Hills*  
*Landform position (two-dimensional): Backslope, footslope*  
*Landform position (three-dimensional): Head slope, side slope, base slope*  
*Down-slope shape: Concave, linear*  
*Across-slope shape: Concave, linear*  
*Parent material: Triassic colluvium derived from shale and siltstone and/or triassic residuum weathered from shale and siltstone*

**Typical profile**

*Ap - 0 to 10 inches: silt loam*  
*Bt1 - 10 to 17 inches: silt loam*  
*Bt2 - 17 to 34 inches: silty clay loam*  
*Btx - 34 to 48 inches: clay loam*  
*C - 48 to 58 inches: channery silt loam*  
*R - 58 to 68 inches: bedrock*

**Properties and qualities**

*Slope: 3 to 8 percent*  
*Surface area covered with cobbles, stones or boulders: 0.0 percent*

## Custom Soil Resource Report

*Depth to restrictive feature:* 20 to 36 inches to fragipan; 40 to 60 inches to lithic bedrock  
*Drainage class:* Moderately well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)  
*Depth to water table:* About 18 to 36 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Moderate (about 6.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
**Hydrologic Soil Group: C**  
*Ecological site:* F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest  
**Hydric soil rating: No**

### Minor Components

#### Abbottstown

*Percent of map unit:* 5 percent  
*Landform:* Hillslopes  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Head slope, base slope  
*Down-slope shape:* Concave, linear  
*Across-slope shape:* Linear, concave  
*Hydric soil rating:* No

#### Reaville

*Percent of map unit:* 5 percent  
*Landform:* Depressions  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

#### Penn

*Percent of map unit:* 5 percent  
*Landform:* Ridges  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Interfluve, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

## UaB—Ungers loam, 3 to 8 percent slopes

### Map Unit Setting

*National map unit symbol:* 16th

## Custom Soil Resource Report

*Elevation:* 250 to 1,500 feet  
*Mean annual precipitation:* 36 to 50 inches  
*Mean annual air temperature:* 46 to 57 degrees F  
*Frost-free period:* 160 to 200 days  
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Ungers and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Ungers

#### Setting

*Landform:* Mountain slopes  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from sandstone and siltstone

#### Typical profile

*H1 - 0 to 11 inches:* loam  
*H2 - 11 to 40 inches:* gravelly sandy clay loam  
*H3 - 40 to 60 inches:* very channery sandy loam  
*H4 - 60 to 64 inches:* bedrock

#### Properties and qualities

*Slope:* 3 to 8 percent  
*Depth to restrictive feature:* 40 to 80 inches to lithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 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:* Moderate (about 6.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2e  
**Hydrologic Soil Group: B**  
*Ecological site:* F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest  
**Hydric soil rating: No**

### Minor Components

#### Penn

*Percent of map unit:* 7 percent  
*Hydric soil rating:* No

#### Readington

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

**Bucks**

*Percent of map unit:* 3 percent  
*Hydric soil rating:* No

**UaD—Ungers loam, 15 to 25 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 16tk  
*Elevation:* 250 to 1,500 feet  
*Mean annual precipitation:* 36 to 50 inches  
*Mean annual air temperature:* 46 to 57 degrees F  
*Frost-free period:* 160 to 200 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Ungers and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Ungers**

**Setting**

*Landform:* Mountain slopes  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from sandstone and siltstone

**Typical profile**

*H1 - 0 to 9 inches:* loam  
*H2 - 9 to 40 inches:* gravelly sandy clay loam  
*H3 - 40 to 60 inches:* very channery sandy loam  
*H4 - 60 to 64 inches:* bedrock

**Properties and qualities**

*Slope:* 15 to 25 percent  
*Depth to restrictive feature:* 40 to 80 inches to lithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.60 to 2.00 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:* Moderate (about 6.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e

## Custom Soil Resource Report

### **Hydrologic Soil Group: B**

*Ecological site:* F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest

### **Hydric soil rating: No**

## Minor Components

### **Penn**

*Percent of map unit:* 7 percent

*Landform:* Hillslopes

*Landform position (two-dimensional):* Shoulder, backslope

*Landform position (three-dimensional):* Nose slope, side slope

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear, convex

*Hydric soil rating:* No

### **Readington**

*Percent of map unit:* 5 percent

*Landform:* Hillslopes

*Landform position (two-dimensional):* Backslope, footslope

*Landform position (three-dimensional):* Head slope, side slope, base slope

*Down-slope shape:* Concave, linear

*Across-slope shape:* Concave, linear

*Hydric soil rating:* No

### **Bucks**

*Percent of map unit:* 3 percent

*Landform:* Hillslopes

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Interfluve, side slope

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear, convex

*Hydric soil rating:* No

## W—Water

### **Map Unit Setting**

*National map unit symbol:* 16tr

*Mean annual precipitation:* 36 to 50 inches

*Mean annual air temperature:* 46 to 59 degrees F

*Frost-free period:* 120 to 214 days

*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Water:* 100 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Water**

#### **Setting**

*Parent material:* Rivers streams ponds

## Custom Soil Resource Report

### **Properties and qualities**

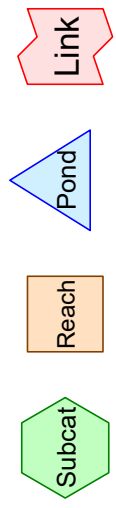
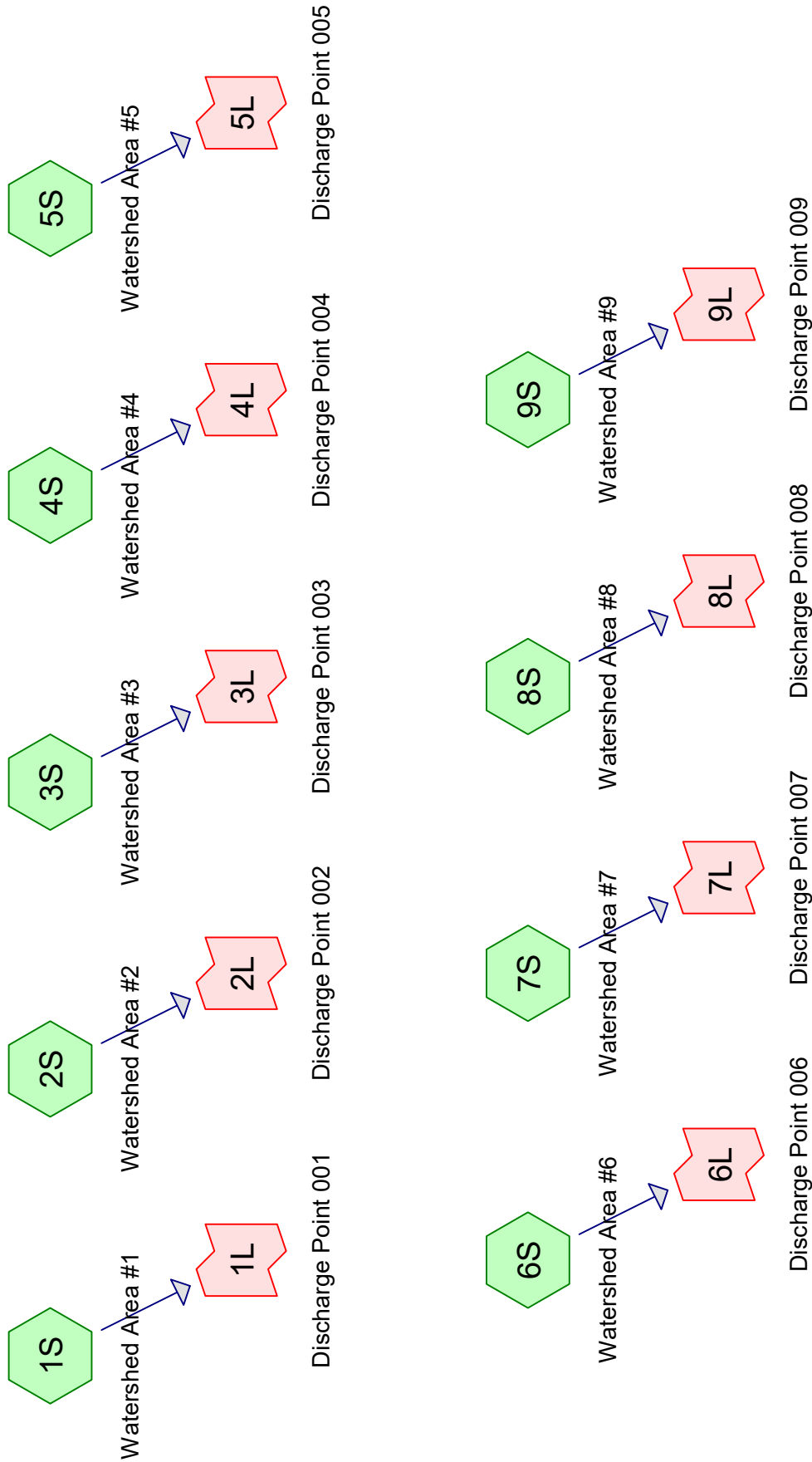
*Runoff class:* Negligible

*Frequency of ponding:* Frequent

**APPENDIX C**  
**STORMWATER MANAGEMENT DESIGN**

## **PRE-DEVELOPMENT CALCULATIONS**





**Routing Diagram for 22-0123-005 - Pre-Dev**  
 Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
 HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

# **PRE-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #1**

**(DISCHARGE POINT 001)**

**Summary for Subcatchment 1S: Watershed Area #1**

Runoff = 11.32 cfs @ 12.04 hrs, Volume= 28,165 cf, Depth= 1.19"  
 Routed to Link 1L : Discharge Point 001

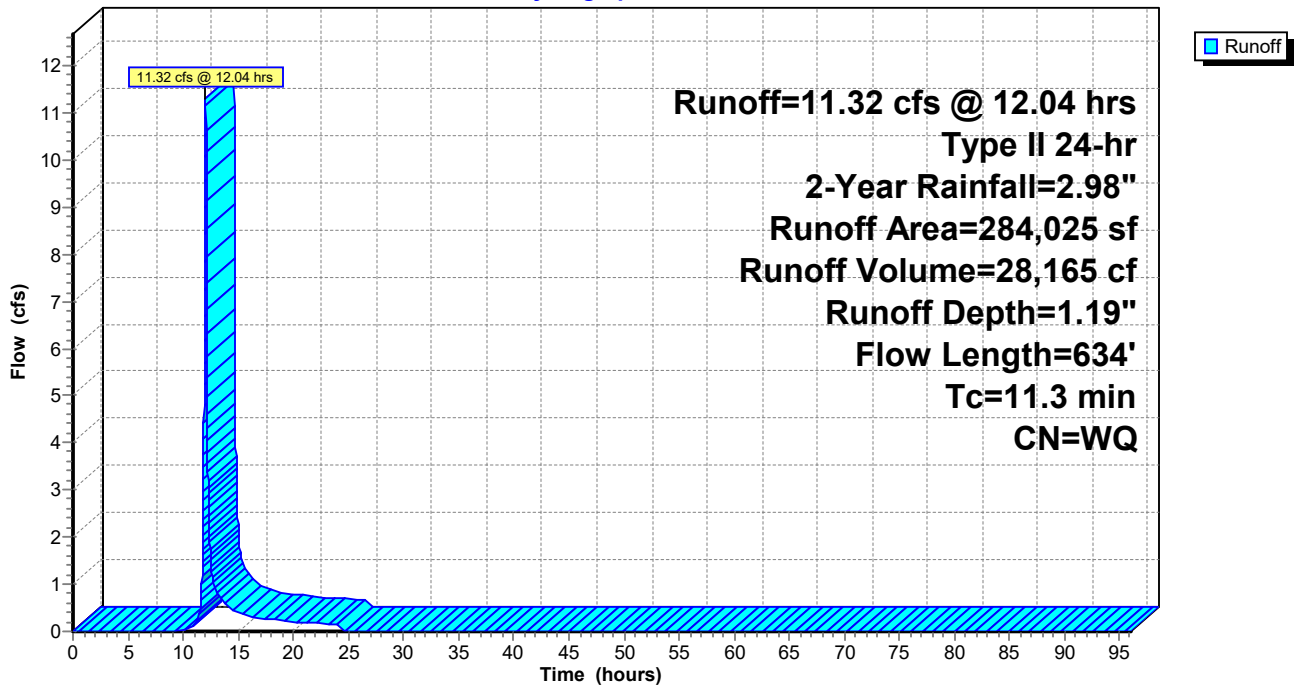
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 238,235	78	Farm / Straight Row / Good Condition / HSG B
* 44,215	85	Farm / Straight Row / Good Condition / HSG C
* 1,575	89	Farm / Straight Row / Good Condition / HSG D
284,025		Weighted Average
284,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0907	0.30		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.8	534	0.0481	1.54		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
11.3	634	Total			

**Subcatchment 1S: Watershed Area #1**

Hydrograph



**Summary for Subcatchment 1S: Watershed Area #1**

Runoff = 17.41 cfs @ 12.03 hrs, Volume= 43,070 cf, Depth= 1.82"  
 Routed to Link 1L : Discharge Point 001

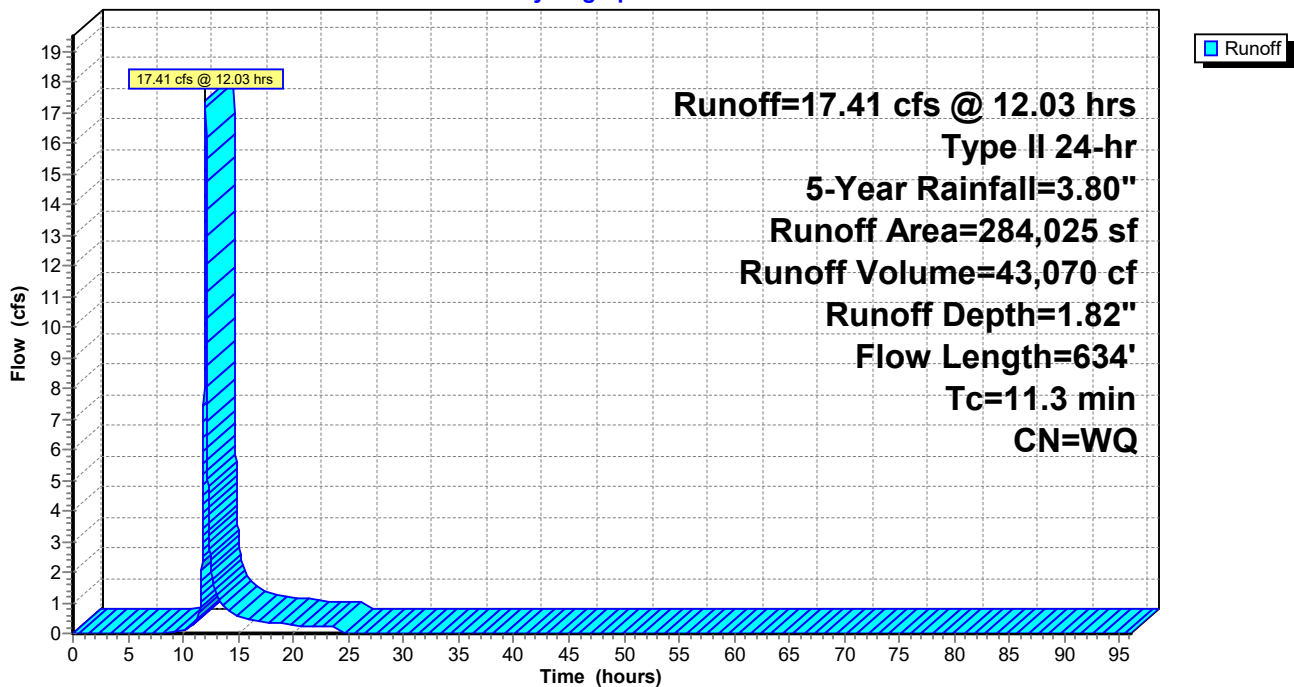
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 238,235	78	Farm / Straight Row / Good Condition / HSG B
* 44,215	85	Farm / Straight Row / Good Condition / HSG C
* 1,575	89	Farm / Straight Row / Good Condition / HSG D
284,025		Weighted Average
284,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0907	0.30		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.8	534	0.0481	1.54		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
11.3	634	Total			

**Subcatchment 1S: Watershed Area #1**

Hydrograph



**Summary for Subcatchment 1S: Watershed Area #1**

Runoff = 22.97 cfs @ 12.03 hrs, Volume= 56,870 cf, Depth= 2.40"  
 Routed to Link 1L : Discharge Point 001

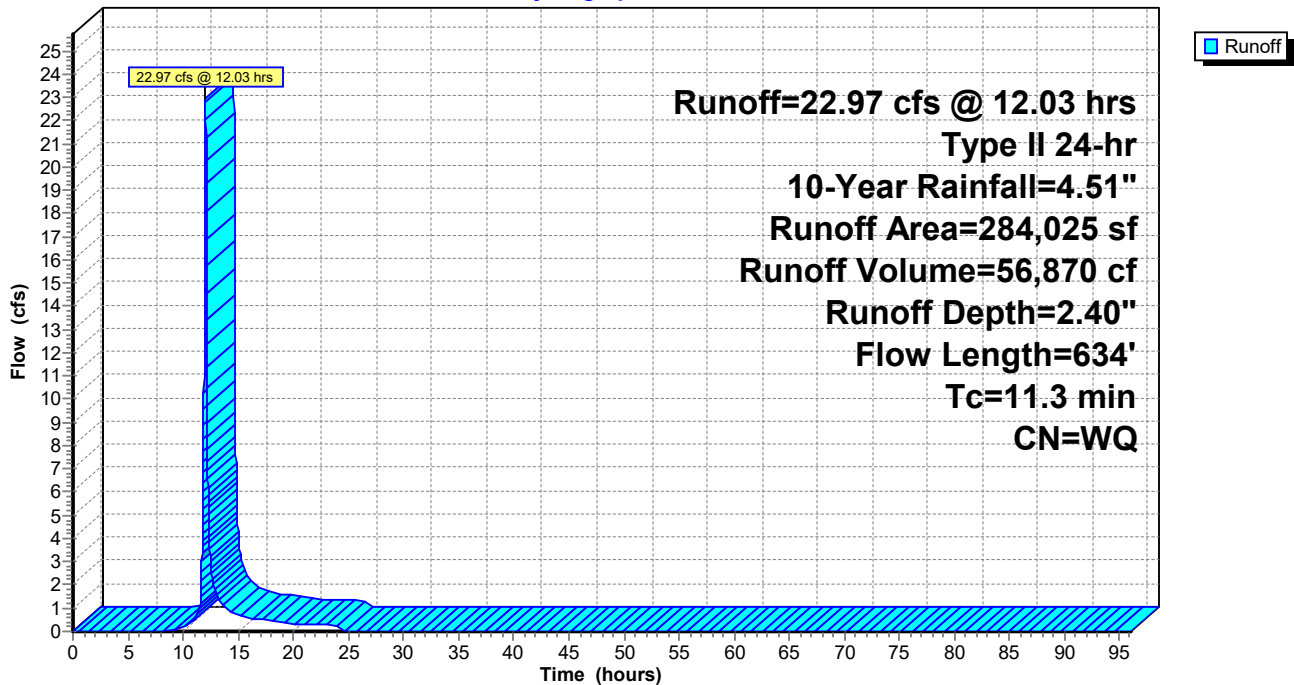
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 238,235	78	Farm / Straight Row / Good Condition / HSG B
* 44,215	85	Farm / Straight Row / Good Condition / HSG C
* 1,575	89	Farm / Straight Row / Good Condition / HSG D
284,025		Weighted Average
284,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0907	0.30		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.8	534	0.0481	1.54		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
11.3	634	Total			

**Subcatchment 1S: Watershed Area #1**

Hydrograph



**Summary for Subcatchment 1S: Watershed Area #1**

Runoff = 31.68 cfs @ 12.03 hrs, Volume= 78,914 cf, Depth= 3.33"  
 Routed to Link 1L : Discharge Point 001

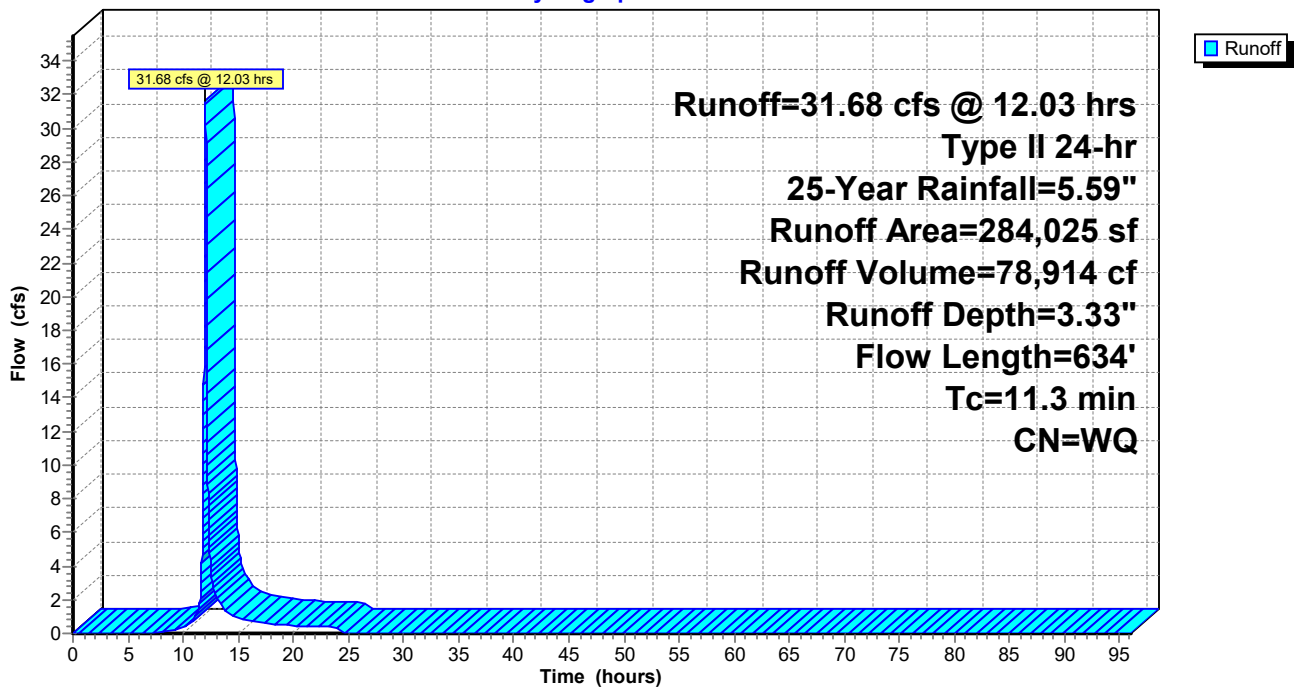
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

Area (sf)	CN	Description
* 238,235	78	Farm / Straight Row / Good Condition / HSG B
* 44,215	85	Farm / Straight Row / Good Condition / HSG C
* 1,575	89	Farm / Straight Row / Good Condition / HSG D
284,025		Weighted Average
284,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0907	0.30		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.8	534	0.0481	1.54		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
11.3	634	Total			

**Subcatchment 1S: Watershed Area #1**

Hydrograph



**Summary for Subcatchment 1S: Watershed Area #1**

Runoff = 39.49 cfs @ 12.03 hrs, Volume= 99,026 cf, Depth= 4.18"

Routed to Link 1L : Discharge Point 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

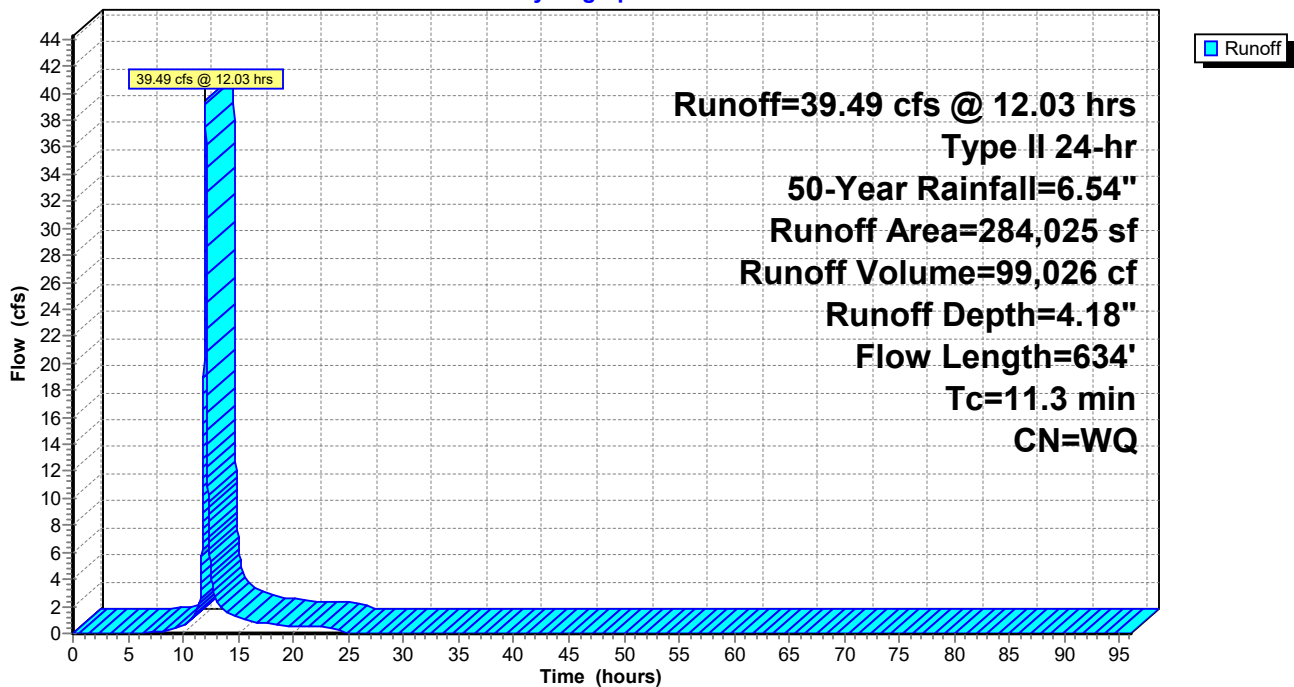
Type II 24-hr 50-Year Rainfall=6.54"

	Area (sf)	CN	Description
*	238,235	78	Farm / Straight Row / Good Condition / HSG B
*	44,215	85	Farm / Straight Row / Good Condition / HSG C
*	1,575	89	Farm / Straight Row / Good Condition / HSG D
	284,025		Weighted Average
	284,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0907	0.30		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.8	534	0.0481	1.54		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
11.3	634	Total			

**Subcatchment 1S: Watershed Area #1**

Hydrograph



**Summary for Subcatchment 1S: Watershed Area #1**

Runoff = 48.35 cfs @ 12.03 hrs, Volume= 122,230 cf, Depth= 5.16"

Routed to Link 1L : Discharge Point 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

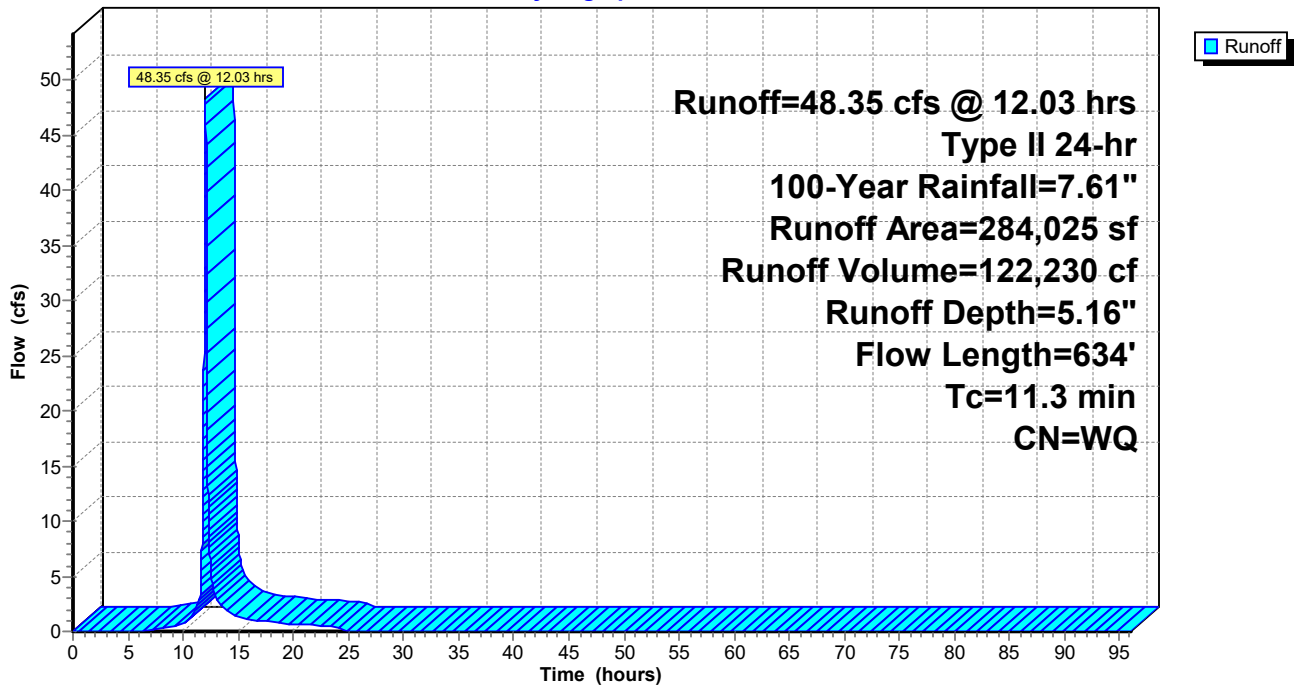
Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 238,235	78	Farm / Straight Row / Good Condition / HSG B
* 44,215	85	Farm / Straight Row / Good Condition / HSG C
* 1,575	89	Farm / Straight Row / Good Condition / HSG D
284,025		Weighted Average
284,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0907	0.30		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.8	534	0.0481	1.54		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
11.3	634	Total			

**Subcatchment 1S: Watershed Area #1**

Hydrograph





# **PRE-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #2**

**(DISCHARGE POINT 002)**

**Summary for Subcatchment 2S: Watershed Area #2**

Runoff = 7.76 cfs @ 12.19 hrs, Volume= 29,279 cf, Depth= 1.30"  
 Routed to Link 2L : Discharge Point 002

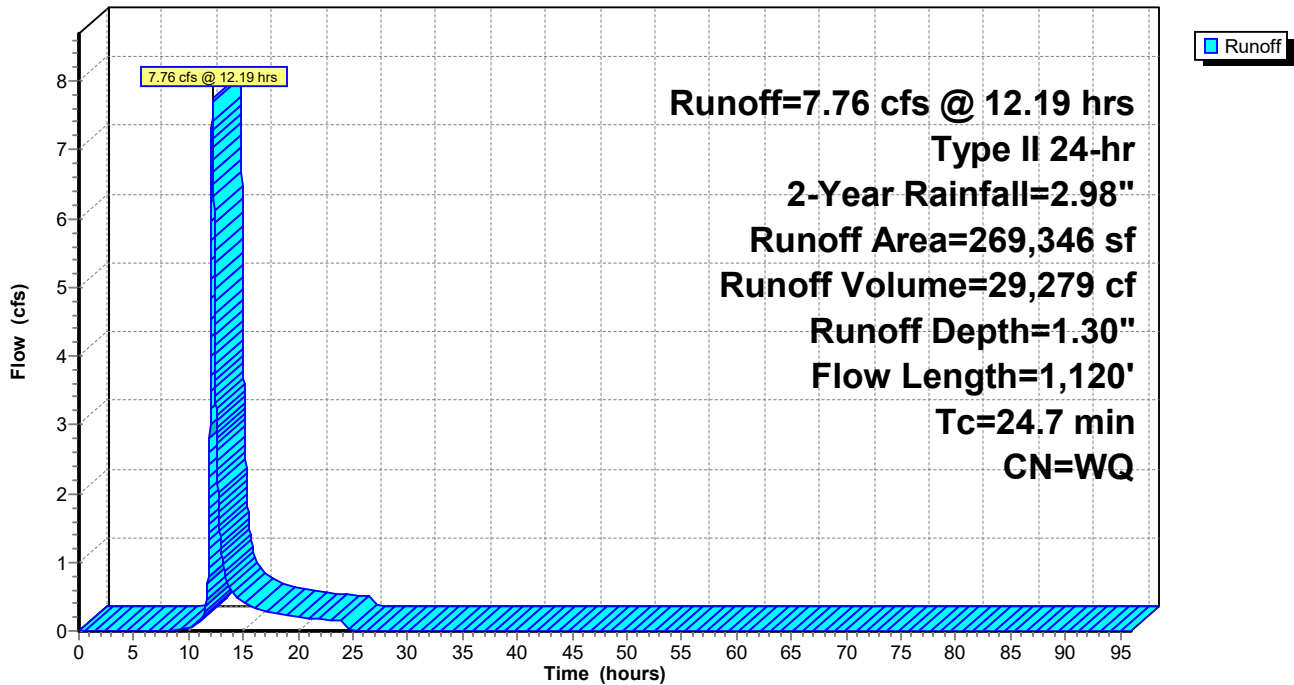
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 154,749	78	Farm / Straight Row / Good Condition / HSG B
* 88,924	85	Farm / Straight Row / Good Condition / HSG C
* 2,665	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 23,008	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
269,346		Weighted Average
269,346		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0721	0.27		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
18.6	1,020	0.0170	0.91		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.7	1,120	Total			

**Subcatchment 2S: Watershed Area #2**

Hydrograph



**Summary for Subcatchment 2S: Watershed Area #2**

Runoff = 11.80 cfs @ 12.18 hrs, Volume= 43,946 cf, Depth= 1.96"  
 Routed to Link 2L : Discharge Point 002

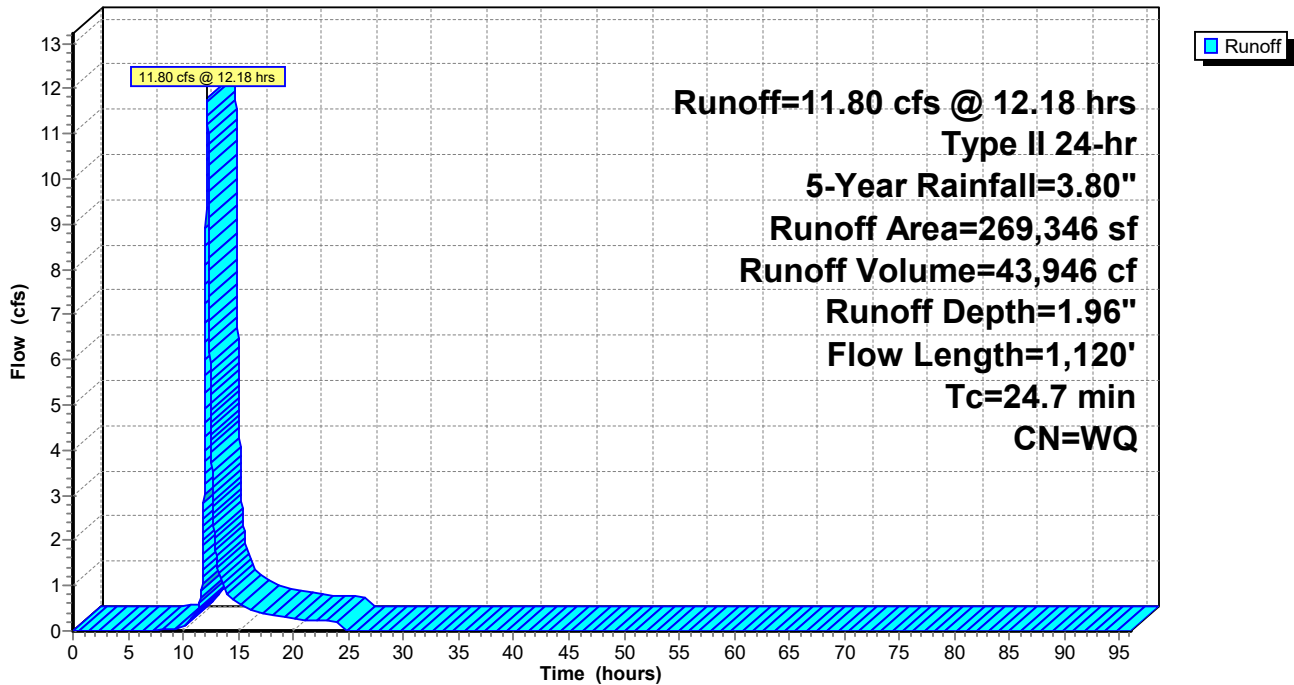
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 154,749	78	Farm / Straight Row / Good Condition / HSG B
* 88,924	85	Farm / Straight Row / Good Condition / HSG C
* 2,665	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 23,008	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
269,346		Weighted Average
269,346		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0721	0.27		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
18.6	1,020	0.0170	0.91		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.7	1,120	Total			

**Subcatchment 2S: Watershed Area #2**

Hydrograph



**Summary for Subcatchment 2S: Watershed Area #2**

Runoff = 15.46 cfs @ 12.18 hrs, Volume= 57,406 cf, Depth= 2.56"  
 Routed to Link 2L : Discharge Point 002

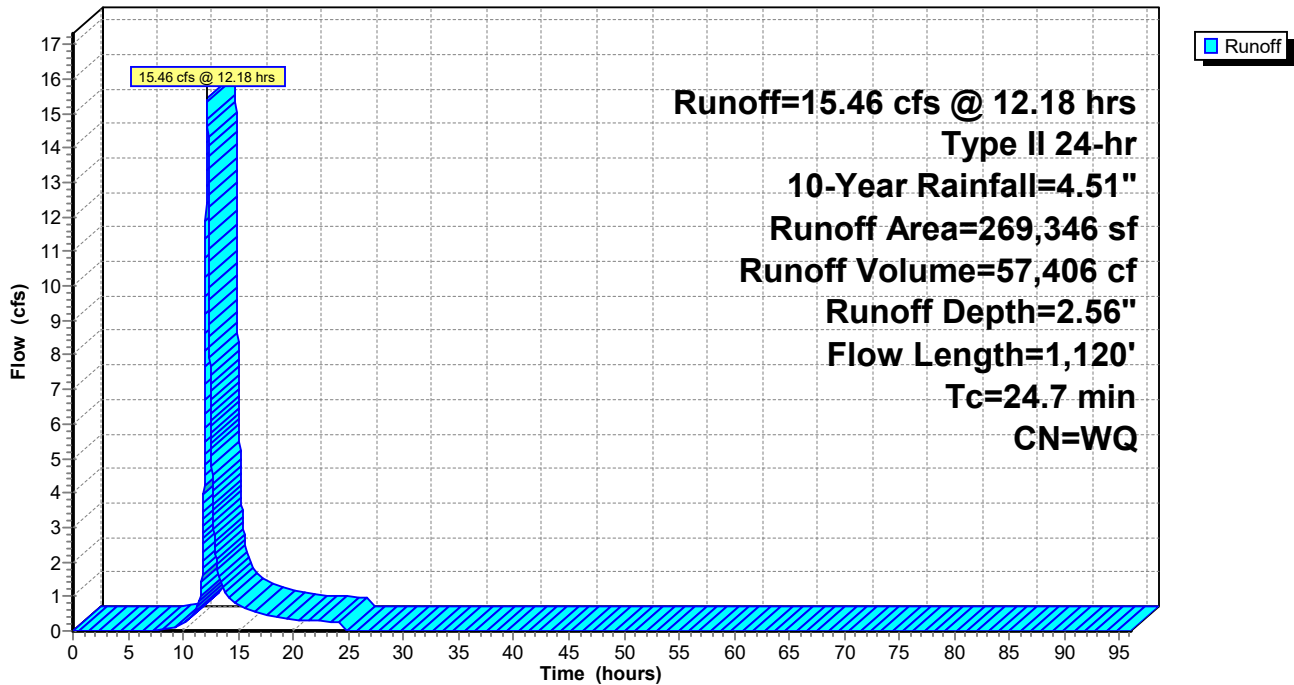
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 154,749	78	Farm / Straight Row / Good Condition / HSG B
* 88,924	85	Farm / Straight Row / Good Condition / HSG C
* 2,665	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 23,008	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
269,346		Weighted Average
269,346		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0721	0.27		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
18.6	1,020	0.0170	0.91		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.7	1,120	Total			

**Subcatchment 2S: Watershed Area #2**

Hydrograph



**Summary for Subcatchment 2S: Watershed Area #2**

Runoff = 21.18 cfs @ 12.18 hrs, Volume= 78,767 cf, Depth= 3.51"

Routed to Link 2L : Discharge Point 002

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

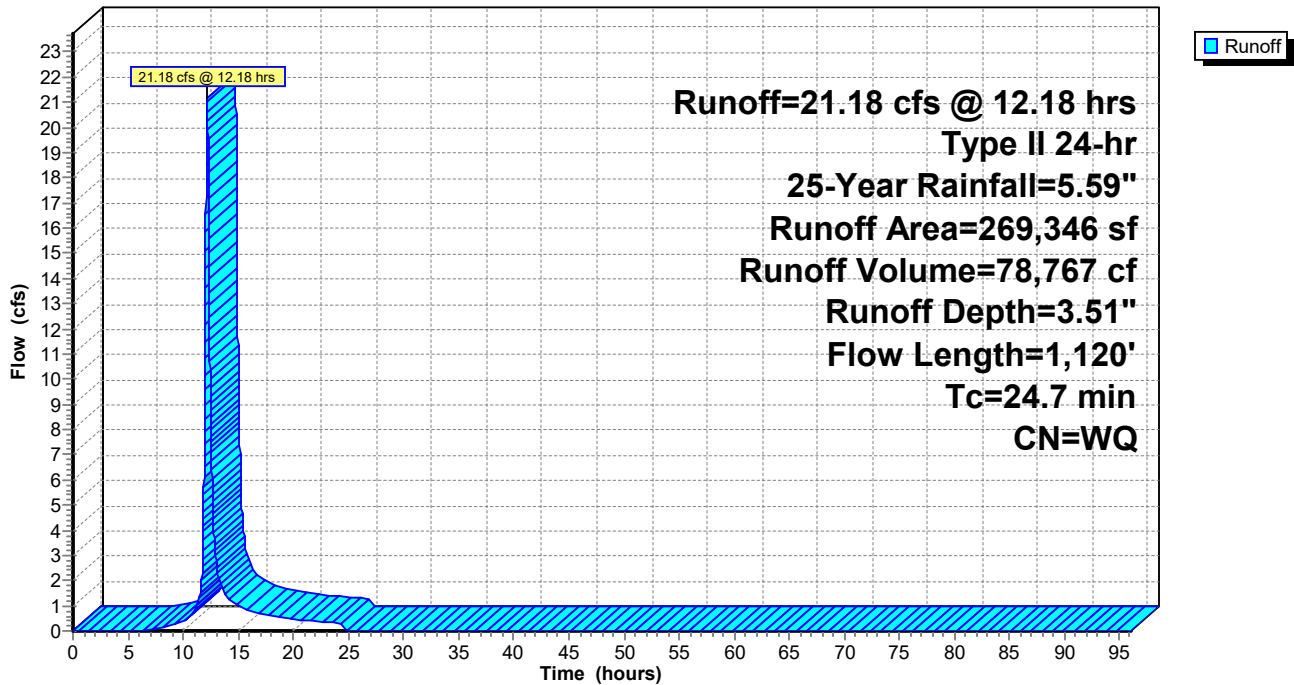
Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	154,749	78	Farm / Straight Row / Good Condition / HSG B
*	88,924	85	Farm / Straight Row / Good Condition / HSG C
*	2,665	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
*	23,008	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
	269,346		Weighted Average
	269,346		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0721	0.27		<b>Sheet Flow, Sheet Flow</b>
					Grass: Short n= 0.150 P2= 2.98"
18.6	1,020	0.0170	0.91		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b>
					Short Grass Pasture Kv= 7.0 fps
24.7	1,120	Total			

**Subcatchment 2S: Watershed Area #2**

Hydrograph



**Summary for Subcatchment 2S: Watershed Area #2**

Runoff = 26.30 cfs @ 12.17 hrs, Volume= 98,159 cf, Depth= 4.37"  
 Routed to Link 2L : Discharge Point 002

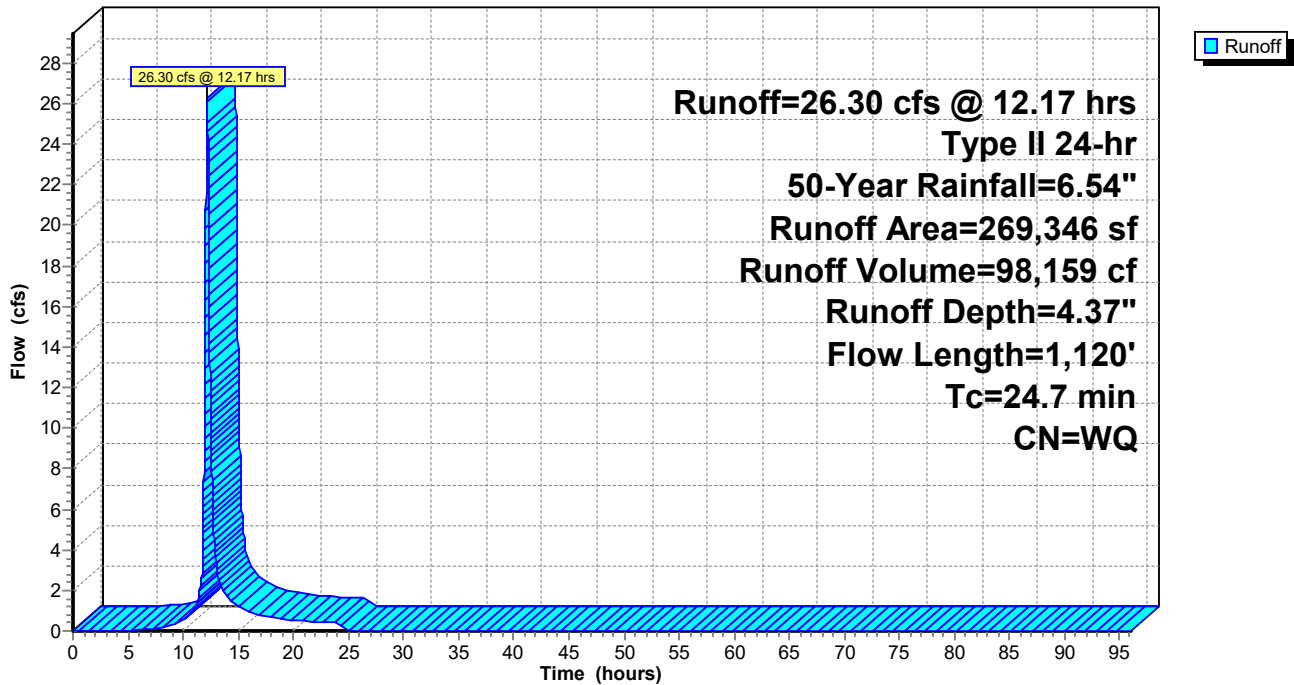
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 154,749	78	Farm / Straight Row / Good Condition / HSG B
* 88,924	85	Farm / Straight Row / Good Condition / HSG C
* 2,665	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 23,008	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
269,346		Weighted Average
269,346		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0721	0.27		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
18.6	1,020	0.0170	0.91		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.7	1,120	Total			

**Subcatchment 2S: Watershed Area #2**

Hydrograph



**Summary for Subcatchment 2S: Watershed Area #2**

Runoff = 32.15 cfs @ 12.16 hrs, Volume= 120,455 cf, Depth= 5.37"  
 Routed to Link 2L : Discharge Point 002

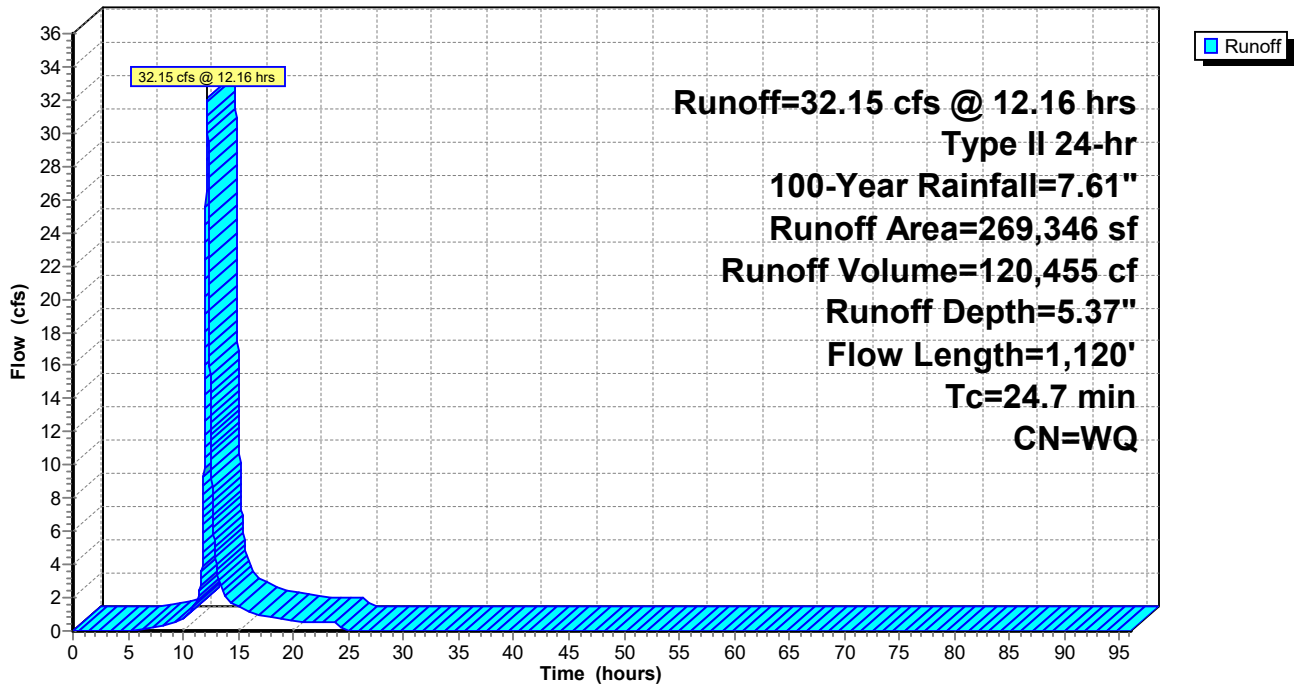
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

	Area (sf)	CN	Description
*	154,749	78	Farm / Straight Row / Good Condition / HSG B
*	88,924	85	Farm / Straight Row / Good Condition / HSG C
*	2,665	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
*	23,008	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
	269,346		Weighted Average
	269,346		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.0721	0.27		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
18.6	1,020	0.0170	0.91		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.7	1,120	Total			

**Subcatchment 2S: Watershed Area #2**

Hydrograph



# **PRE-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #3**

**(DISCHARGE POINT 003)**



**Summary for Subcatchment 3S: Watershed Area #3**

Runoff = 29.53 cfs @ 12.28 hrs, Volume= 138,342 cf, Depth= 1.29"

Routed to Link 3L : Discharge Point 003

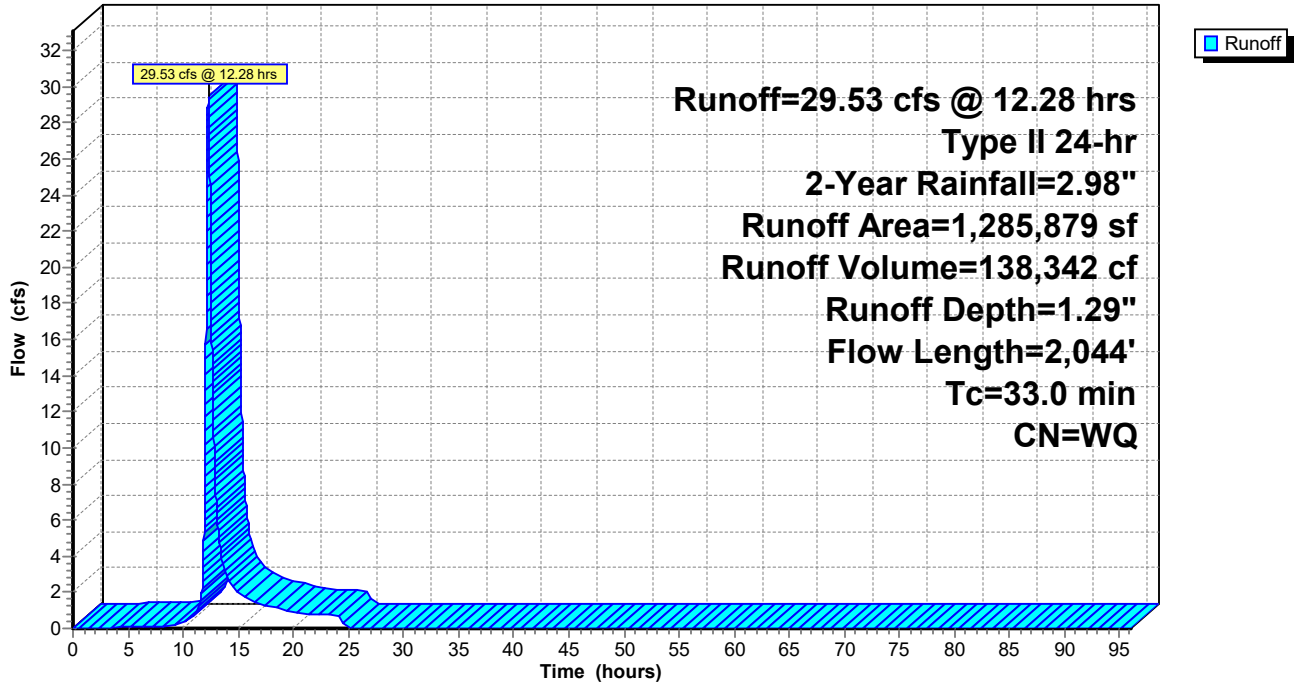
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 54,956	98	Impervious
* 178	61	Open Space / Good Condition / HSG B
* 2,224	74	Open Space / Good Condition / HSG C
* 696,471	78	Farm / Straight Row / Good Condition / HSG B
* 243,785	85	Farm / Straight Row / Good Condition / HSG C
* 38,680	55	Woods / Good Condition / HSG B
* 10,675	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 93,021	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	61	Open Space / Good Condition / HSG B (Offsite)
* 31,342	55	Woods / Good Condition / HSG B (Offsite)
* 1,400	70	Woods / Good Condition / HSG C (Offsite)
1,285,879		Weighted Average
1,174,526		91.34% Pervious Area
111,353		8.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0181	0.16		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
9.7	915	0.0503	1.57		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.5	198	0.0184	2.18		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Unpaved Kv= 16.1 fps
0.3	26	0.0546	1.64		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
10.9	805	0.0307	1.23		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
33.0	2,044	Total			

### Subcatchment 3S: Watershed Area #3

Hydrograph



**Summary for Subcatchment 3S: Watershed Area #3**

Runoff = 44.62 cfs @ 12.28 hrs, Volume= 205,392 cf, Depth= 1.92"

Routed to Link 3L : Discharge Point 003

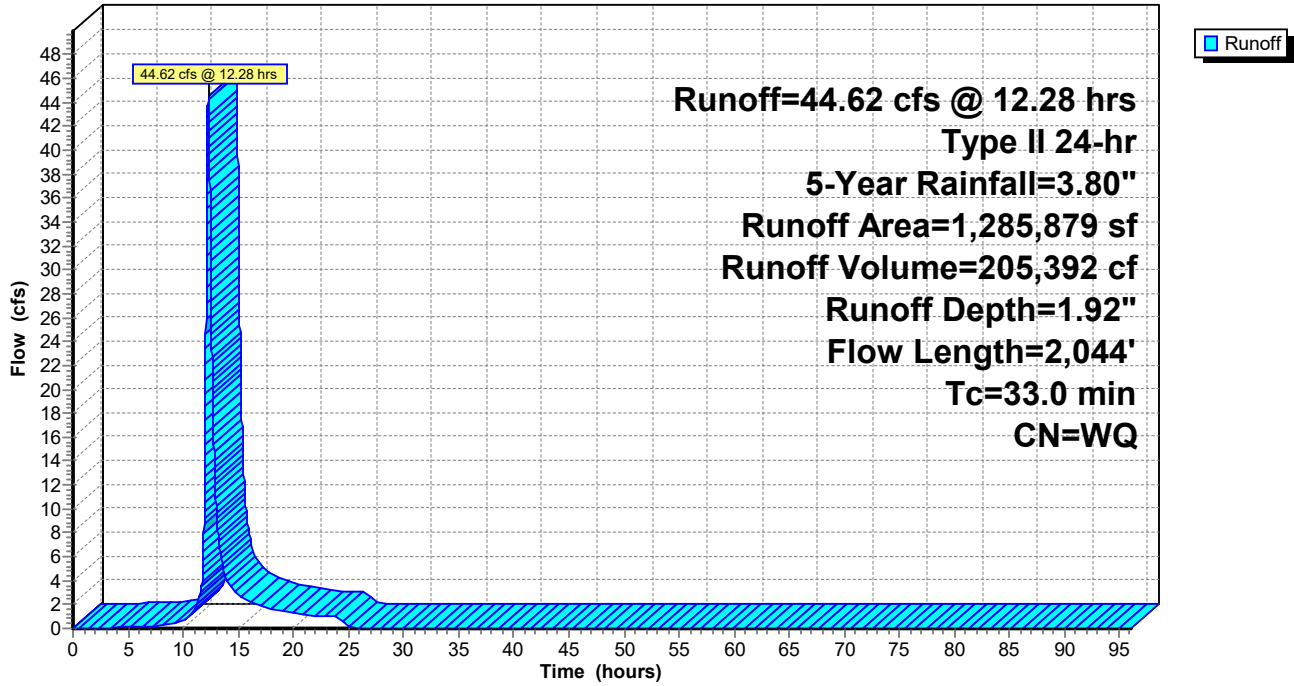
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 54,956	98	Impervious
* 178	61	Open Space / Good Condition / HSG B
* 2,224	74	Open Space / Good Condition / HSG C
* 696,471	78	Farm / Straight Row / Good Condition / HSG B
* 243,785	85	Farm / Straight Row / Good Condition / HSG C
* 38,680	55	Woods / Good Condition / HSG B
* 10,675	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 93,021	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	61	Open Space / Good Condition / HSG B (Offsite)
* 31,342	55	Woods / Good Condition / HSG B (Offsite)
* 1,400	70	Woods / Good Condition / HSG C (Offsite)
1,285,879		Weighted Average
1,174,526		91.34% Pervious Area
111,353		8.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0181	0.16		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
9.7	915	0.0503	1.57		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.5	198	0.0184	2.18		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Unpaved Kv= 16.1 fps
0.3	26	0.0546	1.64		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
10.9	805	0.0307	1.23		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
33.0	2,044	Total			

### Subcatchment 3S: Watershed Area #3

Hydrograph



**Summary for Subcatchment 3S: Watershed Area #3**

Runoff = 58.49 cfs @ 12.28 hrs, Volume= 267,236 cf, Depth= 2.49"  
 Routed to Link 3L : Discharge Point 003

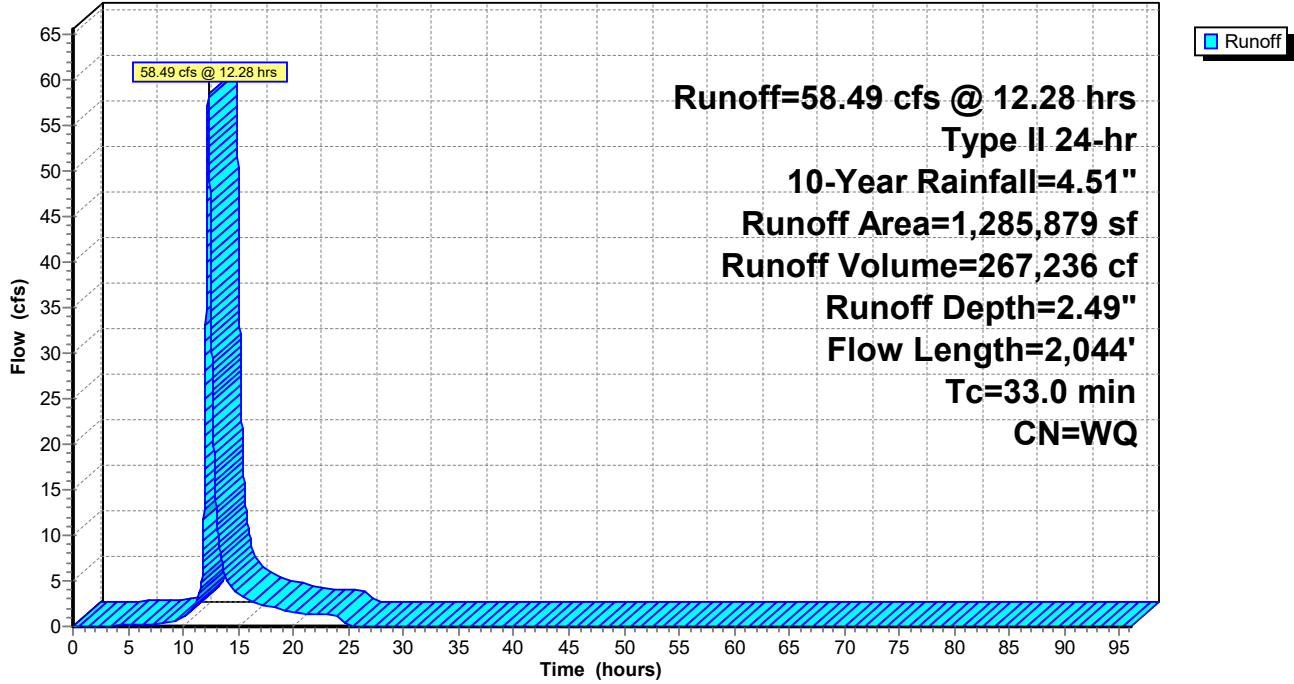
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 54,956	98	Impervious
* 178	61	Open Space / Good Condition / HSG B
* 2,224	74	Open Space / Good Condition / HSG C
* 696,471	78	Farm / Straight Row / Good Condition / HSG B
* 243,785	85	Farm / Straight Row / Good Condition / HSG C
* 38,680	55	Woods / Good Condition / HSG B
* 10,675	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 93,021	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	61	Open Space / Good Condition / HSG B (Offsite)
* 31,342	55	Woods / Good Condition / HSG B (Offsite)
* 1,400	70	Woods / Good Condition / HSG C (Offsite)
1,285,879		Weighted Average
1,174,526		91.34% Pervious Area
111,353		8.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0181	0.16		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
9.7	915	0.0503	1.57		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.5	198	0.0184	2.18		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Unpaved Kv= 16.1 fps
0.3	26	0.0546	1.64		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
10.9	805	0.0307	1.23		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
33.0	2,044	Total			

### Subcatchment 3S: Watershed Area #3

Hydrograph



**Summary for Subcatchment 3S: Watershed Area #3**

Runoff = 80.44 cfs @ 12.28 hrs, Volume= 365,887 cf, Depth= 3.41"

Routed to Link 3L : Discharge Point 003

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

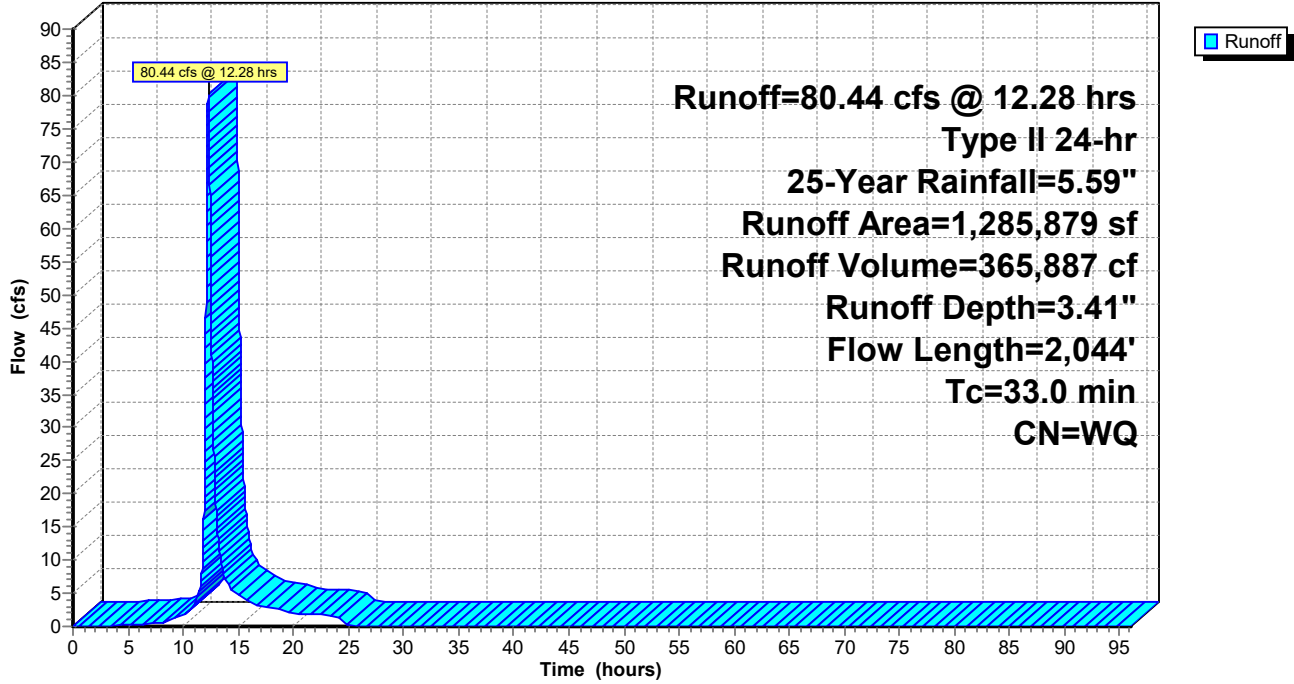
Area (sf)	CN	Description
* 54,956	98	Impervious
* 178	61	Open Space / Good Condition / HSG B
* 2,224	74	Open Space / Good Condition / HSG C
* 696,471	78	Farm / Straight Row / Good Condition / HSG B
* 243,785	85	Farm / Straight Row / Good Condition / HSG C
* 38,680	55	Woods / Good Condition / HSG B
* 10,675	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 93,021	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	61	Open Space / Good Condition / HSG B (Offsite)
* 31,342	55	Woods / Good Condition / HSG B (Offsite)
* 1,400	70	Woods / Good Condition / HSG C (Offsite)
1,285,879		Weighted Average
1,174,526		91.34% Pervious Area
111,353		8.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0181	0.16		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
9.7	915	0.0503	1.57		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.5	198	0.0184	2.18		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Unpaved Kv= 16.1 fps
0.3	26	0.0546	1.64		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
10.9	805	0.0307	1.23		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
33.0	2,044	Total			



### Subcatchment 3S: Watershed Area #3

Hydrograph



**Summary for Subcatchment 3S: Watershed Area #3**

Runoff = 100.25 cfs @ 12.28 hrs, Volume= 455,868 cf, Depth= 4.25"

Routed to Link 3L : Discharge Point 003

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

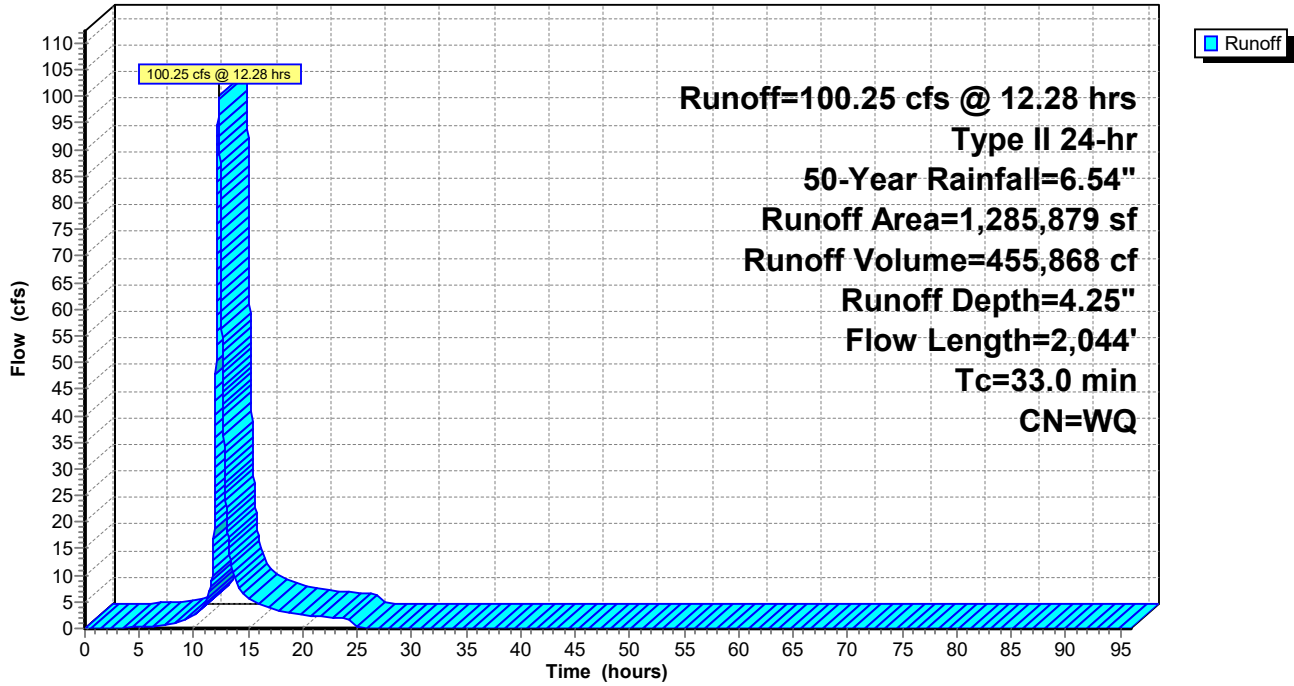
Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 54,956	98	Impervious
* 178	61	Open Space / Good Condition / HSG B
* 2,224	74	Open Space / Good Condition / HSG C
* 696,471	78	Farm / Straight Row / Good Condition / HSG B
* 243,785	85	Farm / Straight Row / Good Condition / HSG C
* 38,680	55	Woods / Good Condition / HSG B
* 10,675	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 93,021	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	61	Open Space / Good Condition / HSG B (Offsite)
* 31,342	55	Woods / Good Condition / HSG B (Offsite)
* 1,400	70	Woods / Good Condition / HSG C (Offsite)
1,285,879		Weighted Average
1,174,526		91.34% Pervious Area
111,353		8.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0181	0.16		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
9.7	915	0.0503	1.57		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.5	198	0.0184	2.18		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Unpaved Kv= 16.1 fps
0.3	26	0.0546	1.64		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
10.9	805	0.0307	1.23		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
33.0	2,044	Total			

### Subcatchment 3S: Watershed Area #3

Hydrograph



**Summary for Subcatchment 3S: Watershed Area #3**

Runoff = 122.88 cfs @ 12.28 hrs, Volume= 559,733 cf, Depth= 5.22"

Routed to Link 3L : Discharge Point 003

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

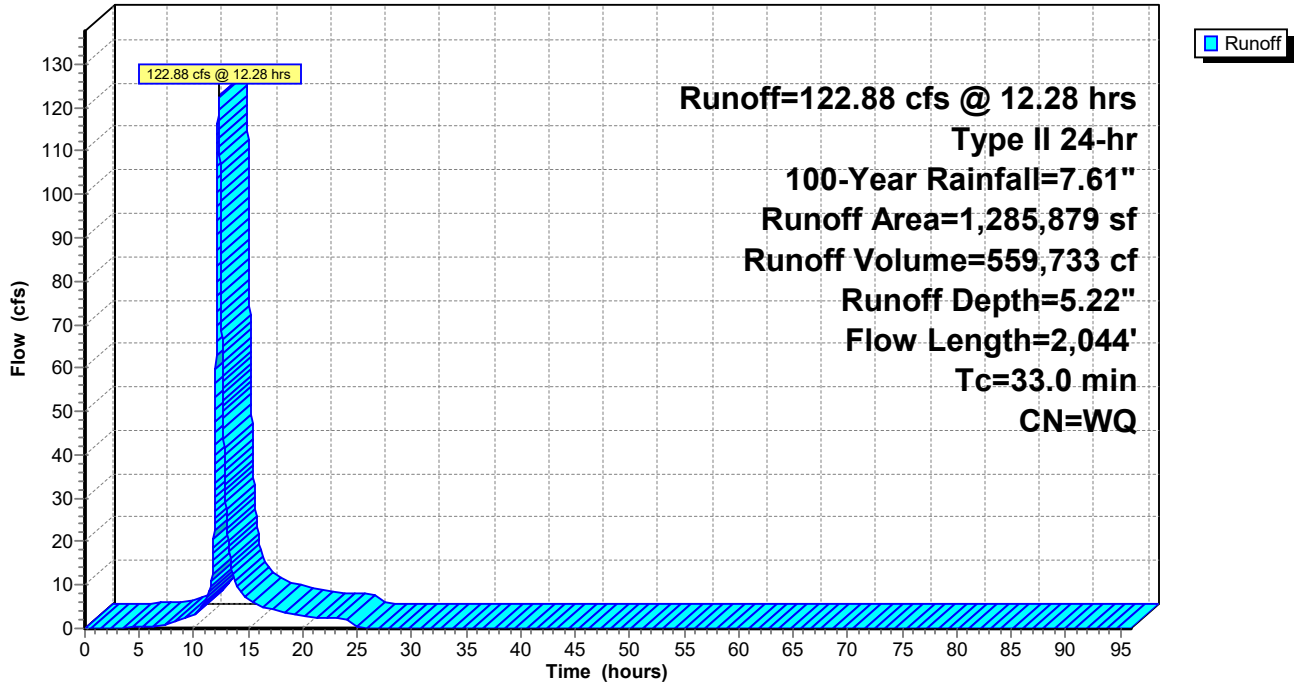
Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 54,956	98	Impervious
* 178	61	Open Space / Good Condition / HSG B
* 2,224	74	Open Space / Good Condition / HSG C
* 696,471	78	Farm / Straight Row / Good Condition / HSG B
* 243,785	85	Farm / Straight Row / Good Condition / HSG C
* 38,680	55	Woods / Good Condition / HSG B
* 10,675	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 93,021	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	61	Open Space / Good Condition / HSG B (Offsite)
* 31,342	55	Woods / Good Condition / HSG B (Offsite)
* 1,400	70	Woods / Good Condition / HSG C (Offsite)
1,285,879		Weighted Average
1,174,526		91.34% Pervious Area
111,353		8.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0181	0.16		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
9.7	915	0.0503	1.57		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.5	198	0.0184	2.18		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Unpaved Kv= 16.1 fps
0.3	26	0.0546	1.64		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
10.9	805	0.0307	1.23		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
33.0	2,044	Total			

Subcatchment 3S: Watershed Area #3

Hydrograph



# **PRE-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #4**

**(DISCHARGE POINT 004)**

**Summary for Subcatchment 4S: Watershed Area #4**

Runoff = 8.89 cfs @ 12.28 hrs, Volume= 40,591 cf, Depth= 1.31"  
 Routed to Link 4L : Discharge Point 004

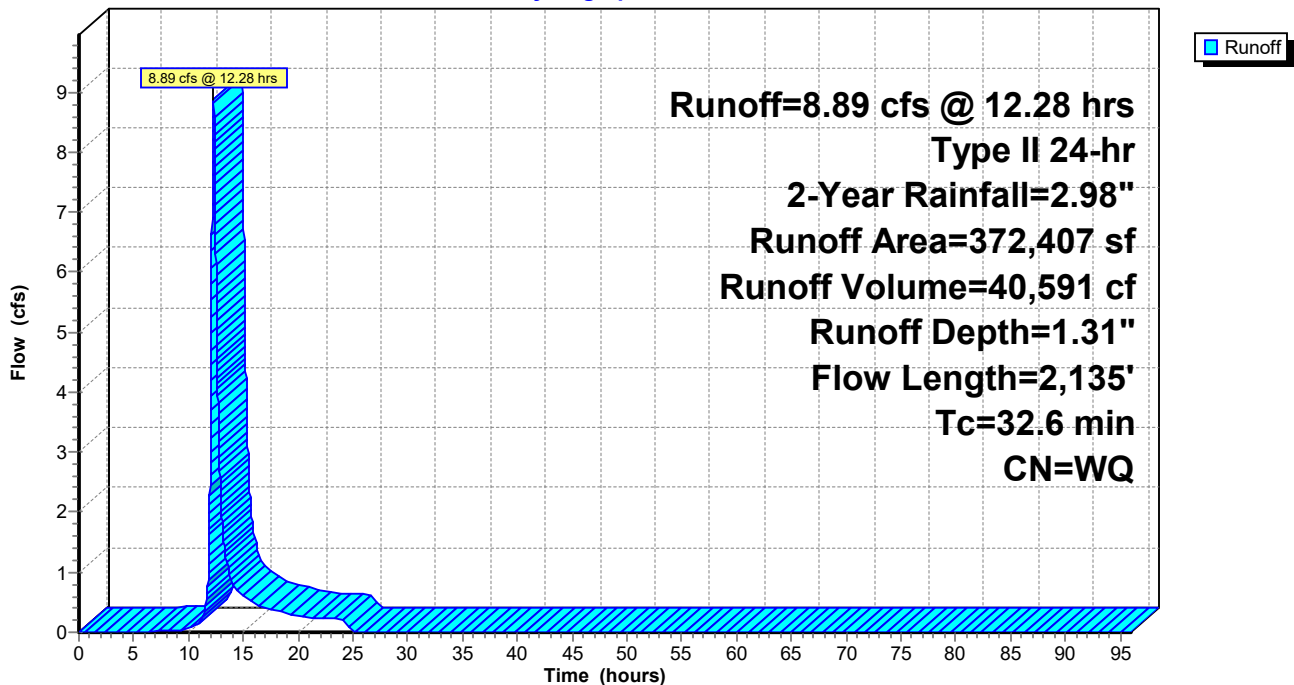
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 14,907	98	Impervious
* 226,428	78	Farm / Straight Row / Good Condition / HSG B
* 21,452	85	Farm / Straight Row / Good Condition / HSG C
* 23,588	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 84,361	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 1,671	70	Woods / Good Condition / HSG C (Offsite)
372,407		Weighted Average
357,500		96.00% Pervious Area
14,907		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0387	0.21		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
24.8	2,035	0.0382	1.37		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
32.6	2,135	Total			

**Subcatchment 4S: Watershed Area #4**

Hydrograph





**Summary for Subcatchment 4S: Watershed Area #4**

Runoff = 13.54 cfs @ 12.28 hrs, Volume= 60,721 cf, Depth= 1.96"  
 Routed to Link 4L : Discharge Point 004

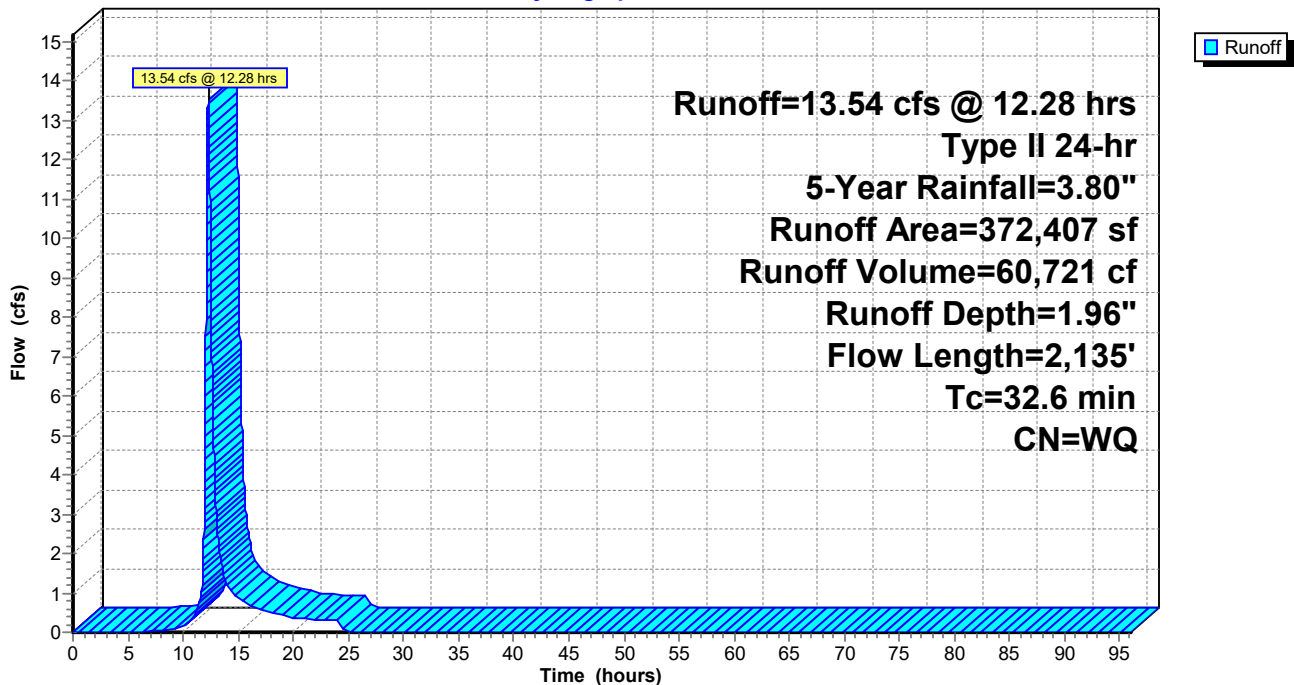
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 14,907	98	Impervious
* 226,428	78	Farm / Straight Row / Good Condition / HSG B
* 21,452	85	Farm / Straight Row / Good Condition / HSG C
* 23,588	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 84,361	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 1,671	70	Woods / Good Condition / HSG C (Offsite)
372,407		Weighted Average
357,500		96.00% Pervious Area
14,907		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0387	0.21		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
24.8	2,035	0.0382	1.37		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
32.6	2,135	Total			

**Subcatchment 4S: Watershed Area #4**

Hydrograph



**Summary for Subcatchment 4S: Watershed Area #4**

Runoff = 17.77 cfs @ 12.28 hrs, Volume= 79,218 cf, Depth= 2.55"  
 Routed to Link 4L : Discharge Point 004

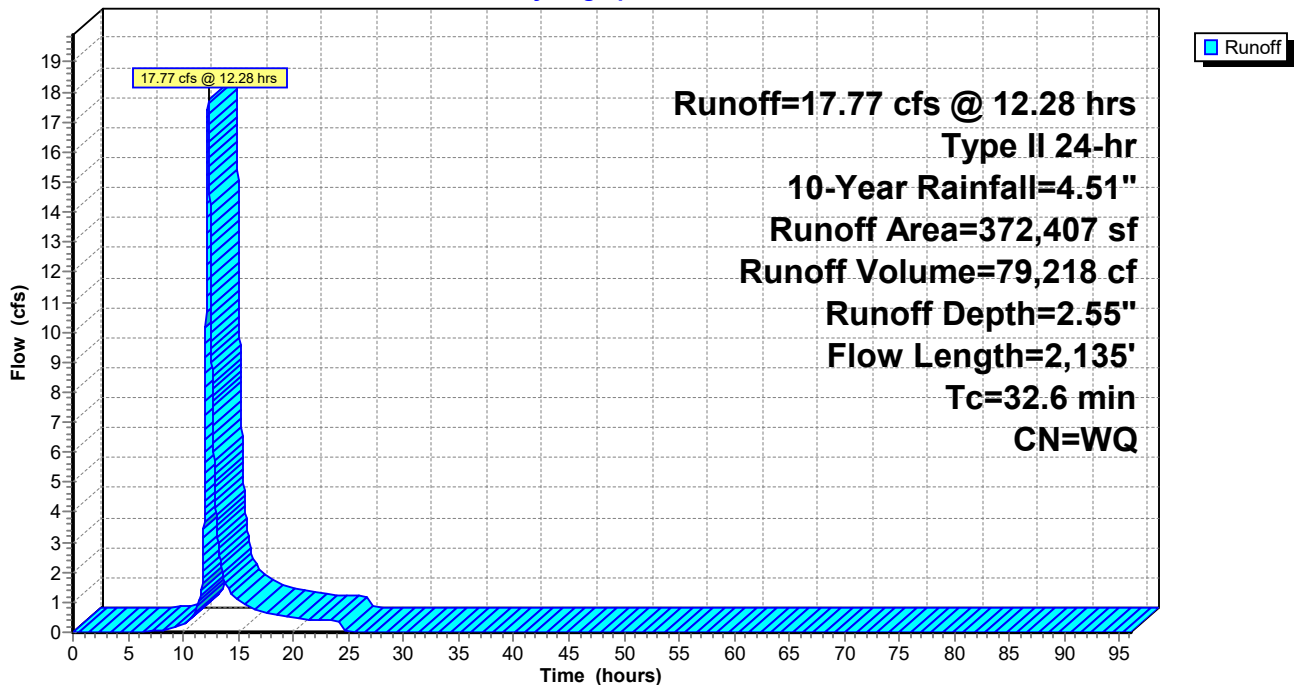
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 14,907	98	Impervious
* 226,428	78	Farm / Straight Row / Good Condition / HSG B
* 21,452	85	Farm / Straight Row / Good Condition / HSG C
* 23,588	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 84,361	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 1,671	70	Woods / Good Condition / HSG C (Offsite)
372,407		Weighted Average
357,500		96.00% Pervious Area
14,907		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0387	0.21		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
24.8	2,035	0.0382	1.37		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
32.6	2,135	Total			

**Subcatchment 4S: Watershed Area #4**

Hydrograph



**Summary for Subcatchment 4S: Watershed Area #4**

Runoff = 24.40 cfs @ 12.28 hrs, Volume= 108,607 cf, Depth= 3.50"  
 Routed to Link 4L : Discharge Point 004

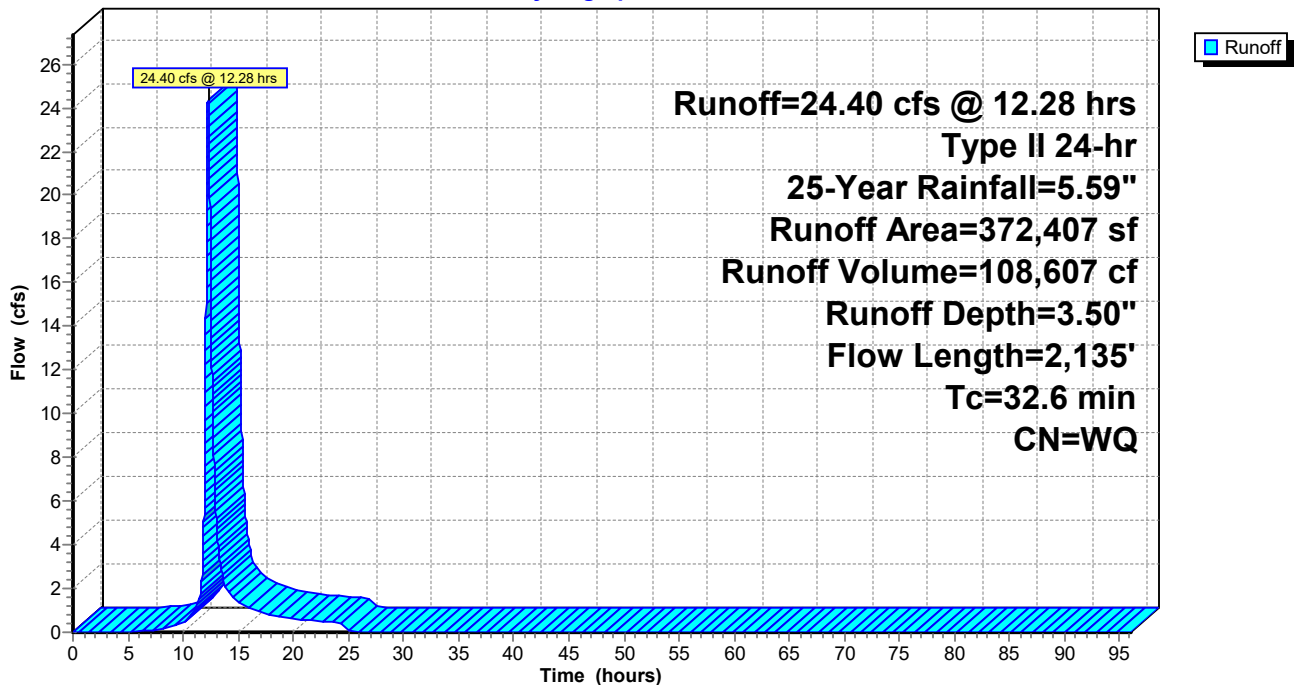
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

Area (sf)	CN	Description
* 14,907	98	Impervious
* 226,428	78	Farm / Straight Row / Good Condition / HSG B
* 21,452	85	Farm / Straight Row / Good Condition / HSG C
* 23,588	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 84,361	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 1,671	70	Woods / Good Condition / HSG C (Offsite)
372,407		Weighted Average
357,500		96.00% Pervious Area
14,907		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0387	0.21		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
24.8	2,035	0.0382	1.37		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
32.6	2,135	Total			

**Subcatchment 4S: Watershed Area #4**

Hydrograph



**Summary for Subcatchment 4S: Watershed Area #4**

Runoff = 30.35 cfs @ 12.28 hrs, Volume= 135,311 cf, Depth= 4.36"  
 Routed to Link 4L : Discharge Point 004

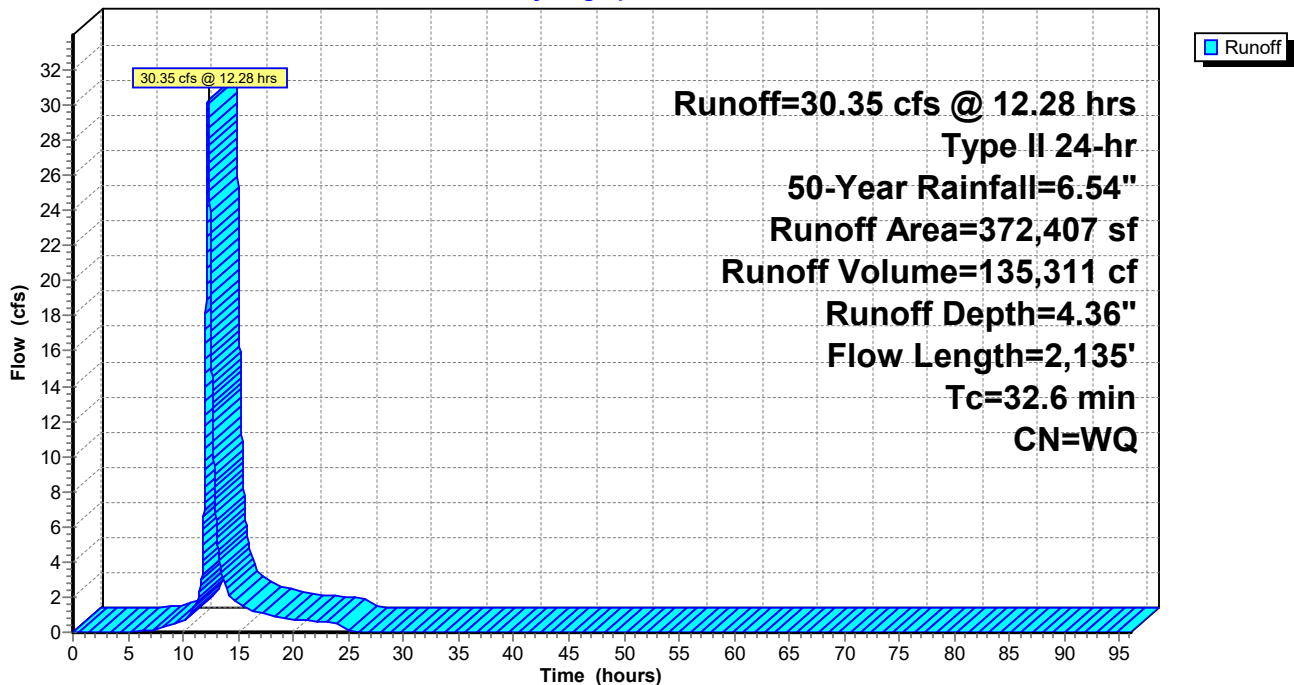
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 14,907	98	Impervious
* 226,428	78	Farm / Straight Row / Good Condition / HSG B
* 21,452	85	Farm / Straight Row / Good Condition / HSG C
* 23,588	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 84,361	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 1,671	70	Woods / Good Condition / HSG C (Offsite)
372,407		Weighted Average
357,500		96.00% Pervious Area
14,907		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0387	0.21		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
24.8	2,035	0.0382	1.37		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
32.6	2,135	Total			

**Subcatchment 4S: Watershed Area #4**

Hydrograph



**Summary for Subcatchment 4S: Watershed Area #4**

Runoff = 37.10 cfs @ 12.28 hrs, Volume= 166,039 cf, Depth= 5.35"  
 Routed to Link 4L : Discharge Point 004

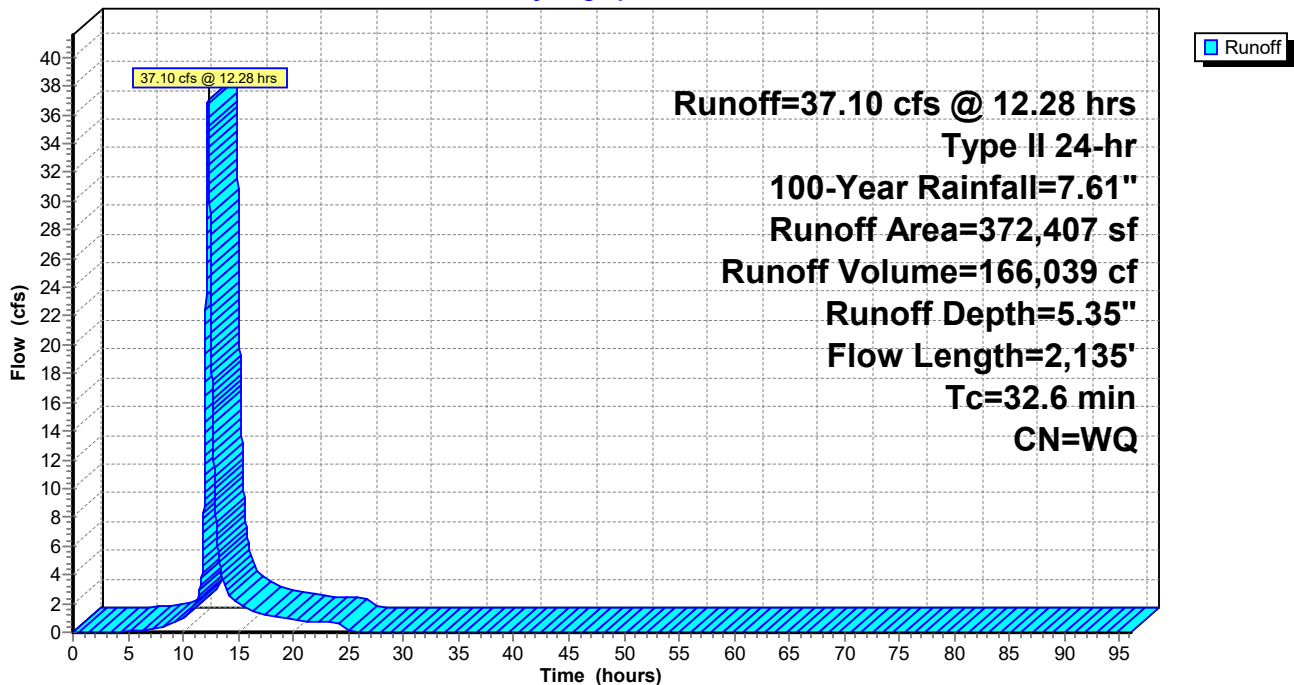
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 14,907	98	Impervious
* 226,428	78	Farm / Straight Row / Good Condition / HSG B
* 21,452	85	Farm / Straight Row / Good Condition / HSG C
* 23,588	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 84,361	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 1,671	70	Woods / Good Condition / HSG C (Offsite)
372,407		Weighted Average
357,500		96.00% Pervious Area
14,907		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0387	0.21		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
24.8	2,035	0.0382	1.37		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
32.6	2,135	Total			

**Subcatchment 4S: Watershed Area #4**

Hydrograph



# **PRE-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #5**

**(DISCHARGE POINT 005)**

**Summary for Subcatchment 5S: Watershed Area #5**

Runoff = 15.30 cfs @ 12.17 hrs, Volume= 55,366 cf, Depth= 1.24"  
 Routed to Link 5L : Discharge Point 005

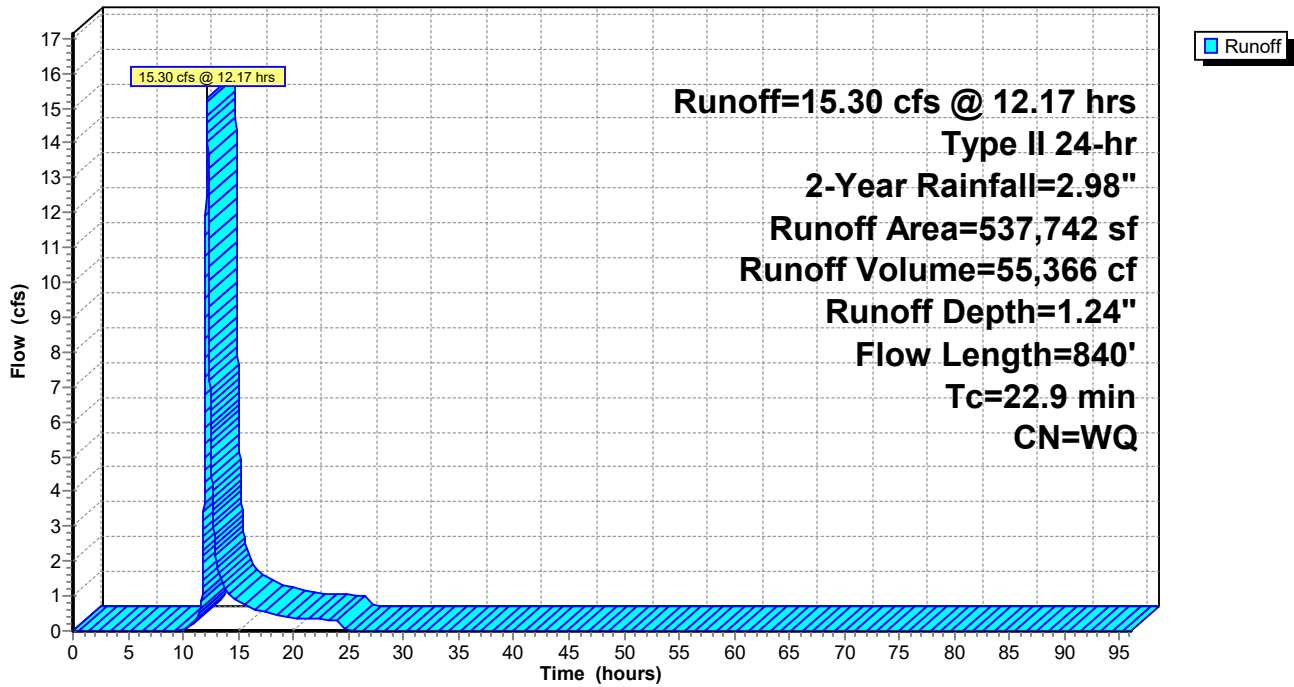
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 395,412	78	Farm / Straight Row / Good Condition / HSG B
* 142,330	85	Farm / Straight Row / Good Condition / HSG C
537,742		Weighted Average
537,742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0132	0.14		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.9	740	0.0263	1.14		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
22.9	840	Total			

**Subcatchment 5S: Watershed Area #5**

Hydrograph



**Summary for Subcatchment 5S: Watershed Area #5**

Runoff = 23.60 cfs @ 12.16 hrs, Volume= 84,011 cf, Depth= 1.87"  
 Routed to Link 5L : Discharge Point 005

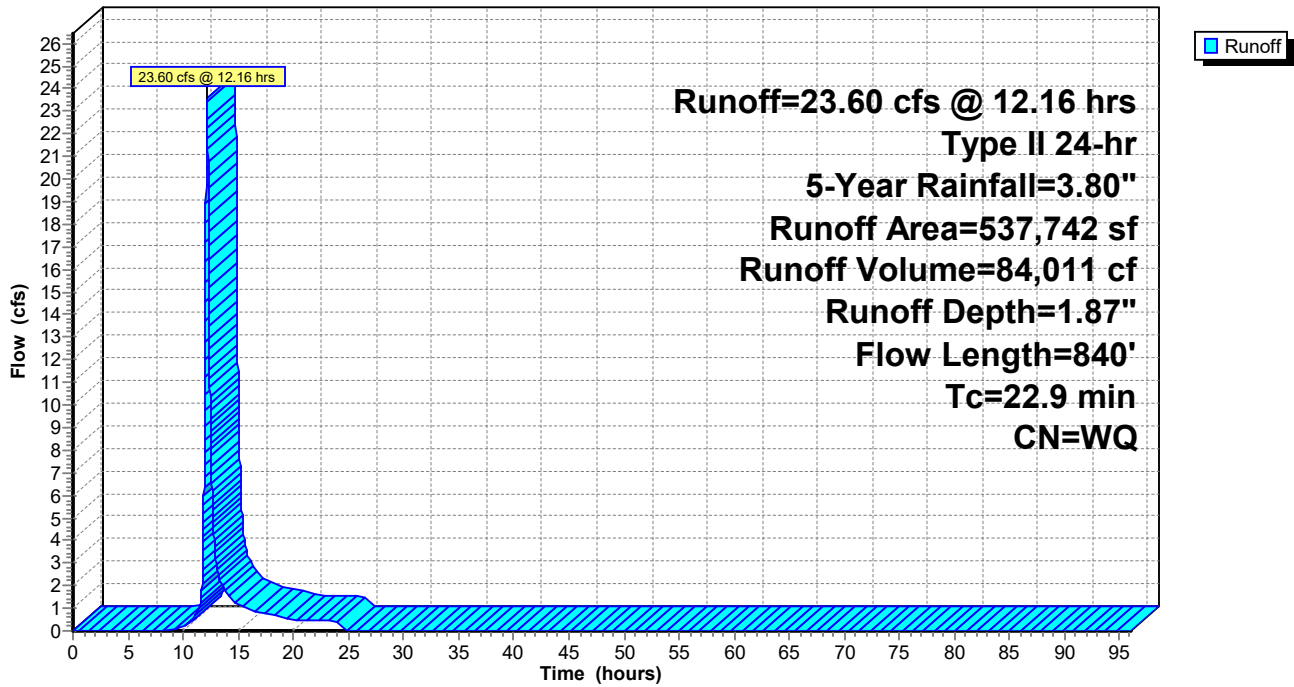
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

	Area (sf)	CN	Description
*	395,412	78	Farm / Straight Row / Good Condition / HSG B
*	142,330	85	Farm / Straight Row / Good Condition / HSG C
	537,742		Weighted Average
	537,742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0132	0.14		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.9	740	0.0263	1.14		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
22.9	840	Total			

**Subcatchment 5S: Watershed Area #5**

Hydrograph





**Summary for Subcatchment 5S: Watershed Area #5**

Runoff = 31.16 cfs @ 12.16 hrs, Volume= 110,436 cf, Depth= 2.46"  
 Routed to Link 5L : Discharge Point 005

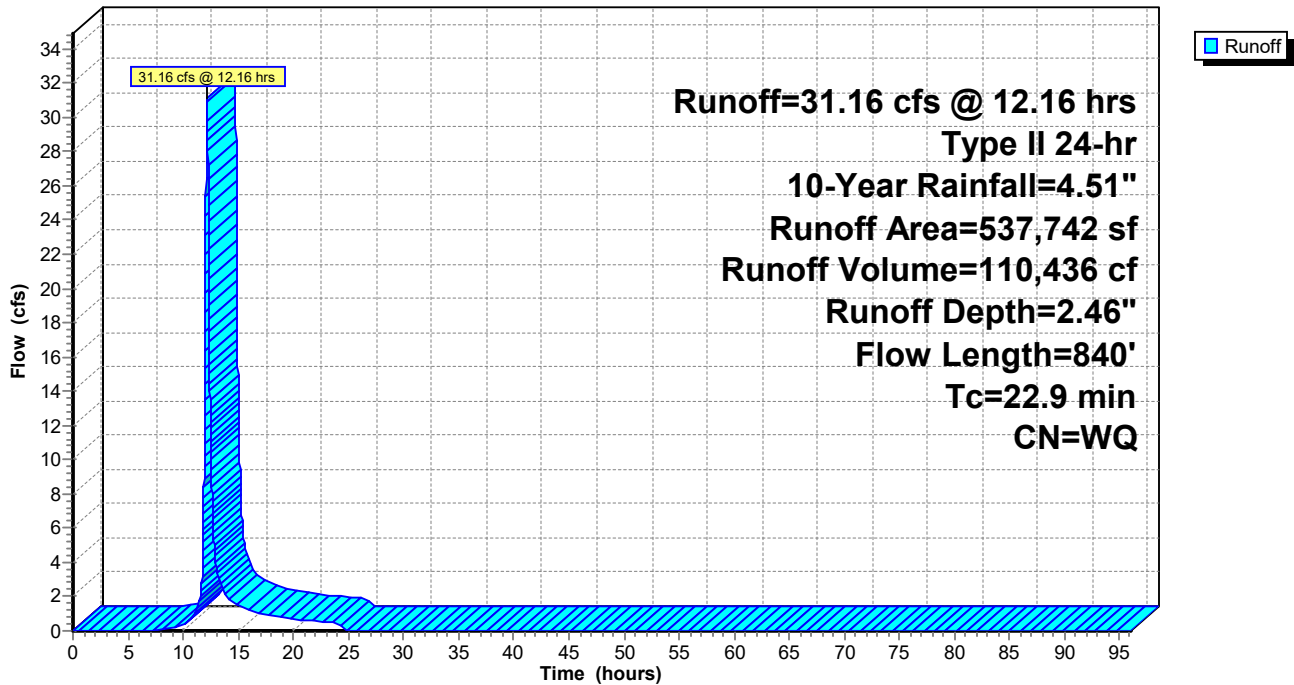
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

	Area (sf)	CN	Description
*	395,412	78	Farm / Straight Row / Good Condition / HSG B
*	142,330	85	Farm / Straight Row / Good Condition / HSG C
	537,742		Weighted Average
	537,742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0132	0.14		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.9	740	0.0263	1.14		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
22.9	840	Total			

**Subcatchment 5S: Watershed Area #5**

Hydrograph



**Summary for Subcatchment 5S: Watershed Area #5**

Runoff = 43.02 cfs @ 12.16 hrs, Volume= 152,538 cf, Depth= 3.40"

Routed to Link 5L : Discharge Point 005

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

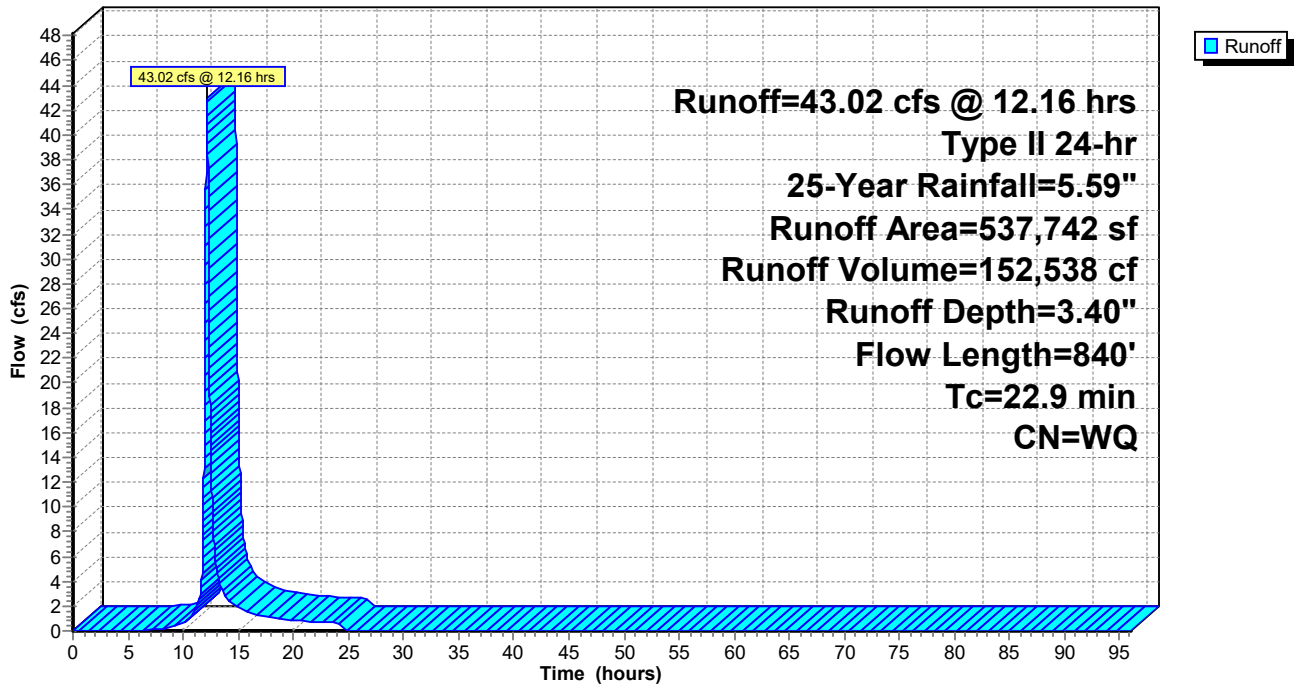
Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	395,412	78	Farm / Straight Row / Good Condition / HSG B
*	142,330	85	Farm / Straight Row / Good Condition / HSG C
	537,742		Weighted Average
	537,742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0132	0.14		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.9	740	0.0263	1.14		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
22.9	840	Total			

**Subcatchment 5S: Watershed Area #5**

Hydrograph



**Summary for Subcatchment 5S: Watershed Area #5**

Runoff = 53.66 cfs @ 12.16 hrs, Volume= 190,871 cf, Depth= 4.26"  
 Routed to Link 5L : Discharge Point 005

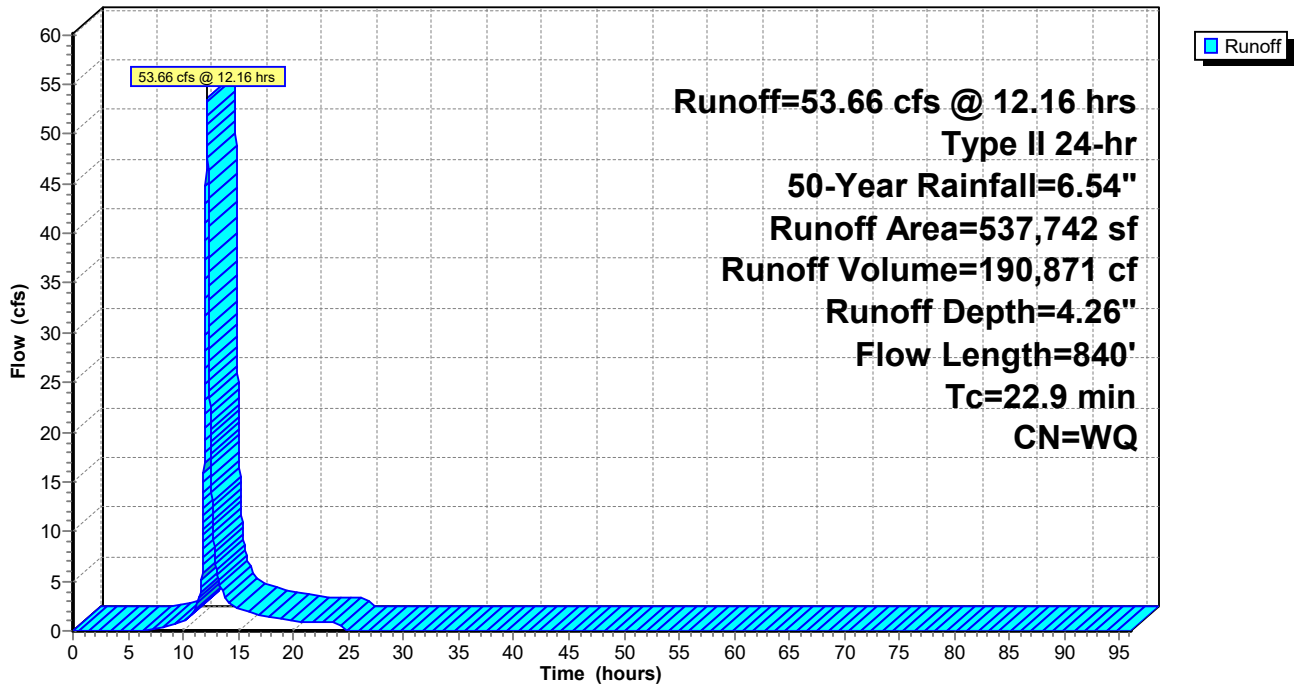
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 395,412	78	Farm / Straight Row / Good Condition / HSG B
* 142,330	85	Farm / Straight Row / Good Condition / HSG C
537,742		Weighted Average
537,742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0132	0.14		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.9	740	0.0263	1.14		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
22.9	840	Total			

**Subcatchment 5S: Watershed Area #5**

Hydrograph



**Summary for Subcatchment 5S: Watershed Area #5**

Runoff = 65.72 cfs @ 12.15 hrs, Volume= 235,037 cf, Depth= 5.24"  
 Routed to Link 5L : Discharge Point 005

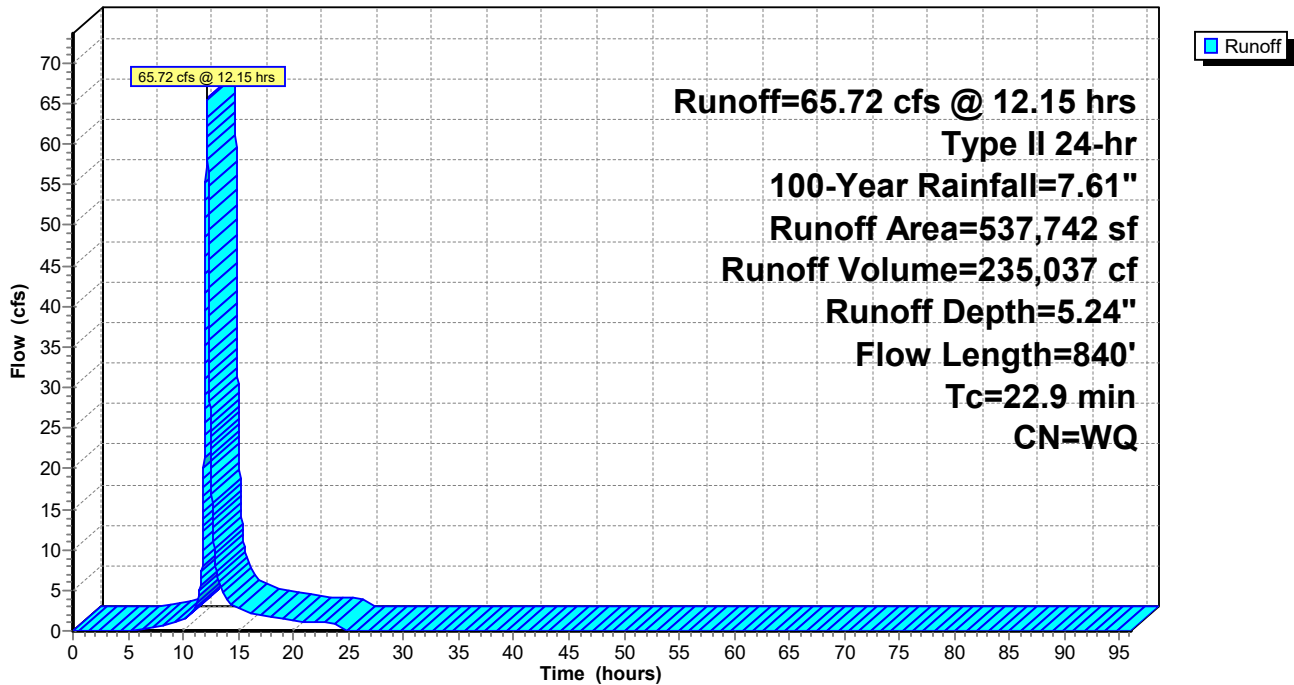
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

	Area (sf)	CN	Description
*	395,412	78	Farm / Straight Row / Good Condition / HSG B
*	142,330	85	Farm / Straight Row / Good Condition / HSG C
	537,742		Weighted Average
	537,742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0132	0.14		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.9	740	0.0263	1.14		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
22.9	840	Total			

**Subcatchment 5S: Watershed Area #5**

Hydrograph



# **PRE-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #6**

**(DISCHARGE POINT 006)**

**Summary for Subcatchment 6S: Watershed Area #6**

Runoff = 11.89 cfs @ 12.20 hrs, Volume= 45,745 cf, Depth= 1.11"

Routed to Link 6L : Discharge Point 006

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 2-Year Rainfall=2.98"

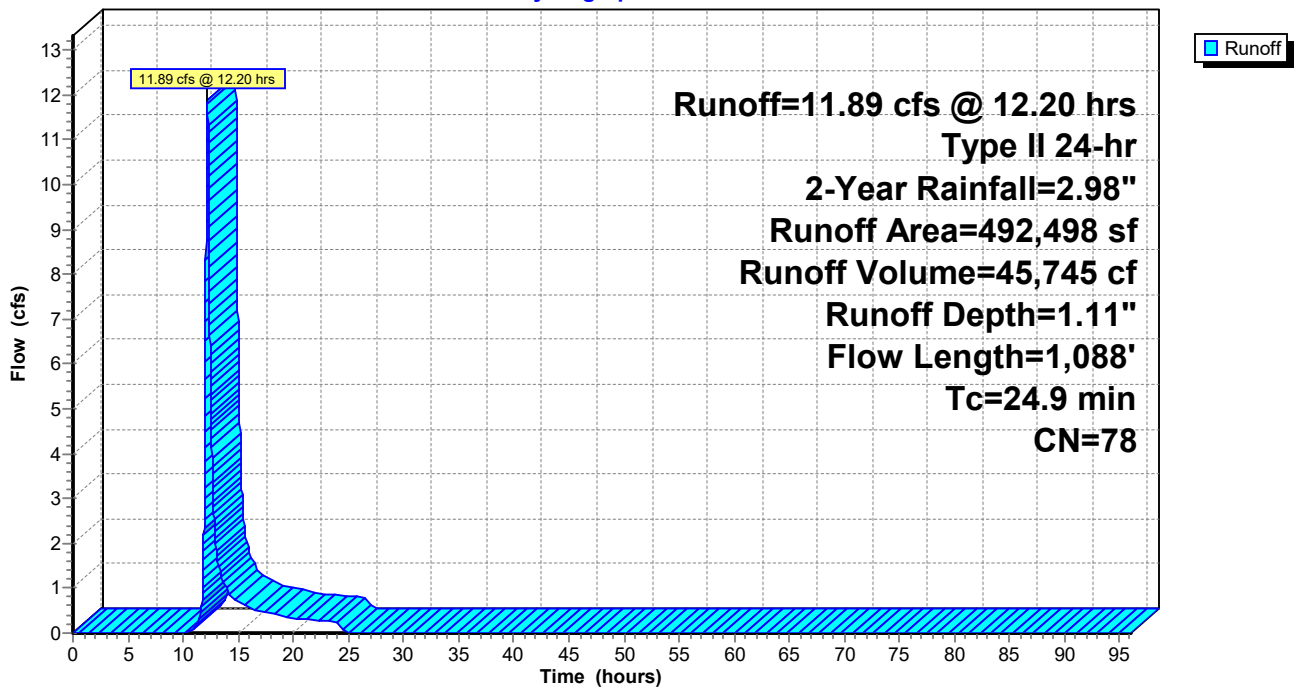
Area (sf)	CN	Description
* 492,498	78	Farm / Straight Row / Good Condition / HSG B
492,498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0104	0.13		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
11.7	988	0.0403	1.41		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.9	1,088	Total			

**Subcatchment 6S: Watershed Area #6**

Hydrograph



**Summary for Subcatchment 6S: Watershed Area #6**

Runoff = 18.88 cfs @ 12.20 hrs, Volume= 70,957 cf, Depth= 1.73"

Routed to Link 6L : Discharge Point 006

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 5-Year Rainfall=3.80"

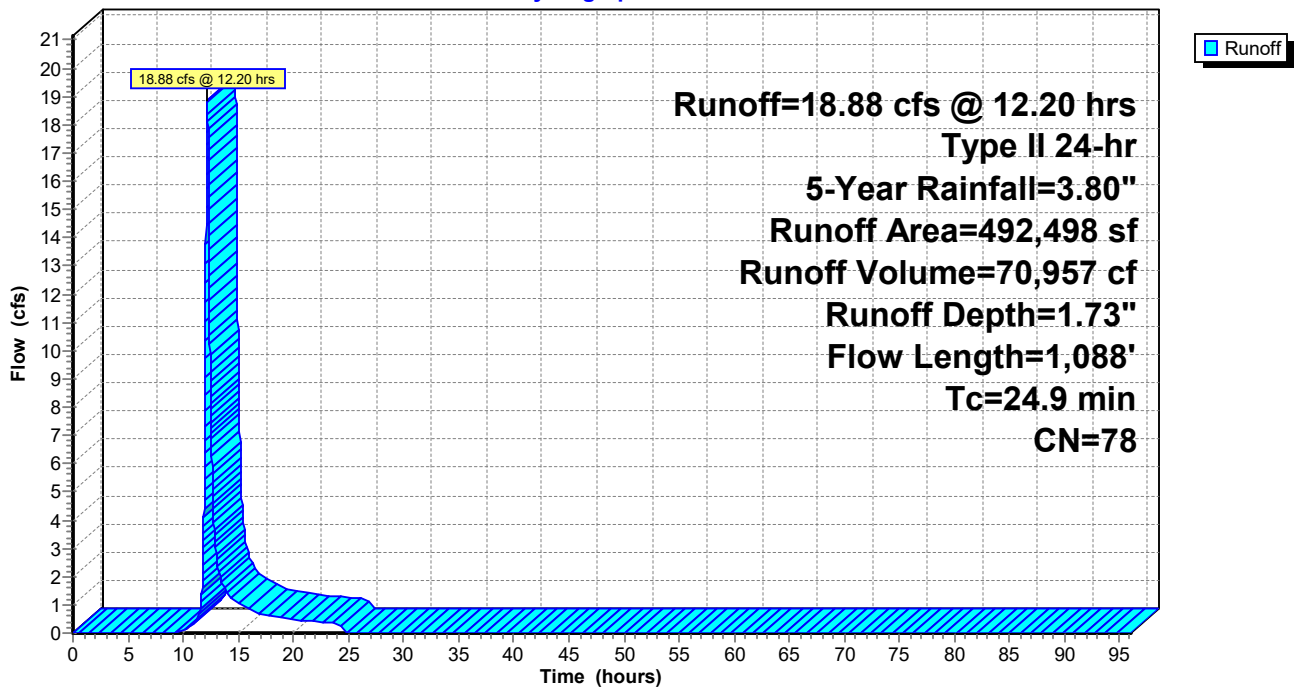
Area (sf)	CN	Description
* 492,498	78	Farm / Straight Row / Good Condition / HSG B
492,498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0104	0.13		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
11.7	988	0.0403	1.41		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.9	1,088	Total			

**Subcatchment 6S: Watershed Area #6**

Hydrograph



**Summary for Subcatchment 6S: Watershed Area #6**

Runoff = 25.30 cfs @ 12.19 hrs, Volume= 94,440 cf, Depth= 2.30"

Routed to Link 6L : Discharge Point 006

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 10-Year Rainfall=4.51"

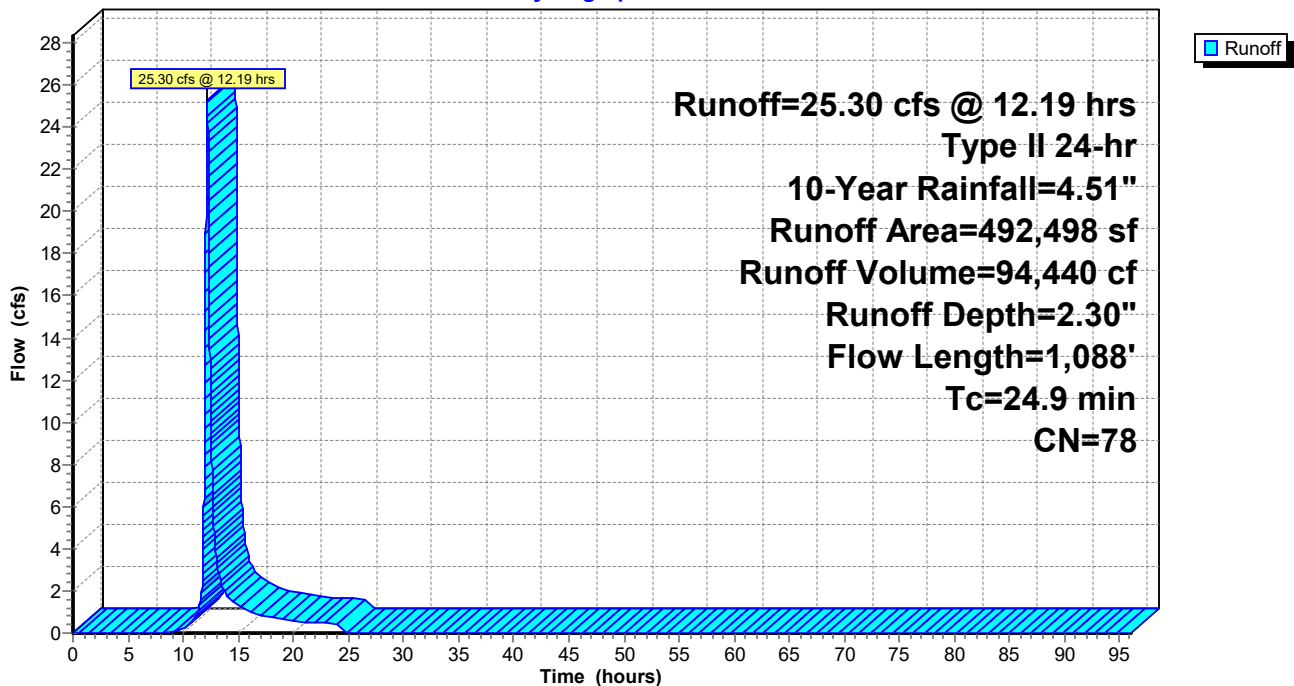
Area (sf)	CN	Description
* 492,498	78	Farm / Straight Row / Good Condition / HSG B
492,498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0104	0.13		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
11.7	988	0.0403	1.41		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.9	1,088	Total			

**Subcatchment 6S: Watershed Area #6**

Hydrograph





**Summary for Subcatchment 6S: Watershed Area #6**

Runoff = 35.52 cfs @ 12.18 hrs, Volume= 132,123 cf, Depth= 3.22"

Routed to Link 6L : Discharge Point 006

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 25-Year Rainfall=5.59"

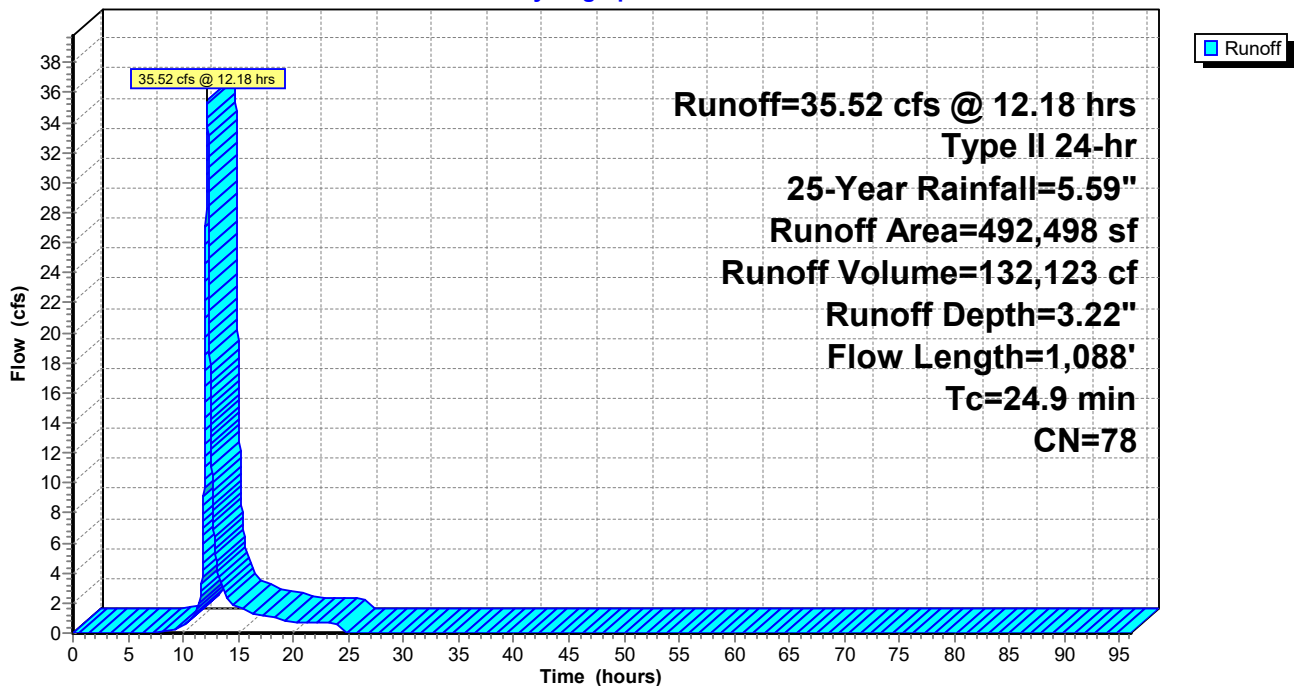
Area (sf)	CN	Description
* 492,498	78	Farm / Straight Row / Good Condition / HSG B
492,498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0104	0.13		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
11.7	988	0.0403	1.41		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.9	1,088	Total			

**Subcatchment 6S: Watershed Area #6**

Hydrograph



**Summary for Subcatchment 6S: Watershed Area #6**

Runoff = 44.74 cfs @ 12.18 hrs, Volume= 166,619 cf, Depth= 4.06"

Routed to Link 6L : Discharge Point 006

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 50-Year Rainfall=6.54"

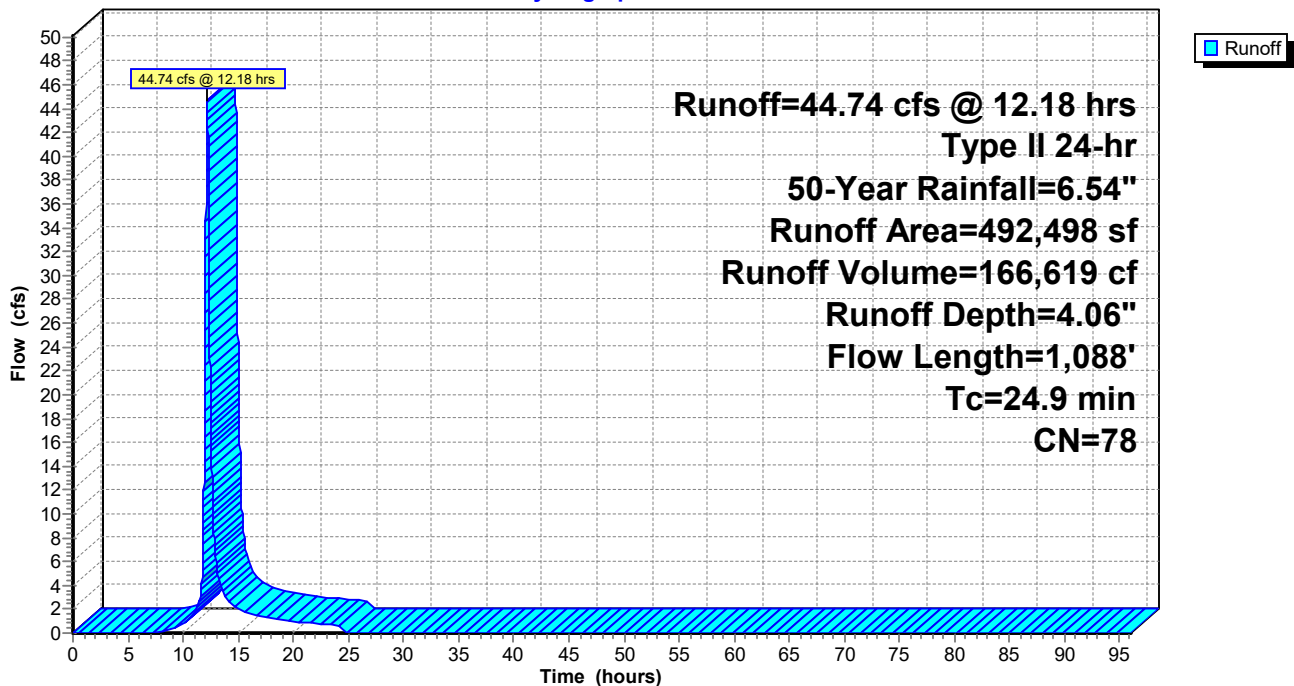
Area (sf)	CN	Description
* 492,498	78	Farm / Straight Row / Good Condition / HSG B
492,498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0104	0.13		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
11.7	988	0.0403	1.41		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.9	1,088	Total			

**Subcatchment 6S: Watershed Area #6**

Hydrograph



**Summary for Subcatchment 6S: Watershed Area #6**

Runoff = 55.26 cfs @ 12.18 hrs, Volume= 206,508 cf, Depth= 5.03"

Routed to Link 6L : Discharge Point 006

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 100-Year Rainfall=7.61"

