

STORMWATER MANAGEMENT REPORT

Prepared for:

West Side Presbyterian Church of Ridgewood, New Jersey

Block 2404, Lot 3
Block 2403, Lot 17.01
6 South Monroe Street

Village of Ridgewood
Bergen County, New Jersey

Prepared by:

BOHLER //

N.J. Certificate of Authorization 24GA28161700

30 Garber Square
Ridgewood, NJ 07450
551-307-1400

BENJ File No. NJD240053.00

Benjamin S. Crowder, P.E.
New Jersey Professional Engineer License No. 52263

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1. Introduction

The subject property is located at 6 South Monroe Street in the Village of Ridgewood, Bergen County, New Jersey. The property is identified as Block 2404, Lot 3 & Block 2403, Lot 17.01 on the Village of Ridgewood tax maps and is a total of 5.614 acres in size and will hereafter be referred to as “the site”. The site is bordered to the north by West Ridgewood Avenue and residential properties beyond; to the east by South Monroe Street and a mix of residential properties and a school beyond; to the west by a church and residential properties beyond; and to the south by a recreational park and Godwin Avenue beyond. A tax map and aerial map are included at the beginning of Appendix G for reference.

The site is currently a church with an off-street parking lot within the R-110 Zone. The proposed development will consist of various site improvements such as a renovated building and associated parking, sidewalks, walls, stormwater management facilities and utilities. The site is considered a major development due to the proposed disturbance totaling more than one acre.

This report summarizes the design objectives, methodology, and calculations for the conveyance, attenuation, and discharge of stormwater runoff leaving the site and is meant to accompany the Site Plan documents prepared by Bohler. Pre-development and post-development conditions are examined for analysis of the stormwater quantity, water quality, and groundwater recharge based on the *NJDEP Stormwater Management Regulations (NJAC 7:8)* and soil erosion and sediment control based on *The Standards for Soil Erosion and Sediment Control in New Jersey*.

2. Stormwater Management Design Methodology

In accordance with the *NJDEP Stormwater Management Regulations*, the proposed development must meet the requirements, if appropriate, for stormwater quantity reductions, water quality, groundwater recharge, etc. The assessment of stormwater runoff has been based upon the Soil Conservation Service Method (SCS) Unit Hydrograph as described in Chapters 7, 9, 10, 15 and 16, Part 630 Hydrology, National Engineering Handbook (NEH) (previously described in Technical Release Number 55 (TR55), “Urban Hydrology for Small Watersheds”). Theoretical storms are modeled with the 24-Hour SCS Unit Dimensionless Hydrograph using the NOAA Atlas 14 Type D rainfall distribution and recurrence intervals of 2, 10, and 100 years. Hydrograph creation and routings are accomplished using the HydroCAD stormwater modeling program by HydroCAD Software Solutions, LLC.

2.1 Rainfall Data

Rainfall data used in the stormwater calculations of this report are obtained from different sources based on the latest NJ stormwater management regulations (*NJAC 7:8*). The Water Quality storm event is based on the NJ BMP Manual Chapter 5 definition of having a total rainfall depth of 1.25 inches and a total duration of two (2) hours. Twenty-four-hour rainfall frequency data in Bergen County for all other storms has been obtained from the Engineering Field Handbook NJ Supplement last revised August 2012 (developed from data contained in NOAA Atlas 14 Volume 2). Per amended NJ stormwater management regulations dated July 17, 2023, the precipitation depths for the 2-, 10-, and 100-year storm events are determined using adjustment factors applied to the NOAA Atlas 14 rainfall estimates. The rainfall depth values used in this project are listed in Table 2.1 and 2.2.

TABLE 2.1 – Current Adjusted, 24-Hour Rainfall Frequency Data

Event (year)	2	10	100
NOAA Atlas 14 Rainfall (inches)	3.34	5.07	8.47
Adjustment Factor	1.01	1.03	1.06
Current Adjusted Rainfall (inches)	3.37	5.22	8.98

TABLE 2.2 – Future Adjusted, 24-Hour Rainfall Frequency Data

Event (year)	2	10	100
NOAA Atlas 14 Rainfall (inches)	3.34	5.07	8.47
Adjustment Factor	1.20	1.23	1.37
Future Adjusted Rainfall (inches)	4.01	6.24	11.60

2.2 Site Soils

Site soil information has been obtained from the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey database. The soil types present within the studied watershed are shown in Table 2.3. The soils consist of hydrologic soil group (HSG) Type C, therefore the CN values used in calculations are those associated with Type C soils. For the purpose of calculations, soils with undefined HSG are assumed to be Type D.

TABLE 2.3 - Site Soil Properties

Soil Symbol	Soil Name	Characteristics	Hydrologic Soil Group Rating
WeuC	Wethersfield-Urban land complex	8 to 15 percent slopes	C
UR	Urban	N/A	undefined

2.3 Curve Numbers

For determining the runoff flows, the cover types in combination with the HSG rating must be determined for each drainage area. These are used to determine the runoff curve number (CN) values that are used in the hydraulic calculations. The CN values used in this project are listed in Table 2.4.

TABLE 2.4 - CN Values

Land Cover Description	HSG C	HSG D
Open space, Good Condition (grass cover >75%)	74	80
Impervious Surfaces	98	98

2.4 Time of Concentration

The time of concentration (T_c) is calculated in accordance with Chapter 15 of the NRCS National Engineering Handbook and has been calculated separately for the pervious and impervious areas within each drainage area. Where there is a long stretch of sheet flow in the proposed condition, the McCuen-Spiess formula is used to determine the appropriate length, not to exceed 100 feet. Full T_c calculations for each drainage area can be found in the HydroCAD summaries in Appendices A & B.

3. Pre-Development Site Conditions

The studied watershed area is a total of 3.954 acres in size and consists of two unique drainage areas: Off-Site Area and Existing Drainage Area #1A & 1B, which are described in more detail below. In the pre-development condition, the site is an existing off-street parking area with a framed structure with associated driveways, playground, sports court, sidewalk and utilities. Currently, the runoff generated on site outfalls to the South Monroe Street right-of-way along the eastern property line via overland flow and storm pipe conveyance. The runoff ultimately flows south to a tributary of the Passaic River. The Existing Drainage Area Map in Appendix G illustrates the limits of each existing drainage area and how they relate to the existing site conditions.

3.1 Point of Analysis #1

Both existing drainage areas flow to Point of Analysis #1 located near the eastern property line within South Monroe Street. The Existing Drainage Area Map in Appendix G illustrates the identified point of analysis and how it relates to the existing topography on the site.

3.1.1 Existing Drainage Area #1A

Existing Drainage Area #1A contains 1.240 acres of land, of which 0.560 acres are impervious surface, and includes the existing framed structure, sports court, lawn and a portion of the parking lot. The topography of the area slopes from west to east from a maximum elevation of approximately 160.50 to a minimum elevation of approximately 126.76 with slopes ranging from 0% to 33%. The runoff from Existing Drainage Area #1A flows from west to east, then collected by a stormwater conveyance system and ultimately discharges to Point of Analysis #1A.

3.1.2 Existing Drainage Area #1B

Existing Drainage Area #1B contains 2.356 acres of land, of which 0.014 acres are impervious surface, and includes the existing playground area, lawn and a majority of the existing parking lot and sidewalks. The topography of the area slopes from west to east from a maximum elevation of approximately 167.00 to a minimum elevation of approximately 122.20 with slopes ranging from 0% to 33%. The runoff from Existing Drainage Area #1B flows from west to east and ultimately discharges to Point of Analysis #1B.

3.1.3 Existing Drainage Area Offsite

Located to the southwest of the proposed site, Existing Drainage Area Offsite contains 0.358 acres of land, of which 0.022 acres are impervious surface, and includes mostly lawn area with a small portion of the existing framed structure. Existing Drainage Area Offsite has no proposed improvements, but runoff from this drainage area flows onto the adjacent site. The topography of the area slopes from west to east from a maximum elevation of approximately 166.00 to a minimum elevation of approximately 124.0 with slopes ranging from 0% to 33%. The runoff from Existing Drainage Area Offsite flows offsite towards the recreational sports field in both the existing and proposed conditions and will be reduced in the proposed stormwater management design. Existing Drainage Area Offsite ultimately discharges to the same conveyance system downstream of Point of Analysis #1.

4. Post-Development Site Conditions

The post-development condition for the site includes the renovation and expansion of one existing framed structure with associated parking fields, driveways, sports court, sidewalks, utility infrastructure, stormwater infrastructure, and other site improvements. The proposed site is designed in a manner that generally maintains the existing drainage patterns. The studied watershed area in the post-development condition contains the same 3.954-acre area that was studied in the pre-development condition and consists of the same two unique drainage areas: Off-Site Area #1, Proposed Drainage Area #1A& 1B, which are described in more detail below.

A proposed stormwater conveyance system will collect the runoff from the proposed building renovation and impervious areas via overland flow, inlets, and stormwater piping and redirect it to the proposed bioretention basin on the site. The construction of the proposed improvements will disturb approximately 3.148 acres of land and will create approximately 3.058 acres of impervious coverage on the site in the post-development condition. The Proposed Drainage Area Map in Appendix G illustrates the limits of each proposed drainage area and how they relate to the proposed site conditions.

4.1 Point of Analysis #1

The drainage areas in the post development condition flow to the same Point of Analysis #1 identified in the existing condition, located near the eastern property line within South Monroe Street. The proposed runoff to Point of Analysis #1A meets the stormwater management criteria set forth in *NJDEP Stormwater Management Regulations* by designing the stormwater measures so that the peak post-construction runoff rates from the disturbed areas are 50, 75, and 80 percent of the peak pre-construction runoff rates for the 2, 10, and 100-year design storms respectively within proposed drainage area #1A and by having the post-construction hydrograph not exceed the pre-construction hydrograph at any point for the two-, 10-, and 100-year storm events within proposed drainage area #1B. Refer to Section 4.3 Stormwater Quantity Controls for a summary of the pre-construction, allowable, and post-construction flows.

4.1.1 Proposed Drainage Area #1A

Proposed Drainage Area #1A consists of approximately a total of 1.283 acres of land – 0.876 acres flows to the basin, and 0.407 acres bypasses the basin. The combined basin and bypass area contains 0.560 acres of impervious surface, and includes the renovated structure, a portion of the parking lot, bioretention basin, driveways, stormwater and utility infrastructure. The drainage area also contains grass and landscape areas. A portion of the runoff from Proposed Drainage Area #1A is routed through the proposed bioretention basin #1, and ultimately flows to the South Monroe Street right-of-way and Point of Analysis #1A.

4.1.2 Proposed Drainage Area #1B

Proposed Drainage Area #1B consists of approximately 2.337 acres of land, of which 1.461 acres are impervious surface, and includes the playground area, lawn and a majority of the parking lot and sidewalks. The runoff from Proposed Drainage Area #1B flows overland and is collected through an existing stormwater conveyance system and ultimately flows to Point of Analysis #1B.

4.1.3 Proposed Drainage Area Offsite

Proposed Drainage Area Offsite in the post-development condition is reduced in area from the pre-development condition. The runoff generated within Proposed Drainage Area Offsite will be reduced and continues to flow offsite as it does under existing conditions. The runoff from Proposed Drainage Area Offsite ultimately discharges to the same conveyance system downstream of Point of Analysis #1.

4.2 Proposed Structural Stormwater Management Strategies

The two sub-drainage areas in the post development condition flow to the same point(s) of analysis identified in the existing condition. One of the sub-drainage areas, Proposed Drainage Area #1A, flows through the proposed bioretention basin system, which is described in more detail below.

4.2.1 Small-Scale Bioretention Systems

The project proposes a small-scale bioretention system. The bioretention systems meet the minimum requirements outlined in the *New Jersey Stormwater Best Management Practices Manual* by providing 18 inches of soil bed depth, an underdrain system, containment and treatment of the entire water quality design storm volume to a maximum storage depth of 12 inches, and 1 foot minimum of separation between the bottom of the bioretention basin and the seasonal high ground water table for underdrain systems. Each bioretention system achieves 80% TSS removal.

Table 4.5 - Small-Scale Bioretention Systems Summary

Bioretention Basin #	1
Drainage Area (Acres)	0.876
Soil Bed Depth (Inches)	18
Subsoil Permeability (Inches/Hour)	N/A
Drain Time (Hours)	12.25
Underdrain Size (Inches)	6
Water Quality Storm Depth (Feet)	0.41
TSS Removal Rate (%)	80
Seasonal High Ground Water Elevation	NOT ENCOUNTERED
System Bottom Elevation	132.00

4.3 Stormwater Quantity Controls

The following stormwater quantity standard technique(s) from the *NJDEP Stormwater Management Regulations* are being applied to each drainage area as noted in Sections 4.1 through 4.2:

1. For stormwater runoff leaving the site, the post-development runoff hydrographs for the current and future/projected 2-, 10-, and 100-year storms do not exceed, at any point in time, the pre-development runoff hydrographs for the same storm events. This technique is applied to drainage areas that, under proposed conditions, will remain unchanged or have a net decrease in total area.
2. The post-development peak runoff rates for the current and future/projected 2-, 10-, and 100-year storm events are reduced to 50, 75, and 80 percent, respectively, of the pre-development peak runoff rates. These reductions only apply to portions of the site that are proposed to be developed, and reductions are not required for undisturbed areas.

To Point of Analysis #1A, the project's proposed stormwater management facilities will consist of one small-scale infiltration basins (Basin #1) to attenuate the flows from the drainage areas outlined in Section 4.1 utilizing technique #2 above. Tables 4.17 & 4.18 summarizes the existing, permitted, and proposed flow rates from the site to Point of Analysis #1A, and detailed calculations can be found in Appendices A & B.

To Point of Analysis #1B, the project's proposed stormwater management facilities will remain undisturbed to reduce the flows from the drainage area as outlined in Section 4.1 utilizing technique #1 above. Tables 4.19 & 4.20 summarizes the existing and proposed flow rates from the site to Point of Analysis #1B, and detailed calculations can be found in Appendices A & B.

**Table 4.17 – Drainage Area #1A Existing vs. Proposed Flow Summary
Current Adjusted Precipitation Depths**

	Existing Peak Flow	Maximum Permitted Peak Flow		Proposed Peak Flow
	CFS	% of Existing	CFS ⁽¹⁾	CFS
2-Year Storm	2.93	50%	1.47	1.40
10-Year Storm	5.24	75%	3.93	2.37
100-Year Storm	10.18	80%	8.14	7.14

**Table 4.18 – Drainage Area #1A Existing vs. Proposed Flow Summary
Future Adjusted Precipitation Depths**

	Existing Peak Flow	Maximum Permitted Peak Flow		Proposed Peak Flow
	CFS	% of Existing	CFS ⁽¹⁾	CFS
2-Year Storm	3.73	50%	1.87	1.77
10-Year Storm	6.59	75%	4.94	2.90
100-Year Storm	13.70	80%	10.96	10.41

**Table 4.19 - Drainage Area #1B Existing vs. Proposed Comparison
Current Adjusted Precipitation Depths**

	Existing Peak Flow	Proposed Peak Flow
	CFS	CFS
2-Year Storm	5.91	4.08
10-Year Storm	9.89	8.16
100-Year Storm	18.23	16.77

See Appendix A for Comparison Hydrographs.

**Table 4.20 - Drainage Area #1B Existing vs. Proposed Comparison
Future Adjusted Precipitation Depths**

	Existing Peak Flow	Proposed Peak Flow
	CFS	CFS
2-Year Storm	7.32	5.52
10-Year Storm	12.24	10.59
100-Year Storm	24.31	22.98

See Appendix B for Comparison Hydrographs.

**Table 4.21 – Off Site Area Existing vs. Proposed Comparison
Current Adjusted Precipitation Depths**

	Existing Peak Flow	Proposed Peak Flow
	CFS	CFS
2-Year Storm	0.63	0.60
10-Year Storm	1.31	1.21
100-Year Storm	2.80	2.53

See Appendix A for Comparison Hydrographs.

**Table 4.22 – Off Site Area Existing vs. Proposed Comparison
Future Adjusted Precipitation Depths**

	Existing Peak Flow	Proposed Peak Flow
	CFS	CFS
2-Year Storm	0.86	0.82
10-Year Storm	1.72	1.58
100-Year Storm	3.85	3.50

4.4 Water Quality Controls

As stated in the NJDEP Stormwater Management Regulations, the stormwater runoff quality standards are applicable when the development proposed an increase of one-quarter acre (10,890 square-feet) or more of regulated motor vehicle surfaces. The proposed development of the site will result in a net reduction of motor vehicle surfaces, and therefore water quality controls do not apply.

The small scale bioretention basin proposed on-site provides 80% TSS removal. Further, to be considered as green infrastructure, the small-scale bioretention basins are proposed with a maximum drainage area of 2.5 acres (excluding the basin area). The proposed basin contains a drainage area of 0.876 acres and provides an aspect of water quality treatment despite not required to provide per the NJDEP Stormwater Management Regulations.

4.5 Groundwater Recharge

The subject site has been previously developed and is located within the Metropolitan Planning Area (PA1); As such, the site falls under the NJDEP’s definition for an urban redevelopment area. Due to the conditions described above, no groundwater recharge is proposed as part of the stormwater management facilities on site.

4.6 Soil Erosion and Sediment Control

The Soil Erosion and Sediment Control plans and details are included within the Site Plan documents prepared by Bohler and must be followed throughout construction. Silt fences, stabilized construction entrances, a temporary stockpile and inlet filters are proposed during construction. This report and the Site Plan documents prepared by Bohler are being submitted to the Bergen Soil Conservation District for approval.

Proposed on-site stormwater facilities discharge to an existing stormwater conveyance network. The rate of runoff at the discharge point has been maintained or decreased.

The downstream off-site stability is met by decreasing the peak flows leaving the site by at least 50% for the 2-year storm and 75% for the 10-year storm for the areas to be disturbed.

4.7 Low-Impact Development and Nonstructural Stormwater Management Facilities

In accordance with the NJDEP regulations (NJAC 7:8-2.4) and the latest *New Jersey Stormwater Best Management Practices Manual*, several nonstructural stormwater management strategies have been incorporated into the design of the site and are listed below:

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.

The footprint of the improvements has been minimized to the previously improved and/or disturbed areas. The majority of the existing landscaped areas are proposed to remain as landscaped area. Stormwater runoff will be discharged in a similar manner of existing conditions.

2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.

The overall impervious coverage is 54.4% and is below the municipal ordinance requirement of 65% maximum impervious coverage. As part of the proposed site design, the minimum allowable parking and drive aisle sizes, in accordance with local ordinances, are used in lieu of larger stalls and aisles to reduce the amount of impervious surface in the post-development condition

The proposed improvements are disconnected from the stormwater conveyance system and will discharge over a grass area and discharge overland to the nearest stormwater management basin. The roof runoff from the building will be discharged directly to the stormwater conveyance system, however perforated underdrains are utilized.

3. Maximize the protection of natural drainage features and vegetation.

The footprint of the improvements has been minimized to the previously developed area. Stormwater runoff will be discharged in a similar manner to existing conditions. Soil erosion measures are proposed to be utilized during construction to protect the adjoining properties.

4. Minimize the decrease in the "time of concentration" from pre-construction to postconstruction.

A Bioretention basin has been included within the project's stormwater design to achieve equivalent times of concentration to the existing conditions. Stormwater runoff from the rear (west) of the site will be collected and discharged to the basin.

5. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.

A comprehensive landscape plan has been incorporated into the design of the proposed improvements which includes low maintenance landscaping. The use of lawn areas has been minimized where applicable and fertilizers and pesticides are to be used sparingly. Native plants, including ground cover, shrubs and trees, are proposed. The native plantings will also require little or no irrigation once they are established.

6. Provide other source controls to prevent or minimize the use or exposure of pollutants from development sites in order to prevent or minimize the release of those pollutants into stormwater runoff. These source controls include, but are not limited to:

- i. Development design features that help to prevent accumulation and discharge of trash and debris in drainage systems.

Proposed stormwater inlets have been specified with "eco" type curb pieces indicating the text "Dump No Waste, Drains to Waterways" and trash racks are specified for installation at the outlet control structure. In addition, a "Stormwater Management Facilities Operation & Maintenance Manual" has been prepared for use by contractors and the owners that specify that street sweeping must occur on a bi-monthly schedule..

- ii. Development design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments.

Spills and accumulation of pollutants are not anticipated due to the type of use proposed. However, proposed stormwater management facilities intercept stormwater from the impervious surfaces and the proposed roadways, which will provide a collection point for vehicular pollutants. The proposed bioretention basin will improve water quality from vehicular surfaces by 80%.

- iii. When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.

The soil erosion and sediment control plans address the requirement for establishing vegetation. Preventative source controls include the use of "eco" inlet curb pieces, storm drain inlets, and trash racks on outlet control structures. Pollution prevention techniques such as water quality treatment through minimized clearing have been implemented in the design. The soil erosion and sediment control plan addresses re-stabilizing vegetation and implementing soil erosion and sediment control protection measures. Prevention and maintenance are also addressed in the Stormwater Operations and Maintenance Manual prepared for the project.

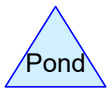
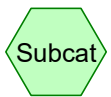
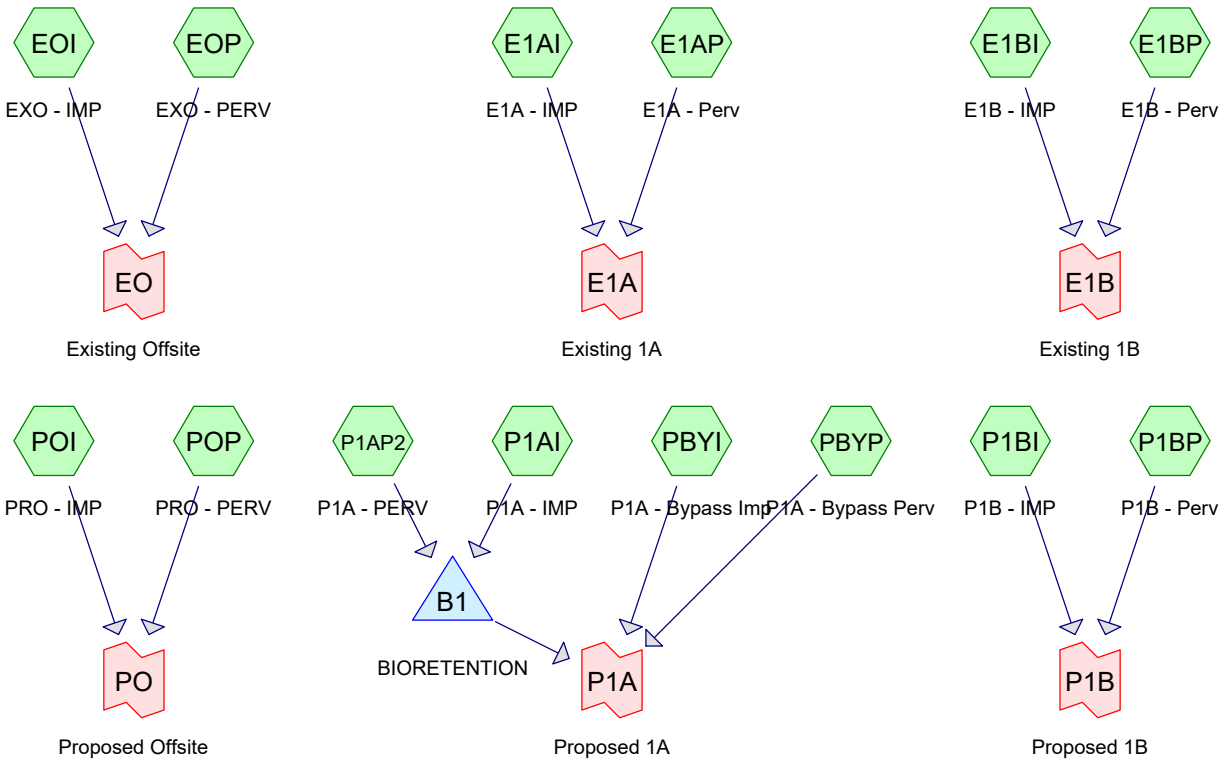
5. Conclusions

As demonstrated in the above sections, the stormwater management plan for the proposed development meets the current *NJDEP Stormwater Management Regulations and Standards for Soil Erosion and Sediment Control in New Jersey*, and addresses the requirements for stormwater quantity reductions, water quality, groundwater recharge, and soil erosion and sediment control. As a result of the design calculations contained herein, Bohler anticipates that the stormwater design will not have a negative impact to surrounding areas.

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A. PRE- vs. POST-DEVELOPMENT HYDROGRAPHS - Current Adjusted Precipitation Depths

- ◆ **2-Year Storm Event**
- ◆ **10-Year Storm Event**
- ◆ **100-Year Storm Event**
- ◆ **Pre- vs. Post Comparison**



Routing Diagram for EX-PR
 Prepared by Bohler, Printed 7/16/2025
 HydroCAD® 10.20-5c s/n 03478 © 2023 HydroCAD Software Solutions LLC

EX-PR

Prepared by Bohler

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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Printed 7/16/2025

Page 2

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1AI: E1A - IMP	Runoff Area=0.560 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=372' Tc=2.0 min CN=98 Runoff=2.00 cfs 0.146 af
SubcatchmentE1AP: E1A - Perv	Runoff Area=0.680 ac 0.00% Impervious Runoff Depth=1.15" Flow Length=409' Tc=3.4 min CN=74 Runoff=0.97 cfs 0.065 af
SubcatchmentE1BI: E1B - IMP	Runoff Area=1.413 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=411' Tc=1.7 min CN=98 Runoff=4.93 cfs 0.369 af
SubcatchmentE1BP: E1B - Perv	Runoff Area=0.943 ac 0.00% Impervious Runoff Depth=1.21" Flow Length=690' Tc=7.6 min CN=75 Runoff=1.22 cfs 0.095 af
SubcatchmentEOI: EXO - IMP	Runoff Area=0.022 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=107' Tc=0.7 min CN=98 Runoff=0.08 cfs 0.006 af
SubcatchmentEOP: EXO - PERV	Runoff Area=0.336 ac 0.00% Impervious Runoff Depth=1.27" Flow Length=138' Tc=2.3 min CN=76 Runoff=0.56 cfs 0.036 af
SubcatchmentP1AI: P1A - IMP	Runoff Area=0.259 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=262' Tc=0.9 min CN=98 Runoff=0.91 cfs 0.068 af
SubcatchmentP1AP2: P1A - PERV	Runoff Area=0.617 ac 0.00% Impervious Runoff Depth=1.53" Flow Length=116' Tc=7.0 min CN=80 Runoff=1.05 cfs 0.079 af
SubcatchmentP1BI: P1B - IMP	Runoff Area=1.461 ac 0.00% Impervious Runoff Depth=1.53" Flow Length=388' Tc=1.4 min CN=80 Runoff=2.98 cfs 0.187 af
SubcatchmentP1BP: P1B - Perv	Runoff Area=0.876 ac 0.00% Impervious Runoff Depth=1.53" Flow Length=711' Tc=7.6 min CN=80 Runoff=1.46 cfs 0.112 af
SubcatchmentPBYI: P1A - Bypass Imp	Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=262' Tc=0.9 min CN=98 Runoff=1.27 cfs 0.095 af
SubcatchmentPBYP: P1A - Bypass Perv	Runoff Area=0.045 ac 0.00% Impervious Runoff Depth=1.21" Flow Length=116' Tc=7.0 min CN=75 Runoff=0.06 cfs 0.005 af
SubcatchmentPOI: PRO - IMP	Runoff Area=0.047 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=99' Tc=0.8 min CN=98 Runoff=0.17 cfs 0.012 af
SubcatchmentPOP: PRO - PERV	Runoff Area=0.287 ac 0.00% Impervious Runoff Depth=1.27" Flow Length=122' Tc=3.4 min CN=76 Runoff=0.46 cfs 0.030 af
Pond B1: BIORETENTION	Peak Elev=132.95' Storage=3,260 cf Inflow=1.69 cfs 0.147 af Outflow=0.25 cfs 0.114 af
Link E1A: Existing 1A	Inflow=2.93 cfs 0.212 af Primary=2.93 cfs 0.212 af

EX-PR

NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Link E1B: Existing 1B

Inflow=5.91 cfs 0.465 af
Primary=5.91 cfs 0.465 af

Link EO: Existing Offsite

Inflow=0.63 cfs 0.041 af
Primary=0.63 cfs 0.041 af

Link P1A: Proposed 1A

Inflow=1.40 cfs 0.214 af
Primary=1.40 cfs 0.214 af

Link P1B: Proposed 1B

Inflow=4.08 cfs 0.299 af
Primary=4.08 cfs 0.299 af

Link PO: Proposed Offsite

Inflow=0.60 cfs 0.043 af
Primary=0.60 cfs 0.043 af

Total Runoff Area = 7.908 ac Runoff Volume = 1.305 af Average Runoff Depth = 1.98"
66.33% Pervious = 5.245 ac 33.67% Impervious = 2.663 ac

EX-PR

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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment E1A: E1A - IMP

Runoff = 2.00 cfs @ 12.08 hrs, Volume= 0.146 af, Depth= 3.14"

Routed to Link E1A : Existing 1A

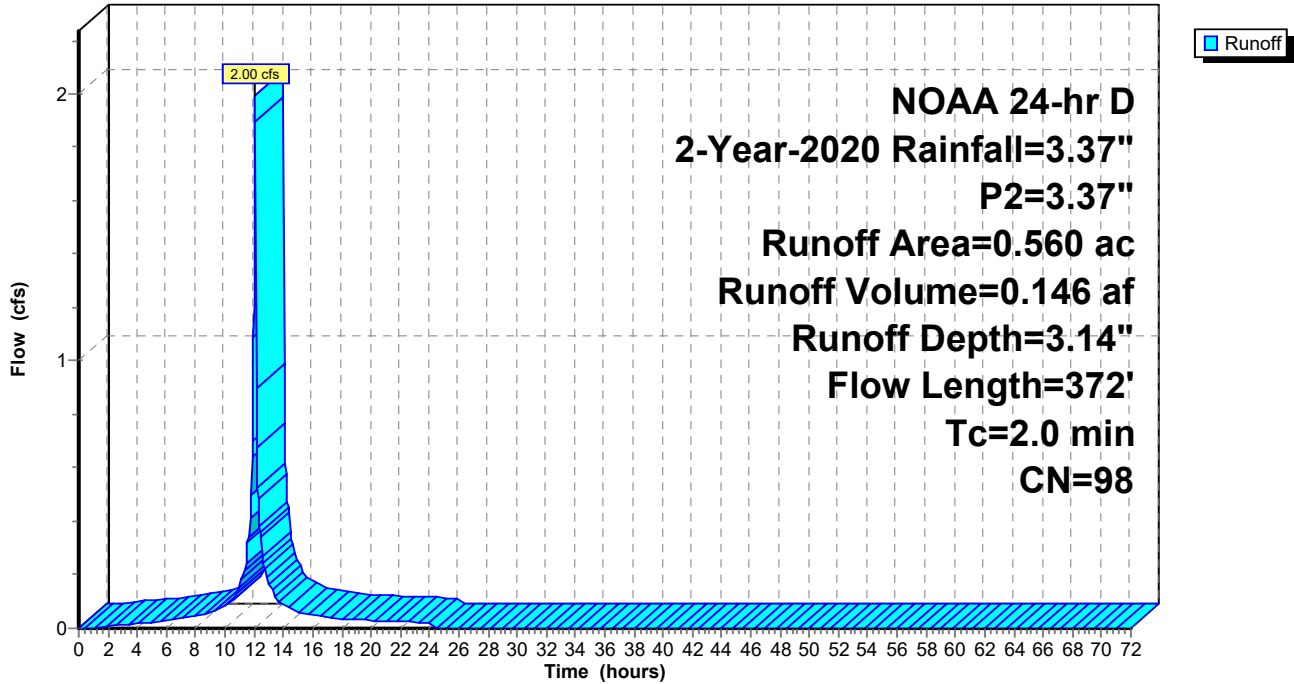
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.560	98	Paved parking, HSG D
0.560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	41	0.0060	0.73		Sheet Flow, H-I Smooth surfaces n= 0.011 P2= 3.37"
0.0	10	0.0300	3.52		Shallow Concentrated Flow, I-C Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
2.0	372	Total			

Subcatchment E1AI: E1A - IMP

Hydrograph



EX-PR

NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment E1AP: E1A - Perv

Runoff = 0.97 cfs @ 12.10 hrs, Volume= 0.065 af, Depth= 1.15"
 Routed to Link E1A : Existing 1A

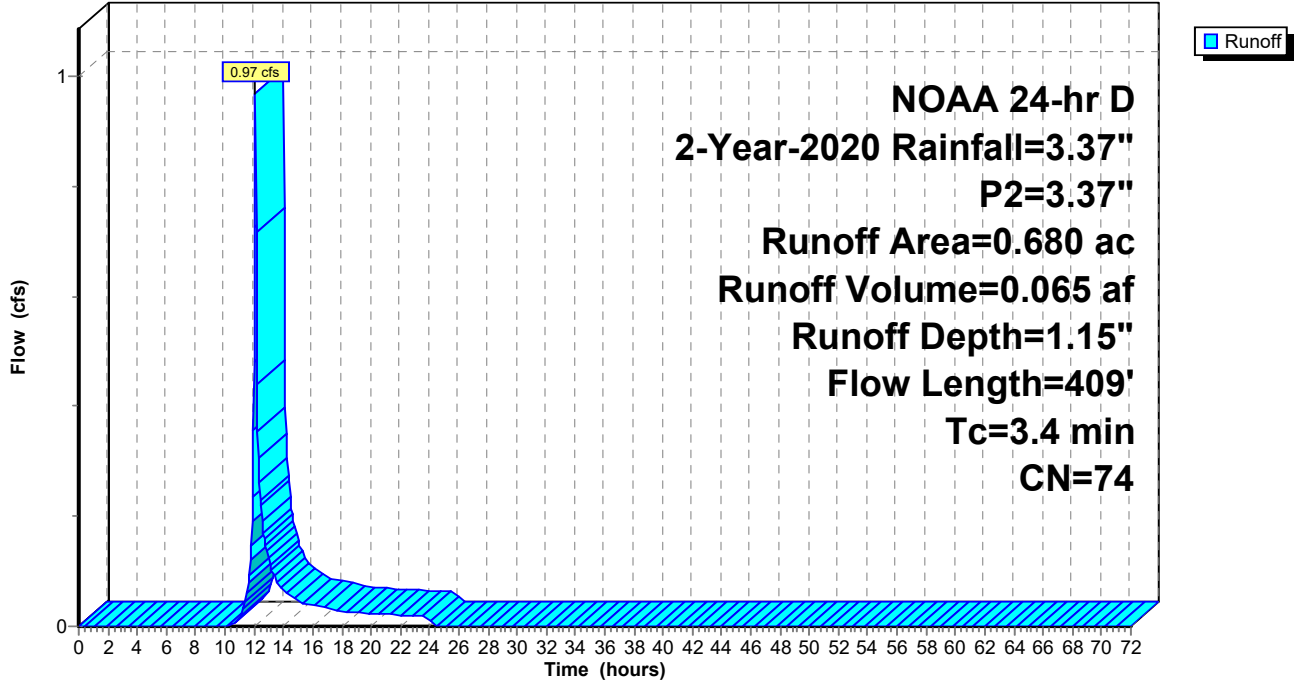
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.676	74	>75% Grass cover, Good, HSG C
0.004	80	>75% Grass cover, Good, HSG D
0.680	74	Weighted Average
0.680		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	35	0.1500	0.32		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 3.37"
0.5	53	0.0090	1.93		Shallow Concentrated Flow, B-C
					Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F
					Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
3.4	409	Total			

Subcatchment E1AP: E1A - Perv

Hydrograph



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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment E1BI: E1B - IMP

Runoff = 4.93 cfs @ 12.07 hrs, Volume= 0.369 af, Depth= 3.14"

Routed to Link E1B : Existing 1B

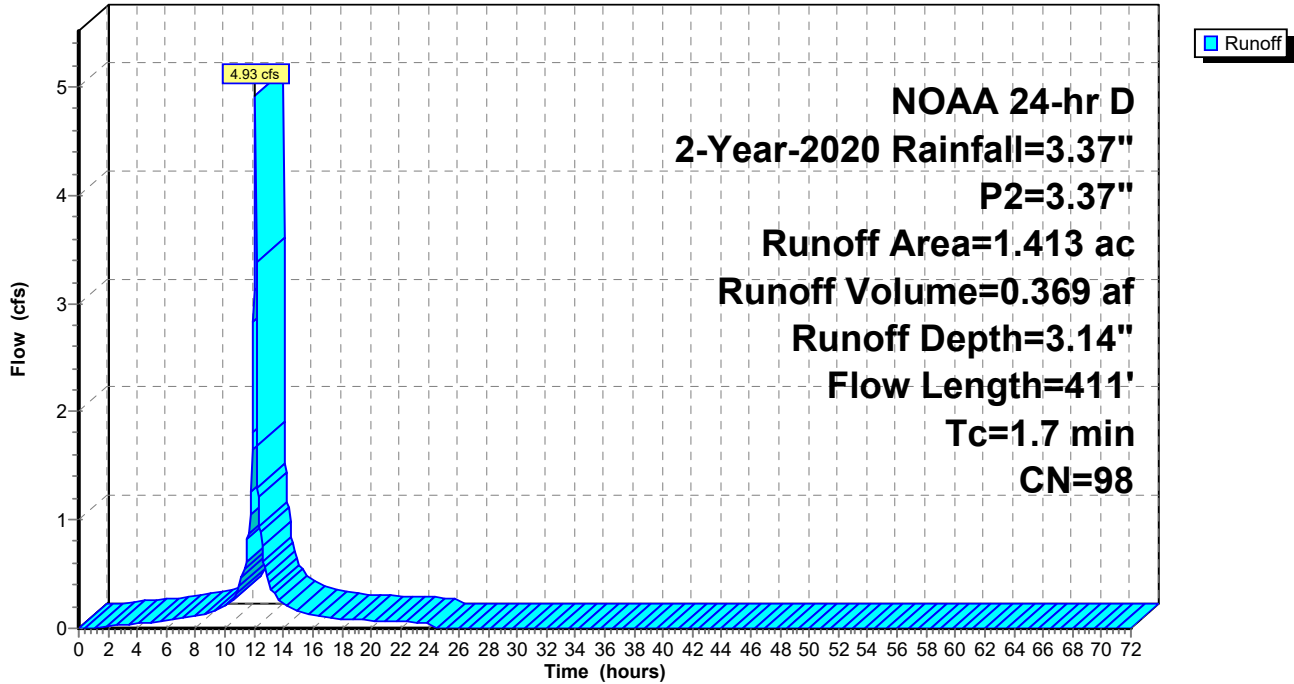
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
1.413	98	Paved parking, HSG D
1.413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.7	411	Total			

