



*Drainage Report  
Prepared For  
Block 286 Lot 14.02  
Hillsborough Township  
Somerset County, New Jersey  
Project Number: 1509FS*

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## **1.0 Introduction**

This report outlines the results of a hydrologic and hydraulic stormwater runoff analysis conducted by Van Cleef Engineering Associates (Van Cleef) with regard to the proposed development on Lot 14.02 in Block 286 as designated by the Franklin Township Tax Maps. The tract consists of approximately 2.77 acres and is located in the R-10 District.

This report has been prepared to summarize stormwater analysis design objectives, methodologies and calculations pertaining to the conveyance of the stormwater runoff that is generated by the property under pre-developed and post-developed conditions.

## **2.0 Site Description**

### 2.1 Pre-Developed Conditions

Under pre-developed conditions, Lot 14.02 is vacant and consists of woods in good hydrologic condition. The adjacent properties along the northern, southern and western property boundaries are dedicated to residential uses. The adjacent property along the eastern property boundary is dedicated to the Mount Carmel Church. The Existing Drainage Area Map (Appendix I) depicts two drainage areas. Area 1A is comprised of the area of disturbance associated with the proposed development and thus the peak flow rate corresponding to the runoff generated by this area must be sufficiently reduced in accordance with N.J.A.C. 7:8-5.6. Area 1B, on the other hand, is comprised of the remaining area that is drained by the proposed pond constructed wetland. The peak flow rate corresponding to the runoff generated by this area does not need to be reduced because this area will not be disturbed as a result of the proposed development. The runoff generated by both areas is conveyed toward Belmar Street via overland flow. The boundaries of the drainage areas and the location of the point of analysis are shown on the Existing Drainage Area Map in Appendix I.

### 2.2 Post-Developed Conditions

Under post-developed conditions, Lot 14.02 is subdivided into six lots. The proposed development involves the construction of a pond constructed wetland, five single-family dwellings and a roadway along with appurtenant driveways. The Proposed Drainage Area Map (Appendix I) depicts two drainage areas. The runoff generated by Area 1A is conveyed to the pond constructed wetland via a network of storm sewers. The runoff generated by Area 1B will bypass the pond

constructed wetland via a swale that is adjacent to the northern tract boundary. The boundaries of the drainage areas and the locations of the point of analysis are shown on the Proposed Drainage Area Map in Appendix I. The outflow from the pond constructed wetland is discharged to the existing storm sewer network. The applicable runoff quantity requirements will be addressed by the pond constructed wetland whereas the applicable runoff quality requirements will be addressed by the proposed MTDs.

### 3.0 Methodology

The assessment of stormwater runoff has been based upon the Natural Resources Conservation Service Methodology as described in Technical Release 55 (TR-55), "Urban Hydrology for Small Watershed." The theoretical storms that are referenced in this report are modeled via the 24-hour SCS Unit Dimensionless Hydrograph and the rainfall distributions are based on the data provided for Region C by the NOAA. The recurrence intervals of 2, 10 and 100 years were analyzed via Bentley Pond Pack version 8i. The program is tailored to model the SCS Method for hydrograph generations and to perform interactive solutions of continuity equation (outflow = inflow +/- storage) with the intermediate values of the routing curve obtained through linear interpretation.

According to the New Jersey Supplement to Chapter 2 of the Engineering Field Handbook published by the NRCS, the rainfall amounts generated by the 24-hour design storm within Somerset County are as follows:

2-Year            =     3.34 inches  
 10-Year           =     5.01 inches  
 100-Year         =     8.21 inches

The Soil Conservation Service Soil Survey (SCS) for Somerset County was utilized in order to classify the soils within the tract.

The Rational Method was utilized to determine whether the capacity provided by the proposed pipes is sufficient for the runoff generated by the 25-year design storm.

<b>Soil Symbol</b>	<b>Soil Name</b>	<b>Hydrologic Soil Group</b>
KkoC	Klinesville Channery Loam (6-12% Slopes)	D



The location of these soils is indicated in Appendix A.

#### **4.0 Stormwater Management Objectives**

The primary objective of this report is to demonstrate that the proposed stormwater management measures are designed in accordance with all of the applicable regulations pertaining to runoff quantity and quality. The proposed improvements are designed to meet the requirements of Franklin Township, the New Jersey Department of Environmental Protection and the Standards for Soil Erosion and Sediment Control in New Jersey.

#### **5.0 Runoff Quantity**

The peak flow rates corresponding to the designated point of analysis will be sufficiently reduced via the proposed outlet structure within the pond constructed wetland. The results of the routing calculations are tabulated below. These results indicate compliance with N.J.A.C. 7:8-5.6. Refer to Appendix C and D for further information pertaining to the routing calculations.

To determine whether the emergency spillway pertaining to the pond constructed wetland is sufficient, routing calculations were performed under the assumption that the outlet structure is blocked. The results of these calculations are included in Appendix G.

Safety ledges are typically required within a pond constructed wetland. However, the proposed pond constructed wetland has been designed without safety ledges because it will be surrounded by a safety fence which merits an exemption from the safety standards for stormwater management basins per N.J.A.C. 7:8-6.3.

<b>Peak Flow Rate Reductions (Current Adjusted Precipitation)</b>				
<b>Storm Frequency</b>	<b>Pre-Developed Peak Flow – Area 1A (CFS)</b>	<b>Pre-Developed Peak Flow – Area 1B (CFS)</b>	<b>Allowable Peak Flow (CFS)</b>	<b>Post-Developed Peak Flow (CFS)</b>
2	2.77	0.46	$2.77*0.50 + 0.42 = 1.81$	1.41
10	5.98	0.91	$5.98*0.75 + 0.91 = 5.40$	4.75
100	13.21	1.90	$13.21*0.80 + 1.90 = 12.47$	10.78

<b>Peak Flow Rate Reductions (Future Precipitation)</b>				
<b>Storm Frequency</b>	<b>Pre-Developed Peak Flow – Area 1A (CFS)</b>	<b>Pre-Developed Peak Flow – Area 1B (CFS)</b>	<b>Allowable Peak Flow (CFS)</b>	<b>Post-Developed Peak Flow (CFS)</b>
2	3.85	0.61	$3.85*0.50 + 0.61 = 2.54$	2.51
10	7.95	1.18	$7.95*0.75 + 1.18 = 7.14$	6.88
100	19.41	2.72	$19.41*0.80 + 2.72 = 18.25$	13.94

## 6.0 Water Surface Elevation Summary

A summary of the water surface elevations and outflows corresponding to the 2-, 10- and 100-year design storms are shown below:

<b>Pond Constructed Wetland (Future Precipitation)</b>		
<b>Storm Frequency</b>	<b>Water Surface Elevation (FT)</b>	<b>Outflow (CFS)</b>
<b>WQDS</b>	95.62	0.45
<b>2</b>	96.71	2.35
<b>10</b>	97.47	6.43
<b>100</b>	99.56	12.85

## **7.0 Runoff Quality**

To fulfill the runoff quality requirements that are applicable to this development, the runoff generated by the proposed motor vehicle surface area during the Water Quality Design Storm will be treated via manufactured treatment devices which are designed to achieve a TSS removal rate of 80% and thus comply with N.J.A.C. 7:8-5.5. Further information pertaining to these BMPs is included in Appendix H.

## **8.0 Groundwater Recharge**

The entirety of the property consists of HSG 'D' soil. Thus, the annual groundwater recharge volume under both pre-developed and post-developed conditions is zero cubic feet and the proposed development will not result in an annual recharge deficit.

## **9.0 Storm Sewer Design**

The storm sewer network was designed to convey the runoff generated by the 25-year design storm. The appropriate size of the sewers was determined via the application of the Manning Formula and a Manning's Roughness Coefficient of 0.013. The runoff coefficients were determined via a weighted average and are dependent on the land cover. The times of concentration associated with the drainage areas that correspond to the proposed catch basins were assumed to be 10 minutes which is the minimum. The drainage areas are shown on the Proposed Inlet Drainage Area Map in Appendix I. Flow rates were computed via the application of the Rational method ( $Q = CIA$ ). Calculations are provided in Appendix F.

## **10.0 Conclusion**

The proposed development will sufficiently reduce the peak flow rates corresponding to the 2-, 10- and 100-year design storms. Furthermore, 80% of the TSS within the runoff generated by the proposed motor vehicle surfaces will be removed. The drainage patterns under post-developed conditions are very similar to the corresponding patterns under pre-developed conditions. Therefore, the proposed development will not negatively impact any off-site or downstream properties. This project has been designed in accordance with the standards set forth by various regulatory agencies including Franklin Township, the New Jersey Department of Environmental Protection, and the Somerset-Union Soil Conservation District. All engineering calculations and the

associated drainage area maps are incorporated in the Appendix for further review.

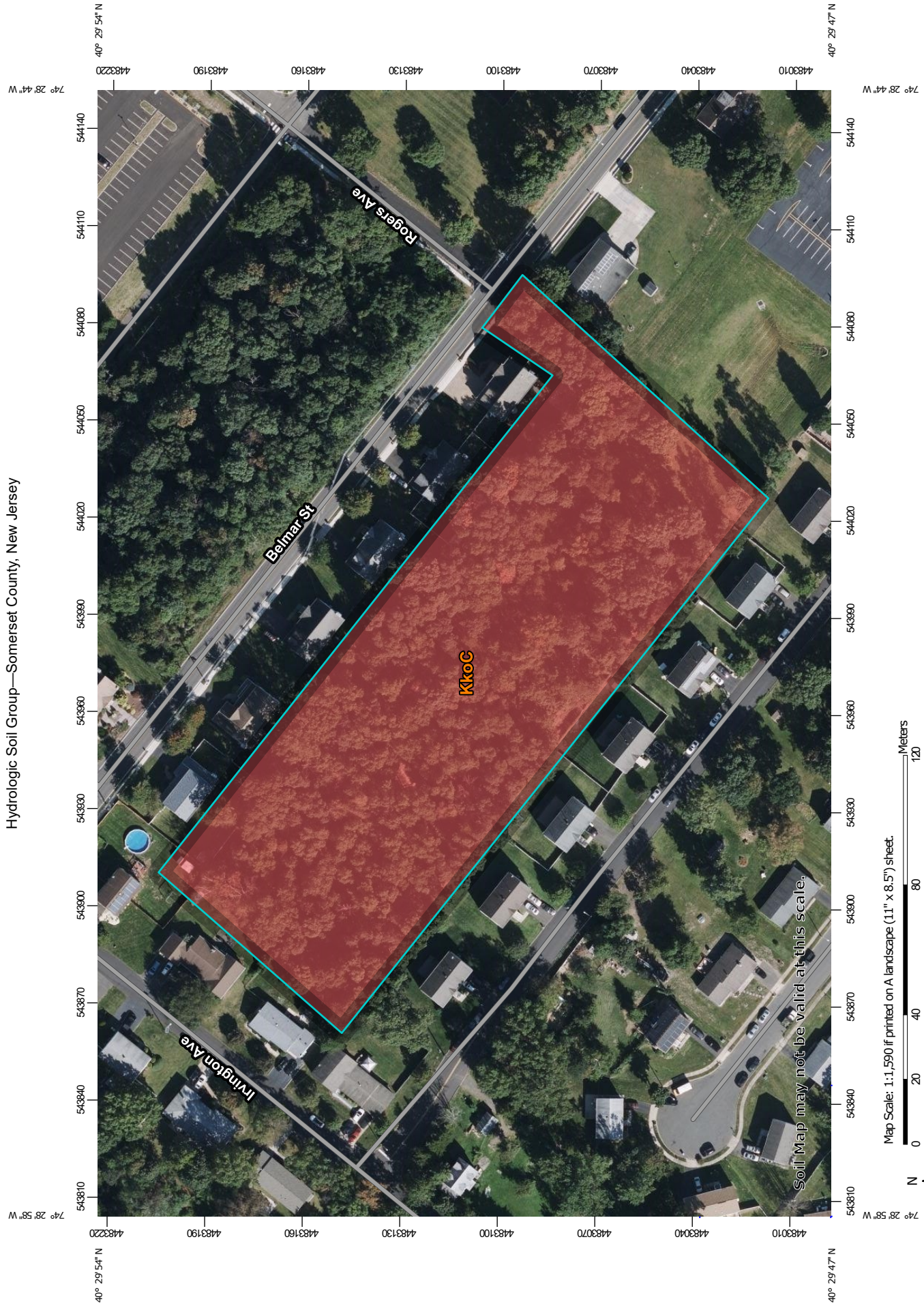
## **11.0 References**

1. DEP Stormwater Management Rules, N.J.A.C 7:8, July 17, 2023.
2. NJ Stormwater Best Management Practices Manual, July 2023.
3. Standards for Soil Erosion and Sediment Control in New Jersey, New Jersey State Soil Conservation Committee, July 2017.
4. Web Soil Survey, United States Department of Agriculture, Natural Resource Conservation Service, Version 8, 2008.
5. Franklin Township Municipal Code.
6. Bentley, StormCAD®, Version 8.11.02.75, 2011.
7. Bentley, PondPack Version 8i, 2012.

# Appendix A

Soil Map, Runoff Curve Numbers & Time of  
Concentration

Hydrologic Soil Group—Somerset County, New Jersey



Soil Map may not be valid at this scale.

































Map Scale: 1:1,590 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



## MAP LEGEND

<b>Area of Interest (AOI)</b>	 C
 Area of Interest (AOI)	 C/D
<b>Soils</b>	 D
<b>Soil Rating Polygons</b>	 Not rated or not available
 A	<b>Water Features</b>
 A/D	 Streams and Canals
 B	<b>Transportation</b>
 B/D	 Rails
 C	 Interstate Highways
 C/D	 US Routes
 D	 Major Roads
 Not rated or not available	 Local Roads
<b>Soil Rating Lines</b>	<b>Background</b>
 A	 Aerial Photography
 A/D	
 B	
 B/D	
 C	
 C/D	
 D	
 Not rated or not available	
<b>Soil Rating Points</b>	
 A	
 A/D	
 B	
 B/D	

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Somerset County, New Jersey  
 Survey Area Data: Version 20, Aug 30, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 14, 2020—Oct 8, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Worksheet 2: Runoff Curve Number

Project 1509FS By KH Date 2/21/2022  
 Location Franklin Township Checked \_\_\_\_\_ Date \_\_\_\_\_  
 Select One: Pre-Developed  
 Area Name Area 1A

1. Runoff Curve Number

Names	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	CN			Area acres miles %	Product CN x area
		Tab 2-2	Fig 2-3	Fig 2-4		
D	Woods - Good Condition	77			2.88	221.76
Totals					2.88	221.76

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{221.76}{2.88}$$

Use CN = 77.0



Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS By KH Date 2/21/2022  
 Location Franklin Township Checked \_\_\_\_\_ Date \_\_\_\_\_  
 Select One: Pre-Developed  
 Select One: Time of Concentration  
 Area Name Area 1A

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- 3 Flow Length, L (total L < 300 ft)
- 4 Two-yr 24-hr rainfall, P2
- 5 land slope, s
- 6  $T_t = (0.007 * (nL)^{0.8} / ((P_2^{0.5}) * (s^{0.4})))$  Compute Tt

Segment ID	C-E	
	Woods	
	0.4	
ft	100	
in	3.34	
ft/ft	0.026	
hr	0.32	0.32

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average velocity, V (figure 3-1)
- 11  $T_t = L / (3600 * V)$  Compute Tt

Segment ID	E-POA	
	Unpaved	
ft	686	
ft/ft	0.013	
ft/s	1.8	
hr	0.11	0.11

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, Pw
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 (r^{2/3}) * (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 * V)$  Compute Tt
- 20 Water shed or Subarea Tc or Tt (add Tt in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		0.00
hr		0.42
min		25.28

Worksheet 2: Runoff Curve Number

Project 1509FS By KH Date 2/21/2022  
 Location Franklin Township Checked \_\_\_\_\_ Date \_\_\_\_\_  
 Select One: Pre-Developed  
 Area Name Area 1B

1. Runoff Curve Number

Names	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	CN			Area acres miles %	Product CN x area
		Tab 2-2	Fig 2-3	Fig 2-4		
D	Woods - Good Condition	77			0.14	10.78
D	Open Space - Good Condition	80			0.20	16
	Impervious Areas	98			0.04	3.92
Totals					0.38	30.7

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{30.7}{0.38}$$

Use CN = 80.8

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS By KH Date 2/21/2022  
 Location Franklin Township Checked \_\_\_\_\_ Date \_\_\_\_\_  
 Select One: Pre-Developed  
 Select One: Time of Concentration  
 Area Name Area 1B

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- 3 Flow Length, L (total L < 300 ft)
- 4 Two-yr 24-hr rainfall, P2
- 5 land slope, s
- 6  $T_t = (0.007 * (nL)^{0.8} / ((P_2^{0.5}) * (s^{0.4})))$  Compute Tt

Segment ID	A-B	B-D	
	Grass	Woods	
	0.24	0.4	
ft	56	44	
in	3.34	3.34	
ft/ft	0.026	0.033	
hr	0.13	0.15	0.28

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average velocity, V (figure 3-1)
- 11  $T_t = L / (3600 * V)$  Compute Tt

Segment ID	D-POA	
	Unpaved	
ft	773	
ft/ft	0.014	
ft/s	1.9	
hr	0.11	0.11

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, Pw
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 (r^{2/3}) * (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 * V)$  Compute Tt
- 20 Water shed or Subarea Tc or Tt (add Tt in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		0.00
hr		0.39
min		23.61

Worksheet 2: Runoff Curve Number

Project 1509FS By KH Date 2/21/2022  
 Location Franklin Township Checked \_\_\_\_\_ Date \_\_\_\_\_  
 Select One: Post-Developed  
 Area Name Area 1A (Pervious)

1. Runoff Curve Number

Names	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	CN			Area acres miles %	Product CN x area
		Tab 2-2	Fig 2-3	Fig 2-4		
D	Woods - Good Condition	77			0.14	10.78
D	Open Space - Good Condition	80			1.7	136
Totals					1.84	146.78

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{146.78}{1.84}$$

Use CN = 79.8

Worksheet 2: Runoff Curve Number

Project 1509FS By KH Date 2/21/2022  
 Location Franklin Township Checked \_\_\_\_\_ Date \_\_\_\_\_  
 Select One: Post-Developed  
 Area Name Area 1A (Impervious)

1. Runoff Curve Number

Names	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	CN			Area acres miles %	Product CN x area
		Tab 2-2	Fig 2-3	Fig 2-4		
	Impervious Areas	98			1.17	114.66
Totals					1.17	114.66

CN (weighted) = total product/ total area=  $\frac{114.66}{1.17}$

Use CN = **98.0**

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS By KH Date 2/21/2022  
 Location Franklin Township Checked \_\_\_\_\_ Date \_\_\_\_\_  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name Area 1A

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- 3 Flow Length, L (total L < 300 ft)
- 4 Two-yr 24-hr rainfall, P2
- 5 land slope, s
- 6  $T_t = (0.007 * (nL)^{0.8} / ((P2^{0.5}) * (s^{0.4})))$  Compute Tt

Segment ID	A-B	B-C	
	Grass	Woods	
	0.24	0.4	
ft	61	30	
in	3.34	3.34	
ft/ft	0.025	0.029	
hr	0.14	0.12	0.26

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average velocity, V (figure 3-1)
- 11  $T_t = L / (3600 * V)$  Compute Tt

Segment ID	C-D	
	Unpaved	
ft	318	
ft/ft	0.024	
ft/s	2.5	
hr	0.04	0.04

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, Pw
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49(r^{2/3}) * (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 * V)$  Compute Tt
- 20 Water shed or Subarea Tc or Tt (add Tt in steps 6, 11, 19)

Segment ID	D-E	
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s	2	(Assumed)
ft	429	
hr	0.06	0.06
hr		0.35
min		21.21

Worksheet 2: Runoff Curve Number

Project 1509FS By KH Date 2/21/2022  
 Location Franklin Township Checked \_\_\_\_\_ Date \_\_\_\_\_  
 Select One: Post-Developed  
 Area Name Area 1B

1. Runoff Curve Number

Names	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	CN			Area acres miles %	Product CN x area
		Tab 2-2	Fig 2-3	Fig 2-4		
D	Open Space - Good Condition	80			0.25	20
Totals					0.25	20

CN (weighted) = total product/ total area=  $\frac{20}{0.25}$

Use CN = 80.0

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS By KH Date 2/21/2022  
 Location Franklin Township Checked \_\_\_\_\_ Date \_\_\_\_\_  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name Area 1B

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- 3 Flow Length, L (total L < 300 ft)
- 4 Two-yr 24-hr rainfall, P2
- 5 land slope, s
- 6  $T_t = (0.007 * (nL)^{0.8} / ((P2^{0.5}) * (s^{0.4})))$  Compute Tt

Segment ID	A-B	
	Grass	
	0.24	
ft	100	
in	3.34	
ft/ft	0.023	
hr	0.22	0.22

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average velocity, V (figure 3-1)
- 11  $T_t = L / (3600 * V)$  Compute Tt

Segment ID	B-C	
	Unpaved	
ft	500	
ft/ft	0.014	
ft/s	1.8	
hr	0.08	0.08

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, Pw
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 * (r^{2/3}) * (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 * V)$  Compute Tt
- 20 Water shed or Subarea Tc or Tt (add Tt in steps 6, 11, 19)

Segment ID	C-POA	
ft^2		
ft		
ft		
ft/ft		
ft/s	2	(Assumed)
ft	156	
hr	0.02	0.02
hr		0.32
min		19.14



# Appendix B

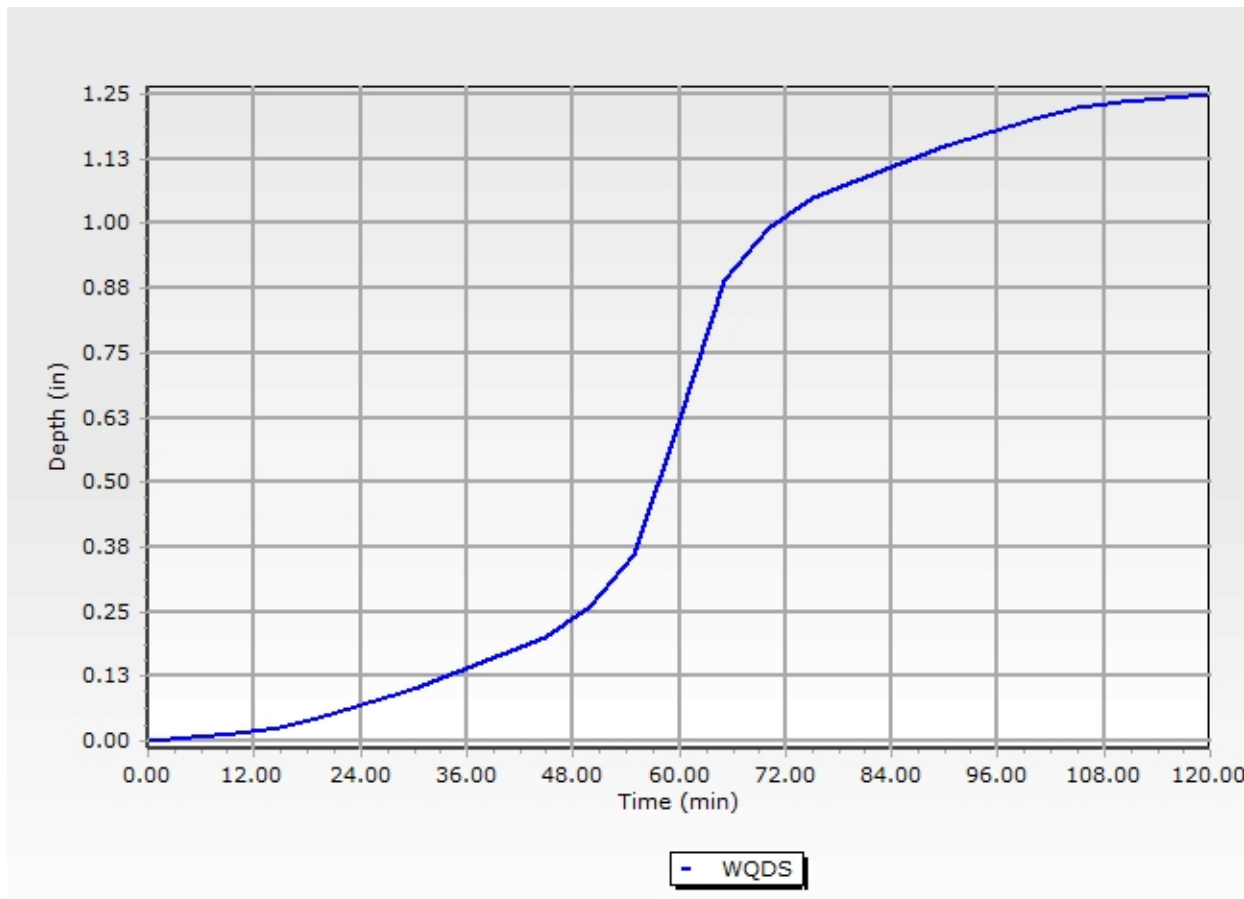
## Pond Report

## Storm Data Detailed Report: WQDS

Element Details			
ID	15	Notes	
Label	WQDS		
WQDS			
Label	WQDS	End Time	120.00 min
Return Event	1 years	Depth	1.00 in
Start Time	0.00 min	Storm Event Depth Type	Cumulative
Increment	5.00 min		

### WQDS

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.01	0.02	0.03	0.05
25.00	0.08	0.10	0.13	0.17	0.20
50.00	0.26	0.36	0.63	0.89	0.99
75.00	1.05	1.08	1.12	1.15	1.18
100.00	1.20	1.23	1.23	1.24	1.25



## Storm Data Detailed Report: Somerset Current Precipitation

Element Details		
ID	151	Notes
Label	Somerset Current Precipitation	

2-Year			
Label	2-Year	End Time	1,440.00 min
Return Event	2 years	Depth	3.34 in
Start Time	0.00 min	Storm Event Depth Type	Cumulative
Increment	6.00 min		

### 2-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.00	0.01	0.01	0.01
30.00	0.02	0.02	0.03	0.03	0.03
60.00	0.04	0.04	0.04	0.05	0.05
90.00	0.06	0.06	0.06	0.07	0.07
120.00	0.08	0.08	0.08	0.09	0.09
150.00	0.10	0.10	0.10	0.11	0.11
180.00	0.12	0.12	0.13	0.13	0.14
210.00	0.14	0.14	0.15	0.15	0.16
240.00	0.16	0.17	0.17	0.18	0.18
270.00	0.19	0.19	0.20	0.20	0.21
300.00	0.21	0.22	0.22	0.23	0.23
330.00	0.24	0.24	0.25	0.25	0.26
360.00	0.26	0.27	0.28	0.28	0.29
390.00	0.29	0.30	0.31	0.31	0.32
420.00	0.33	0.33	0.34	0.35	0.35
450.00	0.36	0.37	0.38	0.38	0.39
480.00	0.40	0.41	0.42	0.43	0.43
510.00	0.44	0.45	0.46	0.47	0.48
540.00	0.49	0.50	0.51	0.52	0.53
570.00	0.54	0.55	0.57	0.58	0.59
600.00	0.61	0.62	0.64	0.66	0.67
630.00	0.69	0.71	0.73	0.75	0.78
660.00	0.80	0.83	0.87	0.90	0.94
690.00	0.99	1.05	1.13	1.22	1.36
720.00	1.59	1.98	2.12	2.21	2.29
750.00	2.35	2.40	2.44	2.47	2.51
780.00	2.54	2.56	2.59	2.61	2.63
810.00	2.65	2.67	2.68	2.70	2.72
840.00	2.73	2.75	2.76	2.77	2.79
870.00	2.80	2.81	2.82	2.83	2.84
900.00	2.85	2.86	2.87	2.88	2.89
930.00	2.90	2.91	2.91	2.92	2.93
960.00	2.94	2.95	2.96	2.96	2.97
990.00	2.98	2.99	2.99	3.00	3.01

# Storm Data Detailed Report: Somerset Current Precipitation

## 2-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,020.00	3.01	3.02	3.03	3.03	3.04
1,050.00	3.05	3.05	3.06	3.06	3.07
1,080.00	3.08	3.08	3.09	3.09	3.10
1,110.00	3.10	3.11	3.11	3.12	3.12
1,140.00	3.13	3.13	3.14	3.14	3.15
1,170.00	3.15	3.16	3.16	3.17	3.17
1,200.00	3.18	3.18	3.19	3.19	3.20
1,230.00	3.20	3.20	3.21	3.21	3.22
1,260.00	3.22	3.23	3.23	3.24	3.24
1,290.00	3.24	3.25	3.25	3.26	3.26
1,320.00	3.26	3.27	3.27	3.28	3.28
1,350.00	3.28	3.29	3.29	3.30	3.30
1,380.00	3.30	3.31	3.31	3.31	3.32
1,410.00	3.32	3.33	3.33	3.33	3.34
1,440.00	3.34	(N/A)	(N/A)	(N/A)	(N/A)

## 10-Year

Label	10-Year	Increment	6.00 min
Return Event	10 years	End Time	1,440.00 min
Start Time	0.00 min	Storm Event Depth Type	Cumulative

## 10-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.01	0.01	0.02	0.02
30.00	0.03	0.03	0.04	0.04	0.05
60.00	0.05	0.06	0.07	0.07	0.08
90.00	0.08	0.09	0.10	0.10	0.11
120.00	0.11	0.12	0.13	0.13	0.14
150.00	0.14	0.15	0.16	0.16	0.17
180.00	0.18	0.18	0.19	0.20	0.20
210.00	0.21	0.22	0.22	0.23	0.24
240.00	0.25	0.25	0.26	0.27	0.27
270.00	0.28	0.29	0.30	0.30	0.31
300.00	0.32	0.33	0.33	0.34	0.35
330.00	0.36	0.37	0.37	0.38	0.39
360.00	0.40	0.41	0.41	0.42	0.43
390.00	0.44	0.45	0.46	0.47	0.48
420.00	0.49	0.50	0.51	0.52	0.53
450.00	0.54	0.55	0.56	0.58	0.59
480.00	0.60	0.61	0.62	0.64	0.65
510.00	0.66	0.68	0.69	0.70	0.72
540.00	0.73	0.75	0.76	0.78	0.80
570.00	0.81	0.83	0.85	0.87	0.89
600.00	0.91	0.94	0.96	0.98	1.01
630.00	1.03	1.06	1.09	1.13	1.16

# Storm Data Detailed Report: Somerset Current Precipitation

## 10-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
660.00	1.20	1.25	1.30	1.35	1.42
690.00	1.48	1.58	1.69	1.83	2.04
720.00	2.39	2.97	3.18	3.32	3.43
750.00	3.53	3.59	3.66	3.71	3.76
780.00	3.81	3.85	3.88	3.92	3.95
810.00	3.98	4.00	4.03	4.05	4.07
840.00	4.10	4.12	4.14	4.16	4.18
870.00	4.20	4.21	4.23	4.25	4.26
900.00	4.28	4.29	4.31	4.32	4.33
930.00	4.35	4.36	4.37	4.39	4.40
960.00	4.41	4.42	4.43	4.45	4.46
990.00	4.47	4.48	4.49	4.50	4.51
1,020.00	4.52	4.53	4.54	4.55	4.56
1,050.00	4.57	4.58	4.59	4.60	4.60
1,080.00	4.61	4.62	4.63	4.64	4.64
1,110.00	4.65	4.66	4.67	4.68	4.68
1,140.00	4.69	4.70	4.71	4.71	4.72
1,170.00	4.73	4.74	4.74	4.75	4.76
1,200.00	4.76	4.77	4.78	4.79	4.79
1,230.00	4.80	4.81	4.81	4.82	4.83
1,260.00	4.83	4.84	4.85	4.85	4.86
1,290.00	4.87	4.87	4.88	4.88	4.89
1,320.00	4.90	4.90	4.91	4.91	4.92
1,350.00	4.93	4.93	4.94	4.94	4.95
1,380.00	4.96	4.96	4.97	4.97	4.98
1,410.00	4.98	4.99	4.99	5.00	5.00
1,440.00	5.01	(N/A)	(N/A)	(N/A)	(N/A)

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### 25-Year

Label	25-Year	Increment	6.00 min
Return Event	25 years	End Time	1,440.00 min
Start Time	0.00 min	Storm Event Depth Type	Cumulative

## 25-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.01	0.01	0.02	0.03
30.00	0.03	0.04	0.05	0.05	0.06
60.00	0.07	0.07	0.08	0.09	0.10
90.00	0.10	0.11	0.12	0.12	0.13
120.00	0.14	0.15	0.15	0.16	0.17
150.00	0.18	0.19	0.19	0.20	0.21
180.00	0.22	0.23	0.23	0.24	0.25
210.00	0.26	0.27	0.28	0.28	0.29
240.00	0.30	0.31	0.32	0.33	0.34
270.00	0.35	0.35	0.36	0.37	0.38

# Storm Data Detailed Report: Somerset Current Precipitation

## 25-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
300.00	0.39	0.40	0.41	0.42	0.43
330.00	0.44	0.45	0.46	0.47	0.48
360.00	0.49	0.50	0.51	0.52	0.53
390.00	0.54	0.55	0.56	0.58	0.59
420.00	0.60	0.61	0.63	0.64	0.65
450.00	0.67	0.68	0.69	0.71	0.72
480.00	0.74	0.75	0.77	0.78	0.80
510.00	0.81	0.83	0.85	0.86	0.88
540.00	0.90	0.92	0.94	0.96	0.98
570.00	1.00	1.02	1.04	1.07	1.09
600.00	1.12	1.15	1.18	1.21	1.24
630.00	1.27	1.30	1.34	1.38	1.43
660.00	1.48	1.53	1.59	1.66	1.74
690.00	1.82	1.94	2.07	2.25	2.50
720.00	2.93	3.65	3.90	4.08	4.21
750.00	4.33	4.41	4.49	4.56	4.62
780.00	4.67	4.72	4.77	4.81	4.85
810.00	4.88	4.91	4.94	4.97	5.00
840.00	5.03	5.06	5.08	5.11	5.13
870.00	5.15	5.17	5.19	5.21	5.23
900.00	5.25	5.27	5.29	5.30	5.32
930.00	5.34	5.35	5.37	5.38	5.40
960.00	5.41	5.43	5.44	5.46	5.47
990.00	5.48	5.50	5.51	5.52	5.54
1,020.00	5.55	5.56	5.57	5.59	5.60
1,050.00	5.61	5.62	5.63	5.64	5.65
1,080.00	5.66	5.67	5.68	5.69	5.70
1,110.00	5.71	5.72	5.73	5.74	5.75
1,140.00	5.76	5.77	5.78	5.79	5.80
1,170.00	5.80	5.81	5.82	5.83	5.84
1,200.00	5.85	5.86	5.87	5.87	5.88
1,230.00	5.89	5.90	5.91	5.92	5.92
1,260.00	5.93	5.94	5.95	5.96	5.96
1,290.00	5.97	5.98	5.99	6.00	6.00
1,320.00	6.01	6.02	6.03	6.03	6.04
1,350.00	6.05	6.05	6.06	6.07	6.08
1,380.00	6.08	6.09	6.10	6.10	6.11
1,410.00	6.12	6.12	6.13	6.14	6.14
1,440.00	6.15	(N/A)	(N/A)	(N/A)	(N/A)

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### 100-Year

Label	100-Year	Increment	6.00 min
Return Event	100 years	End Time	1,440.00 min
Start Time	0.00 min	Storm Event Depth Type	Cumulative

# Storm Data Detailed Report: Somerset Current Precipitation

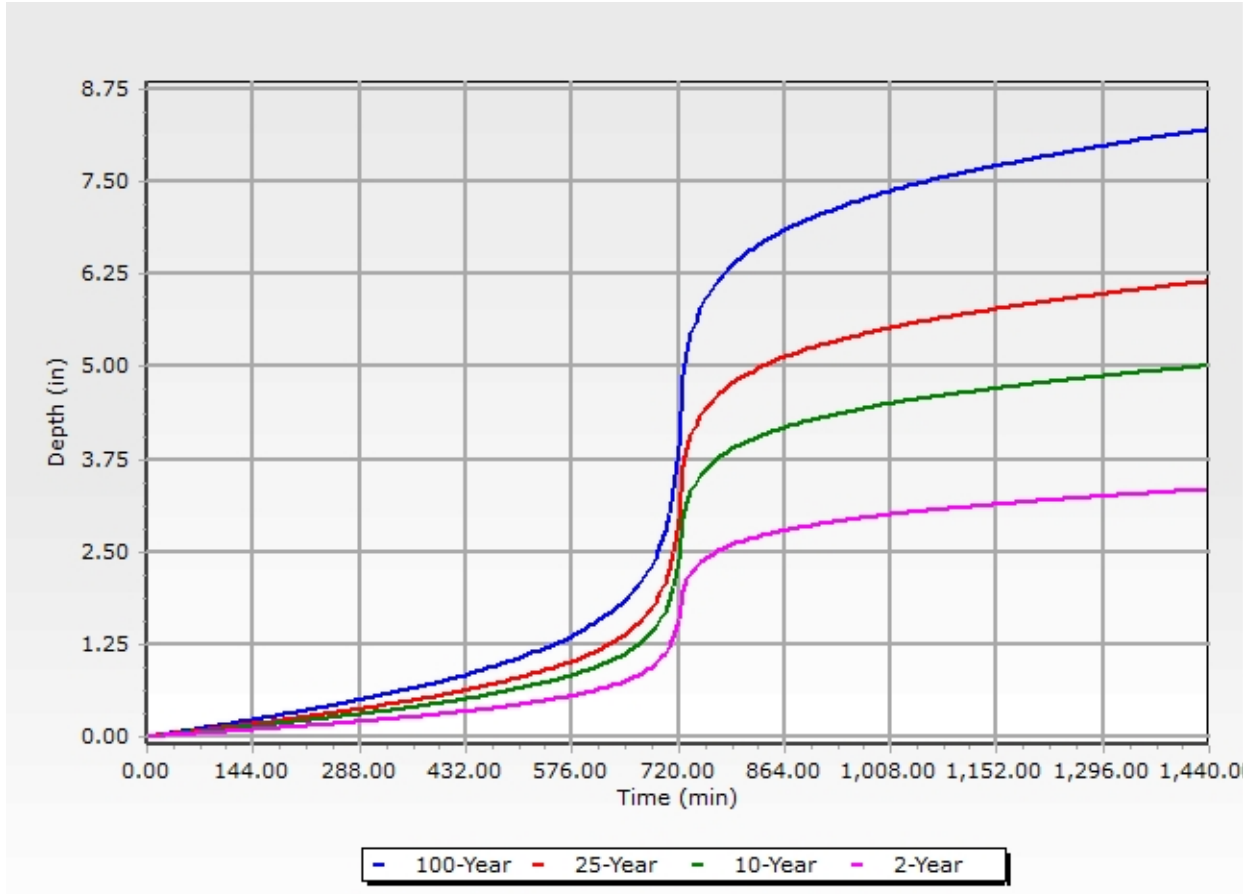
## 100-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.01	0.02	0.03	0.04
30.00	0.04	0.05	0.06	0.07	0.08
60.00	0.09	0.10	0.11	0.12	0.13
90.00	0.14	0.15	0.16	0.17	0.18
120.00	0.19	0.20	0.21	0.22	0.23
150.00	0.24	0.25	0.26	0.27	0.28
180.00	0.29	0.30	0.31	0.32	0.33
210.00	0.34	0.36	0.37	0.38	0.39
240.00	0.40	0.41	0.43	0.44	0.45
270.00	0.46	0.47	0.49	0.50	0.51
300.00	0.52	0.53	0.55	0.56	0.57
330.00	0.59	0.60	0.61	0.62	0.64
360.00	0.65	0.66	0.68	0.69	0.71
390.00	0.72	0.74	0.75	0.77	0.78
420.00	0.80	0.82	0.83	0.85	0.87
450.00	0.89	0.91	0.93	0.94	0.96
480.00	0.98	1.00	1.02	1.04	1.07
510.00	1.09	1.11	1.13	1.15	1.18
540.00	1.20	1.22	1.25	1.28	1.30
570.00	1.33	1.36	1.39	1.43	1.46
600.00	1.50	1.53	1.57	1.61	1.65
630.00	1.69	1.74	1.79	1.84	1.91
660.00	1.97	2.04	2.13	2.22	2.32
690.00	2.43	2.59	2.77	3.01	3.34
720.00	3.91	4.87	5.20	5.44	5.62
750.00	5.78	5.89	5.99	6.08	6.17
780.00	6.24	6.30	6.37	6.42	6.47
810.00	6.52	6.56	6.60	6.64	6.68
840.00	6.71	6.75	6.78	6.82	6.85
870.00	6.88	6.91	6.93	6.96	6.99
900.00	7.01	7.03	7.06	7.08	7.10
930.00	7.12	7.14	7.17	7.19	7.21
960.00	7.23	7.25	7.27	7.28	7.30
990.00	7.32	7.34	7.36	7.38	7.39
1,020.00	7.41	7.43	7.44	7.46	7.47
1,050.00	7.49	7.50	7.52	7.53	7.55
1,080.00	7.56	7.57	7.59	7.60	7.61
1,110.00	7.62	7.64	7.65	7.66	7.68
1,140.00	7.69	7.70	7.71	7.72	7.74
1,170.00	7.75	7.76	7.77	7.78	7.80
1,200.00	7.81	7.82	7.83	7.84	7.85
1,230.00	7.87	7.88	7.89	7.90	7.91
1,260.00	7.92	7.93	7.94	7.95	7.96
1,290.00	7.97	7.98	7.99	8.00	8.01
1,320.00	8.02	8.03	8.04	8.05	8.06
1,350.00	8.07	8.08	8.09	8.10	8.11
1,380.00	8.12	8.13	8.14	8.15	8.16

# Storm Data Detailed Report: Somerset Current Precipitation

## 100-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,410.00	8.17	8.17	8.18	8.19	8.20
1,440.00	8.21	(N/A)	(N/A)	(N/A)	(N/A)





# Storm Data Detailed Report: Somerset Current Adjusted Precipitation

Element Details		
ID	352	Notes
Label	Somerset Current Adjusted Precipitation	

10-Year			
Label	10-Year	Increment	6.00 min
Return Event	10 years	End Time	1,440.00 min
Start Time	0.00 min	Storm Event Depth Type	Cumulative

## 10-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.01	0.01	0.02	0.02
30.00	0.03	0.03	0.04	0.04	0.05
60.00	0.06	0.06	0.07	0.07	0.08
90.00	0.09	0.09	0.10	0.10	0.11
120.00	0.12	0.12	0.13	0.14	0.14
150.00	0.15	0.16	0.16	0.17	0.18
180.00	0.18	0.19	0.20	0.20	0.21
210.00	0.22	0.22	0.23	0.24	0.25
240.00	0.25	0.26	0.27	0.27	0.28
270.00	0.29	0.30	0.30	0.31	0.32
300.00	0.33	0.34	0.34	0.35	0.36
330.00	0.37	0.38	0.38	0.39	0.40
360.00	0.41	0.42	0.43	0.44	0.44
390.00	0.45	0.46	0.47	0.48	0.49
420.00	0.50	0.51	0.52	0.54	0.55
450.00	0.56	0.57	0.58	0.59	0.61
480.00	0.62	0.63	0.64	0.66	0.67
510.00	0.68	0.70	0.71	0.72	0.74
540.00	0.75	0.77	0.78	0.80	0.82
570.00	0.84	0.86	0.88	0.90	0.92
600.00	0.94	0.96	0.99	1.01	1.04
630.00	1.06	1.09	1.12	1.16	1.20
660.00	1.24	1.28	1.34	1.39	1.46
690.00	1.52	1.63	1.74	1.89	2.10
720.00	2.46	3.06	3.27	3.42	3.53
750.00	3.64	3.70	3.77	3.82	3.88
780.00	3.92	3.96	4.00	4.04	4.07
810.00	4.10	4.12	4.15	4.17	4.20
840.00	4.22	4.24	4.26	4.28	4.30
870.00	4.32	4.34	4.36	4.38	4.39
900.00	4.41	4.42	4.44	4.45	4.46
930.00	4.48	4.49	4.50	4.52	4.53
960.00	4.54	4.55	4.57	4.58	4.59
990.00	4.60	4.61	4.62	4.64	4.65

# Storm Data Detailed Report: Somerset Current Adjusted Precipitation

## 10-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,020.00	4.66	4.67	4.68	4.69	4.70
1,050.00	4.71	4.72	4.73	4.73	4.74
1,080.00	4.75	4.76	4.77	4.78	4.78
1,110.00	4.79	4.80	4.81	4.82	4.82
1,140.00	4.83	4.84	4.85	4.86	4.86
1,170.00	4.87	4.88	4.89	4.89	4.90
1,200.00	4.91	4.92	4.92	4.93	4.94
1,230.00	4.94	4.95	4.96	4.96	4.97
1,260.00	4.98	4.99	4.99	5.00	5.01
1,290.00	5.01	5.02	5.02	5.03	5.04
1,320.00	5.04	5.05	5.06	5.06	5.07
1,350.00	5.07	5.08	5.09	5.09	5.10
1,380.00	5.10	5.11	5.12	5.12	5.13
1,410.00	5.13	5.14	5.14	5.15	5.15
1,440.00	5.16	(N/A)	(N/A)	(N/A)	(N/A)

## 100-Year

Label	100-Year	Increment	6.00 min
Return Event	100 years	End Time	1,440.00 min
Start Time	0.00 min	Storm Event Depth Type	Cumulative

## 100-Year

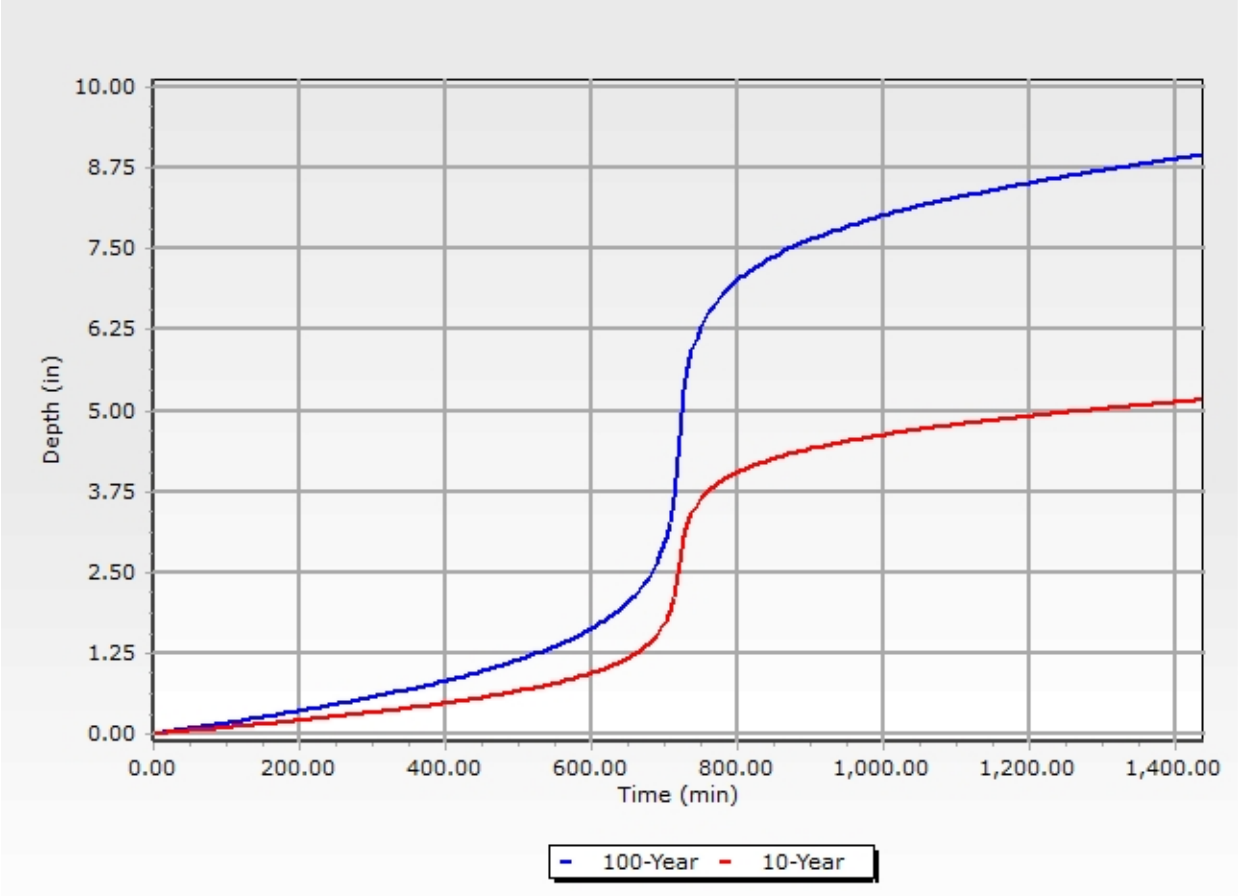
Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.01	0.02	0.03	0.04
30.00	0.05	0.06	0.07	0.08	0.09
60.00	0.10	0.11	0.12	0.13	0.14
90.00	0.15	0.16	0.17	0.18	0.19
120.00	0.20	0.21	0.22	0.24	0.25
150.00	0.26	0.27	0.28	0.29	0.30
180.00	0.32	0.33	0.34	0.35	0.36
210.00	0.38	0.39	0.40	0.41	0.43
240.00	0.44	0.45	0.46	0.48	0.49
270.00	0.50	0.52	0.53	0.54	0.56
300.00	0.57	0.58	0.60	0.61	0.62
330.00	0.64	0.65	0.67	0.68	0.69
360.00	0.71	0.72	0.74	0.75	0.77
390.00	0.79	0.80	0.82	0.84	0.85
420.00	0.87	0.89	0.91	0.93	0.95
450.00	0.97	0.99	1.01	1.03	1.05
480.00	1.07	1.09	1.12	1.14	1.16
510.00	1.19	1.21	1.23	1.26	1.28
540.00	1.31	1.33	1.36	1.39	1.42
570.00	1.45	1.49	1.52	1.56	1.59
600.00	1.63	1.67	1.71	1.76	1.80
630.00	1.84	1.89	1.95	2.01	2.08

# Storm Data Detailed Report: Somerset Current Adjusted Precipitation

## 100-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
660.00	2.15	2.23	2.32	2.42	2.53
690.00	2.64	2.83	3.02	3.28	3.64
720.00	4.27	5.31	5.67	5.93	6.12
750.00	6.30	6.42	6.53	6.63	6.72
780.00	6.80	6.87	6.94	7.00	7.05
810.00	7.10	7.15	7.19	7.24	7.28
840.00	7.32	7.36	7.39	7.43	7.46
870.00	7.50	7.53	7.56	7.59	7.62
900.00	7.64	7.67	7.69	7.72	7.74
930.00	7.76	7.79	7.81	7.83	7.85
960.00	7.88	7.90	7.92	7.94	7.96
990.00	7.98	8.00	8.02	8.04	8.06
1,020.00	8.08	8.09	8.11	8.13	8.15
1,050.00	8.16	8.18	8.19	8.21	8.22
1,080.00	8.24	8.25	8.27	8.28	8.30
1,110.00	8.31	8.32	8.34	8.35	8.37
1,140.00	8.38	8.39	8.41	8.42	8.43
1,170.00	8.45	8.46	8.47	8.49	8.50
1,200.00	8.51	8.52	8.54	8.55	8.56
1,230.00	8.57	8.59	8.60	8.61	8.62
1,260.00	8.63	8.64	8.66	8.67	8.68
1,290.00	8.69	8.70	8.71	8.72	8.74
1,320.00	8.75	8.76	8.77	8.78	8.79
1,350.00	8.80	8.81	8.82	8.83	8.84
1,380.00	8.85	8.86	8.87	8.88	8.89
1,410.00	8.90	8.91	8.92	8.93	8.94
1,440.00	8.95	(N/A)	(N/A)	(N/A)	(N/A)

# Storm Data Detailed Report: Somerset Current Adjusted Precipitation



## Storm Data Detailed Report: Somerset Future Precipitation

Element Details		
ID	328	Notes
Label	Somerset Future Precipitation	

2-Year			
Label	2-Year	Increment	6.00 min
Return Event	2 years	End Time	1,440.00 min
Start Time	0.00 min	Storm Event Depth Type	Cumulative

### 2-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.01	0.01	0.01	0.02
30.00	0.02	0.03	0.03	0.03	0.04
60.00	0.04	0.05	0.05	0.06	0.06
90.00	0.07	0.07	0.08	0.08	0.09
120.00	0.09	0.09	0.10	0.10	0.11
150.00	0.11	0.12	0.12	0.13	0.14
180.00	0.14	0.15	0.15	0.16	0.16
210.00	0.17	0.17	0.18	0.18	0.19
240.00	0.19	0.20	0.21	0.21	0.22
270.00	0.22	0.23	0.23	0.24	0.25
300.00	0.25	0.26	0.26	0.27	0.28
330.00	0.28	0.29	0.30	0.30	0.31
360.00	0.31	0.32	0.33	0.34	0.34
390.00	0.35	0.36	0.36	0.37	0.38
420.00	0.39	0.40	0.40	0.41	0.42
450.00	0.43	0.44	0.45	0.46	0.47
480.00	0.48	0.49	0.50	0.51	0.52
510.00	0.53	0.54	0.55	0.56	0.57
540.00	0.58	0.59	0.60	0.62	0.63
570.00	0.65	0.66	0.68	0.69	0.71
600.00	0.72	0.74	0.76	0.78	0.80
630.00	0.82	0.84	0.87	0.89	0.92
660.00	0.95	0.99	1.03	1.07	1.12
690.00	1.17	1.25	1.34	1.46	1.62
720.00	1.89	2.36	2.52	2.64	2.72
750.00	2.80	2.85	2.90	2.94	2.98
780.00	3.02	3.05	3.08	3.11	3.13
810.00	3.16	3.18	3.20	3.21	3.23
840.00	3.25	3.27	3.28	3.30	3.31
870.00	3.33	3.34	3.36	3.37	3.38
900.00	3.39	3.41	3.42	3.43	3.44
930.00	3.45	3.46	3.47	3.48	3.49
960.00	3.50	3.51	3.52	3.53	3.54
990.00	3.54	3.55	3.56	3.57	3.58
1,020.00	3.59	3.59	3.60	3.61	3.62

# Storm Data Detailed Report: Somerset Future Precipitation

## 2-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,050.00	3.63	3.63	3.64	3.65	3.65
1,080.00	3.66	3.67	3.67	3.68	3.68
1,110.00	3.69	3.70	3.70	3.71	3.72
1,140.00	3.72	3.73	3.73	3.74	3.75
1,170.00	3.75	3.76	3.76	3.77	3.77
1,200.00	3.78	3.79	3.79	3.80	3.80
1,230.00	3.81	3.81	3.82	3.82	3.83
1,260.00	3.83	3.84	3.84	3.85	3.86
1,290.00	3.86	3.87	3.87	3.87	3.88
1,320.00	3.88	3.89	3.89	3.90	3.90
1,350.00	3.91	3.91	3.92	3.92	3.93
1,380.00	3.93	3.94	3.94	3.94	3.95
1,410.00	3.95	3.96	3.96	3.97	3.97
1,440.00	3.97	(N/A)	(N/A)	(N/A)	(N/A)

## 10-Year

Label	10-Year	Increment	6.00 min
Return Event	10 years	End Time	1,440.00 min
Start Time	0.00 min	Storm Event Depth Type	Cumulative

## 10-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.01	0.01	0.02	0.03
30.00	0.03	0.04	0.05	0.05	0.06
60.00	0.07	0.07	0.08	0.09	0.10
90.00	0.10	0.11	0.12	0.13	0.13
120.00	0.14	0.15	0.16	0.16	0.17
150.00	0.18	0.19	0.19	0.20	0.21
180.00	0.22	0.23	0.24	0.24	0.25
210.00	0.26	0.27	0.28	0.29	0.30
240.00	0.30	0.31	0.32	0.33	0.34
270.00	0.35	0.36	0.37	0.38	0.39
300.00	0.40	0.40	0.41	0.42	0.43
330.00	0.44	0.45	0.46	0.47	0.48
360.00	0.49	0.50	0.51	0.52	0.53
390.00	0.55	0.56	0.57	0.58	0.59
420.00	0.61	0.62	0.63	0.64	0.66
450.00	0.67	0.69	0.70	0.71	0.73
480.00	0.74	0.76	0.77	0.79	0.81
510.00	0.82	0.84	0.86	0.87	0.89
540.00	0.91	0.93	0.94	0.97	0.99
570.00	1.01	1.03	1.06	1.08	1.11
600.00	1.13	1.16	1.19	1.22	1.25
630.00	1.28	1.32	1.35	1.40	1.44
660.00	1.49	1.55	1.61	1.68	1.75

# Storm Data Detailed Report: Somerset Future Precipitation

## 10-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
690.00	1.84	1.96	2.09	2.27	2.53
720.00	2.96	3.69	3.94	4.12	4.25
750.00	4.38	4.46	4.53	4.60	4.67
780.00	4.72	4.77	4.82	4.86	4.90
810.00	4.93	4.96	4.99	5.02	5.05
840.00	5.08	5.11	5.13	5.16	5.18
870.00	5.20	5.23	5.25	5.27	5.29
900.00	5.31	5.32	5.34	5.36	5.37
930.00	5.39	5.41	5.42	5.44	5.45
960.00	5.47	5.48	5.50	5.51	5.53
990.00	5.54	5.55	5.57	5.58	5.59
1,020.00	5.61	5.62	5.63	5.64	5.65
1,050.00	5.67	5.68	5.69	5.70	5.71
1,080.00	5.72	5.73	5.74	5.75	5.76
1,110.00	5.77	5.78	5.79	5.80	5.81
1,140.00	5.82	5.83	5.84	5.85	5.85
1,170.00	5.86	5.87	5.88	5.89	5.90
1,200.00	5.91	5.92	5.93	5.93	5.94
1,230.00	5.95	5.96	5.97	5.98	5.99
1,260.00	5.99	6.00	6.01	6.02	6.03
1,290.00	6.03	6.04	6.05	6.06	6.06
1,320.00	6.07	6.08	6.09	6.09	6.10
1,350.00	6.11	6.12	6.12	6.13	6.14
1,380.00	6.14	6.15	6.16	6.16	6.17
1,410.00	6.18	6.19	6.19	6.20	6.20
1,440.00	6.21	(N/A)	(N/A)	(N/A)	(N/A)

### 100-Year

Label	100-Year	Increment	6.00 min
Return Event	100 years	End Time	1,440.00 min
Start Time	0.00 min	Storm Event Depth Type	Cumulative

### 100-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.02	0.03	0.04	0.05
30.00	0.07	0.08	0.09	0.11	0.12
60.00	0.13	0.15	0.16	0.17	0.19
90.00	0.20	0.22	0.23	0.25	0.26
120.00	0.27	0.29	0.30	0.32	0.33
150.00	0.35	0.37	0.38	0.40	0.41
180.00	0.43	0.44	0.46	0.48	0.49
210.00	0.51	0.53	0.54	0.56	0.58
240.00	0.59	0.61	0.63	0.65	0.66
270.00	0.68	0.70	0.72	0.74	0.75
300.00	0.77	0.79	0.81	0.83	0.85

# Storm Data Detailed Report: Somerset Future Precipitation

## 100-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
330.00	0.87	0.89	0.90	0.92	0.94
360.00	0.96	0.98	1.00	1.02	1.05
390.00	1.07	1.09	1.11	1.14	1.16
420.00	1.19	1.21	1.24	1.26	1.29
450.00	1.31	1.34	1.37	1.40	1.43
480.00	1.46	1.49	1.52	1.55	1.58
510.00	1.61	1.64	1.67	1.71	1.74
540.00	1.77	1.81	1.85	1.89	1.93
570.00	1.97	2.02	2.06	2.11	2.16
600.00	2.22	2.27	2.33	2.38	2.44
630.00	2.50	2.57	2.65	2.73	2.82
660.00	2.92	3.03	3.15	3.28	3.43
690.00	3.59	3.84	4.09	4.45	4.94
720.00	5.79	7.21	7.70	8.06	8.31
750.00	8.56	8.72	8.87	9.00	9.13
780.00	9.23	9.33	9.42	9.50	9.58
810.00	9.65	9.71	9.77	9.83	9.88
840.00	9.94	9.99	10.04	10.09	10.13
870.00	10.18	10.22	10.26	10.30	10.34
900.00	10.38	10.41	10.44	10.48	10.51
930.00	10.54	10.57	10.60	10.64	10.67
960.00	10.70	10.72	10.75	10.78	10.81
990.00	10.84	10.86	10.89	10.92	10.94
1,020.00	10.97	10.99	11.01	11.04	11.06
1,050.00	11.08	11.10	11.13	11.15	11.17
1,080.00	11.19	11.21	11.23	11.25	11.27
1,110.00	11.28	11.30	11.32	11.34	11.36
1,140.00	11.38	11.40	11.41	11.43	11.45
1,170.00	11.47	11.49	11.50	11.52	11.54
1,200.00	11.56	11.57	11.59	11.61	11.62
1,230.00	11.64	11.66	11.67	11.69	11.71
1,260.00	11.72	11.74	11.75	11.77	11.79
1,290.00	11.80	11.82	11.83	11.85	11.86
1,320.00	11.88	11.89	11.91	11.92	11.93
1,350.00	11.95	11.96	11.98	11.99	12.00
1,380.00	12.02	12.03	12.04	12.06	12.07
1,410.00	12.08	12.10	12.11	12.12	12.14
1,440.00	12.15	(N/A)	(N/A)	(N/A)	(N/A)

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100-Year + 50%

Label	100-Year + 50%	Increment	6.00 min
Return Event	150 years	End Time	1,440.00 min
Start Time	0.00 min	Storm Event Depth Type	Cumulative

### 100-Year + 50%



# Storm Data Detailed Report: Somerset Future Precipitation

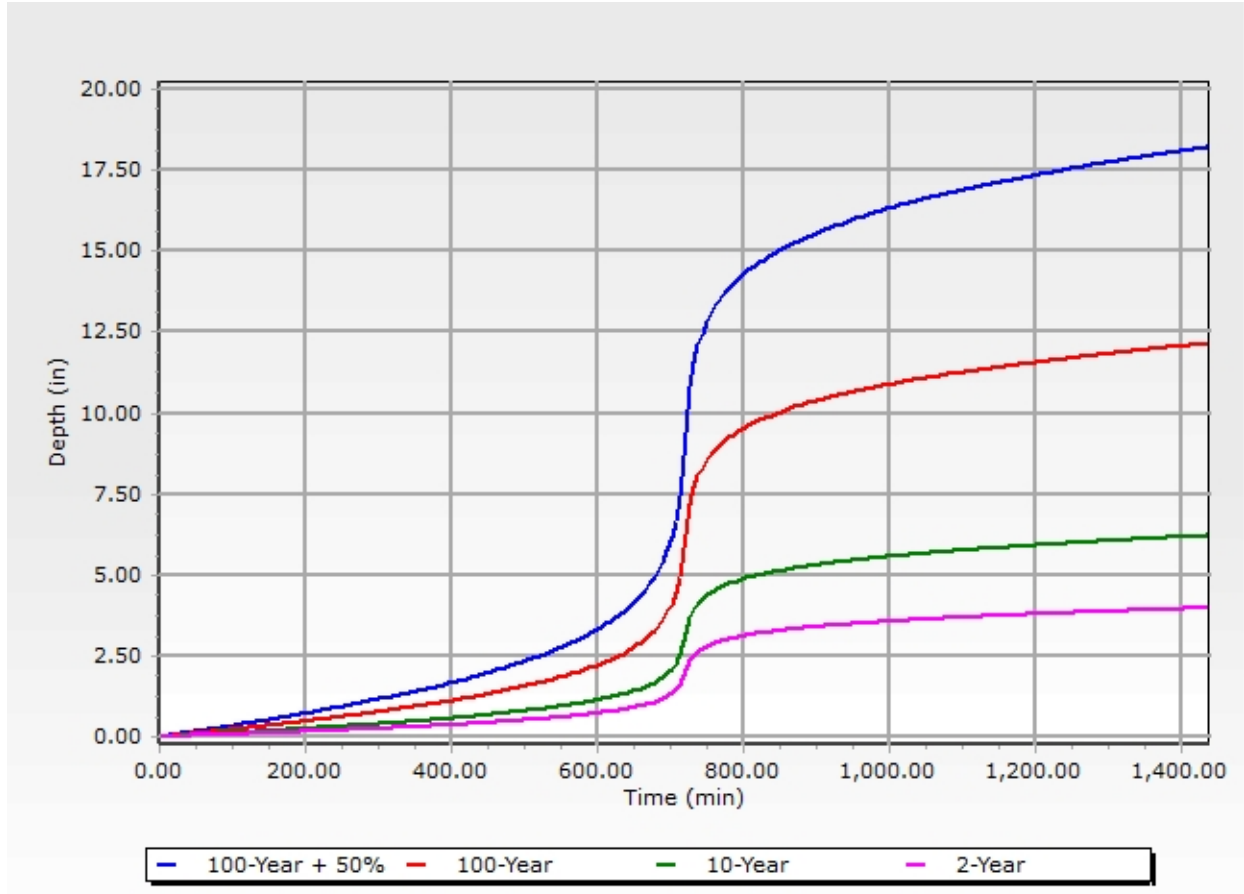
## 100-Year + 50%

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.02	0.04	0.06	0.08
30.00	0.10	0.12	0.14	0.16	0.18
60.00	0.20	0.22	0.24	0.26	0.28
90.00	0.30	0.32	0.35	0.37	0.39
120.00	0.41	0.43	0.46	0.48	0.50
150.00	0.53	0.55	0.57	0.60	0.62
180.00	0.64	0.67	0.69	0.72	0.74
210.00	0.77	0.79	0.82	0.84	0.87
240.00	0.89	0.92	0.94	0.97	1.00
270.00	1.02	1.05	1.08	1.10	1.13
300.00	1.16	1.19	1.22	1.24	1.27
330.00	1.30	1.33	1.36	1.39	1.42
360.00	1.44	1.47	1.51	1.54	1.57
390.00	1.60	1.64	1.67	1.71	1.74
420.00	1.78	1.82	1.85	1.89	1.93
450.00	1.97	2.01	2.05	2.10	2.14
480.00	2.18	2.23	2.27	2.32	2.37
510.00	2.41	2.46	2.51	2.56	2.61
540.00	2.66	2.72	2.77	2.83	2.89
570.00	2.96	3.03	3.10	3.17	3.25
600.00	3.32	3.40	3.49	3.58	3.66
630.00	3.76	3.86	3.97	4.10	4.23
660.00	4.38	4.54	4.72	4.93	5.15
690.00	5.39	5.76	6.14	6.68	7.41
720.00	8.69	10.82	11.55	12.09	12.47
750.00	12.84	13.08	13.30	13.51	13.69
780.00	13.85	14.00	14.13	14.26	14.37
810.00	14.47	14.57	14.65	14.74	14.83
840.00	14.91	14.98	15.06	15.13	15.20
870.00	15.27	15.34	15.40	15.46	15.51
900.00	15.57	15.62	15.67	15.72	15.77
930.00	15.82	15.86	15.91	15.96	16.00
960.00	16.05	16.09	16.13	16.18	16.22
990.00	16.26	16.30	16.34	16.38	16.41
1,020.00	16.45	16.49	16.52	16.56	16.59
1,050.00	16.63	16.66	16.69	16.72	16.76
1,080.00	16.79	16.81	16.84	16.87	16.90
1,110.00	16.93	16.96	16.99	17.01	17.04
1,140.00	17.07	17.10	17.13	17.15	17.18
1,170.00	17.21	17.23	17.26	17.29	17.31
1,200.00	17.34	17.36	17.39	17.41	17.44
1,230.00	17.46	17.49	17.51	17.54	17.56
1,260.00	17.59	17.61	17.63	17.66	17.68
1,290.00	17.70	17.73	17.75	17.77	17.80
1,320.00	17.82	17.84	17.86	17.88	17.91
1,350.00	17.93	17.95	17.97	17.99	18.01
1,380.00	18.03	18.05	18.07	18.09	18.11