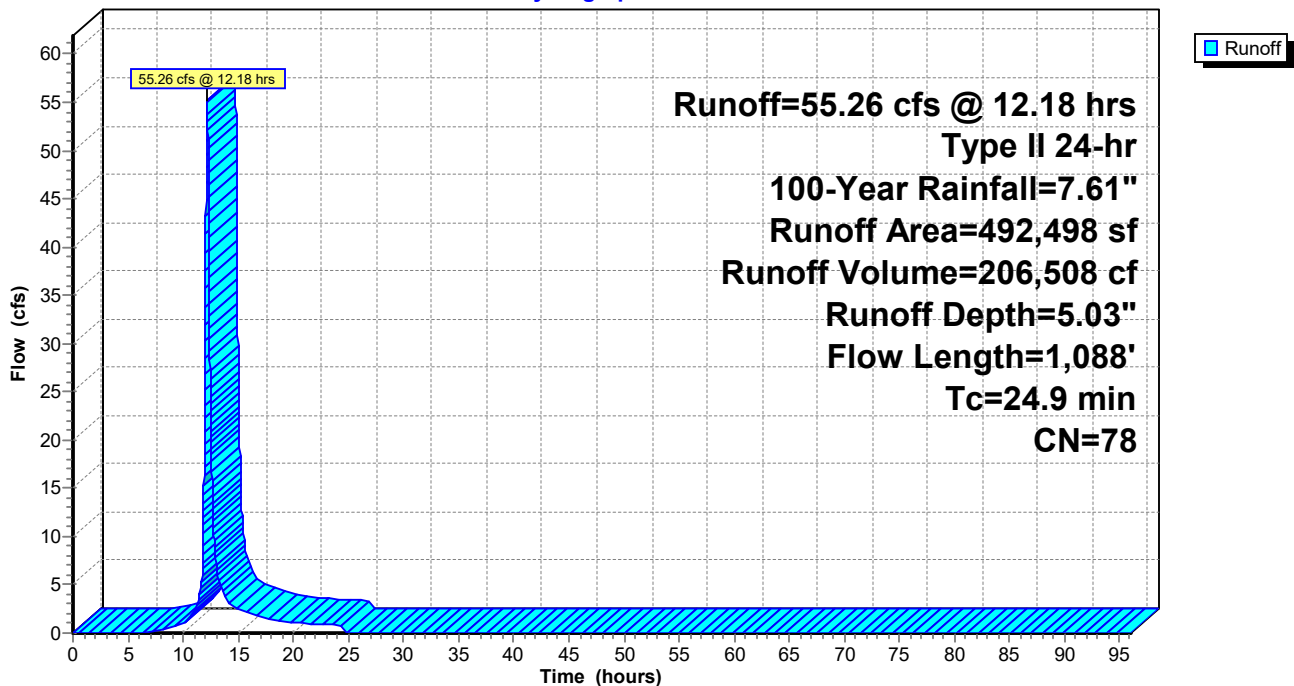
Area (sf)	CN	Description
* 492,498	78	Farm / Straight Row / Good Condition / HSG B
492,498		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0104	0.13		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
11.7	988	0.0403	1.41		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
24.9	1,088	Total			

**Subcatchment 6S: Watershed Area #6**

Hydrograph



# **PRE-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #7**

**(DISCHARGE POINT 007)**

**Summary for Subcatchment 7S: Watershed Area #7**

Runoff = 11.33 cfs @ 12.07 hrs, Volume= 31,754 cf, Depth= 1.11"  
 Routed to Link 7L : Discharge Point 007

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

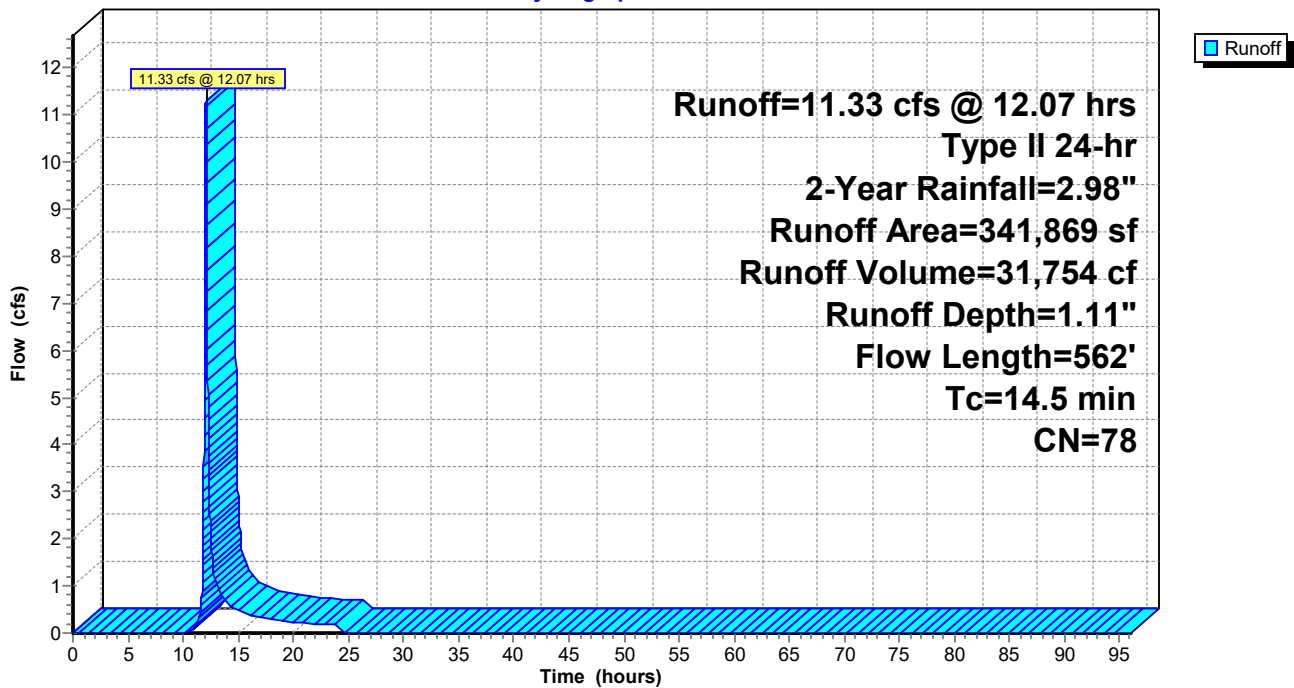
Area (sf)	CN	Description
* 341,869	78	Farm / Straight Row / Good Condition / HSG B
341,869		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0273	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.5	462	0.0395	1.39		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	562	Total			

**Subcatchment 7S: Watershed Area #7**

Hydrograph



**Summary for Subcatchment 7S: Watershed Area #7**

Runoff = 17.85 cfs @ 12.07 hrs, Volume= 49,255 cf, Depth= 1.73"

Routed to Link 7L : Discharge Point 007

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 5-Year Rainfall=3.80"

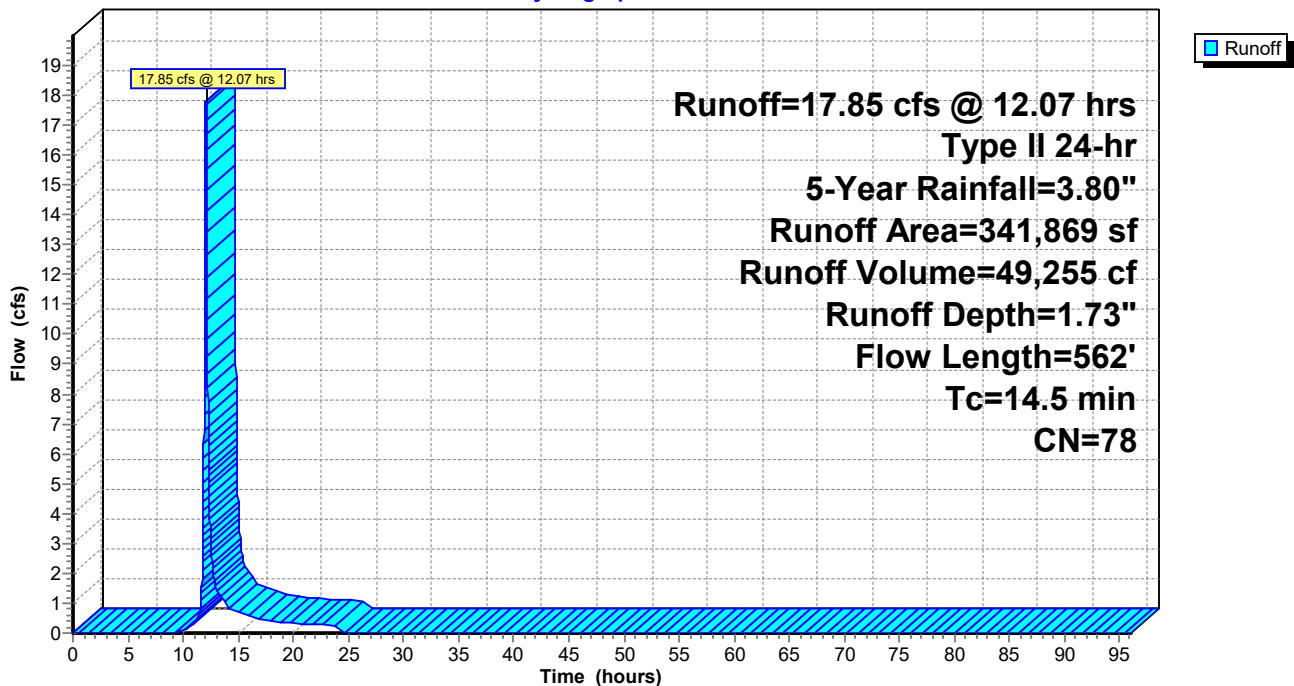
Area (sf)	CN	Description
* 341,869	78	Farm / Straight Row / Good Condition / HSG B
341,869		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0273	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.5	462	0.0395	1.39		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	562	Total			

**Subcatchment 7S: Watershed Area #7**

Hydrograph



**Summary for Subcatchment 7S: Watershed Area #7**

Runoff = 23.83 cfs @ 12.07 hrs, Volume= 65,556 cf, Depth= 2.30"

Routed to Link 7L : Discharge Point 007

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 10-Year Rainfall=4.51"

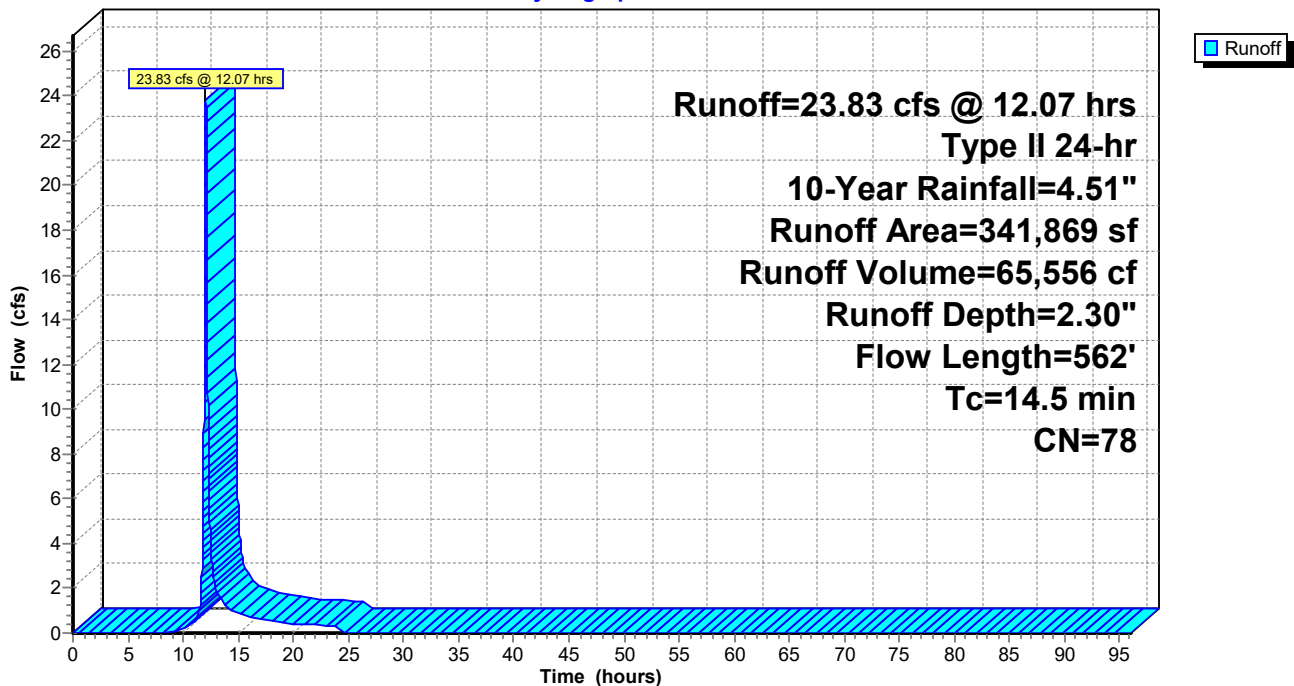
Area (sf)	CN	Description
* 341,869	78	Farm / Straight Row / Good Condition / HSG B
341,869		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0273	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.5	462	0.0395	1.39		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	562	Total			

**Subcatchment 7S: Watershed Area #7**

Hydrograph



**Summary for Subcatchment 7S: Watershed Area #7**

Runoff = 33.27 cfs @ 12.07 hrs, Volume= 91,714 cf, Depth= 3.22"

Routed to Link 7L : Discharge Point 007

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 25-Year Rainfall=5.59"

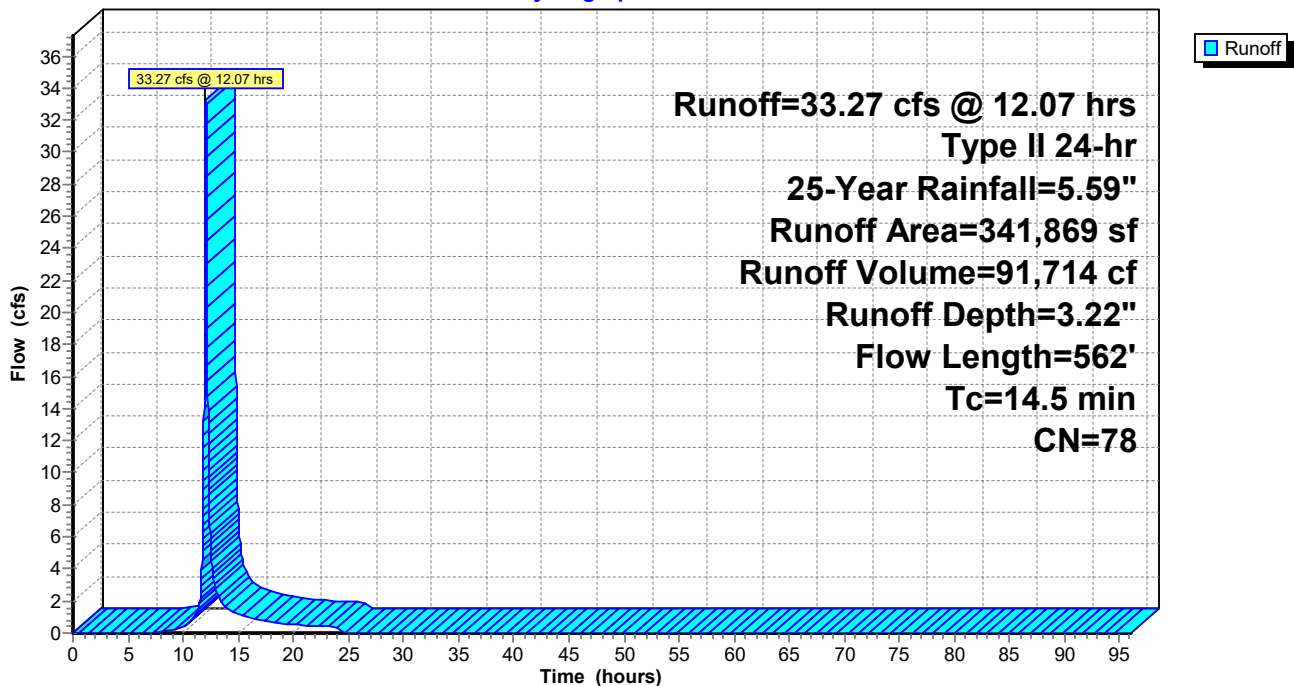
Area (sf)	CN	Description
* 341,869	78	Farm / Straight Row / Good Condition / HSG B
341,869		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0273	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.5	462	0.0395	1.39		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	562	Total			

**Subcatchment 7S: Watershed Area #7**

Hydrograph





**Summary for Subcatchment 7S: Watershed Area #7**

Runoff = 41.76 cfs @ 12.07 hrs, Volume= 115,659 cf, Depth= 4.06"

Routed to Link 7L : Discharge Point 007

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 50-Year Rainfall=6.54"

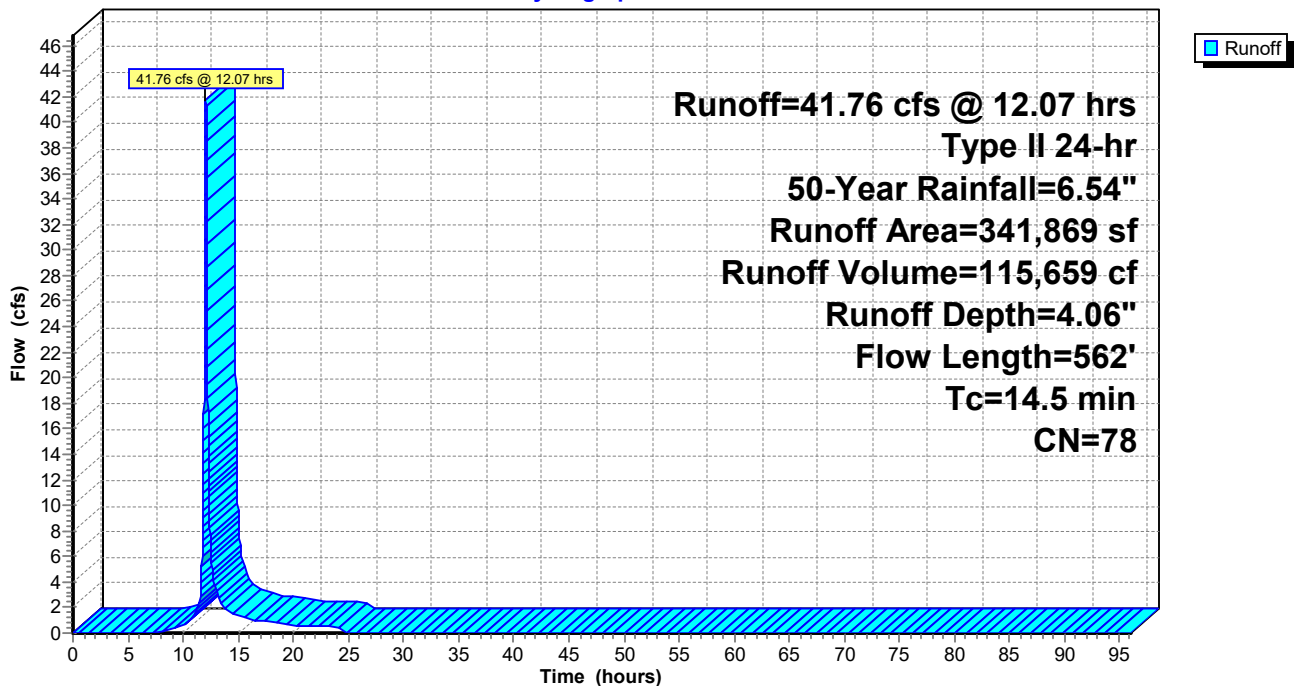
Area (sf)	CN	Description
* 341,869	78	Farm / Straight Row / Good Condition / HSG B
341,869		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0273	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.5	462	0.0395	1.39		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	562	Total			

**Subcatchment 7S: Watershed Area #7**

Hydrograph



**Summary for Subcatchment 7S: Watershed Area #7**

Runoff = 51.40 cfs @ 12.06 hrs, Volume= 143,348 cf, Depth= 5.03"

Routed to Link 7L : Discharge Point 007

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 100-Year Rainfall=7.61"

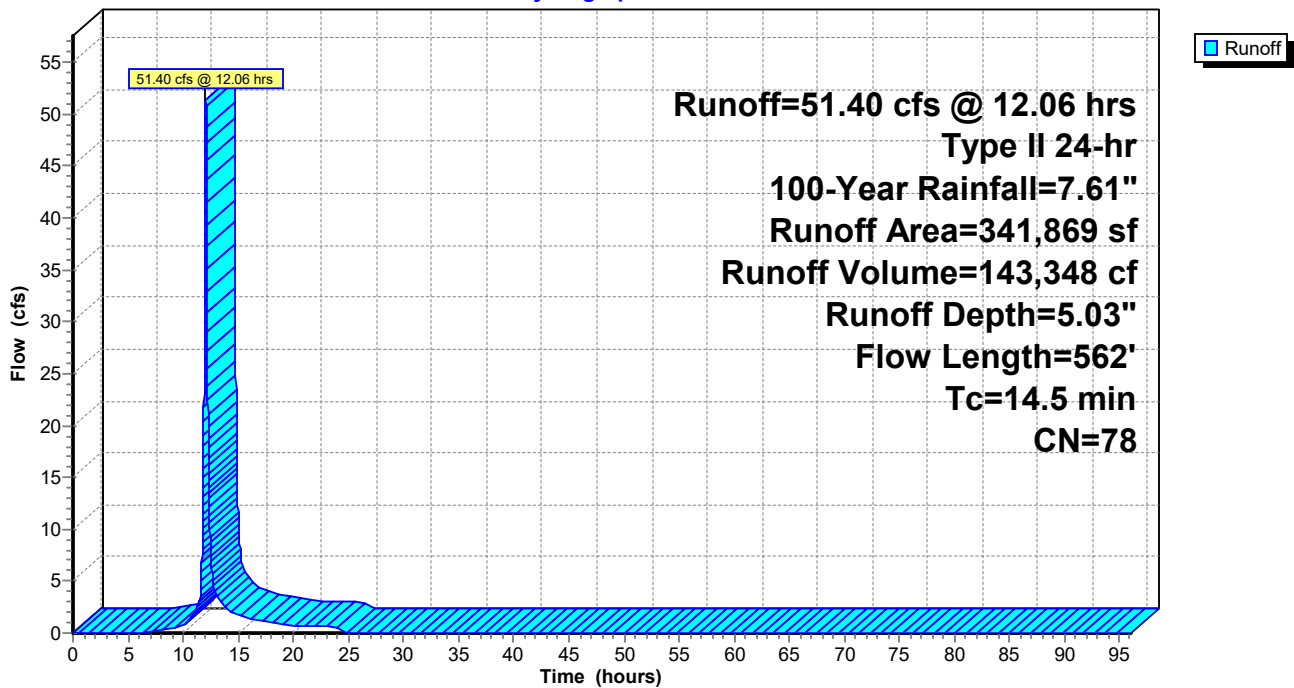
Area (sf)	CN	Description
* 341,869	78	Farm / Straight Row / Good Condition / HSG B
341,869		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0273	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.5	462	0.0395	1.39		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	562	Total			

**Subcatchment 7S: Watershed Area #7**

Hydrograph



# **PRE-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #8**

**(DISCHARGE POINT 008)**

**Summary for Subcatchment 8S: Watershed Area #8**

Runoff = 18.68 cfs @ 12.07 hrs, Volume= 54,936 cf, Depth= 0.90"  
 Routed to Link 8L : Discharge Point 008

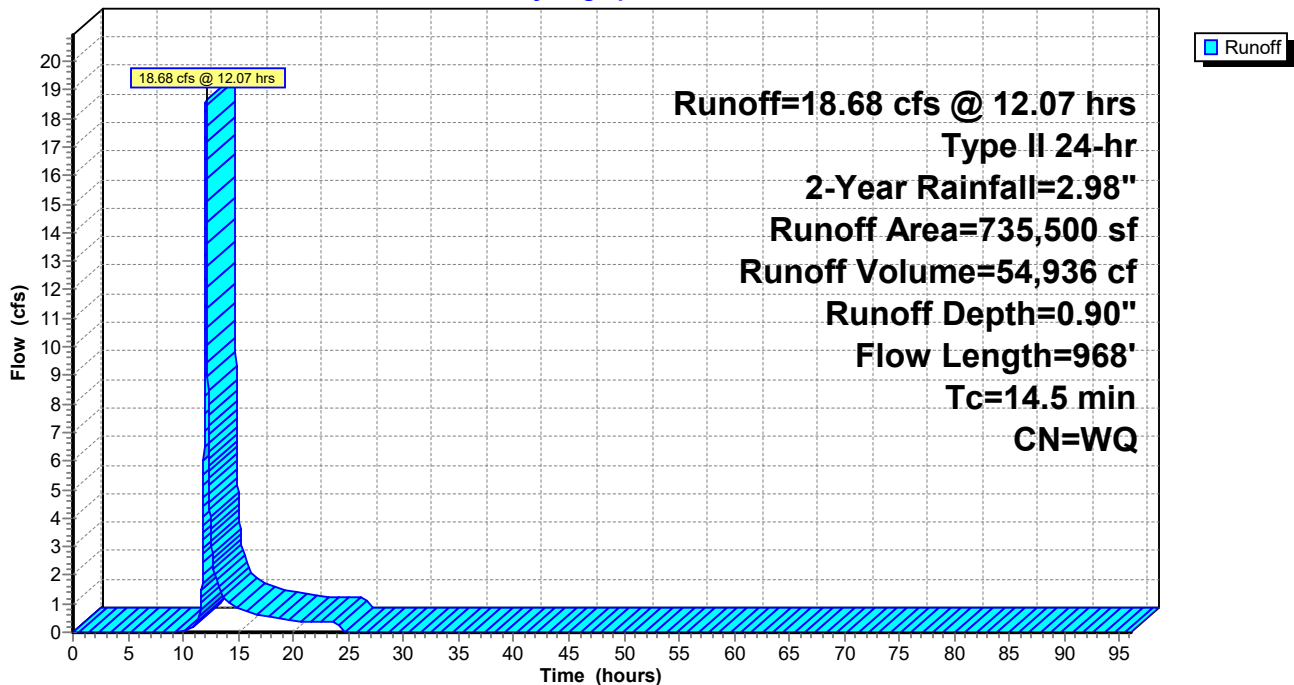
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 489,934	78	Farm / Straight Row / Good Condition / HSG B
* 39,357	89	Farm / Straight Row / Good Condition / HSG D
* 206,209	55	Woods / Good Condition / HSG B
735,500		Weighted Average
735,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0425	0.22		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
0.5	70	0.0949	2.16		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.2	178	0.2374	2.44		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Woodland Kv= 5.0 fps
5.3	620	0.0764	1.93		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	968	Total			

**Subcatchment 8S: Watershed Area #8**

Hydrograph



**Summary for Subcatchment 8S: Watershed Area #8**

Runoff = 30.25 cfs @ 12.07 hrs, Volume= 87,009 cf, Depth= 1.42"

Routed to Link 8L : Discharge Point 008

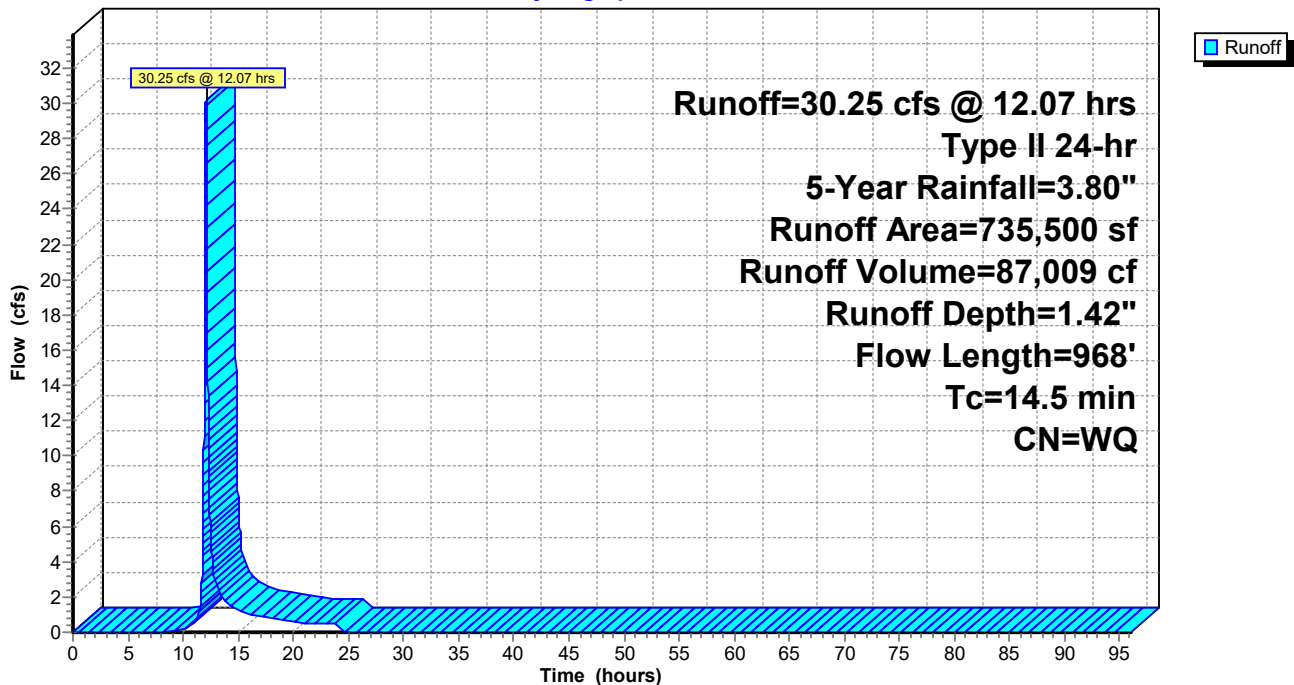
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 489,934	78	Farm / Straight Row / Good Condition / HSG B
* 39,357	89	Farm / Straight Row / Good Condition / HSG D
* 206,209	55	Woods / Good Condition / HSG B
735,500		Weighted Average
735,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0425	0.22		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
0.5	70	0.0949	2.16		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.2	178	0.2374	2.44		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Woodland Kv= 5.0 fps
5.3	620	0.0764	1.93		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	968	Total			

**Subcatchment 8S: Watershed Area #8**

Hydrograph



**Summary for Subcatchment 8S: Watershed Area #8**

Runoff = 41.45 cfs @ 12.07 hrs, Volume= 117,622 cf, Depth= 1.92"  
 Routed to Link 8L : Discharge Point 008

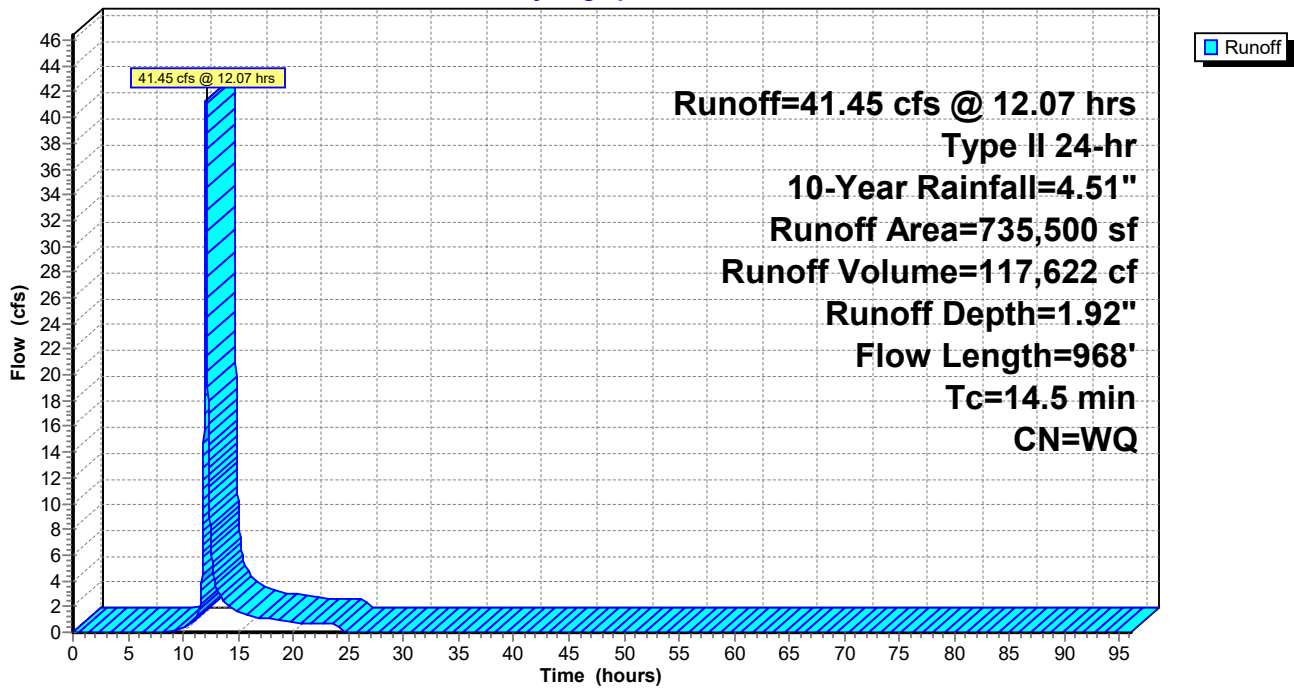
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 489,934	78	Farm / Straight Row / Good Condition / HSG B
* 39,357	89	Farm / Straight Row / Good Condition / HSG D
* 206,209	55	Woods / Good Condition / HSG B
735,500		Weighted Average
735,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0425	0.22		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
0.5	70	0.0949	2.16		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.2	178	0.2374	2.44		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Woodland Kv= 5.0 fps
5.3	620	0.0764	1.93		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	968	Total			

**Subcatchment 8S: Watershed Area #8**

Hydrograph



**Summary for Subcatchment 8S: Watershed Area #8**

Runoff = 59.67 cfs @ 12.07 hrs, Volume= 167,801 cf, Depth= 2.74"

Routed to Link 8L : Discharge Point 008

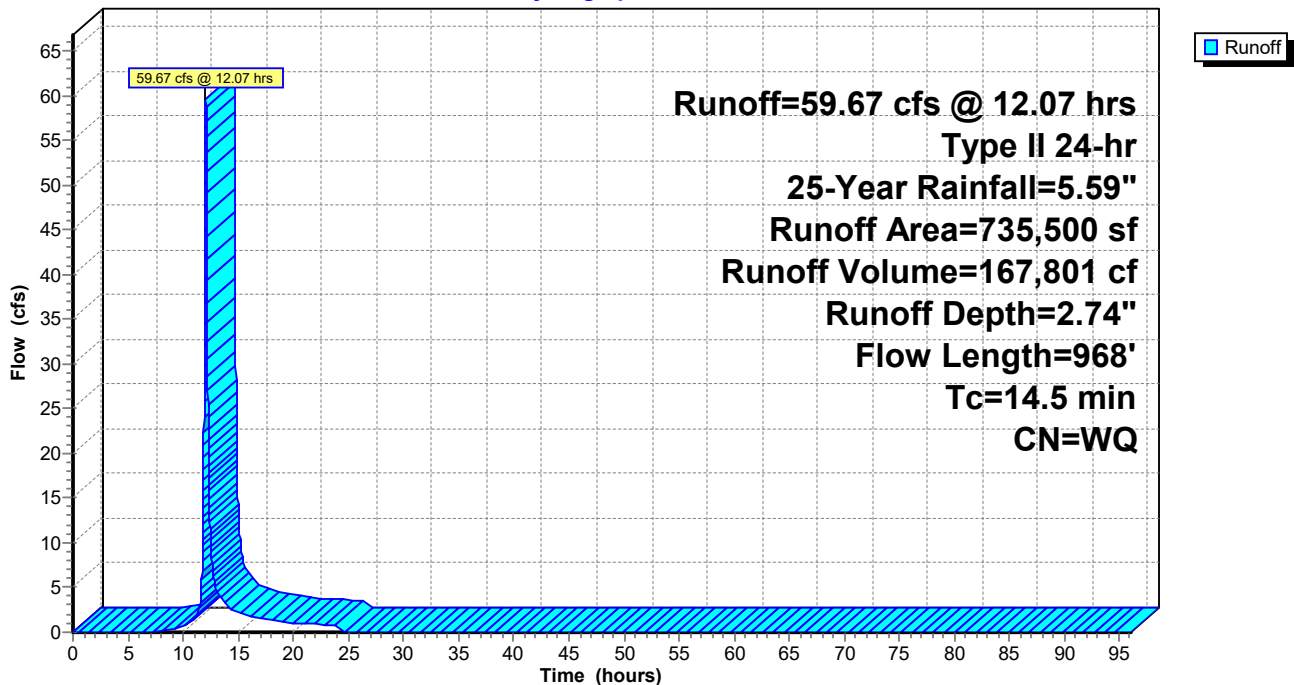
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

Area (sf)	CN	Description
* 489,934	78	Farm / Straight Row / Good Condition / HSG B
* 39,357	89	Farm / Straight Row / Good Condition / HSG D
* 206,209	55	Woods / Good Condition / HSG B
735,500		Weighted Average
735,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0425	0.22		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
0.5	70	0.0949	2.16		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.2	178	0.2374	2.44		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Woodland Kv= 5.0 fps
5.3	620	0.0764	1.93		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	968	Total			

**Subcatchment 8S: Watershed Area #8**

Hydrograph



**Summary for Subcatchment 8S: Watershed Area #8**

Runoff = 76.44 cfs @ 12.07 hrs, Volume= 214,579 cf, Depth= 3.50"

Routed to Link 8L : Discharge Point 008

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

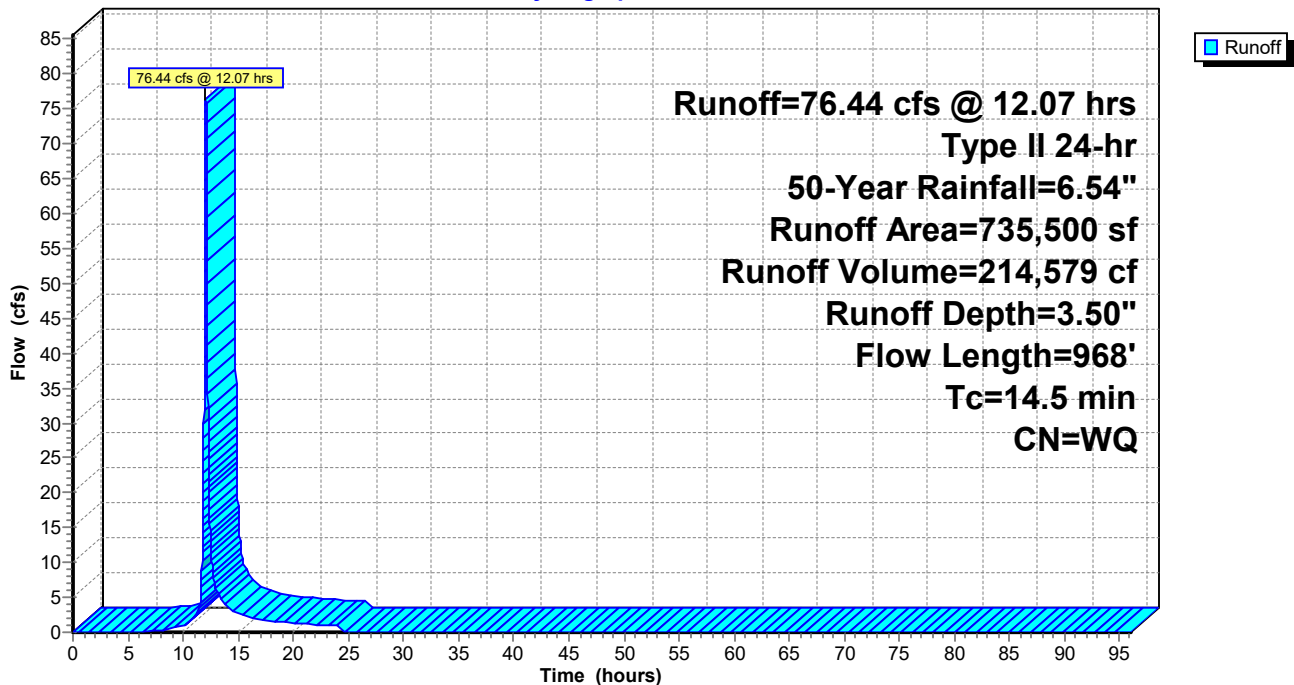
Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 489,934	78	Farm / Straight Row / Good Condition / HSG B
* 39,357	89	Farm / Straight Row / Good Condition / HSG D
* 206,209	55	Woods / Good Condition / HSG B
735,500		Weighted Average
735,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0425	0.22		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
0.5	70	0.0949	2.16		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.2	178	0.2374	2.44		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Woodland Kv= 5.0 fps
5.3	620	0.0764	1.93		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	968	Total			

**Subcatchment 8S: Watershed Area #8**

Hydrograph





**Summary for Subcatchment 8S: Watershed Area #8**

Runoff = 95.86 cfs @ 12.07 hrs, Volume= 269,429 cf, Depth= 4.40"  
 Routed to Link 8L : Discharge Point 008

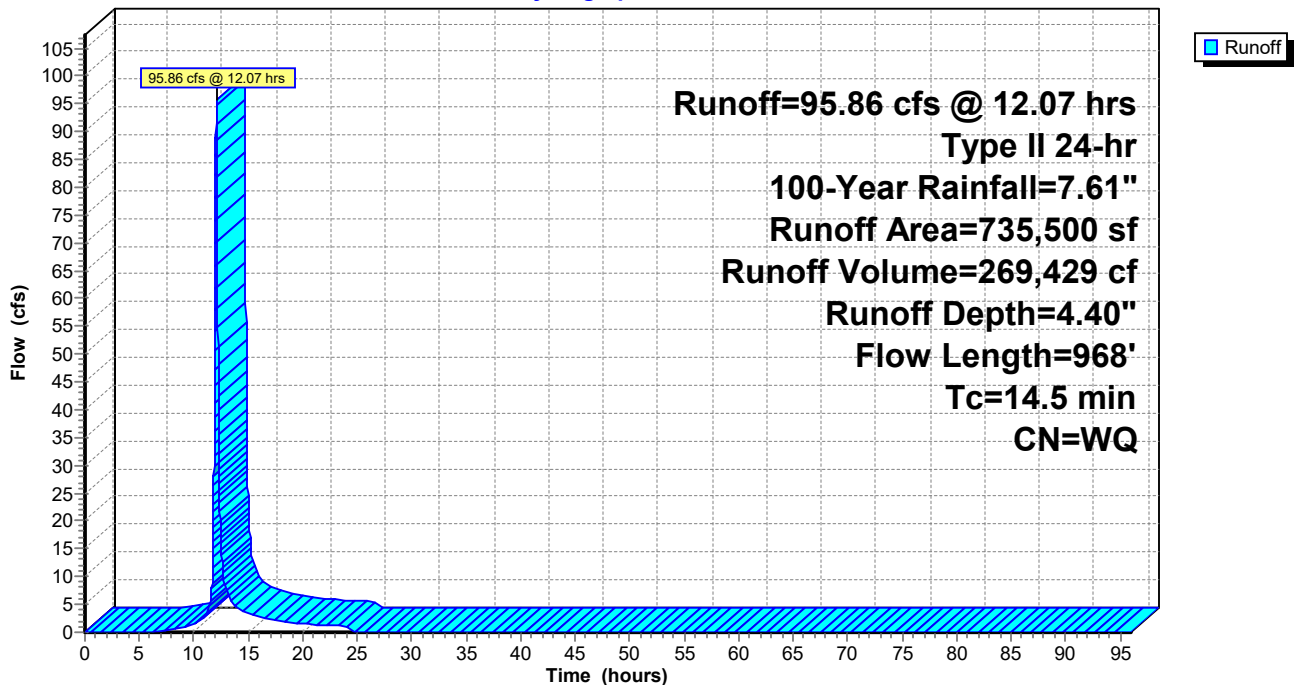
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 489,934	78	Farm / Straight Row / Good Condition / HSG B
* 39,357	89	Farm / Straight Row / Good Condition / HSG D
* 206,209	55	Woods / Good Condition / HSG B
735,500		Weighted Average
735,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0425	0.22		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
0.5	70	0.0949	2.16		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.2	178	0.2374	2.44		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Woodland Kv= 5.0 fps
5.3	620	0.0764	1.93		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
14.5	968	Total			

**Subcatchment 8S: Watershed Area #8**

Hydrograph



# **PRE-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #9**

**(DISCHARGE POINT 009)**

**Summary for Subcatchment 9S: Watershed Area #9**

Runoff = 4.67 cfs @ 12.13 hrs, Volume= 17,835 cf, Depth= 0.70"

Routed to Link 9L : Discharge Point 009

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

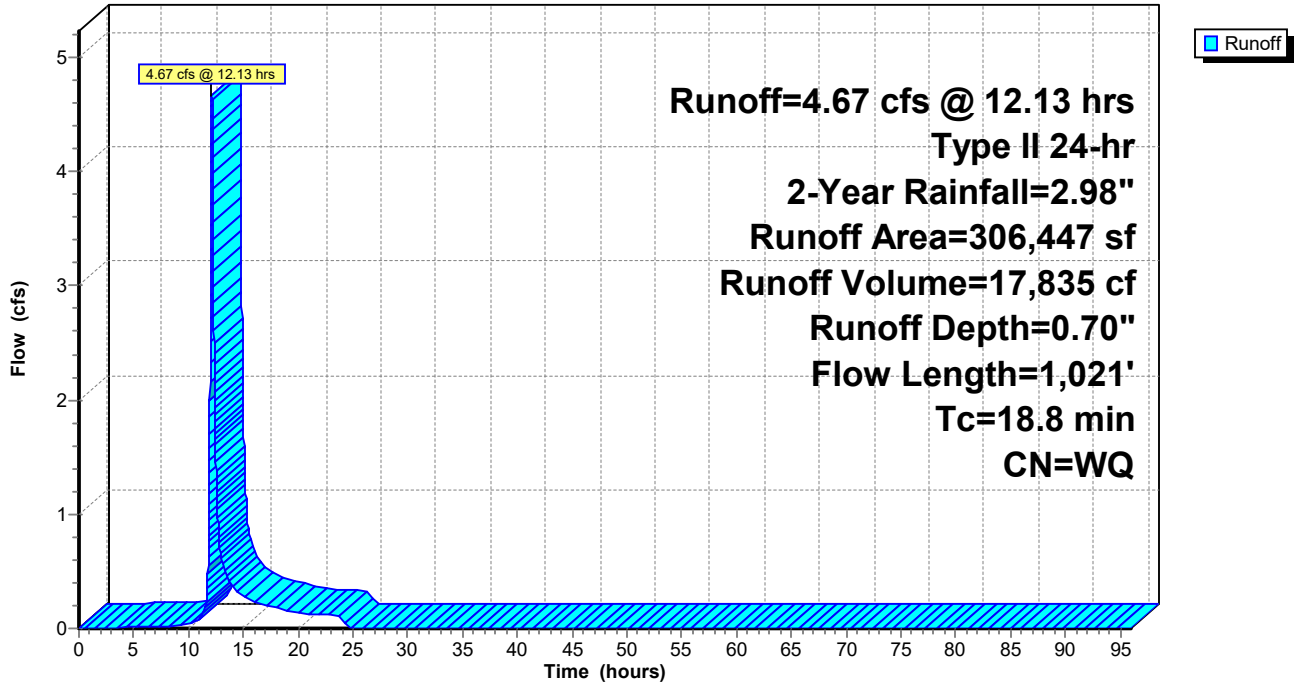
Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 37,178	61	Open Space / Good Condition / HSG B
* 31,300	78	Farm / Straight Row / Good Condition / HSG B
* 35,811	55	Woods / Good Condition / HSG B
* 68,172	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 17,146	98	Impervious
* 82,143	61	Open Space / Good Condition / HSG B (Offsite)
* 34,697	55	Woods / Good Condition / HSG B (Offsite)
306,447		Weighted Average
289,301		94.40% Pervious Area
17,146		5.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.2	921	0.0465	1.51		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
18.8	1,021	Total			

Subcatchment 9S: Watershed Area #9

Hydrograph



**Summary for Subcatchment 9S: Watershed Area #9**

Runoff = 8.17 cfs @ 12.13 hrs, Volume= 29,176 cf, Depth= 1.14"

Routed to Link 9L : Discharge Point 009

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

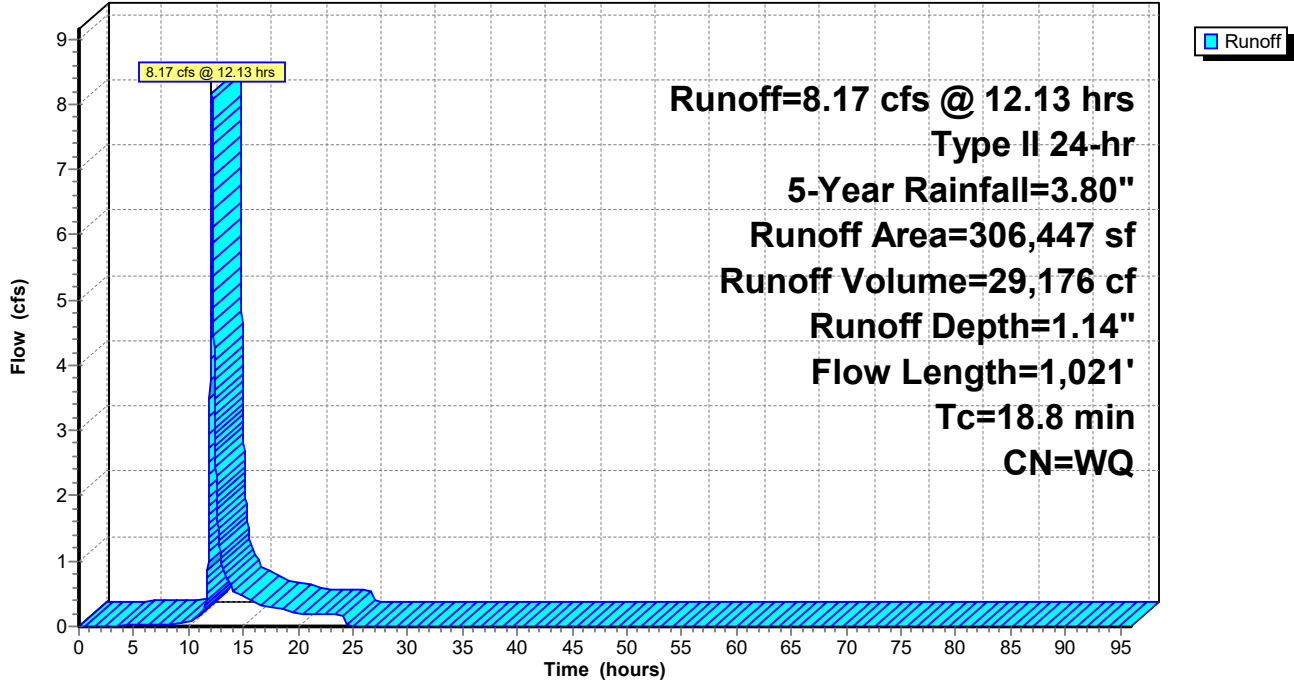
Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 37,178	61	Open Space / Good Condition / HSG B
* 31,300	78	Farm / Straight Row / Good Condition / HSG B
* 35,811	55	Woods / Good Condition / HSG B
* 68,172	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 17,146	98	Impervious
* 82,143	61	Open Space / Good Condition / HSG B (Offsite)
* 34,697	55	Woods / Good Condition / HSG B (Offsite)
306,447		Weighted Average
289,301		94.40% Pervious Area
17,146		5.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.2	921	0.0465	1.51		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
18.8	1,021	Total			

### Subcatchment 9S: Watershed Area #9

Hydrograph



**Summary for Subcatchment 9S: Watershed Area #9**

Runoff = 11.75 cfs @ 12.12 hrs, Volume= 40,357 cf, Depth= 1.58"

Routed to Link 9L : Discharge Point 009

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

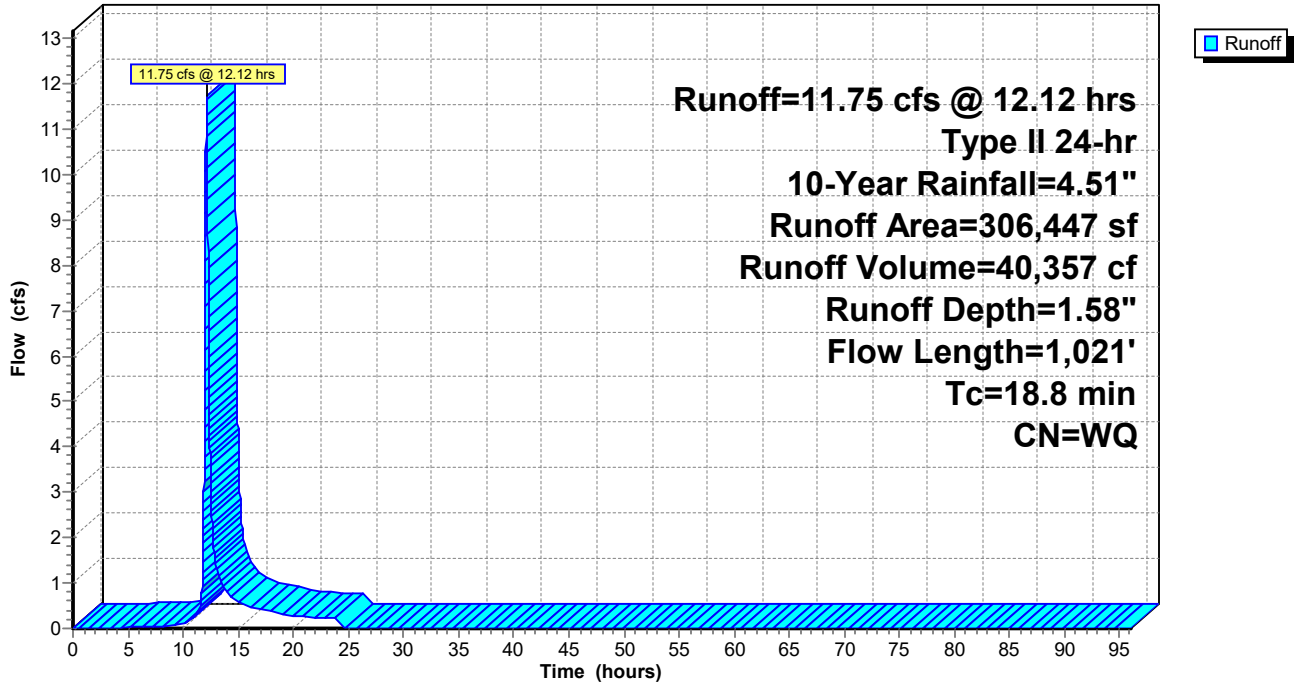
Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 37,178	61	Open Space / Good Condition / HSG B
* 31,300	78	Farm / Straight Row / Good Condition / HSG B
* 35,811	55	Woods / Good Condition / HSG B
* 68,172	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 17,146	98	Impervious
* 82,143	61	Open Space / Good Condition / HSG B (Offsite)
* 34,697	55	Woods / Good Condition / HSG B (Offsite)
306,447		Weighted Average
289,301		94.40% Pervious Area
17,146		5.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.2	921	0.0465	1.51		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
18.8	1,021	Total			

Subcatchment 9S: Watershed Area #9

Hydrograph





**Summary for Subcatchment 9S: Watershed Area #9**

Runoff = 17.79 cfs @ 12.12 hrs, Volume= 59,167 cf, Depth= 2.32"

Routed to Link 9L : Discharge Point 009

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

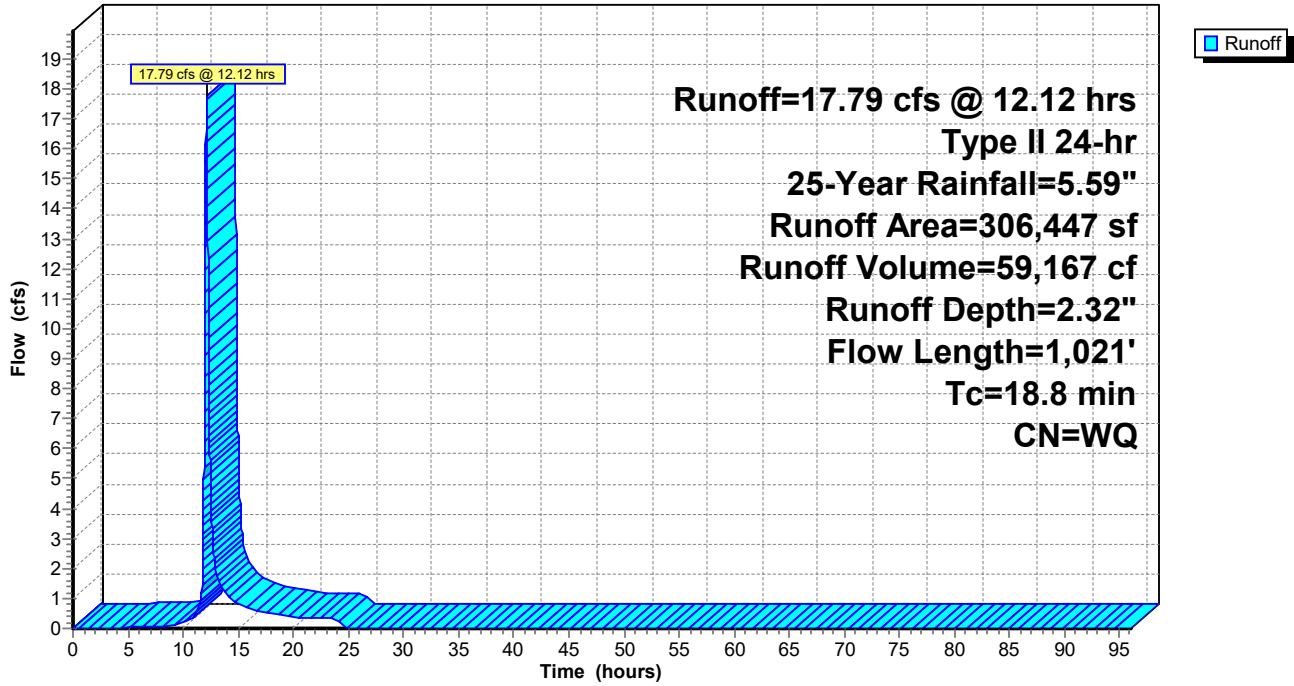
Type II 24-hr 25-Year Rainfall=5.59"

Area (sf)	CN	Description
* 37,178	61	Open Space / Good Condition / HSG B
* 31,300	78	Farm / Straight Row / Good Condition / HSG B
* 35,811	55	Woods / Good Condition / HSG B
* 68,172	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 17,146	98	Impervious
* 82,143	61	Open Space / Good Condition / HSG B (Offsite)
* 34,697	55	Woods / Good Condition / HSG B (Offsite)
306,447		Weighted Average
289,301		94.40% Pervious Area
17,146		5.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.2	921	0.0465	1.51		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
18.8	1,021	Total			

### Subcatchment 9S: Watershed Area #9

Hydrograph



**Summary for Subcatchment 9S: Watershed Area #9**

Runoff = 23.51 cfs @ 12.12 hrs, Volume= 77,070 cf, Depth= 3.02"

Routed to Link 9L : Discharge Point 009

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

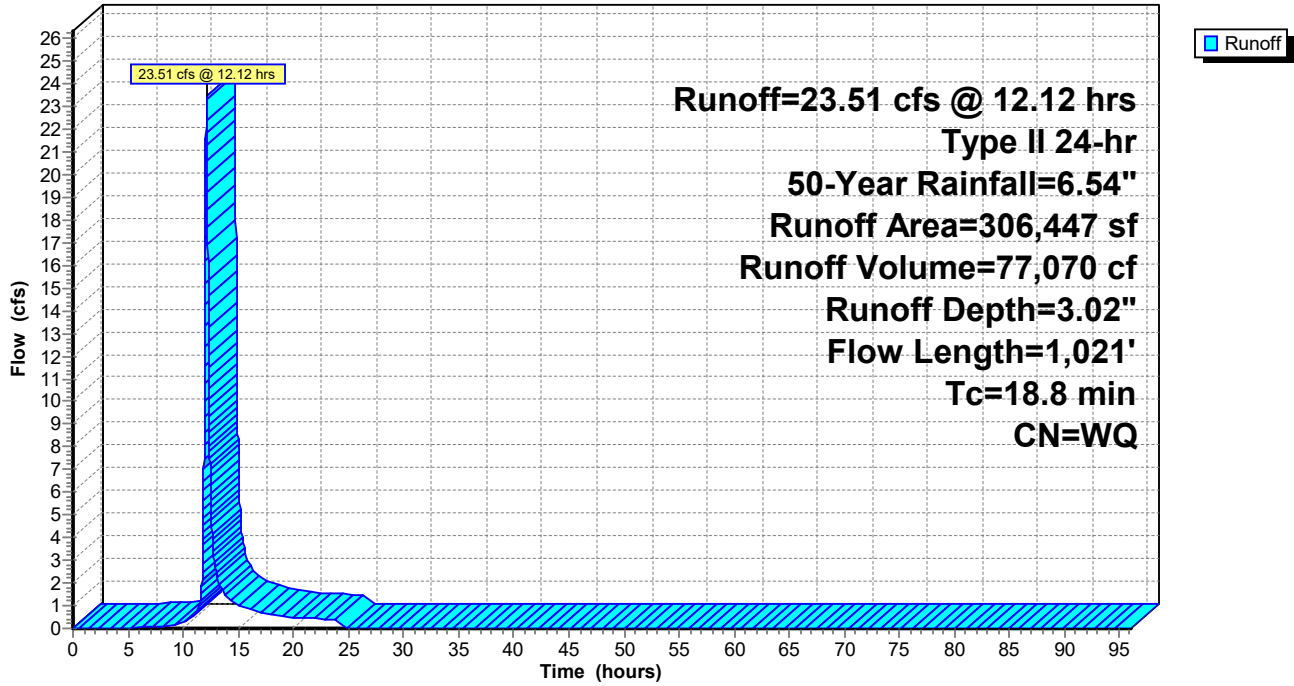
Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 37,178	61	Open Space / Good Condition / HSG B
* 31,300	78	Farm / Straight Row / Good Condition / HSG B
* 35,811	55	Woods / Good Condition / HSG B
* 68,172	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 17,146	98	Impervious
* 82,143	61	Open Space / Good Condition / HSG B (Offsite)
* 34,697	55	Woods / Good Condition / HSG B (Offsite)
306,447		Weighted Average
289,301		94.40% Pervious Area
17,146		5.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.2	921	0.0465	1.51		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
18.8	1,021	Total			

### Subcatchment 9S: Watershed Area #9

Hydrograph



**Summary for Subcatchment 9S: Watershed Area #9**

Runoff = 30.26 cfs @ 12.11 hrs, Volume= 98,376 cf, Depth= 3.85"

Routed to Link 9L : Discharge Point 009

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

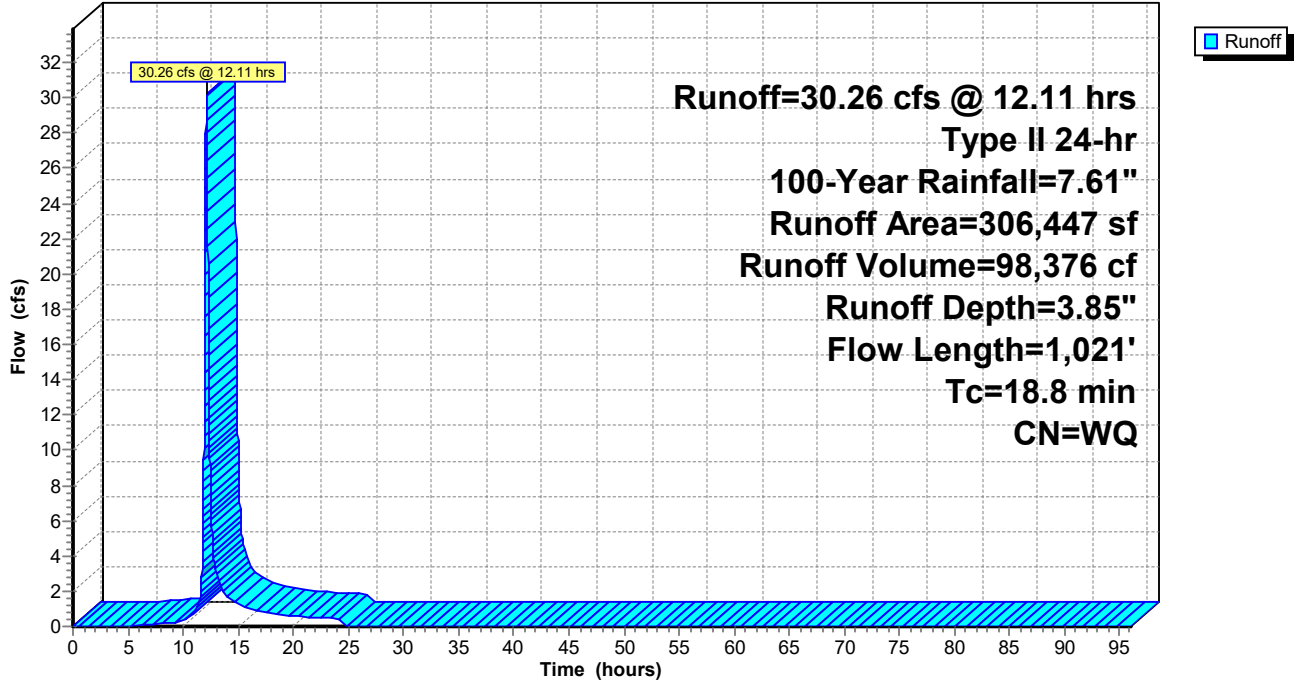
Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 37,178	61	Open Space / Good Condition / HSG B
* 31,300	78	Farm / Straight Row / Good Condition / HSG B
* 35,811	55	Woods / Good Condition / HSG B
* 68,172	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 17,146	98	Impervious
* 82,143	61	Open Space / Good Condition / HSG B (Offsite)
* 34,697	55	Woods / Good Condition / HSG B (Offsite)
306,447		Weighted Average
289,301		94.40% Pervious Area
17,146		5.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.2	921	0.0465	1.51		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
18.8	1,021	Total			

Subcatchment 9S: Watershed Area #9

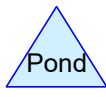
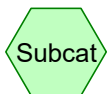
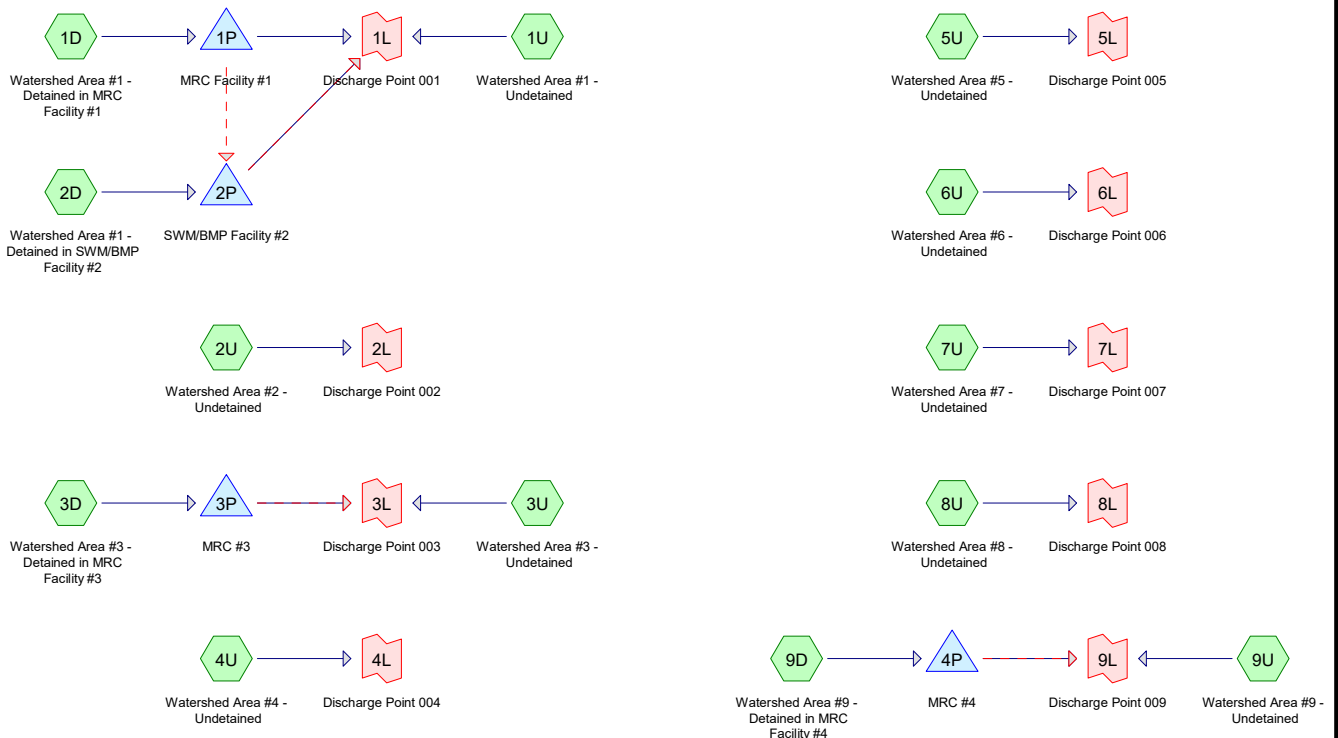
Hydrograph



## **APPENDIX C**

### **STORMWATER MANAGEMENT DESIGN**

#### *POST-DEVELOPMENT CALCULATIONS*



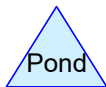
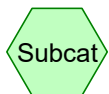
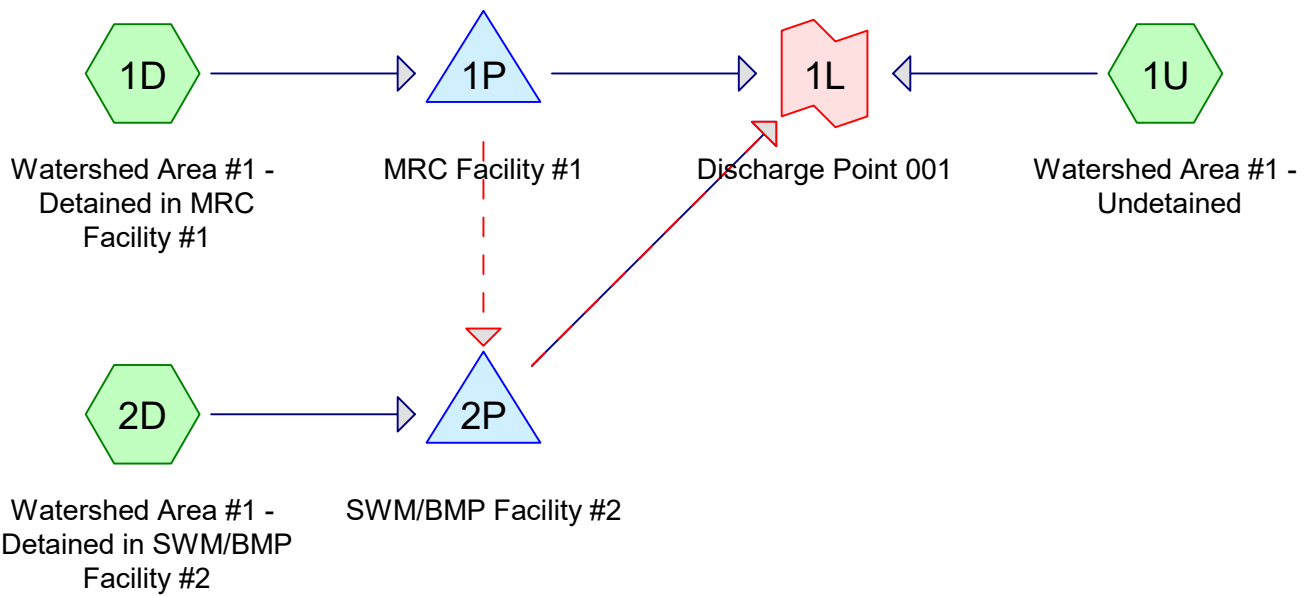
**Routing Diagram for 22-0123-005 - Post-Dev**  
 Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
 HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #1**

**(DISCHARGE POINT 001)**



**Routing Diagram for 22-0123-005 - Post-Dev**  
 Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
 HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #1**

**(DISCHARGE POINT 001)**

**Detained in MRC #1 Routings**

**Summary for Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Runoff = 126.85 cfs @ 12.07 hrs, Volume= 407,432 cf, Depth= 2.34"

Routed to Pond 1P : MRC Facility #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

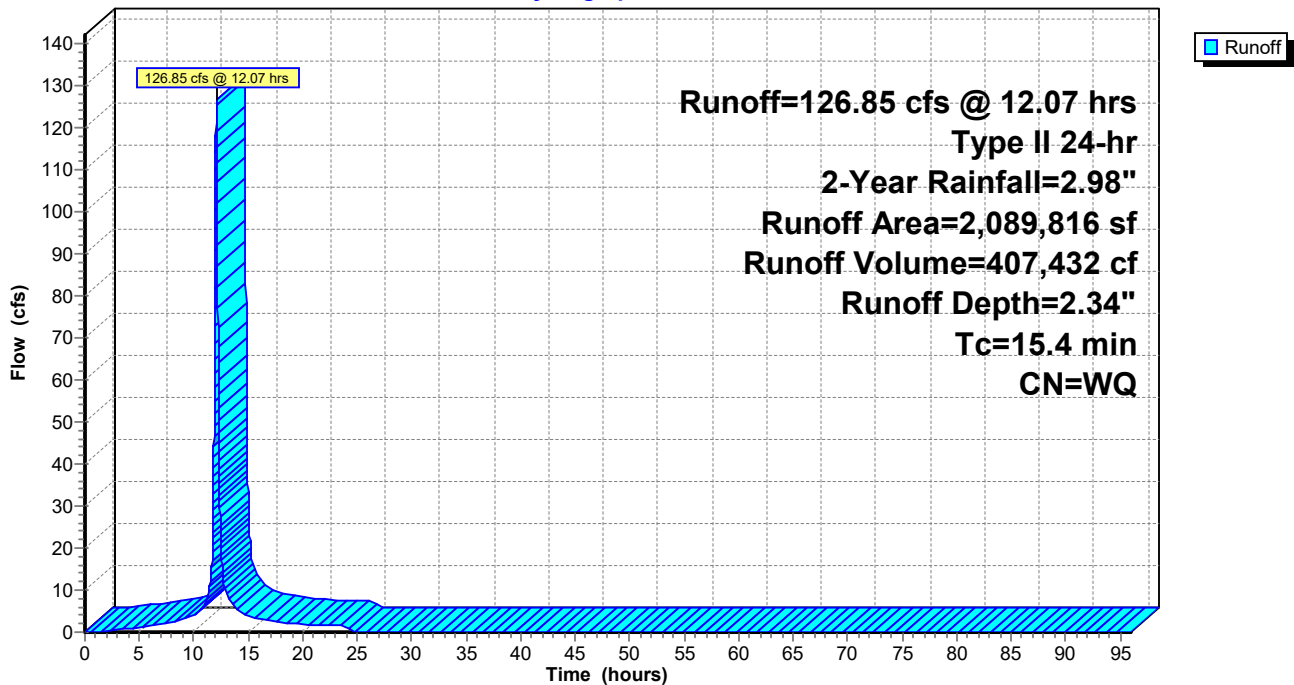
Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 1,736,854	98	Impervious
* 213,964	58	Meadow / HSG B
* 6,567	71	Meadow / HSG C
* 460	78	Meadow / HSG D
* 121,089	61	Open Space / Good Condition / HSG B
* 10,882	74	Open Space / Good Condition / HSG C
2,089,816		Weighted Average
352,962		16.89% Pervious Area
1,736,854		83.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4					Direct Entry, Storm Sewer Tc

**Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Hydrograph



**Summary for Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Runoff = 165.62 cfs @ 12.07 hrs, Volume= 535,625 cf, Depth= 3.08"

Routed to Pond 1P : MRC Facility #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

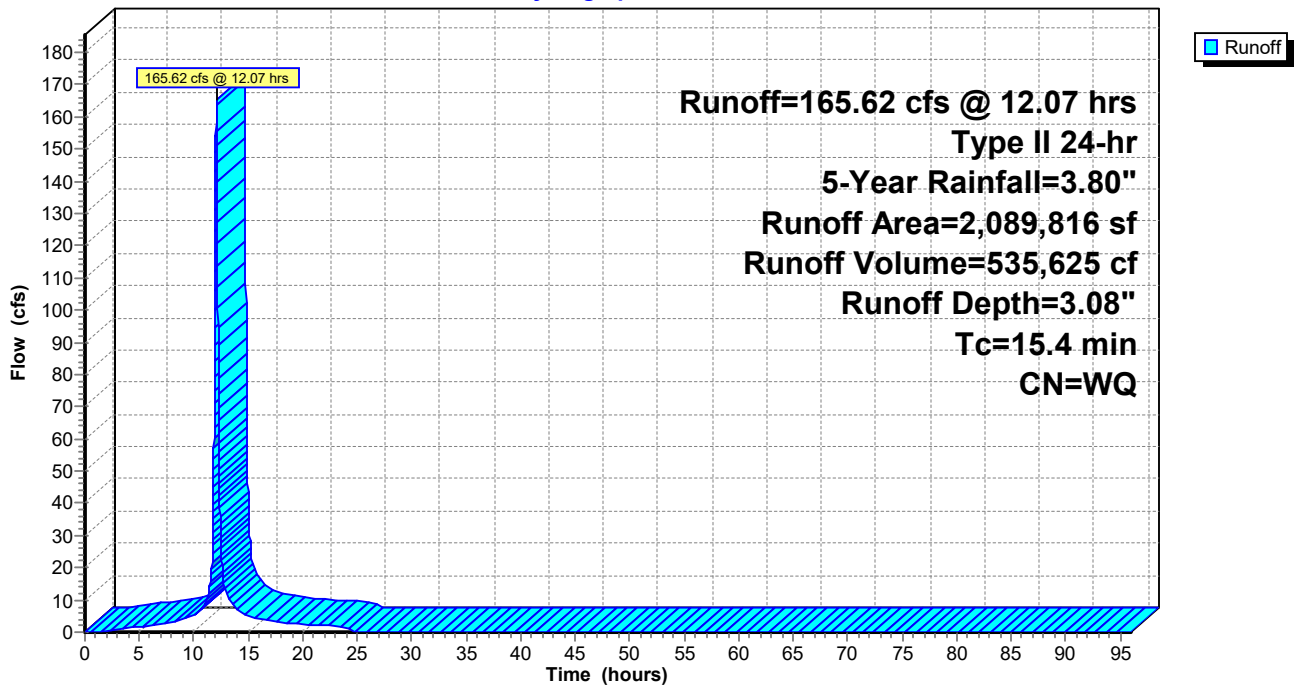
Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 1,736,854	98	Impervious
* 213,964	58	Meadow / HSG B
* 6,567	71	Meadow / HSG C
* 460	78	Meadow / HSG D
* 121,089	61	Open Space / Good Condition / HSG B
* 10,882	74	Open Space / Good Condition / HSG C
2,089,816		Weighted Average
352,962		16.89% Pervious Area
1,736,854		83.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4					Direct Entry, Storm Sewer Tc

**Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Hydrograph



**Summary for Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Runoff = 200.02 cfs @ 12.07 hrs, Volume= 648,625 cf, Depth= 3.72"

Routed to Pond 1P : MRC Facility #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

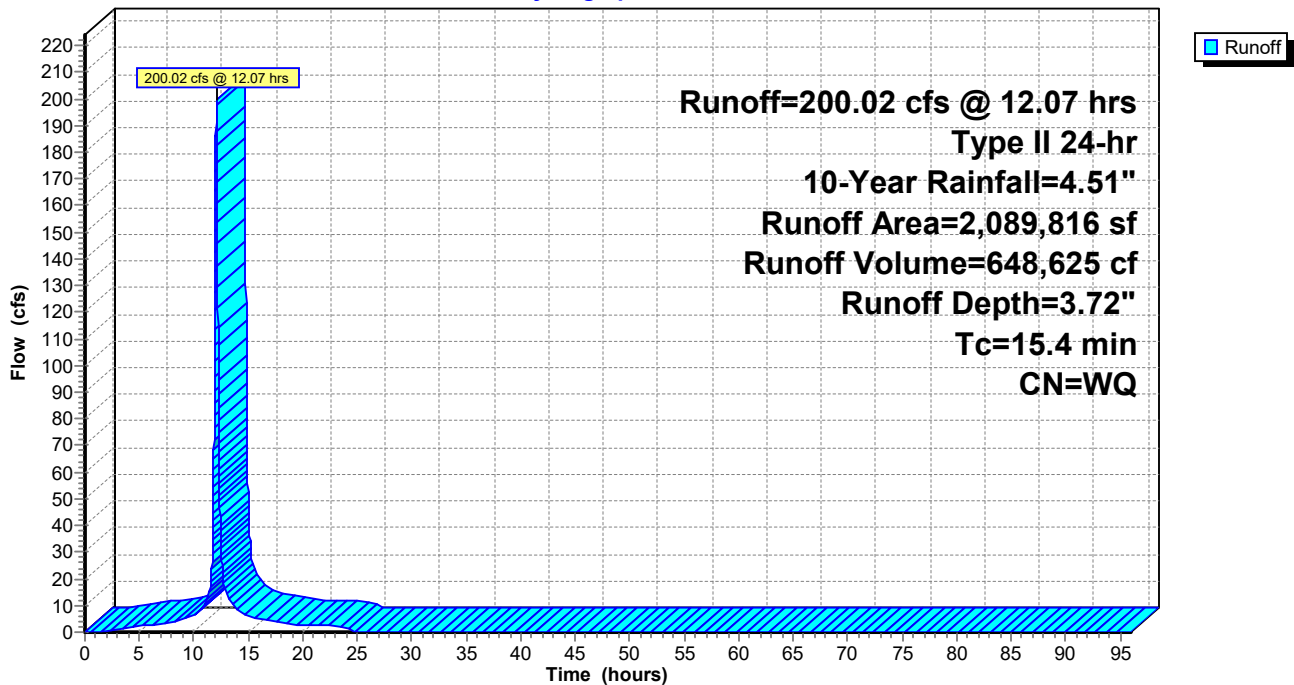
Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 1,736,854	98	Impervious
* 213,964	58	Meadow / HSG B
* 6,567	71	Meadow / HSG C
* 460	78	Meadow / HSG D
* 121,089	61	Open Space / Good Condition / HSG B
* 10,882	74	Open Space / Good Condition / HSG C
2,089,816		Weighted Average
352,962		16.89% Pervious Area
1,736,854		83.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4					Direct Entry, Storm Sewer Tc

**Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Hydrograph



**Summary for Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Runoff = 253.22 cfs @ 12.07 hrs, Volume= 823,186 cf, Depth= 4.73"

Routed to Pond 1P : MRC Facility #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

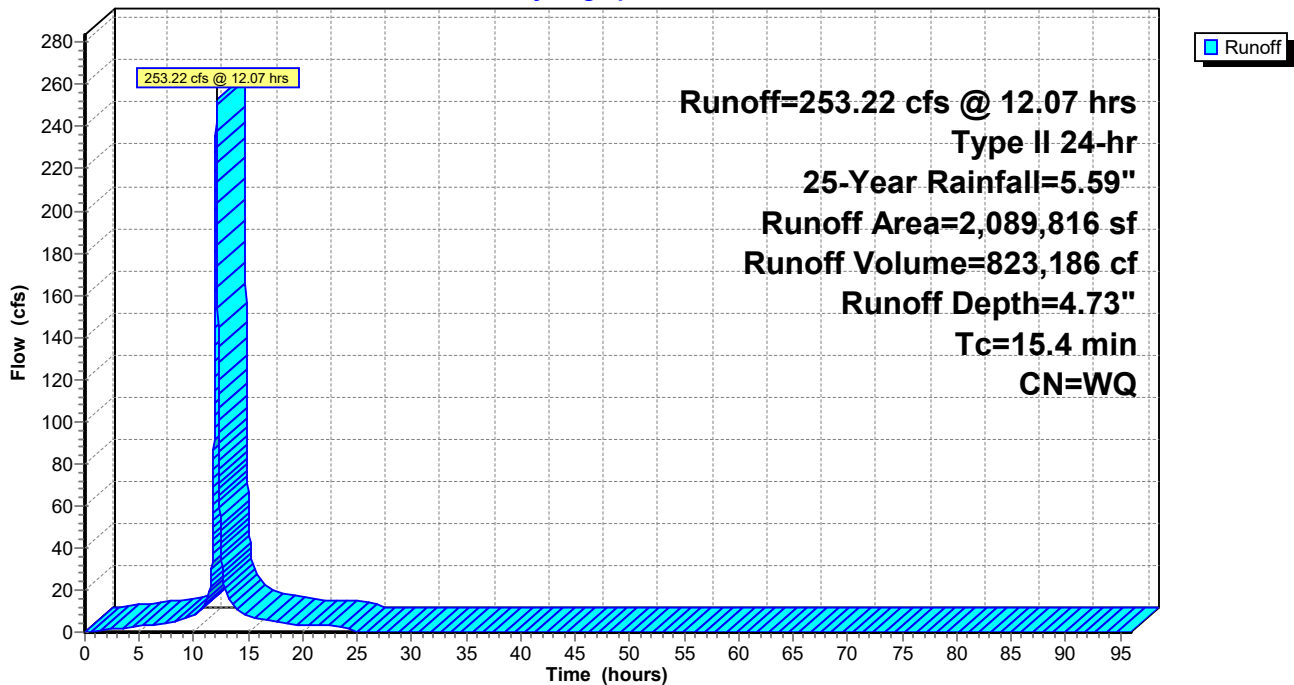
Type II 24-hr 25-Year Rainfall=5.59"

Area (sf)	CN	Description
* 1,736,854	98	Impervious
* 213,964	58	Meadow / HSG B
* 6,567	71	Meadow / HSG C
* 460	78	Meadow / HSG D
* 121,089	61	Open Space / Good Condition / HSG B
* 10,882	74	Open Space / Good Condition / HSG C
2,089,816		Weighted Average
352,962		16.89% Pervious Area
1,736,854		83.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4					Direct Entry, Storm Sewer Tc

**Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Hydrograph



**Summary for Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Runoff = 300.64 cfs @ 12.07 hrs, Volume= 978,775 cf, Depth= 5.62"  
 Routed to Pond 1P : MRC Facility #1

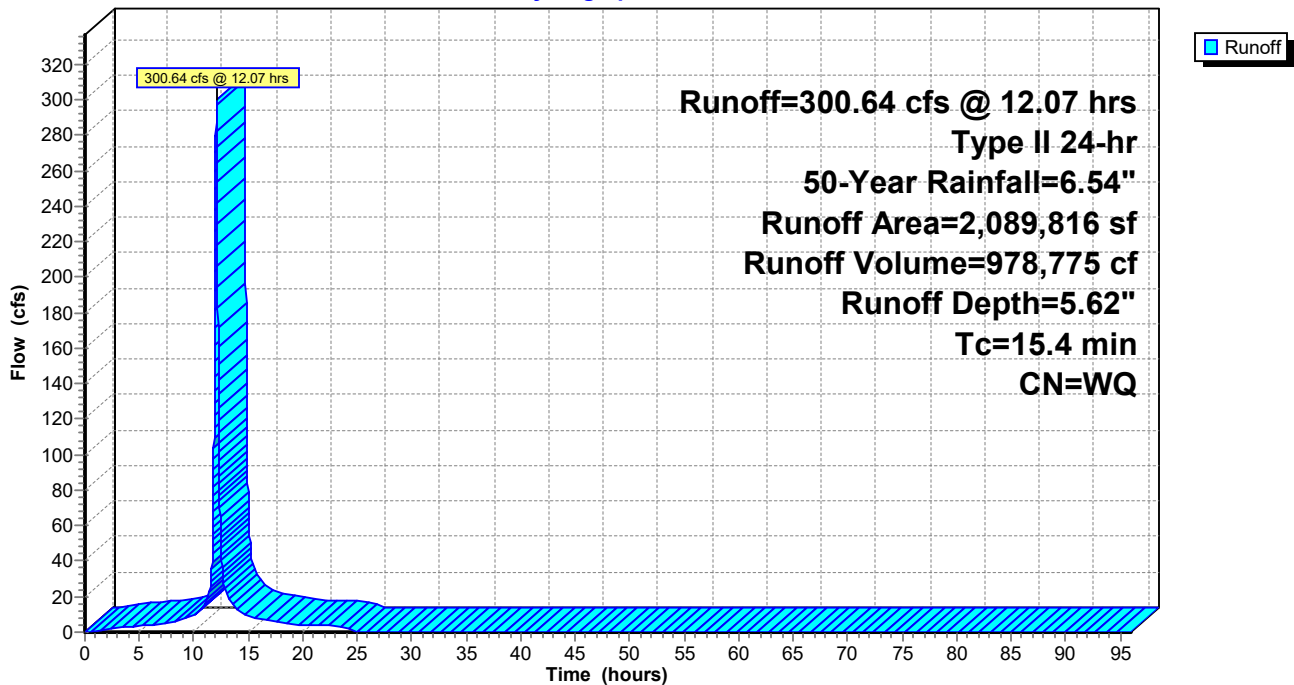
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 1,736,854	98	Impervious
* 213,964	58	Meadow / HSG B
* 6,567	71	Meadow / HSG C
* 460	78	Meadow / HSG D
* 121,089	61	Open Space / Good Condition / HSG B
* 10,882	74	Open Space / Good Condition / HSG C
2,089,816		Weighted Average
352,962		16.89% Pervious Area
1,736,854		83.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4					Direct Entry, Storm Sewer Tc

**Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Hydrograph





**Summary for Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Runoff = 354.57 cfs @ 12.07 hrs, Volume= 1,155,746 cf, Depth= 6.64"

Routed to Pond 1P : MRC Facility #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

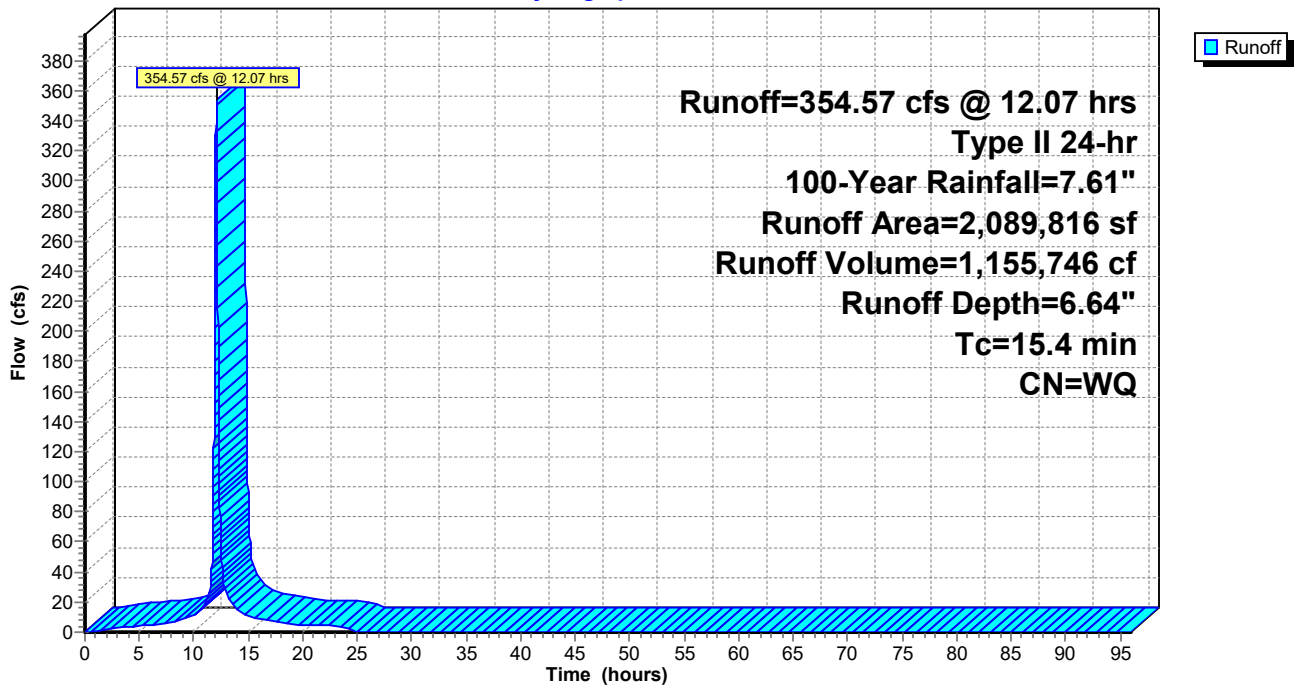
Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 1,736,854	98	Impervious
* 213,964	58	Meadow / HSG B
* 6,567	71	Meadow / HSG C
* 460	78	Meadow / HSG D
* 121,089	61	Open Space / Good Condition / HSG B
* 10,882	74	Open Space / Good Condition / HSG C
2,089,816		Weighted Average
352,962		16.89% Pervious Area
1,736,854		83.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4					Direct Entry, Storm Sewer Tc

**Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #1**

**(DISCHARGE POINT 001)**

**MRC #1 Routings**

**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 2.34" for 2-Year event  
 Inflow = 126.85 cfs @ 12.07 hrs, Volume= 407,432 cf  
 Outflow = 61.56 cfs @ 12.24 hrs, Volume= 358,424 cf, Atten= 51%, Lag= 10.3 min  
 Discarded = 0.18 cfs @ 10.89 hrs, Volume= 59,249 cf  
 Primary = 6.76 cfs @ 12.24 hrs, Volume= 134,357 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 54.62 cfs @ 12.24 hrs, Volume= 164,818 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 438.00' @ 12.24 hrs Surf.Area= 76,079 sf Storage= 211,618 cf

Plug-Flow detention time= 1,190.4 min calculated for 358,386 cf (88% of inflow)  
 Center-of-Mass det. time= 1,130.8 min ( 1,897.6 - 766.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

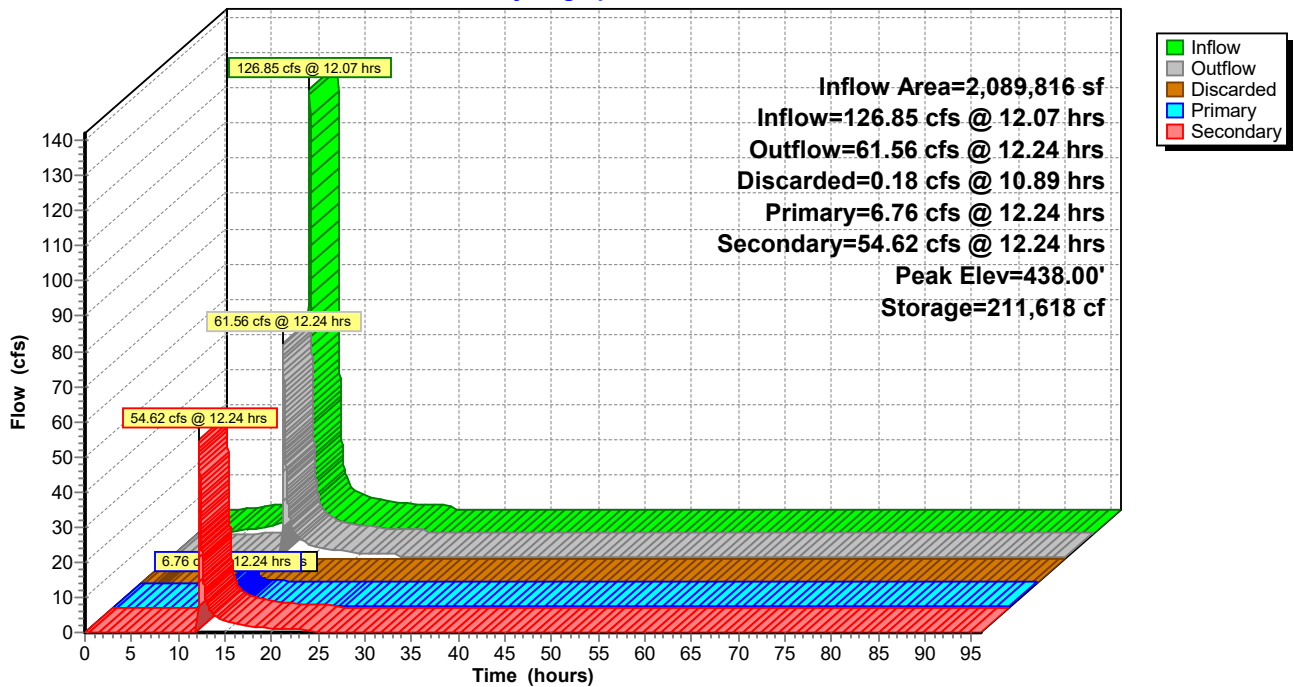
**Discarded OutFlow** Max=0.18 cfs @ 10.89 hrs HW=436.00' (Free Discharge)  
 ↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=6.75 cfs @ 12.24 hrs HW=438.00' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 6.75 cfs of 44.09 cfs potential flow)  
 ↳ **2=MRC Orifice** (Orifice Controls 0.44 cfs @ 9.49 fps)  
 ↳ **3=Type M Inlet** (Weir Controls 6.31 cfs @ 1.80 fps)

**Secondary OutFlow** Max=54.53 cfs @ 12.24 hrs HW=438.00' (Free Discharge)  
 ↳ **4=Overflow Spillway** (Weir Controls 54.53 cfs @ 1.48 fps)

**Pond 1P: MRC Facility #1**

Hydrograph



**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 3.08" for 5-Year event  
 Inflow = 165.62 cfs @ 12.07 hrs, Volume= 535,625 cf  
 Outflow = 135.97 cfs @ 12.15 hrs, Volume= 486,503 cf, Atten= 18%, Lag= 4.9 min  
 Discarded = 0.18 cfs @ 9.84 hrs, Volume= 59,540 cf  
 Primary = 14.39 cfs @ 12.15 hrs, Volume= 148,964 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 121.40 cfs @ 12.15 hrs, Volume= 277,998 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 438.22' @ 12.15 hrs Surf.Area= 76,079 sf Storage= 227,163 cf

Plug-Flow detention time= 897.2 min calculated for 486,452 cf (91% of inflow)  
 Center-of-Mass det. time= 848.0 min ( 1,611.0 - 763.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.18 cfs @ 9.84 hrs HW=436.00' (Free Discharge)

↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=14.36 cfs @ 12.15 hrs HW=438.22' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 14.36 cfs of 44.63 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.45 cfs @ 9.74 fps)

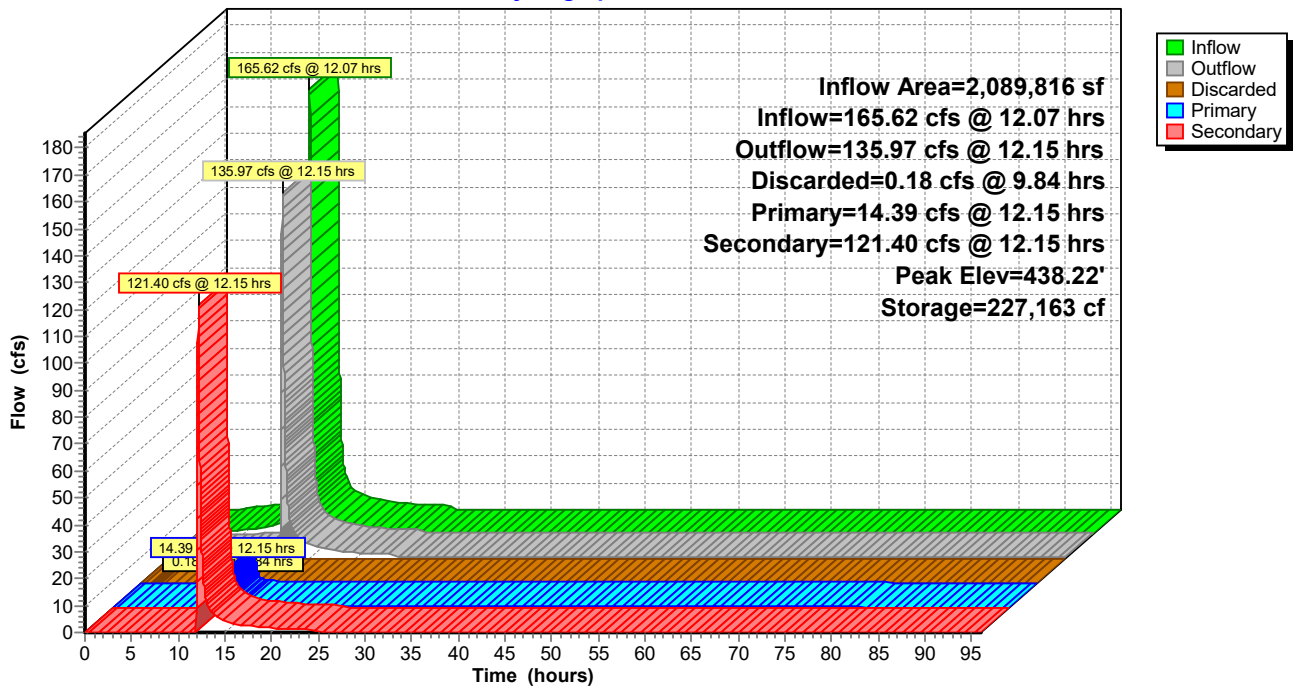
↳ **3=Type M Inlet** (Weir Controls 13.91 cfs @ 2.35 fps)

**Secondary OutFlow** Max=121.07 cfs @ 12.15 hrs HW=438.22' (Free Discharge)

↳ **4=Overflow Spillway** (Weir Controls 121.07 cfs @ 1.93 fps)

**Pond 1P: MRC Facility #1**

Hydrograph



**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 3.72" for 10-Year event  
 Inflow = 200.02 cfs @ 12.07 hrs, Volume= 648,625 cf  
 Outflow = 182.88 cfs @ 12.12 hrs, Volume= 599,423 cf, Atten= 9%, Lag= 3.2 min  
 Discarded = 0.18 cfs @ 8.99 hrs, Volume= 59,713 cf  
 Primary = 19.25 cfs @ 12.12 hrs, Volume= 161,635 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 163.45 cfs @ 12.12 hrs, Volume= 378,074 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 438.33' @ 12.12 hrs Surf.Area= 76,079 sf Storage= 235,864 cf

Plug-Flow detention time= 741.7 min calculated for 599,423 cf (92% of inflow)  
 Center-of-Mass det. time= 698.8 min ( 1,459.4 - 760.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.18 cfs @ 8.99 hrs HW=436.00' (Free Discharge)

↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=19.24 cfs @ 12.12 hrs HW=438.33' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 19.24 cfs of 44.92 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.45 cfs @ 9.88 fps)

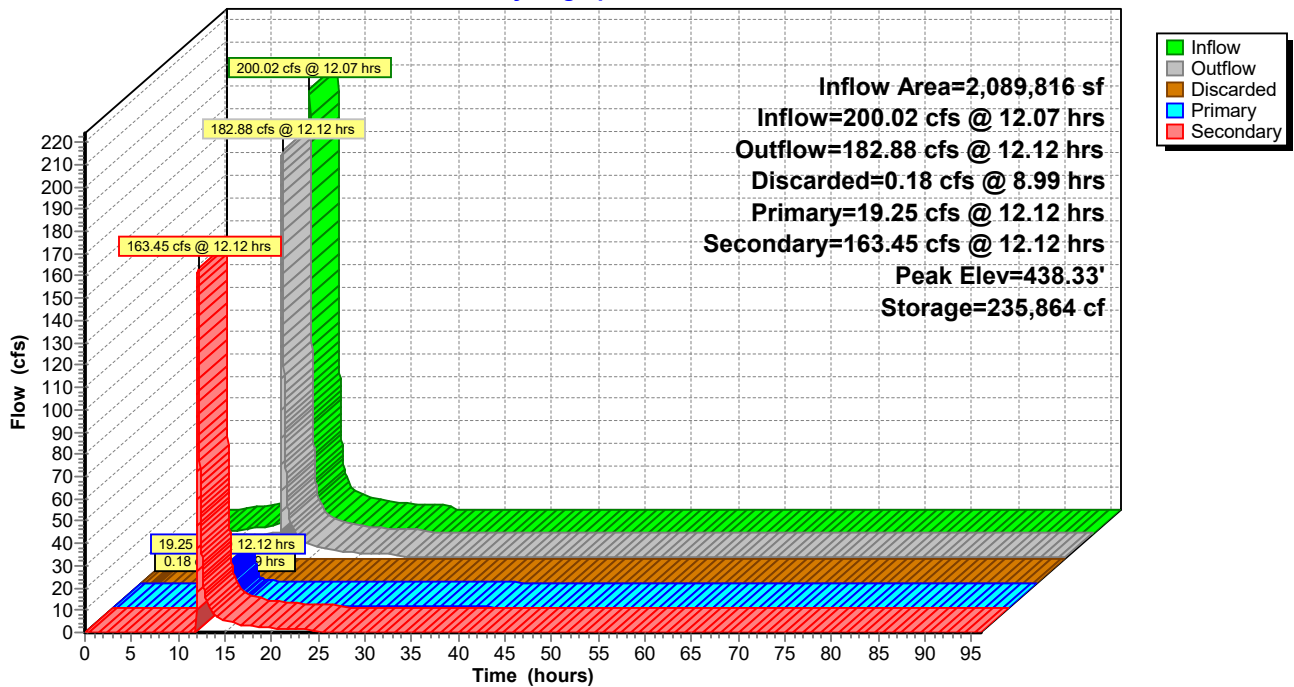
↳ **3=Type M Inlet** (Weir Controls 18.79 cfs @ 2.59 fps)

**Secondary OutFlow** Max=163.36 cfs @ 12.12 hrs HW=438.33' (Free Discharge)

↳ **4=Overflow Spillway** (Weir Controls 163.36 cfs @ 2.13 fps)

**Pond 1P: MRC Facility #1**

Hydrograph





**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 4.73" for 25-Year event  
 Inflow = 253.22 cfs @ 12.07 hrs, Volume= 823,186 cf  
 Outflow = 237.53 cfs @ 12.11 hrs, Volume= 773,887 cf, Atten= 6%, Lag= 2.7 min  
 Discarded = 0.18 cfs @ 7.85 hrs, Volume= 59,898 cf  
 Primary = 24.39 cfs @ 12.11 hrs, Volume= 180,831 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 212.97 cfs @ 12.11 hrs, Volume= 533,157 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 438.46' @ 12.11 hrs Surf.Area= 76,079 sf Storage= 245,845 cf

Plug-Flow detention time= 589.2 min calculated for 773,887 cf (94% of inflow)  
 Center-of-Mass det. time= 553.6 min ( 1,311.6 - 758.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.18 cfs @ 7.85 hrs HW=436.00' (Free Discharge)

↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=24.44 cfs @ 12.11 hrs HW=438.46' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 24.44 cfs of 45.25 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.46 cfs @ 10.03 fps)

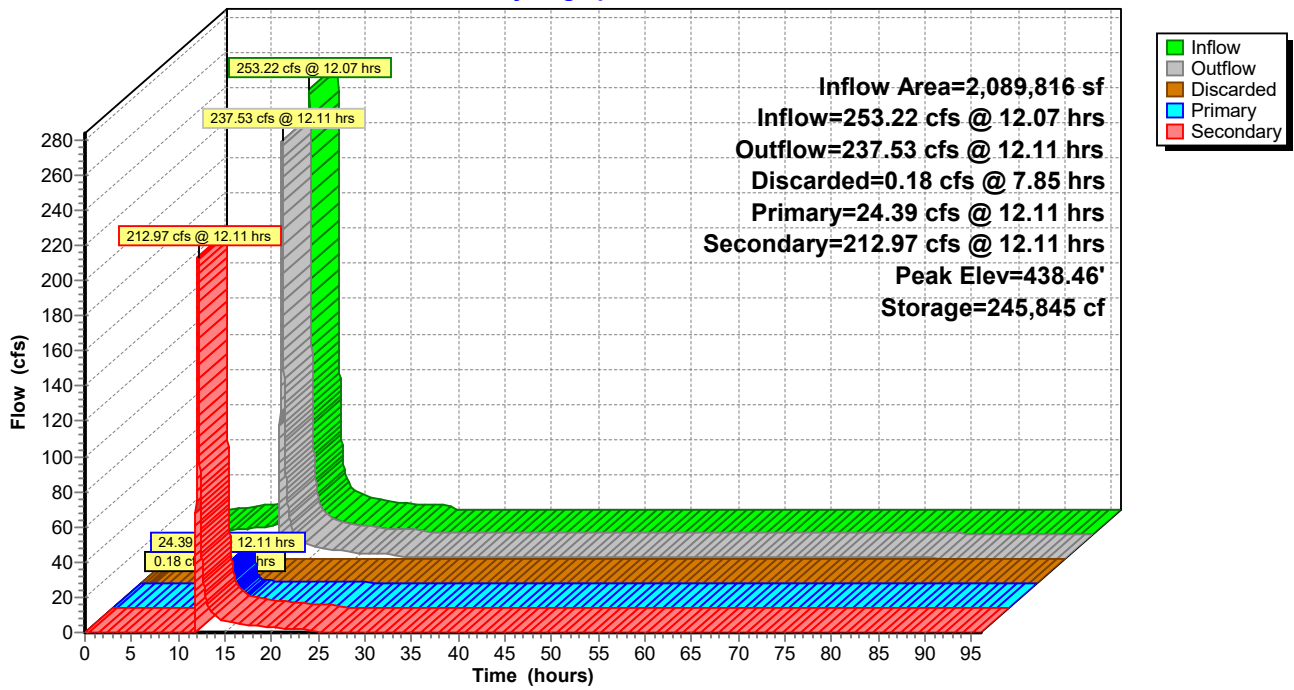
↳ **3=Type M Inlet** (Orifice Controls 23.98 cfs @ 4.19 fps)

**Secondary OutFlow** Max=212.90 cfs @ 12.11 hrs HW=438.46' (Free Discharge)

↳ **4=Overflow Spillway** (Weir Controls 212.90 cfs @ 2.30 fps)

**Pond 1P: MRC Facility #1**

Hydrograph



**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 5.62" for 50-Year event  
 Inflow = 300.64 cfs @ 12.07 hrs, Volume= 978,775 cf  
 Outflow = 282.73 cfs @ 12.11 hrs, Volume= 929,404 cf, Atten= 6%, Lag= 2.7 min  
 Discarded = 0.18 cfs @ 7.02 hrs, Volume= 60,013 cf  
 Primary = 26.01 cfs @ 12.11 hrs, Volume= 196,545 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 256.54 cfs @ 12.11 hrs, Volume= 672,846 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 438.56' @ 12.11 hrs Surf.Area= 76,079 sf Storage= 254,020 cf

Plug-Flow detention time= 500.2 min calculated for 929,307 cf (95% of inflow)  
 Center-of-Mass det. time= 469.8 min ( 1,226.0 - 756.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.18 cfs @ 7.02 hrs HW=436.00' (Free Discharge)

↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=26.02 cfs @ 12.11 hrs HW=438.56' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 26.02 cfs of 45.50 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.47 cfs @ 10.14 fps)

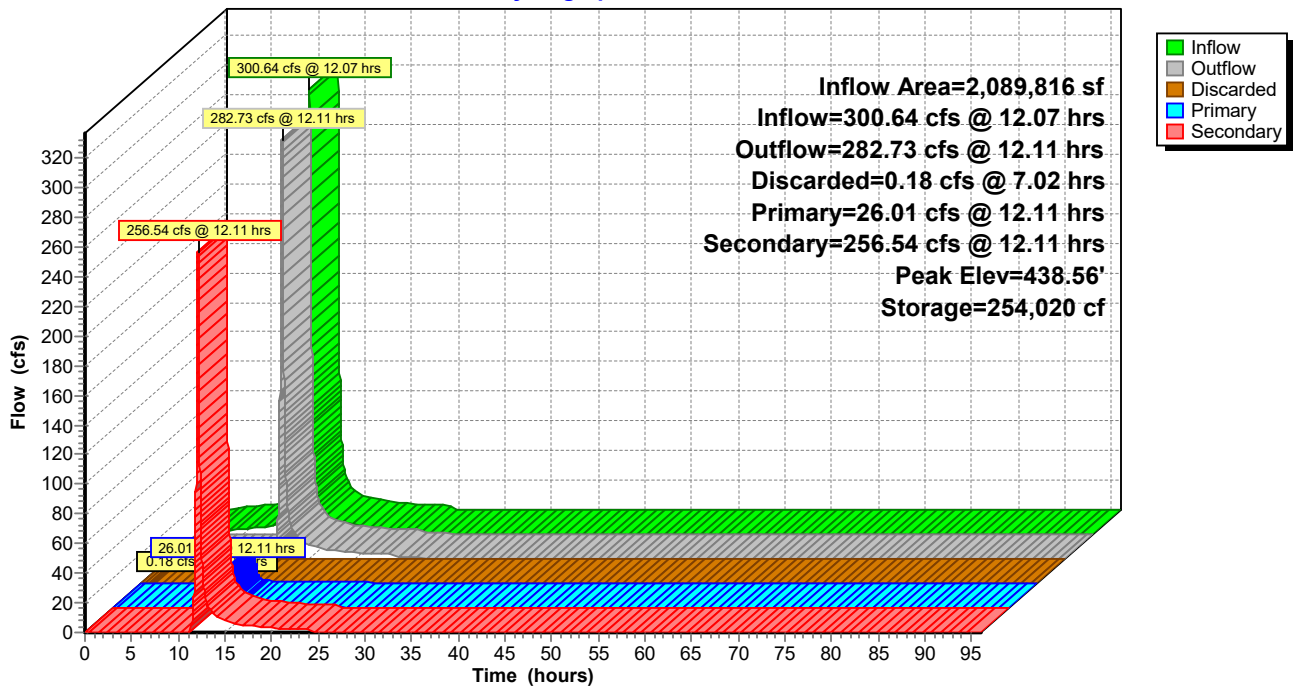
↳ **3=Type M Inlet** (Orifice Controls 25.55 cfs @ 4.46 fps)

**Secondary OutFlow** Max=256.38 cfs @ 12.11 hrs HW=438.56' (Free Discharge)

↳ **4=Overflow Spillway** (Weir Controls 256.38 cfs @ 2.43 fps)

**Pond 1P: MRC Facility #1**

Hydrograph



**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 6.64" for 100-Year event  
 Inflow = 354.57 cfs @ 12.07 hrs, Volume= 1,155,746 cf  
 Outflow = 334.51 cfs @ 12.11 hrs, Volume= 1,106,308 cf, Atten= 6%, Lag= 2.6 min  
 Discarded = 0.18 cfs @ 6.28 hrs, Volume= 60,110 cf  
 Primary = 27.59 cfs @ 12.11 hrs, Volume= 213,239 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 306.74 cfs @ 12.11 hrs, Volume= 832,959 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 438.67' @ 12.11 hrs Surf.Area= 76,079 sf Storage= 262,949 cf

Plug-Flow detention time= 428.6 min calculated for 1,106,193 cf (96% of inflow)  
 Center-of-Mass det. time= 402.3 min ( 1,156.9 - 754.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.18 cfs @ 6.28 hrs HW=436.00' (Free Discharge)

↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=27.59 cfs @ 12.11 hrs HW=438.67' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 27.59 cfs of 45.78 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.47 cfs @ 10.27 fps)

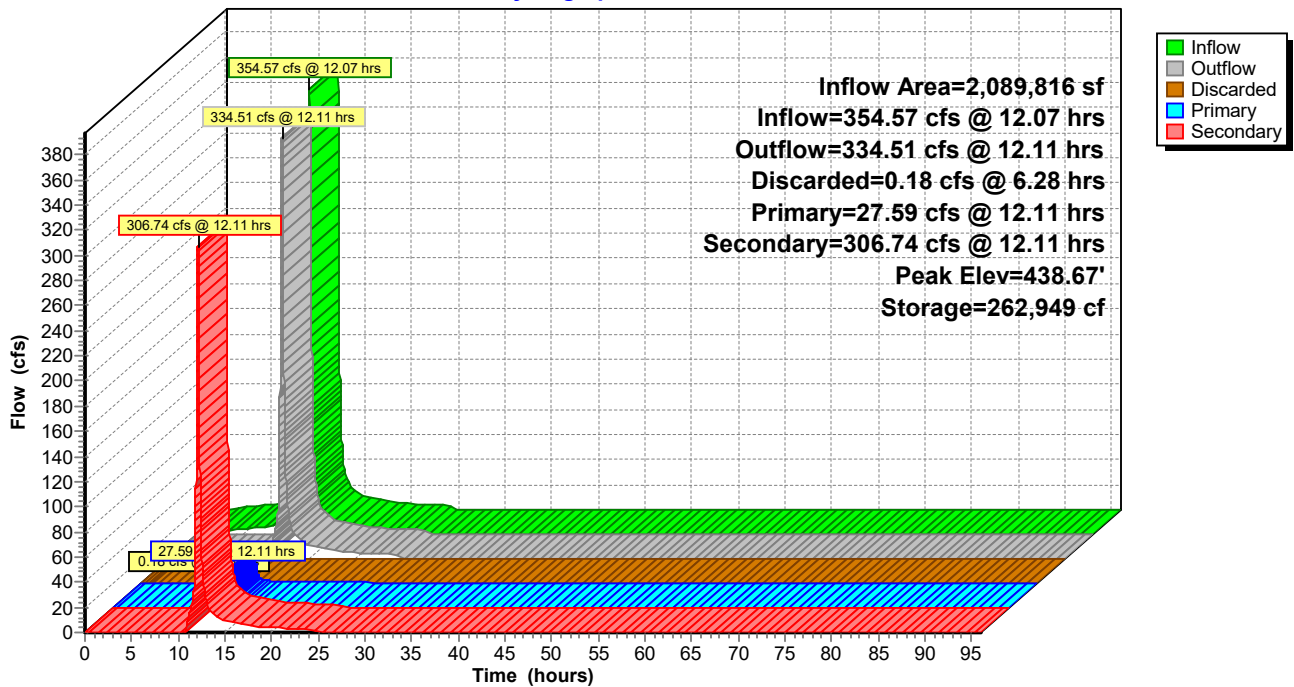
↳ **3=Type M Inlet** (Orifice Controls 27.12 cfs @ 4.74 fps)

**Secondary OutFlow** Max=306.62 cfs @ 12.11 hrs HW=438.67' (Free Discharge)

↳ **4=Overflow Spillway** (Weir Controls 306.62 cfs @ 2.58 fps)

**Pond 1P: MRC Facility #1**

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #1**

**(DISCHARGE POINT 001)**

**Detained in SWM/BMP Facility #2 Routings**

**Summary for Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Runoff = 2.24 cfs @ 12.01 hrs, Volume= 7,658 cf, Depth= 0.28"

Routed to Pond 2P : SWM/BMP Facility #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

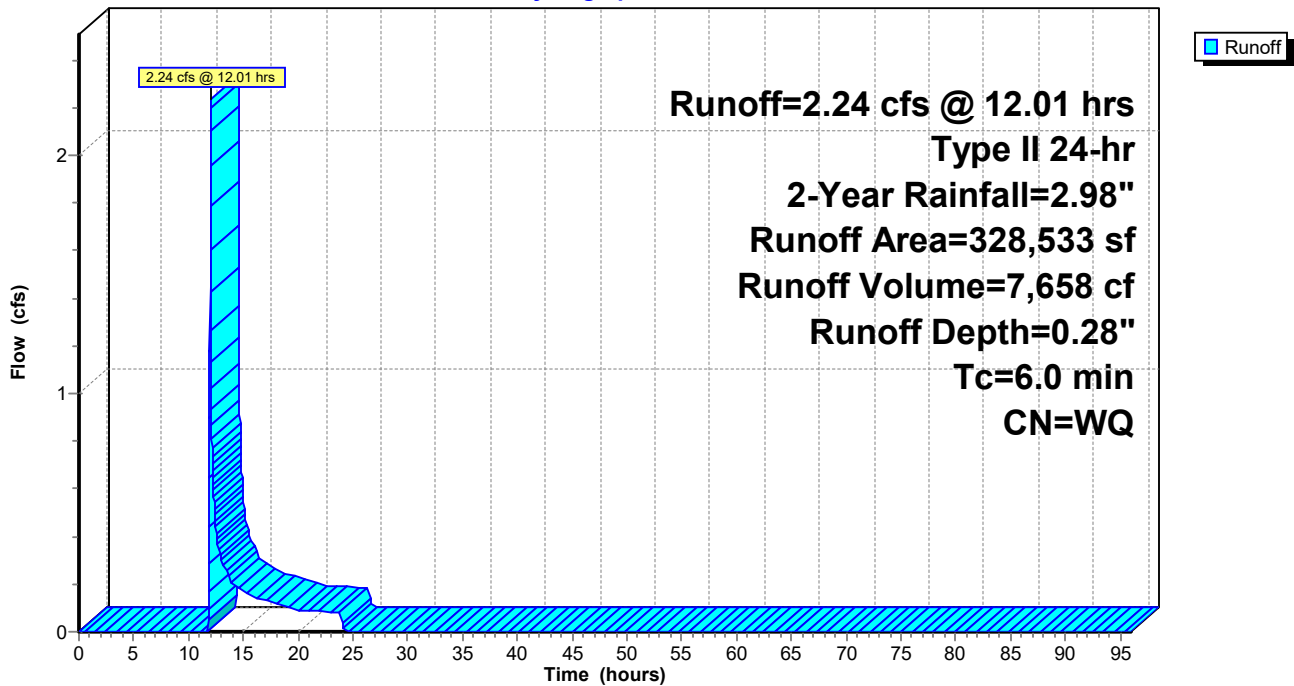
Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 283,756	58	Meadow / HSG B
* 44,777	61	Open Space / Good Condition / HSG B
328,533		Weighted Average
328,533		100.00% Pervious Area

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

**Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Hydrograph





**Summary for Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Runoff = 6.75 cfs @ 11.99 hrs, Volume= 16,293 cf, Depth= 0.60"

Routed to Pond 2P : SWM/BMP Facility #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

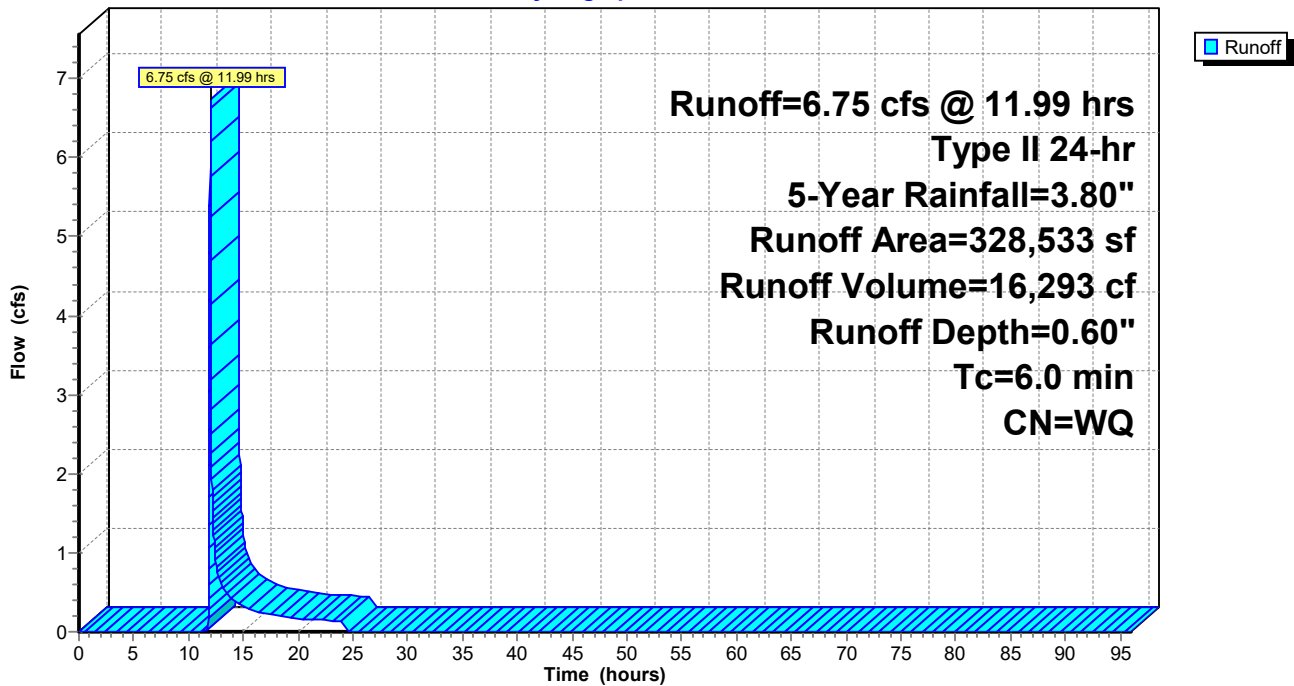
Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 283,756	58	Meadow / HSG B
* 44,777	61	Open Space / Good Condition / HSG B
328,533		Weighted Average
328,533		100.00% Pervious Area

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

**Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Hydrograph



**Summary for Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Runoff = 11.63 cfs @ 11.99 hrs, Volume= 25,562 cf, Depth= 0.93"

Routed to Pond 2P : SWM/BMP Facility #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

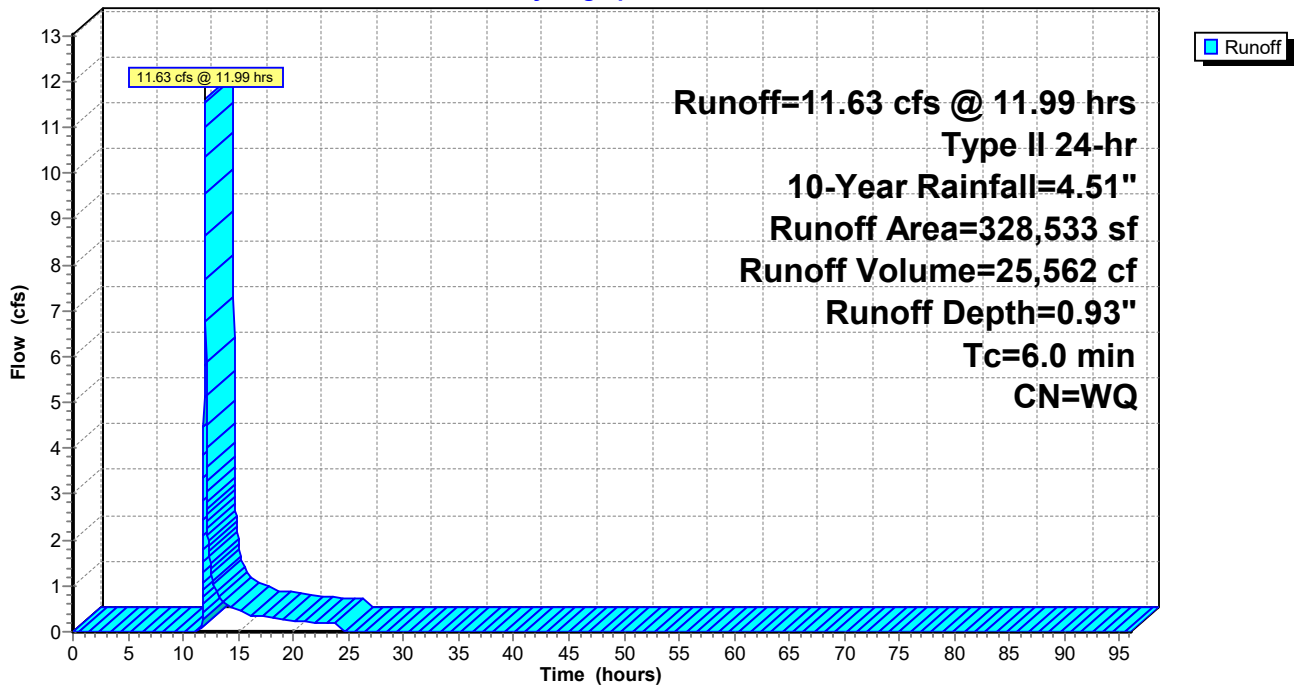
Type II 24-hr 10-Year Rainfall=4.51"

	Area (sf)	CN	Description
*	283,756	58	Meadow / HSG B
*	44,777	61	Open Space / Good Condition / HSG B
	328,533		Weighted Average
	328,533		100.00% Pervious Area

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

**Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Hydrograph



**Summary for Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Runoff = 20.22 cfs @ 11.98 hrs, Volume= 42,113 cf, Depth= 1.54"

Routed to Pond 2P : SWM/BMP Facility #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

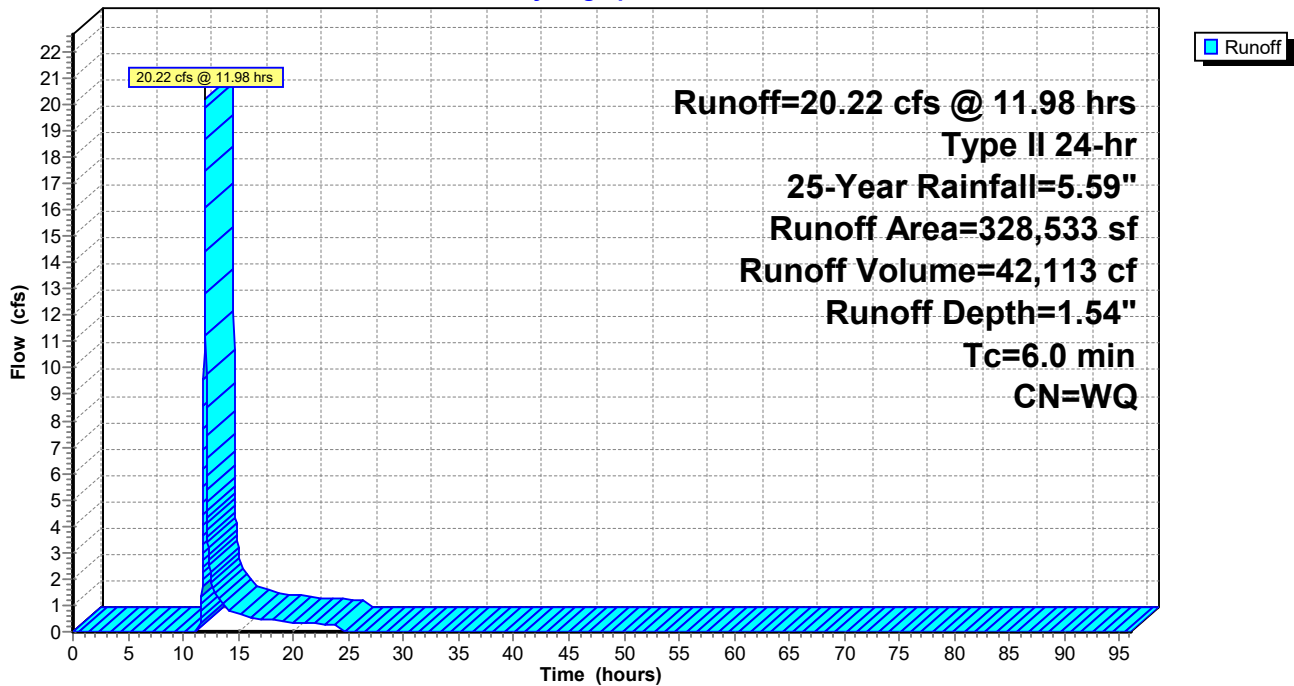
Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	283,756	58	Meadow / HSG B
*	44,777	61	Open Space / Good Condition / HSG B
	328,533		Weighted Average
	328,533		100.00% Pervious Area

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

**Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Hydrograph



**Summary for Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Runoff = 28.64 cfs @ 11.98 hrs, Volume= 58,570 cf, Depth= 2.14"

Routed to Pond 2P : SWM/BMP Facility #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

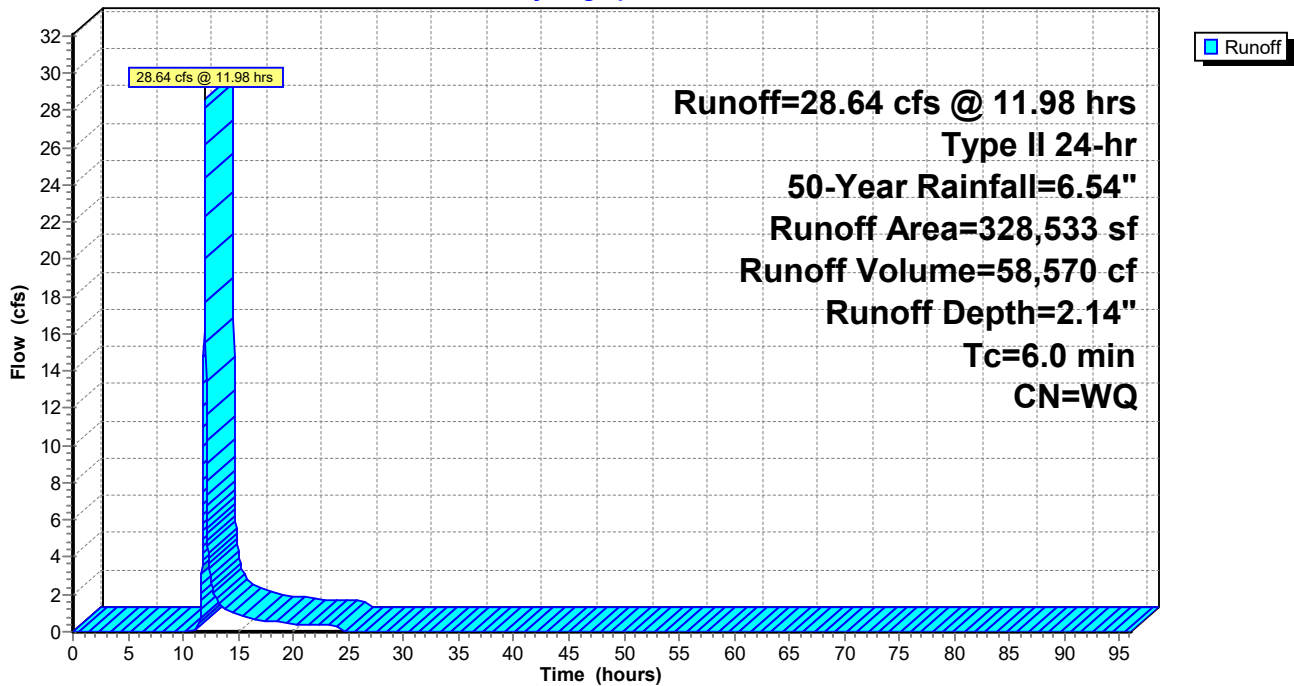
Type II 24-hr 50-Year Rainfall=6.54"

	Area (sf)	CN	Description
*	283,756	58	Meadow / HSG B
*	44,777	61	Open Space / Good Condition / HSG B
	328,533		Weighted Average
	328,533		100.00% Pervious Area

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

**Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Hydrograph



**Summary for Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Runoff = 38.81 cfs @ 11.98 hrs, Volume= 78,737 cf, Depth= 2.88"  
 Routed to Pond 2P : SWM/BMP Facility #2

