POST-CONSTRUCTION STORMWATER MANAGEMENT REPORT

Prepared for:

HCI DP LAND ACQUISITION LLC

INDUSTRIAL DEVELOPMENT

NEW BRITAIN TOWNSHIP
BUCKS COUNTY
PENNSYLVANIA

Prepared by:

BOHLER

1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
(267) 402-3400

Bohler Project No. PAC250095.00

MATTHEW KEARSE
Pennsylvania Professional Engineer License No. PE092988

Dated: April 6, 2026
Revised: July 28, 2026

Table of Contents

General Project Description/ Stormwater Management 3
General Project Description 3
Stormwater Management 3
Storm Drainage System 5
Conclusion 5

Storm Management Calculations 6
NOAA Historic Rainfall Data 7
Runoff Calculation CN Worksheets 15
Time of Concentration Calculations 17
Stormwater Management Summary of Peak Flows 20
DEP Spreadsheets 23
Riparian Forest Buffer Spreadsheet 44
Pre Dev Hydrographs and Summary Reports 47
Post Dev Hydrographs and Summary Reports 97
Level Spreader Design 301
Infiltration Basin Dewatering Calculations 302
Infiltration Basin Spillway Calculations 313

Storm Drainage Calculations 314

Conveyance Calculations 315

Appendix 1.0: 141 Independence Lane Stormwater Impact Calculations

Appendix 2.0: Stormwater Infiltration Report, prepared by Geo-Technology Associates, Inc. for Walnut Street - Chalfont, New Britain Township, Bucks County, PA, dated 9/9/2025, last revised 1/08/2026.

Appendix 3.0: Pre, Post, and Inlet Drainage Area Plans

Appendix 4.0: Soil Report

General Project Description/Stormwater Management

GENERAL PROJECT DESCRIPTION

HCI DP Land Acquisition LLC proposes to develop the existing property located between Walnut Street, Schoolhouse Road, County Line Road and Independence Lane. The existing site is vacant with the West Branch of Neshaminy Creek travelling through the center of the property. The existing site also contains various woodland areas, wetlands, floodplain and riparian buffer areas. Currently the entire project consists of four (4) lots totaling 85.11 acres. The four (4) lots will be consolidated into one (1) lot. The proposal for the property is to develop the site with three (3) industrial buildings. The proposal also includes utilities and stormwater management controls necessary to support the development. Pertinent data characterizing the existing and future site conditions are shown on the accompanying Preliminary Land Development Plans.

STORMWATER MANAGEMENT

The proposed development has been designed to manage the increase in the 2-year volume generated by the on-site runoff as well as reduce peak rates getting to three (3) points of interest in accordance with the New Britain Township Stormwater Management Ordinance for the Neshaminy Creek Watershed. The proposed development has been designed to maintain existing drainage patterns to the greatest extent possible.

The SCS Method as defined in the computer watershed software HydroCAD Version 10.50-7a (HydroCAD) was the method utilized for calculating the peak runoff rates and generating hydrographs for existing conditions and post-development. Precipitation data used for generating hydrographs was generated using NOAA Atlas 14, Volume 2, Version 3 rainfall data obtained on November 18, 2025 for Chalfont, PA.

Pre-Development Conditions

The pre-development condition of the site consists of three (3) Points of Analysis (POAs), which are indicated on the attached Pre-Development Drainage Area Plan. In the existing condition, the site drains directly into the West Branch Neshaminy Creek via POA #1, Unnamed Tributary 02875 to West Branch Neshaminy Creek via POA #2, and Unnamed Tributary 02874 to West Branch Neshaminy Creek via POA #3. West Branch Neshaminy Creek and the Unnamed Tributaries 02875 and 02874 to West Branch Neshaminy Creek have a Designated Use classification of Warm Water Fishes (WWF), Migratory Fishes (MF). The on-site area tributary to each POA has been delineated and broken down by various ground covers for analysis. Hydrographs have been generated for the 1, 2, 5, 10, 25, 50 and 100-year design storms.

Post-Development Conditions

The post-development condition of the site maintains the same POAs and relative drainage patterns. A network of inlets, storm piping, and roof drains are proposed to capture runoff and direct it to underground detention basin systems and an aboveground infiltration basin. The underground detention basins and the aboveground infiltration basin provide stormwater rate control to be in compliance with Township and PADEP standards. The on-site area tributary to each POA has been delineated and broken down by various ground covers for analysis. Hydrographs have been generated for the 1, 2, 5, 10, 25, 50 and 100-year design storms.

Stormwater Volume & Water Quality Requirements

PADEP CG-1 requires that the 2-year, 24-hour storm net runoff volume increase resulting from development of a project site be managed while considering 20% of the existing impervious area as

meadow. The Township requires that the 2-year, 24-hour storm net runoff volume increase resulting from development of a project site be managed while considering 50% of the existing impervious area as meadow. In order to comply with PADEP CG-1 and the Township requirements, the net runoff increase for the 2-year, 24-hour storm was evaluated for the Pre- and Post-Development conditions. When considering 50% of existing impervious area as meadow, there is an increase in net runoff volume for the 2-year, 24-hour storm. Geo-Technology Associates, Inc. conducted infiltration testing throughout the site, and their findings are included within this report under Appendix 1.0. Based on GTA's results of the preliminary and supplemental subsurface testing, GTA considers stormwater infiltration within proposed infiltration basins to be very limited due to shallow limiting zones and slow inconsistent and variable infiltration rates. Issues related to stormwater management include the relatively shallow bedrock observed in the central and northern portions of the site and areas of slower infiltration. GTA recommends alternative SCMs to be considered for this project. Unlined systems, such as MRC, could be considered to maximize infiltration potential without relying on it for complete stormwater management. However, in an effort to in include green infrastructure in the design strategy, riparian forested buffers have been implemented instead of MRCs.

Based on the limited infiltration results across the site, the existing riparian forest buffer (RFB) will be improved and utilized to provide the necessary stormwater volume and water quality requirements needed for the site. Additionally, one (1) surface infiltration basin will be utilized on site where infiltration test results were most desirable.

The existing RFB provides a depth of approximately 100 feet of stormwater runoff volume and water quality treatment prior to entering the stream. The RFB will be improved to include an additional 50 feet of native species plantings that comply with the Township and PADEP requirements. The additional plantings will improve the RFB to provide a total depth of 150 feet of stormwater runoff volume and water quality treatment.

The riparian forest buffer will be utilized in such a way that complies with the latest PADEP regulations. This means that a majority of stormwater runoff from the site, for all design storms up to the 100-year / 24-hour storm, will be collected into subsurface stormwater detention basins to control the rate of stormwater runoff entering the RFB. The subsurface detention systems will also control the runoff duration following the storms routed to the RFB by ensuring that the system is fully dewatered within the required timespan. After entering the subsurface systems, flows enter isolator rows of the ADS chamber system. These isolator rows serve the purpose of a forebay for the underground basins. The subsurface detention basins will discharge to level spreaders that will provide stormwater runoff inflow velocity and flow depth attenuation by creating a sheet flow condition for flows entering the RFB.

Building #1 has an aboveground infiltration basin. This is proposed in an area where GTA got suitable infiltration rates. A factor of safety was applied to the test results to determine a design infiltration rate.

Stormwater Peak Rate Requirements

Based on the New Britain Township Stormwater Management Ordinance, the proposed development site falls within stormwater management District "New Britain Township" of the Neshaminy Creek Watershed. Table 26-124.1 - Peak Rate Runoff Control Standards by Stormwater Management Districts In The Neshaminy Creek Watershed (includes Little Neshaminy Creek) specifies that in management District "New Britain Township", the post-development peak flow rate for each storm shall be reduced to the next lowest storm pre-development peak flow rate with the exception for the 1-year post-development peak flow rate, which is not to exceed the 1-year pre-development peak flow rate. The hydrographs generated for the post-development conditions have been routed through the subsurface detention basin systems & the aboveground infiltration basin and added to the hydrographs generated for bypass drainage areas within the limit of disturbance to determine the total post-development peak rate. The subsurface detention basin systems & the aboveground infiltration basin have been designed such that the peak rate requirements are met.

141 Independence Lane Stormwater Impact

There are existing detention basins situated at 141 Independence Lane that act as regional facilities for New Britain Business Park. There is an approved plan to develop the property. That plan proposed to modify the outfalls from the existing northerly detention basin (basin 1) and modify the existing southerly detention basin (basin 2). That plan also includes new underground stormwater management basins to support proposed improvements on the lot. The design is documented in the Post Construction Stormwater Management Report prepared by Rettew Associates, Inc. for 141 Independence Lane and detailed in the Preliminary/Final Land Development Plan for 141 Independence Lane.

The construction of the Building #3 access will affect the exiting detention basin 2 by reducing its storage volume. This will be mitigated though the installation of ADS MC-3500 subsurface detention basin chambers located underneath the access. Four (4) equalization pipes have been designed to be at the same bottom elevation as the existing surface basin. These culverts will allow runoff to enter the subsurface basin and equalize between the two systems.

The storage volume provided in the subsurface basin will mitigate the volume lost within the surface basin due to construction of the access. This added storage volume prevents any impact on the runoff rate leaving Modified Detention Basin 2. An analysis of the basin is included in an appendix which confirms this. The analysis uses the Rettew PCSM report as its basis so that the full impacts of both the access drive and the 141 Independence Lane development were considered. Note that the storage volume replaced by the underground system is comparable to the storage volume displaced by the access drive, so no impact is expected in the interim condition before 141 Independence Lane is developed

The construction of the access drive for the 141 Independence Lane development will displace the emergency spillway for existing detention basin 1. That plan included a new emergency spillway design for a triple inlet box structure. That structure is proposed to be installed as part of this development as the access drive to building 3 will also affect the emergency spillway from existing basin 1.

The new impervious area of the access drive is managed within the HCI DP Land Acquisition site. The new access drive will not contribute runoff to the existing detention basins on 141 Independence Lane.

Please refer to Appendix 1.0 for runoff rate and volume calculations for the revised Modified Detention Basin 2.

STORM DRAINAGE SYSTEM

The storm drainage system has been designed to intercept runoff at topographic low points and areas of significant runoff quantities and convey stormwater to the underground detention basin systems and aboveground infiltration basin.

CONCLUSION

Based on the calculations provided within this report, the area of the site being re-developed under this application meets the standards and requirements set forth by the New Britain Township Stormwater Management Ordinance and NPDES CG-1.

Stormwater Management Calculations

NOAA Atlas 14, Volume 2, Version 3
Location name: Chalfont, Pennsylvania, USA*
Latitude: 40.2781°, Longitude: -75.2439°
Elevation: 272 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.337** (0.309-0.369)	**0.401** (0.367-0.439)	**0.472** (0.431-0.515)	**0.522** (0.476-0.570)	**0.583** (0.528-0.636)	**0.624** (0.563-0.682)	**0.664** (0.598-0.726)	**0.700** (0.626-0.767)	**0.742** (0.658-0.815)	**0.773** (0.681-0.851)
10-min	**0.539** (0.493-0.589)	**0.642** (0.588-0.702)	**0.756** (0.690-0.825)	**0.835** (0.761-0.912)	**0.929** (0.842-1.01)	**0.994** (0.897-1.09)	**1.06** (0.950-1.15)	**1.11** (0.992-1.22)	**1.17** (1.04-1.29)	**1.22** (1.07-1.34)
15-min	**0.673** (0.617-0.736)	**0.807** (0.739-0.883)	**0.956** (0.872-1.04)	**1.06** (0.963-1.15)	**1.18** (1.07-1.28)	**1.26** (1.14-1.37)	**1.33** (1.20-1.46)	**1.40** (1.25-1.53)	**1.48** (1.31-1.62)	**1.53** (1.35-1.68)
30-min	**0.923** (0.845-1.01)	**1.11** (1.02-1.22)	**1.36** (1.24-1.48)	**1.53** (1.40-1.67)	**1.74** (1.58-1.90)	**1.90** (1.71-2.07)	**2.04** (1.84-2.23)	**2.18** (1.95-2.39)	**2.35** (2.09-2.58)	**2.47** (2.18-2.72)
60-min	**1.15** (1.05-1.26)	**1.40** (1.28-1.53)	**1.74** (1.59-1.90)	**1.99** (1.82-2.18)	**2.32** (2.10-2.53)	**2.57** (2.32-2.80)	**2.82** (2.53-3.08)	**3.06** (2.73-3.35)	**3.37** (2.99-3.70)	**3.61** (3.18-3.98)
2-hr	**1.37** (1.25-1.50)	**1.66** (1.52-1.82)	**2.08** (1.89-2.28)	**2.40** (2.18-2.63)	**2.83** (2.55-3.10)	**3.17** (2.84-3.47)	**3.52** (3.13-3.84)	**3.86** (3.42-4.23)	**4.33** (3.79-4.76)	**4.69** (4.06-5.16)
3-hr	**1.50** (1.36-1.65)	**1.82** (1.65-2.00)	**2.28** (2.06-2.51)	**2.63** (2.38-2.90)	**3.11** (2.80-3.42)	**3.49** (3.12-3.83)	**3.88** (3.44-4.26)	**4.26** (3.75-4.70)	**4.79** (4.17-5.30)	**5.20** (4.48-5.76)
6-hr	**1.87** (1.71-2.07)	**2.26** (2.06-2.51)	**2.83** (2.57-3.12)	**3.29** (2.98-3.62)	**3.93** (3.53-4.33)	**4.46** (3.97-4.90)	**5.01** (4.43-5.50)	**5.59** (4.89-6.14)	**6.41** (5.51-7.06)	**7.06** (5.99-7.80)
12-hr	**2.28** (2.08-2.54)	**2.76** (2.52-3.06)	**3.46** (3.15-3.84)	**4.06** (3.67-4.49)	**4.91** (4.41-5.41)	**5.64** (5.01-6.21)	**6.43** (5.65-7.08)	**7.28** (6.31-8.02)	**8.52** (7.24-9.42)	**9.56** (7.99-10.6)
24-hr	**2.70** (2.48-2.94)	**3.24** (2.99-3.55)	**4.08** (3.75-4.45)	**4.77** (4.36-5.20)	**5.78** (5.25-6.27)	**6.62** (5.99-7.18)	**7.54** (6.78-8.17)	**8.53** (7.61-9.23)	**9.97** (8.78-10.8)	**11.2** (9.74-12.1)
2-day	**3.12** (2.84-3.44)	**3.76** (3.43-4.16)	**4.74** (4.31-5.23)	**5.52** (5.01-6.09)	**6.65** (6.00-7.31)	**7.58** (6.81-8.32)	**8.57** (7.64-9.41)	**9.63** (8.52-10.6)	**11.1** (9.76-12.2)	**12.4** (10.8-13.6)
3-day	**3.29** (3.01-3.62)	**3.97** (3.63-4.36)	**4.97** (4.54-5.46)	**5.79** (5.28-6.35)	**6.94** (6.30-7.60)	**7.90** (7.14-8.64)	**8.91** (8.00-9.74)	**9.98** (8.91-10.9)	**11.5** (10.2-12.6)	**12.8** (11.2-14.0)
4-day	**3.46** (3.19-3.79)	**4.17** (3.84-4.57)	**5.21** (4.78-5.70)	**6.05** (5.54-6.61)	**7.24** (6.60-7.89)	**8.21** (7.46-8.95)	**9.24** (8.36-10.1)	**10.3** (9.29-11.3)	**11.9** (10.6-13.0)	**13.1** (11.6-14.4)
7-day	**4.05** (3.75-4.40)	**4.85** (4.49-5.28)	**5.98** (5.54-6.51)	**6.92** (6.39-7.52)	**8.25** (7.58-8.95)	**9.35** (8.57-10.1)	**10.5** (9.58-11.4)	**11.7** (10.6-12.7)	**13.5** (12.1-14.6)	**14.9** (13.3-16.2)
10-day	**4.59** (4.28-4.96)	**5.49** (5.10-5.92)	**6.68** (6.21-7.21)	**7.64** (7.09-8.24)	**8.97** (8.30-9.67)	**10.0** (9.26-10.8)	**11.2** (10.2-12.0)	**12.3** (11.2-13.2)	**13.9** (12.6-15.0)	**15.2** (13.7-16.4)
20-day	**6.20** (5.79-6.66)	**7.36** (6.87-7.90)	**8.77** (8.19-9.42)	**9.88** (9.21-10.6)	**11.4** (10.6-12.2)	**12.5** (11.6-13.5)	**13.7** (12.7-14.7)	**14.9** (13.7-16.0)	**16.5** (15.1-17.7)	**17.7** (16.1-19.1)
30-day	**7.73** (7.30-8.19)	**9.10** (8.59-9.65)	**10.6** (10.0-11.2)	**11.8** (11.1-12.5)	**13.3** (12.5-14.1)	**14.4** (13.6-15.3)	**15.6** (14.6-16.5)	**16.7** (15.6-17.7)	**18.1** (16.8-19.3)	**19.2** (17.8-20.4)
45-day	**9.81** (9.31-10.4)	**11.5** (10.9-12.2)	**13.2** (12.6-14.0)	**14.5** (13.8-15.3)	**16.2** (15.3-17.0)	**17.4** (16.4-18.3)	**18.5** (17.5-19.5)	**19.6** (18.4-20.6)	**20.9** (19.6-22.1)	**21.8** (20.4-23.1)
60-day	**11.8** (11.2-12.4)	**13.8** (13.1-14.5)	**15.7** (15.0-16.6)	**17.2** (16.3-18.1)	**19.0** (18.0-20.0)	**20.3** (19.2-21.3)	**21.5** (20.4-22.6)	**22.6** (21.4-23.8)	**24.0** (22.6-25.3)	**24.9** (23.5-26.3)

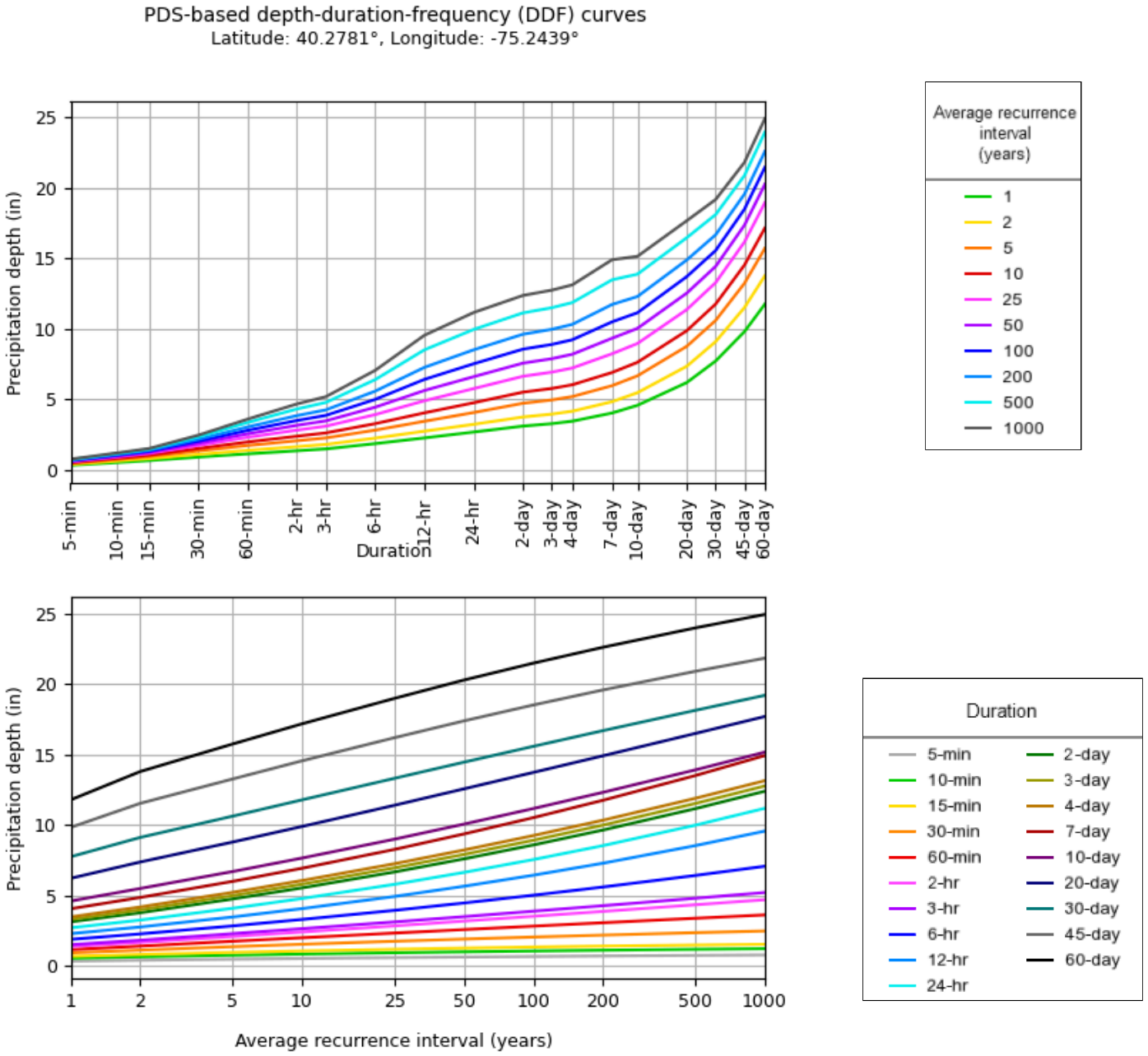
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



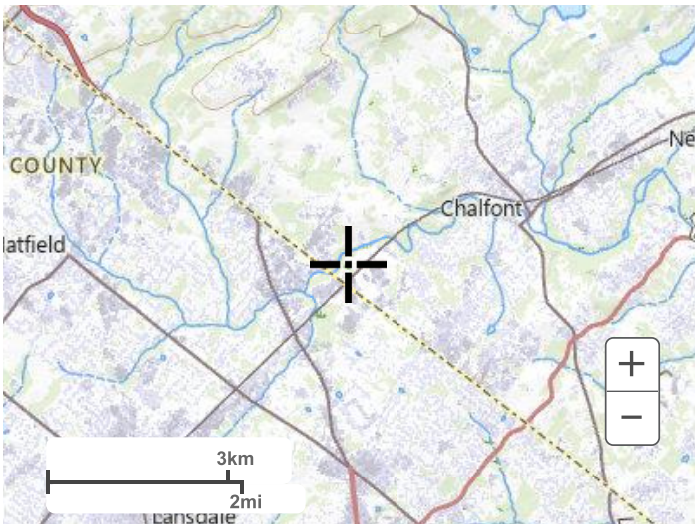
NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Tue Nov 18 16:43:32 2025

Back to Top

Maps & aerials

Small scale terrain



Large scale terrain

Large scale map

Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

NOAA Atlas 14, Volume 2, Version 3
Location name: Chalfont, Pennsylvania, USA*
Latitude: 40.2781°, Longitude: -75.2439°
Elevation: 272 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.04** (3.71-4.43)	**4.81** (4.40-5.27)	**5.66** (5.17-6.18)	**6.26** (5.71-6.84)	**7.00** (6.34-7.63)	**7.49** (6.76-8.18)	**7.97** (7.18-8.71)	**8.40** (7.51-9.20)	**8.90** (7.90-9.78)	**9.28** (8.17-10.2)
10-min	**3.23** (2.96-3.53)	**3.85** (3.53-4.21)	**4.54** (4.14-4.95)	**5.01** (4.57-5.47)	**5.57** (5.05-6.08)	**5.96** (5.38-6.52)	**6.34** (5.70-6.92)	**6.66** (5.95-7.29)	**7.04** (6.25-7.73)	**7.30** (6.44-8.04)
15-min	**2.69** (2.47-2.94)	**3.23** (2.96-3.53)	**3.82** (3.49-4.18)	**4.22** (3.85-4.62)	**4.71** (4.27-5.14)	**5.04** (4.54-5.50)	**5.34** (4.80-5.83)	**5.60** (5.01-6.13)	**5.91** (5.24-6.49)	**6.11** (5.38-6.73)
30-min	**1.85** (1.69-2.02)	**2.23** (2.04-2.44)	**2.72** (2.48-2.97)	**3.06** (2.79-3.34)	**3.49** (3.16-3.80)	**3.79** (3.42-4.14)	**4.09** (3.68-4.47)	**4.36** (3.90-4.77)	**4.70** (4.17-5.16)	**4.95** (4.36-5.45)
60-min	**1.15** (1.05-1.26)	**1.40** (1.28-1.53)	**1.74** (1.59-1.90)	**1.99** (1.82-2.18)	**2.32** (2.10-2.53)	**2.57** (2.32-2.80)	**2.82** (2.53-3.08)	**3.06** (2.73-3.35)	**3.37** (2.99-3.70)	**3.61** (3.18-3.98)
2-hr	**0.684** (0.623-0.751)	**0.831** (0.757-0.911)	**1.04** (0.945-1.14)	**1.20** (1.09-1.31)	**1.42** (1.28-1.55)	**1.59** (1.42-1.73)	**1.76** (1.56-1.92)	**1.93** (1.71-2.11)	**2.16** (1.89-2.38)	**2.34** (2.03-2.58)
3-hr	**0.499** (0.452-0.550)	**0.605** (0.549-0.667)	**0.758** (0.687-0.836)	**0.877** (0.792-0.965)	**1.04** (0.930-1.14)	**1.16** (1.04-1.28)	**1.29** (1.14-1.42)	**1.42** (1.25-1.56)	**1.60** (1.39-1.76)	**1.73** (1.49-1.92)
6-hr	**0.312** (0.285-0.346)	**0.378** (0.344-0.418)	**0.472** (0.429-0.521)	**0.549** (0.497-0.605)	**0.656** (0.589-0.722)	**0.743** (0.663-0.817)	**0.836** (0.739-0.918)	**0.933** (0.816-1.02)	**1.07** (0.920-1.18)	**1.18** (1.00-1.30)
12-hr	**0.189** (0.172-0.210)	**0.228** (0.208-0.253)	**0.287** (0.261-0.318)	**0.336** (0.304-0.372)	**0.407** (0.365-0.449)	**0.468** (0.416-0.515)	**0.533** (0.468-0.587)	**0.604** (0.523-0.665)	**0.707** (0.601-0.782)	**0.793** (0.663-0.878)
24-hr	**0.112** (0.103-0.122)	**0.135** (0.124-0.147)	**0.169** (0.156-0.185)	**0.198** (0.181-0.216)	**0.240** (0.218-0.261)	**0.275** (0.249-0.299)	**0.314** (0.282-0.340)	**0.355** (0.317-0.384)	**0.415** (0.365-0.449)	**0.465** (0.405-0.504)
2-day	**0.064** (0.059-0.071)	**0.078** (0.071-0.086)	**0.098** (0.089-0.108)	**0.115** (0.104-0.126)	**0.138** (0.124-0.152)	**0.157** (0.141-0.173)	**0.178** (0.159-0.196)	**0.200** (0.177-0.220)	**0.232** (0.203-0.254)	**0.257** (0.223-0.283)
3-day	**0.045** (0.041-0.050)	**0.055** (0.050-0.060)	**0.069** (0.063-0.075)	**0.080** (0.073-0.088)	**0.096** (0.087-0.105)	**0.109** (0.099-0.119)	**0.123** (0.111-0.135)	**0.138** (0.123-0.151)	**0.159** (0.141-0.174)	**0.177** (0.155-0.194)
4-day	**0.036** (0.033-0.039)	**0.043** (0.039-0.047)	**0.054** (0.049-0.059)	**0.063** (0.057-0.068)	**0.075** (0.068-0.082)	**0.085** (0.077-0.093)	**0.096** (0.087-0.104)	**0.107** (0.096-0.117)	**0.123** (0.110-0.135)	**0.136** (0.121-0.149)
7-day	**0.024** (0.022-0.026)	**0.028** (0.026-0.031)	**0.035** (0.032-0.038)	**0.041** (0.038-0.044)	**0.049** (0.045-0.053)	**0.055** (0.050-0.060)	**0.062** (0.057-0.067)	**0.069** (0.063-0.075)	**0.080** (0.072-0.087)	**0.088** (0.079-0.096)
10-day	**0.019** (0.017-0.020)	**0.022** (0.021-0.024)	**0.027** (0.025-0.030)	**0.031** (0.029-0.034)	**0.037** (0.034-0.040)	**0.041** (0.038-0.045)	**0.046** (0.042-0.050)	**0.051** (0.046-0.055)	**0.057** (0.052-0.062)	**0.063** (0.056-0.068)
20-day	**0.012** (0.012-0.013)	**0.015** (0.014-0.016)	**0.018** (0.017-0.019)	**0.020** (0.019-0.022)	**0.023** (0.022-0.025)	**0.026** (0.024-0.028)	**0.028** (0.026-0.030)	**0.031** (0.028-0.033)	**0.034** (0.031-0.036)	**0.036** (0.033-0.039)
30-day	**0.010** (0.010-0.011)	**0.012** (0.011-0.013)	**0.014** (0.013-0.015)	**0.016** (0.015-0.017)	**0.018** (0.017-0.019)	**0.020** (0.018-0.021)	**0.021** (0.020-0.022)	**0.023** (0.021-0.024)	**0.025** (0.023-0.026)	**0.026** (0.024-0.028)
45-day	**0.009** (0.008-0.009)	**0.010** (0.010-0.011)	**0.012** (0.011-0.012)	**0.013** (0.012-0.014)	**0.014** (0.014-0.015)	**0.016** (0.015-0.016)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)	**0.019** (0.018-0.020)	**0.020** (0.018-0.021)
60-day	**0.008** (0.007-0.008)	**0.009** (0.009-0.010)	**0.010** (0.010-0.011)	**0.011** (0.011-0.012)	**0.013** (0.012-0.013)	**0.014** (0.013-0.014)	**0.014** (0.014-0.015)	**0.015** (0.014-0.016)	**0.016** (0.015-0.017)	**0.017** (0.016-0.018)

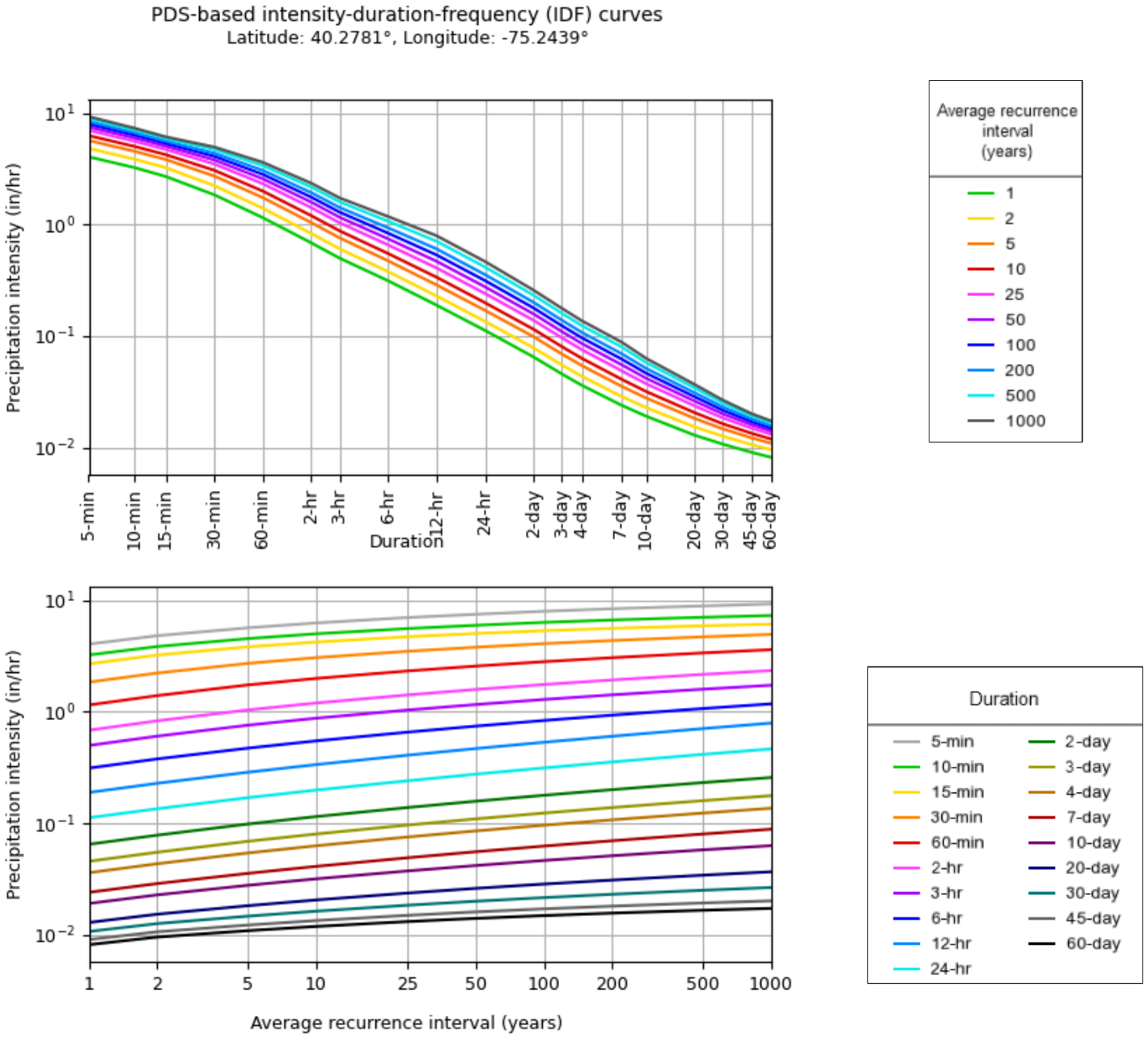
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



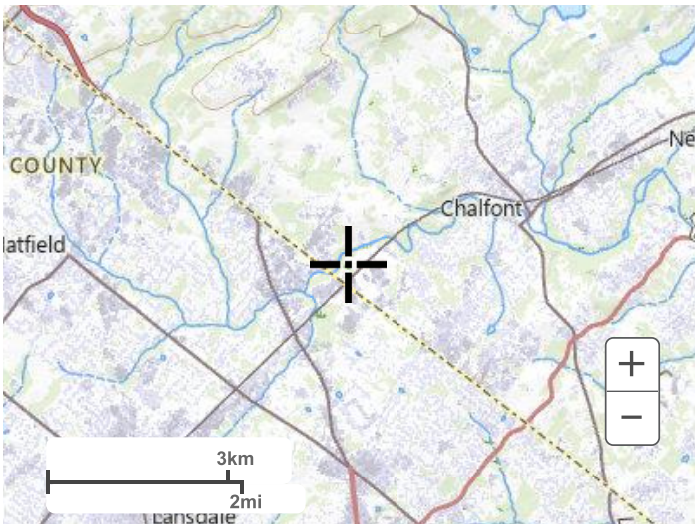
NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Tue Nov 18 16:45:01 2025

Back to Top

Maps & aerials

Small scale terrain



Large scale terrain

Large scale map

Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Runoff Calculation CN Worksheets

Project: **PAC250095.00: Hanover Industrial - Chalfont**

Description: **Pre-Development**

$Q = [(P - 0.2S)^2 / (P + 0.8S)] * 1/12 * 43{,}560$, *where S = (1000/CN) - 10 and:*

P = 3.24 *Rainfall (in)*

Catchment Areas

Description	HSG C / CN		HSG D / CN		Impervious			Total Area (Ac)	Composite CN	Runoff Q (cuft)
	Meadow	Woods, Good Condition	Meadow	Woods, Good Condition	Impervious	Impervious as Meadow	Impervious as Meadow			
	71	70	78	77	98	71	78			
POA #1 to West Branch Neshaminy Creek										
POA #1	0.620	0.204	25.830	2.517	0.292	0.292		29.755	**78**	140,288
Total	0.620	0.204	25.830	2.517	0.292	0.292		29.755		140,288
POA #2 to UNT 02875 to West Branch Neshaminy Creek										
POA #2			4.899	1.156	0.142		0.142	6.339	**78**	30,594
Total			4.899	1.156	0.142		0.142	6.339		30,594
POA #3 to UNT 02874 to West Branch Neshaminy Creek										
POA #3	0.257		3.339	0.750				4.346	**77**	20,009
Total	0.257		3.339	0.750				4.346		20,009
Totals										
POA #2 to UNT 02875 to West **Totals:**	0.877	0.204	34.068	4.423	0.434	0.292	0.284	40.440		190,891

Runoff Calculation CN Worksheets

Project: **PAC250095.00: Hanover Industrial - Chalfont**

Description: **Post-Development**

$Q = [(P - 0.2S)^2 / (P + 0.8S)] * 1/12 * 43,560$, *where* $S = (1000/CN) - 10$ *and:*

P = 3.24

Catchment Areas

Description	HSG C / CN		HSG D / CN		Impervious	Total Area (Ac)	Composite CN	Runoff Q (cuft)
	Open Space (Lawns), Good Condition	Woods, Good Condition	Open Space (Lawns), Good Condition	Woods, Good Condition	Impervious			
	74	70	80	77	98			
POA #1 to West Branch Neshaminy Creek								
DA-1	0.222		1.658		4.859	6.739	**93**	62,524
DA-2			0.137		7.977	8.114	**98**	87,795
DA-3			0.587		3.830	4.417	**96**	44,864
DA-4			0.310	3.275		3.585	**77**	16,359
DA-5			0.381		2.500	2.881	**96**	29,273
DA-6	0.255	0.084	0.328	0.089	2.580	3.336	**93**	31,516
DA-7			0.299		3.954	4.253	**97**	44,719
DA-8	0.374		3.905		0.101	4.380	**80**	22,855
Total	0.851	0.084	7.605	3.364	25.801	37.705		339,905
POA #2 to UNT 02875 to West Branch Neshaminy Creek								
Bypass POA #2			1.462		0.030	1.492	**80**	7,931
Total			1.462		0.030	1.492		7,931
POA #3 to UNT 02874 to West Branch Neshaminy Creek								
Bypass to POA #3	0.072		1.171			1.243	**80**	6,368
Total	0.072		1.171			1.243		6,368
Totals								
Total	0.923	0.084	10.238	3.364	25.831	40.440		354,205

Time of Concentration (Tc) or (Tt) Calculations

Project: **PAC250095.00: Hanover Industrial - Chalfont**

Description: **POA #1**

Note: Space for as many as three segments per flow type can be used for each worksheet.

Sheet Flow ***(Applicable to Tc only)***	**Segment ID**	**AB**				
1. Surface Description *(table 3-1)*		Cultivated soils (residue cover <= 20%)				
2. Manning's roughness coeff., n *(table 3-1)*		0.060				
3. Flow length, L *(total L ≤ 150 ft)*	ft	100				
4. Two-yr 24-hr rainfall, P_2	in	3.24				
5. Land slope, s*	ft/ft	0.0260				
6. Tt =0.007(nL)$^{0.8}$ / $P_2^{0.5}$s$^{0.4}$	**Compute Tt hr**	**0.0702**	+	+	=	**0.0702**
**S is averaged*						

Shallow Concentrated Flow	**Segment ID**	**BC**				
7. Surface Description (paved or unpaved)		Unpaved				
8. Flow length, L	ft	532				
9. Watercourse slope, s*	ft/ft	0.0205				
10. Average velocity, V	ft/sec	2.30				
11. Tt = L / 3600V		**0.0642**	+	+	=	**0.0642**

Channel Flow	**Segment ID**					
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, p	ft					
14. Hydraulic radius, r = a/wp	ft					
15. Channel Slope, s	ft/ft					
16. Manning's roughness coeff., n						
17. V=1.49r$^{2/3}$s$^{1/2}$ / n						
18. Flow length, L	ft					
19. Tt = L / 3600V			+	+	=	
20. Watershed or subarea T_c or T_t (add T_t in steps 6,11, and 19)						**0.1344**

Tc = **8.06** **minutes**

Time of Concentration (Tc) or (Tt) Calculations

Project: **PAC250095.00: Hanover Industrial - Chalfont**

Description: **POA #2**

Note: Space for as many as three segments per flow type can be used for each worksheet.

Sheet Flow ***(Applicable to Tc only)***	**Segment ID**	**AB**						
1. Surface Description *(table 3-1)*		Cultivated soils (residue cover <= 20%)						
2. Manning's roughness coeff., n *(table 3-1)*		0.060						
3. Flow length, L *(total L ≤ 150 ft)*	ft	100						
4. Two-yr 24-hr rainfall, P_2	in	3.24						
5. Land slope, s*	ft/ft	0.0250						
6. Tt =0.007(nL)$^{0.8}$ / $P_2^{0.5}$s$^{0.4}$	**Compute Tt hr**	**0.0713**	+		+		=	**0.0713**
**S is averaged*								

Shallow Concentrated Flow	**Segment ID**	**BC**		**CD**				
7. Surface Description (paved or unpaved)		Unpaved		Unpaved				
8. Flow length, L	ft	481		61				
9. Watercourse slope, s*	ft/ft	0.0177		0.1475				
10. Average velocity, V	ft/sec	2.14		6.23				
11. Tt = L / 3600V		**0.0625**	+	**0.0027**	+		=	**0.0652**

Channel Flow	**Segment ID**							
12. Cross sectional flow area, a	ft^2							
13. Wetted perimeter, p	ft							
14. Hydraulic radius, r = a/wp	ft							
15. Channel Slope, s	ft/ft							
16. Manning's roughness coeff., n								
17. V=1.49r$^{2/3}$s$^{1/2}$ / n								
18. Flow length, L	ft							
19. Tt = L / 3600V			+		+		=	
20. Watershed or subarea T_c or T_t (add T_t in steps 6,11, and 19)								**0.1365**

Tc = **8.19** **minutes**

Time of Concentration (Tc) or (Tt) Calculations

Project: **PAC250095.00: Hanover Industrial - Chalfont**

Description: **POA #3**

Note: Space for as many as three segments per flow type can be used for each worksheet.

Sheet Flow ***(Applicable to Tc only)***	**Segment ID**	**AB**		**BC**				
1. Surface Description *(table 3-1)*		Woods (light underbrush)		Cultivated soils (residue cover <= 20%)				
2. Manning's roughness coeff., n *(table 3-1)*		0.400		0.06				
3. Flow length, L *(total L ≤ 150 ft)*	ft	42		58				
4. Two-yr 24-hr rainfall, P_2	in	3.24		3.24				
5. Land slope, s*	ft/ft	0.0648		0.0174				
6. Tt =0.007(nL)$^{0.8}$ / $P_2^{0.5}$s$^{0.4}$	**Compute Tt hr**	**0.1119**	+	**0.0531**	+		=	**0.1650**
**S is averaged*								

Shallow Concentrated Flow	**Segment ID**	**CD**						
7. Surface Description (paved or unpaved)		Unpaved						
8. Flow length, L	ft	540.58						
9. Watercourse slope, s*	ft/ft	0.0338						
10. Average velocity, V	ft/sec	2.96						
11. Tt = L / 3600V		**0.0507**	+		+		=	**0.0507**

Channel Flow	**Segment ID**							
12. Cross sectional flow area, a	ft^2							
13. Wetted perimeter, p	ft							
14. Hydraulic radius, r = a/wp	ft							
15. Channel Slope, s	ft/ft							
16. Manning's roughness coeff., n								
17. V=1.49r$^{2/3}$s$^{1/2}$ / n								
18. Flow length, L	ft							
19. Tt = L / 3600V			+		+		=	
20. Watershed or subarea T_c or T_t (add T_t in steps 6,11, and 19)								**0.2157**

Tc = **12.94** **minutes**

Peak Flow Summary

Project: **PAC250095.00 Hanover - New Britain Township**

Description:

POA #1

	Peak Flows (cfs)						
Pre-development	**1-year**	**2-year**	**5-year**	**10-year**	**25-year**	**50-year**	**100-year**
DA-1	**44.650**	**63.800**	**95.700**	**123.090**	**164.300**	**199.140**	**237.520**
Post-development							
Routed from SCM 1	0.230	0.230	0.720	1.160	2.930	4.760	7.230
Routed from SCM 2	5.300	6.230	9.330	12.590	17.750	22.420	29.010
Routed from SCM 3	4.310	5.950	9.140	12.070	16.440	20.020	25.750
Routed from SCM 4	4.110	4.960	6.600	8.130	10.590	13.100	16.650
Routed from SCM 5	4.480	6.090	8.990	11.530	15.380	18.000	21.810
Routed from SCM 6	3.810	4.890	7.510	9.980	13.900	16.920	20.550
Routed from SCM 7	4.450	5.840	8.370	10.670	14.330	17.040	20.310
Routed from DA-8	8.370	11.630	16.980	21.530	28.310	34.010	40.280
Totals							
Total Post-Dev Flow to POI *	**31.810**	**40.510**	**59.240**	**77.120**	**106.280**	**130.300**	**163.190**
Post-development Reductions							
POA #1	44.650	63.800	95.700	123.090	164.300	199.140	237.520
Total Post-Dev Flow to POI *	40.510	59.240	77.120	106.280	130.300	163.190	
Post- to Pre- Comparison	***-4.140***	***-4.560***	***-18.580***	***-16.810***	***-34.000***	***-35.950***	

**Based on HydroCAD Routing*

The on-site post development peak flows must be reduced as follows per Section 26-124.A.:

- *2-year storm post-development must be less than 1-year storm pre-development*
- *5-year storm post-development must be less than 2-year storm pre-development*
- *10-year storm post-development must be less than 5-year storm pre-development*
- *50-year storm post-development must be less than 25-year storm pre-development*
- *100-year storm post-development must be less than 50-year storm pre-development*

Peak Flow Summary

Project: **PAC250095.00 Hanover - New Britain Township**

Description:

POA #2

	Peak Flows (cfs)						
Pre-development	**1-year**	**2-year**	**5-year**	**10-year**	**25-year**	**50-year**	**100-year**
DA-2	**9.690**	**13.770**	**20.560**	**26.390**	**35.160**	**42.560**	**50.730**
Post-development							
Bypass	2.920	4.040	5.880	7.440	9.760	11.700	13.840
Total Post-Dev Flow to POI *	**2.920**	**4.040**	**5.880**	**7.440**	**9.760**	**11.700**	**13.840**
Post-development Reductions							
POA #2	9.690	13.770	20.560	26.390	35.160	42.560	50.730
Total Post-Dev Flow to POI *	4.040	5.880	7.440	9.760	11.700	13.840	
Post- to Pre- Comparison	***-5.650***	***-7.890***	***-13.120***	***-16.630***	***-23.460***	***-28.720***	

**Based on HydroCAD Routing*

The on-site post development peak flows must be reduced as follows per Section 26-124.A.:

- *2-year storm post-development must be less than 1-year storm pre-development*
- *5-year storm post-development must be less than 2-year storm pre-development*
- *10-year storm post-development must be less than 5-year storm pre-development*
- *50-year storm post-development must be less than 25-year storm pre-development*
- *100-year storm post-development must be less than 50-year storm pre-development*

Peak Flow Summary

Project: **PAC250095.00 Hanover - New Britain Township**

Description:

POA #3

	Peak Flows (cfs)						
Pre-development	**1-year**	**2-year**	**5-year**	**10-year**	**25-year**	**50-year**	**100-year**
DA-3	**5.230**	**7.580**	**11.520**	**14.930**	**20.060**	**24.420**	**29.240**
Post-development							
Bypass	2.340	3.270	4.790	6.080	8.010	9.630	11.410
Total Post-Dev Flow to POI *	**2.340**	**3.270**	**4.790**	**6.080**	**8.010**	**9.630**	**11.410**
Post-development Reductions							
POA #3	5.230	7.580	11.520	14.930	20.060	24.420	29.240
Total Post-Dev Flow to POI *	3.270	4.790	6.080	8.010	9.630	11.410	
Post- to Pre- Comparison	***-1.960***	***-2.790***	***-5.440***	***-6.920***	***-10.430***	***-13.010***	

**Based on HydroCAD Routing*

The on-site post development peak flows must be reduced as follows per Section 26-124.A.:

- *2-year storm post-development must be less than 1-year storm pre-development*
- *5-year storm post-development must be less than 2-year storm pre-development*
- *10-year storm post-development must be less than 5-year storm pre-development*
- *50-year storm post-development must be less than 25-year storm pre-development*
- *100-year storm post-development must be less than 50-year storm pre-development*

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name: **Hanover Industrial - Chalfont**

Application Type: **PAG-02 NOI**

County: **Bucks**

Municipality: **New Britain Township**

Project Type: **Other**

(●) New Project ( ) Minor / Major Amendment

Area: **37.705** acres
(In Watershed)

Total Earth Disturbance: **37.705** acres
(In Watershed)

No. of Post-Construction Points of Analysis: **1**

at: **001**

Point of Analysis (POA) No.	Total Drainage Area (DA) (acres)	Project Site DA (acres)	Existing Imp., Project Site DA (acres)	Proposed Imp., Project Site DA (acres)	Receiving Waters	Ch. 93 Class	Structural SCM(s)
001	37.705	37.705	0.584	28.801	Wetst Branch Neshaminy Creek	WWF, MF	Yes
Undetained Areas					West Branch Neshaminy Creek	WWF, MF	
Totals:	**37.705**	**37.705**	**0.584**	**28.801**			

Volume Management

Project: Hanover Industrial - Chalfont

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.24** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **6**

☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	Outside LOD	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	0.620	C	☐	71	0.817	0.90	2,031
Woods (Good Condition)	0.204	C	☐	70	0.857	0.85	631
Pervious as Meadow	25.830	D	☐	78	0.564	1.30	122,149
Woods (Good Condition)	2.517	D	☐	77	0.597	1.24	11,334
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.292	N/A	☐	98	0.041	3.01	3,188
Impervious as Meadow	0.292	C	☐	71	0.817	0.90	956
TOTAL (ACRES):	**29.755**					**TOTAL (CF):**	**140,288**

Post-Construction Conditions: *No. Rows:* **5**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.851	C	74	0.703	1.06	3,287
Woods (Good Condition)	0.084	C	70	0.857	0.85	260

Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	7.605	D	80	0.500	1.43	39,553
Woods (Good Condition)	3.364	D	77	0.597	1.24	15,148
Impervious Areas: Industrial	25.801	N/A	98	0.041	3.01	281,660
TOTAL (ACRES):	**37.705**				**TOTAL (CF):**	**339,907**

NET CHANGE IN VOLUME TO MANAGE (CF):	**199,619**

Non-Structural SCM Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural SCM Volume Credits: *No. Structural SCMs:* **3** *Start SCM Numbering at:* **1**

POA No.	SCM No.	SCM Name	MRC?	Discharge	Incremental SCM DA (acres)	Total Vol. Routed to SCM (CF)	Off-Site Vol. Routed to SCM (CF)	Infiltration / Vegetated Area (SF)	Infil. Rate (in/hr)	Infil. Period (hrs)	Vegeta-ted?	Media Depth (ft)	Stored Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Dry Extended Detention Basin		to SCM No. 3	26.586	275,255									
001	2	Infiltration Basin		to SCM No. 3	6.739	62,524		24,939	0.353	84	No		46,060	**53,916**	
001	3	Riparian Forest Buffer (Min 150 Ft)		Off-Site	4.380	179,657									
													Totals:	**53,916**	**0**

INFILTRATION & ET CREDITS - PROJECT SITE (CF):	**53,916**
RIPARIAN FOREST BUFFER CREDIT (CF):	**179,657**

NET CHANGE IN VOLUME TO MANAGE (CF):	**199,619**
TOTAL CREDITS (CF):	**233,573**

Rate Control

Project: Hanover Industrial - Chalfont

Instructions | General | Volume | *Rate* | Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	**3.24**	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):		Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):		Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):		Alternative 100-Year 24-Hour Storm Event (in):	

☑ **Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)			
	Pre-Construction	**Post-Construction**	**Net Change**	
2-Year Storm:	**63.80**	**40.51**	**-23.29**	***Rate Control Satisfied***
10-Year Storm:	**123.09**	**77.12**	**-45.97**	***Rate Control Satisfied***
50-Year Storm:	**199.14**	**130.30**	**-68.84**	***Rate Control Satisfied***
100-Year Storm:	**237.52**	**163.19**	**-74.33**	***Rate Control Satisfied***

Water Quality

Project: Hanover Industrial - Chalfont

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	0.62	C	2,031	48.8	0.22	2.30	6.19	0.03	0.29
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.20	C	631	45.0	0.13	1.05	1.77	0.01	0.04
Pervious as Meadow	Grassland/Herbaceous	25.83	D	122,149	48.8	0.22	2.30	372.21	1.68	17.54
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	2.52	D	11,334	45.0	0.13	1.05	31.85	0.09	0.74
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.29	N/A	3,188	65.0	0.29	2.05	12.94	0.06	0.41
Impervious as Meadow	Grassland/Herbaceous	0.29	C	956	48.8	0.22	2.30	2.91	0.01	0.14
	TOTAL (ACRES):	**29.76**					**TOTALS:**	**427.87**	**1.87**	**19.16**

Post-Construction Pollutant Loads (without SCMs):

Land Cover (from Volume Worksheet)	Land Cover for Water	Area	Soil	Runoff Volume	Pollutant Conc. (mg/L)	Pollutant Loads (lbs)

Land Cover (from Volume Worksheet)	Quality	(acres)	Group	Volume (cf)	TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.85	C	3,287	78.0	0.25	1.25	16.01	0.05	0.26
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.08	C	260	45.0	0.13	1.05	0.73	0.00	0.02
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	7.61	D	39,553	78.0	0.25	1.25	192.64	0.62	3.09
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	3.36	D	15,148	45.0	0.13	1.05	42.56	0.12	0.99
Impervious Areas: Industrial	Industrial	25.80	N/A	281,660	81.0	0.24	2.01	######	4.22	35.35
	TOTAL (ACRES):	**37.71**					**TOTALS:**	**######**	**5.01**	**39.71**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**######**	**3.14**	**20.54**

☐ **Characterize Undetained Areas (for Untreated Stormwater)**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)

Non-Structural SCM Water Quality Credits:

☐ Pervious Undetained Area Credit

☑ Other (attach calculations)

Description: **PA DEP SCM 3.4.2 Spreadsheet**

TSS	TP	TN
######	2.83	18.49

Structural SCM Water Quality Credits:

☑ *Use default SCM Outflows and Median SCM Outflow Concentrations*

POA No.	SCM No.	SCM Name	MRC?	SCM DA (acres)	Vol. Routed to SCM (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
001	1	Dry Extended Detention Basin		26.59	275,255			275,255	-	-	-	-	-	-
001	2	Infiltration Basin		6.74	62,524	53,916		8,608	-	-	-	-	-	-
001	3	Riparian Forest Buffer (Min 150 Ft)		4.38	179,657		179,657	0	0.00	0.00	0.00	0.00	0.00	0.00

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL SCM (TREATED) OUTFLOWS (LBS):	**0.00**	**0.00**	**0.00**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**524.48**	**1.57**	**12.42**
NON-STRUCTURAL SCM WATER QUALITY CREDITS (LBS):	**######**	**2.83**	**18.49**
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**0.00**	**0.00**	**0.00**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**427.87**	**1.87**	**19.16**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Judd Dayton	7/28/2026
Spreadsheet User Name	Date

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name: **Hanover Industrial - Chalfont**

Application Type: **PAG-02 NOI**

County: **Bucks**

Municipality: **New Britain Township**

Project Type: **Other**

◉ New Project ○ Minor / Major Amendment

Area: **6.339** acres
(In Watershed)

Total Earth Disturbance: **6.339** acres
(In Watershed)

No. of Post-Construction Points of Analysis: **1**

at: **002**

Point of Analysis (POA) No.	Total Drainage Area (DA) (acres)	Project Site DA (acres)	Existing Imp., Project Site DA (acres)	Proposed Imp., Project Site DA (acres)	Receiving Waters	Ch. 93 Class	Structural SCM(s)
002			0.284		UNT 02875 to West Branch Neshaminy Creek	WWF, MF	Yes
Undetained Areas	6.339	6.339		0.030	UNT 02875 to West Branch Neshaminy Creek	WWF, MF	
Totals:	**6.339**	**6.339**	**0.284**	**0.030**			

Volume Management

Project: Hanover Industrial - Chalfont

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.24** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **4** ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	Outside LOD	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	4.899	D	☐	78	0.564	1.30	23,167
Woods (Good Condition)	1.156	D	☐	77	0.597	1.24	5,205
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.142	N/A	☐	98	0.041	3.01	1,550
Impervious as Meadow	0.142	D	☐	78	0.564	1.30	672
TOTAL (ACRES):	**6.339**					**TOTAL (CF):**	**30,594**

Post-Construction Conditions: *No. Rows:* **2**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	1.462	D	80	0.500	1.43	7,604
Impervious Areas: Industrial	0.030	N/A	98	0.041	3.01	327
TOTAL (ACRES):	**1.492**				**TOTAL (CF):**	**7,931**

NET CHANGE IN VOLUME TO MANAGE (CF): **-22,663**

Non-Structural SCM Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural SCM Volume Credits: *No. Structural SCMs:* *Start SCM Numbering at:* **1**

POA No.	SCM No.	SCM Name	MRC?	Discharge	Incremental SCM DA (acres)	Total Vol. Routed to SCM (CF)	Off-Site Vol. Routed to SCM (CF)	Infiltration / Vegetated Area (SF)	Infil. Rate (in/hr)	Infil. Period (hrs)	Vegeta-ted?	Media Depth (ft)	Stored Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
	1														
													Totals:	**0**	**0**

INFILTRATION & ET CREDITS - PROJECT SITE (CF): **0**

NET CHANGE IN VOLUME TO MANAGE (CF): **-22,663**

TOTAL CREDITS (CF):

Rate Control

Project: Hanover Industrial - Chalfont

Instructions | General | Volume | *Rate* | Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	**3.24**	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):		Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):		Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):		Alternative 100-Year 24-Hour Storm Event (in):	

☑ **Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)			
	Pre-Construction	**Post-Construction**	**Net Change**	
2-Year Storm:	**13.77**	**4.04**	**-9.73**	***Rate Control Satisfied***
10-Year Storm:	**26.39**	**7.44**	**-18.95**	***Rate Control Satisfied***
50-Year Storm:	**42.56**	**11.70**	**-30.86**	***Rate Control Satisfied***
100-Year Storm:	**50.73**	**13.84**	**-36.89**	***Rate Control Satisfied***

Water Quality

Project: Hanover Industrial - Chalfont

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	4.90	D	23,167	48.8	0.22	2.30	70.60	0.32	3.33
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	1.16	D	5,205	45.0	0.13	1.05	14.63	0.04	0.34
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.14	N/A	1,550	65.0	0.29	2.05	6.29	0.03	0.20
Impervious as Meadow	Grassland/Herbaceous	0.14	D	672	48.8	0.22	2.30	2.05	0.01	0.10
	TOTAL (ACRES):	**6.34**					**TOTALS:**	**93.56**	**0.40**	**3.96**

Post-Construction Pollutant Loads (without SCMs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	1.46	D	7,604	78.0	0.25	1.25	37.03	0.12	0.59

Impervious Areas: Industrial	Industrial	0.03	N/A	327	81.0	0.24	2.01	1.66	0.00	0.04
	TOTAL (ACRES):	**1.49**					**TOTALS:**	**38.69**	**0.12**	**0.63**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**0.00**	**0.00**	**0.00**

☐ **Characterize Undetained Areas (for Untreated Stormwater)**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)

Non-Structural SCM Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural SCM Water Quality Credits:

☑ *Use default SCM Outflows and Median SCM Outflow Concentrations*

POA No.	SCM No.	SCM Name	MRC?	SCM DA (acres)	Vol. Routed to SCM (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
	1													

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL SCM (TREATED) OUTFLOWS (LBS):	**0.00**	**0.00**	**0.00**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**38.69**	**0.12**	**0.63**
NON-STRUCTURAL SCM WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**38.69**	**0.12**	**0.63**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**93.56**	**0.40**	**3.96**

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Judd Dayton	7/28/2026
Spreadsheet User Name	Date

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name: **Hanover Industrial - Chalfont**

Application Type: **PAG-02 NOI**

County: **Bucks**

Municipality: **New Britain Township**

Project Type: **Other**

(●) New Project ( ) Minor / Major Amendment

Area: **4.346** acres
(In Watershed)

Total Earth Disturbance: **4.346** acres
(In Watershed)

No. of Post-Construction Points of Analysis: **1**

at: **002**

Point of Analysis (POA) No.	Total Drainage Area (DA) (acres)	Project Site DA (acres)	Existing Imp., Project Site DA (acres)	Proposed Imp., Project Site DA (acres)	Receiving Waters	Ch. 93 Class	Structural SCM(s)
002					UNT 02874 to West Branch Neshaminy Creek	WWF, MF	Yes
Undetained Areas	4.346	4.346			UNT 02874 to West Branch Neshaminy Creek	WWF, MF	
Totals:	**4.346**	**4.346**	**0.000**	**0.000**			

PROJECT SITE MEETS SMALL SITE EXCEPTION - RATE WORKSHEET NOT REQUIRED

Volume Management

Project: Hanover Industrial - Chalfont

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.24** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **3** ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	Outside LOD	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	0.257	C	☐	71	0.817	0.90	842
Pervious as Meadow	3.339	D	☐	78	0.564	1.30	15,790
Woods (Good Condition)	0.750	D	☐	77	0.597	1.24	3,377
TOTAL (ACRES):	**4.346**					**TOTAL (CF):**	**20,009**

Post-Construction Conditions: *No. Rows:* **2**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.072	C	74	0.703	1.06	278
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	1.171	D	80	0.500	1.43	6,090
TOTAL (ACRES):	**1.243**				**TOTAL (CF):**	**6,368**

NET CHANGE IN VOLUME TO MANAGE (CF): **-13,641**

Non-Structural SCM Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural SCM Volume Credits: *No. Structural SCMs:* *Start SCM Numbering at:*

POA No.	SCM No.	SCM Name	MRC?	Discharge	Incremental SCM DA (acres)	Total Vol. Routed to SCM (CF)	Off-Site Vol. Routed to SCM (CF)	Infiltration / Vegetated Area (SF)	Infil. Rate (in/hr)	Infil. Period (hrs)	Vegeta-ted?	Media Depth (ft)	Stored Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
													Totals:	**0**	**0**

INFILTRATION & ET CREDITS - PROJECT SITE (CF):	**0**
NET CHANGE IN VOLUME TO MANAGE (CF):	**-13,641**
TOTAL CREDITS (CF):	

Rate Control

Project: Hanover Industrial - Chalfont

SMALL SITE EXCEPTION SATISFIED: RATE CONTROL NOT REQUIRED

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	**3.24**	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):		Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):		Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):		Alternative 100-Year 24-Hour Storm Event (in):	

☑ **Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)			
	Pre-Construction	**Post-Construction**	**Net Change**	
2-Year Storm:	**7.58**	**3.27**	**-4.31**	***Rate Control Satisfied***
10-Year Storm:	**14.96**	**6.08**	**-8.88**	***Rate Control Satisfied***
50-Year Storm:	**24.42**	**9.63**	**-14.79**	***Rate Control Satisfied***
100-Year Storm:	**29.24**	**11.41**	**-17.83**	***Rate Control Satisfied***

Water Quality

Project: Hanover Industrial - Chalfont

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	0.26	C	842	48.8	0.22	2.30	2.56	0.01	0.12
Pervious as Meadow	Grassland/Herbaceous	3.34	D	15,790	48.8	0.22	2.30	48.12	0.22	2.27
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.75	D	3,377	45.0	0.13	1.05	9.49	0.03	0.22
	TOTAL (ACRES):	**4.35**					**TOTALS:**	**60.17**	**0.26**	**2.61**

Post-Construction Pollutant Loads (without SCMs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.07	C	278	78.0	0.25	1.25	1.35	0.00	0.02
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	1.17	D	6,090	78.0	0.25	1.25	29.66	0.10	0.48

TOTAL (ACRES):	**1.24**	**TOTALS:**	**31.02 0.10 0.50**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**0.00**	**0.00**	**0.00**

☐ **Characterize Undetained Areas (for Untreated Stormwater)**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)

Non-Structural SCM Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural SCM Water Quality Credits:

☑ *Use default SCM Outflows and Median SCM Outflow Concentrations*

POA No.	SCM No.	SCM Name	MRC?	SCM DA (acres)	Vol. Routed to SCM (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL SCM (TREATED) OUTFLOWS (LBS):	**0.00**	**0.00**	**0.00**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**31.02**	**0.10**	**0.50**
NON-STRUCTURAL SCM WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**31.02**	**0.10**	**0.50**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**60.17**	**0.26**	**2.61**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Judd Dayton	7/28/2026
Spreadsheet User Name	Date

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

SCM 3.4.2
Riparian Forest Buffers (RFBs)

Project Name: **PAC250095.00: Hanover Industrial - Chalfont**

SCM ID: 1 ☑ Chapter 102 SCM Type: **Converted RFB**

2-year/24-hour Precipitation Depth: **3.24** in SCM Contributing Drainage Area: **37.705** ac

Has the Riparian Forest Buffer area been investigated in the field? ☑ Yes ☐ No

Are color photographs of the Riparian Forest Buffer area attached? ☑ Yes ☐ No

Do preferential flow paths through the SCM currently exist? ☐ Yes ☑ No

Will flow be concentrated upslope of the Riparian Forest Buffer? ☑ Yes ☐ No

How will flow be distributed across the length of the SCM? **Level Spreader**

☑ ***Drainage Areas***

Pre-Construction Drainage Area Rows: 6

Pre-Construction Drainage Area Cover Type	Area (ac)	HSG	Off-Site	2-Year/24-Hour Runoff (CF)
Pervious as Meadow	0.620	C	☐	2,031
Woods (Good Condition)	0.204	C	☐	631
Pervious as Meadow	25.830	D	☐	122,149
Woods (Good Condition)	2.517	D	☐	11,334
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.292	N/A	☐	3,188
Impervious as Meadow	0.292	C	☐	956
	29.755			

	Pre-Construction Values		
	Total	**Off-Site**	**Project Site**
Runoff Volume (CF):	140,288		140,288
TSS Load (lbs):	427.9		427.9
TP Load (lbs):	1.874		1.874
TN Load (lbs):	19.164		19.164

Post-Construction Drainage Area Rows: 5

Post-Construction Drainage Area Cover Type	Area (ac)	HSG	Off-Site	2-Year/24-Hour Runoff
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.851	C	☐	3,287
Woods (Good Condition)	0.084	C	☐	260
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	7.605	D	☐	39,553
Woods (Good Condition)	3.364	D	☐	15,148
Impervious Areas: Industrial	25.801	N/A	☐	281,660

	Post-Construction Values		
	Total	**Off-Site**	**Project Site**
Runoff Volume (CF):	339,907		339,907
TSS Load (lbs):	1,676.5		1,676.5
TP Load (lbs):	5.015		5.015
TN Load (lbs):	39.705		39.705

☑ ***RFB Design Standards*** **Soil Type within RFB:** HSG C

Parameter	Standard	Design Value
Maximum Storm Event Routed to RFB		> 10-Year/24-Hour Storm
RFB Length (ft)		3,590
RFB Drainage Area Length (ft)		3345
RFB Inflow Length (ft)		3,345
RFB Average Width, Minimum (ft)	150	150
RFB Area (ac)		11.52
Average Slope within RFB, Maximum (ft/ft)	15%	8.0%
Peak inflow velocity @ 2-year/24-hour storm, Maximum (fps)	1.5	1.5
Peak inflow velocity @ 10-year/24-hour storm, Maximum (fps)	2.0	2.0
Flow depth @ 10-year/24-hour storm, Maximum (ft)	0.10	0.09
Runoff duration following storm routed to SCM, Maximum (hr	48	48
Method used for long-term protection of SCM	Select One	Deed Restriction
Pretreatment:	Select One	Meadow
Width, Minimum (ft)	10	10
Length (ft)	3345	3,345
Average Slope of Meadow (ft/ft)	5.0%	5.0%
Uniform Canopy Cover (%)	60%	60%
Converted Riparian Forest Buffer Species Composition (Top	Percent (%)	Inundation Tolerance
White Ash (Fraxinus americana)	30%	Intermediate
Cherries (Prunus spp.)	19%	Intolerant
Black Walnut (Juglans nigra)	14%	Intermediate

☑ ***Volume and Water Quality Management Credit***

Analysis Method: ☑ Default ☐ Design Storm (Event Based) ☐ Continuous Simulation

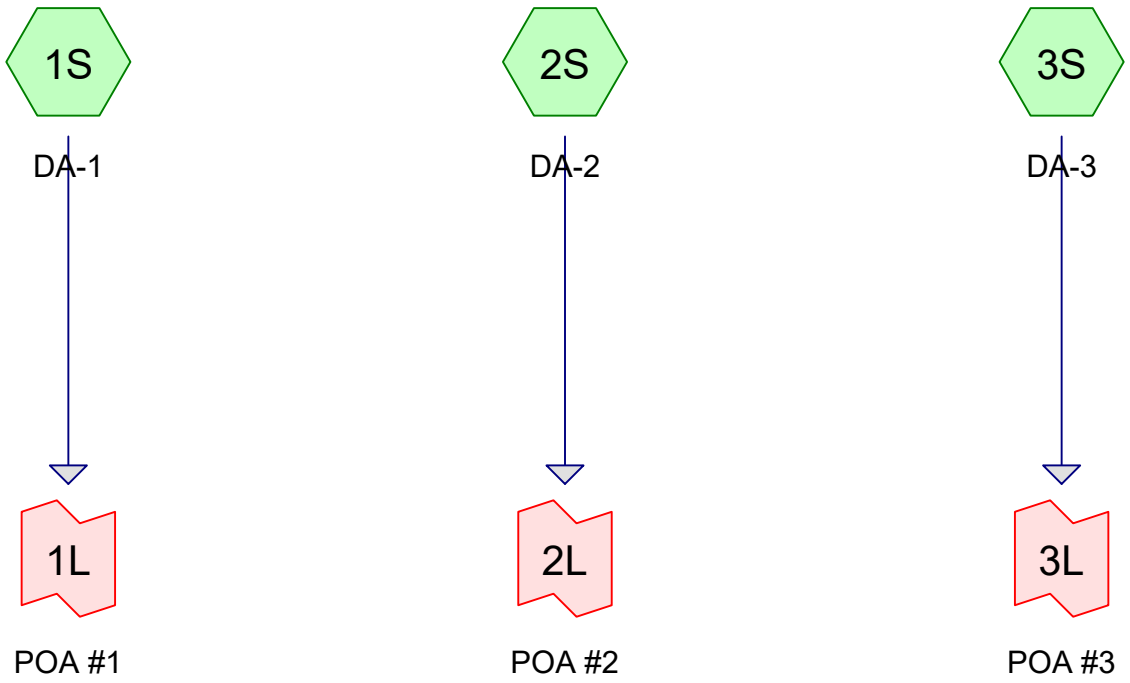
Does the RFB Drainage Area contain residential land use? ☐ Yes ☑ No

Volume Management Credit (CF):	**179,657**
WQM Credit, TSS (lbs):	**1,123.8**
WQM Credit, TP (lbs):	**2.83**
WQM Credit, TN (lbs):	**18.487**

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has

User Name: **Judd Dayton, P.E.** User Company: **Bohler Engineering**



Subcat Reach Pond Link

Routing Diagram for PAC250095.00_Hanover Warehouses PRE
Prepared by Bohler Engineering, PC, Printed 7/27/2026
HydroCAD® 10.20-8a s/n 03478 © 2025 HydroCAD Software Solutions LLC

Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=29.755 ac 0.98% Impervious Runoff Depth=0.92"
Tc=8.1 min CN=WQ Runoff=44.65 cfs 99,580 cf

Subcatchment2S: DA-2 Runoff Area=6.339 ac 2.24% Impervious Runoff Depth=0.95"
Tc=8.2 min CN=WQ Runoff=9.69 cfs 21,761 cf

Subcatchment3S: DA-3 Runoff Area=4.346 ac 0.00% Impervious Runoff Depth=0.89"
Tc=12.9 min CN=WQ Runoff=5.23 cfs 14,075 cf

Link 1L: POA #1 Inflow=44.65 cfs 99,580 cf
Primary=44.65 cfs 99,580 cf

Link 2L: POA #2 Inflow=9.69 cfs 21,761 cf
Primary=9.69 cfs 21,761 cf

Link 3L: POA #3 Inflow=5.23 cfs 14,075 cf
Primary=5.23 cfs 14,075 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 135,416 cf Average Runoff Depth = 0.92"
98.93% Pervious = 1,742,661 sf 1.07% Impervious = 18,905 sf

Summary for Subcatchment 1S: DA-1

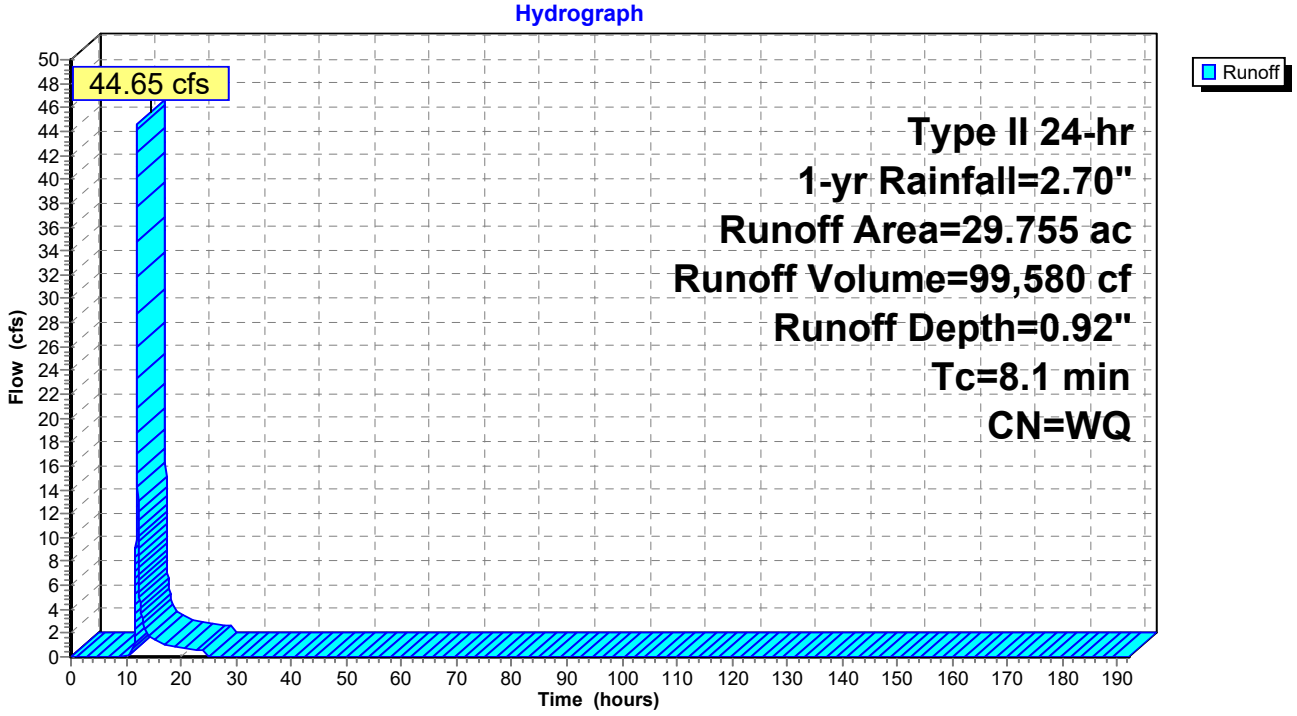
Runoff = 44.65 cfs @ 12.00 hrs, Volume= 99,580 cf, Depth= 0.92"
Routed to Link 1L : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

	Area (ac)	CN	Description
	25.830	78	Meadow, non-grazed, HSG D
	0.620	71	Meadow, non-grazed, HSG C
	2.517	77	Woods, Good, HSG D
	0.204	70	Woods, Good, HSG C
*	0.292	98	Impervious
*	0.292	78	Impervious as Meadow D
	29.755		Weighted Average
	29.463		99.02% Pervious Area
	0.292		0.98% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

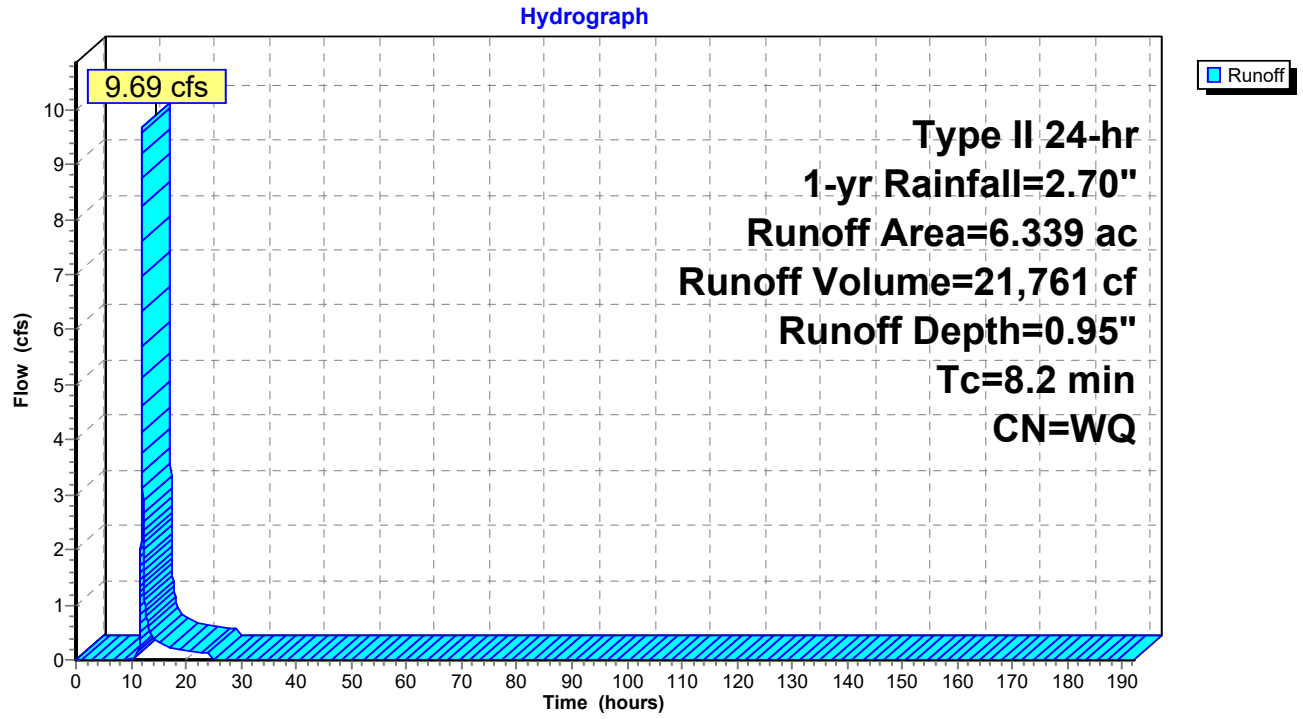
Runoff = 9.69 cfs @ 12.00 hrs, Volume= 21,761 cf, Depth= 0.95"
Routed to Link 2L : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

	Area (ac)	CN	Description
	4.899	78	Meadow, non-grazed, HSG D
	1.156	77	Woods, Good, HSG D
*	0.142	98	Impervious
*	0.142	78	Impervious as Meadow D
	6.339		Weighted Average
	6.197		97.76% Pervious Area
	0.142		2.24% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

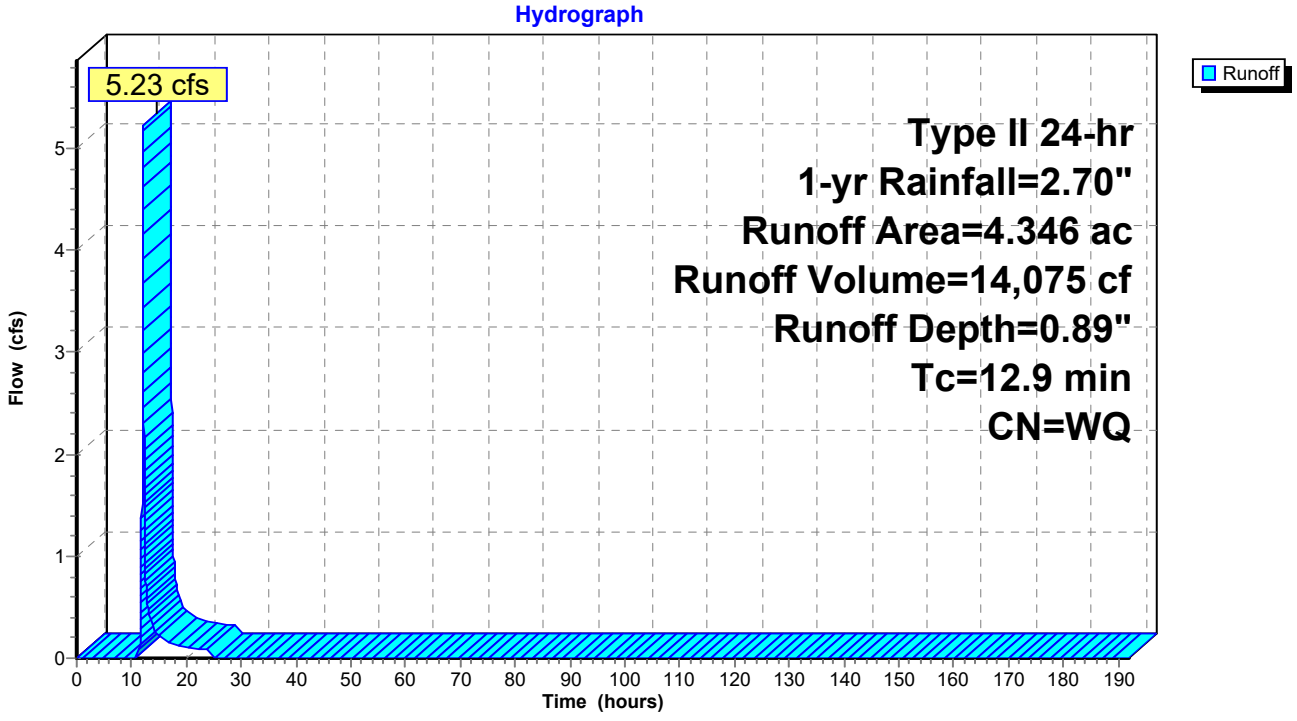
Runoff = 5.23 cfs @ 12.06 hrs, Volume= 14,075 cf, Depth= 0.89"
Routed to Link 3L : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
3.339	78	Meadow, non-grazed, HSG D
0.750	77	Woods, Good, HSG D
0.257	71	Meadow, non-grazed, HSG C
4.346		Weighted Average
4.346		100.00% Pervious Area

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

Subcatchment 3S: DA-3

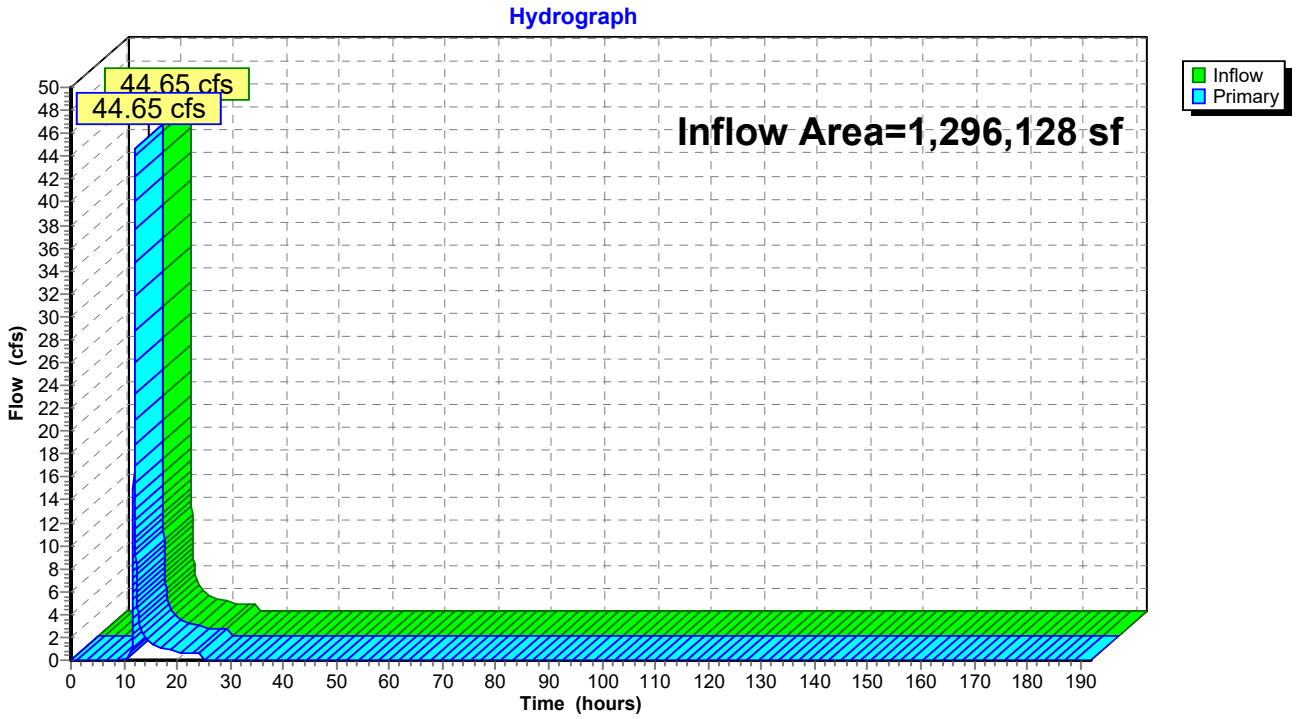


Summary for Link 1L: POA #1

Inflow Area = 1,296,128 sf, 0.98% Impervious, Inflow Depth = 0.92" for 1-yr event
Inflow = 44.65 cfs @ 12.00 hrs, Volume= 99,580 cf
Primary = 44.65 cfs @ 12.00 hrs, Volume= 99,580 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 1L: POA #1

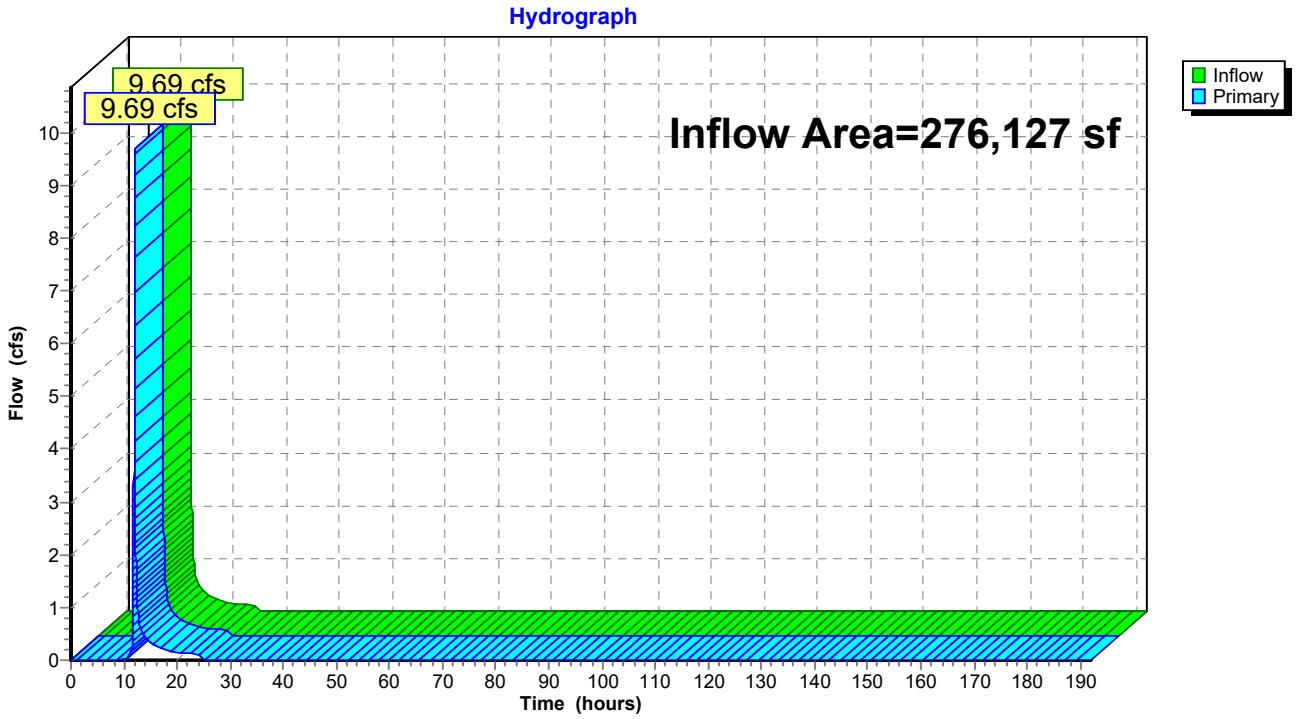


Summary for Link 2L: POA #2

Inflow Area = 276,127 sf, 2.24% Impervious, Inflow Depth = 0.95" for 1-yr event
Inflow = 9.69 cfs @ 12.00 hrs, Volume= 21,761 cf
Primary = 9.69 cfs @ 12.00 hrs, Volume= 21,761 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 2L: POA #2

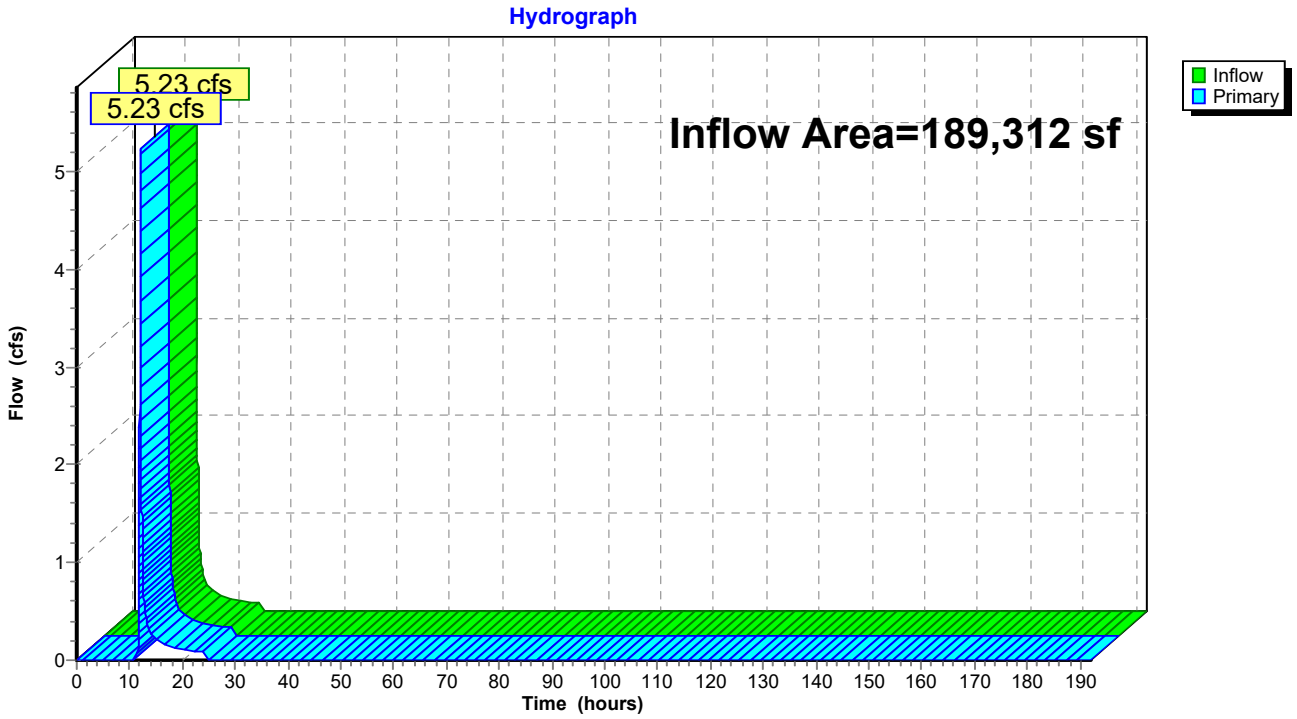


Summary for Link 3L: POA #3

Inflow Area = 189,312 sf, 0.00% Impervious, Inflow Depth = 0.89" for 1-yr event
Inflow = 5.23 cfs @ 12.06 hrs, Volume= 14,075 cf
Primary = 5.23 cfs @ 12.06 hrs, Volume= 14,075 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 3L: POA #3



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=29.755 ac 0.98% Impervious Runoff Depth=1.30"
Tc=8.1 min CN=WQ Runoff=63.80 cfs 140,713 cf

Subcatchment2S: DA-2 Runoff Area=6.339 ac 2.24% Impervious Runoff Depth=1.33"
Tc=8.2 min CN=WQ Runoff=13.77 cfs 30,594 cf

Subcatchment3S: DA-3 Runoff Area=4.346 ac 0.00% Impervious Runoff Depth=1.27"
Tc=12.9 min CN=WQ Runoff=7.58 cfs 20,009 cf

Link 1L: POA #1 Inflow=63.80 cfs 140,713 cf
Primary=63.80 cfs 140,713 cf

Link 2L: POA #2 Inflow=13.77 cfs 30,594 cf
Primary=13.77 cfs 30,594 cf

Link 3L: POA #3 Inflow=7.58 cfs 20,009 cf
Primary=7.58 cfs 20,009 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 191,316 cf Average Runoff Depth = 1.30"
98.93% Pervious = 1,742,661 sf 1.07% Impervious = 18,905 sf

Summary for Subcatchment 1S: DA-1

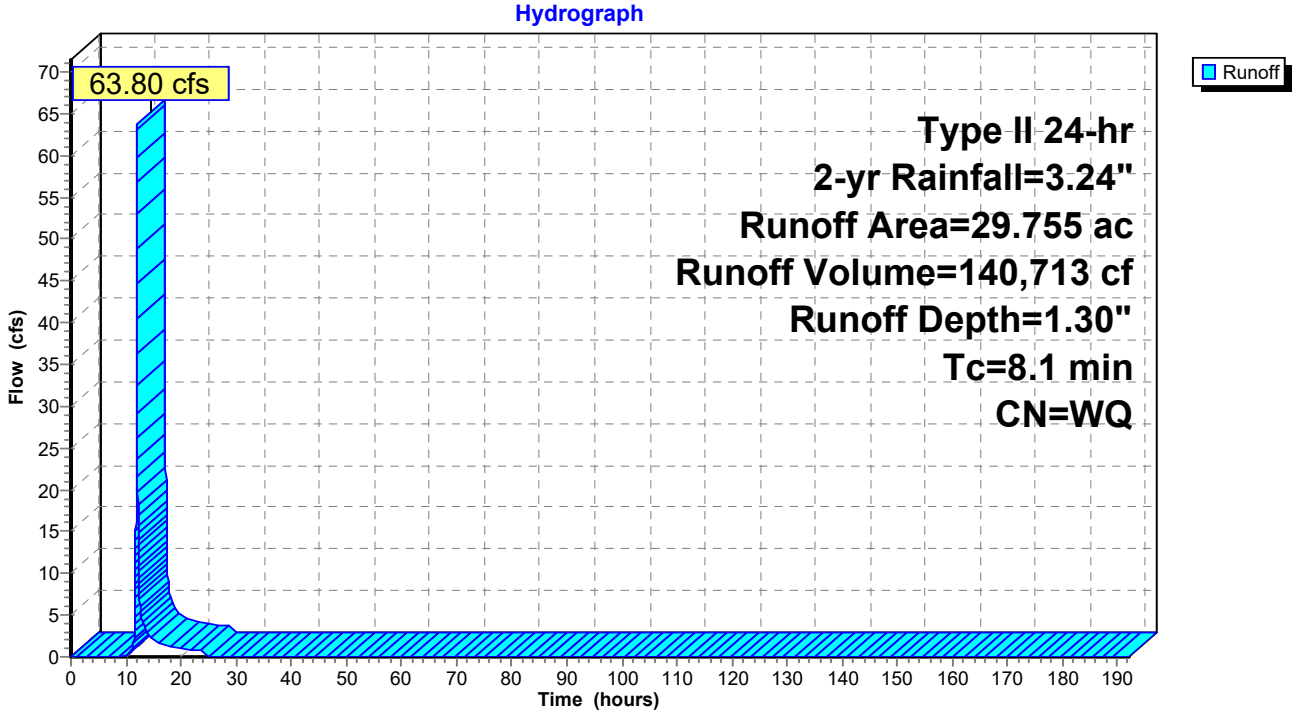
Runoff = 63.80 cfs @ 12.00 hrs, Volume= 140,713 cf, Depth= 1.30"
Routed to Link 1L : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

	Area (ac)	CN	Description
	25.830	78	Meadow, non-grazed, HSG D
	0.620	71	Meadow, non-grazed, HSG C
	2.517	77	Woods, Good, HSG D
	0.204	70	Woods, Good, HSG C
*	0.292	98	Impervious
*	0.292	78	Impervious as Meadow D
	29.755		Weighted Average
	29.463		99.02% Pervious Area
	0.292		0.98% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

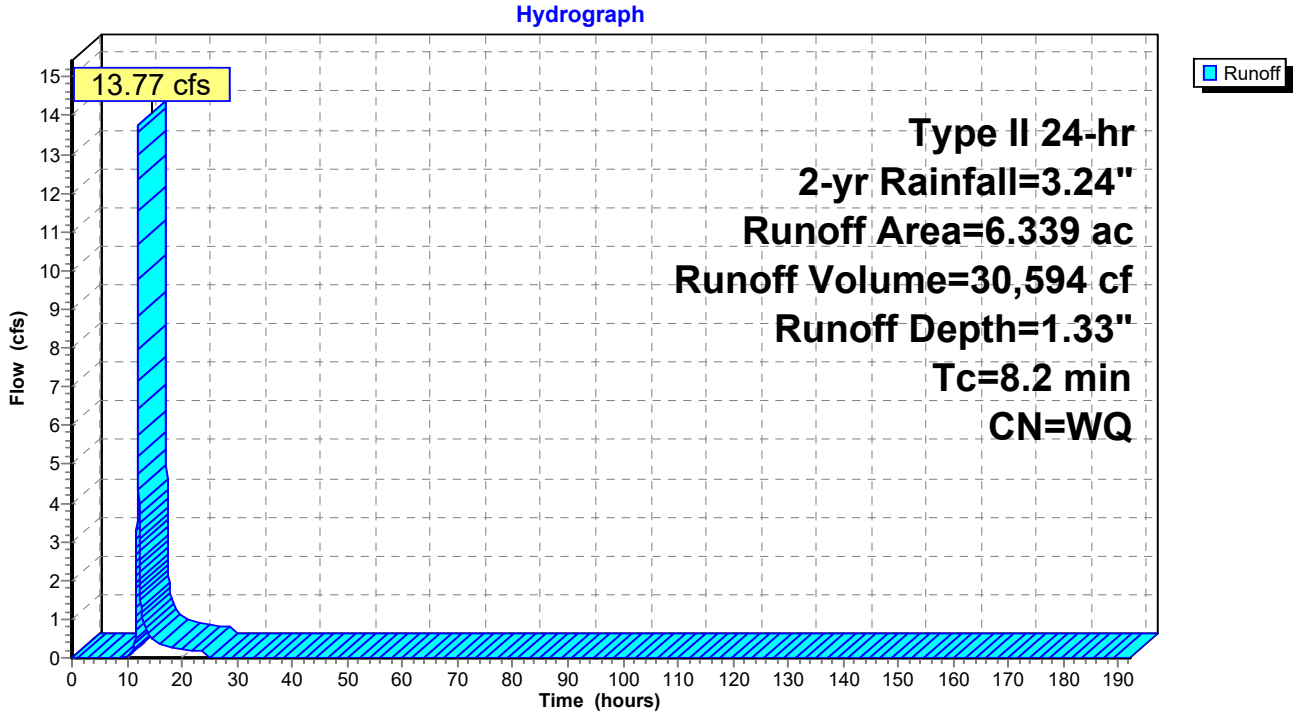
Runoff = 13.77 cfs @ 12.00 hrs, Volume= 30,594 cf, Depth= 1.33"
Routed to Link 2L : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

	Area (ac)	CN	Description
	4.899	78	Meadow, non-grazed, HSG D
	1.156	77	Woods, Good, HSG D
*	0.142	98	Impervious
*	0.142	78	Impervious as Meadow D
	6.339		Weighted Average
	6.197		97.76% Pervious Area
	0.142		2.24% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

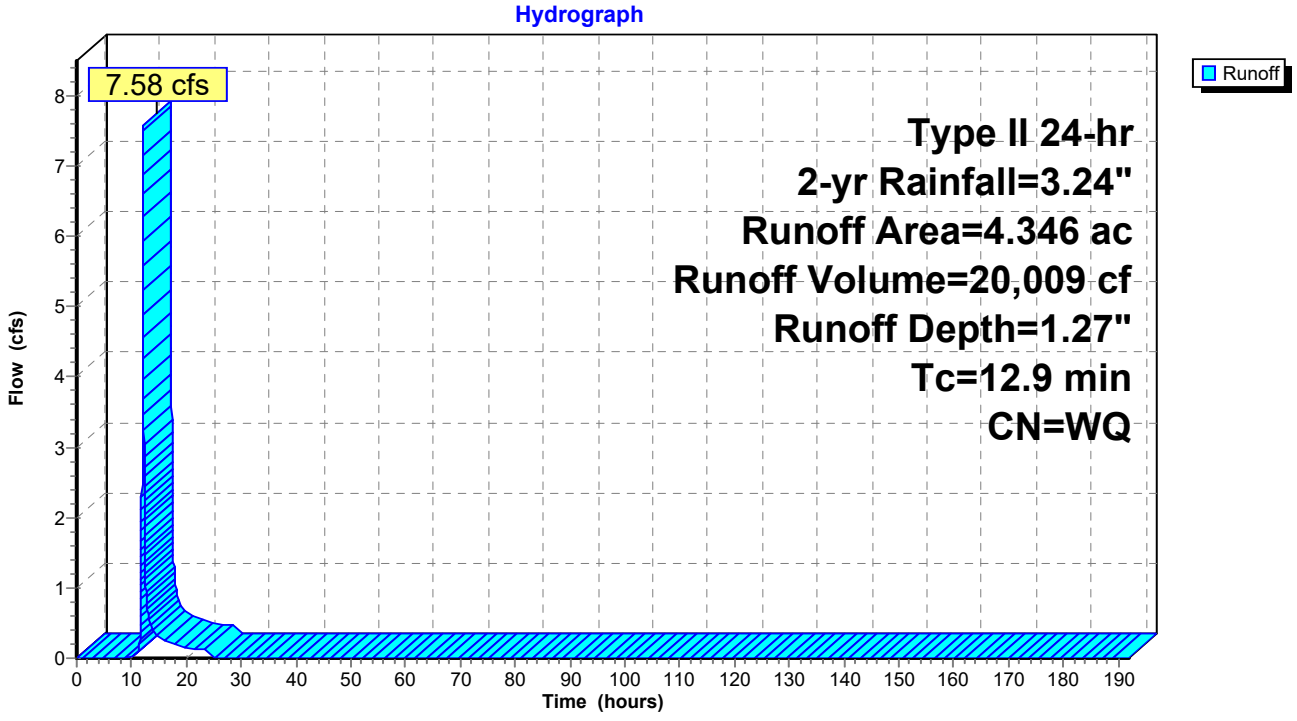
Runoff = 7.58 cfs @ 12.05 hrs, Volume= 20,009 cf, Depth= 1.27"
Routed to Link 3L : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
3.339	78	Meadow, non-grazed, HSG D
0.750	77	Woods, Good, HSG D
0.257	71	Meadow, non-grazed, HSG C
4.346		Weighted Average
4.346		100.00% Pervious Area

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

Subcatchment 3S: DA-3

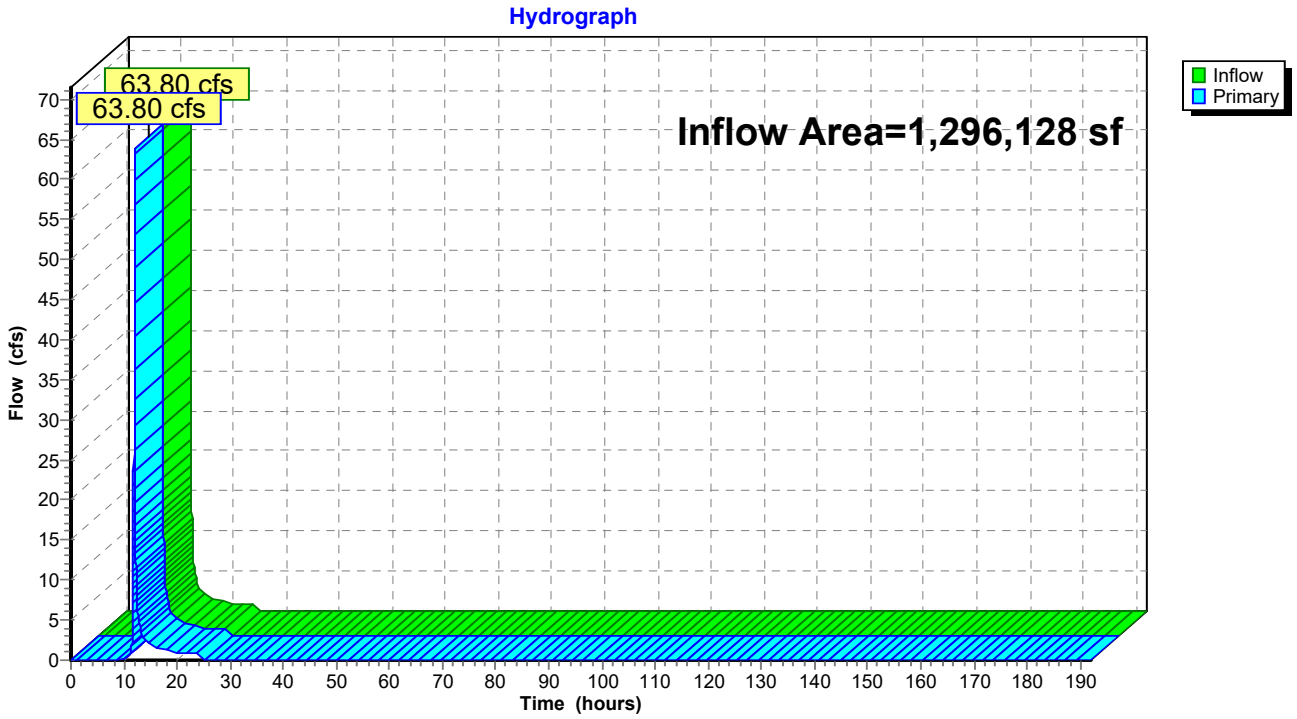


Summary for Link 1L: POA #1

Inflow Area = 1,296,128 sf, 0.98% Impervious, Inflow Depth = 1.30" for 2-yr event
Inflow = 63.80 cfs @ 12.00 hrs, Volume= 140,713 cf
Primary = 63.80 cfs @ 12.00 hrs, Volume= 140,713 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 1L: POA #1

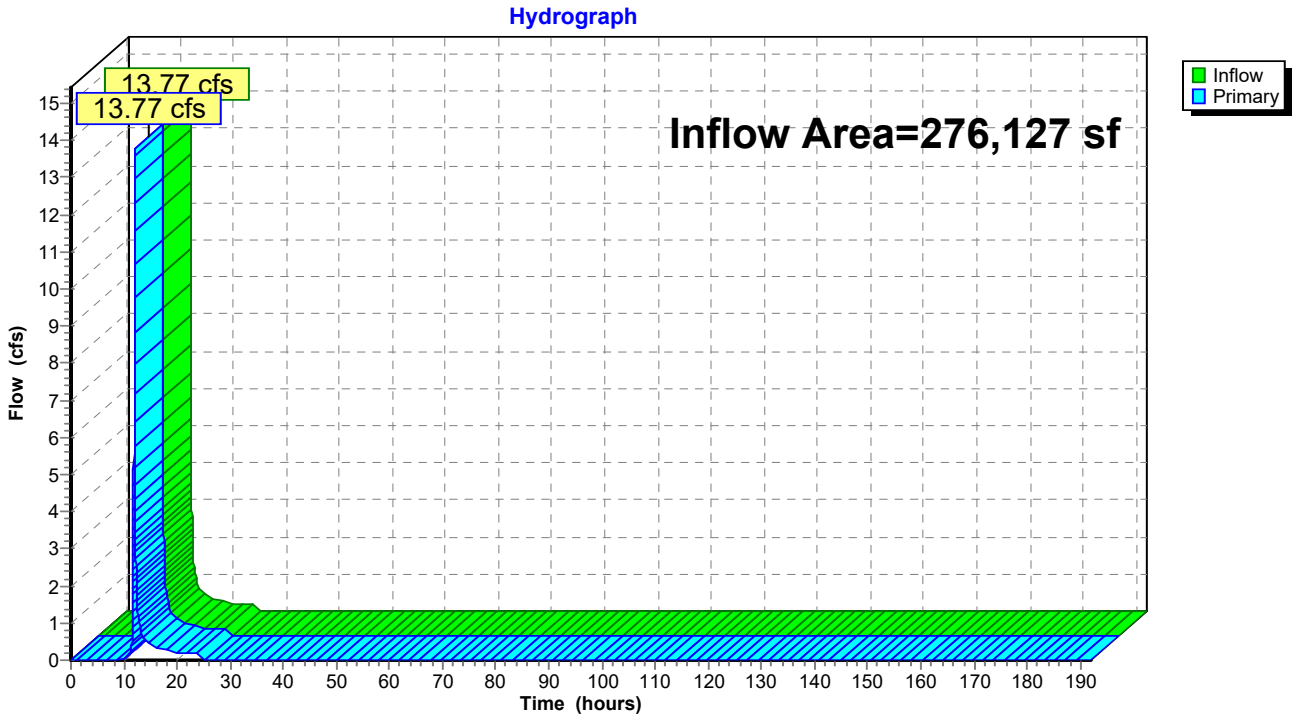


Summary for Link 2L: POA #2

Inflow Area = 276,127 sf, 2.24% Impervious, Inflow Depth = 1.33" for 2-yr event
Inflow = 13.77 cfs @ 12.00 hrs, Volume= 30,594 cf
Primary = 13.77 cfs @ 12.00 hrs, Volume= 30,594 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 2L: POA #2

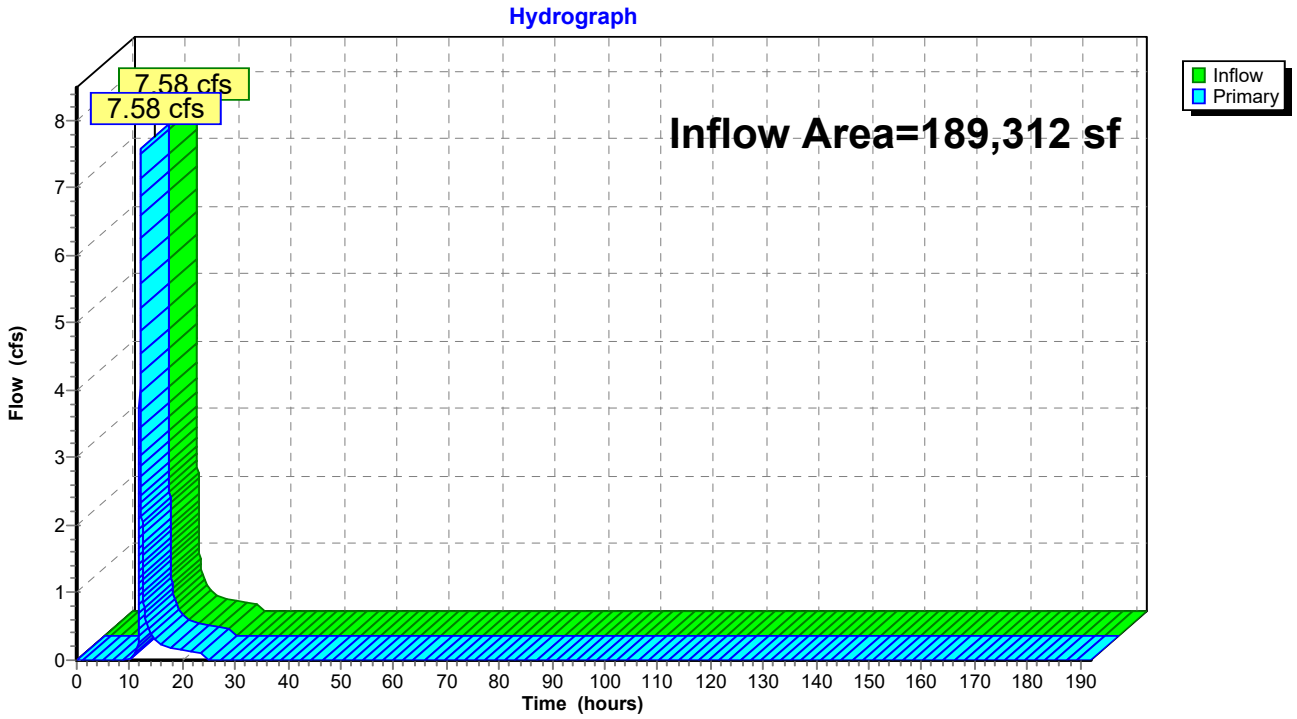


Summary for Link 3L: POA #3

Inflow Area = 189,312 sf, 0.00% Impervious, Inflow Depth = 1.27" for 2-yr event
Inflow = 7.58 cfs @ 12.05 hrs, Volume= 20,009 cf
Primary = 7.58 cfs @ 12.05 hrs, Volume= 20,009 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 3L: POA #3



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=29.755 ac 0.98% Impervious Runoff Depth=1.95"
Tc=8.1 min CN=WQ Runoff=95.70 cfs 210,477 cf

Subcatchment2S: DA-2 Runoff Area=6.339 ac 2.24% Impervious Runoff Depth=1.98"
Tc=8.2 min CN=WQ Runoff=20.56 cfs 45,547 cf

Subcatchment3S: DA-3 Runoff Area=4.346 ac 0.00% Impervious Runoff Depth=1.91"
Tc=12.9 min CN=WQ Runoff=11.52 cfs 30,101 cf

Link 1L: POA #1 Inflow=95.70 cfs 210,477 cf
Primary=95.70 cfs 210,477 cf

Link 2L: POA #2 Inflow=20.56 cfs 45,547 cf
Primary=20.56 cfs 45,547 cf

Link 3L: POA #3 Inflow=11.52 cfs 30,101 cf
Primary=11.52 cfs 30,101 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 286,126 cf Average Runoff Depth = 1.95"
98.93% Pervious = 1,742,661 sf 1.07% Impervious = 18,905 sf

Summary for Subcatchment 1S: DA-1

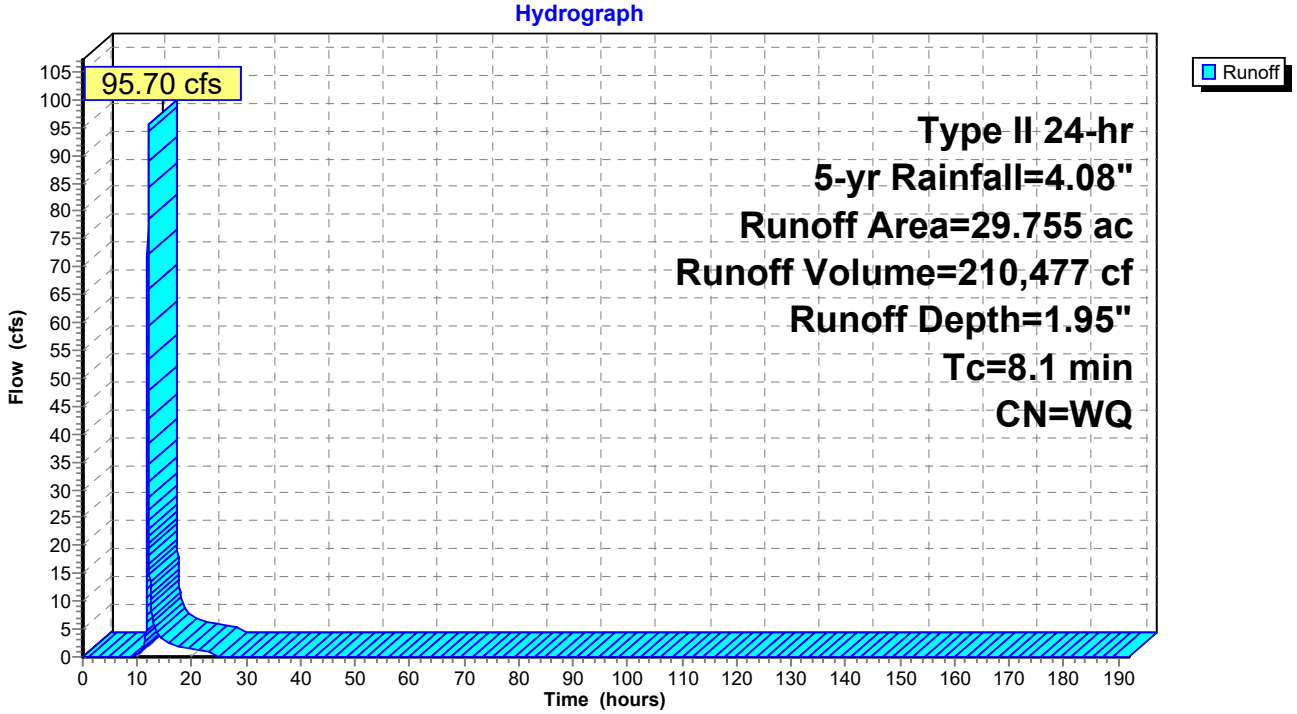
Runoff = 95.70 cfs @ 12.00 hrs, Volume= 210,477 cf, Depth= 1.95"
Routed to Link 1L : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

	Area (ac)	CN	Description
	25.830	78	Meadow, non-grazed, HSG D
	0.620	71	Meadow, non-grazed, HSG C
	2.517	77	Woods, Good, HSG D
	0.204	70	Woods, Good, HSG C
*	0.292	98	Impervious
*	0.292	78	Impervious as Meadow D
	29.755		Weighted Average
	29.463		99.02% Pervious Area
	0.292		0.98% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

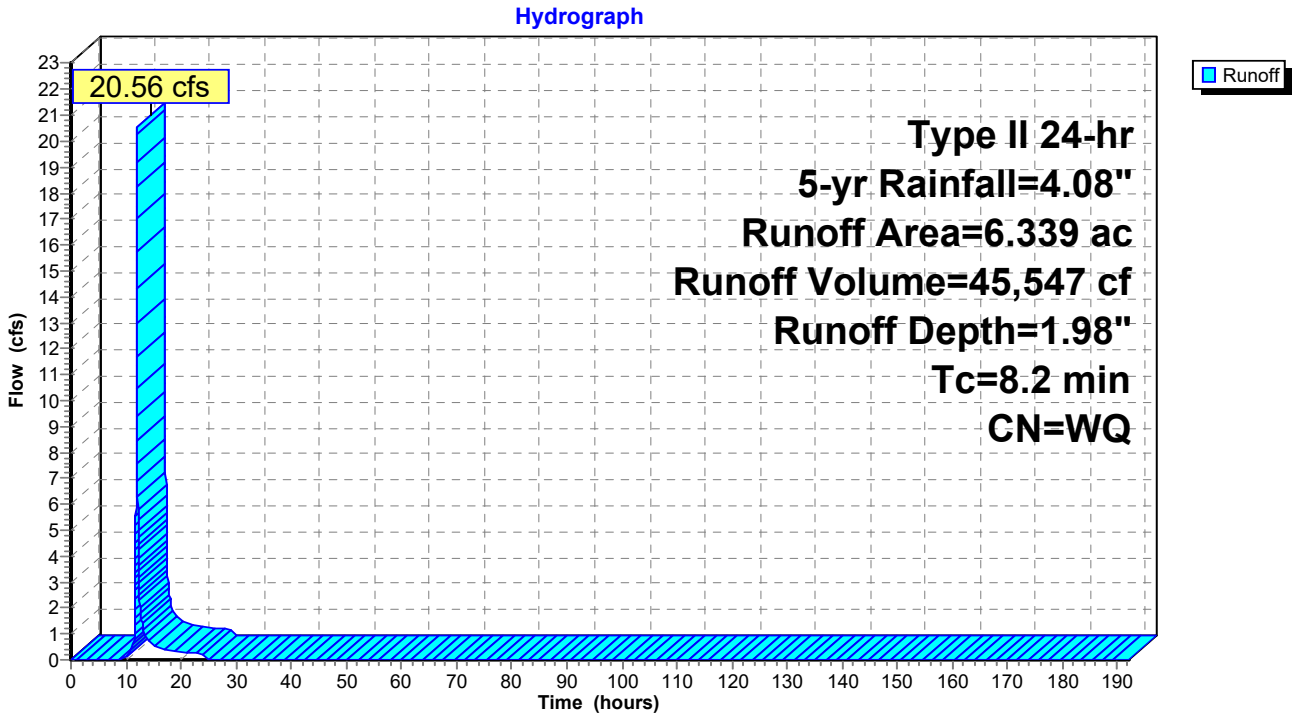
Runoff = 20.56 cfs @ 12.00 hrs, Volume= 45,547 cf, Depth= 1.98"
Routed to Link 2L : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

	Area (ac)	CN	Description
	4.899	78	Meadow, non-grazed, HSG D
	1.156	77	Woods, Good, HSG D
*	0.142	98	Impervious
*	0.142	78	Impervious as Meadow D
	6.339		Weighted Average
	6.197		97.76% Pervious Area
	0.142		2.24% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

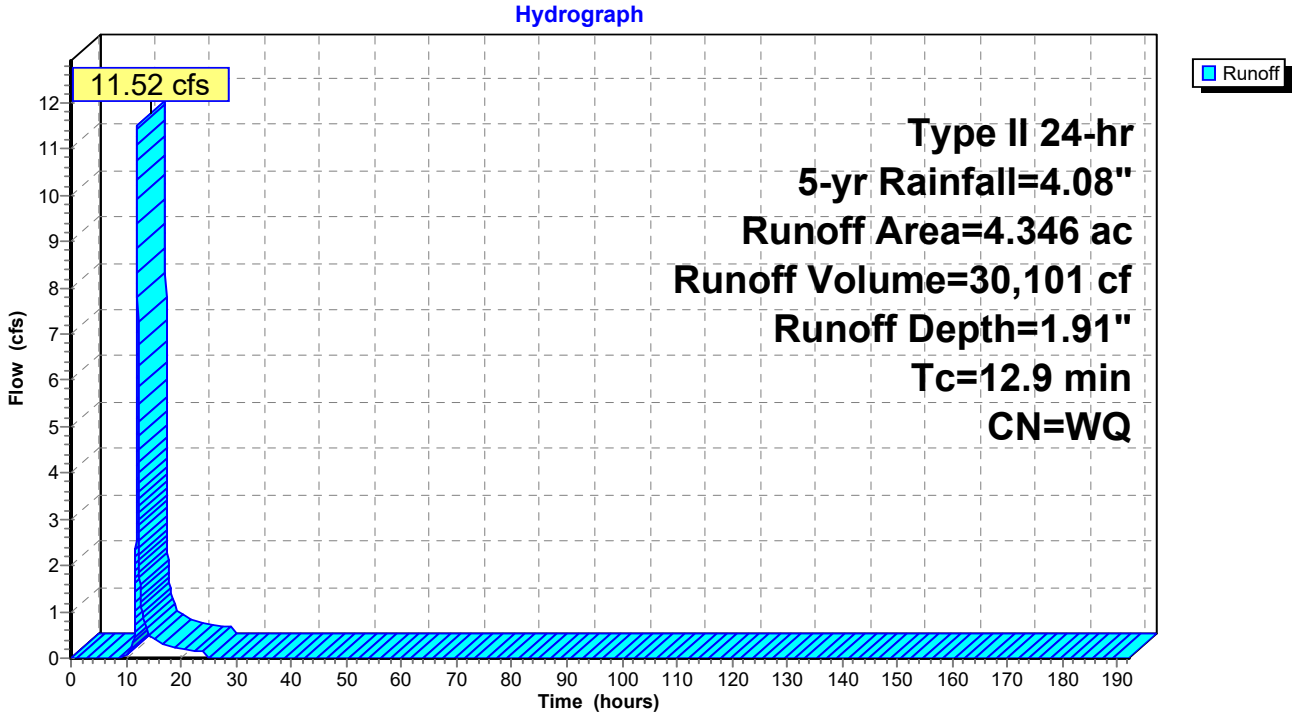
Runoff = 11.52 cfs @ 12.05 hrs, Volume= 30,101 cf, Depth= 1.91"
Routed to Link 3L : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
3.339	78	Meadow, non-grazed, HSG D
0.750	77	Woods, Good, HSG D
0.257	71	Meadow, non-grazed, HSG C
4.346		Weighted Average
4.346		100.00% Pervious Area

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

Subcatchment 3S: DA-3

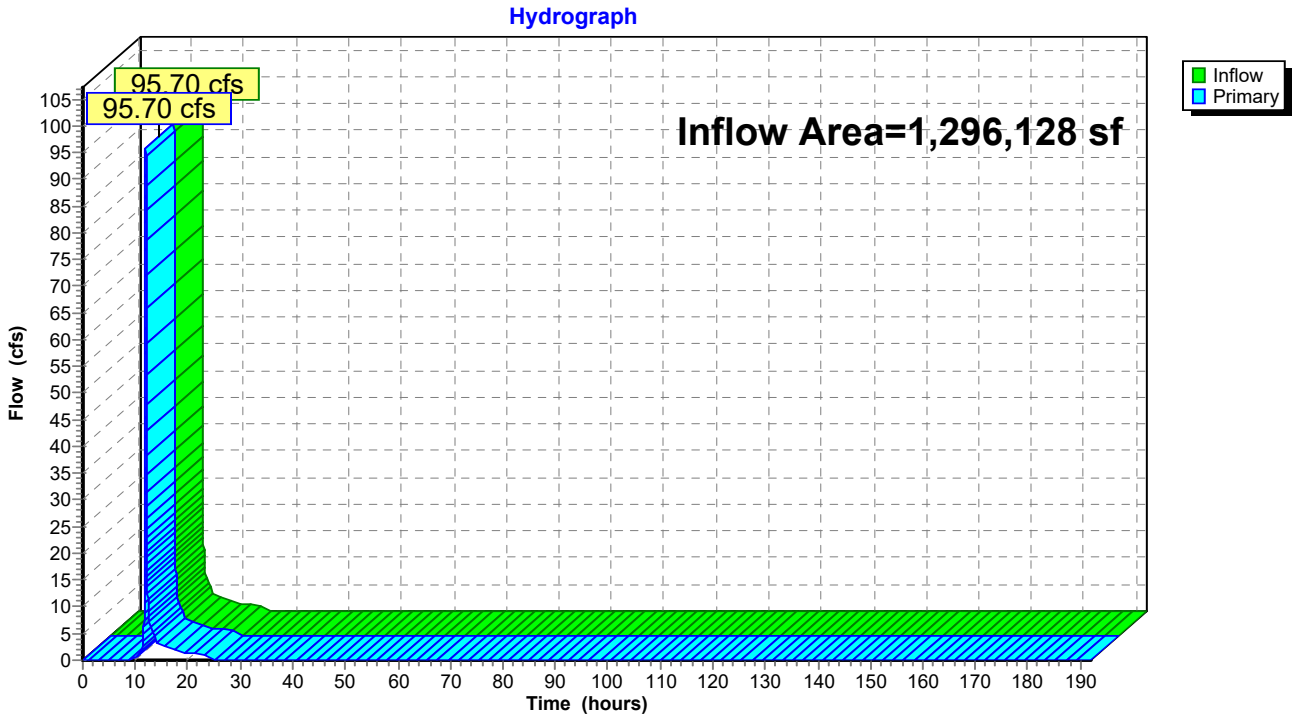


Summary for Link 1L: POA #1

Inflow Area = 1,296,128 sf, 0.98% Impervious, Inflow Depth = 1.95" for 5-yr event
Inflow = 95.70 cfs @ 12.00 hrs, Volume= 210,477 cf
Primary = 95.70 cfs @ 12.00 hrs, Volume= 210,477 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 1L: POA #1

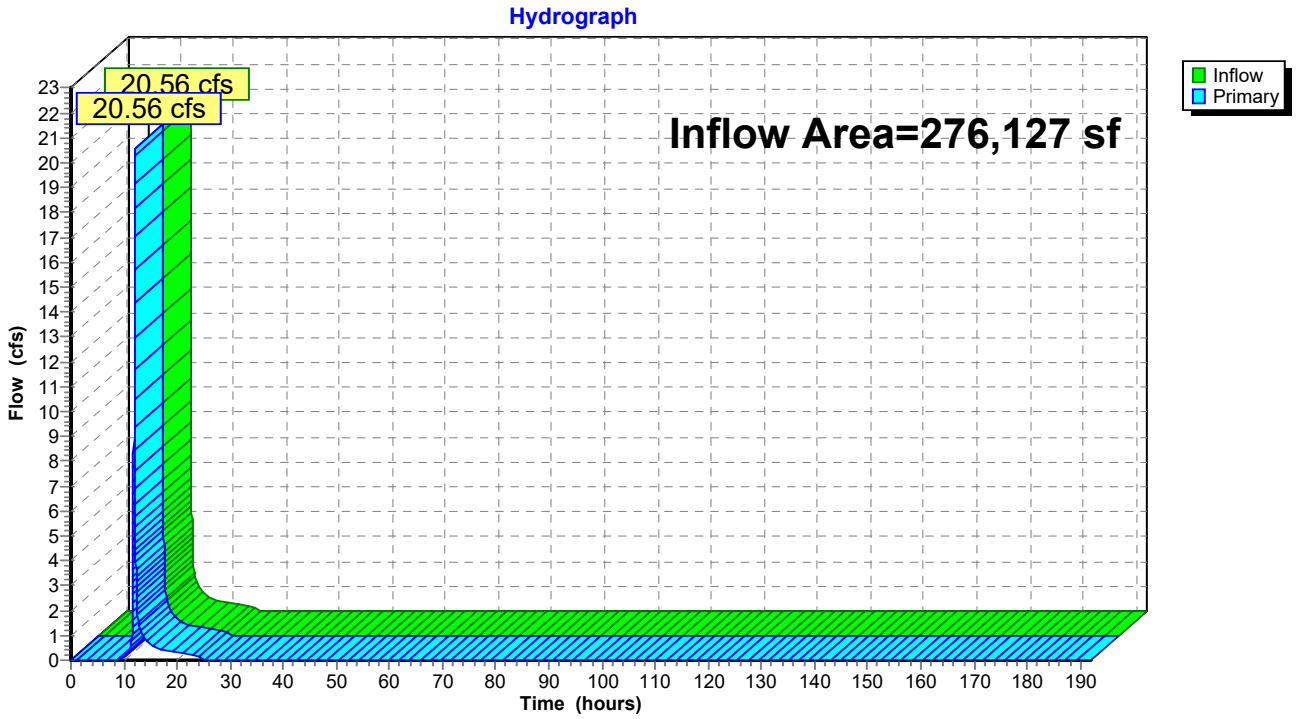


Summary for Link 2L: POA #2

Inflow Area = 276,127 sf, 2.24% Impervious, Inflow Depth = 1.98" for 5-yr event
Inflow = 20.56 cfs @ 12.00 hrs, Volume= 45,547 cf
Primary = 20.56 cfs @ 12.00 hrs, Volume= 45,547 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 2L: POA #2

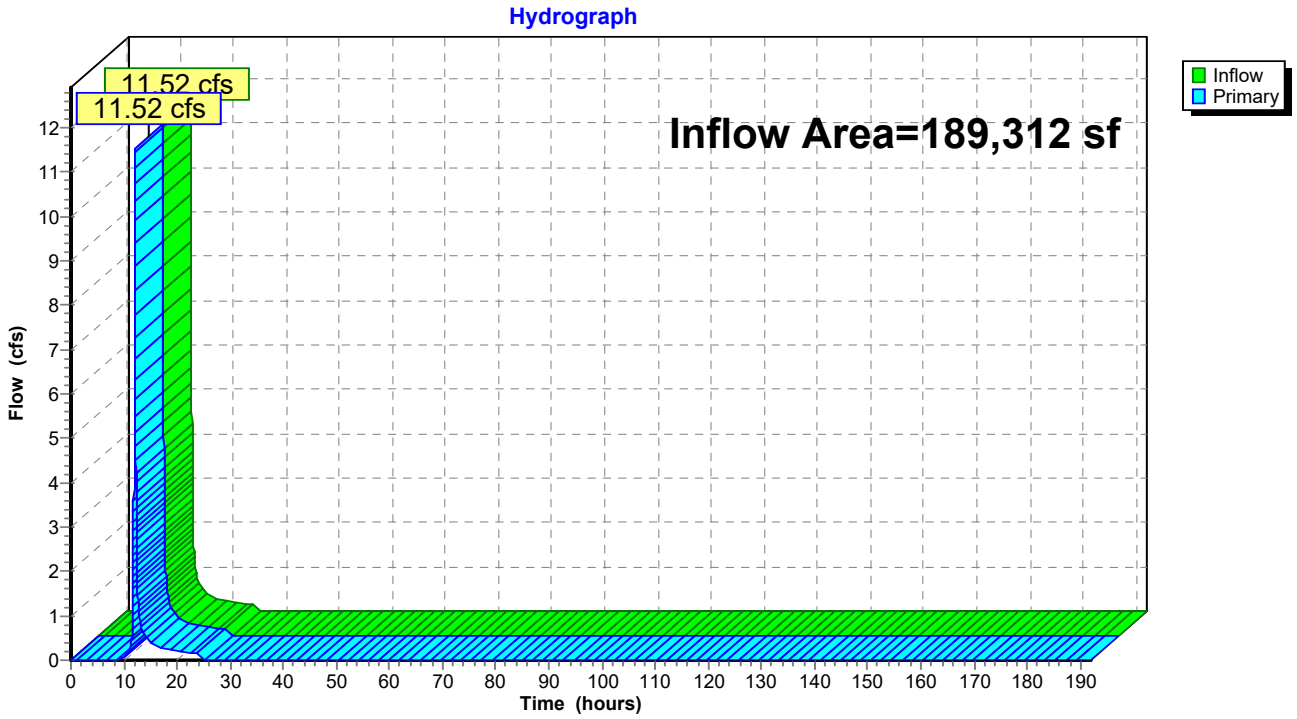


Summary for Link 3L: POA #3

Inflow Area = 189,312 sf, 0.00% Impervious, Inflow Depth = 1.91" for 5-yr event
Inflow = 11.52 cfs @ 12.05 hrs, Volume= 30,101 cf
Primary = 11.52 cfs @ 12.05 hrs, Volume= 30,101 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 3L: POA #3



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=29.755 ac 0.98% Impervious Runoff Depth=2.51"
Tc=8.1 min CN=WQ Runoff=123.09 cfs 271,507 cf

Subcatchment2S: DA-2 Runoff Area=6.339 ac 2.24% Impervious Runoff Depth=2.55"
Tc=8.2 min CN=WQ Runoff=26.39 cfs 58,610 cf

Subcatchment3S: DA-3 Runoff Area=4.346 ac 0.00% Impervious Runoff Depth=2.47"
Tc=12.9 min CN=WQ Runoff=14.93 cfs 38,949 cf

Link 1L: POA #1 Inflow=123.09 cfs 271,507 cf
Primary=123.09 cfs 271,507 cf

Link 2L: POA #2 Inflow=26.39 cfs 58,610 cf
Primary=26.39 cfs 58,610 cf

Link 3L: POA #3 Inflow=14.93 cfs 38,949 cf
Primary=14.93 cfs 38,949 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 369,066 cf Average Runoff Depth = 2.51"
98.93% Pervious = 1,742,661 sf 1.07% Impervious = 18,905 sf

Summary for Subcatchment 1S: DA-1

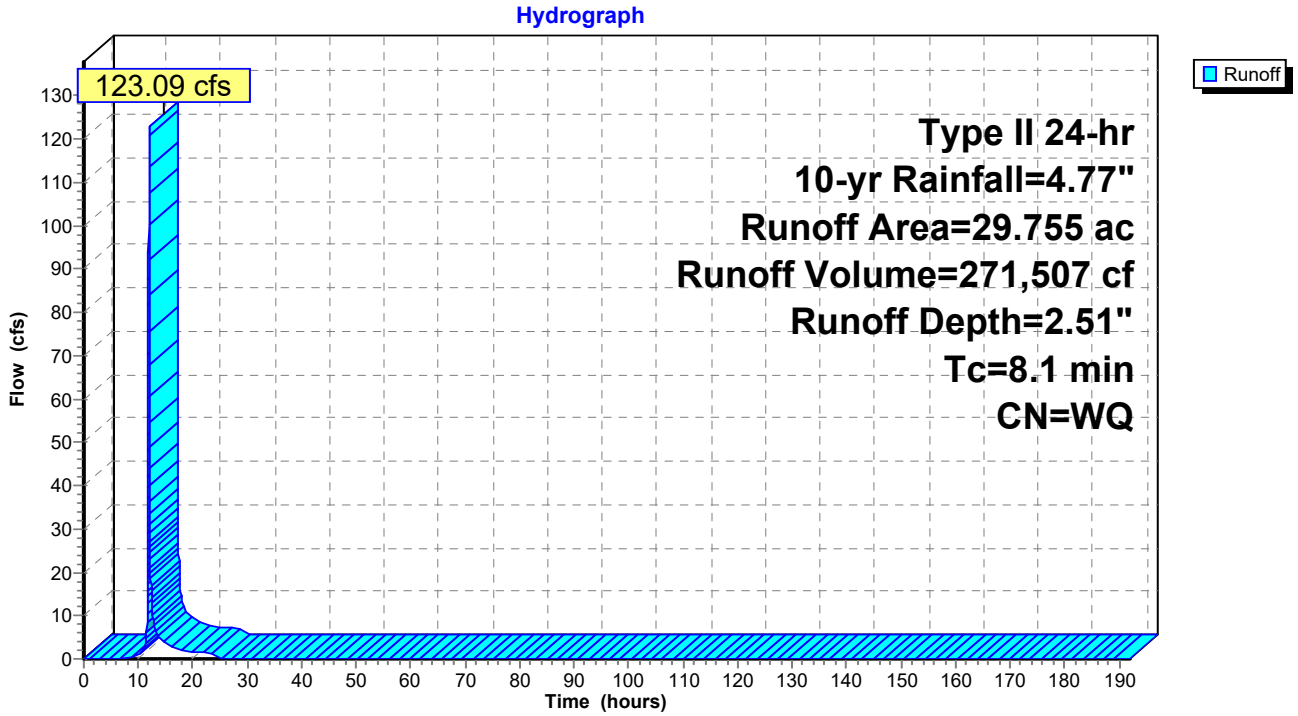
Runoff = 123.09 cfs @ 12.00 hrs, Volume= 271,507 cf, Depth= 2.51"
Routed to Link 1L : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