# Storm Data Detailed Report: Somerset Future Precipitation

## 100-Year + 50%

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,410.00	18.13	18.15	18.17	18.19	18.21
1,440.00	18.23	(N/A)	(N/A)	(N/A)	(N/A)



Subsection: Master Network Summary

**Catchments Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)
Area 1A Imervious (Post-Developed)	WQDS	1	4,387.000	75.00	2.15
Area 1A Imervious (Post-Developed)	2-Year	2	13,202.000	735.00	2.67
Area 1A Imervious (Post-Developed)	Future 2-Year	2	15,891.000	735.00	3.18
Area 1A Imervious (Post-Developed)	Current Adjusted 10-Year	10	20,920.000	735.00	4.15
Area 1A Imervious (Post-Developed)	Future 10-Year	10	25,385.000	735.00	5.00
Area 1A Imervious (Post-Developed)	25-Year	25	25,120.000	735.00	4.95
Area 1A Imervious (Post-Developed)	Current Adjusted 100-Year	100	37,004.000	735.00	7.22
Area 1A Imervious (Post-Developed)	Future 100-Year	100	50,604.000	735.00	9.82
Area 1A Pervious (Post-Developed)	WQDS	1	1,127.000	81.00	0.48
Area 1A Pervious (Post-Developed)	2-Year	2	10,004.000	735.00	2.23
Area 1A Pervious (Post-Developed)	Future 2-Year	2	13,401.000	735.00	3.01
Area 1A Pervious (Post-Developed)	Current Adjusted 10-Year	10	20,147.000	735.00	4.54
Area 1A Pervious (Post-Developed)	Future 10-Year	10	26,417.000	735.00	5.93
Area 1A Pervious (Post-Developed)	25-Year	25	26,040.000	735.00	5.84
Area 1A Pervious (Post-Developed)	Current Adjusted 100-Year	100	43,408.000	735.00	9.60
Area 1A Pervious (Post-Developed)	Future 100-Year	100	63,924.000	735.00	13.88
Area 1B (Post-Developed)	WQDS	1	157.000	78.00	0.07
Area 1B (Post-Developed)	2-Year	2	1,371.000	735.00	0.32
Area 1B (Post-Developed)	Future 2-Year	2	1,834.000	735.00	0.44
Area 1B (Post-Developed)	Current Adjusted 10-Year	10	2,753.000	735.00	0.65
Area 1B (Post-Developed)	Future 10-Year	10	3,607.000	735.00	0.85
Area 1B (Post-Developed)	25-Year	25	3,556.000	735.00	0.84
Area 1B (Post-Developed)	Current Adjusted 100-Year	100	5,918.000	735.00	1.37
Area 1B (Post-Developed)	Future 100-Year	100	8,707.000	735.00	1.98

Subsection: Master Network Summary

**Catchments Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)
Area 1A (Pre-Developed)	WQDS	1	1,225.000	84.00	0.45
Area 1A (Pre-Developed)	2-Year	2	13,730.000	738.00	2.77
Area 1A (Pre-Developed)	Future 2-Year	2	18,743.000	738.00	3.85
Area 1A (Pre-Developed)	Current Adjusted 10-Year	10	28,841.000	738.00	5.98
Area 1A (Pre-Developed)	Future 10-Year	10	38,333.000	738.00	7.95
Area 1A (Pre-Developed)	25-Year	25	37,760.000	738.00	7.83
Area 1A (Pre-Developed)	Current Adjusted 100-Year	100	64,335.000	738.00	13.21
Area 1A (Pre-Developed)	Future 100-Year	100	96,009.000	738.00	19.41
Area 1B (Pre-Developed)	WQDS	1	262.000	81.00	0.11
Area 1B (Pre-Developed)	2-Year	2	2,159.000	738.00	0.46
Area 1B (Pre-Developed)	Future 2-Year	2	2,874.000	738.00	0.61
Area 1B (Pre-Developed)	Current Adjusted 10-Year	10	4,286.000	738.00	0.91
Area 1B (Pre-Developed)	Future 10-Year	10	5,594.000	738.00	1.18
Area 1B (Pre-Developed)	25-Year	25	5,515.000	738.00	1.17
Area 1B (Pre-Developed)	Current Adjusted 100-Year	100	9,125.000	738.00	1.90
Area 1B (Pre-Developed)	Future 100-Year	100	13,376.000	738.00	2.72

**Node Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)
POA (Post-Developed)	WQDS	1	5,671.000	111.00	0.48
POA (Post-Developed)	2-Year	2	24,577.000	765.00	1.41
POA (Post-Developed)	Future 2-Year	2	31,126.000	759.00	2.51
POA (Post-Developed)	Current Adjusted 10-Year	10	43,820.000	753.00	4.75
POA (Post-Developed)	Future 10-Year	10	55,409.000	750.00	6.88
POA (Post-Developed)	25-Year	25	54,715.000	750.00	6.76
POA (Post-Developed)	Current Adjusted 100-Year	100	86,331.000	747.00	10.78

Subsection: Master Network Summary

**Node Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)
POA (Post-Developed)	Future 100-Year	100	123,236.000	747.00	13.94
POA (Pre-Developed - Area 1A)	WQDS	1	1,225.000	84.00	0.45
POA (Pre-Developed - Area 1A)	2-Year	2	13,730.000	738.00	2.77
POA (Pre-Developed - Area 1A)	Future 2-Year	2	18,743.000	738.00	3.85
POA (Pre-Developed - Area 1A)	Current Adjusted 10-Year	10	28,841.000	738.00	5.98
POA (Pre-Developed - Area 1A)	Future 10-Year	10	38,333.000	738.00	7.95
POA (Pre-Developed - Area 1A)	25-Year	25	37,760.000	738.00	7.83
POA (Pre-Developed - Area 1A)	Current Adjusted 100-Year	100	64,335.000	738.00	13.21
POA (Pre-Developed - Area 1A)	Future 100-Year	100	96,009.000	738.00	19.41
POA (Pre-Developed - Area 1B)	WQDS	1	262.000	81.00	0.11
POA (Pre-Developed - Area 1B)	2-Year	2	2,159.000	738.00	0.46
POA (Pre-Developed - Area 1B)	Future 2-Year	2	2,874.000	738.00	0.61
POA (Pre-Developed - Area 1B)	Current Adjusted 10-Year	10	4,286.000	738.00	0.91
POA (Pre-Developed - Area 1B)	Future 10-Year	10	5,594.000	738.00	1.18
POA (Pre-Developed - Area 1B)	25-Year	25	5,515.000	738.00	1.17
POA (Pre-Developed - Area 1B)	Current Adjusted 100-Year	100	9,125.000	738.00	1.90
POA (Pre-Developed - Area 1B)	Future 100-Year	100	13,376.000	738.00	2.72

**Pond Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft <sup>3</sup> )
Pond Constructed Wetland (IN)	WQDS	1	5,514.000	75.00	2.57	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	WQDS	1	5,514.000	117.00	0.45	95.62	17,022.000

Subsection: Master Network Summary

**Pond Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft <sup>3</sup> )
Pond Constructed Wetland (IN)	2-Year	2	23,206.000	735.00	4.89	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	2-Year	2	23,206.000	771.00	1.32	96.45	22,513.000
Pond Constructed Wetland (IN)	Future 2-Year	2	29,292.000	735.00	6.19	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	Future 2-Year	2	29,292.000	762.00	2.35	96.71	24,248.000
Pond Constructed Wetland (IN)	Current Adjusted 10-Year	10	41,067.000	735.00	8.68	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	Current Adjusted 10-Year	10	41,067.000	753.00	4.45	97.13	27,056.000
Pond Constructed Wetland (IN)	Future 10-Year	10	51,802.000	735.00	10.93	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	Future 10-Year	10	51,802.000	750.00	6.43	97.47	29,288.000
Pond Constructed Wetland (IN)	25-Year	25	51,160.000	735.00	10.80	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	25-Year	25	51,160.000	750.00	6.32	97.45	29,158.000
Pond Constructed Wetland (IN)	Current Adjusted 100-Year	100	80,412.000	735.00	16.82	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	Current Adjusted 100-Year	100	80,412.000	750.00	10.00	98.39	35,481.000
Pond Constructed Wetland (IN)	Future 100-Year	100	114,529.000	735.00	23.70	(N/A)	(N/A)

Subsection: Master Network Summary

**Pond Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft <sup>3</sup> )
Pond Constructed Wetland (OUT)	Future 100-Year	100	114,529.000	750.00	12.85	99.56	43,453.000

Subsection: Outlet Input Data  
 Label: OCS  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	90.50 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	101.95 ft

**Outlet Connectivity**

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	6" Orifice	Forward	15" RCP	95.00	101.95
Rectangular Weir	6" Weir	Forward	15" RCP	96.00	101.95
Rectangular Weir	15" Weir	Forward	15" RCP	96.50	101.95
Culvert-Circular	15" RCP	Forward	TW	95.00	101.95
Rectangular Weir	Emergency Spillway	Forward	TW	100.95	101.95
Tailwater Settings	Tailwater			(N/A)	(N/A)



Subsection: Outlet Input Data  
 Label: OCS  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

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Structure ID: 6" Orifice	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	95.00 ft
Orifice Diameter	6.0 in
Orifice Coefficient	0.6

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Structure ID: 15" Weir	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	96.50 ft
Weir Length	1.25 ft
Weir Coefficient	3.00 (ft <sup>0.5</sup> )/s

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Structure ID: 6" Weir	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	96.00 ft
Weir Length	0.50 ft
Weir Coefficient	3.00 (ft <sup>0.5</sup> )/s

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Structure ID: Emergency Spillway	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	100.95 ft
Weir Length	25.00 ft
Weir Coefficient	3.00 (ft <sup>0.5</sup> )/s

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Structure ID: 15" RCP	
Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	15.0 in
Length	25.00 ft
Length (Computed Barrel)	25.00 ft
Slope (Computed)	0.010 ft/ft

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Outlet Control Data	
Manning's n	0.013
Ke	0.2
Kb	0.0
Kr	0.0
Convergence Tolerance	0.00 ft

---

Inlet Control Data

Subsection: Outlet Input Data  
 Label: OCS  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

---

Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.1
T2 ratio (HW/D)	1.2
Slope Correction Factor	-0.5

---

Use unsubmerged inlet control 0 equation below T1 elevation.  
 Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control, interpolate between flows at T1 & T2...

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T1 Elevation	96.36 ft	T1 Flow	4.80 ft <sup>3</sup> /s
T2 Elevation	96.49 ft	T2 Flow	5.49 ft <sup>3</sup> /s

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Subsection: Outlet Input Data  
Label: OCS  
Scenario: Future 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

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Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft <sup>3</sup> /s
Flow Tolerance (Maximum)	10.000 ft <sup>3</sup> /s

---

Subsection: Elevation-Volume-Flow Table (Pond)  
 Label: Pond Constructed Wetland  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Infiltration	
Infiltration Method (Computed)	No Infiltration

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Initial Conditions	
Elevation (Water Surface, Initial)	95.00 ft
Volume (Initial)	12,999.000 ft <sup>3</sup>
Flow (Initial Outlet)	0.00 ft <sup>3</sup> /s
Flow (Initial Infiltration)	0.00 ft <sup>3</sup> /s
Flow (Initial, Total)	0.00 ft <sup>3</sup> /s
Time Increment	3.00 min

Elevation (ft)	Outflow (ft <sup>3</sup> /s)	Storage (ft <sup>3</sup> )	Area (ft <sup>2</sup> )	Infiltration (ft <sup>3</sup> /s)	Flow (Total) (ft <sup>3</sup> /s)	2S/t + O (ft <sup>3</sup> /s)
90.50	0.00	0.000	821.00	0.00	0.00	0.00
91.00	0.00	480.938	1,110.00	0.00	0.00	5.34
91.50	0.00	1,114.843	1,432.47	0.00	0.00	12.39
92.00	0.00	1,920.249	1,796.00	0.00	0.00	21.34
92.50	0.00	2,912.459	2,179.01	0.00	0.00	32.36
93.00	0.00	4,105.419	2,599.00	0.00	0.00	45.62
93.50	0.00	5,515.679	3,048.00	0.00	0.00	61.29
94.00	0.00	7,574.423	4,401.00	0.00	0.00	84.16
94.50	0.00	9,914.997	4,967.00	0.00	0.00	110.17
95.00	0.00	12,999.046	6,474.00	0.00	0.00	144.43
95.50	0.38	16,250.503	6,531.87	0.00	0.38	180.94
96.00	0.69	19,530.960	6,590.00	0.00	0.69	217.70
96.50	1.39	22,836.065	6,630.44	0.00	1.39	255.12
97.00	3.65	26,161.419	6,671.00	0.00	3.65	294.33
97.50	6.63	29,506.401	6,708.95	0.00	6.63	334.48
98.00	8.76	32,870.383	6,747.00	0.00	8.76	373.99
98.50	10.36	36,253.117	6,783.95	0.00	10.36	413.17
99.00	11.64	39,654.350	6,821.00	0.00	11.64	452.25
99.50	12.75	43,074.083	6,857.95	0.00	12.75	491.35
100.00	13.72	46,512.316	6,895.00	0.00	13.72	530.53
100.50	14.62	49,968.925	6,931.45	0.00	14.62	569.83
100.95	15.36	53,095.476	6,964.34	0.00	15.36	605.31
101.00	16.28	53,443.784	6,968.00	0.00	16.28	610.10
101.50	46.81	56,935.799	7,000.07	0.00	46.81	679.43
101.95	91.89	60,092.338	7,029.00	0.00	91.89	759.58

# Appendix C

## Pre-Developed Hydrographs

Subsection: Unit Hydrograph Summary  
 Label: Area 1A (Pre-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>
Computational Time Increment	3.37 min
Time to Peak (Computed)	738.18 min
Flow (Peak, Computed)	2.78 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	2.77 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	77.0
Area (User Defined)	125,452.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.99 in
Maximum Retention (Pervious, 20 percent)	0.60 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	1.31 in
Runoff Volume (Pervious)	13,724.551 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	13,730.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	25.28 min
Computational Time Increment	3.37 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.74 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A (Pre-Developed)  
Scenario: 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	16.85 min
Unit receding limb, $T_r$	67.41 min
Total unit time, $T_b$	84.27 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
609.00	0.00	0.00	0.00	0.00	0.01
624.00	0.01	0.01	0.01	0.01	0.02
639.00	0.02	0.02	0.03	0.03	0.03
654.00	0.04	0.04	0.05	0.06	0.06
669.00	0.07	0.08	0.09	0.10	0.11
684.00	0.13	0.14	0.16	0.18	0.20
699.00	0.23	0.27	0.32	0.37	0.44
714.00	0.53	0.65	0.83	1.09	1.44
729.00	1.86	2.28	2.62	2.77	2.75
744.00	2.62	2.40	2.16	1.94	1.74
759.00	1.57	1.41	1.27	1.15	1.04
774.00	0.95	0.88	0.82	0.76	0.72
789.00	0.67	0.63	0.60	0.56	0.54
804.00	0.51	0.48	0.46	0.44	0.42
819.00	0.40	0.39	0.37	0.36	0.35
834.00	0.33	0.33	0.32	0.31	0.31
849.00	0.30	0.29	0.29	0.28	0.28
864.00	0.27	0.27	0.27	0.26	0.26
879.00	0.25	0.25	0.24	0.24	0.23
894.00	0.23	0.22	0.22	0.22	0.21
909.00	0.21	0.20	0.20	0.19	0.19
924.00	0.19	0.19	0.18	0.18	0.18
939.00	0.18	0.18	0.18	0.17	0.17
954.00	0.17	0.17	0.17	0.17	0.17
969.00	0.17	0.16	0.16	0.16	0.16
984.00	0.16	0.16	0.16	0.16	0.15
999.00	0.15	0.15	0.15	0.15	0.15
1,014.00	0.15	0.15	0.14	0.14	0.14
1,029.00	0.14	0.14	0.14	0.14	0.14
1,044.00	0.13	0.13	0.13	0.13	0.13
1,059.00	0.13	0.13	0.13	0.12	0.12
1,074.00	0.12	0.12	0.12	0.12	0.12
1,089.00	0.12	0.11	0.11	0.11	0.11
1,104.00	0.11	0.11	0.11	0.11	0.11



Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,119.00	0.11	0.11	0.11	0.11	0.11
1,134.00	0.11	0.11	0.11	0.11	0.11
1,149.00	0.10	0.10	0.10	0.10	0.10
1,164.00	0.10	0.10	0.10	0.10	0.10
1,179.00	0.10	0.10	0.10	0.10	0.10
1,194.00	0.10	0.10	0.10	0.10	0.10
1,209.00	0.10	0.10	0.10	0.10	0.10
1,224.00	0.10	0.10	0.10	0.10	0.10
1,239.00	0.10	0.10	0.10	0.09	0.09
1,254.00	0.09	0.09	0.09	0.09	0.09
1,269.00	0.09	0.09	0.09	0.09	0.09
1,284.00	0.09	0.09	0.09	0.09	0.09
1,299.00	0.09	0.09	0.09	0.09	0.09
1,314.00	0.09	0.09	0.09	0.09	0.09
1,329.00	0.09	0.09	0.09	0.09	0.09
1,344.00	0.08	0.08	0.08	0.08	0.08
1,359.00	0.08	0.08	0.08	0.08	0.08
1,374.00	0.08	0.08	0.08	0.08	0.08
1,389.00	0.08	0.08	0.08	0.08	0.08
1,404.00	0.08	0.08	0.08	0.08	0.08
1,419.00	0.08	0.08	0.08	0.08	0.08
1,434.00	0.07	0.07	0.07	0.07	0.07
1,449.00	0.07	0.06	0.05	0.04	0.03
1,464.00	0.02	0.02	0.01	0.01	0.01
1,479.00	0.01	0.00	0.00	0.00	0.00
1,494.00	0.00	0.00	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>
Computational Time Increment	3.37 min
Time to Peak (Computed)	738.18 min
Flow (Peak, Computed)	3.86 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	3.85 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	77.0
Area (User Defined)	125,452.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.99 in
Maximum Retention (Pervious, 20 percent)	0.60 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	1.79 in
Runoff Volume (Pervious)	18,735.594 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	18,743.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	25.28 min
Computational Time Increment	3.37 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.74 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A (Pre-Developed)  
Scenario: Future 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	16.85 min
Unit receding limb, $T_r$	67.41 min
Total unit time, $T_b$	84.27 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
561.00	0.00	0.00	0.00	0.00	0.00
576.00	0.01	0.01	0.01	0.01	0.01
591.00	0.01	0.02	0.02	0.02	0.02
606.00	0.03	0.03	0.03	0.04	0.04
621.00	0.04	0.05	0.05	0.05	0.06
636.00	0.06	0.07	0.07	0.08	0.08
651.00	0.09	0.10	0.11	0.12	0.13
666.00	0.14	0.15	0.16	0.18	0.20
681.00	0.22	0.24	0.26	0.28	0.31
696.00	0.35	0.39	0.45	0.52	0.60
711.00	0.69	0.82	1.00	1.25	1.60
726.00	2.08	2.65	3.22	3.66	3.85
741.00	3.80	3.59	3.28	2.94	2.63
756.00	2.35	2.11	1.89	1.70	1.53
771.00	1.39	1.27	1.17	1.08	1.01
786.00	0.94	0.88	0.83	0.78	0.74
801.00	0.70	0.67	0.63	0.60	0.58
816.00	0.55	0.53	0.50	0.48	0.47
831.00	0.45	0.44	0.42	0.41	0.41
846.00	0.40	0.39	0.38	0.38	0.37
861.00	0.36	0.36	0.35	0.34	0.34
876.00	0.33	0.33	0.32	0.31	0.31
891.00	0.30	0.30	0.29	0.28	0.28
906.00	0.27	0.27	0.26	0.26	0.25
921.00	0.25	0.24	0.24	0.24	0.23
936.00	0.23	0.23	0.23	0.23	0.23
951.00	0.22	0.22	0.22	0.22	0.22
966.00	0.22	0.21	0.21	0.21	0.21
981.00	0.21	0.21	0.20	0.20	0.20
996.00	0.20	0.20	0.20	0.19	0.19
1,011.00	0.19	0.19	0.19	0.19	0.18
1,026.00	0.18	0.18	0.18	0.18	0.18
1,041.00	0.18	0.17	0.17	0.17	0.17
1,056.00	0.17	0.17	0.16	0.16	0.16

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,071.00	0.16	0.16	0.16	0.15	0.15
1,086.00	0.15	0.15	0.15	0.15	0.14
1,101.00	0.14	0.14	0.14	0.14	0.14
1,116.00	0.14	0.14	0.14	0.14	0.14
1,131.00	0.14	0.14	0.14	0.14	0.14
1,146.00	0.13	0.13	0.13	0.13	0.13
1,161.00	0.13	0.13	0.13	0.13	0.13
1,176.00	0.13	0.13	0.13	0.13	0.13
1,191.00	0.13	0.13	0.13	0.13	0.13
1,206.00	0.13	0.13	0.13	0.13	0.13
1,221.00	0.12	0.12	0.12	0.12	0.12
1,236.00	0.12	0.12	0.12	0.12	0.12
1,251.00	0.12	0.12	0.12	0.12	0.12
1,266.00	0.12	0.12	0.12	0.12	0.12
1,281.00	0.12	0.12	0.12	0.12	0.12
1,296.00	0.11	0.11	0.11	0.11	0.11
1,311.00	0.11	0.11	0.11	0.11	0.11
1,326.00	0.11	0.11	0.11	0.11	0.11
1,341.00	0.11	0.11	0.11	0.11	0.11
1,356.00	0.11	0.11	0.11	0.11	0.10
1,371.00	0.10	0.10	0.10	0.10	0.10
1,386.00	0.10	0.10	0.10	0.10	0.10
1,401.00	0.10	0.10	0.10	0.10	0.10
1,416.00	0.10	0.10	0.10	0.10	0.10
1,431.00	0.10	0.10	0.10	0.10	0.10
1,446.00	0.09	0.09	0.08	0.06	0.05
1,461.00	0.04	0.03	0.02	0.02	0.01
1,476.00	0.01	0.01	0.01	0.00	0.00
1,491.00	0.00	0.00	0.00	0.00	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A (Pre-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>
Computational Time Increment	3.37 min
Time to Peak (Computed)	738.18 min
Flow (Peak, Computed)	6.00 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	5.98 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	77.0
Area (User Defined)	125,452.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.99 in
Maximum Retention (Pervious, 20 percent)	0.60 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	2.76 in
Runoff Volume (Pervious)	28,829.607 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	28,841.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	25.28 min
Computational Time Increment	3.37 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.74 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A (Pre-Developed)  
Scenario: Current Adjusted 10-Year

Return Event: 10 years  
Storm Event: 10-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	16.85 min
Unit receding limb, $T_r$	67.41 min
Total unit time, $T_b$	84.27 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
483.00	0.00	0.00	0.00	0.00	0.00
498.00	0.01	0.01	0.01	0.01	0.01
513.00	0.01	0.01	0.02	0.02	0.02
528.00	0.02	0.02	0.02	0.03	0.03
543.00	0.03	0.03	0.03	0.04	0.04
558.00	0.04	0.04	0.05	0.05	0.05
573.00	0.06	0.06	0.06	0.07	0.07
588.00	0.08	0.08	0.08	0.09	0.09
603.00	0.10	0.10	0.11	0.11	0.12
618.00	0.13	0.13	0.14	0.14	0.15
633.00	0.16	0.16	0.17	0.18	0.19
648.00	0.20	0.22	0.23	0.25	0.27
663.00	0.28	0.30	0.33	0.35	0.38
678.00	0.41	0.44	0.48	0.52	0.56
693.00	0.60	0.66	0.74	0.83	0.94
708.00	1.07	1.23	1.44	1.72	2.11
723.00	2.66	3.40	4.26	5.10	5.73
738.00	5.98	5.86	5.51	5.00	4.47
753.00	3.97	3.54	3.16	2.82	2.52
768.00	2.27	2.05	1.87	1.72	1.59
783.00	1.48	1.38	1.29	1.21	1.14
798.00	1.08	1.02	0.96	0.92	0.87
813.00	0.83	0.80	0.76	0.73	0.70
828.00	0.67	0.65	0.63	0.61	0.60
843.00	0.58	0.57	0.56	0.55	0.54
858.00	0.53	0.52	0.51	0.50	0.49
873.00	0.49	0.48	0.47	0.46	0.45
888.00	0.44	0.43	0.42	0.42	0.41
903.00	0.40	0.39	0.38	0.37	0.36
918.00	0.36	0.35	0.35	0.34	0.34
933.00	0.34	0.33	0.33	0.33	0.32
948.00	0.32	0.32	0.32	0.31	0.31
963.00	0.31	0.31	0.30	0.30	0.30
978.00	0.30	0.30	0.29	0.29	0.29



Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
993.00	0.29	0.28	0.28	0.28	0.28
1,008.00	0.27	0.27	0.27	0.27	0.26
1,023.00	0.26	0.26	0.26	0.26	0.25
1,038.00	0.25	0.25	0.25	0.24	0.24
1,053.00	0.24	0.24	0.23	0.23	0.23
1,068.00	0.23	0.22	0.22	0.22	0.22
1,083.00	0.22	0.21	0.21	0.21	0.21
1,098.00	0.20	0.20	0.20	0.20	0.20
1,113.00	0.20	0.20	0.20	0.20	0.20
1,128.00	0.19	0.19	0.19	0.19	0.19
1,143.00	0.19	0.19	0.19	0.19	0.19
1,158.00	0.19	0.19	0.19	0.19	0.19
1,173.00	0.19	0.19	0.18	0.18	0.18
1,188.00	0.18	0.18	0.18	0.18	0.18
1,203.00	0.18	0.18	0.18	0.18	0.18
1,218.00	0.18	0.18	0.18	0.18	0.17
1,233.00	0.17	0.17	0.17	0.17	0.17
1,248.00	0.17	0.17	0.17	0.17	0.17
1,263.00	0.17	0.17	0.17	0.17	0.17
1,278.00	0.17	0.16	0.16	0.16	0.16
1,293.00	0.16	0.16	0.16	0.16	0.16
1,308.00	0.16	0.16	0.16	0.16	0.16
1,323.00	0.16	0.16	0.16	0.15	0.15
1,338.00	0.15	0.15	0.15	0.15	0.15
1,353.00	0.15	0.15	0.15	0.15	0.15
1,368.00	0.15	0.15	0.15	0.15	0.14
1,383.00	0.14	0.14	0.14	0.14	0.14
1,398.00	0.14	0.14	0.14	0.14	0.14
1,413.00	0.14	0.14	0.14	0.14	0.14
1,428.00	0.14	0.13	0.13	0.13	0.13
1,443.00	0.13	0.13	0.12	0.11	0.09
1,458.00	0.07	0.06	0.04	0.03	0.02
1,473.00	0.02	0.01	0.01	0.01	0.01
1,488.00	0.00	0.00	0.00	0.00	0.00
1,503.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>
Computational Time Increment	3.37 min
Time to Peak (Computed)	738.18 min
Flow (Peak, Computed)	7.97 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	7.95 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	77.0
Area (User Defined)	125,452.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.99 in
Maximum Retention (Pervious, 20 percent)	0.60 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	3.67 in
Runoff Volume (Pervious)	38,317.597 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	38,333.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	25.28 min
Computational Time Increment	3.37 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.74 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A (Pre-Developed)  
Scenario: Future 10-Year

Return Event: 10 years  
Storm Event: 10-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	16.85 min
Unit receding limb, $T_r$	67.41 min
Total unit time, $T_b$	84.27 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
429.00	0.00	0.00	0.00	0.00	0.00
444.00	0.01	0.01	0.01	0.01	0.01
459.00	0.01	0.01	0.02	0.02	0.02
474.00	0.02	0.02	0.03	0.03	0.03
489.00	0.03	0.03	0.04	0.04	0.04
504.00	0.04	0.05	0.05	0.05	0.05
519.00	0.06	0.06	0.06	0.06	0.07
534.00	0.07	0.07	0.07	0.08	0.08
549.00	0.08	0.08	0.09	0.09	0.10
564.00	0.10	0.11	0.11	0.12	0.12
579.00	0.13	0.13	0.14	0.15	0.15
594.00	0.16	0.17	0.17	0.18	0.19
609.00	0.19	0.20	0.21	0.22	0.23
624.00	0.23	0.24	0.25	0.26	0.27
639.00	0.28	0.30	0.31	0.33	0.35
654.00	0.37	0.39	0.42	0.44	0.47
669.00	0.50	0.54	0.58	0.62	0.67
684.00	0.72	0.77	0.83	0.89	0.97
699.00	1.08	1.21	1.36	1.54	1.76
714.00	2.03	2.41	2.93	3.67	4.64
729.00	5.76	6.86	7.66	7.95	7.76
744.00	7.27	6.58	5.86	5.19	4.62
759.00	4.11	3.66	3.27	2.94	2.65
774.00	2.41	2.21	2.04	1.90	1.77
789.00	1.66	1.55	1.46	1.38	1.30
804.00	1.23	1.17	1.12	1.07	1.02
819.00	0.97	0.93	0.89	0.86	0.83
834.00	0.80	0.78	0.76	0.74	0.73
849.00	0.71	0.70	0.69	0.67	0.66
864.00	0.65	0.64	0.63	0.62	0.61
879.00	0.59	0.58	0.57	0.56	0.55
894.00	0.54	0.53	0.52	0.50	0.49
909.00	0.48	0.47	0.46	0.45	0.45
924.00	0.44	0.43	0.43	0.42	0.42

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
939.00	0.42	0.41	0.41	0.41	0.40
954.00	0.40	0.40	0.39	0.39	0.39
969.00	0.39	0.38	0.38	0.38	0.37
984.00	0.37	0.37	0.36	0.36	0.36
999.00	0.36	0.35	0.35	0.35	0.34
1,014.00	0.34	0.34	0.33	0.33	0.33
1,029.00	0.33	0.32	0.32	0.32	0.31
1,044.00	0.31	0.31	0.30	0.30	0.30
1,059.00	0.30	0.29	0.29	0.29	0.28
1,074.00	0.28	0.28	0.27	0.27	0.27
1,089.00	0.27	0.26	0.26	0.26	0.26
1,104.00	0.25	0.25	0.25	0.25	0.25
1,119.00	0.25	0.25	0.25	0.25	0.24
1,134.00	0.24	0.24	0.24	0.24	0.24
1,149.00	0.24	0.24	0.24	0.24	0.24
1,164.00	0.24	0.24	0.23	0.23	0.23
1,179.00	0.23	0.23	0.23	0.23	0.23
1,194.00	0.23	0.23	0.23	0.23	0.23
1,209.00	0.23	0.22	0.22	0.22	0.22
1,224.00	0.22	0.22	0.22	0.22	0.22
1,239.00	0.22	0.22	0.22	0.22	0.21
1,254.00	0.21	0.21	0.21	0.21	0.21
1,269.00	0.21	0.21	0.21	0.21	0.21
1,284.00	0.21	0.21	0.21	0.20	0.20
1,299.00	0.20	0.20	0.20	0.20	0.20
1,314.00	0.20	0.20	0.20	0.20	0.20
1,329.00	0.20	0.19	0.19	0.19	0.19
1,344.00	0.19	0.19	0.19	0.19	0.19
1,359.00	0.19	0.19	0.19	0.19	0.18
1,374.00	0.18	0.18	0.18	0.18	0.18
1,389.00	0.18	0.18	0.18	0.18	0.18
1,404.00	0.18	0.18	0.17	0.17	0.17
1,419.00	0.17	0.17	0.17	0.17	0.17
1,434.00	0.17	0.17	0.17	0.17	0.16
1,449.00	0.15	0.14	0.11	0.09	0.07
1,464.00	0.05	0.04	0.03	0.02	0.02
1,479.00	0.01	0.01	0.01	0.00	0.00
1,494.00	0.00	0.00	0.00	0.00	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A (Pre-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>
Computational Time Increment	3.37 min
Time to Peak (Computed)	738.18 min
Flow (Peak, Computed)	13.23 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	13.21 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	77.0
Area (User Defined)	125,452.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.99 in
Maximum Retention (Pervious, 20 percent)	0.60 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	6.15 in
Runoff Volume (Pervious)	64,309.008 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	64,335.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	25.28 min
Computational Time Increment	3.37 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.74 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A (Pre-Developed)  
Scenario: Current Adjusted 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	16.85 min
Unit receding limb, $T_r$	67.41 min
Total unit time, $T_b$	84.27 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
327.00	0.00	0.00	0.00	0.00	0.01
342.00	0.01	0.01	0.01	0.01	0.01
357.00	0.02	0.02	0.02	0.02	0.02
372.00	0.02	0.03	0.03	0.03	0.03
387.00	0.04	0.04	0.04	0.04	0.05
402.00	0.05	0.05	0.05	0.06	0.06
417.00	0.06	0.06	0.07	0.07	0.07
432.00	0.08	0.08	0.08	0.09	0.09
447.00	0.09	0.10	0.10	0.10	0.11
462.00	0.11	0.11	0.12	0.12	0.13
477.00	0.13	0.13	0.14	0.14	0.15
492.00	0.15	0.15	0.16	0.16	0.17
507.00	0.17	0.18	0.18	0.18	0.19
522.00	0.19	0.20	0.20	0.21	0.21
537.00	0.22	0.22	0.23	0.23	0.24
552.00	0.24	0.25	0.26	0.27	0.28
567.00	0.29	0.30	0.31	0.32	0.33
582.00	0.34	0.35	0.37	0.38	0.39
597.00	0.40	0.42	0.43	0.44	0.46
612.00	0.47	0.49	0.50	0.52	0.53
627.00	0.55	0.56	0.58	0.60	0.62
642.00	0.64	0.67	0.71	0.74	0.78
657.00	0.83	0.87	0.92	0.97	1.03
672.00	1.09	1.17	1.24	1.33	1.42
687.00	1.51	1.61	1.72	1.87	2.05
702.00	2.27	2.54	2.85	3.22	3.70
717.00	4.33	5.20	6.42	8.01	9.82
732.00	11.57	12.81	13.21	12.82	11.94
747.00	10.77	9.54	8.42	7.46	6.63
762.00	5.88	5.24	4.69	4.22	3.83
777.00	3.51	3.23	3.00	2.79	2.61
792.00	2.44	2.29	2.16	2.04	1.93
807.00	1.83	1.74	1.66	1.59	1.51
822.00	1.45	1.39	1.33	1.29	1.25



Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
837.00	1.21	1.18	1.15	1.13	1.11
852.00	1.09	1.07	1.05	1.03	1.01
867.00	0.99	0.97	0.96	0.94	0.92
882.00	0.90	0.89	0.87	0.85	0.83
897.00	0.82	0.80	0.78	0.76	0.75
912.00	0.73	0.72	0.70	0.69	0.68
927.00	0.67	0.66	0.66	0.65	0.64
942.00	0.64	0.63	0.63	0.62	0.62
957.00	0.61	0.61	0.60	0.60	0.59
972.00	0.59	0.58	0.58	0.58	0.57
987.00	0.57	0.56	0.56	0.55	0.55
1,002.00	0.54	0.54	0.53	0.53	0.52
1,017.00	0.52	0.52	0.51	0.51	0.50
1,032.00	0.50	0.49	0.49	0.48	0.48
1,047.00	0.47	0.47	0.46	0.46	0.45
1,062.00	0.45	0.45	0.44	0.44	0.43
1,077.00	0.43	0.42	0.42	0.41	0.41
1,092.00	0.40	0.40	0.40	0.39	0.39
1,107.00	0.39	0.39	0.38	0.38	0.38
1,122.00	0.38	0.38	0.38	0.37	0.37
1,137.00	0.37	0.37	0.37	0.37	0.37
1,152.00	0.37	0.37	0.36	0.36	0.36
1,167.00	0.36	0.36	0.36	0.36	0.36
1,182.00	0.35	0.35	0.35	0.35	0.35
1,197.00	0.35	0.35	0.35	0.35	0.34
1,212.00	0.34	0.34	0.34	0.34	0.34
1,227.00	0.34	0.34	0.34	0.33	0.33
1,242.00	0.33	0.33	0.33	0.33	0.33
1,257.00	0.33	0.32	0.32	0.32	0.32
1,272.00	0.32	0.32	0.32	0.32	0.32
1,287.00	0.31	0.31	0.31	0.31	0.31
1,302.00	0.31	0.31	0.31	0.30	0.30
1,317.00	0.30	0.30	0.30	0.30	0.30
1,332.00	0.30	0.30	0.29	0.29	0.29
1,347.00	0.29	0.29	0.29	0.29	0.29
1,362.00	0.28	0.28	0.28	0.28	0.28
1,377.00	0.28	0.28	0.28	0.28	0.27
1,392.00	0.27	0.27	0.27	0.27	0.27
1,407.00	0.27	0.27	0.26	0.26	0.26
1,422.00	0.26	0.26	0.26	0.26	0.26
1,437.00	0.26	0.26	0.26	0.25	0.23
1,452.00	0.21	0.17	0.14	0.11	0.08
1,467.00	0.06	0.04	0.03	0.02	0.02

Subsection: Unit Hydrograph (Hydrograph Table)  
Label: Area 1A (Pre-Developed)  
Scenario: Current Adjusted 100-Year

Return Event: 100 years  
Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,482.00	0.01	0.01	0.01	0.01	0.00
1,497.00	0.00	0.00	0.00	0.00	0.00

Subsection: Unit Hydrograph Summary  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>
Computational Time Increment	3.37 min
Time to Peak (Computed)	738.18 min
Flow (Peak, Computed)	19.44 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	19.41 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	77.0
Area (User Defined)	125,452.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.99 in
Maximum Retention (Pervious, 20 percent)	0.60 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	9.18 in
Runoff Volume (Pervious)	95,971.409 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	96,009.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	25.28 min
Computational Time Increment	3.37 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.74 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A (Pre-Developed)  
Scenario: Future 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	16.85 min
Unit receding limb, $T_r$	67.41 min
Total unit time, $T_b$	84.27 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	25.28 min
Area (User Defined)	125,452.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
252.00	0.00	0.00	0.00	0.00	0.01
267.00	0.01	0.01	0.01	0.02	0.02
282.00	0.02	0.02	0.03	0.03	0.03
297.00	0.04	0.04	0.04	0.04	0.05
312.00	0.05	0.05	0.06	0.06	0.06
327.00	0.06	0.07	0.07	0.07	0.08
342.00	0.08	0.08	0.09	0.09	0.09
357.00	0.09	0.10	0.10	0.10	0.11
372.00	0.11	0.11	0.12	0.12	0.13
387.00	0.13	0.13	0.14	0.14	0.15
402.00	0.15	0.16	0.16	0.17	0.17
417.00	0.18	0.18	0.19	0.19	0.20
432.00	0.20	0.21	0.21	0.22	0.22
447.00	0.23	0.24	0.24	0.25	0.25
462.00	0.26	0.26	0.27	0.28	0.28
477.00	0.29	0.30	0.30	0.31	0.32
492.00	0.32	0.33	0.34	0.34	0.35
507.00	0.36	0.36	0.37	0.38	0.38
522.00	0.39	0.40	0.40	0.41	0.42
537.00	0.43	0.43	0.44	0.45	0.46
552.00	0.47	0.48	0.49	0.51	0.52
567.00	0.54	0.56	0.57	0.59	0.61
582.00	0.63	0.65	0.67	0.69	0.71
597.00	0.73	0.75	0.77	0.79	0.81
612.00	0.84	0.86	0.88	0.90	0.93
627.00	0.95	0.97	1.00	1.03	1.06
642.00	1.10	1.15	1.20	1.26	1.32
657.00	1.39	1.46	1.53	1.62	1.70
672.00	1.80	1.91	2.03	2.16	2.30
687.00	2.44	2.59	2.76	2.98	3.26
702.00	3.60	4.00	4.46	5.02	5.73
717.00	6.66	7.94	9.73	12.04	14.66
732.00	17.16	18.91	19.41	18.78	17.43
747.00	15.67	13.85	12.20	10.78	9.56

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
762.00	8.47	7.53	6.73	6.05	5.48
777.00	5.01	4.61	4.27	3.97	3.71
792.00	3.47	3.26	3.07	2.89	2.74
807.00	2.60	2.47	2.36	2.25	2.14
822.00	2.05	1.96	1.89	1.82	1.76
837.00	1.71	1.67	1.63	1.60	1.56
852.00	1.53	1.51	1.48	1.45	1.43
867.00	1.40	1.37	1.35	1.32	1.30
882.00	1.27	1.25	1.22	1.20	1.18
897.00	1.15	1.13	1.10	1.08	1.05
912.00	1.03	1.01	0.99	0.97	0.96
927.00	0.94	0.93	0.92	0.91	0.91
942.00	0.90	0.89	0.88	0.88	0.87
957.00	0.86	0.86	0.85	0.84	0.84
972.00	0.83	0.82	0.82	0.81	0.80
987.00	0.80	0.79	0.78	0.78	0.77
1,002.00	0.76	0.76	0.75	0.74	0.74
1,017.00	0.73	0.72	0.72	0.71	0.70
1,032.00	0.70	0.69	0.68	0.68	0.67
1,047.00	0.66	0.66	0.65	0.64	0.64
1,062.00	0.63	0.62	0.62	0.61	0.61
1,077.00	0.60	0.59	0.59	0.58	0.57
1,092.00	0.57	0.56	0.55	0.55	0.55
1,107.00	0.54	0.54	0.54	0.54	0.53
1,122.00	0.53	0.53	0.53	0.53	0.52
1,137.00	0.52	0.52	0.52	0.52	0.52
1,152.00	0.51	0.51	0.51	0.51	0.51
1,167.00	0.51	0.50	0.50	0.50	0.50
1,182.00	0.50	0.50	0.49	0.49	0.49
1,197.00	0.49	0.49	0.49	0.48	0.48
1,212.00	0.48	0.48	0.48	0.48	0.47
1,227.00	0.47	0.47	0.47	0.47	0.47
1,242.00	0.46	0.46	0.46	0.46	0.46
1,257.00	0.46	0.45	0.45	0.45	0.45
1,272.00	0.45	0.45	0.44	0.44	0.44
1,287.00	0.44	0.44	0.44	0.44	0.43
1,302.00	0.43	0.43	0.43	0.43	0.43
1,317.00	0.42	0.42	0.42	0.42	0.42
1,332.00	0.42	0.41	0.41	0.41	0.41
1,347.00	0.41	0.41	0.40	0.40	0.40
1,362.00	0.40	0.40	0.40	0.39	0.39
1,377.00	0.39	0.39	0.39	0.39	0.38
1,392.00	0.38	0.38	0.38	0.38	0.38

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A (Pre-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,407.00	0.37	0.37	0.37	0.37	0.37
1,422.00	0.37	0.36	0.36	0.36	0.36
1,437.00	0.36	0.36	0.36	0.35	0.33
1,452.00	0.29	0.24	0.19	0.15	0.11
1,467.00	0.08	0.06	0.05	0.03	0.03
1,482.00	0.02	0.01	0.01	0.01	0.01
1,497.00	0.00	0.00	0.00	0.00	0.00

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Pre-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>
Computational Time Increment	3.15 min
Time to Peak (Computed)	736.63 min
Flow (Peak, Computed)	0.46 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	0.46 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.8
Area (User Defined)	16,552.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.38 in
Maximum Retention (Pervious, 20 percent)	0.48 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	1.57 in
Runoff Volume (Pervious)	2,159.987 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	2,159.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	23.61 min
Computational Time Increment	3.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.09 ft <sup>3</sup> /s



Subsection: Unit Hydrograph Summary  
Label: Area 1B (Pre-Developed)  
Scenario: 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	15.74 min
Unit receding limb, $T_r$	62.96 min
Total unit time, $T_b$	78.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
567.00	0.00	0.00	0.00	0.00	0.00
582.00	0.00	0.00	0.00	0.00	0.00
597.00	0.00	0.00	0.00	0.00	0.00
612.00	0.01	0.01	0.01	0.01	0.01
627.00	0.01	0.01	0.01	0.01	0.01
642.00	0.01	0.01	0.01	0.01	0.01
657.00	0.01	0.02	0.02	0.02	0.02
672.00	0.02	0.02	0.03	0.03	0.03
687.00	0.03	0.04	0.04	0.04	0.05
702.00	0.06	0.06	0.07	0.09	0.10
717.00	0.12	0.16	0.20	0.26	0.33
732.00	0.40	0.45	0.46	0.44	0.41
747.00	0.37	0.33	0.29	0.26	0.23
762.00	0.21	0.18	0.17	0.15	0.14
777.00	0.13	0.12	0.11	0.10	0.10
792.00	0.09	0.09	0.08	0.08	0.07
807.00	0.07	0.07	0.06	0.06	0.06
822.00	0.06	0.05	0.05	0.05	0.05
837.00	0.05	0.05	0.05	0.04	0.04
852.00	0.04	0.04	0.04	0.04	0.04
867.00	0.04	0.04	0.04	0.04	0.04
882.00	0.04	0.04	0.03	0.03	0.03
897.00	0.03	0.03	0.03	0.03	0.03
912.00	0.03	0.03	0.03	0.03	0.03
927.00	0.03	0.03	0.03	0.03	0.03
942.00	0.03	0.03	0.03	0.03	0.03
957.00	0.02	0.02	0.02	0.02	0.02
972.00	0.02	0.02	0.02	0.02	0.02
987.00	0.02	0.02	0.02	0.02	0.02
1,002.00	0.02	0.02	0.02	0.02	0.02
1,017.00	0.02	0.02	0.02	0.02	0.02
1,032.00	0.02	0.02	0.02	0.02	0.02
1,047.00	0.02	0.02	0.02	0.02	0.02
1,062.00	0.02	0.02	0.02	0.02	0.02

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,077.00	0.02	0.02	0.02	0.02	0.02
1,092.00	0.02	0.02	0.02	0.02	0.02
1,107.00	0.02	0.02	0.02	0.02	0.02
1,122.00	0.02	0.02	0.02	0.02	0.02
1,137.00	0.02	0.02	0.02	0.02	0.02
1,152.00	0.02	0.02	0.02	0.02	0.01
1,167.00	0.01	0.01	0.01	0.01	0.01
1,182.00	0.01	0.01	0.01	0.01	0.01
1,197.00	0.01	0.01	0.01	0.01	0.01
1,212.00	0.01	0.01	0.01	0.01	0.01
1,227.00	0.01	0.01	0.01	0.01	0.01
1,242.00	0.01	0.01	0.01	0.01	0.01
1,257.00	0.01	0.01	0.01	0.01	0.01
1,272.00	0.01	0.01	0.01	0.01	0.01
1,287.00	0.01	0.01	0.01	0.01	0.01
1,302.00	0.01	0.01	0.01	0.01	0.01
1,317.00	0.01	0.01	0.01	0.01	0.01
1,332.00	0.01	0.01	0.01	0.01	0.01
1,347.00	0.01	0.01	0.01	0.01	0.01
1,362.00	0.01	0.01	0.01	0.01	0.01
1,377.00	0.01	0.01	0.01	0.01	0.01
1,392.00	0.01	0.01	0.01	0.01	0.01
1,407.00	0.01	0.01	0.01	0.01	0.01
1,422.00	0.01	0.01	0.01	0.01	0.01
1,437.00	0.01	0.01	0.01	0.01	0.01
1,452.00	0.01	0.01	0.01	0.00	0.00
1,467.00	0.00	0.00	0.00	0.00	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>
Computational Time Increment	3.15 min
Time to Peak (Computed)	736.63 min
Flow (Peak, Computed)	0.62 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	0.61 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.8
Area (User Defined)	16,552.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.38 in
Maximum Retention (Pervious, 20 percent)	0.48 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	2.08 in
Runoff Volume (Pervious)	2,874.843 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	2,874.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	23.61 min
Computational Time Increment	3.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.09 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1B (Pre-Developed)  
Scenario: Future 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	15.74 min
Unit receding limb, $T_r$	62.96 min
Total unit time, $T_b$	78.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
516.00	0.00	0.00	0.00	0.00	0.00
531.00	0.00	0.00	0.00	0.00	0.00
546.00	0.00	0.00	0.00	0.00	0.00
561.00	0.00	0.00	0.00	0.00	0.01
576.00	0.01	0.01	0.01	0.01	0.01
591.00	0.01	0.01	0.01	0.01	0.01
606.00	0.01	0.01	0.01	0.01	0.01
621.00	0.01	0.01	0.01	0.01	0.02
636.00	0.02	0.02	0.02	0.02	0.02
651.00	0.02	0.02	0.02	0.03	0.03
666.00	0.03	0.03	0.03	0.04	0.04
681.00	0.04	0.05	0.05	0.06	0.06
696.00	0.07	0.07	0.08	0.10	0.11
711.00	0.13	0.15	0.18	0.22	0.28
726.00	0.36	0.46	0.54	0.60	0.61
741.00	0.59	0.54	0.49	0.43	0.38
756.00	0.34	0.30	0.27	0.24	0.21
771.00	0.19	0.18	0.16	0.15	0.14
786.00	0.13	0.12	0.12	0.11	0.10
801.00	0.10	0.09	0.09	0.09	0.08
816.00	0.08	0.07	0.07	0.07	0.07
831.00	0.06	0.06	0.06	0.06	0.06
846.00	0.06	0.06	0.05	0.05	0.05
861.00	0.05	0.05	0.05	0.05	0.05
876.00	0.05	0.05	0.05	0.04	0.04
891.00	0.04	0.04	0.04	0.04	0.04
906.00	0.04	0.04	0.04	0.04	0.04
921.00	0.04	0.03	0.03	0.03	0.03
936.00	0.03	0.03	0.03	0.03	0.03
951.00	0.03	0.03	0.03	0.03	0.03
966.00	0.03	0.03	0.03	0.03	0.03
981.00	0.03	0.03	0.03	0.03	0.03
996.00	0.03	0.03	0.03	0.03	0.03
1,011.00	0.03	0.03	0.03	0.03	0.03

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,026.00	0.03	0.03	0.03	0.03	0.03
1,041.00	0.02	0.02	0.02	0.02	0.02
1,056.00	0.02	0.02	0.02	0.02	0.02
1,071.00	0.02	0.02	0.02	0.02	0.02
1,086.00	0.02	0.02	0.02	0.02	0.02
1,101.00	0.02	0.02	0.02	0.02	0.02
1,116.00	0.02	0.02	0.02	0.02	0.02
1,131.00	0.02	0.02	0.02	0.02	0.02
1,146.00	0.02	0.02	0.02	0.02	0.02
1,161.00	0.02	0.02	0.02	0.02	0.02
1,176.00	0.02	0.02	0.02	0.02	0.02
1,191.00	0.02	0.02	0.02	0.02	0.02
1,206.00	0.02	0.02	0.02	0.02	0.02
1,221.00	0.02	0.02	0.02	0.02	0.02
1,236.00	0.02	0.02	0.02	0.02	0.02
1,251.00	0.02	0.02	0.02	0.02	0.02
1,266.00	0.02	0.02	0.02	0.02	0.02
1,281.00	0.02	0.02	0.02	0.02	0.02
1,296.00	0.02	0.02	0.02	0.02	0.02
1,311.00	0.02	0.02	0.02	0.02	0.02
1,326.00	0.02	0.02	0.02	0.02	0.02
1,341.00	0.02	0.02	0.02	0.02	0.02
1,356.00	0.02	0.01	0.01	0.01	0.01
1,371.00	0.01	0.01	0.01	0.01	0.01
1,386.00	0.01	0.01	0.01	0.01	0.01
1,401.00	0.01	0.01	0.01	0.01	0.01
1,416.00	0.01	0.01	0.01	0.01	0.01
1,431.00	0.01	0.01	0.01	0.01	0.01
1,446.00	0.01	0.01	0.01	0.01	0.01
1,461.00	0.00	0.00	0.00	0.00	0.00
1,476.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Pre-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>
Computational Time Increment	3.15 min
Time to Peak (Computed)	736.63 min
Flow (Peak, Computed)	0.92 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	0.91 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.8
Area (User Defined)	16,552.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.38 in
Maximum Retention (Pervious, 20 percent)	0.48 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	3.11 in
Runoff Volume (Pervious)	4,287.806 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	4,286.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	23.61 min
Computational Time Increment	3.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.09 ft <sup>3</sup> /s



Subsection: Unit Hydrograph Summary  
Label: Area 1B (Pre-Developed)  
Scenario: Current Adjusted 10-Year

Return Event: 10 years  
Storm Event: 10-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	15.74 min
Unit receding limb, $T_r$	62.96 min
Total unit time, $T_b$	78.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
438.00	0.00	0.00	0.00	0.00	0.00
453.00	0.00	0.00	0.00	0.00	0.00
468.00	0.00	0.00	0.00	0.00	0.00
483.00	0.00	0.00	0.00	0.00	0.00
498.00	0.01	0.01	0.01	0.01	0.01
513.00	0.01	0.01	0.01	0.01	0.01
528.00	0.01	0.01	0.01	0.01	0.01
543.00	0.01	0.01	0.01	0.01	0.01
558.00	0.01	0.01	0.01	0.01	0.01
573.00	0.01	0.01	0.02	0.02	0.02
588.00	0.02	0.02	0.02	0.02	0.02
603.00	0.02	0.02	0.02	0.02	0.03
618.00	0.03	0.03	0.03	0.03	0.03
633.00	0.03	0.03	0.03	0.03	0.04
648.00	0.04	0.04	0.04	0.05	0.05
663.00	0.05	0.06	0.06	0.06	0.07
678.00	0.07	0.08	0.08	0.09	0.10
693.00	0.10	0.11	0.13	0.14	0.16
708.00	0.18	0.21	0.24	0.29	0.35
723.00	0.44	0.56	0.69	0.82	0.90
738.00	0.91	0.87	0.80	0.71	0.63
753.00	0.55	0.49	0.44	0.39	0.34
768.00	0.31	0.28	0.25	0.23	0.22
783.00	0.20	0.19	0.18	0.17	0.16
798.00	0.15	0.14	0.13	0.13	0.12
813.00	0.12	0.11	0.11	0.10	0.10
828.00	0.09	0.09	0.09	0.08	0.08
843.00	0.08	0.08	0.08	0.08	0.08
858.00	0.07	0.07	0.07	0.07	0.07
873.00	0.07	0.07	0.07	0.06	0.06
888.00	0.06	0.06	0.06	0.06	0.06
903.00	0.06	0.05	0.05	0.05	0.05
918.00	0.05	0.05	0.05	0.05	0.05
933.00	0.05	0.05	0.05	0.05	0.05

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
948.00	0.04	0.04	0.04	0.04	0.04
963.00	0.04	0.04	0.04	0.04	0.04
978.00	0.04	0.04	0.04	0.04	0.04
993.00	0.04	0.04	0.04	0.04	0.04
1,008.00	0.04	0.04	0.04	0.04	0.04
1,023.00	0.04	0.04	0.04	0.04	0.04
1,038.00	0.03	0.03	0.03	0.03	0.03
1,053.00	0.03	0.03	0.03	0.03	0.03
1,068.00	0.03	0.03	0.03	0.03	0.03
1,083.00	0.03	0.03	0.03	0.03	0.03
1,098.00	0.03	0.03	0.03	0.03	0.03
1,113.00	0.03	0.03	0.03	0.03	0.03
1,128.00	0.03	0.03	0.03	0.03	0.03
1,143.00	0.03	0.03	0.03	0.03	0.03
1,158.00	0.03	0.03	0.03	0.03	0.03
1,173.00	0.03	0.03	0.03	0.03	0.03
1,188.00	0.03	0.03	0.03	0.03	0.03
1,203.00	0.03	0.02	0.02	0.02	0.02
1,218.00	0.02	0.02	0.02	0.02	0.02
1,233.00	0.02	0.02	0.02	0.02	0.02
1,248.00	0.02	0.02	0.02	0.02	0.02
1,263.00	0.02	0.02	0.02	0.02	0.02
1,278.00	0.02	0.02	0.02	0.02	0.02
1,293.00	0.02	0.02	0.02	0.02	0.02
1,308.00	0.02	0.02	0.02	0.02	0.02
1,323.00	0.02	0.02	0.02	0.02	0.02
1,338.00	0.02	0.02	0.02	0.02	0.02
1,353.00	0.02	0.02	0.02	0.02	0.02
1,368.00	0.02	0.02	0.02	0.02	0.02
1,383.00	0.02	0.02	0.02	0.02	0.02
1,398.00	0.02	0.02	0.02	0.02	0.02
1,413.00	0.02	0.02	0.02	0.02	0.02
1,428.00	0.02	0.02	0.02	0.02	0.02
1,443.00	0.02	0.02	0.02	0.01	0.01
1,458.00	0.01	0.01	0.00	0.00	0.00
1,473.00	0.00	0.00	0.00	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>
Computational Time Increment	3.15 min
Time to Peak (Computed)	736.63 min
Flow (Peak, Computed)	1.20 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	1.18 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.8
Area (User Defined)	16,552.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.38 in
Maximum Retention (Pervious, 20 percent)	0.48 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	4.06 in
Runoff Volume (Pervious)	5,596.038 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	5,594.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	23.61 min
Computational Time Increment	3.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.09 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1B (Pre-Developed)  
Scenario: Future 10-Year

Return Event: 10 years  
Storm Event: 10-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	15.74 min
Unit receding limb, $T_r$	62.96 min
Total unit time, $T_b$	78.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
384.00	0.00	0.00	0.00	0.00	0.00
399.00	0.00	0.00	0.00	0.00	0.00
414.00	0.00	0.00	0.00	0.00	0.00
429.00	0.00	0.00	0.00	0.00	0.01
444.00	0.01	0.01	0.01	0.01	0.01
459.00	0.01	0.01	0.01	0.01	0.01
474.00	0.01	0.01	0.01	0.01	0.01
489.00	0.01	0.01	0.01	0.01	0.01
504.00	0.01	0.01	0.01	0.01	0.01
519.00	0.01	0.01	0.01	0.01	0.02
534.00	0.02	0.02	0.02	0.02	0.02
549.00	0.02	0.02	0.02	0.02	0.02
564.00	0.02	0.02	0.02	0.02	0.02
579.00	0.03	0.03	0.03	0.03	0.03
594.00	0.03	0.03	0.03	0.03	0.04
609.00	0.04	0.04	0.04	0.04	0.04
624.00	0.04	0.04	0.05	0.05	0.05
639.00	0.05	0.05	0.05	0.06	0.06
654.00	0.06	0.07	0.07	0.08	0.08
669.00	0.09	0.09	0.10	0.10	0.11
684.00	0.12	0.13	0.14	0.15	0.16
699.00	0.18	0.20	0.22	0.25	0.28
714.00	0.33	0.39	0.47	0.59	0.74
729.00	0.91	1.07	1.17	1.18	1.13
744.00	1.03	0.92	0.80	0.71	0.63
759.00	0.56	0.49	0.44	0.39	0.35
774.00	0.32	0.30	0.27	0.25	0.24
789.00	0.22	0.21	0.20	0.19	0.18
804.00	0.17	0.16	0.15	0.14	0.14
819.00	0.13	0.13	0.12	0.12	0.11
834.00	0.11	0.11	0.10	0.10	0.10
849.00	0.10	0.10	0.09	0.09	0.09
864.00	0.09	0.09	0.09	0.08	0.08
879.00	0.08	0.08	0.08	0.08	0.08

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
894.00	0.07	0.07	0.07	0.07	0.07
909.00	0.07	0.06	0.06	0.06	0.06
924.00	0.06	0.06	0.06	0.06	0.06
939.00	0.06	0.06	0.06	0.06	0.06
954.00	0.06	0.05	0.05	0.05	0.05
969.00	0.05	0.05	0.05	0.05	0.05
984.00	0.05	0.05	0.05	0.05	0.05
999.00	0.05	0.05	0.05	0.05	0.05
1,014.00	0.05	0.05	0.05	0.05	0.05
1,029.00	0.04	0.04	0.04	0.04	0.04
1,044.00	0.04	0.04	0.04	0.04	0.04
1,059.00	0.04	0.04	0.04	0.04	0.04
1,074.00	0.04	0.04	0.04	0.04	0.04
1,089.00	0.04	0.04	0.04	0.04	0.04
1,104.00	0.03	0.03	0.03	0.03	0.03
1,119.00	0.03	0.03	0.03	0.03	0.03
1,134.00	0.03	0.03	0.03	0.03	0.03
1,149.00	0.03	0.03	0.03	0.03	0.03
1,164.00	0.03	0.03	0.03	0.03	0.03
1,179.00	0.03	0.03	0.03	0.03	0.03
1,194.00	0.03	0.03	0.03	0.03	0.03
1,209.00	0.03	0.03	0.03	0.03	0.03
1,224.00	0.03	0.03	0.03	0.03	0.03
1,239.00	0.03	0.03	0.03	0.03	0.03
1,254.00	0.03	0.03	0.03	0.03	0.03
1,269.00	0.03	0.03	0.03	0.03	0.03
1,284.00	0.03	0.03	0.03	0.03	0.03
1,299.00	0.03	0.03	0.03	0.03	0.03
1,314.00	0.03	0.03	0.03	0.03	0.03
1,329.00	0.03	0.03	0.03	0.03	0.03
1,344.00	0.03	0.03	0.03	0.03	0.03
1,359.00	0.03	0.03	0.03	0.03	0.03
1,374.00	0.03	0.03	0.02	0.02	0.02
1,389.00	0.02	0.02	0.02	0.02	0.02
1,404.00	0.02	0.02	0.02	0.02	0.02
1,419.00	0.02	0.02	0.02	0.02	0.02
1,434.00	0.02	0.02	0.02	0.02	0.02
1,449.00	0.02	0.02	0.01	0.01	0.01
1,464.00	0.01	0.00	0.00	0.00	0.00
1,479.00	0.00	0.00	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Pre-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>
Computational Time Increment	3.15 min
Time to Peak (Computed)	736.63 min
Flow (Peak, Computed)	1.92 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	1.90 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.8
Area (User Defined)	16,552.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.38 in
Maximum Retention (Pervious, 20 percent)	0.48 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	6.62 in
Runoff Volume (Pervious)	9,128.641 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	9,125.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	23.61 min
Computational Time Increment	3.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.09 ft <sup>3</sup> /s



Subsection: Unit Hydrograph Summary  
Label: Area 1B (Pre-Developed)  
Scenario: Current Adjusted 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	15.74 min
Unit receding limb, $T_r$	62.96 min
Total unit time, $T_b$	78.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
285.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	0.00	0.00	0.00
315.00	0.00	0.00	0.00	0.00	0.00
330.00	0.00	0.01	0.01	0.01	0.01
345.00	0.01	0.01	0.01	0.01	0.01
360.00	0.01	0.01	0.01	0.01	0.01
375.00	0.01	0.01	0.01	0.01	0.01
390.00	0.01	0.01	0.01	0.01	0.01
405.00	0.01	0.01	0.01	0.01	0.01
420.00	0.02	0.02	0.02	0.02	0.02
435.00	0.02	0.02	0.02	0.02	0.02
450.00	0.02	0.02	0.02	0.02	0.02
465.00	0.02	0.02	0.02	0.03	0.03
480.00	0.03	0.03	0.03	0.03	0.03
495.00	0.03	0.03	0.03	0.03	0.03
510.00	0.03	0.03	0.03	0.03	0.04
525.00	0.04	0.04	0.04	0.04	0.04
540.00	0.04	0.04	0.04	0.04	0.04
555.00	0.04	0.05	0.05	0.05	0.05
570.00	0.05	0.05	0.05	0.06	0.06
585.00	0.06	0.06	0.06	0.07	0.07
600.00	0.07	0.07	0.07	0.08	0.08
615.00	0.08	0.08	0.08	0.09	0.09
630.00	0.09	0.09	0.10	0.10	0.10
645.00	0.11	0.11	0.12	0.12	0.13
660.00	0.14	0.15	0.15	0.16	0.17
675.00	0.18	0.19	0.21	0.22	0.23
690.00	0.25	0.26	0.29	0.31	0.35
705.00	0.39	0.44	0.49	0.56	0.66
720.00	0.79	0.98	1.22	1.49	1.73
735.00	1.88	1.90	1.80	1.64	1.45
750.00	1.27	1.11	0.98	0.87	0.77
765.00	0.68	0.61	0.55	0.50	0.46
780.00	0.42	0.39	0.37	0.34	0.32