Subcatchment E1BI: E1B - IMP

Hydrograph



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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment E1BP: E1B - Perv

Runoff = 1.22 cfs @ 12.15 hrs, Volume= 0.095 af, Depth= 1.21"
 Routed to Link E1B : Existing 1B

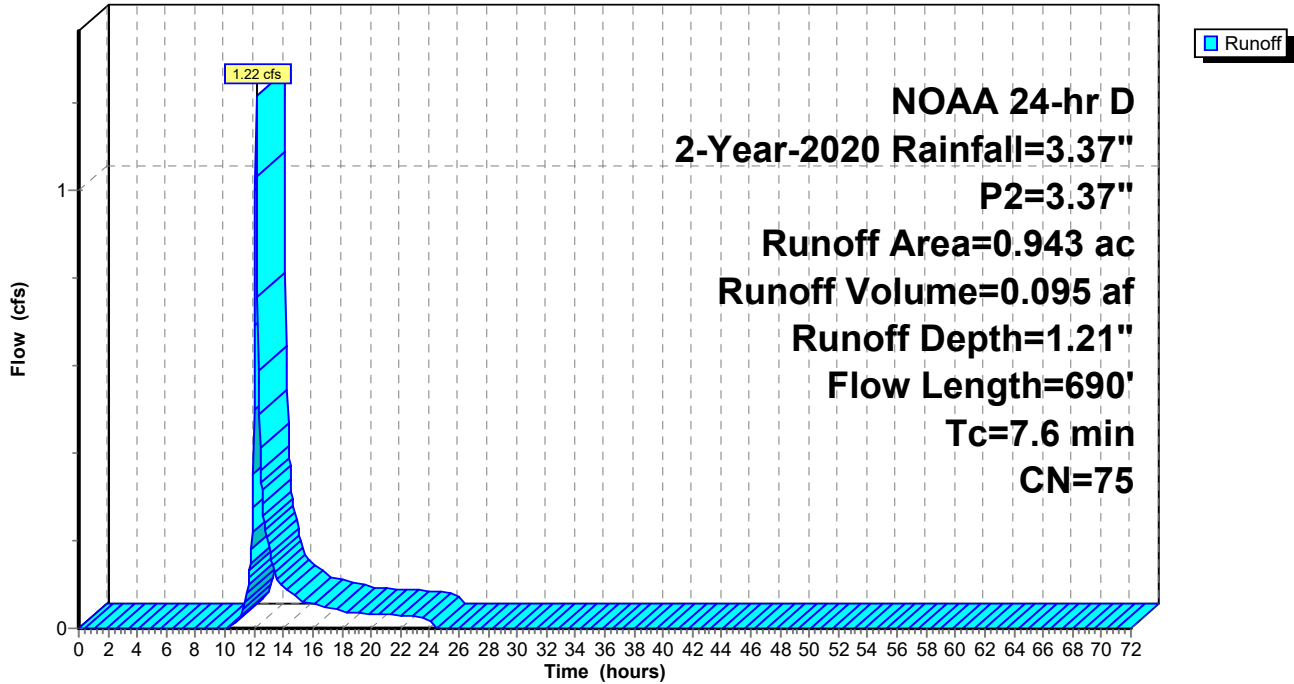
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.805	74	>75% Grass cover, Good, HSG C
0.138	80	>75% Grass cover, Good, HSG D
0.943	75	Weighted Average
0.943		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0900	0.32		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.5	125	0.0700	4.26		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.2	54	0.0850	4.69		Shallow Concentrated Flow, C-K Unpaved Kv= 16.1 fps
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
7.6	690	Total			

Subcatchment E1BP: E1B - Perv

Hydrograph



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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment EOI: EXO - IMP

Runoff = 0.08 cfs @ 12.06 hrs, Volume= 0.006 af, Depth= 3.14"

Routed to Link EO : Existing Offsite

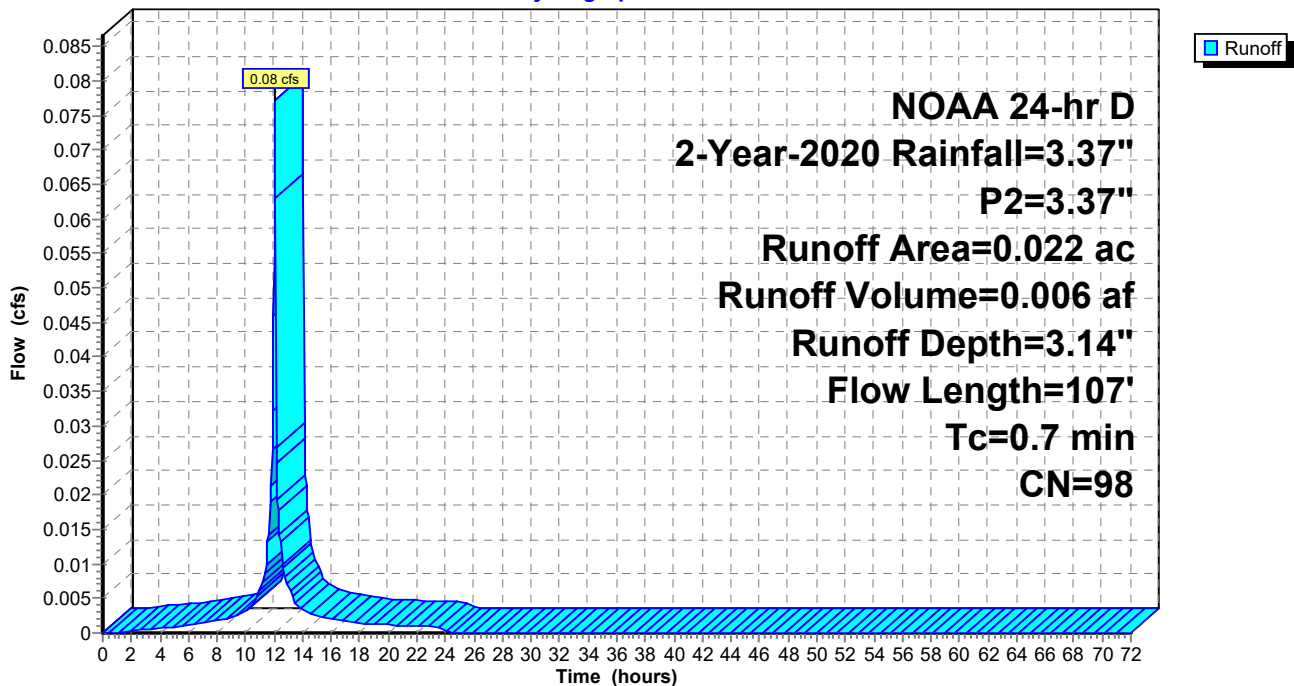
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.022	98	Paved parking, HSG D
0.022		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.7	107	Total			

Subcatchment EOI: EXO - IMP

Hydrograph



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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment EOP: EXO - PERV

Runoff = 0.56 cfs @ 12.09 hrs, Volume= 0.036 af, Depth= 1.27"

Routed to Link EO : Existing Offsite

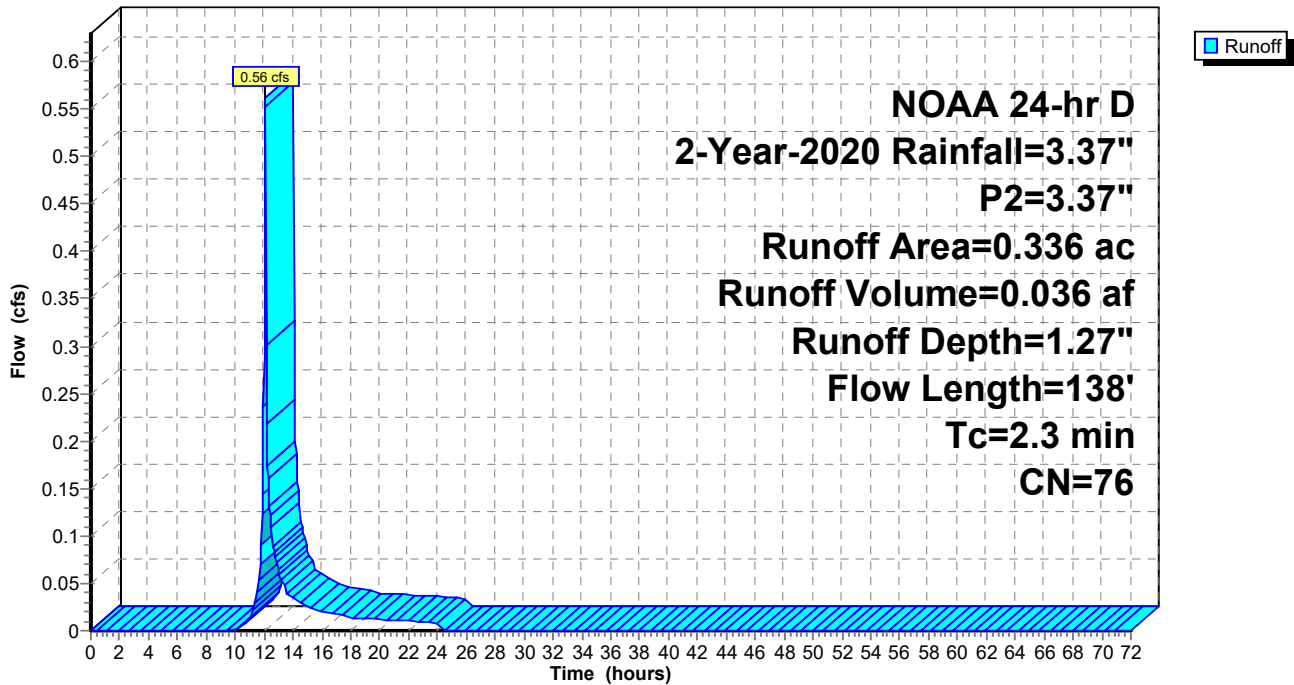
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.248	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.336	76	Weighted Average
0.336		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	31	0.1700	0.33		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
2.3	138	Total			

Subcatchment EOP: EXO - PERV

Hydrograph



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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment P1AI: P1A - IMP

Runoff = 0.91 cfs @ 12.06 hrs, Volume= 0.068 af, Depth= 3.14"
 Routed to Pond B1 : BIORETENTION

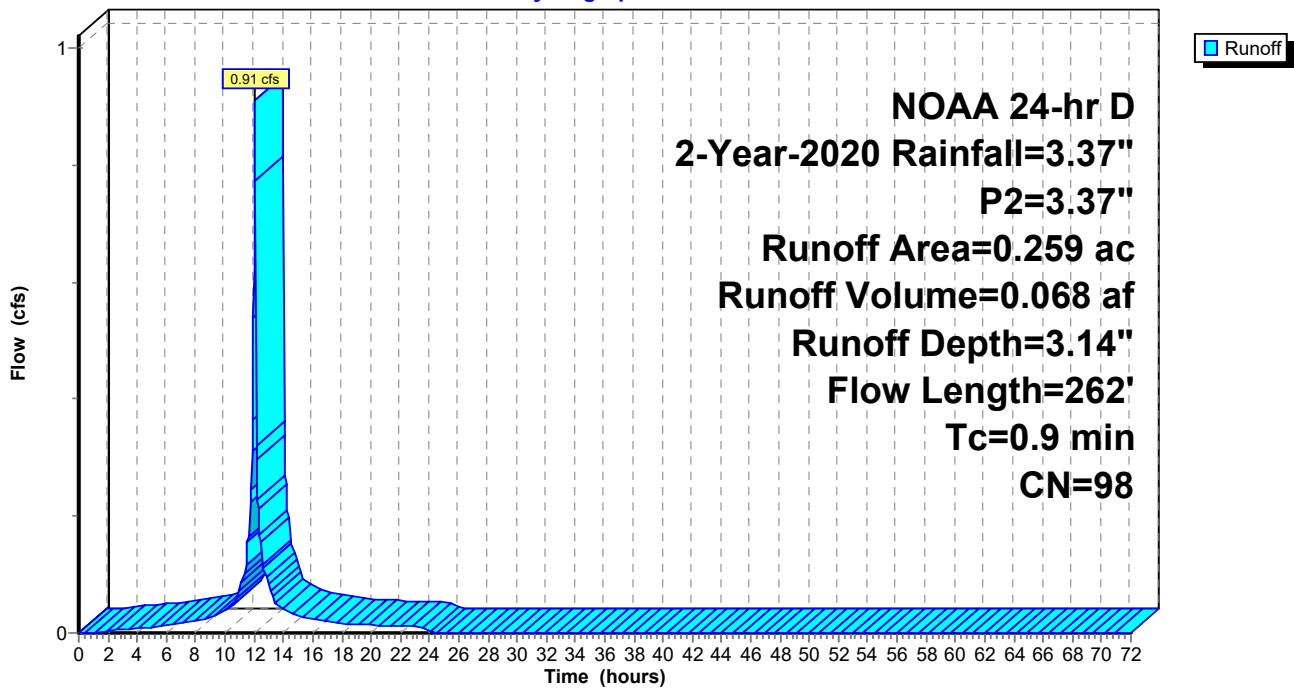
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.259	98	Paved parking, HSG D
0.259		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment P1AI: P1A - IMP

Hydrograph



EX-PR

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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment P1AP2: P1A - PERV

Runoff = 1.05 cfs @ 12.14 hrs, Volume= 0.079 af, Depth= 1.53"
Routed to Pond B1 : BIORETENTION

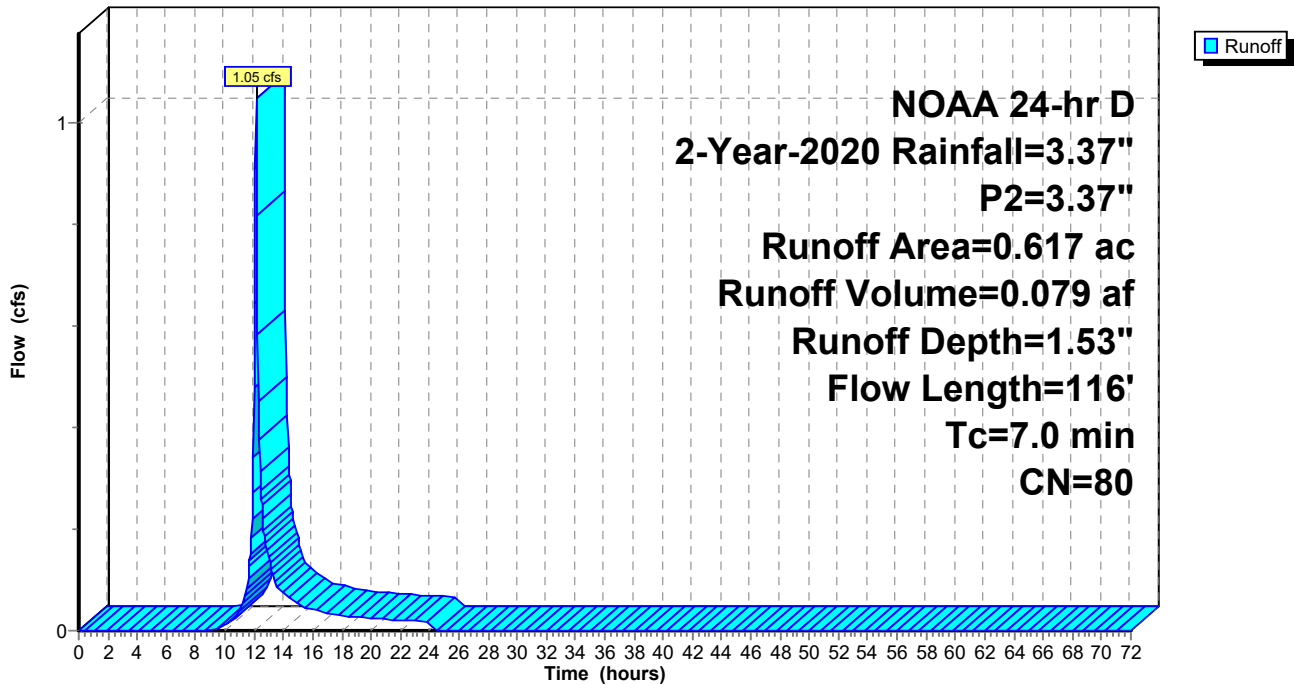
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.617	80	>75% Grass cover, Good, HSG D
0.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	61	0.0320	0.19		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.9	22	0.3200	0.39		Sheet Flow, B-C Grass: Short n= 0.150 P2= 3.37"
0.8	17	0.3000	0.36		Sheet Flow, C-D Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
7.0	116	Total			

Subcatchment P1AP2: P1A - PERV

Hydrograph



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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment P1BI: P1B - IMP

Runoff = 2.98 cfs @ 12.08 hrs, Volume= 0.187 af, Depth= 1.53"
 Routed to Link P1B : Proposed 1B

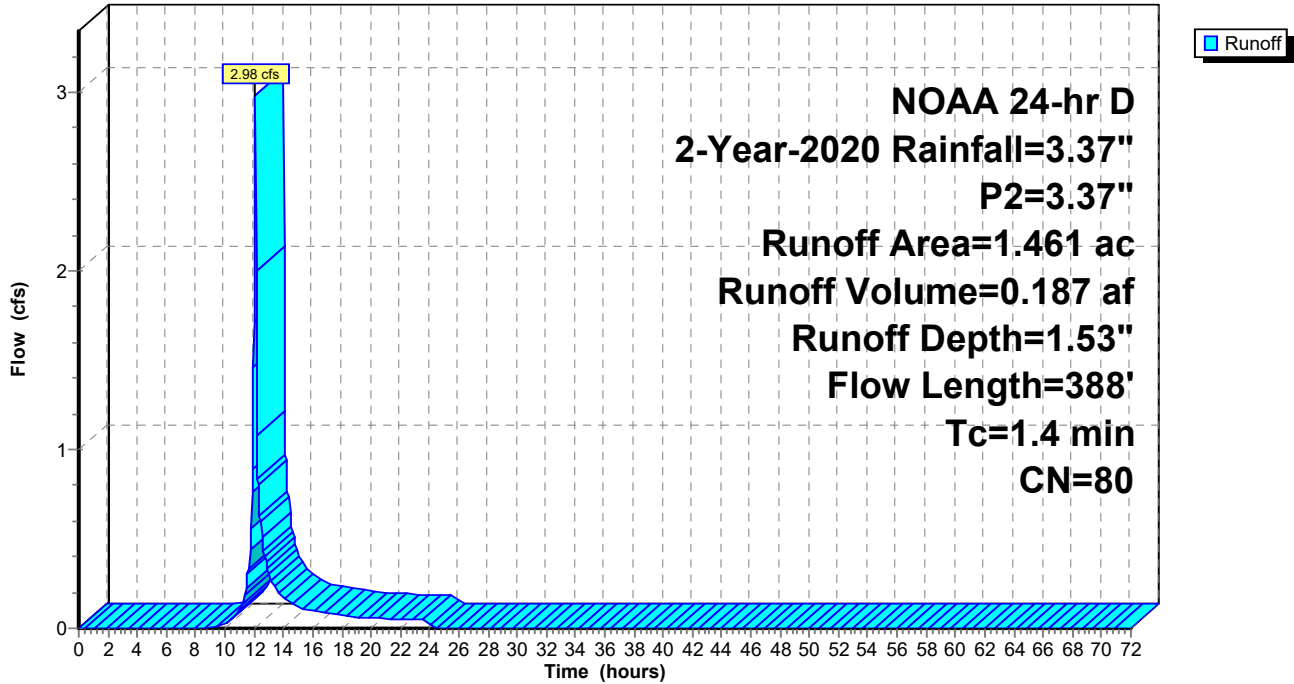
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
1.461	80	>75% Grass cover, Good, HSG D
1.461		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.4	388	Total			

Subcatchment P1BI: P1B - IMP

Hydrograph



Summary for Subcatchment P1BP: P1B - Perv

Runoff = 1.46 cfs @ 12.15 hrs, Volume= 0.112 af, Depth= 1.53"
 Routed to Link P1B : Proposed 1B

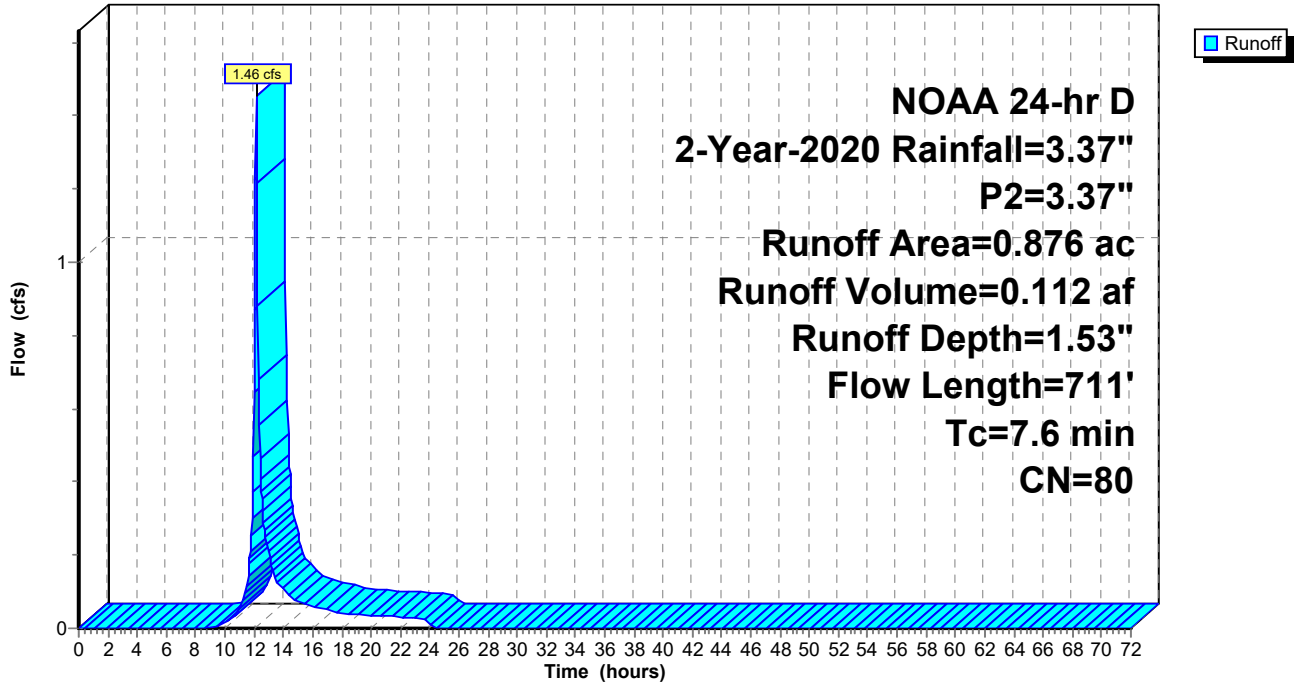
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.750	80	>75% Grass cover, Good, HSG D
0.126	80	>75% Grass cover, Good, HSG D
0.876	80	Weighted Average
0.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0900	0.32		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 3.37"
0.5	127	0.0700	4.26		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
0.2	55	0.0800	4.55		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.2	31	0.0300	2.79		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	10	0.0150	2.49		Shallow Concentrated Flow, E-F
					Paved Kv= 20.3 fps
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H
					Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I
					Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K
					Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
7.6	711	Total			

Subcatchment P1BP: P1B - Perv

Hydrograph



Summary for Subcatchment PBYI: P1A - Bypass Imp

Runoff = 1.27 cfs @ 12.06 hrs, Volume= 0.095 af, Depth= 3.14"
 Routed to Link P1A : Proposed 1A

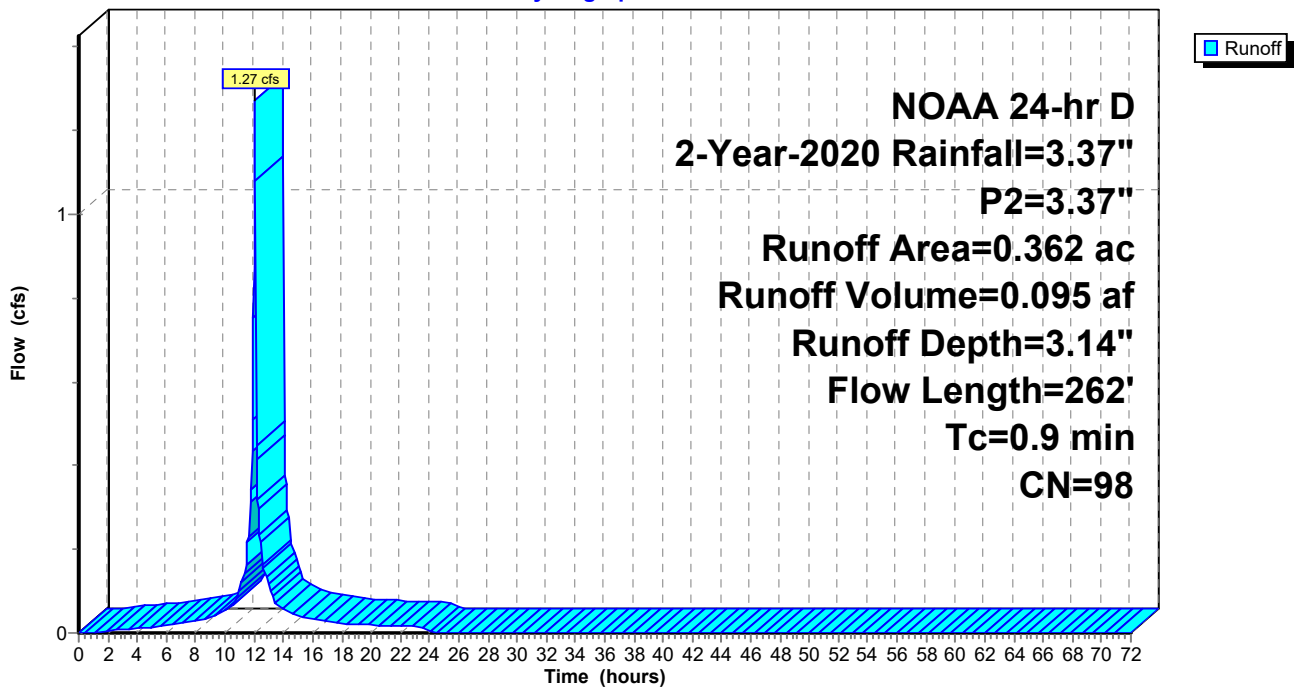
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.362	98	Paved parking, HSG D
0.362		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment PBYI: P1A - Bypass Imp

Hydrograph



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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment PBYP: P1A - Bypass Perv

Runoff = 0.06 cfs @ 12.15 hrs, Volume= 0.005 af, Depth= 1.21"

Routed to Link P1A : Proposed 1A

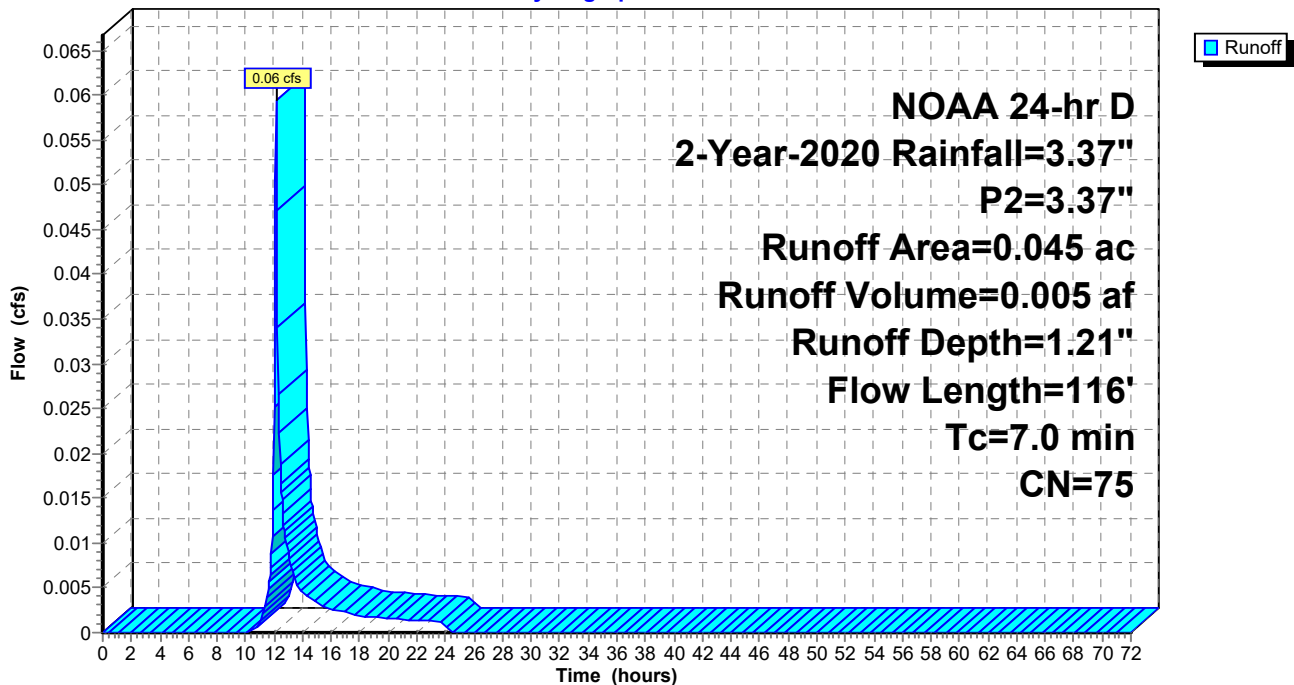
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.039	74	>75% Grass cover, Good, HSG C
0.006	80	>75% Grass cover, Good, HSG D
0.045	75	Weighted Average
0.045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	61	0.0320	0.19		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.9	22	0.3200	0.39		Sheet Flow, B-C Grass: Short n= 0.150 P2= 3.37"
0.8	17	0.3000	0.36		Sheet Flow, C-D Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
7.0	116	Total			

Subcatchment PBYP: P1A - Bypass Perv

Hydrograph



EX-PR

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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Summary for Subcatchment POI: PRO - IMP

Runoff = 0.17 cfs @ 12.06 hrs, Volume= 0.012 af, Depth= 3.14"

Routed to Link PO : Proposed Offsite

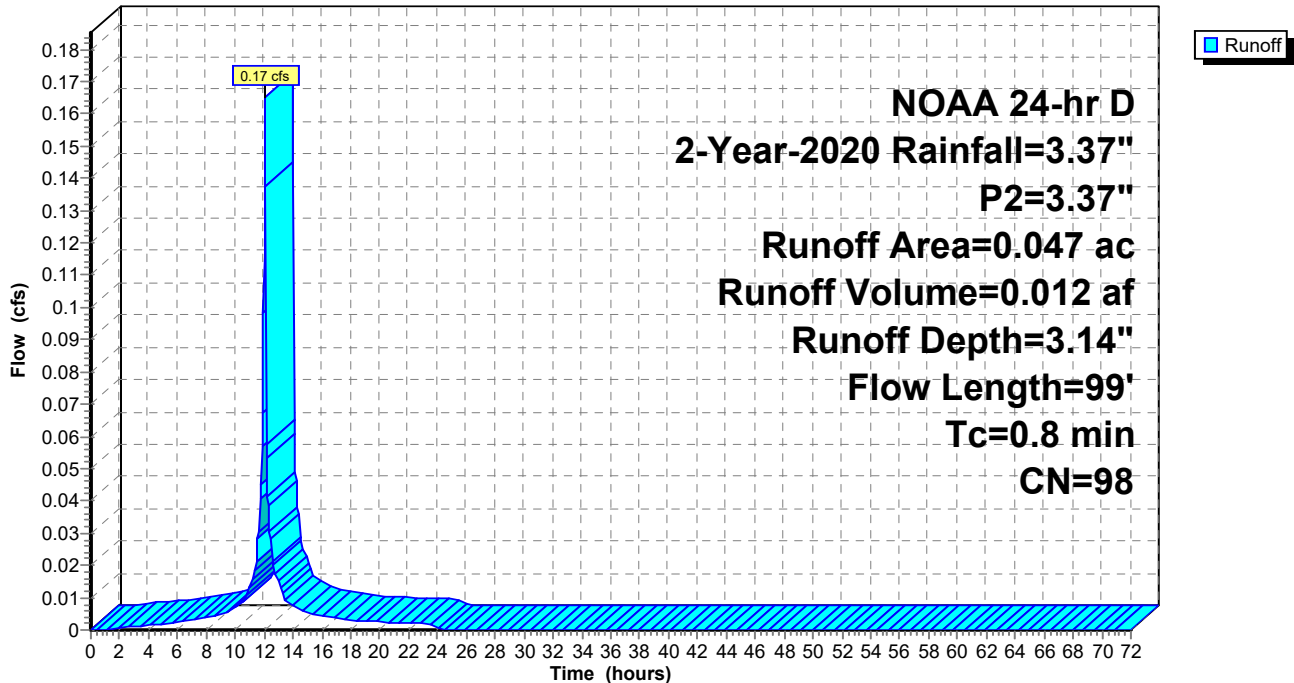
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.047	98	Paved parking, HSG D
0.047		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	0.99		Sheet Flow, D-B Smooth surfaces n= 0.011 P2= 3.37"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.8	99	Total			

Subcatchment POI: PRO - IMP

Hydrograph



Summary for Subcatchment POP: PRO - PERV

Runoff = 0.46 cfs @ 12.10 hrs, Volume= 0.030 af, Depth= 1.27"
 Routed to Link PO : Proposed Offsite

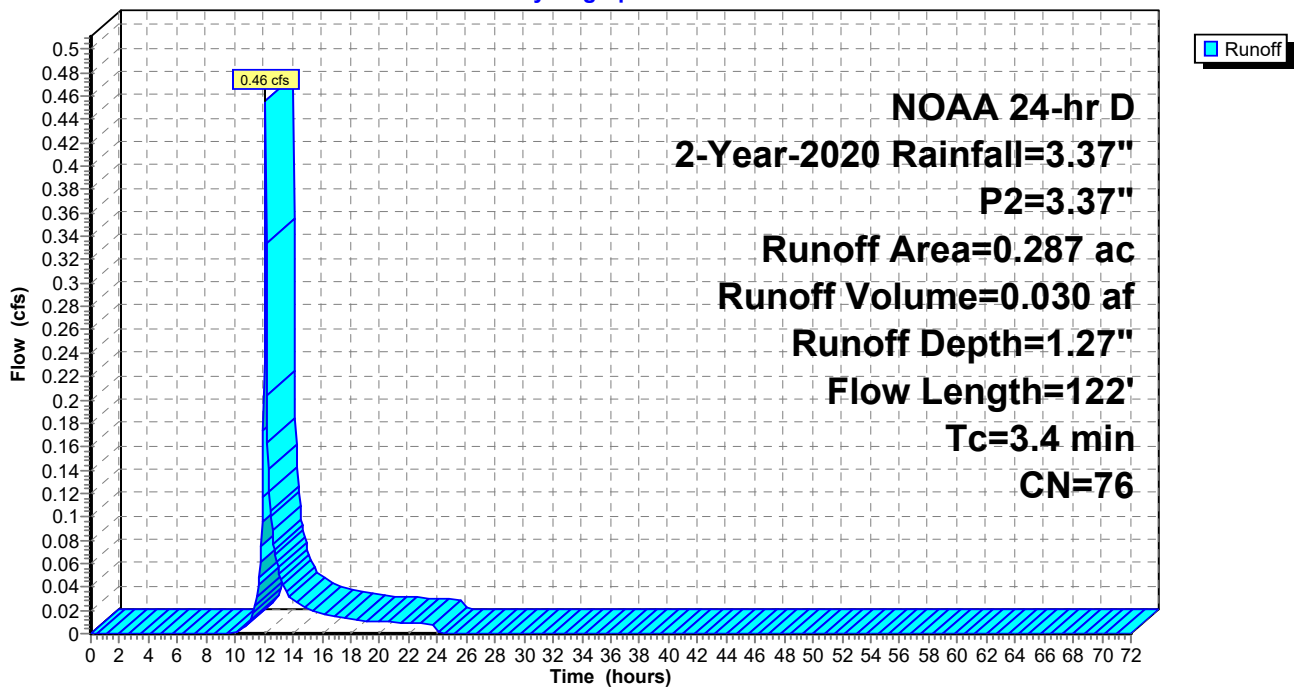
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.199	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.287	76	Weighted Average
0.287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	53	0.0950	0.29		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
3.4	122	Total			

Subcatchment POP: PRO - PERV

Hydrograph



Summary for Pond B1: BIORETENTION

Inflow Area = 0.876 ac, 29.57% Impervious, Inflow Depth = 2.01" for 2-Year-2020 event
 Inflow = 1.69 cfs @ 12.09 hrs, Volume= 0.147 af
 Outflow = 0.25 cfs @ 12.86 hrs, Volume= 0.114 af, Atten= 85%, Lag= 46.2 min
 Primary = 0.25 cfs @ 12.86 hrs, Volume= 0.114 af
 Routed to Link P1A : Proposed 1A

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 132.95' @ 12.86 hrs Surf.Area= 3,635 sf Storage= 3,260 cf

Plug-Flow detention time= 302.9 min calculated for 0.114 af (78% of inflow)
 Center-of-Mass det. time= 213.7 min (1,019.7 - 806.0)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	11,644 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	3,229	0	0
133.00	3,656	3,443	3,443
134.00	4,097	3,877	7,319
135.00	4,552	4,325	11,644