	Area (ac)	CN	Description
	25.830	78	Meadow, non-grazed, HSG D
	0.620	71	Meadow, non-grazed, HSG C
	2.517	77	Woods, Good, HSG D
	0.204	70	Woods, Good, HSG C
*	0.292	98	Impervious
*	0.292	78	Impervious as Meadow D
	29.755		Weighted Average
	29.463		99.02% Pervious Area
	0.292		0.98% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

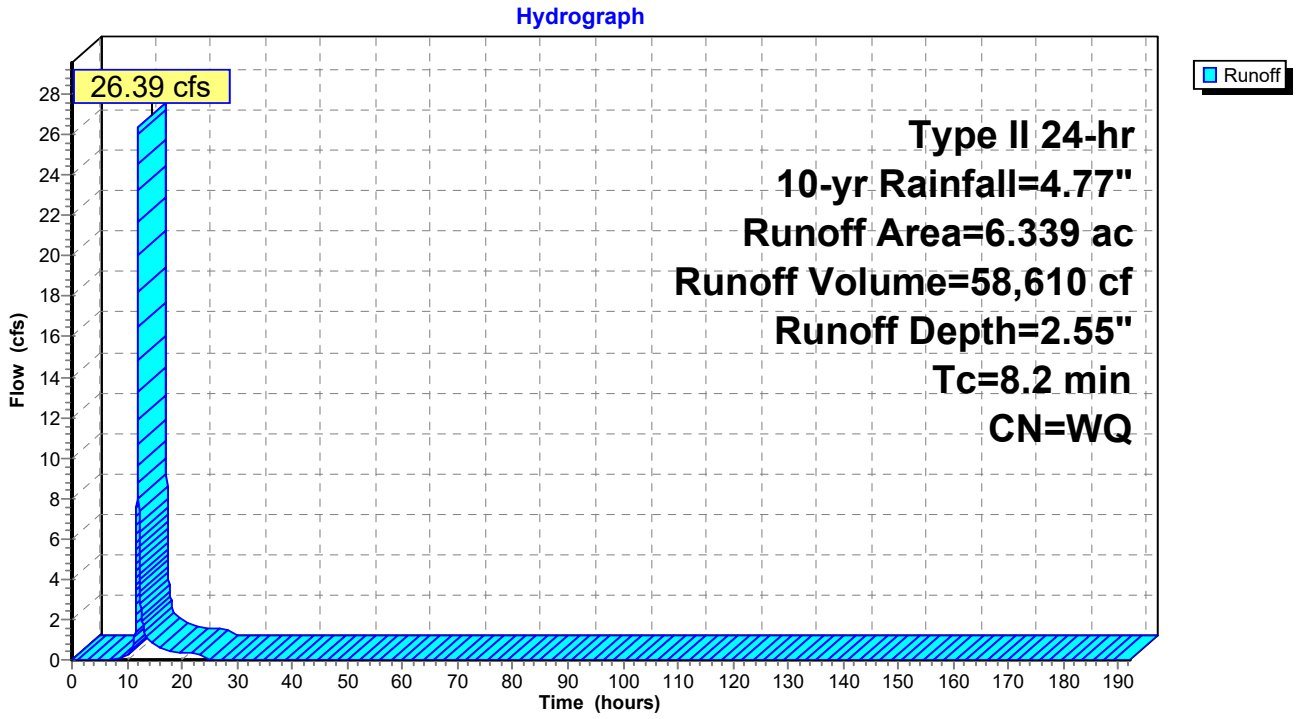
Runoff = 26.39 cfs @ 12.00 hrs, Volume= 58,610 cf, Depth= 2.55"
Routed to Link 2L : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

	Area (ac)	CN	Description
	4.899	78	Meadow, non-grazed, HSG D
	1.156	77	Woods, Good, HSG D
*	0.142	98	Impervious
*	0.142	78	Impervious as Meadow D
	6.339		Weighted Average
	6.197		97.76% Pervious Area
	0.142		2.24% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

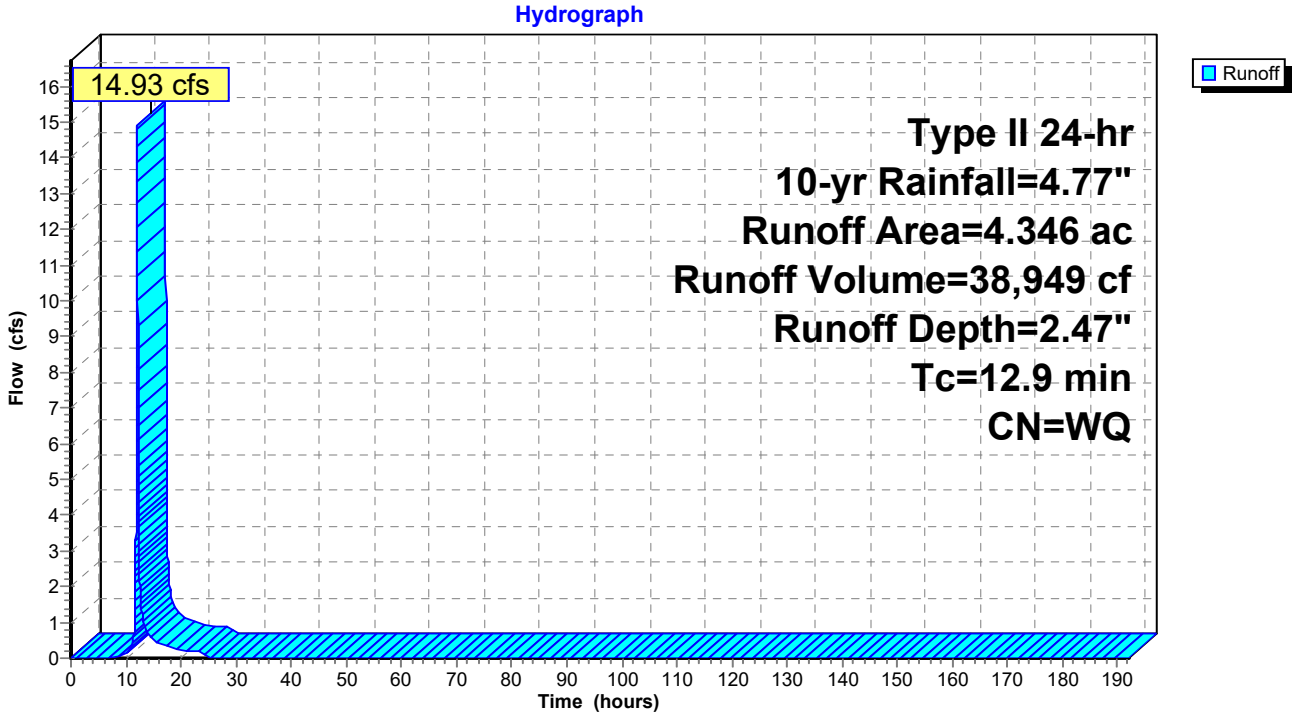
Runoff = 14.93 cfs @ 12.05 hrs, Volume= 38,949 cf, Depth= 2.47"
Routed to Link 3L : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
3.339	78	Meadow, non-grazed, HSG D
0.750	77	Woods, Good, HSG D
0.257	71	Meadow, non-grazed, HSG C
4.346		Weighted Average
4.346		100.00% Pervious Area

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

Subcatchment 3S: DA-3

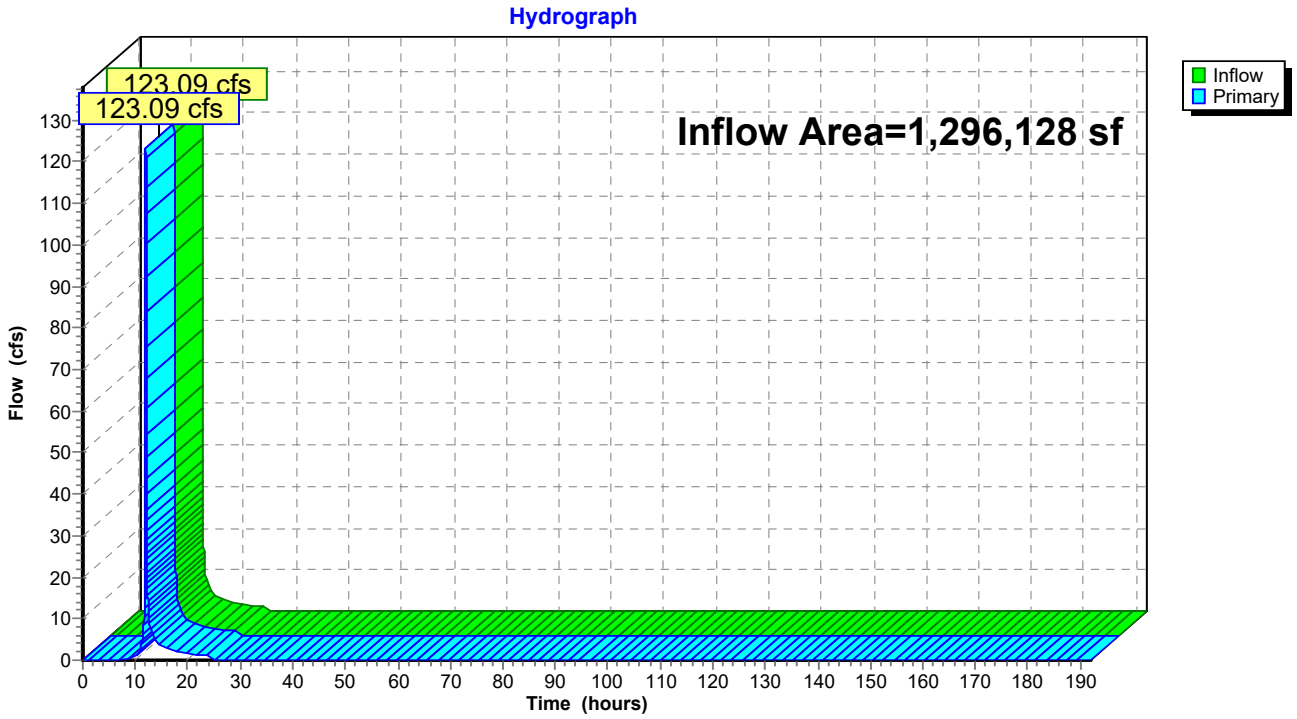


Summary for Link 1L: POA #1

Inflow Area = 1,296,128 sf, 0.98% Impervious, Inflow Depth = 2.51" for 10-yr event
Inflow = 123.09 cfs @ 12.00 hrs, Volume= 271,507 cf
Primary = 123.09 cfs @ 12.00 hrs, Volume= 271,507 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 1L: POA #1

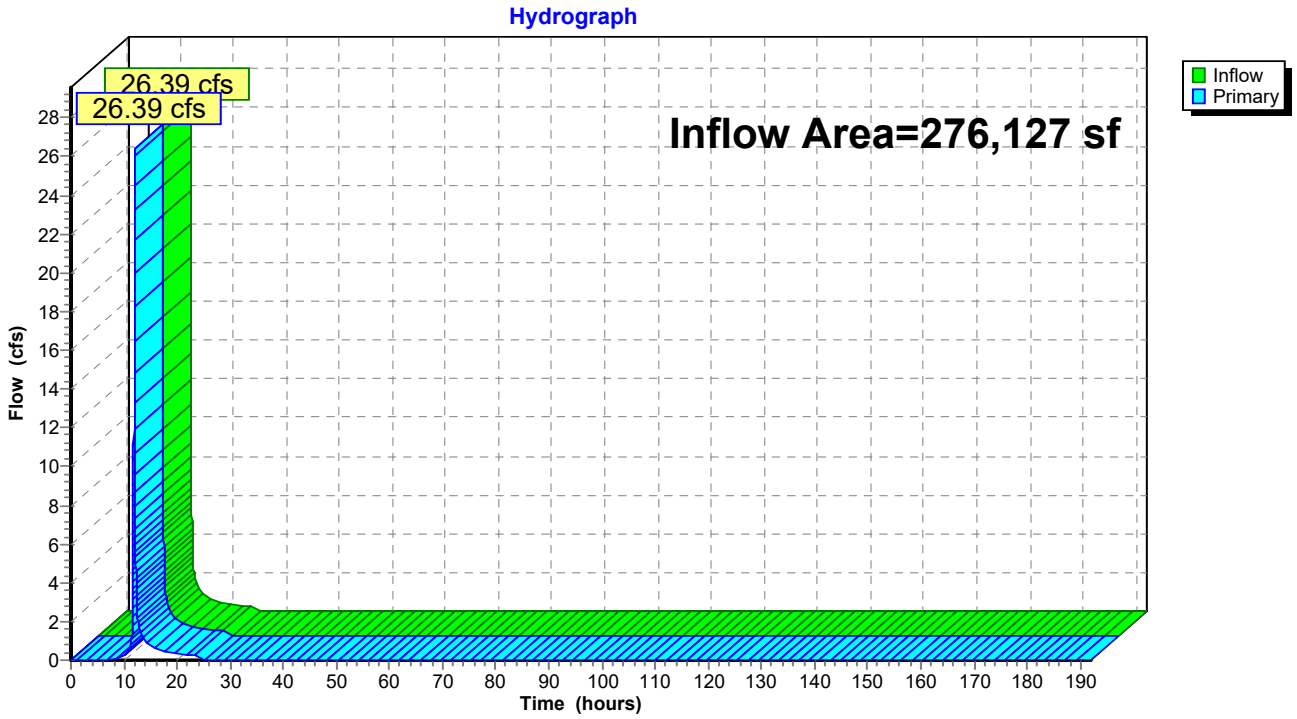


Summary for Link 2L: POA #2

Inflow Area = 276,127 sf, 2.24% Impervious, Inflow Depth = 2.55" for 10-yr event
Inflow = 26.39 cfs @ 12.00 hrs, Volume= 58,610 cf
Primary = 26.39 cfs @ 12.00 hrs, Volume= 58,610 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 2L: POA #2

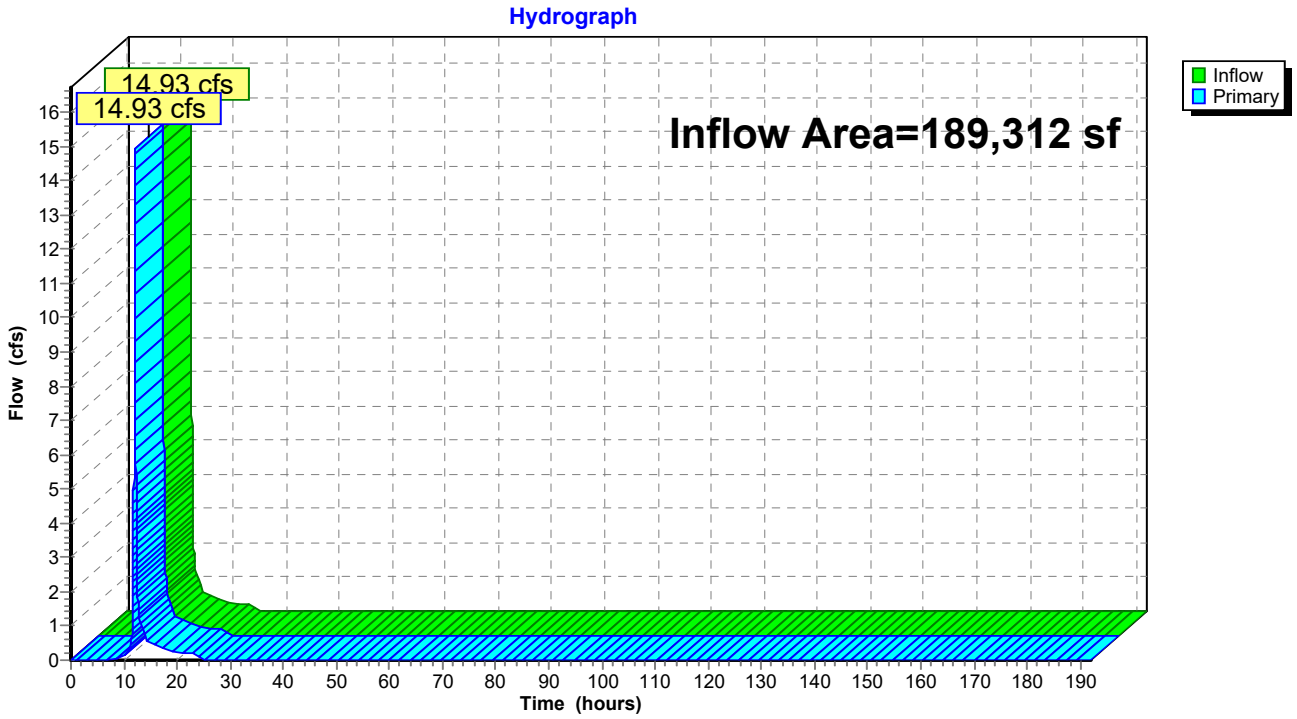


Summary for Link 3L: POA #3

Inflow Area = 189,312 sf, 0.00% Impervious, Inflow Depth = 2.47" for 10-yr event
Inflow = 14.93 cfs @ 12.05 hrs, Volume= 38,949 cf
Primary = 14.93 cfs @ 12.05 hrs, Volume= 38,949 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 3L: POA #3



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=29.755 ac 0.98% Impervious Runoff Depth=3.38"
Tc=8.1 min CN=WQ Runoff=164.30 cfs 364,992 cf

Subcatchment2S: DA-2 Runoff Area=6.339 ac 2.24% Impervious Runoff Depth=3.42"
Tc=8.2 min CN=WQ Runoff=35.16 cfs 78,600 cf

Subcatchment3S: DA-3 Runoff Area=4.346 ac 0.00% Impervious Runoff Depth=3.33"
Tc=12.9 min CN=WQ Runoff=20.06 cfs 52,522 cf

Link 1L: POA #1 Inflow=164.30 cfs 364,992 cf
Primary=164.30 cfs 364,992 cf

Link 2L: POA #2 Inflow=35.16 cfs 78,600 cf
Primary=35.16 cfs 78,600 cf

Link 3L: POA #3 Inflow=20.06 cfs 52,522 cf
Primary=20.06 cfs 52,522 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 496,114 cf Average Runoff Depth = 3.38"
98.93% Pervious = 1,742,661 sf 1.07% Impervious = 18,905 sf

Summary for Subcatchment 1S: DA-1

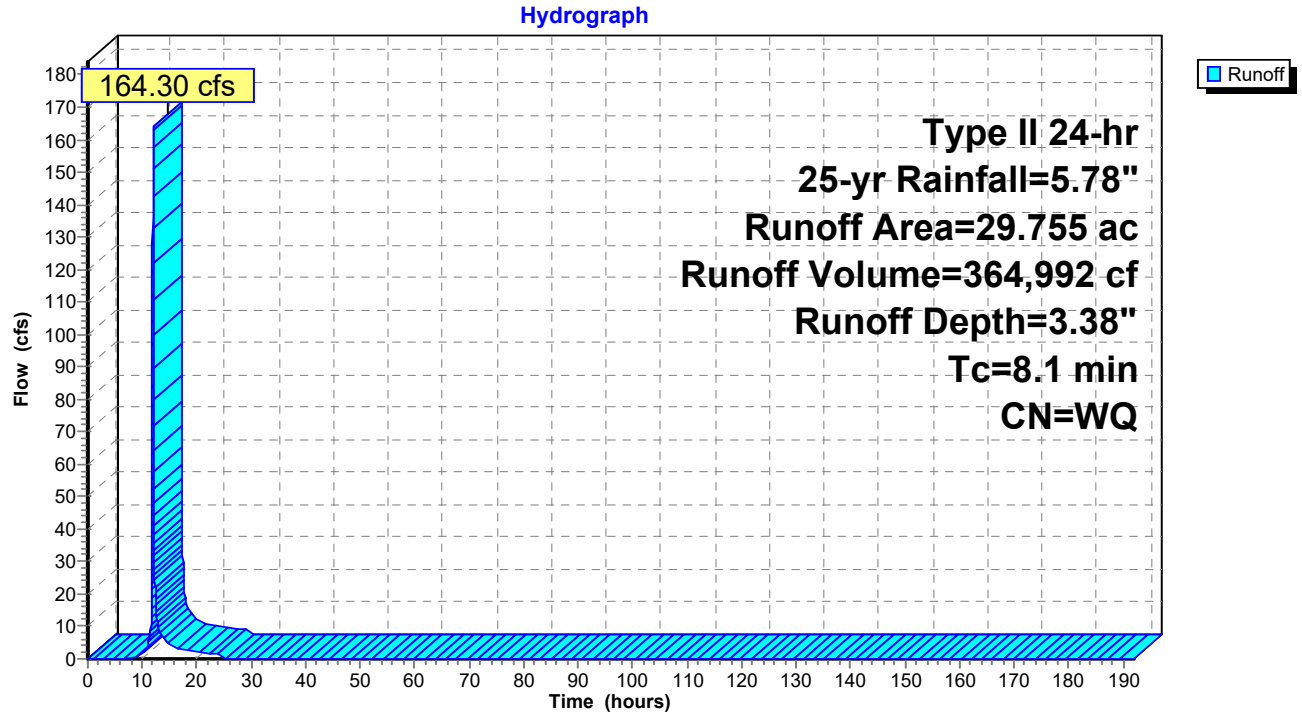
Runoff = 164.30 cfs @ 12.00 hrs, Volume= 364,992 cf, Depth= 3.38"
Routed to Link 1L : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

	Area (ac)	CN	Description
	25.830	78	Meadow, non-grazed, HSG D
	0.620	71	Meadow, non-grazed, HSG C
	2.517	77	Woods, Good, HSG D
	0.204	70	Woods, Good, HSG C
*	0.292	98	Impervious
*	0.292	78	Impervious as Meadow D
	29.755		Weighted Average
	29.463		99.02% Pervious Area
	0.292		0.98% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

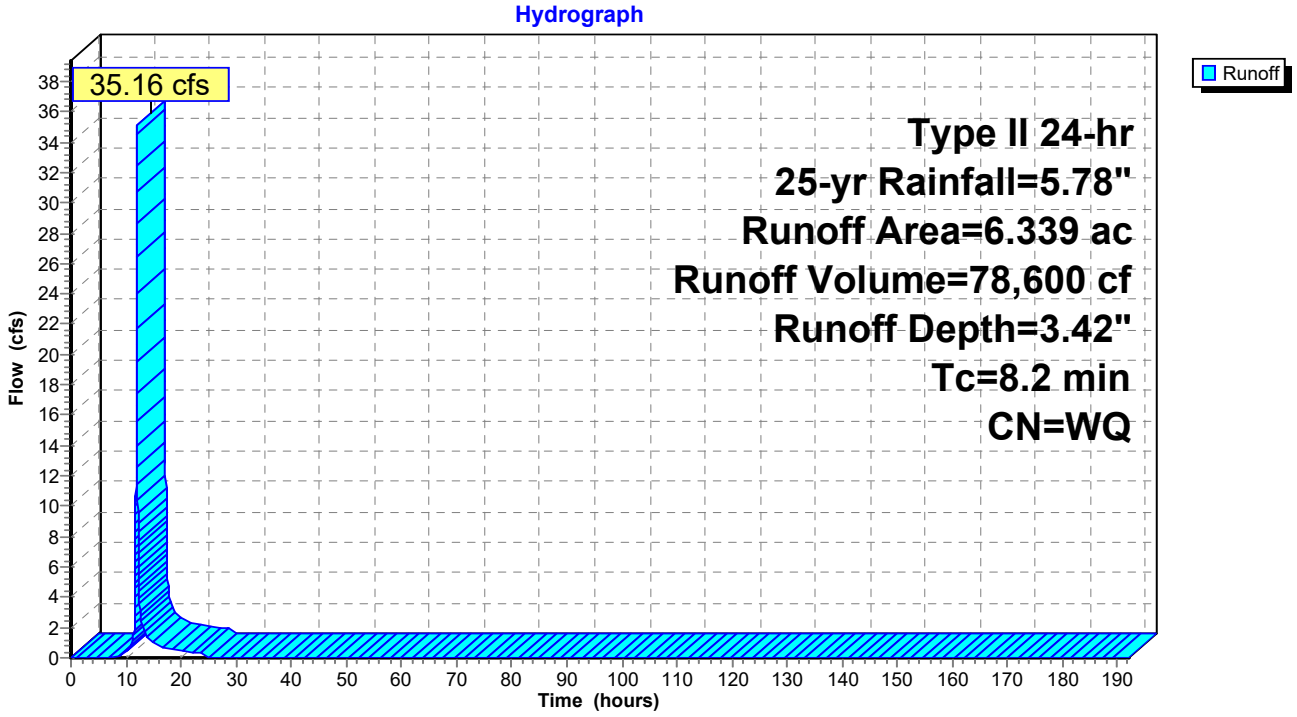
Runoff = 35.16 cfs @ 12.00 hrs, Volume= 78,600 cf, Depth= 3.42"
Routed to Link 2L : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

	Area (ac)	CN	Description
	4.899	78	Meadow, non-grazed, HSG D
	1.156	77	Woods, Good, HSG D
*	0.142	98	Impervious
*	0.142	78	Impervious as Meadow D
	6.339		Weighted Average
	6.197		97.76% Pervious Area
	0.142		2.24% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

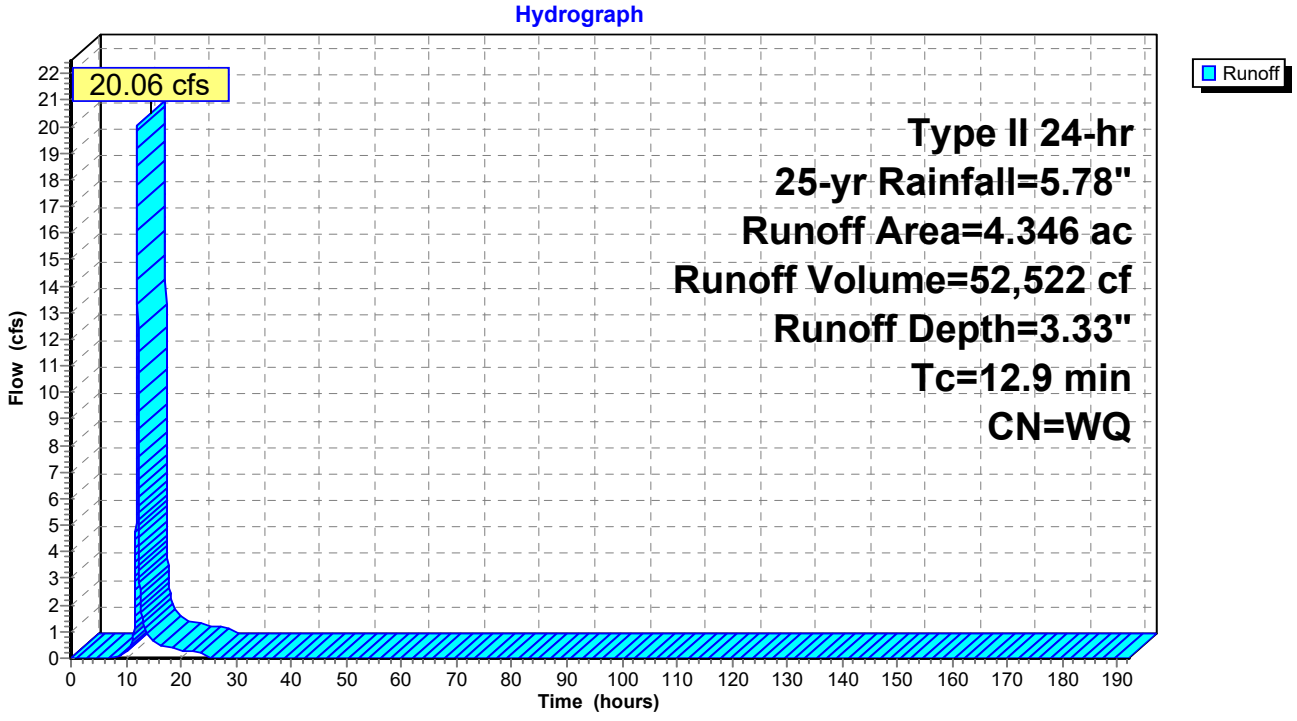
Runoff = 20.06 cfs @ 12.05 hrs, Volume= 52,522 cf, Depth= 3.33"
Routed to Link 3L : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
3.339	78	Meadow, non-grazed, HSG D
0.750	77	Woods, Good, HSG D
0.257	71	Meadow, non-grazed, HSG C
4.346		Weighted Average
4.346		100.00% Pervious Area

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

Subcatchment 3S: DA-3

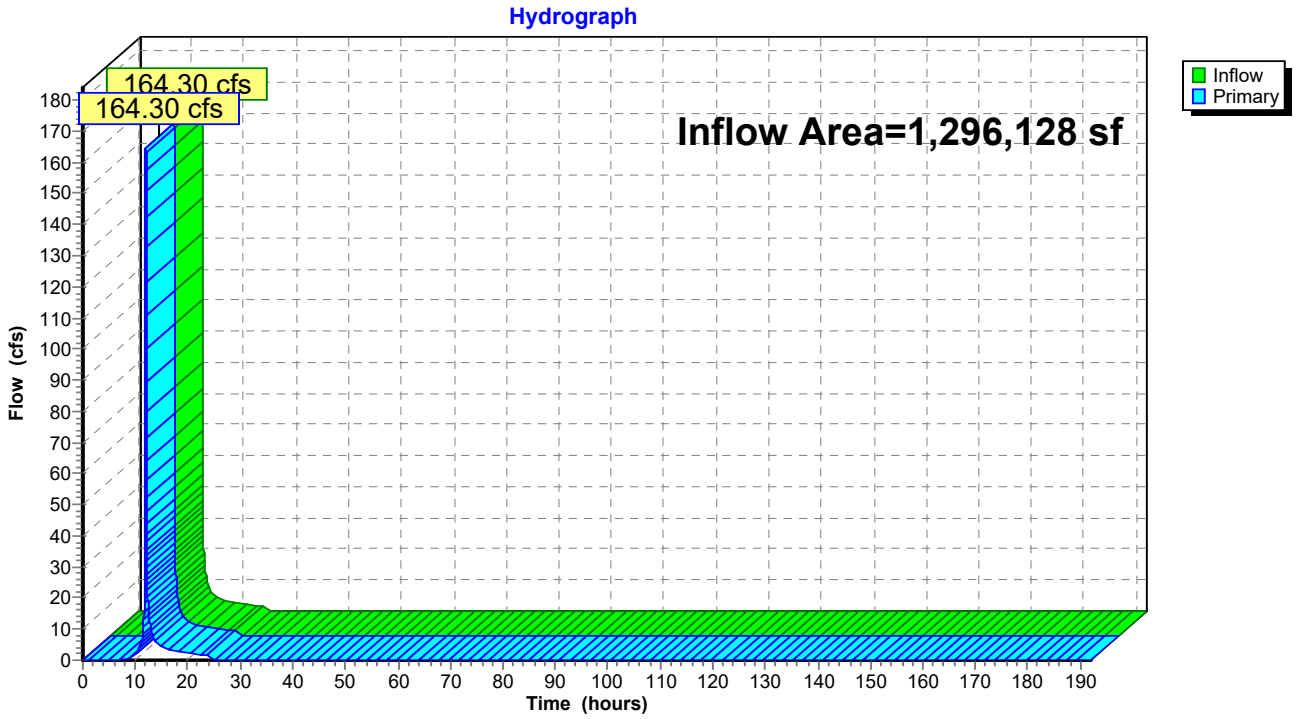


Summary for Link 1L: POA #1

Inflow Area = 1,296,128 sf, 0.98% Impervious, Inflow Depth = 3.38" for 25-yr event
Inflow = 164.30 cfs @ 12.00 hrs, Volume= 364,992 cf
Primary = 164.30 cfs @ 12.00 hrs, Volume= 364,992 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 1L: POA #1

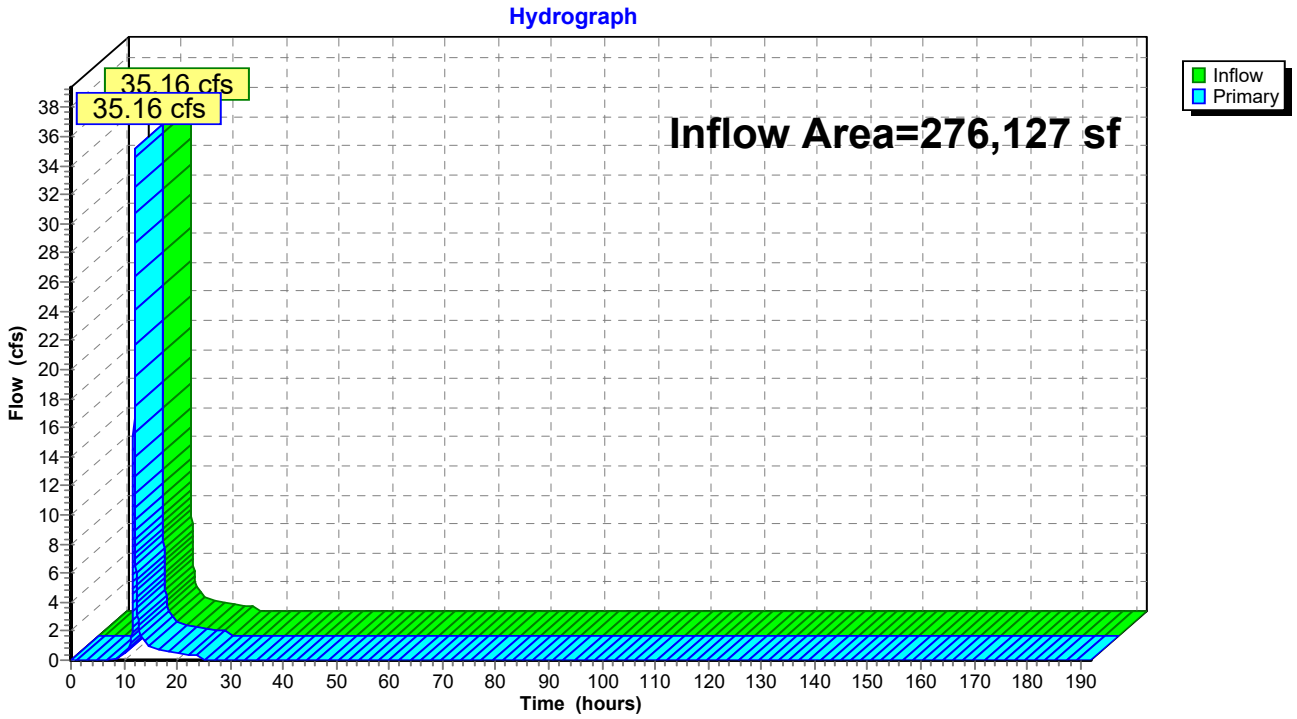


Summary for Link 2L: POA #2

Inflow Area = 276,127 sf, 2.24% Impervious, Inflow Depth = 3.42" for 25-yr event
Inflow = 35.16 cfs @ 12.00 hrs, Volume= 78,600 cf
Primary = 35.16 cfs @ 12.00 hrs, Volume= 78,600 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 2L: POA #2

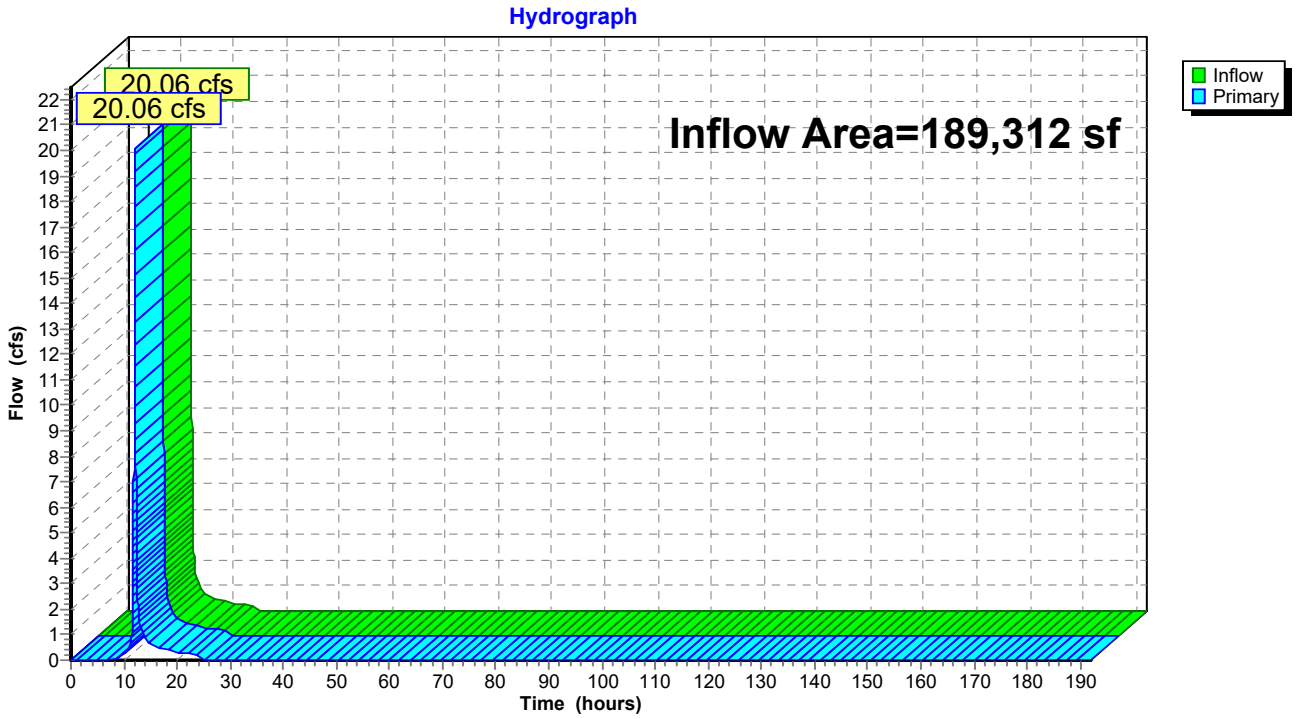


Summary for Link 3L: POA #3

Inflow Area = 189,312 sf, 0.00% Impervious, Inflow Depth = 3.33" for 25-yr event
Inflow = 20.06 cfs @ 12.05 hrs, Volume= 52,522 cf
Primary = 20.06 cfs @ 12.05 hrs, Volume= 52,522 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 3L: POA #3



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=29.755 ac 0.98% Impervious Runoff Depth=4.12"
Tc=8.1 min CN=WQ Runoff=199.14 cfs 445,431 cf

Subcatchment2S: DA-2 Runoff Area=6.339 ac 2.24% Impervious Runoff Depth=4.16"
Tc=8.2 min CN=WQ Runoff=42.56 cfs 95,787 cf

Subcatchment3S: DA-3 Runoff Area=4.346 ac 0.00% Impervious Runoff Depth=4.07"
Tc=12.9 min CN=WQ Runoff=24.42 cfs 64,215 cf

Link 1L: POA #1 Inflow=199.14 cfs 445,431 cf
Primary=199.14 cfs 445,431 cf

Link 2L: POA #2 Inflow=42.56 cfs 95,787 cf
Primary=42.56 cfs 95,787 cf

Link 3L: POA #3 Inflow=24.42 cfs 64,215 cf
Primary=24.42 cfs 64,215 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 605,433 cf Average Runoff Depth = 4.12"
98.93% Pervious = 1,742,661 sf 1.07% Impervious = 18,905 sf

Summary for Subcatchment 1S: DA-1

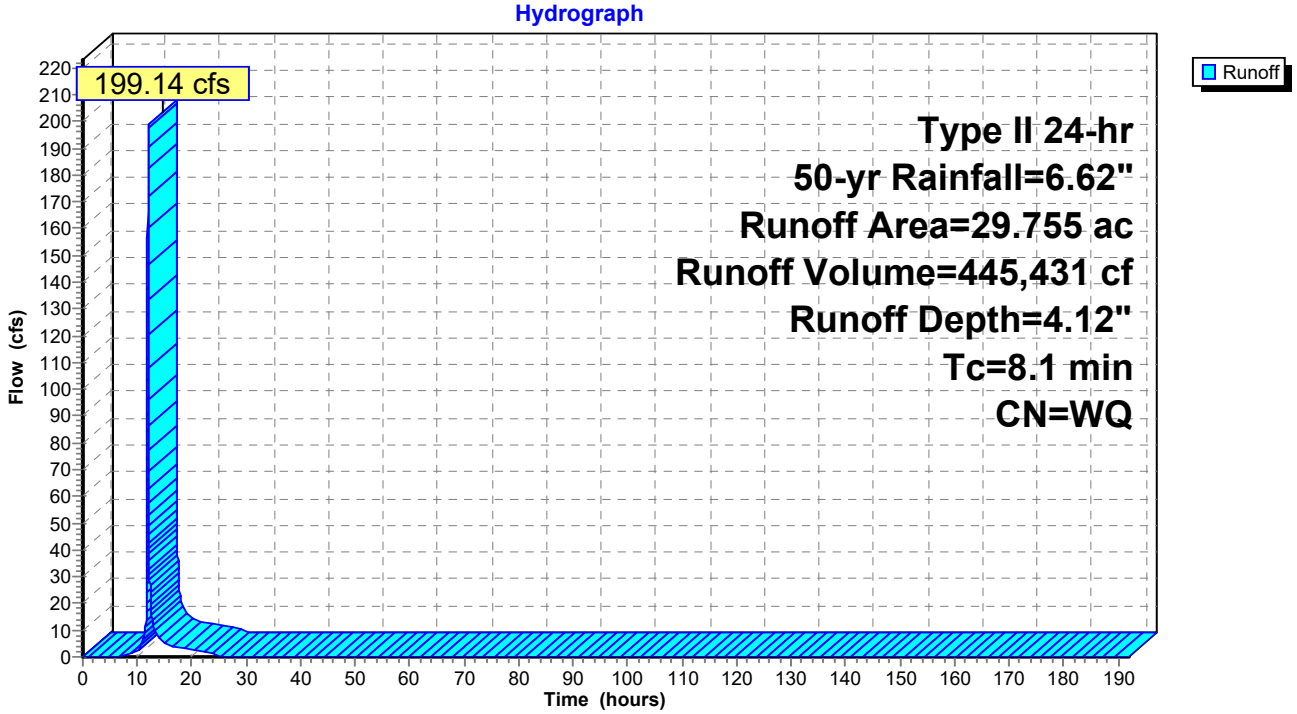
Runoff = 199.14 cfs @ 12.00 hrs, Volume= 445,431 cf, Depth= 4.12"
Routed to Link 1L : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

	Area (ac)	CN	Description
	25.830	78	Meadow, non-grazed, HSG D
	0.620	71	Meadow, non-grazed, HSG C
	2.517	77	Woods, Good, HSG D
	0.204	70	Woods, Good, HSG C
*	0.292	98	Impervious
*	0.292	78	Impervious as Meadow D
	29.755		Weighted Average
	29.463		99.02% Pervious Area
	0.292		0.98% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

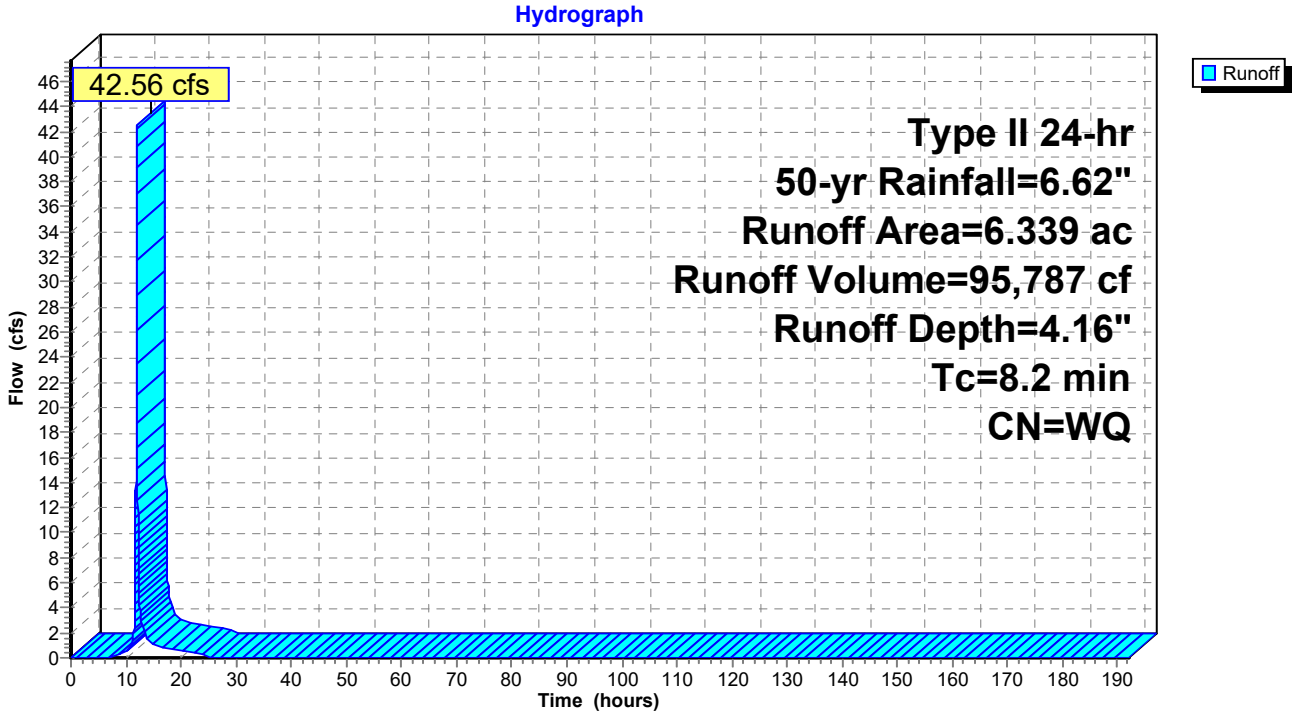
Runoff = 42.56 cfs @ 12.00 hrs, Volume= 95,787 cf, Depth= 4.16"
Routed to Link 2L : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

	Area (ac)	CN	Description
	4.899	78	Meadow, non-grazed, HSG D
	1.156	77	Woods, Good, HSG D
*	0.142	98	Impervious
*	0.142	78	Impervious as Meadow D
	6.339		Weighted Average
	6.197		97.76% Pervious Area
	0.142		2.24% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

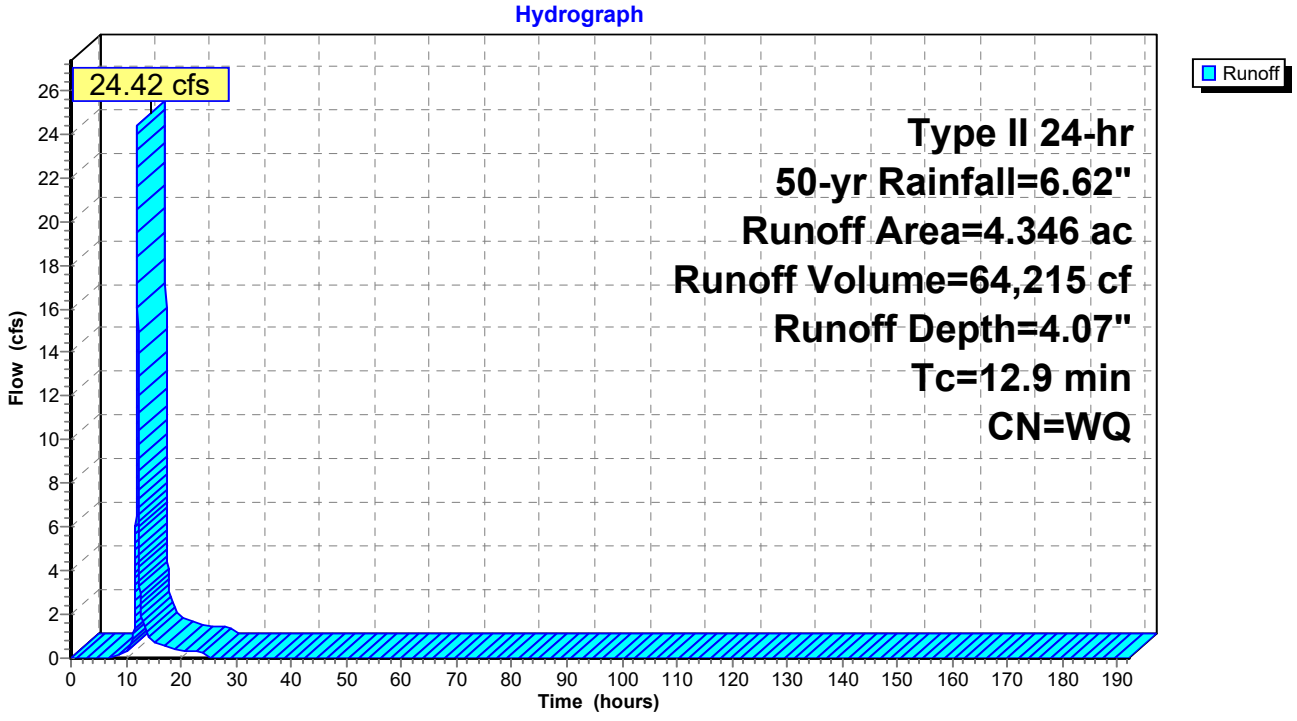
Runoff = 24.42 cfs @ 12.05 hrs, Volume= 64,215 cf, Depth= 4.07"
Routed to Link 3L : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
3.339	78	Meadow, non-grazed, HSG D
0.750	77	Woods, Good, HSG D
0.257	71	Meadow, non-grazed, HSG C
4.346		Weighted Average
4.346		100.00% Pervious Area

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

Subcatchment 3S: DA-3

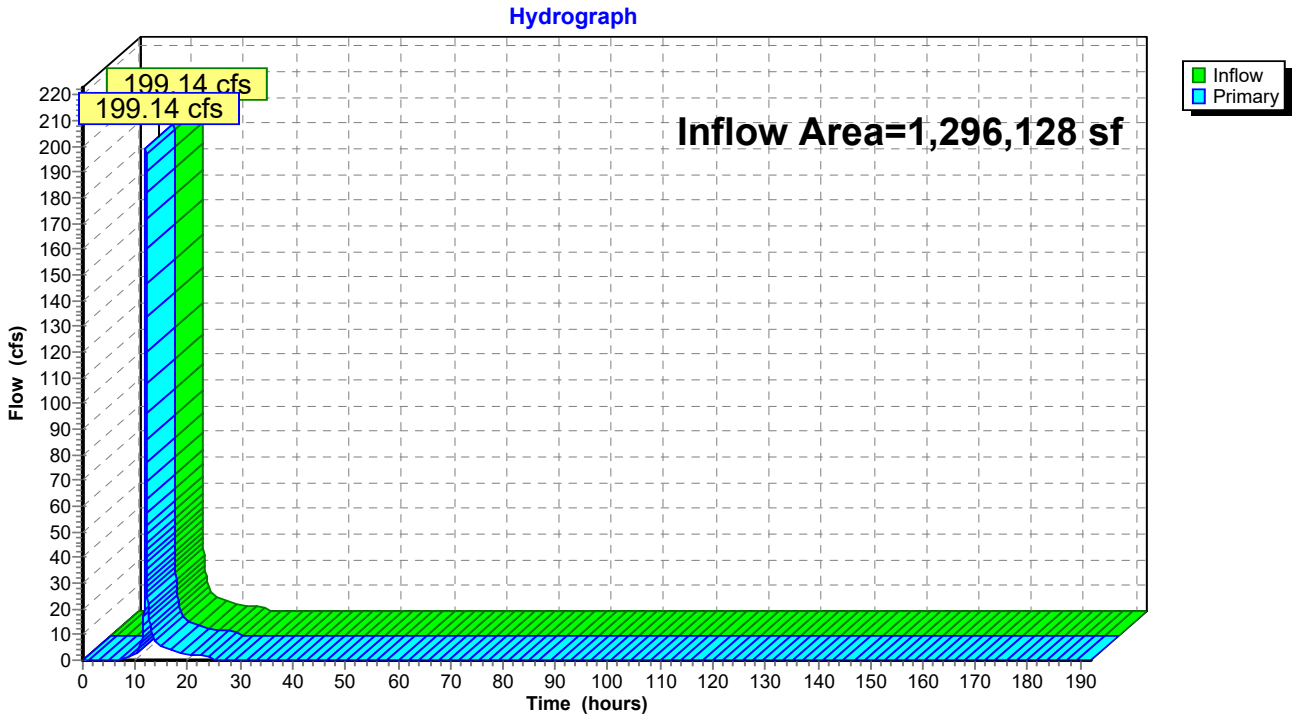


Summary for Link 1L: POA #1

Inflow Area = 1,296,128 sf, 0.98% Impervious, Inflow Depth = 4.12" for 50-yr event
Inflow = 199.14 cfs @ 12.00 hrs, Volume= 445,431 cf
Primary = 199.14 cfs @ 12.00 hrs, Volume= 445,431 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 1L: POA #1

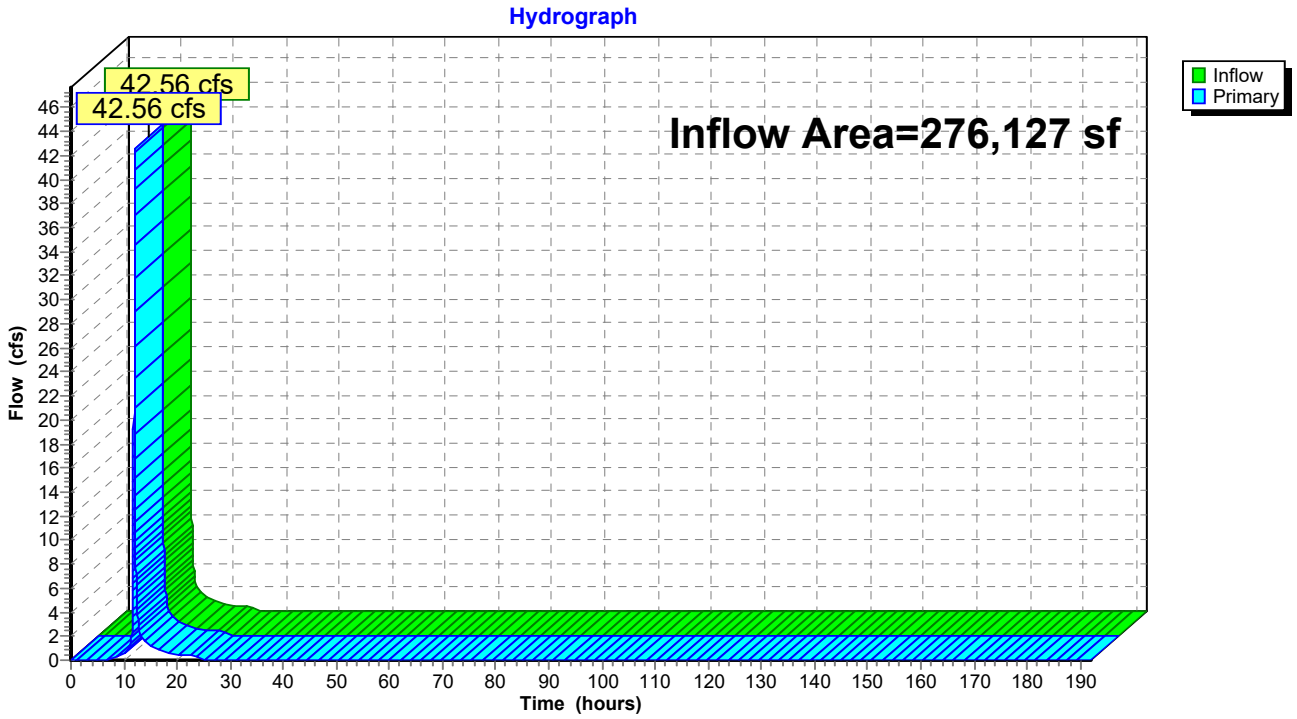


Summary for Link 2L: POA #2

Inflow Area = 276,127 sf, 2.24% Impervious, Inflow Depth = 4.16" for 50-yr event
Inflow = 42.56 cfs @ 12.00 hrs, Volume= 95,787 cf
Primary = 42.56 cfs @ 12.00 hrs, Volume= 95,787 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 2L: POA #2

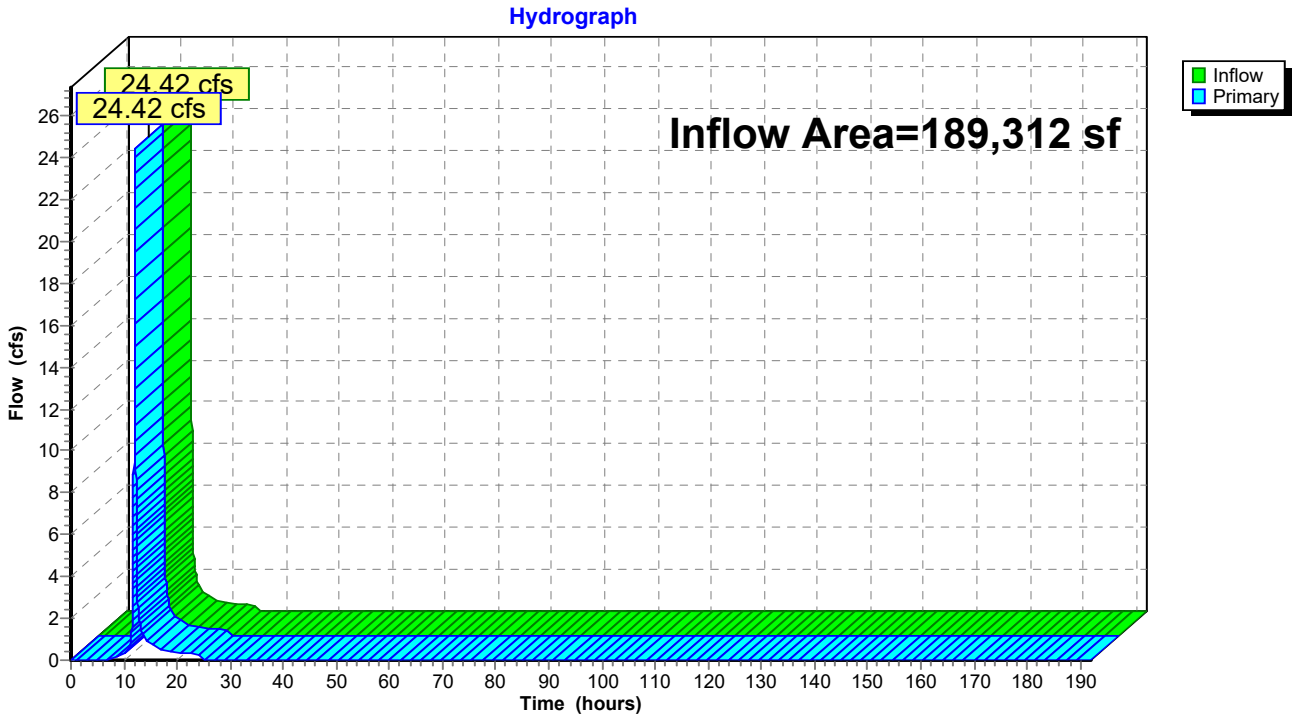


Summary for Link 3L: POA #3

Inflow Area = 189,312 sf, 0.00% Impervious, Inflow Depth = 4.07" for 50-yr event
Inflow = 24.42 cfs @ 12.05 hrs, Volume= 64,215 cf
Primary = 24.42 cfs @ 12.05 hrs, Volume= 64,215 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 3L: POA #3



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=29.755 ac 0.98% Impervious Runoff Depth=4.96"
Tc=8.1 min CN=WQ Runoff=237.52 cfs 535,544 cf

Subcatchment2S: DA-2 Runoff Area=6.339 ac 2.24% Impervious Runoff Depth=5.00"
Tc=8.2 min CN=WQ Runoff=50.73 cfs 115,031 cf

Subcatchment3S: DA-3 Runoff Area=4.346 ac 0.00% Impervious Runoff Depth=4.90"
Tc=12.9 min CN=WQ Runoff=29.24 cfs 77,325 cf

Link 1L: POA #1 Inflow=237.52 cfs 535,544 cf
Primary=237.52 cfs 535,544 cf

Link 2L: POA #2 Inflow=50.73 cfs 115,031 cf
Primary=50.73 cfs 115,031 cf

Link 3L: POA #3 Inflow=29.24 cfs 77,325 cf
Primary=29.24 cfs 77,325 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 727,900 cf Average Runoff Depth = 4.96"
98.93% Pervious = 1,742,661 sf 1.07% Impervious = 18,905 sf

Summary for Subcatchment 1S: DA-1

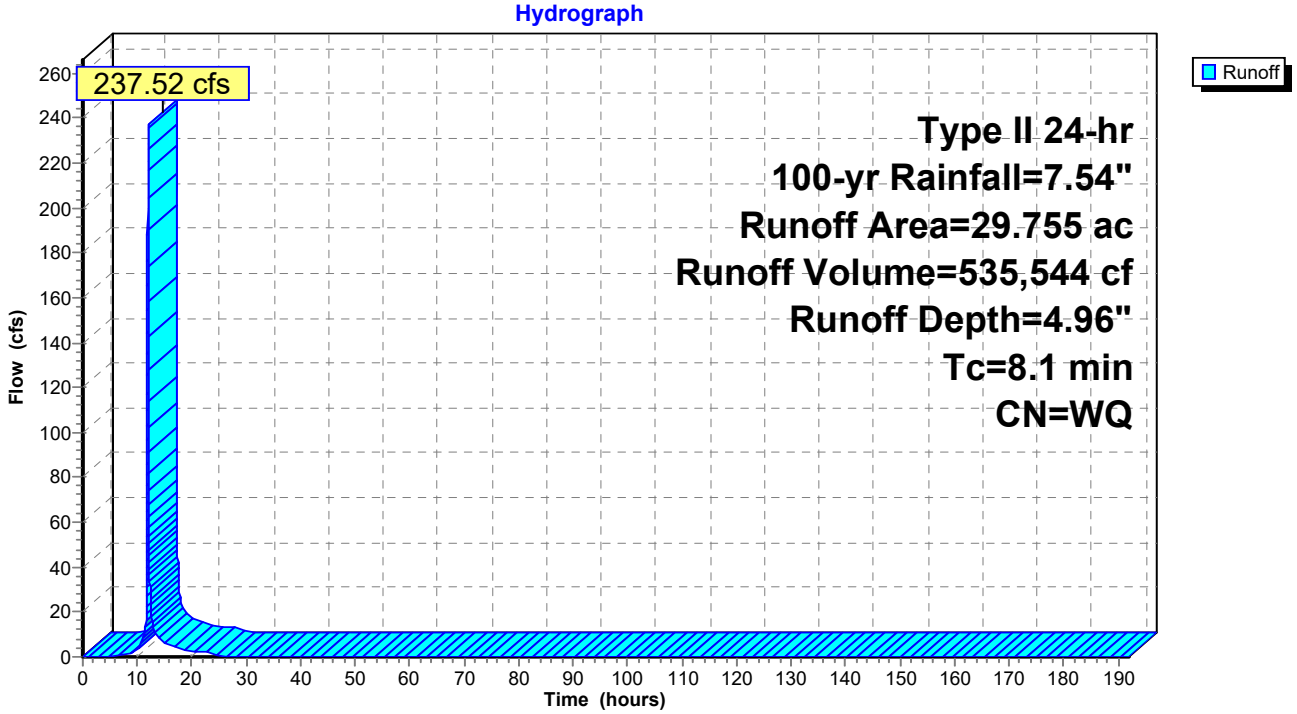
Runoff = 237.52 cfs @ 11.99 hrs, Volume= 535,544 cf, Depth= 4.96"
Routed to Link 1L : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

	Area (ac)	CN	Description
	25.830	78	Meadow, non-grazed, HSG D
	0.620	71	Meadow, non-grazed, HSG C
	2.517	77	Woods, Good, HSG D
	0.204	70	Woods, Good, HSG C
*	0.292	98	Impervious
*	0.292	78	Impervious as Meadow D
	29.755		Weighted Average
	29.463		99.02% Pervious Area
	0.292		0.98% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2S: DA-2

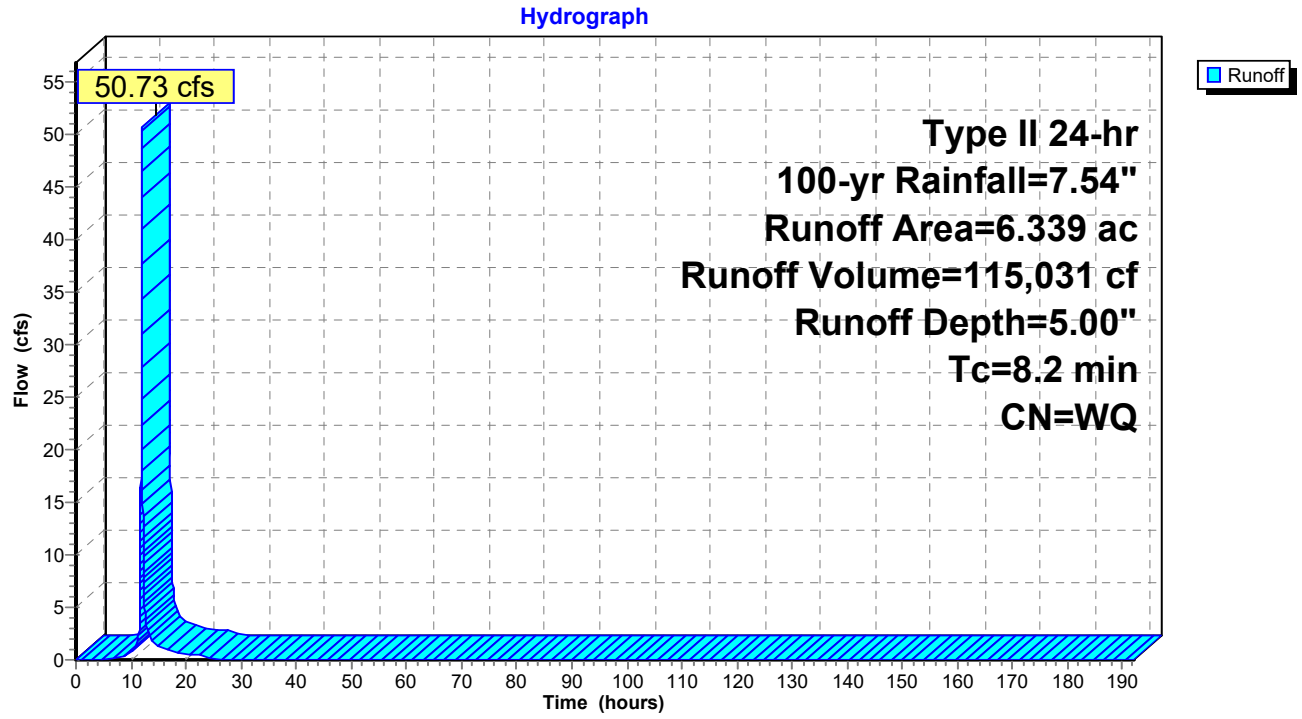
Runoff = 50.73 cfs @ 12.00 hrs, Volume= 115,031 cf, Depth= 5.00"
Routed to Link 2L : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

	Area (ac)	CN	Description
	4.899	78	Meadow, non-grazed, HSG D
	1.156	77	Woods, Good, HSG D
*	0.142	98	Impervious
*	0.142	78	Impervious as Meadow D
	6.339		Weighted Average
	6.197		97.76% Pervious Area
	0.142		2.24% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3S: DA-3

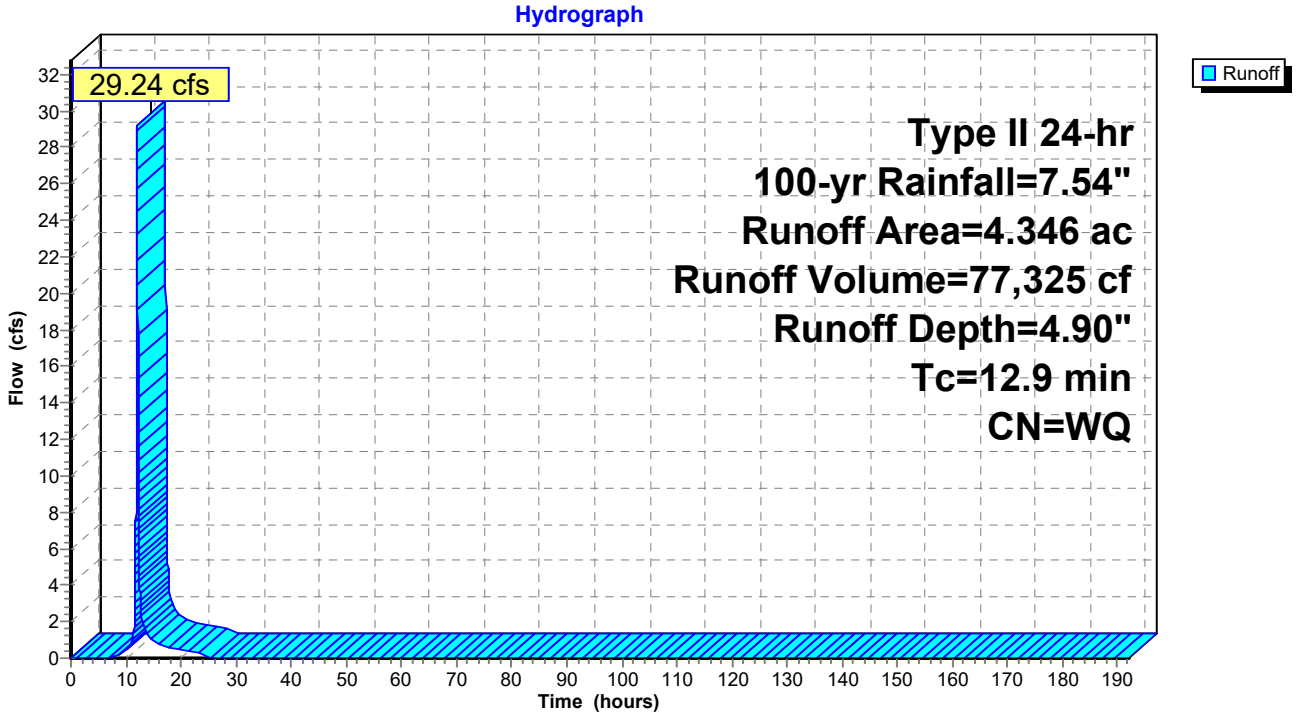
Runoff = 29.24 cfs @ 12.05 hrs, Volume= 77,325 cf, Depth= 4.90"
Routed to Link 3L : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
3.339	78	Meadow, non-grazed, HSG D
0.750	77	Woods, Good, HSG D
0.257	71	Meadow, non-grazed, HSG C
4.346		Weighted Average
4.346		100.00% Pervious Area

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

Subcatchment 3S: DA-3

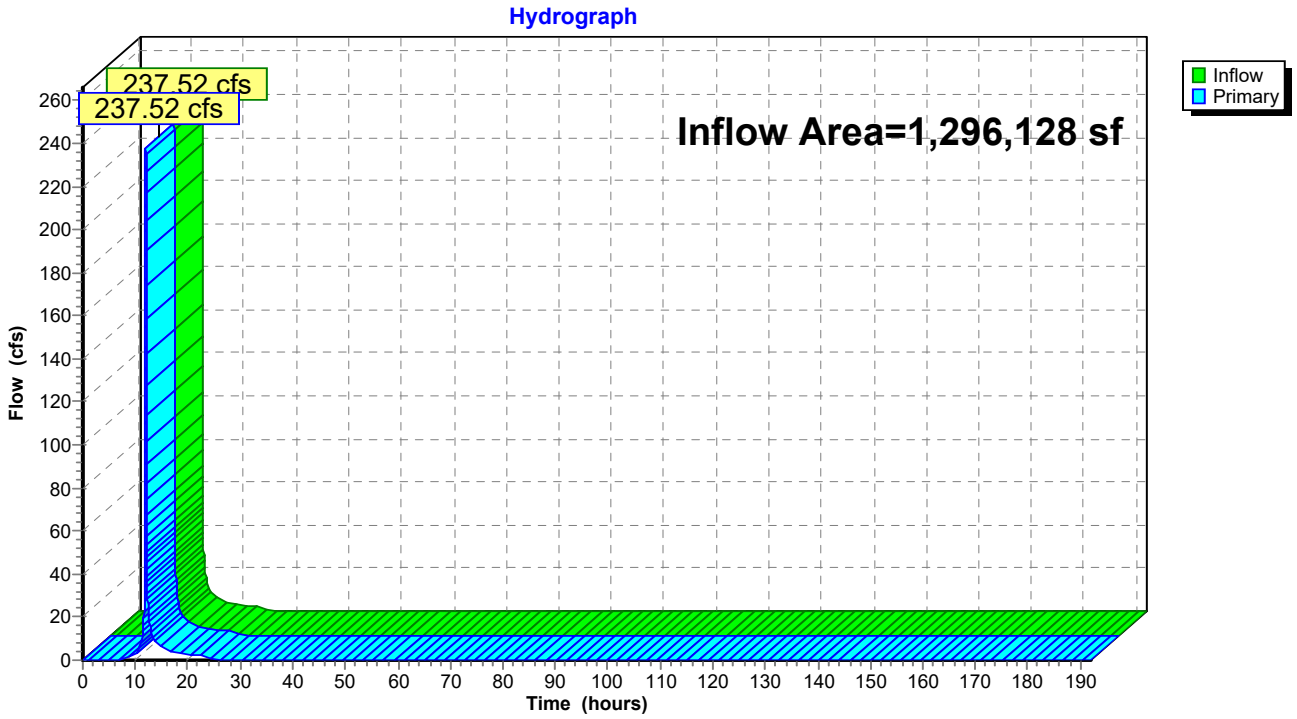


Summary for Link 1L: POA #1

Inflow Area = 1,296,128 sf, 0.98% Impervious, Inflow Depth = 4.96" for 100-yr event
Inflow = 237.52 cfs @ 11.99 hrs, Volume= 535,544 cf
Primary = 237.52 cfs @ 11.99 hrs, Volume= 535,544 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 1L: POA #1

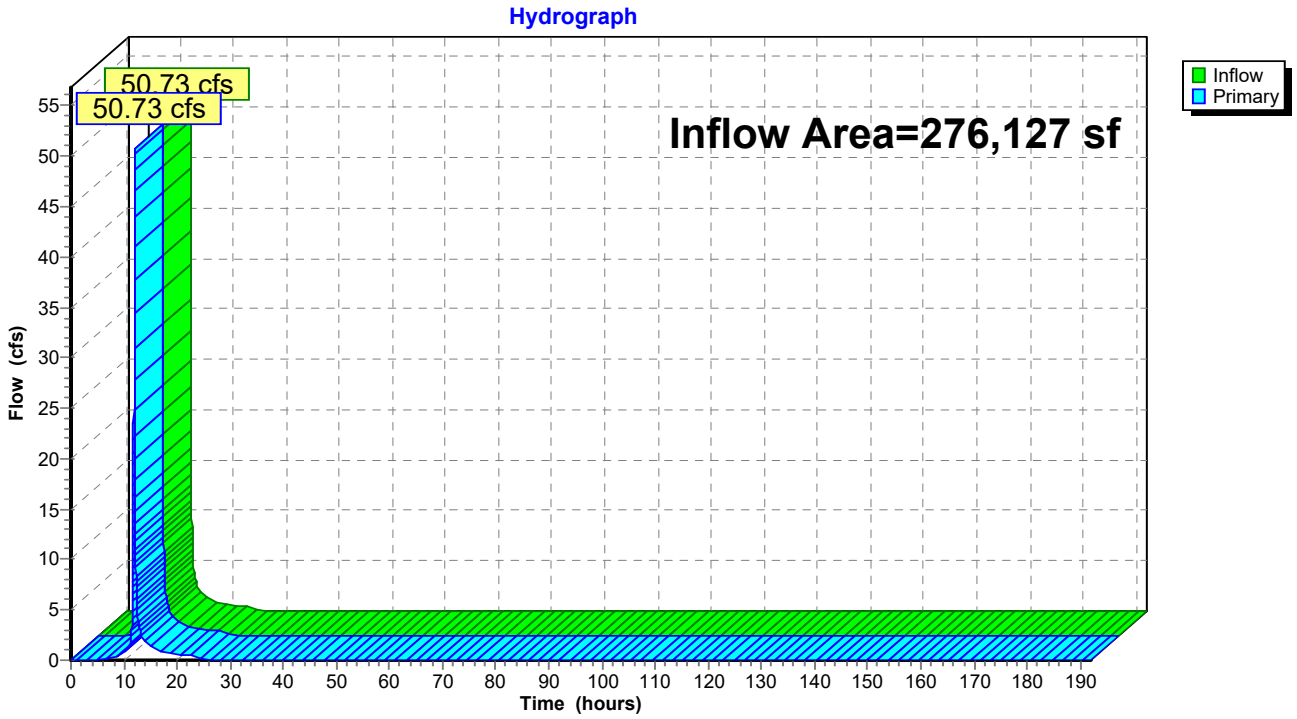


Summary for Link 2L: POA #2

Inflow Area = 276,127 sf, 2.24% Impervious, Inflow Depth = 5.00" for 100-yr event
Inflow = 50.73 cfs @ 12.00 hrs, Volume= 115,031 cf
Primary = 50.73 cfs @ 12.00 hrs, Volume= 115,031 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 2L: POA #2

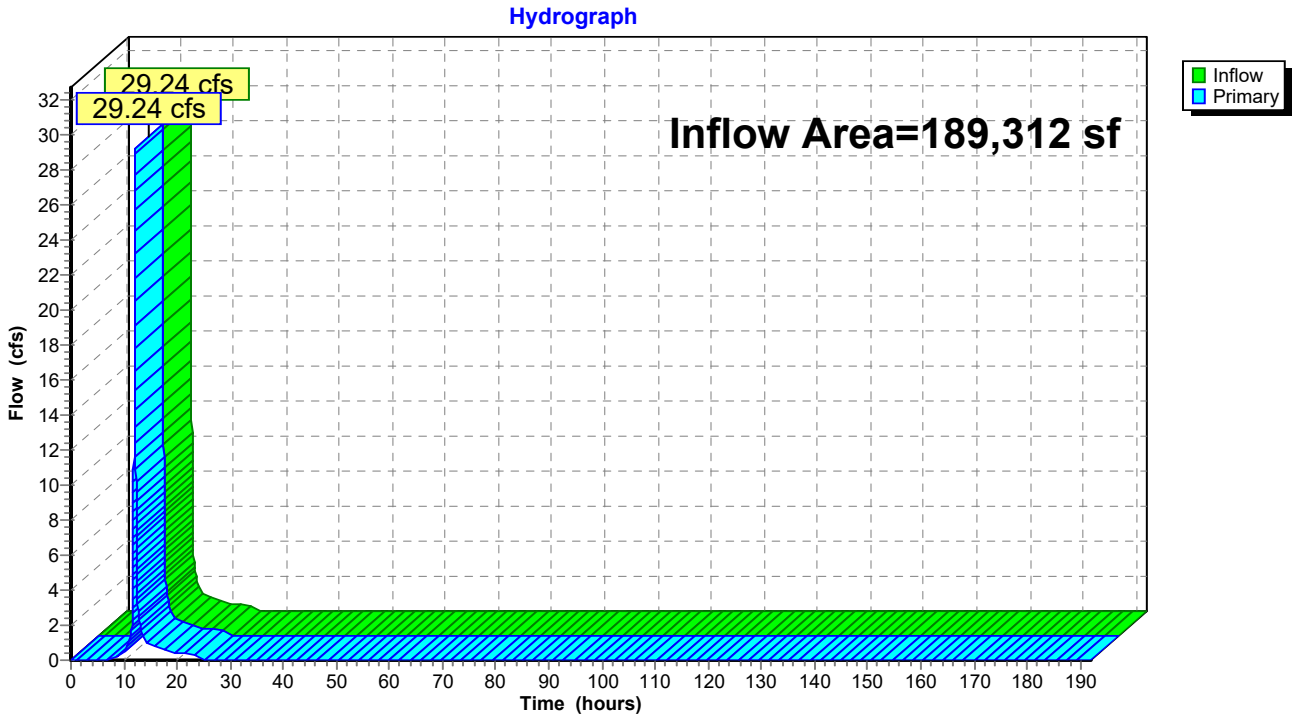


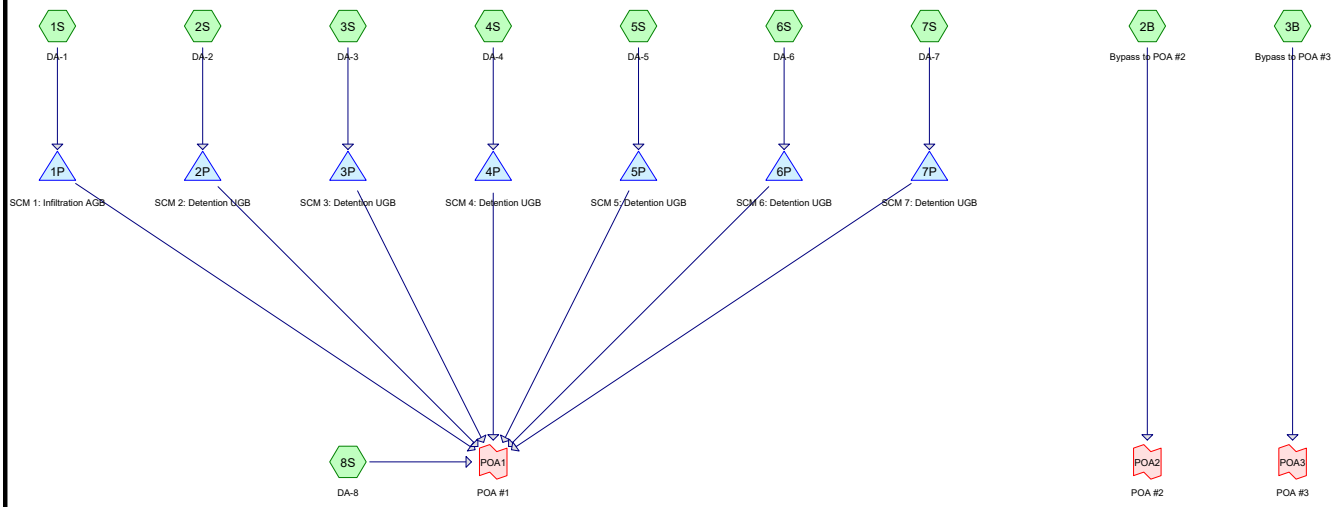
Summary for Link 3L: POA #3

Inflow Area = 189,312 sf, 0.00% Impervious, Inflow Depth = 4.90" for 100-yr event
Inflow = 29.24 cfs @ 12.05 hrs, Volume= 77,325 cf
Primary = 29.24 cfs @ 12.05 hrs, Volume= 77,325 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Link 3L: POA #3





Subcat Reach Pond Link

Routing Diagram for PAC250095.00_Hanover Warehouses POST
Prepared by Bohler Engineering, PC, Printed 7/27/2026
HydroCAD® 10.20-8a s/n 03478 © 2025 HydroCAD Software Solutions LLC

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=6.739 ac 72.10% Impervious Runoff Depth=2.06"
Tc=5.0 min CN=WQ Runoff=22.50 cfs 50,341 cf

Subcatchment2B: Bypass to POA #2 Runoff Area=1.492 ac 2.01% Impervious Runoff Depth=1.06"
Tc=5.0 min CN=WQ Runoff=2.92 cfs 5,734 cf

Subcatchment2S: DA-2 Runoff Area=8.114 ac 98.31% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=WQ Runoff=31.55 cfs 72,025 cf

Subcatchment3B: Bypass to POA #3 Runoff Area=1.243 ac 0.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=WQ Runoff=2.34 cfs 4,567 cf

Subcatchment3S: DA-3 Runoff Area=4.417 ac 86.71% Impervious Runoff Depth=2.28"
Tc=5.0 min CN=WQ Runoff=16.14 cfs 36,530 cf

Subcatchment4S: DA-4 Runoff Area=3.585 ac 91.35% Impervious Runoff Depth=2.35"
Tc=5.0 min CN=WQ Runoff=13.44 cfs 30,519 cf

Subcatchment5S: DA-5 Runoff Area=2.881 ac 86.78% Impervious Runoff Depth=2.28"
Tc=5.0 min CN=WQ Runoff=10.53 cfs 23,836 cf

Subcatchment6S: DA-6 Runoff Area=3.336 ac 77.34% Impervious Runoff Depth=2.10"
Tc=5.0 min CN=WQ Runoff=11.29 cfs 25,475 cf

Subcatchment7S: DA-7 Runoff Area=4.253 ac 92.97% Impervious Runoff Depth=2.37"
Tc=5.0 min CN=WQ Runoff=16.08 cfs 36,565 cf

Subcatchment8S: DA-8 Runoff Area=4.380 ac 2.31% Impervious Runoff Depth=1.04"
Tc=5.0 min CN=WQ Runoff=8.37 cfs 16,486 cf

Pond 1P: SCM 1: Infiltration AGB Peak Elev=275.34' Storage=35,213 cf Inflow=22.50 cfs 50,341 cf
Discarded=0.23 cfs 50,343 cf Primary=0.00 cfs 0 cf Outflow=0.23 cfs 50,343 cf

Pond 2P: SCM 2: Detention UGB Peak Elev=270.36' Storage=32,565 cf Inflow=31.55 cfs 72,025 cf
Outflow=5.30 cfs 71,887 cf

Pond 3P: SCM 3: Detention UGB Peak Elev=273.29' Storage=14,681 cf Inflow=16.14 cfs 36,530 cf
Outflow=4.31 cfs 36,491 cf

Pond 4P: SCM 4: Detention UGB Peak Elev=274.02' Storage=11,096 cf Inflow=13.44 cfs 30,519 cf
Outflow=4.11 cfs 30,477 cf

Pond 5P: SCM 5: Detention UGB Peak Elev=277.81' Storage=7,574 cf Inflow=10.53 cfs 23,836 cf
Outflow=4.48 cfs 23,827 cf

Pond 6P: SCM 6: Detention UGB Peak Elev=281.17' Storage=9,188 cf Inflow=11.29 cfs 25,475 cf
Outflow=3.81 cfs 25,459 cf

Pond 7P: SCM 7: Detention UGB Peak Elev=274.31' Storage=14,372 cf Inflow=16.08 cfs 36,565 cf
Outflow=4.45 cfs 36,533 cf

Link POA1: POA #1 Inflow=31.81 cfs 241,160 cf
Primary=31.81 cfs 241,160 cf

Link POA2: POA #2 Inflow=2.92 cfs 5,734 cf
Primary=2.92 cfs 5,734 cf

Link POA3: POA #3 Inflow=2.34 cfs 4,567 cf
Primary=2.34 cfs 4,567 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 302,076 cf Average Runoff Depth = 2.06"
28.03% Pervious = 493,709 sf 71.97% Impervious = 1,267,857 sf

Summary for Subcatchment 1S: DA-1

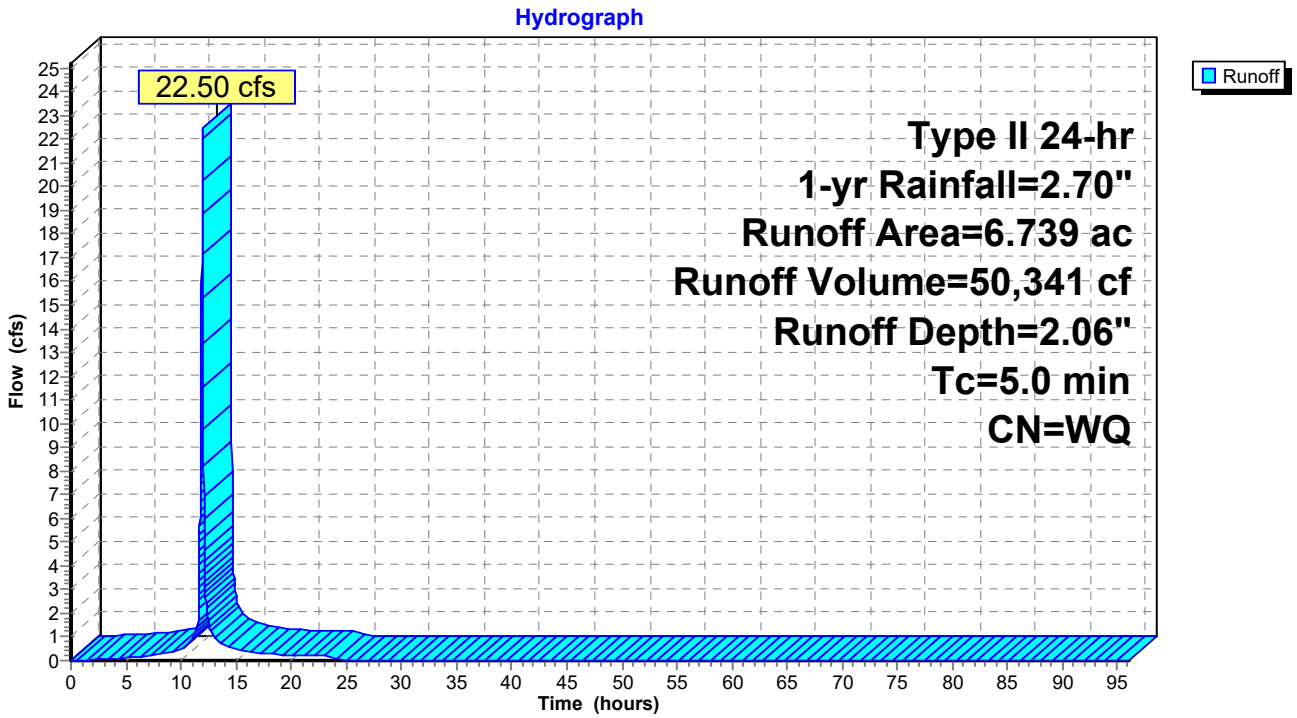
Runoff = 22.50 cfs @ 11.96 hrs, Volume= 50,341 cf, Depth= 2.06"
Routed to Pond 1P : SCM 1: Infiltration AGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
0.222	74	>75% Grass cover, Good, HSG C
1.658	80	>75% Grass cover, Good, HSG D
4.859	98	Paved parking, HSG D
6.739		Weighted Average
1.880		27.90% Pervious Area
4.859		72.10% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2B: Bypass to POA #2

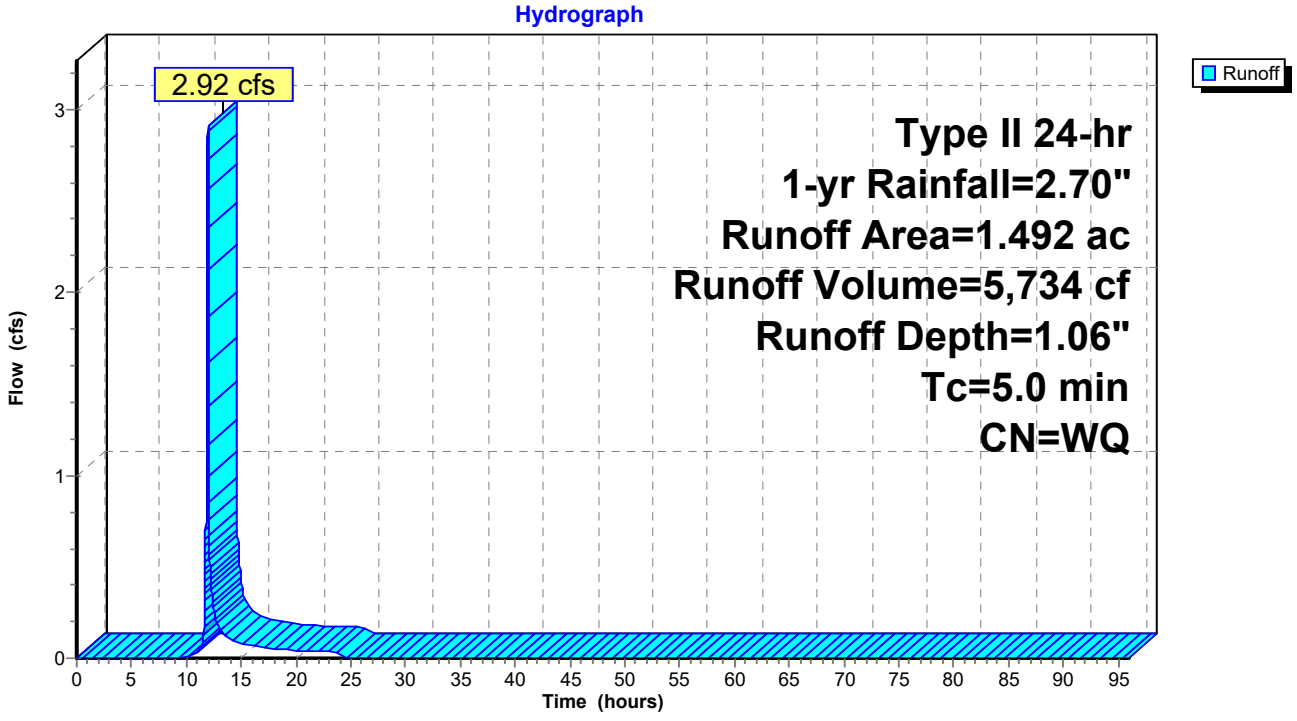
Runoff = 2.92 cfs @ 11.97 hrs, Volume= 5,734 cf, Depth= 1.06"
Routed to Link POA2 : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
1.462	80	>75% Grass cover, Good, HSG D
0.030	98	Paved parking, HSG D
1.492		Weighted Average
1.462		97.99% Pervious Area
0.030		2.01% Impervious Area

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

Subcatchment 2B: Bypass to POA #2



Summary for Subcatchment 2S: DA-2

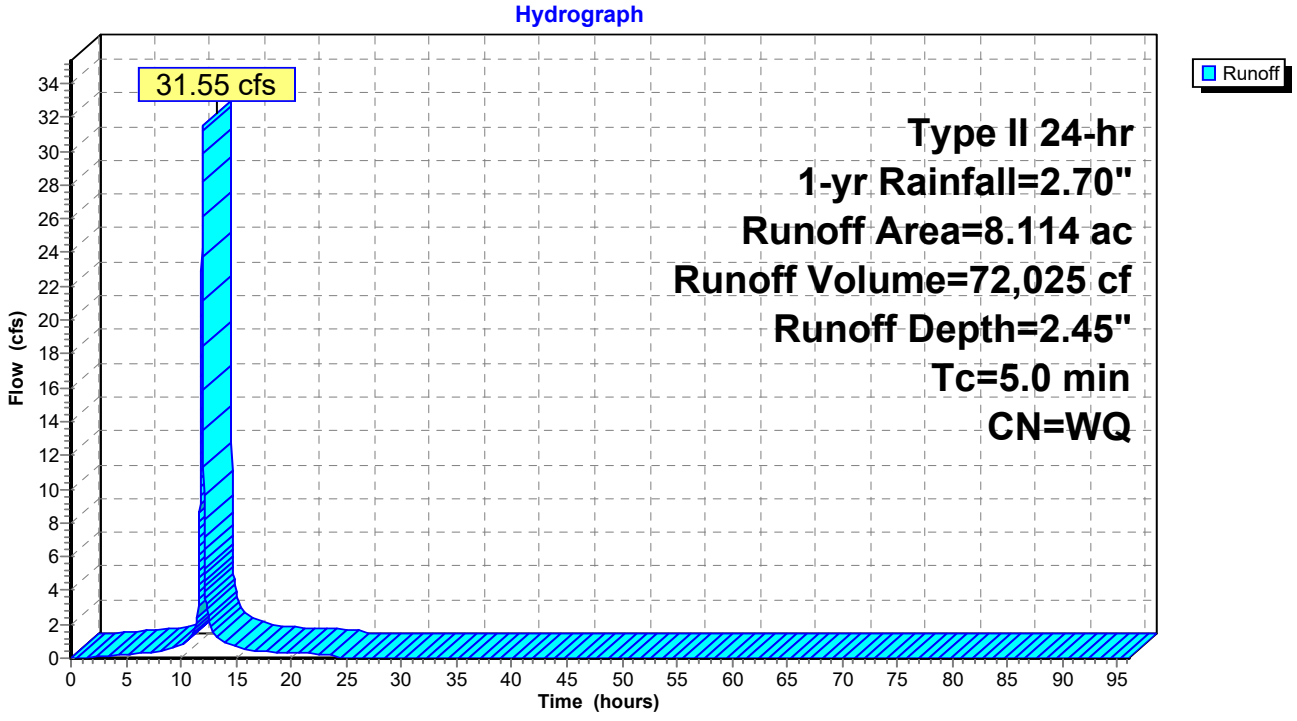
Runoff = 31.55 cfs @ 11.96 hrs, Volume= 72,025 cf, Depth= 2.45"
Routed to Pond 2P : SCM 2: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
0.137	80	>75% Grass cover, Good, HSG D
7.977	98	Paved parking, HSG D
8.114		Weighted Average
0.137		1.69% Pervious Area
7.977		98.31% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3B: Bypass to POA #3

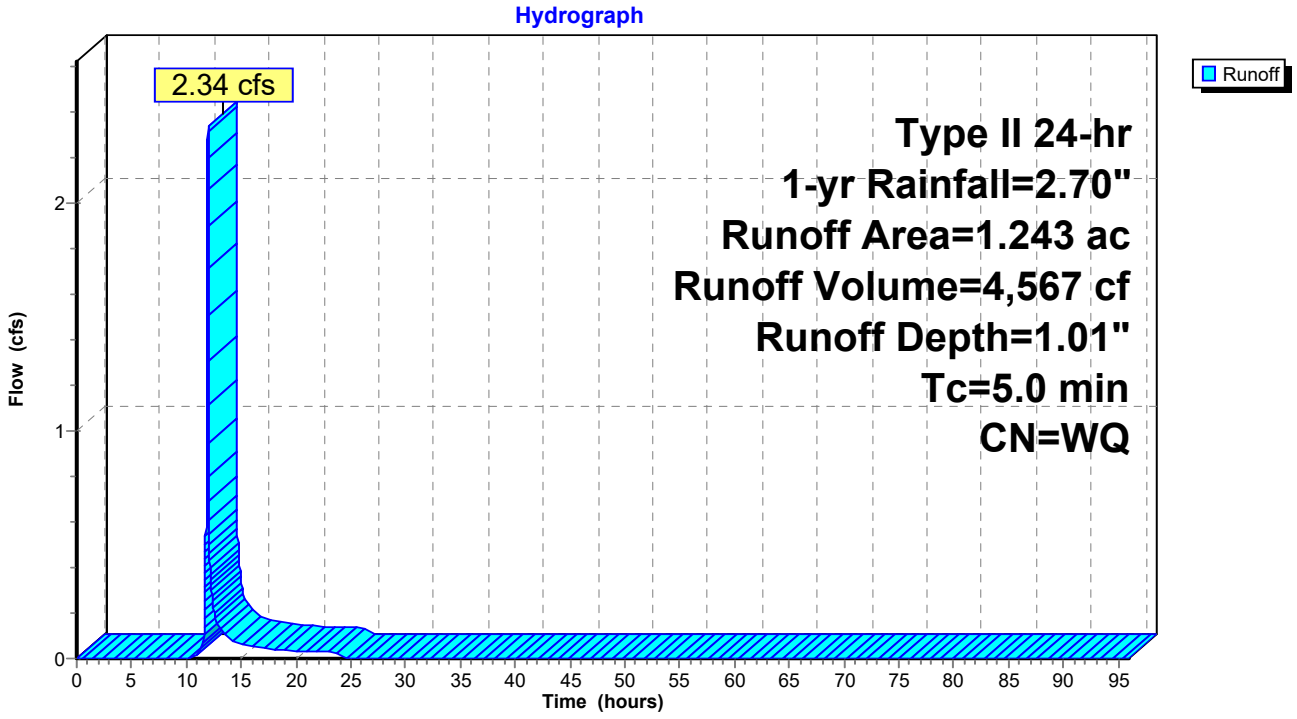
Runoff = 2.34 cfs @ 11.97 hrs, Volume= 4,567 cf, Depth= 1.01"
Routed to Link POA3 : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
0.072	74	>75% Grass cover, Good, HSG C
1.171	80	>75% Grass cover, Good, HSG D
1.243		Weighted Average
1.243		100.00% Pervious Area

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

Subcatchment 3B: Bypass to POA #3



Summary for Subcatchment 3S: DA-3

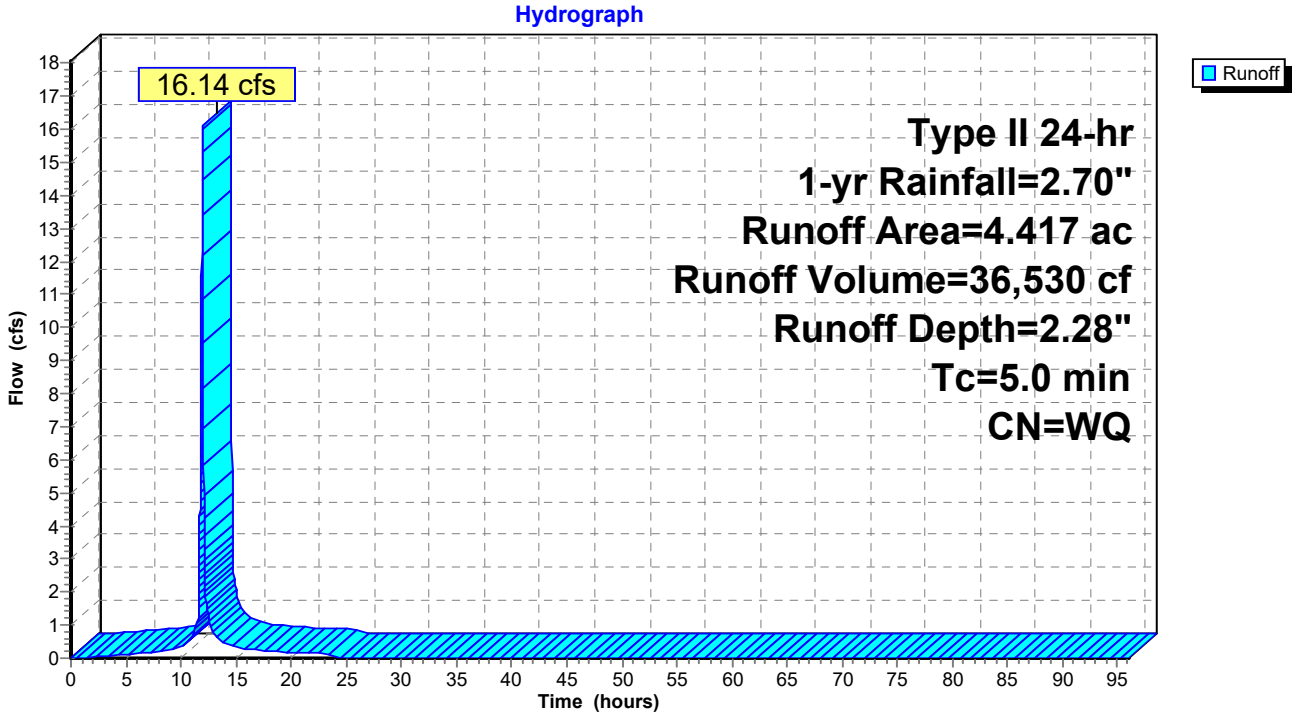
Runoff = 16.14 cfs @ 11.96 hrs, Volume= 36,530 cf, Depth= 2.28"
Routed to Pond 3P : SCM 3: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
0.587	80	>75% Grass cover, Good, HSG D
3.830	98	Paved parking, HSG D
4.417		Weighted Average
0.587		13.29% Pervious Area
3.830		86.71% Impervious Area

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

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

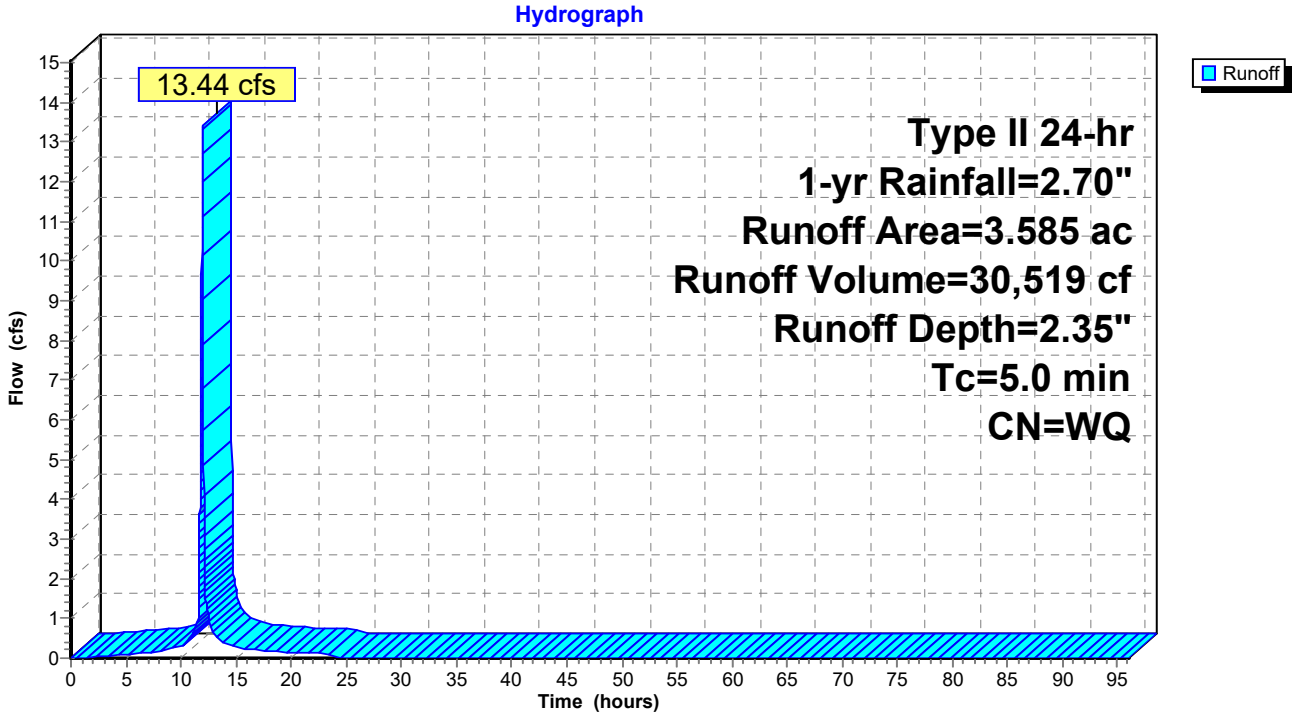
Runoff = 13.44 cfs @ 11.96 hrs, Volume= 30,519 cf, Depth= 2.35"
Routed to Pond 4P : SCM 4: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
0.310	80	>75% Grass cover, Good, HSG D
3.275	98	Paved parking, HSG D
3.585		Weighted Average
0.310		8.65% Pervious Area
3.275		91.35% Impervious Area

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

Subcatchment 4S: DA-4



Summary for Subcatchment 5S: DA-5

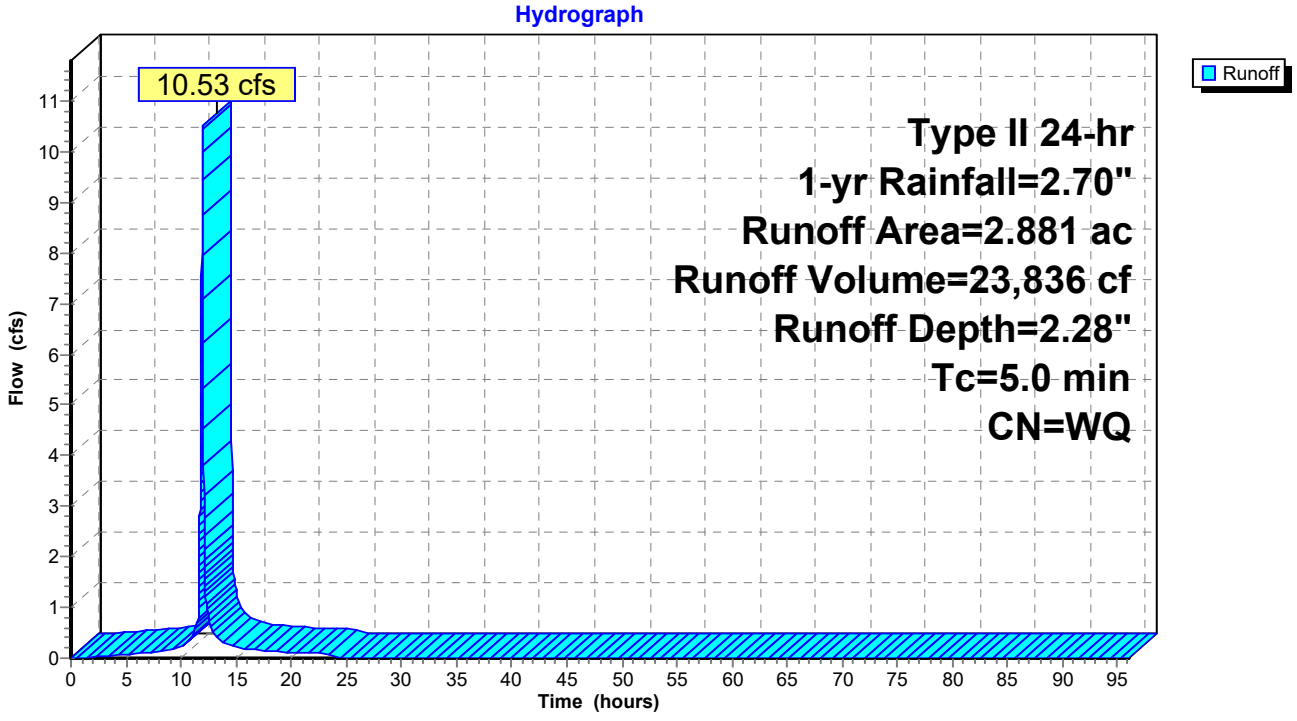
Runoff = 10.53 cfs @ 11.96 hrs, Volume= 23,836 cf, Depth= 2.28"
Routed to Pond 5P : SCM 5: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
0.381	80	>75% Grass cover, Good, HSG D
2.500	98	Paved parking, HSG D
2.881		Weighted Average
0.381		13.22% Pervious Area
2.500		86.78% Impervious Area

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

Subcatchment 5S: DA-5



Summary for Subcatchment 6S: DA-6

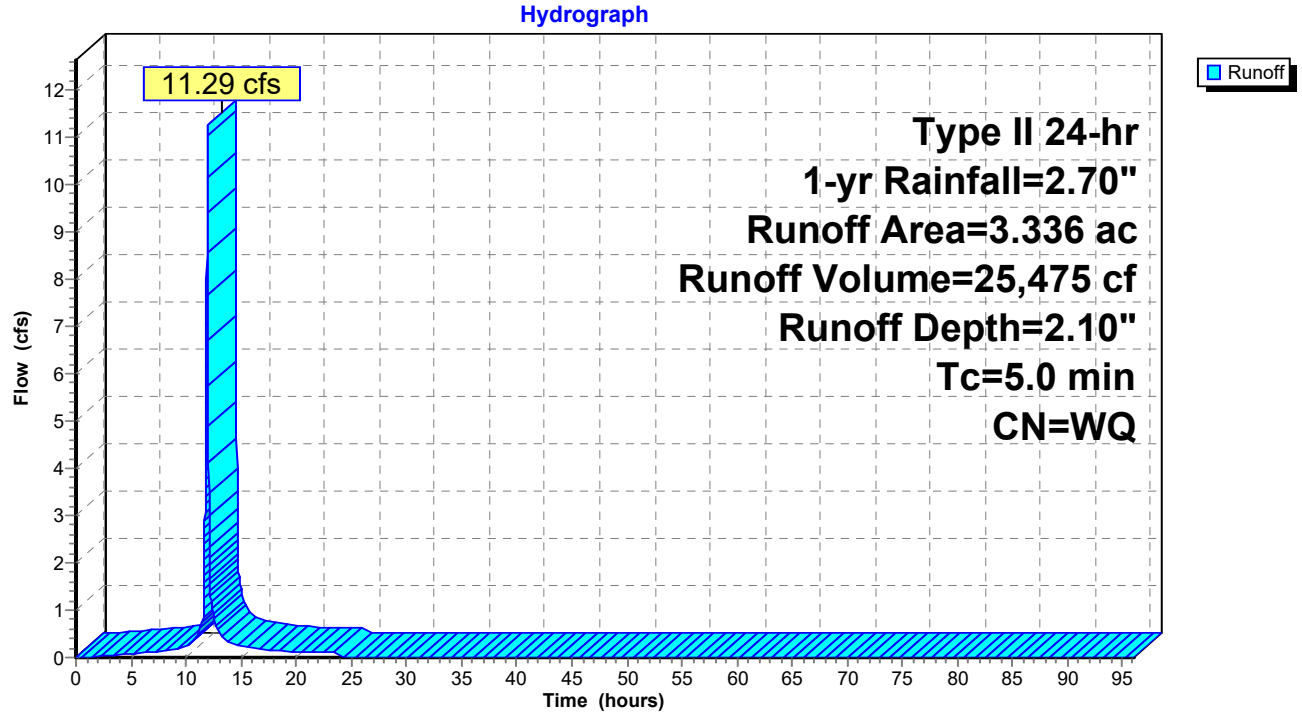
Runoff = 11.29 cfs @ 11.96 hrs, Volume= 25,475 cf, Depth= 2.10"
Routed to Pond 6P : SCM 6: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
0.255	74	>75% Grass cover, Good, HSG C
0.084	70	Woods, Good, HSG C
0.328	80	>75% Grass cover, Good, HSG D
2.580	98	Paved parking, HSG D
0.089	77	Woods, Good, HSG D
3.336		Weighted Average
0.756		22.66% Pervious Area
2.580		77.34% Impervious Area

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

Subcatchment 6S: DA-6



Summary for Subcatchment 7S: DA-7

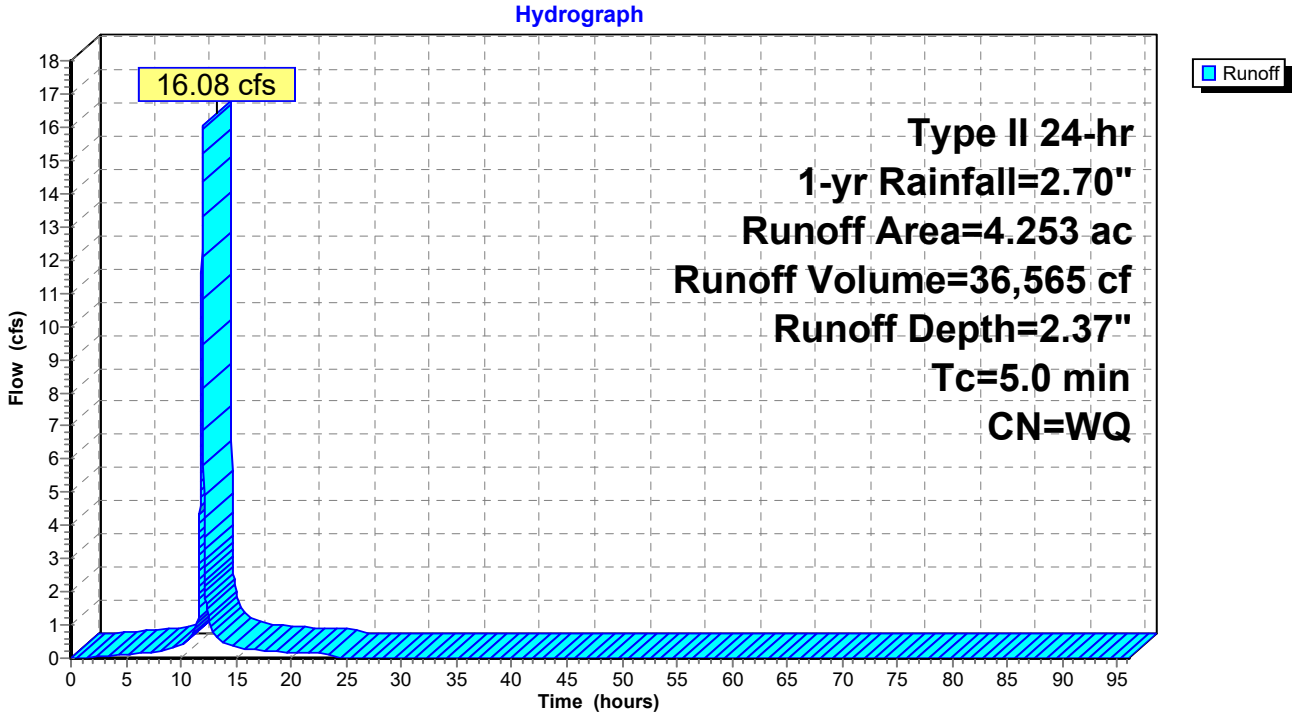
Runoff = 16.08 cfs @ 11.96 hrs, Volume= 36,565 cf, Depth= 2.37"
Routed to Pond 7P : SCM 7: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
0.299	80	>75% Grass cover, Good, HSG D
3.954	98	Paved parking, HSG D
4.253		Weighted Average
0.299		7.03% Pervious Area
3.954		92.97% Impervious Area

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

Subcatchment 7S: DA-7



Summary for Subcatchment 8S: DA-8

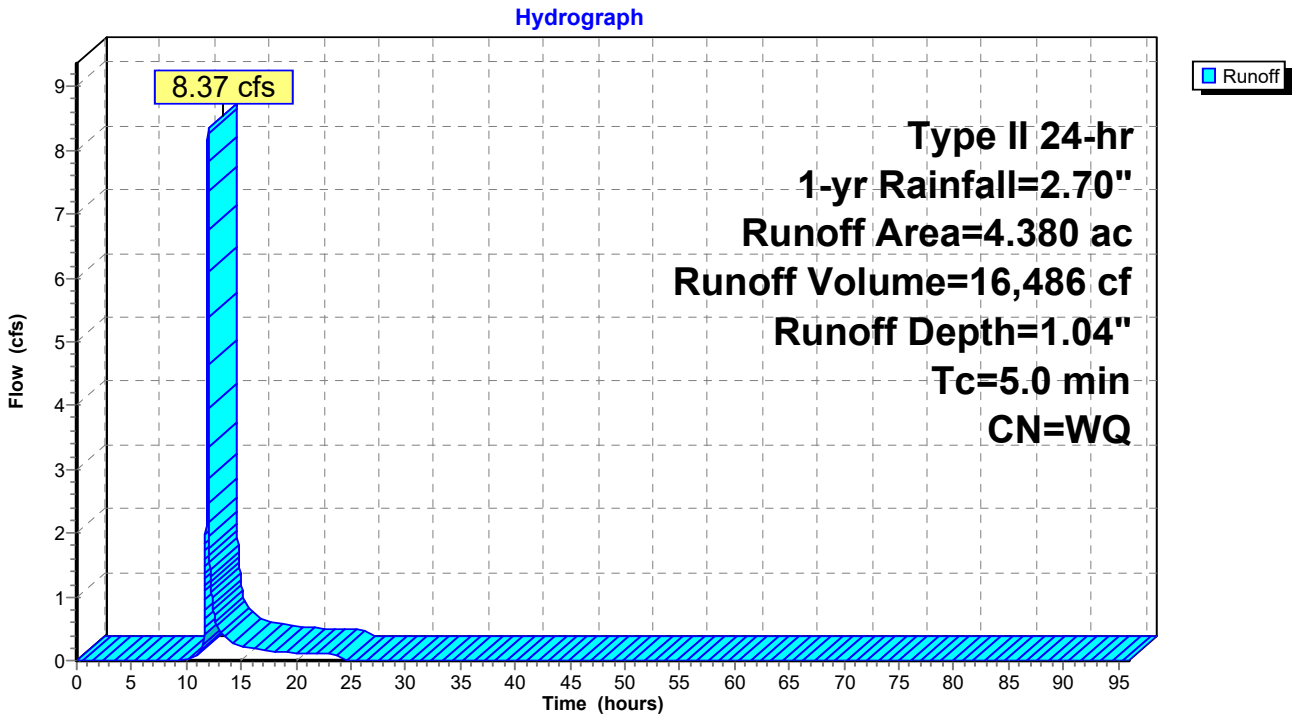
Runoff = 8.37 cfs @ 11.97 hrs, Volume= 16,486 cf, Depth= 1.04"
Routed to Link POA1 : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

Area (ac)	CN	Description
3.905	80	>75% Grass cover, Good, HSG D
0.374	74	>75% Grass cover, Good, HSG C
0.101	98	Paved parking, HSG D
4.380		Weighted Average
4.279		97.69% Pervious Area
0.101		2.31% Impervious Area

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

Subcatchment 8S: DA-8



Summary for Pond 1P: SCM 1: Infiltration AGB

Inflow Area = 293,551 sf, 72.10% Impervious, Inflow Depth = 2.06" for 1-yr event
Inflow = 22.50 cfs @ 11.96 hrs, Volume= 50,341 cf
Outflow = 0.23 cfs @ 19.87 hrs, Volume= 50,343 cf, Atten= 99%, Lag= 474.8 min
Discarded = 0.23 cfs @ 19.87 hrs, Volume= 50,343 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 275.34' @ 19.87 hrs Surf.Area= 27,559 sf Storage= 35,213 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1,419.4 min (2,187.4 - 768.1)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	186,083 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

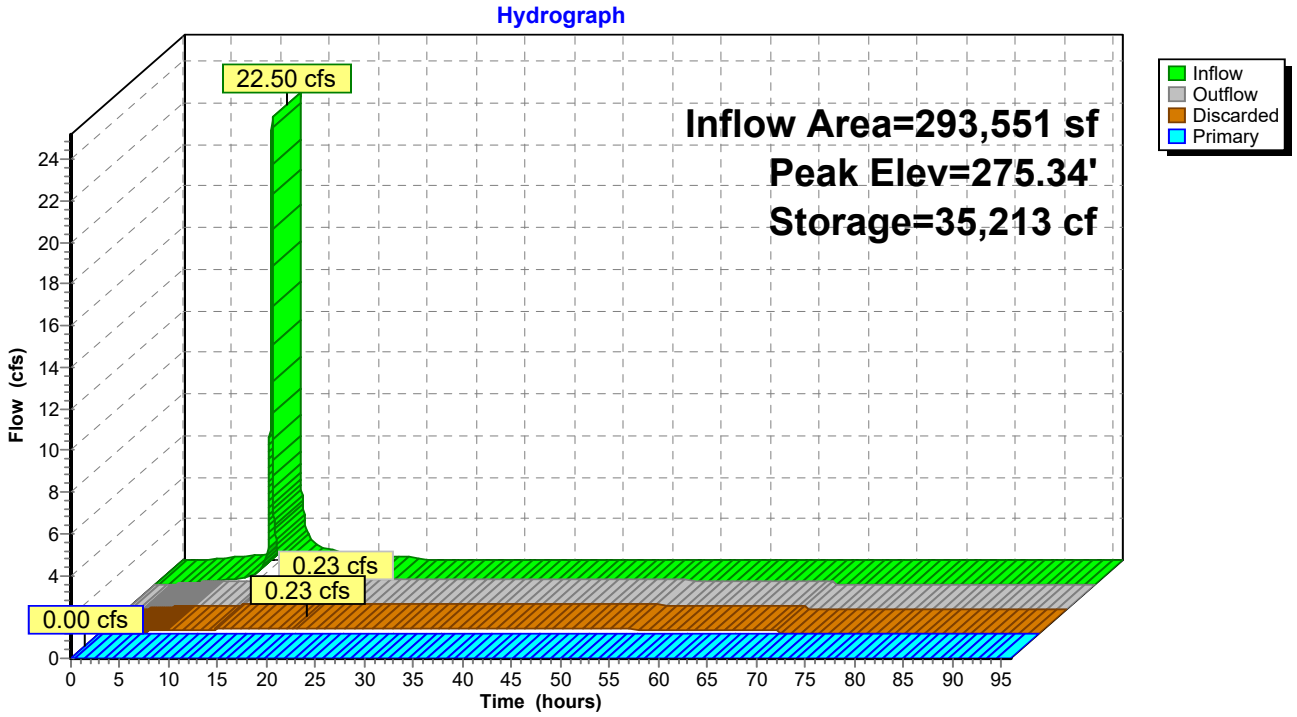
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	24,939	0	0
275.00	26,877	25,908	25,908
276.00	28,873	27,875	53,783
277.00	30,924	29,899	83,682
278.00	33,033	31,979	115,660
279.00	35,197	34,115	149,775
280.00	37,419	36,308	186,083

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**0.353 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**30.0" Round Culvert** L= 52.0' Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.00' S= 0.0385 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#3	Device 2	275.75'	**12.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	276.25'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	277.00'	**24.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	277.50'	**24.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.23 cfs @ 19.87 hrs HW=275.34' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Controls 0.00 cfs)
│ ├**3=Orifice/Grate** (Controls 0.00 cfs)
│ ├**4=Orifice/Grate** (Controls 0.00 cfs)
│ └**5=Orifice/Grate** (Controls 0.00 cfs)
└**6=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: SCM 1: Infiltration AGB



Summary for Pond 2P: SCM 2: Detention UGB

Inflow Area = 353,446 sf, 98.31% Impervious, Inflow Depth = 2.45" for 1-yr event
Inflow = 31.55 cfs @ 11.96 hrs, Volume= 72,025 cf
Outflow = 5.30 cfs @ 12.12 hrs, Volume= 71,887 cf, Atten= 83%, Lag= 9.9 min
Primary = 5.30 cfs @ 12.12 hrs, Volume= 71,887 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 270.36' @ 12.12 hrs Surf.Area= 30,988 sf Storage= 32,565 cf

Plug-Flow detention time= 146.0 min calculated for 71,887 cf (100% of inflow)
Center-of-Mass det. time= 144.7 min (900.7 - 756.0)

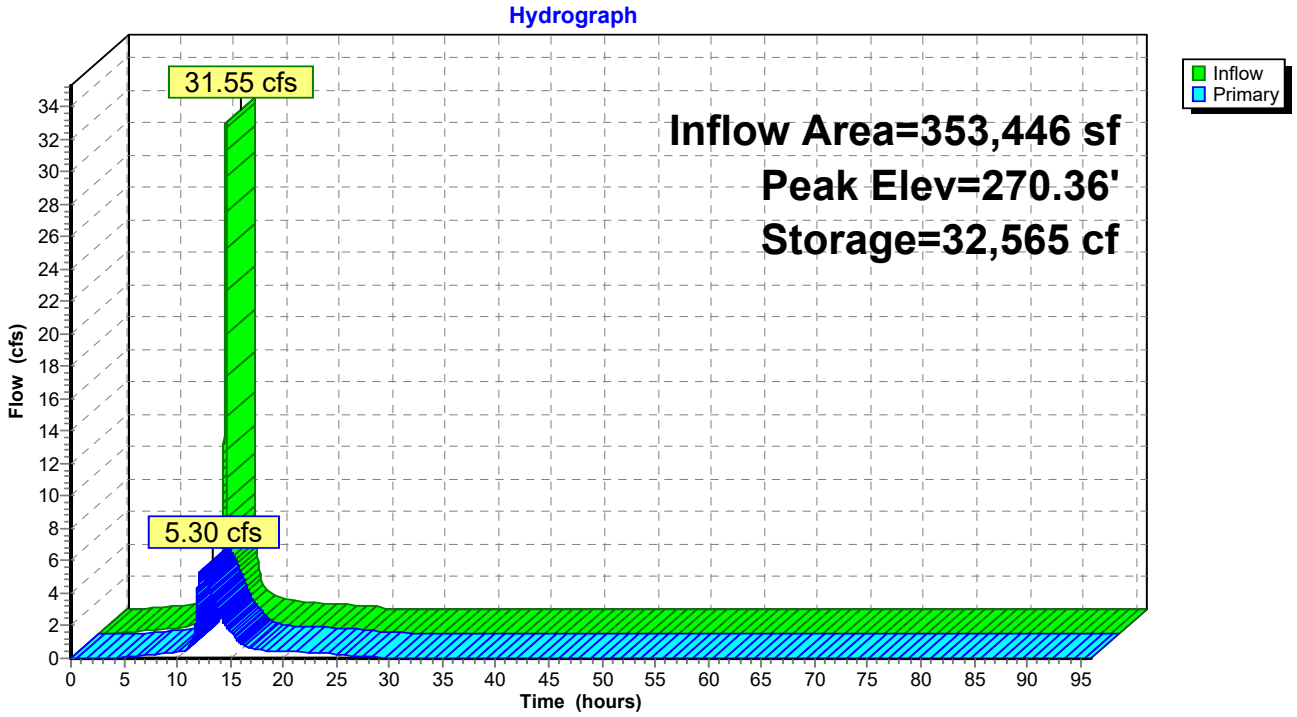
Volume	Invert	Avail.Storage	Storage Description
#1A	268.75'	41,546 cf	**63.75'W x 486.09'L x 5.50'H Field A** 170,435 cf Overall - 66,569 cf Embedded = 103,866 cf x 40.0% Voids
#2A	269.50'	66,569 cf	**ADS_StormTech MC-3500 d +Cap**x 603 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 603 Chambers in 9 Rows Cap Storage= 14.9 cf x 2 x 9 rows = 268.2 cf
		108,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	268.75'	**36.0" Round Outlet Pipe** L= 112.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 268.75' / 268.25' S= 0.0045 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	268.75'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	269.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	270.50'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	271.75'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	272.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=5.30 cfs @ 12.12 hrs HW=270.36' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 5.30 cfs of 12.19 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.86 cfs @ 5.86 fps)
  ├─**3=Orifice** (Orifice Controls 4.44 cfs @ 4.44 fps)
  ├─**4=Orifice** (Controls 0.00 cfs)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SCM 2: Detention UGB



Summary for Pond 3P: SCM 3: Detention UGB

Inflow Area = 192,405 sf, 86.71% Impervious, Inflow Depth = 2.28" for 1-yr event
Inflow = 16.14 cfs @ 11.96 hrs, Volume= 36,530 cf
Outflow = 4.31 cfs @ 12.08 hrs, Volume= 36,491 cf, Atten= 73%, Lag= 7.4 min
Primary = 4.31 cfs @ 12.08 hrs, Volume= 36,491 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 273.29' @ 12.08 hrs Surf.Area= 16,811 sf Storage= 14,681 cf

Plug-Flow detention time= 100.7 min calculated for 36,487 cf (100% of inflow)
Center-of-Mass det. time= 100.3 min (861.3 - 760.9)

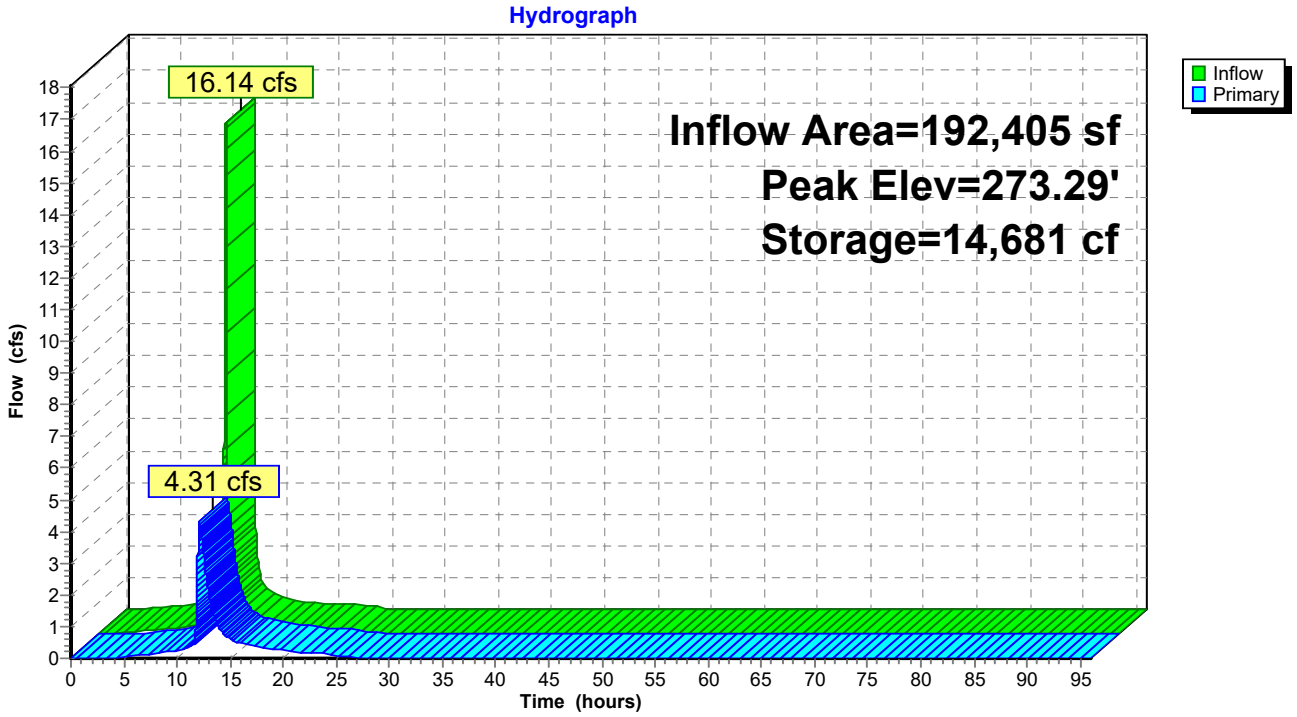
Volume	Invert	Avail.Storage	Storage Description
#1A	272.00'	15,071 cf	**46.75'W x 359.60'L x 3.75'H Field A** 63,042 cf Overall - 25,365 cf Embedded = 37,678 cf x 40.0% Voids
#2A	272.50'	25,365 cf	**ADS_StormTech SC-800 +Cap** x 500 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 500 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		40,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**36.0" Round Outlet Pipe** L= 628.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 272.00' / 268.25' S= 0.0060 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	272.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	272.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	273.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.50'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=4.31 cfs @ 12.08 hrs HW=273.29' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 4.31 cfs of 8.83 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.76 cfs @ 5.19 fps)
  ├─**3=Orifice** (Orifice Controls 3.49 cfs @ 3.49 fps)
  ├─**4=Orifice** (Orifice Controls 0.06 cfs @ 0.61 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: SCM 3: Detention UGB



Summary for Pond 4P: SCM 4: Detention UGB

Inflow Area = 156,163 sf, 91.35% Impervious, Inflow Depth = 2.35" for 1-yr event
Inflow = 13.44 cfs @ 11.96 hrs, Volume= 30,519 cf
Outflow = 4.11 cfs @ 12.07 hrs, Volume= 30,477 cf, Atten= 69%, Lag= 6.8 min
Primary = 4.11 cfs @ 12.07 hrs, Volume= 30,477 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.02' @ 12.07 hrs Surf.Area= 20,685 sf Storage= 11,096 cf

Plug-Flow detention time= 95.8 min calculated for 30,477 cf (100% of inflow)
Center-of-Mass det. time= 94.9 min (853.8 - 758.9)

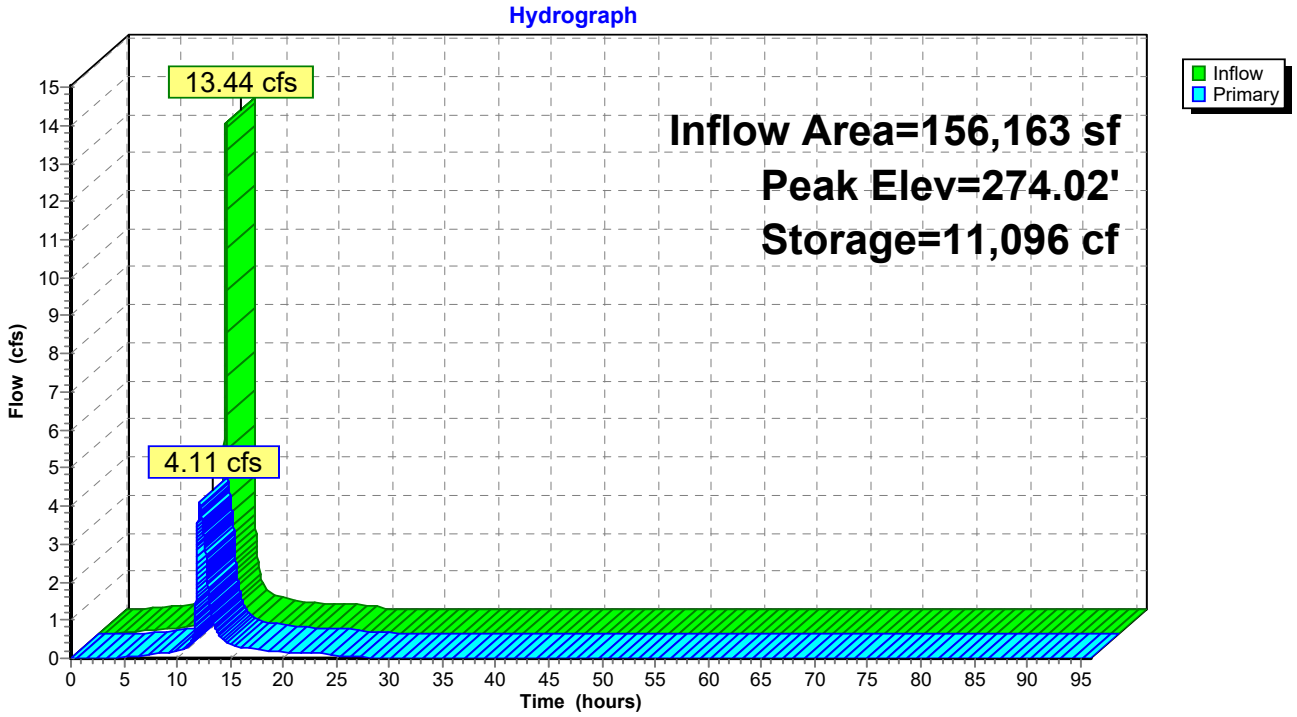
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	27,875 cf	**49.92'W x 414.39'L x 5.50'H Field A** 113,767 cf Overall - 44,079 cf Embedded = 69,688 cf x 40.0% Voids
#2A	273.75'	44,079 cf	**ADS_StormTech MC-3500 d +Cap** x 399 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 399 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		71,955 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 269.00' S= 0.0381 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.00'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.75'	**42.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.09'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=4.11 cfs @ 12.07 hrs HW=274.02' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 4.11 cfs of 5.72 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.67 cfs @ 4.55 fps)
  ├─**3=Orifice** (Orifice Controls 3.43 cfs @ 3.43 fps)
  ├─**4=Orifice** (Orifice Controls 0.02 cfs @ 0.42 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: SCM 4: Detention UGB



Summary for Pond 5P: SCM 5: Detention UGB

Inflow Area = 125,496 sf, 86.78% Impervious, Inflow Depth = 2.28" for 1-yr event
Inflow = 10.53 cfs @ 11.96 hrs, Volume= 23,836 cf
Outflow = 4.48 cfs @ 12.05 hrs, Volume= 23,827 cf, Atten= 57%, Lag= 5.6 min
Primary = 4.48 cfs @ 12.05 hrs, Volume= 23,827 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 277.81' @ 12.05 hrs Surf.Area= 8,494 sf Storage= 7,574 cf

Plug-Flow detention time= 53.9 min calculated for 23,824 cf (100% of inflow)
Center-of-Mass det. time= 54.0 min (814.9 - 760.9)

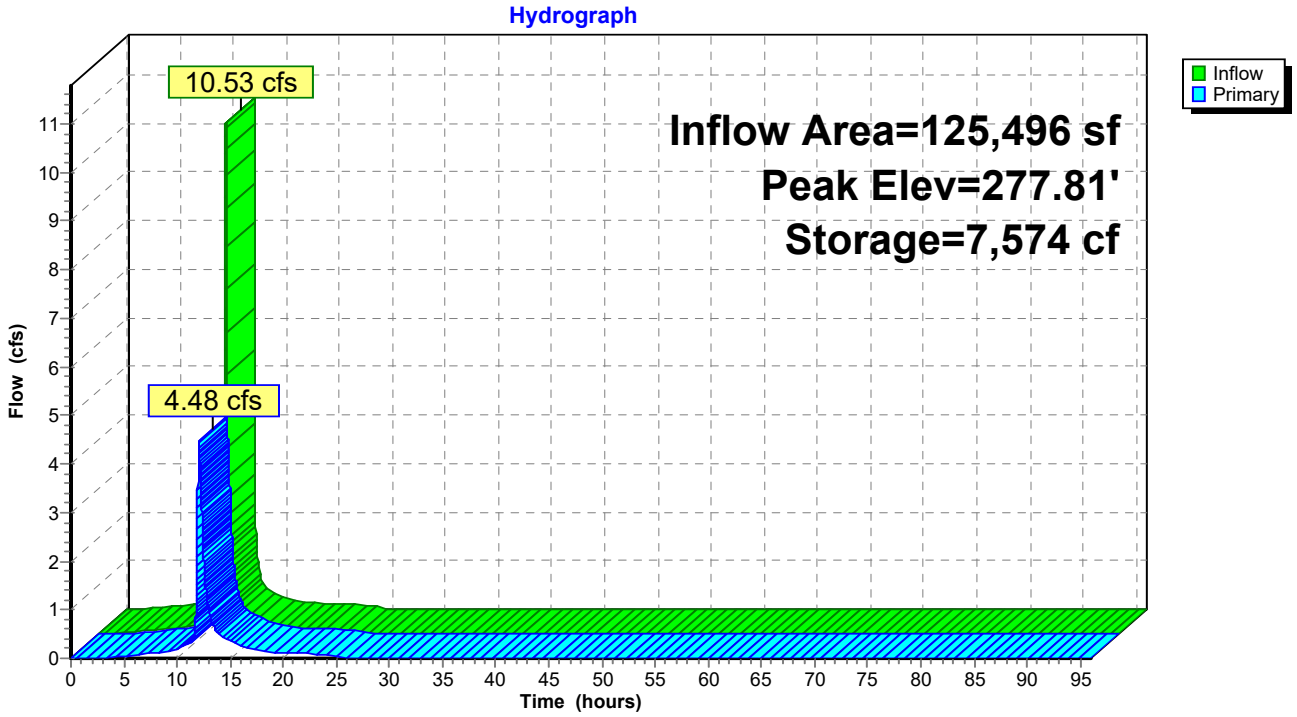
Volume	Invert	Avail.Storage	Storage Description
#1A	276.50'	7,654 cf	**46.75'W x 181.68'L x 3.75'H Field A** 31,851 cf Overall - 12,716 cf Embedded = 19,135 cf x 40.0% Voids
#2A	277.00'	12,716 cf	**ADS_StormTech SC-800 +Cap** x 250 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 250 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		20,370 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	276.50'	**36.0" Round Outlet Pipe** L= 900.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.50' / 269.00' S= 0.0083 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	276.50'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	277.75'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.00'	**36.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	279.60'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=4.48 cfs @ 12.05 hrs HW=277.81' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 4.48 cfs of 9.15 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.77 cfs @ 5.25 fps)
  ├─**3=Orifice** (Orifice Controls 3.58 cfs @ 3.58 fps)
  ├─**4=Orifice** (Orifice Controls 0.12 cfs @ 0.80 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: SCM 5: Detention UGB



Summary for Pond 6P: SCM 6: Detention UGB

Inflow Area = 145,316 sf, 77.34% Impervious, Inflow Depth = 2.10" for 1-yr event
Inflow = 11.29 cfs @ 11.96 hrs, Volume= 25,475 cf
Outflow = 3.81 cfs @ 12.06 hrs, Volume= 25,459 cf, Atten= 66%, Lag= 6.4 min
Primary = 3.81 cfs @ 12.06 hrs, Volume= 25,459 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 281.17' @ 12.06 hrs Surf.Area= 11,821 sf Storage= 9,188 cf

Plug-Flow detention time= 75.9 min calculated for 25,457 cf (100% of inflow)
Center-of-Mass det. time= 75.9 min (840.7 - 764.8)

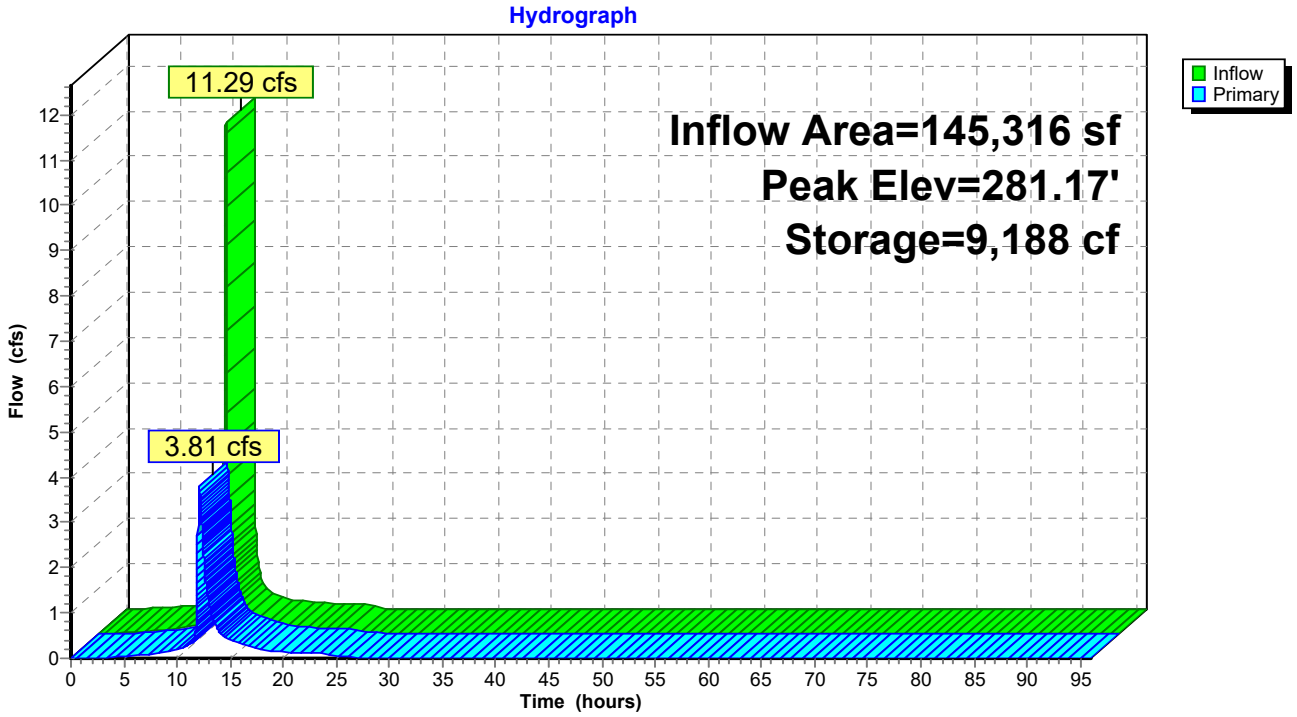
Volume	Invert	Avail.Storage	Storage Description
#1A	280.00'	10,621 cf	**46.75'W x 252.85'L x 3.75'H Field A** 44,328 cf Overall - 17,776 cf Embedded = 26,552 cf x 40.0% Voids
#2A	280.50'	17,776 cf	**ADS_StormTech SC-800 +Cap** x 350 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 350 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		28,397 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	280.00'	**36.0" Round Outlet Pipe** L= 800.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 280.00' / 271.00' S= 0.0112 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	280.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	281.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	282.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	283.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=3.81 cfs @ 12.06 hrs HW=281.17' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 3.81 cfs of 7.45 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.73 cfs @ 4.93 fps)
  ├─**3=Orifice** (Orifice Controls 3.08 cfs @ 3.08 fps)
  ├─**4=Orifice** (Controls 0.00 cfs)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6P: SCM 6: Detention UGB



Summary for Pond 7P: SCM 7: Detention UGB

Inflow Area = 185,261 sf, 92.97% Impervious, Inflow Depth = 2.37" for 1-yr event
Inflow = 16.08 cfs @ 11.96 hrs, Volume= 36,565 cf
Outflow = 4.45 cfs @ 12.08 hrs, Volume= 36,533 cf, Atten= 72%, Lag= 7.2 min
Primary = 4.45 cfs @ 12.08 hrs, Volume= 36,533 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.31' @ 12.08 hrs Surf.Area= 18,180 sf Storage= 14,372 cf

Plug-Flow detention time= 97.4 min calculated for 36,529 cf (100% of inflow)
Center-of-Mass det. time= 97.2 min (855.4 - 758.2)

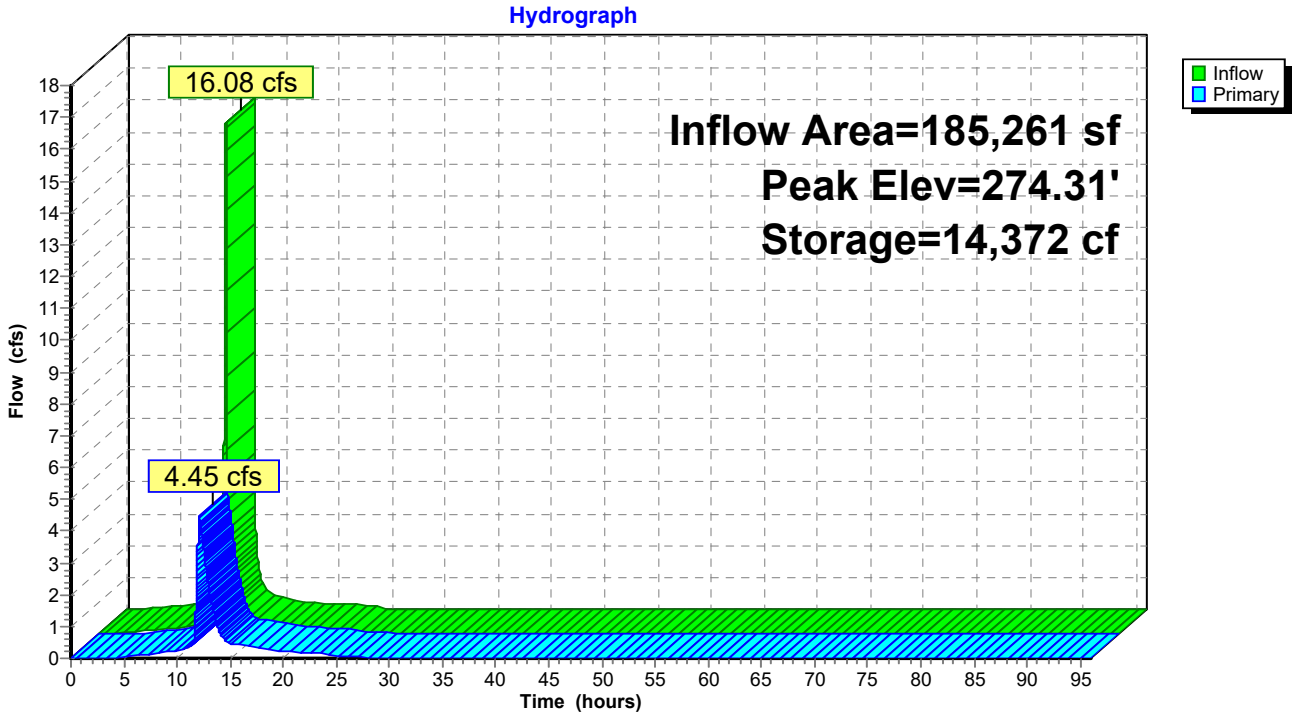
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	24,519 cf	**49.92'W x 364.20'L x 5.50'H Field A** 99,988 cf Overall - 38,692 cf Embedded = 61,296 cf x 40.0% Voids
#2A	273.75'	38,692 cf	**ADS_StormTech MC-3500 d +Cap** x 350 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 350 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		63,210 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 271.00' S= 0.0190 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	275.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	276.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=4.45 cfs @ 12.08 hrs HW=274.31' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 4.45 cfs of 9.10 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.77 cfs @ 5.24 fps)
  ├─**3=Orifice** (Orifice Controls 3.56 cfs @ 3.56 fps)
  ├─**4=Orifice** (Orifice Controls 0.11 cfs @ 0.77 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: SCM 7: Detention UGB

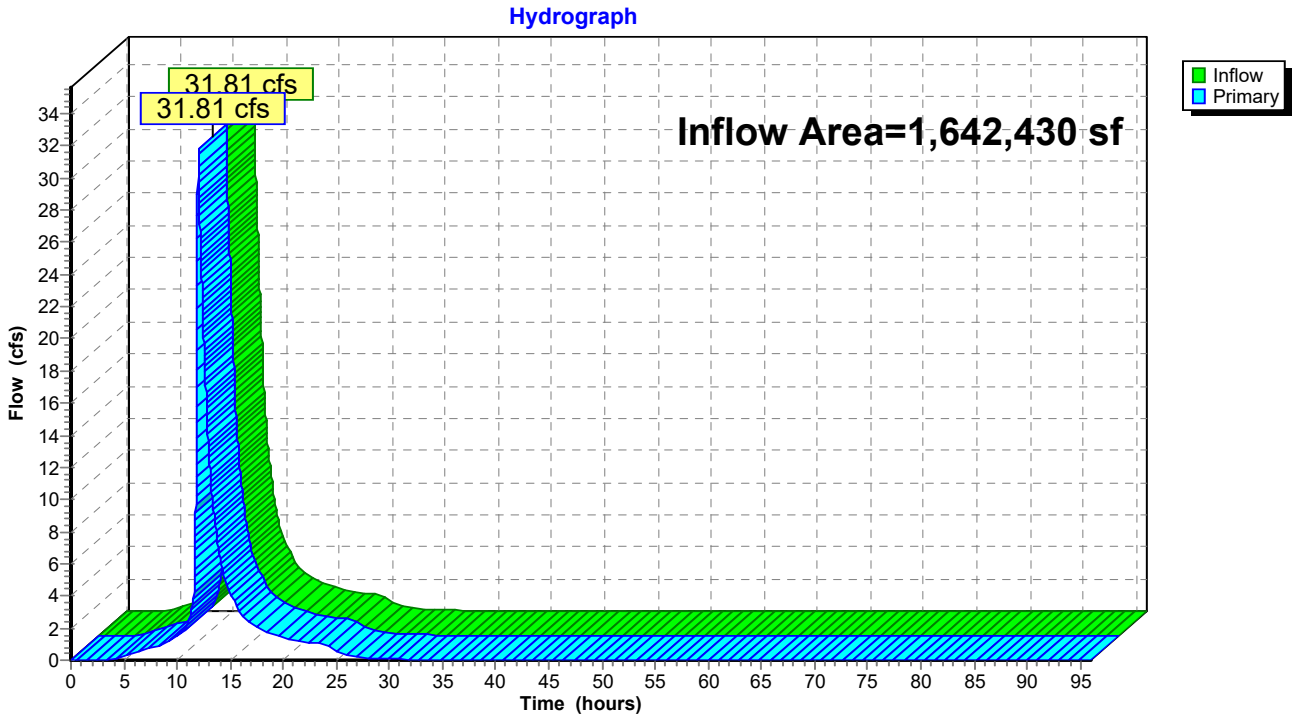


Summary for Link POA1: POA #1

Inflow Area = 1,642,430 sf, 77.11% Impervious, Inflow Depth = 1.76" for 1-yr event
Inflow = 31.81 cfs @ 12.00 hrs, Volume= 241,160 cf
Primary = 31.81 cfs @ 12.00 hrs, Volume= 241,160 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA1: POA #1

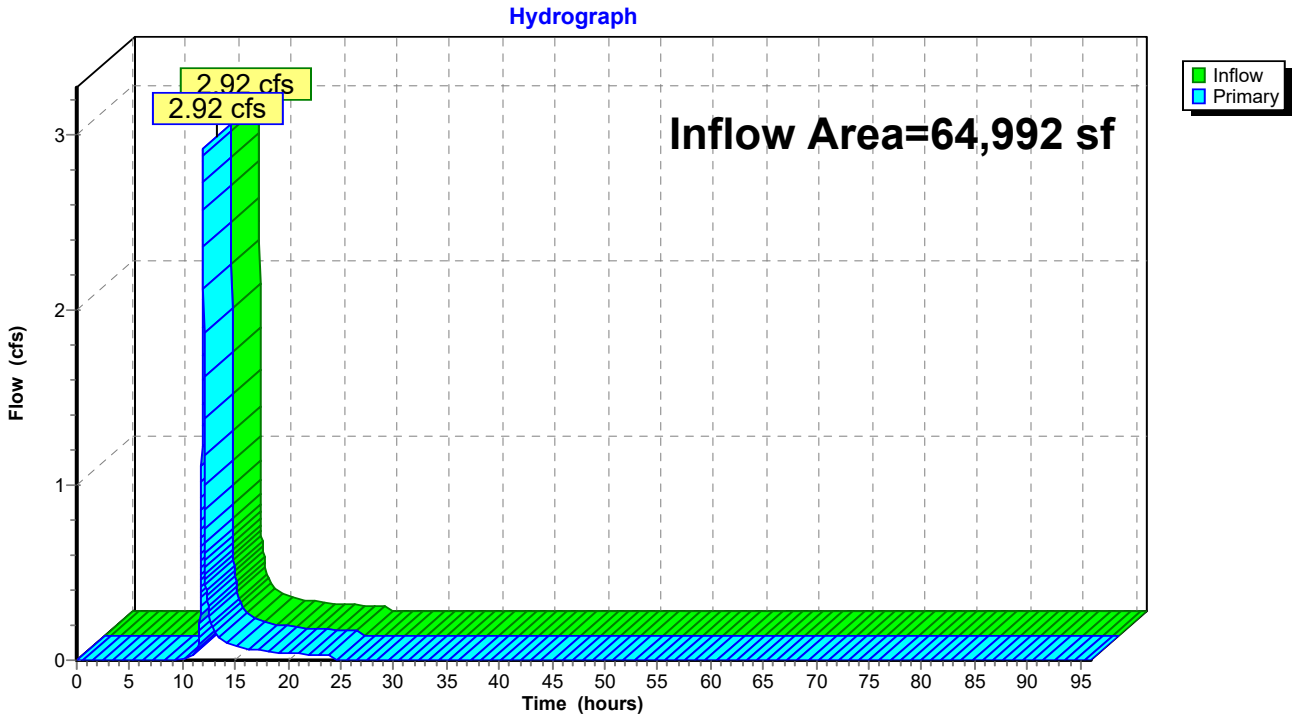


Summary for Link POA2: POA #2

Inflow Area = 64,992 sf, 2.01% Impervious, Inflow Depth = 1.06" for 1-yr event
Inflow = 2.92 cfs @ 11.97 hrs, Volume= 5,734 cf
Primary = 2.92 cfs @ 11.97 hrs, Volume= 5,734 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA2: POA #2

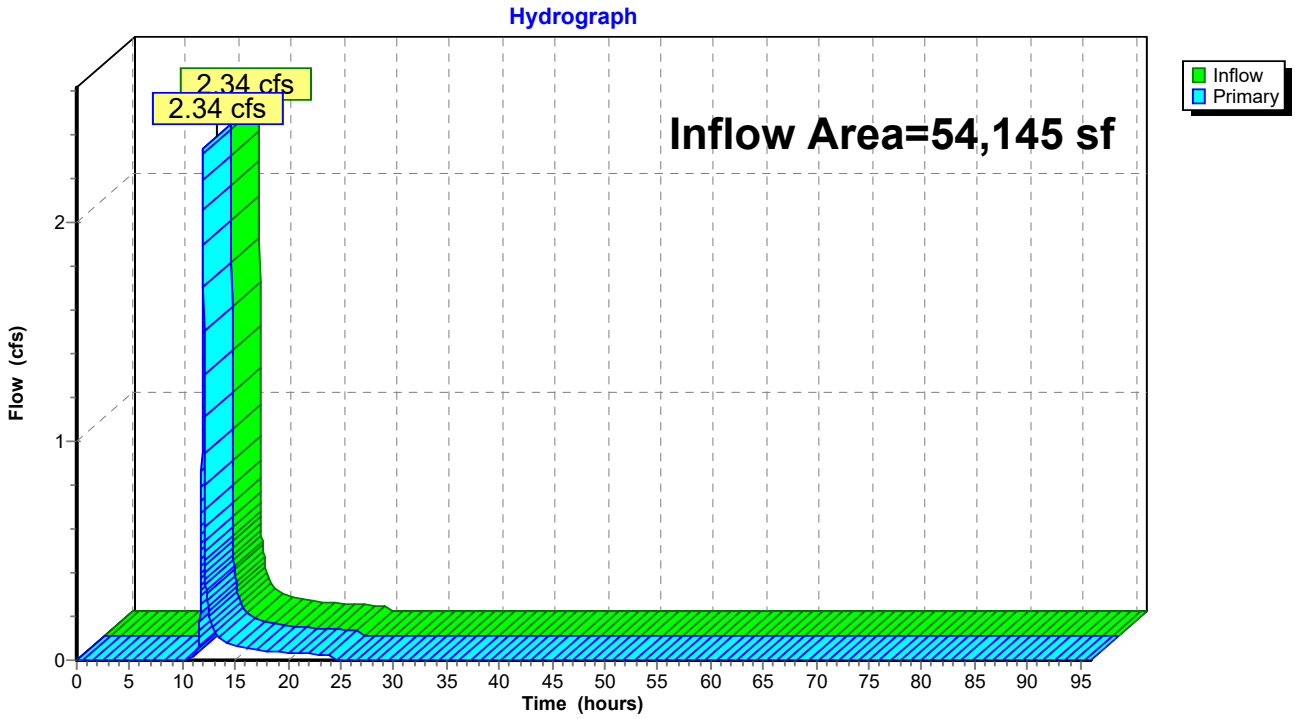


Summary for Link POA3: POA #3

Inflow Area = 54,145 sf, 0.00% Impervious, Inflow Depth = 1.01" for 1-yr event
Inflow = 2.34 cfs @ 11.97 hrs, Volume= 4,567 cf
Primary = 2.34 cfs @ 11.97 hrs, Volume= 4,567 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA3: POA #3



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=6.739 ac 72.10% Impervious Runoff Depth=2.56"
Tc=5.0 min CN=WQ Runoff=27.81 cfs 62,524 cf

Subcatchment2B: Bypass to POA #2 Runoff Area=1.492 ac 2.01% Impervious Runoff Depth=1.46"
Tc=5.0 min CN=WQ Runoff=4.04 cfs 7,931 cf

Subcatchment2S: DA-2 Runoff Area=8.114 ac 98.31% Impervious Runoff Depth=2.98"
Tc=5.0 min CN=WQ Runoff=38.09 cfs 87,795 cf

Subcatchment3B: Bypass to POA #3 Runoff Area=1.243 ac 0.00% Impervious Runoff Depth=1.41"
Tc=5.0 min CN=WQ Runoff=3.27 cfs 6,368 cf

Subcatchment3S: DA-3 Runoff Area=4.417 ac 86.71% Impervious Runoff Depth=2.80"
Tc=5.0 min CN=WQ Runoff=19.67 cfs 44,864 cf

Subcatchment4S: DA-4 Runoff Area=3.585 ac 91.35% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=WQ Runoff=16.31 cfs 37,364 cf

Subcatchment5S: DA-5 Runoff Area=2.881 ac 86.78% Impervious Runoff Depth=2.80"
Tc=5.0 min CN=WQ Runoff=12.83 cfs 29,273 cf

Subcatchment6S: DA-6 Runoff Area=3.336 ac 77.34% Impervious Runoff Depth=2.60"
Tc=5.0 min CN=WQ Runoff=13.90 cfs 31,516 cf

Subcatchment7S: DA-7 Runoff Area=4.253 ac 92.97% Impervious Runoff Depth=2.90"
Tc=5.0 min CN=WQ Runoff=19.49 cfs 44,719 cf

Subcatchment8S: DA-8 Runoff Area=4.380 ac 2.31% Impervious Runoff Depth=1.44"
Tc=5.0 min CN=WQ Runoff=11.63 cfs 22,856 cf

Pond 1P: SCM 1: Infiltration AGB Peak Elev=275.73' Storage=46,163 cf Inflow=27.81 cfs 62,524 cf
Discarded=0.23 cfs 62,526 cf Primary=0.00 cfs 0 cf Outflow=0.23 cfs 62,526 cf

Pond 2P: SCM 2: Detention UGB Peak Elev=270.60' Storage=39,056 cf Inflow=38.09 cfs 87,795 cf
Outflow=6.23 cfs 87,656 cf

Pond 3P: SCM 3: Detention UGB Peak Elev=273.50' Storage=17,575 cf Inflow=19.67 cfs 44,864 cf
Outflow=5.95 cfs 44,825 cf

Pond 4P: SCM 4: Detention UGB Peak Elev=274.14' Storage=13,314 cf Inflow=16.31 cfs 37,364 cf
Outflow=4.96 cfs 37,323 cf

Pond 5P: SCM 5: Detention UGB Peak Elev=278.01' Storage=8,951 cf Inflow=12.83 cfs 29,273 cf
Outflow=6.09 cfs 29,264 cf

Pond 6P: SCM 6: Detention UGB Peak Elev=281.37' Storage=11,121 cf Inflow=13.90 cfs 31,516 cf
Outflow=4.89 cfs 31,500 cf

Pond 7P: SCM 7: Detention UGB Peak Elev=274.48' Storage=17,138 cf Inflow=19.49 cfs 44,719 cf
Outflow=5.84 cfs 44,687 cf

Link POA1: POA #1 Inflow=40.51 cfs 298,112 cf
Primary=40.51 cfs 298,112 cf

Link POA2: POA #2 Inflow=4.04 cfs 7,931 cf
Primary=4.04 cfs 7,931 cf

Link POA3: POA #3 Inflow=3.27 cfs 6,368 cf
Primary=3.27 cfs 6,368 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 375,212 cf Average Runoff Depth = 2.56"
28.03% Pervious = 493,709 sf 71.97% Impervious = 1,267,857 sf

Summary for Subcatchment 1S: DA-1

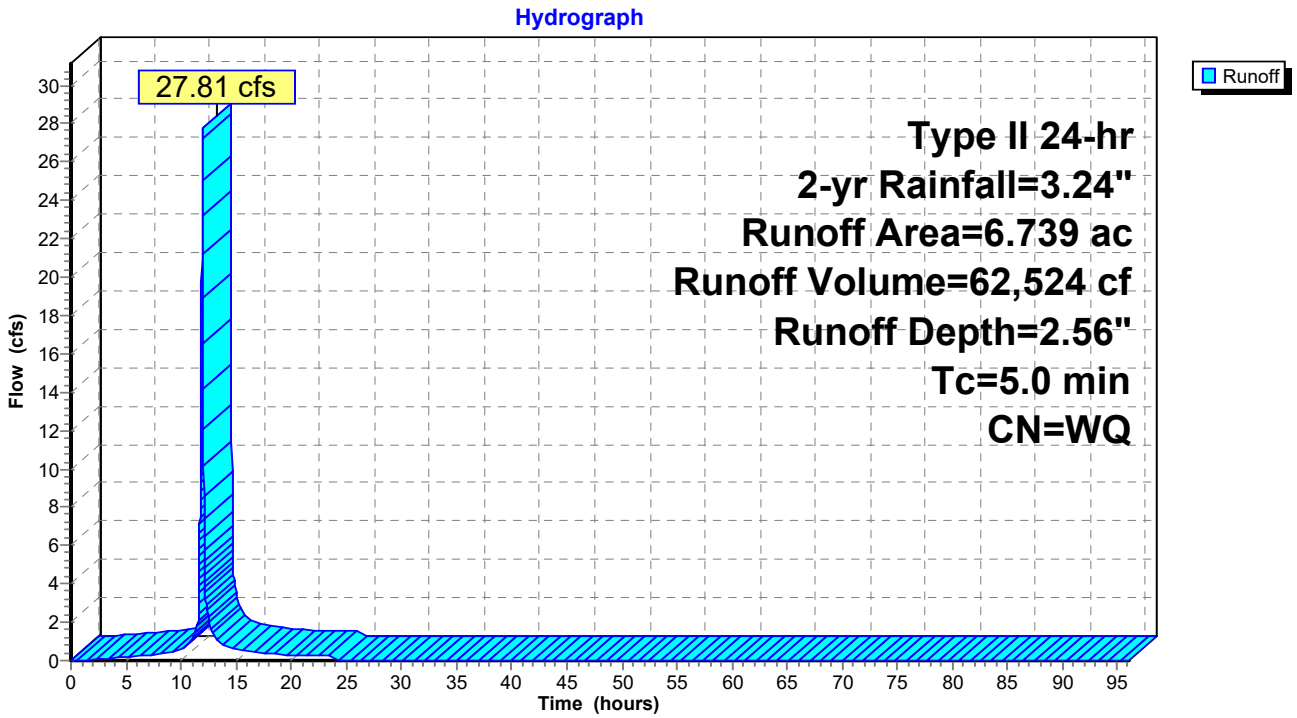
Runoff = 27.81 cfs @ 11.96 hrs, Volume= 62,524 cf, Depth= 2.56"
Routed to Pond 1P : SCM 1: Infiltration AGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
0.222	74	>75% Grass cover, Good, HSG C
1.658	80	>75% Grass cover, Good, HSG D
4.859	98	Paved parking, HSG D
6.739		Weighted Average
1.880		27.90% Pervious Area
4.859		72.10% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2B: Bypass to POA #2

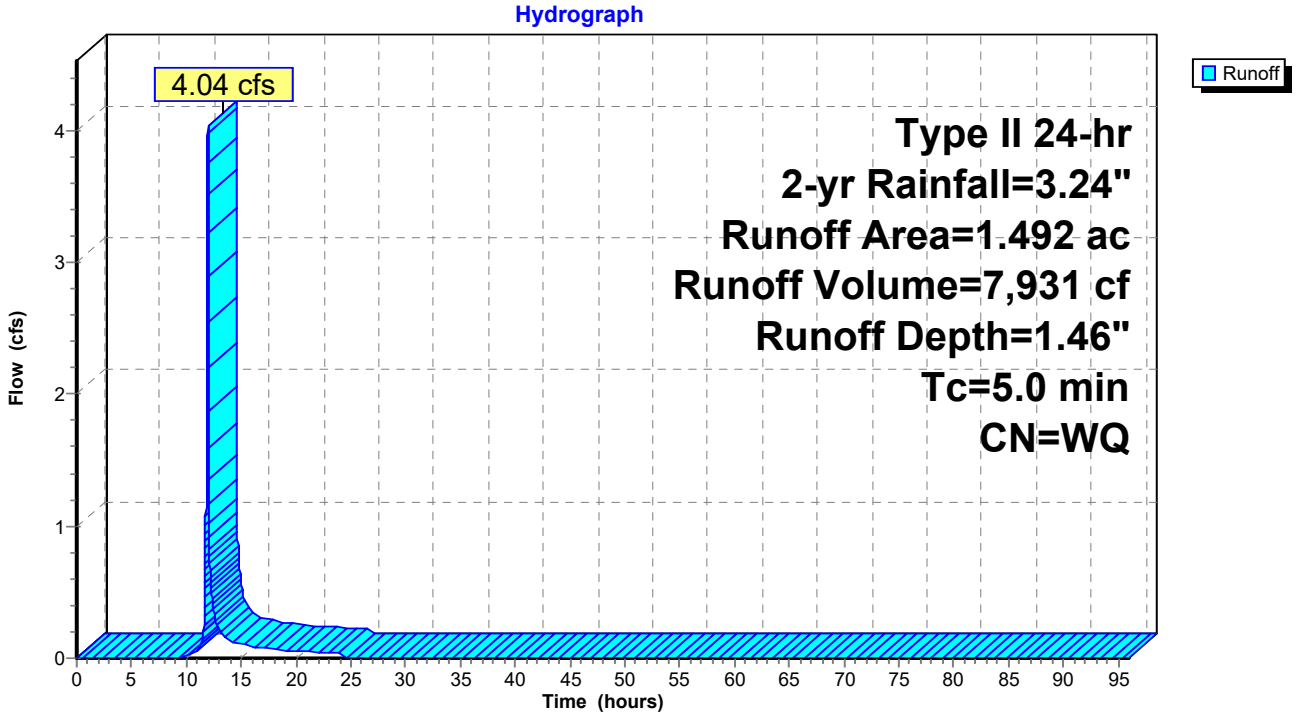
Runoff = 4.04 cfs @ 11.96 hrs, Volume= 7,931 cf, Depth= 1.46"
Routed to Link POA2 : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
1.462	80	>75% Grass cover, Good, HSG D
0.030	98	Paved parking, HSG D
1.492		Weighted Average
1.462		97.99% Pervious Area
0.030		2.01% Impervious Area

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

Subcatchment 2B: Bypass to POA #2



Summary for Subcatchment 2S: DA-2

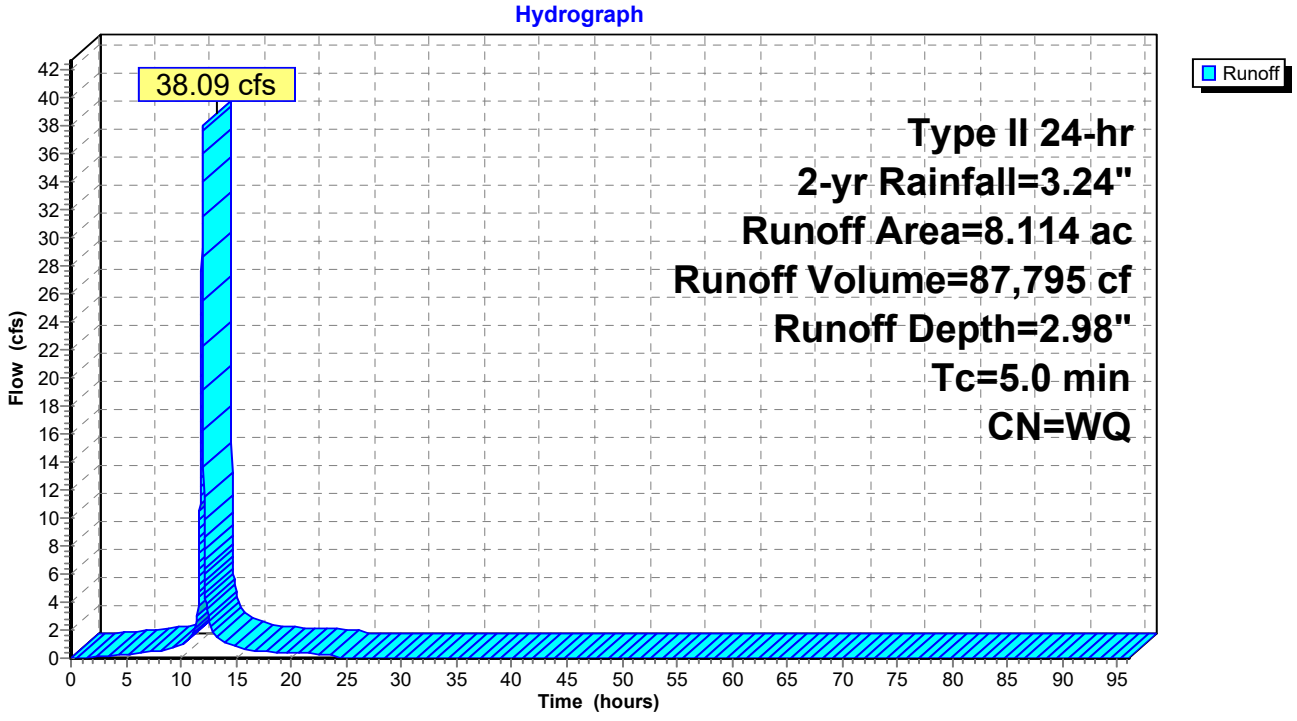
Runoff = 38.09 cfs @ 11.96 hrs, Volume= 87,795 cf, Depth= 2.98"
Routed to Pond 2P : SCM 2: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
0.137	80	>75% Grass cover, Good, HSG D
7.977	98	Paved parking, HSG D
8.114		Weighted Average
0.137		1.69% Pervious Area
7.977		98.31% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3B: Bypass to POA #3

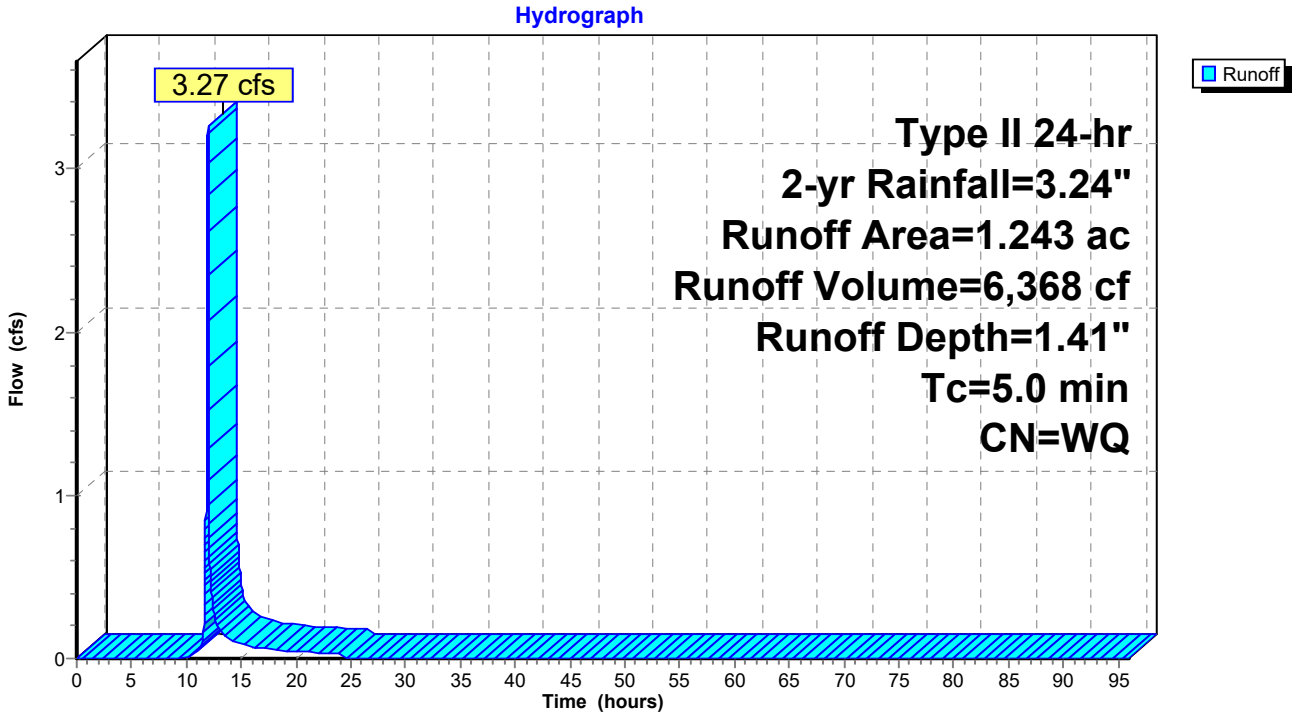
Runoff = 3.27 cfs @ 11.96 hrs, Volume= 6,368 cf, Depth= 1.41"
Routed to Link POA3 : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
0.072	74	>75% Grass cover, Good, HSG C
1.171	80	>75% Grass cover, Good, HSG D
1.243		Weighted Average
1.243		100.00% Pervious Area

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

Subcatchment 3B: Bypass to POA #3



Summary for Subcatchment 3S: DA-3

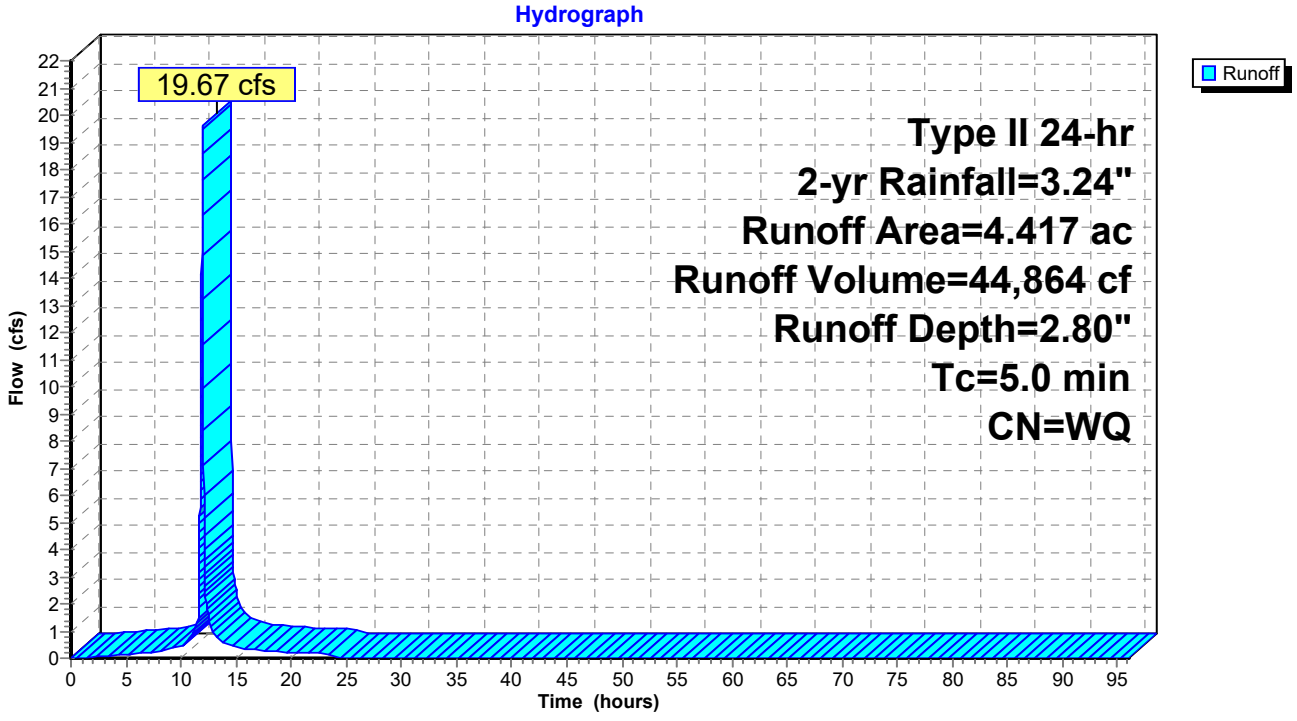
Runoff = 19.67 cfs @ 11.96 hrs, Volume= 44,864 cf, Depth= 2.80"
Routed to Pond 3P : SCM 3: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
0.587	80	>75% Grass cover, Good, HSG D
3.830	98	Paved parking, HSG D
4.417		Weighted Average
0.587		13.29% Pervious Area
3.830		86.71% Impervious Area

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

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

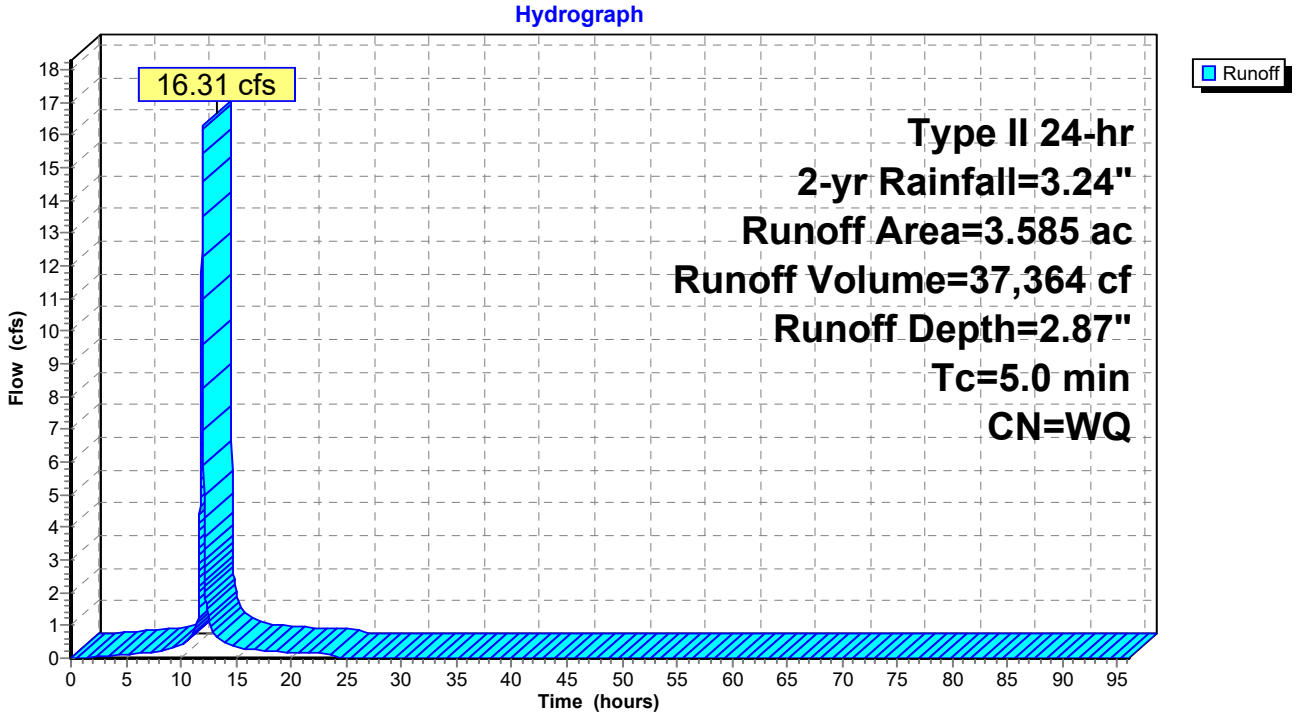
Runoff = 16.31 cfs @ 11.96 hrs, Volume= 37,364 cf, Depth= 2.87"
Routed to Pond 4P : SCM 4: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
0.310	80	>75% Grass cover, Good, HSG D
3.275	98	Paved parking, HSG D
3.585		Weighted Average
0.310		8.65% Pervious Area
3.275		91.35% Impervious Area

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

Subcatchment 4S: DA-4



Summary for Subcatchment 5S: DA-5

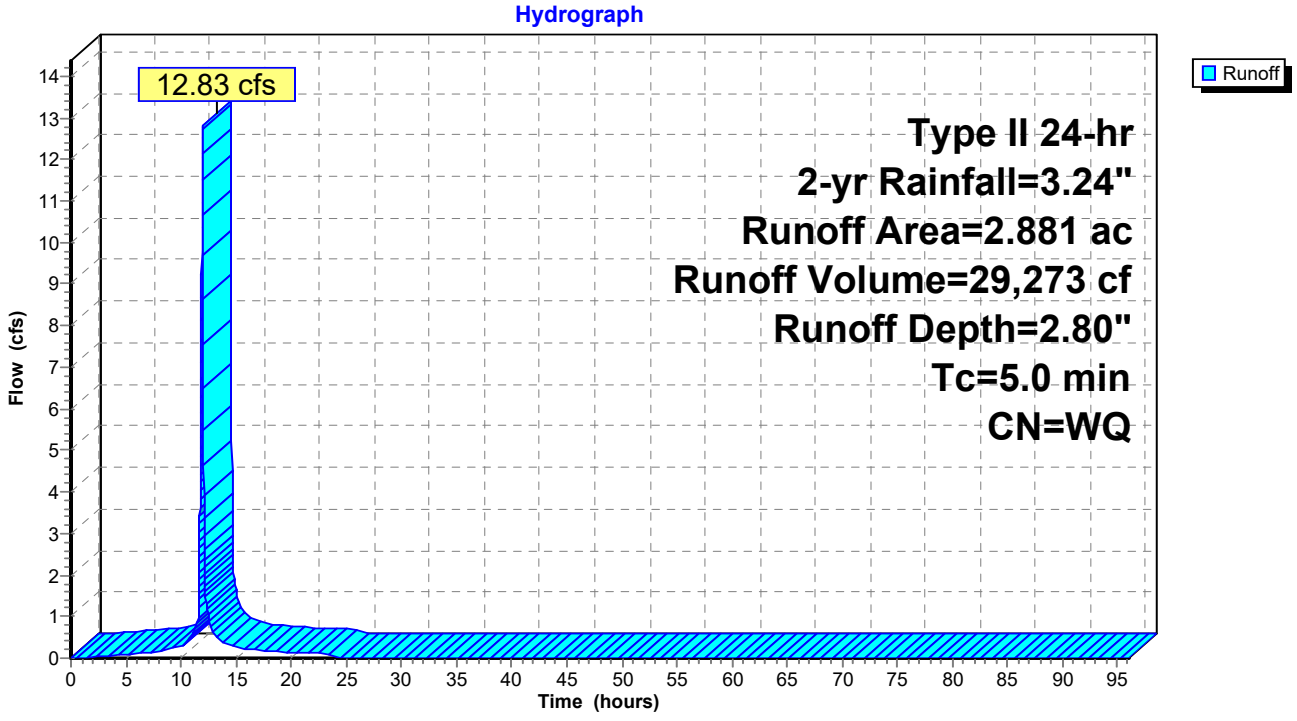
Runoff = 12.83 cfs @ 11.96 hrs, Volume= 29,273 cf, Depth= 2.80"
Routed to Pond 5P : SCM 5: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
0.381	80	>75% Grass cover, Good, HSG D
2.500	98	Paved parking, HSG D
2.881		Weighted Average
0.381		13.22% Pervious Area
2.500		86.78% Impervious Area

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

Subcatchment 5S: DA-5



Summary for Subcatchment 6S: DA-6

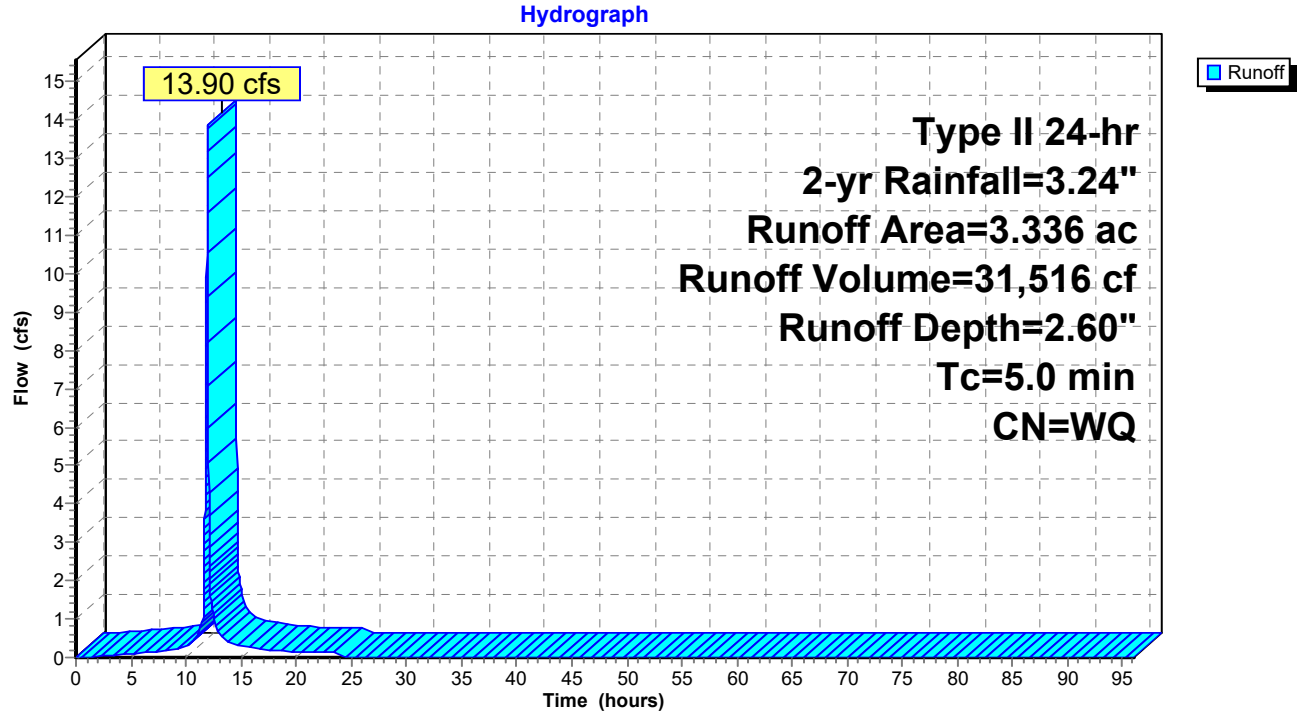
Runoff = 13.90 cfs @ 11.96 hrs, Volume= 31,516 cf, Depth= 2.60"
Routed to Pond 6P : SCM 6: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
0.255	74	>75% Grass cover, Good, HSG C
0.084	70	Woods, Good, HSG C
0.328	80	>75% Grass cover, Good, HSG D
2.580	98	Paved parking, HSG D
0.089	77	Woods, Good, HSG D
3.336		Weighted Average
0.756		22.66% Pervious Area
2.580		77.34% Impervious Area

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

Subcatchment 6S: DA-6



Summary for Subcatchment 7S: DA-7

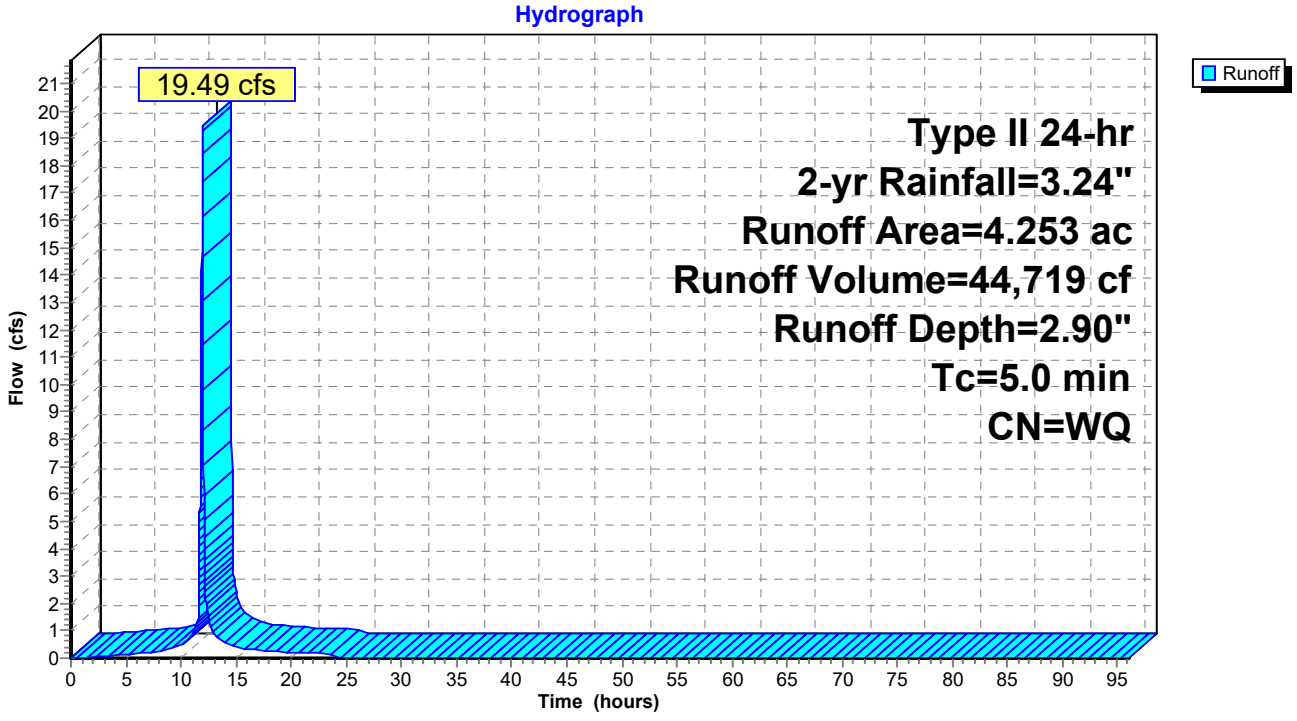
Runoff = 19.49 cfs @ 11.96 hrs, Volume= 44,719 cf, Depth= 2.90"
Routed to Pond 7P : SCM 7: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
0.299	80	>75% Grass cover, Good, HSG D
3.954	98	Paved parking, HSG D
4.253		Weighted Average
0.299		7.03% Pervious Area
3.954		92.97% Impervious Area

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

Subcatchment 7S: DA-7



Summary for Subcatchment 8S: DA-8

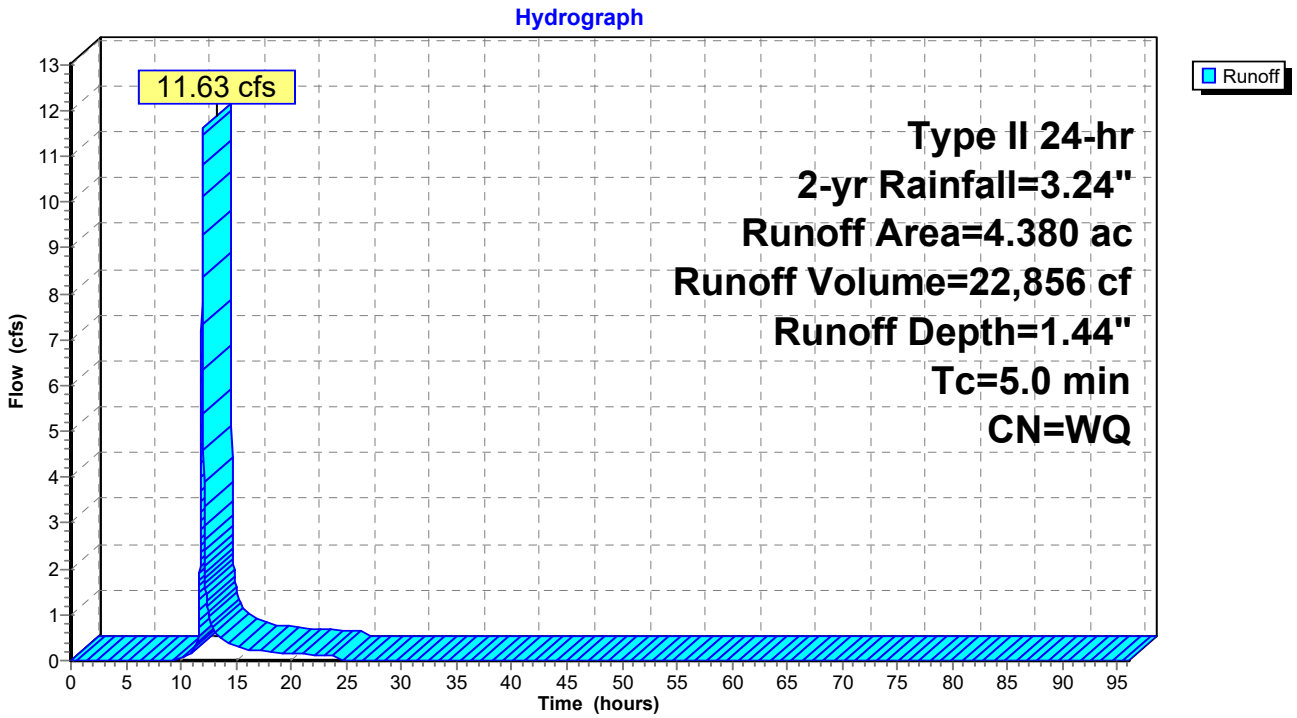
Runoff = 11.63 cfs @ 11.96 hrs, Volume= 22,856 cf, Depth= 1.44"
Routed to Link POA1 : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

Area (ac)	CN	Description
3.905	80	>75% Grass cover, Good, HSG D
0.374	74	>75% Grass cover, Good, HSG C
0.101	98	Paved parking, HSG D
4.380		Weighted Average
4.279		97.69% Pervious Area
0.101		2.31% Impervious Area

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

Subcatchment 8S: DA-8



Summary for Pond 1P: SCM 1: Infiltration AGB

Inflow Area = 293,551 sf, 72.10% Impervious, Inflow Depth = 2.56" for 2-yr event
Inflow = 27.81 cfs @ 11.96 hrs, Volume= 62,524 cf
Outflow = 0.23 cfs @ 23.45 hrs, Volume= 62,526 cf, Atten= 99%, Lag= 689.6 min
Discarded = 0.23 cfs @ 23.45 hrs, Volume= 62,526 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 275.73' @ 23.45 hrs Surf.Area= 28,341 sf Storage= 46,163 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1,798.9 min (2,563.6 - 764.7)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	186,083 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

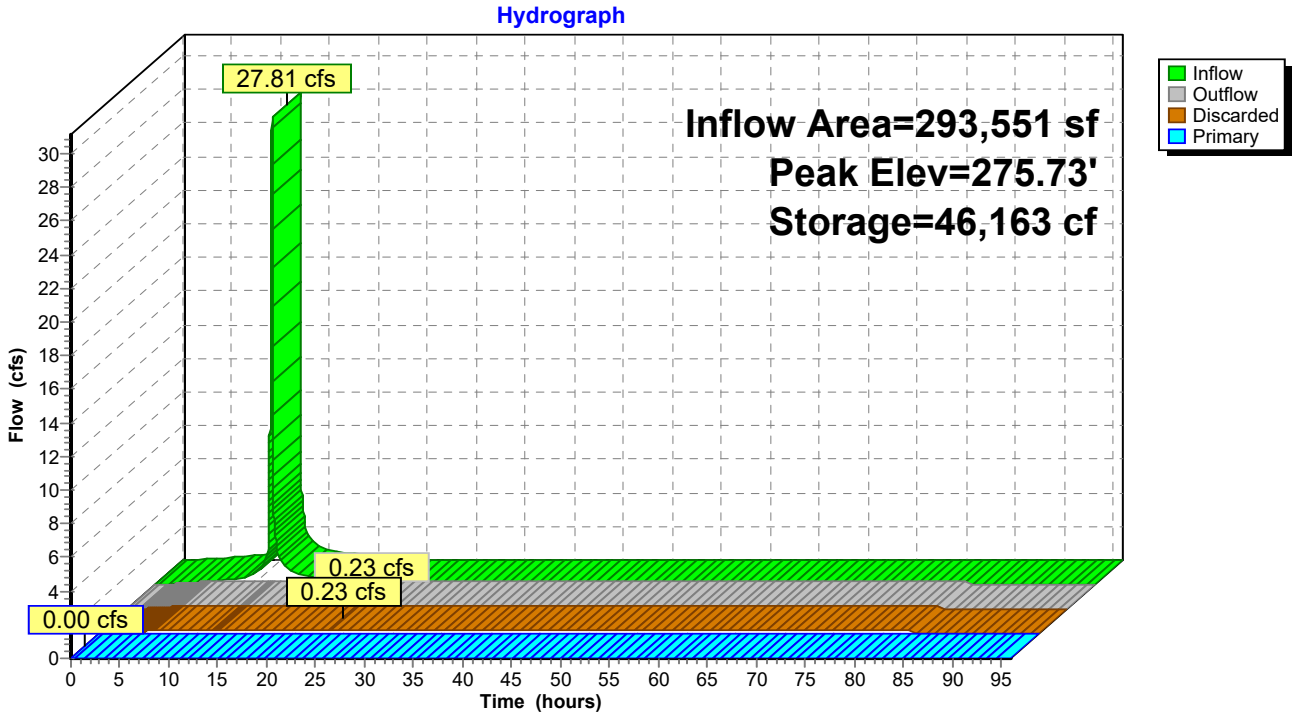
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	24,939	0	0
275.00	26,877	25,908	25,908
276.00	28,873	27,875	53,783
277.00	30,924	29,899	83,682
278.00	33,033	31,979	115,660
279.00	35,197	34,115	149,775
280.00	37,419	36,308	186,083

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**0.353 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**30.0" Round Culvert** L= 52.0' Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.00' S= 0.0385 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#3	Device 2	275.75'	**12.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	276.25'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	277.00'	**24.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	277.50'	**24.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.23 cfs @ 23.45 hrs HW=275.73' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=274.00' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Controls 0.00 cfs)
│ ├**3=Orifice/Grate** (Controls 0.00 cfs)
│ ├**4=Orifice/Grate** (Controls 0.00 cfs)
│ └**5=Orifice/Grate** (Controls 0.00 cfs)
└**6=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: SCM 1: Infiltration AGB



Summary for Pond 2P: SCM 2: Detention UGB

Inflow Area = 353,446 sf, 98.31% Impervious, Inflow Depth = 2.98" for 2-yr event
Inflow = 38.09 cfs @ 11.96 hrs, Volume= 87,795 cf
Outflow = 6.23 cfs @ 12.12 hrs, Volume= 87,656 cf, Atten= 84%, Lag= 10.1 min
Primary = 6.23 cfs @ 12.12 hrs, Volume= 87,656 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 270.60' @ 12.12 hrs Surf.Area= 30,988 sf Storage= 39,056 cf

Plug-Flow detention time= 140.5 min calculated for 87,656 cf (100% of inflow)
Center-of-Mass det. time= 139.5 min (891.5 - 752.0)

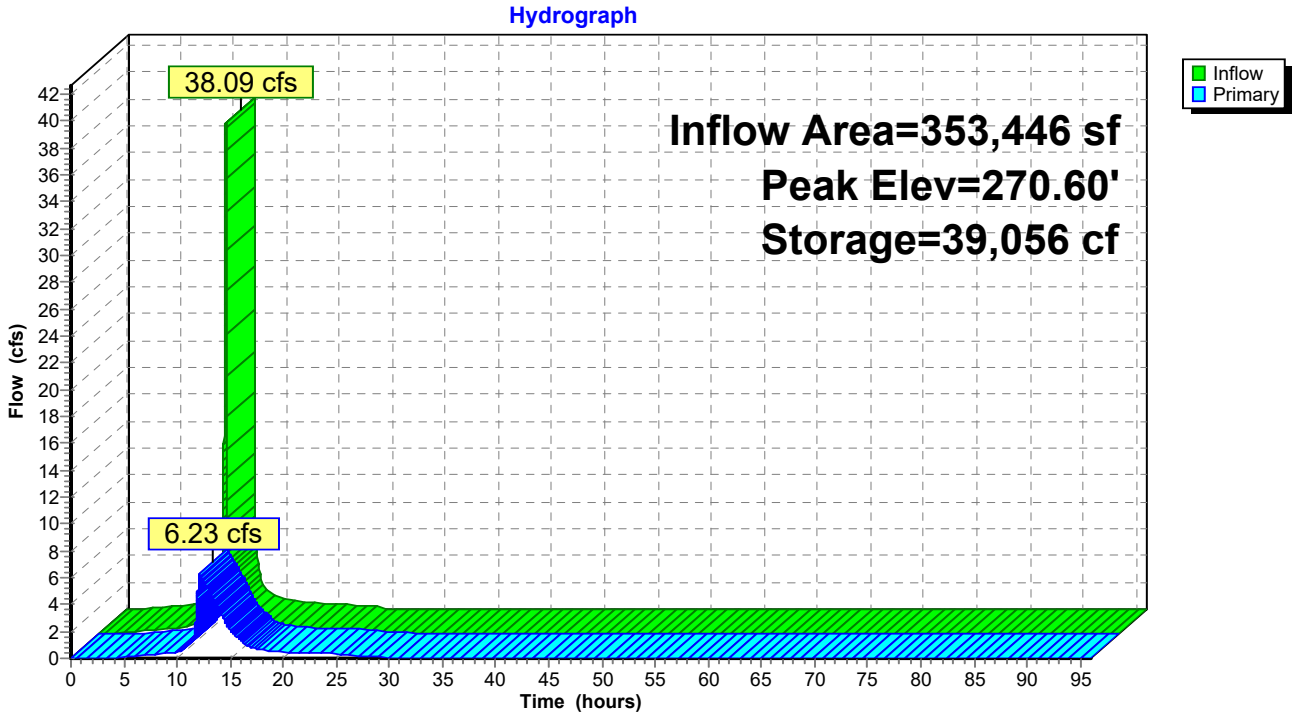
Volume	Invert	Avail.Storage	Storage Description
#1A	268.75'	41,546 cf	**63.75'W x 486.09'L x 5.50'H Field A** 170,435 cf Overall - 66,569 cf Embedded = 103,866 cf x 40.0% Voids
#2A	269.50'	66,569 cf	**ADS_StormTech MC-3500 d +Cap**x 603 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 603 Chambers in 9 Rows Cap Storage= 14.9 cf x 2 x 9 rows = 268.2 cf
		108,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	268.75'	**36.0" Round Outlet Pipe** L= 112.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 268.75' / 268.25' S= 0.0045 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	268.75'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	269.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	270.50'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	271.75'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	272.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=6.23 cfs @ 12.12 hrs HW=270.60' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 6.23 cfs of 15.50 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.93 cfs @ 6.33 fps)
  ├─**3=Orifice** (Orifice Controls 5.04 cfs @ 5.04 fps)
  ├─**4=Orifice** (Orifice Controls 0.26 cfs @ 1.02 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SCM 2: Detention UGB



Summary for Pond 3P: SCM 3: Detention UGB

Inflow Area = 192,405 sf, 86.71% Impervious, Inflow Depth = 2.80" for 2-yr event
Inflow = 19.67 cfs @ 11.96 hrs, Volume= 44,864 cf
Outflow = 5.95 cfs @ 12.07 hrs, Volume= 44,825 cf, Atten= 70%, Lag= 6.9 min
Primary = 5.95 cfs @ 12.07 hrs, Volume= 44,825 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 273.50' @ 12.07 hrs Surf.Area= 16,811 sf Storage= 17,575 cf

Plug-Flow detention time= 95.0 min calculated for 44,825 cf (100% of inflow)
Center-of-Mass det. time= 94.4 min (851.6 - 757.2)

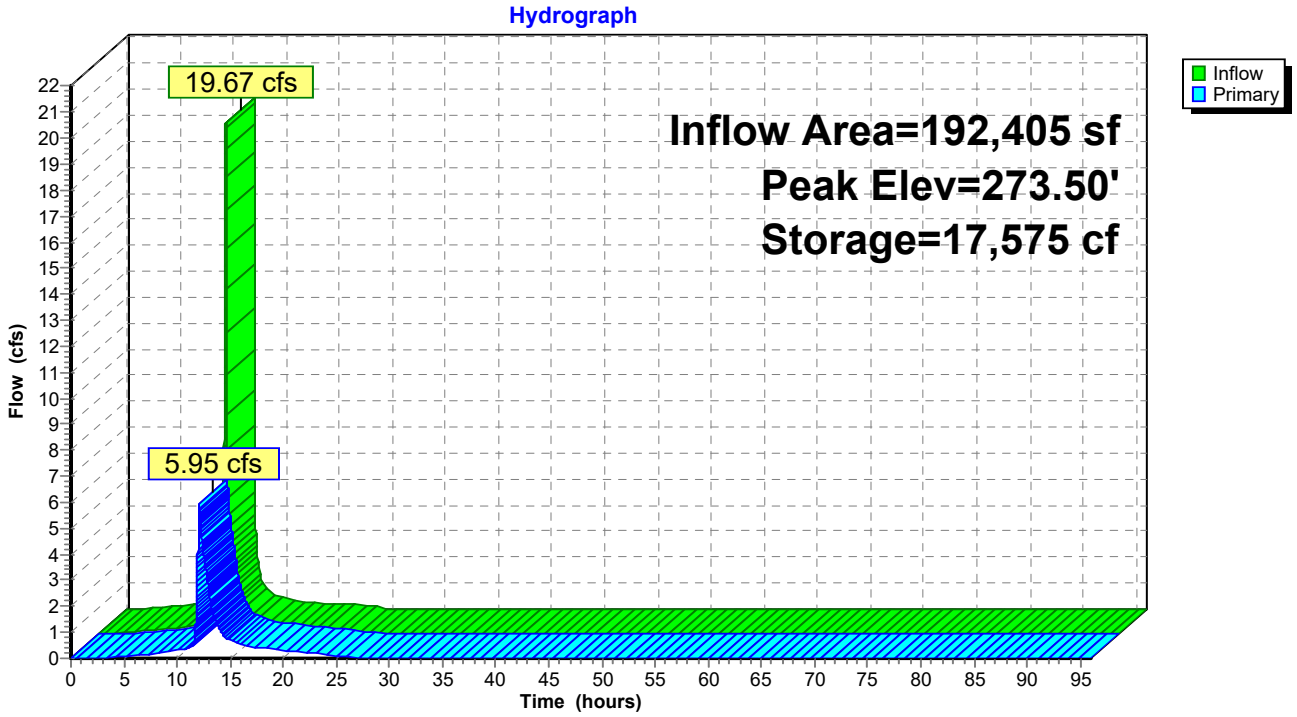
Volume	Invert	Avail.Storage	Storage Description
#1A	272.00'	15,071 cf	**46.75'W x 359.60'L x 3.75'H Field A** 63,042 cf Overall - 25,365 cf Embedded = 37,678 cf x 40.0% Voids
#2A	272.50'	25,365 cf	**ADS_StormTech SC-800 +Cap** x 500 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 500 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		40,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**36.0" Round Outlet Pipe** L= 628.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 272.00' / 268.25' S= 0.0060 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	272.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	272.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	273.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.50'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=5.95 cfs @ 12.07 hrs HW=273.50' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 5.95 cfs of 11.59 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.83 cfs @ 5.64 fps)
  ├─**3=Orifice** (Orifice Controls 4.14 cfs @ 4.14 fps)
  ├─**4=Orifice** (Orifice Controls 0.98 cfs @ 1.59 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: SCM 3: Detention UGB



Summary for Pond 4P: SCM 4: Detention UGB

Inflow Area = 156,163 sf, 91.35% Impervious, Inflow Depth = 2.87" for 2-yr event
Inflow = 16.31 cfs @ 11.96 hrs, Volume= 37,364 cf
Outflow = 4.96 cfs @ 12.07 hrs, Volume= 37,323 cf, Atten= 70%, Lag= 6.9 min
Primary = 4.96 cfs @ 12.07 hrs, Volume= 37,323 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.14' @ 12.07 hrs Surf.Area= 20,685 sf Storage= 13,314 cf

Plug-Flow detention time= 88.8 min calculated for 37,319 cf (100% of inflow)
Center-of-Mass det. time= 88.5 min (843.5 - 755.0)

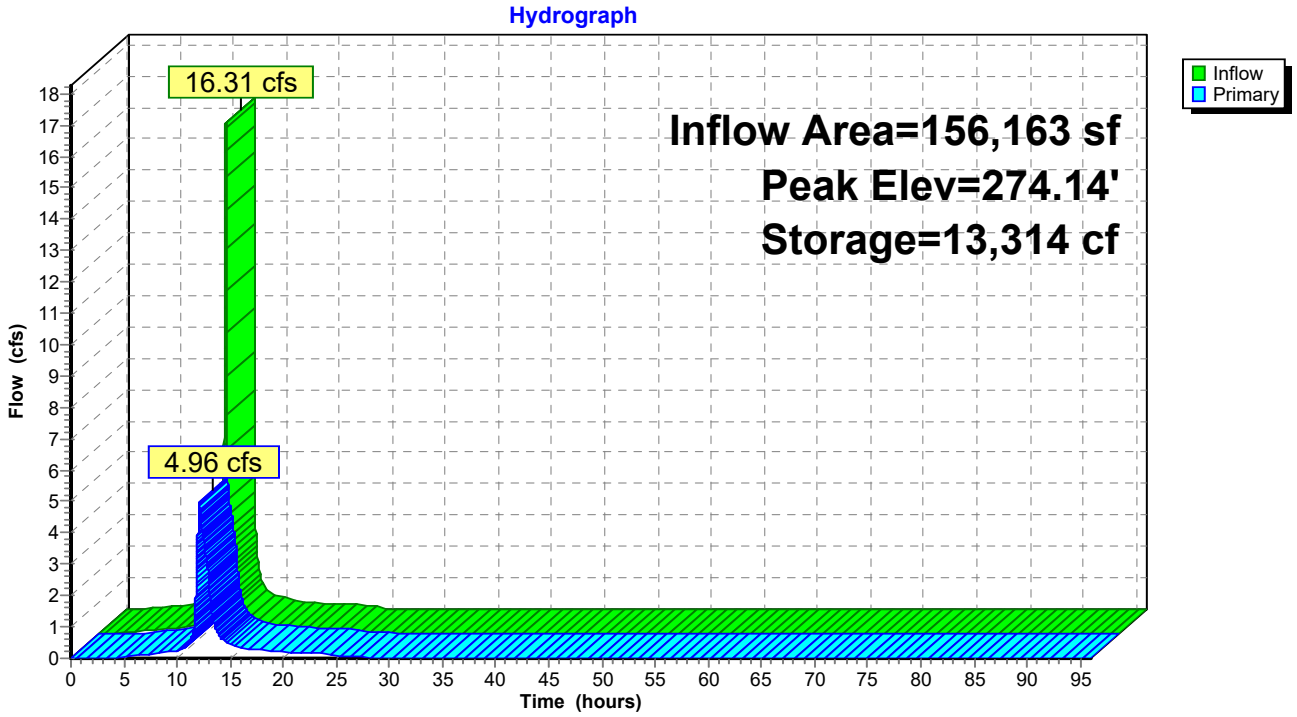
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	27,875 cf	**49.92'W x 414.39'L x 5.50'H Field A** 113,767 cf Overall - 44,079 cf Embedded = 69,688 cf x 40.0% Voids
#2A	273.75'	44,079 cf	**ADS_StormTech MC-3500 d +Cap** x 399 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 399 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		71,955 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 269.00' S= 0.0381 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.00'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.75'	**42.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.09'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=4.95 cfs @ 12.07 hrs HW=274.14' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 4.95 cfs of 7.06 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.71 cfs @ 4.85 fps)
  ├─**3=Orifice** (Orifice Controls 3.82 cfs @ 3.82 fps)
  ├─**4=Orifice** (Orifice Controls 0.42 cfs @ 1.20 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: SCM 4: Detention UGB



Summary for Pond 5P: SCM 5: Detention UGB

Inflow Area = 125,496 sf, 86.78% Impervious, Inflow Depth = 2.80" for 2-yr event
Inflow = 12.83 cfs @ 11.96 hrs, Volume= 29,273 cf
Outflow = 6.09 cfs @ 12.04 hrs, Volume= 29,264 cf, Atten= 53%, Lag= 5.2 min
Primary = 6.09 cfs @ 12.04 hrs, Volume= 29,264 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 278.01' @ 12.04 hrs Surf.Area= 8,494 sf Storage= 8,951 cf

Plug-Flow detention time= 50.5 min calculated for 29,261 cf (100% of inflow)
Center-of-Mass det. time= 50.6 min (807.8 - 757.2)

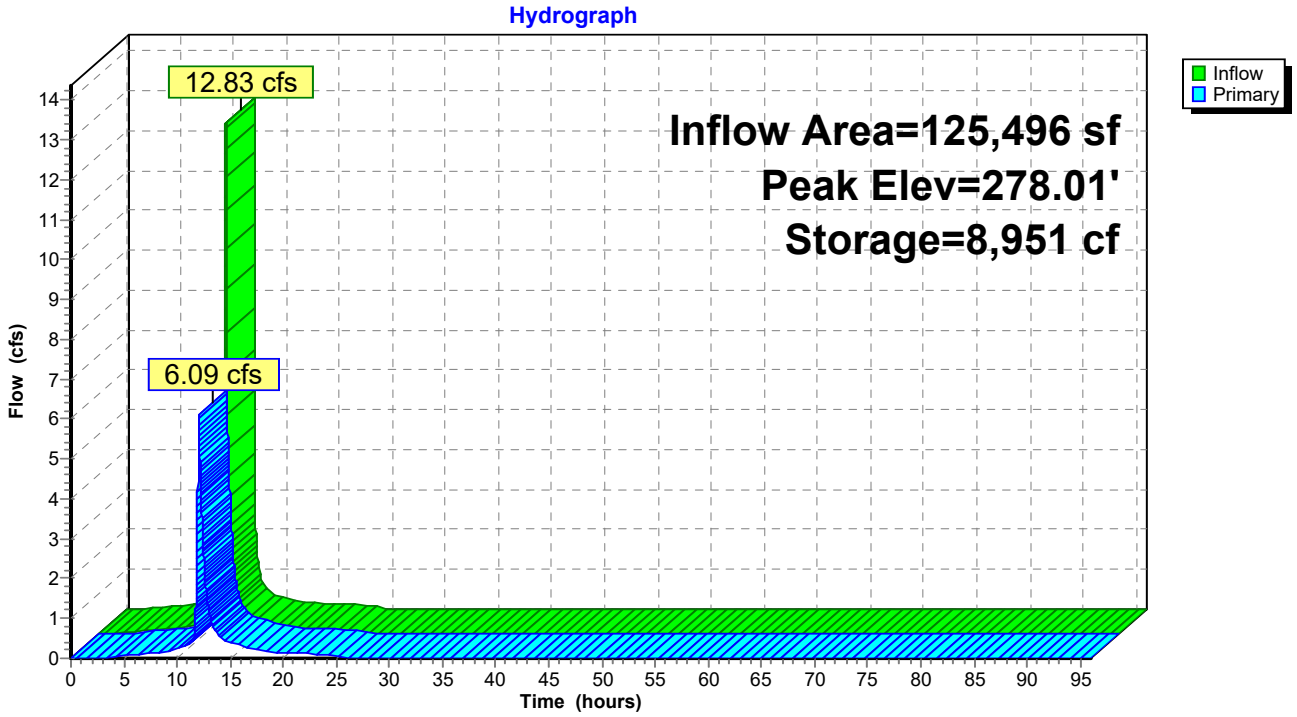
Volume	Invert	Avail.Storage	Storage Description
#1A	276.50'	7,654 cf	**46.75'W x 181.68'L x 3.75'H Field A** 31,851 cf Overall - 12,716 cf Embedded = 19,135 cf x 40.0% Voids
#2A	277.00'	12,716 cf	**ADS_StormTech SC-800 +Cap** x 250 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 250 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		20,370 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	276.50'	**36.0" Round Outlet Pipe** L= 900.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.50' / 269.00' S= 0.0083 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	276.50'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	277.75'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.00'	**36.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	279.60'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=6.08 cfs @ 12.04 hrs HW=278.01' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 6.08 cfs of 11.78 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.83 cfs @ 5.67 fps)
  ├─**3=Orifice** (Orifice Controls 4.18 cfs @ 4.18 fps)
  ├─**4=Orifice** (Orifice Controls 1.07 cfs @ 1.64 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: SCM 5: Detention UGB



Summary for Pond 6P: SCM 6: Detention UGB

Inflow Area = 145,316 sf, 77.34% Impervious, Inflow Depth = 2.60" for 2-yr event
Inflow = 13.90 cfs @ 11.96 hrs, Volume= 31,516 cf
Outflow = 4.89 cfs @ 12.06 hrs, Volume= 31,500 cf, Atten= 65%, Lag= 6.3 min
Primary = 4.89 cfs @ 12.06 hrs, Volume= 31,500 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 281.37' @ 12.06 hrs Surf.Area= 11,821 sf Storage= 11,121 cf

Plug-Flow detention time= 71.4 min calculated for 31,500 cf (100% of inflow)
Center-of-Mass det. time= 71.1 min (832.6 - 761.5)

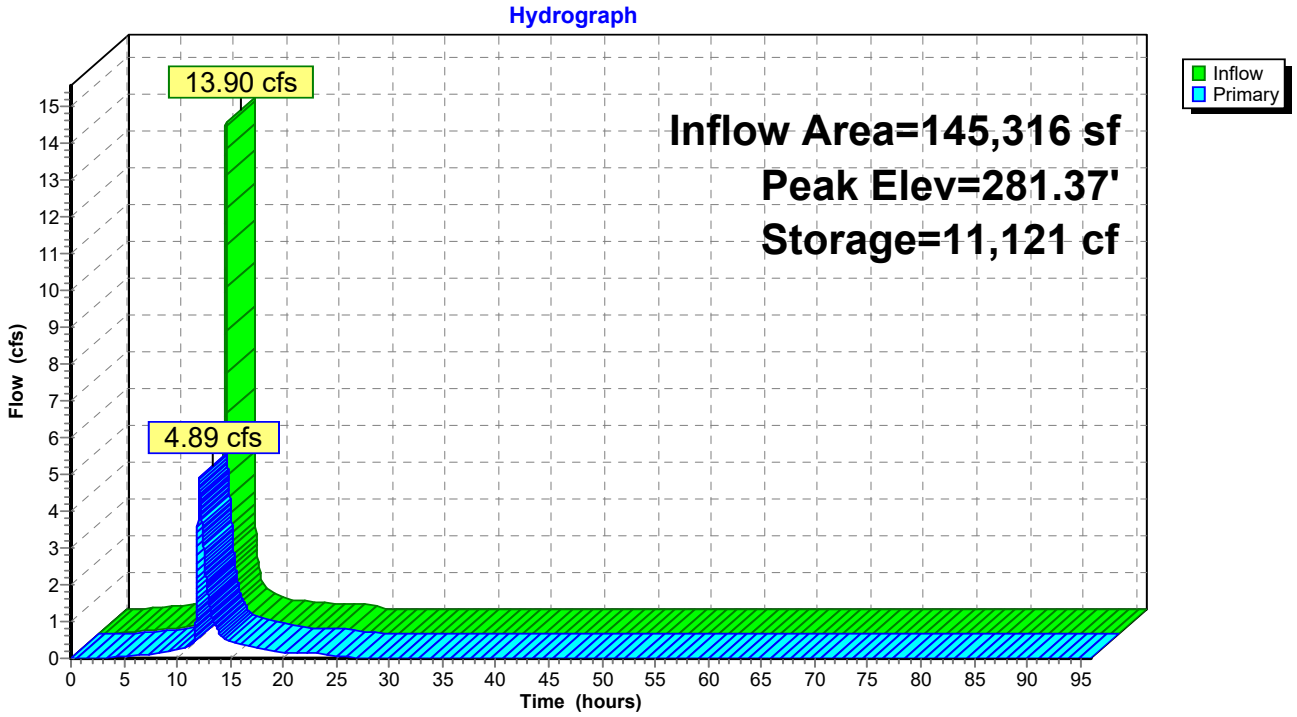
Volume	Invert	Avail.Storage	Storage Description
#1A	280.00'	10,621 cf	**46.75'W x 252.85'L x 3.75'H Field A** 44,328 cf Overall - 17,776 cf Embedded = 26,552 cf x 40.0% Voids
#2A	280.50'	17,776 cf	**ADS_StormTech SC-800 +Cap** x 350 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 350 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		28,397 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	280.00'	**36.0" Round Outlet Pipe** L= 800.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 280.00' / 271.00' S= 0.0112 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	280.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	281.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	282.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	283.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=4.89 cfs @ 12.06 hrs HW=281.37' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 4.89 cfs of 9.89 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.79 cfs @ 5.37 fps)
  ├─**3=Orifice** (Orifice Controls 3.76 cfs @ 3.76 fps)
  ├─**4=Orifice** (Orifice Controls 0.33 cfs @ 1.11 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6P: SCM 6: Detention UGB



Summary for Pond 7P: SCM 7: Detention UGB

Inflow Area = 185,261 sf, 92.97% Impervious, Inflow Depth = 2.90" for 2-yr event
Inflow = 19.49 cfs @ 11.96 hrs, Volume= 44,719 cf
Outflow = 5.84 cfs @ 12.07 hrs, Volume= 44,687 cf, Atten= 70%, Lag= 6.9 min
Primary = 5.84 cfs @ 12.07 hrs, Volume= 44,687 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.48' @ 12.07 hrs Surf.Area= 18,180 sf Storage= 17,138 cf

Plug-Flow detention time= 92.4 min calculated for 44,687 cf (100% of inflow)
Center-of-Mass det. time= 91.9 min (846.2 - 754.3)

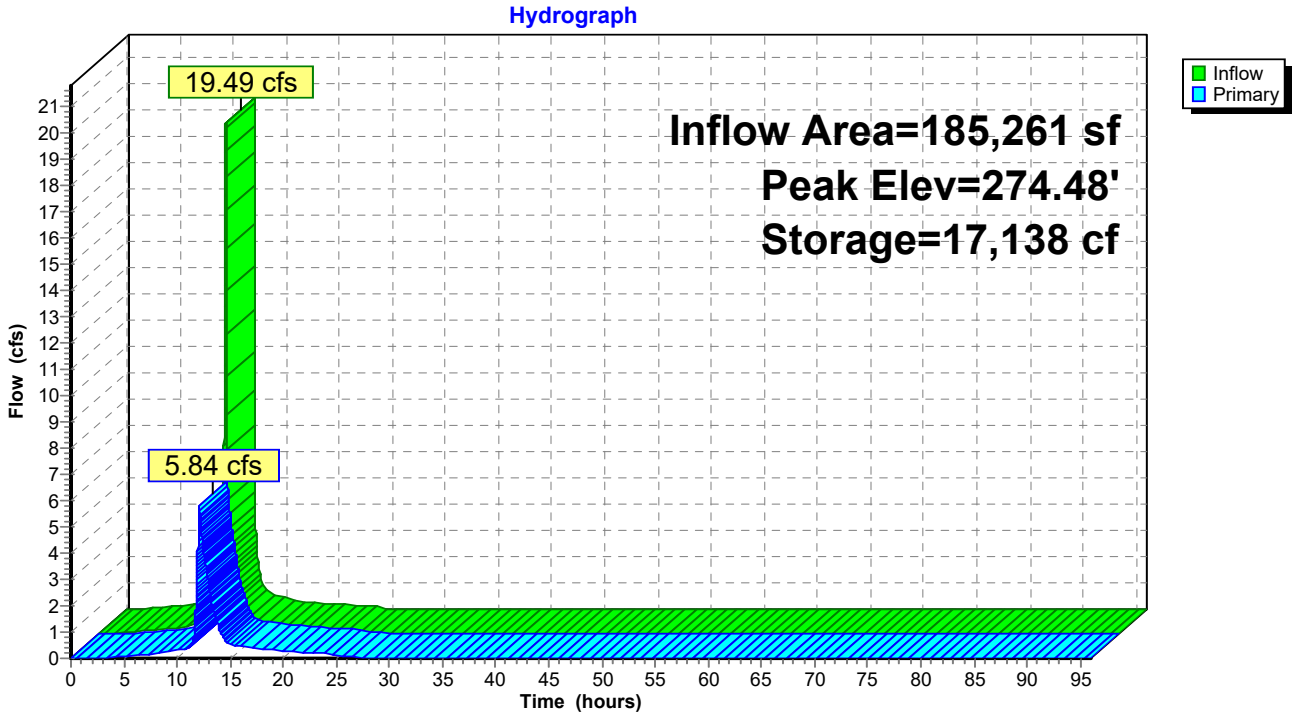
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	24,519 cf	**49.92'W x 364.20'L x 5.50'H Field A** 99,988 cf Overall - 38,692 cf Embedded = 61,296 cf x 40.0% Voids
#2A	273.75'	38,692 cf	**ADS_StormTech MC-3500 d +Cap** x 350 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 350 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		63,210 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 271.00' S= 0.0190 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	275.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	276.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=5.84 cfs @ 12.07 hrs HW=274.48' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 5.84 cfs of 11.41 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.83 cfs @ 5.61 fps)
  ├─**3=Orifice** (Orifice Controls 4.10 cfs @ 4.10 fps)
  ├─**4=Orifice** (Orifice Controls 0.91 cfs @ 1.55 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: SCM 7: Detention UGB

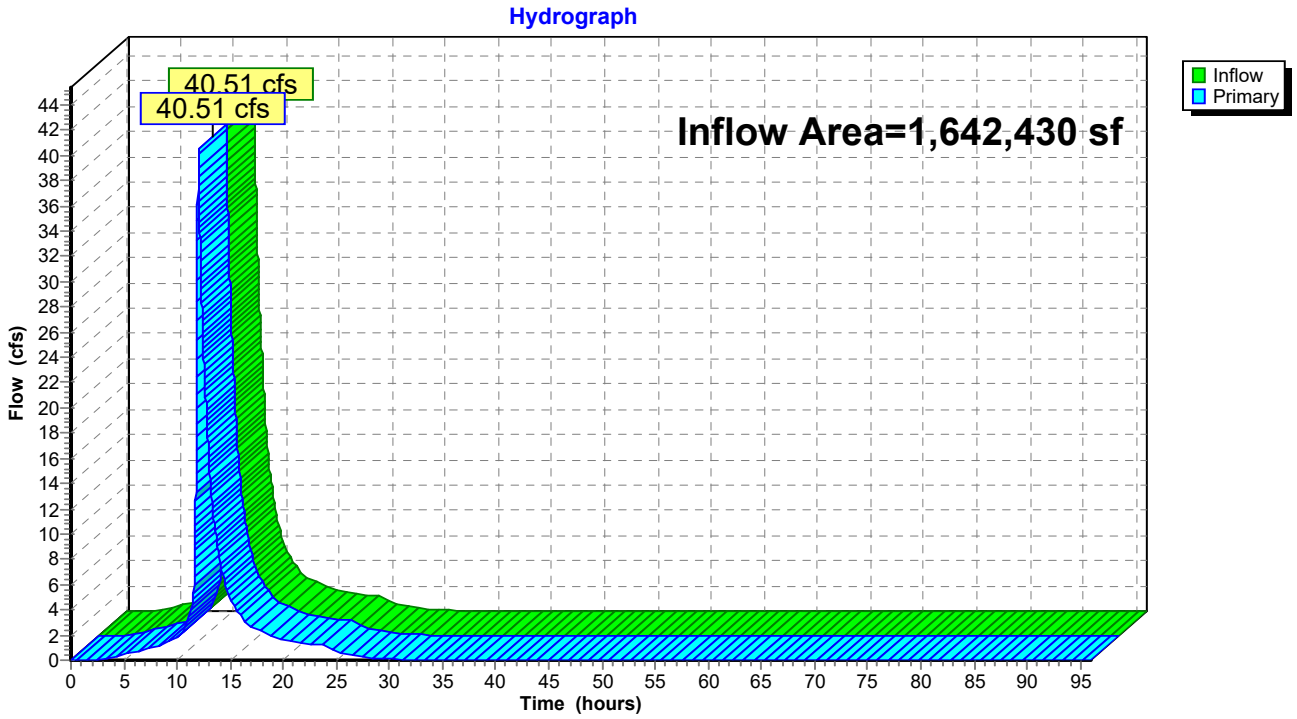


Summary for Link POA1: POA #1

Inflow Area = 1,642,430 sf, 77.11% Impervious, Inflow Depth = 2.18" for 2-yr event
Inflow = 40.51 cfs @ 12.01 hrs, Volume= 298,112 cf
Primary = 40.51 cfs @ 12.01 hrs, Volume= 298,112 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA1: POA #1

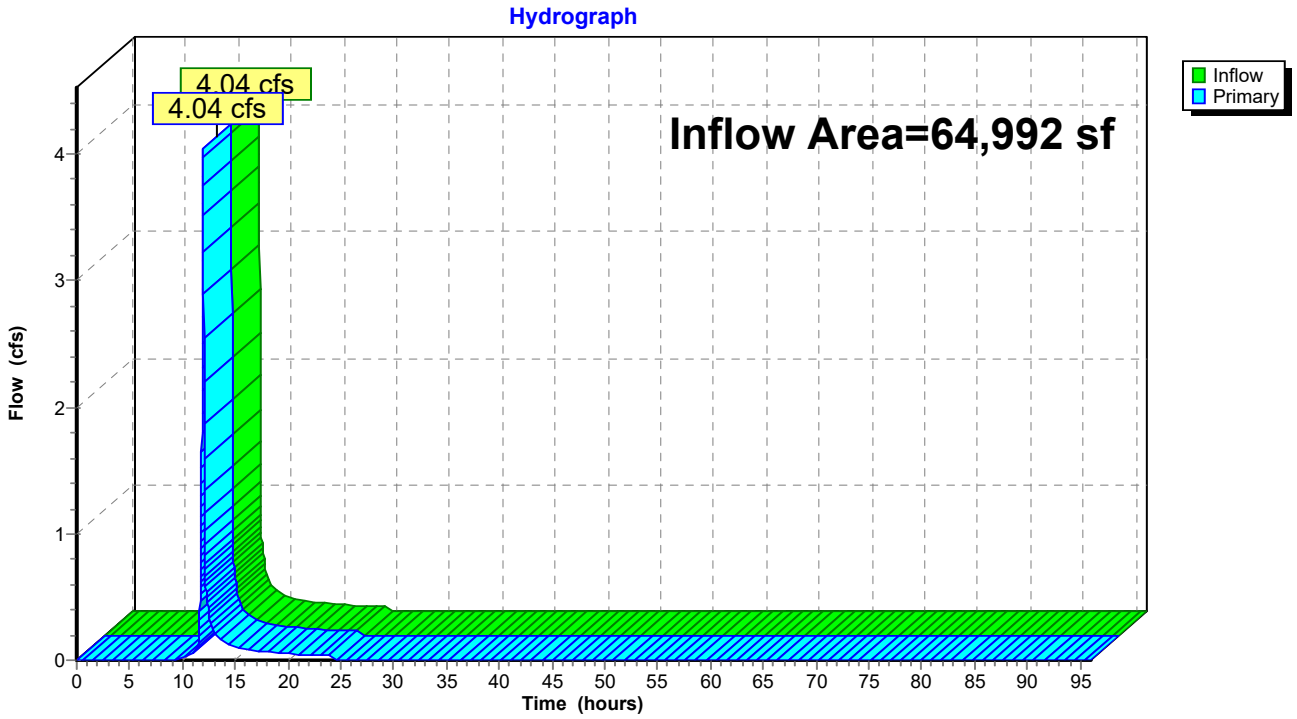


Summary for Link POA2: POA #2

Inflow Area = 64,992 sf, 2.01% Impervious, Inflow Depth = 1.46" for 2-yr event
Inflow = 4.04 cfs @ 11.96 hrs, Volume= 7,931 cf
Primary = 4.04 cfs @ 11.96 hrs, Volume= 7,931 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA2: POA #2

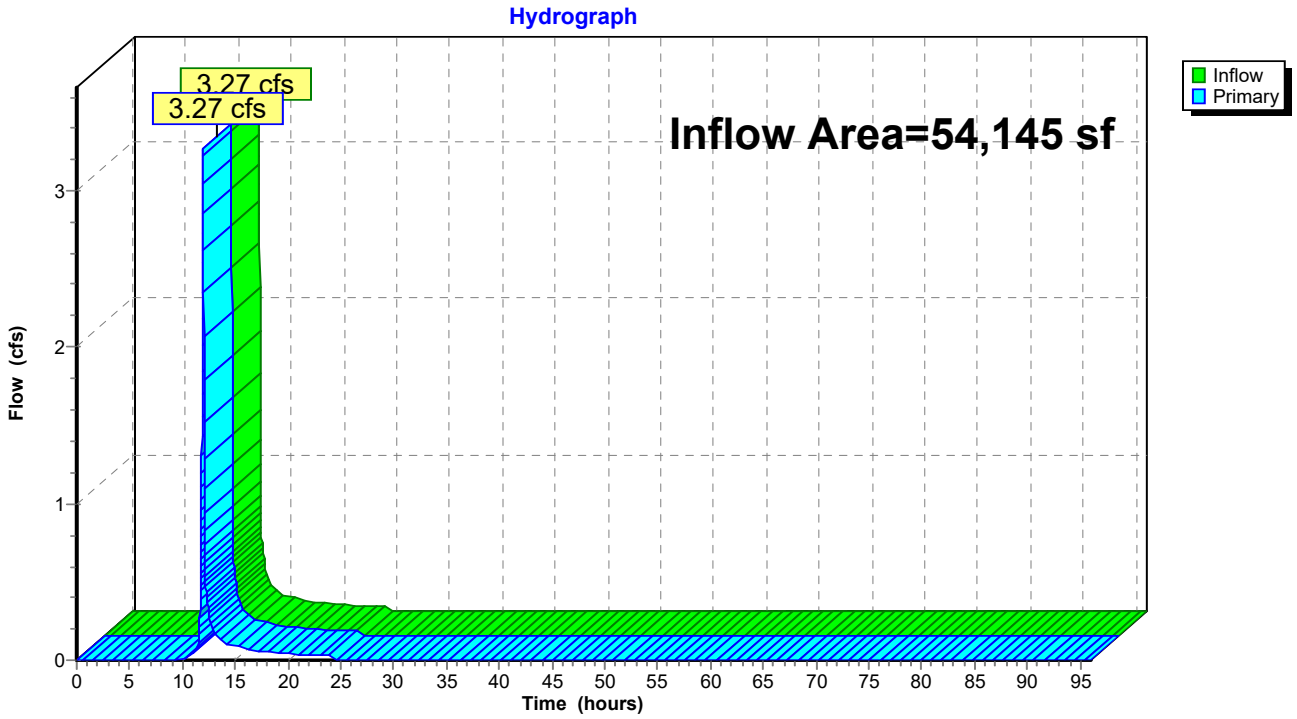


Summary for Link POA3: POA #3

Inflow Area = 54,145 sf, 0.00% Impervious, Inflow Depth = 1.41" for 2-yr event
Inflow = 3.27 cfs @ 11.96 hrs, Volume= 6,368 cf
Primary = 3.27 cfs @ 11.96 hrs, Volume= 6,368 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA3: POA #3



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=6.739 ac 72.10% Impervious Runoff Depth=3.35"
Tc=5.0 min CN=WQ Runoff=36.18 cfs 81,838 cf

Subcatchment2B: Bypass to POA #2 Runoff Area=1.492 ac 2.01% Impervious Runoff Depth=2.14"
Tc=5.0 min CN=WQ Runoff=5.88 cfs 11,606 cf

Subcatchment2S: DA-2 Runoff Area=8.114 ac 98.31% Impervious Runoff Depth=3.82"
Tc=5.0 min CN=WQ Runoff=48.23 cfs 112,384 cf

Subcatchment3B: Bypass to POA #3 Runoff Area=1.243 ac 0.00% Impervious Runoff Depth=2.08"
Tc=5.0 min CN=WQ Runoff=4.79 cfs 9,393 cf

Subcatchment3S: DA-3 Runoff Area=4.417 ac 86.71% Impervious Runoff Depth=3.61"
Tc=5.0 min CN=WQ Runoff=25.18 cfs 57,947 cf

Subcatchment4S: DA-4 Runoff Area=3.585 ac 91.35% Impervious Runoff Depth=3.69"
Tc=5.0 min CN=WQ Runoff=20.79 cfs 48,081 cf

Subcatchment5S: DA-5 Runoff Area=2.881 ac 86.78% Impervious Runoff Depth=3.62"
Tc=5.0 min CN=WQ Runoff=16.43 cfs 37,808 cf

Subcatchment6S: DA-6 Runoff Area=3.336 ac 77.34% Impervious Runoff Depth=3.39"
Tc=5.0 min CN=WQ Runoff=18.00 cfs 41,079 cf

Subcatchment7S: DA-7 Runoff Area=4.253 ac 92.97% Impervious Runoff Depth=3.72"
Tc=5.0 min CN=WQ Runoff=24.80 cfs 57,474 cf

Subcatchment8S: DA-8 Runoff Area=4.380 ac 2.31% Impervious Runoff Depth=2.11"
Tc=5.0 min CN=WQ Runoff=16.98 cfs 33,538 cf

Pond 1P: SCM 1: Infiltration AGB Peak Elev=276.04' Storage=55,029 cf Inflow=36.18 cfs 81,838 cf
Discarded=0.24 cfs 67,014 cf Primary=0.48 cfs 14,827 cf Outflow=0.72 cfs 81,841 cf

Pond 2P: SCM 2: Detention UGB Peak Elev=270.96' Storage=48,342 cf Inflow=48.23 cfs 112,384 cf
Outflow=9.33 cfs 112,244 cf

Pond 3P: SCM 3: Detention UGB Peak Elev=273.80' Storage=21,656 cf Inflow=25.18 cfs 57,947 cf
Outflow=9.14 cfs 57,908 cf

Pond 4P: SCM 4: Detention UGB Peak Elev=274.32' Storage=16,626 cf Inflow=20.79 cfs 48,081 cf
Outflow=6.60 cfs 48,040 cf

Pond 5P: SCM 5: Detention UGB Peak Elev=278.29' Storage=10,821 cf Inflow=16.43 cfs 37,808 cf
Outflow=8.99 cfs 37,798 cf

Pond 6P: SCM 6: Detention UGB Peak Elev=281.66' Storage=13,842 cf Inflow=18.00 cfs 41,079 cf
Outflow=7.51 cfs 41,063 cf

Pond 7P: SCM 7: Detention UGB Peak Elev=274.73' Storage=21,043 cf Inflow=24.80 cfs 57,474 cf
Outflow=8.37 cfs 57,442 cf

Link POA1: POA #1 Inflow=59.24 cfs 402,860 cf
Primary=59.24 cfs 402,860 cf

Link POA2: POA #2 Inflow=5.88 cfs 11,606 cf
Primary=5.88 cfs 11,606 cf

Link POA3: POA #3 Inflow=4.79 cfs 9,393 cf
Primary=4.79 cfs 9,393 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 491,147 cf Average Runoff Depth = 3.35"
28.03% Pervious = 493,709 sf 71.97% Impervious = 1,267,857 sf

Summary for Subcatchment 1S: DA-1

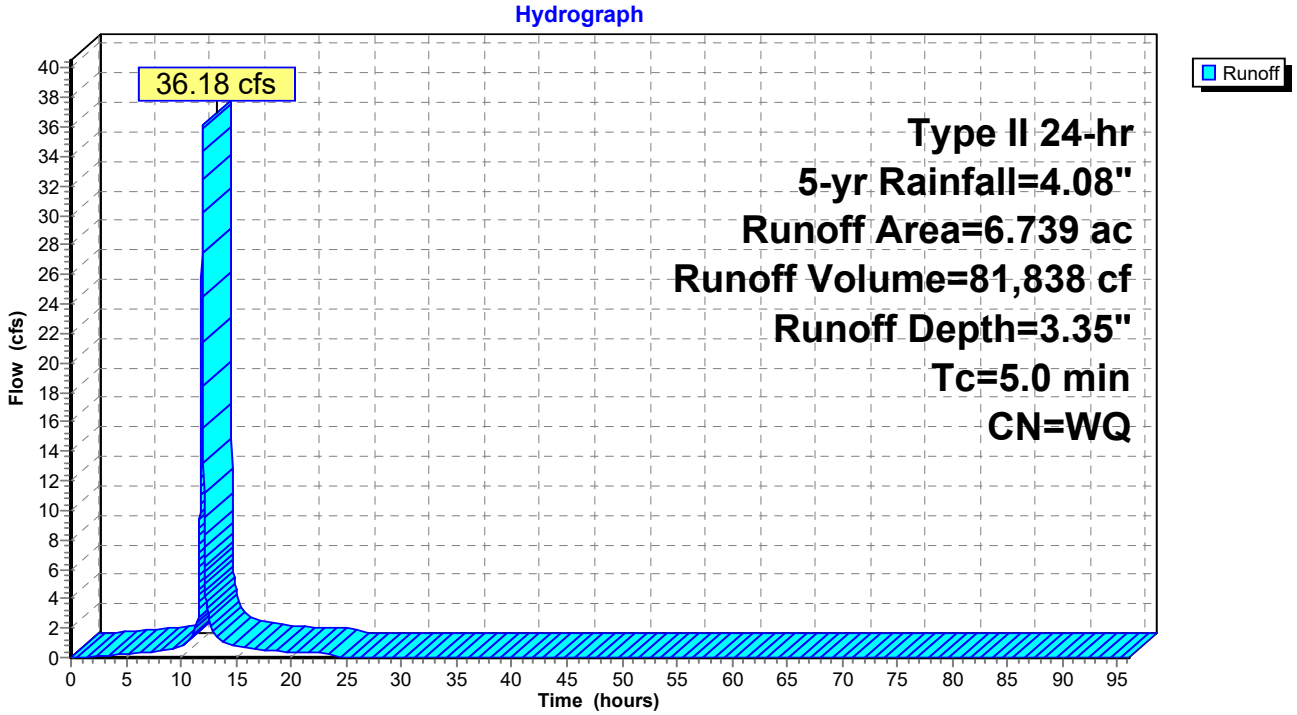
Runoff = 36.18 cfs @ 11.96 hrs, Volume= 81,838 cf, Depth= 3.35"
Routed to Pond 1P : SCM 1: Infiltration AGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
0.222	74	>75% Grass cover, Good, HSG C
1.658	80	>75% Grass cover, Good, HSG D
4.859	98	Paved parking, HSG D
6.739		Weighted Average
1.880		27.90% Pervious Area
4.859		72.10% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2B: Bypass to POA #2

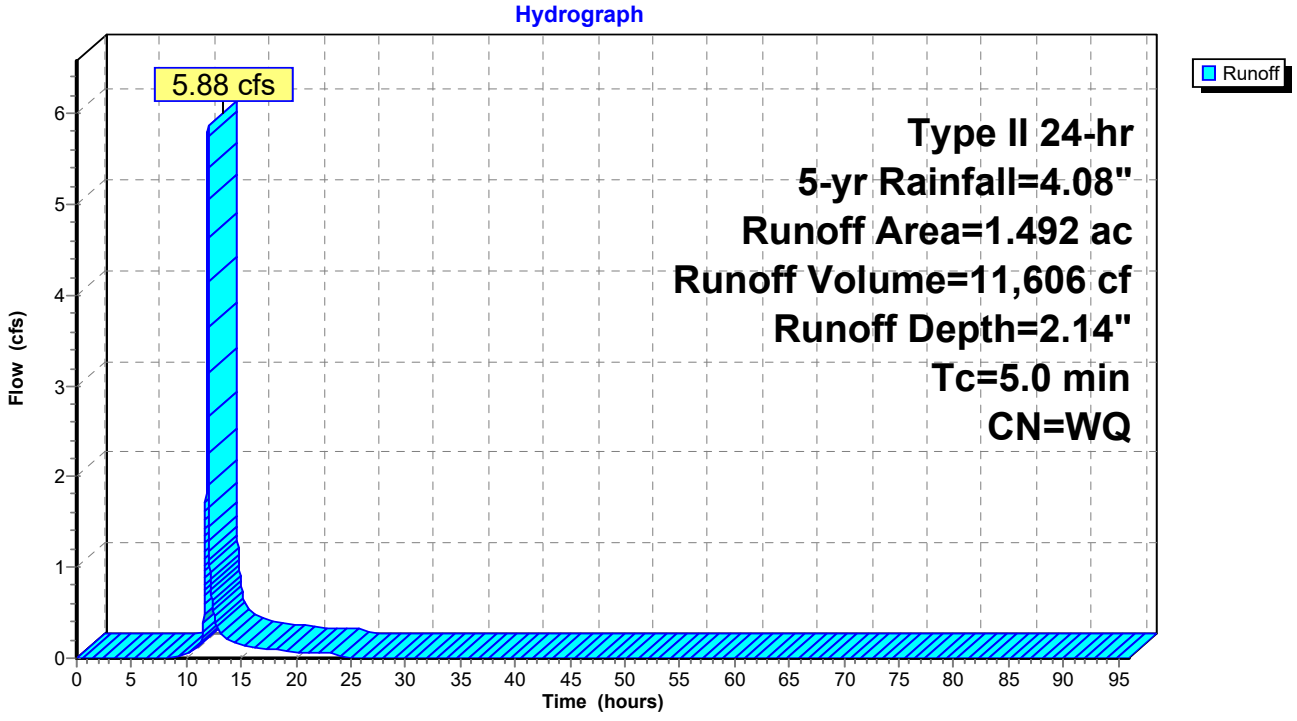
Runoff = 5.88 cfs @ 11.96 hrs, Volume= 11,606 cf, Depth= 2.14"
Routed to Link POA2 : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
1.462	80	>75% Grass cover, Good, HSG D
0.030	98	Paved parking, HSG D
1.492		Weighted Average
1.462		97.99% Pervious Area
0.030		2.01% Impervious Area

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

Subcatchment 2B: Bypass to POA #2



Summary for Subcatchment 2S: DA-2

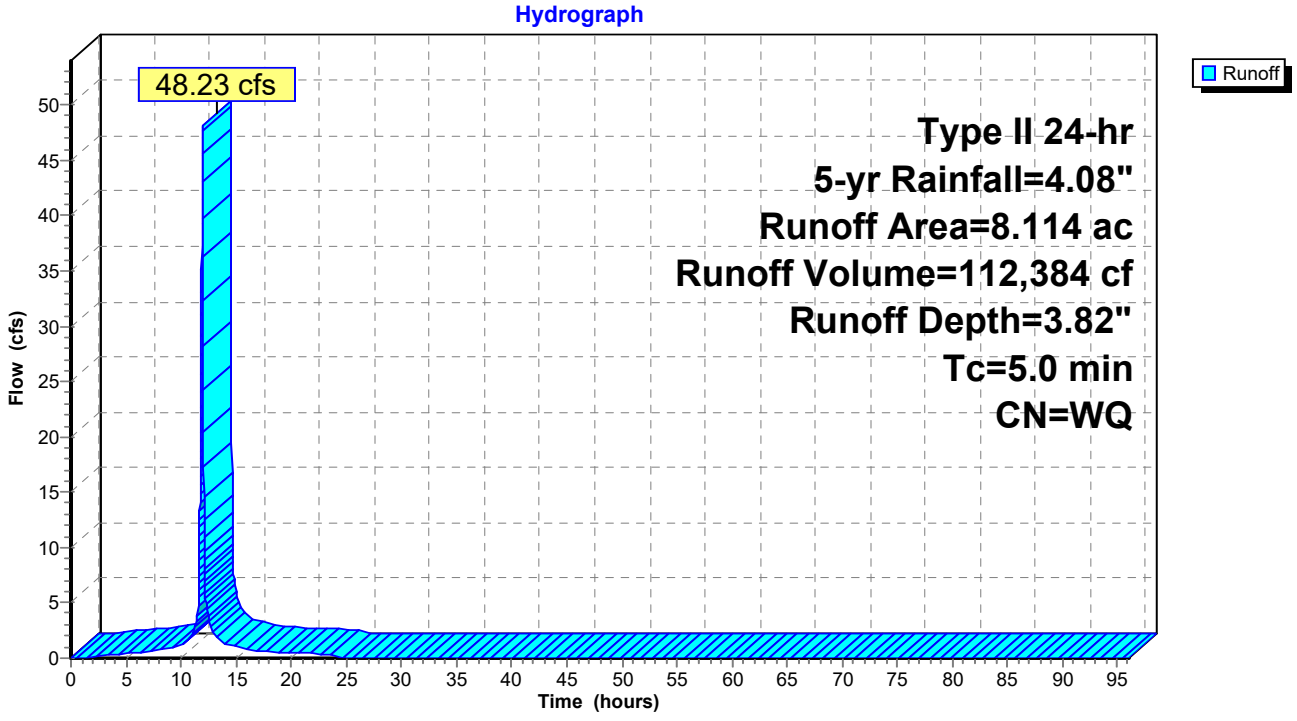
Runoff = 48.23 cfs @ 11.96 hrs, Volume= 112,384 cf, Depth= 3.82"
Routed to Pond 2P : SCM 2: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
0.137	80	>75% Grass cover, Good, HSG D
7.977	98	Paved parking, HSG D
8.114		Weighted Average
0.137		1.69% Pervious Area
7.977		98.31% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3B: Bypass to POA #3

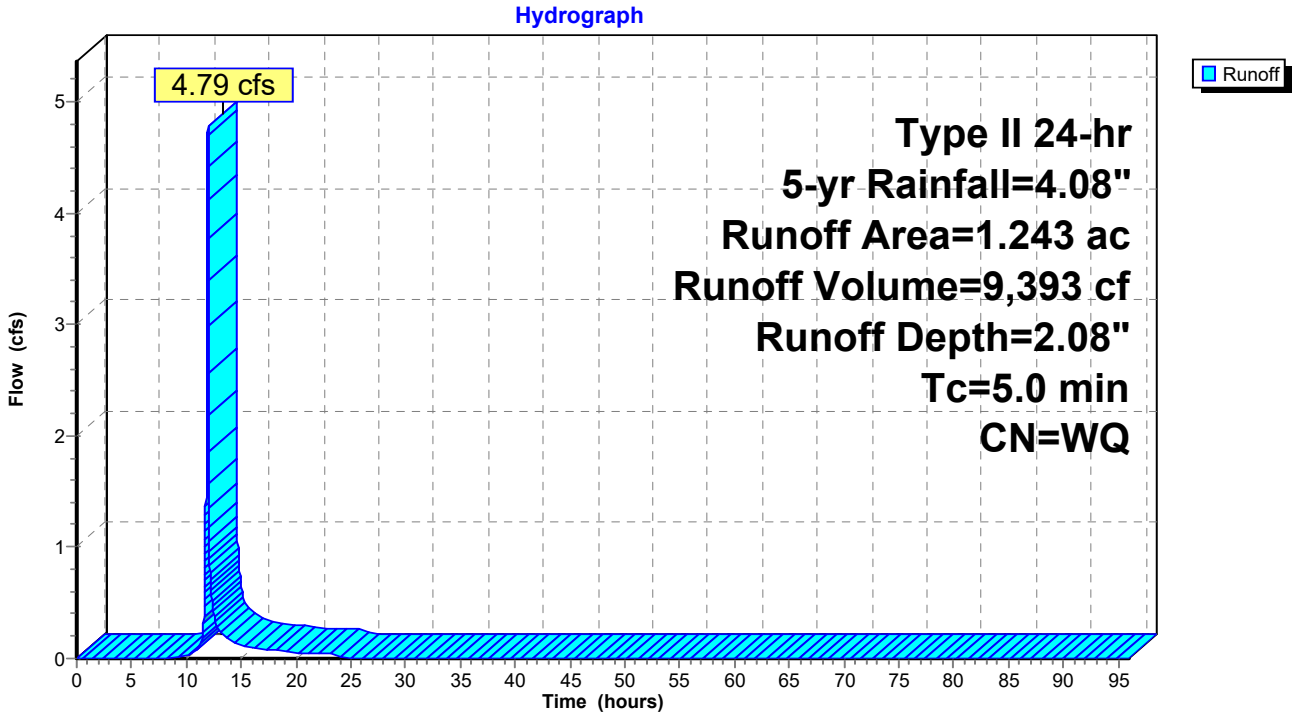
Runoff = 4.79 cfs @ 11.96 hrs, Volume= 9,393 cf, Depth= 2.08"
Routed to Link POA3 : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
0.072	74	>75% Grass cover, Good, HSG C
1.171	80	>75% Grass cover, Good, HSG D
1.243		Weighted Average
1.243		100.00% Pervious Area

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

Subcatchment 3B: Bypass to POA #3



Summary for Subcatchment 3S: DA-3

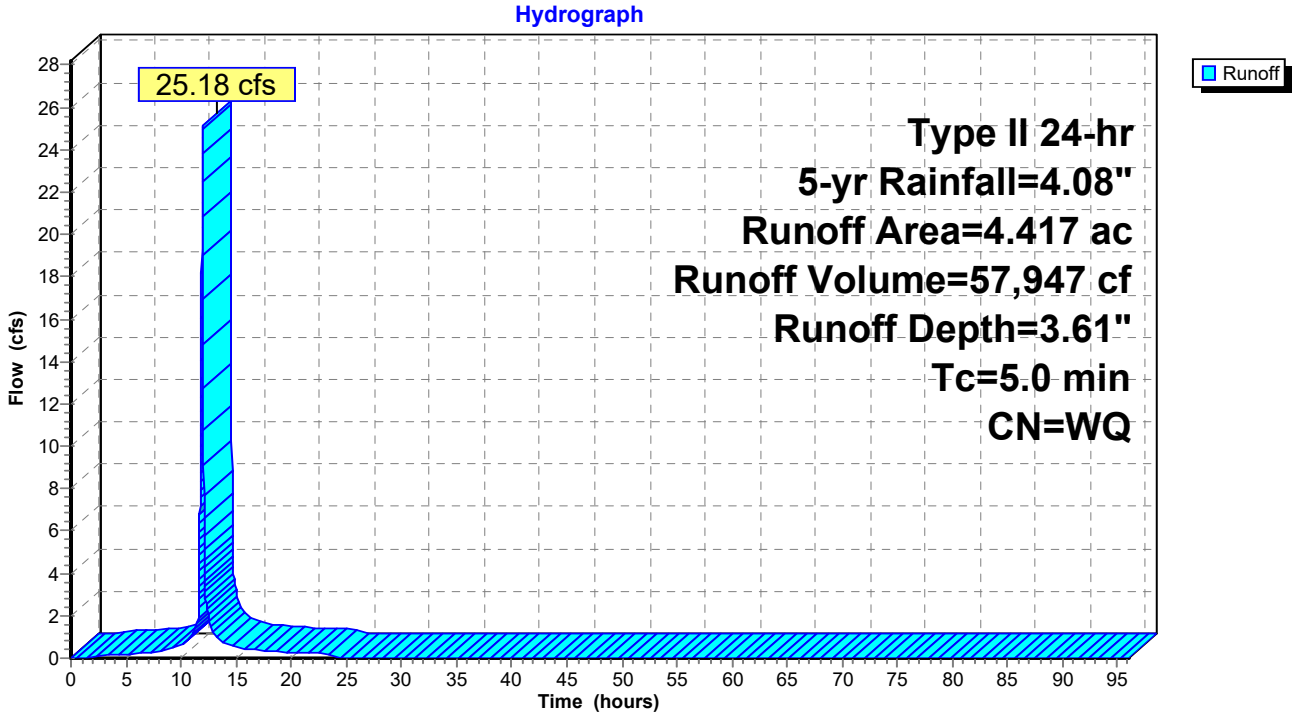
Runoff = 25.18 cfs @ 11.96 hrs, Volume= 57,947 cf, Depth= 3.61"
Routed to Pond 3P : SCM 3: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
0.587	80	>75% Grass cover, Good, HSG D
3.830	98	Paved parking, HSG D
4.417		Weighted Average
0.587		13.29% Pervious Area
3.830		86.71% Impervious Area

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

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

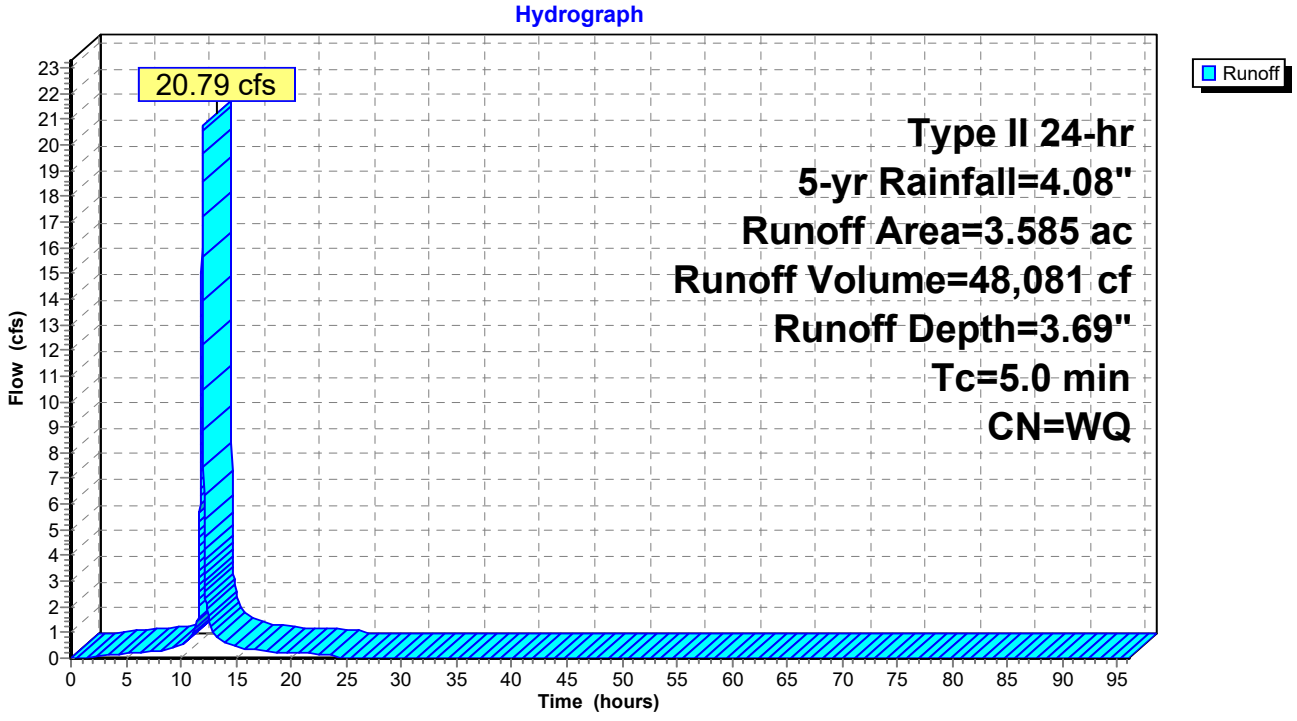
Runoff = 20.79 cfs @ 11.96 hrs, Volume= 48,081 cf, Depth= 3.69"
Routed to Pond 4P : SCM 4: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
0.310	80	>75% Grass cover, Good, HSG D
3.275	98	Paved parking, HSG D
3.585		Weighted Average
0.310		8.65% Pervious Area
3.275		91.35% Impervious Area

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

Subcatchment 4S: DA-4



Summary for Subcatchment 5S: DA-5

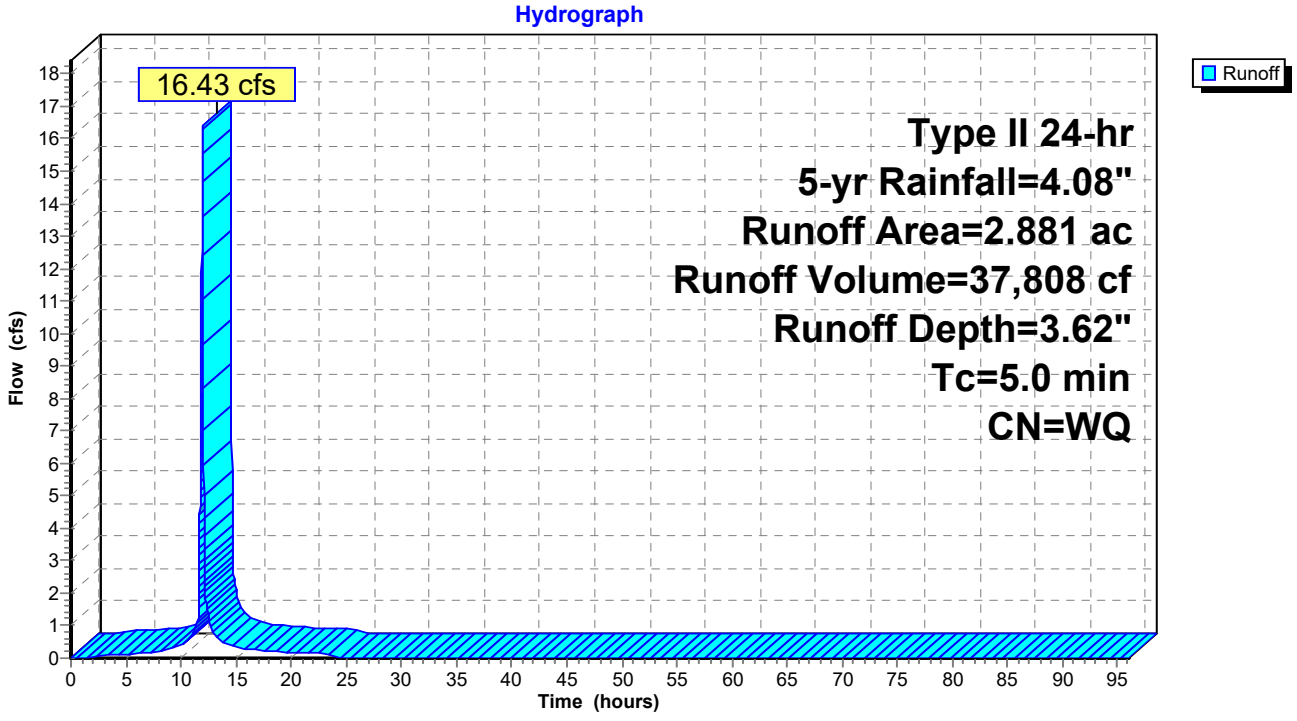
Runoff = 16.43 cfs @ 11.96 hrs, Volume= 37,808 cf, Depth= 3.62"
Routed to Pond 5P : SCM 5: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
0.381	80	>75% Grass cover, Good, HSG D
2.500	98	Paved parking, HSG D
2.881		Weighted Average
0.381		13.22% Pervious Area
2.500		86.78% Impervious Area

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

Subcatchment 5S: DA-5



Summary for Subcatchment 6S: DA-6

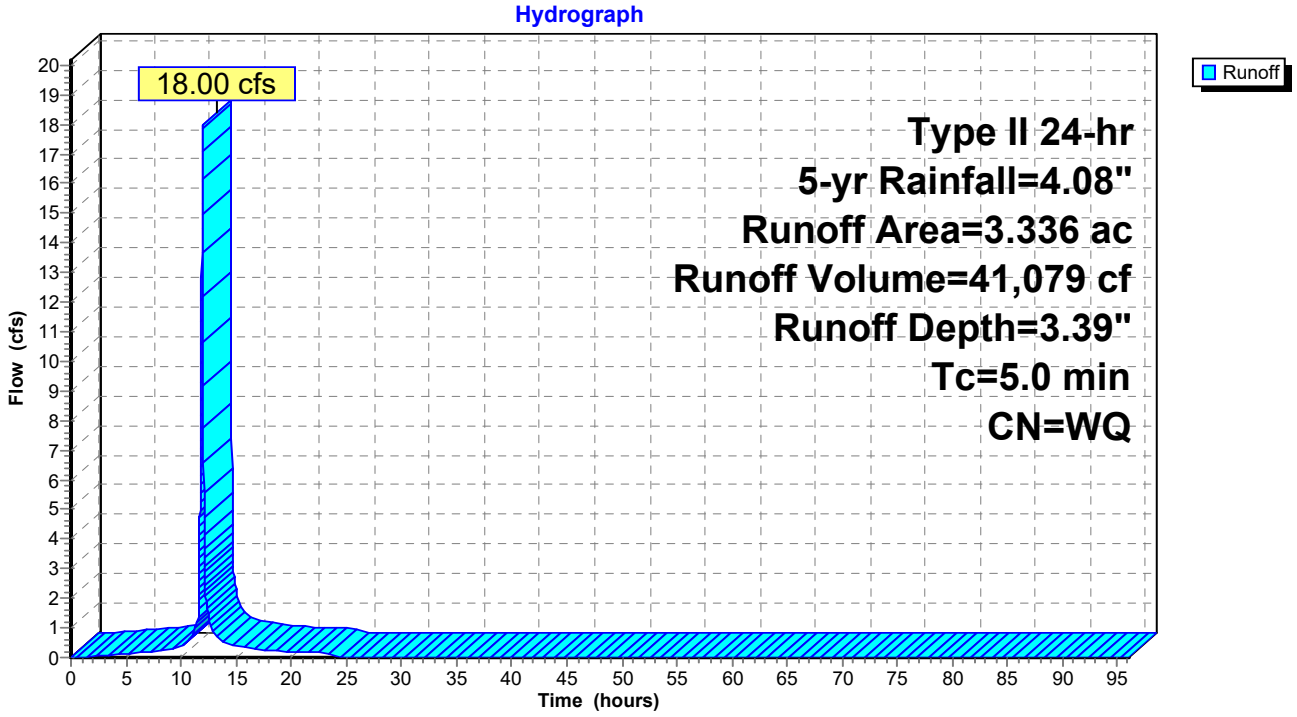
Runoff = 18.00 cfs @ 11.96 hrs, Volume= 41,079 cf, Depth= 3.39"
Routed to Pond 6P : SCM 6: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
0.255	74	>75% Grass cover, Good, HSG C
0.084	70	Woods, Good, HSG C
0.328	80	>75% Grass cover, Good, HSG D
2.580	98	Paved parking, HSG D
0.089	77	Woods, Good, HSG D
3.336		Weighted Average
0.756		22.66% Pervious Area
2.580		77.34% Impervious Area

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

Subcatchment 6S: DA-6



Summary for Subcatchment 7S: DA-7

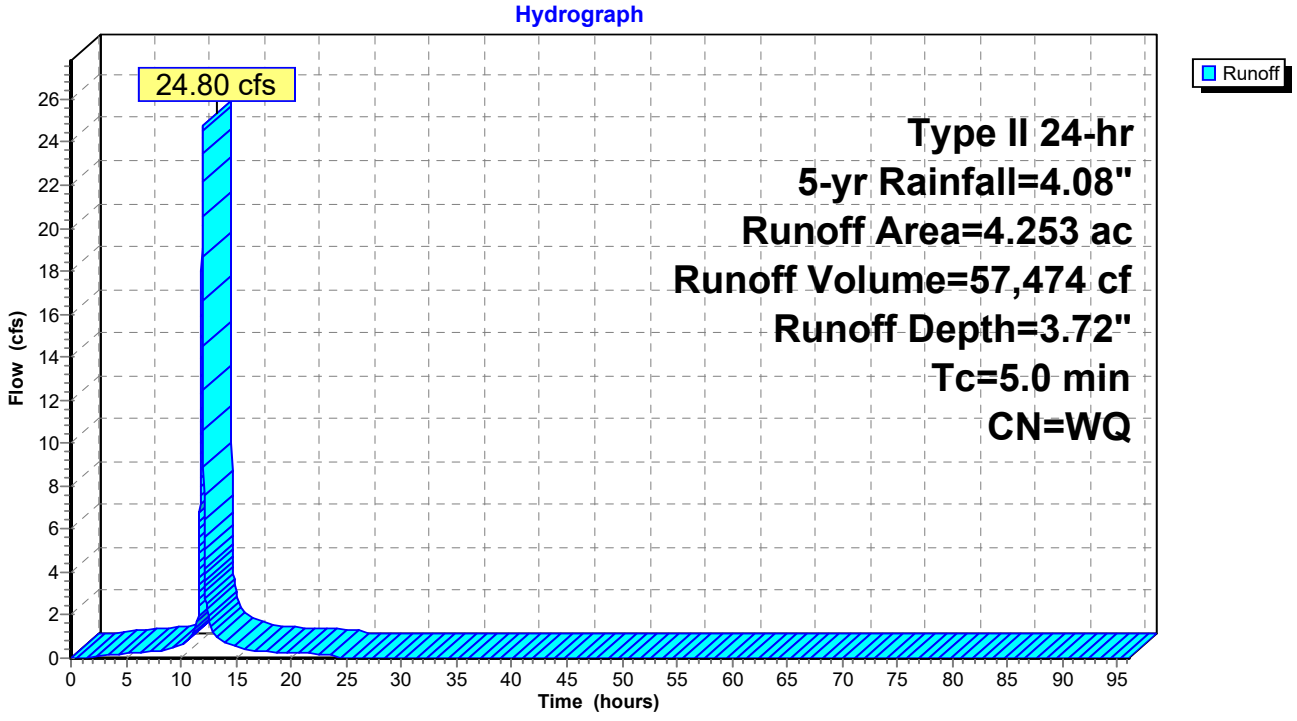
Runoff = 24.80 cfs @ 11.96 hrs, Volume= 57,474 cf, Depth= 3.72"
Routed to Pond 7P : SCM 7: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
0.299	80	>75% Grass cover, Good, HSG D
3.954	98	Paved parking, HSG D
4.253		Weighted Average
0.299		7.03% Pervious Area
3.954		92.97% Impervious Area