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
795.00	0.30	0.28	0.27	0.26	0.24
810.00	0.23	0.22	0.21	0.20	0.19
825.00	0.18	0.18	0.17	0.17	0.16
840.00	0.16	0.16	0.15	0.15	0.15
855.00	0.14	0.14	0.14	0.14	0.13
870.00	0.13	0.13	0.13	0.12	0.12
885.00	0.12	0.12	0.11	0.11	0.11
900.00	0.11	0.11	0.10	0.10	0.10
915.00	0.10	0.09	0.09	0.09	0.09
930.00	0.09	0.09	0.09	0.09	0.09
945.00	0.09	0.08	0.08	0.08	0.08
960.00	0.08	0.08	0.08	0.08	0.08
975.00	0.08	0.08	0.08	0.08	0.08
990.00	0.08	0.08	0.07	0.07	0.07
1,005.00	0.07	0.07	0.07	0.07	0.07
1,020.00	0.07	0.07	0.07	0.07	0.07
1,035.00	0.07	0.07	0.07	0.06	0.06
1,050.00	0.06	0.06	0.06	0.06	0.06
1,065.00	0.06	0.06	0.06	0.06	0.06
1,080.00	0.06	0.06	0.06	0.05	0.05
1,095.00	0.05	0.05	0.05	0.05	0.05
1,110.00	0.05	0.05	0.05	0.05	0.05
1,125.00	0.05	0.05	0.05	0.05	0.05
1,140.00	0.05	0.05	0.05	0.05	0.05
1,155.00	0.05	0.05	0.05	0.05	0.05
1,170.00	0.05	0.05	0.05	0.05	0.05
1,185.00	0.05	0.05	0.05	0.05	0.05
1,200.00	0.05	0.05	0.05	0.05	0.05
1,215.00	0.05	0.05	0.05	0.05	0.05
1,230.00	0.05	0.05	0.05	0.04	0.04
1,245.00	0.04	0.04	0.04	0.04	0.04
1,260.00	0.04	0.04	0.04	0.04	0.04
1,275.00	0.04	0.04	0.04	0.04	0.04
1,290.00	0.04	0.04	0.04	0.04	0.04
1,305.00	0.04	0.04	0.04	0.04	0.04
1,320.00	0.04	0.04	0.04	0.04	0.04
1,335.00	0.04	0.04	0.04	0.04	0.04
1,350.00	0.04	0.04	0.04	0.04	0.04
1,365.00	0.04	0.04	0.04	0.04	0.04
1,380.00	0.04	0.04	0.04	0.04	0.04
1,395.00	0.04	0.04	0.04	0.04	0.04
1,410.00	0.04	0.04	0.04	0.04	0.04
1,425.00	0.04	0.03	0.03	0.03	0.03

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,440.00	0.03	0.03	0.03	0.03	0.03
1,455.00	0.02	0.02	0.01	0.01	0.01
1,470.00	0.00	0.00	0.00	0.00	0.00
1,485.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>
Computational Time Increment	3.15 min
Time to Peak (Computed)	736.63 min
Flow (Peak, Computed)	2.76 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	2.72 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.8
Area (User Defined)	16,552.80 ft <sup>2</sup>
Maximum Retention (Pervious)	2.38 in
Maximum Retention (Pervious, 20 percent)	0.48 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	9.70 in
Runoff Volume (Pervious)	13,381.767 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	13,376.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	23.61 min
Computational Time Increment	3.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.09 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1B (Pre-Developed)  
Scenario: Future 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	15.74 min
Unit receding limb, $T_r$	62.96 min
Total unit time, $T_b$	78.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	23.61 min
Area (User Defined)	16,552.80 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
219.00	0.00	0.00	0.00	0.00	0.00
234.00	0.00	0.00	0.00	0.00	0.00
249.00	0.00	0.01	0.01	0.01	0.01
264.00	0.01	0.01	0.01	0.01	0.01
279.00	0.01	0.01	0.01	0.01	0.01
294.00	0.01	0.01	0.01	0.01	0.01
309.00	0.01	0.01	0.01	0.01	0.02
324.00	0.02	0.02	0.02	0.02	0.02
339.00	0.02	0.02	0.02	0.02	0.02
354.00	0.02	0.02	0.02	0.02	0.02
369.00	0.02	0.02	0.02	0.02	0.02
384.00	0.02	0.03	0.03	0.03	0.03
399.00	0.03	0.03	0.03	0.03	0.03
414.00	0.03	0.03	0.03	0.03	0.04
429.00	0.04	0.04	0.04	0.04	0.04
444.00	0.04	0.04	0.04	0.04	0.04
459.00	0.04	0.05	0.05	0.05	0.05
474.00	0.05	0.05	0.05	0.05	0.05
489.00	0.05	0.05	0.06	0.06	0.06
504.00	0.06	0.06	0.06	0.06	0.06
519.00	0.06	0.06	0.06	0.07	0.07
534.00	0.07	0.07	0.07	0.07	0.07
549.00	0.07	0.08	0.08	0.08	0.08
564.00	0.08	0.09	0.09	0.09	0.09
579.00	0.10	0.10	0.10	0.10	0.11
594.00	0.11	0.11	0.12	0.12	0.12
609.00	0.13	0.13	0.13	0.14	0.14
624.00	0.14	0.15	0.15	0.15	0.16
639.00	0.16	0.17	0.17	0.18	0.19
654.00	0.20	0.21	0.22	0.23	0.24
669.00	0.26	0.27	0.29	0.30	0.32
684.00	0.34	0.36	0.38	0.41	0.44
699.00	0.48	0.53	0.59	0.66	0.74
714.00	0.85	0.98	1.17	1.44	1.79

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
729.00	2.17	2.51	2.71	2.72	2.59
744.00	2.35	2.07	1.81	1.58	1.39
759.00	1.23	1.09	0.96	0.86	0.77
774.00	0.70	0.64	0.59	0.55	0.51
789.00	0.48	0.45	0.42	0.40	0.38
804.00	0.36	0.34	0.32	0.31	0.30
819.00	0.28	0.27	0.26	0.25	0.24
834.00	0.23	0.23	0.22	0.22	0.21
849.00	0.21	0.20	0.20	0.20	0.19
864.00	0.19	0.19	0.18	0.18	0.18
879.00	0.17	0.17	0.17	0.16	0.16
894.00	0.16	0.15	0.15	0.15	0.14
909.00	0.14	0.14	0.13	0.13	0.13
924.00	0.13	0.13	0.12	0.12	0.12
939.00	0.12	0.12	0.12	0.12	0.12
954.00	0.12	0.12	0.11	0.11	0.11
969.00	0.11	0.11	0.11	0.11	0.11
984.00	0.11	0.11	0.11	0.10	0.10
999.00	0.10	0.10	0.10	0.10	0.10
1,014.00	0.10	0.10	0.10	0.10	0.09
1,029.00	0.09	0.09	0.09	0.09	0.09
1,044.00	0.09	0.09	0.09	0.09	0.09
1,059.00	0.09	0.08	0.08	0.08	0.08
1,074.00	0.08	0.08	0.08	0.08	0.08
1,089.00	0.08	0.08	0.07	0.07	0.07
1,104.00	0.07	0.07	0.07	0.07	0.07
1,119.00	0.07	0.07	0.07	0.07	0.07
1,134.00	0.07	0.07	0.07	0.07	0.07
1,149.00	0.07	0.07	0.07	0.07	0.07
1,164.00	0.07	0.07	0.07	0.07	0.07
1,179.00	0.07	0.07	0.07	0.07	0.07
1,194.00	0.07	0.07	0.07	0.07	0.06
1,209.00	0.06	0.06	0.06	0.06	0.06
1,224.00	0.06	0.06	0.06	0.06	0.06
1,239.00	0.06	0.06	0.06	0.06	0.06
1,254.00	0.06	0.06	0.06	0.06	0.06
1,269.00	0.06	0.06	0.06	0.06	0.06
1,284.00	0.06	0.06	0.06	0.06	0.06
1,299.00	0.06	0.06	0.06	0.06	0.06
1,314.00	0.06	0.06	0.06	0.06	0.06
1,329.00	0.06	0.06	0.06	0.06	0.05
1,344.00	0.05	0.05	0.05	0.05	0.05
1,359.00	0.05	0.05	0.05	0.05	0.05



Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Pre-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,374.00	0.05	0.05	0.05	0.05	0.05
1,389.00	0.05	0.05	0.05	0.05	0.05
1,404.00	0.05	0.05	0.05	0.05	0.05
1,419.00	0.05	0.05	0.05	0.05	0.05
1,434.00	0.05	0.05	0.05	0.05	0.05
1,449.00	0.04	0.04	0.03	0.02	0.02
1,464.00	0.01	0.01	0.01	0.00	0.00
1,479.00	0.00	0.00	0.00	0.00	(N/A)

# Appendix D

## Post-Developed Hydrographs

Subsection: Unit Hydrograph Summary  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	2.67 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	2.67 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	98.0
Area (User Defined)	50,965.20 ft <sup>2</sup>
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	3.11 in
Runoff Volume (Pervious)	13,195.700 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	13,202.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.75 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Imervious (Post-Developed)  
Scenario: 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
84.00	0.00	0.00	0.00	0.00	0.00
99.00	0.00	0.00	0.01	0.01	0.01
114.00	0.01	0.01	0.01	0.01	0.01
129.00	0.01	0.01	0.01	0.01	0.01
144.00	0.01	0.02	0.02	0.02	0.02
159.00	0.02	0.02	0.02	0.02	0.02
174.00	0.02	0.02	0.02	0.02	0.02
189.00	0.02	0.02	0.02	0.02	0.03
204.00	0.03	0.03	0.03	0.03	0.03
219.00	0.03	0.03	0.03	0.03	0.03
234.00	0.03	0.03	0.03	0.03	0.03
249.00	0.03	0.03	0.03	0.03	0.03
264.00	0.04	0.04	0.04	0.04	0.04
279.00	0.04	0.04	0.04	0.04	0.04
294.00	0.04	0.04	0.04	0.04	0.04
309.00	0.04	0.04	0.04	0.04	0.04
324.00	0.04	0.04	0.04	0.04	0.04
339.00	0.04	0.05	0.05	0.05	0.05
354.00	0.05	0.05	0.05	0.05	0.05
369.00	0.05	0.05	0.05	0.05	0.05
384.00	0.05	0.05	0.05	0.05	0.05
399.00	0.06	0.06	0.06	0.06	0.06
414.00	0.06	0.06	0.06	0.06	0.06
429.00	0.06	0.06	0.07	0.07	0.07
444.00	0.07	0.07	0.07	0.07	0.07
459.00	0.07	0.07	0.07	0.07	0.08
474.00	0.08	0.08	0.08	0.08	0.08
489.00	0.08	0.08	0.08	0.08	0.08
504.00	0.09	0.09	0.09	0.09	0.09
519.00	0.09	0.09	0.09	0.09	0.09
534.00	0.09	0.09	0.10	0.10	0.10
549.00	0.10	0.10	0.10	0.10	0.11
564.00	0.11	0.11	0.12	0.12	0.12
579.00	0.12	0.13	0.13	0.13	0.14

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
594.00	0.14	0.14	0.14	0.15	0.15
609.00	0.15	0.16	0.16	0.16	0.16
624.00	0.17	0.17	0.17	0.18	0.18
639.00	0.19	0.19	0.20	0.21	0.22
654.00	0.23	0.24	0.25	0.26	0.27
669.00	0.28	0.30	0.32	0.33	0.35
684.00	0.37	0.39	0.41	0.43	0.47
699.00	0.51	0.57	0.63	0.70	0.78
714.00	0.89	1.03	1.23	1.50	1.86
729.00	2.24	2.55	2.67	2.57	2.34
744.00	2.04	1.75	1.50	1.31	1.15
759.00	1.01	0.88	0.78	0.70	0.63
774.00	0.57	0.53	0.49	0.46	0.43
789.00	0.40	0.37	0.35	0.33	0.32
804.00	0.30	0.29	0.28	0.26	0.25
819.00	0.24	0.23	0.22	0.21	0.21
834.00	0.20	0.20	0.19	0.19	0.18
849.00	0.18	0.18	0.17	0.17	0.17
864.00	0.16	0.16	0.16	0.16	0.15
879.00	0.15	0.15	0.14	0.14	0.14
894.00	0.14	0.13	0.13	0.13	0.12
909.00	0.12	0.12	0.12	0.11	0.11
924.00	0.11	0.11	0.11	0.11	0.11
939.00	0.11	0.10	0.10	0.10	0.10
954.00	0.10	0.10	0.10	0.10	0.10
969.00	0.10	0.10	0.10	0.09	0.09
984.00	0.09	0.09	0.09	0.09	0.09
999.00	0.09	0.09	0.09	0.09	0.09
1,014.00	0.09	0.08	0.08	0.08	0.08
1,029.00	0.08	0.08	0.08	0.08	0.08
1,044.00	0.08	0.08	0.08	0.08	0.07
1,059.00	0.07	0.07	0.07	0.07	0.07
1,074.00	0.07	0.07	0.07	0.07	0.07
1,089.00	0.07	0.07	0.06	0.06	0.06
1,104.00	0.06	0.06	0.06	0.06	0.06
1,119.00	0.06	0.06	0.06	0.06	0.06
1,134.00	0.06	0.06	0.06	0.06	0.06
1,149.00	0.06	0.06	0.06	0.06	0.06
1,164.00	0.06	0.06	0.06	0.06	0.06
1,179.00	0.06	0.06	0.06	0.06	0.06
1,194.00	0.06	0.06	0.06	0.06	0.06
1,209.00	0.06	0.06	0.06	0.06	0.06
1,224.00	0.06	0.05	0.05	0.05	0.05

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,239.00	0.05	0.05	0.05	0.05	0.05
1,254.00	0.05	0.05	0.05	0.05	0.05
1,269.00	0.05	0.05	0.05	0.05	0.05
1,284.00	0.05	0.05	0.05	0.05	0.05
1,299.00	0.05	0.05	0.05	0.05	0.05
1,314.00	0.05	0.05	0.05	0.05	0.05
1,329.00	0.05	0.05	0.05	0.05	0.05
1,344.00	0.05	0.05	0.05	0.05	0.05
1,359.00	0.05	0.05	0.05	0.05	0.05
1,374.00	0.05	0.05	0.04	0.04	0.04
1,389.00	0.04	0.04	0.04	0.04	0.04
1,404.00	0.04	0.04	0.04	0.04	0.04
1,419.00	0.04	0.04	0.04	0.04	0.04
1,434.00	0.04	0.04	0.04	0.04	0.04
1,449.00	0.04	0.03	0.02	0.02	0.01
1,464.00	0.01	0.01	0.00	0.00	0.00
1,479.00	0.00	0.00	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	3.19 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	3.18 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	98.0
Area (User Defined)	50,965.20 ft <sup>2</sup>
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	3.74 in
Runoff Volume (Pervious)	15,883.166 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	15,891.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.75 ft <sup>3</sup> /s



Subsection: Unit Hydrograph Summary  
Label: Area 1A Imervious (Post-Developed)  
Scenario: Future 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
69.00	0.00	0.00	0.00	0.00	0.00
84.00	0.00	0.01	0.01	0.01	0.01
99.00	0.01	0.01	0.01	0.01	0.01
114.00	0.01	0.01	0.02	0.02	0.02
129.00	0.02	0.02	0.02	0.02	0.02
144.00	0.02	0.02	0.02	0.02	0.02
159.00	0.03	0.03	0.03	0.03	0.03
174.00	0.03	0.03	0.03	0.03	0.03
189.00	0.03	0.03	0.03	0.03	0.03
204.00	0.04	0.04	0.04	0.04	0.04
219.00	0.04	0.04	0.04	0.04	0.04
234.00	0.04	0.04	0.04	0.04	0.04
249.00	0.04	0.04	0.04	0.04	0.05
264.00	0.05	0.05	0.05	0.05	0.05
279.00	0.05	0.05	0.05	0.05	0.05
294.00	0.05	0.05	0.05	0.05	0.05
309.00	0.05	0.05	0.05	0.05	0.05
324.00	0.05	0.06	0.06	0.06	0.06
339.00	0.06	0.06	0.06	0.06	0.06
354.00	0.06	0.06	0.06	0.06	0.06
369.00	0.06	0.06	0.06	0.06	0.06
384.00	0.07	0.07	0.07	0.07	0.07
399.00	0.07	0.07	0.07	0.07	0.07
414.00	0.07	0.08	0.08	0.08	0.08
429.00	0.08	0.08	0.08	0.08	0.08
444.00	0.08	0.09	0.09	0.09	0.09
459.00	0.09	0.09	0.09	0.09	0.09
474.00	0.09	0.10	0.10	0.10	0.10
489.00	0.10	0.10	0.10	0.10	0.10
504.00	0.10	0.11	0.11	0.11	0.11
519.00	0.11	0.11	0.11	0.11	0.11
534.00	0.11	0.12	0.12	0.12	0.12
549.00	0.12	0.12	0.13	0.13	0.13
564.00	0.13	0.14	0.14	0.14	0.15

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
579.00	0.15	0.15	0.16	0.16	0.16
594.00	0.17	0.17	0.17	0.18	0.18
609.00	0.19	0.19	0.19	0.20	0.20
624.00	0.20	0.21	0.21	0.21	0.22
639.00	0.22	0.23	0.24	0.25	0.26
654.00	0.27	0.29	0.30	0.31	0.33
669.00	0.34	0.36	0.38	0.40	0.42
684.00	0.45	0.47	0.49	0.52	0.56
699.00	0.61	0.68	0.76	0.84	0.94
714.00	1.06	1.23	1.47	1.79	2.22
729.00	2.68	3.05	3.18	3.07	2.79
744.00	2.43	2.08	1.80	1.56	1.37
759.00	1.20	1.05	0.93	0.83	0.75
774.00	0.68	0.63	0.58	0.54	0.51
789.00	0.48	0.45	0.42	0.40	0.38
804.00	0.36	0.34	0.33	0.31	0.30
819.00	0.29	0.27	0.26	0.25	0.25
834.00	0.24	0.23	0.23	0.22	0.22
849.00	0.21	0.21	0.21	0.20	0.20
864.00	0.20	0.19	0.19	0.19	0.18
879.00	0.18	0.18	0.17	0.17	0.16
894.00	0.16	0.16	0.15	0.15	0.15
909.00	0.14	0.14	0.14	0.14	0.13
924.00	0.13	0.13	0.13	0.13	0.13
939.00	0.13	0.12	0.12	0.12	0.12
954.00	0.12	0.12	0.12	0.12	0.12
969.00	0.12	0.11	0.11	0.11	0.11
984.00	0.11	0.11	0.11	0.11	0.11
999.00	0.11	0.11	0.10	0.10	0.10
1,014.00	0.10	0.10	0.10	0.10	0.10
1,029.00	0.10	0.10	0.10	0.09	0.09
1,044.00	0.09	0.09	0.09	0.09	0.09
1,059.00	0.09	0.09	0.09	0.09	0.08
1,074.00	0.08	0.08	0.08	0.08	0.08
1,089.00	0.08	0.08	0.08	0.08	0.08
1,104.00	0.08	0.08	0.07	0.07	0.07
1,119.00	0.07	0.07	0.07	0.07	0.07
1,134.00	0.07	0.07	0.07	0.07	0.07
1,149.00	0.07	0.07	0.07	0.07	0.07
1,164.00	0.07	0.07	0.07	0.07	0.07
1,179.00	0.07	0.07	0.07	0.07	0.07
1,194.00	0.07	0.07	0.07	0.07	0.07
1,209.00	0.07	0.07	0.07	0.07	0.07

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,224.00	0.07	0.07	0.07	0.06	0.06
1,239.00	0.06	0.06	0.06	0.06	0.06
1,254.00	0.06	0.06	0.06	0.06	0.06
1,269.00	0.06	0.06	0.06	0.06	0.06
1,284.00	0.06	0.06	0.06	0.06	0.06
1,299.00	0.06	0.06	0.06	0.06	0.06
1,314.00	0.06	0.06	0.06	0.06	0.06
1,329.00	0.06	0.06	0.06	0.06	0.06
1,344.00	0.06	0.06	0.06	0.06	0.06
1,359.00	0.06	0.06	0.05	0.05	0.05
1,374.00	0.05	0.05	0.05	0.05	0.05
1,389.00	0.05	0.05	0.05	0.05	0.05
1,404.00	0.05	0.05	0.05	0.05	0.05
1,419.00	0.05	0.05	0.05	0.05	0.05
1,434.00	0.05	0.05	0.05	0.05	0.05
1,449.00	0.04	0.04	0.03	0.02	0.01
1,464.00	0.01	0.01	0.00	0.00	0.00
1,479.00	0.00	0.00	0.00	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	4.16 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	4.15 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	98.0
Area (User Defined)	50,965.20 ft <sup>2</sup>
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	4.92 in
Runoff Volume (Pervious)	20,909.432 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	20,920.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.75 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Imervious (Post-Developed)  
Scenario: Current Adjusted 10-Year

Return Event: 10 years  
Storm Event: 10-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
54.00	0.00	0.00	0.00	0.00	0.00
69.00	0.01	0.01	0.01	0.01	0.01
84.00	0.01	0.01	0.02	0.02	0.02
99.00	0.02	0.02	0.02	0.02	0.02
114.00	0.03	0.03	0.03	0.03	0.03
129.00	0.03	0.03	0.03	0.04	0.04
144.00	0.04	0.04	0.04	0.04	0.04
159.00	0.04	0.04	0.04	0.04	0.05
174.00	0.05	0.05	0.05	0.05	0.05
189.00	0.05	0.05	0.05	0.05	0.05
204.00	0.05	0.05	0.06	0.06	0.06
219.00	0.06	0.06	0.06	0.06	0.06
234.00	0.06	0.06	0.06	0.06	0.06
249.00	0.06	0.06	0.07	0.07	0.07
264.00	0.07	0.07	0.07	0.07	0.07
279.00	0.07	0.07	0.07	0.07	0.07
294.00	0.07	0.07	0.07	0.07	0.07
309.00	0.07	0.08	0.08	0.08	0.08
324.00	0.08	0.08	0.08	0.08	0.08
339.00	0.08	0.08	0.08	0.08	0.08
354.00	0.08	0.08	0.08	0.08	0.08
369.00	0.08	0.09	0.09	0.09	0.09
384.00	0.09	0.09	0.09	0.09	0.09
399.00	0.10	0.10	0.10	0.10	0.10
414.00	0.10	0.10	0.10	0.11	0.11
429.00	0.11	0.11	0.11	0.11	0.11
444.00	0.11	0.12	0.12	0.12	0.12
459.00	0.12	0.12	0.12	0.13	0.13
474.00	0.13	0.13	0.13	0.13	0.13
489.00	0.13	0.14	0.14	0.14	0.14
504.00	0.14	0.14	0.14	0.14	0.15
519.00	0.15	0.15	0.15	0.15	0.15
534.00	0.15	0.15	0.16	0.16	0.16
549.00	0.16	0.16	0.17	0.17	0.17

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
564.00	0.18	0.18	0.19	0.19	0.20
579.00	0.20	0.20	0.21	0.21	0.22
594.00	0.22	0.23	0.23	0.24	0.24
609.00	0.25	0.25	0.25	0.26	0.26
624.00	0.27	0.27	0.28	0.28	0.29
639.00	0.30	0.31	0.32	0.33	0.35
654.00	0.36	0.38	0.39	0.41	0.43
669.00	0.45	0.47	0.50	0.53	0.56
684.00	0.59	0.62	0.65	0.68	0.73
699.00	0.81	0.89	0.99	1.10	1.23
714.00	1.39	1.61	1.92	2.34	2.90
729.00	3.50	3.98	4.15	4.00	3.64
744.00	3.17	2.71	2.34	2.03	1.78
759.00	1.56	1.37	1.21	1.08	0.97
774.00	0.89	0.82	0.76	0.71	0.66
789.00	0.62	0.58	0.55	0.52	0.49
804.00	0.47	0.45	0.43	0.41	0.39
819.00	0.37	0.36	0.34	0.33	0.32
834.00	0.31	0.30	0.30	0.29	0.28
849.00	0.28	0.27	0.27	0.26	0.26
864.00	0.26	0.25	0.25	0.24	0.24
879.00	0.23	0.23	0.22	0.22	0.21
894.00	0.21	0.21	0.20	0.20	0.19
909.00	0.19	0.18	0.18	0.18	0.17
924.00	0.17	0.17	0.17	0.17	0.16
939.00	0.16	0.16	0.16	0.16	0.16
954.00	0.16	0.16	0.15	0.15	0.15
969.00	0.15	0.15	0.15	0.15	0.15
984.00	0.14	0.14	0.14	0.14	0.14
999.00	0.14	0.14	0.14	0.13	0.13
1,014.00	0.13	0.13	0.13	0.13	0.13
1,029.00	0.13	0.13	0.12	0.12	0.12
1,044.00	0.12	0.12	0.12	0.12	0.12
1,059.00	0.11	0.11	0.11	0.11	0.11
1,074.00	0.11	0.11	0.11	0.10	0.10
1,089.00	0.10	0.10	0.10	0.10	0.10
1,104.00	0.10	0.10	0.10	0.10	0.10
1,119.00	0.10	0.10	0.10	0.10	0.09
1,134.00	0.09	0.09	0.09	0.09	0.09
1,149.00	0.09	0.09	0.09	0.09	0.09
1,164.00	0.09	0.09	0.09	0.09	0.09
1,179.00	0.09	0.09	0.09	0.09	0.09
1,194.00	0.09	0.09	0.09	0.09	0.09



Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,209.00	0.09	0.09	0.09	0.09	0.09
1,224.00	0.09	0.08	0.08	0.08	0.08
1,239.00	0.08	0.08	0.08	0.08	0.08
1,254.00	0.08	0.08	0.08	0.08	0.08
1,269.00	0.08	0.08	0.08	0.08	0.08
1,284.00	0.08	0.08	0.08	0.08	0.08
1,299.00	0.08	0.08	0.08	0.08	0.08
1,314.00	0.08	0.08	0.08	0.08	0.08
1,329.00	0.07	0.07	0.07	0.07	0.07
1,344.00	0.07	0.07	0.07	0.07	0.07
1,359.00	0.07	0.07	0.07	0.07	0.07
1,374.00	0.07	0.07	0.07	0.07	0.07
1,389.00	0.07	0.07	0.07	0.07	0.07
1,404.00	0.07	0.07	0.07	0.07	0.07
1,419.00	0.07	0.07	0.07	0.06	0.06
1,434.00	0.06	0.06	0.06	0.06	0.06
1,449.00	0.06	0.05	0.04	0.03	0.02
1,464.00	0.01	0.01	0.01	0.00	0.00
1,479.00	0.00	0.00	0.00	0.00	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	5.02 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	5.00 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	98.0
Area (User Defined)	50,965.20 ft <sup>2</sup>
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	5.97 in
Runoff Volume (Pervious)	25,372.322 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	25,385.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.75 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Imervious (Post-Developed)  
Scenario: Future 10-Year

Return Event: 10 years  
Storm Event: 10-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
45.00	0.00	0.00	0.00	0.00	0.01
60.00	0.01	0.01	0.01	0.01	0.01
75.00	0.02	0.02	0.02	0.02	0.02
90.00	0.03	0.03	0.03	0.03	0.03
105.00	0.03	0.04	0.04	0.04	0.04
120.00	0.04	0.04	0.04	0.05	0.05
135.00	0.05	0.05	0.05	0.05	0.05
150.00	0.05	0.05	0.06	0.06	0.06
165.00	0.06	0.06	0.06	0.06	0.06
180.00	0.06	0.06	0.07	0.07	0.07
195.00	0.07	0.07	0.07	0.07	0.07
210.00	0.07	0.07	0.07	0.08	0.08
225.00	0.08	0.08	0.08	0.08	0.08
240.00	0.08	0.08	0.08	0.08	0.08
255.00	0.08	0.08	0.08	0.09	0.09
270.00	0.09	0.09	0.09	0.09	0.09
285.00	0.09	0.09	0.09	0.09	0.09
300.00	0.09	0.09	0.09	0.09	0.10
315.00	0.10	0.10	0.10	0.10	0.10
330.00	0.10	0.10	0.10	0.10	0.10
345.00	0.10	0.10	0.10	0.10	0.10
360.00	0.10	0.10	0.11	0.11	0.11
375.00	0.11	0.11	0.11	0.11	0.11
390.00	0.11	0.12	0.12	0.12	0.12
405.00	0.12	0.12	0.13	0.13	0.13
420.00	0.13	0.13	0.13	0.13	0.14
435.00	0.14	0.14	0.14	0.14	0.14
450.00	0.14	0.15	0.15	0.15	0.15
465.00	0.15	0.15	0.16	0.16	0.16
480.00	0.16	0.16	0.16	0.16	0.17
495.00	0.17	0.17	0.17	0.17	0.17
510.00	0.18	0.18	0.18	0.18	0.18
525.00	0.18	0.18	0.19	0.19	0.19
540.00	0.19	0.19	0.19	0.20	0.20

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
555.00	0.20	0.21	0.21	0.22	0.22
570.00	0.23	0.23	0.24	0.24	0.25
585.00	0.25	0.26	0.27	0.27	0.28
600.00	0.28	0.29	0.29	0.30	0.30
615.00	0.31	0.32	0.32	0.33	0.33
630.00	0.34	0.34	0.35	0.36	0.37
645.00	0.39	0.40	0.42	0.44	0.46
660.00	0.48	0.50	0.52	0.55	0.58
675.00	0.61	0.64	0.67	0.71	0.75
690.00	0.78	0.83	0.89	0.97	1.08
705.00	1.20	1.33	1.48	1.68	1.95
720.00	2.31	2.83	3.50	4.22	4.80
735.00	5.00	4.83	4.39	3.82	3.27
750.00	2.82	2.45	2.15	1.88	1.65
765.00	1.46	1.30	1.17	1.07	0.99
780.00	0.91	0.85	0.80	0.75	0.70
795.00	0.66	0.62	0.59	0.57	0.54
810.00	0.52	0.49	0.47	0.45	0.43
825.00	0.41	0.40	0.38	0.37	0.36
840.00	0.36	0.35	0.34	0.34	0.33
855.00	0.32	0.32	0.31	0.31	0.30
870.00	0.30	0.29	0.29	0.28	0.27
885.00	0.27	0.26	0.26	0.25	0.25
900.00	0.24	0.24	0.23	0.23	0.22
915.00	0.22	0.21	0.21	0.21	0.20
930.00	0.20	0.20	0.20	0.20	0.19
945.00	0.19	0.19	0.19	0.19	0.19
960.00	0.19	0.18	0.18	0.18	0.18
975.00	0.18	0.18	0.18	0.17	0.17
990.00	0.17	0.17	0.17	0.17	0.17
1,005.00	0.16	0.16	0.16	0.16	0.16
1,020.00	0.16	0.16	0.15	0.15	0.15
1,035.00	0.15	0.15	0.15	0.14	0.14
1,050.00	0.14	0.14	0.14	0.14	0.14
1,065.00	0.13	0.13	0.13	0.13	0.13
1,080.00	0.13	0.13	0.12	0.12	0.12
1,095.00	0.12	0.12	0.12	0.12	0.12
1,110.00	0.12	0.12	0.12	0.12	0.12
1,125.00	0.11	0.11	0.11	0.11	0.11
1,140.00	0.11	0.11	0.11	0.11	0.11
1,155.00	0.11	0.11	0.11	0.11	0.11
1,170.00	0.11	0.11	0.11	0.11	0.11
1,185.00	0.11	0.11	0.11	0.11	0.11

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,200.00	0.11	0.11	0.11	0.10	0.10
1,215.00	0.10	0.10	0.10	0.10	0.10
1,230.00	0.10	0.10	0.10	0.10	0.10
1,245.00	0.10	0.10	0.10	0.10	0.10
1,260.00	0.10	0.10	0.10	0.10	0.10
1,275.00	0.10	0.10	0.10	0.10	0.10
1,290.00	0.09	0.09	0.09	0.09	0.09
1,305.00	0.09	0.09	0.09	0.09	0.09
1,320.00	0.09	0.09	0.09	0.09	0.09
1,335.00	0.09	0.09	0.09	0.09	0.09
1,350.00	0.09	0.09	0.09	0.09	0.09
1,365.00	0.09	0.09	0.08	0.08	0.08
1,380.00	0.08	0.08	0.08	0.08	0.08
1,395.00	0.08	0.08	0.08	0.08	0.08
1,410.00	0.08	0.08	0.08	0.08	0.08
1,425.00	0.08	0.08	0.08	0.08	0.08
1,440.00	0.08	0.08	0.07	0.07	0.06
1,455.00	0.04	0.03	0.02	0.02	0.01
1,470.00	0.01	0.01	0.00	0.00	0.00
1,485.00	0.00	0.00	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	7.24 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	7.22 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	98.0
Area (User Defined)	50,965.20 ft <sup>2</sup>
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	8.71 in
Runoff Volume (Pervious)	36,986.179 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	37,004.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.75 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Imervious (Post-Developed)  
Scenario: Current Adjusted 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
33.00	0.00	0.00	0.00	0.01	0.01
48.00	0.01	0.02	0.02	0.02	0.03
63.00	0.03	0.03	0.04	0.04	0.04
78.00	0.05	0.05	0.05	0.05	0.06
93.00	0.06	0.06	0.06	0.07	0.07
108.00	0.07	0.07	0.07	0.08	0.08
123.00	0.08	0.08	0.08	0.09	0.09
138.00	0.09	0.09	0.09	0.09	0.09
153.00	0.10	0.10	0.10	0.10	0.10
168.00	0.10	0.10	0.11	0.11	0.11
183.00	0.11	0.11	0.11	0.11	0.11
198.00	0.11	0.12	0.12	0.12	0.12
213.00	0.12	0.12	0.12	0.12	0.12
228.00	0.12	0.12	0.13	0.13	0.13
243.00	0.13	0.13	0.13	0.13	0.13
258.00	0.13	0.13	0.13	0.14	0.14
273.00	0.14	0.14	0.14	0.14	0.14
288.00	0.14	0.14	0.14	0.14	0.14
303.00	0.14	0.14	0.15	0.15	0.15
318.00	0.15	0.15	0.15	0.15	0.15
333.00	0.15	0.15	0.15	0.15	0.15
348.00	0.15	0.16	0.16	0.16	0.16
363.00	0.16	0.16	0.16	0.16	0.16
378.00	0.16	0.17	0.17	0.17	0.17
393.00	0.17	0.18	0.18	0.18	0.18
408.00	0.19	0.19	0.19	0.19	0.19
423.00	0.20	0.20	0.20	0.20	0.20
438.00	0.21	0.21	0.21	0.21	0.22
453.00	0.22	0.22	0.22	0.22	0.23
468.00	0.23	0.23	0.23	0.23	0.24
483.00	0.24	0.24	0.24	0.25	0.25
498.00	0.25	0.25	0.25	0.26	0.26
513.00	0.26	0.26	0.27	0.27	0.27
528.00	0.27	0.27	0.28	0.28	0.28

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
543.00	0.28	0.29	0.29	0.29	0.30
558.00	0.31	0.31	0.32	0.33	0.33
573.00	0.34	0.35	0.36	0.36	0.37
588.00	0.38	0.39	0.40	0.40	0.41
603.00	0.42	0.43	0.44	0.44	0.45
618.00	0.46	0.47	0.48	0.48	0.49
633.00	0.50	0.51	0.52	0.54	0.56
648.00	0.59	0.61	0.64	0.67	0.69
663.00	0.73	0.76	0.79	0.83	0.88
678.00	0.93	0.98	1.03	1.08	1.14
693.00	1.20	1.29	1.41	1.56	1.73
708.00	1.92	2.15	2.43	2.81	3.34
723.00	4.09	5.05	6.09	6.92	7.22
738.00	6.97	6.33	5.51	4.72	4.06
753.00	3.54	3.09	2.71	2.38	2.11
768.00	1.87	1.69	1.54	1.42	1.32
783.00	1.23	1.15	1.07	1.01	0.95
798.00	0.90	0.86	0.82	0.78	0.74
813.00	0.71	0.68	0.65	0.62	0.59
828.00	0.57	0.55	0.54	0.53	0.51
843.00	0.50	0.49	0.49	0.48	0.47
858.00	0.46	0.45	0.44	0.44	0.43
873.00	0.42	0.41	0.40	0.40	0.39
888.00	0.38	0.37	0.36	0.36	0.35
903.00	0.34	0.33	0.32	0.32	0.31
918.00	0.31	0.30	0.30	0.29	0.29
933.00	0.29	0.29	0.28	0.28	0.28
948.00	0.28	0.27	0.27	0.27	0.27
963.00	0.27	0.26	0.26	0.26	0.26
978.00	0.26	0.25	0.25	0.25	0.25
993.00	0.24	0.24	0.24	0.24	0.24
1,008.00	0.23	0.23	0.23	0.23	0.23
1,023.00	0.22	0.22	0.22	0.22	0.22
1,038.00	0.21	0.21	0.21	0.21	0.20
1,053.00	0.20	0.20	0.20	0.20	0.19
1,068.00	0.19	0.19	0.19	0.19	0.18
1,083.00	0.18	0.18	0.18	0.18	0.17
1,098.00	0.17	0.17	0.17	0.17	0.17
1,113.00	0.17	0.17	0.17	0.17	0.17
1,128.00	0.16	0.16	0.16	0.16	0.16
1,143.00	0.16	0.16	0.16	0.16	0.16
1,158.00	0.16	0.16	0.16	0.16	0.16
1,173.00	0.16	0.16	0.16	0.16	0.15

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,188.00	0.15	0.15	0.15	0.15	0.15
1,203.00	0.15	0.15	0.15	0.15	0.15
1,218.00	0.15	0.15	0.15	0.15	0.15
1,233.00	0.15	0.15	0.15	0.15	0.14
1,248.00	0.14	0.14	0.14	0.14	0.14
1,263.00	0.14	0.14	0.14	0.14	0.14
1,278.00	0.14	0.14	0.14	0.14	0.14
1,293.00	0.14	0.14	0.13	0.13	0.13
1,308.00	0.13	0.13	0.13	0.13	0.13
1,323.00	0.13	0.13	0.13	0.13	0.13
1,338.00	0.13	0.13	0.13	0.13	0.13
1,353.00	0.13	0.13	0.12	0.12	0.12
1,368.00	0.12	0.12	0.12	0.12	0.12
1,383.00	0.12	0.12	0.12	0.12	0.12
1,398.00	0.12	0.12	0.12	0.12	0.12
1,413.00	0.12	0.11	0.11	0.11	0.11
1,428.00	0.11	0.11	0.11	0.11	0.11
1,443.00	0.11	0.11	0.10	0.08	0.06
1,458.00	0.05	0.03	0.02	0.02	0.01
1,473.00	0.01	0.01	0.00	0.00	0.00
1,488.00	0.00	0.00	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	9.84 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	9.82 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	98.0
Area (User Defined)	50,965.20 ft <sup>2</sup>
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	11.91 in
Runoff Volume (Pervious)	50,579.921 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	50,604.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.75 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Imervious (Post-Developed)  
Scenario: Future 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	50,965.20 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
24.00	0.00	0.00	0.00	0.01	0.01
39.00	0.02	0.02	0.03	0.04	0.04
54.00	0.05	0.05	0.06	0.06	0.07
69.00	0.07	0.08	0.08	0.08	0.09
84.00	0.09	0.10	0.10	0.10	0.10
99.00	0.11	0.11	0.11	0.12	0.12
114.00	0.12	0.12	0.13	0.13	0.13
129.00	0.13	0.13	0.14	0.14	0.14
144.00	0.14	0.14	0.14	0.15	0.15
159.00	0.15	0.15	0.15	0.15	0.15
174.00	0.16	0.16	0.16	0.16	0.16
189.00	0.16	0.16	0.17	0.17	0.17
204.00	0.17	0.17	0.17	0.17	0.17
219.00	0.18	0.18	0.18	0.18	0.18
234.00	0.18	0.18	0.18	0.18	0.18
249.00	0.19	0.19	0.19	0.19	0.19
264.00	0.19	0.19	0.19	0.19	0.19
279.00	0.20	0.20	0.20	0.20	0.20
294.00	0.20	0.20	0.20	0.20	0.20
309.00	0.20	0.21	0.21	0.21	0.21
324.00	0.21	0.21	0.21	0.21	0.21
339.00	0.21	0.21	0.21	0.22	0.22
354.00	0.22	0.22	0.22	0.22	0.22
369.00	0.22	0.22	0.23	0.23	0.23
384.00	0.23	0.24	0.24	0.24	0.24
399.00	0.25	0.25	0.25	0.26	0.26
414.00	0.26	0.26	0.27	0.27	0.27
429.00	0.28	0.28	0.28	0.29	0.29
444.00	0.29	0.29	0.30	0.30	0.30
459.00	0.31	0.31	0.31	0.31	0.32
474.00	0.32	0.32	0.33	0.33	0.33
489.00	0.33	0.34	0.34	0.34	0.35
504.00	0.35	0.35	0.35	0.36	0.36
519.00	0.36	0.37	0.37	0.37	0.38

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
534.00	0.38	0.38	0.38	0.39	0.39
549.00	0.40	0.40	0.41	0.42	0.43
564.00	0.44	0.45	0.46	0.47	0.48
579.00	0.49	0.50	0.51	0.52	0.53
594.00	0.54	0.55	0.56	0.57	0.58
609.00	0.59	0.61	0.62	0.63	0.64
624.00	0.65	0.66	0.67	0.68	0.70
639.00	0.72	0.74	0.77	0.80	0.83
654.00	0.87	0.91	0.95	0.99	1.03
669.00	1.08	1.14	1.20	1.26	1.33
684.00	1.40	1.48	1.55	1.63	1.75
699.00	1.92	2.13	2.36	2.61	2.92
714.00	3.31	3.83	4.55	5.56	6.87
729.00	8.28	9.41	9.82	9.47	8.60
744.00	7.49	6.41	5.52	4.80	4.20
759.00	3.69	3.24	2.86	2.55	2.29
774.00	2.09	1.93	1.79	1.67	1.56
789.00	1.46	1.37	1.29	1.22	1.16
804.00	1.11	1.06	1.01	0.96	0.92
819.00	0.88	0.84	0.81	0.78	0.75
834.00	0.73	0.71	0.70	0.68	0.67
849.00	0.66	0.65	0.64	0.62	0.61
864.00	0.60	0.59	0.58	0.57	0.56
879.00	0.55	0.54	0.53	0.52	0.51
894.00	0.49	0.48	0.47	0.46	0.45
909.00	0.44	0.43	0.42	0.41	0.41
924.00	0.40	0.40	0.39	0.39	0.39
939.00	0.38	0.38	0.38	0.38	0.37
954.00	0.37	0.37	0.36	0.36	0.36
969.00	0.35	0.35	0.35	0.35	0.34
984.00	0.34	0.34	0.34	0.33	0.33
999.00	0.33	0.32	0.32	0.32	0.32
1,014.00	0.31	0.31	0.31	0.30	0.30
1,029.00	0.30	0.30	0.29	0.29	0.29
1,044.00	0.28	0.28	0.28	0.28	0.27
1,059.00	0.27	0.27	0.26	0.26	0.26
1,074.00	0.26	0.25	0.25	0.25	0.24
1,089.00	0.24	0.24	0.24	0.23	0.23
1,104.00	0.23	0.23	0.23	0.23	0.23
1,119.00	0.23	0.23	0.22	0.22	0.22
1,134.00	0.22	0.22	0.22	0.22	0.22
1,149.00	0.22	0.22	0.22	0.22	0.22
1,164.00	0.22	0.21	0.21	0.21	0.21

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Imervious (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,179.00	0.21	0.21	0.21	0.21	0.21
1,194.00	0.21	0.21	0.21	0.21	0.21
1,209.00	0.20	0.20	0.20	0.20	0.20
1,224.00	0.20	0.20	0.20	0.20	0.20
1,239.00	0.20	0.20	0.20	0.20	0.19
1,254.00	0.19	0.19	0.19	0.19	0.19
1,269.00	0.19	0.19	0.19	0.19	0.19
1,284.00	0.19	0.19	0.19	0.18	0.18
1,299.00	0.18	0.18	0.18	0.18	0.18
1,314.00	0.18	0.18	0.18	0.18	0.18
1,329.00	0.18	0.18	0.17	0.17	0.17
1,344.00	0.17	0.17	0.17	0.17	0.17
1,359.00	0.17	0.17	0.17	0.17	0.17
1,374.00	0.17	0.16	0.16	0.16	0.16
1,389.00	0.16	0.16	0.16	0.16	0.16
1,404.00	0.16	0.16	0.16	0.16	0.16
1,419.00	0.15	0.15	0.15	0.15	0.15
1,434.00	0.15	0.15	0.15	0.15	0.15
1,449.00	0.13	0.11	0.08	0.06	0.04
1,464.00	0.03	0.02	0.02	0.01	0.01
1,479.00	0.01	0.00	0.00	0.00	0.00
1,494.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)



Subsection: Unit Hydrograph Summary  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>

Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	2.24 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	2.23 ft <sup>3</sup> /s

Drainage Area	
SCS CN (Composite)	79.8
Area (User Defined)	80,150.40 ft <sup>2</sup>
Maximum Retention (Pervious)	2.53 in
Maximum Retention (Pervious, 20 percent)	0.51 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.50 in
Runoff Volume (Pervious)	9,996.957 ft <sup>3</sup>

Hydrograph Volume (Area under Hydrograph curve)	
Volume	10,004.000 ft <sup>3</sup>

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.90 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Pervious (Post-Developed)  
Scenario: 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
567.00	0.00	0.00	0.00	0.00	0.00
582.00	0.00	0.01	0.01	0.01	0.01
597.00	0.01	0.01	0.01	0.02	0.02
612.00	0.02	0.02	0.02	0.02	0.03
627.00	0.03	0.03	0.03	0.03	0.04
642.00	0.04	0.04	0.05	0.05	0.06
657.00	0.06	0.07	0.07	0.08	0.09
672.00	0.09	0.10	0.11	0.12	0.14
687.00	0.15	0.16	0.18	0.20	0.23
702.00	0.27	0.31	0.36	0.42	0.50
717.00	0.61	0.78	1.01	1.34	1.72
732.00	2.05	2.23	2.21	2.07	1.84
747.00	1.61	1.42	1.25	1.12	0.99
762.00	0.89	0.79	0.71	0.65	0.60
777.00	0.56	0.52	0.49	0.46	0.43
792.00	0.41	0.38	0.37	0.35	0.33
807.00	0.32	0.30	0.29	0.28	0.27
822.00	0.26	0.25	0.24	0.23	0.22
837.00	0.22	0.21	0.21	0.21	0.20
852.00	0.20	0.20	0.19	0.19	0.19
867.00	0.18	0.18	0.18	0.17	0.17
882.00	0.17	0.16	0.16	0.16	0.16
897.00	0.15	0.15	0.15	0.14	0.14
912.00	0.14	0.13	0.13	0.13	0.13
927.00	0.13	0.13	0.12	0.12	0.12
942.00	0.12	0.12	0.12	0.12	0.12
957.00	0.12	0.12	0.12	0.11	0.11
972.00	0.11	0.11	0.11	0.11	0.11
987.00	0.11	0.11	0.11	0.11	0.10
1,002.00	0.10	0.10	0.10	0.10	0.10
1,017.00	0.10	0.10	0.10	0.10	0.10
1,032.00	0.10	0.09	0.09	0.09	0.09
1,047.00	0.09	0.09	0.09	0.09	0.09
1,062.00	0.09	0.09	0.08	0.08	0.08

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,077.00	0.08	0.08	0.08	0.08	0.08
1,092.00	0.08	0.08	0.08	0.08	0.08
1,107.00	0.08	0.07	0.07	0.07	0.07
1,122.00	0.07	0.07	0.07	0.07	0.07
1,137.00	0.07	0.07	0.07	0.07	0.07
1,152.00	0.07	0.07	0.07	0.07	0.07
1,167.00	0.07	0.07	0.07	0.07	0.07
1,182.00	0.07	0.07	0.07	0.07	0.07
1,197.00	0.07	0.07	0.07	0.07	0.07
1,212.00	0.07	0.07	0.07	0.07	0.07
1,227.00	0.07	0.07	0.07	0.07	0.07
1,242.00	0.07	0.07	0.06	0.06	0.06
1,257.00	0.06	0.06	0.06	0.06	0.06
1,272.00	0.06	0.06	0.06	0.06	0.06
1,287.00	0.06	0.06	0.06	0.06	0.06
1,302.00	0.06	0.06	0.06	0.06	0.06
1,317.00	0.06	0.06	0.06	0.06	0.06
1,332.00	0.06	0.06	0.06	0.06	0.06
1,347.00	0.06	0.06	0.06	0.06	0.06
1,362.00	0.06	0.06	0.06	0.06	0.06
1,377.00	0.06	0.05	0.05	0.05	0.05
1,392.00	0.05	0.05	0.05	0.05	0.05
1,407.00	0.05	0.05	0.05	0.05	0.05
1,422.00	0.05	0.05	0.05	0.05	0.05
1,437.00	0.05	0.05	0.05	0.05	0.04
1,452.00	0.04	0.03	0.02	0.01	0.01
1,467.00	0.01	0.01	0.00	0.00	0.00
1,482.00	0.00	0.00	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	3.02 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	3.01 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	79.8
Area (User Defined)	80,150.40 ft <sup>2</sup>
Maximum Retention (Pervious)	2.53 in
Maximum Retention (Pervious, 20 percent)	0.51 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	2.01 in
Runoff Volume (Pervious)	13,391.818 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	13,401.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.90 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Pervious (Post-Developed)  
Scenario: Future 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
513.00	0.00	0.00	0.00	0.00	0.00
528.00	0.00	0.00	0.01	0.01	0.01
543.00	0.01	0.01	0.01	0.01	0.01
558.00	0.01	0.01	0.02	0.02	0.02
573.00	0.02	0.02	0.02	0.02	0.03
588.00	0.03	0.03	0.03	0.03	0.04
603.00	0.04	0.04	0.04	0.05	0.05
618.00	0.05	0.05	0.06	0.06	0.06
633.00	0.06	0.07	0.07	0.08	0.08
648.00	0.09	0.09	0.10	0.11	0.12
663.00	0.13	0.14	0.15	0.16	0.17
678.00	0.19	0.20	0.22	0.24	0.26
693.00	0.28	0.31	0.35	0.40	0.46
708.00	0.53	0.62	0.73	0.89	1.11
723.00	1.43	1.86	2.36	2.79	3.01
738.00	2.98	2.76	2.45	2.14	1.87
753.00	1.65	1.47	1.30	1.16	1.03
768.00	0.93	0.84	0.77	0.72	0.67
783.00	0.63	0.59	0.56	0.52	0.50
798.00	0.47	0.45	0.43	0.41	0.39
813.00	0.37	0.36	0.34	0.33	0.31
828.00	0.30	0.29	0.29	0.28	0.27
843.00	0.27	0.26	0.26	0.26	0.25
858.00	0.25	0.24	0.24	0.23	0.23
873.00	0.23	0.22	0.22	0.21	0.21
888.00	0.21	0.20	0.20	0.19	0.19
903.00	0.19	0.18	0.18	0.17	0.17
918.00	0.17	0.16	0.16	0.16	0.16
933.00	0.16	0.16	0.16	0.15	0.15
948.00	0.15	0.15	0.15	0.15	0.15
963.00	0.15	0.15	0.14	0.14	0.14
978.00	0.14	0.14	0.14	0.14	0.14
993.00	0.14	0.13	0.13	0.13	0.13
1,008.00	0.13	0.13	0.13	0.13	0.13

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,023.00	0.12	0.12	0.12	0.12	0.12
1,038.00	0.12	0.12	0.12	0.12	0.11
1,053.00	0.11	0.11	0.11	0.11	0.11
1,068.00	0.11	0.11	0.11	0.10	0.10
1,083.00	0.10	0.10	0.10	0.10	0.10
1,098.00	0.10	0.10	0.10	0.10	0.09
1,113.00	0.09	0.09	0.09	0.09	0.09
1,128.00	0.09	0.09	0.09	0.09	0.09
1,143.00	0.09	0.09	0.09	0.09	0.09
1,158.00	0.09	0.09	0.09	0.09	0.09
1,173.00	0.09	0.09	0.09	0.09	0.09
1,188.00	0.09	0.09	0.09	0.09	0.09
1,203.00	0.09	0.09	0.09	0.09	0.08
1,218.00	0.08	0.08	0.08	0.08	0.08
1,233.00	0.08	0.08	0.08	0.08	0.08
1,248.00	0.08	0.08	0.08	0.08	0.08
1,263.00	0.08	0.08	0.08	0.08	0.08
1,278.00	0.08	0.08	0.08	0.08	0.08
1,293.00	0.08	0.08	0.08	0.08	0.08
1,308.00	0.08	0.08	0.08	0.08	0.07
1,323.00	0.07	0.07	0.07	0.07	0.07
1,338.00	0.07	0.07	0.07	0.07	0.07
1,353.00	0.07	0.07	0.07	0.07	0.07
1,368.00	0.07	0.07	0.07	0.07	0.07
1,383.00	0.07	0.07	0.07	0.07	0.07
1,398.00	0.07	0.07	0.07	0.07	0.07
1,413.00	0.07	0.07	0.07	0.07	0.06
1,428.00	0.06	0.06	0.06	0.06	0.06
1,443.00	0.06	0.06	0.06	0.05	0.04
1,458.00	0.03	0.02	0.01	0.01	0.01
1,473.00	0.00	0.00	0.00	0.00	0.00
1,488.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)



Subsection: Unit Hydrograph Summary  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>
<hr/>	
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	4.56 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	4.54 ft <sup>3</sup> /s
<hr/>	
Drainage Area	
SCS CN (Composite)	79.8
Area (User Defined)	80,150.40 ft <sup>2</sup>
Maximum Retention (Pervious)	2.53 in
Maximum Retention (Pervious, 20 percent)	0.51 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.01 in
Runoff Volume (Pervious)	20,134.225 ft <sup>3</sup>
<hr/>	
Hydrograph Volume (Area under Hydrograph curve)	
Volume	20,147.000 ft <sup>3</sup>
<hr/>	
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.90 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Pervious (Post-Developed)  
Scenario: Current Adjusted 10-Year

Return Event: 10 years  
Storm Event: 10-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
438.00	0.00	0.00	0.00	0.00	0.00
453.00	0.00	0.01	0.01	0.01	0.01
468.00	0.01	0.01	0.01	0.01	0.01
483.00	0.01	0.02	0.02	0.02	0.02
498.00	0.02	0.02	0.02	0.02	0.02
513.00	0.03	0.03	0.03	0.03	0.03
528.00	0.03	0.03	0.04	0.04	0.04
543.00	0.04	0.04	0.04	0.04	0.05
558.00	0.05	0.05	0.05	0.06	0.06
573.00	0.06	0.06	0.07	0.07	0.07
588.00	0.08	0.08	0.08	0.09	0.09
603.00	0.10	0.10	0.10	0.11	0.11
618.00	0.12	0.12	0.12	0.13	0.13
633.00	0.14	0.14	0.15	0.16	0.17
648.00	0.18	0.19	0.20	0.22	0.23
663.00	0.24	0.26	0.28	0.30	0.32
678.00	0.34	0.37	0.40	0.43	0.46
693.00	0.49	0.54	0.61	0.69	0.79
708.00	0.90	1.03	1.20	1.44	1.77
723.00	2.25	2.90	3.63	4.25	4.54
738.00	4.46	4.12	3.64	3.15	2.75
753.00	2.42	2.14	1.89	1.68	1.49
768.00	1.34	1.21	1.11	1.03	0.96
783.00	0.90	0.84	0.79	0.75	0.70
798.00	0.67	0.64	0.61	0.58	0.56
813.00	0.53	0.51	0.48	0.46	0.45
828.00	0.43	0.42	0.41	0.40	0.39
843.00	0.38	0.37	0.37	0.36	0.35
858.00	0.35	0.34	0.34	0.33	0.32
873.00	0.32	0.31	0.31	0.30	0.30
888.00	0.29	0.28	0.28	0.27	0.27
903.00	0.26	0.25	0.25	0.24	0.24
918.00	0.23	0.23	0.23	0.23	0.22
933.00	0.22	0.22	0.22	0.22	0.21

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
948.00	0.21	0.21	0.21	0.21	0.21
963.00	0.20	0.20	0.20	0.20	0.20
978.00	0.20	0.20	0.19	0.19	0.19
993.00	0.19	0.19	0.19	0.18	0.18
1,008.00	0.18	0.18	0.18	0.18	0.18
1,023.00	0.17	0.17	0.17	0.17	0.17
1,038.00	0.17	0.16	0.16	0.16	0.16
1,053.00	0.16	0.16	0.15	0.15	0.15
1,068.00	0.15	0.15	0.15	0.14	0.14
1,083.00	0.14	0.14	0.14	0.14	0.14
1,098.00	0.13	0.13	0.13	0.13	0.13
1,113.00	0.13	0.13	0.13	0.13	0.13
1,128.00	0.13	0.13	0.13	0.13	0.13
1,143.00	0.13	0.13	0.13	0.13	0.13
1,158.00	0.13	0.12	0.12	0.12	0.12
1,173.00	0.12	0.12	0.12	0.12	0.12
1,188.00	0.12	0.12	0.12	0.12	0.12
1,203.00	0.12	0.12	0.12	0.12	0.12
1,218.00	0.12	0.12	0.12	0.12	0.12
1,233.00	0.12	0.11	0.11	0.11	0.11
1,248.00	0.11	0.11	0.11	0.11	0.11
1,263.00	0.11	0.11	0.11	0.11	0.11
1,278.00	0.11	0.11	0.11	0.11	0.11
1,293.00	0.11	0.11	0.11	0.11	0.11
1,308.00	0.11	0.11	0.10	0.10	0.10
1,323.00	0.10	0.10	0.10	0.10	0.10
1,338.00	0.10	0.10	0.10	0.10	0.10
1,353.00	0.10	0.10	0.10	0.10	0.10
1,368.00	0.10	0.10	0.10	0.10	0.10
1,383.00	0.10	0.10	0.09	0.09	0.09
1,398.00	0.09	0.09	0.09	0.09	0.09
1,413.00	0.09	0.09	0.09	0.09	0.09
1,428.00	0.09	0.09	0.09	0.09	0.09
1,443.00	0.09	0.09	0.08	0.06	0.05
1,458.00	0.04	0.03	0.02	0.01	0.01
1,473.00	0.01	0.00	0.00	0.00	0.00
1,488.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	5.95 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	5.93 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	79.8
Area (User Defined)	80,150.40 ft <sup>2</sup>
Maximum Retention (Pervious)	2.53 in
Maximum Retention (Pervious, 20 percent)	0.51 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	3.95 in
Runoff Volume (Pervious)	26,400.671 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	26,417.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.90 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Pervious (Post-Developed)  
Scenario: Future 10-Year

Return Event: 10 years  
Storm Event: 10-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
384.00	0.00	0.00	0.00	0.00	0.00
399.00	0.00	0.01	0.01	0.01	0.01
414.00	0.01	0.01	0.01	0.01	0.01
429.00	0.01	0.02	0.02	0.02	0.02
444.00	0.02	0.02	0.02	0.02	0.03
459.00	0.03	0.03	0.03	0.03	0.03
474.00	0.03	0.04	0.04	0.04	0.04
489.00	0.04	0.04	0.05	0.05	0.05
504.00	0.05	0.05	0.05	0.06	0.06
519.00	0.06	0.06	0.06	0.06	0.07
534.00	0.07	0.07	0.07	0.07	0.08
549.00	0.08	0.08	0.08	0.09	0.09
564.00	0.09	0.10	0.10	0.11	0.11
579.00	0.12	0.12	0.12	0.13	0.13
594.00	0.14	0.14	0.15	0.15	0.16
609.00	0.17	0.17	0.18	0.18	0.19
624.00	0.20	0.20	0.21	0.21	0.22
639.00	0.23	0.24	0.26	0.27	0.29
654.00	0.30	0.32	0.34	0.36	0.38
669.00	0.41	0.44	0.47	0.50	0.54
684.00	0.57	0.61	0.65	0.70	0.77
699.00	0.86	0.97	1.10	1.24	1.42
714.00	1.65	1.96	2.39	3.02	3.85
729.00	4.79	5.58	5.93	5.81	5.34
744.00	4.71	4.07	3.54	3.11	2.74
759.00	2.42	2.14	1.90	1.70	1.54
774.00	1.41	1.31	1.22	1.14	1.07
789.00	1.00	0.94	0.89	0.84	0.80
804.00	0.77	0.73	0.70	0.67	0.64
819.00	0.61	0.58	0.56	0.54	0.52
834.00	0.51	0.50	0.49	0.48	0.47
849.00	0.46	0.45	0.45	0.44	0.43
864.00	0.42	0.42	0.41	0.40	0.39
879.00	0.39	0.38	0.37	0.36	0.36

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
894.00	0.35	0.34	0.33	0.33	0.32
909.00	0.31	0.31	0.30	0.29	0.29
924.00	0.29	0.28	0.28	0.28	0.28
939.00	0.27	0.27	0.27	0.27	0.26
954.00	0.26	0.26	0.26	0.26	0.25
969.00	0.25	0.25	0.25	0.25	0.25
984.00	0.24	0.24	0.24	0.24	0.23
999.00	0.23	0.23	0.23	0.23	0.23
1,014.00	0.22	0.22	0.22	0.22	0.22
1,029.00	0.21	0.21	0.21	0.21	0.21
1,044.00	0.20	0.20	0.20	0.20	0.20
1,059.00	0.19	0.19	0.19	0.19	0.19
1,074.00	0.18	0.18	0.18	0.18	0.18
1,089.00	0.17	0.17	0.17	0.17	0.17
1,104.00	0.17	0.17	0.16	0.16	0.16
1,119.00	0.16	0.16	0.16	0.16	0.16
1,134.00	0.16	0.16	0.16	0.16	0.16
1,149.00	0.16	0.16	0.16	0.16	0.16
1,164.00	0.16	0.15	0.15	0.15	0.15
1,179.00	0.15	0.15	0.15	0.15	0.15
1,194.00	0.15	0.15	0.15	0.15	0.15
1,209.00	0.15	0.15	0.15	0.15	0.15
1,224.00	0.15	0.14	0.14	0.14	0.14
1,239.00	0.14	0.14	0.14	0.14	0.14
1,254.00	0.14	0.14	0.14	0.14	0.14
1,269.00	0.14	0.14	0.14	0.14	0.14
1,284.00	0.14	0.14	0.13	0.13	0.13
1,299.00	0.13	0.13	0.13	0.13	0.13
1,314.00	0.13	0.13	0.13	0.13	0.13
1,329.00	0.13	0.13	0.13	0.13	0.13
1,344.00	0.13	0.12	0.12	0.12	0.12
1,359.00	0.12	0.12	0.12	0.12	0.12
1,374.00	0.12	0.12	0.12	0.12	0.12
1,389.00	0.12	0.12	0.12	0.12	0.12
1,404.00	0.12	0.11	0.11	0.11	0.11
1,419.00	0.11	0.11	0.11	0.11	0.11
1,434.00	0.11	0.11	0.11	0.11	0.11
1,449.00	0.10	0.08	0.06	0.04	0.03
1,464.00	0.02	0.02	0.01	0.01	0.01
1,479.00	0.00	0.00	0.00	0.00	0.00



Subsection: Unit Hydrograph Summary  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>
Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	9.63 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	9.60 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	79.8
Area (User Defined)	80,150.40 ft <sup>2</sup>
Maximum Retention (Pervious)	2.53 in
Maximum Retention (Pervious, 20 percent)	0.51 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	6.50 in
Runoff Volume (Pervious)	43,382.735 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	43,408.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.90 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Pervious (Post-Developed)  
Scenario: Current Adjusted 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
285.00	0.00	0.00	0.00	0.00	0.00
300.00	0.01	0.01	0.01	0.01	0.01
315.00	0.01	0.01	0.01	0.02	0.02
330.00	0.02	0.02	0.02	0.02	0.02
345.00	0.02	0.03	0.03	0.03	0.03
360.00	0.03	0.03	0.03	0.04	0.04
375.00	0.04	0.04	0.04	0.04	0.04
390.00	0.05	0.05	0.05	0.05	0.05
405.00	0.06	0.06	0.06	0.06	0.06
420.00	0.07	0.07	0.07	0.07	0.08
435.00	0.08	0.08	0.08	0.09	0.09
450.00	0.09	0.09	0.10	0.10	0.10
465.00	0.10	0.11	0.11	0.11	0.11
480.00	0.12	0.12	0.12	0.13	0.13
495.00	0.13	0.14	0.14	0.14	0.14
510.00	0.15	0.15	0.15	0.16	0.16
525.00	0.16	0.17	0.17	0.17	0.18
540.00	0.18	0.18	0.19	0.19	0.20
555.00	0.20	0.21	0.21	0.22	0.23
570.00	0.24	0.25	0.25	0.26	0.27
585.00	0.28	0.29	0.30	0.31	0.31
600.00	0.32	0.33	0.34	0.35	0.36
615.00	0.37	0.38	0.39	0.40	0.41
630.00	0.43	0.44	0.45	0.47	0.49
645.00	0.51	0.54	0.56	0.60	0.63
660.00	0.66	0.70	0.74	0.78	0.83
675.00	0.88	0.94	1.00	1.07	1.13
690.00	1.20	1.28	1.39	1.55	1.73
705.00	1.95	2.19	2.48	2.86	3.36
720.00	4.07	5.08	6.41	7.88	9.09
735.00	9.60	9.35	8.56	7.51	6.47
750.00	5.60	4.90	4.31	3.80	3.35
765.00	2.97	2.65	2.40	2.19	2.03
780.00	1.89	1.76	1.65	1.55	1.45