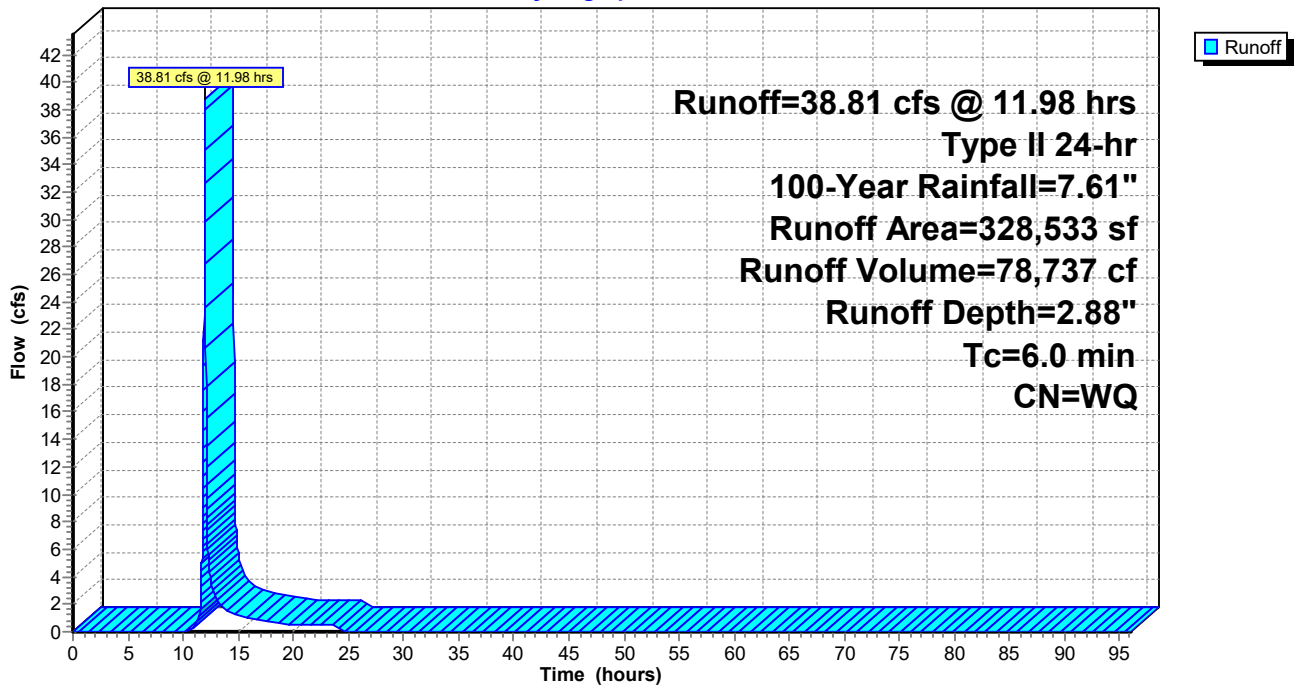
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

	Area (sf)	CN	Description
*	283,756	58	Meadow / HSG B
*	44,777	61	Open Space / Good Condition / HSG B
	328,533		Weighted Average
	328,533		100.00% Pervious Area

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

**Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #1**

**(DISCHARGE POINT 001)**

**SWM/BMP Facility #2 Routings**

**Summary for Pond 2P: SWM/BMP Facility #2**

Inflow Area = 328,533 sf, 0.00% Impervious, Inflow Depth = 6.30" for 2-Year event  
 Inflow = 55.23 cfs @ 12.24 hrs, Volume= 172,476 cf  
 Outflow = 1.72 cfs @ 18.16 hrs, Volume= 132,312 cf, Atten= 97%, Lag= 355.2 min  
 Primary = 1.72 cfs @ 18.16 hrs, Volume= 132,312 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 1L : Discharge Point 001

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 433.00' @ 18.16 hrs Surf.Area= 82,022 sf Storage= 117,161 cf

Plug-Flow detention time= 869.5 min calculated for 132,312 cf (77% of inflow)  
 Center-of-Mass det. time= 782.2 min ( 1,654.9 - 872.7 )

Volume	Invert	Avail.Storage	Storage Description			
#1	431.50'	826,303 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
431.50	75,829	1,764.7	0.0	0	0	75,829
432.00	76,712	1,767.8	100.0	38,135	38,135	77,070
433.00	82,044	1,786.7	100.0	79,363	117,498	82,703
434.00	87,432	1,805.5	100.0	84,724	202,222	88,370
435.00	92,877	1,824.4	100.0	90,141	292,363	94,123
436.00	98,379	1,843.2	100.0	95,615	387,977	99,908
437.00	103,937	1,862.1	100.0	101,145	489,123	105,781
438.00	109,551	1,880.9	100.0	106,732	595,854	111,685
439.00	115,222	1,899.8	100.0	112,375	708,229	117,677
440.00	120,950	1,918.6	100.0	118,074	826,303	123,700

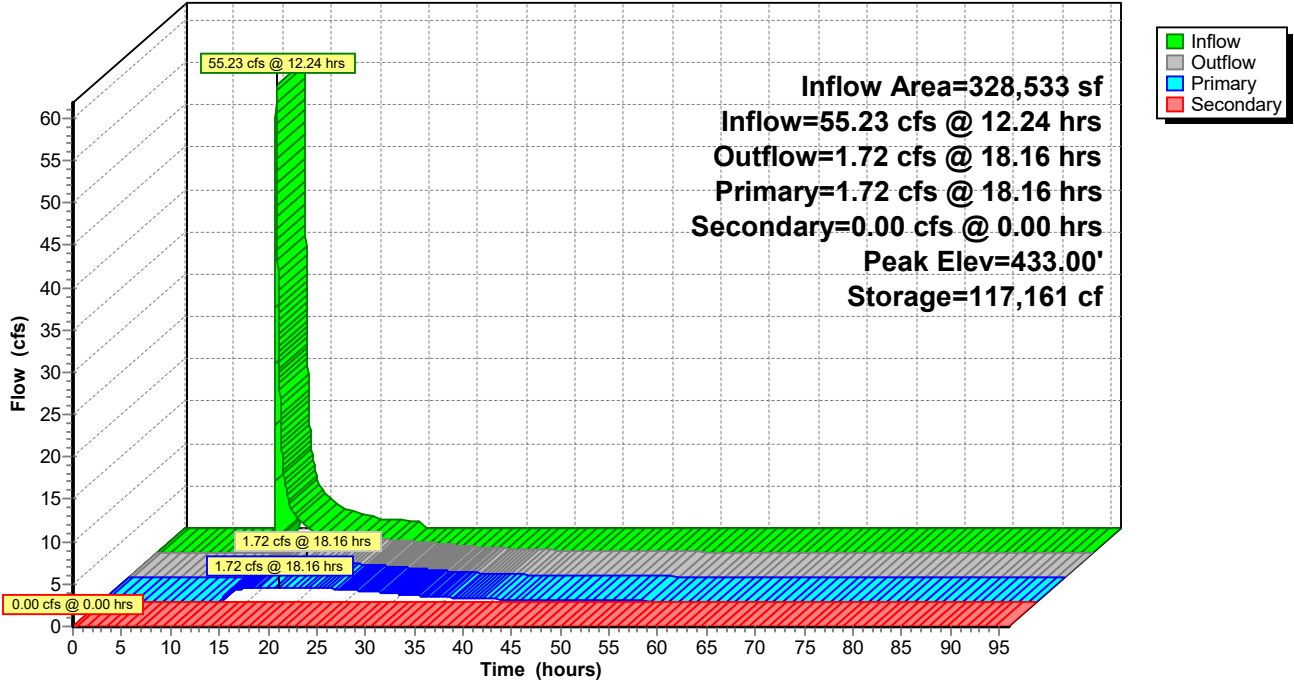
Device	Routing	Invert	Outlet Devices
#1	Primary	429.78'	<b>24.0" Round Outlet Pipe</b> L= 55.6' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 429.78' / 429.22' S= 0.0101 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	432.00'	<b>10.0" W x 6.0" H Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	436.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 23.00 columns</b> X 7 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#4	Secondary	437.60'	<b>70.0' long + 3.0 '/' SideZ x 22.0' breadth Emergency Spillway</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=1.72 cfs @ 18.16 hrs HW=433.00' (Free Discharge)  
 ↑ **1=Outlet Pipe** (Passes 1.72 cfs of 25.11 cfs potential flow)  
 ↑ **2=Orifice** (Orifice Controls 1.72 cfs @ 4.14 fps)  
 ↑ **3=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=431.50' (Free Discharge)  
 ↑ **4=Emergency Spillway** ( Controls 0.00 cfs)

### Pond 2P: SWM/BMP Facility #2

Hydrograph





**Summary for Pond 2P: SWM/BMP Facility #2**

Inflow Area = 328,533 sf, 0.00% Impervious, Inflow Depth = 10.75" for 5-Year event  
 Inflow = 123.15 cfs @ 12.15 hrs, Volume= 294,292 cf  
 Outflow = 2.67 cfs @ 17.63 hrs, Volume= 253,281 cf, Atten= 98%, Lag= 329.0 min  
 Primary = 2.67 cfs @ 17.63 hrs, Volume= 253,281 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 1L : Discharge Point 001

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 434.03' @ 17.63 hrs Surf.Area= 87,571 sf Storage= 204,484 cf

Plug-Flow detention time= 950.5 min calculated for 253,281 cf (86% of inflow)  
 Center-of-Mass det. time= 888.4 min ( 1,738.2 - 849.8 )

Volume	Invert	Avail.Storage	Storage Description			
#1	431.50'	826,303 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
431.50	75,829	1,764.7	0.0	0	0	75,829
432.00	76,712	1,767.8	100.0	38,135	38,135	77,070
433.00	82,044	1,786.7	100.0	79,363	117,498	82,703
434.00	87,432	1,805.5	100.0	84,724	202,222	88,370
435.00	92,877	1,824.4	100.0	90,141	292,363	94,123
436.00	98,379	1,843.2	100.0	95,615	387,977	99,908
437.00	103,937	1,862.1	100.0	101,145	489,123	105,781
438.00	109,551	1,880.9	100.0	106,732	595,854	111,685
439.00	115,222	1,899.8	100.0	112,375	708,229	117,677
440.00	120,950	1,918.6	100.0	118,074	826,303	123,700

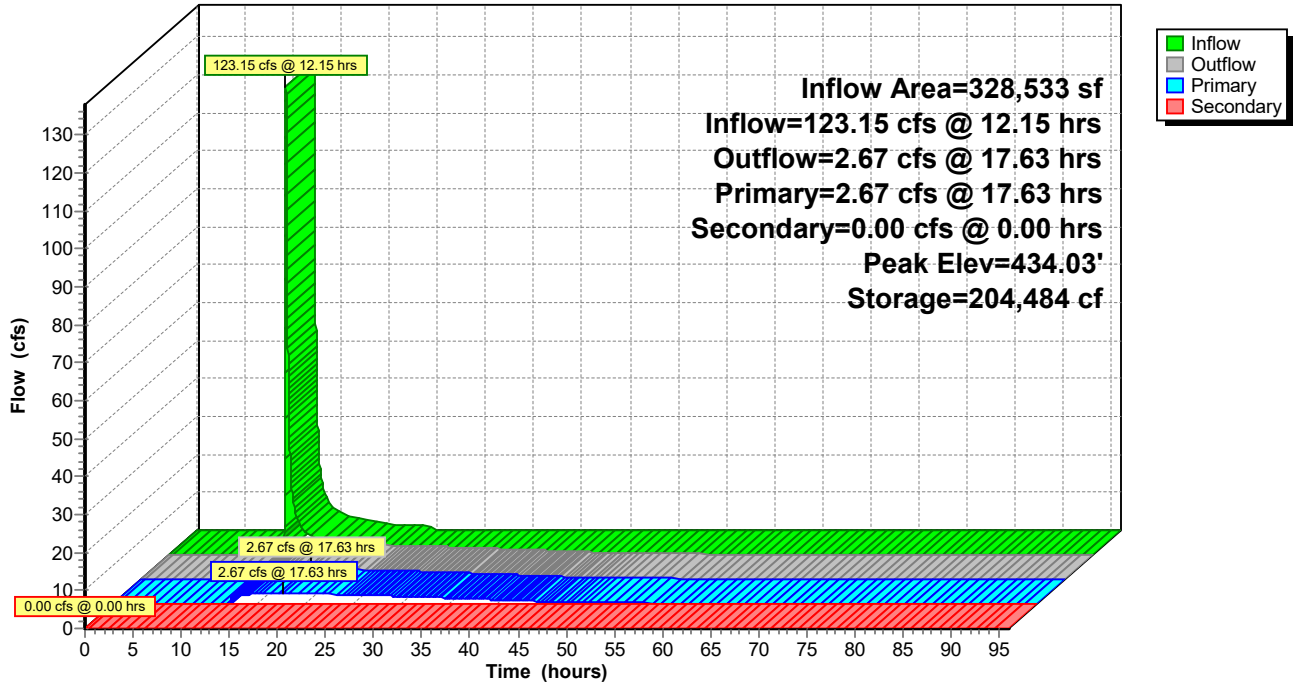
Device	Routing	Invert	Outlet Devices
#1	Primary	429.78'	<b>24.0" Round Outlet Pipe</b> L= 55.6' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 429.78' / 429.22' S= 0.0101 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	432.00'	<b>10.0" W x 6.0" H Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	436.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 23.00 columns</b> X 7 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#4	Secondary	437.60'	<b>70.0' long + 3.0 '/' SideZ x 22.0' breadth Emergency Spillway</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=2.67 cfs @ 17.63 hrs HW=434.03' (Free Discharge)  
 ↑ **1=Outlet Pipe** (Passes 2.67 cfs of 31.56 cfs potential flow)  
 ↑ **2=Orifice** (Orifice Controls 2.67 cfs @ 6.41 fps)  
 ↑ **3=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=431.50' (Free Discharge)  
 ↑ **4=Emergency Spillway** ( Controls 0.00 cfs)

Pond 2P: SWM/BMP Facility #2

Hydrograph



**Summary for Pond 2P: SWM/BMP Facility #2**

Inflow Area = 328,533 sf, 0.00% Impervious, Inflow Depth = 14.74" for 10-Year event  
 Inflow = 166.81 cfs @ 12.12 hrs, Volume= 403,637 cf  
 Outflow = 3.30 cfs @ 17.78 hrs, Volume= 361,704 cf, Atten= 98%, Lag= 339.7 min  
 Primary = 3.30 cfs @ 17.78 hrs, Volume= 361,704 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 1L : Discharge Point 001

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 434.96' @ 17.78 hrs Surf.Area= 92,663 sf Storage= 288,772 cf

Plug-Flow detention time= 1,063.5 min calculated for 361,704 cf (90% of inflow)  
 Center-of-Mass det. time= 1,013.2 min ( 1,853.2 - 840.0 )

Volume	Invert	Avail.Storage	Storage Description			
#1	431.50'	826,303 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
431.50	75,829	1,764.7	0.0	0	0	75,829
432.00	76,712	1,767.8	100.0	38,135	38,135	77,070
433.00	82,044	1,786.7	100.0	79,363	117,498	82,703
434.00	87,432	1,805.5	100.0	84,724	202,222	88,370
435.00	92,877	1,824.4	100.0	90,141	292,363	94,123
436.00	98,379	1,843.2	100.0	95,615	387,977	99,908
437.00	103,937	1,862.1	100.0	101,145	489,123	105,781
438.00	109,551	1,880.9	100.0	106,732	595,854	111,685
439.00	115,222	1,899.8	100.0	112,375	708,229	117,677
440.00	120,950	1,918.6	100.0	118,074	826,303	123,700

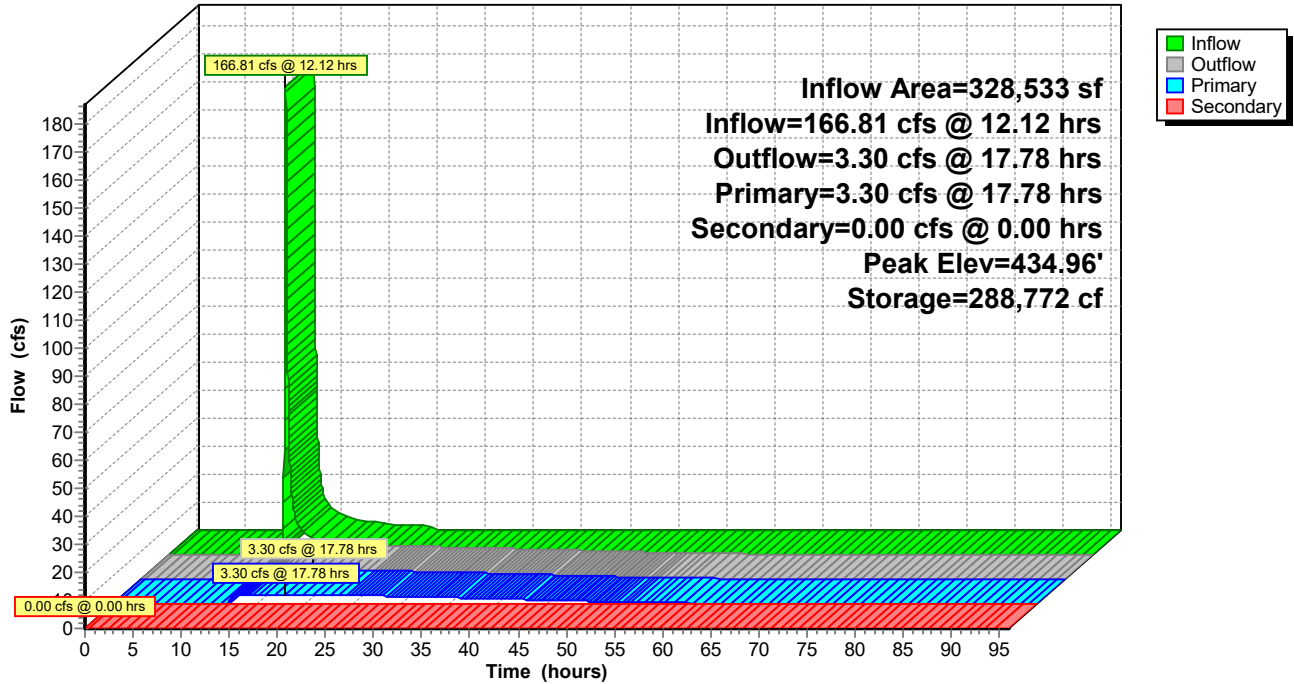
Device	Routing	Invert	Outlet Devices
#1	Primary	429.78'	<b>24.0" Round Outlet Pipe</b> L= 55.6' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 429.78' / 429.22' S= 0.0101 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	432.00'	<b>10.0" W x 6.0" H Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	436.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 23.00 columns</b> X 7 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#4	Secondary	437.60'	<b>70.0' long + 3.0 '/' SideZ x 22.0' breadth Emergency Spillway</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=3.30 cfs @ 17.78 hrs HW=434.96' (Free Discharge)  
 ↑ **1=Outlet Pipe** (Passes 3.30 cfs of 36.44 cfs potential flow)  
 ↑ **2=Orifice** (Orifice Controls 3.30 cfs @ 7.93 fps)  
 ↑ **3=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=431.50' (Free Discharge)  
 ↑ **4=Emergency Spillway** ( Controls 0.00 cfs)

### Pond 2P: SWM/BMP Facility #2

Hydrograph



**Summary for Pond 2P: SWM/BMP Facility #2**

Inflow Area = 328,533 sf, 0.00% Impervious, Inflow Depth = 21.01" for 25-Year event  
 Inflow = 218.97 cfs @ 12.11 hrs, Volume= 575,270 cf  
 Outflow = 6.68 cfs @ 15.46 hrs, Volume= 531,951 cf, Atten= 97%, Lag= 201.2 min  
 Primary = 6.68 cfs @ 15.46 hrs, Volume= 531,951 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 1L : Discharge Point 001

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 436.17' @ 15.46 hrs Surf.Area= 99,329 sf Storage= 405,070 cf

Plug-Flow detention time= 1,132.1 min calculated for 531,951 cf (92% of inflow)  
 Center-of-Mass det. time= 1,092.8 min ( 1,923.9 - 831.0 )

Volume	Invert	Avail.Storage	Storage Description			
#1	431.50'	826,303 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
431.50	75,829	1,764.7	0.0	0	0	75,829
432.00	76,712	1,767.8	100.0	38,135	38,135	77,070
433.00	82,044	1,786.7	100.0	79,363	117,498	82,703
434.00	87,432	1,805.5	100.0	84,724	202,222	88,370
435.00	92,877	1,824.4	100.0	90,141	292,363	94,123
436.00	98,379	1,843.2	100.0	95,615	387,977	99,908
437.00	103,937	1,862.1	100.0	101,145	489,123	105,781
438.00	109,551	1,880.9	100.0	106,732	595,854	111,685
439.00	115,222	1,899.8	100.0	112,375	708,229	117,677
440.00	120,950	1,918.6	100.0	118,074	826,303	123,700

Device	Routing	Invert	Outlet Devices
#1	Primary	429.78'	<b>24.0" Round Outlet Pipe</b> L= 55.6' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 429.78' / 429.22' S= 0.0101 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	432.00'	<b>10.0" W x 6.0" H Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	436.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 23.00 columns</b> X 7 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#4	Secondary	437.60'	<b>70.0' long + 3.0 '/' SideZ x 22.0' breadth Emergency Spillway</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=6.68 cfs @ 15.46 hrs HW=436.17' (Free Discharge)

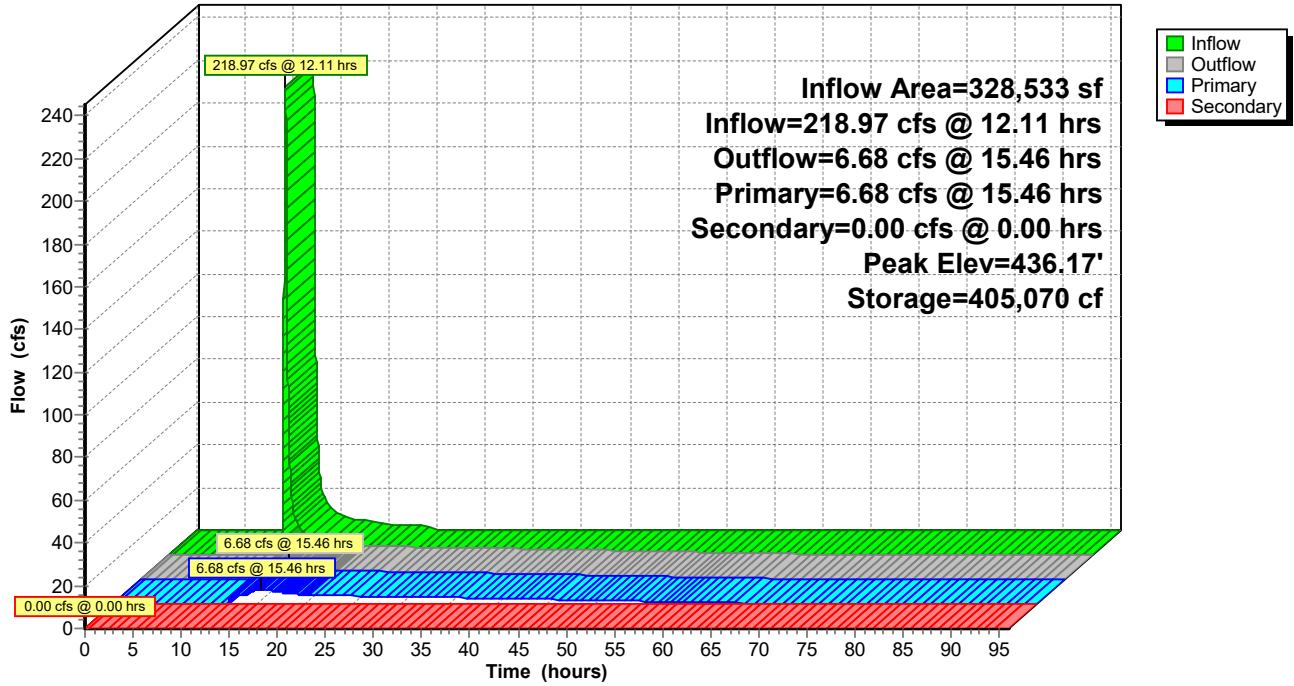
- ↑ **1=Outlet Pipe** (Passes 6.68 cfs of 41.93 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 3.97 cfs @ 9.54 fps)
- ↑ **3=Type M Inlet** (Weir Controls 2.70 cfs @ 1.36 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=431.50' (Free Discharge)

- ↑ **4=Emergency Spillway** ( Controls 0.00 cfs)

Pond 2P: SWM/BMP Facility #2

Hydrograph



**Summary for Pond 2P: SWM/BMP Facility #2**

Inflow Area = 328,533 sf, 0.00% Impervious, Inflow Depth = 26.72" for 50-Year event  
 Inflow = 264.89 cfs @ 12.10 hrs, Volume= 731,416 cf  
 Outflow = 20.73 cfs @ 13.11 hrs, Volume= 687,936 cf, Atten= 92%, Lag= 60.3 min  
 Primary = 20.73 cfs @ 13.11 hrs, Volume= 687,936 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 1L : Discharge Point 001

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 436.58' @ 13.11 hrs Surf.Area= 101,574 sf Storage= 445,775 cf

Plug-Flow detention time= 922.1 min calculated for 687,864 cf (94% of inflow)  
 Center-of-Mass det. time= 889.9 min ( 1,715.4 - 825.4 )

Volume	Invert	Avail.Storage	Storage Description			
#1	431.50'	826,303 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
431.50	75,829	1,764.7	0.0	0	0	75,829
432.00	76,712	1,767.8	100.0	38,135	38,135	77,070
433.00	82,044	1,786.7	100.0	79,363	117,498	82,703
434.00	87,432	1,805.5	100.0	84,724	202,222	88,370
435.00	92,877	1,824.4	100.0	90,141	292,363	94,123
436.00	98,379	1,843.2	100.0	95,615	387,977	99,908
437.00	103,937	1,862.1	100.0	101,145	489,123	105,781
438.00	109,551	1,880.9	100.0	106,732	595,854	111,685
439.00	115,222	1,899.8	100.0	112,375	708,229	117,677
440.00	120,950	1,918.6	100.0	118,074	826,303	123,700

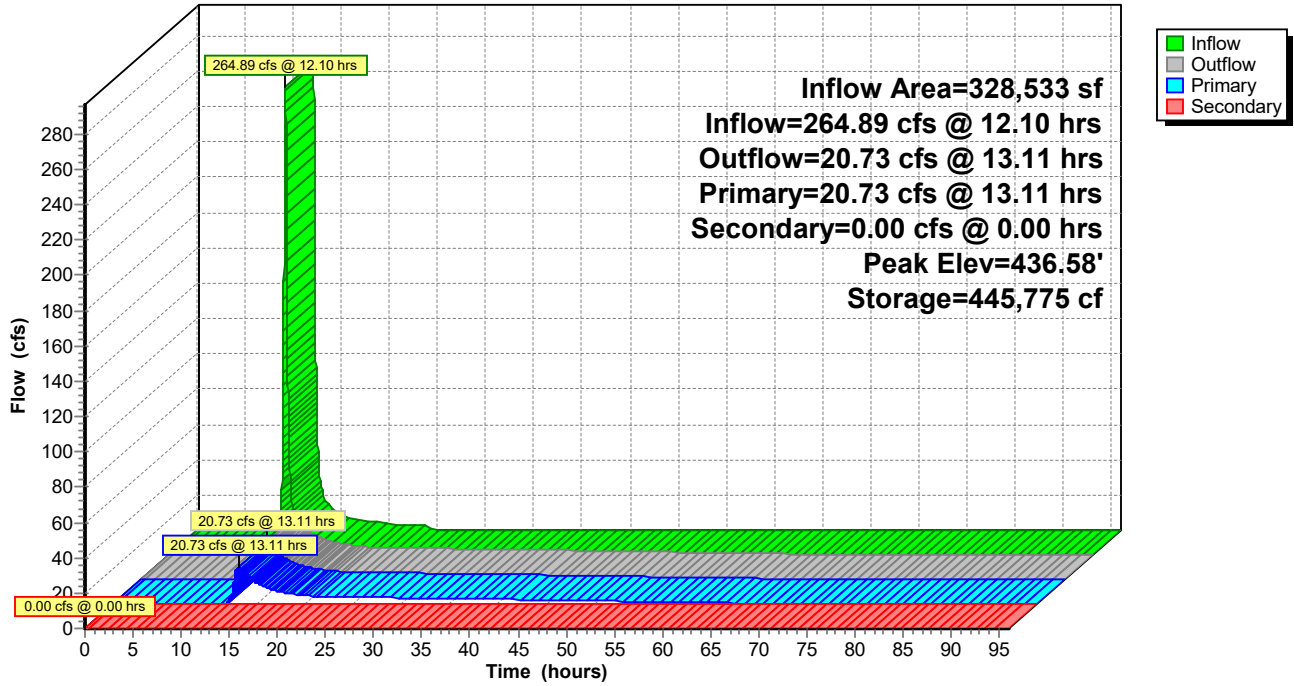
Device	Routing	Invert	Outlet Devices
#1	Primary	429.78'	<b>24.0" Round Outlet Pipe</b> L= 55.6' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 429.78' / 429.22' S= 0.0101 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	432.00'	<b>10.0" W x 6.0" H Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	436.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 23.00 columns</b> X 7 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#4	Secondary	437.60'	<b>70.0' long + 3.0 '/' SideZ x 22.0' breadth Emergency Spillway</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=20.70 cfs @ 13.11 hrs HW=436.58' (Free Discharge)  
 ↑ **1=Outlet Pipe** (Passes 20.70 cfs of 43.61 cfs potential flow)  
 ↑ **2=Orifice** (Orifice Controls 4.17 cfs @ 10.02 fps)  
 ↑ **3=Type M Inlet** (Weir Controls 16.53 cfs @ 2.49 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=431.50' (Free Discharge)  
 ↑ **4=Emergency Spillway** ( Controls 0.00 cfs)

### Pond 2P: SWM/BMP Facility #2

Hydrograph





**Summary for Pond 2P: SWM/BMP Facility #2**

Inflow Area = 328,533 sf, 0.00% Impervious, Inflow Depth = 33.30" for 100-Year event  
 Inflow = 318.00 cfs @ 12.10 hrs, Volume= 911,696 cf  
 Outflow = 36.07 cfs @ 12.77 hrs, Volume= 868,103 cf, Atten= 89%, Lag= 40.0 min  
 Primary = 36.07 cfs @ 12.77 hrs, Volume= 868,103 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 1L : Discharge Point 001

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 437.31' @ 12.77 hrs Surf.Area= 105,667 sf Storage= 521,705 cf

Plug-Flow detention time= 761.0 min calculated for 868,013 cf (95% of inflow)  
 Center-of-Mass det. time= 734.3 min ( 1,554.3 - 820.0 )

Volume	Invert	Avail.Storage	Storage Description			
#1	431.50'	826,303 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
431.50	75,829	1,764.7	0.0	0	0	75,829
432.00	76,712	1,767.8	100.0	38,135	38,135	77,070
433.00	82,044	1,786.7	100.0	79,363	117,498	82,703
434.00	87,432	1,805.5	100.0	84,724	202,222	88,370
435.00	92,877	1,824.4	100.0	90,141	292,363	94,123
436.00	98,379	1,843.2	100.0	95,615	387,977	99,908
437.00	103,937	1,862.1	100.0	101,145	489,123	105,781
438.00	109,551	1,880.9	100.0	106,732	595,854	111,685
439.00	115,222	1,899.8	100.0	112,375	708,229	117,677
440.00	120,950	1,918.6	100.0	118,074	826,303	123,700

Device	Routing	Invert	Outlet Devices
#1	Primary	429.78'	<b>24.0" Round Outlet Pipe</b> L= 55.6' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 429.78' / 429.22' S= 0.0101 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	432.00'	<b>10.0" W x 6.0" H Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	436.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 23.00 columns</b> X 7 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#4	Secondary	437.60'	<b>70.0' long + 3.0 '/' SideZ x 22.0' breadth Emergency Spillway</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=36.07 cfs @ 12.77 hrs HW=437.31' (Free Discharge)

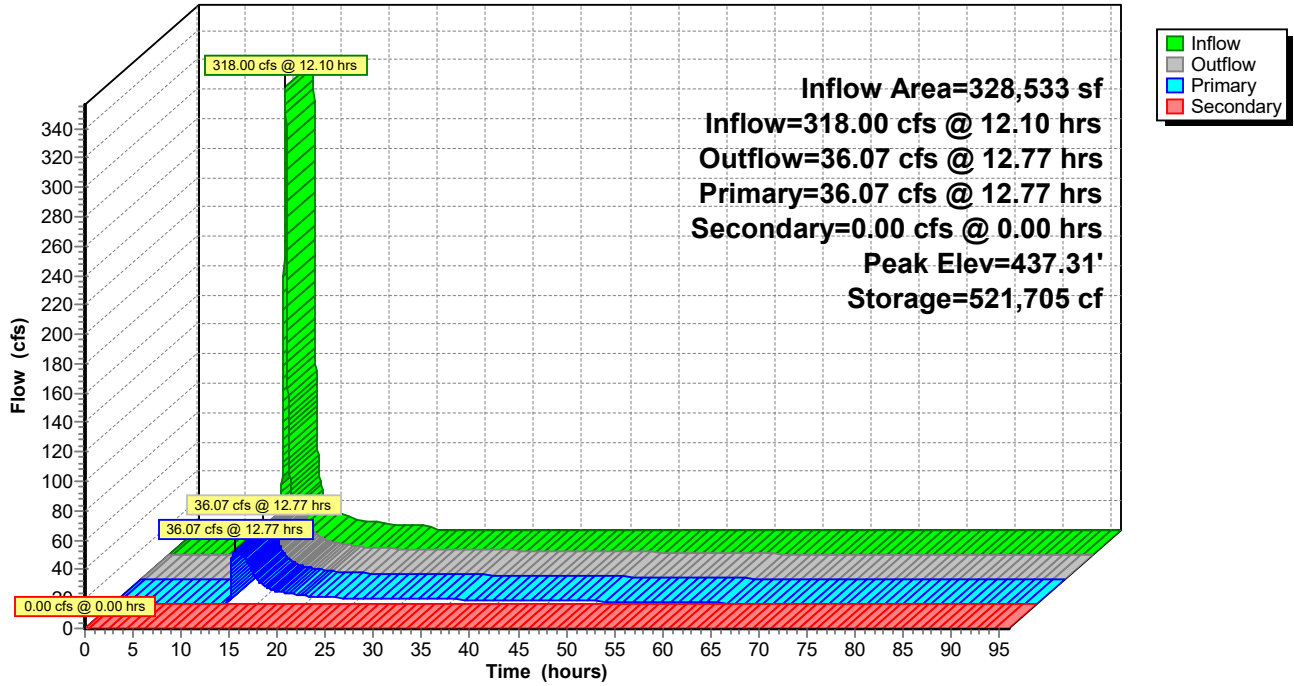
- ↑ **1=Outlet Pipe** (Passes 36.07 cfs of 46.50 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 4.51 cfs @ 10.83 fps)
- ↑ **3=Type M Inlet** (Orifice Controls 31.56 cfs @ 5.51 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=431.50' (Free Discharge)

- ↑ **4=Emergency Spillway** ( Controls 0.00 cfs)

### Pond 2P: SWM/BMP Facility #2

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #1**

**(DISCHARGE POINT 001)**

**Undetained Routings**

**Summary for Subcatchment 1U: Watershed Area #1 - Undetained**

Runoff = 1.25 cfs @ 11.98 hrs, Volume= 2,704 cf, Depth= 0.69"  
 Routed to Link 1L : Discharge Point 001

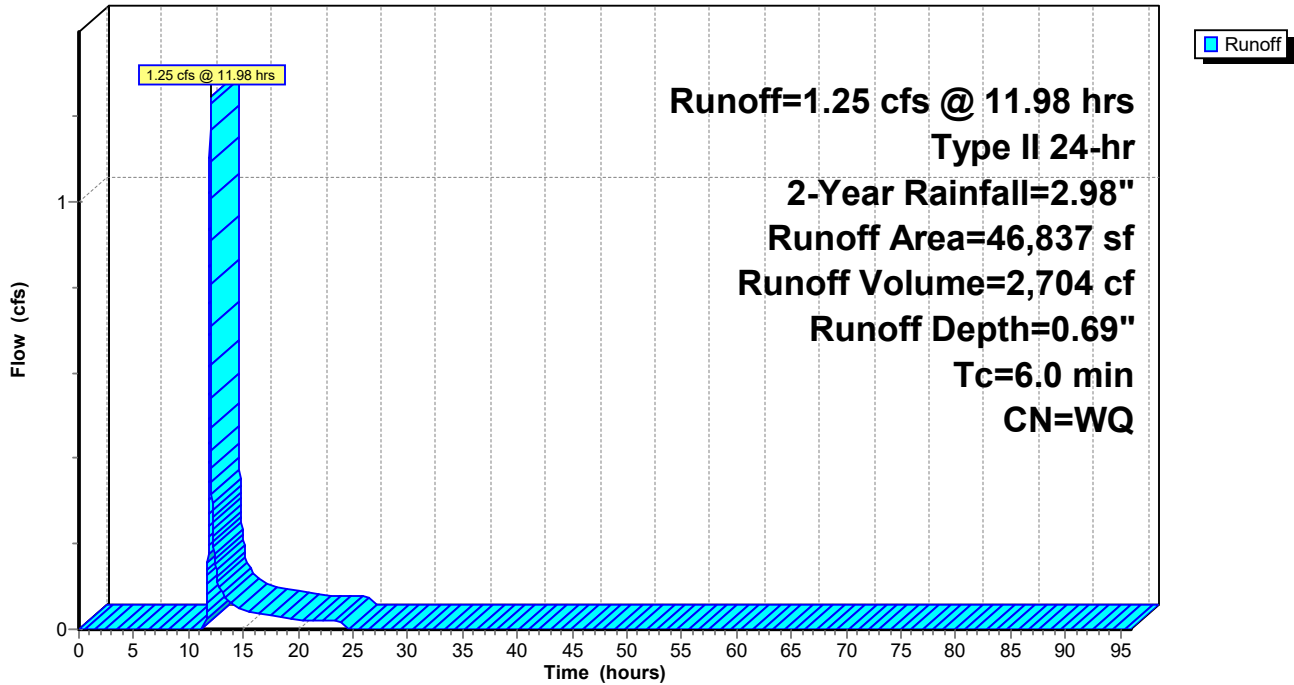
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

	Area (sf)	CN	Description
*	6,569	58	Meadow / HSG B
*	38,806	71	Meadow / HSG C
*	1,462	78	Meadow / HSG D
	46,837		Weighted Average
	46,837		100.00% Pervious Area

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

**Subcatchment 1U: Watershed Area #1 - Undetained**

Hydrograph



**Summary for Subcatchment 1U: Watershed Area #1 - Undetained**

Runoff = 2.22 cfs @ 11.98 hrs, Volume= 4,598 cf, Depth= 1.18"  
 Routed to Link 1L : Discharge Point 001

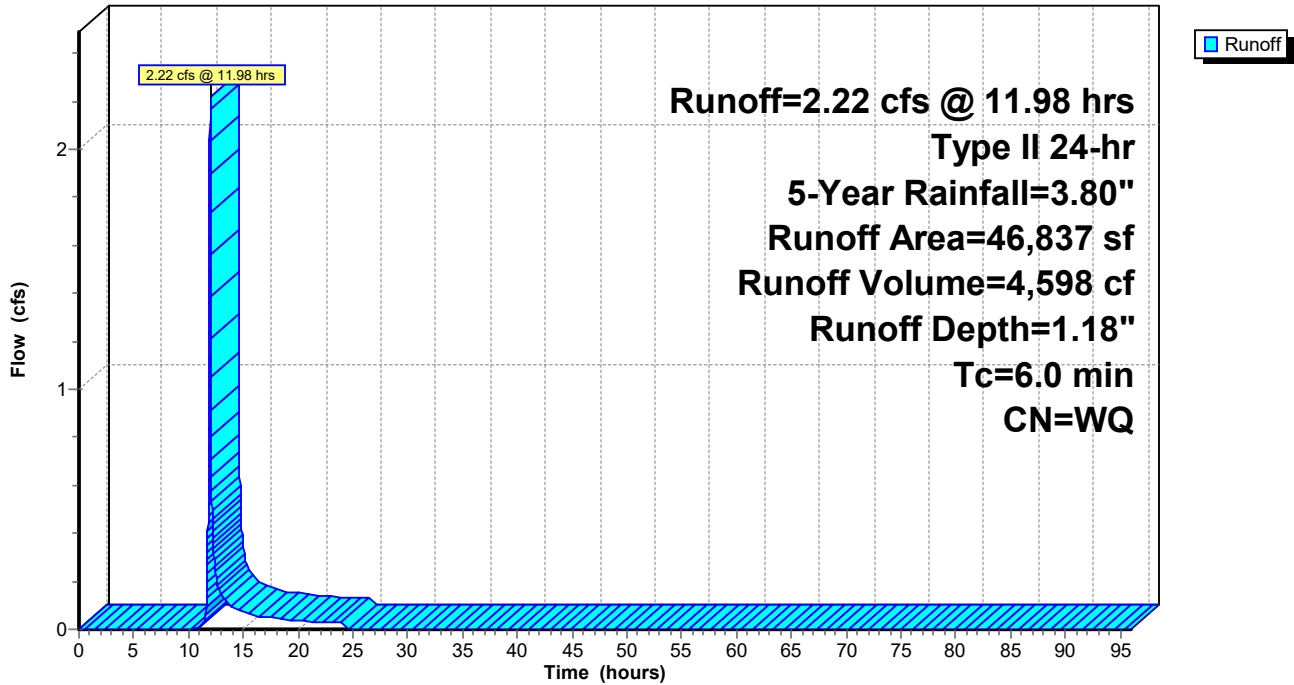
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

	Area (sf)	CN	Description
*	6,569	58	Meadow / HSG B
*	38,806	71	Meadow / HSG C
*	1,462	78	Meadow / HSG D
	46,837		Weighted Average
	46,837		100.00% Pervious Area

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

**Subcatchment 1U: Watershed Area #1 - Undetained**

Hydrograph



**Summary for Subcatchment 1U: Watershed Area #1 - Undetained**

Runoff = 3.16 cfs @ 11.98 hrs, Volume= 6,449 cf, Depth= 1.65"  
 Routed to Link 1L : Discharge Point 001

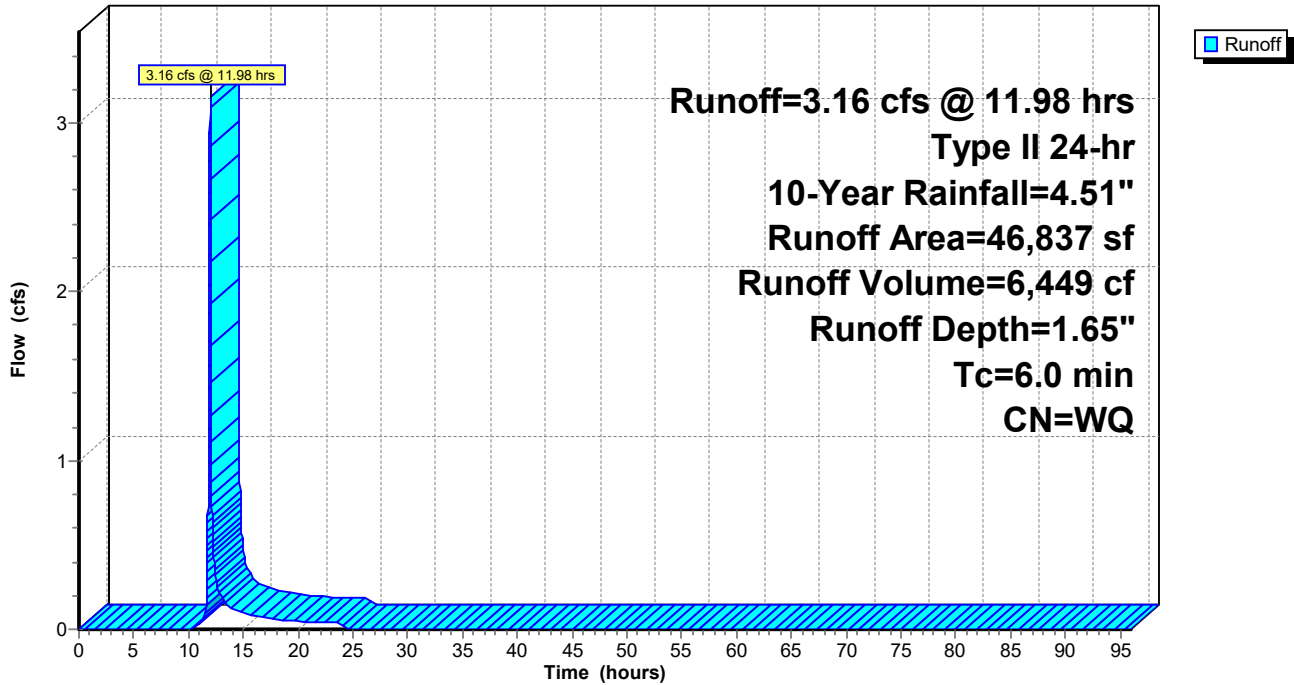
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

	Area (sf)	CN	Description
*	6,569	58	Meadow / HSG B
*	38,806	71	Meadow / HSG C
*	1,462	78	Meadow / HSG D
	46,837		Weighted Average
	46,837		100.00% Pervious Area

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

**Subcatchment 1U: Watershed Area #1 - Undetained**

Hydrograph



**Summary for Subcatchment 1U: Watershed Area #1 - Undetained**

Runoff = 4.69 cfs @ 11.98 hrs, Volume= 9,535 cf, Depth= 2.44"  
 Routed to Link 1L : Discharge Point 001

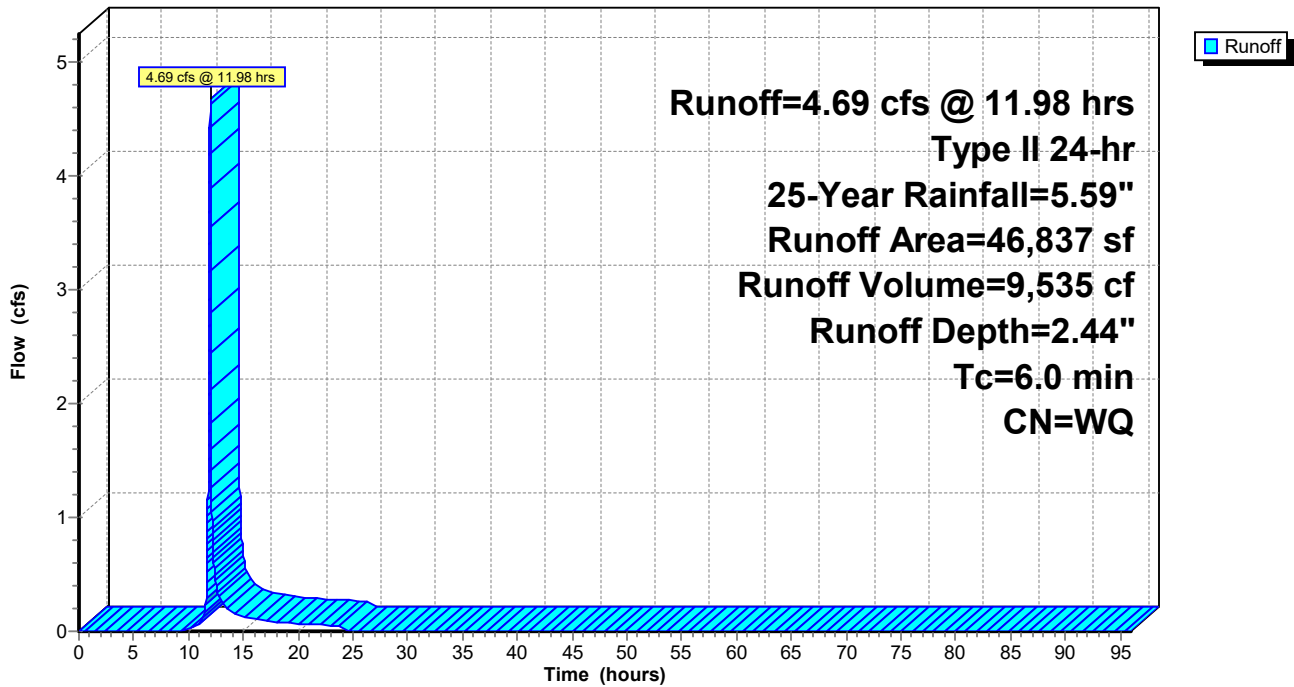
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	6,569	58	Meadow / HSG B
*	38,806	71	Meadow / HSG C
*	1,462	78	Meadow / HSG D
	46,837		Weighted Average
	46,837		100.00% Pervious Area

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

**Subcatchment 1U: Watershed Area #1 - Undetained**

Hydrograph



**Summary for Subcatchment 1U: Watershed Area #1 - Undetained**

Runoff = 6.11 cfs @ 11.97 hrs, Volume= 12,445 cf, Depth= 3.19"  
 Routed to Link 1L : Discharge Point 001

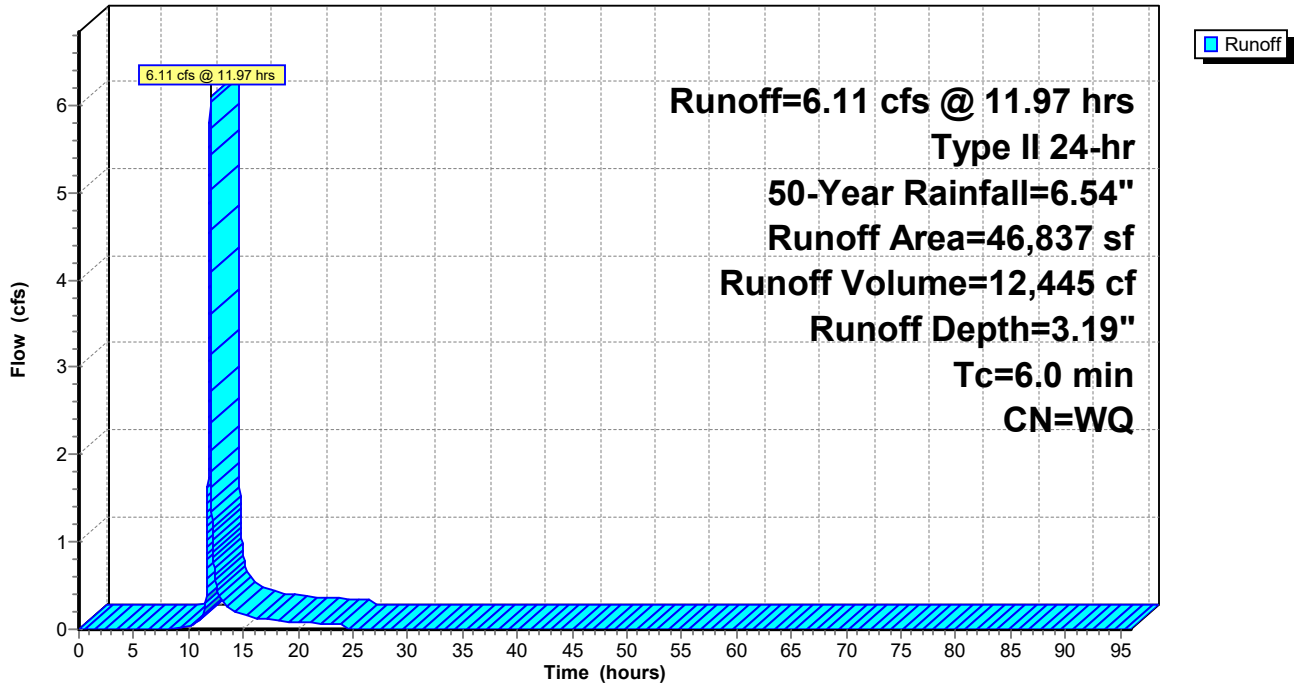
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

	Area (sf)	CN	Description
*	6,569	58	Meadow / HSG B
*	38,806	71	Meadow / HSG C
*	1,462	78	Meadow / HSG D
	46,837		Weighted Average
	46,837		100.00% Pervious Area

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

**Subcatchment 1U: Watershed Area #1 - Undetained**

Hydrograph





**Summary for Subcatchment 1U: Watershed Area #1 - Undetained**

Runoff = 7.76 cfs @ 11.97 hrs, Volume= 15,883 cf, Depth= 4.07"  
 Routed to Link 1L : Discharge Point 001

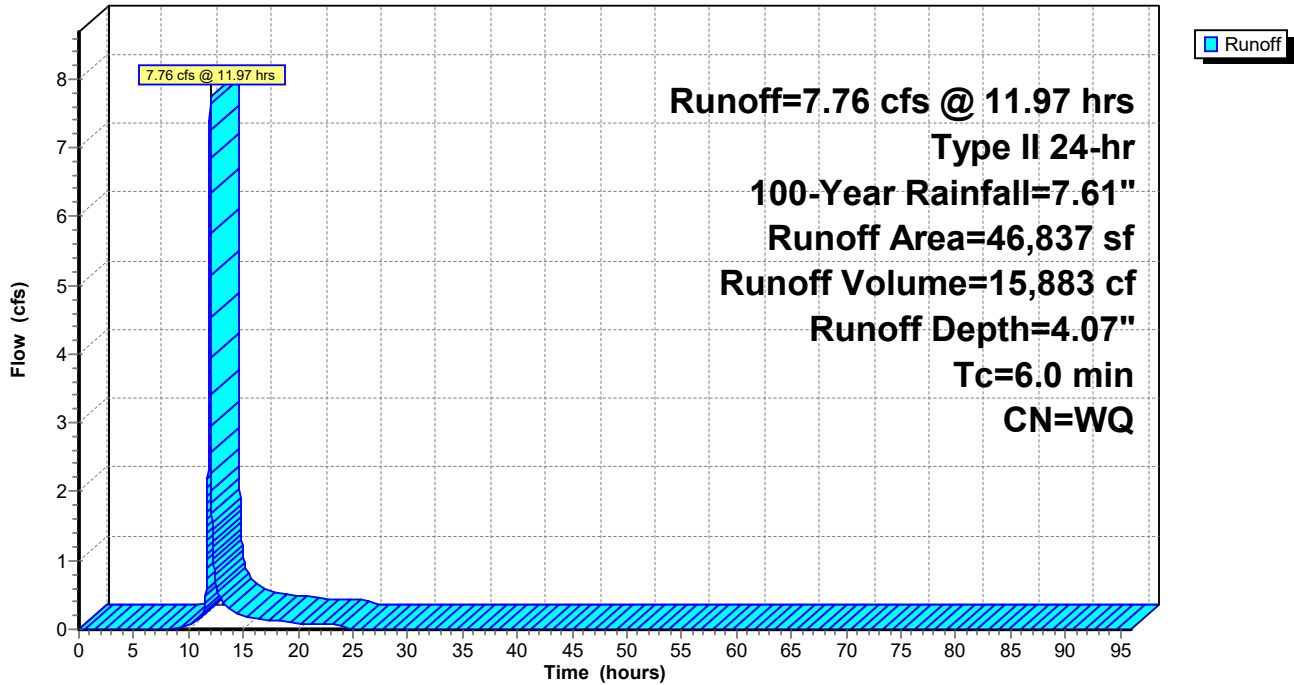
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

	Area (sf)	CN	Description
*	6,569	58	Meadow / HSG B
*	38,806	71	Meadow / HSG C
*	1,462	78	Meadow / HSG D
	46,837		Weighted Average
	46,837		100.00% Pervious Area

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

**Subcatchment 1U: Watershed Area #1 - Undetained**

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #1**

**(DISCHARGE POINT 001)**

**Combined Routings**

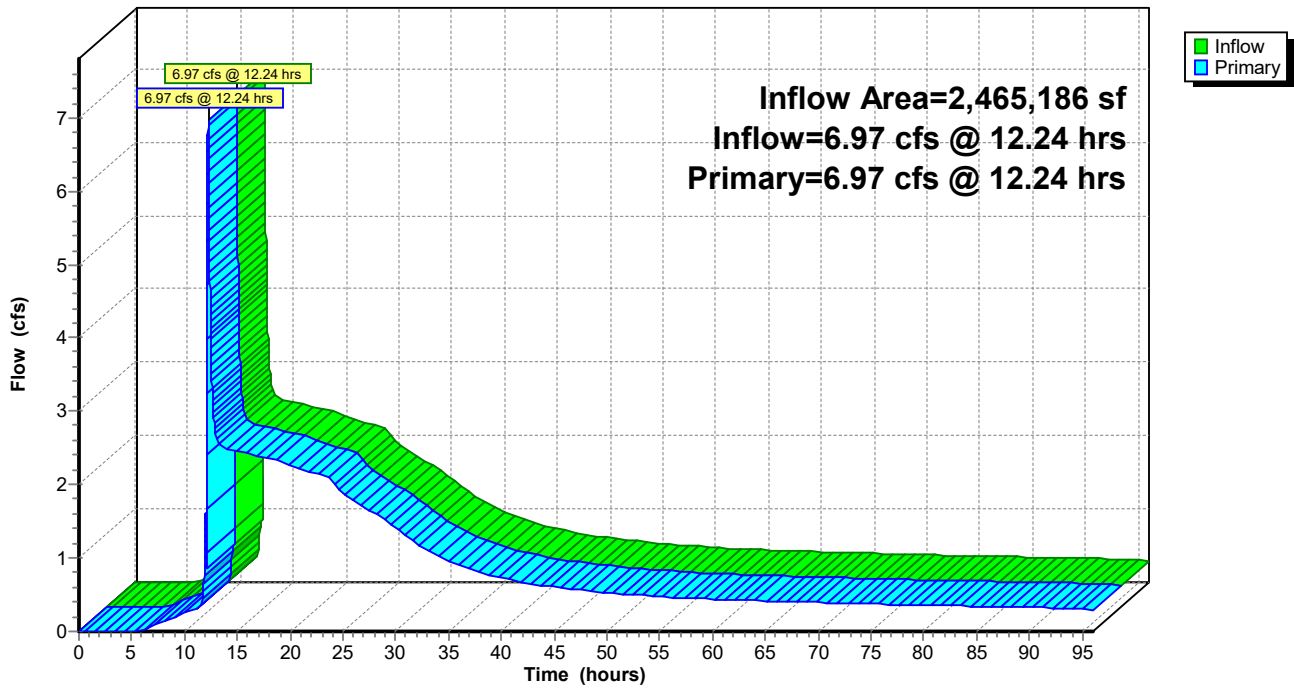
### Summary for Link 1L: Discharge Point 001

Inflow Area = 2,465,186 sf, 70.46% Impervious, Inflow Depth > 1.31" for 2-Year event  
Inflow = 6.97 cfs @ 12.24 hrs, Volume= 269,373 cf  
Primary = 6.97 cfs @ 12.24 hrs, Volume= 269,373 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 1L: Discharge Point 001

Hydrograph



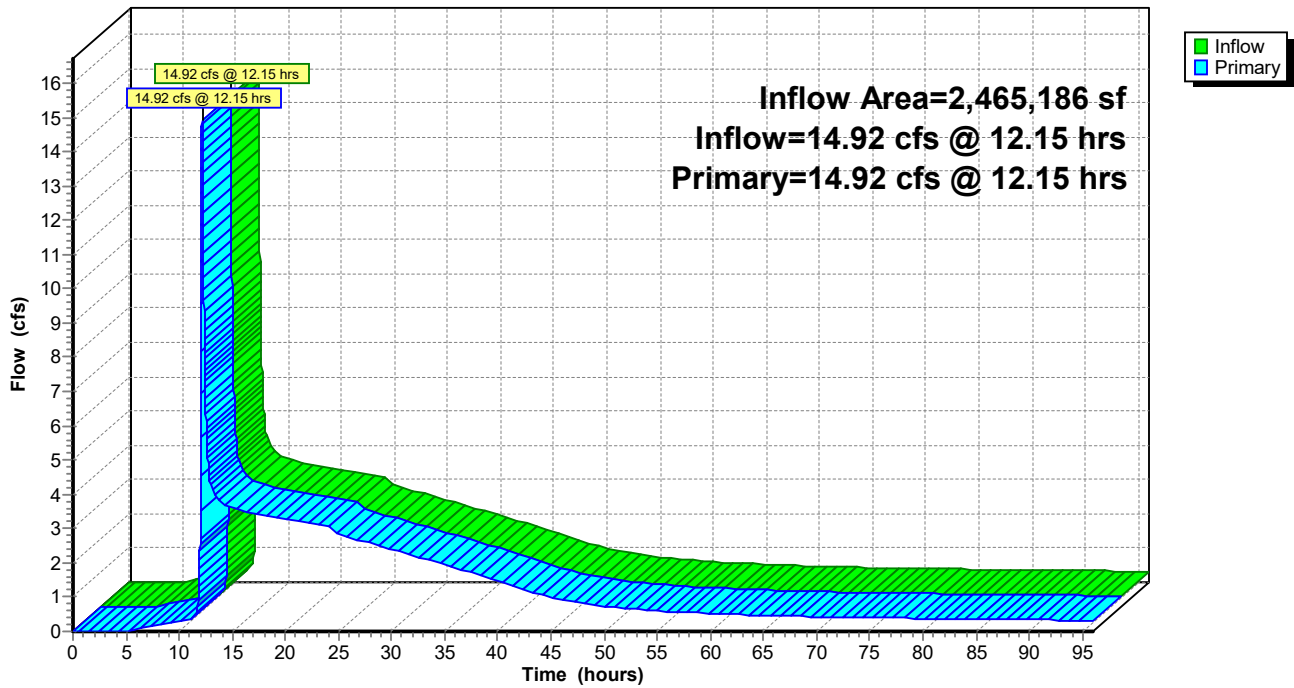
### Summary for Link 1L: Discharge Point 001

Inflow Area = 2,465,186 sf, 70.46% Impervious, Inflow Depth > 1.98" for 5-Year event  
Inflow = 14.92 cfs @ 12.15 hrs, Volume= 406,843 cf  
Primary = 14.92 cfs @ 12.15 hrs, Volume= 406,843 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 1L: Discharge Point 001

Hydrograph



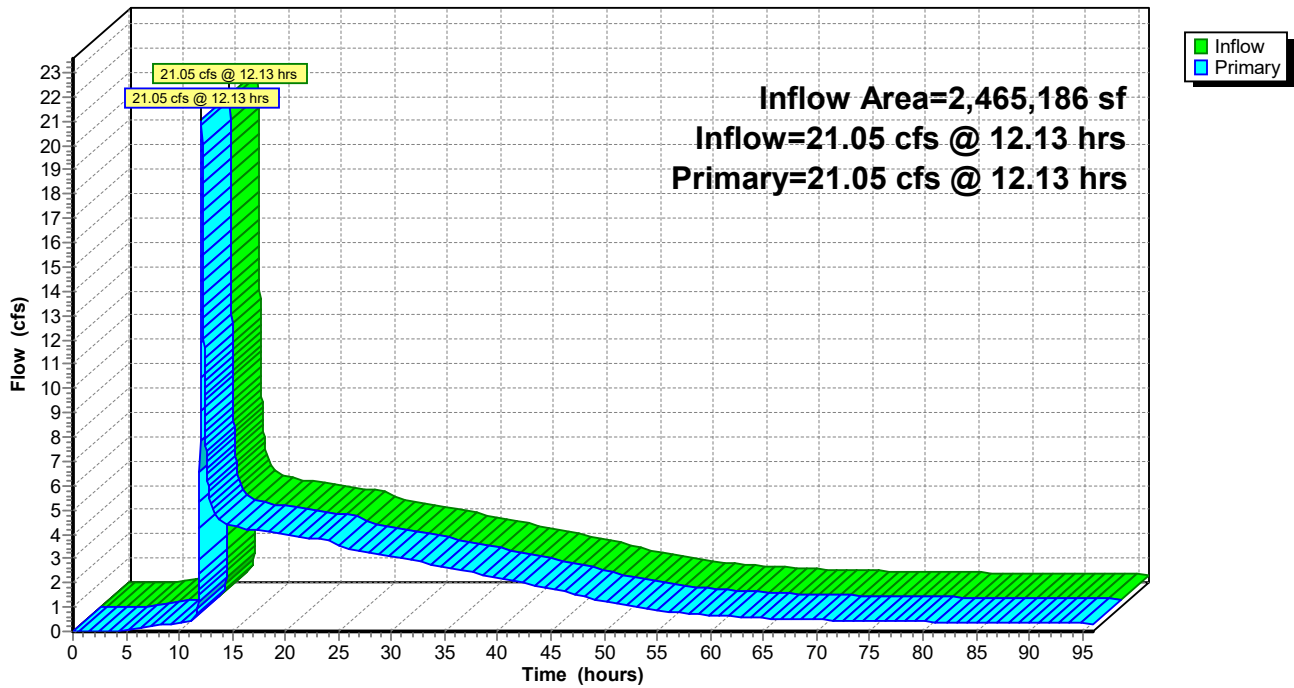
### Summary for Link 1L: Discharge Point 001

Inflow Area = 2,465,186 sf, 70.46% Impervious, Inflow Depth > 2.58" for 10-Year event  
Inflow = 21.05 cfs @ 12.13 hrs, Volume= 529,789 cf  
Primary = 21.05 cfs @ 12.13 hrs, Volume= 529,789 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 1L: Discharge Point 001

Hydrograph



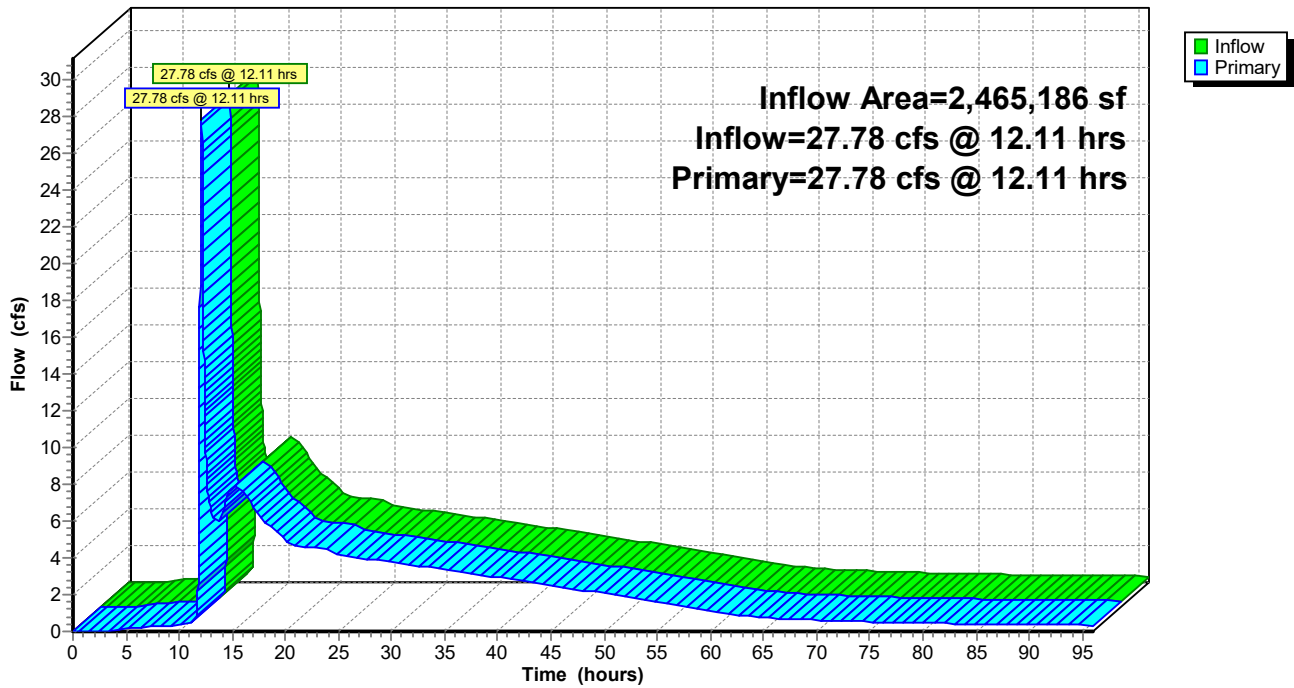
### Summary for Link 1L: Discharge Point 001

Inflow Area = 2,465,186 sf, 70.46% Impervious, Inflow Depth > 3.52" for 25-Year event  
Inflow = 27.78 cfs @ 12.11 hrs, Volume= 722,317 cf  
Primary = 27.78 cfs @ 12.11 hrs, Volume= 722,317 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 1L: Discharge Point 001

Hydrograph



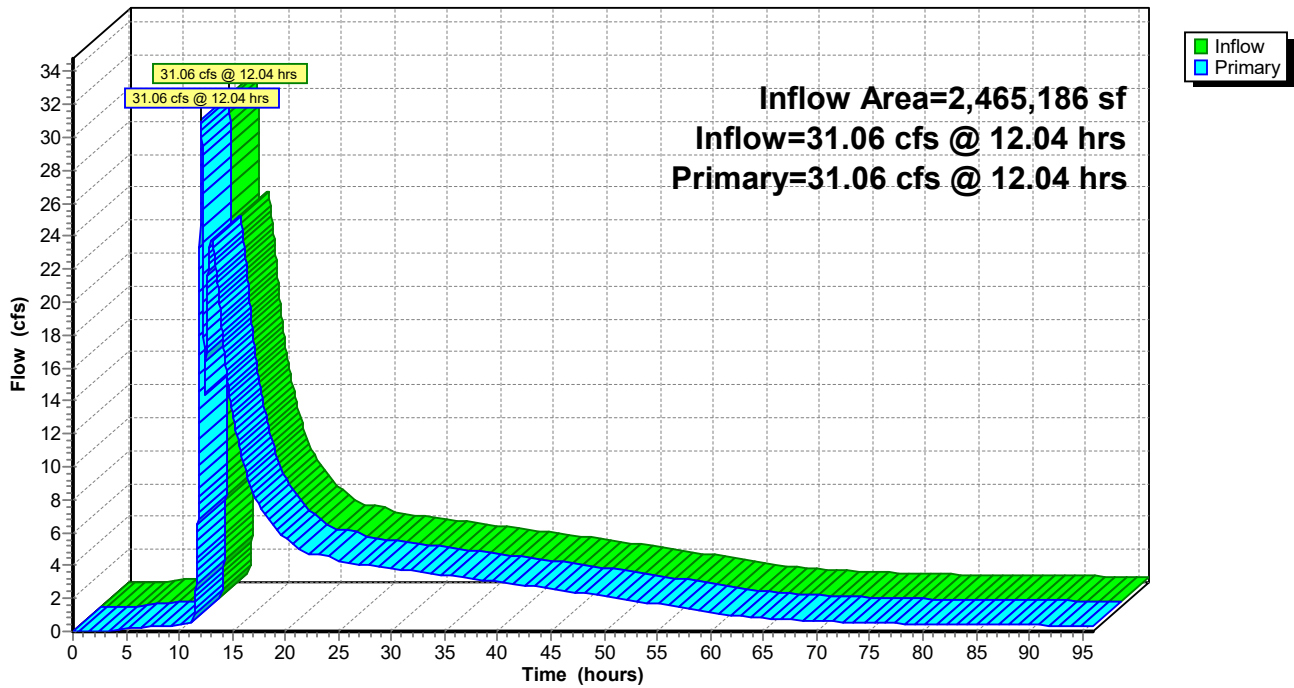
### Summary for Link 1L: Discharge Point 001

Inflow Area = 2,465,186 sf, 70.46% Impervious, Inflow Depth > 4.37" for 50-Year event  
Inflow = 31.06 cfs @ 12.04 hrs, Volume= 896,927 cf  
Primary = 31.06 cfs @ 12.04 hrs, Volume= 896,927 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 1L: Discharge Point 001

Hydrograph



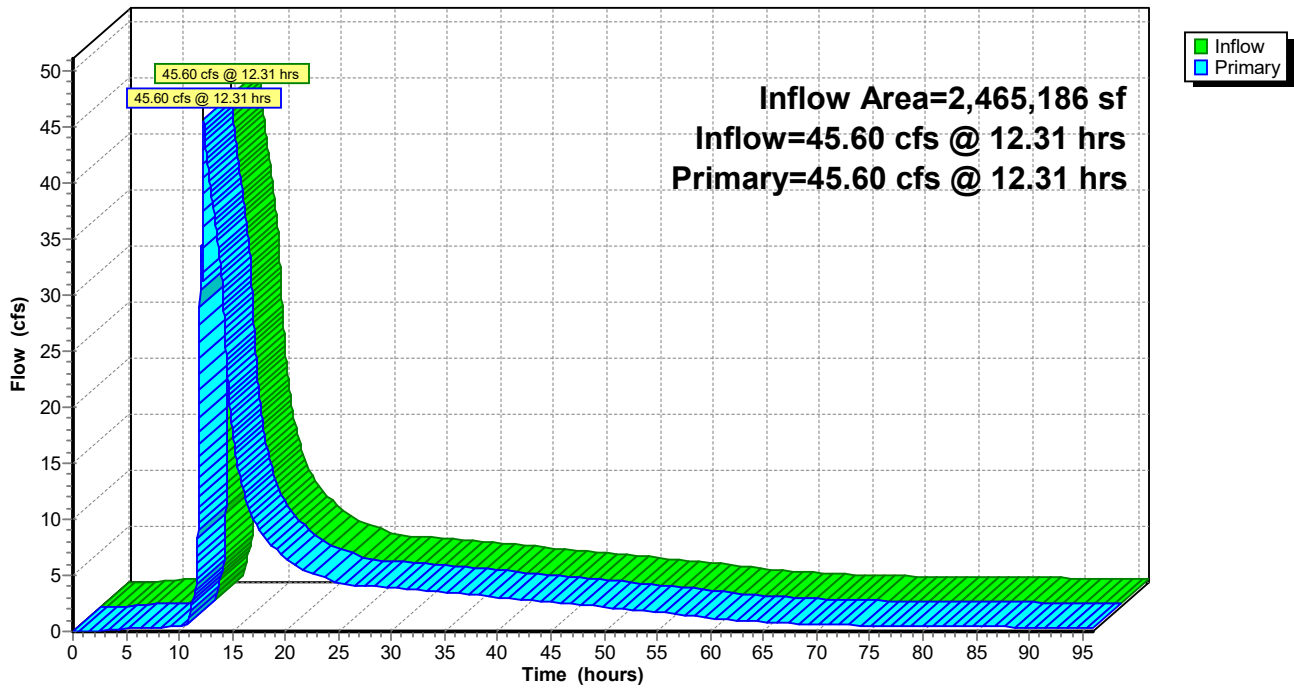
### Summary for Link 1L: Discharge Point 001

Inflow Area = 2,465,186 sf, 70.46% Impervious, Inflow Depth > 5.34" for 100-Year event  
Inflow = 45.60 cfs @ 12.31 hrs, Volume= 1,097,225 cf  
Primary = 45.60 cfs @ 12.31 hrs, Volume= 1,097,225 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 1L: Discharge Point 001

Hydrograph



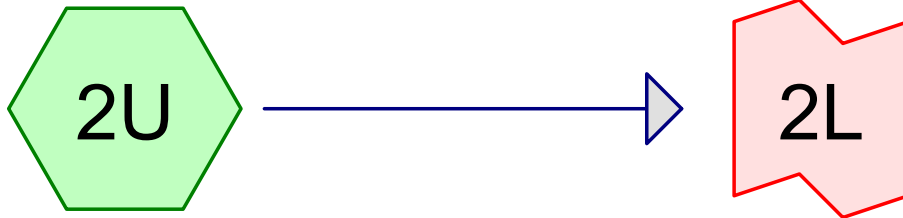


# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #2**

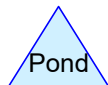
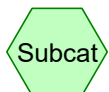
**(DISCHARGE POINT 002)**

**Undetained Routings**



Watershed Area #2 -  
Undetained

Discharge Point 002



**Routing Diagram for 22-0123-005 - Post-Dev**  
Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

**Summary for Subcatchment 2U: Watershed Area #2 - Undetained**

Runoff = 2.60 cfs @ 11.99 hrs, Volume= 6,326 cf, Depth= 0.50"  
 Routed to Link 2L : Discharge Point 002

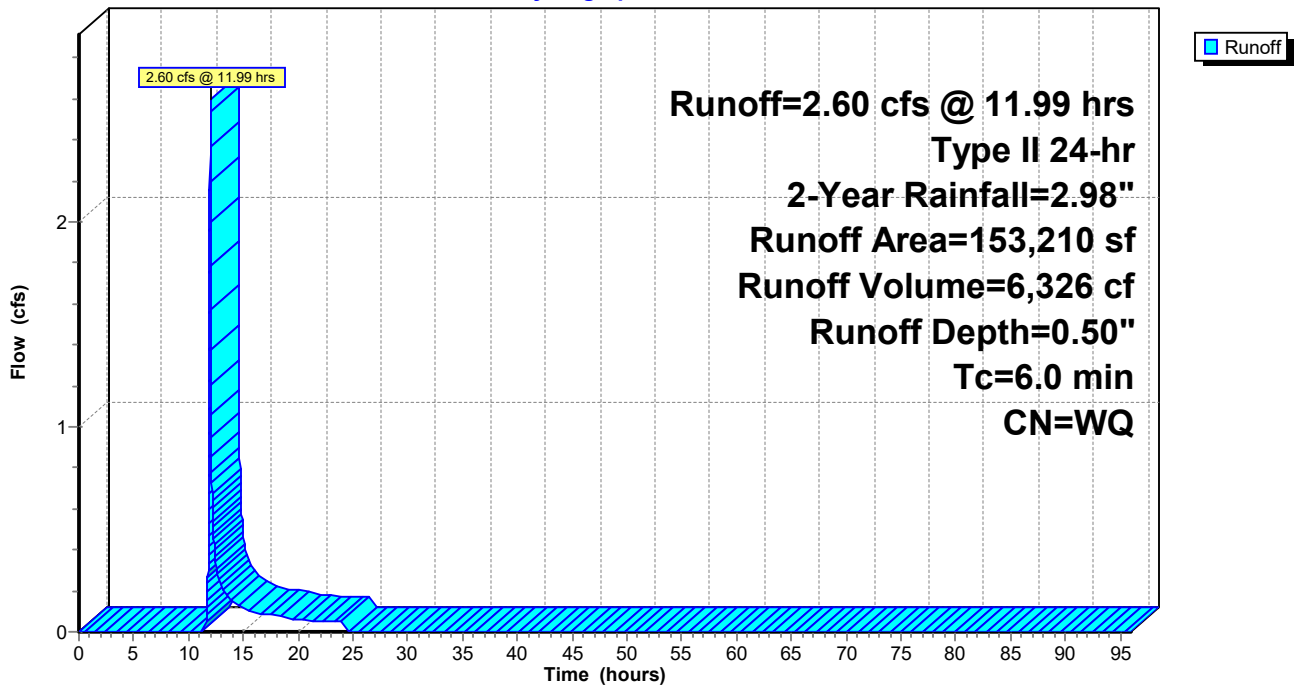
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

	Area (sf)	CN	Description
*	77,981	58	Meadow / HSG B
*	49,556	71	Meadow / HSG C
*	2,665	58	Meadow / HSG B (Offsite)
*	23,008	71	Meadow / HSG C (Offsite)
	153,210		Weighted Average
	153,210		100.00% Pervious Area

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

**Subcatchment 2U: Watershed Area #2 - Undetained**

Hydrograph



**Summary for Subcatchment 2U: Watershed Area #2 - Undetained**

Runoff = 5.28 cfs @ 11.98 hrs, Volume= 11,488 cf, Depth= 0.90"  
 Routed to Link 2L : Discharge Point 002

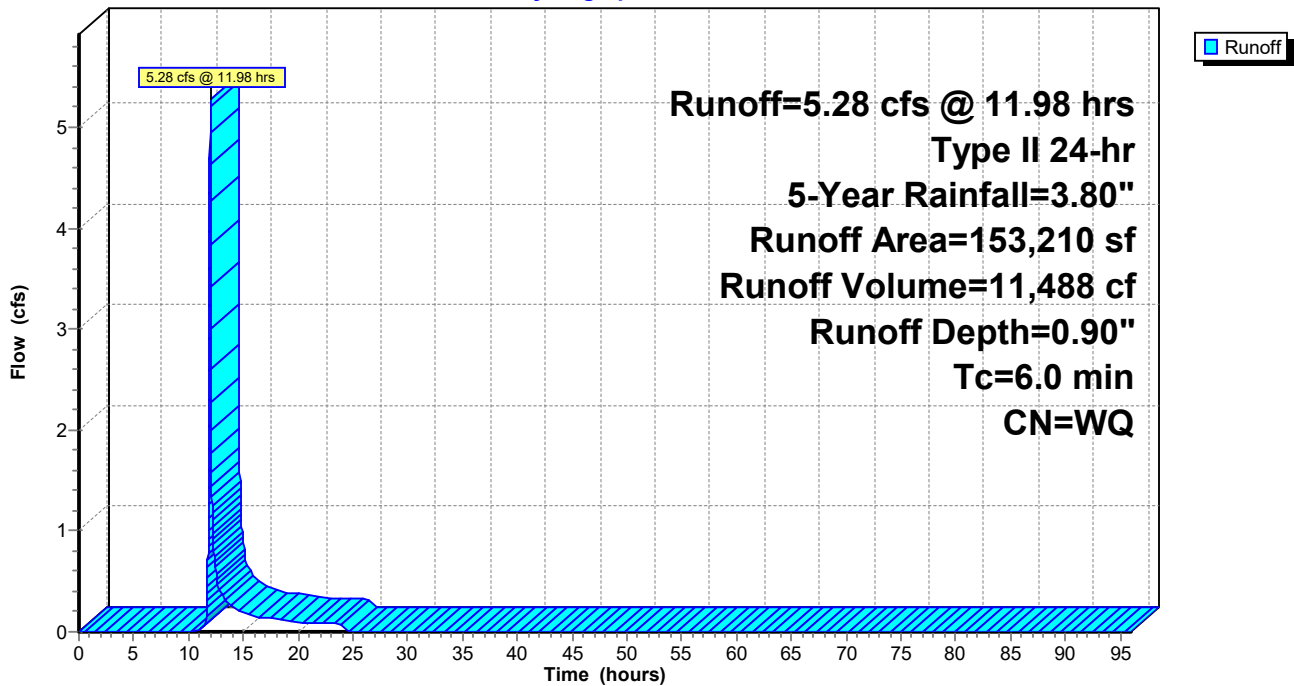
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 77,981	58	Meadow / HSG B
* 49,556	71	Meadow / HSG C
* 2,665	58	Meadow / HSG B (Offsite)
* 23,008	71	Meadow / HSG C (Offsite)
153,210		Weighted Average
153,210		100.00% Pervious Area

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

**Subcatchment 2U: Watershed Area #2 - Undetained**

Hydrograph



**Summary for Subcatchment 2U: Watershed Area #2 - Undetained**

Runoff = 7.98 cfs @ 11.98 hrs, Volume= 16,719 cf, Depth= 1.31"  
 Routed to Link 2L : Discharge Point 002

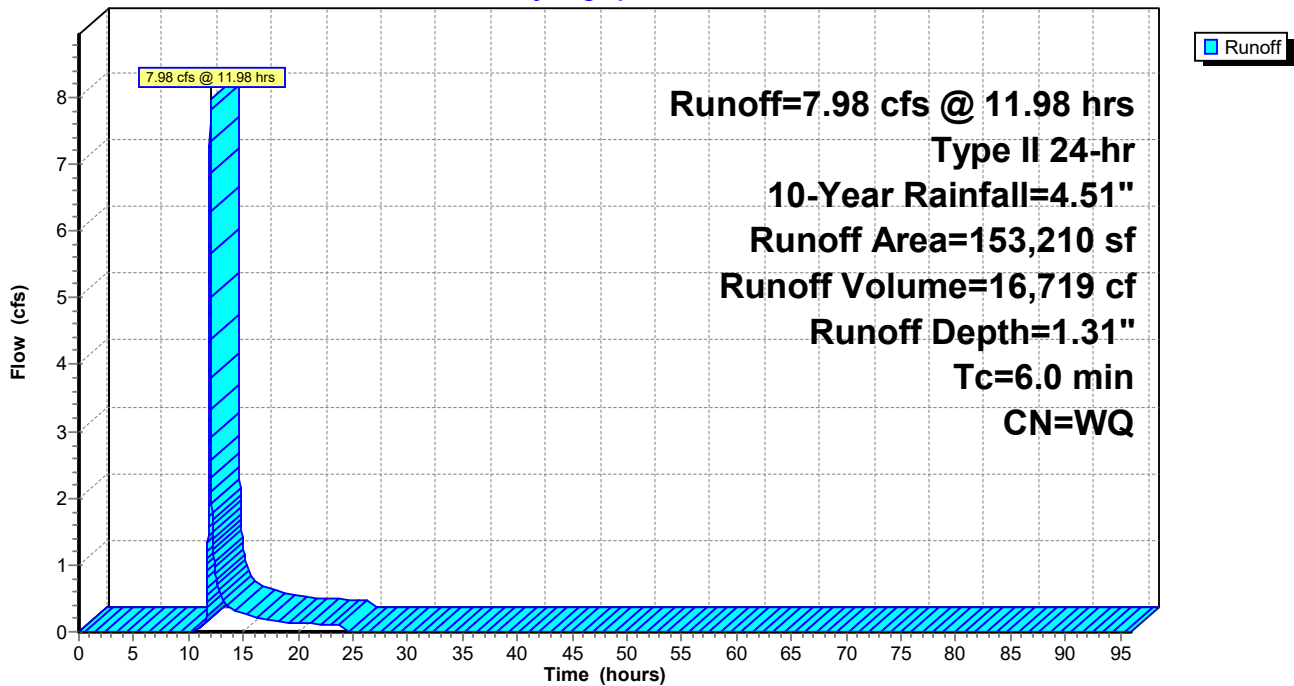
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 77,981	58	Meadow / HSG B
* 49,556	71	Meadow / HSG C
* 2,665	58	Meadow / HSG B (Offsite)
* 23,008	71	Meadow / HSG C (Offsite)
153,210		Weighted Average
153,210		100.00% Pervious Area

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

**Subcatchment 2U: Watershed Area #2 - Undetained**

Hydrograph



**Summary for Subcatchment 2U: Watershed Area #2 - Undetained**

Runoff = 12.51 cfs @ 11.98 hrs, Volume= 25,681 cf, Depth= 2.01"  
 Routed to Link 2L : Discharge Point 002

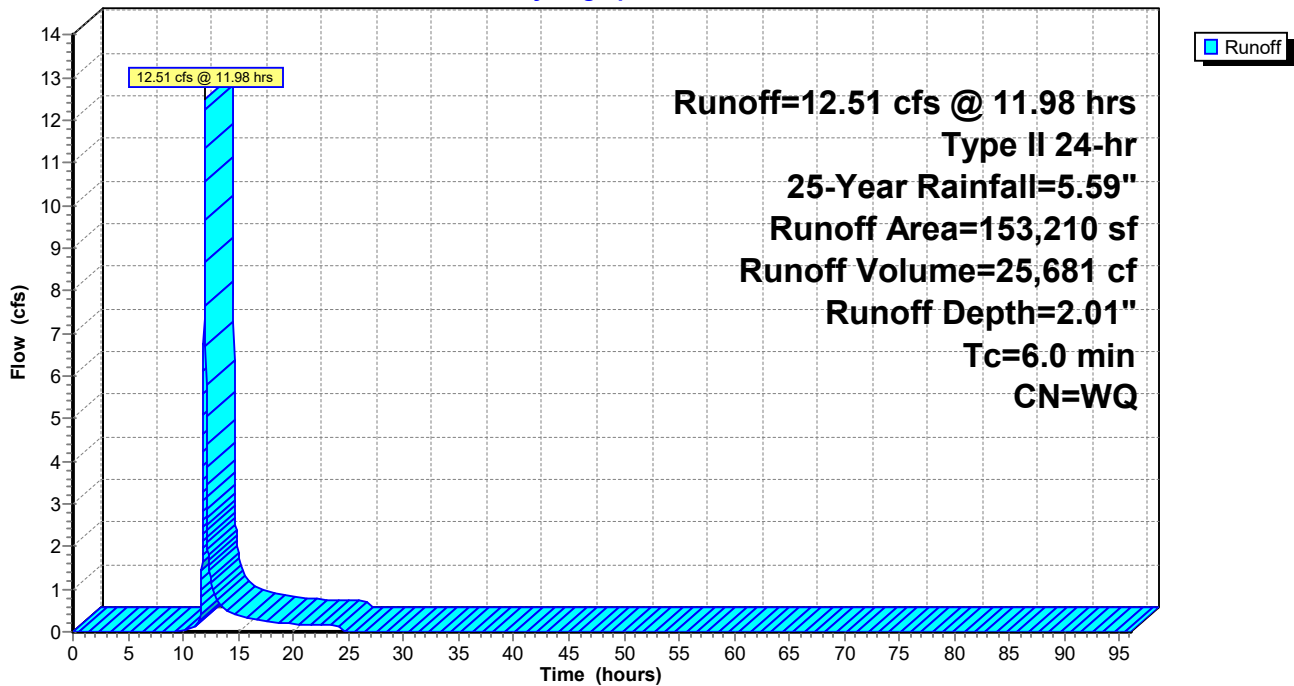
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	77,981	58	Meadow / HSG B
*	49,556	71	Meadow / HSG C
*	2,665	58	Meadow / HSG B (Offsite)
*	23,008	71	Meadow / HSG C (Offsite)
	153,210		Weighted Average
	153,210		100.00% Pervious Area

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

**Subcatchment 2U: Watershed Area #2 - Undetained**

Hydrograph



**Summary for Subcatchment 2U: Watershed Area #2 - Undetained**

Runoff = 16.81 cfs @ 11.98 hrs, Volume= 34,322 cf, Depth= 2.69"  
 Routed to Link 2L : Discharge Point 002

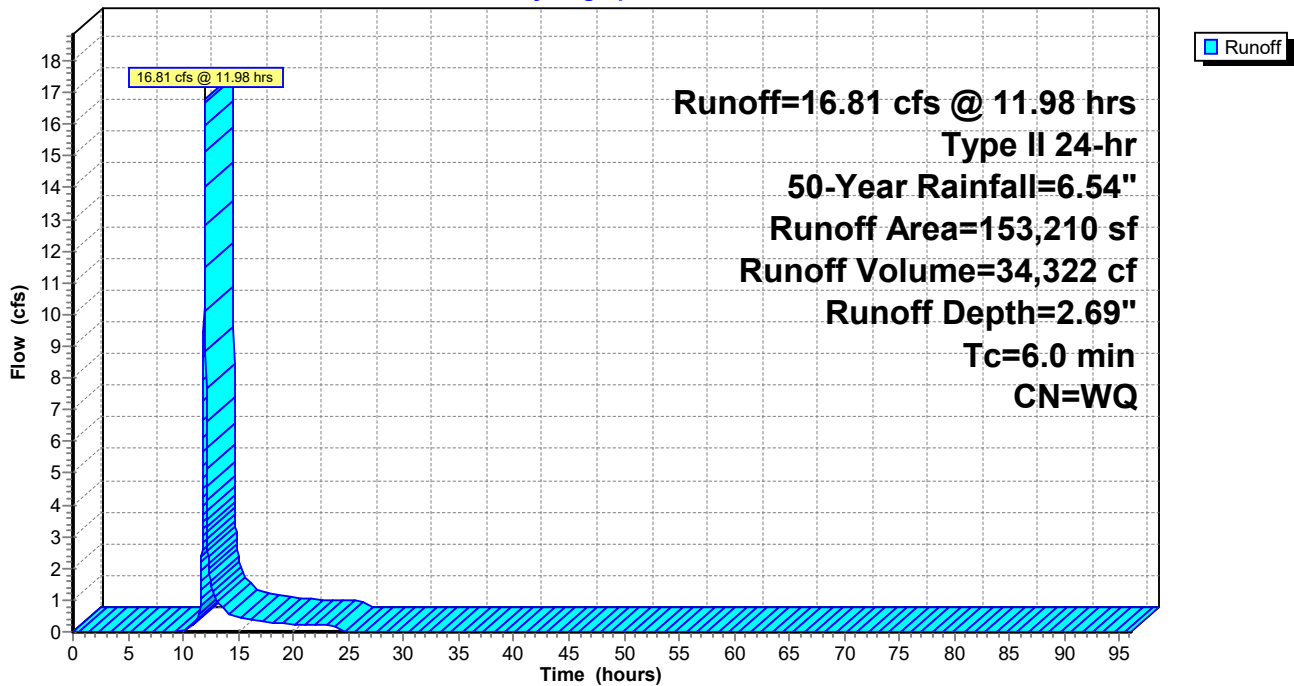
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 77,981	58	Meadow / HSG B
* 49,556	71	Meadow / HSG C
* 2,665	58	Meadow / HSG B (Offsite)
* 23,008	71	Meadow / HSG C (Offsite)
153,210		Weighted Average
153,210		100.00% Pervious Area

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

**Subcatchment 2U: Watershed Area #2 - Undetained**

Hydrograph



**Summary for Subcatchment 2U: Watershed Area #2 - Undetained**

Runoff = 21.90 cfs @ 11.98 hrs, Volume= 44,690 cf, Depth= 3.50"  
 Routed to Link 2L : Discharge Point 002

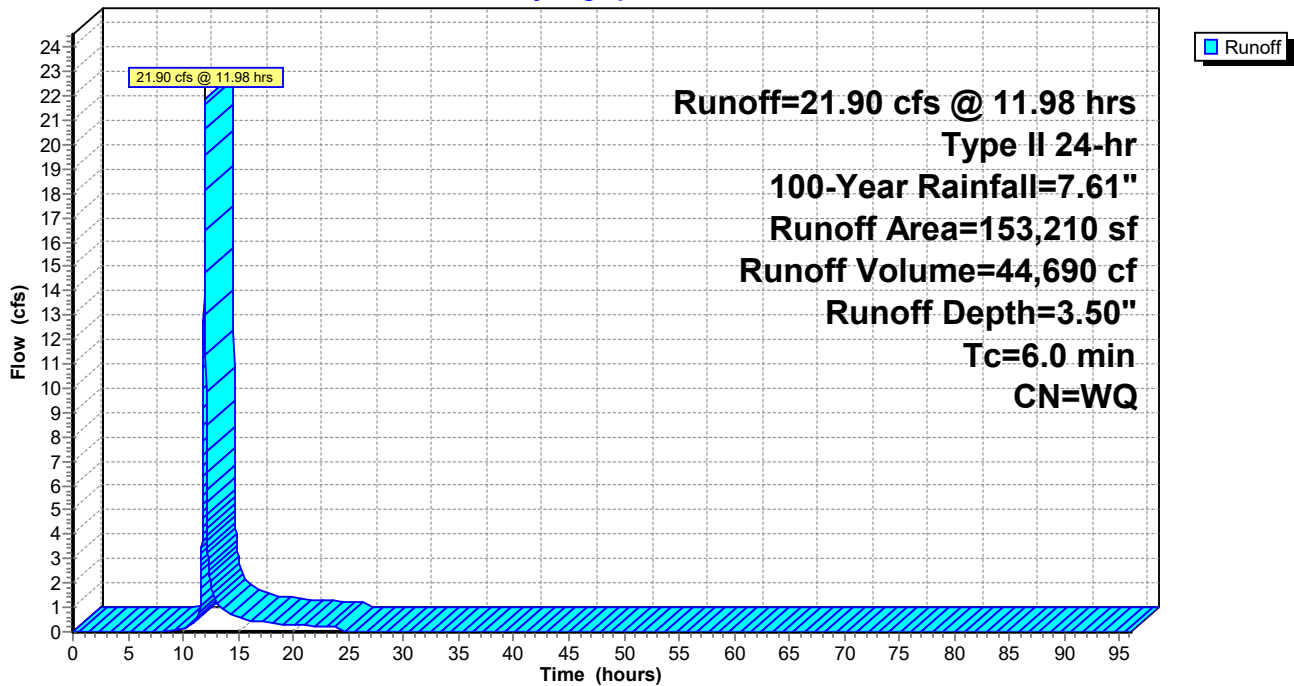
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

	Area (sf)	CN	Description
*	77,981	58	Meadow / HSG B
*	49,556	71	Meadow / HSG C
*	2,665	58	Meadow / HSG B (Offsite)
*	23,008	71	Meadow / HSG C (Offsite)
	153,210		Weighted Average
	153,210		100.00% Pervious Area

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

**Subcatchment 2U: Watershed Area #2 - Undetained**

Hydrograph

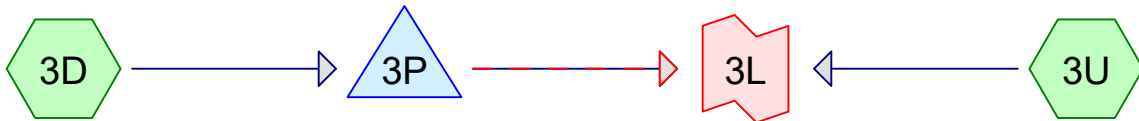




# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #3**

**(DISCHARGE POINT 003)**

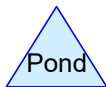
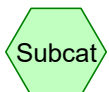


Watershed Area #3 -  
Detained in MRC  
Facility #3

MRC #3

Discharge Point 003

Watershed Area #3 -  
Undetained



**Routing Diagram for 22-0123-005 - Post-Dev**  
Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #3**

**(DISCHARGE POINT 003)**

**Detained in MRC #3 Routings**

**Summary for Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Runoff = 17.04 cfs @ 12.01 hrs, Volume= 43,346 cf, Depth= 1.22"  
 Routed to Pond 3P : MRC #3

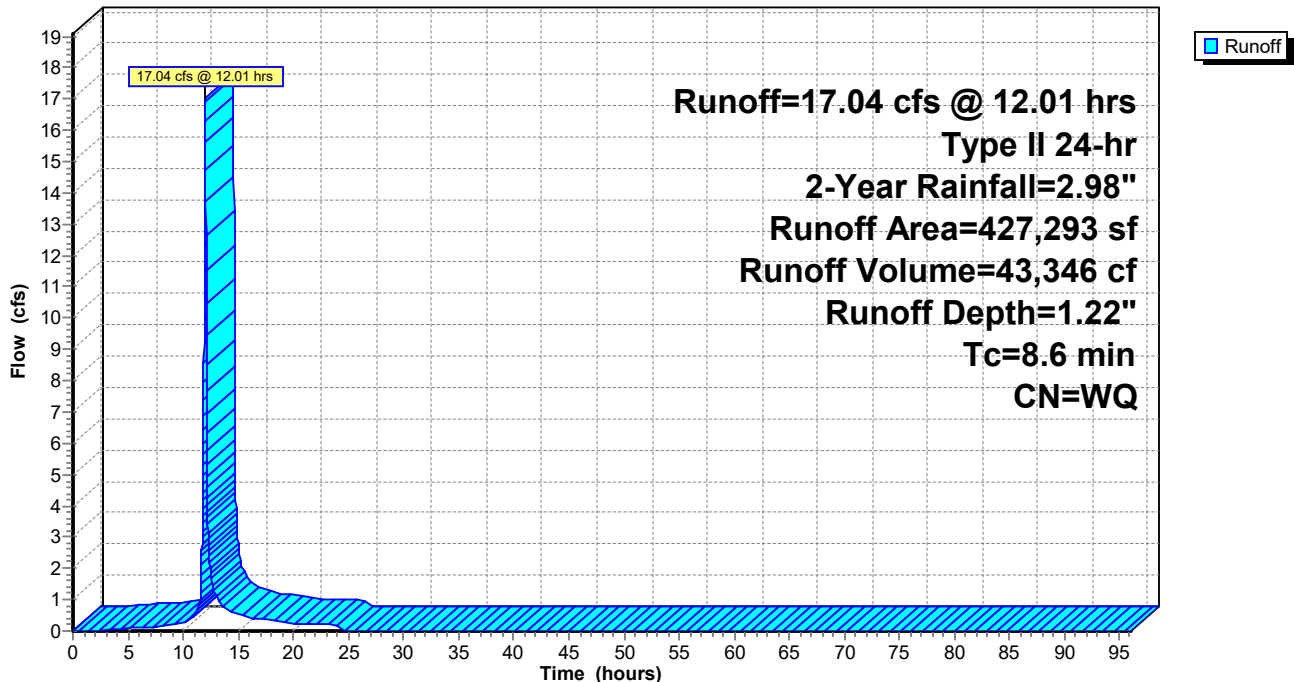
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 52,917	98	Impervious
* 54,151	58	Meadow / HSG B
* 121,220	71	Meadow / HSG C
* 28,624	61	Open Space / Good Condition / HSG B
* 22,400	74	Open Space / Good Condition / HSG C
* 4,588	58	Meadow / HSG B (Offsite)
* 597	71	Meadow / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	79	Open Space / Poor Condition / HSG B (Offsite)
* 29,649	66	Woods / Poor Condition / HSG B (Offsite)
<hr/>		
427,293		Weighted Average
317,979		74.42% Pervious Area
109,314		25.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6					Direct Entry, Storm Sewer Tc

**Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Hydrograph



**Summary for Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Runoff = 25.64 cfs @ 12.00 hrs, Volume= 63,411 cf, Depth= 1.78"  
 Routed to Pond 3P : MRC #3

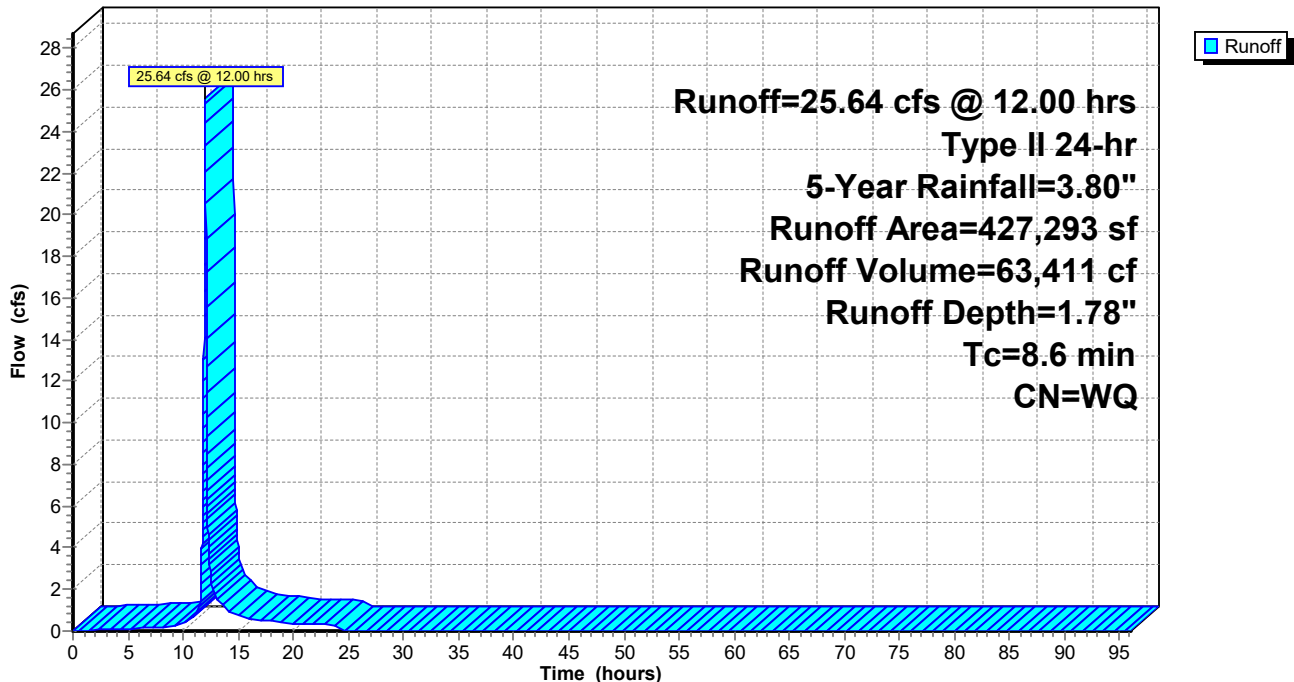
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 52,917	98	Impervious
* 54,151	58	Meadow / HSG B
* 121,220	71	Meadow / HSG C
* 28,624	61	Open Space / Good Condition / HSG B
* 22,400	74	Open Space / Good Condition / HSG C
* 4,588	58	Meadow / HSG B (Offsite)
* 597	71	Meadow / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	79	Open Space / Poor Condition / HSG B (Offsite)
* 29,649	66	Woods / Poor Condition / HSG B (Offsite)
<hr/>		
427,293		Weighted Average
317,979		74.42% Pervious Area
109,314		25.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6					Direct Entry, Storm Sewer Tc

**Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Hydrograph



**Summary for Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Runoff = 33.68 cfs @ 12.00 hrs, Volume= 82,218 cf, Depth= 2.31"  
 Routed to Pond 3P : MRC #3

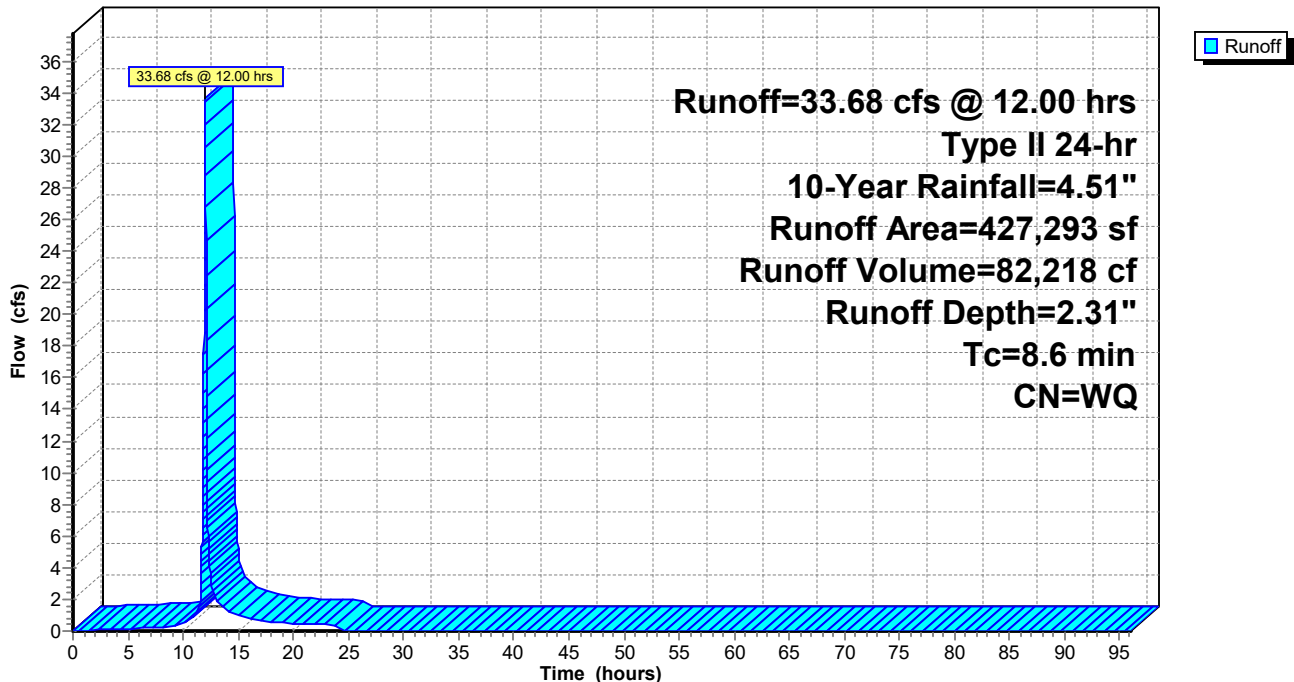
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 52,917	98	Impervious
* 54,151	58	Meadow / HSG B
* 121,220	71	Meadow / HSG C
* 28,624	61	Open Space / Good Condition / HSG B
* 22,400	74	Open Space / Good Condition / HSG C
* 4,588	58	Meadow / HSG B (Offsite)
* 597	71	Meadow / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	79	Open Space / Poor Condition / HSG B (Offsite)
* 29,649	66	Woods / Poor Condition / HSG B (Offsite)
<hr/>		
427,293		Weighted Average
317,979		74.42% Pervious Area
109,314		25.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6					Direct Entry, Storm Sewer Tc

**Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Hydrograph



**Summary for Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Runoff = 46.61 cfs @ 12.00 hrs, Volume= 112,664 cf, Depth= 3.16"  
 Routed to Pond 3P : MRC #3

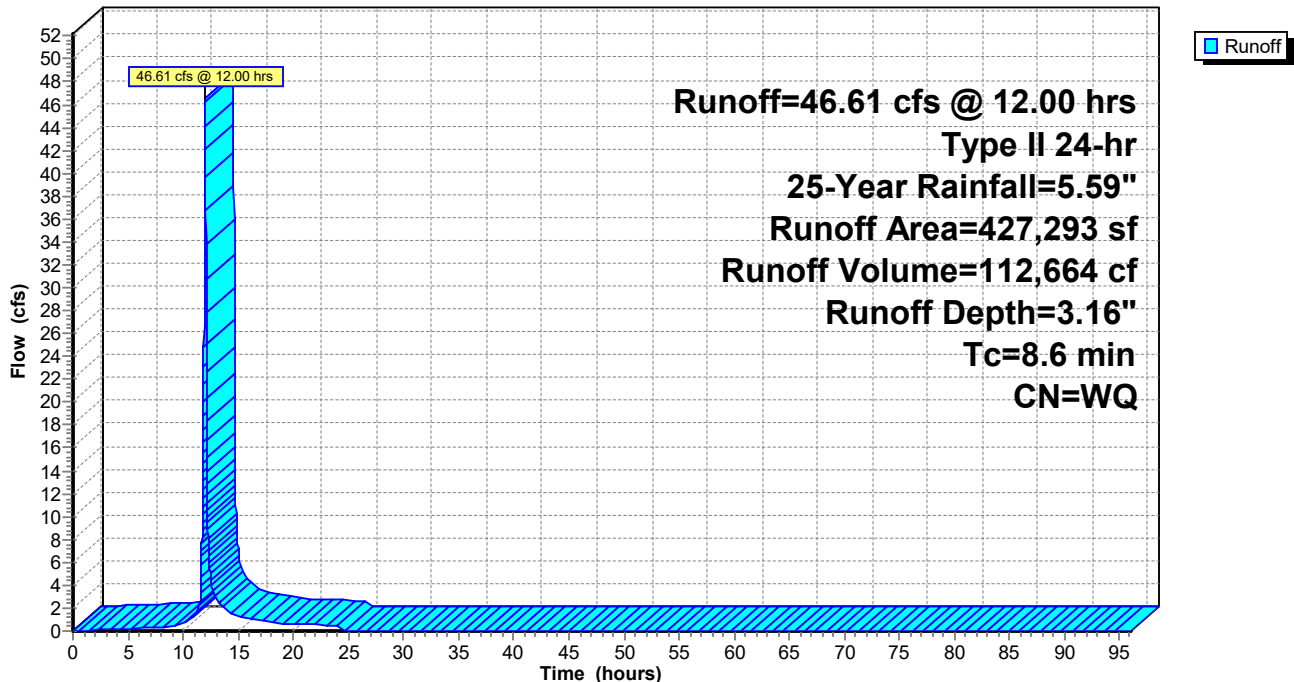
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	52,917	98	Impervious
*	54,151	58	Meadow / HSG B
*	121,220	71	Meadow / HSG C
*	28,624	61	Open Space / Good Condition / HSG B
*	22,400	74	Open Space / Good Condition / HSG C
*	4,588	58	Meadow / HSG B (Offsite)
*	597	71	Meadow / HSG C (Offsite)
*	56,397	98	Impervious (Offsite)
*	56,750	79	Open Space / Poor Condition / HSG B (Offsite)
*	29,649	66	Woods / Poor Condition / HSG B (Offsite)
			Weighted Average
			74.42% Pervious Area
			25.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6					Direct Entry, Storm Sewer Tc

**Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Hydrograph



**Summary for Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Runoff = 58.44 cfs @ 12.00 hrs, Volume= 140,795 cf, Depth= 3.95"  
 Routed to Pond 3P : MRC #3

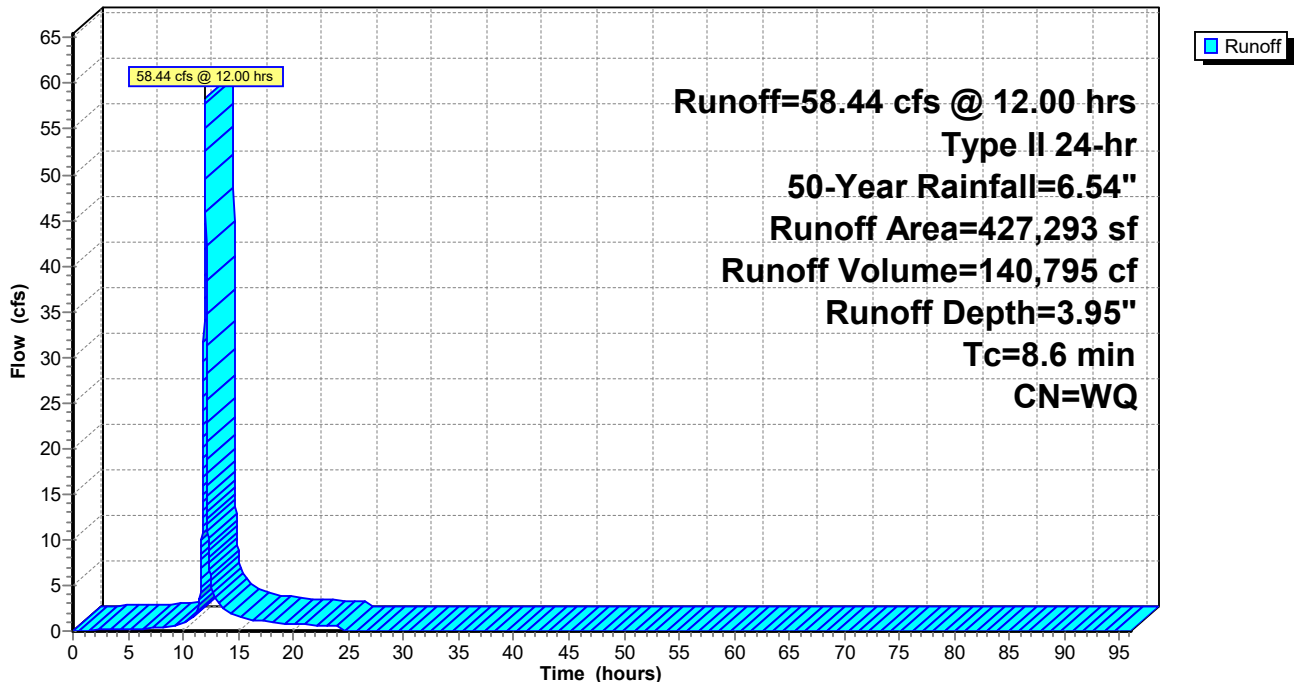
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 52,917	98	Impervious
* 54,151	58	Meadow / HSG B
* 121,220	71	Meadow / HSG C
* 28,624	61	Open Space / Good Condition / HSG B
* 22,400	74	Open Space / Good Condition / HSG C
* 4,588	58	Meadow / HSG B (Offsite)
* 597	71	Meadow / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	79	Open Space / Poor Condition / HSG B (Offsite)
* 29,649	66	Woods / Poor Condition / HSG B (Offsite)
427,293		Weighted Average
317,979		74.42% Pervious Area
109,314		25.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6					Direct Entry, Storm Sewer Tc

**Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Hydrograph





**Summary for Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Runoff = 72.11 cfs @ 12.00 hrs, Volume= 173,587 cf, Depth= 4.87"  
 Routed to Pond 3P : MRC #3

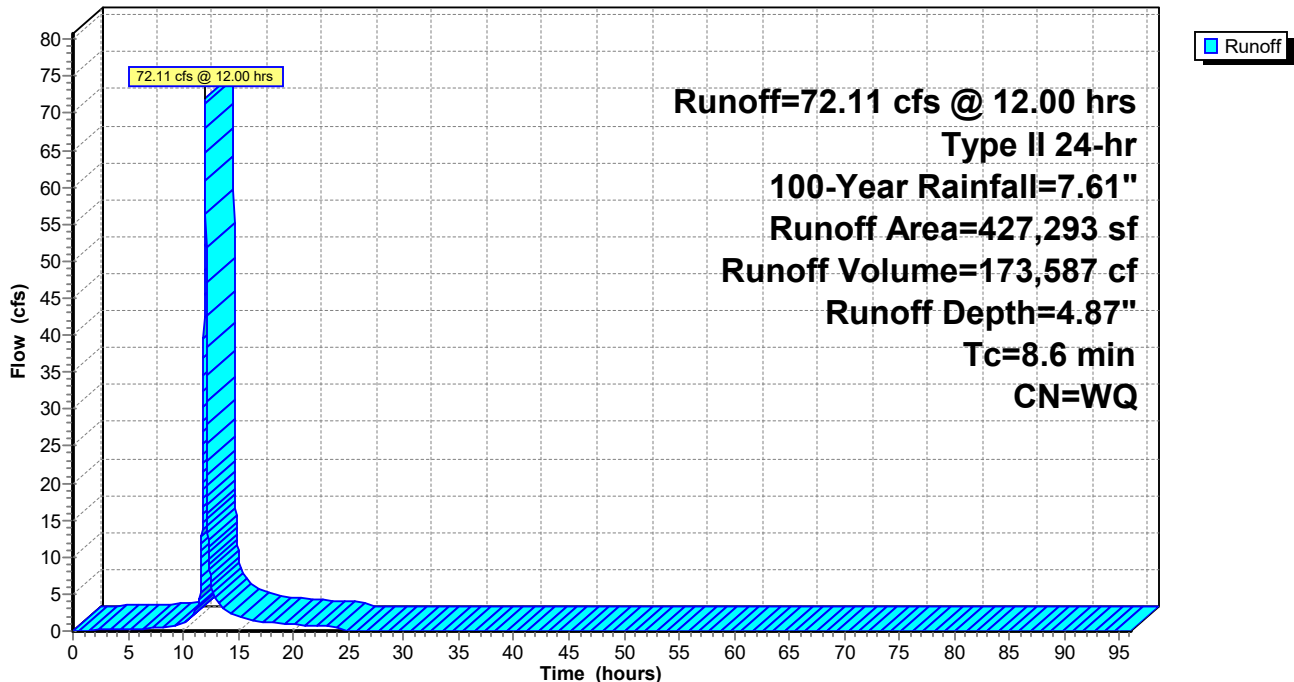
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 52,917	98	Impervious
* 54,151	58	Meadow / HSG B
* 121,220	71	Meadow / HSG C
* 28,624	61	Open Space / Good Condition / HSG B
* 22,400	74	Open Space / Good Condition / HSG C
* 4,588	58	Meadow / HSG B (Offsite)
* 597	71	Meadow / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	79	Open Space / Poor Condition / HSG B (Offsite)
* 29,649	66	Woods / Poor Condition / HSG B (Offsite)
<hr/>		
427,293		Weighted Average
317,979		74.42% Pervious Area
109,314		25.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6					Direct Entry, Storm Sewer Tc

**Subcatchment 3D: Watershed Area #3 - Detained in MRC Facility #3**

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #3**

**(DISCHARGE POINT 003)**

**MRC #3 Routings**

**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 1.22" for 2-Year event  
 Inflow = 17.04 cfs @ 12.01 hrs, Volume= 43,346 cf  
 Outflow = 0.73 cfs @ 13.85 hrs, Volume= 43,345 cf, Atten= 96%, Lag= 110.7 min  
 Discarded = 0.05 cfs @ 11.92 hrs, Volume= 15,320 cf  
 Primary = 0.68 cfs @ 13.85 hrs, Volume= 28,025 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 442.67' @ 13.85 hrs Surf.Area= 22,020 sf Storage= 24,824 cf

Plug-Flow detention time= 919.3 min calculated for 43,340 cf (100% of inflow)  
 Center-of-Mass det. time= 919.6 min ( 1,726.7 - 807.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>1.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

	Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
	Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	
#6	Discarded	440.00'	<b>0.100 in/hr Infiltration over Surface area</b>						Phase-In= 0.01'	

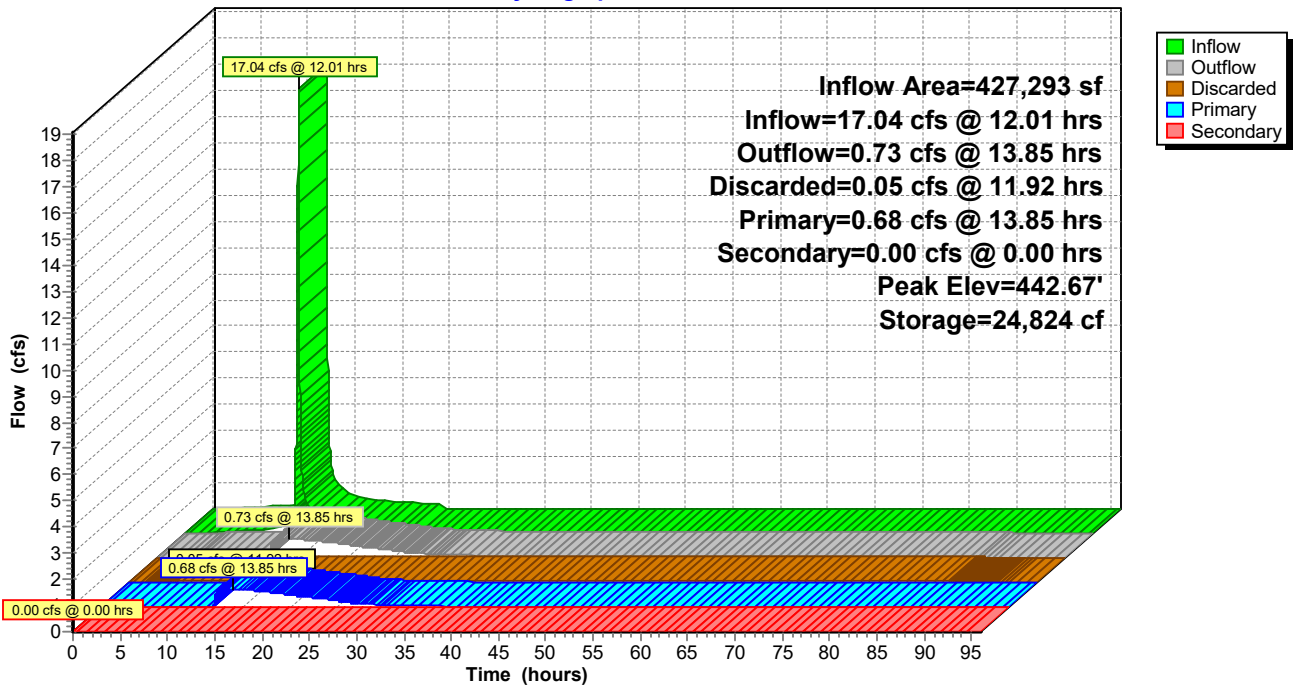
**Discarded OutFlow** Max=0.05 cfs @ 11.92 hrs HW=442.00' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=0.68 cfs @ 13.85 hrs HW=442.67' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 0.68 cfs of 3.16 cfs potential flow)  
 ↳ **2=MRC Orifice** (Orifice Controls 0.07 cfs @ 4.46 fps)  
 ↳ **3=Orifice** (Orifice Controls 0.61 cfs @ 3.12 fps)  
 ↳ **4=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** ( Controls 0.00 cfs)

**Pond 3P: MRC #3**

Hydrograph



**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 1.78" for 5-Year event  
 Inflow = 25.64 cfs @ 12.00 hrs, Volume= 63,411 cf  
 Outflow = 1.06 cfs @ 13.85 hrs, Volume= 63,399 cf, Atten= 96%, Lag= 111.0 min  
 Discarded = 0.05 cfs @ 11.80 hrs, Volume= 16,039 cf  
 Primary = 1.00 cfs @ 13.85 hrs, Volume= 47,361 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 443.19' @ 13.85 hrs Surf.Area= 22,020 sf Storage= 37,081 cf

Plug-Flow detention time= 806.1 min calculated for 63,399 cf (100% of inflow)  
 Center-of-Mass det. time= 806.0 min ( 1,610.5 - 804.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>1.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

	Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
	Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	
#6	Discarded	440.00'	<b>0.100 in/hr Infiltration over Surface area</b>							Phase-In= 0.01'

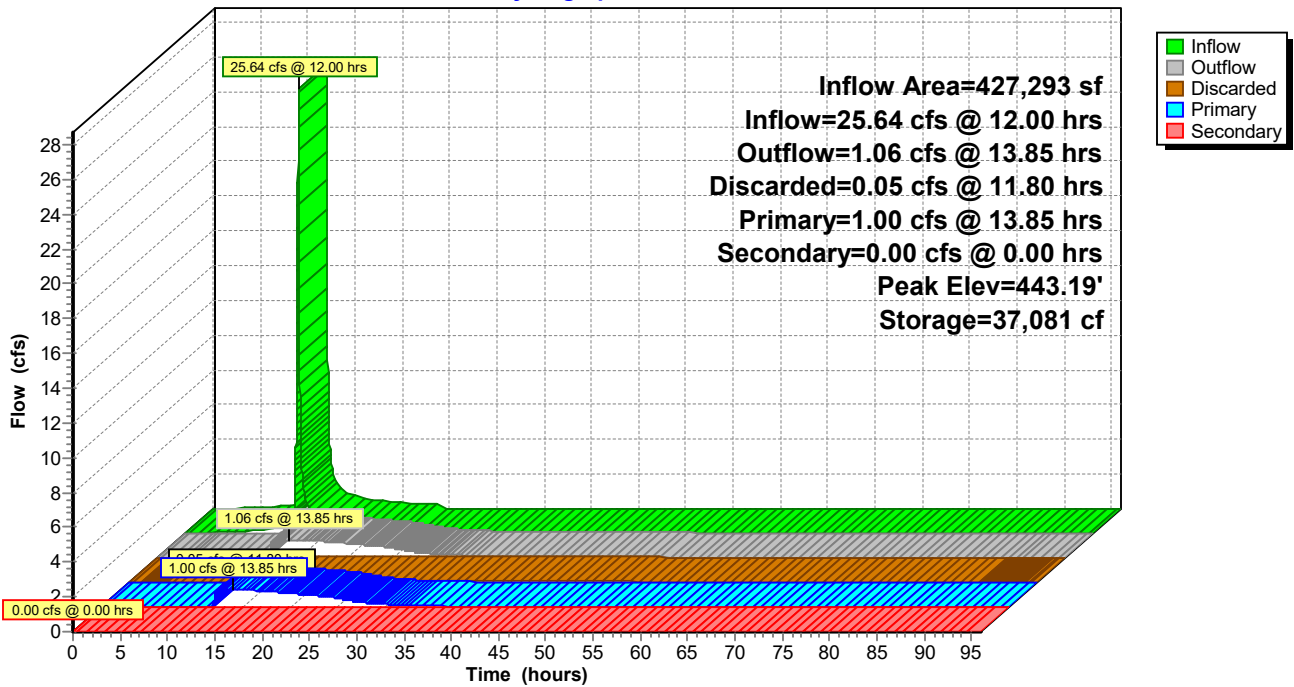
**Discarded OutFlow** Max=0.05 cfs @ 11.80 hrs HW=442.01' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=1.00 cfs @ 13.85 hrs HW=443.19' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 1.00 cfs of 7.15 cfs potential flow)  
 ↳ **2=MRC Orifice** (Orifice Controls 0.09 cfs @ 5.65 fps)  
 ↳ **3=Orifice** (Orifice Controls 0.92 cfs @ 4.66 fps)  
 ↳ **4=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** ( Controls 0.00 cfs)

**Pond 3P: MRC #3**

Hydrograph



**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 2.31" for 10-Year event  
 Inflow = 33.68 cfs @ 12.00 hrs, Volume= 82,218 cf  
 Outflow = 1.29 cfs @ 13.95 hrs, Volume= 82,160 cf, Atten= 96%, Lag= 117.0 min  
 Discarded = 0.05 cfs @ 11.65 hrs, Volume= 16,602 cf  
 Primary = 1.24 cfs @ 13.95 hrs, Volume= 65,558 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 443.68' @ 13.95 hrs Surf.Area= 22,020 sf Storage= 49,296 cf

Plug-Flow detention time= 775.0 min calculated for 82,160 cf (100% of inflow)  
 Center-of-Mass det. time= 774.6 min ( 1,576.6 - 802.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>1.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

	Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
	Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	
#6	Discarded	440.00'	<b>0.100 in/hr Infiltration over Surface area</b>						Phase-In= 0.01'	

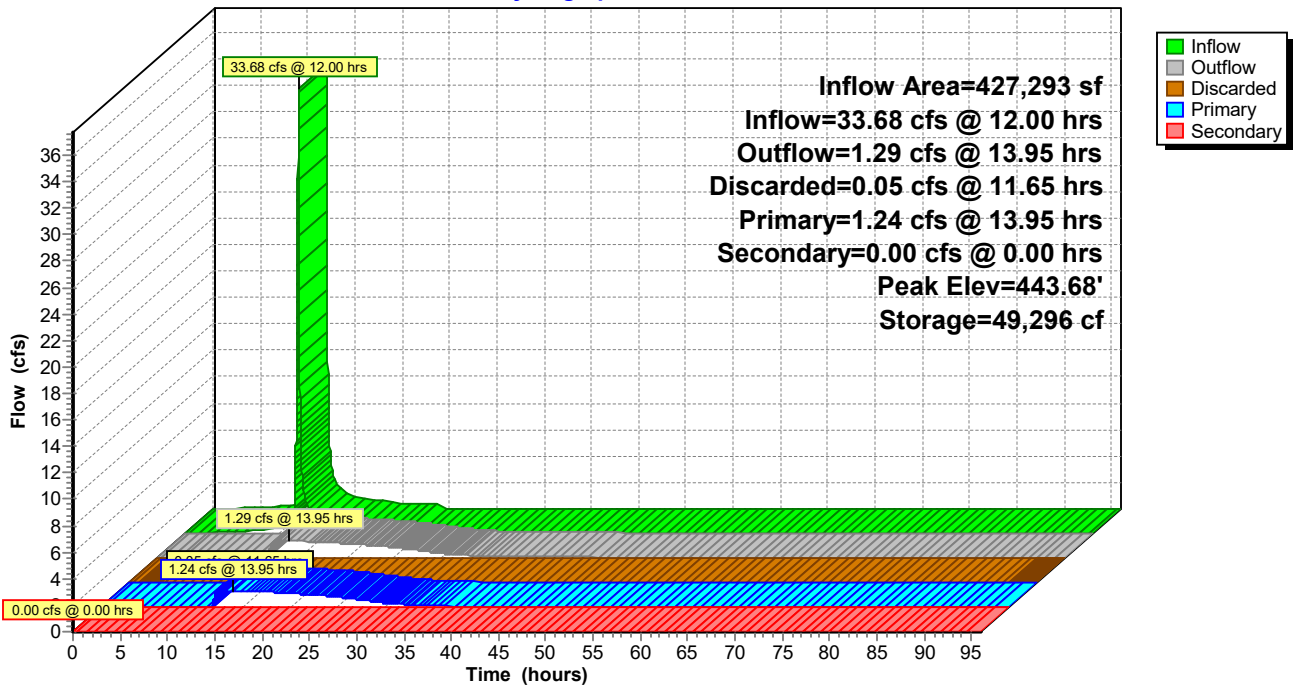
**Discarded OutFlow** Max=0.05 cfs @ 11.65 hrs HW=442.00' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=1.24 cfs @ 13.95 hrs HW=443.68' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 1.24 cfs of 11.60 cfs potential flow)  
 ↳ **2=MRC Orifice** (Orifice Controls 0.10 cfs @ 6.59 fps)  
 ↳ **3=Orifice** (Orifice Controls 1.13 cfs @ 5.77 fps)  
 ↳ **4=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** ( Controls 0.00 cfs)

**Pond 3P: MRC #3**

Hydrograph





**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 3.16" for 25-Year event  
 Inflow = 46.61 cfs @ 12.00 hrs, Volume= 112,664 cf  
 Outflow = 1.59 cfs @ 14.13 hrs, Volume= 112,153 cf, Atten= 97%, Lag= 127.9 min  
 Discarded = 0.05 cfs @ 11.09 hrs, Volume= 17,000 cf  
 Primary = 1.54 cfs @ 14.13 hrs, Volume= 95,152 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 444.48' @ 14.13 hrs Surf.Area= 22,020 sf Storage= 69,845 cf

Plug-Flow detention time= 764.5 min calculated for 112,141 cf (100% of inflow)  
 Center-of-Mass det. time= 761.9 min ( 1,560.4 - 798.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>1.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

	Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
	Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63
#6	Discarded	440.00'	<b>0.100 in/hr Infiltration over Surface area</b>				Phase-In= 0.01'		

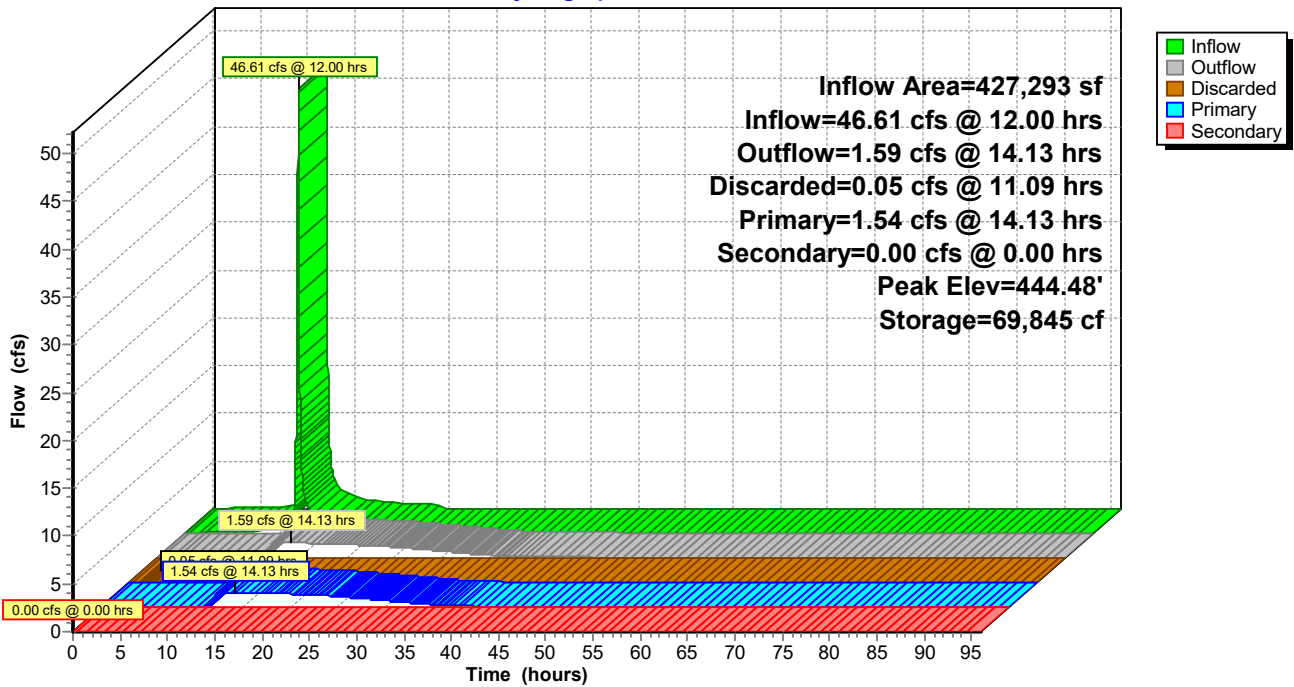
**Discarded OutFlow** Max=0.05 cfs @ 11.09 hrs HW=442.00' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=1.54 cfs @ 14.13 hrs HW=444.48' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 1.54 cfs of 16.98 cfs potential flow)  
 ↳ **2=MRC Orifice** (Orifice Controls 0.12 cfs @ 7.87 fps)  
 ↳ **3=Orifice** (Orifice Controls 1.41 cfs @ 7.19 fps)  
 ↳ **4=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** ( Controls 0.00 cfs)