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

Subcatchment 7S: DA-7



Summary for Subcatchment 8S: DA-8

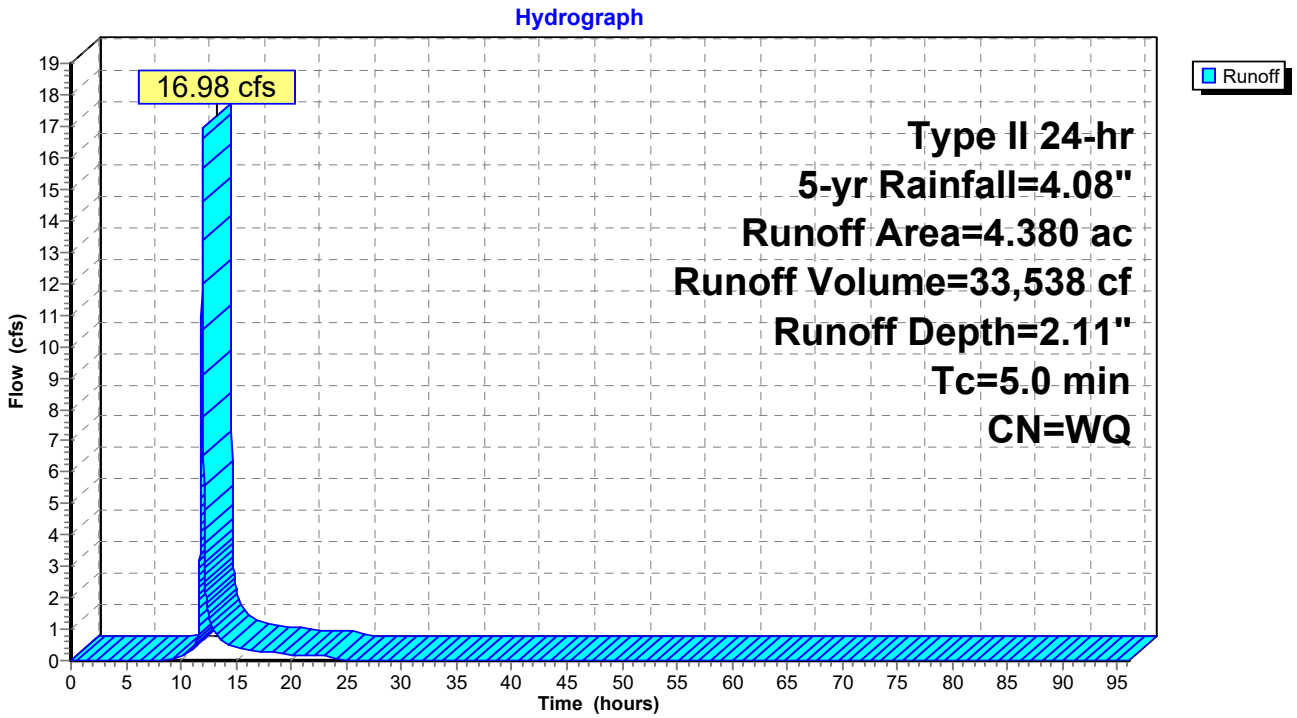
Runoff = 16.98 cfs @ 11.96 hrs, Volume= 33,538 cf, Depth= 2.11"
Routed to Link POA1 : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

Area (ac)	CN	Description
3.905	80	>75% Grass cover, Good, HSG D
0.374	74	>75% Grass cover, Good, HSG C
0.101	98	Paved parking, HSG D
4.380		Weighted Average
4.279		97.69% Pervious Area
0.101		2.31% Impervious Area

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

Subcatchment 8S: DA-8



Summary for Pond 1P: SCM 1: Infiltration AGB

Inflow Area = 293,551 sf, 72.10% Impervious, Inflow Depth = 3.35" for 5-yr event
Inflow = 36.18 cfs @ 11.96 hrs, Volume= 81,838 cf
Outflow = 0.72 cfs @ 15.42 hrs, Volume= 81,841 cf, Atten= 98%, Lag= 207.7 min
Discarded = 0.24 cfs @ 15.42 hrs, Volume= 67,014 cf
Primary = 0.48 cfs @ 15.42 hrs, Volume= 14,827 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 276.04' @ 15.42 hrs Surf.Area= 28,961 sf Storage= 55,029 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1,611.3 min (2,372.0 - 760.7)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	186,083 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

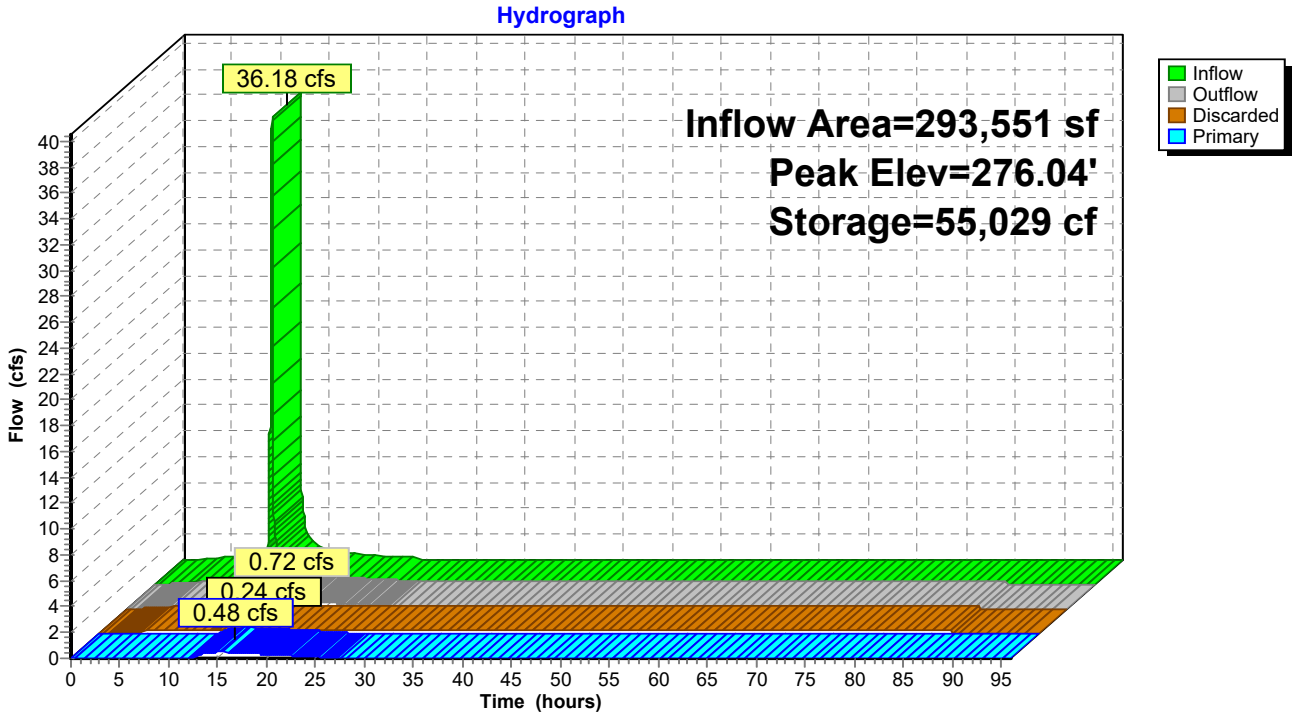
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	24,939	0	0
275.00	26,877	25,908	25,908
276.00	28,873	27,875	53,783
277.00	30,924	29,899	83,682
278.00	33,033	31,979	115,660
279.00	35,197	34,115	149,775
280.00	37,419	36,308	186,083

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**0.353 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**30.0" Round Culvert** L= 52.0' Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.00' S= 0.0385 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#3	Device 2	275.75'	**12.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	276.25'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	277.00'	**24.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	277.50'	**24.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.24 cfs @ 15.42 hrs HW=276.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.48 cfs @ 15.42 hrs HW=276.04' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Passes 0.48 cfs of 20.90 cfs potential flow)
│ ├**3=Orifice/Grate** (Orifice Controls 0.48 cfs @ 1.92 fps)
│ ├**4=Orifice/Grate** (Controls 0.00 cfs)
│ └**5=Orifice/Grate** (Controls 0.00 cfs)
└**6=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: SCM 1: Infiltration AGB



Summary for Pond 2P: SCM 2: Detention UGB

Inflow Area = 353,446 sf, 98.31% Impervious, Inflow Depth = 3.82" for 5-yr event
Inflow = 48.23 cfs @ 11.96 hrs, Volume= 112,384 cf
Outflow = 9.33 cfs @ 12.10 hrs, Volume= 112,244 cf, Atten= 81%, Lag= 8.9 min
Primary = 9.33 cfs @ 12.10 hrs, Volume= 112,244 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 270.96' @ 12.10 hrs Surf.Area= 30,988 sf Storage= 48,342 cf

Plug-Flow detention time= 130.9 min calculated for 112,232 cf (100% of inflow)
Center-of-Mass det. time= 130.5 min (877.9 - 747.4)

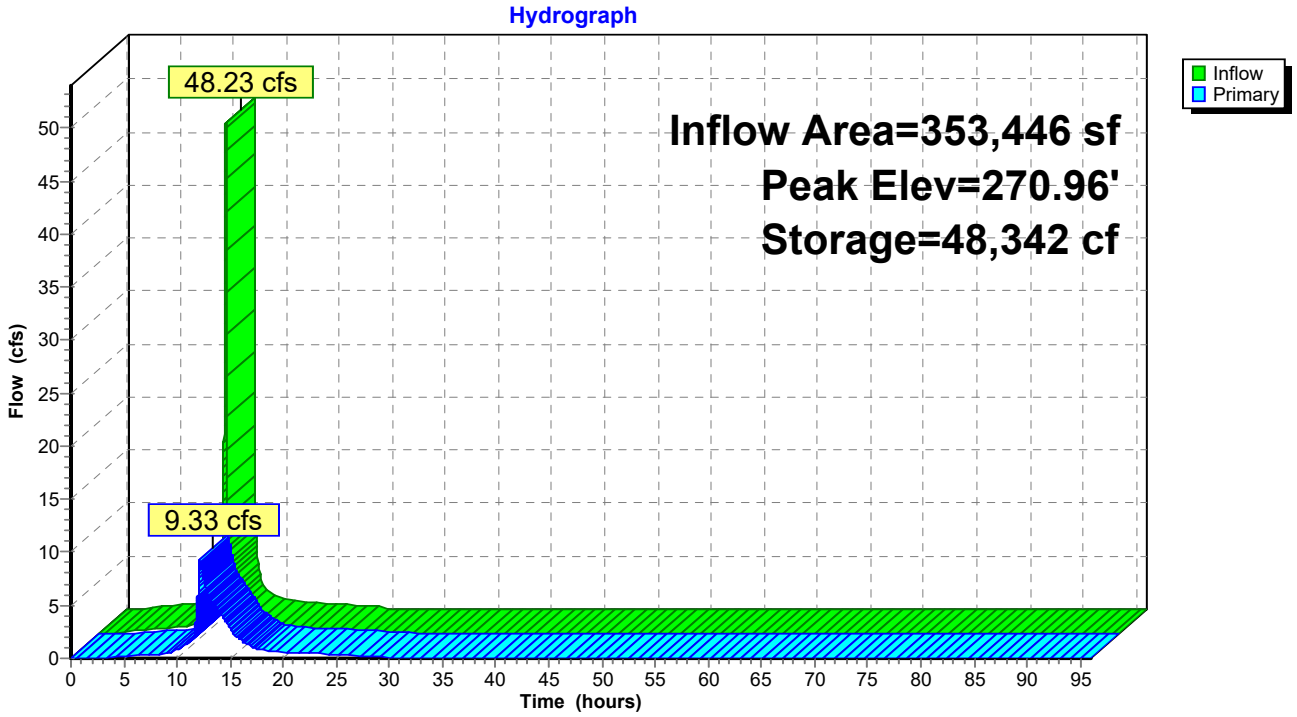
Volume	Invert	Avail.Storage	Storage Description
#1A	268.75'	41,546 cf	**63.75'W x 486.09'L x 5.50'H Field A** 170,435 cf Overall - 66,569 cf Embedded = 103,866 cf x 40.0% Voids
#2A	269.50'	66,569 cf	**ADS_StormTech MC-3500 d +Cap**x 603 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 603 Chambers in 9 Rows Cap Storage= 14.9 cf x 2 x 9 rows = 268.2 cf
		108,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	268.75'	**36.0" Round Outlet Pipe** L= 112.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 268.75' / 268.25' S= 0.0045 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	268.75'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	269.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	270.50'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	271.75'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	272.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=9.33 cfs @ 12.10 hrs HW=270.96' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 9.33 cfs of 20.68 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.02 cfs @ 6.95 fps)
  ├─**3=Orifice** (Orifice Controls 5.81 cfs @ 5.81 fps)
  ├─**4=Orifice** (Orifice Controls 2.50 cfs @ 2.17 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SCM 2: Detention UGB



Summary for Pond 3P: SCM 3: Detention UGB

Inflow Area = 192,405 sf, 86.71% Impervious, Inflow Depth = 3.61" for 5-yr event
Inflow = 25.18 cfs @ 11.96 hrs, Volume= 57,947 cf
Outflow = 9.14 cfs @ 12.06 hrs, Volume= 57,908 cf, Atten= 64%, Lag= 6.2 min
Primary = 9.14 cfs @ 12.06 hrs, Volume= 57,908 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 273.80' @ 12.06 hrs Surf.Area= 16,811 sf Storage= 21,656 cf

Plug-Flow detention time= 87.4 min calculated for 57,902 cf (100% of inflow)
Center-of-Mass det. time= 87.3 min (840.2 - 752.9)

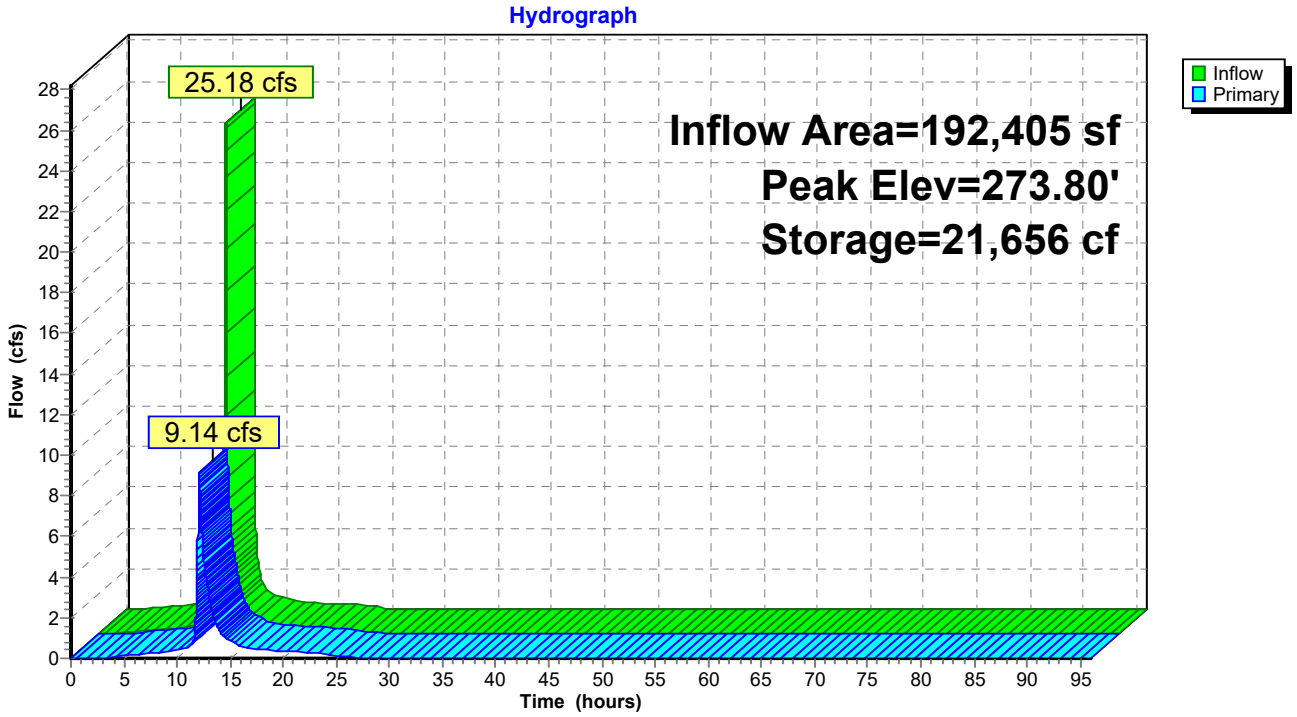
Volume	Invert	Avail.Storage	Storage Description
#1A	272.00'	15,071 cf	**46.75'W x 359.60'L x 3.75'H Field A** 63,042 cf Overall - 25,365 cf Embedded = 37,678 cf x 40.0% Voids
#2A	272.50'	25,365 cf	**ADS_StormTech SC-800 +Cap** x 500 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 500 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		40,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**36.0" Round Outlet Pipe** L= 628.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 272.00' / 268.25' S= 0.0060 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	272.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	272.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	273.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.50'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=9.14 cfs @ 12.06 hrs HW=273.80' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 9.14 cfs of 16.00 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.92 cfs @ 6.24 fps)
  ├─**3=Orifice** (Orifice Controls 4.93 cfs @ 4.93 fps)
  ├─**4=Orifice** (Orifice Controls 3.29 cfs @ 2.38 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: SCM 3: Detention UGB



Summary for Pond 4P: SCM 4: Detention UGB

Inflow Area = 156,163 sf, 91.35% Impervious, Inflow Depth = 3.69" for 5-yr event
Inflow = 20.79 cfs @ 11.96 hrs, Volume= 48,081 cf
Outflow = 6.60 cfs @ 12.07 hrs, Volume= 48,040 cf, Atten= 68%, Lag= 6.7 min
Primary = 6.60 cfs @ 12.07 hrs, Volume= 48,040 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.32' @ 12.07 hrs Surf.Area= 20,685 sf Storage= 16,626 cf

Plug-Flow detention time= 81.1 min calculated for 48,035 cf (100% of inflow)
Center-of-Mass det. time= 80.9 min (831.5 - 750.6)

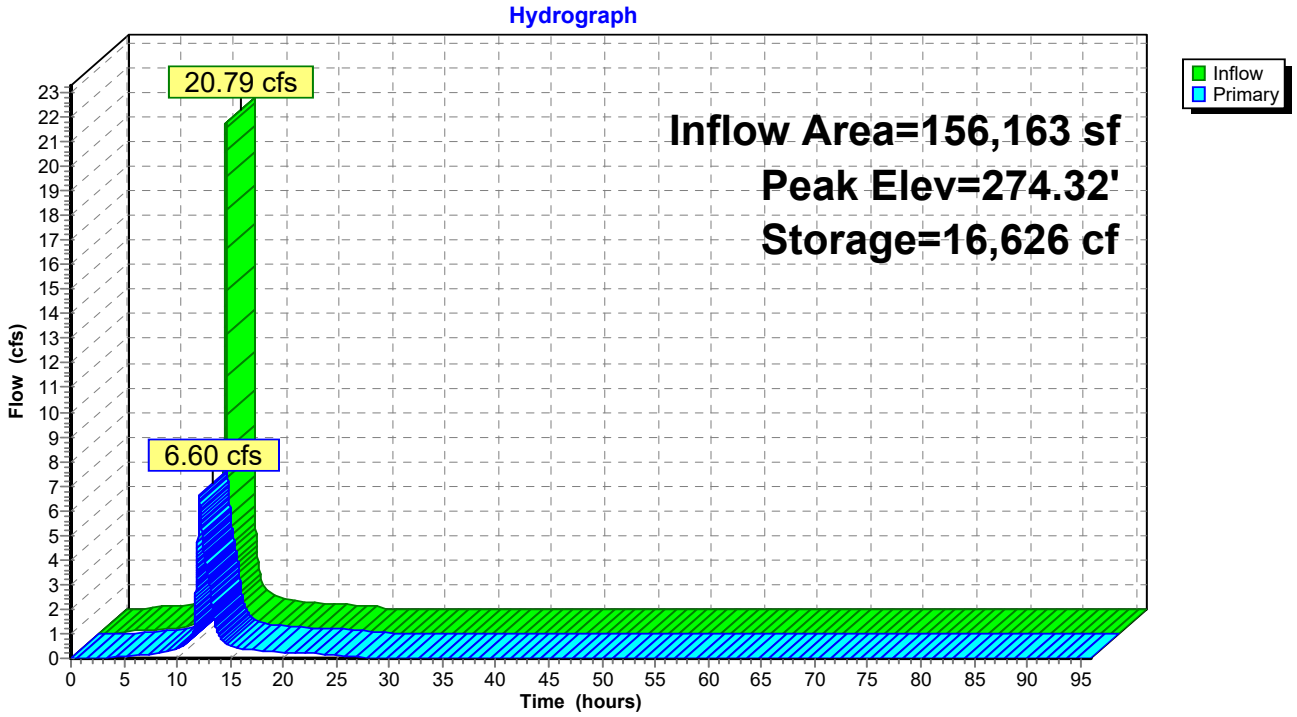
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	27,875 cf	**49.92'W x 414.39'L x 5.50'H Field A** 113,767 cf Overall - 44,079 cf Embedded = 69,688 cf x 40.0% Voids
#2A	273.75'	44,079 cf	**ADS_StormTech MC-3500 d +Cap** x 399 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 399 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		71,955 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 269.00' S= 0.0381 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.00'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.75'	**42.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.09'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=6.60 cfs @ 12.07 hrs HW=274.32' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 6.60 cfs of 9.28 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.78 cfs @ 5.27 fps)
  ├─**3=Orifice** (Orifice Controls 4.35 cfs @ 4.35 fps)
  ├─**4=Orifice** (Orifice Controls 1.47 cfs @ 1.82 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: SCM 4: Detention UGB



Summary for Pond 5P: SCM 5: Detention UGB

Inflow Area = 125,496 sf, 86.78% Impervious, Inflow Depth = 3.62" for 5-yr event
Inflow = 16.43 cfs @ 11.96 hrs, Volume= 37,808 cf
Outflow = 8.99 cfs @ 12.03 hrs, Volume= 37,798 cf, Atten= 45%, Lag= 4.7 min
Primary = 8.99 cfs @ 12.03 hrs, Volume= 37,798 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 278.29' @ 12.03 hrs Surf.Area= 8,494 sf Storage= 10,821 cf

Plug-Flow detention time= 47.0 min calculated for 37,798 cf (100% of inflow)
Center-of-Mass det. time= 46.8 min (799.6 - 752.8)

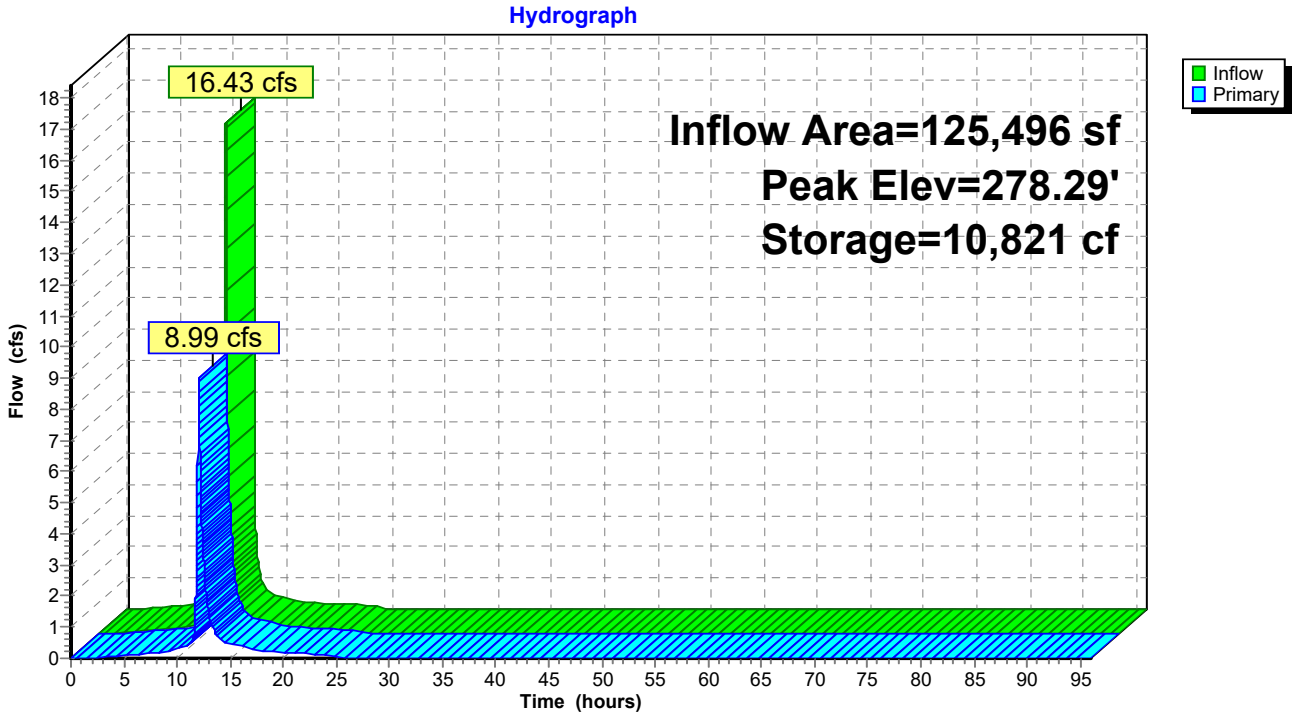
Volume	Invert	Avail.Storage	Storage Description
#1A	276.50'	7,654 cf	**46.75'W x 181.68'L x 3.75'H Field A** 31,851 cf Overall - 12,716 cf Embedded = 19,135 cf x 40.0% Voids
#2A	277.00'	12,716 cf	**ADS_StormTech SC-800 +Cap** x 250 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 250 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		20,370 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	276.50'	**36.0" Round Outlet Pipe** L= 900.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.50' / 269.00' S= 0.0083 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	276.50'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	277.75'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.00'	**36.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	279.60'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=8.98 cfs @ 12.03 hrs HW=278.29' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 8.98 cfs of 15.79 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.91 cfs @ 6.21 fps)
  ├─**3=Orifice** (Orifice Controls 4.89 cfs @ 4.89 fps)
  ├─**4=Orifice** (Orifice Controls 3.17 cfs @ 2.36 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: SCM 5: Detention UGB



Summary for Pond 6P: SCM 6: Detention UGB

Inflow Area = 145,316 sf, 77.34% Impervious, Inflow Depth = 3.39" for 5-yr event
Inflow = 18.00 cfs @ 11.96 hrs, Volume= 41,079 cf
Outflow = 7.51 cfs @ 12.05 hrs, Volume= 41,063 cf, Atten= 58%, Lag= 5.7 min
Primary = 7.51 cfs @ 12.05 hrs, Volume= 41,063 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 281.66' @ 12.05 hrs Surf.Area= 11,821 sf Storage= 13,842 cf

Plug-Flow detention time= 65.8 min calculated for 41,063 cf (100% of inflow)
Center-of-Mass det. time= 65.5 min (823.1 - 757.6)

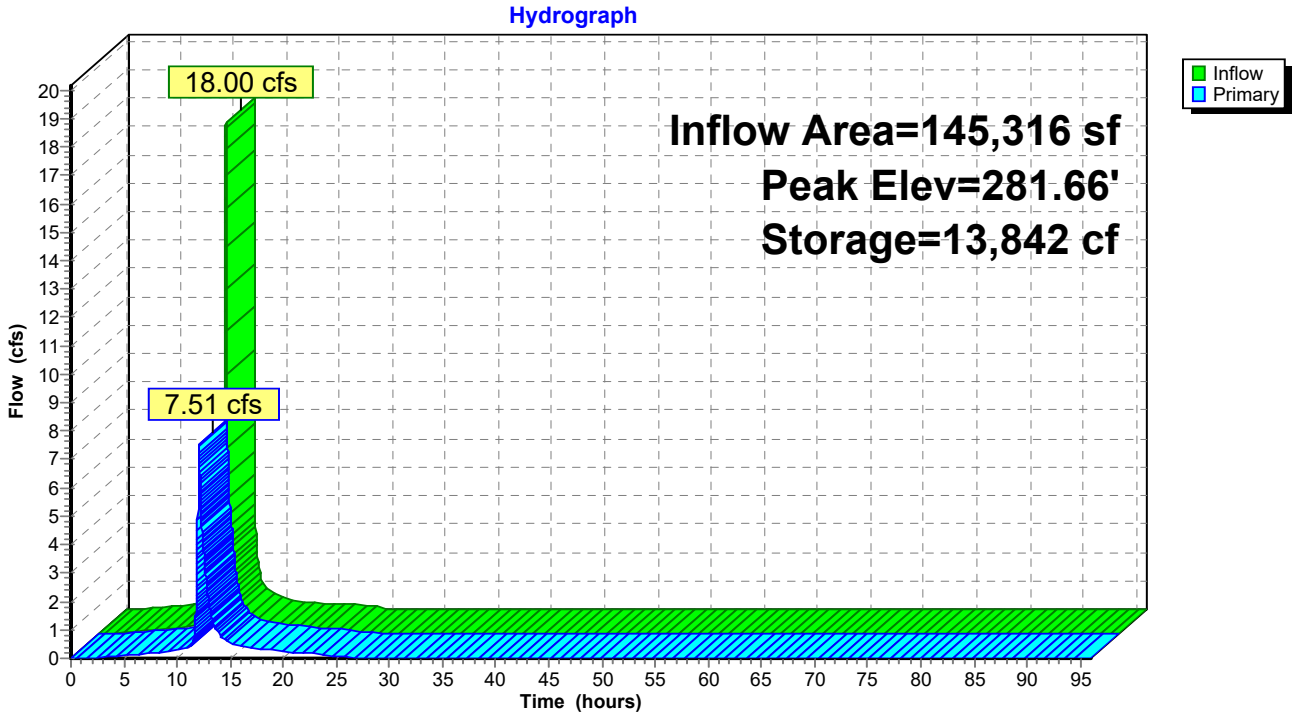
Volume	Invert	Avail.Storage	Storage Description
#1A	280.00'	10,621 cf	**46.75'W x 252.85'L x 3.75'H Field A** 44,328 cf Overall - 17,776 cf Embedded = 26,552 cf x 40.0% Voids
#2A	280.50'	17,776 cf	**ADS_StormTech SC-800 +Cap** x 350 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 350 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		28,397 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	280.00'	**36.0" Round Outlet Pipe** L= 800.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 280.00' / 271.00' S= 0.0112 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	280.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	281.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	282.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	283.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=7.51 cfs @ 12.05 hrs HW=281.65' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 7.51 cfs of 13.82 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.88 cfs @ 5.96 fps)
  ├─**3=Orifice** (Orifice Controls 4.57 cfs @ 4.57 fps)
  ├─**4=Orifice** (Orifice Controls 2.07 cfs @ 2.04 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6P: SCM 6: Detention UGB



Summary for Pond 7P: SCM 7: Detention UGB

Inflow Area = 185,261 sf, 92.97% Impervious, Inflow Depth = 3.72" for 5-yr event
Inflow = 24.80 cfs @ 11.96 hrs, Volume= 57,474 cf
Outflow = 8.37 cfs @ 12.06 hrs, Volume= 57,442 cf, Atten= 66%, Lag= 6.5 min
Primary = 8.37 cfs @ 12.06 hrs, Volume= 57,442 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.73' @ 12.06 hrs Surf.Area= 18,180 sf Storage= 21,043 cf

Plug-Flow detention time= 85.8 min calculated for 57,442 cf (100% of inflow)
Center-of-Mass det. time= 85.4 min (835.2 - 749.8)

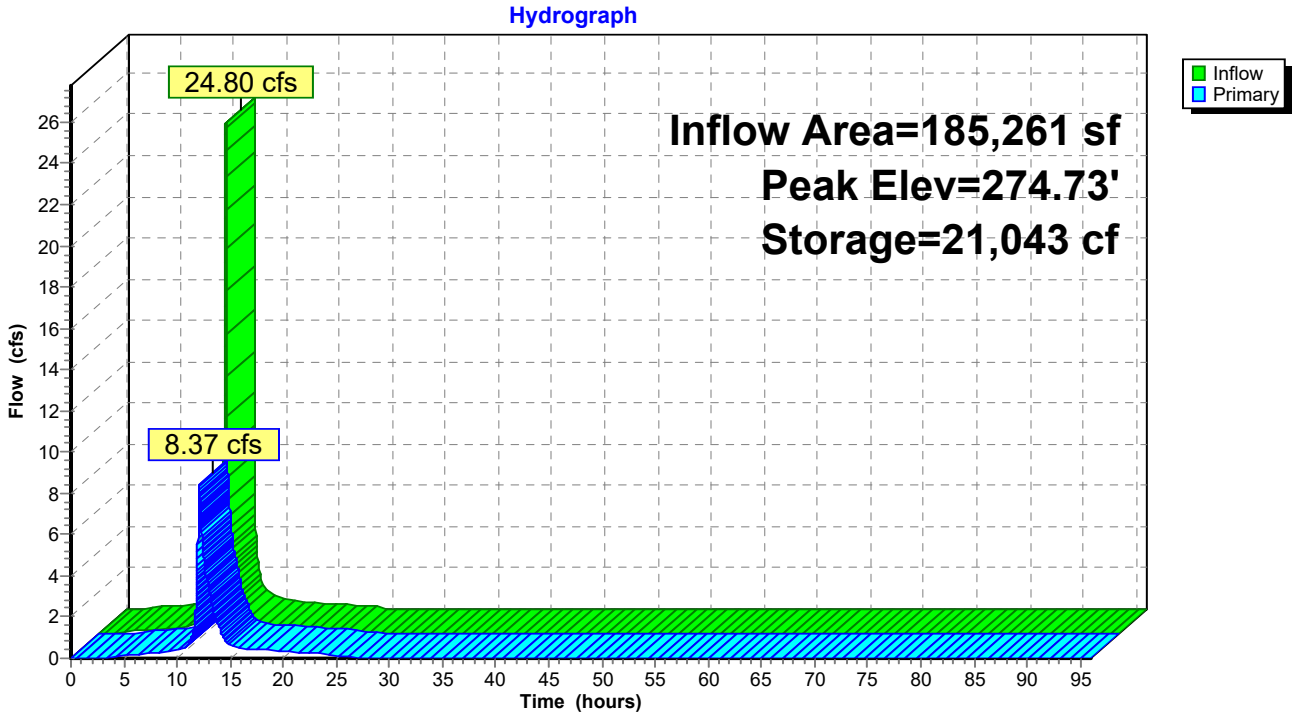
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	24,519 cf	**49.92'W x 364.20'L x 5.50'H Field A** 99,988 cf Overall - 38,692 cf Embedded = 61,296 cf x 40.0% Voids
#2A	273.75'	38,692 cf	**ADS_StormTech MC-3500 d +Cap** x 350 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 350 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		63,210 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 271.00' S= 0.0190 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	275.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	276.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=8.37 cfs @ 12.06 hrs HW=274.73' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 8.37 cfs of 14.99 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.90 cfs @ 6.11 fps)
  ├─**3=Orifice** (Orifice Controls 4.76 cfs @ 4.76 fps)
  ├─**4=Orifice** (Orifice Controls 2.71 cfs @ 2.23 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: SCM 7: Detention UGB

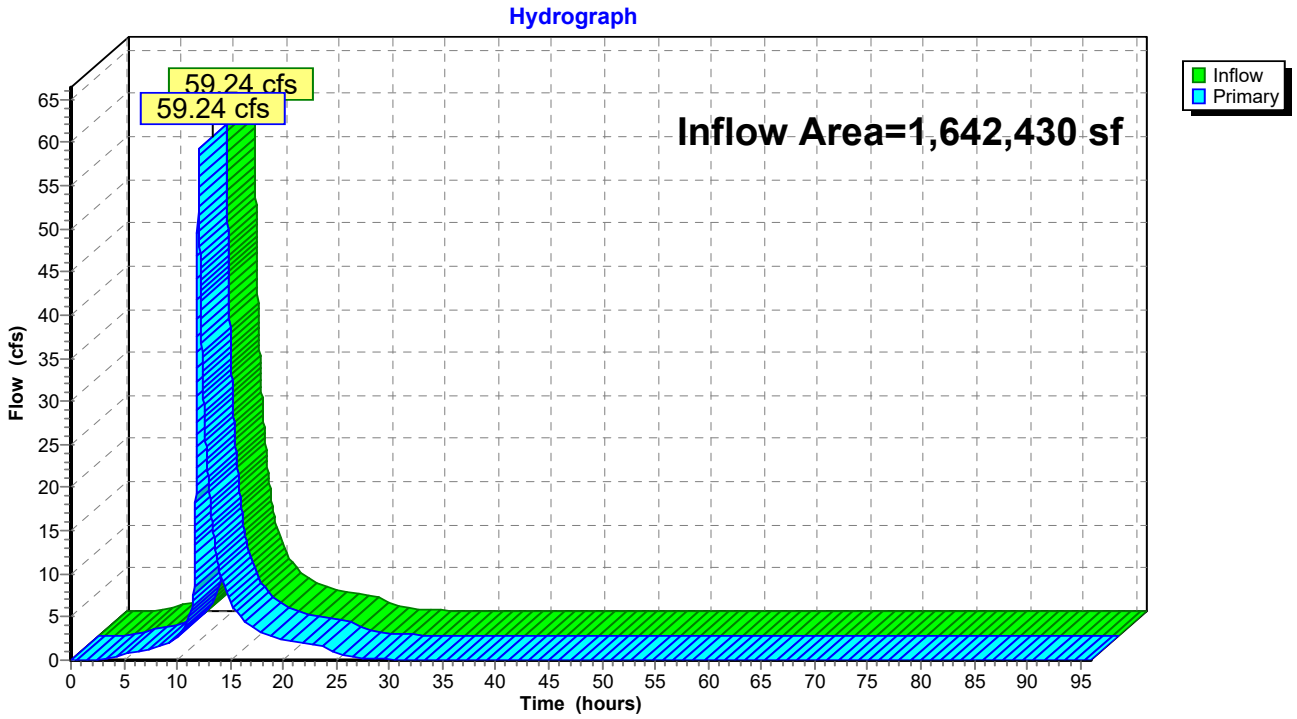


Summary for Link POA1: POA #1

Inflow Area = 1,642,430 sf, 77.11% Impervious, Inflow Depth = 2.94" for 5-yr event
Inflow = 59.24 cfs @ 12.02 hrs, Volume= 402,860 cf
Primary = 59.24 cfs @ 12.02 hrs, Volume= 402,860 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA1: POA #1

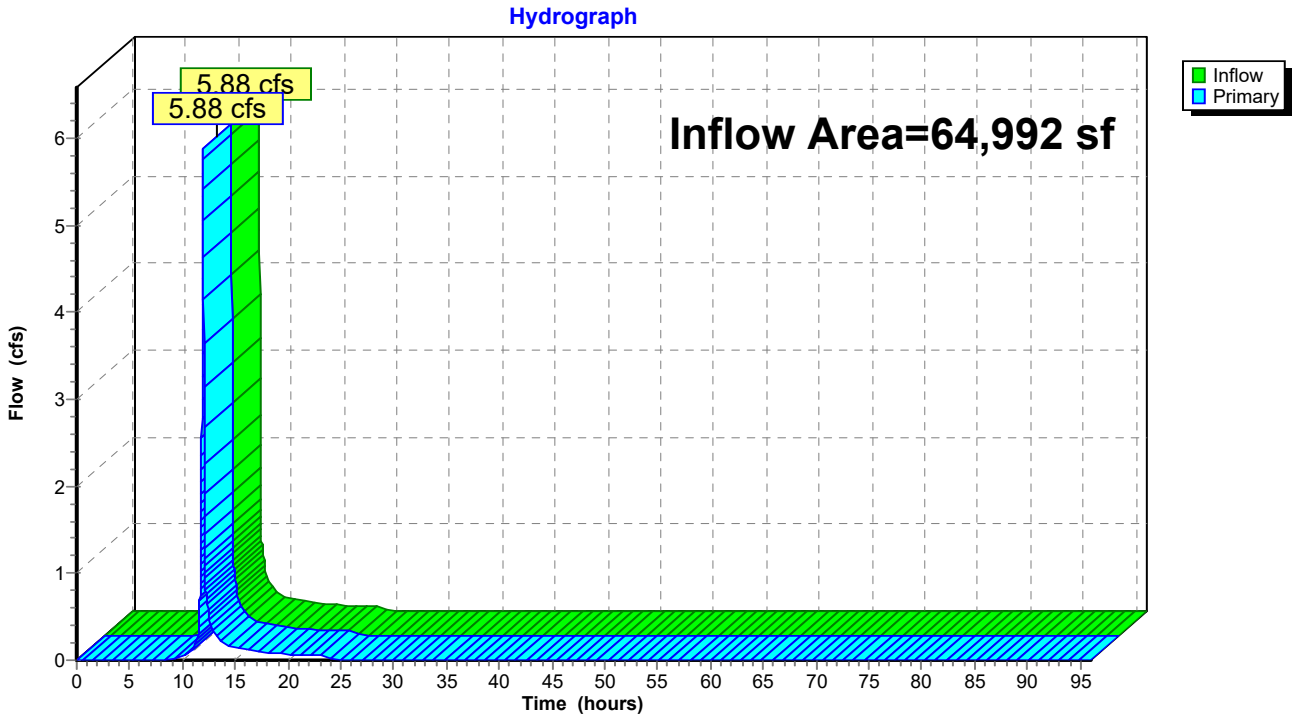


Summary for Link POA2: POA #2

Inflow Area = 64,992 sf, 2.01% Impervious, Inflow Depth = 2.14" for 5-yr event
Inflow = 5.88 cfs @ 11.96 hrs, Volume= 11,606 cf
Primary = 5.88 cfs @ 11.96 hrs, Volume= 11,606 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA2: POA #2

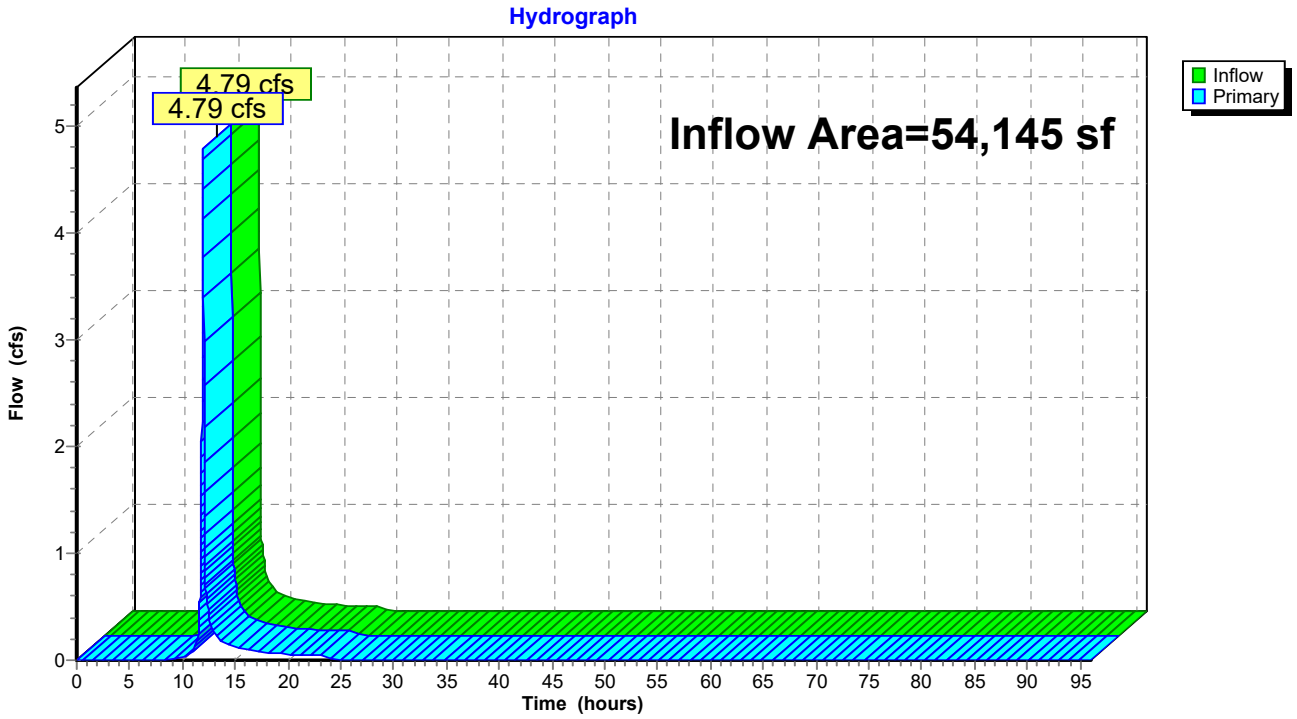


Summary for Link POA3: POA #3

Inflow Area = 54,145 sf, 0.00% Impervious, Inflow Depth = 2.08" for 5-yr event
Inflow = 4.79 cfs @ 11.96 hrs, Volume= 9,393 cf
Primary = 4.79 cfs @ 11.96 hrs, Volume= 9,393 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA3: POA #3



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=6.739 ac 72.10% Impervious Runoff Depth=4.00"
Tc=5.0 min CN=WQ Runoff=43.11 cfs 97,931 cf

Subcatchment2B: Bypass to POA #2 Runoff Area=1.492 ac 2.01% Impervious Runoff Depth=2.73"
Tc=5.0 min CN=WQ Runoff=7.44 cfs 14,787 cf

Subcatchment2S: DA-2 Runoff Area=8.114 ac 98.31% Impervious Runoff Depth=4.50"
Tc=5.0 min CN=WQ Runoff=56.55 cfs 132,615 cf

Subcatchment3B: Bypass to POA #3 Runoff Area=1.243 ac 0.00% Impervious Runoff Depth=2.66"
Tc=5.0 min CN=WQ Runoff=6.08 cfs 12,018 cf

Subcatchment3S: DA-3 Runoff Area=4.417 ac 86.71% Impervious Runoff Depth=4.29"
Tc=5.0 min CN=WQ Runoff=29.72 cfs 68,768 cf

Subcatchment4S: DA-4 Runoff Area=3.585 ac 91.35% Impervious Runoff Depth=4.37"
Tc=5.0 min CN=WQ Runoff=24.47 cfs 56,927 cf

Subcatchment5S: DA-5 Runoff Area=2.881 ac 86.78% Impervious Runoff Depth=4.29"
Tc=5.0 min CN=WQ Runoff=19.39 cfs 44,867 cf

Subcatchment6S: DA-6 Runoff Area=3.336 ac 77.34% Impervious Runoff Depth=4.05"
Tc=5.0 min CN=WQ Runoff=21.41 cfs 49,040 cf

Subcatchment7S: DA-7 Runoff Area=4.253 ac 92.97% Impervious Runoff Depth=4.40"
Tc=5.0 min CN=WQ Runoff=29.17 cfs 67,993 cf

Subcatchment8S: DA-8 Runoff Area=4.380 ac 2.31% Impervious Runoff Depth=2.69"
Tc=5.0 min CN=WQ Runoff=21.53 cfs 42,801 cf

Pond 1P: SCM 1: Infiltration AGB Peak Elev=276.32' Storage=63,152 cf Inflow=43.11 cfs 97,931 cf
Discarded=0.24 cfs 68,568 cf Primary=0.92 cfs 29,366 cf Outflow=1.16 cfs 97,934 cf

Pond 2P: SCM 2: Detention UGB Peak Elev=271.24' Storage=55,514 cf Inflow=56.55 cfs 132,615 cf
Outflow=12.59 cfs 132,475 cf

Pond 3P: SCM 3: Detention UGB Peak Elev=274.04' Storage=24,706 cf Inflow=29.72 cfs 68,768 cf
Outflow=12.07 cfs 68,729 cf

Pond 4P: SCM 4: Detention UGB Peak Elev=274.47' Storage=19,255 cf Inflow=24.47 cfs 56,927 cf
Outflow=8.13 cfs 56,885 cf

Pond 5P: SCM 5: Detention UGB Peak Elev=278.50' Storage=12,177 cf Inflow=19.39 cfs 44,867 cf
Outflow=11.53 cfs 44,857 cf

Pond 6P: SCM 6: Detention UGB Peak Elev=281.87' Storage=15,859 cf Inflow=21.41 cfs 49,040 cf
Outflow=9.98 cfs 49,024 cf

Pond 7P: SCM 7: Detention UGB Peak Elev=274.93' Storage=24,036 cf Inflow=29.17 cfs 67,993 cf
Outflow=10.67 cfs 67,961 cf

Link POA1: POA #1 Inflow=77.12 cfs 492,098 cf
Primary=77.12 cfs 492,098 cf

Link POA2: POA #2 Inflow=7.44 cfs 14,787 cf
Primary=7.44 cfs 14,787 cf

Link POA3: POA #3 Inflow=6.08 cfs 12,018 cf
Primary=6.08 cfs 12,018 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 587,747 cf Average Runoff Depth = 4.00"
28.03% Pervious = 493,709 sf 71.97% Impervious = 1,267,857 sf

Summary for Subcatchment 1S: DA-1

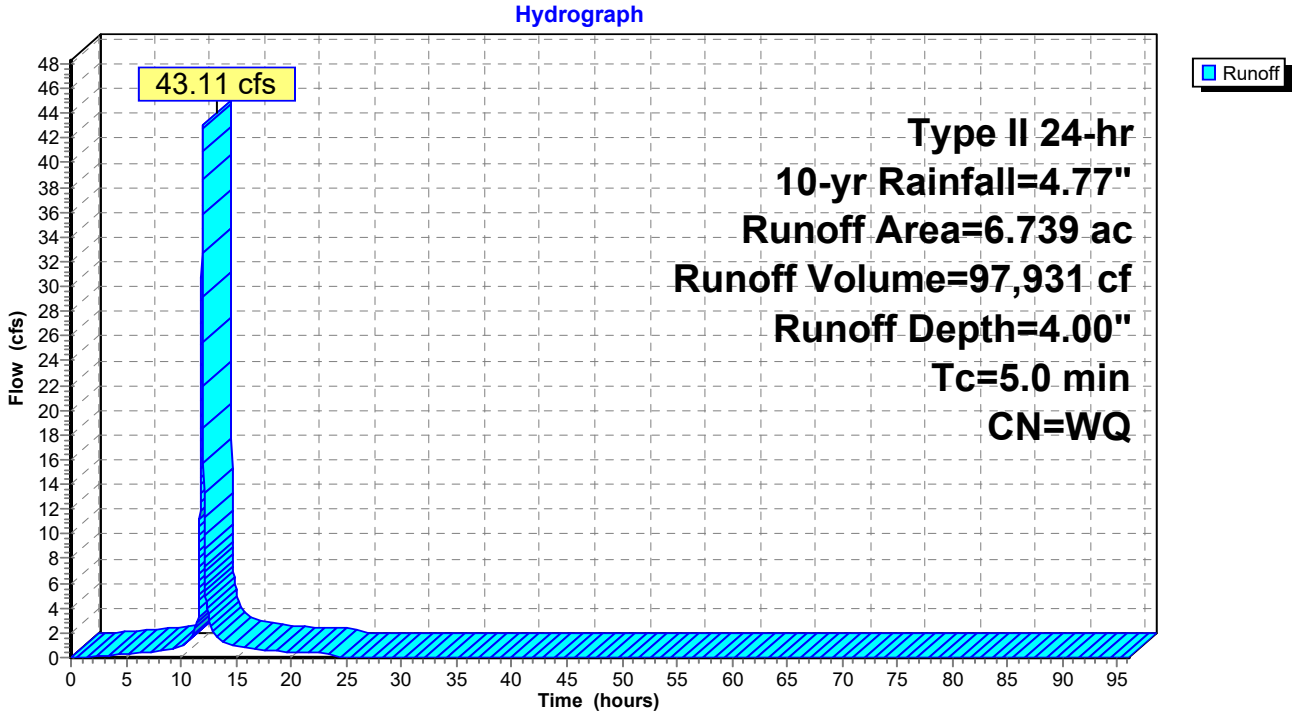
Runoff = 43.11 cfs @ 11.96 hrs, Volume= 97,931 cf, Depth= 4.00"
Routed to Pond 1P : SCM 1: Infiltration AGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
0.222	74	>75% Grass cover, Good, HSG C
1.658	80	>75% Grass cover, Good, HSG D
4.859	98	Paved parking, HSG D
6.739		Weighted Average
1.880		27.90% Pervious Area
4.859		72.10% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2B: Bypass to POA #2

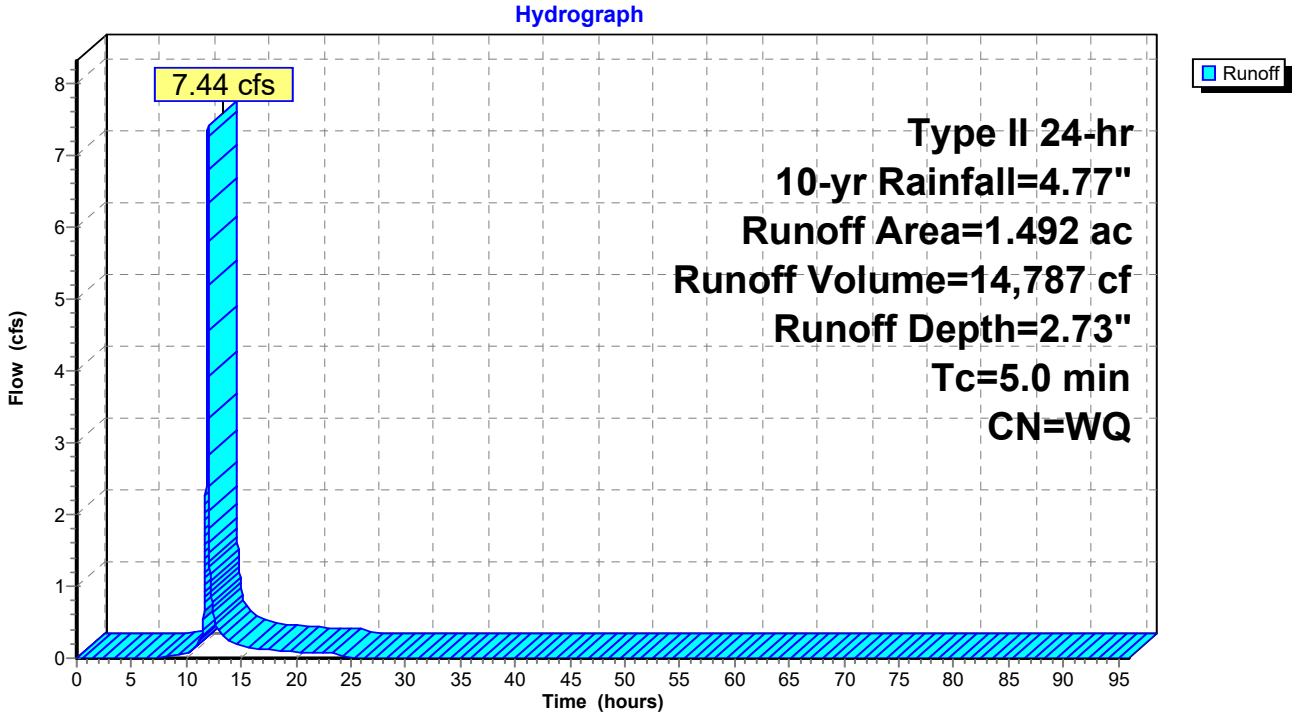
Runoff = 7.44 cfs @ 11.96 hrs, Volume= 14,787 cf, Depth= 2.73"
Routed to Link POA2 : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
1.462	80	>75% Grass cover, Good, HSG D
0.030	98	Paved parking, HSG D
1.492		Weighted Average
1.462		97.99% Pervious Area
0.030		2.01% Impervious Area

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

Subcatchment 2B: Bypass to POA #2



Summary for Subcatchment 2S: DA-2

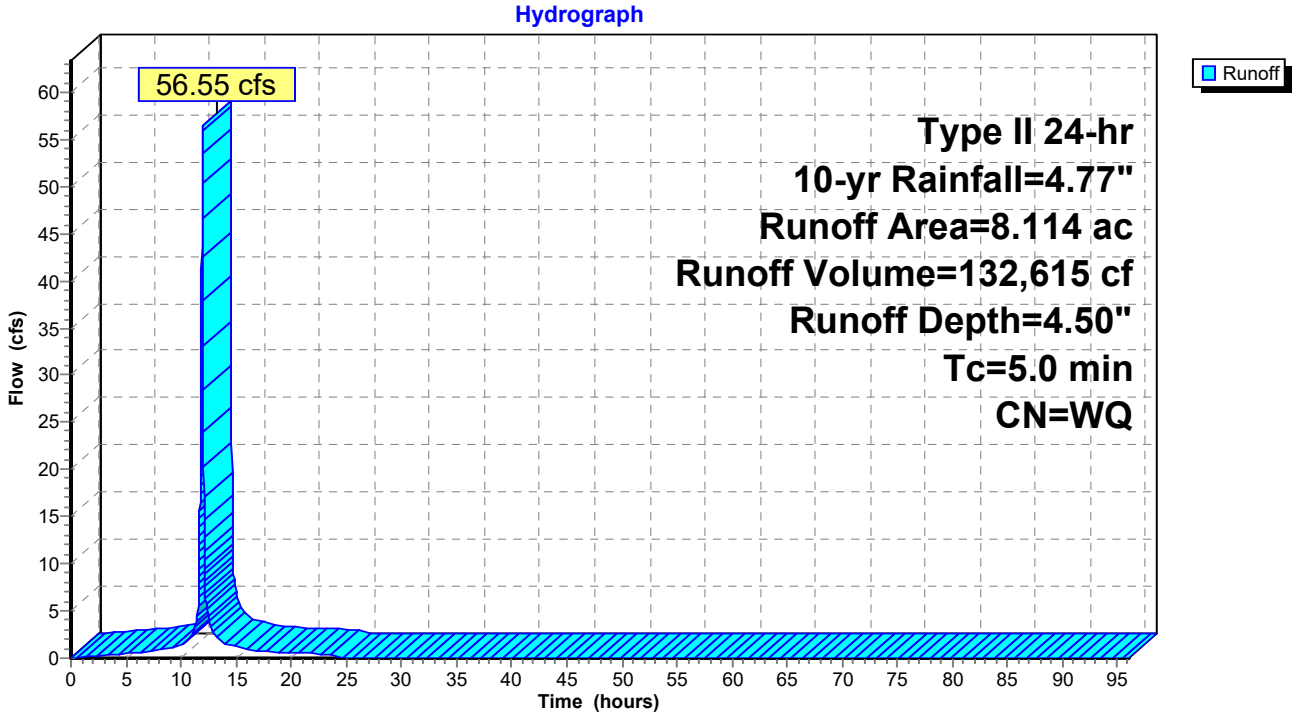
Runoff = 56.55 cfs @ 11.96 hrs, Volume= 132,615 cf, Depth= 4.50"
Routed to Pond 2P : SCM 2: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
0.137	80	>75% Grass cover, Good, HSG D
7.977	98	Paved parking, HSG D
8.114		Weighted Average
0.137		1.69% Pervious Area
7.977		98.31% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3B: Bypass to POA #3

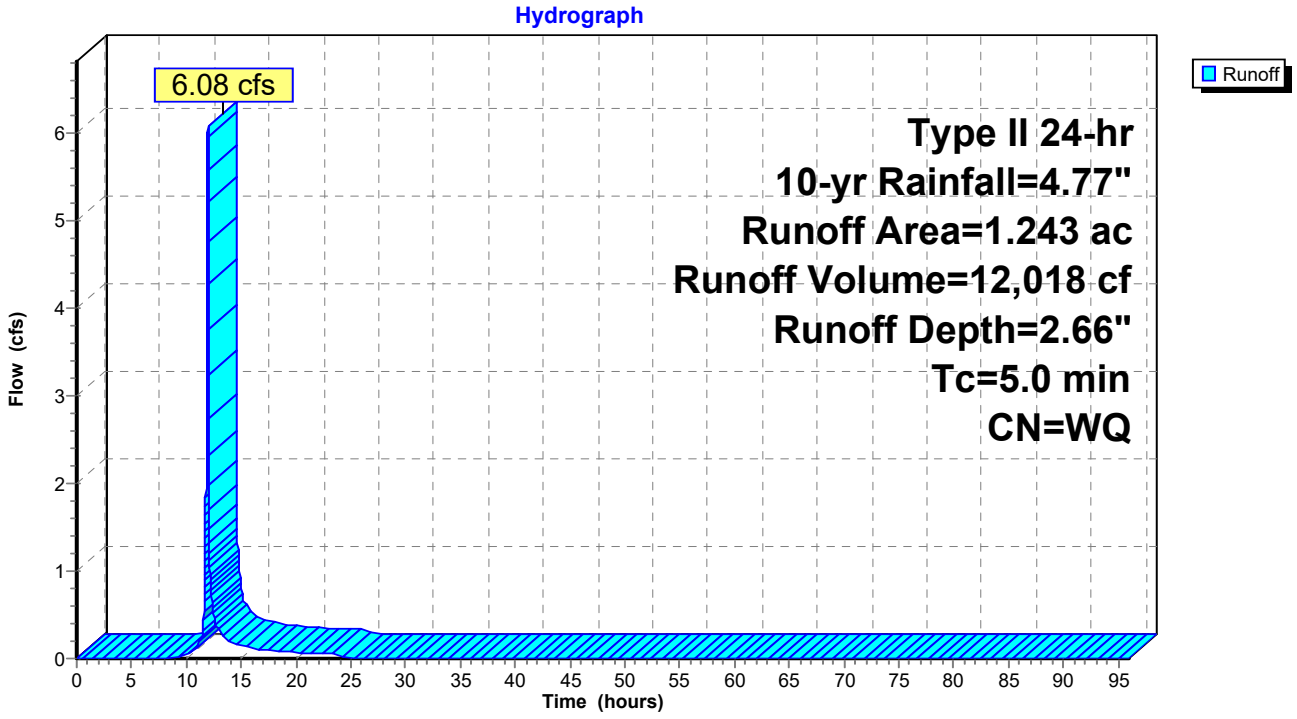
Runoff = 6.08 cfs @ 11.96 hrs, Volume= 12,018 cf, Depth= 2.66"
Routed to Link POA3 : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
0.072	74	>75% Grass cover, Good, HSG C
1.171	80	>75% Grass cover, Good, HSG D
1.243		Weighted Average
1.243		100.00% Pervious Area

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

Subcatchment 3B: Bypass to POA #3



Summary for Subcatchment 3S: DA-3

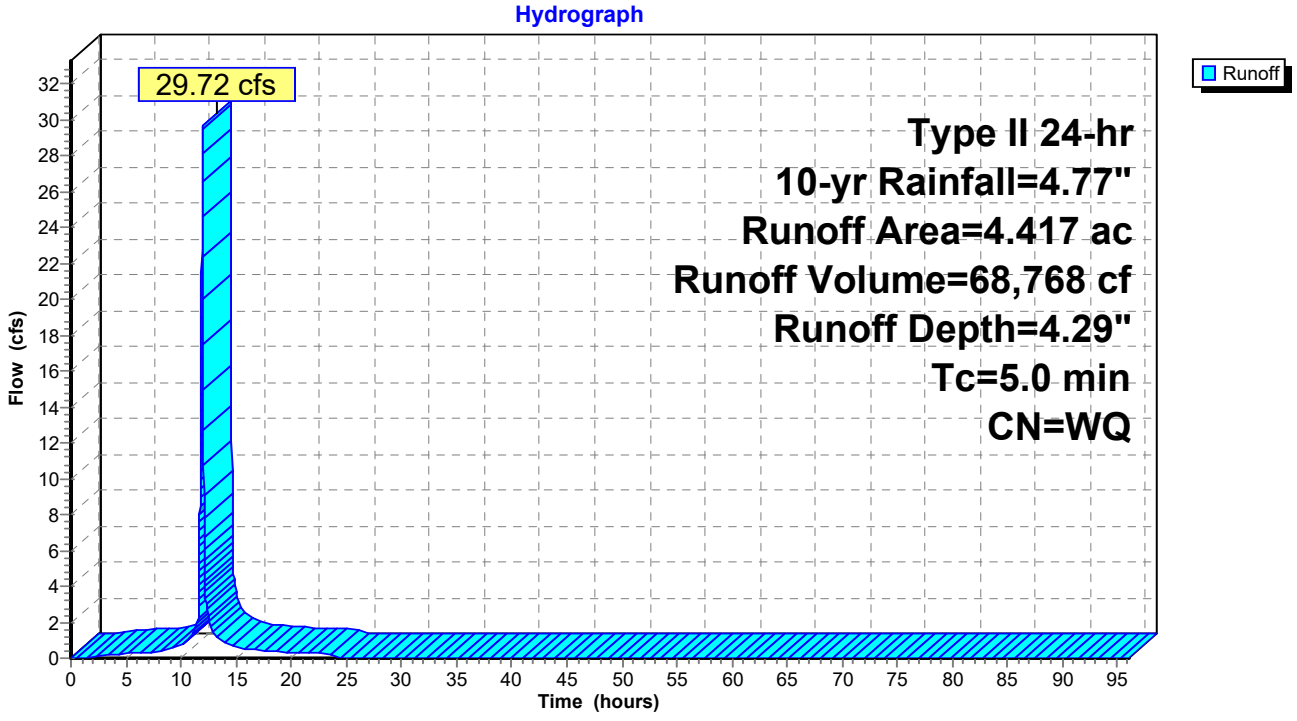
Runoff = 29.72 cfs @ 11.96 hrs, Volume= 68,768 cf, Depth= 4.29"
Routed to Pond 3P : SCM 3: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
0.587	80	>75% Grass cover, Good, HSG D
3.830	98	Paved parking, HSG D
4.417		Weighted Average
0.587		13.29% Pervious Area
3.830		86.71% Impervious Area

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

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

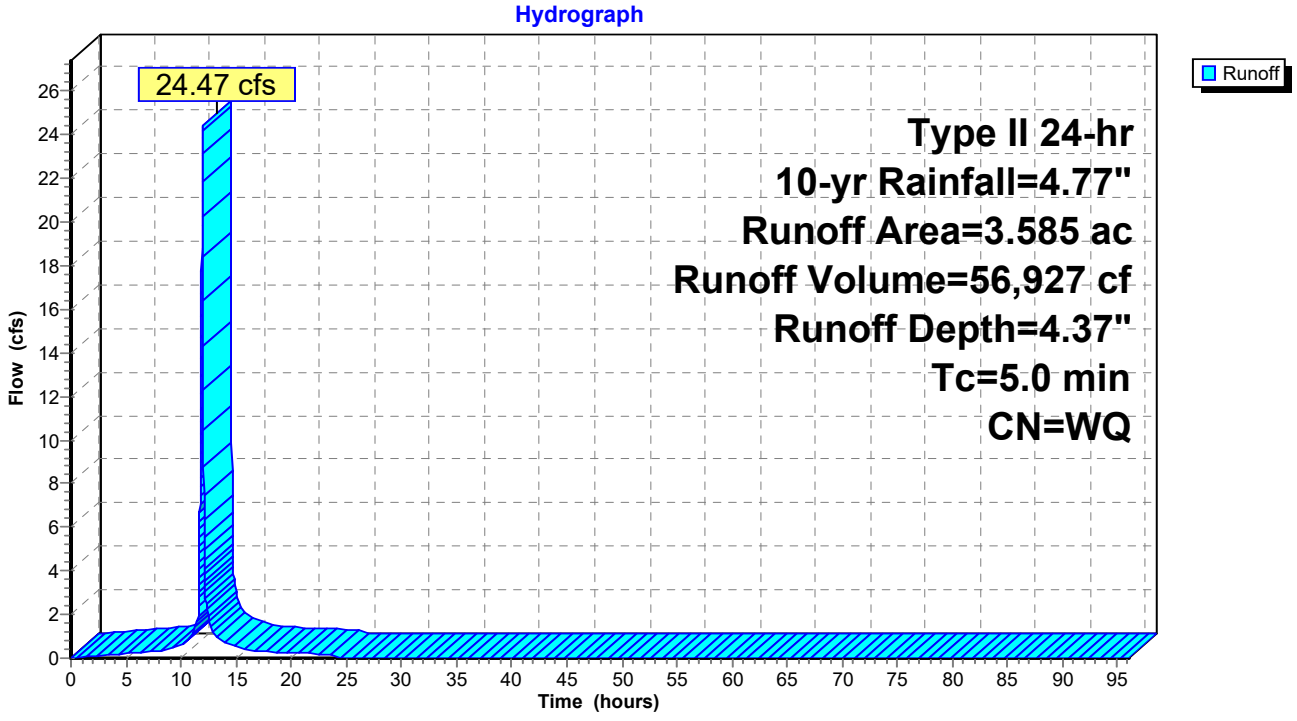
Runoff = 24.47 cfs @ 11.96 hrs, Volume= 56,927 cf, Depth= 4.37"
Routed to Pond 4P : SCM 4: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
0.310	80	>75% Grass cover, Good, HSG D
3.275	98	Paved parking, HSG D
3.585		Weighted Average
0.310		8.65% Pervious Area
3.275		91.35% Impervious Area

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

Subcatchment 4S: DA-4



Summary for Subcatchment 5S: DA-5

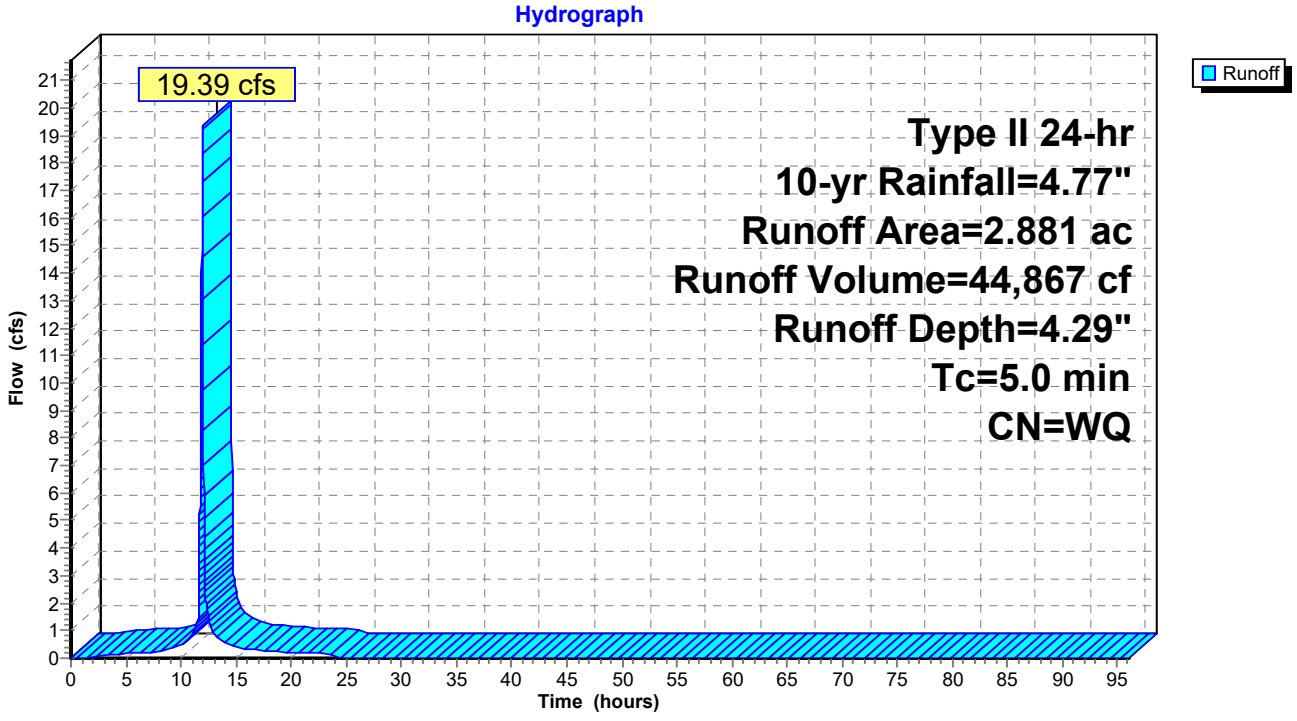
Runoff = 19.39 cfs @ 11.96 hrs, Volume= 44,867 cf, Depth= 4.29"
Routed to Pond 5P : SCM 5: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
0.381	80	>75% Grass cover, Good, HSG D
2.500	98	Paved parking, HSG D
2.881		Weighted Average
0.381		13.22% Pervious Area
2.500		86.78% Impervious Area

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

Subcatchment 5S: DA-5



Summary for Subcatchment 6S: DA-6

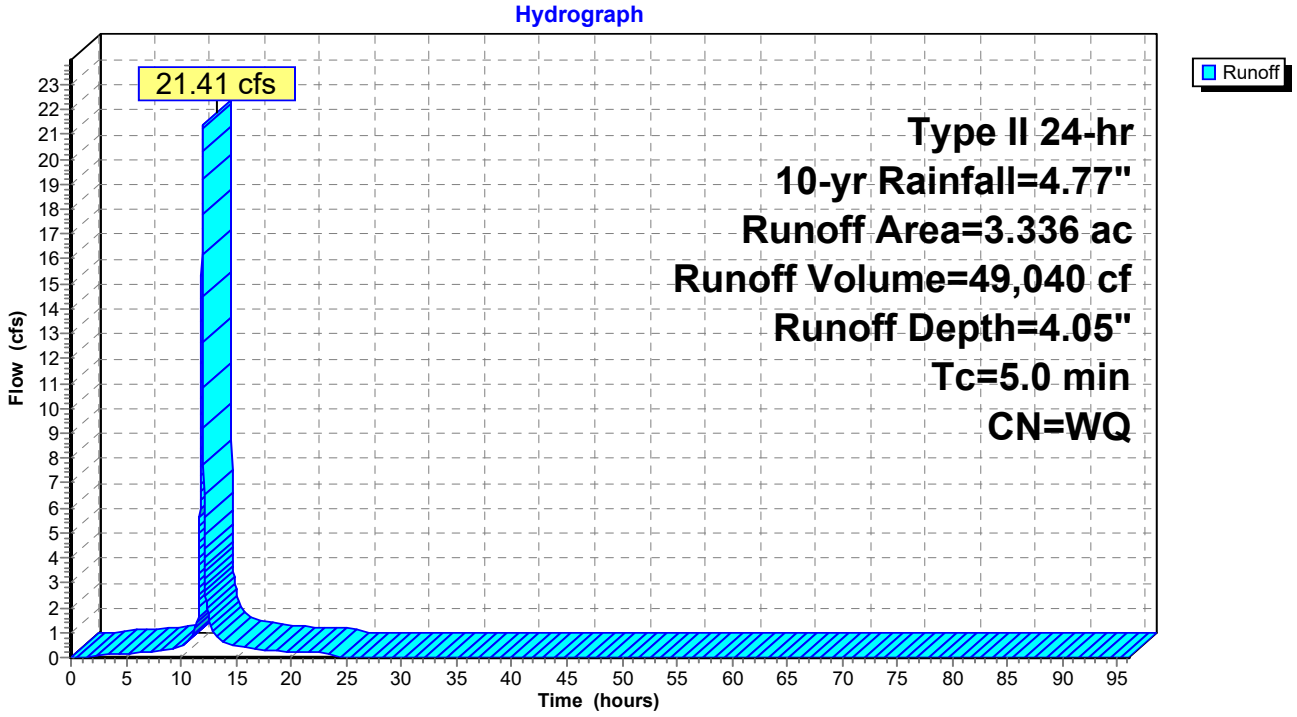
Runoff = 21.41 cfs @ 11.96 hrs, Volume= 49,040 cf, Depth= 4.05"
Routed to Pond 6P : SCM 6: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
0.255	74	>75% Grass cover, Good, HSG C
0.084	70	Woods, Good, HSG C
0.328	80	>75% Grass cover, Good, HSG D
2.580	98	Paved parking, HSG D
0.089	77	Woods, Good, HSG D
3.336		Weighted Average
0.756		22.66% Pervious Area
2.580		77.34% Impervious Area

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

Subcatchment 6S: DA-6



Summary for Subcatchment 7S: DA-7

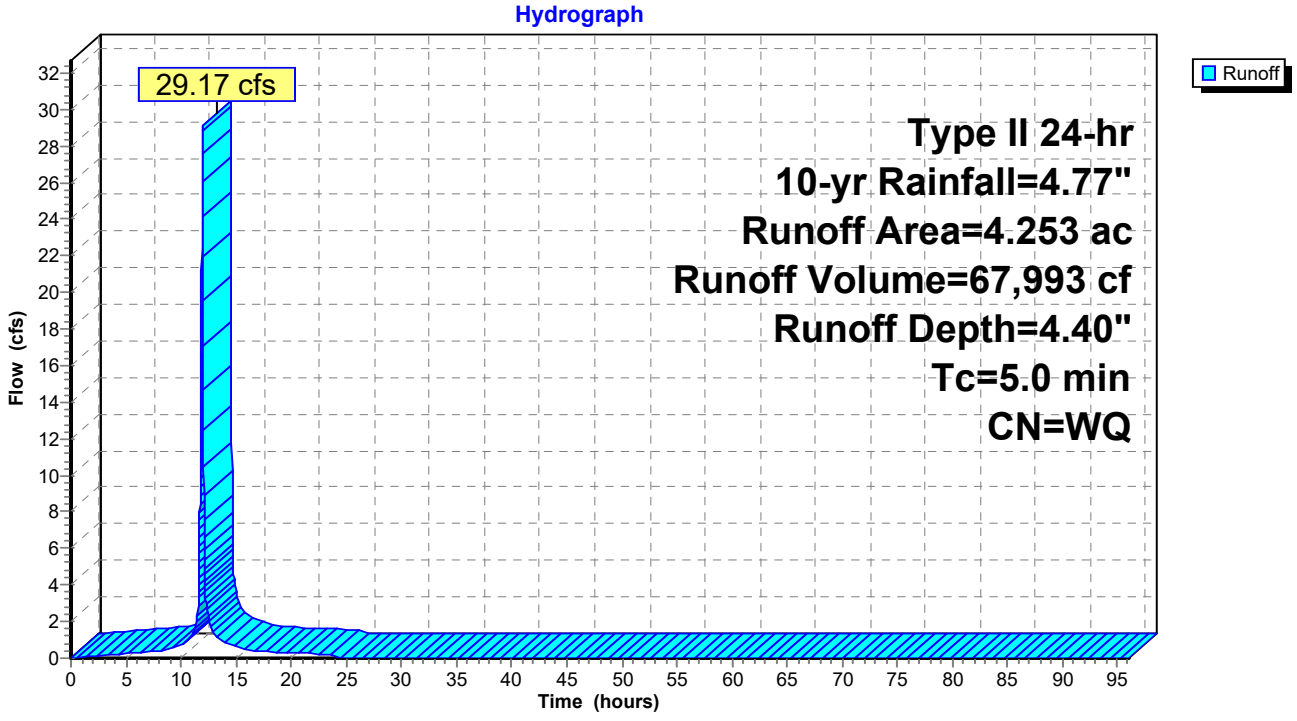
Runoff = 29.17 cfs @ 11.96 hrs, Volume= 67,993 cf, Depth= 4.40"
Routed to Pond 7P : SCM 7: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
0.299	80	>75% Grass cover, Good, HSG D
3.954	98	Paved parking, HSG D
4.253		Weighted Average
0.299		7.03% Pervious Area
3.954		92.97% Impervious Area

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

Subcatchment 7S: DA-7



Summary for Subcatchment 8S: DA-8

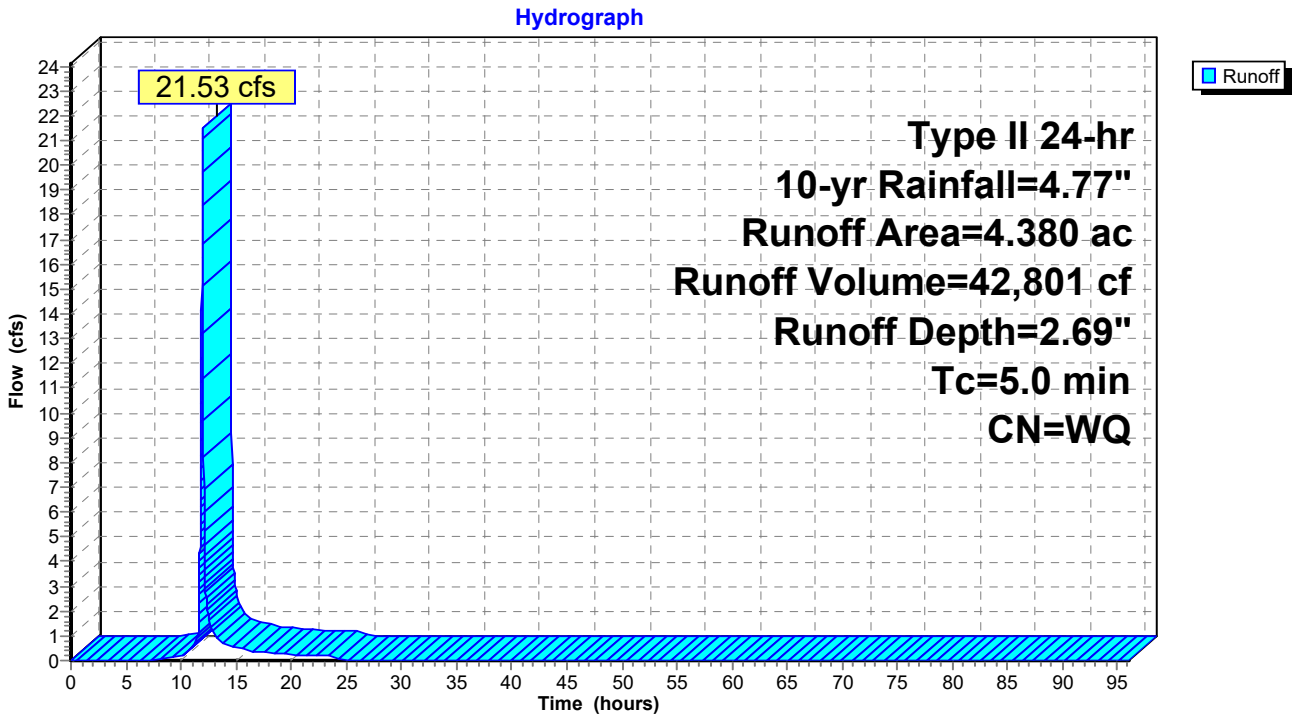
Runoff = 21.53 cfs @ 11.96 hrs, Volume= 42,801 cf, Depth= 2.69"
Routed to Link POA1 : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

Area (ac)	CN	Description
3.905	80	>75% Grass cover, Good, HSG D
0.374	74	>75% Grass cover, Good, HSG C
0.101	98	Paved parking, HSG D
4.380		Weighted Average
4.279		97.69% Pervious Area
0.101		2.31% Impervious Area

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

Subcatchment 8S: DA-8



Summary for Pond 1P: SCM 1: Infiltration AGB

Inflow Area = 293,551 sf, 72.10% Impervious, Inflow Depth = 4.00" for 10-yr event
Inflow = 43.11 cfs @ 11.96 hrs, Volume= 97,931 cf
Outflow = 1.16 cfs @ 14.03 hrs, Volume= 97,934 cf, Atten= 97%, Lag= 124.3 min
Discarded = 0.24 cfs @ 14.03 hrs, Volume= 68,568 cf
Primary = 0.92 cfs @ 14.03 hrs, Volume= 29,366 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 276.32' @ 14.03 hrs Surf.Area= 29,531 sf Storage= 63,152 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1,433.5 min (2,191.5 - 758.0)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	186,083 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

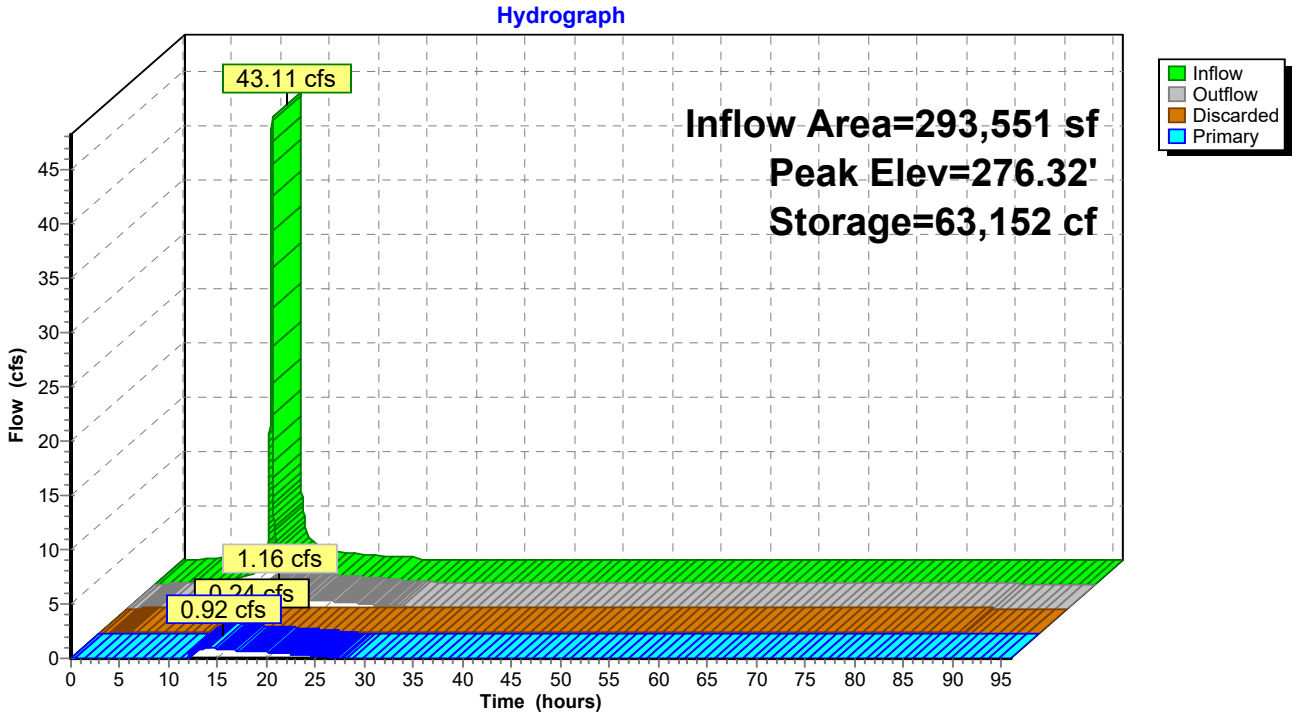
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	24,939	0	0
275.00	26,877	25,908	25,908
276.00	28,873	27,875	53,783
277.00	30,924	29,899	83,682
278.00	33,033	31,979	115,660
279.00	35,197	34,115	149,775
280.00	37,419	36,308	186,083

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**0.353 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**30.0" Round Culvert** L= 52.0' Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.00' S= 0.0385 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#3	Device 2	275.75'	**12.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	276.25'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	277.00'	**24.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	277.50'	**24.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.24 cfs @ 14.03 hrs HW=276.32' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.92 cfs @ 14.03 hrs HW=276.32' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Passes 0.92 cfs of 24.65 cfs potential flow)
│ ├**3=Orifice/Grate** (Orifice Controls 0.80 cfs @ 3.20 fps)
│ ├**4=Orifice/Grate** (Orifice Controls 0.12 cfs @ 0.85 fps)
│ └**5=Orifice/Grate** (Controls 0.00 cfs)
└**6=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: SCM 1: Infiltration AGB



Summary for Pond 2P: SCM 2: Detention UGB

Inflow Area = 353,446 sf, 98.31% Impervious, Inflow Depth = 4.50" for 10-yr event
Inflow = 56.55 cfs @ 11.96 hrs, Volume= 132,615 cf
Outflow = 12.59 cfs @ 12.09 hrs, Volume= 132,475 cf, Atten= 78%, Lag= 8.2 min
Primary = 12.59 cfs @ 12.09 hrs, Volume= 132,475 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 271.24' @ 12.09 hrs Surf.Area= 30,988 sf Storage= 55,514 cf

Plug-Flow detention time= 123.2 min calculated for 132,461 cf (100% of inflow)
Center-of-Mass det. time= 122.9 min (867.5 - 744.6)

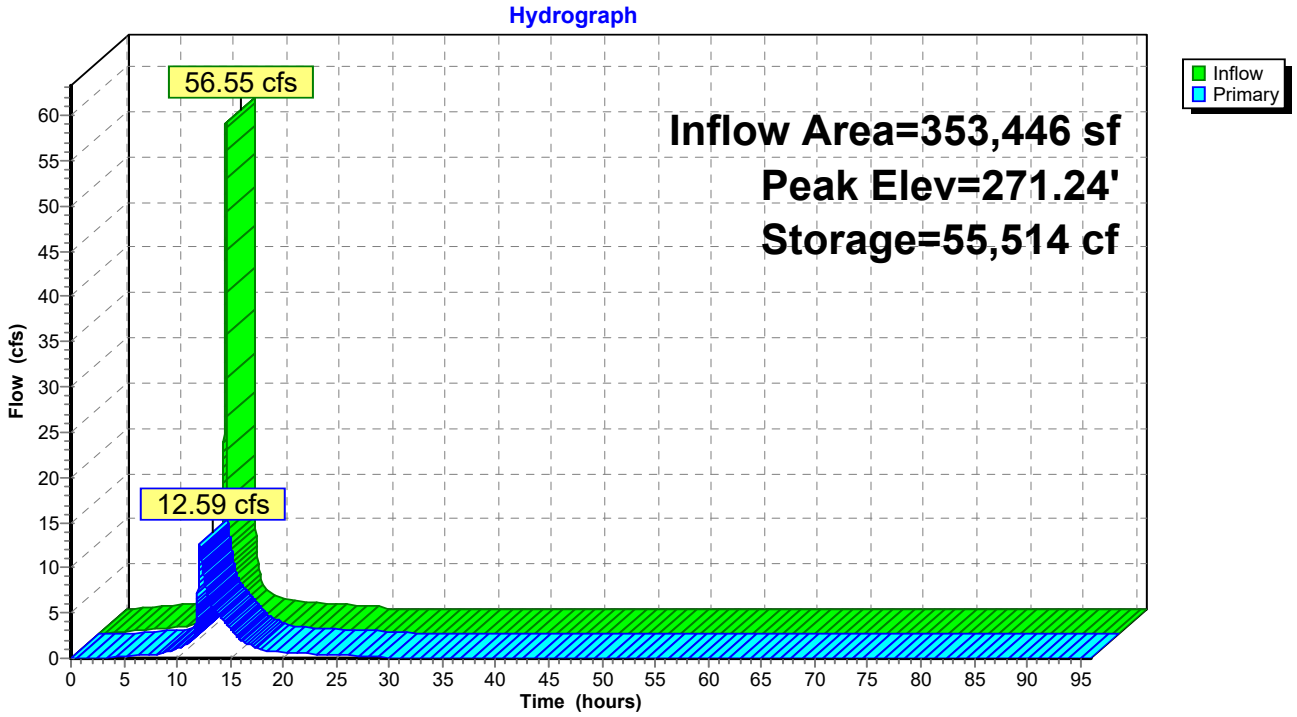
Volume	Invert	Avail.Storage	Storage Description
#1A	268.75'	41,546 cf	**63.75'W x 486.09'L x 5.50'H Field A** 170,435 cf Overall - 66,569 cf Embedded = 103,866 cf x 40.0% Voids
#2A	269.50'	66,569 cf	**ADS_StormTech MC-3500 d +Cap**x 603 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 603 Chambers in 9 Rows Cap Storage= 14.9 cf x 2 x 9 rows = 268.2 cf
		108,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	268.75'	**36.0" Round Outlet Pipe** L= 112.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 268.75' / 268.25' S= 0.0045 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	268.75'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	269.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	270.50'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	271.75'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	272.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=12.59 cfs @ 12.09 hrs HW=271.24' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 12.59 cfs of 24.99 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.09 cfs @ 7.41 fps)
  ├─**3=Orifice** (Orifice Controls 6.35 cfs @ 6.35 fps)
  ├─**4=Orifice** (Orifice Controls 5.15 cfs @ 2.77 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SCM 2: Detention UGB



Summary for Pond 3P: SCM 3: Detention UGB

Inflow Area = 192,405 sf, 86.71% Impervious, Inflow Depth = 4.29" for 10-yr event
Inflow = 29.72 cfs @ 11.96 hrs, Volume= 68,768 cf
Outflow = 12.07 cfs @ 12.05 hrs, Volume= 68,729 cf, Atten= 59%, Lag= 5.8 min
Primary = 12.07 cfs @ 12.05 hrs, Volume= 68,729 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.04' @ 12.05 hrs Surf.Area= 16,811 sf Storage= 24,706 cf

Plug-Flow detention time= 83.3 min calculated for 68,729 cf (100% of inflow)
Center-of-Mass det. time= 82.9 min (833.1 - 750.1)

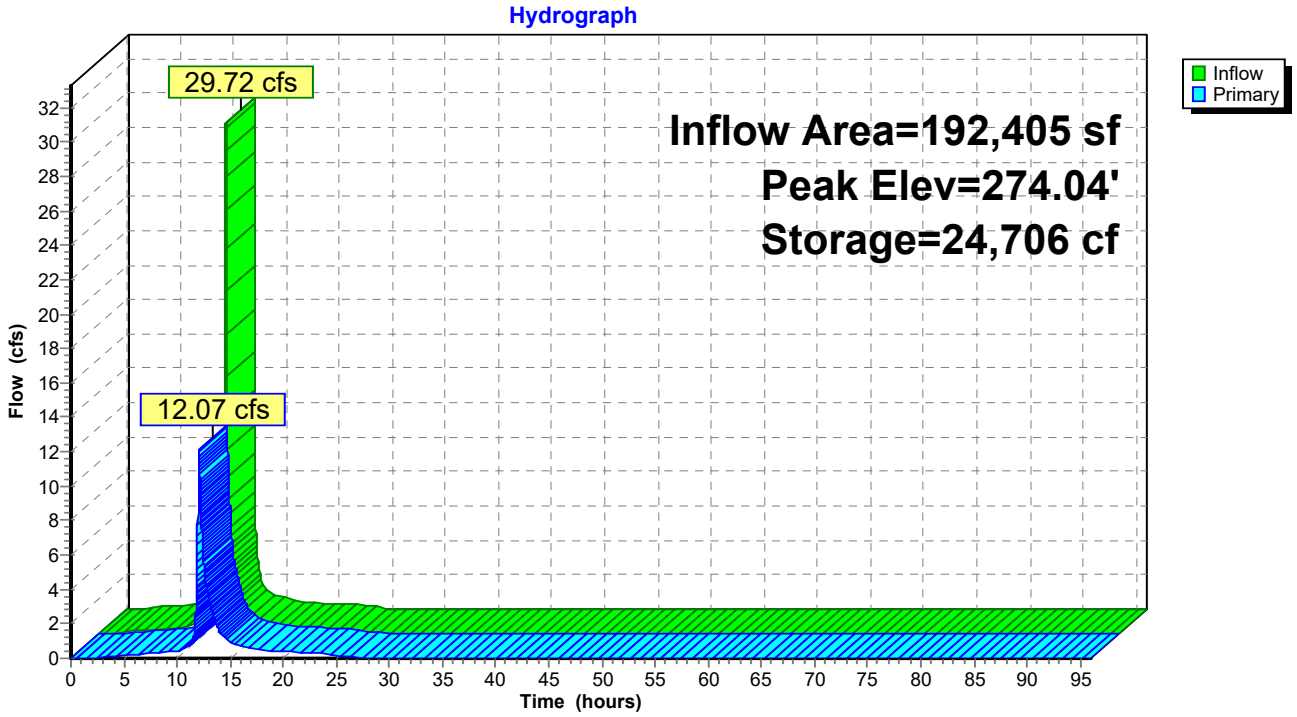
Volume	Invert	Avail.Storage	Storage Description
#1A	272.00'	15,071 cf	**46.75'W x 359.60'L x 3.75'H Field A** 63,042 cf Overall - 25,365 cf Embedded = 37,678 cf x 40.0% Voids
#2A	272.50'	25,365 cf	**ADS_StormTech SC-800 +Cap** x 500 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 500 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		40,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**36.0" Round Outlet Pipe** L= 628.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 272.00' / 268.25' S= 0.0060 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	272.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	272.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	273.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.50'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=12.06 cfs @ 12.05 hrs HW=274.04' TW=0.00' (Dynamic Tailwater)
- **1=Outlet Pipe** (Passes 12.06 cfs of 19.63 cfs potential flow)
  - **2=Orifice** (Orifice Controls 0.98 cfs @ 6.66 fps)
  - **3=Orifice** (Orifice Controls 5.46 cfs @ 5.46 fps)
  - **4=Orifice** (Orifice Controls 5.62 cfs @ 2.85 fps)
  - **5=Orifice** (Controls 0.00 cfs)
  - **6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: SCM 3: Detention UGB



Summary for Pond 4P: SCM 4: Detention UGB

Inflow Area = 156,163 sf, 91.35% Impervious, Inflow Depth = 4.37" for 10-yr event
Inflow = 24.47 cfs @ 11.96 hrs, Volume= 56,927 cf
Outflow = 8.13 cfs @ 12.06 hrs, Volume= 56,885 cf, Atten= 67%, Lag= 6.5 min
Primary = 8.13 cfs @ 12.06 hrs, Volume= 56,885 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.47' @ 12.06 hrs Surf.Area= 20,685 sf Storage= 19,255 cf

Plug-Flow detention time= 76.6 min calculated for 56,885 cf (100% of inflow)
Center-of-Mass det. time= 76.1 min (824.0 - 747.9)

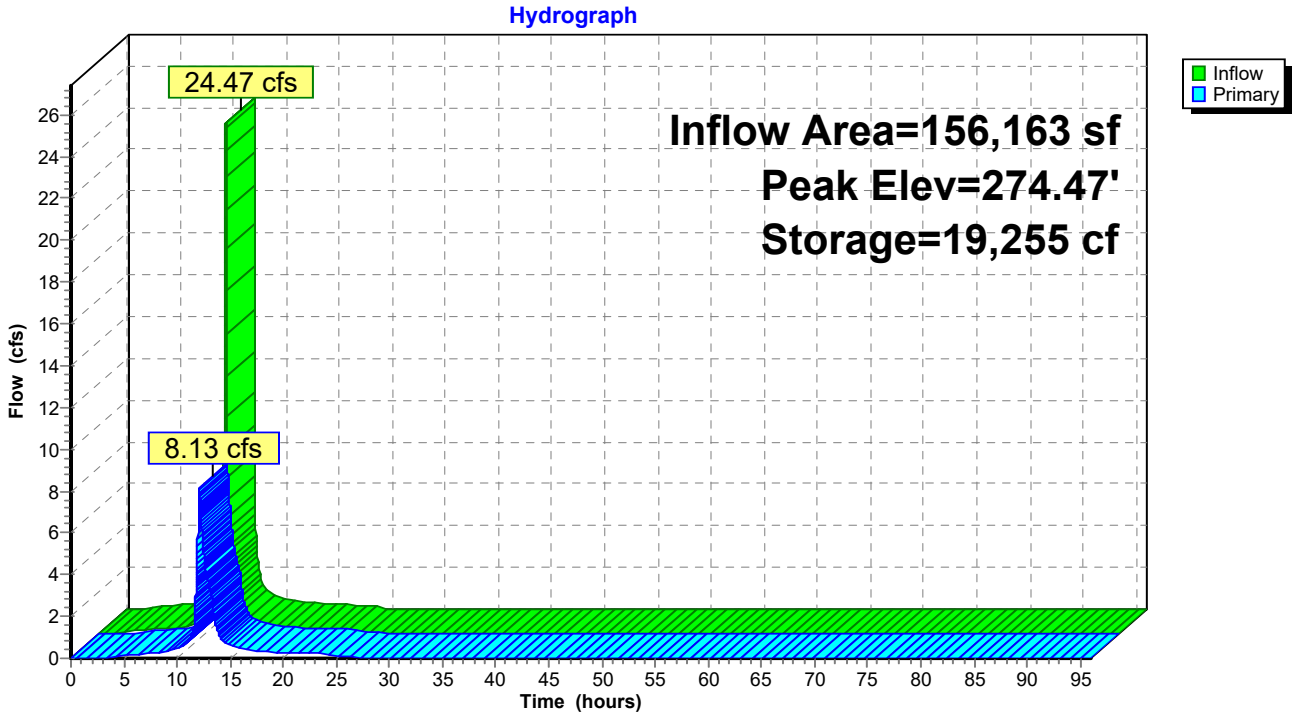
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	27,875 cf	**49.92'W x 414.39'L x 5.50'H Field A** 113,767 cf Overall - 44,079 cf Embedded = 69,688 cf x 40.0% Voids
#2A	273.75'	44,079 cf	**ADS_StormTech MC-3500 d +Cap** x 399 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 399 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		71,955 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 269.00' S= 0.0381 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.00'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.75'	**42.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.09'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=8.13 cfs @ 12.06 hrs HW=274.47' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 8.13 cfs of 11.21 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.82 cfs @ 5.58 fps)
  ├─**3=Orifice** (Orifice Controls 4.73 cfs @ 4.73 fps)
  ├─**4=Orifice** (Orifice Controls 2.58 cfs @ 2.20 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: SCM 4: Detention UGB



Summary for Pond 5P: SCM 5: Detention UGB

Inflow Area = 125,496 sf, 86.78% Impervious, Inflow Depth = 4.29" for 10-yr event
Inflow = 19.39 cfs @ 11.96 hrs, Volume= 44,867 cf
Outflow = 11.53 cfs @ 12.03 hrs, Volume= 44,857 cf, Atten= 41%, Lag= 4.4 min
Primary = 11.53 cfs @ 12.03 hrs, Volume= 44,857 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 278.50' @ 12.03 hrs Surf.Area= 8,494 sf Storage= 12,177 cf

Plug-Flow detention time= 44.3 min calculated for 44,852 cf (100% of inflow)
Center-of-Mass det. time= 44.5 min (794.6 - 750.1)

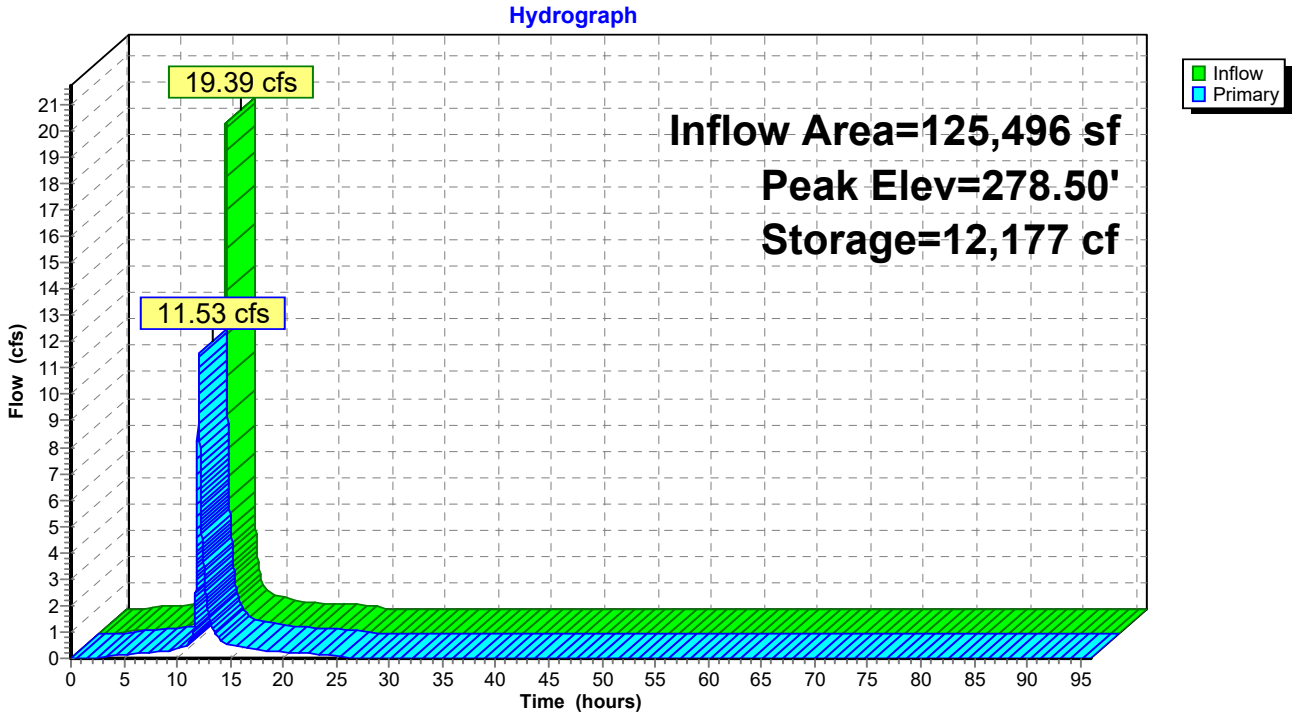
Volume	Invert	Avail.Storage	Storage Description
#1A	276.50'	7,654 cf	**46.75'W x 181.68'L x 3.75'H Field A** 31,851 cf Overall - 12,716 cf Embedded = 19,135 cf x 40.0% Voids
#2A	277.00'	12,716 cf	**ADS_StormTech SC-800 +Cap** x 250 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 250 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		20,370 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	276.50'	**36.0" Round Outlet Pipe** L= 900.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.50' / 269.00' S= 0.0083 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	276.50'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	277.75'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.00'	**36.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	279.60'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=11.53 cfs @ 12.03 hrs HW=278.50' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 11.53 cfs of 19.00 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.97 cfs @ 6.59 fps)
  ├─**3=Orifice** (Orifice Controls 5.37 cfs @ 5.37 fps)
  ├─**4=Orifice** (Orifice Controls 5.19 cfs @ 2.78 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: SCM 5: Detention UGB



Summary for Pond 6P: SCM 6: Detention UGB

Inflow Area = 145,316 sf, 77.34% Impervious, Inflow Depth = 4.05" for 10-yr event
Inflow = 21.41 cfs @ 11.96 hrs, Volume= 49,040 cf
Outflow = 9.98 cfs @ 12.05 hrs, Volume= 49,024 cf, Atten= 53%, Lag= 5.3 min
Primary = 9.98 cfs @ 12.05 hrs, Volume= 49,024 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 281.87' @ 12.05 hrs Surf.Area= 11,821 sf Storage= 15,859 cf

Plug-Flow detention time= 61.9 min calculated for 49,019 cf (100% of inflow)
Center-of-Mass det. time= 62.1 min (817.1 - 755.1)

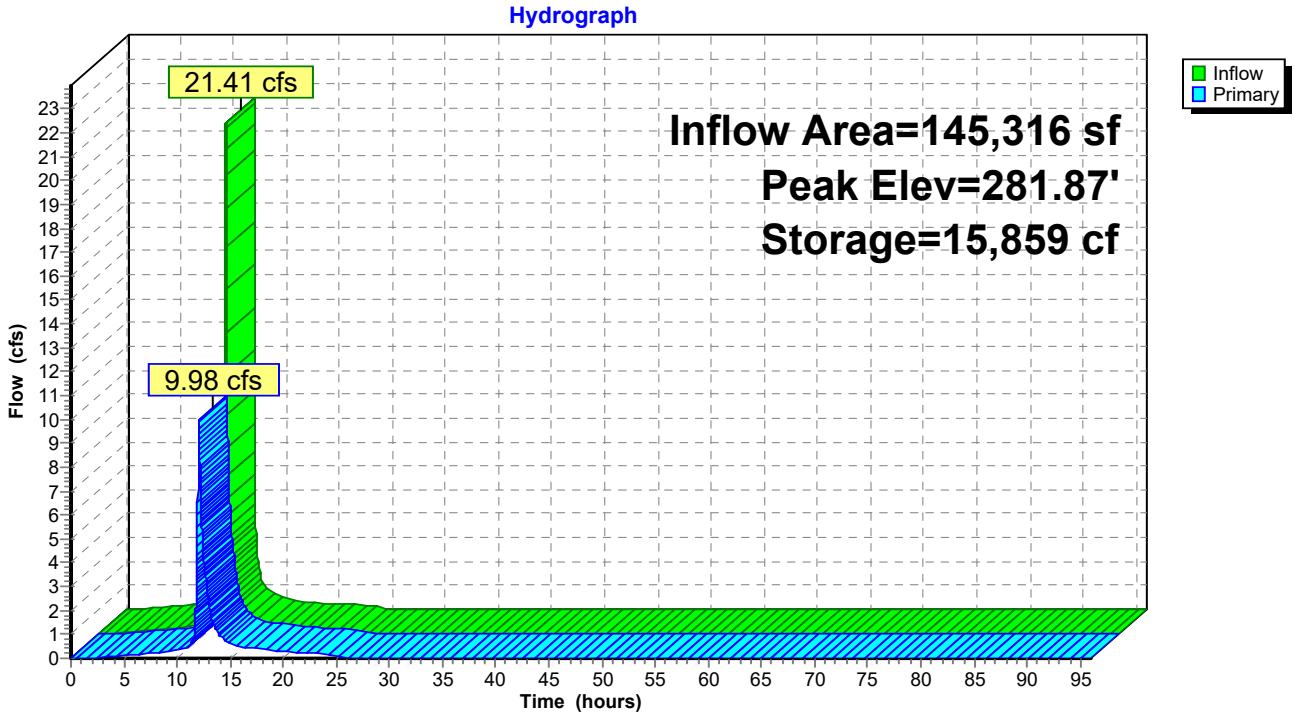
Volume	Invert	Avail.Storage	Storage Description
#1A	280.00'	10,621 cf	**46.75'W x 252.85'L x 3.75'H Field A** 44,328 cf Overall - 17,776 cf Embedded = 26,552 cf x 40.0% Voids
#2A	280.50'	17,776 cf	**ADS_StormTech SC-800 +Cap** x 350 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 350 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		28,397 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	280.00'	**36.0" Round Outlet Pipe** L= 800.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 280.00' / 271.00' S= 0.0112 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	280.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	281.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	282.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	283.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=9.97 cfs @ 12.05 hrs HW=281.87' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 9.97 cfs of 17.07 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.94 cfs @ 6.37 fps)
  ├─**3=Orifice** (Orifice Controls 5.09 cfs @ 5.09 fps)
  ├─**4=Orifice** (Orifice Controls 3.94 cfs @ 2.53 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6P: SCM 6: Detention UGB



Summary for Pond 7P: SCM 7: Detention UGB

Inflow Area = 185,261 sf, 92.97% Impervious, Inflow Depth = 4.40" for 10-yr event
Inflow = 29.17 cfs @ 11.96 hrs, Volume= 67,993 cf
Outflow = 10.67 cfs @ 12.06 hrs, Volume= 67,961 cf, Atten= 63%, Lag= 6.2 min
Primary = 10.67 cfs @ 12.06 hrs, Volume= 67,961 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.93' @ 12.06 hrs Surf.Area= 18,180 sf Storage= 24,036 cf

Plug-Flow detention time= 81.6 min calculated for 67,961 cf (100% of inflow)
Center-of-Mass det. time= 81.2 min (828.3 - 747.1)

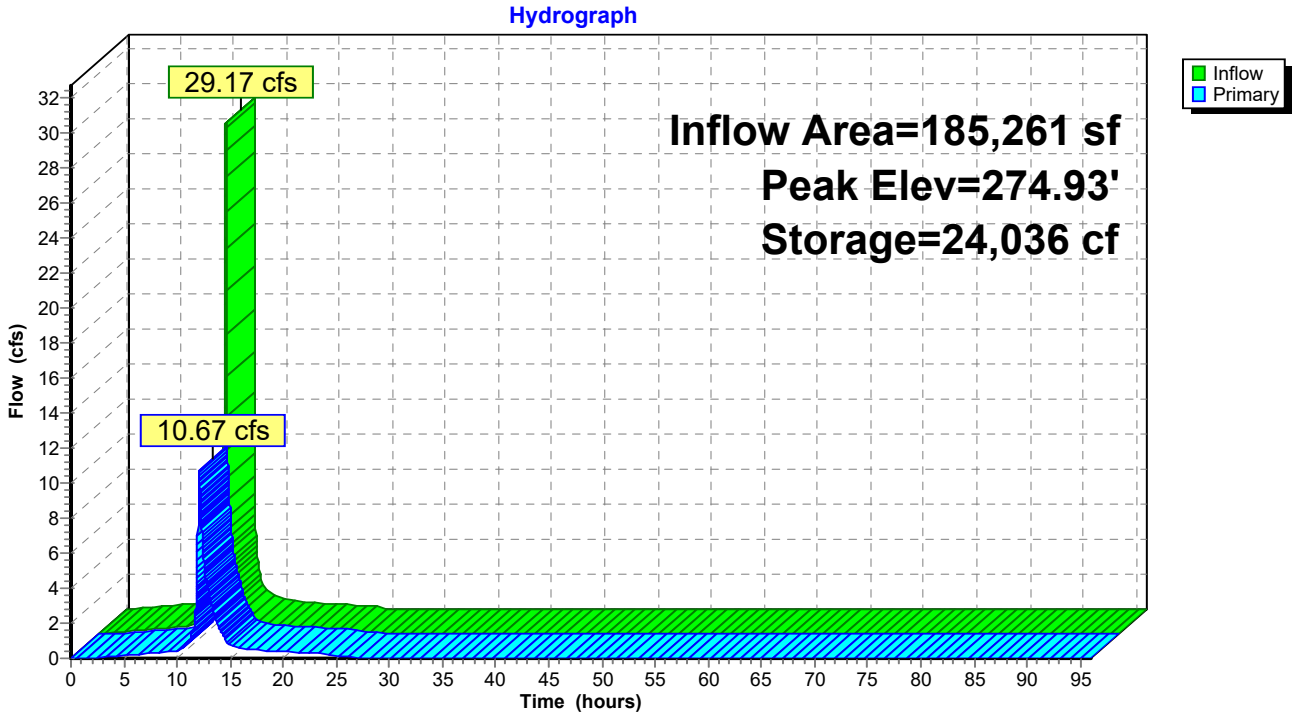
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	24,519 cf	**49.92'W x 364.20'L x 5.50'H Field A** 99,988 cf Overall - 38,692 cf Embedded = 61,296 cf x 40.0% Voids
#2A	273.75'	38,692 cf	**ADS_StormTech MC-3500 d +Cap** x 350 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 350 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		63,210 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 271.00' S= 0.0190 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	275.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	276.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=10.67 cfs @ 12.06 hrs HW=274.93' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 10.67 cfs of 17.95 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.95 cfs @ 6.47 fps)
  ├─**3=Orifice** (Orifice Controls 5.22 cfs @ 5.22 fps)
  ├─**4=Orifice** (Orifice Controls 4.50 cfs @ 2.65 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: SCM 7: Detention UGB

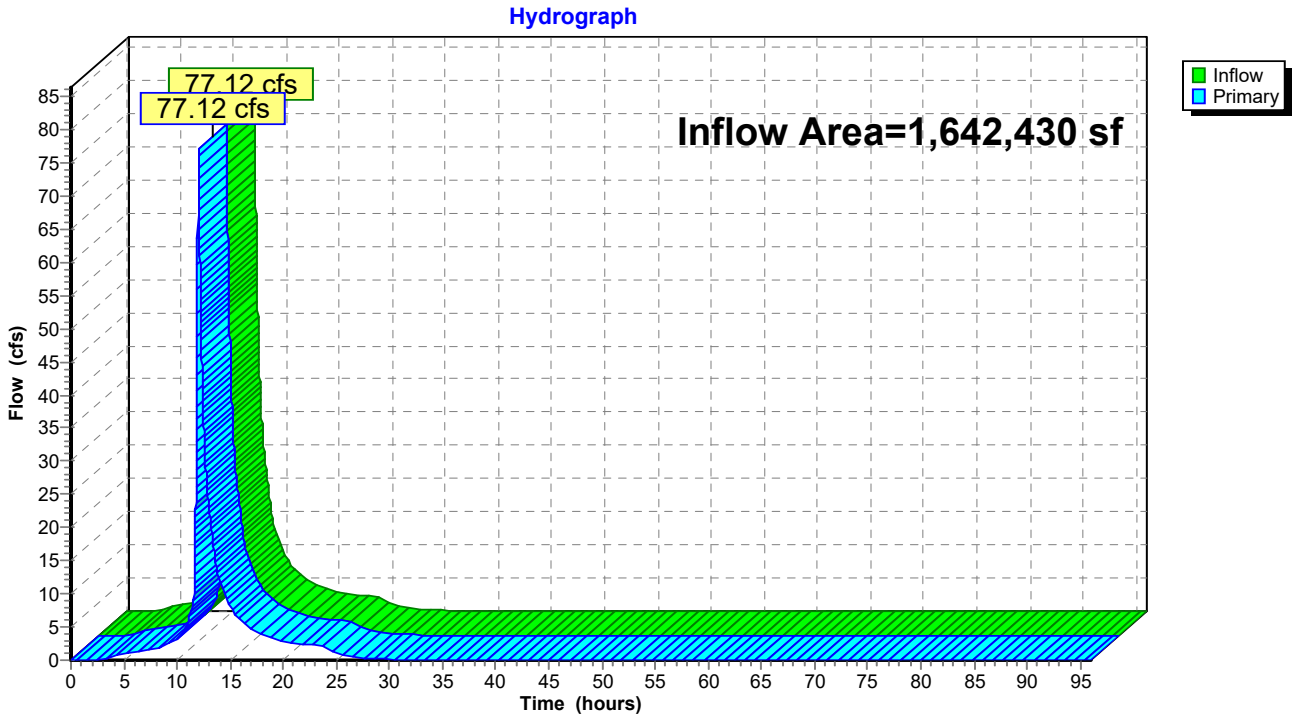


Summary for Link POA1: POA #1

Inflow Area = 1,642,430 sf, 77.11% Impervious, Inflow Depth = 3.60" for 10-yr event
Inflow = 77.12 cfs @ 12.02 hrs, Volume= 492,098 cf
Primary = 77.12 cfs @ 12.02 hrs, Volume= 492,098 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA1: POA #1

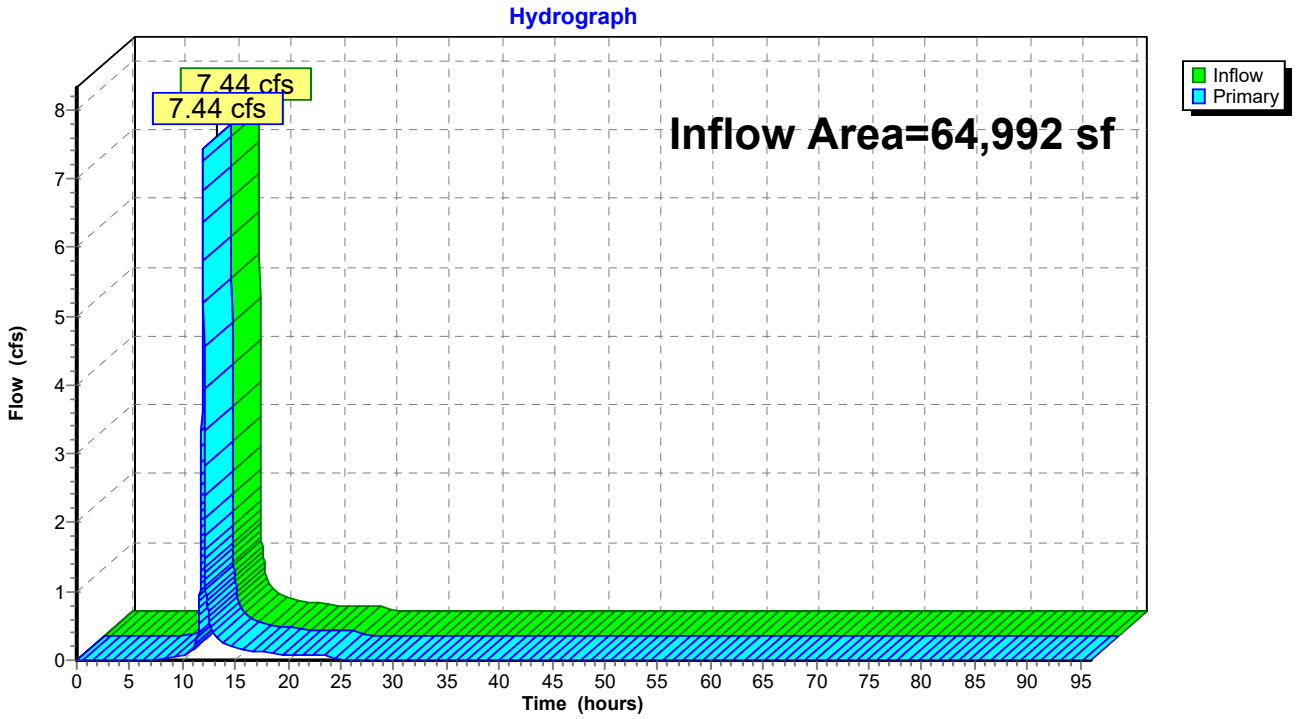


Summary for Link POA2: POA #2

Inflow Area = 64,992 sf, 2.01% Impervious, Inflow Depth = 2.73" for 10-yr event
Inflow = 7.44 cfs @ 11.96 hrs, Volume= 14,787 cf
Primary = 7.44 cfs @ 11.96 hrs, Volume= 14,787 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA2: POA #2

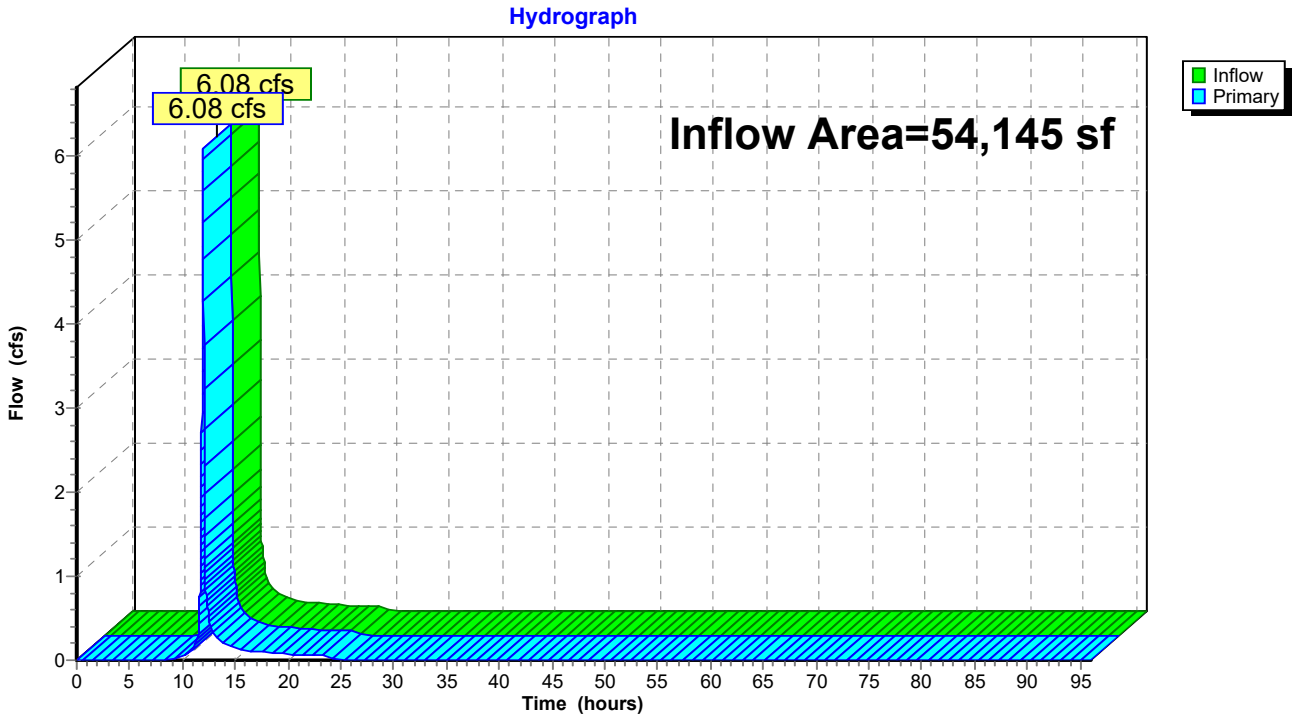


Summary for Link POA3: POA #3

Inflow Area = 54,145 sf, 0.00% Impervious, Inflow Depth = 2.66" for 10-yr event
Inflow = 6.08 cfs @ 11.96 hrs, Volume= 12,018 cf
Primary = 6.08 cfs @ 11.96 hrs, Volume= 12,018 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA3: POA #3



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=6.739 ac 72.10% Impervious Runoff Depth=4.98"
Tc=5.0 min CN=WQ Runoff=53.30 cfs 121,737 cf

Subcatchment2B: Bypass to POA #2 Runoff Area=1.492 ac 2.01% Impervious Runoff Depth=3.62"
Tc=5.0 min CN=WQ Runoff=9.76 cfs 19,621 cf

Subcatchment2S: DA-2 Runoff Area=8.114 ac 98.31% Impervious Runoff Depth=5.51"
Tc=5.0 min CN=WQ Runoff=68.71 cfs 162,262 cf

Subcatchment3B: Bypass to POA #3 Runoff Area=1.243 ac 0.00% Impervious Runoff Depth=3.55"
Tc=5.0 min CN=WQ Runoff=8.01 cfs 16,016 cf

Subcatchment3S: DA-3 Runoff Area=4.417 ac 86.71% Impervious Runoff Depth=5.28"
Tc=5.0 min CN=WQ Runoff=36.37 cfs 84,687 cf

Subcatchment4S: DA-4 Runoff Area=3.585 ac 91.35% Impervious Runoff Depth=5.37"
Tc=5.0 min CN=WQ Runoff=29.85 cfs 69,918 cf

Subcatchment5S: DA-5 Runoff Area=2.881 ac 86.78% Impervious Runoff Depth=5.28"
Tc=5.0 min CN=WQ Runoff=23.73 cfs 55,251 cf

Subcatchment6S: DA-6 Runoff Area=3.336 ac 77.34% Impervious Runoff Depth=5.02"
Tc=5.0 min CN=WQ Runoff=26.42 cfs 60,813 cf

Subcatchment7S: DA-7 Runoff Area=4.253 ac 92.97% Impervious Runoff Depth=5.40"
Tc=5.0 min CN=WQ Runoff=35.56 cfs 83,435 cf

Subcatchment8S: DA-8 Runoff Area=4.380 ac 2.31% Impervious Runoff Depth=3.58"
Tc=5.0 min CN=WQ Runoff=28.31 cfs 56,900 cf

Pond 1P: SCM 1: Infiltration AGB Peak Elev=276.65' Storage=73,008 cf Inflow=53.30 cfs 121,737 cf
Discarded=0.25 cfs 69,816 cf Primary=2.69 cfs 51,923 cf Outflow=2.93 cfs 121,739 cf

Pond 2P: SCM 2: Detention UGB Peak Elev=271.66' Storage=65,556 cf Inflow=68.71 cfs 162,262 cf
Outflow=17.75 cfs 162,122 cf

Pond 3P: SCM 3: Detention UGB Peak Elev=274.38' Storage=28,808 cf Inflow=36.37 cfs 84,687 cf
Outflow=16.44 cfs 84,648 cf

Pond 4P: SCM 4: Detention UGB Peak Elev=274.68' Storage=22,972 cf Inflow=29.85 cfs 69,918 cf
Outflow=10.59 cfs 69,876 cf

Pond 5P: SCM 5: Detention UGB Peak Elev=278.78' Storage=13,948 cf Inflow=23.73 cfs 55,251 cf
Outflow=15.38 cfs 55,241 cf

Pond 6P: SCM 6: Detention UGB Peak Elev=282.18' Storage=18,531 cf Inflow=26.42 cfs 60,813 cf
Outflow=13.90 cfs 60,797 cf

Pond 7P: SCM 7: Detention UGB Peak Elev=275.21' Storage=28,205 cf Inflow=35.56 cfs 83,435 cf
Outflow=14.33 cfs 83,402 cf

Link POA1: POA #1 Inflow=106.28 cfs 624,910 cf
Primary=106.28 cfs 624,910 cf

Link POA2: POA #2 Inflow=9.76 cfs 19,621 cf
Primary=9.76 cfs 19,621 cf

Link POA3: POA #3 Inflow=8.01 cfs 16,016 cf
Primary=8.01 cfs 16,016 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 730,640 cf Average Runoff Depth = 4.98"
28.03% Pervious = 493,709 sf 71.97% Impervious = 1,267,857 sf

Summary for Subcatchment 1S: DA-1

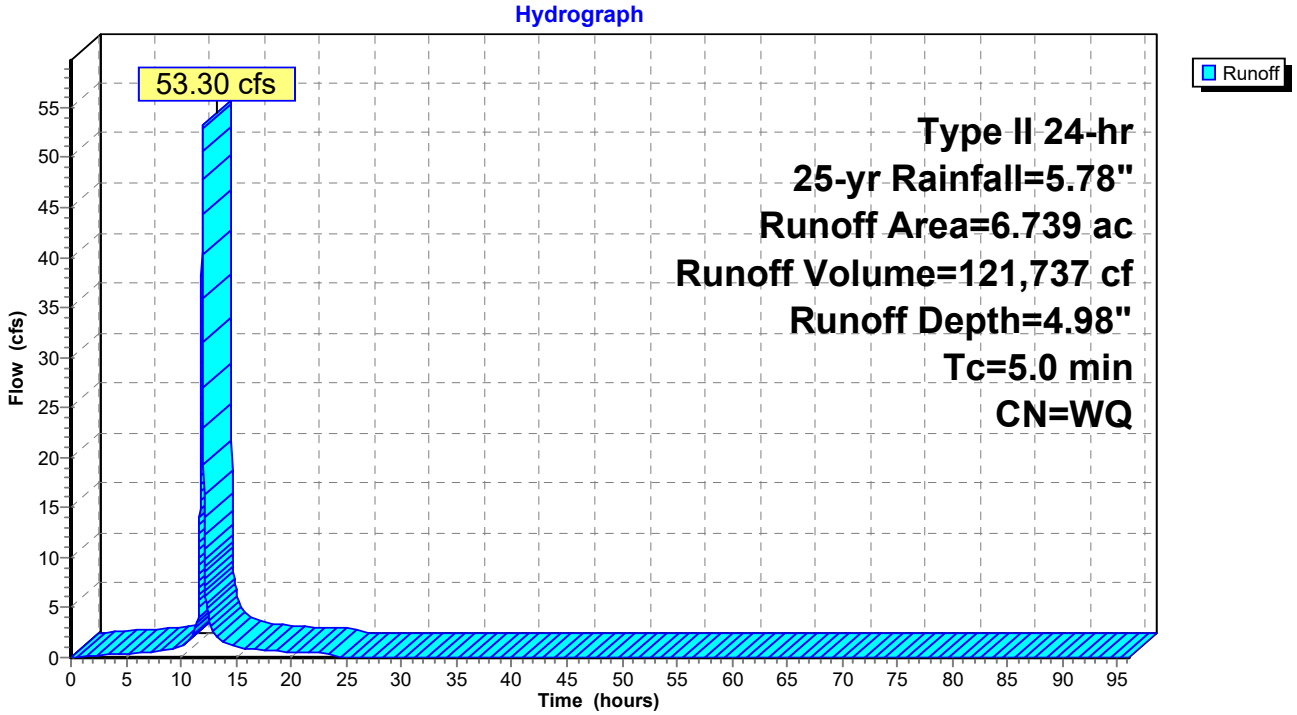
Runoff = 53.30 cfs @ 11.96 hrs, Volume= 121,737 cf, Depth= 4.98"
Routed to Pond 1P : SCM 1: Infiltration AGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
0.222	74	>75% Grass cover, Good, HSG C
1.658	80	>75% Grass cover, Good, HSG D
4.859	98	Paved parking, HSG D
6.739		Weighted Average
1.880		27.90% Pervious Area
4.859		72.10% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2B: Bypass to POA #2

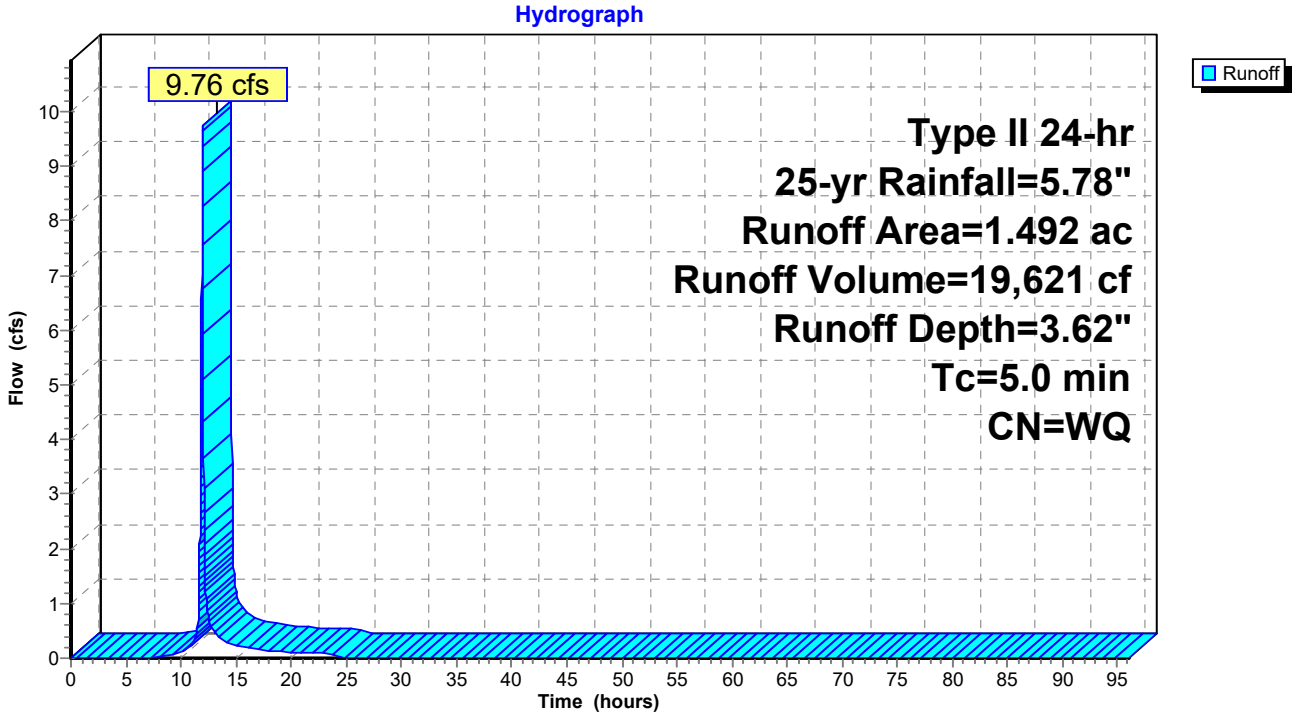
Runoff = 9.76 cfs @ 11.96 hrs, Volume= 19,621 cf, Depth= 3.62"
Routed to Link POA2 : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
1.462	80	>75% Grass cover, Good, HSG D
0.030	98	Paved parking, HSG D
1.492		Weighted Average
1.462		97.99% Pervious Area
0.030		2.01% Impervious Area

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

Subcatchment 2B: Bypass to POA #2



Summary for Subcatchment 2S: DA-2

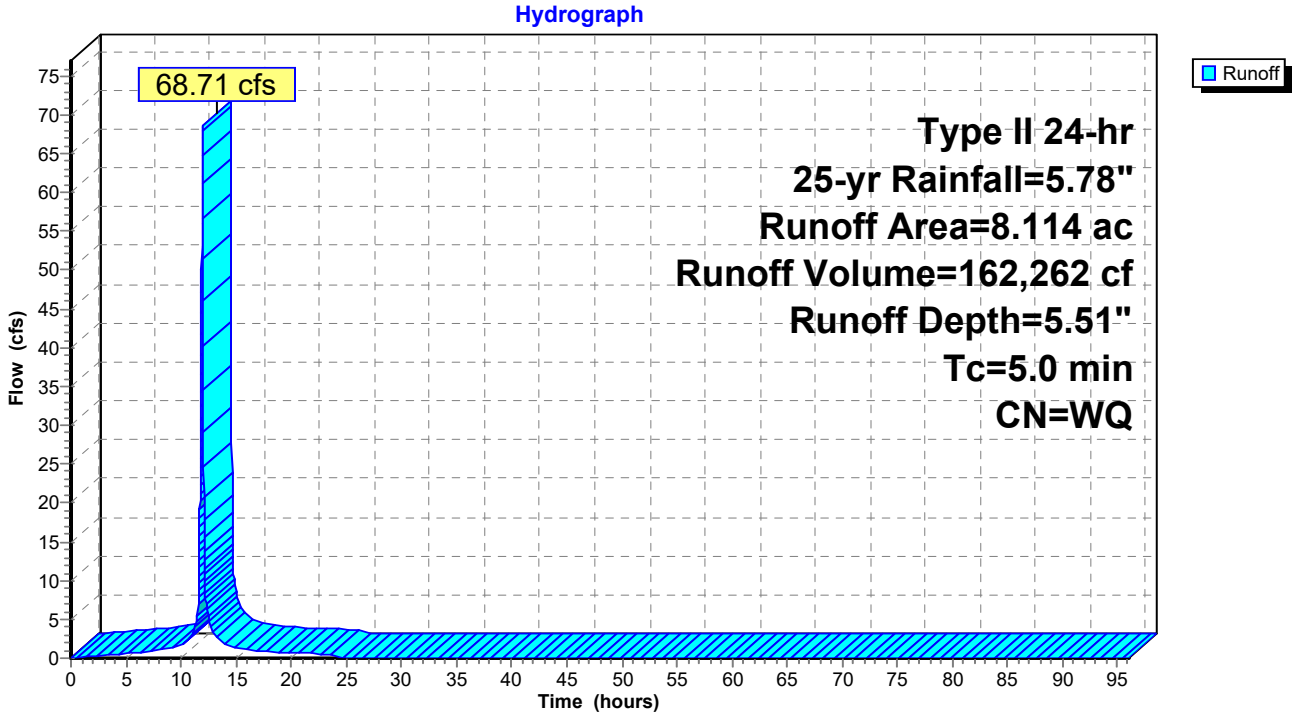
Runoff = 68.71 cfs @ 11.96 hrs, Volume= 162,262 cf, Depth= 5.51"
Routed to Pond 2P : SCM 2: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
0.137	80	>75% Grass cover, Good, HSG D
7.977	98	Paved parking, HSG D
8.114		Weighted Average
0.137		1.69% Pervious Area
7.977		98.31% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3B: Bypass to POA #3