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
795.00	1.37	1.30	1.24	1.18	1.13
810.00	1.08	1.03	0.98	0.94	0.90
825.00	0.86	0.83	0.80	0.78	0.76
840.00	0.75	0.73	0.72	0.71	0.69
855.00	0.68	0.67	0.66	0.65	0.64
870.00	0.62	0.61	0.60	0.59	0.58
885.00	0.57	0.56	0.54	0.53	0.52
900.00	0.51	0.50	0.49	0.48	0.47
915.00	0.46	0.45	0.44	0.44	0.43
930.00	0.43	0.42	0.42	0.42	0.41
945.00	0.41	0.41	0.40	0.40	0.40
960.00	0.39	0.39	0.39	0.38	0.38
975.00	0.38	0.38	0.37	0.37	0.37
990.00	0.36	0.36	0.36	0.35	0.35
1,005.00	0.35	0.34	0.34	0.34	0.34
1,020.00	0.33	0.33	0.33	0.32	0.32
1,035.00	0.32	0.31	0.31	0.31	0.30
1,050.00	0.30	0.30	0.30	0.29	0.29
1,065.00	0.29	0.28	0.28	0.28	0.27
1,080.00	0.27	0.27	0.27	0.26	0.26
1,095.00	0.26	0.25	0.25	0.25	0.25
1,110.00	0.25	0.25	0.25	0.25	0.25
1,125.00	0.24	0.24	0.24	0.24	0.24
1,140.00	0.24	0.24	0.24	0.24	0.24
1,155.00	0.24	0.24	0.24	0.23	0.23
1,170.00	0.23	0.23	0.23	0.23	0.23
1,185.00	0.23	0.23	0.23	0.23	0.23
1,200.00	0.23	0.23	0.22	0.22	0.22
1,215.00	0.22	0.22	0.22	0.22	0.22
1,230.00	0.22	0.22	0.22	0.22	0.22
1,245.00	0.21	0.21	0.21	0.21	0.21
1,260.00	0.21	0.21	0.21	0.21	0.21
1,275.00	0.21	0.21	0.21	0.20	0.20
1,290.00	0.20	0.20	0.20	0.20	0.20
1,305.00	0.20	0.20	0.20	0.20	0.20
1,320.00	0.20	0.19	0.19	0.19	0.19
1,335.00	0.19	0.19	0.19	0.19	0.19
1,350.00	0.19	0.19	0.19	0.19	0.18
1,365.00	0.18	0.18	0.18	0.18	0.18
1,380.00	0.18	0.18	0.18	0.18	0.18
1,395.00	0.18	0.18	0.17	0.17	0.17
1,410.00	0.17	0.17	0.17	0.17	0.17
1,425.00	0.17	0.17	0.17	0.17	0.17

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,440.00	0.17	0.17	0.16	0.14	0.12
1,455.00	0.09	0.07	0.05	0.03	0.02
1,470.00	0.02	0.01	0.01	0.01	0.00
1,485.00	0.00	0.00	0.00	0.00	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>

Computational Time Increment	2.83 min
Time to Peak (Computed)	735.28 min
Flow (Peak, Computed)	13.93 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	13.88 ft <sup>3</sup> /s

Drainage Area	
SCS CN (Composite)	79.8
Area (User Defined)	80,150.40 ft <sup>2</sup>
Maximum Retention (Pervious)	2.53 in
Maximum Retention (Pervious, 20 percent)	0.51 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	9.57 in
Runoff Volume (Pervious)	63,887.987 ft <sup>3</sup>

Hydrograph Volume (Area under Hydrograph curve)	
Volume	63,924.000 ft <sup>3</sup>

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	21.21 min
Computational Time Increment	2.83 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	5.90 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1A Pervious (Post-Developed)  
Scenario: Future 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	14.14 min
Unit receding limb, $T_r$	56.56 min
Total unit time, $T_b$	70.70 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	21.21 min
Area (User Defined)	80,150.40 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
219.00	0.00	0.00	0.00	0.00	0.00
234.00	0.01	0.01	0.01	0.01	0.01
249.00	0.02	0.02	0.02	0.02	0.02
264.00	0.03	0.03	0.03	0.03	0.03
279.00	0.04	0.04	0.04	0.04	0.04
294.00	0.05	0.05	0.05	0.05	0.05
309.00	0.06	0.06	0.06	0.06	0.06
324.00	0.07	0.07	0.07	0.07	0.08
339.00	0.08	0.08	0.08	0.08	0.09
354.00	0.09	0.09	0.09	0.09	0.10
369.00	0.10	0.10	0.10	0.11	0.11
384.00	0.11	0.11	0.12	0.12	0.12
399.00	0.13	0.13	0.13	0.14	0.14
414.00	0.14	0.15	0.15	0.16	0.16
429.00	0.16	0.17	0.17	0.17	0.18
444.00	0.18	0.19	0.19	0.19	0.20
459.00	0.20	0.21	0.21	0.22	0.22
474.00	0.22	0.23	0.23	0.24	0.24
489.00	0.25	0.25	0.26	0.26	0.26
504.00	0.27	0.27	0.28	0.28	0.29
519.00	0.29	0.30	0.30	0.31	0.31
534.00	0.32	0.32	0.33	0.33	0.34
549.00	0.34	0.35	0.36	0.37	0.38
564.00	0.39	0.41	0.42	0.43	0.44
579.00	0.46	0.47	0.48	0.50	0.51
594.00	0.52	0.54	0.55	0.57	0.58
609.00	0.60	0.61	0.63	0.64	0.66
624.00	0.67	0.69	0.70	0.72	0.74
639.00	0.77	0.80	0.83	0.87	0.92
654.00	0.96	1.01	1.06	1.12	1.18
669.00	1.24	1.32	1.40	1.48	1.58
684.00	1.67	1.77	1.87	1.99	2.15
699.00	2.38	2.66	2.97	3.33	3.76
714.00	4.31	5.04	6.06	7.51	9.41



Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
729.00	11.50	13.20	13.88	13.48	12.31
744.00	10.77	9.26	8.00	6.99	6.14
759.00	5.40	4.76	4.21	3.76	3.39
774.00	3.10	2.86	2.66	2.48	2.32
789.00	2.17	2.04	1.93	1.83	1.74
804.00	1.66	1.58	1.51	1.44	1.38
819.00	1.32	1.26	1.21	1.16	1.13
834.00	1.10	1.07	1.05	1.03	1.01
849.00	0.99	0.97	0.95	0.94	0.92
864.00	0.91	0.89	0.87	0.86	0.84
879.00	0.82	0.81	0.79	0.78	0.76
894.00	0.74	0.73	0.71	0.70	0.68
909.00	0.66	0.65	0.64	0.63	0.62
924.00	0.61	0.60	0.60	0.59	0.58
939.00	0.58	0.58	0.57	0.57	0.56
954.00	0.56	0.55	0.55	0.54	0.54
969.00	0.54	0.53	0.53	0.52	0.52
984.00	0.52	0.51	0.51	0.50	0.50
999.00	0.49	0.49	0.49	0.48	0.48
1,014.00	0.47	0.47	0.46	0.46	0.46
1,029.00	0.45	0.45	0.44	0.44	0.43
1,044.00	0.43	0.42	0.42	0.42	0.41
1,059.00	0.41	0.40	0.40	0.40	0.39
1,074.00	0.39	0.38	0.38	0.37	0.37
1,089.00	0.37	0.36	0.36	0.36	0.35
1,104.00	0.35	0.35	0.35	0.35	0.34
1,119.00	0.34	0.34	0.34	0.34	0.34
1,134.00	0.34	0.34	0.34	0.33	0.33
1,149.00	0.33	0.33	0.33	0.33	0.33
1,164.00	0.33	0.33	0.32	0.32	0.32
1,179.00	0.32	0.32	0.32	0.32	0.32
1,194.00	0.32	0.32	0.31	0.31	0.31
1,209.00	0.31	0.31	0.31	0.31	0.31
1,224.00	0.31	0.30	0.30	0.30	0.30
1,239.00	0.30	0.30	0.30	0.30	0.30
1,254.00	0.29	0.29	0.29	0.29	0.29
1,269.00	0.29	0.29	0.29	0.29	0.29
1,284.00	0.28	0.28	0.28	0.28	0.28
1,299.00	0.28	0.28	0.28	0.28	0.27
1,314.00	0.27	0.27	0.27	0.27	0.27
1,329.00	0.27	0.27	0.27	0.27	0.26
1,344.00	0.26	0.26	0.26	0.26	0.26
1,359.00	0.26	0.26	0.26	0.25	0.25

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1A Pervious (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,374.00	0.25	0.25	0.25	0.25	0.25
1,389.00	0.25	0.25	0.24	0.24	0.24
1,404.00	0.24	0.24	0.24	0.24	0.24
1,419.00	0.24	0.23	0.23	0.23	0.23
1,434.00	0.23	0.23	0.23	0.23	0.22
1,449.00	0.20	0.17	0.13	0.09	0.07
1,464.00	0.05	0.03	0.02	0.02	0.01
1,479.00	0.01	0.01	0.00	0.00	0.00
1,494.00	0.00	0.00	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>
Computational Time Increment	2.55 min
Time to Peak (Computed)	734.98 min
Flow (Peak, Computed)	0.32 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	0.32 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.0
Area (User Defined)	10,890.00 ft <sup>2</sup>
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	1.51 in
Runoff Volume (Pervious)	1,370.699 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	1,371.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	19.14 min
Computational Time Increment	2.55 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.89 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1B (Post-Developed)  
Scenario: 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	12.76 min
Unit receding limb, $T_r$	51.04 min
Total unit time, $T_b$	63.80 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.34 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
585.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	0.00	0.00	0.00
615.00	0.00	0.00	0.00	0.00	0.00
630.00	0.00	0.00	0.00	0.01	0.01
645.00	0.01	0.01	0.01	0.01	0.01
660.00	0.01	0.01	0.01	0.01	0.01
675.00	0.02	0.02	0.02	0.02	0.02
690.00	0.02	0.03	0.03	0.03	0.04
705.00	0.05	0.05	0.06	0.07	0.09
720.00	0.12	0.15	0.20	0.26	0.31
735.00	0.32	0.31	0.28	0.24	0.21
750.00	0.18	0.16	0.14	0.13	0.11
765.00	0.10	0.09	0.08	0.08	0.07
780.00	0.07	0.06	0.06	0.06	0.05
795.00	0.05	0.05	0.05	0.04	0.04
810.00	0.04	0.04	0.04	0.04	0.03
825.00	0.03	0.03	0.03	0.03	0.03
840.00	0.03	0.03	0.03	0.03	0.03
855.00	0.03	0.03	0.03	0.03	0.02
870.00	0.02	0.02	0.02	0.02	0.02
885.00	0.02	0.02	0.02	0.02	0.02
900.00	0.02	0.02	0.02	0.02	0.02
915.00	0.02	0.02	0.02	0.02	0.02
930.00	0.02	0.02	0.02	0.02	0.02
945.00	0.02	0.02	0.02	0.02	0.02
960.00	0.02	0.02	0.02	0.02	0.02
975.00	0.02	0.02	0.01	0.01	0.01
990.00	0.01	0.01	0.01	0.01	0.01
1,005.00	0.01	0.01	0.01	0.01	0.01
1,020.00	0.01	0.01	0.01	0.01	0.01
1,035.00	0.01	0.01	0.01	0.01	0.01
1,050.00	0.01	0.01	0.01	0.01	0.01
1,065.00	0.01	0.01	0.01	0.01	0.01
1,080.00	0.01	0.01	0.01	0.01	0.01

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,095.00	0.01	0.01	0.01	0.01	0.01
1,110.00	0.01	0.01	0.01	0.01	0.01
1,125.00	0.01	0.01	0.01	0.01	0.01
1,140.00	0.01	0.01	0.01	0.01	0.01
1,155.00	0.01	0.01	0.01	0.01	0.01
1,170.00	0.01	0.01	0.01	0.01	0.01
1,185.00	0.01	0.01	0.01	0.01	0.01
1,200.00	0.01	0.01	0.01	0.01	0.01
1,215.00	0.01	0.01	0.01	0.01	0.01
1,230.00	0.01	0.01	0.01	0.01	0.01
1,245.00	0.01	0.01	0.01	0.01	0.01
1,260.00	0.01	0.01	0.01	0.01	0.01
1,275.00	0.01	0.01	0.01	0.01	0.01
1,290.00	0.01	0.01	0.01	0.01	0.01
1,305.00	0.01	0.01	0.01	0.01	0.01
1,320.00	0.01	0.01	0.01	0.01	0.01
1,335.00	0.01	0.01	0.01	0.01	0.01
1,350.00	0.01	0.01	0.01	0.01	0.01
1,365.00	0.01	0.01	0.01	0.01	0.01
1,380.00	0.01	0.01	0.01	0.01	0.01
1,395.00	0.01	0.01	0.01	0.01	0.01
1,410.00	0.01	0.01	0.01	0.01	0.01
1,425.00	0.01	0.01	0.01	0.01	0.01
1,440.00	0.01	0.01	0.01	0.01	0.00
1,455.00	0.00	0.00	0.00	0.00	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>
Computational Time Increment	2.55 min
Time to Peak (Computed)	734.98 min
Flow (Peak, Computed)	0.44 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	0.44 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.0
Area (User Defined)	10,890.00 ft <sup>2</sup>
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	2.02 in
Runoff Volume (Pervious)	1,833.781 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	1,834.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	19.14 min
Computational Time Increment	2.55 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.89 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1B (Post-Developed)  
Scenario: Future 2-Year

Return Event: 2 years  
Storm Event: 2-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	12.76 min
Unit receding limb, $T_r$	51.04 min
Total unit time, $T_b$	63.80 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

Storm Event	2-Year
Return Event	2 years
Duration	4,320.00 min
Depth	3.97 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
537.00	0.00	0.00	0.00	0.00	0.00
552.00	0.00	0.00	0.00	0.00	0.00
567.00	0.00	0.00	0.00	0.00	0.00
582.00	0.00	0.00	0.00	0.00	0.00
597.00	0.01	0.01	0.01	0.01	0.01
612.00	0.01	0.01	0.01	0.01	0.01
627.00	0.01	0.01	0.01	0.01	0.01
642.00	0.01	0.01	0.01	0.01	0.01
657.00	0.02	0.02	0.02	0.02	0.02
672.00	0.02	0.02	0.03	0.03	0.03
687.00	0.03	0.04	0.04	0.05	0.05
702.00	0.06	0.07	0.08	0.09	0.11
717.00	0.13	0.16	0.21	0.28	0.36
732.00	0.42	0.44	0.41	0.37	0.32
747.00	0.28	0.24	0.21	0.19	0.17
762.00	0.15	0.13	0.12	0.11	0.10
777.00	0.09	0.09	0.08	0.08	0.07
792.00	0.07	0.07	0.06	0.06	0.06
807.00	0.05	0.05	0.05	0.05	0.05
822.00	0.04	0.04	0.04	0.04	0.04
837.00	0.04	0.04	0.04	0.04	0.04
852.00	0.03	0.03	0.03	0.03	0.03
867.00	0.03	0.03	0.03	0.03	0.03
882.00	0.03	0.03	0.03	0.03	0.03
897.00	0.03	0.03	0.02	0.02	0.02
912.00	0.02	0.02	0.02	0.02	0.02
927.00	0.02	0.02	0.02	0.02	0.02
942.00	0.02	0.02	0.02	0.02	0.02
957.00	0.02	0.02	0.02	0.02	0.02
972.00	0.02	0.02	0.02	0.02	0.02
987.00	0.02	0.02	0.02	0.02	0.02
1,002.00	0.02	0.02	0.02	0.02	0.02
1,017.00	0.02	0.02	0.02	0.02	0.02
1,032.00	0.02	0.02	0.02	0.02	0.02

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 2-Year

Return Event: 2 years  
 Storm Event: 2-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,047.00	0.02	0.02	0.02	0.02	0.02
1,062.00	0.01	0.01	0.01	0.01	0.01
1,077.00	0.01	0.01	0.01	0.01	0.01
1,092.00	0.01	0.01	0.01	0.01	0.01
1,107.00	0.01	0.01	0.01	0.01	0.01
1,122.00	0.01	0.01	0.01	0.01	0.01
1,137.00	0.01	0.01	0.01	0.01	0.01
1,152.00	0.01	0.01	0.01	0.01	0.01
1,167.00	0.01	0.01	0.01	0.01	0.01
1,182.00	0.01	0.01	0.01	0.01	0.01
1,197.00	0.01	0.01	0.01	0.01	0.01
1,212.00	0.01	0.01	0.01	0.01	0.01
1,227.00	0.01	0.01	0.01	0.01	0.01
1,242.00	0.01	0.01	0.01	0.01	0.01
1,257.00	0.01	0.01	0.01	0.01	0.01
1,272.00	0.01	0.01	0.01	0.01	0.01
1,287.00	0.01	0.01	0.01	0.01	0.01
1,302.00	0.01	0.01	0.01	0.01	0.01
1,317.00	0.01	0.01	0.01	0.01	0.01
1,332.00	0.01	0.01	0.01	0.01	0.01
1,347.00	0.01	0.01	0.01	0.01	0.01
1,362.00	0.01	0.01	0.01	0.01	0.01
1,377.00	0.01	0.01	0.01	0.01	0.01
1,392.00	0.01	0.01	0.01	0.01	0.01
1,407.00	0.01	0.01	0.01	0.01	0.01
1,422.00	0.01	0.01	0.01	0.01	0.01
1,437.00	0.01	0.01	0.01	0.01	0.01
1,452.00	0.01	0.00	0.00	0.00	0.00
1,467.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>
Computational Time Increment	2.55 min
Time to Peak (Computed)	734.98 min
Flow (Peak, Computed)	0.65 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	0.65 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.0
Area (User Defined)	10,890.00 ft <sup>2</sup>
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	3.03 in
Runoff Volume (Pervious)	2,752.600 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	2,753.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	19.14 min
Computational Time Increment	2.55 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.89 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1B (Post-Developed)  
Scenario: Current Adjusted 10-Year

Return Event: 10 years  
Storm Event: 10-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	12.76 min
Unit receding limb, $T_r$	51.04 min
Total unit time, $T_b$	63.80 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.16 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
459.00	0.00	0.00	0.00	0.00	0.00
474.00	0.00	0.00	0.00	0.00	0.00
489.00	0.00	0.00	0.00	0.00	0.00
504.00	0.00	0.00	0.00	0.00	0.00
519.00	0.00	0.00	0.00	0.00	0.00
534.00	0.01	0.01	0.01	0.01	0.01
549.00	0.01	0.01	0.01	0.01	0.01
564.00	0.01	0.01	0.01	0.01	0.01
579.00	0.01	0.01	0.01	0.01	0.01
594.00	0.01	0.01	0.01	0.01	0.01
609.00	0.01	0.02	0.02	0.02	0.02
624.00	0.02	0.02	0.02	0.02	0.02
639.00	0.02	0.02	0.02	0.03	0.03
654.00	0.03	0.03	0.03	0.03	0.04
669.00	0.04	0.04	0.05	0.05	0.05
684.00	0.06	0.06	0.07	0.07	0.08
699.00	0.09	0.10	0.11	0.13	0.15
714.00	0.18	0.21	0.26	0.34	0.44
729.00	0.55	0.63	0.65	0.62	0.55
744.00	0.47	0.40	0.35	0.31	0.27
759.00	0.24	0.21	0.19	0.17	0.15
774.00	0.14	0.13	0.12	0.12	0.11
789.00	0.10	0.10	0.09	0.09	0.08
804.00	0.08	0.08	0.07	0.07	0.07
819.00	0.06	0.06	0.06	0.06	0.06
834.00	0.05	0.05	0.05	0.05	0.05
849.00	0.05	0.05	0.05	0.05	0.05
864.00	0.05	0.04	0.04	0.04	0.04
879.00	0.04	0.04	0.04	0.04	0.04
894.00	0.04	0.04	0.04	0.04	0.03
909.00	0.03	0.03	0.03	0.03	0.03
924.00	0.03	0.03	0.03	0.03	0.03
939.00	0.03	0.03	0.03	0.03	0.03
954.00	0.03	0.03	0.03	0.03	0.03

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Current Adjusted 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
969.00	0.03	0.03	0.03	0.03	0.03
984.00	0.03	0.03	0.03	0.03	0.03
999.00	0.03	0.03	0.02	0.02	0.02
1,014.00	0.02	0.02	0.02	0.02	0.02
1,029.00	0.02	0.02	0.02	0.02	0.02
1,044.00	0.02	0.02	0.02	0.02	0.02
1,059.00	0.02	0.02	0.02	0.02	0.02
1,074.00	0.02	0.02	0.02	0.02	0.02
1,089.00	0.02	0.02	0.02	0.02	0.02
1,104.00	0.02	0.02	0.02	0.02	0.02
1,119.00	0.02	0.02	0.02	0.02	0.02
1,134.00	0.02	0.02	0.02	0.02	0.02
1,149.00	0.02	0.02	0.02	0.02	0.02
1,164.00	0.02	0.02	0.02	0.02	0.02
1,179.00	0.02	0.02	0.02	0.02	0.02
1,194.00	0.02	0.02	0.02	0.02	0.02
1,209.00	0.02	0.02	0.02	0.02	0.02
1,224.00	0.02	0.02	0.02	0.02	0.02
1,239.00	0.02	0.02	0.02	0.02	0.02
1,254.00	0.02	0.02	0.02	0.02	0.02
1,269.00	0.02	0.01	0.01	0.01	0.01
1,284.00	0.01	0.01	0.01	0.01	0.01
1,299.00	0.01	0.01	0.01	0.01	0.01
1,314.00	0.01	0.01	0.01	0.01	0.01
1,329.00	0.01	0.01	0.01	0.01	0.01
1,344.00	0.01	0.01	0.01	0.01	0.01
1,359.00	0.01	0.01	0.01	0.01	0.01
1,374.00	0.01	0.01	0.01	0.01	0.01
1,389.00	0.01	0.01	0.01	0.01	0.01
1,404.00	0.01	0.01	0.01	0.01	0.01
1,419.00	0.01	0.01	0.01	0.01	0.01
1,434.00	0.01	0.01	0.01	0.01	0.01
1,449.00	0.01	0.01	0.01	0.00	0.00
1,464.00	0.00	0.00	0.00	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>
Computational Time Increment	2.55 min
Time to Peak (Computed)	734.98 min
Flow (Peak, Computed)	0.85 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	0.85 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.0
Area (User Defined)	10,890.00 ft <sup>2</sup>
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	3.97 in
Runoff Volume (Pervious)	3,605.900 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	3,607.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	19.14 min
Computational Time Increment	2.55 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.89 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1B (Post-Developed)  
Scenario: Future 10-Year

Return Event: 10 years  
Storm Event: 10-Year

---

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	12.76 min
Unit receding limb, Tr	51.04 min
Total unit time, Tb	63.80 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	6.21 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
405.00	0.00	0.00	0.00	0.00	0.00
420.00	0.00	0.00	0.00	0.00	0.00
435.00	0.00	0.00	0.00	0.00	0.00
450.00	0.00	0.00	0.00	0.00	0.00
465.00	0.00	0.00	0.00	0.00	0.01
480.00	0.01	0.01	0.01	0.01	0.01
495.00	0.01	0.01	0.01	0.01	0.01
510.00	0.01	0.01	0.01	0.01	0.01
525.00	0.01	0.01	0.01	0.01	0.01
540.00	0.01	0.01	0.01	0.01	0.01
555.00	0.01	0.01	0.01	0.01	0.01
570.00	0.01	0.02	0.02	0.02	0.02
585.00	0.02	0.02	0.02	0.02	0.02
600.00	0.02	0.02	0.02	0.02	0.02
615.00	0.02	0.03	0.03	0.03	0.03
630.00	0.03	0.03	0.03	0.03	0.03
645.00	0.04	0.04	0.04	0.04	0.05
660.00	0.05	0.05	0.05	0.06	0.06
675.00	0.07	0.07	0.08	0.08	0.09
690.00	0.09	0.10	0.11	0.12	0.14
705.00	0.16	0.18	0.21	0.24	0.28
720.00	0.35	0.45	0.58	0.72	0.82
735.00	0.85	0.80	0.71	0.61	0.52
750.00	0.45	0.39	0.35	0.31	0.27
765.00	0.24	0.21	0.20	0.18	0.17
780.00	0.16	0.15	0.14	0.13	0.12
795.00	0.12	0.11	0.11	0.10	0.10
810.00	0.09	0.09	0.08	0.08	0.08
825.00	0.07	0.07	0.07	0.07	0.07
840.00	0.07	0.06	0.06	0.06	0.06
855.00	0.06	0.06	0.06	0.06	0.06
870.00	0.06	0.05	0.05	0.05	0.05
885.00	0.05	0.05	0.05	0.05	0.05
900.00	0.04	0.04	0.04	0.04	0.04

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 10-Year

Return Event: 10 years  
 Storm Event: 10-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
915.00	0.04	0.04	0.04	0.04	0.04
930.00	0.04	0.04	0.04	0.04	0.04
945.00	0.04	0.04	0.04	0.04	0.04
960.00	0.04	0.03	0.03	0.03	0.03
975.00	0.03	0.03	0.03	0.03	0.03
990.00	0.03	0.03	0.03	0.03	0.03
1,005.00	0.03	0.03	0.03	0.03	0.03
1,020.00	0.03	0.03	0.03	0.03	0.03
1,035.00	0.03	0.03	0.03	0.03	0.03
1,050.00	0.03	0.03	0.03	0.03	0.03
1,065.00	0.03	0.03	0.03	0.02	0.02
1,080.00	0.02	0.02	0.02	0.02	0.02
1,095.00	0.02	0.02	0.02	0.02	0.02
1,110.00	0.02	0.02	0.02	0.02	0.02
1,125.00	0.02	0.02	0.02	0.02	0.02
1,140.00	0.02	0.02	0.02	0.02	0.02
1,155.00	0.02	0.02	0.02	0.02	0.02
1,170.00	0.02	0.02	0.02	0.02	0.02
1,185.00	0.02	0.02	0.02	0.02	0.02
1,200.00	0.02	0.02	0.02	0.02	0.02
1,215.00	0.02	0.02	0.02	0.02	0.02
1,230.00	0.02	0.02	0.02	0.02	0.02
1,245.00	0.02	0.02	0.02	0.02	0.02
1,260.00	0.02	0.02	0.02	0.02	0.02
1,275.00	0.02	0.02	0.02	0.02	0.02
1,290.00	0.02	0.02	0.02	0.02	0.02
1,305.00	0.02	0.02	0.02	0.02	0.02
1,320.00	0.02	0.02	0.02	0.02	0.02
1,335.00	0.02	0.02	0.02	0.02	0.02
1,350.00	0.02	0.02	0.02	0.02	0.02
1,365.00	0.02	0.02	0.02	0.02	0.02
1,380.00	0.02	0.02	0.02	0.02	0.02
1,395.00	0.02	0.02	0.02	0.02	0.02
1,410.00	0.02	0.02	0.02	0.02	0.02
1,425.00	0.02	0.02	0.02	0.01	0.01
1,440.00	0.02	0.02	0.01	0.01	0.01
1,455.00	0.01	0.00	0.00	0.00	0.00
1,470.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>
Computational Time Increment	2.55 min
Time to Peak (Computed)	734.98 min
Flow (Peak, Computed)	1.37 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	1.37 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.0
Area (User Defined)	10,890.00 ft <sup>2</sup>
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	6.52 in
Runoff Volume (Pervious)	5,916.658 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	5,918.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	19.14 min
Computational Time Increment	2.55 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.89 ft <sup>3</sup> /s

Subsection: Unit Hydrograph Summary  
Label: Area 1B (Post-Developed)  
Scenario: Current Adjusted 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	12.76 min
Unit receding limb, $T_r$	51.04 min
Total unit time, $T_b$	63.80 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.95 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
 Time on left represents time for first value in each row.

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
300.00	0.00	0.00	0.00	0.00	0.00
315.00	0.00	0.00	0.00	0.00	0.00
330.00	0.00	0.00	0.00	0.00	0.00
345.00	0.00	0.00	0.00	0.00	0.00
360.00	0.00	0.00	0.00	0.01	0.01
375.00	0.01	0.01	0.01	0.01	0.01
390.00	0.01	0.01	0.01	0.01	0.01
405.00	0.01	0.01	0.01	0.01	0.01
420.00	0.01	0.01	0.01	0.01	0.01
435.00	0.01	0.01	0.01	0.01	0.01
450.00	0.01	0.01	0.01	0.01	0.01
465.00	0.01	0.01	0.02	0.02	0.02
480.00	0.02	0.02	0.02	0.02	0.02
495.00	0.02	0.02	0.02	0.02	0.02
510.00	0.02	0.02	0.02	0.02	0.02
525.00	0.02	0.02	0.02	0.02	0.02
540.00	0.02	0.03	0.03	0.03	0.03
555.00	0.03	0.03	0.03	0.03	0.03
570.00	0.03	0.03	0.04	0.04	0.04
585.00	0.04	0.04	0.04	0.04	0.04
600.00	0.05	0.05	0.05	0.05	0.05
615.00	0.05	0.05	0.05	0.06	0.06
630.00	0.06	0.06	0.06	0.07	0.07
645.00	0.07	0.08	0.08	0.08	0.09
660.00	0.09	0.10	0.10	0.11	0.12
675.00	0.12	0.13	0.14	0.15	0.16
690.00	0.17	0.18	0.20	0.22	0.25
705.00	0.28	0.31	0.36	0.41	0.49
720.00	0.59	0.75	0.95	1.18	1.34
735.00	1.37	1.28	1.13	0.97	0.82
750.00	0.71	0.62	0.54	0.48	0.42
765.00	0.37	0.33	0.30	0.28	0.26
780.00	0.24	0.23	0.21	0.20	0.19
795.00	0.18	0.17	0.16	0.16	0.15

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Current Adjusted 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
810.00	0.14	0.14	0.13	0.12	0.12
825.00	0.11	0.11	0.11	0.10	0.10
840.00	0.10	0.10	0.10	0.10	0.09
855.00	0.09	0.09	0.09	0.09	0.09
870.00	0.08	0.08	0.08	0.08	0.08
885.00	0.08	0.07	0.07	0.07	0.07
900.00	0.07	0.07	0.07	0.06	0.06
915.00	0.06	0.06	0.06	0.06	0.06
930.00	0.06	0.06	0.06	0.06	0.06
945.00	0.06	0.05	0.05	0.05	0.05
960.00	0.05	0.05	0.05	0.05	0.05
975.00	0.05	0.05	0.05	0.05	0.05
990.00	0.05	0.05	0.05	0.05	0.05
1,005.00	0.05	0.05	0.05	0.05	0.05
1,020.00	0.05	0.04	0.04	0.04	0.04
1,035.00	0.04	0.04	0.04	0.04	0.04
1,050.00	0.04	0.04	0.04	0.04	0.04
1,065.00	0.04	0.04	0.04	0.04	0.04
1,080.00	0.04	0.04	0.04	0.04	0.04
1,095.00	0.03	0.03	0.03	0.03	0.03
1,110.00	0.03	0.03	0.03	0.03	0.03
1,125.00	0.03	0.03	0.03	0.03	0.03
1,140.00	0.03	0.03	0.03	0.03	0.03
1,155.00	0.03	0.03	0.03	0.03	0.03
1,170.00	0.03	0.03	0.03	0.03	0.03
1,185.00	0.03	0.03	0.03	0.03	0.03
1,200.00	0.03	0.03	0.03	0.03	0.03
1,215.00	0.03	0.03	0.03	0.03	0.03
1,230.00	0.03	0.03	0.03	0.03	0.03
1,245.00	0.03	0.03	0.03	0.03	0.03
1,260.00	0.03	0.03	0.03	0.03	0.03
1,275.00	0.03	0.03	0.03	0.03	0.03
1,290.00	0.03	0.03	0.03	0.03	0.03
1,305.00	0.03	0.03	0.03	0.03	0.03
1,320.00	0.03	0.03	0.03	0.03	0.03
1,335.00	0.03	0.03	0.03	0.03	0.03
1,350.00	0.03	0.03	0.03	0.03	0.03
1,365.00	0.02	0.02	0.02	0.02	0.02
1,380.00	0.02	0.02	0.02	0.02	0.02
1,395.00	0.02	0.02	0.02	0.02	0.02
1,410.00	0.02	0.02	0.02	0.02	0.02
1,425.00	0.02	0.02	0.02	0.02	0.02
1,440.00	0.02	0.02	0.02	0.02	0.01

Subsection: Unit Hydrograph (Hydrograph Table)  
Label: Area 1B (Post-Developed)  
Scenario: Current Adjusted 100-Year

Return Event: 100 years  
Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,455.00	0.01	0.01	0.00	0.00	0.00
1,470.00	0.00	0.00	0.00	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>
Computational Time Increment	2.55 min
Time to Peak (Computed)	734.98 min
Flow (Peak, Computed)	1.98 ft <sup>3</sup> /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	735.00 min
Flow (Peak Interpolated Output)	1.98 ft <sup>3</sup> /s
<b>Drainage Area</b>	
SCS CN (Composite)	80.0
Area (User Defined)	10,890.00 ft <sup>2</sup>
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
<b>Cumulative Runoff</b>	
Cumulative Runoff Depth (Pervious)	9.59 in
Runoff Volume (Pervious)	8,705.167 ft <sup>3</sup>
<b>Hydrograph Volume (Area under Hydrograph curve)</b>	
Volume	8,707.000 ft <sup>3</sup>
<b>SCS Unit Hydrograph Parameters</b>	
Time of Concentration (Composite)	19.14 min
Computational Time Increment	2.55 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.89 ft <sup>3</sup> /s



Subsection: Unit Hydrograph Summary  
Label: Area 1B (Post-Developed)  
Scenario: Future 100-Year

Return Event: 100 years  
Storm Event: 100-Year

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SCS Unit Hydrograph Parameters	
Unit peak time, $T_p$	12.76 min
Unit receding limb, $T_r$	51.04 min
Total unit time, $T_b$	63.80 min

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Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	12.15 in
Time of Concentration (Composite)	19.14 min
Area (User Defined)	10,890.00 ft <sup>2</sup>

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
231.00	0.00	0.00	0.00	0.00	0.00
246.00	0.00	0.00	0.00	0.00	0.00
261.00	0.00	0.00	0.00	0.00	0.00
276.00	0.01	0.01	0.01	0.01	0.01
291.00	0.01	0.01	0.01	0.01	0.01
306.00	0.01	0.01	0.01	0.01	0.01
321.00	0.01	0.01	0.01	0.01	0.01
336.00	0.01	0.01	0.01	0.01	0.01
351.00	0.01	0.01	0.01	0.01	0.01
366.00	0.01	0.01	0.01	0.01	0.01
381.00	0.02	0.02	0.02	0.02	0.02
396.00	0.02	0.02	0.02	0.02	0.02
411.00	0.02	0.02	0.02	0.02	0.02
426.00	0.02	0.02	0.02	0.02	0.02
441.00	0.02	0.03	0.03	0.03	0.03
456.00	0.03	0.03	0.03	0.03	0.03
471.00	0.03	0.03	0.03	0.03	0.03
486.00	0.03	0.03	0.03	0.04	0.04
501.00	0.04	0.04	0.04	0.04	0.04
516.00	0.04	0.04	0.04	0.04	0.04
531.00	0.04	0.04	0.04	0.05	0.05
546.00	0.05	0.05	0.05	0.05	0.05
561.00	0.05	0.05	0.06	0.06	0.06
576.00	0.06	0.06	0.07	0.07	0.07
591.00	0.07	0.07	0.07	0.08	0.08
606.00	0.08	0.08	0.08	0.09	0.09
621.00	0.09	0.09	0.10	0.10	0.10
636.00	0.10	0.11	0.11	0.12	0.12
651.00	0.13	0.13	0.14	0.15	0.16
666.00	0.16	0.17	0.18	0.20	0.21
681.00	0.22	0.24	0.25	0.26	0.28
696.00	0.31	0.34	0.38	0.43	0.48
711.00	0.54	0.62	0.73	0.88	1.10
726.00	1.40	1.71	1.93	1.98	1.84

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**  
**Output Time Increment = 3.00 min**  
**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
741.00	1.62	1.38	1.17	1.01	0.88
756.00	0.77	0.68	0.59	0.53	0.47
771.00	0.43	0.39	0.37	0.34	0.32
786.00	0.30	0.28	0.27	0.25	0.24
801.00	0.23	0.22	0.21	0.20	0.19
816.00	0.18	0.17	0.17	0.16	0.15
831.00	0.15	0.15	0.14	0.14	0.14
846.00	0.14	0.13	0.13	0.13	0.13
861.00	0.12	0.12	0.12	0.12	0.12
876.00	0.11	0.11	0.11	0.11	0.10
891.00	0.10	0.10	0.10	0.10	0.09
906.00	0.09	0.09	0.09	0.09	0.08
921.00	0.08	0.08	0.08	0.08	0.08
936.00	0.08	0.08	0.08	0.08	0.08
951.00	0.08	0.08	0.07	0.07	0.07
966.00	0.07	0.07	0.07	0.07	0.07
981.00	0.07	0.07	0.07	0.07	0.07
996.00	0.07	0.07	0.07	0.07	0.07
1,011.00	0.06	0.06	0.06	0.06	0.06
1,026.00	0.06	0.06	0.06	0.06	0.06
1,041.00	0.06	0.06	0.06	0.06	0.06
1,056.00	0.06	0.06	0.05	0.05	0.05
1,071.00	0.05	0.05	0.05	0.05	0.05
1,086.00	0.05	0.05	0.05	0.05	0.05
1,101.00	0.05	0.05	0.05	0.05	0.05
1,116.00	0.05	0.05	0.05	0.05	0.05
1,131.00	0.05	0.05	0.05	0.05	0.05
1,146.00	0.05	0.05	0.04	0.04	0.04
1,161.00	0.04	0.04	0.04	0.04	0.04
1,176.00	0.04	0.04	0.04	0.04	0.04
1,191.00	0.04	0.04	0.04	0.04	0.04
1,206.00	0.04	0.04	0.04	0.04	0.04
1,221.00	0.04	0.04	0.04	0.04	0.04
1,236.00	0.04	0.04	0.04	0.04	0.04
1,251.00	0.04	0.04	0.04	0.04	0.04
1,266.00	0.04	0.04	0.04	0.04	0.04
1,281.00	0.04	0.04	0.04	0.04	0.04
1,296.00	0.04	0.04	0.04	0.04	0.04
1,311.00	0.04	0.04	0.04	0.04	0.04
1,326.00	0.04	0.04	0.04	0.04	0.04
1,341.00	0.04	0.04	0.04	0.04	0.04
1,356.00	0.04	0.03	0.03	0.03	0.03
1,371.00	0.03	0.03	0.03	0.03	0.03

Subsection: Unit Hydrograph (Hydrograph Table)  
 Label: Area 1B (Post-Developed)  
 Scenario: Future 100-Year

Return Event: 100 years  
 Storm Event: 100-Year

**HYDROGRAPH ORDINATES (ft<sup>3</sup>/s)**

**Output Time Increment = 3.00 min**

**Time on left represents time for first value in each row.**

Time (min)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)	Flow (ft <sup>3</sup> /s)
1,386.00	0.03	0.03	0.03	0.03	0.03
1,401.00	0.03	0.03	0.03	0.03	0.03
1,416.00	0.03	0.03	0.03	0.03	0.03
1,431.00	0.03	0.03	0.03	0.03	0.03
1,446.00	0.03	0.03	0.02	0.01	0.01
1,461.00	0.01	0.00	0.00	0.00	0.00
1,476.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

# Appendix E

## Soil Data

## Soil Logs and Testing BI 286, L 14.02 Franklin Twp, 11/06/17 to 11/08/17

### Soil Log #1 (Basin Basin Flood Log 1)

0-9" 5YR 4/3 Loam Topsoil; Granular, Friable  
9-26" 5YR 4/3 Highly Fractured Platy Shale w 15% Loam;  
26-105" 5YR 4/4 Fractured Shale; 5% Loam,  
Machine Refusal  
No Water  
5YR 6/2 Mottles @ 26-40"

#### **Basin Flood**

Depth: 72"	Date	Time	Depth to Water
	11/07/17	12:00pm	60" (12" water added)
	11/07/17	2:00pm	66" (6" water left in hole)
	11/08/17	7:45am	72" (dry)
	11/08/17	8:00am	60" (12" water added)
	11/08/17	1:05pm	72" (dry) <b>PASS</b>

### Soil Log #2 (Foundation Log Lot 14.04)

0-10" 5YR 4/3 Loam Topsoil; Granular, Friable  
10-36" 5YR 4/3 Highly Fractured Platy Shale w 15% Loam;  
36-108" 5YR 4/4 Fractured Shale; 5% Loam,  
Machine Refusal  
No Water  
No Mottles

### Soil Log #3 (Foundation Log Lot 14.05)

0-8" 5YR 4/3 Loam Topsoil; Granular, Friable  
8-36" 2.5YR 4/3 Highly Fractured Platy Shale w 15% Loam;  
36-80" 2.5YR 4/4 Fractured Shale; 10% Loam,  
80-105" 2.5YR 4/4 Fractured Shale; 5% Loam,  
Machine Refusal  
No Water  
No Mottles

### Soil Log #4 (Foundation Log Lot 14.06)

0-9" 5YR 4/3 Loam Topsoil; Granular, Friable  
9-18" 2.5YR 4/3 Gravelly Clay Loam; Subangular Blocky, Friable  
18-24" 2.5YR 4/4 Highly Fractured Shale; 15% Loam,  
24-81" 2.5YR 4/4 Fractured Shale; 5% Loam,  
Machine Refusal  
No Water  
5YR 6/2 Mottles @ 18-36"

Soil Log #5 (Foundation Log Lot 14.07)

0-8" 7.5YR 4/4 Silty Clay Loam Topsoil; Granular, Friable  
8-18" 5YR 4/4 Highly Fractured Platy Shale w 15% Loam;  
18-90" 2.5YR 4/4 Shale; 5% Loam,  
Machine Refusal  
Water @ 53"  
7.5YR 6/1 Mottles @ 18-42"

Soil Log #6 (Foundation Log Lot 14.08)

0-10" 7.5YR 4/3 Silty Clay Loam Topsoil; Granular, Friable  
10-24" 7.5YR 5/3 Highly Fractured Platy Shale w 15% Loam;  
24-93" 2.5YR 4/4 Fractured Shale; 5% Loam,  
Machine Refusal  
Water @ 60"  
7.5YR 6/1 Mottles @ 24-72"

Soil Log #7 (Dry Well Log Lot 14.04)

0-10" 5YR 4/3 Loam Topsoil; Granular, Friable  
10-26" 5YR 4/4 Highly Fractured Shale w 15% Loam;  
26-72" 5YR 4/4 Fractured Shale; 5% Loam,  
Machine Refusal  
No Water  
No Mottles

**Basin Flood**

Depth: 72"	Date	Time	Depth to Water
	11/07/17	12:45pm	60" (12" water added)
	11/07/17	2:05pm	72" (dry)
	11/08/17	8:25am	60" (12" water added)
	11/08/17	10:10am	72" (dry) <b>PASS</b>

Soil Log #8 (Dry Well Log Lot 14.05)

0-12" 7.5YR 4/4 Loam Topsoil; Granular, Friable  
12-22" 5YR 5/3 Gravelly Silt Loam; Subangular Blocky, Friable  
22-60" 5YR 4/4 Fractured Shale; 10% Loam,  
Machine Refusal  
No Water  
5YR 6/1 Mottles @ 22-40"

**Basin Flood**

Depth: 60"	Date	Time	Depth to Water
	11/07/17	1:25pm	48" (12" water added)
	11/08/17	8:00am	49" (1" drop >12hrs) <b>FAIL</b>

Soil Log #9 (Dry Well Log Lot 14.06)

0-8" 5YR 4/3 Gravelly Silt Loam Topsoil; Granular, Friable  
8-18" 5YR 4/4 Fractured Shale; 30% Clay Loam,  
18-63" 5YR 4/4 Fractured Shale; 10%Clay Loam,  
Machine Refusal  
No Water  
5YR 6/2 Mottles@ 10-40"

**Basin Flood**

Depth: 63"	Date	Time	Depth to Water
	11/07/17	1:15pm	51" (12" water added)
	11/08/17	7:45am	53" (2" drop >12hrs) <b>FAIL</b>

Soil Log #10 (Dry Well Log Lot 14.07)

0-10" 7.5YR 4/4 Loam Topsoil; Granular, Friable  
10-24" 5YR 4/4 Highly Fractured Shale w 30% Loam;  
24-73" 2.5YR 4/4 Shale; 10% Loam,  
Machine Refusal  
Water @ 26" after 24hrs  
7.5YR 6/1 Mottles @ 18-42"  
**Pit Bail PASS (see spreadsheet)**

Soil Log #11 (Dry Well Log Lot 14.08)

0-10" 7.5YR 4/3 Silty Loam Topsoil; Granular, Friable  
10-24" 7.5YR 5/3 Highly Fractured Shale w 25% Loam;  
24-34" 2.5YR 4/4 Fractured Shale; 5% Loam,  
34-78" 2.5YR 4/4 Fractured Shale; 10% Silt Loam,

Machine Refusal

Water @ 24"  
7.5YR 6/2 Mottles @ 24-34"  
**Pit Bail PASS (see spreadsheet)**

Soil Log #12 (Basin -Basin Flood Log 2)

0-12" 5YR 4/3 Loam Topsoil; Granular, Friable  
12-24" 5YR 4/3 Highly Fractured Platy Shale w 15% Loam;  
24-72" 5YR 4/4 Fractured Shale; 5% Loam,  
Machine Refusal  
No Water  
5YR 6/2 Mottles @ 26-40" (Relic)



**Basin Flood**

Depth: 72"	Date	Time	Depth to Water
	11/07/17	12:20pm	60" (12" water added)
	11/07/17	2:07pm	64" (8" water left)
	11/08/17	7:46am	72" (dry)
	11/08/17	8:10am	60" (12" water added)
	11/08/17	11:00am	65" (7" water left)
	11/08/17	2:00pm	66" <b>FAIL</b>

Note: Test ran at a passing rate until it hit 65-66" on second run, then failed

**Second Test for Drywell on 14.05**

Soil Log #13 (Drywell Log 2 Lot 14.05)

0-14" 7.5YR 4/3 Loam Topsoil; Granular, Friable  
14-30" 5YR 4/4 Highly Fractured Shale w 15% Loam;  
30-42" 5YR 4/4 Fractured Shale; 10% Loam,  
42-64" 2.5YR 4/4 Fractured Shale; 5% Loam,  
Machine Refusal  
No Water  
5YR 7/1 Mottles @ 26-40" (relic?)

**Basin Flood**

Depth: 64"	Date	Time	Depth to Water
	11/08/17	10:30am	52" (12" water added)
	11/08/17	11:30am	60" (4" water left)
	11/08/17	12:30pm	64" (dry)
	11/08/17	12:45pm	52" (12" water added)
	11/08/17	1:45pm	58" (6" water left)
	11/08/17	3:15pm	64" <b>PASS</b>

**Second Test for Drywell on 14.06**

Soil Log #14 (Drywell Log 2 Lot 14.06)

0-10" 7.5YR 4/3 Loam Topsoil; Granular, Friable  
10-26" 5YR 4/4 Highly Fractured Shale w 20% Loam;  
26-58" 5YR 4/4 Fractured Shale; 10% Loam,  
Machine Refusal  
Water @56"  
5YR 6/2 Mottles @ 18-42" (relic?)

**Basin Flood**

Depth: 58"	Date	Time	Depth to Water
	11/08/17	11:00am	Seepage in bottom, test abandoned <b>FAIL</b>

# Appendix F

## Pipe Calculations

Inlet Drainage Area Breakdown						
Drainage Area	Catch Basin I.D.	Area (Acres)	Impervious C Value	Woods C Value (HSG D)	Open Space C Value (HSG D)	Runoff Coefficient (Rational)
			0.99	0.59	0.65	
DA-5	CB #5	0.10	0.06	0.00	0.04	0.85
DA-6	CB #6	0.35	0.09	0.10	0.16	0.72
DA-9	CB #9	0.98	0.15	0.44	0.39	0.68
DA-101	CB #101	0.27	0.09	0.00	0.18	0.76
DA-102	CB #102	0.23	0.10	0.00	0.13	0.80
DA-103	CB #103	0.62	0.28	0.00	0.34	0.80
DA-105	CB #105	0.29	0.05	0.00	0.24	0.71
DA-106	CB #106	0.92	0.10	0.14	0.68	0.68
DA-107	CB #107	0.28	0.01	0.00	0.27	0.66
DA-201	CB #201	0.05	0.02	0.00	0.03	0.79
DA-202	CB #202	0.04	0.01	0.00	0.03	0.74
EX-A	EXISTING INLET A	1.52	0.85	0.00	0.67	0.84

# PIPE CAPACITY ANALYSIS

Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (ft)	System Intensity (in/h)	System CA (acres)	Upstream Inlet Area (acres)	Upstream Inlet C	Slope (%)	Manning's n	Diameter (in)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	HGL (In) (ft)	HGL (Out) (ft)
CB #106	CB #105	98.43	97.65	156	102.75	0.63	0.92	0.68	0.50	0.013	18	4.16	7.42	4.32	99.23	98.50
CB #105	STM MH #104	97.55	97.30	50	101.30	0.83	0.29	0.71	0.50	0.013	18	5.43	7.46	4.61	98.50	98.20
STM MH #104	CB #103	97.01	96.38	127	102.40	1.02	(N/A)	(N/A)	0.50	0.013	18	6.60	7.40	4.73	98.11	97.48
CB #107	STM MH #104	97.67	97.30	73	100.75	0.18	0.28	0.66	0.50	0.013	15	1.23	4.57	3.16	98.14	98.11
CB #202	CB #201	95.56	95.28	28	102.35	0.03	0.04	0.74	1.00	0.013	15	0.20	6.46	2.36	95.73	95.43
CB #201	HW #200	95.18	95.00	18	102.35	0.07	0.05	0.79	1.00	0.013	15	0.46	6.46	3.04	95.44	95.23
CB #9	STM MH#8	94.54	94.44	20	99.60	0.67	0.98	0.68	0.50	0.013	21	10.75	11.20	5.30	95.87	95.72
CB #103	CB #102	96.28	95.82	46	102.50	1.51	0.62	0.80	1.00	0.013	18	9.69	10.48	6.73	97.48	96.96
CB #102	CB #101	95.32	95.18	28	101.75	1.70	0.23	0.80	0.50	0.013	24	10.83	16.00	5.47	96.53	96.37
CB #101	HW#100	95.08	95.00	15	101.75	1.90	0.27	0.76	0.50	0.013	24	12.10	16.07	5.62	96.37	96.25
STM MH#8	STM MH#7	94.34	93.74	121	101.25	0.67	(N/A)	(N/A)	0.50	0.013	21	10.74	11.18	5.29	95.72	94.96
CB #6	CB #5	96.69	96.50	32	99.60	0.25	0.35	0.72	0.60	0.013	15	1.68	5.02	3.68	97.20	97.00
CB #5	STM MH#3	96.40	95.47	123	99.60	0.34	0.10	0.85	0.75	0.013	15	2.23	5.61	4.31	97.00	96.02
OCS	CB #9	95.00	94.75	25	100.95	0.00	(N/A)	(N/A)	1.00	0.013	15	6.32	6.47	6.01	96.01	95.87
STM MH#3	HW #300	95.37	95.00	49	101.45	0.34	(N/A)	(N/A)	0.75	0.013	15	2.20	5.60	4.29	95.96	95.54
EXISTING INLET A	EXISTING INLET B	96.76	77.86	789	100.92	1.28	1.52	0.84	2.40	0.013	15	8.49	10.00	9.14	97.90	78.75

# Appendix G

## Emergency Spillway Design

Subsection: Master Network Summary

**Catchments Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)
Area 1A (Pre-Developed)	Future 100-Year + 50%	150	157,694.000	738.00	31.09
Area 1A Imervious (Post-Developed)	Future 100-Year + 50%	150	76,431.000	735.00	14.74
Area 1A Pervious (Post-Developed)	Future 100-Year + 50%	150	103,642.000	735.00	21.93
Area 1B (Post-Developed)	Future 100-Year + 50%	150	14,105.000	735.00	3.11
Area 1B (Pre-Developed)	Future 100-Year + 50%	150	21,592.000	738.00	4.28

**Node Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)
POA (Post-Developed)	Future 100-Year + 50%	150	154,082.000	735.00	39.36
POA (Pre-Developed - Area 1A)	Future 100-Year + 50%	150	157,694.000	738.00	31.09
POA (Pre-Developed - Area 1B)	Future 100-Year + 50%	150	21,592.000	738.00	4.28

**Pond Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ft <sup>3</sup> )	Time to Peak (min)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft <sup>3</sup> )
Pond Constructed Wetland (IN)	Future 100-Year + 50%	150	180,073.000	735.00	36.67	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	Future 100-Year + 50%	150	139,977.000	735.00	36.25	101.56	57,337.000

Subsection: Outlet Input Data  
 Label: Emergency Spillway  
 Scenario: Future 100-Year + 50%

Return Event: 150 years  
 Storm Event: 100-Year + 50%

Requested Pond Water Surface Elevations	
Minimum (Headwater)	90.50 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	101.00 ft

**Outlet Connectivity**

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Rectangular Weir Tailwater Settings	25' Weir Tailwater	Forward	TW	100.95 (N/A)	101.95 (N/A)

Subsection: Outlet Input Data  
 Label: Emergency Spillway  
 Scenario: Future 100-Year + 50%

Return Event: 150 years  
 Storm Event: 100-Year + 50%

Structure ID: 25' Weir	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	100.95 ft
Weir Length	25.00 ft
Weir Coefficient	3.00 (ft <sup>0.5</sup> )/s
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft <sup>3</sup> /s
Flow Tolerance (Maximum)	10.000 ft <sup>3</sup> /s



# Appendix H

## BMP Calculations

## Pond Constructed Wetland Calculations

### i. Parameters

Standing Water Depth – Pool Zone: 4.5'  
Standing Water Depth – High Marsh Zone: 0-6"  
Standing Water Depth – Low Marsh Zone: 6-18"  
Total Drainage Area: 3.01 Acres

### ii. WQDS Volume Allocation

WQDS Volume: 5,514 ft<sup>3</sup>

#### Pool Zone

Required Volume Allocation: 60% of WQDS Volume =  $0.6 \times 5,514 \text{ ft}^3 = 3,308 \text{ ft}^3$   
Proposed Volume Allocation: 10,088 ft<sup>3</sup>  
WQDS Volume Percentage:  $10,088 \text{ ft}^3 / 5,514 \text{ ft}^3 = 183\%$

#### Low Marsh Zone

Required Volume Allocation: 20% of WQDS Volume =  $0.2 \times 5,514 \text{ ft}^3 = 1,103 \text{ ft}^3$   
Proposed Volume Allocation: 2,303 ft<sup>3</sup>  
WQDS Volume Percentage:  $2,303 \text{ ft}^3 / 5,514 \text{ ft}^3 = 42\%$

#### High Marsh Zone

Required Volume Allocation: 10% of WQDS Volume =  $0.1 \times 5,514 \text{ ft}^3 = 551 \text{ ft}^3$   
Proposed Volume Allocation: 595 ft<sup>3</sup>  
WQDS Volume Percentage:  $595 \text{ ft}^3 / 5,514 \text{ ft}^3 = 11\%$

#### Pretreatment Zone\*

Required WQDS Volume Allocation: 10%  
Proposed WQDS Volume Allocation: 0%

\*The 10% Water Quality Design Storm volume allocation for this component is only applicable to those systems that utilize a forebay per Chapter 10.4 of the BMP Manual.

### iii. Buoyancy Calculations

Density of Water: 62.4 lb/ft<sup>3</sup>  
Acceleration of Gravity: 32 ft/s<sup>2</sup>  
Density of 6" Sand Layer Above Impermeable Liner: 100 lb/ft<sup>3</sup>  
Density of 18" Soil Bed Above Impermeable Liner: 100 lb/ft<sup>3</sup>  
Permanent Pool Surface Area: 6,474 ft<sup>2</sup>  
Volume of Sand =  $6,474 \text{ ft}^2 \times 0.5 \text{ ft} = 3,237 \text{ ft}^3$   
Volume of Soil Bed =  $6,474 \text{ ft}^2 \times 1.5 \text{ ft} = 9,711 \text{ ft}^3$   
Thickness of Impermeable Liner = 40 mm = 0.13 ft  
Volume of Impermeable Liner =  $6,474 \text{ ft}^2 \times 0.13 \text{ ft} = 842 \text{ ft}^3$   
Volume of Displaced Water =  $3,237 \text{ ft}^3 + 9,711 \text{ ft}^3 + 842 \text{ ft}^3 = 13,790 \text{ ft}^3$

$$\begin{aligned}\text{Buoyant Force} &= \text{Density of Water} \times \text{Volume of Displaced Water} \\ &= 62.4 \text{ lb/ft}^3 \times 13,790 \text{ ft}^3 = 860 \text{ kips}\end{aligned}$$

$$\begin{aligned}\text{Weight of Sand/Soil Bed} &= \text{Density of Sand/Soil Bed} \times \text{Volume of Sand/Soil bed} \\ &= 100 \text{ lb/ft}^3 \times 12,948 \text{ ft}^3 = 1,295 \text{ kips} > 860 \text{ kips}\end{aligned}$$

## Pond Constructed Wetland

<b>Pool Zone Volume Results Table</b>				
Elevation (ft)	Area (ft <sup>2</sup> )	$A1+A2+\text{sqr}(A1*A2)$ (ft <sup>2</sup> )	Volume (ft <sup>3</sup> )	Volume (Total) (ft <sup>3</sup> )
90.50	821.00	0.00	0.00	0.00
91.00	1110.00	2885.63	481.00	481.00
92.00	1796.00	4317.93	1439.00	1920.00
93.00	2599.00	6555.51	2185.00	4105.00
93.50	3048.00	8461.56	1410.00	5516.00
95.00	3048.00	9144.00	4572.00	10088.00

<b>Low Marsh Zone Volume Results Table</b>				
Elevation (ft)	Area (ft <sup>2</sup> )	$A1+A2+\text{sqr}(A1*A2)$ (ft <sup>2</sup> )	Volume (ft <sup>3</sup> )	Volume (Total) (ft <sup>3</sup> )
93.50	0.00	0.00	0.00	0.00
93.51	819.00	819.00	3.00	3.00
94.00	1353.00	3224.67	527.00	529.00
94.50	1919.00	4883.34	814.00	1343.00
95.00	1919.00	5757.00	960.00	2303.00

<b>High Marsh Zone Volume Results Table</b>				
Elevation (ft)	Area (ft <sup>2</sup> )	$A1+A2+\text{sqr}(A1*A2)$ (ft <sup>2</sup> )	Volume (ft <sup>3</sup> )	Volume (Total) (ft <sup>3</sup> )
94.50	0.00	0.00	0.00	0.00
94.51	930.00	930.00	3.00	3.00
95.00	1507.00	3620.85	591.00	595.00

# Water Budget Analysis

## Pond Constructed Wetland

$$\Delta S = P + S - ET$$

$\Delta S$  = Change in Volume of Water in Pond Constructed Wetland (ft<sup>3</sup>/day)

P = Precipitation (ft<sup>3</sup>/day)

ET = Evapotranspiration (ft<sup>3</sup>/day)

S = Surface-Water Inflow (ft<sup>3</sup>/day)

$$ET_i = 1.6(10T_i/I)^a$$

ET<sub>i</sub> = Potential Evapotranspiration for Month *i* (cm/mo)

T<sub>i</sub> = Mean Monthly Temperature (°C)

$$I = \text{Annual Heat Index} = \sum(T_i/5)^{1.5}$$

$$a = 0.49 + 0.0179I - 0.0000771I^2 + 0.000000675I^3$$

Data Source: NJDEP - NWS/NOAA MPE Weather Stations

Weather Station: RA120 (South Branch Raritan River at South Branch)

Period of Study: 2001-2022

Model Year (Wet): 2019

Model Year (Dry): 2012

Model Year (Average): 2001

Temperature Data Source: National Climatic Data Center (NCDC) - Somerset Airport Station

Pond Constructed Wetland Drainage Area (ft<sup>2</sup>): 126,149

High Marsh Zone Surface Area (ft<sup>2</sup>): 4,967

### Wet Year (2019)

Month	T <sub>i</sub> (°F)	T <sub>i</sub> (°C)	ET <sub>i</sub> (ft <sup>3</sup> /day)	Correction
				Factor
January	29.9	-1.2	0.0	0.80
February	34.0	1.1	1.0	0.89
March	38.5	3.6	4.9	0.99
April	54.5	12.5	29.4	1.10
May	61.9	16.6	45.4	1.20
June	68.8	20.4	64.5	1.25
July	77.5	25.3	81.6	1.23
August	74.0	23.3	68.6	1.15
September	67.8	19.9	51.7	1.04
October	57.0	13.9	27.7	0.93
November	39.6	4.2	5.2	0.83
December	35.0	1.7	1.4	0.78
	I=	54.0		
	a=	1.3		

## January 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	ΔS (ft <sup>3</sup> /day)	Cumulative ΔS (ft <sup>3</sup> /day)	Cumulative ΔS (in)	RA120
1/1	37.3	946.1175	0.0	983.4	983.4	2.4	0.09
1/2	0.0	0	0.0	0.0	0.0	0.0	0
1/3	0.0	0	0.0	0.0	0.0	0.0	0
1/4	8.3	210.24833	0.0	218.5	218.5	0.5	0.02
1/5	293.9	7463.8158	0.0	7757.7	7757.7	18.7	0.71
1/6	0.0	0	0.0	0.0	0.0	0.0	0
1/7	8.3	210.24833	0.0	218.5	218.5	0.5	0.02
1/8	111.8	2838.3525	0.0	2950.1	2950.1	7.1	0.27
1/9	12.4	315.3725	0.0	327.8	327.8	0.8	0.03
1/10	12.4	315.3725	0.0	327.8	327.8	0.8	0.03
1/11	0.0	0	0.0	0.0	0.0	0.0	0
1/12	0.0	0	0.0	0.0	0.0	0.0	0
1/13	24.8	630.745	0.0	655.6	655.6	1.6	0.06
1/14	0.0	0	0.0	0.0	0.0	0.0	0
1/15	0.0	0	0.0	0.0	0.0	0.0	0
1/16	0.0	0	0.0	0.0	0.0	0.0	0
1/17	20.7	525.62083	0.0	546.3	546.3	1.3	0.05
1/18	16.6	420.49667	0.0	437.1	437.1	1.1	0.04
1/19	235.9	5992.0775	0.0	6228.0	6228.0	15.0	0.57
1/20	372.5	9461.175	0.0	9833.7	9833.7	23.8	0.9
1/21	0.0	0	0.0	0.0	0.0	0.0	0
1/22	0.0	0	0.0	0.0	0.0	0.0	0
1/23	0.0	0	0.0	0.0	0.0	0.0	0
1/24	513.3	13035.397	0.0	13548.7	13548.7	32.7	1.24
1/25	0.0	0	0.0	0.0	0.0	0.0	0
1/26	0.0	0	0.0	0.0	0.0	0.0	0
1/27	0.0	0	0.0	0.0	0.0	0.0	0
1/28	0.0	0	0.0	0.0	0.0	0.0	0
1/29	157.3	3994.7183	0.0	4152.0	4152.0	10.0	0.38
1/30	16.6	420.49667	0.0	437.1	437.1	1.1	0.04
1/31	0.0	0	0.0	0.0	0.0	0.0	0

## February 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
2/1	0.0	0.0	1.0	-1.0	-1.0	0.0	0
2/2	0.0	0.0	1.0	-1.0	-2.0	0.0	0
2/3	0.0	0.0	1.0	-1.0	-3.0	0.0	0
2/4	0.0	0.0	1.0	-1.0	-4.0	0.0	0
2/5	0.0	0.0	1.0	-1.0	-5.0	0.0	0
2/6	207.0	5256.2	1.0	5462.2	5457.2	13.2	0.5
2/7	0.0	0.0	1.0	-1.0	-1.0	0.0	0
2/8	202.8	5151.1	1.0	5352.9	5351.9	12.9	0.49
2/9	0.0	0.0	1.0	-1.0	-1.0	0.0	0
2/10	12.4	315.4	1.0	326.8	325.8	0.8	0.03
2/11	53.8	1366.6	1.0	1419.4	1419.4	3.4	0.13
2/12	256.6	6517.7	1.0	6773.3	6773.3	16.4	0.62
2/13	66.2	1682.0	1.0	1747.2	1747.2	4.2	0.16
2/14	0.0	0.0	1.0	-1.0	-1.0	0.0	0
2/15	0.0	0.0	1.0	-1.0	-2.0	0.0	0
2/16	0.0	0.0	1.0	-1.0	-3.0	0.0	0
2/17	41.4	1051.2	1.0	1091.6	1088.6	2.6	0.1
2/18	12.4	315.4	1.0	326.8	326.8	0.8	0.03
2/19	0.0	0.0	1.0	-1.0	-1.0	0.0	0
2/20	298.0	7568.9	1.0	7866.0	7865.0	19.0	0.72
2/21	0.0	0.0	1.0	-1.0	-1.0	0.0	0
2/22	0.0	0.0	1.0	-1.0	-2.0	0.0	0
2/23	12.4	315.4	1.0	326.8	324.8	0.8	0.03
2/24	207.0	5256.2	1.0	5462.2	5462.2	13.2	0.5
2/25	0.0	0.0	1.0	-1.0	-1.0	0.0	0
2/26	0.0	0.0	1.0	-1.0	-2.0	0.0	0
2/27	0.0	0.0	1.0	-1.0	-3.0	0.0	0
2/28	8.3	210.2	1.0	217.5	214.5	0.5	0.02

## March 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
3/1	41.4	1051.2	4.9	1087.8	1087.8	2.6	0.1
3/2	244.2	6202.3	4.9	6441.7	6441.7	15.6	0.59
3/3	306.3	7779.2	4.9	8080.6	8080.6	19.5	0.74
3/4	91.1	2312.7	4.9	2398.9	2398.9	5.8	0.22
3/5	0.0	0.0	4.9	-4.9	-4.9	0.0	0
3/6	0.0	0.0	4.9	-4.9	-9.7	0.0	0
3/7	8.3	210.2	4.9	213.7	203.9	0.5	0.02
3/8	0.0	0.0	4.9	-4.9	-4.9	0.0	0
3/9	0.0	0.0	4.9	-4.9	-9.7	0.0	0
3/10	302.2	7674.1	4.9	7971.4	7961.6	19.2	0.73
3/11	0.0	0.0	4.9	-4.9	-4.9	0.0	0
3/12	0.0	0.0	4.9	-4.9	-9.7	0.0	0
3/13	0.0	0.0	4.9	-4.9	-14.6	0.0	0
3/14	0.0	0.0	4.9	-4.9	-19.5	0.0	0
3/15	219.4	5571.6	4.9	5786.1	5766.6	13.9	0.53
3/16	0.0	0.0	4.9	-4.9	-4.9	0.0	0
3/17	0.0	0.0	4.9	-4.9	-9.7	0.0	0
3/18	0.0	0.0	4.9	-4.9	-14.6	0.0	0
3/19	0.0	0.0	4.9	-4.9	-19.5	0.0	0
3/20	0.0	0.0	4.9	-4.9	-24.3	-0.1	0
3/21	405.6	10302.2	4.9	10702.9	10678.6	25.8	0.98
3/22	306.3	7779.2	4.9	8080.6	8080.6	19.5	0.74
3/23	0.0	0.0	4.9	-4.9	-4.9	0.0	0
3/24	0.0	0.0	4.9	-4.9	-9.7	0.0	0
3/25	12.4	315.4	4.9	322.9	313.2	0.8	0.03
3/26	0.0	0.0	4.9	-4.9	-4.9	0.0	0
3/27	0.0	0.0	4.9	-4.9	-9.7	0.0	0
3/28	0.0	0.0	4.9	-4.9	-14.6	0.0	0
3/29	8.3	210.2	4.9	213.7	199.1	0.5	0.02
3/30	0.0	0.0	4.9	-4.9	-4.9	0.0	0
3/31	41.4	1051.2	4.9	1087.8	1082.9	2.6	0.1



## April 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
4/1	0.0	0.0	29.4	-29.4	-29.4	-0.1	0
4/2	0.0	0.0	29.4	-29.4	-58.8	-0.1	0
4/3	0.0	0.0	29.4	-29.4	-88.2	-0.2	0
4/4	0.0	0.0	29.4	-29.4	-117.6	-0.3	0
4/5	115.9	2943.5	29.4	3030.0	2912.4	7.0	0.28
4/6	0.0	0.0	29.4	-29.4	-29.4	-0.1	0
4/7	0.0	0.0	29.4	-29.4	-58.8	-0.1	0
4/8	45.5	1156.4	29.4	1172.5	1113.7	2.7	0.11
4/9	20.7	525.6	29.4	516.9	516.9	1.2	0.05
4/10	0.0	0.0	29.4	-29.4	-29.4	-0.1	0
4/11	0.0	0.0	29.4	-29.4	-58.8	-0.1	0
4/12	273.2	6938.2	29.4	7182.0	7123.2	17.2	0.66
4/13	33.1	841.0	29.4	844.7	844.7	2.0	0.08
4/14	16.6	420.5	29.4	407.7	407.7	1.0	0.04
4/15	434.6	11038.0	29.4	11443.3	11443.3	27.6	1.05
4/16	0.0	0.0	29.4	-29.4	-29.4	-0.1	0
4/17	0.0	0.0	29.4	-29.4	-58.8	-0.1	0
4/18	0.0	0.0	29.4	-29.4	-88.2	-0.2	0
4/19	62.1	1576.9	29.4	1609.6	1521.4	3.7	0.15
4/20	343.6	8725.3	29.4	9039.5	9039.5	21.8	0.83
4/21	0.0	0.0	29.4	-29.4	-29.4	-0.1	0
4/22	53.8	1366.6	29.4	1391.0	1361.6	3.3	0.13
4/23	0.0	0.0	29.4	-29.4	-29.4	-0.1	0
4/24	0.0	0.0	29.4	-29.4	-58.8	-0.1	0
4/25	8.3	210.2	29.4	189.1	130.3	0.3	0.02
4/26	322.9	8199.7	29.4	8493.1	8493.1	20.5	0.78
4/27	0.0	0.0	29.4	-29.4	-29.4	-0.1	0
4/28	8.3	210.2	29.4	189.1	159.7	0.4	0.02
4/29	0.0	0.0	29.4	-29.4	-29.4	-0.1	0
4/30	12.4	315.4	29.4	298.4	269.0	0.6	0.03

## May 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
5/1	0.0	0.0	45.4	-45.4	-45.4	-0.1	0
5/2	0.0	0.0	45.4	-45.4	-90.8	-0.2	0
5/3	0.0	0.0	45.4	-45.4	-136.2	-0.3	0
5/4	66.2	1682.0	45.4	1702.8	1566.6	3.8	0.16
5/5	554.6	14086.6	45.4	14595.9	14595.9	35.3	1.34
5/6	0.0	0.0	45.4	-45.4	-45.4	-0.1	0
5/7	95.2	2417.9	45.4	2467.7	2422.3	5.9	0.23
5/8	0.0	0.0	45.4	-45.4	-45.4	-0.1	0
5/9	0.0	0.0	45.4	-45.4	-90.8	-0.2	0
5/10	24.8	630.7	45.4	610.2	519.4	1.3	0.06
5/11	86.9	2207.6	45.4	2249.1	2249.1	5.4	0.21
5/12	389.1	9881.7	45.4	10225.4	10225.4	24.7	0.94
5/13	260.8	6622.8	45.4	6838.2	6838.2	16.5	0.63
5/14	20.7	525.6	45.4	500.9	500.9	1.2	0.05
5/15	8.3	210.2	45.4	173.1	173.1	0.4	0.02
5/16	24.8	630.7	45.4	610.2	610.2	1.5	0.06
5/17	4.1	105.1	45.4	63.9	63.9	0.2	0.01
5/18	0.0	0.0	45.4	-45.4	-45.4	-0.1	0
5/19	149.0	3784.5	45.4	3888.1	3842.7	9.3	0.36
5/20	70.4	1787.1	45.4	1812.1	1812.1	4.4	0.17
5/21	0.0	0.0	45.4	-45.4	-45.4	-0.1	0
5/22	0.0	0.0	45.4	-45.4	-90.8	-0.2	0
5/23	190.4	4835.7	45.4	4980.7	4889.9	11.8	0.46
5/24	0.0	0.0	45.4	-45.4	-45.4	-0.1	0
5/25	0.0	0.0	45.4	-45.4	-90.8	-0.2	0
5/26	4.1	105.1	45.4	63.9	-26.9	-0.1	0.01
5/27	0.0	0.0	45.4	-45.4	-72.3	-0.2	0
5/28	120.0	3048.6	45.4	3123.2	3050.9	7.4	0.29
5/29	467.7	11879.0	45.4	12301.4	12301.4	29.7	1.13
5/30	637.4	16189.1	45.4	16781.2	16781.2	40.5	1.54
5/31	0.0	0.0	45.4	-45.4	-45.4	-0.1	0

## June 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
6/1	0.0	0.0	64.5	-64.5	-109.9	-0.3	0
6/2	153.1	3889.6	64.5	3978.2	3868.3	9.3	0.37
6/3	0.0	0.0	64.5	-64.5	-64.5	-0.2	0
6/4	0.0	0.0	64.5	-64.5	-129.0	-0.3	0
6/5	4.1	105.1	64.5	44.7	-84.3	-0.2	0.01
6/6	53.8	1366.6	64.5	1355.9	1271.6	3.1	0.13
6/7	0.0	0.0	64.5	-64.5	-64.5	-0.2	0
6/8	0.0	0.0	64.5	-64.5	-129.0	-0.3	0
6/9	0.0	0.0	64.5	-64.5	-193.6	-0.5	0
6/10	132.5	3364.0	64.5	3431.9	3238.4	7.8	0.32
6/11	194.5	4940.8	64.5	5070.9	5070.9	12.3	0.47
6/12	0.0	0.0	64.5	-64.5	-64.5	-0.2	0
6/13	384.9	9776.5	64.5	10097.0	10032.5	24.2	0.93
6/14	0.0	0.0	64.5	-64.5	-64.5	-0.2	0
6/15	0.0	0.0	64.5	-64.5	-129.0	-0.3	0
6/16	45.5	1156.4	64.5	1137.4	1008.3	2.4	0.11
6/17	20.7	525.6	64.5	481.8	481.8	1.2	0.05
6/18	794.7	20183.8	64.5	20914.0	20914.0	50.5	1.92
6/19	37.3	946.1	64.5	918.9	918.9	2.2	0.09
6/20	149.0	3784.5	64.5	3869.0	3869.0	9.3	0.36
6/21	124.2	3153.7	64.5	3213.4	3213.4	7.8	0.3
6/22	0.0	0.0	64.5	-64.5	-64.5	-0.2	0
6/23	0.0	0.0	64.5	-64.5	-129.0	-0.3	0
6/24	0.0	0.0	64.5	-64.5	-193.6	-0.5	0
6/25	124.2	3153.7	64.5	3213.4	3019.8	7.3	0.3
6/26	0.0	0.0	64.5	-64.5	-64.5	-0.2	0
6/27	0.0	0.0	64.5	-64.5	-129.0	-0.3	0
6/28	8.3	210.2	64.5	154.0	25.0	0.1	0.02
6/29	41.4	1051.2	64.5	1028.1	1028.1	2.5	0.1
6/30	0.0	0.0	64.5	-64.5	-64.5	-0.2	0

## July 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
7/1	0.0	0.0	81.6	-81.6	-146.1	-0.4	0
7/2	66.2	1682.0	81.6	1666.6	1520.5	3.7	0.16
7/3	0.0	0.0	81.6	-81.6	-81.6	-0.2	0
7/4	0.0	0.0	81.6	-81.6	-163.2	-0.4	0
7/5	0.0	0.0	81.6	-81.6	-244.8	-0.6	0
7/6	78.6	1997.4	81.6	1994.4	1749.6	4.2	0.19
7/7	0.0	0.0	81.6	-81.6	-81.6	-0.2	0
7/8	161.4	4099.8	81.6	4179.7	4098.1	9.9	0.39
7/9	0.0	0.0	81.6	-81.6	-81.6	-0.2	0
7/10	0.0	0.0	81.6	-81.6	-163.2	-0.4	0
7/11	604.3	15348.1	81.6	15870.8	15707.6	37.9	1.46
7/12	0.0	0.0	81.6	-81.6	-81.6	-0.2	0
7/13	0.0	0.0	81.6	-81.6	-163.2	-0.4	0
7/14	0.0	0.0	81.6	-81.6	-244.8	-0.6	0
7/15	0.0	0.0	81.6	-81.6	-326.4	-0.8	0
7/16	0.0	0.0	81.6	-81.6	-408.0	-1.0	0
7/17	331.1	8409.9	81.6	8659.5	8251.4	19.9	0.8
7/18	1051.3	26701.5	81.6	27671.3	27671.3	66.9	2.54
7/19	0.0	0.0	81.6	-81.6	-81.6	-0.2	0
7/20	0.0	0.0	81.6	-81.6	-163.2	-0.4	0
7/21	82.8	2102.5	81.6	2103.7	1940.5	4.7	0.2
7/22	629.2	15978.9	81.6	16526.4	16526.4	39.9	1.52
7/23	260.8	6622.8	81.6	6802.0	6802.0	16.4	0.63
7/24	16.6	420.5	81.6	355.4	355.4	0.9	0.04
7/25	0.0	0.0	81.6	-81.6	-81.6	-0.2	0
7/26	0.0	0.0	81.6	-81.6	-163.2	-0.4	0
7/27	0.0	0.0	81.6	-81.6	-244.8	-0.6	0
7/28	8.3	210.2	81.6	136.9	-107.9	-0.3	0.02
7/29	0.0	0.0	81.6	-81.6	-189.5	-0.5	0
7/30	0.0	0.0	81.6	-81.6	-271.1	-0.7	0
7/31	62.1	1576.9	81.6	1557.3	1286.2	3.1	0.15

## August 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
8/1	0.0	0.0	68.6	-68.6	-68.6	-0.2	0
8/2	0.0	0.0	68.6	-68.6	-137.1	-0.3	0
8/3	0.0	0.0	68.6	-68.6	-205.7	-0.5	0
8/4	0.0	0.0	68.6	-68.6	-274.2	-0.7	0
8/5	0.0	0.0	68.6	-68.6	-342.8	-0.8	0
8/6	78.6	1997.4	68.6	2007.5	1664.7	4.0	0.19
8/7	1142.4	29014.3	68.6	30088.1	30088.1	72.7	2.76
8/8	0.0	0.0	68.6	-68.6	-68.6	-0.2	0
8/9	8.3	210.2	68.6	150.0	81.4	0.2	0.02
8/10	0.0	0.0	68.6	-68.6	-68.6	-0.2	0
8/11	0.0	0.0	68.6	-68.6	-137.1	-0.3	0
8/12	0.0	0.0	68.6	-68.6	-205.7	-0.5	0
8/13	37.3	946.1	68.6	914.8	709.2	1.7	0.09
8/14	219.4	5571.6	68.6	5722.4	5722.4	13.8	0.53
8/15	0.0	0.0	68.6	-68.6	-68.6	-0.2	0
8/16	0.0	0.0	68.6	-68.6	-137.1	-0.3	0
8/17	0.0	0.0	68.6	-68.6	-205.7	-0.5	0
8/18	82.8	2102.5	68.6	2116.7	1911.1	4.6	0.2
8/19	0.0	0.0	68.6	-68.6	-68.6	-0.2	0
8/20	0.0	0.0	68.6	-68.6	-137.1	-0.3	0
8/21	0.0	0.0	68.6	-68.6	-205.7	-0.5	0
8/22	132.5	3364.0	68.6	3427.9	3222.2	7.8	0.32
8/23	45.5	1156.4	68.6	1133.3	1133.3	2.7	0.11
8/24	0.0	0.0	68.6	-68.6	-68.6	-0.2	0
8/25	0.0	0.0	68.6	-68.6	-137.1	-0.3	0
8/26	0.0	0.0	68.6	-68.6	-205.7	-0.5	0
8/27	0.0	0.0	68.6	-68.6	-274.2	-0.7	0
8/28	41.4	1051.2	68.6	1024.1	749.9	1.8	0.1
8/29	0.0	0.0	68.6	-68.6	-68.6	-0.2	0
8/30	0.0	0.0	68.6	-68.6	-137.1	-0.3	0
8/31	0.0	0.0	68.6	-68.6	-205.7	-0.5	0

## September 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
9/1	0.0	0.0	51.7	-51.7	-51.7	-0.1	0
9/2	256.6	6517.7	51.7	6722.6	6670.9	16.1	0.62
9/3	0.0	0.0	51.7	-51.7	-51.7	-0.1	0
9/4	0.0	0.0	51.7	-51.7	-103.5	-0.2	0
9/5	0.0	0.0	51.7	-51.7	-155.2	-0.4	0
9/6	37.3	946.1	51.7	931.6	776.4	1.9	0.09
9/7	0.0	0.0	51.7	-51.7	-51.7	-0.1	0
9/8	0.0	0.0	51.7	-51.7	-103.5	-0.2	0
9/9	57.9	1471.7	51.7	1478.0	1374.5	3.3	0.14
9/10	0.0	0.0	51.7	-51.7	-51.7	-0.1	0
9/11	0.0	0.0	51.7	-51.7	-103.5	-0.2	0
9/12	57.9	1471.7	51.7	1478.0	1374.5	3.3	0.14
9/13	0.0	0.0	51.7	-51.7	-51.7	-0.1	0
9/14	0.0	0.0	51.7	-51.7	-103.5	-0.2	0
9/15	0.0	0.0	51.7	-51.7	-155.2	-0.4	0
9/16	0.0	0.0	51.7	-51.7	-206.9	-0.5	0
9/17	0.0	0.0	51.7	-51.7	-258.7	-0.6	0
9/18	0.0	0.0	51.7	-51.7	-310.4	-0.7	0
9/19	0.0	0.0	51.7	-51.7	-362.2	-0.9	0
9/20	0.0	0.0	51.7	-51.7	-413.9	-1.0	0
9/21	0.0	0.0	51.7	-51.7	-465.6	-1.1	0
9/22	0.0	0.0	51.7	-51.7	-517.4	-1.2	0
9/23	53.8	1366.6	51.7	1368.7	851.3	2.1	0.13
9/24	0.0	0.0	51.7	-51.7	-51.7	-0.1	0
9/25	0.0	0.0	51.7	-51.7	-103.5	-0.2	0
9/26	16.6	420.5	51.7	385.3	281.8	0.7	0.04
9/27	0.0	0.0	51.7	-51.7	-51.7	-0.1	0
9/28	4.1	105.1	51.7	57.5	5.8	0.0	0.01
9/29	0.0	0.0	51.7	-51.7	-51.7	-0.1	0
9/30	0.0	0.0	51.7	-51.7	-103.5	-0.2	0

## October 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
10/1	0.0	0.0	27.7	-27.7	-27.7	-0.1	0
10/2	57.9	1471.7	27.7	1502.0	1474.3	3.6	0.14
10/3	53.8	1366.6	27.7	1392.7	1392.7	3.4	0.13
10/4	0.0	0.0	27.7	-27.7	-27.7	-0.1	0
10/5	0.0	0.0	27.7	-27.7	-55.4	-0.1	0
10/6	29.0	735.9	27.7	737.1	681.8	1.6	0.07
10/7	49.7	1261.5	27.7	1283.5	1283.5	3.1	0.12
10/8	24.8	630.7	27.7	627.9	627.9	1.5	0.06
10/9	70.4	1787.1	27.7	1829.8	1829.8	4.4	0.17
10/10	0.0	0.0	27.7	-27.7	-27.7	-0.1	0
10/11	0.0	0.0	27.7	-27.7	-55.4	-0.1	0
10/12	0.0	0.0	27.7	-27.7	-83.1	-0.2	0
10/13	0.0	0.0	27.7	-27.7	-110.8	-0.3	0
10/14	0.0	0.0	27.7	-27.7	-138.5	-0.3	0
10/15	0.0	0.0	27.7	-27.7	-166.2	-0.4	0
10/16	666.4	16925.0	27.7	17563.7	17397.5	42.0	1.61
10/17	0.0	0.0	27.7	-27.7	-27.7	-0.1	0
10/18	0.0	0.0	27.7	-27.7	-55.4	-0.1	0
10/19	0.0	0.0	27.7	-27.7	-83.1	-0.2	0
10/20	0.0	0.0	27.7	-27.7	-110.8	-0.3	0
10/21	0.0	0.0	27.7	-27.7	-138.5	-0.3	0
10/22	356.0	9040.7	27.7	9369.0	9230.5	22.3	0.86
10/23	0.0	0.0	27.7	-27.7	-27.7	-0.1	0
10/24	0.0	0.0	27.7	-27.7	-55.4	-0.1	0
10/25	0.0	0.0	27.7	-27.7	-83.1	-0.2	0
10/26	20.7	525.6	27.7	518.6	435.5	1.1	0.05
10/27	538.1	13666.1	27.7	14176.5	14176.5	34.2	1.3
10/28	0.0	0.0	27.7	-27.7	-27.7	-0.1	0
10/29	0.0	0.0	27.7	-27.7	-55.4	-0.1	0
10/30	20.7	525.6	27.7	518.6	463.2	1.1	0.05
10/31	281.5	7148.4	27.7	7402.2	7402.2	17.9	0.68

## November 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
11/1	207.0	5256.2	5.2	5251.0	5251.0	12.7	0.5
11/2	0.0	0.0	5.2	-5.2	-5.2	0.0	0
11/3	0.0	0.0	5.2	-5.2	-10.4	0.0	0
11/4	0.0	0.0	5.2	-5.2	-15.6	0.0	0
11/5	0.0	0.0	5.2	-5.2	-20.8	-0.1	0
11/6	0.0	0.0	5.2	-5.2	-26.0	-0.1	0
11/7	45.5	1156.4	5.2	1151.2	1125.2	2.7	0.11
11/8	0.0	0.0	5.2	-5.2	-5.2	0.0	0
11/9	0.0	0.0	5.2	-5.2	-10.4	0.0	0
11/10	0.0	0.0	5.2	-5.2	-15.6	0.0	0
11/11	0.0	0.0	5.2	-5.2	-20.8	-0.1	0
11/12	57.9	1471.7	5.2	1466.5	1445.8	3.5	0.14
11/13	0.0	0.0	5.2	-5.2	-5.2	0.0	0
11/14	0.0	0.0	5.2	-5.2	-10.4	0.0	0
11/15	0.0	0.0	5.2	-5.2	-15.6	0.0	0
11/16	0.0	0.0	5.2	-5.2	-20.8	-0.1	0
11/17	0.0	0.0	5.2	-5.2	-26.0	-0.1	0
11/18	82.8	2102.5	5.2	2097.3	2071.3	5.0	0.2
11/19	0.0	0.0	5.2	-5.2	-5.2	0.0	0
11/20	0.0	0.0	5.2	-5.2	-10.4	0.0	0
11/21	0.0	0.0	5.2	-5.2	-15.6	0.0	0
11/22	37.3	946.1	5.2	940.9	925.3	2.2	0.09
11/23	41.4	1051.2	5.2	1046.0	1046.0	2.5	0.1
11/24	264.9	6727.9	5.2	6722.8	6722.8	16.2	0.64
11/25	0.0	0.0	5.2	-5.2	-5.2	0.0	0
11/26	0.0	0.0	5.2	-5.2	-10.4	0.0	0
11/27	0.0	0.0	5.2	-5.2	-15.6	0.0	0
11/28	0.0	0.0	5.2	-5.2	-20.8	-0.1	0
11/29	0.0	0.0	5.2	-5.2	-26.0	-0.1	0
11/30	0.0	0.0	5.2	-5.2	-31.2	-0.1	0



## December 2019

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
12/1	260.8	6622.8	1.4	6621.5	6590.3	15.9	0.63
12/2	198.7	5046.0	1.4	5044.6	5044.6	12.2	0.48
12/3	12.4	315.4	1.4	314.0	314.0	0.8	0.03
12/4	20.7	525.6	1.4	524.3	524.3	1.3	0.05
12/5	0.0	0.0	1.4	-1.4	-1.4	0.0	0
12/6	16.6	420.5	1.4	419.1	417.8	1.0	0.04
12/7	0.0	0.0	1.4	-1.4	-1.4	0.0	0
12/8	0.0	0.0	1.4	-1.4	-2.7	0.0	0
12/9	492.6	12509.8	1.4	12508.4	12505.7	30.2	1.19
12/10	115.9	2943.5	1.4	2942.1	2942.1	7.1	0.28
12/11	91.1	2312.7	1.4	2311.4	2311.4	5.6	0.22
12/12	0.0	0.0	1.4	-1.4	-1.4	0.0	0
12/13	240.1	6097.2	1.4	6095.8	6094.5	14.7	0.58
12/14	157.3	3994.7	1.4	3993.4	3993.4	9.6	0.38
12/15	0.0	0.0	1.4	-1.4	-1.4	0.0	0
12/16	95.2	2417.9	1.4	2416.5	2415.1	5.8	0.23
12/17	322.9	8199.7	1.4	8198.3	8198.3	19.8	0.78
12/18	0.0	0.0	1.4	-1.4	-1.4	0.0	0
12/19	0.0	0.0	1.4	-1.4	-2.7	0.0	0
12/20	0.0	0.0	1.4	-1.4	-4.1	0.0	0
12/21	0.0	0.0	1.4	-1.4	-5.4	0.0	0
12/22	0.0	0.0	1.4	-1.4	-6.8	0.0	0
12/23	0.0	0.0	1.4	-1.4	-8.2	0.0	0
12/24	0.0	0.0	1.4	-1.4	-9.5	0.0	0
12/25	0.0	0.0	1.4	-1.4	-10.9	0.0	0
12/26	0.0	0.0	1.4	-1.4	-12.3	0.0	0
12/27	0.0	0.0	1.4	-1.4	-13.6	0.0	0
12/28	0.0	0.0	1.4	-1.4	-15.0	0.0	0
12/29	140.7	3574.2	1.4	3572.9	3557.9	8.6	0.34
12/30	211.1	5361.3	1.4	5360.0	5360.0	12.9	0.51
12/31	8.3	210.2	1.4	208.9	208.9	0.5	0.02

## Dry Year (2012)

Month	T <sub>i</sub> (°F)	T <sub>i</sub> (°C)	ET <sub>i</sub> (ft <sup>3</sup> /day)	Correction Factor
January	34.3	1.3	0.0	0.80
February	36.5	2.5	2.9	0.89
March	48.7	9.3	17.2	0.99
April	51.3	10.7	23.9	1.10
May	65.0	18.3	51.8	1.20
June	69.0	20.6	65.0	1.25
July	76.9	24.9	80.2	1.23
August	73.6	23.1	67.7	1.15
September	65.7	18.7	47.7	1.04
October	55.7	13.2	25.8	0.93
November	45.0	7.2	10.6	0.83
December	39.7	4.3	4.8	0.78
	I=	56.5		
	a=	1.4		

## January 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	ΔS (ft <sup>3</sup> /day)	Cumulative ΔS (ft <sup>3</sup> /day)	Cumulative ΔS (in)	RA120
1/1	29.0	735.9	0.0	764.8	764.8	1.8	0.07
1/2	0.0	0.0	0.0	0.0	0.0	0.0	0
1/3	0.0	0.0	0.0	0.0	0.0	0.0	0
1/4	0.0	0.0	0.0	0.0	0.0	0.0	0
1/5	0.0	0.0	0.0	0.0	0.0	0.0	0
1/6	0.0	0.0	0.0	0.0	0.0	0.0	0
1/7	0.0	0.0	0.0	0.0	0.0	0.0	0
1/8	0.0	0.0	0.0	0.0	0.0	0.0	0
1/9	0.0	0.0	0.0	0.0	0.0	0.0	0
1/10	0.0	0.0	0.0	0.0	0.0	0.0	0
1/11	111.8	2838.4	0.0	2950.1	2950.1	7.1	0.27
1/12	529.8	13455.9	0.0	13985.7	13985.7	33.8	1.28
1/13	45.5	1156.4	0.0	1201.9	1201.9	2.9	0.11
1/14	0.0	0.0	0.0	0.0	0.0	0.0	0
1/15	0.0	0.0	0.0	0.0	0.0	0.0	0
1/16	16.6	420.5	0.0	437.1	437.1	1.1	0.04
1/17	91.1	2312.7	0.0	2403.8	2403.8	5.8	0.22
1/18	0.0	0.0	0.0	0.0	0.0	0.0	0
1/19	0.0	0.0	0.0	0.0	0.0	0.0	0
1/20	0.0	0.0	0.0	0.0	0.0	0.0	0
1/21	161.4	4099.8	0.0	4261.3	4261.3	10.3	0.39
1/22	0.0	0.0	0.0	0.0	0.0	0.0	0
1/23	153.1	3889.6	0.0	4042.7	4042.7	9.8	0.37
1/24	0.0	0.0	0.0	0.0	0.0	0.0	0
1/25	0.0	0.0	0.0	0.0	0.0	0.0	0
1/26	82.8	2102.5	0.0	2185.3	2185.3	5.3	0.2
1/27	128.3	3258.8	0.0	3387.2	3387.2	8.2	0.31
1/28	0.0	0.0	0.0	0.0	0.0	0.0	0
1/29	0.0	0.0	0.0	0.0	0.0	0.0	0
1/30	0.0	0.0	0.0	0.0	0.0	0.0	0
1/31	0.0	0.0	0.0	0.0	0.0	0.0	0

## February 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
2/1	24.8	630.7	2.9	652.7	652.7	1.6	0.06
2/2	0.0	0.0	2.9	-2.9	-2.9	0.0	0
2/3	0.0	0.0	2.9	-2.9	-5.7	0.0	0
2/4	0.0	0.0	2.9	-2.9	-8.6	0.0	0
2/5	0.0	0.0	2.9	-2.9	-11.4	0.0	0
2/6	0.0	0.0	2.9	-2.9	-14.3	0.0	0
2/7	0.0	0.0	2.9	-2.9	-17.1	0.0	0
2/8	8.3	210.2	2.9	215.7	198.5	0.5	0.02
2/9	0.0	0.0	2.9	-2.9	-2.9	0.0	0
2/10	0.0	0.0	2.9	-2.9	-5.7	0.0	0
2/11	49.7	1261.5	2.9	1308.3	1302.6	3.1	0.12
2/12	4.1	105.1	2.9	106.4	106.4	0.3	0.01
2/13	0.0	0.0	2.9	-2.9	-2.9	0.0	0
2/14	4.1	105.1	2.9	106.4	103.5	0.3	0.01
2/15	0.0	0.0	2.9	-2.9	-2.9	0.0	0
2/16	70.4	1787.1	2.9	1854.6	1851.8	4.5	0.17
2/17	0.0	0.0	2.9	-2.9	-2.9	0.0	0
2/18	29.0	735.9	2.9	762.0	759.1	1.8	0.07
2/19	0.0	0.0	2.9	-2.9	-2.9	0.0	0
2/20	0.0	0.0	2.9	-2.9	-5.7	0.0	0
2/21	0.0	0.0	2.9	-2.9	-8.6	0.0	0
2/22	0.0	0.0	2.9	-2.9	-11.4	0.0	0
2/23	0.0	0.0	2.9	-2.9	-14.3	0.0	0
2/24	207.0	5256.2	2.9	5460.3	5446.0	13.2	0.5
2/25	0.0	0.0	2.9	-2.9	-2.9	0.0	0
2/26	0.0	0.0	2.9	-2.9	-5.7	0.0	0
2/27	0.0	0.0	2.9	-2.9	-8.6	0.0	0
2/28	0.0	0.0	2.9	-2.9	-11.4	0.0	0
2/29	173.8	4415.2	2.9	4586.2	4574.8	11.1	0.42

## March 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
3/1	16.6	420.5	17.2	419.9	419.9	1.0	0.04
3/2	0.0	0.0	17.2	-17.2	-17.2	0.0	0
3/3	33.1	841.0	17.2	856.9	839.7	2.0	0.08
3/4	0.0	0.0	17.2	-17.2	-17.2	0.0	0
3/5	0.0	0.0	17.2	-17.2	-34.4	-0.1	0
3/6	0.0	0.0	17.2	-17.2	-51.6	-0.1	0
3/7	0.0	0.0	17.2	-17.2	-68.7	-0.2	0
3/8	0.0	0.0	17.2	-17.2	-85.9	-0.2	0
3/9	33.1	841.0	17.2	856.9	771.0	1.9	0.08
3/10	0.0	0.0	17.2	-17.2	-17.2	0.0	0
3/11	0.0	0.0	17.2	-17.2	-34.4	-0.1	0
3/12	0.0	0.0	17.2	-17.2	-51.6	-0.1	0
3/13	20.7	525.6	17.2	529.1	477.6	1.2	0.05
3/14	0.0	0.0	17.2	-17.2	-17.2	0.0	0
3/15	0.0	0.0	17.2	-17.2	-34.4	-0.1	0
3/16	0.0	0.0	17.2	-17.2	-51.6	-0.1	0
3/17	0.0	0.0	17.2	-17.2	-68.7	-0.2	0
3/18	0.0	0.0	17.2	-17.2	-85.9	-0.2	0
3/19	0.0	0.0	17.2	-17.2	-103.1	-0.2	0
3/20	0.0	0.0	17.2	-17.2	-120.3	-0.3	0
3/21	0.0	0.0	17.2	-17.2	-137.5	-0.3	0
3/22	0.0	0.0	17.2	-17.2	-154.7	-0.4	0
3/23	0.0	0.0	17.2	-17.2	-171.9	-0.4	0
3/24	33.1	841.0	17.2	856.9	685.1	1.7	0.08
3/25	0.0	0.0	17.2	-17.2	-17.2	0.0	0
3/26	0.0	0.0	17.2	-17.2	-34.4	-0.1	0
3/27	0.0	0.0	17.2	-17.2	-51.6	-0.1	0
3/28	8.3	210.2	17.2	201.3	149.8	0.4	0.02
3/29	0.0	0.0	17.2	-17.2	-17.2	0.0	0
3/30	20.7	525.6	17.2	529.1	511.9	1.2	0.05
3/31	231.8	5887.0	17.2	6101.6	6101.6	14.7	0.56

## April 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
4/1	41.4	1051.2	23.9	1068.7	1068.7	2.6	0.1
4/2	74.5	1892.2	23.9	1942.8	1942.8	4.7	0.18
4/3	0.0	0.0	23.9	-23.9	-23.9	-0.1	0
4/4	0.0	0.0	23.9	-23.9	-47.9	-0.1	0
4/5	0.0	0.0	23.9	-23.9	-71.8	-0.2	0
4/6	0.0	0.0	23.9	-23.9	-95.8	-0.2	0
4/7	0.0	0.0	23.9	-23.9	-119.7	-0.3	0
4/8	0.0	0.0	23.9	-23.9	-143.7	-0.3	0
4/9	0.0	0.0	23.9	-23.9	-167.6	-0.4	0
4/10	0.0	0.0	23.9	-23.9	-191.6	-0.5	0
4/11	0.0	0.0	23.9	-23.9	-215.5	-0.5	0
4/12	0.0	0.0	23.9	-23.9	-239.5	-0.6	0
4/13	0.0	0.0	23.9	-23.9	-263.4	-0.6	0
4/14	20.7	525.6	23.9	522.4	259.0	0.6	0.05
4/15	8.3	210.2	23.9	194.6	194.6	0.5	0.02
4/16	0.0	0.0	23.9	-23.9	-23.9	-0.1	0
4/17	0.0	0.0	23.9	-23.9	-47.9	-0.1	0
4/18	0.0	0.0	23.9	-23.9	-71.8	-0.2	0
4/19	16.6	420.5	23.9	413.1	341.3	0.8	0.04
4/20	0.0	0.0	23.9	-23.9	-23.9	-0.1	0
4/21	91.1	2312.7	23.9	2379.8	2355.9	5.7	0.22
4/22	865.1	21971.0	23.9	22812.1	22812.1	55.1	2.09
4/23	49.7	1261.5	23.9	1287.2	1287.2	3.1	0.12
4/24	0.0	0.0	23.9	-23.9	-23.9	-0.1	0
4/25	0.0	0.0	23.9	-23.9	-47.9	-0.1	0
4/26	0.0	0.0	23.9	-23.9	-71.8	-0.2	0
4/27	0.0	0.0	23.9	-23.9	-95.8	-0.2	0
4/28	0.0	0.0	23.9	-23.9	-119.7	-0.3	0
4/29	0.0	0.0	23.9	-23.9	-143.7	-0.3	0
4/30	0.0	0.0	23.9	-23.9	-167.6	-0.4	0

## May 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
5/1	124.2	3153.7	51.8	3226.1	3058.5	7.4	0.3
5/2	4.1	105.1	51.8	57.5	57.5	0.1	0.01
5/3	53.8	1366.6	51.8	1368.6	1368.6	3.3	0.13
5/4	8.3	210.2	51.8	166.7	166.7	0.4	0.02
5/5	0.0	0.0	51.8	-51.8	-51.8	-0.1	0
5/6	78.6	1997.4	51.8	2024.2	1972.4	4.8	0.19
5/7	91.1	2312.7	51.8	2352.0	2352.0	5.7	0.22
5/8	120.0	3048.6	51.8	3116.8	3116.8	7.5	0.29
5/9	95.2	2417.9	51.8	2461.2	2461.2	5.9	0.23
5/10	57.9	1471.7	51.8	1477.9	1477.9	3.6	0.14
5/11	0.0	0.0	51.8	-51.8	-51.8	-0.1	0
5/12	12.4	315.4	51.8	276.0	224.2	0.5	0.03
5/13	45.5	1156.4	51.8	1150.1	1150.1	2.8	0.11
5/14	91.1	2312.7	51.8	2352.0	2352.0	5.7	0.22
5/15	331.1	8409.9	51.8	8689.3	8689.3	21.0	0.8
5/16	49.7	1261.5	51.8	1259.4	1259.4	3.0	0.12
5/17	0.0	0.0	51.8	-51.8	-51.8	-0.1	0
5/18	8.3	210.2	51.8	166.7	114.9	0.3	0.02
5/19	0.0	0.0	51.8	-51.8	-51.8	-0.1	0
5/20	33.1	841.0	51.8	822.3	770.5	1.9	0.08
5/21	277.3	7043.3	51.8	7268.8	7268.8	17.6	0.67
5/22	66.2	1682.0	51.8	1696.4	1696.4	4.1	0.16
5/23	124.2	3153.7	51.8	3226.1	3226.1	7.8	0.3
5/24	12.4	315.4	51.8	276.0	276.0	0.7	0.03
5/25	29.0	735.9	51.8	713.0	713.0	1.7	0.07
5/26	128.3	3258.8	51.8	3335.4	3335.4	8.1	0.31
5/27	16.6	420.5	51.8	385.2	385.2	0.9	0.04
5/28	0.0	0.0	51.8	-51.8	-51.8	-0.1	0
5/29	111.8	2838.4	51.8	2898.3	2846.5	6.9	0.27
5/30	0.0	0.0	51.8	-51.8	-51.8	-0.1	0
5/31	0.0	0.0	51.8	-51.8	-103.6	-0.3	0

## June 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
6/1	240.1	6097.2	65.0	6272.3	6168.7	14.9	0.58
6/2	178.0	4520.3	65.0	4633.3	4633.3	11.2	0.43
6/3	91.1	2312.7	65.0	2338.8	2338.8	5.7	0.22
6/4	16.6	420.5	65.0	372.1	372.1	0.9	0.04
6/5	0.0	0.0	65.0	-65.0	-65.0	-0.2	0
6/6	0.0	0.0	65.0	-65.0	-130.0	-0.3	0
6/7	0.0	0.0	65.0	-65.0	-195.0	-0.5	0
6/8	8.3	210.2	65.0	153.5	-41.4	-0.1	0.02
6/9	0.0	0.0	65.0	-65.0	-106.4	-0.3	0
6/10	29.0	735.9	65.0	699.9	593.4	1.4	0.07
6/11	0.0	0.0	65.0	-65.0	-65.0	-0.2	0
6/12	434.6	11038.0	65.0	11407.7	11342.7	27.4	1.05
6/13	78.6	1997.4	65.0	2011.0	2011.0	4.9	0.19
6/14	0.0	0.0	65.0	-65.0	-65.0	-0.2	0
6/15	0.0	0.0	65.0	-65.0	-130.0	-0.3	0
6/16	0.0	0.0	65.0	-65.0	-195.0	-0.5	0
6/17	0.0	0.0	65.0	-65.0	-259.9	-0.6	0
6/18	0.0	0.0	65.0	-65.0	-324.9	-0.8	0
6/19	0.0	0.0	65.0	-65.0	-389.9	-0.9	0
6/20	0.0	0.0	65.0	-65.0	-454.9	-1.1	0
6/21	0.0	0.0	65.0	-65.0	-519.9	-1.3	0
6/22	82.8	2102.5	65.0	2120.3	1600.4	3.9	0.2
6/23	0.0	0.0	65.0	-65.0	-65.0	-0.2	0
6/24	12.4	315.4	65.0	262.8	197.8	0.5	0.03
6/25	194.5	4940.8	65.0	5070.4	5070.4	12.2	0.47
6/26	0.0	0.0	65.0	-65.0	-65.0	-0.2	0
6/27	0.0	0.0	65.0	-65.0	-130.0	-0.3	0
6/28	0.0	0.0	65.0	-65.0	-195.0	-0.5	0
6/29	8.3	210.2	65.0	153.5	-41.4	-0.1	0.02
6/30	0.0	0.0	65.0	-65.0	-106.4	-0.3	0



## July 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
7/1	0.0	0.0	80.2	-80.2	-186.6	-0.5	0
7/2	0.0	0.0	80.2	-80.2	-266.7	-0.6	0
7/3	0.0	0.0	80.2	-80.2	-346.9	-0.8	0
7/4	20.7	525.6	80.2	466.1	119.2	0.3	0.05
7/5	0.0	0.0	80.2	-80.2	-80.2	-0.2	0
7/6	0.0	0.0	80.2	-80.2	-160.3	-0.4	0
7/7	8.3	210.2	80.2	138.4	-22.0	-0.1	0.02
7/8	0.0	0.0	80.2	-80.2	-102.1	-0.2	0
7/9	4.1	105.1	80.2	29.1	-73.1	-0.2	0.01
7/10	0.0	0.0	80.2	-80.2	-153.2	-0.4	0
7/11	0.0	0.0	80.2	-80.2	-233.4	-0.6	0
7/12	0.0	0.0	80.2	-80.2	-313.6	-0.8	0
7/13	0.0	0.0	80.2	-80.2	-393.7	-1.0	0
7/14	4.1	105.1	80.2	29.1	-364.6	-0.9	0.01
7/15	364.2	9250.9	80.2	9535.0	9170.4	22.2	0.88
7/16	0.0	0.0	80.2	-80.2	-80.2	-0.2	0
7/17	0.0	0.0	80.2	-80.2	-160.3	-0.4	0
7/18	293.9	7463.8	80.2	7677.5	7517.2	18.2	0.71
7/19	0.0	0.0	80.2	-80.2	-80.2	-0.2	0
7/20	413.9	10512.4	80.2	10846.2	10766.0	26.0	1
7/21	0.0	0.0	80.2	-80.2	-80.2	-0.2	0
7/22	0.0	0.0	80.2	-80.2	-160.3	-0.4	0
7/23	86.9	2207.6	80.2	2214.4	2054.0	5.0	0.21
7/24	0.0	0.0	80.2	-80.2	-80.2	-0.2	0
7/25	0.0	0.0	80.2	-80.2	-160.3	-0.4	0
7/26	202.8	5151.1	80.2	5273.7	5113.4	12.4	0.49
7/27	0.0	0.0	80.2	-80.2	-80.2	-0.2	0
7/28	120.0	3048.6	80.2	3088.5	3008.3	7.3	0.29
7/29	20.7	525.6	80.2	466.1	466.1	1.1	0.05
7/30	0.0	0.0	80.2	-80.2	-80.2	-0.2	0
7/31	0.0	0.0	80.2	-80.2	-160.3	-0.4	0

## August 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	ΔS (ft <sup>3</sup> /day)	Cumulative ΔS (ft <sup>3</sup> /day)	Cumulative ΔS (in)	RA120
8/1	128.3	3258.8	67.7	3319.5	3159.1	7.6	0.31
8/2	0.0	0.0	67.7	-67.7	-67.7	-0.2	0
8/3	0.0	0.0	67.7	-67.7	-135.4	-0.3	0
8/4	0.0	0.0	67.7	-67.7	-203.0	-0.5	0
8/5	95.2	2417.9	67.7	2445.4	2242.3	5.4	0.23
8/6	62.1	1576.9	67.7	1571.3	1571.3	3.8	0.15
8/7	0.0	0.0	67.7	-67.7	-67.7	-0.2	0
8/8	0.0	0.0	67.7	-67.7	-135.4	-0.3	0
8/9	0.0	0.0	67.7	-67.7	-203.0	-0.5	0
8/10	190.4	4835.7	67.7	4958.4	4755.4	11.5	0.46
8/11	277.3	7043.3	67.7	7253.0	7253.0	17.5	0.67
8/12	0.0	0.0	67.7	-67.7	-67.7	-0.2	0
8/13	0.0	0.0	67.7	-67.7	-135.4	-0.3	0
8/14	103.5	2628.1	67.7	2663.9	2528.5	6.1	0.25
8/15	8.3	210.2	67.7	150.8	150.8	0.4	0.02
8/16	0.0	0.0	67.7	-67.7	-67.7	-0.2	0
8/17	103.5	2628.1	67.7	2663.9	2596.2	6.3	0.25
8/18	190.4	4835.7	67.7	4958.4	4958.4	12.0	0.46
8/19	0.0	0.0	67.7	-67.7	-67.7	-0.2	0
8/20	0.0	0.0	67.7	-67.7	-135.4	-0.3	0
8/21	0.0	0.0	67.7	-67.7	-203.0	-0.5	0
8/22	0.0	0.0	67.7	-67.7	-270.7	-0.7	0
8/23	0.0	0.0	67.7	-67.7	-338.4	-0.8	0
8/24	0.0	0.0	67.7	-67.7	-406.1	-1.0	0
8/25	0.0	0.0	67.7	-67.7	-473.7	-1.1	0
8/26	0.0	0.0	67.7	-67.7	-541.4	-1.3	0
8/27	368.4	9356.1	67.7	9656.8	9115.3	22.0	0.89
8/28	33.1	841.0	67.7	806.4	806.4	1.9	0.08
8/29	0.0	0.0	67.7	-67.7	-67.7	-0.2	0
8/30	0.0	0.0	67.7	-67.7	-135.4	-0.3	0
8/31	0.0	0.0	67.7	-67.7	-203.0	-0.5	0

## September 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
9/1	0.0	0.0	47.7	-47.7	-250.8	-0.6	0
9/2	24.8	630.7	47.7	607.9	357.1	0.9	0.06
9/3	4.1	105.1	47.7	61.5	61.5	0.1	0.01
9/4	235.9	5992.1	47.7	6180.3	6180.3	14.9	0.57
9/5	0.0	0.0	47.7	-47.7	-47.7	-0.1	0
9/6	4.1	105.1	47.7	61.5	13.8	0.0	0.01
9/7	0.0	0.0	47.7	-47.7	-47.7	-0.1	0
9/8	120.0	3048.6	47.7	3120.9	3073.2	7.4	0.29
9/9	0.0	0.0	47.7	-47.7	-47.7	-0.1	0
9/10	0.0	0.0	47.7	-47.7	-95.4	-0.2	0
9/11	0.0	0.0	47.7	-47.7	-143.2	-0.3	0
9/12	0.0	0.0	47.7	-47.7	-190.9	-0.5	0
9/13	0.0	0.0	47.7	-47.7	-238.6	-0.6	0
9/14	0.0	0.0	47.7	-47.7	-286.3	-0.7	0
9/15	16.6	420.5	47.7	389.3	103.0	0.2	0.04
9/16	0.0	0.0	47.7	-47.7	-47.7	-0.1	0
9/17	0.0	0.0	47.7	-47.7	-95.4	-0.2	0
9/18	467.7	11879.0	47.7	12299.0	12203.6	29.5	1.13
9/19	0.0	0.0	47.7	-47.7	-47.7	-0.1	0
9/20	0.0	0.0	47.7	-47.7	-95.4	-0.2	0
9/21	0.0	0.0	47.7	-47.7	-143.2	-0.3	0
9/22	41.4	1051.2	47.7	1044.9	901.8	2.2	0.1
9/23	0.0	0.0	47.7	-47.7	-47.7	-0.1	0
9/24	0.0	0.0	47.7	-47.7	-95.4	-0.2	0
9/25	0.0	0.0	47.7	-47.7	-143.2	-0.3	0
9/26	78.6	1997.4	47.7	2028.3	1885.1	4.6	0.19
9/27	70.4	1787.1	47.7	1809.8	1809.8	4.4	0.17
9/28	107.6	2733.2	47.7	2793.1	2793.1	6.7	0.26
9/29	0.0	0.0	47.7	-47.7	-47.7	-0.1	0
9/30	70.4	1787.1	47.7	1809.8	1762.0	4.3	0.17

## October 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
10/1	0.0	0.0	25.8	-25.8	-25.8	-0.1	0
10/2	186.3	4730.6	25.8	4891.1	4865.3	11.8	0.45
10/3	4.1	105.1	25.8	83.5	83.5	0.2	0.01
10/4	12.4	315.4	25.8	302.0	302.0	0.7	0.03
10/5	0.0	0.0	25.8	-25.8	-25.8	-0.1	0
10/6	0.0	0.0	25.8	-25.8	-51.6	-0.1	0
10/7	41.4	1051.2	25.8	1066.8	1015.3	2.5	0.1
10/8	4.1	105.1	25.8	83.5	83.5	0.2	0.01
10/9	0.0	0.0	25.8	-25.8	-25.8	-0.1	0
10/10	144.9	3679.3	25.8	3798.4	3772.6	9.1	0.35
10/11	0.0	0.0	25.8	-25.8	-25.8	-0.1	0
10/12	0.0	0.0	25.8	-25.8	-51.6	-0.1	0
10/13	0.0	0.0	25.8	-25.8	-77.4	-0.2	0
10/14	0.0	0.0	25.8	-25.8	-103.1	-0.2	0
10/15	178.0	4520.3	25.8	4672.5	4569.4	11.0	0.43
10/16	4.1	105.1	25.8	83.5	83.5	0.2	0.01
10/17	0.0	0.0	25.8	-25.8	-25.8	-0.1	0
10/18	0.0	0.0	25.8	-25.8	-51.6	-0.1	0
10/19	786.4	19973.6	25.8	20734.2	20682.7	50.0	1.9
10/20	0.0	0.0	25.8	-25.8	-25.8	-0.1	0
10/21	0.0	0.0	25.8	-25.8	-51.6	-0.1	0
10/22	0.0	0.0	25.8	-25.8	-77.4	-0.2	0
10/23	12.4	315.4	25.8	302.0	224.6	0.5	0.03
10/24	0.0	0.0	25.8	-25.8	-25.8	-0.1	0
10/25	0.0	0.0	25.8	-25.8	-51.6	-0.1	0
10/26	0.0	0.0	25.8	-25.8	-77.4	-0.2	0
10/27	16.6	420.5	25.8	411.3	333.9	0.8	0.04
10/28	24.8	630.7	25.8	629.8	629.8	1.5	0.06
10/29	529.8	13455.9	25.8	13959.9	13959.9	33.7	1.28
10/30	314.6	7989.4	25.8	8278.2	8278.2	20.0	0.76
10/31	0.0	0.0	25.8	-25.8	-25.8	-0.1	0

## November 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
11/1	0.0	0.0	10.6	-10.6	-36.4	-0.1	0
11/2	0.0	0.0	10.6	-10.6	-47.1	-0.1	0
11/3	0.0	0.0	10.6	-10.6	-57.7	-0.1	0
11/4	0.0	0.0	10.6	-10.6	-68.4	-0.2	0
11/5	0.0	0.0	10.6	-10.6	-79.0	-0.2	0
11/6	0.0	0.0	10.6	-10.6	-89.7	-0.2	0
11/7	231.8	5887.0	10.6	6108.1	6018.4	14.5	0.56
11/8	12.4	315.4	10.6	317.1	317.1	0.8	0.03
11/9	0.0	0.0	10.6	-10.6	-10.6	0.0	0
11/10	0.0	0.0	10.6	-10.6	-21.3	-0.1	0
11/11	0.0	0.0	10.6	-10.6	-31.9	-0.1	0
11/12	0.0	0.0	10.6	-10.6	-42.6	-0.1	0
11/13	86.9	2207.6	10.6	2283.9	2241.3	5.4	0.21
11/14	0.0	0.0	10.6	-10.6	-10.6	0.0	0
11/15	0.0	0.0	10.6	-10.6	-21.3	-0.1	0
11/16	0.0	0.0	10.6	-10.6	-31.9	-0.1	0
11/17	0.0	0.0	10.6	-10.6	-42.6	-0.1	0
11/18	0.0	0.0	10.6	-10.6	-53.2	-0.1	0
11/19	0.0	0.0	10.6	-10.6	-63.9	-0.2	0
11/20	0.0	0.0	10.6	-10.6	-74.5	-0.2	0
11/21	0.0	0.0	10.6	-10.6	-85.2	-0.2	0
11/22	0.0	0.0	10.6	-10.6	-95.8	-0.2	0
11/23	0.0	0.0	10.6	-10.6	-106.5	-0.3	0
11/24	0.0	0.0	10.6	-10.6	-117.1	-0.3	0
11/25	0.0	0.0	10.6	-10.6	-127.8	-0.3	0
11/26	0.0	0.0	10.6	-10.6	-138.4	-0.3	0
11/27	169.7	4310.1	10.6	4469.1	4330.7	10.5	0.41
11/28	0.0	0.0	10.6	-10.6	-10.6	0.0	0
11/29	0.0	0.0	10.6	-10.6	-21.3	-0.1	0
11/30	0.0	0.0	10.6	-10.6	-31.9	-0.1	0

## December 2012

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
12/1	0.0	0.0	4.8	-4.8	-36.8	-0.1	0
12/2	29.0	735.9	4.8	760.0	723.3	1.7	0.07
12/3	0.0	0.0	4.8	-4.8	-4.8	0.0	0
12/4	33.1	841.0	4.8	869.3	864.5	2.1	0.08
12/5	4.1	105.1	4.8	104.5	104.5	0.3	0.01
12/6	0.0	0.0	4.8	-4.8	-4.8	0.0	0
12/7	95.2	2417.9	4.8	2508.2	2503.4	6.0	0.23
12/8	70.4	1787.1	4.8	1852.7	1852.7	4.5	0.17
12/9	99.3	2523.0	4.8	2617.5	2617.5	6.3	0.24
12/10	0.0	0.0	4.8	-4.8	-4.8	0.0	0
12/11	16.6	420.5	4.8	432.2	427.4	1.0	0.04
12/12	0.0	0.0	4.8	-4.8	-4.8	0.0	0
12/13	0.0	0.0	4.8	-4.8	-9.6	0.0	0
12/14	0.0	0.0	4.8	-4.8	-14.4	0.0	0
12/15	4.1	105.1	4.8	104.5	90.0	0.2	0.01
12/16	66.2	1682.0	4.8	1743.4	1743.4	4.2	0.16
12/17	33.1	841.0	4.8	869.3	869.3	2.1	0.08
12/18	33.1	841.0	4.8	869.3	869.3	2.1	0.08
12/19	0.0	0.0	4.8	-4.8	-4.8	0.0	0
12/20	86.9	2207.6	4.8	2289.7	2284.9	5.5	0.21
12/21	674.7	17135.2	4.8	17805.1	17805.1	43.0	1.63
12/22	0.0	0.0	4.8	-4.8	-4.8	0.0	0
12/23	0.0	0.0	4.8	-4.8	-9.6	0.0	0
12/24	41.4	1051.2	4.8	1087.8	1078.2	2.6	0.1
12/25	0.0	0.0	4.8	-4.8	-4.8	0.0	0
12/26	554.6	14086.6	4.8	14636.5	14631.7	35.3	1.34
12/27	66.2	1682.0	4.8	1743.4	1743.4	4.2	0.16
12/28	0.0	0.0	4.8	-4.8	-4.8	0.0	0
12/29	144.9	3679.3	4.8	3819.4	3814.6	9.2	0.35
12/30	0.0	0.0	4.8	-4.8	-4.8	0.0	0
12/31	20.7	525.6	4.8	541.5	536.7	1.3	0.05

## Average Year (2001)

Month	T <sub>i</sub> (°F)	T <sub>i</sub> (°C)	ET <sub>i</sub> (ft <sup>3</sup> /day)	Correction Factor
January	27.0	-2.8	0.0	0.80
February	38.7	3.7	5.0	0.89
March	37.2	2.9	3.6	0.99
April	51.0	10.6	23.4	1.10
May	61.3	16.3	44.2	1.20
June	70.3	21.3	68.1	1.25
July	69.9	21.1	63.9	1.23
August	74.1	23.4	68.8	1.15
September	63.0	17.2	42.7	1.04
October	53.4	11.9	22.5	0.93
November	46.9	8.3	12.8	0.83
December	38.8	3.8	0.0	0.78
	I=	49.7		
	a=	1.3		

## January 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	ΔS (ft <sup>3</sup> /day)	Cumulative ΔS (ft <sup>3</sup> /day)	Cumulative ΔS (in)	RA120
1/1	0.0	0.0	0.0	0.0	0.0	0.0	0
1/2	0.0	0.0	0.0	0.0	0.0	0.0	0
1/3	0.0	0.0	0.0	0.0	0.0	0.0	0
1/4	0.0	0.0	0.0	0.0	0.0	0.0	0
1/5	0.0	0.0	0.0	0.0	0.0	0.0	0
1/6	0.0	0.0	0.0	0.0	0.0	0.0	0
1/7	0.0	0.0	0.0	0.0	0.0	0.0	0
1/8	41.4	1051.2	0.0	1092.6	1092.6	2.6	0.1
1/9	0.0	0.0	0.0	0.0	0.0	0.0	0
1/10	0.0	0.0	0.0	0.0	0.0	0.0	0
1/11	0.0	0.0	0.0	0.0	0.0	0.0	0
1/12	0.0	0.0	0.0	0.0	0.0	0.0	0
1/13	0.0	0.0	0.0	0.0	0.0	0.0	0
1/14	0.0	0.0	0.0	0.0	0.0	0.0	0
1/15	124.2	3153.7	0.0	3277.9	3277.9	7.9	0.3
1/16	0.0	0.0	0.0	0.0	0.0	0.0	0
1/17	0.0	0.0	0.0	0.0	0.0	0.0	0
1/18	24.8	630.7	0.0	655.6	655.6	1.6	0.06
1/19	314.6	7989.4	0.0	8304.0	8304.0	20.1	0.76
1/20	95.2	2417.9	0.0	2513.1	2513.1	6.1	0.23
1/21	41.4	1051.2	0.0	1092.6	1092.6	2.6	0.1
1/22	0.0	0.0	0.0	0.0	0.0	0.0	0
1/23	0.0	0.0	0.0	0.0	0.0	0.0	0
1/24	0.0	0.0	0.0	0.0	0.0	0.0	0
1/25	0.0	0.0	0.0	0.0	0.0	0.0	0
1/26	0.0	0.0	0.0	0.0	0.0	0.0	0
1/27	0.0	0.0	0.0	0.0	0.0	0.0	0
1/28	0.0	0.0	0.0	0.0	0.0	0.0	0
1/29	0.0	0.0	0.0	0.0	0.0	0.0	0
1/30	335.3	8515.1	0.0	8850.3	8850.3	21.4	0.81
1/31	12.4	315.4	0.0	327.8	327.8	0.8	0.03



## February 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
2/1	0.0	0.0	5.0	-5.0	-5.0	0.0	0
2/2	0.0	0.0	5.0	-5.0	-10.1	0.0	0
2/3	0.0	0.0	5.0	-5.0	-15.1	0.0	0
2/4	0.0	0.0	5.0	-5.0	-20.2	0.0	0
2/5	194.5	4940.8	5.0	5130.3	5110.2	12.3	0.47
2/6	0.0	0.0	5.0	-5.0	-5.0	0.0	0
2/7	0.0	0.0	5.0	-5.0	-10.1	0.0	0
2/8	0.0	0.0	5.0	-5.0	-15.1	0.0	0
2/9	0.0	0.0	5.0	-5.0	-20.2	0.0	0
2/10	33.1	841.0	5.0	869.1	848.9	2.1	0.08
2/11	0.0	0.0	5.0	-5.0	-5.0	0.0	0
2/12	0.0	0.0	5.0	-5.0	-10.1	0.0	0
2/13	0.0	0.0	5.0	-5.0	-15.1	0.0	0
2/14	0.0	0.0	5.0	-5.0	-20.2	0.0	0
2/15	20.7	525.6	5.0	541.3	521.1	1.3	0.05
2/16	190.4	4835.7	5.0	5021.1	5021.1	12.1	0.46
2/17	0.0	0.0	5.0	-5.0	-5.0	0.0	0
2/18	0.0	0.0	5.0	-5.0	-10.1	0.0	0
2/19	0.0	0.0	5.0	-5.0	-15.1	0.0	0
2/20	0.0	0.0	5.0	-5.0	-20.2	0.0	0
2/21	0.0	0.0	5.0	-5.0	-25.2	-0.1	0
2/22	95.2	2417.9	5.0	2508.0	2482.8	6.0	0.23
2/23	0.0	0.0	5.0	-5.0	-5.0	0.0	0
2/24	0.0	0.0	5.0	-5.0	-10.1	0.0	0
2/25	120.0	3048.6	5.0	3163.6	3153.5	7.6	0.29
2/26	0.0	0.0	5.0	-5.0	-5.0	0.0	0
2/27	0.0	0.0	5.0	-5.0	-10.1	0.0	0
2/28	0.0	0.0	5.0	-5.0	-15.1	0.0	0

## March 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
3/1	0.0	0.0	3.6	-3.6	-18.7	0.0	0
3/2	0.0	0.0	3.6	-3.6	-22.3	-0.1	0
3/3	0.0	0.0	3.6	-3.6	-26.0	-0.1	0
3/4	78.6	1997.4	3.6	2072.4	2046.4	4.9	0.19
3/5	91.1	2312.7	3.6	2400.2	2400.2	5.8	0.22
3/6	0.0	0.0	3.6	-3.6	-3.6	0.0	0
3/7	0.0	0.0	3.6	-3.6	-7.2	0.0	0
3/8	0.0	0.0	3.6	-3.6	-10.8	0.0	0
3/9	45.5	1156.4	3.6	1198.3	1187.5	2.9	0.11
3/10	0.0	0.0	3.6	-3.6	-3.6	0.0	0
3/11	0.0	0.0	3.6	-3.6	-7.2	0.0	0
3/12	45.5	1156.4	3.6	1198.3	1191.1	2.9	0.11
3/13	322.9	8199.7	3.6	8518.9	8518.9	20.6	0.78
3/14	0.0	0.0	3.6	-3.6	-3.6	0.0	0
3/15	12.4	315.4	3.6	324.2	320.6	0.8	0.03
3/16	136.6	3469.1	3.6	3602.1	3602.1	8.7	0.33
3/17	82.8	2102.5	3.6	2181.7	2181.7	5.3	0.2
3/18	0.0	0.0	3.6	-3.6	-3.6	0.0	0
3/19	0.0	0.0	3.6	-3.6	-7.2	0.0	0
3/20	0.0	0.0	3.6	-3.6	-10.8	0.0	0
3/21	298.0	7568.9	3.6	7863.4	7852.5	19.0	0.72
3/22	41.4	1051.2	3.6	1089.0	1089.0	2.6	0.1
3/23	0.0	0.0	3.6	-3.6	-3.6	0.0	0
3/24	4.1	105.1	3.6	105.7	102.0	0.2	0.01
3/25	0.0	0.0	3.6	-3.6	-3.6	0.0	0
3/26	0.0	0.0	3.6	-3.6	-7.2	0.0	0
3/27	0.0	0.0	3.6	-3.6	-10.8	0.0	0
3/28	0.0	0.0	3.6	-3.6	-14.4	0.0	0
3/29	66.2	1682.0	3.6	1744.6	1730.2	4.2	0.16
3/30	476.0	12089.3	3.6	12561.7	12561.7	30.3	1.15
3/31	178.0	4520.3	3.6	4694.7	4694.7	11.3	0.43

## April 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
4/1	0.0	0.0	23.4	-23.4	-23.4	-0.1	0
4/2	0.0	0.0	23.4	-23.4	-46.9	-0.1	0
4/3	0.0	0.0	23.4	-23.4	-70.3	-0.2	0
4/4	0.0	0.0	23.4	-23.4	-93.8	-0.2	0
4/5	0.0	0.0	23.4	-23.4	-117.2	-0.3	0
4/6	91.1	2312.7	23.4	2380.3	2263.1	5.5	0.22
4/7	0.0	0.0	23.4	-23.4	-23.4	-0.1	0
4/8	49.7	1261.5	23.4	1287.7	1264.3	3.1	0.12
4/9	95.2	2417.9	23.4	2489.6	2489.6	6.0	0.23
4/10	0.0	0.0	23.4	-23.4	-23.4	-0.1	0
4/11	91.1	2312.7	23.4	2380.3	2356.9	5.7	0.22
4/12	24.8	630.7	23.4	632.1	632.1	1.5	0.06
4/13	0.0	0.0	23.4	-23.4	-23.4	-0.1	0
4/14	0.0	0.0	23.4	-23.4	-46.9	-0.1	0
4/15	20.7	525.6	23.4	522.9	476.0	1.1	0.05
4/16	33.1	841.0	23.4	850.7	850.7	2.1	0.08
4/17	45.5	1156.4	23.4	1178.4	1178.4	2.8	0.11
4/18	45.5	1156.4	23.4	1178.4	1178.4	2.8	0.11
4/19	0.0	0.0	23.4	-23.4	-23.4	-0.1	0
4/20	0.0	0.0	23.4	-23.4	-46.9	-0.1	0
4/21	12.4	315.4	23.4	304.3	257.4	0.6	0.03
4/22	0.0	0.0	23.4	-23.4	-23.4	-0.1	0
4/23	0.0	0.0	23.4	-23.4	-46.9	-0.1	0
4/24	0.0	0.0	23.4	-23.4	-70.3	-0.2	0
4/25	0.0	0.0	23.4	-23.4	-93.8	-0.2	0
4/26	0.0	0.0	23.4	-23.4	-117.2	-0.3	0
4/27	0.0	0.0	23.4	-23.4	-140.7	-0.3	0
4/28	0.0	0.0	23.4	-23.4	-164.1	-0.4	0
4/29	0.0	0.0	23.4	-23.4	-187.6	-0.5	0
4/30	0.0	0.0	23.4	-23.4	-211.0	-0.5	0