**Pond 3P: MRC #3**

Hydrograph



**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 3.95" for 50-Year event  
 Inflow = 58.44 cfs @ 12.00 hrs, Volume= 140,795 cf  
 Outflow = 1.81 cfs @ 14.47 hrs, Volume= 139,685 cf, Atten= 97%, Lag= 148.1 min  
 Discarded = 0.05 cfs @ 10.50 hrs, Volume= 17,084 cf  
 Primary = 1.76 cfs @ 14.47 hrs, Volume= 122,601 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 445.20' @ 14.47 hrs Surf.Area= 22,020 sf Storage= 89,355 cf

Plug-Flow detention time= 776.8 min calculated for 139,671 cf (99% of inflow)  
 Center-of-Mass det. time= 772.1 min ( 1,567.7 - 795.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>1.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

	Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
	Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	
#6	Discarded	440.00'	<b>0.100 in/hr Infiltration over Surface area</b>						Phase-In= 0.01'	

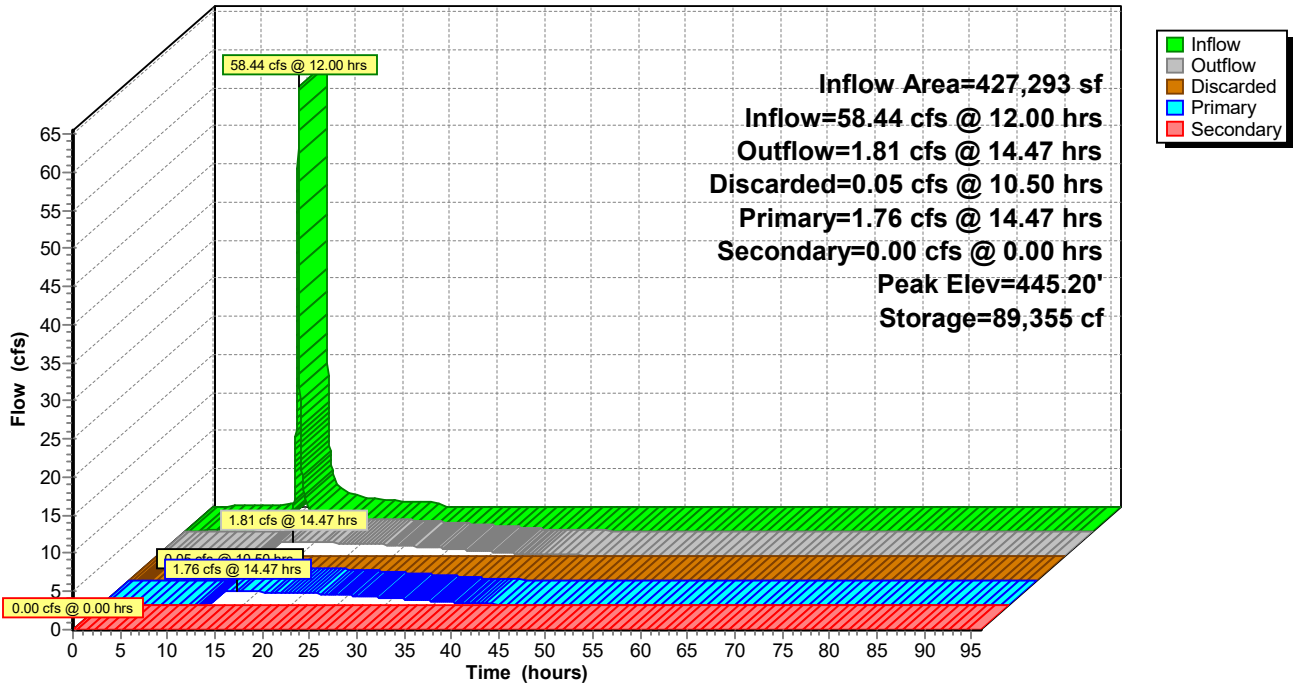
**Discarded OutFlow** Max=0.05 cfs @ 10.50 hrs HW=442.00' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=1.76 cfs @ 14.47 hrs HW=445.20' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 1.76 cfs of 22.59 cfs potential flow)  
 ↳ **2=MRC Orifice** (Orifice Controls 0.14 cfs @ 8.86 fps)  
 ↳ **3=Orifice** (Orifice Controls 1.62 cfs @ 8.27 fps)  
 ↳ **4=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** ( Controls 0.00 cfs)

**Pond 3P: MRC #3**

Hydrograph



**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 4.87" for 100-Year event  
 Inflow = 72.11 cfs @ 12.00 hrs, Volume= 173,587 cf  
 Outflow = 2.08 cfs @ 14.72 hrs, Volume= 171,841 cf, Atten= 97%, Lag= 163.3 min  
 Discarded = 0.05 cfs @ 9.81 hrs, Volume= 17,157 cf  
 Primary = 2.03 cfs @ 14.72 hrs, Volume= 154,684 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 446.00' @ 14.72 hrs Surf.Area= 22,020 sf Storage= 112,517 cf

Plug-Flow detention time= 806.8 min calculated for 171,823 cf (99% of inflow)  
 Center-of-Mass det. time= 800.7 min ( 1,593.3 - 792.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>1.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

	Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
	Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63
#6 Discarded	440.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'							

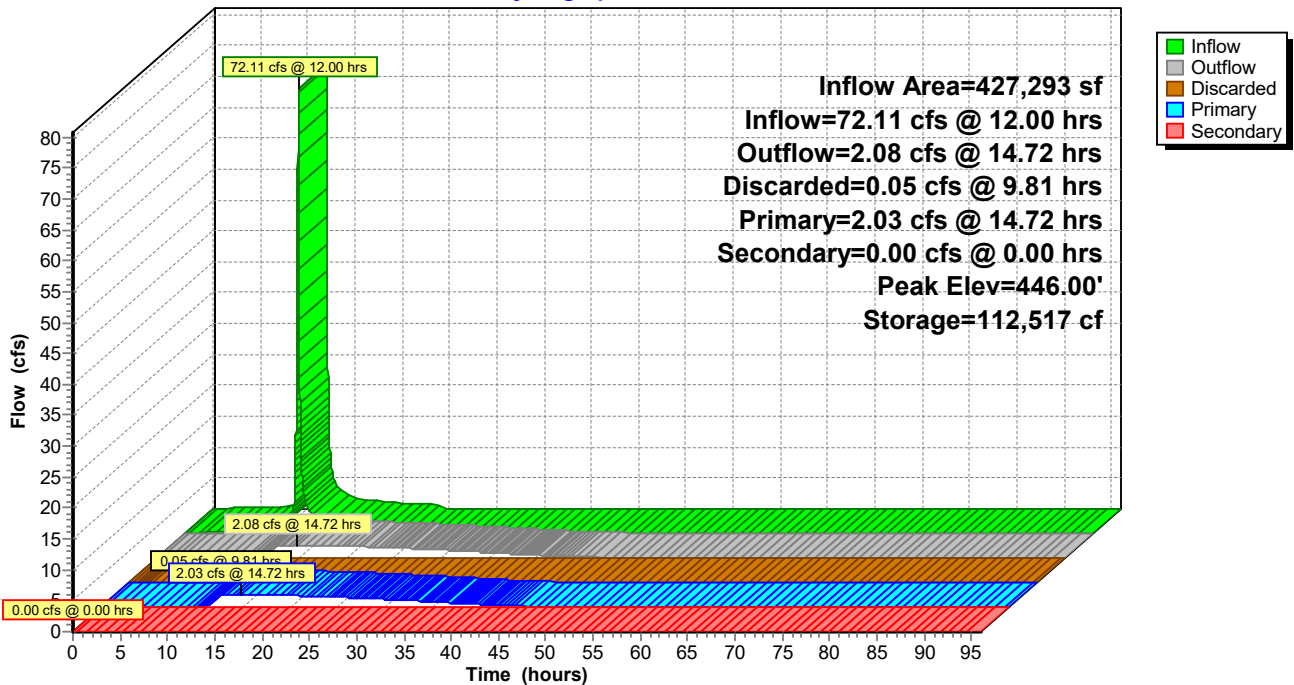
**Discarded OutFlow** Max=0.05 cfs @ 9.81 hrs HW=442.00' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=2.00 cfs @ 14.72 hrs HW=446.00' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 2.00 cfs of 27.03 cfs potential flow)  
 ↳ **2=MRC Orifice** (Orifice Controls 0.16 cfs @ 9.86 fps)  
 ↳ **3=Orifice** (Orifice Controls 1.83 cfs @ 9.33 fps)  
 ↳ **4=Type M Inlet** (Weir Controls 0.01 cfs @ 0.20 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** (Controls 0.00 cfs)

**Pond 3P: MRC #3**

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #3**

**(DISCHARGE POINT 003)**

**Undetained Routings**

**Summary for Subcatchment 3U: Watershed Area #3 - Undetained**

Runoff = 14.82 cfs @ 11.98 hrs, Volume= 36,629 cf, Depth= 0.83"  
 Routed to Link 3L : Discharge Point 003

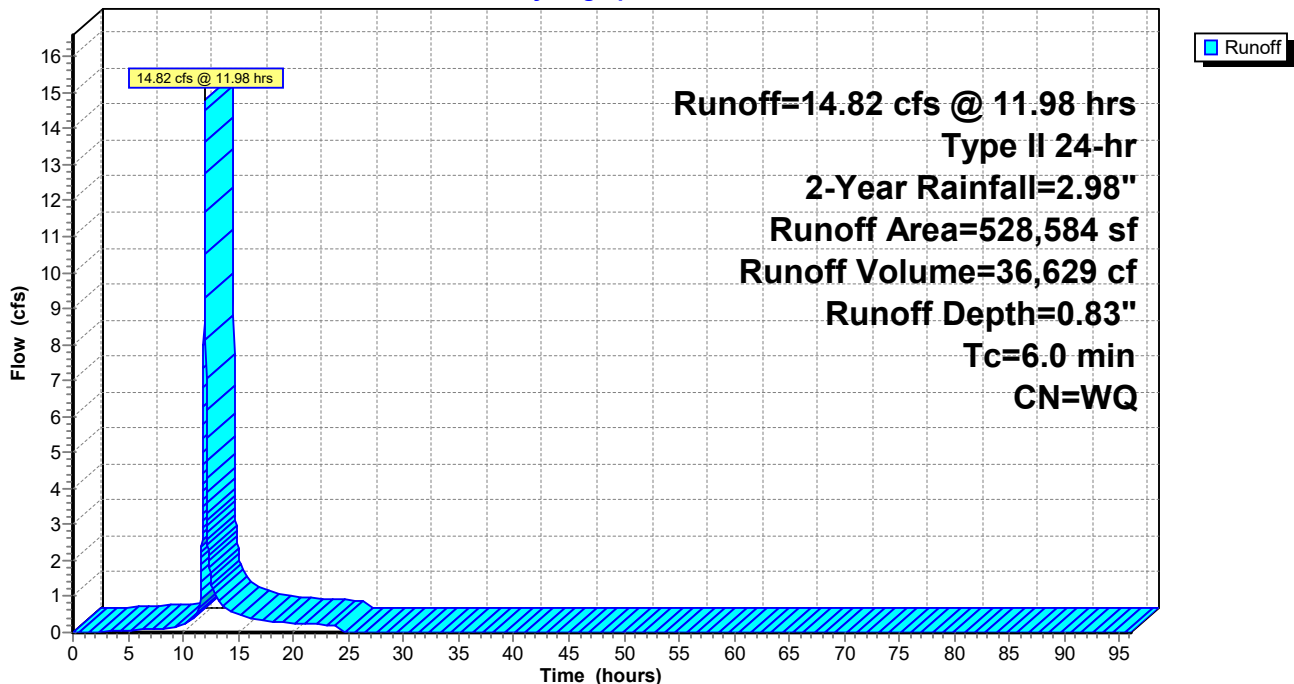
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 85,394	98	Impervious
* 202,584	58	Meadow / HSG B
* 56,089	71	Meadow / HSG C
* 67,545	61	Open Space / Good Condition / HSG B
* 10,962	74	Open Space / Good Condition / HSG C
* 9,896	58	Meadow / HSG B (Offsite)
* 93,021	71	Meadow / HSG C (Offsite)
* 1,693	66	Woods / Poor Condition / HSG B (Offsite)
* 1,400	77	Woods / Poor Condition / HSG C (Offsite)
528,584		Weighted Average
443,190		83.84% Pervious Area
85,394		16.16% Impervious Area

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

**Subcatchment 3U: Watershed Area #3 - Undetained**

Hydrograph





**Summary for Subcatchment 3U: Watershed Area #3 - Undetained**

Runoff = 24.73 cfs @ 11.98 hrs, Volume= 56,897 cf, Depth= 1.29"  
 Routed to Link 3L : Discharge Point 003

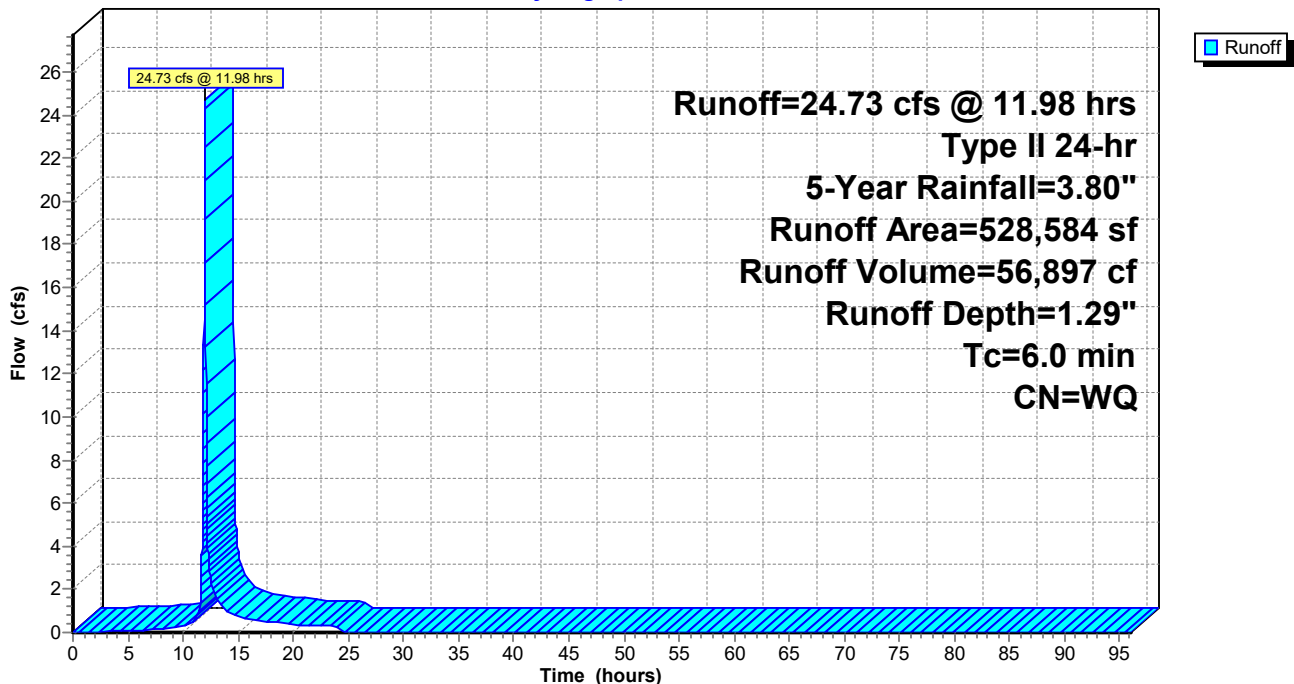
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 85,394	98	Impervious
* 202,584	58	Meadow / HSG B
* 56,089	71	Meadow / HSG C
* 67,545	61	Open Space / Good Condition / HSG B
* 10,962	74	Open Space / Good Condition / HSG C
* 9,896	58	Meadow / HSG B (Offsite)
* 93,021	71	Meadow / HSG C (Offsite)
* 1,693	66	Woods / Poor Condition / HSG B (Offsite)
* 1,400	77	Woods / Poor Condition / HSG C (Offsite)
528,584		Weighted Average
443,190		83.84% Pervious Area
85,394		16.16% Impervious Area

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

**Subcatchment 3U: Watershed Area #3 - Undetained**

Hydrograph



**Summary for Subcatchment 3U: Watershed Area #3 - Undetained**

Runoff = 34.38 cfs @ 11.98 hrs, Volume= 76,687 cf, Depth= 1.74"  
 Routed to Link 3L : Discharge Point 003

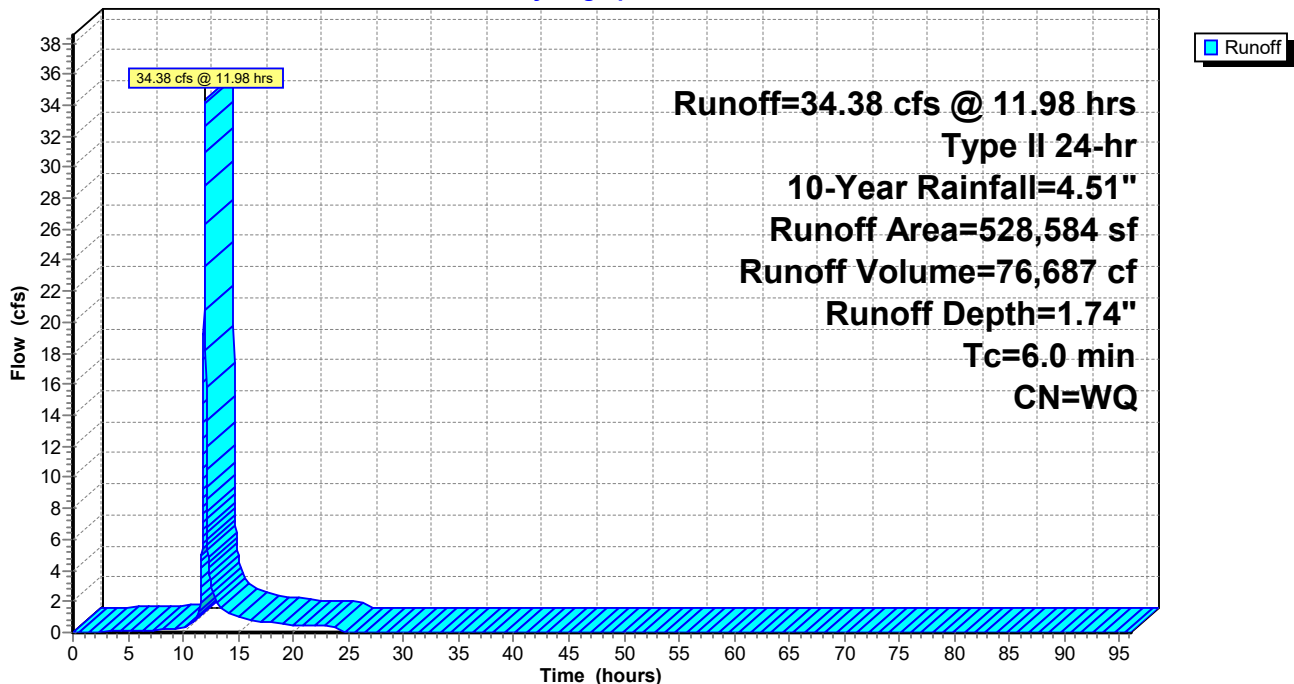
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 85,394	98	Impervious
* 202,584	58	Meadow / HSG B
* 56,089	71	Meadow / HSG C
* 67,545	61	Open Space / Good Condition / HSG B
* 10,962	74	Open Space / Good Condition / HSG C
* 9,896	58	Meadow / HSG B (Offsite)
* 93,021	71	Meadow / HSG C (Offsite)
* 1,693	66	Woods / Poor Condition / HSG B (Offsite)
* 1,400	77	Woods / Poor Condition / HSG C (Offsite)
528,584		Weighted Average
443,190		83.84% Pervious Area
85,394		16.16% Impervious Area

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

**Subcatchment 3U: Watershed Area #3 - Undetained**

Hydrograph



**Summary for Subcatchment 3U: Watershed Area #3 - Undetained**

Runoff = 50.36 cfs @ 11.98 hrs, Volume= 109,769 cf, Depth= 2.49"  
 Routed to Link 3L : Discharge Point 003

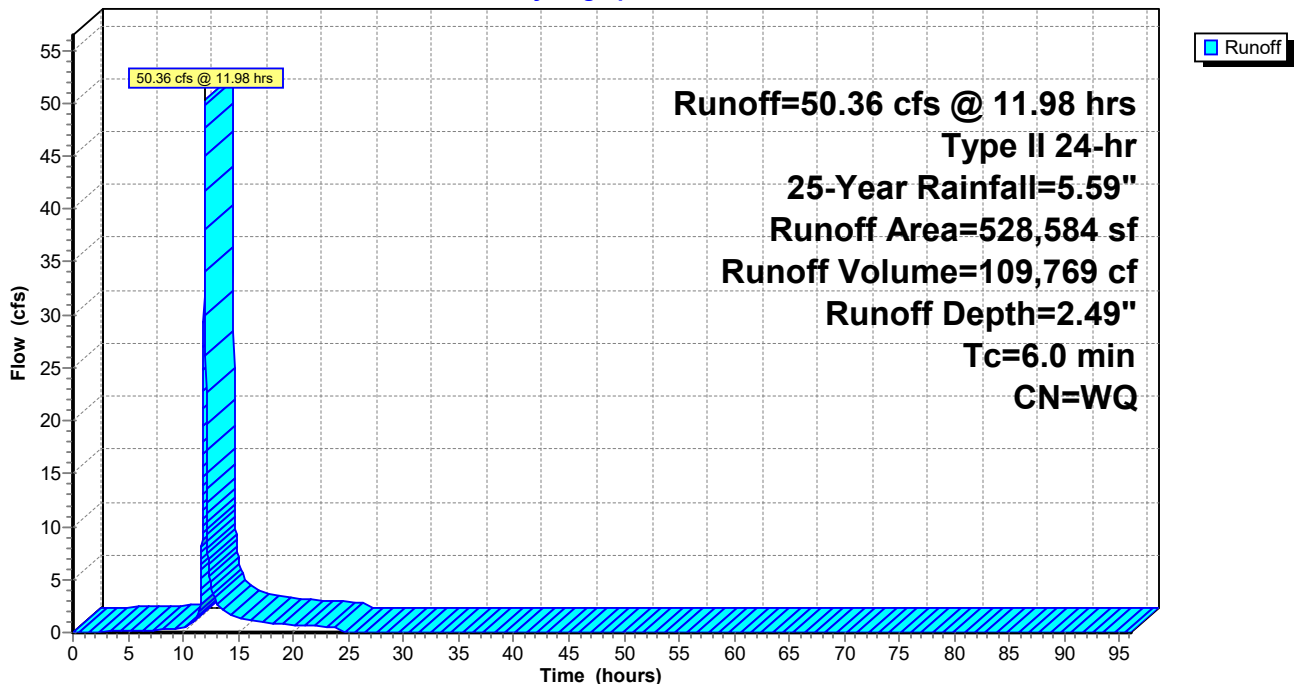
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

Area (sf)	CN	Description
* 85,394	98	Impervious
* 202,584	58	Meadow / HSG B
* 56,089	71	Meadow / HSG C
* 67,545	61	Open Space / Good Condition / HSG B
* 10,962	74	Open Space / Good Condition / HSG C
* 9,896	58	Meadow / HSG B (Offsite)
* 93,021	71	Meadow / HSG C (Offsite)
* 1,693	66	Woods / Poor Condition / HSG B (Offsite)
* 1,400	77	Woods / Poor Condition / HSG C (Offsite)
528,584		Weighted Average
443,190		83.84% Pervious Area
85,394		16.16% Impervious Area

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

**Subcatchment 3U: Watershed Area #3 - Undetained**

Hydrograph



**Summary for Subcatchment 3U: Watershed Area #3 - Undetained**

Runoff = 65.34 cfs @ 11.97 hrs, Volume= 141,121 cf, Depth= 3.20"  
 Routed to Link 3L : Discharge Point 003

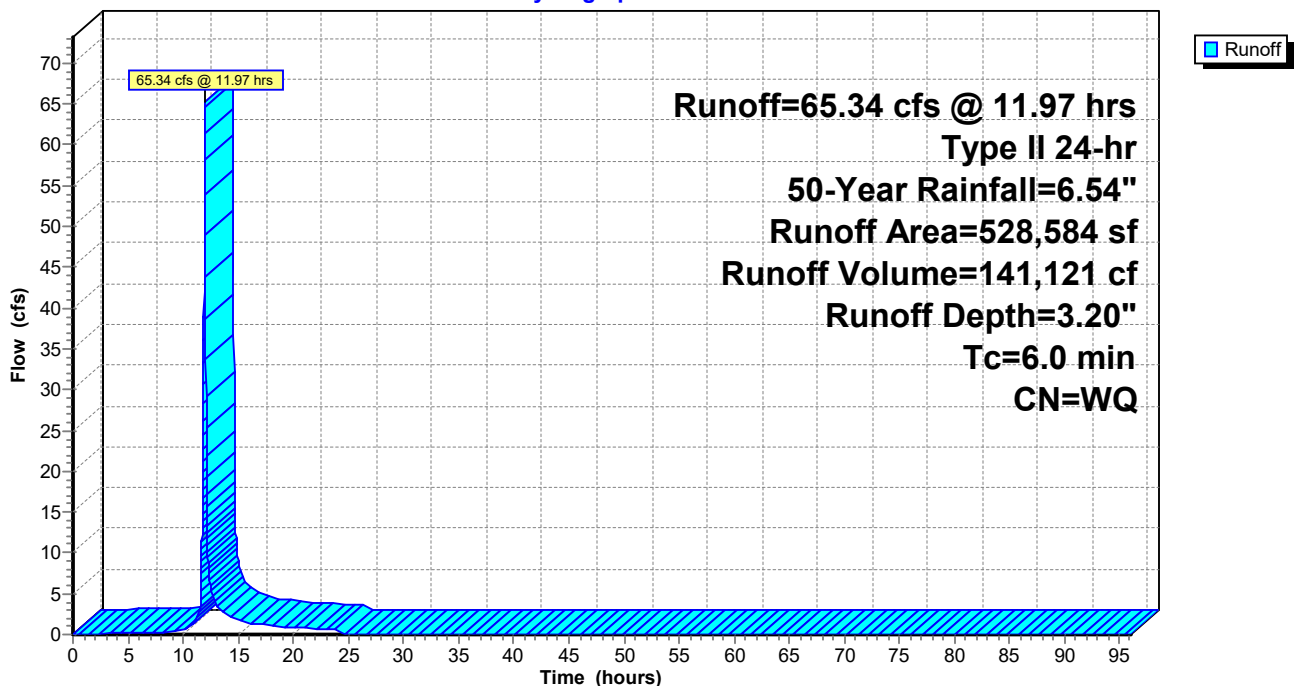
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 85,394	98	Impervious
* 202,584	58	Meadow / HSG B
* 56,089	71	Meadow / HSG C
* 67,545	61	Open Space / Good Condition / HSG B
* 10,962	74	Open Space / Good Condition / HSG C
* 9,896	58	Meadow / HSG B (Offsite)
* 93,021	71	Meadow / HSG C (Offsite)
* 1,693	66	Woods / Poor Condition / HSG B (Offsite)
* 1,400	77	Woods / Poor Condition / HSG C (Offsite)
528,584		Weighted Average
443,190		83.84% Pervious Area
85,394		16.16% Impervious Area

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

**Subcatchment 3U: Watershed Area #3 - Undetained**

Hydrograph



**Summary for Subcatchment 3U: Watershed Area #3 - Undetained**

Runoff = 82.94 cfs @ 11.97 hrs, Volume= 178,330 cf, Depth= 4.05"  
 Routed to Link 3L : Discharge Point 003

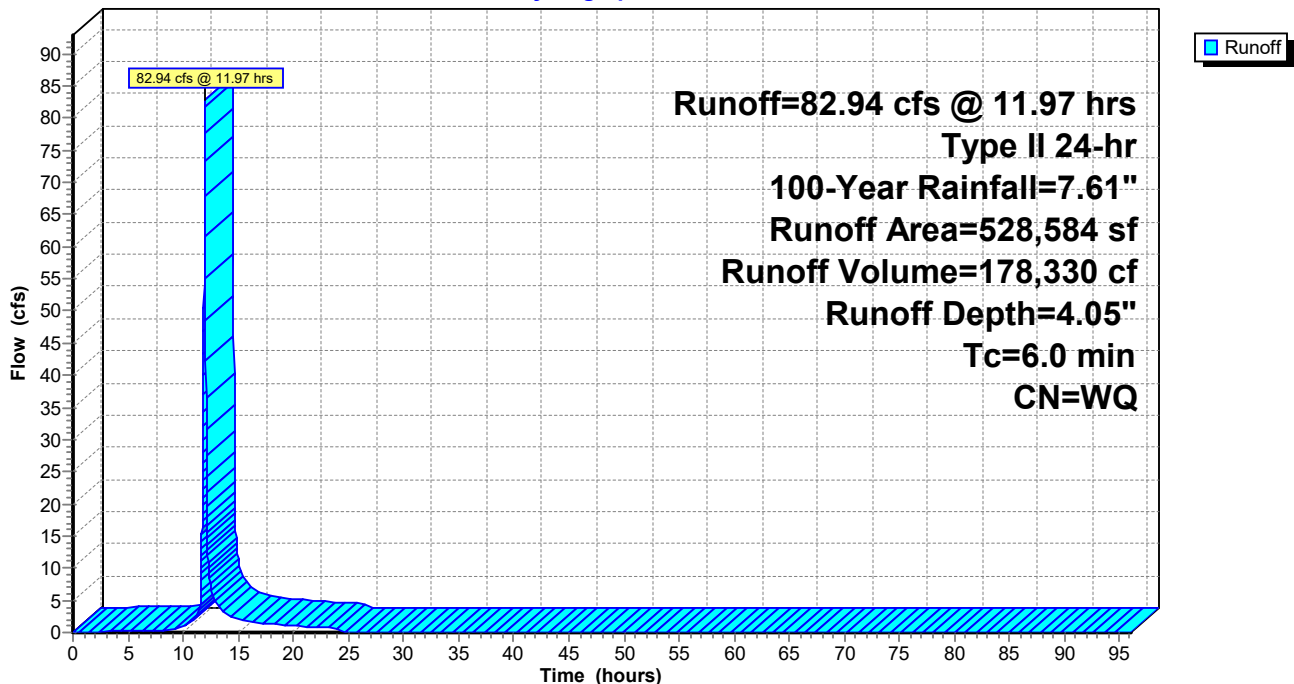
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 85,394	98	Impervious
* 202,584	58	Meadow / HSG B
* 56,089	71	Meadow / HSG C
* 67,545	61	Open Space / Good Condition / HSG B
* 10,962	74	Open Space / Good Condition / HSG C
* 9,896	58	Meadow / HSG B (Offsite)
* 93,021	71	Meadow / HSG C (Offsite)
* 1,693	66	Woods / Poor Condition / HSG B (Offsite)
* 1,400	77	Woods / Poor Condition / HSG C (Offsite)
528,584		Weighted Average
443,190		83.84% Pervious Area
85,394		16.16% Impervious Area

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

**Subcatchment 3U: Watershed Area #3 - Undetained**

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #3**

**(DISCHARGE POINT 003)**

**Combined Routings**

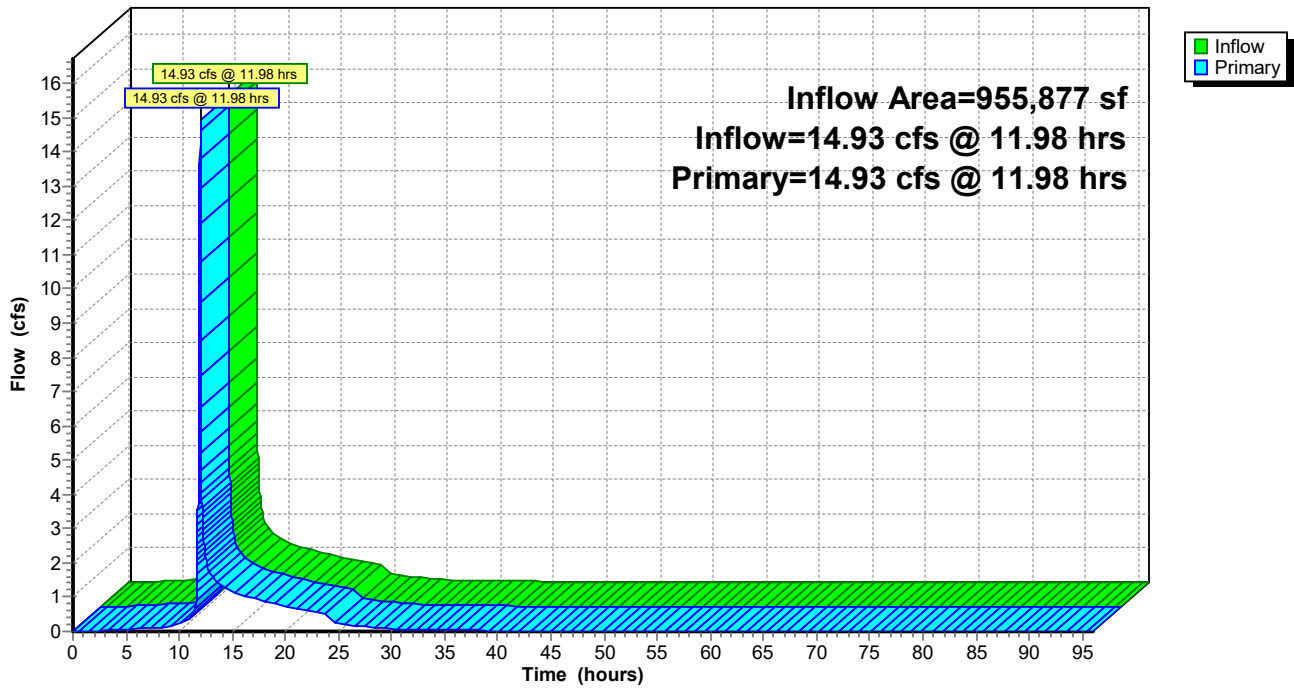
### Summary for Link 3L: Discharge Point 003

Inflow Area = 955,877 sf, 20.37% Impervious, Inflow Depth = 0.81" for 2-Year event  
Inflow = 14.93 cfs @ 11.98 hrs, Volume= 64,654 cf  
Primary = 14.93 cfs @ 11.98 hrs, Volume= 64,654 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 3L: Discharge Point 003

Hydrograph



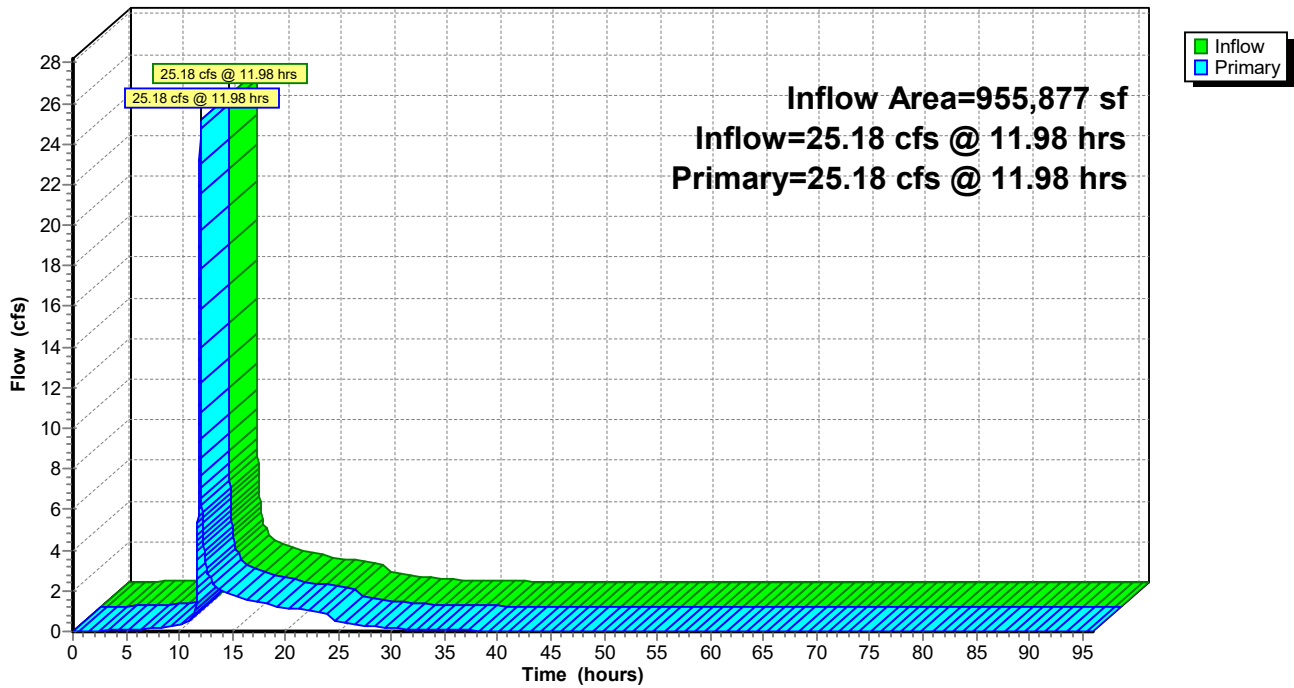
### Summary for Link 3L: Discharge Point 003

Inflow Area = 955,877 sf, 20.37% Impervious, Inflow Depth = 1.31" for 5-Year event  
Inflow = 25.18 cfs @ 11.98 hrs, Volume= 104,257 cf  
Primary = 25.18 cfs @ 11.98 hrs, Volume= 104,257 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 3L: Discharge Point 003

Hydrograph





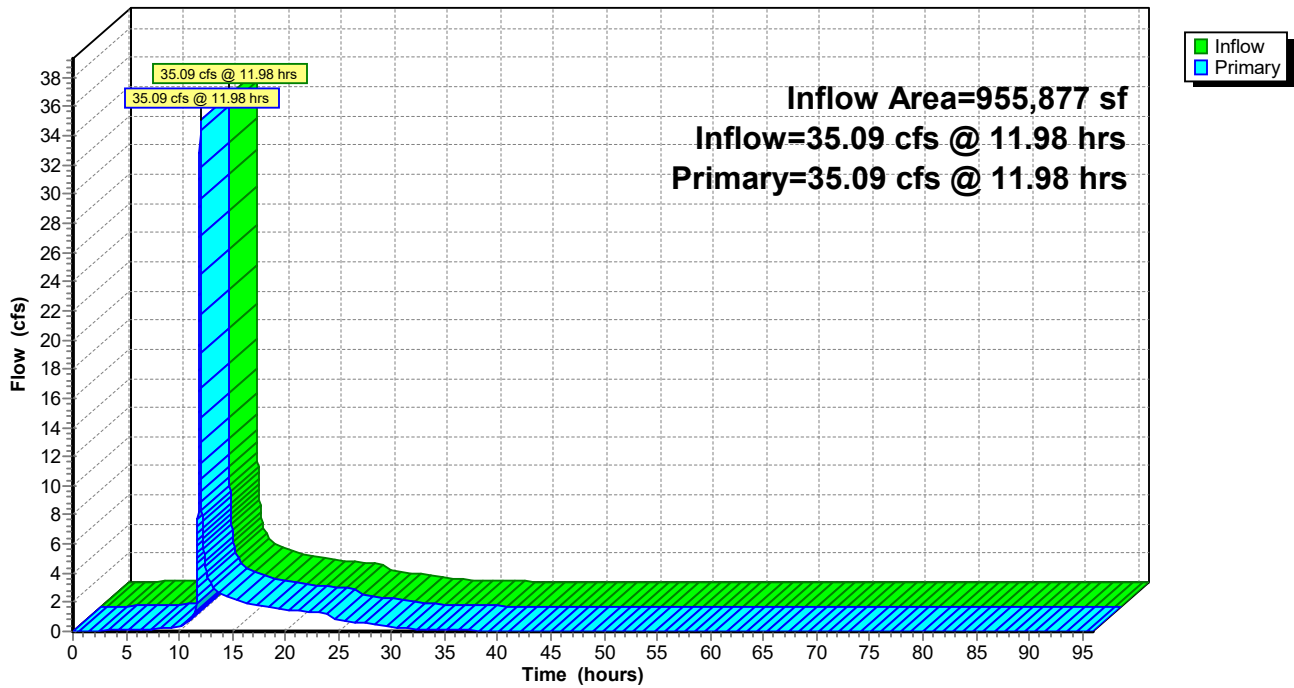
### Summary for Link 3L: Discharge Point 003

Inflow Area = 955,877 sf, 20.37% Impervious, Inflow Depth = 1.79" for 10-Year event  
Inflow = 35.09 cfs @ 11.98 hrs, Volume= 142,244 cf  
Primary = 35.09 cfs @ 11.98 hrs, Volume= 142,244 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 3L: Discharge Point 003

Hydrograph



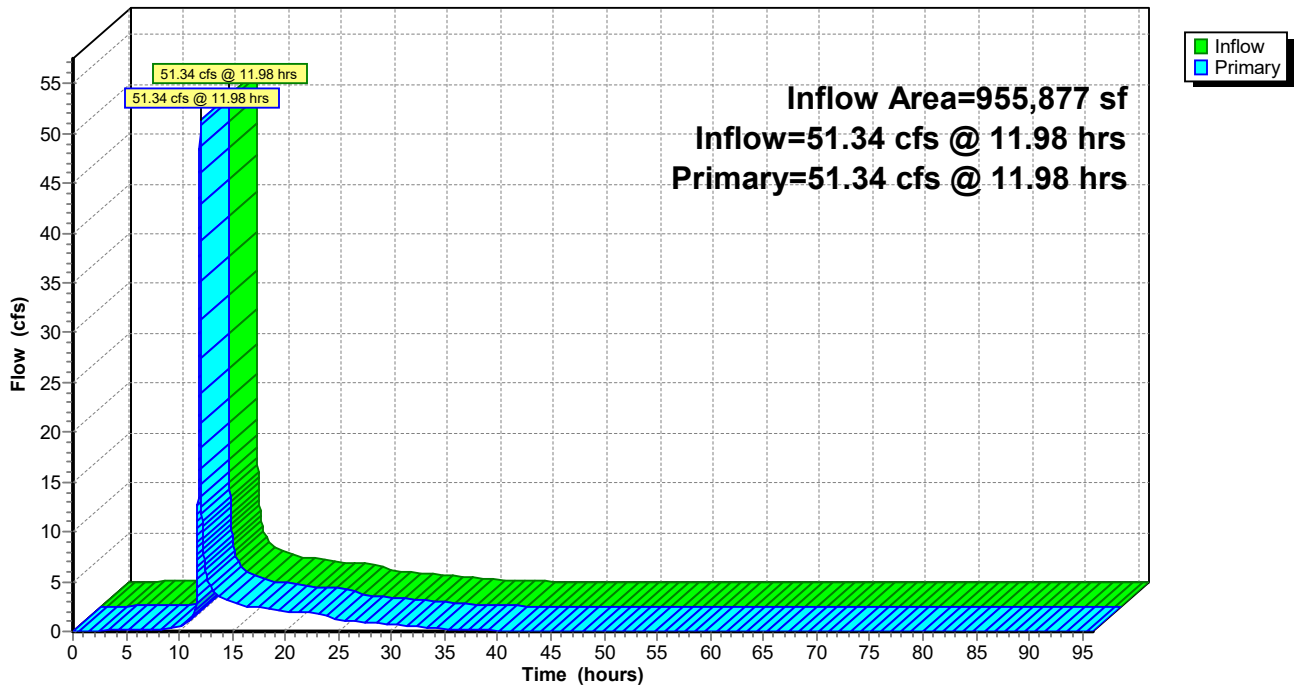
### Summary for Link 3L: Discharge Point 003

Inflow Area = 955,877 sf, 20.37% Impervious, Inflow Depth = 2.57" for 25-Year event  
Inflow = 51.34 cfs @ 11.98 hrs, Volume= 204,921 cf  
Primary = 51.34 cfs @ 11.98 hrs, Volume= 204,921 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 3L: Discharge Point 003

Hydrograph



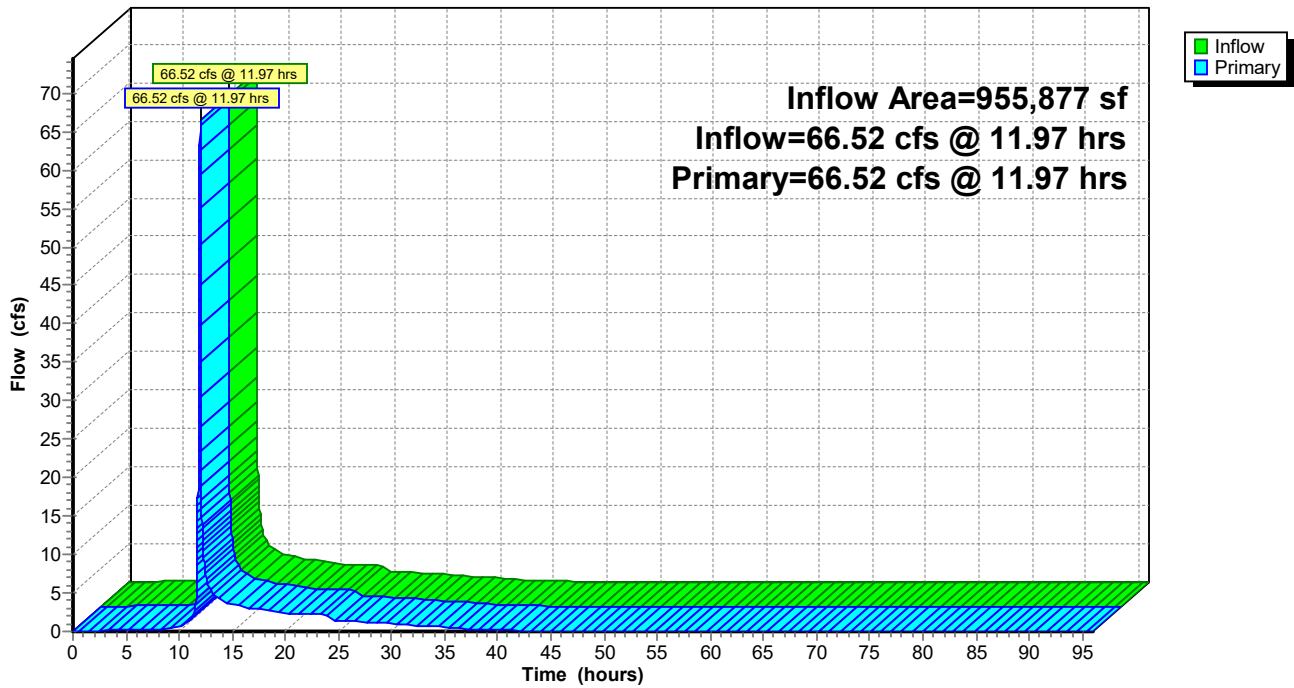
### Summary for Link 3L: Discharge Point 003

Inflow Area = 955,877 sf, 20.37% Impervious, Inflow Depth = 3.31" for 50-Year event  
Inflow = 66.52 cfs @ 11.97 hrs, Volume= 263,723 cf  
Primary = 66.52 cfs @ 11.97 hrs, Volume= 263,723 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 3L: Discharge Point 003

Hydrograph



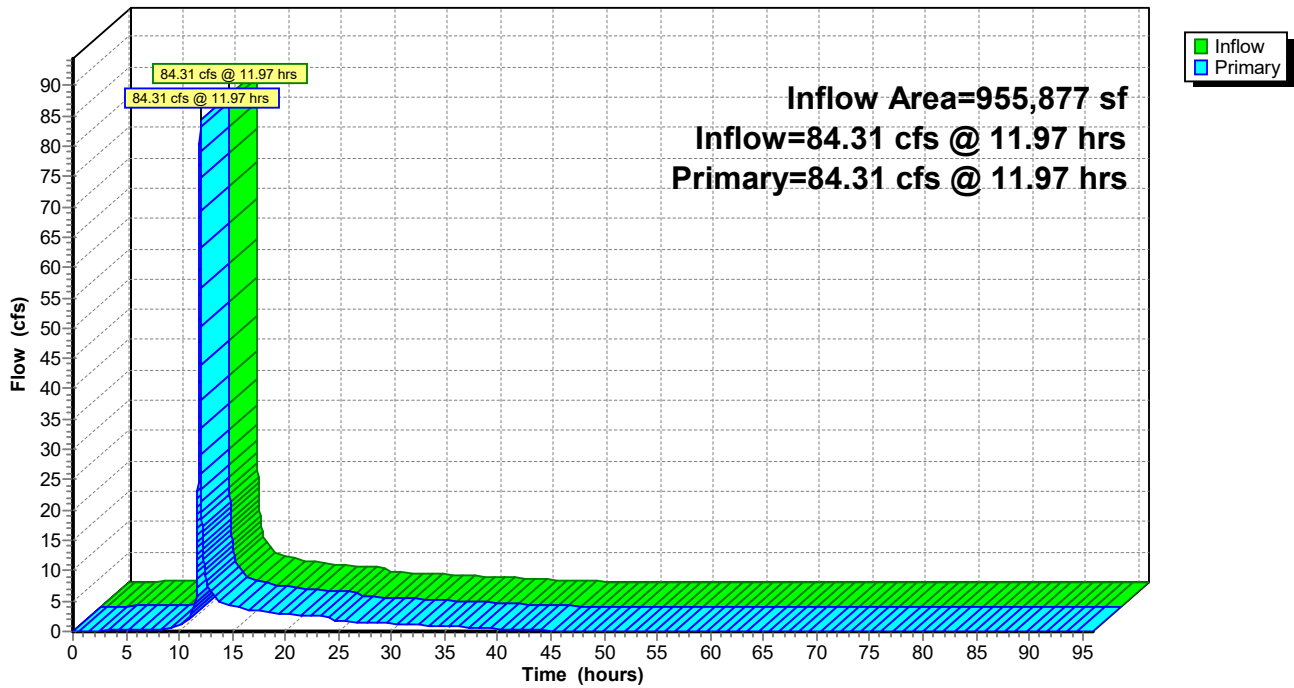
### Summary for Link 3L: Discharge Point 003

Inflow Area = 955,877 sf, 20.37% Impervious, Inflow Depth = 4.18" for 100-Year event  
Inflow = 84.31 cfs @ 11.97 hrs, Volume= 333,013 cf  
Primary = 84.31 cfs @ 11.97 hrs, Volume= 333,013 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 3L: Discharge Point 003

Hydrograph

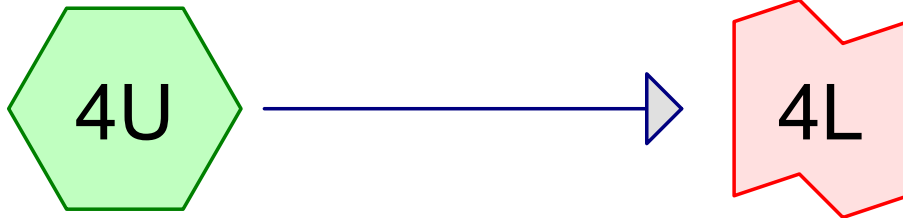


# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #4**

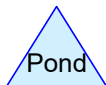
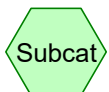
**(DISCHARGE POINT 004)**

**Undetained Routings**



Watershed Area #4 -  
Undetained

Discharge Point 004



**Routing Diagram for 22-0123-005 - Post-Dev**  
Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

**Summary for Subcatchment 4U: Watershed Area #4 - Undetained**

Runoff = 2.90 cfs @ 11.99 hrs, Volume= 6,501 cf, Depth= 0.62"  
 Routed to Link 4L : Discharge Point 004

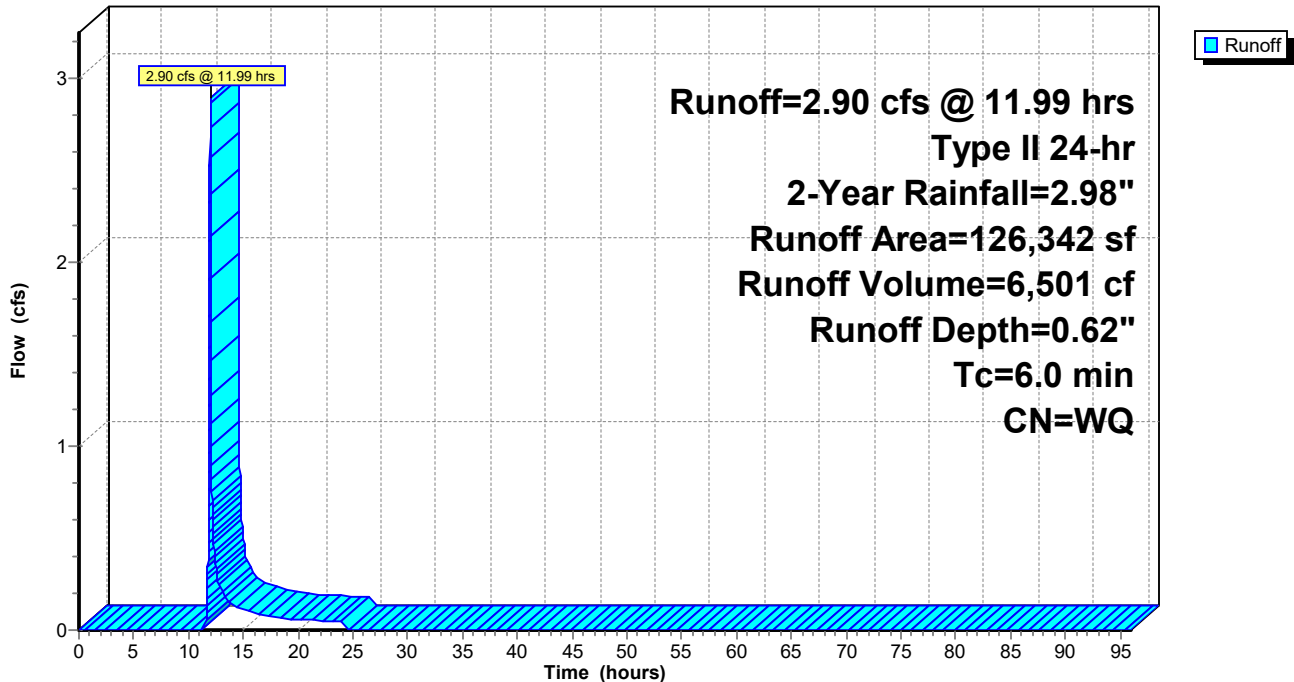
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

	Area (sf)	CN	Description
*	15,793	58	Meadow / HSG B
*	5,335	71	Meadow / HSG C
*	19,779	58	Meadow / HSG B (Offsite)
*	83,764	71	Meadow / HSG C (Offsite)
*	1,671	77	Woods / Poor Condition / HSG C (Offsite)
	126,342		Weighted Average
	126,342		100.00% Pervious Area

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

**Subcatchment 4U: Watershed Area #4 - Undetained**

Hydrograph



**Summary for Subcatchment 4U: Watershed Area #4 - Undetained**

Runoff = 5.37 cfs @ 11.98 hrs, Volume= 11,289 cf, Depth= 1.07"  
 Routed to Link 4L : Discharge Point 004

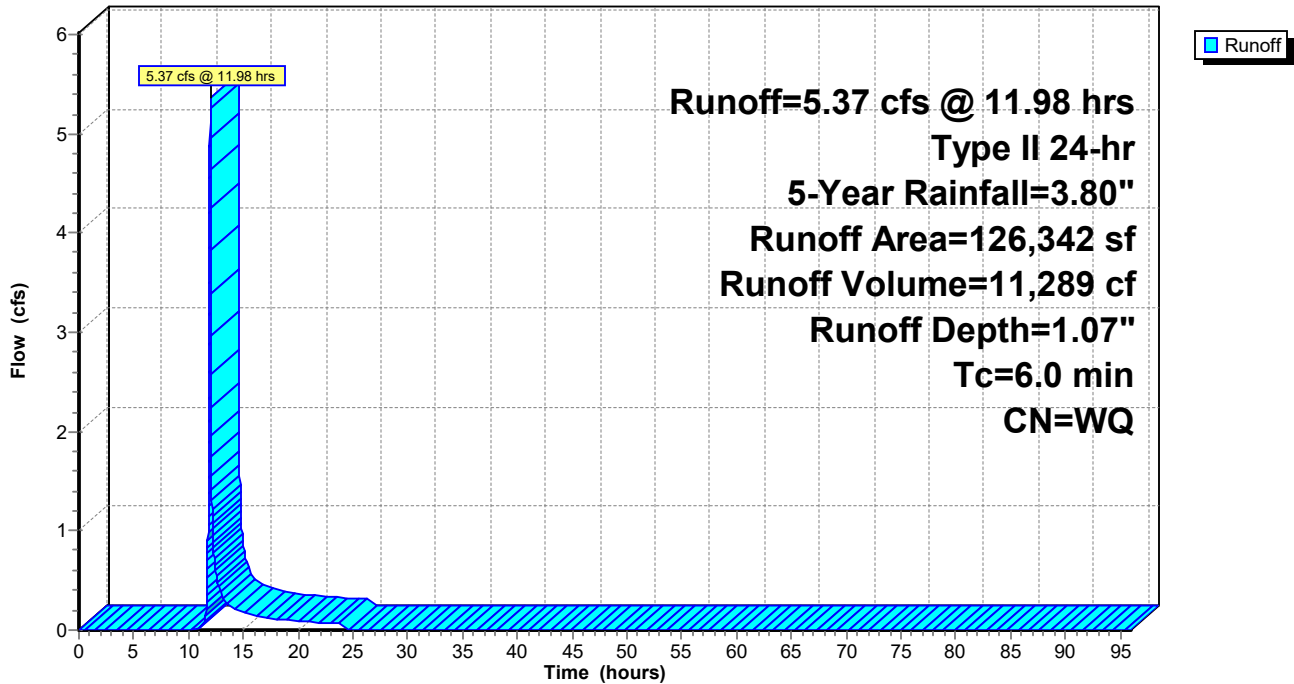
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

	Area (sf)	CN	Description
*	15,793	58	Meadow / HSG B
*	5,335	71	Meadow / HSG C
*	19,779	58	Meadow / HSG B (Offsite)
*	83,764	71	Meadow / HSG C (Offsite)
*	1,671	77	Woods / Poor Condition / HSG C (Offsite)
	126,342		Weighted Average
	126,342		100.00% Pervious Area

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

**Subcatchment 4U: Watershed Area #4 - Undetained**

Hydrograph





**Summary for Subcatchment 4U: Watershed Area #4 - Undetained**

Runoff = 7.78 cfs @ 11.98 hrs, Volume= 16,027 cf, Depth= 1.52"

Routed to Link 4L : Discharge Point 004

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

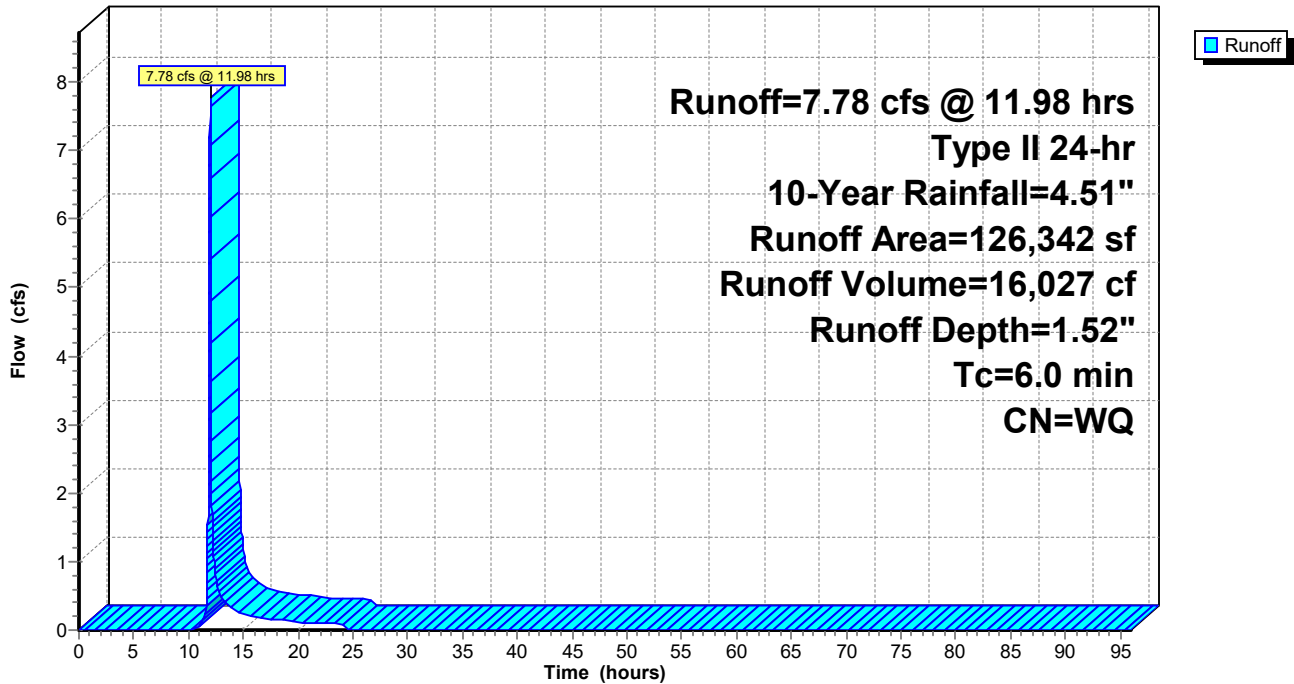
Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 15,793	58	Meadow / HSG B
* 5,335	71	Meadow / HSG C
* 19,779	58	Meadow / HSG B (Offsite)
* 83,764	71	Meadow / HSG C (Offsite)
* 1,671	77	Woods / Poor Condition / HSG C (Offsite)
126,342		Weighted Average
126,342		100.00% Pervious Area

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

**Subcatchment 4U: Watershed Area #4 - Undetained**

Hydrograph



**Summary for Subcatchment 4U: Watershed Area #4 - Undetained**

Runoff = 11.77 cfs @ 11.98 hrs, Volume= 24,000 cf, Depth= 2.28"

Routed to Link 4L : Discharge Point 004

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

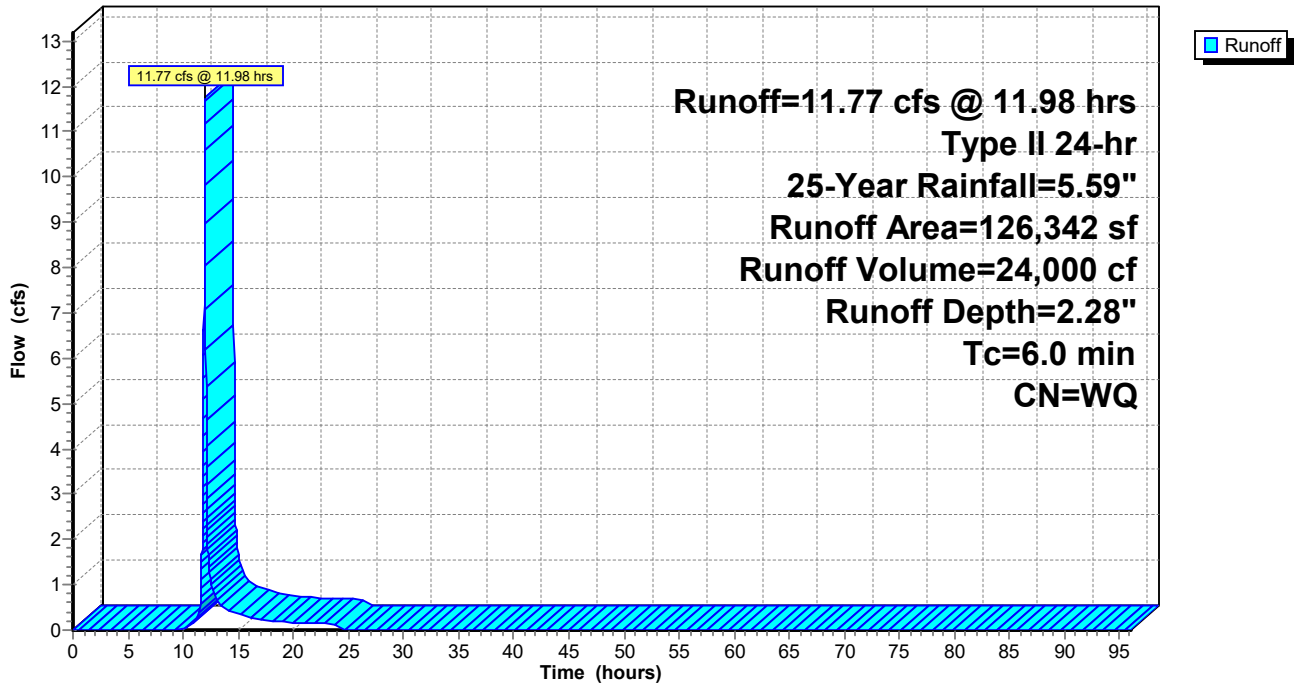
Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	15,793	58	Meadow / HSG B
*	5,335	71	Meadow / HSG C
*	19,779	58	Meadow / HSG B (Offsite)
*	83,764	71	Meadow / HSG C (Offsite)
*	1,671	77	Woods / Poor Condition / HSG C (Offsite)
	126,342		Weighted Average
	126,342		100.00% Pervious Area

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

**Subcatchment 4U: Watershed Area #4 - Undetained**

Hydrograph



**Summary for Subcatchment 4U: Watershed Area #4 - Undetained**

Runoff = 15.49 cfs @ 11.98 hrs, Volume= 31,579 cf, Depth= 3.00"  
 Routed to Link 4L : Discharge Point 004

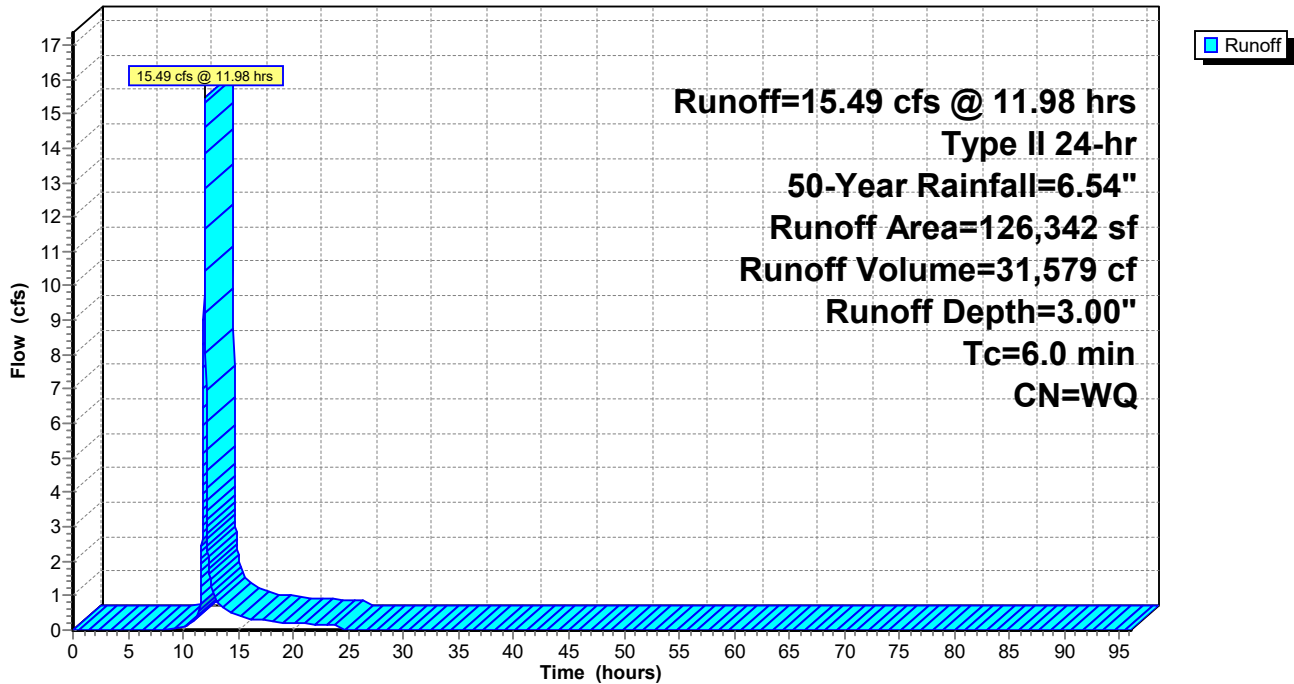
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

	Area (sf)	CN	Description
*	15,793	58	Meadow / HSG B
*	5,335	71	Meadow / HSG C
*	19,779	58	Meadow / HSG B (Offsite)
*	83,764	71	Meadow / HSG C (Offsite)
*	1,671	77	Woods / Poor Condition / HSG C (Offsite)
	126,342		Weighted Average
	126,342		100.00% Pervious Area

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

**Subcatchment 4U: Watershed Area #4 - Undetained**

Hydrograph



**Summary for Subcatchment 4U: Watershed Area #4 - Undetained**

Runoff = 19.84 cfs @ 11.97 hrs, Volume= 40,581 cf, Depth= 3.85"  
 Routed to Link 4L : Discharge Point 004

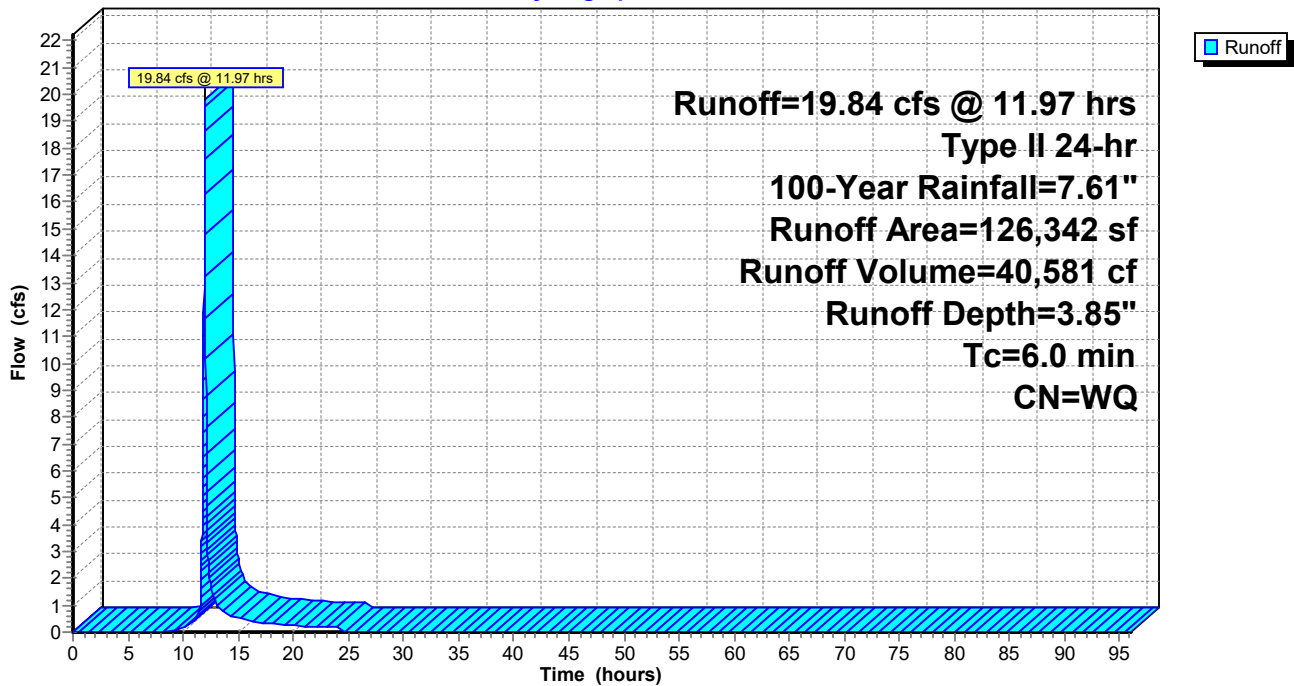
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

	Area (sf)	CN	Description
*	15,793	58	Meadow / HSG B
*	5,335	71	Meadow / HSG C
*	19,779	58	Meadow / HSG B (Offsite)
*	83,764	71	Meadow / HSG C (Offsite)
*	1,671	77	Woods / Poor Condition / HSG C (Offsite)
	126,342		Weighted Average
	126,342		100.00% Pervious Area

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

**Subcatchment 4U: Watershed Area #4 - Undetained**

Hydrograph

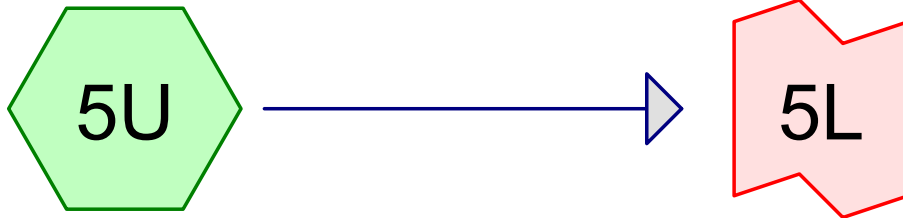


# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #5**

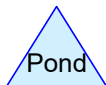
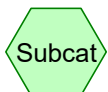
**(DISCHARGE POINT 005)**

**Undetained Routings**



Watershed Area #5 -  
Undetained

Discharge Point 005



**Routing Diagram for 22-0123-005 - Post-Dev**  
Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

**Summary for Subcatchment 5U: Watershed Area #5 - Undetained**

Runoff = 7.04 cfs @ 11.98 hrs, Volume= 17,674 cf, Depth= 0.75"  
 Routed to Link 5L : Discharge Point 005

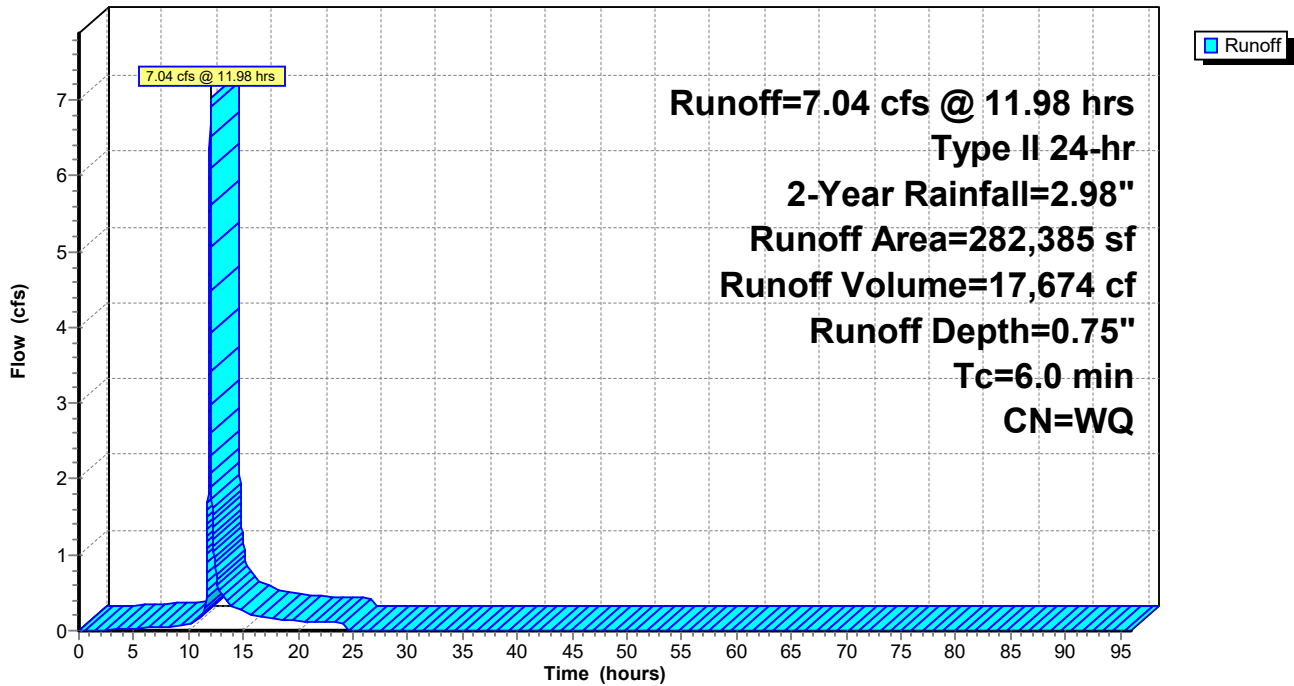
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 38,017	98	Impervious
* 138,575	58	Meadow / HSG B
* 70,832	71	Meadow / HSG C
* 25,685	61	Open Space / Good Condition / HSG B
* 9,276	74	Open Space / Good Condition / HSG C
282,385		Weighted Average
244,368		86.54% Pervious Area
38,017		13.46% Impervious Area

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

**Subcatchment 5U: Watershed Area #5 - Undetained**

Hydrograph



**Summary for Subcatchment 5U: Watershed Area #5 - Undetained**

Runoff = 12.16 cfs @ 11.98 hrs, Volume= 28,034 cf, Depth= 1.19"  
 Routed to Link 5L : Discharge Point 005

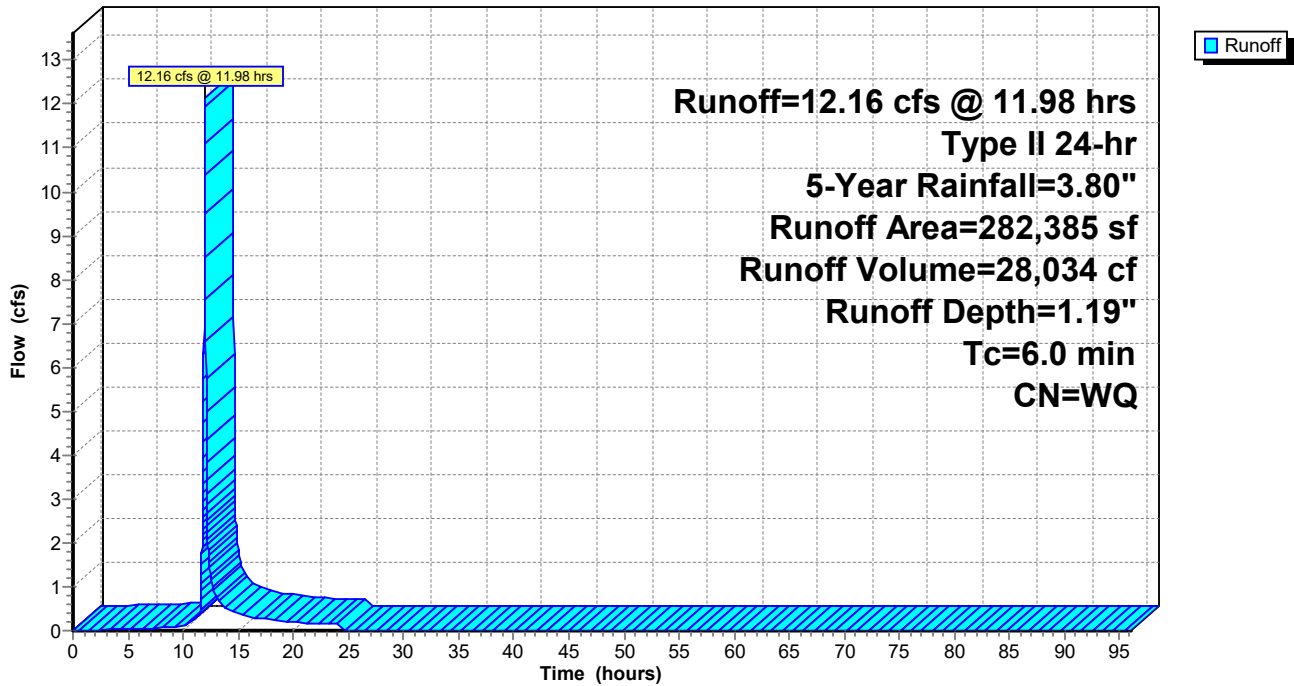
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 38,017	98	Impervious
* 138,575	58	Meadow / HSG B
* 70,832	71	Meadow / HSG C
* 25,685	61	Open Space / Good Condition / HSG B
* 9,276	74	Open Space / Good Condition / HSG C
282,385		Weighted Average
244,368		86.54% Pervious Area
38,017		13.46% Impervious Area

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

**Subcatchment 5U: Watershed Area #5 - Undetained**

Hydrograph





**Summary for Subcatchment 5U: Watershed Area #5 - Undetained**

Runoff = 17.19 cfs @ 11.98 hrs, Volume= 38,251 cf, Depth= 1.63"  
 Routed to Link 5L : Discharge Point 005

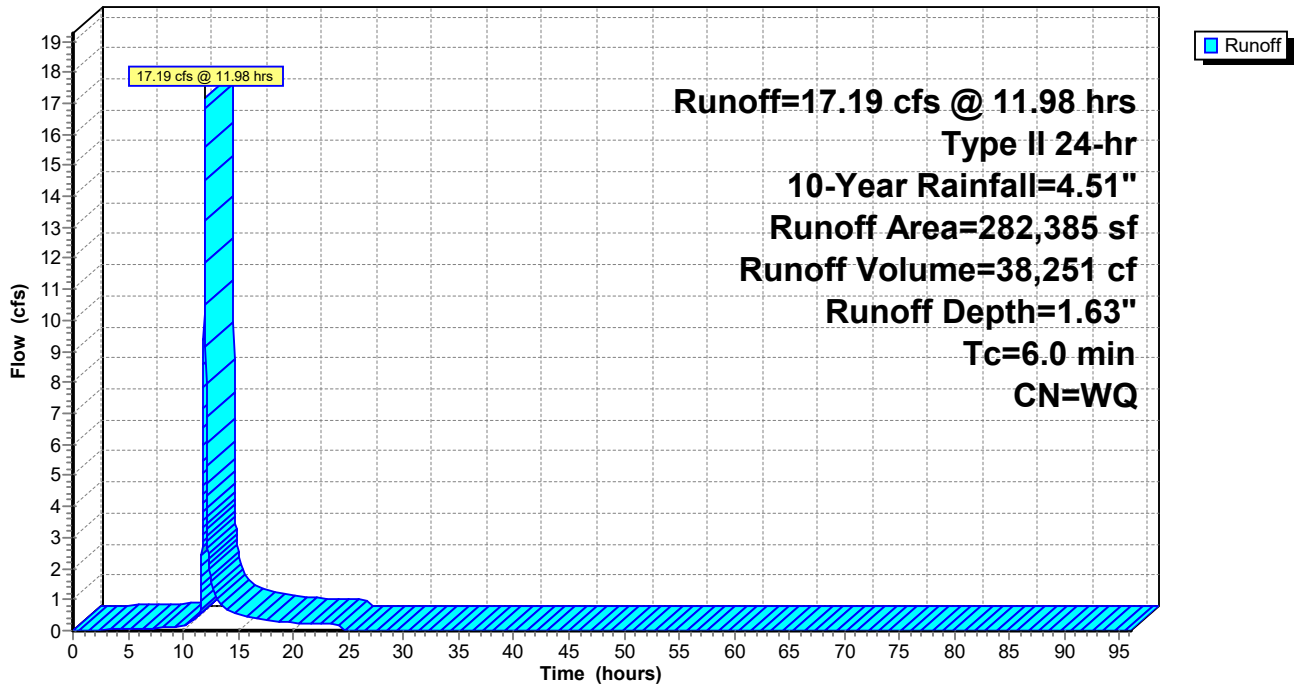
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 38,017	98	Impervious
* 138,575	58	Meadow / HSG B
* 70,832	71	Meadow / HSG C
* 25,685	61	Open Space / Good Condition / HSG B
* 9,276	74	Open Space / Good Condition / HSG C
282,385		Weighted Average
244,368		86.54% Pervious Area
38,017		13.46% Impervious Area

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

**Subcatchment 5U: Watershed Area #5 - Undetained**

Hydrograph



**Summary for Subcatchment 5U: Watershed Area #5 - Undetained**

Runoff = 25.58 cfs @ 11.98 hrs, Volume= 55,455 cf, Depth= 2.36"

Routed to Link 5L : Discharge Point 005

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

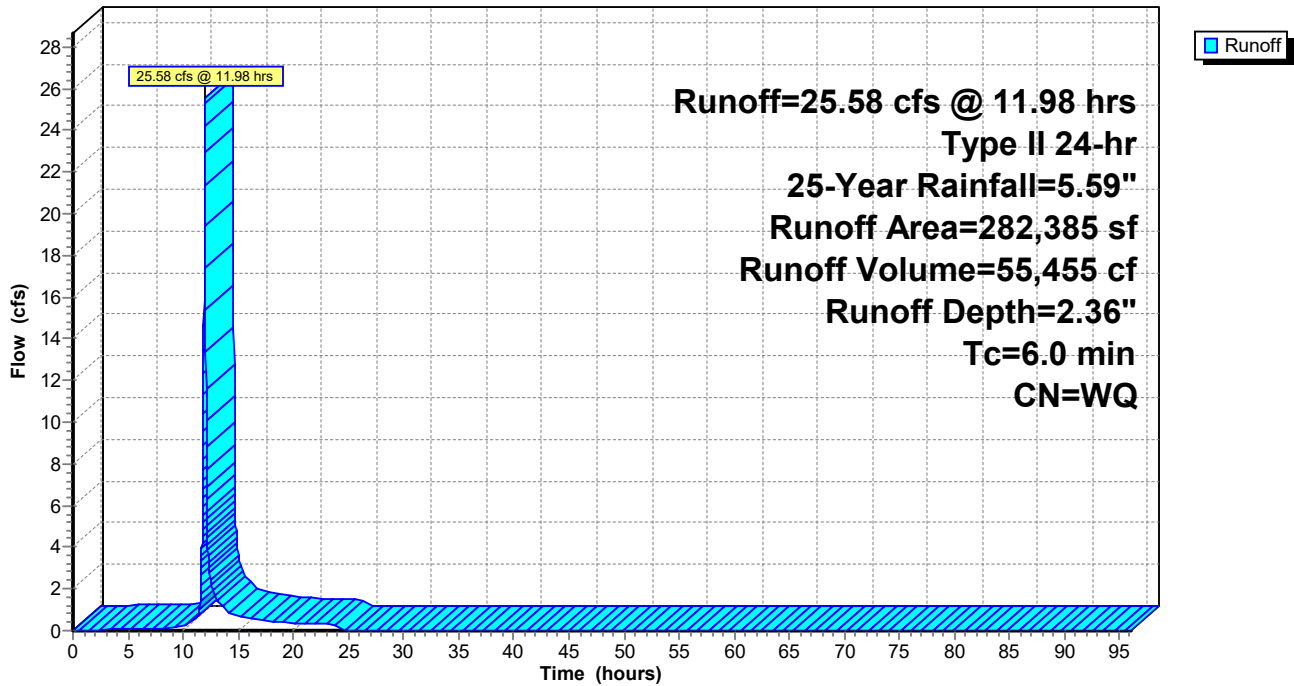
Type II 24-hr 25-Year Rainfall=5.59"

Area (sf)	CN	Description
* 38,017	98	Impervious
* 138,575	58	Meadow / HSG B
* 70,832	71	Meadow / HSG C
* 25,685	61	Open Space / Good Condition / HSG B
* 9,276	74	Open Space / Good Condition / HSG C
282,385		Weighted Average
244,368		86.54% Pervious Area
38,017		13.46% Impervious Area

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

**Subcatchment 5U: Watershed Area #5 - Undetained**

Hydrograph



**Summary for Subcatchment 5U: Watershed Area #5 - Undetained**

Runoff = 33.49 cfs @ 11.97 hrs, Volume= 71,851 cf, Depth= 3.05"  
 Routed to Link 5L : Discharge Point 005

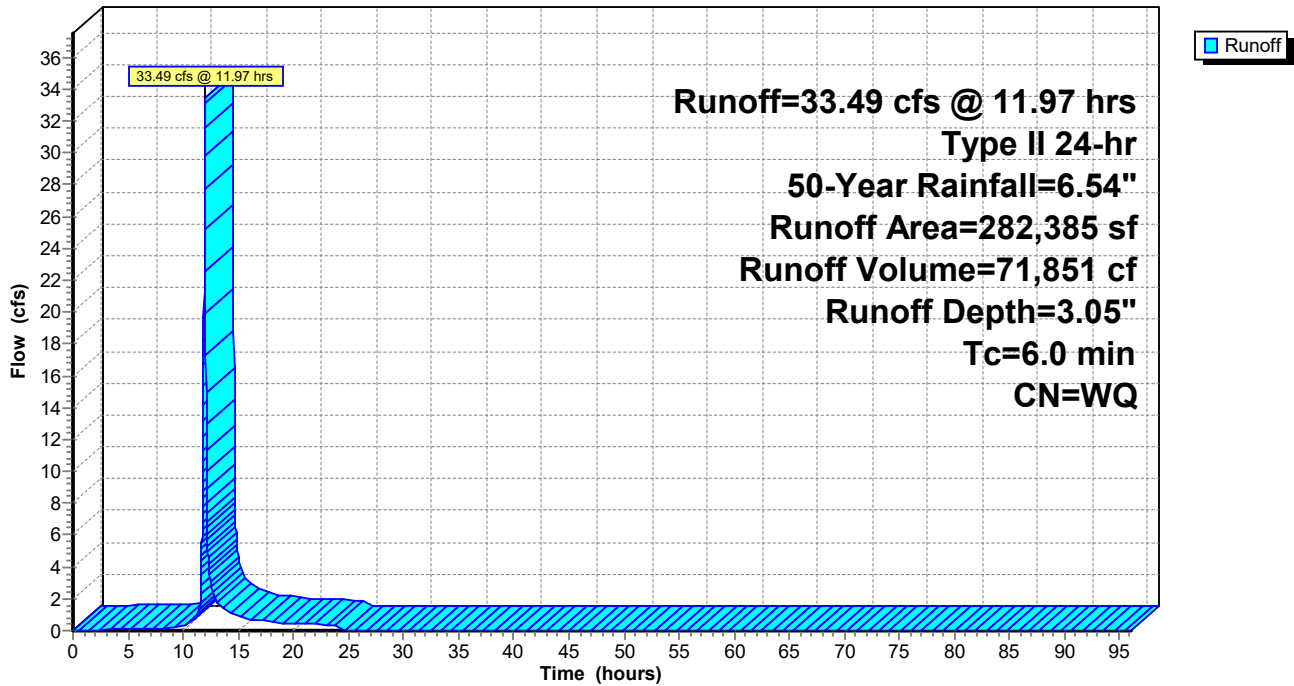
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 38,017	98	Impervious
* 138,575	58	Meadow / HSG B
* 70,832	71	Meadow / HSG C
* 25,685	61	Open Space / Good Condition / HSG B
* 9,276	74	Open Space / Good Condition / HSG C
282,385		Weighted Average
244,368		86.54% Pervious Area
38,017		13.46% Impervious Area

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

**Subcatchment 5U: Watershed Area #5 - Undetained**

Hydrograph



**Summary for Subcatchment 5U: Watershed Area #5 - Undetained**

Runoff = 42.81 cfs @ 11.97 hrs, Volume= 91,385 cf, Depth= 3.88"  
 Routed to Link 5L : Discharge Point 005

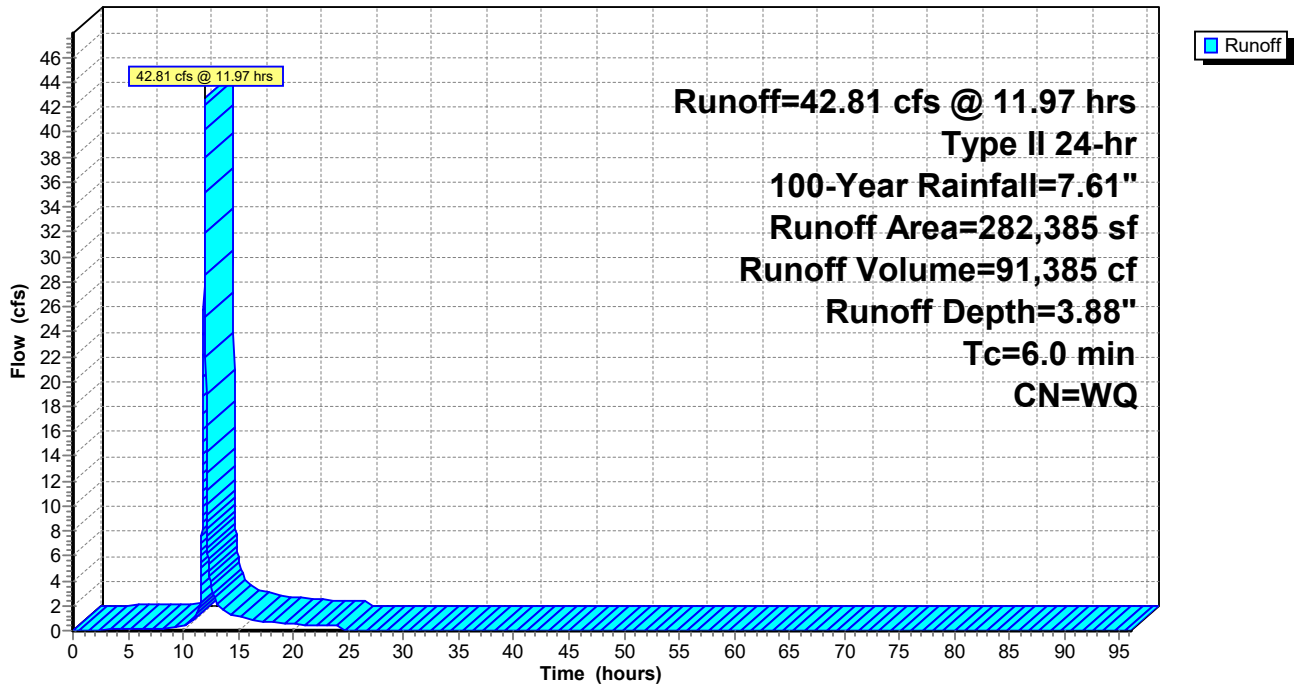
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 38,017	98	Impervious
* 138,575	58	Meadow / HSG B
* 70,832	71	Meadow / HSG C
* 25,685	61	Open Space / Good Condition / HSG B
* 9,276	74	Open Space / Good Condition / HSG C
282,385		Weighted Average
244,368		86.54% Pervious Area
38,017		13.46% Impervious Area

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

**Subcatchment 5U: Watershed Area #5 - Undetained**

Hydrograph

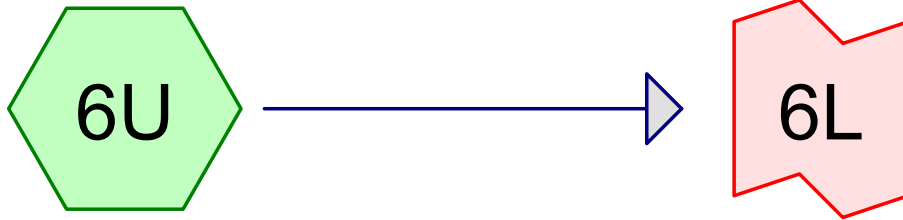


# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #6**

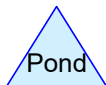
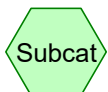
**(DISCHARGE POINT 006)**

**Undetained Routings**



Watershed Area #6 -  
Undetained

Discharge Point 006



**Routing Diagram for 22-0123-005 - Post-Dev**  
Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

**Summary for Subcatchment 6U: Watershed Area #6 - Undetained**

Runoff = 0.21 cfs @ 12.01 hrs, Volume= 757 cf, Depth= 0.27"

Routed to Link 6L : Discharge Point 006

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

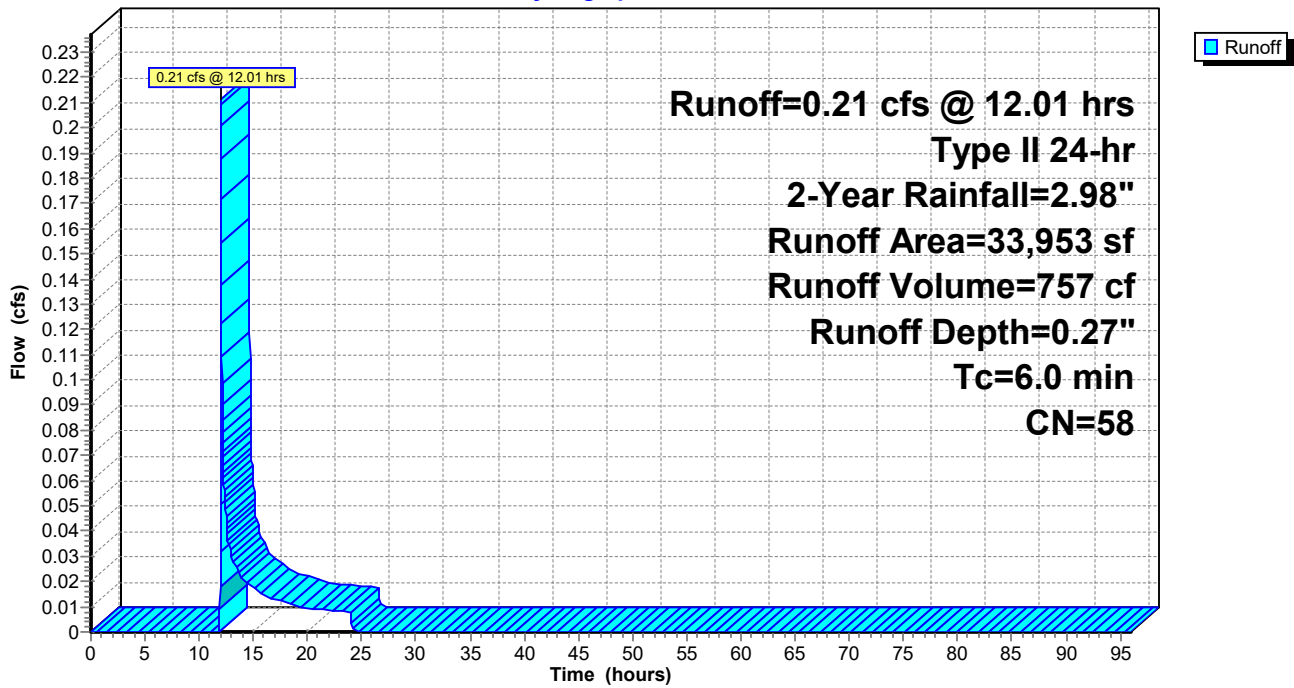
Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 33,953	58	Meadow / HSG B
33,953		100.00% Pervious Area

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

**Subcatchment 6U: Watershed Area #6 - Undetained**

Hydrograph



**Summary for Subcatchment 6U: Watershed Area #6 - Undetained**

Runoff = 0.67 cfs @ 11.99 hrs, Volume= 1,631 cf, Depth= 0.58"  
 Routed to Link 6L : Discharge Point 006

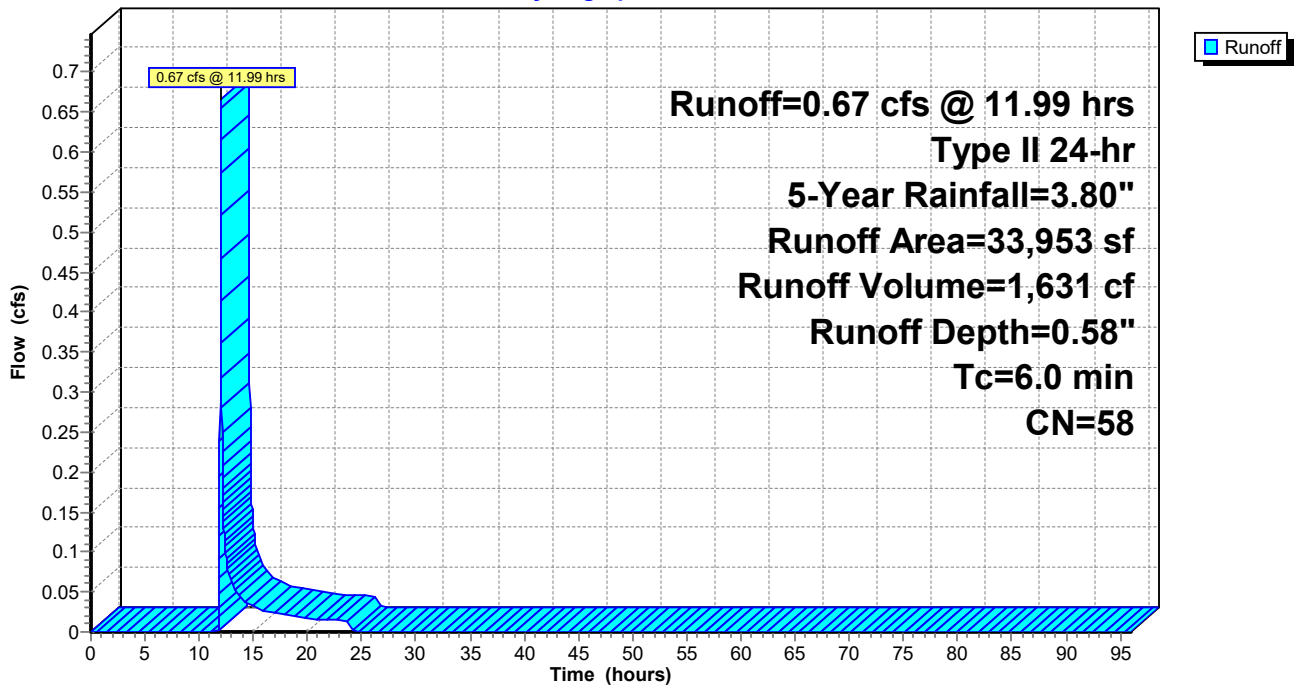
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 33,953	58	Meadow / HSG B
33,953		100.00% Pervious Area

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

**Subcatchment 6U: Watershed Area #6 - Undetained**

Hydrograph





**Summary for Subcatchment 6U: Watershed Area #6 - Undetained**

Runoff = 1.16 cfs @ 11.99 hrs, Volume= 2,574 cf, Depth= 0.91"  
 Routed to Link 6L : Discharge Point 006

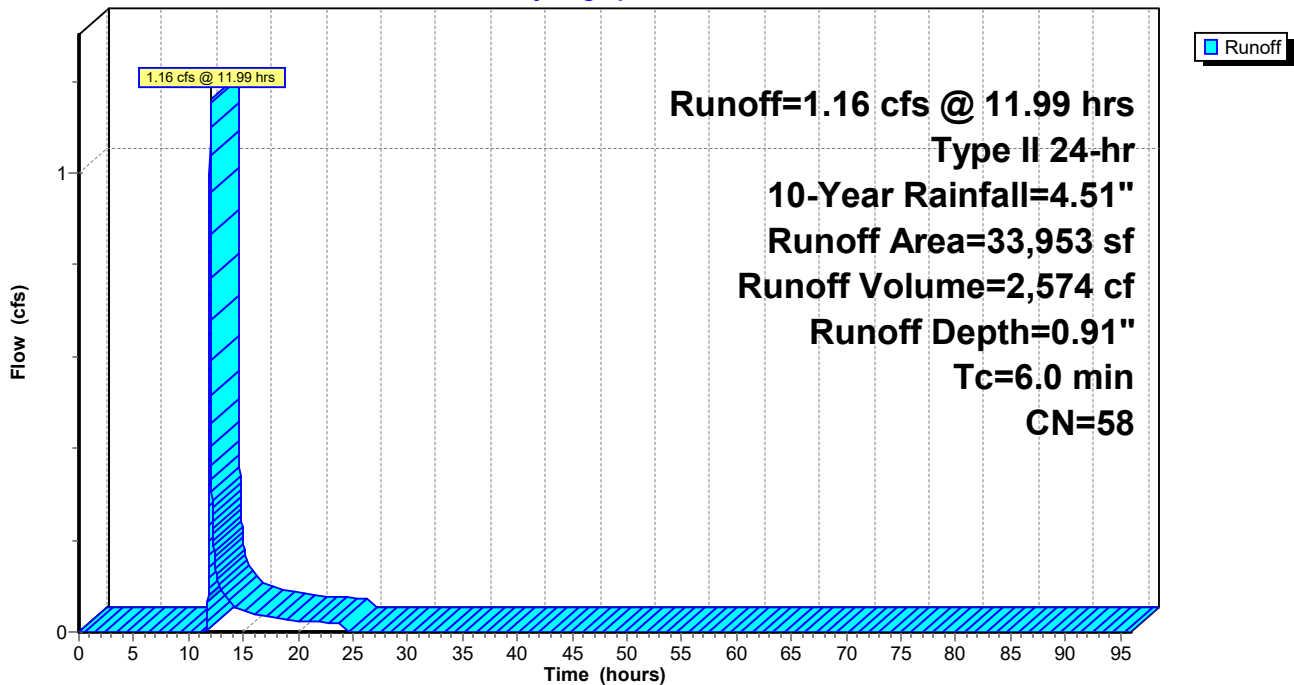
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 33,953	58	Meadow / HSG B
33,953		100.00% Pervious Area

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

**Subcatchment 6U: Watershed Area #6 - Undetained**

Hydrograph



**Summary for Subcatchment 6U: Watershed Area #6 - Undetained**

Runoff = 2.04 cfs @ 11.98 hrs, Volume= 4,264 cf, Depth= 1.51"  
 Routed to Link 6L : Discharge Point 006

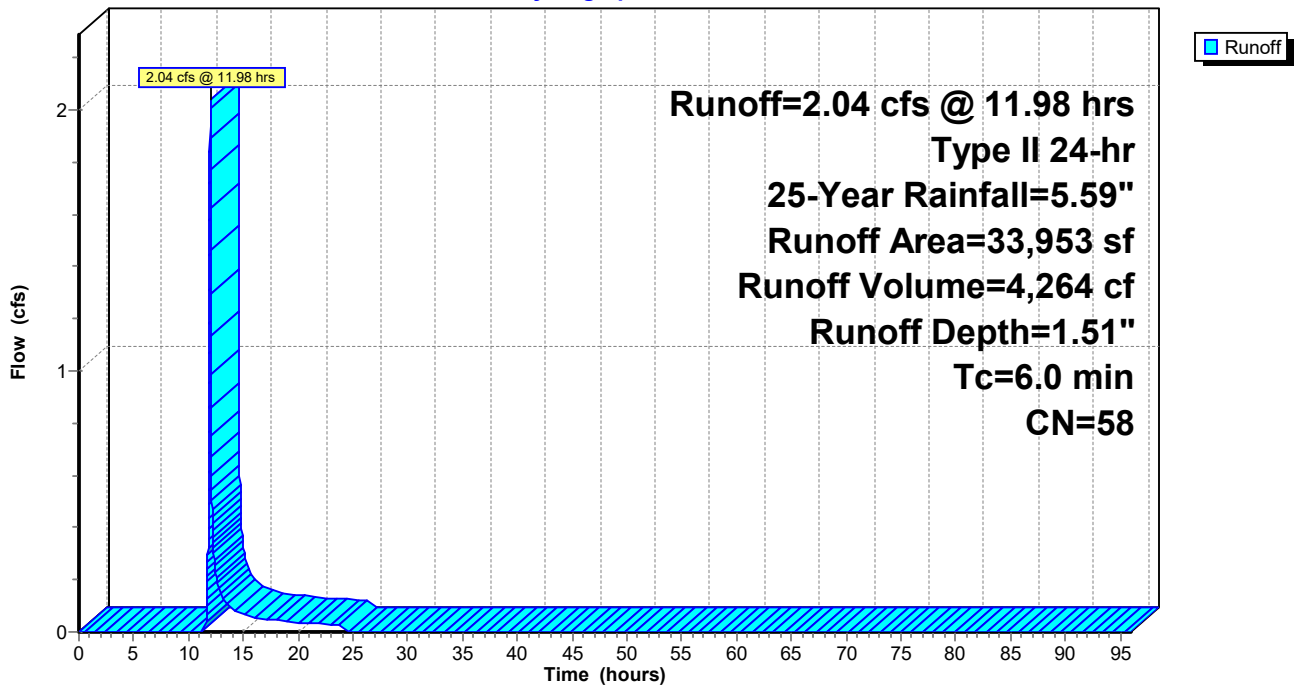
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

Area (sf)	CN	Description
* 33,953	58	Meadow / HSG B
33,953		100.00% Pervious Area

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

**Subcatchment 6U: Watershed Area #6 - Undetained**

Hydrograph



**Summary for Subcatchment 6U: Watershed Area #6 - Undetained**

Runoff = 2.90 cfs @ 11.98 hrs, Volume= 5,948 cf, Depth= 2.10"  
 Routed to Link 6L : Discharge Point 006

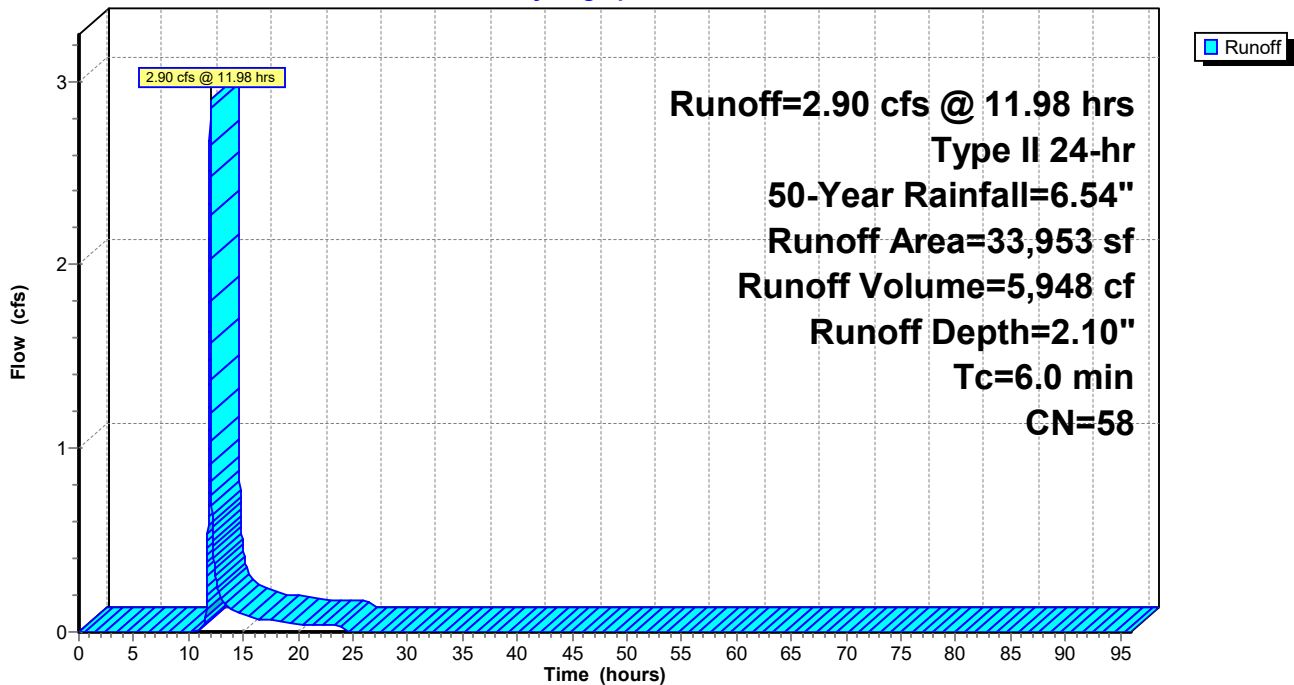
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 33,953	58	Meadow / HSG B
33,953		100.00% Pervious Area

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

**Subcatchment 6U: Watershed Area #6 - Undetained**

Hydrograph



**Summary for Subcatchment 6U: Watershed Area #6 - Undetained**

Runoff = 3.95 cfs @ 11.98 hrs, Volume= 8,015 cf, Depth= 2.83"

Routed to Link 6L : Discharge Point 006

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

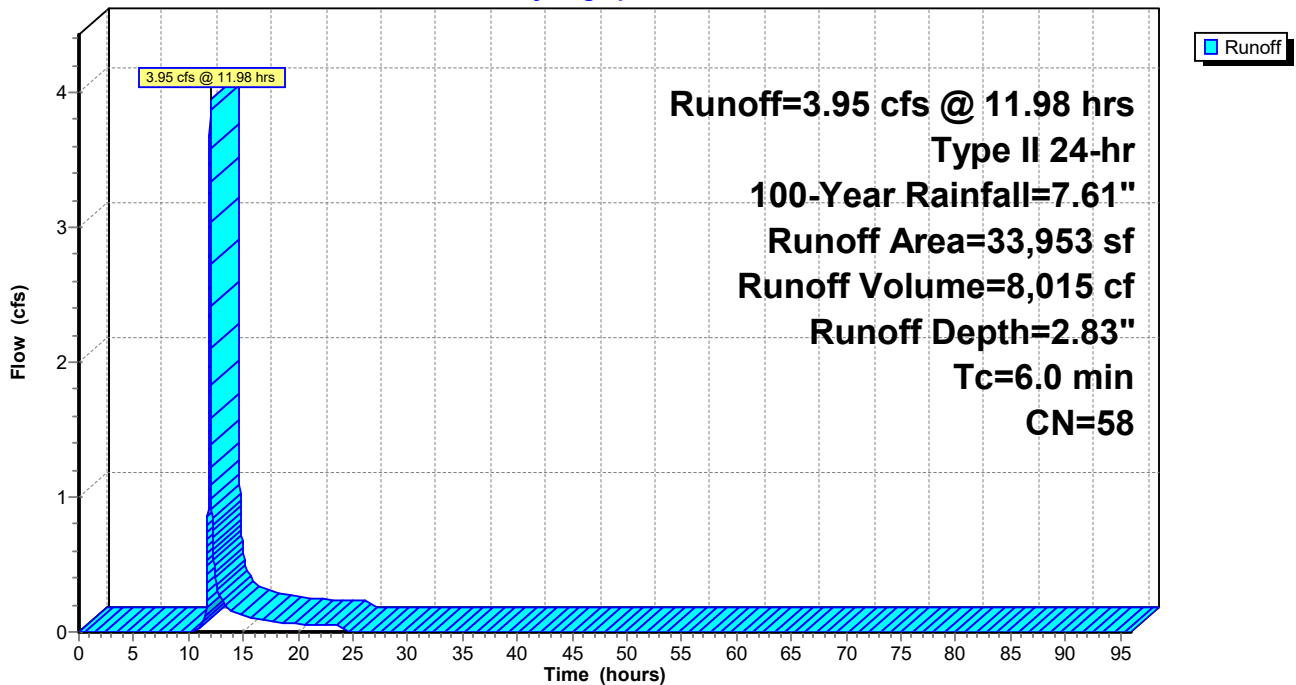
Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 33,953	58	Meadow / HSG B
33,953		100.00% Pervious Area

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

**Subcatchment 6U: Watershed Area #6 - Undetained**

Hydrograph

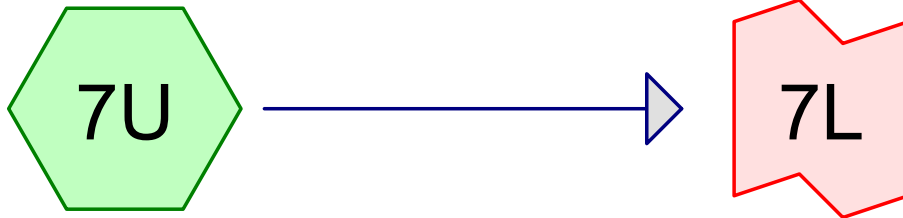


# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #7**

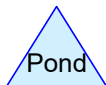
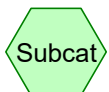
**(DISCHARGE POINT 007)**

**Undetained Routings**



Watershed Area #7 -  
Undetained

Discharge Point 007



**Routing Diagram for 22-0123-005 - Post-Dev**  
Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

**Summary for Subcatchment 7U: Watershed Area #7 - Undetained**

Runoff = 0.59 cfs @ 12.01 hrs, Volume= 2,121 cf, Depth= 0.27"  
 Routed to Link 7L : Discharge Point 007

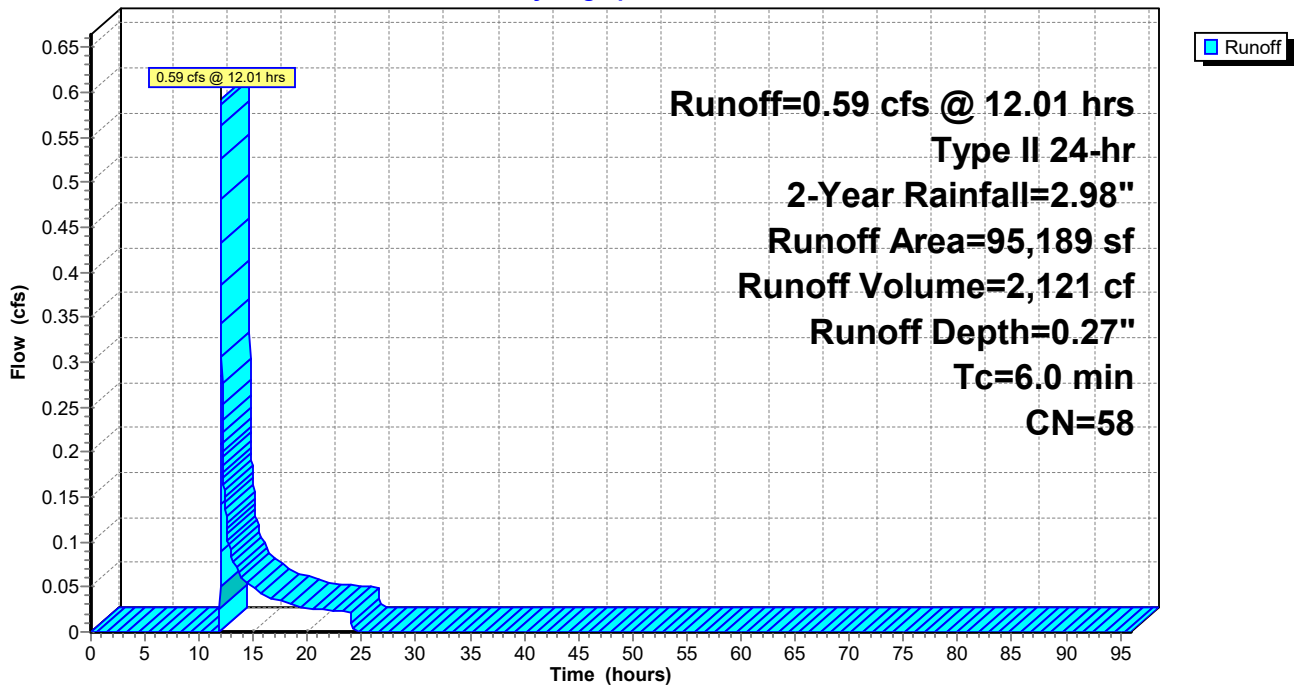
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 95,189	58	Meadow / HSG B
95,189		100.00% Pervious Area

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

**Subcatchment 7U: Watershed Area #7 - Undetained**

Hydrograph



**Summary for Subcatchment 7U: Watershed Area #7 - Undetained**

Runoff = 1.87 cfs @ 11.99 hrs, Volume= 4,573 cf, Depth= 0.58"  
 Routed to Link 7L : Discharge Point 007

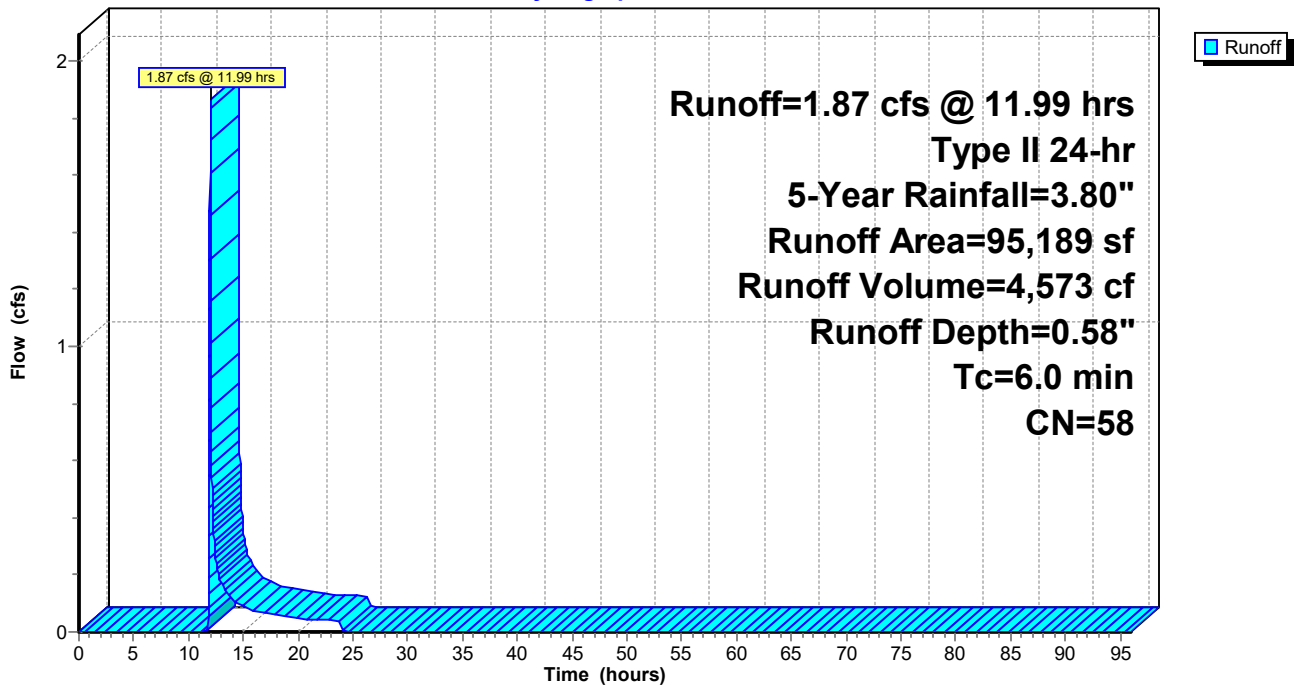
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

Area (sf)	CN	Description
* 95,189	58	Meadow / HSG B
95,189		100.00% Pervious Area

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

**Subcatchment 7U: Watershed Area #7 - Undetained**

Hydrograph





**Summary for Subcatchment 7U: Watershed Area #7 - Undetained**

Runoff = 3.26 cfs @ 11.99 hrs, Volume= 7,217 cf, Depth= 0.91"  
 Routed to Link 7L : Discharge Point 007

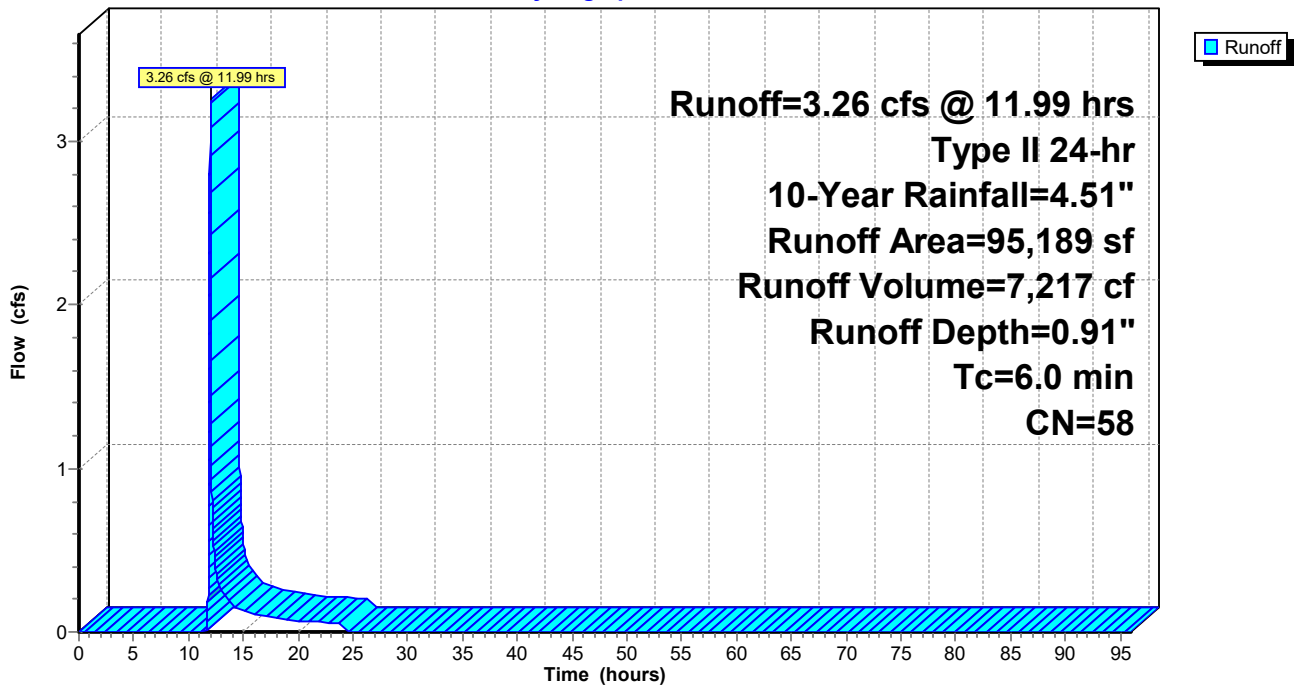
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

Area (sf)	CN	Description
* 95,189	58	Meadow / HSG B
95,189		100.00% Pervious Area

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

**Subcatchment 7U: Watershed Area #7 - Undetained**

Hydrograph



**Summary for Subcatchment 7U: Watershed Area #7 - Undetained**

Runoff = 5.73 cfs @ 11.98 hrs, Volume= 11,954 cf, Depth= 1.51"  
 Routed to Link 7L : Discharge Point 007

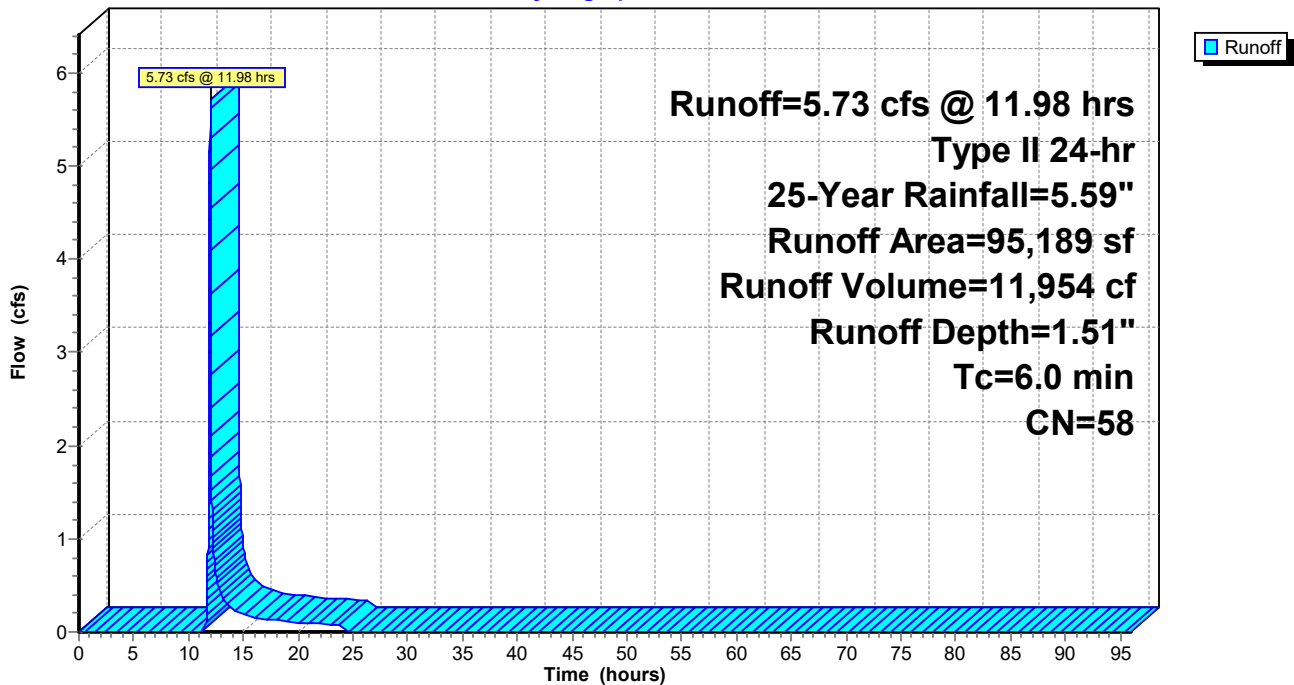
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

Area (sf)	CN	Description
* 95,189	58	Meadow / HSG B
95,189		100.00% Pervious Area

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

**Subcatchment 7U: Watershed Area #7 - Undetained**

Hydrograph



**Summary for Subcatchment 7U: Watershed Area #7 - Undetained**

Runoff = 8.14 cfs @ 11.98 hrs, Volume= 16,675 cf, Depth= 2.10"  
 Routed to Link 7L : Discharge Point 007

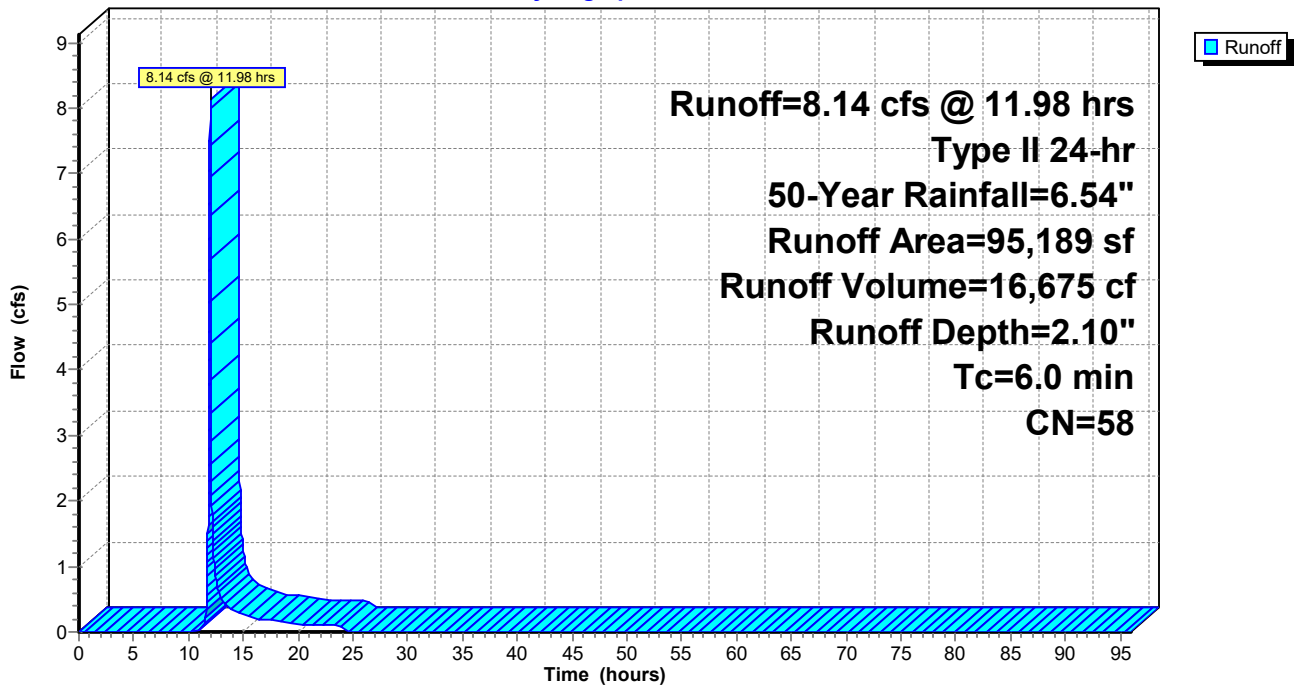
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

Area (sf)	CN	Description
* 95,189	58	Meadow / HSG B
95,189		100.00% Pervious Area

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

**Subcatchment 7U: Watershed Area #7 - Undetained**

Hydrograph



**Summary for Subcatchment 7U: Watershed Area #7 - Undetained**

Runoff = 11.07 cfs @ 11.98 hrs, Volume= 22,470 cf, Depth= 2.83"  
 Routed to Link 7L : Discharge Point 007

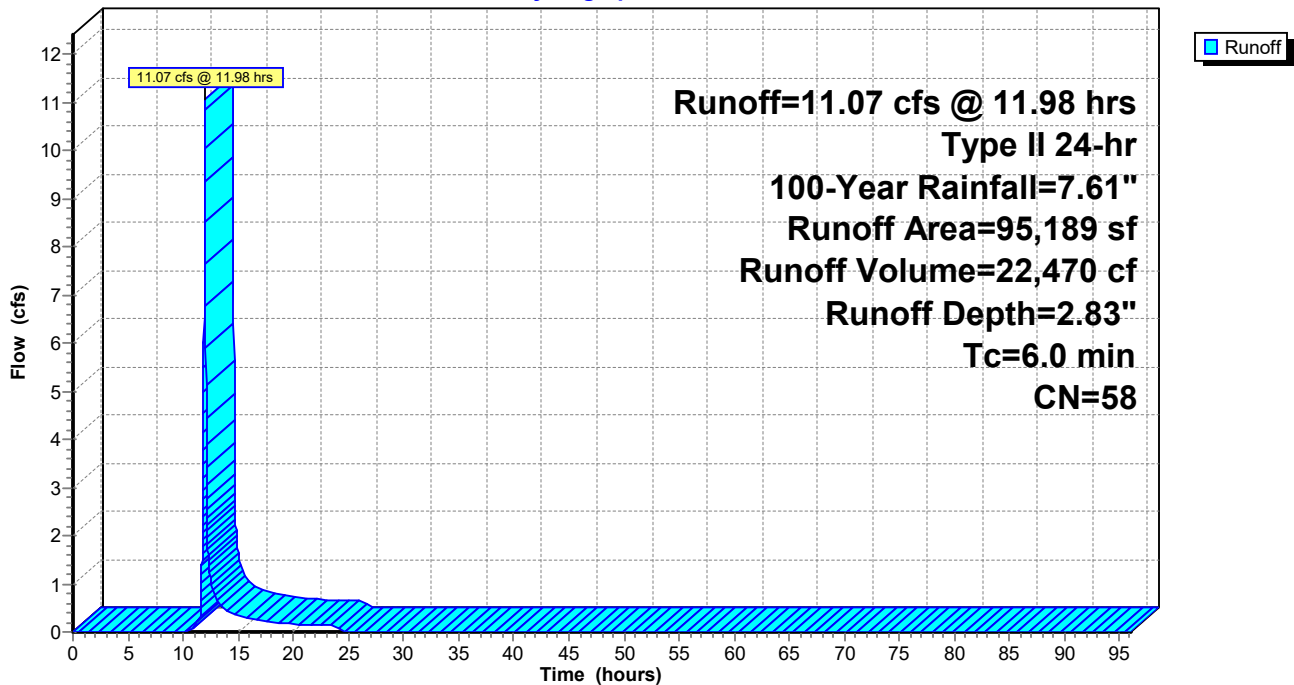
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

Area (sf)	CN	Description
* 95,189	58	Meadow / HSG B
95,189		100.00% Pervious Area

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

**Subcatchment 7U: Watershed Area #7 - Undetained**

Hydrograph

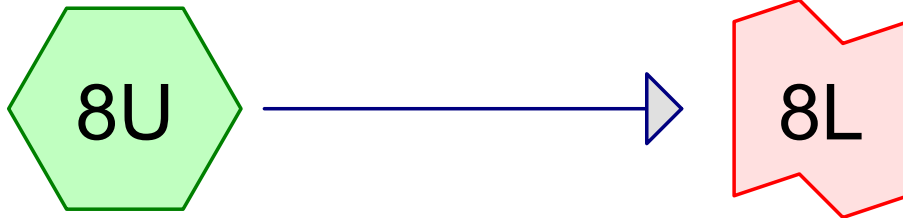


# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #8**

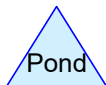
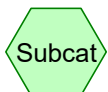
**(DISCHARGE POINT 008)**

**Undetained Routings**



Watershed Area #8 -  
Undetained

Discharge Point 008



**Routing Diagram for 22-0123-005 - Post-Dev**  
Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

**Summary for Subcatchment 8U: Watershed Area #8 - Undetained**

Runoff = 2.76 cfs @ 11.99 hrs, Volume= 7,450 cf, Depth= 0.42"  
 Routed to Link 8L : Discharge Point 008

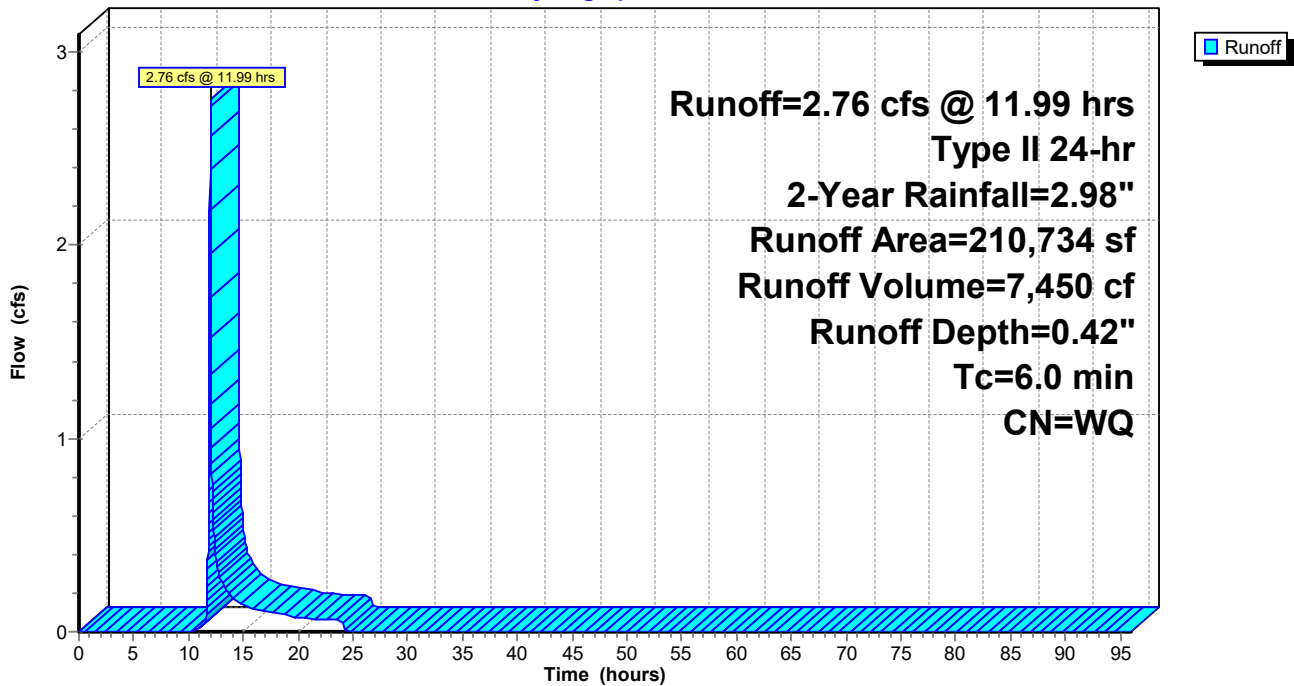
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

	Area (sf)	CN	Description
*	171,723	58	Meadow / HSG B
*	39,011	78	Meadow / HSG D
	210,734		Weighted Average
	210,734		100.00% Pervious Area

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

**Subcatchment 8U: Watershed Area #8 - Undetained**

Hydrograph



**Summary for Subcatchment 8U: Watershed Area #8 - Undetained**

Runoff = 6.09 cfs @ 11.99 hrs, Volume= 13,871 cf, Depth= 0.79"  
 Routed to Link 8L : Discharge Point 008

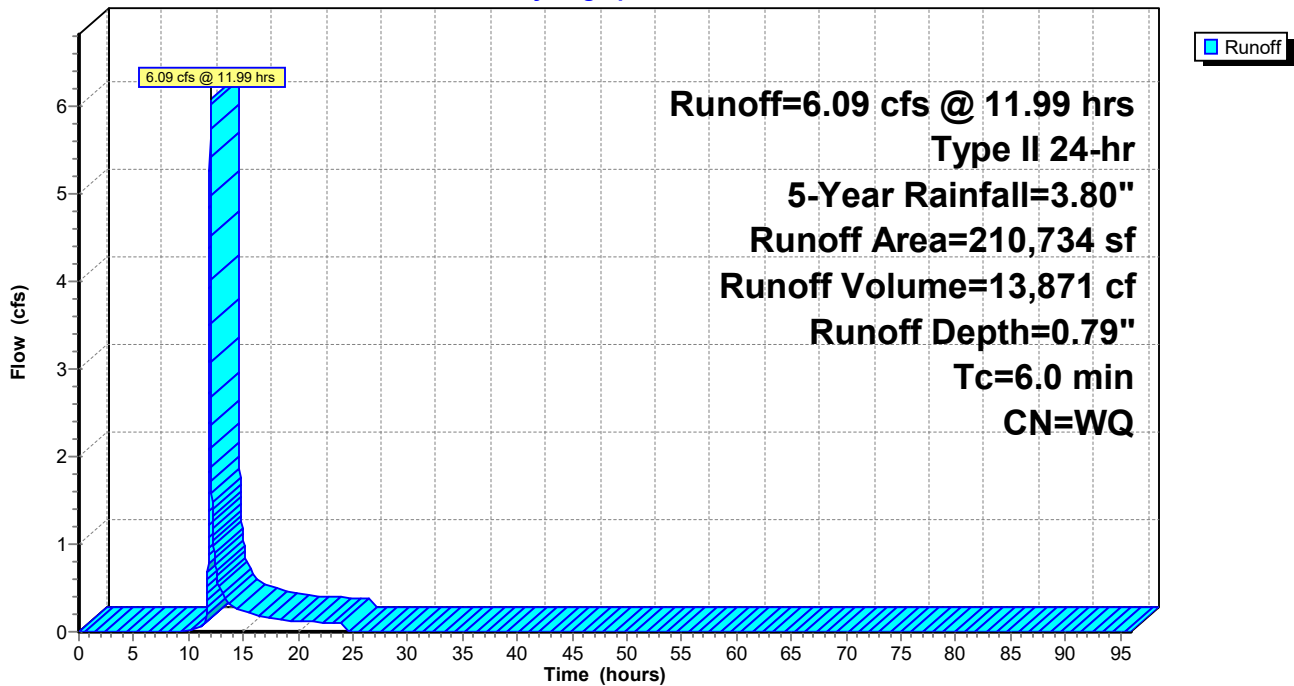
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

	Area (sf)	CN	Description
*	171,723	58	Meadow / HSG B
*	39,011	78	Meadow / HSG D
	210,734		Weighted Average
	210,734		100.00% Pervious Area

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

**Subcatchment 8U: Watershed Area #8 - Undetained**

Hydrograph





**Summary for Subcatchment 8U: Watershed Area #8 - Undetained**

Runoff = 9.52 cfs @ 11.98 hrs, Volume= 20,501 cf, Depth= 1.17"

Routed to Link 8L : Discharge Point 008

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

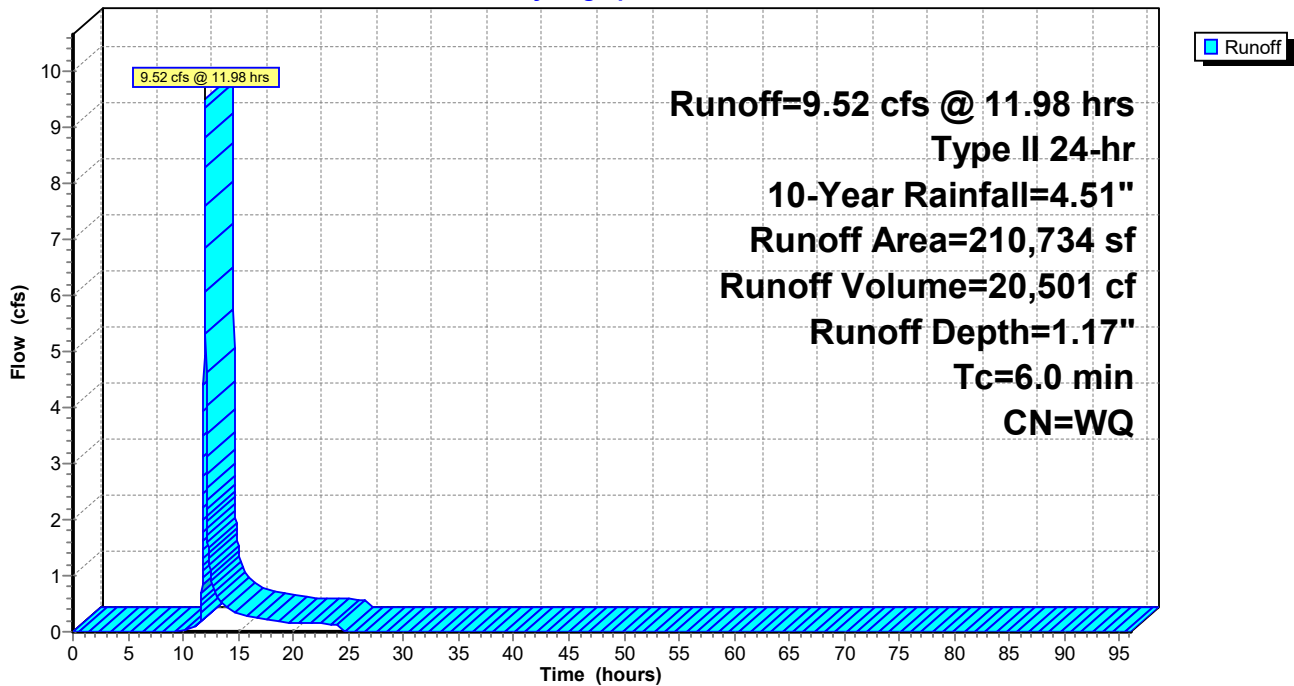
Type II 24-hr 10-Year Rainfall=4.51"

	Area (sf)	CN	Description
*	171,723	58	Meadow / HSG B
*	39,011	78	Meadow / HSG D
	210,734		Weighted Average
	210,734		100.00% Pervious Area

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

**Subcatchment 8U: Watershed Area #8 - Undetained**

Hydrograph



**Summary for Subcatchment 8U: Watershed Area #8 - Undetained**

Runoff = 15.39 cfs @ 11.98 hrs, Volume= 32,031 cf, Depth= 1.82"

Routed to Link 8L : Discharge Point 008

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

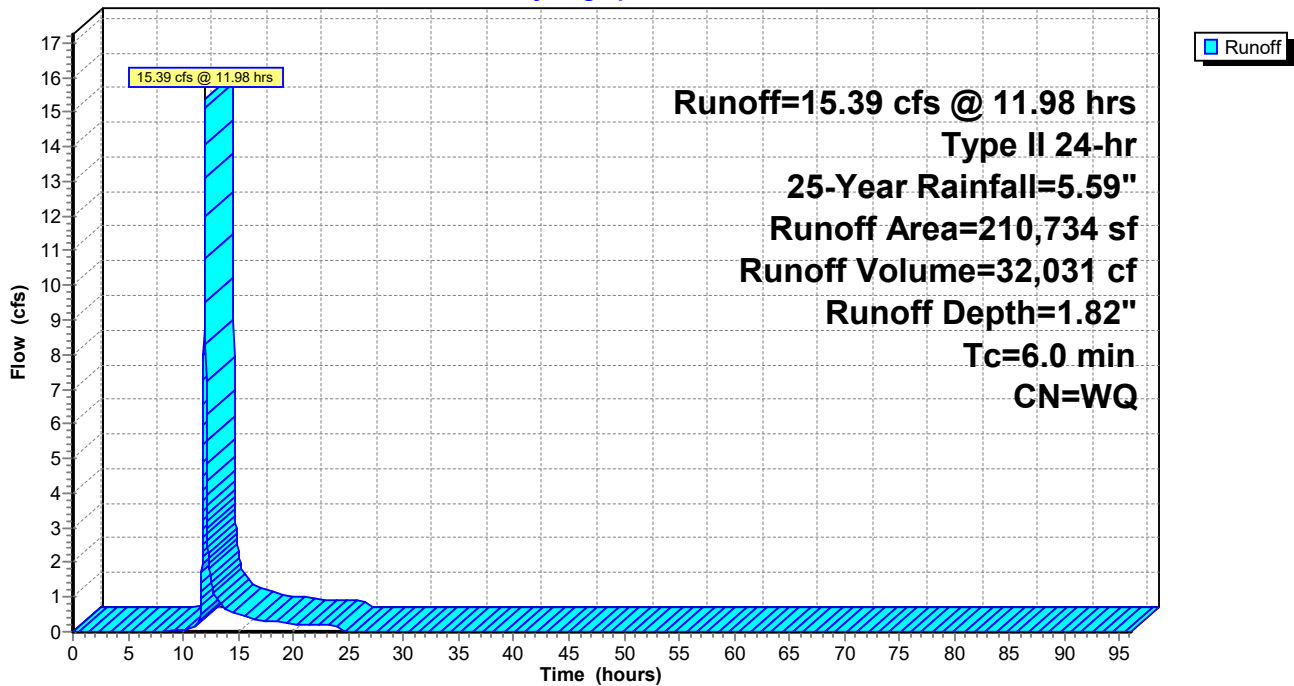
Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	171,723	58	Meadow / HSG B
*	39,011	78	Meadow / HSG D
	210,734		Weighted Average
	210,734		100.00% Pervious Area

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

**Subcatchment 8U: Watershed Area #8 - Undetained**

Hydrograph



**Summary for Subcatchment 8U: Watershed Area #8 - Undetained**

Runoff = 21.03 cfs @ 11.98 hrs, Volume= 43,280 cf, Depth= 2.46"

Routed to Link 8L : Discharge Point 008

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

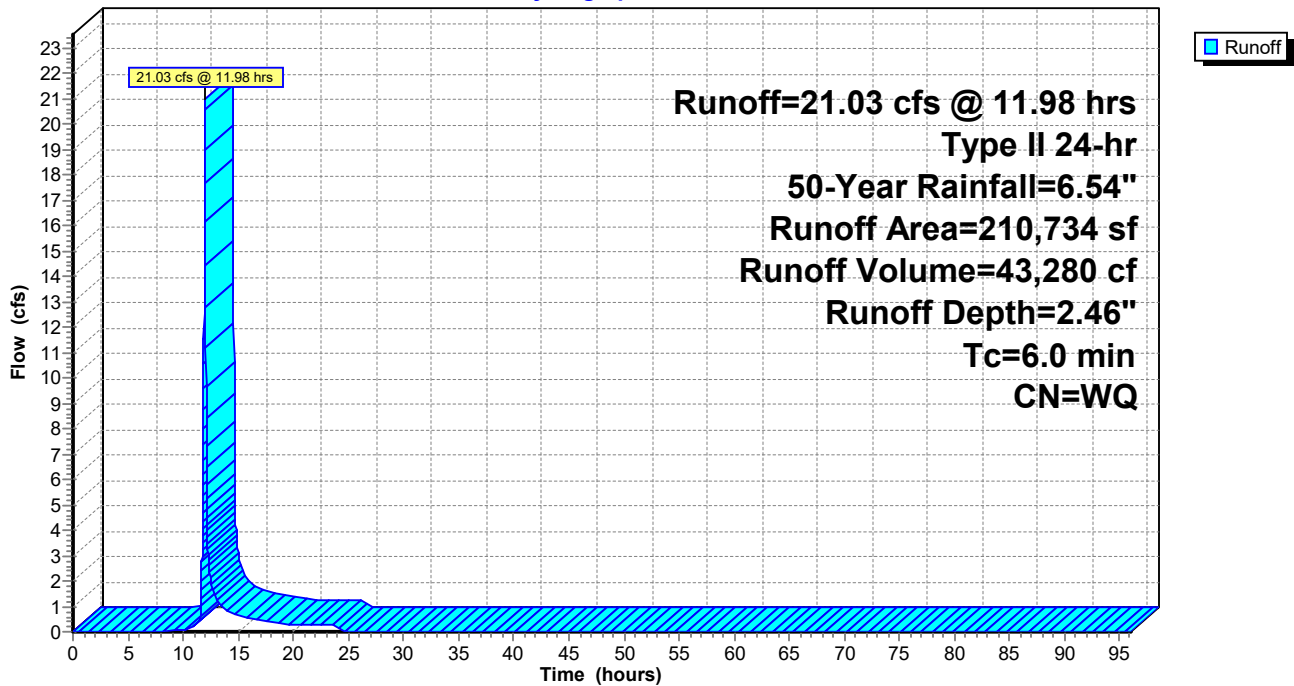
Type II 24-hr 50-Year Rainfall=6.54"

	Area (sf)	CN	Description
*	171,723	58	Meadow / HSG B
*	39,011	78	Meadow / HSG D
	210,734		Weighted Average
	210,734		100.00% Pervious Area

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

**Subcatchment 8U: Watershed Area #8 - Undetained**

Hydrograph



**Summary for Subcatchment 8U: Watershed Area #8 - Undetained**

Runoff = 27.76 cfs @ 11.98 hrs, Volume= 56,894 cf, Depth= 3.24"

Routed to Link 8L : Discharge Point 008

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

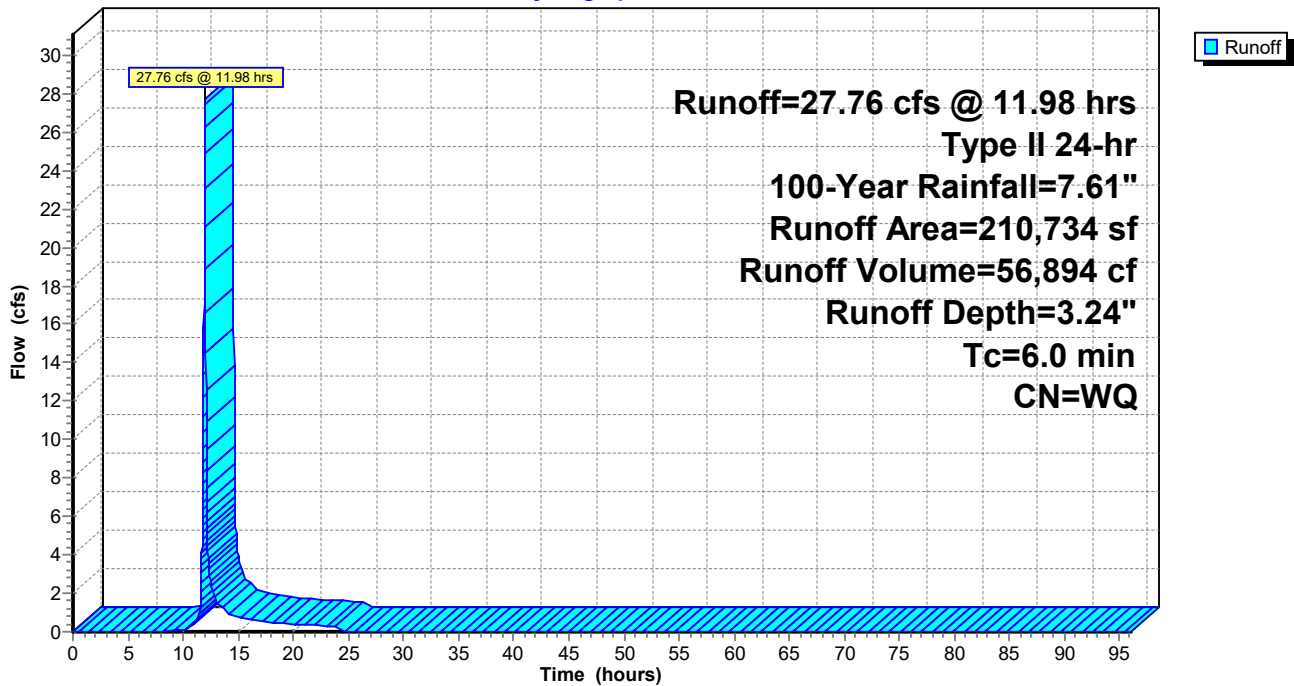
Type II 24-hr 100-Year Rainfall=7.61"

	Area (sf)	CN	Description
*	171,723	58	Meadow / HSG B
*	39,011	78	Meadow / HSG D
	210,734		Weighted Average
	210,734		100.00% Pervious Area

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

**Subcatchment 8U: Watershed Area #8 - Undetained**

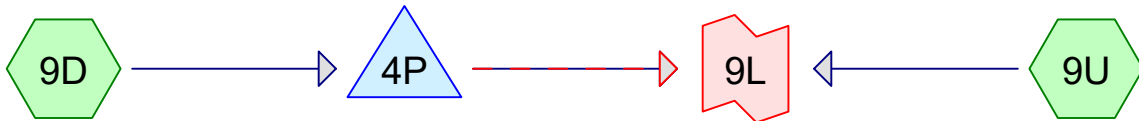
Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #9**

**(DISCHARGE POINT 009)**

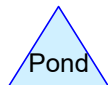
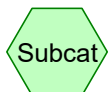


Watershed Area #9 -  
Detained in MRC  
Facility #4

MRC #4

Discharge Point 009

Watershed Area #9 -  
Undetained



**Routing Diagram for 22-0123-005 - Post-Dev**  
 Prepared by Landworks Civil Design LLC, Printed 1/1/2023  
 HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #9**

**(DISCHARGE POINT 009)**

**Detained in MRC #4 Routings**

**Summary for Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Runoff = 12.50 cfs @ 11.98 hrs, Volume= 28,143 cf, Depth= 1.23"  
 Routed to Pond 4P : MRC #4

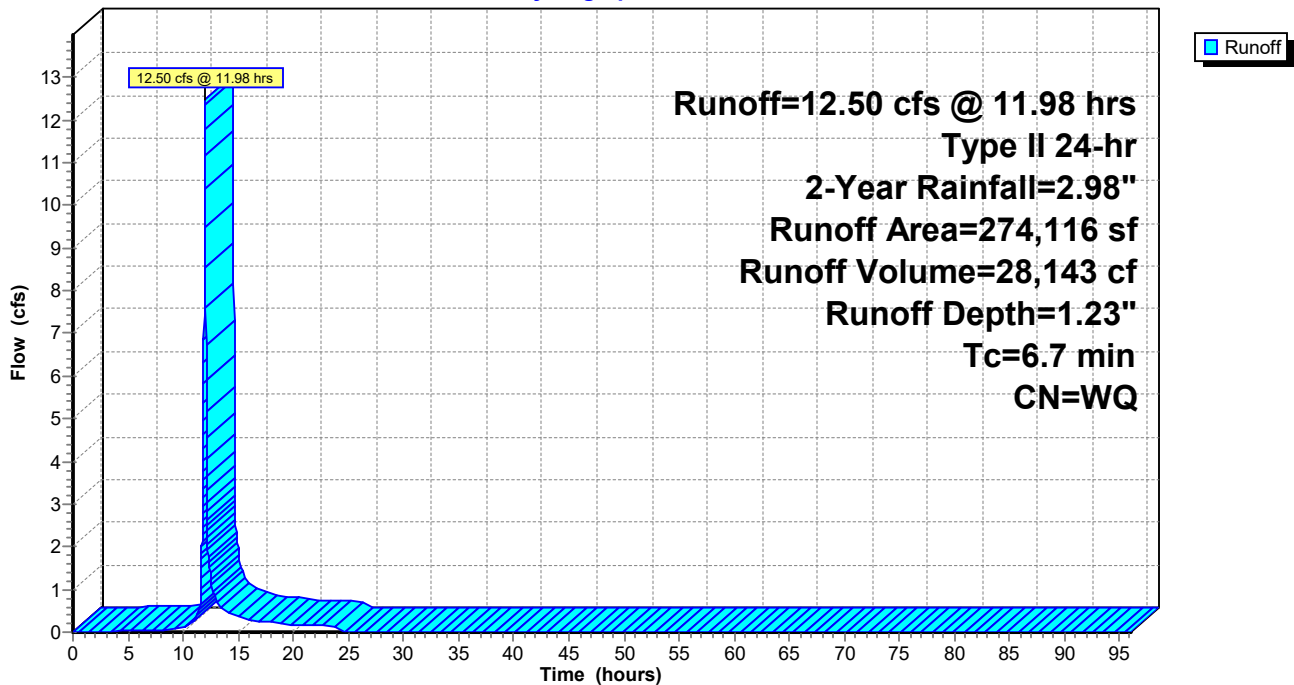
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

	Area (sf)	CN	Description
*	25,668	98	Impervious
*	46,290	61	Open Space / Good Condition / HSG B
*	68,172	81	Farm / Straight Row / Poor Condition / HSG B (Offsite)
*	17,146	98	Impervious (Offsite)
*	82,143	79	Open Space / Poor Condition / HSG B (Offsite)
*	34,697	66	Woods / Poor Condition / HSG B (Offsite)
	274,116		Weighted Average
	231,302		84.38% Pervious Area
	42,814		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7					Direct Entry, Storm Sewer Tc

**Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Hydrograph





**Summary for Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Runoff = 18.83 cfs @ 11.98 hrs, Volume= 41,714 cf, Depth= 1.83"  
 Routed to Pond 4P : MRC #4

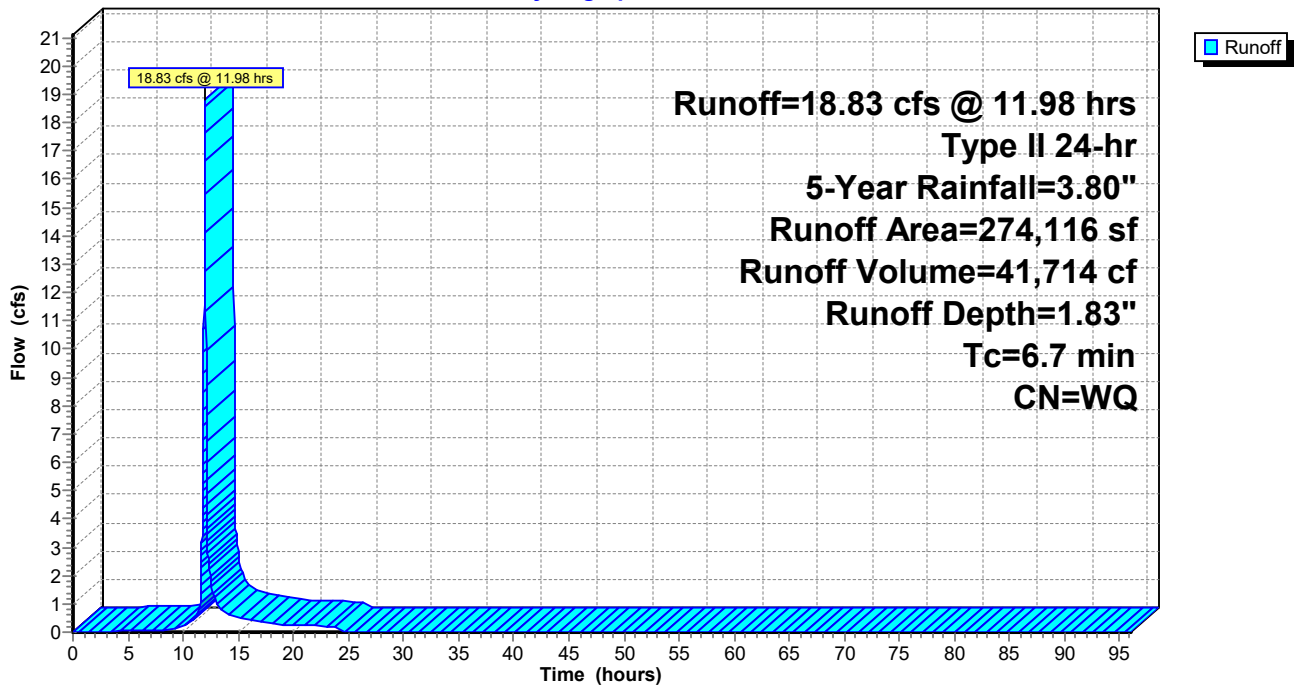
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

	Area (sf)	CN	Description
*	25,668	98	Impervious
*	46,290	61	Open Space / Good Condition / HSG B
*	68,172	81	Farm / Straight Row / Poor Condition / HSG B (Offsite)
*	17,146	98	Impervious (Offsite)
*	82,143	79	Open Space / Poor Condition / HSG B (Offsite)
*	34,697	66	Woods / Poor Condition / HSG B (Offsite)
			Weighted Average
			84.38% Pervious Area
			15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7					Direct Entry, Storm Sewer Tc

**Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Hydrograph



**Summary for Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Runoff = 24.65 cfs @ 11.98 hrs, Volume= 54,340 cf, Depth= 2.38"  
 Routed to Pond 4P : MRC #4

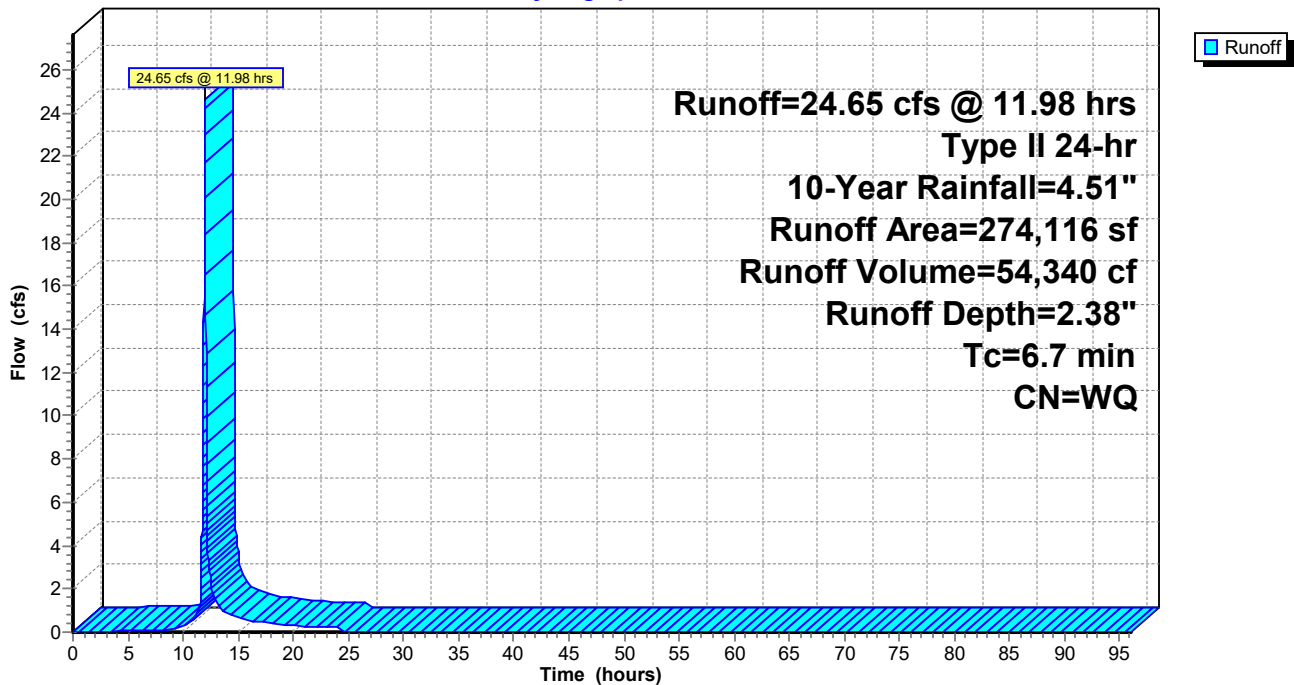
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

	Area (sf)	CN	Description
*	25,668	98	Impervious
*	46,290	61	Open Space / Good Condition / HSG B
*	68,172	81	Farm / Straight Row / Poor Condition / HSG B (Offsite)
*	17,146	98	Impervious (Offsite)
*	82,143	79	Open Space / Poor Condition / HSG B (Offsite)
*	34,697	66	Woods / Poor Condition / HSG B (Offsite)
	274,116		Weighted Average
	231,302		84.38% Pervious Area
	42,814		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7					Direct Entry, Storm Sewer Tc

**Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Hydrograph



**Summary for Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Runoff = 33.87 cfs @ 11.98 hrs, Volume= 74,635 cf, Depth= 3.27"  
 Routed to Pond 4P : MRC #4

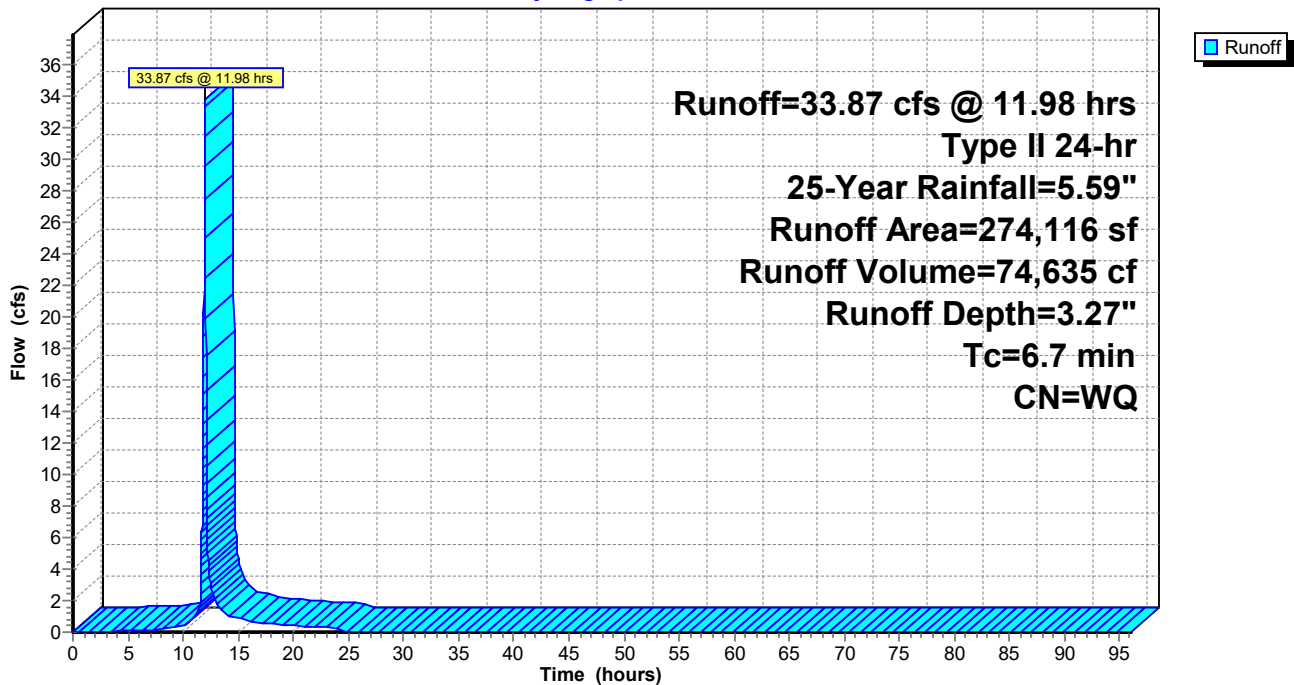
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	25,668	98	Impervious
*	46,290	61	Open Space / Good Condition / HSG B
*	68,172	81	Farm / Straight Row / Poor Condition / HSG B (Offsite)
*	17,146	98	Impervious (Offsite)
*	82,143	79	Open Space / Poor Condition / HSG B (Offsite)
*	34,697	66	Woods / Poor Condition / HSG B (Offsite)
	274,116		Weighted Average
	231,302		84.38% Pervious Area
	42,814		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7					Direct Entry, Storm Sewer Tc

**Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Hydrograph



**Summary for Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Runoff = 42.21 cfs @ 11.98 hrs, Volume= 93,267 cf, Depth= 4.08"  
 Routed to Pond 4P : MRC #4

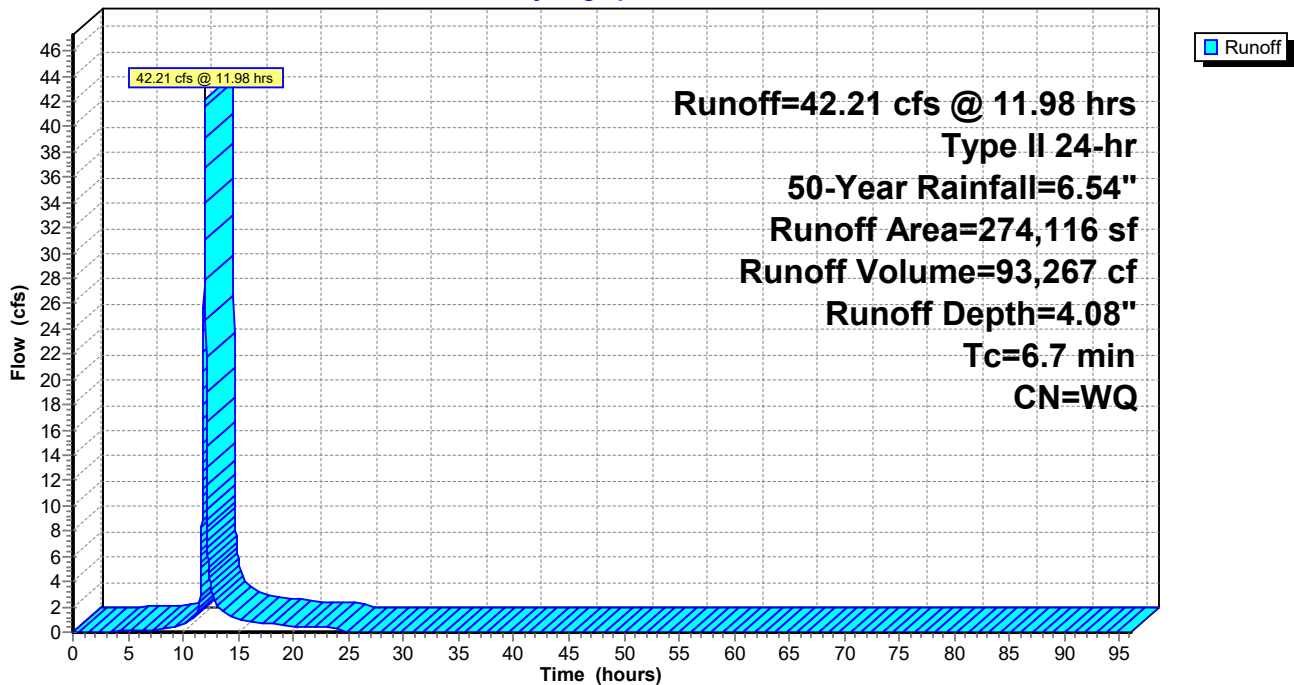
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

	Area (sf)	CN	Description
*	25,668	98	Impervious
*	46,290	61	Open Space / Good Condition / HSG B
*	68,172	81	Farm / Straight Row / Poor Condition / HSG B (Offsite)
*	17,146	98	Impervious (Offsite)
*	82,143	79	Open Space / Poor Condition / HSG B (Offsite)
*	34,697	66	Woods / Poor Condition / HSG B (Offsite)
	274,116		Weighted Average
	231,302		84.38% Pervious Area
	42,814		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7					Direct Entry, Storm Sewer Tc

**Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Hydrograph



**Summary for Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Runoff = 51.76 cfs @ 11.98 hrs, Volume= 114,880 cf, Depth= 5.03"  
 Routed to Pond 4P : MRC #4

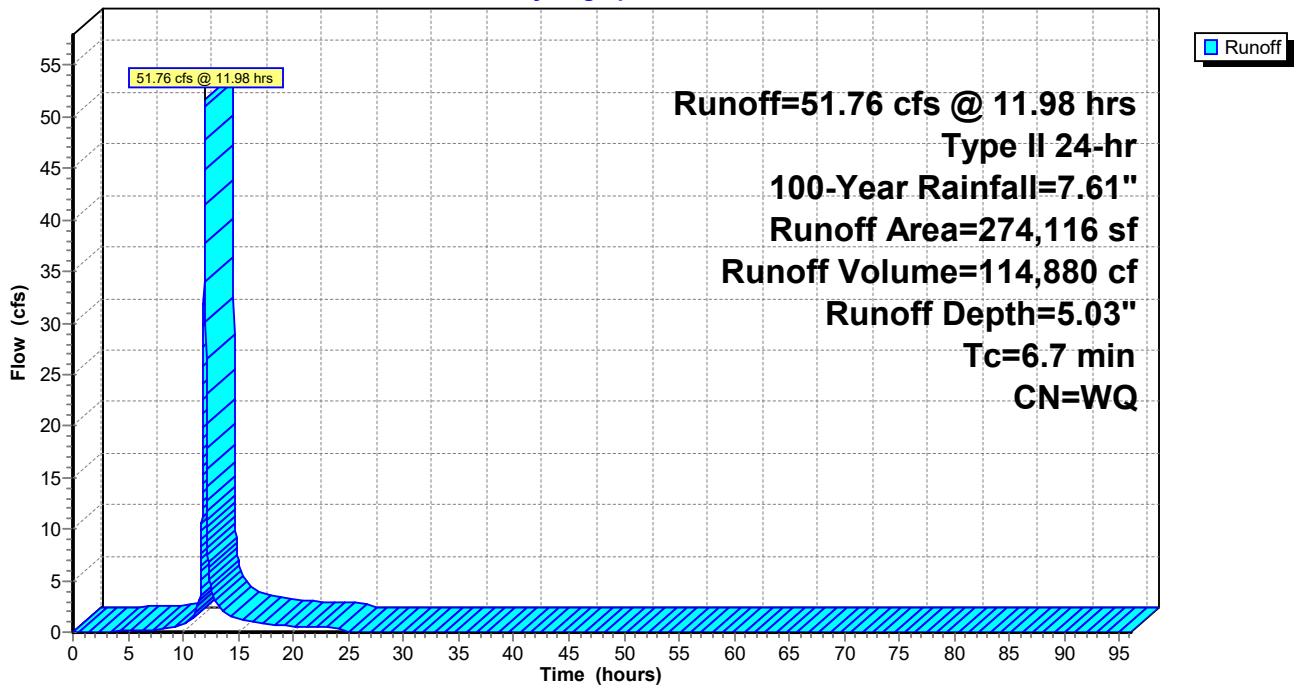
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

	Area (sf)	CN	Description
*	25,668	98	Impervious
*	46,290	61	Open Space / Good Condition / HSG B
*	68,172	81	Farm / Straight Row / Poor Condition / HSG B (Offsite)
*	17,146	98	Impervious (Offsite)
*	82,143	79	Open Space / Poor Condition / HSG B (Offsite)
*	34,697	66	Woods / Poor Condition / HSG B (Offsite)
	274,116		Weighted Average
	231,302		84.38% Pervious Area
	42,814		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7					Direct Entry, Storm Sewer Tc

**Subcatchment 9D: Watershed Area #9 - Detained in MRC Facility #4**

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #9**

**(DISCHARGE POINT 009)**

**MRC #4 Routings**

**Summary for Pond 4P: MRC #4**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 1.23" for 2-Year event  
 Inflow = 12.50 cfs @ 11.98 hrs, Volume= 28,143 cf  
 Outflow = 0.70 cfs @ 13.12 hrs, Volume= 28,143 cf, Atten= 94%, Lag= 68.4 min  
 Discarded = 0.03 cfs @ 11.90 hrs, Volume= 7,617 cf  
 Primary = 0.67 cfs @ 13.12 hrs, Volume= 20,526 cf  
 Routed to Link 9L : Discharge Point 009

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 447.72' @ 13.12 hrs Surf.Area= 12,314 sf Storage= 14,670 cf

Plug-Flow detention time= 677.7 min calculated for 28,143 cf (100% of inflow)  
 Center-of-Mass det. time= 677.7 min ( 1,497.3 - 819.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	445.60'	<b>18.0" Round Primary Outlet Pipe</b> L= 9.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.60' / 445.55' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	446.00'	<b>0.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	447.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	449.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Device 1	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads
#6	Discarded	445.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.90 hrs HW=447.02' (Free Discharge)

↳6=Infiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.67 cfs @ 13.12 hrs HW=447.72' (Free Discharge)

↳1=Primary Outlet Pipe (Passes 0.67 cfs of 9.09 cfs potential flow)

↳2=MRC Orifice (Orifice Controls 0.02 cfs @ 6.27 fps)

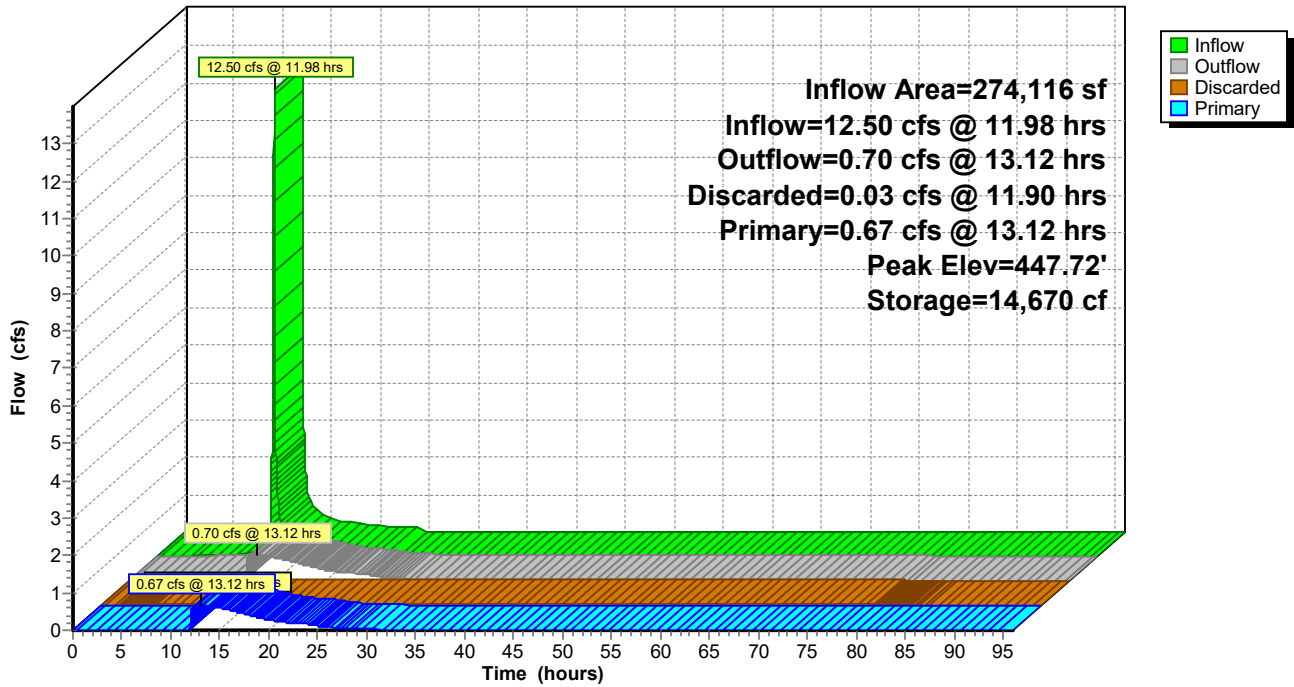
↳3=Orifice (Orifice Controls 0.65 cfs @ 3.31 fps)

↳4=Type M Inlet ( Controls 0.00 cfs)

↳5=Emergency Type DH Inlet ( Controls 0.00 cfs)

### Pond 4P: MRC #4

#### Hydrograph





**Summary for Pond 4P: MRC #4**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 1.83" for 5-Year event  
 Inflow = 18.83 cfs @ 11.98 hrs, Volume= 41,714 cf  
 Outflow = 1.01 cfs @ 13.11 hrs, Volume= 41,714 cf, Atten= 95%, Lag= 67.6 min  
 Discarded = 0.03 cfs @ 11.77 hrs, Volume= 7,852 cf  
 Primary = 0.98 cfs @ 13.11 hrs, Volume= 33,862 cf  
 Routed to Link 9L : Discharge Point 009

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 448.28' @ 13.11 hrs Surf.Area= 12,314 sf Storage= 22,480 cf

Plug-Flow detention time= 564.0 min calculated for 41,709 cf (100% of inflow)  
 Center-of-Mass det. time= 564.3 min ( 1,378.0 - 813.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	445.60'	<b>18.0" Round Primary Outlet Pipe</b> L= 9.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.60' / 445.55' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	446.00'	<b>0.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	447.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	449.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Device 1	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads
#6	Discarded	445.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.77 hrs HW=447.00' (Free Discharge)

6=Infiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.98 cfs @ 13.11 hrs HW=448.28' (Free Discharge)

1=Primary Outlet Pipe (Passes 0.98 cfs of 11.83 cfs potential flow)

2=MRC Orifice (Orifice Controls 0.02 cfs @ 7.23 fps)

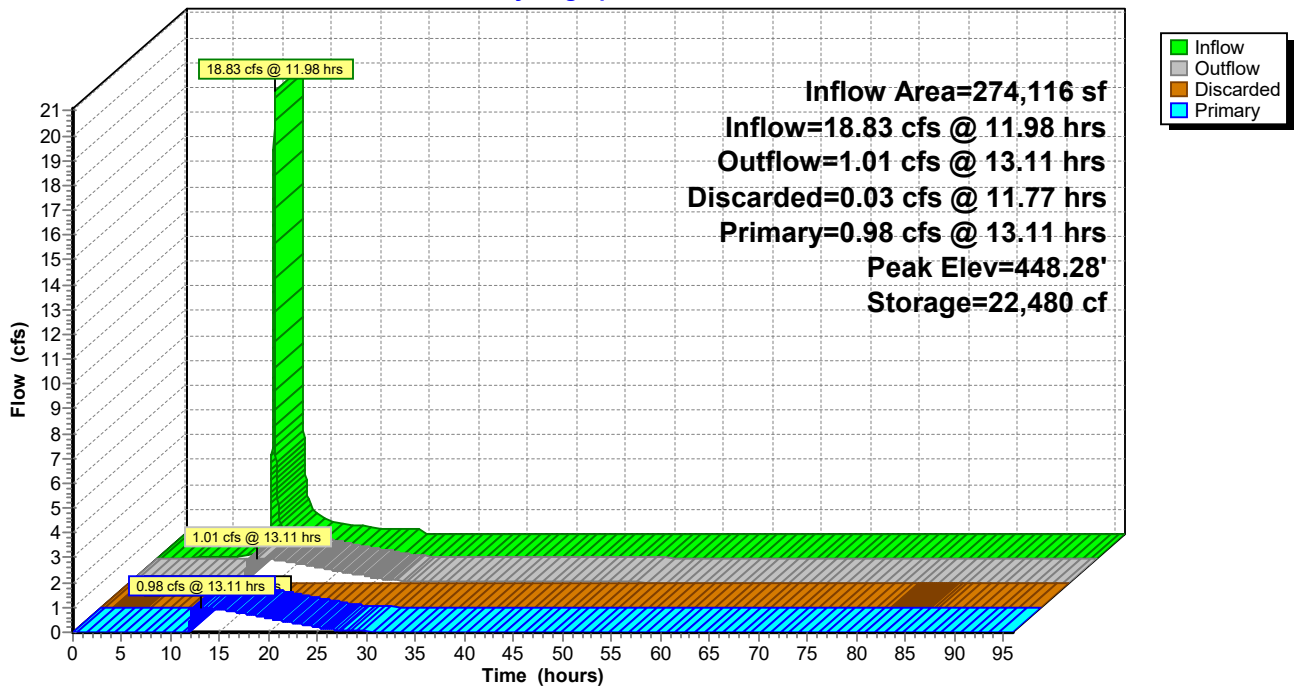
3=Orifice (Orifice Controls 0.96 cfs @ 4.90 fps)

4=Type M Inlet ( Controls 0.00 cfs)

5=Emergency Type DH Inlet ( Controls 0.00 cfs)

### Pond 4P: MRC #4

#### Hydrograph



**Summary for Pond 4P: MRC #4**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 2.38" for 10-Year event  
 Inflow = 24.65 cfs @ 11.98 hrs, Volume= 54,340 cf  
 Outflow = 1.23 cfs @ 13.20 hrs, Volume= 54,340 cf, Atten= 95%, Lag= 72.9 min  
 Discarded = 0.03 cfs @ 11.62 hrs, Volume= 8,057 cf  
 Primary = 1.20 cfs @ 13.20 hrs, Volume= 46,283 cf  
 Routed to Link 9L : Discharge Point 009

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 448.81' @ 13.20 hrs Surf.Area= 12,314 sf Storage= 30,215 cf

Plug-Flow detention time= 530.3 min calculated for 54,334 cf (100% of inflow)  
 Center-of-Mass det. time= 530.7 min ( 1,339.9 - 809.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	445.60'	<b>18.0" Round Primary Outlet Pipe</b> L= 9.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.60' / 445.55' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	446.00'	<b>0.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	447.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	449.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Device 1	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads
#6	Discarded	445.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.03 cfs @ 11.62 hrs HW=447.00' (Free Discharge)

↳ **6=Infiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=1.20 cfs @ 13.20 hrs HW=448.81' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 1.20 cfs of 13.33 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.02 cfs @ 8.02 fps)

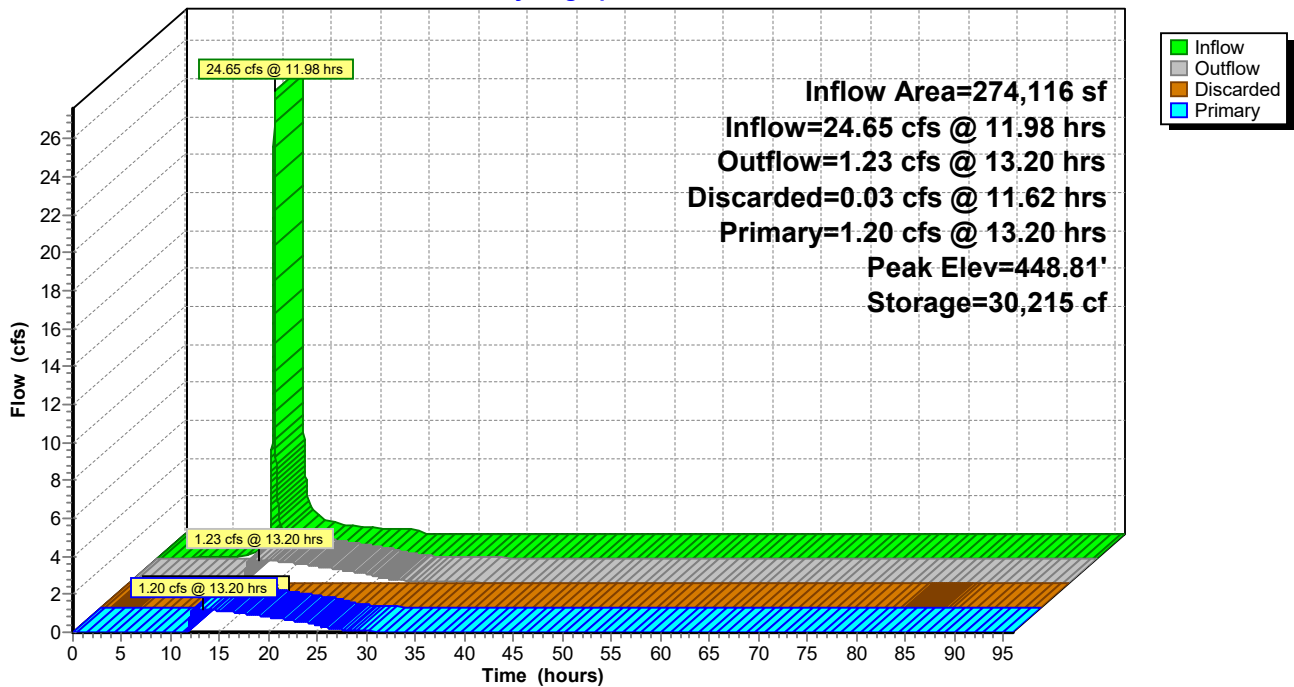
↳ **3=Orifice** (Orifice Controls 1.18 cfs @ 6.01 fps)

↳ **4=Type M Inlet** ( Controls 0.00 cfs)

↳ **5=Emergency Type DH Inlet** ( Controls 0.00 cfs)

**Pond 4P: MRC #4**

**Hydrograph**



**Summary for Pond 4P: MRC #4**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 3.27" for 25-Year event  
 Inflow = 33.87 cfs @ 11.98 hrs, Volume= 74,635 cf  
 Outflow = 5.82 cfs @ 12.19 hrs, Volume= 74,635 cf, Atten= 83%, Lag= 12.5 min  
 Discarded = 0.03 cfs @ 11.06 hrs, Volume= 8,254 cf  
 Primary = 5.79 cfs @ 12.19 hrs, Volume= 66,381 cf  
 Routed to Link 9L : Discharge Point 009

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 449.24' @ 12.19 hrs Surf.Area= 12,314 sf Storage= 37,008 cf

Plug-Flow detention time= 449.2 min calculated for 74,635 cf (100% of inflow)  
 Center-of-Mass det. time= 449.2 min ( 1,252.6 - 803.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	445.60'	<b>18.0" Round Primary Outlet Pipe</b> L= 9.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.60' / 445.55' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	446.00'	<b>0.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	447.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	449.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Device 1	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads
#6	Discarded	445.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.03 cfs @ 11.06 hrs HW=447.00' (Free Discharge)

↳ **6=Infiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=5.79 cfs @ 12.19 hrs HW=449.24' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 5.79 cfs of 14.47 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.02 cfs @ 8.63 fps)

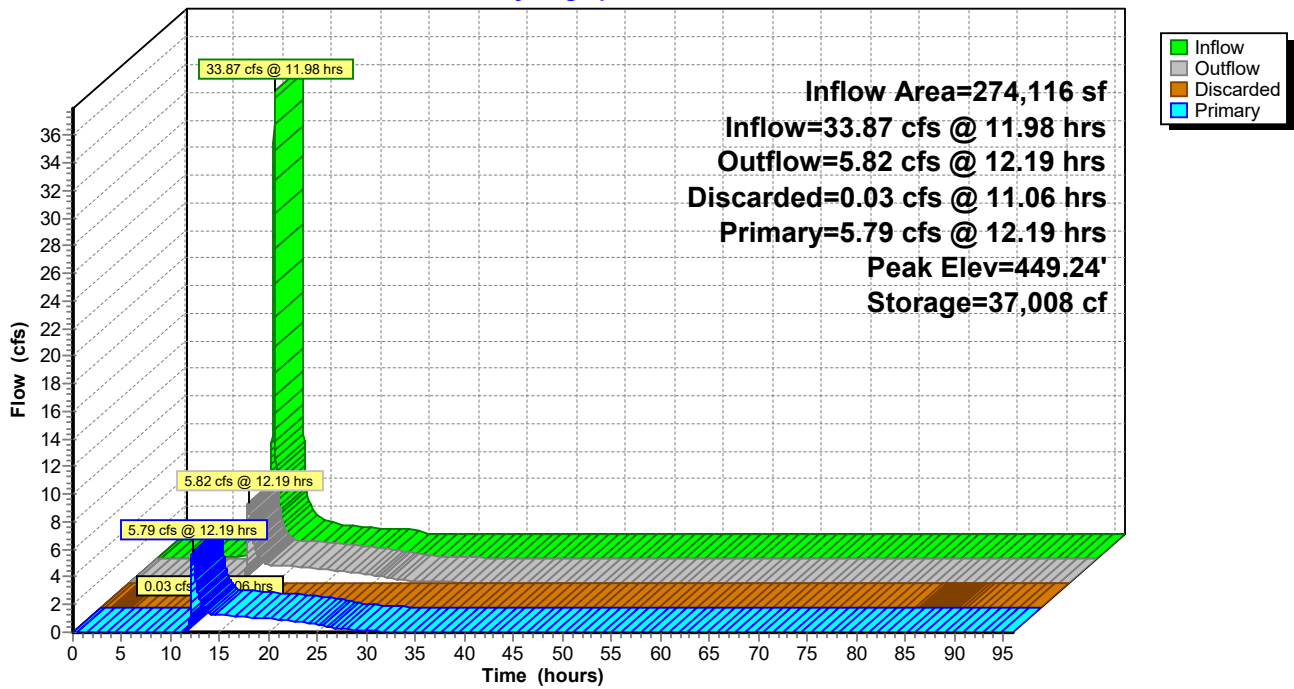
↳ **3=Orifice** (Orifice Controls 1.33 cfs @ 6.79 fps)

↳ **4=Type M Inlet** (Weir Controls 4.43 cfs @ 1.60 fps)

↳ **5=Emergency Type DH Inlet** (Controls 0.00 cfs)

**Pond 4P: MRC #4**

**Hydrograph**



**Summary for Pond 4P: MRC #4**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 4.08" for 50-Year event  
 Inflow = 42.21 cfs @ 11.98 hrs, Volume= 93,267 cf  
 Outflow = 15.28 cfs @ 12.10 hrs, Volume= 93,267 cf, Atten= 64%, Lag= 7.0 min  
 Discarded = 0.03 cfs @ 10.48 hrs, Volume= 8,368 cf  
 Primary = 15.25 cfs @ 12.10 hrs, Volume= 84,900 cf  
 Routed to Link 9L : Discharge Point 009

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 449.56' @ 12.10 hrs Surf.Area= 12,314 sf Storage= 42,264 cf

Plug-Flow detention time= 385.2 min calculated for 93,267 cf (100% of inflow)  
 Center-of-Mass det. time= 385.2 min ( 1,184.4 - 799.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	445.60'	<b>18.0" Round Primary Outlet Pipe</b> L= 9.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.60' / 445.55' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	446.00'	<b>0.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	447.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	449.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Device 1	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads
#6	Discarded	445.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 10.48 hrs HW=447.00' (Free Discharge)

6=Infiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=15.25 cfs @ 12.10 hrs HW=449.56' (Free Discharge)

1=Primary Outlet Pipe (Inlet Controls 15.25 cfs @ 8.63 fps)

2=MRC Orifice (Passes < 0.02 cfs potential flow)

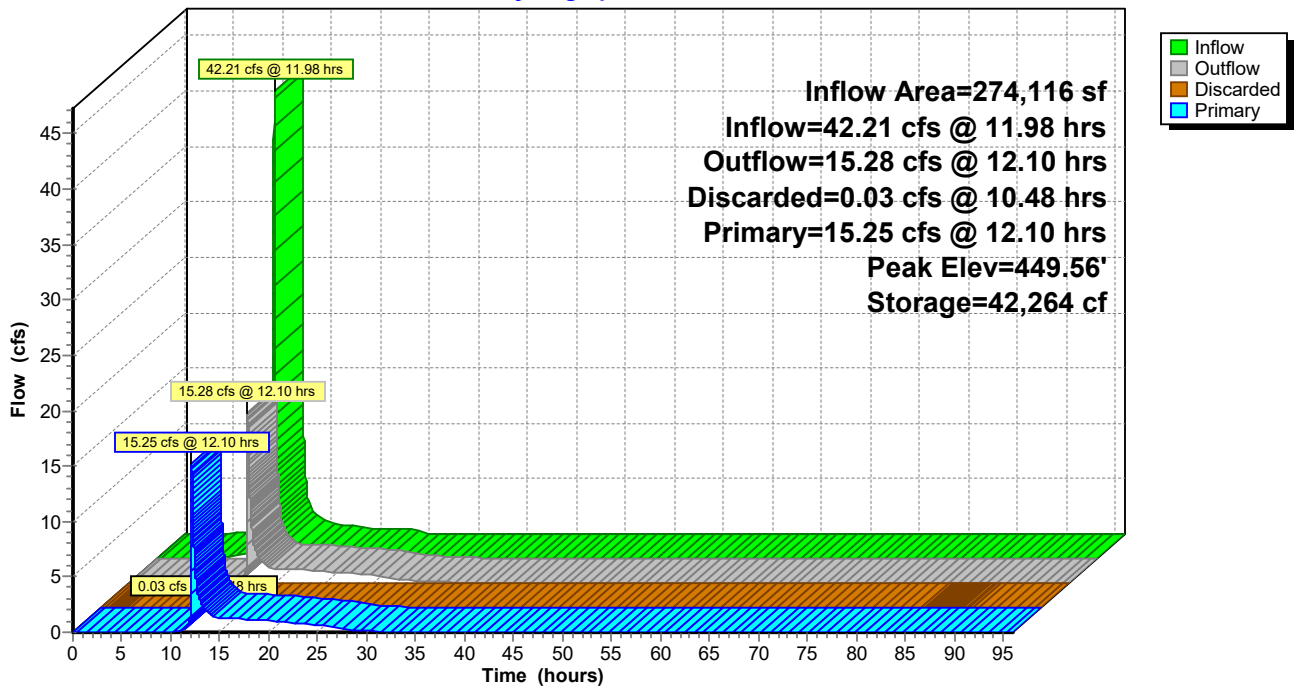
3=Orifice (Passes < 1.44 cfs potential flow)

4=Type M Inlet (Passes < 15.88 cfs potential flow)

5=Emergency Type DH Inlet (Controls 0.00 cfs)

### Pond 4P: MRC #4

Hydrograph





**Summary for Pond 4P: MRC #4**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 5.03" for 100-Year event  
 Inflow = 51.76 cfs @ 11.98 hrs, Volume= 114,880 cf  
 Outflow = 16.41 cfs @ 12.11 hrs, Volume= 114,880 cf, Atten= 68%, Lag= 7.7 min  
 Discarded = 0.03 cfs @ 9.79 hrs, Volume= 8,474 cf  
 Primary = 16.38 cfs @ 12.11 hrs, Volume= 106,406 cf  
 Routed to Link 9L : Discharge Point 009

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 450.06' @ 12.11 hrs Surf.Area= 12,314 sf Storage= 50,664 cf

Plug-Flow detention time= 335.8 min calculated for 114,880 cf (100% of inflow)  
 Center-of-Mass det. time= 335.8 min ( 1,130.8 - 795.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	445.60'	<b>18.0" Round Primary Outlet Pipe</b> L= 9.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.60' / 445.55' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	446.00'	<b>0.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	447.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	449.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Device 1	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads
#6	Discarded	445.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.03 cfs @ 9.79 hrs HW=447.00' (Free Discharge)

↳ **6=Infiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=16.38 cfs @ 12.11 hrs HW=450.06' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Inlet Controls 16.38 cfs @ 9.27 fps)

↳ **2=MRC Orifice** (Passes < 0.03 cfs potential flow)

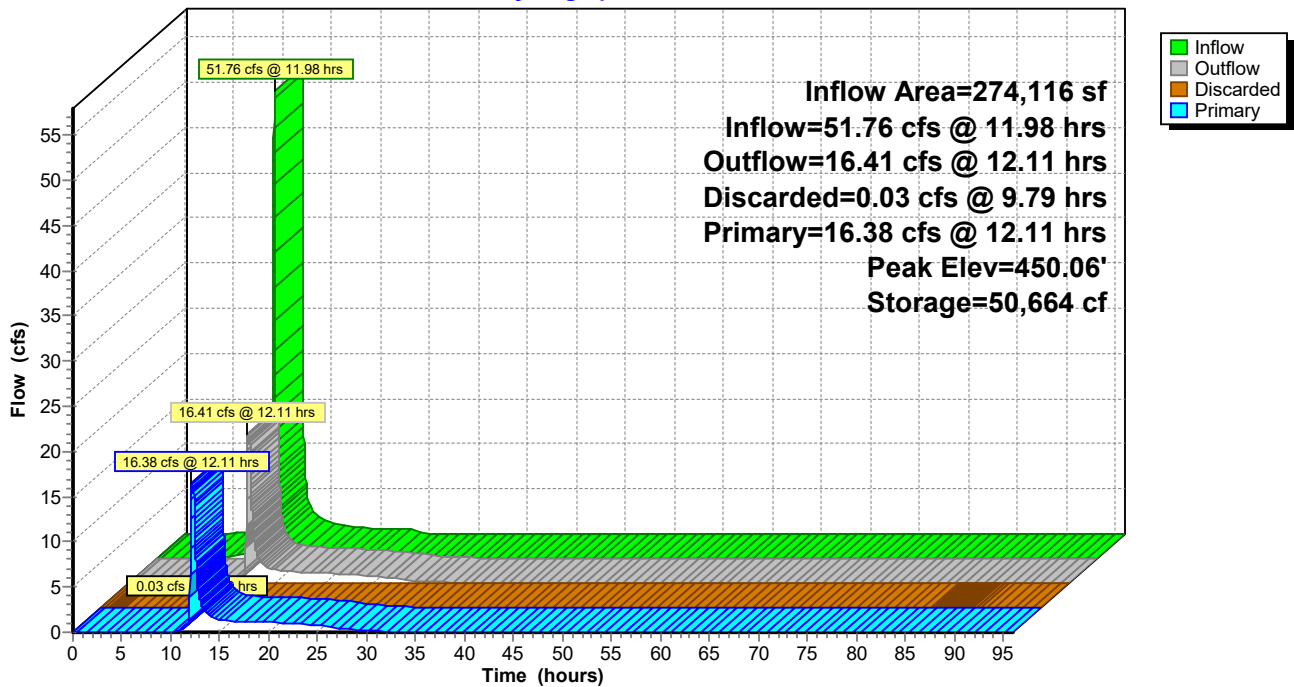
↳ **3=Orifice** (Passes < 1.58 cfs potential flow)

↳ **4=Type M Inlet** (Passes < 28.34 cfs potential flow)

↳ **5=Emergency Type DH Inlet** (Controls 0.00 cfs)

### Pond 4P: MRC #4

#### Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #9**

**(DISCHARGE POINT 009)**

**Undetained Routings**

**Summary for Subcatchment 9U: Watershed Area #9 - Undetained**

Runoff = 0.78 cfs @ 11.98 hrs, Volume= 2,012 cf, Depth= 0.84"  
 Routed to Link 9L : Discharge Point 009

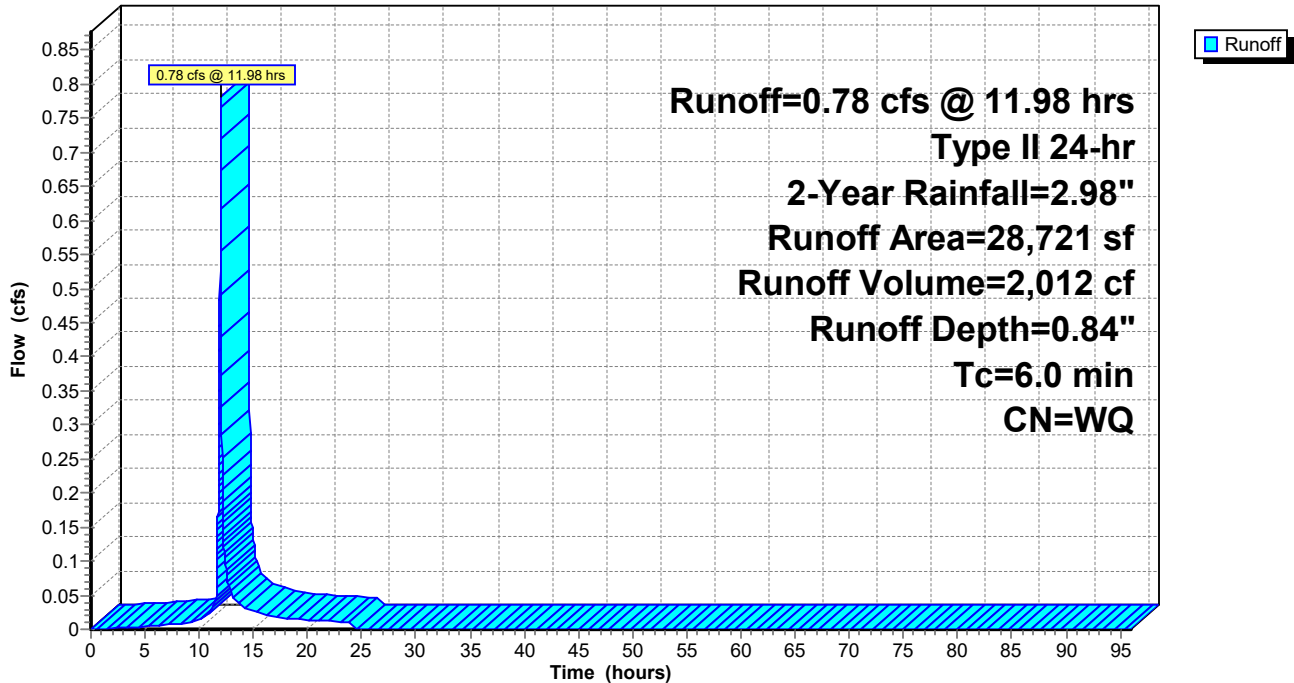
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

	Area (sf)	CN	Description
*	5,801	98	Impervious
*	22,920	61	Open Space / Good Condition / HSG B
	28,721		Weighted Average
	22,920		79.80% Pervious Area
	5,801		20.20% Impervious Area

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

**Subcatchment 9U: Watershed Area #9 - Undetained**

Hydrograph



**Summary for Subcatchment 9U: Watershed Area #9 - Undetained**

Runoff = 1.31 cfs @ 11.98 hrs, Volume= 3,086 cf, Depth= 1.29"  
 Routed to Link 9L : Discharge Point 009

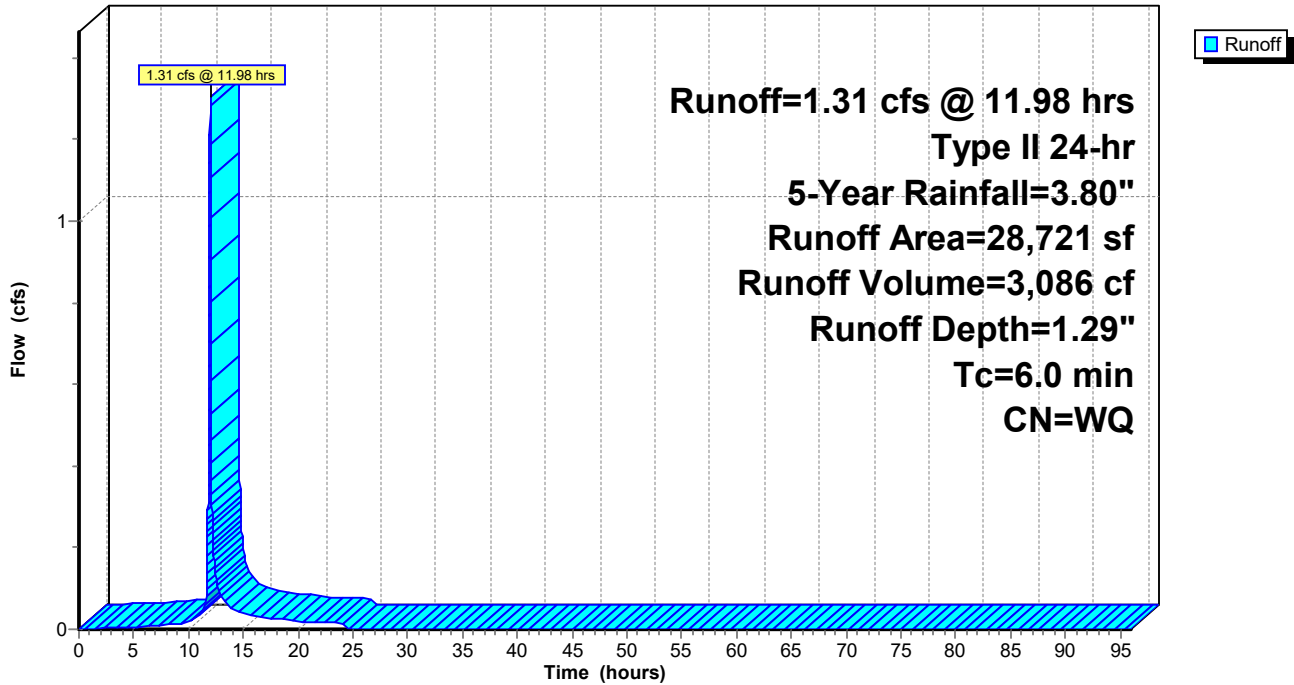
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 5-Year Rainfall=3.80"

	Area (sf)	CN	Description
*	5,801	98	Impervious
*	22,920	61	Open Space / Good Condition / HSG B
	28,721		Weighted Average
	22,920		79.80% Pervious Area
	5,801		20.20% Impervious Area

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

**Subcatchment 9U: Watershed Area #9 - Undetained**

Hydrograph



**Summary for Subcatchment 9U: Watershed Area #9 - Undetained**

Runoff = 1.82 cfs @ 11.98 hrs, Volume= 4,138 cf, Depth= 1.73"  
 Routed to Link 9L : Discharge Point 009

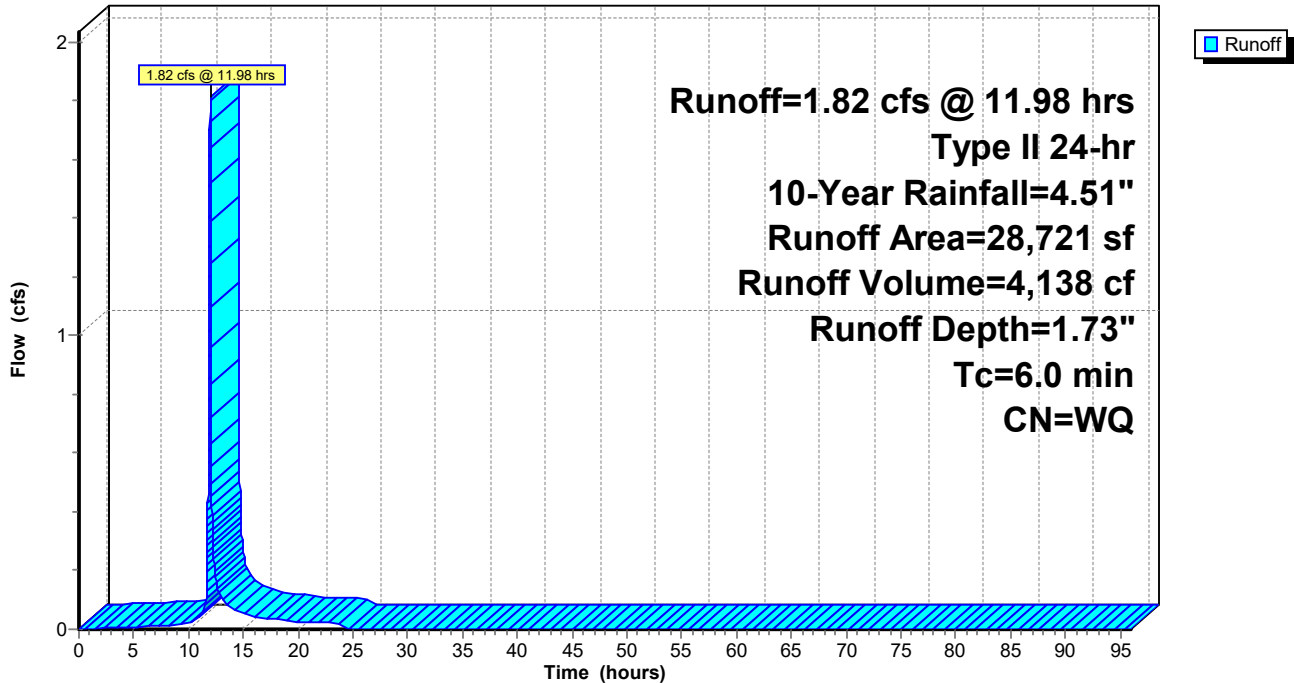
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 10-Year Rainfall=4.51"

	Area (sf)	CN	Description
*	5,801	98	Impervious
*	22,920	61	Open Space / Good Condition / HSG B
	28,721		Weighted Average
	22,920		79.80% Pervious Area
	5,801		20.20% Impervious Area

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

**Subcatchment 9U: Watershed Area #9 - Undetained**

Hydrograph



**Summary for Subcatchment 9U: Watershed Area #9 - Undetained**

Runoff = 2.67 cfs @ 11.98 hrs, Volume= 5,904 cf, Depth= 2.47"  
 Routed to Link 9L : Discharge Point 009

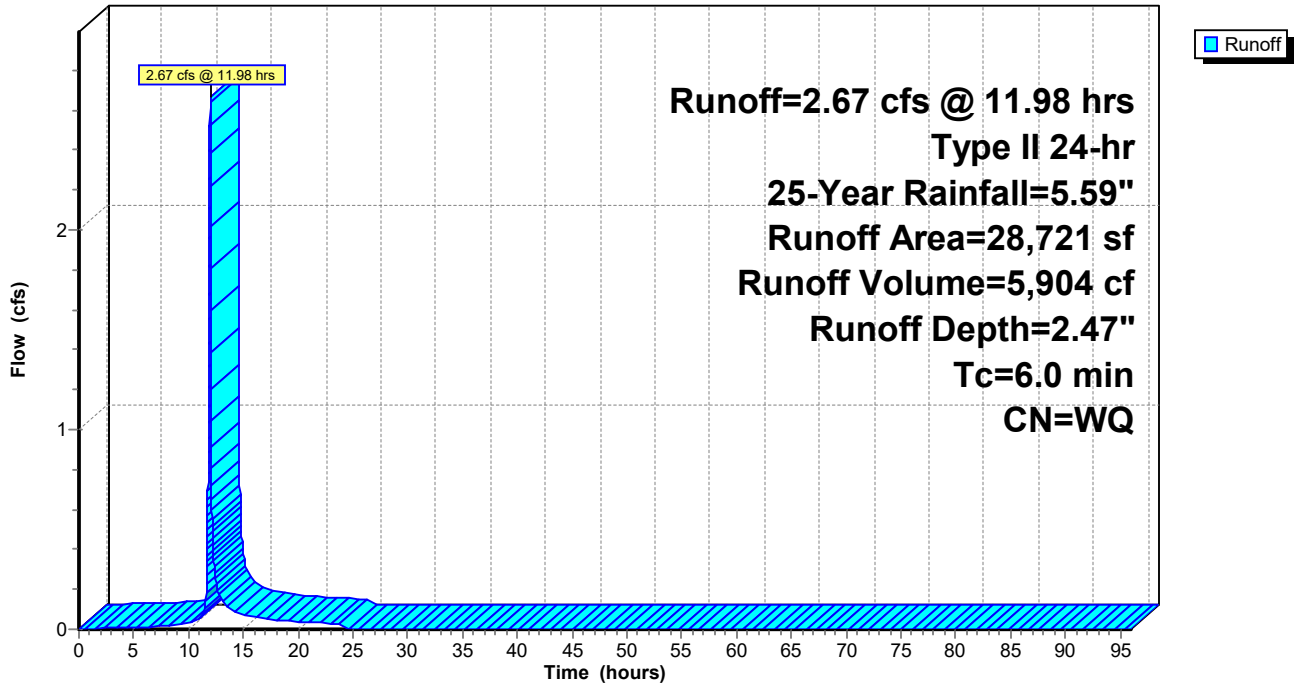
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 25-Year Rainfall=5.59"

	Area (sf)	CN	Description
*	5,801	98	Impervious
*	22,920	61	Open Space / Good Condition / HSG B
	28,721		Weighted Average
	22,920		79.80% Pervious Area
	5,801		20.20% Impervious Area

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

**Subcatchment 9U: Watershed Area #9 - Undetained**

Hydrograph



**Summary for Subcatchment 9U: Watershed Area #9 - Undetained**

Runoff = 3.47 cfs @ 11.97 hrs, Volume= 7,583 cf, Depth= 3.17"  
 Routed to Link 9L : Discharge Point 009

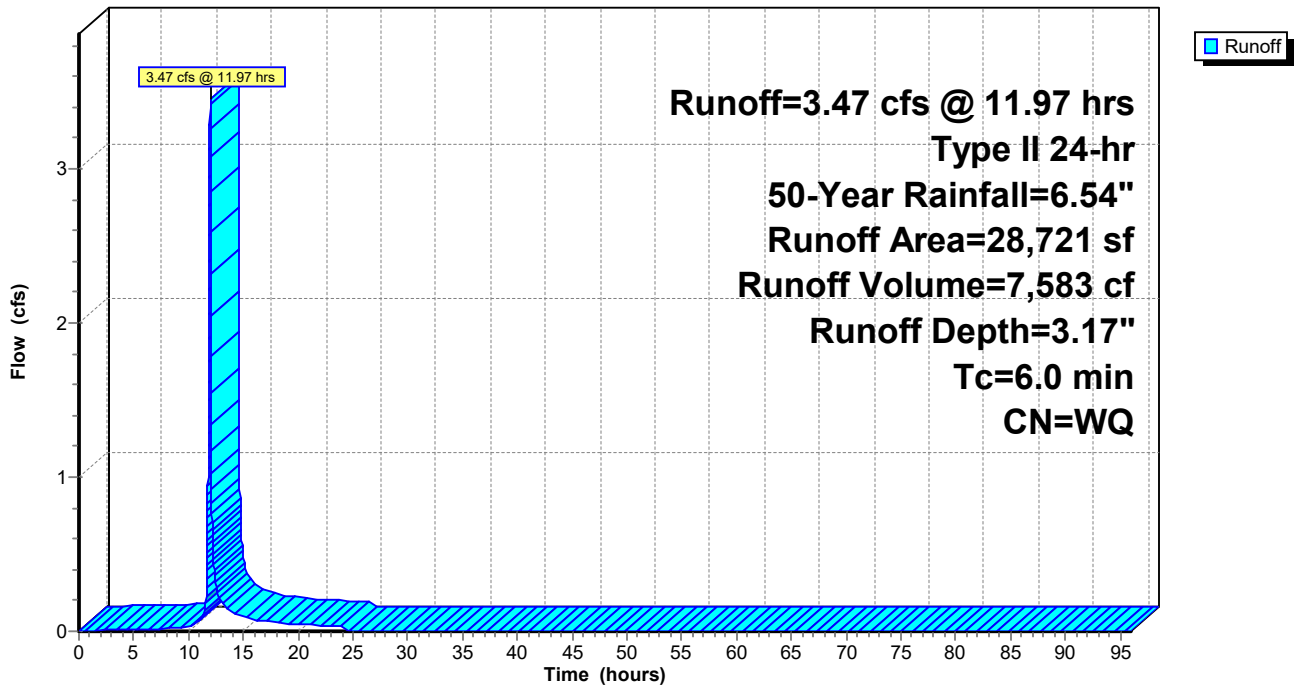
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-Year Rainfall=6.54"

	Area (sf)	CN	Description
*	5,801	98	Impervious
*	22,920	61	Open Space / Good Condition / HSG B
	28,721		Weighted Average
	22,920		79.80% Pervious Area
	5,801		20.20% Impervious Area

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

**Subcatchment 9U: Watershed Area #9 - Undetained**

Hydrograph





**Summary for Subcatchment 9U: Watershed Area #9 - Undetained**

Runoff = 4.41 cfs @ 11.97 hrs, Volume= 9,580 cf, Depth= 4.00"  
 Routed to Link 9L : Discharge Point 009

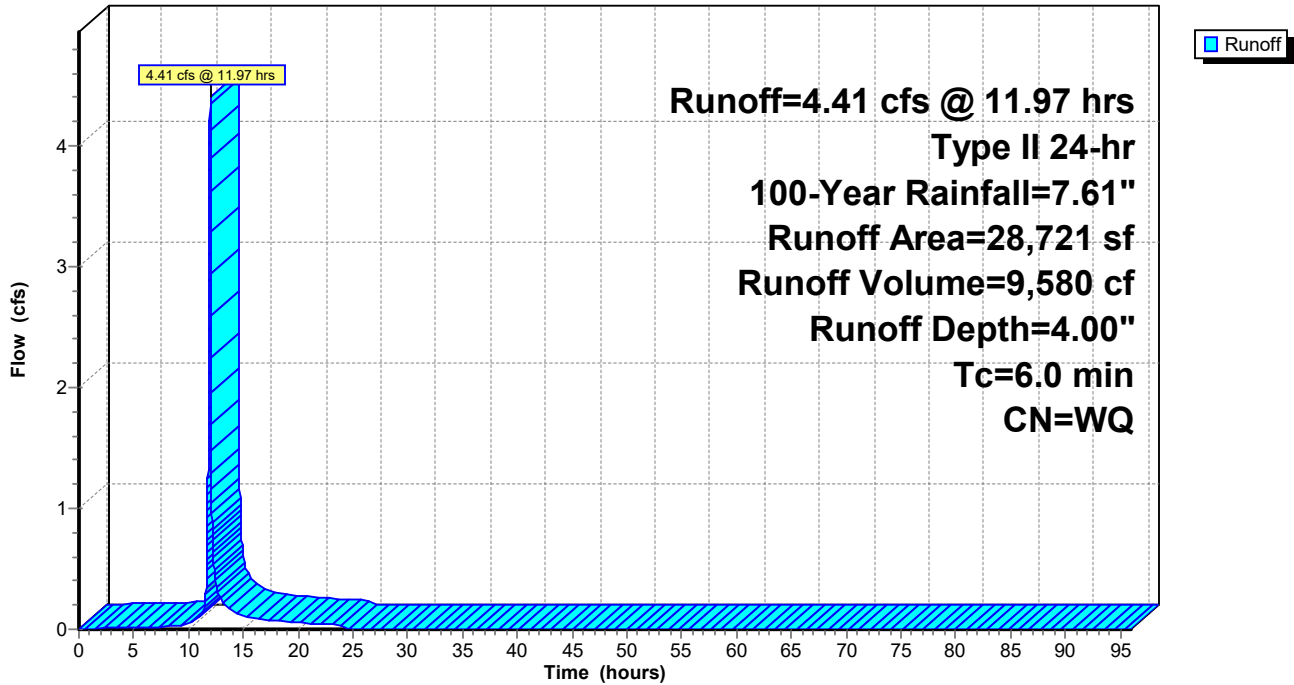
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=7.61"

	Area (sf)	CN	Description
*	5,801	98	Impervious
*	22,920	61	Open Space / Good Condition / HSG B
	28,721		Weighted Average
	22,920		79.80% Pervious Area
	5,801		20.20% Impervious Area

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

**Subcatchment 9U: Watershed Area #9 - Undetained**

Hydrograph



# **POST-DEVELOPMENT CALCULATIONS**

**WATERSHED AREA #9**

**(DISCHARGE POINT 009)**

**Combined Routings**

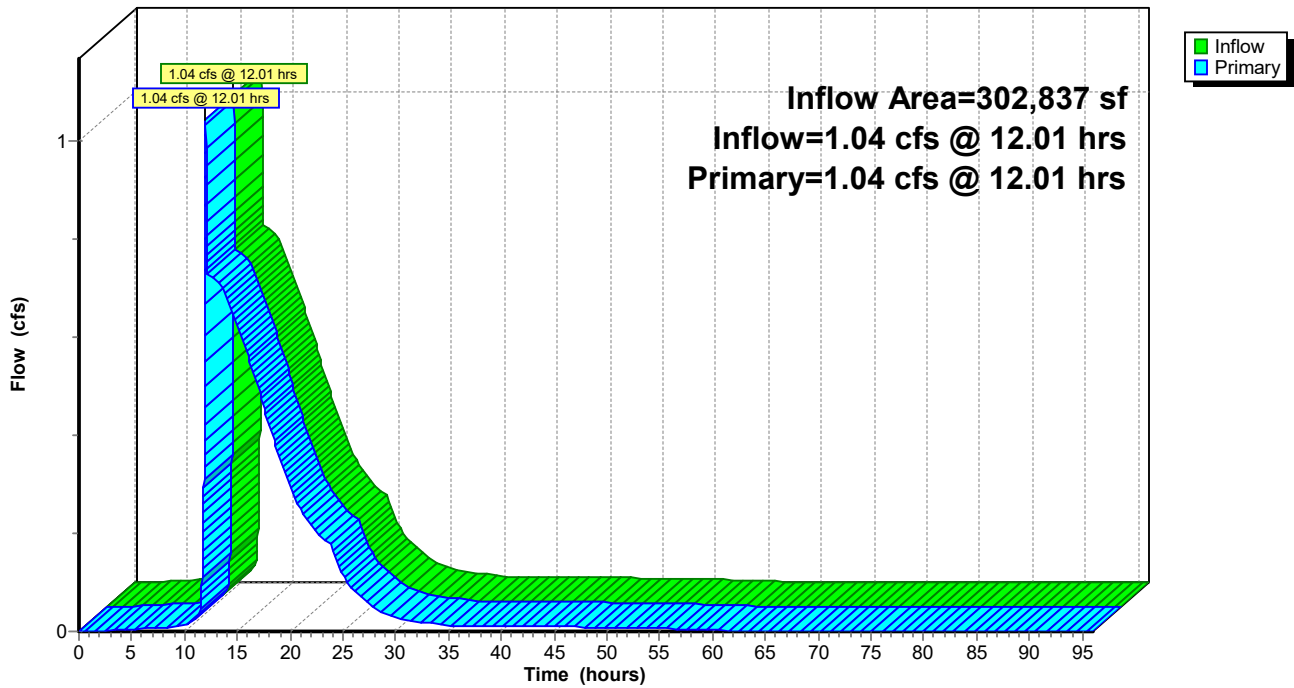
### Summary for Link 9L: Discharge Point 009

Inflow Area = 302,837 sf, 16.05% Impervious, Inflow Depth = 0.89" for 2-Year event  
Inflow = 1.04 cfs @ 12.01 hrs, Volume= 22,537 cf  
Primary = 1.04 cfs @ 12.01 hrs, Volume= 22,537 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 9L: Discharge Point 009

Hydrograph



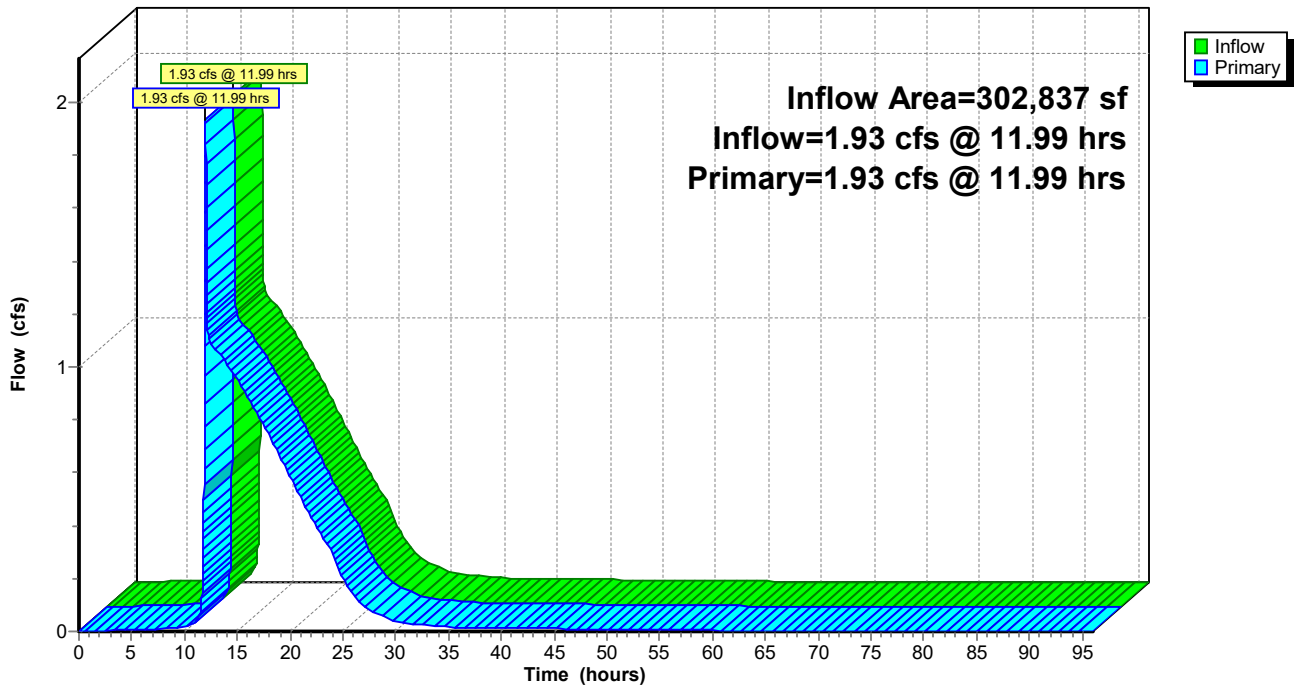
### Summary for Link 9L: Discharge Point 009

Inflow Area = 302,837 sf, 16.05% Impervious, Inflow Depth = 1.46" for 5-Year event  
Inflow = 1.93 cfs @ 11.99 hrs, Volume= 36,948 cf  
Primary = 1.93 cfs @ 11.99 hrs, Volume= 36,948 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 9L: Discharge Point 009

Hydrograph



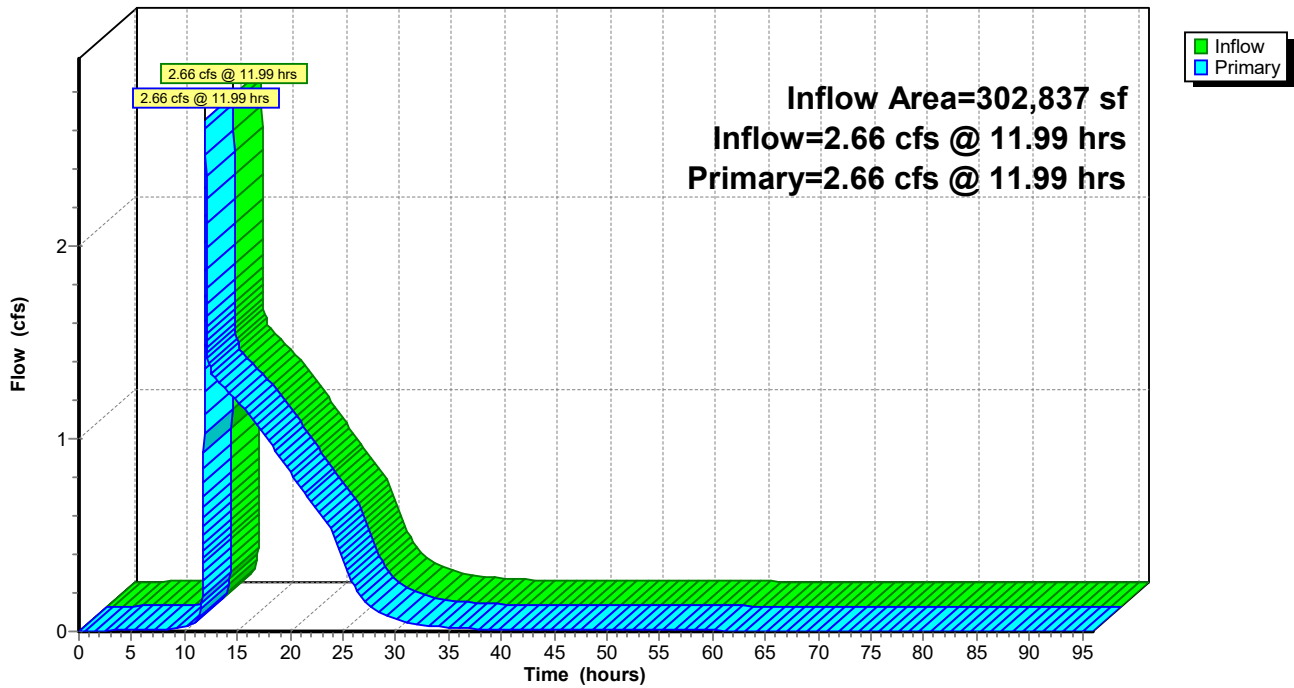
### Summary for Link 9L: Discharge Point 009

Inflow Area = 302,837 sf, 16.05% Impervious, Inflow Depth = 2.00" for 10-Year event  
Inflow = 2.66 cfs @ 11.99 hrs, Volume= 50,421 cf  
Primary = 2.66 cfs @ 11.99 hrs, Volume= 50,421 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 9L: Discharge Point 009

Hydrograph



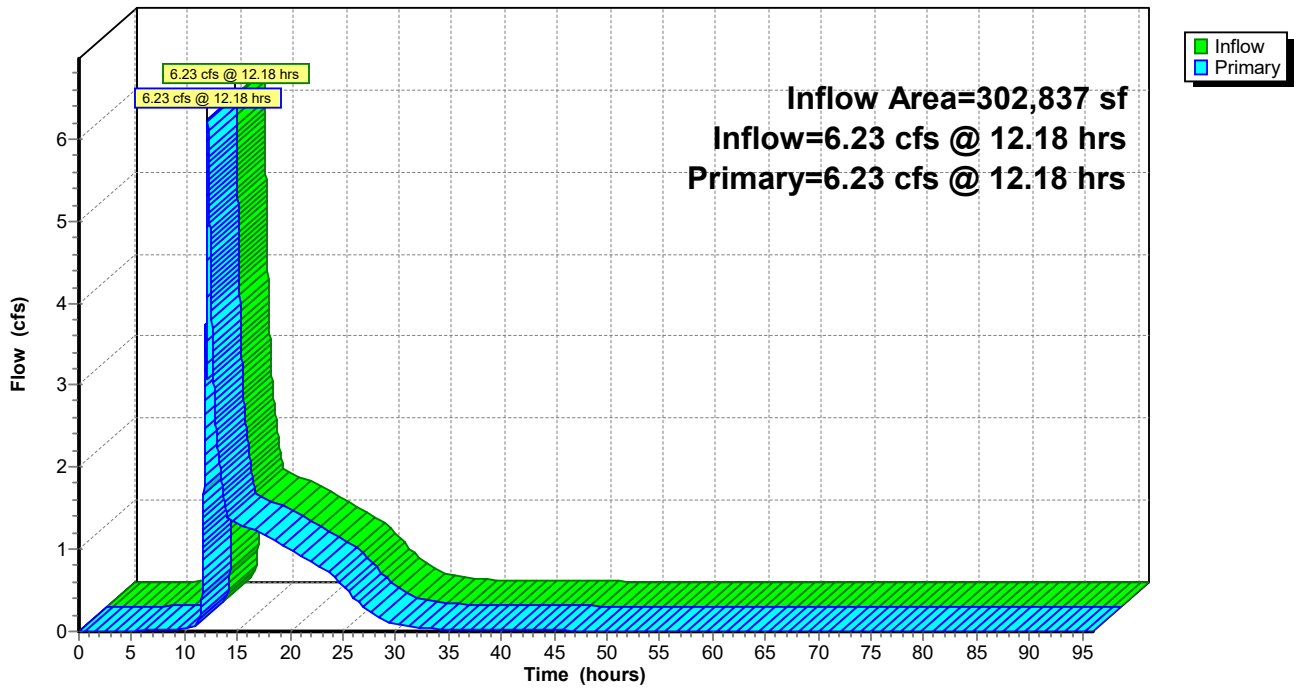
### Summary for Link 9L: Discharge Point 009

Inflow Area = 302,837 sf, 16.05% Impervious, Inflow Depth = 2.86" for 25-Year event  
Inflow = 6.23 cfs @ 12.18 hrs, Volume= 72,284 cf  
Primary = 6.23 cfs @ 12.18 hrs, Volume= 72,284 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 9L: Discharge Point 009

Hydrograph



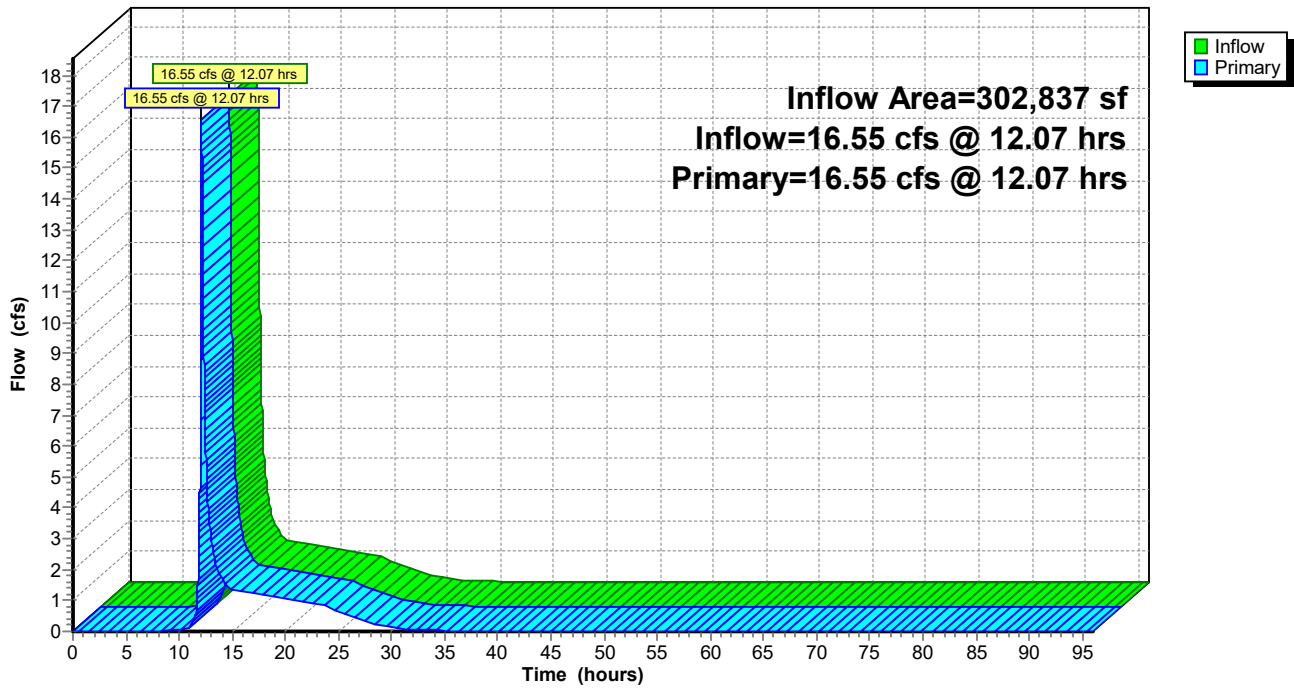
### Summary for Link 9L: Discharge Point 009

Inflow Area = 302,837 sf, 16.05% Impervious, Inflow Depth = 3.66" for 50-Year event  
Inflow = 16.55 cfs @ 12.07 hrs, Volume= 92,482 cf  
Primary = 16.55 cfs @ 12.07 hrs, Volume= 92,482 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 9L: Discharge Point 009

Hydrograph



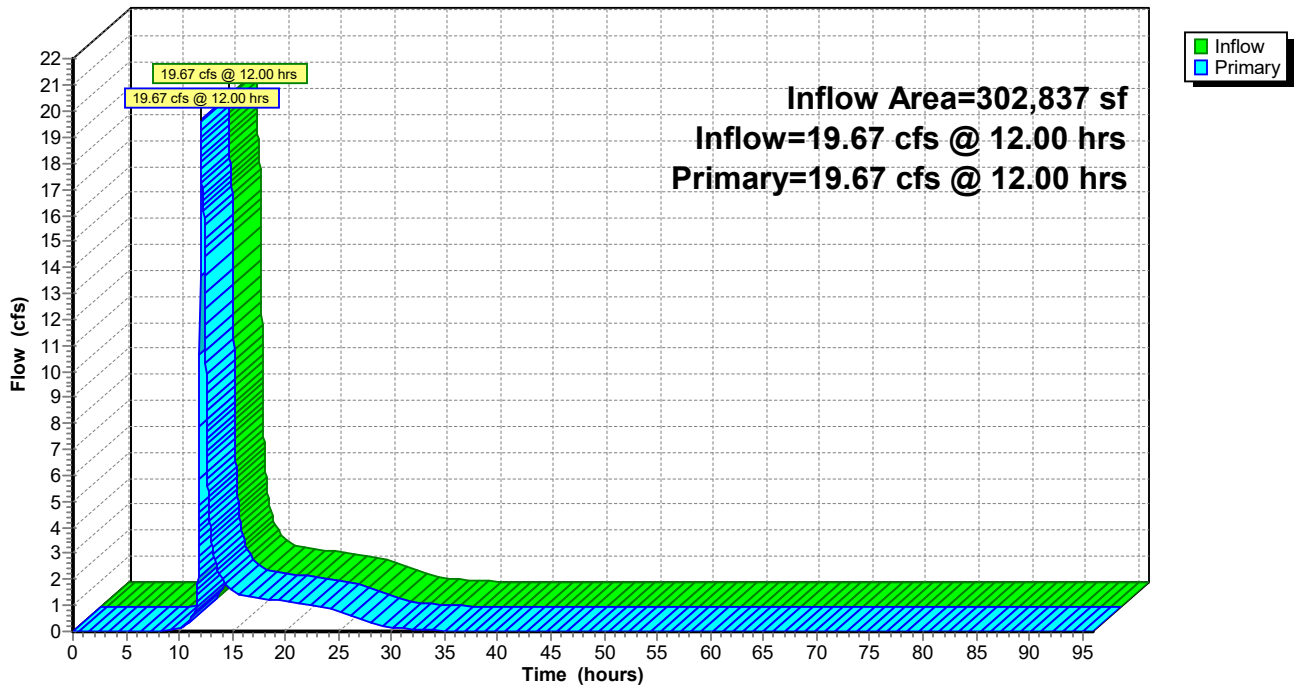
### Summary for Link 9L: Discharge Point 009

Inflow Area = 302,837 sf, 16.05% Impervious, Inflow Depth = 4.60" for 100-Year event  
Inflow = 19.67 cfs @ 12.00 hrs, Volume= 115,986 cf  
Primary = 19.67 cfs @ 12.00 hrs, Volume= 115,986 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 9L: Discharge Point 009

Hydrograph





# VOLUME CALCULATIONS

## Standard Worksheet #4

Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** 283 Commerce Center - Building #1  
**Drainage Area:** Watershed Area #1  
**2-Year Rainfall:** 2.98 Inches

**Total Site Area:** 56.593 Acres  
**Protected Site Area:** 0.000 Acres  
**Managed Area:** 56.593 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow (20%)	B	0	0.000	58	7.24	1.45	0.27	0
Meadow (20%)	C	0	0.000	71	4.08	0.82	0.75	0
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	238,235	5.469	58	7.24	1.45	0.27	5,309
Meadow	C	44,215	1.015	71	4.08	0.82	0.75	2,759
Meadow	D	1,575	0.036	78	2.82	0.56	1.11	146
Woods / Good Condition	B	0	0.000	55	8.18	1.64	0.19	0
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
<b>TOTAL:</b>		<b>284,025</b>	<b>6.520</b>					<b>8,215</b>

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	1,736,854	39.873	98	0.20	0.04	2.75	397,791
Meadow	B	504,289	11.577	58	7.24	1.45	0.27	11,238
Meadow	C	90,150	2.070	71	4.08	0.82	0.75	5,626
Meadow	D	1,922	0.044	78	2.82	0.56	1.11	179
Open Space / Good Condition	B	121,089	2.780	61	6.39	1.28	0.36	3,608
Open Space / Good Condition	C	10,882	0.250	74	3.51	0.70	0.90	812
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
<b>TOTAL:</b>		<b>2,465,186</b>	<b>56.593</b>					<b>419,254</b>

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>411,039</b>
---	----------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S =  $(1000 / CN) - 10$

2. Runoff Volume (CF) =  $Q \times \text{Area} \times 1/12$

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.**

**The use of a weighted CN value for volume calculations is not acceptable.**

Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** 283 Commerce Center - Building #1  
**Drainage Area:** Watershed Area #2  
**2-Year Rainfall:** 2.98 Inches  
  
**Total Site Area:** 3.517 Acres  
**Protected Site Area:** 0.589 Acres  
**Managed Area:** 2.928 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow (20%)	B	0	0.000	58	7.24	1.45	0.27	0
Meadow (20%)	C	0	0.000	71	4.08	0.82	0.75	0
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	154,749	3.553	58	7.24	1.45	0.27	3,449
Meadow	C	88,924	2.041	71	4.08	0.82	0.75	5,550
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Woods / Good Condition	B	0	0.000	55	8.18	1.64	0.19	0
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
<b>TOTAL:</b>		<b>243,673</b>	<b>5.594</b>					<b>8,998</b>

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow	B	77,981	1.790	58	7.24	1.45	0.27	1,738
Meadow	C	49,556	1.138	71	4.08	0.82	0.75	3,093
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Open Space / Good Condition	B	0	0.000	61	6.39	1.28	0.36	0
Open Space / Good Condition	C	0	0.000	74	3.51	0.70	0.90	0
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
<b>TOTAL:</b>		<b>127,537</b>	<b>2.928</b>					<b>4,831</b>

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>-4,168</b>
---	---------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S =  $(1000 / CN) - 10$

2. Runoff Volume (CF) =  $Q \times \text{Area} \times 1/12$

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.**

Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** 283 Commerce Center - Building #1  
**Drainage Area:** Watershed Area #3  
**2-Year Rainfall:** 2.98 Inches  
  
**Total Site Area:** 22.499 Acres  
**Protected Site Area:** 5.831 Acres  
**Managed Area:** 16.669 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	43,965	1.009	98	0.20	0.04	2.75	10,069
Meadow (20%)	B	10,500	0.241	58	7.24	1.45	0.27	234
Meadow (20%)	C	491	0.011	71	4.08	0.82	0.75	31
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	696,649	15.993	58	7.24	1.45	0.27	15,525
Meadow	C	246,009	5.648	71	4.08	0.82	0.75	15,354
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Woods / Good Condition	B	38,680	0.888	55	8.18	1.64	0.19	611
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
Impervious (Road Reconstruction)	N/A	24,200	0.556	98	0.20	0.04	2.75	5,543
<b>TOTAL:</b>		<b>1,060,494</b>	<b>24.346</b>					<b>47,366</b>

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	138,311	3.175	98	0.20	0.04	2.75	31,677
Meadow	B	256,735	5.894	58	7.24	1.45	0.27	5,722
Meadow	C	177,309	4.070	71	4.08	0.82	0.75	11,066
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Open Space / Good Condition	B	96,169	2.208	61	6.39	1.28	0.36	2,866
Open Space / Good Condition	C	33,362	0.766	74	3.51	0.70	0.90	2,490
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
Impervious (Road Reconstruction)	N/A	24,200	0.556	98	0.20	0.04	2.75	5,543
<b>TOTAL:</b>		<b>726,086</b>	<b>16.669</b>					<b>59,363</b>

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>11,996</b>
---	---------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S =  $(1000 / CN) - 10$

2. Runoff Volume (CF) =  $Q \times \text{Area} \times 1/12$

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.**

Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** Greiner Property  
**Drainage Area:** Watershed Area #4  
**2-Year Rainfall:** 2.98 Inches  
  
**Total Site Area:** 0.485 Acres  
**Protected Site Area:** 0.000 Acres  
**Managed Area:** 0.485 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	11,926	0.274	98	0.20	0.04	2.75	2,731
Meadow (20%)	B	2,860	0.066	58	7.24	1.45	0.27	64
Meadow (20%)	C	121	0.003	71	4.08	0.82	0.75	8
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	226,428	5.198	58	7.24	1.45	0.27	5,046
Meadow	C	21,452	0.492	71	4.08	0.82	0.75	1,339
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Woods / Good Condition	B	0	0.000	55	8.18	1.64	0.19	0
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
<b>TOTAL:</b>		<b>262,787</b>	<b>6.033</b>					<b>9,188</b>

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow	B	15,793	0.363	58	7.24	1.45	0.27	352
Meadow	C	5,335	0.122	71	4.08	0.82	0.75	333
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Open Space / Good Condition	B	0	0.000	61	6.39	1.28	0.36	0
Open Space / Good Condition	C	0	0.000	74	3.51	0.70	0.90	0
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
<b>TOTAL:</b>		<b>21,128</b>	<b>0.485</b>					<b>685</b>

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>-8,503</b>
---	---------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S =  $(1000 / CN) - 10$

2. Runoff Volume (CF) =  $Q \times \text{Area} \times 1/12$

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.**

**The use of a weighted CN value for volume calculations is not acceptable.**

Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** 283 Commerce Center - Building #1  
**Drainage Area:** Watershed Area #5  
**2-Year Rainfall:** 2.98 Inches

**Total Site Area:** 6.850 Acres  
**Protected Site Area:** 0.000 Acres  
**Managed Area:** 6.850 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow (20%)	B	0	0.000	58	7.24	1.45	0.27	0
Meadow (20%)	C	0	0.000	71	4.08	0.82	0.75	0
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	395,412	9.077	58	7.24	1.45	0.27	8,812
Meadow	C	142,330	3.267	71	4.08	0.82	0.75	8,883
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Woods / Good Condition	B	0	0.000	55	8.18	1.64	0.19	0
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
Impervious (Road Reconstruction)	N/A	15,990	0.367	98	0.20	0.04	2.75	3,662
<b>TOTAL:</b>		<b>553,732</b>	<b>12.712</b>					<b>21,357</b>

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	38,017	0.873	98	0.20	0.04	2.75	8,707
Meadow	B	138,575	3.181	58	7.24	1.45	0.27	3,088
Meadow	C	70,832	1.626	71	4.08	0.82	0.75	4,421
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Open Space / Good Condition	B	25,685	0.590	61	6.39	1.28	0.36	765
Open Space / Good Condition	C	9,276	0.213	74	3.51	0.70	0.90	692
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
Impervious (Road Reconstruction)	N/A	15,990	0.367	98	0.20	0.04	2.75	3,662
<b>TOTAL:</b>		<b>298,375</b>	<b>6.850</b>					<b>21,336</b>

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>-21</b>
---	------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S = (1000/ CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.**

Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** 283 Commerce Center - Building #1  
**Drainage Area:** Watershed Area #6  
**2-Year Rainfall:** 2.98 Inches  
  
**Total Site Area:** 0.779 Acres  
**Protected Site Area:** 0.000 Acres  
**Managed Area:** 0.779 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow (20%)	B	0	0.000	58	7.24	1.45	0.27	0
Meadow (20%)	C	0	0.000	71	4.08	0.82	0.75	0
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	492,498	11.306	58	7.24	1.45	0.27	10,976
Meadow	C	0	0.000	71	4.08	0.82	0.75	0
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Woods / Good Condition	B	0	0.000	55	8.18	1.64	0.19	0
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
<b>TOTAL:</b>		492,498	11.306					10,976

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow	B	33,953	0.779	58	7.24	1.45	0.27	757
Meadow	C	0	0.000	71	4.08	0.82	0.75	0
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Open Space / Good Condition	B	0	0.000	61	6.39	1.28	0.36	0
Open Space / Good Condition	C	0	0.000	74	3.51	0.70	0.90	0
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
<b>TOTAL:</b>		33,953	0.779					757

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>-10,219</b>
---	----------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S =  $(1000 / CN) - 10$

2. Runoff Volume (CF) =  $Q \times \text{Area} \times 1/12$

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.**

Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** 283 Commerce Center - Building #1  
**Drainage Area:** Watershed Area #7  
**2-Year Rainfall:** 2.98 Inches  
  
**Total Site Area:** 2.185 Acres  
**Protected Site Area:** 0.000 Acres  
**Managed Area:** 2.185 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow (20%)	B	0	0.000	58	7.24	1.45	0.27	0
Meadow (20%)	C	0	0.000	71	4.08	0.82	0.75	0
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	341,869	7.848	58	7.24	1.45	0.27	7,619
Meadow	C	0	0.000	71	4.08	0.82	0.75	0
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Woods / Good Condition	B	0	0.000	55	8.18	1.64	0.19	0
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
<b>TOTAL:</b>		<b>341,869</b>	<b>7.848</b>					<b>7,619</b>

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow	B	95,189	2.185	58	7.24	1.45	0.27	2,121
Meadow	C	0	0.000	71	4.08	0.82	0.75	0
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Open Space / Good Condition	B	0	0.000	61	6.39	1.28	0.36	0
Open Space / Good Condition	C	0	0.000	74	3.51	0.70	0.90	0
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
<b>TOTAL:</b>		<b>95,189</b>	<b>2.185</b>					<b>2,121</b>

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>-5,497</b>
---	---------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S =  $(1000 / CN) - 10$

2. Runoff Volume (CF) =  $Q \times \text{Area} \times 1/12$

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.**

**The use of a weighted CN value for volume calculations is not acceptable.**



Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** 283 Commerce Center - Building #1  
**Drainage Area:** Watershed Area #8  
**2-Year Rainfall:** 2.98 Inches

**Total Site Area:** 14.418 Acres  
**Protected Site Area:** 9.580 Acres  
**Managed Area:** 4.838 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow (20%)	B	0	0.000	58	7.24	1.45	0.27	0
Meadow (20%)	C	0	0.000	71	4.08	0.82	0.75	0
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	489,934	11.247	58	7.24	1.45	0.27	10,919
Meadow	C	0	0.000	71	4.08	0.82	0.75	0
Meadow	D	39,357	0.904	78	2.82	0.56	1.11	3,656
Woods / Good Condition	B	206,209	4.734	55	8.18	1.64	0.19	3,257
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
<b>TOTAL:</b>		<b>735,500</b>	<b>16.885</b>					<b>17,831</b>

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow	B	171,723	3.942	58	7.24	1.45	0.27	3,827
Meadow	C	0	0.000	71	4.08	0.82	0.75	0
Meadow	D	39,011	0.896	78	2.82	0.56	1.11	3,624
Open Space / Good Condition	B	0	0.000	61	6.39	1.28	0.36	0
Open Space / Good Condition	C	0	0.000	74	3.51	0.70	0.90	0
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
<b>TOTAL:</b>		<b>210,734</b>	<b>4.838</b>					<b>7,450</b>

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>-10,381</b>
---	----------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S =  $(1000 / CN) - 10$

2. Runoff Volume (CF) =  $Q \times \text{Area} \times 1/12$

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI.**

**The use of a weighted CN value for volume calculations is not acceptable.**

Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** 283 Commerce Center - Building #1  
**Drainage Area:** Watershed Area #9  
**2-Year Rainfall:** 2.98 Inches  
  
**Total Site Area:** 2.673 Acres  
**Protected Site Area:** 0.000 Acres  
**Managed Area:** 2.673 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	0	0.000	98	0.20	0.04	2.75	0
Meadow (20%)	B	0	0.000	58	7.24	1.45	0.27	0
Meadow (20%)	C	0	0.000	71	4.08	0.82	0.75	0
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	68,478	1.572	58	7.24	1.45	0.27	1,526
Meadow	C	0	0.000	71	4.08	0.82	0.75	0
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Woods / Good Condition	B	35,811	0.822	55	8.18	1.64	0.19	566
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
Impervious (Road Reconstruction)	N/A	15,773	0.362	98	0.20	0.04	2.75	3,612
<b>TOTAL:</b>		<b>120,062</b>	<b>2.756</b>					<b>5,704</b>

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	31,469	0.722	98	0.20	0.04	2.75	7,207
Meadow	B	0	0.000	58	7.24	1.45	0.27	0
Meadow	C	0	0.000	71	4.08	0.82	0.75	0
Meadow	D	0	0.000	78	2.82	0.56	1.11	0
Open Space / Good Condition	B	69,210	1.589	61	6.39	1.28	0.36	2,062
Open Space / Good Condition	C	0	0.000	74	3.51	0.70	0.90	0
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
Impervious (Road Reconstruction)	N/A	15,773	0.362	98	0.20	0.04	2.75	3,612
<b>TOTAL:</b>		<b>116,452</b>	<b>2.673</b>					<b>12,882</b>

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>7,178</b>
---	--------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S = (1000/CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.**

Application

<b>Worksheet 4. Change in Runoff Volume for 2-YR Storm Event</b>
--

**PROJECT:** 283 Commerce Center - Building #1  
**Drainage Area:** Watershed Area Overall  
**2-Year Rainfall:** 2.98 Inches  
  
**Total Site Area:** 110.000 Acres  
**Protected Site Area:** 16.000 Acres  
**Managed Area:** 94.000 Acres

**Existing Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious (80%)	N/A	55,891	1.283	98	0.20	0.04	2.75	12,801
Meadow (20%)	B	13,360	0.307	58	7.24	1.45	0.27	298
Meadow (20%)	C	612	0.014	71	4.08	0.82	0.75	38
Meadow (20%)	D	0	0.000	78	2.82	0.56	1.11	0
Meadow	B	3,104,252	71.264	58	7.24	1.45	0.27	69,180
Meadow	C	542,930	12.464	71	4.08	0.82	0.75	33,885
Meadow	D	40,932	0.940	78	2.82	0.56	1.11	3,802
Woods / Good Condition	B	280,700	6.444	55	8.18	1.64	0.19	4,433
Woods / Good Condition	C	0	0.000	70	4.29	0.86	0.70	0
Woods / Good Condition	D	0	0.000	77	2.99	0.60	1.06	0
Impervious (Road Reconstruction)	N/A	55,963	1.285	98	0.20	0.04	2.75	12,817
<b>TOTAL:</b>		<b>4,094,640</b>	<b>94.000</b>					<b>137,254</b>

**Developed Conditions:**

Cover Type/Condition	Soil Type	Area (SF)	Area (AC)	CN	S	la (0.2*S)	Q Runoff <sup>1</sup> (IN)	Runoff Volume <sup>2</sup> (FT <sup>3</sup> )
Impervious	N/A	1,944,651	44.643	98	0.20	0.04	2.75	445,382
Meadow	B	1,294,238	29.712	58	7.24	1.45	0.27	28,843
Meadow	C	393,182	9.026	71	4.08	0.82	0.75	24,539
Meadow	D	40,933	0.940	78	2.82	0.56	1.11	3,802
Open Space / Good Condition	B	312,153	7.166	61	6.39	1.28	0.36	9,301
Open Space / Good Condition	C	53,520	1.229	74	3.51	0.70	0.90	3,994
Open Space / Good Condition	D	0	0.000	80	2.50	0.50	1.24	0
Impervious (Road Reconstruction)	N/A	55,963	1.285	98	0.20	0.04	2.75	12,817
<b>TOTAL:</b>		<b>4,094,640</b>	<b>94.000</b>					<b>528,679</b>

<b>2-Year Volume Increase (ft<sup>3</sup>):</b>	<b>391,425</b>
---	----------------

**2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume**

1. Runoff (in) =  $Q = (P-0.2S)^2 / (P+0.8S)$  where

P = 2-Year Rainfall (in)

S = (1000/ CN)-10

2. Runoff Volume (CF) =  $Q \times \text{Area} \times 1/12$

Q = Runoff (in)

Area = Land use area (sq. ft)

**Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.**

**DEP PCSM SPREADSHEETS**  
**(DP 001-009)**

# **DEP PCSM SPREADSHEET**

**WATERSHED AREA #1  
(DISCHARGE POINT 001)**

## General Information

Instructions
General
Volume
Rate
Quality

Project Name:  Application Type:

County:  Municipality:

Project Type:   New Project  Minor / Major Amendment

Area:  acres Total Earth Disturbance:  acres  
*(In Watershed)* *(In Watershed)*

No. of Post-Construction Discharge Points:  Start DP Numbering at:

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	56.59	56.59	0.00	39.87	UNT to Little Chiques Creek	TSF, MF	Yes
Undetained Areas							
<b>Totals:</b>	<b>56.59</b>	<b>56.59</b>		<b>39.87</b>			

# Volume Management

Project: 283 Commerce Center - Building #1

Instructions **General** **Volume** **Rate** **Quality**

2-Year / 24-Hour Storm Event (NOAA Atlas 14):  inches

Alternative 2-Year / 24-Hour Storm Event  inches

Alternative Source:

**Pre-Construction Conditions:** No. Rows:   Exempt from Meadow in Good Condition  Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Pervious as Meadow	0.00	B	58	1.448	0.27	0
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Pervious as Meadow	5.47	B	58	1.448	0.27	5,309
Pervious as Meadow	1.02	C	71	0.817	0.75	2,759
Pervious as Meadow	0.04	D	78	0.564	1.11	146
Forested (Good Condition)	0.00	B	55	1.636	0.19	0
Forested (Good Condition)	0.00	C	70	0.857	0.70	0
Forested (Good Condition)	0.00	D	77	0.597	1.06	0

**Post-Construction Conditions:** **TOTAL (ACRES):** 6.52 **TOTAL (CF):** 8,215

No. Rows: 7

Land Cover	Area (acres)	Group	CN	la (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	39.87	N/A	98	0.041	2.75	397,791
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	11.58	B	58	1.448	0.27	11,238
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	2.07	C	71	0.817	0.75	5,626
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.04	D	78	0.564	1.11	179
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	2.78	B	61	1.279	0.36	3,608
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.25	C	74	0.703	0.90	812
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
<b>TOTAL (ACRES):</b> 56.59						<b>TOTAL (CF):</b> 419,254

**NET CHANGE IN VOLUME TO MANAGE (CF):** 411,039

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

**Structural BMP Volume Credits:** No. Structural BMPs: 2 Start BMP Numbering at: 1

DP No.	BMP No.	BMP Name	MRG	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Rain Garden / Bioretention	Y	Off-Site	47.98	407,432	76,079	0.10	96	Yes	3.0	0	6,847	57,744
001	2	Dry Extended Detention Basin	-	Off-Site	7.54	7,658	76,712	0.00	96	Yes	0.5	0	0	7,658



Totals: 6,847 65,402

INFILTRATION & ET CREDITS (CF):	72,249
MANAGED RELEASE CREDIT (CF):	342,841

NET CHANGE IN VOLUME TO MANAGE (CF):	411,039
TOTAL CREDITS (CF):	415,090

VOLUME REQUIREMENT SATISFIED

# Rate Control

Project: 283 Commerce Center - Building #1

Instructions    General    Volume    Rate    Quality

### Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	2.98
NOAA 10-Year 24-Hour Storm Event (in):	4.51
NOAA 50-Year 24-Hour Storm Event (in):	6.54
NOAA 100-Year 24-Hour Storm Event (in):	7.61

Alternative 2-Year 24-Hour Storm Event (in):	
Alternative 10-Year 24-Hour Storm Event (in):	
Alternative 50-Year 24-Hour Storm Event (in):	
Alternative 100-Year 24-Hour Storm Event (in):	

Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)		
	Pre-Construction	Post-Construction	Net Change
2-Year Storm:	11.32	6.97	-4.35
10-Year Storm:	22.97	21.05	-1.92
50-Year Storm:	39.49	31.06	-8.43
100-Year Storm:	48.35	45.60	-2.75

Rate Control Satisfied  
Rate Control Satisfied  
Rate Control Satisfied  
Rate Control Satisfied

# Water Quality

Project: 283 Commerce Center - Building #1

PRINT

- Instructions
- General
- Volume
- Rate
- Quality

**Pre-Construction Pollutant Loads:**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	B	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	5.47	B	5,309	48.8	0.22	2.30	16.18	0.07	0.76
Pervious as Meadow	Grassland/Herbaceous	1.02	C	2,759	48.8	0.22	2.30	8.41	0.04	0.40
Pervious as Meadow	Grassland/Herbaceous	0.04	D	146	48.8	0.22	2.30	0.45	0.00	0.02
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	B	0	45.0	0.13	1.05	0.00	0.00	0.00

Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	C	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>6.52</b>			<b>25.03</b>	<b>0.11</b>	<b>1.18</b>	<b>0.11</b>	<b>0.00</b>	<b>1.18</b>

**Post-Construction Pollutant Loads (without BMPs):**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	39.87	N/A	397,791	65.0	0.29	2.05	#####	7.20	50.92
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	11.58	B	11,238	48.8	0.22	2.30	34.25	0.15	1.61
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	2.07	C	5,626	48.8	0.22	2.30	17.14	0.08	0.81
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.04	D	179	48.8	0.22	2.30	0.54	0.00	0.03
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	2.78	B	3,608	78.0	0.25	1.25	17.57	0.06	0.28
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.25	C	812	78.0	0.25	1.25	3.96	0.01	0.06
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	D	0	78.0	0.25	1.25	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>56.59</b>			<b>#####</b>	<b>7.51</b>	<b>53.71</b>	<b>7.51</b>	<b>0.00</b>	<b>53.71</b>

**POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):**

##### **7.39** **52.53**

Characterize Undetained Areas (for Untreated Stormwater) No. Rows: 7

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.15	B	58	1.448	0.27	146
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.89	C	71	0.817	0.75	2,420
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.03	D	78	0.564	1.11	121
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	D	80	0.500	1.24	0

**Non-Structural BMP Water Quality Credits:**

- Pervious Undetained Area Credit
- Other (attach calculations)