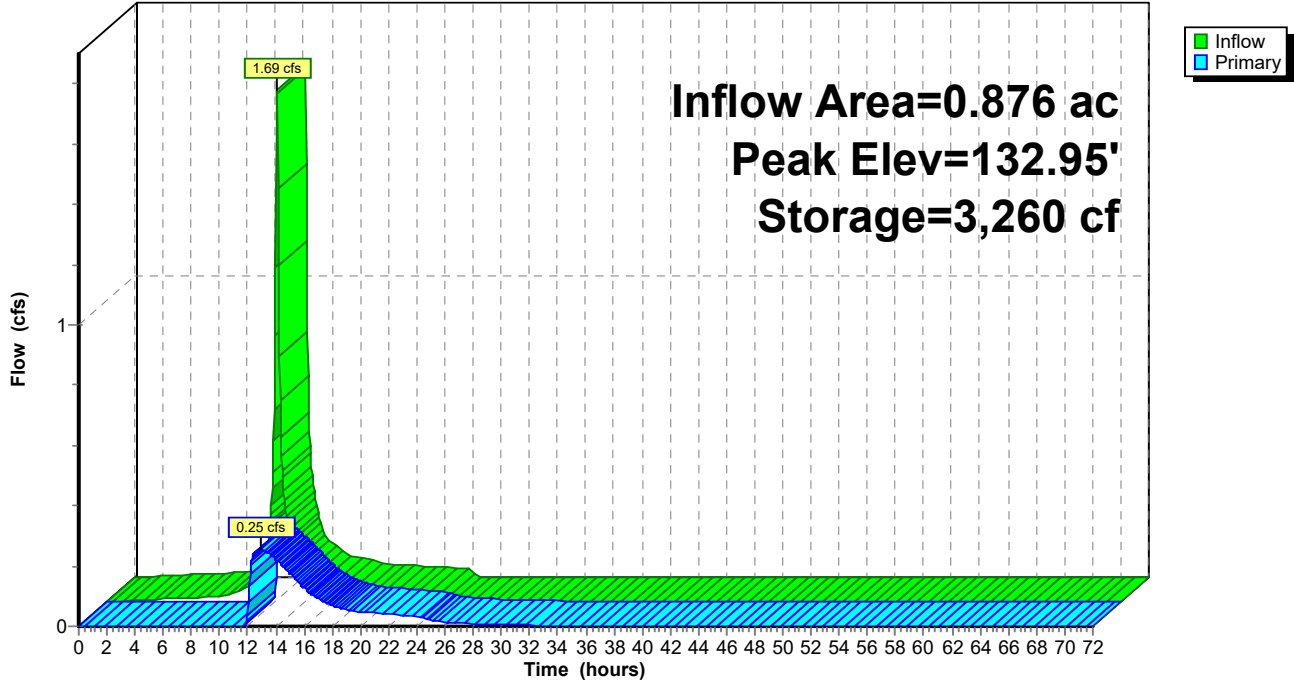
Device	Routing	Invert	Outlet Devices
#1	Primary	130.25'	18.0" Round Culvert L= 157.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.25' / 126.50' S= 0.0239 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	132.42'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.40'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.25 cfs @ 12.86 hrs HW=132.95' (Free Discharge)

- 1=Culvert (Passes 0.25 cfs of 9.38 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.25 cfs @ 2.90 fps)
- 3=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond B1: BIORETENTION

Hydrograph



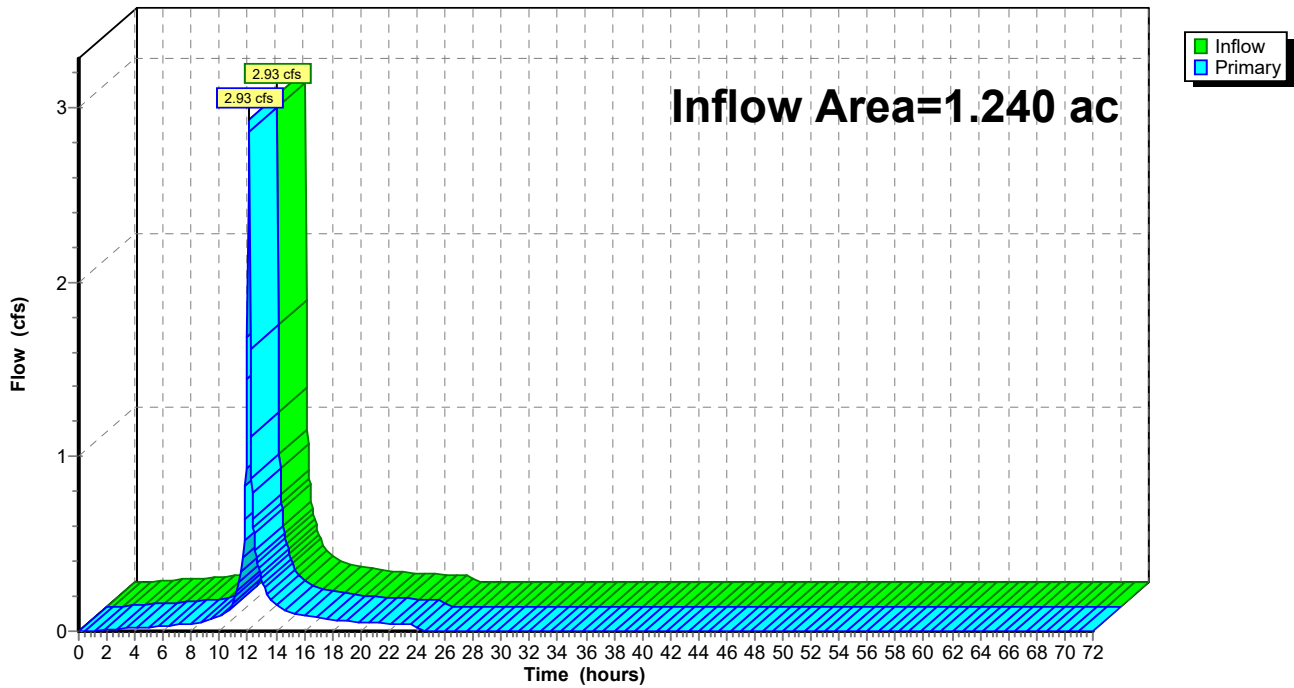
Summary for Link E1A: Existing 1A

Inflow Area = 1.240 ac, 45.16% Impervious, Inflow Depth = 2.05" for 2-Year-2020 event
Inflow = 2.93 cfs @ 12.08 hrs, Volume= 0.212 af
Primary = 2.93 cfs @ 12.08 hrs, Volume= 0.212 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1A: Existing 1A

Hydrograph



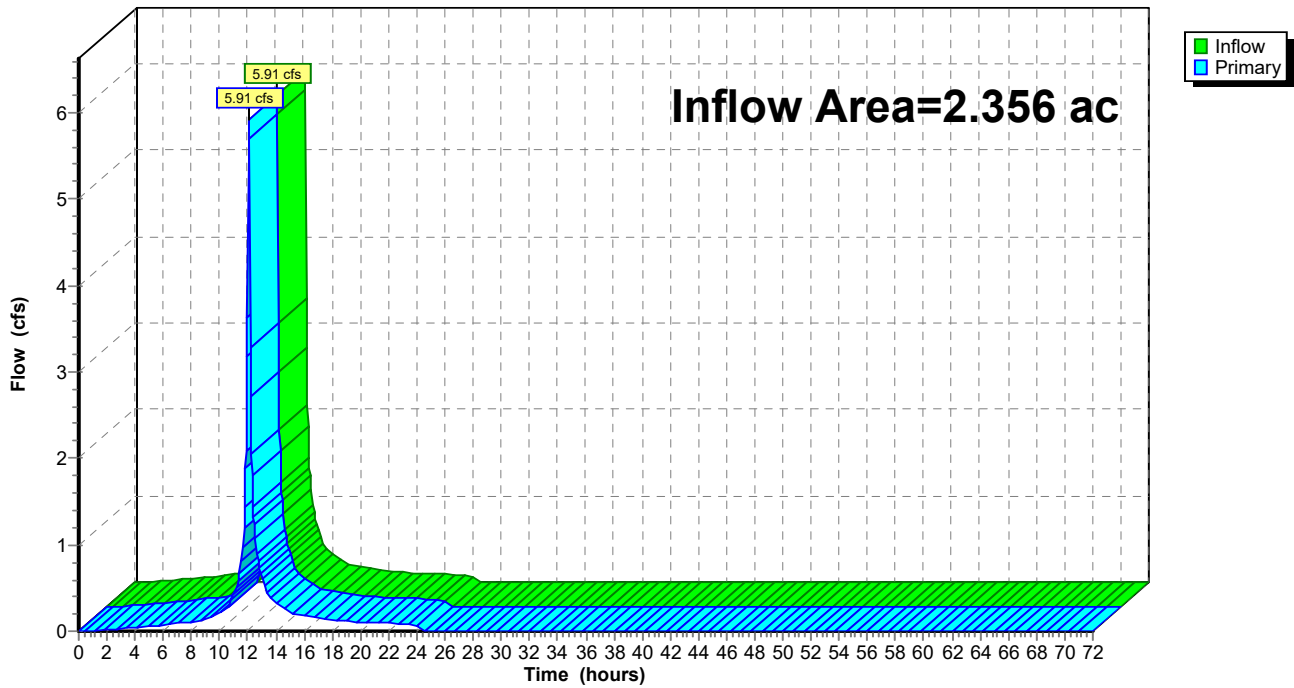
Summary for Link E1B: Existing 1B

Inflow Area = 2.356 ac, 59.97% Impervious, Inflow Depth = 2.37" for 2-Year-2020 event
Inflow = 5.91 cfs @ 12.08 hrs, Volume= 0.465 af
Primary = 5.91 cfs @ 12.08 hrs, Volume= 0.465 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1B: Existing 1B

Hydrograph



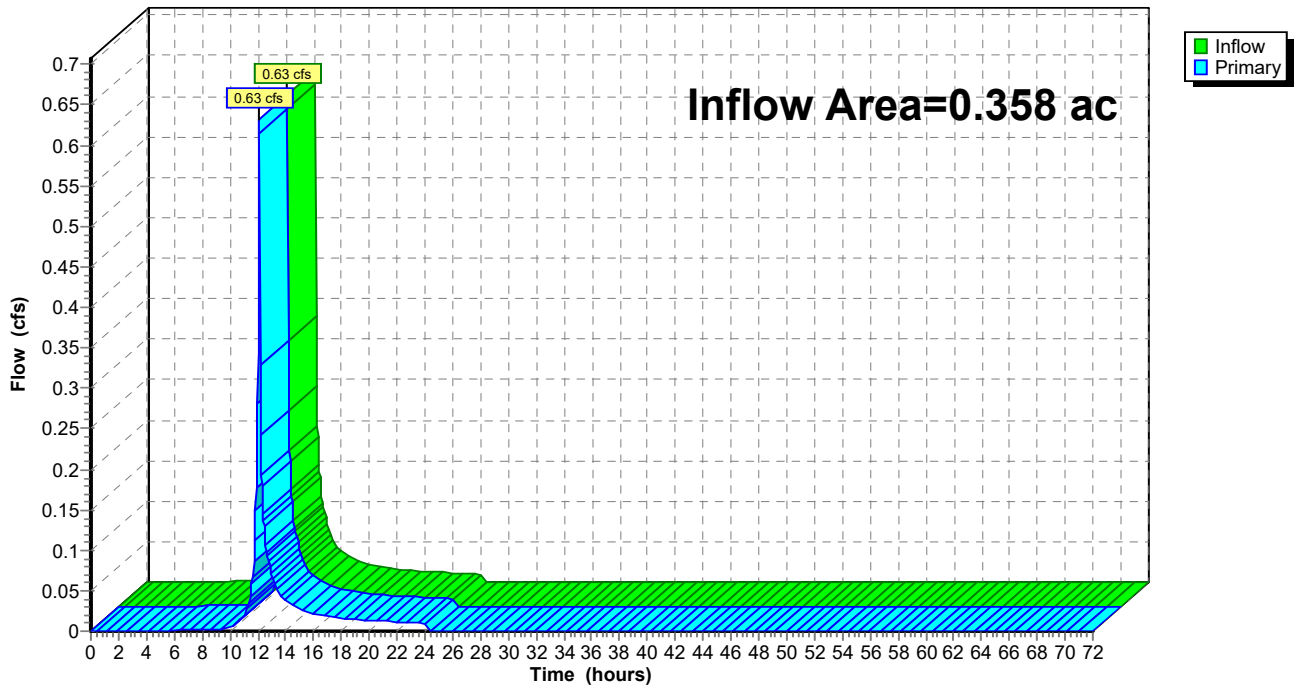
Summary for Link EO: Existing Offsite

Inflow Area = 0.358 ac, 6.15% Impervious, Inflow Depth = 1.39" for 2-Year-2020 event
Inflow = 0.63 cfs @ 12.08 hrs, Volume= 0.041 af
Primary = 0.63 cfs @ 12.08 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link EO: Existing Offsite

Hydrograph



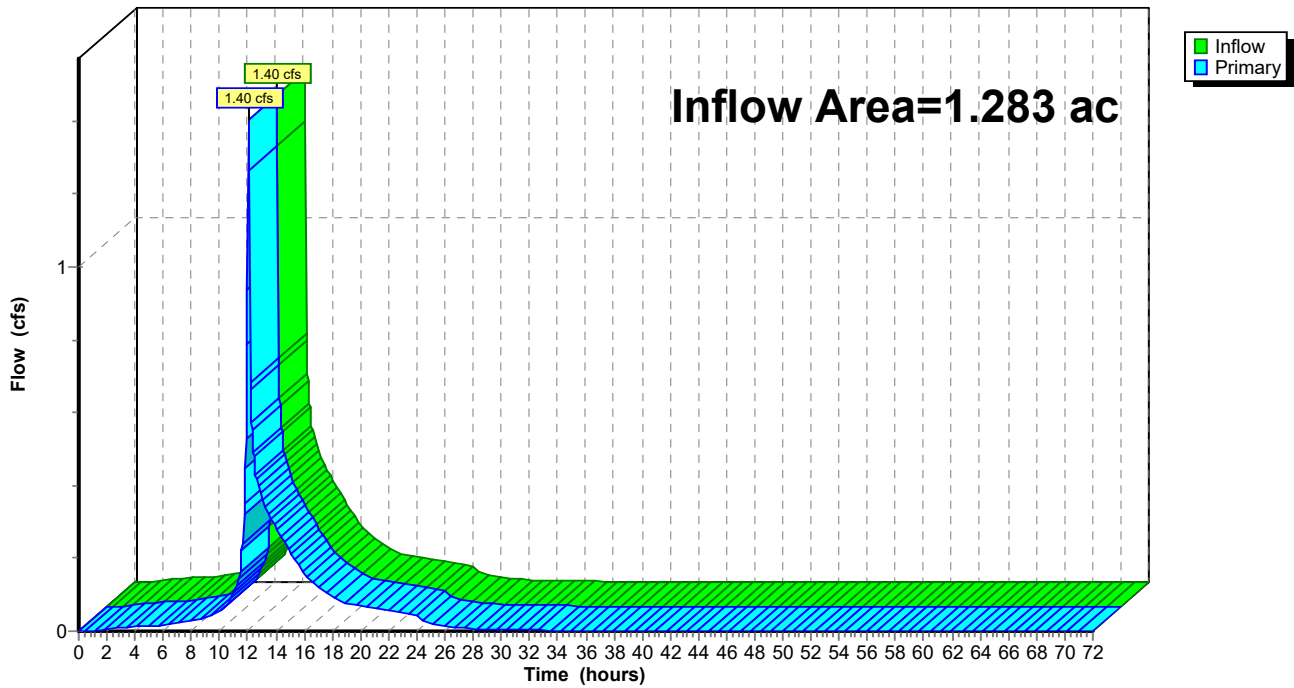
Summary for Link P1A: Proposed 1A

Inflow Area = 1.283 ac, 48.40% Impervious, Inflow Depth = 2.00" for 2-Year-2020 event
Inflow = 1.40 cfs @ 12.06 hrs, Volume= 0.214 af
Primary = 1.40 cfs @ 12.06 hrs, Volume= 0.214 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1A: Proposed 1A

Hydrograph



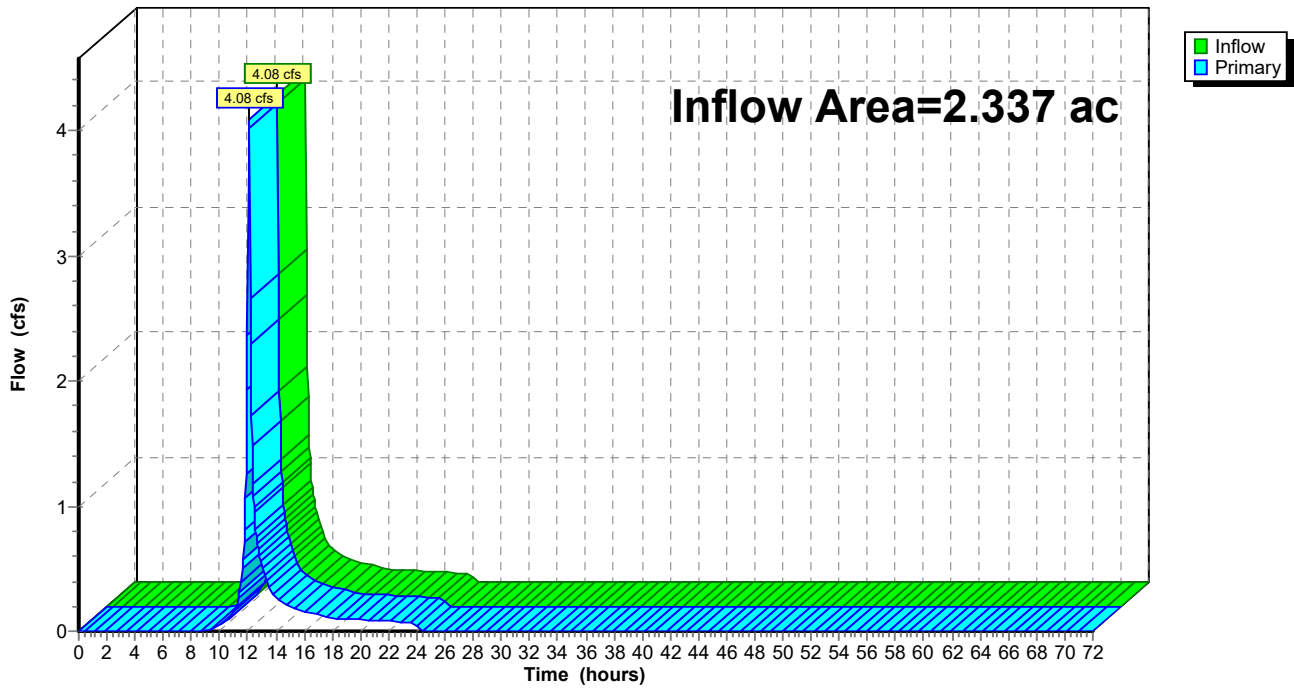
Summary for Link P1B: Proposed 1B

Inflow Area = 2.337 ac, 0.00% Impervious, Inflow Depth = 1.53" for 2-Year-2020 event
Inflow = 4.08 cfs @ 12.09 hrs, Volume= 0.299 af
Primary = 4.08 cfs @ 12.09 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1B: Proposed 1B

Hydrograph



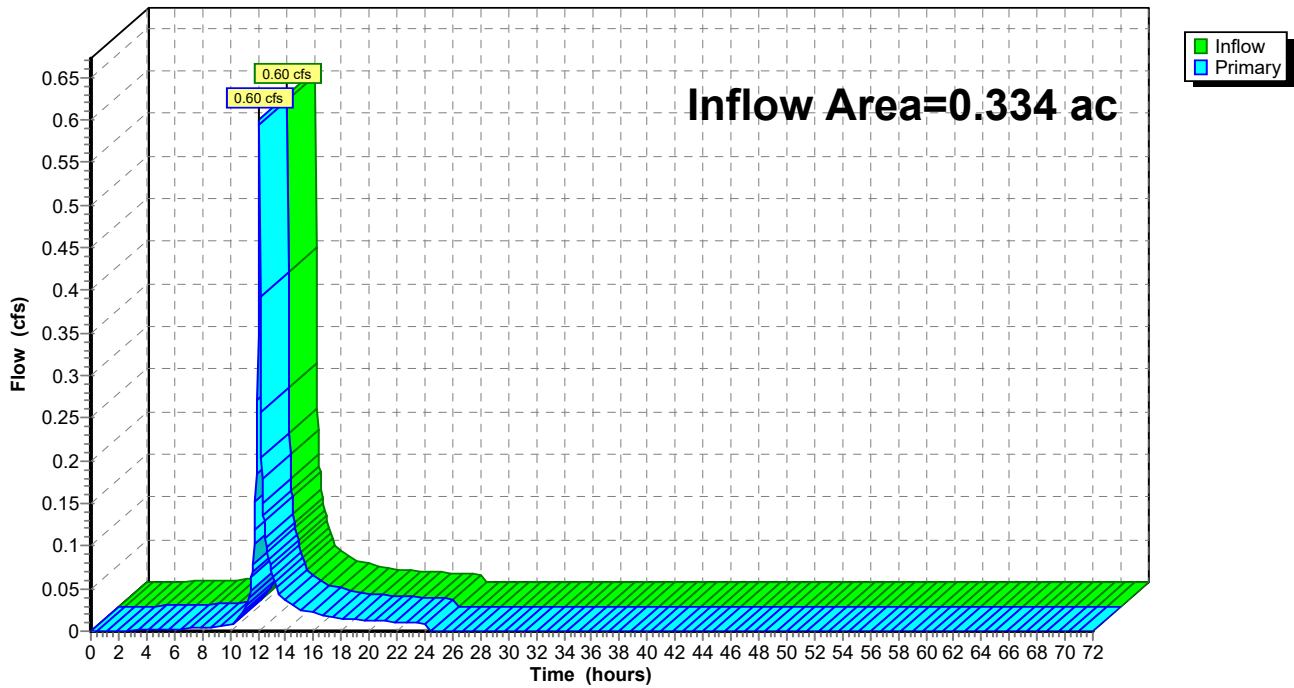
Summary for Link PO: Proposed Offsite

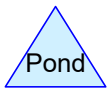
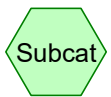
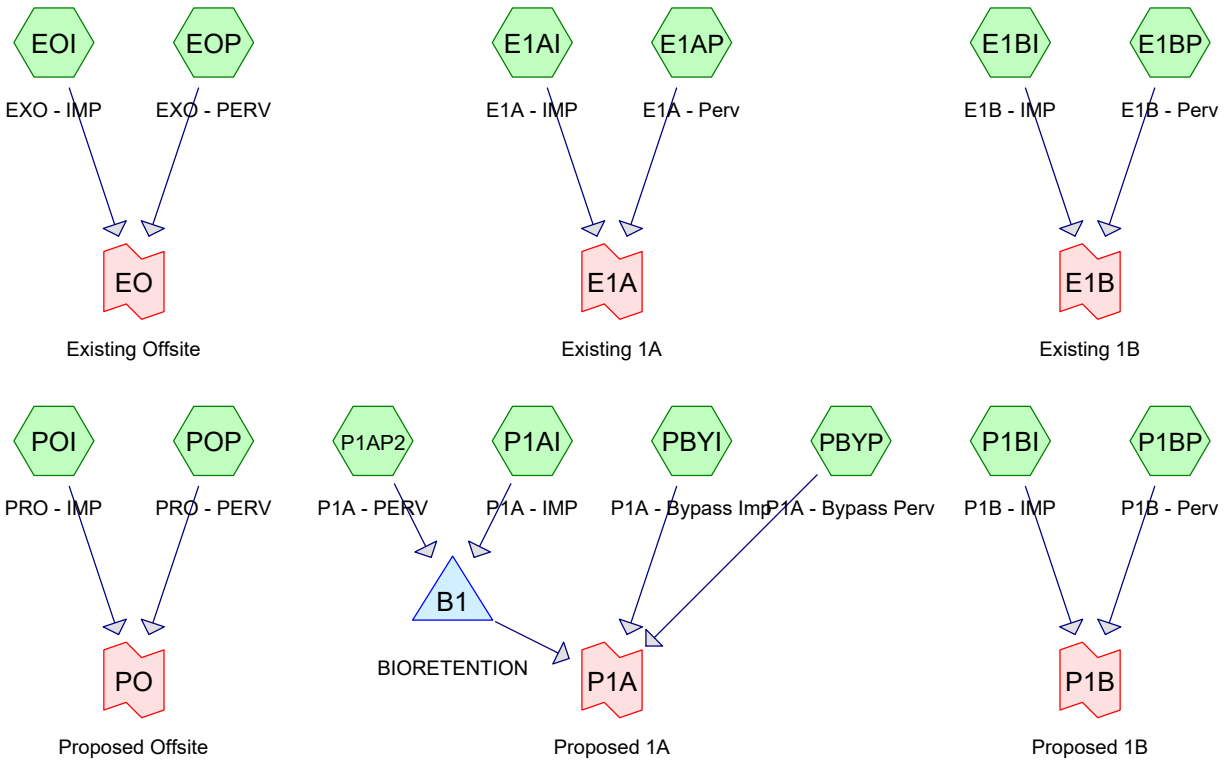
Inflow Area = 0.334 ac, 14.07% Impervious, Inflow Depth = 1.53" for 2-Year-2020 event
Inflow = 0.60 cfs @ 12.09 hrs, Volume= 0.043 af
Primary = 0.60 cfs @ 12.09 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PO: Proposed Offsite

Hydrograph





Routing Diagram for EX-PR
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EX-PR

NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Prepared by Bohler

Printed 7/16/2025

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1AI: E1A - IMP	Runoff Area=0.560 ac 100.00% Impervious Runoff Depth=4.98" Flow Length=372' Tc=2.0 min CN=98 Runoff=3.11 cfs 0.233 af
SubcatchmentE1AP: E1A - Perv	Runoff Area=0.680 ac 0.00% Impervious Runoff Depth=2.54" Flow Length=409' Tc=3.4 min CN=74 Runoff=2.18 cfs 0.144 af
SubcatchmentE1BI: E1B - IMP	Runoff Area=1.413 ac 100.00% Impervious Runoff Depth=4.98" Flow Length=411' Tc=1.7 min CN=98 Runoff=7.68 cfs 0.587 af
SubcatchmentE1BP: E1B - Perv	Runoff Area=0.943 ac 0.00% Impervious Runoff Depth=2.63" Flow Length=690' Tc=7.6 min CN=75 Runoff=2.69 cfs 0.207 af
SubcatchmentEOI: EXO - IMP	Runoff Area=0.022 ac 100.00% Impervious Runoff Depth=4.98" Flow Length=107' Tc=0.7 min CN=98 Runoff=0.12 cfs 0.009 af
SubcatchmentEOP: EXO - PERV	Runoff Area=0.336 ac 0.00% Impervious Runoff Depth=2.72" Flow Length=138' Tc=2.3 min CN=76 Runoff=1.20 cfs 0.076 af
SubcatchmentP1AI: P1A - IMP	Runoff Area=0.259 ac 100.00% Impervious Runoff Depth=4.98" Flow Length=262' Tc=0.9 min CN=98 Runoff=1.42 cfs 0.108 af
SubcatchmentP1AP2: P1A - PERV	Runoff Area=0.617 ac 0.00% Impervious Runoff Depth=3.09" Flow Length=116' Tc=7.0 min CN=80 Runoff=2.10 cfs 0.159 af
SubcatchmentP1BI: P1B - IMP	Runoff Area=1.461 ac 0.00% Impervious Runoff Depth=3.09" Flow Length=388' Tc=1.4 min CN=80 Runoff=5.80 cfs 0.376 af
SubcatchmentP1BP: P1B - Perv	Runoff Area=0.876 ac 0.00% Impervious Runoff Depth=3.09" Flow Length=711' Tc=7.6 min CN=80 Runoff=2.92 cfs 0.225 af
SubcatchmentPBYI: P1A - Bypass Imp	Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=4.98" Flow Length=262' Tc=0.9 min CN=98 Runoff=1.99 cfs 0.150 af
SubcatchmentPBYP: P1A - Bypass Perv	Runoff Area=0.045 ac 0.00% Impervious Runoff Depth=2.63" Flow Length=116' Tc=7.0 min CN=75 Runoff=0.13 cfs 0.010 af
SubcatchmentPOI: PRO - IMP	Runoff Area=0.047 ac 100.00% Impervious Runoff Depth=4.98" Flow Length=99' Tc=0.8 min CN=98 Runoff=0.26 cfs 0.020 af
SubcatchmentPOP: PRO - PERV	Runoff Area=0.287 ac 0.00% Impervious Runoff Depth=2.72" Flow Length=122' Tc=3.4 min CN=76 Runoff=0.98 cfs 0.065 af
Pond B1: BIORETENTION	Peak Elev=133.51' Storage=5,382 cf Inflow=3.06 cfs 0.266 af Outflow=0.84 cfs 0.234 af
Link E1A: Existing 1A	Inflow=5.24 cfs 0.377 af Primary=5.24 cfs 0.377 af

EX-PR

NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

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Link E1B: Existing 1B

Inflow=9.89 cfs 0.793 af
Primary=9.89 cfs 0.793 af

Link EO: Existing Offsite

Inflow=1.31 cfs 0.085 af
Primary=1.31 cfs 0.085 af

Link P1A: Proposed 1A

Inflow=2.37 cfs 0.394 af
Primary=2.37 cfs 0.394 af

Link P1B: Proposed 1B

Inflow=8.16 cfs 0.601 af
Primary=8.16 cfs 0.601 af

Link PO: Proposed Offsite

Inflow=1.21 cfs 0.085 af
Primary=1.21 cfs 0.085 af

Total Runoff Area = 7.908 ac Runoff Volume = 2.367 af Average Runoff Depth = 3.59"
66.33% Pervious = 5.245 ac 33.67% Impervious = 2.663 ac

Summary for Subcatchment E1A: E1A - IMP

Runoff = 3.11 cfs @ 12.08 hrs, Volume= 0.233 af, Depth= 4.98"

Routed to Link E1A : Existing 1A

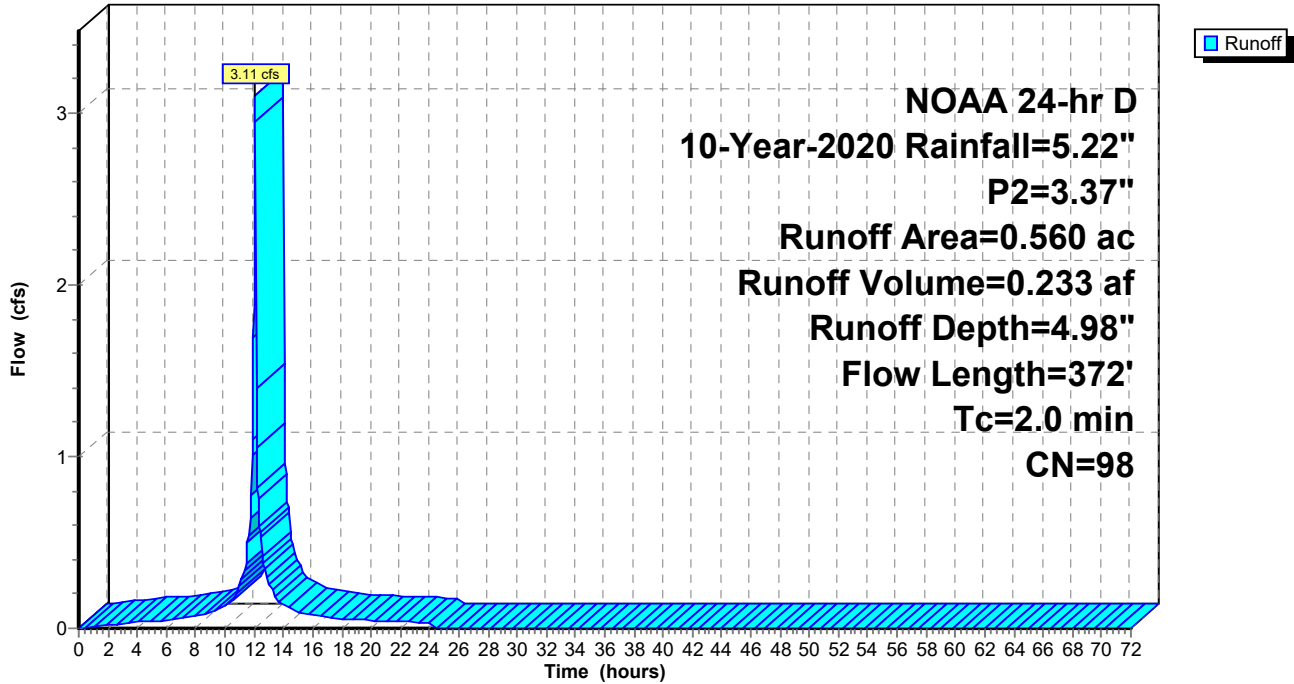
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.560	98	Paved parking, HSG D
0.560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	41	0.0060	0.73		Sheet Flow, H-I Smooth surfaces n= 0.011 P2= 3.37"
0.0	10	0.0300	3.52		Shallow Concentrated Flow, I-C Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
2.0	372	Total			

Subcatchment E1AI: E1A - IMP

Hydrograph



Summary for Subcatchment E1AP: E1A - Perv

Runoff = 2.18 cfs @ 12.10 hrs, Volume= 0.144 af, Depth= 2.54"
 Routed to Link E1A : Existing 1A

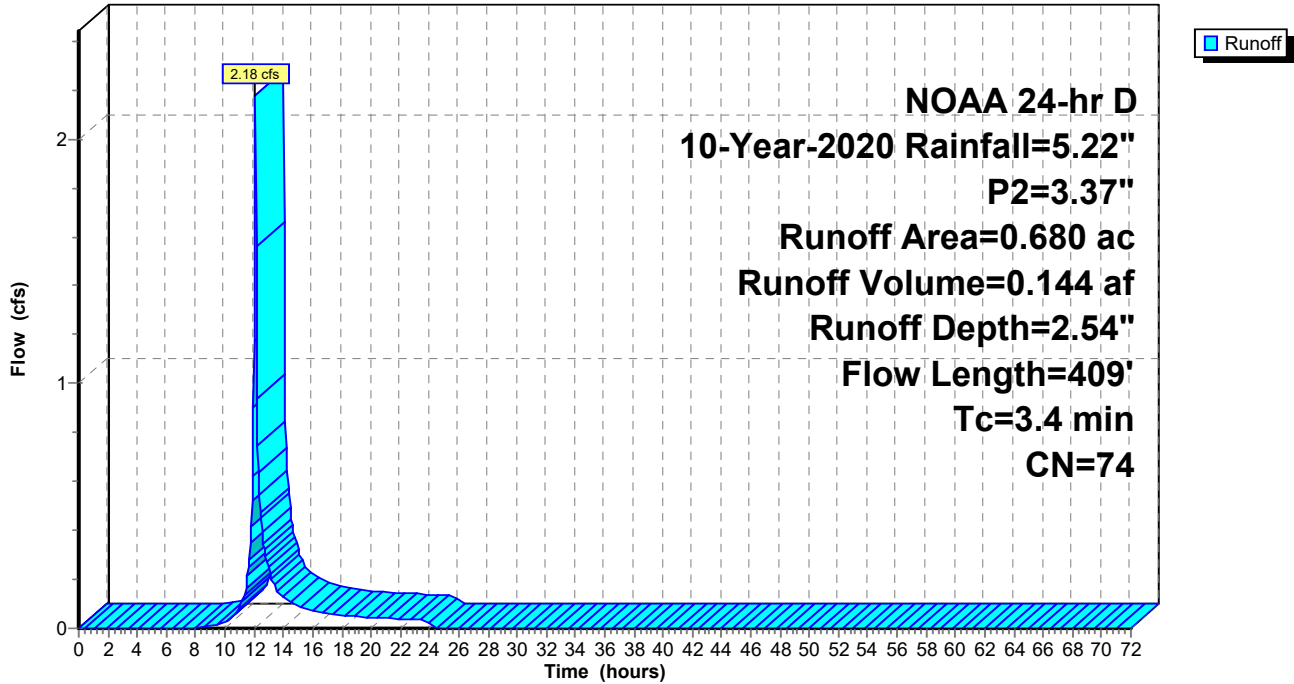
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.676	74	>75% Grass cover, Good, HSG C
0.004	80	>75% Grass cover, Good, HSG D
0.680	74	Weighted Average
0.680		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	35	0.1500	0.32		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.5	53	0.0090	1.93		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
3.4	409	Total			

Subcatchment E1AP: E1A - Perv

Hydrograph



Summary for Subcatchment E1BI: E1B - IMP

Runoff = 7.68 cfs @ 12.07 hrs, Volume= 0.587 af, Depth= 4.98"
 Routed to Link E1B : Existing 1B

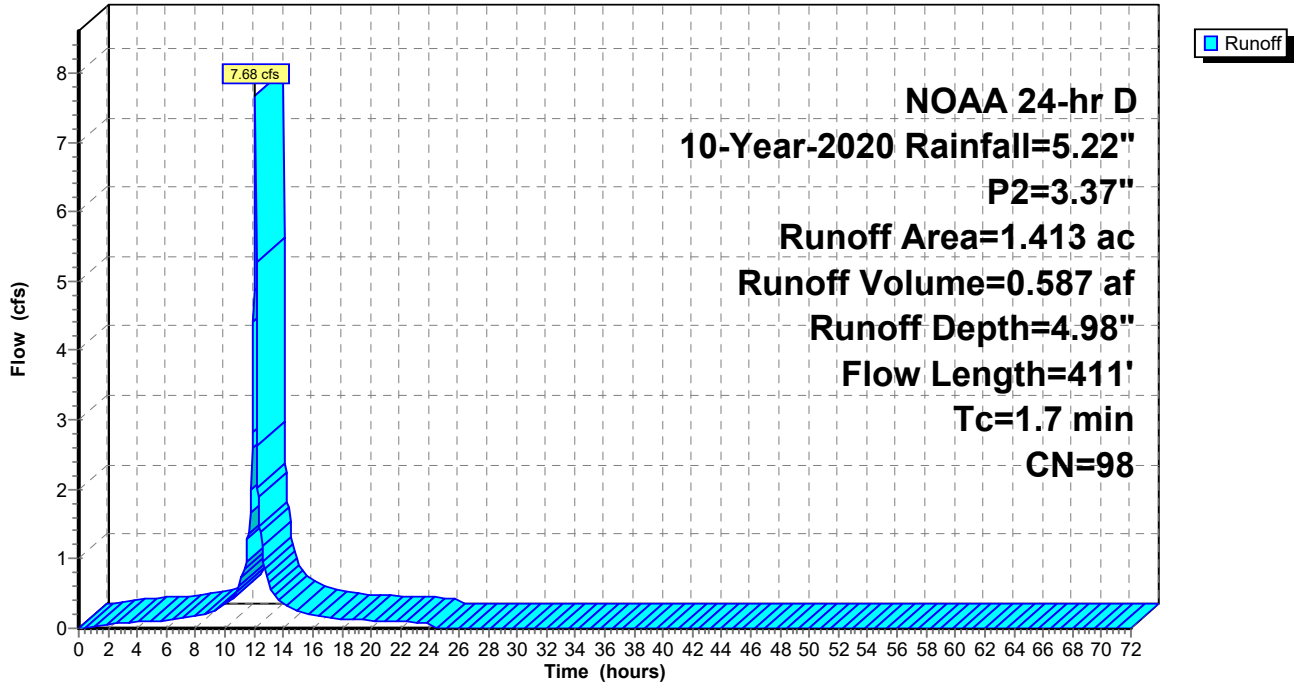
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
1.413	98	Paved parking, HSG D
1.413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.7	411	Total			

Subcatchment E1BI: E1B - IMP

Hydrograph



Summary for Subcatchment E1BP: E1B - Perv

Runoff = 2.69 cfs @ 12.15 hrs, Volume= 0.207 af, Depth= 2.63"
 Routed to Link E1B : Existing 1B

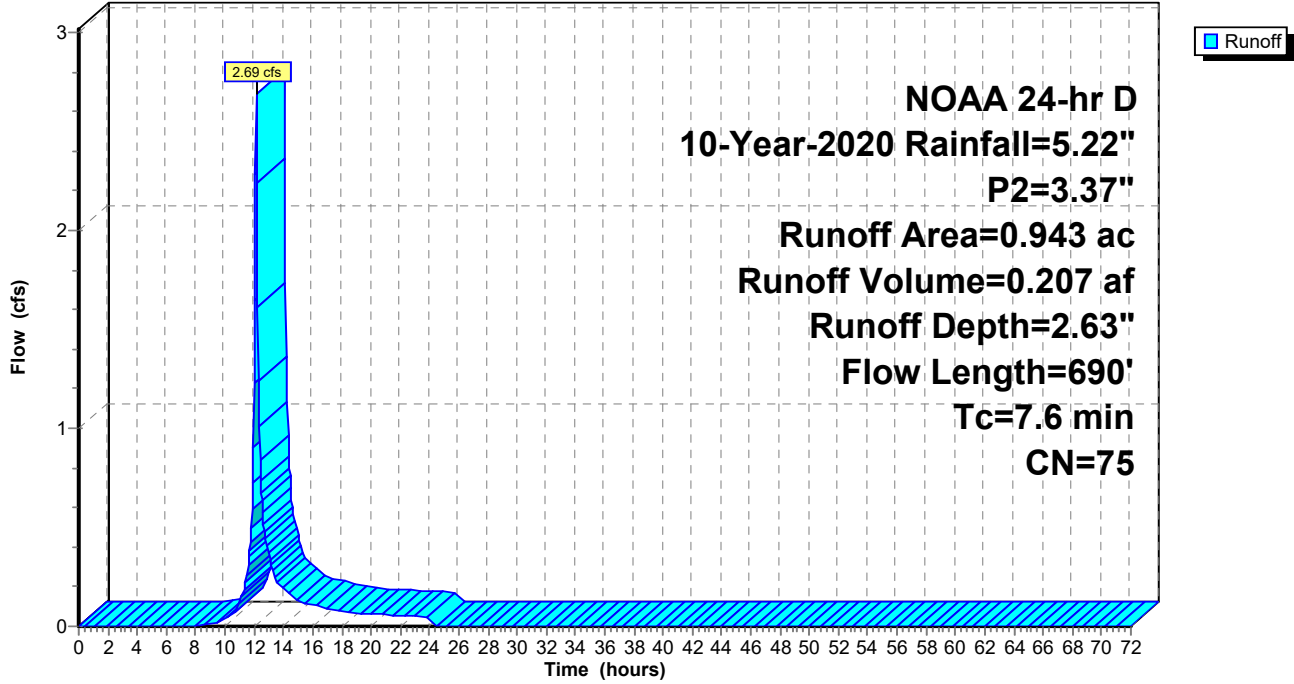
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.805	74	>75% Grass cover, Good, HSG C
0.138	80	>75% Grass cover, Good, HSG D
0.943	75	Weighted Average
0.943		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0900	0.32		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.5	125	0.0700	4.26		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.2	54	0.0850	4.69		Shallow Concentrated Flow, C-K Unpaved Kv= 16.1 fps
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
7.6	690	Total			

Subcatchment E1BP: E1B - Perv

Hydrograph



EX-PR

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NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

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Summary for Subcatchment EOI: EXO - IMP

Runoff = 0.12 cfs @ 12.06 hrs, Volume= 0.009 af, Depth= 4.98"

Routed to Link EO : Existing Offsite

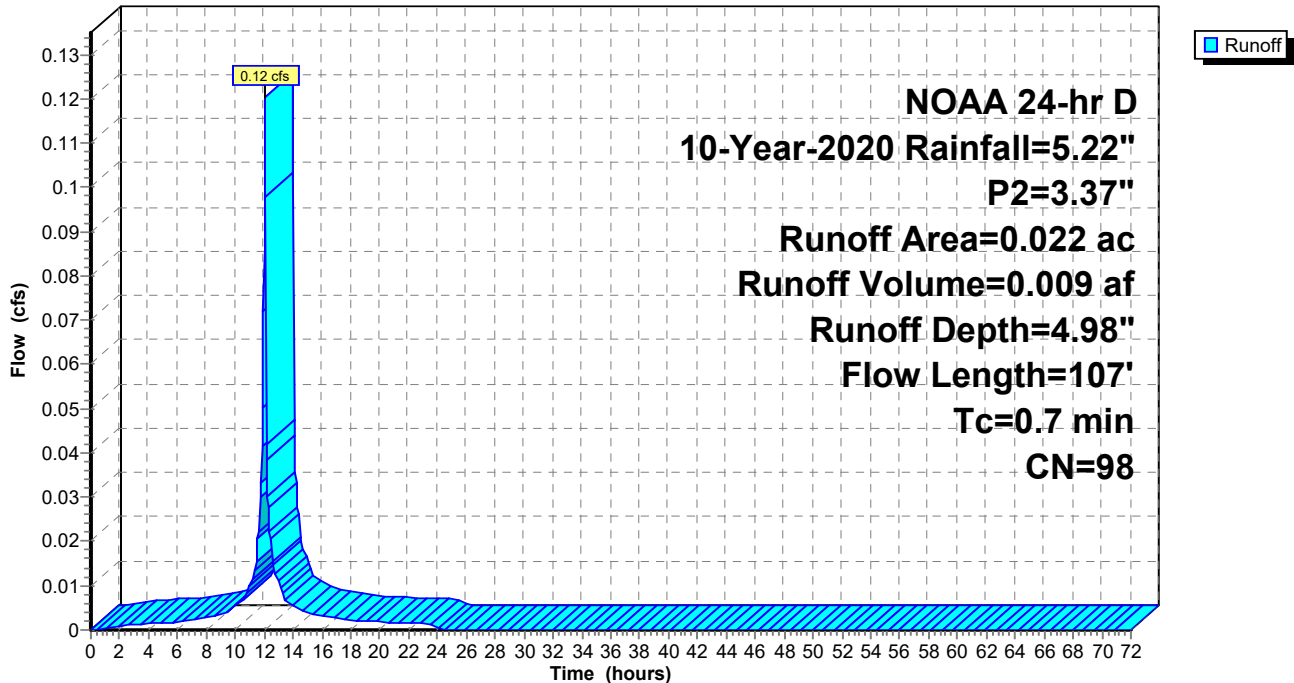
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.022	98	Paved parking, HSG D
0.022		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.7	107	Total			

Subcatchment EOI: EXO - IMP

Hydrograph



EX-PR

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NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

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Summary for Subcatchment EOP: EXO - PERV

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 0.076 af, Depth= 2.72"

Routed to Link EO : Existing Offsite

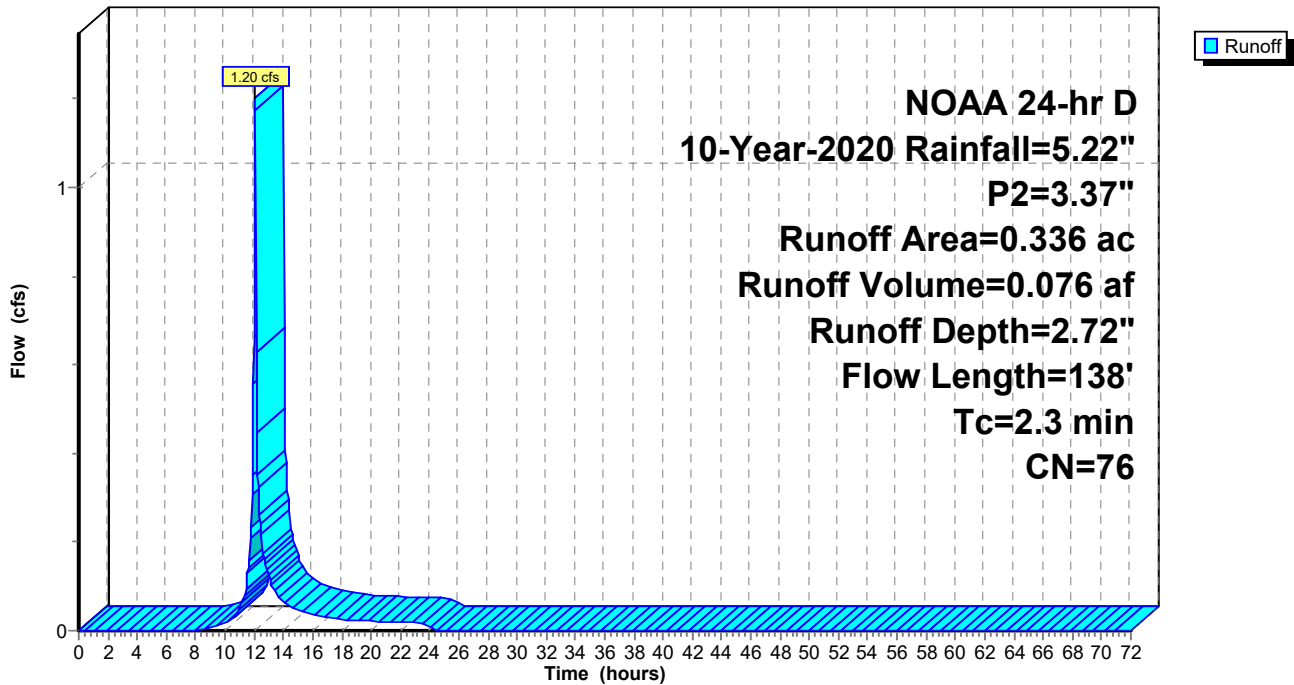
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.248	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.336	76	Weighted Average
0.336		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	31	0.1700	0.33		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
2.3	138	Total			

Subcatchment EOP: EXO - PERV

Hydrograph



Summary for Subcatchment P1AI: P1A - IMP

Runoff = 1.42 cfs @ 12.06 hrs, Volume= 0.108 af, Depth= 4.98"
 Routed to Pond B1 : BIORETENTION

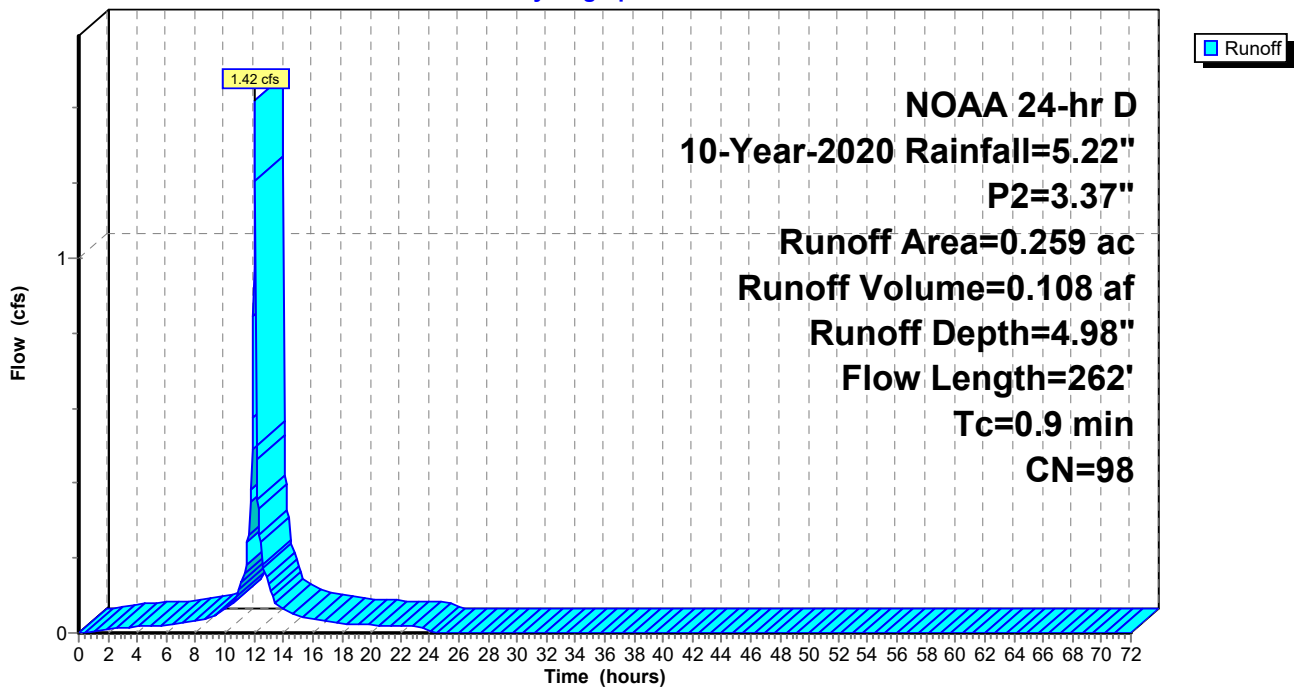
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.259	98	Paved parking, HSG D
0.259		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment P1AI: P1A - IMP

Hydrograph



Summary for Subcatchment P1AP2: P1A - PERV

Runoff = 2.10 cfs @ 12.14 hrs, Volume= 0.159 af, Depth= 3.09"
 Routed to Pond B1 : BIORETENTION

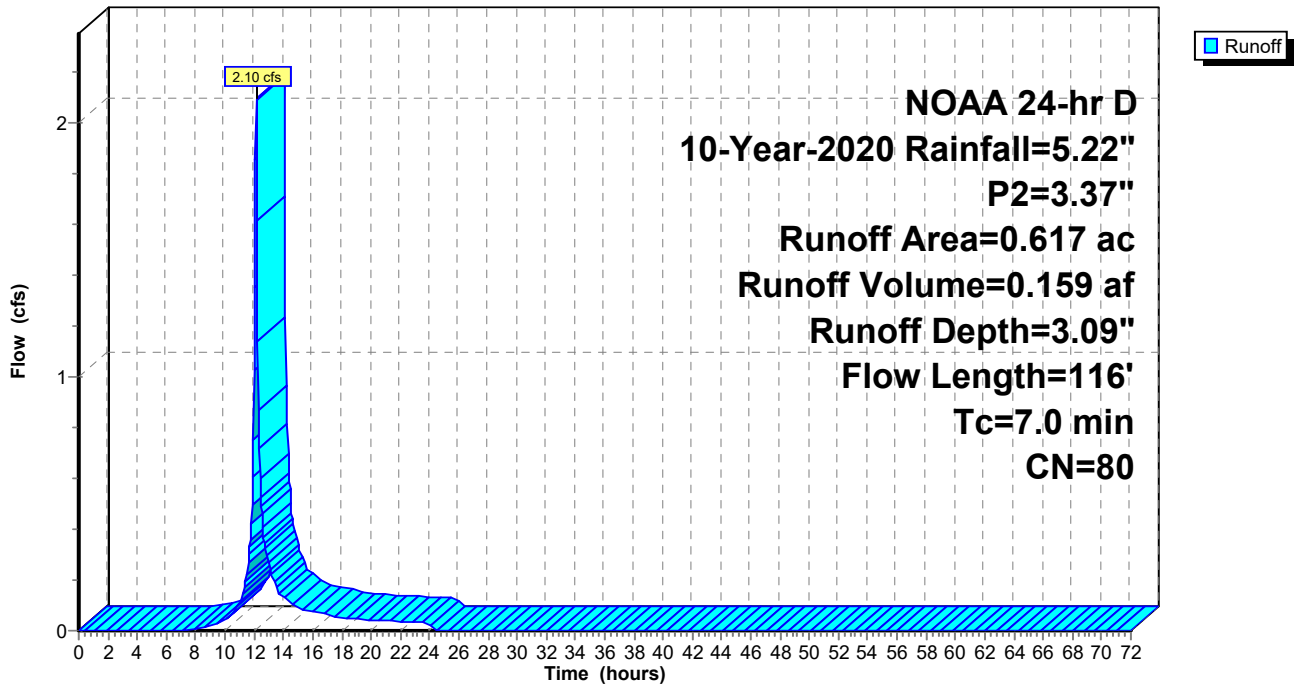
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.617	80	>75% Grass cover, Good, HSG D
0.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	61	0.0320	0.19		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.9	22	0.3200	0.39		Sheet Flow, B-C Grass: Short n= 0.150 P2= 3.37"
0.8	17	0.3000	0.36		Sheet Flow, C-D Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
7.0	116	Total			

Subcatchment P1AP2: P1A - PERV

Hydrograph



Summary for Subcatchment P1BI: P1B - IMP

Runoff = 5.80 cfs @ 12.07 hrs, Volume= 0.376 af, Depth= 3.09"
 Routed to Link P1B : Proposed 1B

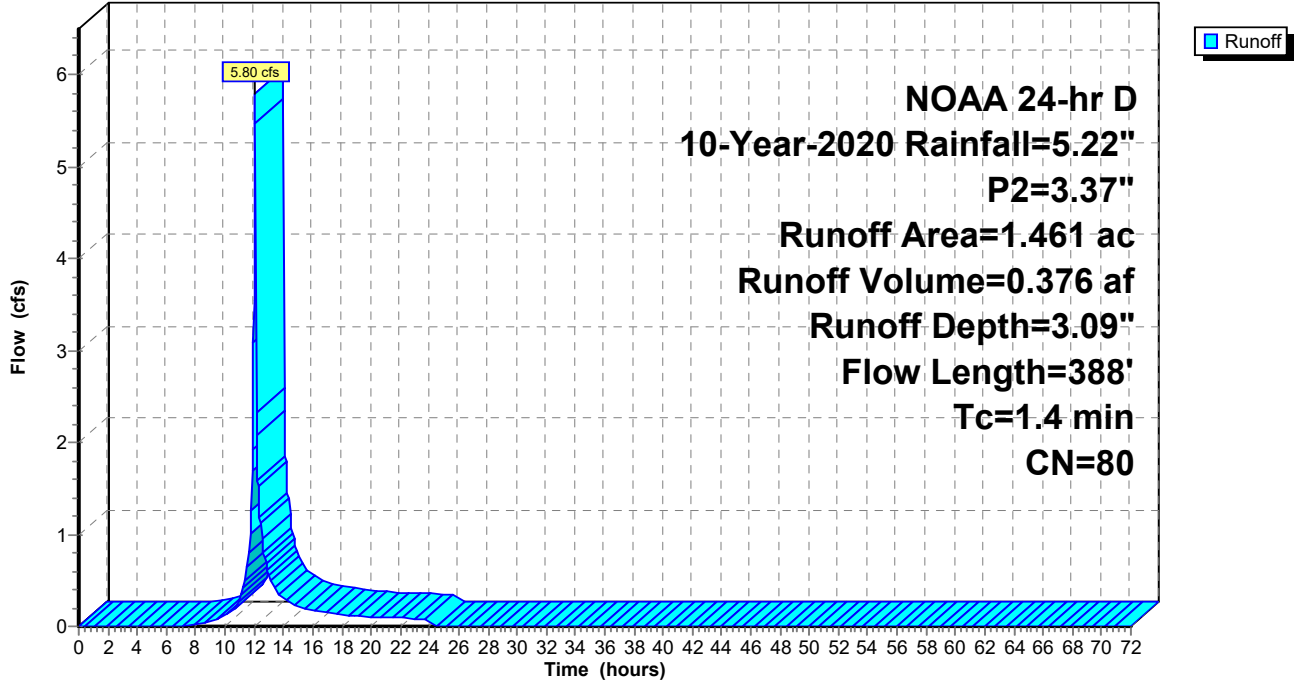
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
1.461	80	>75% Grass cover, Good, HSG D
1.461		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.4	388	Total			

Subcatchment P1BI: P1B - IMP

Hydrograph



Summary for Subcatchment P1BP: P1B - Perv

Runoff = 2.92 cfs @ 12.15 hrs, Volume= 0.225 af, Depth= 3.09"
 Routed to Link P1B : Proposed 1B

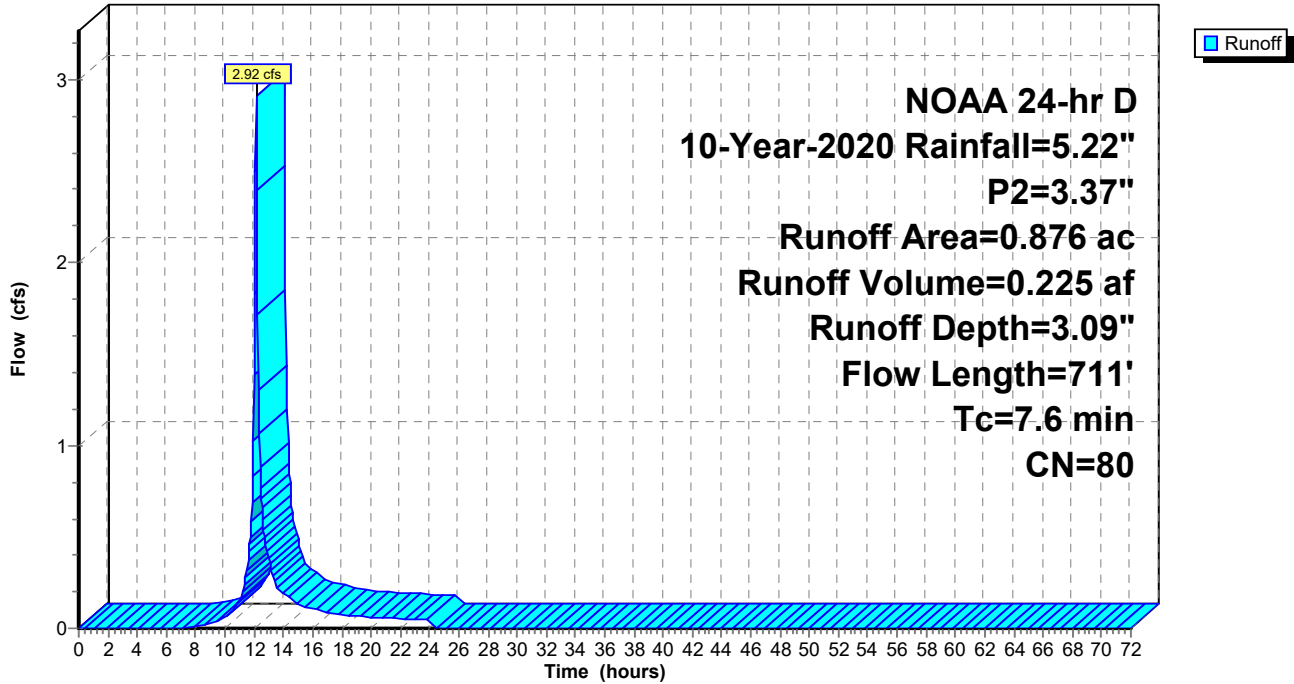
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.750	80	>75% Grass cover, Good, HSG D
0.126	80	>75% Grass cover, Good, HSG D
0.876	80	Weighted Average
0.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0900	0.32		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 3.37"
0.5	127	0.0700	4.26		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
0.2	55	0.0800	4.55		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.2	31	0.0300	2.79		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	10	0.0150	2.49		Shallow Concentrated Flow, E-F
					Paved Kv= 20.3 fps
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H
					Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I
					Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K
					Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
7.6	711	Total			

Subcatchment P1BP: P1B - Perv

Hydrograph



Summary for Subcatchment PBYI: P1A - Bypass Imp

Runoff = 1.99 cfs @ 12.06 hrs, Volume= 0.150 af, Depth= 4.98"
 Routed to Link P1A : Proposed 1A

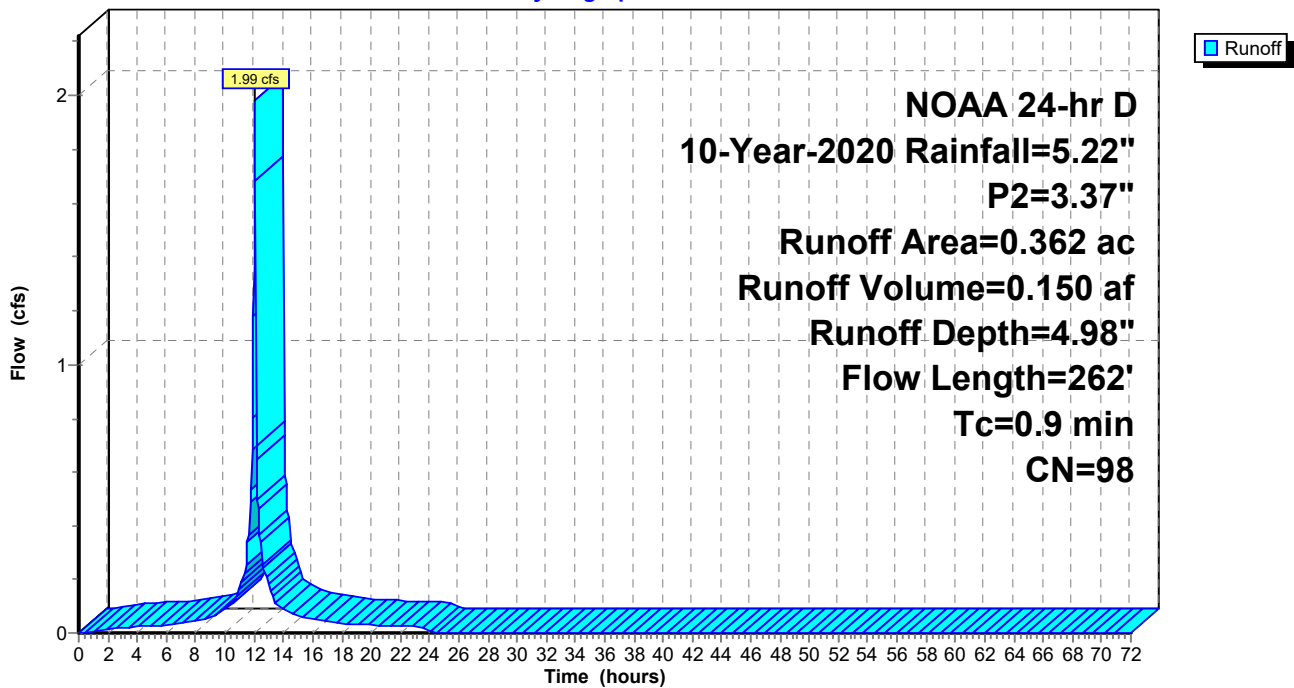
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.362	98	Paved parking, HSG D
0.362		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment PBYI: P1A - Bypass Imp

Hydrograph



Summary for Subcatchment PBYP: P1A - Bypass Perv

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.010 af, Depth= 2.63"
 Routed to Link P1A : Proposed 1A

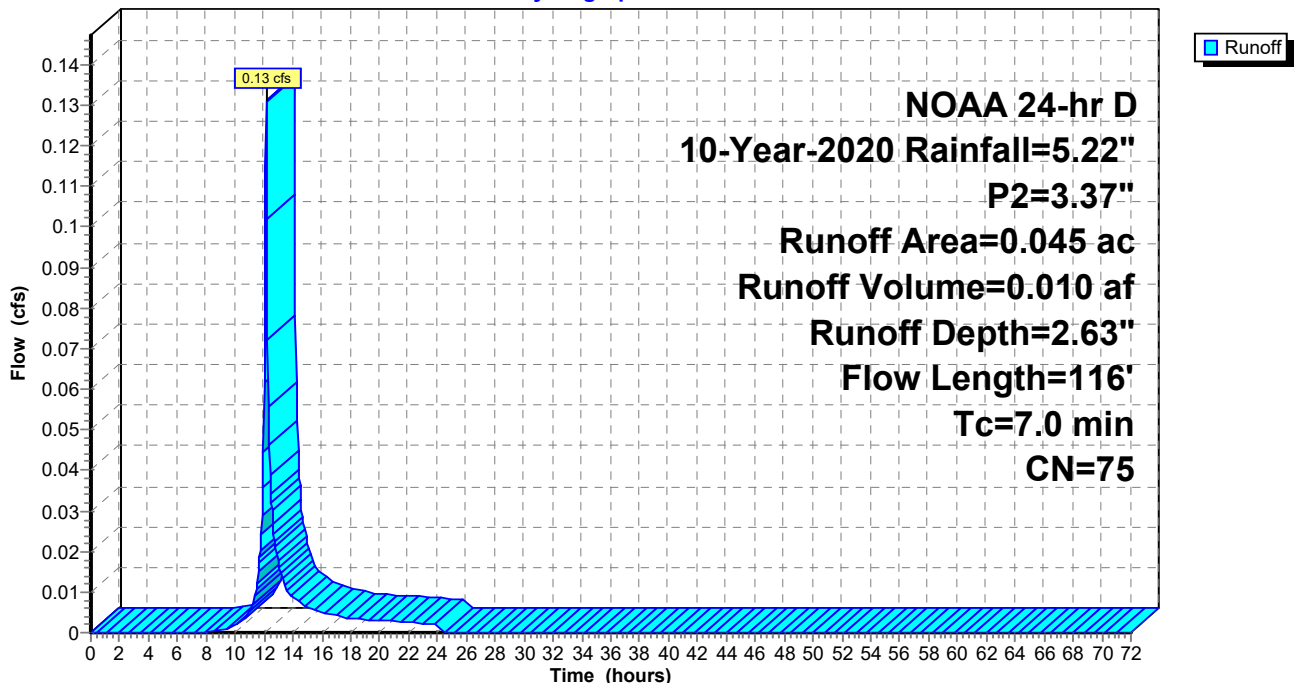
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.039	74	>75% Grass cover, Good, HSG C
0.006	80	>75% Grass cover, Good, HSG D
0.045	75	Weighted Average
0.045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	61	0.0320	0.19		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.9	22	0.3200	0.39		Sheet Flow, B-C Grass: Short n= 0.150 P2= 3.37"
0.8	17	0.3000	0.36		Sheet Flow, C-D Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
7.0	116	Total			

Subcatchment PBYP: P1A - Bypass Perv

Hydrograph



EX-PR

Prepared by Bohler

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NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Printed 7/16/2025

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Summary for Subcatchment POI: PRO - IMP

Runoff = 0.26 cfs @ 12.06 hrs, Volume= 0.020 af, Depth= 4.98"
Routed to Link PO : Proposed Offsite

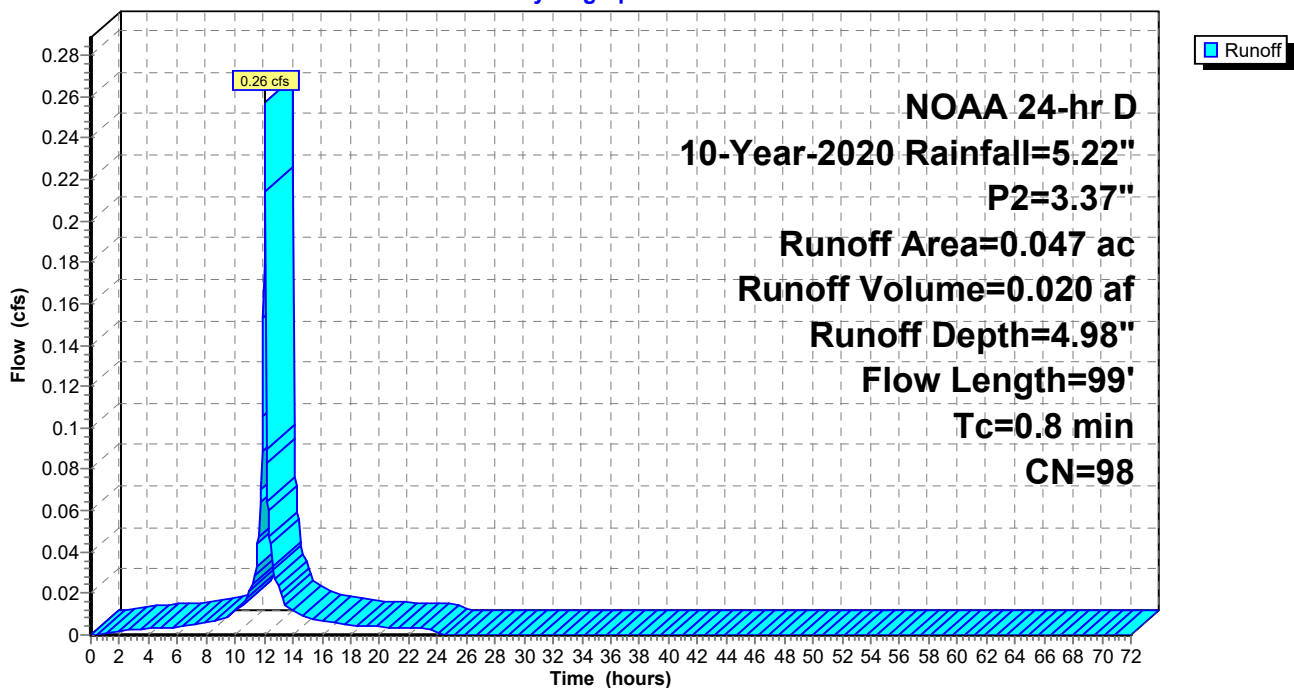
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.047	98	Paved parking, HSG D
0.047		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	0.99		Sheet Flow, D-B Smooth surfaces n= 0.011 P2= 3.37"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.8	99	Total			

Subcatchment POI: PRO - IMP

Hydrograph



Summary for Subcatchment POP: PRO - PERV

Runoff = 0.98 cfs @ 12.10 hrs, Volume= 0.065 af, Depth= 2.72"

Routed to Link PO : Proposed Offsite

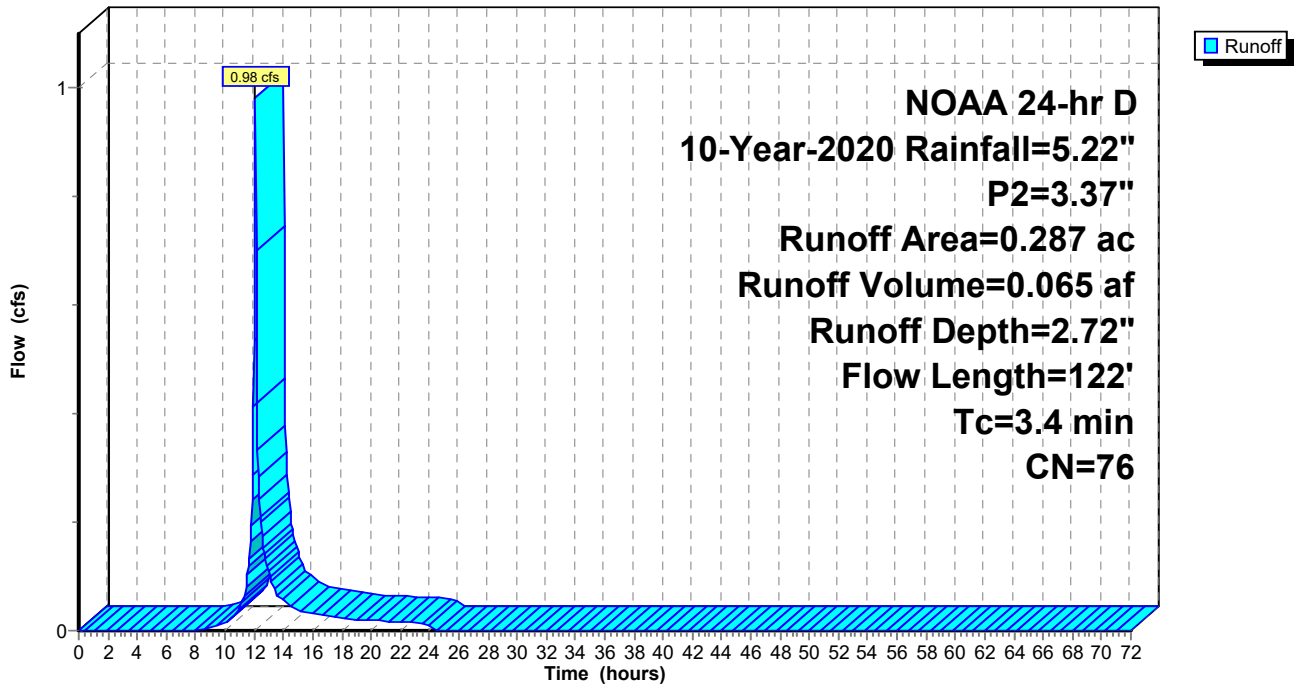
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.199	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.287	76	Weighted Average
0.287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	53	0.0950	0.29		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 3.37"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
3.4	122	Total			

Subcatchment POP: PRO - PERV

Hydrograph



Summary for Pond B1: BIORETENTION

Inflow Area = 0.876 ac, 29.57% Impervious, Inflow Depth = 3.65" for 10-Year-2020 event
 Inflow = 3.06 cfs @ 12.09 hrs, Volume= 0.266 af
 Outflow = 0.84 cfs @ 12.41 hrs, Volume= 0.234 af, Atten= 73%, Lag= 19.2 min
 Primary = 0.84 cfs @ 12.41 hrs, Volume= 0.234 af
 Routed to Link P1A : Proposed 1A

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 133.51' @ 12.41 hrs Surf.Area= 3,883 sf Storage= 5,382 cf

Plug-Flow detention time= 239.6 min calculated for 0.234 af (88% of inflow)
 Center-of-Mass det. time= 179.1 min (974.1 - 795.0)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	11,644 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	3,229	0	0
133.00	3,656	3,443	3,443
134.00	4,097	3,877	7,319
135.00	4,552	4,325	11,644

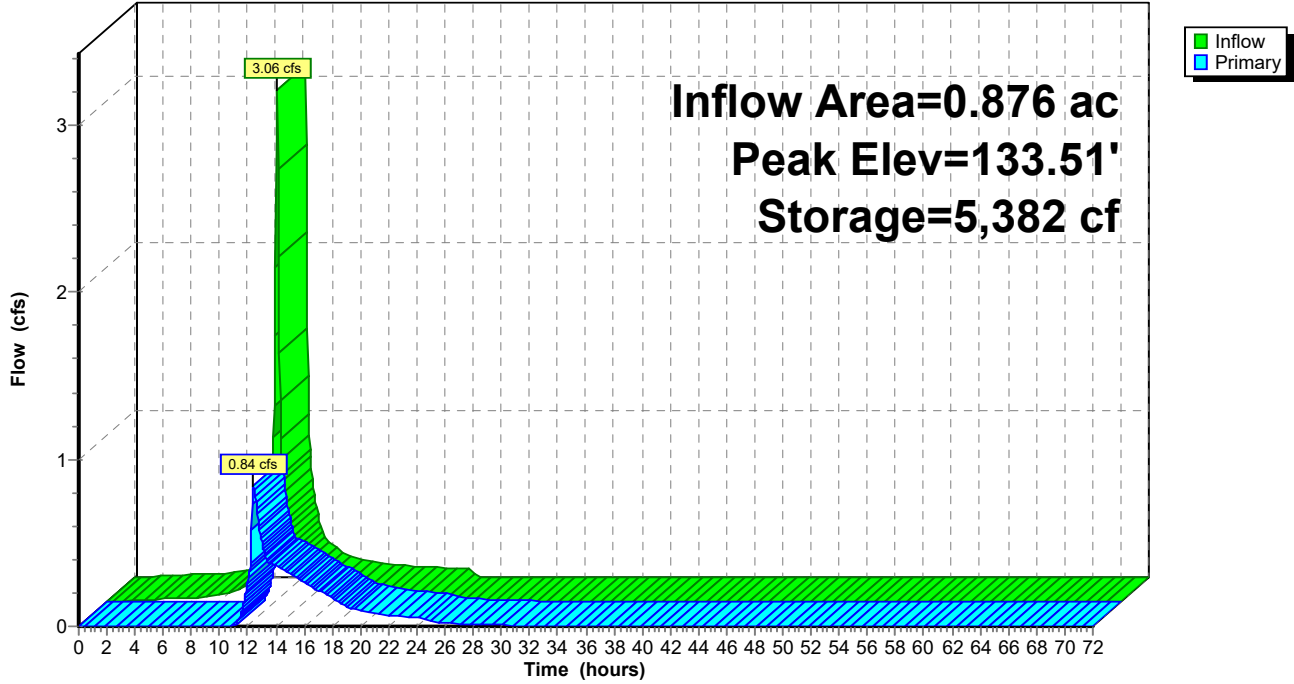
Device	Routing	Invert	Outlet Devices
#1	Primary	130.25'	18.0" Round Culvert L= 157.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.25' / 126.50' S= 0.0239 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	132.42'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.40'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.84 cfs @ 12.41 hrs HW=133.51' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.84 cfs of 10.65 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.40 cfs @ 4.64 fps)
- ↑ **3=Broad-Crested Rectangular Weir**(Weir Controls 0.43 cfs @ 0.95 fps)

Pond B1: BIORETENTION

Hydrograph



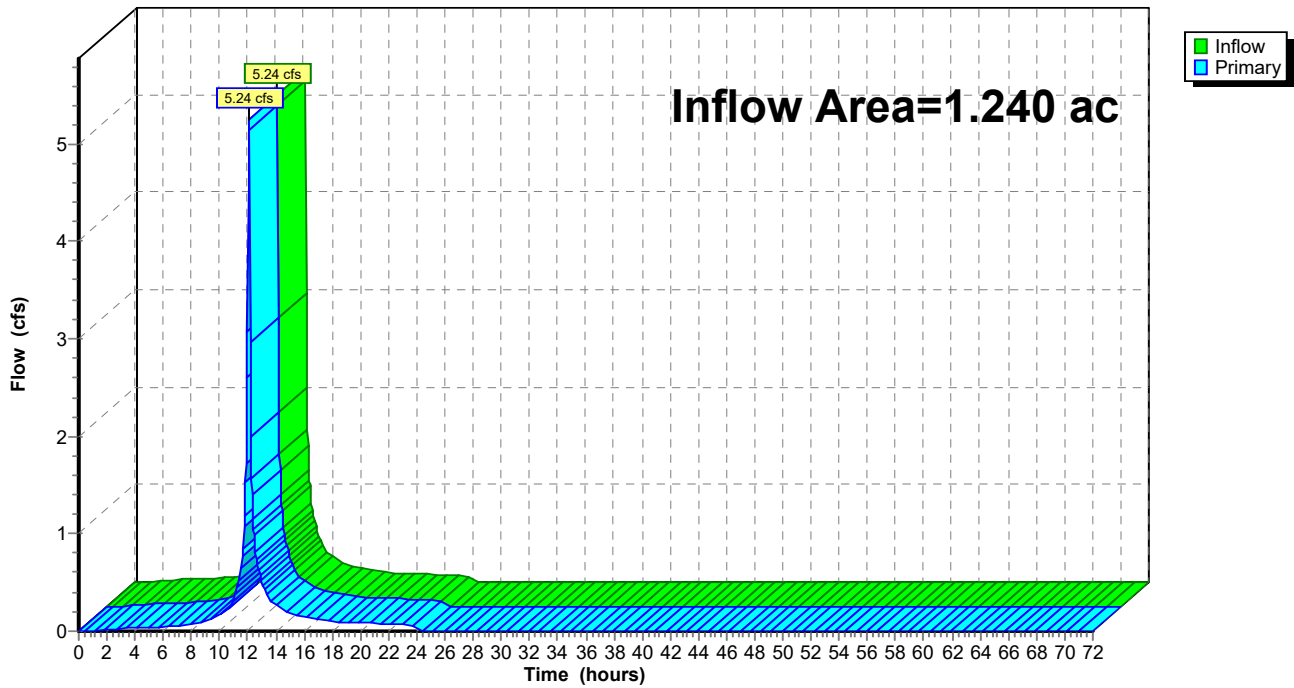
Summary for Link E1A: Existing 1A

Inflow Area = 1.240 ac, 45.16% Impervious, Inflow Depth = 3.64" for 10-Year-2020 event
Inflow = 5.24 cfs @ 12.09 hrs, Volume= 0.377 af
Primary = 5.24 cfs @ 12.09 hrs, Volume= 0.377 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1A: Existing 1A

Hydrograph



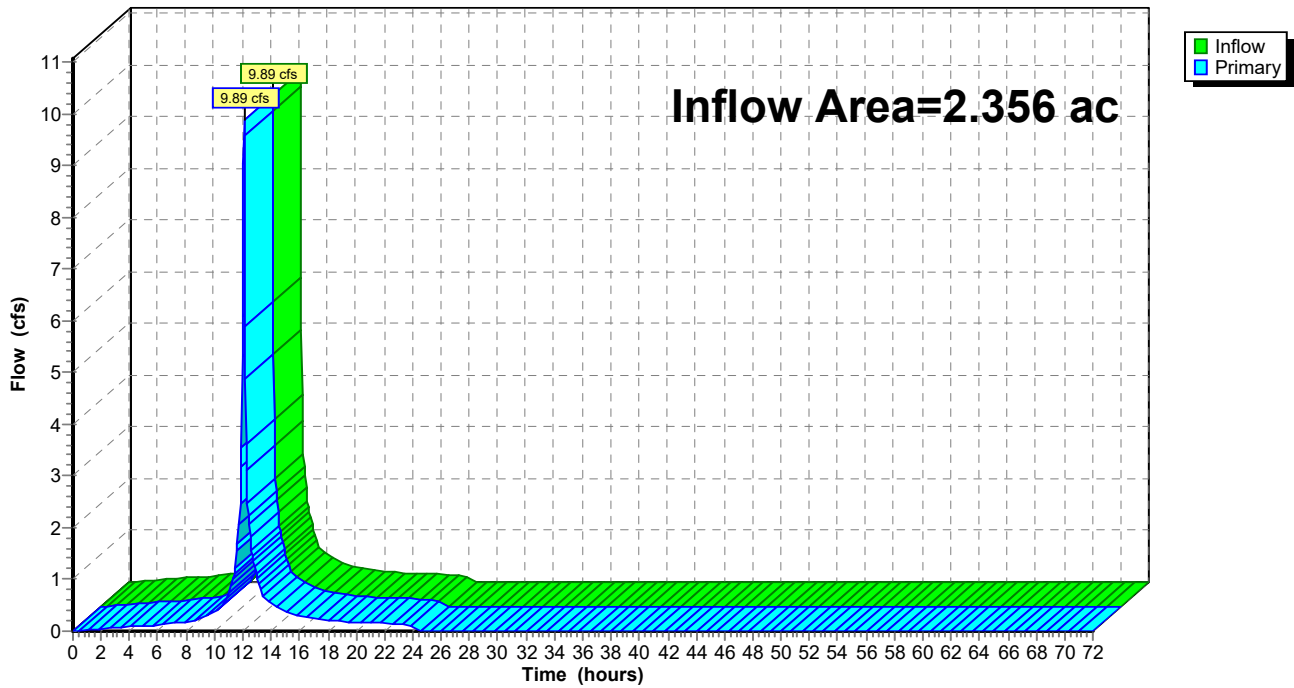
Summary for Link E1B: Existing 1B

Inflow Area = 2.356 ac, 59.97% Impervious, Inflow Depth = 4.04" for 10-Year-2020 event
Inflow = 9.89 cfs @ 12.08 hrs, Volume= 0.793 af
Primary = 9.89 cfs @ 12.08 hrs, Volume= 0.793 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1B: Existing 1B

Hydrograph



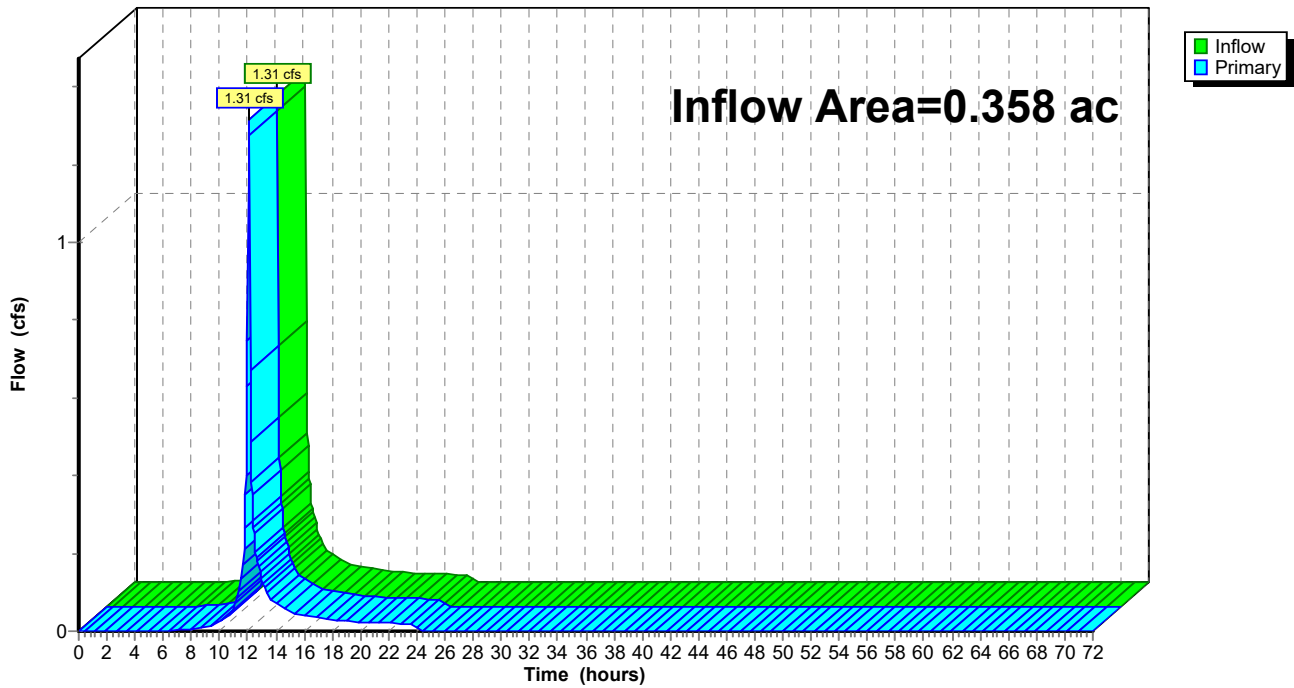
Summary for Link EO: Existing Offsite

Inflow Area = 0.358 ac, 6.15% Impervious, Inflow Depth = 2.86" for 10-Year-2020 event
Inflow = 1.31 cfs @ 12.08 hrs, Volume= 0.085 af
Primary = 1.31 cfs @ 12.08 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link EO: Existing Offsite

Hydrograph



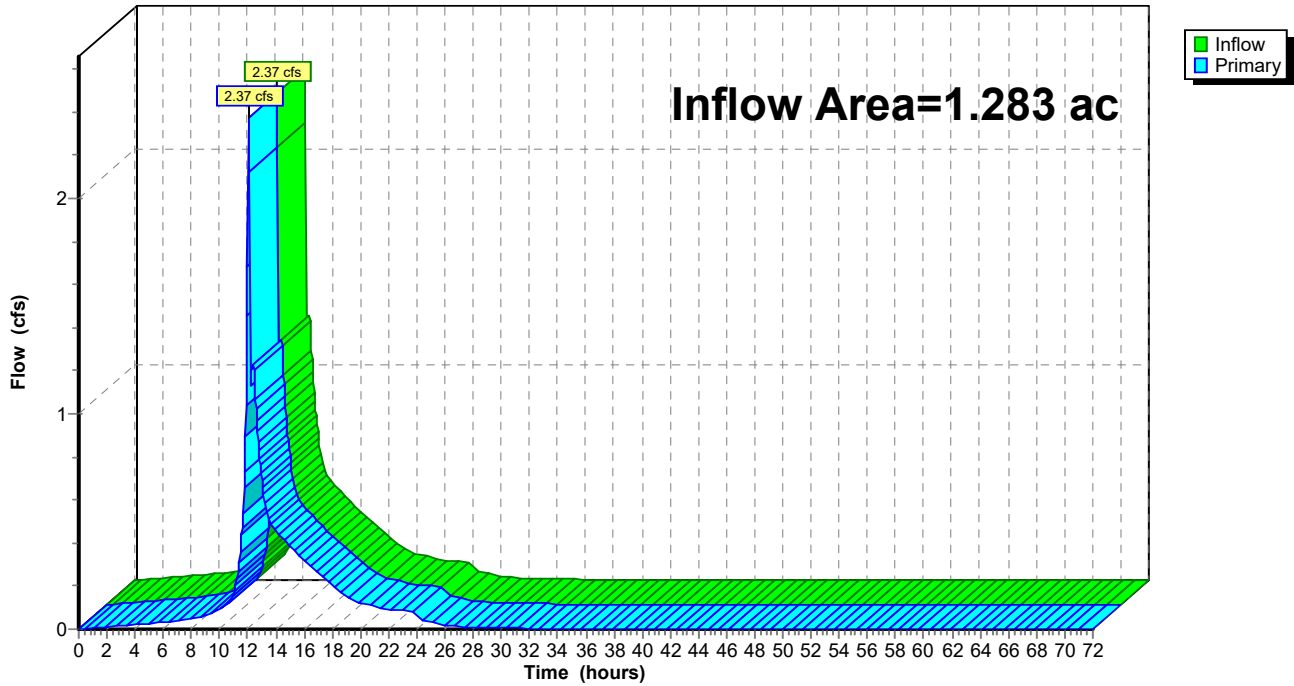
Summary for Link P1A: Proposed 1A

Inflow Area = 1.283 ac, 48.40% Impervious, Inflow Depth = 3.69" for 10-Year-2020 event
Inflow = 2.37 cfs @ 12.06 hrs, Volume= 0.394 af
Primary = 2.37 cfs @ 12.06 hrs, Volume= 0.394 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1A: Proposed 1A

Hydrograph



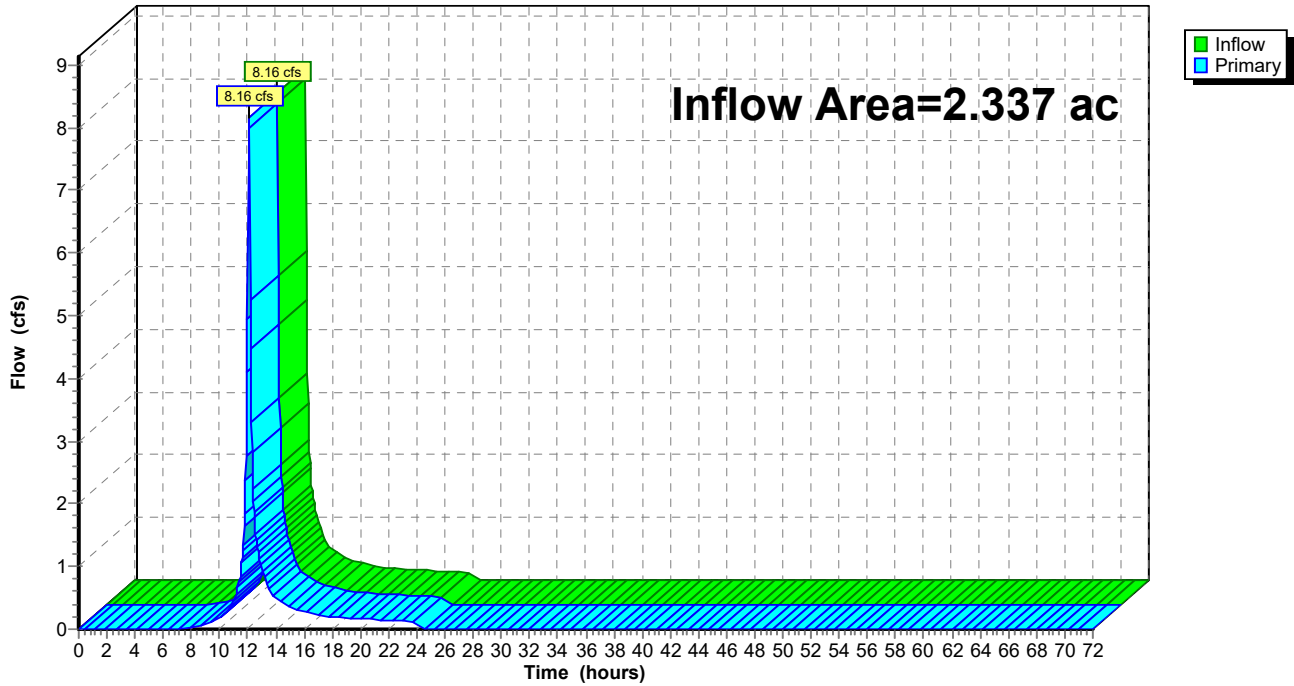
Summary for Link P1B: Proposed 1B

Inflow Area = 2.337 ac, 0.00% Impervious, Inflow Depth = 3.09" for 10-Year-2020 event
Inflow = 8.16 cfs @ 12.08 hrs, Volume= 0.601 af
Primary = 8.16 cfs @ 12.08 hrs, Volume= 0.601 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1B: Proposed 1B

Hydrograph



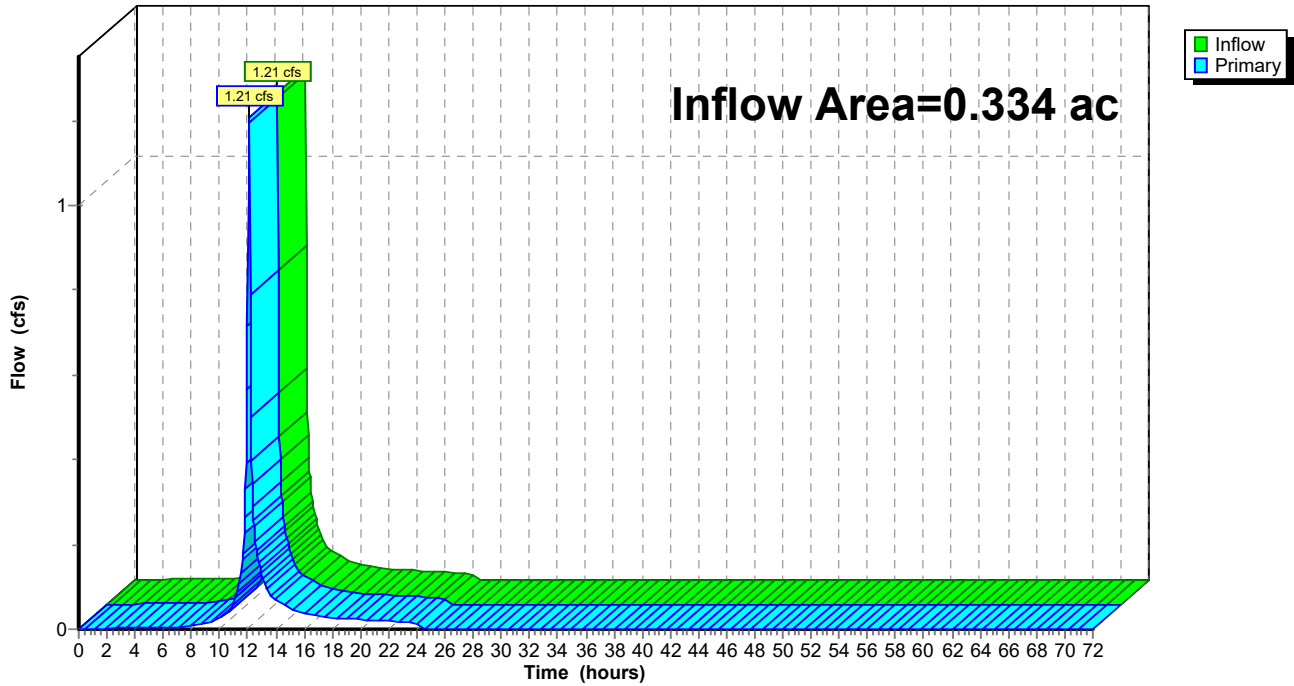
Summary for Link PO: Proposed Offsite

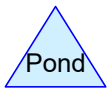
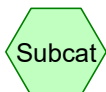
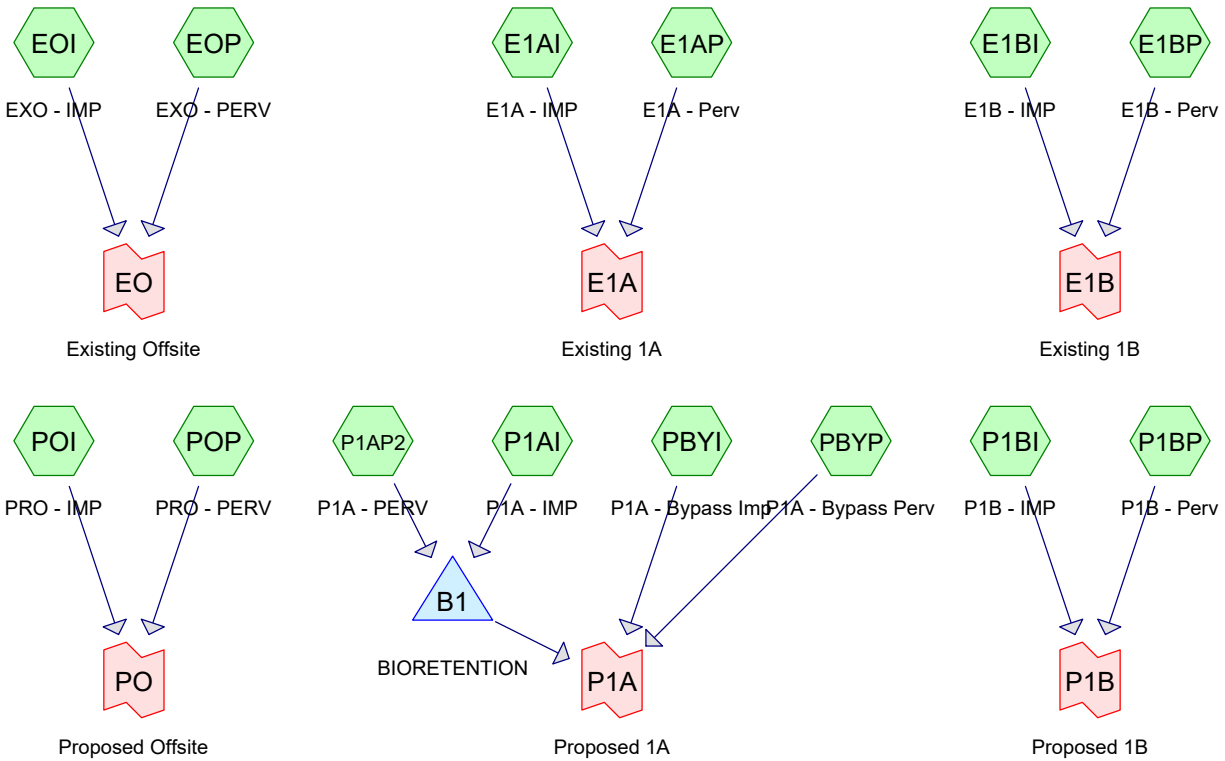
Inflow Area = 0.334 ac, 14.07% Impervious, Inflow Depth = 3.04" for 10-Year-2020 event
Inflow = 1.21 cfs @ 12.09 hrs, Volume= 0.085 af
Primary = 1.21 cfs @ 12.09 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PO: Proposed Offsite

Hydrograph





Routing Diagram for EX-PR
 Prepared by Bohler, Printed 7/16/2025
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EX-PR

Prepared by Bohler

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NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Printed 7/16/2025

Page 2

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1AI: E1A - IMP	Runoff Area=0.560 ac 100.00% Impervious Runoff Depth=8.74" Flow Length=372' Tc=2.0 min CN=98 Runoff=5.37 cfs 0.408 af
SubcatchmentE1AP: E1A - Perv	Runoff Area=0.680 ac 0.00% Impervious Runoff Depth=5.81" Flow Length=409' Tc=3.4 min CN=74 Runoff=4.89 cfs 0.329 af
SubcatchmentE1BI: E1B - IMP	Runoff Area=1.413 ac 100.00% Impervious Runoff Depth=8.74" Flow Length=411' Tc=1.7 min CN=98 Runoff=13.26 cfs 1.029 af
SubcatchmentE1BP: E1B - Perv	Runoff Area=0.943 ac 0.00% Impervious Runoff Depth=5.93" Flow Length=690' Tc=7.6 min CN=75 Runoff=5.97 cfs 0.466 af
SubcatchmentEOI: EXO - IMP	Runoff Area=0.022 ac 100.00% Impervious Runoff Depth=8.74" Flow Length=107' Tc=0.7 min CN=98 Runoff=0.21 cfs 0.016 af
SubcatchmentEOP: EXO - PERV	Runoff Area=0.336 ac 0.00% Impervious Runoff Depth=6.06" Flow Length=138' Tc=2.3 min CN=76 Runoff=2.61 cfs 0.170 af
SubcatchmentP1AI: P1A - IMP	Runoff Area=0.259 ac 100.00% Impervious Runoff Depth=8.74" Flow Length=262' Tc=0.9 min CN=98 Runoff=2.45 cfs 0.189 af
SubcatchmentP1AP2: P1A - PERV	Runoff Area=0.617 ac 0.00% Impervious Runoff Depth=6.55" Flow Length=116' Tc=7.0 min CN=80 Runoff=4.32 cfs 0.337 af
SubcatchmentP1BI: P1B - IMP	Runoff Area=1.461 ac 0.00% Impervious Runoff Depth=6.55" Flow Length=388' Tc=1.4 min CN=80 Runoff=11.91 cfs 0.797 af
SubcatchmentP1BP: P1B - Perv	Runoff Area=0.876 ac 0.00% Impervious Runoff Depth=6.55" Flow Length=711' Tc=7.6 min CN=80 Runoff=6.01 cfs 0.478 af
SubcatchmentPBYI: P1A - Bypass Imp	Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=8.74" Flow Length=262' Tc=0.9 min CN=98 Runoff=3.43 cfs 0.264 af
SubcatchmentPBYP: P1A - Bypass Perv	Runoff Area=0.045 ac 0.00% Impervious Runoff Depth=5.93" Flow Length=116' Tc=7.0 min CN=75 Runoff=0.29 cfs 0.022 af
SubcatchmentPOI: PRO - IMP	Runoff Area=0.047 ac 100.00% Impervious Runoff Depth=8.74" Flow Length=99' Tc=0.8 min CN=98 Runoff=0.44 cfs 0.034 af
SubcatchmentPOP: PRO - PERV	Runoff Area=0.287 ac 0.00% Impervious Runoff Depth=6.06" Flow Length=122' Tc=3.4 min CN=76 Runoff=2.13 cfs 0.145 af
Pond B1: BIORETENTION	Peak Elev=133.90' Storage=6,927 cf Inflow=5.95 cfs 0.525 af Outflow=4.78 cfs 0.493 af
Link E1A: Existing 1A	Inflow=10.18 cfs 0.737 af Primary=10.18 cfs 0.737 af

EX-PR

NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Link E1B: Existing 1B

Inflow=18.23 cfs 1.495 af
Primary=18.23 cfs 1.495 af

Link EO: Existing Offsite

Inflow=2.80 cfs 0.186 af
Primary=2.80 cfs 0.186 af

Link P1A: Proposed 1A

Inflow=7.14 cfs 0.779 af
Primary=7.14 cfs 0.779 af

Link P1B: Proposed 1B

Inflow=16.77 cfs 1.275 af
Primary=16.77 cfs 1.275 af

Link PO: Proposed Offsite

Inflow=2.53 cfs 0.179 af
Primary=2.53 cfs 0.179 af

Total Runoff Area = 7.908 ac Runoff Volume = 4.684 af Average Runoff Depth = 7.11"
66.33% Pervious = 5.245 ac 33.67% Impervious = 2.663 ac

Summary for Subcatchment E1A1: E1A - IMP

Runoff = 5.37 cfs @ 12.08 hrs, Volume= 0.408 af, Depth= 8.74"

Routed to Link E1A : Existing 1A

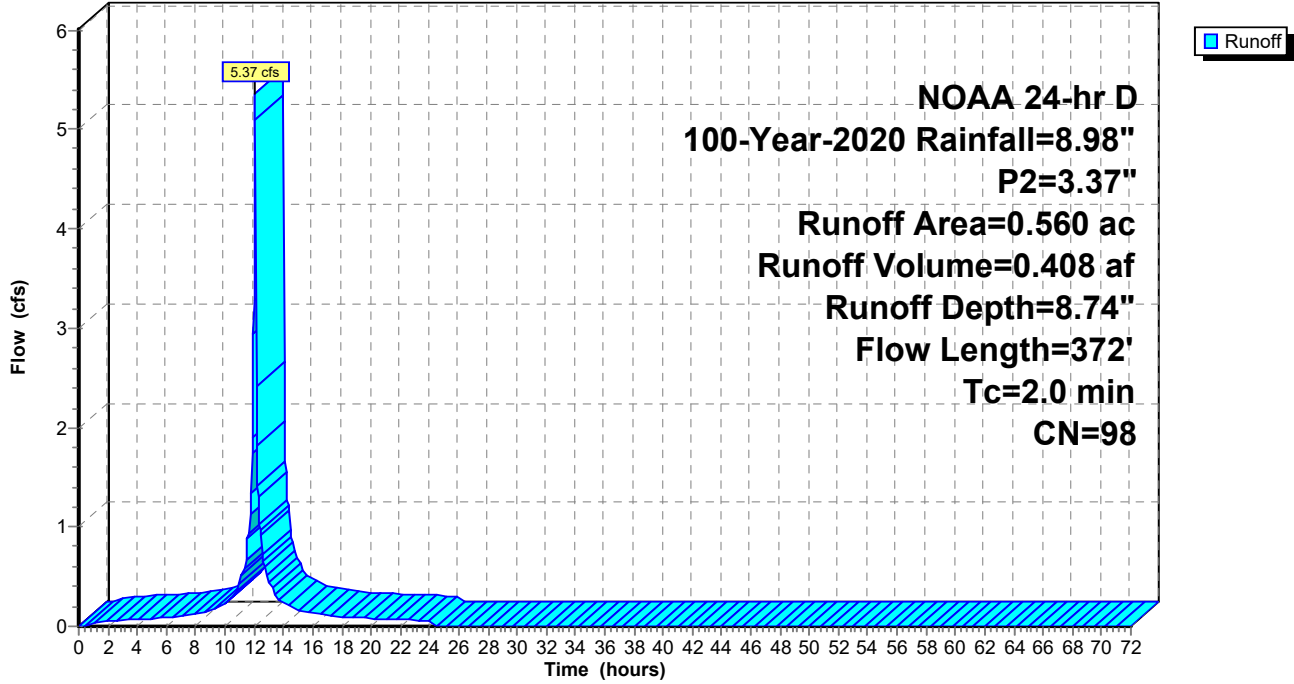
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.560	98	Paved parking, HSG D
0.560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	41	0.0060	0.73		Sheet Flow, H-I Smooth surfaces n= 0.011 P2= 3.37"
0.0	10	0.0300	3.52		Shallow Concentrated Flow, I-C Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
2.0	372	Total			

Subcatchment E1AI: E1A - IMP

Hydrograph



Summary for Subcatchment E1AP: E1A - Perv

Runoff = 4.89 cfs @ 12.09 hrs, Volume= 0.329 af, Depth= 5.81"

Routed to Link E1A : Existing 1A

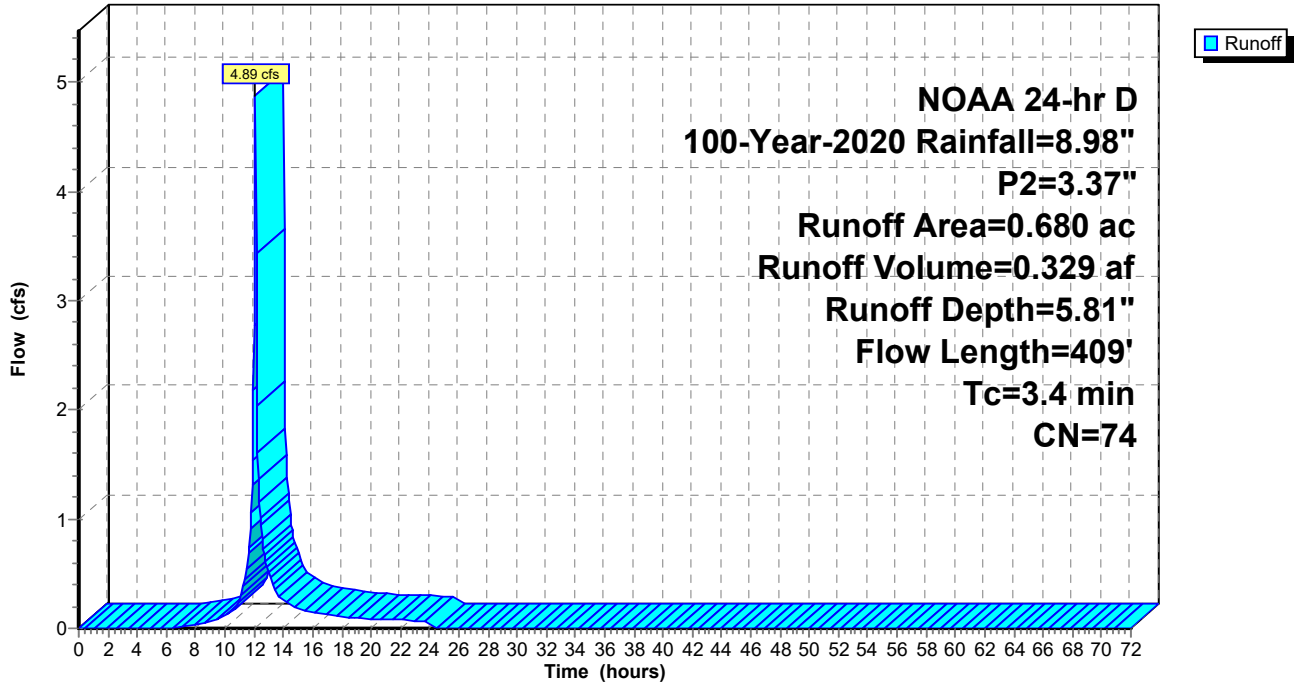
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.676	74	>75% Grass cover, Good, HSG C
0.004	80	>75% Grass cover, Good, HSG D
0.680	74	Weighted Average
0.680		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	35	0.1500	0.32		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 3.37"
0.5	53	0.0090	1.93		Shallow Concentrated Flow, B-C
					Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F
					Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
3.4	409	Total			

Subcatchment E1AP: E1A - Perv

Hydrograph



Summary for Subcatchment E1BI: E1B - IMP

Runoff = 13.26 cfs @ 12.07 hrs, Volume= 1.029 af, Depth= 8.74"
 Routed to Link E1B : Existing 1B

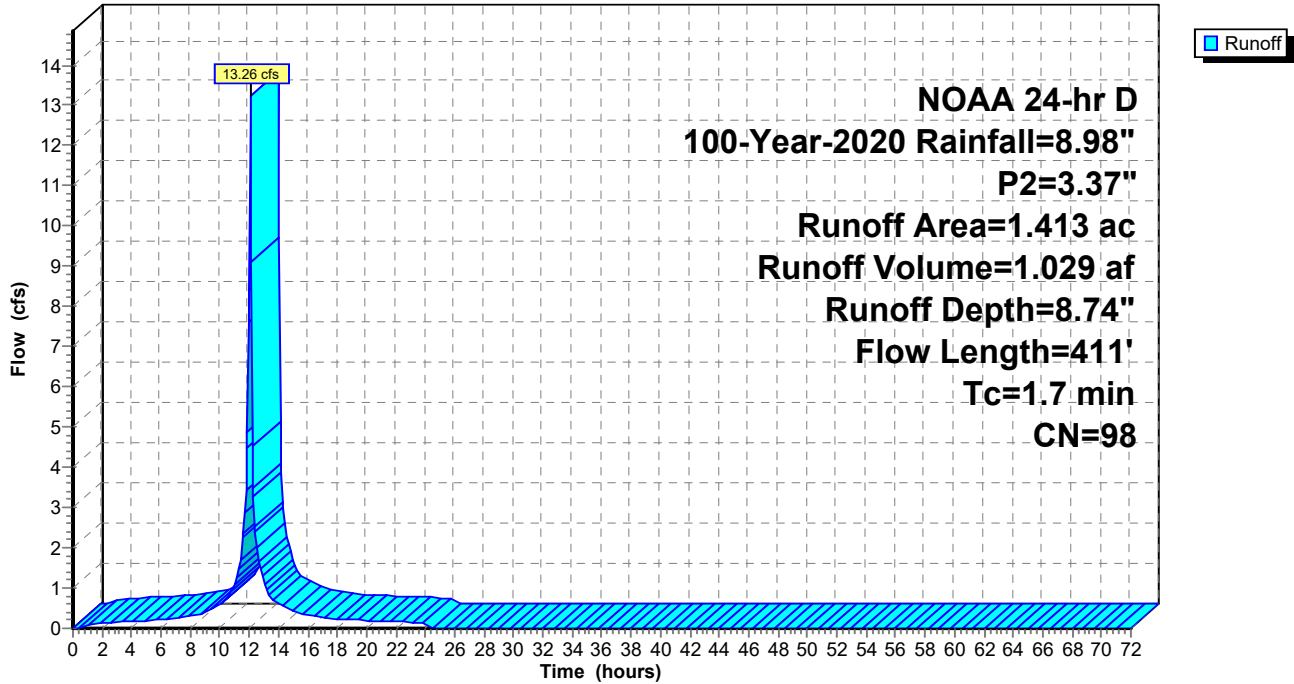
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
1.413	98	Paved parking, HSG D
1.413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.7	411	Total			

Subcatchment E1BI: E1B - IMP

Hydrograph



Summary for Subcatchment E1BP: E1B - Perv

Runoff = 5.97 cfs @ 12.15 hrs, Volume= 0.466 af, Depth= 5.93"
 Routed to Link E1B : Existing 1B

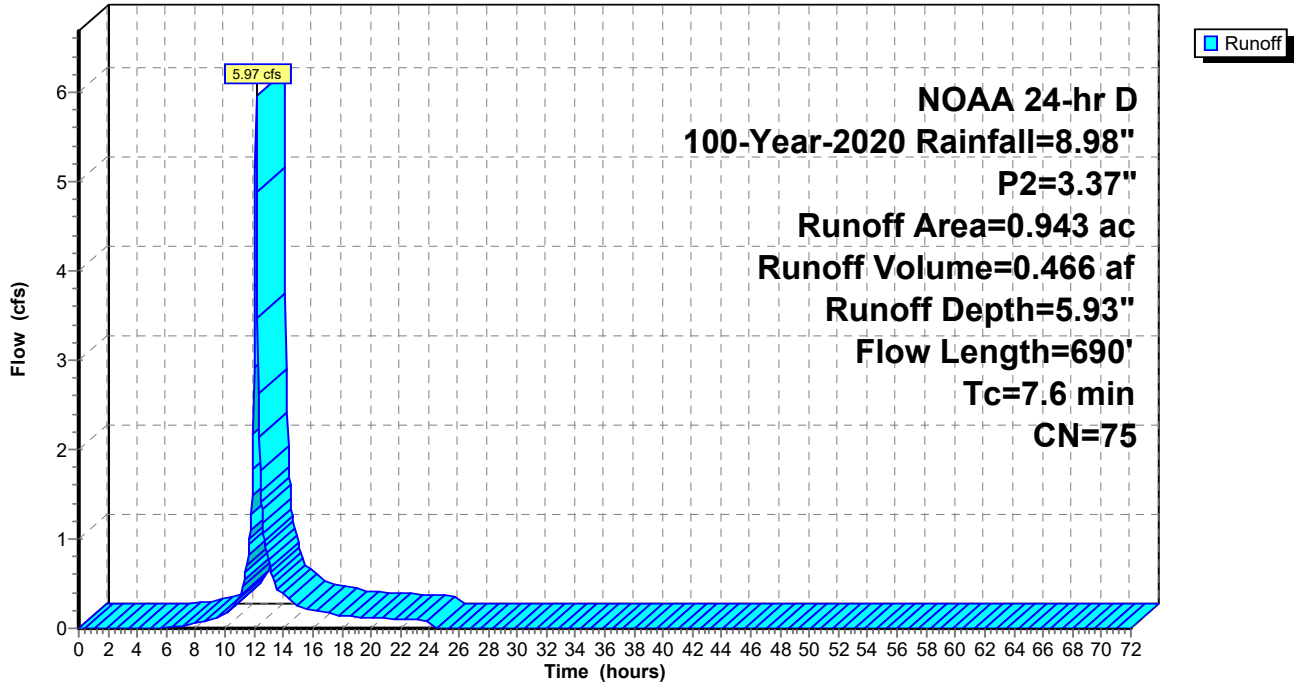
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.805	74	>75% Grass cover, Good, HSG C
0.138	80	>75% Grass cover, Good, HSG D
0.943	75	Weighted Average
0.943		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0900	0.32		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.5	125	0.0700	4.26		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.2	54	0.0850	4.69		Shallow Concentrated Flow, C-K Unpaved Kv= 16.1 fps
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
7.6	690	Total			

Subcatchment E1BP: E1B - Perv

Hydrograph



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Summary for Subcatchment EOI: EXO - IMP

Runoff = 0.21 cfs @ 12.06 hrs, Volume= 0.016 af, Depth= 8.74"

Routed to Link EO : Existing Offsite

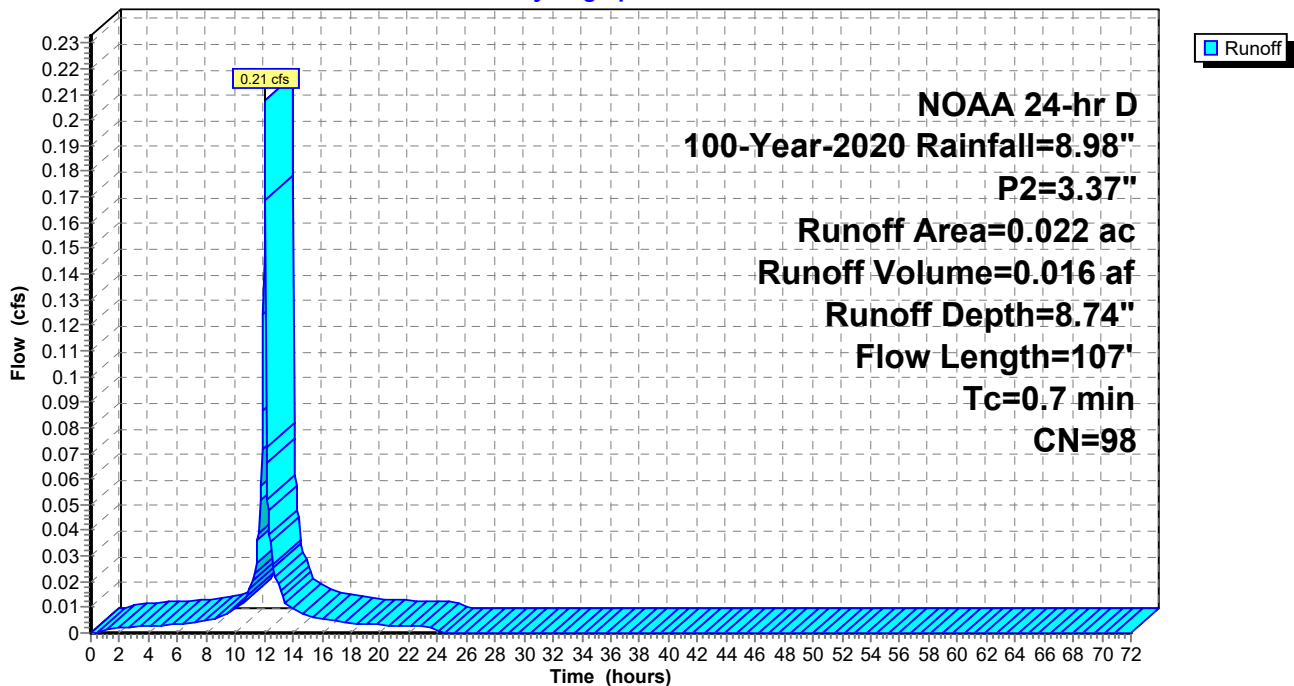
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.022	98	Paved parking, HSG D
0.022		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.7	107	Total			

Subcatchment EOI: EXO - IMP

Hydrograph



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Summary for Subcatchment EOP: EXO - PERV

Runoff = 2.61 cfs @ 12.08 hrs, Volume= 0.170 af, Depth= 6.06"

Routed to Link EO : Existing Offsite

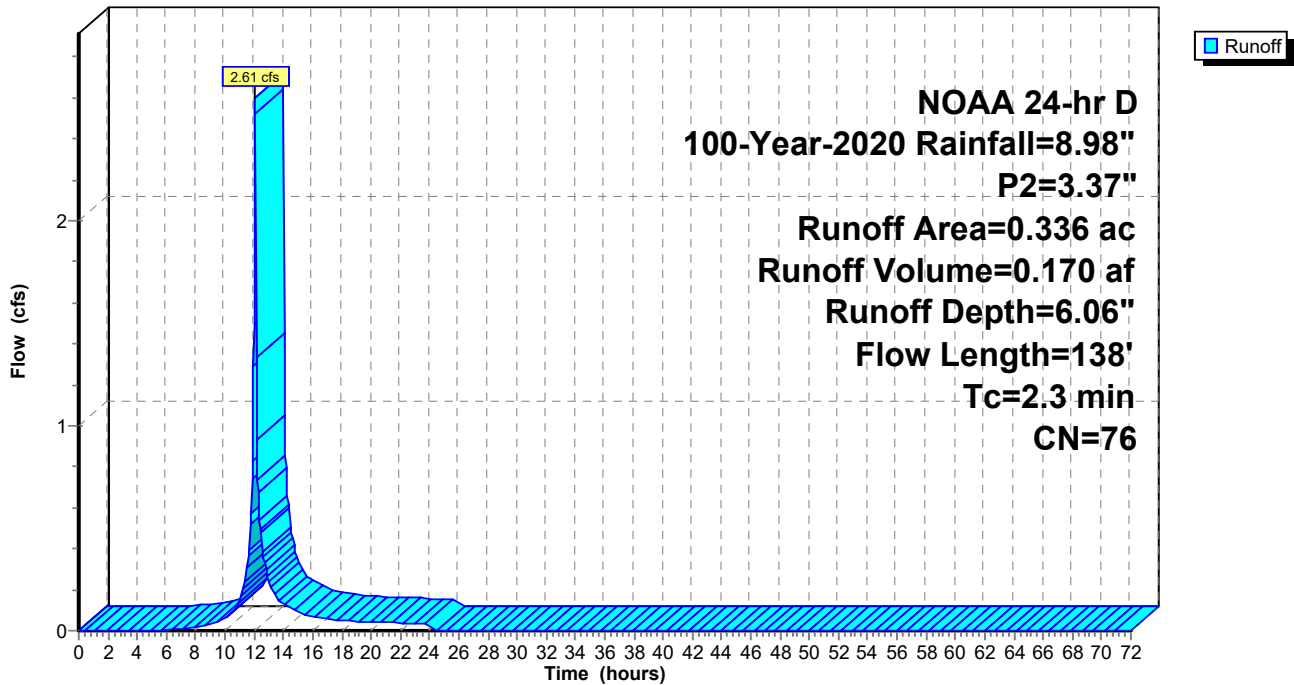
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.248	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.336	76	Weighted Average
0.336		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	31	0.1700	0.33		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
2.3	138	Total			

Subcatchment EOP: EXO - PERV

Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Summary for Subcatchment P1AI: P1A - IMP

Runoff = 2.45 cfs @ 12.06 hrs, Volume= 0.189 af, Depth= 8.74"
Routed to Pond B1 : BIORETENTION

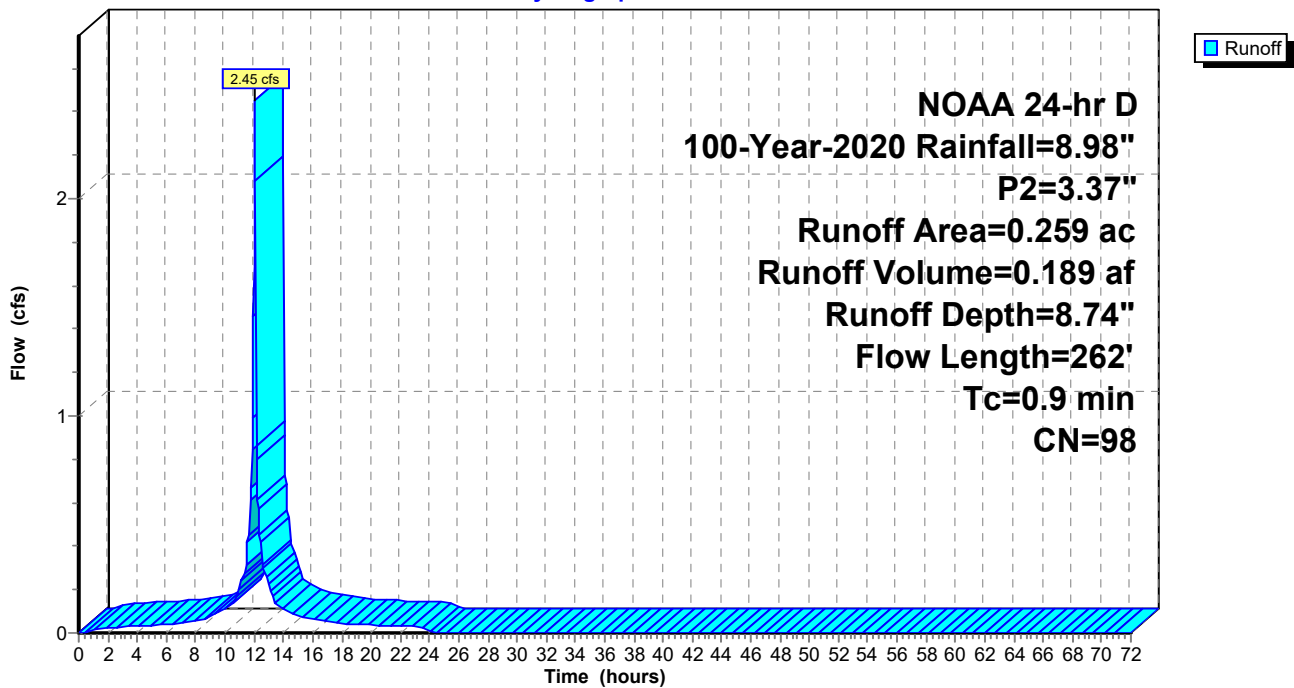
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.259	98	Paved parking, HSG D
0.259		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment P1AI: P1A - IMP

Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Summary for Subcatchment P1AP2: P1A - PERV

Runoff = 4.32 cfs @ 12.14 hrs, Volume= 0.337 af, Depth= 6.55"
Routed to Pond B1 : BIORETENTION

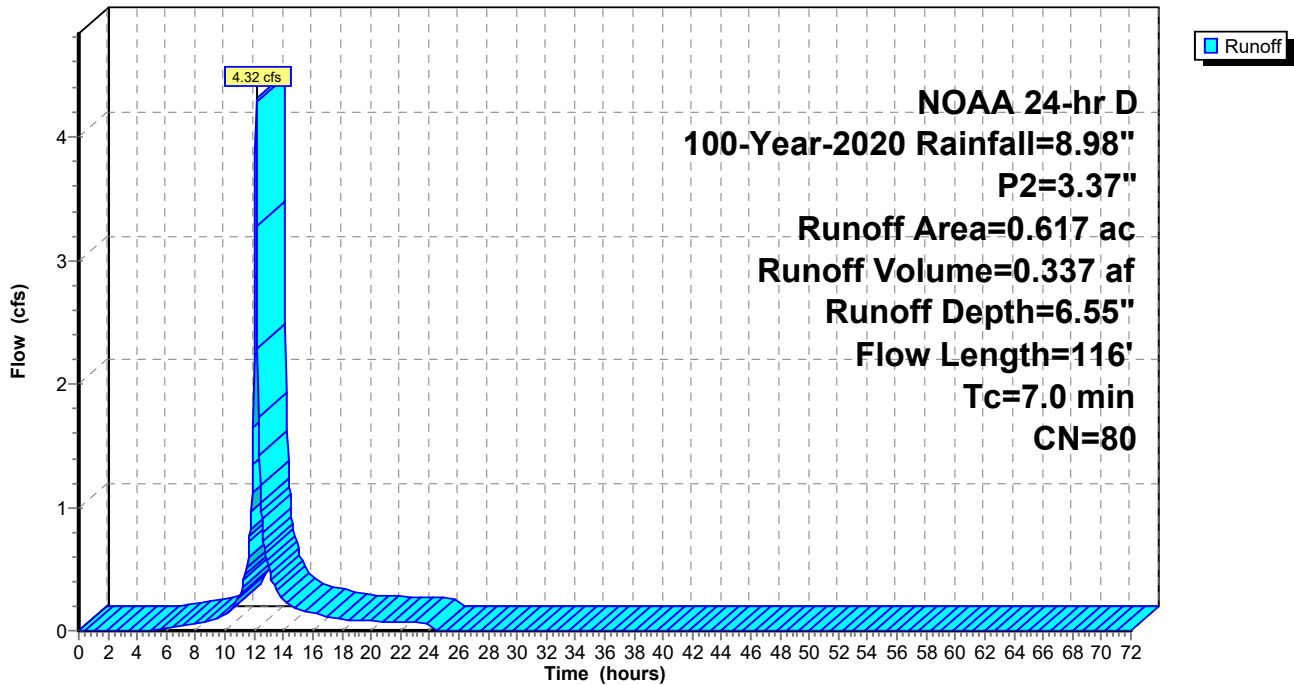
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.617	80	>75% Grass cover, Good, HSG D
0.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	61	0.0320	0.19		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.9	22	0.3200	0.39		Sheet Flow, B-C Grass: Short n= 0.150 P2= 3.37"
0.8	17	0.3000	0.36		Sheet Flow, C-D Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
7.0	116	Total			

Subcatchment P1AP2: P1A - PERV

Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Summary for Subcatchment P1BI: P1B - IMP

Runoff = 11.91 cfs @ 12.07 hrs, Volume= 0.797 af, Depth= 6.55"

Routed to Link P1B : Proposed 1B

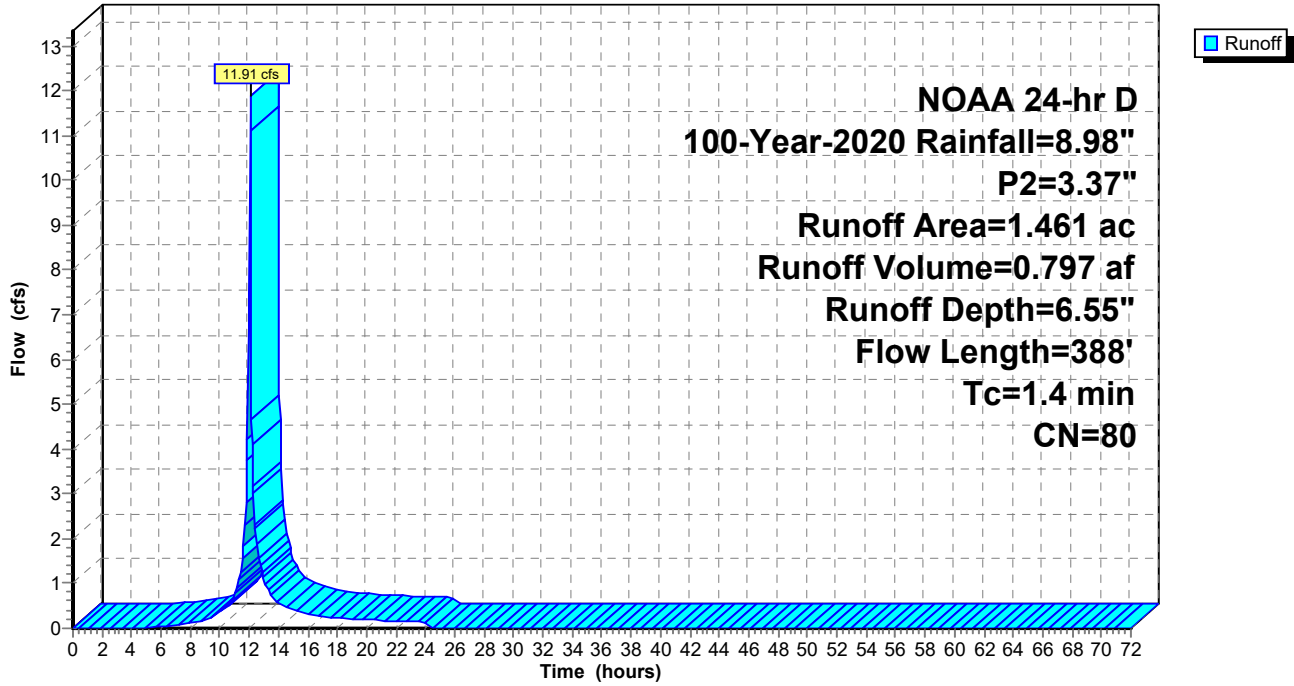
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NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
1.461	80	>75% Grass cover, Good, HSG D
1.461		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.4	388	Total			

Subcatchment P1BI: P1B - IMP

Hydrograph



Summary for Subcatchment P1BP: P1B - Perv

Runoff = 6.01 cfs @ 12.15 hrs, Volume= 0.478 af, Depth= 6.55"
 Routed to Link P1B : Proposed 1B

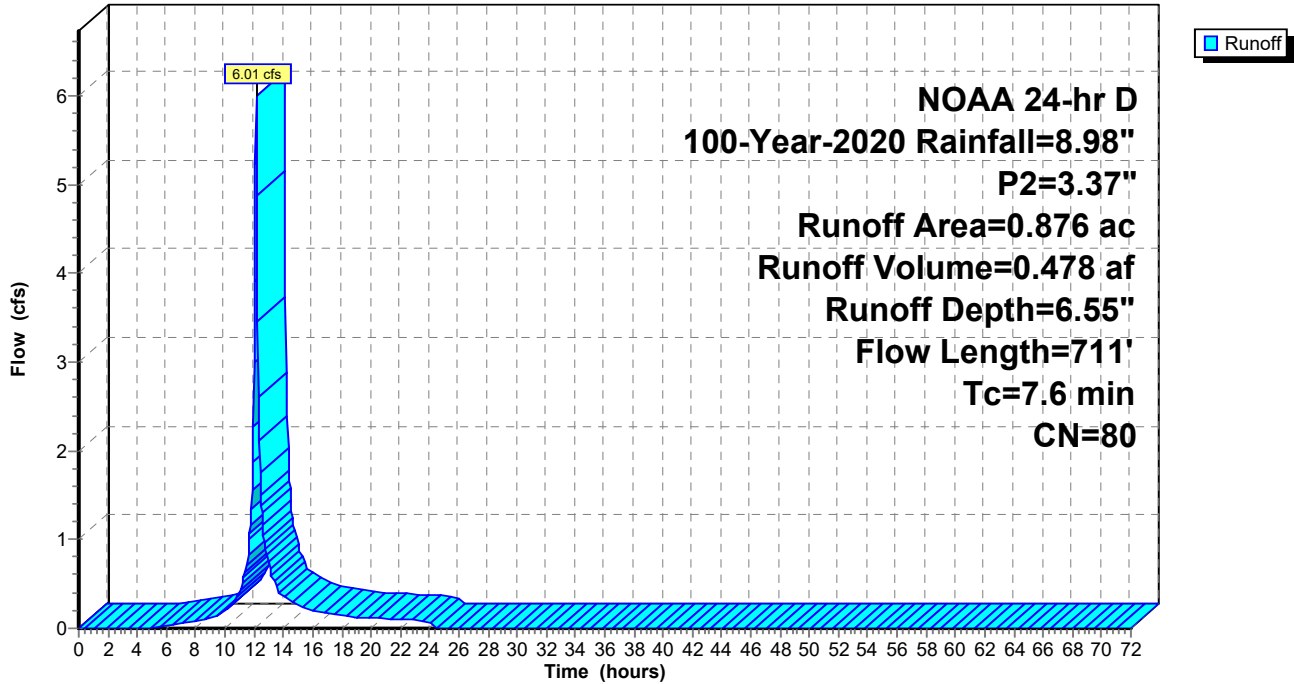
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.750	80	>75% Grass cover, Good, HSG D
0.126	80	>75% Grass cover, Good, HSG D
0.876	80	Weighted Average
0.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0900	0.32		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 3.37"
0.5	127	0.0700	4.26		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
0.2	55	0.0800	4.55		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.2	31	0.0300	2.79		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	10	0.0150	2.49		Shallow Concentrated Flow, E-F
					Paved Kv= 20.3 fps
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H
					Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I
					Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K
					Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
7.6	711	Total			

Subcatchment P1BP: P1B - Perv

Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Summary for Subcatchment PBYI: P1A - Bypass Imp

Runoff = 3.43 cfs @ 12.06 hrs, Volume= 0.264 af, Depth= 8.74"

Routed to Link P1A : Proposed 1A

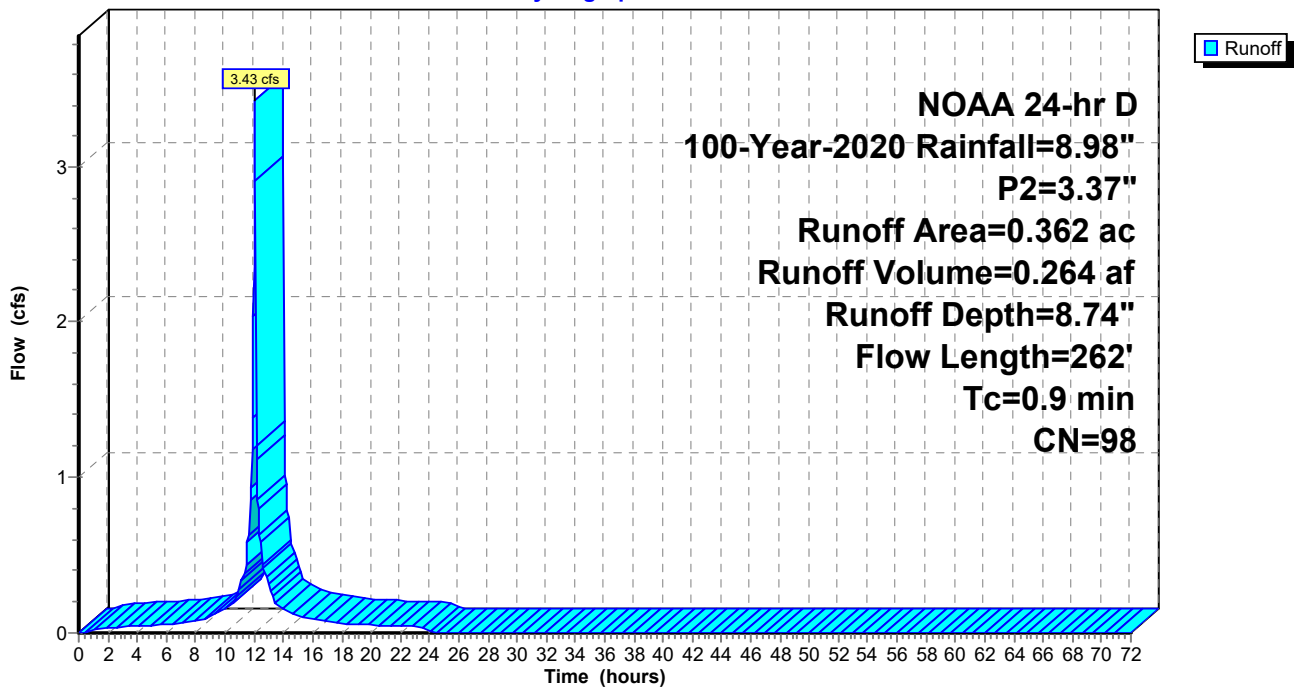
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.362	98	Paved parking, HSG D
0.362		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment PBYI: P1A - Bypass Imp

Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Summary for Subcatchment PBYP: P1A - Bypass Perv

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.022 af, Depth= 5.93"

Routed to Link P1A : Proposed 1A

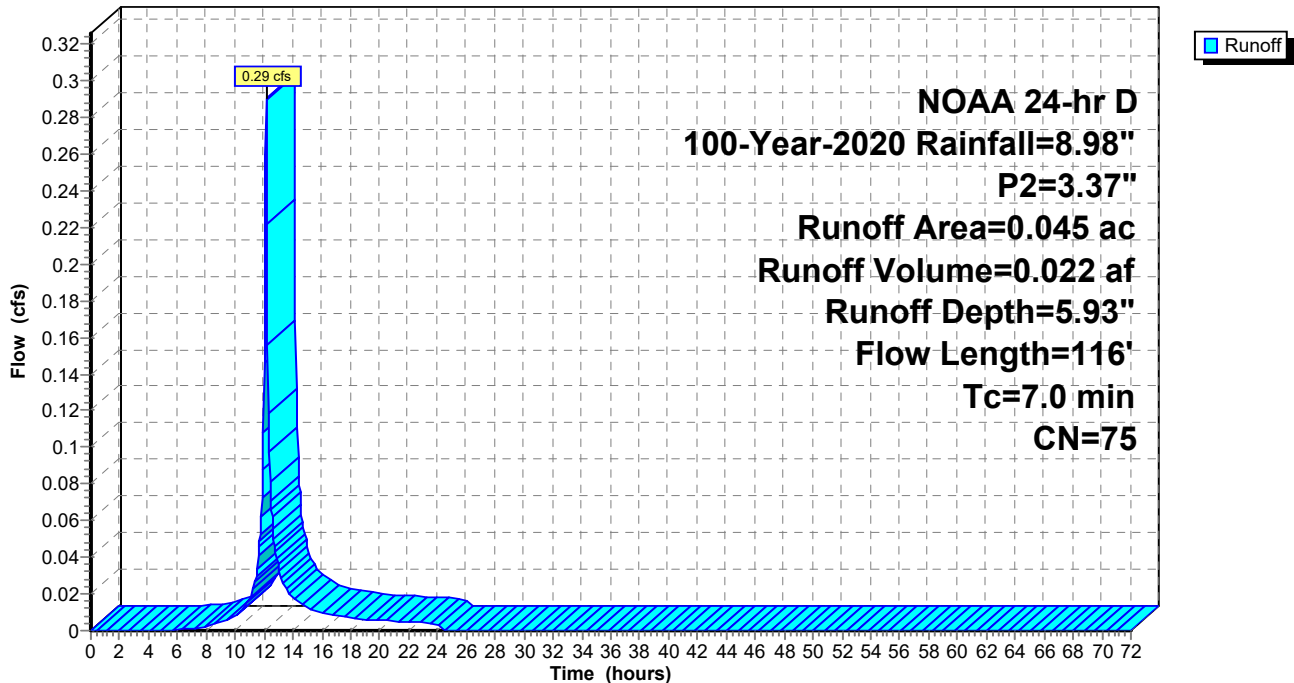
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.039	74	>75% Grass cover, Good, HSG C
0.006	80	>75% Grass cover, Good, HSG D
0.045	75	Weighted Average
0.045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	61	0.0320	0.19		Sheet Flow, A-B Grass: Short n= 0.150 P2= 3.37"
0.9	22	0.3200	0.39		Sheet Flow, B-C Grass: Short n= 0.150 P2= 3.37"
0.8	17	0.3000	0.36		Sheet Flow, C-D Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
7.0	116	Total			

Subcatchment PBYP: P1A - Bypass Perv

Hydrograph



EX-PR

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NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Summary for Subcatchment POI: PRO - IMP

Runoff = 0.44 cfs @ 12.06 hrs, Volume= 0.034 af, Depth= 8.74"
Routed to Link PO : Proposed Offsite

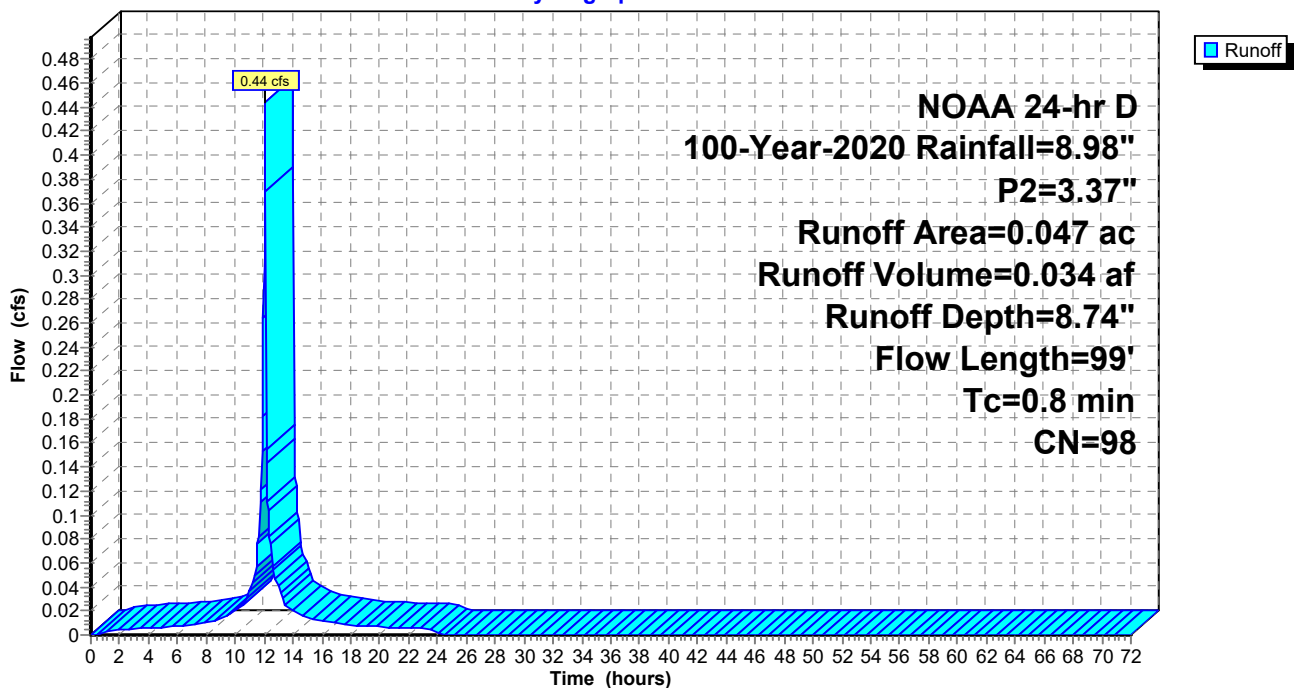
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.047	98	Paved parking, HSG D
0.047		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	0.99		Sheet Flow, D-B Smooth surfaces n= 0.011 P2= 3.37"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.8	99	Total			

Subcatchment POI: PRO - IMP

Hydrograph



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Summary for Subcatchment POP: PRO - PERV

Runoff = 2.13 cfs @ 12.09 hrs, Volume= 0.145 af, Depth= 6.06"

Routed to Link PO : Proposed Offsite

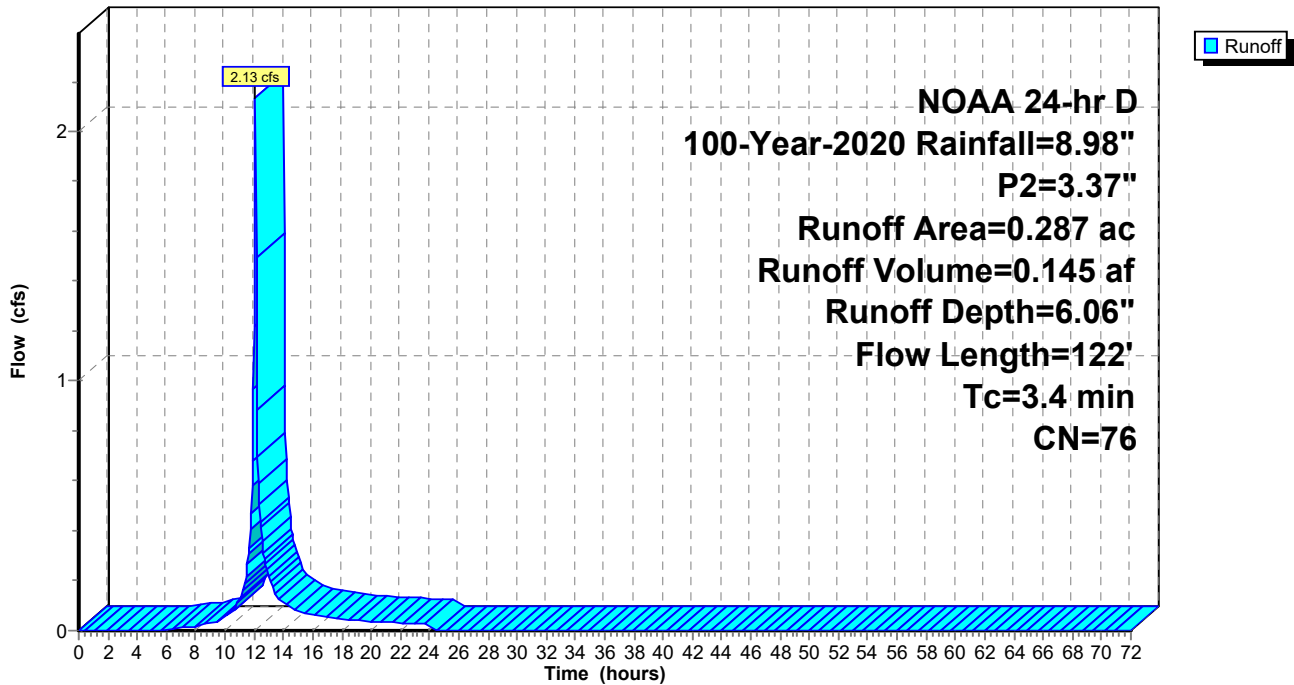
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.199	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.287	76	Weighted Average
0.287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	53	0.0950	0.29		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 3.37"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
3.4	122	Total			

Subcatchment POP: PRO - PERV

Hydrograph



Summary for Pond B1: BIORETENTION

Inflow Area = 0.876 ac, 29.57% Impervious, Inflow Depth = 7.20" for 100-Year-2020 event
 Inflow = 5.95 cfs @ 12.10 hrs, Volume= 0.525 af
 Outflow = 4.78 cfs @ 12.17 hrs, Volume= 0.493 af, Atten= 20%, Lag= 4.5 min
 Primary = 4.78 cfs @ 12.17 hrs, Volume= 0.493 af
 Routed to Link P1A : Proposed 1A

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 133.90' @ 12.17 hrs Surf.Area= 4,055 sf Storage= 6,927 cf

Plug-Flow detention time= 157.5 min calculated for 0.493 af (94% of inflow)
 Center-of-Mass det. time= 124.1 min (904.9 - 780.8)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	11,644 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	3,229	0	0
133.00	3,656	3,443	3,443
134.00	4,097	3,877	7,319
135.00	4,552	4,325	11,644

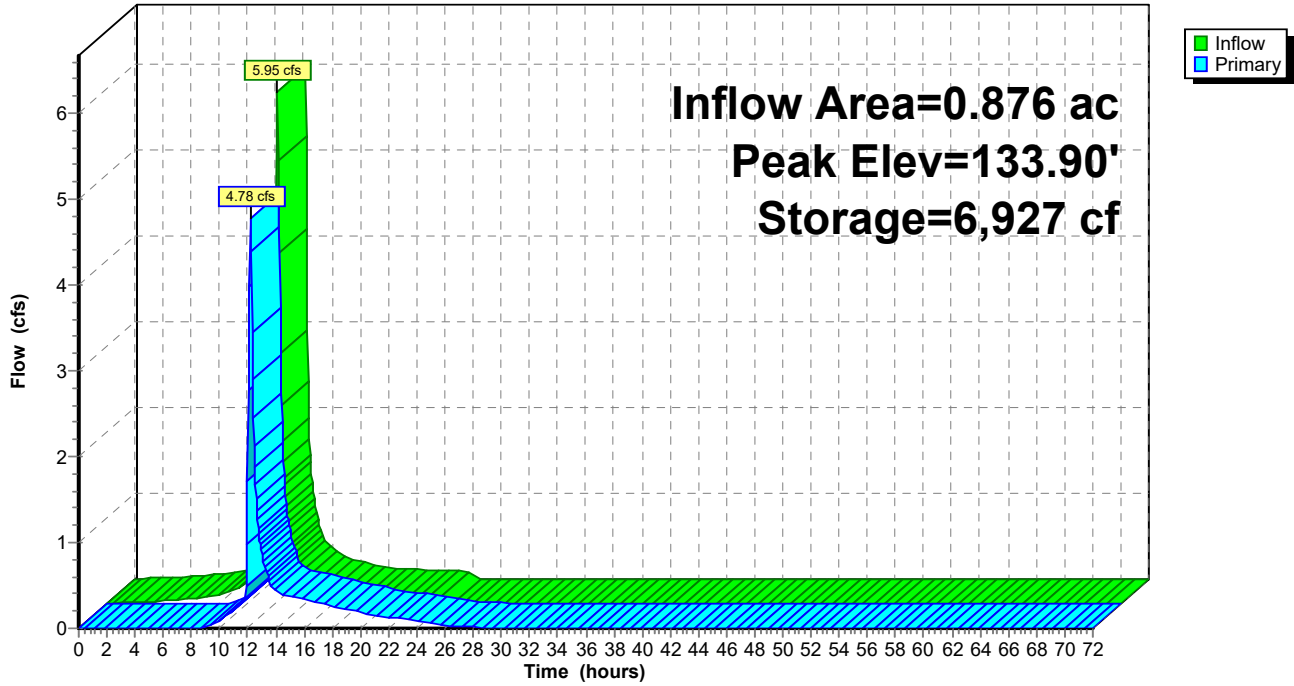
Device	Routing	Invert	Outlet Devices
#1	Primary	130.25'	18.0" Round Culvert L= 157.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.25' / 126.50' S= 0.0239 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	132.42'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.40'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.68 cfs @ 12.17 hrs HW=133.90' (Free Discharge)

- ↑ **1=Culvert** (Passes 4.68 cfs of 11.43 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.48 cfs @ 5.51 fps)
- ↑ **3=Broad-Crested Rectangular Weir**(Weir Controls 4.20 cfs @ 2.11 fps)

Pond B1: BIORETENTION

Hydrograph



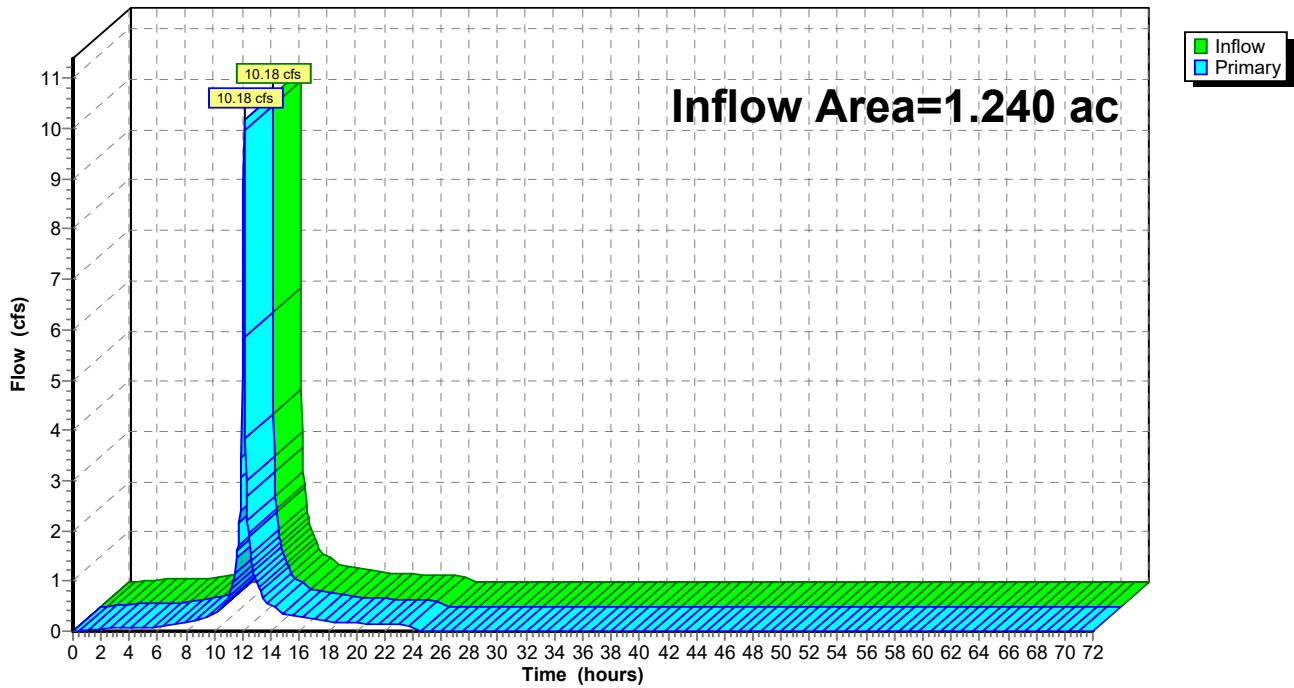
Summary for Link E1A: Existing 1A

Inflow Area = 1.240 ac, 45.16% Impervious, Inflow Depth = 7.13" for 100-Year-2020 event
Inflow = 10.18 cfs @ 12.09 hrs, Volume= 0.737 af
Primary = 10.18 cfs @ 12.09 hrs, Volume= 0.737 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1A: Existing 1A

Hydrograph



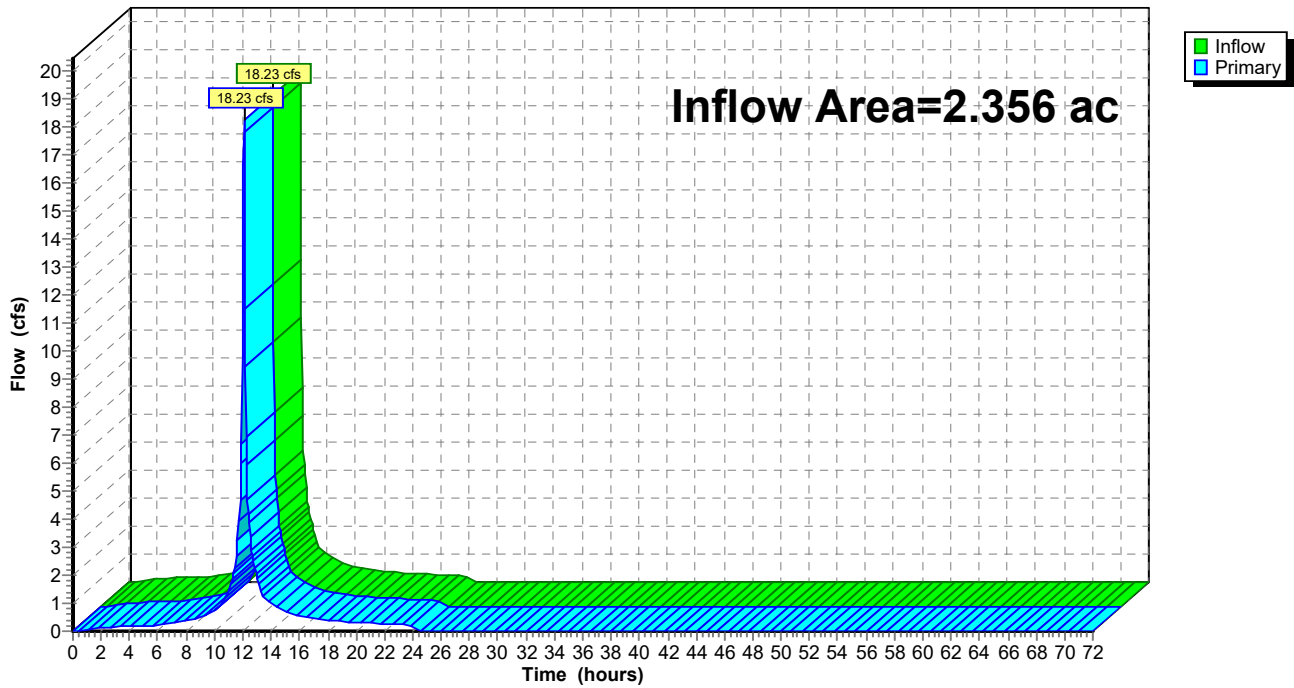
Summary for Link E1B: Existing 1B

Inflow Area = 2.356 ac, 59.97% Impervious, Inflow Depth = 7.62" for 100-Year-2020 event
Inflow = 18.23 cfs @ 12.08 hrs, Volume= 1.495 af
Primary = 18.23 cfs @ 12.08 hrs, Volume= 1.495 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1B: Existing 1B

Hydrograph



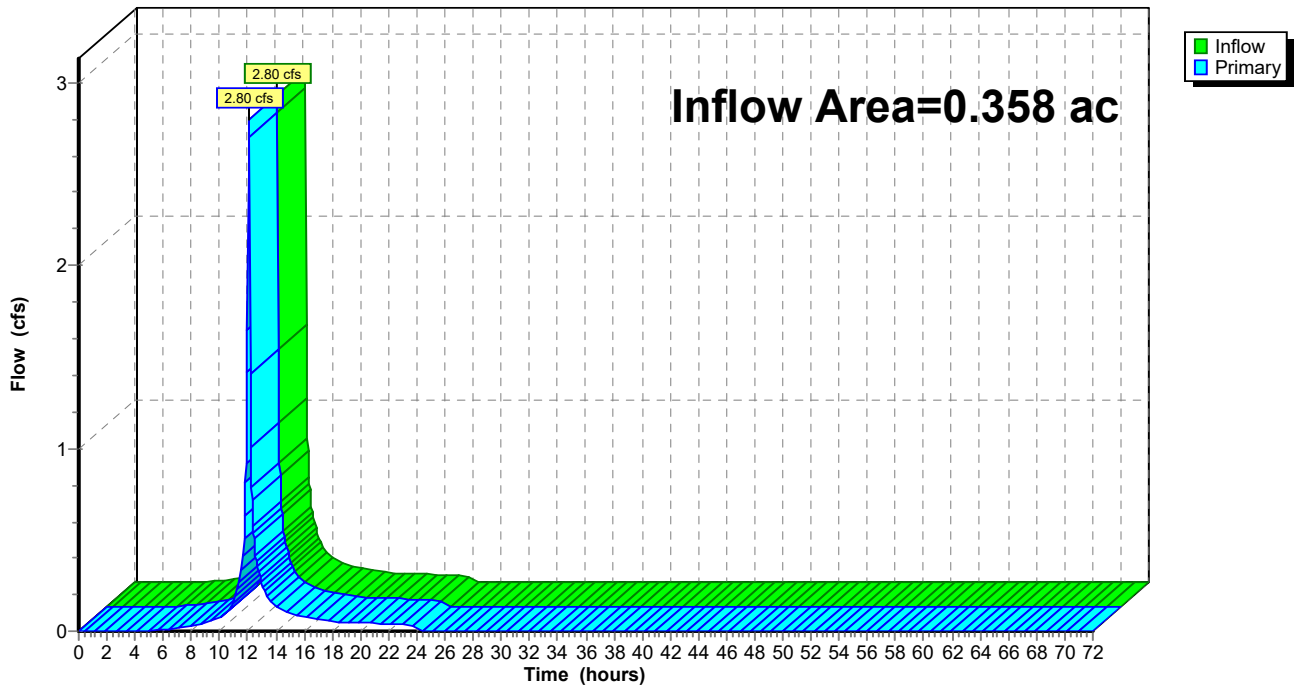
Summary for Link EO: Existing Offsite

Inflow Area = 0.358 ac, 6.15% Impervious, Inflow Depth = 6.22" for 100-Year-2020 event
Inflow = 2.80 cfs @ 12.08 hrs, Volume= 0.186 af
Primary = 2.80 cfs @ 12.08 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link EO: Existing Offsite

Hydrograph



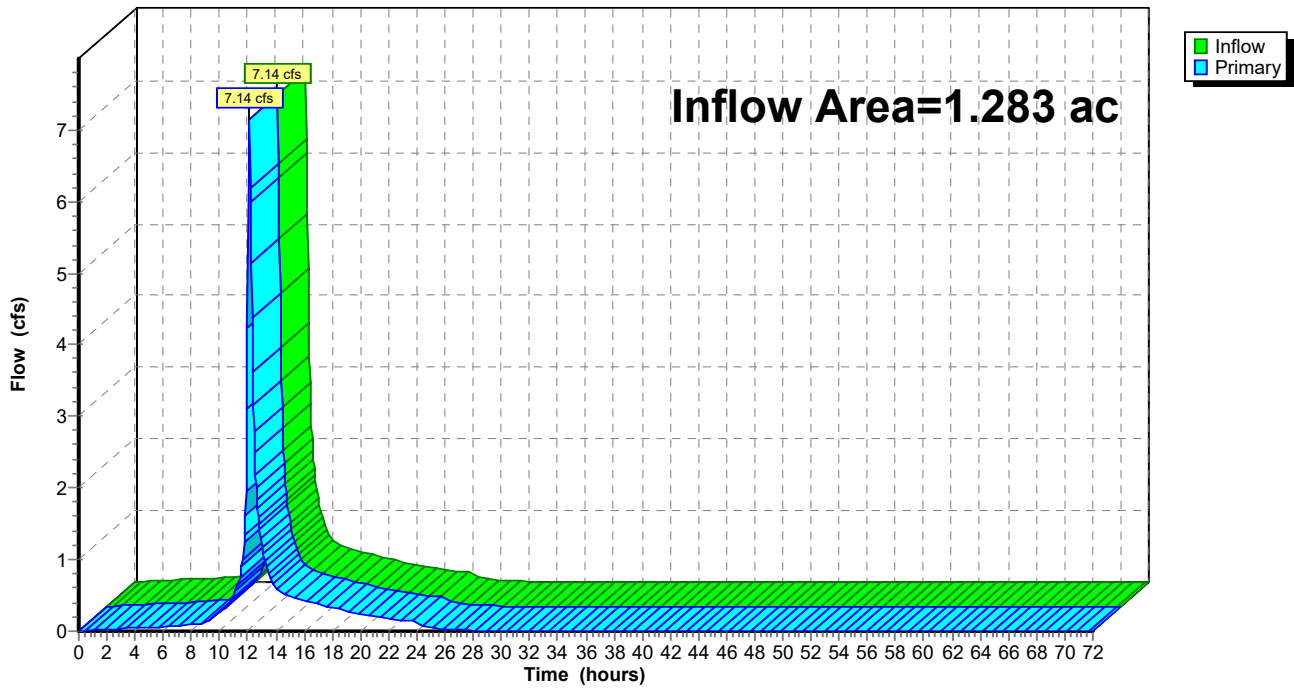
Summary for Link P1A: Proposed 1A

Inflow Area = 1.283 ac, 48.40% Impervious, Inflow Depth = 7.29" for 100-Year-2020 event
Inflow = 7.14 cfs @ 12.10 hrs, Volume= 0.779 af
Primary = 7.14 cfs @ 12.10 hrs, Volume= 0.779 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1A: Proposed 1A

Hydrograph



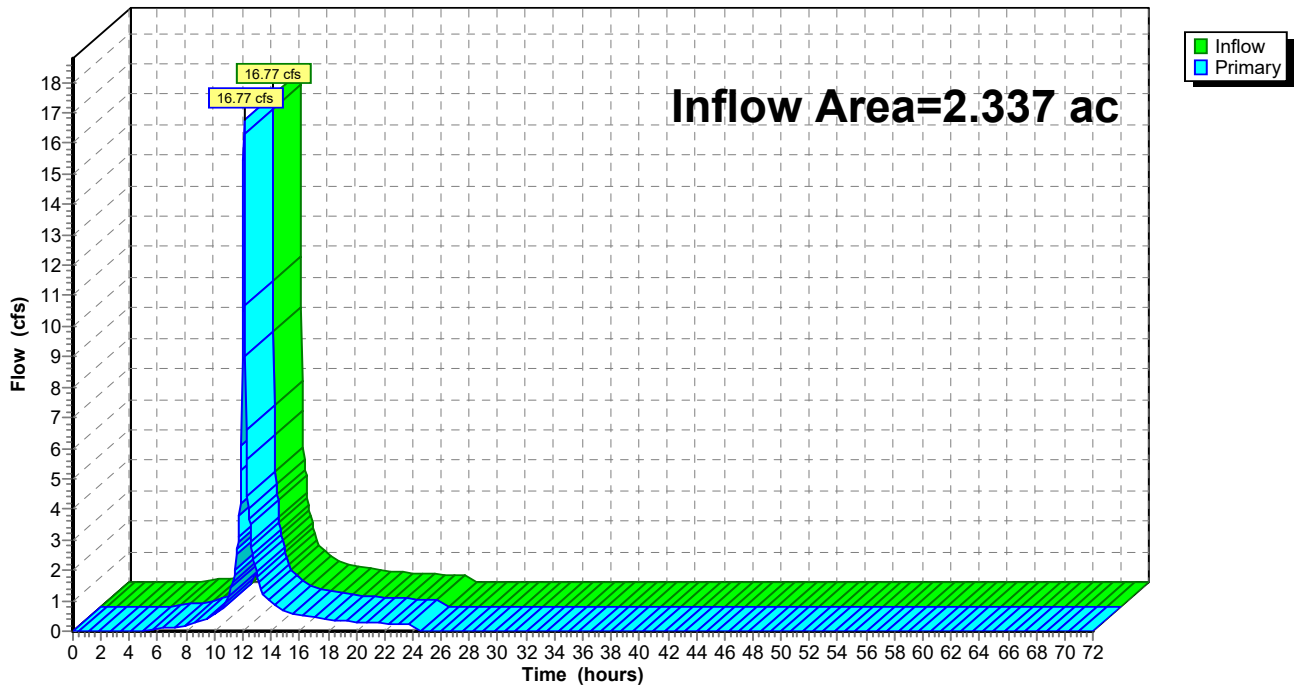
Summary for Link P1B: Proposed 1B

Inflow Area = 2.337 ac, 0.00% Impervious, Inflow Depth = 6.55" for 100-Year-2020 event
Inflow = 16.77 cfs @ 12.08 hrs, Volume= 1.275 af
Primary = 16.77 cfs @ 12.08 hrs, Volume= 1.275 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1B: Proposed 1B

Hydrograph



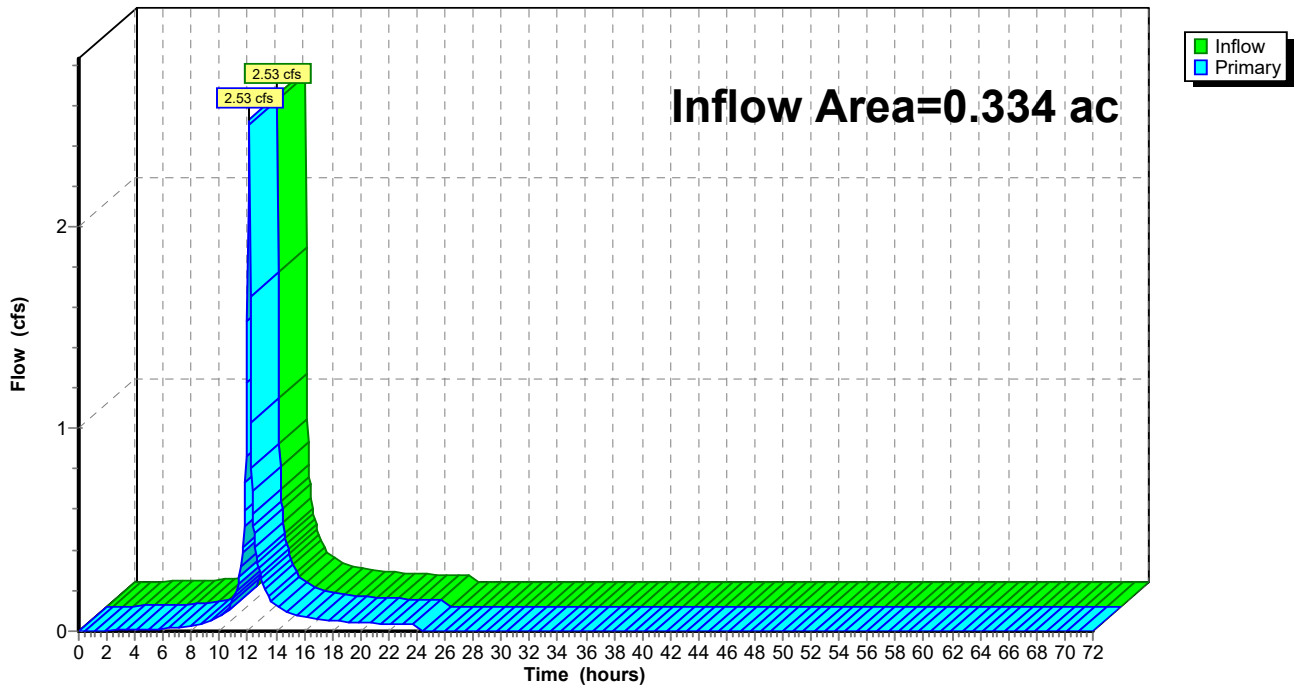
Summary for Link PO: Proposed Offsite

Inflow Area = 0.334 ac, 14.07% Impervious, Inflow Depth = 6.43" for 100-Year-2020 event
Inflow = 2.53 cfs @ 12.09 hrs, Volume= 0.179 af
Primary = 2.53 cfs @ 12.09 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PO: Proposed Offsite

Hydrograph



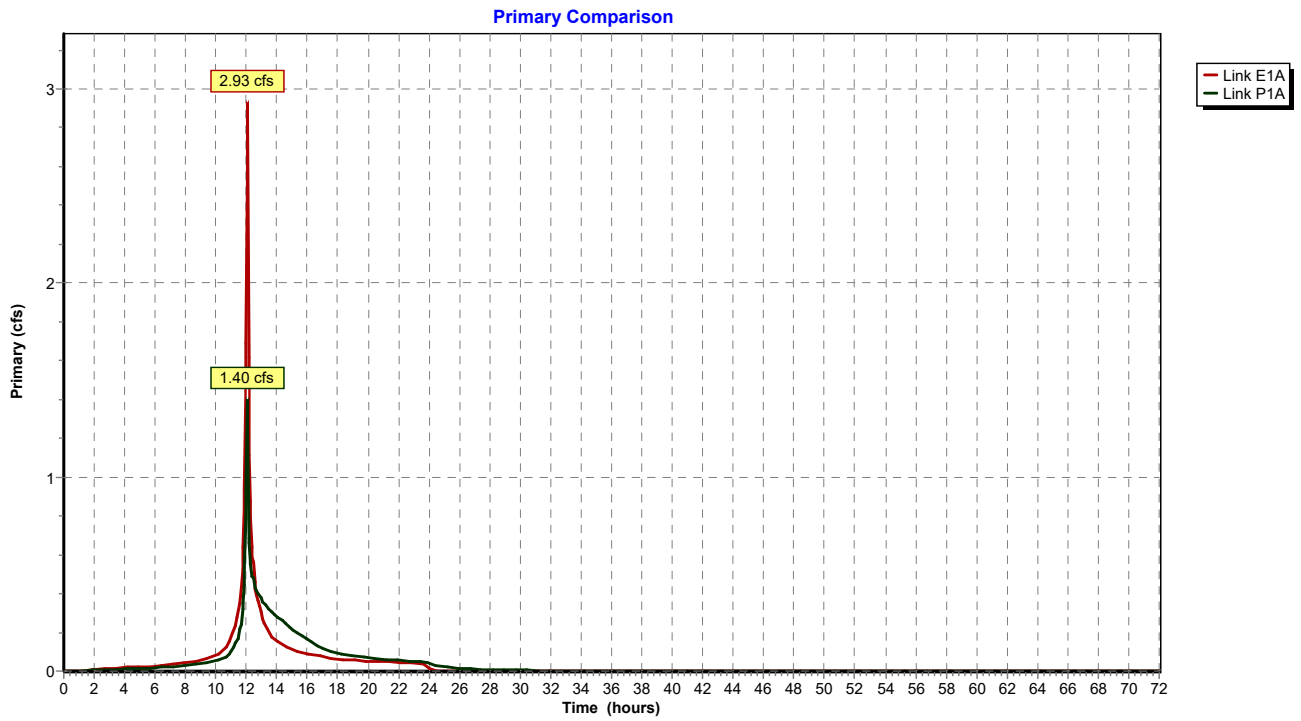
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Primary Comparison

Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)
0.00	0.00	0.00	26.00	0.00	0.01	52.00	0.00	0.00
0.50	0.00	0.00	26.50	0.00	0.01	52.50	0.00	0.00
1.00	0.00	0.00	27.00	0.00	0.01	53.00	0.00	0.00
1.50	0.00	0.00	27.50	0.00	0.01	53.50	0.00	0.00
2.00	0.01	0.00	28.00	0.00	0.01	54.00	0.00	0.00
2.50	0.01	0.01	28.50	0.00	0.01	54.50	0.00	0.00
3.00	0.01	0.01	29.00	0.00	0.01	55.00	0.00	0.00
3.50	0.02	0.01	29.50	0.00	0.01	55.50	0.00	0.00
4.00	0.02	0.01	30.00	0.00	0.00	56.00	0.00	0.00
4.50	0.02	0.01	30.50	0.00	0.00	56.50	0.00	0.00
5.00	0.02	0.01	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.02	0.02	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.03	0.02	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.03	0.02	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.04	0.02	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.04	0.03	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.04	0.03	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.05	0.03	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.05	0.04	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.07	0.04	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.08	0.05	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.10	0.07	36.50	0.00	0.00	62.50	0.00	0.00
11.00	0.17	0.10	37.00	0.00	0.00	63.00	0.00	0.00
11.50	0.31	0.18	37.50	0.00	0.00	63.50	0.00	0.00
12.00	1.69	0.94	38.00	0.00	0.00	64.00	0.00	0.00
12.50	0.56	0.47	38.50	0.00	0.00	64.50	0.00	0.00
13.00	0.30	0.37	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.19	0.32	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.16	0.28	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.13	0.25	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.11	0.22	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.10	0.19	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.09	0.16	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.08	0.14	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.08	0.12	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.07	0.11	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.06	0.09	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.06	0.08	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.06	0.08	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.05	0.07	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.05	0.07	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.05	0.07	46.50	0.00	0.00			
21.00	0.05	0.06	47.00	0.00	0.00			
21.50	0.05	0.06	47.50	0.00	0.00			
22.00	0.05	0.06	48.00	0.00	0.00			
22.50	0.04	0.05	48.50	0.00	0.00			
23.00	0.04	0.05	49.00	0.00	0.00			
23.50	0.04	0.05	49.50	0.00	0.00			
24.00	0.04	0.04	50.00	0.00	0.00			
24.50	0.00	0.03	50.50	0.00	0.00			
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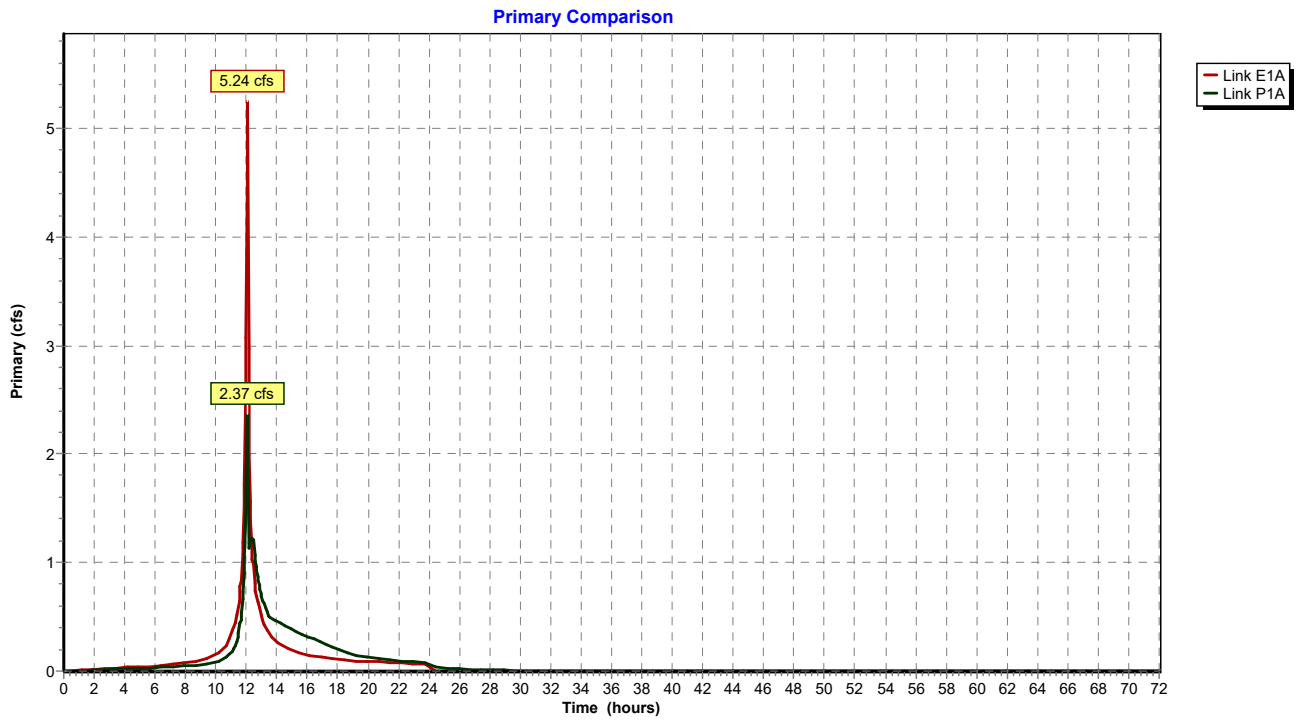
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NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

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Primary Comparison

Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)
0.00	0.00	0.00	26.00	0.00	0.02	52.00	0.00	0.00
0.50	0.00	0.00	26.50	0.00	0.02	52.50	0.00	0.00
1.00	0.01	0.00	27.00	0.00	0.01	53.00	0.00	0.00
1.50	0.01	0.01	27.50	0.00	0.01	53.50	0.00	0.00
2.00	0.02	0.01	28.00	0.00	0.01	54.00	0.00	0.00
2.50	0.02	0.02	28.50	0.00	0.01	54.50	0.00	0.00
3.00	0.03	0.02	29.00	0.00	0.01	55.00	0.00	0.00
3.50	0.03	0.02	29.50	0.00	0.01	55.50	0.00	0.00
4.00	0.04	0.02	30.00	0.00	0.01	56.00	0.00	0.00
4.50	0.04	0.02	30.50	0.00	0.01	56.50	0.00	0.00
5.00	0.04	0.03	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.04	0.03	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.05	0.03	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.05	0.03	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.06	0.04	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.07	0.04	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.07	0.05	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.08	0.05	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.09	0.06	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.13	0.07	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.16	0.09	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.20	0.11	36.50	0.00	0.00	62.50	0.00	0.00
11.00	0.33	0.17	37.00	0.00	0.00	63.00	0.00	0.00
11.50	0.58	0.35	37.50	0.00	0.00	63.50	0.00	0.00
12.00	3.07	1.69	38.00	0.00	0.00	64.00	0.00	0.00
12.50	0.97	1.17	38.50	0.00	0.00	64.50	0.00	0.00
13.00	0.52	0.69	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.34	0.50	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.27	0.46	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.23	0.42	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.18	0.38	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.17	0.35	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.15	0.32	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.14	0.29	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.13	0.26	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.12	0.23	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.10	0.20	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.10	0.18	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.10	0.15	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.09	0.14	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.09	0.12	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.09	0.11	46.50	0.00	0.00			
21.00	0.08	0.11	47.00	0.00	0.00			
21.50	0.08	0.10	47.50	0.00	0.00			
22.00	0.08	0.09	48.00	0.00	0.00			
22.50	0.07	0.09	48.50	0.00	0.00			
23.00	0.07	0.09	49.00	0.00	0.00			
23.50	0.07	0.08	49.50	0.00	0.00			
24.00	0.06	0.07	50.00	0.00	0.00			
24.50	0.00	0.04	50.50	0.00	0.00			
25.00	0.00	0.03	51.00	0.00	0.00			
25.50	0.00	0.02	51.50	0.00	0.00			

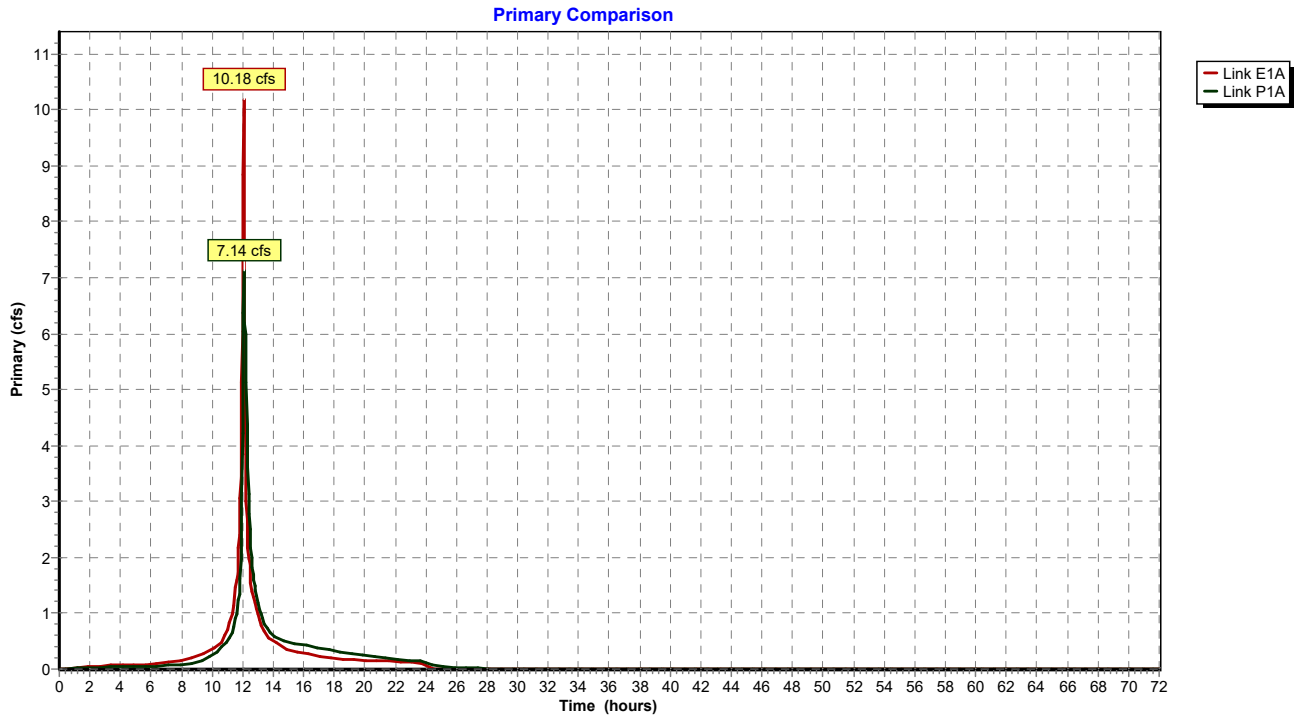
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NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

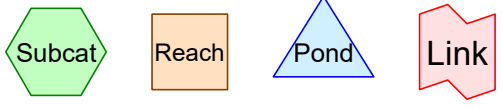
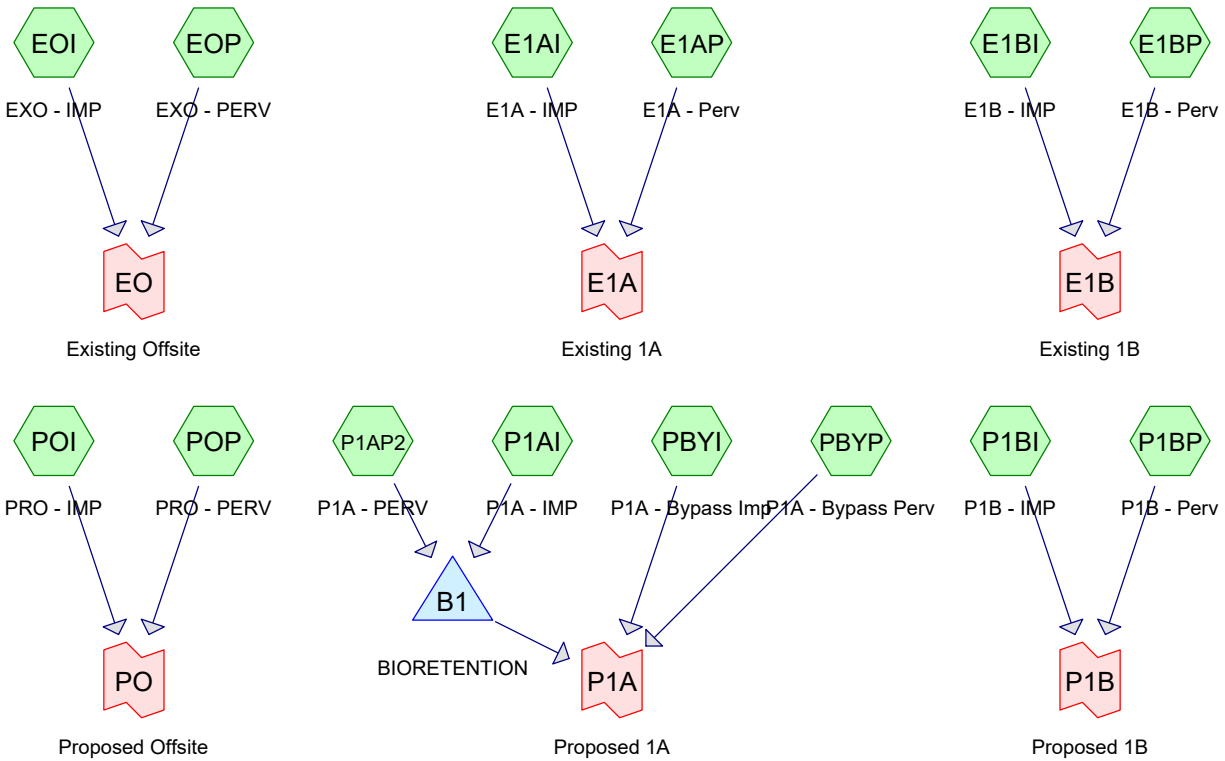
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Primary Comparison

Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)
0.00	0.00	0.00	26.00	0.00	0.03	52.00	0.00	0.00
0.50	0.00	0.00	26.50	0.00	0.02	52.50	0.00	0.00
1.00	0.02	0.02	27.00	0.00	0.02	53.00	0.00	0.00
1.50	0.04	0.02	27.50	0.00	0.02	53.50	0.00	0.00
2.00	0.05	0.03	28.00	0.00	0.01	54.00	0.00	0.00
2.50	0.05	0.03	28.50	0.00	0.01	54.50	0.00	0.00
3.00	0.06	0.04	29.00	0.00	0.01	55.00	0.00	0.00
3.50	0.07	0.04	29.50	0.00	0.01	55.50	0.00	0.00
4.00	0.07	0.04	30.00	0.00	0.01	56.00	0.00	0.00
4.50	0.07	0.05	30.50	0.00	0.01	56.50	0.00	0.00
5.00	0.08	0.05	31.00	0.00	0.01	57.00	0.00	0.00
5.50	0.08	0.05	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.09	0.06	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.10	0.06	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.12	0.07	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.14	0.08	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.17	0.09	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.19	0.10	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.21	0.12	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.28	0.18	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.35	0.26	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.43	0.35	36.50	0.00	0.00	62.50	0.00	0.00
11.00	0.69	0.51	37.00	0.00	0.00	63.00	0.00	0.00
11.50	1.19	0.79	37.50	0.00	0.00	63.50	0.00	0.00
12.00	6.05	4.22	38.00	0.00	0.00	64.00	0.00	0.00
12.50	1.84	2.49	38.50	0.00	0.00	64.50	0.00	0.00
13.00	0.97	1.21	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.63	0.79	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.51	0.60	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.42	0.52	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.34	0.48	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.31	0.46	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.28	0.43	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.26	0.41	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.24	0.38	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.21	0.36	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.19	0.33	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.18	0.30	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.18	0.28	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.17	0.26	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.16	0.24	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.16	0.22	46.50	0.00	0.00			
21.00	0.15	0.21	47.00	0.00	0.00			
21.50	0.15	0.19	47.50	0.00	0.00			
22.00	0.14	0.18	48.00	0.00	0.00			
22.50	0.13	0.17	48.50	0.00	0.00			
23.00	0.13	0.16	49.00	0.00	0.00			
23.50	0.12	0.15	49.50	0.00	0.00			
24.00	0.11	0.13	50.00	0.00	0.00			
24.50	0.00	0.07	50.50	0.00	0.00			
25.00	0.00	0.05	51.00	0.00	0.00			
25.50	0.00	0.04	51.50	0.00	0.00			

B. PRE- vs. POST-DEVELOPMENT HYDROGRAPHS - Future Adjusted Precipitation Depths

- ◆ **2-Year Storm Event**
- ◆ **10-Year Storm Event**
- ◆ **100-Year Storm Event**
- ◆ **Pre- vs. Post Comparison**



Routing Diagram for EX-PR
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EX-PR

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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1AI: E1A - IMP	Runoff Area=0.560 ac 100.00% Impervious Runoff Depth=3.78" Flow Length=372' Tc=2.0 min CN=98 Runoff=2.38 cfs 0.176 af
SubcatchmentE1AP: E1A - Perv	Runoff Area=0.680 ac 0.00% Impervious Runoff Depth=1.60" Flow Length=409' Tc=3.3 min CN=74 Runoff=1.38 cfs 0.091 af
SubcatchmentE1BI: E1B - IMP	Runoff Area=1.413 ac 100.00% Impervious Runoff Depth=3.78" Flow Length=411' Tc=1.7 min CN=98 Runoff=5.88 cfs 0.445 af
SubcatchmentE1BP: E1B - Perv	Runoff Area=0.943 ac 0.00% Impervious Runoff Depth=1.67" Flow Length=690' Tc=7.2 min CN=75 Runoff=1.73 cfs 0.132 af
SubcatchmentEOI: EXO - IMP	Runoff Area=0.022 ac 100.00% Impervious Runoff Depth=3.78" Flow Length=107' Tc=0.7 min CN=98 Runoff=0.09 cfs 0.007 af
SubcatchmentEOP: EXO - PERV	Runoff Area=0.336 ac 0.00% Impervious Runoff Depth=1.75" Flow Length=138' Tc=2.2 min CN=76 Runoff=0.78 cfs 0.049 af
SubcatchmentP1AI: P1A - IMP	Runoff Area=0.259 ac 100.00% Impervious Runoff Depth=3.78" Flow Length=262' Tc=0.9 min CN=98 Runoff=1.09 cfs 0.081 af
SubcatchmentP1AP2: P1A - PERV	Runoff Area=0.617 ac 0.00% Impervious Runoff Depth=2.05" Flow Length=116' Tc=6.5 min CN=80 Runoff=1.42 cfs 0.105 af
SubcatchmentP1BI: P1B - IMP	Runoff Area=1.461 ac 0.00% Impervious Runoff Depth=2.05" Flow Length=388' Tc=1.4 min CN=80 Runoff=3.89 cfs 0.250 af
SubcatchmentP1BP: P1B - Perv	Runoff Area=0.876 ac 0.00% Impervious Runoff Depth=2.05" Flow Length=711' Tc=7.2 min CN=80 Runoff=1.98 cfs 0.150 af
SubcatchmentPBYI: P1A - Bypass Imp	Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=3.78" Flow Length=262' Tc=0.9 min CN=98 Runoff=1.52 cfs 0.114 af
SubcatchmentPBYP: P1A - Bypass Perv	Runoff Area=0.045 ac 0.00% Impervious Runoff Depth=1.67" Flow Length=116' Tc=6.5 min CN=75 Runoff=0.08 cfs 0.006 af
SubcatchmentPOI: PRO - IMP	Runoff Area=0.047 ac 100.00% Impervious Runoff Depth=3.78" Flow Length=99' Tc=0.8 min CN=98 Runoff=0.20 cfs 0.015 af
SubcatchmentPOP: PRO - PERV	Runoff Area=0.287 ac 0.00% Impervious Runoff Depth=1.75" Flow Length=122' Tc=3.1 min CN=76 Runoff=0.64 cfs 0.042 af
Pond B1: BIORETENTION	Peak Elev=133.19' Storage=4,129 cf Inflow=2.21 cfs 0.187 af Outflow=0.33 cfs 0.155 af
Link E1A: Existing 1A	Inflow=3.73 cfs 0.267 af Primary=3.73 cfs 0.267 af

EX-PR

NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Link E1B: Existing 1B

Inflow=7.32 cfs 0.576 af
Primary=7.32 cfs 0.576 af

Link EO: Existing Offsite

Inflow=0.86 cfs 0.056 af
Primary=0.86 cfs 0.056 af

Link P1A: Proposed 1A

Inflow=1.77 cfs 0.275 af
Primary=1.77 cfs 0.275 af

Link P1B: Proposed 1B

Inflow=5.52 cfs 0.399 af
Primary=5.52 cfs 0.399 af

Link PO: Proposed Offsite

Inflow=0.82 cfs 0.057 af
Primary=0.82 cfs 0.057 af

Total Runoff Area = 7.908 ac Runoff Volume = 1.662 af Average Runoff Depth = 2.52"
66.33% Pervious = 5.245 ac 33.67% Impervious = 2.663 ac

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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment E1A: E1A - IMP

Runoff = 2.38 cfs @ 12.08 hrs, Volume= 0.176 af, Depth= 3.78"

Routed to Link E1A : Existing 1A

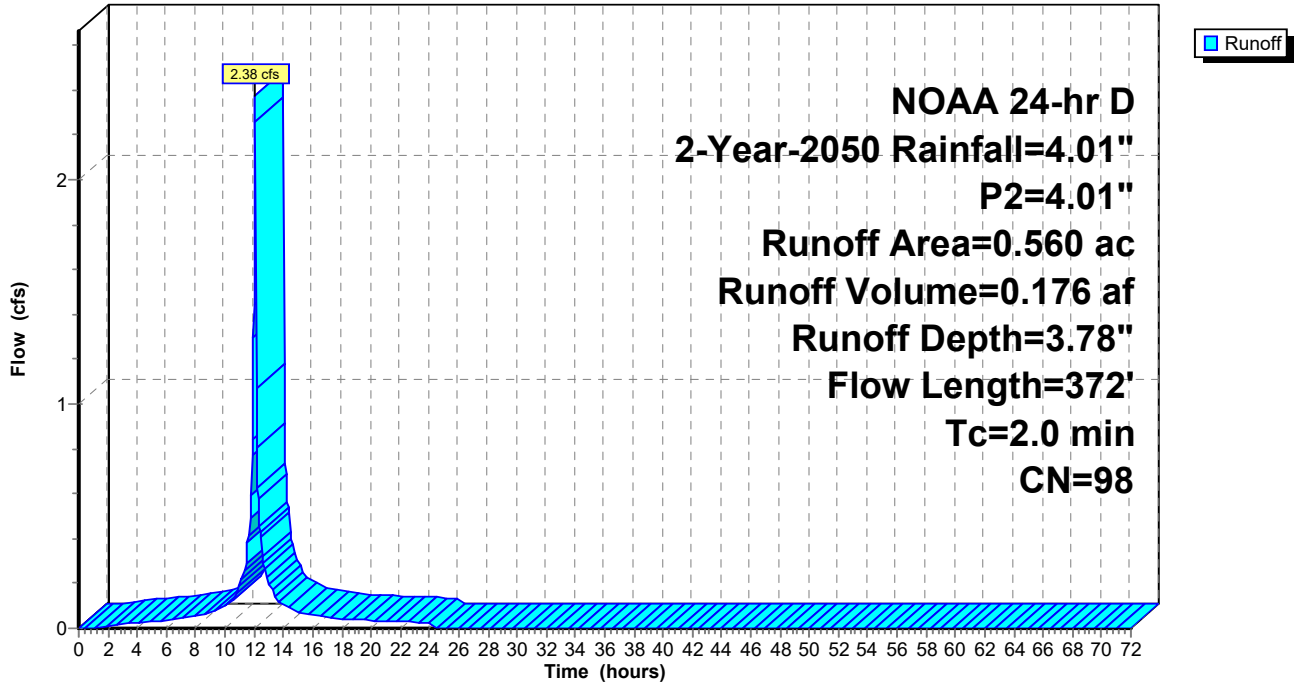
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.560	98	Paved parking, HSG D
0.560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	41	0.0060	0.80		Sheet Flow, H-I Smooth surfaces n= 0.011 P2= 4.01"
0.0	10	0.0300	3.52		Shallow Concentrated Flow, I-C Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
2.0	372	Total			

Subcatchment E1AI: E1A - IMP

Hydrograph



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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment E1AP: E1A - Perv

Runoff = 1.38 cfs @ 12.10 hrs, Volume= 0.091 af, Depth= 1.60"

Routed to Link E1A : Existing 1A

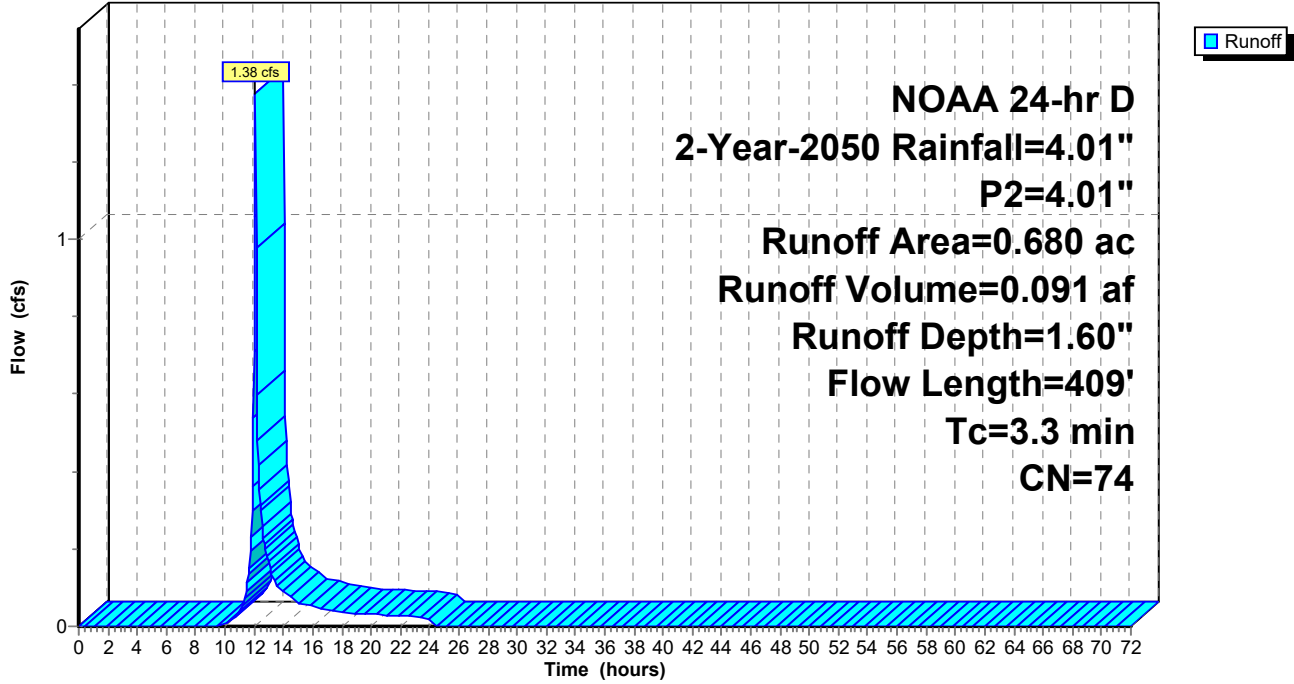
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.676	74	>75% Grass cover, Good, HSG C
0.004	80	>75% Grass cover, Good, HSG D
0.680	74	Weighted Average
0.680		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	35	0.1500	0.35		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.5	53	0.0090	1.93		Shallow Concentrated Flow, B-C
					Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F
					Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
3.3	409	Total			

Subcatchment E1AP: E1A - Perv

Hydrograph



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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment E1BI: E1B - IMP

Runoff = 5.88 cfs @ 12.07 hrs, Volume= 0.445 af, Depth= 3.78"

Routed to Link E1B : Existing 1B

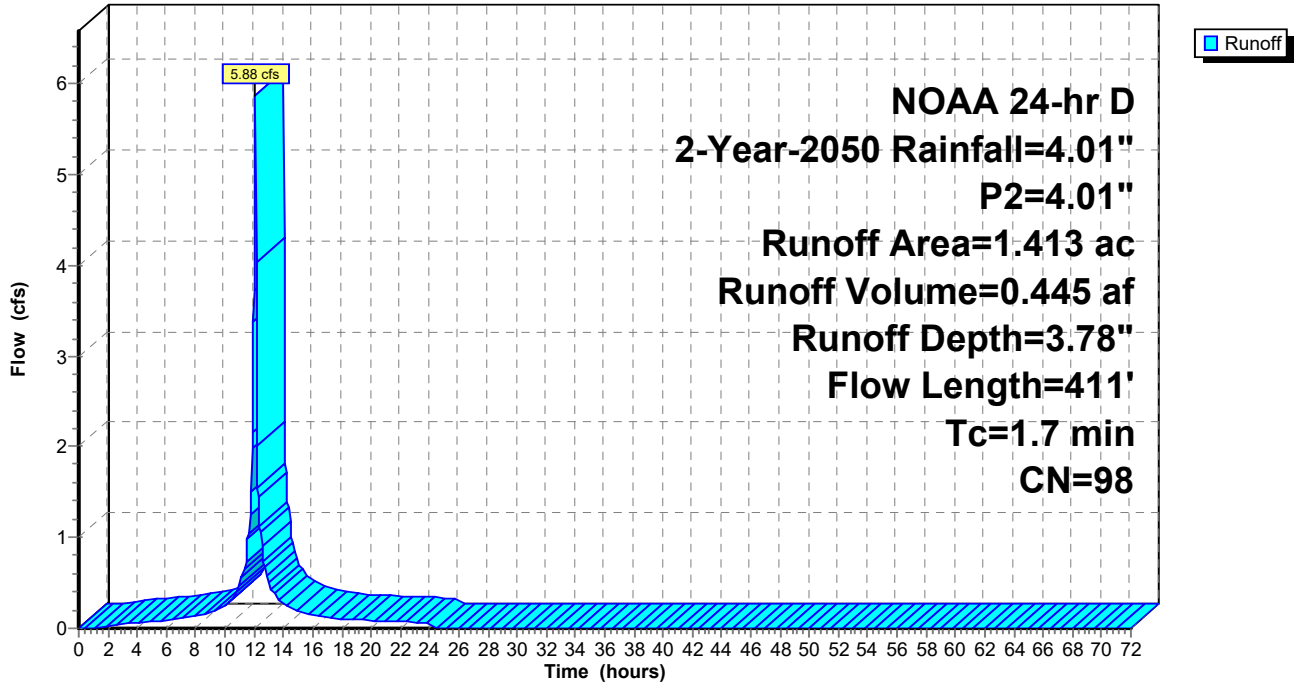
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
1.413	98	Paved parking, HSG D
1.413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.7	411	Total			

Subcatchment E1BI: E1B - IMP

Hydrograph



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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment E1BP: E1B - Perv

Runoff = 1.73 cfs @ 12.15 hrs, Volume= 0.132 af, Depth= 1.67"

Routed to Link E1B : Existing 1B

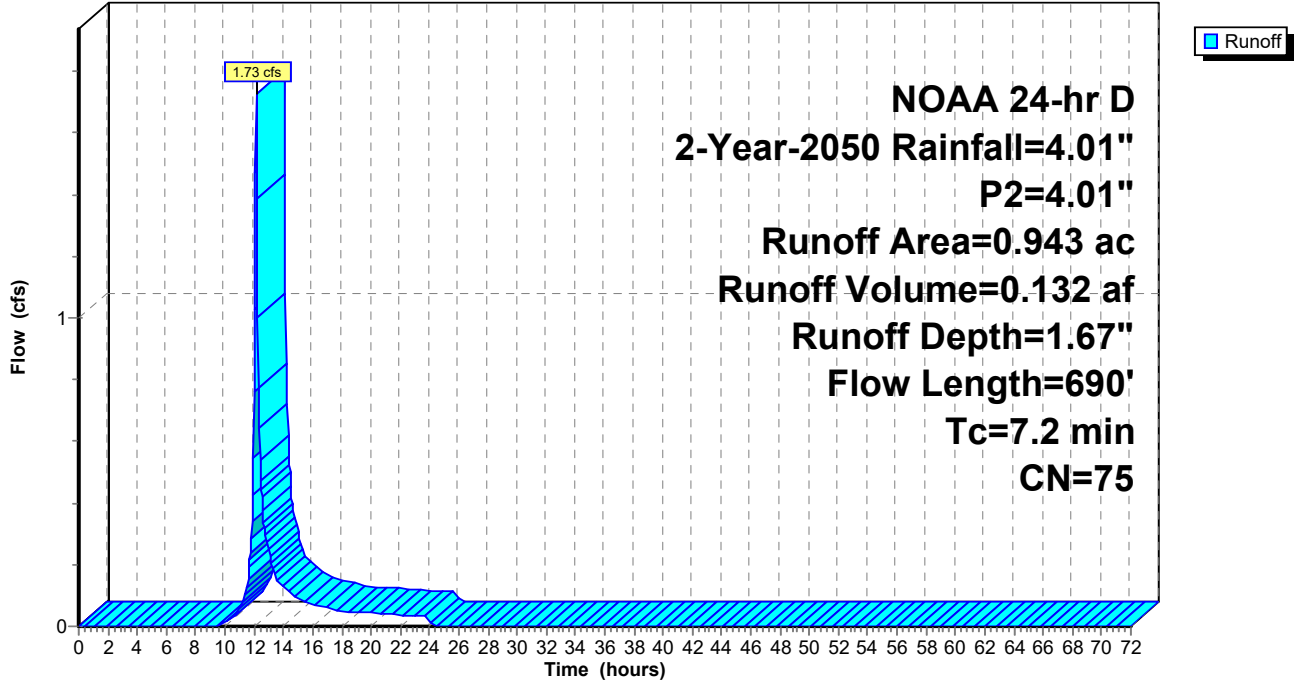
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.805	74	>75% Grass cover, Good, HSG C
0.138	80	>75% Grass cover, Good, HSG D
0.943	75	Weighted Average
0.943		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.0900	0.35		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.5	125	0.0700	4.26		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.2	54	0.0850	4.69		Shallow Concentrated Flow, C-K Unpaved Kv= 16.1 fps
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
7.2	690	Total			

Subcatchment E1BP: E1B - Perv

Hydrograph



Summary for Subcatchment EOI: EXO - IMP

Runoff = 0.09 cfs @ 12.06 hrs, Volume= 0.007 af, Depth= 3.78"

Routed to Link EO : Existing Offsite

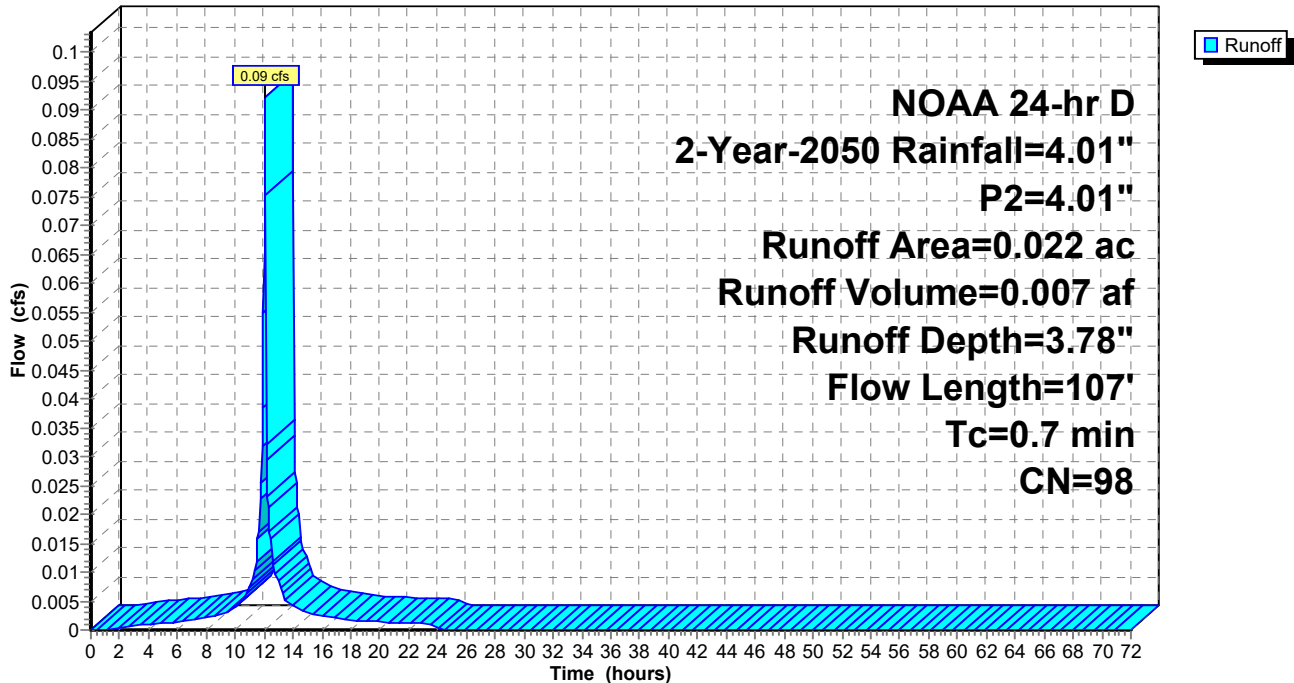
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.022	98	Paved parking, HSG D
0.022		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.7	107	Total			

Subcatchment EOI: EXO - IMP

Hydrograph



Summary for Subcatchment EOP: EXO - PERV

Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.049 af, Depth= 1.75"

Routed to Link EO : Existing Offsite

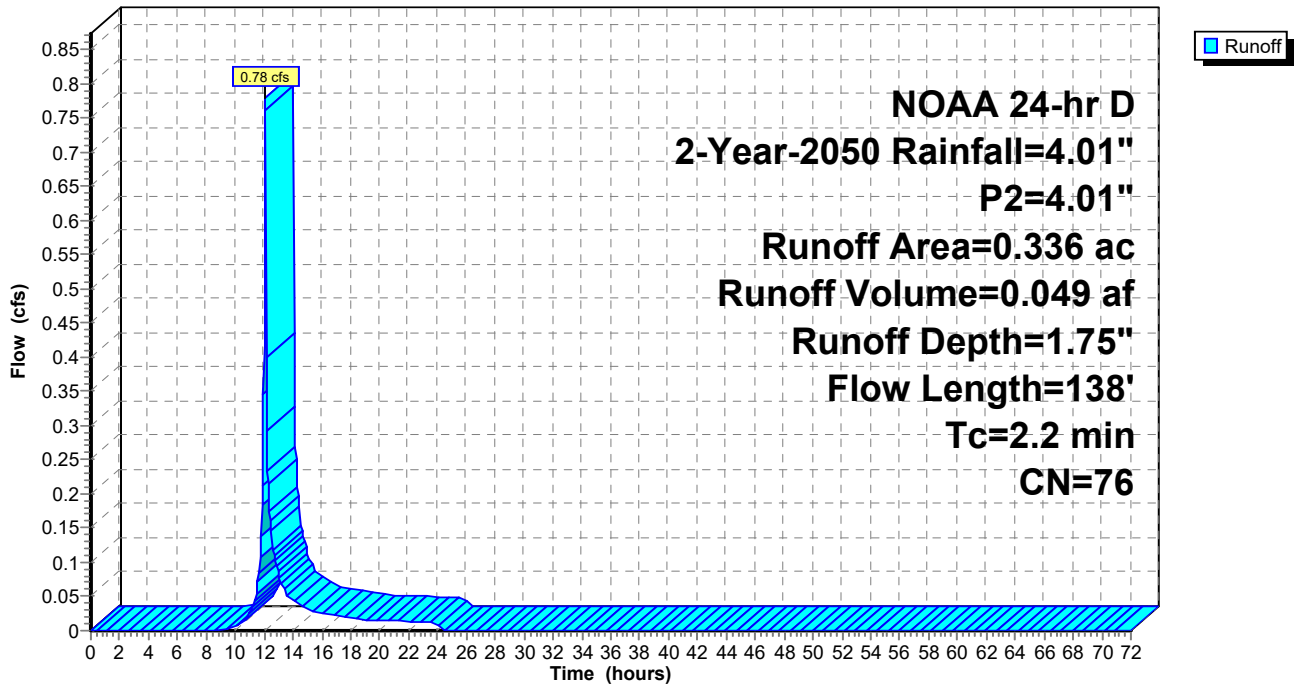
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.248	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.336	76	Weighted Average
0.336		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	31	0.1700	0.35		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
2.2	138	Total			

Subcatchment EOP: EXO - PERV

Hydrograph



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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment P1AI: P1A - IMP

Runoff = 1.09 cfs @ 12.06 hrs, Volume= 0.081 af, Depth= 3.78"
Routed to Pond B1 : BIORETENTION

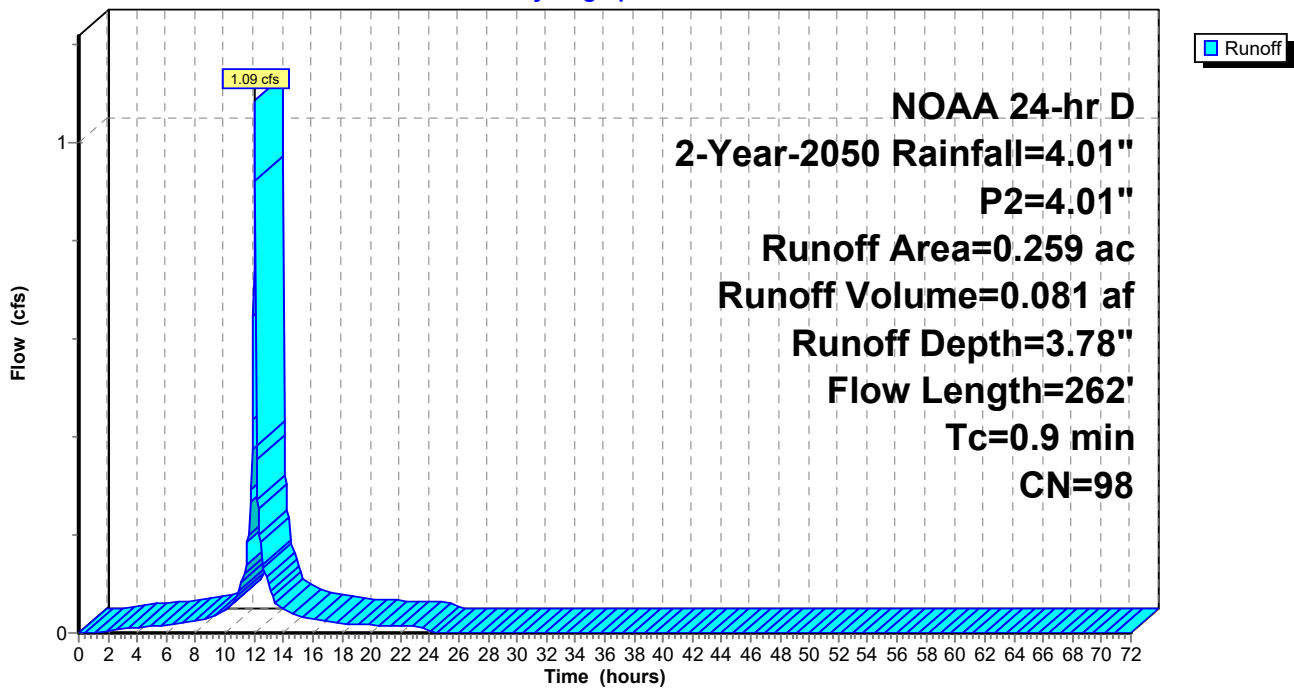
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.259	98	Paved parking, HSG D
0.259		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment P1AI: P1A - IMP

Hydrograph



Summary for Subcatchment P1AP2: P1A - PERV

Runoff = 1.42 cfs @ 12.14 hrs, Volume= 0.105 af, Depth= 2.05"
 Routed to Pond B1 : BIORETENTION

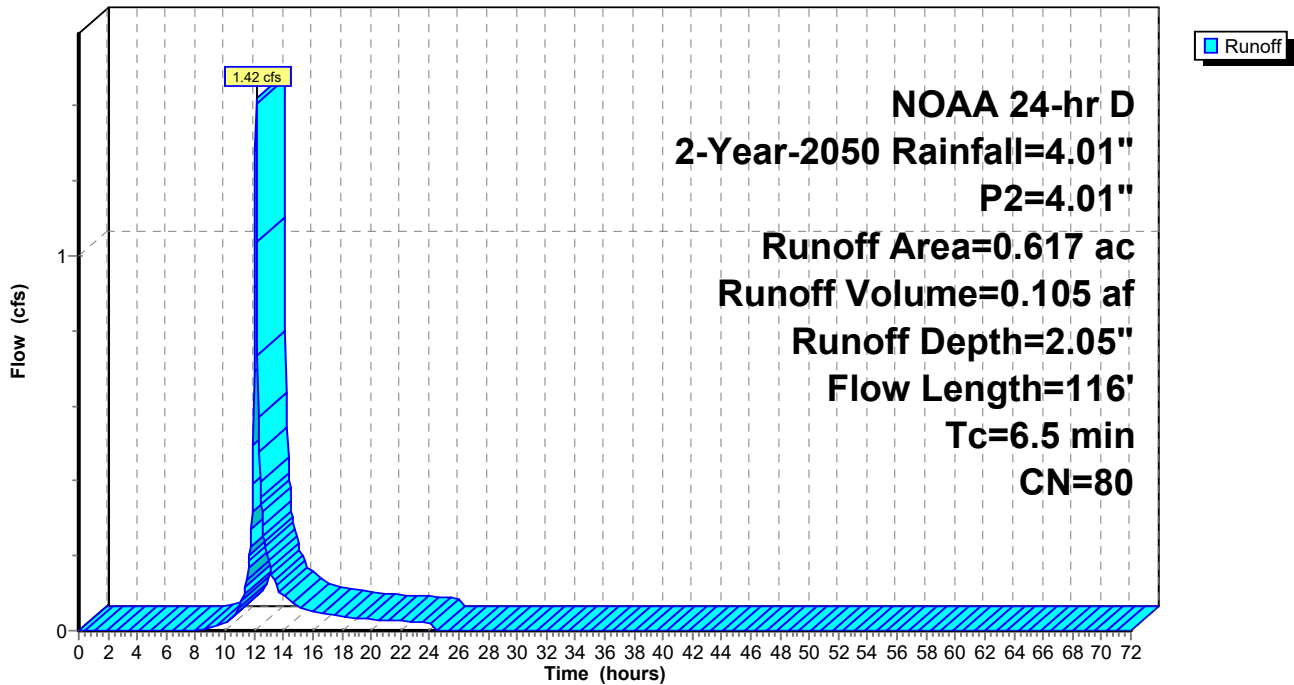
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.617	80	>75% Grass cover, Good, HSG D
0.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	61	0.0320	0.21		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.9	22	0.3200	0.43		Sheet Flow, B-C Grass: Short n= 0.150 P2= 4.01"
0.7	17	0.3000	0.39		Sheet Flow, C-D Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
6.5	116	Total			

Subcatchment P1AP2: P1A - PERV

Hydrograph



EX-PR

Prepared by Bohler

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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment P1BI: P1B - IMP

Runoff = 3.89 cfs @ 12.07 hrs, Volume= 0.250 af, Depth= 2.05"
 Routed to Link P1B : Proposed 1B

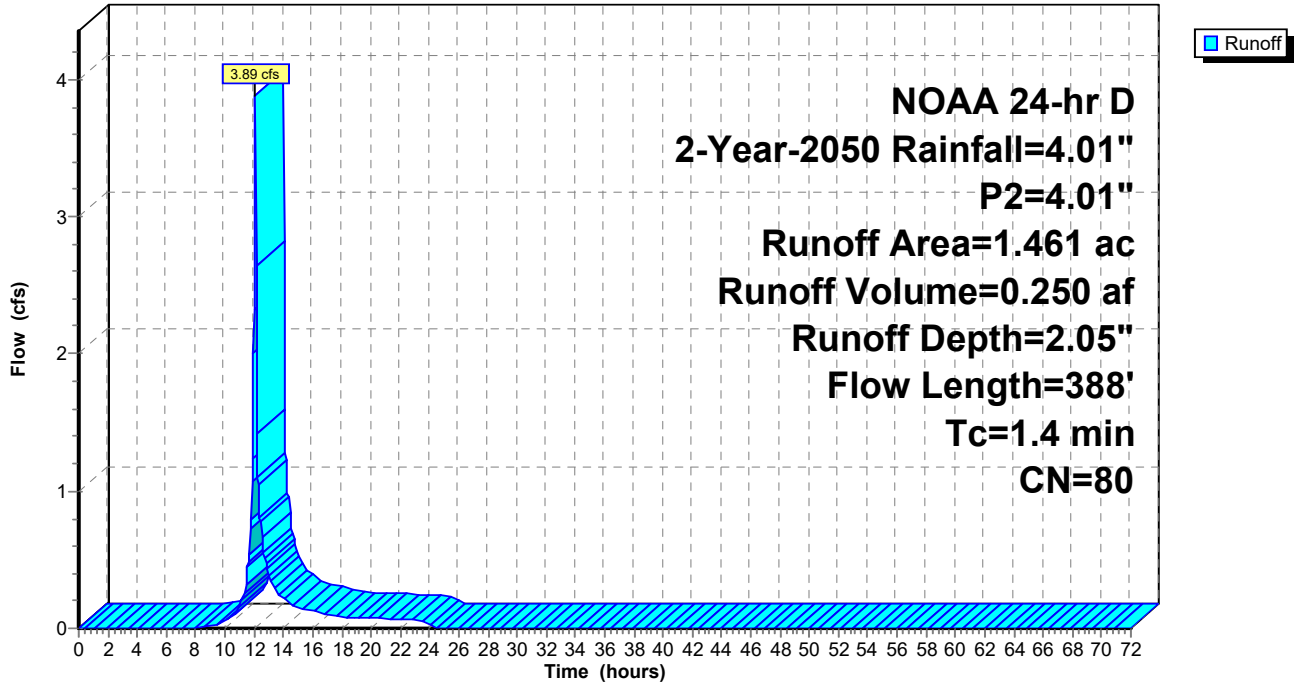
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
1.461	80	>75% Grass cover, Good, HSG D
1.461		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.4	388	Total			

Subcatchment P1BI: P1B - IMP

Hydrograph



EX-PR

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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment P1BP: P1B - Perv

Runoff = 1.98 cfs @ 12.14 hrs, Volume= 0.150 af, Depth= 2.05"
 Routed to Link P1B : Proposed 1B

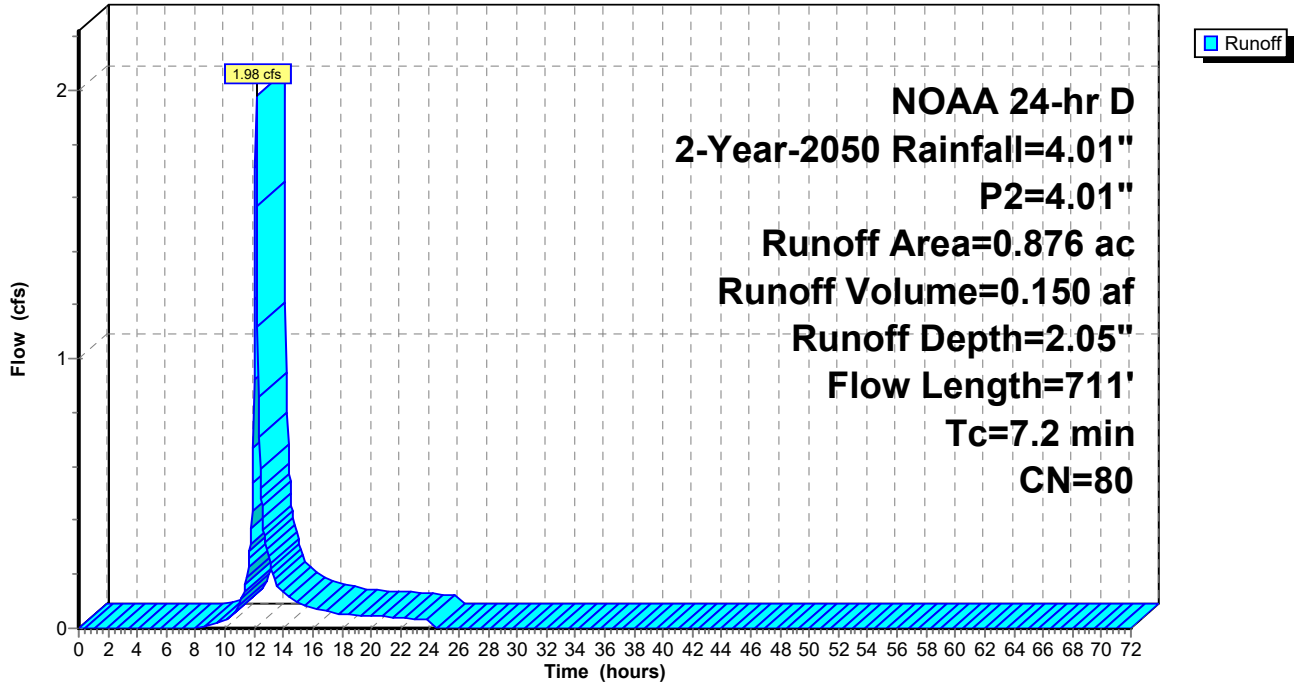
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.750	80	>75% Grass cover, Good, HSG D
0.126	80	>75% Grass cover, Good, HSG D
0.876	80	Weighted Average
0.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.0900	0.35		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.5	127	0.0700	4.26		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
0.2	55	0.0800	4.55		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.2	31	0.0300	2.79		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	10	0.0150	2.49		Shallow Concentrated Flow, E-F
					Paved Kv= 20.3 fps
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H
					Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I
					Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K
					Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
7.2	711	Total			

Subcatchment P1BP: P1B - Perv

Hydrograph



EX-PR

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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment PBYI: P1A - Bypass Imp

Runoff = 1.52 cfs @ 12.06 hrs, