



***Drainage Report
Prepared For
Block 6001 Lot 33, 34, 34.01, 35, 35.01 & 36
Montgomery Township
Somerset County, New Jersey
Project Number: 1805M***

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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 (VCEA) with regard to the proposed construction on Lots 33, 34, 34.01, 35, 35.01 & 36 in Block 6001 as designated by the Montgomery Township Tax Maps. The tract consists of approximately 22 acres and is located along US-206 within the Harlingen Village Square district.

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

2.0 Site Description

2.1 Pre-Developed Condition

The property is presently vacant and consists mostly of woods and open space. The adjacent properties are dedicated to residential and commercial uses. Fox Brook runs through the eastern boundary of the tract. A portion of the tract is comprised of wetlands. The runoff generated by the property under pre-developed conditions is conveyed to a tributary to Pike Run via overland flow. The boundary of the drainage area and the location of the corresponding point of analysis is shown on the Existing Drainage Area Map in Appendix M.

2.2 Post-Developed Condition

The proposed development of the site includes the construction of 36 townhouses and 3 apartment buildings along with a parking lot and roadway. This development will result in a net increase of impervious area that amounts to 4.41 acres. Furthermore, the total area of disturbance is 12.27 acres. A pond constructed wetland will be installed to collect the runoff generated by Area 1 via a proposed storm sewer network. All of the runoff generated by the proposed motor vehicle surface area will be treated by manufactured treatment devices before it enters the pond constructed wetland and is discharged to the existing wetlands via the outlet structure. The runoff generated by Area 2 will bypass the pond constructed wetland and will be conveyed to the point of analysis via overland flow. The boundaries of the drainage areas and the location of the corresponding point of analysis is shown on the Proposed Drainage Area Map in Appendix M.

3.0 Methodology

The runoff quantity analysis is based on the Natural Resources Conservation Service

methodology that is described in Technical Release No. 55 (TR-55), "Urban Hydrology for Small Watersheds." 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 the 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 Rational Method was utilized to determine whether the capacity provided by the proposed pipes is sufficient for the runoff generated by the 25-year storm event.

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 Montgomery Township, Residential Site Improvements Standards (RSIS), the New Jersey Department of Environmental Protection and the Standards for Soil Erosion and Sediment Control in New Jersey.

5.0 Runoff Quantity

Under post-developed conditions, the pond constructed wetland will ensure that the peak flow rates associated with the point of analysis have been sufficiently reduced in accordance with N.J.A.C. 7:8-5.6. The results of the analysis are tabulated below:

POA			
Storm Frequency	Pre-Developed Peak Flow (CFS)	Allowable Peak Flow (CFS)	Post-Developed Peak Flow (CFS)
2	11.59	5.80 (50%)	5.09
10	23.92	17.94 (75%)	9.88
100	49.22	39.38 (80%)	30.62

Detailed information pertaining to the routing calculations and the associated hydrographs is included in Appendix A-E.

6.0 Water Surface Elevation Summary

The water surface elevations within the pond constructed wetland and peak flow rates corresponding to the outflow are tabulated below:

Storm Frequency	Water Surface Elevation (FT)	Outflow (CFS)
2	77.75	0.26
10	78.57	2.29
100	79.84	16.37

7.0 Runoff Quality

In order 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 GI MTDs that are designed to achieve a TSS removal rate of 80% and thus comply with N.J.A.C. 7:8-5.5. The MTD certifications are included in Appendix F2.

8.0 Groundwater Recharge

Although the NRCS Web Soil Survey indicates that a portion of the site consists of HSG 'C' soil, the soil explorations that were performed indicate that this classification is inaccurate. Thus a number of soil explorations were performed within each HSG 'C' mapping unit to reclassify these soils in accordance with Chapter 12 of the BMP Manual. Every soil exploration that was performed indicated the presence of mottling at a depth of 24" or less. These results indicate that these soils belong to HSG 'D' rather than HSG 'C' and therefore the groundwater recharge standards that are described at N.J.A.C. 7:8-5.4 are not applicable to this development. The Hydrologic Soil Group Map that was obtained via the NRCS Web Soil Survey is included in Appendix H. The Soil Exploration Exhibit in Appendix M depicts the locations of each of the soil explorations along with the area of each soil mapping unit within the bounds of the development.

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 in the Inlet Drainage Area Map in Appendix L. Flow rates were computed via the application of the Rational method ($Q = CIA$). Detailed information pertaining to storm sewer capacity is included in Appendix I.

10.0 Off-Site Stability

Point of Discharge Stability Analysis

There is no well-defined waterway below the point of discharge associated with the proposed pond constructed wetland. Thus the standard for point of discharge stability has been adhered to by meeting the stability criteria listed in the Standards for Soil Erosion and Sediment Control in New Jersey as follows:

- i. The maximum discharge rate associated with the 25-year design storm is 6.24 cfs which is less than the threshold of 10 cfs.
- ii. Multiple outlets are not necessary because the maximum discharge rate is less than the threshold.
- iii. The width of the preformed scour hole is 20 ft and the discharge rate associated with the 25-year design storm is 5.86 cfs. Thus the flow over the outlet area is 0.293 cfs/ft ($5.86 \text{ cfs} / 20 \text{ ft}$) which is less than the threshold of 0.5 cfs/ft.
- iv. Conduit outlet protection in the form of a preformed scour hole is provided.
- v. Topography shows broad, uniform outlet area where flows will not concentrate.
- vi. Discharge location contains perennial, natural vegetation.
- vii. Conduit outlet protection in the form of a preformed scour hole is provided.
- viii. The length of slope below the outlet is no more than 100 ft.

Downstream Stability Analysis

The peak flow rates corresponding to the 2 and 10-year design storms under the post-developed condition are no more than 50% and 75%, respectively, of the corresponding peak flow rates under the pre-developed condition. Thus the standard for downstream stability has been adhered to per the Standards for Soil Erosion and Sediment Control in New Jersey.

11.0 Conclusion

The proposed development will sufficiently reduce the peak flow rates associated with the runoff generated by the disturbed area during the 2, 10 and 100-year design storms. Furthermore, 80% of the TSS within the runoff generated by the proposed

motor vehicle surface 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 Montgomery Township, the Residential Site Improvement Standards, the New Jersey Department of Environmental Protection, and the Somerset-Union Soil Conservation District. All engineering calculations and the associated drainage area maps are included in the appendix for further review.

12.0 References

1. Urban Hydrology for Small Watersheds, TR-55, USDA Soil Conservation Service, June 1986.
2. DEP Stormwater Management Rules, NJAC 7:8, March 2, 2020.
3. DEP Stormwater Best Management Practices Manual, March 2021.
4. Standards for Soil Erosion and Sediment Control in New Jersey, New Jersey State Soil Conservation Committee, July 2017.
5. Web Soil Survey, United States Department of Agriculture, Natural Resource Conservation Service, Version 8, 2008.
6. Montgomery Township Code.
7. Bentley, StormCAD®, Version 8.11.02.75, 2011.
8. Bentley, Pond Pack version 8i, 2012.

Appendix A

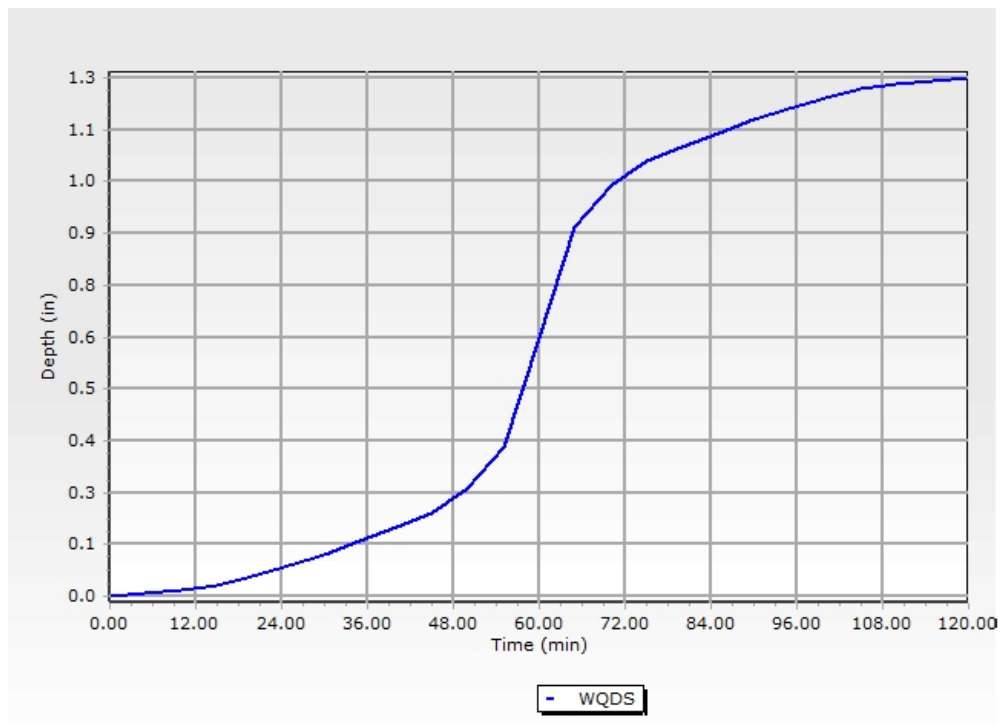
Stormwater Management Model Summary

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	1.0 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	0.0	0.0	0.0	0.0	0.1
25.00	0.1	0.1	0.1	0.2	0.2
50.00	0.3	0.4	0.6	0.9	1.0
75.00	1.1	1.1	1.1	1.2	1.2
100.00	1.2	1.2	1.2	1.2	1.3



Storm Data Detailed Report: Type C - Somerset

Element Details			
ID	291	Notes	
Label	Type C - Somerset		
2-Year			
Label	2-Year	End Time	1,440.00 min
Return Event	2 years	Depth	3.3 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	0.0	0.0	0.0	0.0	0.0
30.00	0.0	0.0	0.0	0.0	0.0
60.00	0.0	0.0	0.0	0.0	0.1
90.00	0.1	0.1	0.1	0.1	0.1
120.00	0.1	0.1	0.1	0.1	0.1
150.00	0.1	0.1	0.1	0.1	0.1
180.00	0.1	0.1	0.1	0.1	0.1
210.00	0.1	0.1	0.1	0.2	0.2
240.00	0.2	0.2	0.2	0.2	0.2
270.00	0.2	0.2	0.2	0.2	0.2
300.00	0.2	0.2	0.2	0.2	0.2
330.00	0.2	0.2	0.2	0.3	0.3
360.00	0.3	0.3	0.3	0.3	0.3
390.00	0.3	0.3	0.3	0.3	0.3
420.00	0.3	0.3	0.3	0.3	0.3
450.00	0.4	0.4	0.4	0.4	0.4
480.00	0.4	0.4	0.4	0.4	0.4
510.00	0.4	0.4	0.5	0.5	0.5
540.00	0.5	0.5	0.5	0.5	0.5
570.00	0.5	0.5	0.6	0.6	0.6
600.00	0.6	0.6	0.6	0.6	0.7
630.00	0.7	0.7	0.7	0.7	0.8
660.00	0.8	0.8	0.9	0.9	0.9
690.00	1.0	1.0	1.1	1.2	1.3
720.00	1.6	2.0	2.1	2.2	2.3
750.00	2.3	2.4	2.4	2.4	2.5
780.00	2.5	2.5	2.6	2.6	2.6
810.00	2.6	2.6	2.7	2.7	2.7
840.00	2.7	2.7	2.7	2.7	2.8
870.00	2.8	2.8	2.8	2.8	2.8
900.00	2.8	2.8	2.8	2.8	2.9
930.00	2.9	2.9	2.9	2.9	2.9
960.00	2.9	2.9	2.9	2.9	2.9
990.00	2.9	3.0	3.0	3.0	3.0
1,020.00	3.0	3.0	3.0	3.0	3.0

Storm Data Detailed Report: Type C - Somerset

2-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,050.00	3.0	3.0	3.0	3.0	3.0
1,080.00	3.0	3.0	3.0	3.1	3.1
1,110.00	3.1	3.1	3.1	3.1	3.1
1,140.00	3.1	3.1	3.1	3.1	3.1
1,170.00	3.1	3.1	3.1	3.1	3.1
1,200.00	3.1	3.1	3.1	3.2	3.2
1,230.00	3.2	3.2	3.2	3.2	3.2
1,260.00	3.2	3.2	3.2	3.2	3.2
1,290.00	3.2	3.2	3.2	3.2	3.2
1,320.00	3.2	3.2	3.2	3.2	3.2
1,350.00	3.2	3.2	3.3	3.3	3.3
1,380.00	3.3	3.3	3.3	3.3	3.3
1,410.00	3.3	3.3	3.3	3.3	3.3
1,440.00	3.3	(N/A)	(N/A)	(N/A)	(N/A)

10-Year

Label	10-Year	End Time	1,440.00 min
Return Event	10 years	Depth	5.0 in
Start Time	0.00 min	Storm Event Depth Type	Cumulative
Increment	6.00 min		

10-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.0	0.0	0.0	0.0	0.0
30.00	0.0	0.0	0.0	0.0	0.0
60.00	0.1	0.1	0.1	0.1	0.1
90.00	0.1	0.1	0.1	0.1	0.1
120.00	0.1	0.1	0.1	0.1	0.1
150.00	0.1	0.2	0.2	0.2	0.2
180.00	0.2	0.2	0.2	0.2	0.2
210.00	0.2	0.2	0.2	0.2	0.2
240.00	0.2	0.3	0.3	0.3	0.3
270.00	0.3	0.3	0.3	0.3	0.3
300.00	0.3	0.3	0.3	0.3	0.3
330.00	0.4	0.4	0.4	0.4	0.4
360.00	0.4	0.4	0.4	0.4	0.4
390.00	0.4	0.4	0.5	0.5	0.5
420.00	0.5	0.5	0.5	0.5	0.5
450.00	0.5	0.6	0.6	0.6	0.6
480.00	0.6	0.6	0.6	0.6	0.6
510.00	0.7	0.7	0.7	0.7	0.7
540.00	0.7	0.7	0.8	0.8	0.8
570.00	0.8	0.8	0.8	0.9	0.9
600.00	0.9	0.9	1.0	1.0	1.0
630.00	1.0	1.1	1.1	1.1	1.2

Storm Data Detailed Report: Type C - Somerset

10-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
660.00	1.2	1.2	1.3	1.4	1.4
690.00	1.5	1.6	1.7	1.8	2.0
720.00	2.4	3.0	3.2	3.3	3.4
750.00	3.5	3.6	3.6	3.7	3.8
780.00	3.8	3.8	3.9	3.9	3.9
810.00	4.0	4.0	4.0	4.0	4.1
840.00	4.1	4.1	4.1	4.2	4.2
870.00	4.2	4.2	4.2	4.2	4.3
900.00	4.3	4.3	4.3	4.3	4.3
930.00	4.3	4.4	4.4	4.4	4.4
960.00	4.4	4.4	4.4	4.4	4.4
990.00	4.5	4.5	4.5	4.5	4.5
1,020.00	4.5	4.5	4.5	4.5	4.6
1,050.00	4.6	4.6	4.6	4.6	4.6
1,080.00	4.6	4.6	4.6	4.6	4.6
1,110.00	4.6	4.7	4.7	4.7	4.7
1,140.00	4.7	4.7	4.7	4.7	4.7
1,170.00	4.7	4.7	4.7	4.7	4.7
1,200.00	4.8	4.8	4.8	4.8	4.8
1,230.00	4.8	4.8	4.8	4.8	4.8
1,260.00	4.8	4.8	4.8	4.8	4.8
1,290.00	4.9	4.9	4.9	4.9	4.9
1,320.00	4.9	4.9	4.9	4.9	4.9
1,350.00	4.9	4.9	4.9	4.9	4.9
1,380.00	4.9	5.0	5.0	5.0	5.0
1,410.00	5.0	5.0	5.0	5.0	5.0
1,440.00	5.0	(N/A)	(N/A)	(N/A)	(N/A)

25-Year

Label	25-Year	End Time	1,440.00 min
Return Event	25 years	Depth	6.2 in
Start Time	0.00 min	Storm Event Depth Type	Cumulative
Increment	6.00 min		

25-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.0	0.0	0.0	0.0	0.0
30.00	0.0	0.0	0.0	0.1	0.1
60.00	0.1	0.1	0.1	0.1	0.1
90.00	0.1	0.1	0.1	0.1	0.1
120.00	0.1	0.1	0.2	0.2	0.2
150.00	0.2	0.2	0.2	0.2	0.2
180.00	0.2	0.2	0.2	0.2	0.3
210.00	0.3	0.3	0.3	0.3	0.3
240.00	0.3	0.3	0.3	0.3	0.3

Storm Data Detailed Report: Type C - Somerset

25-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
270.00	0.3	0.4	0.4	0.4	0.4
300.00	0.4	0.4	0.4	0.4	0.4
330.00	0.4	0.5	0.5	0.5	0.5
360.00	0.5	0.5	0.5	0.5	0.5
390.00	0.5	0.6	0.6	0.6	0.6
420.00	0.6	0.6	0.6	0.6	0.7
450.00	0.7	0.7	0.7	0.7	0.7
480.00	0.7	0.8	0.8	0.8	0.8
510.00	0.8	0.8	0.9	0.9	0.9
540.00	0.9	0.9	0.9	1.0	1.0
570.00	1.0	1.0	1.1	1.1	1.1
600.00	1.1	1.2	1.2	1.2	1.2
630.00	1.3	1.3	1.4	1.4	1.4
660.00	1.5	1.5	1.6	1.7	1.8
690.00	1.8	2.0	2.1	2.3	2.5
720.00	3.0	3.7	3.9	4.1	4.2
750.00	4.4	4.4	4.5	4.6	4.7
780.00	4.7	4.8	4.8	4.8	4.9
810.00	4.9	5.0	5.0	5.0	5.0
840.00	5.1	5.1	5.1	5.1	5.2
870.00	5.2	5.2	5.2	5.3	5.3
900.00	5.3	5.3	5.3	5.3	5.4
930.00	5.4	5.4	5.4	5.4	5.4
960.00	5.5	5.5	5.5	5.5	5.5
990.00	5.5	5.5	5.6	5.6	5.6
1,020.00	5.6	5.6	5.6	5.6	5.6
1,050.00	5.7	5.7	5.7	5.7	5.7
1,080.00	5.7	5.7	5.7	5.7	5.7
1,110.00	5.8	5.8	5.8	5.8	5.8
1,140.00	5.8	5.8	5.8	5.8	5.8
1,170.00	5.9	5.9	5.9	5.9	5.9
1,200.00	5.9	5.9	5.9	5.9	5.9
1,230.00	5.9	5.9	6.0	6.0	6.0
1,260.00	6.0	6.0	6.0	6.0	6.0
1,290.00	6.0	6.0	6.0	6.0	6.1
1,320.00	6.1	6.1	6.1	6.1	6.1
1,350.00	6.1	6.1	6.1	6.1	6.1
1,380.00	6.1	6.1	6.1	6.2	6.2
1,410.00	6.2	6.2	6.2	6.2	6.2
1,440.00	6.2	(N/A)	(N/A)	(N/A)	(N/A)

100-Year

Label	100-Year	End Time	1,440.00 min
Return Event	100 years	Depth	8.2 in
Start Time	0.00 min	Storm Event Depth Type	Cumulative
Increment	6.00 min		

Storm Data Detailed Report: Type C - Somerset

100-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.0	0.0	0.0	0.0	0.0	0.0
30.00	0.0	0.1	0.1	0.1	0.1	0.1
60.00	0.1	0.1	0.1	0.1	0.1	0.1
90.00	0.1	0.1	0.2	0.2	0.2	0.2
120.00	0.2	0.2	0.2	0.2	0.2	0.2
150.00	0.2	0.2	0.3	0.3	0.3	0.3
180.00	0.3	0.3	0.3	0.3	0.3	0.3
210.00	0.3	0.4	0.4	0.4	0.4	0.4
240.00	0.4	0.4	0.4	0.4	0.4	0.4
270.00	0.5	0.5	0.5	0.5	0.5	0.5
300.00	0.5	0.5	0.5	0.6	0.6	0.6
330.00	0.6	0.6	0.6	0.6	0.6	0.6
360.00	0.6	0.7	0.7	0.7	0.7	0.7
390.00	0.7	0.7	0.8	0.8	0.8	0.8
420.00	0.8	0.8	0.8	0.9	0.9	0.9
450.00	0.9	0.9	0.9	0.9	1.0	1.0
480.00	1.0	1.0	1.0	1.0	1.1	1.1
510.00	1.1	1.1	1.1	1.2	1.2	1.2
540.00	1.2	1.2	1.2	1.3	1.3	1.3
570.00	1.3	1.4	1.4	1.4	1.5	1.5
600.00	1.5	1.5	1.6	1.6	1.6	1.6
630.00	1.7	1.7	1.8	1.8	1.9	1.9
660.00	2.0	2.0	2.1	2.2	2.3	2.3
690.00	2.4	2.6	2.8	3.0	3.3	3.3
720.00	3.9	4.9	5.2	5.4	5.6	5.6
750.00	5.8	5.9	6.0	6.1	6.2	6.2
780.00	6.2	6.3	6.4	6.4	6.5	6.5
810.00	6.5	6.6	6.6	6.6	6.7	6.7
840.00	6.7	6.7	6.8	6.8	6.8	6.8
870.00	6.9	6.9	6.9	7.0	7.0	7.0
900.00	7.0	7.0	7.0	7.1	7.1	7.1
930.00	7.1	7.1	7.2	7.2	7.2	7.2
960.00	7.2	7.2	7.3	7.3	7.3	7.3
990.00	7.3	7.3	7.3	7.4	7.4	7.4
1,020.00	7.4	7.4	7.4	7.4	7.5	7.5
1,050.00	7.5	7.5	7.5	7.5	7.5	7.5
1,080.00	7.6	7.6	7.6	7.6	7.6	7.6
1,110.00	7.6	7.6	7.6	7.7	7.7	7.7
1,140.00	7.7	7.7	7.7	7.7	7.7	7.7
1,170.00	7.7	7.8	7.8	7.8	7.8	7.8
1,200.00	7.8	7.8	7.8	7.8	7.8	7.8
1,230.00	7.9	7.9	7.9	7.9	7.9	7.9
1,260.00	7.9	7.9	7.9	7.9	8.0	8.0
1,290.00	8.0	8.0	8.0	8.0	8.0	8.0
1,320.00	8.0	8.0	8.0	8.0	8.1	8.1
1,350.00	8.1	8.1	8.1	8.1	8.1	8.1
1,380.00	8.1	8.1	8.1	8.1	8.1	8.1

Storm Data Detailed Report: Type C - Somerset

100-Year

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,410.00	8.2	8.2	8.2	8.2	8.2
1,440.00	8.2	(N/A)	(N/A)	(N/A)	(N/A)

100-Year + 50%

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

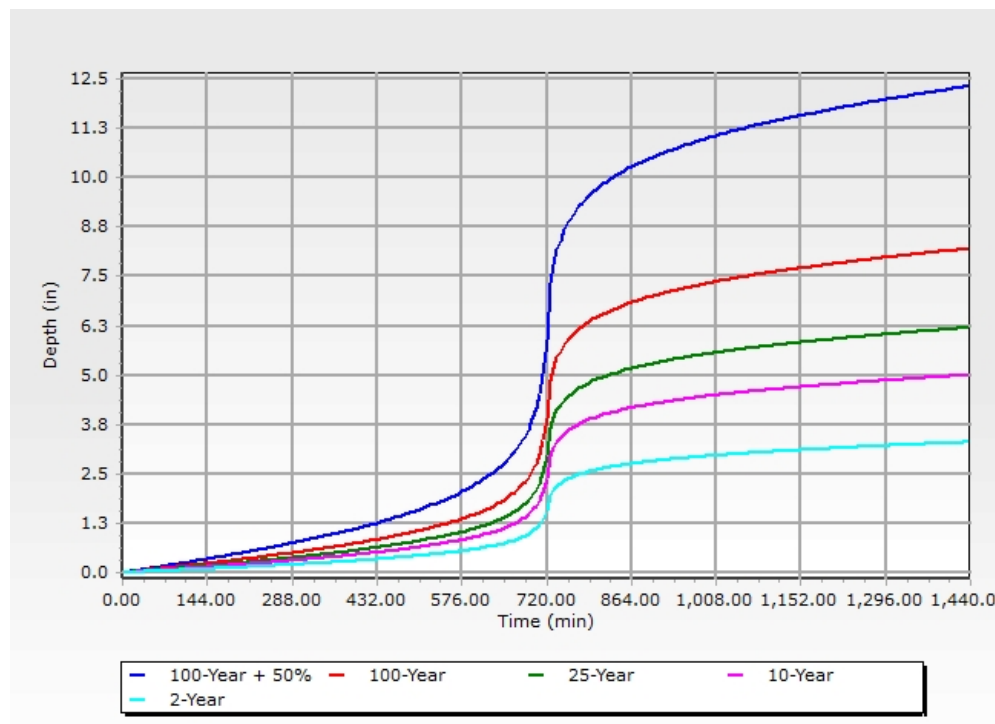
100-Year + 50%

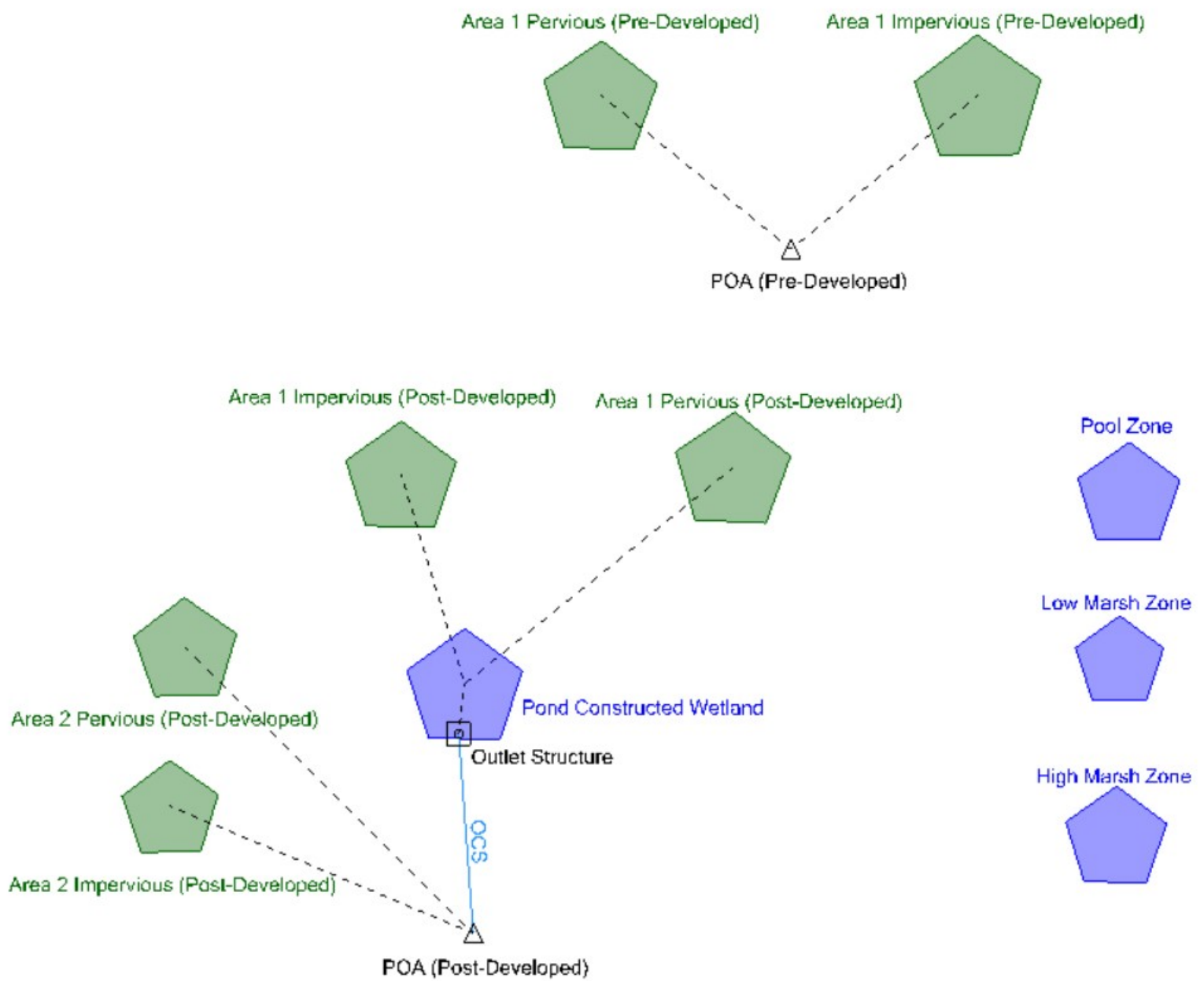
Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.0	0.0	0.0	0.0	0.1
30.00	0.1	0.1	0.1	0.1	0.1
60.00	0.1	0.1	0.2	0.2	0.2
90.00	0.2	0.2	0.2	0.2	0.3
120.00	0.3	0.3	0.3	0.3	0.3
150.00	0.4	0.4	0.4	0.4	0.4
180.00	0.4	0.5	0.5	0.5	0.5
210.00	0.5	0.5	0.6	0.6	0.6
240.00	0.6	0.6	0.6	0.7	0.7
270.00	0.7	0.7	0.7	0.7	0.8
300.00	0.8	0.8	0.8	0.8	0.9
330.00	0.9	0.9	0.9	0.9	1.0
360.00	1.0	1.0	1.0	1.0	1.1
390.00	1.1	1.1	1.1	1.2	1.2
420.00	1.2	1.2	1.3	1.3	1.3
450.00	1.3	1.4	1.4	1.4	1.4
480.00	1.5	1.5	1.5	1.6	1.6
510.00	1.6	1.7	1.7	1.7	1.8
540.00	1.8	1.8	1.9	1.9	2.0
570.00	2.0	2.0	2.1	2.1	2.2
600.00	2.2	2.3	2.4	2.4	2.5
630.00	2.5	2.6	2.7	2.8	2.9
660.00	3.0	3.1	3.2	3.3	3.5
690.00	3.6	3.9	4.2	4.5	5.0
720.00	5.9	7.3	7.8	8.2	8.4
750.00	8.7	8.8	9.0	9.1	9.2
780.00	9.4	9.5	9.5	9.6	9.7
810.00	9.8	9.8	9.9	10.0	10.0
840.00	10.1	10.1	10.2	10.2	10.3
870.00	10.3	10.4	10.4	10.4	10.5
900.00	10.5	10.6	10.6	10.6	10.7
930.00	10.7	10.7	10.7	10.8	10.8
960.00	10.8	10.9	10.9	10.9	11.0
990.00	11.0	11.0	11.0	11.1	11.1

Storm Data Detailed Report: Type C - Somerset

100-Year + 50%

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,020.00	11.1	11.1	11.2	11.2	11.2
1,050.00	11.2	11.3	11.3	11.3	11.3
1,080.00	11.3	11.4	11.4	11.4	11.4
1,110.00	11.4	11.5	11.5	11.5	11.5
1,140.00	11.5	11.6	11.6	11.6	11.6
1,170.00	11.6	11.6	11.7	11.7	11.7
1,200.00	11.7	11.7	11.7	11.8	11.8
1,230.00	11.8	11.8	11.8	11.8	11.9
1,260.00	11.9	11.9	11.9	11.9	11.9
1,290.00	12.0	12.0	12.0	12.0	12.0
1,320.00	12.0	12.1	12.1	12.1	12.1
1,350.00	12.1	12.1	12.1	12.2	12.2
1,380.00	12.2	12.2	12.2	12.2	12.2
1,410.00	12.2	12.3	12.3	12.3	12.3
1,440.00	12.3	(N/A)	(N/A)	(N/A)	(N/A)





Stormwater Management Model Diagram

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
Area 1 Pervious (Pre-Developed)	WQDS	1	5,928.00	90.00	1.95
Area 1 Pervious (Pre-Developed)	2-Year	2	62,716.00	744.00	11.37
Area 1 Pervious (Pre-Developed)	10-Year	10	127,375.00	741.00	23.58
Area 1 Pervious (Pre-Developed)	25-Year	25	177,045.00	741.00	32.84
Area 1 Pervious (Pre-Developed)	100-Year	100	263,792.00	741.00	48.66
Area 1 Impervious (Post-Developed)	WQDS	1	15,244.00	72.00	8.58
Area 1 Impervious (Post-Developed)	2-Year	2	45,201.00	732.00	10.28
Area 1 Impervious (Post-Developed)	10-Year	10	70,196.00	732.00	15.69
Area 1 Impervious (Post-Developed)	25-Year	25	87,859.00	732.00	19.50
Area 1 Impervious (Post-Developed)	100-Year	100	117,310.00	732.00	25.83
Area 1 Pervious (Post-Developed)	WQDS	1	2,889.00	75.00	1.43
Area 1 Pervious (Post-Developed)	2-Year	2	25,658.00	732.00	6.47
Area 1 Pervious (Post-Developed)	10-Year	10	50,536.00	732.00	12.89
Area 1 Pervious (Post-Developed)	25-Year	25	69,409.00	732.00	17.63
Area 1 Pervious (Post-Developed)	100-Year	100	102,126.00	732.00	25.64
Area 2 Pervious (Post-Developed)	WQDS	1	2,341.00	84.00	0.92
Area 2 Pervious (Post-Developed)	2-Year	2	21,420.00	738.00	4.46
Area 2 Pervious (Post-Developed)	10-Year	10	42,430.00	738.00	8.95
Area 2 Pervious (Post-Developed)	25-Year	25	58,407.00	738.00	12.28
Area 2 Pervious (Post-Developed)	100-Year	100	86,140.00	738.00	17.92
Area 2 Impervious (Post-Developed)	WQDS	1	789.00	75.00	0.36
Area 2 Impervious (Post-Developed)	2-Year	2	2,337.00	738.00	0.44
Area 2 Impervious (Post-Developed)	10-Year	10	3,630.00	738.00	0.67
Area 2 Impervious (Post-Developed)	25-Year	25	4,543.00	738.00	0.84

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
Area 2 Impervious (Post-Developed)	100-Year	100	6,066.00	738.00	1.11
Area 1 Impervious (Pre-Developed)	WQDS	1	451.00	81.00	0.18
Area 1 Impervious (Pre-Developed)	2-Year	2	1,336.00	741.00	0.22
Area 1 Impervious (Pre-Developed)	10-Year	10	2,075.00	741.00	0.34
Area 1 Impervious (Pre-Developed)	25-Year	25	2,597.00	741.00	0.43
Area 1 Impervious (Pre-Developed)	100-Year	100	3,467.00	741.00	0.56

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
POA (Pre-Developed)	WQDS	1	6,378.00	90.00	2.09
POA (Pre-Developed)	2-Year	2	64,052.00	744.00	11.59
POA (Pre-Developed)	10-Year	10	129,450.00	741.00	23.92
POA (Pre-Developed)	25-Year	25	179,642.00	741.00	33.26
POA (Pre-Developed)	100-Year	100	267,259.00	741.00	49.22
POA (Post-Developed)	WQDS	1	20,050.00	81.00	1.35
POA (Post-Developed)	2-Year	2	72,545.00	738.00	5.09
POA (Post-Developed)	10-Year	10	139,748.00	738.00	9.88
POA (Post-Developed)	25-Year	25	192,826.00	741.00	14.54
POA (Post-Developed)	100-Year	100	283,825.00	744.00	30.62

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft ³)
Pond Constructed Wetland (IN)	WQDS	1	18,133.00	72.00	9.80	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	WQDS	1	16,920.00	138.00	0.15	75.97	45,184.00
Pond Constructed Wetland (IN)	2-Year	2	70,859.00	732.00	16.75	(N/A)	(N/A)

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft ³)
Pond Constructed Wetland (OUT)	2-Year	2	48,788.00	1,446.00	0.26	77.75	86,260.00
Pond Constructed Wetland (IN)	10-Year	10	120,732.00	732.00	28.58	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	10-Year	10	93,688.00	819.00	2.29	78.57	107,357.00
Pond Constructed Wetland (IN)	25-Year	25	157,268.00	732.00	37.13	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	25-Year	25	129,876.00	777.00	5.86	79.09	121,393.00
Pond Constructed Wetland (IN)	100-Year	100	219,436.00	732.00	51.47	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	100-Year	100	191,619.00	756.00	16.37	79.84	142,778.00

Appendix B

Curve Numbers and Time of Concentration

Worksheet 2: Runoff Curve Number

Project 1805M By KH Date 10/10/2022
 Location Montgomery Township Checked _____ Date _____
 Select One: Pre-Developed
 Area Name Area 1 (Pervious)

1. Runoff Curve Number

Names	Cover Description	CN			Area	Product
Soil Name and Hydrologic Group (appendix A)	(cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	Tab 2-2	Fig 2-3	Fig 2-4	acres miles %	CN x area
D	Woods - Good Condition	77			11.63	895.51
D	Open Space - Good Condition	80			1.57	125.6
Totals					13.20	1021.11

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1021.1}{13.2}$$

Use CN = 77.4

Worksheet 2: Runoff Curve Number

Project 1805M By KH Date 10/10/2022
 Location Montgomery Township Checked _____ Date _____
 Select One: Pre-Developed
 Area Name Area 1 (Impervious)

1. Runoff Curve Number

Names	Cover Description	CN			Area	Product
Soil Name and Hydrologic Group (appendix A)	(cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	Tab 2-2	Fig 2-3	Fig 2-4	acres miles %	CN x area
	Impervious	98			0.12	11.76
Totals					0.12	11.76

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{11.76}{0.12}$$

Use CN = **98.0**

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

Project 1805M By KH Date 10/10/2022
 Location Montgomery Township Checked _____ Date _____
 Select One: Pre-Developed
 Select One: Time of Concentration
 Area Name Area 1

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	
	Woods	
	0.4	
ft	100	
in	3.34	
ft/ft	0.028	
hr	0.31	0.31

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	804	
ft/ft	0.025	
ft/s	2.5	
hr	0.09	0.09

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	886	
hr	0.12	0.12
		0.52
min		31.12

Worksheet 2: Runoff Curve Number

Project 1805M By KH Date 10/10/2022
 Location Montgomery Township Checked _____ Date _____
 Select One: Post-Developed
 Area Name Area 1 (Pervious)

1. Runoff Curve Number

Names	Cover Description	CN			Area	Product
Soil Name and Hydrologic Group (appendix A)	(cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	Tab 2-2	Fig 2-3	Fig 2-4	acres miles %	CN x area
D	Open Space - Good Condition	80			4.09	327.20
D	Woods - Good Condition	77			0.8	61.60
Totals					4.89	388.8

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{388.8}{4.89}$$

Use CN = **79.5**

Worksheet 2: Runoff Curve Number

Project 1805M By KH Date 10/10/2022
 Location Montgomery Township Checked _____ Date _____
 Select One: Post-Developed
 Area Name Area 1 (Impervious)

1. Runoff Curve Number

Names	Cover Description	CN			Area	Product
Soil Name and Hydrologic Group (appendix A)	(cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	Tab 2-2	Fig 2-3	Fig 2-4	acres miles %	CN x area
	Impervious	98			4.06	397.88
Totals					4.06	397.88

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{397.88}{4.06}$$

Use CN = 98.0

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

Project 1805M By KH Date 10/10/2022
 Location Montgomery Township Checked _____ Date _____
 Select One: Post-Developed
 Select One: Time of Concentration
 Area Name Area 1

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	76	
in	3.34	
ft/ft	0.033	
hr	0.15	0.15

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	C-D
	Unpaved	Paved
ft	80	309
ft/ft	0.026	0.012
ft/s	2.6	2.2
hr	0.01	0.04
		0.05

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^2		
ft		
ft		
ft/ft		
ft/s	2	Assumed
ft	485	
hr	0.07	0.07
		0.27
min		16.07

Worksheet 2: Runoff Curve Number

Project 1805M By KH Date 10/10/2022
 Location Montgomery Township Checked _____ Date _____
 Select One: Post-Developed
 Area Name Area 2 (Pervious)

1. Runoff Curve Number

Names	Cover Description	CN			Area	Product
Soil Name and Hydrologic Group (appendix A)	(cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	Tab 2-2	Fig 2-3	Fig 2-4	acres miles %	CN x area
D	Open Space - Good Condition	80			2.97	237.60
D	Woods - Good Condition	77			1.19	91.63
Totals					4.16	329.23

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{329.23}{4.16}$$

Use CN = 79.1

Worksheet 2: Runoff Curve Number

Project 1805M By KH Date 10/10/2022
 Location Montgomery Township Checked _____ Date _____
 Select One: Post-Developed
 Area Name Area 2 (Impervious)

1. Runoff Curve Number

Names	Cover Description	CN			Area	Product
Soil Name and Hydrologic Group (appendix A)	(cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected area ratio)	Tab 2-2	Fig 2-3	Fig 2-4	acres miles %	CN x area
	Impervious	98			0.21	20.58
Totals					0.21	20.58

CN (weighted) = total product/ total area=

$$\frac{20.58}{0.21}$$

Use CN = 98.0

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

Project 1805M By KH Date 10/10/2022
 Location Montgomery Township Checked _____ Date _____
 Select One: Post-Developed
 Select One: Time of Concentration
 Area Name Area 2

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	53	
in	3.34	
ft/ft	0.016	
hr	0.15	0.15

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	1058	
ft/ft	0.02	
ft/s	2.3	
hr	0.13	0.13

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	886	
hr	0.12	0.12
min		0.40
		24.24

Sheet Flow Calculations

McCuen-Spiess Limitation

$$L = \frac{100\sqrt{S}}{n}$$

Area 1 (Post-Developed): $L = 100 * (0.033)^{1/2} / 0.24 = 76 \text{ ft}$

Area 2 (Post-Developed): $L = 100 * (0.016)^{1/2} / 0.24 = 53 \text{ ft}$

Appendix C

Pond Report

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

Return Event: 100 years
 Storm Event: 100-Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	70.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	81.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 2.5"	Forward	30" RCP	75.00	81.50
Rectangular Weir	Weir - 18"	Forward	30" RCP	78.00	81.50
Rectangular Weir	Weir - 24"	Forward	30" RCP	79.00	81.50
Culvert-Circular	30" RCP	Forward	TW	75.00	81.50
Rectangular Weir	Emergency Spillway	Forward	TW	80.00	81.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

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

Return Event: 100 years
Storm Event: 100-Year

Structure ID: Orifice - 2.5"	
Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	75.00 ft
Orifice Diameter	2.50 in
Orifice Coefficient	0.6
Structure ID: Weir - 18"	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	78.00 ft
Weir Length	1.50 ft
Weir Coefficient	3.00 (ft ^{0.5})/s

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

Return Event: 100 years
Storm Event: 100-Year

Structure ID: 30" RCP	
Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	30.00 in
Length	205.00 ft
Length (Computed Barrel)	205.00 ft
Slope (Computed)	0.004 ft/ft
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	
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...