TSS	TP	TN
2.05	0.01	0.06

**Structural BMP Water Quality Credits:**

Use default BMP Outflows and Median BMP Outflow Concentrations

DP No.	BMP No.	BMP Name	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
								TSS	TP	TN	TSS	TP	TN

001	1	Rain Garden / Bioretention	Y	47.98	407,432	64,591		342,841	-	-	-	-
001	2	Dry Extended Detention Basin	-	7.54	7,658	7,658		0	22.00	0.19	1.22	0.00
												0.00

TSS	TP	TN
0.00	0.00	0.00
8.19	0.04	0.39
2.05	0.01	0.06
6.14	0.03	0.33
25.03	0.11	1.18

**POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):**

**POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):**

**NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):**

**NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):**

**POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):**

**WATER QUALITY REQUIREMENT SATISFIED**

**CERTIFICATION**

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

**Timothy Fink, E.I.T.**

Spreadsheet User Name

1/3/2023

Date

# **DEP PCSM SPREADSHEET**

**WATERSHED AREA #2  
(DISCHARGE POINT 002)**

## General Information

Instructions
General
Volume
Rate
Quality

Project Name:  Application Type:

County:  Municipality:

Project Type:   New Project  Minor / Major Amendment

Area:  acres Total Earth Disturbance:  acres  
*(In Watershed)* *(In Watershed)*

No. of Post-Construction Discharge Points:  Start DP Numbering at:

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
002	3.52	2.93	0.00	0.00	UNT to Little Chiques Creek	TSF, MF	No
Undetained Areas							
<b>Totals:</b>	<b>3.52</b>	<b>2.93</b>					

**PROJECT SITE MEETS SMALL SITE EXCEPTION - RATE WORKSHEET NOT REQUIRED**



# Volume Management

Project: 283 Commerce Center - Building #1

Instructions **General** **Volume** **Rate** **Quality**

2-Year / 24-Hour Storm Event (NOAA Atlas 14):  inches

Alternative 2-Year / 24-Hour Storm Event  inches

Alternative Source:

Pre-Construction Conditions:  No. Rows:   Exempt from Meadow in Good Condition  Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Pervious as Meadow	0.00	B	58	1.448	0.27	0
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Pervious as Meadow	3.55	B	58	1.448	0.27	3,449
Pervious as Meadow	2.04	C	71	0.817	0.75	5,550
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Forested (Good Condition)	0.00	B	55	1.636	0.19	0
Forested (Good Condition)	0.00	C	70	0.857	0.70	0
Forested (Good Condition)	0.00	D	77	0.597	1.06	0

Post-Construction Conditions: **TOTAL (ACRES): 5.59** **TOTAL (CF): 8,998**

No. Rows: **7**

Land Cover	Area (acres)	Group	CN	la (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.79	B	58	1.448	0.27	1,738
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.14	C	71	0.817	0.75	3,093
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
<b>TOTAL (ACRES): 2.93</b>						<b>TOTAL (CF): 4,831</b>

**NET CHANGE IN VOLUME TO MANAGE (CF): -4,168**

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

**Structural BMP Volume Credits:**

No. Structural BMPs:  Start BMP Numbering at:

DP No.	BMP No.	BMP Name	MRP	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)

**Totals:**

INFILTRATION & ET CREDITS (CF):

NET CHANGE IN VOLUME TO MANAGE (CF):

TOTAL CREDITS (CF):

-4,168

# Rate Control

Project: 283 Commerce Center - Building #1

Instructions    General    Volume    Rate    Quality

**SMALL SITE EXCEPTION SATISFIED: RATE CONTROL NOT REQUIRED**

**Precipitation Amounts:**

NOAA 2-Year 24-Hour Storm Event (in):	2.98
NOAA 10-Year 24-Hour Storm Event (in):	4.51
NOAA 50-Year 24-Hour Storm Event (in):	6.54
NOAA 100-Year 24-Hour Storm Event (in):	7.61

Alternative 2-Year 24-Hour Storm Event (in):	
Alternative 10-Year 24-Hour Storm Event (in):	
Alternative 50-Year 24-Hour Storm Event (in):	
Alternative 100-Year 24-Hour Storm Event (in):	

Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)		Net Change	
	Pre-Construction	Post-Construction		
2-Year Storm:	7.76	2.60	-5.16	Rate Control Satisfied
10-Year Storm:	15.46	7.98	-7.48	Rate Control Satisfied
50-Year Storm:	26.30	16.81	-9.49	Rate Control Satisfied
100-Year Storm:	32.15	21.90	-10.25	Rate Control Satisfied

# Water Quality

Project: 283 Commerce Center - Building #1

PRINT

Instructions    General    Volume    Rate    **Quality**

**Pre-Construction Pollutant Loads:**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	B	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	3.55	B	3,449	48.8	0.22	2.30	10.51	0.05	0.50
Pervious as Meadow	Grassland/Herbaceous	2.04	C	5,550	48.8	0.22	2.30	16.91	0.08	0.80
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	B	0	45.0	0.13	1.05	0.00	0.00	0.00

Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	C	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>5.59</b>						<b>27.42</b>	<b>0.12</b>	<b>1.29</b>

**Post-Construction Pollutant Loads (without BMPs):**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.79	B	1,738	48.8	0.22	2.30	5.30	0.02	0.25
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.14	C	3,093	48.8	0.22	2.30	9.42	0.04	0.44
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	B	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	C	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	D	0	78.0	0.25	1.25	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>2.93</b>						<b>14.72</b>	<b>0.07</b>	<b>0.69</b>

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):

0.00	0.00	0.00
------	------	------

Characterize Undetained Areas (for Untreated Stormwater)

No. Rows:

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.79	B	58	1.448	0.27	1,738
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.14	C	71	0.817	0.75	3,099
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	D	80	0.500	1.24	0

Non-Structural BMP Water Quality Credits:

Pervious Undetained Area Credit

Other (attach calculations)

TSS	TP	TN
3.68	0.01	0.10

Structural BMP Water Quality Credits:

Use default BMP Outflows and Median BMP Outflow Concentrations

BMP DP No.	BMP No.	BMP Name	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)				
								TSS	TP	TN	TSS	TP	TN		





# **DEP PCSM SPREADSHEET**

**WATERSHED AREA #3**

**(DISCHARGE POINT 003)**

## General Information

Instructions
General
Volume
Rate
Quality

Project Name:  Application Type:

County:  Municipality:

Project Type:   New Project  Minor / Major Amendment

Area:  acres Total Earth Disturbance:  acres  
*(In Watershed)* *(In Watershed)*

No. of Post-Construction Discharge Points:  Start DP Numbering at:

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
003	22.50	16.67	1.26	3.18	UNT to Little Chiques Creek	TSF, MF	Yes
Undetained Areas							
<b>Totals:</b>	<b>22.50</b>	<b>16.67</b>	<b>1.26</b>	<b>3.18</b>			

# Volume Management

Project: 283 Commerce Center - Building #1

Instructions **General** **Volume** **Rate** **Quality**

2-Year / 24-Hour Storm Event (NOAA Atlas 14):  inches

Alternative 2-Year / 24-Hour Storm Event  inches

Alternative Source:

**Pre-Construction Conditions:** No. Rows:   Exempt from Meadow in Good Condition  Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	1.01	N/A	98	0.041	2.75	10,069
Pervious as Meadow	0.24	B	58	1.448	0.27	234
Pervious as Meadow	0.01	C	71	0.817	0.75	31
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Pervious as Meadow	15.99	B	58	1.448	0.27	15,525
Pervious as Meadow	5.65	C	71	0.817	0.75	15,354
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Forested (Good Condition)	0.89	B	55	1.636	0.19	611
Forested (Good Condition)	0.00	C	70	0.857	0.70	0
Forested (Good Condition)	0.00	D	77	0.597	1.06	0

Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.56	N/A	98	0.041	2.75	5,543
<b>TOTAL (ACRES):</b> 24.35			<b>TOTAL (CF):</b> 47,366			

No. Rows:

Post-Construction Conditions:

Land Cover	Area (acres)	Group	CN	la (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	3.18	N/A	98	0.041	2.75	31,677
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	5.89	B	58	1.448	0.27	5,722
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	4.07	C	71	0.817	0.75	11,066
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	2.21	B	61	1.279	0.36	2,866
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.77	C	74	0.703	0.90	2,490
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.56	N/A	98	0.041	2.75	5,543
<b>TOTAL (ACRES):</b> 16.67			<b>TOTAL (CF):</b> 59,363			

**NET CHANGE IN VOLUME TO MANAGE (CF):**

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

Structural BMP Volume Credits:  No. Structural BMPs:  Start BMP Numbering at:

DP No.	BMP No.	BMP Name	MR?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)

003	3	Rain Garden / Bioretention	Y	Off-Site	6.41	23,416	22,020	0.10	96	No	2.0	0	1,982	
-----	---	----------------------------	---	----------	------	--------	--------	------	----	----	-----	---	-------	--

Totals: 1,982

INFILTRATION & ET CREDITS (CF):	1,982
MANAGED RELEASE CREDIT (CF):	21,434

NET CHANGE IN VOLUME TO MANAGE (CF):	11,996
TOTAL CREDITS (CF):	23,416

VOLUME REQUIREMENT SATISFIED

# Rate Control

Project: 283 Commerce Center - Building #1

Instructions
General
Volume
Rate
Quality

### Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	<b>2.98</b>
NOAA 10-Year 24-Hour Storm Event (in):	<b>4.51</b>
NOAA 50-Year 24-Hour Storm Event (in):	<b>6.54</b>
NOAA 100-Year 24-Hour Storm Event (in):	<b>7.61</b>

Alternative 2-Year 24-Hour Storm Event (in):	
Alternative 10-Year 24-Hour Storm Event (in):	
Alternative 50-Year 24-Hour Storm Event (in):	
Alternative 100-Year 24-Hour Storm Event (in):	

**Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)		
	Pre-Construction	Post-Construction	
2-Year Storm:	29.53	14.94	-14.59
10-Year Storm:	58.49	32.15	-26.34
50-Year Storm:	100.25	66.55	-33.70
100-Year Storm:	122.88	84.35	-38.53

Rate Control Satisfied  
Rate Control Satisfied  
Rate Control Satisfied  
Rate Control Satisfied

# Water Quality

Project: 283 Commerce Center - Building #1

PRINT

- Instructions
- General
- Volume
- Rate
- Quality

**Pre-Construction Pollutant Loads:**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	1.01	N/A	10,069	65.0	0.29	2.05	40.87	0.18	1.29
Pervious as Meadow	Grassland/Herbaceous	0.24	B	234	48.8	0.22	2.30	0.71	0.00	0.03
Pervious as Meadow	Grassland/Herbaceous	0.01	C	31	48.8	0.22	2.30	0.09	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	15.99	B	15,525	48.8	0.22	2.30	47.31	0.21	2.23
Pervious as Meadow	Grassland/Herbaceous	5.65	C	15,354	48.8	0.22	2.30	46.79	0.21	2.21
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.89	B	611	45.0	0.13	1.05	1.72	0.00	0.04

Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	C	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.56	N/A	5,543	65.0	0.29	2.05	22.50	0.10	0.71
<b>TOTAL (ACRES):</b>		<b>24.35</b>						<b>159.98</b>	<b>0.72</b>	<b>6.51</b>

**Post-Construction Pollutant Loads (without BMPs):**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	3.18	N/A	31,677	65.0	0.29	2.05	128.57	0.57	4.05
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	5.89	B	5,722	48.8	0.22	2.30	17.43	0.08	0.82
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	4.07	C	11,066	48.8	0.22	2.30	33.72	0.15	1.59
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	2.21	B	2,866	78.0	0.25	1.25	13.96	0.04	0.22
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.77	C	2,490	78.0	0.25	1.25	12.13	0.04	0.19
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	D	0	78.0	0.25	1.25	0.00	0.00	0.00



Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.56	N/A	5,543	65.0	0.29	2.05	22.50	0.10	0.71
--	-------------	------	-----	-------	------	------	------	-------	------	------

TOTAL (ACRES): 16.67 TOTALS: 228.31 0.99 7.59

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS): 68.32 0.27 1.08

Characterize Undetained Areas (for Untreated Stormwater) No. Rows: 7

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	1.96	N/A	98	0.041	2.75	19,554
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	4.65	B	58	1.448	0.27	4,514
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.29	C	71	0.817	0.75	3,507
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	1.55	B	61	1.279	0.36	2,012
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.25	C	74	0.703	0.90	813
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	D	80	0.500	1.24	0

Non-Structural BMP Water Quality Credits:

<input checked="" type="checkbox"/> Pervious Undetained Area Credit	TSS	TP	TN
<input type="checkbox"/> Other (attach calculations)	8.26	0.03	0.23

**Structural BMP Water Quality Credits:**

Use default BMP Outflows and Median BMP Outflow Concentrations

DP No.	BMP No.	BMP Name	MRP	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
003	3	Rain Garden / Bioretention	Y	6.41	23,416	1,982	21,434	-	-	-	-	-	-	-

TSS	TP	TN
0.00	0.00	0.00
117.56	0.51	3.88
8.26	0.03	0.23
109.30	0.48	3.64
159.98	0.72	6.51

**POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):**  
**POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):**  
**NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):**  
**NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):**  
**POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):**

**WATER QUALITY REQUIREMENT SATISFIED**

**CERTIFICATION**

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

**Timothy Fink, E.I.T.** 1/3/2023

Spreadsheet User Name Date

# DEP PCSM SPREADSHEET

WATERSHED AREA #4  
(DISCHARGE POINT 004)

## General Information

Instructions
General
Volume
Rate
Quality

Project Name:  Application Type:

County:  Municipality:

Project Type:   New Project  Minor / Major Amendment

Area:  acres Total Earth Disturbance:  acres  
*(In Watershed)* *(In Watershed)*

No. of Post-Construction Discharge Points:  Start DP Numbering at:

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
004	0.49	0.49	0.34	0.00	UNT to Little Chiques Creek	TSF, MF	No
Undetained Areas							
<b>Totals:</b>	<b>0.49</b>	<b>0.49</b>	<b>0.34</b>				

**PROJECT SITE MEETS SMALL SITE EXCEPTION - RATE WORKSHEET NOT REQUIRED**

# Volume Management

Project: 283 Commerce Center - Building #1

Instructions **General** **Volume** **Rate** **Quality**

2-Year / 24-Hour Storm Event (NOAA Atlas 14):  inches

Alternative 2-Year / 24-Hour Storm Event  inches

Alternative Source:

**Pre-Construction Conditions:** No. Rows:   Exempt from Meadow in Good Condition  Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.27	N/A	98	0.041	2.75	2,731
Pervious as Meadow	0.07	B	58	1.448	0.27	64
Pervious as Meadow	0.00	C	71	0.817	0.75	8
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Pervious as Meadow	5.20	B	58	1.448	0.27	5,046
Pervious as Meadow	0.49	C	71	0.817	0.75	1,339
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Forested (Good Condition)	0.00	B	55	1.636	0.19	0
Forested (Good Condition)	0.00	C	70	0.857	0.70	0
Forested (Good Condition)	0.00	D	77	0.597	1.06	0

TOTAL (CF): 9,188

TOTAL (ACRES): 6.03

No. Rows: 7

Post-Construction Conditions:

Land Cover	Area (acres)	Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.36	B	58	1.448	0.27	352
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.12	C	71	0.817	0.75	333
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
<b>TOTAL (CF):</b>						<b>685</b>

TOTAL (ACRES): 0.49

TOTAL (CF): 685

-8,503

NET CHANGE IN VOLUME TO MANAGE (CF):

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

**Structural BMP Volume Credits:**

No. Structural BMPs:  Start BMP Numbering at:

DP No.	BMP No.	BMP Name	MRP	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)

Totals:

--

INFILTRATION & ET CREDITS (CF):

-8,503
--------

NET CHANGE IN VOLUME TO MANAGE (CF):

--

TOTAL CREDITS (CF):

# Rate Control

Project: 283 Commerce Center - Building #1

Instructions    General    Volume    Rate    Quality

**SMALL SITE EXCEPTION SATISFIED: RATE CONTROL NOT REQUIRED**

**Precipitation Amounts:**

NOAA 2-Year 24-Hour Storm Event (in):	2.98
NOAA 10-Year 24-Hour Storm Event (in):	4.51
NOAA 50-Year 24-Hour Storm Event (in):	6.54
NOAA 100-Year 24-Hour Storm Event (in):	7.61

Alternative 2-Year 24-Hour Storm Event (in):	
Alternative 10-Year 24-Hour Storm Event (in):	
Alternative 50-Year 24-Hour Storm Event (in):	
Alternative 100-Year 24-Hour Storm Event (in):	

Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)		Net Change	
	Pre-Construction	Post-Construction		
2-Year Storm:	8.89	2.90	-5.99	Rate Control Satisfied
10-Year Storm:	17.77	7.78	-9.99	Rate Control Satisfied
50-Year Storm:	30.35	15.49	-14.86	Rate Control Satisfied
100-Year Storm:	37.10	19.84	-17.26	Rate Control Satisfied



# Water Quality

Project: 283 Commerce Center - Building #1

PRINT

- Instructions
- General
- Volume
- Rate
- Quality

**Pre-Construction Pollutant Loads:**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.27	N/A	2,731	65.0	0.29	2.05	11.09	0.05	0.35
Pervious as Meadow	Grassland/Herbaceous	0.07	B	64	48.8	0.22	2.30	0.19	0.00	0.01
Pervious as Meadow	Grassland/Herbaceous	0.00	C	8	48.8	0.22	2.30	0.02	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	5.20	B	5,046	48.8	0.22	2.30	15.38	0.07	0.72
Pervious as Meadow	Grassland/Herbaceous	0.49	C	1,339	48.8	0.22	2.30	4.08	0.02	0.19
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	B	0	45.0	0.13	1.05	0.00	0.00	0.00

Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	C	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>6.03</b>						<b>30.76</b>	<b>0.14</b>	<b>1.28</b>

**Post-Construction Pollutant Loads (without BMPs):**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.36	B	352	48.8	0.22	2.30	1.07	0.00	0.05
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.12	C	333	48.8	0.22	2.30	1.01	0.00	0.05
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	B	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	C	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	D	0	78.0	0.25	1.25	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>0.49</b>						<b>2.09</b>	<b>0.01</b>	<b>0.10</b>

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):

0.00	0.00	0.00
------	------	------

Characterize Undetained Areas (for Untreated Stormwater)

No. Rows:

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.36	B	58	1.448	0.27	349
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.12	C	71	0.817	0.75	326
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	D	80	0.500	1.24	0

**Non-Structural BMP Water Quality Credits:**

Pervious Undetained Area Credit

Other (attach calculations)

TSS	TP	TN
0.51	0.00	0.01

**Structural BMP Water Quality Credits:**

Use default BMP Outflows and Median BMP Outflow Concentrations

DP No.	BMP No.	BMP Name	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)				
								TSS	TP	TN	TSS	TP	TN		



# DEP PCSM SPREADSHEET

WATERSHED AREA #5  
(DISCHARGE POINT 005)

## General Information

Instructions
General
Volume
Rate
Quality

Project Name:  Application Type:

County:  Municipality:

Project Type:   New Project  Minor / Major Amendment

Area:  acres Total Earth Disturbance:  acres  
*(In Watershed)* *(In Watershed)*

No. of Post-Construction Discharge Points:  Start DP Numbering at:

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
005	6.85	6.85	0.00	0.87	UNT to Little Chiques Creek	TSF, MF	Yes
Undetained Areas							
<b>Totals:</b>	<b>6.85</b>	<b>6.85</b>		<b>0.87</b>			

# Volume Management

Project: 283 Commerce Center - Building #1

Instructions **General** **Volume** **Rate** **Quality**

2-Year / 24-Hour Storm Event (NOAA Atlas 14):  inches

Alternative 2-Year / 24-Hour Storm Event  inches

Alternative Source:

**Pre-Construction Conditions:** No. Rows:   Exempt from Meadow in Good Condition  Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Pervious as Meadow	0.00	B	58	1.448	0.27	0
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Pervious as Meadow	9.08	B	58	1.448	0.27	8,812
Pervious as Meadow	3.27	C	71	0.817	0.75	8,883
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Forested (Good Condition)	0.00	B	55	1.636	0.19	0
Forested (Good Condition)	0.00	C	70	0.857	0.70	0
Forested (Good Condition)	0.00	D	77	0.597	1.06	0

Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.37	N/A	98	0.041	2.75	3,662
<b>TOTAL (ACRES):</b>			<b>12.71</b>	<b>TOTAL (CF):</b>		
				<b>21,357</b>		

No. Rows: **8**

**Post-Construction Conditions:**

Land Cover	Area (acres)	Group	CN	la (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.87	N/A	98	0.041	2.75	8,707
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	3.18	B	58	1.448	0.27	3,088
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.63	C	71	0.817	0.75	4,421
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.59	B	61	1.279	0.36	765
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.21	C	74	0.703	0.90	692
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.37	N/A	98	0.041	2.75	3,662
<b>TOTAL (ACRES):</b>			<b>6.85</b>	<b>TOTAL (CF):</b>		
				<b>21,336</b>		

**NET CHANGE IN VOLUME TO MANAGE (CF):** -21

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

No. Structural BMPs:  Start BMP Numbering at:

**Structural BMP Volume Credits:**

DP No.	BMP No.	BMP Name	MR?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)





# Rate Control

Project: 283 Commerce Center - Building #1

Instructions	General	Volume	Rate	Quality
--------------	---------	--------	------	---------

### Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	<b>2.98</b>	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):	<b>4.51</b>	Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):	<b>6.54</b>	Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):	<b>7.61</b>	Alternative 100-Year 24-Hour Storm Event (in):	

**Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)		Net Change	
	Pre-Construction	Post-Construction		
2-Year Storm:	15.30	7.04	-8.26	Rate Control Satisfied
10-Year Storm:	31.16	17.19	-13.97	Rate Control Satisfied
50-Year Storm:	53.66	33.49	-20.17	Rate Control Satisfied
100-Year Storm:	65.72	42.81	-22.91	Rate Control Satisfied

# Water Quality

Project: 283 Commerce Center - Building #1

PRINT

Instructions **General** Volume Rate **Quality**

**Pre-Construction Pollutant Loads:**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	B	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	9.08	B	8,812	48.8	0.22	2.30	26.85	0.12	1.27
Pervious as Meadow	Grassland/Herbaceous	3.27	C	8,883	48.8	0.22	2.30	27.07	0.12	1.28
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	B	0	45.0	0.13	1.05	0.00	0.00	0.00

Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	C	0	45.0	0.13	1.05	0.00	0.00	0.00		
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00		
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.37	N/A	3,662	65.0	0.29	2.05	14.86	0.07	0.47		
<b>TOTAL (ACRES): 12.71</b>										<b>68.78</b>	<b>0.31</b>	<b>3.01</b>

**Post-Construction Pollutant Loads (without BMPs):**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.87	N/A	8,707	65.0	0.29	2.05	35.34	0.16	1.11
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	3.18	B	3,088	48.8	0.22	2.30	9.41	0.04	0.44
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.63	C	4,421	48.8	0.22	2.30	13.47	0.06	0.63
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.59	B	765	78.0	0.25	1.25	3.73	0.01	0.06
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.21	C	692	78.0	0.25	1.25	3.37	0.01	0.05
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	D	0	78.0	0.25	1.25	0.00	0.00	0.00

Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.37	N/A	3,662	65.0	0.29	2.05	14.86	0.07	0.47
--	-------------	------	-----	-------	------	------	------	-------	------	------

TOTAL (ACRES): 6.85

TOTALS: 80.18 0.35 2.78

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS): 11.40 0.04 0.00

Characterize Undetained Areas (for Untreated Stormwater) No. Rows: 7

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.87	N/A	98	0.041	2.75	8,680
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	3.02	B	58	1.448	0.27	2,932
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.79	C	71	0.817	0.75	4,866
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.59	B	61	1.279	0.36	766
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.21	C	74	0.703	0.90	683
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	D	80	0.500	1.24	0

Non-Structural BMP Water Quality Credits:

<input checked="" type="checkbox"/> Pervious Undetained Area Credit	TSS	TP	TN
<input type="checkbox"/> Other (attach calculations)	7.04	0.03	0.20

**Structural BMP Water Quality Credits:**

Use default BMP Outflows and Median BMP Outflow Concentrations

DP No.	BMP No.	BMP Name	MR C	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)			
									TSS	TP	TN	TSS	TP	TN	

TSS	TP	TN
0.00	0.00	0.00
66.05	0.29	2.34
7.04	0.03	0.20
59.00	0.26	2.14
68.78	0.31	3.01

POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):  
 POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):  
 NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):  
 NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):  
 POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):

**WATER QUALITY REQUIREMENT SATISFIED**

**CERTIFICATION**

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

**Timothy Fink, E.I.T.**

1/3/2023

Spreadsheet User Name

Date

# DEP PCSM SPREADSHEET

WATERSHED AREA #6  
(DISCHARGE POINT 006)

## General Information

Instructions
General
Volume
Rate
Quality

Project Name:  Application Type:

County:  Municipality:

Project Type:   New Project  Minor / Major Amendment

Area:  acres Total Earth Disturbance:  acres  
*(In Watershed)* *(In Watershed)*

No. of Post-Construction Discharge Points:  Start DP Numbering at:

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
006	0.78	0.78	0.00	0.00	UNT to Little Chiques Creek	TSF, MF	No
Undetained Areas							
<b>Totals:</b>	<b>0.78</b>	<b>0.78</b>					

**PROJECT SITE MEETS SMALL SITE EXCEPTION - RATE WORKSHEET NOT REQUIRED**



# Volume Management

Project: 283 Commerce Center - Building #1

Instructions **General** **Volume** **Rate** **Quality**

2-Year / 24-Hour Storm Event (NOAA Atlas 14):  inches

Alternative 2-Year / 24-Hour Storm Event  inches

Alternative Source:

**Pre-Construction Conditions:** No. Rows:   Exempt from Meadow in Good Condition  Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Pervious as Meadow	0.00	B	58	1.448	0.27	0
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Pervious as Meadow	11.31	B	58	1.448	0.27	10,976
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Forested (Good Condition)	0.00	B	55	1.636	0.19	0
Forested (Good Condition)	0.00	C	70	0.857	0.70	0
Forested (Good Condition)	0.00	D	77	0.597	1.06	0

Post-Construction Conditions: **TOTAL (ACRES): 11.31** **TOTAL (CF): 10,976**

No. Rows: **7**

Land Cover	Area (acres)	Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.78	B	58	1.448	0.27	757
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	C	71	0.817	0.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
<b>TOTAL (ACRES): 0.78</b>	<b>0.78</b>				<b>TOTAL (CF): 757</b>	<b>757</b>

**NET CHANGE IN VOLUME TO MANAGE (CF): -10,219**

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

**Structural BMP Volume Credits:**

No. Structural BMPs:  Start BMP Numbering at:

DP No.	BMP No.	BMP Name	MRP	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)

Totals:

INFILTRATION & ET CREDITS (CF):

NET CHANGE IN VOLUME TO MANAGE (CF):

TOTAL CREDITS (CF):

-10,219

# Rate Control

Project: 283 Commerce Center - Building #1

Instructions    General    Volume    Rate    Quality

**SMALL SITE EXCEPTION SATISFIED: RATE CONTROL NOT REQUIRED**

**Precipitation Amounts:**

NOAA 2-Year 24-Hour Storm Event (in):	2.98
NOAA 10-Year 24-Hour Storm Event (in):	4.51
NOAA 50-Year 24-Hour Storm Event (in):	6.54
NOAA 100-Year 24-Hour Storm Event (in):	7.61

Alternative 2-Year 24-Hour Storm Event (in):	
Alternative 10-Year 24-Hour Storm Event (in):	
Alternative 50-Year 24-Hour Storm Event (in):	
Alternative 100-Year 24-Hour Storm Event (in):	

Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)		Net Change	
	Pre-Construction	Post-Construction		
2-Year Storm:	11.89	0.21	-11.68	Rate Control Satisfied
10-Year Storm:	25.30	1.16	-24.14	Rate Control Satisfied
50-Year Storm:	44.74	2.90	-41.84	Rate Control Satisfied
100-Year Storm:	55.26	3.95	-51.31	Rate Control Satisfied

# Water Quality

Project: 283 Commerce Center - Building #1

PRINT

- Instructions
- General
- Volume
- Rate
- Quality

**Pre-Construction Pollutant Loads:**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	B	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	11.31	B	10,976	48.8	0.22	2.30	33.45	0.15	1.58
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	B	0	45.0	0.13	1.05	0.00	0.00	0.00

Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	C	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>11.31</b>						<b>33.45</b>	<b>0.15</b>	<b>1.58</b>

**Post-Construction Pollutant Loads (without BMPs):**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.78	B	757	48.8	0.22	2.30	2.31	0.01	0.11
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	B	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	C	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	D	0	78.0	0.25	1.25	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>0.78</b>						<b>2.31</b>	<b>0.01</b>	<b>0.11</b>

**POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):**

0.00	0.00	0.00
------	------	------

Characterize Undetained Areas (for Untreated Stormwater)

No. Rows:

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.78	B	58	1.448	0.27	757
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	C	71	0.817	0.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	D	80	0.500	1.24	0

**Non-Structural BMP Water Quality Credits:**

Pervious Undetained Area Credit

Other (attach calculations)

TSS	TP	TN
0.58	0.00	0.02

**Structural BMP Water Quality Credits:**

Use default BMP Outflows and Median BMP Outflow Concentrations

BMP DP No.	BMP No.	BMP Name	M R C	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)			
									TSS	TP	TN	TSS	TP	TN	





# **DEP PCSM SPREADSHEET**

**WATERSHED AREA #7**

**(DISCHARGE POINT 007)**

## General Information

Instructions
General
Volume
Rate
Quality

Project Name:  Application Type:

County:  Municipality:

Project Type:   New Project  Minor / Major Amendment

Area:  acres Total Earth Disturbance:  acres  
*(In Watershed)* *(In Watershed)*

No. of Post-Construction Discharge Points:  Start DP Numbering at:

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
007	2.19	2.19	0.00	0.00	UNT to Little Chiques Creek	TSF, MF	No
Undetained Areas							
<b>Totals:</b>	<b>2.19</b>	<b>2.19</b>					

**PROJECT SITE MEETS SMALL SITE EXCEPTION - RATE WORKSHEET NOT REQUIRED**

# Volume Management

Project: 283 Commerce Center - Building #1

Instructions **General** **Volume** **Rate** **Quality**

2-Year / 24-Hour Storm Event (NOAA Atlas 14):  inches

Alternative 2-Year / 24-Hour Storm Event  inches

Alternative Source:

**Pre-Construction Conditions:** No. Rows:   Exempt from Meadow in Good Condition  Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Pervious as Meadow	0.00	B	58	1.448	0.27	0
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Pervious as Meadow	7.85	B	58	1.448	0.27	7,619
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Forested (Good Condition)	0.00	B	55	1.636	0.19	0
Forested (Good Condition)	0.00	C	70	0.857	0.70	0
Forested (Good Condition)	0.00	D	77	0.597	1.06	0

Post-Construction Conditions: **TOTAL (ACRES): 7.85** **TOTAL (CF): 7,619**

No. Rows: **7**

Land Cover	Area (acres)	Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	2.19	B	58	1.448	0.27	2,121
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	C	71	0.817	0.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
<b>TOTAL (ACRES): 2.19</b>						<b>TOTAL (CF): 2,121</b>

**NET CHANGE IN VOLUME TO MANAGE (CF): -5,497**

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

**Structural BMP Volume Credits:**

No. Structural BMPs:  Start BMP Numbering at:

DP No.	BMP No.	BMP Name	MRP	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)

**Totals:**

INFILTRATION & ET CREDITS (CF):

NET CHANGE IN VOLUME TO MANAGE (CF):

TOTAL CREDITS (CF):

-5,497

# Rate Control

Project: 283 Commerce Center - Building #1

Instructions    General    Volume    Rate    Quality

**SMALL SITE EXCEPTION SATISFIED: RATE CONTROL NOT REQUIRED**

**Precipitation Amounts:**

NOAA 2-Year 24-Hour Storm Event (in):	2.98
NOAA 10-Year 24-Hour Storm Event (in):	4.51
NOAA 50-Year 24-Hour Storm Event (in):	6.54
NOAA 100-Year 24-Hour Storm Event (in):	7.61

Alternative 2-Year 24-Hour Storm Event (in):	
Alternative 10-Year 24-Hour Storm Event (in):	
Alternative 50-Year 24-Hour Storm Event (in):	
Alternative 100-Year 24-Hour Storm Event (in):	

Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)		Net Change	
	Pre-Construction	Post-Construction		
2-Year Storm:	11.33	0.59	-10.74	Rate Control Satisfied
10-Year Storm:	23.83	3.26	-20.57	Rate Control Satisfied
50-Year Storm:	41.76	8.14	-33.62	Rate Control Satisfied
100-Year Storm:	51.40	11.07	-40.33	Rate Control Satisfied

# Water Quality

Project: 283 Commerce Center - Building #1

PRINT

Instructions

General

Volume

Rate

Quality

## Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	B	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	7.85	B	7,619	48.8	0.22	2.30	23.22	0.10	1.09
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	B	0	45.0	0.13	1.05	0.00	0.00	0.00

Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	C	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>7.85</b>						<b>23.22</b>	<b>0.10</b>	<b>1.09</b>

**Post-Construction Pollutant Loads (without BMPs):**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	2.19	B	2,121	48.8	0.22	2.30	6.46	0.03	0.30
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	B	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	C	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	D	0	78.0	0.25	1.25	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>2.19</b>						<b>6.46</b>	<b>0.03</b>	<b>0.30</b>



POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):

0.00	0.00	0.00
------	------	------

Characterize Undetained Areas (for Untreated Stormwater)

No. Rows: 7

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	2.19	B	58	1.448	0.27	2,126
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	C	71	0.817	0.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	D	80	0.500	1.24	0

**Non-Structural BMP Water Quality Credits:**

Pervious Undetained Area Credit

Other (attach calculations)

TSS	TP	TN
1.62	0.01	0.05

**Structural BMP Water Quality Credits:**

Use default BMP Outflows and Median BMP Outflow Concentrations

BMP DP No.	BMP No.	BMP Name	M R C	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)		
									TSS	TP	TN
									TSS	TP	TN



# DEP PCSM SPREADSHEET

WATERSHED AREA #8  
(DISCHARGE POINT 008)

## General Information

Instructions
General
Volume
Rate
Quality

Project Name:  Application Type:

County:  Municipality:

Project Type:   New Project  Minor / Major Amendment

Area:  acres Total Earth Disturbance:  acres  
*(In Watershed)* *(In Watershed)*

No. of Post-Construction Discharge Points:  Start DP Numbering at:

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
008	14.42	4.84	0.00	0.00	UNT to Little Chiques Creek	TSF, MF	No
Undetained Areas							
<b>Totals:</b>	<b>14.42</b>	<b>4.84</b>					

**PROJECT SITE MEETS SMALL SITE EXCEPTION - RATE WORKSHEET NOT REQUIRED**

# Volume Management

Project: 283 Commerce Center - Building #1

Instructions **General** **Volume** **Rate** **Quality**

2-Year / 24-Hour Storm Event (NOAA Atlas 14):  inches

Alternative 2-Year / 24-Hour Storm Event  inches

Alternative Source:

**Pre-Construction Conditions:** No. Rows:   Exempt from Meadow in Good Condition  Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Impervious as Meadow	0.00	B	58	1.448	0.27	0
Impervious as Meadow	0.00	C	71	0.817	0.75	0
Impervious as Meadow	0.00	D	78	0.564	1.11	0
Pervious as Meadow	11.25	B	58	1.448	0.27	10,919
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.90	D	78	0.564	1.11	3,656
Forested (Good Condition)	4.73	B	55	1.636	0.19	3,257
Forested (Good Condition)	0.00	C	70	0.857	0.70	0
Forested (Good Condition)	0.00	D	77	0.597	1.06	0

**Post-Construction Conditions:** **TOTAL (ACRES):** 16.88 **TOTAL (CF):** 17,831

No. Rows: 7

Land Cover	Area (acres)	Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	3.94	B	58	1.448	0.27	3,827
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	C	71	0.817	0.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.90	D	78	0.564	1.11	3,624
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
<b>TOTAL (ACRES):</b> 4.84					<b>TOTAL (CF):</b> 7,450	

**NET CHANGE IN VOLUME TO MANAGE (CF):** -10,381

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

**Structural BMP Volume Credits:**

No. Structural BMPs:  Start BMP Numbering at:

DP No.	BMP No.	BMP Name	MRP	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)

Totals:

INFILTRATION & ET CREDITS (CF):

NET CHANGE IN VOLUME TO MANAGE (CF):

TOTAL CREDITS (CF):

-10,381

# Rate Control

Project: 283 Commerce Center - Building #1

Instructions    General    Volume    Rate    Quality

**SMALL SITE EXCEPTION SATISFIED: RATE CONTROL NOT REQUIRED**

**Precipitation Amounts:**

NOAA 2-Year 24-Hour Storm Event (in):	2.98
NOAA 10-Year 24-Hour Storm Event (in):	4.51
NOAA 50-Year 24-Hour Storm Event (in):	6.54
NOAA 100-Year 24-Hour Storm Event (in):	7.61

Alternative 2-Year 24-Hour Storm Event (in):	
Alternative 10-Year 24-Hour Storm Event (in):	
Alternative 50-Year 24-Hour Storm Event (in):	
Alternative 100-Year 24-Hour Storm Event (in):	

Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)		Net Change	
	Pre-Construction	Post-Construction		
2-Year Storm:	18.68	2.76	-15.92	Rate Control Satisfied
10-Year Storm:	41.45	9.52	-31.93	Rate Control Satisfied
50-Year Storm:	76.44	21.03	-55.41	Rate Control Satisfied
100-Year Storm:	95.86	27.76	-68.10	Rate Control Satisfied



# Water Quality

Project: 283 Commerce Center - Building #1

PRINT

Instructions

General

Volume

Rate

Quality

## Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Impervious as Meadow	Grassland/Herbaceous	0.00	B	0	48.8	0.22	2.30	0.00	0.00	0.00
Impervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Impervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	11.25	B	10,919	48.8	0.22	2.30	33.27	0.15	1.57
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.90	D	3,656	48.8	0.22	2.30	11.14	0.05	0.53
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	4.73	B	3,257	45.0	0.13	1.05	9.15	0.03	0.21

Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	C	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>16.88</b>						<b>53.56</b>	<b>0.23</b>	<b>2.31</b>

**Post-Construction Pollutant Loads (without BMPs):**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	3.94	B	3,827	48.8	0.22	2.30	11.66	0.05	0.55
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.90	D	3,624	48.8	0.22	2.30	11.04	0.05	0.52
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	B	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	C	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	D	0	78.0	0.25	1.25	0.00	0.00	0.00
<b>TOTAL (ACRES):</b>		<b>4.84</b>						<b>22.70</b>	<b>0.10</b>	<b>1.07</b>

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):

0.00	0.00	0.00
------	------	------

Characterize Undetained Areas (for Untreated Stormwater)

No. Rows:

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0	N/A	98	0.041	2.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	3.94	B	58	1.448	0.27	3,825
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	C	71	0.817	0.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.9	D	78	0.564	1.11	3,641
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	B	61	1.279	0.36	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	D	80	0.500	1.24	0

Non-Structural BMP Water Quality Credits:

Pervious Undetained Area Credit

Other (attach calculations)

TSS	TP	TN
5.69	0.02	0.16

Structural BMP Water Quality Credits:

Use default BMP Outflows and Median BMP Outflow Concentrations

BMP DP No.	BMP Name	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)				
							TSS	TP	TN	TSS	TP	TN		



# DEP PCSM SPREADSHEET

WATERSHED AREA #9

(DISCHARGE POINT 009)

## General Information

Instructions
General
Volume
Rate
Quality

Project Name:  Application Type:

County:  Municipality:

Project Type:   New Project  Minor / Major Amendment

Area:  acres Total Earth Disturbance:  acres  
*(In Watershed)* *(In Watershed)*

No. of Post-Construction Discharge Points:  Start DP Numbering at:

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
009	102.67	102.67	0.00	0.72	UNT to Little Chiques Creek	TSF, MF	Yes
Undetained Areas							
<b>Totals:</b>	<b>102.67</b>	<b>102.67</b>		<b>0.72</b>			

# Volume Management

Project: 283 Commerce Center - Building #1

Instructions **General** **Volume** **Rate** **Quality**

2-Year / 24-Hour Storm Event (NOAA Atlas 14):  inches

Alternative 2-Year / 24-Hour Storm Event  inches

Alternative Source:

**Pre-Construction Conditions:** No. Rows:   Exempt from Meadow in Good Condition  Automatically Calculate CN, Ia, Runoff and Volume

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.00	N/A	98	0.041	2.75	0
Pervious as Meadow	0.00	B	58	1.448	0.27	0
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Pervious as Meadow	1.57	B	58	1.448	0.27	1,526
Pervious as Meadow	0.00	C	71	0.817	0.75	0
Pervious as Meadow	0.00	D	78	0.564	1.11	0
Forested (Good Condition)	0.82	B	55	1.636	0.19	566
Forested (Good Condition)	0.00	C	70	0.857	0.70	0
Forested (Good Condition)	0.00	D	77	0.597	1.06	0

Impervious Areas: Streets and Roads - Paved; Curbs and Storm Sewers (Excluding ROW)	0.36	N/A	98	0.041	2.75	3,612
<b>TOTAL (ACRES):</b>		<b>2.76</b>	<b>TOTAL (CF):</b>		<b>5,704</b>	

No. Rows: **8**

**Post-Construction Conditions:**

Land Cover	Area (acres)	Group	CN	la (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.72	N/A	98	0.041	2.75	7,207
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	B	58	1.448	0.27	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	C	71	0.817	0.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	1.59	B	61	1.279	0.36	2,062
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.36	N/A	98	0.041	2.75	3,612
<b>TOTAL (ACRES):</b>		<b>2.67</b>	<b>TOTAL (CF):</b>		<b>12,882</b>	

**NET CHANGE IN VOLUME TO MANAGE (CF):** **7,178**

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

**Structural BMP Volume Credits:** No. Structural BMPs: **1** Start BMP Numbering at: **4**

DP No.	BMP No.	BMP Name	MR?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)



009	4	Rain Garden / Bioretention	Y	Off-Site	1.65	7,258	12,314	0.10	96	No	2.0	0	1,108	
-----	---	-------------------------------	---	----------	------	-------	--------	------	----	----	-----	---	-------	--

Totals: 1,108

INFILTRATION & ET CREDITS (CF):	1,108
MANAGED RELEASE CREDIT (CF):	6,150

NET CHANGE IN VOLUME TO MANAGE (CF):	7,178
TOTAL CREDITS (CF):	7,258

VOLUME REQUIREMENT SATISFIED

# Rate Control

Project: 283 Commerce Center - Building #1

Instructions    General    Volume    Rate    Quality

### Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	2.98
NOAA 10-Year 24-Hour Storm Event (in):	4.51
NOAA 50-Year 24-Hour Storm Event (in):	6.54
NOAA 100-Year 24-Hour Storm Event (in):	7.61

Alternative 2-Year 24-Hour Storm Event (in):	
Alternative 10-Year 24-Hour Storm Event (in):	
Alternative 50-Year 24-Hour Storm Event (in):	
Alternative 100-Year 24-Hour Storm Event (in):	

Report Summary of Peak Rates Only

Attach model input and output data or other calculations to support the rates reported below.

Peak Discharge Rates (cfs)			
	Pre-Construction	Post-Construction	Net Change
2-Year Storm:	4.67	1.05	-3.62
10-Year Storm:	11.75	2.66	-9.09
50-Year Storm:	23.51	16.53	-6.98
100-Year Storm:	30.26	19.67	-10.59

Rate Control Satisfied  
Rate Control Satisfied  
Rate Control Satisfied  
Rate Control Satisfied

# Water Quality

Project: 283 Commerce Center - Building #1

PRINT

- Instructions
- General
- Volume
- Rate
- Quality

**Pre-Construction Pollutant Loads:**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.00	N/A	0	65.0	0.29	2.05	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	B	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	1.57	B	1,526	48.8	0.22	2.30	4.65	0.02	0.22
Pervious as Meadow	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.82	B	566	45.0	0.13	1.05	1.59	0.00	0.04

Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	C	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.00	D	0	45.0	0.13	1.05	0.00	0.00	0.00
Impervious Areas: Streets and Roads - Paved; Curbs and Storm Sewers (Excluding ROW)	Urban Highway	0.36	N/A	3,612	142.0	0.32	3.00	32.03	0.07	0.68
<b>TOTAL (ACRES):</b>		<b>2.76</b>						<b>38.27</b>	<b>0.10</b>	<b>0.93</b>

**TOTALS:** 38.27 0.10 0.93

**Post-Construction Pollutant Loads (without BMPs):**

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.72	N/A	7,207	65.0	0.29	2.05	29.25	0.13	0.92
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	B	0	48.8	0.22	2.30	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	C	0	48.8	0.22	2.30	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.00	D	0	48.8	0.22	2.30	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	1.59	B	2,062	78.0	0.25	1.25	10.04	0.03	0.16
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	C	0	78.0	0.25	1.25	0.00	0.00	0.00
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.00	D	0	78.0	0.25	1.25	0.00	0.00	0.00

Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.36	N/A	3,612	65.0	0.29	2.05	14.66	0.07	0.46
--	-------------	------	-----	-------	------	------	------	-------	------	------

TOTAL (ACRES): 2.67      TOTALS: 53.96    0.23    1.55

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS): 15.69    0.13    0.61

Characterize Undetained Areas (for Untreated Stormwater)      No. Rows: 7

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.13	N/A	98	0.041	2.75	1,297
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	B	58	1.448	0.27	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	C	71	0.817	0.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.53	B	61	1.279	0.36	688
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0	D	80	0.500	1.24	0

Non-Structural BMP Water Quality Credits:

<input checked="" type="checkbox"/> Pervious Undetained Area Credit	TSS	TP	TN
<input type="checkbox"/> Other (attach calculations)	0.52	0.00	0.01

**Structural BMP Water Quality Credits:**

Use default BMP Outflows and Median BMP Outflow Concentrations

DP No.	BMP No.	BMP Name	MRP	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
009	4	Rain Garden / Bioretention	Y	1.65	7,258	1,108	6,150	-	-	-	-	-	-	-

TSS	TP	TN
0.00	0.00	0.00
8.61	0.03	0.22
0.52	0.00	0.01
8.09	0.03	0.20
38.27	0.10	0.93

**POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):**  
**POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):**  
**NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):**  
**NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):**  
**POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):**

**WATER QUALITY REQUIREMENT SATISFIED**

**CERTIFICATION**

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

**Timothy Fink, E.I.T.**

1/3/2023

Date

Spreadsheet User Name

# DEP PCSM SPREADSHEET

2-YEAR VOLUME TO BASINS

**22-0123-005 - Post-Dev**

Type II 24-hr 2-Year Rainfall=2.98"

Prepared by Landworks Civil Design LLC

Printed 1/1/2023

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

Page 1

**Summary for Subcatchment 1D: Watershed Area #1 - Detained in MRC Facility #1**

Runoff = 126.85 cfs @ 12.07 hrs, Volume= 407,432 cf, Depth= 2.34"

Routed to Pond 1P : MRC Facility #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 2-Year Rainfall=2.98"

	Area (sf)	CN	Description
*	1,736,854	98	Impervious
*	213,964	58	Meadow / HSG B
*	6,567	71	Meadow / HSG C
*	460	78	Meadow / HSG D
*	121,089	61	Open Space / Good Condition / HSG B
*	10,882	74	Open Space / Good Condition / HSG C
	2,089,816		Weighted Average
	352,962		16.89% Pervious Area
	1,736,854		83.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4					<b>Direct Entry, Storm Sewer Tc</b>



**22-0123-005 - Post-Dev**

Type II 24-hr 2-Year Rainfall=2.98"

Prepared by Landworks Civil Design LLC

Printed 1/1/2023

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

Page 1

**Summary for Subcatchment 2D: Watershed Area #1 - Detained in SWM/BMP Facility #2**

Runoff = 2.24 cfs @ 12.01 hrs, Volume= 7,658 cf, Depth= 0.28"  
 Routed to Pond 2P : SWM/BMP Facility #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

	Area (sf)	CN	Description
*	283,756	58	Meadow / HSG B
*	44,777	61	Open Space / Good Condition / HSG B
	328,533		Weighted Average
	328,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					<b>Direct Entry, Minimum Tc</b>

**Summary for Subcatchment 3DD: Detained in MRC Facility #3 (Disturbed Only)**

Runoff = 9.06 cfs @ 12.01 hrs, Volume= 23,416 cf, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 2-Year Rainfall=2.98"

Area (sf)	CN	Description
* 52,917	98	Impervious
* 54,151	58	Meadow / HSG B
* 121,220	71	Meadow / HSG C
* 28,624	61	Open Space / Good Condition / HSG B
* 22,400	74	Open Space / Good Condition / HSG C
279,312		Weighted Average
226,395		81.05% Pervious Area
52,917		18.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6					<b>Direct Entry, Storm Sewer Tc</b>

**22-0123-005 - Post-Dev**

Type II 24-hr 2-Year Rainfall=2.98"

Prepared by Landworks Civil Design LLC

Printed 1/1/2023

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

Page 1

**Summary for Subcatchment 9DD: Detained in MRC Facility #4 (Disturbed Only)**

Runoff = 2.84 cfs @ 11.98 hrs, Volume= 7,258 cf, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Type II 24-hr 2-Year Rainfall=2.98"

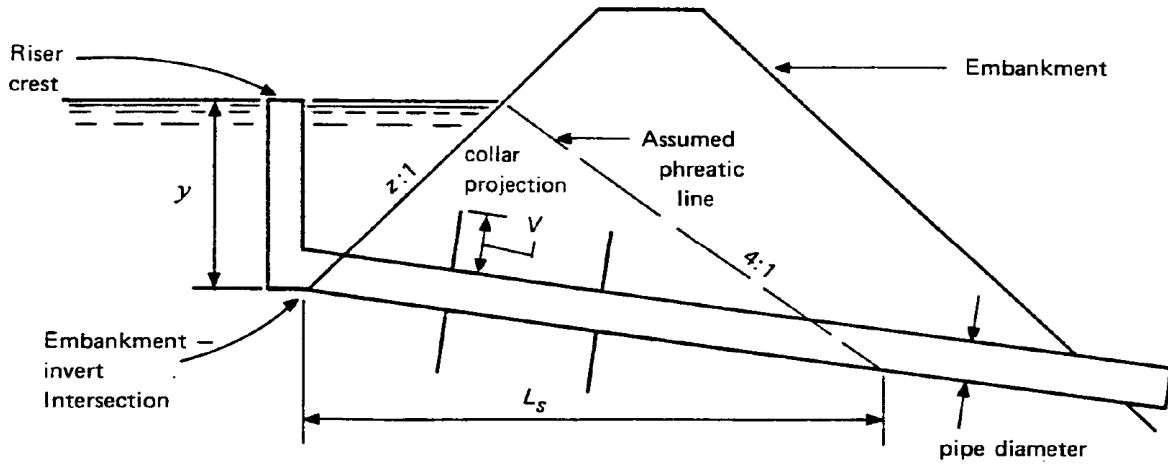
	Area (sf)	CN	Description
*	25,668	98	Impervious
*	46,290	61	Open Space / Good Condition / HSG B
	71,958		Weighted Average
	46,290		64.33% Pervious Area
	25,668		35.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7					<b>Direct Entry, Storm Sewer Tc</b>

## **ANTI-SEEP COLLAR DESIGN**

# STANDARD WORKSHEET # 18

## Anti-seep Collar Design



BASIN NO.	TEMP. OR PERM.	Y (FT)	Z	Ls (FT)	Lf (FT)	V (IN)	BARREL DIA. (IN)	COLLAR SIZE (IN)	NO. COLLARS	COLLAR SPACING (FT)	DISTANCE TO 1 <sup>ST</sup> COLLAR (FT)
1	P	10.16	3	74.1	85.2	34	24	92	2	15.0	6.0
2	P	7.53	3	54.9	63.1	25	24	74	2	11.0	15.0
3	P	4.17	3	29.8	34.3	14	24	52	2	10.0	12.0
4	P	4.46	3	31.9	36.6	29	18	76	1	7.0	15.0

## **EMERGENCY SPILLWAY DESIGN**

# Emergency Spillway Design - Basin 1

BASIN:	1
Project:	22-0123-005
Date:	1/3/2023

The basin will use an emergency spillway over the proposed berm to serve as an emergency outflow device. The spillway has been designed to convey the respective 100 year design flow entirely through the spillway **in the event that all primary outfall devices fail**. The following calculations demonstrate the adequacy of the emergency spillway:

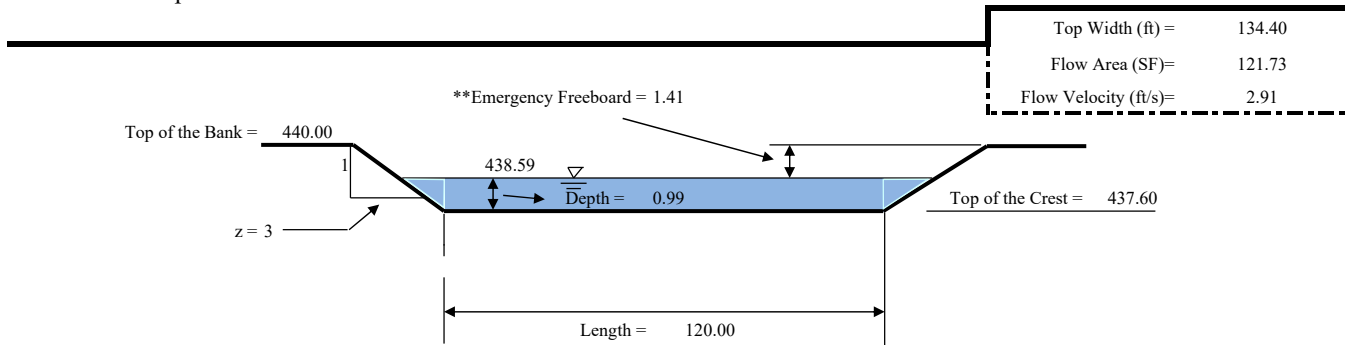
1. 100-yr Peak Inflow to Basin, Q            354.57    CFS

2. Spillway Design

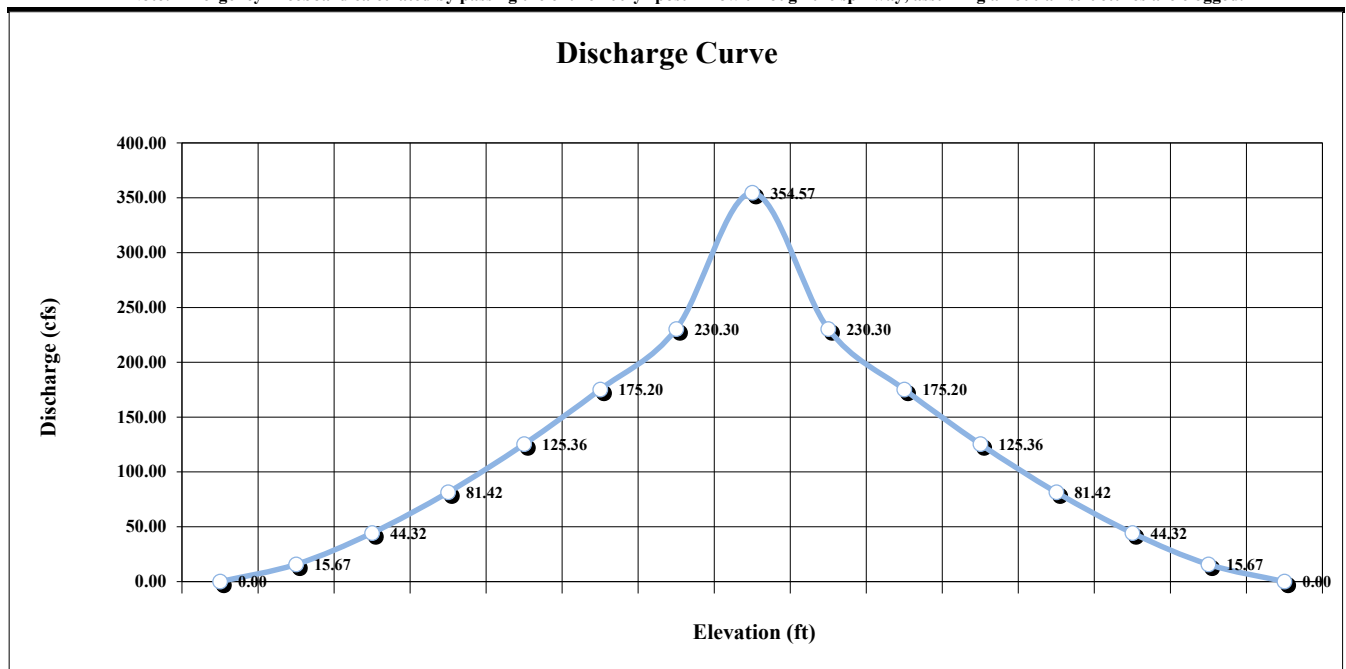
Weir Coefficient, C = 3.0  
 Weir Length, L = 120.00  
 Flow Depth, H = 0.99  
 Freeboard (minimum 1' required) = 1.41

Weir Flow Equation:  $Q=CLH^{3/2}$

3. Top of the Crest Elevation = 437.60  
 4. Top of the Berm Elevation = 440.00



\*\*Note: Emergency Freeboard calculated by passing the entire 100-yr post inflow through the spillway, assuming all outfall structures are clogged.



## Emergency Spillway Design - Basin 2

BASIN:	2
Project:	22-0123-005
Date:	1/3/2023

The basin will use an emergency spillway over the proposed berm to serve as an emergency outflow device. The spillway has been designed to convey the respective 100 year design flow entirely through the spillway **in the event that all primary outfall devices fail**. The following calculations demonstrate the adequacy of the emergency spillway:

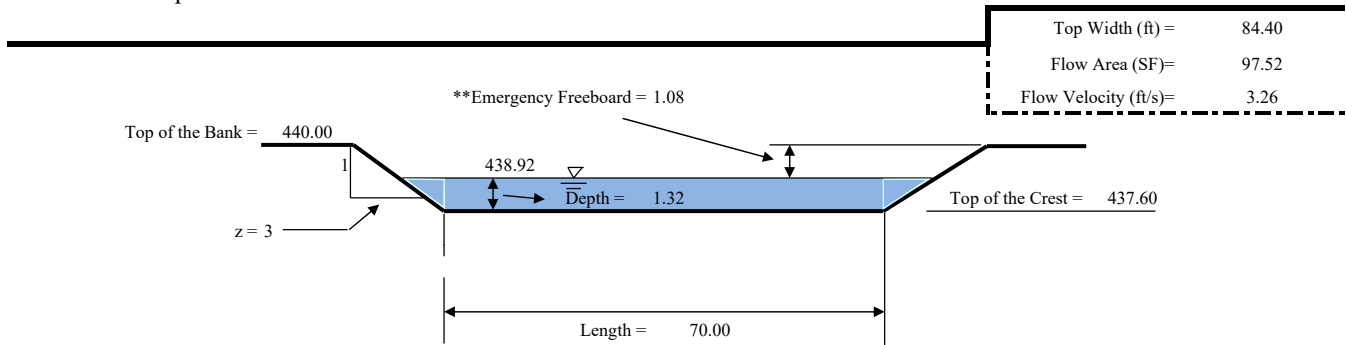
1. 100-yr Peak Inflow to Basin, Q            318.00    CFS

2. Spillway Design

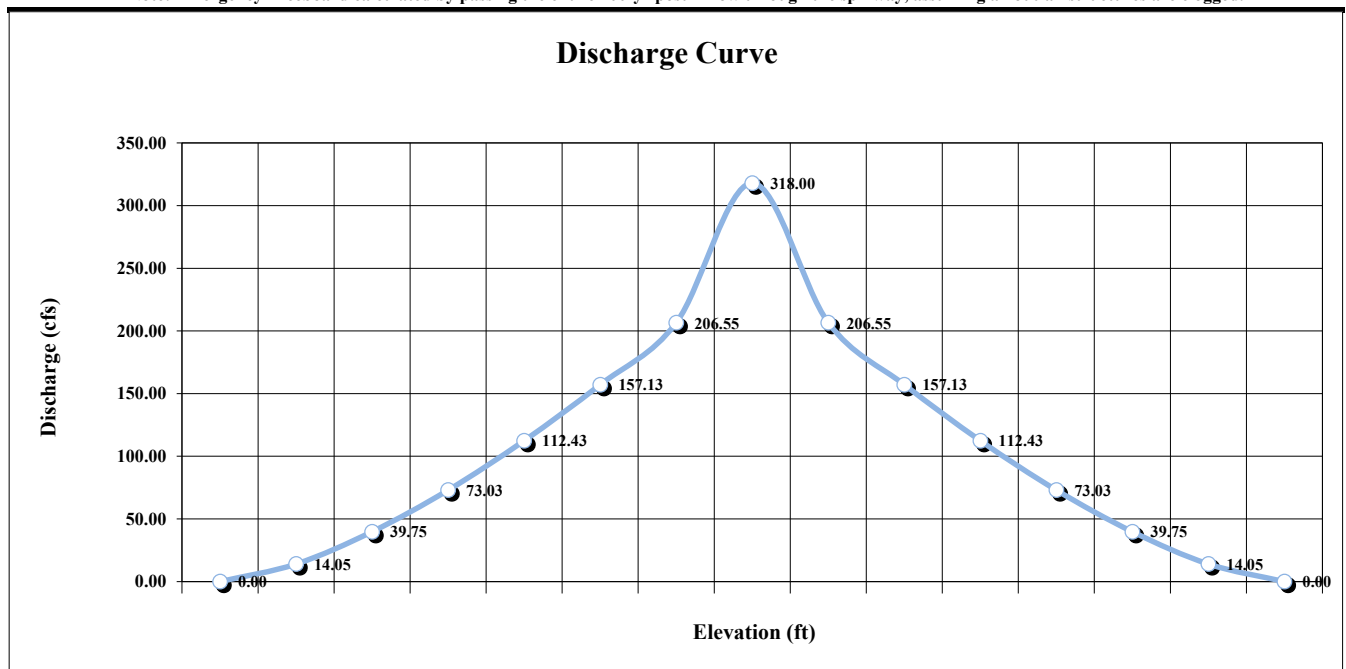
Weir Coefficient, C =    3.0  
 Weir Length, L =    70.00  
 Flow Depth, H =    1.32  
 Freeboard (minimum 1' required) =    1.08

Weir Flow Equation:  $Q=CLH^{3/2}$

- 3. Top of the Crest Elevation = 437.60
- 4. Top of the Berm Elevation = 440.00



**\*\*Note:** Emergency Freeboard calculated by passing the entire 100-yr post inflow through the spillway, assuming all outfall structures are clogged.





## Emergency Spillway Design - Basin 3

BASIN:	3
Project:	22-0123-005
Date:	1/3/2023

The basin will use an emergency spillway over the proposed berm to serve as an emergency outflow device. The spillway has been designed to convey the respective 100 year design flow entirely through the spillway **in the event that all primary outfall devices fail**. The following calculations demonstrate the adequacy of the emergency spillway:

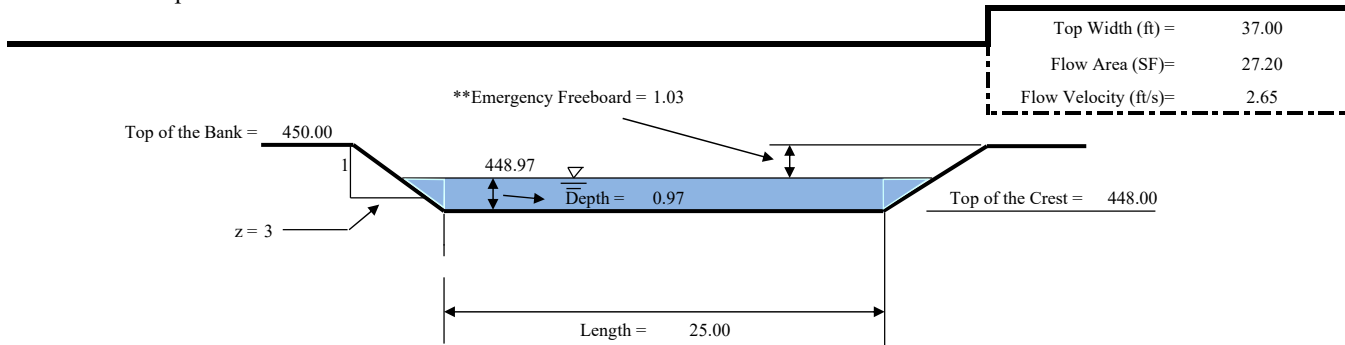
1. 100-yr Peak Inflow to Basin, Q            72.11        CFS

2. Spillway Design

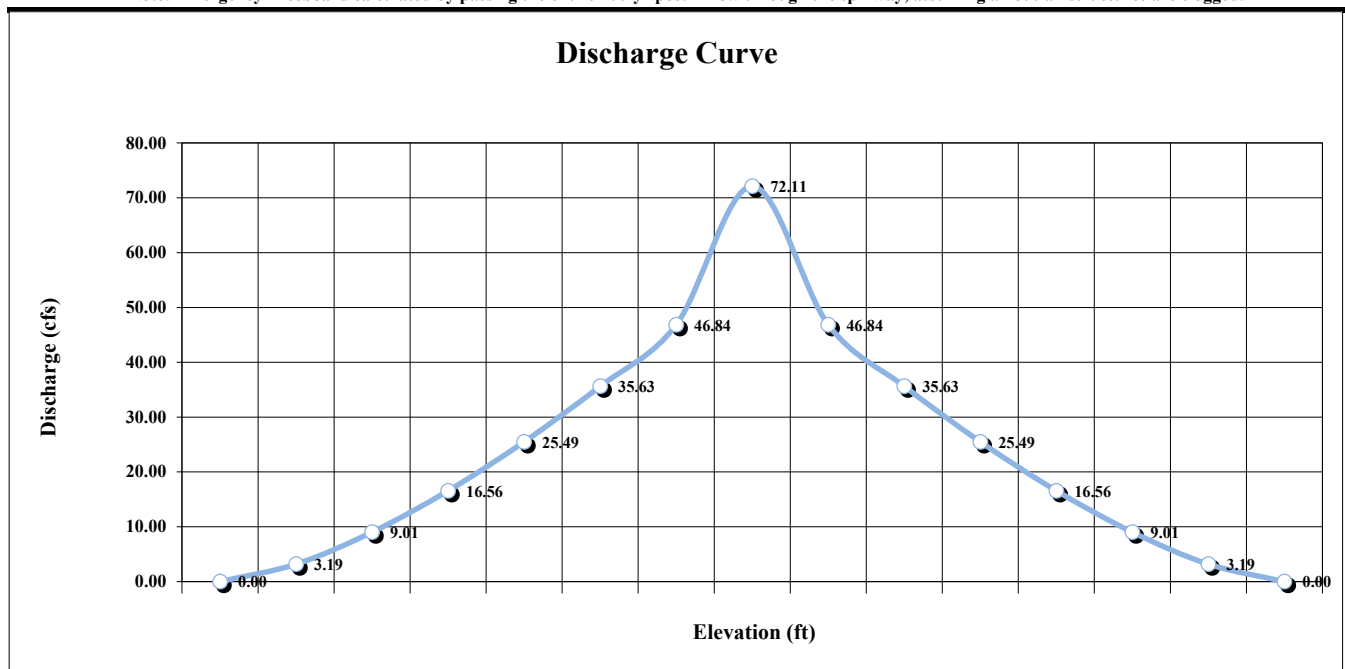
Weir Coefficient, C =    3.0  
 Weir Length, L =    25.00  
 Flow Depth, H =    0.97  
 Freeboard (minimum 1' required) =    1.03

Weir Flow Equation:  $Q=CLH^{3/2}$

3. Top of the Crest Elevation = 448.00  
 4. Top of the Berm Elevation = 450.00



**\*\*Note: Emergency Freeboard calculated by passing the entire 100-yr post inflow through the spillway, assuming all outfall structures are clogged.**



## STANDARD E&S WORKSHEET # 11

### Channel Design Data

PROJECT NAME:	283 Commerce Center - Building #1		
LOCATION:	Mount Joy Township, Lancaster County, Pennsylvania		
PREPARED BY:	Timothy Fink, E.I.T.	DATE:	2023.01.03
CHECKED BY:	Joshua C. George, P.E.	DATE:	2023.01.03

CHANNEL OR CHANNEL SECTION	1-Spillway	2-Spillway	3-Spillway		
TEMPORARY OR PERMANENT (T OR P)	P	P	P		
DESIGN STORM ( <del>2,5, OR 10 YR</del> )	100 YR	100 YR	100 YR		
ACRES (AC)	N/A	N/A	N/A		
MULTIPLIER (1.6,2.25, OR 2.75) <sup>1</sup>	N/A	N/A	N/A		
Q <sub>r</sub> (REQUIRED CAPACITY) (CFS)	354.57	318.00	72.11		
Q (CALCULATED AT FLOW DEPTH d) (CFS)	354.59	318.00	72.11		
PROTECTIVE LINING	SC250	SC250	SC250		
n (MANNING'S COEFFICIENT) <sup>2</sup>	0.040	0.040	0.040		
V <sub>a</sub> (ALLOWABLE VELOCITY) (FPS)	N/A	N/A	N/A		
V (CALCULATED AT FLOW DEPTH d) (FPS)	9.64	11.37	9.34		
τ <sub>a</sub> (MAX ALLOWABLE SHEAR STRESS) (LB/FT <sup>2</sup> )	10.00	10.00	10.00		
τ <sub>d</sub> (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT <sup>2</sup> )	6.32	8.17	6.20		
CHANNEL BOTTOM WIDTH (FT)	120.0	70.0	25.0		
CHANNEL SIDE SLOPES (H:1)	3.0	3.0	3.0		
D (TOTAL DEPTH) (FT)	1.0	1.0	1.0		
CHANNEL TOP WIDTH @ D (FT)	126.0	76.0	31.0		
d (CALCULATED FLOW DEPTH) (FT)	0.3	0.4	0.3		
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	121.8	72.4	26.8		
BOTTOM WIDTH:FLOW DEPTH RATIO (12:1 MAX)	394.65:1	178.12:1	83.82:1		
d <sub>50</sub> STONE SIZE (IN)	-	-	-		
A (CROSS-SECTIONAL AREA) (SQ. FT.)	36.77	27.97	7.72		
R (HYDRAULIC RADIUS)	0.30	0.39	0.29		
S (BED SLOPE) <sup>3</sup> (FT/FT)	0.333	0.333	0.333		
S <sub>c</sub> (CRITICAL SLOPE) (FT/FT)	0.035	0.032	0.035		
.7S <sub>c</sub> (FT/FT)	0.024	0.022	0.025		
1.3S <sub>c</sub> (FT/FT)	0.045	0.042	0.046		
STABLE FLOW? (Y/N)	Yes	Yes	Yes		
FREEBOARD PROVIDED BASED ON UNSTABLE FLOW (FT)	-	-	-		
FREEBOARD PROVIDED BASED ON STABLE FLOW (FT)	0.70	0.61	0.70		
MINIMUM REQUIRED FREEBOARD <sup>4</sup> (FT)	0.50	0.50	0.50		
DESIGN METHOD FOR PROTECTIVE LINING <sup>5</sup> PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S		
VEGETATED OR UNVEGETATED?	Vegetated	Vegetated	Vegetated		

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft or 1/4 Total Channel Depth, whichever is greater.
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 6.64" for 100-Year event  
**Inflow = 354.57 cfs** @ 12.07 hrs, Volume= 1,155,746 cf  
 Outflow = 334.51 cfs @ 12.11 hrs, Volume= 1,106,308 cf, Atten= 6%, Lag= 2.6 min  
 Discarded = 0.18 cfs @ 6.28 hrs, Volume= 60,110 cf  
 Primary = 27.59 cfs @ 12.11 hrs, Volume= 213,239 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 306.74 cfs @ 12.11 hrs, Volume= 832,959 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 438.67' @ 12.11 hrs Surf.Area= 76,079 sf Storage= 262,949 cf

Plug-Flow detention time= 428.6 min calculated for 1,106,193 cf (96% of inflow)  
 Center-of-Mass det. time= 402.3 min ( 1,156.9 - 754.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

**22-0123-005 - Post-Dev**

Type II 24-hr 100-Year Rainfall=7.61"

Prepared by Landworks Civil Design LLC

Printed 1/1/2023

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

Page 2

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.18 cfs @ 6.28 hrs HW=436.00' (Free Discharge)

↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=27.59 cfs @ 12.11 hrs HW=438.67' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 27.59 cfs of 45.78 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.47 cfs @ 10.27 fps)

↳ **3=Type M Inlet** (Orifice Controls 27.12 cfs @ 4.74 fps)

**Secondary OutFlow** Max=306.62 cfs @ 12.11 hrs HW=438.67' (Free Discharge)

↳ **4=Overflow Spillway** (Weir Controls 306.62 cfs @ 2.58 fps)

**Summary for Pond 2P: SWM/BMP Facility #2**

Inflow Area = 328,533 sf, 0.00% Impervious, Inflow Depth = 33.30" for 100-Year event  
**Inflow = 318.00 cfs** @ 12.10 hrs, Volume= 911,696 cf  
 Outflow = 36.07 cfs @ 12.77 hrs, Volume= 868,103 cf, Atten= 89%, Lag= 40.0 min  
 Primary = 36.07 cfs @ 12.77 hrs, Volume= 868,103 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 1L : Discharge Point 001

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 437.31' @ 12.77 hrs Surf.Area= 105,667 sf Storage= 521,705 cf

Plug-Flow detention time= 761.0 min calculated for 868,013 cf (95% of inflow)  
 Center-of-Mass det. time= 734.3 min ( 1,554.3 - 820.0 )

Volume	Invert	Avail.Storage	Storage Description			
#1	431.50'	826,303 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
431.50	75,829	1,764.7	0.0	0	0	75,829
432.00	76,712	1,767.8	100.0	38,135	38,135	77,070
433.00	82,044	1,786.7	100.0	79,363	117,498	82,703
434.00	87,432	1,805.5	100.0	84,724	202,222	88,370
435.00	92,877	1,824.4	100.0	90,141	292,363	94,123
436.00	98,379	1,843.2	100.0	95,615	387,977	99,908
437.00	103,937	1,862.1	100.0	101,145	489,123	105,781
438.00	109,551	1,880.9	100.0	106,732	595,854	111,685
439.00	115,222	1,899.8	100.0	112,375	708,229	117,677
440.00	120,950	1,918.6	100.0	118,074	826,303	123,700

Device	Routing	Invert	Outlet Devices
#1	Primary	429.78'	<b>24.0" Round Outlet Pipe</b> L= 55.6' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 429.78' / 429.22' S= 0.0101 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	432.00'	<b>10.0" W x 6.0" H Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	436.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 23.00 columns</b> X 7 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#4	Secondary	437.60'	<b>70.0' long + 3.0 '/' SideZ x 22.0' breadth Emergency Spillway</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=36.07 cfs @ 12.77 hrs HW=437.31' (Free Discharge)

- ↑ **1=Outlet Pipe** (Passes 36.07 cfs of 46.50 cfs potential flow)
- ↑ **2=Orifice** (Orifice Controls 4.51 cfs @ 10.83 fps)
- ↑ **3=Type M Inlet** (Orifice Controls 31.56 cfs @ 5.51 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=431.50' (Free Discharge)

- ↑ **4=Emergency Spillway** ( Controls 0.00 cfs)

**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 4.87" for 100-Year event  
**Inflow = 72.11 cfs** @ 12.00 hrs, Volume= 173,587 cf  
 Outflow = 2.09 cfs @ 14.70 hrs, Volume= 172,299 cf, Atten= 97%, Lag= 162.3 min  
 Discarded = 0.05 cfs @ 9.82 hrs, Volume= 17,138 cf  
 Primary = 2.04 cfs @ 14.70 hrs, Volume= 155,161 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 445.98' @ 14.70 hrs Surf.Area= 22,020 sf Storage= 111,874 cf

Plug-Flow detention time= 789.0 min calculated for 172,299 cf (99% of inflow)  
 Center-of-Mass det. time= 784.2 min ( 1,576.8 - 792.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>2.0" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

**22-0123-005 - Post-Dev**

Type II 24-hr 100-Year Rainfall=7.61"

Prepared by Landworks Civil Design LLC

Printed 1/1/2023

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

Page 5

			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63
#6	Discarded	440.00'	<b>0.100 in/hr Infiltration over Surface area</b>	Phase-In= 0.01'							

**Discarded OutFlow** Max=0.05 cfs @ 9.82 hrs HW=442.00' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=2.04 cfs @ 14.70 hrs HW=445.98' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 2.04 cfs of 26.94 cfs potential flow)  
   ↳ **2=MRC Orifice** (Orifice Controls 0.21 cfs @ 9.83 fps)  
   ↳ **3=Orifice** (Orifice Controls 1.83 cfs @ 9.30 fps)  
   ↳ **4=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** ( Controls 0.00 cfs)



## Specification Sheet

### VMax® SC250® Turf Reinforcement Mat

#### DESCRIPTION

The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 70% straw and 30% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra heavy UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 inch (1.27 x 1.27 cm) openings, and covered by an heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81cm) centers with UV stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with a colored thread stitched along both outer edges as an overlap guide for adjacent mats.

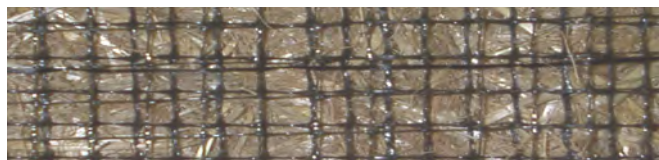
The SC250 shall meet Type 5A, 5B, and 5C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18

#### Material Content

<b>Matrix</b>	70% Straw Fiber	0.35 lb/sq yd (0.19 kg/sm)
	30% Coconut Fiber	0.15 lbs/sq yd (0.08 kg/sm)
<b>Netting</b>	Top and Bottom, UV-Stabilized Polypropylene	5 lb/1000 sq ft (2.44 kg/100 sm)
	Middle, Corrugated UV-Stabilized Polypropylene	24 lb/1000 sf (11.7 kg/100 sm)
<b>Thread</b>	Polypropylene, UV Stable	

#### Standard Roll Sizes

<b>Width</b>	6.5 ft (2.0 m)	8 ft (2.44m)
<b>Length</b>	55.5 ft (16.9 m)	90 ft (27.4 m)
<b>Weight ± 10%</b>	34 lbs (15.42 kg)	70 lbs (31.8 kg)
<b>Area</b>	40 sq yd (33.4 sm)	80 sq. yd. (66.8 sm)



Index Property	Test Method	Typical
<b>Thickness</b>	ASTM D6525	0.62 in. (15.75 mm)
<b>Resiliency</b>	ASTM 6524	95.2%
<b>Density</b>	ASTM D792	0.891 g/cm <sup>3</sup>
<b>Mass/Unit Area</b>	ASTM 6566	16.13 oz/sy (548 g/sm)
<b>UV Stability</b>	ASTM D4355/ 1000 HR	80%
<b>Porosity</b>	ECTC Guidelines	99%
<b>Stiffness</b>	ASTM D1388	222.65 oz-in.
<b>Light Penetration</b>	ASTM D6567	4.1%
<b>Tensile Strength - MD</b>	ASTM D6818	709 lbs/ft (10.51 kN/m)
<b>Elongation - MD</b>	ASTM D6818	23.9%
<b>Tensile Strength - TD</b>	ASTM D6818	712 lbs/ft (10.56 kN/m)
<b>Elongation - TD</b>	ASTM D6818	36.9%
<b>Biomass Improvement</b>	ASTM D7322	441%

#### Design Permissible Shear Stress

	Short Duration	Long Duration
<b>Phase 1: Unvegetated</b>	3.0 psf (144 Pa)	2.5 psf (120 Pa)
<b>Phase 2: Partially Veg.</b>	8.0 psf (383 Pa)	8.0 psf (383 Pa)
<b>Phase 3: Fully Veg.</b>	10.0 psf (480 Pa)	8.0 psf (383 Pa)
<b>Unvegetated Velocity</b>	9.5 fps (2.9 m/s)	
<b>Vegetated Velocity</b>	15 fps (4.6 m/s)	



### Slope Design Data: C Factors

Slope Length (L)	Slope Gradients (S)		
	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.0010	0.0209	0.0507
20-50 ft	0.0081	0.0266	0.0574
≥ 50 ft (15.2 m)	0.0455	0.0555	0.081

### Roughness Coefficients – Unveg.

Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.040
0.50 – 2.0 ft	0.040-0.012
≥ 2.0 ft (0.60 m)	0.011



Western Green  
 4609 E. Boonville-New Harmony Rd.  
 Evansville, IN 47725

nagreen.com  
 800-772-2040

©2019, North American Green is a registered trademark from Western Green. Certain products and/or applications described or illustrated herein are protected under one or more U.S. patents. Other U.S. patents are pending, and certain foreign patents and patent applications may also exist. Trademark rights also apply as indicated herein. Final determination of the suitability of any information or material for the use contemplated, and its manner of use, is the sole responsibility of the user. Printed in the U.S.A.

**Summary for Pond 4P-ES: MRC #4 (Emergency Spillway Only)**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 5.03" for 100-Year event  
**Inflow = 51.76 cfs @ 11.98 hrs, Volume= 114,880 cf**  
 Outflow = 4.05 cfs @ 12.55 hrs, Volume= 47,011 cf, Atten= 92%, Lag= 34.2 min  
 Primary = 4.05 cfs @ 12.55 hrs, Volume= 47,011 cf

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 451.16' @ 12.55 hrs Surf.Area= 12,314 sf Storage= 70,932 cf

Plug-Flow detention time= 310.0 min calculated for 47,006 cf (41% of inflow)  
 Center-of-Mass det. time= 179.0 min ( 974.0 - 795.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads

**Primary OutFlow Max=4.05 cfs @ 12.55 hrs HW=451.16' (Free Discharge)**

**1=Emergency Type DH Inlet (Weir Controls 4.05 cfs @ 1.30 fps)**

**Stage-Discharge for Pond 4P-ES: MRC #4 (Emergency Spillway Only)**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
445.00	0.00	445.52	0.00	446.04	0.00	446.56	0.00
445.01	0.00	445.53	0.00	446.05	0.00	446.57	0.00
445.02	0.00	445.54	0.00	446.06	0.00	446.58	0.00
445.03	0.00	445.55	0.00	446.07	0.00	446.59	0.00
445.04	0.00	445.56	0.00	446.08	0.00	446.60	0.00
445.05	0.00	445.57	0.00	446.09	0.00	446.61	0.00
445.06	0.00	445.58	0.00	446.10	0.00	446.62	0.00
445.07	0.00	445.59	0.00	446.11	0.00	446.63	0.00
445.08	0.00	445.60	0.00	446.12	0.00	446.64	0.00
445.09	0.00	445.61	0.00	446.13	0.00	446.65	0.00
445.10	0.00	445.62	0.00	446.14	0.00	446.66	0.00
445.11	0.00	445.63	0.00	446.15	0.00	446.67	0.00
445.12	0.00	445.64	0.00	446.16	0.00	446.68	0.00
445.13	0.00	445.65	0.00	446.17	0.00	446.69	0.00
445.14	0.00	445.66	0.00	446.18	0.00	446.70	0.00
445.15	0.00	445.67	0.00	446.19	0.00	446.71	0.00
445.16	0.00	445.68	0.00	446.20	0.00	446.72	0.00
445.17	0.00	445.69	0.00	446.21	0.00	446.73	0.00
445.18	0.00	445.70	0.00	446.22	0.00	446.74	0.00
445.19	0.00	445.71	0.00	446.23	0.00	446.75	0.00
445.20	0.00	445.72	0.00	446.24	0.00	446.76	0.00
445.21	0.00	445.73	0.00	446.25	0.00	446.77	0.00
445.22	0.00	445.74	0.00	446.26	0.00	446.78	0.00
445.23	0.00	445.75	0.00	446.27	0.00	446.79	0.00
445.24	0.00	445.76	0.00	446.28	0.00	446.80	0.00
445.25	0.00	445.77	0.00	446.29	0.00	446.81	0.00
445.26	0.00	445.78	0.00	446.30	0.00	446.82	0.00
445.27	0.00	445.79	0.00	446.31	0.00	446.83	0.00
445.28	0.00	445.80	0.00	446.32	0.00	446.84	0.00
445.29	0.00	445.81	0.00	446.33	0.00	446.85	0.00
445.30	0.00	445.82	0.00	446.34	0.00	446.86	0.00
445.31	0.00	445.83	0.00	446.35	0.00	446.87	0.00
445.32	0.00	445.84	0.00	446.36	0.00	446.88	0.00
445.33	0.00	445.85	0.00	446.37	0.00	446.89	0.00
445.34	0.00	445.86	0.00	446.38	0.00	446.90	0.00
445.35	0.00	445.87	0.00	446.39	0.00	446.91	0.00
445.36	0.00	445.88	0.00	446.40	0.00	446.92	0.00
445.37	0.00	445.89	0.00	446.41	0.00	446.93	0.00
445.38	0.00	445.90	0.00	446.42	0.00	446.94	0.00
445.39	0.00	445.91	0.00	446.43	0.00	446.95	0.00
445.40	0.00	445.92	0.00	446.44	0.00	446.96	0.00
445.41	0.00	445.93	0.00	446.45	0.00	446.97	0.00
445.42	0.00	445.94	0.00	446.46	0.00	446.98	0.00
445.43	0.00	445.95	0.00	446.47	0.00	446.99	0.00
445.44	0.00	445.96	0.00	446.48	0.00	447.00	0.00
445.45	0.00	445.97	0.00	446.49	0.00	447.01	0.00
445.46	0.00	445.98	0.00	446.50	0.00	447.02	0.00
445.47	0.00	445.99	0.00	446.51	0.00	447.03	0.00
445.48	0.00	446.00	0.00	446.52	0.00	447.04	0.00
445.49	0.00	446.01	0.00	446.53	0.00	447.05	0.00
445.50	0.00	446.02	0.00	446.54	0.00	447.06	0.00
445.51	0.00	446.03	0.00	446.55	0.00	447.07	0.00

**Stage-Discharge for Pond 4P-ES: MRC #4 (Emergency Spillway Only) (continued)**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
447.08	0.00	447.60	0.00	448.12	0.00	448.64	0.00
447.09	0.00	447.61	0.00	448.13	0.00	448.65	0.00
447.10	0.00	447.62	0.00	448.14	0.00	448.66	0.00
447.11	0.00	447.63	0.00	448.15	0.00	448.67	0.00
447.12	0.00	447.64	0.00	448.16	0.00	448.68	0.00
447.13	0.00	447.65	0.00	448.17	0.00	448.69	0.00
447.14	0.00	447.66	0.00	448.18	0.00	448.70	0.00
447.15	0.00	447.67	0.00	448.19	0.00	448.71	0.00
447.16	0.00	447.68	0.00	448.20	0.00	448.72	0.00
447.17	0.00	447.69	0.00	448.21	0.00	448.73	0.00
447.18	0.00	447.70	0.00	448.22	0.00	448.74	0.00
447.19	0.00	447.71	0.00	448.23	0.00	448.75	0.00
447.20	0.00	447.72	0.00	448.24	0.00	448.76	0.00
447.21	0.00	447.73	0.00	448.25	0.00	448.77	0.00
447.22	0.00	447.74	0.00	448.26	0.00	448.78	0.00
447.23	0.00	447.75	0.00	448.27	0.00	448.79	0.00
447.24	0.00	447.76	0.00	448.28	0.00	448.80	0.00
447.25	0.00	447.77	0.00	448.29	0.00	448.81	0.00
447.26	0.00	447.78	0.00	448.30	0.00	448.82	0.00
447.27	0.00	447.79	0.00	448.31	0.00	448.83	0.00
447.28	0.00	447.80	0.00	448.32	0.00	448.84	0.00
447.29	0.00	447.81	0.00	448.33	0.00	448.85	0.00
447.30	0.00	447.82	0.00	448.34	0.00	448.86	0.00
447.31	0.00	447.83	0.00	448.35	0.00	448.87	0.00
447.32	0.00	447.84	0.00	448.36	0.00	448.88	0.00
447.33	0.00	447.85	0.00	448.37	0.00	448.89	0.00
447.34	0.00	447.86	0.00	448.38	0.00	448.90	0.00
447.35	0.00	447.87	0.00	448.39	0.00	448.91	0.00
447.36	0.00	447.88	0.00	448.40	0.00	448.92	0.00
447.37	0.00	447.89	0.00	448.41	0.00	448.93	0.00
447.38	0.00	447.90	0.00	448.42	0.00	448.94	0.00
447.39	0.00	447.91	0.00	448.43	0.00	448.95	0.00
447.40	0.00	447.92	0.00	448.44	0.00	448.96	0.00
447.41	0.00	447.93	0.00	448.45	0.00	448.97	0.00
447.42	0.00	447.94	0.00	448.46	0.00	448.98	0.00
447.43	0.00	447.95	0.00	448.47	0.00	448.99	0.00
447.44	0.00	447.96	0.00	448.48	0.00	449.00	0.00
447.45	0.00	447.97	0.00	448.49	0.00	449.01	0.00
447.46	0.00	447.98	0.00	448.50	0.00	449.02	0.00
447.47	0.00	447.99	0.00	448.51	0.00	449.03	0.00
447.48	0.00	448.00	0.00	448.52	0.00	449.04	0.00
447.49	0.00	448.01	0.00	448.53	0.00	449.05	0.00
447.50	0.00	448.02	0.00	448.54	0.00	449.06	0.00
447.51	0.00	448.03	0.00	448.55	0.00	449.07	0.00
447.52	0.00	448.04	0.00	448.56	0.00	449.08	0.00
447.53	0.00	448.05	0.00	448.57	0.00	449.09	0.00
447.54	0.00	448.06	0.00	448.58	0.00	449.10	0.00
447.55	0.00	448.07	0.00	448.59	0.00	449.11	0.00
447.56	0.00	448.08	0.00	448.60	0.00	449.12	0.00
447.57	0.00	448.09	0.00	448.61	0.00	449.13	0.00
447.58	0.00	448.10	0.00	448.62	0.00	449.14	0.00
447.59	0.00	448.11	0.00	448.63	0.00	449.15	0.00

**Stage-Discharge for Pond 4P-ES: MRC #4 (Emergency Spillway Only) (continued)**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
449.16	0.00	449.68	0.00	450.20	0.00	450.72	0.00
449.17	0.00	449.69	0.00	450.21	0.00	450.73	0.00
449.18	0.00	449.70	0.00	450.22	0.00	450.74	0.00
449.19	0.00	449.71	0.00	450.23	0.00	450.75	0.00
449.20	0.00	449.72	0.00	450.24	0.00	450.76	0.00
449.21	0.00	449.73	0.00	450.25	0.00	450.77	0.00
449.22	0.00	449.74	0.00	450.26	0.00	450.78	0.00
449.23	0.00	449.75	0.00	450.27	0.00	450.79	0.00
449.24	0.00	449.76	0.00	450.28	0.00	450.80	0.00
449.25	0.00	449.77	0.00	450.29	0.00	450.81	0.00
449.26	0.00	449.78	0.00	450.30	0.00	450.82	0.00
449.27	0.00	449.79	0.00	450.31	0.00	450.83	0.00
449.28	0.00	449.80	0.00	450.32	0.00	450.84	0.00
449.29	0.00	449.81	0.00	450.33	0.00	450.85	0.00
449.30	0.00	449.82	0.00	450.34	0.00	450.86	0.00
449.31	0.00	449.83	0.00	450.35	0.00	450.87	0.00
449.32	0.00	449.84	0.00	450.36	0.00	450.88	0.00
449.33	0.00	449.85	0.00	450.37	0.00	450.89	0.00
449.34	0.00	449.86	0.00	450.38	0.00	450.90	0.00
449.35	0.00	449.87	0.00	450.39	0.00	450.91	0.00
449.36	0.00	449.88	0.00	450.40	0.00	450.92	0.00
449.37	0.00	449.89	0.00	450.41	0.00	450.93	0.00
449.38	0.00	449.90	0.00	450.42	0.00	450.94	0.00
449.39	0.00	449.91	0.00	450.43	0.00	450.95	0.00
449.40	0.00	449.92	0.00	450.44	0.00	450.96	0.00
449.41	0.00	449.93	0.00	450.45	0.00	450.97	0.00
449.42	0.00	449.94	0.00	450.46	0.00	450.98	0.00
449.43	0.00	449.95	0.00	450.47	0.00	450.99	0.00
449.44	0.00	449.96	0.00	450.48	0.00	451.00	0.00
449.45	0.00	449.97	0.00	450.49	0.00	451.01	0.06
449.46	0.00	449.98	0.00	450.50	0.00	451.02	0.18
449.47	0.00	449.99	0.00	450.51	0.00	451.03	0.33
449.48	0.00	450.00	0.00	450.52	0.00	451.04	0.51
449.49	0.00	450.01	0.00	450.53	0.00	451.05	0.71
449.50	0.00	450.02	0.00	450.54	0.00	451.06	0.94
449.51	0.00	450.03	0.00	450.55	0.00	451.07	1.18
449.52	0.00	450.04	0.00	450.56	0.00	451.08	1.44
449.53	0.00	450.05	0.00	450.57	0.00	451.09	1.72
449.54	0.00	450.06	0.00	450.58	0.00	451.10	2.02
449.55	0.00	450.07	0.00	450.59	0.00	451.11	2.33
449.56	0.00	450.08	0.00	450.60	0.00	451.12	2.65
449.57	0.00	450.09	0.00	450.61	0.00	451.13	2.99
449.58	0.00	450.10	0.00	450.62	0.00	451.14	3.34
449.59	0.00	450.11	0.00	450.63	0.00	451.15	3.70
449.60	0.00	450.12	0.00	450.64	0.00	451.16	4.08
449.61	0.00	450.13	0.00	450.65	0.00	451.17	4.47
449.62	0.00	450.14	0.00	450.66	0.00	451.18	4.87
449.63	0.00	450.15	0.00	450.67	0.00	451.19	5.28
449.64	0.00	450.16	0.00	450.68	0.00	451.20	5.70
449.65	0.00	450.17	0.00	450.69	0.00	451.21	6.14
449.66	0.00	450.18	0.00	450.70	0.00	451.22	6.58
449.67	0.00	450.19	0.00	450.71	0.00	451.23	7.03

**Stage-Discharge for Pond 4P-ES: MRC #4 (Emergency Spillway Only) (continued)**

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
451.24	7.50	451.76	42.25	452.28	62.37	452.80	73.96
451.25	7.97	451.77	43.08	452.29	62.61	452.81	74.16
451.26	8.45	451.78	43.93	452.30	62.85	452.82	74.37
451.27	8.95	451.79	44.77	452.31	63.09	452.83	74.57
451.28	9.45	451.80	45.63	452.32	63.34	452.84	74.78
451.29	9.96	451.81	46.48	452.33	63.57	452.85	74.98
451.30	10.48	451.82	47.35	452.34	63.81	452.86	75.18
451.31	11.01	451.83	48.22	452.35	64.05	452.87	75.38
451.32	11.54	451.84	49.09	452.36	64.29	452.88	75.59
451.33	12.09	451.85	49.97	452.37	64.52	452.89	75.79
451.34	12.64	451.86	50.85	452.38	64.76	452.90	75.99
451.35	13.20	451.87	51.42	452.39	64.99	452.91	76.19
451.36	13.77	451.88	51.71	452.40	65.23	452.92	76.39
451.37	14.35	451.89	52.01	452.41	65.46	452.93	76.58
451.38	14.94	451.90	52.30	452.42	65.69	452.94	76.78
451.39	15.53	451.91	52.59	452.43	65.92	452.95	76.98
451.40	16.13	451.92	52.88	452.44	66.15	452.96	77.18
451.41	16.74	451.93	53.16	452.45	66.38	452.97	77.37
451.42	17.36	451.94	53.45	452.46	66.61	452.98	77.57
451.43	17.98	451.95	53.73	452.47	66.84	452.99	77.76
451.44	18.61	451.96	54.01	452.48	67.06	453.00	77.96
451.45	19.25	451.97	54.29	452.49	67.29		
451.46	19.89	451.98	54.57	452.50	67.52		
451.47	20.55	451.99	54.85	452.51	67.74		
451.48	21.21	452.00	55.13	452.52	67.96		
451.49	21.87	452.01	55.40	452.53	68.19		
451.50	22.54	452.02	55.67	452.54	68.41		
451.51	23.22	452.03	55.95	452.55	68.63		
451.52	23.91	452.04	56.22	452.56	68.85		
451.53	24.60	452.05	56.49	452.57	69.07		
451.54	25.30	452.06	56.76	452.58	69.29		
451.55	26.01	452.07	57.02	452.59	69.51		
451.56	26.72	452.08	57.29	452.60	69.73		
451.57	27.44	452.09	57.55	452.61	69.95		
451.58	28.17	452.10	57.82	452.62	70.16		
451.59	28.90	452.11	58.08	452.63	70.38		
451.60	29.64	452.12	58.34	452.64	70.60		
451.61	30.38	452.13	58.60	452.65	70.81		
451.62	31.13	452.14	58.86	452.66	71.03		
451.63	31.89	452.15	59.12	452.67	71.24		
451.64	32.65	452.16	59.37	452.68	71.45		
451.65	33.42	452.17	59.63	452.69	71.66		
451.66	34.19	452.18	59.88	452.70	71.88		
451.67	34.97	452.19	60.14	452.71	72.09		
451.68	35.76	452.20	60.39	452.72	72.30		
451.69	36.55	452.21	60.64	452.73	72.51		
451.70	37.34	452.22	60.89	452.74	72.72		
451.71	38.15	452.23	61.14	452.75	72.93		
451.72	38.96	452.24	61.39	452.76	73.13		
451.73	39.77	452.25	61.63	452.77	73.34		
451.74	40.59	452.26	61.88	452.78	73.55		
451.75	41.42	452.27	62.12	452.79	73.75		

EMERGENCY SPILLWAY  
STRUCTURE CAN  
DISCHARGE THE 1000-YEAR  
STORM AND PROVIDE >1' OF  
FREEBOARD

## DEWATERING CALCULATIONS

**Hydrograph for Pond 1P: MRC Facility #1**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	433.00	0.00	0.00	0.00	0.00
2.00	2.03	4,615	433.43	0.17	0.17	0.00	0.00
4.00	3.52	23,626	434.57	0.32	0.17	0.15	0.00
6.00	4.95	51,191	435.80	0.46	<b>0.18</b>	0.29	0.00
8.00	6.33	88,331	436.44	0.51	<b>0.18</b>	0.34	0.00
10.00	10.91	145,864	437.19	0.56	0.18	0.39	0.00
12.00	<b>307.02</b>	<b>247,024</b>	<b>438.47</b>	<b>243.94</b>	0.18	<b>24.68</b>	<b>219.09</b>
14.00	<b>14.48</b>	<b>196,249</b>	<b>437.82</b>	<b>15.47</b>	0.18	<b>1.98</b>	<b>13.31</b>
16.00	8.60	193,011	437.78	8.93	0.18	1.29	7.46
18.00	6.49	191,867	437.76	6.62	0.18	1.05	5.39
20.00	4.76	190,671	437.75	4.98	0.18	0.88	3.93
22.00	4.25	190,033	437.74	4.29	0.18	0.81	3.31
24.00	3.90	189,713	437.74	3.95	0.18	0.77	3.00
26.00	0.00	183,946	437.67	0.59	0.18	0.42	0.00
28.00	0.00	179,694	437.61	0.59	0.18	0.41	0.00
30.00	0.00	175,465	437.56	0.59	0.18	0.41	0.00
32.00	0.00	171,258	437.51	0.58	0.18	0.41	0.00
34.00	0.00	167,074	437.46	0.58	0.18	0.40	0.00
36.00	0.00	162,912	437.41	0.58	0.18	0.40	0.00
38.00	0.00	158,773	437.35	0.57	0.18	0.40	0.00
40.00	0.00	154,657	437.30	0.57	0.18	0.39	0.00
42.00	0.00	150,564	437.25	0.57	0.18	0.39	0.00
44.00	0.00	146,494	437.20	0.56	0.18	0.39	0.00
46.00	0.00	142,448	437.15	0.56	0.18	0.38	0.00
48.00	0.00	138,425	437.10	0.56	0.18	0.38	0.00
50.00	0.00	134,426	437.05	0.55	0.18	0.38	0.00
52.00	0.00	130,450	436.99	0.55	0.18	0.37	0.00
54.00	0.00	126,499	436.94	0.55	0.18	0.37	0.00
56.00	0.00	122,571	436.89	0.54	0.18	0.37	0.00
58.00	0.00	118,668	436.84	0.54	0.18	0.36	0.00
60.00	0.00	114,789	436.79	0.54	0.18	0.36	0.00
62.00	0.00	110,934	436.74	0.53	0.18	0.36	0.00
64.00	0.00	107,105	436.69	0.53	0.18	0.35	0.00
66.00	0.00	103,300	436.64	0.53	0.18	0.35	0.00
68.00	0.00	99,520	436.59	0.52	0.18	0.35	0.00
70.00	0.00	95,765	436.54	0.52	0.18	0.34	0.00
72.00	0.00	92,036	436.49	0.52	0.18	0.34	0.00
74.00	0.00	88,333	436.44	0.51	0.18	0.34	0.00
76.00	0.00	84,655	436.39	0.51	0.18	0.33	0.00
78.00	0.00	81,003	436.34	0.51	0.18	0.33	0.00
80.00	0.00	77,377	436.30	0.50	0.18	0.33	0.00
82.00	0.00	73,777	436.25	0.50	0.18	0.32	0.00
84.00	0.00	70,204	436.20	0.49	0.18	0.32	0.00
86.00	0.00	66,658	436.15	0.49	0.18	0.31	0.00
88.00	0.00	63,138	436.10	0.49	0.18	0.31	0.00
90.00	0.00	59,646	436.05	0.48	0.18	0.31	0.00
92.00	0.00	56,181	436.01	0.48	0.18	0.30	0.00
<b>94.00</b>	<b>0.00</b>	<b>52,768</b>	<b>435.87</b>	<b>0.47</b>	<b>0.18</b>	<b>0.29</b>	<b>0.00</b>
96.00	0.00	49,447	435.72	0.45	0.18	0.28	0.00



**Hydrograph for Pond 2P: SWM/BMP Facility #2**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	431.50	0.00	0.00	0.00
2.00	0.00	0	431.50	0.00	0.00	0.00
4.00	0.00	0	431.50	0.00	0.00	0.00
6.00	0.00	0	431.50	0.00	0.00	0.00
8.00	0.00	0	431.50	0.00	0.00	0.00
10.00	0.01	3	431.50	0.00	0.00	0.00
12.00	<b>256.08</b>	<b>184,327</b>	<b>433.79</b>	<b>2.49</b>	<b>2.49</b>	0.00
14.00	<b>14.76</b>	<b>470,068</b>	<b>436.82</b>	<b>29.17</b>	<b>29.17</b>	0.00
16.00	8.37	420,934	436.33	11.27	11.27	0.00
18.00	6.11	407,479	436.20	7.32	7.32	0.00
20.00	4.46	399,661	436.12	5.54	5.54	0.00
22.00	3.80	393,279	436.05	4.50	4.50	0.00
24.00	3.46	389,024	436.01	3.97	3.97	0.00
26.00	0.00	365,833	435.77	3.77	3.77	0.00
28.00	0.00	339,265	435.50	3.61	3.61	0.00
30.00	0.00	313,789	435.23	3.46	3.46	0.00
32.00	0.00	289,422	434.97	3.31	3.31	0.00
34.00	0.00	266,181	434.72	3.15	3.15	0.00
36.00	0.00	244,084	434.47	2.99	2.99	0.00
38.00	0.00	223,148	434.24	2.83	2.83	0.00
40.00	0.00	203,389	434.01	2.66	2.66	0.00
42.00	0.00	184,824	433.80	2.49	2.49	0.00
44.00	0.00	167,471	433.60	2.33	2.33	0.00
46.00	0.00	151,346	433.41	2.15	2.15	0.00
48.00	0.00	136,465	433.23	1.98	1.98	0.00
50.00	0.00	122,844	433.06	1.80	1.80	0.00
52.00	0.00	110,498	432.91	1.62	1.62	0.00
54.00	0.00	99,452	432.78	1.44	1.44	0.00
56.00	0.00	89,726	432.66	1.26	1.26	0.00
58.00	0.00	81,365	432.55	1.06	1.06	0.00
60.00	0.00	74,458	432.47	0.85	0.85	0.00
62.00	0.00	69,011	432.40	0.67	0.67	0.00
64.00	0.00	64,687	432.34	0.54	0.54	0.00
66.00	0.00	61,194	432.30	0.44	0.44	0.00
68.00	0.00	58,347	432.26	0.36	0.36	0.00
70.00	0.00	55,985	432.23	0.30	0.30	0.00
72.00	0.00	54,001	432.21	0.25	0.25	0.00
74.00	0.00	52,335	432.18	0.21	0.21	0.00
76.00	0.00	50,921	432.17	0.18	0.18	0.00
78.00	0.00	49,689	432.15	0.16	0.16	0.00
80.00	0.00	48,616	432.14	0.14	0.14	0.00
82.00	0.00	47,681	432.12	0.12	0.12	0.00
84.00	0.00	46,867	432.11	0.11	0.11	0.00
86.00	0.00	46,157	432.10	0.09	0.09	0.00
88.00	0.00	45,539	432.10	0.08	0.08	0.00
90.00	0.00	44,990	432.09	0.07	0.07	0.00
92.00	0.00	44,485	432.08	0.07	0.07	0.00
94.00	0.00	44,021	432.08	0.06	0.06	0.00
<b>96.00</b>	<b>0.00</b>	<b>43,594</b>	<b>432.07</b>	<b>0.06</b>	<b>0.06</b>	<b>0.00</b>

<1" OF WATER WHICH WILL INFILTRATE OR EVAPOTRANSPIRATE

**Hydrograph for Pond 3P: MRC #3**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	440.00	0.00	0.00	0.00	<b>0.00</b>
2.00	0.13	292	440.09	0.05	0.05	0.00	0.00
4.00	0.23	1,273	440.40	0.05	0.05	0.00	0.00
6.00	0.32	2,873	440.91	0.05	0.05	0.00	0.00
8.00	0.48	5,335	441.33	0.05	<b>0.05</b>	0.00	0.00
10.00	1.11	10,341	442.03	0.11	<b>0.05</b>	0.06	0.00
12.00	<b>72.11</b>	64,121	444.26	1.56	0.05	1.51	0.00
14.00	2.50	<b>111,463</b>	<b>445.97</b>	<b>2.09</b>	0.05	<b>2.04</b>	0.00
16.00	1.53	<b>110,595</b>	<b>445.94</b>	<b>2.08</b>	0.05	<b>2.03</b>	0.00
18.00	1.18	105,442	445.76	2.03	0.05	1.98	0.00
20.00	0.87	98,445	445.52	1.96	0.05	1.91	0.00
22.00	0.79	90,520	445.24	1.88	0.05	1.83	0.00
24.00	0.73	82,756	444.96	1.79	0.05	1.74	0.00
26.00	0.00	70,706	444.51	1.65	0.05	1.59	0.00
28.00	0.00	59,419	444.08	1.49	0.05	1.44	0.00
30.00	0.00	49,281	443.68	1.33	0.05	1.28	0.00
32.00	0.00	40,332	443.32	1.16	0.05	1.11	0.00
34.00	0.00	32,615	443.00	0.98	0.05	0.93	0.00
36.00	0.00	26,172	442.73	0.80	0.05	0.75	0.00
38.00	0.00	21,057	442.51	0.62	0.05	0.57	0.00
40.00	0.00	17,355	442.34	0.41	0.05	0.36	0.00
42.00	0.00	14,928	442.24	0.27	0.05	0.22	0.00
44.00	0.00	13,286	442.16	0.19	0.05	0.14	0.00
46.00	0.00	12,076	442.11	0.14	0.05	0.09	0.00
48.00	0.00	11,124	442.06	0.12	0.05	0.07	0.00
50.00	0.00	10,293	442.03	0.11	0.05	0.06	0.00
<b>52.00</b>	<b>0.00</b>	<b>9,566</b>	<b>441.98</b>	<b>0.09</b>	<b>0.05</b>	<b>0.04</b>	<b>0.00</b>
54.00	0.00	8,941	441.89	0.08	0.05	0.03	0.00
56.00	0.00	8,478	441.82	0.05	0.05	0.00	0.00
58.00	0.00	8,112	441.76	0.05	0.05	0.00	0.00
60.00	0.00	7,748	441.70	0.05	0.05	0.00	0.00
62.00	0.00	7,384	441.65	0.05	0.05	0.00	0.00
64.00	0.00	7,021	441.59	0.05	0.05	0.00	0.00
66.00	0.00	6,658	441.54	0.05	0.05	0.00	0.00
68.00	0.00	6,296	441.48	0.05	0.05	0.00	0.00
70.00	0.00	5,934	441.43	0.05	0.05	0.00	0.00
72.00	0.00	5,573	441.37	0.05	0.05	0.00	0.00
74.00	0.00	5,212	441.32	0.05	0.05	0.00	0.00
76.00	0.00	4,852	441.26	0.05	0.05	0.00	0.00
78.00	0.00	4,492	441.20	0.05	0.05	0.00	0.00
80.00	0.00	4,133	441.15	0.05	0.05	0.00	0.00
82.00	0.00	3,775	441.09	0.05	0.05	0.00	0.00
84.00	0.00	3,417	441.04	0.05	0.05	0.00	0.00
86.00	0.00	3,060	440.96	0.05	0.05	0.00	0.00
88.00	0.00	2,703	440.85	0.05	0.05	0.00	0.00
90.00	0.00	2,348	440.74	0.05	0.05	0.00	0.00
92.00	0.00	1,993	440.63	0.05	0.05	0.00	0.00
94.00	0.00	1,640	440.52	0.05	0.05	0.00	0.00
96.00	0.00	1,288	440.41	0.05	0.05	0.00	0.00

**Hydrograph for Pond 4P: MRC #4**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	445.00	0.00	0.00	0.00
2.00	0.05	111	445.07	0.02	0.02	0.00
4.00	0.09	449	445.26	0.03	0.03	0.00
6.00	0.16	1,070	445.62	0.03	0.03	0.00
8.00	0.30	2,508	446.22	0.03	<b>0.03</b>	0.01
10.00	<b>0.76</b>	5,829	447.04	0.05	<b>0.03</b>	0.03
12.00	<b>49.84</b>	<b>44,194</b>	<b>449.68</b>	<b>15.55</b>	0.03	<b>15.52</b>
14.00	1.63	<b>34,096</b>	<b>449.06</b>	<b>1.93</b>	0.03	<b>1.90</b>
16.00	1.00	32,733	448.97	1.30	0.03	1.27
18.00	0.78	29,970	448.79	1.23	0.03	1.20
20.00	0.57	26,302	448.55	1.13	0.03	1.10
22.00	0.52	22,463	448.28	1.01	0.03	0.99
24.00	0.48	19,167	448.05	0.90	0.03	0.87
26.00	0.00	13,736	447.65	0.65	0.03	0.62
28.00	0.00	10,030	447.37	0.37	0.03	0.34
30.00	0.00	8,125	447.22	0.18	0.03	0.16
32.00	0.00	7,115	447.14	0.11	0.03	0.08
34.00	0.00	6,472	447.09	0.07	0.03	0.04
36.00	0.00	6,012	447.05	0.06	0.03	0.03
38.00	0.00	5,620	447.02	0.05	0.03	0.02
<b>40.00</b>	<b>0.00</b>	<b>5,280</b>	<b>446.98</b>	<b>0.04</b>	<b>0.03</b>	<b>0.02</b>
42.00	0.00	4,960	446.90	0.04	0.03	0.02
44.00	0.00	4,646	446.81	0.04	0.03	0.01
46.00	0.00	4,340	446.73	0.04	0.03	0.01
48.00	0.00	4,039	446.64	0.04	0.03	0.01
50.00	0.00	3,746	446.56	0.04	0.03	0.01
52.00	0.00	3,461	446.48	0.04	0.03	0.01
54.00	0.00	3,183	446.41	0.04	0.03	0.01
56.00	0.00	2,913	446.33	0.04	0.03	0.01
58.00	0.00	2,652	446.26	0.04	0.03	0.01
60.00	0.00	2,401	446.19	0.03	0.03	0.01
62.00	0.00	2,162	446.12	0.03	0.03	0.00
64.00	0.00	1,938	446.06	0.03	0.03	0.00
66.00	0.00	1,733	446.00	0.03	0.03	0.00
68.00	0.00	1,537	445.89	0.03	0.03	0.00
70.00	0.00	1,342	445.78	0.03	0.03	0.00
72.00	0.00	1,148	445.67	0.03	0.03	0.00
74.00	0.00	955	445.56	0.03	0.03	0.00
76.00	0.00	763	445.45	0.03	0.03	0.00
78.00	0.00	572	445.34	0.03	0.03	0.00
80.00	0.00	381	445.22	0.03	0.03	0.00
82.00	0.00	192	445.11	0.03	0.03	0.00
84.00	0.00	51	445.03	0.01	0.01	0.00
86.00	0.00	13	445.01	0.00	0.00	0.00
88.00	0.00	3	445.00	0.00	0.00	0.00
90.00	0.00	1	445.00	0.00	0.00	0.00
92.00	0.00	0	445.00	0.00	0.00	0.00
94.00	0.00	0	445.00	0.00	0.00	0.00
96.00	0.00	0	445.00	0.00	0.00	0.00

## **MRC DESIGN SUMMARY & CALCULATIONS**

## MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY #1

*Complete One Design Summary Sheet for Each BMP Designed for MRC*

### GENERAL INFORMATION

Applicant Name: PDC Northeast LPIV, LLC Project Name: 283 Commerce Center - Building #1  
 Applicant Address: 6059 Allentown Boulevard, Suite 127 Municipality: Mount Joy Township  
 City, State, Zip: Harrisburg, PA 17112 County: Lancaster  
 Permit Type:  NPDES PAG-02  NPDES IP  ESCGP  ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.00	39.87	+39.87

### MRC BMP INFORMATION

MRC BMP Type: Bioretention Area Stormwater BMP Manual Section: 6.4.5

Will the BMP Include Vegetation?  Yes  No

If Yes, Identify Proposed Vegetation: Ernst Conservation Seeds Native Detention Area Mix (ERNMX-183)

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment?  Yes (Pre-)  Yes (Post-)  No

If Yes, Identify Proposed Pre- or Post-Treatment: N/A

Name of Surface Water to Receive MRC BMP Discharges: UNT To Little Chiques Creek

Designated Use of Surface Water: TSF, MF Existing Use of Surface Water (if different): None

Is the Surface Water Impaired?  Yes  No

If Yes, Identify Cause(s): Agriculture - Siltation

Will the BMP have an impermeable liner?  Yes  No

If Yes, explain why a liner is proposed: N/A

BMP Media Description: 3' of Topsoil mixture, well blended loam topsoil with min. 10% sand and max 5% clay

Are Any Deviations from MRC Design Standards Proposed?  Yes  No

If Yes, Identify Deviations: N/A

### MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	<b>39.87</b>	
Equivalent Contributing Impervious Area to BMP (acres)	<b>39.34</b>	
Total Drainage Area to BMP (acres)	<b>47.98</b>	
MRC BMP Release Rate (cfs)	<b>0.39</b>	<i>No greater than 0.01 cfs / acre of equivalent contributing impervious</i>
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	<b>0.38</b>	<i>&lt;= MRC BMP Release Rate (cfs)</i>
Maximum Storm Event Routed to MRC BMP	<b>100-year</b>	

**MRC BMP Design Summary**  
**Revised, August 25, 2020**

Parameter	Design Value	Design Standard
BMP Footprint Area (ft <sup>2</sup> )	<b>76,079</b>	
Bottom BMP Elevation (Native Soils) (ft)	<b>433.00</b>	
2-Yr/24-Hr Storm Ponding Depth (ft)	<b>2.00</b>	1 ft (recommended) (2 ft max)
Maximum Ponding Depth (ft)	<b>2.67</b>	4 ft (max)
Overflow Bypass Elevation (ft)	<b>437.60</b>	
Media Depth (ft)	<b>3</b>	2 ft (min) – 4 ft (max)
Media Void Space (%)	<b>30</b>	
Internal Water Storage (IWS) Depth (ft)	<b>1</b>	1 ft recommended
Top of IWS Elevation (ft)	<b>434.00</b>	
Underdrain Pipe Diameter (in)	<b>6</b>	
Underdrain Orifice Diameter (in)	<b>2.9</b>	
Underdrain Outlet Elevation (ft)	<b>434.00</b>	
IWS Available for Routing (%)	<b>50</b>	50% max
Separation Distance (Groundwater) (ft)	<b>&gt;2</b>	1 ft (min) (2 ft recommended)
Infiltration Rate (in/hr)	<b>0.1</b>	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	<b>0</b>	0 (No overflow allowed)
1-Yr/24-Hr <b>Pre</b> -Development Peak Rate (cfs)	<b>7.72</b>	
2-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>6.97</b>	1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)
10-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>21.05</b>	10-Yr/24-Hr Pre-Development Peak Rate
50-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>31.06</b>	50-Yr/24-Hr Pre-Development Peak Rate
100-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>45.60</b>	100-Yr/24-Hr Pre-Development Peak Rate
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	<b>342,841</b>	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	<b>92 / 155</b>	72 hrs (surface), 7 days (underground)
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	<b>92 / 155</b>	72 hrs (surface), 7 days (underground)
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	<b>93 / 155</b>	72 hrs (surface), 7 days (underground)
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	<b>93 / 155</b>	72 hrs (surface), 7 days (underground)

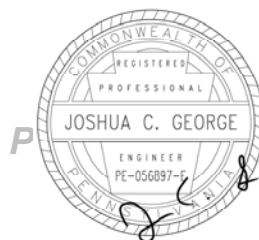
Joshua C. George, P.E.  
 Licensed P.E. Name

PE-056897-E  
 License No.

*J.C.G.*

Licensed P.E. Signature

01/03/2023  
 Date



## MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY #2

*Complete One Design Summary Sheet for Each BMP Designed for MRC*

### GENERAL INFORMATION

Applicant Name: PDC Northeast LPIV, LLC Project Name: 283 Commerce Center - Building #1  
 Applicant Address: 6059 Allentown Boulevard, Suite 127 Municipality: Mount Joy Township  
 City, State, Zip: Harrisburg, PA 17112 County: Lancaster  
 Permit Type:  NPDES PAG-02  NPDES IP  ESCGP  ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.32	3.18	+2.86

### MRC BMP INFORMATION

MRC BMP Type: Bioretention Area Stormwater BMP Manual Section: 6.4.5

Will the BMP Include Vegetation?  Yes  No

If Yes, Identify Proposed Vegetation: Ernst Conservation Seeds Native Detention Area Mix (ERNMX-183)

For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment?  Yes (Pre-)  Yes (Post-)  No

If Yes, Identify Proposed Pre- or Post-Treatment: N/A

Name of Surface Water to Receive MRC BMP Discharges: UNT To Little Chiques Creek

Designated Use of Surface Water: TSF, MF Existing Use of Surface Water (if different): None

Is the Surface Water Impaired?  Yes  No

If Yes, Identify Cause(s): Agriculture - Siltation

Will the BMP have an impermeable liner?  Yes  No

If Yes, explain why a liner is proposed: N/A

BMP Media Description: 2' of Topsoil mixture, well blended loam topsoil with min. 10% sand and max 5% clay

Are Any Deviations from MRC Design Standards Proposed?  Yes  No

If Yes, Identify Deviations: N/A

### MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	<b>2.51</b>	
Equivalent Contributing Impervious Area to BMP (acres)	<b>2.60</b>	
Total Drainage Area to BMP (acres)	<b>3.40</b>	
MRC BMP Release Rate (cfs)	<b>0.03</b>	<i>No greater than 0.01 cfs / acre of equivalent contributing impervious</i>
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	<b>0.03</b>	<i>&lt;= MRC BMP Release Rate (cfs)</i>
Maximum Storm Event Routed to MRC BMP	<b>100-year</b>	

**MRC BMP Design Summary**  
**Revised, August 25, 2020**

Parameter	Design Value	Design Standard
BMP Footprint Area (ft <sup>2</sup> )	<b>22,020</b>	
Bottom BMP Elevation (Native Soils) (ft)	<b>440.00</b>	
2-Yr/24-Hr Storm Ponding Depth (ft)	<b>0.67</b>	1 ft (recommended) (2 ft max)
Maximum Ponding Depth (ft)	<b>4.00</b>	4 ft (max)
Overflow Bypass Elevation (ft)	<b>442.00</b>	
Media Depth (ft)	<b>2</b>	2 ft (min) – 4 ft (max)
Media Void Space (%)	<b>30</b>	
Internal Water Storage (IWS) Depth (ft)	<b>1</b>	1 ft recommended
Top of IWS Elevation (ft)	<b>441.00</b>	
Underdrain Pipe Diameter (in)	<b>6</b>	
Underdrain Orifice Diameter (in)	<b>1.7</b>	
Underdrain Outlet Elevation (ft)	<b>441.00</b>	
IWS Available for Routing (%)	<b>50</b>	50% max
Separation Distance (Groundwater) (ft)	<b>&gt;2</b>	1 ft (min) (2 ft recommended)
Infiltration Rate (in/hr)	<b>0.1</b>	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	<b>0</b>	0 (No overflow allowed)
1-Yr/24-Hr <b>Pre</b> -Development Peak Rate (cfs)	<b>20.74</b>	
2-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>14.93</b>	1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)
10-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>35.09</b>	10-Yr/24-Hr Pre-Development Peak Rate
50-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>66.52</b>	50-Yr/24-Hr Pre-Development Peak Rate
100-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>84.31</b>	100-Yr/24-Hr Pre-Development Peak Rate
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	<b>21,434</b>	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	<b>36 / 99</b>	72 hrs (surface), 7 days (underground)
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	<b>43 / 105</b>	72 hrs (surface), 7 days (underground)
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	<b>51 / 113</b>	72 hrs (surface), 7 days (underground)
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	<b>54 / 116</b>	72 hrs (surface), 7 days (underground)

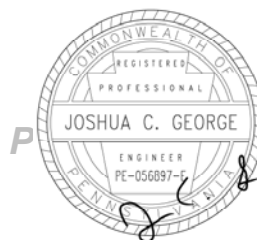
Joshua C. George, P.E.  
 Licensed P.E. Name

PE-056897-E  
 License No.

*J.C.G.*

Licensed P.E. Signature

01/03/2023  
 Date





## MANAGED RELEASE CONCEPT (MRC) DESIGN SUMMARY #3

*Complete One Design Summary Sheet for Each BMP Designed for MRC*

### GENERAL INFORMATION

Applicant Name: PDC Northeast LPIV, LLC Project Name: 283 Commerce Center - Building #1  
 Applicant Address: 6059 Allentown Boulevard, Suite 127 Municipality: Mount Joy Township  
 City, State, Zip: Harrisburg, PA 17112 County: Lancaster  
 Permit Type:  NPDES PAG-02  NPDES IP  ESCGP  ESP

	Pre-Development	Post-Development	Change
Impervious Area (acres):	0.00	0.72	+0.72

### MRC BMP INFORMATION

MRC BMP Type: Bioretention Area Stormwater BMP Manual Section: 6.4.5  
 Will the BMP Include Vegetation?  Yes  No  
*If Yes, Identify Proposed Vegetation:* Ernst Conservation Seeds Native Detention Area Mix (ERNMX-183)  
 For Non-Vegetated BMPs Will There Be Pre- or Post-Treatment?  Yes (Pre-)  Yes (Post-)  No  
*If Yes, Identify Proposed Pre- or Post-Treatment:* N/A  
 Name of Surface Water to Receive MRC BMP Discharges: UNT To Little Chiques Creek  
 Designated Use of Surface Water: TSF, MF Existing Use of Surface Water (if different): None  
 Is the Surface Water Impaired?  Yes  No  
*If Yes, Identify Cause(s):* Agriculture - Siltation  
 Will the BMP have an impermeable liner?  Yes  No  
*If Yes, explain why a liner is proposed:* N/A  
 BMP Media Description: 2' of Topsoil mixture, well blended loam topsoil with min. 10% sand and max 5% clay  
 Are Any Deviations from MRC Design Standards Proposed?  Yes  No  
*If Yes, Identify Deviations:* N/A

### MRC BMP DESIGN VALUES AND STANDARDS

Parameter	Design Value	Design Standard
Actual Contributing Impervious Area to BMP (acres)	<b>0.72</b>	
Equivalent Contributing Impervious Area to BMP (acres)	<b>1.15</b>	
Total Drainage Area to BMP (acres)	<b>6.29</b>	
MRC BMP Release Rate (cfs)	<b>0.01</b>	<i>No greater than 0.01 cfs / acre of equivalent contributing impervious</i>
Underdrain Outflow Rate During 1.2-Inch/2-Hour Storm (cfs)	<b>0.01</b>	<i>&lt;= MRC BMP Release Rate (cfs)</i>
Maximum Storm Event Routed to MRC BMP	<b>100-year</b>	

**MRC BMP Design Summary**  
**Revised, August 25, 2020**

Parameter	Design Value	Design Standard
BMP Footprint Area (ft <sup>2</sup> )	<b>12,314</b>	
Bottom BMP Elevation (Native Soils) (ft)	<b>445.00</b>	
2-Yr/24-Hr Storm Ponding Depth (ft)	<b>0.72</b>	1 ft (recommended) (2 ft max)
Maximum Ponding Depth (ft)	<b>3.06</b>	4 ft (max)
Overflow Bypass Elevation (ft)	<b>447.00</b>	
Media Depth (ft)	<b>2</b>	2 ft (min) – 4 ft (max)
Media Void Space (%)	<b>30</b>	
Internal Water Storage (IWS) Depth (ft)	<b>1</b>	1 ft recommended
Top of IWS Elevation (ft)	<b>446.00</b>	
Underdrain Pipe Diameter (in)	<b>6</b>	
Underdrain Orifice Diameter (in)	<b>0.7</b>	
Underdrain Outlet Elevation (ft)	<b>446.00</b>	
IWS Available for Routing (%)	<b>50</b>	50% max
Separation Distance (Groundwater) (ft)	<b>&gt;2</b>	1 ft (min) (2 ft recommended)
Infiltration Rate (in/hr)	<b>0.1</b>	
Volume of Overflow During 1.2-Inch/2-Hour Storm (cf)	<b>0</b>	0 (No overflow allowed)
1-Yr/24-Hr <b>Pre</b> -Development Peak Rate (cfs)	<b>2.97</b>	
2-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>1.04</b>	1-Yr/24-Hr Pre-Development Peak Rate (or per approved Act 167 Plan)
10-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>2.66</b>	10-Yr/24-Hr Pre-Development Peak Rate
50-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>16.55</b>	50-Yr/24-Hr Pre-Development Peak Rate
100-Yr/24-Hr <b>Post</b> -Development Peak Rate (cfs)	<b>19.67</b>	100-Yr/24-Hr Pre-Development Peak Rate
Total 2-Yr/24-Hr Runoff Volume Managed by BMP (cf)	<b>6,150</b>	
Ponding Time @ 2-Yr/24-Hr Storm (hrs)	<b>35 / 88</b>	72 hrs (surface), 7 days (underground)
Ponding Time @ 10-Yr/24-Hr Storm (hrs)	<b>38 / 91</b>	72 hrs (surface), 7 days (underground)
Ponding Time @ 50-Yr/24-Hr Storm (hrs)	<b>40 / 93</b>	72 hrs (surface), 7 days (underground)
Ponding Time @ 100-Yr/24-Hr Storm (hrs)	<b>40 / 93</b>	72 hrs (surface), 7 days (underground)

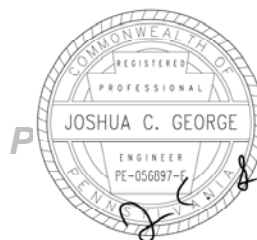
Joshua C. George, P.E.  
 Licensed P.E. Name

PE-056897-E  
 License No.