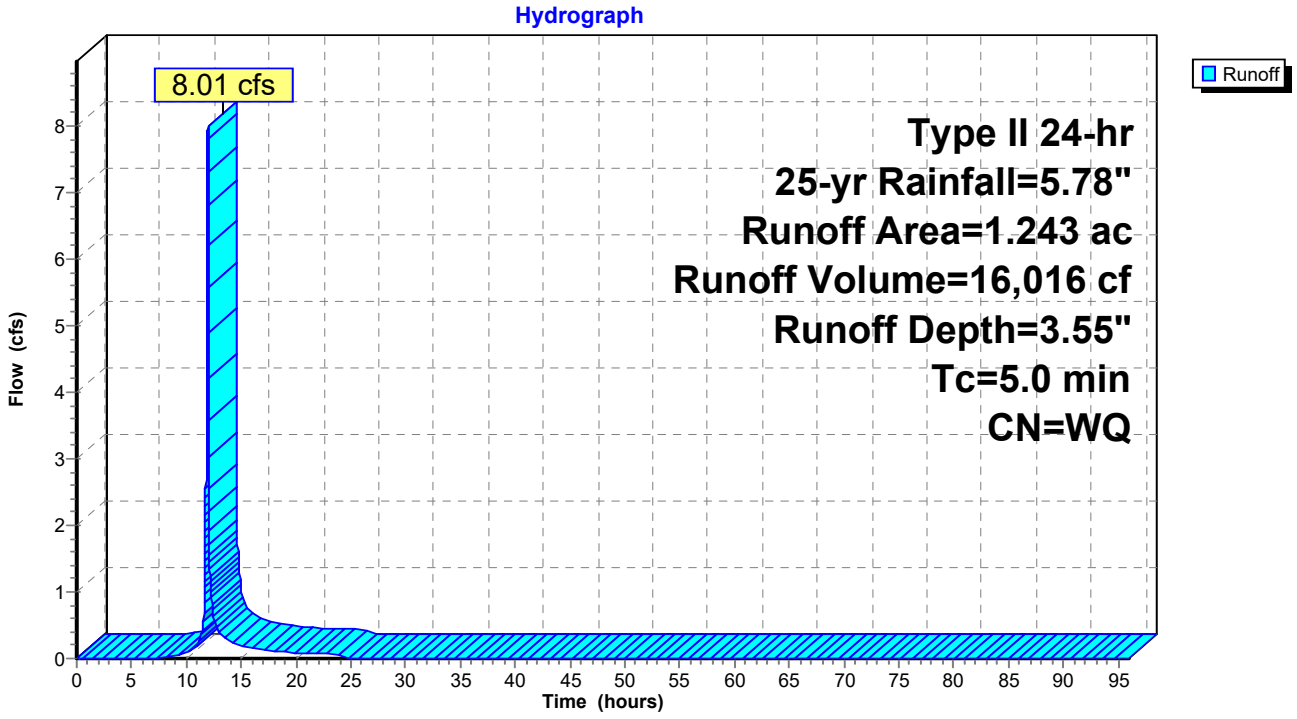
Runoff = 8.01 cfs @ 11.96 hrs, Volume= 16,016 cf, Depth= 3.55"
Routed to Link POA3 : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
0.072	74	>75% Grass cover, Good, HSG C
1.171	80	>75% Grass cover, Good, HSG D
1.243		Weighted Average
1.243		100.00% Pervious Area

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

Subcatchment 3B: Bypass to POA #3



Summary for Subcatchment 3S: DA-3

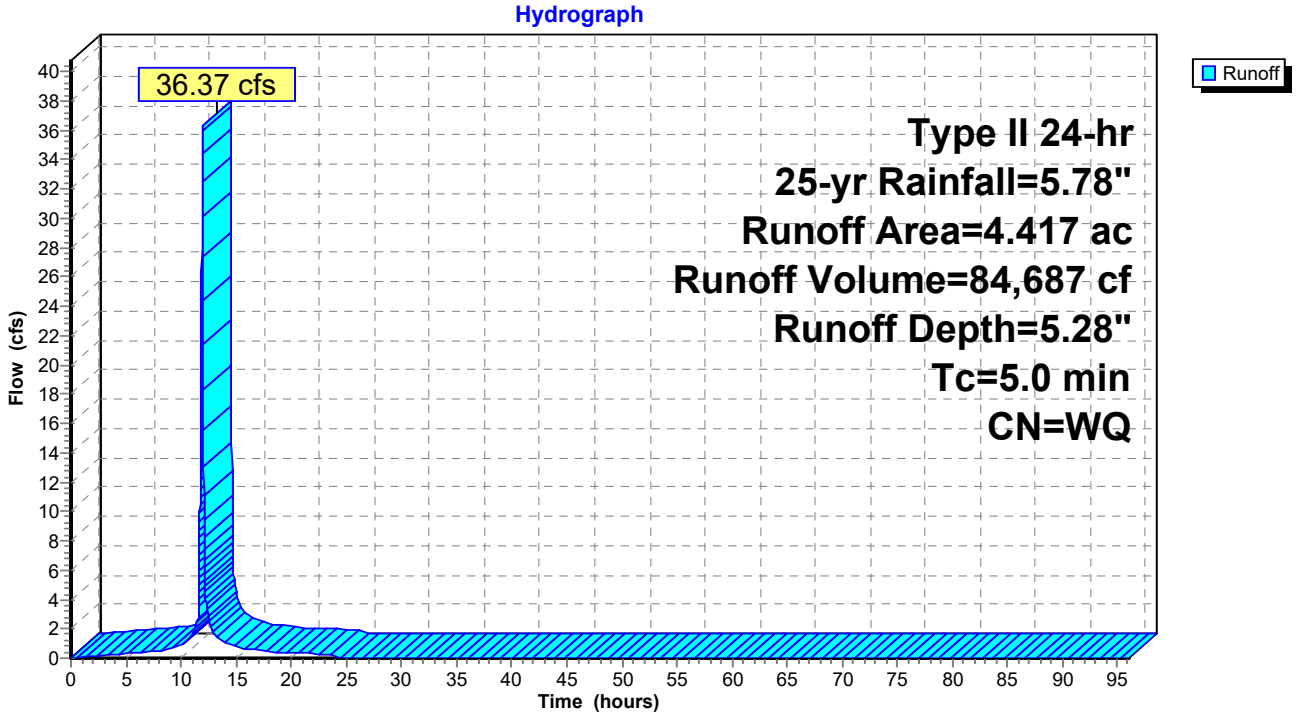
Runoff = 36.37 cfs @ 11.96 hrs, Volume= 84,687 cf, Depth= 5.28"
Routed to Pond 3P : SCM 3: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
0.587	80	>75% Grass cover, Good, HSG D
3.830	98	Paved parking, HSG D
4.417		Weighted Average
0.587		13.29% Pervious Area
3.830		86.71% Impervious Area

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

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

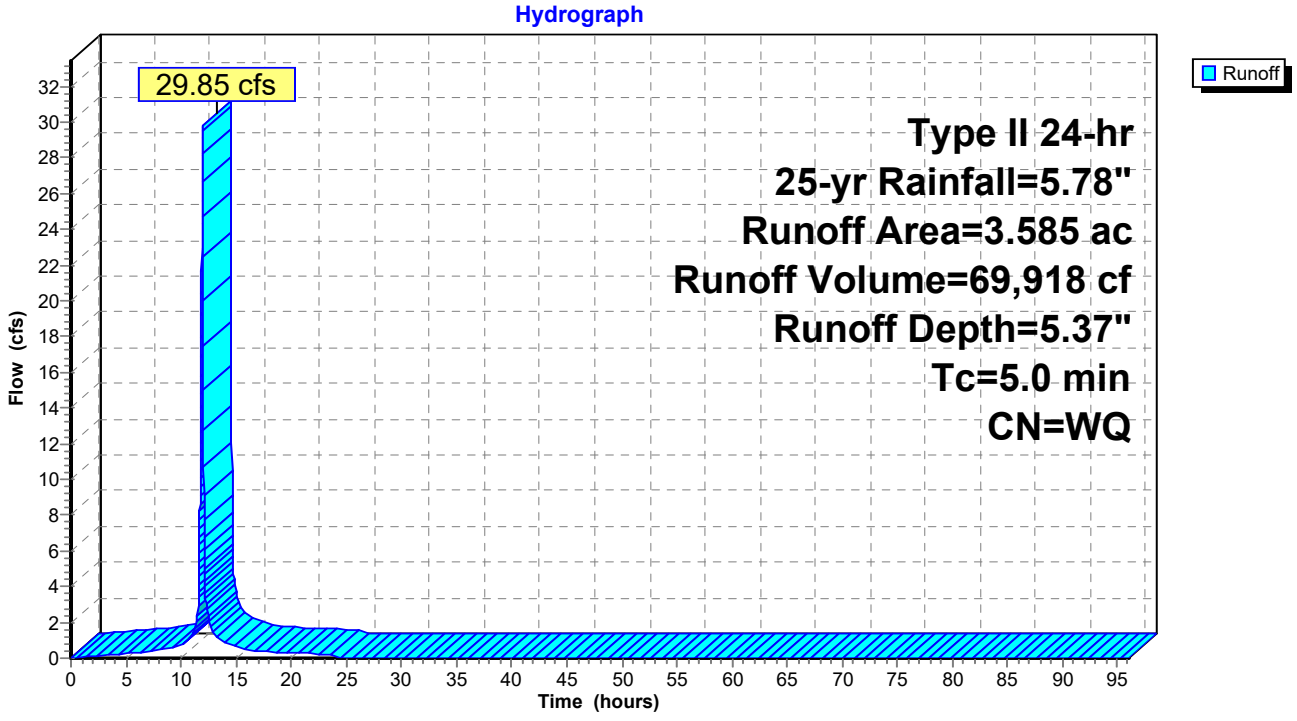
Runoff = 29.85 cfs @ 11.96 hrs, Volume= 69,918 cf, Depth= 5.37"
Routed to Pond 4P : SCM 4: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
0.310	80	>75% Grass cover, Good, HSG D
3.275	98	Paved parking, HSG D
3.585		Weighted Average
0.310		8.65% Pervious Area
3.275		91.35% Impervious Area

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

Subcatchment 4S: DA-4



Summary for Subcatchment 5S: DA-5

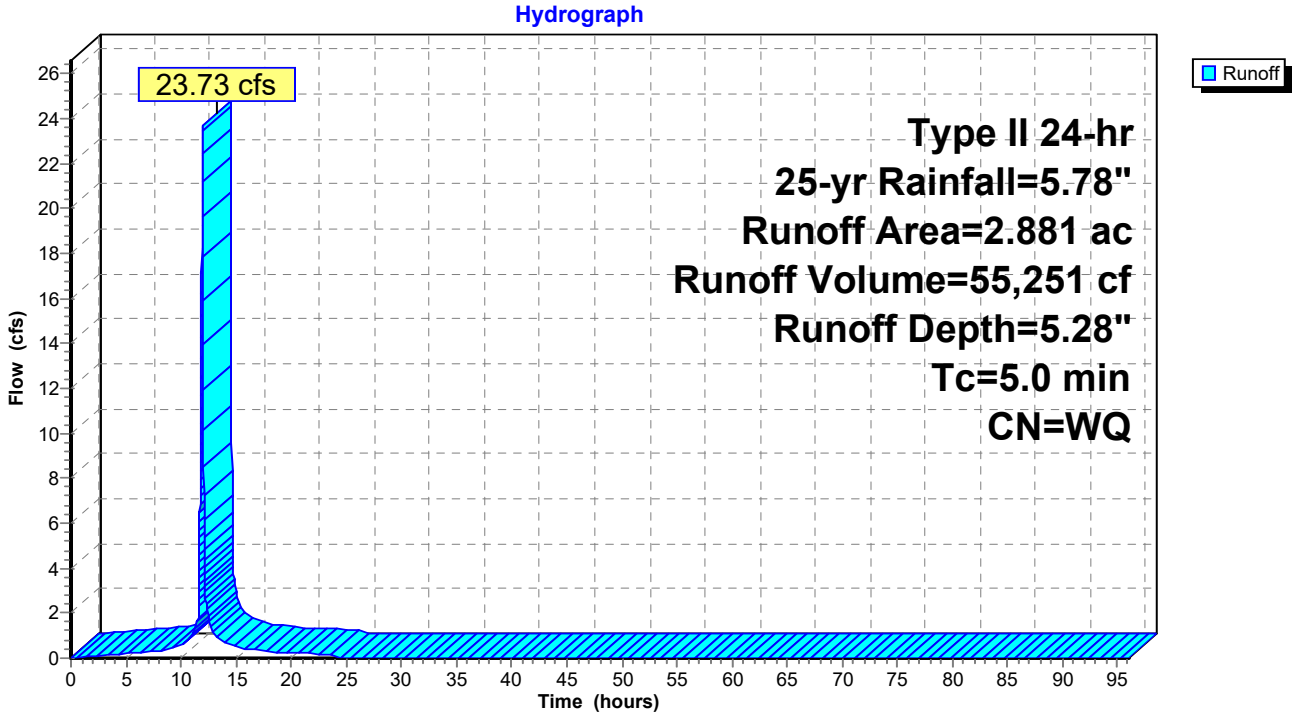
Runoff = 23.73 cfs @ 11.96 hrs, Volume= 55,251 cf, Depth= 5.28"
Routed to Pond 5P : SCM 5: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
0.381	80	>75% Grass cover, Good, HSG D
2.500	98	Paved parking, HSG D
2.881		Weighted Average
0.381		13.22% Pervious Area
2.500		86.78% Impervious Area

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

Subcatchment 5S: DA-5



Summary for Subcatchment 6S: DA-6

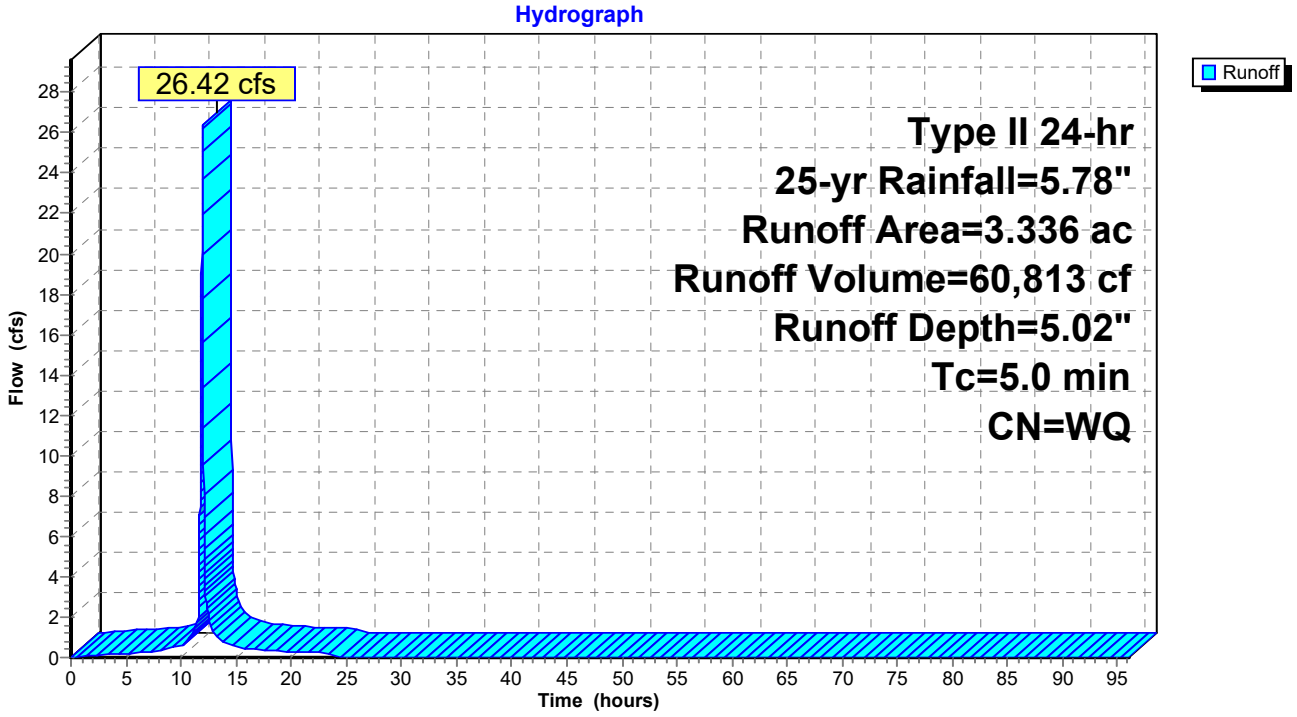
Runoff = 26.42 cfs @ 11.96 hrs, Volume= 60,813 cf, Depth= 5.02"
Routed to Pond 6P : SCM 6: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
0.255	74	>75% Grass cover, Good, HSG C
0.084	70	Woods, Good, HSG C
0.328	80	>75% Grass cover, Good, HSG D
2.580	98	Paved parking, HSG D
0.089	77	Woods, Good, HSG D
3.336		Weighted Average
0.756		22.66% Pervious Area
2.580		77.34% Impervious Area

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

Subcatchment 6S: DA-6



Summary for Subcatchment 7S: DA-7

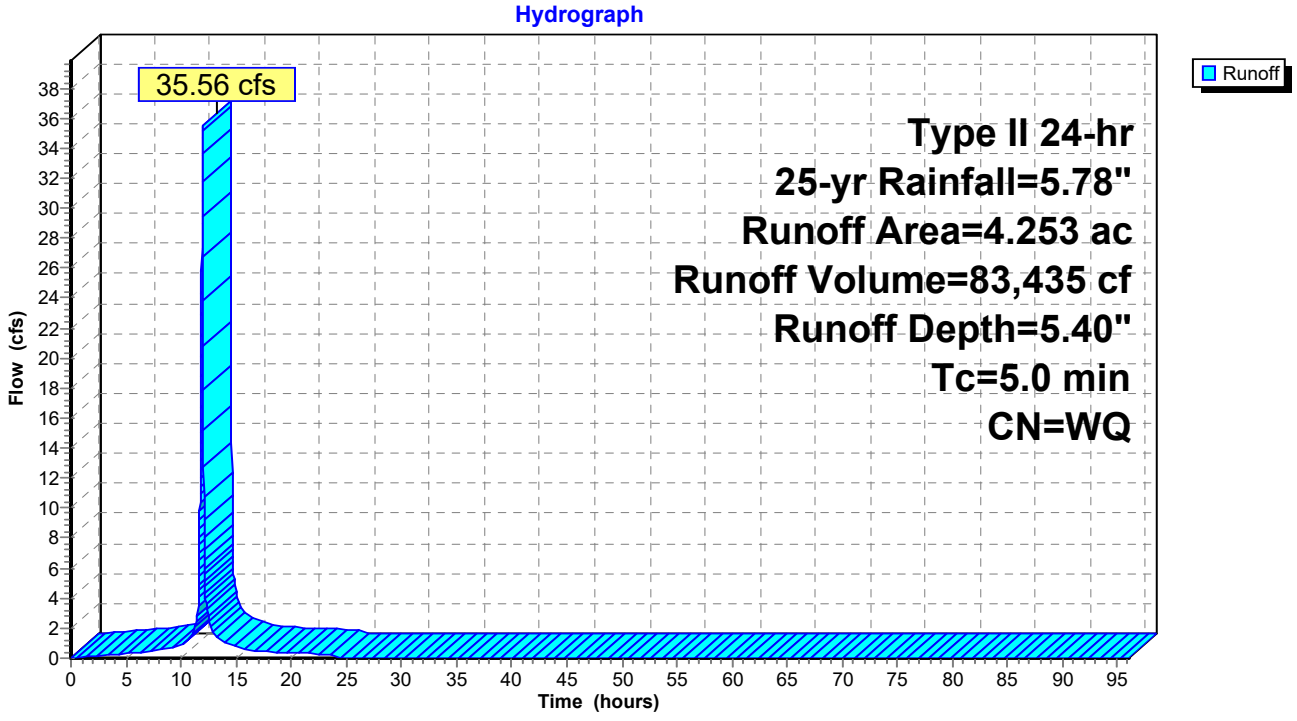
Runoff = 35.56 cfs @ 11.96 hrs, Volume= 83,435 cf, Depth= 5.40"
Routed to Pond 7P : SCM 7: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
0.299	80	>75% Grass cover, Good, HSG D
3.954	98	Paved parking, HSG D
4.253		Weighted Average
0.299		7.03% Pervious Area
3.954		92.97% Impervious Area

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

Subcatchment 7S: DA-7



Summary for Subcatchment 8S: DA-8

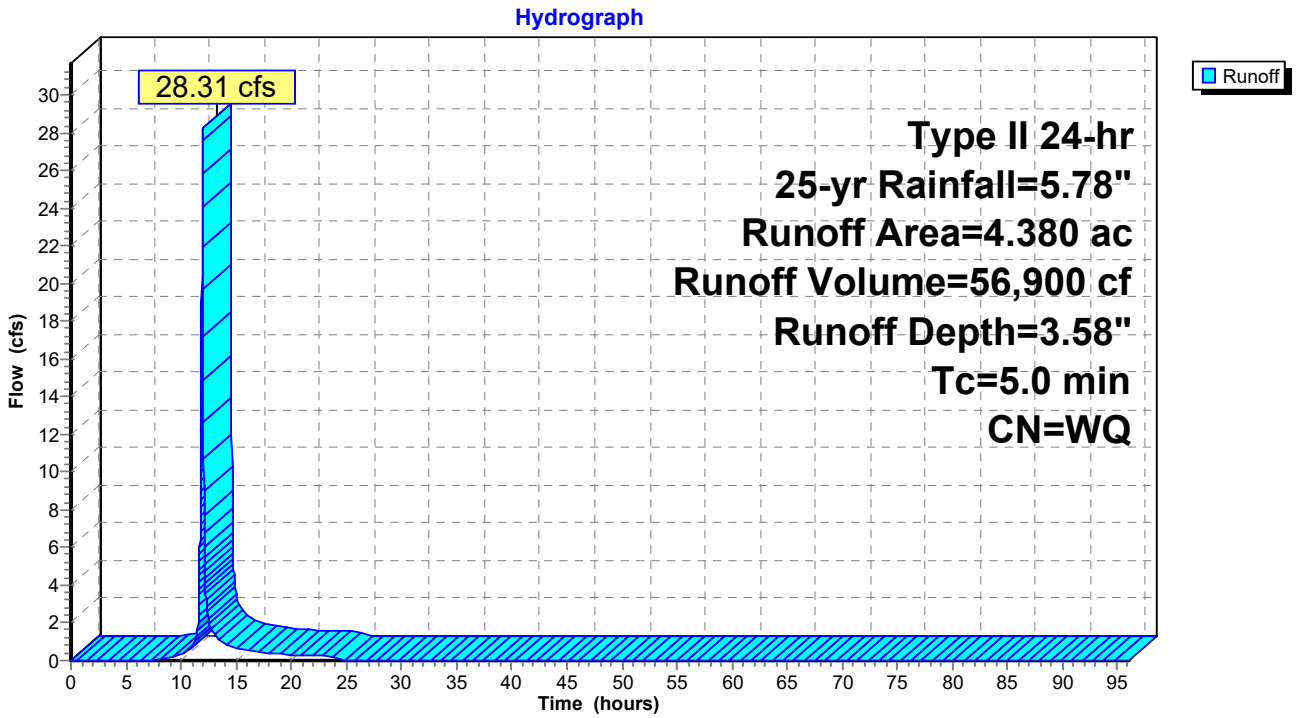
Runoff = 28.31 cfs @ 11.96 hrs, Volume= 56,900 cf, Depth= 3.58"
Routed to Link POA1 : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

Area (ac)	CN	Description
3.905	80	>75% Grass cover, Good, HSG D
0.374	74	>75% Grass cover, Good, HSG C
0.101	98	Paved parking, HSG D
4.380		Weighted Average
4.279		97.69% Pervious Area
0.101		2.31% Impervious Area

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

Subcatchment 8S: DA-8



Summary for Pond 1P: SCM 1: Infiltration AGB

Inflow Area = 293,551 sf, 72.10% Impervious, Inflow Depth = 4.98" for 25-yr event
Inflow = 53.30 cfs @ 11.96 hrs, Volume= 121,737 cf
Outflow = 2.93 cfs @ 12.74 hrs, Volume= 121,739 cf, Atten= 94%, Lag= 47.1 min
Discarded = 0.25 cfs @ 12.74 hrs, Volume= 69,816 cf
Primary = 2.69 cfs @ 12.74 hrs, Volume= 51,923 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 276.65' @ 12.74 hrs Surf.Area= 30,208 sf Storage= 73,008 cf

Plug-Flow detention time= 1,210.7 min calculated for 121,726 cf (100% of inflow)
Center-of-Mass det. time= 1,211.0 min (1,965.9 - 754.9)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	186,083 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

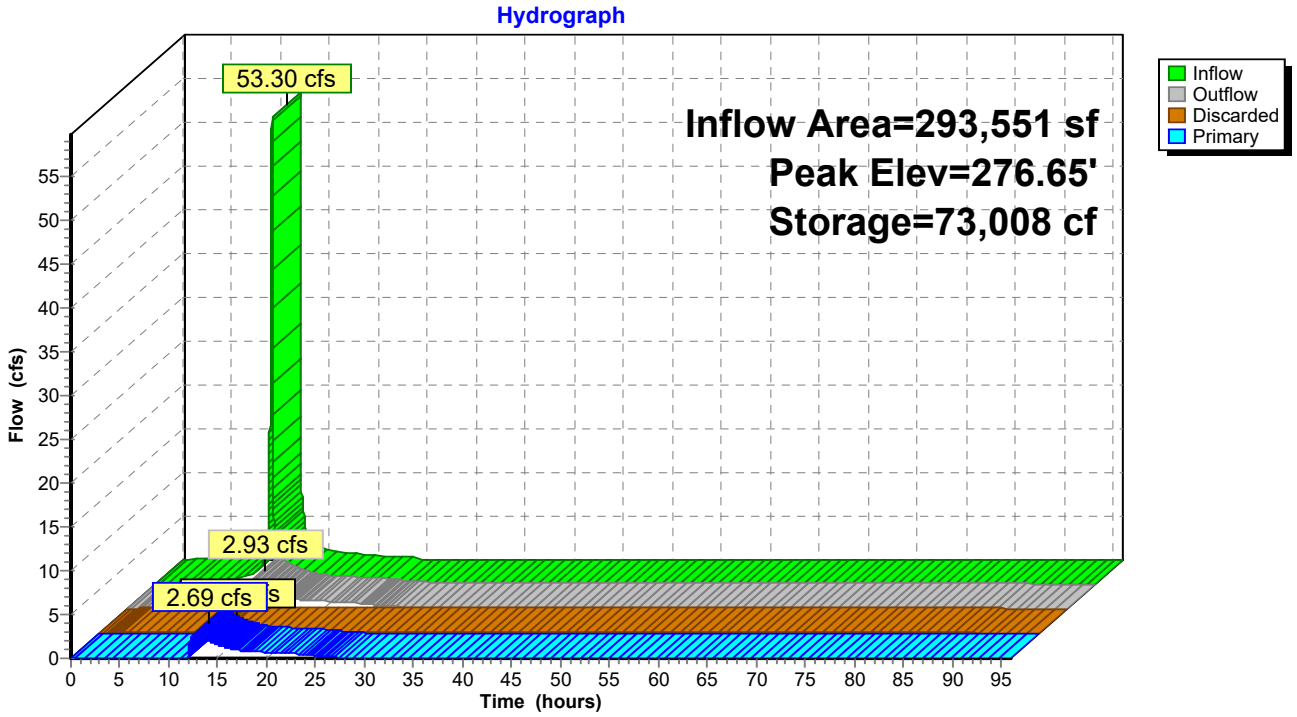
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	24,939	0	0
275.00	26,877	25,908	25,908
276.00	28,873	27,875	53,783
277.00	30,924	29,899	83,682
278.00	33,033	31,979	115,660
279.00	35,197	34,115	149,775
280.00	37,419	36,308	186,083

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**0.353 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**30.0" Round Culvert** L= 52.0' Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.00' S= 0.0385 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#3	Device 2	275.75'	**12.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	276.25'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	277.00'	**24.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	277.50'	**24.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.25 cfs @ 12.74 hrs HW=276.65' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=2.69 cfs @ 12.74 hrs HW=276.65' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Passes 2.69 cfs of 27.97 cfs potential flow)
│ ├**3=Orifice/Grate** (Orifice Controls 1.06 cfs @ 4.24 fps)
│ ├**4=Orifice/Grate** (Orifice Controls 1.63 cfs @ 2.03 fps)
│ └**5=Orifice/Grate** (Controls 0.00 cfs)
└**6=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: SCM 1: Infiltration AGB



Summary for Pond 2P: SCM 2: Detention UGB

Inflow Area = 353,446 sf, 98.31% Impervious, Inflow Depth = 5.51" for 25-yr event
Inflow = 68.71 cfs @ 11.96 hrs, Volume= 162,262 cf
Outflow = 17.75 cfs @ 12.08 hrs, Volume= 162,122 cf, Atten= 74%, Lag= 7.5 min
Primary = 17.75 cfs @ 12.08 hrs, Volume= 162,122 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 271.66' @ 12.08 hrs Surf.Area= 30,988 sf Storage= 65,556 cf

Plug-Flow detention time= 113.8 min calculated for 162,122 cf (100% of inflow)
Center-of-Mass det. time= 113.2 min (854.6 - 741.4)

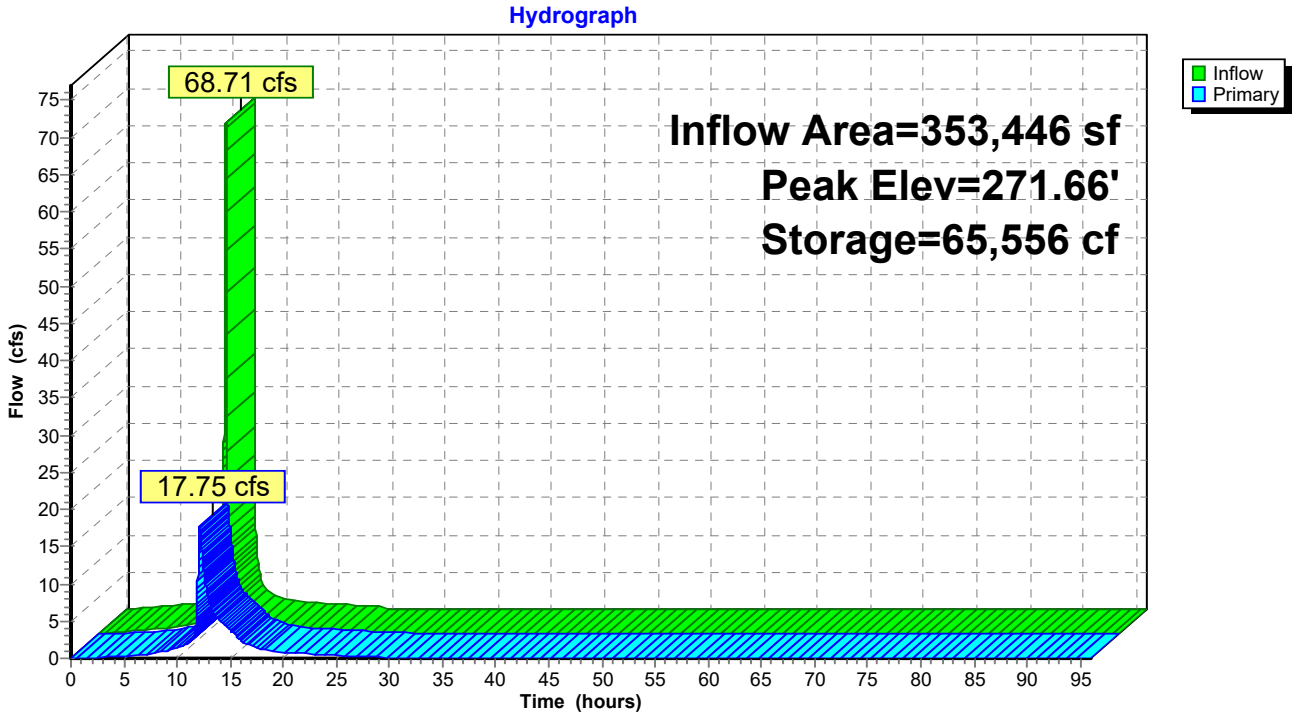
Volume	Invert	Avail.Storage	Storage Description
#1A	268.75'	41,546 cf	**63.75'W x 486.09'L x 5.50'H Field A** 170,435 cf Overall - 66,569 cf Embedded = 103,866 cf x 40.0% Voids
#2A	269.50'	66,569 cf	**ADS_StormTech MC-3500 d +Cap**x 603 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 603 Chambers in 9 Rows Cap Storage= 14.9 cf x 2 x 9 rows = 268.2 cf
		108,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	268.75'	**36.0" Round Outlet Pipe** L= 112.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 268.75' / 268.25' S= 0.0045 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	268.75'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	269.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	270.50'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	271.75'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	272.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=17.75 cfs @ 12.08 hrs HW=271.66' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 17.75 cfs of 31.30 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.18 cfs @ 8.03 fps)
  ├─**3=Orifice** (Orifice Controls 7.07 cfs @ 7.07 fps)
  ├─**4=Orifice** (Orifice Controls 9.50 cfs @ 3.80 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SCM 2: Detention UGB



Summary for Pond 3P: SCM 3: Detention UGB

Inflow Area = 192,405 sf, 86.71% Impervious, Inflow Depth = 5.28" for 25-yr event
Inflow = 36.37 cfs @ 11.96 hrs, Volume= 84,687 cf
Outflow = 16.44 cfs @ 12.05 hrs, Volume= 84,648 cf, Atten= 55%, Lag= 5.4 min
Primary = 16.44 cfs @ 12.05 hrs, Volume= 84,648 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.38' @ 12.05 hrs Surf.Area= 16,811 sf Storage= 28,808 cf

Plug-Flow detention time= 78.1 min calculated for 84,648 cf (100% of inflow)
Center-of-Mass det. time= 77.8 min (824.8 - 747.0)

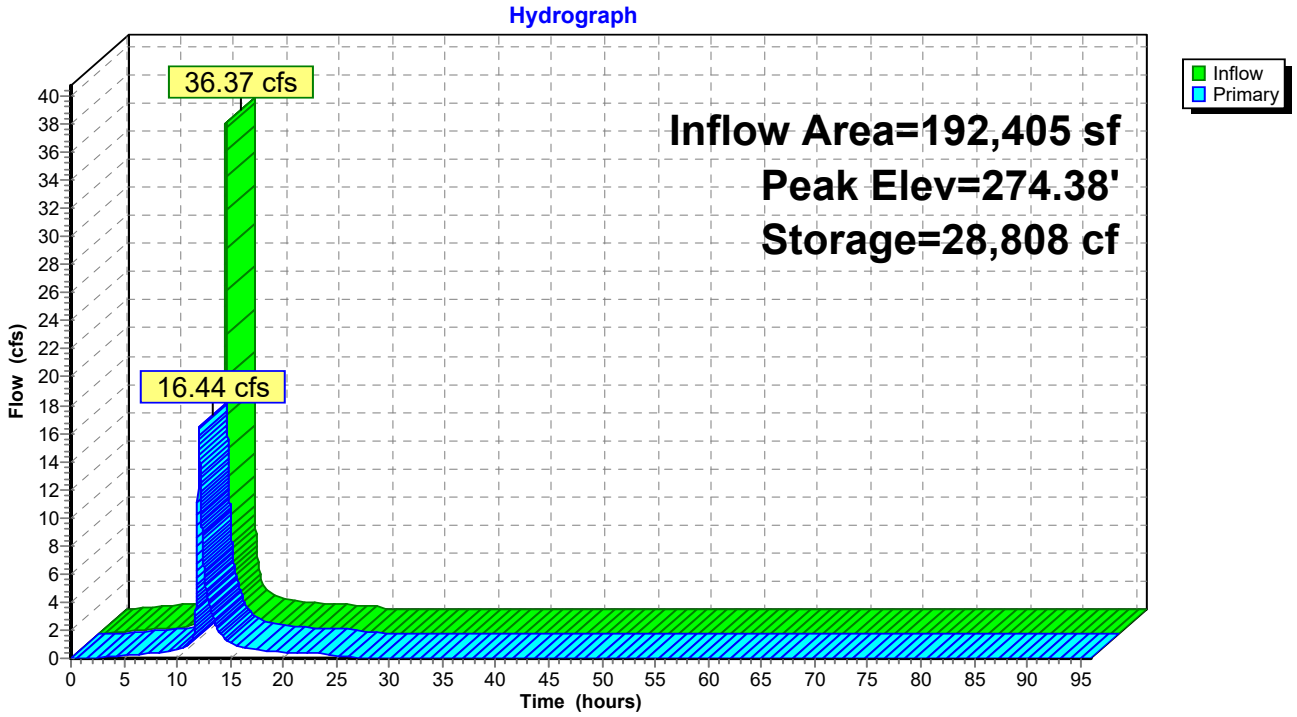
Volume	Invert	Avail.Storage	Storage Description
#1A	272.00'	15,071 cf	**46.75'W x 359.60'L x 3.75'H Field A** 63,042 cf Overall - 25,365 cf Embedded = 37,678 cf x 40.0% Voids
#2A	272.50'	25,365 cf	**ADS_StormTech SC-800 +Cap** x 500 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 500 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		40,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**36.0" Round Outlet Pipe** L= 628.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 272.00' / 268.25' S= 0.0060 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	272.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	272.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	273.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.50'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=16.43 cfs @ 12.05 hrs HW=274.38' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 16.43 cfs of 24.88 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.06 cfs @ 7.22 fps)
  ├─**3=Orifice** (Orifice Controls 6.13 cfs @ 6.13 fps)
  ├─**4=Orifice** (Orifice Controls 9.23 cfs @ 3.69 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: SCM 3: Detention UGB



Summary for Pond 4P: SCM 4: Detention UGB

Inflow Area = 156,163 sf, 91.35% Impervious, Inflow Depth = 5.37" for 25-yr event
Inflow = 29.85 cfs @ 11.96 hrs, Volume= 69,918 cf
Outflow = 10.59 cfs @ 12.06 hrs, Volume= 69,876 cf, Atten= 65%, Lag= 6.3 min
Primary = 10.59 cfs @ 12.06 hrs, Volume= 69,876 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.68' @ 12.06 hrs Surf.Area= 20,685 sf Storage= 22,972 cf

Plug-Flow detention time= 70.8 min calculated for 69,876 cf (100% of inflow)
Center-of-Mass det. time= 70.4 min (815.2 - 744.7)

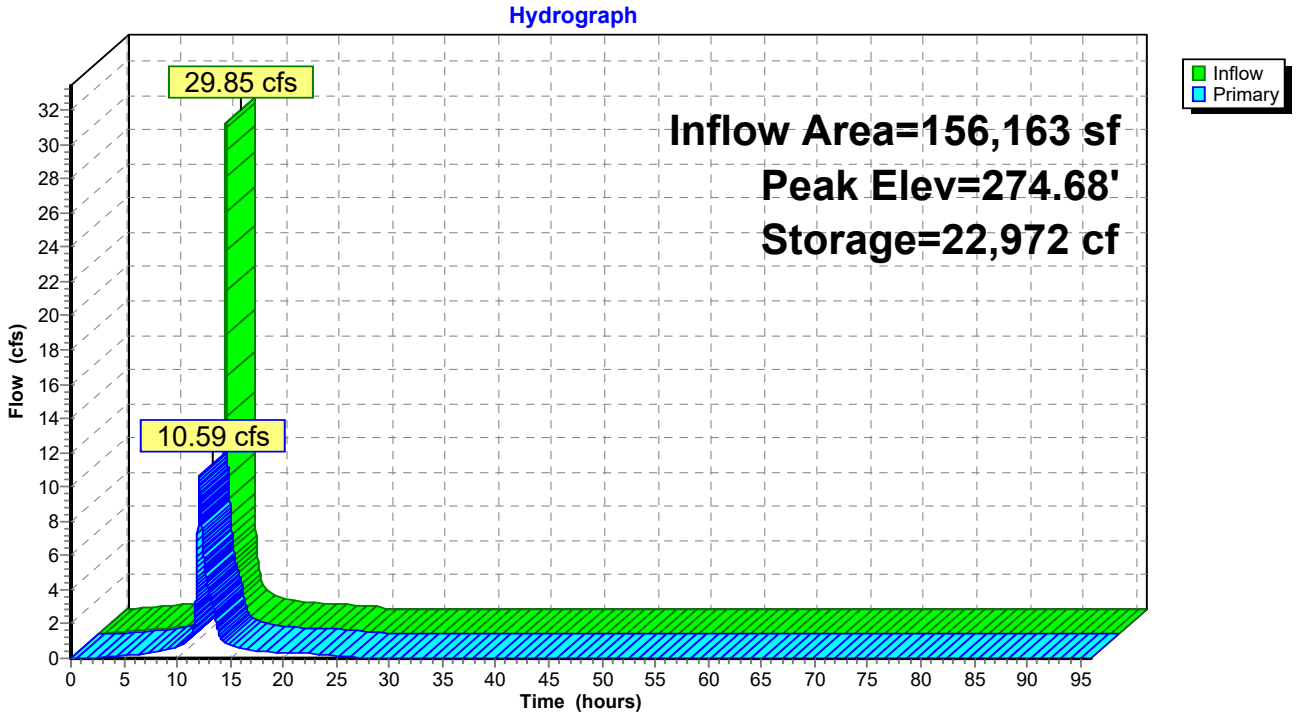
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	27,875 cf	**49.92'W x 414.39'L x 5.50'H Field A** 113,767 cf Overall - 44,079 cf Embedded = 69,688 cf x 40.0% Voids
#2A	273.75'	44,079 cf	**ADS_StormTech MC-3500 d +Cap**x 399 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 399 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		71,955 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 269.00' S= 0.0381 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.00'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.75'	**42.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.09'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=10.59 cfs @ 12.06 hrs HW=274.68' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 10.59 cfs of 14.17 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.88 cfs @ 6.00 fps)
  ├─**3=Orifice** (Orifice Controls 5.22 cfs @ 5.22 fps)
  ├─**4=Orifice** (Orifice Controls 4.49 cfs @ 2.64 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: SCM 4: Detention UGB



Summary for Pond 5P: SCM 5: Detention UGB

Inflow Area = 125,496 sf, 86.78% Impervious, Inflow Depth = 5.28" for 25-yr event
Inflow = 23.73 cfs @ 11.96 hrs, Volume= 55,251 cf
Outflow = 15.38 cfs @ 12.02 hrs, Volume= 55,241 cf, Atten= 35%, Lag= 4.0 min
Primary = 15.38 cfs @ 12.02 hrs, Volume= 55,241 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 278.78' @ 12.02 hrs Surf.Area= 8,494 sf Storage= 13,948 cf

Plug-Flow detention time= 41.8 min calculated for 55,235 cf (100% of inflow)
Center-of-Mass det. time= 42.0 min (789.0 - 747.0)

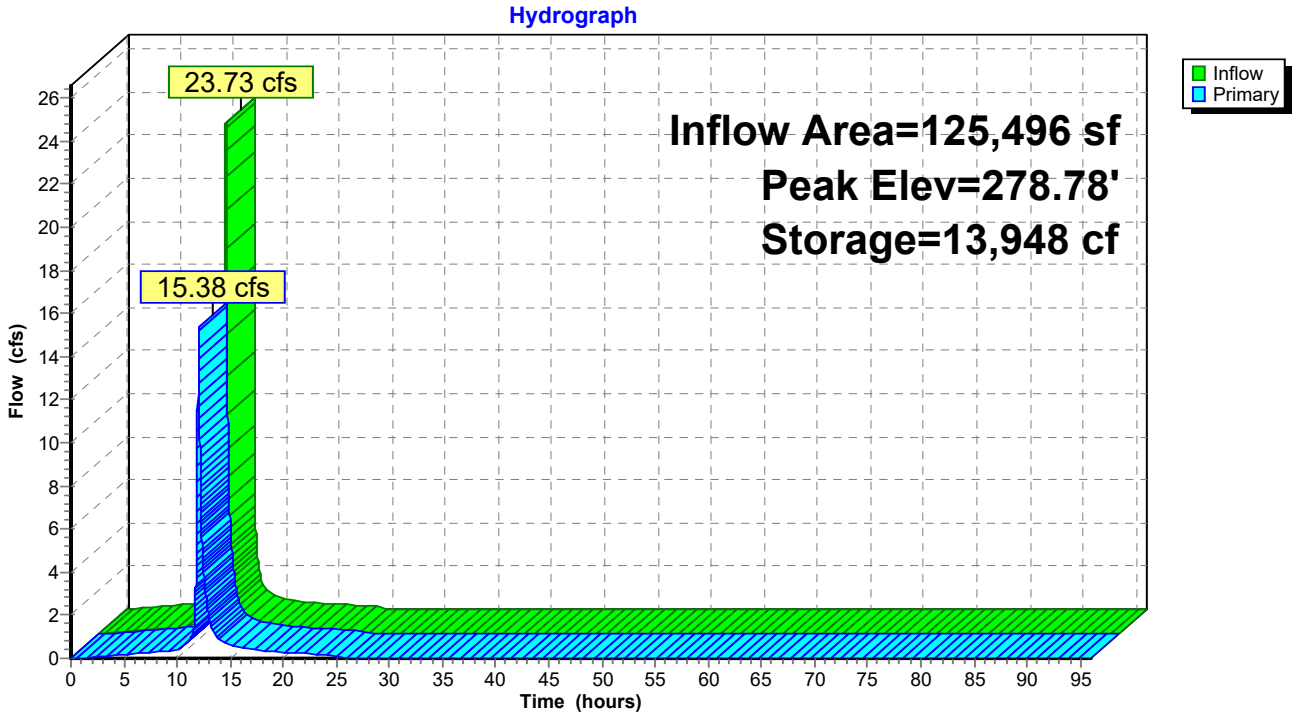
Volume	Invert	Avail.Storage	Storage Description
#1A	276.50'	7,654 cf	**46.75'W x 181.68'L x 3.75'H Field A** 31,851 cf Overall - 12,716 cf Embedded = 19,135 cf x 40.0% Voids
#2A	277.00'	12,716 cf	**ADS_StormTech SC-800 +Cap** x 250 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 250 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		20,370 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	276.50'	**36.0" Round Outlet Pipe** L= 900.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.50' / 269.00' S= 0.0083 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	276.50'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	277.75'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.00'	**36.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	279.60'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=15.37 cfs @ 12.02 hrs HW=278.78' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 15.37 cfs of 23.43 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.04 cfs @ 7.07 fps)
  ├─**3=Orifice** (Orifice Controls 5.95 cfs @ 5.95 fps)
  ├─**4=Orifice** (Orifice Controls 8.37 cfs @ 3.35 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: SCM 5: Detention UGB



Summary for Pond 6P: SCM 6: Detention UGB

Inflow Area = 145,316 sf, 77.34% Impervious, Inflow Depth = 5.02" for 25-yr event
Inflow = 26.42 cfs @ 11.96 hrs, Volume= 60,813 cf
Outflow = 13.90 cfs @ 12.04 hrs, Volume= 60,797 cf, Atten= 47%, Lag= 4.9 min
Primary = 13.90 cfs @ 12.04 hrs, Volume= 60,797 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 282.18' @ 12.04 hrs Surf.Area= 11,821 sf Storage= 18,531 cf

Plug-Flow detention time= 58.5 min calculated for 60,797 cf (100% of inflow)
Center-of-Mass det. time= 58.3 min (810.4 - 752.2)

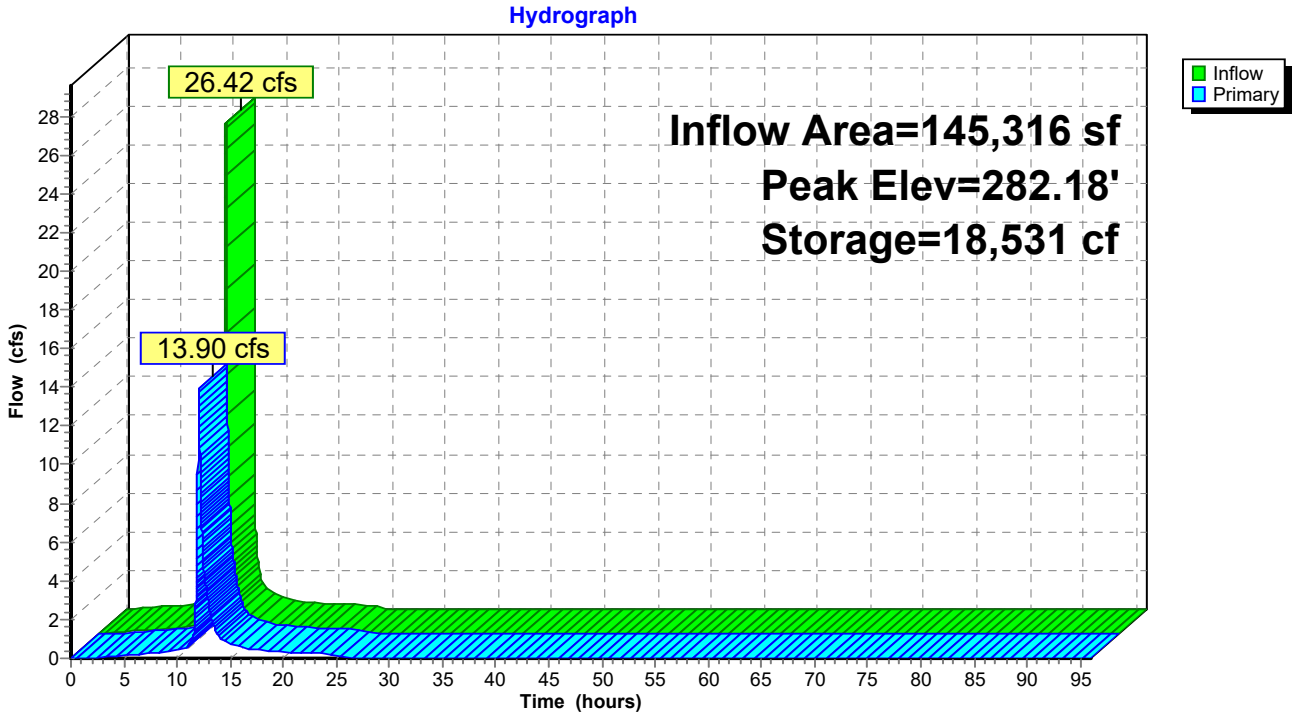
Volume	Invert	Avail.Storage	Storage Description
#1A	280.00'	10,621 cf	**46.75'W x 252.85'L x 3.75'H Field A** 44,328 cf Overall - 17,776 cf Embedded = 26,552 cf x 40.0% Voids
#2A	280.50'	17,776 cf	**ADS_StormTech SC-800 +Cap** x 350 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 350 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		28,397 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	280.00'	**36.0" Round Outlet Pipe** L= 800.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 280.00' / 271.00' S= 0.0112 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	280.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	281.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	282.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	283.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=13.89 cfs @ 12.04 hrs HW=282.17' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 13.89 cfs of 21.75 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.02 cfs @ 6.89 fps)
  ├─**3=Orifice** (Orifice Controls 5.74 cfs @ 5.74 fps)
  ├─**4=Orifice** (Orifice Controls 7.14 cfs @ 3.09 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6P: SCM 6: Detention UGB



Summary for Pond 7P: SCM 7: Detention UGB

Inflow Area = 185,261 sf, 92.97% Impervious, Inflow Depth = 5.40" for 25-yr event
Inflow = 35.56 cfs @ 11.96 hrs, Volume= 83,435 cf
Outflow = 14.33 cfs @ 12.05 hrs, Volume= 83,402 cf, Atten= 60%, Lag= 5.8 min
Primary = 14.33 cfs @ 12.05 hrs, Volume= 83,402 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 275.21' @ 12.05 hrs Surf.Area= 18,180 sf Storage= 28,205 cf

Plug-Flow detention time= 75.9 min calculated for 83,394 cf (100% of inflow)
Center-of-Mass det. time= 76.0 min (820.0 - 743.9)

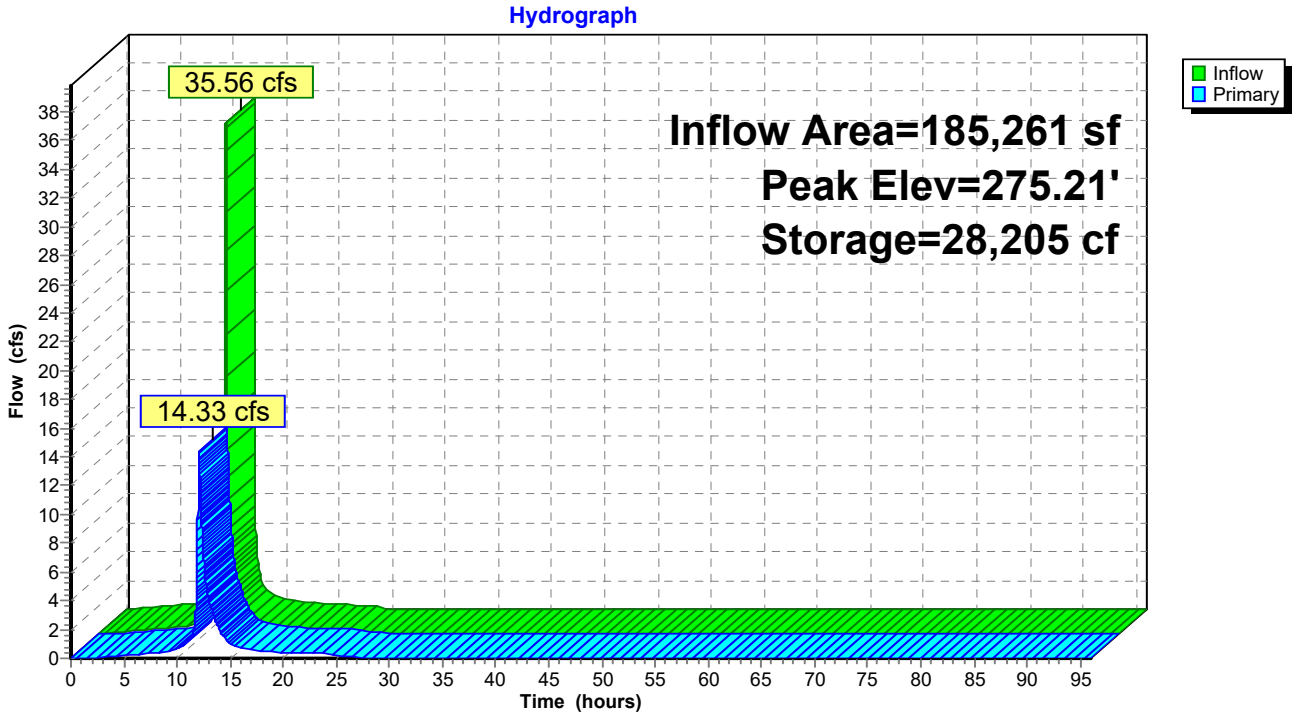
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	24,519 cf	**49.92'W x 364.20'L x 5.50'H Field A** 99,988 cf Overall - 38,692 cf Embedded = 61,296 cf x 40.0% Voids
#2A	273.75'	38,692 cf	**ADS_StormTech MC-3500 d +Cap**x 350 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 350 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		63,210 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 271.00' S= 0.0190 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	275.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	276.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=14.32 cfs @ 12.05 hrs HW=275.21' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 14.32 cfs of 22.24 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.02 cfs @ 6.95 fps)
  ├─**3=Orifice** (Orifice Controls 5.80 cfs @ 5.80 fps)
  ├─**4=Orifice** (Orifice Controls 7.50 cfs @ 3.14 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: SCM 7: Detention UGB

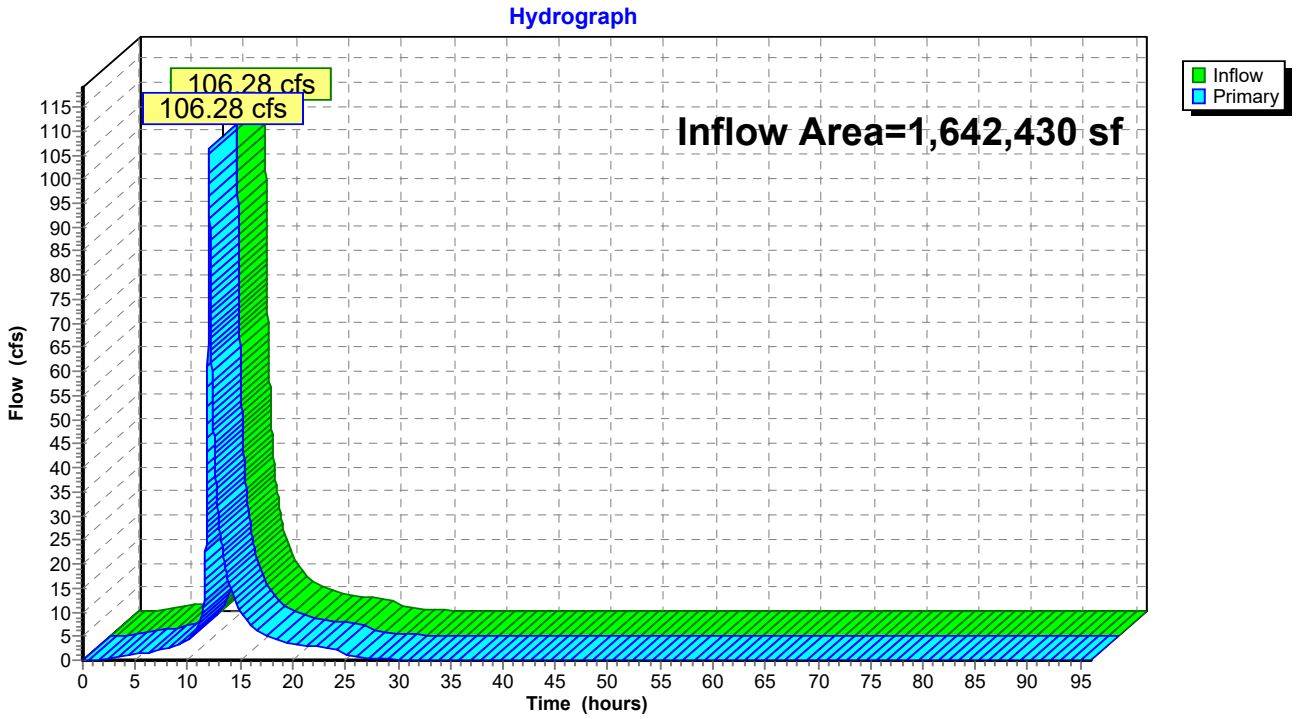


Summary for Link POA1: POA #1

Inflow Area = 1,642,430 sf, 77.11% Impervious, Inflow Depth = 4.57" for 25-yr event
Inflow = 106.28 cfs @ 12.01 hrs, Volume= 624,910 cf
Primary = 106.28 cfs @ 12.01 hrs, Volume= 624,910 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA1: POA #1

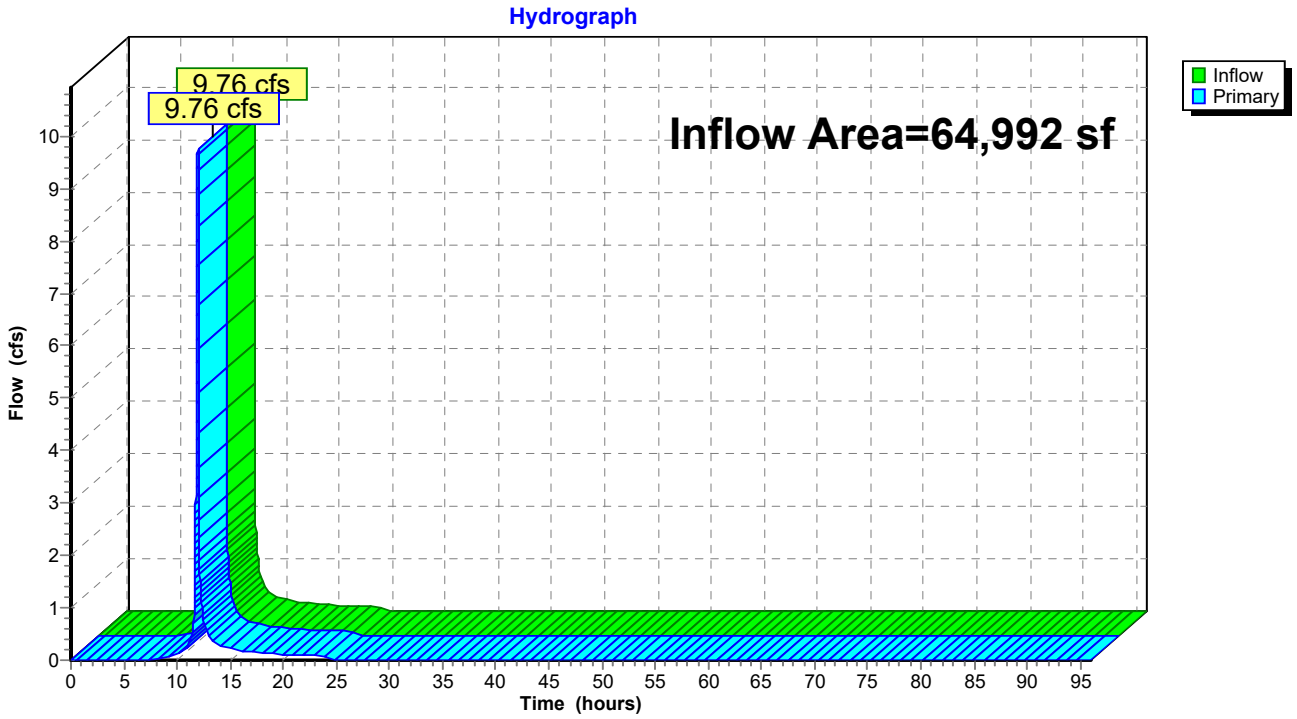


Summary for Link POA2: POA #2

Inflow Area = 64,992 sf, 2.01% Impervious, Inflow Depth = 3.62" for 25-yr event
Inflow = 9.76 cfs @ 11.96 hrs, Volume= 19,621 cf
Primary = 9.76 cfs @ 11.96 hrs, Volume= 19,621 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA2: POA #2

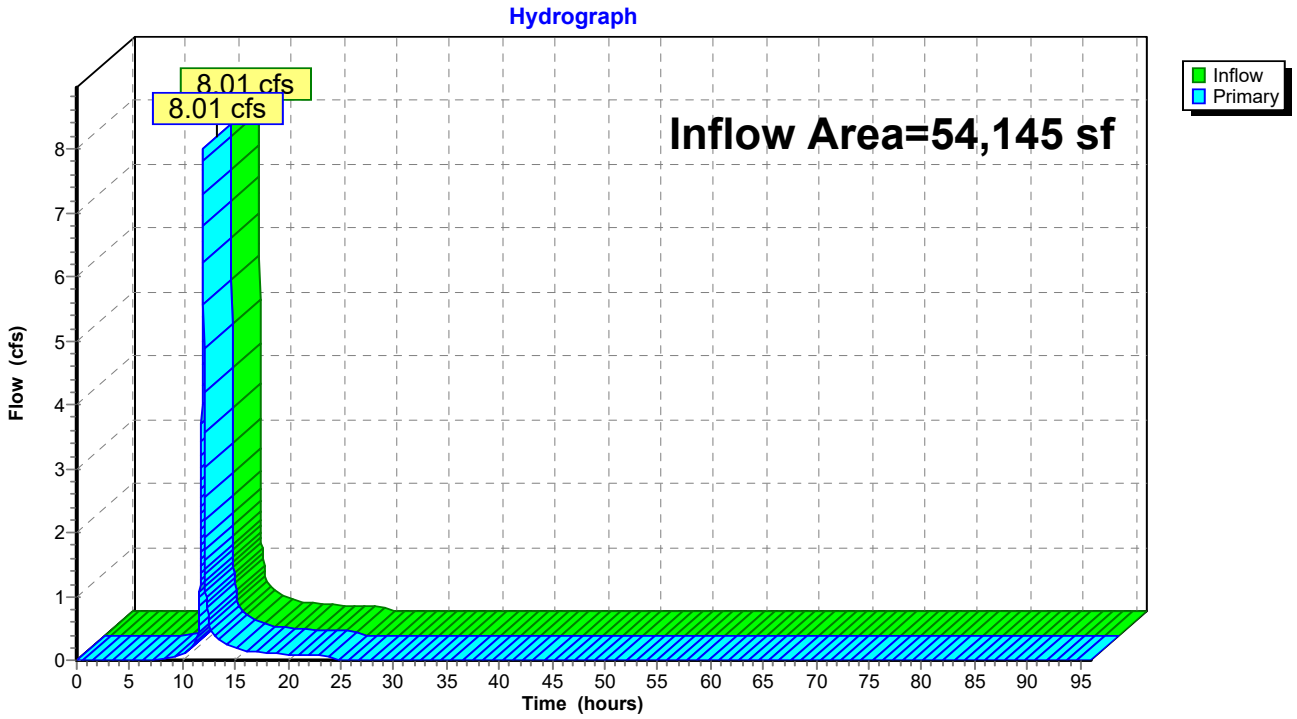


Summary for Link POA3: POA #3

Inflow Area = 54,145 sf, 0.00% Impervious, Inflow Depth = 3.55" for 25-yr event
Inflow = 8.01 cfs @ 11.96 hrs, Volume= 16,016 cf
Primary = 8.01 cfs @ 11.96 hrs, Volume= 16,016 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA3: POA #3



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=6.739 ac 72.10% Impervious Runoff Depth=5.79"
Tc=5.0 min CN=WQ Runoff=61.79 cfs 141,696 cf

Subcatchment2B: Bypass to POA #2 Runoff Area=1.492 ac 2.01% Impervious Runoff Depth=4.39"
Tc=5.0 min CN=WQ Runoff=11.70 cfs 23,754 cf

Subcatchment2S: DA-2 Runoff Area=8.114 ac 98.31% Impervious Runoff Depth=6.35"
Tc=5.0 min CN=WQ Runoff=78.81 cfs 186,939 cf

Subcatchment3B: Bypass to POA #3 Runoff Area=1.243 ac 0.00% Impervious Runoff Depth=4.31"
Tc=5.0 min CN=WQ Runoff=9.63 cfs 19,440 cf

Subcatchment3S: DA-3 Runoff Area=4.417 ac 86.71% Impervious Runoff Depth=6.11"
Tc=5.0 min CN=WQ Runoff=41.90 cfs 97,976 cf

Subcatchment4S: DA-4 Runoff Area=3.585 ac 91.35% Impervious Runoff Depth=6.21"
Tc=5.0 min CN=WQ Runoff=34.34 cfs 80,751 cf

Subcatchment5S: DA-5 Runoff Area=2.881 ac 86.78% Impervious Runoff Depth=6.11"
Tc=5.0 min CN=WQ Runoff=27.34 cfs 63,919 cf

Subcatchment6S: DA-6 Runoff Area=3.336 ac 77.34% Impervious Runoff Depth=5.84"
Tc=5.0 min CN=WQ Runoff=30.60 cfs 70,681 cf

Subcatchment7S: DA-7 Runoff Area=4.253 ac 92.97% Impervious Runoff Depth=6.24"
Tc=5.0 min CN=WQ Runoff=40.87 cfs 96,306 cf

Subcatchment8S: DA-8 Runoff Area=4.380 ac 2.31% Impervious Runoff Depth=4.34"
Tc=5.0 min CN=WQ Runoff=34.01 cfs 68,972 cf

Pond 1P: SCM 1: Infiltration AGB Peak Elev=276.97' Storage=82,640 cf Inflow=61.79 cfs 141,696 cf
Discarded=0.25 cfs 70,568 cf Primary=4.50 cfs 71,130 cf Outflow=4.76 cfs 141,698 cf

Pond 2P: SCM 2: Detention UGB Peak Elev=272.01' Storage=73,736 cf Inflow=78.81 cfs 186,939 cf
Outflow=22.42 cfs 186,798 cf

Pond 3P: SCM 3: Detention UGB Peak Elev=274.67' Storage=32,096 cf Inflow=41.90 cfs 97,976 cf
Outflow=20.02 cfs 97,937 cf

Pond 4P: SCM 4: Detention UGB Peak Elev=274.85' Storage=25,918 cf Inflow=34.34 cfs 80,751 cf
Outflow=13.10 cfs 80,709 cf

Pond 5P: SCM 5: Detention UGB Peak Elev=279.03' Storage=15,381 cf Inflow=27.34 cfs 63,919 cf
Outflow=18.00 cfs 63,910 cf

Pond 6P: SCM 6: Detention UGB Peak Elev=282.42' Storage=20,601 cf Inflow=30.60 cfs 70,681 cf
Outflow=16.92 cfs 70,666 cf

Pond 7P: SCM 7: Detention UGB Peak Elev=275.44' Storage=31,588 cf Inflow=40.87 cfs 96,306 cf
Outflow=17.04 cfs 96,273 cf

Link POA1: POA #1 Inflow=130.30 cfs 736,395 cf
Primary=130.30 cfs 736,395 cf

Link POA2: POA #2 Inflow=11.70 cfs 23,754 cf
Primary=11.70 cfs 23,754 cf

Link POA3: POA #3 Inflow=9.63 cfs 19,440 cf
Primary=9.63 cfs 19,440 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 850,436 cf Average Runoff Depth = 5.79"
28.03% Pervious = 493,709 sf 71.97% Impervious = 1,267,857 sf

Summary for Subcatchment 1S: DA-1

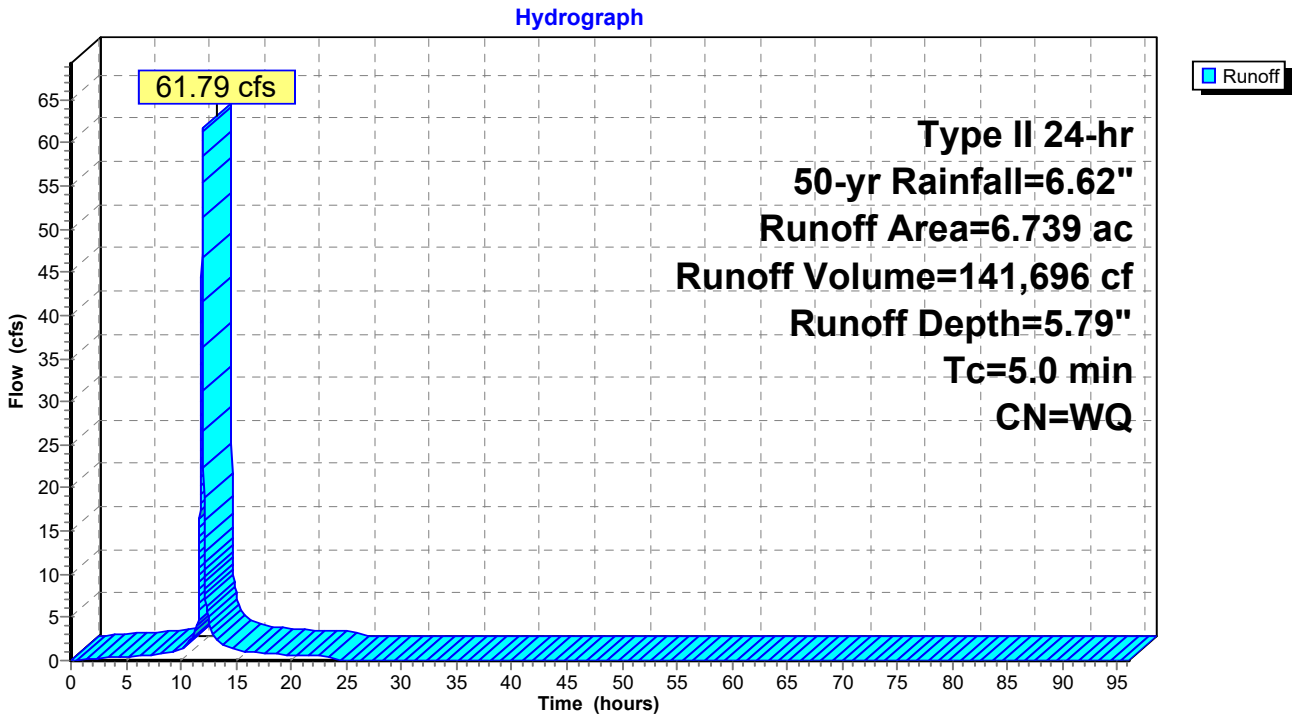
Runoff = 61.79 cfs @ 11.96 hrs, Volume= 141,696 cf, Depth= 5.79"
Routed to Pond 1P : SCM 1: Infiltration AGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
0.222	74	>75% Grass cover, Good, HSG C
1.658	80	>75% Grass cover, Good, HSG D
4.859	98	Paved parking, HSG D
6.739		Weighted Average
1.880		27.90% Pervious Area
4.859		72.10% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2B: Bypass to POA #2

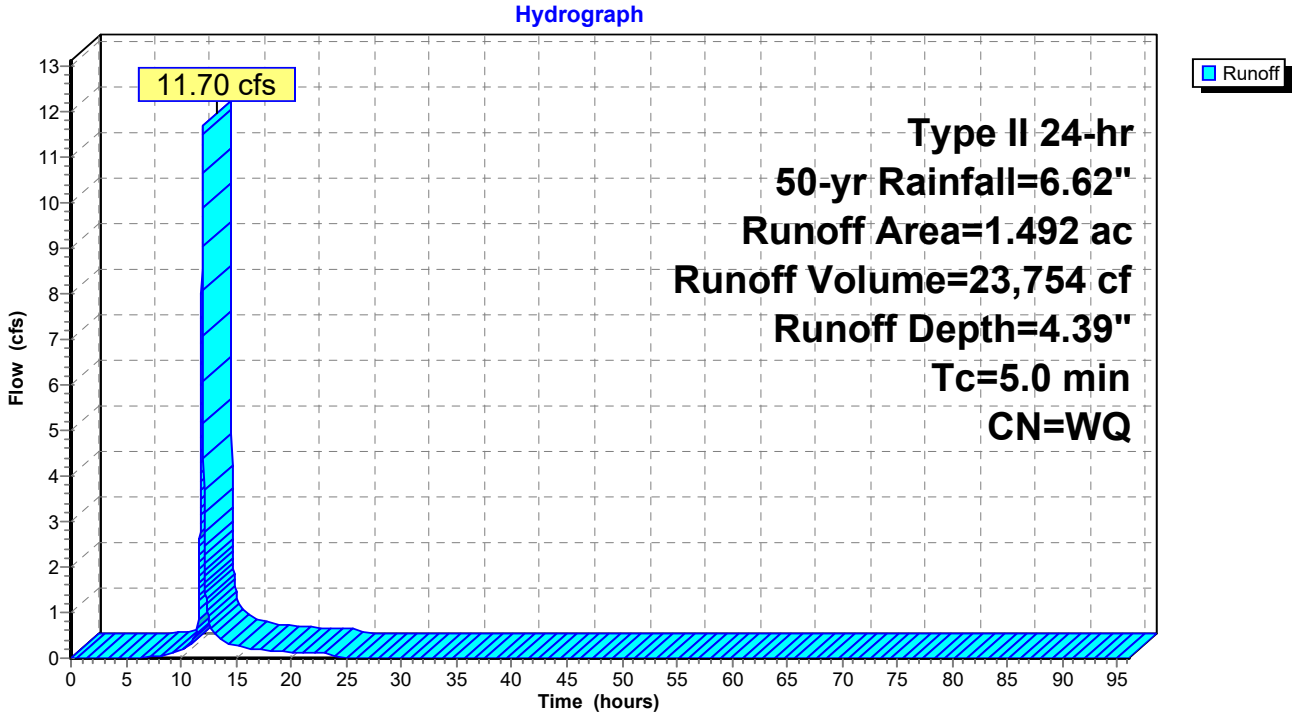
Runoff = 11.70 cfs @ 11.96 hrs, Volume= 23,754 cf, Depth= 4.39"
Routed to Link POA2 : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
1.462	80	>75% Grass cover, Good, HSG D
0.030	98	Paved parking, HSG D
1.492		Weighted Average
1.462		97.99% Pervious Area
0.030		2.01% Impervious Area

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

Subcatchment 2B: Bypass to POA #2



Summary for Subcatchment 2S: DA-2

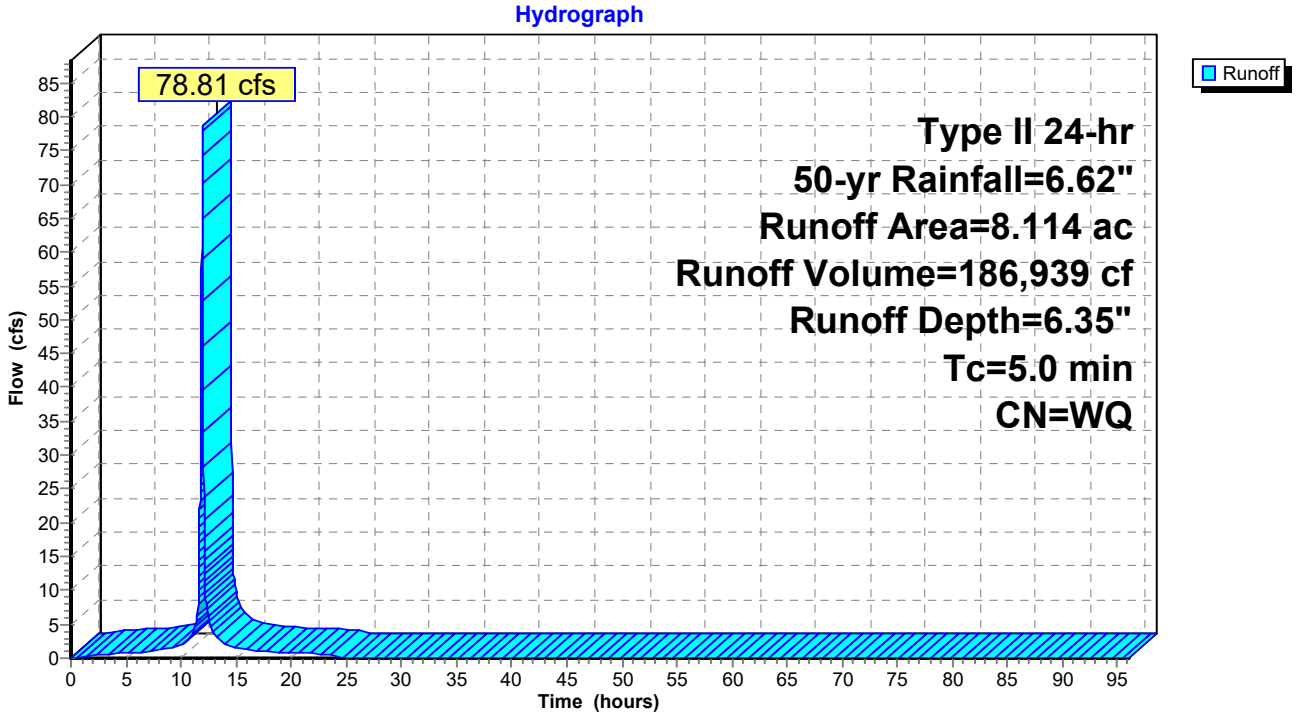
Runoff = 78.81 cfs @ 11.96 hrs, Volume= 186,939 cf, Depth= 6.35"
Routed to Pond 2P : SCM 2: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
0.137	80	>75% Grass cover, Good, HSG D
7.977	98	Paved parking, HSG D
8.114		Weighted Average
0.137		1.69% Pervious Area
7.977		98.31% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3B: Bypass to POA #3

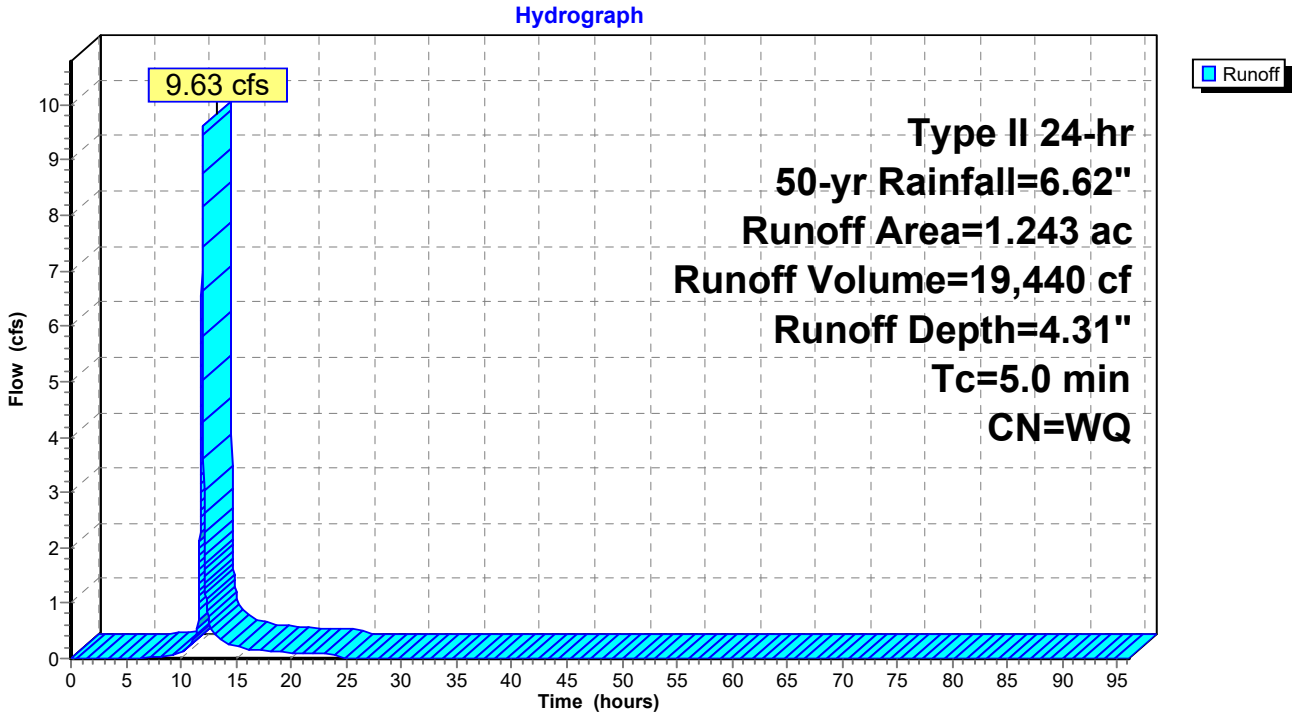
Runoff = 9.63 cfs @ 11.96 hrs, Volume= 19,440 cf, Depth= 4.31"
Routed to Link POA3 : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
0.072	74	>75% Grass cover, Good, HSG C
1.171	80	>75% Grass cover, Good, HSG D
1.243		Weighted Average
1.243		100.00% Pervious Area

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

Subcatchment 3B: Bypass to POA #3



Summary for Subcatchment 3S: DA-3

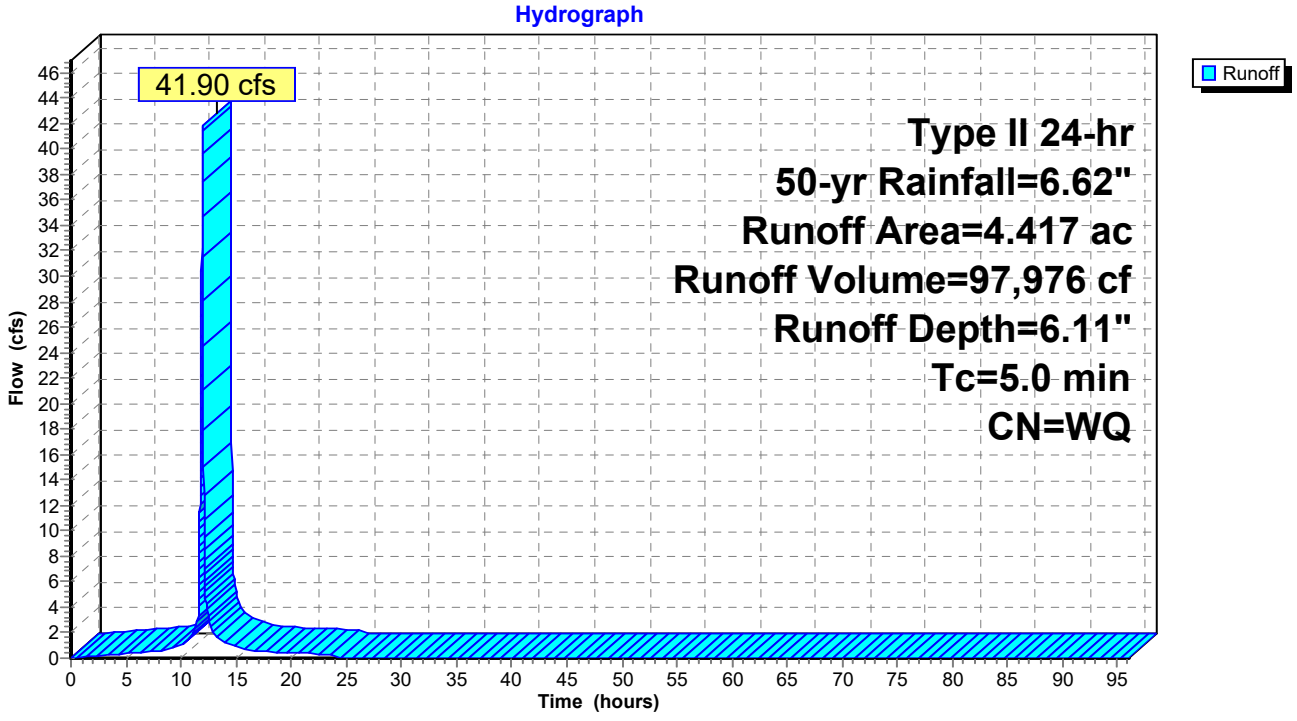
Runoff = 41.90 cfs @ 11.96 hrs, Volume= 97,976 cf, Depth= 6.11"
Routed to Pond 3P : SCM 3: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
0.587	80	>75% Grass cover, Good, HSG D
3.830	98	Paved parking, HSG D
4.417		Weighted Average
0.587		13.29% Pervious Area
3.830		86.71% Impervious Area

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

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

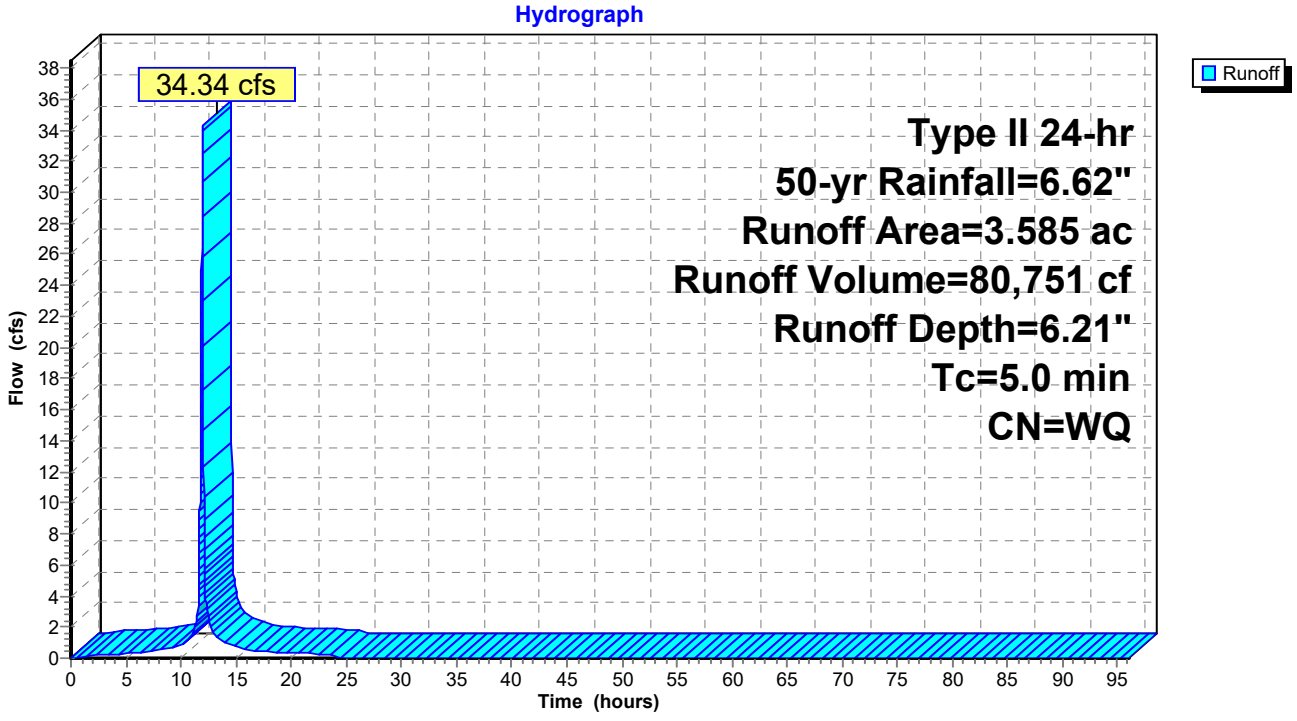
Runoff = 34.34 cfs @ 11.96 hrs, Volume= 80,751 cf, Depth= 6.21"
Routed to Pond 4P : SCM 4: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
0.310	80	>75% Grass cover, Good, HSG D
3.275	98	Paved parking, HSG D
3.585		Weighted Average
0.310		8.65% Pervious Area
3.275		91.35% Impervious Area

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

Subcatchment 4S: DA-4



Summary for Subcatchment 5S: DA-5

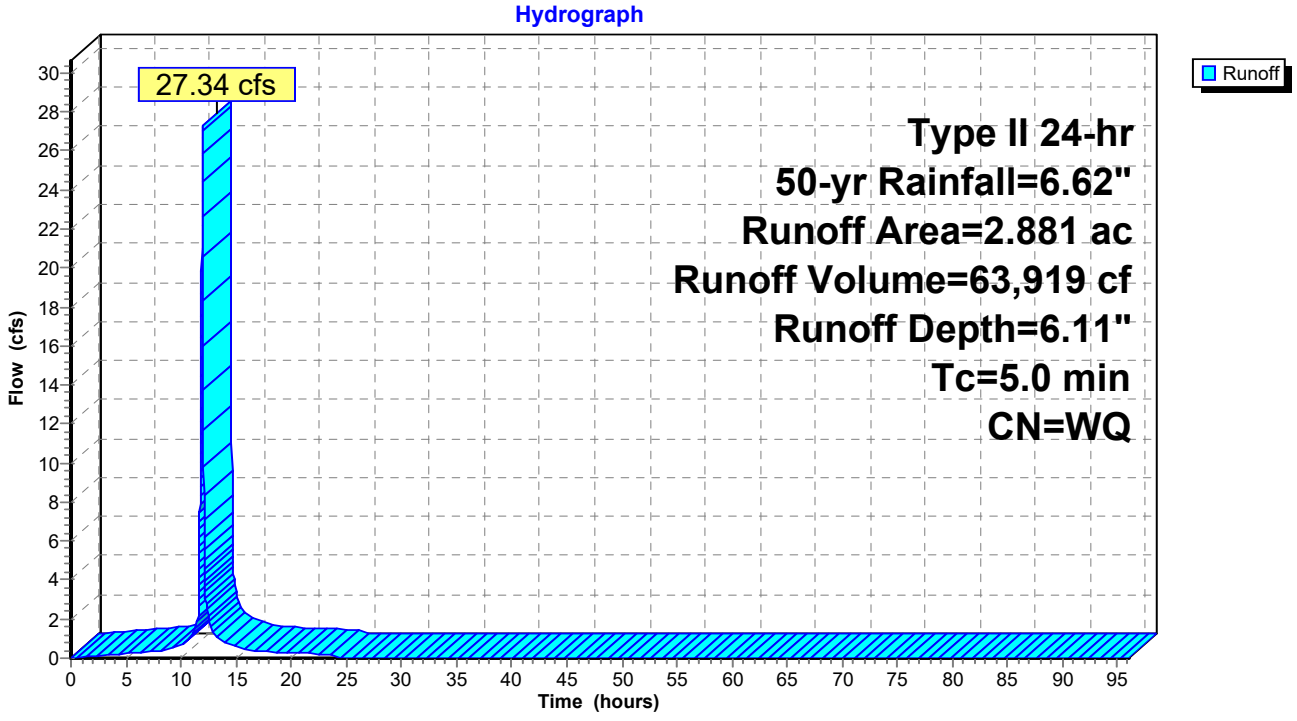
Runoff = 27.34 cfs @ 11.96 hrs, Volume= 63,919 cf, Depth= 6.11"
Routed to Pond 5P : SCM 5: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
0.381	80	>75% Grass cover, Good, HSG D
2.500	98	Paved parking, HSG D
2.881		Weighted Average
0.381		13.22% Pervious Area
2.500		86.78% Impervious Area

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

Subcatchment 5S: DA-5



Summary for Subcatchment 6S: DA-6

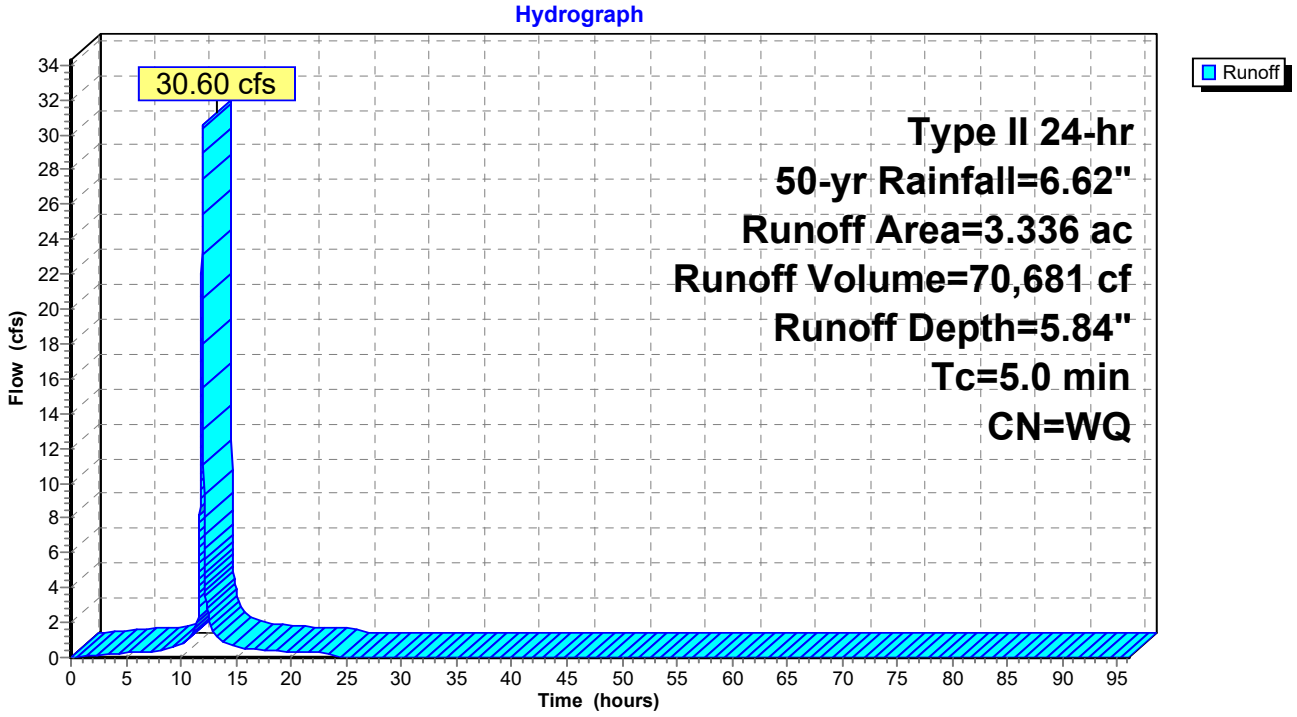
Runoff = 30.60 cfs @ 11.96 hrs, Volume= 70,681 cf, Depth= 5.84"
Routed to Pond 6P : SCM 6: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
0.255	74	>75% Grass cover, Good, HSG C
0.084	70	Woods, Good, HSG C
0.328	80	>75% Grass cover, Good, HSG D
2.580	98	Paved parking, HSG D
0.089	77	Woods, Good, HSG D
3.336		Weighted Average
0.756		22.66% Pervious Area
2.580		77.34% Impervious Area

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

Subcatchment 6S: DA-6



Summary for Subcatchment 7S: DA-7

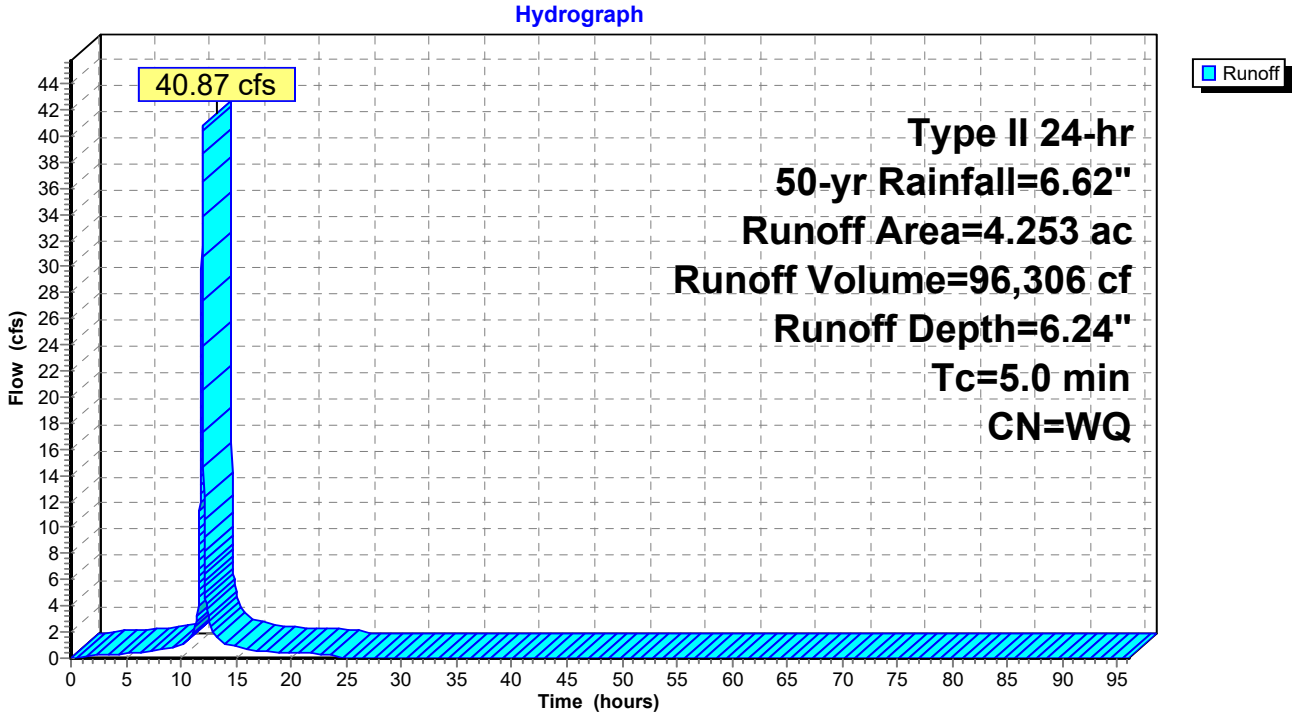
Runoff = 40.87 cfs @ 11.96 hrs, Volume= 96,306 cf, Depth= 6.24"
Routed to Pond 7P : SCM 7: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
0.299	80	>75% Grass cover, Good, HSG D
3.954	98	Paved parking, HSG D
4.253		Weighted Average
0.299		7.03% Pervious Area
3.954		92.97% Impervious Area

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

Subcatchment 7S: DA-7



Summary for Subcatchment 8S: DA-8

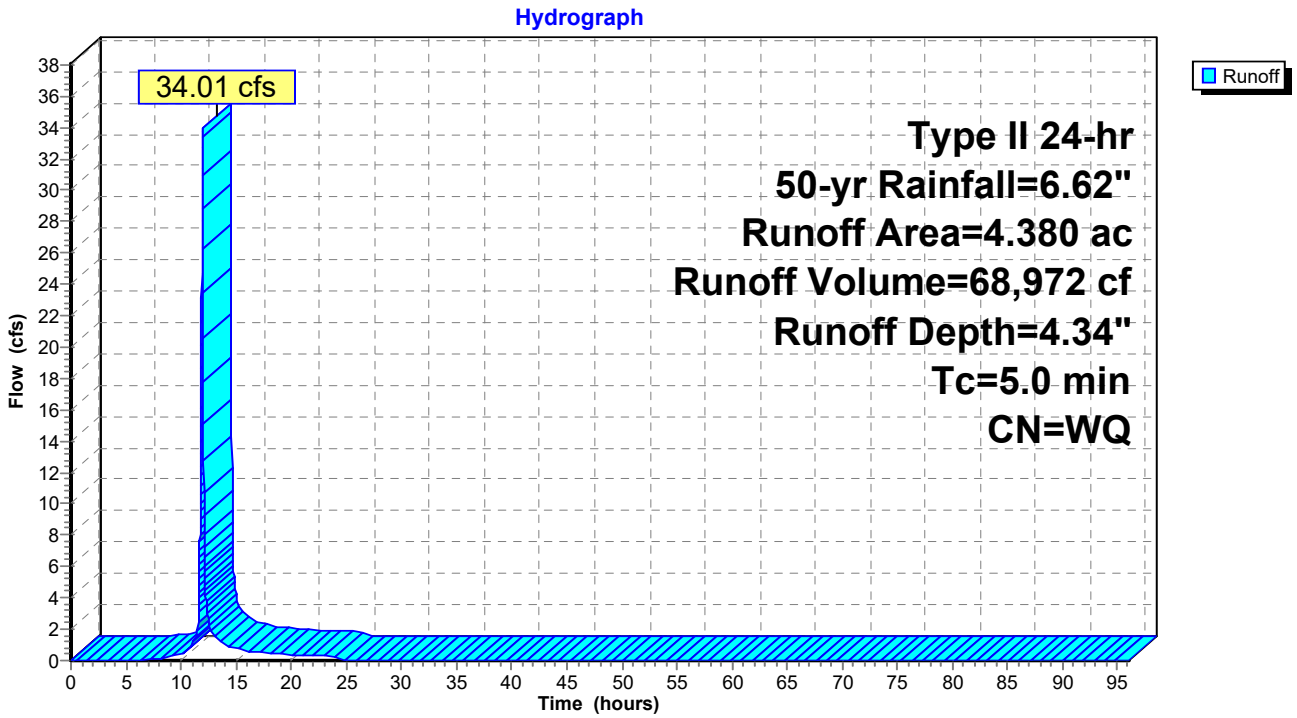
Runoff = 34.01 cfs @ 11.96 hrs, Volume= 68,972 cf, Depth= 4.34"
Routed to Link POA1 : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

Area (ac)	CN	Description
3.905	80	>75% Grass cover, Good, HSG D
0.374	74	>75% Grass cover, Good, HSG C
0.101	98	Paved parking, HSG D
4.380		Weighted Average
4.279		97.69% Pervious Area
0.101		2.31% Impervious Area

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

Subcatchment 8S: DA-8



Summary for Pond 1P: SCM 1: Infiltration AGB

Inflow Area = 293,551 sf, 72.10% Impervious, Inflow Depth = 5.79" for 50-yr event
Inflow = 61.79 cfs @ 11.96 hrs, Volume= 141,696 cf
Outflow = 4.76 cfs @ 12.48 hrs, Volume= 141,698 cf, Atten= 92%, Lag= 31.1 min
Discarded = 0.25 cfs @ 12.48 hrs, Volume= 70,568 cf
Primary = 4.50 cfs @ 12.48 hrs, Volume= 71,130 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 276.97' @ 12.48 hrs Surf.Area= 30,855 sf Storage= 82,640 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1,073.6 min (1,826.4 - 752.8)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	186,083 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

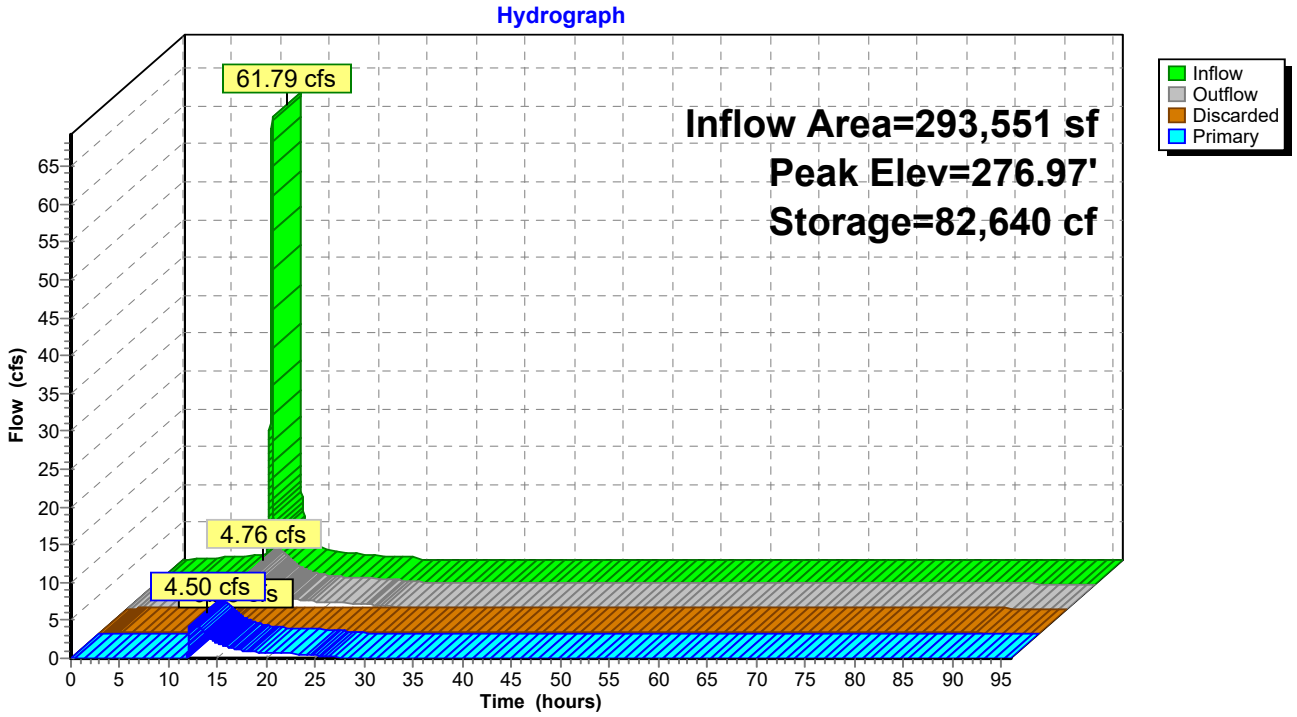
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	24,939	0	0
275.00	26,877	25,908	25,908
276.00	28,873	27,875	53,783
277.00	30,924	29,899	83,682
278.00	33,033	31,979	115,660
279.00	35,197	34,115	149,775
280.00	37,419	36,308	186,083

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**0.353 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**30.0" Round Culvert** L= 52.0' Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.00' S= 0.0385 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#3	Device 2	275.75'	**12.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	276.25'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	277.00'	**24.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	277.50'	**24.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.25 cfs @ 12.48 hrs HW=276.97' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=4.50 cfs @ 12.48 hrs HW=276.97' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Passes 4.50 cfs of 30.96 cfs potential flow)
│ ├**3=Orifice/Grate** (Orifice Controls 1.26 cfs @ 5.03 fps)
│ ├**4=Orifice/Grate** (Orifice Controls 3.25 cfs @ 3.25 fps)
│ └**5=Orifice/Grate** (Controls 0.00 cfs)
└**6=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: SCM 1: Infiltration AGB



Summary for Pond 2P: SCM 2: Detention UGB

Inflow Area = 353,446 sf, 98.31% Impervious, Inflow Depth = 6.35" for 50-yr event
Inflow = 78.81 cfs @ 11.96 hrs, Volume= 186,939 cf
Outflow = 22.42 cfs @ 12.07 hrs, Volume= 186,798 cf, Atten= 72%, Lag= 7.1 min
Primary = 22.42 cfs @ 12.07 hrs, Volume= 186,798 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 272.01' @ 12.07 hrs Surf.Area= 30,988 sf Storage= 73,736 cf

Plug-Flow detention time= 107.2 min calculated for 186,798 cf (100% of inflow)
Center-of-Mass det. time= 106.7 min (846.1 - 739.4)

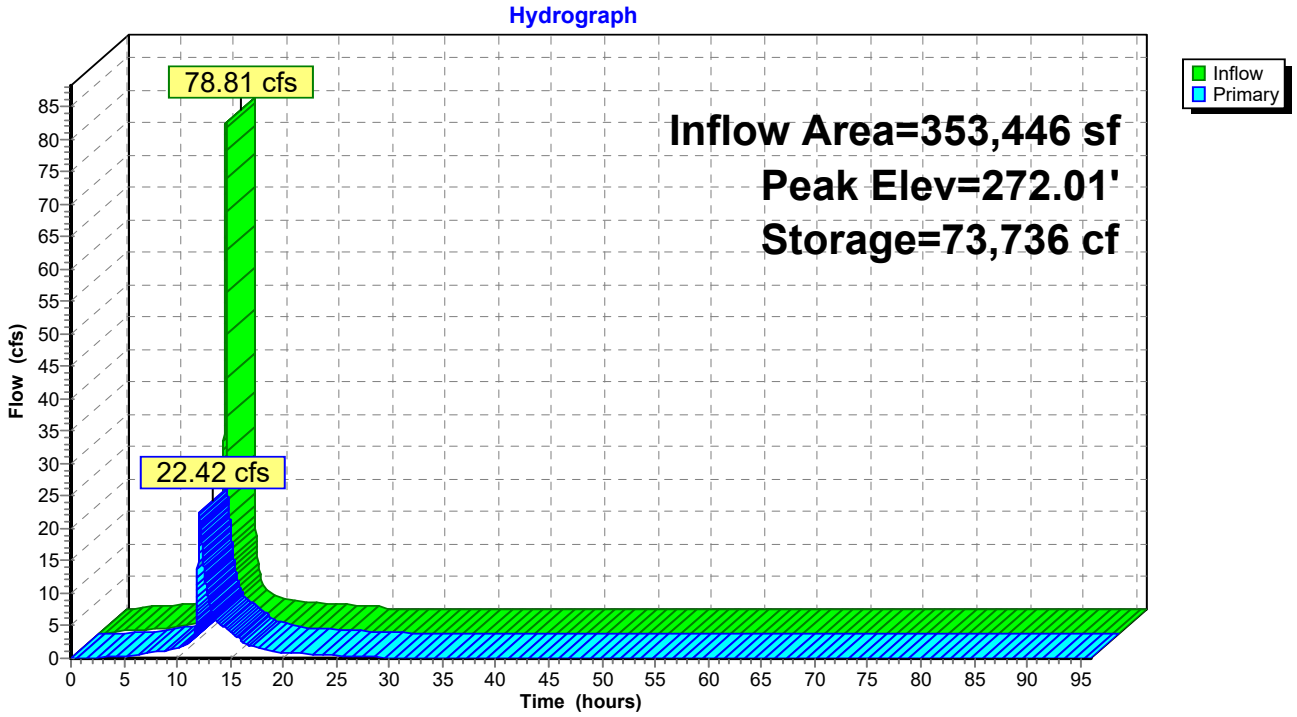
Volume	Invert	Avail.Storage	Storage Description
#1A	268.75'	41,546 cf	**63.75'W x 486.09'L x 5.50'H Field A** 170,435 cf Overall - 66,569 cf Embedded = 103,866 cf x 40.0% Voids
#2A	269.50'	66,569 cf	**ADS_StormTech MC-3500 d +Cap**x 603 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 603 Chambers in 9 Rows Cap Storage= 14.9 cf x 2 x 9 rows = 268.2 cf
		108,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	268.75'	**36.0" Round Outlet Pipe** L= 112.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 268.75' / 268.25' S= 0.0045 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	268.75'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	269.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	270.50'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	271.75'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	272.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=22.40 cfs @ 12.07 hrs HW=272.01' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 22.40 cfs of 35.69 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.26 cfs @ 8.53 fps)
  ├─**3=Orifice** (Orifice Controls 7.63 cfs @ 7.63 fps)
  ├─**4=Orifice** (Orifice Controls 11.99 cfs @ 4.80 fps)
  ├─**5=Orifice** (Orifice Controls 1.52 cfs @ 1.65 fps)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SCM 2: Detention UGB



Summary for Pond 3P: SCM 3: Detention UGB

Inflow Area = 192,405 sf, 86.71% Impervious, Inflow Depth = 6.11" for 50-yr event
Inflow = 41.90 cfs @ 11.96 hrs, Volume= 97,976 cf
Outflow = 20.02 cfs @ 12.04 hrs, Volume= 97,937 cf, Atten= 52%, Lag= 5.2 min
Primary = 20.02 cfs @ 12.04 hrs, Volume= 97,937 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.67' @ 12.04 hrs Surf.Area= 16,811 sf Storage= 32,096 cf

Plug-Flow detention time= 74.6 min calculated for 97,937 cf (100% of inflow)
Center-of-Mass det. time= 74.3 min (819.3 - 745.0)

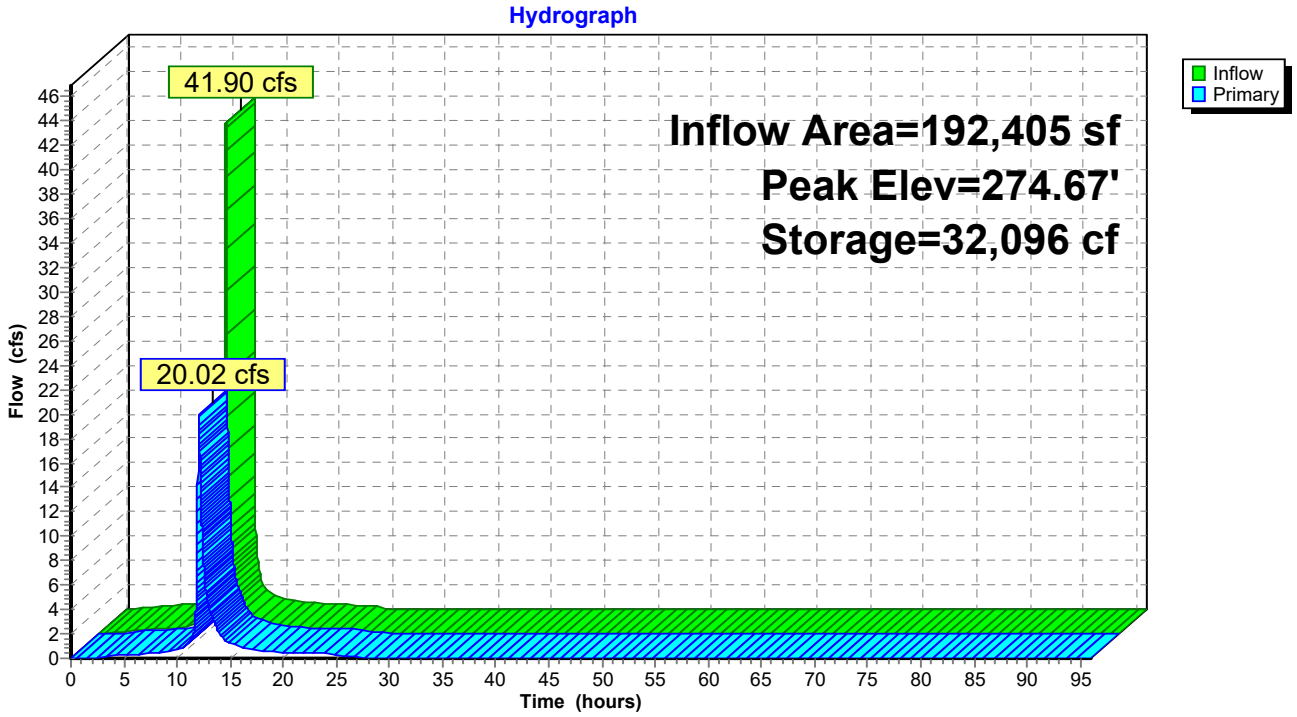
Volume	Invert	Avail.Storage	Storage Description
#1A	272.00'	15,071 cf	**46.75'W x 359.60'L x 3.75'H Field A** 63,042 cf Overall - 25,365 cf Embedded = 37,678 cf x 40.0% Voids
#2A	272.50'	25,365 cf	**ADS_StormTech SC-800 +Cap** x 500 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 500 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		40,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**36.0" Round Outlet Pipe** L= 628.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 272.00' / 268.25' S= 0.0060 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	272.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	272.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	273.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.50'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=20.00 cfs @ 12.04 hrs HW=274.67' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 20.00 cfs of 29.20 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.13 cfs @ 7.68 fps)
  ├─**3=Orifice** (Orifice Controls 6.67 cfs @ 6.67 fps)
  ├─**4=Orifice** (Orifice Controls 11.40 cfs @ 4.56 fps)
  ├─**5=Orifice** (Orifice Controls 0.79 cfs @ 1.33 fps)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: SCM 3: Detention UGB



Summary for Pond 4P: SCM 4: Detention UGB

Inflow Area = 156,163 sf, 91.35% Impervious, Inflow Depth = 6.21" for 50-yr event
Inflow = 34.34 cfs @ 11.96 hrs, Volume= 80,751 cf
Outflow = 13.10 cfs @ 12.06 hrs, Volume= 80,709 cf, Atten= 62%, Lag= 6.0 min
Primary = 13.10 cfs @ 12.06 hrs, Volume= 80,709 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 274.85' @ 12.06 hrs Surf.Area= 20,685 sf Storage= 25,918 cf

Plug-Flow detention time= 66.7 min calculated for 80,709 cf (100% of inflow)
Center-of-Mass det. time= 66.3 min (809.0 - 742.7)

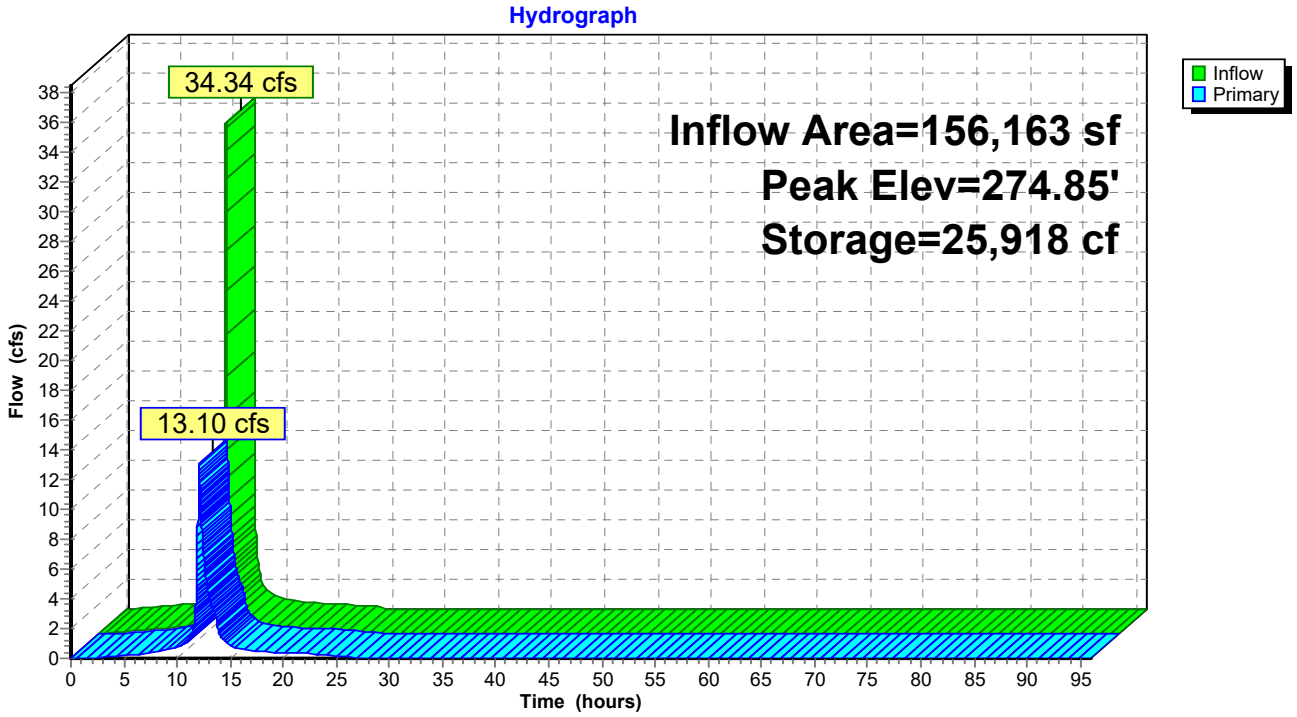
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	27,875 cf	**49.92'W x 414.39'L x 5.50'H Field A** 113,767 cf Overall - 44,079 cf Embedded = 69,688 cf x 40.0% Voids
#2A	273.75'	44,079 cf	**ADS_StormTech MC-3500 d +Cap** x 399 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 399 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		71,955 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 269.00' S= 0.0381 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.00'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.75'	**42.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.09'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=13.10 cfs @ 12.06 hrs HW=274.85' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 13.10 cfs of 16.67 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 0.93 cfs @ 6.32 fps)
  ├─**3=Orifice** (Orifice Controls 5.58 cfs @ 5.58 fps)
  ├─**4=Orifice** (Orifice Controls 6.25 cfs @ 2.95 fps)
  ├─**5=Orifice** (Orifice Controls 0.34 cfs @ 1.00 fps)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: SCM 4: Detention UGB



Summary for Pond 5P: SCM 5: Detention UGB

Inflow Area = 125,496 sf, 86.78% Impervious, Inflow Depth = 6.11" for 50-yr event
Inflow = 27.34 cfs @ 11.96 hrs, Volume= 63,919 cf
Outflow = 18.00 cfs @ 12.02 hrs, Volume= 63,910 cf, Atten= 34%, Lag= 3.9 min
Primary = 18.00 cfs @ 12.02 hrs, Volume= 63,910 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 279.03' @ 12.02 hrs Surf.Area= 8,494 sf Storage= 15,381 cf

Plug-Flow detention time= 40.2 min calculated for 63,903 cf (100% of inflow)
Center-of-Mass det. time= 40.4 min (785.4 - 745.0)

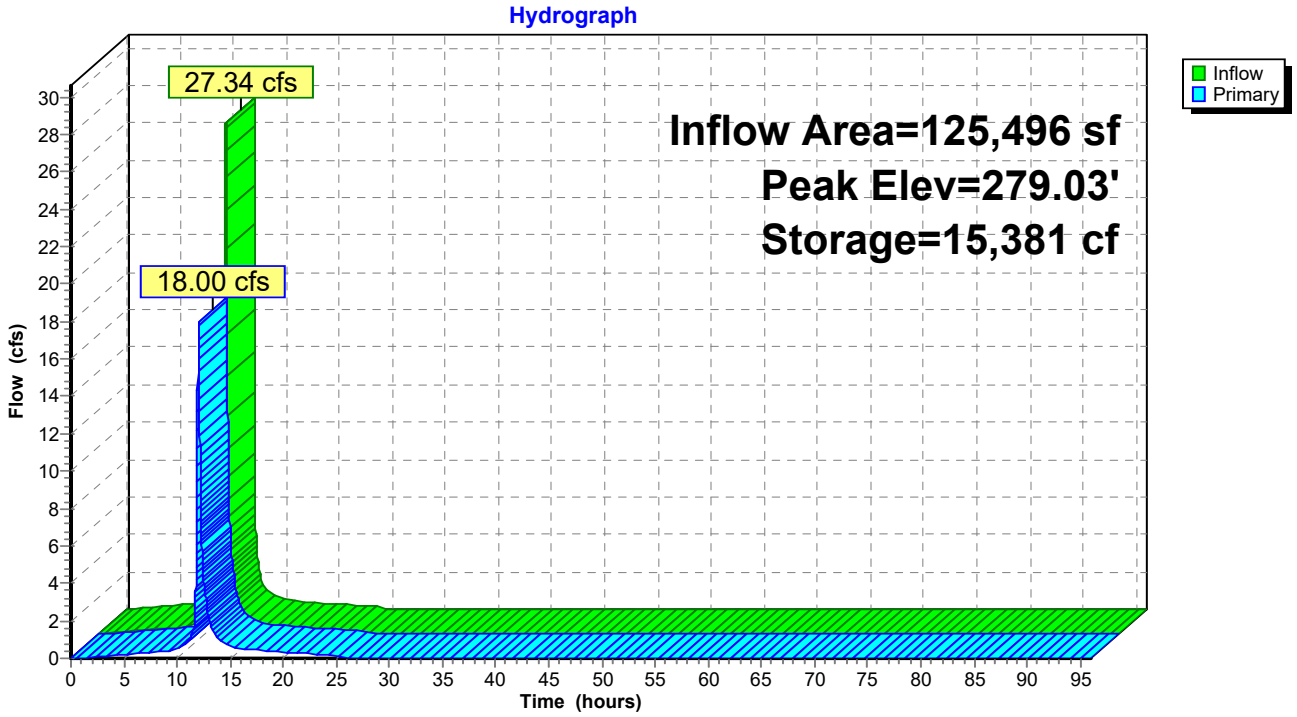
Volume	Invert	Avail.Storage	Storage Description
#1A	276.50'	7,654 cf	**46.75'W x 181.68'L x 3.75'H Field A** 31,851 cf Overall - 12,716 cf Embedded = 19,135 cf x 40.0% Voids
#2A	277.00'	12,716 cf	**ADS_StormTech SC-800 +Cap** x 250 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 250 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		20,370 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	276.50'	**36.0" Round Outlet Pipe** L= 900.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.50' / 269.00' S= 0.0083 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	276.50'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	277.75'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.00'	**36.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	279.60'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=17.99 cfs @ 12.02 hrs HW=279.03' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 17.99 cfs of 27.17 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.10 cfs @ 7.47 fps)
  ├─**3=Orifice** (Orifice Controls 6.42 cfs @ 6.42 fps)
  ├─**4=Orifice** (Orifice Controls 10.42 cfs @ 4.17 fps)
  ├─**5=Orifice** (Orifice Controls 0.05 cfs @ 0.54 fps)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: SCM 5: Detention UGB



Summary for Pond 6P: SCM 6: Detention UGB

Inflow Area = 145,316 sf, 77.34% Impervious, Inflow Depth = 5.84" for 50-yr event
Inflow = 30.60 cfs @ 11.96 hrs, Volume= 70,681 cf
Outflow = 16.92 cfs @ 12.03 hrs, Volume= 70,666 cf, Atten= 45%, Lag= 4.7 min
Primary = 16.92 cfs @ 12.03 hrs, Volume= 70,666 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 282.42' @ 12.03 hrs Surf.Area= 11,821 sf Storage= 20,601 cf

Plug-Flow detention time= 56.0 min calculated for 70,666 cf (100% of inflow)
Center-of-Mass det. time= 55.8 min (806.0 - 750.2)

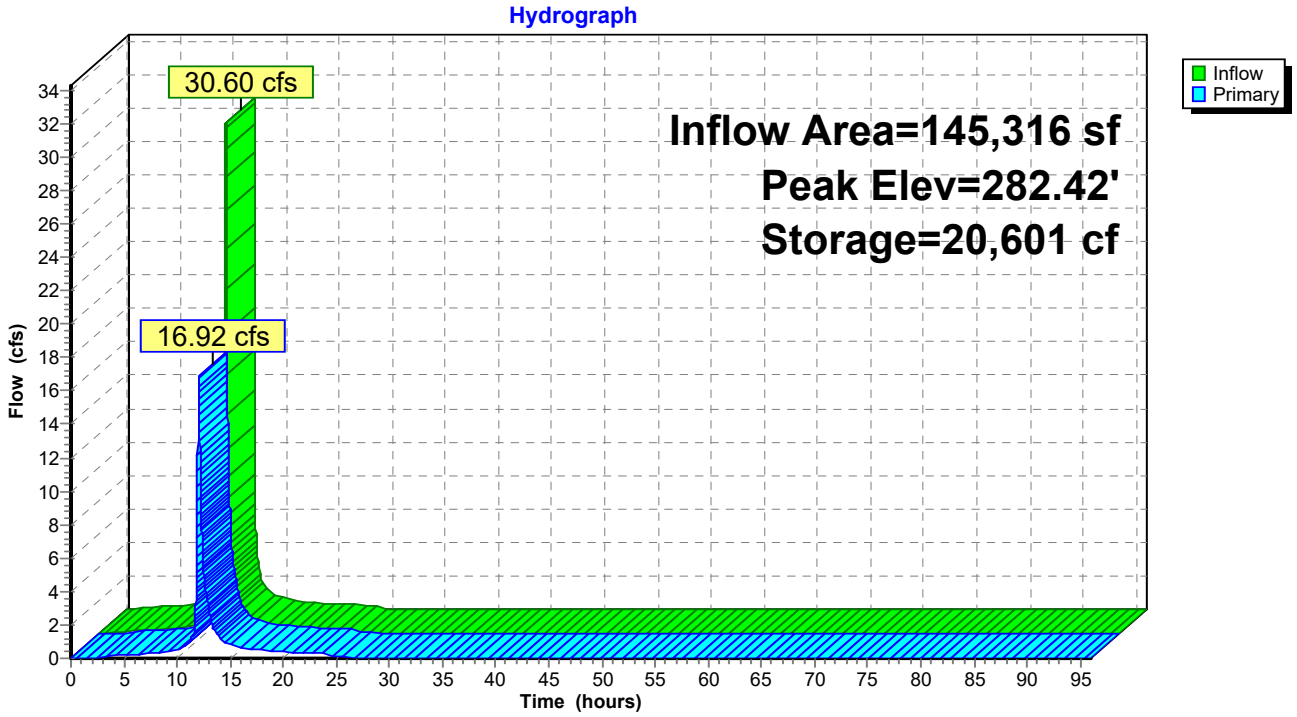
Volume	Invert	Avail.Storage	Storage Description
#1A	280.00'	10,621 cf	**46.75'W x 252.85'L x 3.75'H Field A** 44,328 cf Overall - 17,776 cf Embedded = 26,552 cf x 40.0% Voids
#2A	280.50'	17,776 cf	**ADS_StormTech SC-800 +Cap** x 350 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 350 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		28,397 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	280.00'	**36.0" Round Outlet Pipe** L= 800.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 280.00' / 271.00' S= 0.0112 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	280.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	281.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	282.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	283.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=16.90 cfs @ 12.03 hrs HW=282.42' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 16.90 cfs of 25.58 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.07 cfs @ 7.30 fps)
  ├─**3=Orifice** (Orifice Controls 6.22 cfs @ 6.22 fps)
  ├─**4=Orifice** (Orifice Controls 9.61 cfs @ 3.84 fps)
  ├─**5=Orifice** (Controls 0.00 cfs)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6P: SCM 6: Detention UGB



Summary for Pond 7P: SCM 7: Detention UGB

Inflow Area = 185,261 sf, 92.97% Impervious, Inflow Depth = 6.24" for 50-yr event
Inflow = 40.87 cfs @ 11.96 hrs, Volume= 96,306 cf
Outflow = 17.04 cfs @ 12.05 hrs, Volume= 96,273 cf, Atten= 58%, Lag= 5.7 min
Primary = 17.04 cfs @ 12.05 hrs, Volume= 96,273 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 275.44' @ 12.05 hrs Surf.Area= 18,180 sf Storage= 31,588 cf

Plug-Flow detention time= 72.6 min calculated for 96,273 cf (100% of inflow)
Center-of-Mass det. time= 72.4 min (814.3 - 741.9)

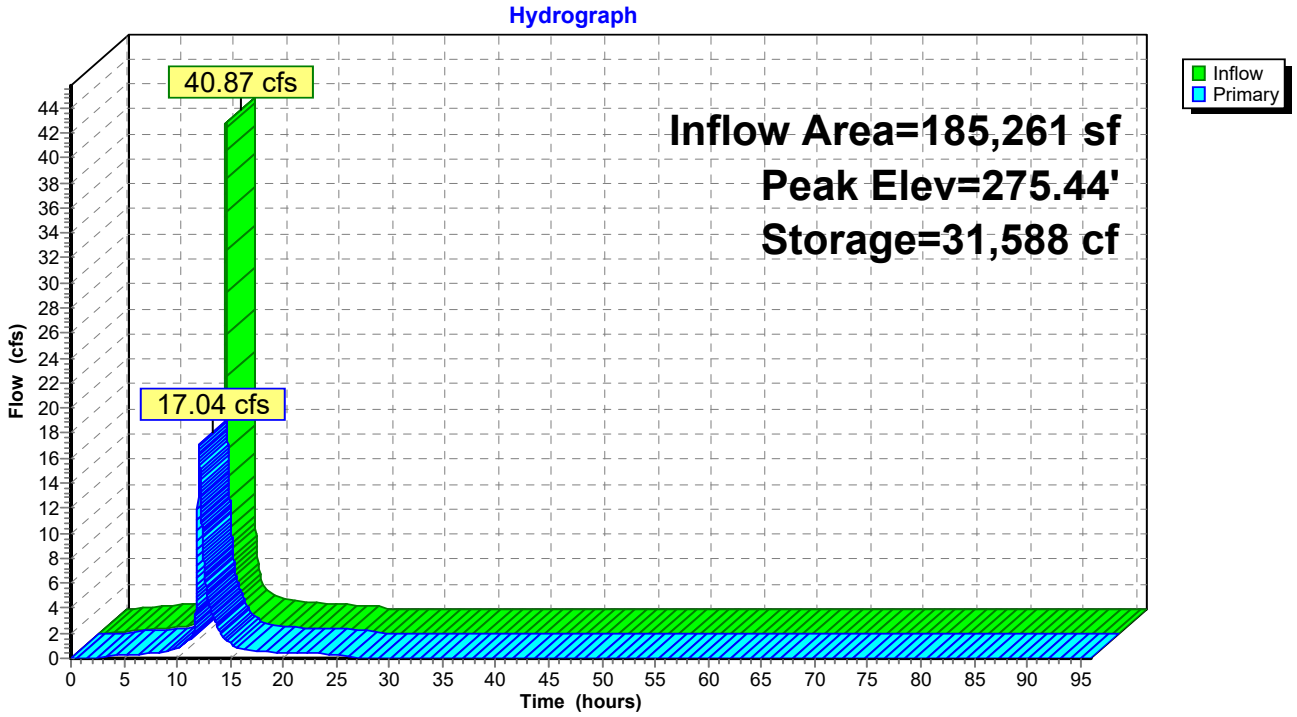
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	24,519 cf	**49.92'W x 364.20'L x 5.50'H Field A** 99,988 cf Overall - 38,692 cf Embedded = 61,296 cf x 40.0% Voids
#2A	273.75'	38,692 cf	**ADS_StormTech MC-3500 d +Cap**x 350 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 350 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		63,210 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 271.00' S= 0.0190 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	275.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	276.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=17.04 cfs @ 12.05 hrs HW=275.44' TW=0.00' (Dynamic Tailwater)
- **1=Outlet Pipe** (Passes 17.04 cfs of 25.78 cfs potential flow)
  - **2=Orifice** (Orifice Controls 1.08 cfs @ 7.32 fps)
  - **3=Orifice** (Orifice Controls 6.25 cfs @ 6.25 fps)
  - **4=Orifice** (Orifice Controls 9.72 cfs @ 3.89 fps)
  - **5=Orifice** (Controls 0.00 cfs)
  - **6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: SCM 7: Detention UGB

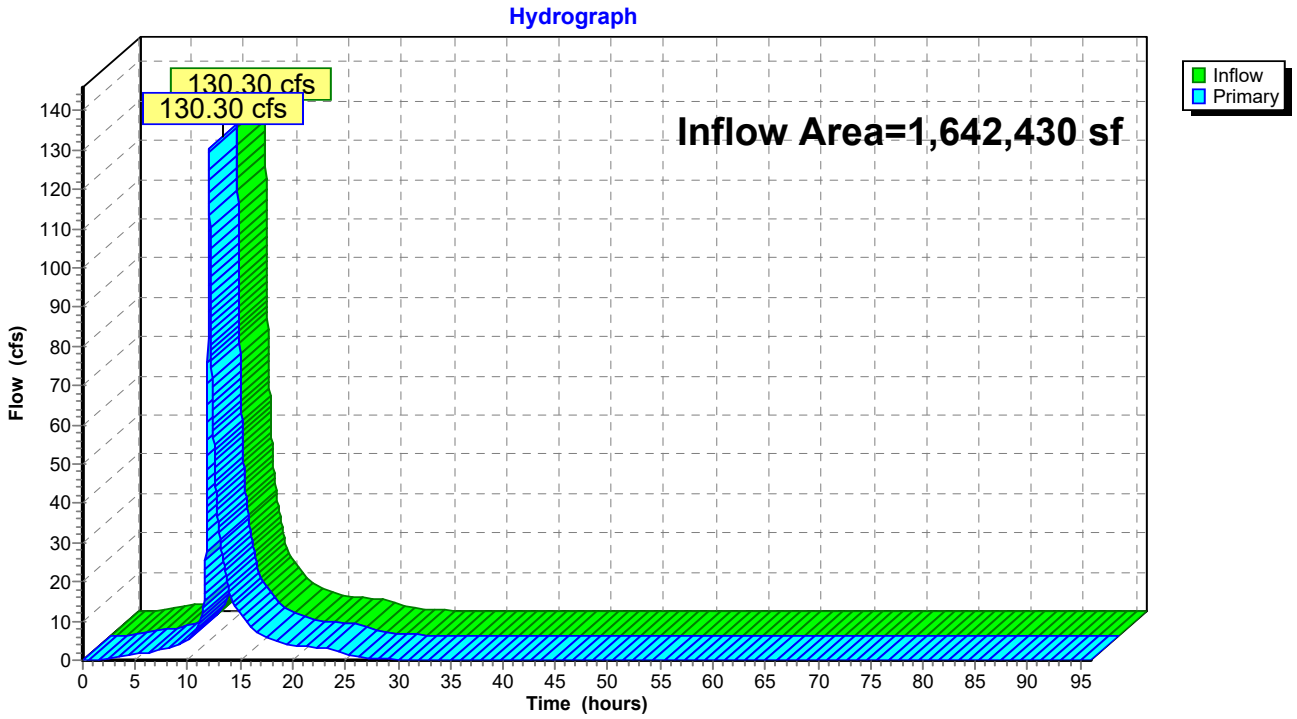


Summary for Link POA1: POA #1

Inflow Area = 1,642,430 sf, 77.11% Impervious, Inflow Depth = 5.38" for 50-yr event
Inflow = 130.30 cfs @ 12.01 hrs, Volume= 736,395 cf
Primary = 130.30 cfs @ 12.01 hrs, Volume= 736,395 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA1: POA #1