T1 Elevation	77.73 ft	T1 Flow	27.16 ft ³ /s
T2 Elevation	77.99 ft	T2 Flow	31.05 ft ³ /s

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

Return Event: 100 years
Storm Event: 100-Year

Structure ID: Emergency Spillway	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	80.00 ft
Weir Length	75.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
Structure ID: Weir - 24"	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	79.00 ft
Weir Length	2.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/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 ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

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

Return Event: 100 years
Storm Event: 100-Year

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	75.00 ft
Volume (Initial)	27,672.00 ft ³
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	3.00 min

Elevation (ft)	Outflow (ft ³ /s)	Storage (ft ³)	Area (ft ²)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
70.00	0.00	0.00	1,099.00	0.00	0.00	0.00
70.50	0.00	621.46	1,392.64	0.00	0.00	6.91
71.00	0.00	1,398.42	1,721.00	0.00	0.00	15.54
71.50	0.00	2,347.93	2,082.76	0.00	0.00	26.09
72.00	0.00	3,486.93	2,479.00	0.00	0.00	38.74
72.50	0.00	4,832.25	2,908.00	0.00	0.00	53.69
73.00	0.00	7,070.04	4,777.00	0.00	0.00	78.56
73.50	0.00	9,602.64	5,359.00	0.00	0.00	106.70
74.00	0.00	14,273.19	9,757.00	0.00	0.00	158.59
74.50	0.00	19,338.28	10,508.00	0.00	0.00	214.87
75.00	0.00	27,671.68	17,177.00	0.00	0.00	307.46
75.50	0.10	36,481.33	18,065.30	0.00	0.10	405.45
76.00	0.15	45,740.72	18,976.00	0.00	0.15	508.38
76.50	0.19	56,691.05	22,409.84	0.00	0.19	630.09
77.00	0.22	68,141.62	23,396.00	0.00	0.22	757.35
77.50	0.25	80,084.75	24,379.87	0.00	0.25	890.08
78.00	0.27	92,524.87	25,384.00	0.00	0.27	1,028.33
78.50	1.87	105,469.19	26,396.60	0.00	1.87	1,173.75
79.00	4.81	118,924.77	27,429.00	0.00	4.81	1,326.19
79.50	10.66	132,898.66	28,469.81	0.00	10.66	1,487.31
80.00	19.00	147,397.81	29,530.00	0.00	19.00	1,656.75
80.50	108.57	162,429.39	30,599.49	0.00	108.57	1,913.34
81.00	262.24	178,000.47	31,688.00	0.00	262.24	2,240.02
81.50	455.93	194,118.93	32,789.00	0.00	455.93	2,612.81

Appendix D

Pre-Development Hydrographs

Subsection: Unit Hydrograph Summary
Label: Area 1 Impervious (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	3.3 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	5,227.20 ft ²
Computational Time Increment	4.15 min
Time to Peak (Computed)	742.73 min
Flow (Peak, Computed)	0.22 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	741.00 min
Flow (Peak Interpolated Output)	0.22 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.0
Area (User Defined)	5,227.20 ft ²
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	1,336.04 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,336.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	31.12 min
Computational Time Increment	4.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.26 ft ³ /s

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

Return Event: 2 years
Storm Event: 2-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	20.75 min
Unit receding limb, Tr	82.99 min
Total unit time, Tb	103.73 min

Subsection: Unit Hydrograph (Hydrograph Table)
Label: Area 1 Impervious (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	3.3 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	5,227.20 ft ²

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
132.00	0.00	0.00	0.00	0.00	0.00
147.00	0.00	0.00	0.00	0.00	0.00
162.00	0.00	0.00	0.00	0.00	0.00
177.00	0.00	0.00	0.00	0.00	0.00
192.00	0.00	0.00	0.00	0.00	0.00
207.00	0.00	0.00	0.00	0.00	0.00
222.00	0.00	0.00	0.00	0.00	0.00
237.00	0.00	0.00	0.00	0.00	0.00
252.00	0.00	0.00	0.00	0.00	0.00
267.00	0.00	0.00	0.00	0.00	0.00
282.00	0.00	0.00	0.00	0.00	0.00
297.00	0.00	0.00	0.00	0.00	0.00
312.00	0.00	0.00	0.00	0.00	0.00
327.00	0.00	0.00	0.00	0.00	0.00
342.00	0.00	0.00	0.00	0.00	0.00
357.00	0.00	0.00	0.00	0.00	0.00
372.00	0.00	0.00	0.00	0.00	0.01
387.00	0.01	0.01	0.01	0.01	0.01
402.00	0.01	0.01	0.01	0.01	0.01
417.00	0.01	0.01	0.01	0.01	0.01
432.00	0.01	0.01	0.01	0.01	0.01
447.00	0.01	0.01	0.01	0.01	0.01
462.00	0.01	0.01	0.01	0.01	0.01
477.00	0.01	0.01	0.01	0.01	0.01
492.00	0.01	0.01	0.01	0.01	0.01
507.00	0.01	0.01	0.01	0.01	0.01
522.00	0.01	0.01	0.01	0.01	0.01
537.00	0.01	0.01	0.01	0.01	0.01
552.00	0.01	0.01	0.01	0.01	0.01
567.00	0.01	0.01	0.01	0.01	0.01
582.00	0.01	0.01	0.01	0.01	0.01
597.00	0.01	0.01	0.01	0.01	0.01
612.00	0.01	0.02	0.02	0.02	0.02
627.00	0.02	0.02	0.02	0.02	0.02

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

Return Event: 2 years
 Storm Event: 2-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
642.00	0.02	0.02	0.02	0.02	0.02
657.00	0.02	0.02	0.02	0.02	0.03
672.00	0.03	0.03	0.03	0.03	0.03
687.00	0.04	0.04	0.04	0.04	0.04
702.00	0.05	0.05	0.06	0.06	0.07
717.00	0.08	0.09	0.11	0.13	0.16
732.00	0.18	0.21	0.22	0.22	0.22
747.00	0.21	0.19	0.17	0.16	0.14
762.00	0.13	0.11	0.10	0.09	0.08
777.00	0.07	0.07	0.06	0.06	0.05
792.00	0.05	0.05	0.04	0.04	0.04
807.00	0.04	0.03	0.03	0.03	0.03
822.00	0.03	0.03	0.02	0.02	0.02
837.00	0.02	0.02	0.02	0.02	0.02
852.00	0.02	0.02	0.02	0.02	0.02
867.00	0.02	0.02	0.02	0.02	0.02
882.00	0.02	0.02	0.02	0.01	0.01
897.00	0.01	0.01	0.01	0.01	0.01
912.00	0.01	0.01	0.01	0.01	0.01
927.00	0.01	0.01	0.01	0.01	0.01
942.00	0.01	0.01	0.01	0.01	0.01
957.00	0.01	0.01	0.01	0.01	0.01
972.00	0.01	0.01	0.01	0.01	0.01
987.00	0.01	0.01	0.01	0.01	0.01
1,002.00	0.01	0.01	0.01	0.01	0.01
1,017.00	0.01	0.01	0.01	0.01	0.01
1,032.00	0.01	0.01	0.01	0.01	0.01
1,047.00	0.01	0.01	0.01	0.01	0.01
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

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

Return Event: 2 years
 Storm Event: 2-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
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	0.00	0.00	0.00
1,332.00	0.00	0.00	0.00	0.00	0.00
1,347.00	0.00	0.00	0.00	0.00	0.00
1,362.00	0.00	0.00	0.00	0.00	0.00
1,377.00	0.00	0.00	0.00	0.00	0.00
1,392.00	0.00	0.00	0.00	0.00	0.00
1,407.00	0.00	0.00	0.00	0.00	0.00
1,422.00	0.00	0.00	0.00	0.00	0.00
1,437.00	0.00	0.00	0.00	0.00	0.00
1,452.00	0.00	0.00	0.00	0.00	0.00
1,467.00	0.00	0.00	0.00	(N/A)	(N/A)

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

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	5,227.20 ft ²
Computational Time Increment	4.15 min
Time to Peak (Computed)	742.73 min
Flow (Peak, Computed)	0.34 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	741.00 min
Flow (Peak Interpolated Output)	0.34 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.0
Area (User Defined)	5,227.20 ft ²
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	2,074.84 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	2,075.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	31.12 min
Computational Time Increment	4.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.26 ft ³ /s

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

Return Event: 10 years
Storm Event: 10-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	20.75 min
Unit receding limb, Tr	82.99 min
Total unit time, Tb	103.73 min

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

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	5,227.20 ft ²

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
87.00	0.00	0.00	0.00	0.00	0.00
102.00	0.00	0.00	0.00	0.00	0.00
117.00	0.00	0.00	0.00	0.00	0.00
132.00	0.00	0.00	0.00	0.00	0.00
147.00	0.00	0.00	0.00	0.00	0.00
162.00	0.00	0.00	0.00	0.00	0.00
177.00	0.00	0.00	0.00	0.00	0.00
192.00	0.00	0.00	0.00	0.00	0.01
207.00	0.01	0.01	0.01	0.01	0.01
222.00	0.01	0.01	0.01	0.01	0.01
237.00	0.01	0.01	0.01	0.01	0.01
252.00	0.01	0.01	0.01	0.01	0.01
267.00	0.01	0.01	0.01	0.01	0.01
282.00	0.01	0.01	0.01	0.01	0.01
297.00	0.01	0.01	0.01	0.01	0.01
312.00	0.01	0.01	0.01	0.01	0.01
327.00	0.01	0.01	0.01	0.01	0.01
342.00	0.01	0.01	0.01	0.01	0.01
357.00	0.01	0.01	0.01	0.01	0.01
372.00	0.01	0.01	0.01	0.01	0.01
387.00	0.01	0.01	0.01	0.01	0.01
402.00	0.01	0.01	0.01	0.01	0.01
417.00	0.01	0.01	0.01	0.01	0.01
432.00	0.01	0.01	0.01	0.01	0.01
447.00	0.01	0.01	0.01	0.01	0.01
462.00	0.01	0.01	0.01	0.01	0.01
477.00	0.01	0.01	0.01	0.01	0.01
492.00	0.01	0.01	0.01	0.01	0.01
507.00	0.01	0.01	0.01	0.01	0.01
522.00	0.01	0.01	0.01	0.01	0.01
537.00	0.02	0.02	0.02	0.02	0.02
552.00	0.02	0.02	0.02	0.02	0.02
567.00	0.02	0.02	0.02	0.02	0.02
582.00	0.02	0.02	0.02	0.02	0.02

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

Return Event: 10 years
 Storm Event: 10-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
597.00	0.02	0.02	0.02	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	0.03
642.00	0.03	0.03	0.03	0.03	0.03
657.00	0.03	0.04	0.04	0.04	0.04
672.00	0.04	0.04	0.05	0.05	0.05
687.00	0.05	0.06	0.06	0.06	0.07
702.00	0.07	0.08	0.09	0.10	0.11
717.00	0.12	0.14	0.17	0.20	0.24
732.00	0.28	0.32	0.34	0.34	0.34
747.00	0.32	0.29	0.27	0.24	0.21
762.00	0.19	0.17	0.15	0.14	0.12
777.00	0.11	0.10	0.09	0.09	0.08
792.00	0.07	0.07	0.07	0.06	0.06
807.00	0.05	0.05	0.05	0.05	0.04
822.00	0.04	0.04	0.04	0.04	0.03
837.00	0.03	0.03	0.03	0.03	0.03
852.00	0.03	0.03	0.03	0.03	0.03
867.00	0.03	0.03	0.03	0.02	0.02
882.00	0.02	0.02	0.02	0.02	0.02
897.00	0.02	0.02	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	0.01	0.01	0.01
987.00	0.01	0.01	0.01	0.01	0.01
1,002.00	0.01	0.01	0.01	0.01	0.01
1,017.00	0.01	0.01	0.01	0.01	0.01
1,032.00	0.01	0.01	0.01	0.01	0.01
1,047.00	0.01	0.01	0.01	0.01	0.01
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

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

Return Event: 10 years
 Storm Event: 10-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
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	0.00	0.00	0.00
1,467.00	0.00	0.00	0.00	0.00	0.00

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

Return Event: 100 years
Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	5,227.20 ft ²
Computational Time Increment	4.15 min
Time to Peak (Computed)	738.58 min
Flow (Peak, Computed)	0.56 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	741.00 min
Flow (Peak Interpolated Output)	0.56 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.0
Area (User Defined)	5,227.20 ft ²
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	3,467.41 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	3,467.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	31.12 min
Computational Time Increment	4.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.26 ft ³ /s

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

Return Event: 100 years
Storm Event: 100-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	20.75 min
Unit receding limb, Tr	82.99 min
Total unit time, Tb	103.73 min

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

Return Event: 100 years
Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	5,227.20 ft ²

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
54.00	0.00	0.00	0.00	0.00	0.00
69.00	0.00	0.00	0.00	0.00	0.00
84.00	0.00	0.00	0.00	0.00	0.00
99.00	0.01	0.01	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	0.01	0.01	0.01	0.01
159.00	0.01	0.01	0.01	0.01	0.01
174.00	0.01	0.01	0.01	0.01	0.01
189.00	0.01	0.01	0.01	0.01	0.01
204.00	0.01	0.01	0.01	0.01	0.01
219.00	0.01	0.01	0.01	0.01	0.01
234.00	0.01	0.01	0.01	0.01	0.01
249.00	0.01	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	0.01
324.00	0.01	0.01	0.01	0.01	0.01
339.00	0.01	0.01	0.01	0.01	0.01
354.00	0.01	0.01	0.01	0.01	0.01
369.00	0.01	0.01	0.01	0.02	0.02
384.00	0.02	0.02	0.02	0.02	0.02
399.00	0.02	0.02	0.02	0.02	0.02
414.00	0.02	0.02	0.02	0.02	0.02
429.00	0.02	0.02	0.02	0.02	0.02
444.00	0.02	0.02	0.02	0.02	0.02
459.00	0.02	0.02	0.02	0.02	0.02
474.00	0.02	0.02	0.02	0.02	0.02
489.00	0.02	0.02	0.02	0.02	0.02
504.00	0.02	0.02	0.02	0.02	0.02
519.00	0.02	0.02	0.02	0.02	0.03
534.00	0.03	0.03	0.03	0.03	0.03
549.00	0.03	0.03	0.03	0.03	0.03

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

Return Event: 100 years
 Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
564.00	0.03	0.03	0.03	0.03	0.03
579.00	0.03	0.03	0.03	0.03	0.03
594.00	0.04	0.04	0.04	0.04	0.04
609.00	0.04	0.04	0.04	0.04	0.04
624.00	0.04	0.04	0.04	0.04	0.05
639.00	0.05	0.05	0.05	0.05	0.05
654.00	0.05	0.06	0.06	0.06	0.06
669.00	0.07	0.07	0.07	0.08	0.08
684.00	0.09	0.09	0.10	0.10	0.11
699.00	0.11	0.12	0.13	0.15	0.16
714.00	0.18	0.21	0.24	0.28	0.34
729.00	0.40	0.47	0.52	0.56	0.56
744.00	0.55	0.53	0.48	0.44	0.39
759.00	0.35	0.31	0.28	0.25	0.23
774.00	0.20	0.19	0.17	0.16	0.14
789.00	0.13	0.12	0.11	0.11	0.10
804.00	0.09	0.09	0.08	0.08	0.08
819.00	0.07	0.07	0.06	0.06	0.06
834.00	0.06	0.05	0.05	0.05	0.05
849.00	0.05	0.05	0.05	0.05	0.04
864.00	0.04	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	0.03	0.03	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
969.00	0.03	0.02	0.02	0.02	0.02
984.00	0.02	0.02	0.02	0.02	0.02
999.00	0.02	0.02	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	0.01	0.01	0.01	0.01
1,179.00	0.01	0.01	0.01	0.01	0.01
1,194.00	0.01	0.01	0.01	0.01	0.01

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

Return Event: 100 years
 Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,209.00	0.01	0.01	0.01	0.01	0.01
1,224.00	0.01	0.01	0.01	0.01	0.01
1,239.00	0.01	0.01	0.01	0.01	0.01
1,254.00	0.01	0.01	0.01	0.01	0.01
1,269.00	0.01	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	0.01	0.01
1,464.00	0.00	0.00	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 1 Pervious (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	3.3 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	574,992.00 ft ²
Computational Time Increment	4.15 min
Time to Peak (Computed)	742.73 min
Flow (Peak, Computed)	11.47 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	744.00 min
Flow (Peak Interpolated Output)	11.37 ft ³ /s
Drainage Area	
SCS CN (Composite)	77.4
Area (User Defined)	574,992.00 ft ²
Maximum Retention (Pervious)	2.9 in
Maximum Retention (Pervious, 20 percent)	0.6 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.3 in
Runoff Volume (Pervious)	62,716.54 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	62,716.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	31.12 min
Computational Time Increment	4.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	28.84 ft ³ /s

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

Return Event: 2 years
Storm Event: 2-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	20.75 min
Unit receding limb, Tr	82.99 min
Total unit time, Tb	103.73 min

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 1 Pervious (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	3.3 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	574,992.00 ft ²

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
600.00	0.00	0.00	0.00	0.01	0.01
615.00	0.01	0.02	0.03	0.03	0.04
630.00	0.05	0.06	0.07	0.08	0.10
645.00	0.11	0.13	0.14	0.16	0.19
660.00	0.21	0.24	0.26	0.30	0.33
675.00	0.37	0.42	0.47	0.52	0.58
690.00	0.65	0.73	0.82	0.94	1.07
705.00	1.24	1.46	1.71	2.03	2.47
720.00	3.11	3.97	5.13	6.63	8.19
735.00	9.68	10.76	11.26	11.37	11.12
750.00	10.48	9.70	8.87	8.08	7.38
765.00	6.72	6.12	5.59	5.12	4.70
780.00	4.33	4.03	3.75	3.51	3.29
795.00	3.09	2.91	2.74	2.60	2.46
810.00	2.34	2.23	2.12	2.02	1.92
825.00	1.83	1.76	1.69	1.63	1.58
840.00	1.53	1.49	1.45	1.42	1.39
855.00	1.37	1.34	1.32	1.29	1.27
870.00	1.25	1.22	1.20	1.18	1.16
885.00	1.14	1.12	1.10	1.08	1.05
900.00	1.03	1.01	0.99	0.97	0.95
915.00	0.93	0.91	0.90	0.88	0.87
930.00	0.86	0.85	0.84	0.83	0.82
945.00	0.81	0.81	0.80	0.79	0.79
960.00	0.78	0.78	0.77	0.76	0.76
975.00	0.75	0.75	0.74	0.74	0.73
990.00	0.72	0.72	0.71	0.71	0.70
1,005.00	0.70	0.69	0.69	0.68	0.67
1,020.00	0.67	0.66	0.66	0.65	0.65
1,035.00	0.64	0.63	0.63	0.62	0.62
1,050.00	0.61	0.61	0.60	0.59	0.59
1,065.00	0.58	0.58	0.57	0.57	0.56
1,080.00	0.55	0.55	0.54	0.54	0.53
1,095.00	0.52	0.52	0.52	0.51	0.51

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

Return Event: 2 years
 Storm Event: 2-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,110.00	0.50	0.50	0.50	0.50	0.49
1,125.00	0.49	0.49	0.49	0.49	0.49
1,140.00	0.48	0.48	0.48	0.48	0.48
1,155.00	0.48	0.48	0.47	0.47	0.47
1,170.00	0.47	0.47	0.47	0.47	0.46
1,185.00	0.46	0.46	0.46	0.46	0.46
1,200.00	0.46	0.46	0.45	0.45	0.45
1,215.00	0.45	0.45	0.45	0.45	0.44
1,230.00	0.44	0.44	0.44	0.44	0.44
1,245.00	0.44	0.43	0.43	0.43	0.43
1,260.00	0.43	0.43	0.43	0.42	0.42
1,275.00	0.42	0.42	0.42	0.42	0.42
1,290.00	0.41	0.41	0.41	0.41	0.41
1,305.00	0.41	0.41	0.40	0.40	0.40
1,320.00	0.40	0.40	0.40	0.40	0.39
1,335.00	0.39	0.39	0.39	0.39	0.39
1,350.00	0.38	0.38	0.38	0.38	0.38
1,365.00	0.38	0.38	0.37	0.37	0.37
1,380.00	0.37	0.37	0.37	0.37	0.36
1,395.00	0.36	0.36	0.36	0.36	0.36
1,410.00	0.35	0.35	0.35	0.35	0.35
1,425.00	0.35	0.35	0.34	0.34	0.34
1,440.00	0.34	0.34	0.33	0.32	0.30
1,455.00	0.27	0.23	0.20	0.16	0.13
1,470.00	0.10	0.08	0.06	0.05	0.04
1,485.00	0.03	0.02	0.02	0.01	0.01
1,500.00	0.01	0.01	0.01	0.00	0.00
1,515.00	0.00	0.00	0.00	0.00	(N/A)

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

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	574,992.00 ft ²
Computational Time Increment	4.15 min
Time to Peak (Computed)	742.73 min
Flow (Peak, Computed)	23.85 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	741.00 min
Flow (Peak Interpolated Output)	23.58 ft ³ /s
Drainage Area	
SCS CN (Composite)	77.4
Area (User Defined)	574,992.00 ft ²
Maximum Retention (Pervious)	2.9 in
Maximum Retention (Pervious, 20 percent)	0.6 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.7 in
Runoff Volume (Pervious)	127,376.19 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	127,375.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	31.12 min
Computational Time Increment	4.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	28.84 ft ³ /s

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

Return Event: 10 years
Storm Event: 10-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	20.75 min
Unit receding limb, Tr	82.99 min
Total unit time, Tb	103.73 min

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

Return Event: 10 years
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	574,992.00 ft ²

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
483.00	0.00	0.00	0.00	0.01	0.01
498.00	0.01	0.02	0.02	0.03	0.03
513.00	0.04	0.05	0.05	0.06	0.07
528.00	0.07	0.08	0.09	0.10	0.11
543.00	0.11	0.12	0.13	0.14	0.15
558.00	0.16	0.17	0.18	0.20	0.21
573.00	0.22	0.24	0.25	0.27	0.29
588.00	0.30	0.32	0.34	0.36	0.38
603.00	0.40	0.42	0.44	0.46	0.49
618.00	0.51	0.53	0.56	0.59	0.61
633.00	0.64	0.67	0.70	0.74	0.78
648.00	0.83	0.88	0.93	1.00	1.06
663.00	1.14	1.22	1.30	1.40	1.51
678.00	1.62	1.75	1.89	2.05	2.21
693.00	2.39	2.62	2.89	3.22	3.61
708.00	4.11	4.70	5.40	6.38	7.74
723.00	9.55	11.93	14.95	18.00	20.86
738.00	22.82	23.58	23.54	22.79	21.28
753.00	19.53	17.70	16.01	14.52	13.15
768.00	11.90	10.81	9.85	9.01	8.26
783.00	7.64	7.09	6.60	6.17	5.78
798.00	5.42	5.10	4.82	4.56	4.32
813.00	4.10	3.90	3.71	3.52	3.36
828.00	3.22	3.09	2.97	2.88	2.79
843.00	2.72	2.65	2.59	2.53	2.48
858.00	2.43	2.39	2.34	2.30	2.26
873.00	2.22	2.18	2.14	2.10	2.06
888.00	2.02	1.98	1.94	1.90	1.86
903.00	1.82	1.78	1.75	1.71	1.67
918.00	1.64	1.61	1.58	1.56	1.54
933.00	1.52	1.50	1.48	1.47	1.46
948.00	1.44	1.43	1.42	1.41	1.40
963.00	1.39	1.38	1.37	1.35	1.34
978.00	1.33	1.32	1.31	1.30	1.29

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

Return Event: 10 years
 Storm Event: 10-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
993.00	1.28	1.27	1.26	1.25	1.24
1,008.00	1.23	1.22	1.21	1.20	1.19
1,023.00	1.18	1.17	1.16	1.15	1.14
1,038.00	1.13	1.12	1.11	1.10	1.09
1,053.00	1.07	1.06	1.05	1.04	1.03
1,068.00	1.02	1.01	1.00	0.99	0.98
1,083.00	0.97	0.96	0.95	0.94	0.93
1,098.00	0.92	0.91	0.90	0.90	0.89
1,113.00	0.89	0.88	0.88	0.87	0.87
1,128.00	0.87	0.86	0.86	0.86	0.86
1,143.00	0.85	0.85	0.85	0.84	0.84
1,158.00	0.84	0.84	0.83	0.83	0.83
1,173.00	0.83	0.82	0.82	0.82	0.82
1,188.00	0.81	0.81	0.81	0.81	0.80
1,203.00	0.80	0.80	0.80	0.79	0.79
1,218.00	0.79	0.79	0.78	0.78	0.78
1,233.00	0.78	0.77	0.77	0.77	0.77
1,248.00	0.76	0.76	0.76	0.75	0.75
1,263.00	0.75	0.75	0.74	0.74	0.74
1,278.00	0.74	0.73	0.73	0.73	0.73
1,293.00	0.72	0.72	0.72	0.72	0.71
1,308.00	0.71	0.71	0.70	0.70	0.70
1,323.00	0.70	0.69	0.69	0.69	0.69
1,338.00	0.68	0.68	0.68	0.68	0.67
1,353.00	0.67	0.67	0.66	0.66	0.66
1,368.00	0.66	0.65	0.65	0.65	0.65
1,383.00	0.64	0.64	0.64	0.64	0.63
1,398.00	0.63	0.63	0.62	0.62	0.62
1,413.00	0.62	0.61	0.61	0.61	0.61
1,428.00	0.60	0.60	0.60	0.60	0.60
1,443.00	0.59	0.58	0.56	0.53	0.47
1,458.00	0.41	0.34	0.28	0.22	0.17
1,473.00	0.14	0.11	0.09	0.07	0.05
1,488.00	0.04	0.03	0.03	0.02	0.02
1,503.00	0.01	0.01	0.01	0.01	0.00
1,518.00	0.00	0.00	0.00	0.00	0.00

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

Return Event: 100 years
Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	574,992.00 ft ²
Computational Time Increment	4.15 min
Time to Peak (Computed)	742.73 min
Flow (Peak, Computed)	48.97 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	741.00 min
Flow (Peak Interpolated Output)	48.66 ft ³ /s
Drainage Area	
SCS CN (Composite)	77.4
Area (User Defined)	574,992.00 ft ²
Maximum Retention (Pervious)	2.9 in
Maximum Retention (Pervious, 20 percent)	0.6 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.5 in
Runoff Volume (Pervious)	263,793.71 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	263,792.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	31.12 min
Computational Time Increment	4.15 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	28.84 ft ³ /s

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

Return Event: 100 years
Storm Event: 100-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	20.75 min
Unit receding limb, Tr	82.99 min
Total unit time, Tb	103.73 min

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

Return Event: 100 years
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	31.12 min
Area (User Defined)	574,992.00 ft ²

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
339.00	0.00	0.00	0.00	0.01	0.01
354.00	0.01	0.02	0.02	0.03	0.03
369.00	0.04	0.05	0.06	0.06	0.07
384.00	0.08	0.09	0.10	0.11	0.11
399.00	0.12	0.13	0.14	0.15	0.16
414.00	0.17	0.19	0.20	0.21	0.22
429.00	0.23	0.24	0.26	0.27	0.28
444.00	0.29	0.31	0.32	0.33	0.35
459.00	0.36	0.38	0.39	0.40	0.42
474.00	0.43	0.45	0.46	0.48	0.50
489.00	0.51	0.53	0.55	0.56	0.58
504.00	0.60	0.61	0.63	0.65	0.67
519.00	0.68	0.70	0.72	0.74	0.76
534.00	0.78	0.80	0.81	0.83	0.85
549.00	0.88	0.90	0.93	0.96	0.99
564.00	1.02	1.06	1.09	1.13	1.17
579.00	1.22	1.26	1.31	1.35	1.40
594.00	1.45	1.50	1.55	1.60	1.66
609.00	1.71	1.77	1.82	1.88	1.94
624.00	2.00	2.06	2.12	2.19	2.26
639.00	2.33	2.42	2.52	2.64	2.76
654.00	2.91	3.06	3.23	3.41	3.60
669.00	3.81	4.04	4.30	4.58	4.88
684.00	5.20	5.55	5.93	6.34	6.85
699.00	7.47	8.19	9.08	10.16	11.44
714.00	12.96	15.05	17.89	21.61	26.46
729.00	32.47	38.46	43.95	47.53	48.66
744.00	48.19	46.30	42.94	39.17	35.30
759.00	31.75	28.66	25.84	23.27	21.04
774.00	19.12	17.40	15.90	14.66	13.57
789.00	12.59	11.73	10.97	10.27	9.64
804.00	9.09	8.59	8.13	7.70	7.31
819.00	6.94	6.59	6.27	6.00	5.76
834.00	5.54	5.36	5.19	5.05	4.92

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

Return Event: 100 years
 Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
849.00	4.81	4.70	4.60	4.51	4.42
864.00	4.34	4.26	4.18	4.10	4.02
879.00	3.95	3.87	3.80	3.73	3.65
894.00	3.58	3.51	3.43	3.36	3.29
909.00	3.22	3.15	3.08	3.02	2.96
924.00	2.91	2.86	2.82	2.79	2.76
939.00	2.73	2.70	2.68	2.65	2.63
954.00	2.61	2.58	2.56	2.54	2.52
969.00	2.50	2.48	2.46	2.44	2.42
984.00	2.40	2.39	2.37	2.35	2.33
999.00	2.31	2.29	2.27	2.25	2.23
1,014.00	2.21	2.19	2.17	2.15	2.13
1,029.00	2.12	2.10	2.08	2.06	2.04
1,044.00	2.02	2.00	1.98	1.96	1.94
1,059.00	1.92	1.90	1.88	1.86	1.84
1,074.00	1.82	1.80	1.79	1.77	1.75
1,089.00	1.73	1.71	1.69	1.67	1.66
1,104.00	1.64	1.63	1.62	1.61	1.60
1,119.00	1.60	1.59	1.58	1.58	1.57
1,134.00	1.57	1.56	1.55	1.55	1.54
1,149.00	1.54	1.53	1.53	1.52	1.52
1,164.00	1.51	1.51	1.50	1.50	1.49
1,179.00	1.49	1.49	1.48	1.48	1.47
1,194.00	1.47	1.46	1.46	1.45	1.45
1,209.00	1.44	1.44	1.43	1.43	1.42
1,224.00	1.42	1.41	1.41	1.40	1.40
1,239.00	1.39	1.39	1.39	1.38	1.38
1,254.00	1.37	1.37	1.36	1.36	1.35
1,269.00	1.35	1.34	1.34	1.33	1.33
1,284.00	1.32	1.32	1.31	1.31	1.30
1,299.00	1.30	1.29	1.29	1.28	1.28
1,314.00	1.27	1.27	1.26	1.26	1.25
1,329.00	1.25	1.24	1.24	1.23	1.23
1,344.00	1.22	1.22	1.21	1.21	1.20
1,359.00	1.20	1.19	1.19	1.18	1.18
1,374.00	1.17	1.17	1.16	1.16	1.16
1,389.00	1.15	1.15	1.14	1.14	1.13
1,404.00	1.13	1.12	1.12	1.11	1.11
1,419.00	1.10	1.10	1.09	1.09	1.08
1,434.00	1.08	1.08	1.08	1.07	1.05
1,449.00	1.01	0.95	0.84	0.73	0.62
1,464.00	0.50	0.40	0.31	0.24	0.19
1,479.00	0.15	0.12	0.09	0.08	0.06

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

Return Event: 100 years
Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,494.00	0.05	0.04	0.03	0.02	0.02
1,509.00	0.01	0.01	0.01	0.01	0.00
1,524.00	0.00	0.00	0.00	0.00	(N/A)

Appendix E

Post-Development Hydrographs

Subsection: Unit Hydrograph Summary
Label: Area 1 Impervious (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	3.3 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.06 acres
Computational Time Increment	2.14 min
Time to Peak (Computed)	732.79 min
Flow (Peak, Computed)	10.32 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	732.00 min
Flow (Peak Interpolated Output)	10.28 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.0
Area (User Defined)	4.06 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	45,202.72 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	45,201.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	16.07 min
Computational Time Increment	2.14 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.18 ft ³ /s

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

Return Event: 2 years
Storm Event: 2-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	10.71 min
Unit receding limb, Tr	42.85 min
Total unit time, Tb	53.57 min

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 1 Impervious (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	3.3 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.06 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
75.00	0.00	0.00	0.00	0.00	0.01
90.00	0.01	0.01	0.01	0.02	0.02
105.00	0.02	0.02	0.03	0.03	0.03
120.00	0.03	0.04	0.04	0.04	0.04
135.00	0.04	0.05	0.05	0.05	0.05
150.00	0.06	0.06	0.06	0.06	0.06
165.00	0.07	0.07	0.07	0.07	0.07
180.00	0.08	0.08	0.08	0.08	0.08
195.00	0.08	0.09	0.09	0.09	0.09
210.00	0.09	0.09	0.10	0.10	0.10
225.00	0.10	0.10	0.10	0.11	0.11
240.00	0.11	0.11	0.11	0.11	0.12
255.00	0.12	0.12	0.12	0.12	0.12
270.00	0.12	0.13	0.13	0.13	0.13
285.00	0.13	0.13	0.13	0.14	0.14
300.00	0.14	0.14	0.14	0.14	0.14
315.00	0.14	0.15	0.15	0.15	0.15
330.00	0.15	0.15	0.15	0.15	0.16
345.00	0.16	0.16	0.16	0.16	0.16
360.00	0.16	0.16	0.17	0.17	0.17
375.00	0.17	0.17	0.18	0.18	0.18
390.00	0.19	0.19	0.19	0.19	0.20
405.00	0.20	0.20	0.20	0.21	0.21
420.00	0.21	0.22	0.22	0.22	0.22
435.00	0.23	0.23	0.23	0.24	0.24
450.00	0.24	0.25	0.25	0.25	0.25
465.00	0.26	0.26	0.26	0.27	0.27
480.00	0.27	0.27	0.28	0.28	0.28
495.00	0.29	0.29	0.29	0.29	0.30
510.00	0.30	0.30	0.31	0.31	0.31
525.00	0.32	0.32	0.32	0.32	0.33
540.00	0.33	0.33	0.34	0.34	0.35
555.00	0.36	0.37	0.38	0.39	0.40
570.00	0.41	0.42	0.43	0.44	0.45

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

Return Event: 2 years
Storm Event: 2-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
585.00	0.46	0.47	0.48	0.49	0.50
600.00	0.51	0.52	0.53	0.54	0.55
615.00	0.56	0.57	0.58	0.59	0.60
630.00	0.61	0.62	0.64	0.66	0.69
645.00	0.72	0.75	0.79	0.82	0.86
660.00	0.90	0.94	0.98	1.04	1.09
675.00	1.16	1.22	1.29	1.36	1.43
690.00	1.50	1.59	1.74	1.96	2.19
705.00	2.43	2.70	3.03	3.48	4.11
720.00	4.98	6.27	7.94	9.59	10.28
735.00	9.77	8.43	6.96	5.77	4.84
750.00	4.13	3.61	3.17	2.77	2.42
765.00	2.14	1.94	1.79	1.66	1.56
780.00	1.47	1.39	1.31	1.23	1.17
795.00	1.11	1.06	1.01	0.97	0.93
810.00	0.88	0.85	0.81	0.77	0.74
825.00	0.71	0.69	0.67	0.66	0.65
840.00	0.63	0.62	0.61	0.60	0.59
855.00	0.58	0.57	0.56	0.55	0.54
870.00	0.53	0.52	0.51	0.50	0.49
885.00	0.48	0.47	0.46	0.45	0.44
900.00	0.43	0.42	0.41	0.40	0.39
915.00	0.38	0.38	0.37	0.37	0.37
930.00	0.37	0.36	0.36	0.36	0.35
945.00	0.35	0.35	0.35	0.34	0.34
960.00	0.34	0.33	0.33	0.33	0.33
975.00	0.32	0.32	0.32	0.32	0.31
990.00	0.31	0.31	0.31	0.30	0.30
1,005.00	0.30	0.29	0.29	0.29	0.29
1,020.00	0.28	0.28	0.28	0.28	0.27
1,035.00	0.27	0.27	0.27	0.26	0.26
1,050.00	0.26	0.25	0.25	0.25	0.25
1,065.00	0.24	0.24	0.24	0.24	0.23
1,080.00	0.23	0.23	0.23	0.22	0.22
1,095.00	0.22	0.22	0.22	0.22	0.21
1,110.00	0.21	0.21	0.21	0.21	0.21
1,125.00	0.21	0.21	0.21	0.21	0.21
1,140.00	0.21	0.21	0.21	0.20	0.20
1,155.00	0.20	0.20	0.20	0.20	0.20
1,170.00	0.20	0.20	0.20	0.20	0.20
1,185.00	0.20	0.20	0.20	0.20	0.19
1,200.00	0.19	0.19	0.19	0.19	0.19
1,215.00	0.19	0.19	0.19	0.19	0.19

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

Return Event: 2 years
 Storm Event: 2-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,230.00	0.19	0.19	0.19	0.18	0.18
1,245.00	0.18	0.18	0.18	0.18	0.18
1,260.00	0.18	0.18	0.18	0.18	0.18
1,275.00	0.18	0.18	0.18	0.17	0.17
1,290.00	0.17	0.17	0.17	0.17	0.17
1,305.00	0.17	0.17	0.17	0.17	0.17
1,320.00	0.17	0.17	0.17	0.16	0.16
1,335.00	0.16	0.16	0.16	0.16	0.16
1,350.00	0.16	0.16	0.16	0.16	0.16
1,365.00	0.16	0.16	0.16	0.15	0.15
1,380.00	0.15	0.15	0.15	0.15	0.15
1,395.00	0.15	0.15	0.15	0.15	0.15
1,410.00	0.15	0.15	0.15	0.14	0.14
1,425.00	0.14	0.14	0.14	0.14	0.14
1,440.00	0.14	0.14	0.13	0.11	0.07
1,455.00	0.05	0.03	0.02	0.01	0.01
1,470.00	0.00	0.00	0.00	0.00	0.00

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

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.06 acres
Computational Time Increment	2.14 min
Time to Peak (Computed)	732.79 min
Flow (Peak, Computed)	15.74 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	732.00 min
Flow (Peak Interpolated Output)	15.69 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.0
Area (User Defined)	4.06 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	70,198.62 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	70,196.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	16.07 min
Computational Time Increment	2.14 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.18 ft ³ /s

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

Return Event: 10 years
Storm Event: 10-Year

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	10.71 min
Unit receding limb, T_r	42.85 min
Total unit time, T_b	53.57 min

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

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.06 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
51.00	0.00	0.00	0.00	0.01	0.01
66.00	0.02	0.02	0.03	0.03	0.04
81.00	0.04	0.05	0.05	0.06	0.06
96.00	0.07	0.07	0.07	0.08	0.08
111.00	0.09	0.09	0.09	0.10	0.10
126.00	0.11	0.11	0.11	0.12	0.12
141.00	0.12	0.13	0.13	0.13	0.14
156.00	0.14	0.14	0.14	0.15	0.15
171.00	0.15	0.16	0.16	0.16	0.16
186.00	0.17	0.17	0.17	0.17	0.18
201.00	0.18	0.18	0.18	0.19	0.19
216.00	0.19	0.19	0.20	0.20	0.20
231.00	0.20	0.20	0.21	0.21	0.21
246.00	0.21	0.21	0.22	0.22	0.22
261.00	0.22	0.23	0.23	0.23	0.23
276.00	0.23	0.23	0.24	0.24	0.24
291.00	0.24	0.24	0.25	0.25	0.25
306.00	0.25	0.25	0.25	0.26	0.26
321.00	0.26	0.26	0.26	0.26	0.27
336.00	0.27	0.27	0.27	0.27	0.27
351.00	0.28	0.28	0.28	0.28	0.28
366.00	0.28	0.29	0.29	0.29	0.30
381.00	0.30	0.31	0.31	0.31	0.32
396.00	0.32	0.33	0.33	0.33	0.34
411.00	0.34	0.35	0.35	0.36	0.36
426.00	0.36	0.37	0.37	0.38	0.38
441.00	0.39	0.39	0.39	0.40	0.40
456.00	0.41	0.41	0.42	0.42	0.42
471.00	0.43	0.43	0.44	0.44	0.45
486.00	0.45	0.46	0.46	0.46	0.47
501.00	0.47	0.48	0.48	0.49	0.49
516.00	0.49	0.50	0.50	0.51	0.51
531.00	0.52	0.52	0.52	0.53	0.53
546.00	0.54	0.55	0.56	0.57	0.59

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

Return Event: 10 years
 Storm Event: 10-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
561.00	0.60	0.62	0.63	0.65	0.66
576.00	0.68	0.69	0.71	0.72	0.74
591.00	0.75	0.77	0.78	0.80	0.81
606.00	0.83	0.84	0.86	0.88	0.89
621.00	0.91	0.92	0.94	0.95	0.97
636.00	1.00	1.03	1.07	1.12	1.17
651.00	1.23	1.28	1.34	1.40	1.46
666.00	1.53	1.61	1.70	1.80	1.90
681.00	2.00	2.11	2.21	2.32	2.46
696.00	2.69	3.02	3.38	3.74	4.15
711.00	4.66	5.35	6.30	7.63	9.60
726.00	12.14	14.65	15.69	14.91	12.85
741.00	10.60	8.78	7.38	6.29	5.49
756.00	4.82	4.21	3.68	3.26	2.95
771.00	2.72	2.53	2.37	2.23	2.11
786.00	1.99	1.88	1.78	1.68	1.61
801.00	1.53	1.47	1.41	1.34	1.28
816.00	1.23	1.17	1.12	1.08	1.05
831.00	1.02	1.00	0.98	0.96	0.95
846.00	0.93	0.91	0.90	0.88	0.87
861.00	0.85	0.84	0.82	0.81	0.79
876.00	0.78	0.76	0.74	0.73	0.71
891.00	0.70	0.68	0.67	0.65	0.64
906.00	0.62	0.61	0.60	0.58	0.58
921.00	0.57	0.56	0.56	0.55	0.55
936.00	0.55	0.54	0.54	0.53	0.53
951.00	0.52	0.52	0.52	0.51	0.51
966.00	0.50	0.50	0.50	0.49	0.49
981.00	0.48	0.48	0.48	0.47	0.47
996.00	0.46	0.46	0.46	0.45	0.45
1,011.00	0.44	0.44	0.44	0.43	0.43
1,026.00	0.42	0.42	0.42	0.41	0.41
1,041.00	0.40	0.40	0.39	0.39	0.39
1,056.00	0.38	0.38	0.37	0.37	0.37
1,071.00	0.36	0.36	0.35	0.35	0.35
1,086.00	0.34	0.34	0.33	0.33	0.33
1,101.00	0.33	0.33	0.33	0.32	0.32
1,116.00	0.32	0.32	0.32	0.32	0.32
1,131.00	0.32	0.32	0.31	0.31	0.31
1,146.00	0.31	0.31	0.31	0.31	0.31
1,161.00	0.31	0.31	0.30	0.30	0.30
1,176.00	0.30	0.30	0.30	0.30	0.30
1,191.00	0.30	0.30	0.30	0.29	0.29

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

Return Event: 10 years
 Storm Event: 10-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,206.00	0.29	0.29	0.29	0.29	0.29
1,221.00	0.29	0.29	0.28	0.28	0.28
1,236.00	0.28	0.28	0.28	0.28	0.28
1,251.00	0.28	0.28	0.27	0.27	0.27
1,266.00	0.27	0.27	0.27	0.27	0.27
1,281.00	0.27	0.27	0.26	0.26	0.26
1,296.00	0.26	0.26	0.26	0.26	0.26
1,311.00	0.26	0.26	0.25	0.25	0.25
1,326.00	0.25	0.25	0.25	0.25	0.25
1,341.00	0.25	0.25	0.24	0.24	0.24
1,356.00	0.24	0.24	0.24	0.24	0.24
1,371.00	0.24	0.23	0.23	0.23	0.23
1,386.00	0.23	0.23	0.23	0.23	0.23
1,401.00	0.23	0.22	0.22	0.22	0.22
1,416.00	0.22	0.22	0.22	0.22	0.22
1,431.00	0.22	0.21	0.22	0.22	0.22
1,446.00	0.20	0.16	0.11	0.07	0.05
1,461.00	0.03	0.02	0.01	0.01	0.00
1,476.00	0.00	0.00	0.00	(N/A)	(N/A)

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

Return Event: 100 years
Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.06 acres
Computational Time Increment	2.14 min
Time to Peak (Computed)	732.79 min
Flow (Peak, Computed)	25.92 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	732.00 min
Flow (Peak Interpolated Output)	25.83 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.0
Area (User Defined)	4.06 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	117,314.10 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	117,310.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	16.07 min
Computational Time Increment	2.14 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.18 ft ³ /s

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

Return Event: 100 years
Storm Event: 100-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	10.71 min
Unit receding limb, Tr	42.85 min
Total unit time, Tb	53.57 min

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

Return Event: 100 years
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.06 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
30.00	0.00	0.00	0.00	0.01	0.02
45.00	0.03	0.04	0.05	0.06	0.08
60.00	0.09	0.10	0.11	0.12	0.13
75.00	0.14	0.15	0.15	0.16	0.17
90.00	0.18	0.19	0.19	0.20	0.21
105.00	0.21	0.22	0.23	0.23	0.24
120.00	0.25	0.25	0.26	0.26	0.27
135.00	0.27	0.28	0.28	0.29	0.29
150.00	0.30	0.30	0.30	0.31	0.31
165.00	0.32	0.32	0.33	0.33	0.33
180.00	0.34	0.34	0.34	0.35	0.35
195.00	0.35	0.36	0.36	0.36	0.37
210.00	0.37	0.37	0.38	0.38	0.38
225.00	0.39	0.39	0.39	0.40	0.40
240.00	0.40	0.40	0.41	0.41	0.41
255.00	0.42	0.42	0.42	0.42	0.43
270.00	0.43	0.43	0.43	0.44	0.44
285.00	0.44	0.44	0.45	0.45	0.45
300.00	0.45	0.46	0.46	0.46	0.46
315.00	0.47	0.47	0.47	0.47	0.47
330.00	0.48	0.48	0.48	0.48	0.49
345.00	0.49	0.49	0.49	0.49	0.50
360.00	0.50	0.50	0.50	0.51	0.51
375.00	0.52	0.53	0.53	0.54	0.55
390.00	0.55	0.56	0.57	0.57	0.58
405.00	0.59	0.59	0.60	0.61	0.61
420.00	0.62	0.63	0.63	0.64	0.65
435.00	0.66	0.66	0.67	0.68	0.68
450.00	0.69	0.70	0.70	0.71	0.72
465.00	0.72	0.73	0.74	0.74	0.75
480.00	0.76	0.77	0.77	0.78	0.79
495.00	0.79	0.80	0.81	0.81	0.82
510.00	0.83	0.83	0.84	0.85	0.86
525.00	0.86	0.87	0.88	0.88	0.89

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

Return Event: 100 years
 Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
540.00	0.90	0.91	0.92	0.93	0.95
555.00	0.97	0.99	1.02	1.04	1.06
570.00	1.09	1.11	1.14	1.16	1.19
585.00	1.21	1.24	1.26	1.29	1.32
600.00	1.34	1.37	1.39	1.42	1.44
615.00	1.47	1.49	1.52	1.54	1.57
630.00	1.59	1.62	1.66	1.72	1.79
645.00	1.87	1.96	2.05	2.14	2.23
660.00	2.32	2.43	2.54	2.67	2.82
675.00	2.98	3.15	3.32	3.50	3.67
690.00	3.84	4.07	4.45	5.00	5.60
705.00	6.19	6.86	7.71	8.83	10.41
720.00	12.58	15.82	20.01	24.12	25.83
735.00	24.53	21.14	17.44	14.44	12.13
750.00	10.34	9.03	7.92	6.92	6.05
765.00	5.35	4.85	4.47	4.16	3.89
780.00	3.67	3.46	3.27	3.08	2.92
795.00	2.77	2.64	2.52	2.41	2.31
810.00	2.21	2.11	2.01	1.92	1.84
825.00	1.77	1.72	1.68	1.64	1.61
840.00	1.58	1.55	1.53	1.50	1.48
855.00	1.45	1.42	1.40	1.37	1.35
870.00	1.32	1.30	1.27	1.25	1.22
885.00	1.20	1.17	1.15	1.12	1.10
900.00	1.07	1.05	1.02	1.00	0.98
915.00	0.96	0.95	0.94	0.93	0.92
930.00	0.91	0.90	0.90	0.89	0.88
945.00	0.88	0.87	0.86	0.85	0.85
960.00	0.84	0.84	0.83	0.82	0.82
975.00	0.81	0.80	0.80	0.79	0.78
990.00	0.78	0.77	0.76	0.75	0.75
1,005.00	0.74	0.74	0.73	0.72	0.71
1,020.00	0.71	0.70	0.70	0.69	0.68
1,035.00	0.68	0.67	0.66	0.65	0.65
1,050.00	0.64	0.64	0.63	0.62	0.62
1,065.00	0.61	0.60	0.60	0.59	0.58
1,080.00	0.58	0.57	0.56	0.56	0.55
1,095.00	0.55	0.54	0.54	0.54	0.53
1,110.00	0.53	0.53	0.53	0.53	0.53
1,125.00	0.52	0.52	0.52	0.52	0.52
1,140.00	0.52	0.51	0.51	0.51	0.51
1,155.00	0.51	0.51	0.50	0.50	0.50
1,170.00	0.50	0.50	0.50	0.49	0.49

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

Return Event: 100 years
 Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,185.00	0.49	0.49	0.49	0.49	0.48
1,200.00	0.48	0.48	0.48	0.48	0.48
1,215.00	0.47	0.47	0.47	0.47	0.47
1,230.00	0.47	0.46	0.46	0.46	0.46
1,245.00	0.46	0.46	0.45	0.45	0.45
1,260.00	0.45	0.45	0.45	0.44	0.44
1,275.00	0.44	0.44	0.44	0.44	0.43
1,290.00	0.43	0.43	0.43	0.43	0.42
1,305.00	0.42	0.42	0.42	0.42	0.42
1,320.00	0.42	0.41	0.41	0.41	0.41
1,335.00	0.41	0.41	0.40	0.40	0.40
1,350.00	0.40	0.40	0.40	0.39	0.39
1,365.00	0.39	0.39	0.39	0.38	0.38
1,380.00	0.38	0.38	0.38	0.38	0.38
1,395.00	0.37	0.37	0.37	0.37	0.37
1,410.00	0.37	0.36	0.36	0.36	0.36
1,425.00	0.36	0.36	0.35	0.35	0.35
1,440.00	0.36	0.36	0.33	0.26	0.19
1,455.00	0.12	0.07	0.05	0.03	0.02
1,470.00	0.01	0.01	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 1 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	3.3 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.89 acres
Computational Time Increment	2.14 min
Time to Peak (Computed)	732.79 min
Flow (Peak, Computed)	6.56 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	732.00 min
Flow (Peak Interpolated Output)	6.47 ft ³ /s
Drainage Area	
SCS CN (Composite)	79.5
Area (User Defined)	4.89 acres
Maximum Retention (Pervious)	2.6 in
Maximum Retention (Pervious, 20 percent)	0.5 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.4 in
Runoff Volume (Pervious)	25,659.08 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	25,658.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	16.07 min
Computational Time Increment	2.14 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	20.69 ft ³ /s

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

Return Event: 2 years
Storm Event: 2-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	10.71 min
Unit receding limb, Tr	42.85 min
Total unit time, Tb	53.57 min

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 1 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	3.3 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.89 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
567.00	0.00	0.00	0.00	0.00	0.01
582.00	0.01	0.01	0.01	0.02	0.02
597.00	0.02	0.03	0.03	0.04	0.04
612.00	0.04	0.05	0.05	0.06	0.06
627.00	0.07	0.07	0.08	0.09	0.09
642.00	0.10	0.11	0.12	0.14	0.15
657.00	0.16	0.18	0.19	0.21	0.23
672.00	0.26	0.28	0.31	0.34	0.38
687.00	0.41	0.45	0.50	0.57	0.67
702.00	0.78	0.91	1.06	1.25	1.51
717.00	1.89	2.44	3.30	4.48	5.76
732.00	6.47	6.37	5.66	4.80	4.07
747.00	3.49	3.04	2.70	2.41	2.13
762.00	1.88	1.68	1.54	1.43	1.34
777.00	1.26	1.19	1.13	1.07	1.01
792.00	0.96	0.92	0.88	0.84	0.81
807.00	0.77	0.74	0.71	0.68	0.65
822.00	0.62	0.60	0.58	0.57	0.56
837.00	0.55	0.54	0.53	0.52	0.51
852.00	0.51	0.50	0.49	0.48	0.47
867.00	0.46	0.46	0.45	0.44	0.43
882.00	0.42	0.42	0.41	0.40	0.39
897.00	0.38	0.37	0.37	0.36	0.35
912.00	0.34	0.34	0.33	0.33	0.32
927.00	0.32	0.32	0.32	0.32	0.31
942.00	0.31	0.31	0.31	0.30	0.30
957.00	0.30	0.30	0.30	0.29	0.29
972.00	0.29	0.29	0.28	0.28	0.28
987.00	0.28	0.28	0.27	0.27	0.27
1,002.00	0.27	0.26	0.26	0.26	0.26
1,017.00	0.26	0.25	0.25	0.25	0.25
1,032.00	0.24	0.24	0.24	0.24	0.23
1,047.00	0.23	0.23	0.23	0.23	0.22
1,062.00	0.22	0.22	0.22	0.21	0.21