## May 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
5/1	0.0	0.0	44.2	-44.2	-255.2	-0.6	0
5/2	0.0	0.0	44.2	-44.2	-299.4	-0.7	0
5/3	0.0	0.0	44.2	-44.2	-343.6	-0.8	0
5/4	0.0	0.0	44.2	-44.2	-387.8	-0.9	0
5/5	8.3	210.2	44.2	174.3	-213.5	-0.5	0.02
5/6	0.0	0.0	44.2	-44.2	-257.6	-0.6	0
5/7	0.0	0.0	44.2	-44.2	-301.8	-0.7	0
5/8	0.0	0.0	44.2	-44.2	-346.0	-0.8	0
5/9	0.0	0.0	44.2	-44.2	-390.2	-0.9	0
5/10	0.0	0.0	44.2	-44.2	-434.4	-1.0	0
5/11	0.0	0.0	44.2	-44.2	-478.6	-1.2	0
5/12	70.4	1787.1	44.2	1813.3	1334.7	3.2	0.17
5/13	0.0	0.0	44.2	-44.2	-44.2	-0.1	0
5/14	0.0	0.0	44.2	-44.2	-88.4	-0.2	0
5/15	0.0	0.0	44.2	-44.2	-132.6	-0.3	0
5/16	0.0	0.0	44.2	-44.2	-176.8	-0.4	0
5/17	0.0	0.0	44.2	-44.2	-220.9	-0.5	0
5/18	4.1	105.1	44.2	65.1	-155.9	-0.4	0.01
5/19	4.1	105.1	44.2	65.1	-90.8	-0.2	0.01
5/20	0.0	0.0	44.2	-44.2	-135.0	-0.3	0
5/21	331.1	8409.9	44.2	8696.9	8561.9	20.7	0.8
5/22	372.5	9461.2	44.2	9789.5	9789.5	23.7	0.9
5/23	24.8	630.7	44.2	611.4	611.4	1.5	0.06
5/24	12.4	315.4	44.2	283.6	283.6	0.7	0.03
5/25	12.4	315.4	44.2	283.6	283.6	0.7	0.03
5/26	769.9	19553.1	44.2	20278.8	20278.8	49.0	1.86
5/27	285.6	7253.6	44.2	7495.0	7495.0	18.1	0.69
5/28	20.7	525.6	44.2	502.1	502.1	1.2	0.05
5/29	33.1	841.0	44.2	829.9	829.9	2.0	0.08
5/30	8.3	210.2	44.2	174.3	174.3	0.4	0.02
5/31	0.0	0.0	44.2	-44.2	-44.2	-0.1	0

## June 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
6/1	662.3	16819.9	68.1	17414.1	17369.9	42.0	1.6
6/2	384.9	9776.5	68.1	10093.4	10093.4	24.4	0.93
6/3	41.4	1051.2	68.1	1024.6	1024.6	2.5	0.1
6/4	8.3	210.2	68.1	150.5	150.5	0.4	0.02
6/5	0.0	0.0	68.1	-68.1	-68.1	-0.2	0
6/6	0.0	0.0	68.1	-68.1	-136.1	-0.3	0
6/7	0.0	0.0	68.1	-68.1	-204.2	-0.5	0
6/8	0.0	0.0	68.1	-68.1	-272.2	-0.7	0
6/9	0.0	0.0	68.1	-68.1	-340.3	-0.8	0
6/10	0.0	0.0	68.1	-68.1	-408.4	-1.0	0
6/11	74.5	1892.2	68.1	1898.7	1490.3	3.6	0.18
6/12	0.0	0.0	68.1	-68.1	-68.1	-0.2	0
6/13	0.0	0.0	68.1	-68.1	-136.1	-0.3	0
6/14	0.0	0.0	68.1	-68.1	-204.2	-0.5	0
6/15	0.0	0.0	68.1	-68.1	-272.2	-0.7	0
6/16	211.1	5361.3	68.1	5504.4	5232.1	12.6	0.51
6/17	1080.3	27437.4	68.1	28449.7	28449.7	68.7	2.61
6/18	0.0	0.0	68.1	-68.1	-68.1	-0.2	0
6/19	0.0	0.0	68.1	-68.1	-136.1	-0.3	0
6/20	20.7	525.6	68.1	478.3	342.1	0.8	0.05
6/21	318.7	8094.6	68.1	8345.2	8345.2	20.2	0.77
6/22	8.3	210.2	68.1	150.5	150.5	0.4	0.02
6/23	596.0	15137.9	68.1	15665.9	15665.9	37.8	1.44
6/24	0.0	0.0	68.1	-68.1	-68.1	-0.2	0
6/25	0.0	0.0	68.1	-68.1	-136.1	-0.3	0
6/26	0.0	0.0	68.1	-68.1	-204.2	-0.5	0
6/27	0.0	0.0	68.1	-68.1	-272.2	-0.7	0
6/28	12.4	315.4	68.1	259.7	-12.5	0.0	0.03
6/29	49.7	1261.5	68.1	1243.1	1230.6	3.0	0.12
6/30	4.1	105.1	68.1	41.2	41.2	0.1	0.01

## July 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
7/1	384.9	9776.5	63.9	10097.6	10097.6	24.4	0.93
7/2	0.0	0.0	63.9	-63.9	-63.9	-0.2	0
7/3	0.0	0.0	63.9	-63.9	-127.8	-0.3	0
7/4	364.2	9250.9	63.9	9551.3	9423.5	22.8	0.88
7/5	4.1	105.1	63.9	45.4	45.4	0.1	0.01
7/6	0.0	0.0	63.9	-63.9	-63.9	-0.2	0
7/7	0.0	0.0	63.9	-63.9	-127.8	-0.3	0
7/8	66.2	1682.0	63.9	1684.3	1556.5	3.8	0.16
7/9	53.8	1366.6	63.9	1356.5	1356.5	3.3	0.13
7/10	62.1	1576.9	63.9	1575.0	1575.0	3.8	0.15
7/11	37.3	946.1	63.9	919.5	919.5	2.2	0.09
7/12	0.0	0.0	63.9	-63.9	-63.9	-0.2	0
7/13	0.0	0.0	63.9	-63.9	-127.8	-0.3	0
7/14	0.0	0.0	63.9	-63.9	-191.7	-0.5	0
7/15	0.0	0.0	63.9	-63.9	-255.6	-0.6	0
7/16	0.0	0.0	63.9	-63.9	-319.5	-0.8	0
7/17	252.5	6412.6	63.9	6601.2	6281.6	15.2	0.61
7/18	29.0	735.9	63.9	700.9	700.9	1.7	0.07
7/19	0.0	0.0	63.9	-63.9	-63.9	-0.2	0
7/20	0.0	0.0	63.9	-63.9	-127.8	-0.3	0
7/21	0.0	0.0	63.9	-63.9	-191.7	-0.5	0
7/22	0.0	0.0	63.9	-63.9	-255.6	-0.6	0
7/23	0.0	0.0	63.9	-63.9	-319.5	-0.8	0
7/24	0.0	0.0	63.9	-63.9	-383.4	-0.9	0
7/25	74.5	1892.2	63.9	1902.8	1519.4	3.7	0.18
7/26	20.7	525.6	63.9	482.4	482.4	1.2	0.05
7/27	0.0	0.0	63.9	-63.9	-63.9	-0.2	0
7/28	0.0	0.0	63.9	-63.9	-127.8	-0.3	0
7/29	4.1	105.1	63.9	45.4	-82.5	-0.2	0.01
7/30	0.0	0.0	63.9	-63.9	-146.4	-0.4	0
7/31	0.0	0.0	63.9	-63.9	-210.3	-0.5	0

## August 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
8/1	0.0	0.0	68.8	-68.8	-279.0	-0.7	0
8/2	0.0	0.0	68.8	-68.8	-347.8	-0.8	0
8/3	12.4	315.4	68.8	259.0	-88.8	-0.2	0.03
8/4	376.7	9566.3	68.8	9874.2	9785.4	23.6	0.91
8/5	0.0	0.0	68.8	-68.8	-68.8	-0.2	0
8/6	0.0	0.0	68.8	-68.8	-137.5	-0.3	0
8/7	12.4	315.4	68.8	259.0	121.5	0.3	0.03
8/8	0.0	0.0	68.8	-68.8	-68.8	-0.2	0
8/9	0.0	0.0	68.8	-68.8	-137.5	-0.3	0
8/10	140.7	3574.2	68.8	3646.2	3508.6	8.5	0.34
8/11	99.3	2523.0	68.8	2553.6	2553.6	6.2	0.24
8/12	778.2	19763.3	68.8	20472.7	20472.7	49.5	1.88
8/13	662.3	16819.9	68.8	17413.4	17413.4	42.1	1.6
8/14	8.3	210.2	68.8	149.8	149.8	0.4	0.02
8/15	0.0	0.0	68.8	-68.8	-68.8	-0.2	0
8/16	0.0	0.0	68.8	-68.8	-137.5	-0.3	0
8/17	0.0	0.0	68.8	-68.8	-206.3	-0.5	0
8/18	0.0	0.0	68.8	-68.8	-275.1	-0.7	0
8/19	0.0	0.0	68.8	-68.8	-343.8	-0.8	0
8/20	0.0	0.0	68.8	-68.8	-412.6	-1.0	0
8/21	0.0	0.0	68.8	-68.8	-481.4	-1.2	0
8/22	0.0	0.0	68.8	-68.8	-550.2	-1.3	0
8/23	124.2	3153.7	68.8	3209.1	2659.0	6.4	0.3
8/24	0.0	0.0	68.8	-68.8	-68.8	-0.2	0
8/25	0.0	0.0	68.8	-68.8	-137.5	-0.3	0
8/26	0.0	0.0	68.8	-68.8	-206.3	-0.5	0
8/27	0.0	0.0	68.8	-68.8	-275.1	-0.7	0
8/28	0.0	0.0	68.8	-68.8	-343.8	-0.8	0
8/29	0.0	0.0	68.8	-68.8	-412.6	-1.0	0
8/30	0.0	0.0	68.8	-68.8	-481.4	-1.2	0
8/31	4.1	105.1	68.8	40.5	-440.9	-1.1	0.01

## September 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
9/1	4.1	105.1	42.7	66.6	-374.3	-0.9	0.01
9/2	0.0	0.0	42.7	-42.7	-417.0	-1.0	0
9/3	0.0	0.0	42.7	-42.7	-459.6	-1.1	0
9/4	82.8	2102.5	42.7	2142.6	1682.9	4.1	0.2
9/5	0.0	0.0	42.7	-42.7	-42.7	-0.1	0
9/6	0.0	0.0	42.7	-42.7	-85.3	-0.2	0
9/7	0.0	0.0	42.7	-42.7	-128.0	-0.3	0
9/8	0.0	0.0	42.7	-42.7	-170.7	-0.4	0
9/9	0.0	0.0	42.7	-42.7	-213.4	-0.5	0
9/10	49.7	1261.5	42.7	1268.5	1055.1	2.5	0.12
9/11	0.0	0.0	42.7	-42.7	-42.7	-0.1	0
9/12	0.0	0.0	42.7	-42.7	-85.3	-0.2	0
9/13	12.4	315.4	42.7	285.1	199.8	0.5	0.03
9/14	964.4	24493.9	42.7	25415.7	25415.7	61.4	2.33
9/15	0.0	0.0	42.7	-42.7	-42.7	-0.1	0
9/16	0.0	0.0	42.7	-42.7	-85.3	-0.2	0
9/17	0.0	0.0	42.7	-42.7	-128.0	-0.3	0
9/18	0.0	0.0	42.7	-42.7	-170.7	-0.4	0
9/19	0.0	0.0	42.7	-42.7	-213.4	-0.5	0
9/20	298.0	7568.9	42.7	7824.3	7610.9	18.4	0.72
9/21	579.5	14717.4	42.7	15254.2	15254.2	36.9	1.4
9/22	4.1	105.1	42.7	66.6	66.6	0.2	0.01
9/23	0.0	0.0	42.7	-42.7	-42.7	-0.1	0
9/24	20.7	525.6	42.7	503.6	461.0	1.1	0.05
9/25	223.5	5676.7	42.7	5857.5	5857.5	14.2	0.54
9/26	0.0	0.0	42.7	-42.7	-42.7	-0.1	0
9/27	0.0	0.0	42.7	-42.7	-85.3	-0.2	0
9/28	0.0	0.0	42.7	-42.7	-128.0	-0.3	0
9/29	0.0	0.0	42.7	-42.7	-170.7	-0.4	0
9/30	99.3	2523.0	42.7	2579.6	2409.0	5.8	0.24



## October 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
10/1	29.0	735.9	22.5	742.3	742.3	1.8	0.07
10/2	0.0	0.0	22.5	-22.5	-22.5	-0.1	0
10/3	0.0	0.0	22.5	-22.5	-45.0	-0.1	0
10/4	0.0	0.0	22.5	-22.5	-67.5	-0.2	0
10/5	0.0	0.0	22.5	-22.5	-90.0	-0.2	0
10/6	33.1	841.0	22.5	851.6	761.6	1.8	0.08
10/7	0.0	0.0	22.5	-22.5	-22.5	-0.1	0
10/8	0.0	0.0	22.5	-22.5	-45.0	-0.1	0
10/9	0.0	0.0	22.5	-22.5	-67.5	-0.2	0
10/10	0.0	0.0	22.5	-22.5	-90.0	-0.2	0
10/11	0.0	0.0	22.5	-22.5	-112.5	-0.3	0
10/12	0.0	0.0	22.5	-22.5	-135.0	-0.3	0
10/13	0.0	0.0	22.5	-22.5	-157.5	-0.4	0
10/14	12.4	315.4	22.5	305.3	147.8	0.4	0.03
10/15	111.8	2838.4	22.5	2927.6	2927.6	7.1	0.27
10/16	0.0	0.0	22.5	-22.5	-22.5	-0.1	0
10/17	0.0	0.0	22.5	-22.5	-45.0	-0.1	0
10/18	0.0	0.0	22.5	-22.5	-67.5	-0.2	0
10/19	0.0	0.0	22.5	-22.5	-90.0	-0.2	0
10/20	0.0	0.0	22.5	-22.5	-112.5	-0.3	0
10/21	0.0	0.0	22.5	-22.5	-135.0	-0.3	0
10/22	0.0	0.0	22.5	-22.5	-157.5	-0.4	0
10/23	0.0	0.0	22.5	-22.5	-180.0	-0.4	0
10/24	0.0	0.0	22.5	-22.5	-202.5	-0.5	0
10/25	0.0	0.0	22.5	-22.5	-224.9	-0.5	0
10/26	0.0	0.0	22.5	-22.5	-247.4	-0.6	0
10/27	4.1	105.1	22.5	86.8	-160.7	-0.4	0.01
10/28	0.0	0.0	22.5	-22.5	-183.2	-0.4	0
10/29	0.0	0.0	22.5	-22.5	-205.7	-0.5	0
10/30	4.1	105.1	22.5	86.8	-118.9	-0.3	0.01
10/31	0.0	0.0	22.5	-22.5	-141.4	-0.3	0

## November 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
11/1	0.0	0.0	12.8	-12.8	-154.2	-0.4	0
11/2	0.0	0.0	12.8	-12.8	-166.9	-0.4	0
11/3	24.8	630.7	12.8	642.8	475.8	1.1	0.06
11/4	0.0	0.0	12.8	-12.8	-12.8	0.0	0
11/5	0.0	0.0	12.8	-12.8	-25.6	-0.1	0
11/6	0.0	0.0	12.8	-12.8	-38.3	-0.1	0
11/7	0.0	0.0	12.8	-12.8	-51.1	-0.1	0
11/8	0.0	0.0	12.8	-12.8	-63.9	-0.2	0
11/9	0.0	0.0	12.8	-12.8	-76.7	-0.2	0
11/10	0.0	0.0	12.8	-12.8	-89.5	-0.2	0
11/11	0.0	0.0	12.8	-12.8	-102.3	-0.2	0
11/12	0.0	0.0	12.8	-12.8	-115.0	-0.3	0
11/13	0.0	0.0	12.8	-12.8	-127.8	-0.3	0
11/14	0.0	0.0	12.8	-12.8	-140.6	-0.3	0
11/15	4.1	105.1	12.8	96.5	-44.1	-0.1	0.01
11/16	0.0	0.0	12.8	-12.8	-56.9	-0.1	0
11/17	0.0	0.0	12.8	-12.8	-69.7	-0.2	0
11/18	0.0	0.0	12.8	-12.8	-82.5	-0.2	0
11/19	0.0	0.0	12.8	-12.8	-95.2	-0.2	0
11/20	12.4	315.4	12.8	315.0	219.8	0.5	0.03
11/21	0.0	0.0	12.8	-12.8	-12.8	0.0	0
11/22	0.0	0.0	12.8	-12.8	-25.6	-0.1	0
11/23	0.0	0.0	12.8	-12.8	-38.3	-0.1	0
11/24	0.0	0.0	12.8	-12.8	-51.1	-0.1	0
11/25	413.9	10512.4	12.8	10913.6	10862.4	26.2	1
11/26	0.0	0.0	12.8	-12.8	-12.8	0.0	0
11/27	0.0	0.0	12.8	-12.8	-25.6	-0.1	0
11/28	0.0	0.0	12.8	-12.8	-38.3	-0.1	0
11/29	0.0	0.0	12.8	-12.8	-51.1	-0.1	0
11/30	0.0	0.0	12.8	-12.8	-63.9	-0.2	0

## December 2001

Date	P (ft <sup>3</sup> /day)	S (ft <sup>3</sup> /day)	ET (ft <sup>3</sup> /day)	$\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (ft <sup>3</sup> /day)	Cumulative $\Delta S$ (in)	RA120
12/1	0.0	0.0	0.0	0.0	-63.9	-0.2	0
12/2	0.0	0.0	0.0	0.0	-63.9	-0.2	0
12/3	0.0	0.0	0.0	0.0	-63.9	-0.2	0
12/4	0.0	0.0	0.0	0.0	-63.9	-0.2	0
12/5	0.0	0.0	0.0	0.0	-63.9	-0.2	0
12/6	0.0	0.0	0.0	0.0	-63.9	-0.2	0
12/7	0.0	0.0	0.0	0.0	-63.9	-0.2	0
12/8	318.7	8094.6	0.0	8413.3	8349.4	20.2	0.77
12/9	29.0	735.9	0.0	764.8	764.8	1.8	0.07
12/10	0.0	0.0	0.0	0.0	0.0	0.0	0
12/11	0.0	0.0	0.0	0.0	0.0	0.0	0
12/12	0.0	0.0	0.0	0.0	0.0	0.0	0
12/13	4.1	105.1	0.0	109.3	109.3	0.3	0.01
12/14	37.3	946.1	0.0	983.4	983.4	2.4	0.09
12/15	0.0	0.0	0.0	0.0	0.0	0.0	0
12/16	0.0	0.0	0.0	0.0	0.0	0.0	0
12/17	120.0	3048.6	0.0	3168.6	3168.6	7.7	0.29
12/18	140.7	3574.2	0.0	3715.0	3715.0	9.0	0.34
12/19	4.1	105.1	0.0	109.3	109.3	0.3	0.01
12/20	0.0	0.0	0.0	0.0	0.0	0.0	0
12/21	0.0	0.0	0.0	0.0	0.0	0.0	0
12/22	0.0	0.0	0.0	0.0	0.0	0.0	0
12/23	37.3	946.1	0.0	983.4	983.4	2.4	0.09
12/24	165.6	4205.0	0.0	4370.5	4370.5	10.6	0.4
12/25	0.0	0.0	0.0	0.0	0.0	0.0	0
12/26	0.0	0.0	0.0	0.0	0.0	0.0	0
12/27	0.0	0.0	0.0	0.0	0.0	0.0	0
12/28	0.0	0.0	0.0	0.0	0.0	0.0	0
12/29	0.0	0.0	0.0	0.0	0.0	0.0	0
12/30	0.0	0.0	0.0	0.0	0.0	0.0	0
12/31	0.0	0.0	0.0	0.0	0.0	0.0	0

Note: There are no losses due to infiltration because the pond constructed wetland will be underlaid with an impervious liner.

Conclusion: The greatest cumulative decrease in depth is 1.0 inch and occurs from June 26, 2012 to July 13, 2012. Thus, the required depths of water in the pond constructed wetland are maintained throughout the year.

**MTD Drainage Area Breakdown**

Drainage Area	Area (Acres)	Open Space Curve Number	Woods Curve Number	Weighted Pervious Curve Number	Impervious Curve Number	Time of Concentration (min)
		80	77		98	
MTD-101A	0.19	0.05	0.00	80.00	0.14	2.57
MTD-101B	0.08	0.04	0.00	80.00	0.04	0.91
MTD-102A	0.07	0.04	0.00	80.00	0.03	0.30
MTD-102B	0.16	0.07	0.00	80.00	0.09	0.91
MTD-103	0.62	0.29	0.00	80.00	0.33	2.33
MTD-201	0.05	0.02	0.00	80.00	0.03	0.56
MTD-202	0.04	0.00	0.00	N/A	0.04	0.74
MTD-5	0.10	0.00	0.00	N/A	0.10	1.80
MTD-6	0.35	0.12	0.09	78.71	0.14	1.24

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS  
 Location Franklin Township  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name MTD-101A

By KH  
 Checked \_\_\_\_\_

Date 2/9/2024  
 Date \_\_\_\_\_

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- Flow Length, L  $Max L = (100 \cdot \sqrt{S})/n$
- 3  $= (100 \cdot \sqrt{0.067})/0.24 = 108 \text{ ft (100 max)}$
- 4 Two-yr 24-hr Rainfall, P<sub>2</sub>
- 5 land slope, s
- 6  $T_t = (0.007 \cdot (nL)^{0.8} / ((P^2 \cdot 0.5) \cdot (s^{0.4})))$  Compute T<sub>t</sub>

Segment ID	A-B	
	Asphalt	
	0.011	
ft	33	
in	3.97	
ft/ft	0.056	
hr	0.00	=
		<input type="text" value="0.00"/>

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average Velocity, V (Figure 15-4)
- 11  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>

Segment ID	B-C	
	Pavement	
ft	341	
ft/ft	0.0169	
ft/s	2.5	
hr	0.04	=
		<input type="text" value="0.04"/>

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, P<sub>w</sub>
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 (r^{2/3}) (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>
- 20 Water shed or Subarea T<sub>c</sub> or T<sub>t</sub> (add T<sub>t</sub> in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		=
		<input type="text" value="0.00"/>
hr		<input type="text" value="0.04"/>
min		<input type="text" value="2.57"/>

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS  
 Location Franklin Township  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name MTD-101B

By KH  
 Checked \_\_\_\_\_

Date 2/9/2024  
 Date \_\_\_\_\_

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- Flow Length, L  $Max L = (100 \cdot \sqrt{S})/n$
- 3  $= (100 \cdot \sqrt{0.067})/0.24 = 108 \text{ ft (100 max)}$
- 4 Two-yr 24-hr Rainfall, P<sub>2</sub>
- 5 land slope, s
- 6  $T_t = (0.007 \cdot (nL)^{0.8} / ((P^2 \cdot 0.5) \cdot (s^{0.4})))$  Compute Tt

Segment ID	A-B	
	Asphalt	
	0.011	
ft	14	
in	3.97	
ft/ft	0.0257	
hr	0.00	= <span style="border: 1px solid black; padding: 2px;">0.00</span>

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average Velocity, V (Figure 15-4)
- 11  $T_t = L / (3600 \cdot V)$  Compute Tt

Segment ID	B-C	
	Pavement	
ft	107	
ft/ft	0.0178	
ft/s	2.5	
hr	0.01	= <span style="border: 1px solid black; padding: 2px;">0.01</span>

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, P<sub>w</sub>
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 (r^{2/3}) (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 \cdot V)$  Compute Tt
- 20 Water shed or Subarea Tc or Tt (add Tt in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		= <span style="border: 1px solid black; padding: 2px;">0.00</span>
hr		<span style="border: 1px solid black; padding: 2px;">0.02</span>
min		<span style="border: 1px solid black; padding: 2px; background-color: yellow;">0.91</span>

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS  
 Location Franklin Township  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name MTD-102A

By KH  
 Checked \_\_\_\_\_

Date 2/9/2024  
 Date \_\_\_\_\_

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- Flow Length, L  $Max L = (100 \cdot \sqrt{S})/n$
- 3  $= (100 \cdot \sqrt{0.067})/0.24 = 108 \text{ ft (100 max)}$
- 4 Two-yr 24-hr Rainfall, P2
- 5 land slope, s
- 6  $T_t = (0.007 \cdot (nL)^{0.8} / ((P^2 \cdot 0.5) \cdot (s^{0.4})))$  Compute Tt

Segment ID	A-B	
	Asphalt	
	0.011	
ft	14	
in	3.97	
ft/ft	0.0427	
hr	0.00	= <span style="border: 1px solid black; padding: 2px;">0.00</span>

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average Velocity, V (Figure 15-4)
- 11  $T_t = L / (3600 \cdot V)$  Compute Tt

Segment ID	B-C	
	Pavement	
ft	34	
ft/ft	0.0397	
ft/s	4	
hr	0.00	= <span style="border: 1px solid black; padding: 2px;">0.00</span>

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, Pw
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 \cdot (r^{2/3}) \cdot (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 \cdot V)$  Compute Tt
- 20 Water shed or Subarea Tc or Tt (add Tt in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		= <span style="border: 1px solid black; padding: 2px;">0.00</span>
hr		= <span style="border: 1px solid black; padding: 2px;">0.01</span>
min		= <span style="border: 1px solid black; padding: 2px; background-color: yellow;">0.30</span>



Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS  
 Location Franklin Township  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name MTD-3B

By KH  
 Checked \_\_\_\_\_

Date 2/9/2024  
 Date \_\_\_\_\_

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- Flow Length, L  $Max L = (100 \cdot \sqrt{S})/n$
- 3  $= (100 \cdot \sqrt{0.067})/0.24 = 108 \text{ ft (100 max)}$
- 4 Two-yr 24-hr Rainfall, P<sub>2</sub>
- 5 land slope, s
- 6  $T_t = (0.007 \cdot (nL)^{0.8} / ((P^2 \cdot 0.5) \cdot (s^{0.4})))$  Compute Tt

Segment ID	A-B	
	Asphalt	
	0.011	
ft	14	
in	3.97	
ft/ft	0.0257	
hr	0.00	= <span style="border: 1px solid black; padding: 2px;">0.00</span>

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average Velocity, V (Figure 15-4)
- 11  $T_t = L / (3600 \cdot V)$  Compute Tt

Segment ID	B-C	
	Pavement	
ft	107	
ft/ft	0.047	
ft/s	2.5	
hr	0.01	= <span style="border: 1px solid black; padding: 2px;">0.01</span>

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, P<sub>w</sub>
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 (r^{2/3}) (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 \cdot V)$  Compute Tt
- 20 Water shed or Subarea Tc or Tt (add Tt in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		= <span style="border: 1px solid black; padding: 2px;">0.00</span>
hr		= <span style="border: 1px solid black; padding: 2px;">0.02</span>
min		= <span style="border: 1px solid black; padding: 2px; background-color: yellow;">0.91</span>

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS  
 Location Franklin Township  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name MTD-103

By KH  
 Checked \_\_\_\_\_

Date 2/9/2024  
 Date \_\_\_\_\_

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- Flow Length, L  $Max L = (100 \cdot \sqrt{S})/n$
- 3  $= (100 \cdot \sqrt{0.067})/0.24 = 108 \text{ ft (100 max)}$
- 4 Two-yr 24-hr Rainfall, P<sub>2</sub>
- 5 land slope, s
- 6  $T_t = (0.007 \cdot (nL)^{0.8} / ((P^2 \cdot 0.5) \cdot (s^{0.4})))$  Compute T<sub>t</sub>

Segment ID	A-B	
	Asphalt	
	0.011	
ft	33	
in	3.97	
ft/ft	0.056	
hr	0.00	=
		<input type="text" value="0.00"/>

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average Velocity, V (Figure 15-4)
- 11  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>

Segment ID	B-C	
	Pavement	
ft	305	
ft/ft	0.0164	
ft/s	2.5	
hr	0.03	=
		<input type="text" value="0.03"/>

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, P<sub>w</sub>
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 (r^{2/3}) (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>
- 20 Water shed or Subarea T<sub>c</sub> or T<sub>t</sub> (add T<sub>t</sub> in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		=
		<input type="text" value="0.00"/>
hr		<input type="text" value="0.04"/>
min		<input type="text" value="2.33"/>

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS  
 Location Franklin Township  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name MTD-201

By KH  
 Checked \_\_\_\_\_

Date 2/9/2024  
 Date \_\_\_\_\_

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- Flow Length, L  $Max L = (100 \cdot \sqrt{S})/n$
- 3  $= (100 \cdot \sqrt{0.067})/0.24 = 108 \text{ ft (100 max)}$
- 4 Two-yr 24-hr Rainfall, P<sub>2</sub>
- 5 land slope, s
- 6  $T_t = (0.007 \cdot (nL)^{0.8} / ((P^2 \cdot 0.5) \cdot (s^{0.4})))$  Compute T<sub>t</sub>

Segment ID	A-B	
	Asphalt	
	0.011	
ft	14	
in	3.97	
ft/ft	0.0257	
hr	0.00	= <span style="border: 1px solid black; padding: 2px;">0.00</span>

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average Velocity, V (Figure 15-4)
- 11  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>

Segment ID	B-C	
	Pavement	
ft	60	
ft/ft	0.0217	
ft/s	2.75	
hr	0.01	= <span style="border: 1px solid black; padding: 2px;">0.01</span>

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, P<sub>w</sub>
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 (r^{2/3}) (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>
- 20 Water shed or Subarea T<sub>c</sub> or T<sub>t</sub> (add T<sub>t</sub> in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		= <span style="border: 1px solid black; padding: 2px;">0.00</span>
hr		<span style="border: 1px solid black; padding: 2px;">0.01</span>
min		<span style="border: 1px solid black; padding: 2px; background-color: yellow;">0.56</span>

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS  
 Location Franklin Township  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name MTD-202

By KH  
 Checked \_\_\_\_\_

Date 2/9/2024  
 Date \_\_\_\_\_

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- Flow Length, L  $Max L = (100 \cdot \sqrt{S})/n$
- 3  $= (100 \cdot \sqrt{0.067})/0.24 = 108 \text{ ft (100 max)}$
- 4 Two-yr 24-hr Rainfall, P<sub>2</sub>
- 5 land slope, s
- 6  $T_t = (0.007 \cdot (nL)^{0.8} / ((P^2 \cdot 0.5) \cdot (s^{0.4})))$  Compute T<sub>t</sub>

Segment ID	A-B	
	Asphalt	
	0.011	
ft	14	
in	3.97	
ft/ft	0.0257	
hr	0.00	=
		<input type="text" value="0.00"/>

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average Velocity, V (Figure 15-4)
- 11  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>

Segment ID	B-C	
	Pavement	
ft	80	
ft/ft	0.0163	
ft/s	2.5	
hr	0.01	=
		<input type="text" value="0.01"/>

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, P<sub>w</sub>
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 (r^{2/3}) (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>
- 20 Water shed or Subarea T<sub>c</sub> or T<sub>t</sub> (add T<sub>t</sub> in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		=
		<input type="text" value="0.00"/>
hr		<input type="text" value="0.01"/>
min		<input type="text" value="0.74"/>

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS  
 Location Franklin Township  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name MTD-5

By KH  
 Checked \_\_\_\_\_

Date 2/9/2024  
 Date \_\_\_\_\_

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- Flow Length, L  $Max L = (100 \cdot \sqrt{S})/n$
- 3  $= (100 \cdot \sqrt{0.067})/0.24 = 108 \text{ ft (100 max)}$
- 4 Two-yr 24-hr Rainfall, P<sub>2</sub>
- 5 land slope, s
- 6  $T_t = (0.007 \cdot (nL)^{0.8} / ((P^2 \cdot 0.5) \cdot (s^{0.4})))$  Compute T<sub>t</sub>

Segment ID	A-B	
	Asphalt	
	0.011	
ft	14	
in	3.97	
ft/ft	0.0257	
hr	0.00	=
		<input type="text" value="0.00"/>

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average Velocity, V (Figure 15-4)
- 11  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>

Segment ID	B-C	
	Pavement	
ft	191	
ft/ft	0.0152	
ft/s	2	
hr	0.03	=
		<input type="text" value="0.03"/>

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, P<sub>w</sub>
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 (r^{2/3}) (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>
- 20 Water shed or Subarea T<sub>c</sub> or T<sub>t</sub> (add T<sub>t</sub> in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		=
		<input type="text" value="0.00"/>
hr		<input type="text" value="0.03"/>
min		<input type="text" value="1.80"/>

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt)

Project 1509FS  
 Location Franklin Township  
 Select One: Post-Developed  
 Select One: Time of Concentration  
 Area Name MTD-6

By KH  
 Checked \_\_\_\_\_

Date 2/9/2024  
 Date \_\_\_\_\_

Notes: Space for as many as two segments per flow type can be used for each worksheet  
 Include a Map, schematic, or description of flow segments

Sheet Flow (Applicable to Tc only)

- 1 Surface Description (table 3-1)
- 2 Mannings Roughness Coeff., n (table 3-1)
- Flow Length, L  $Max L = (100 \cdot \sqrt{S})/n$
- 3  $= (100 \cdot \sqrt{0.067})/0.24 = 108 \text{ ft (100 max)}$
- 4 Two-yr 24-hr Rainfall, P<sub>2</sub>
- 5 land slope, s
- 6  $T_t = (0.007 \cdot (nL)^{0.8} / ((P^2 \cdot 0.5) \cdot (s^{0.4})))$  Compute T<sub>t</sub>

Segment ID	A-B	
	Asphalt	
	0.011	
ft	14	
in	3.97	
ft/ft	0.0257	
hr	0.00	= <span style="border: 1px solid black; padding: 2px;">0.00</span>

Shallow Concentrated Flow

- 7 Surface Description (paved or unpaved)
- 8 Flow Length, L
- 9 Watercourse Slope, s
- 10 Average Velocity, V (Figure 15-4)
- 11  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>

Segment ID	B-C	
	PAVEMENT	
ft	169	
ft/ft	0.0172	
ft/s	2.7	
hr	0.02	= <span style="border: 1px solid black; padding: 2px;">0.02</span>

Channel Flow

- 12 Cross sectional flow area, a
- 13 Wetted Perimeter, P<sub>w</sub>
- 14 Hydraulic Radius,  $r = a / P_w$  Compute r
- 15 Channel Slope, s
- 16 Mannings roughness Coeff., n
- 17  $V = 1.49 \cdot (r^{2/3}) \cdot (s^{1/2}) / n$  Compute V
- 18 Flow Length, L
- 19  $T_t = L / (3600 \cdot V)$  Compute T<sub>t</sub>
- 20 Water shed or Subarea T<sub>c</sub> or T<sub>t</sub> (add T<sub>t</sub> in steps 6, 11, 19)

Segment ID		
ft <sup>2</sup>		
ft		
ft		
ft/ft		
ft/s		
ft		
hr		= <span style="border: 1px solid black; padding: 2px;">0.00</span>
hr		<span style="border: 1px solid black; padding: 2px;">0.02</span>
min		<span style="border: 1px solid black; padding: 2px; background-color: yellow;">1.24</span>

**Lot 14.02 in Block 286**

Somerset, NJ

2/14/24

**Sizing Basis:**

Filterra High Capacity biofiltration system has received final certification from the NJDEP for 80% TSS removal. Per the NJDEP, Filterra HC is considered a Green Infrastructure (GI) MTD. The sizing for the Filterra HC system under NJDEP regulations is based on the methodology outlined in Chapter 5 of the NJDEP BMP Manual. The NRCS method is utilized to determine a water quality flow rate for the drainage area in question. To validate the sizing, the parameters below were assumed.

**Design Parameters:**

Design Storm = NJDEP Water Quality Design Storm (1.25-inch/2-hour storm event)  
 Filterra HC Media Flow Rate = 300 inches/hour  
 Allowable Ponding in Filterra = 9"

**Design Summary:**

Utilizing NRCS Method and HydroCAD software, a hydrograph can be derived to represent the design storm. The WQ flow is routed to an appropriately sized Filterra unit. Since the Filterra system can provide up to 9" of ponding, some flow attenuation is possible. The Filterra system is able to accommodate a portion of the water quality volume in the head space above the media and release it at the system's NJDEP certified maximum treatment flow rate.

Site Designation	Open Space Area (ac) CN=80	Woods Area (ac) CN=77	Impervious Area (ac) CN=98	Time of Concentration (min)	Filterra HC Model Size
MTD-101A	0.05	0	0.14	2.57	10'x6' Offline Filterra HC Vault
MTD-101B	0.04	0	0.04	0.91	4'x4' Offline Filterra HC Vault
MTD-102A	0.04	0	0.03	0.3	4'x4' Offline Filterra HC Vault
MTD-102B	0.07	0	0.09	0.91	6'x6' Offline Filterra HC Vault
MTD-103	0.29	0	0.33	2.33	18'x8' Offline Filterra HC Vault
MTD-201	0.02	0	0.03	0.56	4'x4' Offline Filterra HC Vault
MTD-202	0	0	0.04	0.74	4'x4' Offline Filterra HC Vault
MTD-5	0	0	0.1	1.8	6'x6' Offline Filterra HC Vault
MTD-6	0.12	0.09	0.14	1.24	10'x6' Offline Filterra HC Vault

Thank you for the opportunity to present this to you and your client. Please do not hesitate to contact me should you have any additional questions.

Sincerely,

Taylor Murdock  
 Stormwater Design Engineer  
 Contech Engineered Solutions, LLC.

**Lot 14.02 in Block 286 (2-13-24)**

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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Page 2

**Summary for Subcatchment 1AS: MTD-101A DA**

Runoff = 0.46 cfs @ 1.09 hrs, Volume= 557 cf, Depth= 0.81"

Routed to Pond 1AP : Filterra 6x10/10x6

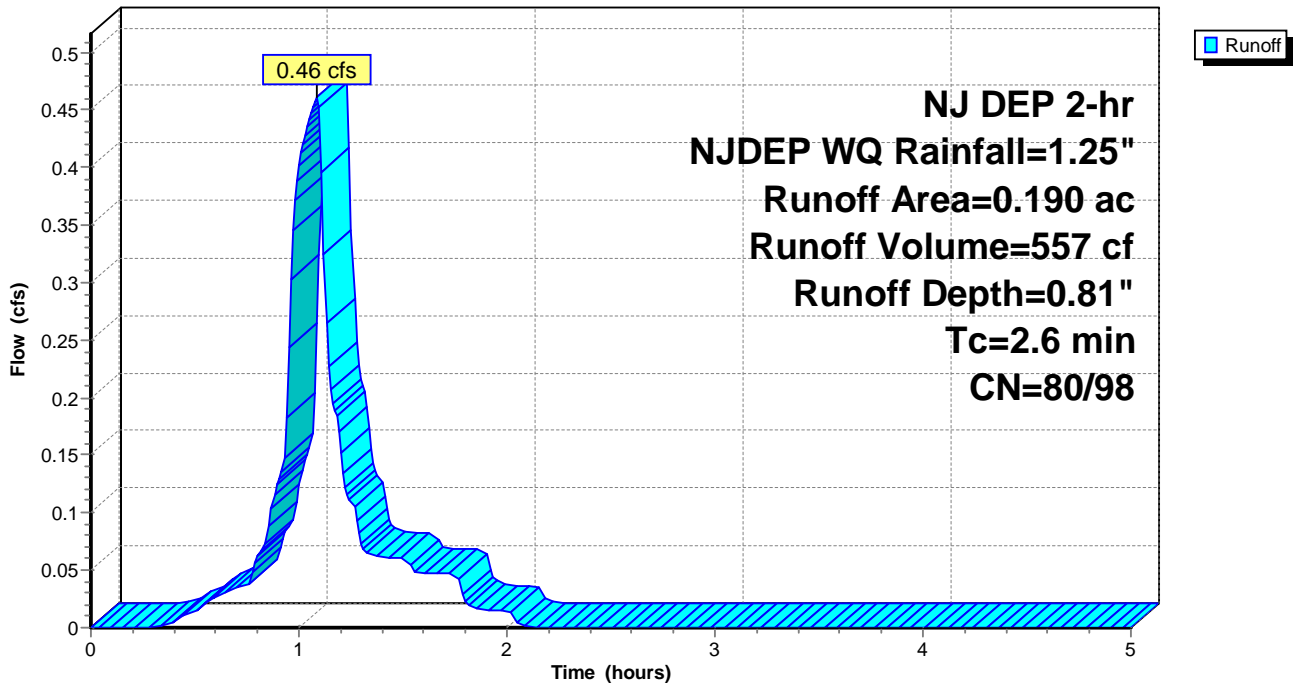
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.01 hrs  
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.050	80	
* 0.140	98	
0.190	93	Weighted Average
0.050	80	26.32% Pervious Area
0.140	98	73.68% Impervious Area

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

**Subcatchment 1AS: MTD-101A DA**

Hydrograph





**Summary for Pond 1AP: Filterra 6x10/10x6**

Inflow Area = 0.190 ac, 73.68% Impervious, Inflow Depth = 0.81" for NJDEP WQ event  
 Inflow = 0.46 cfs @ 1.09 hrs, Volume= 557 cf  
 Outflow = 0.42 cfs @ 1.02 hrs, Volume= 554 cf, Atten= 10%, Lag= 0.0 min  
 Primary = 0.42 cfs @ 1.02 hrs, Volume= 554 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 0.15' @ 1.11 hrs Surf.Area= 0.001 ac Storage= 9 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.1 min ( 67.9 - 67.8 )

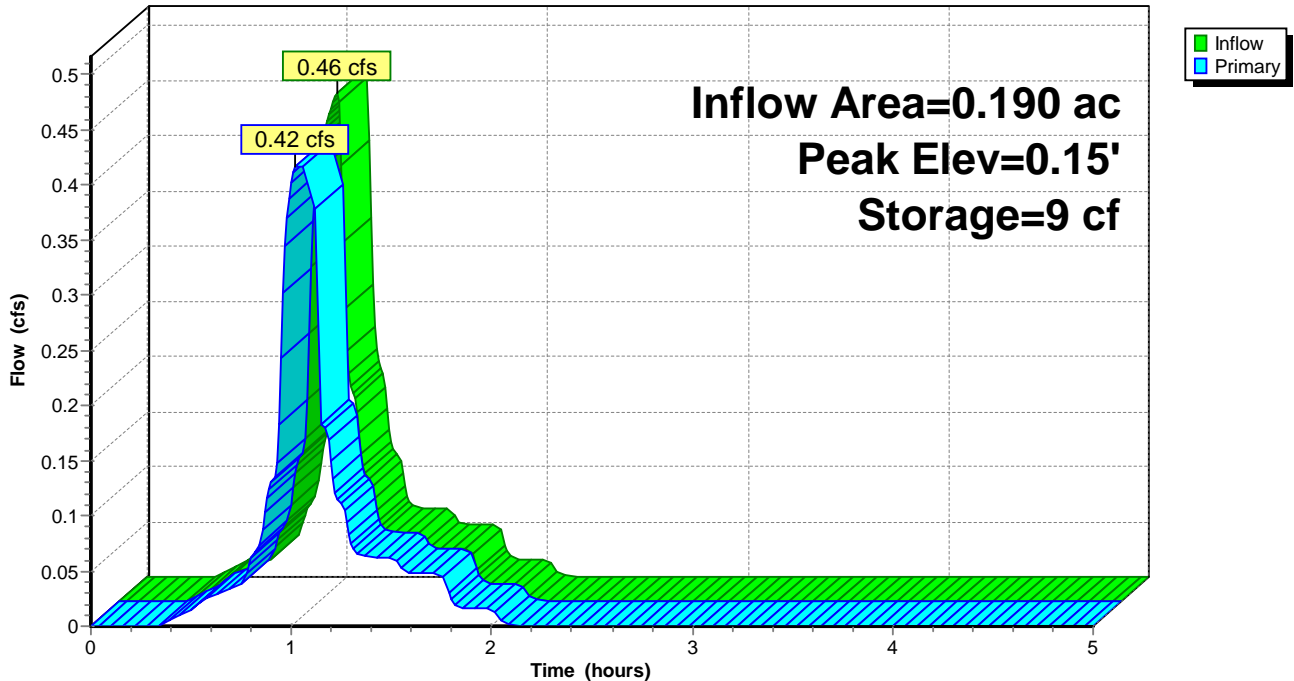
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	45 cf	<b>6.00'W x 10.00'L x 0.75'H Prismaoid</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>300.000 in/hr Exfiltration over Surface area</b>

**Primary OutFlow** Max=0.42 cfs @ 1.02 hrs HW=0.01' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 0.42 cfs @ 0.01 fps)

**Pond 1AP: Filterra 6x10/10x6**

Hydrograph



**Summary for Subcatchment 1BS: MTD-101B DA**

Runoff = 0.15 cfs @ 1.08 hrs, Volume= 175 cf, Depth= 0.60"  
 Routed to Pond 1BP : Filterra 4x4

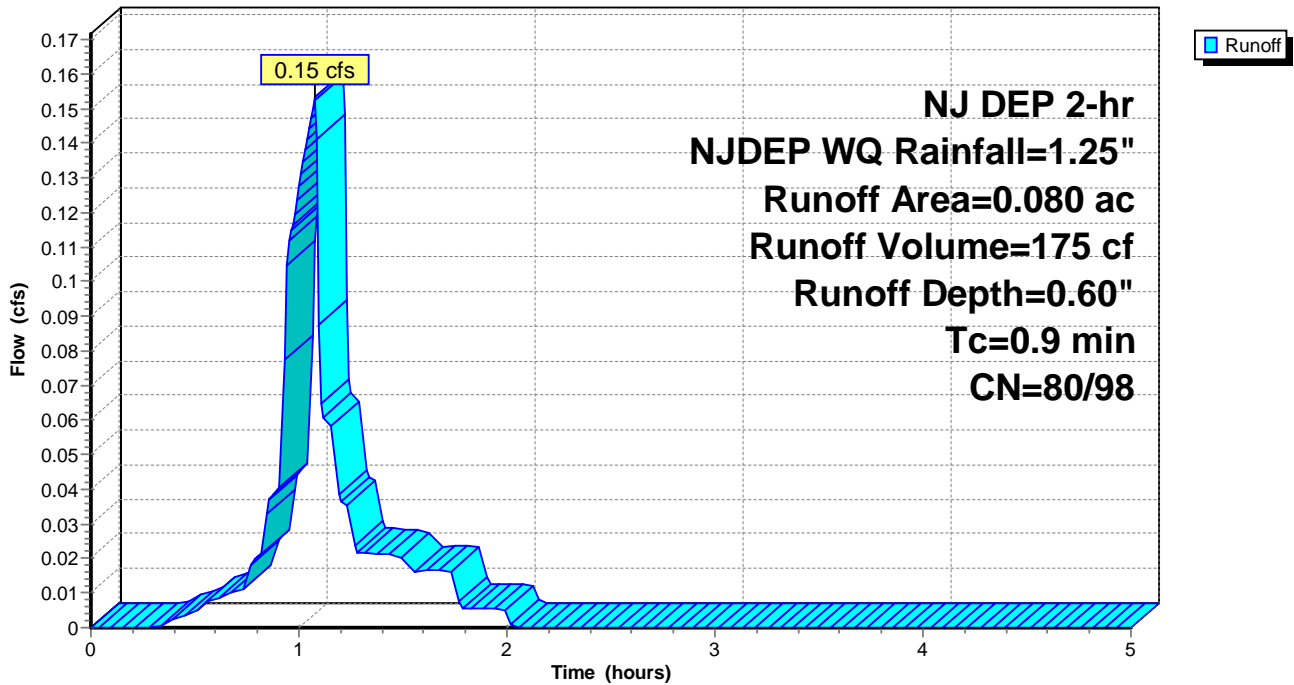
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.01 hrs  
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.040	80	
* 0.040	98	
0.080	89	Weighted Average
0.040	80	50.00% Pervious Area
0.040	98	50.00% Impervious Area

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

**Subcatchment 1BS: MTD-101B DA**

Hydrograph



**Summary for Pond 1BP: Filterra 4x4**

Inflow Area = 0.080 ac, 50.00% Impervious, Inflow Depth = 0.60" for NJDEP WQ event  
 Inflow = 0.15 cfs @ 1.08 hrs, Volume= 175 cf  
 Outflow = 0.11 cfs @ 0.95 hrs, Volume= 172 cf, Atten= 27%, Lag= 0.0 min  
 Primary = 0.11 cfs @ 0.95 hrs, Volume= 172 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 0.72' @ 1.10 hrs Surf.Area= 0.000 ac Storage= 12 cf

Plug-Flow detention time= 1.2 min calculated for 172 cf (98% of inflow)  
 Center-of-Mass det. time= 0.3 min ( 67.6 - 67.3 )

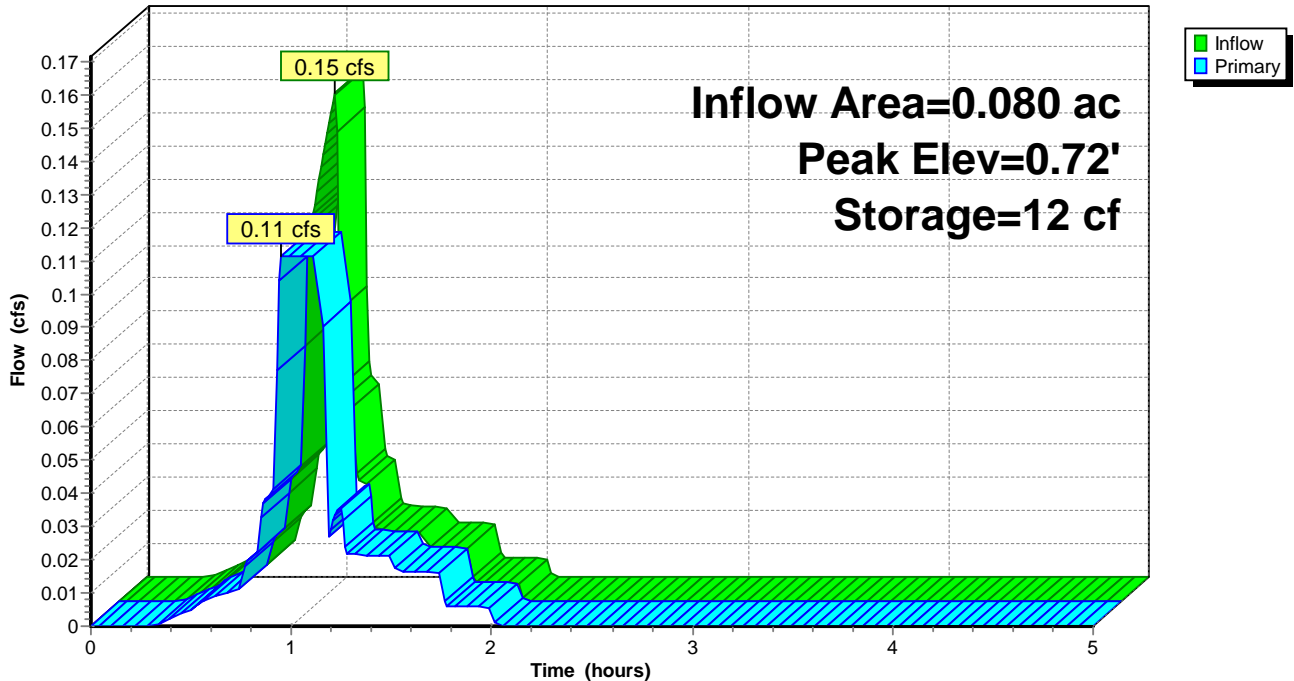
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	12 cf	4.00'W x 4.00'L x 0.75'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

**Primary OutFlow** Max=0.11 cfs @ 0.95 hrs HW=0.01' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 0.11 cfs @ 0.01 fps)

**Pond 1BP: Filterra 4x4**

Hydrograph



**Summary for Subcatchment 2AS: MTD-102A DA**

Runoff = 0.13 cfs @ 1.08 hrs, Volume= 138 cf, Depth= 0.54"  
 Routed to Pond 2AP : Filterra 4x4

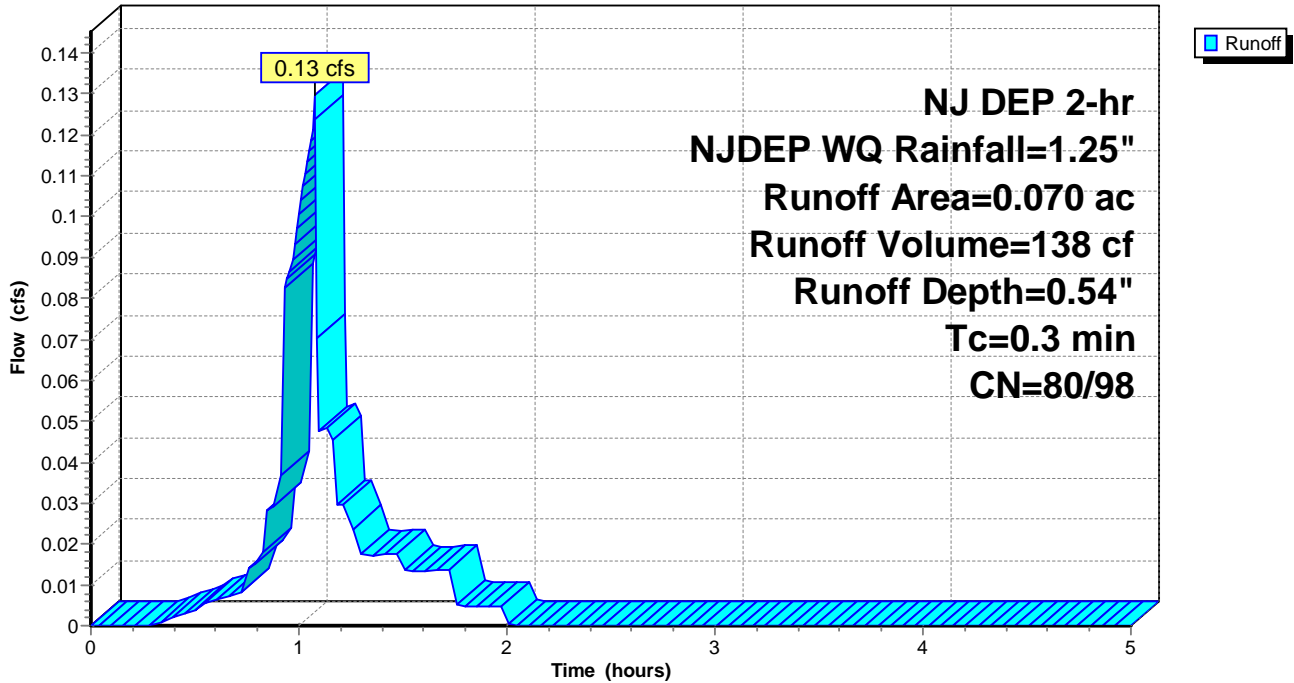
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.01 hrs  
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.040	80	
* 0.030	98	
0.070	88	Weighted Average
0.040	80	57.14% Pervious Area
0.030	98	42.86% Impervious Area

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

**Subcatchment 2AS: MTD-102A DA**

Hydrograph



**Summary for Pond 2AP: Filterra 4x4**

Inflow Area = 0.070 ac, 42.86% Impervious, Inflow Depth = 0.54" for NJDEP WQ event  
 Inflow = 0.13 cfs @ 1.08 hrs, Volume= 138 cf  
 Outflow = 0.11 cfs @ 1.04 hrs, Volume= 136 cf, Atten= 14%, Lag= 0.0 min  
 Primary = 0.11 cfs @ 1.04 hrs, Volume= 136 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 0.08' @ 1.08 hrs Surf.Area= 0.000 ac Storage= 1 cf

Plug-Flow detention time= 0.8 min calculated for 136 cf (98% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 67.3 - 67.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	12 cf	4.00'W x 4.00'L x 0.75'H Prismaoid

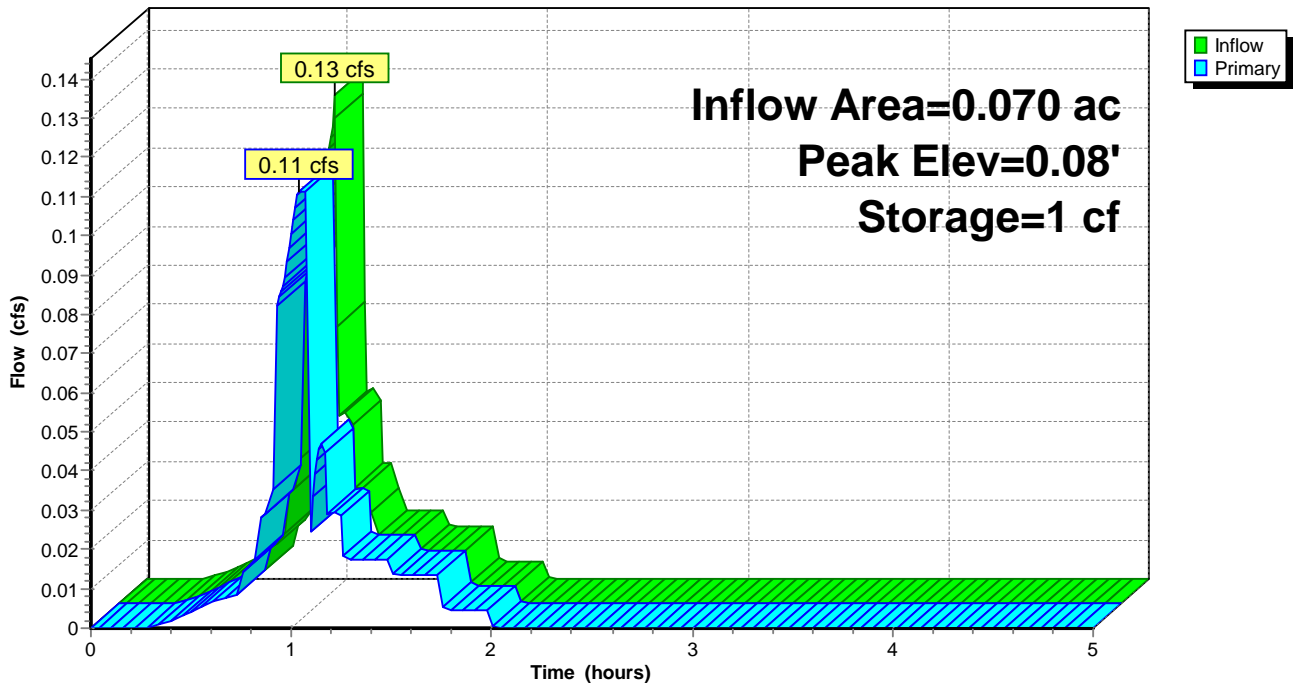
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

**Primary OutFlow** Max=0.11 cfs @ 1.04 hrs HW=0.01' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.11 cfs @ 0.01 fps)

**Pond 2AP: Filterra 4x4**

Hydrograph



**Summary for Subcatchment 2BS: MTD-102B DA**

Runoff = 0.33 cfs @ 1.08 hrs, Volume= 382 cf, Depth= 0.66"  
 Routed to Pond 2BP : Filterra 6x6

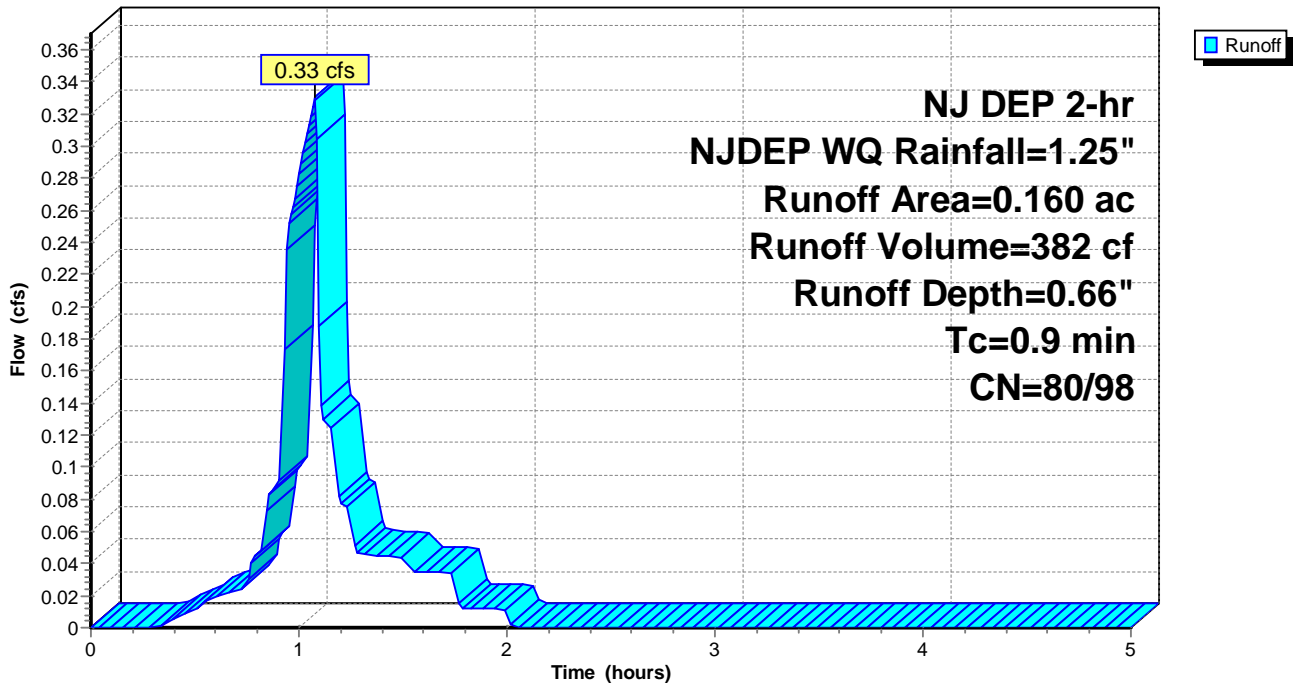
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.01 hrs  
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.070	80	
* 0.090	98	
0.160	90	Weighted Average
0.070	80	43.75% Pervious Area
0.090	98	56.25% Impervious Area

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

**Subcatchment 2BS: MTD-102B DA**

Hydrograph



**Summary for Pond 2BP: Filterra 6x6**

Inflow Area = 0.160 ac, 56.25% Impervious, Inflow Depth = 0.66" for NJDEP WQ event  
 Inflow = 0.33 cfs @ 1.08 hrs, Volume= 382 cf  
 Outflow = 0.25 cfs @ 0.95 hrs, Volume= 381 cf, Atten= 24%, Lag= 0.0 min  
 Primary = 0.25 cfs @ 0.95 hrs, Volume= 381 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 0.62' @ 1.09 hrs Surf.Area= 0.001 ac Storage= 22 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.3 min ( 67.3 - 67.0 )

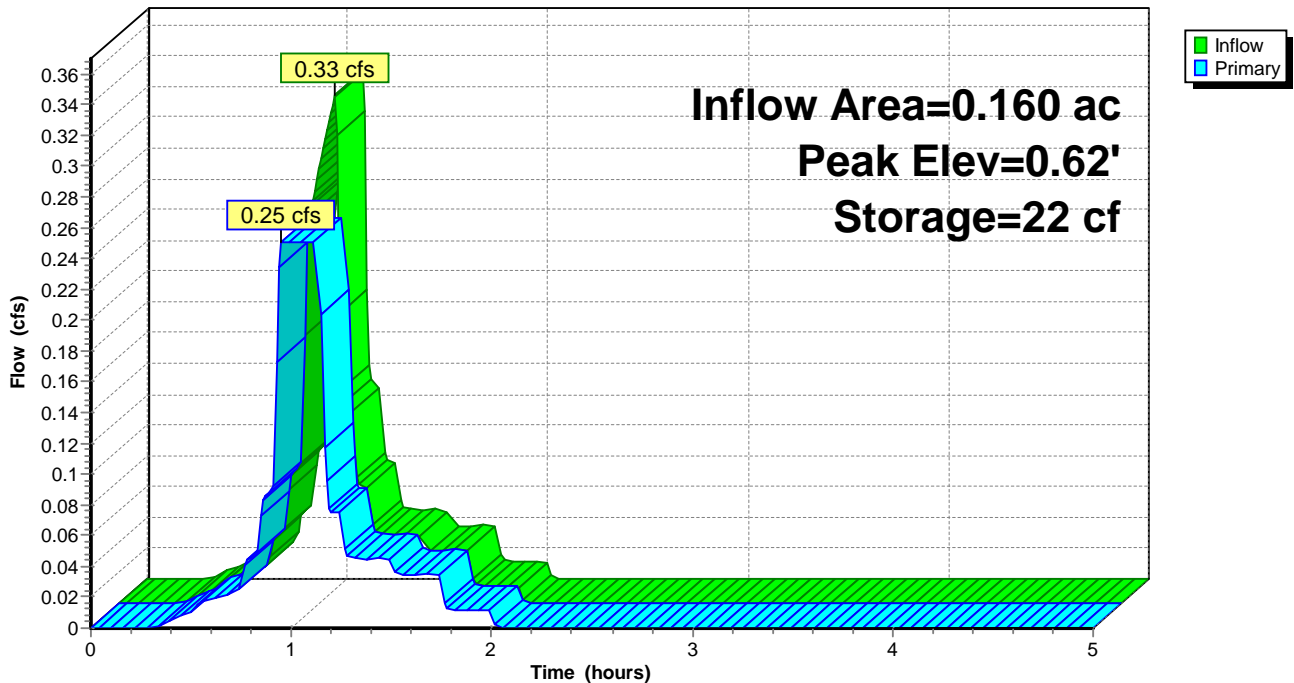
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	27 cf	<b>6.00'W x 6.00'L x 0.75'H Prismaoid</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>300.000 in/hr Exfiltration over Surface area</b>

**Primary OutFlow** Max=0.25 cfs @ 0.95 hrs HW=0.01' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 0.25 cfs @ 0.01 fps)

**Pond 2BP: Filterra 6x6**

Hydrograph



**Lot 14.02 in Block 286 (2-13-24)**

NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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**Summary for Subcatchment 3S: MTD-103 DA**

Runoff = 1.20 cfs @ 1.09 hrs, Volume= 1,422 cf, Depth= 0.63"  
 Routed to Pond 3P : Filterra 18x8

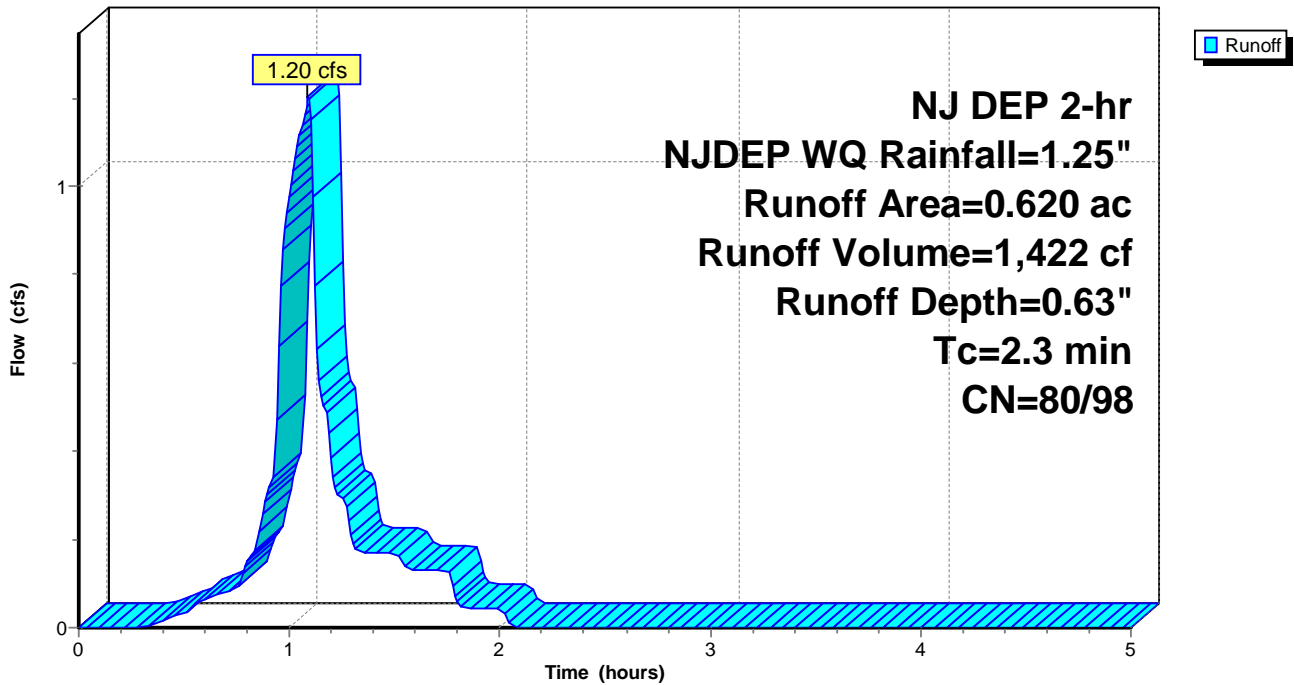
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.01 hrs  
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.290	80	
* 0.330	98	
0.620	90	Weighted Average
0.290	80	46.77% Pervious Area
0.330	98	53.23% Impervious Area

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

**Subcatchment 3S: MTD-103 DA**

Hydrograph





**Summary for Pond 3P: Filtterra 18x8**

Inflow Area = 0.620 ac, 53.23% Impervious, Inflow Depth = 0.63" for NJDEP WQ event  
 Inflow = 1.20 cfs @ 1.09 hrs, Volume= 1,422 cf  
 Outflow = 1.00 cfs @ 1.01 hrs, Volume= 1,413 cf, Atten= 17%, Lag= 0.0 min  
 Primary = 1.00 cfs @ 1.01 hrs, Volume= 1,413 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 0.29' @ 1.11 hrs Surf.Area= 0.003 ac Storage= 42 cf

Plug-Flow detention time= 0.4 min calculated for 1,413 cf (99% of inflow)  
 Center-of-Mass det. time= 0.1 min ( 68.6 - 68.4 )

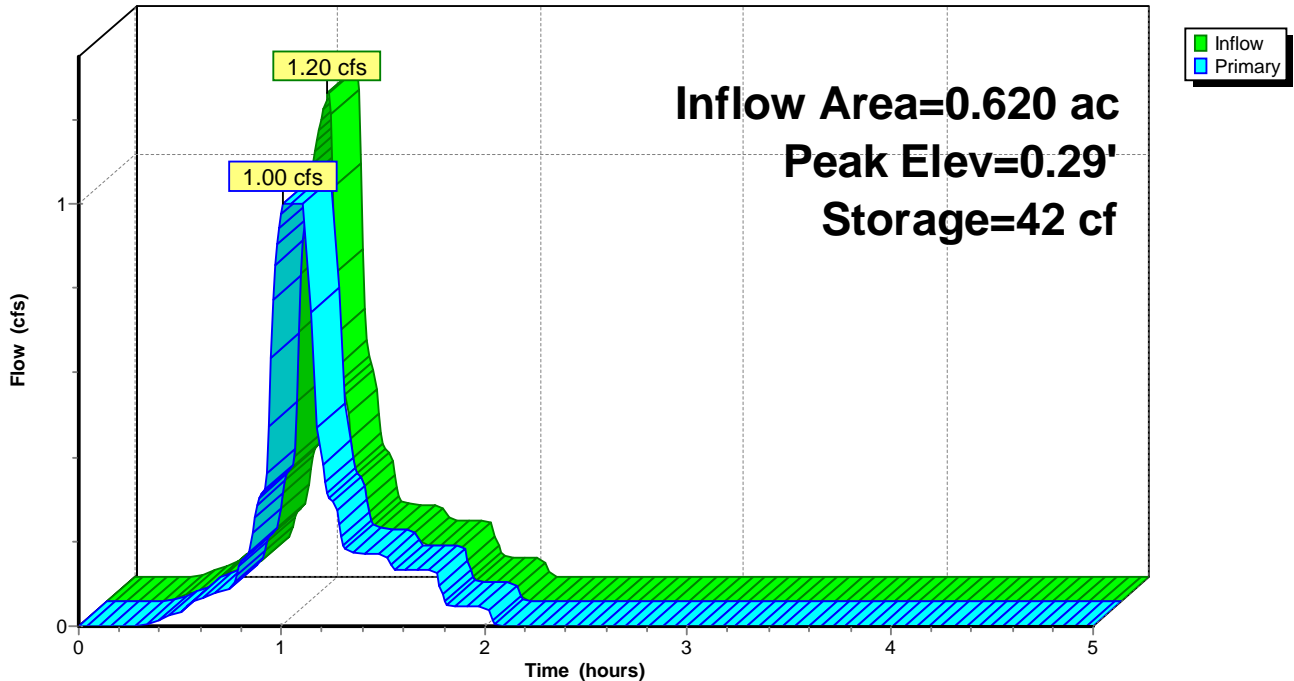
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	108 cf	<b>18.00'W x 8.00'L x 0.75'H Prismaoid</b>

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	<b>300.000 in/hr Exfiltration over Surface area</b>

**Primary OutFlow** Max=1.00 cfs @ 1.01 hrs HW=0.01' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 1.00 cfs @ 0.01 fps)

**Pond 3P: Filtterra 18x8**

Hydrograph



**Lot 14.02 in Block 286 (2-13-24)**

NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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**Summary for Subcatchment 1S: MTD-201 DA**

Runoff = 0.11 cfs @ 1.08 hrs, Volume= 125 cf, Depth= 0.69"  
 Routed to Pond 1P : Filterra 4x4

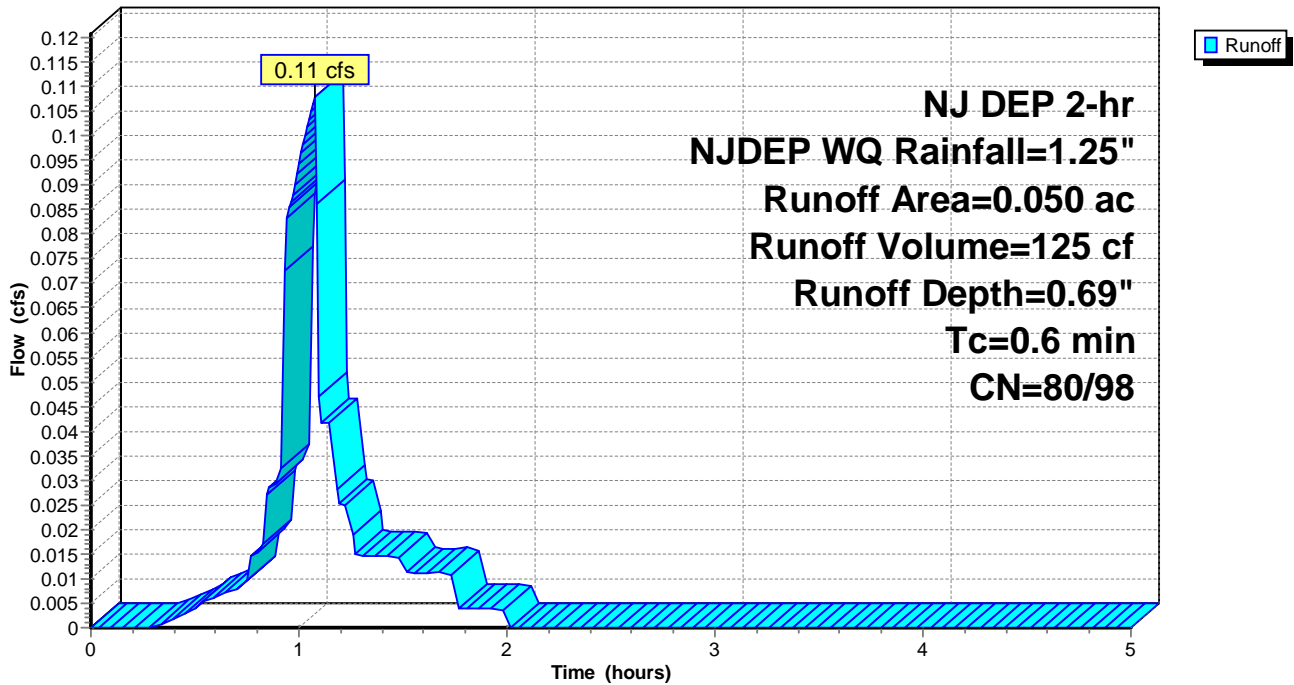
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.01 hrs  
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.020	80	
* 0.030	98	
0.050	91	Weighted Average
0.020	80	40.00% Pervious Area
0.030	98	60.00% Impervious Area

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

**Subcatchment 1S: MTD-201 DA**

Hydrograph



**Summary for Pond 1P: Filterra 4x4**

Inflow Area = 0.050 ac, 60.00% Impervious, Inflow Depth = 0.69" for NJDEP WQ event  
 Inflow = 0.11 cfs @ 1.08 hrs, Volume= 125 cf  
 Outflow = 0.11 cfs @ 1.08 hrs, Volume= 125 cf, Atten= 0%, Lag= 0.0 min  
 Primary = 0.11 cfs @ 1.08 hrs, Volume= 125 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 0.01' @ 1.08 hrs Surf.Area= 0.000 ac Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 125 cf (100% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 66.5 - 66.5 )

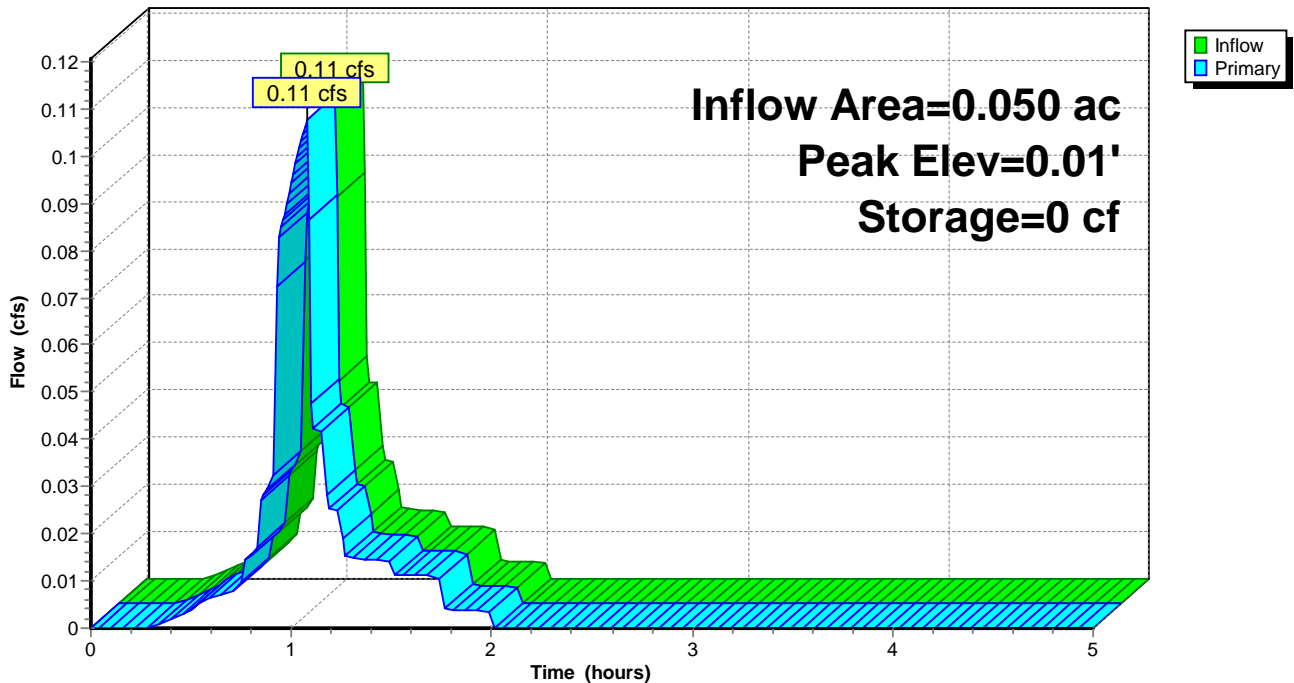
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	12 cf	4.00'W x 4.00'L x 0.75'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

**Primary OutFlow** Max=0.11 cfs @ 1.08 hrs HW=0.01' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 0.11 cfs @ 0.01 fps)

**Pond 1P: Filterra 4x4**

Hydrograph



**Summary for Subcatchment 2S: MTD-202 DA**

Runoff = 0.12 cfs @ 1.08 hrs, Volume= 150 cf, Depth= 1.03"  
 Routed to Pond 2P : Filterra 4x4

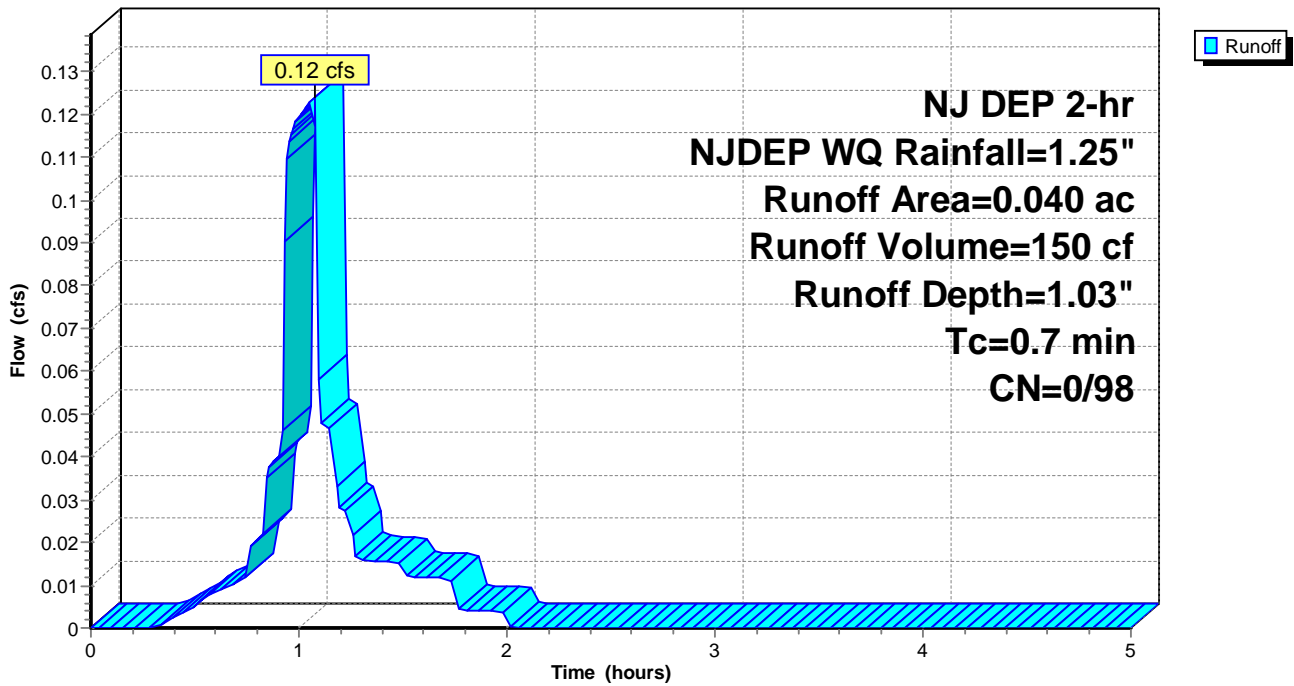
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.01 hrs  
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.040	98	
0.040	98	100.00% Impervious Area

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

**Subcatchment 2S: MTD-202 DA**

Hydrograph



**Summary for Pond 2P: Filterra 4x4**

Inflow Area = 0.040 ac, 100.00% Impervious, Inflow Depth = 1.03" for NJDEP WQ event  
 Inflow = 0.12 cfs @ 1.08 hrs, Volume= 150 cf  
 Outflow = 0.11 cfs @ 0.95 hrs, Volume= 146 cf, Atten= 10%, Lag= 0.0 min  
 Primary = 0.11 cfs @ 0.95 hrs, Volume= 146 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 0.29' @ 1.09 hrs Surf.Area= 0.000 ac Storage= 5 cf

Plug-Flow detention time= 1.5 min calculated for 146 cf (97% of inflow)  
 Center-of-Mass det. time= 0.1 min ( 65.4 - 65.4 )

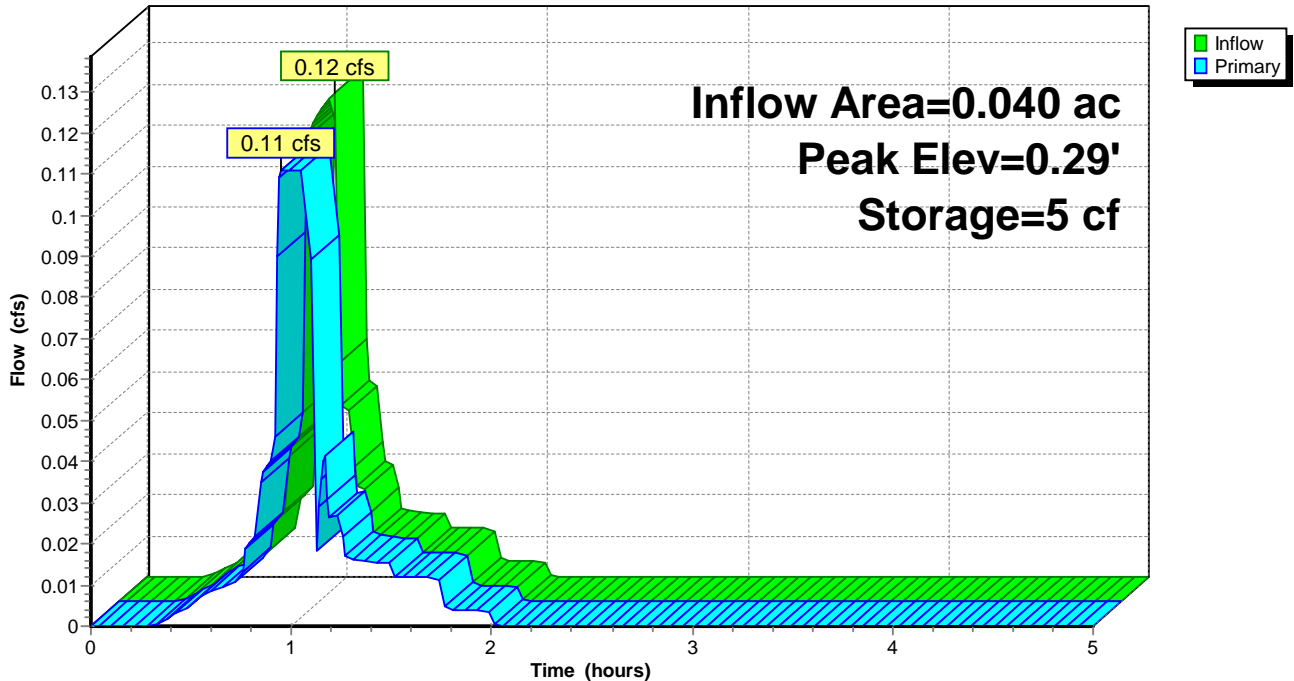
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	12 cf	4.00'W x 4.00'L x 0.75'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

**Primary OutFlow** Max=0.11 cfs @ 0.95 hrs HW=0.01' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 0.11 cfs @ 0.01 fps)

**Pond 2P: Filterra 4x4**

Hydrograph



**Summary for Subcatchment 5S: MTD-5 DA**

Runoff = 0.31 cfs @ 1.08 hrs, Volume= 376 cf, Depth= 1.03"  
 Routed to Pond 5P : Filterra 6x6

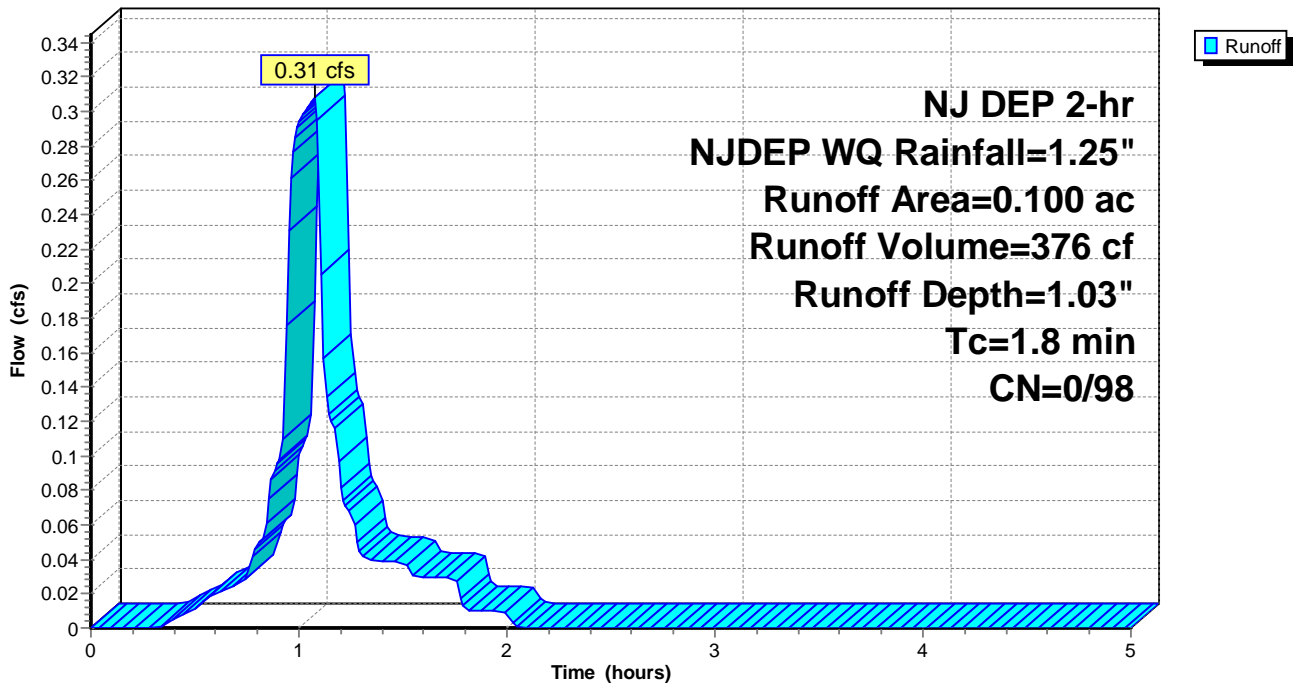
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.01 hrs  
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.100	98	
0.100	98	100.00% Impervious Area

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

**Subcatchment 5S: MTD-5 DA**

Hydrograph



**Summary for Pond 5P: Filterra 6x6**

Inflow Area = 0.100 ac, 100.00% Impervious, Inflow Depth = 1.03" for NJDEP WQ event  
 Inflow = 0.31 cfs @ 1.08 hrs, Volume= 376 cf  
 Outflow = 0.25 cfs @ 0.96 hrs, Volume= 371 cf, Atten= 19%, Lag= 0.0 min  
 Primary = 0.25 cfs @ 0.96 hrs, Volume= 371 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 0.66' @ 1.10 hrs Surf.Area= 0.001 ac Storage= 24 cf

Plug-Flow detention time= 1.0 min calculated for 371 cf (99% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 66.7 - 66.4 )

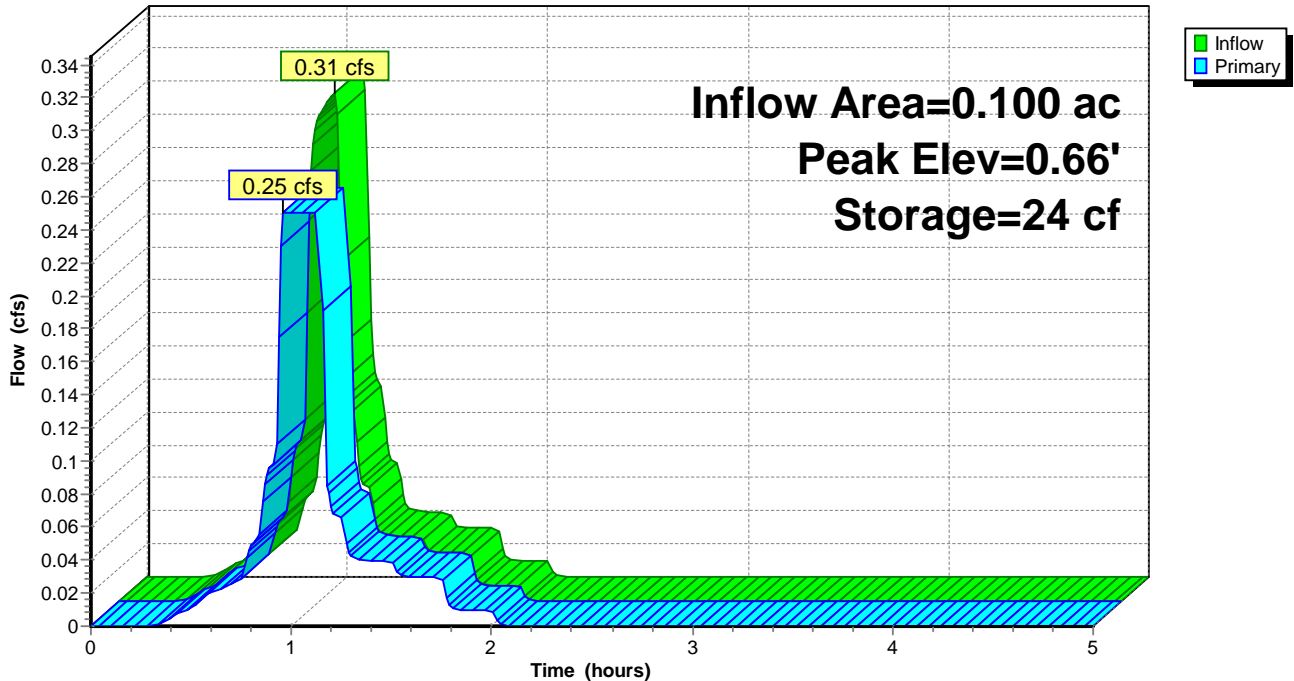
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	27 cf	6.00'W x 6.00'L x 0.75'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

**Primary OutFlow** Max=0.25 cfs @ 0.96 hrs HW=0.01' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 0.25 cfs @ 0.01 fps)

**Pond 5P: Filterra 6x6**

Hydrograph



**Lot 14.02 in Block 286 (2-13-24)**

NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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**Summary for Subcatchment 6S: MTD-6 DA**

Runoff = 0.56 cfs @ 1.08 hrs, Volume= 642 cf, Depth= 0.51"  
 Routed to Pond 6P : Filterra 6x10/10x6

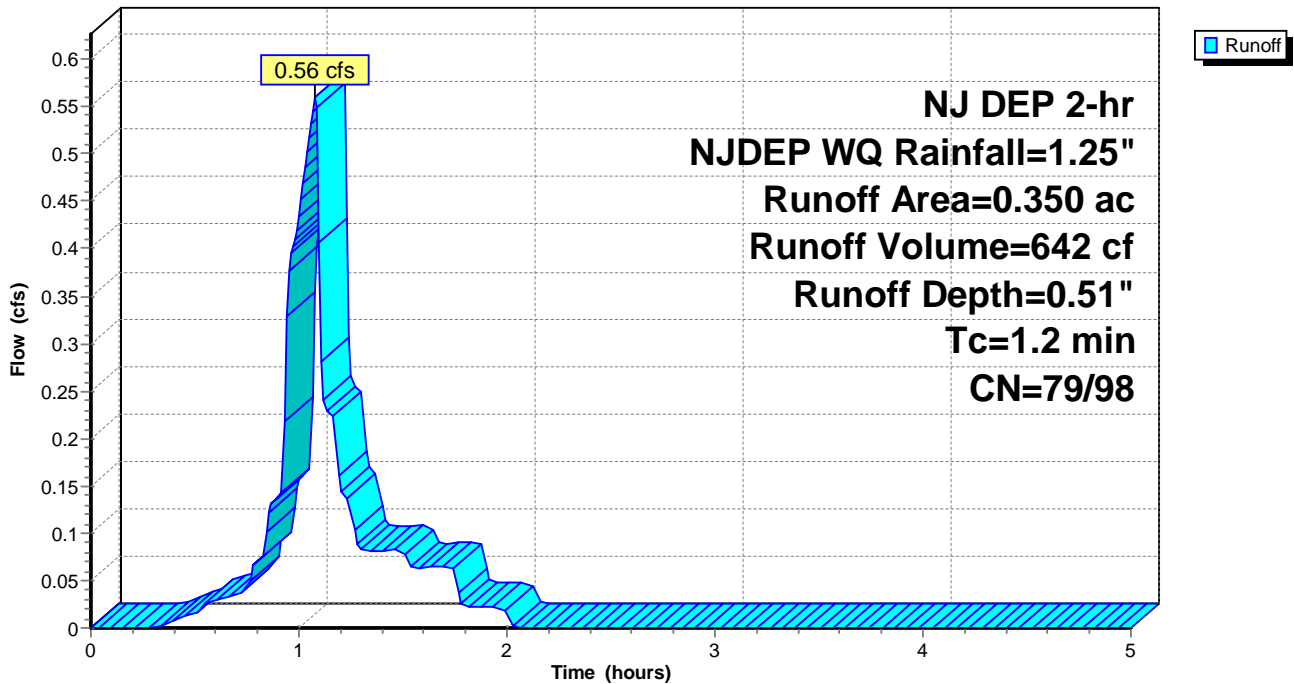
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.01 hrs  
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.120	80	
* 0.090	77	
* 0.140	98	
0.350	86	Weighted Average
0.210	79	60.00% Pervious Area
0.140	98	40.00% Impervious Area

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

**Subcatchment 6S: MTD-6 DA**

Hydrograph





**Summary for Pond 6P: Filterra 6x10/10x6**

Inflow Area = 0.350 ac, 40.00% Impervious, Inflow Depth = 0.51" for NJDEP WQ event  
 Inflow = 0.56 cfs @ 1.08 hrs, Volume= 642 cf  
 Outflow = 0.42 cfs @ 0.99 hrs, Volume= 631 cf, Atten= 25%, Lag= 0.0 min  
 Primary = 0.42 cfs @ 0.99 hrs, Volume= 631 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.01 hrs / 2  
 Peak Elev= 0.53' @ 1.10 hrs Surf.Area= 0.001 ac Storage= 32 cf

Plug-Flow detention time= 1.1 min calculated for 631 cf (98% of inflow)  
 Center-of-Mass det. time= 0.2 min ( 68.4 - 68.2 )

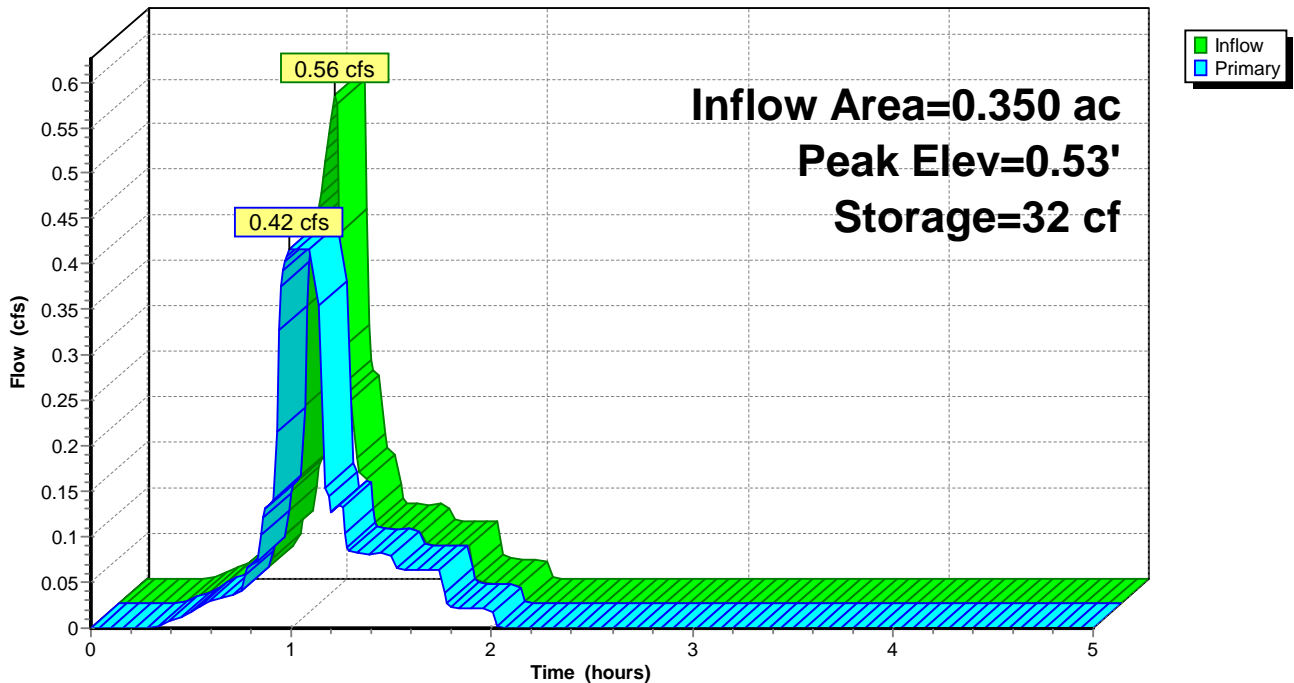
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	45 cf	6.00'W x 10.00'L x 0.75'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

**Primary OutFlow** Max=0.42 cfs @ 0.99 hrs HW=0.01' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 0.42 cfs @ 0.01 fps)

**Pond 6P: Filterra 6x10/10x6**

Hydrograph





# State of New Jersey

## DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WATER QUALITY  
Bureau of Stormwater Permitting

401 East State Street  
P.O. Box 420 Mail Code 401-02B  
Trenton, NJ 08625-0420  
Tel. (609) 633-7021 • Fax (609) 777-0432  
[www.nj.gov/dep/dwq/bnpc\\_home.htm](http://www.nj.gov/dep/dwq/bnpc_home.htm)

**PHILIP D. MURPHY**  
*Governor*

**SHEILA Y. OLIVER**  
*Lt. Governor*

**SHAWN M. LATOURETTE**  
*Acting Commissioner*

**February 12, 2021**

Derek M. Berg  
Director – Stormwater Regulatory Management - East  
Contech Engineered Solutions LLC  
71 US Route 1, Suite F  
Scarborough, ME 04074

Re: MTD Lab Certification  
Filtterra<sup>®</sup> HC Bioretention System  
Off-line Installation Approved

### **TSS Removal Rate 80%**

Dear Mr. Berg:

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Contech Engineered Solutions LLC has requested a Laboratory Certification for the Filtterra<sup>®</sup> HC Bioretention System (Filtterra<sup>®</sup> HC.)

The project falls under the “Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology” dated January 25, 2013. The applicable protocol is the “New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device” dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated January 2021) for this device is published online at [http://www.njcat.org/uploads/newDocs/NJCATFiltterraTechnologyVerificationReportFinal\\_.pdf](http://www.njcat.org/uploads/newDocs/NJCATFiltterraTechnologyVerificationReportFinal_.pdf).

**The NJDEP certifies the use of the Filterra® HC stormwater treatment unit by Contech Engineered Solutions LLC at a TSS removal rate of 80% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:**

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5. The MTFR is calculated based on a verified loading rate of 3.12 gpm/ft<sup>2</sup> of effective filtration treatment area.
2. The Filterra® HC stormwater treatment unit shall be installed using the same configuration reviewed by NJCAT, and sized in accordance with the criteria specified in item 7 below.
3. This device cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. Additional design criteria for MTDs can be found in the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual, which can be found online at [www.njstormwater.org](http://www.njstormwater.org).
5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the Filterra® HC. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at <https://www.conteches.com/Portals/0/Documents/Maintenance%20Guides/Filterra%20HC%20OM%20Packet.pdf> for any changes to the maintenance requirements.
6. For an MTD to be considered “green infrastructure” (GI) in accordance with the March 2, 2020 amendments to the Stormwater Management rules at N.J.A.C. 7:8, the MTD must meet the GI definition noted at amended N.J.A.C. 7:8-1.2. Specifically, the MTD shall (1) treat stormwater runoff through infiltration into subsoil; and/or (2) treat stormwater runoff through filtration by vegetation or soil; or (3) store stormwater runoff for reuse.

The Filterra® HC filters stormwater runoff through an engineered biofiltration soil media and, thus, meets the definition of GI. Filterra® HC can be configured with or without a precast vault. Installations that will not include a precast vault will additionally need to comply the NJDEP Stormwater BMP Manual conditions regarding separation from the seasonal high water table and, if infiltration is proposed as an outlet, minimum vertical saturated hydraulic conductivity of the subsoil. Installations without a precast vault that do not rely on infiltration are required to maintain at least a one-foot separation from the seasonal high water table measured from the lowest point of the system. Installations without a precast vault that utilize infiltration are required to have the most hydraulically restrictive soil layer below the MTD meet the minimum tested vertical saturated hydraulic conductivity of one inch per hour and have at least two feet of separation from the seasonal high water table measured from the lowest point of the system.

## 7. Sizing Requirement:

The example below demonstrates the sizing procedure for the Filterra® HC:

Example: A 0.25-acre impervious site is to be treated to 80% TSS removal using the Filterra® HC. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

The selection of the appropriate model of Filterra® HC is based upon both the maximum inflow drainage area and the MTFR. It is necessary to calculate the required model using both methods and to use the largest model determined by the two methods.

### Inflow Drainage Area Evaluation:

The drainage area to the Filterra® HC in this example is 0.25 acres. Included in Table 1 below, all of the Filterra® HC models are designed with a maximum allowable drainage area greater than 0.25 acres. Specifically, the Filterra® HC with a 4'x4' media bay and a maximum allowable drainage area of 0.40 acres would be the smallest model able to treat runoff without exceeding the maximum allowable drainage area.

### Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:  
time of concentration = 10 minutes  
 $i = 3.2$  in/hr (page 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)  
 $c = 0.99$  (runoff coefficient for impervious)  
 $Q = ciA = 0.99 \times 3.2 \times 0.25 = 0.79$  cfs

Given the site runoff is 0.79 cfs and based on the MTFR's listed in Table 1 below, the Filterra® HC with a 16'x8' media bay and an MTFR of 0.889 cfs would be the smallest model that could be used to treat the impervious area without exceeding the MTFR. If using more than one unit for treating runoff, the units should be configured such that the flowrate to each unit does not exceed the design MTFR for each unit and ensuring the entire 0.25 acre area is treated.

The MTFR evaluation results will be used since that method results in the highest minimum configuration determined by the two methods.

The sizing table corresponding to the available system models is noted below:

**Table 1. Filterra® HC MTFRs and Maximum Allowable Drainage Areas**

	Available Filterra® Media Bay Sizes (feet)	Effective Filtration Treatment Area (ft <sup>2</sup> )	Treatment Flow Rate (cfs)	Maximum Allowable Drainage Area (ac)
Standard Configuration Filterra and Filterra Bioscape Vaults	4x4	16	0.111	0.40
	4x6 or 6x4	24	0.167	0.60
	4.5x7.83 or 7.83x4.5 (Nominal 4x8/8x4)	35.24	0.245	0.89
	6x6	36	0.250	0.91
	6x8 or 8x6	48	0.333	1.21
	6x10 or 10x6	60	0.417	1.51
	6x12 or 12x6	72	0.500	1.81
	7x13 or 13x7	91	0.632	2.29
	14x8	112	0.778	2.82
	16x8	128	0.889	3.22
	18x8	144	1.000	3.62
	20x8	160	1.111	4.03
	22x8	176	1.222	4.43
Peak Diversion Filterra Vaults	4x4	16	0.111	0.40
	4.5x5.83 (Nominal 4x6)	26.24	0.182	0.66
	6x4	24	0.167	0.60
	6x6	36	0.250	0.91
	6x8	48	0.333	1.21
	6x10 or 10x6	60	0.417	1.51
	7x10	70	0.486	1.76
	8x10.5	84	0.583	2.11
	8x12.5	100	0.694	2.52
Custom and/or Filterra Bioscape	Media Area in ft <sup>2</sup>	0.00694 * (Media Area in ft <sup>2</sup> )	0.0252 * (Media Area in ft <sup>2</sup> )	

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management rules, N.J.A.C. 7:8. The plan must include all of the items identified in the Stormwater Management rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact me at (609) 633-7021.

Sincerely,

A handwritten signature in blue ink that reads "Gabriel Mahon". The signature is written in a cursive, flowing style.

Gabriel Mahon, Chief  
Bureau of Stormwater Permitting

Attachment: Maintenance Plan

cc: Chron File  
Richard Magee, NJCAT  
Vince Mazzei, NJDEP – Water & Land Management  
Nancy Kempel, NJDEP– BSTP  
Keith Stampfel, NJDEP – DLRP  
Dennis Contois, NJDEP – DLRP

# Appendix I

## Drainage Area Maps & Soil Log Exhibit



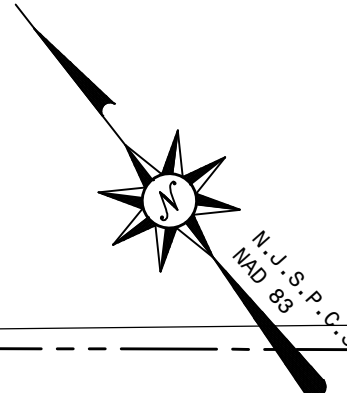
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IRVINGTON AVENUE 40 FT. R.O.W.

ROGERS AVENUE

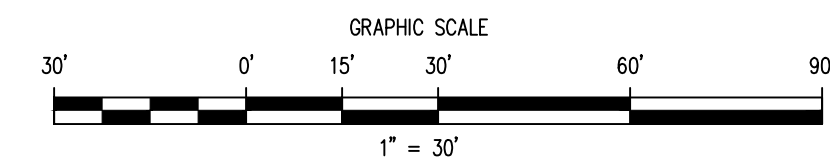
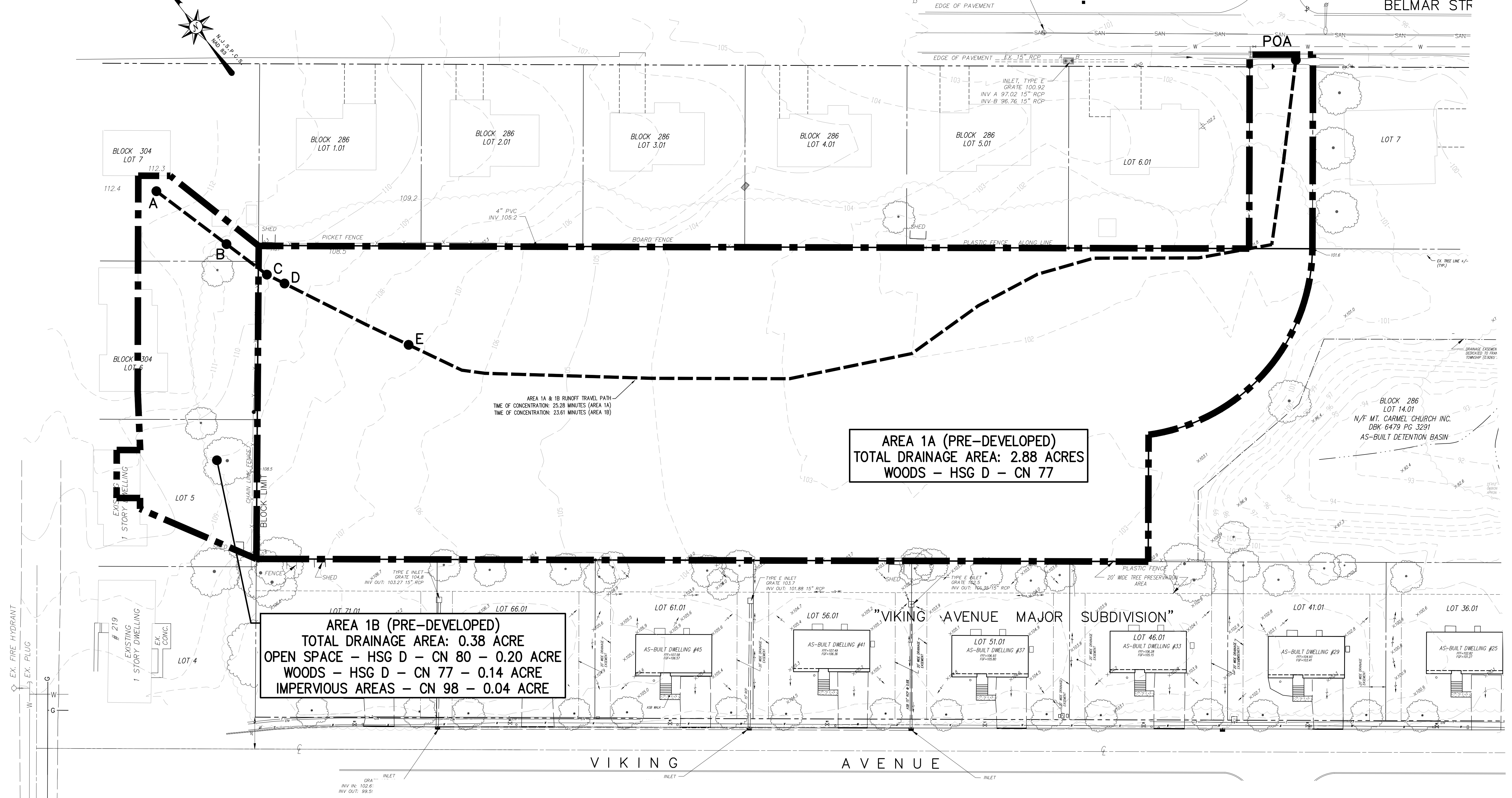
BELMAR STP

POA



**AREA 1A (PRE-DEVELOPED)**  
**TOTAL DRAINAGE AREA: 2.88 ACRES**  
**WOODS - HSG D - CN 77**

**AREA 1B (PRE-DEVELOPED)**  
**TOTAL DRAINAGE AREA: 0.38 ACRE**  
**OPEN SPACE - HSG D - CN 80 - 0.20 ACRE**  
**WOODS - HSG D - CN 77 - 0.14 ACRE**  
**IMPERVIOUS AREAS - CN 98 - 0.04 ACRE**



DATE:	DECEMBER 15, 2017		
SCALE:	1" = 30'		
PER TOWNSHIP	M.K.F. 2/24/24		
DESIGNED BY:	M.K.F.		
PER DRCC	M.K.F. 3/24/22		
DRAWN BY:	A.B.		
PER REVISIONS	M.K.F. 7/30/21		
CHECKED BY:	M.K.F.		
AUTH.	DATE	JOB No.	15-09-FS



**VAN CLEEF ENGINEERING ASSOCIATES, LLC**  
 32 BROWER LANE, HILLSBOROUGH, NJ 08844  
 WWW.VANCLEEFENGINEERING.COM  
 PHONE (908) 359-8291  
 CERT. OF AUTHORIZATION NO. 246428133200

Bridges/Highways  
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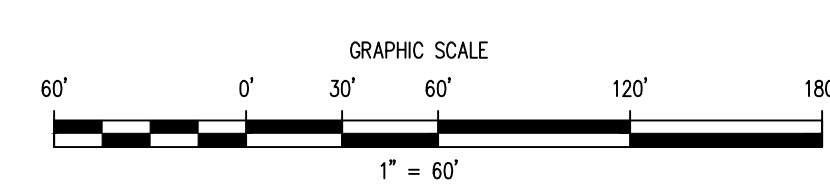
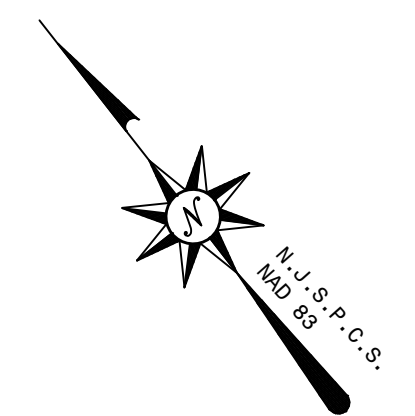
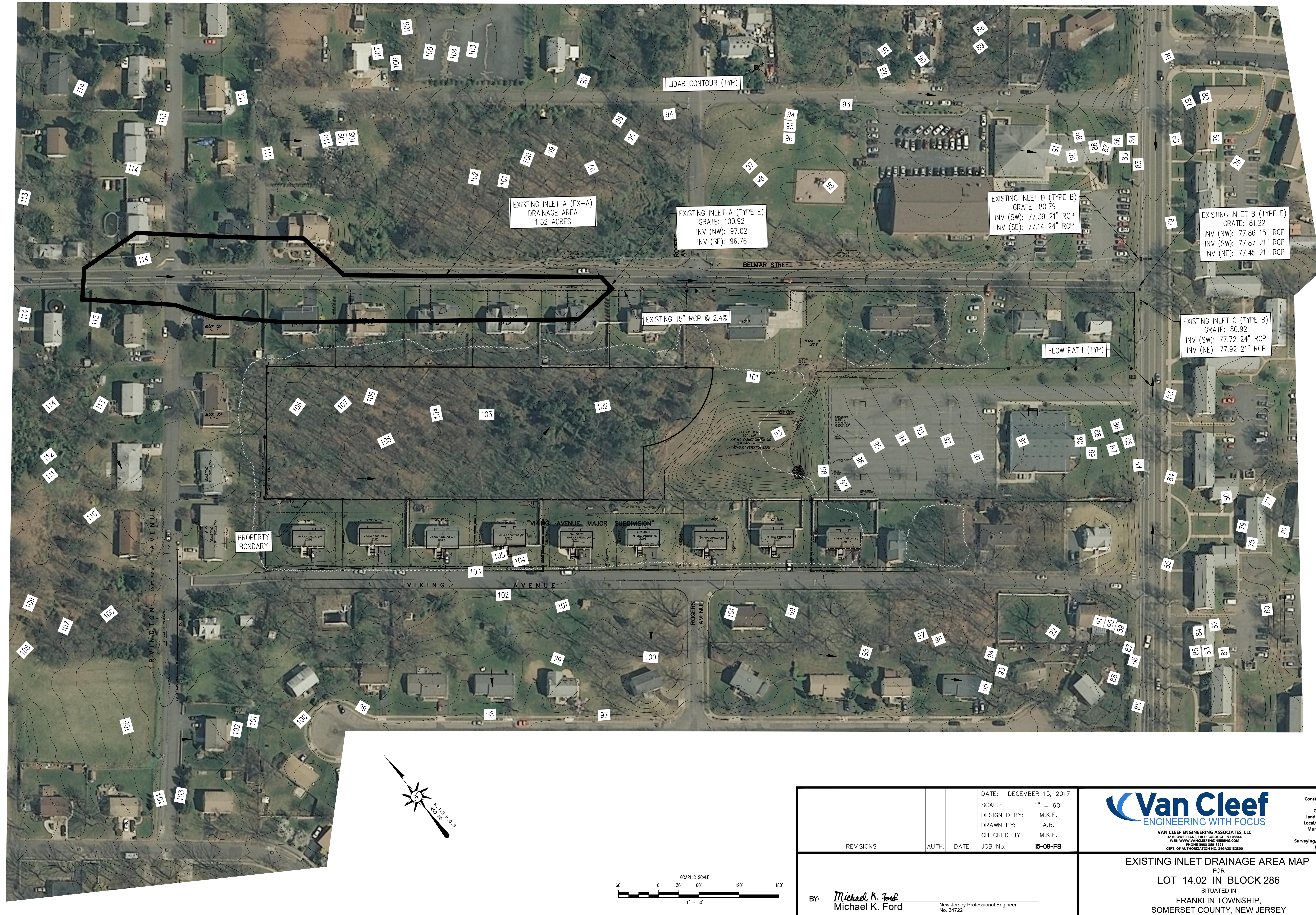
BY: *Michael K. Ford*  
 Michael K. Ford  
 New Jersey Professional Engineer  
 No. 34722

**EXISTING DRAINAGE AREA MAP**  
 FOR  
**LOT 14.02 IN BLOCK 286**  
 SITUATED IN  
**FRANKLIN TOWNSHIP,**  
**SOMERSET COUNTY, NEW JERSEY**









DATE:	DECEMBER 15, 2017
SCALE:	1" = 60'
DESIGNED BY:	M.K.F.
DRAWN BY:	A.B.
CHECKED BY:	M.K.F.
REVISIONS	AUTH. DATE JOB No. 15-09-FS

BY: *Michael K. Ford*  
 Michael K. Ford  
 New Jersey Professional Engineer  
 No. 34722

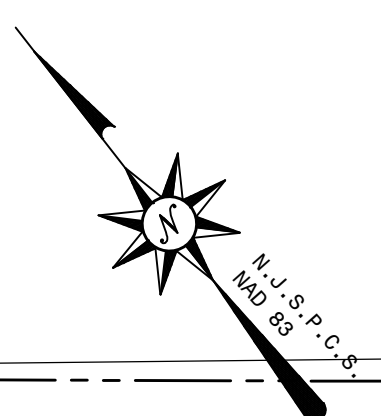
**Van Cleef**  
 ENGINEERING WITH FOCUS

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- Bridges/Highways
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- Environmental
- Geotechnical/Dams
- Landscape Architecture
- Local/Regional Planning
- Municipal Engineering
- Site Development
- Surveying/Aerial Drones/GIS
- Water/Wastewater

**EXISTING INLET DRAINAGE AREA MAP**  
 FOR  
**LOT 14.02 IN BLOCK 286**  
 SITUATED IN  
**FRANKLIN TOWNSHIP,**  
**SOMERSET COUNTY, NEW JERSEY**



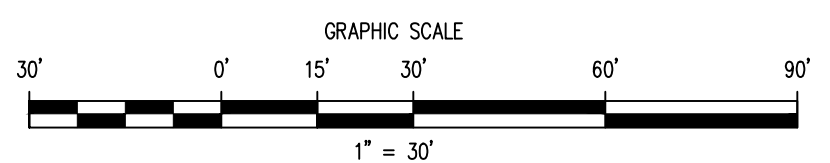
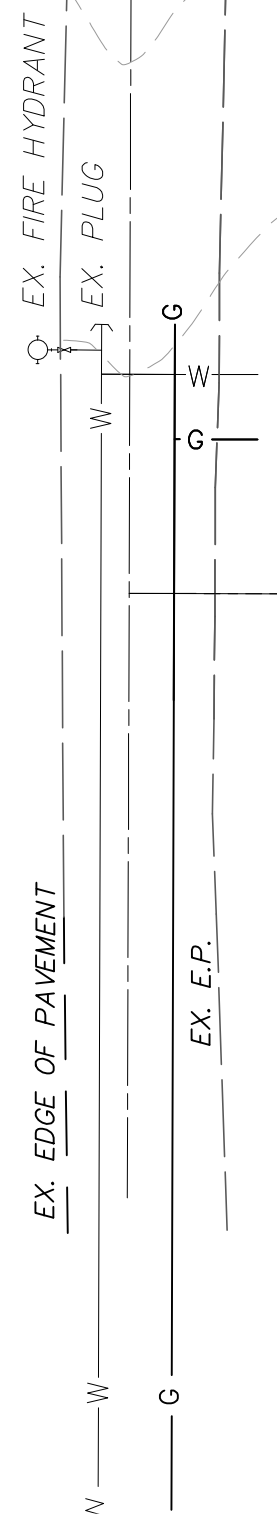
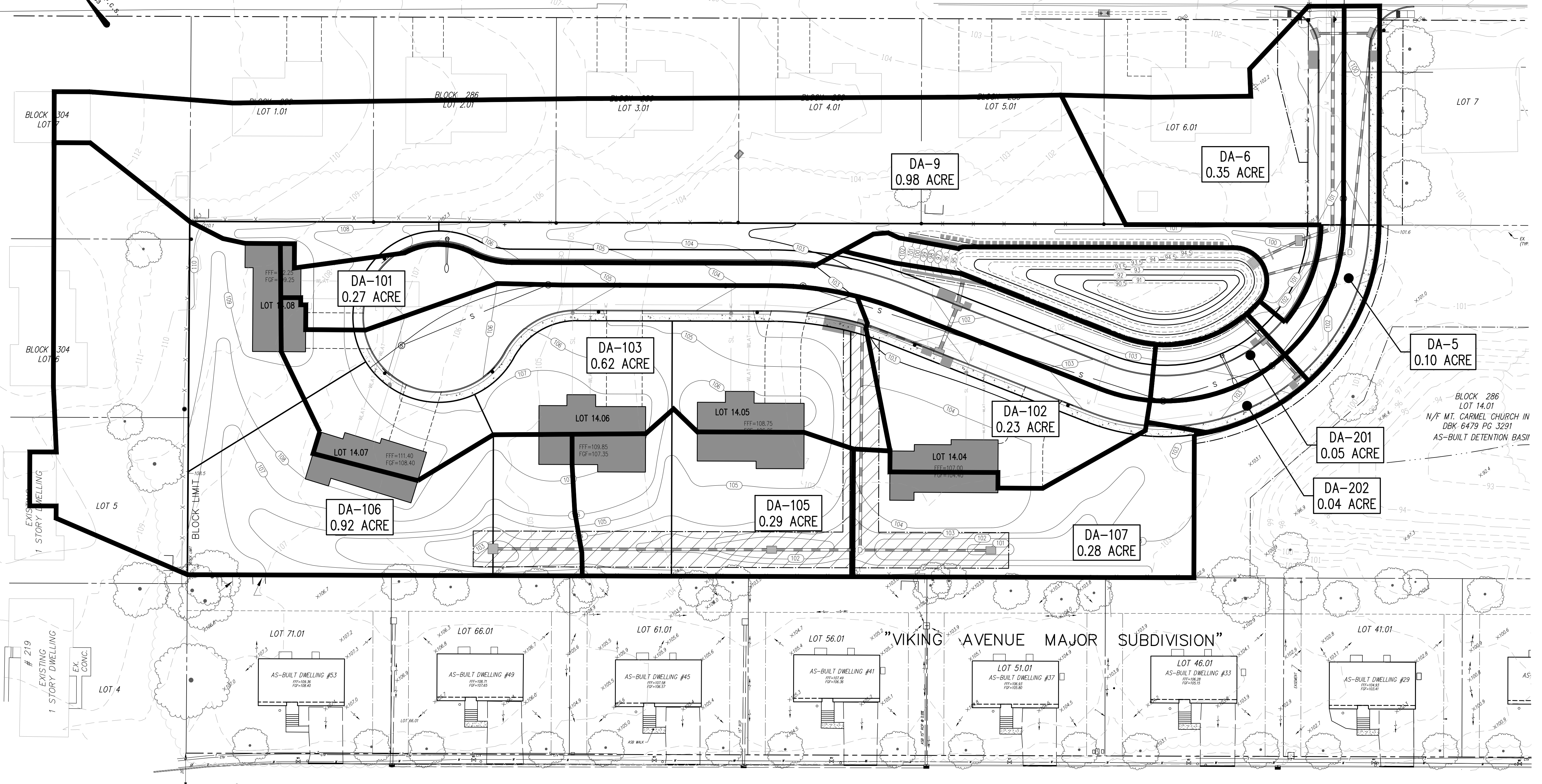


ROGERS AVENUE  
BELMAR

IRVINGTON AVENUE  
40 FT. R.O.W.

VIKING AVENUE

VIKING AVENUE MAJOR SUBDIVISION



		DATE:	DECEMBER 15, 2017
		SCALE:	1" = 30'
PER TOWNSHIP	M.K.F.	2/24/24	DESIGNED BY: M.K.F.
PER TOWNSHIP	M.K.F.	3/24/22	DRAWN BY: A.B.
PER DRCC	M.K.F.	7/30/21	CHECKED BY: M.K.F.
REVISIONS	AUTH.	DATE	JOB No. 15-09-FS



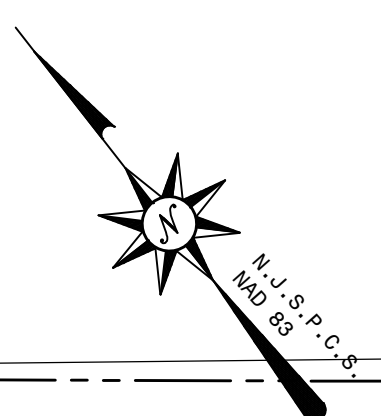
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PHONE (908) 359-8291  
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Site Development  
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Water/Wastewater

PROPOSED INLET DRAINAGE AREA MAP  
FOR  
LOT 14.02 IN BLOCK 286  
SITUATED IN  
FRANKLIN TOWNSHIP,  
SOMERSET COUNTY, NEW JERSEY

BY: *Michael K. Ford*  
Michael K. Ford  
New Jersey Professional Engineer  
No. 34722

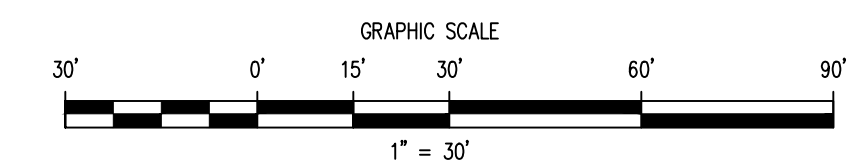
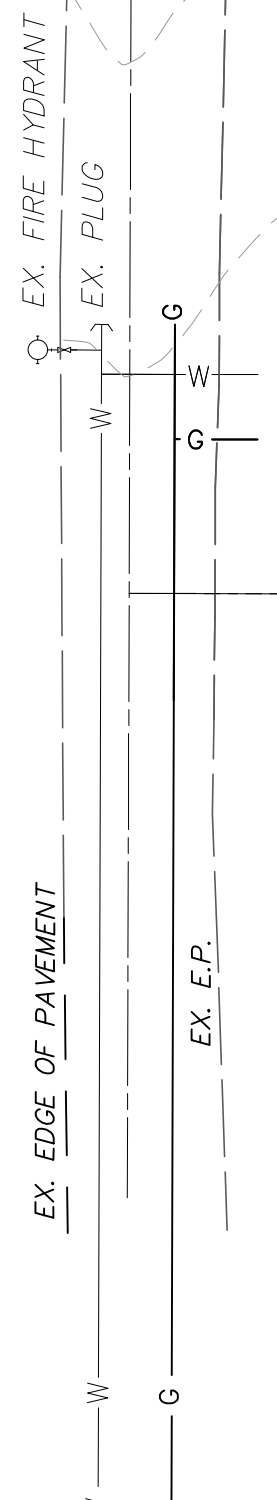
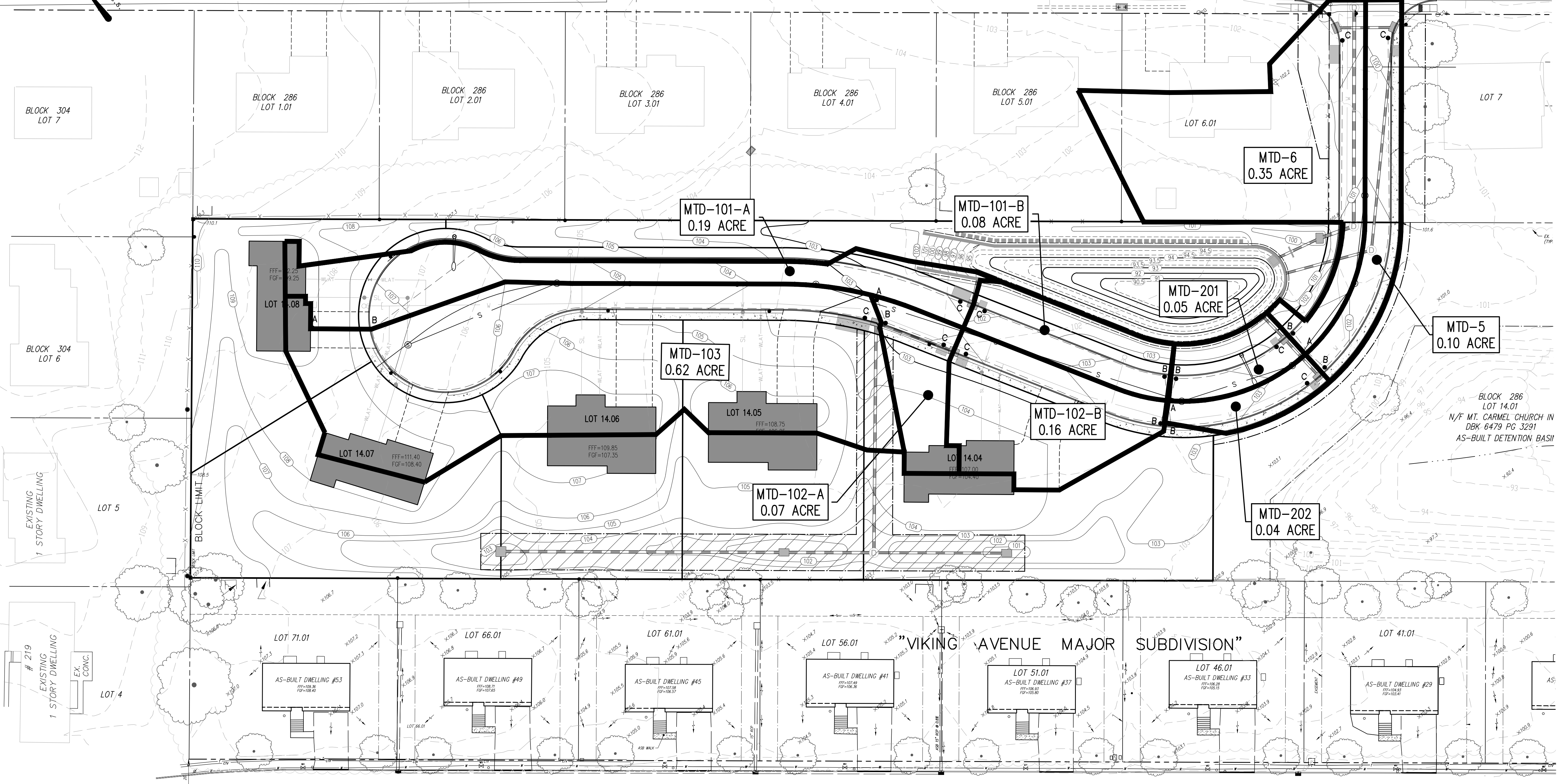




ROGERS AVENUE  
BELMAR

IRVINGTON AVENUE 40 FT. R.O.W.