*J.C.G.*

Licensed P.E. Signature

01/03/2023  
 Date



## **MRC WATER QUALITY STORM (1.2"/2-HOUR)**

**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 0.82" for WQ Storm event  
 Inflow = 83.64 cfs @ 1.21 hrs, Volume= 142,740 cf  
 Outflow = 0.56 cfs @ 2.36 hrs, Volume= 139,064 cf, Atten= 99%, Lag= 69.1 min  
 Discarded = 0.18 cfs @ 1.22 hrs, Volume= 59,706 cf  
 Primary = 0.38 cfs @ 2.36 hrs, Volume= 79,359 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 437.11' @ 2.36 hrs Surf.Area= 76,079 sf Storage= 139,780 cf

Plug-Flow detention time= 2,305.0 min calculated for 139,064 cf (97% of inflow)  
 Center-of-Mass det. time= 2,303.7 min ( 2,382.8 - 79.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.18 cfs @ 1.22 hrs HW=436.03' (Free Discharge)

↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=0.38 cfs @ 2.36 hrs HW=437.11' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 0.38 cfs of 41.71 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.38 cfs @ 8.33 fps)

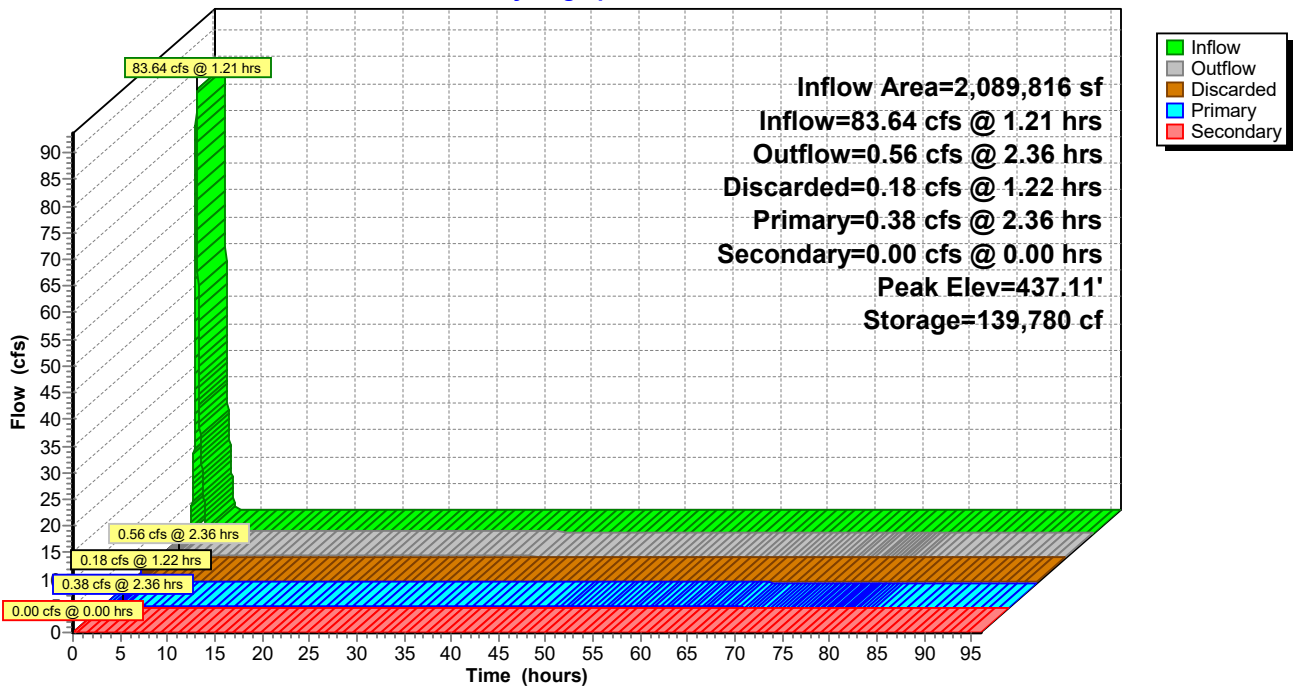
↳ **3=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=433.00' (Free Discharge)

↳ **4=Overflow Spillway** ( Controls 0.00 cfs)

**Pond 1P: MRC Facility #1**

Hydrograph



**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 0.28" for WQ Storm event  
 Inflow = 6.85 cfs @ 1.14 hrs, Volume= 10,076 cf  
 Outflow = 0.08 cfs @ 2.16 hrs, Volume= 10,076 cf, Atten= 99%, Lag= 61.6 min  
 Discarded = 0.05 cfs @ 2.07 hrs, Volume= 9,663 cf  
 Primary = 0.03 cfs @ 2.16 hrs, Volume= 412 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 442.00' @ 2.16 hrs Surf.Area= 22,020 sf Storage= 9,731 cf

Plug-Flow detention time= 1,510.7 min calculated for 10,075 cf (100% of inflow)  
 Center-of-Mass det. time= 1,510.9 min ( 1,585.6 - 74.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>1.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60  
 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63  
 #6 Discarded 440.00' **0.100 in/hr Infiltration over Surface area** Phase-In= 0.01'

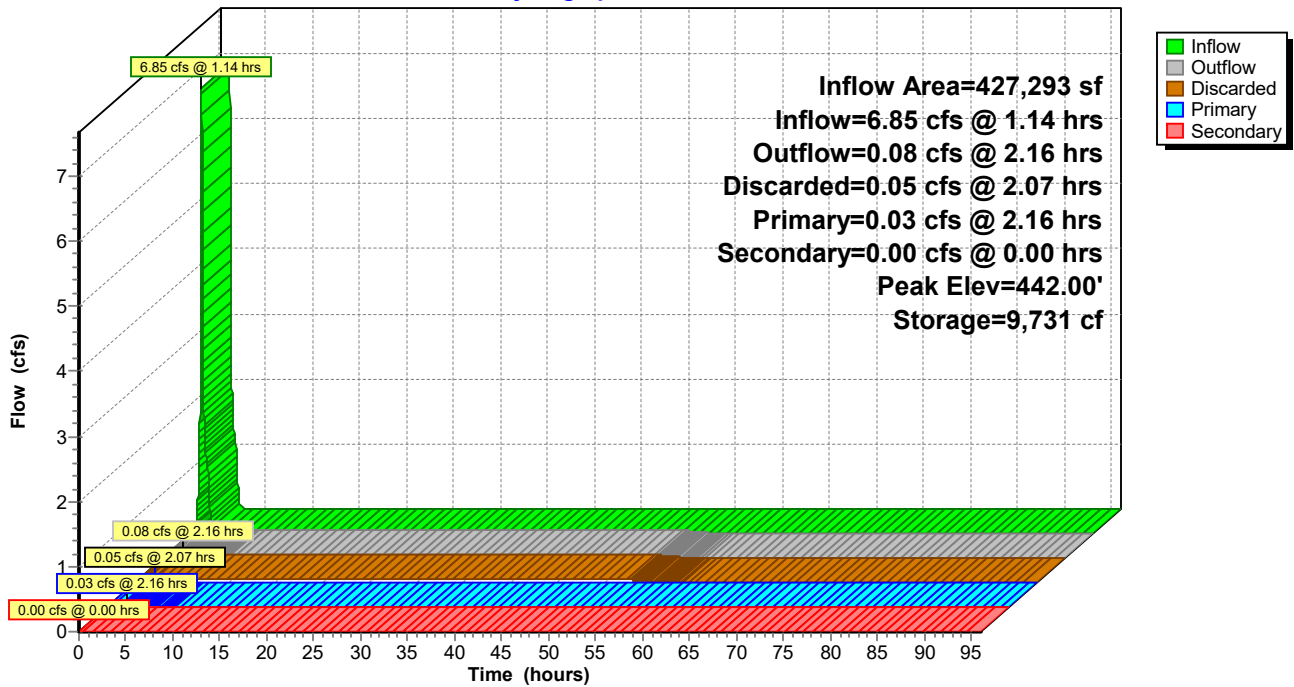
**Discarded OutFlow** Max=0.05 cfs @ 2.07 hrs HW=442.00' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=0.03 cfs @ 2.16 hrs HW=442.00' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 0.03 cfs of 0.17 cfs potential flow)  
 ↳ **2=MRC Orifice** (Orifice Controls 0.03 cfs @ 2.11 fps)  
 ↳ **3=Orifice** (Orifice Controls 0.00 cfs @ 0.15 fps)  
 ↳ **4=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** ( Controls 0.00 cfs)

**Pond 3P: MRC #3**

Hydrograph



**Summary for Pond 4P: MRC #4**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 0.24" for WQ Storm event  
 Inflow = 3.94 cfs @ 1.13 hrs, Volume= 5,438 cf  
 Outflow = 0.04 cfs @ 2.14 hrs, Volume= 5,438 cf, Atten= 99%, Lag= 60.6 min  
 Discarded = 0.03 cfs @ 2.14 hrs, Volume= 4,631 cf  
 Primary = 0.01 cfs @ 2.14 hrs, Volume= 807 cf  
 Routed to Link 9L : Discharge Point 009

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 446.97' @ 2.14 hrs Surf.Area= 12,299 sf Storage= 5,243 cf

Plug-Flow detention time= 1,248.6 min calculated for 5,438 cf (100% of inflow)  
 Center-of-Mass det. time= 1,248.6 min ( 1,324.2 - 75.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	445.60'	<b>18.0" Round Primary Outlet Pipe</b> L= 9.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.60' / 445.55' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	446.00'	<b>0.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	447.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	449.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Device 1	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads
#6	Discarded	445.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'



**Discarded OutFlow** Max=0.03 cfs @ 2.14 hrs HW=446.97' (Free Discharge)

↳ **6=Infiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.01 cfs @ 2.14 hrs HW=446.97' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 0.01 cfs of 5.12 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.01 cfs @ 4.68 fps)

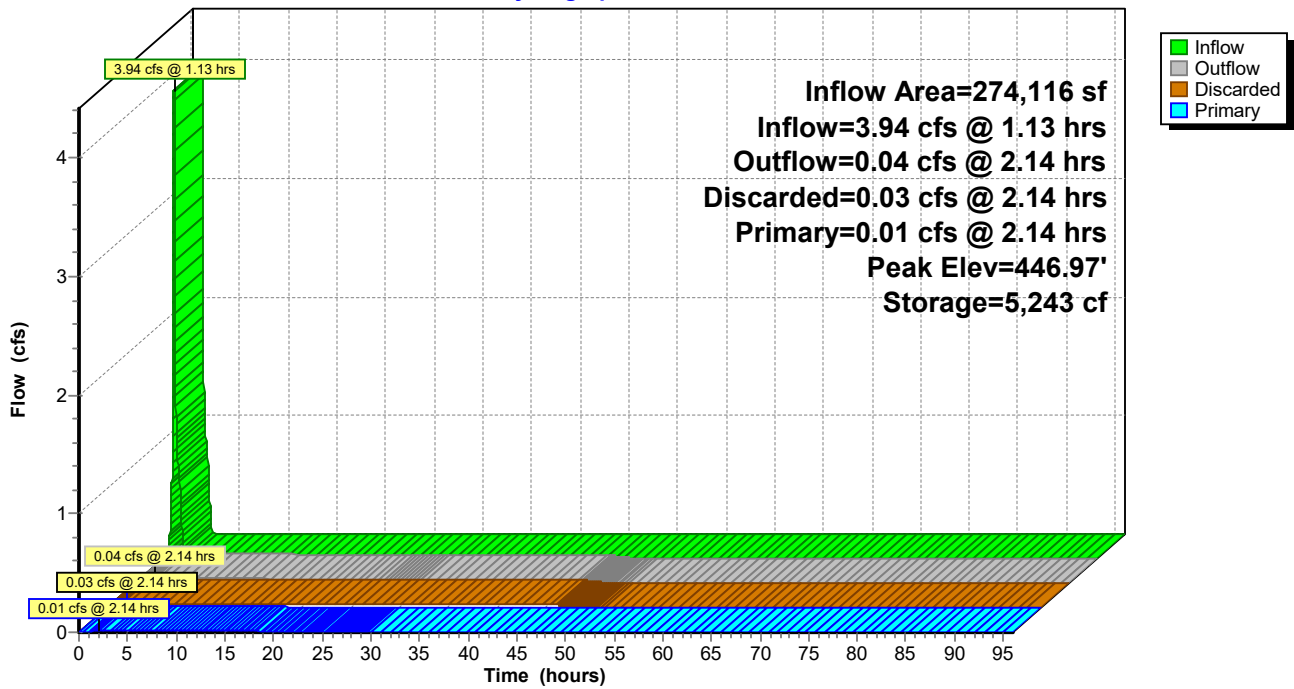
↳ **3=Orifice** ( Controls 0.00 cfs)

↳ **4=Type M Inlet** ( Controls 0.00 cfs)

↳ **5=Emergency Type DH Inlet** ( Controls 0.00 cfs)

**Pond 4P: MRC #4**

Hydrograph



## **MRC 2-YEAR & 100-YEAR PONDING DEPTHS**

**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 2.34" for 2-Year event  
 Inflow = 126.85 cfs @ 12.07 hrs, Volume= 407,432 cf  
 Outflow = 61.56 cfs @ 12.24 hrs, Volume= 358,424 cf, Atten= 51%, Lag= 10.3 min  
 Discarded = 0.18 cfs @ 10.89 hrs, Volume= 59,249 cf  
 Primary = 6.76 cfs @ 12.24 hrs, Volume= 134,357 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 54.62 cfs @ 12.24 hrs, Volume= 164,818 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 438.00' @ 12.24 hrs Surf.Area= 76,079 sf Storage= 211,618 cf

Plug-Flow detention time= 1,190.4 min calculated for 358,386 cf (88% of inflow)  
 Center-of-Mass det. time= 1,130.8 min ( 1,897.6 - 766.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

**22-0123-005 - Post-Dev**

Type II 24-hr 2-Year Rainfall=2.98"

Prepared by Landworks Civil Design LLC

Printed 1/1/2023

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

Page 2

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.18 cfs @ 10.89 hrs HW=436.00' (Free Discharge)

↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=6.75 cfs @ 12.24 hrs HW=438.00' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 6.75 cfs of 44.09 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.44 cfs @ 9.49 fps)

↳ **3=Type M Inlet** (Weir Controls 6.31 cfs @ 1.80 fps)

**Secondary OutFlow** Max=54.53 cfs @ 12.24 hrs HW=438.00' (Free Discharge)

↳ **4=Overflow Spillway** (Weir Controls 54.53 cfs @ 1.48 fps)

**Summary for Pond 1P: MRC Facility #1**

Inflow Area = 2,089,816 sf, 83.11% Impervious, Inflow Depth = 6.64" for 100-Year event  
 Inflow = 354.57 cfs @ 12.07 hrs, Volume= 1,155,746 cf  
 Outflow = 334.51 cfs @ 12.11 hrs, Volume= 1,106,308 cf, Atten= 6%, Lag= 2.6 min  
 Discarded = 0.18 cfs @ 6.28 hrs, Volume= 60,110 cf  
 Primary = 27.59 cfs @ 12.11 hrs, Volume= 213,239 cf  
 Routed to Link 1L : Discharge Point 001  
 Secondary = 306.74 cfs @ 12.11 hrs, Volume= 832,959 cf  
 Routed to Pond 2P : SWM/BMP Facility #2

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 438.67' @ 12.11 hrs Surf.Area= 76,079 sf Storage= 262,949 cf

Plug-Flow detention time= 428.6 min calculated for 1,106,193 cf (96% of inflow)  
 Center-of-Mass det. time= 402.3 min ( 1,156.9 - 754.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	433.00'	55,746 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	436.00'	19,995 cf	<b>Forebay 1-0 Storage (Irregular)</b> Listed below (Recalc) -Impervious
#3	436.00'	306,235 cf	<b>Main Storage (Irregular)</b> Listed below (Recalc) -Impervious
		381,976 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
433.00	72,050	1,333.3	0.0	0	0	72,050
434.00	73,387	1,339.6	15.0	10,908	10,908	73,943
435.00	74,730	1,345.9	30.0	22,217	33,125	75,844
436.00	76,079	1,352.1	30.0	22,621	55,746	77,739

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	8,843	372.7	0	0	8,843
437.00	9,989	391.6	9,410	9,410	10,054
438.00	11,192	410.4	10,585	19,995	11,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
436.00	63,692	1,350.8	0	0	63,692
437.00	67,772	1,369.6	65,721	65,721	67,983
438.00	71,909	1,388.5	69,830	135,552	72,355
439.00	88,502	1,408.7	80,062	215,614	77,063
440.00	92,757	1,427.5	90,621	306,235	81,537

Device	Routing	Invert	Outlet Devices
#1	Primary	428.51'	<b>24.0" Round Primary Outlet Pipe</b> L= 46.5' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 428.51' / 428.05' S= 0.0099 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	434.00'	<b>2.9" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	437.70'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b>

**22-0123-005 - Post-Dev**

Type II 24-hr 100-Year Rainfall=7.61"

Prepared by Landworks Civil Design LLC

Printed 1/1/2023

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

Page 4

			X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area)
			Limited to weir flow at low heads
#4	Secondary	437.70'	<b>120.0' long + 3.0 '/' SideZ x 22.0' breadth Overflow Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#5	Discarded	433.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**Discarded OutFlow** Max=0.18 cfs @ 6.28 hrs HW=436.00' (Free Discharge)

↳ **5=Infiltration** (Exfiltration Controls 0.18 cfs)

**Primary OutFlow** Max=27.59 cfs @ 12.11 hrs HW=438.67' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 27.59 cfs of 45.78 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.47 cfs @ 10.27 fps)

↳ **3=Type M Inlet** (Orifice Controls 27.12 cfs @ 4.74 fps)

**Secondary OutFlow** Max=306.62 cfs @ 12.11 hrs HW=438.67' (Free Discharge)

↳ **4=Overflow Spillway** (Weir Controls 306.62 cfs @ 2.58 fps)

**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 1.22" for 2-Year event  
 Inflow = 17.04 cfs @ 12.01 hrs, Volume= 43,346 cf  
 Outflow = 0.73 cfs @ 13.85 hrs, Volume= 43,345 cf, Atten= 96%, Lag= 110.7 min  
 Discarded = 0.05 cfs @ 11.92 hrs, Volume= 15,320 cf  
 Primary = 0.68 cfs @ 13.85 hrs, Volume= 28,025 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 442.67' @ 13.85 hrs Surf.Area= 22,020 sf Storage= 24,824 cf

Plug-Flow detention time= 919.3 min calculated for 43,340 cf (100% of inflow)  
 Center-of-Mass det. time= 919.6 min ( 1,726.7 - 807.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>1.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

**22-0123-005 - Post-Dev**

Type II 24-hr 2-Year Rainfall=2.98"

Prepared by Landworks Civil Design LLC

Printed 1/1/2023

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

Page 2

			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63
#6	Discarded	440.00'	<b>0.100 in/hr Infiltration over Surface area</b>	Phase-In= 0.01'							

**Discarded OutFlow** Max=0.05 cfs @ 11.92 hrs HW=442.00' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=0.68 cfs @ 13.85 hrs HW=442.67' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 0.68 cfs of 3.16 cfs potential flow)  
   ↳ **2=MRC Orifice** (Orifice Controls 0.07 cfs @ 4.46 fps)  
   ↳ **3=Orifice** (Orifice Controls 0.61 cfs @ 3.12 fps)  
   ↳ **4=Type M Inlet** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** ( Controls 0.00 cfs)



**Summary for Pond 3P: MRC #3**

Inflow Area = 427,293 sf, 25.58% Impervious, Inflow Depth = 4.87" for 100-Year event  
 Inflow = 72.11 cfs @ 12.00 hrs, Volume= 173,587 cf  
 Outflow = 2.08 cfs @ 14.72 hrs, Volume= 171,841 cf, Atten= 97%, Lag= 163.3 min  
 Discarded = 0.05 cfs @ 9.81 hrs, Volume= 17,157 cf  
 Primary = 2.03 cfs @ 14.72 hrs, Volume= 154,684 cf  
 Routed to Link 3L : Discharge Point 003  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf  
 Routed to Link 3L : Discharge Point 003

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 446.00' @ 14.72 hrs Surf.Area= 22,020 sf Storage= 112,517 cf

Plug-Flow detention time= 806.8 min calculated for 171,823 cf (99% of inflow)  
 Center-of-Mass det. time= 800.7 min ( 1,593.3 - 792.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	440.00'	9,691 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	442.00'	237,461 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		247,153 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
440.00	20,864	272.0	0.0	0	0	20,864
441.00	21,439	578.3	15.0	3,173	3,173	41,594
442.00	22,020	587.6	30.0	6,519	9,691	42,635

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.00	22,020	584.6	0	0	22,020
443.00	23,802	603.4	22,905	22,905	23,894
444.00	25,641	622.3	24,716	47,621	25,837
445.00	27,536	641.1	26,583	74,204	27,830
446.00	29,488	660.0	28,506	102,710	29,892
447.00	31,496	678.8	30,486	133,197	32,003
448.00	33,561	697.7	32,523	165,720	34,185
449.00	35,682	716.5	34,616	200,336	36,416
450.00	38,588	768.5	37,126	237,461	42,606

Device	Routing	Invert	Outlet Devices
#1	Primary	441.81'	<b>24.0" Round Primary Outlet Pipe</b> L= 51.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 441.81' / 441.55' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	441.00'	<b>1.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	442.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Secondary	448.00'	<b>25.0' long + 3.0' /' SideZ x 22.0' breadth Emergency Spillway</b>

**22-0123-005 - Post-Dev**

Type II 24-hr 100-Year Rainfall=7.61"

Prepared by Landworks Civil Design LLC

Printed 1/1/2023

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

Page 4

	Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
	Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63
#6 Discarded	440.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'							

**Discarded OutFlow** Max=0.05 cfs @ 9.81 hrs HW=442.00' (Free Discharge)  
 ↳ **6=Infiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=2.00 cfs @ 14.72 hrs HW=446.00' (Free Discharge)  
 ↳ **1=Primary Outlet Pipe** (Passes 2.00 cfs of 27.03 cfs potential flow)  
 ↳ **2=MRC Orifice** (Orifice Controls 0.16 cfs @ 9.86 fps)  
 ↳ **3=Orifice** (Orifice Controls 1.83 cfs @ 9.33 fps)  
 ↳ **4=Type M Inlet** (Weir Controls 0.01 cfs @ 0.20 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=440.00' (Free Discharge)  
 ↳ **5=Emergency Spillway** ( Controls 0.00 cfs)

**Summary for Pond 4P: MRC #4**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 1.23" for 2-Year event  
 Inflow = 12.50 cfs @ 11.98 hrs, Volume= 28,143 cf  
 Outflow = 0.70 cfs @ 13.12 hrs, Volume= 28,143 cf, Atten= 94%, Lag= 68.4 min  
 Discarded = 0.03 cfs @ 11.90 hrs, Volume= 7,617 cf  
 Primary = 0.67 cfs @ 13.12 hrs, Volume= 20,526 cf  
 Routed to Link 9L : Discharge Point 009

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 447.72' @ 13.12 hrs Surf.Area= 12,314 sf Storage= 14,670 cf

Plug-Flow detention time= 677.7 min calculated for 28,143 cf (100% of inflow)  
 Center-of-Mass det. time= 677.7 min ( 1,497.3 - 819.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	445.60'	<b>18.0" Round Primary Outlet Pipe</b> L= 9.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.60' / 445.55' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	446.00'	<b>0.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	447.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	449.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Device 1	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads
#6	Discarded	445.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**22-0123-005 - Post-Dev**

Prepared by Landworks Civil Design LLC

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

*Type II 24-hr 2-Year Rainfall=2.98"*

Printed 1/1/2023

Page 2

**Discarded OutFlow** Max=0.03 cfs @ 11.90 hrs HW=447.02' (Free Discharge)

↳ **6=Infiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.67 cfs @ 13.12 hrs HW=447.72' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Passes 0.67 cfs of 9.09 cfs potential flow)

↳ **2=MRC Orifice** (Orifice Controls 0.02 cfs @ 6.27 fps)

↳ **3=Orifice** (Orifice Controls 0.65 cfs @ 3.31 fps)

↳ **4=Type M Inlet** ( Controls 0.00 cfs)

↳ **5=Emergency Type DH Inlet** ( Controls 0.00 cfs)

**Summary for Pond 4P: MRC #4**

Inflow Area = 274,116 sf, 15.62% Impervious, Inflow Depth = 5.03" for 100-Year event  
 Inflow = 51.76 cfs @ 11.98 hrs, Volume= 114,880 cf  
 Outflow = 16.41 cfs @ 12.11 hrs, Volume= 114,880 cf, Atten= 68%, Lag= 7.7 min  
 Discarded = 0.03 cfs @ 9.79 hrs, Volume= 8,474 cf  
 Primary = 16.38 cfs @ 12.11 hrs, Volume= 106,406 cf  
 Routed to Link 9L : Discharge Point 009

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 450.06' @ 12.11 hrs Surf.Area= 12,314 sf Storage= 50,664 cf

Plug-Flow detention time= 335.8 min calculated for 114,880 cf (100% of inflow)  
 Center-of-Mass det. time= 335.8 min ( 1,130.8 - 795.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	5,344 cf	<b>Soil Storage (Irregular)</b> Listed below (Recalc)
#2	447.00'	104,429 cf	<b>Basin Storage (Irregular)</b> Listed below (Recalc) -Impervious
		109,773 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	11,270	515.7	0.0	0	0	11,270
446.00	11,788	522.0	15.0	1,729	1,729	12,005
447.00	12,314	528.3	30.0	3,615	5,344	12,748

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.00	12,314	528.3	0	0	12,314
448.00	13,927	547.1	13,112	13,112	14,010
449.00	15,596	566.0	14,754	27,866	15,775
450.00	17,323	584.8	16,452	44,318	17,590
451.00	19,105	603.7	18,207	62,525	19,474
452.00	20,945	622.6	20,018	82,542	21,417
453.00	22,841	641.4	21,886	104,429	23,411

Device	Routing	Invert	Outlet Devices
#1	Primary	445.60'	<b>18.0" Round Primary Outlet Pipe</b> L= 9.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 445.60' / 445.55' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	446.00'	<b>0.7" Vert. MRC Orifice</b> C= 0.600 Limited to weir flow at low heads
#3	Device 1	447.00'	<b>6.0" Vert. Orifice</b> C= 0.600 Limited to weir flow at low heads
#4	Device 1	449.00'	<b>1.6" x 3.2" Horiz. Type M Inlet X 7.00 columns</b> X 23 rows C= 0.600 in 24.0" x 45.0" Grate (76% open area) Limited to weir flow at low heads
#5	Device 1	451.00'	<b>1.6" x 3.2" Horiz. Emergency Type DH Inlet X 7.00 columns</b> X 46 rows C= 0.600 in 24.0" x 93.0" Grate (74% open area) Limited to weir flow at low heads
#6	Discarded	445.00'	<b>0.100 in/hr Infiltration over Surface area</b> Phase-In= 0.01'

**22-0123-005 - Post-Dev**

Prepared by Landworks Civil Design LLC

HydroCAD® 10.20-2g s/n 12370 © 2022 HydroCAD Software Solutions LLC

*Type II 24-hr 100-Year Rainfall=7.61"*

Printed 1/1/2023

Page 4

**Discarded OutFlow** Max=0.03 cfs @ 9.79 hrs HW=447.00' (Free Discharge)

↳ **6=Infiltration** (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=16.38 cfs @ 12.11 hrs HW=450.06' (Free Discharge)

↳ **1=Primary Outlet Pipe** (Inlet Controls 16.38 cfs @ 9.27 fps)

↳ **2=MRC Orifice** (Passes < 0.03 cfs potential flow)

↳ **3=Orifice** (Passes < 1.58 cfs potential flow)

↳ **4=Type M Inlet** (Passes < 28.34 cfs potential flow)

↳ **5=Emergency Type DH Inlet** (Controls 0.00 cfs)

## **MRC 2-YEAR TO 1-YEAR RATE CHANGE**

**Summary for Subcatchment 1S: Watershed Area #1**

Runoff = 7.72 cfs @ 12.04 hrs, Volume= 19,542 cf, Depth= 0.83"  
 Routed to Link 1L : Discharge Point 001

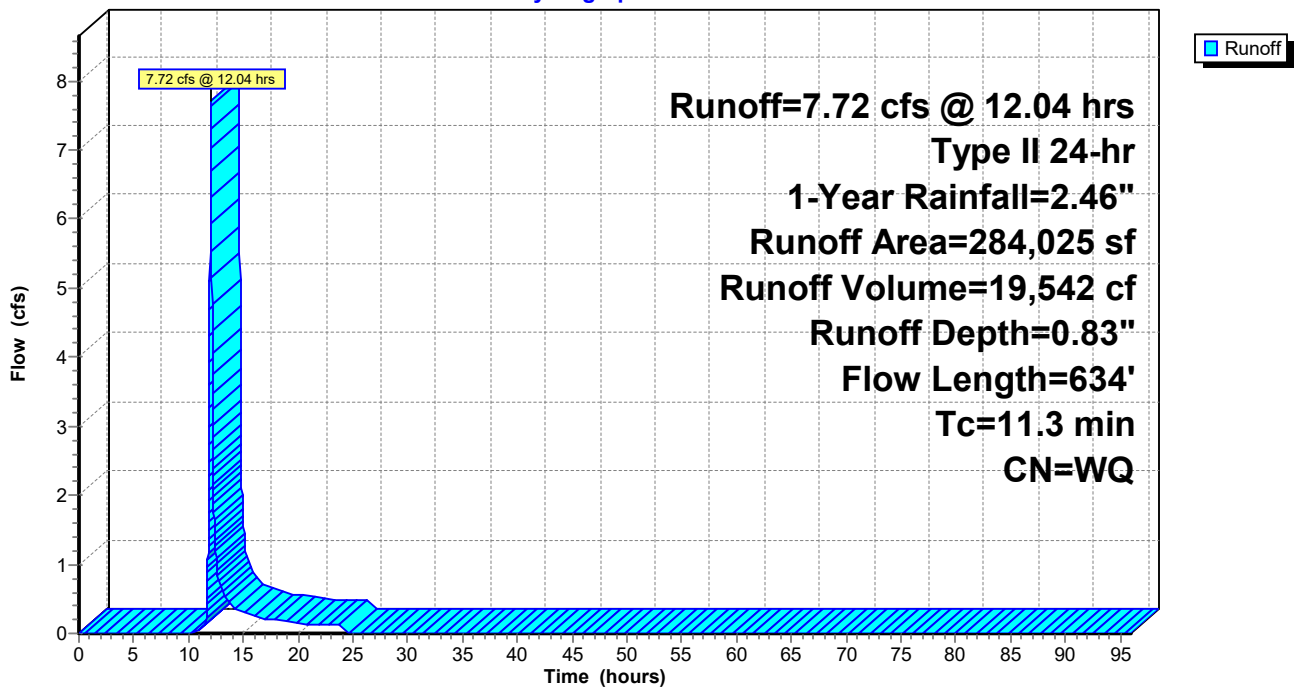
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 1-Year Rainfall=2.46"

Area (sf)	CN	Description
* 238,235	78	Farm / Straight Row / Good Condition / HSG B
* 44,215	85	Farm / Straight Row / Good Condition / HSG C
* 1,575	89	Farm / Straight Row / Good Condition / HSG D
284,025		Weighted Average
284,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	100	0.0907	0.30		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
5.8	534	0.0481	1.54		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
11.3	634	Total			

**Subcatchment 1S: Watershed Area #1**

Hydrograph





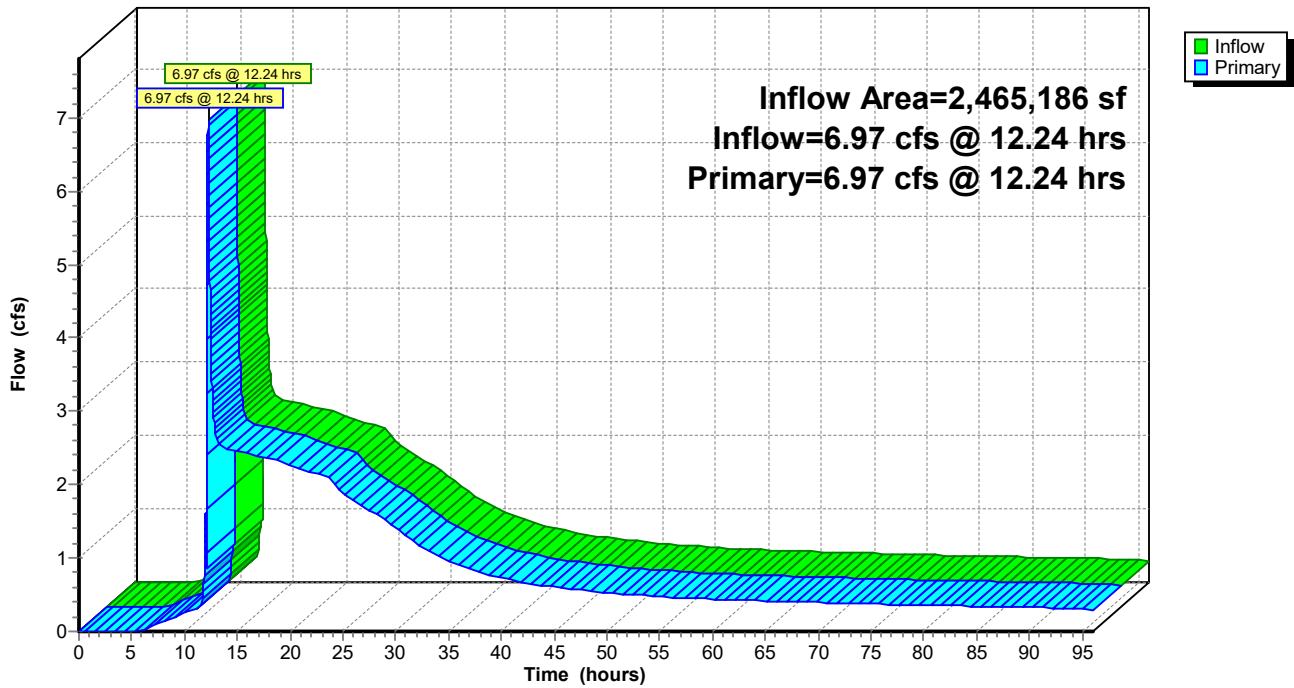
### Summary for Link 1L: Discharge Point 001

Inflow Area = 2,465,186 sf, 70.46% Impervious, Inflow Depth > 1.31" for 2-Year event  
Inflow = 6.97 cfs @ 12.24 hrs, Volume= 269,373 cf  
Primary = 6.97 cfs @ 12.24 hrs, Volume= 269,373 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 1L: Discharge Point 001

Hydrograph



**Summary for Subcatchment 3S: Watershed Area #3**

Runoff = 20.74 cfs @ 12.29 hrs, Volume= 99,270 cf, Depth= 0.93"

Routed to Link 3L : Discharge Point 003

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

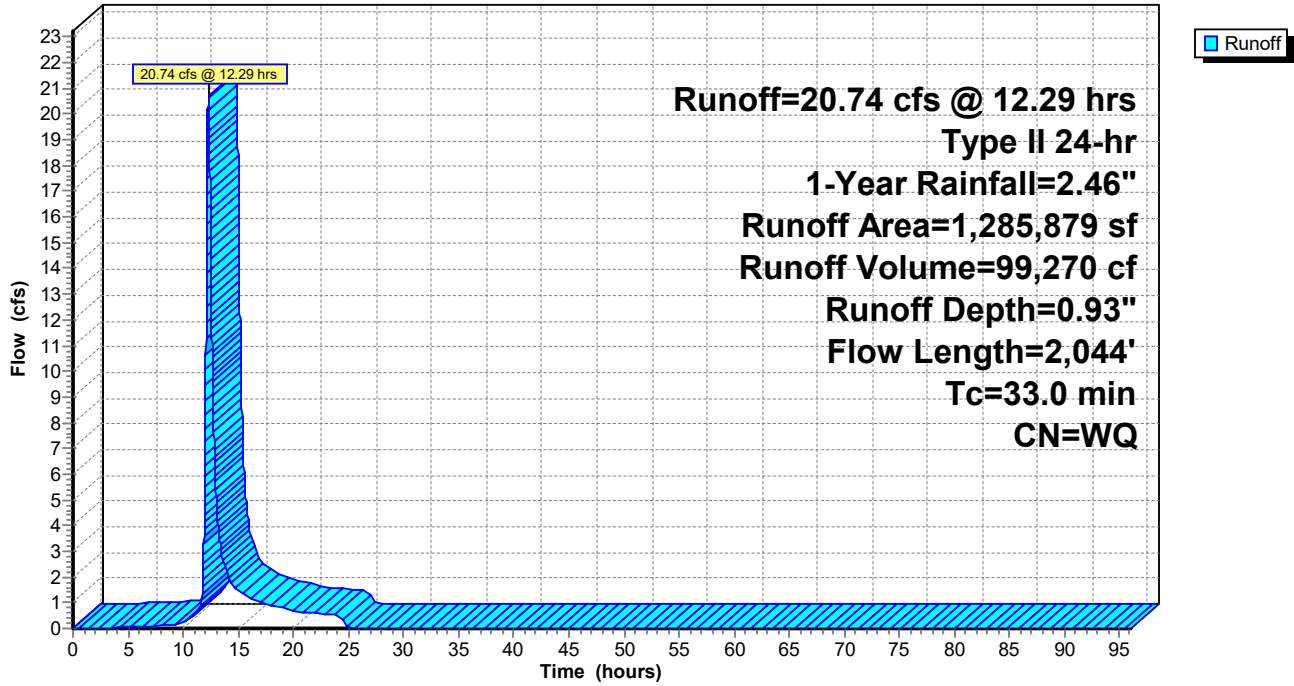
Type II 24-hr 1-Year Rainfall=2.46"

Area (sf)	CN	Description
* 54,956	98	Impervious
* 178	61	Open Space / Good Condition / HSG B
* 2,224	74	Open Space / Good Condition / HSG C
* 696,471	78	Farm / Straight Row / Good Condition / HSG B
* 243,785	85	Farm / Straight Row / Good Condition / HSG C
* 38,680	55	Woods / Good Condition / HSG B
* 10,675	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 93,021	85	Farm / Straight Row / Good Condition / HSG C (Offsite)
* 56,397	98	Impervious (Offsite)
* 56,750	61	Open Space / Good Condition / HSG B (Offsite)
* 31,342	55	Woods / Good Condition / HSG B (Offsite)
* 1,400	70	Woods / Good Condition / HSG C (Offsite)
1,285,879		Weighted Average
1,174,526		91.34% Pervious Area
111,353		8.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0181	0.16		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
9.7	915	0.0503	1.57		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
1.5	198	0.0184	2.18		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Unpaved Kv= 16.1 fps
0.3	26	0.0546	1.64		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
10.9	805	0.0307	1.23		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
33.0	2,044	Total			

### Subcatchment 3S: Watershed Area #3

Hydrograph



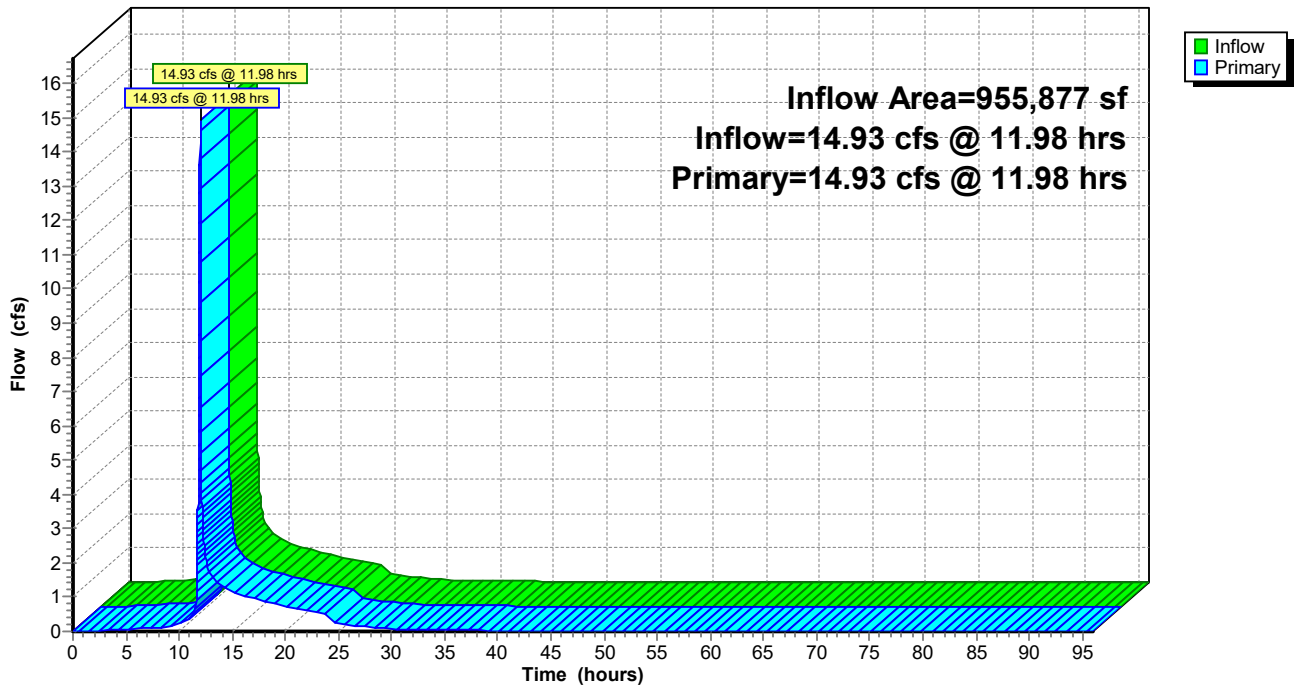
### Summary for Link 3L: Discharge Point 003

Inflow Area = 955,877 sf, 20.37% Impervious, Inflow Depth = 0.81" for 2-Year event  
Inflow = 14.93 cfs @ 11.98 hrs, Volume= 64,654 cf  
Primary = 14.93 cfs @ 11.98 hrs, Volume= 64,654 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 3L: Discharge Point 003

Hydrograph



**Summary for Subcatchment 9S: Watershed Area #9**

Runoff = 2.97 cfs @ 12.13 hrs, Volume= 11,780 cf, Depth= 0.46"

Routed to Link 9L : Discharge Point 009

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

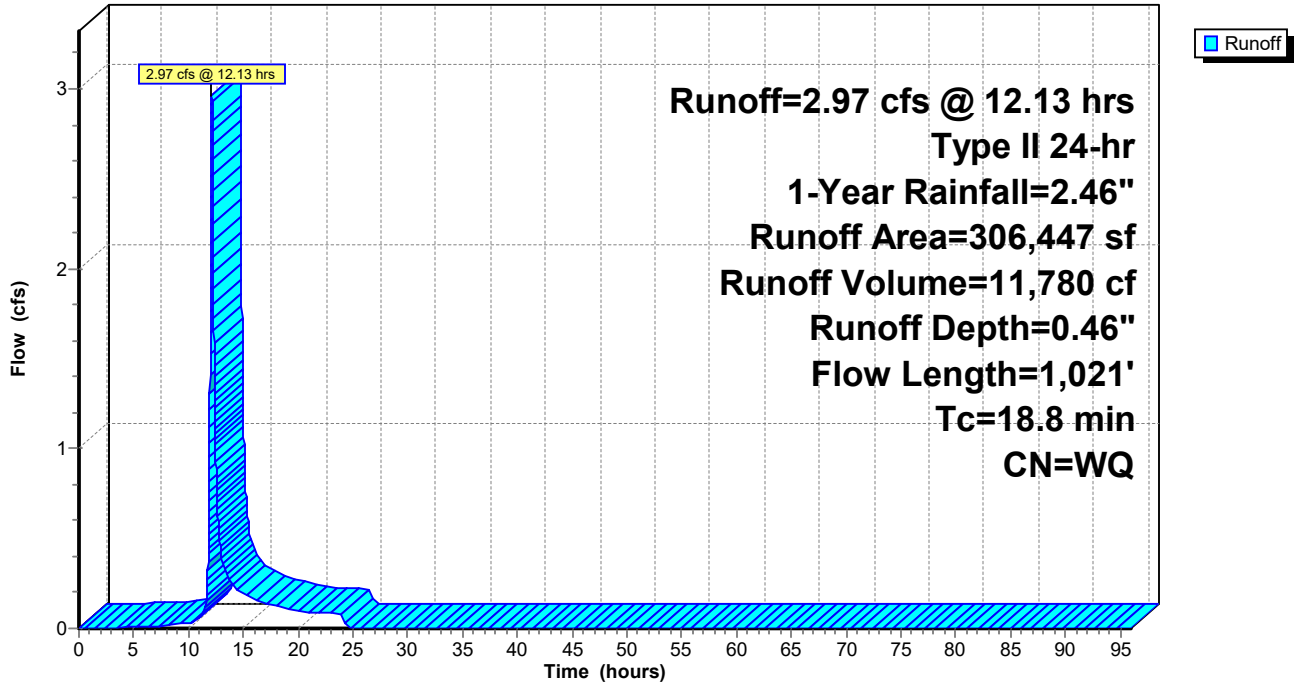
Type II 24-hr 1-Year Rainfall=2.46"

Area (sf)	CN	Description
* 37,178	61	Open Space / Good Condition / HSG B
* 31,300	78	Farm / Straight Row / Good Condition / HSG B
* 35,811	55	Woods / Good Condition / HSG B
* 68,172	78	Farm / Straight Row / Good Condition / HSG B (Offsite)
* 17,146	98	Impervious
* 82,143	61	Open Space / Good Condition / HSG B (Offsite)
* 34,697	55	Woods / Good Condition / HSG B (Offsite)
306,447		Weighted Average
289,301		94.40% Pervious Area
17,146		5.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	100	0.0300	0.19		<b>Sheet Flow, Sheet Flow</b> Grass: Short n= 0.150 P2= 2.98"
10.2	921	0.0465	1.51		<b>Shallow Concentrated Flow, Shallow Concentrated Flow</b> Short Grass Pasture Kv= 7.0 fps
18.8	1,021	Total			

Subcatchment 9S: Watershed Area #9

Hydrograph



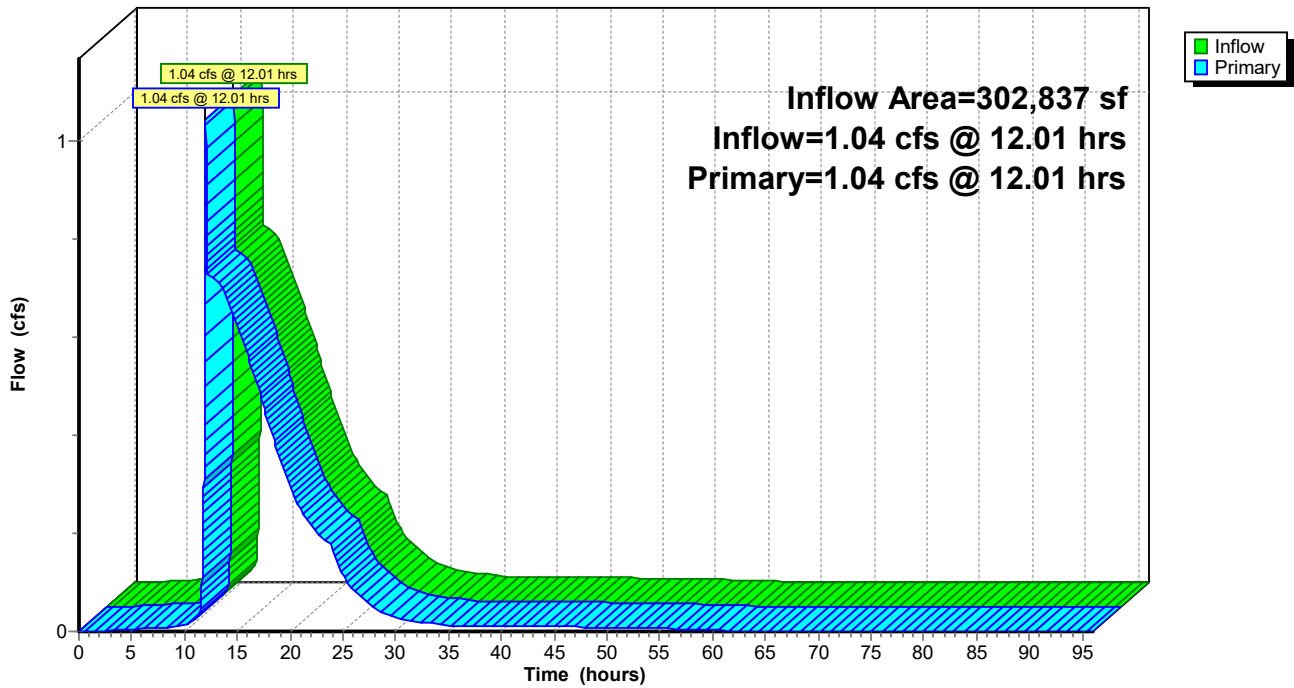
### Summary for Link 9L: Discharge Point 009

Inflow Area = 302,837 sf, 16.05% Impervious, Inflow Depth = 0.89" for 2-Year event  
Inflow = 1.04 cfs @ 12.01 hrs, Volume= 22,537 cf  
Primary = 1.04 cfs @ 12.01 hrs, Volume= 22,537 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

### Link 9L: Discharge Point 009

Hydrograph



## **MRC MANAGED VOLUME**



Post-Construction Conditions: 7 No. Rows: 7 TOTAL (ACRES): 6.52 TOTAL (CF): 8,215

Land Cover	Area (acres)	Group	CN	la (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	39.87	N/A	98	0.041	2.75	397,791
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	11.58	B	58	1.448	0.27	11,238
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	2.07	C	71	0.817	0.75	5,626
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.04	D	78	0.564	1.11	179
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	2.78	B	61	1.279	0.36	3,608
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.25	C	74	0.703	0.90	812
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
<b>TOTAL (ACRES): 56.59</b>						<b>TOTAL (CF): 419,254</b>

NET CHANGE IN VOLUME TO MANAGE (CF): 411,039

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

**Structural BMP Volume Credits:**

No. Structural BMPs: 2 Start BMP Numbering at: 1

DP No.	BMP No.	BMP Name	MRG	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Rain Garden / Bioretention	Y	Off-Site	47.98	407,432	76,079	0.10	96	Yes	3.0	0	6,847	57,744
001	2	Dry Extended Detention Basin	-	Off-Site	7.54	7,658	76,712	0.00	96	Yes	0.5	0	0	7,658

Totals: 6,847 65,402

INFILTRATION & ET CREDITS (CF):	72,249
MANAGED RELEASE CREDIT (CF):	342,841

NET CHANGE IN VOLUME TO MANAGE (CF):	411,039
TOTAL CREDITS (CF):	415,090

VOLUME REQUIREMENT SATISFIED

Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.56	N/A	98	0.041	2.75	5,543
<b>TOTAL (ACRES):</b>		<b>24.35</b>	<b>TOTAL (CF):</b>			<b>47,366</b>

No. Rows:

Post-Construction Conditions:

Land Cover	Area (acres)	Group	CN	la (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	3.18	N/A	98	0.041	2.75	31,677
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	5.89	B	58	1.448	0.27	5,722
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	4.07	C	71	0.817	0.75	11,066
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	2.21	B	61	1.279	0.36	2,866
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.77	C	74	0.703	0.90	2,490
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.56	N/A	98	0.041	2.75	5,543
<b>TOTAL (ACRES):</b>		<b>16.67</b>	<b>TOTAL (CF):</b>			<b>59,363</b>

**NET CHANGE IN VOLUME TO MANAGE (CF):**

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

No. Structural BMPs:  Start BMP Numbering at:

Structural BMP Volume Credits:

DP No.	BMP No.	BMP Name	MR?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)

003	3	Rain Garden / Bioretention	Y	Off-Site	6.41	23,416	22,020	0.10	96	No	2.0	0	1,982	
-----	---	----------------------------	---	----------	------	--------	--------	------	----	----	-----	---	-------	--

Totals: 1,982

INFILTRATION & ET CREDITS (CF):	1,982
MANAGED RELEASE CREDIT (CF):	21,434

NET CHANGE IN VOLUME TO MANAGE (CF):	11,996
TOTAL CREDITS (CF):	23,416

VOLUME REQUIREMENT SATISFIED

Impervious Areas: Streets and Roads - Paved; Curbs and Storm Sewers (Excluding ROW)	0.36	N/A	98	0.041	2.75	3,612
<b>TOTAL (ACRES):</b>		<b>2.76</b>	<b>TOTAL (CF):</b>		<b>5,704</b>	

**Post-Construction Conditions:** No. Rows:

Land Cover	Area (acres)	Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.72	N/A	98	0.041	2.75	7,207
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	B	58	1.448	0.27	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	C	71	0.817	0.75	0
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.00	D	78	0.564	1.11	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	1.59	B	61	1.279	0.36	2,062
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	C	74	0.703	0.90	0
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.00	D	80	0.500	1.24	0
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.36	N/A	98	0.041	2.75	3,612
<b>TOTAL (ACRES):</b>		<b>2.67</b>	<b>TOTAL (CF):</b>		<b>12,882</b>	

**NET CHANGE IN VOLUME TO MANAGE (CF):**

**Non-Structural BMP Volume Credits:**

- Tree Planting Credit
- Other (attach calculations):

**Structural BMP Volume Credits:** No. Structural BMPs:  Start BMP Numbering at:

DP No.	BMP No.	BMP Name	MR?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)

009	4	Rain Garden / Bioretention	Y	Off-Site	1.65	7,258	12,314	0.10	96	No	2.0	0	1,108	
-----	---	-------------------------------	---	----------	------	-------	--------	------	----	----	-----	---	-------	--

Totals: 1,108

INFILTRATION & ET CREDITS (CF):	1,108
MANAGED RELEASE CREDIT (CF):	6,150

NET CHANGE IN VOLUME TO MANAGE (CF):	7,178
TOTAL CREDITS (CF):	7,258

VOLUME REQUIREMENT SATISFIED

## **MRC DEWATERING TIMES**

**Hydrograph for Pond 1P: MRC Facility #1**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	433.00	0.00	0.00	0.00	0.00
0.50	0.00	0	433.00	0.00	0.00	0.00	0.00
1.00	0.55	268	433.02	0.06	0.06	0.00	0.00
1.50	1.40	1,804	433.17	0.17	0.17	0.00	0.00
2.00	2.03	4,615	433.43	0.17	0.17	0.00	0.00
2.50	2.51	8,410	433.77	0.17	0.17	0.00	0.00
3.00	2.90	12,977	434.09	0.19	0.17	0.02	0.00
3.50	3.23	18,082	434.32	0.27	0.17	0.10	0.00
4.00	3.52	23,626	434.57	0.32	0.17	0.15	0.00
4.50	3.85	29,620	434.84	0.36	0.17	0.19	0.00
5.00	4.22	36,205	435.14	0.40	0.17	0.22	0.00
5.50	4.59	43,400	435.46	0.43	0.17	0.26	0.00
6.00	4.95	51,191	435.80	0.46	<b>0.18</b>	0.29	0.00
6.50	5.30	59,571	436.05	0.48	<b>0.18</b>	0.31	0.00
7.00	5.66	68,557	436.18	0.49	0.18	0.32	0.00
7.50	5.99	78,146	436.31	0.50	0.18	0.33	0.00
8.00	6.33	88,331	436.44	0.51	0.18	0.34	0.00
8.50	7.30	99,451	436.59	0.52	0.18	0.35	0.00
9.00	8.82	113,006	436.77	0.54	0.18	0.36	0.00
9.50	9.58	128,869	436.97	0.55	0.18	0.37	0.00
10.00	10.91	145,864	437.19	0.56	0.18	0.39	0.00
10.50	14.06	167,062	437.46	0.58	0.18	0.40	0.00
11.00	19.26	193,363	437.78	9.64	0.18	1.37	8.09
11.50	30.48	200,971	437.88	27.41	0.18	3.23	24.01
12.00	<b>307.02</b>	<b>247,024</b>	<b>438.47</b>	<b>243.94</b>	0.18	<b>24.68</b>	<b>219.09</b>
12.50	<b>56.81</b>	<b>213,782</b>	<b>438.03</b>	<b>70.88</b>	0.18	<b>7.72</b>	<b>62.98</b>
13.00	25.49	201,261	437.88	28.19	0.18	3.31	24.70
13.50	18.60	198,086	437.84	19.72	0.18	2.42	17.12
14.00	14.48	196,249	437.82	15.47	0.18	1.98	13.31
14.50	12.22	194,869	437.80	12.68	0.18	1.69	10.82
15.00	11.01	194,207	437.79	11.34	0.18	1.55	9.62
15.50	9.80	193,609	437.79	10.13	0.18	1.42	8.54
16.00	8.60	193,011	437.78	8.93	0.18	1.29	7.46
16.50	7.79	192,531	437.77	7.96	0.18	1.19	6.59
17.00	7.36	192,295	437.77	7.48	0.18	1.14	6.16
17.50	6.93	192,081	437.77	7.05	0.18	1.10	5.78
18.00	6.49	191,867	437.76	6.62	0.18	1.05	5.39
18.50	6.07	191,653	437.76	6.18	0.18	1.01	5.00
19.00	5.63	191,424	437.76	5.80	0.18	0.96	4.65
19.50	5.19	191,067	437.75	5.41	0.18	0.92	4.31
20.00	4.76	190,671	437.75	4.98	0.18	0.88	3.93
20.50	4.51	190,339	437.75	4.62	0.18	0.84	3.61
21.00	4.42	190,202	437.74	4.48	0.18	0.83	3.47
21.50	4.34	190,114	437.74	4.38	0.18	0.82	3.39
22.00	4.25	190,033	437.74	4.29	0.18	0.81	3.31
22.50	4.17	189,953	437.74	4.21	0.18	0.80	3.23
23.00	4.07	189,873	437.74	4.12	0.18	0.79	3.16
23.50	3.99	189,793	437.74	4.03	0.18	0.78	3.08
24.00	3.90	189,713	437.74	3.95	0.18	0.77	3.00
24.50	0.13	187,471	437.71	1.53	0.18	0.52	0.84
25.00	0.00	186,080	437.69	0.59	0.18	0.42	0.00
25.50	0.00	185,012	437.68	0.59	0.18	0.42	0.00



**Hydrograph for Pond 1P: MRC Facility #1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
26.00	0.00	183,946	437.67	0.59	0.18	0.42	0.00
26.50	0.00	182,881	437.65	0.59	0.18	0.42	0.00
27.00	0.00	181,817	437.64	0.59	0.18	0.41	0.00
27.50	0.00	180,755	437.63	0.59	0.18	0.41	0.00
28.00	0.00	179,694	437.61	0.59	0.18	0.41	0.00
28.50	0.00	178,635	437.60	0.59	0.18	0.41	0.00
29.00	0.00	177,577	437.59	0.59	0.18	0.41	0.00
29.50	0.00	176,520	437.58	0.59	0.18	0.41	0.00
30.00	0.00	175,465	437.56	0.59	0.18	0.41	0.00
30.50	0.00	174,411	437.55	0.59	0.18	0.41	0.00
31.00	0.00	173,359	437.54	0.58	0.18	0.41	0.00
31.50	0.00	172,308	437.52	0.58	0.18	0.41	0.00
32.00	0.00	171,258	437.51	0.58	0.18	0.41	0.00
32.50	0.00	170,210	437.50	0.58	0.18	0.41	0.00
33.00	0.00	169,163	437.48	0.58	0.18	0.41	0.00
33.50	0.00	168,118	437.47	0.58	0.18	0.40	0.00
34.00	0.00	167,074	437.46	0.58	0.18	0.40	0.00
34.50	0.00	166,031	437.45	0.58	0.18	0.40	0.00
35.00	0.00	164,990	437.43	0.58	0.18	0.40	0.00
35.50	0.00	163,950	437.42	0.58	0.18	0.40	0.00
36.00	0.00	162,912	437.41	0.58	0.18	0.40	0.00
36.50	0.00	161,875	437.39	0.58	0.18	0.40	0.00
37.00	0.00	160,840	437.38	0.57	0.18	0.40	0.00
37.50	0.00	159,806	437.37	0.57	0.18	0.40	0.00
38.00	0.00	158,773	437.35	0.57	0.18	0.40	0.00
38.50	0.00	157,742	437.34	0.57	0.18	0.40	0.00
39.00	0.00	156,712	437.33	0.57	0.18	0.40	0.00
39.50	0.00	155,684	437.32	0.57	0.18	0.39	0.00
40.00	0.00	154,657	437.30	0.57	0.18	0.39	0.00
40.50	0.00	153,632	437.29	0.57	0.18	0.39	0.00
41.00	0.00	152,608	437.28	0.57	0.18	0.39	0.00
41.50	0.00	151,585	437.26	0.57	0.18	0.39	0.00
42.00	0.00	150,564	437.25	0.57	0.18	0.39	0.00
42.50	0.00	149,545	437.24	0.57	0.18	0.39	0.00
43.00	0.00	148,526	437.23	0.57	0.18	0.39	0.00
43.50	0.00	147,510	437.21	0.56	0.18	0.39	0.00
44.00	0.00	146,494	437.20	0.56	0.18	0.39	0.00
44.50	0.00	145,481	437.19	0.56	0.18	0.39	0.00
45.00	0.00	144,468	437.17	0.56	0.18	0.39	0.00
45.50	0.00	143,457	437.16	0.56	0.18	0.39	0.00
46.00	0.00	142,448	437.15	0.56	0.18	0.38	0.00
46.50	0.00	141,440	437.14	0.56	0.18	0.38	0.00
47.00	0.00	140,434	437.12	0.56	0.18	0.38	0.00
47.50	0.00	139,429	437.11	0.56	0.18	0.38	0.00
48.00	0.00	138,425	437.10	0.56	0.18	0.38	0.00
48.50	0.00	137,423	437.08	0.56	0.18	0.38	0.00
49.00	0.00	136,422	437.07	0.56	0.18	0.38	0.00
49.50	0.00	135,423	437.06	0.55	0.18	0.38	0.00
50.00	0.00	134,426	437.05	0.55	0.18	0.38	0.00
50.50	0.00	133,430	437.03	0.55	0.18	0.38	0.00
51.00	0.00	132,435	437.02	0.55	0.18	0.38	0.00
51.50	0.00	131,442	437.01	0.55	0.18	0.38	0.00

**Hydrograph for Pond 1P: MRC Facility #1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
52.00	0.00	130,450	436.99	0.55	0.18	0.37	0.00
52.50	0.00	129,460	436.98	0.55	0.18	0.37	0.00
53.00	0.00	128,471	436.97	0.55	0.18	0.37	0.00
53.50	0.00	127,484	436.96	0.55	0.18	0.37	0.00
54.00	0.00	126,499	436.94	0.55	0.18	0.37	0.00
54.50	0.00	125,514	436.93	0.55	0.18	0.37	0.00
55.00	0.00	124,532	436.92	0.55	0.18	0.37	0.00
55.50	0.00	123,551	436.91	0.54	0.18	0.37	0.00
56.00	0.00	122,571	436.89	0.54	0.18	0.37	0.00
56.50	0.00	121,593	436.88	0.54	0.18	0.37	0.00
57.00	0.00	120,616	436.87	0.54	0.18	0.37	0.00
57.50	0.00	119,641	436.85	0.54	0.18	0.37	0.00
58.00	0.00	118,668	436.84	0.54	0.18	0.36	0.00
58.50	0.00	117,696	436.83	0.54	0.18	0.36	0.00
59.00	0.00	116,725	436.82	0.54	0.18	0.36	0.00
59.50	0.00	115,756	436.80	0.54	0.18	0.36	0.00
60.00	0.00	114,789	436.79	0.54	0.18	0.36	0.00
60.50	0.00	113,823	436.78	0.54	0.18	0.36	0.00
61.00	0.00	112,858	436.77	0.54	0.18	0.36	0.00
61.50	0.00	111,896	436.75	0.53	0.18	0.36	0.00
62.00	0.00	110,934	436.74	0.53	0.18	0.36	0.00
62.50	0.00	109,975	436.73	0.53	0.18	0.36	0.00
63.00	0.00	109,016	436.72	0.53	0.18	0.36	0.00
63.50	0.00	108,060	436.70	0.53	0.18	0.35	0.00
64.00	0.00	107,105	436.69	0.53	0.18	0.35	0.00
64.50	0.00	106,151	436.68	0.53	0.18	0.35	0.00
65.00	0.00	105,199	436.67	0.53	0.18	0.35	0.00
65.50	0.00	104,249	436.65	0.53	0.18	0.35	0.00
66.00	0.00	103,300	436.64	0.53	0.18	0.35	0.00
66.50	0.00	102,352	436.63	0.53	0.18	0.35	0.00
67.00	0.00	101,407	436.62	0.52	0.18	0.35	0.00
67.50	0.00	100,463	436.60	0.52	0.18	0.35	0.00
68.00	0.00	99,520	436.59	0.52	0.18	0.35	0.00
68.50	0.00	98,579	436.58	0.52	0.18	0.35	0.00
69.00	0.00	97,640	436.57	0.52	0.18	0.35	0.00
69.50	0.00	96,702	436.55	0.52	0.18	0.34	0.00
70.00	0.00	95,765	436.54	0.52	0.18	0.34	0.00
70.50	0.00	94,831	436.53	0.52	0.18	0.34	0.00
71.00	0.00	93,898	436.52	0.52	0.18	0.34	0.00
71.50	0.00	92,966	436.50	0.52	0.18	0.34	0.00
72.00	0.00	92,036	436.49	0.52	0.18	0.34	0.00
72.50	0.00	91,108	436.48	0.52	0.18	0.34	0.00
73.00	0.00	90,181	436.47	0.51	0.18	0.34	0.00
73.50	0.00	89,256	436.45	0.51	0.18	0.34	0.00
74.00	0.00	88,333	436.44	0.51	0.18	0.34	0.00
74.50	0.00	87,411	436.43	0.51	0.18	0.34	0.00
75.00	0.00	86,490	436.42	0.51	0.18	0.33	0.00
75.50	0.00	85,572	436.41	0.51	0.18	0.33	0.00
76.00	0.00	84,655	436.39	0.51	0.18	0.33	0.00
76.50	0.00	83,739	436.38	0.51	0.18	0.33	0.00
77.00	0.00	82,825	436.37	0.51	0.18	0.33	0.00
77.50	0.00	81,913	436.36	0.51	0.18	0.33	0.00

**Hydrograph for Pond 1P: MRC Facility #1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
78.00	0.00	81,003	436.34	0.51	0.18	0.33	0.00
78.50	0.00	80,094	436.33	0.50	0.18	0.33	0.00
79.00	0.00	79,186	436.32	0.50	0.18	0.33	0.00
79.50	0.00	78,281	436.31	0.50	0.18	0.33	0.00
80.00	0.00	77,377	436.30	0.50	0.18	0.33	0.00
80.50	0.00	76,474	436.28	0.50	0.18	0.32	0.00
81.00	0.00	75,574	436.27	0.50	0.18	0.32	0.00
81.50	0.00	74,675	436.26	0.50	0.18	0.32	0.00
82.00	0.00	73,777	436.25	0.50	0.18	0.32	0.00
82.50	0.00	72,882	436.23	0.50	0.18	0.32	0.00
83.00	0.00	71,987	436.22	0.50	0.18	0.32	0.00
83.50	0.00	71,095	436.21	0.50	0.18	0.32	0.00
84.00	0.00	70,204	436.20	0.49	0.18	0.32	0.00
84.50	0.00	69,315	436.19	0.49	0.18	0.32	0.00
85.00	0.00	68,428	436.17	0.49	0.18	0.32	0.00
85.50	0.00	67,542	436.16	0.49	0.18	0.32	0.00
86.00	0.00	66,658	436.15	0.49	0.18	0.31	0.00
86.50	0.00	65,775	436.14	0.49	0.18	0.31	0.00
87.00	0.00	64,895	436.13	0.49	0.18	0.31	0.00
87.50	0.00	64,016	436.11	0.49	0.18	0.31	0.00
88.00	0.00	63,138	436.10	0.49	0.18	0.31	0.00
88.50	0.00	62,263	436.09	0.49	0.18	0.31	0.00
89.00	0.00	61,389	436.08	0.49	0.18	0.31	0.00
89.50	0.00	60,517	436.07	0.48	0.18	0.31	0.00
90.00	0.00	59,646	436.05	0.48	0.18	0.31	0.00
90.50	0.00	58,777	436.04	0.48	0.18	0.31	0.00
91.00	0.00	57,910	436.03	0.48	0.18	0.31	0.00
91.50	0.00	57,045	436.02	0.48	0.18	0.30	0.00
92.00	0.00	56,181	436.01	0.48	0.18	0.30	0.00
92.50	0.00	55,320	435.98	0.48	0.18	0.30	0.00
93.00	0.00	54,463	435.94	0.47	0.18	0.30	0.00
93.50	0.00	53,613	435.91	0.47	0.18	0.30	0.00
94.00	0.00	52,768	435.87	0.47	0.18	0.29	0.00
94.50	0.00	51,929	435.83	0.46	0.18	0.29	0.00
95.00	0.00	51,096	435.80	0.46	0.18	0.29	0.00
95.50	0.00	50,268	435.76	0.46	0.18	0.28	0.00
96.00	0.00	49,447	435.72	0.45	0.18	0.28	0.00
96.50	0.00	48,631	435.69	0.45	0.18	0.28	0.00
97.00	0.00	47,821	435.65	0.45	0.18	0.27	0.00
97.50	0.00	47,017	435.62	0.44	0.17	0.27	0.00
98.00	0.00	46,219	435.58	0.44	0.17	0.27	0.00
98.50	0.00	45,427	435.55	0.44	0.17	0.26	0.00
99.00	0.00	44,641	435.51	0.44	0.17	0.26	0.00
99.50	0.00	43,861	435.48	0.43	0.17	0.26	0.00
100.00	0.00	43,087	435.44	0.43	0.17	0.25	0.00
100.50	0.00	42,319	435.41	0.42	0.17	0.25	0.00
101.00	0.00	41,558	435.37	0.42	0.17	0.25	0.00
101.50	0.00	40,802	435.34	0.42	0.17	0.24	0.00
102.00	0.00	40,053	435.31	0.41	0.17	0.24	0.00
102.50	0.00	39,310	435.28	0.41	0.17	0.24	0.00
103.00	0.00	38,573	435.24	0.41	0.17	0.23	0.00
103.50	0.00	37,842	435.21	0.40	0.17	0.23	0.00

**Hydrograph for Pond 1P: MRC Facility #1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
104.00	0.00	37,118	435.18	0.40	0.17	0.23	0.00
104.50	0.00	36,400	435.15	0.40	0.17	0.22	0.00
105.00	0.00	35,689	435.11	0.39	0.17	0.22	0.00
105.50	0.00	34,984	435.08	0.39	0.17	0.22	0.00
106.00	0.00	34,285	435.05	0.39	0.17	0.21	0.00
106.50	0.00	33,593	435.02	0.38	0.17	0.21	0.00
107.00	0.00	32,908	434.99	0.38	0.17	0.21	0.00
107.50	0.00	32,229	434.96	0.38	0.17	0.20	0.00
108.00	0.00	31,557	434.93	0.37	0.17	0.20	0.00
108.50	0.00	30,892	434.90	0.37	0.17	0.19	0.00
109.00	0.00	30,234	434.87	0.36	0.17	0.19	0.00
109.50	0.00	29,583	434.84	0.36	0.17	0.19	0.00
110.00	0.00	28,938	434.81	0.36	0.17	0.18	0.00
110.50	0.00	28,301	434.78	0.35	0.17	0.18	0.00
111.00	0.00	27,670	434.76	0.35	0.17	0.18	0.00
111.50	0.00	27,047	434.73	0.34	0.17	0.17	0.00
112.00	0.00	26,431	434.70	0.34	0.17	0.17	0.00
112.50	0.00	25,822	434.67	0.34	0.17	0.16	0.00
113.00	0.00	25,221	434.65	0.33	0.17	0.16	0.00
113.50	0.00	24,628	434.62	0.33	0.17	0.16	0.00
114.00	0.00	24,041	434.59	0.32	0.17	0.15	0.00
114.50	0.00	23,463	434.57	0.32	0.17	0.15	0.00
115.00	0.00	22,893	434.54	0.31	0.17	0.14	0.00
115.50	0.00	22,330	434.52	0.31	0.17	0.14	0.00
116.00	0.00	21,776	434.49	0.31	0.17	0.13	0.00
116.50	0.00	21,229	434.47	0.30	0.17	0.13	0.00
117.00	0.00	20,692	434.44	0.30	0.17	0.13	0.00
117.50	0.00	20,162	434.42	0.29	0.17	0.12	0.00
118.00	0.00	19,642	434.40	0.29	0.17	0.12	0.00
118.50	0.00	19,130	434.37	0.28	0.17	0.11	0.00
119.00	0.00	18,628	434.35	0.28	0.17	0.11	0.00
119.50	0.00	18,136	434.33	0.27	0.17	0.10	0.00
120.00	0.00	17,653	434.31	0.27	0.17	0.09	0.00
120.50	0.00	17,180	434.28	0.26	0.17	0.09	0.00
121.00	0.00	16,718	434.26	0.25	0.17	0.08	0.00
121.50	0.00	16,267	434.24	0.25	0.17	0.08	0.00
122.00	0.00	15,829	434.22	0.24	0.17	0.07	0.00
122.50	0.00	15,404	434.20	0.23	0.17	0.06	0.00
123.00	0.00	14,991	434.19	0.23	0.17	0.06	0.00
123.50	0.00	14,592	434.17	0.22	0.17	0.05	0.00
124.00	0.00	14,207	434.15	0.21	0.17	0.04	0.00
124.50	0.00	13,835	434.13	0.20	0.17	0.03	0.00
125.00	0.00	13,477	434.12	0.20	0.17	0.03	0.00
125.50	0.00	13,128	434.10	0.19	0.17	0.02	0.00
126.00	0.00	12,789	434.09	0.19	0.17	0.02	0.00
126.50	0.00	12,458	434.07	0.18	0.17	0.01	0.00
127.00	0.00	12,135	434.06	0.18	0.17	0.01	0.00
127.50	0.00	11,819	434.04	0.17	0.17	0.00	0.00
128.00	0.00	11,507	434.03	0.17	0.17	0.00	0.00
128.50	0.00	11,197	434.01	0.17	0.17	0.00	0.00
129.00	0.00	10,890	434.00	0.17	0.17	0.00	0.00
129.50	0.00	10,585	433.97	0.17	0.17	0.00	0.00

**Hydrograph for Pond 1P: MRC Facility #1 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
130.00	0.00	10,279	433.94	0.17	0.17	0.00	0.00
130.50	0.00	9,974	433.92	0.17	0.17	0.00	0.00
131.00	0.00	9,668	433.89	0.17	0.17	0.00	0.00
131.50	0.00	9,363	433.86	0.17	0.17	0.00	0.00
132.00	0.00	9,058	433.83	0.17	0.17	0.00	0.00
132.50	0.00	8,754	433.80	0.17	0.17	0.00	0.00
133.00	0.00	8,449	433.78	0.17	0.17	0.00	0.00
133.50	0.00	8,145	433.75	0.17	0.17	0.00	0.00
134.00	0.00	7,840	433.72	0.17	0.17	0.00	0.00
134.50	0.00	7,536	433.69	0.17	0.17	0.00	0.00
135.00	0.00	7,232	433.67	0.17	0.17	0.00	0.00
135.50	0.00	6,928	433.64	0.17	0.17	0.00	0.00
136.00	0.00	6,625	433.61	0.17	0.17	0.00	0.00
136.50	0.00	6,321	433.58	0.17	0.17	0.00	0.00
137.00	0.00	6,018	433.55	0.17	0.17	0.00	0.00
137.50	0.00	5,715	433.53	0.17	0.17	0.00	0.00
138.00	0.00	5,412	433.50	0.17	0.17	0.00	0.00
138.50	0.00	5,109	433.47	0.17	0.17	0.00	0.00
139.00	0.00	4,806	433.44	0.17	0.17	0.00	0.00
139.50	0.00	4,503	433.42	0.17	0.17	0.00	0.00
140.00	0.00	4,201	433.39	0.17	0.17	0.00	0.00
140.50	0.00	3,899	433.36	0.17	0.17	0.00	0.00
141.00	0.00	3,596	433.33	0.17	0.17	0.00	0.00
141.50	0.00	3,295	433.30	0.17	0.17	0.00	0.00
142.00	0.00	2,993	433.28	0.17	0.17	0.00	0.00
142.50	0.00	2,691	433.25	0.17	0.17	0.00	0.00
143.00	0.00	2,390	433.22	0.17	0.17	0.00	0.00
143.50	0.00	2,088	433.19	0.17	0.17	0.00	0.00
144.00	0.00	1,787	433.17	0.17	0.17	0.00	0.00
144.50	0.00	1,486	433.14	0.17	0.17	0.00	0.00
145.00	0.00	1,185	433.11	0.17	0.17	0.00	0.00
145.50	0.00	884	433.08	0.17	0.17	0.00	0.00
146.00	0.00	602	433.06	0.13	0.13	0.00	0.00
146.50	0.00	405	433.04	0.09	0.09	0.00	0.00
147.00	0.00	272	433.03	0.06	0.06	0.00	0.00
147.50	0.00	183	433.02	0.04	0.04	0.00	0.00
148.00	0.00	123	433.01	0.03	0.03	0.00	0.00
148.50	0.00	83	433.01	0.02	0.02	0.00	0.00
149.00	0.00	56	433.01	0.01	0.01	0.00	0.00
149.50	0.00	37	433.00	0.01	0.01	0.00	0.00
150.00	0.00	25	433.00	0.01	0.01	0.00	0.00
150.50	0.00	17	433.00	0.00	0.00	0.00	0.00
151.00	0.00	11	433.00	0.00	0.00	0.00	0.00
151.50	0.00	8	433.00	0.00	0.00	0.00	0.00
152.00	0.00	5	433.00	0.00	0.00	0.00	0.00
152.50	0.00	3	433.00	0.00	0.00	0.00	0.00
153.00	0.00	2	433.00	0.00	0.00	0.00	0.00
153.50	0.00	2	433.00	0.00	0.00	0.00	0.00
154.00	0.00	1	433.00	0.00	0.00	0.00	0.00
154.50	0.00	1	433.00	0.00	0.00	0.00	0.00
155.00	0.00	0	433.00	0.00	0.00	0.00	0.00
155.50	0.00	0	433.00	0.00	0.00	0.00	0.00

Hydrograph for Pond 1P: MRC Facility #1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
156.00	0.00	0	433.00	0.00	0.00	0.00	0.00
156.50	0.00	0	433.00	0.00	0.00	0.00	0.00
157.00	0.00	0	433.00	0.00	0.00	0.00	0.00
157.50	0.00	0	433.00	0.00	0.00	0.00	0.00
158.00	0.00	0	433.00	0.00	0.00	0.00	0.00
158.50	0.00	0	433.00	0.00	0.00	0.00	0.00
159.00	0.00	0	433.00	0.00	0.00	0.00	0.00
159.50	0.00	0	433.00	0.00	0.00	0.00	0.00
160.00	0.00	0	433.00	0.00	0.00	0.00	0.00
160.50	0.00	0	433.00	0.00	0.00	0.00	0.00
161.00	0.00	0	433.00	0.00	0.00	0.00	0.00
161.50	0.00	0	433.00	0.00	0.00	0.00	0.00
162.00	0.00	0	433.00	0.00	0.00	0.00	0.00
162.50	0.00	0	433.00	0.00	0.00	0.00	0.00
163.00	0.00	0	433.00	0.00	0.00	0.00	0.00
163.50	0.00	0	433.00	0.00	0.00	0.00	0.00
164.00	0.00	0	433.00	0.00	0.00	0.00	0.00
164.50	0.00	0	433.00	0.00	0.00	0.00	0.00
165.00	0.00	0	433.00	0.00	0.00	0.00	0.00
165.50	0.00	0	433.00	0.00	0.00	0.00	0.00
166.00	0.00	0	433.00	0.00	0.00	0.00	0.00
166.50	0.00	0	433.00	0.00	0.00	0.00	0.00
167.00	0.00	0	433.00	0.00	0.00	0.00	0.00
167.50	0.00	0	433.00	0.00	0.00	0.00	0.00
168.00	0.00	0	433.00	0.00	0.00	0.00	0.00

**Hydrograph for Pond 3P: MRC #3**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	440.00	0.00	0.00	0.00	<b>0.00</b>
0.50	0.00	0	440.00	0.00	0.00	0.00	0.00
1.00	0.05	30	440.01	0.00	0.00	0.00	0.00
1.50	0.10	140	440.04	0.02	0.02	0.00	0.00
2.00	0.13	292	440.09	0.05	0.05	0.00	0.00
2.50	0.16	474	440.15	0.05	0.05	0.00	0.00
3.00	0.19	703	440.22	0.05	0.05	0.00	0.00
3.50	0.21	971	440.31	0.05	0.05	0.00	0.00
4.00	0.23	1,273	440.40	0.05	0.05	0.00	0.00
4.50	0.25	1,608	440.51	0.05	0.05	0.00	0.00
5.00	0.27	1,986	440.63	0.05	0.05	0.00	0.00
5.50	0.29	2,406	440.76	0.05	0.05	0.00	0.00
6.00	0.32	2,873	440.91	0.05	0.05	0.00	0.00
6.50	0.36	3,395	441.03	0.05	0.05	0.00	0.00
7.00	0.39	3,974	441.12	0.05	0.05	0.00	0.00
7.50	0.42	4,616	441.22	0.05	0.05	0.00	0.00
8.00	0.48	5,335	441.33	0.05	0.05	0.00	0.00
8.50	0.60	6,200	441.47	0.05	0.05	0.00	0.00
9.00	0.78	7,346	441.64	0.05	0.05	0.00	0.00
9.50	0.87	8,760	441.86	0.06	<b>0.05</b>	0.01	0.00
10.00	1.11	10,361	442.03	0.10	<b>0.05</b>	0.04	0.00
10.50	1.56	12,526	442.13	0.15	0.05	0.10	0.00
11.00	2.36	15,615	442.27	0.29	0.05	0.24	0.00
11.50	4.26	20,583	442.49	0.57	0.05	0.52	0.00
12.00	<b>72.11</b>	64,273	444.27	1.51	0.05	1.46	0.00
12.50	7.16	101,849	445.64	1.94	0.05	1.89	0.00
13.00	4.21	107,683	445.84	1.99	0.05	1.94	0.00
13.50	3.17	110,593	445.94	2.02	0.05	1.97	0.00
14.00	2.50	112,006	445.99	2.03	0.05	1.98	0.00
14.50	2.18	<b>112,476</b>	<b>446.00</b>	<b>2.07</b>	0.05	<b>2.02</b>	0.00
15.00	1.97	<b>112,466</b>	<b>446.00</b>	<b>2.06</b>	0.05	<b>2.01</b>	0.00
15.50	1.75	112,138	445.99	2.03	0.05	1.98	0.00
16.00	1.53	111,434	445.97	2.03	0.05	1.98	0.00
16.50	1.42	110,423	445.93	2.02	0.05	1.97	0.00
17.00	1.34	109,279	445.89	2.01	0.05	1.96	0.00
17.50	1.26	108,017	445.85	2.00	0.05	1.95	0.00
18.00	1.18	106,636	445.80	1.98	0.05	1.93	0.00
18.50	1.11	105,139	445.75	1.97	0.05	1.92	0.00
19.00	1.03	103,526	445.70	1.96	0.05	1.90	0.00
19.50	0.95	101,798	445.64	1.94	0.05	1.89	0.00
20.00	0.87	99,958	445.57	1.92	0.05	1.87	0.00
20.50	0.84	98,039	445.50	1.90	0.05	1.85	0.00
21.00	0.82	96,122	445.44	1.88	0.05	1.83	0.00
21.50	0.80	94,211	445.37	1.86	0.05	1.81	0.00
22.00	0.79	92,309	445.30	1.84	0.05	1.79	0.00
22.50	0.77	90,413	445.23	1.82	0.05	1.77	0.00
23.00	0.76	88,526	445.17	1.80	0.05	1.75	0.00
23.50	0.74	86,647	445.10	1.78	0.05	1.73	0.00
24.00	0.73	84,777	445.03	1.76	0.05	1.71	0.00
24.50	0.00	81,974	444.93	1.73	0.05	1.68	0.00
25.00	0.00	78,887	444.82	1.70	0.05	1.65	0.00
25.50	0.00	75,865	444.71	1.66	0.05	1.61	0.00

**Hydrograph for Pond 3P: MRC #3 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
26.00	0.00	72,906	444.60	1.63	0.05	1.57	0.00
26.50	0.00	70,013	444.49	1.59	0.05	1.54	0.00
27.00	0.00	67,186	444.38	1.55	0.05	1.50	0.00
27.50	0.00	64,425	444.27	1.52	0.05	1.46	0.00
28.00	0.00	61,731	444.17	1.48	0.05	1.43	0.00
28.50	0.00	59,105	444.07	1.44	0.05	1.39	0.00
29.00	0.00	56,546	443.97	1.40	0.05	1.35	0.00
29.50	0.00	54,057	443.87	1.36	0.05	1.31	0.00
30.00	0.00	51,636	443.78	1.33	0.05	1.27	0.00
30.50	0.00	49,285	443.68	1.29	0.05	1.24	0.00
31.00	0.00	47,005	443.59	1.25	0.05	1.20	0.00
31.50	0.00	44,795	443.50	1.21	0.05	1.16	0.00
32.00	0.00	42,657	443.42	1.17	0.05	1.12	0.00
32.50	0.00	40,591	443.33	1.13	0.05	1.08	0.00
33.00	0.00	38,598	443.25	1.09	0.05	1.04	0.00
33.50	0.00	36,677	443.17	1.05	0.05	1.00	0.00
34.00	0.00	34,831	443.09	1.01	0.05	0.95	0.00
34.50	0.00	33,060	443.02	0.96	0.05	0.91	0.00
35.00	0.00	31,363	442.95	0.92	0.05	0.87	0.00
35.50	0.00	29,743	442.88	0.88	0.05	0.83	0.00
36.00	0.00	28,199	442.81	0.84	0.05	0.79	0.00
36.50	0.00	26,732	442.75	0.79	0.05	0.74	0.00
37.00	0.00	25,343	442.69	0.75	0.05	0.70	0.00
37.50	0.00	24,033	442.64	0.71	0.05	0.65	0.00
38.00	0.00	22,802	442.58	0.66	0.05	0.61	0.00
38.50	0.00	21,653	442.53	0.62	0.05	0.56	0.00
39.00	0.00	20,585	442.49	0.57	0.05	0.52	0.00
39.50	0.00	19,604	442.44	0.52	0.05	0.47	0.00
40.00	0.00	18,709	442.40	0.48	0.05	0.42	0.00
40.50	0.00	17,897	442.37	0.43	0.05	0.38	0.00
41.00	0.00	17,170	442.34	0.38	0.05	0.33	0.00
41.50	0.00	16,519	442.31	0.34	0.05	0.29	0.00
42.00	0.00	15,934	442.28	0.31	0.05	0.26	0.00
42.50	0.00	15,404	442.26	0.28	0.05	0.23	0.00
43.00	0.00	14,924	442.24	0.25	0.05	0.20	0.00
43.50	0.00	14,489	442.22	0.23	0.05	0.18	0.00
44.00	0.00	14,096	442.20	0.21	0.05	0.16	0.00
44.50	0.00	13,733	442.18	0.19	0.05	0.14	0.00
45.00	0.00	13,395	442.17	0.18	0.05	0.13	0.00
45.50	0.00	13,081	442.15	0.17	0.05	0.12	0.00
46.00	0.00	12,788	442.14	0.16	0.05	0.11	0.00
46.50	0.00	12,515	442.13	0.15	0.05	0.10	0.00
47.00	0.00	12,261	442.12	0.14	0.05	0.09	0.00
47.50	0.00	12,025	442.11	0.13	0.05	0.08	0.00
48.00	0.00	11,804	442.10	0.12	0.05	0.07	0.00
48.50	0.00	11,590	442.09	0.12	0.05	0.07	0.00
49.00	0.00	11,384	442.08	0.11	0.05	0.06	0.00
49.50	0.00	11,183	442.07	0.11	0.05	0.06	0.00
50.00	0.00	10,989	442.06	0.11	0.05	0.06	0.00
50.50	0.00	10,801	442.05	0.10	0.05	0.05	0.00
51.00	0.00	10,618	442.04	0.10	0.05	0.05	0.00
51.50	0.00	10,441	442.03	0.10	0.05	0.05	0.00



**Hydrograph for Pond 3P: MRC #3 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
52.00	0.00	10,269	442.03	0.09	0.05	0.04	0.00
52.50	0.00	10,102	442.02	0.09	0.05	0.04	0.00
53.00	0.00	9,941	442.01	0.09	0.05	0.04	0.00
53.50	0.00	9,784	442.00	0.09	0.05	0.03	0.00
54.00	0.00	9,633	441.99	0.08	0.05	0.03	0.00
54.50	0.00	9,485	441.97	0.08	0.05	0.03	0.00
55.00	0.00	9,342	441.95	0.08	0.05	0.03	0.00
55.50	0.00	9,202	441.93	0.08	0.05	0.03	0.00
56.00	0.00	9,067	441.91	0.07	0.05	0.02	0.00
56.50	0.00	8,937	441.89	0.07	0.05	0.02	0.00
57.00	0.00	8,815	441.87	0.07	0.05	0.01	0.00
57.50	0.00	8,702	441.85	0.06	0.05	0.01	0.00
58.00	0.00	8,596	441.83	0.06	0.05	0.01	0.00
58.50	0.00	8,497	441.82	0.05	0.05	0.00	0.00
59.00	0.00	8,405	441.80	0.05	0.05	0.00	0.00
59.50	0.00	8,313	441.79	0.05	0.05	0.00	0.00
60.00	0.00	8,222	441.78	0.05	0.05	0.00	0.00
60.50	0.00	8,131	441.76	0.05	0.05	0.00	0.00
61.00	0.00	8,040	441.75	0.05	0.05	0.00	0.00
61.50	0.00	7,949	441.74	0.05	0.05	0.00	0.00
62.00	0.00	7,858	441.72	0.05	0.05	0.00	0.00
62.50	0.00	7,767	441.71	0.05	0.05	0.00	0.00
63.00	0.00	7,676	441.69	0.05	0.05	0.00	0.00
63.50	0.00	7,585	441.68	0.05	0.05	0.00	0.00
64.00	0.00	7,494	441.67	0.05	0.05	0.00	0.00
64.50	0.00	7,403	441.65	0.05	0.05	0.00	0.00
65.00	0.00	7,312	441.64	0.05	0.05	0.00	0.00
65.50	0.00	7,221	441.62	0.05	0.05	0.00	0.00
66.00	0.00	7,130	441.61	0.05	0.05	0.00	0.00
66.50	0.00	7,039	441.60	0.05	0.05	0.00	0.00
67.00	0.00	6,949	441.58	0.05	0.05	0.00	0.00
67.50	0.00	6,858	441.57	0.05	0.05	0.00	0.00
68.00	0.00	6,767	441.55	0.05	0.05	0.00	0.00
68.50	0.00	6,677	441.54	0.05	0.05	0.00	0.00
69.00	0.00	6,586	441.53	0.05	0.05	0.00	0.00
69.50	0.00	6,495	441.51	0.05	0.05	0.00	0.00
70.00	0.00	6,405	441.50	0.05	0.05	0.00	0.00
70.50	0.00	6,314	441.49	0.05	0.05	0.00	0.00
71.00	0.00	6,224	441.47	0.05	0.05	0.00	0.00
71.50	0.00	6,133	441.46	0.05	0.05	0.00	0.00
72.00	0.00	6,043	441.44	0.05	0.05	0.00	0.00
72.50	0.00	5,953	441.43	0.05	0.05	0.00	0.00
73.00	0.00	5,862	441.42	0.05	0.05	0.00	0.00
73.50	0.00	5,772	441.40	0.05	0.05	0.00	0.00
74.00	0.00	5,682	441.39	0.05	0.05	0.00	0.00
74.50	0.00	5,591	441.37	0.05	0.05	0.00	0.00
75.00	0.00	5,501	441.36	0.05	0.05	0.00	0.00
75.50	0.00	5,411	441.35	0.05	0.05	0.00	0.00
76.00	0.00	5,321	441.33	0.05	0.05	0.00	0.00
76.50	0.00	5,231	441.32	0.05	0.05	0.00	0.00
77.00	0.00	5,141	441.30	0.05	0.05	0.00	0.00
77.50	0.00	5,051	441.29	0.05	0.05	0.00	0.00

**Hydrograph for Pond 3P: MRC #3 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
78.00	0.00	4,961	441.28	0.05	0.05	0.00	0.00
78.50	0.00	4,871	441.26	0.05	0.05	0.00	0.00
79.00	0.00	4,781	441.25	0.05	0.05	0.00	0.00
79.50	0.00	4,691	441.24	0.05	0.05	0.00	0.00
80.00	0.00	4,601	441.22	0.05	0.05	0.00	0.00
80.50	0.00	4,511	441.21	0.05	0.05	0.00	0.00
81.00	0.00	4,421	441.19	0.05	0.05	0.00	0.00
81.50	0.00	4,331	441.18	0.05	0.05	0.00	0.00
82.00	0.00	4,242	441.17	0.05	0.05	0.00	0.00
82.50	0.00	4,152	441.15	0.05	0.05	0.00	0.00
83.00	0.00	4,062	441.14	0.05	0.05	0.00	0.00
83.50	0.00	3,973	441.12	0.05	0.05	0.00	0.00
84.00	0.00	3,883	441.11	0.05	0.05	0.00	0.00
84.50	0.00	3,793	441.10	0.05	0.05	0.00	0.00
85.00	0.00	3,704	441.08	0.05	0.05	0.00	0.00
85.50	0.00	3,614	441.07	0.05	0.05	0.00	0.00
86.00	0.00	3,525	441.05	0.05	0.05	0.00	0.00
86.50	0.00	3,435	441.04	0.05	0.05	0.00	0.00
87.00	0.00	3,346	441.03	0.05	0.05	0.00	0.00
87.50	0.00	3,257	441.01	0.05	0.05	0.00	0.00
88.00	0.00	3,167	441.00	0.05	0.05	0.00	0.00
88.50	0.00	3,078	440.97	0.05	0.05	0.00	0.00
89.00	0.00	2,989	440.94	0.05	0.05	0.00	0.00
89.50	0.00	2,900	440.91	0.05	0.05	0.00	0.00
90.00	0.00	2,811	440.89	0.05	0.05	0.00	0.00
90.50	0.00	2,722	440.86	0.05	0.05	0.00	0.00
91.00	0.00	2,633	440.83	0.05	0.05	0.00	0.00
91.50	0.00	2,544	440.80	0.05	0.05	0.00	0.00
92.00	0.00	2,455	440.78	0.05	0.05	0.00	0.00
92.50	0.00	2,366	440.75	0.05	0.05	0.00	0.00
93.00	0.00	2,277	440.72	0.05	0.05	0.00	0.00
93.50	0.00	2,189	440.69	0.05	0.05	0.00	0.00
94.00	0.00	2,100	440.66	0.05	0.05	0.00	0.00
94.50	0.00	2,012	440.64	0.05	0.05	0.00	0.00
95.00	0.00	1,923	440.61	0.05	0.05	0.00	0.00
95.50	0.00	1,835	440.58	0.05	0.05	0.00	0.00
96.00	0.00	1,747	440.55	0.05	0.05	0.00	0.00
96.50	0.00	1,658	440.53	0.05	0.05	0.00	0.00
97.00	0.00	1,570	440.50	0.05	0.05	0.00	0.00
97.50	0.00	1,482	440.47	0.05	0.05	0.00	0.00
98.00	0.00	1,394	440.44	0.05	0.05	0.00	0.00
98.50	0.00	1,306	440.41	0.05	0.05	0.00	0.00
99.00	0.00	1,218	440.39	0.05	0.05	0.00	0.00
99.50	0.00	1,130	440.36	0.05	0.05	0.00	0.00
100.00	0.00	1,043	440.33	0.05	0.05	0.00	0.00
100.50	0.00	955	440.30	0.05	0.05	0.00	0.00
101.00	0.00	867	440.28	0.05	0.05	0.00	0.00
101.50	0.00	780	440.25	0.05	0.05	0.00	0.00
102.00	0.00	692	440.22	0.05	0.05	0.00	0.00
102.50	0.00	605	440.19	0.05	0.05	0.00	0.00
103.00	0.00	518	440.16	0.05	0.05	0.00	0.00
103.50	0.00	430	440.14	0.05	0.05	0.00	0.00

**Hydrograph for Pond 3P: MRC #3 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
104.00	0.00	343	440.11	0.05	0.05	0.00	0.00
104.50	0.00	261	440.08	0.04	0.04	0.00	0.00
105.00	0.00	198	440.06	0.03	0.03	0.00	0.00
105.50	0.00	150	440.05	0.02	0.02	0.00	0.00
106.00	0.00	113	440.04	0.02	0.02	0.00	0.00
106.50	0.00	86	440.03	0.01	0.01	0.00	0.00
107.00	0.00	65	440.02	0.01	0.01	0.00	0.00
107.50	0.00	49	440.02	0.01	0.01	0.00	0.00
108.00	0.00	37	440.01	0.01	0.01	0.00	0.00
108.50	0.00	28	440.01	0.00	0.00	0.00	0.00
109.00	0.00	21	440.01	0.00	0.00	0.00	0.00
109.50	0.00	16	440.01	0.00	0.00	0.00	0.00
110.00	0.00	12	440.00	0.00	0.00	0.00	0.00
110.50	0.00	9	440.00	0.00	0.00	0.00	0.00
111.00	0.00	7	440.00	0.00	0.00	0.00	0.00
111.50	0.00	5	440.00	0.00	0.00	0.00	0.00
112.00	0.00	4	440.00	0.00	0.00	0.00	0.00
112.50	0.00	3	440.00	0.00	0.00	0.00	0.00
113.00	0.00	2	440.00	0.00	0.00	0.00	0.00
113.50	0.00	2	440.00	0.00	0.00	0.00	0.00
114.00	0.00	1	440.00	0.00	0.00	0.00	0.00
114.50	0.00	1	440.00	0.00	0.00	0.00	0.00
115.00	0.00	1	440.00	0.00	0.00	0.00	0.00
115.50	0.00	1	440.00	0.00	0.00	0.00	0.00
<b>116.00</b>	<b>0.00</b>	<b>0</b>	<b>440.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
116.50	0.00	0	440.00	0.00	0.00	0.00	0.00
117.00	0.00	0	440.00	0.00	0.00	0.00	0.00
117.50	0.00	0	440.00	0.00	0.00	0.00	0.00
118.00	0.00	0	440.00	0.00	0.00	0.00	0.00
118.50	0.00	0	440.00	0.00	0.00	0.00	0.00
119.00	0.00	0	440.00	0.00	0.00	0.00	0.00
119.50	0.00	0	440.00	0.00	0.00	0.00	0.00
120.00	0.00	0	440.00	0.00	0.00	0.00	0.00
120.50	0.00	0	440.00	0.00	0.00	0.00	0.00
121.00	0.00	0	440.00	0.00	0.00	0.00	0.00
121.50	0.00	0	440.00	0.00	0.00	0.00	0.00
122.00	0.00	0	440.00	0.00	0.00	0.00	0.00
122.50	0.00	0	440.00	0.00	0.00	0.00	0.00
123.00	0.00	0	440.00	0.00	0.00	0.00	0.00
123.50	0.00	0	440.00	0.00	0.00	0.00	0.00
124.00	0.00	0	440.00	0.00	0.00	0.00	0.00
124.50	0.00	0	440.00	0.00	0.00	0.00	0.00
125.00	0.00	0	440.00	0.00	0.00	0.00	0.00
125.50	0.00	0	440.00	0.00	0.00	0.00	0.00
126.00	0.00	0	440.00	0.00	0.00	0.00	0.00
126.50	0.00	0	440.00	0.00	0.00	0.00	0.00
127.00	0.00	0	440.00	0.00	0.00	0.00	0.00
127.50	0.00	0	440.00	0.00	0.00	0.00	0.00
128.00	0.00	0	440.00	0.00	0.00	0.00	0.00
128.50	0.00	0	440.00	0.00	0.00	0.00	0.00
129.00	0.00	0	440.00	0.00	0.00	0.00	0.00
129.50	0.00	0	440.00	0.00	0.00	0.00	0.00

**Hydrograph for Pond 3P: MRC #3 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
130.00	0.00	0	440.00	0.00	0.00	0.00	0.00
130.50	0.00	0	440.00	0.00	0.00	0.00	0.00
131.00	0.00	0	440.00	0.00	0.00	0.00	0.00
131.50	0.00	0	440.00	0.00	0.00	0.00	0.00
132.00	0.00	0	440.00	0.00	0.00	0.00	0.00
132.50	0.00	0	440.00	0.00	0.00	0.00	0.00
133.00	0.00	0	440.00	0.00	0.00	0.00	0.00
133.50	0.00	0	440.00	0.00	0.00	0.00	0.00
134.00	0.00	0	440.00	0.00	0.00	0.00	0.00
134.50	0.00	0	440.00	0.00	0.00	0.00	0.00
135.00	0.00	0	440.00	0.00	0.00	0.00	0.00
135.50	0.00	0	440.00	0.00	0.00	0.00	0.00
136.00	0.00	0	440.00	0.00	0.00	0.00	0.00
136.50	0.00	0	440.00	0.00	0.00	0.00	0.00
137.00	0.00	0	440.00	0.00	0.00	0.00	0.00
137.50	0.00	0	440.00	0.00	0.00	0.00	0.00
138.00	0.00	0	440.00	0.00	0.00	0.00	0.00
138.50	0.00	0	440.00	0.00	0.00	0.00	0.00
139.00	0.00	0	440.00	0.00	0.00	0.00	0.00
139.50	0.00	0	440.00	0.00	0.00	0.00	0.00
140.00	0.00	0	440.00	0.00	0.00	0.00	0.00
140.50	0.00	0	440.00	0.00	0.00	0.00	0.00
141.00	0.00	0	440.00	0.00	0.00	0.00	0.00
141.50	0.00	0	440.00	0.00	0.00	0.00	0.00
142.00	0.00	0	440.00	0.00	0.00	0.00	0.00
142.50	0.00	0	440.00	0.00	0.00	0.00	0.00
143.00	0.00	0	440.00	0.00	0.00	0.00	0.00
143.50	0.00	0	440.00	0.00	0.00	0.00	0.00
144.00	0.00	0	440.00	0.00	0.00	0.00	0.00
144.50	0.00	0	440.00	0.00	0.00	0.00	0.00
145.00	0.00	0	440.00	0.00	0.00	0.00	0.00
145.50	0.00	0	440.00	0.00	0.00	0.00	0.00
146.00	0.00	0	440.00	0.00	0.00	0.00	0.00
146.50	0.00	0	440.00	0.00	0.00	0.00	0.00
147.00	0.00	0	440.00	0.00	0.00	0.00	0.00
147.50	0.00	0	440.00	0.00	0.00	0.00	0.00
148.00	0.00	0	440.00	0.00	0.00	0.00	0.00
148.50	0.00	0	440.00	0.00	0.00	0.00	0.00
149.00	0.00	0	440.00	0.00	0.00	0.00	0.00
149.50	0.00	0	440.00	0.00	0.00	0.00	0.00
150.00	0.00	0	440.00	0.00	0.00	0.00	0.00
150.50	0.00	0	440.00	0.00	0.00	0.00	0.00
151.00	0.00	0	440.00	0.00	0.00	0.00	0.00
151.50	0.00	0	440.00	0.00	0.00	0.00	0.00
152.00	0.00	0	440.00	0.00	0.00	0.00	0.00
152.50	0.00	0	440.00	0.00	0.00	0.00	0.00
153.00	0.00	0	440.00	0.00	0.00	0.00	0.00
153.50	0.00	0	440.00	0.00	0.00	0.00	0.00
154.00	0.00	0	440.00	0.00	0.00	0.00	0.00
154.50	0.00	0	440.00	0.00	0.00	0.00	0.00
155.00	0.00	0	440.00	0.00	0.00	0.00	0.00
155.50	0.00	0	440.00	0.00	0.00	0.00	0.00

**Hydrograph for Pond 3P: MRC #3 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
156.00	0.00	0	440.00	0.00	0.00	0.00	0.00
156.50	0.00	0	440.00	0.00	0.00	0.00	0.00
157.00	0.00	0	440.00	0.00	0.00	0.00	0.00
157.50	0.00	0	440.00	0.00	0.00	0.00	0.00
158.00	0.00	0	440.00	0.00	0.00	0.00	0.00
158.50	0.00	0	440.00	0.00	0.00	0.00	0.00
159.00	0.00	0	440.00	0.00	0.00	0.00	0.00
159.50	0.00	0	440.00	0.00	0.00	0.00	0.00
160.00	0.00	0	440.00	0.00	0.00	0.00	0.00
160.50	0.00	0	440.00	0.00	0.00	0.00	0.00
161.00	0.00	0	440.00	0.00	0.00	0.00	0.00
161.50	0.00	0	440.00	0.00	0.00	0.00	0.00
162.00	0.00	0	440.00	0.00	0.00	0.00	0.00
162.50	0.00	0	440.00	0.00	0.00	0.00	0.00
163.00	0.00	0	440.00	0.00	0.00	0.00	0.00
163.50	0.00	0	440.00	0.00	0.00	0.00	0.00
164.00	0.00	0	440.00	0.00	0.00	0.00	0.00
164.50	0.00	0	440.00	0.00	0.00	0.00	0.00
165.00	0.00	0	440.00	0.00	0.00	0.00	0.00
165.50	0.00	0	440.00	0.00	0.00	0.00	0.00
166.00	0.00	0	440.00	0.00	0.00	0.00	0.00
166.50	0.00	0	440.00	0.00	0.00	0.00	0.00
167.00	0.00	0	440.00	0.00	0.00	0.00	0.00
167.50	0.00	0	440.00	0.00	0.00	0.00	0.00
168.00	0.00	0	440.00	0.00	0.00	0.00	0.00

**Hydrograph for Pond 4P: MRC #4**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	445.00	0.00	0.00	0.00
0.50	0.00	0	445.00	0.00	0.00	0.00
1.00	0.02	13	445.01	0.00	0.00	0.00
1.50	0.04	56	445.03	0.01	0.01	0.00
2.00	0.05	111	445.07	0.02	0.02	0.00
2.50	0.06	172	445.10	0.03	0.03	0.00
3.00	0.07	250	445.15	0.03	0.03	0.00
3.50	0.08	343	445.20	0.03	0.03	0.00
4.00	0.09	449	445.26	0.03	0.03	0.00
4.50	0.10	568	445.33	0.03	0.03	0.00
5.00	0.11	704	445.41	0.03	0.03	0.00
5.50	0.13	864	445.51	0.03	0.03	0.00
6.00	0.16	1,070	445.62	0.03	0.03	0.00
6.50	0.19	1,336	445.78	0.03	0.03	0.00
7.00	0.23	1,664	445.96	0.03	0.03	0.00
7.50	0.27	2,056	446.09	0.03	0.03	0.00
8.00	0.30	2,511	446.22	0.03	0.03	0.01
8.50	0.39	3,067	446.38	0.04	0.03	0.01
9.00	0.51	3,815	446.58	0.04	0.03	0.01
9.50	0.58	4,745	446.84	0.04	<b>0.03</b>	0.01
10.00	0.76	5,852	447.04	0.05	<b>0.03</b>	0.02
10.50	1.09	7,361	447.16	0.12	0.03	0.09
11.00	1.66	9,428	447.32	0.31	0.03	0.28
11.50	<b>3.02</b>	12,691	447.58	0.58	0.03	0.55
12.00	<b>49.84</b>	<b>44,223</b>	<b>449.68</b>	<b>15.56</b>	0.03	<b>15.53</b>
12.50	4.49	<b>39,329</b>	<b>449.38</b>	<b>10.41</b>	0.03	<b>10.39</b>
13.00	2.73	35,481	449.14	3.46	0.03	3.43
13.50	2.07	34,624	449.09	2.38	0.03	2.35
14.00	1.63	34,104	449.06	1.93	0.03	1.90
14.50	1.43	33,658	449.03	1.62	0.03	1.59
15.00	1.29	33,384	449.01	1.42	0.03	1.39
15.50	1.15	33,154	449.00	1.30	0.03	1.27
16.00	1.00	32,757	448.97	1.29	0.03	1.26
16.50	0.93	32,174	448.93	1.28	0.03	1.25
17.00	0.88	31,522	448.89	1.26	0.03	1.23
17.50	0.83	30,808	448.84	1.24	0.03	1.22
18.00	0.78	30,034	448.79	1.22	0.03	1.20
18.50	0.73	29,202	448.74	1.20	0.03	1.17
19.00	0.67	28,317	448.68	1.18	0.03	1.15
19.50	0.62	27,381	448.62	1.15	0.03	1.13
20.00	0.57	26,397	448.55	1.13	0.03	1.10
20.50	0.55	25,393	448.48	1.10	0.03	1.07
21.00	0.54	24,421	448.42	1.07	0.03	1.04
21.50	0.53	23,483	448.35	1.04	0.03	1.01
22.00	0.52	22,578	448.29	1.01	0.03	0.98
22.50	0.51	21,707	448.23	0.98	0.03	0.95
23.00	0.50	20,869	448.17	0.95	0.03	0.93
23.50	0.49	20,064	448.11	0.93	0.03	0.90
24.00	0.48	19,292	448.06	0.90	0.03	0.87
24.50	0.00	17,899	447.96	0.84	0.03	0.81
25.00	0.00	16,438	447.85	0.78	0.03	0.75
25.50	0.00	15,091	447.75	0.72	0.03	0.69

**Hydrograph for Pond 4P: MRC #4 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
26.00	0.00	13,859	447.66	0.65	0.03	0.62
26.50	0.00	12,744	447.58	0.59	0.03	0.56
27.00	0.00	11,747	447.50	0.52	0.03	0.49
27.50	0.00	10,870	447.44	0.45	0.03	0.42
28.00	0.00	10,126	447.38	0.38	0.03	0.35
28.50	0.00	9,505	447.33	0.31	0.03	0.28
29.00	0.00	8,990	447.29	0.26	0.03	0.23
29.50	0.00	8,558	447.26	0.22	0.03	0.19
30.00	0.00	8,196	447.23	0.19	0.03	0.16
30.50	0.00	7,884	447.20	0.16	0.03	0.13
31.00	0.00	7,615	447.18	0.14	0.03	0.11
31.50	0.00	7,383	447.16	0.12	0.03	0.09
32.00	0.00	7,179	447.15	0.11	0.03	0.08
32.50	0.00	6,995	447.13	0.10	0.03	0.07
33.00	0.00	6,828	447.12	0.09	0.03	0.06
33.50	0.00	6,677	447.11	0.08	0.03	0.05
34.00	0.00	6,540	447.10	0.07	0.03	0.04
34.50	0.00	6,416	447.09	0.07	0.03	0.04
35.00	0.00	6,303	447.08	0.06	0.03	0.03
35.50	0.00	6,196	447.07	0.06	0.03	0.03
36.00	0.00	6,092	447.06	0.06	0.03	0.03
36.50	0.00	5,993	447.05	0.05	0.03	0.03
37.00	0.00	5,897	447.04	0.05	0.03	0.02
37.50	0.00	5,804	447.04	0.05	0.03	0.02
38.00	0.00	5,715	447.03	0.05	0.03	0.02
38.50	0.00	5,629	447.02	0.05	0.03	0.02
39.00	0.00	5,546	447.02	0.05	0.03	0.02
39.50	0.00	5,466	447.01	0.04	0.03	0.02
40.00	0.00	5,389	447.00	0.04	0.03	0.01
40.50	0.00	5,314	446.99	0.04	0.03	0.01
41.00	0.00	5,240	446.97	0.04	0.03	0.01
41.50	0.00	5,167	446.95	0.04	0.03	0.01
42.00	0.00	5,093	446.93	0.04	0.03	0.01
42.50	0.00	5,020	446.91	0.04	0.03	0.01
43.00	0.00	4,948	446.89	0.04	0.03	0.01
43.50	0.00	4,875	446.87	0.04	0.03	0.01
44.00	0.00	4,803	446.85	0.04	0.03	0.01
44.50	0.00	4,731	446.83	0.04	0.03	0.01
45.00	0.00	4,660	446.81	0.04	0.03	0.01
45.50	0.00	4,588	446.79	0.04	0.03	0.01
46.00	0.00	4,517	446.78	0.04	0.03	0.01
46.50	0.00	4,447	446.76	0.04	0.03	0.01
47.00	0.00	4,376	446.74	0.04	0.03	0.01
47.50	0.00	4,306	446.72	0.04	0.03	0.01
48.00	0.00	4,237	446.70	0.04	0.03	0.01
48.50	0.00	4,167	446.68	0.04	0.03	0.01
49.00	0.00	4,098	446.66	0.04	0.03	0.01
49.50	0.00	4,029	446.64	0.04	0.03	0.01
50.00	0.00	3,961	446.62	0.04	0.03	0.01
50.50	0.00	3,893	446.60	0.04	0.03	0.01
51.00	0.00	3,825	446.59	0.04	0.03	0.01
51.50	0.00	3,757	446.57	0.04	0.03	0.01

**Hydrograph for Pond 4P: MRC #4 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
52.00	0.00	3,690	446.55	0.04	0.03	0.01
52.50	0.00	3,623	446.53	0.04	0.03	0.01
53.00	0.00	3,557	446.51	0.04	0.03	0.01
53.50	0.00	3,491	446.49	0.04	0.03	0.01
54.00	0.00	3,425	446.47	0.04	0.03	0.01
54.50	0.00	3,360	446.46	0.04	0.03	0.01
55.00	0.00	3,295	446.44	0.04	0.03	0.01
55.50	0.00	3,230	446.42	0.04	0.03	0.01
56.00	0.00	3,166	446.40	0.04	0.03	0.01
56.50	0.00	3,102	446.38	0.04	0.03	0.01
57.00	0.00	3,038	446.37	0.04	0.03	0.01
57.50	0.00	2,975	446.35	0.03	0.03	0.01
58.00	0.00	2,912	446.33	0.03	0.03	0.01
58.50	0.00	2,850	446.31	0.03	0.03	0.01
59.00	0.00	2,788	446.30	0.03	0.03	0.01
59.50	0.00	2,726	446.28	0.03	0.03	0.01
60.00	0.00	2,665	446.26	0.03	0.03	0.01
60.50	0.00	2,605	446.25	0.03	0.03	0.01
61.00	0.00	2,544	446.23	0.03	0.03	0.01
61.50	0.00	2,485	446.21	0.03	0.03	0.01
62.00	0.00	2,425	446.20	0.03	0.03	0.01
62.50	0.00	2,367	446.18	0.03	0.03	0.00
63.00	0.00	2,309	446.16	0.03	0.03	0.00
63.50	0.00	2,251	446.15	0.03	0.03	0.00
64.00	0.00	2,194	446.13	0.03	0.03	0.00
64.50	0.00	2,138	446.12	0.03	0.03	0.00
65.00	0.00	2,082	446.10	0.03	0.03	0.00
65.50	0.00	2,027	446.08	0.03	0.03	0.00
66.00	0.00	1,974	446.07	0.03	0.03	0.00
66.50	0.00	1,921	446.05	0.03	0.03	0.00
67.00	0.00	1,869	446.04	0.03	0.03	0.00
67.50	0.00	1,818	446.02	0.03	0.03	0.00
68.00	0.00	1,767	446.01	0.03	0.03	0.00
68.50	0.00	1,718	445.99	0.03	0.03	0.00
69.00	0.00	1,669	445.97	0.03	0.03	0.00
69.50	0.00	1,620	445.94	0.03	0.03	0.00
70.00	0.00	1,571	445.91	0.03	0.03	0.00
70.50	0.00	1,522	445.88	0.03	0.03	0.00
71.00	0.00	1,473	445.85	0.03	0.03	0.00
71.50	0.00	1,424	445.83	0.03	0.03	0.00
72.00	0.00	1,376	445.80	0.03	0.03	0.00
72.50	0.00	1,327	445.77	0.03	0.03	0.00
73.00	0.00	1,278	445.74	0.03	0.03	0.00
73.50	0.00	1,230	445.72	0.03	0.03	0.00
74.00	0.00	1,182	445.69	0.03	0.03	0.00
74.50	0.00	1,133	445.66	0.03	0.03	0.00
75.00	0.00	1,085	445.63	0.03	0.03	0.00
75.50	0.00	1,036	445.60	0.03	0.03	0.00
76.00	0.00	988	445.58	0.03	0.03	0.00
76.50	0.00	940	445.55	0.03	0.03	0.00
77.00	0.00	892	445.52	0.03	0.03	0.00
77.50	0.00	844	445.49	0.03	0.03	0.00



**Hydrograph for Pond 4P: MRC #4 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
78.00	0.00	796	445.47	0.03	0.03	0.00
78.50	0.00	748	445.44	0.03	0.03	0.00
79.00	0.00	700	445.41	0.03	0.03	0.00
79.50	0.00	652	445.38	0.03	0.03	0.00
80.00	0.00	605	445.35	0.03	0.03	0.00
80.50	0.00	557	445.33	0.03	0.03	0.00
81.00	0.00	509	445.30	0.03	0.03	0.00
81.50	0.00	462	445.27	0.03	0.03	0.00
82.00	0.00	414	445.24	0.03	0.03	0.00
82.50	0.00	367	445.22	0.03	0.03	0.00
83.00	0.00	319	445.19	0.03	0.03	0.00
83.50	0.00	272	445.16	0.03	0.03	0.00
84.00	0.00	225	445.13	0.03	0.03	0.00
84.50	0.00	178	445.10	0.03	0.03	0.00
85.00	0.00	130	445.08	0.03	0.03	0.00
85.50	0.00	92	445.05	0.02	0.02	0.00
86.00	0.00	65	445.04	0.01	0.01	0.00
86.50	0.00	46	445.03	0.01	0.01	0.00
87.00	0.00	32	445.02	0.01	0.01	0.00
87.50	0.00	23	445.01	0.00	0.00	0.00
88.00	0.00	16	445.01	0.00	0.00	0.00
88.50	0.00	11	445.01	0.00	0.00	0.00
89.00	0.00	8	445.00	0.00	0.00	0.00
89.50	0.00	6	445.00	0.00	0.00	0.00
90.00	0.00	4	445.00	0.00	0.00	0.00
90.50	0.00	3	445.00	0.00	0.00	0.00
91.00	0.00	2	445.00	0.00	0.00	0.00
91.50	0.00	1	445.00	0.00	0.00	0.00
92.00	0.00	1	445.00	0.00	0.00	0.00
92.50	0.00	1	445.00	0.00	0.00	0.00
<b>93.00</b>	<b>0.00</b>	<b>0</b>	<b>445.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
93.50	0.00	0	445.00	0.00	0.00	0.00
94.00	0.00	0	445.00	0.00	0.00	0.00
94.50	0.00	0	445.00	0.00	0.00	0.00
95.00	0.00	0	445.00	0.00	0.00	0.00
95.50	0.00	0	445.00	0.00	0.00	0.00
96.00	0.00	0	445.00	0.00	0.00	0.00
96.50	0.00	0	445.00	0.00	0.00	0.00
97.00	0.00	0	445.00	0.00	0.00	0.00
97.50	0.00	0	445.00	0.00	0.00	0.00
98.00	0.00	0	445.00	0.00	0.00	0.00
98.50	0.00	0	445.00	0.00	0.00	0.00
99.00	0.00	0	445.00	0.00	0.00	0.00
99.50	0.00	0	445.00	0.00	0.00	0.00
100.00	0.00	0	445.00	0.00	0.00	0.00
100.50	0.00	0	445.00	0.00	0.00	0.00
101.00	0.00	0	445.00	0.00	0.00	0.00
101.50	0.00	0	445.00	0.00	0.00	0.00
102.00	0.00	0	445.00	0.00	0.00	0.00
102.50	0.00	0	445.00	0.00	0.00	0.00
103.00	0.00	0	445.00	0.00	0.00	0.00
103.50	0.00	0	445.00	0.00	0.00	0.00

**Hydrograph for Pond 4P: MRC #4 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
104.00	0.00	0	445.00	0.00	0.00	0.00
104.50	0.00	0	445.00	0.00	0.00	0.00
105.00	0.00	0	445.00	0.00	0.00	0.00
105.50	0.00	0	445.00	0.00	0.00	0.00
106.00	0.00	0	445.00	0.00	0.00	0.00
106.50	0.00	0	445.00	0.00	0.00	0.00
107.00	0.00	0	445.00	0.00	0.00	0.00
107.50	0.00	0	445.00	0.00	0.00	0.00
108.00	0.00	0	445.00	0.00	0.00	0.00
108.50	0.00	0	445.00	0.00	0.00	0.00
109.00	0.00	0	445.00	0.00	0.00	0.00
109.50	0.00	0	445.00	0.00	0.00	0.00
110.00	0.00	0	445.00	0.00	0.00	0.00
110.50	0.00	0	445.00	0.00	0.00	0.00
111.00	0.00	0	445.00	0.00	0.00	0.00
111.50	0.00	0	445.00	0.00	0.00	0.00
112.00	0.00	0	445.00	0.00	0.00	0.00
112.50	0.00	0	445.00	0.00	0.00	0.00
113.00	0.00	0	445.00	0.00	0.00	0.00
113.50	0.00	0	445.00	0.00	0.00	0.00
114.00	0.00	0	445.00	0.00	0.00	0.00
114.50	0.00	0	445.00	0.00	0.00	0.00
115.00	0.00	0	445.00	0.00	0.00	0.00
115.50	0.00	0	445.00	0.00	0.00	0.00
116.00	0.00	0	445.00	0.00	0.00	0.00
116.50	0.00	0	445.00	0.00	0.00	0.00
117.00	0.00	0	445.00	0.00	0.00	0.00
117.50	0.00	0	445.00	0.00	0.00	0.00
118.00	0.00	0	445.00	0.00	0.00	0.00
118.50	0.00	0	445.00	0.00	0.00	0.00
119.00	0.00	0	445.00	0.00	0.00	0.00
119.50	0.00	0	445.00	0.00	0.00	0.00
120.00	0.00	0	445.00	0.00	0.00	0.00
120.50	0.00	0	445.00	0.00	0.00	0.00
121.00	0.00	0	445.00	0.00	0.00	0.00
121.50	0.00	0	445.00	0.00	0.00	0.00
122.00	0.00	0	445.00	0.00	0.00	0.00
122.50	0.00	0	445.00	0.00	0.00	0.00
123.00	0.00	0	445.00	0.00	0.00	0.00
123.50	0.00	0	445.00	0.00	0.00	0.00
124.00	0.00	0	445.00	0.00	0.00	0.00
124.50	0.00	0	445.00	0.00	0.00	0.00
125.00	0.00	0	445.00	0.00	0.00	0.00
125.50	0.00	0	445.00	0.00	0.00	0.00
126.00	0.00	0	445.00	0.00	0.00	0.00
126.50	0.00	0	445.00	0.00	0.00	0.00
127.00	0.00	0	445.00	0.00	0.00	0.00
127.50	0.00	0	445.00	0.00	0.00	0.00
128.00	0.00	0	445.00	0.00	0.00	0.00
128.50	0.00	0	445.00	0.00	0.00	0.00
129.00	0.00	0	445.00	0.00	0.00	0.00
129.50	0.00	0	445.00	0.00	0.00	0.00

**Hydrograph for Pond 4P: MRC #4 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
130.00	0.00	0	445.00	0.00	0.00	0.00
130.50	0.00	0	445.00	0.00	0.00	0.00
131.00	0.00	0	445.00	0.00	0.00	0.00
131.50	0.00	0	445.00	0.00	0.00	0.00
132.00	0.00	0	445.00	0.00	0.00	0.00
132.50	0.00	0	445.00	0.00	0.00	0.00
133.00	0.00	0	445.00	0.00	0.00	0.00
133.50	0.00	0	445.00	0.00	0.00	0.00
134.00	0.00	0	445.00	0.00	0.00	0.00
134.50	0.00	0	445.00	0.00	0.00	0.00
135.00	0.00	0	445.00	0.00	0.00	0.00
135.50	0.00	0	445.00	0.00	0.00	0.00
136.00	0.00	0	445.00	0.00	0.00	0.00
136.50	0.00	0	445.00	0.00	0.00	0.00
137.00	0.00	0	445.00	0.00	0.00	0.00
137.50	0.00	0	445.00	0.00	0.00	0.00
138.00	0.00	0	445.00	0.00	0.00	0.00
138.50	0.00	0	445.00	0.00	0.00	0.00
139.00	0.00	0	445.00	0.00	0.00	0.00
139.50	0.00	0	445.00	0.00	0.00	0.00
140.00	0.00	0	445.00	0.00	0.00	0.00
140.50	0.00	0	445.00	0.00	0.00	0.00
141.00	0.00	0	445.00	0.00	0.00	0.00
141.50	0.00	0	445.00	0.00	0.00	0.00
142.00	0.00	0	445.00	0.00	0.00	0.00
142.50	0.00	0	445.00	0.00	0.00	0.00
143.00	0.00	0	445.00	0.00	0.00	0.00
143.50	0.00	0	445.00	0.00	0.00	0.00
144.00	0.00	0	445.00	0.00	0.00	0.00
144.50	0.00	0	445.00	0.00	0.00	0.00
145.00	0.00	0	445.00	0.00	0.00	0.00
145.50	0.00	0	445.00	0.00	0.00	0.00
146.00	0.00	0	445.00	0.00	0.00	0.00
146.50	0.00	0	445.00	0.00	0.00	0.00
147.00	0.00	0	445.00	0.00	0.00	0.00
147.50	0.00	0	445.00	0.00	0.00	0.00
148.00	0.00	0	445.00	0.00	0.00	0.00
148.50	0.00	0	445.00	0.00	0.00	0.00
149.00	0.00	0	445.00	0.00	0.00	0.00
149.50	0.00	0	445.00	0.00	0.00	0.00
150.00	0.00	0	445.00	0.00	0.00	0.00
150.50	0.00	0	445.00	0.00	0.00	0.00
151.00	0.00	0	445.00	0.00	0.00	0.00
151.50	0.00	0	445.00	0.00	0.00	0.00
152.00	0.00	0	445.00	0.00	0.00	0.00
152.50	0.00	0	445.00	0.00	0.00	0.00
153.00	0.00	0	445.00	0.00	0.00	0.00
153.50	0.00	0	445.00	0.00	0.00	0.00
154.00	0.00	0	445.00	0.00	0.00	0.00
154.50	0.00	0	445.00	0.00	0.00	0.00
155.00	0.00	0	445.00	0.00	0.00	0.00
155.50	0.00	0	445.00	0.00	0.00	0.00

**Hydrograph for Pond 4P: MRC #4 (continued)**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
156.00	0.00	0	445.00	0.00	0.00	0.00
156.50	0.00	0	445.00	0.00	0.00	0.00
157.00	0.00	0	445.00	0.00	0.00	0.00
157.50	0.00	0	445.00	0.00	0.00	0.00
158.00	0.00	0	445.00	0.00	0.00	0.00
158.50	0.00	0	445.00	0.00	0.00	0.00
159.00	0.00	0	445.00	0.00	0.00	0.00
159.50	0.00	0	445.00	0.00	0.00	0.00
160.00	0.00	0	445.00	0.00	0.00	0.00
160.50	0.00	0	445.00	0.00	0.00	0.00
161.00	0.00	0	445.00	0.00	0.00	0.00
161.50	0.00	0	445.00	0.00	0.00	0.00
162.00	0.00	0	445.00	0.00	0.00	0.00
162.50	0.00	0	445.00	0.00	0.00	0.00
163.00	0.00	0	445.00	0.00	0.00	0.00
163.50	0.00	0	445.00	0.00	0.00	0.00
164.00	0.00	0	445.00	0.00	0.00	0.00
164.50	0.00	0	445.00	0.00	0.00	0.00
165.00	0.00	0	445.00	0.00	0.00	0.00
165.50	0.00	0	445.00	0.00	0.00	0.00
166.00	0.00	0	445.00	0.00	0.00	0.00
166.50	0.00	0	445.00	0.00	0.00	0.00
167.00	0.00	0	445.00	0.00	0.00	0.00
167.50	0.00	0	445.00	0.00	0.00	0.00
168.00	0.00	0	445.00	0.00	0.00	0.00

## PERMANENT CHANNEL DESIGN

## STANDARD E&S WORKSHEET # 11

### Channel Design Data

PROJECT NAME:	283 Commerce Center - Building #1				
LOCATION:	Mount Joy Township, Lancaster County, Pennsylvania				
PREPARED BY:	Timothy Fink, E.I.T.	DATE: 2023.01.03			
CHECKED BY:	Joshua C. George, P.E.	DATE: 2023.01.03			

CHANNEL OR CHANNEL SECTION	#1	#1	#2A	#2A	
TEMPORARY OR PERMANENT (T OR P)	T	P	T	P	
DESIGN STORM (2,5, OR 10 YR)	2 YR	10 YR	2 YR	10 YR	
ACRES (AC)	4.451	4.451	0.81	0.81	
MULTIPLIER (1.6,2.25, OR 2.75) <sup>1</sup>	N/A	N/A	N/A	N/A	
Q <sub>r</sub> (REQUIRED CAPACITY) (CFS)	11.63	15.37	1.82	2.38	
Q (CALCULATED AT FLOW DEPTH d) (CFS)	11.63	15.37	1.82	2.38	
PROTECTIVE LINING	S75	N/A	S75	N/A	
n (MANNING'S COEFFICIENT) <sup>2</sup>	0.053	0.068	0.055	0.056	
V <sub>a</sub> (ALLOWABLE VELOCITY) (FPS)	N/A	N/A	N/A	N/A	
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.74	1.62	2.02	2.15	
τ <sub>a</sub> (MAX ALLOWABLE SHEAR STRESS) (LB/FT <sup>2</sup> )	1.55	1.00	1.55	1.00	
τ <sub>d</sub> (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT <sup>2</sup> )	0.36	0.48	0.77	0.90	
CHANNEL BOTTOM WIDTH (FT)	10.0	10.0	2.0	2.0	
CHANNEL SIDE SLOPES (H:1)	3.0	3.0	3.0	3.0	
D (TOTAL DEPTH) (FT)	2.0	2.0	1.5	1.5	
CHANNEL TOP WIDTH @ D (FT)	22.0	22.0	11.0	11.0	
d (CALCULATED FLOW DEPTH) (FT)	0.6	0.8	0.3	0.4	
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	13.4	14.6	3.9	4.2	
BOTTOM WIDTH:FLOW DEPTH RATIO (12:1 MAX)	17.49:1	12.98:1	6.48:1	5.58:1	
d <sub>50</sub> STONE SIZE (IN)	-	-	-	-	
A (CROSS-SECTIONAL AREA) (SQ. FT.)	6.70	9.49	0.90	1.10	
R (HYDRAULIC RADIUS)	0.49	0.64	0.23	0.26	
S (BED SLOPE) <sup>3</sup> (FT/FT)	0.010	0.010	0.040	0.040	
S <sub>c</sub> (CRITICAL SLOPE) (FT/FT)	0.053	0.079	0.074	0.074	
.7S <sub>c</sub> (FT/FT)	0.037	0.056	0.052	0.052	
1.3S <sub>c</sub> (FT/FT)	0.069	0.103	0.096	0.096	
STABLE FLOW? (Y/N)	Yes	Yes	Yes	Yes	
FREEBOARD PROVIDED BASED ON UNSTABLE FLOW (FT)	-	-	-	-	
FREEBOARD PROVIDED BASED ON STABLE FLOW (FT)	1.43	1.23	1.19	1.14	
MINIMUM REQUIRED FREEBOARD <sup>4</sup> (FT)	0.50	0.50	0.50	0.50	
DESIGN METHOD FOR PROTECTIVE LINING <sup>5</sup> PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S	S	
VEGETATED OR UNVEGETATED?	Unvegetated	Vegetated	Unvegetated	Vegetated	

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft or 1/4 Total Channel Depth, whichever is greater.
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

## STANDARD E&S WORKSHEET # 11

### Channel Design Data

PROJECT NAME:	283 Commerce Center - Building #1				
LOCATION:	Mount Joy Township, Lancaster County, Pennsylvania				
PREPARED BY:	Timothy Fink, E.I.T.	DATE: 2023.01.03			
CHECKED BY:	Joshua C. George, P.E.	DATE: 2023.01.03			

CHANNEL OR CHANNEL SECTION	#2B	#2B	#2C	#2C	
TEMPORARY OR PERMANENT (T OR P)	T	P	T	P	
DESIGN STORM (2,5, OR 10 YR)	2 YR	10 YR	2 YR	10 YR	
ACRES (AC)	0.145	0.145	0.158	0.158	
MULTIPLIER (1.6,2.25, OR 2.75) <sup>1</sup>	N/A	N/A	N/A	N/A	
Q <sub>r</sub> (REQUIRED CAPACITY) (CFS)	0.35	0.46	0.39	0.51	
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.35	0.46	0.39	0.51	
PROTECTIVE LINING	S75	N/A	S75	N/A	
n (MANNING'S COEFFICIENT) <sup>2</sup>	0.055	0.072	0.055	0.071	
V <sub>a</sub> (ALLOWABLE VELOCITY) (FPS)	N/A	N/A	N/A	N/A	
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.21	1.10	1.25	1.15	
τ <sub>a</sub> (MAX ALLOWABLE SHEAR STRESS) (LB/FT <sup>2</sup> )	1.55	1.00	1.55	1.00	
τ <sub>d</sub> (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT <sup>2</sup> )	0.31	0.42	0.33	0.44	
CHANNEL BOTTOM WIDTH (FT)	2.0	2.0	2.0	2.0	
CHANNEL SIDE SLOPES (H:1)	3.0	3.0	3.0	3.0	
D (TOTAL DEPTH) (FT)	1.5	1.5	1.5	1.5	
CHANNEL TOP WIDTH @ D (FT)	11.0	11.0	11.0	11.0	
d (CALCULATED FLOW DEPTH) (FT)	0.1	0.2	0.1	0.2	
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	2.7	3.0	2.8	3.1	
BOTTOM WIDTH:FLOW DEPTH RATIO (12:1 MAX)	16.15:1	11.9:1	15.2:1	11.31:1	
d <sub>50</sub> STONE SIZE (IN)	-	-	-	-	
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.29	0.42	0.32	0.45	
R (HYDRAULIC RADIUS)	0.11	0.14	0.11	0.14	
S (BED SLOPE) <sup>3</sup> (FT/FT)	0.040	0.040	0.040	0.040	
S <sub>c</sub> (CRITICAL SLOPE) (FT/FT)	0.095	0.149	0.093	0.142	
.7S <sub>c</sub> (FT/FT)	0.066	0.105	0.065	0.100	
1.3S <sub>c</sub> (FT/FT)	0.123	0.194	0.121	0.185	
STABLE FLOW? (Y/N)	Yes	Yes	Yes	Yes	
FREEBOARD PROVIDED BASED ON UNSTABLE FLOW (FT)	-	-	-	-	
FREEBOARD PROVIDED BASED ON STABLE FLOW (FT)	1.38	1.33	1.37	1.32	
MINIMUM REQUIRED FREEBOARD <sup>4</sup> (FT)	0.50	0.50	0.50	0.50	
DESIGN METHOD FOR PROTECTIVE LINING <sup>5</sup> PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S	S	
VEGETATED OR UNVEGETATED?	Unvegetated	Vegetated	Unvegetated	Vegetated	

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft or 1/4 Total Channel Depth, whichever is greater.
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

## STANDARD E&S WORKSHEET # 11

### Channel Design Data

PROJECT NAME:	283 Commerce Center - Building #1		
LOCATION:	Mount Joy Township, Lancaster County, Pennsylvania		
PREPARED BY:	Timothy Fink, E.I.T.	DATE:	2023.01.03
CHECKED BY:	Joshua C. George, P.E.	DATE:	2023.01.03

CHANNEL OR CHANNEL SECTION	#2D	#2D	#3	#3	
TEMPORARY OR PERMANENT (T OR P)	T	P	T	P	
DESIGN STORM (2,5, OR 10 YR)	2 YR	10 YR	2 YR	10 YR	
ACRES (AC)	0.138	0.138	1.148	1.148	
MULTIPLIER (1.6,2.25, OR 2.75) <sup>1</sup>	N/A	N/A	N/A	N/A	
Q <sub>r</sub> (REQUIRED CAPACITY) (CFS)	0.24	0.32	1.91	2.49	
Q (CALCULATED AT FLOW DEPTH d) (CFS)	0.24	0.32	1.91	2.49	
PROTECTIVE LINING	R-3	R-4	S75	N/A	
n (MANNING'S COEFFICIENT) <sup>2</sup>	0.043	0.063	0.055	0.054	
V <sub>a</sub> (ALLOWABLE VELOCITY) (FPS)	N/A	N/A	N/A	N/A	
V (CALCULATED AT FLOW DEPTH d) (FPS)	2.46	2.12	2.12	2.31	
τ <sub>a</sub> (MAX ALLOWABLE SHEAR STRESS) (LB/FT <sup>2</sup> )	1.00	2.00	1.55	1.00	
τ <sub>d</sub> (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT <sup>2</sup> )	0.96	1.41	0.85	0.97	
CHANNEL BOTTOM WIDTH (FT)	2.0	2.0	2.0	2.0	
CHANNEL SIDE SLOPES (H:1)	3.0	3.0	3.0	3.0	
D (TOTAL DEPTH) (FT)	1.5	1.5	1.5	1.5	
CHANNEL TOP WIDTH @ D (FT)	11.0	11.0	11.0	11.0	
d (CALCULATED FLOW DEPTH) (FT)	0.0	0.1	0.3	0.4	
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	2.3	2.4	3.9	4.1	
BOTTOM WIDTH:FLOW DEPTH RATIO (12:1 MAX)	43.18:1	29.47:1	6.48:1	5.67:1	
d <sub>50</sub> STONE SIZE (IN)	3	6	-	-	
A (CROSS-SECTIONAL AREA) (SQ. FT.)	0.10	0.15	0.90	1.08	
R (HYDRAULIC RADIUS)	0.04	0.06	0.23	0.25	
S (BED SLOPE) <sup>3</sup> (FT/FT)	0.333	0.333	0.044	0.044	
S <sub>c</sub> (CRITICAL SLOPE) (FT/FT)	0.077	0.148	0.074	0.069	
.7S <sub>c</sub> (FT/FT)	0.054	0.103	0.052	0.049	
1.3S <sub>c</sub> (FT/FT)	0.100	0.192	0.096	0.090	
STABLE FLOW? (Y/N)	Yes	Yes	Yes	Yes	
FREEBOARD PROVIDED BASED ON UNSTABLE FLOW (FT)	-	-	-	-	
FREEBOARD PROVIDED BASED ON STABLE FLOW (FT)	1.45	1.43	1.19	1.15	
MINIMUM REQUIRED FREEBOARD <sup>4</sup> (FT)	0.50	0.50	0.50	0.50	
DESIGN METHOD FOR PROTECTIVE LINING <sup>5</sup> PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S	S	
VEGETATED OR UNVEGETATED?	Unvegetated	Unvegetated	Unvegetated	Vegetated	

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft or 1/4 Total Channel Depth, whichever is greater.
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.



## STANDARD E&S WORKSHEET # 11

### Channel Design Data

PROJECT NAME:	283 Commerce Center - Building #1				
LOCATION:	Mount Joy Township, Lancaster County, Pennsylvania				
PREPARED BY:	Timothy Fink, E.I.T.	DATE: 2023.01.03			
CHECKED BY:	Joshua C. George, P.E.	DATE: 2023.01.03			

CHANNEL OR CHANNEL SECTION	#4	#4	#5A	#5A	
TEMPORARY OR PERMANENT (T OR P)	T	P	T	P	
DESIGN STORM (2,5, OR 10 YR)	2 YR	10 YR	2 YR	10 YR	
ACRES (AC)	0.61	0.61	2.292	2.292	
MULTIPLIER (1.6,2.25, OR 2.75) <sup>1</sup>	N/A	N/A	N/A	N/A	
Q <sub>r</sub> (REQUIRED CAPACITY) (CFS)	6.36	8.30	3.56	4.65	
Q (CALCULATED AT FLOW DEPTH d) (CFS)	6.36	8.30	3.56	4.65	
PROTECTIVE LINING	S75	N/A	S75	N/A	
n (MANNING'S COEFFICIENT) <sup>2</sup>	0.046	0.083	0.055	0.058	
V <sub>a</sub> (ALLOWABLE VELOCITY) (FPS)	N/A	N/A	N/A	N/A	
V (CALCULATED AT FLOW DEPTH d) (FPS)	1.52	1.05	2.04	2.09	
τ <sub>a</sub> (MAX ALLOWABLE SHEAR STRESS) (LB/FT <sup>2</sup> )	1.55	1.00	1.55	1.00	
τ <sub>d</sub> (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT <sup>2</sup> )	0.28	0.41	0.75	0.88	
CHANNEL BOTTOM WIDTH (FT)	2.0	2.0	2.0	2.0	
CHANNEL SIDE SLOPES (H:1)	3.0	3.0	3.0	3.0	
D (TOTAL DEPTH) (FT)	2.0	2.0	1.5	1.5	
CHANNEL TOP WIDTH @ D (FT)	14.0	14.0	11.0	11.0	
d (CALCULATED FLOW DEPTH) (FT)	0.9	1.3	0.5	0.6	
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	7.4	9.9	5.0	5.5	
BOTTOM WIDTH:FLOW DEPTH RATIO (12:1 MAX)	2.24:1	1.51:1	4:1	3.4:1	
d <sub>50</sub> STONE SIZE (IN)	-	-	-	-	
A (CROSS-SECTIONAL AREA) (SQ. FT.)	4.18	7.91	1.75	2.22	
R (HYDRAULIC RADIUS)	0.55	0.76	0.34	0.39	
S (BED SLOPE) <sup>3</sup> (FT/FT)	0.005	0.005	0.024	0.024	
S <sub>c</sub> (CRITICAL SLOPE) (FT/FT)	0.039	0.116	0.065	0.071	
.7S <sub>c</sub> (FT/FT)	0.028	0.081	0.046	0.049	
1.3S <sub>c</sub> (FT/FT)	0.051	0.151	0.085	0.092	
STABLE FLOW? (Y/N)	Yes	Yes	Yes	Yes	
FREEBOARD PROVIDED BASED ON UNSTABLE FLOW (FT)	-	-	-	-	
FREEBOARD PROVIDED BASED ON STABLE FLOW (FT)	1.11	0.68	1.00	0.91	
MINIMUM REQUIRED FREEBOARD <sup>4</sup> (FT)	0.50	0.50	0.50	0.50	
DESIGN METHOD FOR PROTECTIVE LINING <sup>5</sup> PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S	S	S	
VEGETATED OR UNVEGETATED?	Unvegetated	Vegetated	Unvegetated	Vegetated	

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft or 1/4 Total Channel Depth, whichever is greater.
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

## STANDARD E&S WORKSHEET # 11

### Channel Design Data

PROJECT NAME:	283 Commerce Center - Building #1		
LOCATION:	Mount Joy Township, Lancaster County, Pennsylvania		
PREPARED BY:	Timothy Fink, E.I.T.	DATE:	2023.01.03
CHECKED BY:	Joshua C. George, P.E.	DATE:	2023.01.03

CHANNEL OR CHANNEL SECTION	#5B	#5B			
TEMPORARY OR PERMANENT (T OR P)	T	P			
DESIGN STORM (2,5, OR 10 YR)	2 YR	10 YR			
ACRES (AC)	1.024	1.024			
MULTIPLIER (1.6,2.25, OR 2.75) <sup>1</sup>	N/A	N/A			
Q <sub>r</sub> (REQUIRED CAPACITY) (CFS)	5.39	7.03			
Q (CALCULATED AT FLOW DEPTH d) (CFS)	5.39	7.03			
PROTECTIVE LINING	S75	N/A			
n (MANNING'S COEFFICIENT) <sup>2</sup>	0.051	0.063			
V <sub>a</sub> (ALLOWABLE VELOCITY) (FPS)	N/A	N/A			
V (CALCULATED AT FLOW DEPTH d) (FPS)	2.02	1.87			
τ <sub>a</sub> (MAX ALLOWABLE SHEAR STRESS) (LB/FT <sup>2</sup> )	1.55	1.00			
τ <sub>d</sub> (CALC'D SHEAR STRESS AT FLOW DEPTH d) (LB/FT <sup>2</sup> )	0.62	0.78			
CHANNEL BOTTOM WIDTH (FT)	2.0	2.0			
CHANNEL SIDE SLOPES (H:1)	3.0	3.0			
D (TOTAL DEPTH) (FT)	1.5	1.5			
CHANNEL TOP WIDTH @ D (FT)	11.0	11.0			
d (CALCULATED FLOW DEPTH) (FT)	0.7	0.8			
CHANNEL TOP WIDTH @ FLOW DEPTH d (FT)	6.0	7.0			
BOTTOM WIDTH:FLOW DEPTH RATIO (12:1 MAX)	3:1	2.39:1			
d <sub>50</sub> STONE SIZE (IN)	-	-			
A (CROSS-SECTIONAL AREA) (SQ. FT.)	2.67	3.77			
R (HYDRAULIC RADIUS)	0.43	0.52			
S (BED SLOPE) <sup>3</sup> (FT/FT)	0.015	0.015			
S <sub>c</sub> (CRITICAL SLOPE) (FT/FT)	0.052	0.074			
.7S <sub>c</sub> (FT/FT)	0.037	0.052			
1.3S <sub>c</sub> (FT/FT)	0.068	0.097			
STABLE FLOW? (Y/N)	Yes	Yes			
FREEBOARD PROVIDED BASED ON UNSTABLE FLOW (FT)	-	-			
FREEBOARD PROVIDED BASED ON STABLE FLOW (FT)	0.83	0.66			
MINIMUM REQUIRED FREEBOARD <sup>4</sup> (FT)	0.50	0.50			
DESIGN METHOD FOR PROTECTIVE LINING <sup>5</sup> PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	S	S			
VEGETATED OR UNVEGETATED?	Unvegetated	Vegetated			

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft or 1/4 Total Channel Depth, whichever is greater.
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

Channel #1						
Cover	HSG	C Value	Area (ft <sup>2</sup> )	Area (Acres)	(CxA)	C <sub>w</sub>
Farm	B	0.21	626	0.014	0.0030	0.26
Farm	C	0.26	121	0.003	0.0007	
Impervious	N/A	0.93	0	0.000	0.0000	
Open Space	B	0.26	189,171	4.343	1.1291	
Open Space	C	0.30	3,899	0.090	0.0269	
Woods	B	0.18	62	0.001	0.0003	
Total			193,879	4.451		

Channel #2A						
Cover	HSG	C Value	Area (ft <sup>2</sup> )	Area (Acres)	(CxA)	C <sub>w</sub>
Farm	B	0.21	0	0.000	0.0000	0.49
Farm	C	0.26	0	0.000	0.0000	
Impervious	N/A	0.93	12,021	0.276	0.2566	
Open Space	B	0.26	22,470	0.516	0.1341	
Open Space	C	0.30	774	0.018	0.0053	
Woods	B	0.18	0	0.000	0.0000	
Total			35,265	0.810		

Channel #2B						
Cover	HSG	C Value	Area (ft <sup>2</sup> )	Area (Acres)	(CxA)	C <sub>w</sub>
Farm	B	0.21	0	0.000	0.0000	0.53
Farm	C	0.26	0	0.000	0.0000	
Impervious	N/A	0.93	2,552	0.059	0.0545	
Open Space	B	0.26	3,773	0.087	0.0225	
Open Space	C	0.30	0	0.000	0.0000	
Woods	B	0.18	0	0.000	0.0000	
Total			6,325	0.145		

Channel #2C						
Cover	HSG	C Value	Area (ft <sup>2</sup> )	Area (Acres)	(CxA)	C <sub>w</sub>
Farm	B	0.21	0	0.000	0.0000	0.54
Farm	C	0.26	0	0.000	0.0000	
Impervious	N/A	0.93	2,859	0.066	0.0610	
Open Space	B	0.26	3,483	0.080	0.0208	
Open Space	C	0.30	554	0.013	0.0038	
Woods	B	0.18	0	0.000	0.0000	
Total			6,896	0.158		

Channel #2D						
Cover	HSG	C Value	Area (ft <sup>2</sup> )	Area (Acres)	(CxA)	C <sub>w</sub>
Farm	B	0.21	0	0.000	0.0000	0.38
Farm	C	0.26	0	0.000	0.0000	
Impervious	N/A	0.93	1,105	0.025	0.0236	
Open Space	B	0.26	4,907	0.113	0.0293	
Open Space	C	0.30	0	0.000	0.0000	
Woods	B	0.18	0	0.000	0.0000	
Total			6,012	0.138		

Channel #3						
Cover	HSG	C Value	Area (ft <sup>2</sup> )	Area (Acres)	(CxA)	C <sub>w</sub>
Farm	B	0.21	0	0.000	0.0000	0.36
Farm	C	0.26	0	0.000	0.0000	
Impervious	N/A	0.93	7,531	0.173	0.1608	
Open Space	B	0.26	41,340	0.949	0.2467	
Open Space	C	0.30	1,154	0.026	0.0079	
Woods	B	0.18	0	0.000	0.0000	
Total			50,025	1.148		

Channel #4						
Cover	HSG	C Value	Area (ft <sup>2</sup> )	Area (Acres)	(CxA)	C <sub>w</sub>
Farm	B	0.21	0	0.000	0.0000	0.35
Farm	C	0.26	0	0.000	0.0000	
Impervious	N/A	0.93	2,369	0.054	0.0506	
Open Space	B	0.26	6,489	0.149	0.0387	
Open Space	C	0.30	17,702	0.406	0.1219	
Woods	B	0.18	0	0.000	0.0000	
Total			26,560	0.610		

Channel #5A						
Cover	HSG	C Value	Area (ft <sup>2</sup> )	Area (Acres)	(CxA)	C <sub>w</sub>
Farm	B	0.21	27,105	0.622	0.1307	0.34
Farm	C	0.26	22,007	0.505	0.1314	
Impervious	N/A	0.93	12,670	0.291	0.2705	
Open Space	B	0.26	22,311	0.512	0.1332	
Open Space	C	0.30	15,768	0.362	0.1086	
Woods	B	0.18	0	0.000	0.0000	
Total			99,861	2.292		

Channel #5B						
Cover	HSG	C Value	Area (ft <sup>2</sup> )	Area (Acres)	(CxA)	C <sub>w</sub>
Farm	B	0.21	6,032	0.138	0.0291	0.39
Farm	C	0.26	9,385	0.215	0.0560	
Impervious	N/A	0.93	9,017	0.207	0.1925	
Open Space	B	0.26	20,170	0.463	0.1204	
Open Space	C	0.30	12	0.000	0.0001	
Woods	B	0.18	0	0.000	0.0000	
Total			44,616	1.024		

Channel 2-year Runoff Calculations						
Channel	C	I (in/hr)	A (Acres)	Q (cfs)	Upstream Q (cfs)	Total Q (cfs)
#1	0.26	4.60	4.451	5.34	6.29	11.63
#2A	0.49	4.60	0.810	1.82	0	1.82
#2B	0.53	4.60	0.145	0.35	0	0.35
#2C	0.54	4.60	0.158	0.39	0	0.39
#2D	0.38	4.60	0.138	0.24	0	0.24
#3	0.36	4.60	1.148	1.91	0	1.91
#4	0.35	4.60	0.610	0.97	5.39	6.36
#5A	0.34	4.60	2.292	3.56	0	3.56
#5B	0.39	4.60	1.024	1.83	3.56	5.39

Channel 10-year Runoff Calculations						
Channel	C	I (in/hr)	A (Acres)	Q (cfs)	Upstream Q (cfs)	Total Q (cfs)
#1	0.26	6.00	4.451	6.96	8.41	15.37
#2A	0.49	6.00	0.810	2.38	0	2.38
#2B	0.53	6.00	0.145	0.46	0	0.46
#2C	0.54	6.00	0.158	0.51	0	0.51
#2D	0.38	6.00	0.138	0.32	0	0.32
#3	0.36	6.00	1.148	2.49	0	2.49
#4	0.35	6.00	0.610	1.27	7.03	8.30
#5A	0.34	6.00	2.292	4.65	0	4.65
#5B	0.39	6.00	1.024	2.39	4.65	7.03

## REFERENCES





**NOAA Atlas 14, Volume 2, Version 3**  
**Location name: Mt Joy Twp, Pennsylvania, USA\***  
**Latitude: 40.1464°, Longitude: -76.5431°**  
**Elevation: 515.93 ft\*\***  
\* source: ESRI Maps  
\*\* source: USGS



**POINT PRECIPITATION FREQUENCY ESTIMATES**

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

**PF tabular**

<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
<b>Duration</b>	<b>Average recurrence interval (years)</b>									
	<b>1</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>500</b>	<b>1000</b>
<b>5-min</b>	0.322 (0.290-0.357)	0.383 (0.345-0.426)	0.451 (0.406-0.501)	0.500 (0.449-0.554)	0.559 (0.499-0.618)	0.600 (0.535-0.664)	0.641 (0.569-0.709)	0.678 (0.599-0.751)	0.723 (0.633-0.799)	0.756 (0.659-0.838)
<b>10-min</b>	0.514 (0.464-0.570)	0.612 (0.552-0.681)	0.722 (0.650-0.802)	0.799 (0.718-0.886)	0.890 (0.796-0.986)	0.956 (0.852-1.06)	1.02 (0.904-1.13)	1.08 (0.949-1.19)	1.14 (1.00-1.26)	1.19 (1.04-1.32)
<b>15-min</b>	0.642 (0.580-0.713)	0.769 (0.694-0.856)	0.913 (0.822-1.01)	1.01 (0.908-1.12)	1.13 (1.01-1.25)	1.21 (1.08-1.34)	1.29 (1.14-1.42)	1.36 (1.20-1.50)	1.44 (1.26-1.59)	1.50 (1.30-1.66)
<b>30-min</b>	0.881 (0.795-0.978)	1.06 (0.958-1.18)	1.30 (1.17-1.44)	1.47 (1.32-1.62)	1.67 (1.49-1.85)	1.82 (1.62-2.02)	1.97 (1.75-2.18)	2.11 (1.86-2.34)	2.29 (2.01-2.53)	2.42 (2.11-2.68)
<b>60-min</b>	1.10 (0.991-1.22)	1.33 (1.20-1.48)	1.66 (1.50-1.85)	1.91 (1.71-2.12)	2.23 (1.99-2.46)	2.47 (2.20-2.73)	2.72 (2.41-3.00)	2.96 (2.61-3.28)	3.29 (2.88-3.63)	3.54 (3.08-3.91)
<b>2-hr</b>	1.30 (1.17-1.44)	1.57 (1.42-1.75)	1.99 (1.79-2.21)	2.31 (2.08-2.57)	2.77 (2.48-3.06)	3.14 (2.80-3.47)	3.54 (3.13-3.90)	3.95 (3.46-4.36)	4.53 (3.93-5.01)	5.00 (4.30-5.54)
<b>3-hr</b>	1.41 (1.28-1.58)	1.72 (1.55-1.92)	2.17 (1.96-2.42)	2.53 (2.27-2.81)	3.03 (2.70-3.35)	3.43 (3.05-3.80)	3.87 (3.41-4.28)	4.32 (3.78-4.77)	4.96 (4.30-5.49)	5.47 (4.70-6.07)
<b>6-hr</b>	1.74 (1.57-1.96)	2.11 (1.91-2.37)	2.66 (2.39-2.98)	3.12 (2.79-3.49)	3.77 (3.35-4.20)	4.33 (3.82-4.81)	4.93 (4.31-5.46)	5.57 (4.83-6.17)	6.51 (5.57-7.21)	7.30 (6.17-8.09)
<b>12-hr</b>	2.13 (1.91-2.41)	2.57 (2.30-2.91)	3.26 (2.92-3.69)	3.85 (3.42-4.34)	4.72 (4.17-5.30)	5.47 (4.79-6.13)	6.31 (5.47-7.05)	7.24 (6.19-8.07)	8.63 (7.26-9.61)	9.83 (8.14-10.9)
<b>24-hr</b>	2.46 (2.26-2.71)	2.98 (2.73-3.28)	3.80 (3.48-4.18)	4.51 (4.12-4.95)	5.59 (5.06-6.11)	6.54 (5.87-7.12)	7.61 (6.78-8.26)	8.81 (7.72-9.54)	10.6 (9.17-11.5)	12.2 (10.4-13.2)
<b>2-day</b>	2.85 (2.62-3.15)	3.45 (3.18-3.82)	4.41 (4.04-4.86)	5.21 (4.76-5.74)	6.41 (5.81-7.02)	7.44 (6.69-8.14)	8.58 (7.65-9.37)	9.84 (8.68-10.7)	11.7 (10.2-12.8)	13.3 (11.4-14.6)
<b>3-day</b>	3.02 (2.79-3.32)	3.65 (3.37-4.02)	4.65 (4.28-5.11)	5.50 (5.04-6.03)	6.76 (6.15-7.39)	7.85 (7.09-8.57)	9.06 (8.12-9.87)	10.4 (9.23-11.3)	12.4 (10.8-13.5)	14.2 (12.2-15.4)
<b>4-day</b>	3.20 (2.95-3.49)	3.86 (3.57-4.22)	4.90 (4.52-5.36)	5.79 (5.32-6.32)	7.12 (6.50-7.75)	8.27 (7.50-8.99)	9.55 (8.59-10.4)	11.0 (9.78-11.9)	13.1 (11.5-14.2)	15.0 (13.0-16.3)
<b>7-day</b>	3.75 (3.48-4.09)	4.51 (4.18-4.92)	5.67 (5.25-6.18)	6.66 (6.15-7.24)	8.13 (7.46-8.83)	9.40 (8.57-10.2)	10.8 (9.77-11.7)	12.4 (11.1-13.4)	14.7 (13.0-15.9)	16.7 (14.5-18.1)
<b>10-day</b>	4.30 (4.01-4.65)	5.16 (4.81-5.58)	6.41 (5.96-6.92)	7.45 (6.91-8.03)	8.96 (8.26-9.65)	10.2 (9.39-11.0)	11.6 (10.6-12.5)	13.1 (11.8-14.1)	15.2 (13.6-16.4)	17.0 (15.1-18.4)
<b>20-day</b>	5.86 (5.52-6.25)	6.97 (6.56-7.43)	8.38 (7.89-8.95)	9.53 (8.95-10.2)	11.1 (10.4-11.9)	12.4 (11.6-13.2)	13.8 (12.8-14.7)	15.2 (14.0-16.2)	17.1 (15.7-18.3)	18.7 (17.0-20.0)
<b>30-day</b>	7.25 (6.85-7.70)	8.57 (8.10-9.10)	10.1 (9.57-10.8)	11.4 (10.7-12.1)	13.1 (12.3-13.9)	14.5 (13.6-15.4)	15.9 (14.9-16.9)	17.4 (16.1-18.5)	19.4 (17.9-20.6)	20.9 (19.2-22.3)
<b>45-day</b>	9.13 (8.69-9.62)	10.8 (10.2-11.3)	12.5 (11.9-13.2)	13.9 (13.2-14.6)	15.7 (14.8-16.4)	17.0 (16.1-17.9)	18.4 (17.3-19.3)	19.7 (18.5-20.7)	21.4 (20.1-22.6)	22.7 (21.2-24.0)
<b>60-day</b>	10.9 (10.4-11.5)	12.8 (12.2-13.5)	14.8 (14.1-15.5)	16.2 (15.5-17.0)	18.2 (17.3-19.0)	19.6 (18.6-20.5)	21.0 (19.8-22.0)	22.3 (21.0-23.4)	24.0 (22.6-25.2)	25.2 (23.7-26.6)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

**PF graphical**



**Table 2-2a** Runoff curve numbers for urban areas <sup>1/</sup>

Cover description	Average percent impervious area <sup>2/</sup>	Curve numbers for hydrologic soil group			
		A	B	C	D
<b>Fully developed urban areas (vegetation established)</b>					
Open space (lawns, parks, golf courses, cemeteries, etc.) <sup>3/</sup> :					
Poor condition (grass cover < 50%) .....		68	79	86	89
Fair condition (grass cover 50% to 75%) .....		49	69	79	84
Good condition (grass cover > 75%) .....		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way) .....		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way) .....		98	98	98	98
Paved; open ditches (including right-of-way) .....		83	89	92	93
Gravel (including right-of-way) .....		76	85	89	91
Dirt (including right-of-way) .....		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) <sup>4/</sup> .....		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders) .....		96	96	96	96
Urban districts:					
Commercial and business .....	85	89	92	94	95
Industrial .....	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses) .....	65	77	85	90	92
1/4 acre .....	38	61	75	83	87
1/3 acre .....	30	57	72	81	86
1/2 acre .....	25	54	70	80	85
1 acre .....	20	51	68	79	84
2 acres .....	12	46	65	77	82

**Developing urban areas**

Newly graded areas  
(pervious areas only, no vegetation) <sup>5/</sup> .....

	77	86	91	94
--	----	----	----	----

Idle lands (CN's are determined using cover types  
similar to those in table 2-2c).

<sup>1/</sup> Average runoff condition, and  $I_a = 0.2S$ .

<sup>2/</sup> The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

<sup>3/</sup> CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

<sup>4/</sup> Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

<sup>5/</sup> Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

**Table 2-2b** Runoff curve numbers for cultivated agricultural lands <sup>1/</sup>

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment <sup>2/</sup>	Hydrologic condition <sup>3/</sup>	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
C&T+ CR	Poor	65	73	79	81	
	Good	61	70	77	80	
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

<sup>1</sup> Average runoff condition, and  $I_a=0.2S$

<sup>2</sup> Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

<sup>3</sup> Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good  $\geq 20\%$ ), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

**Table 2-2c** Runoff curve numbers for other agricultural lands <sup>1/</sup>

Cover description	Hydrologic condition	Curve numbers for hydrologic soil group			
		A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. <sup>2/</sup>	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. <sup>3/</sup>	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 <sup>4/</sup>	48	65	73
Woods—grass combination (orchard or tree farm). <sup>5/</sup>	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. <sup>6/</sup>	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 <sup>4/</sup>	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

<sup>1</sup> Average runoff condition, and  $I_a = 0.2S$ .

<sup>2</sup> **Poor:** <50% ground cover or heavily grazed with no mulch.

**Fair:** 50 to 75% ground cover and not heavily grazed.

**Good:** > 75% ground cover and lightly or only occasionally grazed.

<sup>3</sup> **Poor:** <50% ground cover.

**Fair:** 50 to 75% ground cover.

**Good:** >75% ground cover.

<sup>4</sup> Actual curve number is less than 30; use CN = 30 for runoff computations.

<sup>5</sup> CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

<sup>6</sup> **Poor:** Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

**Fair:** Woods are grazed but not burned, and some forest litter covers the soil.

**Good:** Woods are protected from grazing, and litter and brush adequately cover the soil.

**Table 2-2d** Runoff curve numbers for arid and semiarid rangelands <sup>1/</sup>

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition <sup>2/</sup>	A <sup>3/</sup>	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

<sup>1</sup> Average runoff condition, and  $I_a$ , = 0.2S. For range in humid regions, use table 2-2c.

<sup>2</sup> Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

<sup>3</sup> Curve numbers for group A have been developed only for desert shrub.

**APPENDIX D**  
**STORM SEWER CONVEYANCE DESIGN**

## **STORM SEWER DRAINAGE AREA CALCULATIONS**



**Project Name:** 283 Commerce Center - Building #1

**Project #:** 22-0123-005

**Date:** January 3, 2023

**Rational "C" Coefficients (Mount Joy Township SWMO, Appendix No. 1):**

Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
FARM	0.10	0.16	0.22	0.14	0.20	0.28	0.19	0.26	0.33	0.23	0.29	0.38
IMPERVIOUS	0.90	0.91	0.92	0.91	0.92	0.93	0.92	0.93	0.94	0.93	0.94	0.95
OPEN SPACE	0.10	0.16	0.20	0.14	0.19	0.26	0.18	0.22	0.30	0.21	0.25	0.35
WOODS	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25



**Project Name:** 283 Commerce Center - Building #1

**Project #:** 22-0123-005

**Date:** January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 1**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
1-1	FARM															
	IMPERVIOUS															
	OPEN SPACE															
	WOODS															
																5.0
1-2	FARM															
	IMPERVIOUS															
	OPEN SPACE															
	WOODS															
																5.0
1-3	FARM															
	IMPERVIOUS						0.184							0.184	0.93	
	OPEN SPACE						0.174							0.174	0.26	
	WOODS															
														0.358	0.60	5.0
1-4	FARM															
	IMPERVIOUS						0.030							0.030	0.93	
	OPEN SPACE						0.023							0.023	0.26	
	WOODS															
														0.053	0.64	5.0
1-4A	FARM															
	IMPERVIOUS						0.155							0.155	0.93	
	OPEN SPACE						0.050							0.050	0.26	
	WOODS															
														0.205	0.77	5.0
1-4B	FARM															
	IMPERVIOUS						0.181							0.181	0.93	
	OPEN SPACE						0.046							0.046	0.26	
	WOODS															
														0.227	0.79	5.0
1-4C	FARM															
	IMPERVIOUS						0.181							0.181	0.93	
	OPEN SPACE						0.046							0.046	0.26	
	WOODS															
														0.227	0.79	5.0
1-4D	FARM															
	IMPERVIOUS						0.223							0.223	0.93	
	OPEN SPACE						0.045							0.045	0.26	
	WOODS															
														0.268	0.82	5.0






**Project Name:** 283 Commerce Center - Building #1

**Project #:** 22-0123-005

**Date:** January 3, 2023


**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 1**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
1-5	FARM															
	IMPERVIOUS						0.626							0.626	0.93	
	OPEN SPACE						0.434							0.434	0.26	
	WOODS															
													1.060	0.66	5.0	
1-6	FARM															
	IMPERVIOUS						0.083							0.083	0.93	
	OPEN SPACE						0.121							0.121	0.26	
	WOODS															
													0.204	0.53	5.0	
1-7	FARM															
	IMPERVIOUS						0.030							0.030	0.93	
	OPEN SPACE						0.012							0.012	0.26	
	WOODS															
													0.042	0.74	5.0	
1-8	FARM															
	IMPERVIOUS						0.824							0.824	0.93	
	OPEN SPACE						0.055							0.055	0.26	
	WOODS															
													0.879	0.89	5.0	
1-9	FARM															
	IMPERVIOUS						2.192							2.192	0.93	
	OPEN SPACE															
	WOODS															
													2.192	0.93	5.0	
1-9A	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.236							0.236	0.26	
	WOODS															
													1.076	0.78	5.0	
1-9B	FARM															
	IMPERVIOUS						0.733							0.733	0.93	
	OPEN SPACE						0.428							0.428	0.26	
	WOODS															
													1.161	0.68	5.0	
1-9C	FARM															
	IMPERVIOUS						0.214							0.214	0.93	
	OPEN SPACE						0.414							0.414	0.26	
	WOODS															
													0.628	0.49	5.0	

	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 1**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
1-9D	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.204							0.204	0.26	
	WOODS															
													1.044	0.80	5.0	
1-10	FARM															
	IMPERVIOUS						3.188							3.188	0.93	
	OPEN SPACE															
	WOODS															
													3.188	0.93	5.0	
1-10A	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.198							0.198	0.26	
	WOODS															
													1.038	0.80	5.0	
1-10B	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.180							0.180	0.26	
	WOODS															
													1.020	0.81	5.0	
1-11	FARM															
	IMPERVIOUS						2.391							2.391	0.93	
	OPEN SPACE															
	WOODS															
													2.391	0.93	5.0	
1-11A	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.159							0.159	0.26	
	WOODS															
													0.999	0.82	5.0	
1-11B	FARM															
	IMPERVIOUS						0.710							0.710	0.93	
	OPEN SPACE						0.440							0.440	0.26	
	WOODS															
													1.150	0.67	5.0	
1-12	FARM															
	IMPERVIOUS						2.391							2.391	0.93	
	OPEN SPACE															
	WOODS															
													2.391	0.93	5.0	

	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 1**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
1-13	FARM															
	IMPERVIOUS						1.023							1.023	0.93	
	OPEN SPACE						0.067							0.067	0.26	
	WOODS															
													1.090	0.89	5.0	
1-14	FARM															
	IMPERVIOUS						0.050							0.050	0.93	
	OPEN SPACE						0.018							0.018	0.26	
	WOODS															
													0.068	0.76	5.0	
1-15	FARM															
	IMPERVIOUS						0.061							0.061	0.93	
	OPEN SPACE						0.028							0.028	0.26	
	WOODS															
													0.089	0.72	5.0	
1-16	FARM															
	IMPERVIOUS						0.703							0.703	0.93	
	OPEN SPACE						0.050							0.050	0.26	
	WOODS															
													0.753	0.89	5.0	
1-16A	FARM															
	IMPERVIOUS															
	OPEN SPACE															
	WOODS															
															5.0	
1-16B	FARM															
	IMPERVIOUS						2.391							2.391	0.93	
	OPEN SPACE															
	WOODS															
													2.391	0.93	5.0	
1-16C	FARM															
	IMPERVIOUS						1.993							1.993	0.93	
	OPEN SPACE															
	WOODS															
													1.993	0.93	5.0	
1-17	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.044							0.044	0.26	
	WOODS															
													0.884	0.90	5.0	



**Project Name:** 283 Commerce Center - Building #1

**Project #:** 22-0123-005

**Date:** January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 1**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
1-18	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.044							0.044	0.26	
	WOODS															
													0.884	0.90	5.0	
1-19	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.044							0.044	0.26	
	WOODS															
													0.884	0.90	5.0	
1-20	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.044							0.044	0.26	
	WOODS															
													0.884	0.90	5.0	
1-20A	FARM															
	IMPERVIOUS						0.797							0.797	0.93	
	OPEN SPACE															
	WOODS															
													0.797	0.93	5.0	
1-20B	FARM															
	IMPERVIOUS						2.391							2.391	0.93	
	OPEN SPACE															
	WOODS															
													2.391	0.93	5.0	
1-20C	FARM															
	IMPERVIOUS						2.391							2.391	0.93	
	OPEN SPACE															
	WOODS															
													2.391	0.93	5.0	
1-21	FARM															
	IMPERVIOUS						0.840							0.840	0.93	
	OPEN SPACE						0.044							0.044	0.26	
	WOODS															
													0.884	0.90	5.0	
1-22	FARM															
	IMPERVIOUS						0.708							0.708	0.93	
	OPEN SPACE						0.052							0.052	0.26	
	WOODS															
													0.760	0.88	5.0	




**Project Name:** 283 Commerce Center - Building #1

**Project #:** 22-0123-005

**Date:** January 3, 2023


**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 1**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
1-23	FARM															
	IMPERVIOUS						0.002							0.002	0.93	
	OPEN SPACE						0.001							0.001	0.26	
	WOODS															
													0.003	0.70	5.0	
1-24	FARM															
	IMPERVIOUS						0.375			0.056				0.430	0.93	
	OPEN SPACE						0.303			0.031				0.334	0.26	
	WOODS															
													0.764	0.64	5.0	
1-25	FARM															
	IMPERVIOUS						0.050							0.050	0.93	
	OPEN SPACE						0.015							0.015	0.26	
	WOODS															
													0.065	0.78	5.0	
1-25A	FARM															
	IMPERVIOUS						1.820							1.820	0.93	
	OPEN SPACE						0.066							0.066	0.26	
	WOODS															
													1.886	0.91	5.0	
1-26	FARM															
	IMPERVIOUS						0.061							0.061	0.93	
	OPEN SPACE						0.028							0.028	0.26	
	WOODS															
													0.089	0.72	5.0	
1-27	FARM															
	IMPERVIOUS						0.411							0.411	0.93	
	OPEN SPACE						0.048							0.048	0.26	
	WOODS															
													0.459	0.86	5.0	
1-27A	FARM															
	IMPERVIOUS						0.385			0.002				0.387	0.93	
	OPEN SPACE						0.336			0.004				0.340	0.26	
	WOODS															
													0.727	0.62	5.0	
1-28	FARM															
	IMPERVIOUS						0.298			0.038				0.337	0.93	
	OPEN SPACE						0.074			0.014				0.088	0.27	
	WOODS															
													0.425	0.79	5.0	

	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023


**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 1**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
1-29	FARM															
	IMPERVIOUS						0.157			0.183				0.340	0.94	
	OPEN SPACE						0.026			0.059				0.085	0.29	
	WOODS															
														0.425	0.81	5.0
1-30	FARM															
	IMPERVIOUS						0.358			0.052				0.410	0.93	
	OPEN SPACE						0.032			0.014				0.045	0.27	
	WOODS															
														0.455	0.87	5.0
1-31	FARM															
	IMPERVIOUS						0.107			0.269				0.376	0.94	
	OPEN SPACE						0.106			0.278				0.383	0.29	
	WOODS															
														0.759	0.61	5.0

 <b>LANDWORKS CIVIL DESIGN</b> land development consultants	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 2**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
2-1	FARM															
	IMPERVIOUS															
	OPEN SPACE															
	WOODS															
																5.0
2-2	FARM															
	IMPERVIOUS						0.114							0.114	0.93	
	OPEN SPACE						0.127							0.127	0.26	
	WOODS															
														0.241	0.58	5.0
2-2A	FARM															
	IMPERVIOUS						0.114							0.114	0.93	
	OPEN SPACE						0.122							0.122	0.26	
	WOODS															
														0.236	0.58	5.0
2-3	FARM															
	IMPERVIOUS						0.078							0.078	0.93	
	OPEN SPACE						0.049							0.049	0.26	
	WOODS															
														0.127	0.67	5.0
2-3A	FARM															
	IMPERVIOUS						0.673							0.673	0.93	
	OPEN SPACE						0.714							0.714	0.26	
	WOODS															
														1.387	0.59	5.0
2-4	FARM															
	IMPERVIOUS															
	OPEN SPACE															
	WOODS															
																5.0
2-4A	FARM															
	IMPERVIOUS						0.002							0.002	0.93	
	OPEN SPACE						0.020							0.020	0.26	
	WOODS															
														0.022	0.33	5.0
2-5	FARM															
	IMPERVIOUS						0.105							0.105	0.93	
	OPEN SPACE						0.224							0.224	0.26	
	WOODS															
														0.329	0.47	5.0

	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 2**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
2-5A	FARM															
	IMPERVIOUS						0.105							0.105	0.93	
	OPEN SPACE						0.122							0.122	0.26	
	WOODS															
													0.227	0.57	5.0	






**Project Name:** 283 Commerce Center - Building #1

**Project #:** 22-0123-005

**Date:** January 3, 2023


**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 3**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
3-1	FARM															
	IMPERVIOUS									0.094				0.094	0.94	
	OPEN SPACE									0.064				0.064	0.30	
	WOODS															
													0.158	0.68	5.0	
3-2	FARM															
	IMPERVIOUS									0.116				0.116	0.94	
	OPEN SPACE						0.022			0.089				0.111	0.29	
	WOODS															
													0.227	0.62	5.0	
3-3	FARM															
	IMPERVIOUS									0.130				0.130	0.94	
	OPEN SPACE						0.457			1.105				1.562	0.29	
	WOODS															
													1.692	0.34	5.0	
3-4	FARM															
	IMPERVIOUS									0.064				0.064	0.94	
	OPEN SPACE									0.160				0.160	0.30	
	WOODS															
													0.224	0.48	5.0	
3-4A	FARM															
	IMPERVIOUS						0.059							0.059	0.93	
	OPEN SPACE						0.087							0.087	0.26	
	WOODS															
													0.146	0.53	5.0	
3-4B	FARM						0.013							0.013	0.28	
	IMPERVIOUS						1.351							1.351	0.93	
	OPEN SPACE						1.248							1.248	0.26	
	WOODS						0.681							0.681	0.18	
													3.293	0.52	5.0	
3-5	FARM									0.001				0.001	0.33	
	IMPERVIOUS									0.062				0.062	0.94	
	OPEN SPACE									0.110				0.110	0.30	
	WOODS															
													0.173	0.53	5.0	
3-5A	FARM															
	IMPERVIOUS						0.002			0.064				0.066	0.94	
	OPEN SPACE						0.041			0.057				0.098	0.28	
	WOODS															
													0.164	0.55	5.0	

	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023


**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 3**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
3-5B	FARM															
	IMPERVIOUS						0.276							0.276	0.93	
	OPEN SPACE						0.516			0.018				0.534	0.26	
	WOODS															
													0.810	0.49	5.0	
3-6	FARM															
	IMPERVIOUS									0.040				0.040	0.94	
	OPEN SPACE									0.113				0.113	0.30	
	WOODS															
													0.153	0.47	5.0	
3-6A	FARM						0.053			0.012				0.065	0.29	
	IMPERVIOUS									0.041				0.041	0.94	
	OPEN SPACE						0.007			0.089				0.096	0.30	
	WOODS															
													0.202	0.43	5.0	
3-7	FARM															
	IMPERVIOUS						0.001			0.062				0.064	0.94	
	OPEN SPACE						0.010			0.256				0.266	0.30	
	WOODS															
													0.330	0.42	5.0	
3-7A	FARM						0.034			0.001				0.035	0.28	
	IMPERVIOUS						0.053			0.053				0.105	0.94	
	OPEN SPACE						0.118			0.071				0.189	0.28	
	WOODS															
													0.329	0.49	5.0	
3-8	FARM															
	IMPERVIOUS						0.052			0.004				0.056	0.93	
	OPEN SPACE						0.134			0.055				0.189	0.27	
	WOODS															
													0.245	0.42	5.0	
3-9	FARM															
	IMPERVIOUS						0.059							0.059	0.93	
	OPEN SPACE						0.067							0.067	0.26	
	WOODS															
													0.126	0.57	5.0	
3-9A	FARM															
	IMPERVIOUS						0.059							0.059	0.93	
	OPEN SPACE						0.139							0.139	0.26	
	WOODS															
													0.198	0.46	5.0	

	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 3**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
3-10	FARM															
	IMPERVIOUS						0.064							0.064	0.93	
	OPEN SPACE						0.075							0.075	0.26	
	WOODS															
													0.139	0.57	5.0	
3-10A	FARM															
	IMPERVIOUS						0.064							0.064	0.93	
	OPEN SPACE						0.149							0.149	0.26	
	WOODS															
													0.213	0.46	5.0	

	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 4**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
4-1	FARM															
	IMPERVIOUS									0.259				0.259	0.94	
	OPEN SPACE									0.173				0.173	0.30	
	WOODS															
													0.432	0.68	5.0	
4-2	FARM															
	IMPERVIOUS						0.039			0.137				0.176	0.94	
	OPEN SPACE						0.002			0.098				0.101	0.30	
	WOODS															
													0.277	0.71	5.0	
OS-3	FARM	Known Q: 25-Year Discharge from MRC #3 - 1.54 cfs														
	IMPERVIOUS															
	OPEN SPACE															
	WOODS															
															5.0	




**Project Name:** 283 Commerce Center - Building #1

**Project #:** 22-0123-005

**Date:** January 3, 2023


**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 5**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)		
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+					
5-1	FARM																	
	IMPERVIOUS																	
	OPEN SPACE																	
	WOODS																	
															5.0			
5-1A	FARM																	
	IMPERVIOUS						0.222			0.005				0.227	0.93			
	OPEN SPACE						1.098			0.433				1.531	0.27			
	WOODS																	
													1.758	0.36	5.0			
5-2	FARM																	
	IMPERVIOUS						0.126			0.073				0.199	0.93			
	OPEN SPACE						1.175			1.069				2.244	0.28			
	WOODS																	
													2.443	0.33	5.0			
5-3	FARM																	
	IMPERVIOUS														0.94			
	OPEN SPACE									0.002				0.002	0.30			
	WOODS																	
													0.002	0.43	5.0			
5-3A	FARM						0.761			0.721				1.481	0.30			
	IMPERVIOUS						0.362			0.136				0.498	0.93			
	OPEN SPACE						0.975			0.362				1.337	0.27			
	WOODS																	
													3.316	0.39	5.0			
5-4	FARM																	
	IMPERVIOUS						0.031			0.057				0.088	0.94			
	OPEN SPACE						0.028			0.041				0.069	0.28			
	WOODS																	
													0.157	0.65	5.0			
5-5	FARM																	
	IMPERVIOUS						0.044			0.251				0.294	0.94			
	OPEN SPACE						0.062			0.177				0.239	0.29			
	WOODS																	
													0.533	0.65	5.0			
5-6	FARM																	
	IMPERVIOUS						0.113							0.113	0.93			
	OPEN SPACE						0.268							0.268	0.26			
	WOODS																	
													0.381	0.46	5.0			

 <b>LANDWORKS CIVIL DESIGN</b> land development consultants	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023


**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 5**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
5-7	FARM															
	IMPERVIOUS						0.118							0.118	0.93	
	OPEN SPACE						0.112							0.112	0.26	
	WOODS															
														0.230	0.60	5.0

	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 6**


Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
6-1	FARM															
	IMPERVIOUS						0.026							0.026	0.93	
	OPEN SPACE						0.006							0.006	0.26	
	WOODS															
													0.032	0.80	5.0	
6-2	FARM						4.643							4.643	0.28	
	IMPERVIOUS						0.699				0.103			0.802	0.93	
	OPEN SPACE						1.209				0.433			1.642	0.27	
	WOODS						0.602							0.602	0.18	
													7.689	0.34	5.0	
6-3	FARM						0.003							0.003	0.28	
	IMPERVIOUS						0.108							0.108	0.93	
	OPEN SPACE						0.091							0.091	0.26	
	WOODS															
													0.202	0.62	5.0	
6-4	FARM						0.017							0.017	0.28	
	IMPERVIOUS						0.097							0.097	0.93	
	OPEN SPACE						0.348							0.348	0.26	
	WOODS															
													0.462	0.40	5.0	

 <b>LANDWORKS</b> <b>CIVIL DESIGN</b> <small>land development consultants</small>	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 7**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
7-1	FARM															
	IMPERVIOUS						0.126							0.126	0.93	
	OPEN SPACE						0.062							0.062	0.26	
	WOODS															
													0.188	0.71	5.0	
7-1A	FARM															
	IMPERVIOUS						0.093							0.093	0.93	
	OPEN SPACE						0.025							0.025	0.26	
	WOODS															
													0.118	0.79	5.0	
7-2	FARM															
	IMPERVIOUS						0.086							0.086	0.93	
	OPEN SPACE						0.048							0.048	0.26	
	WOODS															
													0.134	0.69	5.0	
7-2A	FARM															
	IMPERVIOUS						0.082							0.082	0.93	
	OPEN SPACE						0.021							0.021	0.26	
	WOODS															
													0.103	0.79	5.0	
7-3	FARM															
	IMPERVIOUS						0.084							0.084	0.93	
	OPEN SPACE						0.047							0.047	0.26	
	WOODS															
													0.131	0.69	5.0	
7-3A	FARM															
	IMPERVIOUS						0.084							0.084	0.93	
	OPEN SPACE						0.041							0.041	0.26	
	WOODS															
													0.125	0.71	5.0	



 <b>LANDWORKS</b> <b>CIVIL DESIGN</b> <small>land development consultants</small>	<b>Project Name:</b>	283 Commerce Center - Building #1
	<b>Project #:</b>	22-0123-005
	<b>Date:</b>	January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 8**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
8-1	FARM															
	IMPERVIOUS						0.062							0.062	0.93	
	OPEN SPACE						0.030							0.030	0.26	
	WOODS															
													0.092	0.71	5.0	
8-2	FARM															
	IMPERVIOUS						0.164							0.164	0.93	
	OPEN SPACE						0.087							0.087	0.26	
	WOODS															
													0.251	0.70	5.0	
8-3	FARM						0.052							0.052	0.28	
	IMPERVIOUS						0.203							0.203	0.93	
	OPEN SPACE						0.048							0.048	0.26	
	WOODS															
													0.303	0.71	5.0	



**Project Name:** 283 Commerce Center - Building #1

**Project #:** 22-0123-005

**Date:** January 3, 2023

**STORMWATER CONVEYANCE DRAINAGE AREAS: PIPE RUN 9**

Inlet	Land Use	Soil "A"			Soil "B"			Soil "C"			Soil "D"			Total Area (Ac.)	Weighted "C"	Tc (Min)
		0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+			
9-1	FARM															
	IMPERVIOUS															
	OPEN SPACE															
	WOODS															
																5.0
9-2	FARM															
	IMPERVIOUS													2.245	0.93	
	OPEN SPACE													1.602	0.26	
	WOODS													0.247	0.18	
														4.094	0.62	5.0

## 25-YEAR STORM EVENT

# Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
105	OS-3 TO 4-1	1.54	24	Cir	51.870	441.55	441.81	0.501	442.18	442.24	0.15	442.24	103	DropGrate
104	4-2 TO 4-1	1.64	15	Cir	62.709	442.10	443.23	1.802	442.45	443.74	n/a	443.74	103	Combination
103	4-1 TO 4-0	5.54	24	Cir	70.352	441.00	441.35	0.498	441.83	442.18	n/a	442.18	End	Combination
102	6-4 TO 6-3	1.52	15	Cir	47.293	446.83	448.01	2.495	447.40	448.50	n/a	448.50 j	101	Combination
101	6-3 TO 6-2	2.52	15	Cir	54.422	445.74	446.63	1.635	447.29	447.28	0.12	447.40	100	Combination
100	6-2 TO 6-1	23.60	30	Cir	29.764	445.49	445.64	0.504	447.10	447.29	0.84	447.29	99	Combination
99	6-1 TO 6-0	23.73	30	Cir	15.769	445.31	445.39	0.507	446.97	447.05	0.46	447.05	End	Combination
98	9-2 TO 9-1	20.91	30	Cir	26.582	447.17	447.30	0.489	448.67	448.85	0.66	448.85	97	DropGrate
97	9-1 TO 9-0	20.86	30	Cir	116.043	446.38	446.96	0.500	447.93	448.51	n/a	448.51	End	Manhole
96	7-1A TO 7-1	0.78	15	Cir	33.750	448.52	448.69	0.504	448.86	449.04	0.12	449.04	91	Combination
95	7-2A TO 7-2	0.65	15	Cir	33.750	450.30	450.47	0.504	450.77	450.79	n/a	450.79 j	92	Combination
94	7-3A TO 7-3	0.76	15	Cir	33.750	452.75	452.92	0.504	453.08	453.26	n/a	453.26	93	Combination
93	7-3 TO 7-2	1.49	15	Cir	201.671	450.33	452.55	1.101	450.77	453.03	0.27	453.03	92	Combination
92	7-2 TO 7-1	2.77	15	Cir	162.851	448.47	450.10	1.001	449.02	450.77	0.40	450.77	91	Combination
91	7-1 TO 7-0	4.50	15	Cir	27.056	447.00	447.14	0.518	447.86	448.07	0.49	448.56	End	Combination
90	8-3 TO 8-2	1.76	15	Cir	34.610	455.43	455.60	0.491	455.95	456.13	n/a	456.13	89	Combination
89	8-2 TO 8-1	3.18	15	Cir	119.066	450.23	455.23	4.199	450.63	455.95	0.42	455.95	88	Combination
88	8-1 TO 8-0	3.66	15	Cir	38.261	447.00	447.19	0.497	447.77	448.01	0.42	448.43	End	Combination
87	3-4B TO 3-4A	14.11	24	Cir	47.252	451.71	451.95	0.508	453.07	453.31	0.60	453.91	86	DropGrate
86	3-4A TO 3-4	14.69	24	Cir	70.500	449.03	449.74	1.007	450.24	451.12	0.31	451.12	73	DropGrate
85	3-5B TO 3-5A	3.27	15	Cir	39.625	452.45	455.62	8.000	453.25	456.35	n/a	456.35 j	84	DropGrate
84	3-5A TO 3-5	3.98	15	Cir	31.750	452.09	452.25	0.504	452.96	453.09	0.16	453.25	74	Combination
83	3-6A TO 3-6	0.71	15	Cir	31.750	454.53	454.68	0.472	455.30	455.01	n/a	455.01	75	Combination
82	3-7A TO 3-7	1.33	15	Cir	31.750	456.08	456.24	0.504	456.85	456.70	0.17	456.70	76	Combination

Project File: New.stm

Number of lines: 105

Run Date: 1/1/2023

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

# Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
81	3-9A TO 3-9	0.76	15	Cir	31.750	459.61	459.77	0.504	460.07	460.11	n/a	460.11 j	78	Combination
80	3-10A TO 3-10	0.80	15	Cir	31.750	461.86	462.02	0.504	462.20	462.37	0.13	462.37	79	Combination
79	3-10 TO 3-9	1.44	15	Cir	150.000	459.71	461.66	1.300	460.07	462.14	n/a	462.14	78	Combination
78	3-9 TO 3-8	2.74	15	Cir	129.178	457.99	459.41	1.099	458.54	460.07	0.40	460.07	77	Combination
77	3-8 TO 3-7	3.49	15	Cir	129.178	456.24	457.79	1.200	456.85	458.54	n/a	458.54	76	Combination
76	3-7 TO 3-6	5.77	15	Cir	103.730	454.64	455.88	1.195	455.45	456.85	n/a	456.85	75	Combination
75	3-6 TO 3-5	6.91	18	Cir	159.528	451.88	454.28	1.504	452.96	455.30	n/a	455.30 j	74	Combination
74	3-5 TO 3-4	11.13	18	Cir	163.093	449.56	451.68	1.300	450.63	452.96	1.13	452.96	73	Combination
73	3-4 TO 3-3	25.14	30	Cir	91.089	447.17	448.53	1.493	448.81	450.24	n/a	450.24	72	Combination
72	3-3 TO 3-2	29.21	30	Cir	120.234	445.16	446.97	1.505	446.83	448.81	n/a	448.81	71	Combination
71	3-2 TO 3-1	30.02	30	Cir	121.802	443.14	444.96	1.494	445.45	446.83	n/a	446.83 j	70	Combination
70	3-1 TO 3-0	30.52	30	Cir	44.364	442.00	442.22	0.496	443.88	444.22	1.22	445.45	End	Combination
69	2-2A TO 2-2	1.15	15	Cir	31.750	459.68	459.84	0.504	462.21*	462.22*	0.01	462.23	62	Combination
68	2-5A TO 2-5	1.08	15	Cir	31.750	460.28	460.43	0.472	462.38*	462.39*	0.01	462.40	67	Combination
67	2-5 TO 2-2	2.31	15	Cir	79.770	459.68	460.08	0.501	462.21*	462.30*	0.08	462.38	62	Combination
66	2-3A TO 2-3	6.76	15	Cir	31.750	467.28	467.44	0.504	468.53*	468.83*	0.47	469.30	63	Combination
65	2-4A TO 2-4	0.05	15	Cir	31.750	475.52	475.68	0.504	475.61	475.77	n/a	475.80 j	64	Combination
64	2-4 TO 2-3	0.05	15	Cir	200.000	467.42	475.32	3.950	468.10	475.41	n/a	475.41 j	63	Combination
63	2-3 TO 2-2	6.36	15	Cir	200.000	459.68	467.08	3.700	462.21	468.10	n/a	468.10 j	62	Combination
62	2-2 TO 2-1	10.10	18	Cir	31.125	459.32	459.48	0.514	460.82*	461.07*	1.14	462.21	61	Combination
61	2-1 TO 2-0	10.07	18	Cir	19.621	459.02	459.12	0.510	460.24	460.51	0.29	460.80	End	Manhole
60	5-1A TO 5-1	5.23	18	Cir	11.220	472.06	472.12	0.535	473.58	473.60	0.14	473.74	52	OpenHeadwall
59	5-3A TO 5-3	10.68	18	Cir	90.000	474.42	476.22	2.000	482.85*	483.65*	0.57	484.21	54	OpenHeadwall
58	5-7 TO 5-6	1.14	15	Cir	149.996	482.70	484.80	1.400	484.25	485.22	n/a	485.22 j	57	Combination

Project File: New.stm

Number of lines: 105

Run Date: 1/1/2023

NOTES: Return period = 25 Yrs. ; \*Surcharged (HGL above crown). ; j - Line contains hyd. jump.

# Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
57	5-6 TO 5-5	2.46	15	Cir	167.391	478.15	482.50	2.599	484.02*	484.22*	0.03	484.25	56	Combination
56	5-5 TO 5-4	4.93	15	Cir	61.151	476.27	477.95	2.747	483.59*	483.89*	0.13	484.02	55	Combination
55	5-4 TO 5-3	5.66	15	Cir	64.189	474.47	476.07	2.493	482.85*	483.27*	0.31	483.59	54	Combination
54	5-3 TO 5-2	15.18	18	Cir	83.051	472.98	474.22	1.493	479.61*	481.09*	1.77	482.85	53	Combination
53	5-2 TO 5-1	21.01	18	Cir	144.431	472.06	472.78	0.499	473.58*	478.51*	1.10	479.61	52	DropGrate
52	5-1 TO 5-0	25.49	30	Cir	34.403	471.69	471.86	0.494	473.41	473.58	1.17	473.58	End	DropGrate
51	1-11B TO 1-11A	6.35	18	Cir	192.000	482.80	483.76	0.500	487.50*	488.10*	0.20	488.30	50	Combination
50	1-11A TO 1-11	12.69	24	Cir	113.875	481.73	482.30	0.501	486.81*	487.12*	0.38	487.50	11	Combination
49	1-9D TO 1-9A	6.86	18	Cir	192.000	482.80	483.76	0.500	483.87	484.82	0.41	485.23	44	Combination
48	1-10B TO 1-10A	6.81	18	Cir	192.000	482.80	483.76	0.500	485.13*	485.82*	0.23	486.05	47	Combination
47	1-10A TO 1-10	13.26	24	Cir	113.875	481.73	482.30	0.501	484.39*	484.72*	0.42	485.13	10	Combination
46	1-9C TO 1-9B	2.55	15	Cir	94.019	483.90	487.19	3.499	485.76	487.83	n/a	487.83 j	45	Combination
45	1-9B TO 1-9A	8.88	18	Cir	192.000	482.69	483.65	0.500	484.19*	485.36*	0.40	485.76	44	Combination
44	1-9A TO 1-9	21.90	30	Cir	113.875	481.12	481.69	0.501	482.84	483.28	n/a	483.28 j	9	Combination
43	1-31 TO 1-30	3.82	15	Cir	64.000	486.00	486.32	0.500	490.82*	491.01*	0.15	491.16	42	Combination
42	1-30 TO 1-29	7.03	18	Cir	195.502	484.77	485.75	0.501	489.70*	490.45*	0.37	490.82	41	Combination
41	1-29 TO 1-28	9.51	24	Cir	118.000	483.68	484.27	0.500	489.46*	489.63*	0.07	489.70	40	Combination
40	1-28 TO 1-27	11.85	24	Cir	195.500	482.51	483.48	0.496	488.89*	489.35*	0.11	489.46	33	Combination
39	1-25A TO 1-25	14.18	24	Cir	129.115	486.35	487.00	0.503	487.72	488.37	0.59	488.96	31	Combination
38	1-20C TO 1-20A	18.33	24	Cir	332.000	486.85	488.51	0.500	488.62	490.28	0.60	490.88	35	Manhole
37	1-16B TO 1-16A	18.33	24	Cir	324.000	486.85	488.47	0.500	488.62	490.24	0.60	490.84	21	Manhole
36	1-20B TO 1-20A	18.33	24	Cir	340.000	486.85	488.55	0.500	488.62	490.32	0.60	490.92	35	Manhole
35	1-20A TO 1-20	41.37	24	Cir	167.500	481.63	486.65	2.997	483.23	488.61	2.72	488.61	26	Manhole
34	1-27A TO 1-27	3.73	15	Cir	64.875	487.29	487.61	0.493	488.89*	489.07*	0.14	489.22	33	Combination

Project File: New.stm

Number of lines: 105

Run Date: 1/1/2023

NOTES: Return period = 25 Yrs. ; \*Surcharged (HGL above crown). ; j - Line contains hyd. jump.

# Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
33	1-27 TO 1-26	17.86	24	Cir	104.913	481.78	482.31	0.505	487.49*	488.05*	0.84	488.89	32	Combination
32	1-26 TO 1-25	18.15	24	Cir	49.638	481.33	481.58	0.504	486.73*	487.00*	0.49	487.49	31	Combination
31	1-25 TO 1-24	31.15	30	Cir	57.532	480.54	480.83	0.504	485.50*	485.79*	0.94	486.73	30	Combination
30	1-24 TO 1-23	34.57	36	Cir	209.616	479.00	480.04	0.496	484.51*	484.99*	0.51	485.50	29	Combination
29	1-23 TO 1-22	33.77	36	Cir	94.019	478.32	478.80	0.511	483.94*	484.14*	0.37	484.51	28	Combination
28	1-22 TO 1-21	38.16	36	Cir	192.001	477.16	478.12	0.500	482.94*	483.47*	0.47	483.94	27	Combination
27	1-21 TO 1-20	42.98	36	Cir	192.001	476.00	476.96	0.500	481.97*	482.65*	0.29	482.94	26	Combination
26	1-20 TO 1-19	83.29	48	Cir	192.000	474.00	474.96	0.500	480.39*	480.94*	1.02	481.97	25	Combination
25	1-19 TO 1-18	87.44	48	Cir	192.000	472.84	473.80	0.500	479.41*	480.02*	0.38	480.39	24	Combination
24	1-18 TO 1-17	91.54	48	Cir	192.000	471.68	472.64	0.500	478.33*	479.00*	0.41	479.41	23	Combination
23	1-17 TO 1-16	95.58	48	Cir	192.000	470.52	471.48	0.500	477.16*	477.88*	0.45	478.33	20	Combination
22	1-16C TO 1-16A	15.26	24	Cir	180.000	488.00	488.90	0.500	489.46	490.36	0.60	490.96	21	Manhole
21	1-16A TO 1-16	32.52	24	Cir	167.500	483.30	486.65	2.000	484.84	488.55	n/a	488.55	20	Manhole
20	1-16 TO 1-2	125.2	48	Cir	107.561	469.79	470.32	0.493	473.79*	474.49*	2.67	477.16	2	Combination
19	1-4D TO 1-4C	1.83	15	Cir	195.500	489.84	490.82	0.501	490.70	491.36	n/a	491.36 j	18	Combination
18	1-4C TO 1-4B	3.18	15	Cir	118.000	489.05	489.64	0.500	490.41	490.63	0.07	490.70	17	Combination
17	1-4B TO 1-4A	4.51	15	Cir	173.000	487.99	488.85	0.497	489.59*	490.31*	0.10	490.41	16	Combination
16	1-4A TO 1-4	5.54	15	Cir	60.103	487.49	487.79	0.499	488.74*	489.12*	0.47	489.59	4	Combination
15	1-15 TO 1-14	0.53	15	Cir	50.304	490.43	490.68	0.497	490.71	490.96	0.10	490.96	14	Combination
14	1-14 TO 1-13	0.91	15	Cir	129.115	489.58	490.23	0.503	490.40	490.60	0.13	490.60	13	Combination
13	1-13 TO 1-12	7.63	18	Cir	115.518	487.83	489.33	1.298	488.66	490.40	n/a	490.40	12	Combination
12	1-12 TO 1-11	22.94	30	Cir	253.997	485.56	486.83	0.500	487.15	488.46	0.11	488.46	11	Manhole
11	1-11 TO 1-10	48.17	36	Cir	384.000	478.81	480.73	0.500	484.39*	486.09*	0.72	486.81	10	Manhole
10	1-10 TO 1-9	77.50	48	Cir	384.000	476.09	478.01	0.500	482.84*	483.79*	0.59	484.39	9	Manhole

Project File: New.stm

Number of lines: 105

Run Date: 1/1/2023

NOTES: Return period = 25 Yrs. ; \*Surcharged (HGL above crown). ; j - Line contains hyd. jump.

# Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
9	1-9 TO 1-8	106.4	48	Cir	369.500	474.04	475.89	0.501	480.00*	481.73*	1.11	482.84	8	Manhole
8	1-8 TO 1-7	109.4	48	Cir	108.252	473.30	473.84	0.499	478.88*	479.41*	0.59	480.00	7	Combination
7	1-7 TO 1-6	109.0	48	Cir	103.312	472.58	473.10	0.503	477.78*	478.29*	0.59	478.88	6	Combination
6	1-6 TO 1-5	109.2	48	Cir	312.615	470.82	472.38	0.499	474.07	475.63	2.15	477.78	5	Combination
5	1-5 TO 1-4	111.9	60	Cir	238.934	468.62	469.82	0.502	471.48	472.84	0.64	472.84	4	Combination
4	1-4 TO 1-3	115.4	60	Cir	232.961	467.26	468.42	0.498	470.13	471.48	1.95	471.48	3	Combination
3	1-3 TO 1-2	115.5	60	Cir	171.812	466.20	467.06	0.501	468.93	470.13	n/a	470.13	2	Combination
2	1-2 TO 1-1	230.0	60	Cir	167.418	443.50	456.89	7.998	445.34	461.17	2.57	461.17	1	Manhole
1	1-1 TO 1-0	229.3	60	Cir	21.484	436.00	436.11	0.512	440.28	440.58	2.38	442.96	End	Manhole

536

Project File: New.stm

Number of lines: 105

Run Date: 1/1/2023

NOTES: Return period = 25 Yrs. ; \*Surcharged (HGL above crown). ; j - Line contains hyd. jump.



# Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
105	103	51.870	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	1.54	17.35	2.47	24	0.50	441.55	441.81	442.18	442.24	446.19	446.00	OS-3 TO 4-1
104	103	62.709	0.28	0.28	0.71	0.20	0.20	5.0	5.0	8.2	1.64	9.39	4.63	15	1.80	442.10	443.23	442.45	443.74	446.19	447.41	4-2 TO 4-1
103	End	70.352	0.43	0.71	0.68	0.29	0.49	5.0	5.4	8.1	5.54	17.28	4.49	24	0.50	441.00	441.35	441.83	442.18	444.92	446.19	4-1 TO 4-0
102	101	47.293	0.46	0.46	0.40	0.18	0.18	5.0	5.0	8.2	1.52	11.05	3.11	15	2.50	446.83	448.01	447.40	448.50	451.10	452.32	6-4 TO 6-3
101	100	54.422	0.20	0.66	0.62	0.12	0.31	5.0	5.3	8.2	2.52	8.95	2.97	15	1.64	445.74	446.63	447.29	447.28	449.99	451.10	6-3 TO 6-2
100	99	29.764	7.69	8.35	0.34	2.61	2.92	5.0	5.6	8.1	23.60	31.54	6.95	30	0.50	445.49	445.64	447.10	447.29	449.90	449.99	6-2 TO 6-1
99	End	15.769	0.03	8.38	0.80	0.02	2.95	5.0	5.6	8.1	23.73	31.65	6.86	30	0.51	445.31	445.39	446.97	447.05	449.23	449.90	6-1 TO 6-0
98	97	26.582	4.09	4.09	0.62	2.54	2.54	5.0	5.0	8.2	20.91	31.07	6.66	30	0.49	447.17	447.30	448.67	448.85	455.42	452.56	9-2 TO 9-1
97	End	116.043	0.00	4.09	0.00	0.00	2.54	5.0	5.1	8.2	20.86	31.41	6.52	30	0.50	446.38	446.96	447.93	448.51	450.30	455.42	9-1 TO 9-0
96	91	33.750	0.12	0.12	0.79	0.09	0.09	5.0	5.0	8.2	0.78	4.97	2.89	15	0.50	448.52	448.69	448.86	449.04	452.83	452.83	7-1A TO 7-1
95	92	33.750	0.10	0.10	0.79	0.08	0.08	5.0	5.0	8.2	0.65	4.97	2.12	15	0.50	450.30	450.47	450.77	450.79	454.61	454.61	7-2A TO 7-2
94	93	33.750	0.13	0.13	0.71	0.09	0.09	5.0	5.0	8.2	0.76	4.97	2.87	15	0.50	452.75	452.92	453.08	453.26	457.06	457.06	7-3A TO 7-3
93	92	201.671	0.13	0.26	0.69	0.09	0.18	5.0	5.2	8.2	1.49	7.34	3.64	15	1.10	450.33	452.55	450.77	453.03	454.61	457.06	7-3 TO 7-2
92	91	162.851	0.13	0.49	0.69	0.09	0.35	5.0	6.1	7.9	2.77	7.00	4.76	15	1.00	448.47	450.10	449.02	450.77	452.83	454.61	7-2 TO 7-1
91	End	27.056	0.19	0.80	0.71	0.13	0.58	5.0	6.7	7.8	4.50	5.03	4.78	15	0.52	447.00	447.14	447.86	448.07	449.83	452.83	7-1 TO 7-0
90	89	34.610	0.30	0.30	0.71	0.21	0.21	5.0	5.0	8.2	1.76	4.90	3.62	15	0.49	455.43	455.60	455.95	456.13	459.61	459.74	8-3 TO 8-2
89	88	119.066	0.25	0.55	0.70	0.18	0.39	5.0	5.2	8.2	3.18	14.34	6.87	15	4.20	450.23	455.23	450.63	455.95	454.60	459.61	8-2 TO 8-1
88	End	38.261	0.09	0.64	0.71	0.06	0.45	5.0	5.4	8.1	3.66	4.93	4.45	15	0.50	447.00	447.19	447.77	448.01	449.83	454.60	8-1 TO 8-0
87	86	47.252	3.29	3.29	0.52	1.71	1.71	5.0	5.0	8.2	14.11	17.46	6.19	24	0.51	451.71	451.95	453.07	453.31	455.82	457.91	3-4B TO 3-4A
86	73	70.500	0.15	3.44	0.53	0.08	1.79	5.0	5.1	8.2	14.69	24.59	6.88	24	1.01	449.03	449.74	450.24	451.12	453.95	455.82	3-4A TO 3-4
85	84	39.625	0.81	0.81	0.49	0.40	0.40	5.0	5.0	8.2	3.27	19.79	4.17	15	8.00	452.45	455.62	453.25	456.35	456.39	461.65	3-5B TO 3-5A
84	74	31.750	0.16	0.97	0.55	0.09	0.48	5.0	5.2	8.2	3.98	4.97	4.45	15	0.50	452.09	452.25	452.96	453.09	456.38	456.39	3-5A TO 3-5

Project File: New.stm Number of lines: 105 Run Date: 1/1/2023

NOTES: Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82 ; Return period = Yrs. 25 ; c = cir e = ellip b = box

# Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
83	75	31.750	0.20	0.20	0.43	0.09	0.09	5.0	5.0	8.2	0.71	4.81	1.82	15	0.47	454.53	454.68	455.30	455.01	458.83	458.83	3-6A TO 3-6
82	76	31.750	0.33	0.33	0.49	0.16	0.16	5.0	5.0	8.2	1.33	4.97	2.49	15	0.50	456.08	456.24	456.85	456.70	460.38	460.38	3-7A TO 3-7
81	78	31.750	0.20	0.20	0.46	0.09	0.09	5.0	5.0	8.2	0.76	4.97	2.32	15	0.50	459.61	459.77	460.07	460.11	463.91	463.91	3-9A TO 3-9
80	79	31.750	0.21	0.21	0.46	0.10	0.10	5.0	5.0	8.2	0.80	4.97	2.90	15	0.50	461.86	462.02	462.20	462.37	466.16	466.16	3-10A TO 3-10
79	78	150.000	0.14	0.35	0.57	0.08	0.18	5.0	5.2	8.2	1.44	7.98	4.12	15	1.30	459.71	461.66	460.07	462.14	463.91	466.16	3-10 TO 3-9
78	77	129.178	0.13	0.68	0.57	0.07	0.34	5.0	5.8	8.0	2.74	7.33	4.69	15	1.10	457.99	459.41	458.54	460.07	462.14	463.91	3-9 TO 3-8
77	76	129.178	0.24	0.92	0.42	0.10	0.44	5.0	6.2	7.9	3.49	7.66	5.18	15	1.20	456.24	457.79	456.85	458.54	460.38	462.14	3-8 TO 3-7
76	75	103.730	0.33	1.58	0.42	0.14	0.74	5.0	6.7	7.8	5.77	7.65	6.24	15	1.20	454.64	455.88	455.45	456.85	458.83	460.38	3-7 TO 3-6
75	74	159.528	0.15	1.93	0.47	0.07	0.90	5.0	6.9	7.7	6.91	13.95	5.26	18	1.50	451.88	454.28	452.96	455.30	456.38	458.83	3-6 TO 3-5
74	73	163.093	0.17	3.07	0.53	0.09	1.48	5.0	7.4	7.5	11.13	12.97	7.60	18	1.30	449.56	451.68	450.63	452.96	453.95	456.38	3-5 TO 3-4
73	72	91.089	0.22	6.73	0.48	0.11	3.37	5.0	7.8	7.5	25.14	54.29	7.20	30	1.49	447.17	448.53	448.81	450.24	452.59	453.95	3-4 TO 3-3
72	71	120.234	1.69	8.42	0.34	0.57	3.95	5.0	8.0	7.4	29.21	54.51	7.97	30	1.51	445.16	446.97	446.83	448.81	450.50	452.59	3-3 TO 3-2
71	70	121.802	0.23	8.65	0.62	0.14	4.09	5.0	8.3	7.3	30.02	54.31	6.99	30	1.49	443.14	444.96	445.45	446.83	448.59	450.50	3-2 TO 3-1
70	End	44.364	0.16	8.81	0.68	0.11	4.20	5.0	8.6	7.3	30.52	31.29	7.47	30	0.50	442.00	442.22	443.88	444.22	445.92	448.59	3-1 TO 3-0
69	62	31.750	0.24	0.24	0.58	0.14	0.14	5.0	5.0	8.2	1.15	4.97	0.94	15	0.50	459.68	459.84	462.21	462.22	463.52	463.52	2-2A TO 2-2
68	67	31.750	0.23	0.23	0.57	0.13	0.13	5.0	5.0	8.2	1.08	4.81	0.88	15	0.47	460.28	460.43	462.38	462.39	464.59	464.59	2-5A TO 2-5
67	62	79.770	0.33	0.56	0.47	0.16	0.29	5.0	5.6	8.1	2.31	4.95	1.88	15	0.50	459.68	460.08	462.21	462.30	463.52	464.59	2-5 TO 2-2
66	63	31.750	1.39	1.39	0.59	0.82	0.82	5.0	5.0	8.2	6.76	4.97	5.51	15	0.50	467.28	467.44	468.53	468.83	471.58	471.58	2-3A TO 2-3
65	64	31.750	0.02	0.02	0.33	0.01	0.01	5.0	5.0	8.2	0.05	4.97	1.33	15	0.50	475.52	475.68	475.61	475.77	479.64	479.82	2-4A TO 2-4
64	63	200.000	0.00	0.02	0.00	0.00	0.01	5.0	5.4	8.1	0.05	13.90	0.73	15	3.95	467.42	475.32	468.10	475.41	471.58	479.64	2-4 TO 2-3
63	62	200.000	0.13	1.54	0.67	0.09	0.91	5.0	9.9	7.0	6.36	13.46	5.57	15	3.70	459.68	467.08	462.21	468.10	463.52	471.58	2-3 TO 2-2
62	61	31.125	0.24	2.58	0.58	0.14	1.48	5.0	10.5	6.8	10.10	8.16	5.72	18	0.51	459.32	459.48	460.82	461.07	464.18	463.52	2-2 TO 2-1

Project File: New.stm

Number of lines: 105

Run Date: 1/1/2023

NOTES: Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82 ; Return period = Yrs. 25 ; c = cir e = ellip b = box

# Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
61	End	19.621	0.00	2.58	0.00	0.00	1.48	5.0	10.6	6.8	10.07	8.12	6.22	18	0.51	459.02	459.12	460.24	460.51	461.86	464.18	2-1 TO 2-0
60	52	11.220	1.76	1.76	0.36	0.63	0.63	5.0	5.0	8.2	5.23	8.32	2.96	18	0.53	472.06	472.12	473.58	473.60	476.22	474.95	5-1A TO 5-1
59	54	90.000	3.32	3.32	0.39	1.29	1.29	5.0	5.0	8.2	10.68	16.09	6.04	18	2.00	474.42	476.22	482.85	483.65	478.75	479.05	5-3A TO 5-3
58	57	149.996	0.23	0.23	0.60	0.14	0.14	5.0	5.0	8.2	1.14	8.28	2.04	15	1.40	482.70	484.80	484.25	485.22	486.85	488.94	5-7 TO 5-6
57	56	167.391	0.38	0.61	0.46	0.17	0.31	5.0	6.2	7.9	2.46	11.28	2.01	15	2.60	478.15	482.50	484.02	484.22	482.33	486.85	5-6 TO 5-5
56	55	61.151	0.53	1.14	0.65	0.34	0.66	5.0	7.6	7.5	4.93	11.60	4.02	15	2.75	476.27	477.95	483.59	483.89	480.43	482.33	5-5 TO 5-4
55	54	64.189	0.16	1.30	0.65	0.10	0.76	5.0	7.9	7.4	5.66	11.04	4.62	15	2.49	474.47	476.07	482.85	483.27	478.75	480.43	5-4 TO 5-3
54	53	83.051	0.00	4.62	0.43	0.00	2.06	5.0	8.1	7.4	15.18	13.90	8.59	18	1.49	472.98	474.22	479.61	481.09	476.58	478.75	5-3 TO 5-2
53	52	144.431	2.44	7.06	0.33	0.81	2.86	5.0	8.3	7.3	21.01	8.03	11.89	18	0.50	472.06	472.78	473.58	478.51	476.22	476.58	5-2 TO 5-1
52	End	34.403	0.00	8.82	0.00	0.00	3.49	5.0	8.5	7.3	25.49	31.23	7.08	30	0.49	471.69	471.86	473.41	473.58	475.61	476.22	5-1 TO 5-0
51	50	192.000	1.15	1.15	0.67	0.77	0.77	5.0	5.0	8.2	6.35	8.04	3.60	18	0.50	482.80	483.76	487.50	488.10	488.15	488.15	1-11B TO 1-11A
50	11	113.875	1.00	2.15	0.82	0.82	1.59	5.0	5.9	8.0	12.69	17.34	4.04	24	0.50	481.73	482.30	486.81	487.12	492.28	488.15	1-11A TO 1-11
49	44	192.000	1.04	1.04	0.80	0.83	0.83	5.0	5.0	8.2	6.86	8.04	5.11	18	0.50	482.80	483.76	483.87	484.82	488.15	488.15	1-9D TO 1-9A
48	47	192.000	1.02	1.02	0.81	0.83	0.83	5.0	5.0	8.2	6.81	8.04	3.86	18	0.50	482.80	483.76	485.13	485.82	488.15	488.15	1-10B TO 1-10A
47	10	113.875	1.04	2.06	0.80	0.83	1.66	5.0	5.8	8.0	13.26	17.34	4.22	24	0.50	481.73	482.30	484.39	484.72	492.28	488.15	1-10A TO 1-10
46	45	94.019	0.63	0.63	0.49	0.31	0.31	5.0	5.0	8.2	2.55	13.09	3.06	15	3.50	483.90	487.19	485.76	487.83	488.15	491.34	1-9C TO 1-9B
45	44	192.000	1.16	1.79	0.68	0.79	1.10	5.0	5.5	8.1	8.88	8.04	5.02	18	0.50	482.69	483.65	484.19	485.36	488.15	488.15	1-9B TO 1-9A
44	9	113.875	1.08	3.91	0.78	0.84	2.77	5.0	6.2	7.9	21.90	31.43	6.36	30	0.50	481.12	481.69	482.84	483.28	492.28	488.15	1-9A TO 1-9
43	42	64.000	0.76	0.76	0.61	0.46	0.46	5.0	5.0	8.2	3.82	4.95	3.12	15	0.50	486.00	486.32	490.82	491.01	494.00	490.46	1-31 TO 1-30
42	41	195.502	0.46	1.22	0.87	0.40	0.86	5.0	5.3	8.1	7.03	8.05	3.98	18	0.50	484.77	485.75	489.70	490.45	494.22	494.00	1-30 TO 1-29
41	40	118.000	0.42	1.64	0.81	0.34	1.20	5.0	6.2	7.9	9.51	17.33	3.03	24	0.50	483.68	484.27	489.46	489.63	494.22	494.22	1-29 TO 1-28
40	33	195.500	0.42	2.06	0.79	0.33	1.54	5.0	6.8	7.7	11.85	17.26	3.77	24	0.50	482.51	483.48	488.89	489.35	494.02	494.22	1-28 TO 1-27

Project File: New.stm Number of lines: 105 Run Date: 1/1/2023

NOTES: Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82 ; Return period = Yrs. 25 ; c = cir e = ellip b = box

# Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
39	31	129.115	1.89	1.89	0.91	1.72	1.72	5.0	5.0	8.2	14.18	17.39	6.17	24	0.50	486.35	487.00	487.72	488.37	495.19	494.99	1-25A TO 1-25
38	35	332.000	2.39	2.39	0.93	2.22	2.22	5.0	5.0	8.2	18.33	17.33	6.23	24	0.50	486.85	488.51	488.62	490.28	493.60	493.60	1-20C TO 1-20A
37	21	324.000	2.39	2.39	0.93	2.22	2.22	5.0	5.0	8.2	18.33	17.33	6.23	24	0.50	486.85	488.47	488.62	490.24	493.60	493.60	1-16B TO 1-16A
36	35	340.000	2.39	2.39	0.93	2.22	2.22	5.0	5.0	8.2	18.33	17.33	6.23	24	0.50	486.85	488.55	488.62	490.32	493.60	493.60	1-20B TO 1-20A
35	26	167.500	0.80	5.58	0.93	0.74	5.19	5.0	5.9	8.0	41.37	42.42	14.31	24	3.00	481.63	486.65	483.23	488.61	488.20	493.60	1-20A TO 1-20
34	33	64.875	0.73	0.73	0.62	0.45	0.45	5.0	5.0	8.2	3.73	4.91	3.04	15	0.49	487.29	487.61	488.89	489.07	494.02	491.76	1-27A TO 1-27
33	32	104.913	0.46	3.25	0.86	0.40	2.38	5.0	7.7	7.5	17.86	17.42	5.68	24	0.51	481.78	482.31	487.49	488.05	494.84	494.02	1-27 TO 1-26
32	31	49.638	0.09	3.34	0.72	0.06	2.45	5.0	8.0	7.4	18.15	17.39	5.78	24	0.50	481.33	481.58	486.73	487.00	495.19	494.84	1-26 TO 1-25
31	30	57.532	0.07	5.30	0.78	0.05	4.22	5.0	8.1	7.4	31.15	31.54	6.35	30	0.50	480.54	480.83	485.50	485.79	487.41	495.19	1-25 TO 1-24
30	29	209.616	0.76	6.06	0.64	0.49	4.71	5.0	8.3	7.3	34.57	50.89	4.89	36	0.50	479.00	480.04	484.51	484.99	490.80	487.41	1-24 TO 1-23
29	28	94.019	0.00	6.06	0.70	0.00	4.71	5.0	9.0	7.2	33.77	51.62	4.78	36	0.51	478.32	478.80	483.94	484.14	488.20	490.80	1-23 TO 1-22
28	27	192.001	0.76	6.82	0.88	0.67	5.38	5.0	9.3	7.1	38.16	51.09	5.40	36	0.50	477.16	478.12	482.94	483.47	488.18	488.20	1-22 TO 1-21
27	26	192.001	0.88	7.70	0.90	0.79	6.17	5.0	9.9	7.0	42.98	51.09	6.08	36	0.50	476.00	476.96	481.97	482.65	488.20	488.18	1-21 TO 1-20
26	25	192.000	0.88	14.16	0.90	0.79	12.15	5.0	10.4	6.9	83.29	110.0	6.63	48	0.50	474.00	474.96	480.39	480.94	488.20	488.20	1-20 TO 1-19
25	24	192.000	0.88	15.04	0.90	0.79	12.94	5.0	10.9	6.8	87.44	110.0	6.96	48	0.50	472.84	473.80	479.41	480.02	488.20	488.20	1-19 TO 1-18
24	23	192.000	0.88	15.92	0.90	0.79	13.74	5.0	11.4	6.7	91.54	110.0	7.28	48	0.50	471.68	472.64	478.33	479.00	488.20	488.20	1-18 TO 1-17
23	20	192.000	0.88	16.80	0.90	0.79	14.53	5.0	11.8	6.6	95.58	110.0	7.61	48	0.50	470.52	471.48	477.16	477.88	488.20	488.20	1-17 TO 1-16
22	21	180.000	1.99	1.99	0.93	1.85	1.85	5.0	5.0	8.2	15.26	17.33	6.22	24	0.50	488.00	488.90	489.46	490.36	493.60	496.02	1-16C TO 1-16A
21	20	167.500	0.00	4.38	0.00	0.00	4.07	5.0	5.9	8.0	32.52	34.65	11.55	24	2.00	483.30	486.65	484.84	488.55	488.20	493.60	1-16A TO 1-16
20	2	107.561	0.75	21.93	0.89	0.67	19.27	5.0	12.2	6.5	125.2	109.2	9.97	48	0.49	469.79	470.32	473.79	474.49	487.63	488.20	1-16 TO 1-2
19	18	195.500	0.27	0.27	0.82	0.22	0.22	5.0	5.0	8.2	1.83	4.95	2.83	15	0.50	489.84	490.82	490.70	491.36	495.16	494.96	1-4D TO 1-4C
18	17	118.000	0.23	0.50	0.79	0.18	0.40	5.0	6.2	7.9	3.18	4.95	2.83	15	0.50	489.05	489.64	490.41	490.63	495.16	495.16	1-4C TO 1-4B

Project File: New.stm Number of lines: 105 Run Date: 1/1/2023

NOTES: Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82 ; Return period = Yrs. 25 ; c = cir e = ellip b = box

# Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
17	16	173.000	0.23	0.73	0.79	0.18	0.58	5.0	6.8	7.7	4.51	4.93	3.67	15	0.50	487.99	488.85	489.59	490.31	495.29	495.16	1-4B TO 1-4A
16	4	60.103	0.20	0.93	0.77	0.15	0.74	5.0	7.6	7.5	5.54	4.94	4.52	15	0.50	487.49	487.79	488.74	489.12	493.87	495.29	1-4A TO 1-4
15	14	50.304	0.09	0.09	0.72	0.06	0.06	5.0	5.0	8.2	0.53	4.93	2.59	15	0.50	490.43	490.68	490.71	490.96	495.17	494.82	1-15 TO 1-14
14	13	129.115	0.07	0.16	0.76	0.05	0.12	5.0	6.9	7.7	0.91	4.96	2.00	15	0.50	489.58	490.23	490.40	490.60	494.96	495.17	1-14 TO 1-13
13	12	115.518	1.09	1.25	0.89	0.97	1.09	5.0	9.7	7.0	7.63	12.96	6.65	18	1.30	487.83	489.33	488.66	490.40	492.50	494.96	1-13 TO 1-12
12	11	253.997	2.39	3.64	0.93	2.22	3.31	5.0	10.1	6.9	22.94	31.42	6.88	30	0.50	485.56	486.83	487.15	488.46	492.28	492.50	1-12 TO 1-11
11	10	384.000	2.39	8.18	0.93	2.22	7.12	5.0	10.9	6.8	48.17	51.09	6.81	36	0.50	478.81	480.73	484.39	486.09	492.28	492.28	1-11 TO 1-10
10	9	384.000	3.19	13.43	0.93	2.97	11.75	5.0	11.7	6.6	77.50	110.0	6.17	48	0.50	476.09	478.01	482.84	483.79	492.28	492.28	1-10 TO 1-9
9	8	369.500	2.19	19.53	0.93	2.04	16.56	5.0	12.6	6.4	106.4	110.1	8.46	48	0.50	474.04	475.89	480.00	481.73	495.01	492.28	1-9 TO 1-8
8	7	108.252	0.88	20.41	0.89	0.78	17.34	5.0	13.3	6.3	109.4	109.9	8.71	48	0.50	473.30	473.84	478.88	479.41	495.74	495.01	1-8 TO 1-7
541	6	103.312	0.04	20.45	0.74	0.03	17.37	5.0	13.5	6.3	109.0	110.4	8.68	48	0.50	472.58	473.10	477.78	478.29	496.80	495.74	1-7 TO 1-6
6	5	312.615	0.20	20.65	0.53	0.11	17.48	5.0	13.7	6.2	109.2	109.9	9.97	48	0.50	470.82	472.38	474.07	475.63	492.13	496.80	1-6 TO 1-5
5	4	238.934	1.06	21.71	0.66	0.70	18.18	5.0	14.2	6.2	111.9	200.0	9.33	60	0.50	468.62	469.82	471.48	472.84	493.87	492.13	1-5 TO 1-4
4	3	232.961	0.05	22.69	0.64	0.03	18.95	5.0	14.6	6.1	115.4	199.1	9.53	60	0.50	467.26	468.42	470.13	471.48	489.22	493.87	1-4 TO 1-3
3	2	171.812	0.36	23.05	0.60	0.22	19.16	5.0	15.0	6.0	115.5	199.6	9.84	60	0.50	466.20	467.06	468.93	470.13	487.63	489.22	1-3 TO 1-2
2	1	167.418	0.00	44.98	0.00	0.00	38.43	5.0	15.3	6.0	230.0	798.0	23.98	60	8.00	443.50	456.89	445.34	461.17	452.06	487.63	1-2 TO 1-1
1	End	21.484	0.00	44.98	0.00	0.00	38.43	5.0	15.4	6.0	229.3	201.9	12.60	60	0.51	436.00	436.11	440.28	440.58	442.25	452.06	1-1 TO 1-0

Project File: New.stm

Number of lines: 105

Run Date: 1/1/2023

NOTES: Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82 ; Return period = Yrs. 25 ; c = cir e = ellip b = box

# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
105	OS-3	1.54*	1.20	2.74	0.00	DrGr	0.0	0.00	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.000	0.20	21.99	0.20	21.99	0.0	Off
104	4-2	1.64	0.00	1.07	0.57	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.15	7.44	0.10	5.01	0.0	103
103	4-1	2.41	0.57	2.98	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.28	14.12	0.28	14.12	0.0	Off
102	6-4	1.52	0.00	1.05	0.47	Comb	3.5	3.52	5.90	3.17	1.90	0.043	1.90	0.020	0.020	0.013	0.12	5.95	0.08	3.82	0.0	100
101	6-3	1.02	0.00	0.76	0.27	Comb	3.5	3.52	5.90	3.17	1.90	0.028	1.90	0.020	0.020	0.013	0.11	5.57	0.07	3.36	0.0	100
100	6-2	21.56	11.68	33.24	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	1.36	68.23	1.36	68.23	0.0	Off
99	6-1	0.20	0.00	0.20	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.06	3.07	0.06	3.07	0.0	Off
98	9-2	20.91	0.00	20.91	0.00	DrGr	0.0	0.00	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.000	0.78	79.79	0.78	79.79	0.0	Off
97	9-1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
96	7-1A	0.78	0.20	0.98	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.14	7.20	0.14	7.20	0.0	Off
95	7-2A	0.65	0.17	0.63	0.20	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.12	5.91	0.07	3.47	0.0	96
94	7-3A	0.76	0.00	0.59	0.17	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.11	5.74	0.07	3.30	0.0	95
93	7-3	0.74	0.00	0.57	0.17	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.11	5.67	0.06	3.24	0.0	92
92	7-2	0.74	0.17	0.67	0.23	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.12	6.12	0.07	3.67	0.0	91
91	7-1	1.11	0.46	1.57	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.19	9.53	0.19	9.53	0.0	Off
90	8-3	1.76	0.00	1.22	0.53	Comb	3.5	3.52	5.90	3.17	1.90	0.072	1.90	0.020	0.020	0.013	0.11	5.69	0.07	3.64	0.0	Off
89	8-2	1.44	0.00	1.05	0.39	Comb	3.5	3.52	5.90	3.17	1.90	0.072	1.90	0.020	0.020	0.013	0.11	5.29	0.06	3.24	0.0	88
88	8-1	0.53	0.39	0.69	0.23	Comb	3.5	3.52	5.90	3.17	1.90	0.022	1.90	0.020	0.020	0.013	0.11	5.57	0.07	3.31	0.0	91
87	3-4B	14.11	0.00	3.16	10.95	DrGr	0.0	0.00	5.90	3.17	1.90	0.042	1.90	0.020	0.020	0.013	0.21	23.00	0.21	23.00	0.0	100
86	3-4A	0.66	2.00	1.05	1.61	DrGr	0.0	0.00	5.90	3.17	1.90	0.042	1.90	0.020	0.020	0.013	0.11	13.00	0.11	13.00	0.0	Off
85	3-5B	3.27	0.00	1.27	2.00	DrGr	0.0	0.00	5.90	3.17	1.90	0.030	1.90	0.020	0.020	0.013	0.13	15.00	0.13	15.00	0.0	86
84	3-5A	0.73	0.29	0.74	0.27	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.12	6.21	0.08	3.81	0.0	72
83	3-6A	0.71	0.54	0.87	0.38	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.13	6.72	0.09	4.31	0.0	74

542

Project File: New.stm	Number of lines: 105	Run Date: 1/1/2023
-----------------------	----------------------	--------------------

NOTES: Inlet N-Values = 0.015; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.

# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
82	3-7A	1.33	0.25	1.04	0.54	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.15	7.34	0.10	4.91	0.0	83
81	3-9A	0.76	0.19	0.70	0.25	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.12	6.06	0.07	3.66	0.0	82
80	3-10A	0.80	0.00	0.61	0.19	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.11	5.68	0.07	3.30	0.0	81
79	3-10	0.66	0.00	0.52	0.13	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.11	5.29	0.06	2.92	0.0	78
78	3-9	0.61	0.13	0.58	0.17	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.11	5.54	0.06	3.17	0.0	77
77	3-8	0.83	0.17	0.73	0.27	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.12	6.18	0.08	3.78	0.0	76
76	3-7	1.14	0.27	0.95	0.46	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.14	7.04	0.09	4.62	0.0	75
75	3-6	0.58	0.46	0.75	0.29	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.13	6.27	0.08	3.87	0.0	84
74	3-5	0.74	0.38	0.80	0.32	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.13	6.46	0.08	4.05	0.0	73
73	3-4	0.87	0.32	0.84	0.36	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.13	6.61	0.08	4.20	0.0	72
72	3-3	4.74	0.63	2.54	2.83	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.23	11.61	0.18	9.14	0.0	71
71	3-2	1.18	2.83	2.11	1.90	Comb	3.5	3.52	5.90	3.17	1.90	0.007	1.90	0.020	0.020	0.013	0.24	12.00	0.18	9.08	0.0	70
70	3-1	0.90	1.90	1.60	1.20	Comb	3.5	3.52	5.90	3.17	1.90	0.019	1.90	0.020	0.020	0.013	0.17	8.70	0.13	6.34	0.0	105
69	2-2A	1.15	3.97	5.12	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.40	19.84	0.40	19.84	0.0	Off
68	2-5A	1.08	0.00	0.78	0.30	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.13	6.37	0.08	3.96	0.0	69
67	2-5	1.28	0.00	0.88	0.39	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.14	6.78	0.09	4.37	0.0	62
66	2-3A	6.76	0.00	3.10	3.67	Comb	3.5	3.52	5.90	3.17	1.90	0.040	1.90	0.020	0.020	0.013	0.21	10.54	0.17	8.37	0.0	69
65	2-4A	0.05	0.00	0.05	0.00	Comb	3.5	3.52	5.90	3.17	1.90	0.040	1.90	0.020	0.020	0.013	0.03	1.73	0.00	0.01	0.0	66
64	2-4	0.00	0.65	0.54	0.11	Comb	3.5	3.52	5.90	3.17	1.90	0.040	1.90	0.020	0.020	0.013	0.09	4.38	0.05	2.27	0.0	63
63	2-3	0.72	0.11	0.66	0.17	Comb	3.5	3.52	5.90	3.17	1.90	0.040	1.90	0.020	0.020	0.013	0.10	4.80	0.05	2.68	0.0	62
62	2-2	1.15	0.57	1.72	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.20	10.05	0.20	10.05	0.0	Off
61	2-1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
60	5-1A	5.23	6.65	11.87	0.00	Hdwl	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

543

Project File: New.stm Number of lines: 105 Run Date: 1/1/2023

NOTES: Inlet N-Values = 0.015; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.

# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
59	5-3A	10.68	0.00	10.68	0.00	Hdwl	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
58	5-7	1.14	0.00	0.81	0.33	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.13	6.67	0.08	4.20	0.0	57
57	5-6	1.44	0.33	1.14	0.64	Comb	3.5	3.52	5.90	3.17	1.90	0.017	1.90	0.020	0.020	0.013	0.15	7.53	0.10	5.13	0.0	56
56	5-5	2.84	2.41	2.55	2.70	Comb	3.5	3.52	5.90	3.17	1.90	0.030	1.90	0.020	0.020	0.013	0.20	10.11	0.16	7.89	0.0	53
55	5-4	0.86	0.00	0.65	0.21	Comb	3.5	3.52	5.90	3.17	1.90	0.019	1.90	0.020	0.020	0.013	0.11	5.59	0.07	3.28	0.0	54
54	5-3	0.00	0.21	0.20	0.01	Comb	3.5	3.52	5.90	3.17	1.90	0.025	1.90	0.020	0.020	0.013	0.06	3.12	0.02	1.00	0.0	53
53	5-2	6.64	2.71	2.71	6.65	DrGr	0.0	0.00	5.90	3.17	1.90	0.019	1.90	0.020	0.020	0.013	0.21	23.00	0.21	23.00	0.0	60
52	5-1	0.00	0.00	0.00	0.00	DrGr	0.0	0.00	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.000	0.00	1.90	0.00	1.90	0.0	Off
51	1-11B	6.35	0.00	6.35	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.46	22.82	0.46	22.82	0.0	Off
50	1-11A	6.76	0.00	6.76	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.48	23.77	0.48	23.77	0.0	Off
49	1-9D	6.86	0.00	3.06	3.80	Comb	3.5	3.52	5.90	3.17	1.90	0.029	1.90	0.020	0.020	0.013	0.23	11.25	0.18	9.01	0.0	45
48	1-10B	6.81	0.00	6.81	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.48	23.89	0.48	23.89	0.0	Off
47	1-10A	6.86	0.00	6.86	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.48	24.00	0.48	24.00	0.0	Off
46	1-9C	2.55	0.00	2.55	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.26	12.80	0.26	12.80	0.0	Off
45	1-9B	6.51	3.80	10.30	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.63	31.37	0.63	31.37	0.0	Off
44	1-9A	6.95	0.00	6.95	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.48	24.20	0.48	24.20	0.0	Off
43	1-31	3.82	0.00	2.05	1.77	Comb	3.5	3.52	5.90	3.17	1.90	0.034	1.90	0.020	0.020	0.013	0.18	8.77	0.13	6.58	0.0	56
42	1-30	3.30	0.00	3.30	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.30	15.04	0.30	15.04	0.0	Off
41	1-29	2.81	0.00	2.81	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.27	13.59	0.27	13.59	0.0	Off
40	1-28	2.74	0.00	2.74	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.27	13.38	0.27	13.38	0.0	Off
39	1-25A	14.18	0.00	14.18	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.78	38.76	0.78	38.76	0.0	Off
38	1-20C	18.33	0.00	0.00	18.33	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
37	1-16B	18.33	0.00	0.00	18.33	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

544

Project File: New.stm	Number of lines: 105	Run Date: 1/1/2023
-----------------------	----------------------	--------------------

NOTES: Inlet N-Values = 0.015; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.



# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			By Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
36	1-20B	18.33	0.00	0.00	18.33	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
35	1-20A	6.14	0.00	0.00	6.14	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
34	1-27A	3.73	0.00	1.96	1.77	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.20	10.13	0.15	7.67	0.0	30
33	1-27	3.26	0.00	3.26	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.30	14.93	0.30	14.93	0.0	Off
32	1-26	0.53	0.00	0.53	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.10	5.11	0.10	5.11	0.0	Off
31	1-25	0.45	0.00	0.45	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.09	4.65	0.09	4.65	0.0	Off
30	1-24	4.01	-nan(ind)	-nan(ind)	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	5.02	250.95	5.02	250.95	0.0	Off
29	1-23	0.00	0.00	-nan(ind)	-nan(ind)	Comb	3.5	3.52	5.90	3.17	1.90	0.016	1.90	0.020	0.020	0.013	0.00	0.00	0.00	0.01	0.0	30
28	1-22	5.52	0.00	5.52	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.42	20.80	0.42	20.80	0.0	Off
27	1-21	6.53	0.00	6.53	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.46	23.24	0.46	23.24	0.0	Off
26	1-20	6.53	0.00	6.53	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.46	23.24	0.46	23.24	0.0	Off
25	1-19	6.53	0.00	6.53	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.46	23.24	0.46	23.24	0.0	Off
24	1-18	6.53	0.00	6.53	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.46	23.24	0.46	23.24	0.0	Off
23	1-17	6.53	0.00	6.53	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.46	23.24	0.46	23.24	0.0	Off
22	1-16C	15.26	0.00	0.00	15.26	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
21	1-16A	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
20	1-16	5.51	0.00	5.51	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.42	20.77	0.42	20.77	0.0	Off
19	1-4D	1.83	0.00	1.83	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.21	10.43	0.21	10.43	0.0	Off
18	1-4C	1.50	0.00	1.50	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.19	9.26	0.19	9.26	0.0	Off
17	1-4B	1.50	0.00	1.50	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.19	9.26	0.19	9.26	0.0	Off
16	1-4A	1.27	0.00	1.27	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.17	8.39	0.17	8.39	0.0	Off
15	1-15	0.53	0.00	0.53	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.10	5.11	0.10	5.11	0.0	Off
14	1-14	0.44	0.00	0.44	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.09	4.59	0.09	4.59	0.0	Off

545

Project File: New.stm

Number of lines: 105

Run Date: 1/1/2023

NOTES: Inlet N-Values = 0.015; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.

# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			By Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
13	1-13	8.00	0.00	8.00	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.53	26.55	0.53	26.55	0.0	Off
12	1-12	18.33	0.00	0.00	18.33	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
11	1-11	18.33	0.00	0.00	18.33	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10	1-10	24.47	0.00	0.00	24.47	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
9	1-9	16.80	0.00	0.00	16.80	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
8	1-8	6.46	0.00	6.46	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.46	23.07	0.46	23.07	0.0	Off
7	1-7	0.24	0.00	0.24	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.07	3.40	0.07	3.40	0.0	Off
6	1-6	0.87	0.00	0.66	0.22	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.12	5.88	0.07	3.49	0.0	5
5	1-5	5.77	0.22	5.99	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.44	21.95	0.44	21.95	0.0	Off
4	1-4	0.26	0.00	0.24	0.02	Comb	3.5	3.52	5.90	3.17	1.90	0.021	1.90	0.020	0.020	0.013	0.07	3.53	0.03	1.34	0.0	3
3	1-3	1.78	0.02	1.15	0.65	Comb	3.5	3.52	5.90	3.17	1.90	0.018	1.90	0.020	0.020	0.013	0.15	7.42	0.10	5.07	0.0	64
2	1-2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
1	1-1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

546

Project File: New.stm

Number of lines: 105

Run Date: 1/1/2023

NOTES: Inlet N-Values = 0.015; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.

## **100-YEAR STORM EVENT**

# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
105	OS-3	1.54*	1.70	3.24	0.00	DrGr	0.0	0.00	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.000	0.22	24.34	0.22	24.34	0.0	Off
104	4-2	1.95	0.00	1.22	0.73	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.16	7.95	0.11	5.51	0.0	103
103	4-1	2.88	0.73	3.61	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.32	15.91	0.32	15.91	0.0	Off
102	6-4	1.81	0.00	1.20	0.61	Comb	3.5	3.52	5.90	3.17	1.90	0.043	1.90	0.020	0.020	0.013	0.13	6.35	0.08	4.22	0.0	100
101	6-3	1.22	0.00	0.87	0.35	Comb	3.5	3.52	5.90	3.17	1.90	0.028	1.90	0.020	0.020	0.013	0.12	5.95	0.07	3.73	0.0	100
100	6-2	25.71	14.20	39.91	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	1.54	76.76	1.54	76.76	0.0	Off
99	6-1	0.24	0.00	0.24	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.07	3.34	0.07	3.34	0.0	Off
98	9-2	24.93	0.00	24.93	0.00	DrGr	0.0	0.00	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.000	0.88	89.48	0.88	89.48	0.0	Off
97	9-1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
96	7-1A	0.93	0.27	1.21	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.16	8.13	0.16	8.13	0.0	Off
95	7-2A	0.78	0.23	0.73	0.27	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.13	6.37	0.08	3.91	0.0	96
94	7-3A	0.91	0.00	0.68	0.23	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.12	6.13	0.07	3.67	0.0	95
93	7-3	0.88	0.00	0.66	0.22	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.12	6.06	0.07	3.61	0.0	92
92	7-2	0.88	0.22	0.79	0.32	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.13	6.59	0.08	4.12	0.0	91
91	7-1	1.33	0.64	1.97	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.22	10.92	0.22	10.92	0.0	Off
90	8-3	2.09	0.00	1.40	0.70	Comb	3.5	3.52	5.90	3.17	1.90	0.072	1.90	0.020	0.020	0.013	0.12	6.08	0.08	4.03	0.0	Off
89	8-2	1.72	0.00	1.20	0.52	Comb	3.5	3.52	5.90	3.17	1.90	0.072	1.90	0.020	0.020	0.013	0.11	5.65	0.07	3.60	0.0	88
88	8-1	0.63	0.52	0.82	0.32	Comb	3.5	3.52	5.90	3.17	1.90	0.022	1.90	0.020	0.020	0.013	0.12	6.06	0.08	3.78	0.0	91
87	3-4B	16.82	0.00	3.58	13.25	DrGr	0.0	0.00	5.90	3.17	1.90	0.042	1.90	0.020	0.020	0.013	0.23	25.00	0.23	25.00	0.0	100
86	3-4A	0.78	2.46	1.21	2.04	DrGr	0.0	0.00	5.90	3.17	1.90	0.042	1.90	0.020	0.020	0.013	0.12	14.00	0.12	14.00	0.0	Off
85	3-5B	3.90	0.00	1.44	2.46	DrGr	0.0	0.00	5.90	3.17	1.90	0.030	1.90	0.020	0.020	0.013	0.14	16.00	0.14	16.00	0.0	86
84	3-5A	0.87	0.41	0.88	0.39	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.14	6.77	0.09	4.36	0.0	72
83	3-6A	0.85	0.72	1.03	0.53	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.15	7.32	0.10	4.89	0.0	74

548

Project File: New.stm Number of lines: 105 Run Date: 1/1/2023

NOTES: Inlet N-Values = 0.015; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.

# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
82	3-7A	1.59	0.34	1.21	0.72	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.16	7.91	0.11	5.47	0.0	83
81	3-9A	0.90	0.25	0.82	0.34	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.13	6.52	0.08	4.11	0.0	82
80	3-10A	0.95	0.00	0.70	0.25	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.12	6.07	0.07	3.67	0.0	81
79	3-10	0.78	0.00	0.60	0.18	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.11	5.65	0.07	3.27	0.0	78
78	3-9	0.73	0.18	0.68	0.23	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.12	5.97	0.07	3.58	0.0	77
77	3-8	0.99	0.23	0.86	0.37	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.13	6.67	0.09	4.25	0.0	76
76	3-7	1.36	0.37	1.11	0.62	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.15	7.60	0.10	5.16	0.0	75
75	3-6	0.69	0.62	0.90	0.41	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.14	6.84	0.09	4.43	0.0	84
74	3-5	0.89	0.53	0.96	0.46	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.14	7.05	0.09	4.63	0.0	73
73	3-4	1.04	0.46	1.00	0.50	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.14	7.20	0.10	4.77	0.0	72
72	3-3	5.65	0.89	2.91	3.63	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.25	12.51	0.20	10.03	0.0	71
71	3-2	1.40	3.63	2.48	2.55	Comb	3.5	3.52	5.90	3.17	1.90	0.007	1.90	0.020	0.020	0.013	0.26	13.07	0.20	10.13	0.0	70
70	3-1	1.07	2.55	1.92	1.70	Comb	3.5	3.52	5.90	3.17	1.90	0.019	1.90	0.020	0.020	0.013	0.19	9.58	0.14	7.21	0.0	105
69	2-2A	1.37	4.96	6.33	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.46	22.77	0.46	22.77	0.0	Off
68	2-5A	1.29	0.00	0.89	0.40	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.14	6.80	0.09	4.38	0.0	69
67	2-5	1.53	0.00	1.01	0.51	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.14	7.24	0.10	4.81	0.0	62
66	2-3A	8.06	0.00	3.50	4.57	Comb	3.5	3.52	5.90	3.17	1.90	0.040	1.90	0.020	0.020	0.013	0.23	11.25	0.18	9.09	0.0	69
65	2-4A	0.06	0.00	0.06	0.00	Comb	3.5	3.52	5.90	3.17	1.90	0.040	1.90	0.020	0.020	0.013	0.04	1.85	0.00	0.01	0.0	66
64	2-4	0.00	0.84	0.66	0.18	Comb	3.5	3.52	5.90	3.17	1.90	0.040	1.90	0.020	0.020	0.013	0.10	4.82	0.05	2.70	0.0	63
63	2-3	0.86	0.18	0.78	0.25	Comb	3.5	3.52	5.90	3.17	1.90	0.040	1.90	0.020	0.020	0.013	0.10	5.21	0.06	3.08	0.0	62
62	2-2	1.37	0.77	2.14	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.23	11.48	0.23	11.48	0.0	Off
61	2-1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
60	5-1A	6.23	8.33	14.56	0.00	Hdwl	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

549

Project File: New.stm Number of lines: 105 Run Date: 1/1/2023

NOTES: Inlet N-Values = 0.015; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.

# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
59	5-3A	12.73	0.00	12.73	0.00	Hdwl	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
58	5-7	1.36	0.00	0.92	0.43	Comb	3.5	3.52	5.90	3.17	1.90	0.013	1.90	0.020	0.020	0.013	0.14	7.12	0.09	4.64	0.0	57
57	5-6	1.72	0.43	1.31	0.84	Comb	3.5	3.52	5.90	3.17	1.90	0.017	1.90	0.020	0.020	0.013	0.16	8.10	0.11	5.69	0.0	56
56	5-5	3.39	3.08	2.95	3.52	Comb	3.5	3.52	5.90	3.17	1.90	0.030	1.90	0.020	0.020	0.013	0.22	10.93	0.17	8.70	0.0	53
55	5-4	1.02	0.00	0.75	0.28	Comb	3.5	3.52	5.90	3.17	1.90	0.019	1.90	0.020	0.020	0.013	0.12	5.97	0.07	3.65	0.0	54
54	5-3	0.00	0.28	0.25	0.02	Comb	3.5	3.52	5.90	3.17	1.90	0.025	1.90	0.020	0.020	0.013	0.07	3.47	0.03	1.31	0.0	53
53	5-2	7.92	3.54	3.12	8.33	DrGr	0.0	0.00	5.90	3.17	1.90	0.019	1.90	0.020	0.020	0.013	0.23	25.00	0.23	25.00	0.0	60
52	5-1	0.00	0.00	0.00	0.00	DrGr	0.0	0.00	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.000	0.00	1.90	0.00	1.90	0.0	Off
51	1-11B	7.58	0.00	7.58	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.51	25.62	0.51	25.62	0.0	Off
50	1-11A	8.06	0.00	8.06	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.53	26.69	0.53	26.69	0.0	Off
49	1-9D	8.18	0.00	3.46	4.72	Comb	3.5	3.52	5.90	3.17	1.90	0.029	1.90	0.020	0.020	0.013	0.24	12.02	0.20	9.78	0.0	45
48	1-10B	8.12	0.00	8.12	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.54	26.82	0.54	26.82	0.0	Off
47	1-10A	8.18	0.00	8.18	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.54	26.94	0.54	26.94	0.0	Off
46	1-9C	3.04	0.00	3.04	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.29	14.28	0.29	14.28	0.0	Off
45	1-9B	7.76	4.72	12.47	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.71	35.60	0.71	35.60	0.0	Off
44	1-9A	8.28	0.00	8.28	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.54	27.16	0.54	27.16	0.0	Off
43	1-31	4.56	0.00	2.32	2.24	Comb	3.5	3.52	5.90	3.17	1.90	0.034	1.90	0.020	0.020	0.013	0.19	9.37	0.14	7.17	0.0	56
42	1-30	3.94	0.00	3.94	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.34	16.80	0.34	16.80	0.0	Off
41	1-29	3.35	0.00	3.35	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.30	15.17	0.30	15.17	0.0	Off
40	1-28	3.26	0.00	3.26	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.30	14.93	0.30	14.93	0.0	Off
39	1-25A	16.91	0.00	16.91	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.87	43.55	0.87	43.55	0.0	Off
38	1-20C	21.86	0.00	0.00	21.86	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
37	1-16B	21.86	0.00	0.00	21.86	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

550

Project File: New.stm	Number of lines: 105	Run Date: 1/1/2023
-----------------------	----------------------	--------------------

NOTES: Inlet N-Values = 0.015; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.

# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
36	1-20B	21.86	0.00	0.00	21.86	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
35	1-20A	7.32	0.00	0.00	7.32	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
34	1-27A	4.45	0.00	2.22	2.23	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.22	10.82	0.17	8.35	0.0	30
33	1-27	3.89	0.00	3.89	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.33	16.67	0.33	16.67	0.0	Off
32	1-26	0.64	0.00	0.64	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.11	5.63	0.11	5.63	0.0	Off
31	1-25	0.54	0.00	0.54	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.10	5.12	0.10	5.12	0.0	Off
30	1-24	4.78	-nan(ind)	-nan(ind)	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	5.02	250.95	5.02	250.95	0.0	Off
29	1-23	0.00	0.00	-nan(ind)	-nan(ind)	Comb	3.5	3.52	5.90	3.17	1.90	0.016	1.90	0.020	0.020	0.013	0.00	0.00	0.00	0.01	0.0	30
28	1-22	6.58	0.00	6.58	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.47	23.34	0.47	23.34	0.0	Off
27	1-21	7.79	0.00	7.79	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.52	26.08	0.52	26.08	0.0	Off
26	1-20	7.79	0.00	7.79	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.52	26.08	0.52	26.08	0.0	Off
25	1-19	7.79	0.00	7.79	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.52	26.08	0.52	26.08	0.0	Off
24	1-18	7.79	0.00	7.79	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.52	26.08	0.52	26.08	0.0	Off
23	1-17	7.79	0.00	7.79	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.52	26.08	0.52	26.08	0.0	Off
22	1-16C	18.20	0.00	0.00	18.20	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
21	1-16A	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
20	1-16	6.56	0.00	6.56	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.47	23.31	0.47	23.31	0.0	Off
19	1-4D	2.18	0.00	2.18	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.23	11.62	0.23	11.62	0.0	Off
18	1-4C	1.79	0.00	1.79	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.21	10.30	0.21	10.30	0.0	Off
17	1-4B	1.79	0.00	1.79	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.21	10.30	0.21	10.30	0.0	Off
16	1-4A	1.51	0.00	1.51	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.19	9.32	0.19	9.32	0.0	Off
15	1-15	0.64	0.00	0.64	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.11	5.63	0.11	5.63	0.0	Off
14	1-14	0.52	0.00	0.52	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.10	5.05	0.10	5.05	0.0	Off

551

Project File: New.stm Number of lines: 105 Run Date: 1/1/2023

NOTES: Inlet N-Values = 0.015; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.

# Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			By Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
13	1-13	9.54	0.00	9.54	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.60	29.81	0.60	29.81	0.0	Off
12	1-12	21.86	0.00	0.00	21.86	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
11	1-11	21.86	0.00	0.00	21.86	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10	1-10	29.17	0.00	0.00	29.17	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
9	1-9	20.03	0.00	0.00	20.03	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
8	1-8	7.70	0.00	7.70	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.52	25.89	0.52	25.89	0.0	Off
7	1-7	0.29	0.00	0.29	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.07	3.71	0.07	3.71	0.0	Off
6	1-6	1.04	0.00	0.75	0.29	Comb	3.5	3.52	5.90	3.17	1.90	0.015	1.90	0.020	0.020	0.013	0.13	6.28	0.08	3.88	0.0	5
5	1-5	6.88	0.29	7.17	0.00	Comb	3.5	3.52	5.90	3.17	1.90	Sag	1.90	0.020	0.020	0.013	0.49	24.70	0.49	24.70	0.0	Off
4	1-4	0.31	0.00	0.28	0.03	Comb	3.5	3.52	5.90	3.17	1.90	0.021	1.90	0.020	0.020	0.013	0.08	3.77	0.03	1.56	0.0	3
3	1-3	2.12	0.03	1.32	0.84	Comb	3.5	3.52	5.90	3.17	1.90	0.018	1.90	0.020	0.020	0.013	0.16	7.94	0.11	5.57	0.0	64
2	1-2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
1	1-1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

552

Project File: New.stm Number of lines: 105 Run Date: 1/1/2023

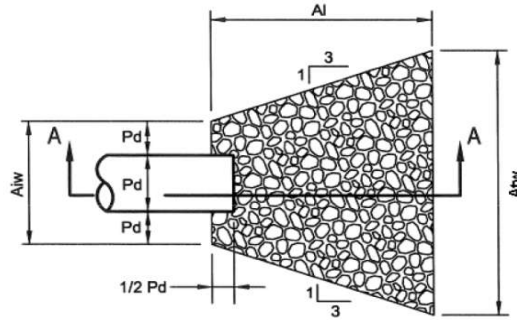
NOTES: Inlet N-Values = 0.015; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; \* Indicates Known Q added. All curb inlets are Horiz throat.



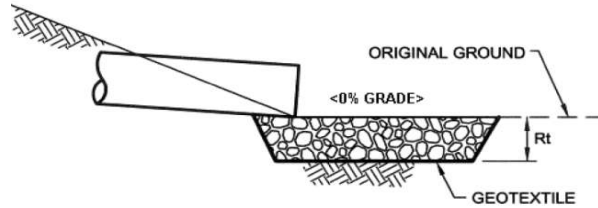
## RIPRAP DESIGN

**STANDARD E&S WORKSHEET #20  
Riprap Apron Outlet Protection**

PROJECT NAME: 283 Commerce Center - Building #1  
 LOCATION: Mount Joy Township, Lancaster County, Pennsylvania  
 PREPARED BY: Timothy Fink, E.I.T. Date: 2023.01.03  
 CHECKED BY: Joshua C. George, P.E. Date: 2023.01.03



**PLAN VIEW**



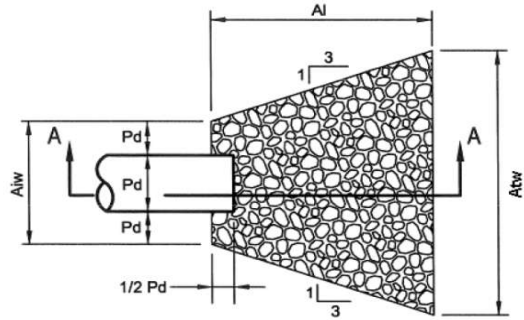
**SECTION A - A**

NO.	PIPE DIA. Do (in.)	TAIL WATER COND. (Max or Min)	MAN "n" FOR PIPE	PIPE SLOPE (FT/FT)	Q (CFS)	V* (FPS)	RIPRAP SIZE	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
1-0	60	Max.	0.011	0.005	218.23	11.11	R-5	27	33	15	29
2-0	18	Min.	0.011	0.005	8.80	4.98	R-3	9	8	5	13
3-0	30	Max.	0.011	0.005	34.37	7.00	R-4	18	12	8	13
4-0	24	Min.	0.011	0.005	18.96	6.04	R-3	9	12	6	18
5-0	30	Min.	0.012	0.005	31.51	6.42	R-3	9	19	8	27
6-0	30	Min.	0.012	0.005	31.51	6.42	R-3	9	19	8	27
7-0	15	Max.	0.011	0.005	5.41	4.41	R-3	9	6	4	7
8-0	15	Max.	0.011	0.005	5.41	4.41	R-3	9	6	4	7
9-0	30	Min.	0.011	0.005	34.37	7.00	R-4	18	21	8	29

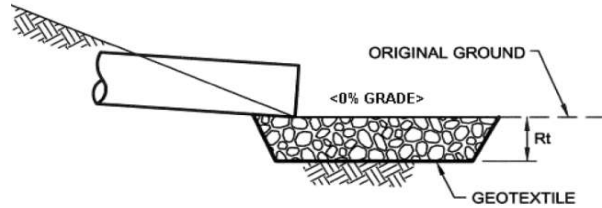
**\*:The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Mannings equation to calculate velocity for pipe slopes greater than or equal to 0.05 ft/ft**

**STANDARD E&S WORKSHEET #20**  
**Riprap Apron Outlet Protection**

PROJECT NAME: 283 Commerce Center - Building #1  
 LOCATION: Mount Joy Township, Lancaster County, Pennsylvania  
 PREPARED BY: Timothy Fink, E.I.T. Date: 2023.01.03  
 CHECKED BY: Joshua C. George, P.E. Date: 2023.01.03



PLAN VIEW



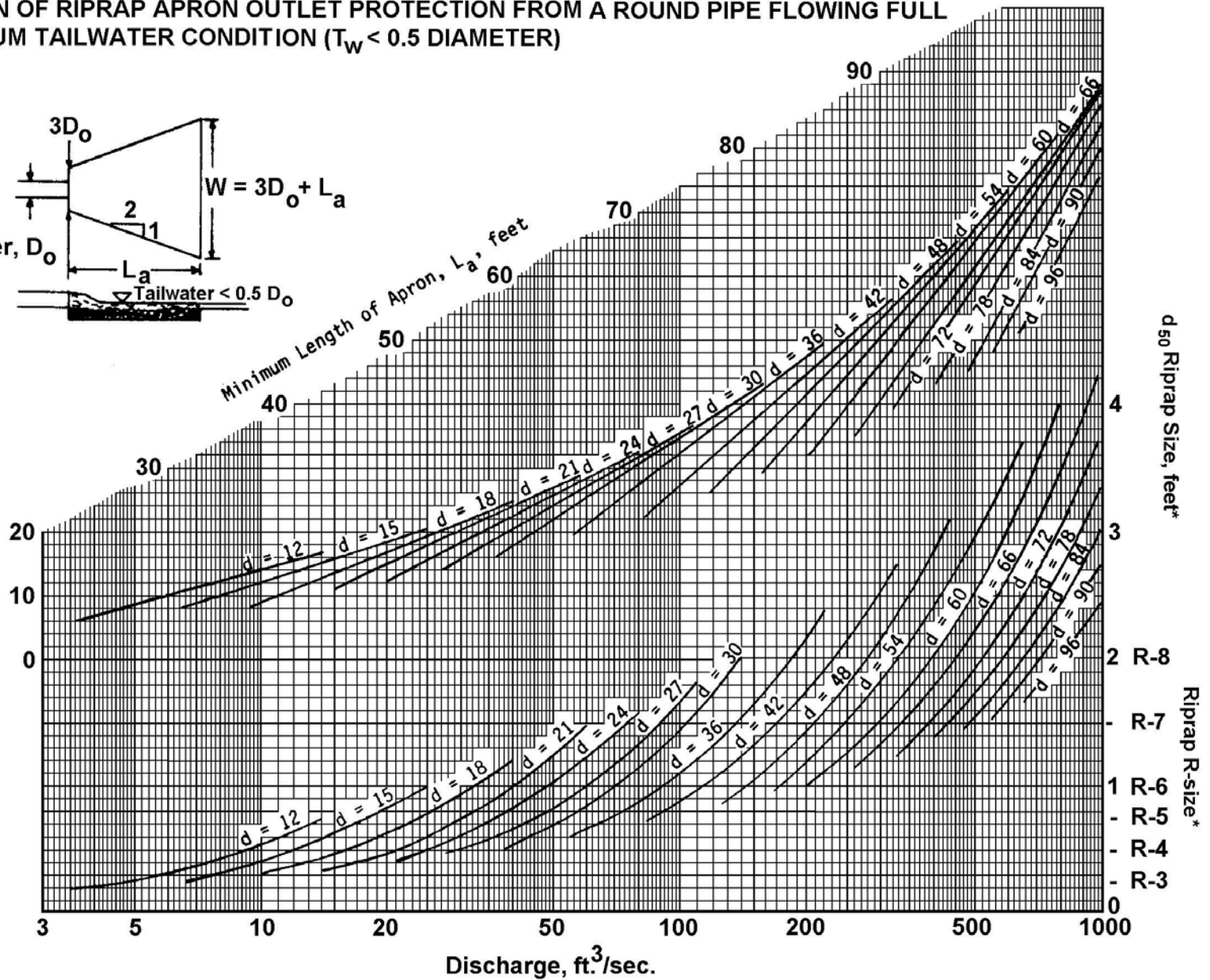
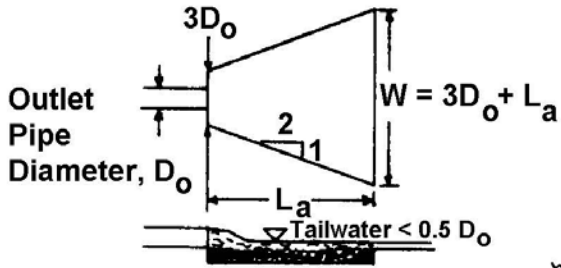
SECTION A - A

NO.	PIPE DIA. Do (in.)	TAIL WATER COND. (Max or Min)	MAN "n" FOR PIPE	PIPE SLOPE (FT/FT)	Q (CFS)	V* (FPS)	RIPRAP SIZE	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
OS-1B	24	Min.	0.012	0.010	17.38	8.48	R-4	18	12	6	18
OS-2B	24	Min.	0.012	0.010	17.38	8.48	R-4	18	12	6	18
OS-4B	36	Min.	0.012	0.005	51.23	7.25	R-4	18	20	9	29

**\*:The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Mannings equation to calculate velocity for pipe slopes greater than or equal to 0.05 ft/ft**

**DESIGN OF RIPRAP APRON OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL  
MINIMUM TAILWATER CONDITION ( $T_w < 0.5$  DIAMETER)**

Adapted from USDA - NRCS



NOTE: Do not extrapolate

Not to be used for Box Culverts

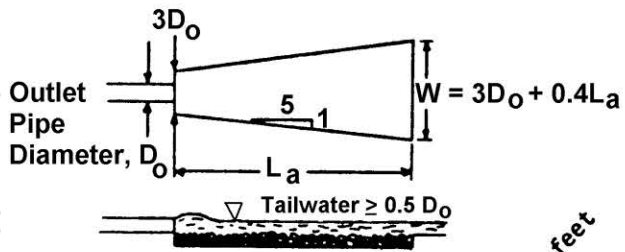
**FIGURE 9.3**  
**Riprap Apron Design, Minimum Tailwater Condition**

\* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase  $d_{50}$  stone size and/or provide velocity reduction device.



**FIGURE 9.4**  
Riprap Apron Design, Maximum Tailwater Condition

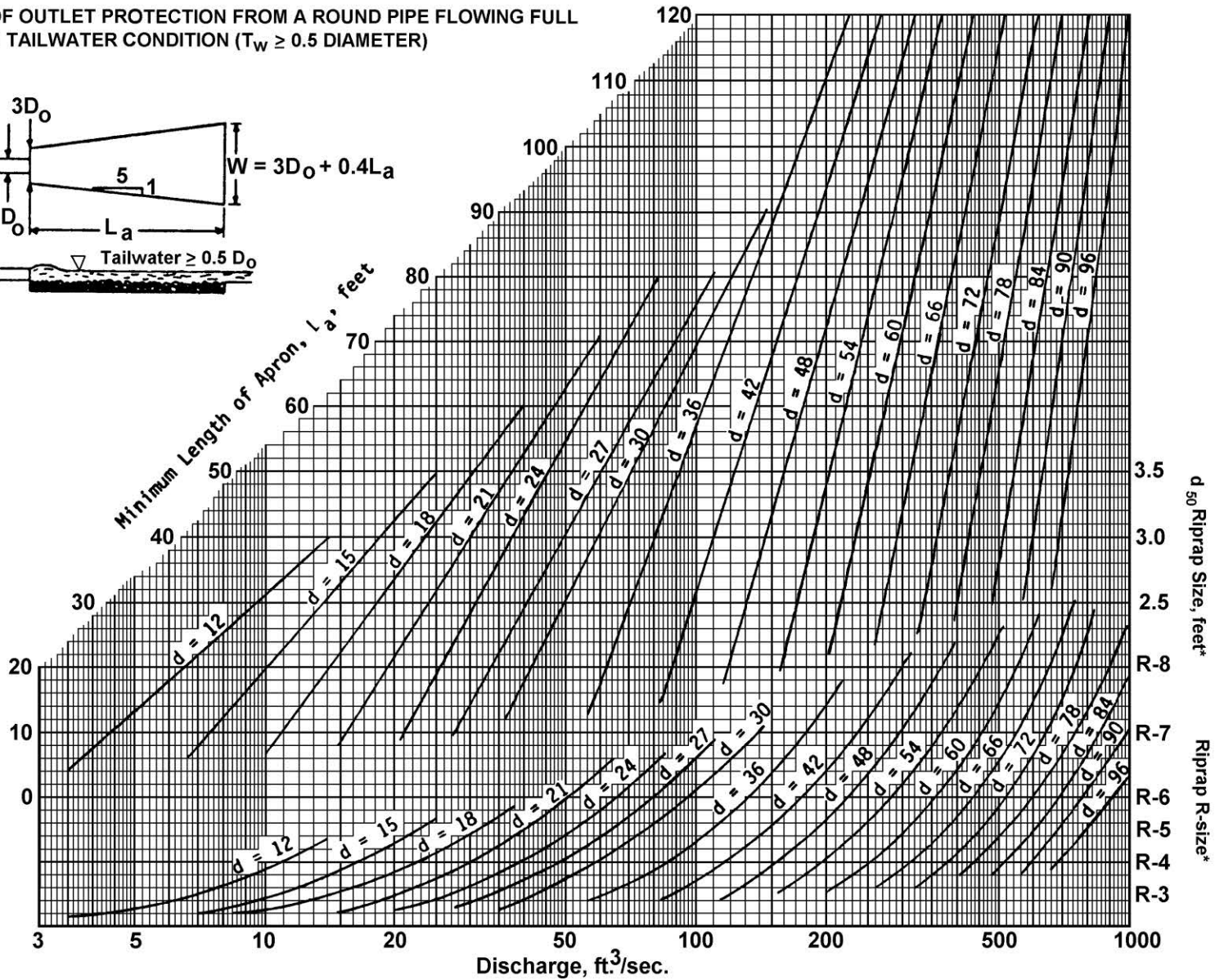
DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL  
MAXIMUM TAILWATER CONDITION ( $T_w \geq 0.5$  DIAMETER)



Adapted from USDA - NRCS

Not to be used for Box Culverts

NOTE: Do not extrapolate



\*For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase  $d_{50}$  stone size and/or provide velocity reduction device.

## REFERENCES





**NOAA Atlas 14, Volume 2, Version 3**  
**Location name: Mt Joy Twp, Pennsylvania, USA\***  
**Latitude: 40.1464°, Longitude: -76.5431°**  
**Elevation: 515.93 ft\*\***  
\* source: ESRI Maps  
\*\* source: USGS



**POINT PRECIPITATION FREQUENCY ESTIMATES**

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

**PF tabular**

<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
<b>5-min</b>	3.86 (3.48-4.28)	4.60 (4.14-5.11)	5.41 (4.87-6.01)	6.00 (5.39-6.65)	6.71 (5.99-7.42)	7.20 (6.42-7.97)	7.69 (6.83-8.51)	8.14 (7.19-9.01)	8.68 (7.60-9.59)	9.07 (7.91-10.1)
<b>10-min</b>	3.08 (2.78-3.42)	3.67 (3.31-4.09)	4.33 (3.90-4.81)	4.79 (4.31-5.32)	5.34 (4.78-5.92)	5.74 (5.11-6.34)	6.11 (5.42-6.76)	6.45 (5.69-7.14)	6.86 (6.01-7.59)	7.15 (6.23-7.91)
<b>15-min</b>	2.57 (2.32-2.85)	3.08 (2.78-3.42)	3.65 (3.29-4.06)	4.04 (3.63-4.48)	4.52 (4.03-5.00)	4.84 (4.31-5.36)	5.15 (4.57-5.69)	5.42 (4.79-6.00)	5.76 (5.04-6.37)	5.98 (5.21-6.62)
<b>30-min</b>	1.76 (1.59-1.96)	2.12 (1.92-2.36)	2.59 (2.34-2.88)	2.93 (2.63-3.25)	3.34 (2.99-3.70)	3.65 (3.25-4.03)	3.95 (3.50-4.36)	4.22 (3.73-4.67)	4.58 (4.01-5.07)	4.84 (4.22-5.36)
<b>60-min</b>	1.10 (0.991-1.22)	1.33 (1.20-1.48)	1.66 (1.50-1.85)	1.91 (1.71-2.12)	2.23 (1.99-2.46)	2.47 (2.20-2.73)	2.72 (2.41-3.00)	2.96 (2.61-3.28)	3.29 (2.88-3.63)	3.54 (3.08-3.91)
<b>2-hr</b>	0.648 (0.586-0.722)	0.786 (0.710-0.874)	0.994 (0.896-1.10)	1.16 (1.04-1.28)	1.39 (1.24-1.53)	1.57 (1.40-1.73)	1.77 (1.56-1.95)	1.97 (1.73-2.18)	2.27 (1.97-2.50)	2.50 (2.15-2.77)
<b>3-hr</b>	0.471 (0.425-0.526)	0.571 (0.517-0.638)	0.722 (0.651-0.805)	0.841 (0.757-0.936)	1.01 (0.900-1.12)	1.14 (1.01-1.27)	1.29 (1.14-1.43)	1.44 (1.26-1.59)	1.65 (1.43-1.83)	1.82 (1.56-2.02)
<b>6-hr</b>	0.291 (0.263-0.327)	0.353 (0.318-0.396)	0.445 (0.399-0.498)	0.520 (0.466-0.582)	0.630 (0.560-0.702)	0.722 (0.638-0.803)	0.822 (0.720-0.912)	0.930 (0.807-1.03)	1.09 (0.931-1.20)	1.22 (1.03-1.35)
<b>12-hr</b>	0.177 (0.159-0.200)	0.213 (0.191-0.242)	0.271 (0.242-0.306)	0.319 (0.284-0.360)	0.392 (0.346-0.440)	0.454 (0.397-0.508)	0.524 (0.454-0.585)	0.601 (0.514-0.670)	0.716 (0.602-0.798)	0.816 (0.676-0.908)
<b>24-hr</b>	0.103 (0.094-0.113)	0.124 (0.114-0.137)	0.158 (0.145-0.174)	0.188 (0.171-0.208)	0.233 (0.211-0.254)	0.272 (0.245-0.297)	0.317 (0.282-0.344)	0.367 (0.322-0.397)	0.443 (0.382-0.478)	0.510 (0.433-0.549)
<b>2-day</b>	0.059 (0.055-0.066)	0.072 (0.066-0.079)	0.092 (0.084-0.101)	0.109 (0.099-0.120)	0.133 (0.121-0.146)	0.155 (0.139-0.170)	0.179 (0.159-0.195)	0.205 (0.181-0.224)	0.244 (0.212-0.267)	0.278 (0.238-0.304)
<b>3-day</b>	0.042 (0.039-0.046)	0.051 (0.047-0.056)	0.065 (0.059-0.071)	0.076 (0.070-0.084)	0.094 (0.085-0.103)	0.109 (0.099-0.119)	0.126 (0.113-0.137)	0.145 (0.128-0.157)	0.173 (0.151-0.188)	0.197 (0.170-0.214)
<b>4-day</b>	0.033 (0.031-0.036)	0.040 (0.037-0.044)	0.051 (0.047-0.056)	0.060 (0.055-0.066)	0.074 (0.068-0.081)	0.086 (0.078-0.094)	0.099 (0.089-0.108)	0.114 (0.102-0.124)	0.137 (0.120-0.148)	0.156 (0.135-0.170)
<b>7-day</b>	0.022 (0.021-0.024)	0.027 (0.025-0.029)	0.034 (0.031-0.037)	0.040 (0.037-0.043)	0.048 (0.044-0.053)	0.056 (0.051-0.061)	0.064 (0.058-0.070)	0.074 (0.066-0.080)	0.087 (0.077-0.095)	0.099 (0.087-0.108)
<b>10-day</b>	0.018 (0.017-0.019)	0.022 (0.020-0.023)	0.027 (0.025-0.029)	0.031 (0.029-0.033)	0.037 (0.034-0.040)	0.043 (0.039-0.046)	0.048 (0.044-0.052)	0.054 (0.049-0.059)	0.063 (0.057-0.068)	0.071 (0.063-0.076)
<b>20-day</b>	0.012 (0.011-0.013)	0.015 (0.014-0.015)	0.017 (0.016-0.019)	0.020 (0.019-0.021)	0.023 (0.022-0.025)	0.026 (0.024-0.028)	0.029 (0.027-0.031)	0.032 (0.029-0.034)	0.036 (0.033-0.038)	0.039 (0.035-0.042)
<b>30-day</b>	0.010 (0.010-0.011)	0.012 (0.011-0.013)	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.018 (0.017-0.019)	0.020 (0.019-0.021)	0.022 (0.021-0.023)	0.024 (0.022-0.026)	0.027 (0.025-0.029)	0.029 (0.027-0.031)
<b>45-day</b>	0.008 (0.008-0.009)	0.010 (0.009-0.010)	0.012 (0.011-0.012)	0.013 (0.012-0.014)	0.014 (0.014-0.015)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.020 (0.019-0.021)	0.021 (0.020-0.022)
<b>60-day</b>	0.008 (0.007-0.008)	0.009 (0.008-0.009)	0.010 (0.010-0.011)	0.011 (0.011-0.012)	0.013 (0.012-0.013)	0.014 (0.013-0.014)	0.015 (0.014-0.015)	0.015 (0.015-0.016)	0.017 (0.016-0.018)	0.018 (0.016-0.018)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

**PF graphical**

STORMWATER MANAGEMENT

113 Attachment 1

Township of Mount Joy

**Appendix No. 1**  
**Runoff Coefficients "C" for Rational Formula**  
**[Amended 4-17-2017 by Ord. No. 312-2017; 9-19-2022 by Ord. No. 338-2022]**

Soil Group	A			B			C			D		
	0% to 2%	2% to 6%	6%+	0% to 2%	2% to 6%	6%+	0% to 2%	2% to 6%	6%+	0% to 2%	2% to 6%	6%+
<b>Slope</b>												
<b>Land Use</b>												
Cultivated land												
Winter conditions	0.14	0.23	0.34	0.21	0.32	0.41	0.27	0.37	0.48	0.34	0.45	0.56
Summer conditions	0.10	0.16	0.22	0.14	0.20	0.28	0.19	0.26	0.33	0.23	0.29	0.38
Fallowed fields												
Poor conditions	0.12	0.19	0.28	0.17	0.25	0.34	0.23	0.33	0.40	0.27	0.35	0.45
Good conditions	0.08	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
Forest/woodland	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25
Grass areas												
Good conditions	0.10	0.16	0.20	0.14	0.19	0.26	0.18	0.22	0.30	0.21	0.25	0.35
Average conditions	0.12	0.18	0.22	0.16	0.21	0.28	0.20	0.25	0.34	0.24	0.29	0.41
Poor conditions	0.14	0.21	0.30	0.18	0.28	0.37	0.25	0.35	0.44	0.30	0.40	0.50
Impervious areas	0.09	0.91	0.92	0.91	0.92	0.93	0.92	0.93	0.94	0.93	0.94	0.95
Weighted residential												
Lot size: 1/8 acre	0.29	0.33	0.36	0.31	0.35	0.40	0.34	0.38	0.44	0.36	0.41	0.48
Lot size: 1/4 acre	0.26	0.30	0.34	0.29	0.33	0.38	0.32	0.36	0.42	0.34	0.38	0.46
Lot size: 1/3 acre	0.24	0.28	0.31	0.26	0.32	0.35	0.29	0.35	0.40	0.32	0.36	0.45
Lot size: 1/2 acre	0.21	0.25	0.28	0.24	0.27	0.32	0.27	0.31	0.37	0.30	0.34	0.43
Lot size: 1 acre	0.18	0.23	0.26	0.21	0.24	0.30	0.24	0.29	0.36	0.28	0.32	0.41



**APPENDIX E**  
**DRAINAGE AREA EXHIBITS**