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

Return Event: 2 years
 Storm Event: 2-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,077.00	0.21	0.21	0.21	0.20	0.20
1,092.00	0.20	0.20	0.20	0.19	0.19
1,107.00	0.19	0.19	0.19	0.19	0.19
1,122.00	0.19	0.19	0.19	0.19	0.19
1,137.00	0.19	0.19	0.19	0.19	0.19
1,152.00	0.18	0.18	0.18	0.18	0.18
1,167.00	0.18	0.18	0.18	0.18	0.18
1,182.00	0.18	0.18	0.18	0.18	0.18
1,197.00	0.18	0.18	0.18	0.18	0.17
1,212.00	0.17	0.17	0.17	0.17	0.17
1,227.00	0.17	0.17	0.17	0.17	0.17
1,242.00	0.17	0.17	0.17	0.17	0.17
1,257.00	0.17	0.16	0.16	0.16	0.16
1,272.00	0.16	0.16	0.16	0.16	0.16
1,287.00	0.16	0.16	0.16	0.16	0.16
1,302.00	0.16	0.16	0.16	0.16	0.15
1,317.00	0.15	0.15	0.15	0.15	0.15
1,332.00	0.15	0.15	0.15	0.15	0.15
1,347.00	0.15	0.15	0.15	0.15	0.15
1,362.00	0.15	0.14	0.14	0.14	0.14
1,377.00	0.14	0.14	0.14	0.14	0.14
1,392.00	0.14	0.14	0.14	0.14	0.14
1,407.00	0.14	0.14	0.14	0.13	0.13
1,422.00	0.13	0.13	0.13	0.13	0.13
1,437.00	0.13	0.13	0.13	0.12	0.10
1,452.00	0.07	0.04	0.03	0.02	0.01
1,467.00	0.01	0.00	0.00	0.00	0.00

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

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.89 acres
Computational Time Increment	2.14 min
Time to Peak (Computed)	732.79 min
Flow (Peak, Computed)	13.02 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	732.00 min
Flow (Peak Interpolated Output)	12.89 ft ³ /s
Drainage Area	
SCS CN (Composite)	79.5
Area (User Defined)	4.89 acres
Maximum Retention (Pervious)	2.6 in
Maximum Retention (Pervious, 20 percent)	0.5 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.8 in
Runoff Volume (Pervious)	50,537.95 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	50,536.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	16.07 min
Computational Time Increment	2.14 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	20.69 ft ³ /s

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

Return Event: 10 years
Storm Event: 10-Year

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	10.71 min
Unit receding limb, T_r	42.85 min
Total unit time, T_b	53.57 min

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

Return Event: 10 years
 Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.89 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
444.00	0.00	0.00	0.00	0.00	0.01
459.00	0.01	0.01	0.01	0.02	0.02
474.00	0.02	0.02	0.03	0.03	0.03
489.00	0.03	0.04	0.04	0.04	0.04
504.00	0.05	0.05	0.05	0.06	0.06
519.00	0.06	0.07	0.07	0.07	0.08
534.00	0.08	0.08	0.09	0.09	0.10
549.00	0.10	0.10	0.11	0.12	0.12
564.00	0.13	0.14	0.14	0.15	0.16
579.00	0.17	0.17	0.18	0.19	0.20
594.00	0.21	0.22	0.23	0.24	0.25
609.00	0.26	0.27	0.28	0.29	0.30
624.00	0.31	0.32	0.33	0.35	0.36
639.00	0.38	0.41	0.43	0.46	0.49
654.00	0.53	0.56	0.60	0.63	0.68
669.00	0.73	0.79	0.85	0.92	0.99
684.00	1.07	1.14	1.22	1.33	1.49
699.00	1.72	1.97	2.24	2.55	2.95
714.00	3.50	4.27	5.36	7.05	9.32
729.00	11.69	12.89	12.52	10.99	9.22
744.00	7.75	6.60	5.70	5.03	4.46
759.00	3.92	3.46	3.07	2.80	2.59
774.00	2.42	2.28	2.15	2.04	1.93
789.00	1.82	1.73	1.64	1.57	1.50
804.00	1.44	1.38	1.32	1.26	1.21
819.00	1.15	1.10	1.06	1.03	1.01
834.00	0.99	0.97	0.96	0.94	0.92
849.00	0.91	0.89	0.88	0.86	0.85
864.00	0.83	0.82	0.81	0.79	0.78
879.00	0.76	0.75	0.73	0.72	0.70
894.00	0.69	0.67	0.66	0.64	0.63
909.00	0.61	0.60	0.59	0.58	0.57
924.00	0.57	0.56	0.56	0.56	0.55
939.00	0.55	0.54	0.54	0.53	0.53

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

Return Event: 10 years
 Storm Event: 10-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
954.00	0.53	0.52	0.52	0.52	0.51
969.00	0.51	0.50	0.50	0.50	0.49
984.00	0.49	0.48	0.48	0.48	0.47
999.00	0.47	0.46	0.46	0.46	0.45
1,014.00	0.45	0.44	0.44	0.44	0.43
1,029.00	0.43	0.42	0.42	0.42	0.41
1,044.00	0.41	0.40	0.40	0.40	0.39
1,059.00	0.39	0.38	0.38	0.38	0.37
1,074.00	0.37	0.36	0.36	0.36	0.35
1,089.00	0.35	0.34	0.34	0.34	0.34
1,104.00	0.34	0.33	0.33	0.33	0.33
1,119.00	0.33	0.33	0.33	0.33	0.33
1,134.00	0.33	0.32	0.32	0.32	0.32
1,149.00	0.32	0.32	0.32	0.32	0.32
1,164.00	0.32	0.31	0.31	0.31	0.31
1,179.00	0.31	0.31	0.31	0.31	0.31
1,194.00	0.31	0.30	0.30	0.30	0.30
1,209.00	0.30	0.30	0.30	0.30	0.30
1,224.00	0.30	0.29	0.29	0.29	0.29
1,239.00	0.29	0.29	0.29	0.29	0.29
1,254.00	0.29	0.28	0.28	0.28	0.28
1,269.00	0.28	0.28	0.28	0.28	0.28
1,284.00	0.28	0.27	0.27	0.27	0.27
1,299.00	0.27	0.27	0.27	0.27	0.27
1,314.00	0.27	0.26	0.26	0.26	0.26
1,329.00	0.26	0.26	0.26	0.26	0.26
1,344.00	0.26	0.25	0.25	0.25	0.25
1,359.00	0.25	0.25	0.25	0.25	0.25
1,374.00	0.24	0.24	0.24	0.24	0.24
1,389.00	0.24	0.24	0.24	0.24	0.24
1,404.00	0.23	0.23	0.23	0.23	0.23
1,419.00	0.23	0.23	0.23	0.23	0.23
1,434.00	0.22	0.22	0.23	0.23	0.21
1,449.00	0.17	0.12	0.07	0.05	0.03
1,464.00	0.02	0.01	0.01	0.00	0.00
1,479.00	0.00	0.00	(N/A)	(N/A)	(N/A)

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

Return Event: 100 years
Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.89 acres
Computational Time Increment	2.14 min
Time to Peak (Computed)	732.79 min
Flow (Peak, Computed)	25.83 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	732.00 min
Flow (Peak Interpolated Output)	25.64 ft ³ /s
Drainage Area	
SCS CN (Composite)	79.5
Area (User Defined)	4.89 acres
Maximum Retention (Pervious)	2.6 in
Maximum Retention (Pervious, 20 percent)	0.5 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.8 in
Runoff Volume (Pervious)	102,129.60 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	102,126.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	16.07 min
Computational Time Increment	2.14 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	20.69 ft ³ /s

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

Return Event: 100 years
Storm Event: 100-Year

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	10.71 min
Unit receding limb, T_r	42.85 min
Total unit time, T_b	53.57 min

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

Return Event: 100 years
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	16.07 min
Area (User Defined)	4.89 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
306.00	0.00	0.00	0.00	0.01	0.01
321.00	0.01	0.01	0.02	0.02	0.02
336.00	0.03	0.03	0.03	0.03	0.04
351.00	0.04	0.04	0.05	0.05	0.05
366.00	0.06	0.06	0.06	0.07	0.07
381.00	0.07	0.08	0.08	0.09	0.09
396.00	0.10	0.10	0.10	0.11	0.11
411.00	0.12	0.12	0.13	0.13	0.14
426.00	0.14	0.15	0.15	0.16	0.16
441.00	0.17	0.18	0.18	0.19	0.19
456.00	0.20	0.20	0.21	0.22	0.22
471.00	0.23	0.24	0.24	0.25	0.26
486.00	0.26	0.27	0.28	0.28	0.29
501.00	0.30	0.30	0.31	0.32	0.33
516.00	0.33	0.34	0.35	0.36	0.36
531.00	0.37	0.38	0.39	0.39	0.40
546.00	0.41	0.42	0.44	0.45	0.47
561.00	0.49	0.50	0.52	0.54	0.56
576.00	0.58	0.60	0.62	0.64	0.66
591.00	0.68	0.70	0.72	0.74	0.77
606.00	0.79	0.81	0.84	0.86	0.88
621.00	0.91	0.93	0.96	0.98	1.01
636.00	1.05	1.10	1.15	1.22	1.29
651.00	1.36	1.44	1.52	1.60	1.68
666.00	1.78	1.90	2.03	2.17	2.32
681.00	2.48	2.64	2.80	2.97	3.19
696.00	3.54	4.03	4.58	5.14	5.78
711.00	6.61	7.72	9.27	11.45	14.76
726.00	19.13	23.56	25.64	24.66	21.46
741.00	17.87	14.92	12.62	10.83	9.52
756.00	8.39	7.36	6.46	5.73	5.22
771.00	4.81	4.49	4.21	3.97	3.76
786.00	3.55	3.35	3.17	3.01	2.88
801.00	2.75	2.64	2.52	2.42	2.31

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

Return Event: 100 years
 Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.00 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
816.00	2.20	2.10	2.01	1.94	1.89
831.00	1.84	1.80	1.77	1.74	1.71
846.00	1.68	1.65	1.62	1.60	1.57
861.00	1.54	1.52	1.49	1.46	1.43
876.00	1.41	1.38	1.35	1.32	1.30
891.00	1.27	1.24	1.21	1.19	1.16
906.00	1.13	1.11	1.08	1.06	1.05
921.00	1.04	1.03	1.02	1.01	1.00
936.00	0.99	0.99	0.98	0.97	0.96
951.00	0.96	0.95	0.94	0.94	0.93
966.00	0.92	0.91	0.91	0.90	0.89
981.00	0.89	0.88	0.87	0.86	0.86
996.00	0.85	0.84	0.83	0.83	0.82
1,011.00	0.81	0.80	0.80	0.79	0.78
1,026.00	0.78	0.77	0.76	0.75	0.75
1,041.00	0.74	0.73	0.72	0.72	0.71
1,056.00	0.70	0.69	0.69	0.68	0.67
1,071.00	0.67	0.66	0.65	0.64	0.64
1,086.00	0.63	0.62	0.62	0.61	0.61
1,101.00	0.60	0.60	0.60	0.60	0.59
1,116.00	0.59	0.59	0.59	0.59	0.58
1,131.00	0.58	0.58	0.58	0.58	0.58
1,146.00	0.57	0.57	0.57	0.57	0.57
1,161.00	0.56	0.56	0.56	0.56	0.56
1,176.00	0.56	0.55	0.55	0.55	0.55
1,191.00	0.55	0.55	0.54	0.54	0.54
1,206.00	0.54	0.54	0.53	0.53	0.53
1,221.00	0.53	0.53	0.52	0.52	0.52
1,236.00	0.52	0.52	0.52	0.51	0.51
1,251.00	0.51	0.51	0.51	0.50	0.50
1,266.00	0.50	0.50	0.50	0.49	0.49
1,281.00	0.49	0.49	0.49	0.49	0.48
1,296.00	0.48	0.48	0.48	0.48	0.48
1,311.00	0.47	0.47	0.47	0.47	0.47
1,326.00	0.46	0.46	0.46	0.46	0.46
1,341.00	0.46	0.45	0.45	0.45	0.45
1,356.00	0.45	0.44	0.44	0.44	0.44
1,371.00	0.44	0.43	0.43	0.43	0.43
1,386.00	0.43	0.43	0.42	0.42	0.42
1,401.00	0.42	0.42	0.41	0.41	0.41
1,416.00	0.41	0.41	0.40	0.40	0.40
1,431.00	0.40	0.40	0.40	0.41	0.41
1,446.00	0.37	0.30	0.21	0.13	0.08

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

Return Event: 100 years
Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,461.00	0.05	0.03	0.02	0.01	0.01
1,476.00	0.00	0.00	0.00	0.00	(N/A)

Subsection: Unit Hydrograph Summary
Label: Area 2 Impervious (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	3.3 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	0.21 acres
Computational Time Increment	3.23 min
Time to Peak (Computed)	736.90 min
Flow (Peak, Computed)	0.45 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	0.44 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.0
Area (User Defined)	0.21 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	2,338.07 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	2,337.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	24.24 min
Computational Time Increment	3.23 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.59 ft ³ /s

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

Return Event: 2 years
Storm Event: 2-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	16.16 min
Unit receding limb, Tr	64.64 min
Total unit time, Tb	80.80 min

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Impervious (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	3.3 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	0.21 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
108.00	0.00	0.00	0.00	0.00	0.00
123.00	0.00	0.00	0.00	0.00	0.00
138.00	0.00	0.00	0.00	0.00	0.00
153.00	0.00	0.00	0.00	0.00	0.00
168.00	0.00	0.00	0.00	0.00	0.00
183.00	0.00	0.00	0.00	0.00	0.00
198.00	0.00	0.00	0.00	0.00	0.00
213.00	0.00	0.00	0.00	0.00	0.01
228.00	0.01	0.01	0.01	0.01	0.01
243.00	0.01	0.01	0.01	0.01	0.01
258.00	0.01	0.01	0.01	0.01	0.01
273.00	0.01	0.01	0.01	0.01	0.01
288.00	0.01	0.01	0.01	0.01	0.01
303.00	0.01	0.01	0.01	0.01	0.01
318.00	0.01	0.01	0.01	0.01	0.01
333.00	0.01	0.01	0.01	0.01	0.01
348.00	0.01	0.01	0.01	0.01	0.01
363.00	0.01	0.01	0.01	0.01	0.01
378.00	0.01	0.01	0.01	0.01	0.01
393.00	0.01	0.01	0.01	0.01	0.01
408.00	0.01	0.01	0.01	0.01	0.01
423.00	0.01	0.01	0.01	0.01	0.01
438.00	0.01	0.01	0.01	0.01	0.01
453.00	0.01	0.01	0.01	0.01	0.01
468.00	0.01	0.01	0.01	0.01	0.01
483.00	0.01	0.01	0.01	0.01	0.01
498.00	0.01	0.01	0.01	0.02	0.02
513.00	0.02	0.02	0.02	0.02	0.02
528.00	0.02	0.02	0.02	0.02	0.02
543.00	0.02	0.02	0.02	0.02	0.02
558.00	0.02	0.02	0.02	0.02	0.02
573.00	0.02	0.02	0.02	0.02	0.02
588.00	0.02	0.02	0.02	0.02	0.03
603.00	0.03	0.03	0.03	0.03	0.03

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

Return Event: 2 years
 Storm Event: 2-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
618.00	0.03	0.03	0.03	0.03	0.03
633.00	0.03	0.03	0.03	0.03	0.03
648.00	0.04	0.04	0.04	0.04	0.04
663.00	0.04	0.05	0.05	0.05	0.05
678.00	0.06	0.06	0.06	0.07	0.07
693.00	0.07	0.08	0.09	0.09	0.10
708.00	0.12	0.13	0.15	0.17	0.20
723.00	0.24	0.29	0.35	0.40	0.44
738.00	0.44	0.42	0.38	0.34	0.29
753.00	0.26	0.23	0.20	0.18	0.16
768.00	0.14	0.12	0.11	0.10	0.10
783.00	0.09	0.08	0.08	0.07	0.07
798.00	0.06	0.06	0.06	0.05	0.05
813.00	0.05	0.05	0.04	0.04	0.04
828.00	0.04	0.04	0.04	0.04	0.03
843.00	0.03	0.03	0.03	0.03	0.03
858.00	0.03	0.03	0.03	0.03	0.03
873.00	0.03	0.03	0.03	0.03	0.03
888.00	0.03	0.02	0.02	0.02	0.02
903.00	0.02	0.02	0.02	0.02	0.02
918.00	0.02	0.02	0.02	0.02	0.02
933.00	0.02	0.02	0.02	0.02	0.02
948.00	0.02	0.02	0.02	0.02	0.02
963.00	0.02	0.02	0.02	0.02	0.02
978.00	0.02	0.02	0.02	0.02	0.02
993.00	0.02	0.02	0.02	0.02	0.02
1,008.00	0.02	0.02	0.02	0.02	0.01
1,023.00	0.01	0.01	0.01	0.01	0.01
1,038.00	0.01	0.01	0.01	0.01	0.01
1,053.00	0.01	0.01	0.01	0.01	0.01
1,068.00	0.01	0.01	0.01	0.01	0.01
1,083.00	0.01	0.01	0.01	0.01	0.01
1,098.00	0.01	0.01	0.01	0.01	0.01
1,113.00	0.01	0.01	0.01	0.01	0.01
1,128.00	0.01	0.01	0.01	0.01	0.01
1,143.00	0.01	0.01	0.01	0.01	0.01
1,158.00	0.01	0.01	0.01	0.01	0.01
1,173.00	0.01	0.01	0.01	0.01	0.01
1,188.00	0.01	0.01	0.01	0.01	0.01
1,203.00	0.01	0.01	0.01	0.01	0.01
1,218.00	0.01	0.01	0.01	0.01	0.01
1,233.00	0.01	0.01	0.01	0.01	0.01
1,248.00	0.01	0.01	0.01	0.01	0.01

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

Return Event: 2 years
 Storm Event: 2-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,263.00	0.01	0.01	0.01	0.01	0.01
1,278.00	0.01	0.01	0.01	0.01	0.01
1,293.00	0.01	0.01	0.01	0.01	0.01
1,308.00	0.01	0.01	0.01	0.01	0.01
1,323.00	0.01	0.01	0.01	0.01	0.01
1,338.00	0.01	0.01	0.01	0.01	0.01
1,353.00	0.01	0.01	0.01	0.01	0.01
1,368.00	0.01	0.01	0.01	0.01	0.01
1,383.00	0.01	0.01	0.01	0.01	0.01
1,398.00	0.01	0.01	0.01	0.01	0.01
1,413.00	0.01	0.01	0.01	0.01	0.01
1,428.00	0.01	0.01	0.01	0.01	0.01
1,443.00	0.01	0.01	0.01	0.01	0.00
1,458.00	0.00	0.00	0.00	0.00	0.00
1,473.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary
Label: Area 2 Impervious (Post-Developed)
Scenario: 10-Year

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	0.21 acres
Computational Time Increment	3.23 min
Time to Peak (Computed)	736.90 min
Flow (Peak, Computed)	0.68 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	0.67 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.0
Area (User Defined)	0.21 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.8 in
Runoff Volume (Pervious)	3,630.96 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	3,630.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	24.24 min
Computational Time Increment	3.23 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.59 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: Area 2 Impervious (Post-Developed)
Scenario: 10-Year

Return Event: 10 years
Storm Event: 10-Year

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	16.16 min
Unit receding limb, T_r	64.64 min
Total unit time, T_b	80.80 min

Subsection: Unit Hydrograph (Hydrograph Table)
Label: Area 2 Impervious (Post-Developed)
Scenario: 10-Year

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	0.21 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
72.00	0.00	0.00	0.00	0.00	0.00
87.00	0.00	0.00	0.00	0.00	0.00
102.00	0.00	0.00	0.00	0.00	0.00
117.00	0.00	0.00	0.00	0.01	0.01
132.00	0.01	0.01	0.01	0.01	0.01
147.00	0.01	0.01	0.01	0.01	0.01
162.00	0.01	0.01	0.01	0.01	0.01
177.00	0.01	0.01	0.01	0.01	0.01
192.00	0.01	0.01	0.01	0.01	0.01
207.00	0.01	0.01	0.01	0.01	0.01
222.00	0.01	0.01	0.01	0.01	0.01
237.00	0.01	0.01	0.01	0.01	0.01
252.00	0.01	0.01	0.01	0.01	0.01
267.00	0.01	0.01	0.01	0.01	0.01
282.00	0.01	0.01	0.01	0.01	0.01
297.00	0.01	0.01	0.01	0.01	0.01
312.00	0.01	0.01	0.01	0.01	0.01
327.00	0.01	0.01	0.01	0.01	0.01
342.00	0.01	0.01	0.01	0.01	0.01
357.00	0.01	0.01	0.01	0.01	0.01
372.00	0.01	0.01	0.02	0.02	0.02
387.00	0.02	0.02	0.02	0.02	0.02
402.00	0.02	0.02	0.02	0.02	0.02
417.00	0.02	0.02	0.02	0.02	0.02
432.00	0.02	0.02	0.02	0.02	0.02
447.00	0.02	0.02	0.02	0.02	0.02
462.00	0.02	0.02	0.02	0.02	0.02
477.00	0.02	0.02	0.02	0.02	0.02
492.00	0.02	0.02	0.02	0.02	0.02
507.00	0.02	0.02	0.02	0.03	0.03
522.00	0.03	0.03	0.03	0.03	0.03
537.00	0.03	0.03	0.03	0.03	0.03
552.00	0.03	0.03	0.03	0.03	0.03
567.00	0.03	0.03	0.03	0.03	0.03

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Impervious (Post-Developed)
 Scenario: 10-Year

Return Event: 10 years
 Storm Event: 10-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
582.00	0.03	0.04	0.04	0.04	0.04
597.00	0.04	0.04	0.04	0.04	0.04
612.00	0.04	0.04	0.04	0.05	0.05
627.00	0.05	0.05	0.05	0.05	0.05
642.00	0.05	0.05	0.06	0.06	0.06
657.00	0.06	0.07	0.07	0.07	0.08
672.00	0.08	0.08	0.09	0.09	0.10
687.00	0.10	0.11	0.12	0.12	0.13
702.00	0.15	0.16	0.18	0.20	0.22
717.00	0.26	0.30	0.37	0.45	0.54
732.00	0.62	0.67	0.67	0.64	0.58
747.00	0.52	0.45	0.39	0.35	0.31
762.00	0.27	0.24	0.21	0.19	0.17
777.00	0.16	0.14	0.13	0.12	0.12
792.00	0.11	0.10	0.10	0.09	0.09
807.00	0.08	0.08	0.07	0.07	0.07
822.00	0.06	0.06	0.06	0.06	0.06
837.00	0.05	0.05	0.05	0.05	0.05
852.00	0.05	0.05	0.05	0.05	0.05
867.00	0.04	0.04	0.04	0.04	0.04
882.00	0.04	0.04	0.04	0.04	0.04
897.00	0.04	0.04	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	0.03	0.03	0.03	0.03	0.03
972.00	0.03	0.03	0.03	0.03	0.03
987.00	0.03	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
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	0.02
1,167.00	0.02	0.02	0.02	0.02	0.02
1,182.00	0.02	0.02	0.02	0.02	0.02
1,197.00	0.02	0.02	0.02	0.02	0.02
1,212.00	0.02	0.02	0.01	0.01	0.01

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Impervious (Post-Developed)
 Scenario: 10-Year

Return Event: 10 years
 Storm Event: 10-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
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 2 Impervious (Post-Developed)
Scenario: 100-Year

Return Event: 100 years
Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	0.21 acres
Computational Time Increment	3.23 min
Time to Peak (Computed)	736.90 min
Flow (Peak, Computed)	1.12 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	1.11 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.0
Area (User Defined)	0.21 acres
Maximum Retention (Pervious)	0.2 in
Maximum Retention (Pervious, 20 percent)	0.0 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	8.0 in
Runoff Volume (Pervious)	6,067.97 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	6,066.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	24.24 min
Computational Time Increment	3.23 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.59 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: Area 2 Impervious (Post-Developed)
Scenario: 100-Year

Return Event: 100 years
Storm Event: 100-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	16.16 min
Unit receding limb, Tr	64.64 min
Total unit time, Tb	80.80 min

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Impervious (Post-Developed)
 Scenario: 100-Year

Return Event: 100 years
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	0.21 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
45.00	0.00	0.00	0.00	0.00	0.00
60.00	0.00	0.00	0.00	0.00	0.01
75.00	0.01	0.01	0.01	0.01	0.01
90.00	0.01	0.01	0.01	0.01	0.01
105.00	0.01	0.01	0.01	0.01	0.01
120.00	0.01	0.01	0.01	0.01	0.01
135.00	0.01	0.01	0.01	0.01	0.01
150.00	0.01	0.02	0.02	0.02	0.02
165.00	0.02	0.02	0.02	0.02	0.02
180.00	0.02	0.02	0.02	0.02	0.02
195.00	0.02	0.02	0.02	0.02	0.02
210.00	0.02	0.02	0.02	0.02	0.02
225.00	0.02	0.02	0.02	0.02	0.02
240.00	0.02	0.02	0.02	0.02	0.02
255.00	0.02	0.02	0.02	0.02	0.02
270.00	0.02	0.02	0.02	0.02	0.02
285.00	0.02	0.02	0.02	0.02	0.02
300.00	0.02	0.02	0.02	0.02	0.02
315.00	0.02	0.02	0.02	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	0.03	0.03
375.00	0.03	0.03	0.03	0.03	0.03
390.00	0.03	0.03	0.03	0.03	0.03
405.00	0.03	0.03	0.03	0.03	0.03
420.00	0.03	0.03	0.03	0.03	0.03
435.00	0.03	0.03	0.03	0.03	0.03
450.00	0.03	0.04	0.04	0.04	0.04
465.00	0.04	0.04	0.04	0.04	0.04
480.00	0.04	0.04	0.04	0.04	0.04
495.00	0.04	0.04	0.04	0.04	0.04
510.00	0.04	0.04	0.04	0.04	0.04
525.00	0.04	0.04	0.04	0.04	0.05
540.00	0.05	0.05	0.05	0.05	0.05

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Impervious (Post-Developed)
 Scenario: 100-Year

Return Event: 100 years
 Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
555.00	0.05	0.05	0.05	0.05	0.05
570.00	0.05	0.06	0.06	0.06	0.06
585.00	0.06	0.06	0.06	0.06	0.07
600.00	0.07	0.07	0.07	0.07	0.07
615.00	0.07	0.07	0.08	0.08	0.08
630.00	0.08	0.08	0.08	0.08	0.09
645.00	0.09	0.09	0.10	0.10	0.11
660.00	0.11	0.12	0.12	0.13	0.13
675.00	0.14	0.15	0.15	0.16	0.17
690.00	0.18	0.19	0.20	0.22	0.24
705.00	0.27	0.29	0.33	0.37	0.42
720.00	0.50	0.60	0.74	0.89	1.02
735.00	1.10	1.11	1.05	0.96	0.85
750.00	0.74	0.65	0.57	0.50	0.44
765.00	0.39	0.35	0.31	0.28	0.26
780.00	0.24	0.22	0.20	0.19	0.18
795.00	0.17	0.16	0.15	0.14	0.13
810.00	0.13	0.12	0.12	0.11	0.11
825.00	0.10	0.10	0.09	0.09	0.09
840.00	0.09	0.08	0.08	0.08	0.08
855.00	0.08	0.08	0.08	0.07	0.07
870.00	0.07	0.07	0.07	0.07	0.07
885.00	0.06	0.06	0.06	0.06	0.06
900.00	0.06	0.06	0.06	0.05	0.05
915.00	0.05	0.05	0.05	0.05	0.05
930.00	0.05	0.05	0.05	0.05	0.05
945.00	0.05	0.05	0.05	0.05	0.04
960.00	0.04	0.04	0.04	0.04	0.04
975.00	0.04	0.04	0.04	0.04	0.04
990.00	0.04	0.04	0.04	0.04	0.04
1,005.00	0.04	0.04	0.04	0.04	0.04
1,020.00	0.04	0.04	0.04	0.04	0.04
1,035.00	0.04	0.04	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	0.03	0.03
1,080.00	0.03	0.03	0.03	0.03	0.03
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

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Impervious (Post-Developed)
 Scenario: 100-Year

Return Event: 100 years
 Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,200.00	0.03	0.03	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	0.02	0.02
1,440.00	0.02	0.02	0.02	0.02	0.01
1,455.00	0.01	0.01	0.01	0.01	0.00
1,470.00	0.00	0.00	0.00	0.00	0.00

Subsection: Unit Hydrograph Summary
Label: Area 2 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	3.3 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	4.16 acres
Computational Time Increment	3.23 min
Time to Peak (Computed)	736.90 min
Flow (Peak, Computed)	4.47 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	4.46 ft ³ /s
Drainage Area	
SCS CN (Composite)	79.1
Area (User Defined)	4.16 acres
Maximum Retention (Pervious)	2.6 in
Maximum Retention (Pervious, 20 percent)	0.5 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.4 in
Runoff Volume (Pervious)	21,426.26 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	21,420.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	24.24 min
Computational Time Increment	3.23 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	11.67 ft ³ /s

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

Return Event: 2 years
Storm Event: 2-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	16.16 min
Unit receding limb, Tr	64.64 min
Total unit time, Tb	80.80 min

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 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	3.3 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	4.16 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
579.00	0.00	0.00	0.00	0.00	0.01
594.00	0.01	0.01	0.01	0.02	0.02
609.00	0.02	0.02	0.03	0.03	0.04
624.00	0.04	0.04	0.05	0.05	0.06
639.00	0.06	0.07	0.07	0.08	0.09
654.00	0.10	0.11	0.12	0.13	0.14
669.00	0.15	0.17	0.19	0.21	0.23
684.00	0.25	0.28	0.31	0.34	0.38
699.00	0.43	0.50	0.57	0.67	0.78
714.00	0.93	1.13	1.43	1.86	2.45
729.00	3.14	3.80	4.27	4.46	4.38
744.00	4.10	3.70	3.29	2.94	2.63
759.00	2.36	2.11	1.90	1.71	1.55
774.00	1.42	1.31	1.22	1.14	1.07
789.00	1.00	0.94	0.89	0.84	0.80
804.00	0.76	0.72	0.69	0.66	0.63
819.00	0.60	0.58	0.55	0.53	0.52
834.00	0.50	0.49	0.48	0.47	0.46
849.00	0.45	0.44	0.43	0.43	0.42
864.00	0.41	0.41	0.40	0.39	0.39
879.00	0.38	0.37	0.36	0.36	0.35
894.00	0.34	0.34	0.33	0.32	0.32
909.00	0.31	0.30	0.30	0.29	0.29
924.00	0.28	0.28	0.28	0.27	0.27
939.00	0.27	0.27	0.26	0.26	0.26
954.00	0.26	0.26	0.25	0.25	0.25
969.00	0.25	0.25	0.25	0.24	0.24
984.00	0.24	0.24	0.24	0.23	0.23
999.00	0.23	0.23	0.23	0.22	0.22
1,014.00	0.22	0.22	0.22	0.22	0.21
1,029.00	0.21	0.21	0.21	0.21	0.20
1,044.00	0.20	0.20	0.20	0.20	0.19
1,059.00	0.19	0.19	0.19	0.19	0.18
1,074.00	0.18	0.18	0.18	0.18	0.17

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

Return Event: 2 years
 Storm Event: 2-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,089.00	0.17	0.17	0.17	0.17	0.17
1,104.00	0.17	0.16	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	0.15	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	0.15	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	0.14	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	0.13	0.13	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	0.12	0.12	0.12	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	0.09	0.07	0.06	0.04
1,464.00	0.03	0.02	0.02	0.01	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 2 Pervious (Post-Developed)
Scenario: 10-Year

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	4.16 acres
Computational Time Increment	3.23 min
Time to Peak (Computed)	736.90 min
Flow (Peak, Computed)	9.01 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	8.95 ft ³ /s
Drainage Area	
SCS CN (Composite)	79.1
Area (User Defined)	4.16 acres
Maximum Retention (Pervious)	2.6 in
Maximum Retention (Pervious, 20 percent)	0.5 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.8 in
Runoff Volume (Pervious)	42,444.04 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	42,430.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	24.24 min
Computational Time Increment	3.23 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	11.67 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: Area 2 Pervious (Post-Developed)
Scenario: 10-Year

Return Event: 10 years
Storm Event: 10-Year

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	16.16 min
Unit receding limb, T_r	64.64 min
Total unit time, T_b	80.80 min

Subsection: Unit Hydrograph (Hydrograph Table)
Label: Area 2 Pervious (Post-Developed)
Scenario: 10-Year

Return Event: 10 years
Storm Event: 10-Year

Storm Event	10-Year
Return Event	10 years
Duration	4,320.00 min
Depth	5.0 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	4.16 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
456.00	0.00	0.00	0.00	0.00	0.01
471.00	0.01	0.01	0.01	0.01	0.01
486.00	0.02	0.02	0.02	0.02	0.03
501.00	0.03	0.03	0.03	0.04	0.04
516.00	0.04	0.04	0.05	0.05	0.05
531.00	0.05	0.06	0.06	0.06	0.07
546.00	0.07	0.07	0.07	0.08	0.08
561.00	0.09	0.09	0.10	0.10	0.11
576.00	0.11	0.12	0.13	0.13	0.14
591.00	0.15	0.15	0.16	0.17	0.17
606.00	0.18	0.19	0.20	0.21	0.22
621.00	0.22	0.23	0.24	0.25	0.26
636.00	0.27	0.29	0.30	0.32	0.34
651.00	0.36	0.38	0.41	0.43	0.46
666.00	0.49	0.53	0.57	0.61	0.66
681.00	0.71	0.76	0.82	0.89	0.96
696.00	1.05	1.17	1.31	1.49	1.69
711.00	1.94	2.25	2.68	3.27	4.14
726.00	5.29	6.62	7.86	8.69	8.95
741.00	8.69	8.05	7.22	6.36	5.63
756.00	5.02	4.47	3.98	3.55	3.19
771.00	2.88	2.62	2.41	2.23	2.08
786.00	1.94	1.82	1.71	1.61	1.52
801.00	1.44	1.37	1.30	1.24	1.19
816.00	1.13	1.08	1.04	0.99	0.95
831.00	0.92	0.89	0.87	0.85	0.83
846.00	0.82	0.80	0.79	0.77	0.76
861.00	0.75	0.73	0.72	0.71	0.70
876.00	0.68	0.67	0.66	0.64	0.63
891.00	0.62	0.61	0.59	0.58	0.57
906.00	0.56	0.54	0.53	0.52	0.51
921.00	0.50	0.50	0.49	0.48	0.48
936.00	0.48	0.47	0.47	0.46	0.46
951.00	0.46	0.45	0.45	0.45	0.44

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Pervious (Post-Developed)
 Scenario: 10-Year

Return Event: 10 years
 Storm Event: 10-Year

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
966.00	0.44	0.44	0.43	0.43	0.43
981.00	0.42	0.42	0.42	0.41	0.41
996.00	0.41	0.40	0.40	0.40	0.39
1,011.00	0.39	0.39	0.38	0.38	0.38
1,026.00	0.37	0.37	0.37	0.36	0.36
1,041.00	0.36	0.35	0.35	0.35	0.34
1,056.00	0.34	0.34	0.33	0.33	0.32
1,071.00	0.32	0.32	0.31	0.31	0.31
1,086.00	0.30	0.30	0.30	0.29	0.29
1,101.00	0.29	0.29	0.29	0.28	0.28
1,116.00	0.28	0.28	0.28	0.28	0.28
1,131.00	0.28	0.28	0.28	0.28	0.27
1,146.00	0.27	0.27	0.27	0.27	0.27
1,161.00	0.27	0.27	0.27	0.27	0.27
1,176.00	0.27	0.26	0.26	0.26	0.26
1,191.00	0.26	0.26	0.26	0.26	0.26
1,206.00	0.26	0.26	0.26	0.25	0.25
1,221.00	0.25	0.25	0.25	0.25	0.25
1,236.00	0.25	0.25	0.25	0.25	0.25
1,251.00	0.24	0.24	0.24	0.24	0.24
1,266.00	0.24	0.24	0.24	0.24	0.24
1,281.00	0.24	0.23	0.23	0.23	0.23
1,296.00	0.23	0.23	0.23	0.23	0.23
1,311.00	0.23	0.23	0.23	0.22	0.22
1,326.00	0.22	0.22	0.22	0.22	0.22
1,341.00	0.22	0.22	0.22	0.22	0.21
1,356.00	0.21	0.21	0.21	0.21	0.21
1,371.00	0.21	0.21	0.21	0.21	0.21
1,386.00	0.21	0.20	0.20	0.20	0.20
1,401.00	0.20	0.20	0.20	0.20	0.20
1,416.00	0.20	0.20	0.19	0.19	0.19
1,431.00	0.19	0.19	0.19	0.19	0.19
1,446.00	0.19	0.17	0.15	0.12	0.10
1,461.00	0.07	0.05	0.04	0.03	0.02
1,476.00	0.02	0.01	0.01	0.01	0.00
1,491.00	0.00	0.00	0.00	0.00	0.00

Subsection: Unit Hydrograph Summary
Label: Area 2 Pervious (Post-Developed)
Scenario: 100-Year

Return Event: 100 years
Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	4.16 acres
Computational Time Increment	3.23 min
Time to Peak (Computed)	736.90 min
Flow (Peak, Computed)	18.08 ft ³ /s
Output Increment	3.00 min
Time to Flow (Peak Interpolated Output)	738.00 min
Flow (Peak Interpolated Output)	17.92 ft ³ /s
Drainage Area	
SCS CN (Composite)	79.1
Area (User Defined)	4.16 acres
Maximum Retention (Pervious)	2.6 in
Maximum Retention (Pervious, 20 percent)	0.5 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.7 in
Runoff Volume (Pervious)	86,168.57 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	86,140.00 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	24.24 min
Computational Time Increment	3.23 min
Unit Hydrograph Shape Factor	483.4
K Factor	0.7
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	11.67 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: Area 2 Pervious (Post-Developed)
Scenario: 100-Year

Return Event: 100 years
Storm Event: 100-Year

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	16.16 min
Unit receding limb, Tr	64.64 min
Total unit time, Tb	80.80 min

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Pervious (Post-Developed)
 Scenario: 100-Year

Return Event: 100 years
 Storm Event: 100-Year

Storm Event	100-Year
Return Event	100 years
Duration	4,320.00 min
Depth	8.2 in
Time of Concentration (Composite)	24.24 min
Area (User Defined)	4.16 acres

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

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

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
315.00	0.00	0.00	0.00	0.00	0.01
330.00	0.01	0.01	0.01	0.01	0.02
345.00	0.02	0.02	0.02	0.03	0.03
360.00	0.03	0.03	0.04	0.04	0.04
375.00	0.04	0.05	0.05	0.05	0.06
390.00	0.06	0.06	0.07	0.07	0.07
405.00	0.08	0.08	0.09	0.09	0.09
420.00	0.10	0.10	0.11	0.11	0.11
435.00	0.12	0.12	0.13	0.13	0.14
450.00	0.14	0.15	0.15	0.16	0.16
465.00	0.17	0.17	0.18	0.18	0.19
480.00	0.19	0.20	0.20	0.21	0.21
495.00	0.22	0.22	0.23	0.24	0.24
510.00	0.25	0.25	0.26	0.27	0.27
525.00	0.28	0.28	0.29	0.30	0.30
540.00	0.31	0.32	0.32	0.33	0.34
555.00	0.35	0.36	0.37	0.39	0.40
570.00	0.42	0.43	0.45	0.46	0.48
585.00	0.49	0.51	0.53	0.54	0.56
600.00	0.58	0.60	0.62	0.63	0.65
615.00	0.67	0.69	0.71	0.73	0.75
630.00	0.77	0.80	0.82	0.85	0.89
645.00	0.93	0.97	1.03	1.08	1.14
660.00	1.20	1.27	1.34	1.42	1.51
675.00	1.60	1.71	1.83	1.95	2.08
690.00	2.21	2.37	2.57	2.82	3.14
705.00	3.51	3.94	4.46	5.10	5.98
720.00	7.18	8.91	11.17	13.73	16.06
735.00	17.57	17.92	17.25	15.87	14.13
750.00	12.38	10.90	9.66	8.57	7.60
765.00	6.75	6.03	5.43	4.92	4.52
780.00	4.17	3.88	3.62	3.38	3.17
795.00	2.98	2.81	2.65	2.52	2.40
810.00	2.29	2.18	2.08	1.99	1.90

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Pervious (Post-Developed)
 Scenario: 100-Year

Return Event: 100 years
 Storm Event: 100-Year

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.00 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
825.00	1.82	1.75	1.69	1.64	1.60
840.00	1.56	1.52	1.49	1.46	1.44
855.00	1.41	1.39	1.36	1.34	1.31
870.00	1.29	1.27	1.24	1.22	1.20
885.00	1.17	1.15	1.13	1.10	1.08
900.00	1.06	1.03	1.01	0.99	0.97
915.00	0.95	0.93	0.91	0.90	0.89
930.00	0.88	0.87	0.86	0.85	0.85
945.00	0.84	0.83	0.83	0.82	0.81
960.00	0.81	0.80	0.79	0.79	0.78
975.00	0.78	0.77	0.76	0.76	0.75
990.00	0.75	0.74	0.73	0.73	0.72
1,005.00	0.71	0.71	0.70	0.70	0.69
1,020.00	0.68	0.68	0.67	0.67	0.66
1,035.00	0.65	0.65	0.64	0.63	0.63
1,050.00	0.62	0.61	0.61	0.60	0.60
1,065.00	0.59	0.58	0.58	0.57	0.57
1,080.00	0.56	0.55	0.55	0.54	0.53
1,095.00	0.53	0.52	0.52	0.52	0.51
1,110.00	0.51	0.51	0.51	0.50	0.50
1,125.00	0.50	0.50	0.50	0.50	0.49
1,140.00	0.49	0.49	0.49	0.49	0.49
1,155.00	0.49	0.48	0.48	0.48	0.48
1,170.00	0.48	0.48	0.47	0.47	0.47
1,185.00	0.47	0.47	0.47	0.47	0.46
1,200.00	0.46	0.46	0.46	0.46	0.46
1,215.00	0.45	0.45	0.45	0.45	0.45
1,230.00	0.45	0.45	0.44	0.44	0.44
1,245.00	0.44	0.44	0.44	0.43	0.43
1,260.00	0.43	0.43	0.43	0.43	0.42
1,275.00	0.42	0.42	0.42	0.42	0.42
1,290.00	0.42	0.41	0.41	0.41	0.41
1,305.00	0.41	0.41	0.40	0.40	0.40
1,320.00	0.40	0.40	0.40	0.40	0.39
1,335.00	0.39	0.39	0.39	0.39	0.39
1,350.00	0.38	0.38	0.38	0.38	0.38
1,365.00	0.38	0.38	0.37	0.37	0.37
1,380.00	0.37	0.37	0.37	0.36	0.36
1,395.00	0.36	0.36	0.36	0.36	0.35
1,410.00	0.35	0.35	0.35	0.35	0.35
1,425.00	0.35	0.34	0.34	0.34	0.34
1,440.00	0.34	0.34	0.33	0.31	0.27
1,455.00	0.22	0.17	0.13	0.10	0.07

Subsection: Unit Hydrograph (Hydrograph Table)
 Label: Area 2 Pervious (Post-Developed)
 Scenario: 100-Year

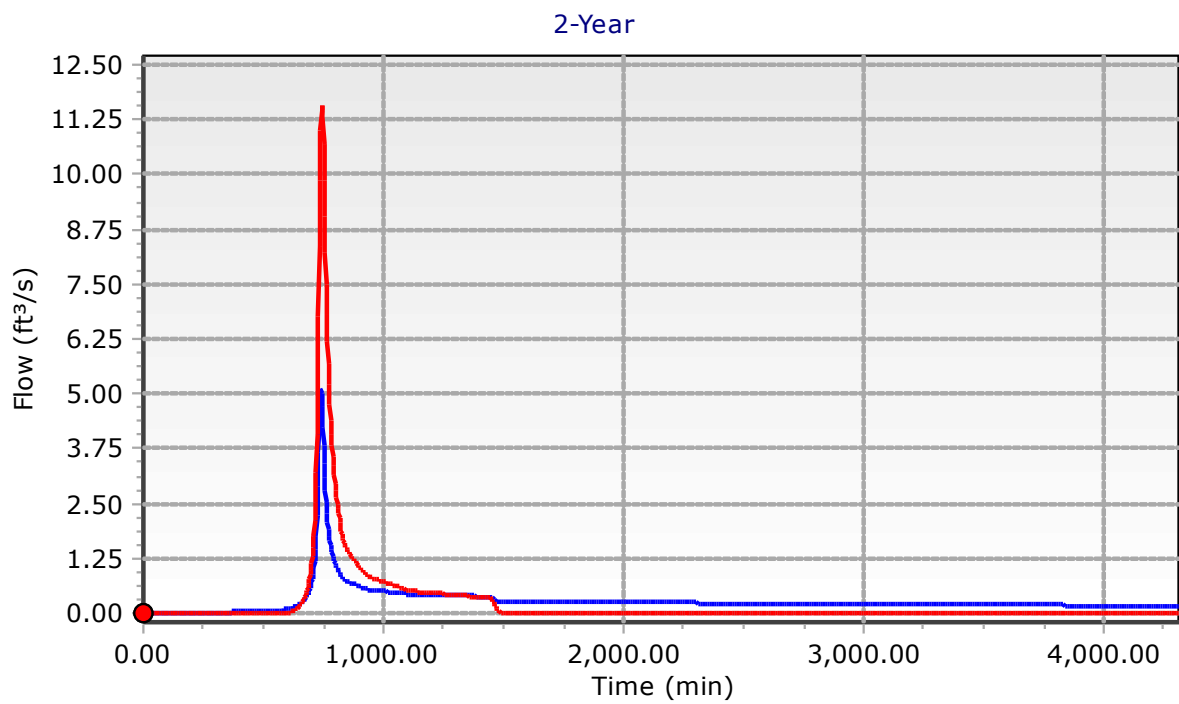
Return Event: 100 years
 Storm Event: 100-Year

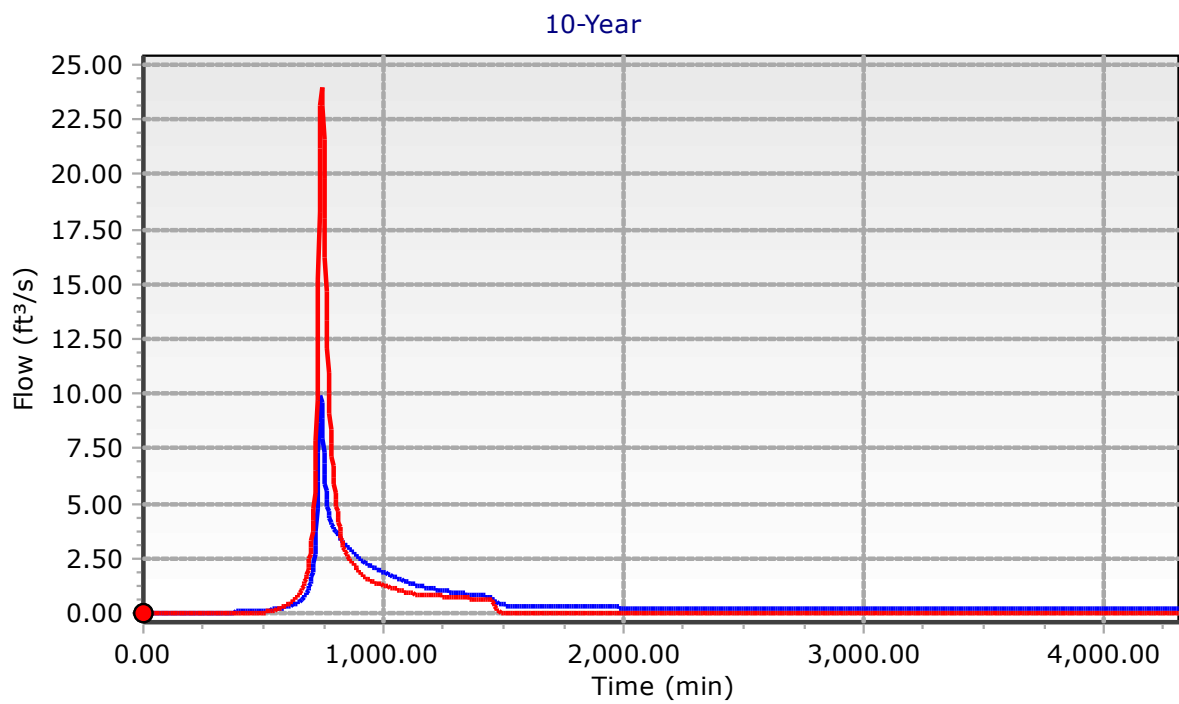
HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 3.00 min

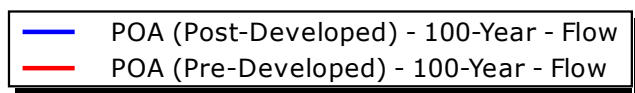
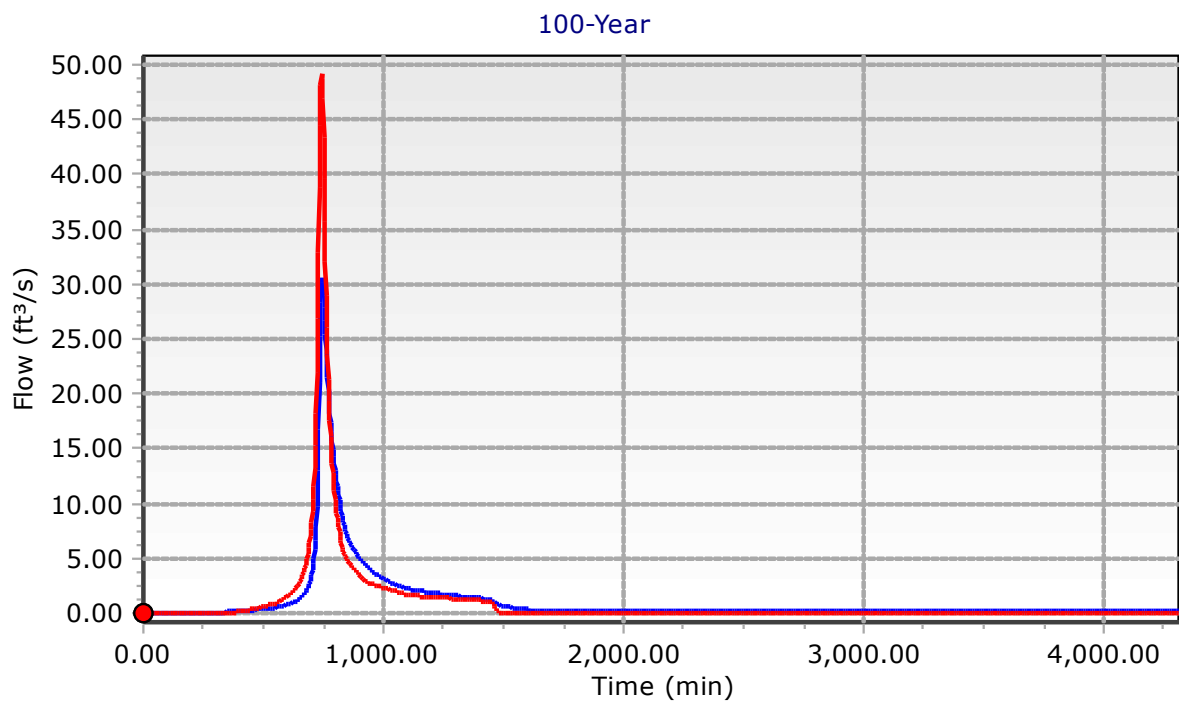
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,470.00	0.05	0.04	0.03	0.02	0.02
1,485.00	0.01	0.01	0.01	0.00	0.00
1,500.00	0.00	0.00	0.00	(N/A)	(N/A)





POA (Post-Developed) - 10-Year - Flow
POA (Pre-Developed) - 10-Year - Flow



Appendix F1

Pond Constructed Wetland Information

BMP Calculations

I. Pond Constructed Wetland

i. Parameters

Standing Water Depth – Pool Zone: 5'
Standing Water Depth – High Marsh Zone: 0-6"
Standing Water Depth – Low Marsh Zone: 6-18"
Total Drainage Area: 8.95 Acres

ii. WQDS Volume Allocation

WQDS Volume: 18,133 ft³

Pool Zone

Required Volume Allocation: 60% of WQDS Volume = $0.6 \times 18,133 \text{ ft}^3 = 10,880 \text{ ft}^3$
Proposed Volume Allocation: 17,641 ft³
WQDS Volume Percentage: $17,641 \text{ ft}^3 / 18,133 \text{ ft}^3 = 97\%$

Low Marsh Zone

Required Volume Allocation: 20% of WQDS Volume = $0.2 \times 18,133 \text{ ft}^3 = 3,627 \text{ ft}^3$
Proposed Volume Allocation: 6,943 ft³
WQDS Volume Percentage: $6,943 \text{ ft}^3 / 18,133 \text{ ft}^3 = 38\%$

High Marsh Zone

Required Volume Allocation: 10% of WQDS Volume = $0.1 \times 18,133 \text{ ft}^3 = 1,813 \text{ ft}^3$
Proposed Volume Allocation: 3,069 ft³
WQDS Volume Percentage: $3,069 \text{ ft}^3 / 18,133 \text{ ft}^3 = 17\%$

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.

Pool Zone Volume Results Table

Elevation (ft)	Area (ft ²)	A1+A2+sqr(A1*A2) (ft ²)	Volume (ft ³)	Volume (Total) (ft ³)
70.00	1099.00	0.00	0.00	0.00
71.00	1721.00	4195.27	1398.00	1398.00
72.00	2479.00	6265.52	2089.00	3487.00
72.50	2908.00	8071.95	1345.00	4832.00
72.51	4218.00	10628.28	35.00	4868.00
73.00	4777.00	13483.81	2202.00	7070.00
73.50	5359.00	15195.64	2533.00	9603.00
75.00	5359.00	16077.00	8038.00	17641.00

Low Marsh Zone Volume Results Table

Elevation (ft)	Area (ft ²)	A1+A2+sqr(A1*A2) (ft ²)	Volume (ft ³)	Volume (Total) (ft ³)
73.50	0.00	0.00	0.00	0.00
73.51	3662.00	3662.00	12.00	12.00
74.00	4398.00	12073.16	1972.00	1984.00
74.50	5149.00	14305.71	2384.00	4368.00
75.00	5149.00	15447.00	2574.00	6943.00

High Marsh Zone Volume Results Table

Elevation (ft)	Area (ft ²)	A1+A2+sqr(A1*A2) (ft ²)	Volume (ft ³)	Volume (Total) (ft ³)
74.50	0.00	0.00	0.00	0.00
74.51	5790.00	5790.00	19.00	19.00
75.00	6669.00	18672.98	3050.00	3069.00

Water Budget Analysis

$$\Delta S = P - ET$$

ΔS = Change in Volume of Water in Pond Constructed Wetland (ft³/day)

P = Precipitation (ft³/day)

ET = Evapotranspiration (ft³/day)

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

ET_i = Potential Evapotranspiration for Month *i* (cm/mo)

T_i = Mean Monthly Temperature (°C)

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

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

Data Source: National Climatic Data Center (NCDC)

Weather Observing Station: Somerset Airport

Model Year (Wet): 2019

Model Year (Dry): 2016

Model Year (Average): 2017

Pond Constructed Wetland Drainage Area (ft²): 389,862

High Marsh Zone Surface Area (ft²): 10,508

Wet Year (2019)

Month	T_i (°F)	T_i (°C)	ET_i (ft ³ /day)	Correction Factor
January	29.9	-1.2	0.0	0.80
February	34.0	1.1	2.1	0.89
March	38.5	3.6	10.3	0.99
April	54.5	12.5	62.2	1.10
May	61.9	16.6	96.1	1.20
June	68.8	20.4	136.5	1.25
July	77.5	25.3	172.6	1.23
August	74.0	23.3	145.0	1.15
September	67.8	19.9	109.5	1.04
October	57.0	13.9	58.6	0.93
November	39.6	4.2	11.0	0.83
December	35.0	1.7	2.9	0.78
	I=	54.0		
	a=	1.3		

January 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
1/1	1624.4	0.0	1624.4	1624.4
1/2	0.0	0.0	0.0	0.0
1/3	0.0	0.0	0.0	0.0
1/4	324.9	0.0	324.9	324.9
1/5	17218.9	0.0	17218.9	17218.9
1/6	0.0	0.0	0.0	0.0
1/7	0.0	0.0	0.0	0.0
1/8	4223.5	0.0	4223.5	4223.5
1/9	324.9	0.0	324.9	324.9
1/10	0.0	0.0	0.0	0.0
1/11	0.0	0.0	0.0	0.0
1/12	0.0	0.0	0.0	0.0
1/13	0.0	0.0	0.0	0.0
1/14	0.0	0.0	0.0	0.0
1/15	0.0	0.0	0.0	0.0
1/16	0.0	0.0	0.0	0.0
1/17	0.0	0.0	0.0	0.0
1/18	1299.5	0.0	1299.5	1299.5
1/19	19818.0	0.0	19818.0	19818.0
1/20	28914.8	0.0	28914.8	28914.8
1/21	0.0	0.0	0.0	0.0
1/22	0.0	0.0	0.0	0.0
1/23	0.0	0.0	0.0	0.0
1/24	39636.0	0.0	39636.0	39636.0
1/25	0.0	0.0	0.0	0.0
1/26	0.0	0.0	0.0	0.0
1/27	0.0	0.0	0.0	0.0
1/28	0.0	0.0	0.0	0.0
1/29	7147.5	0.0	7147.5	7147.5
1/30	0.0	0.0	0.0	0.0
1/31	0.0	0.0	0.0	0.0

February 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
2/1	0.0	2.1	-2.1	-2.1
2/2	0.0	2.1	-2.1	-4.2
2/3	0.0	2.1	-2.1	-6.3
2/4	0.0	2.1	-2.1	-8.5
2/5	0.0	2.1	-2.1	-10.6
2/6	14619.8	2.1	14617.7	14607.1
2/7	649.8	2.1	647.7	647.7
2/8	10396.3	2.1	10394.2	10394.2
2/9	0.0	2.1	-2.1	-2.1
2/10	0.0	2.1	-2.1	-4.2
2/11	649.8	2.1	647.7	643.4
2/12	22092.2	2.1	22090.1	22090.1
2/13	974.7	2.1	972.5	972.5
2/14	0.0	2.1	-2.1	-2.1
2/15	0.0	2.1	-2.1	-4.2
2/16	0.0	2.1	-2.1	-6.3
2/17	1624.4	2.1	1622.3	1616.0
2/18	4223.5	2.1	4221.4	4221.4
2/19	0.0	2.1	-2.1	-2.1
2/20	23391.7	2.1	23389.6	23387.5
2/21	974.7	2.1	972.5	972.5
2/22	0.0	2.1	-2.1	-2.1
2/23	1299.5	2.1	1297.4	1295.3
2/24	17543.8	2.1	17541.7	17541.7
2/25	0.0	2.1	-2.1	-2.1
2/26	0.0	2.1	-2.1	-4.2
2/27	0.0	2.1	-2.1	-6.3
2/28	649.8	2.1	647.7	641.3

March 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
3/1	1624.4	10.3	1614.1	1614.1
3/2	10071.4	10.3	10061.1	10061.1
3/3	20467.8	10.3	20457.5	20457.5
3/4	5523.0	10.3	5512.8	5512.8
3/5	0.0	10.3	-10.3	-10.3
3/6	0.0	10.3	-10.3	-20.6
3/7	0.0	10.3	-10.3	-30.9
3/8	0.0	10.3	-10.3	-41.2
3/9	0.0	10.3	-10.3	-51.4
3/10	22417.1	10.3	22406.8	22355.3
3/11	0.0	10.3	-10.3	-10.3
3/12	0.0	10.3	-10.3	-20.6
3/13	0.0	10.3	-10.3	-30.9
3/14	0.0	10.3	-10.3	-41.2
3/15	11371.0	10.3	11360.7	11319.5
3/16	0.0	10.3	-10.3	-10.3
3/17	0.0	10.3	-10.3	-20.6
3/18	0.0	10.3	-10.3	-30.9
3/19	0.0	10.3	-10.3	-41.2
3/20	0.0	10.3	-10.3	-51.4
3/21	29239.7	10.3	29229.4	29177.9
3/22	14944.7	10.3	14934.4	14934.4
3/23	0.0	10.3	-10.3	-10.3
3/24	0.0	10.3	-10.3	-20.6
3/25	0.0	10.3	-10.3	-30.9
3/26	0.0	10.3	-10.3	-41.2
3/27	0.0	10.3	-10.3	-51.4
3/28	0.0	10.3	-10.3	-61.7
3/29	0.0	10.3	-10.3	-72.0
3/30	0.0	10.3	-10.3	-82.3
3/31	2924.0	10.3	2913.7	2831.4

April 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
4/1	0.0	62.2	-62.2	-62.2
4/2	0.0	62.2	-62.2	-124.4
4/3	0.0	62.2	-62.2	-186.6
4/4	0.0	62.2	-62.2	-248.8
4/5	8771.9	62.2	8709.7	8460.9
4/6	0.0	62.2	-62.2	-62.2
4/7	1299.5	62.2	1237.3	1175.1
4/8	4873.3	62.2	4811.1	4811.1
4/9	2924.0	62.2	2861.8	2861.8
4/10	0.0	62.2	-62.2	-62.2
4/11	0.0	62.2	-62.2	-124.4
4/12	22742.0	62.2	22679.8	22555.4
4/13	4223.5	62.2	4161.3	4161.3
4/14	1624.4	62.2	1562.2	1562.2
4/15	38661.3	62.2	38599.1	38599.1
4/16	0.0	62.2	-62.2	-62.2
4/17	0.0	62.2	-62.2	-124.4
4/18	0.0	62.2	-62.2	-186.6
4/19	4223.5	62.2	4161.3	3974.7
4/20	20142.9	62.2	20080.7	20080.7
4/21	0.0	62.2	-62.2	-62.2
4/22	1624.4	62.2	1562.2	1500.0
4/23	0.0	62.2	-62.2	-62.2
4/24	0.0	62.2	-62.2	-124.4
4/25	0.0	62.2	-62.2	-186.6
4/26	24366.4	62.2	24304.2	24117.6
4/27	0.0	62.2	-62.2	-62.2
4/28	324.9	62.2	262.7	200.5
4/29	324.9	62.2	262.7	262.7
4/30	1299.5	62.2	1237.3	1237.3

May 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
5/1	0.0	96.1	-96.1	-96.1
5/2	2924.0	96.1	2827.9	2731.9
5/3	0.0	96.1	-96.1	-96.1
5/4	0.0	96.1	-96.1	-192.1
5/5	59778.8	96.1	59682.8	59490.7
5/6	0.0	96.1	-96.1	-96.1
5/7	5523.0	96.1	5427.0	5330.9
5/8	0.0	96.1	-96.1	-96.1
5/9	0.0	96.1	-96.1	-192.1
5/10	0.0	96.1	-96.1	-288.2
5/11	0.0	96.1	-96.1	-384.2
5/12	0.0	96.1	-96.1	-480.3
5/13	324.9	96.1	228.8	-251.4
5/14	54905.6	96.1	54809.5	54558.1
5/15	0.0	96.1	-96.1	-96.1
5/16	974.7	96.1	878.6	782.6
5/17	324.9	96.1	228.8	228.8
5/18	0.0	96.1	-96.1	-96.1
5/19	6822.6	96.1	6726.5	6630.5
5/20	8447.0	96.1	8351.0	8351.0
5/21	0.0	96.1	-96.1	-96.1
5/22	0.0	96.1	-96.1	-192.1
5/23	25341.0	96.1	25245.0	25052.9
5/24	0.0	96.1	-96.1	-96.1
5/25	1299.5	96.1	1203.5	1107.4
5/26	2274.2	96.1	2178.1	2178.1
5/27	0.0	96.1	-96.1	-96.1
5/28	11371.0	96.1	11274.9	11178.9
5/29	35087.6	96.1	34991.5	34991.5
5/30	48407.9	96.1	48311.8	48311.8
5/31	0.0	96.1	-96.1	-96.1

June 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
6/1	0.0	136.5	-136.5	-232.5
6/2	6822.6	136.5	6686.1	6453.6
6/3	0.0	136.5	-136.5	-136.5
6/4	0.0	136.5	-136.5	-273.0
6/5	0.0	136.5	-136.5	-409.5
6/6	0.0	136.5	-136.5	-546.0
6/7	0.0	136.5	-136.5	-682.5
6/8	0.0	136.5	-136.5	-818.9
6/9	0.0	136.5	-136.5	-955.4
6/10	9746.6	136.5	9610.1	8654.6
6/11	2924.0	136.5	2787.5	2787.5
6/12	0.0	136.5	-136.5	-136.5
6/13	33788.0	136.5	33651.5	33515.1
6/14	0.0	136.5	-136.5	-136.5
6/15	0.0	136.5	-136.5	-273.0
6/16	1299.5	136.5	1163.0	890.1
6/17	0.0	136.5	-136.5	-136.5
6/18	65626.8	136.5	65490.3	65353.8
6/19	649.8	136.5	513.3	513.3
6/20	5847.9	136.5	5711.4	5711.4
6/21	10071.4	136.5	9934.9	9934.9
6/22	0.0	136.5	-136.5	-136.5
6/23	0.0	136.5	-136.5	-273.0
6/24	0.0	136.5	-136.5	-409.5
6/25	16894.0	136.5	16757.5	16348.1
6/26	0.0	136.5	-136.5	-136.5
6/27	0.0	136.5	-136.5	-273.0
6/28	0.0	136.5	-136.5	-409.5
6/29	2274.2	136.5	2137.7	1728.2
6/30	0.0	136.5	-136.5	-136.5

July 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
7/1	0.0	172.6	-172.6	-309.1
7/2	324.9	172.6	152.2	-156.9
7/3	0.0	172.6	-172.6	-329.5
7/4	0.0	172.6	-172.6	-502.2
7/5	0.0	172.6	-172.6	-674.8
7/6	6497.7	172.6	6325.1	5650.2
7/7	0.0	172.6	-172.6	-172.6
7/8	11046.1	172.6	10873.4	10700.8
7/9	0.0	172.6	-172.6	-172.6
7/10	0.0	172.6	-172.6	-345.3
7/11	25665.9	172.6	25493.3	25148.0
7/12	0.0	172.6	-172.6	-172.6
7/13	0.0	172.6	-172.6	-345.3
7/14	0.0	172.6	-172.6	-517.9
7/15	0.0	172.6	-172.6	-690.6
7/16	0.0	172.6	-172.6	-863.2
7/17	37686.7	172.6	37514.0	36650.8
7/18	27290.3	172.6	27117.7	27117.7
7/19	0.0	172.6	-172.6	-172.6
7/20	0.0	172.6	-172.6	-345.3
7/21	20142.9	172.6	19970.2	19624.9
7/22	18193.6	172.6	18020.9	18020.9
7/23	11371.0	172.6	11198.3	11198.3
7/24	0.0	172.6	-172.6	-172.6
7/25	0.0	172.6	-172.6	-345.3
7/26	0.0	172.6	-172.6	-517.9
7/27	0.0	172.6	-172.6	-690.6
7/28	1949.3	172.6	1776.7	1086.1
7/29	0.0	172.6	-172.6	-172.6
7/30	0.0	172.6	-172.6	-345.3
7/31	22417.1	172.6	22244.4	21899.1

August 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
8/1	0.0	145.0	-145.0	-145.0
8/2	0.0	145.0	-145.0	-290.0
8/3	0.0	145.0	-145.0	-435.1
8/4	0.0	145.0	-145.0	-580.1
8/5	0.0	145.0	-145.0	-725.1
8/6	10721.2	145.0	10576.2	9851.1
8/7	51331.8	145.0	51186.8	51186.8
8/8	0.0	145.0	-145.0	-145.0
8/9	0.0	145.0	-145.0	-290.0
8/10	0.0	145.0	-145.0	-435.1
8/11	0.0	145.0	-145.0	-580.1
8/12	0.0	145.0	-145.0	-725.1
8/13	1299.5	145.0	1154.5	429.4
8/14	649.8	145.0	504.7	504.7
8/15	0.0	145.0	-145.0	-145.0
8/16	0.0	145.0	-145.0	-290.0
8/17	0.0	145.0	-145.0	-435.1
8/18	0.0	145.0	-145.0	-580.1
8/19	0.0	145.0	-145.0	-725.1
8/20	0.0	145.0	-145.0	-870.1
8/21	17868.7	145.0	17723.7	16853.5
8/22	22417.1	145.0	22272.0	22272.0
8/23	4223.5	145.0	4078.5	4078.5
8/24	0.0	145.0	-145.0	-145.0
8/25	0.0	145.0	-145.0	-290.0
8/26	0.0	145.0	-145.0	-435.1
8/27	0.0	145.0	-145.0	-580.1
8/28	2274.2	145.0	2129.2	1549.1
8/29	0.0	145.0	-145.0	-145.0
8/30	0.0	145.0	-145.0	-290.0
8/31	0.0	145.0	-145.0	-435.1

September 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
9/1	0.0	109.5	-109.5	-544.5
9/2	16894.0	109.5	16784.6	16240.0
9/3	0.0	109.5	-109.5	-109.5
9/4	0.0	109.5	-109.5	-218.9
9/5	0.0	109.5	-109.5	-328.4
9/6	649.8	109.5	540.3	212.0
9/7	0.0	109.5	-109.5	-109.5
9/8	0.0	109.5	-109.5	-218.9
9/9	1299.5	109.5	1190.1	971.2
9/10	0.0	109.5	-109.5	-109.5
9/11	0.0	109.5	-109.5	-218.9
9/12	2274.2	109.5	2164.7	1945.8
9/13	0.0	109.5	-109.5	-109.5
9/14	0.0	109.5	-109.5	-218.9
9/15	0.0	109.5	-109.5	-328.4
9/16	324.9	109.5	215.4	-112.9
9/17	0.0	109.5	-109.5	-222.4
9/18	0.0	109.5	-109.5	-331.8
9/19	0.0	109.5	-109.5	-441.3
9/20	0.0	109.5	-109.5	-550.7
9/21	0.0	109.5	-109.5	-660.2
9/22	0.0	109.5	-109.5	-769.6
9/23	324.9	109.5	215.4	-554.2
9/24	0.0	109.5	-109.5	-663.6
9/25	0.0	109.5	-109.5	-773.1
9/26	974.7	109.5	865.2	92.1
9/27	0.0	109.5	-109.5	-109.5
9/28	0.0	109.5	-109.5	-218.9
9/29	0.0	109.5	-109.5	-328.4
9/30	324.9	109.5	215.4	-112.9

October 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
10/1	0.0	58.6	-58.6	-171.5
10/2	1949.3	58.6	1890.7	1719.2
10/3	8447.0	58.6	8388.4	8388.4
10/4	0.0	58.6	-58.6	-58.6
10/5	0.0	58.6	-58.6	-117.2
10/6	324.9	58.6	266.3	149.1
10/7	974.7	58.6	916.1	916.1
10/8	0.0	58.6	-58.6	-58.6
10/9	4223.5	58.6	4164.9	4106.3
10/10	0.0	58.6	-58.6	-58.6
10/11	0.0	58.6	-58.6	-117.2
10/12	0.0	58.6	-58.6	-175.8
10/13	0.0	58.6	-58.6	-234.4
10/14	0.0	58.6	-58.6	-293.0
10/15	0.0	58.6	-58.6	-351.5
10/16	48732.8	58.6	48674.2	48322.6
10/17	0.0	58.6	-58.6	-58.6
10/18	0.0	58.6	-58.6	-117.2
10/19	0.0	58.6	-58.6	-175.8
10/20	12020.7	58.6	11962.2	11786.4
10/21	0.0	58.6	-58.6	-58.6
10/22	24691.3	58.6	24632.7	24574.1
10/23	0.0	58.6	-58.6	-58.6
10/24	0.0	58.6	-58.6	-117.2
10/25	0.0	58.6	-58.6	-175.8
10/26	324.9	58.6	266.3	90.5
10/27	39960.9	58.6	39902.3	39902.3
10/28	0.0	58.6	-58.6	-58.6
10/29	1624.4	58.6	1565.8	1507.2
10/30	6822.6	58.6	6764.0	6764.0
10/31	974.7	58.6	916.1	916.1

November 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
11/1	4223.5	11.0	4212.5	4212.5
11/2	0.0	11.0	-11.0	-11.0
11/3	0.0	11.0	-11.0	-22.0
11/4	0.0	11.0	-11.0	-33.0
11/5	0.0	11.0	-11.0	-44.0
11/6	0.0	11.0	-11.0	-54.9
11/7	1624.4	11.0	1613.4	1558.5
11/8	0.0	11.0	-11.0	-11.0
11/9	0.0	11.0	-11.0	-22.0
11/10	0.0	11.0	-11.0	-33.0
11/11	0.0	11.0	-11.0	-44.0
11/12	2274.2	11.0	2263.2	2219.3
11/13	0.0	11.0	-11.0	-11.0
11/14	0.0	11.0	-11.0	-22.0
11/15	0.0	11.0	-11.0	-33.0
11/16	0.0	11.0	-11.0	-44.0
11/17	0.0	11.0	-11.0	-54.9
11/18	4873.3	11.0	4862.3	4807.3
11/19	649.8	11.0	638.8	638.8
11/20	0.0	11.0	-11.0	-11.0
11/21	0.0	11.0	-11.0	-22.0
11/22	0.0	11.0	-11.0	-33.0
11/23	5198.2	11.0	5187.2	5154.2
11/24	32163.6	11.0	32152.6	32152.6
11/25	0.0	11.0	-11.0	-11.0
11/26	0.0	11.0	-11.0	-22.0
11/27	0.0	11.0	-11.0	-33.0
11/28	0.0	11.0	-11.0	-44.0
11/29	0.0	11.0	-11.0	-54.9
11/30	0.0	11.0	-11.0	-65.9

December 2019

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
12/1	22742.0	2.9	22739.1	22673.1
12/2	10071.4	2.9	10068.6	10068.6
12/3	649.8	2.9	646.9	646.9
12/4	0.0	2.9	-2.9	-2.9
12/5	0.0	2.9	-2.9	-5.8
12/6	0.0	2.9	-2.9	-8.6
12/7	0.0	2.9	-2.9	-11.5
12/8	0.0	2.9	-2.9	-14.4
12/9	23391.7	2.9	23388.8	23374.4
12/10	5198.2	2.9	5195.3	5195.3
12/11	7472.4	2.9	7469.5	7469.5
12/12	0.0	2.9	-2.9	-2.9
12/13	16894.0	2.9	16891.1	16888.3
12/14	8447.0	2.9	8444.1	8444.1
12/15	0.0	2.9	-2.9	-2.9
12/16	7147.5	2.9	7144.6	7141.7
12/17	23391.7	2.9	23388.8	23388.8
12/18	0.0	2.9	-2.9	-2.9
12/19	0.0	2.9	-2.9	-5.8
12/20	0.0	2.9	-2.9	-8.6
12/21	0.0	2.9	-2.9	-11.5
12/22	0.0	2.9	-2.9	-14.4
12/23	0.0	2.9	-2.9	-17.3
12/24	0.0	2.9	-2.9	-20.2
12/25	0.0	2.9	-2.9	-23.1
12/26	0.0	2.9	-2.9	-25.9
12/27	0.0	2.9	-2.9	-28.8
12/28	0.0	2.9	-2.9	-31.7
12/29	9096.8	2.9	9093.9	9062.2
12/30	19493.1	2.9	19490.2	19490.2
12/31	0.0	2.9	-2.9	-2.9

Dry Year (2016)

Month	T _i (°F)	T _i (°C)	ET _i (ft ³ /day)	Correction Factor
January	30.3	-0.9	0.0	0.80
February	34.3	1.3	2.5	0.89
March	46.2	7.9	29.3	0.99
April	50.1	10.1	46.5	1.10
May	59.8	15.4	87.1	1.20
June	70.1	21.2	143.0	1.25
July	76.7	24.8	168.6	1.23
August	76.2	24.6	155.3	1.15
September	68.7	20.4	113.1	1.04
October	55.6	13.1	54.2	0.93
November	45.4	7.4	23.5	0.83
December	34.2	1.2	1.9	0.78
	I=	55.5		
	a=	1.4		

January 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
1/1	0.0	0.0	0.0	0.0
1/2	0.0	0.0	0.0	0.0
1/3	0.0	0.0	0.0	0.0
1/4	0.0	0.0	0.0	0.0
1/5	0.0	0.0	0.0	0.0
1/6	0.0	0.0	0.0	0.0
1/7	0.0	0.0	0.0	0.0
1/8	0.0	0.0	0.0	0.0
1/9	974.7	0.0	974.7	974.7
1/10	51981.6	0.0	51981.6	51981.6
1/11	0.0	0.0	0.0	0.0
1/12	0.0	0.0	0.0	0.0
1/13	0.0	0.0	0.0	0.0
1/14	0.0	0.0	0.0	0.0
1/15	649.8	0.0	649.8	649.8
1/16	6497.7	0.0	6497.7	6497.7
1/17	0.0	0.0	0.0	0.0
1/18	0.0	0.0	0.0	0.0
1/19	0.0	0.0	0.0	0.0
1/20	0.0	0.0	0.0	0.0
1/21	0.0	0.0	0.0	0.0
1/22	0.0	0.0	0.0	0.0
1/23	0.0	0.0	0.0	0.0
1/24	0.0	0.0	0.0	0.0
1/25	0.0	0.0	0.0	0.0
1/26	0.0	0.0	0.0	0.0
1/27	0.0	0.0	0.0	0.0
1/28	0.0	0.0	0.0	0.0
1/29	0.0	0.0	0.0	0.0
1/30	0.0	0.0	0.0	0.0
1/31	0.0	0.0	0.0	0.0

February 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
2/1	649.8	2.5	647.3	647.3
2/2	0.0	2.5	-2.5	-2.5
2/3	37361.8	2.5	37359.3	37356.8
2/4	324.9	2.5	322.4	322.4
2/5	3898.6	2.5	3896.2	3896.2
2/6	0.0	2.5	-2.5	-2.5
2/7	0.0	2.5	-2.5	-4.9
2/8	0.0	2.5	-2.5	-7.4
2/9	0.0	2.5	-2.5	-9.9
2/10	1624.4	2.5	1622.0	1612.1
2/11	0.0	2.5	-2.5	-2.5
2/12	0.0	2.5	-2.5	-4.9
2/13	0.0	2.5	-2.5	-7.4
2/14	0.0	2.5	-2.5	-9.9
2/15	974.7	2.5	972.2	962.3
2/16	19818.0	2.5	19815.5	19815.5
2/17	0.0	2.5	-2.5	-2.5
2/18	0.0	2.5	-2.5	-4.9
2/19	0.0	2.5	-2.5	-7.4
2/20	0.0	2.5	-2.5	-9.9
2/21	2274.2	2.5	2271.7	2261.9
2/22	0.0	2.5	-2.5	-2.5
2/23	6172.8	2.5	6170.4	6167.9
2/24	45159.0	2.5	45156.6	45156.6
2/25	1299.5	2.5	1297.1	1297.1
2/26	0.0	2.5	-2.5	-2.5
2/27	0.0	2.5	-2.5	-4.9
2/28	0.0	2.5	-2.5	-7.4
2/29	974.7	2.5	972.2	964.8

March 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
3/1	0.0	29.3	-29.3	-29.3
3/2	10071.4	29.3	10042.2	10012.9
3/3	0.0	29.3	-29.3	-29.3
3/4	324.9	29.3	295.6	266.4
3/5	0.0	29.3	-29.3	-29.3
3/6	0.0	29.3	-29.3	-58.5
3/7	0.0	29.3	-29.3	-87.8
3/8	0.0	29.3	-29.3	-117.1
3/9	0.0	29.3	-29.3	-146.3
3/10	0.0	29.3	-29.3	-175.6
3/11	1299.5	29.3	1270.3	1094.7
3/12	0.0	29.3	-29.3	-29.3
3/13	649.8	29.3	620.5	591.2
3/14	16894.0	29.3	16864.8	16864.8
3/15	0.0	29.3	-29.3	-29.3
3/16	649.8	29.3	620.5	591.2
3/17	0.0	29.3	-29.3	-29.3
3/18	0.0	29.3	-29.3	-58.5
3/19	0.0	29.3	-29.3	-87.8
3/20	0.0	29.3	-29.3	-117.1
3/21	0.0	29.3	-29.3	-146.3
3/22	0.0	29.3	-29.3	-175.6
3/23	0.0	29.3	-29.3	-204.9
3/24	0.0	29.3	-29.3	-234.1
3/25	1624.4	29.3	1595.2	1361.0
3/26	0.0	29.3	-29.3	-29.3
3/27	0.0	29.3	-29.3	-58.5
3/28	12995.4	29.3	12966.1	12907.6
3/29	0.0	29.3	-29.3	-29.3
3/30	0.0	29.3	-29.3	-58.5
3/31	0.0	29.3	-29.3	-87.8

April 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
4/1	10396.3	46.5	10349.8	10262.0
4/2	8771.9	46.5	8725.4	8725.4
4/3	649.8	46.5	603.3	603.3
4/4	11046.1	46.5	10999.6	10999.6
4/5	0.0	46.5	-46.5	-46.5
4/6	0.0	46.5	-46.5	-93.0
4/7	6497.7	46.5	6451.2	6358.2
4/8	0.0	46.5	-46.5	-46.5
4/9	1949.3	46.5	1902.8	1856.3
4/10	0.0	46.5	-46.5	-46.5
4/11	0.0	46.5	-46.5	-93.0
4/12	0.0	46.5	-46.5	-139.5
4/13	0.0	46.5	-46.5	-186.0
4/14	0.0	46.5	-46.5	-232.4
4/15	0.0	46.5	-46.5	-278.9
4/16	0.0	46.5	-46.5	-325.4
4/17	0.0	46.5	-46.5	-371.9
4/18	0.0	46.5	-46.5	-418.4
4/19	0.0	46.5	-46.5	-464.9
4/20	0.0	46.5	-46.5	-511.4
4/21	0.0	46.5	-46.5	-557.9
4/22	0.0	46.5	-46.5	-604.4
4/23	1624.4	46.5	1577.9	973.6
4/24	0.0	46.5	-46.5	-46.5
4/25	0.0	46.5	-46.5	-93.0
4/26	2274.2	46.5	2227.7	2134.7
4/27	0.0	46.5	-46.5	-46.5
4/28	649.8	46.5	603.3	556.8
4/29	1949.3	46.5	1902.8	1902.8
4/30	0.0	46.5	-46.5	-46.5

May 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
5/1	8447.0	87.1	8359.9	8313.4
5/2	4873.3	87.1	4786.1	4786.1
5/3	18518.4	87.1	18431.3	18431.3
5/4	4223.5	87.1	4136.4	4136.4
5/5	59778.8	87.1	59691.7	59691.7
5/6	13320.3	87.1	13233.1	13233.1
5/7	0.0	87.1	-87.1	-87.1
5/8	6497.7	87.1	6410.6	6323.4
5/9	0.0	87.1	-87.1	-87.1
5/10	0.0	87.1	-87.1	-174.3
5/11	0.0	87.1	-87.1	-261.4
5/12	0.0	87.1	-87.1	-348.5
5/13	5847.9	87.1	5760.8	5412.2
5/14	2274.2	87.1	2187.1	2187.1
5/15	1299.5	87.1	1212.4	1212.4
5/16	0.0	87.1	-87.1	-87.1
5/17	0.0	87.1	-87.1	-174.3
5/18	0.0	87.1	-87.1	-261.4
5/19	0.0	87.1	-87.1	-348.5
5/20	0.0	87.1	-87.1	-435.7
5/21	15594.5	87.1	15507.3	15071.7
5/22	6497.7	87.1	6410.6	6410.6
5/23	3898.6	87.1	3811.5	3811.5
5/24	1624.4	87.1	1537.3	1537.3
5/25	0.0	87.1	-87.1	-87.1
5/26	0.0	87.1	-87.1	-174.3
5/27	324.9	87.1	237.7	63.5
5/28	0.0	87.1	-87.1	-87.1
5/29	1949.3	87.1	1862.2	1775.0
5/30	4548.4	87.1	4461.3	4461.3
5/31	0.0	87.1	-87.1	-87.1

June 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
6/1	0.0	143.0	-143.0	-230.1
6/2	0.0	143.0	-143.0	-373.1
6/3	0.0	143.0	-143.0	-516.1
6/4	0.0	143.0	-143.0	-659.1
6/5	10721.2	143.0	10578.2	9919.2
6/6	0.0	143.0	-143.0	-143.0
6/7	324.9	143.0	181.9	38.9
6/8	18843.3	143.0	18700.4	18700.4
6/9	0.0	143.0	-143.0	-143.0
6/10	0.0	143.0	-143.0	-286.0
6/11	0.0	143.0	-143.0	-428.9
6/12	0.0	143.0	-143.0	-571.9
6/13	0.0	143.0	-143.0	-714.9
6/14	0.0	143.0	-143.0	-857.9
6/15	0.0	143.0	-143.0	-1000.9
6/16	324.9	143.0	181.9	-818.9
6/17	0.0	143.0	-143.0	-961.9
6/18	0.0	143.0	-143.0	-1104.9
6/19	0.0	143.0	-143.0	-1247.9
6/20	0.0	143.0	-143.0	-1390.9
6/21	0.0	143.0	-143.0	-1533.8
6/22	0.0	143.0	-143.0	-1676.8
6/23	6497.7	143.0	6354.7	4677.9
6/24	0.0	143.0	-143.0	-143.0
6/25	0.0	143.0	-143.0	-286.0
6/26	0.0	143.0	-143.0	-428.9
6/27	3248.9	143.0	3105.9	2676.9
6/28	22417.1	143.0	22274.1	22274.1
6/29	0.0	143.0	-143.0	-143.0
6/30	0.0	143.0	-143.0	-286.0

July 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
7/1	649.8	168.6	481.2	195.2
7/2	0.0	168.6	-168.6	-168.6
7/3	0.0	168.6	-168.6	-337.2
7/4	15269.6	168.6	15101.0	14763.8
7/5	10396.3	168.6	10227.7	10227.7
7/6	0.0	168.6	-168.6	-168.6
7/7	0.0	168.6	-168.6	-337.2
7/8	25665.9	168.6	25497.3	25160.1
7/9	1949.3	168.6	1780.7	1780.7
7/10	0.0	168.6	-168.6	-168.6
7/11	0.0	168.6	-168.6	-337.2
7/12	0.0	168.6	-168.6	-505.8
7/13	6172.8	168.6	6004.2	5498.4
7/14	12345.6	168.6	12177.0	12177.0
7/15	0.0	168.6	-168.6	-168.6
7/16	0.0	168.6	-168.6	-337.2
7/17	0.0	168.6	-168.6	-505.8
7/18	13970.1	168.6	13801.5	13295.7
7/19	0.0	168.6	-168.6	-168.6
7/20	0.0	168.6	-168.6	-337.2
7/21	0.0	168.6	-168.6	-505.8
7/22	0.0	168.6	-168.6	-674.4
7/23	0.0	168.6	-168.6	-843.0
7/24	0.0	168.6	-168.6	-1011.6
7/25	26640.6	168.6	26472.0	25460.4
7/26	0.0	168.6	-168.6	-168.6
7/27	0.0	168.6	-168.6	-337.2
7/28	974.7	168.6	806.1	468.9
7/29	19168.2	168.6	18999.6	18999.6
7/30	32163.6	168.6	31995.0	31995.0
7/31	25665.9	168.6	25497.3	25497.3

August 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
8/1	0.0	155.3	-155.3	-155.3
8/2	0.0	155.3	-155.3	-310.5
8/3	0.0	155.3	-155.3	-465.8
8/4	0.0	155.3	-155.3	-621.1
8/5	0.0	155.3	-155.3	-776.4
8/6	10721.2	155.3	10565.9	9789.6
8/7	0.0	155.3	-155.3	-155.3
8/8	0.0	155.3	-155.3	-310.5
8/9	324.9	155.3	169.6	-140.9
8/10	3248.9	155.3	3093.6	2952.6
8/11	25990.8	155.3	25835.5	25835.5
8/12	20142.9	155.3	19987.6	19987.6
8/13	0.0	155.3	-155.3	-155.3
8/14	0.0	155.3	-155.3	-310.5
8/15	0.0	155.3	-155.3	-465.8
8/16	12995.4	155.3	12840.1	12374.3
8/17	0.0	155.3	-155.3	-155.3
8/18	5198.2	155.3	5042.9	4887.6
8/19	0.0	155.3	-155.3	-155.3
8/20	0.0	155.3	-155.3	-310.5
8/21	13970.1	155.3	13814.8	13504.2
8/22	0.0	155.3	-155.3	-155.3
8/23	0.0	155.3	-155.3	-310.5
8/24	0.0	155.3	-155.3	-465.8
8/25	0.0	155.3	-155.3	-621.1
8/26	0.0	155.3	-155.3	-776.4
8/27	0.0	155.3	-155.3	-931.6
8/28	0.0	155.3	-155.3	-1086.9
8/29	0.0	155.3	-155.3	-1242.2
8/30	0.0	155.3	-155.3	-1397.5
8/31	649.8	155.3	494.5	-903.0

September 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
9/1	7147.5	113.1	7034.3	6131.4
9/2	0.0	113.1	-113.1	-113.1
9/3	0.0	113.1	-113.1	-226.3
9/4	0.0	113.1	-113.1	-339.4
9/5	0.0	113.1	-113.1	-452.6
9/6	0.0	113.1	-113.1	-565.7
9/7	0.0	113.1	-113.1	-678.9
9/8	0.0	113.1	-113.1	-792.0
9/9	0.0	113.1	-113.1	-905.2
9/10	0.0	113.1	-113.1	-1018.3
9/11	0.0	113.1	-113.1	-1131.5
9/12	0.0	113.1	-113.1	-1244.6
9/13	0.0	113.1	-113.1	-1357.8
9/14	0.0	113.1	-113.1	-1470.9
9/15	0.0	113.1	-113.1	-1584.1
9/16	0.0	113.1	-113.1	-1697.2
9/17	0.0	113.1	-113.1	-1810.4
9/18	0.0	113.1	-113.1	-1923.5
9/19	17868.7	113.1	17755.5	15832.0
9/20	0.0	113.1	-113.1	-113.1
9/21	0.0	113.1	-113.1	-226.3
9/22	0.0	113.1	-113.1	-339.4
9/23	0.0	113.1	-113.1	-452.6
9/24	0.0	113.1	-113.1	-565.7
9/25	0.0	113.1	-113.1	-678.9
9/26	0.0	113.1	-113.1	-792.0
9/27	10071.4	113.1	9958.3	9166.3
9/28	0.0	113.1	-113.1	-113.1
9/29	974.7	113.1	861.5	748.4
9/30	1949.3	113.1	1836.2	1836.2

October 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
10/1	0.0	54.2	-54.2	-54.2
10/2	0.0	54.2	-54.2	-108.5
10/3	0.0	54.2	-54.2	-162.7
10/4	0.0	54.2	-54.2	-217.0
10/5	0.0	54.2	-54.2	-271.2
10/6	0.0	54.2	-54.2	-325.5
10/7	0.0	54.2	-54.2	-379.7
10/8	0.0	54.2	-54.2	-434.0
10/9	0.0	54.2	-54.2	-488.2
10/10	0.0	54.2	-54.2	-542.4
10/11	0.0	54.2	-54.2	-596.7
10/12	0.0	54.2	-54.2	-650.9
10/13	0.0	54.2	-54.2	-705.2
10/14	0.0	54.2	-54.2	-759.4
10/15	0.0	54.2	-54.2	-813.7
10/16	0.0	54.2	-54.2	-867.9
10/17	0.0	54.2	-54.2	-922.1
10/18	0.0	54.2	-54.2	-976.4
10/19	0.0	54.2	-54.2	-1030.6
10/20	0.0	54.2	-54.2	-1084.9
10/21	974.7	54.2	920.4	-164.5
10/22	7797.2	54.2	7743.0	7578.5
10/23	0.0	54.2	-54.2	-54.2
10/24	0.0	54.2	-54.2	-108.5
10/25	0.0	54.2	-54.2	-162.7
10/26	0.0	54.2	-54.2	-217.0
10/27	14944.7	54.2	14890.5	14673.5
10/28	0.0	54.2	-54.2	-54.2
10/29	0.0	54.2	-54.2	-108.5
10/30	5847.9	54.2	5793.7	5685.2
10/31	0.0	54.2	-54.2	-54.2

November 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
11/1	0.0	23.5	-23.5	-77.7
11/2	0.0	23.5	-23.5	-101.2
11/3	0.0	23.5	-23.5	-124.6
11/4	0.0	23.5	-23.5	-148.1
11/5	0.0	23.5	-23.5	-171.6
11/6	0.0	23.5	-23.5	-195.0
11/7	0.0	23.5	-23.5	-218.5
11/8	0.0	23.5	-23.5	-241.9
11/9	5198.2	23.5	5174.7	4932.8
11/10	0.0	23.5	-23.5	-23.5
11/11	0.0	23.5	-23.5	-46.9
11/12	0.0	23.5	-23.5	-70.4
11/13	0.0	23.5	-23.5	-93.9
11/14	0.0	23.5	-23.5	-117.3
11/15	8122.1	23.5	8098.7	7981.3
11/16	0.0	23.5	-23.5	-23.5
11/17	0.0	23.5	-23.5	-46.9
11/18	0.0	23.5	-23.5	-70.4
11/19	6172.8	23.5	6149.4	6079.0
11/20	3573.7	23.5	3550.3	3550.3
11/21	0.0	23.5	-23.5	-23.5
11/22	0.0	23.5	-23.5	-46.9
11/23	0.0	23.5	-23.5	-70.4
11/24	0.0	23.5	-23.5	-93.9
11/25	0.0	23.5	-23.5	-117.3
11/26	0.0	23.5	-23.5	-140.8
11/27	0.0	23.5	-23.5	-164.2
11/28	0.0	23.5	-23.5	-187.7
11/29	49382.5	23.5	49359.1	49171.4
11/30	39960.9	23.5	39937.4	39937.4

December 2016

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
12/1	1299.5	1.9	1297.6	1297.6
12/2	0.0	1.9	-1.9	-1.9
12/3	0.0	1.9	-1.9	-3.8
12/4	0.0	1.9	-1.9	-5.7
12/5	5847.9	1.9	5846.0	5840.3
12/6	15919.4	1.9	15917.5	15917.5
12/7	974.7	1.9	972.8	972.8
12/8	0.0	1.9	-1.9	-1.9
12/9	0.0	1.9	-1.9	-3.8
12/10	0.0	1.9	-1.9	-5.7
12/11	0.0	1.9	-1.9	-7.6
12/12	18518.4	1.9	18516.5	18508.9
12/13	0.0	1.9	-1.9	-1.9
12/14	0.0	1.9	-1.9	-3.8
12/15	0.0	1.9	-1.9	-5.7
12/16	0.0	1.9	-1.9	-7.6
12/17	16244.3	1.9	16242.3	16234.7
12/18	4873.3	1.9	4871.4	4871.4
12/19	0.0	1.9	-1.9	-1.9
12/20	0.0	1.9	-1.9	-3.8
12/21	0.0	1.9	-1.9	-5.7
12/22	0.0	1.9	-1.9	-7.6
12/23	0.0	1.9	-1.9	-9.5
12/24	12995.4	1.9	12993.5	12984.0
12/25	0.0	1.9	-1.9	-1.9
12/26	324.9	1.9	323.0	321.1
12/27	0.0	1.9	-1.9	-1.9
12/28	0.0	1.9	-1.9	-3.8
12/29	10396.3	1.9	10394.4	10390.6
12/30	0.0	1.9	-1.9	-1.9
12/31	0.0	1.9	-1.9	-3.8

Average Year (2017)

Month	T _i (°F)	T _i (°C)	ET _i (ft ³ /day)	Correction Factor
January	35.1	1.7	3.1	0.80
February	38.7	3.7	10.7	0.89
March	37.7	3.2	8.6	0.99
April	56.0	13.3	67.8	1.10
May	59.5	15.3	85.9	1.20
June	69.4	20.8	139.5	1.25
July	75.0	23.9	160.1	1.23
August	71.1	21.7	131.8	1.15
September	67.6	19.8	108.6	1.04
October	59.6	15.3	66.9	0.93
November	42.7	5.9	17.4	0.83
December	30.6	-0.8	0.0	0.78
	I=	53.5		
	a=	1.3		

January 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
1/1	0.0	3.1	-3.1	-3.1
1/2	7797.2	3.1	7794.2	7791.1
1/3	11371.0	3.1	11367.9	11367.9
1/4	0.0	3.1	-3.1	-3.1
1/5	0.0	3.1	-3.1	-6.2
1/6	1299.5	3.1	1296.5	1290.3
1/7	1624.4	3.1	1621.3	1621.3
1/8	0.0	3.1	-3.1	-3.1
1/9	0.0	3.1	-3.1	-6.2
1/10	0.0	3.1	-3.1	-9.3
1/11	16894.0	3.1	16890.9	16881.7
1/12	1299.5	3.1	1296.5	1296.5
1/13	0.0	3.1	-3.1	-3.1
1/14	3248.9	3.1	3245.8	3242.7
1/15	0.0	3.1	-3.1	-3.1
1/16	0.0	3.1	-3.1	-6.2
1/17	13645.2	3.1	13642.1	13635.9
1/18	1949.3	3.1	1946.2	1946.2
1/19	0.0	3.1	-3.1	-3.1
1/20	6172.8	3.1	6169.7	6166.6
1/21	0.0	3.1	-3.1	-3.1
1/22	324.9	3.1	321.8	318.7
1/23	35412.5	3.1	35409.4	35409.4
1/24	9096.8	3.1	9093.7	9093.7
1/25	0.0	3.1	-3.1	-3.1
1/26	0.0	3.1	-3.1	-6.2
1/27	0.0	3.1	-3.1	-9.3
1/28	0.0	3.1	-3.1	-12.4
1/29	0.0	3.1	-3.1	-15.4
1/30	0.0	3.1	-3.1	-18.5
1/31	324.9	3.1	321.8	303.3

February 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
2/1	0.0	10.7	-10.7	-10.7
2/2	0.0	10.7	-10.7	-21.3
2/3	0.0	10.7	-10.7	-32.0
2/4	0.0	10.7	-10.7	-42.7
2/5	0.0	10.7	-10.7	-53.3
2/6	0.0	10.7	-10.7	-64.0
2/7	10071.4	10.7	10060.8	9996.8
2/8	649.8	10.7	639.1	639.1
2/9	15269.6	10.7	15258.9	15258.9
2/10	0.0	10.7	-10.7	-10.7
2/11	0.0	10.7	-10.7	-21.3
2/12	10396.3	10.7	10385.7	10364.3
2/13	324.9	10.7	314.2	314.2
2/14	0.0	10.7	-10.7	-10.7
2/15	0.0	10.7	-10.7	-21.3
2/16	0.0	10.7	-10.7	-32.0
2/17	0.0	10.7	-10.7	-42.7
2/18	0.0	10.7	-10.7	-53.3
2/19	0.0	10.7	-10.7	-64.0
2/20	0.0	10.7	-10.7	-74.7
2/21	0.0	10.7	-10.7	-85.3
2/22	0.0	10.7	-10.7	-96.0
2/23	0.0	10.7	-10.7	-106.7
2/24	0.0	10.7	-10.7	-117.3
2/25	12670.5	10.7	12659.8	12542.5
2/26	974.7	10.7	964.0	964.0
2/27	0.0	10.7	-10.7	-10.7
2/28	0.0	10.7	-10.7	-21.3

March 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
3/1	7797.2	8.6	7788.6	7767.3
3/2	649.8	8.6	641.1	641.1
3/3	0.0	8.6	-8.6	-8.6
3/4	0.0	8.6	-8.6	-17.3
3/5	0.0	8.6	-8.6	-25.9
3/6	0.0	8.6	-8.6	-34.5
3/7	4873.3	8.6	4864.6	4830.1
3/8	324.9	8.6	316.3	316.3
3/9	0.0	8.6	-8.6	-8.6
3/10	7472.4	8.6	7463.7	7455.1
3/11	0.0	8.6	-8.6	-8.6
3/12	0.0	8.6	-8.6	-17.3
3/13	324.9	8.6	316.3	299.0
3/14	55555.3	8.6	55546.7	55546.7
3/15	649.8	8.6	641.1	641.1
3/16	0.0	8.6	-8.6	-8.6
3/17	0.0	8.6	-8.6	-17.3
3/18	324.9	8.6	316.3	299.0
3/19	0.0	8.6	-8.6	-8.6
3/20	0.0	8.6	-8.6	-17.3
3/21	0.0	8.6	-8.6	-25.9
3/22	0.0	8.6	-8.6	-34.5
3/23	0.0	8.6	-8.6	-43.2
3/24	0.0	8.6	-8.6	-51.8
3/25	0.0	8.6	-8.6	-60.4
3/26	0.0	8.6	-8.6	-69.1
3/27	3573.7	8.6	3565.1	3496.0
3/28	1949.3	8.6	1940.7	1940.7
3/29	0.0	8.6	-8.6	-8.6
3/30	324.9	8.6	316.3	307.6
3/31	649.8	8.6	641.1	641.1

April 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
4/1	0.0	67.8	-67.8	-67.8
4/2	0.0	67.8	-67.8	-135.6
4/3	0.0	67.8	-67.8	-203.4
4/4	74073.8	67.8	74006.0	73802.6
4/5	0.0	67.8	-67.8	-67.8
4/6	30864.1	67.8	30796.3	30728.5
4/7	324.9	67.8	257.1	257.1
4/8	0.0	67.8	-67.8	-67.8
4/9	0.0	67.8	-67.8	-135.6
4/10	0.0	67.8	-67.8	-203.4
4/11	0.0	67.8	-67.8	-271.2
4/12	0.0	67.8	-67.8	-339.0
4/13	0.0	67.8	-67.8	-406.8
4/14	0.0	67.8	-67.8	-474.6
4/15	0.0	67.8	-67.8	-542.4
4/16	0.0	67.8	-67.8	-610.3
4/17	0.0	67.8	-67.8	-678.1
4/18	0.0	67.8	-67.8	-745.9
4/19	0.0	67.8	-67.8	-813.7
4/20	3248.9	67.8	3181.0	2367.4
4/21	1299.5	67.8	1231.7	1231.7
4/22	3248.9	67.8	3181.0	3181.0
4/23	0.0	67.8	-67.8	-67.8
4/24	0.0	67.8	-67.8	-135.6
4/25	17218.9	67.8	17151.1	17015.5
4/26	324.9	67.8	257.1	257.1
4/27	0.0	67.8	-67.8	-67.8
4/28	0.0	67.8	-67.8	-135.6
4/29	4548.4	67.8	4480.6	4345.0
4/30	0.0	67.8	-67.8	-67.8

May 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
5/1	0.0	85.9	-85.9	-153.7
5/2	324.9	85.9	239.0	85.3
5/3	0.0	85.9	-85.9	-85.9
5/4	0.0	85.9	-85.9	-171.8
5/5	38336.4	85.9	38250.5	38078.8
5/6	974.7	85.9	888.8	888.8
5/7	0.0	85.9	-85.9	-85.9
5/8	324.9	85.9	239.0	153.1
5/9	0.0	85.9	-85.9	-85.9
5/10	0.0	85.9	-85.9	-171.8
5/11	0.0	85.9	-85.9	-257.6
5/12	324.9	85.9	239.0	-18.6
5/13	46458.6	85.9	46372.7	46354.0
5/14	10071.4	85.9	9985.6	9985.6
5/15	0.0	85.9	-85.9	-85.9
5/16	0.0	85.9	-85.9	-171.8
5/17	0.0	85.9	-85.9	-257.6
5/18	0.0	85.9	-85.9	-343.5
5/19	0.0	85.9	-85.9	-429.4
5/20	1624.4	85.9	1538.5	1109.1
5/21	0.0	85.9	-85.9	-85.9
5/22	0.0	85.9	-85.9	-171.8
5/23	0.0	85.9	-85.9	-257.6
5/24	0.0	85.9	-85.9	-343.5
5/25	324.9	85.9	239.0	-104.5
5/26	0.0	85.9	-85.9	-190.4
5/27	0.0	85.9	-85.9	-276.3
5/28	6822.6	85.9	6736.7	6460.4
5/29	10071.4	85.9	9985.6	9985.6
5/30	7147.5	85.9	7061.6	7061.6
5/31	3573.7	85.9	3487.9	3487.9

June 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
6/1	0.0	139.5	-139.5	-139.5
6/2	0.0	139.5	-139.5	-279.0
6/3	4548.4	139.5	4408.9	4130.0
6/4	4223.5	139.5	4084.0	4084.0
6/5	1624.4	139.5	1484.9	1484.9
6/6	9421.7	139.5	9282.2	9282.2
6/7	0.0	139.5	-139.5	-139.5
6/8	0.0	139.5	-139.5	-279.0
6/9	0.0	139.5	-139.5	-418.4
6/10	0.0	139.5	-139.5	-557.9
6/11	0.0	139.5	-139.5	-697.4
6/12	0.0	139.5	-139.5	-836.9
6/13	0.0	139.5	-139.5	-976.3
6/14	0.0	139.5	-139.5	-1115.8
6/15	0.0	139.5	-139.5	-1255.3
6/16	974.7	139.5	835.2	-420.1
6/17	22417.1	139.5	22277.6	21857.5
6/18	0.0	139.5	-139.5	-139.5
6/19	19818.0	139.5	19678.5	19539.0
6/20	0.0	139.5	-139.5	-139.5
6/21	0.0	139.5	-139.5	-279.0
6/22	0.0	139.5	-139.5	-418.4
6/23	23716.6	139.5	23577.1	23158.7
6/24	26965.5	139.5	26826.0	26826.0
6/25	0.0	139.5	-139.5	-139.5
6/26	0.0	139.5	-139.5	-279.0
6/27	3573.7	139.5	3434.3	3155.3
6/28	0.0	139.5	-139.5	-139.5
6/29	0.0	139.5	-139.5	-279.0
6/30	3248.9	139.5	3109.4	2830.4

July 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
7/1	7472.4	160.1	7312.3	7312.3
7/2	0.0	160.1	-160.1	-160.1
7/3	0.0	160.1	-160.1	-320.1
7/4	0.0	160.1	-160.1	-480.2
7/5	0.0	160.1	-160.1	-640.3
7/6	0.0	160.1	-160.1	-800.4
7/7	61403.3	160.1	61243.2	60442.8
7/8	324.9	160.1	164.8	164.8
7/9	0.0	160.1	-160.1	-160.1
7/10	0.0	160.1	-160.1	-320.1
7/11	0.0	160.1	-160.1	-480.2
7/12	0.0	160.1	-160.1	-640.3
7/13	14944.7	160.1	14784.6	14144.4
7/14	15594.5	160.1	15434.4	15434.4
7/15	324.9	160.1	164.8	164.8
7/16	0.0	160.1	-160.1	-160.1
7/17	974.7	160.1	814.6	654.5
7/18	0.0	160.1	-160.1	-160.1
7/19	0.0	160.1	-160.1	-320.1
7/20	12345.6	160.1	12185.6	11865.4
7/21	0.0	160.1	-160.1	-160.1
7/22	19493.1	160.1	19333.0	19173.0
7/23	649.8	160.1	489.7	489.7
7/24	43209.7	160.1	43049.6	43049.6
7/25	3248.9	160.1	3088.8	3088.8
7/26	0.0	160.1	-160.1	-160.1
7/27	0.0	160.1	-160.1	-320.1
7/28	0.0	160.1	-160.1	-480.2
7/29	0.0	160.1	-160.1	-640.3
7/30	0.0	160.1	-160.1	-800.4
7/31	0.0	160.1	-160.1	-960.4

August 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
8/1	0.0	131.8	-131.8	-1092.2
8/2	26315.7	131.8	26183.9	25091.7
8/3	1624.4	131.8	1492.6	1492.6
8/4	0.0	131.8	-131.8	-131.8
8/5	38011.5	131.8	37879.8	37748.0
8/6	0.0	131.8	-131.8	-131.8
8/7	23391.7	131.8	23259.9	23128.1
8/8	0.0	131.8	-131.8	-131.8
8/9	0.0	131.8	-131.8	-263.6
8/10	0.0	131.8	-131.8	-395.4
8/11	974.7	131.8	842.9	447.5
8/12	1949.3	131.8	1817.5	1817.5
8/13	0.0	131.8	-131.8	-131.8
8/14	324.9	131.8	193.1	61.3
8/15	13970.1	131.8	13838.3	13838.3
8/16	0.0	131.8	-131.8	-131.8
8/17	0.0	131.8	-131.8	-263.6
8/18	16894.0	131.8	16762.2	16498.7
8/19	0.0	131.8	-131.8	-131.8
8/20	0.0	131.8	-131.8	-263.6
8/21	0.0	131.8	-131.8	-395.4
8/22	22092.2	131.8	21960.4	21565.0
8/23	0.0	131.8	-131.8	-131.8
8/24	0.0	131.8	-131.8	-263.6
8/25	0.0	131.8	-131.8	-395.4
8/26	0.0	131.8	-131.8	-527.1
8/27	0.0	131.8	-131.8	-658.9
8/28	0.0	131.8	-131.8	-790.7
8/29	4873.3	131.8	4741.5	3950.8
8/30	0.0	131.8	-131.8	-131.8
8/31	0.0	131.8	-131.8	-263.6

September 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
9/1	0.0	108.6	-108.6	-372.2
9/2	14294.9	108.6	14186.3	13814.1
9/3	7147.5	108.6	7038.8	7038.8
9/4	0.0	108.6	-108.6	-108.6
9/5	3248.9	108.6	3140.2	3031.6
9/6	16894.0	108.6	16785.4	16785.4
9/7	1299.5	108.6	1190.9	1190.9
9/8	0.0	108.6	-108.6	-108.6
9/9	0.0	108.6	-108.6	-217.3
9/10	0.0	108.6	-108.6	-325.9
9/11	0.0	108.6	-108.6	-434.5
9/12	0.0	108.6	-108.6	-543.2
9/13	1299.5	108.6	1190.9	647.7
9/14	324.9	108.6	216.3	216.3
9/15	0.0	108.6	-108.6	-108.6
9/16	0.0	108.6	-108.6	-217.3
9/17	0.0	108.6	-108.6	-325.9
9/18	0.0	108.6	-108.6	-434.5
9/19	649.8	108.6	541.1	106.6
9/20	0.0	108.6	-108.6	-108.6
9/21	0.0	108.6	-108.6	-217.3
9/22	0.0	108.6	-108.6	-325.9
9/23	0.0	108.6	-108.6	-434.5
9/24	0.0	108.6	-108.6	-543.2
9/25	0.0	108.6	-108.6	-651.8
9/26	0.0	108.6	-108.6	-760.4
9/27	0.0	108.6	-108.6	-869.1
9/28	0.0	108.6	-108.6	-977.7
9/29	0.0	108.6	-108.6	-1086.3
9/30	0.0	108.6	-108.6	-1195.0

October 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
10/1	0.0	66.9	-66.9	-1261.9
10/2	0.0	66.9	-66.9	-1328.7
10/3	0.0	66.9	-66.9	-1395.6
10/4	0.0	66.9	-66.9	-1462.5
10/5	649.8	66.9	582.9	-879.6
10/6	0.0	66.9	-66.9	-946.5
10/7	0.0	66.9	-66.9	-1013.4
10/8	4223.5	66.9	4156.6	3143.2
10/9	10721.2	66.9	10654.3	10654.3
10/10	0.0	66.9	-66.9	-66.9
10/11	324.9	66.9	258.0	191.1
10/12	5523.0	66.9	5456.2	5456.2
10/13	0.0	66.9	-66.9	-66.9
10/14	974.7	66.9	907.8	840.9
10/15	324.9	66.9	258.0	258.0
10/16	974.7	66.9	907.8	907.8
10/17	0.0	66.9	-66.9	-66.9
10/18	0.0	66.9	-66.9	-133.8
10/19	0.0	66.9	-66.9	-200.6
10/20	0.0	66.9	-66.9	-267.5
10/21	0.0	66.9	-66.9	-334.4
10/22	0.0	66.9	-66.9	-401.3
10/23	0.0	66.9	-66.9	-468.2
10/24	19168.2	66.9	19101.3	18633.2
10/25	0.0	66.9	-66.9	-66.9
10/26	974.7	66.9	907.8	840.9
10/27	0.0	66.9	-66.9	-66.9
10/28	0.0	66.9	-66.9	-133.8
10/29	104288.1	66.9	104221.2	104087.4
10/30	15269.6	66.9	15202.7	15202.7
10/31	0.0	66.9	-66.9	-66.9

November 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
11/1	0.0	17.4	-17.4	-84.2
11/2	0.0	17.4	-17.4	-101.6
11/3	0.0	17.4	-17.4	-119.0
11/4	324.9	17.4	307.5	188.5
11/5	0.0	17.4	-17.4	-17.4
11/6	0.0	17.4	-17.4	-34.7
11/7	14944.7	17.4	14927.3	14892.6
11/8	0.0	17.4	-17.4	-17.4
11/9	1624.4	17.4	1607.1	1589.7
11/10	0.0	17.4	-17.4	-17.4
11/11	0.0	17.4	-17.4	-34.7
11/12	0.0	17.4	-17.4	-52.1
11/13	5847.9	17.4	5830.6	5778.5
11/14	0.0	17.4	-17.4	-17.4
11/15	0.0	17.4	-17.4	-34.7
11/16	1624.4	17.4	1607.1	1572.3
11/17	0.0	17.4	-17.4	-17.4
11/18	7147.5	17.4	7130.1	7112.7
11/19	2924.0	17.4	2906.6	2906.6
11/20	0.0	17.4	-17.4	-17.4
11/21	0.0	17.4	-17.4	-34.7
11/22	1949.3	17.4	1931.9	1897.2
11/23	0.0	17.4	-17.4	-17.4
11/24	0.0	17.4	-17.4	-34.7
11/25	0.0	17.4	-17.4	-52.1
11/26	0.0	17.4	-17.4	-69.5
11/27	0.0	17.4	-17.4	-86.8
11/28	0.0	17.4	-17.4	-104.2
11/29	0.0	17.4	-17.4	-121.6
11/30	324.9	17.4	307.5	186.0

December 2017

Date	P (ft ³ /day)	ET (ft ³ /day)	ΔS (ft ³ /day)	Cumulative ΔS (ft ³ /day)
12/1	0.0	0.0	0.0	0.0
12/2	0.0	0.0	0.0	0.0
12/3	0.0	0.0	0.0	0.0
12/4	0.0	0.0	0.0	0.0
12/5	7472.4	0.0	7472.4	7472.4
12/6	0.0	0.0	0.0	0.0
12/7	0.0	0.0	0.0	0.0
12/8	0.0	0.0	0.0	0.0
12/9	8122.1	0.0	8122.1	8122.1
12/10	0.0	0.0	0.0	0.0
12/11	0.0	0.0	0.0	0.0
12/12	0.0	0.0	0.0	0.0
12/13	649.8	0.0	649.8	649.8
12/14	1949.3	0.0	1949.3	1949.3
12/15	1949.3	0.0	1949.3	1949.3
12/16	0.0	0.0	0.0	0.0
12/17	0.0	0.0	0.0	0.0
12/18	0.0	0.0	0.0	0.0
12/19	0.0	0.0	0.0	0.0
12/20	0.0	0.0	0.0	0.0
12/21	0.0	0.0	0.0	0.0
12/22	0.0	0.0	0.0	0.0
12/23	21767.3	0.0	21767.3	21767.3
12/24	324.9	0.0	324.9	324.9
12/25	5523.0	0.0	5523.0	5523.0
12/26	0.0	0.0	0.0	0.0
12/27	0.0	0.0	0.0	0.0
12/28	0.0	0.0	0.0	0.0
12/29	0.0	0.0	0.0	0.0
12/30	649.8	0.0	649.8	649.8
12/31	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 volume is 1,923.5 cubic feet and occurs from September 2, 2016 to September 18, 2016. This decrease in volume amounts to approximately a 2" decrease in depth within the permanent pool. Thus, the required depths of water in the pond constructed wetland are maintained throughout the year.

Appendix F2

MTD Information

1805M - Montgomery Twp, NJ

4/4/22

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
Time of Concentration =	10 minutes
Allowable Ponding in Filterra =	9"

Design Summary:

Utilizing NRCS Method and HydroCAD software, a hydrograph can be derived to represent the design storm. As seen in the provided HydroCAD report, 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	Impervious Drainage Area (ac) CN=98	Pervious Drainage Area (ac) CN=39	Filterra HC Model Analyzed
DA #2-2	0.08	0.12	4'x6' Standard Offline Filterra HC - Curb Inlet
DA #2-2A	0.07	0.08	6'x8' Peak Diversion Filterra HC - Grate/Pipe Inlet
DA #2-2B	0.07	0.06	
DA #2-3	0.08	0.21	(2) 4'x4' Standard Offline Filterra HC - Curb Inlet
DA #2-4	0.05	0.15	4'x4' Standard Offline Filterra HC - Curb Inlet
DA #2-5	0.05	0.00	4'x4' Standard Offline Filterra HC - Curb Inlet
DA #2-6	0.29	0.09	13'x7 Standard Offline Filterra HC - Curb Inlet
DA #2-7	0.10	0.71	7.83'x4.5' Standard Offline Filterra HC - Curb Inlet
DA #2-8	0.05	0.00	4'x4' Standard Offline Filterra HC - Curb Inlet
DA #2-9	0.04	0.01	4'x4' Standard Offline Filterra HC - Curb Inlet
DA #2-10	0.08	0.11	4'x6' Standard Offline Filterra HC - Curb Inlet
DA #2-11	0.06	0.00	4'x6' Standard Offline Filterra HC - Curb Inlet
DA #2-12	0.11	0.11	(2) 4'x4' Standard Offline Filterra HC - Curb Inlet
DA #2-13	0.18	0.14	6'x10' Peak Diversion Filterra HC - Grate Inlet
DA #1-1	0.12	0.05	7.83'x4.5' Standard Offline Filterra HC - Curb Inlet
DA #1-2	0.08	0.19	6'x4' Standard Offline Filterra HC - Curb Inlet
DA #1-4	0.08	0.23	6'x4' Standard Offline Filterra HC - Curb Inlet
DA #1-5	0.10	0.62	7.83'x4.5' Standard Offline Filterra HC - Curb Inlet

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.

1805M - Montgomery Twp (4-1-22)

Prepared by quikrete

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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Printed 4/4/2022

Page 1

Summary for Subcatchment 1S: DA #2-2

Runoff = 0.21 cfs @ 1.15 hrs, Volume= 300 cf, Depth= 0.41"

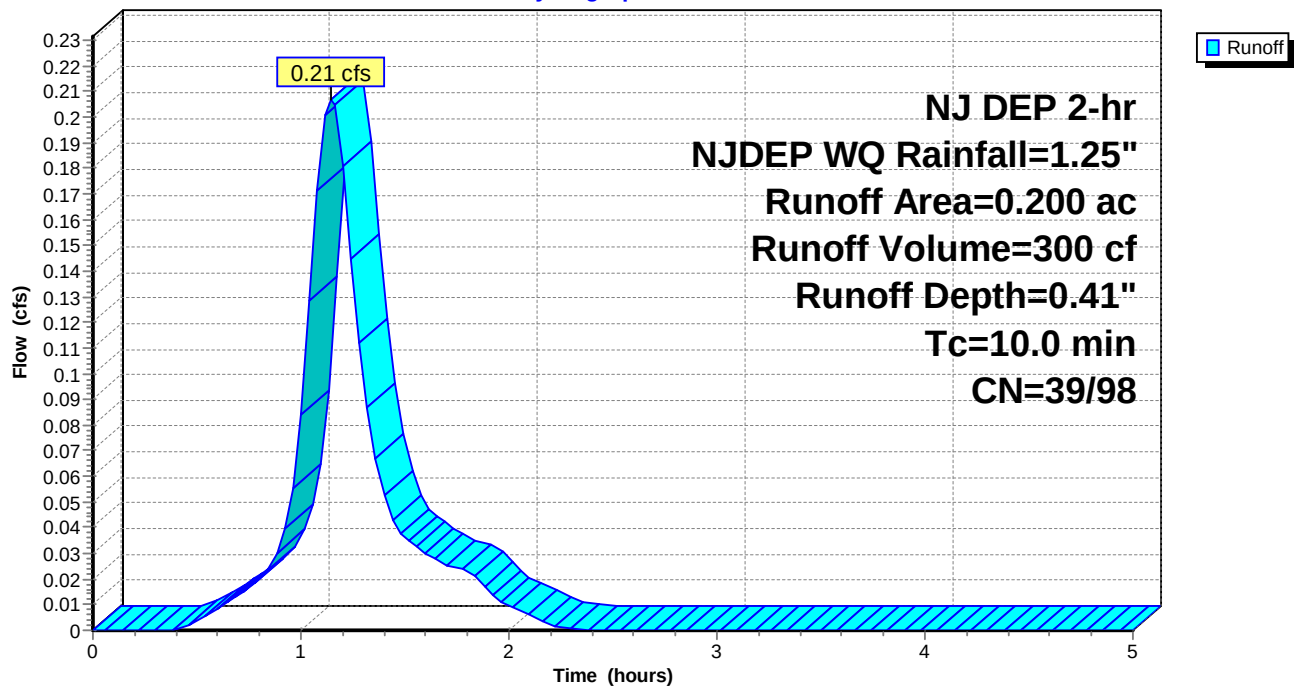
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.080	98	
* 0.120	39	
0.200	63	Weighted Average
0.120	39	60.00% Pervious Area
0.080	98	40.00% Impervious Area

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

Subcatchment 1S: DA #2-2

Hydrograph



Summary for Pond 1P: Filterra 4x6

Inflow Area = 0.200 ac, 40.00% Impervious, Inflow Depth = 0.41" for NJDEP WQ event
 Inflow = 0.21 cfs @ 1.15 hrs, Volume= 300 cf
 Outflow = 0.17 cfs @ 1.08 hrs, Volume= 272 cf, Atten= 19%, Lag= 0.0 min
 Primary = 0.17 cfs @ 1.08 hrs, Volume= 272 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.52' @ 1.21 hrs Surf.Area= 0.001 ac Storage= 12 cf

Plug-Flow detention time= 2.2 min calculated for 272 cf (90% of inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	18 cf	4.00'W x 6.00'L x 0.75'H Prismatic

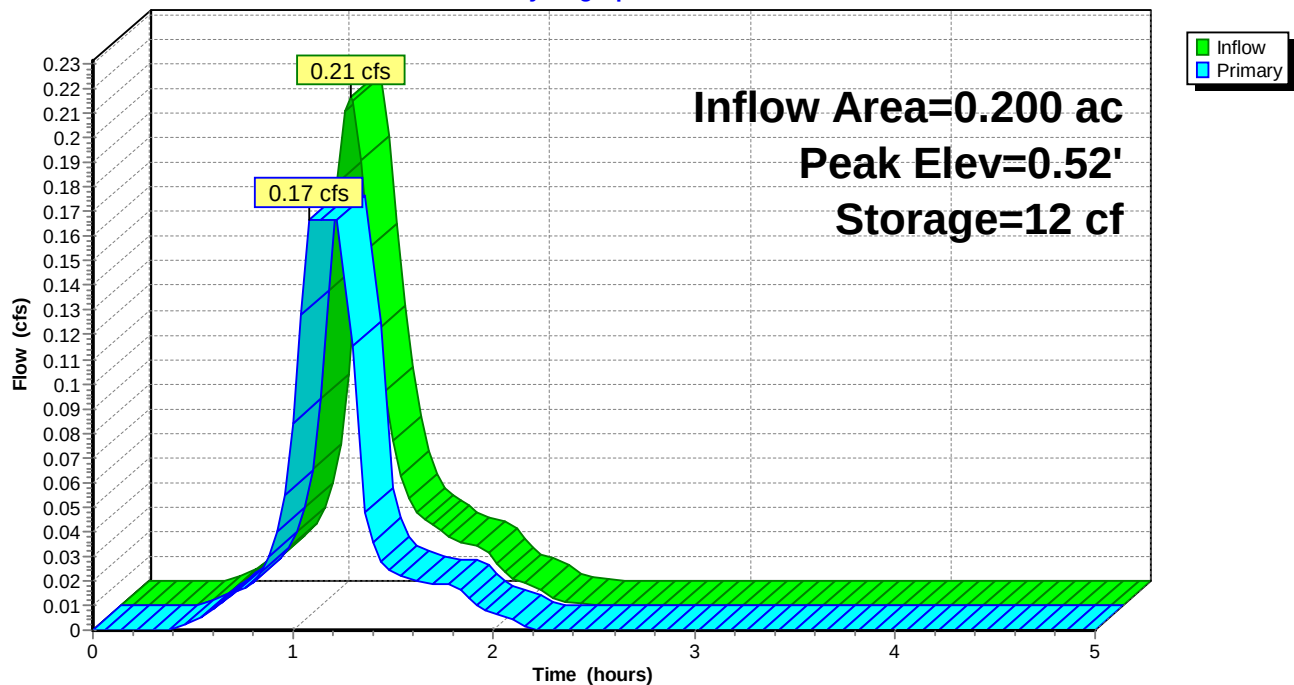
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.17 cfs @ 1.08 hrs HW=0.01' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.17 cfs @ 0.01 fps)

Pond 1P: Filterra 4x6

Hydrograph



1805M - Montgomery Twp (4-1-22)

Prepared by quikrete

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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Page 1

Summary for Subcatchment 2AS: DA #2-2A

Runoff = 0.18 cfs @ 1.15 hrs, Volume= 263 cf, Depth= 0.48"

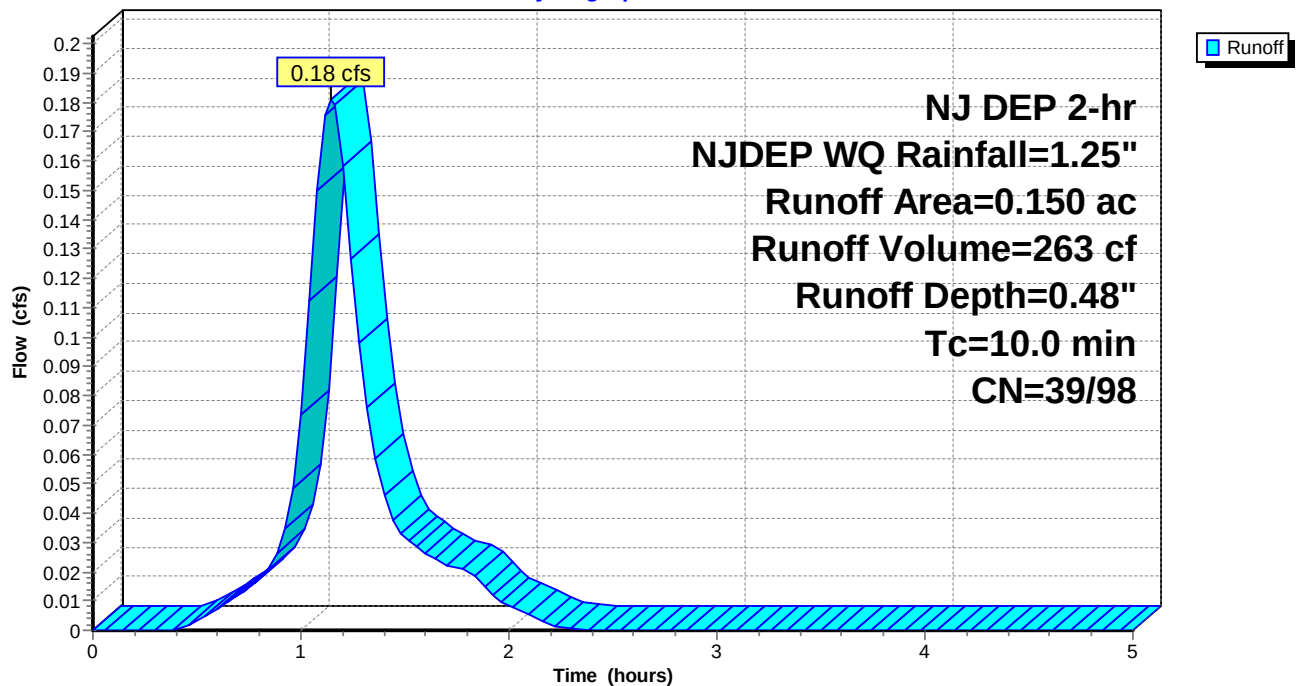
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.070	98	
* 0.080	39	
0.150	67	Weighted Average
0.080	39	53.33% Pervious Area
0.070	98	46.67% Impervious Area

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

Subcatchment 2AS: DA #2-2A

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 2BS: DA #2-2B

Runoff = 0.18 cfs @ 1.15 hrs, Volume= 263 cf, Depth= 0.56"

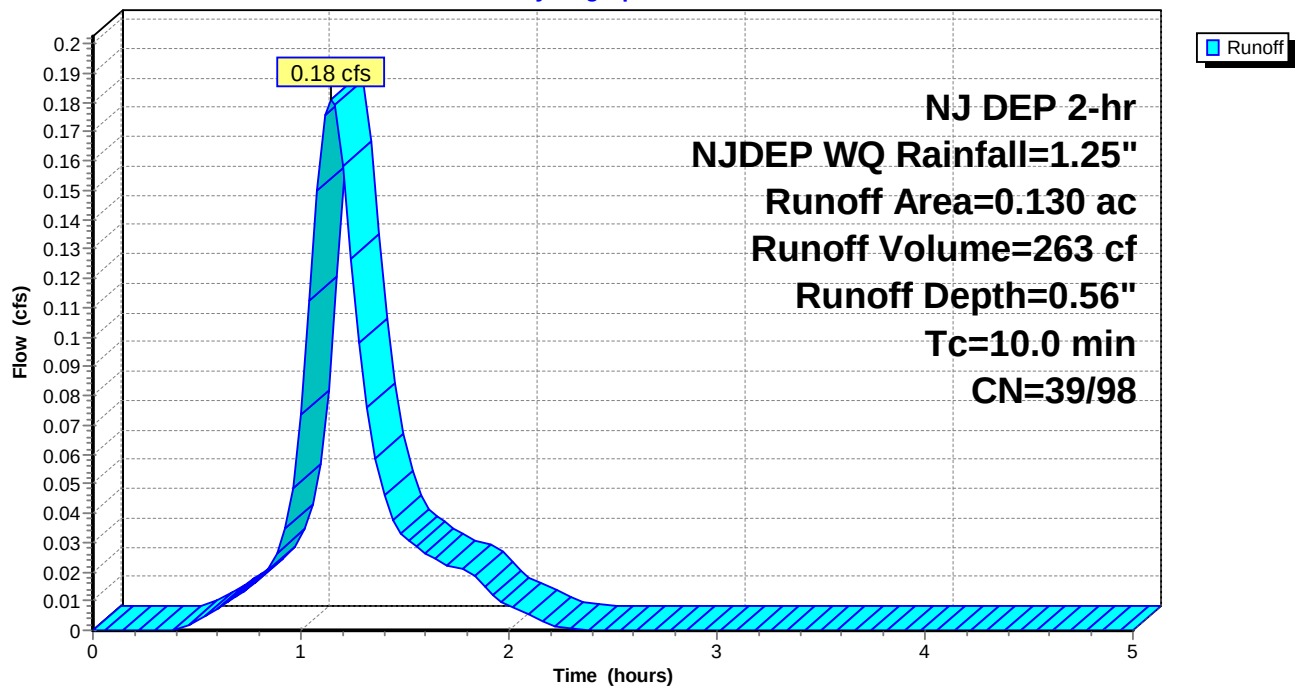
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.070	98	
* 0.060	39	
0.130	71	Weighted Average
0.060	39	46.15% Pervious Area
0.070	98	53.85% Impervious Area

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

Subcatchment 2BS: DA #2-2B

Hydrograph



Summary for Pond 2P: Filterra PD 6x8

Inflow Area = 0.280 ac, 50.00% Impervious, Inflow Depth = 0.52" for NJDEP WQ event
 Inflow = 0.36 cfs @ 1.15 hrs, Volume= 526 cf
 Outflow = 0.33 cfs @ 1.12 hrs, Volume= 535 cf, Atten= 8%, Lag= 0.0 min
 Primary = 0.33 cfs @ 1.12 hrs, Volume= 535 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.11' @ 1.18 hrs Surf.Area= 0.001 ac Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.5 min (74.5 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	36 cf	6.00'W x 8.00'L x 0.75'H Prismatic

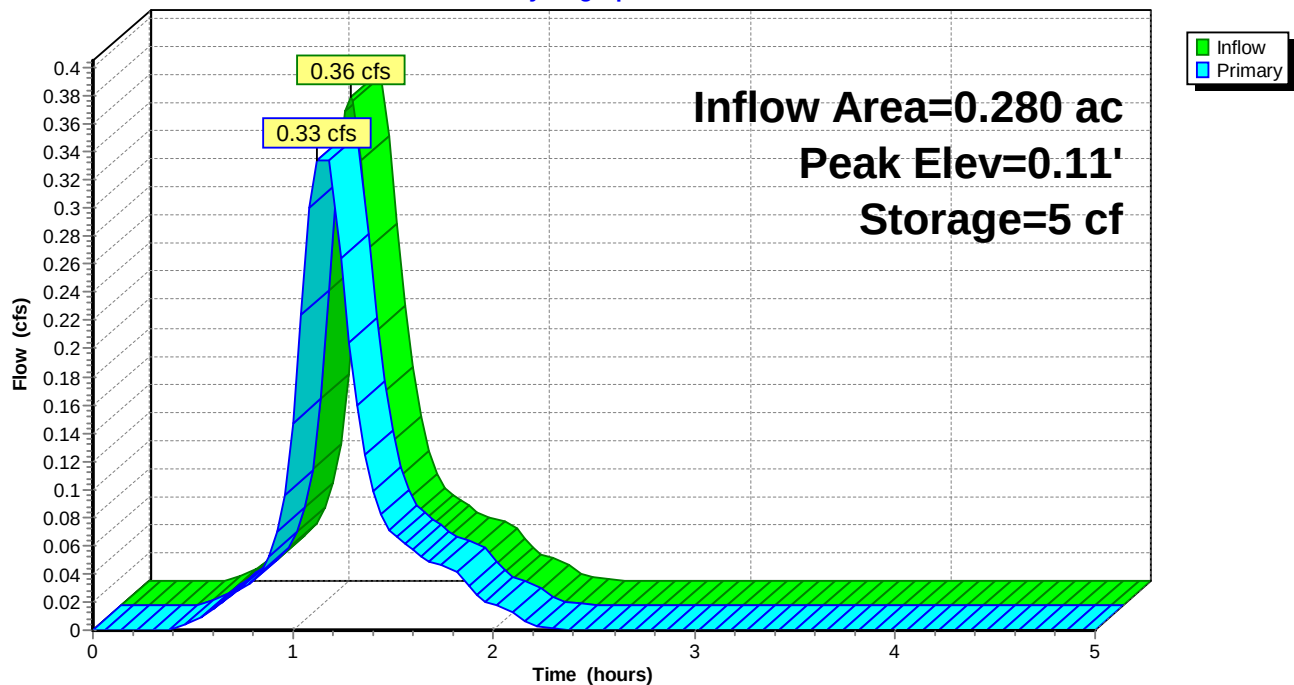
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.33 cfs @ 1.12 hrs HW=0.02' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.33 cfs @ 0.01 fps)

Pond 2P: Filterra PD 6x8

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 3S: DA #2-3

Runoff = 0.21 cfs @ 1.15 hrs, Volume= 300 cf, Depth= 0.29"

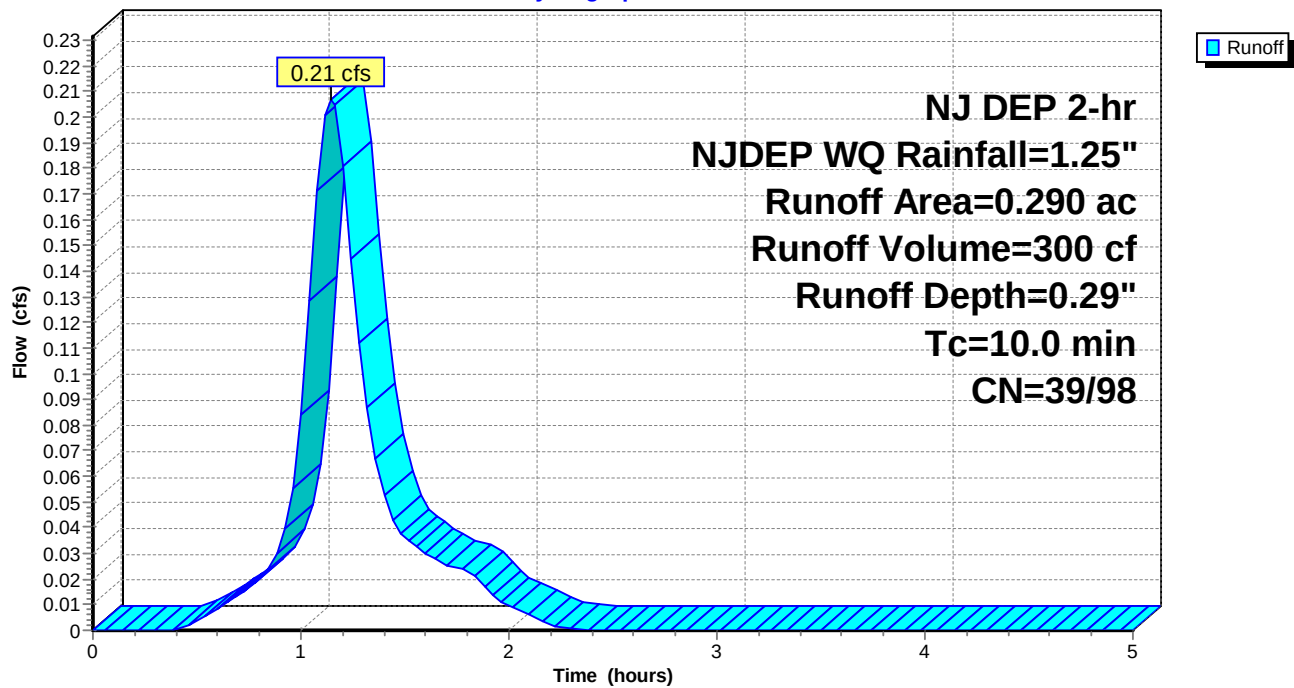
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.080	98	
* 0.210	39	
0.290	55	Weighted Average
0.210	39	72.41% Pervious Area
0.080	98	27.59% Impervious Area

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

Subcatchment 3S: DA #2-3

Hydrograph



Summary for Pond 3P: (2) Filterra 4x4

Inflow Area = 0.290 ac, 27.59% Impervious, Inflow Depth = 0.29" for NJDEP WQ event
 Inflow = 0.21 cfs @ 1.15 hrs, Volume= 300 cf
 Outflow = 0.21 cfs @ 1.15 hrs, Volume= 300 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.21 cfs @ 1.15 hrs, Volume= 300 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.01' @ 1.15 hrs Surf.Area= 0.001 ac Storage= 0 cf

Plug-Flow detention time= 0.1 min calculated for 300 cf (100% of inflow)
 Center-of-Mass det. time= 0.0 min (74.0 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	24 cf	4.00'W x 4.00'L x 0.75'H Prismaoid x 2

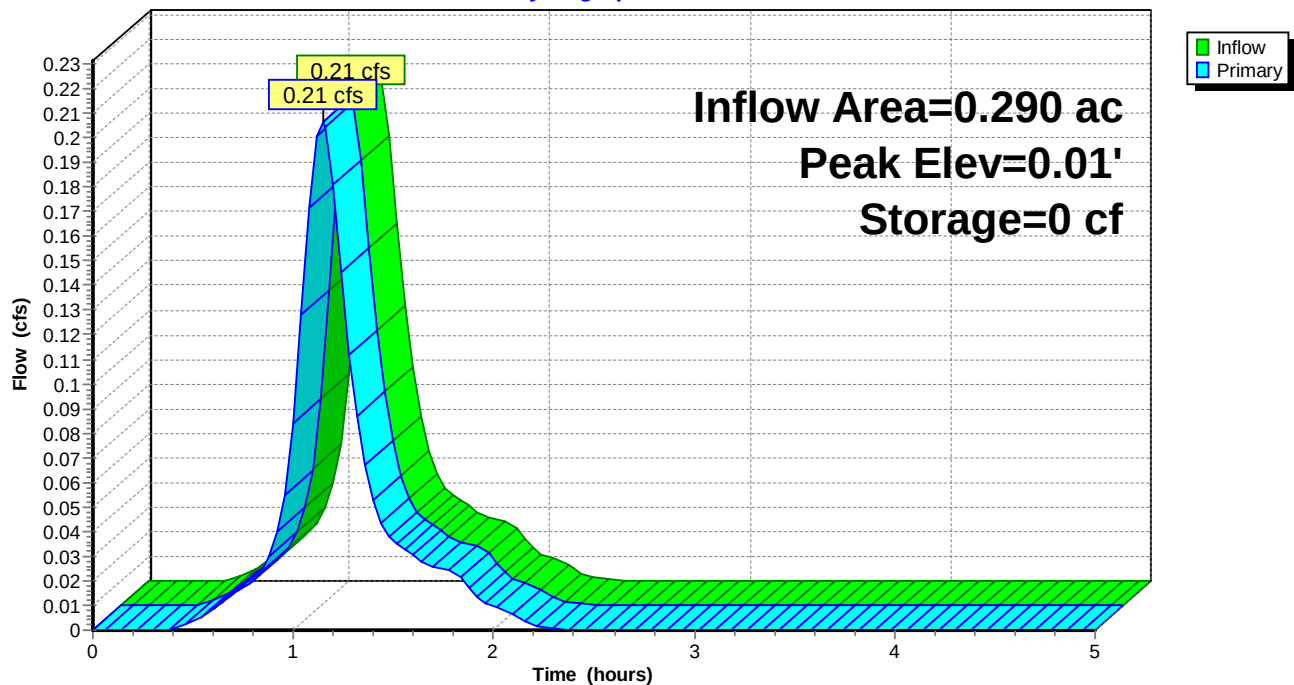
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.22 cfs @ 1.15 hrs HW=0.01' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.22 cfs @ 0.01 fps)

Pond 3P: (2) Filterra 4x4

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 4S: DA #2-4

Runoff = 0.13 cfs @ 1.15 hrs, Volume= 188 cf, Depth= 0.26"

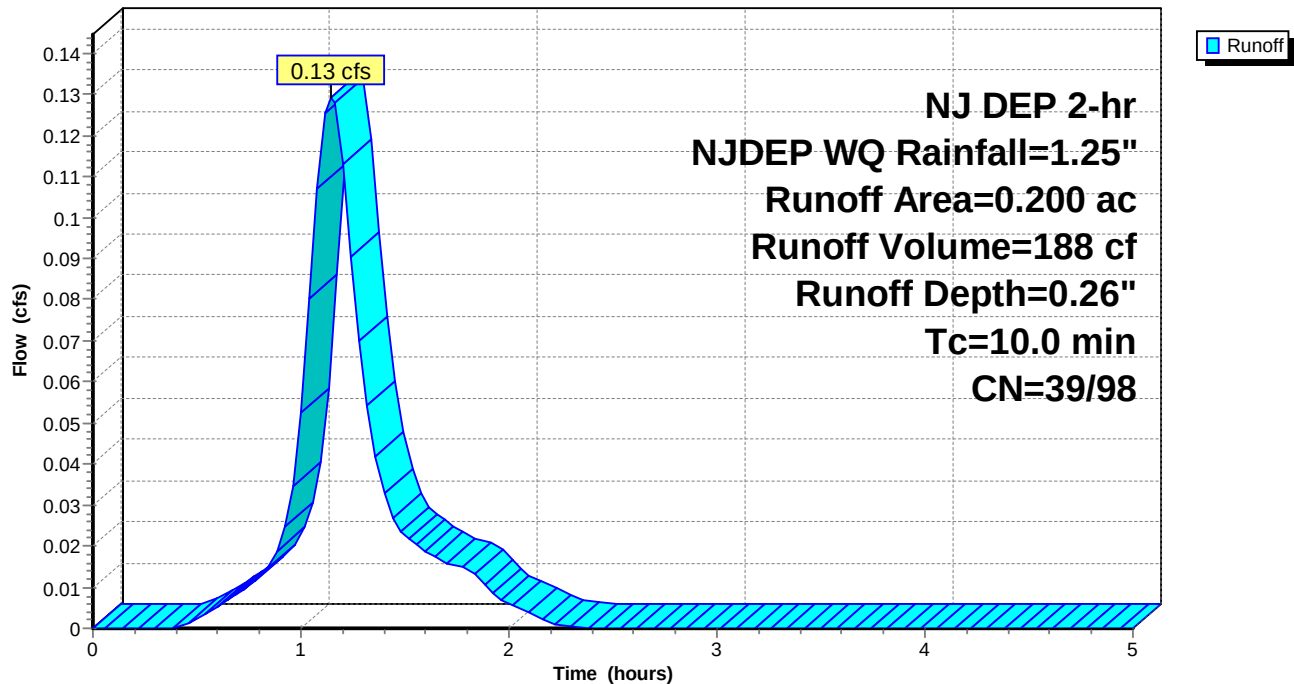
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.050	98	
* 0.150	39	
0.200	54	Weighted Average
0.150	39	75.00% Pervious Area
0.050	98	25.00% Impervious Area

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

Subcatchment 4S: DA #2-4

Hydrograph



Summary for Pond 4P: Filterra 4x4

Inflow Area = 0.200 ac, 25.00% Impervious, Inflow Depth = 0.26" for NJDEP WQ event
 Inflow = 0.13 cfs @ 1.15 hrs, Volume= 188 cf
 Outflow = 0.11 cfs @ 1.12 hrs, Volume= 195 cf, Atten= 14%, Lag= 0.0 min
 Primary = 0.11 cfs @ 1.12 hrs, Volume= 195 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.29' @ 1.20 hrs Surf.Area= 0.000 ac Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.0 min (75.0 - 74.0)

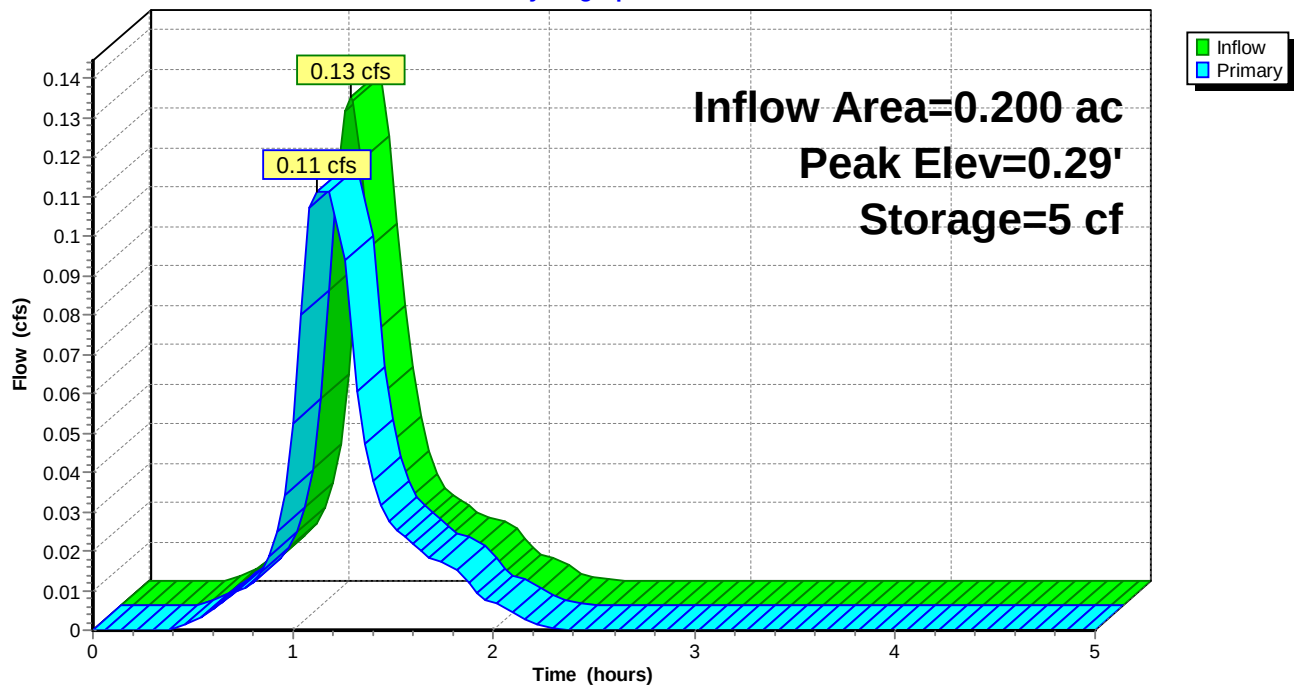
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	12 cf	4.00'W x 4.00'L x 0.75'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.11 cfs @ 1.12 hrs HW=0.06' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 0.11 cfs @ 0.01 fps)

Pond 4P: Filterra 4x4

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 5S: DA #2-5

Runoff = 0.13 cfs @ 1.15 hrs, Volume= 188 cf, Depth= 1.03"

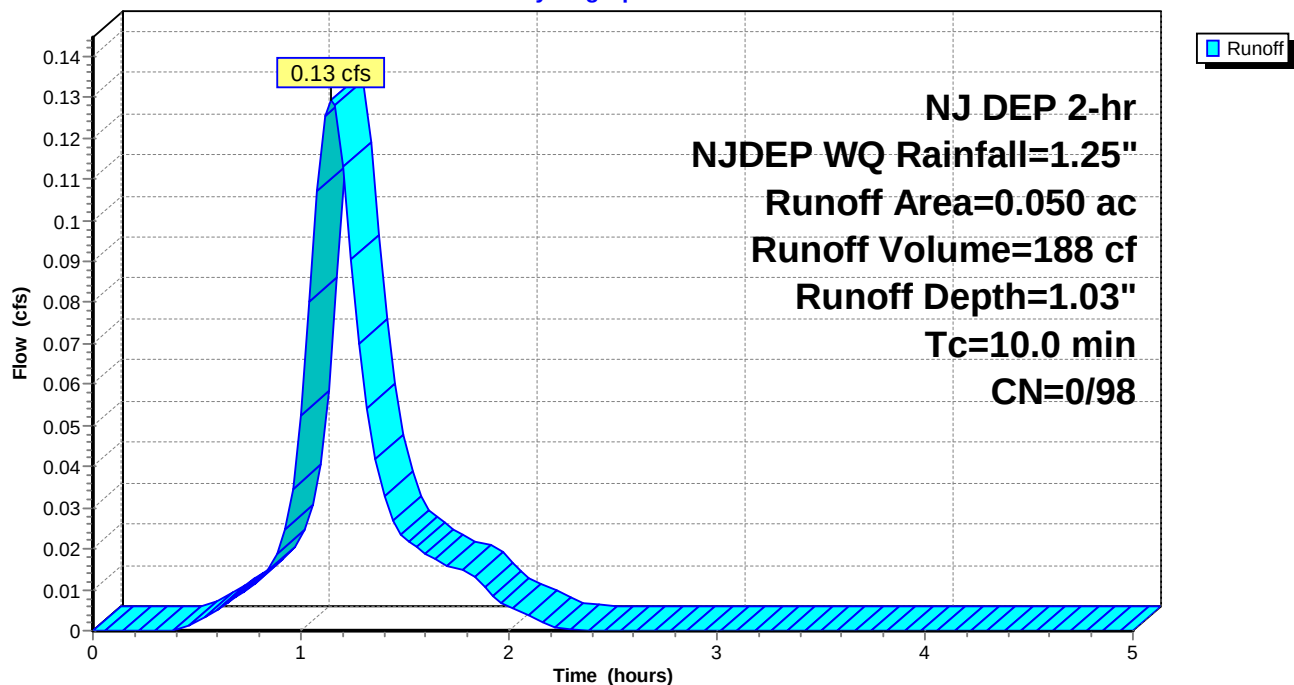
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.050	98	
0.050	98	100.00% Impervious Area

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

Subcatchment 5S: DA #2-5

Hydrograph



Summary for Pond 5P: Filterra 4x4

Inflow Area = 0.050 ac, 100.00% Impervious, Inflow Depth = 1.03" for NJDEP WQ event
 Inflow = 0.13 cfs @ 1.15 hrs, Volume= 188 cf
 Outflow = 0.11 cfs @ 1.12 hrs, Volume= 195 cf, Atten= 14%, Lag= 0.0 min
 Primary = 0.11 cfs @ 1.12 hrs, Volume= 195 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.29' @ 1.20 hrs Surf.Area= 0.000 ac Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.0 min (75.0 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	12 cf	4.00'W x 4.00'L x 0.75'H Prismatic

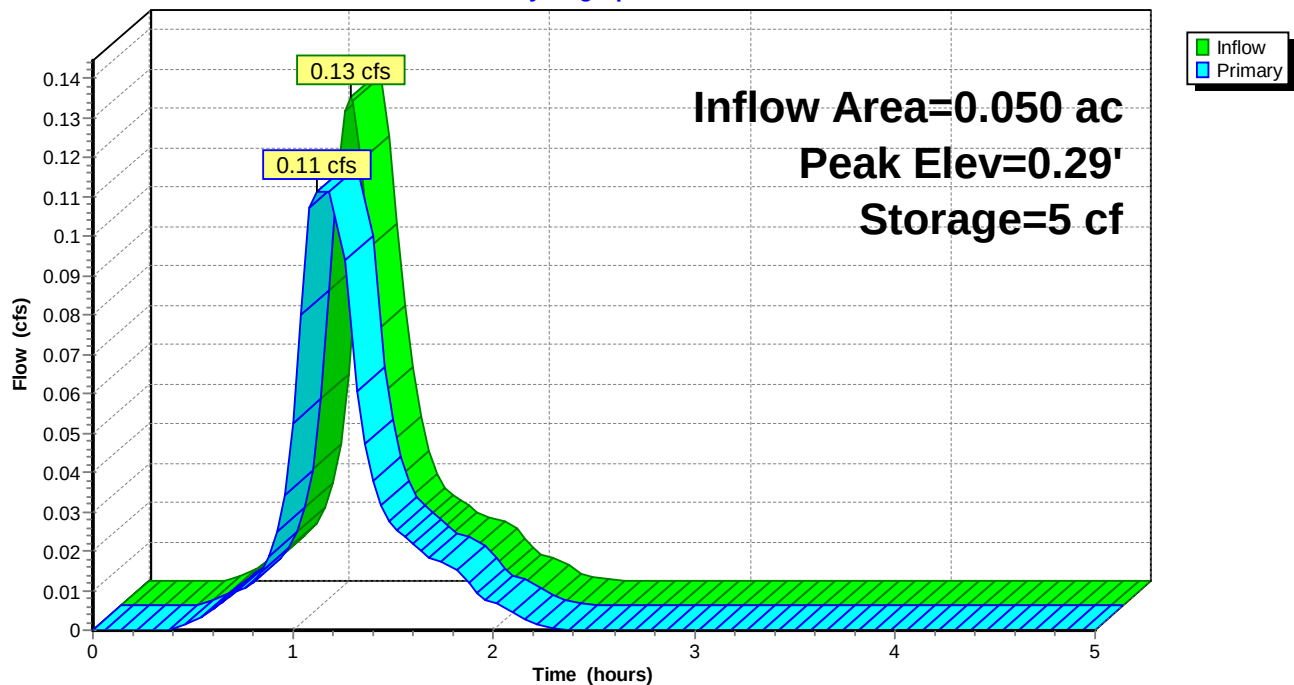
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.11 cfs @ 1.12 hrs HW=0.06' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.11 cfs @ 0.01 fps)

Pond 5P: Filterra 4x4

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 6S: DA #2-6

Runoff = 0.75 cfs @ 1.15 hrs, Volume= 1,089 cf, Depth= 0.79"

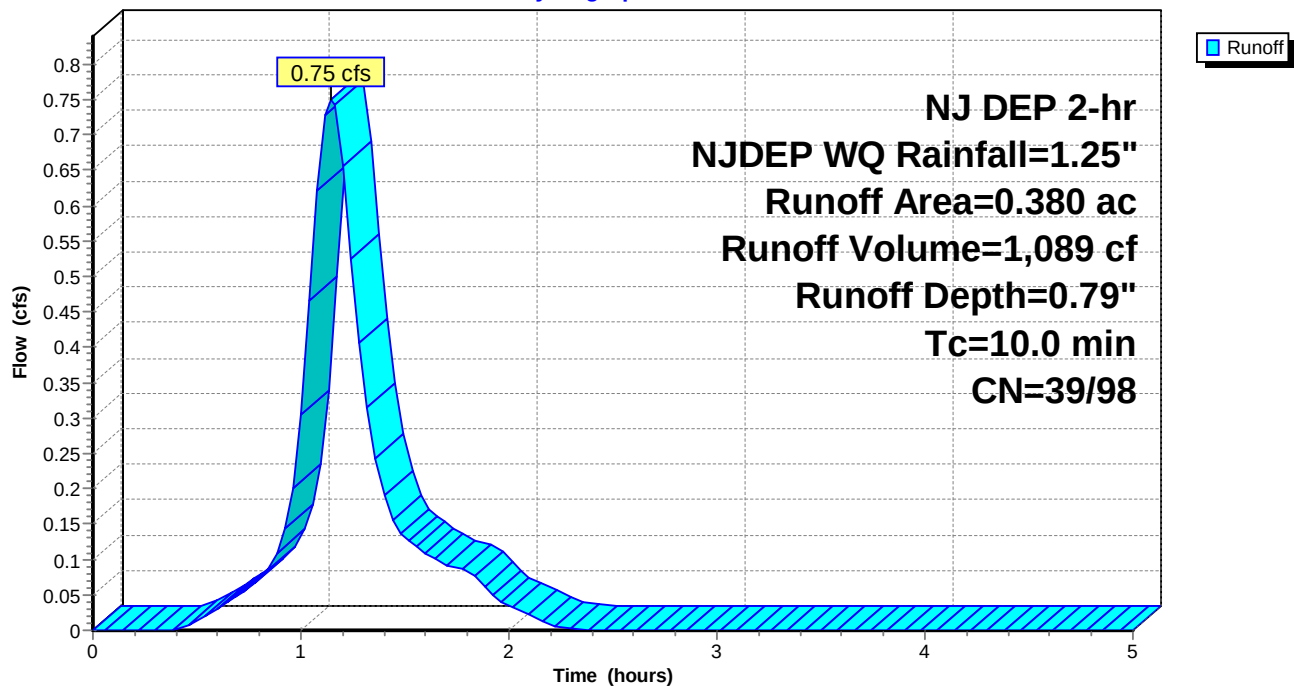
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.290	98	
* 0.090	39	
0.380	84	Weighted Average
0.090	39	23.68% Pervious Area
0.290	98	76.32% Impervious Area

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

Subcatchment 6S: DA #2-6

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 7S: DA #2-7

Runoff = 0.26 cfs @ 1.15 hrs, Volume= 376 cf, Depth= 0.13"

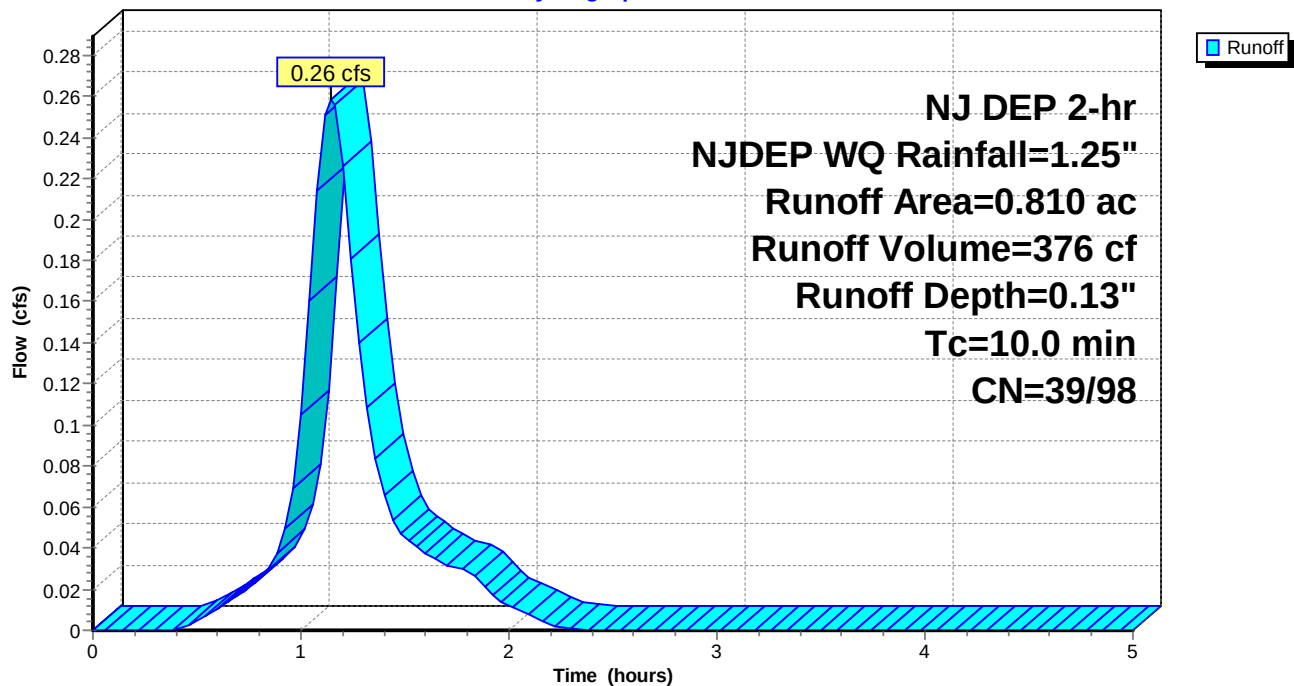
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.100	98	
* 0.710	39	
0.810	46	Weighted Average
0.710	39	87.65% Pervious Area
0.100	98	12.35% Impervious Area

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

Subcatchment 7S: DA #2-7

Hydrograph



Summary for Pond 7P: Filterra 7.83x4.5

Inflow Area = 0.810 ac, 12.35% Impervious, Inflow Depth = 0.13" for NJDEP WQ event
 Inflow = 0.26 cfs @ 1.15 hrs, Volume= 376 cf
 Outflow = 0.24 cfs @ 1.12 hrs, Volume= 365 cf, Atten= 5%, Lag= 0.0 min
 Primary = 0.24 cfs @ 1.12 hrs, Volume= 365 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.05' @ 1.17 hrs Surf.Area= 0.001 ac Storage= 2 cf

Plug-Flow detention time= 0.9 min calculated for 365 cf (97% of inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

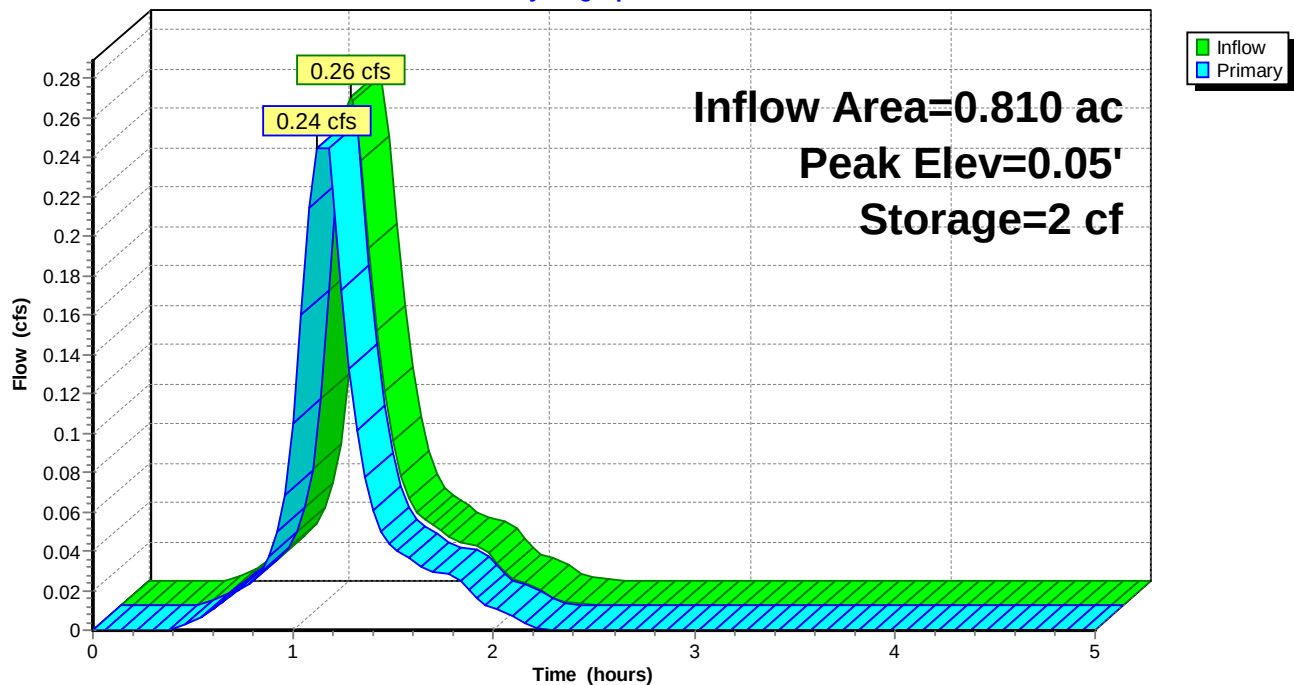
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	26 cf	4.50'W x 7.83'L x 0.75'H Prismaoid

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.24 cfs @ 1.12 hrs HW=0.01' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 0.24 cfs @ 0.01 fps)

Pond 7P: Filterra 7.83x4.5

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 8S: DA #2-8

Runoff = 0.13 cfs @ 1.15 hrs, Volume= 188 cf, Depth= 1.03"

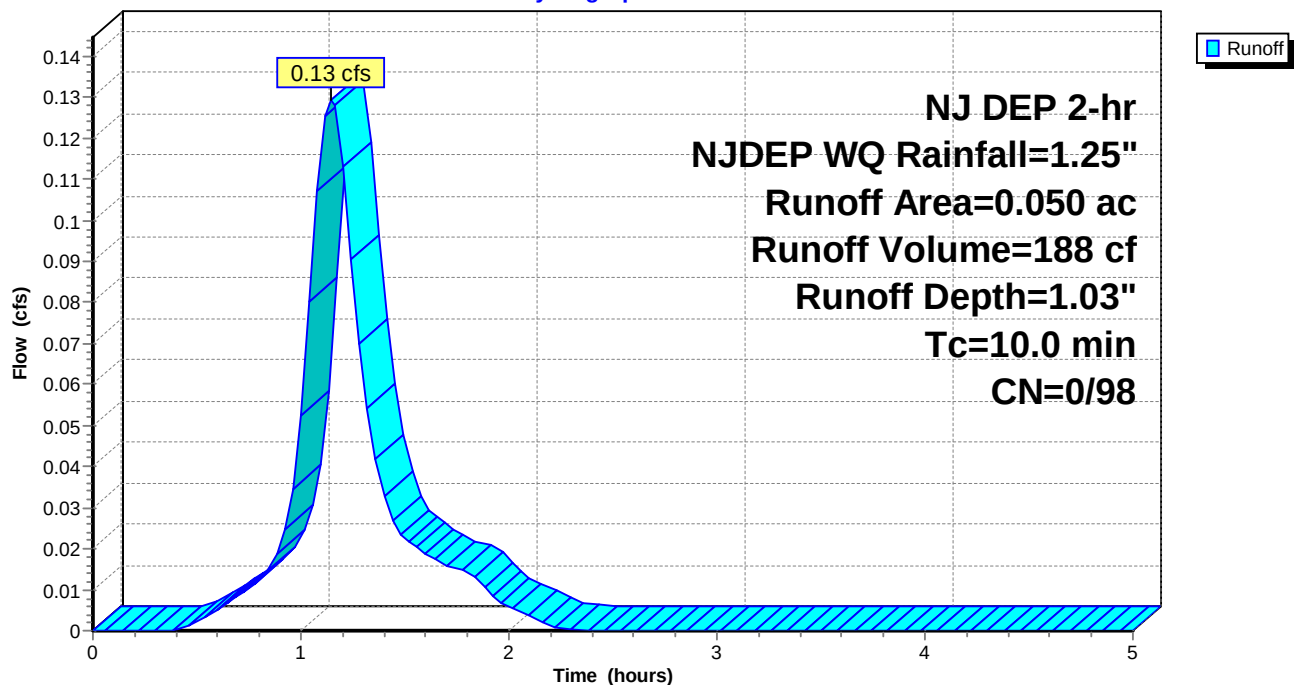
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.050	98	
0.050	98	100.00% Impervious Area

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

Subcatchment 8S: DA #2-8

Hydrograph



Summary for Pond 8P: Filterra 4x4

Inflow Area = 0.050 ac, 100.00% Impervious, Inflow Depth = 1.03" for NJDEP WQ event
 Inflow = 0.13 cfs @ 1.15 hrs, Volume= 188 cf
 Outflow = 0.11 cfs @ 1.12 hrs, Volume= 195 cf, Atten= 14%, Lag= 0.0 min
 Primary = 0.11 cfs @ 1.12 hrs, Volume= 195 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.29' @ 1.20 hrs Surf.Area= 0.000 ac Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.0 min (75.0 - 74.0)

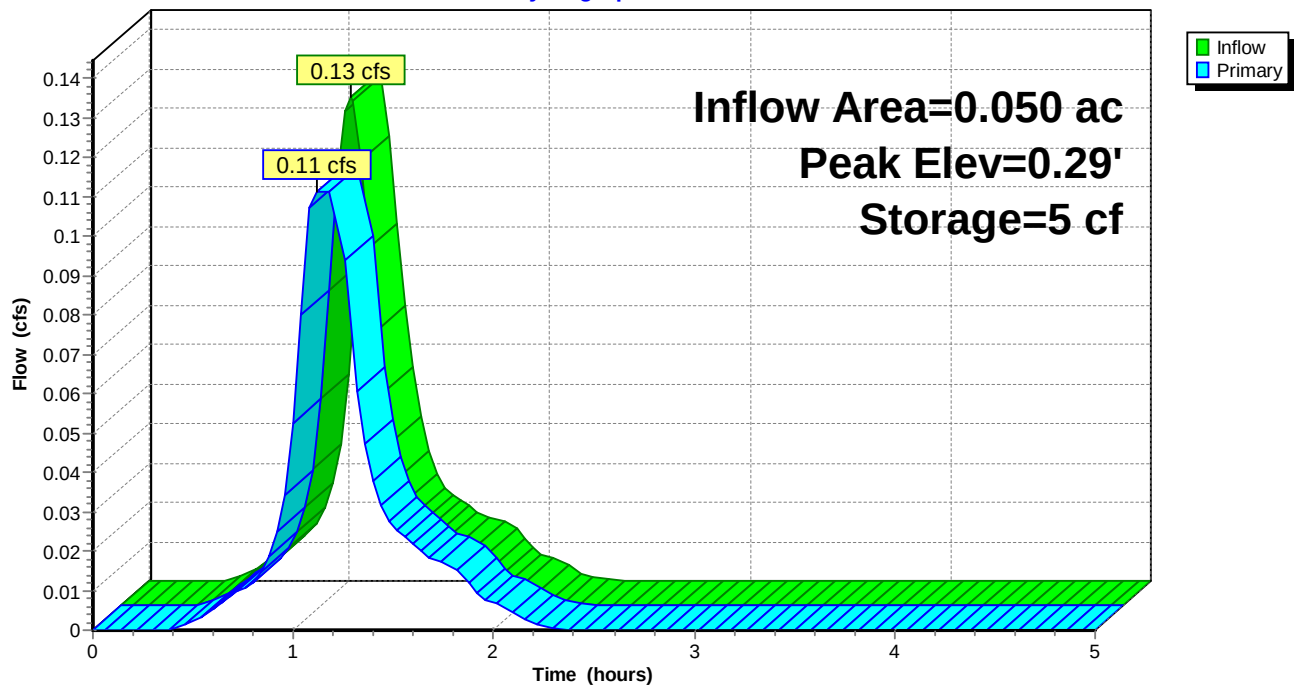
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	12 cf	4.00'W x 4.00'L x 0.75'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.11 cfs @ 1.12 hrs HW=0.06' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 0.11 cfs @ 0.01 fps)

Pond 8P: Filterra 4x4

Hydrograph



Summary for Subcatchment 9S: DA #2-9

Runoff = 0.10 cfs @ 1.15 hrs, Volume= 150 cf, Depth= 0.83"

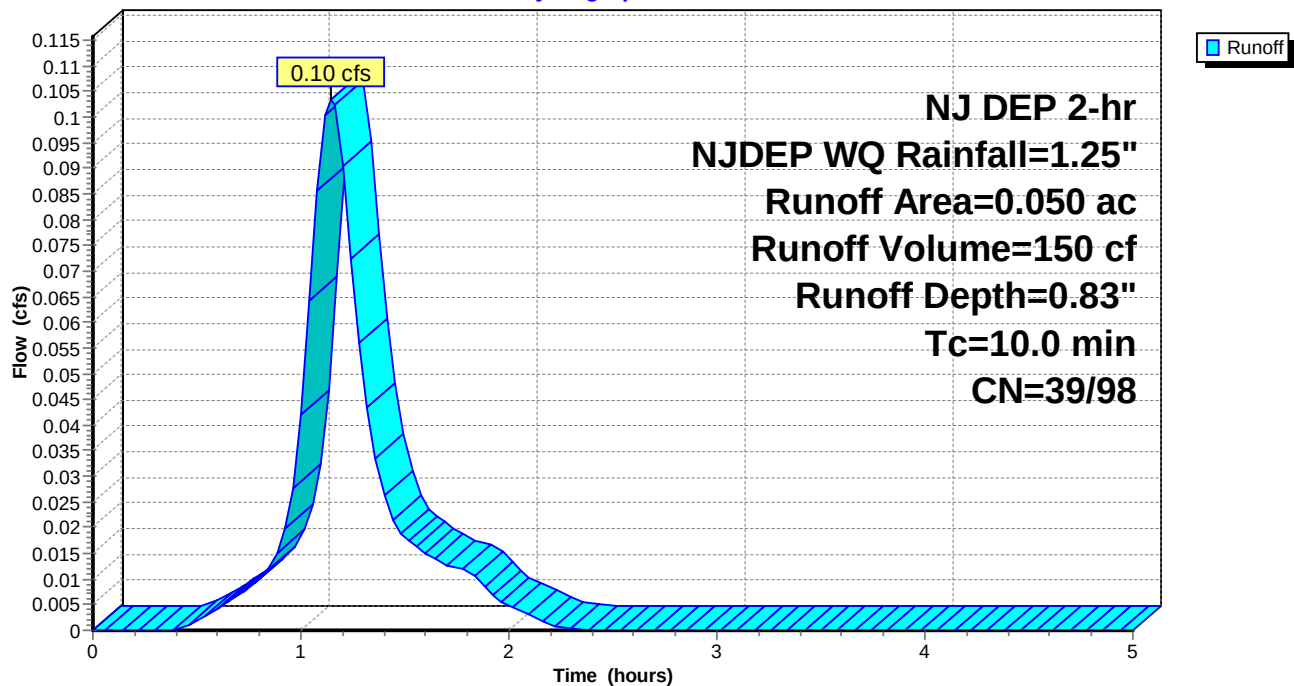
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.040	98	
* 0.010	39	
0.050	86	Weighted Average
0.010	39	20.00% Pervious Area
0.040	98	80.00% Impervious Area

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

Subcatchment 9S: DA #2-9

Hydrograph



Summary for Pond 9P: Filterra 4x4

Inflow Area = 0.050 ac, 80.00% Impervious, Inflow Depth = 0.83" for NJDEP WQ event
 Inflow = 0.10 cfs @ 1.15 hrs, Volume= 150 cf
 Outflow = 0.10 cfs @ 1.15 hrs, Volume= 150 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.10 cfs @ 1.15 hrs, Volume= 150 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.01' @ 1.15 hrs Surf.Area= 0.000 ac Storage= 0 cf

Plug-Flow detention time= 0.1 min calculated for 150 cf (100% of inflow)
 Center-of-Mass det. time= 0.0 min (74.0 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	12 cf	4.00'W x 4.00'L x 0.75'H Prismatic

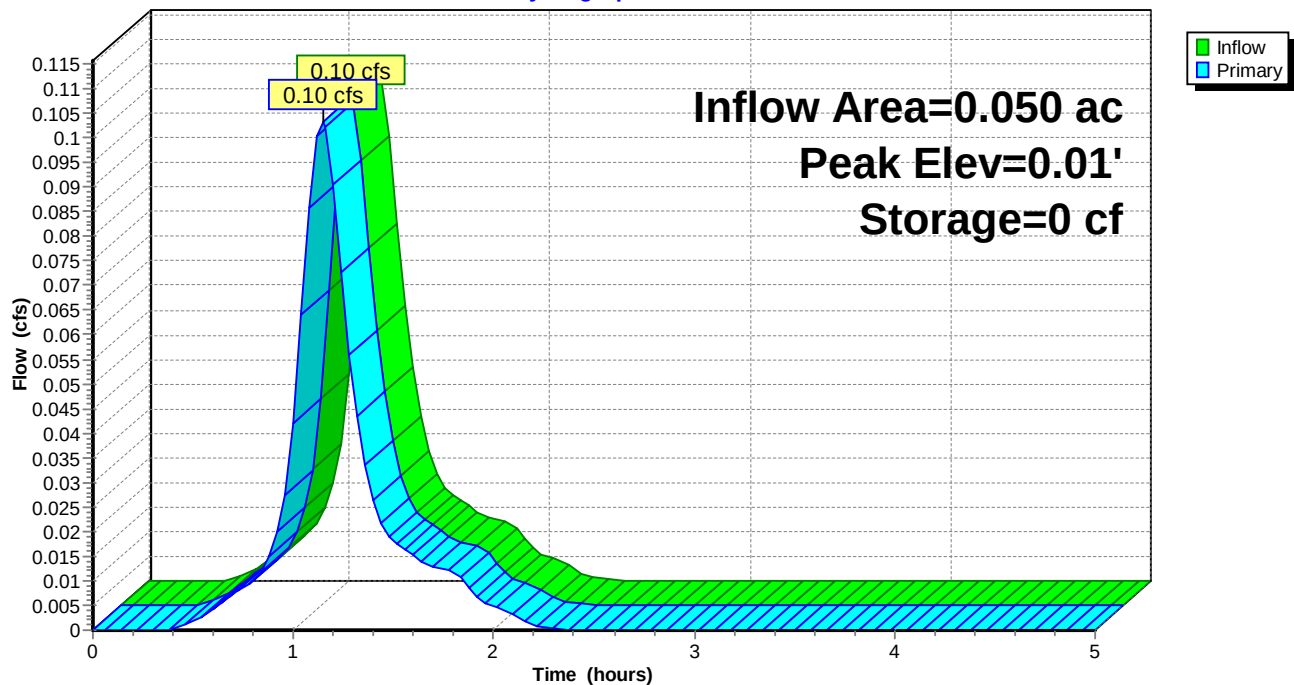
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.11 cfs @ 1.15 hrs HW=0.01' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.11 cfs @ 0.01 fps)

Pond 9P: Filterra 4x4

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 10S: DA #2-10

Runoff = 0.21 cfs @ 1.15 hrs, Volume= 300 cf, Depth= 0.44"

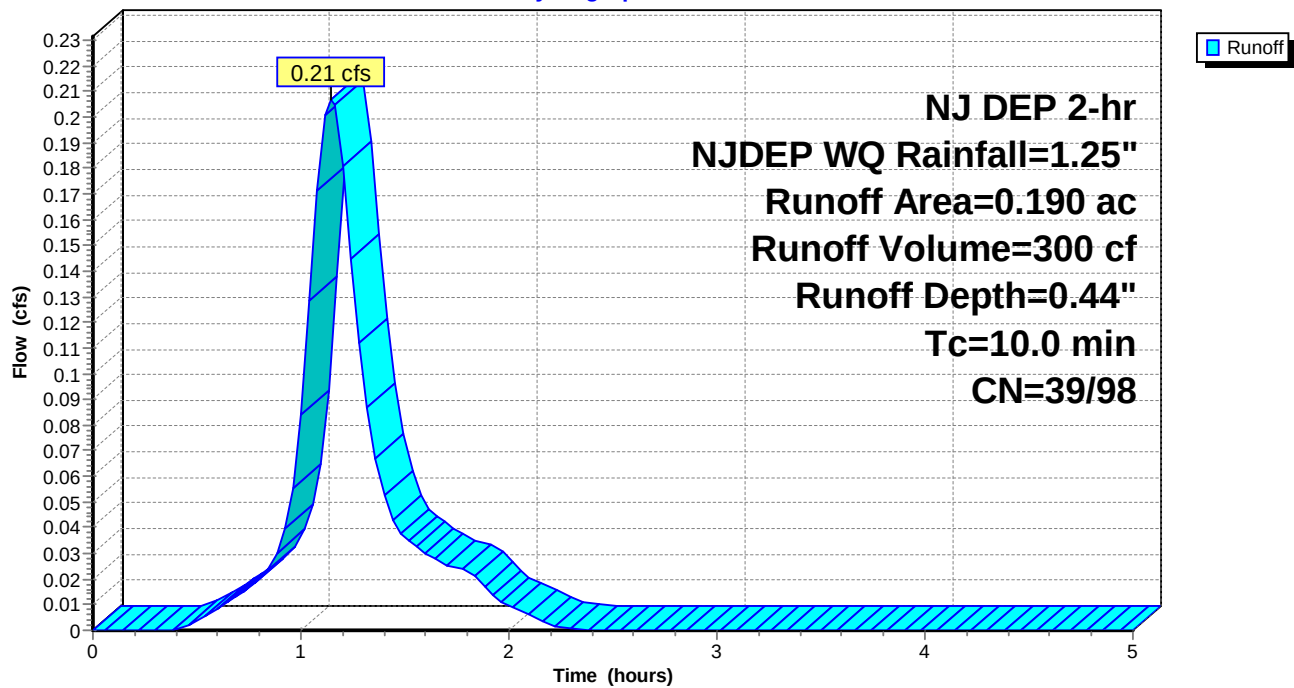
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.080	98	
* 0.110	39	
0.190	64	Weighted Average
0.110	39	57.89% Pervious Area
0.080	98	42.11% Impervious Area

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

Subcatchment 10S: DA #2-10

Hydrograph



Summary for Pond 10P: Filterra 4x6

Inflow Area = 0.190 ac, 42.11% Impervious, Inflow Depth = 0.44" for NJDEP WQ event
 Inflow = 0.21 cfs @ 1.15 hrs, Volume= 300 cf
 Outflow = 0.17 cfs @ 1.08 hrs, Volume= 272 cf, Atten= 19%, Lag= 0.0 min
 Primary = 0.17 cfs @ 1.08 hrs, Volume= 272 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.52' @ 1.21 hrs Surf.Area= 0.001 ac Storage= 12 cf

Plug-Flow detention time= 2.2 min calculated for 272 cf (90% of inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	18 cf	4.00'W x 6.00'L x 0.75'H Prismaoid

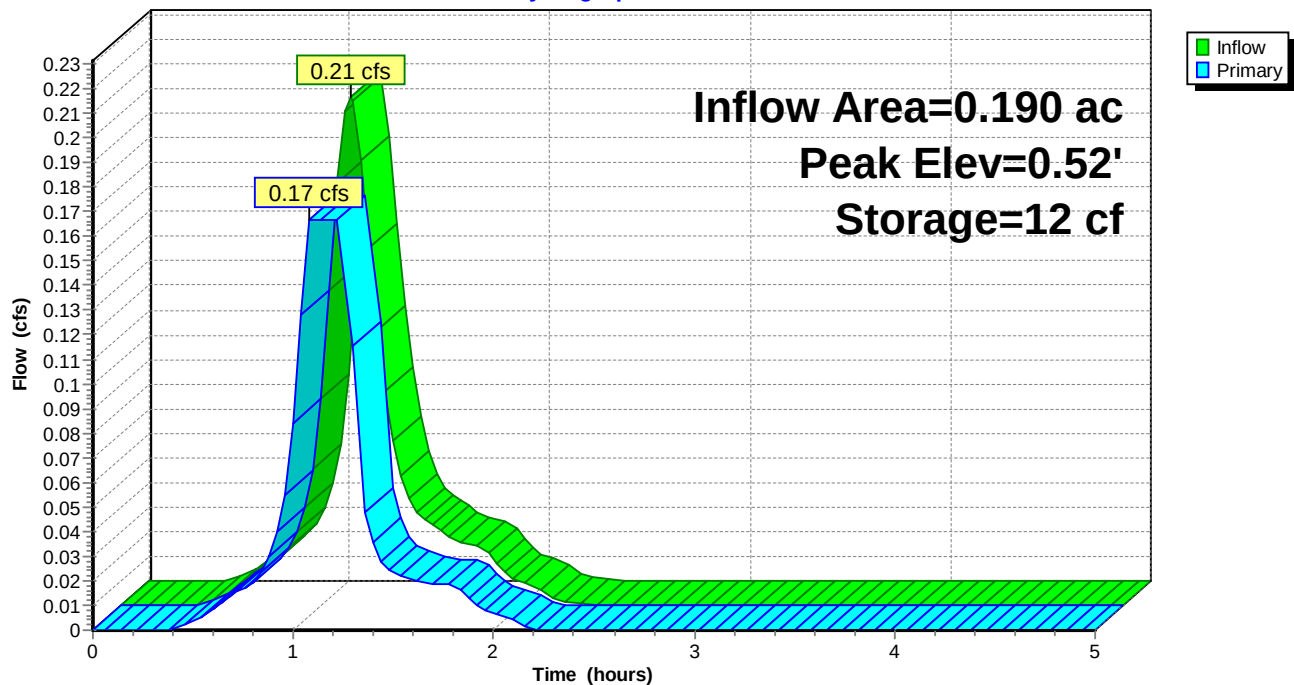
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.17 cfs @ 1.08 hrs HW=0.01' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.17 cfs @ 0.01 fps)

Pond 10P: Filterra 4x6

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 11S: DA #2-11

Runoff = 0.15 cfs @ 1.15 hrs, Volume= 225 cf, Depth= 1.03"

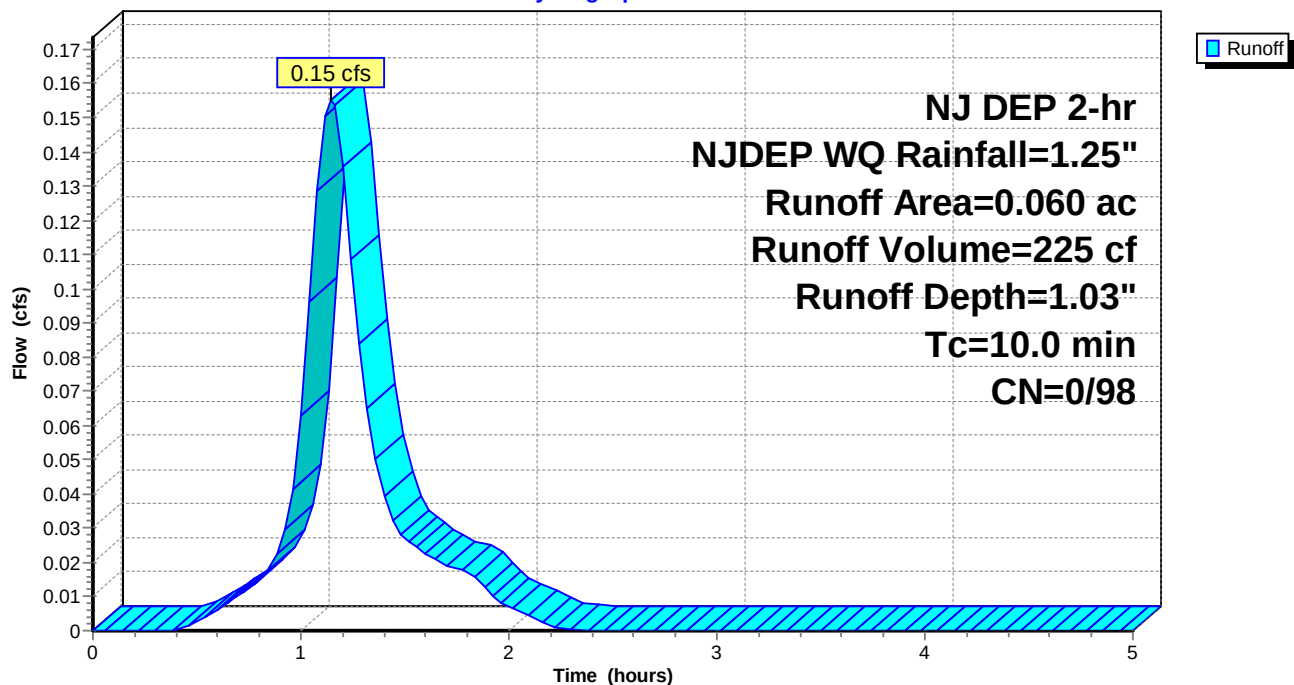
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.060	98	
0.060	98	100.00% Impervious Area

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

Subcatchment 11S: DA #2-11

Hydrograph



Summary for Pond 11P: Filterra 4x6

Inflow Area = 0.060 ac, 100.00% Impervious, Inflow Depth = 1.03" for NJDEP WQ event
 Inflow = 0.15 cfs @ 1.15 hrs, Volume= 225 cf
 Outflow = 0.15 cfs @ 1.15 hrs, Volume= 225 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.15 cfs @ 1.15 hrs, Volume= 225 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.01' @ 1.15 hrs Surf.Area= 0.001 ac Storage= 0 cf

Plug-Flow detention time= 0.1 min calculated for 225 cf (100% of inflow)
 Center-of-Mass det. time= 0.0 min (74.0 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	18 cf	4.00'W x 6.00'L x 0.75'H Prismatic

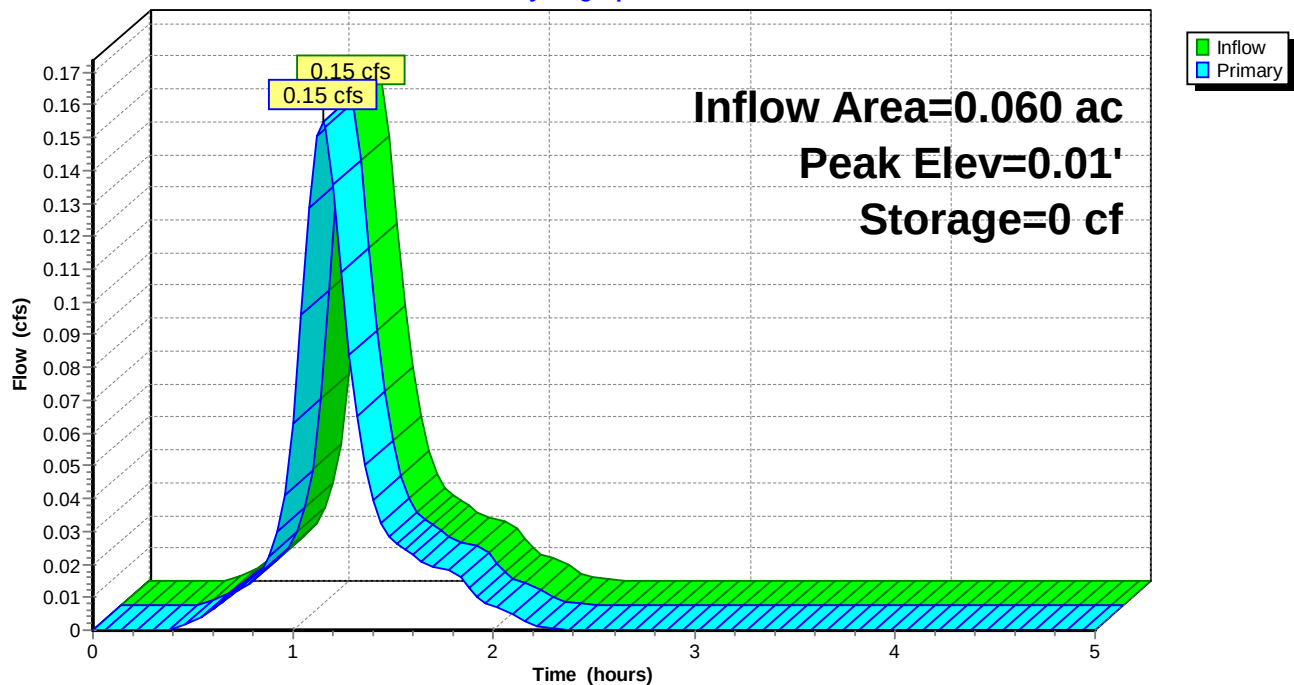
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.17 cfs @ 1.15 hrs HW=0.01' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.17 cfs @ 0.01 fps)

Pond 11P: Filterra 4x6

Hydrograph



1805M - Montgomery Twp (4-1-22)

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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Page 1

Summary for Subcatchment 12S: DA #2-12

Runoff = 0.28 cfs @ 1.15 hrs, Volume= 413 cf, Depth= 0.52"

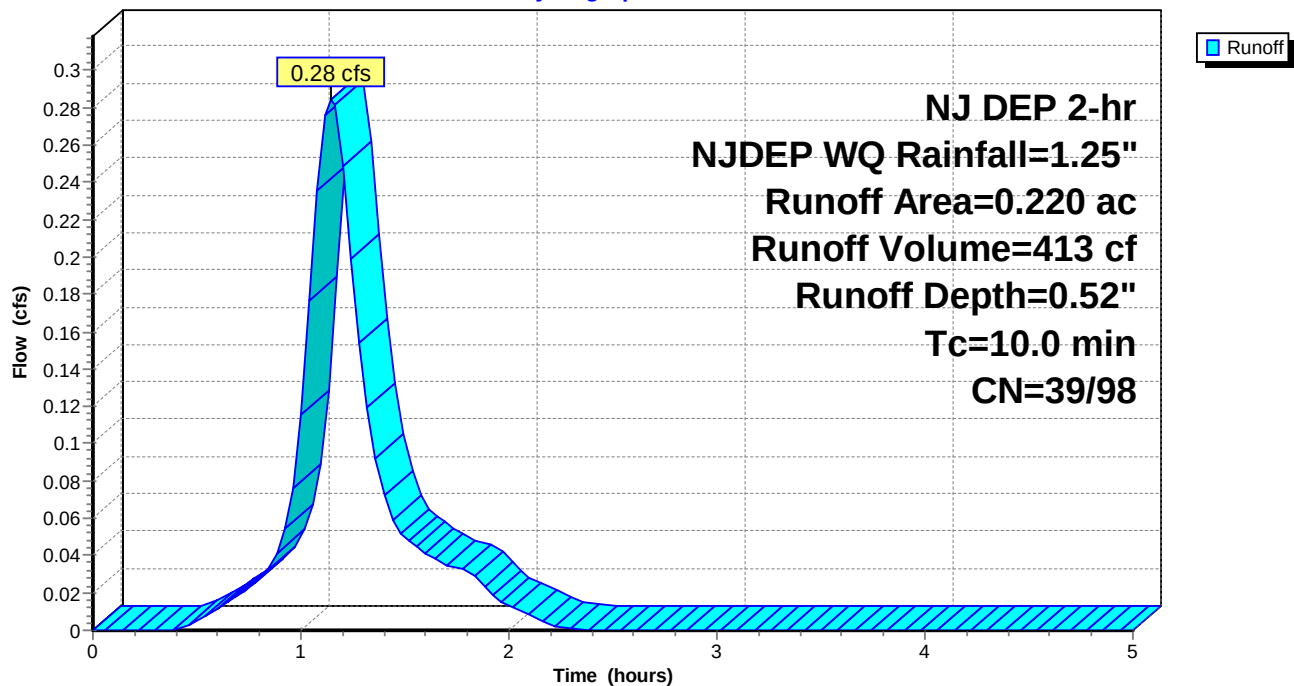
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

	Area (ac)	CN	Description
*	0.110	98	
*	0.110	39	
	0.220	69	Weighted Average
	0.110	39	50.00% Pervious Area
	0.110	98	50.00% Impervious Area

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

Subcatchment 12S: DA #2-12

Hydrograph



Summary for Pond 12P: (2) Filterra 4x4

Inflow Area = 0.220 ac, 50.00% Impervious, Inflow Depth = 0.52" for NJDEP WQ event
 Inflow = 0.28 cfs @ 1.15 hrs, Volume= 413 cf
 Outflow = 0.22 cfs @ 1.08 hrs, Volume= 496 cf, Atten= 22%, Lag= 0.0 min
 Primary = 0.22 cfs @ 1.08 hrs, Volume= 496 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.65' @ 1.22 hrs Surf.Area= 0.001 ac Storage= 21 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 3.9 min (77.9 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	24 cf	4.00'W x 4.00'L x 0.75'H Prismaoid x 2

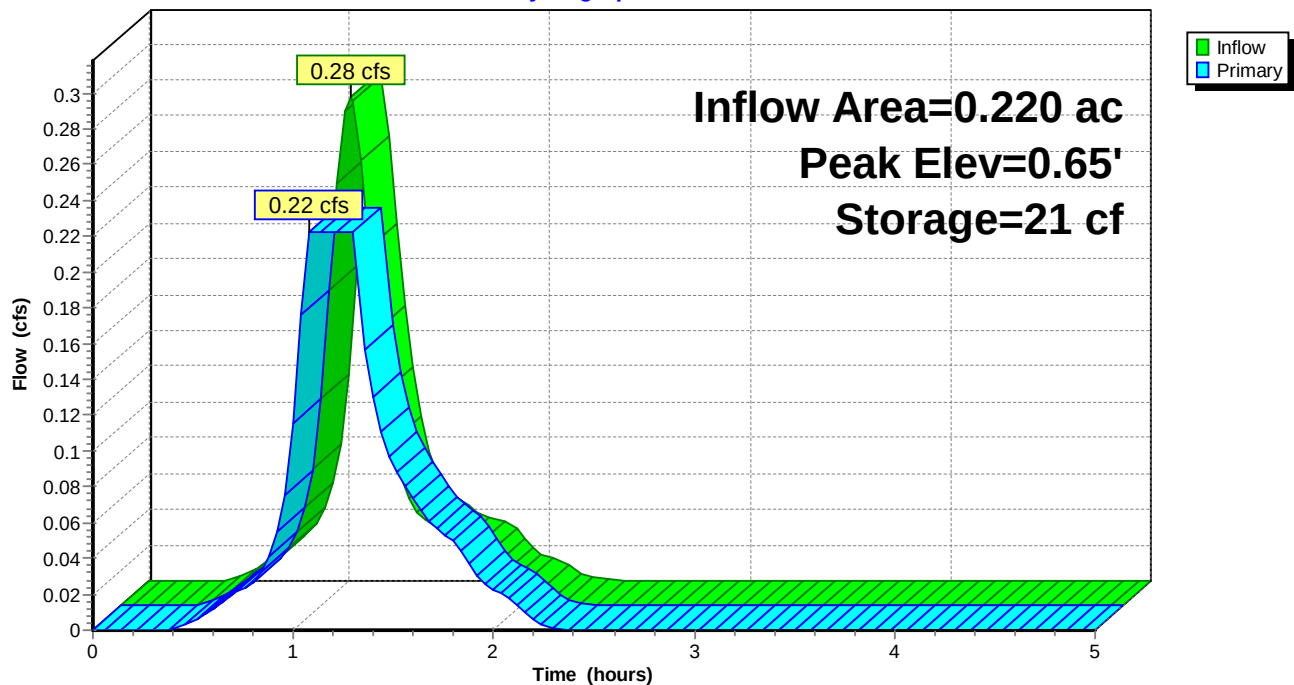
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.22 cfs @ 1.08 hrs HW=0.02' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.22 cfs @ 0.01 fps)

Pond 12P: (2) Filterra 4x4

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Page 1

Summary for Subcatchment 13S: DA #2-13

Runoff = 0.46 cfs @ 1.15 hrs, Volume= 676 cf, Depth= 0.58"

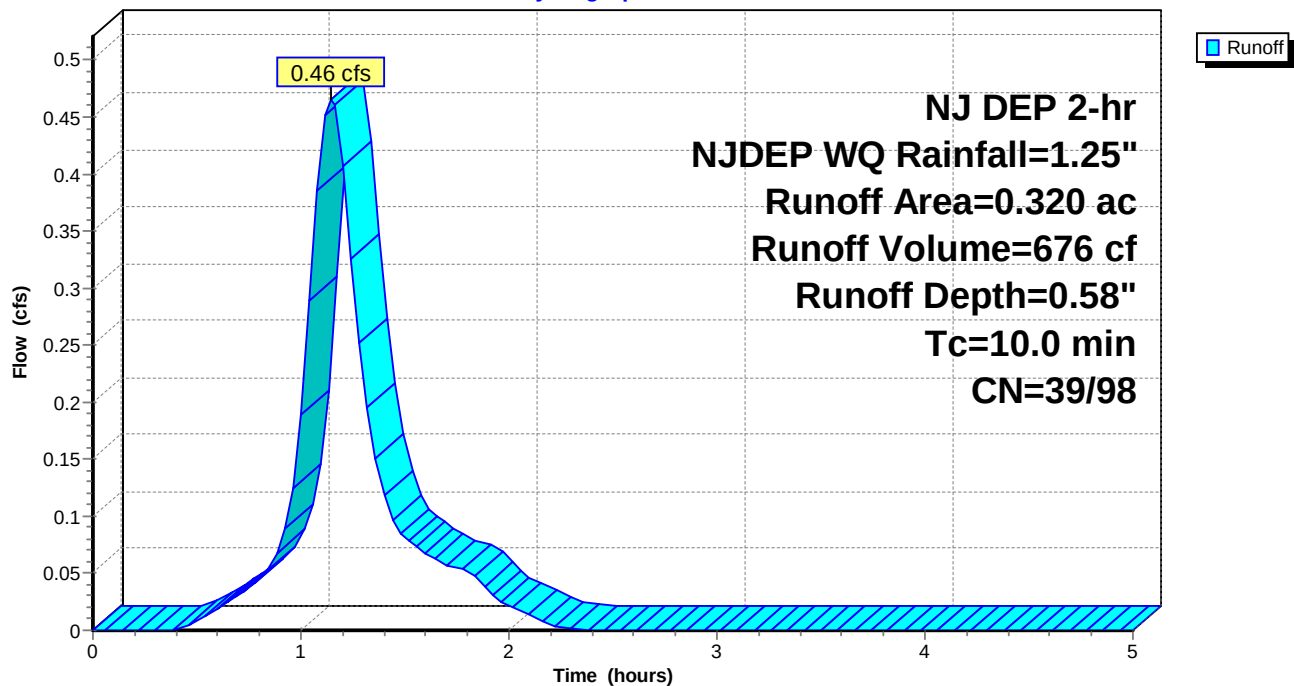
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.180	98	
* 0.140	39	
0.320	72	Weighted Average
0.140	39	43.75% Pervious Area
0.180	98	56.25% Impervious Area

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

Subcatchment 13S: DA #2-13

Hydrograph



Summary for Pond 13P: Filterra PD 6x10

Inflow Area = 0.320 ac, 56.25% Impervious, Inflow Depth = 0.58" for NJDEP WQ event
 Inflow = 0.46 cfs @ 1.15 hrs, Volume= 676 cf
 Outflow = 0.42 cfs @ 1.12 hrs, Volume= 702 cf, Atten= 10%, Lag= 0.0 min
 Primary = 0.42 cfs @ 1.12 hrs, Volume= 702 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.17' @ 1.19 hrs Surf.Area= 0.001 ac Storage= 10 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.7 min (74.7 - 74.0)

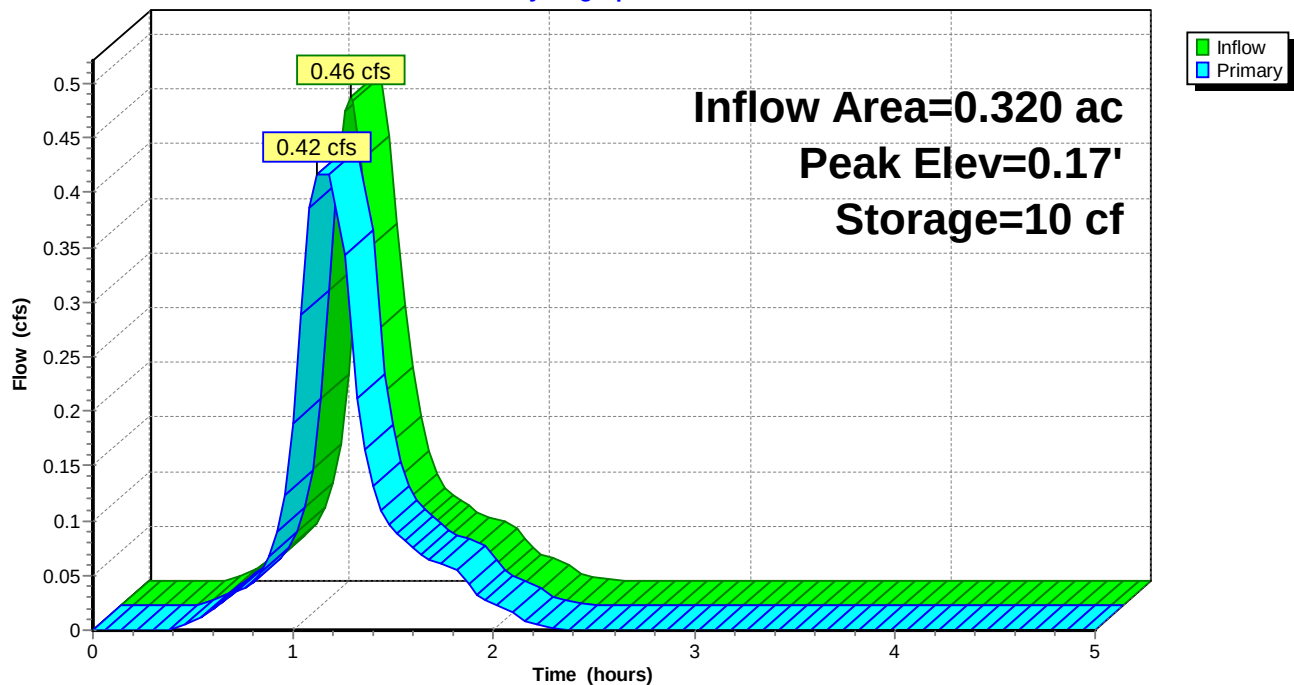
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	45 cf	6.00'W x 10.00'L x 0.75'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.42 cfs @ 1.12 hrs HW=0.03' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 0.42 cfs @ 0.01 fps)

Pond 13P: Filterra PD 6x10

Hydrograph



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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Page 1

Summary for Subcatchment 1-1S: DA #1-1

Runoff = 0.31 cfs @ 1.15 hrs, Volume= 451 cf, Depth= 0.73"

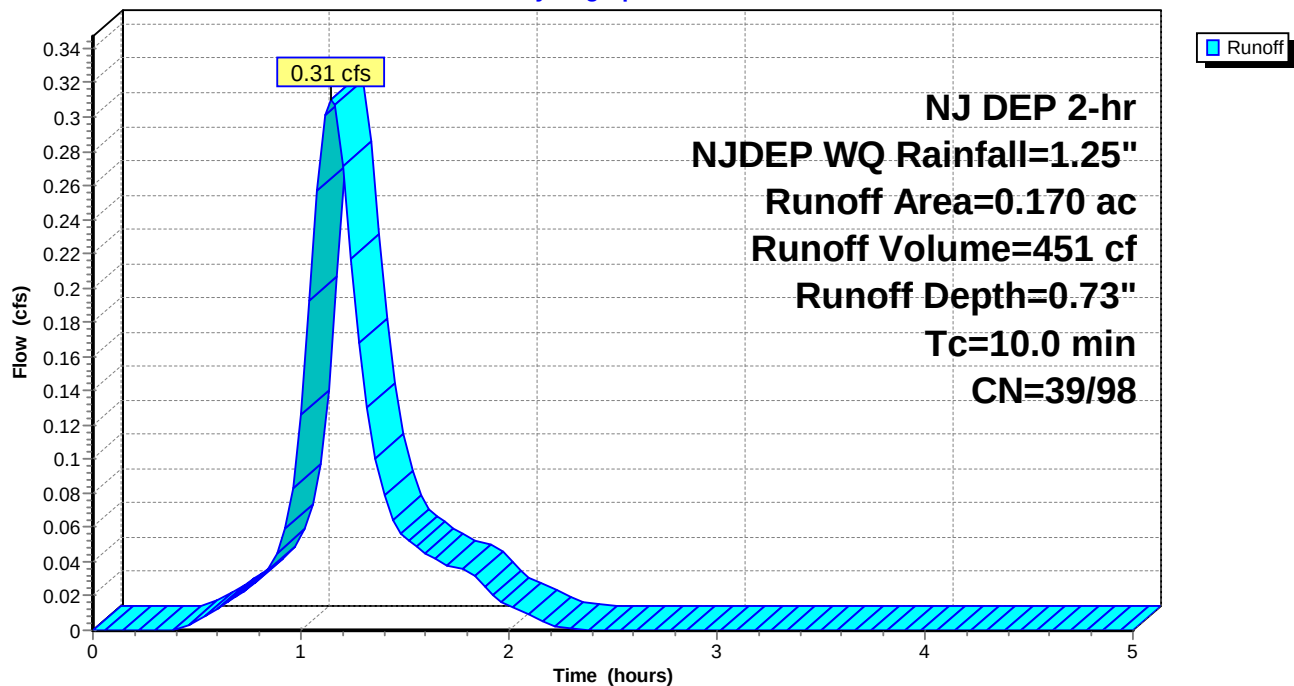
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.120	98	
* 0.050	39	
0.170	81	Weighted Average
0.050	39	29.41% Pervious Area
0.120	98	70.59% Impervious Area

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

Subcatchment 1-1S: DA #1-1

Hydrograph



Summary for Pond 1-1P: Filterra 7.83x4.5

Inflow Area = 0.170 ac, 70.59% Impervious, Inflow Depth = 0.73" for NJDEP WQ event
 Inflow = 0.31 cfs @ 1.15 hrs, Volume= 451 cf
 Outflow = 0.24 cfs @ 1.08 hrs, Volume= 551 cf, Atten= 21%, Lag= 0.0 min
 Primary = 0.24 cfs @ 1.08 hrs, Volume= 551 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.61' @ 1.22 hrs Surf.Area= 0.001 ac Storage= 22 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 4.3 min (78.3 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	26 cf	4.50'W x 7.83'L x 0.75'H Prismaoid

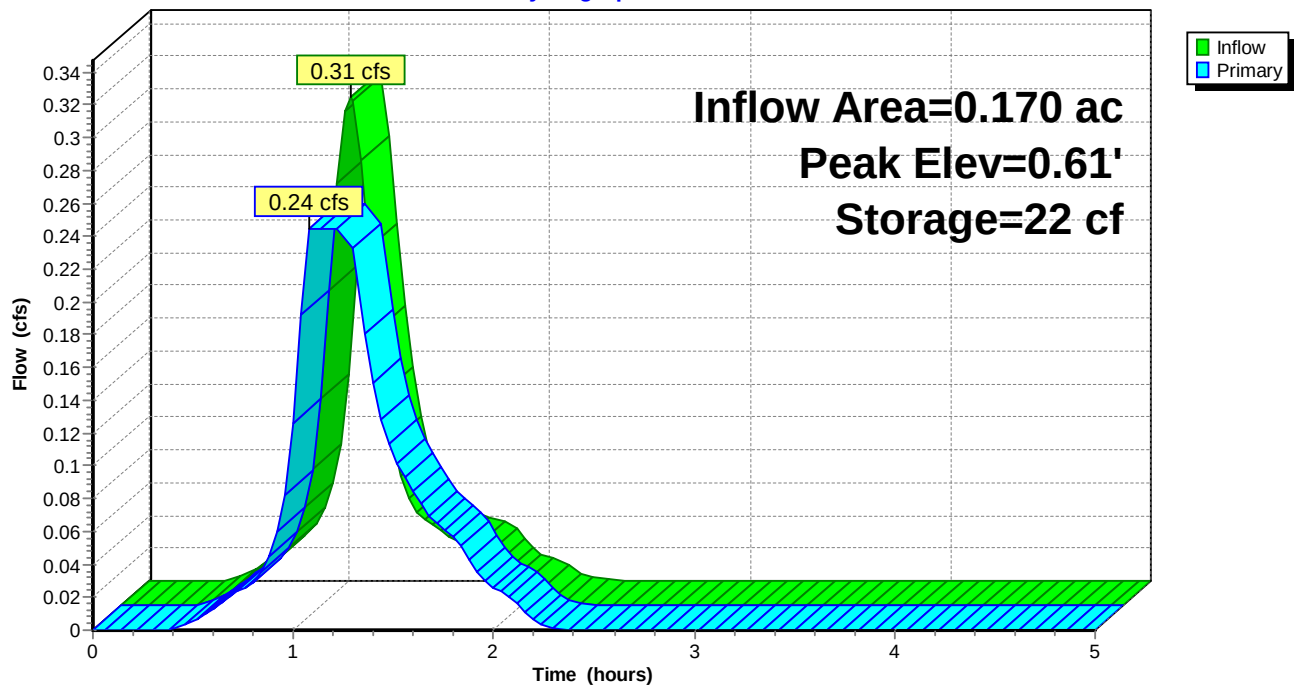
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.24 cfs @ 1.08 hrs HW=0.02' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.24 cfs @ 0.01 fps)

Pond 1-1P: Filterra 7.83x4.5

Hydrograph



1805M - Montgomery Twp (4-1-22)

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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Page 1

Summary for Subcatchment 1-2S: DA #1-2

Runoff = 0.21 cfs @ 1.15 hrs, Volume= 300 cf, Depth= 0.31"

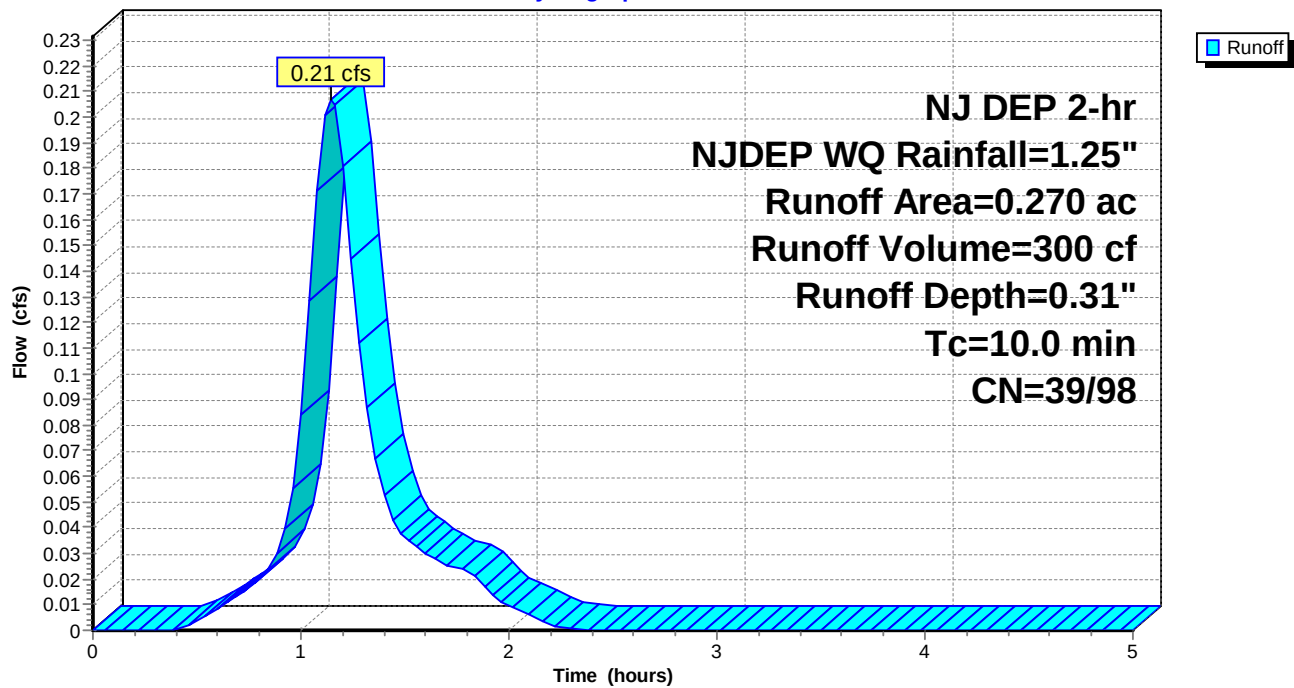
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.080	98	
* 0.190	39	
0.270	56	Weighted Average
0.190	39	70.37% Pervious Area
0.080	98	29.63% Impervious Area

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

Subcatchment 1-2S: DA #1-2

Hydrograph



Summary for Pond 1-2P: Filterra 6x4

Inflow Area = 0.270 ac, 29.63% Impervious, Inflow Depth = 0.31" for NJDEP WQ event
 Inflow = 0.21 cfs @ 1.15 hrs, Volume= 300 cf
 Outflow = 0.17 cfs @ 1.08 hrs, Volume= 272 cf, Atten= 19%, Lag= 0.0 min
 Primary = 0.17 cfs @ 1.08 hrs, Volume= 272 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.52' @ 1.21 hrs Surf.Area= 0.001 ac Storage= 12 cf

Plug-Flow detention time= 2.2 min calculated for 272 cf (90% of inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	18 cf	4.00'W x 6.00'L x 0.75'H Prismatic

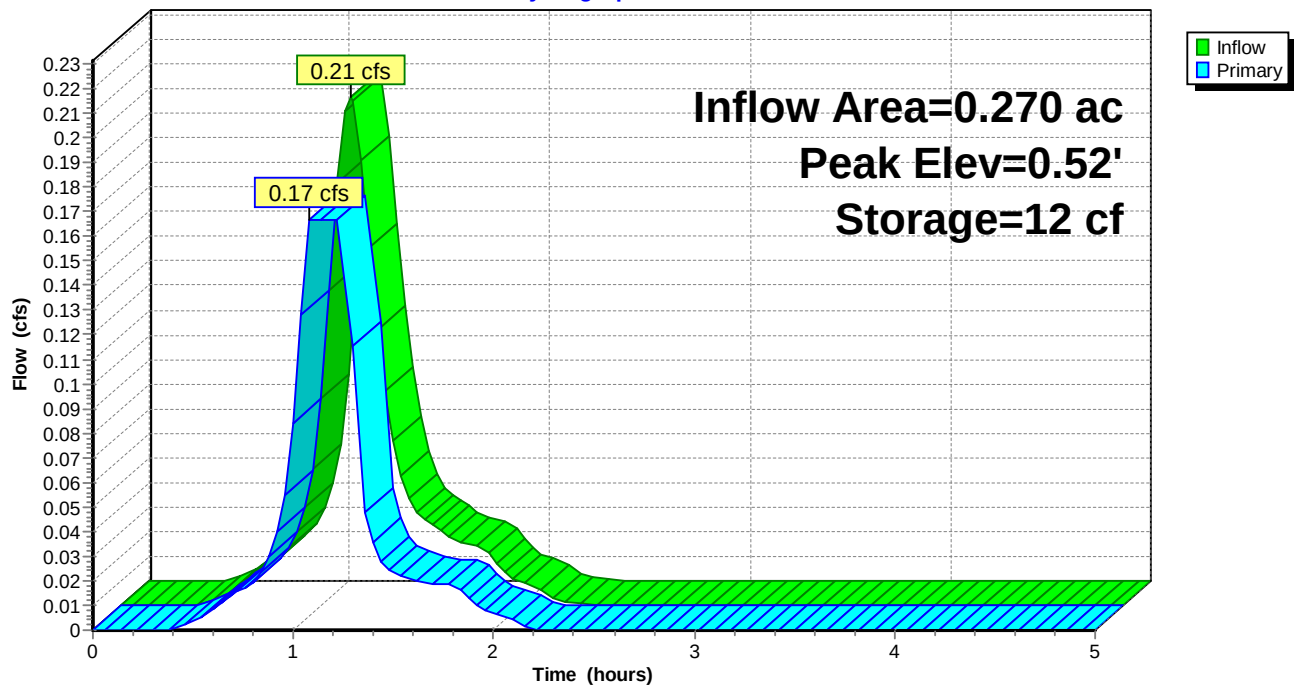
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.17 cfs @ 1.08 hrs HW=0.01' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.17 cfs @ 0.01 fps)

Pond 1-2P: Filterra 6x4

Hydrograph



1805M - Montgomery Twp (4-1-22)

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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Page 1

Summary for Subcatchment 1-4S: DA #1-4

Runoff = 0.21 cfs @ 1.15 hrs, Volume= 300 cf, Depth= 0.27"

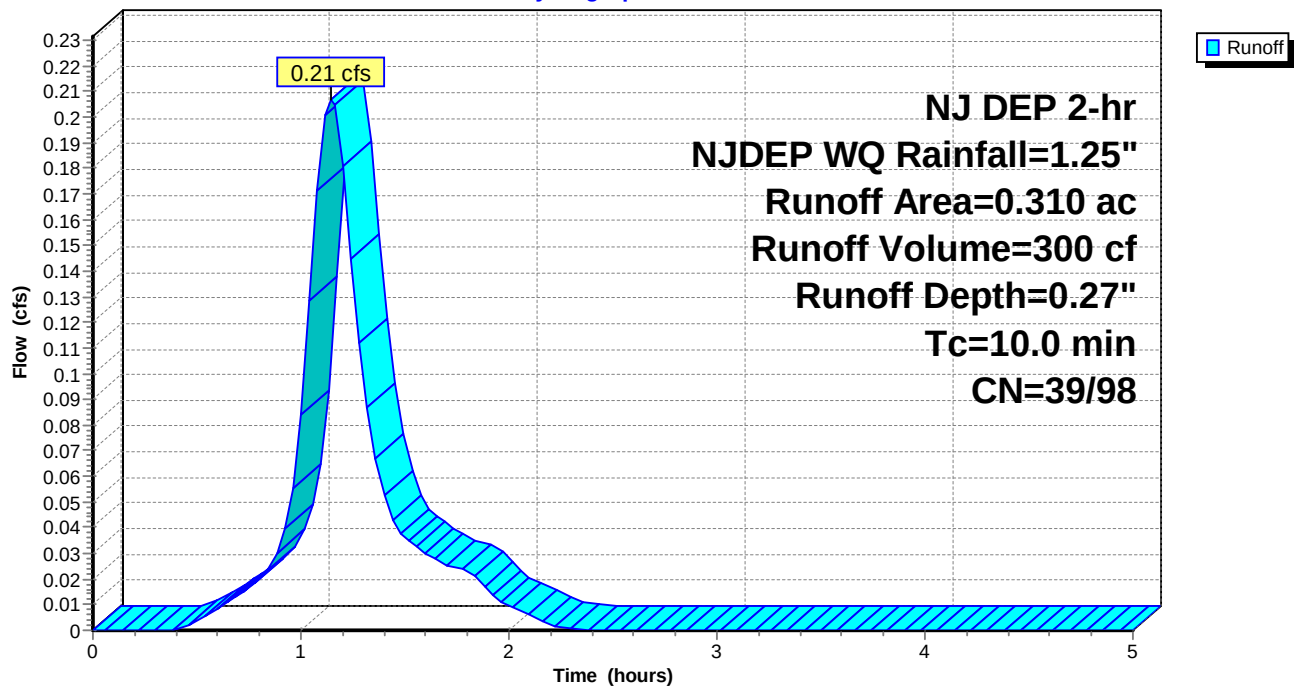
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.080	98	
* 0.230	39	
0.310	54	Weighted Average
0.230	39	74.19% Pervious Area
0.080	98	25.81% Impervious Area

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

Subcatchment 1-4S: DA #1-4

Hydrograph



Summary for Pond 1-4P: Filterra 6x4

Inflow Area = 0.310 ac, 25.81% Impervious, Inflow Depth = 0.27" for NJDEP WQ event
 Inflow = 0.21 cfs @ 1.15 hrs, Volume= 300 cf
 Outflow = 0.17 cfs @ 1.08 hrs, Volume= 272 cf, Atten= 19%, Lag= 0.0 min
 Primary = 0.17 cfs @ 1.08 hrs, Volume= 272 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.52' @ 1.21 hrs Surf.Area= 0.001 ac Storage= 12 cf

Plug-Flow detention time= 2.2 min calculated for 272 cf (90% of inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	18 cf	4.00'W x 6.00'L x 0.75'H Prismatic

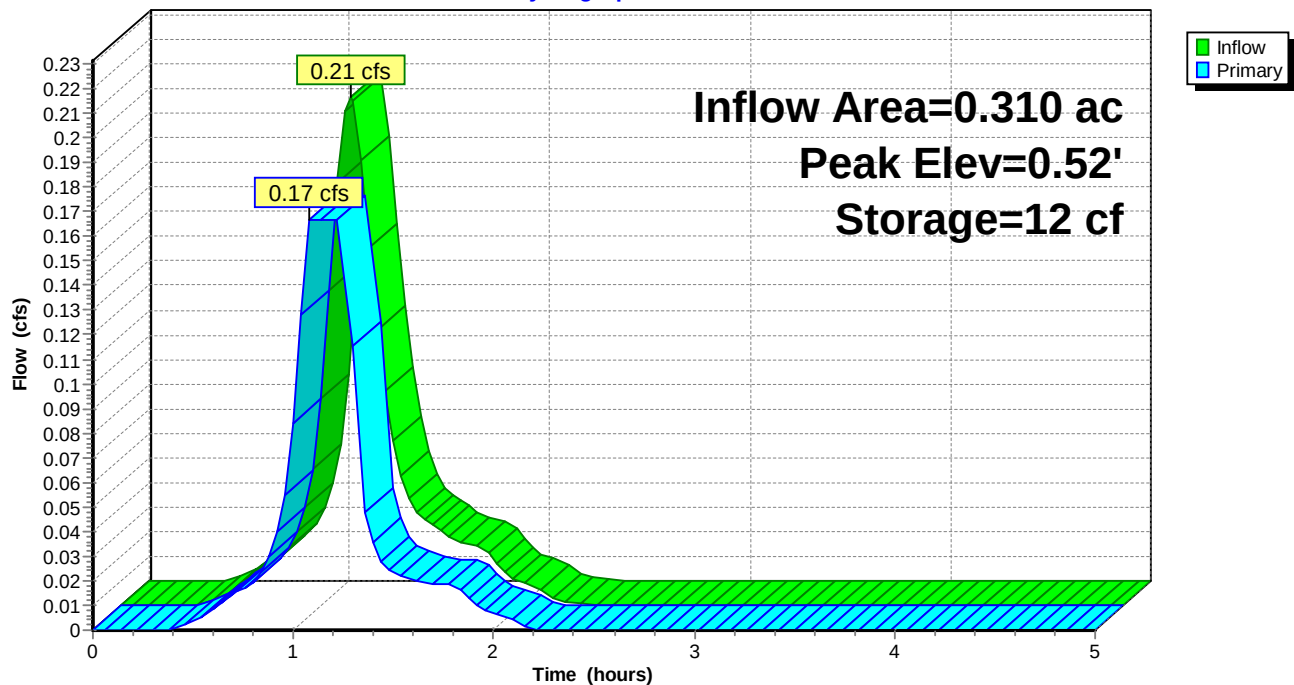
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.17 cfs @ 1.08 hrs HW=0.01' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.17 cfs @ 0.01 fps)

Pond 1-4P: Filterra 6x4

Hydrograph



1805M - Montgomery Twp (4-1-22)

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NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

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Summary for Subcatchment 1-5S: DA #1-5

Runoff = 0.26 cfs @ 1.15 hrs, Volume= 376 cf, Depth= 0.14"

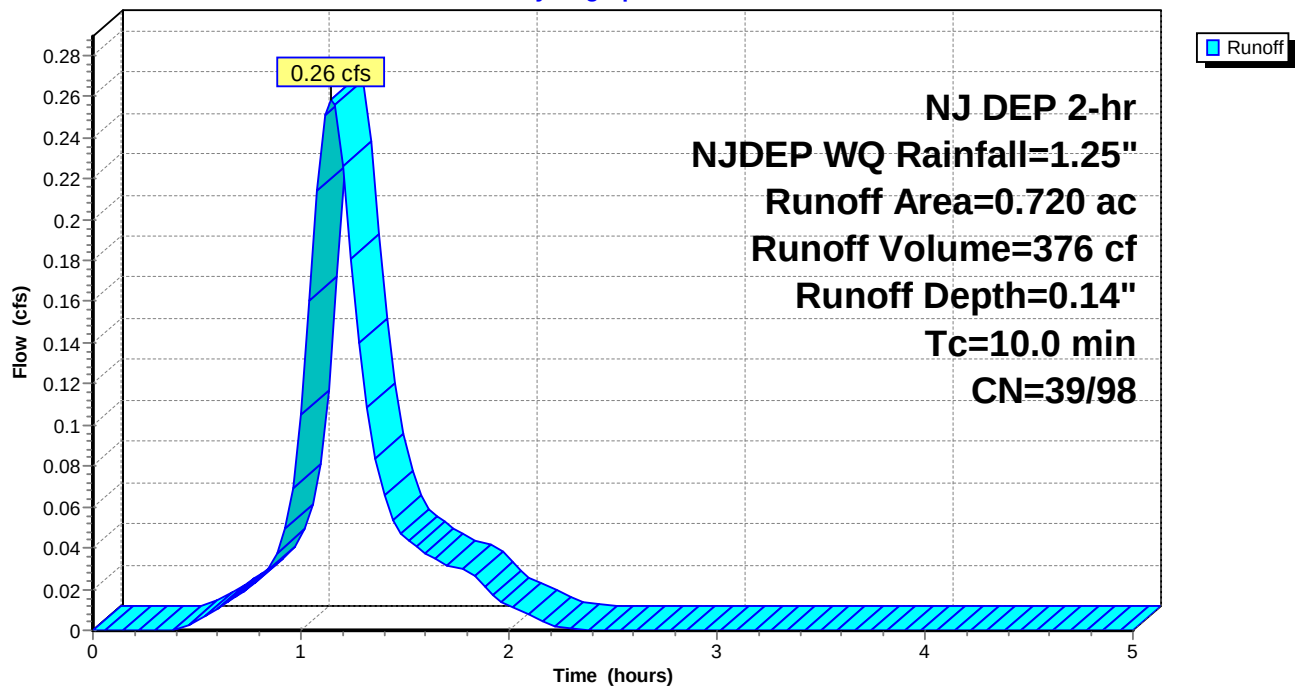
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.100	98	
* 0.620	39	
0.720	47	Weighted Average
0.620	39	86.11% Pervious Area
0.100	98	13.89% Impervious Area

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

Subcatchment 1-5S: DA #1-5

Hydrograph



Summary for Pond 1-5P: Filterra 7.83x4.5

Inflow Area = 0.720 ac, 13.89% Impervious, Inflow Depth = 0.14" for NJDEP WQ event
 Inflow = 0.26 cfs @ 1.15 hrs, Volume= 376 cf
 Outflow = 0.24 cfs @ 1.12 hrs, Volume= 365 cf, Atten= 5%, Lag= 0.0 min
 Primary = 0.24 cfs @ 1.12 hrs, Volume= 365 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.05' @ 1.17 hrs Surf.Area= 0.001 ac Storage= 2 cf

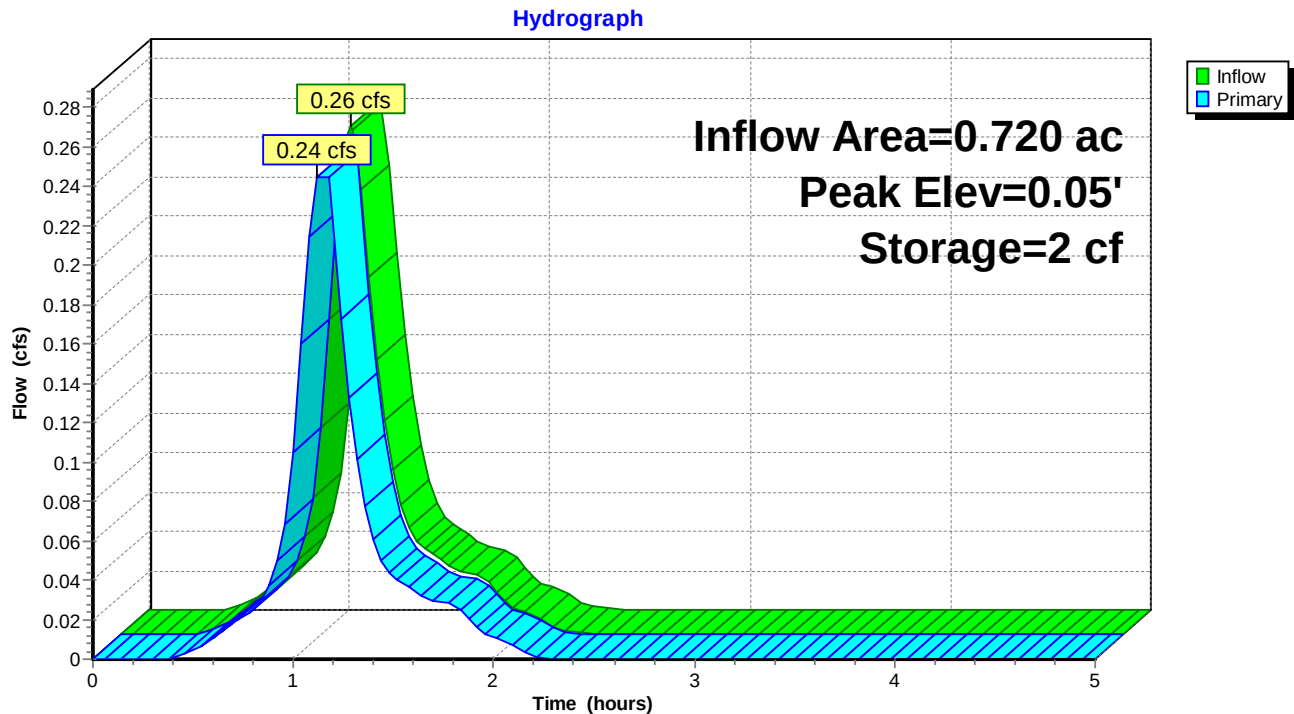
Plug-Flow detention time= 0.9 min calculated for 365 cf (97% of inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	26 cf	4.50'W x 7.83'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=0.24 cfs @ 1.12 hrs HW=0.01' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.24 cfs @ 0.01 fps)

Pond 1-5P: Filterra 7.83x4.5



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

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www.nj.gov/dep/dwq/bnpe_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® 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® HC Bioretention System (Filtterra® 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.

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/ft² 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.
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. Filtterra® HC MTFRs and Maximum Allowable Drainage Areas

	Available Filtterra® Media Bay Sizes (feet)	Effective Filtration Treatment Area (ft ²)	Treatment Flow Rate (cfs)	Maximum Allowable Drainage Area (ac)
Standard Configuration Filtterra and Filtterra 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 Filtterra 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 Filtterra Bioscape	Media Area in ft ²	0.00694 * (Media Area in ft ²)	0.0252 * (Media Area in ft ²)

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 G

Emergency Spillway

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
Area 1 Impervious (Post-Developed)	100-Year + 50%	100	177,930.00	732.00	38.84
Area 1 Impervious (Pre-Developed)	100-Year + 50%	100	5,259.00	741.00	0.85
Area 1 Pervious (Post-Developed)	100-Year + 50%	100	171,876.00	732.00	42.13
Area 1 Pervious (Pre-Developed)	100-Year + 50%	100	450,074.00	741.00	81.53
Area 2 Impervious (Post-Developed)	100-Year + 50%	100	9,201.00	738.00	1.67
Area 2 Pervious (Post-Developed)	100-Year + 50%	100	145,345.00	738.00	29.55

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
POA (Post-Developed)	100-Year + 50%	100	384,625.00	735.00	106.16
POA (Pre-Developed)	100-Year + 50%	100	455,333.00	741.00	82.38

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft ³)
Pond Constructed Wetland (IN)	100-Year + 50%	100	349,806.00	732.00	80.97	(N/A)	(N/A)
Pond Constructed Wetland (OUT)	100-Year + 50%	100	230,080.00	735.00	75.41	80.47	161,633.00

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

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

Requested Pond Water Surface Elevations	
Minimum (Headwater)	70.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	81.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Rectangular Weir Tailwater Settings	Weir - 75' Tailwater	Forward	TW	80.00 (N/A)	81.50 (N/A)

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

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

Structure ID: Weir - 75'	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	80.00 ft
Weir Length	75.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/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 ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

EMERGENCY SPILLWAY VELOCITY CALCULATION SHEET POND CONSTRUCTED WETLAND

SPILLWAY ELEV.	80.00 FT.
TOTAL FLOW	75.41 CFS
E.S. FLOW	75.41 CFS
E.S. LENGTH	75.00 FT.
E.S. DISCHARGE	1.005 CFS/FT
SLOPE	33 %
n	0.24

CHECK VELOCITY

$$Q = \frac{1.486 S^{1/2} R^{2/3} A}{n}$$

ON A FT./FT. BASIS, d=R AND d=A

$$Q = \frac{1.486 S^{1/2} d^{5/3}}{n}$$

$$d = 0.469$$

$$V = \frac{1.486 S^{1/2} d^{2/3}}{n}$$

$$V = 2.15 \text{ FPS}$$

VELOCITY = 2.15 FPS < 4.00 FPS, LINE SPILLWAY WITH GRASS

Appendix H

Soil Data

Custom Soil Resource Report Soil Map



MAP LEGEND**Area of Interest (AOI)**
 Area of Interest (AOI)
Soils
 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points
Special Point Features
 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features
Water Features
 Streams and Canals
Transportation
 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads
Background
 Aerial Photography
MAP INFORMATION

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

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 18, Jun 1, 2020

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

Date(s) aerial images were photographed: Mar 31, 2014—Apr 2, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KkoC	Klinesville channery loam, 6 to 12 percent slopes	6.4	24.6%
PeoB	Penn channery silt loam, 2 to 6 percent slopes	4.8	18.4%
RehB	Reaville silt loam, 2 to 6 percent slopes	10.9	42.3%
RorAt	Rowland silt loam, 0 to 2 percent slopes, frequently flooded	3.8	14.7%
Totals for Area of Interest		25.9	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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Block 6001, Lot 33 – 2187 Route 206, Belle Mead
Block 6001, Lots 34 & 34.01 – 2179 Route 206, Belle Mead
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Montgomery Township, Somerset County, NJ

Soil Testing Logs – April 8, 20 & 21, 2020

Stake #201

0 - 12"	5YR 4/3	Silt Loam; Granular, Friable
12 - 26"	5YR 5/3	Shale Gravel; 15% Silt Loam
28 - 84"	5YR 4/4	Fractured Shale; 10% Silt Loam

Mottles @ 16-40" (5YR 5/2 and 6/1)
Seepage @ 20"
Heavy Seepage @ 26"+
Machine Refusal @ 84"

Stake #202

0 - 9"	7.5YR 3/3	Silt Loam; Granular, Friable
9 - 13"	7.5YR 5/6 & 5/3	Clay Loam; Angular Blocky, Friable
13 - 32"	5YR 4/4	Gravelly Loam; 20% Gravel, Weak Subangular Blocky, Friable

Mottles @ 9-42" (5YR 5/1)
32 - 100" 5YR 4/4 Fractured Shale; 10% Loam
Seepage @ 46"
Mottles @ 9-42" (5YR 5/1)
Machine Refusal @ 100"

Stake #203

0 - 10"	7.5YR 5/4	Silty Clay Loam; Subangular Blocky, Friable
10 - 16"	5YR 4/4	Gravelly Clay Loam; Subangular Blocky, Friable
16 - 28"	5YR 4/4	Fractured Shale (Gravel Size); 10% Silt Loam

28 - 80" 5YR 4/4 Fractured Shale; 10% Silt Loam
Mottles @ 16-80"
Seepage @ 24"
Machine Refusal @ 80"

Stake #204

0 - 11"	5YR 5/3	Silt Loam; Granular, Friable
11 - 22"	5YR 4/4	Shale Gravel; 10% Silt Loam

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Soil Testing Logs – April 8, 20 & 21, 2020

Stake #204 (continued)

22 - 84"	5YR 4/4	Fractured Shale; 5% Silt Loam Mottles @ 11-45" (5YR 5/1 & 5YR 5/3) Seepage @ 17"; Heavy Seepage @ 40" Machine Refusal @ 84"
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Stake #205

0 - 10"	5YR 4/3	Silt Loam; Granular, Friable
10 - 18"	5YR 5/3	Shale Gravel; 10% Silt Loam
18 - 61"	5YR 4/4	Fractured Shale; 5% Silt Loam Mottles @ 18" (10YR 5/1 & 10YR 6/1) Seepage @ 15" Machine Refusal @ 61"

Stake #206

0 - 8"	7.5YR 4/4	Silt Loam; Granular, Friable
8 - 16"	5YR 4/4	Gravelly Clay Loam; Angular Blocky, Friable
16 - 78"	5YR 4/4	Fractured Shale; 10% Clay Loam Mottles @ 0-78" (7.5YR 4/6 & 5YR 5/1) Slight Seepage @ 20" – No Accumulation Machine Refusal @ 78"

Stake #207

0 - 6"	7.5YR 5/3	Silt Loam; Granular, Friable
6 - 24"	5YR 4/4	Shale Gravel; 15% Silt Loam
24 - 32"	5YR 4/4	Fractured Shale; 10% Silt Loam
32 - 80"	5YR 4/4	Fractured Shale; 5% Silt Loam Mottles @ 6" (5YR 5/2 & 5YR 6/1) Seepage @ 6", Dry Below 32" Machine Refusal @ 80"

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Soil Testing Logs – April 8, 20 & 21, 2020

Stake #208

0 - 12"	5YR 5/3	Gravelly Silt Loam; Granular, Friable
12 - 26"	5YR 4/4	Shale Gravel
26 - 88"	5YR 4/4	Fractured Shale; 10% Silt Loam

Mottles @ 12-48" (5YR 5/2 & 5YR 6/1)
Seepage @ 12"
Machine Refusal @ 88"

Stake #209

0 - 12"	5YR 5/3	Gravelly Silt Loam; Granular, Friable
12 - 26"	5YR 4/4	Shale Gravel; 15% Silt Loam
26 - 82"	5YR 4/4	Fractured Shale; 10% Silt Loam

Mottles @ 12-48" (5YR 5/2 & 5YR 6/1)
Seepage @ 12"
Machine Refusal @ 82"

Stake #210

0 - 9"	5YR 4/3	Silt Loam; Granular, Friable
9 - 30"	5YR 5/3	Shale Gravel; 20% Silt Loam
30 - 72"	5YR 4/4	Fractured Shale; 10% Silt Loam

Mottles @ 28-52" (5YR 5/1 & 5YR 5/3)
Seepage @ 40"
Machine Refusal @ 72"

Stake #211

0 - 10"	7.5YR 4/3	Gravelly Loam; Granular, Friable
10 - 16"	7.5YR 5/3	Fractured Shale; 20% Silt Loam
16 - 81"	5YR 4/4	Fractured Shale; 5% Silt Loam

Mottles @ 20" (5YR 5/2)
Water @ 40" to 52"
Machine Refusal @ 81"

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Soil Testing Logs – April 8, 20 & 21, 2020

Stake #212

0 - 10"	5YR 4/3	Silt Loam; Granular, Friable
10 - 24"	5YR 5/3	Shale Gravel; 30% Silt Loam
24 - 72"	5YR 4/4	Fractured Shale; 5% Silt Loam

Mottles @ 16" (5YR 6/1)
Seepage @ 18" to 42"
Machine Refusal @ 72"

Stake #213

0 - 10"	5YR 4/3	Loam; Granular, Friable
10 - 36"	5YR 4/4	Highly Fractured Shale; 15% Silt Loam
36 - 96"	5YR 4/4	Fractured Shale; 5% Silt Loam

Mottles @ 18" to 40" (5YR 6/1, 5YR 5/2, 5YR 5/4)
Seepage @ 18" to 40"
24hr Static Water @ 66"

Stake #214

0 - 12"	5YR 4/3	Silt Loam; Granular, Friable
12 - 30"	5YR 4/4	Highly Fractured Shale; 15% Silt Loam
30 - 96"	5YR 4/4	Fractured Shale; 5% Loam

Mottles @ 18" (5YR 5/1)
Seepage Perched @ 18" to 48"
Machine Refusal @ 96"

Stake #215

0 - 12"	7.5YR 4/3	Loam; Granular, Friable
12 - 24"	5YR 4/3	Shale Gravel; 20% Silt Loam
24 - 88"	5YR 4/4	Fractured Shale; 10% Loam

Mottles @ 19" to 49" (5YR 5/2)
Seepage @ 55"
Machine Refusal @ 88"

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Soil Testing Logs – August 17-18, 2020

Soil Log #216

0 - 10"	5YR 4/3	Silt Loam; Granular, Friable
10 - 33"	5YR 4/4	Fractured Shale; 15% Silt Loam
33 - 74"	5YR 4/4	Fractured Shale; 5% Silt Loam

Mottles @ 10-33" (5YR 5/2)
Water @ 71"
Machine Refusal @ 74"

Soil Log #217

0 - 11"	5YR 4/3	Silt Loam; Granular, Friable
11 - 24"	5YR 4/4	Fractured Shale; 15% Silt Loam
24 - 66"	5YR 4/4	Fractured Shale; 10% Silt Loam

Mottles @ 11-24" (5YR 5/2)
Water @ 44"
Machine Refusal @ 66"

Soil Log #218

0 - 10"	5YR 4/3	Gravelly Silt Loam; Granular, Friable
10 - 32"	5YR 4/4	Fractured Shale; 10% Silt Loam
32 - 56"	5YR 4/4	Fractured Shale; 5% Silt Loam

Mottles @ 10-32" (5YR 6/1)
Water @ 50"
Machine Refusal @ 56"

Soil Log #219

0 - 9"	5YR 4/3	Gravelly Silty Clay Loam; Subangular Blocky, Friable
9 - 50"	5YR 4/4	Fractured Shale; 10% Silt Loam
50 - 60"	5YR 4/4	Fractured Shale; 5% Silt Loam

Mottles @ 10-48" (5YR 6/1)
Seepage @ 40"
Water @ 29"
Machine Refusal @ 60"

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Soil Testing Logs – August 17-18, 2020

Soil Log #220

0 - 11"	5YR 4/3	Silt Loam; Granular, Friable
11 - 16"	5YR 4/4	Fractured Shale; 15% Silt (7.5YR 5/4)
16 - 58"	5YR 4/4	Fractured Shale; 10% Loam

Mottles @ 16-36" (5YR 5/2)
Seepage @ 34"
Water @ 34"
Machine Refusal @ 58"

Soil Log #221

0 - 10"	5YR 4/3	Silty Clay Loam; 15% Gravel, Granular, Friable
10 - 32"	5YR 4/4	Fractured Shale; 10% Clay Loam
32 - 69"	5YR 4/4	Fractured Shale; 5% Clay Loam

Mottles @ 12-30" (5YR 5/2)
Water @ 31"
Machine Refusal @ 69"

Soil Log #222

0 - 10"	5YR 4/3	Silt Loam; Granular, Friable
10 - 30"	5YR 4/4	Silt Loam; Subangular Blocky, Friable
30 - 53"	5YR 4/4	Fractured Shale; 10% Silt Loam

Mottles @ 10-30" (5YR 6/2)
Water @ 50" (3" Accumulation) – No Test
Machine Refusal @ 53"

Soil Log #223

0 - 10"	5YR 4/3	Silty Clay Loam; Subangular Blocky, Friable
10 - 33"	5YR 4/4	Fractured Shale; 10% Silty Clay Loam
33 - 60"	5YR 4/4	Fractured Shale; 5% Loam

Mottles @ 10-33" (5YR 5/2)
Water @ 57" (3" Accumulation) – No Test
Machine Refusal @ 60"

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Soil Testing Logs – August 17-18, 2020

Soil Log #224

0 - 12"	5YR 4/3	Gravelly Clay Loam; Subangular Blocky, Friable
12 - 28"	5YR 4/4	Gravelly Clay Loam; Subangular Blocky, Friable
28 - 72"	5YR 4/4	Fractured Shale; 10% Loam
		Mottles @ 21-28" (5YR 5/2)
		Water @ 35"
		Seepage @ 42"
		Machine Refusal @ 72"

Soil Log #225

0 - 10"	5YR 4/3	Silty Clay Loam; Subangular Blocky, Friable
10 - 30"	5YR 4/4	Fractured Shale; 10% Clay Loam
30 - 54"	5YR 4/4	Fractured Shale; 5% Loam
		Mottles @ 10-30" (5YR 5/1)
		Water @ 49"
		Machine Refusal @ 54"

Soil Log #226

0 - 10"	5YR 4/3	Silt Loam; Granular, Friable
10 - 30"	5YR 4/4	Fractured Shale; 10% Silt Loam
30 - 70"	5YR 4/4	Fractured Shale; 5% Silt Loam
		Mottles @ 10-32" (5YR 5/2)
		Static Water @ 24"
		Machine Refusal @ 70"

Soil Log #227

0 - 12"	5YR 4/3	Silty Clay Loam; Granular, Friable
12 - 56"	5YR 4/4	Fractured Shale; 10% Clay Loam
56 - 75"	5YR 4/4	Fractured Shale; 5% Clay Loam
		Mottles @ 21-36" (5YR 5/2)
		Static Water @ 72" – No Test
		Machine Refusal @ 75"

Soil Logs – Route 206, Harlingen (VCEA 1805M) 11/02/22-11/03/22

Soil Log #11000

0-10" 5YR 3/3 Gravelly Clay Loam; Subangular Blocky, Friable
10-14" 5YR 4/4 Shale Gravel; 20% Clay Loam
14-36" 5YR 5/4 Fractured Shale; 10% Clay Loam
36-60" 5YR 4/4 Fractured Shale; 10% Loam
5YR 6/1 Mottles @ 15-32", Water @ 32", Refusal @ 60"

Soil Log #11001

0-8" 5YR 4/3 Loam; Subangular Blocky, Friable
8-20" 5YR 4/4 Shaly Clay Loam; Subangular Blocky, Friable
20-30" 5YR 4/4 Fractured Shale; 15% Silt Loam
30-57" 5YR 4/4 Fractured Shale; 10% Silt Loam
5YR 6/2 Mottles @ 16", Water @ 18", Refusal @ 57"

Soil Log #11002

0-6" 5YR 4/3 Gravelly Clay Loam; Granular, Friable
6-12" 5YR 4/4 Shaly Gravel; 20% Clay Loam
12-36" 5YR 4/4 Fractured Shale; 15% Clay Loam
36-73" 5YR 4/4 Fractured Shale; 10% Clay Loam
5YR 5/2 Mottles @ 23", Water @ 50", Refusal @ 73"

Soil Log #11003

0-8" 5YR 4/3 Heavy Loam; Granular, Friable
8-20" 5YR 4/4 Shaly Clay Loam; 20% Shale, Subangular Blocky, Friable
20-76" 5YR 4/4 Fractured Shale; 10% Loam
5YR 5/2 Mottles @ 22", Water @ 30", Refusal @ 76"

Soil Log #11004

0-8" 5YR 4/3 Silt Loam; Granular, Friable
8-28" 5YR 4/4 Shale Gravel; 15% Clay Loam, Subangular Blocky, Friable
28-63" 5YR 4/4 Fractured Shale; 10% Clay Loam
5YR 5/2 Mottles @ 16-40", Water @ 54", Refusal @ 63"

Soil Log #11005

0-8" 5YR 4/3 Clay Loam; Granular, Friable
8-16" 5YR 4/4 Shale Gravel; 30% Clay Loam, Subangular Blocky, Friable
16-65" 5YR 4/4 Fractured Shale; 10% Clay Loam
5YR 5/2 Mottles @ 21-53", Water @ 40", Refusal @ 65"

Soil Log #11006

0-12" 5YR 4/3 Silt Loam; Granular, Friable
12-32" 5YR 4/4 Fractured Shale; 15% Silt Loam, Subangular Blocky, Friable
32-53" 5YR 4/4 Fractured Shale; 10% Loam
5YR 5/2 Mottles @ 20-38", Water @ 21", Refusal @ 53"

Soil Logs – Route 206, Harlingen (VCEA 1805M) 11/02/22-11/03/22

Soil Log #11007

0-10" 5YR 4/3 Silt Loam; Granular, Friable
10-24" 5YR 4/4 Fractured Shale; 15% Silt Loam, Subangular Blocky, Friable
24-51" 5YR 4/4 Fractured Shale; 10% Loam
5YR 5/2 Mottles @ 19-48", Water @ 21", Refusal @ 51"

Soil Log #11008

0-8" 5YR 4/3 Silt Loam; Granular, Friable
8-22" 5YR 4/4 Gravelly Clay Loam; 40% Gravel, Subangular Blocky, Friable
22-44" 5YR 4/4 Fractured Shale; 15% Loam
44-68" 5YR 4/4 Fractured Shale; 10% Loam
5YR 5/2 Mottles @ 22", Water @ 19", Refusal @ 68"

Soil Log #11009

0-10" 5YR 3/3 Silt Loam; Granular, Friable
10-18" 5YR 4/4 Shale Gravel; 10% Clay Loam
18-58" 5YR 4/4 Fractured Shale; 15% Loam
5YR 5/1 Mottles @ 12-38", Water @ 3", Refusal @ 58"

Soil Log #11010

0-12" 5YR 3/3 Silt Loam; Granular, Friable
12-16" 5YR 4/4 Shale Gravel; 10% Clay Loam
16-44" 5YR 4/4 Fractured Shale; 15% Loam
5YR 6/1 Mottles @ 13", Water @ 13", Refusal @ 44"

Appendix I

Storm Sewer Capacity Analysis

Inlet Drainage Area Breakdown

Drainage Area	Catch Basin I.D.	Area (Acres)	Total Impervious Runoff Coefficient	Open Space Runoff Coefficient (HSG D)	Runoff Coefficient (Rational)	Rooftop Area (Acres)
			0.99	0.65		
DA:1-1	CB:1-1	0.30	0.25	0.05	0.93	0.10
DA:1-2	CB:1-2	0.40	0.21	0.19	0.83	0.05
DA:1-3	CB:1-3	0.73	0.17	0.56	0.73	0.20
DA:1-4	CB:1-4	0.29	0.18	0.11	0.86	0.12
DA:1-5	CB:1-5	0.78	0.14	0.64	0.71	0.00
DA: 2-2	CB:2-2	0.52	0.40	0.12	0.91	0.12
DA: 2-2A	CB:2-2A	0.31	0.23	0.08	0.90	0.00
DA: 2-2B	CB:2-2B	0.13	0.07	0.06	0.83	0.00
DA: 2-3	CB:2-3	0.50	0.29	0.21	0.85	0.07
DA: 2-5	CB:2-5	0.07	0.07	0.00	0.99	0.00
DA: 2-6	CB:2-6	0.38	0.29	0.09	0.91	0.05
DA: 2-7	CB:2-7	0.84	0.13	0.71	0.70	0.00
DA: 2-8	CB:2-8	0.05	0.05	0.00	0.99	0.00
DA: 2-9	CB:2-9	0.16	0.15	0.01	0.97	0.00
DA: 2-10	CB:2-10	0.22	0.13	0.09	0.85	0.10
DA: 2-11	CB:2-11	0.17	0.12	0.05	0.89	0.00
DA: 2-12	CB:2-12	0.14	0.00	0.14	0.65	0.00
DA: 2-13	CB:2-13	0.03	0.03	0.00	0.99	0.00
DA: 2-14	CB:2-14	0.35	0.24	0.11	0.88	0.09
DA: 2-15	CB:2-15	0.45	0.31	0.14	0.88	0.09
DA: 2-16	CB:2-16	0.63	0.22	0.41	0.77	0.15
DA: 2-17	HW-4	0.38	0.00	0.38	0.65	0.00
DA: YI6	YI-6	0.10	0.09	0.01	0.96	0.09
DA: YI5	YI-5	0.01	0.00	0.01	0.65	0.00
DA: YI4	YI-4	0.01	0.00	0.01	0.65	0.00
DA: YI3	YI-3	0.10	0.09	0.01	0.96	0.09
DA: YI2	YI-2	0.01	0.00	0.01	0.65	0.00
DA: YI1	YI-1	0.01	0.00	0.01	0.65	0.00

Pipe Capacity Analysis (25-Year Storm)

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)
CB1-1	DMH1-1	77.71	76.13	113	6.39	1.95	0.30	0.93	1.40	0.013	24	12.54	26.79	8.39	78.98	77.09
DMH1-1	HW-1	76.03	75.00	44	6.35	1.95	(N/A)	(N/A)	2.33	0.013	24	12.45	34.54	10.10	77.30	75.89
CB1-5	CB1-4	81.32	81.20	23	6.60	0.55	0.78	0.71	0.50	0.013	15	3.68	4.57	4.14	82.16	82.04
CB1-4	CB1-3	81.10	80.45	129	6.58	0.80	0.29	0.86	0.50	0.013	18	5.33	7.43	4.57	82.04	81.40
CB2-9	CB2-8	79.32	79.13	37	6.60	0.16	0.16	0.97	0.50	0.013	15	1.03	4.57	3.01	79.72	79.53
CB2-8	CB2-5	79.03	78.25	78	6.56	0.21	0.05	0.99	1.00	0.013	18	1.35	10.50	4.09	79.47	78.96
CB1-2	CB1-1	79.60	79.31	29	6.40	1.67	0.40	0.83	1.00	0.013	24	10.77	22.62	7.11	80.77	80.31
CB1-3	CB1-2	80.35	79.70	130	6.49	1.34	0.73	0.73	0.50	0.013	24	8.74	16.00	5.20	81.40	80.77
CB2-2	DMH2-1	76.10	75.66	97	6.01	4.36	0.52	0.91	0.45	0.013	30	26.40	27.59	6.40	78.09	77.44
DMH2-1	HW-2	75.66	75.00	174	5.96	4.36	(N/A)	(N/A)	0.38	0.013	36	26.17	41.11	6.16	77.44	76.68
CB2-7	CB2-6	78.69	78.54	29	6.60	0.59	0.84	0.70	0.48	0.013	15	3.91	4.49	4.12	79.59	79.44
CB2-6	CB2-5	78.44	78.25	34	6.58	0.93	0.38	0.91	0.57	0.013	18	6.19	7.95	4.97	79.44	79.21
Y1-6	CB2-13	78.31	77.86	45	6.49	0.92	0.10	0.96	1.00	0.013	15	6.03	6.46	5.98	79.30	79.00
CB2-13	CB2-5	77.76	77.60	24	6.46	0.95	0.03	0.99	0.65	0.013	18	6.20	8.47	5.23	79.00	78.96
CB2-5	DMH2-4	77.50	76.54	193	6.45	2.16	0.07	0.99	0.50	0.013	24	14.03	15.95	5.73	78.96	78.15
CB2-15	Y1-1	80.29	80.18	11	6.60	0.40	0.45	0.88	1.00	0.013	15	2.63	6.46	4.99	80.94	80.84
Y1-1	Y1-2	80.18	79.85	33	6.59	0.40	0.01	0.65	1.00	0.013	15	2.67	6.46	5.01	80.84	80.51
Y1-3	Y1-4	79.43	79.13	15	6.54	0.51	0.10	0.96	2.04	0.013	15	3.33	9.23	6.92	80.17	79.87
Y1-4	Y1-5	79.13	78.75	38	6.54	0.51	0.01	0.65	1.00	0.013	15	3.37	6.46	5.32	79.87	79.69
Y1-5	Y1-6	78.75	78.31	44	6.51	0.83	0.01	0.65	1.00	0.013	15	5.42	6.46	5.90	79.69	79.30
CB2-14	Y1-5	78.86	78.75	11	6.60	0.31	0.35	0.88	1.00	0.013	15	2.05	6.46	4.67	79.68	79.69
Y1-2	Y1-3	79.85	79.43	42	6.57	0.41	0.01	0.65	1.00	0.013	15	2.71	6.46	5.03	80.51	80.17
DMH2-4	CB2-2	76.44	76.20	49	6.34	3.07	(N/A)	(N/A)	0.50	0.013	30	19.63	28.93	6.33	78.15	78.09
CB2-3	CB2-2	77.79	77.35	35	6.60	0.43	0.50	0.85	1.25	0.013	15	2.83	7.22	5.52	78.47	78.09
CB2-2A	CB2-2	76.93	76.20	207	6.35	0.387	0.31	0.90	0.35	0.013	15	2.48	3.82	2.02	78.41	78.09
HW-4	HW-5	82.00	81.95	5	6.60	0.247	0.38	0.65	1.00	0.013	15	1.64	6.46	4.4	82.51	82.4
CB2-16	CB2-12	78.99	78.35	128	6.60	0.485	0.63	0.77	0.50	0.013	15	3.23	4.57	4.03	79.77	79.07
CB2-10	DMH2-4	77.27	77.19	15	6.60	0.187	0.22	0.85	0.50	0.013	15	1.24	4.57	3.17	78.15	78.15
CB2-11	DMH2-4	77.35	77.27	9	6.45	0.727	0.17	0.89	1.00	0.013	15	4.73	6.46	5.75	78.23	78.08
CB2-12	CB2-11	78.25	77.45	80	6.49	0.576	0.14	0.65	1.00	0.013	15	3.77	6.46	5.47	79.03	78.14
CB2-2B	CB2-2A	77.11	76.94	44	6.60	0.108	0.13	0.83	0.38	0.013	15	0.72	3.98	0.58	78.42	78.41
OCS	HW-3	75.00	74.28	204	7.90	0	(N/A)	(N/A)	0.35	0.013	30	5.86	24.37	4.08	75.83	75.08

Roof Drain Sizing Sheet

Building Number	Roof Area (SQ. FT.)	Size (Inches)	Slope (Inch/Foot)
1	3,935	8	1/16
2-3	3,748	8	1/16
4-8, 10-11, 13	4,457	8	1/16
9, 12, 14	6,012	8	1/16

Please note that all roof drains have been sized per the 2015 National Standard Plumbing Code Chapter 13 Section 13.1.10.1 Primary Roof Drainage. See Table 13.6.2 Part 1 enclosed in this appendix. A rainfall rate of five inches per hour was utilized per NJAC 5:23-3.15(b)11.ii, which states that "rainfall rates shall be applied so that the applicable rainfall rate for Burlington and Ocean Counties and all counties south shall be six inches per hour and for Mercer and Monmouth Counties and all counties north, the applicable rainfall rate shall be five inches per hour." This site is located north of Mercer and Monmouth Counties.

Table 13.6.2 Part 1							
SIZE OF HORIZONTAL STORM DRAINS (for 1"/hr to 6"/hr rainfall rates)							
Size of Drain (inches)	Design Flow of Drain	Allowable Projected Roof Area at Various Rates of Rainfall per Hour (Square Feet of Roof)					
Slope 1/16 inch/foot							
	GPM	1"/hr	2"/hr	3"/hr	4"/hr	5"/hr	6"/hr
2							
3							
4	53	5,101	2,551	1,700	1,275	1,020	850
5	97	9,336	4,668	3,112	2,334	1,867	1,556
6	157	15,111	7,556	5,037	3,778	3,022	2,519
8	339	32,629	16,314	10,876	8,157	6,526	5,438
10	615	59,194	29,597	19,731	14,798	11,839	9,866
12	999	96,154	48,077	32,051	24,039	19,231	16,026
15	1812	174,405	87,203	58,135	43,601	34,881	29,068
Slope 1/8 inch/foot							
Size	GPM	1"/hr	2"/hr	3"/hr	4"/hr	5"/hr	6"/hr
2							
3	35	3,369	1,684	1,123	842	674	561
4	75	7,219	3,609	2,406	1,805	1,444	1,203
5	137	13,186	6,593	4,395	3,297	2,637	2,198
6	223	21,464	10,732	7,155	5,366	4,293	3,577
8	479	46,104	23,052	15,368	11,526	9,221	7,684
10	869	83,641	41,821	27,880	20,910	16,728	13,940
12	1413	136,002	68,001	45,334	34,000	27,200	22,667
15	2563	246,689	123,345	82,230	61,672	49,338	41,115
Slope 1/4 inch/foot							
Size	GPM	1"/hr	2"/hr	3"/hr	4"/hr	5"/hr	6"/hr
2	17	1,636	818	545	409	327	273
3	50	4,813	2,406	1,604	1,203	963	802
4	107	10,299	5,149	3,433	2,575	2,060	1,716
5	194	18,673	9,336	6,224	4,668	3,735	3,112
6	315	30,319	15,159	10,106	7,580	6,064	5,053
8	678	65,258	32,629	21,753	16,314	13,052	10,876
10	1229	118,292	59,146	39,431	29,573	23,658	19,715
12	1999	192,404	96,202	64,135	48,101	38,481	32,067
15	3625	348,907	174,454	116,302	87,227	69,781	58,151
Slope 1/2 inch/foot							
Size	GPM	1"/hr	2"/hr	3"/hr	4"/hr	5"/hr	6"/hr
2	24	2,310	1,155	770	578	462	385
3	70	6,738	3,369	2,246	1,684	1,348	1,123
4	151	14,534	7,267	4,845	3,633	2,907	2,422
5	274	26,373	13,186	8,791	6,593	5,275	4,395
6	445	42,831	21,416	14,277	10,708	8,566	7,139
8	959	92,304	46,152	30,768	23,076	18,461	15,384
10	1738	167,283	83,641	55,761	41,821	33,457	27,880
12	2827	272,099	136,050	90,700	68,025	54,420	45,350
15	5126	493,379	246,689	164,460	123,345	98,676	82,230

NOTES FOR TABLE 13.6.2 – Part 1:

- Design flows are based on fairly rough pipe with a Manning friction coefficient of $n = 0.015$

Appendix J

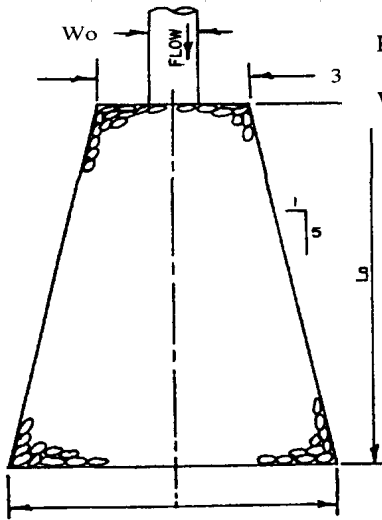
Soil Erosion & Sediment Control

RIPRAP APRON DATA SHEET

Project Number: 1850M
Storm Frequency: 25-Year

DATE: 5/18/2023
BY: KH

OUTLET STRUCT.	YEAR STORM	Q (cfs)	PIPE HEIGHT (in)	PIPE WIDTH (in)	TAILWATER (ft)	La (ft)	W (beg) (ft)	W (end) (ft)	d50 (in)
HW-1	25	12.45	24	24	2.75	13.2	6.0	11.3	0.8
HW-2	25	26.17	36	36	2.75	15.1	9.0	15.0	1.2



$$W = 3 W_o + 0.4 L_a$$

(Tailwater $\geq 0.5 D_o$)

For tailwater elevation greater than or equal to the elevation of the center of the pipe,

$$W = 3 W_o + 0.4 L_a$$

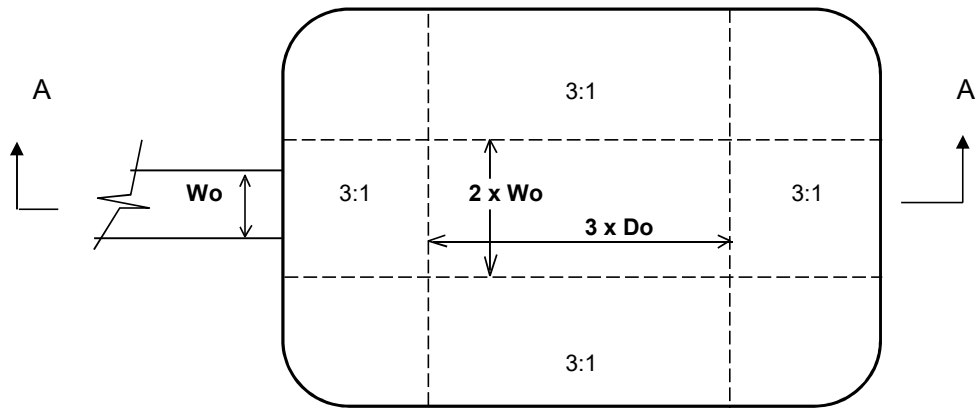
$$L_a = 3 \frac{q}{D_o^{1/2}}$$

$$TW > \frac{1}{2} D_o$$

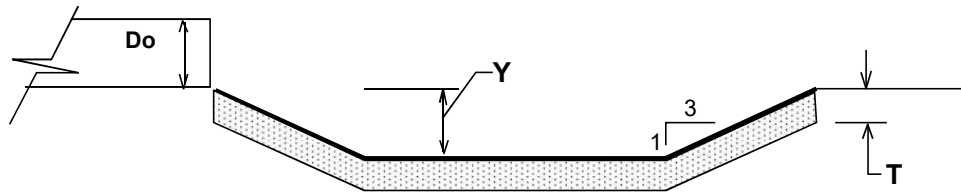
$$TW = 0.2 D_o$$

$$D_{50} = \frac{0.016}{T_w} q^{1.33}$$

where $q = Q/D_o$



PLAN



SECTION A - A

$T = 3 \times d50$ without filter fabric
 $T = 2 \times d50$ with filter fabric

SCOUR HOLE

(nts)

STRUCTURE #	Q (cfs)	Do (in)	Wo (in)	TW (ft)	Y = .5 Do (Y or N)	Y (ft)	d 50 (ft)	USE d 50 (in)
HW-3	5.86	30	30	0.5	N	2.5	0.05	1

FORMULAS USED: $d50 = \frac{0.0125 (Q/Do)^{1.33}}{TW}$ where $Y = 0.5 Do$

$d50 = \frac{0.0082 (Q/Do)^{1.33}}{TW}$ where $Y = Do$

Where TW cannot be computed USE $TW = 0.2 Do$

Appendix K

Dam Safety Compliance

Dam Safety Standards Compliance Statement

This document is intended to verify that the pond constructed wetland is compliant with the design criteria described at N.J.A.C. 7:20-1.9. The pond constructed wetland can be classified as a Class IV dam per N.J.A.C. 7:20-1.8 because it impounds less than 15 acre-feet of water, has less than 15 feet height-of-dam, drains less than 150 acres and does not pose any hazard potential. Each of the aforementioned design criteria is listed below followed by a description of the manner in which it is being met.

a)

The minimum design storm used to calculate required spillway capacity for Class IV dams is the 24-hour, 100-year frequency, Type III storm plus 50% .*

**Any later technology adopted by the U.S. Department of Agriculture, Natural Resources Conservation Service may be substituted for the use of the Type III storm.*

In order to determine whether the emergency spillway capacities are sufficient, routing calculations were performed under the assumption that the outlet structures are blocked. The design storm that was utilized is the 24-hour, 100-year design storm + 50%. The NOAA Region C rainfall distribution was used to model this design storm.

Complies

b)

For existing dams, it is recognized that the relationships between valley slope and width, total reservoir storage, drainage area, and other hydrologic factors have a critical bearing on determining the safe spillway design flood. When appropriate, based on the design of a dam, rational selection of a reduced spillway design for specific site conditions based on quantitative and relative impact analysis is acceptable. The spillway should be sized so that the increased downstream damage resulting from overtopping failure of the dam would not be significant as compared with the damage caused by the flood in the absence of a dam overtopping failure. The minimum design storm for the dam shall be the 100 year storm.

The pond constructed wetland is a proposed dam rather than an existing dam. **Not Applicable**

c)

All Class II and III dams shall, where practicable incorporate in the proposed design, the ability to make modifications necessary to increase the spillway capacity of the facility or other alternative measures if the downstream hazard potential increases.

The pond constructed wetland is a Class IV dam. **Not Applicable**

d)

All dams shall have an adequate storage for the design storm or have a spillway system which will safely pass the design storm without endangering the safety of the dam.

The proposed dam has been designed with an appropriate emergency spillway that can safely pass the design storm without endangering the safety of the dam as demonstrated by the results of the routing calculations. **Complies**

e)

Each spillway shall include a satisfactory means of dissipating the energy of flow at its outlet without endangering the safety of the dam.

The velocity of the flow that passes through the spillway was determined to be less than 4 feet per second. Thus a spillway lined with grass is sufficient to ensure that the energy of the flow will not endanger the safety of the dam. **Complies**

f)

The capacity of the spillway system shall be equal to the peak inflow of the design flood unless the applicant demonstrates by flood routing procedures that the spillway system has the capacity to safely pass the resulting water flow.

The routing calculations demonstrate that the freeboard corresponding to the dam will be at least 1 foot and thus the spillway system has the capacity to safely pass the water flow. **Complies**

g)

Pipe conduits may be used for the primary (principal) spillway.

Pipe conduits will not be used for the primary spillway corresponding to the proposed dam. **Not Applicable**

h)

Should a vegetated or unlined auxiliary spillway, approved by the Department, be installed, it must be able to pass the design storm without jeopardizing the safety of the structure and that has a predicted average frequency of use less than once in 25 years

for Class IV dams.

The proposed dam has not been designed with an auxiliary spillway. **Not Applicable**

i)

Except for excavated impoundments, all dams shall include a device to permit draining the reservoir, as approved in writing by the Department. Computations for the minimum time required to drain the reservoir shall be required for new and existing dams.

The proposed dam is an excavated impoundment. Thus the drawdown requirements are not applicable. **Not Applicable**

j)

Design references used shall be cited in the information submitted to the Department.

Owners and operators of Class IV dams are not required to file documents with nor obtain a permit from the Department per N.J.A.C. 7:20-1.3. **Not Applicable**

k)

Monitoring devices to permit inspection and assessment of the dam's condition may be required by the Department for use in the inspections during and after completion of construction.

Owners and operators of Class IV dams are not required to file documents with nor obtain a permit from the Department per N.J.A.C. 7:20-1.3. **Not Applicable**

l)

The applicant shall demonstrate to the Department that the riparian rights of downstream property owners will be protected during construction, during the period when the reservoir is being filled and during the life of the dam and reservoir.

Owners and operators of Class IV dams are not required to file documents with nor obtain a permit from the Department per N.J.A.C. 7:20-1.3. **Not Applicable**

m)

Unless the applicant can demonstrate that an alternative slope is acceptable, upstream slopes of an earth dam may be no steeper than three horizontal to one vertical ratio, and downstream slopes may be no steeper than two horizontal to one vertical ratio. Measures are required for protection of upstream slopes against wave action or rapid

draw-down and for protection of the downstream slope against scour or erosion due to high tailwater.

Both the upstream and downstream slopes of the proposed dam are not steeper than three horizontal to one vertical ratio. Both the upstream and downstream slopes will be stabilized with vegetation for protection. A scour hole will be used to prevent erosion caused by the outflow associated with the pond constructed wetland. **Complies**

n)

Freeboard requirements are as follows:

1. Sufficient freeboard shall be provided to prevent overtopping of the dam or any dike or levee due to passage of the design flood or due to frost damage, ice damage or wave action.

At least one foot of freeboard to the top of the dam has been provided. **Complies**

2. For all dams the minimum elevation of the top of the dam must be that necessary to pass the design storm with at least one foot of freeboard to the top of dam.

At least one foot of freeboard to the top of the dam has been provided. **Complies**

3. Where special conditions of severe frost damage, ice damage or wave action may occur, higher elevations than required in (n)2 above may be required and should be considered by the applicant.

These special conditions are not applicable to the proposed dam. **Not Applicable**

o)

The Department may require the design and installation of any additional or modified measures by any applicant for a dam permit where appropriate to insure the protection of human health or safety.

Owners and operators of Class IV dams are not required to file documents with nor obtain a permit from the Department per N.J.A.C. 7:20-1.3. **Not Applicable**

Dam Parameters

I. Pond Constructed Wetland

i. Elevations

- Emergency Spillway Crest: 80.00 ft
- Junction of the Downstream Face of the Dam with the Ground Surface: 79.00 ft
- Invert of the Outlet Pipe at the Point of Discharge: 74.28 ft
- Toe-of-dam: 74.28 ft
- Vertical Distance from Toe-of-dam to Emergency Spillway Crest: 5.72 ft > 5.00 ft

Appendix L

NSPS Worksheet

NJDEP Nonstructural Strategies Points System (NSPS)

Version: January 31, 2006

Note: Input Values in Yellow Cells Only

Project: 1805M

Date: November 3, 2022

User:

Notes:

Step 1 - Provide Basic Major Development Site Information

A. Specify Total Area in Acres of Development Site Described in Steps 2 and 3 = 22.2 Acres

B. Specify by Percent the Various Planning Areas Located within the Development Site:

State Plan Planning Area:	PA-1	PA-2	PA-3	PA-4	PA-4B	PA-5	Total % Area
Percent of Each Planning Area within Site:			100.0%				100.0%

Note: See User's Guide for Equivalent Zones within Designated Centers and the NJ Meadowlands, Pinelands, and Highlands Districts

Step 2 - Describe Existing or Pre-Developed Site Conditions

A. Specify Existing Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals	Points
		HSG A	HSG B	HSG C	HSG D		
1	Wetlands and Undisturbed Stream Buffers					0.0	0
2	Lawn and Open Space				1.6	1.6	13
3	Brush and Shrub					0.0	0
4	Meadow, Pasture, Grassland, or Range					0.0	0
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous					0.0	0
8	Woods - Planted					0.0	0
9	Woods and Grass Combination				20.5	20.5	200
10	Ponds, Lakes, and Other Open Water					0.0	0
11	Gravel and Dirt					0.0	0
12	Porous and Permeable Paving					0.0	0
13	Directly Connected Impervious					0.0	0
14	Unconnected Impervious with Small D/S Pervious				0.1	0.1	0
15	Unconnected Impervious with Large D/S Pervious					0.0	0
HSG Subtotals (Acres):		0.0	0.0	0.0	22.2		Total Area:
HSG Subtotals (%):		0.0%	0.0%	0.0%	100.0%		Total % Area:
							Points Subtotal:
							213
							Total Existing Site Points:
							213

A. Specify Proposed Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals	Points
		HSG A	HSG B	HSG C	HSG D		
1	Wetlands and Undisturbed Stream Buffers					0.0	0
2	Lawn and Open Space				7.8	7.8	64
3	Brush and Shrub					0.0	0
4	Meadow, Pasture, Grassland, or Range					0.0	0
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous					0.0	0
8	Woods - Planted					0.0	0
9	Woods and Grass Combination				9.9	9.9	96
10	Ponds, Lakes, and Other Open Water					0.0	0
11	Gravel and Dirt					0.0	0
12	Porous and Permeable Paving					0.0	0
13	Directly Connected Impervious				4.5	4.5	0
14	Unconnected Impervious with Small D/S Pervious					0.0	0
15	Unconnected Impervious with Large D/S Pervious					0.0	0
HSG Subtotals (Acres):		0.0	0.0	0.0	22.2		Total Area: 22.2
HSG Subtotals (%):		0.0%	0.0%	0.0%	100.0%		Total % Area: 100.0%
Points Subtotal:							160

B. Compare Proposed Impervious Coverage with Maximum Allowable Impervious Coverage:

Total Directly Connected Impervious Coverage =
Total Unconnected Impervious Coverage with Small D/S Pervious =
Total Unconnected Impervious Coverage with Large D/S Pervious =
Total Site Impervious Coverage =
Effective Site Impervious Coverage =

20%	% of Site
0%	% of Site
0%	% of Site
20%	% of Site
20%	% of Site

Specify Source of Maximum Allowable Impervious Coverage:

Table	(None or Table)
-------	-----------------

Allowable Site Impervious Cover from Maximum Impervious Cover Table:
Note: See Maximum Impervious Cover Table Worksheet for Details

12%

Points Subtotal: 0

C. Compare Proposed Site Disturbance with Maximum Allowable Site Disturbance:

Total Proposed Site Disturbance =
Maximum Allowable Site Disturbance by Municipal Ordinance =

57%	% of Site
100%	% of Site

Points Subtotal: 16

D. Describe Proposed Runoff Conveyance System:

Total Length of Runoff Conveyance System =
Length of Vegetated Runoff Conveyance System =
% of Total Runoff Conveyance System That is Vegetated =

2965	Feet
896	Feet
30%	

Points Subtotal: 22

E. Residential Lot Clustering:

Percent of Total Site Area that will be Clustered =
Minimum Standard Lot Size as Per Zoning (Note: 1/2 Acre or Greater) =
Maximum Proposed Cluster Lot Size (Note: 1/4 Acre or Less) =
Percent of Clustered Portion of Site to be Preserved as Vegetated Open Space =

	% of Site
	Acres
	Acres
	% of Clustered Site Portion

Points Subtotal: 0

F. Will the Following be Utilized to Minimize Soil Compaction?

Proposed Lawn Areas will be Graded with Lightweight Construction Equipment:
Percent of Proposed Lawn Areas to be Graded with Such Equipment:

Yes
100%

(Yes or No)
% of Lawn Areas

Points Subtotal:

18

G. Are Any of the Following Stormwater Management Standards Met Using Only Nonstructural Strategies and Measures?

Groundwater Recharge Standards (NJAC 7:8-5.4-a-2):

Stormwater Runoff Quality Standards (NJAC 7:8-5.5):

Stormwater Runoff Quantity Standards (NJAC 7:8-5.4-a-3):

Yes
No
No

(Yes or No)

(Yes or No)

(Yes or No)

Points Subtotal:

71

Note: If the Answers to All Three Questions at G Above are "Yes", Adequate Nonstructural Measures have been Utilized.

Total Proposed Site Points:

286

Ratio of Proposed to Existing Site Points:

134%

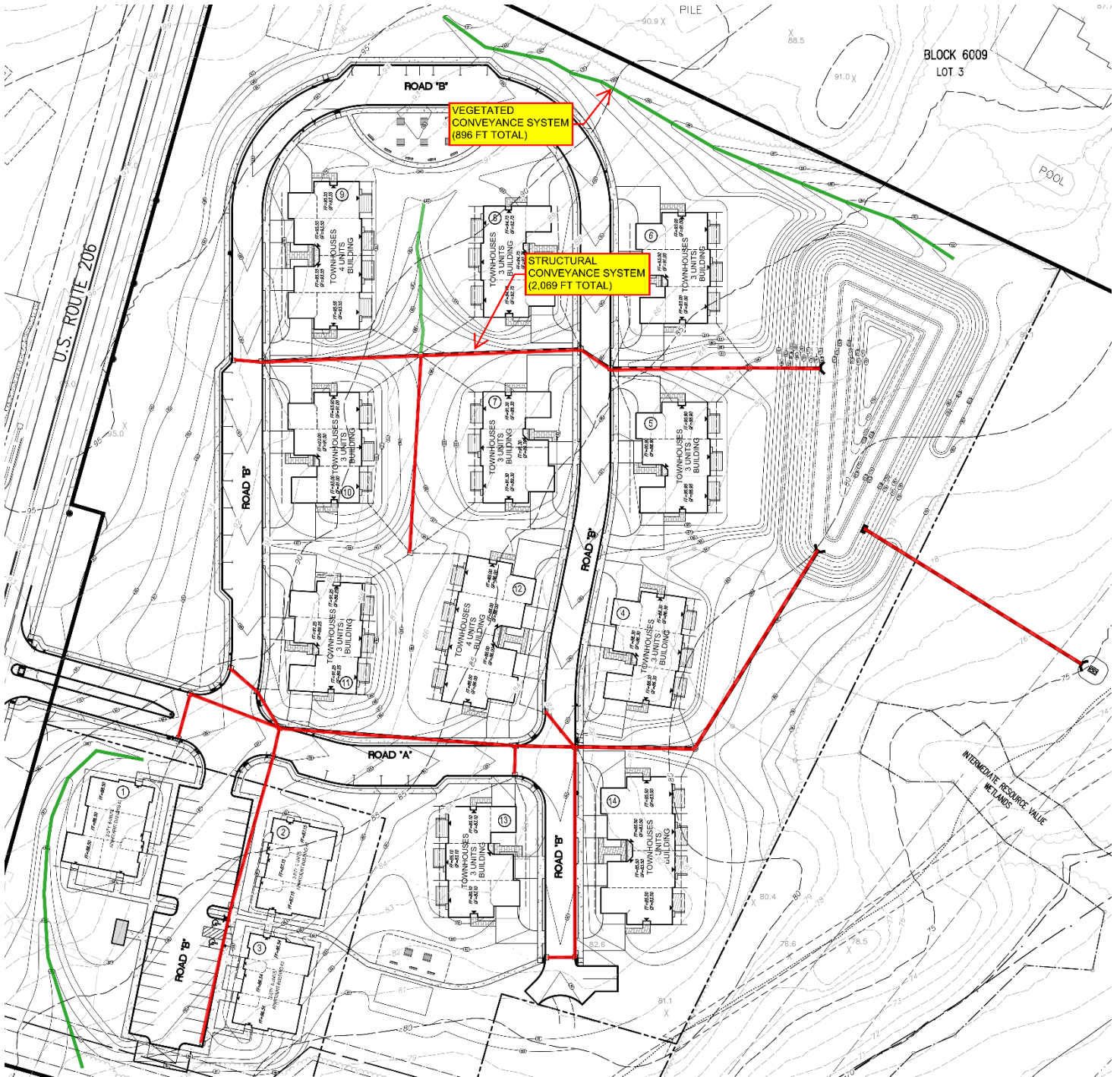
Required Site Points Ratio:

100%

Nonstructural Point System Results:

Proposed Nonstructural Measures are Adequate

Runoff Conveyance System Map



Appendix M

Drainage Area Maps & Soil Exploration Exhibit