VIKING AVENUE



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PER DRCC	M.K.F. 7/30/21	DESIGNED BY:	M.K.F.
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		CHECKED BY:	M.K.F.
		JOB No.	15-09-FS

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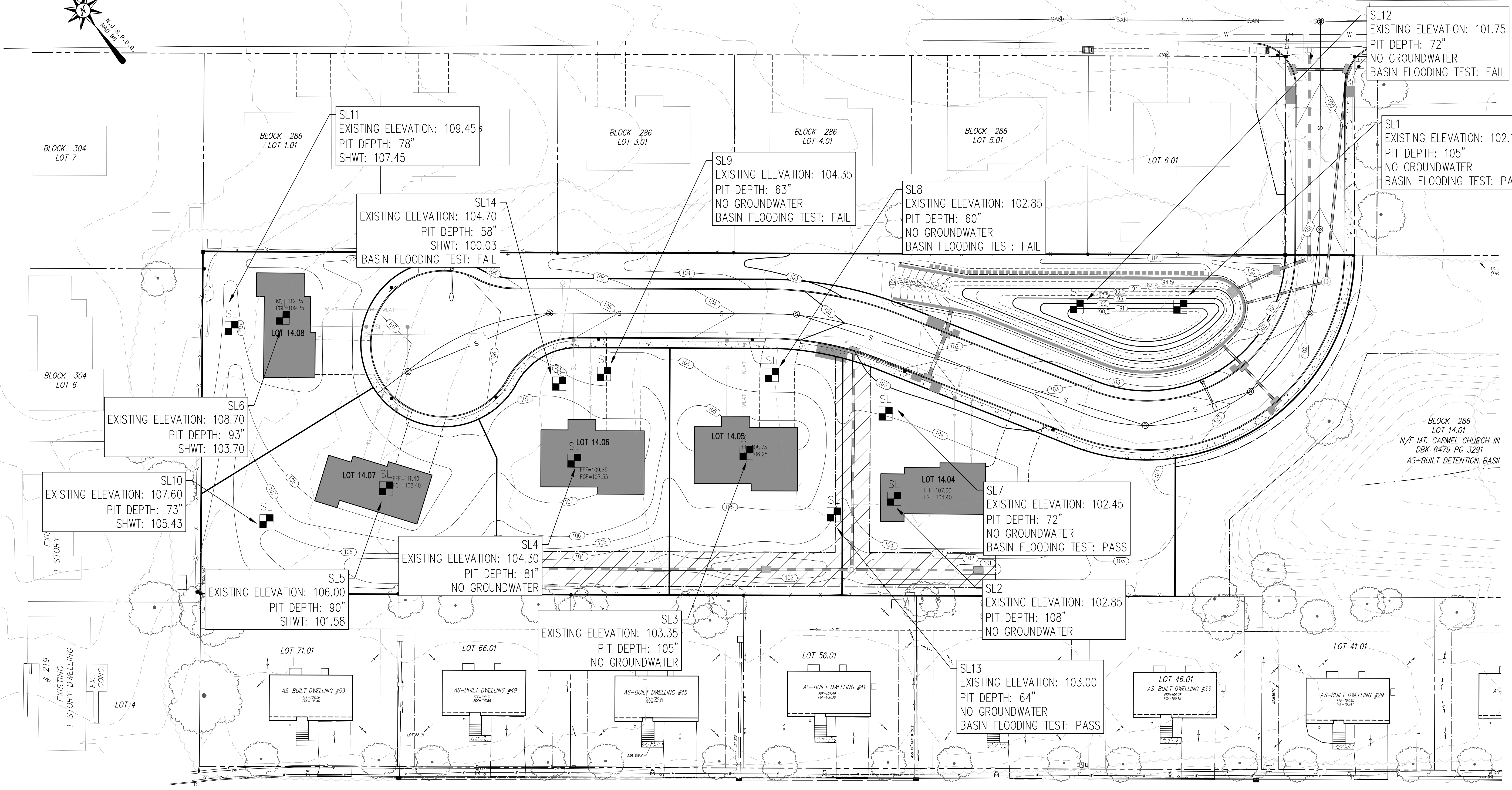
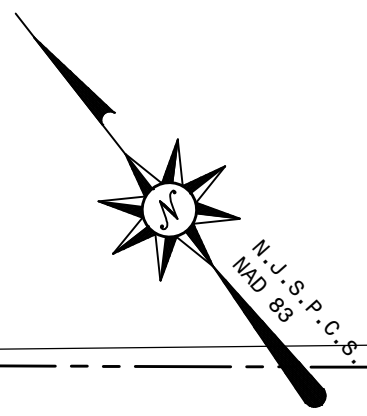
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Water/Wastewater

BY: *Michael K. Ford*  
Michael K. Ford  
New Jersey Professional Engineer  
No. 34722

MTD DRAINAGE AREA MAP  
FOR  
LOT 14.02 IN BLOCK 286  
SITUATED IN  
FRANKLIN TOWNSHIP,  
SOMERSET COUNTY, NEW JERSEY

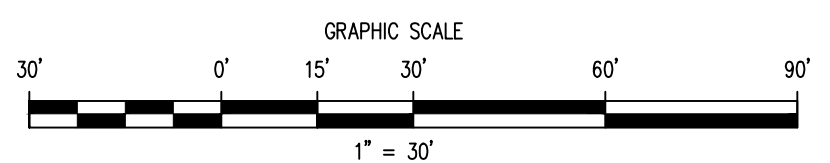




EX. FIRE HYDRANT  
EX. PLUG  
EX. E.P.  
EX. E.P.  
EX. E.P.  
EX. E.P.

EXISTING 1 STORY DWELLING #219  
EX. CONC.  
LOT 4

BLOCK 286  
LOT 14.01  
N/F MT. CARMEL CHURCH IN  
DBK 6479 PC 3291  
AS-BUILT DETENTION BASIN



		DATE: DECEMBER 15, 2017
		SCALE: 1" = 30'
PER TOWNSHIP	M.K.F. 2/24/24	DESIGNED BY: M.K.F.
PER TOWNSHIP	M.K.F. 3/24/22	DRAWN BY: A.B.
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Site Development  
Surveying/Aerial Drones/GIS  
Water/Wastewater

BY: *Michael K. Ford*  
Michael K. Ford  
New Jersey Professional Engineer  
No. 34722

SOIL LOG EXHIBIT  
FOR  
LOT 14.02 IN BLOCK 286  
SITUATED IN  
FRANKLIN TOWNSHIP,  
SOMERSET COUNTY, NEW JERSEY

# **STORMWATER MANAGEMENT MEASURES OPERATION AND MAINTENANCE MANUAL**

**For  
Block 286, Lot 14.02  
Franklin Township  
Somerset County, New Jersey**

**Deed Book #6780, Page #2189, Recorded March 23<sup>rd</sup>, 2015**

PREPARATION DATE: DECEMBER 15, 2017  
REVISED: FEBRUARY 24, 2024

PREPARED BY  
VAN CLEEF ENGINEERING ASSOCIATES, LLC  
32 Brower Lane  
Hillsborough, NJ 08844

## **INTRODUCTION**

The purpose of this manual is to provide guidelines for the operation and maintenance of the stormwater management measures that are utilized on this tract. This manual has been prepared for the use of the manager of the site to ensure that the stormwater management measures will be properly maintained in order to function as intended. The primary function of these stormwater management measures is to control the quantity and quality of runoff while providing groundwater recharge. The stormwater management measures on this property are listed below:

- Pond Constructed Wetland
- Filterra MTDs

## **RESPONSIBLE PARTY**

The maintenance of the stormwater management facilities on this property along with all the associated logs and records, in accordance with this manual, is the responsibility of:

**Mohamed Gouda  
Forefront Contracting  
252 Melvin Avenue  
Staten Island, NY 10314  
646-420-9481  
forefront15@yahoo.com**

This responsibility may be transferred to another party if the appropriate agencies are notified. Franklin Township and Somerset County shall be granted emergency access and maintenance rights – but are not obligated to handle all required responsibilities – in the circumstance where emergency maintenance must be performed to ensure public safety. The responsible party listed above shall cover the costs of any emergency maintenance and/or operation performed by Franklin Township or Somerset County.

# Table of Contents

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Description of Stormwater Management Measures.....	6
Preventative and Corrective Maintenance Action Plan.....	7
Disposal Plan.....	9
Maintenance Personnel, Equipment, Tools, and Supplies.....	10

## Part II - Field Manuals

Field Manual for Pond Constructed Wetland (PCW-1)	
Field Manual for Filterra MTD (MTD-5, 6, 101A, 101B, 102A, 102B, 103, 201, & 202)	

## Part III - Maintenance and Inspection Logs

Inspection Checklist Log	
Preventative Maintenance Log	
Corrective Maintenance Log	

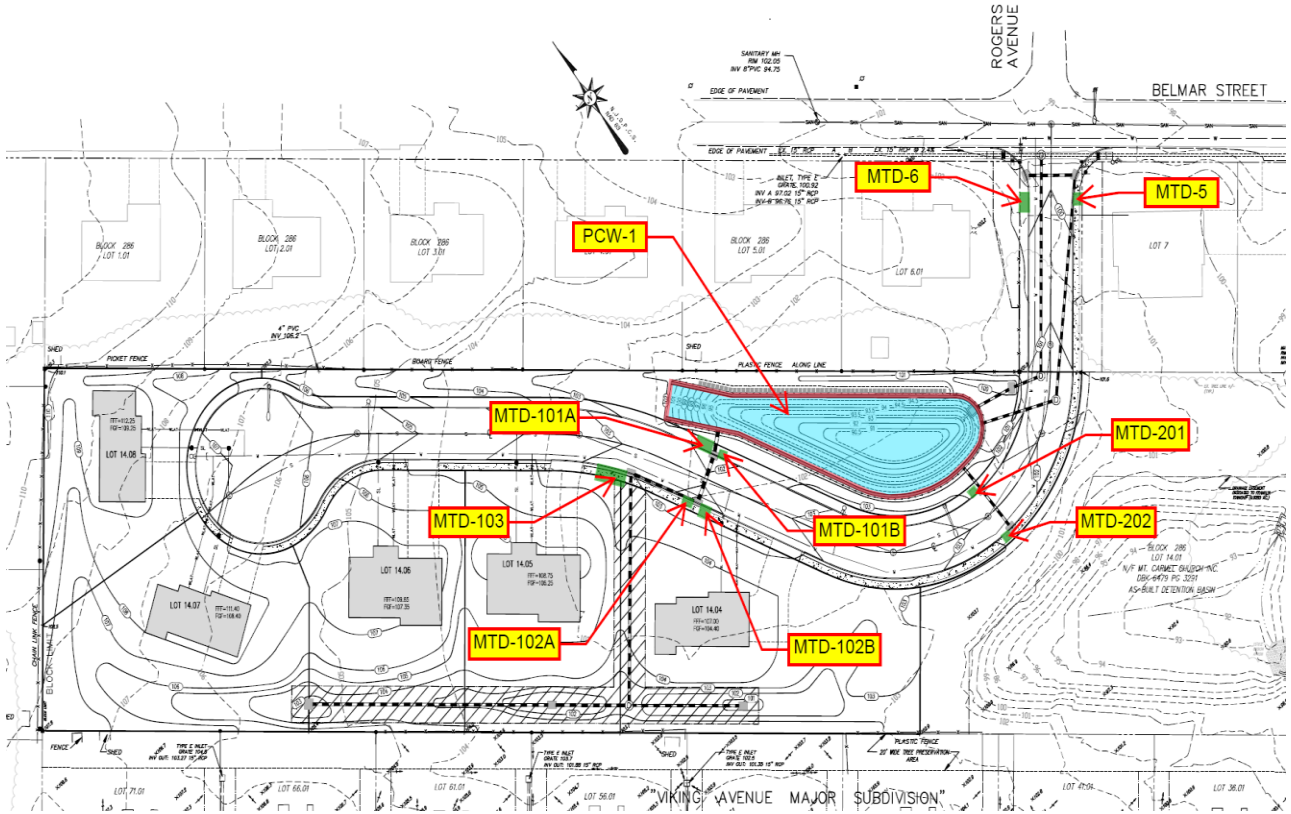
# Part I - Maintenance



## List of Stormwater Management Measures

<b>Type of Stormwater Management Measure</b>	<b>Stormwater Management Measure No.</b>	<b>Location Description</b>	<b>State Plane Coordinates</b>
Pond Constructed Wetland	PCW-1	Proposed Lot 14.03	X = 497581 Y = 606054
Manufactured Treatment Device	MTD-5	Driveway entrance	X = 497769 Y = 606071
Manufactured Treatment Device	MTD-6	Driveway entrance	X = 497741 Y = 606090
Manufactured Treatment Device	MTD-101A	NE of Lot 14.04	X = 497498 Y = 606114
Manufactured Treatment Device	MTD-101B	NE of Lot 14.04	X = 497503 Y = 606102
Manufactured Treatment Device	MTD-102A	NE of Lot 14.04	X = 497470 Y = 606096
Manufactured Treatment Device	MTD-102B	NE of Lot 14.04	X = 497475 Y = 606085
Manufactured Treatment Device	MTD-103	NE of Lot 14.05	X = 497440 Y = 606138
Manufactured Treatment Device	MTD-201	South of PCW	X = 497617 Y = 605986
Manufactured Treatment Device	MTD-202	South of PCW	X = 497619 Y = 605954

# Location Map



## **Description of Stormwater Management Measures**

### **Pond Constructed Wetland**

Design Storms:

- 2-Year Storm (3.34 inches)
- 10-Year Storm (5.01 inches)
- 100-Year Storm (8.21 inches)

Design Purpose: Water Quantity

### **Manufactured Treatment Devices – Filterra**

Design Storm: Water Quality Design Storm (1.25 inches in 2 hours)

Design Purpose: Runoff Quality

Manufacturer: Contech Engineered Solutions

# Preventative and Corrective Maintenance Action Plan

## Preventative Maintenance Actions

<b>Preventative Maintenance</b>		
<b>Frequency</b>	<b>Action</b>	<b>Stormwater Management Measure</b>
Quarterly	<ul style="list-style-type: none"> <li>• Perform Quarterly Inspection</li> <li>• Remove Trash or Debris from Basin Embankment</li> <li>• Remove Trash or Debris from Emergency Spillway</li> <li>• Remove Trash or Debris from Outlet Structure</li> <li>• Remove Trash or Debris from Sand Bed</li> <li>• Mow/Trim Vegetation</li> </ul>	Pond Constructed Wetland
Semiannual	<ul style="list-style-type: none"> <li>• Remove Sediment Buildup</li> <li>• Pump Out Standing Water in Outlet Structure</li> </ul>	Pond Constructed Wetland
Annual	<ul style="list-style-type: none"> <li>• Perform Structural Inspection</li> <li>• Replace Sand Layer</li> <li>• Revegetate</li> </ul>	Pond Constructed Wetland
Biennial	<ul style="list-style-type: none"> <li>• Replace Sand Layer</li> </ul>	Pond Constructed Wetland
	<ul style="list-style-type: none"> <li>• Refer to Cascade Separator Inspection and Maintenance Guide</li> </ul>	Manufactured Treatment Devices
Unscheduled	<ul style="list-style-type: none"> <li>• Perform Quick Inspection Following Any Storm Event That Produces 1" of Rainfall or More</li> <li>• Monitor for Sinkhole Development</li> </ul>	Pond Constructed Wetland

Corrective Maintenance Actions

<b>Potential Corrective Maintenance Actions</b>	<b>Stormwater Management Measure</b>
<ul style="list-style-type: none"> <li>• Repair/Replace Outlet Structure Components</li> <li>• Install New Bolts to Fix the Orifice Plate</li> <li>• Stabilize Side Slope</li> <li>• Repair/Replace Trash Rack</li> <li>• Pest Control</li> <li>• Remove Invasive Plants</li> <li>• Revegetate Basin Bed if Large Barren Spots in Soil Begin to Form</li> <li>• Resurface Bed</li> </ul>	Pond Constructed Wetland
<ul style="list-style-type: none"> <li>• Refer to Filtterra Inspection and Maintenance Guide</li> </ul>	Manufactured Treatment Devices

Notes:

- The maintenance of stormwater management facilities and any future revisions to the manual shall be recorded upon the deed of record for the property.
- The person responsible for maintenance shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, this maintenance plan.
- The operations and maintenance manual shall be evaluated by the person responsible for maintenance for updates and effectiveness at least once per year. The operations and maintenance manual shall be updated and recorded in the deed as needed at that time.

# Disposal Plan

**Disposal/Recycling Procedures**

- Dewatering procedures and requirements  
A portable pump shall be utilized for dewatering.
  
- Unloading procedures and requirements  
Maintenance crew shall abide by all state, local, and federal laws during the unloading operations.
  
- Covering procedures and requirements  
Maintenance crew shall abide by all state, local, and federal laws during the covering operations.

**Disposal Field – Onsite** (if applicable)

**Location of the Onsite Disposal Field:**

Onsite disposal is not permitted.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Permits for the Proposed Onsite Disposal Field**

Local/State permits  not required  
 required

Permit Number	Government Entity	Issuance Date	Expiration Date
(If available)	(If available)	(If available)	(If available)

A copy of all permits should be included in the Documents section of the Maintenance Plan.

**Disposal Field – Offsite** (if applicable)

**Description of the Offsite Disposal:**

Disposal of debris, trash, sediment and other waste material must be done at suitable \_\_\_\_\_ disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.  
 \_\_\_\_\_

A copy of the contract should be included in the Documents section of the Maintenance Plan if available.

## Maintenance Personnel, Equipment, Tools, and Supplies

### Maintenance Personnel/Equipment/Tools/Supplies

Personnel/Equipment/Tools Name	Quantity
General Maintenance Crew	1
Debris Removal Tools (Leaf Blower, Shovel, Rake, Trimmers, Gloves, Boots, etc)	1
Heavy Machinery (Light Backhoe, Skid steer, etc)	1

### Specialized, proprietary or nonstandard equipment, tools, and supplies, if applicable

Name of the specialized, proprietary or nonstandard equipment, tools and supplies	Source

Warranty and parts information should be attached to the Documents section.

### Maintenance Cost Estimate

<b>Manufactured Treatment Device (Filterra HC)</b>	Replace Mulch/Remove Trash: \$2,000/yr
<b>Pond Constructed Wetland</b>	Remove Sediment/Invasive Plants: \$300 x 2 = \$600/yr Remove Trash & Debris: \$150/yr x 2 = \$300/yr Mow Berm: \$250 x 2 = \$500/yr Total Cost: \$1,050/yr
<b>Total</b>	= \$3,050/yr

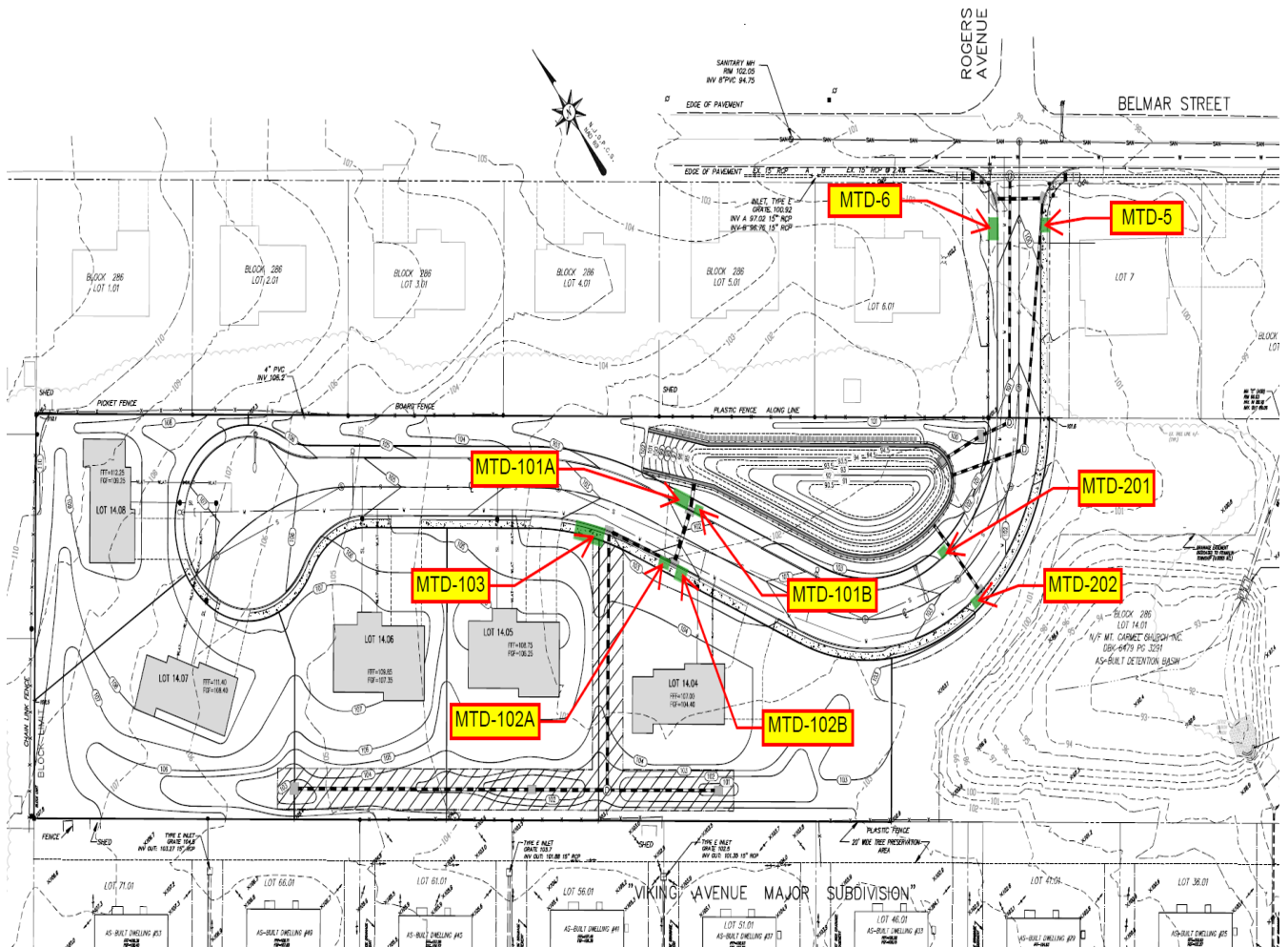
# Part II - Field Manuals



# MANUFACTURED TREATMENT DEVICE FIELD MANUAL

Block 286, Lot 14.02  
Franklin Township  
Somerset County, New Jersey

## Location Map



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## **MTD Overview**

A Manufactured Treatment Device (MTD) is a prefabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff.

Manufactured treatment devices are intended to capture sediments, metals, hydrocarbons, floatables, and/or other pollutants in stormwater runoff before being conveyed to a storm sewer system, additional stormwater quality treatment measure, or body of water.

Proper care and attention with regard to the long-term maintenance of this stormwater management measure is critically important to the safety and health of the public.

The MTDs that are utilized on this property are designed to remain dry between storm events. These MTDs are designed to remove 80% of the TSS that are found in the inflow generated by the Water Quality Design Storm. These MTDs are not designed to attenuate peak flows or recharge groundwater.

The MTDs that are utilized on this property qualify as green infrastructure since they runoff to infiltrate into the subsoil and treat stormwater runoff through filtration by vegetation/soil.

## **Basic Design Information**

### **Hydrology Design Targets**

1. The maximum design storm is the Water Quality Design Storm which corresponds to 1.25 inches of rainfall in 2 hours.
2. The TSS removal rate is 80%.

### **Configuration Targets**

1. The name of the MTD is Filterra.
2. The manufacturer of the MTD is Contech Engineered Solutions.

### **Critical Maintenance Features**

The maintenance procedures associated with the MTDs are described in the Filterra HC Owner's Manual which is attached to this Field Manual.

## **Reference Documents**



# State of New Jersey

## DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WATER QUALITY  
Bureau of Stormwater Permitting

401 East State Street  
P.O. Box 420 Mail Code 401-02B  
Trenton, NJ 08625-0420  
Tel. (609) 633-7021 • Fax (609) 777-0432  
[www.nj.gov/dep/dwq/bnpc\\_home.htm](http://www.nj.gov/dep/dwq/bnpc_home.htm)

**PHILIP D. MURPHY**  
*Governor*

**SHEILA Y. OLIVER**  
*Lt. Governor*

**SHAWN M. LATOURETTE**  
*Acting Commissioner*

**February 12, 2021**

Derek M. Berg  
Director – Stormwater Regulatory Management - East  
Contech Engineered Solutions LLC  
71 US Route 1, Suite F  
Scarborough, ME 04074

Re: MTD Lab Certification  
Filtterra<sup>®</sup> HC Bioretention System  
Off-line Installation Approved

### **TSS Removal Rate 80%**

Dear Mr. Berg:

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Contech Engineered Solutions LLC has requested a Laboratory Certification for the Filtterra<sup>®</sup> HC Bioretention System (Filtterra<sup>®</sup> HC.)

The project falls under the “Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology” dated January 25, 2013. The applicable protocol is the “New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device” dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated January 2021) for this device is published online at [http://www.njcat.org/uploads/newDocs/NJCATFiltterraTechnologyVerificationReportFinal\\_.pdf](http://www.njcat.org/uploads/newDocs/NJCATFiltterraTechnologyVerificationReportFinal_.pdf).

**The NJDEP certifies the use of the Filterra® HC stormwater treatment unit by Contech Engineered Solutions LLC at a TSS removal rate of 80% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:**

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5. The MTFR is calculated based on a verified loading rate of 3.12 gpm/ft<sup>2</sup> of effective filtration treatment area.
2. The Filterra® HC stormwater treatment unit shall be installed using the same configuration reviewed by NJCAT, and sized in accordance with the criteria specified in item 7 below.
3. This device cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. Additional design criteria for MTDs can be found in the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual, which can be found online at [www.njstormwater.org](http://www.njstormwater.org).
5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the Filterra® HC. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at <https://www.conteches.com/Portals/0/Documents/Maintenance%20Guides/Filterra%20HC%20OM%20Packet.pdf> for any changes to the maintenance requirements.
6. For an MTD to be considered “green infrastructure” (GI) in accordance with the March 2, 2020 amendments to the Stormwater Management rules at N.J.A.C. 7:8, the MTD must meet the GI definition noted at amended N.J.A.C. 7:8-1.2. Specifically, the MTD shall (1) treat stormwater runoff through infiltration into subsoil; and/or (2) treat stormwater runoff through filtration by vegetation or soil; or (3) store stormwater runoff for reuse.

The Filterra® HC filters stormwater runoff through an engineered biofiltration soil media and, thus, meets the definition of GI. Filterra® HC can be configured with or without a precast vault. Installations that will not include a precast vault will additionally need to comply the NJDEP Stormwater BMP Manual conditions regarding separation from the seasonal high water table and, if infiltration is proposed as an outlet, minimum vertical saturated hydraulic conductivity of the subsoil. Installations without a precast vault that do not rely on infiltration are required to maintain at least a one-foot separation from the seasonal high water table measured from the lowest point of the system. Installations without a precast vault that utilize infiltration are required to have the most hydraulically restrictive soil layer below the MTD meet the minimum tested vertical saturated hydraulic conductivity of one inch per hour and have at least two feet of separation from the seasonal high water table measured from the lowest point of the system.

## 7. Sizing Requirement:

The example below demonstrates the sizing procedure for the Filterra<sup>®</sup> HC:

Example: A 0.25-acre impervious site is to be treated to 80% TSS removal using the Filterra<sup>®</sup> HC. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

The selection of the appropriate model of Filterra<sup>®</sup> HC is based upon both the maximum inflow drainage area and the MTFR. It is necessary to calculate the required model using both methods and to use the largest model determined by the two methods.

### Inflow Drainage Area Evaluation:

The drainage area to the Filterra<sup>®</sup> HC in this example is 0.25 acres. Included in Table 1 below, all of the Filterra<sup>®</sup> HC models are designed with a maximum allowable drainage area greater than 0.25 acres. Specifically, the Filterra<sup>®</sup> HC with a 4'x4' media bay and a maximum allowable drainage area of 0.40 acres would be the smallest model able to treat runoff without exceeding the maximum allowable drainage area.

### Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:  
time of concentration = 10 minutes  
 $i = 3.2$  in/hr (page 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)  
 $c = 0.99$  (runoff coefficient for impervious)  
 $Q = ciA = 0.99 \times 3.2 \times 0.25 = 0.79$  cfs

Given the site runoff is 0.79 cfs and based on the MTFR's listed in Table 1 below, the Filterra<sup>®</sup> HC with a 16'x8' media bay and an MTFR of 0.889 cfs would be the smallest model that could be used to treat the impervious area without exceeding the MTFR. If using more than one unit for treating runoff, the units should be configured such that the flowrate to each unit does not exceed the design MTFR for each unit and ensuring the entire 0.25 acre area is treated.

The MTFR evaluation results will be used since that method results in the highest minimum configuration determined by the two methods.

The sizing table corresponding to the available system models is noted below:

**Table 1. Filterra® HC MTFRs and Maximum Allowable Drainage Areas**

	Available Filterra® Media Bay Sizes (feet)	Effective Filtration Treatment Area (ft <sup>2</sup> )	Treatment Flow Rate (cfs)	Maximum Allowable Drainage Area (ac)
Standard Configuration Filterra and Filterra Bioscape Vaults	4x4	16	0.111	0.40
	4x6 or 6x4	24	0.167	0.60
	4.5x7.83 or 7.83x4.5 (Nominal 4x8/8x4)	35.24	0.245	0.89
	6x6	36	0.250	0.91
	6x8 or 8x6	48	0.333	1.21
	6x10 or 10x6	60	0.417	1.51
	6x12 or 12x6	72	0.500	1.81
	7x13 or 13x7	91	0.632	2.29
	14x8	112	0.778	2.82
	16x8	128	0.889	3.22
	18x8	144	1.000	3.62
	20x8	160	1.111	4.03
	22x8	176	1.222	4.43
Peak Diversion Filterra Vaults	4x4	16	0.111	0.40
	4.5x5.83 (Nominal 4x6)	26.24	0.182	0.66
	6x4	24	0.167	0.60
	6x6	36	0.250	0.91
	6x8	48	0.333	1.21
	6x10 or 10x6	60	0.417	1.51
	7x10	70	0.486	1.76
	8x10.5	84	0.583	2.11
	8x12.5	100	0.694	2.52
Custom and/or Filterra Bioscape	Media Area in ft <sup>2</sup>	0.00694 * (Media Area in ft <sup>2</sup> )	0.0252 * (Media Area in ft <sup>2</sup> )	



Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management rules, N.J.A.C. 7:8. The plan must include all of the items identified in the Stormwater Management rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact me at (609) 633-7021.

Sincerely,

A handwritten signature in blue ink that reads "Gabriel Mahon". The signature is written in a cursive, flowing style.

Gabriel Mahon, Chief  
Bureau of Stormwater Permitting

Attachment: Maintenance Plan

cc: Chron File  
Richard Magee, NJCAT  
Vince Mazzei, NJDEP – Water & Land Management  
Nancy Kempel, NJDEP– BSTP  
Keith Stampfel, NJDEP – DLRP  
Dennis Contois, NJDEP – DLRP

## Filterra HC Plant Selection Overview

Plant Lists are available on the Contech website highlighting recommended plants for Filterra systems in your area. Keep in mind that plants are subject to availability due to seasonality and required minimum size for the Filterra HC system. Plants installed in the Filterra HC system are container plants (max 15 gallon) from nursery stock and will be immature in height and spread at Activation.

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant of the Filterra HC system.

The “Planting Requirements for Filterra HC Systems” document is included as an appendix and discusses proper selection and care of the plants within Filterra HC systems.

## Warranty Overview

Refer to the Contech Engineered Solutions LLC Stormwater Treatment System LIMITED WARRANTY for further information. The following conditions may void the Filterra HC system’s warranty and waive the manufacturer provided Activation and Maintenance services:

- Unauthorized activation or performance of any of the items listed in the activation overview
- Any tampering, modifications or damage to the Filterra HC system or runoff protection devices
- Removal of any Filterra HC system components
- Failure to prevent construction related runoff from entering the Filterra HC system
- Failure to properly store and protect any Filterra HC components (including media and underdrain stone) that may be shipped separately from the vault

## Routine Maintenance Guidelines

Routine maintenance is included by the manufacturer on all Filterra HC systems for the first year after activation. This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation. More information is provided in the Operations and Maintenance Guidelines. Some Filterra HC systems also contain diversion bypass or outlet bays. Depending on site pollutant loading, these bays may require periodic removal of debris, however this is not included in the first year of maintenance and would likely not be required within the first year of operation.

These services, as well as routine maintenance outside of the included first year, can be provided by certified maintenance providers listed on the Contech website. Training can also be provided to other stormwater maintenance or landscape providers.





## Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons to maintain are:

- Avoiding legal challenges from your jurisdiction's maintenance enforcement program.
- Prolonging the expected lifespan the media in the Filterra HC system.
- Avoiding more costly media replacement.
- Helping reduce pollutant loads leaving your property.

Simple maintenance of the Filterra HC is required to continue effective pollutant removal from stormwater runoff before discharge into downstream waters. This procedure will also extend the longevity of the living biofilter system. The Filterra HC system is also subjected to various materials entering the inlet, including trash, silt, leaves, etc. which will be contained above the mulch layer. Too much silt may inhibit the Filterra HC system flow rate, which is the reason for site stabilization before activation. Regular replacement of the mulch stops accumulation of such sediment.

If the system is not maintained on regular intervals, is subject to a catastrophic spill or other event, or subject to unusual pollutant loading, full media bed replacement could be required. Please contact Contech for further evaluation if you feel this may be necessary.

## When to Maintain?

Contech includes a 1-year maintenance plan with each system purchase. Annual included maintenance consists of a maximum of two (2) scheduled visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated.

Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands while the fall visit helps the system by removing excessive leaf litter.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required; regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency; e.g. some fast food restaurants require more frequent trash removal. Contributing drainage areas which are subject to new development wherein the recommended erosion and sediment control measures have not been implemented may require additional maintenance visits.

Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the Supplier and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the (maintenance) Supplier of any damage to the plant(s), which constitute(s) an integral part of the bioretention technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance to the Supplier (i.e. no pruning or fertilizing) during the first year.



## Exclusion of Services

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the Supplier maintenance contract. Should a major contamination event occur the Owner must block off the outlet pipe of the Filterra HC (where the cleaned runoff drains to, such as drop inlet) and block off the inlet of the Filterra HC. The Supplier should be informed immediately.

## Maintenance Visit Summary

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of Filterra HC and surrounding area
2. Removal of tree grate and erosion control stones
3. Removal of debris, trash and mulch
4. Mulch replacement
5. Plant health evaluation & pruning or replacement as necessary
6. Clean area around Filterra HC
7. Complete paperwork

## Maintenance Tools, Safety Equipment and Supplies

Ideal tools include camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working near traffic and also safety hats and shoes. A T-Bar or crowbar should be used for moving the tree grates (up to 170 lbs ea.). Most visits require minor trash removal and a full replacement of mulch. See below for actual number of bagged mulch that is required in each media bay size. Mulch should be a double shredded, hardwood variety. Some visits may require additional Filterra engineered soil media for the Filterra HC system, available from the Supplier.

	Available Filterra® HC Media Bay Sizes (feet)	Filter Surface Area (ft <sup>2</sup> )	Mulch Volume at 3" Depth (ft <sup>2</sup> )	# of 2 ft <sup>2</sup> Mulch Bags
Standard Configuration Filtrerra and Filterra Bioscape Vaults	4x4	16	4	2
	4x6 or 6x4	24	6	3
	4.5x7.83 or 7.83x4.5 (Nominal 4x8/8x4)	35.24	9	5
	6x6	36	9	5
	6x8 or 8x6	48	12	6
	6x10 or 10x6	60	15	8
	6x12 or 12x6	72	18	9
	7x13 or 13x7	91	23	12
	14x8	112	28	14
	16x8	128	32	16
	18x8	144	36	18
	20x8	160	40	20
22x8	176	44	22	
Peak Diversion Filtrerra Vaults	4x4	16	4	2
	4.5x5.83 or 5.83x4.5 (Nominal 4x6/6x4)	26.24	7	4
	6x6	36	9	5
	6x8	48	12	6
	6x10 or 10x6	60	15	8
	7x10	70	18	9
	8x10.5	84	21	11
	8x12.5	100	25	13
	Custom and/or Filterra Bioscape	Media Area in ft <sup>2</sup>	0.25 x (Media Area in ft <sup>2</sup> )	0.125 x (Media Area in ft <sup>2</sup> )



# Maintenance Visit Procedure

Keep sufficient documentation of maintenance actions to predict location specific maintenance frequencies and needs. An example Maintenance Report is included in this manual.



## 1. Inspection of Filterra HC and surrounding area

- Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

Record on Maintenance Report the following:

Standing Water	yes   no
Damage to Box Structure	yes   no
Damage to Grate	yes   no
Is Bypass Clear	yes   no

If yes answered to any of these observations, record with close-up photograph (numbered).



## 2. Removal of tree grate and erosion control stones

- Remove cast iron grates for access into Filterra HC box.
- Dig out silt (if any) and mulch and remove trash & foreign items.

## 3. Removal of debris, trash and mulch

Record on Maintenance Report the following:

Silt/Clay	yes   no
Cups/ Bags	yes   no
Leaves	yes   no
Buckets Removed	_____



- After removal of mulch and debris, measure distance from the top of the Filterra engineered media soil to the top of the top slab. Compare the measured distance to the distance shown on the approved Contract Drawings for the system. Add Filterra media (not top soil or other) to bring media up as needed to distance indicated on drawings.

Record on Maintenance Report the following:

Distance to Top of Top Slab (inches)	_____
Inches of Media Added	_____



#### 4. Mulch replacement

- Add double shredded mulch evenly across the entire unit to a depth of 3".
- Refer to Filterra Mulch Specifications for information on acceptable sources.
- Ensure correct repositioning of erosion control stones by the Filterra HC inlet to allow for entry of trash during a storm event.
- Replace Filterra HC grates correctly using appropriate lifting or moving tools, taking care not to damage the plant.



#### 5. Plant health evaluation and pruning or replacement as necessary

- Examine the plant's health and replace if necessary.
- Prune as necessary to encourage growth in the correct directions

Record on Maintenance Report the following:

Height above Grate	_____	(ft)
Width at Widest Point	_____	(ft)
Health		healthy   unhealthy
Damage to Plant		yes   no
Plant Replaced		yes   no



#### 6. Clean area around Filterra HC

- Clean area around unit and remove all refuse to be disposed of appropriately.



#### 7. Complete paperwork

- Deliver Maintenance Report and photographs to appropriate location (normally Contech during maintenance contract period).
- Some jurisdictions may require submission of maintenance reports in accordance with approvals. It is the responsibility of the Owner to comply with local regulations.

# Maintenance Checklist

Drainage System Failure	Problem	Conditions to Check	Condition that Should Exist	Actions
Inlet	Excessive sediment or trash accumulation.	Accumulated sediments or trash impair free flow of water into Filterra HC.	Inlet should be free of obstructions allowing free distributed flow of water into Filterra HC HC.	Sediments and/or trash should be removed.
Mulch Cover	Trash and floatable debris accumulation.	Excessive trash and/or debris accumulation.	Minimal trash or other debris on mulch cover.	Trash and debris should be removed and mulch cover raked level. Ensure bark nugget mulch is not used.
Mulch Cover	"Ponding" of water on mulch cover.	"Ponding" in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils.	Stormwater should drain freely and evenly through mulch cover.	Recommend contact manufacturer and replace mulch as a minimum.
Vegetation	Plants not growing or in poor condition.	Soil/mulch too wet, evidence of spill. Incorrect plant selection. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact manufacturer for advice.
Vegetation	Plant growth excessive.	Plants should be appropriate to the species and location of Filterra HC.		Trim/prune plants in accordance with typical landscaping and safety needs.
Structure	Structure has visible cracks.	Cracks wider than 1/2 inch or evidence of soil particles entering the structure through the cracks.		Vault should be repaired.

Maintenance is ideally to be performed twice annually.

# Filterra HC Inspection & Maintenance Log

Filterra HC System Size/Model: \_\_\_\_\_ Location: \_\_\_\_\_

Date	Mulch & Debris Removed	Depth of Mulch Added	Mulch Brand	Height of Vegetation Above Grate	Vegetation Species	Issues with System	Comments
1/1/17	5 – 5 gal Buckets	3"	Lowe's Premium Brown Mulch	4'	Galaxy Magnolia	- Standing water in downstream structure	- Removed blockage in downstream structure

**Inspection Checklist and Maintenance Actions  
Manufactured Treatment Device MTD-5, 6, 101A, 101B, 102A,  
102B, 103, 201, & 202**

**Checklist** (circle one): Quarterly / Annual / Monthly / Special Event Inspection

**Checklist No.** \_\_\_\_\_ **Inspection Date:** \_\_\_\_\_

**Date of Most Recent Rain Event:** \_\_\_\_\_

**Rain Condition** (circle one):  
Drizzle / Shower / Downpour / Other \_\_\_\_\_

**Ground Condition** (circle one):  
Dry / Moist / Ponding / Submerged / Snow Accumulation



Component No. Component Name	For Inspector		For Maintenance Crew
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
A Conveyance System	1	Pipes are clogged	Y__ N__ Clean and clear clogged pipes
	2	Runoff is present more than 48 hours after the last storm event	Y__ N__ Perform maintenance procedures described in the Filterra HC Owner's Manual
B Filter System	1	Flows are below design levels	Y__ N__ Perform maintenance procedures described in the Filterra HC Owner's Manual

**Follow Up Items (Component No. / Inspection Item No.):**

\_\_\_\_\_

Associated Work Orders: # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_

\_\_\_\_\_  
Inspector Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.**

**File this checklist in the Maintenance Log after performing maintenance.**

## Preventative Maintenance Record

Corresponding Checklist No. \_\_\_\_\_  
 Component No. \_\_\_\_\_ Inspection Item No. \_\_\_\_\_

### Work Logs

Activities	Components	Date Completed
Perform Maintenance Procedures Described in the Filterra HC Owner's Manual	A – Conveyance System	
	B – Filter System	

**Crew Member:** \_\_\_\_\_ / \_\_\_\_\_ **Date:** \_\_\_\_\_  
 (Name/Signature)

**Supervisor:** \_\_\_\_\_ / \_\_\_\_\_ **Date:** \_\_\_\_\_  
 (Name/Signature)

**File this Preventative Maintenance Record in the Maintenance Log after performing maintenance.**

## Corrective Maintenance Record

1. **Work Order #** \_\_\_\_\_ **Date Issued** \_\_\_\_\_

2. **Issue to Be Resolved:**

3. The issue was from **Corresponding Checklist** \_\_\_\_\_, **Component No.** \_\_\_\_\_, **Inspection Item No.** \_\_\_\_\_.

4. **Required Actions**

Actions	Planned Date	Date Completed
Repair/Replace Grates		
Replace Media Treatment Cell		
Replace Plants		

5. **Responsible Person(s):**

\_\_\_\_\_

6. **Special Requirements**

- Time of the season or weather condition : \_\_\_\_\_
- Tools/equipment: \_\_\_\_\_
- Subcontractor (name or specific type): \_\_\_\_\_

**Approved By** \_\_\_\_\_/\_\_\_\_\_ **Date** \_\_\_\_\_  
(Name/Signature)

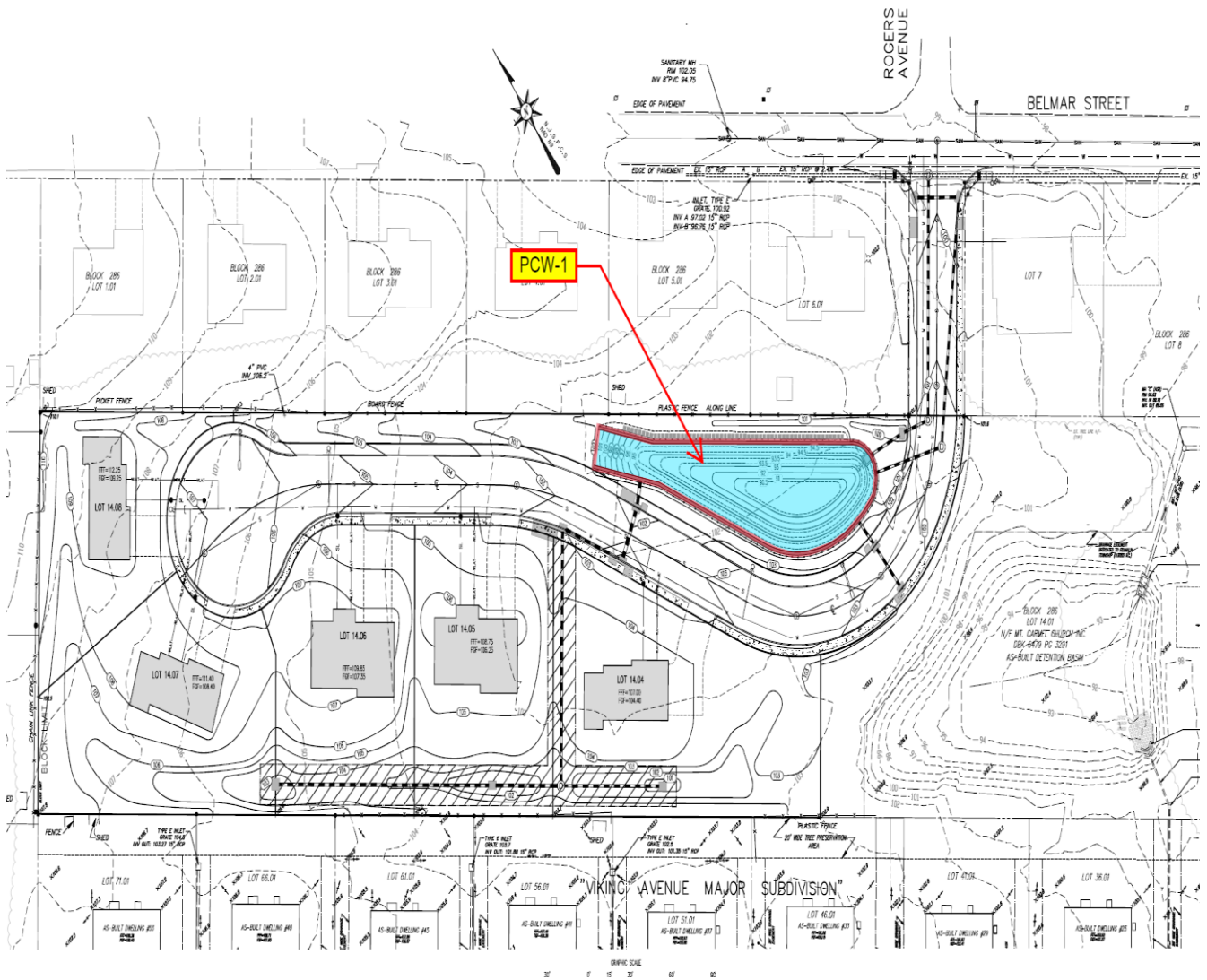
**Verification of Completion by** \_\_\_\_\_/\_\_\_\_\_ **Date** \_\_\_\_\_  
(Name/Signature)

**File this Corrective Maintenance Record in the Maintenance Log after performing maintenance.**

# POND CONSTRUCTED WETLAND FIELD MANUAL

Block 286, Lot 14.02  
Franklin Township  
Somerset County, New Jersey

## Location Map



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## **Standard Constructed Wetland Overview**

### Functionality

Standard constructed wetlands are stormwater management systems designed to maximize the removal of pollutants from stormwater runoff. Flow is directed through an engineered, open marsh system where pollutants are removed through settling and vegetative uptake/filtration. The total suspended solids (TSS) removal rate is 90%.

Proper care and attention in the long-term maintenance of the stormwater management measure is critically important to the safety and health of the public.

### Type of BMP – Wet Basin / Extended Detention of Runoff and Settlement of TSS

A constructed wetland is a type of wet basin, in which water is retained in a permanent pool. This standard constructed wetland is designed for extended detention of runoff and settlement of TSS. It is not designed to infiltrate the runoff.

Standard constructed wetlands shall have a water surface elevation approximately at the design water surface elevation year-round. Standard constructed wetlands consist of a combination of two or more of the following components: pool zone, marsh zone and semi-wet zone. The different zones of the constructed wetland require different water depths, shapes, and vegetation; therefore, it is normal to see varying water depths throughout the system.

## Basic Design Information

### PCW-1

#### Hydrology Design Targets

1. This standard constructed wetland is designed as a pond constructed wetland consisting of the following zones:

<b>Pond Constructed Wetlands Design Specifications</b>	
Drainage Area	3.01 Acres
Standing Water Depth: High Marsh Zone	0-6 Inches
Standing Water Depth: Low Marsh Zone	6-18 Inches
Standing Water Depth: Pool Zone	4.5 Feet

2. This pond will discharge runoff to the existing storm manhole.

#### Hydraulic Design Targets

1. Design Parameters

	<b>Water Quality Design Storm</b>	<b>Future 2-Year Storm</b>	<b>Future 10-Year Storm</b>	<b>Future 100-Year Storm</b>
<b>Rainfall Depth (inches)</b>	1.25 inches in 2 hours	3.34 inches in 24 hours	5.01 inches in 24 hours	8.21 inches in 24 hours
<b>Runoff Volume (cubic feet)</b>	5,514	29,292	51,802	114,529
<b>Peak Flow Rate (cfs)</b>	0.45	2.35	6.43	12.85
<b>Water Surface Elevation (feet)</b>	95.62	96.71	97.47	99.56

2. The 25' wide emergency spillway is at EL. 100.95 feet.

## Basin Configuration Targets

1. Pretreatment is provided by manufactured treatment devices.
2. Outlet Information:

Outlet Type	Orifice Size / Weir Length	Invert Elevation
Orifice	6"	95.00
Weir	6"	96.00
Weir	15"	96.50

3. The basin is lined.
4. The pond does not intercept groundwater.
5. The pond is designed without a drawdown conduit.

## Critical Maintenance Features

1. Floatables need to be cleaned and removed from the wetland.
2. Remove dead vegetation to prevent mosquito problems.
3. Water depth in each zone must be maintained at design level.
4. Sediment level in the pool zone needs to be checked and sediment needs to be frequently removed to ensure sufficient storage volume and detention time.
5. Native species are preferred during revegetation.



**Inspection Checklist / Maintenance Actions  
Pond Constructed Wetland PCW-1**

**Checklist** (circle one): Quarterly / Annual / Monthly / Special Event Inspection

**Checklist No.** \_\_\_\_\_ **Inspection Date:** \_\_\_\_\_

**Date of Most Recent Rain Event:** \_\_\_\_\_

**Rain Condition** (circle one):  
Drizzle / Shower / Downpour / Other \_\_\_\_\_

**Ground Condition** (circle one):  
Dry / Moist / Ponding / Submerged / Snow Accumulation

	<b>For Inspector</b>		<b>For Maintenance Crew</b>	
<b>Component No. Component Name</b>	<b>Inspection Item and Inspection Item No.</b>		<b>Result</b>	<b>Preventative / Corrective Maintenance Actions</b>
A2 Pretreatment (MTD)	1	MTD Inspection	Y___ N___	Refer to Filterra HC Owner's Manual
Note:				
B1 Marsh Zone	1	<p>The water depth in the marsh zone is significantly above or below the design water depth</p> <p>Dry spot(s) appearing in the marsh zone</p> <p>Growth of trees or bushes in the marsh zone</p>	Y___ N___	<p>Check for:</p> <ul style="list-style-type: none"> <li>* Damages to the liner</li> <li>* Changes in inflow patterns</li> </ul> <p>Repair any structural damages</p> <p>Remove sediment, reconfigure the marsh zone, remove trees, or repair the liner</p> <p>Work Order # _____</p>

	For Inspector		For Maintenance Crew	
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
	2	Vegetation loss in the high marsh zone	Y__ N__	<p>Check whether the water level is higher than the design level</p> <p>Check the Landscaping Plan for remedial actions</p> <p>Work Order # _____</p>
	3	Channelization in the wetland	Y__ N__	<p>Check whether the incoming flow is larger than the design inflow</p> <p>Check if excessive sediment has accumulated in the marsh zone</p> <p>Work Order # _____</p>
Note:				
B2 Pond Zone	1	The water depth in the marsh zone is significantly above or below the design water depth	Y__ N__	<p>Check for:</p> <ul style="list-style-type: none"> <li>- Changes in inflow patterns</li> <li>- Damages to the outlet structure</li> <li>- Damages to the liner</li> </ul> <p>Repair any structural damages</p> <p>Work Order # _____</p>

	For Inspector		For Maintenance Crew	
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
	2	Islands or shallow marsh emerging out of the pond zone	Y__ N__	<p>Check whether there is excessive sediment in the pond</p> <p>Check whether the incoming flow has excessive sediment</p> <p>Remove excessive sediment</p> <p>Find the source of excessive sediment and method to reduce the source</p> <p>Work Order # _____</p>
<p>Note: If emptying the pond is required before sediment removal, it shall be noted that a permit may be required before discharging the pond water. Contact NJDEP Division of Land Use Regulation before discharge.</p> <p>Other Note:</p>				
B2 Pond Zone	3	<p>The observed detention time is longer than the design detention time.</p> <p>The observed detention time is approximately _____ hours.</p>	Y__ N__	Check whether the outlets are clogged, see section E-Outlet of this checklist

	<b>For Inspector</b>		<b>For Maintenance Crew</b>	
<b>Component No. Component Name</b>	<b>Inspection Item and Inspection Item No.</b>		<b>Result</b>	<b>Preventative / Corrective Maintenance Actions</b>
	4	Debris or trash floating on the water	Y__ N__	Remove debris and trash  If trash and debris are excessive, find the source and the method to reduce the source.
	5	Excessive dead vegetation in the pond	Y__ N__	Clear and remove vegetation
	6	Mosquitoes breeding	Y__ N__	Remove dead vegetation  Consult local mosquito commission for guidance  Work Order # _____
	7	Subsidence of safety ledge	Y__ N__	Drain the pond and repair the safety ledge  Work Order # _____
<p>Note: If emptying the pond is required, a permit may be required before discharging the pond water. Contact NJDEP Division of Land Use Regulation before discharge.</p> <p>Other Note:</p>				
C Vegetation	1	Invasive plants are present	Y__ N__	Remove the invasive plants and restore the vegetation in accordance with the landscaping plan  Work Order # _____

	<b>For Inspector</b>		<b>For Maintenance Crew</b>	
<b>Component No. Component Name</b>	<b>Inspection Item and Inspection Item No.</b>		<b>Result</b>	<b>Preventative / Corrective Maintenance Actions</b>
	2	Algae blooming	Y__ N__	Remove algae  Find the nutrient source and the solution to reduce the nutrient loading  Work Order # _____
Note:				
D Pond Embankment and Side Slopes	1	Signs of erosion, soil slide or bulges, seeps and wet spots, loss of vegetation, or erosion on the basin slope	Y__ N__	Check for excessive overland runoff flow through the embankment.  Check for any sink hole development  Restabilize the bank  Work Order # _____

Component No. Component Name	For Inspector		For Maintenance Crew	
	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions	
E Outlet	1	Trash or debris accumulation more than 20%	Y__ N__	Clean and remove  Determine source of trash and address to reduce future maintenance costs or basin failure
	2	Trash rack is damaged or rusted greater than 50%	Y__	Repair or replace trash rack
		Trash rack is bent, loose, or missing parts	N__	Work Order # _____
	3	Outlet components (e.g., orifice plates or weir plate) skewed, misaligned, or missing	Y__ N__	Repair or replace component  Work Order # _____
4	Standing water is present in the outlet structure longer than 72 hours	Y__ N__	Pump out the standing water  Work Order # _____	
Note:				
F Emergency Spillway	1	Trees or excessive vegetation present	Y__ N__	Remove trees and roots, and restore berms if necessary  Work Order # _____
	2	Damaged structure	Y__ N__	Repair  Work Order # _____
G Miscellaneous	1	Fence: broken or eroded parts	Y__ N__	Repair or replace  Work Order # _____

	For Inspector		For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result Preventative / Corrective Maintenance Actions
	2	Excessive or overgrown vegetation blocking access to the basin	Y__ N__ Clear, trim, or prune the vegetation to allow access for inspection and maintenance Work Order # _____
Note:			

**Follow Up Items (Component No. / Inspection Item No.):**

\_\_\_\_\_

**Associated Work Orders: # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_**

\_\_\_\_\_

\_\_\_\_\_

**Inspector Name**

\_\_\_\_\_

**Signature**

**Date**

**Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.**

**File this checklist in the Maintenance Log after performing maintenance**



## Preventative Maintenance Record

Corresponding Checklist No. \_\_\_\_\_  
 Component No. \_\_\_\_\_, Inspection Item No. \_\_\_\_\_

### Work Logs

Activities	Components	Check if finished
Sediment/debris removal <b>Sediment removal should take place when the pond zone is thoroughly dry.</b>	A2 – Pretreatment	
	B2 – Pond Zone	
	D – Pond Embankment and Side Slopes	
	E – Outlet	
Vegetation removal	A2 – Pretreatment	
	B1 – Marsh Zone	
	B2 – Pond Zone	
	D – Pond Embankment and Side Slopes	
	E – Outlet	
	F – Emergency Spillway	

Vegetation shall be removed with minimum disruption to the remaining vegetation.

All use of fertilizers, pesticides, mechanical treatments, and other means to ensure optimum vegetation health must not compromise the intended purpose of the stormwater management measure.

**Crew Member:** \_\_\_\_\_ / \_\_\_\_\_ **Date:** \_\_\_\_\_  
 (name/ signature)

**Supervisor:** \_\_\_\_\_ / \_\_\_\_\_ **Date:** \_\_\_\_\_

**A permit may be required to discharge when emptying the pond. Contact NJDEP Division of Land Use Regulation before discharging. File this Preventative Maintenance Record in the Maintenance Log after performing maintenance.**

## Corrective Maintenance Record

1. **Work Order #** \_\_\_\_\_ **Date Issued** \_\_\_\_\_

2. **Issue to be Resolved:**

3. The issue was from **Corresponding Checklist No.** \_\_\_\_\_,  
**Component No.** \_\_\_\_\_, **Inspection Item No.** \_\_\_\_\_.

4. **Required Actions**

Actions	Planned Date	Date Completed
New bolts to fix the orifice plate		
Repair/replace the trash rack		
Restabilize side slope (indicate location)		
Revegetate		

5. **Responsible person(s):**

---

6. **Special requirements**

- Time of the season or weather condition: \_\_\_\_\_
- Tools/equipment: \_\_\_\_\_
- Subcontractor (name or specific type): \_\_\_\_\_

**Approved by** \_\_\_\_\_/\_\_\_\_\_ **Date** \_\_\_\_\_  
 (name/signature)

**Verification of Completion by** \_\_\_\_\_/\_\_\_\_\_ **Date** \_\_\_\_\_  
 (name/signature)

**File this Corrective Maintenance Record in the Maintenance Log after performing maintenance.**

# Part III - Maintenance and Inspection Logs

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## Inspection Checklist Log

1. The responsible party shall report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.
2. The maintenance crew should fill out the checklist in the field manual when performing each inspection/maintenance task.
3. After the maintenance task is performed, the checklist should be filed in the Maintenance Plan and recorded in the log below.

Cycle of Inspection	Stormwater Management Measure No.	Checklist No.	Date(s) of Inspection

<b>Cycle of Inspection</b>	<b>Stormwater Management Measure No.</b>	<b>Checklist No.</b>	<b>Date(s) of Inspection</b>

Continue the Table When Necessary

## Preventative Maintenance Log

Maintenance Schedule	Stormwater Management Measure No.	Preventative Maintenance Record No.	Date(s) of Maintenance

Continue the Table When Necessary

## Corrective Maintenance Log

Maintenance Schedule	Stormwater Management Measure No.	Corrective Maintenance Record No.	Date(s) of Maintenance

Continue the Table When Necessary



### Attachment D – Major Development Stormwater Summary

General Information			
1. Project Name:			
2. Municipality:	County:	Block(s):	Lot(s):
3. Site Location (State Plane Coordinates – NAD83):		E:	N:
4. Date of Final Approval for Construction by Municipality: Date of Certificate of Occupancy:			
5. Project Type (check all that apply): Residential      Commercial      Industrial      Other (please specify) _____			
6. Soil Conservation District Project Number:			
7. Did project require an NJDEP Land Use Permit?		Yes	No
		Land Use Permit #:	
8. Did project require the use of any mitigation measures?		Yes	No
If yes, which standard was mitigated? _____			

Site Design Specifications	
1. Area of Disturbance (acres):	Area of Proposed Impervious (acres):
2. List all Hydrologic Soil Groups:	
3. Please Identify the Amount of Each Best Management Practices (BMPs) Utilized in Design Below:	
Bioretention Systems _____	Constructed Wetlands _____
Dry Wells _____	Extended Detention Basins _____
Infiltration Basins _____	Combination Infiltration/Detention Basins _____
Manufactured Treatment Devices _____	
Pervious Paving Systems _____	Sand Filters _____
Vegetative Filter Strips _____	Wet Ponds _____
Grass Swales _____	Subsurface Gravel Wetlands _____
Other _____	

Storm Event Information			
Storm Event - Rainfall (inches and duration):	2 yr.: _____	10 yr.: _____	
	100 yr.: _____	WQDS: _____	
Runoff Computation Method:			
NRCS: Dimensionless Unit Hydrograph	NRCS: Delmarva Unit Hydrograph	Rational	Modified Rational
Other: _____			

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*			
1. Type of Basin:	Surface/Subsurface (select one): Surface      Subsurface		
2. Owner (select one):	Public	Private: If so, Name:	Phone number:
3. Basin Construction Completion Date:			
4. Drain Down Time (hr.):			
5. Design Soil Permeability (in./hr.):			
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):		Date Obtained:	
7. Groundwater Recharge Methodology (select one):	2 Year Difference	NJGRS	Other      NA
8. Groundwater Mounding Analysis (select one):	Yes	No	If, Yes Methodology Used:
9. Maintenance Plan Submitted:	Yes	No	Is the Basin Deed Restricted: Yes      No

Comments:

Name of Person Filling Out This Form: \_\_\_\_\_

Signature: Michael K. Ford

Title: \_\_\_\_\_

Date: \_\_\_\_\_

2/2/2018