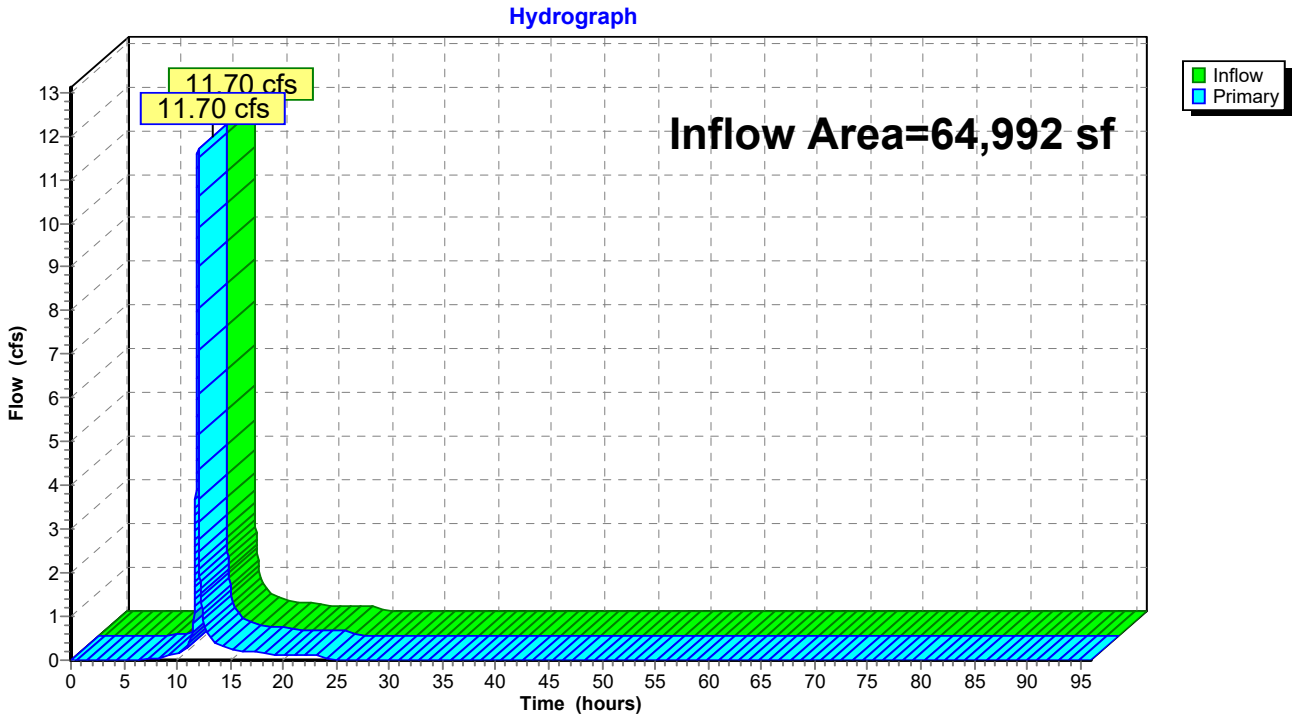


Summary for Link POA2: POA #2

Inflow Area = 64,992 sf, 2.01% Impervious, Inflow Depth = 4.39" for 50-yr event
Inflow = 11.70 cfs @ 11.96 hrs, Volume= 23,754 cf
Primary = 11.70 cfs @ 11.96 hrs, Volume= 23,754 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA2: POA #2

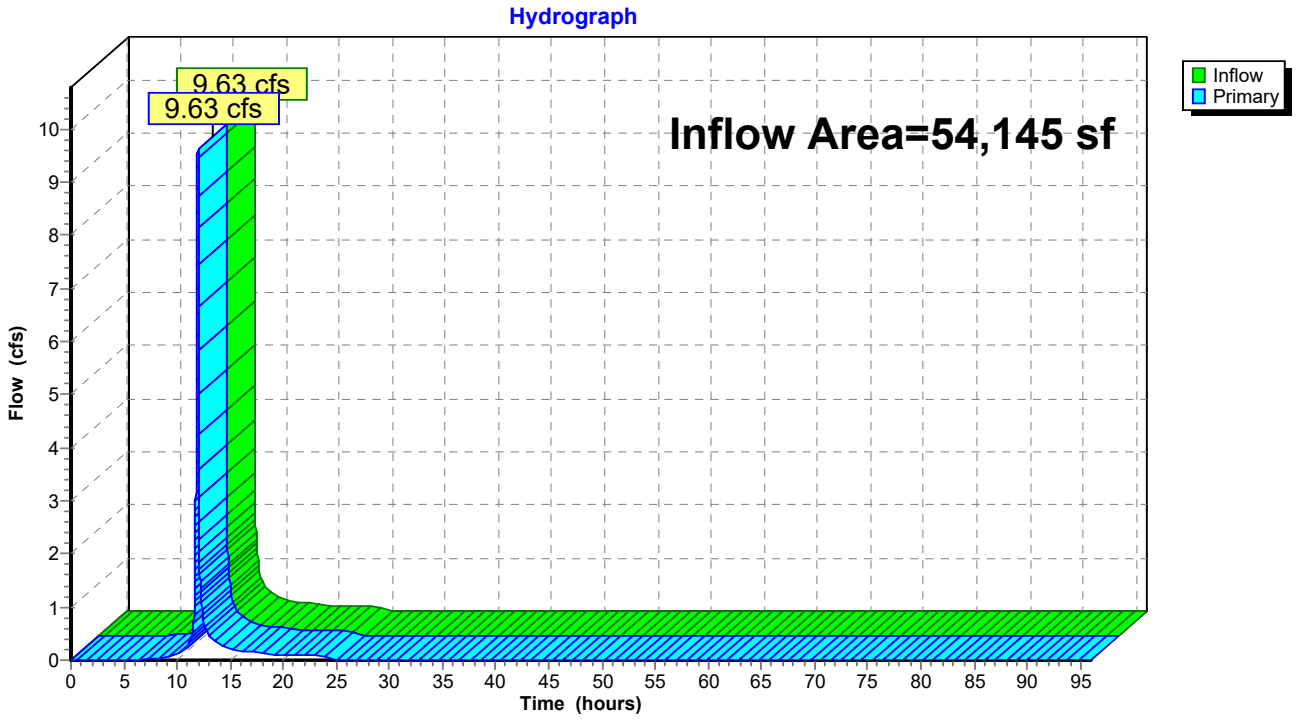


Summary for Link POA3: POA #3

Inflow Area = 54,145 sf, 0.00% Impervious, Inflow Depth = 4.31" for 50-yr event
Inflow = 9.63 cfs @ 11.96 hrs, Volume= 19,440 cf
Primary = 9.63 cfs @ 11.96 hrs, Volume= 19,440 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA3: POA #3



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=6.739 ac 72.10% Impervious Runoff Depth=6.69"
Tc=5.0 min CN=WQ Runoff=71.11 cfs 163,674 cf

Subcatchment2B: Bypass to POA #2 Runoff Area=1.492 ac 2.01% Impervious Runoff Depth=5.24"
Tc=5.0 min CN=WQ Runoff=13.84 cfs 28,366 cf

Subcatchment2S: DA-2 Runoff Area=8.114 ac 98.31% Impervious Runoff Depth=7.26"
Tc=5.0 min CN=WQ Runoff=89.87 cfs 213,981 cf

Subcatchment3B: Bypass to POA #3 Runoff Area=1.243 ac 0.00% Impervious Runoff Depth=5.16"
Tc=5.0 min CN=WQ Runoff=11.41 cfs 23,264 cf

Subcatchment3S: DA-3 Runoff Area=4.417 ac 86.71% Impervious Runoff Depth=7.02"
Tc=5.0 min CN=WQ Runoff=47.96 cfs 112,568 cf

Subcatchment4S: DA-4 Runoff Area=3.585 ac 91.35% Impervious Runoff Depth=7.12"
Tc=5.0 min CN=WQ Runoff=39.24 cfs 92,636 cf

Subcatchment5S: DA-5 Runoff Area=2.881 ac 86.78% Impervious Runoff Depth=7.02"
Tc=5.0 min CN=WQ Runoff=31.29 cfs 73,437 cf

Subcatchment6S: DA-6 Runoff Area=3.336 ac 77.34% Impervious Runoff Depth=6.73"
Tc=5.0 min CN=WQ Runoff=35.19 cfs 81,548 cf

Subcatchment7S: DA-7 Runoff Area=4.253 ac 92.97% Impervious Runoff Depth=7.15"
Tc=5.0 min CN=WQ Runoff=46.68 cfs 110,423 cf

Subcatchment8S: DA-8 Runoff Area=4.380 ac 2.31% Impervious Runoff Depth=5.19"
Tc=5.0 min CN=WQ Runoff=40.28 cfs 82,450 cf

Pond 1P: SCM 1: Infiltration AGB Peak Elev=277.32' Storage=93,754 cf Inflow=71.11 cfs 163,674 cf
Discarded=0.26 cfs 71,252 cf Primary=6.97 cfs 92,426 cf Outflow=7.23 cfs 163,678 cf

Pond 2P: SCM 2: Detention UGB Peak Elev=272.41' Storage=82,049 cf Inflow=89.87 cfs 213,981 cf
Outflow=29.01 cfs 213,840 cf

Pond 3P: SCM 3: Detention UGB Peak Elev=275.00' Storage=35,212 cf Inflow=47.96 cfs 112,568 cf
Outflow=25.75 cfs 112,529 cf

Pond 4P: SCM 4: Detention UGB Peak Elev=275.02' Storage=28,862 cf Inflow=39.24 cfs 92,636 cf
Outflow=16.65 cfs 92,594 cf

Pond 5P: SCM 5: Detention UGB Peak Elev=279.30' Storage=16,807 cf Inflow=31.29 cfs 73,437 cf
Outflow=21.81 cfs 73,428 cf

Pond 6P: SCM 6: Detention UGB Peak Elev=282.71' Storage=22,786 cf Inflow=35.19 cfs 81,548 cf
Outflow=20.55 cfs 81,532 cf

Pond 7P: SCM 7: Detention UGB Peak Elev=275.69' Storage=35,262 cf Inflow=46.68 cfs 110,423 cf
Outflow=20.31 cfs 110,390 cf

Link POA1: POA #1 Inflow=163.19 cfs 859,188 cf
Primary=163.19 cfs 859,188 cf

Link POA2: POA #2 Inflow=13.84 cfs 28,366 cf
Primary=13.84 cfs 28,366 cf

Link POA3: POA #3 Inflow=11.41 cfs 23,264 cf
Primary=11.41 cfs 23,264 cf

Total Runoff Area = 1,761,566 sf Runoff Volume = 982,347 cf Average Runoff Depth = 6.69"
28.03% Pervious = 493,709 sf 71.97% Impervious = 1,267,857 sf

Summary for Subcatchment 1S: DA-1

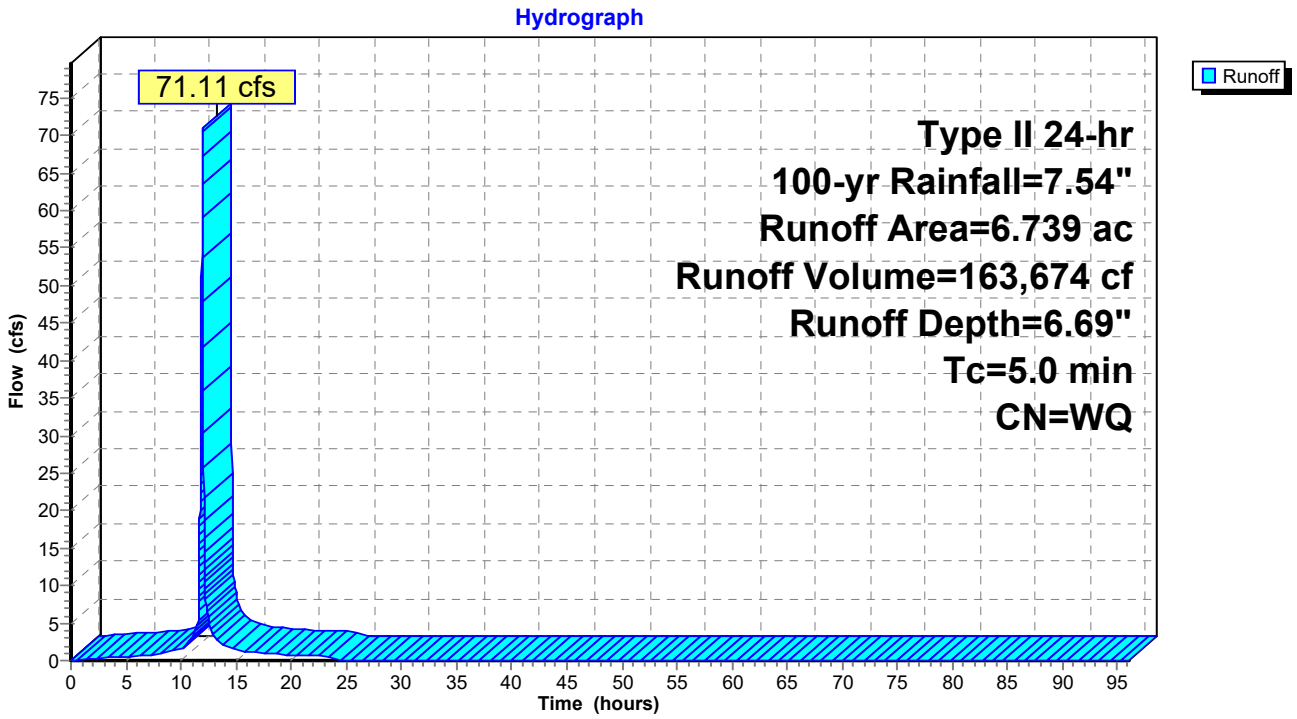
Runoff = 71.11 cfs @ 11.96 hrs, Volume= 163,674 cf, Depth= 6.69"
Routed to Pond 1P : SCM 1: Infiltration AGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
0.222	74	>75% Grass cover, Good, HSG C
1.658	80	>75% Grass cover, Good, HSG D
4.859	98	Paved parking, HSG D
6.739		Weighted Average
1.880		27.90% Pervious Area
4.859		72.10% Impervious Area

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

Subcatchment 1S: DA-1



Summary for Subcatchment 2B: Bypass to POA #2

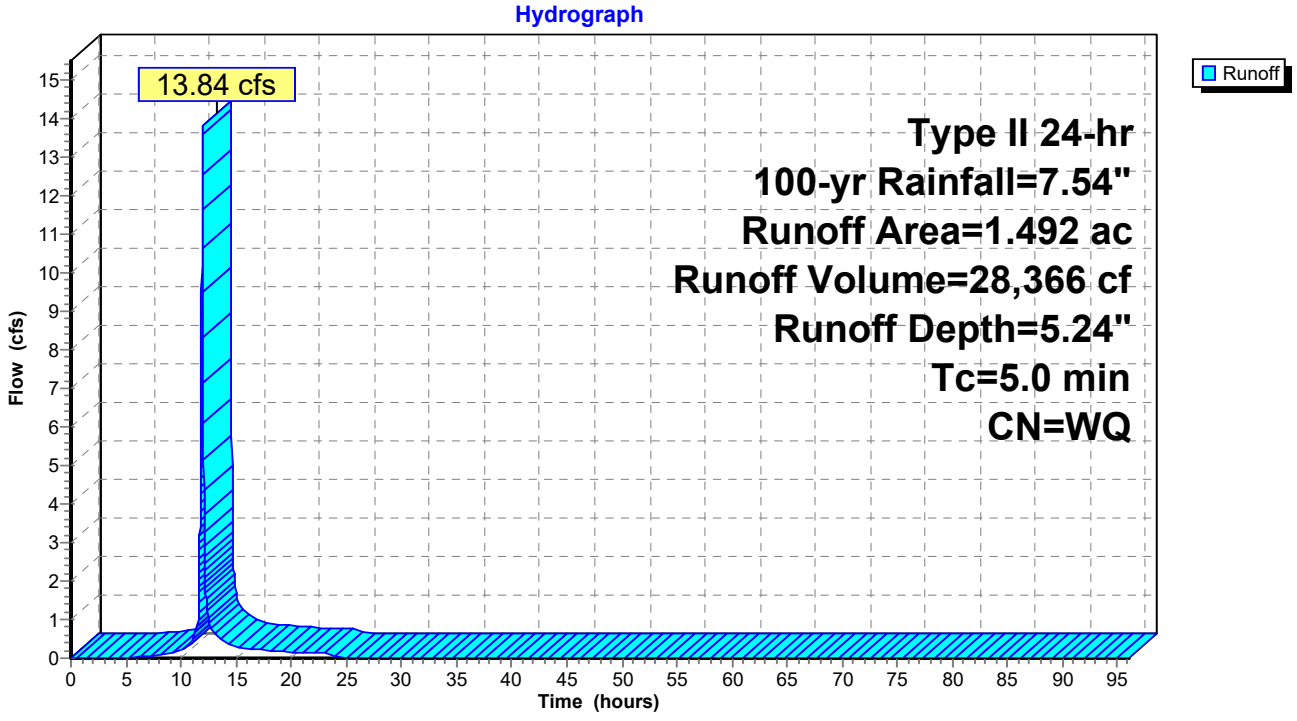
Runoff = 13.84 cfs @ 11.96 hrs, Volume= 28,366 cf, Depth= 5.24"
Routed to Link POA2 : POA #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
1.462	80	>75% Grass cover, Good, HSG D
0.030	98	Paved parking, HSG D
1.492		Weighted Average
1.462		97.99% Pervious Area
0.030		2.01% Impervious Area

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

Subcatchment 2B: Bypass to POA #2



Summary for Subcatchment 2S: DA-2

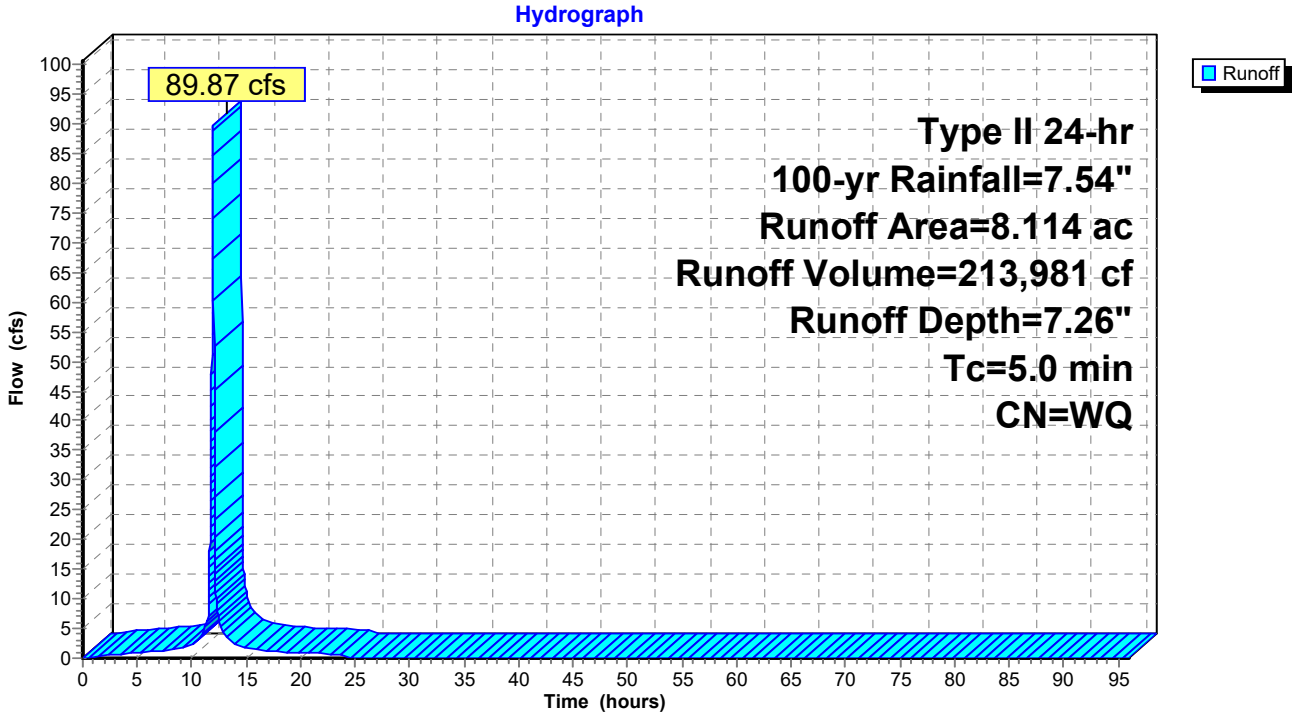
Runoff = 89.87 cfs @ 11.96 hrs, Volume= 213,981 cf, Depth= 7.26"
Routed to Pond 2P : SCM 2: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
0.137	80	>75% Grass cover, Good, HSG D
7.977	98	Paved parking, HSG D
8.114		Weighted Average
0.137		1.69% Pervious Area
7.977		98.31% Impervious Area

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

Subcatchment 2S: DA-2



Summary for Subcatchment 3B: Bypass to POA #3

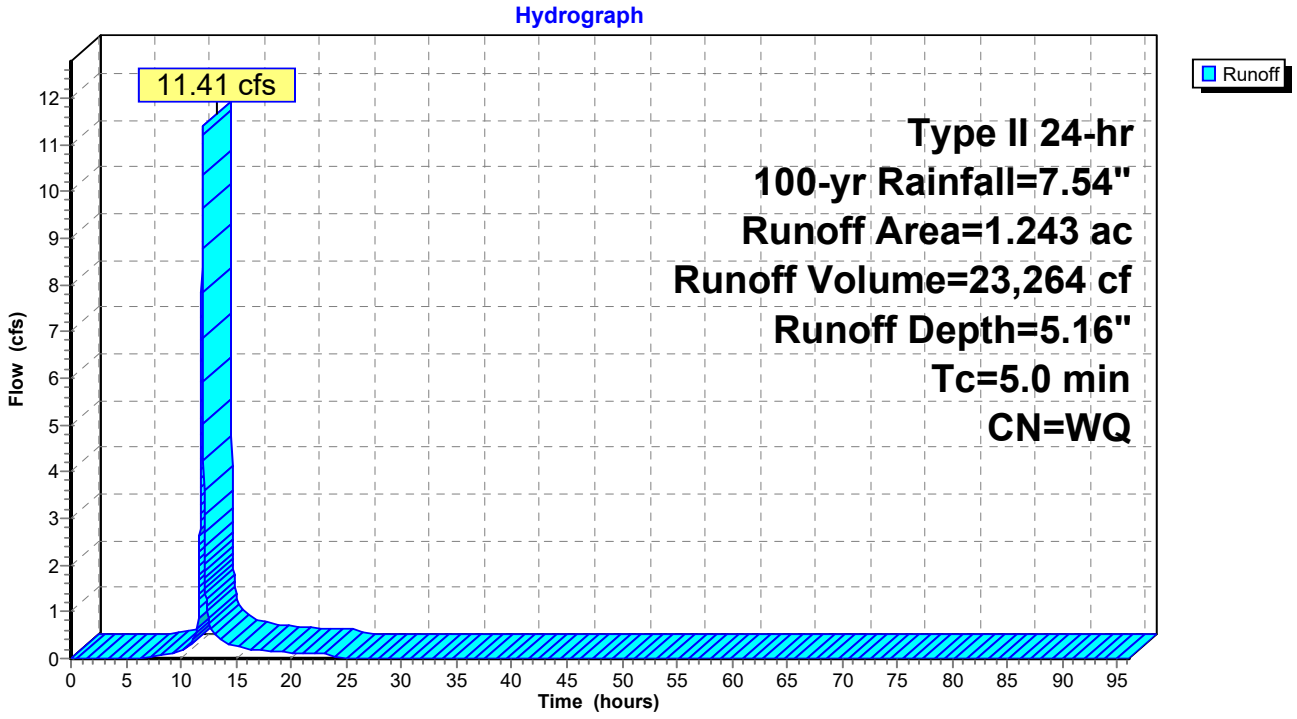
Runoff = 11.41 cfs @ 11.96 hrs, Volume= 23,264 cf, Depth= 5.16"
Routed to Link POA3 : POA #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
0.072	74	>75% Grass cover, Good, HSG C
1.171	80	>75% Grass cover, Good, HSG D
1.243		Weighted Average
1.243		100.00% Pervious Area

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

Subcatchment 3B: Bypass to POA #3



Summary for Subcatchment 3S: DA-3

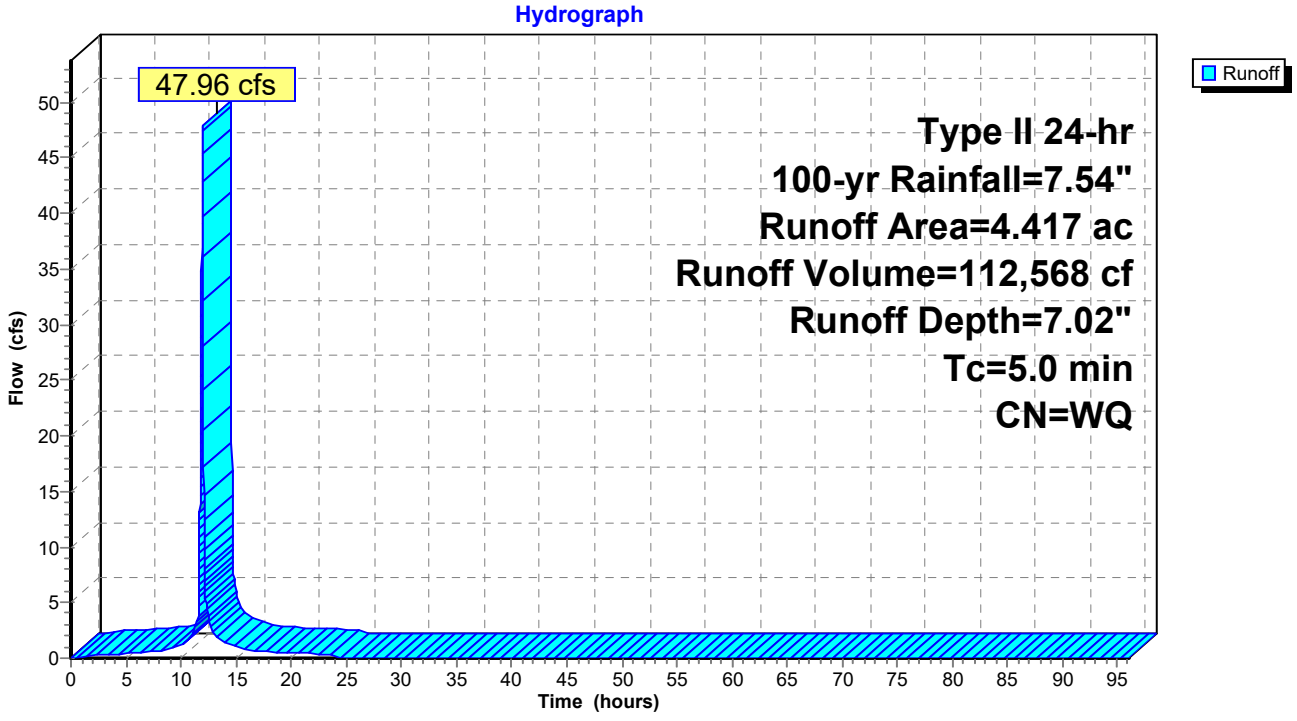
Runoff = 47.96 cfs @ 11.96 hrs, Volume= 112,568 cf, Depth= 7.02"
Routed to Pond 3P : SCM 3: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
0.587	80	>75% Grass cover, Good, HSG D
3.830	98	Paved parking, HSG D
4.417		Weighted Average
0.587		13.29% Pervious Area
3.830		86.71% Impervious Area

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

Subcatchment 3S: DA-3



Summary for Subcatchment 4S: DA-4

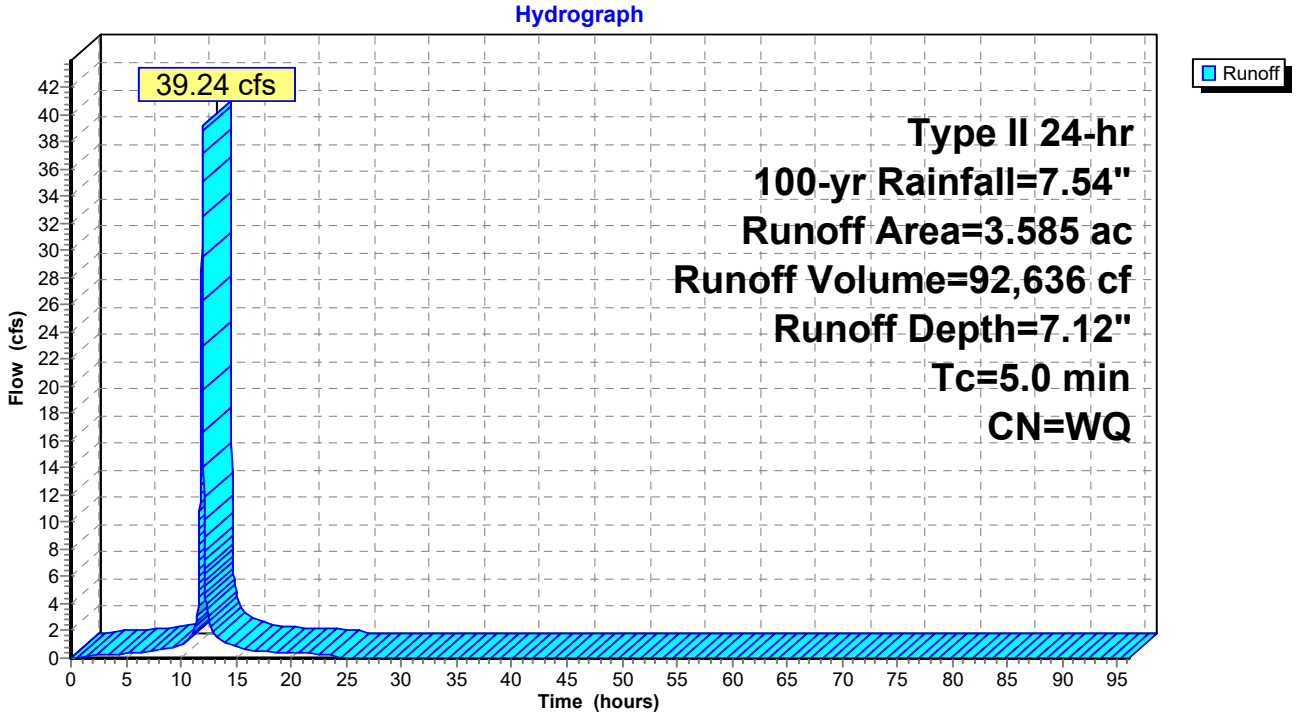
Runoff = 39.24 cfs @ 11.96 hrs, Volume= 92,636 cf, Depth= 7.12"
Routed to Pond 4P : SCM 4: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
0.310	80	>75% Grass cover, Good, HSG D
3.275	98	Paved parking, HSG D
3.585		Weighted Average
0.310		8.65% Pervious Area
3.275		91.35% Impervious Area

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

Subcatchment 4S: DA-4



Summary for Subcatchment 5S: DA-5

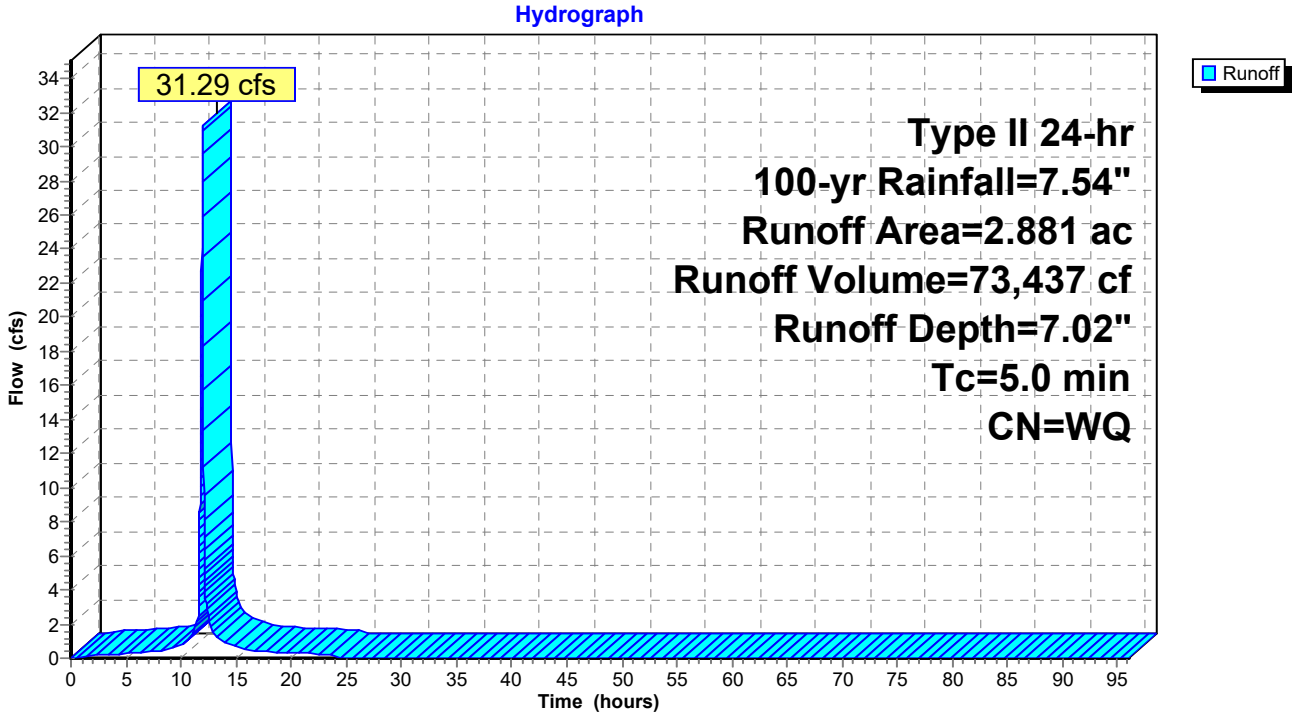
Runoff = 31.29 cfs @ 11.96 hrs, Volume= 73,437 cf, Depth= 7.02"
Routed to Pond 5P : SCM 5: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
0.381	80	>75% Grass cover, Good, HSG D
2.500	98	Paved parking, HSG D
2.881		Weighted Average
0.381		13.22% Pervious Area
2.500		86.78% Impervious Area

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

Subcatchment 5S: DA-5



Summary for Subcatchment 6S: DA-6

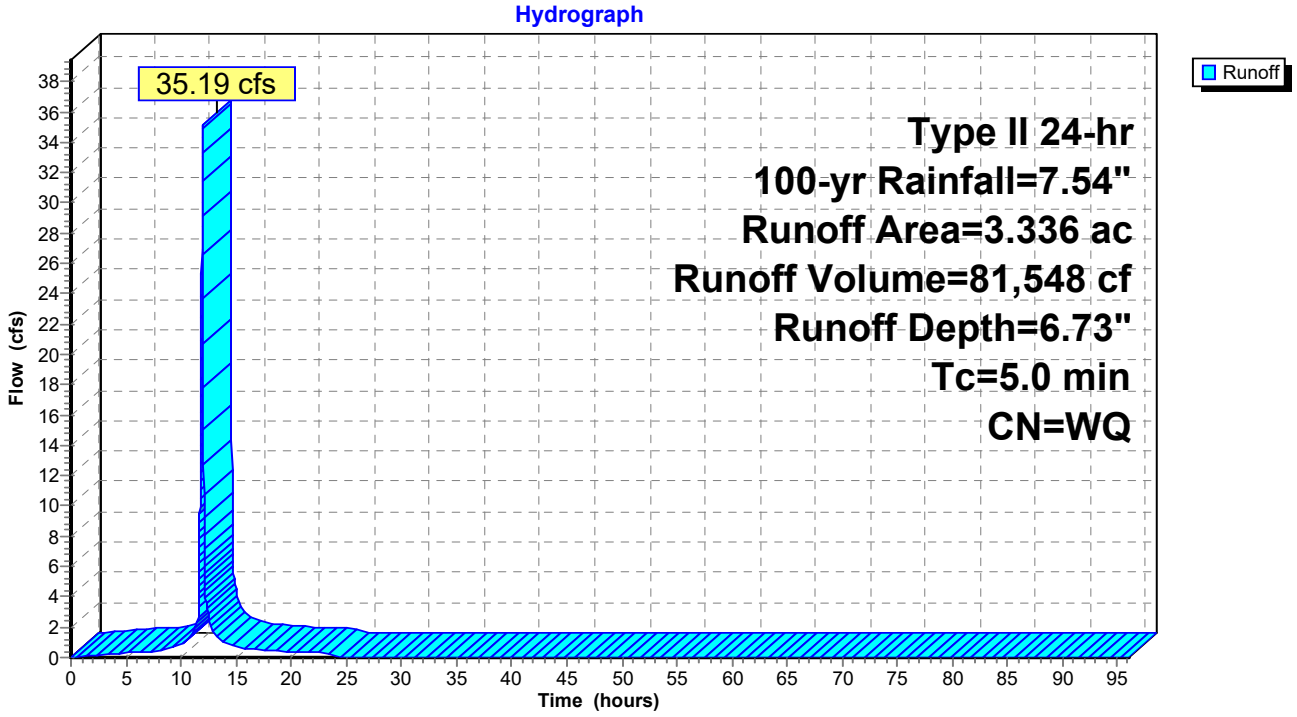
Runoff = 35.19 cfs @ 11.96 hrs, Volume= 81,548 cf, Depth= 6.73"
Routed to Pond 6P : SCM 6: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
0.255	74	>75% Grass cover, Good, HSG C
0.084	70	Woods, Good, HSG C
0.328	80	>75% Grass cover, Good, HSG D
2.580	98	Paved parking, HSG D
0.089	77	Woods, Good, HSG D
3.336		Weighted Average
0.756		22.66% Pervious Area
2.580		77.34% Impervious Area

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

Subcatchment 6S: DA-6



Summary for Subcatchment 7S: DA-7

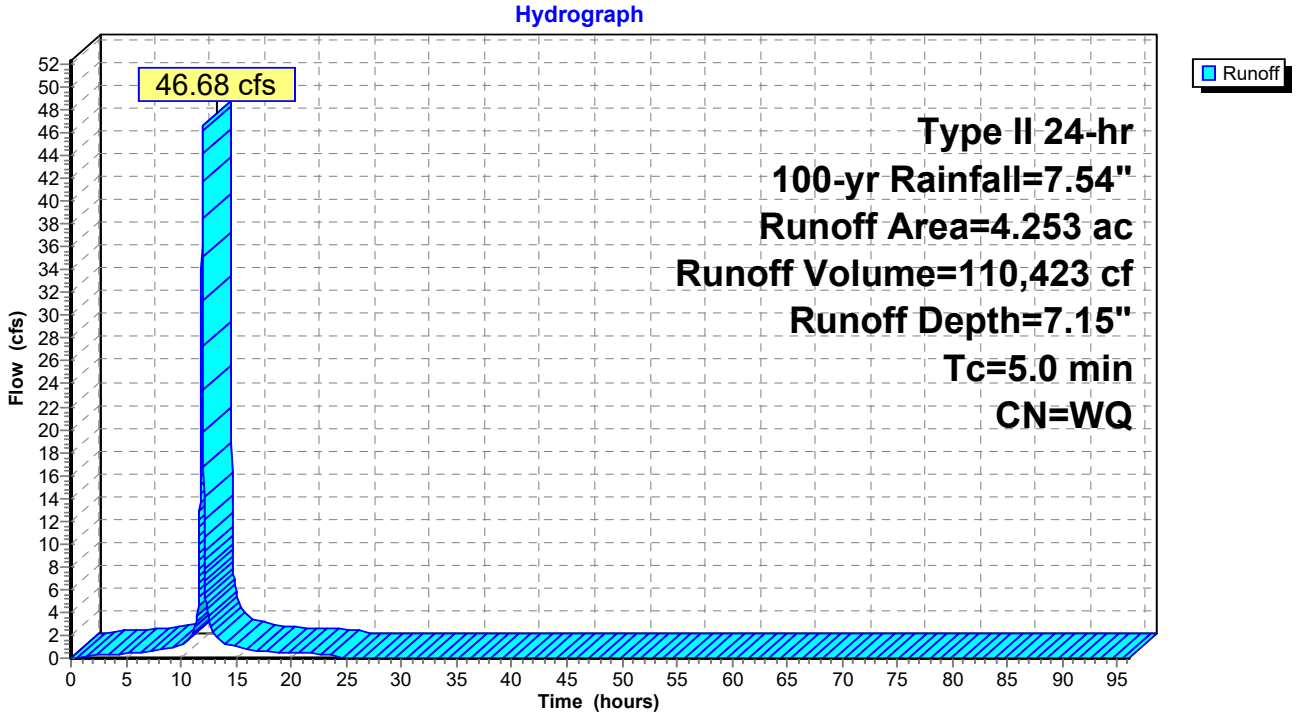
Runoff = 46.68 cfs @ 11.96 hrs, Volume= 110,423 cf, Depth= 7.15"
Routed to Pond 7P : SCM 7: Detention UGB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
0.299	80	>75% Grass cover, Good, HSG D
3.954	98	Paved parking, HSG D
4.253		Weighted Average
0.299		7.03% Pervious Area
3.954		92.97% Impervious Area

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

Subcatchment 7S: DA-7



Summary for Subcatchment 8S: DA-8

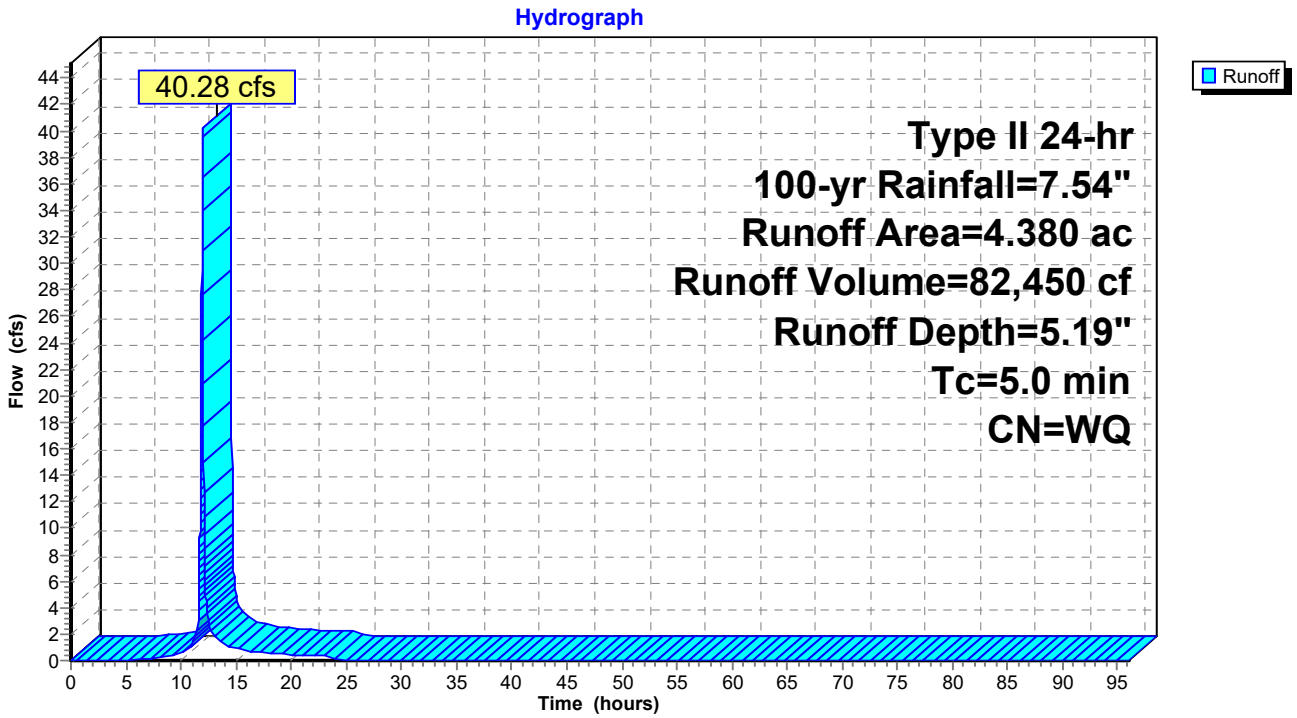
Runoff = 40.28 cfs @ 11.96 hrs, Volume= 82,450 cf, Depth= 5.19"
Routed to Link POA1 : POA #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

Area (ac)	CN	Description
3.905	80	>75% Grass cover, Good, HSG D
0.374	74	>75% Grass cover, Good, HSG C
0.101	98	Paved parking, HSG D
4.380		Weighted Average
4.279		97.69% Pervious Area
0.101		2.31% Impervious Area

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

Subcatchment 8S: DA-8



Summary for Pond 1P: SCM 1: Infiltration AGB

Inflow Area = 293,551 sf, 72.10% Impervious, Inflow Depth = 6.69" for 100-yr event
Inflow = 71.11 cfs @ 11.96 hrs, Volume= 163,674 cf
Outflow = 7.23 cfs @ 12.32 hrs, Volume= 163,678 cf, Atten= 90%, Lag= 21.6 min
Discarded = 0.26 cfs @ 12.32 hrs, Volume= 71,252 cf
Primary = 6.97 cfs @ 12.32 hrs, Volume= 92,426 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 277.32' @ 12.32 hrs Surf.Area= 31,603 sf Storage= 93,754 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 959.2 min (1,710.0 - 750.8)

Volume	Invert	Avail.Storage	Storage Description
#1	274.00'	186,083 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

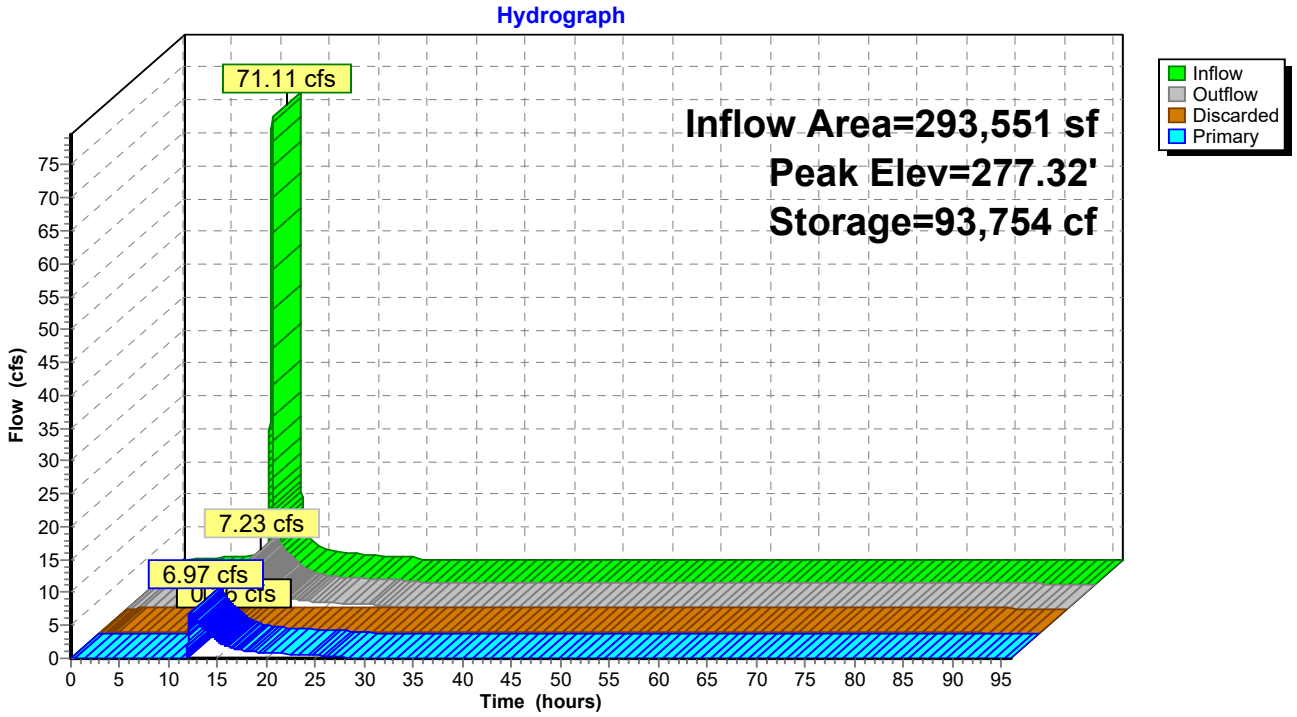
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
274.00	24,939	0	0
275.00	26,877	25,908	25,908
276.00	28,873	27,875	53,783
277.00	30,924	29,899	83,682
278.00	33,033	31,979	115,660
279.00	35,197	34,115	149,775
280.00	37,419	36,308	186,083

Device	Routing	Invert	Outlet Devices
#1	Discarded	274.00'	**0.353 in/hr Exfiltration over Surface area**
#2	Primary	274.00'	**30.0" Round Culvert** L= 52.0' Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.00' S= 0.0385 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#3	Device 2	275.75'	**12.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	276.25'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	277.00'	**24.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Primary	277.50'	**24.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.26 cfs @ 12.32 hrs HW=277.32' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=6.97 cfs @ 12.32 hrs HW=277.32' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Passes 6.97 cfs of 34.02 cfs potential flow)
│ ├**3=Orifice/Grate** (Orifice Controls 1.45 cfs @ 5.79 fps)
│ ├**4=Orifice/Grate** (Orifice Controls 4.35 cfs @ 4.35 fps)
│ └**5=Orifice/Grate** (Orifice Controls 1.17 cfs @ 1.82 fps)
└**6=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: SCM 1: Infiltration AGB



Summary for Pond 2P: SCM 2: Detention UGB

Inflow Area = 353,446 sf, 98.31% Impervious, Inflow Depth = 7.26" for 100-yr event
Inflow = 89.87 cfs @ 11.96 hrs, Volume= 213,981 cf
Outflow = 29.01 cfs @ 12.07 hrs, Volume= 213,840 cf, Atten= 68%, Lag= 6.6 min
Primary = 29.01 cfs @ 12.07 hrs, Volume= 213,840 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 272.41' @ 12.07 hrs Surf.Area= 30,988 sf Storage= 82,049 cf

Plug-Flow detention time= 101.0 min calculated for 213,840 cf (100% of inflow)
Center-of-Mass det. time= 100.6 min (838.2 - 737.6)

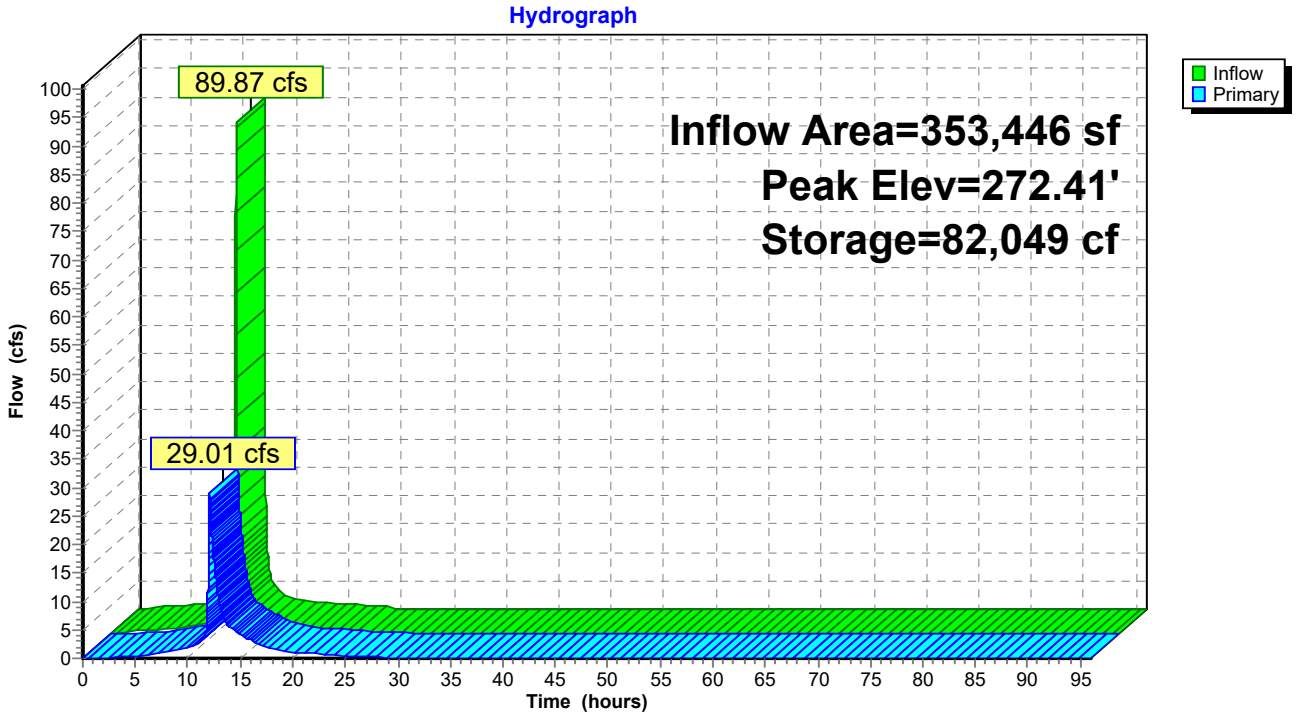
Volume	Invert	Avail.Storage	Storage Description
#1A	268.75'	41,546 cf	**63.75'W x 486.09'L x 5.50'H Field A** 170,435 cf Overall - 66,569 cf Embedded = 103,866 cf x 40.0% Voids
#2A	269.50'	66,569 cf	**ADS_StormTech MC-3500 d +Cap**x 603 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 603 Chambers in 9 Rows Cap Storage= 14.9 cf x 2 x 9 rows = 268.2 cf
		108,116 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	268.75'	**36.0" Round Outlet Pipe** L= 112.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 268.75' / 268.25' S= 0.0045 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	268.75'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	269.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	270.50'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	271.75'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	272.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=29.00 cfs @ 12.07 hrs HW=272.41' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 29.00 cfs of 39.45 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.33 cfs @ 9.05 fps)
  ├─**3=Orifice** (Orifice Controls 8.20 cfs @ 8.20 fps)
  ├─**4=Orifice** (Orifice Controls 14.19 cfs @ 5.68 fps)
  ├─**5=Orifice** (Orifice Controls 5.27 cfs @ 3.01 fps)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: SCM 2: Detention UGB



Summary for Pond 3P: SCM 3: Detention UGB

Inflow Area = 192,405 sf, 86.71% Impervious, Inflow Depth = 7.02" for 100-yr event
Inflow = 47.96 cfs @ 11.96 hrs, Volume= 112,568 cf
Outflow = 25.75 cfs @ 12.04 hrs, Volume= 112,529 cf, Atten= 46%, Lag= 4.8 min
Primary = 25.75 cfs @ 12.04 hrs, Volume= 112,529 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 275.00' @ 12.04 hrs Surf.Area= 16,811 sf Storage= 35,212 cf

Plug-Flow detention time= 71.2 min calculated for 112,529 cf (100% of inflow)
Center-of-Mass det. time= 70.9 min (814.1 - 743.1)

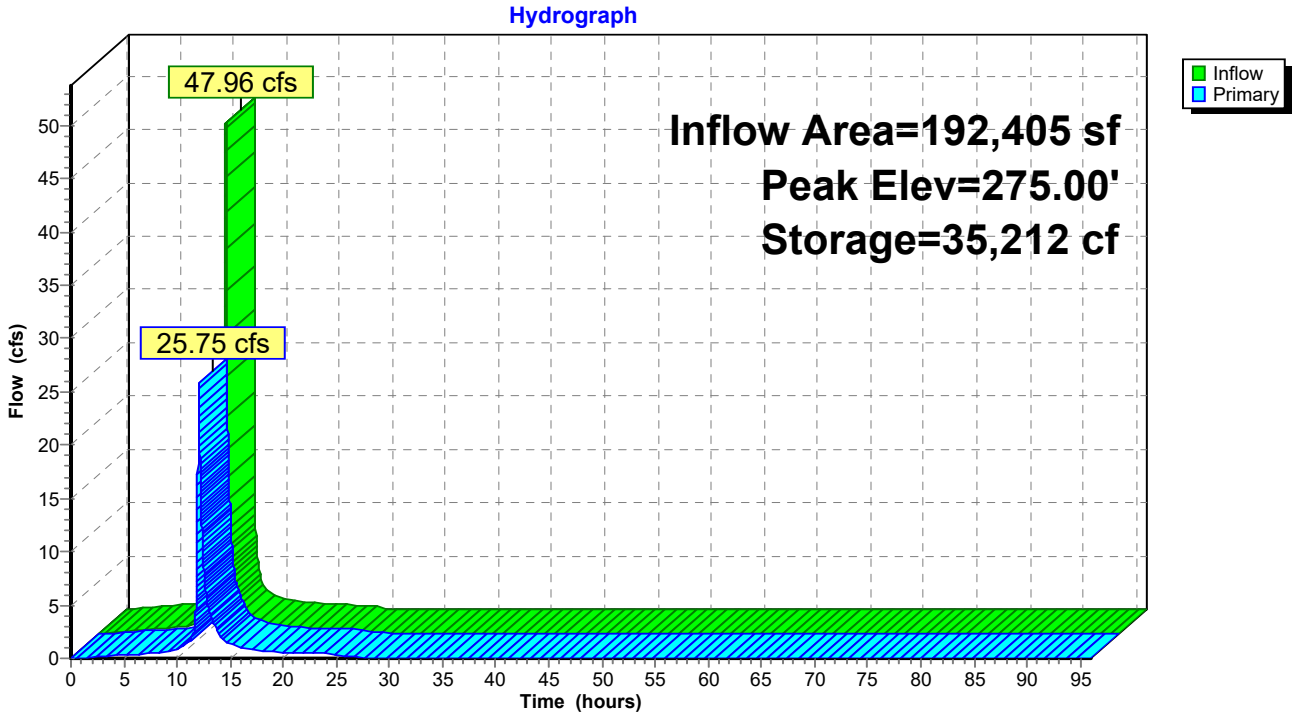
Volume	Invert	Avail.Storage	Storage Description
#1A	272.00'	15,071 cf	**46.75'W x 359.60'L x 3.75'H Field A** 63,042 cf Overall - 25,365 cf Embedded = 37,678 cf x 40.0% Voids
#2A	272.50'	25,365 cf	**ADS_StormTech SC-800 +Cap** x 500 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 500 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		40,436 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.00'	**36.0" Round Outlet Pipe** L= 628.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 272.00' / 268.25' S= 0.0060 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	272.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	272.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	273.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.50'	**42.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=25.71 cfs @ 12.04 hrs HW=275.00' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 25.71 cfs of 32.89 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.20 cfs @ 8.16 fps)
  ├─**3=Orifice** (Orifice Controls 7.21 cfs @ 7.21 fps)
  ├─**4=Orifice** (Orifice Controls 13.35 cfs @ 5.34 fps)
  ├─**5=Orifice** (Orifice Controls 3.94 cfs @ 2.26 fps)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: SCM 3: Detention UGB



Summary for Pond 4P: SCM 4: Detention UGB

Inflow Area = 156,163 sf, 91.35% Impervious, Inflow Depth = 7.12" for 100-yr event
Inflow = 39.24 cfs @ 11.96 hrs, Volume= 92,636 cf
Outflow = 16.65 cfs @ 12.05 hrs, Volume= 92,594 cf, Atten= 58%, Lag= 5.7 min
Primary = 16.65 cfs @ 12.05 hrs, Volume= 92,594 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 275.02' @ 12.05 hrs Surf.Area= 20,685 sf Storage= 28,862 cf

Plug-Flow detention time= 62.6 min calculated for 92,594 cf (100% of inflow)
Center-of-Mass det. time= 62.3 min (803.2 - 740.9)

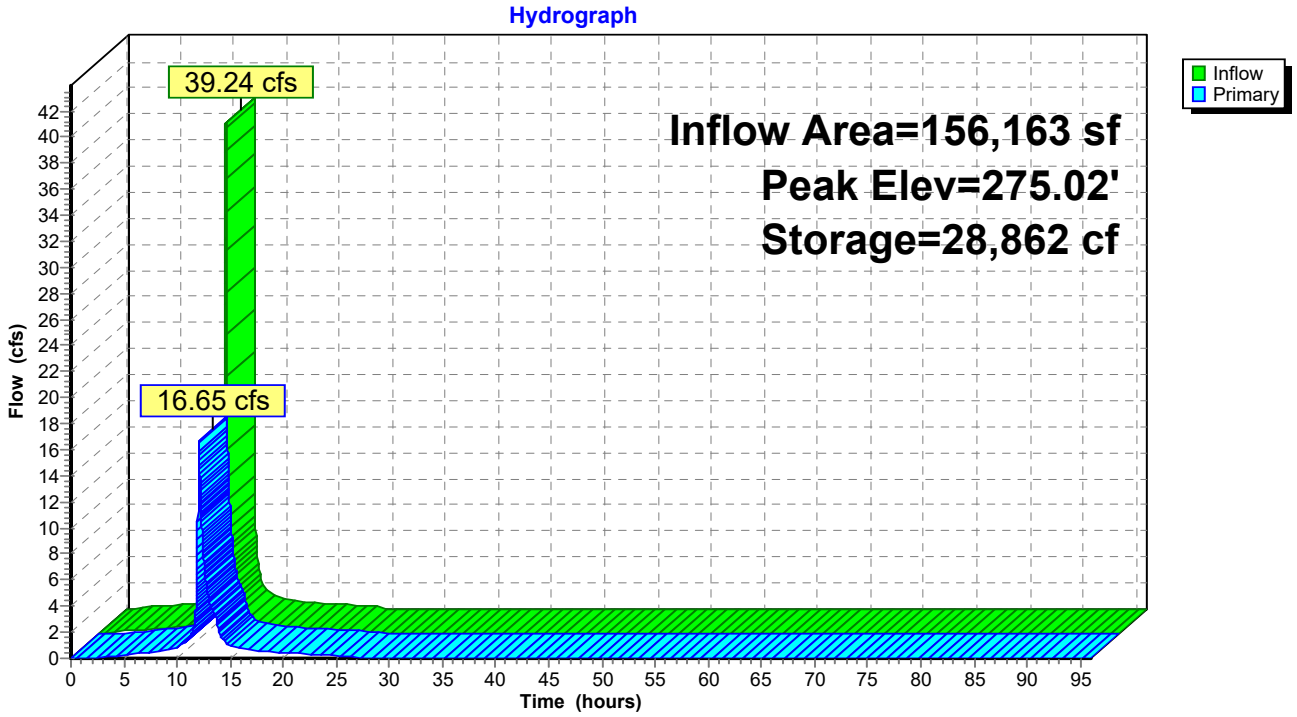
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	27,875 cf	**49.92'W x 414.39'L x 5.50'H Field A** 113,767 cf Overall - 44,079 cf Embedded = 69,688 cf x 40.0% Voids
#2A	273.75'	44,079 cf	**ADS_StormTech MC-3500 d +Cap** x 399 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 399 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		71,955 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 269.00' S= 0.0381 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.25'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.00'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	274.75'	**42.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	275.09'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=16.65 cfs @ 12.05 hrs HW=275.02' TW=0.00' (Dynamic Tailwater)
- **1=Outlet Pipe** (Passes 16.65 cfs of 19.28 cfs potential flow)
  - **2=Orifice** (Orifice Controls 0.98 cfs @ 6.62 fps)
  - **3=Orifice** (Orifice Controls 5.92 cfs @ 5.92 fps)
  - **4=Orifice** (Orifice Controls 8.21 cfs @ 3.28 fps)
  - **5=Orifice** (Orifice Controls 1.55 cfs @ 1.66 fps)
  - **6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: SCM 4: Detention UGB



Summary for Pond 5P: SCM 5: Detention UGB

Inflow Area = 125,496 sf, 86.78% Impervious, Inflow Depth = 7.02" for 100-yr event
Inflow = 31.29 cfs @ 11.96 hrs, Volume= 73,437 cf
Outflow = 21.81 cfs @ 12.02 hrs, Volume= 73,428 cf, Atten= 30%, Lag= 3.6 min
Primary = 21.81 cfs @ 12.02 hrs, Volume= 73,428 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 279.30' @ 12.02 hrs Surf.Area= 8,494 sf Storage= 16,807 cf

Plug-Flow detention time= 38.8 min calculated for 73,420 cf (100% of inflow)
Center-of-Mass det. time= 39.0 min (782.1 - 743.1)

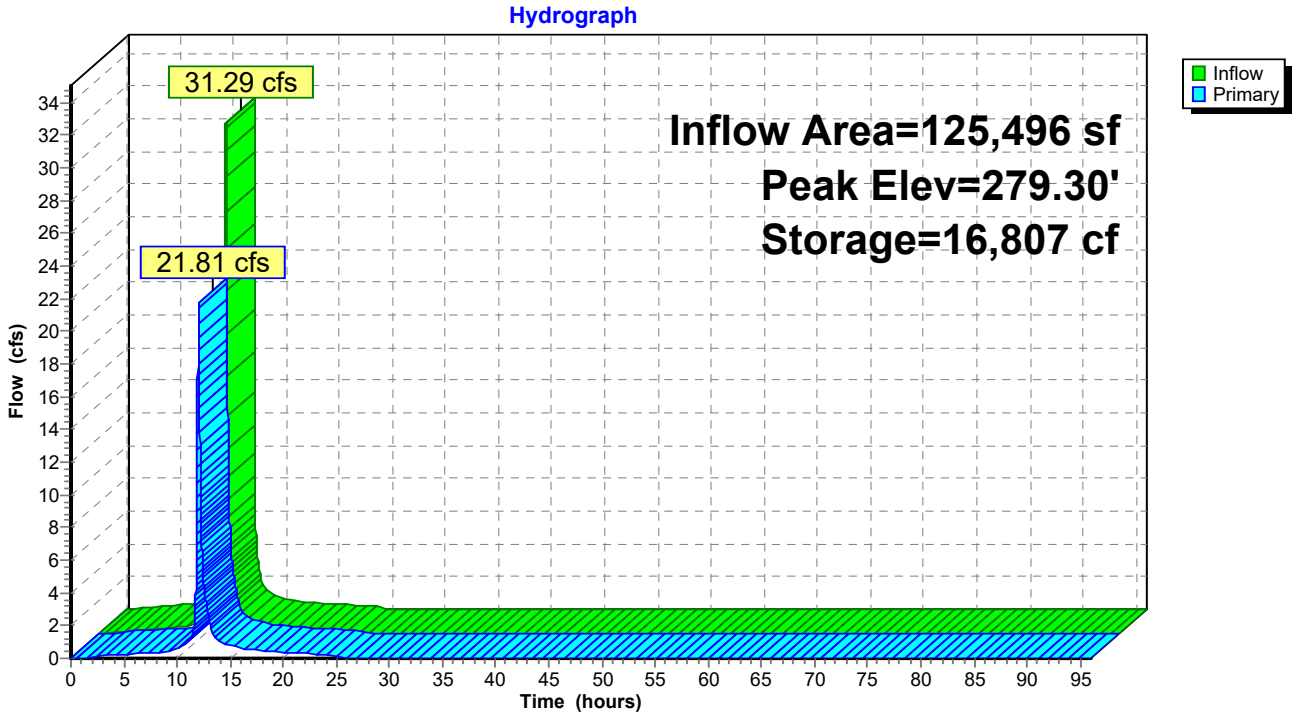
Volume	Invert	Avail.Storage	Storage Description
#1A	276.50'	7,654 cf	**46.75'W x 181.68'L x 3.75'H Field A** 31,851 cf Overall - 12,716 cf Embedded = 19,135 cf x 40.0% Voids
#2A	277.00'	12,716 cf	**ADS_StormTech SC-800 +Cap** x 250 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 250 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		20,370 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	276.50'	**36.0" Round Outlet Pipe** L= 900.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.50' / 269.00' S= 0.0083 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	276.50'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	277.00'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	277.75'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.00'	**36.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	279.60'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=21.78 cfs @ 12.02 hrs HW=279.30' TW=0.00' (Dynamic Tailwater)
- **1=Outlet Pipe** (Passes 21.78 cfs of 30.83 cfs potential flow)
  - **2=Orifice** (Orifice Controls 1.16 cfs @ 7.87 fps)
  - **3=Orifice** (Orifice Controls 6.88 cfs @ 6.88 fps)
  - **4=Orifice** (Orifice Controls 12.19 cfs @ 4.87 fps)
  - **5=Orifice** (Orifice Controls 1.55 cfs @ 1.75 fps)
  - **6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: SCM 5: Detention UGB



Summary for Pond 6P: SCM 6: Detention UGB

Inflow Area = 145,316 sf, 77.34% Impervious, Inflow Depth = 6.73" for 100-yr event
Inflow = 35.19 cfs @ 11.96 hrs, Volume= 81,548 cf
Outflow = 20.55 cfs @ 12.03 hrs, Volume= 81,532 cf, Atten= 42%, Lag= 4.4 min
Primary = 20.55 cfs @ 12.03 hrs, Volume= 81,532 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 282.71' @ 12.03 hrs Surf.Area= 11,821 sf Storage= 22,786 cf

Plug-Flow detention time= 53.4 min calculated for 81,524 cf (100% of inflow)
Center-of-Mass det. time= 53.6 min (802.0 - 748.4)

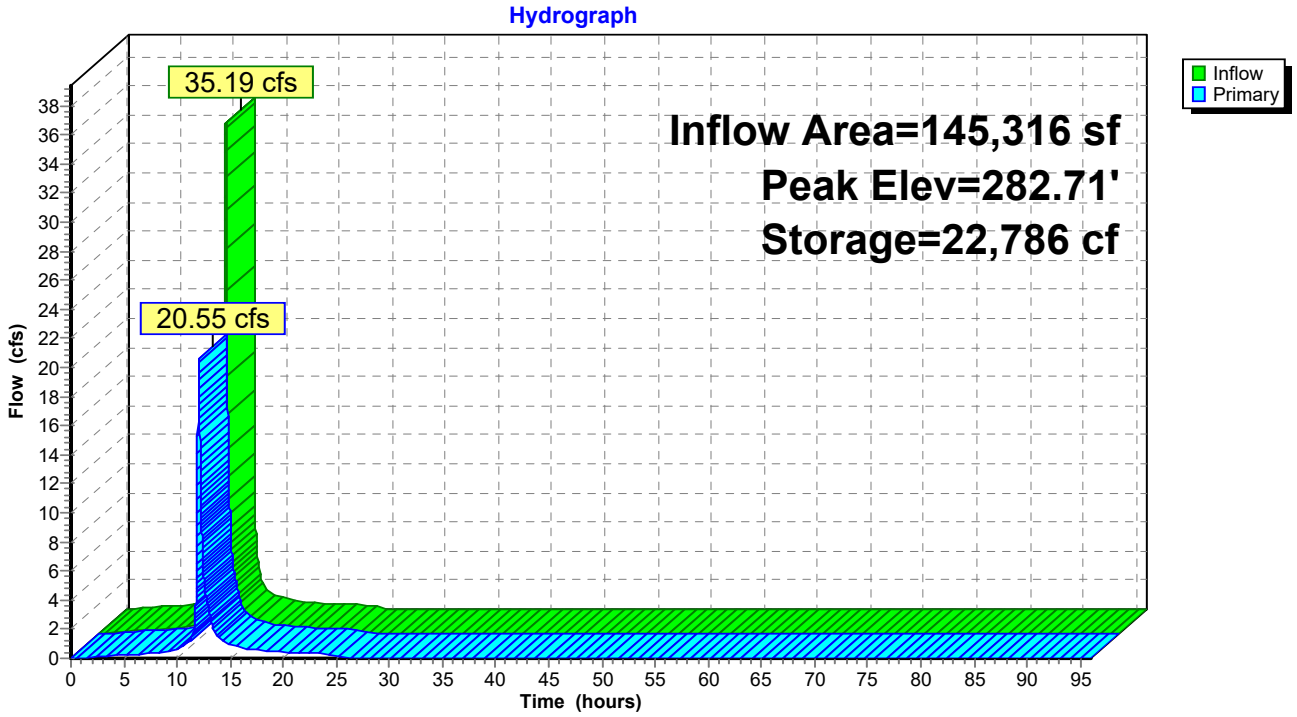
Volume	Invert	Avail.Storage	Storage Description
#1A	280.00'	10,621 cf	**46.75'W x 252.85'L x 3.75'H Field A** 44,328 cf Overall - 17,776 cf Embedded = 26,552 cf x 40.0% Voids
#2A	280.50'	17,776 cf	**ADS_StormTech SC-800 +Cap** x 350 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 350 Chambers in 10 Rows Cap Storage= 3.4 cf x 2 x 10 rows = 68.4 cf
		28,397 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	280.00'	**36.0" Round Outlet Pipe** L= 800.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 280.00' / 271.00' S= 0.0112 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	280.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	281.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	282.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	283.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=20.55 cfs @ 12.03 hrs HW=282.71' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 20.55 cfs of 29.68 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.14 cfs @ 7.74 fps)
  ├─**3=Orifice** (Orifice Controls 6.73 cfs @ 6.73 fps)
  ├─**4=Orifice** (Orifice Controls 11.63 cfs @ 4.65 fps)
  ├─**5=Orifice** (Orifice Controls 1.05 cfs @ 1.46 fps)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 6P: SCM 6: Detention UGB



Summary for Pond 7P: SCM 7: Detention UGB

Inflow Area = 185,261 sf, 92.97% Impervious, Inflow Depth = 7.15" for 100-yr event
Inflow = 46.68 cfs @ 11.96 hrs, Volume= 110,423 cf
Outflow = 20.31 cfs @ 12.05 hrs, Volume= 110,390 cf, Atten= 56%, Lag= 5.6 min
Primary = 20.31 cfs @ 12.05 hrs, Volume= 110,390 cf
Routed to Link POA1 : POA #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 275.69' @ 12.05 hrs Surf.Area= 18,180 sf Storage= 35,262 cf

Plug-Flow detention time= 68.8 min calculated for 110,378 cf (100% of inflow)
Center-of-Mass det. time= 69.0 min (809.1 - 740.1)

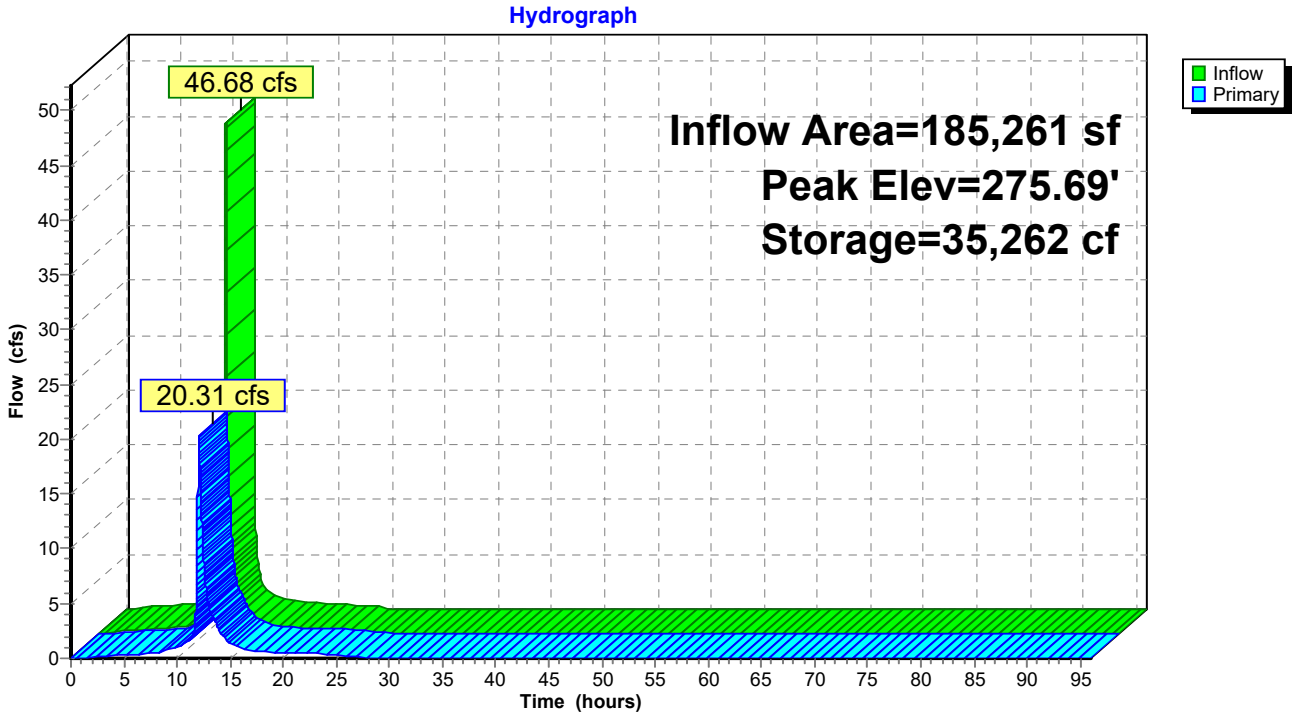
Volume	Invert	Avail.Storage	Storage Description
#1A	273.00'	24,519 cf	**49.92'W x 364.20'L x 5.50'H Field A** 99,988 cf Overall - 38,692 cf Embedded = 61,296 cf x 40.0% Voids
#2A	273.75'	38,692 cf	**ADS_StormTech MC-3500 d +Cap**x 350 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 350 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		63,210 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	273.00'	**36.0" Round Outlet Pipe** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 273.00' / 271.00' S= 0.0190 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Device 1	273.00'	**3.0" Vert. Orifice X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	273.50'	**24.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	274.25'	**30.0" W x 12.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	275.50'	**42.0" W x 3.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#6	Device 1	276.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=20.30 cfs @ 12.05 hrs HW=275.69' TW=0.00' (Dynamic Tailwater)
└─**1=Outlet Pipe** (Passes 20.30 cfs of 29.47 cfs potential flow)
  ├─**2=Orifice** (Orifice Controls 1.14 cfs @ 7.71 fps)
  ├─**3=Orifice** (Orifice Controls 6.70 cfs @ 6.70 fps)
  ├─**4=Orifice** (Orifice Controls 11.53 cfs @ 4.61 fps)
  ├─**5=Orifice** (Orifice Controls 0.94 cfs @ 1.40 fps)
  └─**6=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: SCM 7: Detention UGB

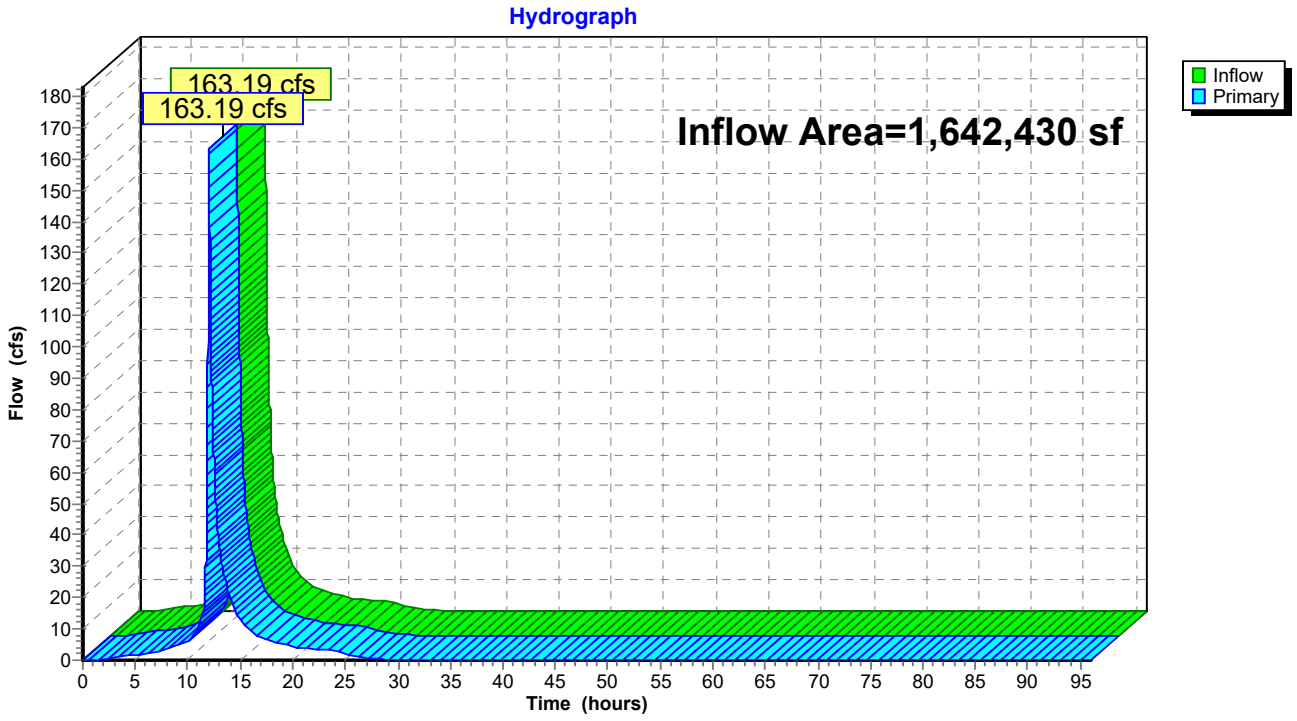


Summary for Link POA1: POA #1

Inflow Area = 1,642,430 sf, 77.11% Impervious, Inflow Depth = 6.28" for 100-yr event
Inflow = 163.19 cfs @ 12.02 hrs, Volume= 859,188 cf
Primary = 163.19 cfs @ 12.02 hrs, Volume= 859,188 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA1: POA #1

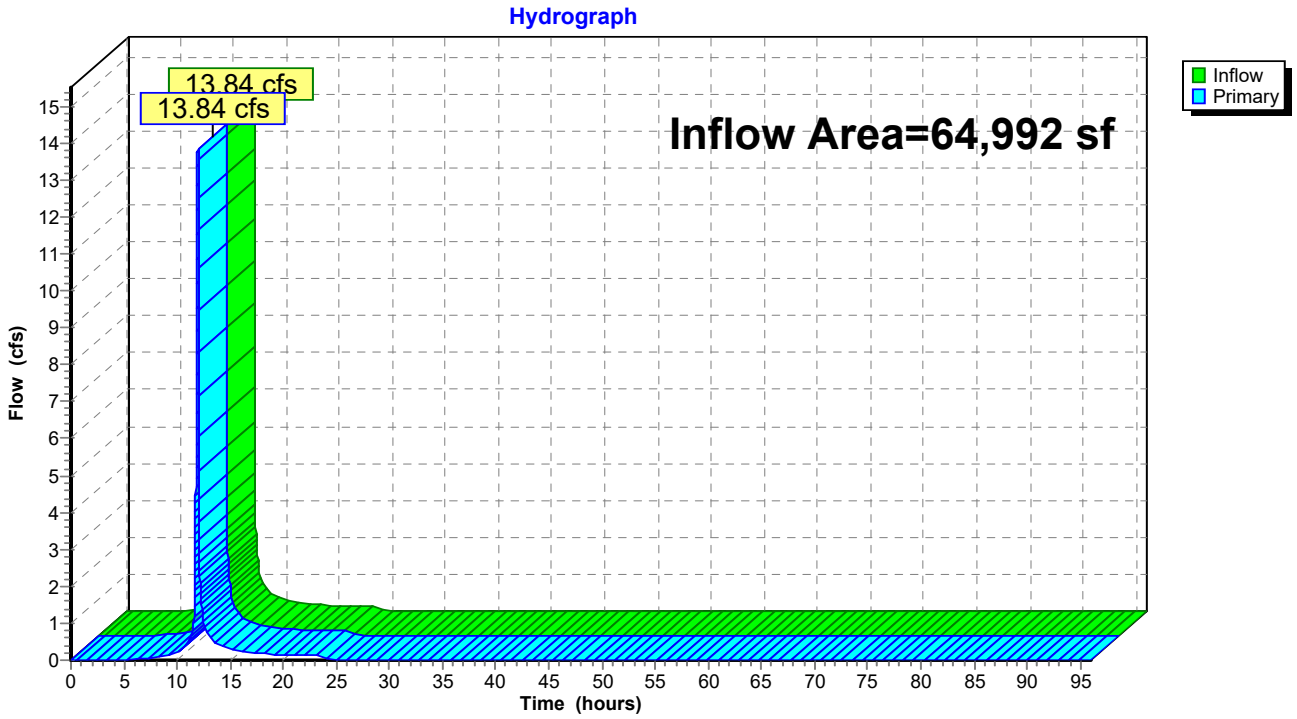


Summary for Link POA2: POA #2

Inflow Area = 64,992 sf, 2.01% Impervious, Inflow Depth = 5.24" for 100-yr event
Inflow = 13.84 cfs @ 11.96 hrs, Volume= 28,366 cf
Primary = 13.84 cfs @ 11.96 hrs, Volume= 28,366 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA2: POA #2

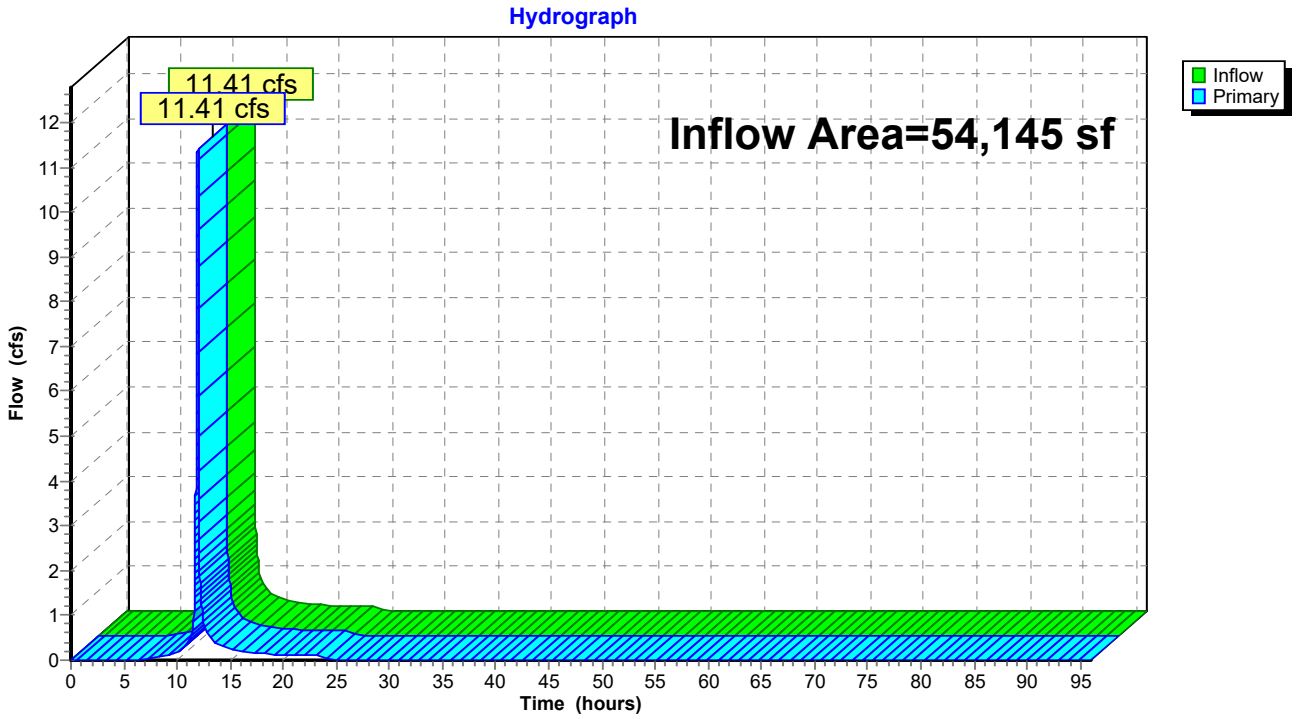


Summary for Link POA3: POA #3

Inflow Area = 54,145 sf, 0.00% Impervious, Inflow Depth = 5.16" for 100-yr event
Inflow = 11.41 cfs @ 11.96 hrs, Volume= 23,264 cf
Primary = 11.41 cfs @ 11.96 hrs, Volume= 23,264 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link POA3: POA #3



Level Spreader Design (BMP Manual)

Project: **PAC250095.00: Hanover Industrial - Chalfont**

Description: **Level Spreaders**

Level Spreader Length Design

Level Spreader	10-Yr Peak Flow (CFS)	10 -Yr (13 LF/1 CFS) Length (Ft)	Provided Length (Ft)	Height of Water over Weir (Ft)	100-Yr Velocity (fps)	Less than Max. Allowable Velocity for RFB (2.0 fps)?
LS-1	0.92	12	20	0.06	0.53	Yes
LS-2	12.59	164	164	0.09	0.63	Yes
LS-3	12.07	157	157	0.09	0.63	Yes
LS-4	8.13	106	106	0.09	0.62	Yes
LS-5	11.53	150	150	0.09	0.63	Yes
LS-6	9.98	130	130	0.09	0.63	Yes
LS-7	10.67	139	139	0.09	0.63	Yes

Calculation of Head over spreader based on allowable velocity

$V = 1.5 \times Cw \times H^{1/2}$

Max =	Max. velocity of downslope cover	4.00	fps (grass)
V =	33% of Max	1.33	fps
Cw =	weir coefficient	3.00	
H =	height of water over weir	**0.09**	ft

2-Yr Storm Even Velocity Check

Level Spreader	2-Yr Peak Flow (CFS)	Provided Length (Ft)	Height of Water over Weir (Ft)	2-Yr Velocity (fps)	Less than Max. Allowable Velocity for RFB (1.5 fps)?
LS-1	0.00	20	0.00	0.00	Yes
LS-2	6.23	164	0.05	0.49	Yes
LS-3	5.95	157	0.05	0.49	Yes
LS-4	4.96	106	0.06	0.53	Yes
LS-5	6.09	150	0.06	0.51	Yes
LS-6	4.89	130	0.05	0.49	Yes
LS-7	5.84	139	0.06	0.51	Yes

Calculation of Head over spreader based on 2-Yr Peak Flow

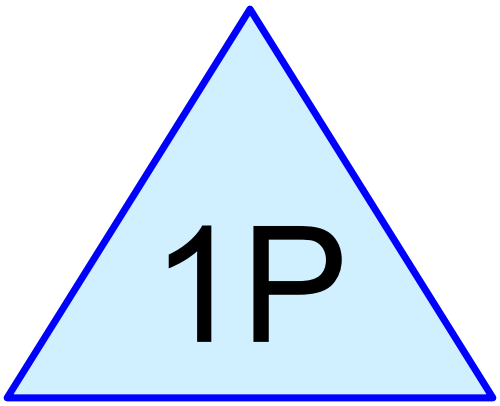
$Q = Cw \times L \times H^{1/2}$

Q = 2-yr peak flow (fps)
Cw = weir coefficient (3.0)
L = 10-yr provided length of level spreader (ft)
H = height of water over weir (ft)

Calculation of Velocity based on height of water over weir at the 2-year event

$V = 1.5 \times Cw \times H^{1/2}$

V = velocity at 2-yr storm event (fps)
Cw = weir coefficient
H = height of water over weir (ft)



SCM 1: Infiltration AGB

Subcat Reach Pond Link

Routing Diagram for PAC250095.00_Hanover Warehouses POST
Prepared by Bohler Engineering, PC, Printed 7/27/2026
HydroCAD® 10.20-8a s/n 03478 © 2025 HydroCAD Software Solutions LLC

Hydrograph for Pond 1P: SCM 1: Infiltration AGB

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	274.00	0.00	0.00	0.00
0.20	0.00	0	274.00	0.00	0.00	0.00
0.40	0.00	0	274.00	0.00	0.00	0.00
0.60	0.00	0	274.00	0.00	0.00	0.00
0.80	0.05	0	274.00	0.05	0.05	0.00
1.00	0.10	0	274.00	0.10	0.10	0.00
1.20	0.14	0	274.00	0.14	0.14	0.00
1.40	0.18	0	274.00	0.18	0.18	0.00
1.60	0.21	1	274.00	0.20	0.20	0.00
1.80	0.24	16	274.00	0.20	0.20	0.00
2.00	0.26	50	274.00	0.20	0.20	0.00
2.20	0.29	101	274.00	0.20	0.20	0.00
2.40	0.31	169	274.01	0.20	0.20	0.00
2.60	0.33	251	274.01	0.20	0.20	0.00
2.80	0.35	346	274.01	0.20	0.20	0.00
3.00	0.36	454	274.02	0.20	0.20	0.00
3.20	0.38	574	274.02	0.20	0.20	0.00
3.40	0.39	705	274.03	0.20	0.20	0.00
3.60	0.41	846	274.03	0.20	0.20	0.00
3.80	0.42	997	274.04	0.20	0.20	0.00
4.00	0.43	1,158	274.05	0.20	0.20	0.00
4.20	0.45	1,329	274.05	0.20	0.20	0.00
4.40	0.47	1,513	274.06	0.20	0.20	0.00
4.60	0.49	1,710	274.07	0.20	0.20	0.00
4.80	0.51	1,920	274.08	0.20	0.20	0.00
5.00	0.52	2,143	274.09	0.21	0.21	0.00
5.20	0.54	2,378	274.10	0.21	0.21	0.00
5.40	0.56	2,627	274.10	0.21	0.21	0.00
5.60	0.58	2,892	274.12	0.21	0.21	0.00
5.80	0.61	3,171	274.13	0.21	0.21	0.00
6.00	0.63	3,467	274.14	0.21	0.21	0.00
6.20	0.65	3,778	274.15	0.21	0.21	0.00
6.40	0.67	4,104	274.16	0.21	0.21	0.00
6.60	0.69	4,446	274.18	0.21	0.21	0.00
6.80	0.71	4,804	274.19	0.21	0.21	0.00
7.00	0.74	5,178	274.21	0.21	0.21	0.00
7.20	0.76	5,567	274.22	0.21	0.21	0.00
7.40	0.78	5,973	274.24	0.21	0.21	0.00
7.60	0.80	6,395	274.25	0.21	0.21	0.00
7.80	0.83	6,832	274.27	0.21	0.21	0.00
8.00	0.85	7,286	274.29	0.21	0.21	0.00
8.20	0.91	7,766	274.31	0.21	0.21	0.00
8.40	1.00	8,303	274.33	0.21	0.21	0.00
8.60	1.09	8,903	274.35	0.21	0.21	0.00
8.80	1.18	9,567	274.38	0.21	0.21	0.00
9.00	1.27	10,297	274.41	0.21	0.21	0.00
9.20	1.31	11,080	274.44	0.21	0.21	0.00
9.40	1.32	11,877	274.47	0.21	0.21	0.00
9.60	1.35	12,682	274.50	0.21	0.21	0.00
9.80	1.49	13,552	274.53	0.21	0.21	0.00
10.00	1.64	14,526	274.57	0.21	0.21	0.00
10.20	1.83	15,617	274.61	0.21	0.21	0.00

Hydrograph for Pond 1P: SCM 1: Infiltration AGB (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
10.40	2.05	16,861	274.66	0.21	0.21	0.00
10.60	2.30	18,267	274.71	0.22	0.22	0.00
10.80	2.66	19,897	274.77	0.22	0.22	0.00
11.00	3.04	21,794	274.85	0.22	0.22	0.00
11.20	3.73	24,039	274.93	0.22	0.22	0.00
11.40	4.64	26,894	275.04	0.22	0.22	0.00
11.60	8.66	30,680	275.18	0.22	0.22	0.00
11.80	**30.98**	44,327	275.67	0.23	0.23	0.00
12.00	**58.99**	82,480	276.96	4.73	0.25	4.48
12.20	8.72	**93,454**	**277.31**	**7.15**	**0.26**	**6.89**
12.40	6.30	**93,619**	**277.32**	**7.19**	**0.26**	**6.93**
12.60	4.31	92,299	277.28	6.84	0.26	6.58
12.80	3.74	90,434	277.22	6.35	0.26	6.10
13.00	3.23	88,535	277.16	5.89	0.26	5.63
13.20	2.86	86,626	277.09	5.46	0.25	5.20
13.40	2.58	84,793	277.04	5.08	0.25	4.83
13.60	2.32	83,000	276.98	4.80	0.25	4.55
13.80	2.12	81,226	276.92	4.55	0.25	4.30
14.00	1.92	79,494	276.86	4.29	0.25	4.04
14.20	1.80	77,835	276.81	4.01	0.25	3.76
14.40	1.73	76,325	276.76	3.71	0.25	3.46
14.60	1.66	74,988	276.72	3.39	0.25	3.15
14.80	1.59	73,817	276.68	3.12	0.25	2.87
15.00	1.52	72,779	276.64	2.88	0.25	2.64
15.20	1.45	71,849	276.61	2.68	0.25	2.43
15.40	1.38	71,007	276.58	2.50	0.25	2.25
15.60	1.31	70,237	276.56	2.34	0.25	2.10
15.80	1.24	69,524	276.54	2.20	0.24	1.95
16.00	1.17	68,860	276.51	2.07	0.24	1.82
16.20	1.13	68,240	276.49	1.95	0.24	1.71
16.40	1.11	67,678	276.47	1.85	0.24	1.61
16.60	1.08	67,168	276.46	1.76	0.24	1.52
16.80	1.06	66,701	276.44	1.68	0.24	1.44
17.00	1.03	66,270	276.43	1.61	0.24	1.37
17.20	1.01	65,871	276.41	1.54	0.24	1.30
17.40	0.98	65,498	276.40	1.49	0.24	1.24
17.60	0.96	65,147	276.39	1.43	0.24	1.19
17.80	0.93	64,815	276.38	1.38	0.24	1.14
18.00	0.91	64,499	276.37	1.34	0.24	1.10
18.20	0.88	64,197	276.36	1.30	0.24	1.05
18.40	0.86	63,906	276.35	1.26	0.24	1.02
18.60	0.83	63,623	276.34	1.22	0.24	0.98
18.80	0.81	63,349	276.33	1.19	0.24	0.95
19.00	0.79	63,080	276.32	1.15	0.24	0.91
19.20	0.76	62,816	276.31	1.12	0.24	0.88
19.40	0.74	62,555	276.30	1.10	0.24	0.86
19.60	0.71	62,295	276.29	1.07	0.24	0.83
19.80	0.69	62,037	276.28	1.05	0.24	0.80
20.00	0.66	61,777	276.27	1.02	0.24	0.78
20.20	0.65	61,518	276.27	1.00	0.24	0.76
20.40	0.64	61,268	276.26	0.98	0.24	0.74
20.60	0.64	61,025	276.25	0.97	0.24	0.73

Hydrograph for Pond 1P: SCM 1: Infiltration AGB (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
20.80	0.63	60,786	276.24	0.96	0.24	0.72
21.00	0.63	60,548	276.23	0.96	0.24	0.72
21.20	0.62	60,314	276.22	0.95	0.24	0.71
21.40	0.62	60,082	276.22	0.94	0.24	0.70
21.60	0.61	59,852	276.21	0.93	0.24	0.69
21.80	0.61	59,624	276.20	0.92	0.24	0.68
22.00	0.60	59,400	276.19	0.91	0.24	0.67
22.20	0.60	59,177	276.19	0.91	0.24	0.67
22.40	0.59	58,958	276.18	0.90	0.24	0.66
22.60	0.59	58,740	276.17	0.89	0.24	0.65
22.80	0.58	58,526	276.16	0.88	0.24	0.64
23.00	0.58	58,314	276.16	0.87	0.24	0.63
23.20	0.57	58,104	276.15	0.86	0.24	0.62
23.40	0.57	57,897	276.14	0.85	0.24	0.62
23.60	0.56	57,693	276.13	0.85	0.24	0.61
23.80	0.56	57,491	276.13	0.84	0.24	0.60
24.00	0.55	57,292	276.12	0.83	0.24	0.59
24.20	0.01	56,855	276.11	0.81	0.24	0.57
24.40	0.00	56,282	276.09	0.78	0.24	0.54
24.60	0.00	55,729	276.07	0.75	0.24	0.52
24.80	0.00	55,196	276.05	0.73	0.24	0.49
25.00	0.00	54,683	276.03	0.70	0.24	0.46
25.20	0.00	54,192	276.01	0.67	0.24	0.43
25.40	0.00	53,724	276.00	0.63	0.24	0.40
25.60	0.00	53,282	275.98	0.60	0.24	0.36
25.80	0.00	52,865	275.97	0.56	0.24	0.33
26.00	0.00	52,471	275.95	0.53	0.24	0.30
26.20	0.00	52,099	275.94	0.50	0.23	0.27
26.40	0.00	51,745	275.93	0.48	0.23	0.24
26.60	0.00	51,409	275.92	0.45	0.23	0.22
26.80	0.00	51,090	275.91	0.43	0.23	0.20
27.00	0.00	50,785	275.90	0.41	0.23	0.18
27.20	0.00	50,495	275.89	0.39	0.23	0.16
27.40	0.00	50,217	275.88	0.38	0.23	0.14
27.60	0.00	49,951	275.87	0.36	0.23	0.13
27.80	0.00	49,696	275.86	0.35	0.23	0.11
28.00	0.00	49,451	275.85	0.33	0.23	0.10
28.20	0.00	49,215	275.84	0.32	0.23	0.09
28.40	0.00	48,988	275.83	0.31	0.23	0.08
28.60	0.00	48,769	275.83	0.30	0.23	0.07
28.80	0.00	48,557	275.82	0.29	0.23	0.06
29.00	0.00	48,351	275.81	0.28	0.23	0.05
29.20	0.00	48,152	275.80	0.27	0.23	0.04
29.40	0.00	47,959	275.80	0.27	0.23	0.03
29.60	0.00	47,770	275.79	0.26	0.23	0.03
29.80	0.00	47,586	275.78	0.25	0.23	0.02
30.00	0.00	47,407	275.78	0.25	0.23	0.01
30.20	0.00	47,231	275.77	0.24	0.23	0.01
30.40	0.00	47,058	275.77	0.24	0.23	0.01
30.60	0.00	46,888	275.76	0.23	0.23	0.00
30.80	0.00	46,719	275.75	0.23	0.23	0.00
31.00	0.00	46,552	275.75	0.23	0.23	0.00

Hydrograph for Pond 1P: SCM 1: Infiltration AGB (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
31.20	0.00	46,385	275.74	0.23	0.23	0.00
31.40	0.00	46,219	275.74	0.23	0.23	0.00
31.60	0.00	46,052	275.73	0.23	0.23	0.00
31.80	0.00	45,885	275.72	0.23	0.23	0.00
32.00	0.00	45,719	275.72	0.23	0.23	0.00
32.20	0.00	45,552	275.71	0.23	0.23	0.00
32.40	0.00	45,386	275.71	0.23	0.23	0.00
32.60	0.00	45,219	275.70	0.23	0.23	0.00
32.80	0.00	45,053	275.69	0.23	0.23	0.00
33.00	0.00	44,887	275.69	0.23	0.23	0.00
33.20	0.00	44,721	275.68	0.23	0.23	0.00
33.40	0.00	44,554	275.68	0.23	0.23	0.00
33.60	0.00	44,388	275.67	0.23	0.23	0.00
33.80	0.00	44,222	275.66	0.23	0.23	0.00
34.00	0.00	44,057	275.66	0.23	0.23	0.00
34.20	0.00	43,891	275.65	0.23	0.23	0.00
34.40	0.00	43,725	275.65	0.23	0.23	0.00
34.60	0.00	43,559	275.64	0.23	0.23	0.00
34.80	0.00	43,394	275.64	0.23	0.23	0.00
35.00	0.00	43,228	275.63	0.23	0.23	0.00
35.20	0.00	43,063	275.62	0.23	0.23	0.00
35.40	0.00	42,897	275.62	0.23	0.23	0.00
35.60	0.00	42,732	275.61	0.23	0.23	0.00
35.80	0.00	42,567	275.61	0.23	0.23	0.00
36.00	0.00	42,401	275.60	0.23	0.23	0.00
36.20	0.00	42,236	275.59	0.23	0.23	0.00
36.40	0.00	42,071	275.59	0.23	0.23	0.00
36.60	0.00	41,906	275.58	0.23	0.23	0.00
36.80	0.00	41,741	275.58	0.23	0.23	0.00
37.00	0.00	41,576	275.57	0.23	0.23	0.00
37.20	0.00	41,412	275.56	0.23	0.23	0.00
37.40	0.00	41,247	275.56	0.23	0.23	0.00
37.60	0.00	41,082	275.55	0.23	0.23	0.00
37.80	0.00	40,918	275.55	0.23	0.23	0.00
38.00	0.00	40,753	275.54	0.23	0.23	0.00
38.20	0.00	40,589	275.54	0.23	0.23	0.00
38.40	0.00	40,424	275.53	0.23	0.23	0.00
38.60	0.00	40,260	275.52	0.23	0.23	0.00
38.80	0.00	40,096	275.52	0.23	0.23	0.00
39.00	0.00	39,931	275.51	0.23	0.23	0.00
39.20	0.00	39,767	275.51	0.23	0.23	0.00
39.40	0.00	39,603	275.50	0.23	0.23	0.00
39.60	0.00	39,439	275.49	0.23	0.23	0.00
39.80	0.00	39,275	275.49	0.23	0.23	0.00
40.00	0.00	39,112	275.48	0.23	0.23	0.00
40.20	0.00	38,948	275.48	0.23	0.23	0.00
40.40	0.00	38,784	275.47	0.23	0.23	0.00
40.60	0.00	38,621	275.46	0.23	0.23	0.00
40.80	0.00	38,457	275.46	0.23	0.23	0.00
41.00	0.00	38,294	275.45	0.23	0.23	0.00
41.20	0.00	38,130	275.45	0.23	0.23	0.00
41.40	0.00	37,967	275.44	0.23	0.23	0.00

Hydrograph for Pond 1P: SCM 1: Infiltration AGB (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
41.60	0.00	37,804	275.44	0.23	0.23	0.00
41.80	0.00	37,640	275.43	0.23	0.23	0.00
42.00	0.00	37,477	275.42	0.23	0.23	0.00
42.20	0.00	37,314	275.42	0.23	0.23	0.00
42.40	0.00	37,151	275.41	0.23	0.23	0.00
42.60	0.00	36,988	275.41	0.23	0.23	0.00
42.80	0.00	36,825	275.40	0.23	0.23	0.00
43.00	0.00	36,663	275.39	0.23	0.23	0.00
43.20	0.00	36,500	275.39	0.23	0.23	0.00
43.40	0.00	36,337	275.38	0.23	0.23	0.00
43.60	0.00	36,175	275.38	0.23	0.23	0.00
43.80	0.00	36,012	275.37	0.23	0.23	0.00
44.00	0.00	35,850	275.36	0.23	0.23	0.00
44.20	0.00	35,687	275.36	0.23	0.23	0.00
44.40	0.00	35,525	275.35	0.23	0.23	0.00
44.60	0.00	35,363	275.35	0.23	0.23	0.00
44.80	0.00	35,200	275.34	0.23	0.23	0.00
45.00	0.00	35,038	275.34	0.23	0.23	0.00
45.20	0.00	34,876	275.33	0.22	0.22	0.00
45.40	0.00	34,714	275.32	0.22	0.22	0.00
45.60	0.00	34,553	275.32	0.22	0.22	0.00
45.80	0.00	34,391	275.31	0.22	0.22	0.00
46.00	0.00	34,229	275.31	0.22	0.22	0.00
46.20	0.00	34,067	275.30	0.22	0.22	0.00
46.40	0.00	33,906	275.29	0.22	0.22	0.00
46.60	0.00	33,744	275.29	0.22	0.22	0.00
46.80	0.00	33,583	275.28	0.22	0.22	0.00
47.00	0.00	33,421	275.28	0.22	0.22	0.00
47.20	0.00	33,260	275.27	0.22	0.22	0.00
47.40	0.00	33,099	275.26	0.22	0.22	0.00
47.60	0.00	32,937	275.26	0.22	0.22	0.00
47.80	0.00	32,776	275.25	0.22	0.22	0.00
48.00	0.00	32,615	275.25	0.22	0.22	0.00
48.20	0.00	32,454	275.24	0.22	0.22	0.00
48.40	0.00	32,293	275.24	0.22	0.22	0.00
48.60	0.00	32,132	275.23	0.22	0.22	0.00
48.80	0.00	31,972	275.22	0.22	0.22	0.00
49.00	0.00	31,811	275.22	0.22	0.22	0.00
49.20	0.00	31,650	275.21	0.22	0.22	0.00
49.40	0.00	31,490	275.21	0.22	0.22	0.00
49.60	0.00	31,329	275.20	0.22	0.22	0.00
49.80	0.00	31,169	275.19	0.22	0.22	0.00
50.00	0.00	31,008	275.19	0.22	0.22	0.00
50.20	0.00	30,848	275.18	0.22	0.22	0.00
50.40	0.00	30,688	275.18	0.22	0.22	0.00
50.60	0.00	30,528	275.17	0.22	0.22	0.00
50.80	0.00	30,368	275.16	0.22	0.22	0.00
51.00	0.00	30,207	275.16	0.22	0.22	0.00
51.20	0.00	30,048	275.15	0.22	0.22	0.00
51.40	0.00	29,888	275.15	0.22	0.22	0.00
51.60	0.00	29,728	275.14	0.22	0.22	0.00
51.80	0.00	29,568	275.14	0.22	0.22	0.00

Hydrograph for Pond 1P: SCM 1: Infiltration AGB (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
52.00	0.00	29,408	275.13	0.22	0.22	0.00
52.20	0.00	29,249	275.12	0.22	0.22	0.00
52.40	0.00	29,089	275.12	0.22	0.22	0.00
52.60	0.00	28,930	275.11	0.22	0.22	0.00
52.80	0.00	28,770	275.11	0.22	0.22	0.00
53.00	0.00	28,611	275.10	0.22	0.22	0.00
53.20	0.00	28,452	275.09	0.22	0.22	0.00
53.40	0.00	28,293	275.09	0.22	0.22	0.00
53.60	0.00	28,133	275.08	0.22	0.22	0.00
53.80	0.00	27,974	275.08	0.22	0.22	0.00
54.00	0.00	27,815	275.07	0.22	0.22	0.00
54.20	0.00	27,656	275.06	0.22	0.22	0.00
54.40	0.00	27,498	275.06	0.22	0.22	0.00
54.60	0.00	27,339	275.05	0.22	0.22	0.00
54.80	0.00	27,180	275.05	0.22	0.22	0.00
55.00	0.00	27,021	275.04	0.22	0.22	0.00
55.20	0.00	26,863	275.04	0.22	0.22	0.00
55.40	0.00	26,704	275.03	0.22	0.22	0.00
55.60	0.00	26,546	275.02	0.22	0.22	0.00
55.80	0.00	26,388	275.02	0.22	0.22	0.00
56.00	0.00	26,229	275.01	0.22	0.22	0.00
56.20	0.00	26,071	275.01	0.22	0.22	0.00
56.40	0.00	25,913	275.00	0.22	0.22	0.00
56.60	0.00	25,755	274.99	0.22	0.22	0.00
56.80	0.00	25,597	274.99	0.22	0.22	0.00
57.00	0.00	25,439	274.98	0.22	0.22	0.00
57.20	0.00	25,281	274.98	0.22	0.22	0.00
57.40	0.00	25,123	274.97	0.22	0.22	0.00
57.60	0.00	24,965	274.96	0.22	0.22	0.00
57.80	0.00	24,808	274.96	0.22	0.22	0.00
58.00	0.00	24,650	274.95	0.22	0.22	0.00
58.20	0.00	24,492	274.95	0.22	0.22	0.00
58.40	0.00	24,335	274.94	0.22	0.22	0.00
58.60	0.00	24,177	274.94	0.22	0.22	0.00
58.80	0.00	24,020	274.93	0.22	0.22	0.00
59.00	0.00	23,863	274.92	0.22	0.22	0.00
59.20	0.00	23,706	274.92	0.22	0.22	0.00
59.40	0.00	23,548	274.91	0.22	0.22	0.00
59.60	0.00	23,391	274.91	0.22	0.22	0.00
59.80	0.00	23,234	274.90	0.22	0.22	0.00
60.00	0.00	23,077	274.89	0.22	0.22	0.00
60.20	0.00	22,921	274.89	0.22	0.22	0.00
60.40	0.00	22,764	274.88	0.22	0.22	0.00
60.60	0.00	22,607	274.88	0.22	0.22	0.00
60.80	0.00	22,450	274.87	0.22	0.22	0.00
61.00	0.00	22,294	274.86	0.22	0.22	0.00
61.20	0.00	22,137	274.86	0.22	0.22	0.00
61.40	0.00	21,981	274.85	0.22	0.22	0.00
61.60	0.00	21,824	274.85	0.22	0.22	0.00
61.80	0.00	21,668	274.84	0.22	0.22	0.00
62.00	0.00	21,512	274.84	0.22	0.22	0.00
62.20	0.00	21,355	274.83	0.22	0.22	0.00

Hydrograph for Pond 1P: SCM 1: Infiltration AGB (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
62.40	0.00	21,199	274.82	0.22	0.22	0.00
62.60	0.00	21,043	274.82	0.22	0.22	0.00
62.80	0.00	20,887	274.81	0.22	0.22	0.00
63.00	0.00	20,731	274.81	0.22	0.22	0.00
63.20	0.00	20,575	274.80	0.22	0.22	0.00
63.40	0.00	20,419	274.79	0.22	0.22	0.00
63.60	0.00	20,264	274.79	0.22	0.22	0.00
63.80	0.00	20,108	274.78	0.22	0.22	0.00
64.00	0.00	19,952	274.78	0.22	0.22	0.00
64.20	0.00	19,797	274.77	0.22	0.22	0.00
64.40	0.00	19,641	274.76	0.22	0.22	0.00
64.60	0.00	19,486	274.76	0.22	0.22	0.00
64.80	0.00	19,331	274.75	0.22	0.22	0.00
65.00	0.00	19,175	274.75	0.22	0.22	0.00
65.20	0.00	19,020	274.74	0.22	0.22	0.00
65.40	0.00	18,865	274.74	0.22	0.22	0.00
65.60	0.00	18,710	274.73	0.22	0.22	0.00
65.80	0.00	18,555	274.72	0.22	0.22	0.00
66.00	0.00	18,400	274.72	0.22	0.22	0.00
66.20	0.00	18,245	274.71	0.22	0.22	0.00
66.40	0.00	18,090	274.71	0.21	0.21	0.00
66.60	0.00	17,936	274.70	0.21	0.21	0.00
66.80	0.00	17,781	274.69	0.21	0.21	0.00
67.00	0.00	17,626	274.69	0.21	0.21	0.00
67.20	0.00	17,472	274.68	0.21	0.21	0.00
67.40	0.00	17,317	274.68	0.21	0.21	0.00
67.60	0.00	17,163	274.67	0.21	0.21	0.00
67.80	0.00	17,008	274.66	0.21	0.21	0.00
68.00	0.00	16,854	274.66	0.21	0.21	0.00
68.20	0.00	16,700	274.65	0.21	0.21	0.00
68.40	0.00	16,546	274.65	0.21	0.21	0.00
68.60	0.00	16,392	274.64	0.21	0.21	0.00
68.80	0.00	16,238	274.64	0.21	0.21	0.00
69.00	0.00	16,084	274.63	0.21	0.21	0.00
69.20	0.00	15,930	274.62	0.21	0.21	0.00
69.40	0.00	15,776	274.62	0.21	0.21	0.00
69.60	0.00	15,622	274.61	0.21	0.21	0.00
69.80	0.00	15,469	274.61	0.21	0.21	0.00
70.00	0.00	15,315	274.60	0.21	0.21	0.00
70.20	0.00	15,162	274.59	0.21	0.21	0.00
70.40	0.00	15,008	274.59	0.21	0.21	0.00
70.60	0.00	14,855	274.58	0.21	0.21	0.00
70.80	0.00	14,701	274.58	0.21	0.21	0.00
71.00	0.00	14,548	274.57	0.21	0.21	0.00
71.20	0.00	14,395	274.56	0.21	0.21	0.00
71.40	0.00	14,242	274.56	0.21	0.21	0.00
71.60	0.00	14,089	274.55	0.21	0.21	0.00
71.80	0.00	13,936	274.55	0.21	0.21	0.00
72.00	0.00	13,783	274.54	0.21	0.21	0.00
72.20	0.00	13,630	274.54	0.21	0.21	0.00
72.40	0.00	13,477	274.53	0.21	0.21	0.00
72.60	0.00	13,324	274.52	0.21	0.21	0.00

Hydrograph for Pond 1P: SCM 1: Infiltration AGB (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
72.80	0.00	13,172	274.52	0.21	0.21	0.00
73.00	0.00	13,019	274.51	0.21	0.21	0.00
73.20	0.00	12,867	274.51	0.21	0.21	0.00
73.40	0.00	12,714	274.50	0.21	0.21	0.00
73.60	0.00	12,562	274.49	0.21	0.21	0.00
73.80	0.00	12,410	274.49	0.21	0.21	0.00
74.00	0.00	12,257	274.48	0.21	0.21	0.00
74.20	0.00	12,105	274.48	0.21	0.21	0.00
74.40	0.00	11,953	274.47	0.21	0.21	0.00
74.60	0.00	11,801	274.46	0.21	0.21	0.00
74.80	0.00	11,649	274.46	0.21	0.21	0.00
75.00	0.00	11,497	274.45	0.21	0.21	0.00
75.20	0.00	11,345	274.45	0.21	0.21	0.00
75.40	0.00	11,193	274.44	0.21	0.21	0.00
75.60	0.00	11,042	274.44	0.21	0.21	0.00
75.80	0.00	10,890	274.43	0.21	0.21	0.00
76.00	0.00	10,738	274.42	0.21	0.21	0.00
76.20	0.00	10,587	274.42	0.21	0.21	0.00
76.40	0.00	10,435	274.41	0.21	0.21	0.00
76.60	0.00	10,284	274.41	0.21	0.21	0.00
76.80	0.00	10,133	274.40	0.21	0.21	0.00
77.00	0.00	9,981	274.39	0.21	0.21	0.00
77.20	0.00	9,830	274.39	0.21	0.21	0.00
77.40	0.00	9,679	274.38	0.21	0.21	0.00
77.60	0.00	9,528	274.38	0.21	0.21	0.00
77.80	0.00	9,377	274.37	0.21	0.21	0.00
78.00	0.00	9,226	274.36	0.21	0.21	0.00
78.20	0.00	9,075	274.36	0.21	0.21	0.00
78.40	0.00	8,925	274.35	0.21	0.21	0.00
78.60	0.00	8,774	274.35	0.21	0.21	0.00
78.80	0.00	8,623	274.34	0.21	0.21	0.00
79.00	0.00	8,473	274.34	0.21	0.21	0.00
79.20	0.00	8,322	274.33	0.21	0.21	0.00
79.40	0.00	8,172	274.32	0.21	0.21	0.00
79.60	0.00	8,021	274.32	0.21	0.21	0.00
79.80	0.00	7,871	274.31	0.21	0.21	0.00
80.00	0.00	7,721	274.31	0.21	0.21	0.00
80.20	0.00	7,571	274.30	0.21	0.21	0.00
80.40	0.00	7,420	274.29	0.21	0.21	0.00
80.60	0.00	7,270	274.29	0.21	0.21	0.00
80.80	0.00	7,120	274.28	0.21	0.21	0.00
81.00	0.00	6,970	274.28	0.21	0.21	0.00
81.20	0.00	6,821	274.27	0.21	0.21	0.00
81.40	0.00	6,671	274.26	0.21	0.21	0.00
81.60	0.00	6,521	274.26	0.21	0.21	0.00
81.80	0.00	6,372	274.25	0.21	0.21	0.00
82.00	0.00	6,222	274.25	0.21	0.21	0.00
82.20	0.00	6,072	274.24	0.21	0.21	0.00
82.40	0.00	5,923	274.24	0.21	0.21	0.00
82.60	0.00	5,774	274.23	0.21	0.21	0.00
82.80	0.00	5,624	274.22	0.21	0.21	0.00
83.00	0.00	5,475	274.22	0.21	0.21	0.00

Hydrograph for Pond 1P: SCM 1: Infiltration AGB (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
83.20	0.00	5,326	274.21	0.21	0.21	0.00
83.40	0.00	5,177	274.21	0.21	0.21	0.00
83.60	0.00	5,028	274.20	0.21	0.21	0.00
83.80	0.00	4,879	274.19	0.21	0.21	0.00
84.00	0.00	4,730	274.19	0.21	0.21	0.00
84.20	0.00	4,581	274.18	0.21	0.21	0.00
84.40	0.00	4,432	274.18	0.21	0.21	0.00
84.60	0.00	4,284	274.17	0.21	0.21	0.00
84.80	0.00	4,135	274.16	0.21	0.21	0.00
85.00	0.00	3,986	274.16	0.21	0.21	0.00
85.20	0.00	3,838	274.15	0.21	0.21	0.00
85.40	0.00	3,689	274.15	0.21	0.21	0.00
85.60	0.00	3,541	274.14	0.21	0.21	0.00
85.80	0.00	3,393	274.14	0.21	0.21	0.00
86.00	0.00	3,245	274.13	0.21	0.21	0.00
86.20	0.00	3,096	274.12	0.21	0.21	0.00
86.40	0.00	2,948	274.12	0.21	0.21	0.00
86.60	0.00	2,800	274.11	0.21	0.21	0.00
86.80	0.00	2,652	274.11	0.21	0.21	0.00
87.00	0.00	2,504	274.10	0.21	0.21	0.00
87.20	0.00	2,357	274.09	0.21	0.21	0.00
87.40	0.00	2,209	274.09	0.21	0.21	0.00
87.60	0.00	2,061	274.08	0.21	0.21	0.00
87.80	0.00	1,913	274.08	0.20	0.20	0.00
88.00	0.00	1,766	274.07	0.20	0.20	0.00
88.20	0.00	1,618	274.06	0.20	0.20	0.00
88.40	0.00	1,471	274.06	0.20	0.20	0.00
88.60	0.00	1,324	274.05	0.20	0.20	0.00
88.80	0.00	1,176	274.05	0.20	0.20	0.00
89.00	0.00	1,029	274.04	0.20	0.20	0.00
89.20	0.00	882	274.04	0.20	0.20	0.00
89.40	0.00	735	274.03	0.20	0.20	0.00
89.60	0.00	588	274.02	0.20	0.20	0.00
89.80	0.00	441	274.02	0.20	0.20	0.00
90.00	0.00	294	274.01	0.20	0.20	0.00
90.20	0.00	147	274.01	0.20	0.20	0.00
90.40	0.00	0	274.00	0.20	0.20	0.00
90.60	0.00	0	274.00	0.00	0.00	0.00
90.80	0.00	0	274.00	0.00	0.00	0.00
91.00	0.00	0	274.00	0.00	0.00	0.00
91.20	0.00	0	274.00	0.00	0.00	0.00
91.40	0.00	0	274.00	0.00	0.00	0.00
91.60	0.00	0	274.00	0.00	0.00	0.00
91.80	0.00	0	274.00	0.00	0.00	0.00
92.00	0.00	0	274.00	0.00	0.00	0.00
92.20	0.00	0	274.00	0.00	0.00	0.00
92.40	0.00	0	274.00	0.00	0.00	0.00
92.60	0.00	0	274.00	0.00	0.00	0.00
92.80	0.00	0	274.00	0.00	0.00	0.00
93.00	0.00	0	274.00	0.00	0.00	0.00
93.20	0.00	0	274.00	0.00	0.00	0.00
93.40	0.00	0	274.00	0.00	0.00	0.00

SCM 1 Dewatering Time: 90.40 Hours (< 72 Hours After End of 100-yr/24-hour Storm)

Hydrograph for Pond 1P: SCM 1: Infiltration AGB (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
93.60	0.00	0	274.00	0.00	0.00	0.00
93.80	0.00	0	274.00	0.00	0.00	0.00
94.00	0.00	0	274.00	0.00	0.00	0.00
94.20	0.00	0	274.00	0.00	0.00	0.00
94.40	0.00	0	274.00	0.00	0.00	0.00
94.60	0.00	0	274.00	0.00	0.00	0.00
94.80	0.00	0	274.00	0.00	0.00	0.00
95.00	0.00	0	274.00	0.00	0.00	0.00
95.20	0.00	0	274.00	0.00	0.00	0.00
95.40	0.00	0	274.00	0.00	0.00	0.00
95.60	0.00	0	274.00	0.00	0.00	0.00
95.80	0.00	0	274.00	0.00	0.00	0.00
96.00	0.00	0	274.00	0.00	0.00	0.00

Spillway Calculations

Project Name: **Hanover Industrial - Chalfont**

Description: **SCM 1**

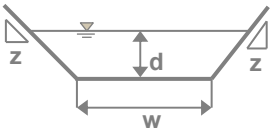
Determine Values for Equation $Q = CLH^{1.5}$

Q =	71.11	Post-development 100-year flow (cfs)
L =	75	Length (LF)
C =	2.80	Weir Coefficient
H =	0.49	Flow Depth Over Weir (ft)

Determine Required Top of Berm Elevation

	278.50	Spillway Elevation
+	1.00	Required Freeboard
+	0.49	Depth of Flow (from above)
=	279.99	Required Top of Berm Elevation
	280.00	Provided Top of Berm Elevation

Determine Spillway Lining



Z1 & Z2 =	3.00	ft : ft
Slope =	0.33	ft/ft (downslope of spillway)

Shear Stress	Design Method
10.00	Calculated Shear Stress
NAG SC250	Spillway Lining
10.00	Allowable Shear Stress

Storm Drainage Calculations

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
A-20	A-10	57.1		0.17			0.16		6.8	7.40	1.15		12	2.97	39%	3.79	3.54	0.3	274.34	274.00	N/A	0.59%
A-30	A-20	66.5	0.02	0.12	0.90	0.02	0.11	5.0	6.2	7.58	0.82		12	1.57	52%	2.00	2.02	0.5	279.21	279.10	N/A	0.17%
A-40	A-30	144.2	0.10	0.10	0.90	0.09	0.09	5.0	5.0	7.97	0.70		12	1.57	44%	2.00	1.94	1.2	282.96	282.73	N/A	0.17%
A-21	A-20	96.8	0.05	0.05	0.90	0.05	0.05	5.0	5.0	7.97	0.38		12	3.01	13%	3.83	2.62	0.6	278.76	278.17	N/A	0.61%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
A-10	#VALUE!							274.43	274.43							275.00	275.67	
A-20	12	1.15	57.12	3.54	0.43	0.45	0.20	274.63	274.43			274.97	274.77	0.72	275.06	280.10	282.98	No
A-30	12	0.82	66.47	2.02	0.51	0.38	0.06	279.68	279.61	0.002	0.11	279.79	279.72	0.64	279.85	283.73	286.23	No
A-40	12	0.70	144.18	1.94	0.47	0.35	0.06	283.25	283.19	0.002	0.239	283.49	283.43	0.59	283.55	---	288.08	No
A-21	12	0.38	96.76	2.62	0.24	0.26	0.11	278.52	278.41			279.11	279.00	0.35	279.11	---	281.30	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
A-40	---	On Grade	0.10	0.90	5.0	8.0	0.70	0.02	0.05		0.70	0.14	2	4.06	0.49	Curb inlet	0.33	0.37
A-21	---	On Grade	0.05	0.90	5.0	8.0	0.38	0.02	0.05		0.38	0.12	2	2.74	0.73	Curb inlet	0.23	0.16
A-30	---	On Grade	0.02	0.90	5.0	8.0	0.17	0.02	0.05		0.17	0.08	2	1.68	1.19	Curb inlet	0.13	0.04

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
B-20	B-10	285.3	0.15	3.17	0.75	0.11	2.66	5.0	6.9	7.35	19.75		36	43.00	46%	6.08	5.95	0.8	275.01	274.00	N/A	0.35%
B-30	B-20	94.0	0.19	2.87	0.75	0.14	2.42	5.0	6.7	7.43	18.11		36	51.22	35%	7.25	6.62	0.2	275.65	275.18	N/A	0.50%
B-40	B-30	72.5	0.17	1.25	0.75	0.13	0.99	5.0	6.2	7.58	7.60		24	17.68	43%	5.63	5.41	0.2	277.03	276.65	N/A	0.52%
B-50	B-40	86.3	0.19	1.08	0.75	0.14	0.86	5.0	5.9	7.67	6.68		21	12.45	54%	5.18	5.26	0.3	277.90	277.45	N/A	0.53%
B-60	B-50	75.1	0.18	0.89	0.75	0.13	0.72	5.0	5.7	7.75	5.65		18	8.16	69%	4.62	4.98	0.3	278.53	278.15	N/A	0.51%
B-70	B-60	84.3	0.18	0.72	0.75	0.14	0.59	5.0	5.4	7.85	4.67		18	8.15	57%	4.61	4.76	0.3	279.14	278.70	N/A	0.51%
B-80	B-70	72.7	0.18	0.53	0.75	0.13	0.45	5.0	5.1	7.94	3.63		18	8.23	44%	4.66	4.51	0.3	279.69	279.31	N/A	0.52%
CO-B-80	B-80	20.5		0.36			0.32		5.0	7.97	2.57		12	2.58	100%	3.28	3.73	0.1	280.28	280.19	N/A	0.44%
RD-B-80	CO-B-80	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		8.004	2.58	100%	7.38	8.41	0.0	280.97	280.78	N/A	3.87%
CO-B-30	B-30	12.3		1.42			1.28		6.6	7.45	9.62		24	9.63	100%	3.07	3.49	0.1	277.81	277.79	N/A	0.15%
CO-B-31	CO-B-30	100.0		1.07			0.96		6.0	7.65	7.41		24	7.42	100%	2.36	2.69	0.6	278.07	277.98	N/A	0.09%
RD-B-31	CO-B-31	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	2.57	100%	3.27	3.73	0.0	280.30	280.27	N/A	0.44%
CO-B-32	CO-B-31	100.0		0.71			0.64		5.5	7.82	5.05		18	5.06	100%	2.86	3.26	0.5	278.94	278.74	N/A	0.20%
CO-B-33	CO-B-32	100.0		0.36			0.32		5.0	7.97	2.57		12	2.57	100%	3.28	3.73	0.4	280.06	279.61	N/A	0.44%
RD-B-33	CO-B-33	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		9.996	2.58	100%	4.72	5.38	0.0	280.45	280.39	N/A	1.18%
RD-B-32	CO-B-32	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	2.58	100%	3.28	3.74	0.0	280.28	280.26	N/A	0.45%
RD-B-30	CO-B-30	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		9.996	2.58	100%	4.72	5.38	0.0	280.46	280.40	N/A	1.18%
CO-B-21	B-20	15.9		0.15			0.14		5.0	7.96	1.09		8.004	1.09	100%	3.13	3.57	0.1	280.04	279.93	N/A	0.70%
RD-B-22	CO-B-21	5.0	0.15	0.15	0.90	0.14	0.14	5.0	5.0	7.97	1.09		8.004	1.10	100%	3.14	3.57	0.0	280.58	280.55	N/A	0.70%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
B-10	#VALUE!							275.43	275.43							277.00	277.71	
B-20	36	19.75	285.27	5.95	1.43	1.43	0.55	275.98	275.43	0.004	1.008	276.99	276.44	2.10	277.11	278.18	283.10	No
B-30	36	18.11	94.00	6.62	1.23	1.36	0.68	277.20	276.98			277.56	276.88	1.96	277.61	278.65	283.13	No
B-40	24	7.60	72.54	5.41	0.92	0.98	0.46	278.02	277.57			278.40	277.94	1.45	278.48	279.20	283.14	No
B-50	21	6.68	86.35	5.26	0.91	0.95	0.43	278.61	278.29			279.24	278.81	1.47	279.37	279.65	283.13	No
B-60	18	5.65	75.15	4.98	0.92	0.92	0.39	279.46	279.25	0.005	0.385	279.84	279.46	1.47	280.01	280.20	283.13	No
B-70	18	4.67	84.33	4.76	0.82	0.83	0.35	280.06	279.93			280.30	279.95	1.29	280.43	280.81	283.13	No
B-80	18	3.63	72.66	4.51	0.70	0.73	0.32	280.47	280.37			280.70	280.38	1.11	280.79	281.19	283.14	No
CO-B-80	12	2.57	20.54	3.73	0.82	0.69	0.22	281.22	281.01	0.004	0.091	281.31	281.10	1.30	281.57	281.45	283.25	No
RD-B-80	8.004	2.57	5.00	8.41	0.55	0.65	1.10	281.91	281.07	0.039		282.62	281.52	1.69	282.66	---	283.80	No
CO-B-30	24	9.62	12.28	3.49	1.64	1.11	0.19	279.62	279.43	0.002	0.019	279.64	279.45	1.90	279.72	279.98	283.73	No
CO-B-31	24	7.41	100.00	2.69	1.64	0.97	0.11	279.76	279.66	0.001	0.091	279.85	279.74	1.80	279.87	280.24	283.77	No
RD-B-31	12	2.57	5.00	3.73	0.82	0.69	0.22	281.31	281.09	0.004	0.022	281.33	281.12	1.11	281.40	---	283.80	No
CO-B-32	18	5.05	100.00	3.26	1.23	0.87	0.17	280.14	279.97	0.002	0.197	280.34	280.17	1.49	280.43	280.61	283.76	No
CO-B-33	12	2.57	100.00	3.73	0.82	0.69	0.22	280.65	280.43	0.004	0.444	281.09	280.87	1.33	281.39	281.23	283.73	No
RD-B-33	9.996	2.57	5.00	4.72	0.68	0.71	0.35	281.53	281.18	0.012	0.059	281.59	281.24	1.25	281.70	---	283.80	No
RD-B-32	12	2.57	5.00	3.74	0.82	0.69	0.22	281.29	281.08	0.004	0.022	281.31	281.10	1.11	281.39	---	283.80	No
RD-B-30	9.996	2.57	5.00	5.38	0.68	0.71	0.45	281.53	281.08			281.59	281.14	1.25	281.71	---	283.80	No
CO-B-21	8.004	1.09	15.86	3.57	0.55	0.50	0.20	280.67	280.48	0.007	0.11	280.79	280.59	1.01	281.05	281.21	283.71	No
RD-B-22	8.004	1.09	5.00	3.57	0.55	0.50	0.20	281.29	281.09	0.007	0.035	281.33	281.13	0.82	281.40	---	283.80	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
B-80	---	On Grade	0.18	0.75	5.0	8.0	1.07	0.02	0.05		1.07	0.16	2	5.12	0.39	Curb inlet	0.42	0.65
B-70	---	On Grade	0.18	0.75	5.0	8.0	1.10	0.02	0.05		1.10	0.16	2	5.20	0.38	Curb inlet	0.42	0.68
B-60	---	On Grade	0.18	0.75	5.0	8.0	1.06	0.02	0.05		1.06	0.16	2	5.11	0.39	Curb inlet	0.42	0.65
B-50	---	On Grade	0.19	0.75	5.0	8.0	1.13	0.02	0.05		1.13	0.17	2	5.27	0.38	Curb inlet	0.43	0.70
B-40	---	On Grade	0.17	0.75	5.0	8.0	1.05	0.02	0.05		1.05	0.16	2	5.07	0.39	Curb inlet	0.41	0.64
B-30	---	On Grade	0.19	0.75	5.0	8.0	1.14	0.02	0.05		1.14	0.17	2	5.30	0.38	Curb inlet	0.43	0.71
B-20	---	On Grade	0.15	0.75	5.0	8.0	0.90	0.02	0.05		0.90	0.15	2	4.67	0.43	Curb inlet	0.38	0.52

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
C-20	C-10	41.7	0.11	0.23	0.90	0.10	0.21	5.0	8.6	6.81	1.41		18	20.86	7%	11.81	6.73	0.1	274.14	272.50	N/A	3.94%
C-30	C-20	299.8	0.05	0.12	0.90	0.04	0.10	5.0	7.1	7.28	0.76		18	10.50	7%	5.94	3.45	1.4	284.28	281.29	N/A	1.00%
C-40	C-30	300.2	0.07	0.07	0.90	0.06	0.06	5.0	5.0	7.97	0.48		18	7.44	6%	4.21	2.37	2.1	285.95	284.45	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
C-10	#VALUE!							272.76	272.76							274.00	283.84	
C-20	18	1.41	41.71	6.73	0.26	0.45	0.70	273.47	272.76			275.11	274.41	0.97	275.11	282.79	285.50	No
C-30	18	0.76	299.84	3.45	0.27	0.32	0.19	281.75	281.56			284.74	284.55	0.46	284.74	285.95	289.43	No
C-40	18	0.48	300.16	2.37	0.26	0.26	0.09	284.76	284.70	0.005		286.30	286.21	0.35	286.30	---	290.16	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
C-40	---	On Grade	0.07	0.90	5.0	8.0	0.48	0.02	0.05		0.48	0.13	2	3.24	0.62	Curb inlet	0.26	0.22
C-30	---	On Grade	0.05	0.90	5.0	8.0	0.35	0.02	0.05		0.35	0.11	2	2.55	0.79	Curb inlet	0.21	0.13
C-20	---	On Grade	0.11	0.90	5.0	8.0	0.82	0.02	0.05		0.82	0.15	2	4.46	0.45	Curb inlet	0.36	0.46

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
C-60	C-50	10.5	0.18	1.76	0.75	0.13	1.48	5.0	5.7	7.73	11.57		27	42.82	27%	10.77	9.14	0.0	272.67	272.50	N/A	1.63%
C-70	C-60	84.2	0.18	0.36	0.75	0.13	0.27	5.0	5.4	7.85	2.16		12	2.81	77%	3.57	3.94	0.4	279.23	278.78	N/A	0.53%
C-80	C-70	74.8	0.19	0.19	0.75	0.14	0.14	5.0	5.0	7.97	1.11		9.996	1.74	64%	3.19	3.38	0.4	279.80	279.39	N/A	0.54%
C-61	C-60	72.6	0.16	0.51	0.75	0.12	0.44	5.0	5.0	7.96	3.52		15	4.95	71%	4.04	4.38	0.3	279.08	278.71	N/A	0.50%
CO-C-61	C-61	6.4		0.36			0.32		5.0	7.97	2.57		15	4.95	52%	4.04	4.07	0.0	279.28	279.25	N/A	0.50%
RD-C-61	CO-C-61	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		8.004	4.70	55%	13.47	13.76	0.0	280.39	279.74	N/A	12.87%
CO-C-60	C-60	6.1		0.71			0.64		5.5	7.80	5.04		18	4.97	101%	2.81	3.20	0.0	279.08	279.07	N/A	0.19%
CO-C-60A	CO-C-60	25.8		0.71			0.64		5.4	7.83	5.06		18	8.05	63%	4.56	4.81	0.1	279.41	279.28	N/A	0.50%
CO-C-60B	CO-C-60A	100.0		0.36			0.32		5.0	7.96	2.57		15	4.95	52%	4.04	4.07	0.4	279.91	279.41	N/A	0.50%
RD-C-60B	CO-C-60B	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	2.73	94%	3.48	3.95	0.0	280.18	280.15	N/A	0.50%
RD-C-60A	CO-C-60A	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	2.85	90%	3.62	4.10	0.0	280.18	280.15	N/A	0.54%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
C-50	#VALUE!							273.30	273.30							274.75	283.25	
C-60	27	11.57	10.48	9.14	0.80	1.18	1.30	274.60	273.30			274.77	273.47	2.10	274.77	279.78	283.13	No
C-70	12	2.16	84.21	3.94	0.66	0.63	0.24	279.68	279.44	0.005	0.444	280.13	279.89	1.11	280.34	280.23	283.13	No
C-80	9.996	1.11	74.84	2.04	0.49	0.47	0.07	280.36	280.30	0.002	0.165	280.53	280.46	0.78	280.58	---	283.13	No
C-61	15	3.52	72.55	4.38	0.78	0.76	0.30	279.79	279.49	0.005	0.363	280.15	279.85	1.43	280.51	280.50	283.14	No
CO-C-61	15	2.57	6.41	2.10	0.64	0.64	0.07	280.54	280.47	0.001	0.009	280.55	280.48	1.29	280.57	280.41	280.73	No
RD-C-61	8.004	2.57	5.04	13.76	0.35	0.65	2.94	280.91	280.06	0.039		283.68	280.74	3.30	283.68	---	283.80	No
CO-C-60	18	5.04	6.12	3.20	1.25	0.86	0.16	280.48	280.32	0.002	0.012	280.49	280.33	1.54	280.63	280.78	283.70	No
CO-C-60A	18	5.06	25.81	4.81	0.86	0.87	0.36	280.68	280.54			280.68	280.32	1.41	280.81	281.15	283.77	No
CO-C-60B	15	2.57	100.00	2.10	0.64	0.64	0.07	280.84	280.77	0.001	0.135	280.98	280.91	1.13	281.03	281.15	283.78	No
RD-C-60B	12	2.57	5.00	3.95	0.77	0.69	0.24	281.11	280.92	0.005	0.025	281.19	280.95	1.11	281.28	---	283.80	No
RD-C-60A	12	2.57	5.00	4.10	0.75	0.69	0.26	281.15	280.89	0.005	0.027	281.18	280.92	1.11	281.28	---	283.80	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
C-61	---	On Grade	0.16	0.75	5.0	8.0	0.95	0.02	0.05		0.95	0.16	2	4.81	0.42	Curb inlet	0.39	0.56
C-60	---	On Grade	0.18	0.75	5.0	8.0	1.06	0.02	0.05		1.06	0.16	2	5.10	0.39	Curb inlet	0.42	0.65
C-70	---	On Grade	0.18	0.75	5.0	8.0	1.08	0.02	0.05		1.08	0.16	2	5.14	0.39	Curb inlet	0.42	0.66
C-80	---	On Grade	0.18	0.75	5.0	8.0	1.11	0.02	0.05		1.11	0.17	2	5.23	0.38	Curb inlet	0.43	0.69

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
D-70	D-60	10.2	0.13	1.31	0.90	0.11	1.15	5.0	5.7	3.92	4.54		24	42.57	11%	13.55	8.82	0.0	272.81	272.50	N/A	3.01%
D-71	D-70	75.0	0.14	0.14	0.75	0.10	0.10	5.0	5.0	4.04	0.42		8.004	0.93	45%	2.65	2.59	0.5	279.92	279.55	N/A	0.50%
D-80	D-70	49.6	0.08	0.34	0.75	0.06	0.29	5.0	5.5	3.96	1.17		12	2.73	43%	3.48	3.34	0.2	278.81	278.56	N/A	0.50%
D-90	D-80	75.8	0.07	0.26	0.90	0.07	0.23	5.0	5.1	4.03	0.95		12	2.73	35%	3.48	3.16	0.4	279.35	278.98	N/A	0.50%
CO-D-90	D-90	20.6		0.19			0.17		5.0	4.04	0.69		8.004	1.93	35%	5.54	5.06	0.1	280.31	279.86	N/A	2.18%
RD-D-90	CO-D-90	5.0	0.19	0.19	0.90	0.17	0.17	5.0	5.0	4.04	0.69		8.004	2.82	24%	8.08	6.66	0.0	280.59	280.36	N/A	4.63%
CO-D-70	D-70	6.2		0.71			0.64		5.3	3.99	2.58		15	15.94	16%	12.99	9.54	0.0	279.50	279.18	N/A	5.18%
CO-D-70A	CO-D-70	40.2		0.36			0.32		5.0	4.04	1.30		15	4.95	26%	4.04	3.40	0.2	279.93	279.72	N/A	0.50%
RD-D-70A	CO-D-70A	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	4.04	1.31		12	2.73	48%	3.48	3.44	0.0	280.18	280.15	N/A	0.50%
CO-D-70B	CO-D-70	59.8		0.36			0.32		5.0	4.04	1.30		15	4.95	26%	4.04	3.40	0.3	279.87	279.58	N/A	0.50%
RD-D-70B	CO-D-70B	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	4.04	1.31		12	3.92	33%	4.99	4.48	0.0	280.18	280.12	N/A	1.03%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
D-60	#VALUE!							272.94	272.94							274.50	283.25	
D-70	24	4.54	10.18	8.82	0.44	0.75	1.21	274.15	272.94			274.46	273.25	1.65	274.46	280.21	283.13	No
D-71	8.004	0.42	75.01	2.59	0.32	0.30	0.10	279.96	279.86	0.005	0.375	280.34	280.23	0.53	280.45	---	283.13	No
D-80	12	1.17	49.60	3.34	0.46	0.46	0.17	279.19	279.01	0.005	0.248	279.44	279.26	0.69	279.50	279.98	283.12	No
D-90	12	0.95	75.82	3.16	0.41	0.41	0.16	279.53	279.45			279.92	279.76	0.58	279.93	280.52	283.12	No
CO-D-90	8.004	0.69	20.56	5.06	0.27	0.39	0.40	280.53	280.13			280.98	280.58	0.67	280.98	281.03	283.57	No
RD-D-90	8.004	0.69	5.01	6.66	0.22	0.39	0.69	281.00	280.94			281.51	280.82	0.91	281.51	---	283.80	No
CO-D-70	15	2.58	6.21	9.54	0.34	0.64	1.41	280.93	279.52			281.26	279.84	1.75	281.26	280.97	283.70	No
CO-D-70A	15	1.30	40.19	1.06	1.25	n/a	0.02	281.26	281.25		0.014	281.28	281.26	1.37	281.29	281.15	283.80	No
RD-D-70A	12	1.31	5.00	1.66	1.00	n/a	0.04	281.31	281.27	0.001	0.006	281.31	281.27	1.15	281.32	---	283.80	No
CO-D-70B	15	1.30	59.82	1.06	1.25	n/a	0.02	281.26	281.25		0.021	281.28	281.27	1.42	281.30	281.12	283.75	No
RD-D-70B	12	1.31	5.00	1.66	1.00	n/a	0.04	281.32	281.27	0.001	0.006	281.32	281.28	1.15	281.33	---	283.80	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
D-71	---	On Grade	0.14	0.75	5.0	4.0	0.42	0.02	0.05		0.42	0.12	2	2.94	0.68	Curb inlet	0.24	0.18
D-80	---	On Grade	0.08	0.75	5.0	4.0	0.24	0.02	0.05		0.24	0.10	2	1.93	1.04	Curb inlet	0.17	0.07
D-90	---	On Grade	0.07	0.90	5.0	4.0	0.27	0.02	0.05		0.27	0.10	2	2.03	0.99	Curb inlet	0.18	0.09
D-70	---	On Grade	0.13	0.90	5.0	4.0	0.46	0.02	0.05		0.46	0.12	2	3.13	0.64	Curb inlet	0.26	0.20

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
D-110	D-100	40.9	0.22	0.55	0.60	0.13	0.40	5.0	6.0	7.65	3.05		15	12.03	25%	9.80	8.18	0.1	273.71	272.50	N/A	2.95%
A-70	D-110	81.3	0.10	0.33	0.60	0.06	0.27	5.0	5.6	7.77	2.08		12	2.73	76%	3.48	3.83	0.4	274.53	274.13	N/A	0.50%
D-120	A-70	137.0	0.23	0.23	0.90	0.20	0.20	5.0	5.0	7.97	1.63		12	2.73	60%	3.48	3.63	0.6	275.22	274.53	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
D-100	#VALUE!							272.93	272.93							273.75	283.70	
D-110	15	3.05	40.93	8.18	0.43	0.70	1.04	273.97	272.93			275.18	274.14	1.47	275.18	275.13	279.55	No
A-70	12	2.08	81.28	2.65	0.65	0.62	0.11	275.22	275.11	0.003	0.236	275.46	275.35	0.99	275.52	275.53	278.41	No
D-120	12	1.63	137.02	3.63	0.56	0.54	0.21	275.55	275.48	0.005	0.685	276.23	276.03	1.12	276.34	---	277.91	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
D-110	---	On Grade	0.22	0.60	5.0	8.0	1.05	0.02	0.05		1.05	0.16	2	5.06	0.40	Curb inlet	0.41	0.63
D-120	---	On Grade	0.23	0.90	5.0	8.0	1.63	0.02	0.05		1.63	0.19	2	6.29	0.32	Curb inlet	0.52	1.11
A-70	---	On Grade	0.10	0.60	5.0	8.0	0.50	0.02	0.05		0.50	0.13	2	3.33	0.60	Curb inlet	0.27	0.23

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
E-20	E-10	160.8		0.60			0.54		5.3	7.86	4.31		18	8.07	53%	4.57	4.64	0.6	273.50	272.69	N/A	0.50%
E-30	E-20	116.2	0.25	0.25	0.90	0.23	0.23	5.0	5.0	7.97	1.82		12	4.70	39%	5.98	5.59	0.3	275.72	274.00	N/A	1.48%
E-21	E-20	58.8	0.35	0.35	0.90	0.32	0.32	5.0	5.0	7.97	2.55		12	4.65	55%	5.92	6.05	0.2	274.85	274.00	N/A	1.45%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
E-10	#VALUE!							273.47	273.47							274.19	279.15	
E-20	18	4.31	160.79	4.64	0.78	0.80	0.34	273.81	273.47			274.62	274.28	1.43	274.93	275.00	277.83	No
E-30	12	1.82	116.23	5.59	0.43	0.57	0.49	274.97	274.88			276.64	276.15	0.92	276.64	---	278.35	No
E-21	12	2.55	58.77	6.05	0.53	0.69	0.57	275.00	274.83			275.95	275.38	1.11	275.96	---	277.47	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
E-30	---	On Grade	0.25	0.90	5.0	8.0	1.82	0.02	0.05		1.82	0.19	2	6.61	0.30	Curb inlet	0.55	1.26
E-21	---	On Grade	0.35	0.90	5.0	8.0	2.55	0.02	0.05		2.55	0.21	2	7.70	0.26	Curb inlet	0.66	1.89

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
CO-E-11	CO-E-10	56.8		1.78			1.60		6.5	7.50	12.10		27	12.11	100%	3.05	3.47	0.3	269.57	269.50	0.17	0.13%
CO-E-15	CO-E-11	100.0		1.07			0.96		6.0	7.65	7.41		21	7.42	100%	3.08	3.51	0.5	274.35	274.16	0.17	0.19%
CO-E-16	CO-E-15	100.0		0.71			0.64		5.5	7.82	5.05		18	5.05	100%	2.86	3.26	0.5	274.97	274.77	0.17	0.20%
CO-E-17	CO-E-16	100.0		0.36			0.32		5.0	7.96	2.57		12	2.57	100%	3.28	3.73	0.4	276.08	275.64	0.17	0.44%
RD-E-17	CO-E-17	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	2.58	100%	3.28	3.74	0.0	276.27	276.25	---	0.45%
RD-E-16	CO-E-16	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	2.58	100%	3.28	3.74	0.0	276.27	276.25	---	0.45%
RD-E-15	CO-E-15	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	2.58	100%	3.28	3.74	0.0	276.27	276.25	---	0.45%
CO-E-12	CO-E-11	100.0		0.71			0.64		5.5	7.82	5.05		18	5.05	100%	2.86	3.26	0.5	274.80	274.60	0.17	0.20%
CO-E-13	CO-E-12	100.0		0.36			0.32		5.0	7.96	2.57		12	2.57	100%	3.28	3.73	0.4	275.91	275.47	0.17	0.44%
CO-E-14	CO-E-13	105.0											3	0.11		2.27			278.25	276.83	0.17	1.35%
RD-E-14	CO-E-14	5.0											3	0.34		6.95			279.05	278.42	---	12.66%
RD-E-13	CO-E-13	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	2.58	100%	3.28	3.74	0.0	276.27	276.25	---	0.45%
RD-E-12	CO-E-12	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	2.58	100%	3.28	3.74	0.0	276.27	276.25	---	0.45%
RD-E-11	CO-E-11	5.0											3	0.10		2.00			277.05	277.00	---	1.05%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
CO-E-10	#VALUE!							271.34	271.34							271.75	279.22	
CO-E-11	27	12.10	56.83	3.47	1.84	1.21	0.19	271.53	271.34	0.001	0.074	271.61	271.42	2.12	271.69	275.91	279.75	No
CO-E-15	21	7.41	100.00	3.51	1.43	1.01	0.19	275.79	275.60	0.002	0.186	275.98	275.78	1.67	276.02	276.27	279.75	No
CO-E-16	18	5.05	100.00	3.26	1.23	0.87	0.17	276.08	275.92	0.002	0.197	276.36	276.20	1.49	276.45	276.64	279.75	No
CO-E-17	12	2.57	100.00	3.73	0.82	0.69	0.22	276.67	276.46	0.004	0.444	277.12	276.90	1.33	277.41	277.25	279.75	No
RD-E-17	12	2.57	5.00	3.28	1.00	n/a	0.17	277.48	277.31	0.004	0.022	277.50	277.34	1.26	277.54	---	279.80	No
RD-E-16	12	2.57	5.00	3.74	0.82	0.69	0.22	277.29	277.07	0.004	0.022	277.31	277.09	1.11	277.38	---	279.80	No
RD-E-15	12	2.57	5.00	3.74	0.82	0.69	0.22	277.29	277.07	0.004	0.022	277.31	277.09	1.11	277.38	---	279.80	No
CO-E-12	18	5.05	100.00	3.26	1.23	0.87	0.17	275.99	275.83	0.002	0.197	276.19	276.03	1.43	276.22	277.25	279.75	No
CO-E-13	12	2.57	100.00	3.73	0.82	0.69	0.22	276.50	276.29	0.004	0.444	276.95	276.73	1.33	277.24	277.25	279.75	No
RD-E-13	12	2.57	5.00	3.74	0.82	0.69	0.22	277.31	277.14	0.004	0.022	277.33	277.12	1.11	277.38	---	279.80	No
RD-E-12	12	2.57	5.00	3.74	0.82	0.69	0.22	277.29	277.07	0.004	0.022	277.31	277.09	1.11	277.38	---	279.80	No

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
F-20	F-10	86.6	1.25	1.25	0.90	1.12	1.12	5.0	5.0	7.97	9.03		24	9.03	100%	2.88	3.28	0.4	272.71	272.59	N/A	0.14%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
F-10	#VALUE!							274.23	274.23							274.59	278.22	
F-20	24	9.03	86.60	3.28	1.64	1.07	0.17	274.40	274.23	0.001	0.117	274.52	274.35	1.87	274.58	---	276.12	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
F-20	---	On Grade	1.25	0.90	5.0	8.0	9.03	0.02	0.05		9.03	0.32	2	12.98	0.15	Curb inlet	1.27	7.76

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
G-20	G-10	45.8	0.21	1.29	0.90	0.18	1.00	5.0	5.6	7.78	7.82		21	34.33	23%	14.27	11.55	0.1	275.83	274.00	N/A	3.99%
G-30	G-20	98.7	0.29	1.08	0.75	0.22	0.81	5.0	5.3	7.88	6.46		21	12.15	53%	5.05	5.13	0.3	276.32	275.83	N/A	0.50%
G-40	G-30	70.1	0.39	0.79	0.75	0.30	0.59	5.0	5.0	7.96	4.76		18	8.05	59%	4.56	4.74	0.2	277.09	276.74	N/A	0.50%
G-50	G-40	12.3	0.40	0.40	0.75	0.30	0.30	5.0	5.0	7.97	2.39		8.004	2.45	98%	7.01	7.98	0.0	278.52	278.10	N/A	3.49%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
G-10	#VALUE!							274.57	274.57							275.75	276.42	
G-20	21	7.82	45.81	11.55	0.57	1.04	2.08	276.64	274.57			278.47	276.40	2.64	278.47	277.58	282.49	No
G-30	21	6.46	98.68	2.69	1.75	n/a	0.11	278.52	278.40	0.001	0.14	278.66	278.54	2.37	278.69	278.24	281.57	No
G-40	18	4.76	70.07	2.69	1.50	n/a	0.11	278.74	278.63	0.002	0.123	278.86	278.75	1.81	278.90	278.76	281.36	No
G-50	8.004	2.39	12.32	7.98	0.53	0.65	0.99	279.19	278.46	0.033		280.05	279.06	1.53	280.05	---	281.79	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
G-30	---	On Grade	0.29	0.75	5.0	8.0	1.77	0.02	0.05		1.77	0.19	2	6.53	0.31	Curb inlet	0.55	1.22
G-40	---	On Grade	0.39	0.75	5.0	8.0	2.37	0.02	0.05		2.37	0.21	2	7.45	0.27	Curb inlet	0.64	1.73
G-50	---	On Grade	0.40	0.75	5.0	8.0	2.39	0.02	0.05		2.39	0.21	2	7.48	0.27	Curb inlet	0.64	1.75
G-20	---	On Grade	0.20	0.90	5.0	8.0	1.48	0.02	0.05		1.48	0.18	2	6.01	0.33	Curb inlet	0.50	0.98

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total	Coeff "C"	Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
H-40	H-30	169.3	0.14	0.47	0.60	0.09	0.37	5.0	5.5	7.80	2.93		15	6.73	44%	5.48	5.29	0.5	275.56	274.00	N/A	0.92%
H-41	H-40	78.2	0.09	0.15	0.90	0.08	0.12	5.0	5.1	7.94	0.99		8.004	0.93	107%	2.65	2.98	0.4	277.12	276.73	N/A	0.50%
H-42	H-41	23.5	0.06	0.06	0.75	0.05	0.05	5.0	5.0	7.97	0.38		3.996	0.28	138%	3.15	4.35	0.1	278.04	277.63	N/A	1.77%
H-50	H-40	48.8	0.04	0.18	0.90	0.04	0.16	5.0	5.3	7.88	1.30		9.996	1.68	78%	3.08	3.40	0.2	276.39	276.15	N/A	0.50%
H-60	H-50	35.2	0.02	0.14	0.90	0.02	0.13	5.0	5.1	7.93	1.01		8.004	1.19	84%	3.41	3.82	0.2	277.03	276.74	N/A	0.83%
H-70	H-60	21.9	0.12	0.12	0.90	0.11	0.11	5.0	5.0	7.97	0.85		8.004	0.99	86%	2.82	3.17	0.1	277.32	277.20	N/A	0.57%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
H-30	#VALUE!							274.58	274.58							275.25	275.88	
H-40	15	2.93	169.33	5.29	0.58	0.69	0.44	275.01	274.58			276.57	276.14	1.06	276.62	276.98	280.36	No
H-41	8.004	0.99	78.22	2.98	0.60	0.47	0.14	277.47	277.34	0.005	0.391	277.87	277.73	0.87	277.99	277.96	280.58	No
H-42	3.996	0.38	23.48	4.35	0.33	n/a	0.30	278.11	277.82	0.034	0.797	278.91	278.61	1.28	279.33	---	280.99	No
H-50	9.996	1.30	48.79	3.40	0.55	0.51	0.18	276.88	276.70	0.005	0.244	277.12	276.95	0.84	277.24	277.40	279.95	No
H-60	8.004	1.01	35.20	3.82	0.47	0.48	0.23	277.32	277.12			277.73	277.50	0.88	277.91	277.87	280.41	No
H-70	8.004	0.85	21.85	2.42	0.48	0.44	0.09	277.94	277.85	0.004	0.091	278.03	277.94	0.80	278.12	---	280.54	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
H-42	---	On Grade	0.06	0.75	5.0	8.0	0.38	0.02	0.05		0.38	0.12	2	2.73	0.73	Curb inlet	0.23	0.15
H-41	---	On Grade	0.08	0.90	5.0	8.0	0.61	0.02	0.05		0.61	0.14	2	3.77	0.53	Curb inlet	0.30	0.31
H-40	---	On Grade	0.14	0.60	5.0	8.0	0.68	0.02	0.05		0.68	0.14	2	4.01	0.50	Curb inlet	0.32	0.36
H-70	---	On Grade	0.12	0.90	5.0	8.0	0.85	0.02	0.05		0.85	0.15	2	4.53	0.44	Curb inlet	0.37	0.48
H-60	---	On Grade	0.02	0.90	5.0	8.0	0.17	0.02	0.05		0.17	0.08	2	1.68	1.19	Curb inlet	0.13	0.04
H-50	---	On Grade	0.04	0.90	5.0	8.0	0.31	0.02	0.05		0.31	0.11	2	2.31	0.87	Curb inlet	0.20	0.11

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
J-20	J-10	42.1		4.02			3.49		6.8	7.38	25.98		42	168.14	15%	17.48	12.67	0.1	270.44	269.44	N/A	2.38%
J-21	J-20	45.3	1.60	1.60	0.90	1.44	1.44	5.0	5.0	7.97	11.59		27	23.75	49%	5.97	5.93	0.1	272.30	272.07	N/A	0.50%
J-30	J-20	34.9		2.42			2.05		6.7	7.41	15.30		30	34.70	44%	7.07	6.84	0.1	271.53	271.32	N/A	0.61%
J-40	J-30	65.0		1.70			1.41		6.5	7.47	10.60		27	23.75	45%	5.97	5.80	0.2	272.11	271.78	N/A	0.50%
J-50	J-40	147.1	0.84	1.70	0.75	0.63	1.41	5.0	6.1	7.61	10.79		27	23.75	45%	5.97	5.83	0.4	273.01	272.28	N/A	0.50%
CO-J-50	J-50	123.1		0.86			0.78		5.7	7.75	6.07		15	4.95	122%	4.04	4.94	0.4	274.80	274.18	N/A	0.50%
CO-J-50A	CO-J-50	100.1		0.51			0.46		5.5	7.81	3.59		9.996	4.13	87%	7.57	8.52	0.2	277.82	274.80	N/A	3.02%
RD-J-50A	CO-J-50A	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		9.996	3.13	82%	5.73	6.40	0.0	281.50	281.41	N/A	1.73%
CO-J-50B	CO-J-50A	90.0		0.15			0.14		5.0	7.97	1.09		8.004	0.93	118%	2.65	3.13	0.5	280.80	280.35	N/A	0.50%
RD-J-50B	CO-J-50B	5.0	0.15	0.15	0.90	0.14	0.14	5.0	5.0	7.97	1.09		8.004	2.12	52%	6.07	6.11	0.0	281.10	280.97	N/A	2.61%
RD-J-50	CO-J-50	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	3.86	67%	4.92	5.26	0.0	277.18	277.13	N/A	1.00%
CO-J-30	J-30	127.0		0.71			0.64		5.4	7.83	5.06		15	6.78	75%	5.52	6.05	0.4	276.63	275.44	N/A	0.94%
CO-J-30A	CO-J-30	100.0		0.36			0.32		5.0	7.97	2.57		12	2.73	94%	3.48	3.95	0.4	277.13	276.63	N/A	0.50%
RD-J-30A	CO-J-30A	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	3.86	67%	4.92	5.26	0.0	277.18	277.13	N/A	1.00%
RD-J-30	CO-J-30	5.0	0.36	0.36	0.90	0.32	0.32	5.0	5.0	7.97	2.57		12	3.86	67%	4.92	5.26	0.0	277.18	277.13	N/A	1.00%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
J-10	#VALUE!							270.37	270.37							272.94	277.97	
J-20	42	25.98	42.12	12.67	0.93	1.57	2.50	272.86	270.37			273.86	271.37	3.43	273.86	274.32	277.53	No
J-21	27	11.59	45.28	5.93	1.11	1.18	0.55	273.94	273.76			273.96	273.41	1.85	274.15	---	276.12	No
J-30	30	15.30	34.90	3.12	1.16	1.32	0.15	273.93	273.77	0.001	0.041	273.97	273.82	2.48	274.02	274.03	278.31	No
J-40	27	10.60	65.00	5.80	1.05	1.13	0.52	274.06	273.95			274.06	273.54	1.95	274.06	274.53	278.95	No
J-50	27	10.79	147.08	5.83	1.07	1.14	0.53	274.12	273.96			274.61	274.08	1.86	274.87	275.43	277.52	No
CO-J-50	15	6.07	123.06	4.94	1.25	n/a	0.38	275.81	275.43	0.005	0.615	276.43	276.05	1.86	276.65	275.63	279.75	No
CO-J-50A	9.996	3.59	100.08	8.52	0.60	0.79	1.13	276.92	276.25	0.023		279.55	278.42	1.73	279.55	282.25	283.62	No
RD-J-50A	9.996	2.57	5.00	6.40	0.58	0.71	0.64	282.63	281.99			282.71	282.08	1.25	282.75	---	284.29	No
CO-J-50B	8.004	1.09	89.99	3.13	0.67	n/a	0.15	281.17	281.02	0.005	0.45	281.62	281.47	0.95	281.75	281.64	283.01	No
RD-J-50B	8.004	1.09	5.00	3.13	0.34	0.50	0.15	281.81	281.66	0.007	0.035	281.84	281.69	0.82	281.92	---	283.80	No
RD-J-50	12	2.57	5.00	5.26	0.60	0.69	0.43	278.15	277.72			278.20	277.77	1.11	278.28	---	279.80	No
CO-J-30	15	5.06	126.97	6.05	0.81	0.91	0.57	276.81	276.24			278.00	277.43	1.72	278.34	277.63	279.75	No
CO-J-30A	12	2.57	100.00	3.28	1.00	n/a	0.17	278.41	278.24	0.004	0.444	278.85	278.69	1.87	278.99	278.13	279.75	No
RD-J-30A	12	2.57	5.00	3.28	1.00	n/a	0.17	279.06	278.89	0.004	0.022	279.08	278.91	1.94	279.11	---	279.80	No
RD-J-30	12	2.57	5.00	3.28	1.00	n/a	0.17	278.41	278.24	0.004	0.022	278.43	278.26	1.29	278.46	---	279.80	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
J-50	---	On Grade	0.84	0.75	5.0	8.0	5.06	0.02	0.05		5.06	0.27	2	10.28	0.20	Curb inlet	0.94	4.12
J-21	---	On Grade	1.60	0.90	5.0	8.0	11.59	0.02	0.05		11.59	0.35	2	14.33	0.14	Curb inlet	1.44	10.15

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
K-70	K-60	54.6	0.20	0.39	0.75	0.15	0.32	5.0	5.8	7.72	2.48		18	15.76	16%	8.92	6.50	0.1	278.04	277.00	N/A	1.91%
K-80	K-70	55.5	0.13	0.19	0.90	0.12	0.17	5.0	5.5	7.81	1.33		18	8.05	17%	4.56	3.37	0.3	278.49	278.21	N/A	0.50%
K-130	K-80	67.5	0.06	0.06	0.90	0.05	0.05	5.0	5.0	7.97	0.44		18	7.44	6%	4.21	2.30	0.5	279.00	278.66	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
K-60	#VALUE!							277.40	277.40							278.50	284.82	
K-70	18	2.48	54.56	6.50	0.40	0.60	0.66	278.06	277.40			279.10	278.45	1.06	279.10	279.71	284.09	No
K-80	18	1.33	55.55	3.37	0.41	0.43	0.18	279.11	279.09			279.11	278.94	0.62	279.11	280.16	284.14	No
K-130	18	0.44	67.54	2.30	0.25	0.24	0.08	279.12	279.10	0.005	0.338	279.46	279.37	0.51	279.51	---	283.21	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
K-130	---	On Grade	0.06	0.90	5.0	8.0	0.44	0.02	0.05		0.44	0.12	2	3.01	0.66	Curb inlet	0.25	0.19
K-80	---	On Grade	0.13	0.90	5.0	8.0	0.93	0.02	0.05		0.93	0.16	2	4.75	0.42	Curb inlet	0.39	0.54
K-70	---	On Grade	0.20	0.75	5.0	8.0	1.20	0.02	0.05		1.20	0.17	2	5.42	0.37	Curb inlet	0.44	0.75

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
K-110	K-90	23.9	0.18	0.37	0.75	0.13	0.28	5.0	5.1	7.95	2.20		18	11.24	20%	6.36	4.93	0.1	277.23	277.00	N/A	0.97%
K-111	K-110	14.8	0.19	0.19	0.75	0.14	0.14	5.0	5.0	7.97	1.15		18	8.05	14%	4.56	3.23	0.1	279.88	279.80	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
K-90	#VALUE!							277.45	277.45							278.50	284.84	
K-110	18	2.20	23.87	4.93	0.45	0.56	0.38	277.83	277.45			278.06	277.68	0.83	278.06	281.30	284.10	No
K-111	18	1.15	14.76	3.23	0.38	0.40	0.16	280.35	280.19			280.42	280.26	0.55	280.42	---	284.10	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
K-111	---	On Grade	0.19	0.75	5.0	8.0	1.15	0.02	0.05		1.15	0.17	2	5.31	0.38	Curb inlet	0.43	0.72
K-110	---	On Grade	0.18	0.75	5.0	8.0	1.06	0.02	0.05		1.06	0.16	2	5.09	0.39	Curb inlet	0.41	0.64

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
M-20	M-10	63.7	0.18	1.35	0.75	0.13	1.19	5.0	6.4	7.52	9.02		24	23.35	39%	7.43	6.95	0.2	277.58	277.00	N/A	0.91%
M-30	M-20	14.9	0.15	0.99	0.90	0.13	0.89	5.0	6.3	7.53	6.78		24	17.35	39%	5.52	5.18	0.0	277.82	277.75	N/A	0.50%
M-40	M-30	145.2	0.13	0.27	0.90	0.12	0.25	5.0	5.7	7.74	1.92		12	2.73	70%	3.48	3.76	0.6	279.72	278.99	N/A	0.50%
M-50	M-40	125.6	0.14	0.14	0.90	0.13	0.13	5.0	5.0	7.97	1.04		8.004	0.93	112%	2.65	2.98	0.7	280.85	280.22	N/A	0.50%
CO-M-30	M-30	63.7		0.57			0.52		6.0	7.64	3.98		12	6.42	62%	8.17	8.60	0.1	283.13	281.38	N/A	2.76%
CO-M-31	CO-M-30	100.0		0.34			0.31		5.6	7.78	2.43		12	2.73	89%	3.48	3.93	0.4	283.73	283.23	N/A	0.50%
CO-M-32	CO-M-31	100.1		0.12			0.10		5.0	7.96	0.83		8.004	0.93	90%	2.65	3.00	0.6	284.23	283.73	N/A	0.50%
RD-M-32	CO-M-32	5.0	0.12	0.12	0.90	0.10	0.10	5.0	5.0	7.97	0.83		6	0.78	107%	3.95	4.40	0.0	284.48	284.40	N/A	1.62%
RD-M-31	CO-M-31	5.1	0.23	0.23	0.90	0.21	0.21	5.0	5.0	7.97	1.66		8.004	3.03	55%	8.69	8.88	0.0	284.79	284.52	N/A	5.36%
RD-M-30	CO-M-30	5.2	0.23	0.23	0.90	0.21	0.21	5.0	5.0	7.97	1.66		8.004	3.03	55%	8.69	8.88	0.0	284.79	284.51	N/A	5.36%
M-21	M-20	32.0	0.06	0.18	0.90	0.06	0.16	5.0	5.8	7.72	1.28		9.996	1.72	75%	3.15	3.45	0.2	280.20	280.03	N/A	0.52%
M-22	M-21	137.0	0.12	0.12	0.90	0.11	0.11	5.0	5.0	7.97	0.86		8.004	0.93	93%	2.65	3.01	0.8	281.05	280.36	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
M-10	#VALUE!							277.86	277.86							279.00	284.92	
M-20	24	9.02	63.74	6.95	0.86	1.07	0.75	278.61	277.86			279.19	278.44	1.61	279.19	279.75	284.10	No
M-30	24	6.78	14.86	5.18	0.87	0.92	0.42	279.24	279.12			279.24	278.82	1.42	279.24	279.99	284.10	No
M-40	12	1.92	145.21	3.76	0.62	0.59	0.22	279.83	279.61	0.005	0.726	280.56	280.34	1.08	280.80	280.89	284.12	No
M-50	8.004	1.04	125.64	2.98	0.67	n/a	0.14	281.03	280.89	0.005	0.628	281.65	281.52	0.89	281.74	---	283.06	No
CO-M-30	12	3.98	63.66	8.60	0.57	0.85	1.15	283.10	281.95			284.85	283.70	1.72	284.85	285.18	286.72	No
CO-M-31	12	2.43	100.00	3.10	1.00	n/a	0.15	284.91	284.76	0.004	0.397	285.31	285.16	1.68	285.41	284.40	286.73	No
CO-M-32	8.004	0.83	100.10	2.38	0.67	n/a	0.09	285.44	285.36	0.004	0.402	285.85	285.76	1.69	285.92	284.90	286.44	No
RD-M-32	6	0.83	5.00	4.23	0.50	n/a	0.28	286.03	285.75	0.019	0.093	286.12	285.85	1.70	286.18	---	287.00	No
RD-M-31	8.004	1.66	5.11	8.88	0.35	0.60	1.23	285.55	285.20	0.016		286.37	285.14	1.58	286.37	---	287.00	No
RD-M-30	8.004	1.66	5.22	8.88	0.35	0.60	1.23	286.09	284.86			286.37	285.14	1.58	286.37	---	287.00	No
M-21	9.996	1.28	32.03	3.45	0.54	0.51	0.19	280.75	280.57	0.005	0.167	280.92	280.73	1.02	281.21	281.03	284.77	No
M-22	8.004	0.86	137.05	2.47	0.67	n/a	0.10	281.25	281.16	0.004	0.596	281.85	281.75	0.86	281.91	---	283.26	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
M-50	---	On Grade	0.14	0.90	5.0	8.0	1.04	0.02	0.05		1.04	0.16	2	5.05	0.40	Curb inlet	0.41	0.63
M-40	---	On Grade	0.13	0.90	5.0	8.0	0.93	0.02	0.05		0.93	0.16	2	4.77	0.42	Curb inlet	0.39	0.55
M-30	---	On Grade	0.15	0.90	5.0	8.0	1.05	0.02	0.05		1.05	0.16	2	5.08	0.39	Curb inlet	0.41	0.64
M-20	---	On Grade	0.18	0.75	5.0	8.0	1.07	0.02	0.05		1.07	0.16	2	5.12	0.39	Curb inlet	0.42	0.65
M-22	---	On Grade	0.12	0.90	5.0	8.0	0.86	0.02	0.05		0.86	0.15	2	4.58	0.44	Curb inlet	0.37	0.49
M-21	---	On Grade	0.06	0.90	5.0	8.0	0.46	0.02	0.05		0.46	0.12	2	3.13	0.64	Curb inlet	0.26	0.20

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
CO-M-33	M-33	12.5		0.57			0.52		6.0	7.65	3.98		15	10.34	39%	8.43	7.87	0.0	277.27	277.00	N/A	2.18%
CO-M-34	CO-M-33	100.0		0.34			0.31		5.6	7.78	2.43		12	2.73	89%	3.48	3.93	0.4	283.99	283.49	N/A	0.50%
CO-M-35	CO-M-34	100.0		0.11			0.10		5.0	7.96	0.83		8.004	0.93	89%	2.65	3.00	0.6	284.49	283.99	N/A	0.50%
RD-M-35	CO-M-35	5.6	0.11	0.11	0.90	0.10	0.10	5.0	5.0	7.97	0.83		6	0.92	90%	4.67	5.28	0.0	284.79	284.66	N/A	2.27%
RD-M-34	CO-M-34	5.4	0.23	0.23	0.90	0.21	0.21	5.0	5.0	7.97	1.66		8.004	3.03	55%	8.69	8.88	0.0	284.79	284.50	N/A	5.36%
RD-M-33	CO-M-33	5.4	0.23	0.23	0.90	0.21	0.21	5.0	5.0	7.97	1.66		8.004	1.83	91%	5.23	5.92	0.0	284.61	284.50	N/A	1.94%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
M-33	#VALUE!							277.54	277.54							278.25	285.81	
CO-M-33	15	3.98	12.54	7.87	0.54	0.81	0.96	278.50	277.54			278.78	277.81	1.50	278.78	285.17	286.71	No
CO-M-34	12	2.43	100.00	3.93	0.74	0.67	0.24	284.47	284.23	0.005	0.5	284.97	284.73	1.28	285.27	285.16	286.71	No
CO-M-35	8.004	0.83	100.00	2.37	0.67	n/a	0.09	285.30	285.22	0.004	0.398	285.70	285.61	1.28	285.77	285.16	286.70	No
RD-M-35	6	0.83	5.62	4.21	0.50	n/a	0.28	285.88	285.61	0.018	0.104	285.99	285.71	1.26	286.04	---	287.00	No
RD-M-34	8.004	1.66	5.44	8.88	0.35	0.60	1.23	285.41	285.06	0.016		286.37	285.14	1.58	286.37	---	287.00	No
RD-M-33	8.004	1.66	5.37	5.92	0.50	0.60	0.55	285.55	285.00			285.65	285.11	1.09	285.69	---	287.00	No

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
O-20	O-10	23.2		0.82			0.74		5.2	7.89	5.90		21	13.81	43%	5.74	5.51	0.1	273.90	273.75	N/A	0.65%
O-40	O-20	55.0	0.26	0.26	0.90	0.24	0.24	5.0	5.0	7.97	1.91		12	2.73	70%	3.48	3.76	0.2	277.28	277.01	N/A	0.50%
O-21	O-20	15.5	0.56	0.56	0.90	0.50	0.50	5.0	5.0	7.97	4.05		18	8.05	50%	4.56	4.56	0.1	277.39	277.32	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
O-10	#VALUE!							274.55	274.55							275.50	281.11	
O-20	21	5.90	23.15	5.51	0.80	0.90	0.47	275.02	274.55			275.17	274.70	1.38	275.28	278.01	281.65	No
O-40	12	1.91	54.99	3.76	0.62	0.59	0.22	277.84	277.62	0.005	0.275	278.12	277.90	1.03	278.31	---	279.91	No
O-21	18	4.05	15.52	4.56	0.75	0.77	0.32	278.39	278.07			278.47	278.15	1.23	278.62	---	280.53	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
O-40	---	On Grade	0.26	0.90	5.0	8.0	1.91	0.02	0.05		1.91	0.20	2	6.76	0.30	Curb inlet	0.57	1.34
O-21	---	On Grade	0.56	0.90	5.0	8.0	4.05	0.02	0.05		4.05	0.25	2	9.37	0.21	Curb inlet	0.84	3.21

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
P-20	P-10	32.7	0.28	0.74	0.90	0.25	0.67	5.0	5.7	7.75	5.23		18	25.44	21%	14.40	11.32	0.0	275.38	273.75	N/A	4.99%
O-30	P-20	202.1	0.17	0.17	0.90	0.16	0.16	5.0	5.0	7.97	1.25		8.004	1.53	82%	4.39	4.89	0.7	281.77	279.00	N/A	1.37%
P-30	P-20	69.2	0.29	0.29	0.90	0.26	0.26	5.0	5.0	7.97	2.10		12	2.73	77%	3.48	3.83	0.3	277.29	276.95	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
P-10	#VALUE!							274.21	274.21							275.25	281.55	
P-20	18	5.23	32.72	11.32	0.46	0.88	1.99	276.20	274.21			277.83	275.84	2.45	277.83	279.67	281.21	No
O-30	8.004	1.25	202.10	4.89	0.46	0.53	0.37	279.83	279.46			282.60	282.23	1.04	282.80	---	283.98	No
P-30	12	2.10	69.18	3.83	0.66	0.62	0.23	277.88	277.76	0.005	0.346	278.23	278.00	1.06	278.35	---	279.92	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
O-30	---	On Grade	0.17	0.90	5.0	8.0	1.25	0.02	0.05		1.25	0.17	2	5.55	0.36	Curb inlet	0.46	0.80
P-20	---	On Grade	0.28	0.90	5.0	8.0	2.02	0.02	0.05		2.02	0.20	2	6.94	0.29	Curb inlet	0.59	1.44
P-30	---		0.29	0.90	5.0	8.0	2.10	0.02	0.05		2.10	0.20	2	7.06	0.28	Curb inlet	0.60	1.50

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
Q-20	Q-10	30.2	0.60	0.71	0.90	0.54	0.62	5.0	6.3	7.53	4.71		18	13.74	34%	7.78	7.04	0.1	274.19	273.75	N/A	1.46%
Q-30	Q-20	112.4		0.10			0.08		6.0	7.66	0.59		6	0.92	64%	4.70	4.98	0.4	280.88	278.30	N/A	2.30%
Q-40	Q-30	162.1		0.10			0.08		5.1	7.94	0.61		6	0.47	131%	2.38	3.11	0.9	281.90	280.94	N/A	0.59%
Q-50	Q-40	17.9	0.10	0.10	0.75	0.08	0.08	5.0	5.0	7.97	0.61		6	0.43	143%	2.19	3.13	0.1	281.99	281.90	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
Q-10	#VALUE!							274.36	274.36							275.25	281.01	
Q-20	18	4.71	30.15	7.04	0.61	0.83	0.77	275.13	274.36			275.57	274.79	1.38	275.57	278.80	280.40	No
Q-30	6	0.59	112.36	4.98	0.29	0.39	0.39	278.97	278.59			281.56	281.17	0.68	281.56	281.44	282.99	No
Q-40	6	0.61	162.06	3.11	0.50	n/a	0.15	281.62	281.47	0.01	1.639	283.26	283.11	1.49	283.39	282.40	284.44	No
Q-50	6	0.61	17.87	3.13	0.50	n/a	0.15	283.45	283.29	0.01	0.182	283.63	283.48	1.70	283.68	---	284.03	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
Q-50	---	On Grade	0.10	0.75	5.0	8.0	0.61	0.02	0.05		0.61	0.14	2	3.77	0.53	Curb inlet	0.30	0.31
Q-20	---	On Grade	0.60	0.90	5.0	8.0	4.36	0.02	0.05		4.36	0.25	2	9.67	0.21	Curb inlet	0.87	3.49

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
CO-R-10	R-10	56.5		1.15			1.03		6.4	7.51	7.82		21	13.46	58%	5.60	5.80	0.2	277.16	276.81	N/A	0.61%
CO-R-11	CO-R-10	100.1		0.12			0.10		5.0	7.96	0.83		8.004	0.93	90%	2.65	3.00	0.6	280.77	280.27	N/A	0.50%
RD-R-11	CO-R-11	5.0	0.12	0.12	0.90	0.10	0.10	5.0	5.0	7.97	0.83		8.004	0.93	90%	2.65	3.00	0.0	280.79	280.77	N/A	0.50%
CO-R-12	CO-R-10	100.0		0.80			0.72		6.1	7.62	5.55		21	12.15	46%	5.05	4.93	0.3	278.59	278.09	N/A	0.50%
CO-R-13	CO-R-12	100.0		0.57			0.52		5.7	7.74	4.03		15	4.95	81%	4.04	4.49	0.4	279.09	278.59	N/A	0.50%
CO-R-14	CO-R-13	100.0		0.34			0.31		5.3	7.88	2.46		12	2.73	90%	3.48	3.93	0.4	279.59	279.09	N/A	0.50%
CO-R-15	CO-R-14	100.0		0.12			0.10		5.0	7.97	0.83		6	1.05	79%	5.36	5.93	0.3	282.58	279.59	N/A	2.99%
RD-R-15	CO-R-15	5.0	0.12	0.12	0.90	0.10	0.10	5.0	5.0	7.97	0.83		3.996	0.23	360%	2.63	9.50	0.0	284.15	284.09	N/A	1.24%
RD-R-14	CO-R-14	5.2	0.23	0.23	0.90	0.21	0.21	5.0	5.0	7.97	1.66		6	2.72	61%	13.86	14.53	0.0	280.97	279.96	N/A	20.00%
RD-R-13	CO-R-13	5.1	0.23	0.23	0.90	0.21	0.21	5.0	5.0	7.97	1.66		6	2.72	61%	13.86	14.53	0.0	280.97	279.96	N/A	20.00%
RD-R-12	CO-R-12	5.0	0.23	0.23	0.90	0.21	0.21	5.0	5.0	7.97	1.66		6	1.33	125%	6.79	8.46	0.0	280.20	279.96	N/A	4.80%
RD-R-10	CO-R-10	5.0	0.23	0.23	0.90	0.21	0.21	5.0	5.0	7.97	1.66		6	0.50	334%	2.53	8.46	0.0	280.27	280.24	N/A	0.67%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
R-10	#VALUE!							277.77	277.77							278.56	282.09	
CO-R-10	21	7.82	56.50	5.80	0.96	1.04	0.52	278.29	277.77			278.64	278.12	1.90	279.06	280.93	282.93	No
CO-R-11	8.004	0.83	100.07	3.00	0.49	0.43	0.14	280.90	280.76	0.005	0.5	281.40	281.26	0.84	281.61	281.43	282.99	No
RD-R-11	8.004	0.83	5.00	2.38	0.67	n/a	0.09	281.64	281.56	0.004	0.02	281.66	281.58	0.89	281.68	---	283.00	No
CO-R-12	21	5.55	100.00	4.93	0.83	0.87	0.38	279.16	278.90			279.80	279.43	1.27	279.87	280.46	282.94	No
CO-R-13	15	4.03	100.00	3.28	0.86	0.81	0.17	279.93	279.77	0.003	0.332	280.27	280.10	1.45	280.55	280.46	282.91	No
CO-R-14	12	2.46	100.00	3.13	1.00	n/a	0.15	280.61	280.46	0.004	0.406	281.01	280.86	1.52	281.12	280.46	282.95	No
CO-R-15	6	0.83	100.01	5.93	0.34	0.45	0.55	281.23	280.95	0.019		283.46	282.92	0.88	283.46	284.43	285.94	No
RD-R-15	3.996	0.83	5.00	9.50	0.33	n/a	1.40	285.83	284.43	0.012	0.062	285.89	284.49	2.80	286.96	---	287.00	No
RD-R-14	6	1.66	5.17	14.53	0.28	0.50	3.28	281.56	280.45	0.075		284.54	281.25	3.57	284.54	---	285.60	No
RD-R-13	6	1.66	5.15	14.53	0.28	0.50	3.28	280.99	279.88	0.075		284.53	281.25	3.57	284.53	---	284.95	No
RD-R-12	6	1.66	5.04	8.46	0.50	n/a	1.11	281.57	280.46	0.048	0.242	281.81	280.70	2.22	282.42	---	284.30	No
RD-R-10	6	1.66	5.02	8.46	0.50	n/a	1.11	281.85	280.74	0.007	0.033	281.88	280.77	2.22	282.49	---	283.65	No

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
S-20	S-10	85.9	0.74	1.46	0.90	0.67	1.32	5.0	5.7	7.73	10.25		24	25.00	41%	7.96	7.56	0.2	274.64	273.75	N/A	1.04%
S-30	S-20	89.4		0.72			0.65		5.4	7.83	5.11		15	4.95	103%	4.04	4.59	0.3	279.31	278.87	N/A	0.50%
S-40	S-30	110.1	0.33	0.33	0.90	0.29	0.29	5.0	5.0	7.97	2.36		12	3.14	75%	4.00	4.39	0.4	281.54	280.82	N/A	0.66%
S-31	S-30	84.1	0.39	0.39	0.90	0.35	0.35	5.0	5.0	7.97	2.83		15	4.95	57%	4.04	4.17	0.3	279.91	279.48	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
S-10	#VALUE!							274.64	274.64							275.75	282.74	
S-20	24	10.25	85.92	7.56	0.89	1.15	0.89	275.53	274.64			276.42	275.54	1.78	276.42	280.12	281.79	No
S-30	15	5.11	89.37	4.59	1.07	0.92	0.33	280.26	279.93	0.005	0.447	280.71	280.38	1.70	281.01	281.82	283.57	No
S-40	12	2.36	110.07	4.39	0.65	0.66	0.30	281.76	281.46			282.49	282.19	1.22	282.76	---	284.29	No
S-31	15	2.83	84.14	2.31	0.68	0.68	0.08	281.04	280.96	0.002	0.138	281.18	281.10	1.32	281.22	---	282.78	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
S-40	---	On Grade	0.33	0.90	5.0	8.0	2.36	0.02	0.05		2.36	0.21	2	7.44	0.27	Curb inlet	0.64	1.73
S-31	---	On Grade	0.39	0.90	5.0	8.0	2.83	0.02	0.05		2.83	0.22	2	8.05	0.25	Curb inlet	0.70	2.14
S-20	---	On Grade	0.74	0.90	5.0	8.0	5.37	0.02	0.05		5.37	0.27	2	10.53	0.19	Curb inlet	0.97	4.40

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
CO-T-30	T-30	55.5		1.33			1.19		6.4	7.53	9.06		24	32.77	28%	10.43	8.91	0.1	274.74	273.75	N/A	1.78%
CO-T-34	CO-T-30	100.0		0.60			0.54		6.0	7.65	4.18		18	8.05	52%	4.56	4.60	0.4	281.51	281.01	N/A	0.50%
CO-T-35	CO-T-34	100.0		0.36			0.33		5.6	7.78	2.55		15	4.95	52%	4.04	4.06	0.4	282.01	281.51	N/A	0.50%
CO-T-36	CO-T-35	99.9		0.12			0.11		5.0	7.96	0.87		8.004	0.93	94%	2.65	3.02	0.6	282.57	282.07	N/A	0.50%
RD-T-36	CO-T-36	5.0	0.12	0.12	0.90	0.11	0.11	5.0	5.0	7.97	0.87		8.004	0.93	94%	2.65	3.02	0.0	282.59	282.57	N/A	0.50%
RD-T-35	CO-T-35	6.0	0.24	0.24	0.90	0.22	0.22	5.0	5.0	7.97	1.74		8.004	1.86	94%	5.34	6.06	0.0	282.79	282.67	N/A	2.02%
RD-T-34	CO-T-34	7.0	0.24	0.24	0.90	0.22	0.22	5.0	5.0	7.97	1.74		8.004	1.88	93%	5.38	6.11	0.0	282.80	282.65	N/A	2.06%
CO-T-31	CO-T-30	100.0		0.48			0.43		5.9	7.68	3.36		15	4.95	68%	4.04	4.34	0.4	281.89	281.39	N/A	0.50%
CO-T-32	CO-T-31	100.0		0.24			0.22		5.4	7.84	1.71		9.996	1.68	102%	3.08	3.50	0.5	282.39	281.89	N/A	0.50%
CO-T-33	CO-T-32	50.0		0.06			0.05		5.1	7.95	0.43		6	0.43	101%	2.19	2.49	0.3	282.71	282.46	N/A	0.50%
RD-T-33	CO-T-33	10.4	0.06	0.06	0.90	0.05	0.05	5.0	5.0	7.97	0.44		6	0.43	101%	2.19	2.49	0.1	282.76	282.71	N/A	0.50%
RD-T-32	CO-T-32	9.9	0.18	0.18	0.90	0.16	0.16	5.0	5.0	7.97	1.31		8.004	1.90	69%	5.46	5.87	0.0	282.79	282.58	N/A	2.11%
RD-T-31	CO-T-31	8.9	0.24	0.24	0.90	0.22	0.22	5.0	5.0	7.97	1.74		8.004	1.90	92%	5.44	6.17	0.0	282.79	282.60	N/A	2.10%
RD-T-30	CO-T-30	7.9	0.24	0.24	0.90	0.22	0.22	5.0	5.0	7.97	1.74		8.004	1.66	105%	4.74	5.36	0.0	282.75	282.63	N/A	1.60%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
T-30	#VALUE!							274.47	274.47							275.75	283.76	
CO-T-30	24	9.06	55.50	8.91	0.72	1.08	1.23	275.70	274.47			276.69	275.46	1.95	276.69	283.29	284.84	No
CO-T-34	18	4.18	100.00	4.60	0.77	0.78	0.33	282.10	281.77			282.60	282.27	1.27	282.77	283.32	284.86	No
CO-T-35	15	2.55	100.00	2.08	0.64	0.64	0.07	282.80	282.73	0.001	0.133	282.93	282.87	0.99	283.00	282.73	284.88	No
CO-T-36	8.004	0.87	99.94	2.49	0.67	n/a	0.10	283.04	282.94	0.004	0.442	283.48	283.38	0.99	283.56	283.23	284.92	No
RD-T-36	8.004	0.87	5.00	2.50	0.67	n/a	0.10	283.60	283.50	0.004	0.022	283.62	283.52	1.05	283.64	---	284.80	No
RD-T-35	8.004	1.74	5.98	6.06	0.51	0.60	0.57	283.76	283.18			283.88	283.31	1.12	283.92	---	285.00	No
RD-T-34	8.004	1.74	6.96	6.11	0.51	0.60	0.58	283.74	283.16			283.88	283.30	1.12	283.92	---	285.00	No
CO-T-31	15	3.36	100.00	4.34	0.76	0.74	0.29	282.43	282.14	0.005	0.5	282.93	282.64	1.30	283.19	283.27	284.82	No
CO-T-32	9.996	1.71	100.00	3.14	0.83	n/a	0.15	283.25	283.10	0.005	0.521	283.77	283.62	1.50	283.88	283.25	284.80	No
CO-T-33	6	0.43	50.00	2.21	0.50	n/a	0.08	283.91	283.84	0.005	0.255	284.17	284.09	1.52	284.23	283.21	285.15	No
RD-T-33	6	0.44	10.40	2.22	0.50	n/a	0.08	284.26	284.19	0.005	0.053	284.31	284.24	1.57	284.33	---	284.80	No
RD-T-32	8.004	1.31	9.91	3.75	0.67	n/a	0.22	283.97	283.75	0.01	0.099	284.07	283.85	1.32	284.11	---	285.01	No
RD-T-31	8.004	1.74	8.93	6.17	0.50	0.60	0.59	283.70	283.11			283.89	283.30	1.12	283.91	---	285.01	No
RD-T-30	8.004	1.74	7.95	5.36	0.59	0.60	0.45	283.66	283.21			283.79	283.34	1.12	283.88	---	285.01	No

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
V-20	V-10	20.7	0.76	1.45	0.90	0.68	1.30	5.0	5.1	7.94	10.44		27	22.86	46%	5.75	5.62	0.1	273.85	273.75	N/A	0.46%
V-30	V-20	33.3	0.69	0.69	0.90	0.62	0.62	5.0	5.0	7.97	4.98		15	7.55	66%	6.15	6.57	0.1	278.65	278.26	N/A	1.16%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
V-10	#VALUE!							274.82	274.82							276.00	282.00	
V-20	27	10.44	20.70	5.62	1.07	1.12	0.49	275.31	274.82			275.40	274.91	1.79	275.64	279.51	281.18	No
V-30	15	4.98	33.29	6.57	0.74	0.91	0.67	279.67	279.00			280.06	279.39	1.56	280.21	---	281.57	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
V-30	---	On Grade	0.69	0.90	5.0	8.0	4.98	0.02	0.05		4.98	0.26	2	10.21	0.20	Curb inlet	0.93	4.04
V-20	---	On Grade	0.76	0.90	5.0	8.0	5.50	0.02	0.05		5.50	0.27	2	10.64	0.19	Curb inlet	0.98	4.52

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
X-20	X-10	53.3	0.19	1.03	0.60	0.11	0.76	5.0	6.0	7.63	5.88		18	8.30	71%	4.69	5.09	0.2	280.78	280.50	N/A	0.53%
X-30	X-20	43.6	0.09	0.84	0.60	0.05	0.65	5.0	5.9	7.68	5.03		18	8.05	62%	4.56	4.81	0.2	284.05	283.83	N/A	0.50%
X-40	X-30	65.1	0.14	0.27	0.60	0.09	0.17	5.0	5.4	7.84	1.30		9.996	1.68	77%	3.08	3.40	0.3	285.21	284.88	N/A	0.50%
X-50	X-40	80.0	0.13	0.13	0.60	0.08	0.08	5.0	5.0	7.97	0.64		6	0.43	149%	2.19	3.26	0.4	286.11	285.71	N/A	0.50%
CO-X-30	X-30	5.8		0.48			0.43		5.9	7.68	3.36		15	8.63	39%	7.03	6.59	0.0	285.13	285.04	N/A	1.52%
CO-X-31	CO-X-30	19.8		0.48			0.43		5.8	7.71	3.37		15	4.95	68%	4.04	4.34	0.1	285.74	285.64	N/A	0.50%
CO-X-32	CO-X-31	100.0		0.24			0.22		5.4	7.86	1.72		12	2.73	63%	3.48	3.67	0.5	286.24	285.74	N/A	0.50%
CO-X-33	CO-X-32	50.0		0.06			0.05		5.0	7.96	0.44		6	0.43	101%	2.19	2.49	0.3	286.82	286.57	N/A	0.50%
RD-X-33	CO-X-33	5.0	0.06	0.06	0.90	0.05	0.05	5.0	5.0	7.97	0.44		6	0.87	50%	4.41	4.42	0.0	286.92	286.82	N/A	2.03%
RD-X-32	CO-X-32	5.0	0.18	0.18	0.90	0.16	0.16	5.0	5.0	7.97	1.31		8.004	2.17	60%	6.22	6.50	0.0	286.79	286.65	N/A	2.75%
RD-X-31	CO-X-31	5.2	0.24	0.24	0.90	0.22	0.22	5.0	5.0	7.97	1.74		8.004	2.77	63%	7.94	8.39	0.0	286.79	286.55	N/A	4.48%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
X-10	#VALUE!							281.43	281.43							282.00	287.97	
X-20	18	5.88	53.28	5.09	0.93	0.94	0.40	281.84	281.43			282.12	281.72	1.65	282.44	285.33	287.65	No
X-30	18	5.03	43.63	4.81	0.86	0.86	0.36	285.05	284.69			285.27	284.91	1.57	285.62	285.72	288.05	No
X-40	9.996	1.30	65.11	3.40	0.55	0.51	0.18	285.66	285.55	0.005	0.326	285.98	285.80	0.86	286.06	286.21	288.13	No
X-50	6	0.64	80.02	3.26	0.50	n/a	0.17	286.38	286.21	0.005	0.4	286.78	286.61	0.79	286.90	---	288.15	No
CO-X-30	15	3.36	5.83	6.59	0.54	0.74	0.68	286.26	285.58			286.34	285.67	1.22	286.34	286.89	288.72	No
CO-X-31	15	3.37	19.77	4.34	0.76	0.74	0.29	286.69	286.40	0.005	0.099	286.79	286.50	1.31	287.04	286.74	288.77	No
CO-X-32	12	1.72	99.99	2.19	0.58	0.56	0.07	287.07	287.00	0.002	0.198	287.27	287.20	1.09	287.33	287.07	288.86	No
CO-X-33	6	0.44	50.00	2.22	0.50	n/a	0.08	287.36	287.28	0.005	0.257	287.61	287.54	0.86	287.68	287.32	288.86	No
RD-X-33	6	0.44	5.00	2.22	0.50	n/a	0.08	287.71	287.63	0.005	0.026	287.73	287.66	0.83	287.75	---	289.00	No
RD-X-32	8.004	1.31	5.00	6.50	0.37	0.54	0.66	287.41	287.19	0.01		287.82	287.17	1.03	287.82	---	289.00	No
RD-X-31	8.004	1.74	5.25	8.39	0.38	0.60	1.09	288.03	286.94			288.27	287.17	1.48	288.27	---	289.00	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
X-50	---	On Grade	0.13	0.60	5.0	8.0	0.64	0.02	0.05		0.64	0.14	2	3.86	0.52	Curb inlet	0.31	0.33
X-40	---	On Grade	0.14	0.60	5.0	8.0	0.68	0.02	0.05		0.68	0.14	2	4.02	0.50	Curb inlet	0.32	0.36
X-30	---	On Grade	0.09	0.60	5.0	8.0	0.42	0.02	0.05		0.42	0.12	2	2.92	0.69	Curb inlet	0.24	0.18
X-20	---	On Grade	0.19	0.60	5.0	8.0	0.92	0.02	0.05		0.92	0.16	2	4.73	0.42	Curb inlet	0.38	0.53

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
Y-20	Y-10	24.5	0.07	0.29	0.90	0.06	0.23	5.0	5.4	7.84	1.80		12	4.32	42%	5.49	5.24	0.1	280.81	280.50	N/A	1.25%
Y-30	Y-20	80.4	0.22	0.22	0.75	0.17	0.17	5.0	5.0	7.97	1.35		9.996	1.68	80%	3.08	3.42	0.4	285.74	285.34	N/A	0.50%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
Y-10	#VALUE!							280.95	280.95							281.50	288.59	
Y-20	12	1.80	24.52	5.24	0.45	0.57	0.43	281.38	280.95			281.68	281.26	0.88	281.68	286.17	288.13	No
Y-30	9.996	1.35	80.37	3.42	0.57	0.52	0.18	286.08	285.90	0.005	0.402	286.48	286.30	0.94	286.67	---	288.15	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
Y-30	---	On Grade	0.22	0.75	5.0	8.0	1.35	0.02	0.05		1.35	0.18	2	5.74	0.35	Curb inlet	0.47	0.87
Y-20	---	On Grade	0.07	0.90	5.0	8.0	0.48	0.02	0.05		0.48	0.13	2	3.23	0.62	Curb inlet	0.26	0.22

BOHLER

Page print

Storm Drain Design Sheet

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

From	To	Length	Drainage Area		Runoff Coeff "C"	Area X "C"		Time of Concentration		Rain "I"	Runoff "Q"	Known "Q"	Pipe Dia.	Pipe Flow		Velocity		Sec Time	Invert Elev.		Crown Drop	Slope
			Inc.	Total		Inc.	Total	Inlet	System					Q_{FULL}	Design/Capacity	Full	Design		U/S	D/S		
		(ft)	(ac)	(ac)		(ac)	(ac)	(min)	(min)	(inch/hr)	(cu. ft/sec)	(cu. ft/sec)	(in)	(cu. ft/sec)	%	(ft/s)	(ft/s)	(min)	(ft)	(ft)	(ft)	
Z-20	Z-10	22.2	0.08	1.69	0.90	0.07	1.52	5.0	8.4	6.87	10.53		24	17.35	61%	5.52	5.78	0.1	280.61	280.50	N/A	0.50%
Z-30	Z-20	75.3	0.07	1.61	0.90	0.07	1.45	5.0	8.2	6.94	10.14		24	17.35	58%	5.52	5.73	0.2	283.44	283.06	N/A	0.50%
Z-40	Z-30	68.9	0.18	0.69	0.90	0.16	0.63	5.0	7.9	7.02	4.43		18	8.05	55%	4.56	4.66	0.2	284.68	284.34	N/A	0.50%
Z-50	Z-40	185.3		0.52			0.46		7.2	7.26	3.39		15	4.95	69%	4.04	4.34	0.7	285.61	284.68	N/A	0.50%
Z-60	Z-50	309.0		0.13			0.11		5.6	7.76	0.88		8.004	1.02	86%	2.94	3.30	1.6	289.07	287.18	N/A	0.61%
Z-70	Z-60	114.7	0.13	0.13	0.90	0.11	0.11	5.0	5.0	7.97	0.91		8.004	0.93	98%	2.65	3.02	0.6	289.67	289.09	N/A	0.50%
Z-51	Z-50	29.2	0.39	0.39	0.90	0.35	0.35	5.0	5.0	7.97	2.82		15	4.95	57%	4.04	4.17	0.1	285.75	285.61	N/A	0.50%
CO-Z-30	Z-30	6.2		0.84			0.76		6.2	7.58	5.80		21	12.15	48%	5.05	4.99	0.0	283.89	283.86	N/A	0.50%
CO-Z-32	CO-Z-30	92.7		0.72			0.65		5.9	7.69	5.04		21	12.15	42%	5.05	4.81	0.3	284.35	283.89	N/A	0.50%
CO-Z-33	CO-Z-32	100.0		0.48			0.43		5.5	7.81	3.42		15	4.95	69%	4.04	4.35	0.4	284.85	284.35	N/A	0.50%
CO-Z-34	CO-Z-33	100.0		0.24			0.22		5.0	7.97	1.74		9.996	1.68	104%	3.08	3.50	0.5	285.35	284.85	N/A	0.50%
RD-Z-34	CO-Z-34	5.0	0.24	0.24	0.90	0.22	0.22	5.0	5.0	7.97	1.74		6	1.02	171%	5.21	8.88	0.0	285.54	285.40	N/A	2.82%
RD-Z-33	CO-Z-33	5.0	0.24	0.24	0.90	0.22	0.22	5.0	5.0	7.97	1.74		8.004	2.50	70%	7.17	7.75	0.0	286.79	286.61	N/A	3.65%
RD-Z-32	CO-Z-32	5.0	0.24	0.24	0.90	0.22	0.22	5.0	5.0	7.97	1.74		8.004	2.30	76%	6.58	7.23	0.0	286.79	286.64	N/A	3.07%
CO-Z-31	CO-Z-30	7.3		0.12			0.11		5.0	7.97	0.87		8.004	1.17	74%	3.35	3.67	0.0	286.60	286.54	N/A	0.80%
RD-Z-31	CO-Z-31	5.0	0.12	0.12	0.90	0.11	0.11	5.0	5.0	7.97	0.87		6	1.07	82%	5.43	6.05	0.0	286.96	286.81	N/A	3.07%

BOHLER

Energy Grade Line Computation - Table A

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 100-Year

Struct. ID	Pipe Dia. (in)	Q (cu. ft/sec)	Length (ft)	Velocity (ft/s)	d (ft)	d_c (ft)	$v^2/2g$ (ft)	EGL_o (ft)	HGL_o (ft)	S_f (ft/ft)	Total Pipe Loss (ft)	EGL_i (ft)	HGL_i (ft)	E_a (ft)	EGL_a (ft)	U/S TOC (ft)	Surface Elev. (ft)	HGL > Surface Elev.
Z-10	#VALUE!							281.63	281.63							282.50	288.93	
Z-20	24	10.53	22.16	5.78	1.13	1.16	0.52	282.15	281.63			282.26	281.74	1.85	282.46	285.06	288.17	No
Z-30	24	10.14	75.31	5.73	1.10	1.14	0.51	284.67	284.16			285.05	284.54	2.02	285.46	285.84	288.16	No
Z-40	18	4.43	68.93	4.66	0.79	0.81	0.34	285.52	285.37			285.81	285.47	1.25	285.93	285.93	287.89	No
Z-50	15	3.39	185.30	4.34	0.76	0.74	0.29	285.98	285.86	0.005	0.927	286.90	286.61	1.39	287.00	287.85	289.41	No
Z-60	8.004	0.88	309.03	3.30	0.48	0.45	0.17	287.83	287.66	0.006	1.889	289.72	289.55	0.76	289.84	289.76	294.25	No
Z-70	8.004	0.91	114.74	2.59	0.53	0.45	0.11	289.88	289.77	0.005	0.548	290.43	290.32	0.83	290.49	---	291.87	No
Z-51	15	2.82	29.19	2.30	0.68	0.68	0.08	287.03	286.95	0.002	0.048	287.08	286.99	1.36	287.11	---	288.63	No
CO-Z-30	21	5.80	6.21	4.99	0.85	0.89	0.39	285.50	285.40			285.50	285.11	1.61	285.50	285.64	288.79	No
CO-Z-32	21	5.04	92.66	4.81	0.79	0.82	0.36	285.53	285.46			285.53	285.17	1.20	285.55	287.30	288.85	No
CO-Z-33	15	3.42	100.00	4.35	0.76	0.75	0.29	285.60	285.47	0.005	0.5	286.10	285.80	1.32	286.17	285.69	288.82	No
CO-Z-34	9.996	1.74	100.00	3.20	0.83	n/a	0.16	286.23	286.07	0.005	0.539	286.77	286.61	1.55	286.90	285.90	287.77	No
RD-Z-34	6	1.74	5.00	8.88	0.50	n/a	1.23	287.39	286.17	0.082	0.411	287.80	286.58	2.51	288.05	---	289.00	No
RD-Z-33	8.004	1.74	5.00	7.75	0.41	0.60	0.93	287.95	287.02			288.13	287.20	1.34	288.13	---	289.00	No
RD-Z-32	8.004	1.74	5.00	7.23	0.44	0.60	0.81	287.88	287.07			288.04	287.22	1.25	288.04	---	289.00	No
CO-Z-31	8.004	0.87	7.34	3.67	0.43	0.44	0.21	287.18	286.97			287.23	287.03	0.92	287.51	287.31	288.85	No
RD-Z-31	6	0.87	5.00	4.44	0.34	0.46	0.31	287.64	287.33	0.021	0.103	287.74	287.43	0.86	287.82	---	289.00	No

BOHLER

Inlet Analysis Data

Project Name: Hanover Industrial - Chalfont
Project Number: PAC250095.00
Design Storm: 0.314in/hr

Inlet			Gutter Discharge													Inlet Discharge		
Name	Stat. (ft)	Inlet Location	Drain. Area A (sq. ft)	Runoff Coeff. C	Time of Conc. t_c (min)	Rainfall Intens. I (inch/hr)	Q=CIA/K_c (cu. ft/sec)	Long. Slope S_L	Cross Slope S_x or S_w	Prev. Bypass Flow (cu. ft/sec)	Total Gutter Flow (cu. ft/sec)	Depth d (ft)	Grate or Gutter Width (ft)	Spread T (ft)	W / T	Inlet Type	Intercept Flow Q_i (cu. ft/sec)	Bypass Flow Q_b (cu. ft/sec)
Z-30	---	On Grade	0.07	0.90	5.0	8.0	0.52	0.02	0.05		0.52	0.13	2	3.41	0.59	Curb inlet	0.28	0.25
Z-20	---	On Grade	0.08	0.90	5.0	8.0	0.57	0.02	0.05		0.57	0.13	2	3.59	0.56	Curb inlet	0.29	0.28
Z-40	---	On Grade	0.18	0.90	5.0	8.0	1.29	0.02	0.05		1.29	0.17	2	5.63	0.36	Curb inlet	0.46	0.83
Z-51	---	On Grade	0.39	0.90	5.0	8.0	2.82	0.02	0.05		2.82	0.22	2	8.04	0.25	Curb inlet	0.70	2.13
Z-70	---	On Grade	0.13	0.90	5.0	8.0	0.91	0.02	0.05		0.91	0.15	2	4.70	0.43	Curb inlet	0.38	0.53

Appendix 1.0

Post Construction
Stormwater Management Report

Prepared For:

101 Independence Lane Associates, LLC

One Tower Bridge
100 Front Street, Suite 560
West Conshohocken, PA 19428
Phone: 717-435-0911

Project:

141 Independence Lane

New Britain Township
Bucks County, Pennsylvania

Prepared by:

RETTEW ASSOCIATES, INC.
3020 Columbia Ave.
Lancaster, PA 17603
Phone: (717)-697-3551
Project # 111902019

Published:
June 2022
Revised: May 2023

TOWNSHIP

Pre-Development	1yr (cfs)	2yr (cfs)	5yr (cfs)	10yr (cfs)	25yr (cfs)	50yr (cfs)	100yr (cfs)
Off-Site POI 001	7.68	8.47	10.80	13.15	15.88	21.49	34.26
On-Site POI 001	6.47	8.36	11.07	13.30	16.53	19.30	22.26
Allowable Discharge Rate	14.94	19.16	24.22	29.18	38.02	53.56	
Post(BMP+Undetained)							
POI 001		10.83	14.08	17.01	25.14	35.30	51.59
Reduction Summary	1yr	2yr- 1yr	5yr -2yr	10yr-5yr	25yr-10yr	50yr-25yr	100yr - 50yr
POI 001		-4.11	-5.08	-7.21	-4.04	-2.72	-1.97

NPDES

Pre-Development	2yr (cfs)	10yr (cfs)	50yr (cfs)	100yr (cfs)
POI 001	16.83	26.45	40.79	56.52
Post(BMP+Undetained)				
POI 001	10.83	17.01	35.30	51.59
Reduction Summary				
POI 001	-6.00	-9.44	-5.49	-4.93

The Township has a rate requirements that states the following: the 2-Year Post-Development must be less than or equal to the 1-Year Pre-Development, the 5-Year Post Development must be less than or equal to the 2-Year Pre-Development, and so on. For calculation purposes, this requirement was only utilized for the rate produced by On-Site runoff. We believe that we should not be responsible to manage Off-Site runoff with this requirement. The Pre-Development values above and the HydroCAD files below reflect this statement.

Worksheet 4: Change in Runoff Volume for 2-YR Storm Event

Project: 141 Independence Lane
Drainage Basin: POI 001
2-Year Rainfall: 3.25 in

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	I_a (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Meadow	C	53,425	1.23	71	4.08	0.82	0.91	4,044
Meadow	D	259,059	5.95	78	2.82	0.56	1.31	28,283
TOTAL:		**312,484**	**7.17**					**32,327**

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	I_a (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Meadow	C	47,723	1.10	71	4.08	0.82	0.91	3,612
Meadow	D	66,165	1.52	78	2.82	0.56	1.31	7,224
Open Space	D	33,332	0.77	80	2.50	0.50	1.44	4,001
Impervious	N/A	165,264	3.79	98	0.20	0.04	3.02	41,554
TOTAL:		**312,484**	**7.17**					**56,391**

2-Year Volume Increase (ft^3):	**24,064**

To Non-Vegetated MRC Basin 1:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	I_a (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Meadow	D	17,073	0.39	78	2.82	0.56	1.31	1,864
Open Space	D	14,913	0.34	80	2.50	0.50	1.44	1,790
Impervious	N/A	19,103	0.44	98	0.20	0.04	3.02	4,803
TOTAL:		**51,089**	**1.17**					**8,457**

To Non-Vegetated MRC Basin 2:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	I_a (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Meadow	D	17,360	0.40	78	2.82	0.56	1.31	1,895
Open Space	D	18,419	0.42	80	2.50	0.50	1.44	2,211
Impervious	N/A	132,047	3.03	98	0.20	0.04	3.02	33,202
TOTAL:		**167,826**	**3.85**					**37,308**

To Undetained:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	I_a (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Meadow	C	47,723	1.10	71	4.08	0.82	0.91	3,612
Meadow	D	31,732	0.73	78	2.82	0.56	1.31	3,464
Impervious	N/A	14,114	0.32	98	0.20	0.04	3.02	3,549
TOTAL:		**93,569**	**2.15**					**10,625**

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name:	**141 Independence Lane**	Application Type:	**PAG-02 NOI**
County:	**Bucks**	Municipality:	**New Britain Township**
Project Type:	**Commercial Building**	◉ New Project	○ Minor / Major Amendment

Area: **7.17** acres *(In Watershed)*

Total Earth Disturbance: **7.17** acres *(In Watershed)*

No. of Post-Construction Discharge Points: **1**

Start DP Numbering at: **001**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	5.02	5.02	0.00	3.47	UNT to West Branch Neshaminy Creek	WWF, MF	Yes
Undetained Areas	2.15	2.15	0.00	0.32	UNT to West Branch Neshaminy Creek	WWF, MF	
Totals:	**7.17**	**7.17**		**3.79**			

Volume Management

Project: 141 Independence Lane

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.25** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **2** ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	1.23	C	71	0.817	0.91	4,044
Pervious as Meadow	5.95	D	78	0.564	1.31	28,283
TOTAL (ACRES):	**7.17**				**TOTAL (CF):**	**32,327**

Post-Construction Conditions: *No. Rows:* **4**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.10	C	71	0.817	0.91	3,612
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.52	D	78	0.564	1.31	7,224
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.77	D	80	0.500	1.44	4,001
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	3.79	N/A	98	0.041	3.02	41,554
TOTAL (ACRES):	**7.17**				**TOTAL (CF):**	**56,391**

NET CHANGE IN VOLUME TO MANAGE (CF): **24,064**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **2** *Start BMP Numbering at:* **1**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Non-Vegetated MRC Basin 1	Y	Off-Site	1.17	6,593	12,601	0.00		No	1.0	6,593		
001	2	Non-Vegetated MRC Basin 2	Y	Off-Site	3.85	37,308	28,078	0.00		No	1.0	13,242		
											Totals:			

INFILTRATION & ET CREDITS (CF):	
MANAGED RELEASE CREDIT (CF):	**43,901**
NET CHANGE IN VOLUME TO MANAGE (CF):	**24,064**
TOTAL CREDITS (CF):	**43,901**

VOLUME REQUIREMENT SATISFIED

Rate Control

Project: 141 Independence Lane

Instructions | General | Volume | *Rate* | Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	**3.25**	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):	**4.77**	Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):	**6.62**	Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):	**7.53**	Alternative 100-Year 24-Hour Storm Event (in):	

☑ **Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)			
	Pre-Construction	**Post-Construction**	**Net Change**	
2-Year Storm:	**16.83**	**11.05**	**-5.78**	***Rate Control Satisfied***
10-Year Storm:	**26.45**	**17.40**	**-9.05**	***Rate Control Satisfied***
50-Year Storm:	**40.79**	**35.31**	**-5.48**	***Rate Control Satisfied***
100-Year Storm:	**56.52**	**52.53**	**-3.99**	***Rate Control Satisfied***

Water Quality

Project: 141 Independence Lane

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	1.23	C	4,044	48.8	0.22	2.30	12.32	0.06	0.58
Pervious as Meadow	Grassland/Herbaceous	5.95	D	28,283	48.8	0.22	2.30	86.18	0.39	4.06
	TOTAL (ACRES):	**7.17**					**TOTALS:**	**98.51**	**0.44**	**4.64**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.10	C	3,612	48.8	0.22	2.30	11.01	0.05	0.52
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.52	D	7,224	48.8	0.22	2.30	22.01	0.10	1.04
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.77	D	4,001	78.0	0.25	1.25	19.49	0.06	0.31

Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	3.79	N/A	41,554	65.0	0.29	2.05	168.66	0.75	5.32
	TOTAL (ACRES):	**7.17**					**TOTALS:**	**221.17**	**0.96**	**7.19**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS): | **122.66** | **0.52** | **2.55**

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:* **3**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**1.09556933**	**C**	**71**	**0.817**	**0.91**	**3,612**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**0.728466483**	**D**	**78**	**0.564**	**1.31**	**3,464**
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	**0.324012856**	**N/A**	**98**	**0.041**	**3.02**	**3,549**

Non-Structural BMP Water Quality Credits:

☑ Pervious Undetained Area Credit

☐ Other (attach calculations)

TSS	TP	TN

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
001	1	Non-Vegetated MRC Basin 1	Y	1.17	6,593			6,593	-	-	-	-	-	-
001	2	Non-Vegetated MRC Basin 2	Y	3.85	37,308			37,308	-	-	-	-	-	-

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	0.00	0.00	0.00
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	35.97	0.16	1.47
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):	5.39	0.02	0.15
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	30.58	0.14	1.32
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	98.51	0.44	4.64

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Trey A. Shellenberger, EIT	5/4/2023
Spreadsheet User Name	Date

Township

Pre-Development	1yr (cfs)	2yr (cfs)	5yr (cfs)	10yr (cfs)	25yr (cfs)	50yr (cfs)	100yr (cfs)
Off-Site POI 001	7.68	8.47	10.80	13.15	15.88	21.49	34.26
On-Site POI 001	6.47	8.36	11.07	13.30	16.53	19.30	22.26
Allowable Discharge Rate	14.94	19.16	24.22	29.18	38.02	53.56	
Post(BMP+Undetained)							
POI 001		10.11	13.33	15.78	23.43	34.55	50.78
Reduction Summary	1 yr	2yr - 1yr	5yr - 2yr	10yr - 5yr	25yr - 10yr	50yr - 25yr	100yr - 50yr
POI 001		-4.83	-5.83	-8.44	-5.75	-3.47	-2.78

NPDES

Pre-Development	2yr (cfs)	10yr (cfs)	50yr (cfs)	100yr (cfs)
POI 001	16.83	26.45	40.79	56.52
Post(BMP+Undetained)				
POI 001	10.11	15.78	34.55	50.78
Reduction Summary				
POI 001	-6.72	-10.67	-6.24	-5.74

Runoff Calculation CN Worksheets

Project: **PAC250095.00: Hanover Industrial - Chalfont**

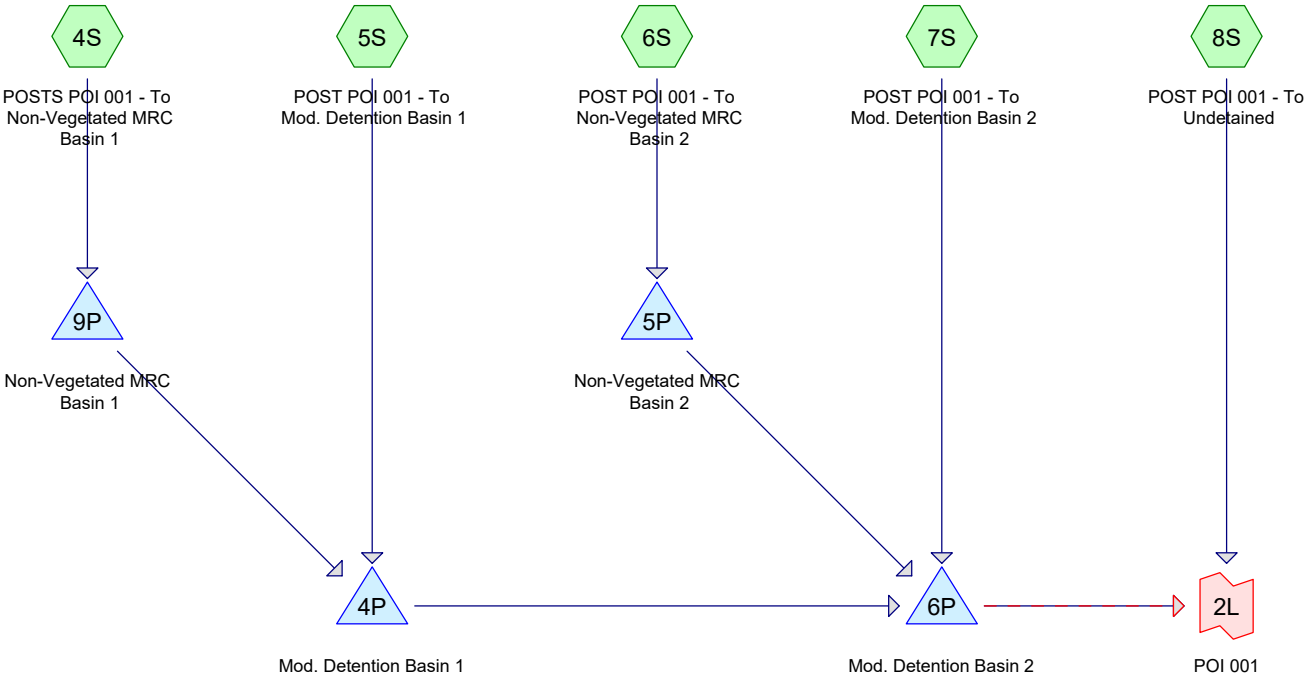
Description: **141 Independence Lane Mod. Detention Basin 2 Post-Development**

$Q = [(P - 0.2S)^2 / (P + 0.8S)] * 1/12 * 43{,}560$, *where* $S = (1000/CN) - 10$ *and:*

P = 3.24

Catchment Areas

	HSG C / CN		HSG D / CN				
Description	Urban Industrial, 72% Imp, Good Condition (91)	Meadow (71)	Urban Industrial, 72% Imp, Good Condition (93)	Meadow (78)	Total Area (Ac)	Composite CN	Runoff Q (cuft)
POST POI 001 - To Mod. Detention Basin 2	0.60	0.31	2.81	0.11	3.83	**90**	31,925
Totals:	0.60	0.31	2.81	0.11	3.83		31,925



Subcat Reach Pond Link

Routing Diagram for PAC250095.00_Hanover Warehouses Lot 3 Access
Prepared by Bohler Engineering, PC, Printed 3/25/2026
HydroCAD® 10.20-7a s/n 03478 © 2025 HydroCAD Software Solutions LLC

Summary for Subcatchment 4S: POSTS POI 001 - To Non-Vegetated MRC Basin 1

Runoff = 5.34 cfs @ 11.97 hrs, Volume= 11,680 cf, Depth= 1.70"
Routed to Pond 9P : Non-Vegetated MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

	Area (sf)	CN	Description
*	31,334	93	Urban industrial, 72% imp, HSG D
*	17,073	80	>75% Grass cover, Good, HSG D
*	14,913	78	Meadow, non-grazed, HSG D
*	19,103	98	Impervious
	82,423		Weighted Average
	40,760		49.45% Pervious Area
	41,663		50.55% Impervious Area

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

Summary for Subcatchment 5S: POST POI 001 - To Mod. Detention Basin 1

Runoff = 34.91 cfs @ 11.97 hrs, Volume= 74,890 cf, Depth= 1.87"
Routed to Pond 4P : Mod. Detention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

	Area (sf)	CN	Description
*	37,741	91	Urban industrial, 72% imp, HSG C
*	390,706	93	Urban industrial, 72% imp, HSG D
*	24,652	71	Meadow, non-grazed, HSG C
*	14,659	78	Meadow, non-grazed, HSG D
*	13,693	98	Impervious
	481,451		Weighted Average
	159,276		33.08% Pervious Area
	322,175		66.92% Impervious Area

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

Summary for Subcatchment 6S: POST POI 001 - To Non-Vegetated MRC Basin 2

Runoff = 16.22 cfs @ 11.97 hrs, Volume= 37,108 cf, Depth= 2.11"
Routed to Pond 5P : Non-Vegetated MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

	Area (sf)	CN	Description
*	42,859	93	Urban industrial, 72% imp, HSG D
*	17,360	80	>75% Grass cover, Good, HSG D
*	18,419	78	Meadow, non-grazed, HSG D
*	132,047	98	Impervious
	210,685		Weighted Average
	47,780		22.68% Pervious Area
	162,905		77.32% Impervious Area

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

Summary for Subcatchment 7S: POST POI 001 - To Mod. Detention Basin 2

Runoff = 11.74 cfs @ 11.97 hrs, Volume= 25,059 cf, Depth= 1.80"
Routed to Pond 6P : Mod. Detention Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

	Area (sf)	CN	Description
*	26,331	91	Urban industrial, 72% imp, HSG C
*	122,517	93	Urban industrial, 72% imp, HSG D
*	13,397	71	Meadow, non-grazed, HSG C
*	4,754	78	Meadow, non-grazed, HSG D
	166,999		Weighted Average
	59,828		35.83% Pervious Area
	107,171		64.17% Impervious Area

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

Summary for Subcatchment 8S: POST POI 001 - To Undetained

Runoff = 0.54 cfs @ 11.98 hrs, Volume= 1,140 cf, Depth= 1.08"
Routed to Link 2L : POI 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.70"

	Area (sf)	CN	Description
*	3,806	91	Urban industrial, 72% imp, HSG C
*	4,088	71	Meadow, non-grazed, HSG C
*	4,808	78	Meadow, non-grazed, HSG D
	12,702		Weighted Average
	9,962		78.43% Pervious Area
	2,740		21.57% Impervious Area

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

Summary for Pond 4P: Mod. Detention Basin 1

Inflow Area = 563,874 sf, 64.52% Impervious, Inflow Depth = 1.59" for 1-yr event
Inflow = 34.91 cfs @ 11.97 hrs, Volume= 74,890 cf
Outflow = 9.21 cfs @ 12.11 hrs, Volume= 74,890 cf, Atten= 74%, Lag= 8.1 min
Primary = 9.21 cfs @ 12.11 hrs, Volume= 74,890 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 289.06' @ 12.11 hrs Surf.Area= 15,529 sf Storage= 21,457 cf

Plug-Flow detention time= 18.0 min calculated for 74,886 cf (100% of inflow)
Center-of-Mass det. time= 18.0 min (815.1 - 797.2)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	164,860 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.00	111	0	0
287.00	3,780	1,946	1,946
288.00	9,192	6,486	8,432
289.00	15,171	12,182	20,613
290.00	21,678	18,425	39,038
291.00	26,906	24,292	63,330
292.00	33,181	30,044	93,373
293.00	39,698	36,440	129,813
293.83	44,754	35,048	164,860

Device	Routing	Invert	Outlet Devices
#1	Primary	283.70'	**42.0" Round Culvert** L= 103.0' Ke= 0.700 Inlet / Outlet Invert= 283.70' / 282.43' S= 0.0123 '/' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	291.28'	**24.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	286.00'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	291.75'	**36.0" W x 57.0" H Vert. Doghouse Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.21 cfs @ 12.11 hrs HW=289.05' TW=282.11' (Dynamic Tailwater)
└─**1=Culvert** (Passes 9.21 cfs of 77.61 cfs potential flow)
  ├─**2=Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 9.21 cfs @ 7.51 fps)
  └─**4=Doghouse Grate** (Controls 0.00 cfs)

Summary for Pond 5P: Non-Vegetated MRC Basin 2

Inflow Area = 210,685 sf, 77.32% Impervious, Inflow Depth = 2.11" for 1-yr event
Inflow = 16.22 cfs @ 11.97 hrs, Volume= 37,108 cf
Outflow = 0.93 cfs @ 12.77 hrs, Volume= 33,216 cf, Atten= 94%, Lag= 48.3 min
Primary = 0.93 cfs @ 12.77 hrs, Volume= 33,216 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 285.87' @ 12.77 hrs Surf.Area= 56,156 sf Storage= 23,459 cf

Plug-Flow detention time= 1,798.2 min calculated for 33,214 cf (90% of inflow)
Center-of-Mass det. time= 1,744.5 min (2,515.7 - 771.2)

Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 28,078 cf Overall x 0.0% Voids
#2	284.50'	23,560 cf	**Media Storage (Prismatic)** Listed below (Recalc) 84,234 cf Overall - 25,333 cf Embedded = 58,901 cf x 40.0% Voids
#3	287.50'	28,078 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 70,195 cf Overall x 40.0% Voids
#4	284.50'	12,514 cf	**60.0"W x 34.0"H x 265.00'L Parabolic Arch** x 5 Inside #2 14,133 cf Overall - 2.0" Wall Thickness = 12,514 cf
#5	284.50'	9,917 cf	**60.0"W x 34.0"H x 210.00'L Parabolic Arch** x 5 Inside #2 11,200 cf Overall - 2.0" Wall Thickness = 9,917 cf
		74,069 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.50	28,078	0	0
284.50	28,078	28,078	28,078

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
284.50	28,078	0	0
287.50	28,078	84,234	84,234

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.50	28,078	0	0
290.00	28,078	70,195	70,195

Device	Routing	Invert	Outlet Devices
#1	Primary	283.75'	**24.0" Round Culvert** L= 116.0' Ke= 0.700 Inlet / Outlet Invert= 283.75' / 283.00' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	285.25'	**10.0" W x 4.0" H Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	283.50'	**6.0" Vert. Perforated Underdrain** C= 0.600

			Limited to weir flow at low heads
#5	Device 1	287.50'	**4.0' long Bypass Weir** 2 End Contraction(s) 1.0' Crest Height
#6	Device 2	284.50'	**30.0" Vert. Chamber Connection** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=0.93 cfs @ 12.77 hrs HW=285.87' TW=282.49' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.93 cfs of 14.14 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 0.90 cfs @ 3.23 fps)
    - **6=Chamber Connection** (Passes 0.90 cfs of 10.49 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.03 cfs @ 5.55 fps)
    - **4=Perforated Underdrain** (Passes 0.03 cfs of 1.11 cfs potential flow)
  - **5=Bypass Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Mod. Detention Basin 2

Inflow Area = 941,558 sf, 67.33% Impervious, Inflow Depth > 1.70" for 1-yr event
Inflow = 20.42 cfs @ 11.98 hrs, Volume= 133,165 cf
Outflow = 8.95 cfs @ 12.76 hrs, Volume= 133,166 cf, Atten= 56%, Lag= 46.8 min
Primary = 8.95 cfs @ 12.76 hrs, Volume= 133,166 cf
Routed to Link 2L : POI 001
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : POI 001

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 282.49' @ 12.76 hrs Surf.Area= 13,090 sf Storage= 22,222 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 35.6 min (1,272.2 - 1,236.5)

Volume	Invert	Avail.Storage	Storage Description
#1	280.50'	68,907 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2A	279.75'	5,015 cf	**22.75'W x 156.27'L x 5.50'H Field A** 19,553 cf Overall - 7,016 cf Embedded = 12,537 cf x 40.0% Voids
#3A	280.50'	7,016 cf	**ADS_StormTech MC-3500 d +Cap** x 63 Inside #2 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 63 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		80,938 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.50	4,593	0	0
281.00	7,165	2,940	2,940
282.00	8,853	8,009	10,949
283.00	10,254	9,554	20,502
284.00	11,173	10,714	31,216
285.00	12,082	11,628	42,843
286.00	13,006	12,544	55,387
287.00	14,033	13,520	68,907

Device	Routing	Invert	Outlet Devices
#1	Primary	277.97'	**36.0" Round Culvert** L= 75.0' Ke= 0.700 Inlet / Outlet Invert= 277.97' / 276.58' S= 0.0185 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	285.14'	**24.0" x 48.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	283.00'	**30.0" W x 12.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.50'	**4.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#6	Secondary	285.25'	**50.0' long + 3.0 '/' SideZ x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=8.95 cfs @ 12.76 hrs HW=282.49' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 8.95 cfs of 52.16 cfs potential flow)
  - **2=Orifice/Grate** (Controls 0.00 cfs)
  - **3=Orifice/Grate** (Orifice Controls 8.24 cfs @ 6.18 fps)
  - **4=Orifice/Grate** (Controls 0.00 cfs)
  - **5=Underdrain Orifice** (Orifice Controls 0.71 cfs @ 8.09 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=279.75' TW=0.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 9P: Non-Vegetated MRC Basin 1

Inflow Area = 82,423 sf, 50.55% Impervious, Inflow Depth = 1.70" for 1-yr event
Inflow = 5.34 cfs @ 11.97 hrs, Volume= 11,680 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 4P : Mod. Detention Basin 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 292.85' @ 24.34 hrs Surf.Area= 25,202 sf Storage= 11,680 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	290.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 12,601 cf Overall x 0.0% Voids
#2	291.50'	8,900 cf	**Media Storage (Prismatic)** Listed below (Recalc) 37,803 cf Overall - 15,552 cf Embedded = 22,251 cf x 40.0% Voids
#3	294.50'	2,520 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 6,301 cf Overall x 40.0% Voids
#4	291.50'	6,517 cf	**60.0"W x 34.0"H x 115.00'L Parabolic Arch** x 6 Inside #2 7,360 cf Overall - 2.0" Wall Thickness = 6,517 cf
#5	291.50'	5,100 cf	**60.0"W x 34.0"H x 90.00'L Parabolic Arch** x 6 Inside #2 5,760 cf Overall - 2.0" Wall Thickness = 5,100 cf
#6	291.50'	2,153 cf	**60.0"W x 34.0"H x 228.00'L Parabolic Arch** Inside #2 2,432 cf Overall - 2.0" Wall Thickness = 2,153 cf
		25,191 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
290.50	12,601	0	0
291.50	12,601	12,601	12,601

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.50	12,601	0	0
294.50	12,601	37,803	37,803

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.50	12,601	0	0
295.00	12,601	6,301	6,301

Device	Routing	Invert	Outlet Devices
#1	Primary	290.50'	**18.0" Round Culvert** L= 87.0' Ke= 0.700 Inlet / Outlet Invert= 290.50' / 288.00' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	293.00'	**1.0" Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	294.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	290.50'	**4.0" Vert. Perforated Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 1	294.50'	**3.0' long Bypass Weir** 2 End Contraction(s) 0.5' Crest Height
#6	Device 2	291.50'	**12.0" Vert. Chamber Connection** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=290.50' TW=286.00' (Dynamic Tailwater)
- **1=Culvert** (Controls 0.00 cfs)
- **2=Weir Orifice** (Controls 0.00 cfs)
  - **6=Chamber Connection** (Controls 0.00 cfs)
- **3=Underdrain Orifice** (Controls 0.00 cfs)
  - **4=Perforated Underdrain** (Controls 0.00 cfs)
- **5=Bypass Weir** (Controls 0.00 cfs)

Summary for Link 2L: POI 001

Inflow Area = 954,260 sf, 66.72% Impervious, Inflow Depth > 1.69" for 1-yr event
Inflow = 8.99 cfs @ 12.76 hrs, Volume= 134,306 cf
Primary = 8.99 cfs @ 12.76 hrs, Volume= 134,306 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 4S: POSTS POI 001 - To Non-Vegetated MRC Basin 1

Runoff = 2.83 cfs @ 1.12 hrs, Volume= 3,528 cf, Depth= 0.51"
Routed to Pond 9P : Non-Vegetated MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2 Inch MRC Rainfall=1.20"

	Area (sf)	CN	Description
*	31,334	93	Urban industrial, 72% imp, HSG D
*	17,073	80	>75% Grass cover, Good, HSG D
*	14,913	78	Meadow, non-grazed, HSG D
*	19,103	98	Impervious
	82,423		Weighted Average
	40,760		49.45% Pervious Area
	41,663		50.55% Impervious Area

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

Summary for Subcatchment 5S: POST POI 001 - To Mod. Detention Basin 1

Runoff = 19.46 cfs @ 1.12 hrs, Volume= 22,820 cf, Depth= 0.57"
Routed to Pond 4P : Mod. Detention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2 Inch MRC Rainfall=1.20"

	Area (sf)	CN	Description
*	37,741	91	Urban industrial, 72% imp, HSG C
*	390,706	93	Urban industrial, 72% imp, HSG D
*	24,652	71	Meadow, non-grazed, HSG C
*	14,659	78	Meadow, non-grazed, HSG D
*	13,693	98	Impervious
	481,451		Weighted Average
	159,276		33.08% Pervious Area
	322,175		66.92% Impervious Area

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

Summary for Subcatchment 6S: POST POI 001 - To Non-Vegetated MRC Basin 2

Runoff = 10.58 cfs @ 1.11 hrs, Volume= 13,430 cf, Depth= 0.76"
Routed to Pond 5P : Non-Vegetated MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2 Inch MRC Rainfall=1.20"

	Area (sf)	CN	Description
*	42,859	93	Urban industrial, 72% imp, HSG D
*	17,360	80	>75% Grass cover, Good, HSG D
*	18,419	78	Meadow, non-grazed, HSG D
*	132,047	98	Impervious
	210,685		Weighted Average
	47,780		22.68% Pervious Area
	162,905		77.32% Impervious Area

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

Summary for Subcatchment 7S: POST POI 001 - To Mod. Detention Basin 2

Runoff = 6.36 cfs @ 1.12 hrs, Volume= 7,429 cf, Depth= 0.53"
Routed to Pond 6P : Mod. Detention Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2 Inch MRC Rainfall=1.20"

	Area (sf)	CN	Description
*	26,331	91	Urban industrial, 72% imp, HSG C
*	122,517	93	Urban industrial, 72% imp, HSG D
*	13,397	71	Meadow, non-grazed, HSG C
*	4,754	78	Meadow, non-grazed, HSG D
	166,999		Weighted Average
	59,828		35.83% Pervious Area
	107,171		64.17% Impervious Area

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

Summary for Subcatchment 8S: POST POI 001 - To Undetained

Runoff = 0.17 cfs @ 1.13 hrs, Volume= 218 cf, Depth= 0.21"
Routed to Link 2L : POI 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2 Inch MRC Rainfall=1.20"

	Area (sf)	CN	Description
*	3,806	91	Urban industrial, 72% imp, HSG C
*	4,088	71	Meadow, non-grazed, HSG C
*	4,808	78	Meadow, non-grazed, HSG D
	12,702		Weighted Average
	9,962		78.43% Pervious Area
	2,740		21.57% Impervious Area

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

Summary for Pond 4P: Mod. Detention Basin 1

Inflow Area = 563,874 sf, 64.52% Impervious, Inflow Depth = 0.49" for 1.2 Inch MRC event
Inflow = 19.46 cfs @ 1.12 hrs, Volume= 22,820 cf
Outflow = 7.10 cfs @ 1.27 hrs, Volume= 22,820 cf, Atten= 64%, Lag= 9.1 min
Primary = 7.10 cfs @ 1.27 hrs, Volume= 22,820 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 288.07' @ 1.27 hrs Surf.Area= 9,603 sf Storage= 9,078 cf

Plug-Flow detention time= 15.3 min calculated for 22,818 cf (100% of inflow)
Center-of-Mass det. time= 15.3 min (90.4 - 75.1)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	164,860 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.00	111	0	0
287.00	3,780	1,946	1,946
288.00	9,192	6,486	8,432
289.00	15,171	12,182	20,613
290.00	21,678	18,425	39,038
291.00	26,906	24,292	63,330
292.00	33,181	30,044	93,373
293.00	39,698	36,440	129,813
293.83	44,754	35,048	164,860

Device	Routing	Invert	Outlet Devices
#1	Primary	283.70'	**42.0" Round Culvert** L= 103.0' Ke= 0.700 Inlet / Outlet Invert= 283.70' / 282.43' S= 0.0123 '/' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	291.28'	**24.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	286.00'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	291.75'	**36.0" W x 57.0" H Vert. Doghouse Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.10 cfs @ 1.27 hrs HW=288.07' TW=281.30' (Dynamic Tailwater)
└**1=Culvert** (Passes 7.10 cfs of 66.15 cfs potential flow)
  ├**2=Grate** (Controls 0.00 cfs)
  ├**3=Orifice/Grate** (Orifice Controls 7.10 cfs @ 5.79 fps)
  └**4=Doghouse Grate** (Controls 0.00 cfs)

Summary for Pond 5P: Non-Vegetated MRC Basin 2

Inflow Area = 210,685 sf, 77.32% Impervious, Inflow Depth = 0.76" for 1.2 Inch MRC event
Inflow = 10.58 cfs @ 1.11 hrs, Volume= 13,430 cf
Outflow = 0.03 cfs @ 2.17 hrs, Volume= 10,671 cf, Atten= 100%, Lag= 63.5 min
Primary = 0.03 cfs @ 2.17 hrs, Volume= 10,671 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 285.26' @ 2.17 hrs Surf.Area= 56,156 sf Storage= 13,339 cf

Plug-Flow detention time= 4,890.6 min calculated for 10,671 cf (79% of inflow)
Center-of-Mass det. time= 4,883.8 min (4,955.3 - 71.6)

Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 28,078 cf Overall x 0.0% Voids
#2	284.50'	23,560 cf	**Media Storage (Prismatic)** Listed below (Recalc) 84,234 cf Overall - 25,333 cf Embedded = 58,901 cf x 40.0% Voids
#3	287.50'	28,078 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 70,195 cf Overall x 40.0% Voids
#4	284.50'	12,514 cf	**60.0"W x 34.0"H x 265.00'L Parabolic Arch** x 5 Inside #2 14,133 cf Overall - 2.0" Wall Thickness = 12,514 cf
#5	284.50'	9,917 cf	**60.0"W x 34.0"H x 210.00'L Parabolic Arch** x 5 Inside #2 11,200 cf Overall - 2.0" Wall Thickness = 9,917 cf
		74,069 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.50	28,078	0	0
284.50	28,078	28,078	28,078

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
284.50	28,078	0	0
287.50	28,078	84,234	84,234

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.50	28,078	0	0
290.00	28,078	70,195	70,195

Device	Routing	Invert	Outlet Devices
#1	Primary	283.75'	**24.0" Round Culvert** L= 116.0' Ke= 0.700 Inlet / Outlet Invert= 283.75' / 283.00' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	285.25'	**10.0" W x 4.0" H Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	283.50'	**6.0" Vert. Perforated Underdrain** C= 0.600

			Limited to weir flow at low heads
#5	Device 1	287.50'	**4.0' long Bypass Weir** 2 End Contraction(s) 1.0' Crest Height
#6	Device 2	284.50'	**30.0" Vert. Chamber Connection** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 2.17 hrs HW=285.26' TW=281.30' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.03 cfs of 9.32 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 0.00 cfs @ 0.33 fps)
    - **6=Chamber Connection** (Passes 0.00 cfs of 0.62 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.02 cfs @ 4.08 fps)
    - **4=Perforated Underdrain** (Passes 0.02 cfs of 0.82 cfs potential flow)
  - **5=Bypass Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Mod. Detention Basin 2

Inflow Area = 941,558 sf, 67.33% Impervious, Inflow Depth > 0.52" for 1.2 Inch MRC event
Inflow = 12.56 cfs @ 1.13 hrs, Volume= 40,920 cf
Outflow = 6.09 cfs @ 1.75 hrs, Volume= 40,922 cf, Atten= 52%, Lag= 37.3 min
Primary = 6.09 cfs @ 1.75 hrs, Volume= 40,922 cf
Routed to Link 2L : POI 001
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : POI 001

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 281.58' @ 1.75 hrs Surf.Area= 11,703 sf Storage= 11,677 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 24.5 min (1,380.9 - 1,356.4)

Volume	Invert	Avail.Storage	Storage Description
#1	280.50'	68,907 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2A	279.75'	5,015 cf	**22.75'W x 156.27'L x 5.50'H Field A** 19,553 cf Overall - 7,016 cf Embedded = 12,537 cf x 40.0% Voids
#3A	280.50'	7,016 cf	**ADS_StormTech MC-3500 d +Cap** x 63 Inside #2 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 63 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		80,938 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.50	4,593	0	0
281.00	7,165	2,940	2,940
282.00	8,853	8,009	10,949
283.00	10,254	9,554	20,502
284.00	11,173	10,714	31,216
285.00	12,082	11,628	42,843
286.00	13,006	12,544	55,387
287.00	14,033	13,520	68,907

Device	Routing	Invert	Outlet Devices
#1	Primary	277.97'	**36.0" Round Culvert** L= 75.0' Ke= 0.700 Inlet / Outlet Invert= 277.97' / 276.58' S= 0.0185 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	285.14'	**24.0" x 48.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	283.00'	**30.0" W x 12.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.50'	**4.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#6	Secondary	285.25'	**50.0' long + 3.0 '/' SideZ x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=6.09 cfs @ 1.75 hrs HW=281.58' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 6.09 cfs of 43.65 cfs potential flow)
  - **2=Orifice/Grate** (Controls 0.00 cfs)
  - **3=Orifice/Grate** (Orifice Controls 5.51 cfs @ 4.13 fps)
  - **4=Orifice/Grate** (Controls 0.00 cfs)
  - **5=Underdrain Orifice** (Orifice Controls 0.58 cfs @ 6.66 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=279.75' TW=0.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 9P: Non-Vegetated MRC Basin 1

Inflow Area = 82,423 sf, 50.55% Impervious, Inflow Depth = 0.51" for 1.2 Inch MRC event
Inflow = 2.83 cfs @ 1.12 hrs, Volume= 3,528 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 4P : Mod. Detention Basin 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 291.89' @ 2.34 hrs Surf.Area= 25,202 sf Storage= 3,528 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	290.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 12,601 cf Overall x 0.0% Voids
#2	291.50'	8,900 cf	**Media Storage (Prismatic)** Listed below (Recalc) 37,803 cf Overall - 15,552 cf Embedded = 22,251 cf x 40.0% Voids
#3	294.50'	2,520 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 6,301 cf Overall x 40.0% Voids
#4	291.50'	6,517 cf	**60.0"W x 34.0"H x 115.00'L Parabolic Arch** x 6 Inside #2 7,360 cf Overall - 2.0" Wall Thickness = 6,517 cf
#5	291.50'	5,100 cf	**60.0"W x 34.0"H x 90.00'L Parabolic Arch** x 6 Inside #2 5,760 cf Overall - 2.0" Wall Thickness = 5,100 cf
#6	291.50'	2,153 cf	**60.0"W x 34.0"H x 228.00'L Parabolic Arch** Inside #2 2,432 cf Overall - 2.0" Wall Thickness = 2,153 cf
		25,191 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
290.50	12,601	0	0
291.50	12,601	12,601	12,601

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.50	12,601	0	0
294.50	12,601	37,803	37,803

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.50	12,601	0	0
295.00	12,601	6,301	6,301

Device	Routing	Invert	Outlet Devices
#1	Primary	290.50'	**18.0" Round Culvert** L= 87.0' Ke= 0.700 Inlet / Outlet Invert= 290.50' / 288.00' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	293.00'	**1.0" Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	294.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	290.50'	**4.0" Vert. Perforated Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 1	294.50'	**3.0' long Bypass Weir** 2 End Contraction(s) 0.5' Crest Height
#6	Device 2	291.50'	**12.0" Vert. Chamber Connection** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=290.50' TW=286.00' (Dynamic Tailwater)
- **1=Culvert** (Controls 0.00 cfs)
- **2=Weir Orifice** (Controls 0.00 cfs)
  - **6=Chamber Connection** (Controls 0.00 cfs)
- **3=Underdrain Orifice** (Controls 0.00 cfs)
  - **4=Perforated Underdrain** (Controls 0.00 cfs)
- **5=Bypass Weir** (Controls 0.00 cfs)

Summary for Link 2L: POI 001

Inflow Area = 954,260 sf, 66.72% Impervious, Inflow Depth > 0.52" for 1.2 Inch MRC event
Inflow = 6.12 cfs @ 1.75 hrs, Volume= 41,140 cf
Primary = 6.12 cfs @ 1.75 hrs, Volume= 41,140 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 4S: POSTS POI 001 - To Non-Vegetated MRC Basin 1

Runoff = 6.79 cfs @ 11.97 hrs, Volume= 14,932 cf, Depth= 2.17"
Routed to Pond 9P : Non-Vegetated MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
*	31,334	93	Urban industrial, 72% imp, HSG D
*	17,073	80	>75% Grass cover, Good, HSG D
*	14,913	78	Meadow, non-grazed, HSG D
*	19,103	98	Impervious
	82,423		Weighted Average
	40,760		49.45% Pervious Area
	41,663		50.55% Impervious Area

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

Summary for Subcatchment 5S: POST POI 001 - To Mod. Detention Basin 1

Runoff = 43.72 cfs @ 11.97 hrs, Volume= 94,981 cf, Depth= 2.37"
Routed to Pond 4P : Mod. Detention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
*	37,741	91	Urban industrial, 72% imp, HSG C
*	390,706	93	Urban industrial, 72% imp, HSG D
*	24,652	71	Meadow, non-grazed, HSG C
*	14,659	78	Meadow, non-grazed, HSG D
*	13,693	98	Impervious
	481,451		Weighted Average
	159,276		33.08% Pervious Area
	322,175		66.92% Impervious Area

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

Summary for Subcatchment 6S: POST POI 001 - To Non-Vegetated MRC Basin 2

Runoff = 19.97 cfs @ 11.97 hrs, Volume= 46,037 cf, Depth= 2.62"
Routed to Pond 5P : Non-Vegetated MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
*	42,859	93	Urban industrial, 72% imp, HSG D
*	17,360	80	>75% Grass cover, Good, HSG D
*	18,419	78	Meadow, non-grazed, HSG D
*	132,047	98	Impervious
	210,685		Weighted Average
	47,780		22.68% Pervious Area
	162,905		77.32% Impervious Area

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

Summary for Subcatchment 7S: POST POI 001 - To Mod. Detention Basin 2

Runoff = 14.77 cfs @ 11.97 hrs, Volume= 31,924 cf, Depth= 2.29"
Routed to Pond 6P : Mod. Detention Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
*	26,331	91	Urban industrial, 72% imp, HSG C
*	122,517	93	Urban industrial, 72% imp, HSG D
*	13,397	71	Meadow, non-grazed, HSG C
*	4,754	78	Meadow, non-grazed, HSG D
	166,999		Weighted Average
	59,828		35.83% Pervious Area
	107,171		64.17% Impervious Area

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

Summary for Subcatchment 8S: POST POI 001 - To Undetained

Runoff = 0.75 cfs @ 11.98 hrs, Volume= 1,557 cf, Depth= 1.47"
Routed to Link 2L : POI 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=3.24"

	Area (sf)	CN	Description
*	3,806	91	Urban industrial, 72% imp, HSG C
*	4,088	71	Meadow, non-grazed, HSG C
*	4,808	78	Meadow, non-grazed, HSG D
	12,702		Weighted Average
	9,962		78.43% Pervious Area
	2,740		21.57% Impervious Area

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

Summary for Pond 4P: Mod. Detention Basin 1

Inflow Area = 563,874 sf, 64.52% Impervious, Inflow Depth = 2.06" for 2-yr event
Inflow = 43.72 cfs @ 11.97 hrs, Volume= 96,951 cf
Outflow = 10.00 cfs @ 12.12 hrs, Volume= 96,950 cf, Atten= 77%, Lag= 8.9 min
Primary = 10.00 cfs @ 12.12 hrs, Volume= 96,950 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 289.49' @ 12.12 hrs Surf.Area= 18,365 sf Storage= 28,842 cf

Plug-Flow detention time= 21.6 min calculated for 96,945 cf (100% of inflow)
Center-of-Mass det. time= 21.5 min (862.5 - 841.0)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	164,860 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.00	111	0	0
287.00	3,780	1,946	1,946
288.00	9,192	6,486	8,432
289.00	15,171	12,182	20,613
290.00	21,678	18,425	39,038
291.00	26,906	24,292	63,330
292.00	33,181	30,044	93,373
293.00	39,698	36,440	129,813
293.83	44,754	35,048	164,860

Device	Routing	Invert	Outlet Devices
#1	Primary	283.70'	**42.0" Round Culvert** L= 103.0' Ke= 0.700 Inlet / Outlet Invert= 283.70' / 282.43' S= 0.0123 '/' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	291.28'	**24.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	286.00'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	291.75'	**36.0" W x 57.0" H Vert. Doghouse Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.00 cfs @ 12.12 hrs HW=289.49' TW=282.46' (Dynamic Tailwater)
└**1=Culvert** (Passes 10.00 cfs of 82.17 cfs potential flow)
  ├**2=Grate** (Controls 0.00 cfs)
  ├**3=Orifice/Grate** (Orifice Controls 10.00 cfs @ 8.15 fps)
  └**4=Doghouse Grate** (Controls 0.00 cfs)

Summary for Pond 5P: Non-Vegetated MRC Basin 2

Inflow Area = 210,685 sf, 77.32% Impervious, Inflow Depth = 2.62" for 2-yr event
Inflow = 19.97 cfs @ 11.97 hrs, Volume= 46,037 cf
Outflow = 1.23 cfs @ 12.66 hrs, Volume= 42,120 cf, Atten= 94%, Lag= 41.4 min
Primary = 1.23 cfs @ 12.66 hrs, Volume= 42,120 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 286.22' @ 12.66 hrs Surf.Area= 56,156 sf Storage= 28,901 cf

Plug-Flow detention time= 1,477.9 min calculated for 42,120 cf (91% of inflow)
Center-of-Mass det. time= 1,431.6 min (2,198.8 - 767.3)

Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 28,078 cf Overall x 0.0% Voids
#2	284.50'	23,560 cf	**Media Storage (Prismatic)** Listed below (Recalc) 84,234 cf Overall - 25,333 cf Embedded = 58,901 cf x 40.0% Voids
#3	287.50'	28,078 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 70,195 cf Overall x 40.0% Voids
#4	284.50'	12,514 cf	**60.0"W x 34.0"H x 265.00'L Parabolic Arch** x 5 Inside #2 14,133 cf Overall - 2.0" Wall Thickness = 12,514 cf
#5	284.50'	9,917 cf	**60.0"W x 34.0"H x 210.00'L Parabolic Arch** x 5 Inside #2 11,200 cf Overall - 2.0" Wall Thickness = 9,917 cf
		74,069 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.50	28,078	0	0
284.50	28,078	28,078	28,078

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
284.50	28,078	0	0
287.50	28,078	84,234	84,234

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.50	28,078	0	0
290.00	28,078	70,195	70,195

Device	Routing	Invert	Outlet Devices
#1	Primary	283.75'	**24.0" Round Culvert** L= 116.0' Ke= 0.700 Inlet / Outlet Invert= 283.75' / 283.00' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	285.25'	**10.0" W x 4.0" H Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	283.50'	**6.0" Vert. Perforated Underdrain** C= 0.600

			Limited to weir flow at low heads
#5	Device 1	287.50'	**4.0' long Bypass Weir** 2 End Contraction(s) 1.0' Crest Height
#6	Device 2	284.50'	**30.0" Vert. Chamber Connection** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=1.23 cfs @ 12.66 hrs HW=286.22' TW=282.90' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.23 cfs of 16.18 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 1.20 cfs @ 4.31 fps)
    - **6=Chamber Connection** (Passes 1.20 cfs of 16.07 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.03 cfs @ 6.24 fps)
    - **4=Perforated Underdrain** (Passes 0.03 cfs of 1.24 cfs potential flow)
  - **5=Bypass Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Mod. Detention Basin 2

Inflow Area = 941,558 sf, 67.33% Impervious, Inflow Depth > 2.18" for 2-yr event
Inflow = 24.61 cfs @ 11.98 hrs, Volume= 170,994 cf
Outflow = 10.06 cfs @ 12.92 hrs, Volume= 170,994 cf, Atten= 59%, Lag= 56.5 min
Primary = 10.06 cfs @ 12.92 hrs, Volume= 170,994 cf
Routed to Link 2L : POI 001
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : POI 001

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 282.94' @ 12.92 hrs Surf.Area= 13,722 sf Storage= 27,822 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 37.2 min (1,216.0 - 1,178.9)

Volume	Invert	Avail.Storage	Storage Description
#1	280.50'	68,907 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2A	279.75'	5,015 cf	**22.75'W x 156.27'L x 5.50'H Field A** 19,553 cf Overall - 7,016 cf Embedded = 12,537 cf x 40.0% Voids
#3A	280.50'	7,016 cf	**ADS_StormTech MC-3500 d +Cap** x 63 Inside #2 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 63 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		80,938 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.50	4,593	0	0
281.00	7,165	2,940	2,940
282.00	8,853	8,009	10,949
283.00	10,254	9,554	20,502
284.00	11,173	10,714	31,216
285.00	12,082	11,628	42,843
286.00	13,006	12,544	55,387
287.00	14,033	13,520	68,907

Device	Routing	Invert	Outlet Devices
#1	Primary	277.97'	**36.0" Round Culvert** L= 75.0' Ke= 0.700 Inlet / Outlet Invert= 277.97' / 276.58' S= 0.0185 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	285.14'	**24.0" x 48.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	283.00'	**30.0" W x 12.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.50'	**4.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#6	Secondary	285.25'	**50.0' long + 3.0 '/' SideZ x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=10.06 cfs @ 12.92 hrs HW=282.94' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 10.06 cfs of 55.92 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 9.30 cfs @ 6.98 fps)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Underdrain Orifice** (Orifice Controls 0.76 cfs @ 8.71 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=279.75' TW=0.00' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 9P: Non-Vegetated MRC Basin 1

Inflow Area = 82,423 sf, 50.55% Impervious, Inflow Depth = 2.17" for 2-yr event
Inflow = 6.79 cfs @ 11.97 hrs, Volume= 14,932 cf
Outflow = 0.01 cfs @ 24.12 hrs, Volume= 1,970 cf, Atten= 100%, Lag= 729.2 min
Primary = 0.01 cfs @ 24.12 hrs, Volume= 1,970 cf
Routed to Pond 4P : Mod. Detention Basin 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 293.24' @ 24.12 hrs Surf.Area= 25,202 sf Storage= 14,729 cf

Plug-Flow detention time= 2,702.5 min calculated for 1,970 cf (13% of inflow)
Center-of-Mass det. time= 2,463.4 min (3,253.5 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	290.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 12,601 cf Overall x 0.0% Voids
#2	291.50'	8,900 cf	**Media Storage (Prismatic)** Listed below (Recalc) 37,803 cf Overall - 15,552 cf Embedded = 22,251 cf x 40.0% Voids
#3	294.50'	2,520 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 6,301 cf Overall x 40.0% Voids
#4	291.50'	6,517 cf	**60.0"W x 34.0"H x 115.00'L Parabolic Arch** x 6 Inside #2 7,360 cf Overall - 2.0" Wall Thickness = 6,517 cf
#5	291.50'	5,100 cf	**60.0"W x 34.0"H x 90.00'L Parabolic Arch** x 6 Inside #2 5,760 cf Overall - 2.0" Wall Thickness = 5,100 cf
#6	291.50'	2,153 cf	**60.0"W x 34.0"H x 228.00'L Parabolic Arch** Inside #2 2,432 cf Overall - 2.0" Wall Thickness = 2,153 cf
		25,191 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
290.50	12,601	0	0
291.50	12,601	12,601	12,601

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.50	12,601	0	0
294.50	12,601	37,803	37,803

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.50	12,601	0	0
295.00	12,601	6,301	6,301

Device	Routing	Invert	Outlet Devices
#1	Primary	290.50'	**18.0" Round Culvert** L= 87.0' Ke= 0.700 Inlet / Outlet Invert= 290.50' / 288.00' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	293.00'	**1.0" Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	294.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	290.50'	**4.0" Vert. Perforated Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 1	294.50'	**3.0' long Bypass Weir** 2 End Contraction(s) 0.5' Crest Height
#6	Device 2	291.50'	**12.0" Vert. Chamber Connection** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 24.12 hrs HW=293.24' TW=286.25' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.01 cfs of 10.60 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 0.01 cfs @ 2.16 fps)
    - **6=Chamber Connection** (Passes 0.01 cfs of 1.86 cfs potential flow)
  - **3=Underdrain Orifice** (Controls 0.00 cfs)
    - **4=Perforated Underdrain** (Controls 0.00 cfs)
  - **5=Bypass Weir** (Controls 0.00 cfs)

Summary for Link 2L: POI 001

Inflow Area = 954,260 sf, 66.72% Impervious, Inflow Depth > 2.17" for 2-yr event
Inflow = 10.11 cfs @ 12.91 hrs, Volume= 172,551 cf
Primary = 10.11 cfs @ 12.91 hrs, Volume= 172,551 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 4S: POSTS POI 001 - To Non-Vegetated MRC Basin 1

Runoff = 9.09 cfs @ 11.97 hrs, Volume= 20,155 cf, Depth= 2.93"
Routed to Pond 9P : Non-Vegetated MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

	Area (sf)	CN	Description
*	31,334	93	Urban industrial, 72% imp, HSG D
*	17,073	80	>75% Grass cover, Good, HSG D
*	14,913	78	Meadow, non-grazed, HSG D
*	19,103	98	Impervious
	82,423		Weighted Average
	40,760		49.45% Pervious Area
	41,663		50.55% Impervious Area

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

Summary for Subcatchment 5S: POST POI 001 - To Mod. Detention Basin 1

Runoff = 57.43 cfs @ 11.97 hrs, Volume= 126,850 cf, Depth= 3.16"
Routed to Pond 4P : Mod. Detention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

	Area (sf)	CN	Description
*	37,741	91	Urban industrial, 72% imp, HSG C
*	390,706	93	Urban industrial, 72% imp, HSG D
*	24,652	71	Meadow, non-grazed, HSG C
*	14,659	78	Meadow, non-grazed, HSG D
*	13,693	98	Impervious
	481,451		Weighted Average
	159,276		33.08% Pervious Area
	322,175		66.92% Impervious Area

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

Summary for Subcatchment 6S: POST POI 001 - To Non-Vegetated MRC Basin 2

Runoff = 25.84 cfs @ 11.97 hrs, Volume= 60,131 cf, Depth= 3.42"
Routed to Pond 5P : Non-Vegetated MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

	Area (sf)	CN	Description
*	42,859	93	Urban industrial, 72% imp, HSG D
*	17,360	80	>75% Grass cover, Good, HSG D
*	18,419	78	Meadow, non-grazed, HSG D
*	132,047	98	Impervious
	210,685		Weighted Average
	47,780		22.68% Pervious Area
	162,905		77.32% Impervious Area

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

Summary for Subcatchment 7S: POST POI 001 - To Mod. Detention Basin 2

Runoff = 19.51 cfs @ 11.97 hrs, Volume= 42,849 cf, Depth= 3.08"
Routed to Pond 6P : Mod. Detention Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

	Area (sf)	CN	Description
*	26,331	91	Urban industrial, 72% imp, HSG C
*	122,517	93	Urban industrial, 72% imp, HSG D
*	13,397	71	Meadow, non-grazed, HSG C
*	4,754	78	Meadow, non-grazed, HSG D
	166,999		Weighted Average
	59,828		35.83% Pervious Area
	107,171		64.17% Impervious Area

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

Summary for Subcatchment 8S: POST POI 001 - To Undetained

Runoff = 1.08 cfs @ 11.97 hrs, Volume= 2,257 cf, Depth= 2.13"
Routed to Link 2L : POI 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-yr Rainfall=4.08"

	Area (sf)	CN	Description
*	3,806	91	Urban industrial, 72% imp, HSG C
*	4,088	71	Meadow, non-grazed, HSG C
*	4,808	78	Meadow, non-grazed, HSG D
	12,702		Weighted Average
	9,962		78.43% Pervious Area
	2,740		21.57% Impervious Area

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

Summary for Pond 4P: Mod. Detention Basin 1

Inflow Area = 563,874 sf, 64.52% Impervious, Inflow Depth = 2.85" for 5-yr event
Inflow = 57.43 cfs @ 11.97 hrs, Volume= 133,945 cf
Outflow = 11.00 cfs @ 12.14 hrs, Volume= 133,944 cf, Atten= 81%, Lag= 10.1 min
Primary = 11.00 cfs @ 12.14 hrs, Volume= 133,944 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 290.09' @ 12.14 hrs Surf.Area= 22,142 sf Storage= 40,983 cf

Plug-Flow detention time= 26.8 min calculated for 133,944 cf (100% of inflow)
Center-of-Mass det. time= 26.7 min (983.8 - 957.1)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	164,860 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.00	111	0	0
287.00	3,780	1,946	1,946
288.00	9,192	6,486	8,432
289.00	15,171	12,182	20,613
290.00	21,678	18,425	39,038
291.00	26,906	24,292	63,330
292.00	33,181	30,044	93,373
293.00	39,698	36,440	129,813
293.83	44,754	35,048	164,860

Device	Routing	Invert	Outlet Devices
#1	Primary	283.70'	**42.0" Round Culvert** L= 103.0' Ke= 0.700 Inlet / Outlet Invert= 283.70' / 282.43' S= 0.0123 '/' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	291.28'	**24.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	286.00'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	291.75'	**36.0" W x 57.0" H Vert. Doghouse Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=11.00 cfs @ 12.14 hrs HW=290.09' TW=282.99' (Dynamic Tailwater)
1=Culvert (Passes 11.00 cfs of 88.04 cfs potential flow)
2=Grate (Controls 0.00 cfs)
3=Orifice/Grate (Orifice Controls 11.00 cfs @ 8.96 fps)
4=Doghouse Grate (Controls 0.00 cfs)

Summary for Pond 5P: Non-Vegetated MRC Basin 2

Inflow Area = 210,685 sf, 77.32% Impervious, Inflow Depth = 3.42" for 5-yr event
Inflow = 25.84 cfs @ 11.97 hrs, Volume= 60,131 cf
Outflow = 1.62 cfs @ 12.63 hrs, Volume= 56,179 cf, Atten= 94%, Lag= 39.5 min
Primary = 1.62 cfs @ 12.63 hrs, Volume= 56,179 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 286.82' @ 12.63 hrs Surf.Area= 56,156 sf Storage= 37,711 cf

Plug-Flow detention time= 1,187.6 min calculated for 56,179 cf (93% of inflow)
Center-of-Mass det. time= 1,149.8 min (1,912.3 - 762.5)

Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 28,078 cf Overall x 0.0% Voids
#2	284.50'	23,560 cf	**Media Storage (Prismatic)** Listed below (Recalc) 84,234 cf Overall - 25,333 cf Embedded = 58,901 cf x 40.0% Voids
#3	287.50'	28,078 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 70,195 cf Overall x 40.0% Voids
#4	284.50'	12,514 cf	**60.0"W x 34.0"H x 265.00'L Parabolic Arch** x 5 Inside #2 14,133 cf Overall - 2.0" Wall Thickness = 12,514 cf
#5	284.50'	9,917 cf	**60.0"W x 34.0"H x 210.00'L Parabolic Arch** x 5 Inside #2 11,200 cf Overall - 2.0" Wall Thickness = 9,917 cf
		74,069 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.50	28,078	0	0
284.50	28,078	28,078	28,078

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
284.50	28,078	0	0
287.50	28,078	84,234	84,234

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.50	28,078	0	0
290.00	28,078	70,195	70,195

Device	Routing	Invert	Outlet Devices
#1	Primary	283.75'	**24.0" Round Culvert** L= 116.0' Ke= 0.700 Inlet / Outlet Invert= 283.75' / 283.00' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	285.25'	**10.0" W x 4.0" H Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	283.50'	**6.0" Vert. Perforated Underdrain** C= 0.600

			Limited to weir flow at low heads
#5	Device 1	287.50'	**4.0' long Bypass Weir** 2 End Contraction(s) 1.0' Crest Height
#6	Device 2	284.50'	**30.0" Vert. Chamber Connection** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=1.62 cfs @ 12.63 hrs HW=286.82' TW=283.28' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.62 cfs of 19.20 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 1.58 cfs @ 5.70 fps)
    - **6=Chamber Connection** (Passes 1.58 cfs of 24.63 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.04 cfs @ 7.27 fps)
    - **4=Perforated Underdrain** (Passes 0.04 cfs of 1.44 cfs potential flow)
  - **5=Bypass Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Mod. Detention Basin 2

Inflow Area = 941,558 sf, 67.33% Impervious, Inflow Depth > 2.97" for 5-yr event
Inflow = 30.64 cfs @ 11.98 hrs, Volume= 232,972 cf
Outflow = 13.25 cfs @ 12.61 hrs, Volume= 232,972 cf, Atten= 57%, Lag= 38.3 min
Primary = 13.25 cfs @ 12.61 hrs, Volume= 232,972 cf
Routed to Link 2L : POI 001
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : POI 001

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 283.28' @ 12.61 hrs Surf.Area= 14,069 sf Storage= 32,225 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 36.8 min (1,208.1 - 1,171.4)

Volume	Invert	Avail.Storage	Storage Description
#1	280.50'	68,907 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2A	279.75'	5,015 cf	**22.75'W x 156.27'L x 5.50'H Field A** 19,553 cf Overall - 7,016 cf Embedded = 12,537 cf x 40.0% Voids
#3A	280.50'	7,016 cf	**ADS_StormTech MC-3500 d +Cap** x 63 Inside #2 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 63 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		80,938 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.50	4,593	0	0
281.00	7,165	2,940	2,940
282.00	8,853	8,009	10,949
283.00	10,254	9,554	20,502
284.00	11,173	10,714	31,216
285.00	12,082	11,628	42,843
286.00	13,006	12,544	55,387
287.00	14,033	13,520	68,907

Device	Routing	Invert	Outlet Devices
#1	Primary	277.97'	**36.0" Round Culvert** L= 75.0' Ke= 0.700 Inlet / Outlet Invert= 277.97' / 276.58' S= 0.0185 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	285.14'	**24.0" x 48.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	283.00'	**30.0" W x 12.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.50'	**4.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#6	Secondary	285.25'	**50.0' long + 3.0 '/' SideZ x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=13.25 cfs @ 12.61 hrs HW=283.28' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 13.25 cfs of 58.64 cfs potential flow)
  - **2=Orifice/Grate** (Controls 0.00 cfs)
  - **3=Orifice/Grate** (Orifice Controls 10.04 cfs @ 7.53 fps)
  - **4=Orifice/Grate** (Orifice Controls 2.41 cfs @ 1.71 fps)
  - **5=Underdrain Orifice** (Orifice Controls 0.80 cfs @ 9.16 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=279.75' TW=0.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 9P: Non-Vegetated MRC Basin 1

Inflow Area = 82,423 sf, 50.55% Impervious, Inflow Depth = 2.93" for 5-yr event
Inflow = 9.09 cfs @ 11.97 hrs, Volume= 20,155 cf
Outflow = 0.02 cfs @ 24.11 hrs, Volume= 7,095 cf, Atten= 100%, Lag= 728.1 min
Primary = 0.02 cfs @ 24.11 hrs, Volume= 7,095 cf
Routed to Pond 4P : Mod. Detention Basin 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 293.89' @ 24.11 hrs Surf.Area= 25,202 sf Storage= 19,336 cf

Plug-Flow detention time= 3,420.2 min calculated for 7,095 cf (35% of inflow)
Center-of-Mass det. time= 3,277.0 min (4,061.2 - 784.2)

Volume	Invert	Avail.Storage	Storage Description
#1	290.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 12,601 cf Overall x 0.0% Voids
#2	291.50'	8,900 cf	**Media Storage (Prismatic)** Listed below (Recalc) 37,803 cf Overall - 15,552 cf Embedded = 22,251 cf x 40.0% Voids
#3	294.50'	2,520 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 6,301 cf Overall x 40.0% Voids
#4	291.50'	6,517 cf	**60.0"W x 34.0"H x 115.00'L Parabolic Arch** x 6 Inside #2 7,360 cf Overall - 2.0" Wall Thickness = 6,517 cf
#5	291.50'	5,100 cf	**60.0"W x 34.0"H x 90.00'L Parabolic Arch** x 6 Inside #2 5,760 cf Overall - 2.0" Wall Thickness = 5,100 cf
#6	291.50'	2,153 cf	**60.0"W x 34.0"H x 228.00'L Parabolic Arch** Inside #2 2,432 cf Overall - 2.0" Wall Thickness = 2,153 cf
		25,191 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
290.50	12,601	0	0
291.50	12,601	12,601	12,601

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.50	12,601	0	0
294.50	12,601	37,803	37,803

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.50	12,601	0	0
295.00	12,601	6,301	6,301

Device	Routing	Invert	Outlet Devices
#1	Primary	290.50'	**18.0" Round Culvert** L= 87.0' Ke= 0.700 Inlet / Outlet Invert= 290.50' / 288.00' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	293.00'	**1.0" Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	294.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	290.50'	**4.0" Vert. Perforated Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 1	294.50'	**3.0' long Bypass Weir** 2 End Contraction(s) 0.5' Crest Height
#6	Device 2	291.50'	**12.0" Vert. Chamber Connection** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 24.11 hrs HW=293.89' TW=286.30' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.02 cfs of 12.21 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 0.02 cfs @ 4.44 fps)
    - **6=Chamber Connection** (Passes 0.02 cfs of 3.57 cfs potential flow)
  - **3=Underdrain Orifice** (Controls 0.00 cfs)
    - **4=Perforated Underdrain** (Controls 0.00 cfs)
  - **5=Bypass Weir** (Controls 0.00 cfs)

Summary for Link 2L: POI 001

Inflow Area = 954,260 sf, 66.72% Impervious, Inflow Depth > 2.96" for 5-yr event
Inflow = 13.33 cfs @ 12.61 hrs, Volume= 235,229 cf
Primary = 13.33 cfs @ 12.61 hrs, Volume= 235,229 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 4S: POSTS POI 001 - To Non-Vegetated MRC Basin 1

Runoff = 11.00 cfs @ 11.97 hrs, Volume= 24,550 cf, Depth= 3.57"
Routed to Pond 9P : Non-Vegetated MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

	Area (sf)	CN	Description
*	31,334	93	Urban industrial, 72% imp, HSG D
*	17,073	80	>75% Grass cover, Good, HSG D
*	14,913	78	Meadow, non-grazed, HSG D
*	19,103	98	Impervious
	82,423		Weighted Average
	40,760		49.45% Pervious Area
	41,663		50.55% Impervious Area

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

Summary for Subcatchment 5S: POST POI 001 - To Mod. Detention Basin 1

Runoff = 68.68 cfs @ 11.97 hrs, Volume= 153,397 cf, Depth= 3.82"
Routed to Pond 4P : Mod. Detention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

	Area (sf)	CN	Description
*	37,741	91	Urban industrial, 72% imp, HSG C
*	390,706	93	Urban industrial, 72% imp, HSG D
*	24,652	71	Meadow, non-grazed, HSG C
*	14,659	78	Meadow, non-grazed, HSG D
*	13,693	98	Impervious
	481,451		Weighted Average
	159,276		33.08% Pervious Area
	322,175		66.92% Impervious Area

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

Summary for Subcatchment 6S: POST POI 001 - To Non-Vegetated MRC Basin 2

Runoff = 30.68 cfs @ 11.97 hrs, Volume= 71,834 cf, Depth= 4.09"
Routed to Pond 5P : Non-Vegetated MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

	Area (sf)	CN	Description
*	42,859	93	Urban industrial, 72% imp, HSG D
*	17,360	80	>75% Grass cover, Good, HSG D
*	18,419	78	Meadow, non-grazed, HSG D
*	132,047	98	Impervious
	210,685		Weighted Average
	47,780		22.68% Pervious Area
	162,905		77.32% Impervious Area

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

Summary for Subcatchment 7S: POST POI 001 - To Mod. Detention Basin 2

Runoff = 23.40 cfs @ 11.97 hrs, Volume= 51,972 cf, Depth= 3.73"
Routed to Pond 6P : Mod. Detention Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

	Area (sf)	CN	Description
*	26,331	91	Urban industrial, 72% imp, HSG C
*	122,517	93	Urban industrial, 72% imp, HSG D
*	13,397	71	Meadow, non-grazed, HSG C
*	4,754	78	Meadow, non-grazed, HSG D
	166,999		Weighted Average
	59,828		35.83% Pervious Area
	107,171		64.17% Impervious Area

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

Summary for Subcatchment 8S: POST POI 001 - To Undetained

Runoff = 1.36 cfs @ 11.97 hrs, Volume= 2,863 cf, Depth= 2.71"
Routed to Link 2L : POI 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=4.77"

	Area (sf)	CN	Description
*	3,806	91	Urban industrial, 72% imp, HSG C
*	4,088	71	Meadow, non-grazed, HSG C
*	4,808	78	Meadow, non-grazed, HSG D
	12,702		Weighted Average
	9,962		78.43% Pervious Area
	2,740		21.57% Impervious Area

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

Summary for Pond 4P: Mod. Detention Basin 1

Inflow Area = 563,874 sf, 64.52% Impervious, Inflow Depth = 3.51" for 10-yr event
Inflow = 68.68 cfs @ 11.97 hrs, Volume= 164,726 cf
Outflow = 11.68 cfs @ 12.15 hrs, Volume= 164,722 cf, Atten= 83%, Lag= 11.2 min
Primary = 11.68 cfs @ 12.15 hrs, Volume= 164,722 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 290.54' @ 12.15 hrs Surf.Area= 24,478 sf Storage= 51,399 cf

Plug-Flow detention time= 31.1 min calculated for 164,722 cf (100% of inflow)
Center-of-Mass det. time= 30.9 min (1,055.4 - 1,024.5)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	164,860 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.00	111	0	0
287.00	3,780	1,946	1,946
288.00	9,192	6,486	8,432
289.00	15,171	12,182	20,613
290.00	21,678	18,425	39,038
291.00	26,906	24,292	63,330
292.00	33,181	30,044	93,373
293.00	39,698	36,440	129,813
293.83	44,754	35,048	164,860

Device	Routing	Invert	Outlet Devices
#1	Primary	283.70'	**42.0" Round Culvert** L= 103.0' Ke= 0.700 Inlet / Outlet Invert= 283.70' / 282.43' S= 0.0123 '/' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	291.28'	**24.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	286.00'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	291.75'	**36.0" W x 57.0" H Vert. Doghouse Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=11.68 cfs @ 12.15 hrs HW=290.54' TW=283.36' (Dynamic Tailwater)
1=Culvert (Passes 11.68 cfs of 92.18 cfs potential flow)
- **2=Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 11.68 cfs @ 9.52 fps)
- **4=Doghouse Grate** (Controls 0.00 cfs)

Summary for Pond 5P: Non-Vegetated MRC Basin 2

Inflow Area = 210,685 sf, 77.32% Impervious, Inflow Depth = 4.09" for 10-yr event
Inflow = 30.68 cfs @ 11.97 hrs, Volume= 71,834 cf
Outflow = 1.93 cfs @ 12.62 hrs, Volume= 67,854 cf, Atten= 94%, Lag= 39.2 min
Primary = 1.93 cfs @ 12.62 hrs, Volume= 67,854 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 287.41' @ 12.62 hrs Surf.Area= 56,156 sf Storage= 45,004 cf

Plug-Flow detention time= 1,042.4 min calculated for 67,851 cf (94% of inflow)
Center-of-Mass det. time= 1,010.0 min (1,769.5 - 759.5)

Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 28,078 cf Overall x 0.0% Voids
#2	284.50'	23,560 cf	**Media Storage (Prismatic)** Listed below (Recalc) 84,234 cf Overall - 25,333 cf Embedded = 58,901 cf x 40.0% Voids
#3	287.50'	28,078 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 70,195 cf Overall x 40.0% Voids
#4	284.50'	12,514 cf	**60.0"W x 34.0"H x 265.00'L Parabolic Arch** x 5 Inside #2 14,133 cf Overall - 2.0" Wall Thickness = 12,514 cf
#5	284.50'	9,917 cf	**60.0"W x 34.0"H x 210.00'L Parabolic Arch** x 5 Inside #2 11,200 cf Overall - 2.0" Wall Thickness = 9,917 cf
		74,069 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.50	28,078	0	0
284.50	28,078	28,078	28,078

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
284.50	28,078	0	0
287.50	28,078	84,234	84,234

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.50	28,078	0	0
290.00	28,078	70,195	70,195

Device	Routing	Invert	Outlet Devices
#1	Primary	283.75'	**24.0" Round Culvert** L= 116.0' Ke= 0.700 Inlet / Outlet Invert= 283.75' / 283.00' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	285.25'	**10.0" W x 4.0" H Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	283.50'	**6.0" Vert. Perforated Underdrain** C= 0.600

			Limited to weir flow at low heads
#5	Device 1	287.50'	**4.0' long Bypass Weir** 2 End Contraction(s) 1.0' Crest Height
#6	Device 2	284.50'	**30.0" Vert. Chamber Connection** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=1.93 cfs @ 12.62 hrs HW=287.41' TW=283.40' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.93 cfs of 21.76 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 1.89 cfs @ 6.79 fps)
    - **6=Chamber Connection** (Passes 1.89 cfs of 30.43 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.04 cfs @ 8.15 fps)
    - **4=Perforated Underdrain** (Passes 0.04 cfs of 1.61 cfs potential flow)
  - **5=Bypass Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Mod. Detention Basin 2

Inflow Area = 941,558 sf, 67.33% Impervious, Inflow Depth > 3.63" for 10-yr event
Inflow = 35.39 cfs @ 11.97 hrs, Volume= 284,548 cf
Outflow = 15.64 cfs @ 12.40 hrs, Volume= 284,548 cf, Atten= 56%, Lag= 25.8 min
Primary = 15.64 cfs @ 12.40 hrs, Volume= 284,548 cf
Routed to Link 2L : POI 001
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : POI 001

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 283.43' @ 12.40 hrs Surf.Area= 14,202 sf Storage= 34,092 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 35.7 min (1,211.3 - 1,175.7)

Volume	Invert	Avail.Storage	Storage Description
#1	280.50'	68,907 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2A	279.75'	5,015 cf	**22.75'W x 156.27'L x 5.50'H Field A** 19,553 cf Overall - 7,016 cf Embedded = 12,537 cf x 40.0% Voids
#3A	280.50'	7,016 cf	**ADS_StormTech MC-3500 d +Cap** x 63 Inside #2 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 63 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		80,938 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.50	4,593	0	0
281.00	7,165	2,940	2,940
282.00	8,853	8,009	10,949
283.00	10,254	9,554	20,502
284.00	11,173	10,714	31,216
285.00	12,082	11,628	42,843
286.00	13,006	12,544	55,387
287.00	14,033	13,520	68,907

Device	Routing	Invert	Outlet Devices
#1	Primary	277.97'	**36.0" Round Culvert** L= 75.0' Ke= 0.700 Inlet / Outlet Invert= 277.97' / 276.58' S= 0.0185 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	285.14'	**24.0" x 48.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	283.00'	**30.0" W x 12.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.50'	**4.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#6	Secondary	285.25'	**50.0' long + 3.0 '/' SideZ x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=15.64 cfs @ 12.40 hrs HW=283.43' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 15.64 cfs of 59.74 cfs potential flow)
  - **2=Orifice/Grate** (Controls 0.00 cfs)
  - **3=Orifice/Grate** (Orifice Controls 10.33 cfs @ 7.75 fps)
  - **4=Orifice/Grate** (Orifice Controls 4.49 cfs @ 2.10 fps)
  - **5=Underdrain Orifice** (Orifice Controls 0.81 cfs @ 9.34 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=279.75' TW=0.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 9P: Non-Vegetated MRC Basin 1

Inflow Area = 82,423 sf, 50.55% Impervious, Inflow Depth = 3.57" for 10-yr event
Inflow = 11.00 cfs @ 11.97 hrs, Volume= 24,550 cf
Outflow = 0.10 cfs @ 23.37 hrs, Volume= 11,329 cf, Atten= 99%, Lag= 683.8 min
Primary = 0.10 cfs @ 23.37 hrs, Volume= 11,329 cf
Routed to Pond 4P : Mod. Detention Basin 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 294.53' @ 23.37 hrs Surf.Area= 37,803 sf Storage= 22,844 cf

Plug-Flow detention time= 3,697.2 min calculated for 11,328 cf (46% of inflow)
Center-of-Mass det. time= 3,572.1 min (4,352.4 - 780.3)

Volume	Invert	Avail.Storage	Storage Description
#1	290.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 12,601 cf Overall x 0.0% Voids
#2	291.50'	8,900 cf	**Media Storage (Prismatic)** Listed below (Recalc) 37,803 cf Overall - 15,552 cf Embedded = 22,251 cf x 40.0% Voids
#3	294.50'	2,520 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 6,301 cf Overall x 40.0% Voids
#4	291.50'	6,517 cf	**60.0"W x 34.0"H x 115.00'L Parabolic Arch** x 6 Inside #2 7,360 cf Overall - 2.0" Wall Thickness = 6,517 cf
#5	291.50'	5,100 cf	**60.0"W x 34.0"H x 90.00'L Parabolic Arch** x 6 Inside #2 5,760 cf Overall - 2.0" Wall Thickness = 5,100 cf
#6	291.50'	2,153 cf	**60.0"W x 34.0"H x 228.00'L Parabolic Arch** Inside #2 2,432 cf Overall - 2.0" Wall Thickness = 2,153 cf
		25,191 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
290.50	12,601	0	0
291.50	12,601	12,601	12,601

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.50	12,601	0	0
294.50	12,601	37,803	37,803

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.50	12,601	0	0
295.00	12,601	6,301	6,301

Device	Routing	Invert	Outlet Devices
#1	Primary	290.50'	**18.0" Round Culvert** L= 87.0' Ke= 0.700 Inlet / Outlet Invert= 290.50' / 288.00' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	293.00'	**1.0" Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	294.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	290.50'	**4.0" Vert. Perforated Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 1	294.50'	**3.0' long Bypass Weir** 2 End Contraction(s) 0.5' Crest Height
#6	Device 2	291.50'	**12.0" Vert. Chamber Connection** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.10 cfs @ 23.37 hrs HW=294.53' TW=286.39' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.10 cfs of 13.61 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 0.03 cfs @ 5.88 fps)
    - **6=Chamber Connection** (Passes 0.03 cfs of 4.68 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.00 cfs @ 0.63 fps)
    - **4=Perforated Underdrain** (Passes 0.00 cfs of 0.08 cfs potential flow)
  - **5=Bypass Weir** (Weir Controls 0.06 cfs @ 0.61 fps)

Summary for Link 2L: POI 001

Inflow Area = 954,260 sf, 66.72% Impervious, Inflow Depth > 3.61" for 10-yr event
Inflow = 15.78 cfs @ 12.39 hrs, Volume= 287,412 cf
Primary = 15.78 cfs @ 12.39 hrs, Volume= 287,412 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 4S: POSTS POI 001 - To Non-Vegetated MRC Basin 1

Runoff = 13.81 cfs @ 11.97 hrs, Volume= 31,094 cf, Depth= 4.53"
Routed to Pond 9P : Non-Vegetated MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

	Area (sf)	CN	Description
*	31,334	93	Urban industrial, 72% imp, HSG D
*	17,073	80	>75% Grass cover, Good, HSG D
*	14,913	78	Meadow, non-grazed, HSG D
*	19,103	98	Impervious
	82,423		Weighted Average
	40,760		49.45% Pervious Area
	41,663		50.55% Impervious Area

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

Summary for Subcatchment 5S: POST POI 001 - To Mod. Detention Basin 1

Runoff = 85.09 cfs @ 11.97 hrs, Volume= 192,639 cf, Depth= 4.80"
Routed to Pond 4P : Mod. Detention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

	Area (sf)	CN	Description
*	37,741	91	Urban industrial, 72% imp, HSG C
*	390,706	93	Urban industrial, 72% imp, HSG D
*	24,652	71	Meadow, non-grazed, HSG C
*	14,659	78	Meadow, non-grazed, HSG D
*	13,693	98	Impervious
	481,451		Weighted Average
	159,276		33.08% Pervious Area
	322,175		66.92% Impervious Area

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

Summary for Subcatchment 6S: POST POI 001 - To Non-Vegetated MRC Basin 2

Runoff = 37.78 cfs @ 11.97 hrs, Volume= 89,100 cf, Depth= 5.07"
Routed to Pond 5P : Non-Vegetated MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

	Area (sf)	CN	Description
*	42,859	93	Urban industrial, 72% imp, HSG D
*	17,360	80	>75% Grass cover, Good, HSG D
*	18,419	78	Meadow, non-grazed, HSG D
*	132,047	98	Impervious
	210,685		Weighted Average
	47,780		22.68% Pervious Area
	162,905		77.32% Impervious Area

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

Summary for Subcatchment 7S: POST POI 001 - To Mod. Detention Basin 2

Runoff = 29.10 cfs @ 11.97 hrs, Volume= 65,483 cf, Depth= 4.71"
Routed to Pond 6P : Mod. Detention Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

	Area (sf)	CN	Description
*	26,331	91	Urban industrial, 72% imp, HSG C
*	122,517	93	Urban industrial, 72% imp, HSG D
*	13,397	71	Meadow, non-grazed, HSG C
*	4,754	78	Meadow, non-grazed, HSG D
	166,999		Weighted Average
	59,828		35.83% Pervious Area
	107,171		64.17% Impervious Area

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

Summary for Subcatchment 8S: POST POI 001 - To Undetained

Runoff = 1.79 cfs @ 11.97 hrs, Volume= 3,788 cf, Depth= 3.58"
Routed to Link 2L : POI 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-yr Rainfall=5.78"

	Area (sf)	CN	Description
*	3,806	91	Urban industrial, 72% imp, HSG C
*	4,088	71	Meadow, non-grazed, HSG C
*	4,808	78	Meadow, non-grazed, HSG D
	12,702		Weighted Average
	9,962		78.43% Pervious Area
	2,740		21.57% Impervious Area

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

Summary for Pond 4P: Mod. Detention Basin 1

Inflow Area = 563,874 sf, 64.52% Impervious, Inflow Depth = 4.48" for 25-yr event
Inflow = 85.10 cfs @ 11.97 hrs, Volume= 210,511 cf
Outflow = 12.56 cfs @ 12.18 hrs, Volume= 210,508 cf, Atten= 85%, Lag= 12.8 min
Primary = 12.56 cfs @ 12.18 hrs, Volume= 210,508 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 291.14' @ 12.18 hrs Surf.Area= 27,804 sf Storage= 67,243 cf

Plug-Flow detention time= 37.8 min calculated for 210,508 cf (100% of inflow)
Center-of-Mass det. time= 37.7 min (1,010.9 - 973.3)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	164,860 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.00	111	0	0
287.00	3,780	1,946	1,946
288.00	9,192	6,486	8,432
289.00	15,171	12,182	20,613
290.00	21,678	18,425	39,038
291.00	26,906	24,292	63,330
292.00	33,181	30,044	93,373
293.00	39,698	36,440	129,813
293.83	44,754	35,048	164,860

Device	Routing	Invert	Outlet Devices
#1	Primary	283.70'	**42.0" Round Culvert** L= 103.0' Ke= 0.700 Inlet / Outlet Invert= 283.70' / 282.43' S= 0.0123 '/' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	291.28'	**24.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	286.00'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	291.75'	**36.0" W x 57.0" H Vert. Doghouse Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=12.56 cfs @ 12.18 hrs HW=291.14' TW=283.79' (Dynamic Tailwater)
└**1=Culvert** (Passes 12.56 cfs of 97.53 cfs potential flow)
  ├**2=Grate** (Controls 0.00 cfs)
  ├**3=Orifice/Grate** (Orifice Controls 12.56 cfs @ 10.23 fps)
  └**4=Doghouse Grate** (Controls 0.00 cfs)

Summary for Pond 5P: Non-Vegetated MRC Basin 2

Inflow Area = 210,685 sf, 77.32% Impervious, Inflow Depth = 5.07" for 25-yr event
Inflow = 37.78 cfs @ 11.97 hrs, Volume= 89,100 cf
Outflow = 6.75 cfs @ 12.15 hrs, Volume= 85,095 cf, Atten= 82%, Lag= 10.6 min
Primary = 6.75 cfs @ 12.15 hrs, Volume= 85,095 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 287.98' @ 12.15 hrs Surf.Area= 84,234 sf Storage= 51,432 cf

Plug-Flow detention time= 869.1 min calculated for 85,095 cf (96% of inflow)
Center-of-Mass det. time= 841.5 min (1,597.4 - 755.9)

Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 28,078 cf Overall x 0.0% Voids
#2	284.50'	23,560 cf	**Media Storage (Prismatic)** Listed below (Recalc) 84,234 cf Overall - 25,333 cf Embedded = 58,901 cf x 40.0% Voids
#3	287.50'	28,078 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 70,195 cf Overall x 40.0% Voids
#4	284.50'	12,514 cf	**60.0"W x 34.0"H x 265.00'L Parabolic Arch** x 5 Inside #2 14,133 cf Overall - 2.0" Wall Thickness = 12,514 cf
#5	284.50'	9,917 cf	**60.0"W x 34.0"H x 210.00'L Parabolic Arch** x 5 Inside #2 11,200 cf Overall - 2.0" Wall Thickness = 9,917 cf
		74,069 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.50	28,078	0	0
284.50	28,078	28,078	28,078

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
284.50	28,078	0	0
287.50	28,078	84,234	84,234

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.50	28,078	0	0
290.00	28,078	70,195	70,195

Device	Routing	Invert	Outlet Devices
#1	Primary	283.75'	**24.0" Round Culvert** L= 116.0' Ke= 0.700 Inlet / Outlet Invert= 283.75' / 283.00' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	285.25'	**10.0" W x 4.0" H Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	283.50'	**6.0" Vert. Perforated Underdrain** C= 0.600

			Limited to weir flow at low heads
#5	Device 1	287.50'	**4.0' long Bypass Weir** 2 End Contraction(s) 1.0' Crest Height
#6	Device 2	284.50'	**30.0" Vert. Chamber Connection** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=6.75 cfs @ 12.15 hrs HW=287.98' TW=283.78' (Dynamic Tailwater)
- **1=Culvert** (Passes 6.75 cfs of 24.00 cfs potential flow)
- **2=Weir Orifice** (Orifice Controls 2.14 cfs @ 7.71 fps)
  - **6=Chamber Connection** (Passes 2.14 cfs of 35.33 cfs potential flow)
- **3=Underdrain Orifice** (Orifice Controls 0.05 cfs @ 8.93 fps)
  - **4=Perforated Underdrain** (Passes 0.05 cfs of 1.76 cfs potential flow)
- **5=Bypass Weir** (Weir Controls 4.56 cfs @ 2.41 fps)

Summary for Pond 6P: Mod. Detention Basin 2

Inflow Area = 941,558 sf, 67.33% Impervious, Inflow Depth > 4.60" for 25-yr event
Inflow = 42.17 cfs @ 11.97 hrs, Volume= 361,085 cf
Outflow = 23.16 cfs @ 12.20 hrs, Volume= 361,085 cf, Atten= 45%, Lag= 13.5 min
Primary = 23.16 cfs @ 12.20 hrs, Volume= 361,085 cf
Routed to Link 2L : POI 001
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : POI 001

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 283.79' @ 12.20 hrs Surf.Area= 14,535 sf Storage= 38,766 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 34.3 min (1,140.8 - 1,106.5)

Volume	Invert	Avail.Storage	Storage Description
#1	280.50'	68,907 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2A	279.75'	5,015 cf	**22.75'W x 156.27'L x 5.50'H Field A** 19,553 cf Overall - 7,016 cf Embedded = 12,537 cf x 40.0% Voids
#3A	280.50'	7,016 cf	**ADS_StormTech MC-3500 d +Cap** x 63 Inside #2 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 63 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		80,938 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.50	4,593	0	0
281.00	7,165	2,940	2,940
282.00	8,853	8,009	10,949
283.00	10,254	9,554	20,502
284.00	11,173	10,714	31,216
285.00	12,082	11,628	42,843
286.00	13,006	12,544	55,387
287.00	14,033	13,520	68,907

Device	Routing	Invert	Outlet Devices
#1	Primary	277.97'	**36.0" Round Culvert** L= 75.0' Ke= 0.700 Inlet / Outlet Invert= 277.97' / 276.58' S= 0.0185 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	285.14'	**24.0" x 48.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	283.00'	**30.0" W x 12.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.50'	**4.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#6	Secondary	285.25'	**50.0' long + 3.0 '/' SideZ x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=23.16 cfs @ 12.20 hrs HW=283.79' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 23.16 cfs of 62.42 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 11.03 cfs @ 8.28 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 11.28 cfs @ 2.85 fps)
  └─**5=Underdrain Orifice** (Orifice Controls 0.85 cfs @ 9.78 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=279.75' TW=0.00' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 9P: Non-Vegetated MRC Basin 1

Inflow Area = 82,423 sf, 50.55% Impervious, Inflow Depth = 4.53" for 25-yr event
Inflow = 13.81 cfs @ 11.97 hrs, Volume= 31,094 cf
Outflow = 0.41 cfs @ 13.93 hrs, Volume= 17,872 cf, Atten= 97%, Lag= 117.7 min
Primary = 0.41 cfs @ 13.93 hrs, Volume= 17,872 cf
Routed to Pond 4P : Mod. Detention Basin 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 294.61' @ 13.93 hrs Surf.Area= 37,803 sf Storage= 23,235 cf

Plug-Flow detention time= 2,466.7 min calculated for 17,871 cf (57% of inflow)
Center-of-Mass det. time= 2,355.1 min (3,130.7 - 775.6)

Volume	Invert	Avail.Storage	Storage Description
#1	290.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 12,601 cf Overall x 0.0% Voids
#2	291.50'	8,900 cf	**Media Storage (Prismatic)** Listed below (Recalc) 37,803 cf Overall - 15,552 cf Embedded = 22,251 cf x 40.0% Voids
#3	294.50'	2,520 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 6,301 cf Overall x 40.0% Voids
#4	291.50'	6,517 cf	**60.0"W x 34.0"H x 115.00'L Parabolic Arch** x 6 Inside #2 7,360 cf Overall - 2.0" Wall Thickness = 6,517 cf
#5	291.50'	5,100 cf	**60.0"W x 34.0"H x 90.00'L Parabolic Arch** x 6 Inside #2 5,760 cf Overall - 2.0" Wall Thickness = 5,100 cf
#6	291.50'	2,153 cf	**60.0"W x 34.0"H x 228.00'L Parabolic Arch** Inside #2 2,432 cf Overall - 2.0" Wall Thickness = 2,153 cf
		25,191 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
290.50	12,601	0	0
291.50	12,601	12,601	12,601

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.50	12,601	0	0
294.50	12,601	37,803	37,803

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.50	12,601	0	0
295.00	12,601	6,301	6,301

Device	Routing	Invert	Outlet Devices
#1	Primary	290.50'	**18.0" Round Culvert** L= 87.0' Ke= 0.700 Inlet / Outlet Invert= 290.50' / 288.00' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	293.00'	**1.0" Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	294.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	290.50'	**4.0" Vert. Perforated Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 1	294.50'	**3.0' long Bypass Weir** 2 End Contraction(s) 0.5' Crest Height
#6	Device 2	291.50'	**12.0" Vert. Chamber Connection** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.41 cfs @ 13.93 hrs HW=294.61' TW=289.34' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.41 cfs of 13.77 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 0.03 cfs @ 6.03 fps)
    - **6=Chamber Connection** (Passes 0.03 cfs of 4.80 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.01 cfs @ 1.28 fps)
    - **4=Perforated Underdrain** (Passes 0.01 cfs of 0.14 cfs potential flow)
  - **5=Bypass Weir** (Weir Controls 0.37 cfs @ 1.12 fps)

Summary for Link 2L: POI 001

Inflow Area = 954,260 sf, 66.72% Impervious, Inflow Depth > 4.59" for 25-yr event
Inflow = 23.43 cfs @ 12.19 hrs, Volume= 364,873 cf
Primary = 23.43 cfs @ 12.19 hrs, Volume= 364,873 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 4S: POSTS POI 001 - To Non-Vegetated MRC Basin 1

Runoff = 16.15 cfs @ 11.97 hrs, Volume= 36,607 cf, Depth= 5.33"
Routed to Pond 9P : Non-Vegetated MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

	Area (sf)	CN	Description
*	31,334	93	Urban industrial, 72% imp, HSG D
*	17,073	80	>75% Grass cover, Good, HSG D
*	14,913	78	Meadow, non-grazed, HSG D
*	19,103	98	Impervious
	82,423		Weighted Average
	40,760		49.45% Pervious Area
	41,663		50.55% Impervious Area

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

Summary for Subcatchment 5S: POST POI 001 - To Mod. Detention Basin 1

Runoff = 98.71 cfs @ 11.97 hrs, Volume= 225,514 cf, Depth= 5.62"
Routed to Pond 4P : Mod. Detention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

	Area (sf)	CN	Description
*	37,741	91	Urban industrial, 72% imp, HSG C
*	390,706	93	Urban industrial, 72% imp, HSG D
*	24,652	71	Meadow, non-grazed, HSG C
*	14,659	78	Meadow, non-grazed, HSG D
*	13,693	98	Impervious
	481,451		Weighted Average
	159,276		33.08% Pervious Area
	322,175		66.92% Impervious Area

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

Summary for Subcatchment 6S: POST POI 001 - To Non-Vegetated MRC Basin 2

Runoff = 43.69 cfs @ 11.97 hrs, Volume= 103,544 cf, Depth= 5.90"
Routed to Pond 5P : Non-Vegetated MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

	Area (sf)	CN	Description
*	42,859	93	Urban industrial, 72% imp, HSG D
*	17,360	80	>75% Grass cover, Good, HSG D
*	18,419	78	Meadow, non-grazed, HSG D
*	132,047	98	Impervious
	210,685		Weighted Average
	47,780		22.68% Pervious Area
	162,905		77.32% Impervious Area

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

Summary for Subcatchment 7S: POST POI 001 - To Mod. Detention Basin 2

Runoff = 33.82 cfs @ 11.97 hrs, Volume= 76,818 cf, Depth= 5.52"
Routed to Pond 6P : Mod. Detention Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

	Area (sf)	CN	Description
*	26,331	91	Urban industrial, 72% imp, HSG C
*	122,517	93	Urban industrial, 72% imp, HSG D
*	13,397	71	Meadow, non-grazed, HSG C
*	4,754	78	Meadow, non-grazed, HSG D
	166,999		Weighted Average
	59,828		35.83% Pervious Area
	107,171		64.17% Impervious Area

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

Summary for Subcatchment 8S: POST POI 001 - To Undetained

Runoff = 2.15 cfs @ 11.97 hrs, Volume= 4,581 cf, Depth= 4.33"
Routed to Link 2L : POI 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-yr Rainfall=6.62"

	Area (sf)	CN	Description
*	3,806	91	Urban industrial, 72% imp, HSG C
*	4,088	71	Meadow, non-grazed, HSG C
*	4,808	78	Meadow, non-grazed, HSG D
	12,702		Weighted Average
	9,962		78.43% Pervious Area
	2,740		21.57% Impervious Area

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

Summary for Pond 4P: Mod. Detention Basin 1

Inflow Area = 563,874 sf, 64.52% Impervious, Inflow Depth = 5.30" for 50-yr event
Inflow = 98.73 cfs @ 11.97 hrs, Volume= 248,899 cf
Outflow = 18.52 cfs @ 12.14 hrs, Volume= 248,896 cf, Atten= 81%, Lag= 10.3 min
Primary = 18.52 cfs @ 12.14 hrs, Volume= 248,896 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 291.55' @ 12.14 hrs Surf.Area= 30,337 sf Storage= 78,978 cf

Plug-Flow detention time= 42.0 min calculated for 248,896 cf (100% of inflow)
Center-of-Mass det. time= 41.9 min (982.4 - 940.6)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	164,860 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.00	111	0	0
287.00	3,780	1,946	1,946
288.00	9,192	6,486	8,432
289.00	15,171	12,182	20,613
290.00	21,678	18,425	39,038
291.00	26,906	24,292	63,330
292.00	33,181	30,044	93,373
293.00	39,698	36,440	129,813
293.83	44,754	35,048	164,860

Device	Routing	Invert	Outlet Devices
#1	Primary	283.70'	**42.0" Round Culvert** L= 103.0' Ke= 0.700 Inlet / Outlet Invert= 283.70' / 282.43' S= 0.0123 '/' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	291.28'	**24.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	286.00'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	291.75'	**36.0" W x 57.0" H Vert. Doghouse Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=18.51 cfs @ 12.14 hrs HW=291.55' TW=284.29' (Dynamic Tailwater)
└**1=Culvert** (Passes 18.51 cfs of 100.93 cfs potential flow)
  ├**2=Grate** (Weir Controls 5.40 cfs @ 1.69 fps)
  ├**3=Orifice/Grate** (Orifice Controls 13.11 cfs @ 10.68 fps)
  └**4=Doghouse Grate** (Controls 0.00 cfs)

Summary for Pond 5P: Non-Vegetated MRC Basin 2

Inflow Area = 210,685 sf, 77.32% Impervious, Inflow Depth = 5.90" for 50-yr event
Inflow = 43.69 cfs @ 11.97 hrs, Volume= 103,544 cf
Outflow = 14.23 cfs @ 12.09 hrs, Volume= 99,523 cf, Atten= 67%, Lag= 7.2 min
Primary = 14.23 cfs @ 12.09 hrs, Volume= 99,523 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 288.40' @ 12.09 hrs Surf.Area= 84,234 sf Storage= 56,113 cf

Plug-Flow detention time= 761.8 min calculated for 99,517 cf (96% of inflow)
Center-of-Mass det. time= 738.1 min (1,491.6 - 753.5)

Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 28,078 cf Overall x 0.0% Voids
#2	284.50'	23,560 cf	**Media Storage (Prismatic)** Listed below (Recalc) 84,234 cf Overall - 25,333 cf Embedded = 58,901 cf x 40.0% Voids
#3	287.50'	28,078 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 70,195 cf Overall x 40.0% Voids
#4	284.50'	12,514 cf	**60.0"W x 34.0"H x 265.00'L Parabolic Arch** x 5 Inside #2 14,133 cf Overall - 2.0" Wall Thickness = 12,514 cf
#5	284.50'	9,917 cf	**60.0"W x 34.0"H x 210.00'L Parabolic Arch** x 5 Inside #2 11,200 cf Overall - 2.0" Wall Thickness = 9,917 cf
		74,069 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.50	28,078	0	0
284.50	28,078	28,078	28,078

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
284.50	28,078	0	0
287.50	28,078	84,234	84,234

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.50	28,078	0	0
290.00	28,078	70,195	70,195

Device	Routing	Invert	Outlet Devices
#1	Primary	283.75'	**24.0" Round Culvert** L= 116.0' Ke= 0.700 Inlet / Outlet Invert= 283.75' / 283.00' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	285.25'	**10.0" W x 4.0" H Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	283.50'	**6.0" Vert. Perforated Underdrain** C= 0.600

			Limited to weir flow at low heads
#5	Device 1	287.50'	**4.0' long Bypass Weir** 2 End Contraction(s) 1.0' Crest Height
#6	Device 2	284.50'	**30.0" Vert. Chamber Connection** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=14.22 cfs @ 12.09 hrs HW=288.40' TW=284.18' (Dynamic Tailwater)
- **1=Culvert** (Passes 14.22 cfs of 25.50 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 2.31 cfs @ 8.32 fps)
    - **6=Chamber Connection** (Passes 2.31 cfs of 38.48 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.05 cfs @ 9.46 fps)
    - **4=Perforated Underdrain** (Passes 0.05 cfs of 1.87 cfs potential flow)
  - **5=Bypass Weir** (Weir Controls 11.85 cfs @ 3.45 fps)

Summary for Pond 6P: Mod. Detention Basin 2

Inflow Area = 941,558 sf, 67.33% Impervious, Inflow Depth > 5.42" for 50-yr event
Inflow = 50.08 cfs @ 12.00 hrs, Volume= 425,237 cf
Outflow = 34.23 cfs @ 12.19 hrs, Volume= 425,237 cf, Atten= 32%, Lag= 11.5 min
Primary = 34.23 cfs @ 12.19 hrs, Volume= 425,237 cf
Routed to Link 2L : POI 001
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : POI 001

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 284.31' @ 12.19 hrs Surf.Area= 15,014 sf Storage= 45,471 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.0 min (1,096.6 - 1,063.6)

Volume	Invert	Avail.Storage	Storage Description
#1	280.50'	68,907 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2A	279.75'	5,015 cf	**22.75'W x 156.27'L x 5.50'H Field A** 19,553 cf Overall - 7,016 cf Embedded = 12,537 cf x 40.0% Voids
#3A	280.50'	7,016 cf	**ADS_StormTech MC-3500 d +Cap** x 63 Inside #2 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 63 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		80,938 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.50	4,593	0	0
281.00	7,165	2,940	2,940
282.00	8,853	8,009	10,949
283.00	10,254	9,554	20,502
284.00	11,173	10,714	31,216
285.00	12,082	11,628	42,843
286.00	13,006	12,544	55,387
287.00	14,033	13,520	68,907

Device	Routing	Invert	Outlet Devices
#1	Primary	277.97'	**36.0" Round Culvert** L= 75.0' Ke= 0.700 Inlet / Outlet Invert= 277.97' / 276.58' S= 0.0185 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	285.14'	**24.0" x 48.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	283.00'	**30.0" W x 12.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.50'	**4.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#6	Secondary	285.25'	**50.0' long + 3.0 '/' SideZ x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=34.23 cfs @ 12.19 hrs HW=284.31' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 34.23 cfs of 66.10 cfs potential flow)
  - **2=Orifice/Grate** (Controls 0.00 cfs)
  - **3=Orifice/Grate** (Orifice Controls 11.97 cfs @ 8.98 fps)
  - **4=Orifice/Grate** (Orifice Controls 21.35 cfs @ 4.27 fps)
  - **5=Underdrain Orifice** (Orifice Controls 0.91 cfs @ 10.38 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=279.75' TW=0.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 9P: Non-Vegetated MRC Basin 1

Inflow Area = 82,423 sf, 50.55% Impervious, Inflow Depth = 5.33" for 50-yr event
Inflow = 16.15 cfs @ 11.97 hrs, Volume= 36,607 cf
Outflow = 1.21 cfs @ 12.53 hrs, Volume= 23,385 cf, Atten= 93%, Lag= 33.4 min
Primary = 1.21 cfs @ 12.53 hrs, Volume= 23,385 cf
Routed to Pond 4P : Mod. Detention Basin 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 294.74' @ 12.53 hrs Surf.Area= 37,803 sf Storage= 23,855 cf

Plug-Flow detention time= 1,924.4 min calculated for 23,385 cf (64% of inflow)
Center-of-Mass det. time= 1,819.3 min (2,591.7 - 772.3)

Volume	Invert	Avail.Storage	Storage Description
#1	290.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 12,601 cf Overall x 0.0% Voids
#2	291.50'	8,900 cf	**Media Storage (Prismatic)** Listed below (Recalc) 37,803 cf Overall - 15,552 cf Embedded = 22,251 cf x 40.0% Voids
#3	294.50'	2,520 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 6,301 cf Overall x 40.0% Voids
#4	291.50'	6,517 cf	**60.0"W x 34.0"H x 115.00'L Parabolic Arch** x 6 Inside #2 7,360 cf Overall - 2.0" Wall Thickness = 6,517 cf
#5	291.50'	5,100 cf	**60.0"W x 34.0"H x 90.00'L Parabolic Arch** x 6 Inside #2 5,760 cf Overall - 2.0" Wall Thickness = 5,100 cf
#6	291.50'	2,153 cf	**60.0"W x 34.0"H x 228.00'L Parabolic Arch** Inside #2 2,432 cf Overall - 2.0" Wall Thickness = 2,153 cf
		25,191 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
290.50	12,601	0	0
291.50	12,601	12,601	12,601

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.50	12,601	0	0
294.50	12,601	37,803	37,803

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.50	12,601	0	0
295.00	12,601	6,301	6,301

Device	Routing	Invert	Outlet Devices
#1	Primary	290.50'	**18.0" Round Culvert** L= 87.0' Ke= 0.700 Inlet / Outlet Invert= 290.50' / 288.00' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	293.00'	**1.0" Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	294.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	290.50'	**4.0" Vert. Perforated Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 1	294.50'	**3.0' long Bypass Weir** 2 End Contraction(s) 0.5' Crest Height
#6	Device 2	291.50'	**12.0" Vert. Chamber Connection** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.21 cfs @ 12.53 hrs HW=294.73' TW=291.34' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.21 cfs of 13.83 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 0.03 cfs @ 6.27 fps)
    - **6=Chamber Connection** (Passes 0.03 cfs of 4.98 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.01 cfs @ 2.12 fps)
    - **4=Perforated Underdrain** (Passes 0.01 cfs of 0.20 cfs potential flow)
  - **5=Bypass Weir** (Weir Controls 1.16 cfs @ 1.68 fps)

Summary for Link 2L: POI 001

Inflow Area = 954,260 sf, 66.72% Impervious, Inflow Depth > 5.41" for 50-yr event
Inflow = 34.55 cfs @ 12.19 hrs, Volume= 429,818 cf
Primary = 34.55 cfs @ 12.19 hrs, Volume= 429,818 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 4S: POSTS POI 001 - To Non-Vegetated MRC Basin 1

Runoff = 18.72 cfs @ 11.97 hrs, Volume= 42,698 cf, Depth= 6.22"
Routed to Pond 9P : Non-Vegetated MRC Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

	Area (sf)	CN	Description
*	31,334	93	Urban industrial, 72% imp, HSG D
*	17,073	80	>75% Grass cover, Good, HSG D
*	14,913	78	Meadow, non-grazed, HSG D
*	19,103	98	Impervious
	82,423		Weighted Average
	40,760		49.45% Pervious Area
	41,663		50.55% Impervious Area

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

Summary for Subcatchment 5S: POST POI 001 - To Mod. Detention Basin 1

Runoff = 113.59 cfs @ 11.97 hrs, Volume= 261,692 cf, Depth= 6.52"
Routed to Pond 4P : Mod. Detention Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

	Area (sf)	CN	Description
*	37,741	91	Urban industrial, 72% imp, HSG C
*	390,706	93	Urban industrial, 72% imp, HSG D
*	24,652	71	Meadow, non-grazed, HSG C
*	14,659	78	Meadow, non-grazed, HSG D
*	13,693	98	Impervious
	481,451		Weighted Average
	159,276		33.08% Pervious Area
	322,175		66.92% Impervious Area

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

Summary for Subcatchment 6S: POST POI 001 - To Non-Vegetated MRC Basin 2

Runoff = 50.15 cfs @ 11.97 hrs, Volume= 119,427 cf, Depth= 6.80"
Routed to Pond 5P : Non-Vegetated MRC Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

	Area (sf)	CN	Description
*	42,859	93	Urban industrial, 72% imp, HSG D
*	17,360	80	>75% Grass cover, Good, HSG D
*	18,419	78	Meadow, non-grazed, HSG D
*	132,047	98	Impervious
	210,685		Weighted Average
	47,780		22.68% Pervious Area
	162,905		77.32% Impervious Area

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

Summary for Subcatchment 7S: POST POI 001 - To Mod. Detention Basin 2

Runoff = 38.99 cfs @ 11.97 hrs, Volume= 89,305 cf, Depth= 6.42"
Routed to Pond 6P : Mod. Detention Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

	Area (sf)	CN	Description
*	26,331	91	Urban industrial, 72% imp, HSG C
*	122,517	93	Urban industrial, 72% imp, HSG D
*	13,397	71	Meadow, non-grazed, HSG C
*	4,754	78	Meadow, non-grazed, HSG D
	166,999		Weighted Average
	59,828		35.83% Pervious Area
	107,171		64.17% Impervious Area

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

Summary for Subcatchment 8S: POST POI 001 - To Undetained

Runoff = 2.55 cfs @ 11.97 hrs, Volume= 5,467 cf, Depth= 5.17"
Routed to Link 2L : POI 001

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=7.54"

	Area (sf)	CN	Description
*	3,806	91	Urban industrial, 72% imp, HSG C
*	4,088	71	Meadow, non-grazed, HSG C
*	4,808	78	Meadow, non-grazed, HSG D
	12,702		Weighted Average
	9,962		78.43% Pervious Area
	2,740		21.57% Impervious Area

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

Summary for Pond 4P: Mod. Detention Basin 1

Inflow Area = 563,874 sf, 64.52% Impervious, Inflow Depth = 6.20" for 100-yr event
Inflow = 113.62 cfs @ 11.97 hrs, Volume= 291,167 cf
Outflow = 33.28 cfs @ 12.10 hrs, Volume= 291,164 cf, Atten= 71%, Lag= 8.2 min
Primary = 33.28 cfs @ 12.10 hrs, Volume= 291,164 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 291.88' @ 12.10 hrs Surf.Area= 32,443 sf Storage= 89,512 cf

Plug-Flow detention time= 41.1 min calculated for 291,149 cf (100% of inflow)
Center-of-Mass det. time= 41.0 min (954.6 - 913.6)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	164,860 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
286.00	111	0	0
287.00	3,780	1,946	1,946
288.00	9,192	6,486	8,432
289.00	15,171	12,182	20,613
290.00	21,678	18,425	39,038
291.00	26,906	24,292	63,330
292.00	33,181	30,044	93,373
293.00	39,698	36,440	129,813
293.83	44,754	35,048	164,860

Device	Routing	Invert	Outlet Devices
#1	Primary	283.70'	**42.0" Round Culvert** L= 103.0' Ke= 0.700 Inlet / Outlet Invert= 283.70' / 282.43' S= 0.0123 '/' Cc= 0.900 n= 0.012, Flow Area= 9.62 sf
#2	Device 1	291.28'	**24.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	286.00'	**15.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	291.75'	**36.0" W x 57.0" H Vert. Doghouse Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=33.25 cfs @ 12.10 hrs HW=291.88' TW=285.04' (Dynamic Tailwater)
└**1=Culvert** (Passes 33.25 cfs of 103.66 cfs potential flow)
  ├**2=Grate** (Weir Controls 18.32 cfs @ 2.54 fps)
  ├**3=Orifice/Grate** (Orifice Controls 13.55 cfs @ 11.04 fps)
  └**4=Doghouse Grate** (Orifice Controls 1.38 cfs @ 1.17 fps)

Summary for Pond 5P: Non-Vegetated MRC Basin 2

Inflow Area = 210,685 sf, 77.32% Impervious, Inflow Depth = 6.80" for 100-yr event
Inflow = 50.15 cfs @ 11.97 hrs, Volume= 119,427 cf
Outflow = 23.20 cfs @ 12.06 hrs, Volume= 115,388 cf, Atten= 54%, Lag= 5.7 min
Primary = 23.20 cfs @ 12.06 hrs, Volume= 115,388 cf
Routed to Pond 6P : Mod. Detention Basin 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 288.79' @ 12.06 hrs Surf.Area= 84,234 sf Storage= 60,450 cf

Plug-Flow detention time= 674.2 min calculated for 115,382 cf (97% of inflow)
Center-of-Mass det. time= 653.3 min (1,404.6 - 751.3)

Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 28,078 cf Overall x 0.0% Voids
#2	284.50'	23,560 cf	**Media Storage (Prismatic)** Listed below (Recalc) 84,234 cf Overall - 25,333 cf Embedded = 58,901 cf x 40.0% Voids
#3	287.50'	28,078 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 70,195 cf Overall x 40.0% Voids
#4	284.50'	12,514 cf	**60.0"W x 34.0"H x 265.00'L Parabolic Arch** x 5 Inside #2 14,133 cf Overall - 2.0" Wall Thickness = 12,514 cf
#5	284.50'	9,917 cf	**60.0"W x 34.0"H x 210.00'L Parabolic Arch** x 5 Inside #2 11,200 cf Overall - 2.0" Wall Thickness = 9,917 cf
		74,069 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.50	28,078	0	0
284.50	28,078	28,078	28,078

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
284.50	28,078	0	0
287.50	28,078	84,234	84,234

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
287.50	28,078	0	0
290.00	28,078	70,195	70,195

Device	Routing	Invert	Outlet Devices
#1	Primary	283.75'	**24.0" Round Culvert** L= 116.0' Ke= 0.700 Inlet / Outlet Invert= 283.75' / 283.00' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	285.25'	**10.0" W x 4.0" H Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	284.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	283.50'	**6.0" Vert. Perforated Underdrain** C= 0.600

			Limited to weir flow at low heads
#5	Device 1	287.50'	**4.0' long Bypass Weir** 2 End Contraction(s) 1.0' Crest Height
#6	Device 2	284.50'	**30.0" Vert. Chamber Connection** C= 0.600
			Limited to weir flow at low heads

Primary OutFlow Max=23.17 cfs @ 12.06 hrs HW=288.79' TW=284.75' (Dynamic Tailwater)
- **1=Culvert** (Passes 23.17 cfs of 26.80 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 2.45 cfs @ 8.84 fps)
    - **6=Chamber Connection** (Passes 2.45 cfs of 41.18 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.05 cfs @ 9.67 fps)
    - **4=Perforated Underdrain** (Passes 0.05 cfs of 1.90 cfs potential flow)
  - **5=Bypass Weir** (Weir Controls 20.66 cfs @ 4.29 fps)

Summary for Pond 6P: Mod. Detention Basin 2

Inflow Area = 941,558 sf, 67.33% Impervious, Inflow Depth > 6.32" for 100-yr event
Inflow = 72.77 cfs @ 12.04 hrs, Volume= 495,858 cf
Outflow = 50.40 cfs @ 12.19 hrs, Volume= 495,858 cf, Atten= 31%, Lag= 9.0 min
Primary = 50.08 cfs @ 12.19 hrs, Volume= 495,814 cf
Routed to Link 2L : POI 001
Secondary = 0.33 cfs @ 12.19 hrs, Volume= 43 cf
Routed to Link 2L : POI 001

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 285.27' @ 12.19 hrs Surf.Area= 15,886 sf Storage= 58,161 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 31.6 min (1,057.4 - 1,025.8)

Volume	Invert	Avail.Storage	Storage Description
#1	280.50'	68,907 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2A	279.75'	5,015 cf	**22.75'W x 156.27'L x 5.50'H Field A** 19,553 cf Overall - 7,016 cf Embedded = 12,537 cf x 40.0% Voids
#3A	280.50'	7,016 cf	**ADS_StormTech MC-3500 d +Cap** x 63 Inside #2 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 63 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		80,938 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.50	4,593	0	0
281.00	7,165	2,940	2,940
282.00	8,853	8,009	10,949
283.00	10,254	9,554	20,502
284.00	11,173	10,714	31,216
285.00	12,082	11,628	42,843
286.00	13,006	12,544	55,387
287.00	14,033	13,520	68,907

Device	Routing	Invert	Outlet Devices
#1	Primary	277.97'	**36.0" Round Culvert** L= 75.0' Ke= 0.700 Inlet / Outlet Invert= 277.97' / 276.58' S= 0.0185 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	285.14'	**24.0" x 48.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	280.50'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	283.00'	**30.0" W x 12.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	279.50'	**4.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#6	Secondary	285.25'	**50.0' long + 3.0 '/' SideZ x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=50.07 cfs @ 12.19 hrs HW=285.27' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 50.07 cfs of 72.32 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 3.64 cfs @ 1.18 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 13.52 cfs @ 10.14 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 31.91 cfs @ 6.38 fps)
  └─**5=Underdrain Orifice** (Orifice Controls 0.99 cfs @ 11.40 fps)

Secondary OutFlow Max=0.32 cfs @ 12.19 hrs HW=285.27' TW=0.00' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 0.32 cfs @ 0.34 fps)

Summary for Pond 9P: Non-Vegetated MRC Basin 1

Inflow Area = 82,423 sf, 50.55% Impervious, Inflow Depth = 6.22" for 100-yr event
Inflow = 18.72 cfs @ 11.97 hrs, Volume= 42,698 cf
Outflow = 3.75 cfs @ 12.13 hrs, Volume= 29,475 cf, Atten= 80%, Lag= 9.8 min
Primary = 3.75 cfs @ 12.13 hrs, Volume= 29,475 cf
Routed to Pond 4P : Mod. Detention Basin 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Peak Elev= 294.99' @ 12.13 hrs Surf.Area= 37,803 sf Storage= 25,160 cf

Plug-Flow detention time= 1,554.8 min calculated for 29,475 cf (69% of inflow)
Center-of-Mass det. time= 1,455.7 min (2,225.0 - 769.3)

Volume	Invert	Avail.Storage	Storage Description
#1	290.50'	0 cf	**Internal Water Storage (Prismatic)** Listed below (Recalc) 12,601 cf Overall x 0.0% Voids
#2	291.50'	8,900 cf	**Media Storage (Prismatic)** Listed below (Recalc) 37,803 cf Overall - 15,552 cf Embedded = 22,251 cf x 40.0% Voids
#3	294.50'	2,520 cf	**Rock Bed Above Media (Prismatic)** Listed below (Recalc) 6,301 cf Overall x 40.0% Voids
#4	291.50'	6,517 cf	**60.0"W x 34.0"H x 115.00'L Parabolic Arch** x 6 Inside #2 7,360 cf Overall - 2.0" Wall Thickness = 6,517 cf
#5	291.50'	5,100 cf	**60.0"W x 34.0"H x 90.00'L Parabolic Arch** x 6 Inside #2 5,760 cf Overall - 2.0" Wall Thickness = 5,100 cf
#6	291.50'	2,153 cf	**60.0"W x 34.0"H x 228.00'L Parabolic Arch** Inside #2 2,432 cf Overall - 2.0" Wall Thickness = 2,153 cf
		25,191 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
290.50	12,601	0	0
291.50	12,601	12,601	12,601

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
291.50	12,601	0	0
294.50	12,601	37,803	37,803

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.50	12,601	0	0
295.00	12,601	6,301	6,301

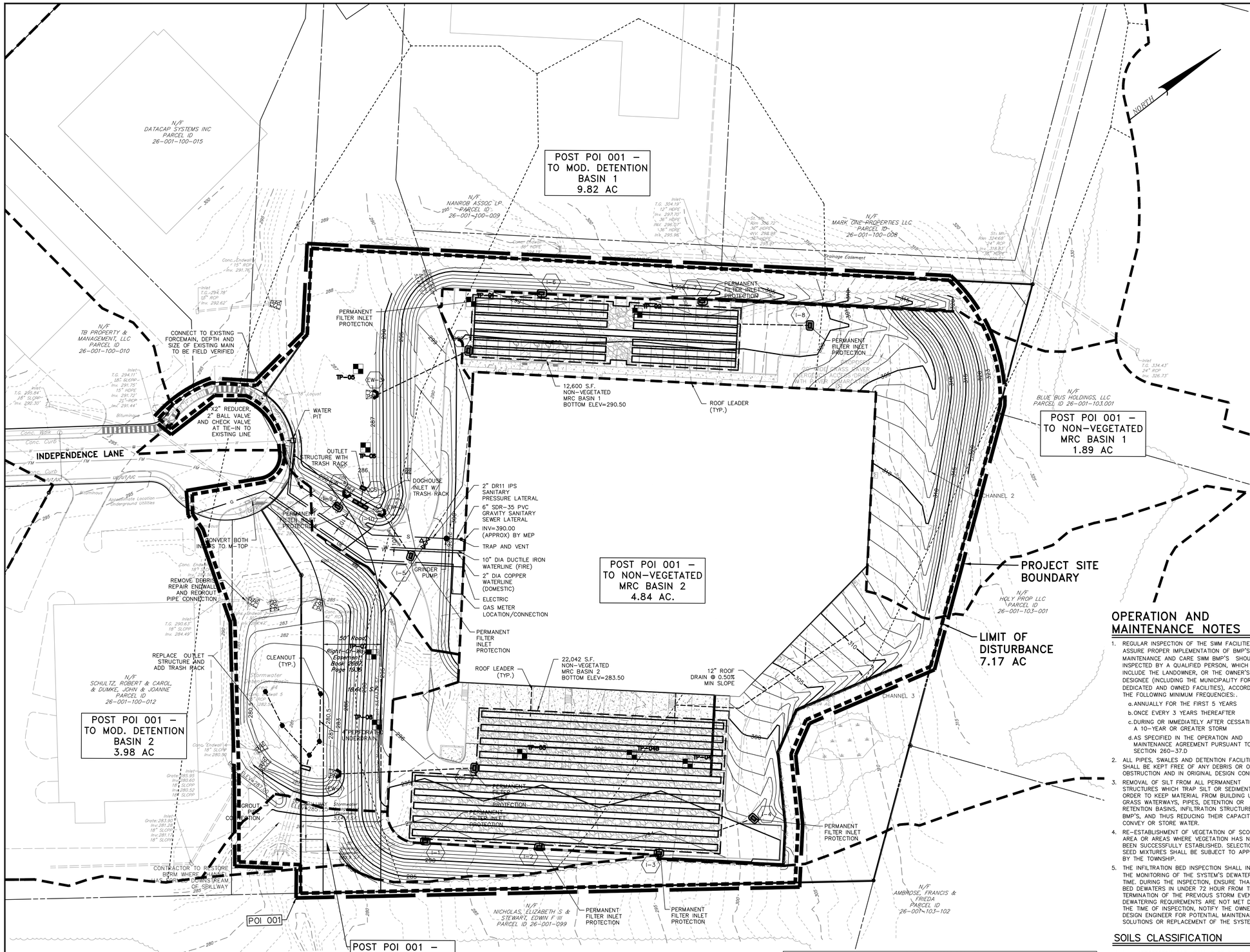
Device	Routing	Invert	Outlet Devices
#1	Primary	290.50'	**18.0" Round Culvert** L= 87.0' Ke= 0.700 Inlet / Outlet Invert= 290.50' / 288.00' S= 0.0287 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	293.00'	**1.0" Vert. Weir Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	294.50'	**1.0" Vert. Underdrain Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 3	290.50'	**4.0" Vert. Perforated Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 1	294.50'	**3.0' long Bypass Weir** 2 End Contraction(s) 0.5' Crest Height
#6	Device 2	291.50'	**12.0" Vert. Chamber Connection** C= 0.600 Limited to weir flow at low heads

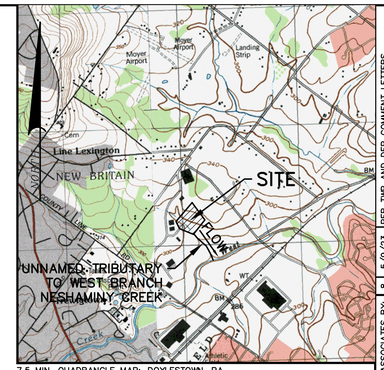
Primary OutFlow Max=3.74 cfs @ 12.13 hrs HW=294.99' TW=291.87' (Dynamic Tailwater)
- **1=Culvert** (Passes 3.74 cfs of 13.27 cfs potential flow)
  - **2=Weir Orifice** (Orifice Controls 0.04 cfs @ 6.73 fps)
    - **6=Chamber Connection** (Passes 0.04 cfs of 5.34 cfs potential flow)
  - **3=Underdrain Orifice** (Orifice Controls 0.02 cfs @ 3.24 fps)
    - **4=Perforated Underdrain** (Passes 0.02 cfs of 0.30 cfs potential flow)
  - **5=Bypass Weir** (Weir Controls 3.69 cfs @ 2.58 fps)

Summary for Link 2L: POI 001

Inflow Area = 954,260 sf, 66.72% Impervious, Inflow Depth > 6.30" for 100-yr event
Inflow = 50.78 cfs @ 12.19 hrs, Volume= 501,325 cf
Primary = 50.78 cfs @ 12.19 hrs, Volume= 501,325 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs





7.5 MIN. QUADRANGLE MAP: DOYLESTOWN, PA

LOCATION MAP

SCALE – 1"=800'

LEGEND

BENCHMARK
CONCRETE MONUMENT
FOUND PROPERTY MARKER
CALCULATED PROPERTY MARKER
SIGN
MAILBOX
LIGHT POLE
GUY WIRE
UTILITY POLE
GAS METER
GAS VALVE
WATER VALVE
WATER METER
HYDRANT
INLET
SANITARY MANHOLE
STORM MANHOLE
ELECTRIC MANHOLE
UNKNOWN STRUCTURE
ELECTRIC BOX
CABLE BOX
TELEPHONE BOX
TREE LINE
BRUSH LINE
FENCE LINE
WATER LINE
GAS LINE
SANITARY SEWER LINE
UNDERGROUND ELECTRIC
UNDERGROUND TELEPHONE
UNDERGROUND CABLE
OVERHEAD ELECTRIC
OVERHEAD TELEPHONE
OVERHEAD CABLE
STORM PIPE
4" WHITE PAINT LINE
4" DOUBLE YELLOW PAINT LINE
RIGHT OF WAY LINE
PROPERTY LINE
ADJOINER PROPERTY LINE
MAJOR CONTOUR (5')
MINOR CONTOUR (1')
GIS CONTOUR (2')
WETLANDS
EASEMENT LINE
RAILROAD TRACKS
SOIL TYPE BOUNDARY LINE
SOIL TYPE DESIGNATION
PROPOSED SETBACK LINE
PROPOSED PAVEMENT
PROPOSED BUILDING
PROPOSED CONCRETE
PROPOSED PAVEMENT MARKING
PROPOSED CLEAR SITE TRIANGLE
PROPOSED CONTOUR LINE
PROPOSED SPOT ELEVATION
PROPOSED FINISHED FLOOR ELEVATION
LIMITS OF DISTURBANCE
PROJECT SITE BOUNDARY
PROPOSED WATER LINE
PROPOSED SANITARY SEWER LINE
PROPOSED SANITARY SEWER STRUCTURE LABEL
PROPOSED MANHOLE
PROPOSED STORM INLET
PROPOSED STORM HEADWALL/ENDWALL
PROPOSED PIPE OUTLET PROTECTION
PERMANENT INLET PROTECTION
PROPOSED STORM PIPE
PROPOSED STORM STRUCTURE LABEL

OPERATION AND MAINTENANCE NOTES

1. REGULAR INSPECTION OF THE SWM FACILITIES. TO ASSURE PROPER IMPLEMENTATION OF BMP'S, MAINTENANCE AND CARE SWM BMP'S SHOULD BE INSPECTED BY A QUALIFIED PERSON, WHICH MAY INCLUDE THE LANDOWNER, OR THE OWNER'S DESIGNEE (INCLUDING THE MUNICIPALITY FOR DEDICATED AND OWNED FACILITIES), ACCORDING TO THE FOLLOWING MINIMUM FREQUENCIES:.
   a. ANNUALLY FOR THE FIRST 5 YEARS
   b. ONCE EVERY 3 YEARS THEREAFTER
   c. DURING OR IMMEDIATELY AFTER CESSATION OF A 10-YEAR OR GREATER STORM
   d. AS SPECIFIED IN THE OPERATION AND MAINTENANCE AGREEMENT PURSUANT TO SECTION 260-37.D
2. ALL PIPES, SWALES AND DETENTION FACILITIES SHALL BE KEPT FREE OF ANY DEBRIS OR OTHER OBSTRUCTION AND IN ORIGINAL DESIGN CONDITION.
3. REMOVAL OF SILT FROM ALL PERMANENT STRUCTURES WHICH TRAP SILT OR SEDIMENT IN ORDER TO KEEP MATERIAL FROM BUILDING UP IN GRASS WATERWAYS, PIPES, DETENTION OR RETENTION BASINS, INFILTRATION STRUCTURES, OR BMP'S, AND THUS REDUCING THEIR CAPACITY TO CONVEY OR STORE WATER.
4. RE-ESTABLISHMENT OF VEGETATION OF SCOURED AREA OR AREAS WHERE VEGETATION HAS NOT BEEN SUCCESSFULLY ESTABLISHED. SELECTION OF SEED MIXTURES SHALL BE SUBJECT TO APPROVAL BY THE TOWNSHIP.
5. THE INFILTRATION BED INSPECTION SHALL INCLUDE THE MONITORING OF THE SYSTEM'S DEWATERING TIME. DURING THE INSPECTION, ENSURE THAT THE BED DEWATERS IN UNDER 72 HOUR FROM THE TERMINATION OF THE PREVIOUS STORM EVENT. IF DEWATERING REQUIREMENTS ARE NOT MET DURING THE TIME OF INSPECTION, NOTIFY THE OWNER AND DESIGN ENGINEER FOR POTENTIAL MAINTENANCE SOLUTIONS OR REPLACEMENT OF THE SYSTEM.

SOILS CLASSIFICATION

AbA: ABBOTTSTON SILT LOAM, 0 TO 3 PERCENT SLOPES

ReB: READINGTON SILT LOAM, 3 TO 8 PERCENT SLOPES

RIC: REAVILLE CHANNERY SILT LOAM, 8 TO 15 PERCENT SLOPES

RECEIVING WATER CLASSIFICATION WATER QUALITY DESIGNATION

- UNNAMED TRIBUTARY TO WEST BRANCH NESHAMINY CREEK
  - DESIGNATED USE: WARM WATER FISHES (WWF) AND MIGRATORY FISH (MF)
  - EXISTING USE: NO SEPARATE CLASSIFICATION

INFILTRATION TEST RESULTS

TEST LOCATION	SURFACE ELEVATION (FT)	PROPOSED TEST ELEVATION (FT)	ACTUAL TEST ELEVATION (FT)	LIMITING ZONE ELEVATION (FT)	INFILTRATION RATE (IN/HR)*
TP-1	294	290	292	WEATHERED BEDROCK AT 290	0
TP-2	298	290	296.5	WEATHERED BEDROCK AT 294.5	0
TP-3	290	288	289	WEATHERED BEDROCK AT 287	0
TP-4A	298	288	NO TEST	WEATHERED BEDROCK AT 296.7	NO TEST
TP-5	288	288	287.5	GROUNDWATER AT 285.5	0
TP-6	288	288	287.5	GROUNDWATER AT 285.5	0
TP-7	286	282	281	WEATHERED BEDROCK AT 281	0
TP-8	285	282	NO TEST	WEATHERED BEDROCK AT 284	NO TEST

TP-4B 290 288 NO TEST WEATHERED BEDROCK AT 289 NO TEST

*INFILTRATION RATES REPRESENT THE RATES RECORDED IN THE FIELD AND NO SAFETY FACTOR HAS BEEN APPLIED

DESIGN ENGINEER CERTIFICATION

I, DERYK SHAW, ON THIS DATE _____ HEREBY CERTIFY THAT THE SWM SITE PLAN MEETS ALL DESIGN STANDARDS AND CRITERIA OF THE NESHAMINY CREEK WATERSHED ACT 167 STORMWATER MANAGEMENT ORDINANCE OR PLAN.

_____

LANDOWNER CERTIFICATION

ANY REVISION TO THE APPROVED SWM SITE PLAN MUST BE APPROVED BY THE MUNICIPALITY AND THAT A REVISED E&S PLAN MUST BE SUBMITTED TO THE CONSERVATION DISTRICT.

LANDOWNER: _____

DATE: _____

NO.	DATE	REVISION
8	5/9/23	PER TWP AND DEP COMMENT LETTERS
7	4/6/23	PER TWP COMMENT LETTERS
6	01/27/23	PER TWP COMMENT LETTERS
5	11/23/22	PER TWP AND DEP COMMENT LETTERS
4	10/24/22	CLIENT CHANGES
3	09/20/22	CLIENT REVISIONS
2	08/19/22	PER BCCD AND TWP COMMENT LETTERS
1	07/14/22	PER CNBSA REVIEW

FOR RETTEW ASSOCIATES BY:

XREFS:
111902019-SV-BASE
111902019-LD-BASE
111902019-LD-GRTL
111902019-LD-GRTL1
111902019-LD-EROS
111902019-LD-LAND
111902019-SV-SWM

MANAGER: KIM M. FASNACHT
DESIGN BY: MJB | CHKD BY: KMF
SURV. CHIEF: | FIELDBOOK NO. DATA COLLECTOR
DRAWN BY: JMS | CHKD BY: JAM

DRAWING REFERENCE: C:\LDAD\System\Software\Autodesk\Temp\AC4\Publish_13132\111902019-Prelim_Final LD Plan.dwg

CLIENT
101 INDEPENDENCE LANE ASSOCIATES, LLC
ONE TOWER BRIDGE
100 FRONT STREET, SUITE 560
WEST CONSHOHOCKEN, PA 19428

SCALE
1"=40'
0 20' 40' 80' 120'

RETTEW
RETTEW Associates, Inc.
3020 Columbia Avenue, Lancaster, PA 17603
Phone (717) 435-8366
Email info@rettew.com
Website www.rettew.com
Engineers • Planners • Surveyors • Landscape Architects
Environmental Consultants

PCSM PLAN
PRELIMINARY/FINAL LAND DEVELOPMENT PLAN
141 INDEPENDENCE LANE
NEW BRITAIN TOWNSHIP BUCKS COUNTY, PA

DATE: 6/9/2022
SHEET NO. 23 OF 26
DWG. NO. 111902019

Appendix 2.0

Appendix 3.0

NAD83

KEY MAP

SCALE: 1" = 100'

Runoff Calculation CN Worksheets

Project: PAC250095.00: Hanover Industrial - Chalfont

Description: Pre-Development

$Q = [(P - 0.2S)^2 / (P + 0.8S)] * 1/12 * 43,560$, where $S = (1000/CN) - 10$ and:

P = 3.24 Rainfall (in)

Catchment Areas

Description	HSG C / CN Meadow	HSG C / CN Woods, Good Condition	HSG D / CN Meadow	HSG D / CN Woods, Good Condition	Impervious Impervious	Impervious Impervious as Meadow	Impervious Impervious as Meadow	Total Area (Ac)	Composite CN	Runoff Q (cuft)
	71	70	78	77	98	71	78			
POA #1 to West Branch Neshaminy Creek										
POA #1	0.620	0.204	25.830	2.517	0.292	0.292		29.755	78	140,288
Total	0.620	0.204	25.830	2.517	0.292	0.292		29.755		140,288
POA #2 to UNT 02875 to West Branch Neshaminy Creek										
POA #2			4.899	1.156	0.142		0.142	6.339	78	30,594
Total			4.899	1.156	0.142		0.142	6.339		30,594
POA #3 to UNT 02874 to West Branch Neshaminy Creek										
POA #3	0.257		3.339	0.750				4.346	77	20,009
Total	0.257		3.339	0.750				4.346		20,009
Totals										
POA #2 to UNT 02875 to West Totals:	0.877	0.204	34.068	4.423	0.434	0.292	0.284	40.440		190,891

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
URBAN DESIGN & PLANNING
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE BOHLER CIVIL DESIGN AND CONTENT OF THIS PLAN ARE COPYRIGHTED AND SHALL NOT BE COPIED OR USED FOR ANY PURPOSE WITHOUT THE EXPRESS AUTHORIZATION FROM BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE
PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

OVERALL PRE DEVELOPMENT DRAINAGE AREA MAP

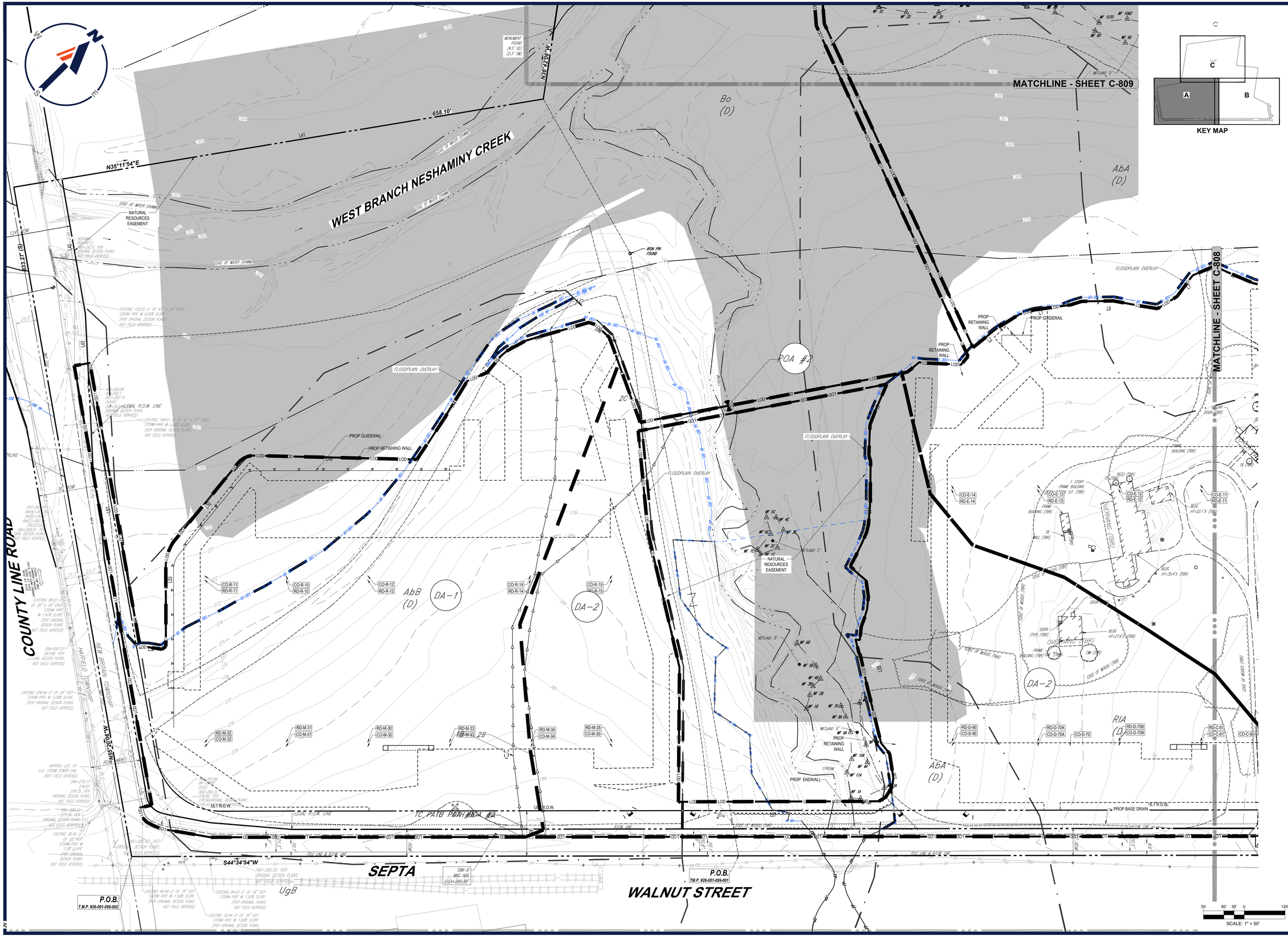
SHEET NUMBER:

C-01

OF 102

REVISION 1 - 07/28/2026

Jul 29, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-DRIN-PAC250095.00-1A-----LAYOUT C-01 OVRL PRED
JV



BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE EXCLUSIVELY AND SOLELY FOR USE BY BOHLER. IT MAY NOT BE COPIED OR USED FOR ANY PURPOSE WITHOUT BOHLER'S AUTHORIZATION FROM BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER

1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE

PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

PRE DEVELOPMENT DRAINAGE AREA MAP

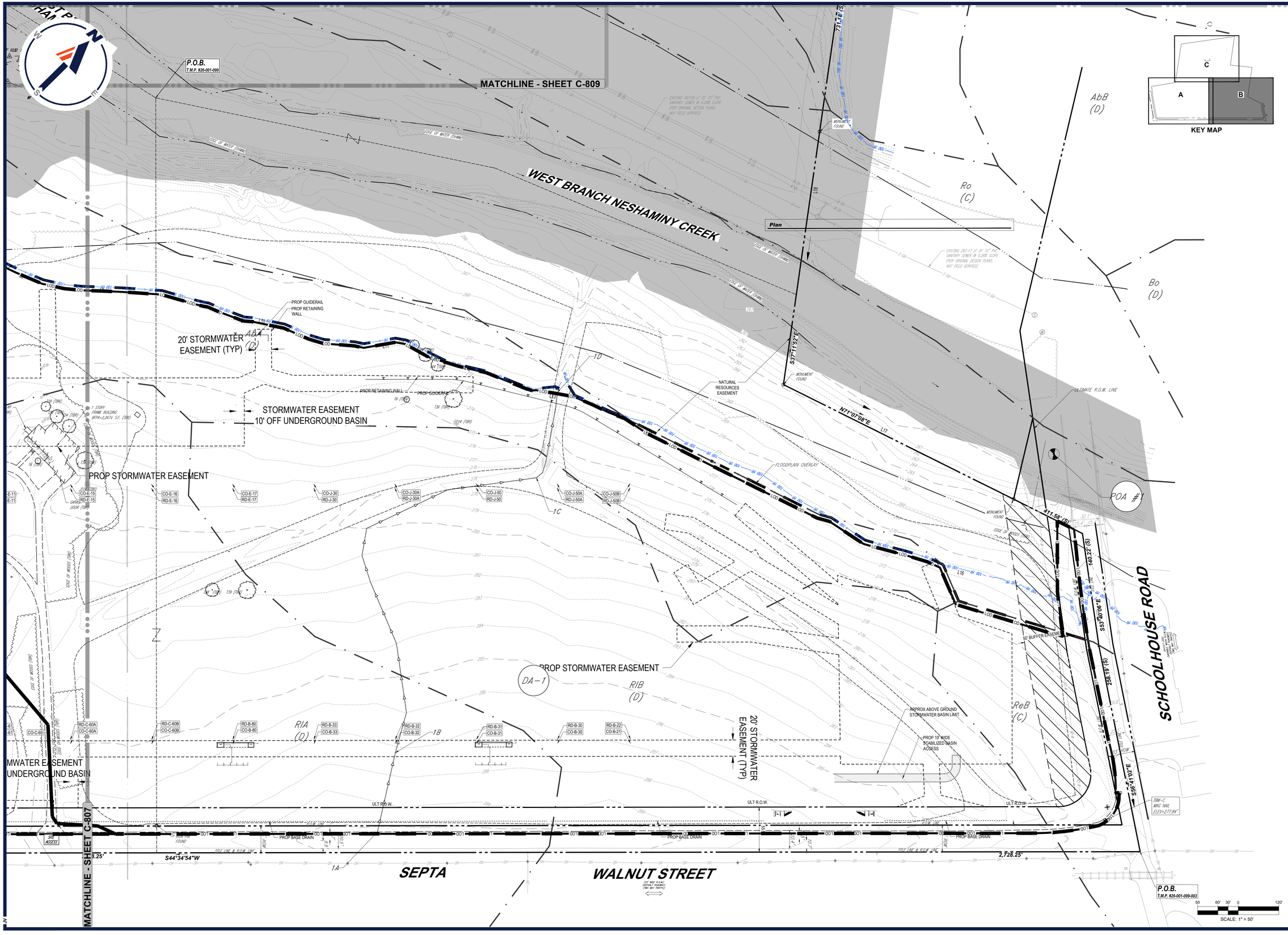
SHEET NUMBER:

C-02

OF 102

REVISION 1 - 07/28/2026

Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWING\PLAN SET\CIVIL SITE PLANS\P-CIVL-DRIN-PAC250095.00-1A.----\LAYOUT: C-02 PRED A
JW



Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-DRIN+PAC250095.00-1A-----LAYOUT: C-03 PRED B
JV

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE COPIED OR USED FOR ANY PURPOSE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED, SIGNED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE
PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

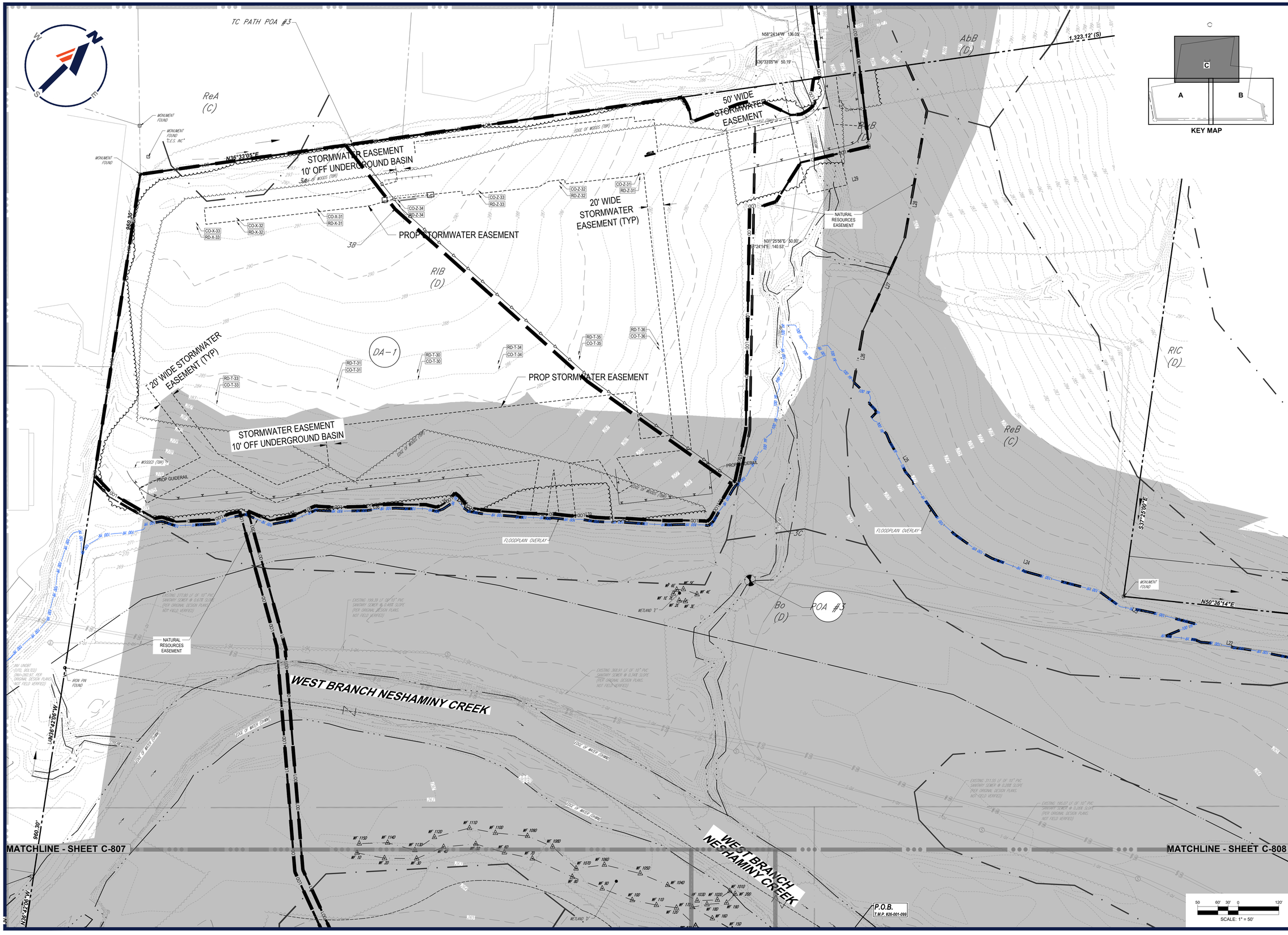
SHEET TITLE:

PRE DEVELOPMENT DRAINAGE AREA MAP

SHEET NUMBER:

C-03
OF 102

REVISION 1 - 07/28/2026



Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-DRIN-PAC250095.00-1A-----LAYOUT1 C-04 PRED C
M. KEARSE

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE WORK CIVIL DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED, USED FOR ANY PURPOSE, REPRODUCED OR TRANSFERRED TO ANY OTHER PARTY WITHOUT THE EXPRESS WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.
©2026 BOHLER

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND
COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE
PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

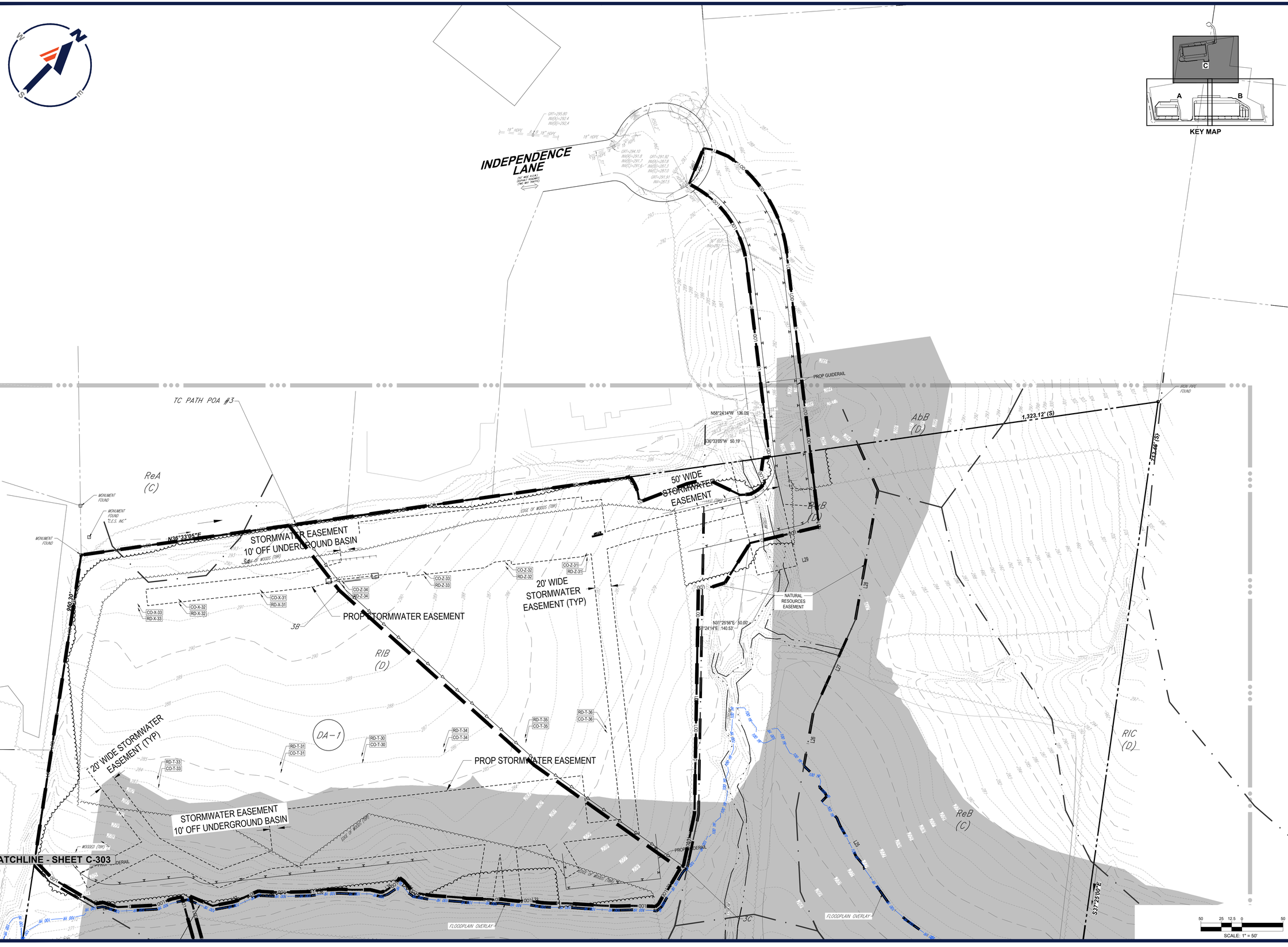
PRE DEVELOPMENT DRAINAGE AREA MAP

SHEET NUMBER:

C-04

OF 102

REVISION 1 - 07/28/2026



BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN IS FOR CONCEPTUAL PURPOSES ONLY AND SHALL NOT BE SCALED OR USED FOR ANY PURPOSE. IF ANY CONSTRUCTION AUTHORIZATION IS RELEASED FROM BOHLER, ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS. LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE
PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

PRE DEVELOPMENT DRAINAGE AREA MAP

SHEET NUMBER:

C-05
OF 102

REVISION 1 - 07/28/2026

Jul 26, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-DRIN-PAC250095.00-1A---LAYOUT: C-05 PRED D
JN

NAD83

KEY MAP

SCALE: 1" = 100'

Runoff Calculation CN Worksheets

Project: PAC250095.00: Hanover Industrial - Chalfont

Description: Post-Development

$Q = [(P - 0.2S)^2 / (P + 0.8S)] * 1/12 * 43.560$, where $S = (1000/CN) - 10$ and:

P = 3.24

Catchment Areas

Description	HSG C / CN: Open Space (Lawns), Good Condition 74	HSG C / CN: Woods, Good Condition 70	HSG D / CN: Open Space (Lawns), Good Condition 80	HSG D / CN: Woods, Good Condition 77	Impervious 98	Total Area (Ac)	Composite CN	Runoff Q (cuft)
POA #1 to West Branch Neshaminy Creek								
DA-1	0.222		1.658		4.859	6.739	93	62,524
DA-2			0.137		7.977	8.114	98	87,795
DA-3			0.587		3.830	4.417	96	44,864
DA-4			0.310	3.275		3.585	77	16,359
DA-5			0.381		2.500	2.881	96	29,273
DA-6	0.255	0.084	0.328	0.089	2.580	3.336	93	31,516
DA-7			0.299		3.954	4.253	97	44,719
DA-8	0.374		3.905		0.101	4.380	80	22,855
Total	0.851	0.084	7.605	3.364	25.801	37.705		339,905
POA #2 to UNT 02875 to West Branch Neshaminy Creek								
Bypass POA #2			1.462		0.030	1.492	80	7,931
Total			1.462		0.030	1.492		7,931
POA #3 to UNT 02874 to West Branch Neshaminy Creek								
Bypass to POA #3	0.072		1.171			1.243	80	6,368
Total	0.072		1.171			1.243		6,368
Totals								
Total	0.923	0.084	10.238	3.364	25.831	40.440		354,205

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
INDUSTRIAL ENGINEERING
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE BOHLER CIVIL DESIGN AND CONTENT OF THIS PLAN ARE COPYRIGHTED AND SHALL NOT BE COPIED OR USED FOR ANY PURPOSE WITHOUT THE EXPRESS AUTHORIZATION FROM BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER

1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE

PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

OVERALL POST DEVELOPMENT DRAINAGE AREA MAP

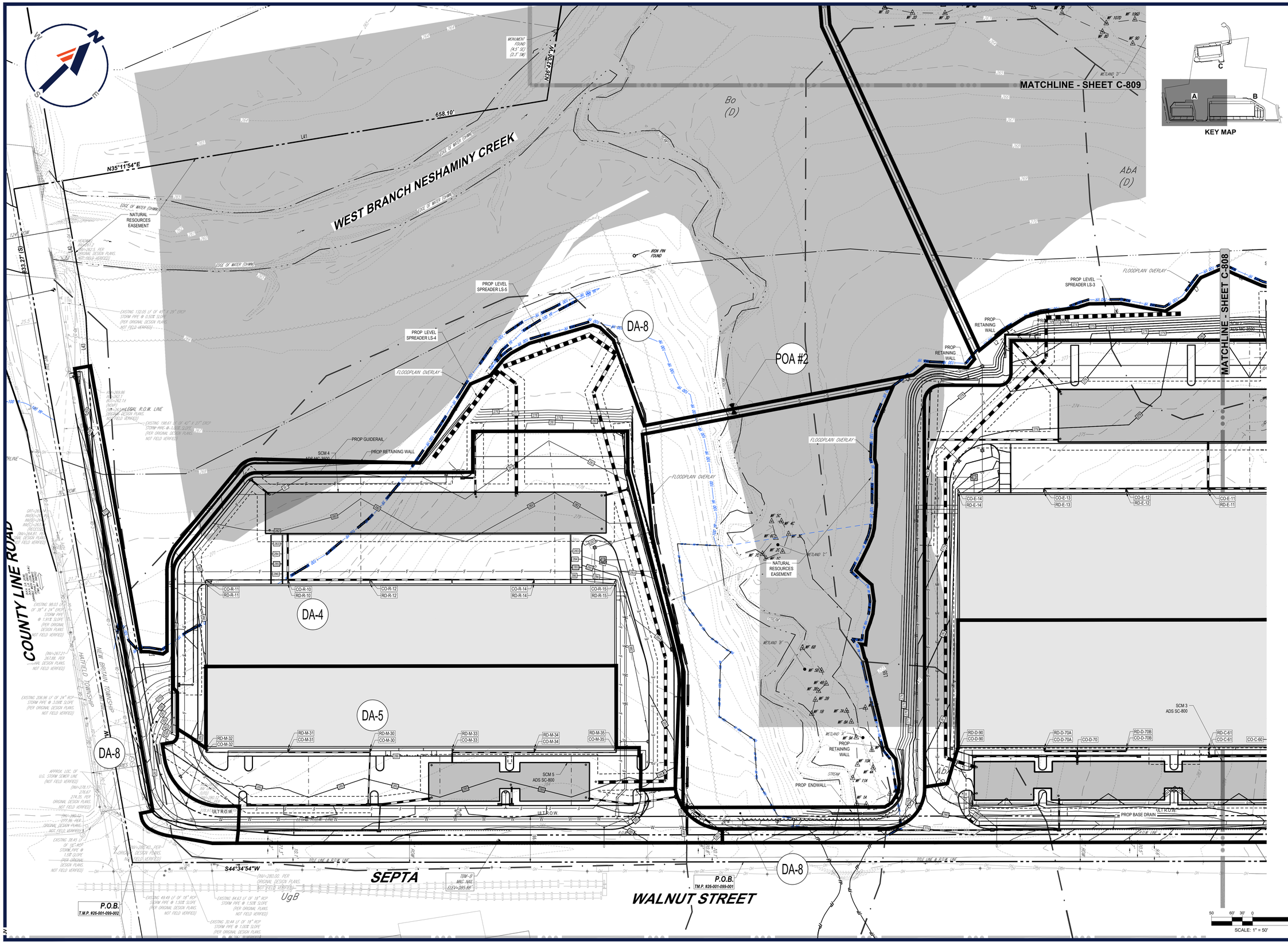
SHEET NUMBER:

C-06

OF 102

REVISION 1 - 07/28/2026

Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-DRIN+PAC250095.00-1A-----LAYOUT: C-06 OVRL PSTD



BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
LIGHTING DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE WORK, CIVIL DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED OR USED FOR ANY PURPOSE, WITHOUT THE EXPRESS AUTHORIZATION FROM BOHLER. ONLY APPROVED, SIGNED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD NEW BRITAIN TOWNSHIP BUCKS COUNTY, PA

BOHLER

1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE

PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

POST DEVELOPMENT DRAINAGE AREA MAP

SHEET NUMBER:

C-07
OF 102

REVISION 1 - 07/28/2026

Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SET\CIVIL SITE PLAN\SP-CIVL-DRIN-PAC250095.00-1A---LAYOUT: C-07 PSTD A

MATCHLINE - SHEET C-809

WEST BRANCH NESHAMINY CREEK

EXISTING 467.53 LF OF 10" PVC SANITARY SEWER @ 0.25% SLOPE (PER ORIGINAL DESIGN PLANS, NOT FIELD VERIFIED)

EXISTING 267.17 LF OF 10" PVC SANITARY SEWER @ 0.25% SLOPE (PER ORIGINAL DESIGN PLANS, NOT FIELD VERIFIED)

TOE OF WATER (TYP.)

TOP OF BANK (TYP.)

PROP LEVEL SPREADER LS-2

PROP GUIDERAIL

PROP RETAINING WALL

DA-8

20' STORMWATER EASEMENT (TYP)

STORMWATER EASEMENT 10' OFF UNDERGROUND BASIN

PROP STORMWATER EASEMENT

PROP RETAINING WALL

PROP GUIDERAIL

DA-2

DA-3

DA-1

NATURAL RESOURCES EASEMENT

FLOODPLAIN OVERLAY

MONUMENT FOUND

S37°11'52"E

N71°07'08"E

L17

L16

L15

L18

731.48' (S)

411.58' (S)

140.22' (S)

S53°30'06"E

258.19' (S)

S58°41'02"E

ULTIMATE R.O.W. LINE

ULT.R.O.W.

R.O.W. LINE

TITLE LINE & R.O.W. LINE

PROP BASE DRAIN

PROP EMERGENCY SPILLWAY EL. 278.50

R=40.00'
TAN= 48.75'
Δ=104°55'56"
CHB=S06°03'04"E
CHD=61.85'

TOP OF ABOVE GROUND STORMWATER BASIN LIMIT ELEV=276.00

PROP 10' WIDE STABILIZED BASIN ACCESS

50' BUFFER

INFILTRATION AGB 1-3
INFILTRATION BASIN

SCHOOLHOUSE ROAD

WALNUT STREET

SEPTA

MATCHLINE - SHEET C-807

POA #1

P.O.B.
T.M.P. 926-001-099-003

TBM-C
MAG NAIL
ELEV=277.84'

S44°34'54"W

2,728.25'

AbB (D)

Ro (C)

Bo (D)

ReB (C)

KEY MAP

SCALE: 1" = 50'

Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-DRIN-PAC250095.00-1A-----LAYOUT: C-08 PSTD B

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE COPYRIGHTED AND SHALL NOT BE COPIED OR USED FOR ANY PURPOSE WITHOUT THE EXPRESS AUTHORIZATION FROM BOHLER. ONLY APPROVED, SIGNED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE
PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

POST DEVELOPMENT DRAINAGE AREA MAP

SHEET NUMBER:

C-08
OF 102

REVISION 1 - 07/28/2026

OFFSITE

DA-6

DA-7

DA-8

SCM 6
ADS SC-800

SCM 7
ADS MC-3500

STORMWATER EASEMENT
10' OFF UNDERGROUND BASIN

50' WIDE STORMWATER EASEMENT

PROP STORMWATER EASEMENT

NATURAL RESOURCES EASEMENT

RECREATION AREA
7.96 AC

PROP LEVEL SPREADER LS-7

PROP LEVEL SPREADER LS-6

FLOODPLAIN OVERLAY

WEST BRANCH NESHAMINY CREEK

WETLAND 'D'

POA #3

MONUMENT FOUND

IRON PIN FOUND

N36°42'06"W 960.30'

N58°24'14"W 136.03'

N36°33'05"W 50.19'

N36°33'05"E 960.30'

1,323.12' (S)

S37°25'00"E

N50°36'14"E

MATCHLINE - SHEET C-807

MATCHLINE - SHEET C-808

KEY MAP

SCALE: 1" = 50'

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL RESOURCES
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE WORKING IDEAS AND CONCEPTS OF THIS PLANS DEVELOPED BY BOHLER, NOT BE EXPOSED OR USED FOR ANY PURPOSE, WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.
©2026 BOHLER, INC.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS. LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK.
WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVIL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND
COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE
PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

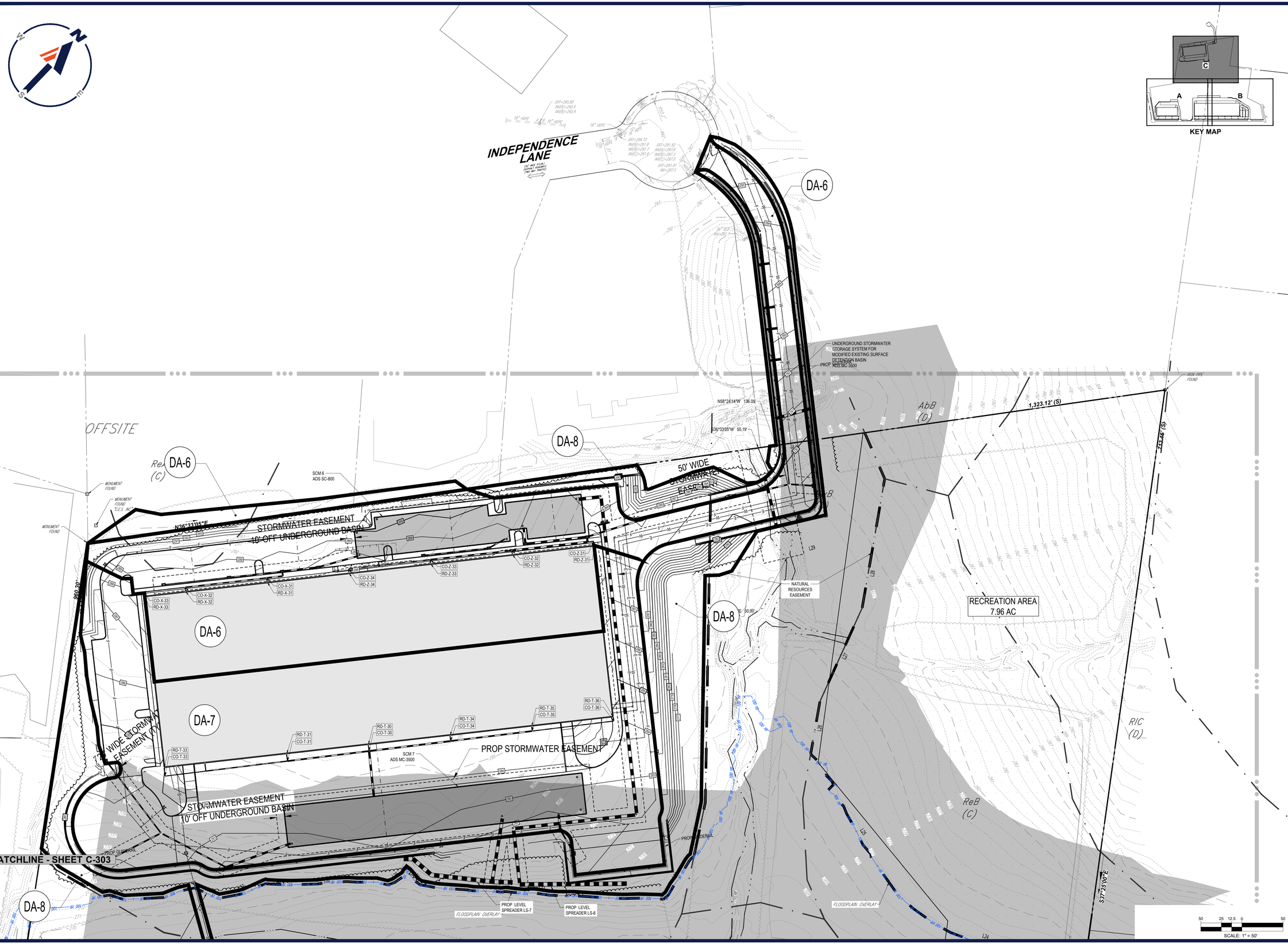
POST DEVELOPMENT DRAINAGE AREA MAP

SHEET NUMBER:

C-09
OF 102

REVISION 1 - 07/28/2026

Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVIL-DRIN-PAC250095.00-1A---LAYOUT C-09 PSTD C



BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLANS DEVELOPED AND SHALL NOT BE EXPOSED OR USED FOR ANY PURPOSE, WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS. LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE
PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

POST DEVELOPMENT DRAINAGE AREA MAP

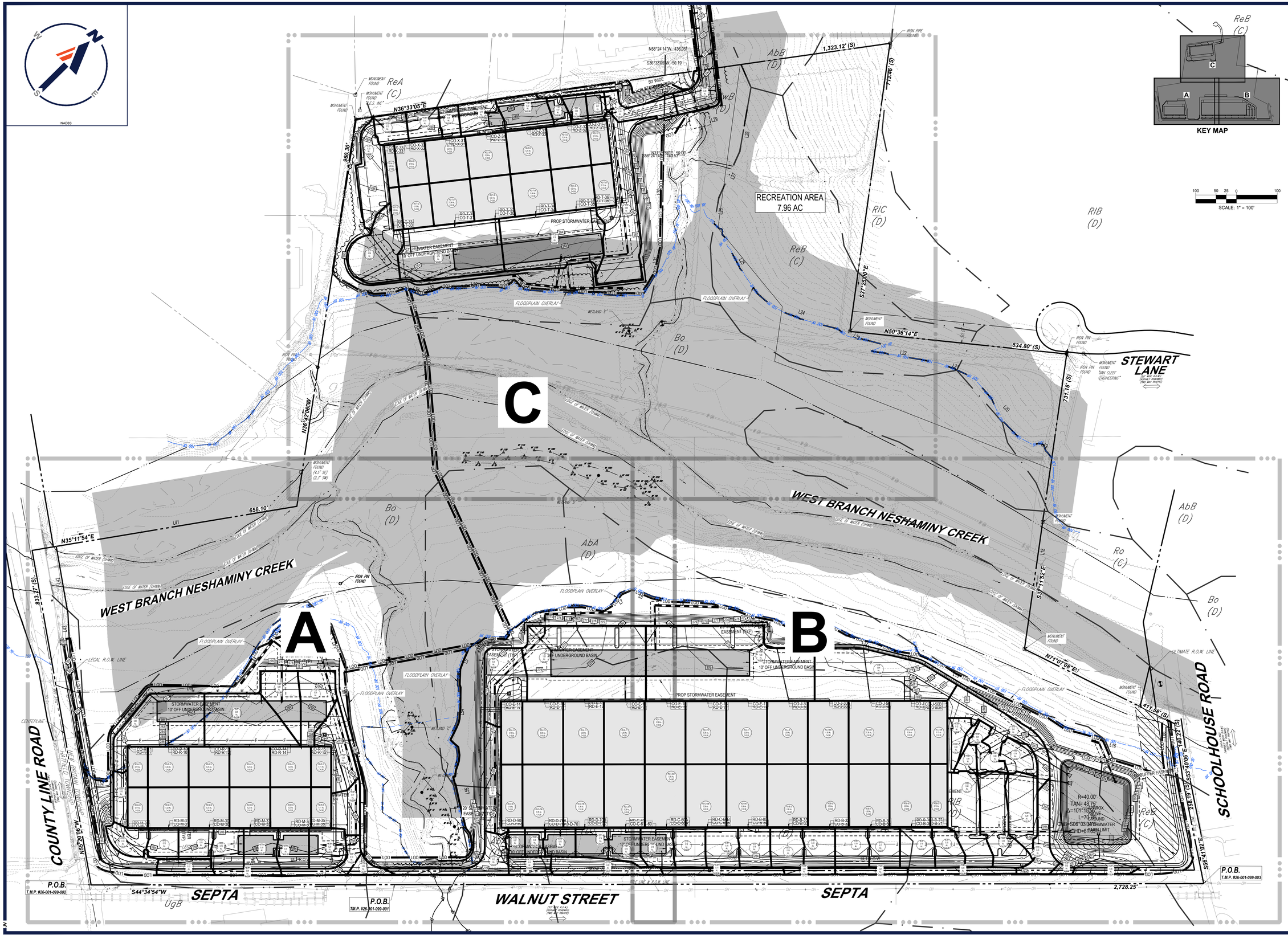
SHEET NUMBER:

C-10
OF 102

REVISION 1 - 07/28/2026

Jul 26, 2026
P:\PA2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-DRIN-PAC250095.00-1A---LAYOUT: C-10 PSTD

NADB3



BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
LAND PLANNING
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE WORKING DOCUMENTS OF THIS PLANS DEPICTED ON THIS SHEET ARE COPYRIGHTED AND SHALL NOT BE ALTERED OR USED FOR ANY PURPOSE WITHOUT THE EXPRESS AUTHORIZATION FROM BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE
PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

OVERALL INLET DRAINAGE AREA MAP

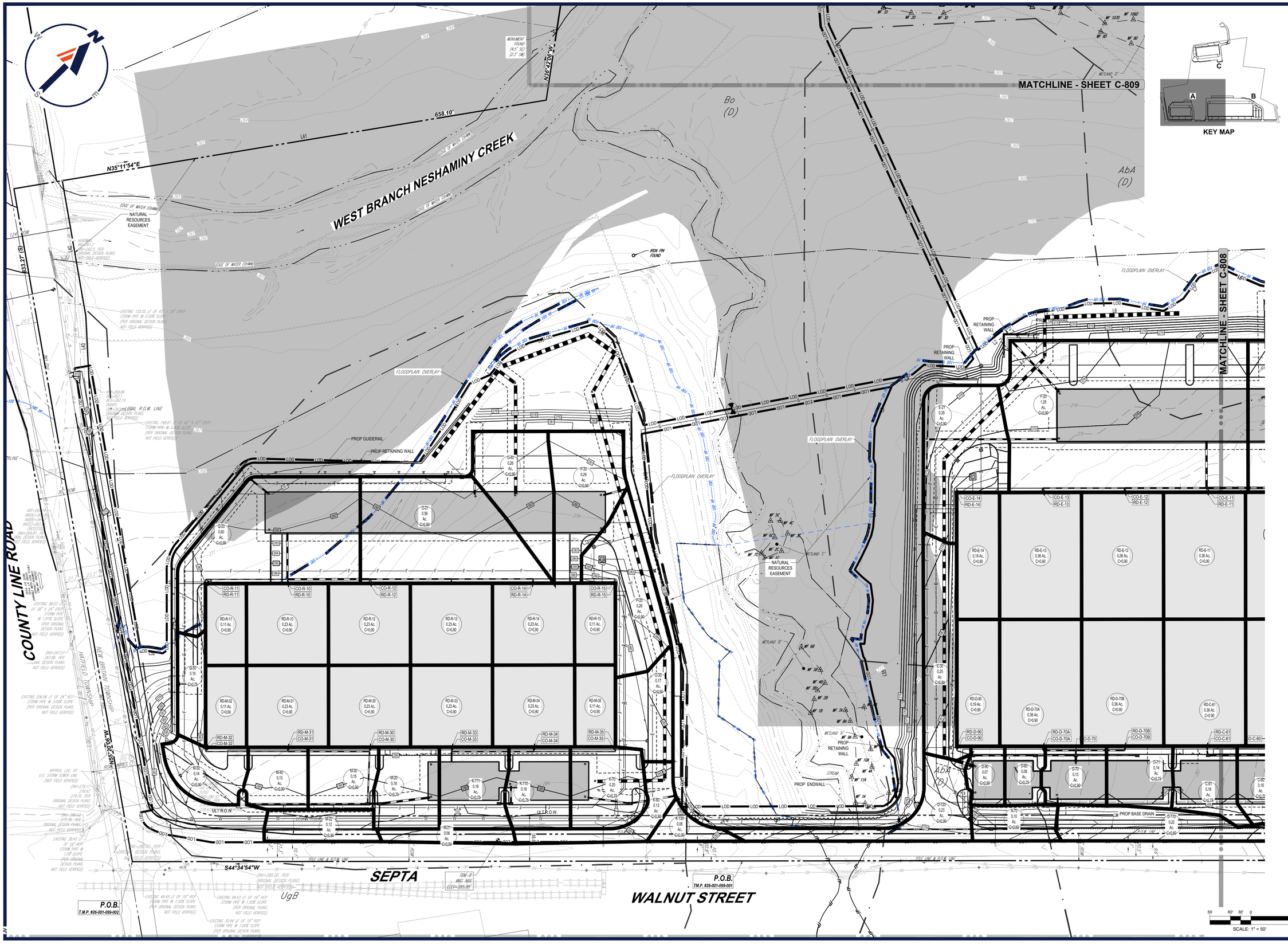
SHEET NUMBER:

C-11

OF 102

REVISION 1 - 07/28/2026

Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-DRIN-PAC250095.00-1A-----LAYOUT: C-11 OVRL INLT


MATCHLINE - SHEET C-809
MATCHLINE - SHEET C-808
WEST BRANCH NESHAMINY CREEK
COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
HATFIELD TOWNSHIP
WALNUT STREET
SEPTA
N35°11'54"E
658.10'
N36°42'56"W
S44°34'54"W
693.27'
L41
L45
L42
L43
L44
L46
L47
L48
L49
L50
L51
L52
L53
L54
L55
L56
L57
L58
L59
L60
L61
L62
L63
L64
L65
L66
L67
L68
L69
L70
L71
L72
L73
L74
L75
L76
L77
L78
L79
L80
L81
L82
L83
L84
L85

MATCHLINE - SHEET C-809

WEST BRANCH NESHAMINY CREEK

TOE OF WATER (TYP)

EXISTING 447.53 LF OF 10" PVC SANITARY SEWER @ 0.25% SLOPE (PER ORIGINAL DESIGN PLANS, NOT FIELD VERIFIED)

EXISTING 267.17 LF OF 10" PVC SANITARY SEWER @ 0.25% SLOPE (PER ORIGINAL DESIGN PLANS, NOT FIELD VERIFIED)

MONUMENT FOUND

S37°11'52"E

N71°07'08"E

411.58' (S)

140.22' (S)

258.19' (S)

S53°30'06"E

S58°41'07"E

SCHOOLHOUSE ROAD

ULTIMATE R.O.W. LINE

PROP GUIDERAIL

PROP RETAINING WALL

20' STORMWATER EASEMENT (TYP)

STORMWATER EASEMENT 10' OFF UNDERGROUND BASIN

PROP STORMWATER EASEMENT

NATURAL RESOURCES EASEMENT

FLOODPLAIN OVERLAY

50' BUFFER EASEMENT

R=40.00'
TAN= 48.75'
Δ=104°09'56"
CHB=S06°03'04"E
CHD=61.85'

ABOVE GROUND STORMWATER BASIN LIMIT

PROP 10' WIDE STABILIZED BASIN ACCESS

50' STORMWATER EASEMENT

PROP BASE DRAIN

ROW PIN FOUND

TITLE LINE & R.O.W. LINE

S44°34'54"W

2,728.25'

SEPTA

WALNUT STREET

(1ST MOST RURAL) (ASPHALT ROADWAY) (TWO WAY TRAFFIC)

MATCHLINE - SHEET C-807

TEMP C MAC NAIL ELEV=277.84'

P.O.B.
T.M.P. 926-001-099-003

KEY MAP

SCALE: 1" = 50'

Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SET\CIVIL SITE PLANS\P-CIVL-DRIN-PAC250095.00-1A-----LAYOUT: C-13 INLT B
JW

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED OR USED FOR ANY PURPOSE, WITHOUT THE EXPRESS AUTHORIZATION FROM BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE
PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

INLET DRAINAGE AREA MAP

SHEET NUMBER:

C-13
OF 102

REVISION 1 - 07/28/2026

Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVIL-DRIN-PAC250095.00-1A---LAYOUT C-14 INLT C

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ARCHITECTURAL DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE WORKING CIVIL DESIGN AND CONTENT OF THESE PLANS ARE COPYRIGHTED AND SHALL NOT BE ACCESSED OR USED FOR ANY PURPOSE, WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER, ONLY APPROVED, SIGNED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.
© 2026 BOHLER, INC.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS. LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVIL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER
1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE

PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

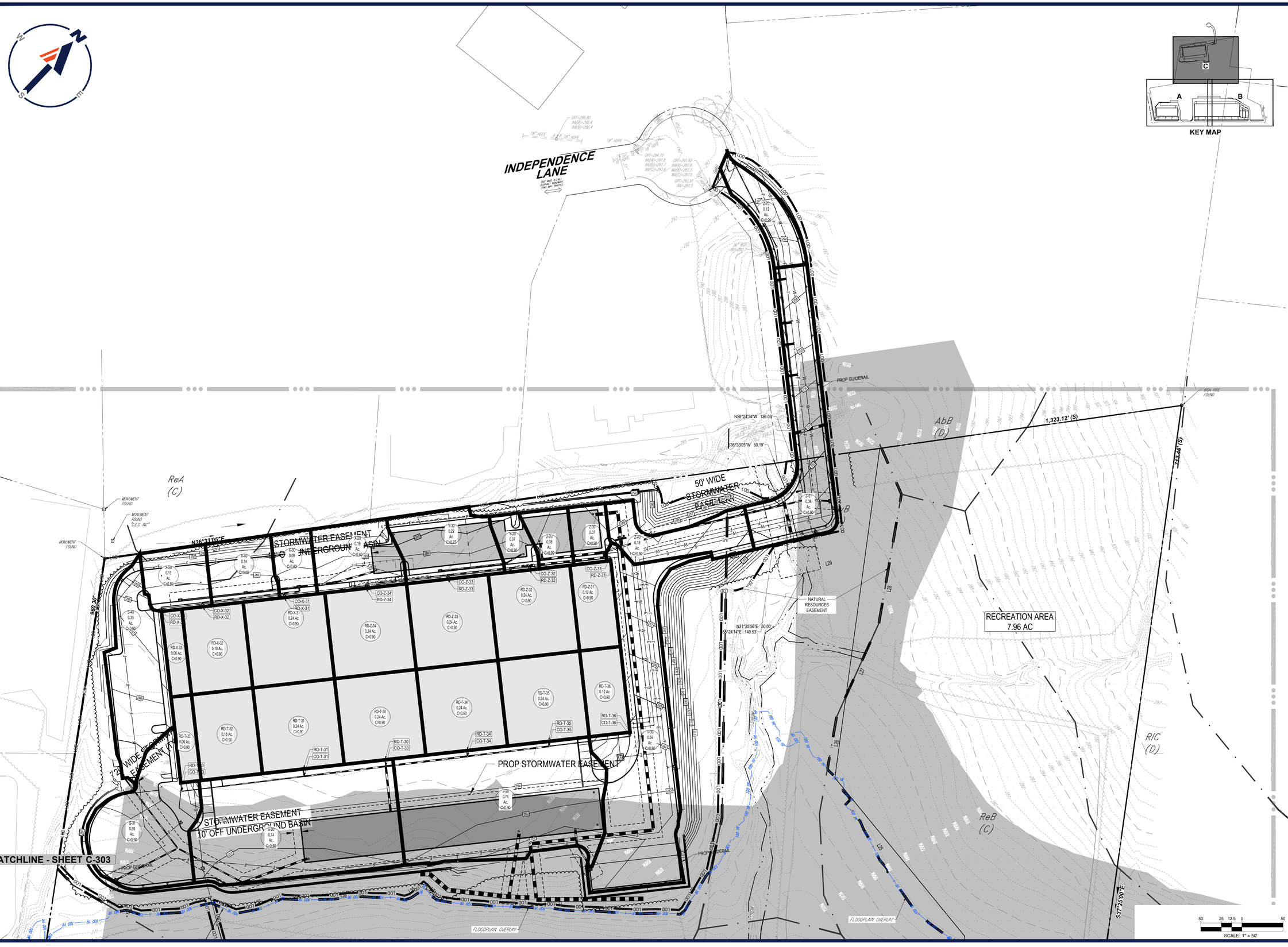
SHEET TITLE:

INLET DRAINAGE AREA MAP

SHEET NUMBER:

C-14
OF 102

REVISION 1 - 07/28/2026



BOHLER™

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENT OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE COPIED OR USED FOR ANY PURPOSE, WITHOUT PRIOR WRITTEN AUTHORIZATION FROM BOHLER. ONLY APPROVED, SIGNED AND SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES.

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	07/28/2026	PER TOWNSHIP COMMENTS	PAB / RDE

ATTENTION ALL CONTRACTORS. LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREIN HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT NUMBER 287 OF 1974 AS AMENDED BY ACT 50 OF 2017, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. WWW.PA1CALL.ORG

NOT APPROVED FOR CONSTRUCTION

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.:	PAC250095.00-1A
DRAWN BY:	PAB
CHECKED BY:	RDE
DATE:	04/06/2026
CAD I.D.:	P-CIVL-DRIN

PROJECT:

PRELIMINARY SUBDIVISION / LAND DEVELOPMENT PLANS

FOR

HCI DP LAND ACQUISITION LLC

PROPOSED DEVELOPMENT

WALNUT STREET AND COUNTY LINE ROAD
NEW BRITAIN TOWNSHIP
BUCKS COUNTY, PA

BOHLER™

1515 MARKET STREET, SUITE 920
PHILADELPHIA, PA 19102
Phone: (267) 402-3400
Fax: (267) 402-3401
www.BohlerEngineering.com

M. KEARSE

PROFESSIONAL ENGINEER
PENNSYLVANIA LICENSE No. PE092988

SHEET TITLE:

INLET DRAINAGE AREA MAP

SHEET NUMBER:

C-15
OF 102

REVISION 1 - 07/28/2026

Jul 28, 2026
P:\PA\2025\PAC250095.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-DRIN-PAC250095.00-1A-----LAYOUT C-15 INLT D
JV

Appendix 4.0

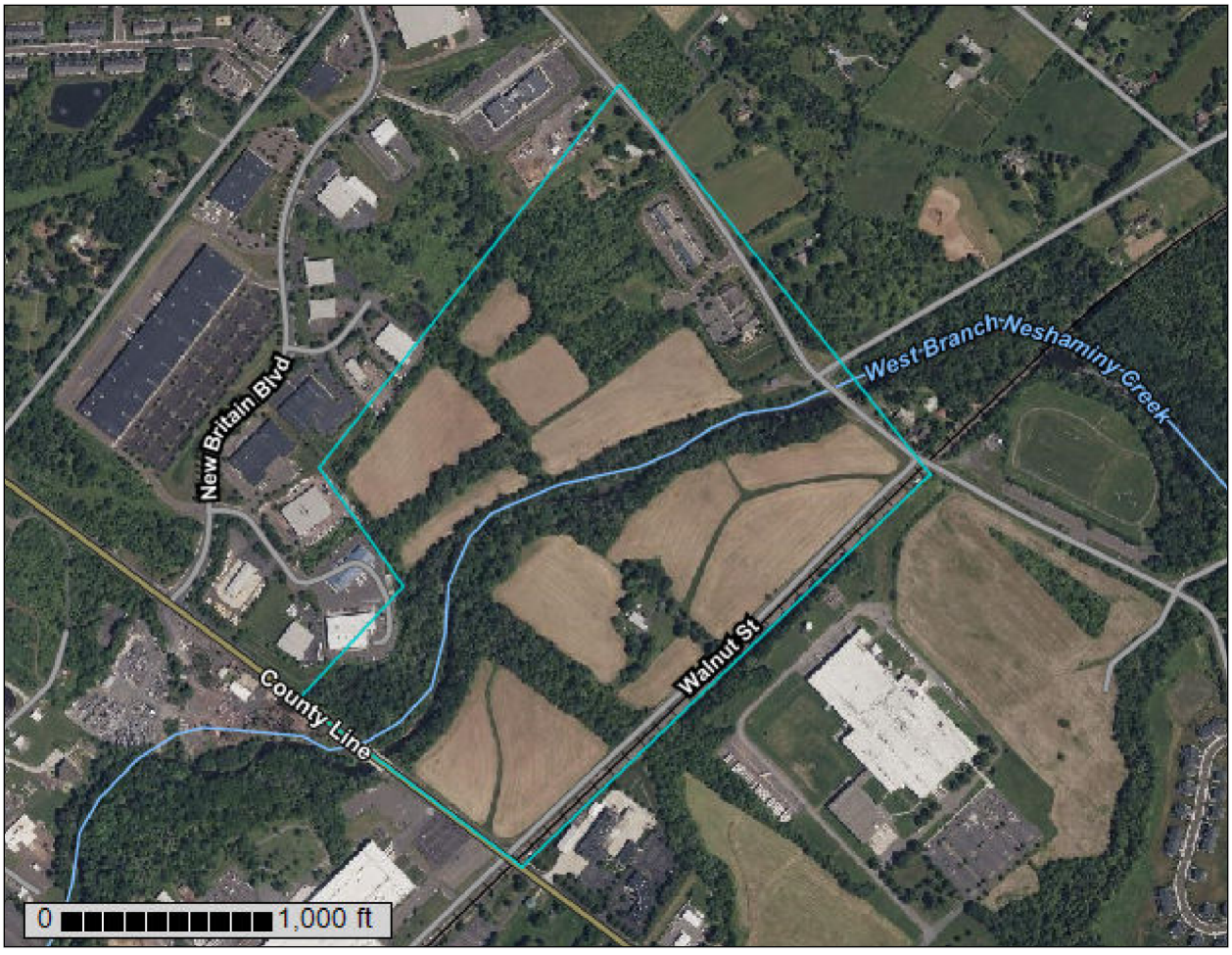
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Bucks County, Pennsylvania, and Montgomery County, Pennsylvania



November 18, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
Bucks County, Pennsylvania.....15
AbA—Abbottstown silt loam, 0 to 3 percent slopes.....15
AbB—Abbottstown silt loam, 3 to 8 percent slopes.....16
Bo—Bowmansville-Knauers silt loams.....18
BwB—Buckingham silt loam, 3 to 8 percent slopes.....20
ReA—Readington silt loam, 0 to 3 percent slopes.....21
ReB—Readington silt loam, 3 to 8 percent slopes.....23
RlA—Reaville channery silt loam, 0 to 3 percent slopes.....24
RlB—Reaville channery silt loam, 3 to 8 percent slopes.....27
RlC—Reaville channery silt loam, 8 to 15 percent slopes.....29
Ro—Rowland silt loam.....31
UgB—Urban land-Abbottstown complex, 0 to 8 percent slopes.....32
W—Water.....34
Montgomery County, Pennsylvania.....35
Bo—Bowmansville-Knauers silt loams.....35
UrcB—Urban land-Abbottstown complex, 0 to 8 percent slopes.....37
W—Water.....38
Soil Information for All Uses.....40
Soil Properties and Qualities.....40
Soil Qualities and Features.....40
Hydrologic Soil Group.....40
References.....47

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

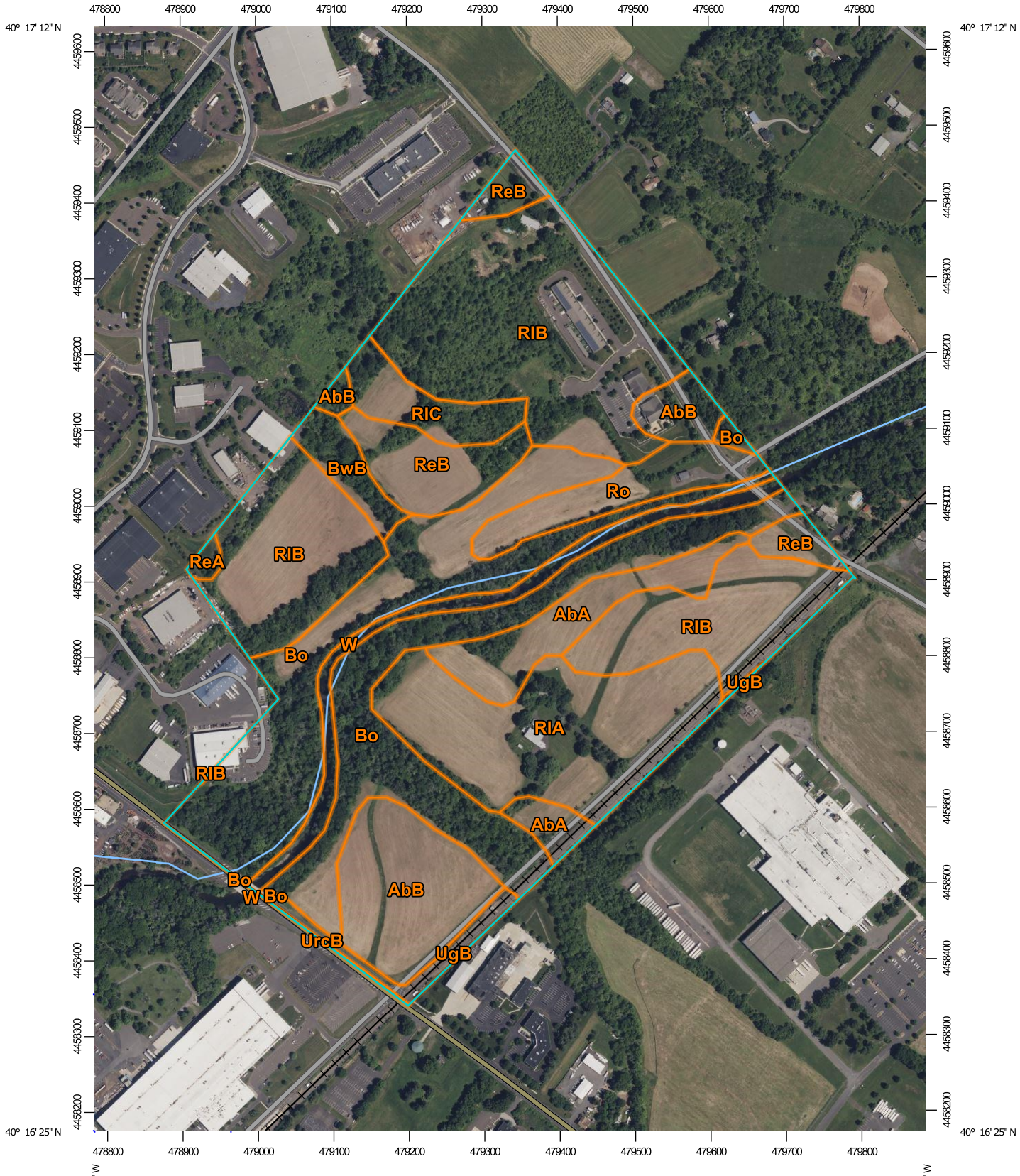
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:7,110 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 300 600 1200 1800

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:24,000.

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: Bucks County, Pennsylvania
Survey Area Data: Version 22, Sep 5, 2025

Soil Survey Area: Montgomery County, Pennsylvania
Survey Area Data: Version 20, Sep 4, 2025

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jun 3, 2022—Jul 20, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
AbA	Abbottstown silt loam, 0 to 3 percent slopes	6.9	5.2%
AbB	Abbottstown silt loam, 3 to 8 percent slopes	10.9	8.2%
Bo	Bowmansville-Knauers silt loams	33.9	25.5%
BwB	Buckingham silt loam, 3 to 8 percent slopes	2.3	1.7%
ReA	Readington silt loam, 0 to 3 percent slopes	0.4	0.3%
ReB	Readington silt loam, 3 to 8 percent slopes	7.3	5.5%
RlA	Reaville channery silt loam, 0 to 3 percent slopes	16.2	12.2%
RlB	Reaville channery silt loam, 3 to 8 percent slopes	39.9	30.1%
RlC	Reaville channery silt loam, 8 to 15 percent slopes	3.6	2.7%
Ro	Rowland silt loam	5.0	3.7%
UgB	Urban land-Abbottstown complex, 0 to 8 percent slopes	1.8	1.3%
W	Water	4.4	3.3%
Subtotals for Soil Survey Area		**132.6**	**99.9%**
Totals for Area of Interest		**132.7**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Bo	Bowmansville-Knauers silt loams	0.0	0.0%
UrcB	Urban land-Abbottstown complex, 0 to 8 percent slopes	0.1	0.1%
W	Water	0.0	0.0%
Subtotals for Soil Survey Area		**0.1**	**0.1%**
Totals for Area of Interest		**132.7**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps.

The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Bucks County, Pennsylvania

AbA—Abbottstown silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tt88
Elevation: 130 to 660 feet
Mean annual precipitation: 40 to 48 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 150 to 178 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Abbottstown

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Acid reddish brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 20 inches: silt loam
Bx - 20 to 39 inches: channery silt loam
BCg - 39 to 48 inches: channery silt loam
R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 18 to 22 inches to fragipan; 46 to 50 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest
Hydric soil rating: No

Minor Components

Croton

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

Penn

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

AbB—Abbottstown silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2v7gd
Elevation: 130 to 660 feet
Mean annual precipitation: 40 to 48 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 190 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Abbottstown

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Acid reddish brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 20 inches: silt loam
Bx - 20 to 39 inches: channery silt loam
BCg - 39 to 48 inches: channery silt loam

R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 22 inches to fragipan; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest
Hydric soil rating: No

Minor Components

Klinesville

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

Croton

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

Penn

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

Bo—Bowmansville-Knauers silt loams

Map Unit Setting

National map unit symbol: l7nk
Elevation: 150 to 900 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bowmansville and similar soils: 41 percent
Knauers and similar soils: 39 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bowmansville

Setting

Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Recent alluvial deposits weathered from sandstone and siltstone

Typical profile

Ap - 0 to 7 inches: silt loam
Bg - 7 to 26 inches: silty clay loam
Cg - 26 to 43 inches: fine sandy loam
2Cg - 43 to 65 inches: stratified gravel to sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 72 to 99 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F148XY028PA - Moist, Triassic, Riparian Zone, Ecotonal Meadow-Shrub-Forest

Hydric soil rating: No

Description of Knauers

Setting

Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Recent alluvium derived from sandstone and shale

Typical profile

A - 0 to 8 inches: silt loam
Bg1 - 8 to 17 inches: silt loam
Bg2 - 17 to 24 inches: gravelly sandy loam
2Cg - 24 to 60 inches: stratified sand to gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 72 to 99 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Occasional
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F148XY031PA - Hydric, Triassic, Riparian Zone, Swamp Meadow-Shrub-Forest
Hydric soil rating: Yes

Minor Components

Rowland

Percent of map unit: 20 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

BwB—Buckingham silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l7nv
Elevation: 150 to 900 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Buckingham and similar soils: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buckingham

Setting

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Fine-loamy colluvium and old alluvium derived from shale and siltstone

Typical profile

A - 0 to 7 inches: silt loam
Bt - 7 to 30 inches: silt loam
Btx1 - 30 to 44 inches: silty clay loam
Btx2 - 44 to 70 inches: gravelly silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to fragipan; 80 to 99 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D

Ecological site: F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest
Hydric soil rating: No

Minor Components

Bowmansville
Percent of map unit: 8 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Knauers
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Croton
Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

ReA—Readington silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: l7s3
Elevation: 200 to 1,000 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 160 to 200 days
Farmland classification: All areas are prime farmland

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

Description of Readington

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Head slope, side slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 29 inches: silt loam
Btx - 29 to 58 inches: channery silt loam
R - 58 to 68 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 36 inches to fragipan; 40 to 70 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

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

Minor Components

Penn

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Reaville

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Croton

Percent of map unit: 3 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

ReB—Readington silt loam, 3 to 8 percent slopes

Map Unit Setting

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

Map Unit Composition

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

Description of Readington

Setting

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

Typical profile

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

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 36 inches to fragipan; 40 to 60 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

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

Minor Components

Penn

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

Reaville

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

Abbottstown

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

RIA—Reaville channery silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: l7s6
Elevation: 150 to 1,300 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 130 to 210 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Reaville and similar soils: 90 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reaville

Setting

Landform: Hillslopes, drainageways
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Red triassic residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bt - 8 to 19 inches: channery silty clay loam
C - 19 to 32 inches: very channery silt loam
R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest
Hydric soil rating: No

Minor Components

Penn

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Abbottstown

Percent of map unit: 1 percent
Landform: Hillslopes

Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Joanna

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Bowmansville

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Croton

Percent of map unit: 1 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Klinesville

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Knauers

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

RIB—Reaville channery silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l7s7
Elevation: 150 to 1,300 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 130 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Reaville and similar soils: 90 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reaville

Setting

Landform: Hillslopes, drainageways
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Red triassic residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bt - 8 to 19 inches: channery silty clay loam
C - 19 to 32 inches: very channery silt loam
R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest
Hydric soil rating: No

Minor Components

Penn

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Klinesville

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Bowmansville

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Knauers

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Joanna

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Abbottstown

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Croton

Percent of map unit: 1 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

RIC—Reaville channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: l7s8
Elevation: 150 to 1,400 feet
Mean annual precipitation: 38 to 55 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 160 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Reaville and similar soils: 90 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reaville

Setting

Landform: Hillslopes, drainageways
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Red triassic residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bt - 8 to 19 inches: channery silty clay loam
C - 19 to 32 inches: very channery silt loam
R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 36 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest
Hydric soil rating: No

Minor Components

Penn

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Abbottstown

Percent of map unit: 1 percent
Hydric soil rating: No

Knauers

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Croton

Percent of map unit: 1 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Bowmansville

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Steinsburg

Percent of map unit: 1 percent
Landform: Hillsides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Convex
Hydric soil rating: No

Ro—Rowland silt loam

Map Unit Setting

National map unit symbol: l7s9
Elevation: 150 to 1,000 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 150 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Rowland and similar soils: 82 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rowland

Setting

Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Alluvium derived from sandstone and shale

Typical profile

A - 0 to 12 inches: silt loam
B - 12 to 34 inches: silty clay loam
Cg - 34 to 46 inches: silty clay loam
2Cg - 46 to 61 inches: stratified gravel to sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C

Ecological site: F148XY028PA - Moist, Triassic, Riparian Zone, Ecotonal Meadow-Shrub-Forest
Hydric soil rating: No

Minor Components

Knauers
Percent of map unit: 8 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Abbottstown
Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

UgB—Urban land-Abbottstown complex, 0 to 8 percent slopes

Map Unit Setting
National map unit symbol: l7ss
Elevation: 250 to 1,300 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 65 percent
Abbottstown and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas

Typical profile
C - 0 to 6 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Abbottstown

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Acid reddish brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Btg - 10 to 20 inches: silt loam
Btxg - 20 to 39 inches: channery loam
BCg - 39 to 48 inches: channery silt loam
R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 15 to 30 inches to fragipan; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest
Hydric soil rating: No

Minor Components

Penn

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

Klinesville

Percent of map unit: 5 percent
Landform: Hillslopes

Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: l7th
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Parent material: Rivers streams ponds

Properties and qualities

Frequency of ponding: Frequent

Montgomery County, Pennsylvania

Bo—Bowmansville-Knauers silt loams

Map Unit Setting

National map unit symbol: 2lh87
Elevation: 150 to 900 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bowmansville and similar soils: 41 percent
Knauers and similar soils: 39 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bowmansville

Setting

Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Recent alluvial deposits weathered from sandstone and siltstone

Typical profile

Ap - 0 to 7 inches: silt loam
Bg - 7 to 26 inches: silty clay loam
Cg - 26 to 43 inches: fine sandy loam
2Cg - 43 to 65 inches: stratified gravel to sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 72 to 99 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F148XY028PA - Moist, Triassic, Riparian Zone, Ecotonal Meadow-Shrub-Forest
Hydric soil rating: No

Description of Knauers

Setting

Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Recent alluvium derived from sandstone and shale

Typical profile

A - 0 to 8 inches: silt loam
Bg1 - 8 to 17 inches: silt loam
Bg2 - 17 to 24 inches: gravelly sandy loam
2Cg - 24 to 60 inches: stratified sand to gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 72 to 99 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Occasional
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F148XY031PA - Hydric, Triassic, Riparian Zone, Swamp Meadow-Shrub-Forest
Hydric soil rating: Yes

Minor Components

Rowland

Percent of map unit: 20 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

UrcB—Urban land-Abbottstown complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2l0p9
Elevation: 250 to 1,300 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent
Abbottstown and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas

Typical profile

C - 0 to 6 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Abbottstown

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Acid reddish brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Btg - 10 to 20 inches: silt loam
Btxg - 20 to 39 inches: channery loam
BCg - 39 to 48 inches: channery silt loam
R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 15 to 30 inches to fragipan; 40 to 60 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F148XY025PA - Moist, Triassic, Upland, Mixed Oak - Hardwood - Conifer Forest
Hydric soil rating: No

Minor Components

Penn

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

Klinesville

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

W—Water

Map Unit Setting

National map unit symbol: 1nnv3
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

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

Description of Water

Setting

Parent material: Rivers streams ponds

Properties and qualities

Frequency of ponding: Frequent

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

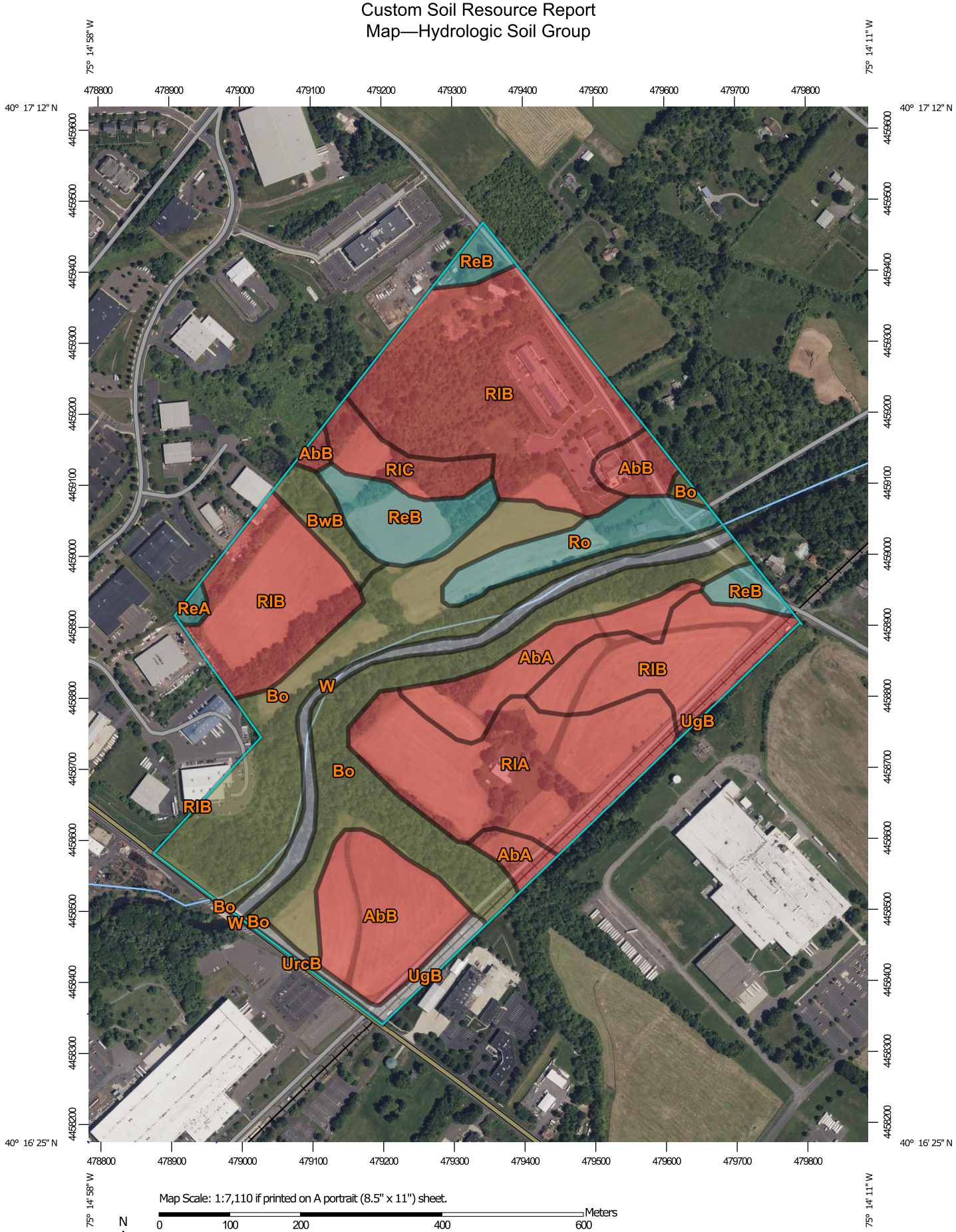
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:7,110 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 300 600 1200 1800

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

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 scales ranging from 1:12,000 to 1:24,000.

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: Bucks County, Pennsylvania
Survey Area Data: Version 22, Sep 5, 2025

Soil Survey Area: Montgomery County, Pennsylvania
Survey Area Data: Version 20, Sep 4, 2025

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Jun 3, 2022—Jul 20, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AbA	Abbottstown silt loam, 0 to 3 percent slopes	D	6.9	5.2%
AbB	Abbottstown silt loam, 3 to 8 percent slopes	D	10.9	8.2%
Bo	Bowmansville-Knauers silt loams	C/D	33.9	25.5%
BwB	Buckingham silt loam, 3 to 8 percent slopes	C/D	2.3	1.7%
ReA	Readington silt loam, 0 to 3 percent slopes	C	0.4	0.3%
ReB	Readington silt loam, 3 to 8 percent slopes	C	7.3	5.5%
RlA	Reaville channery silt loam, 0 to 3 percent slopes	D	16.2	12.2%
RlB	Reaville channery silt loam, 3 to 8 percent slopes	D	39.9	30.1%
RlC	Reaville channery silt loam, 8 to 15 percent slopes	D	3.6	2.7%
Ro	Rowland silt loam	C	5.0	3.7%
UgB	Urban land-Abbottstown complex, 0 to 8 percent slopes		1.8	1.3%
W	Water		4.4	3.3%
Subtotals for Soil Survey Area			**132.6**	**99.9%**
Totals for Area of Interest			**132.7**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Bo	Bowmansville-Knauers silt loams	C/D	0.0	0.0%
UrcB	Urban land-Abbottstown complex, 0 to 8 percent slopes		0.1	0.1%
W	Water		0.0	0.0%
Subtotals for Soil Survey Area			**0.1**	**0.1%**
Totals for Area of Interest			**132.7**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf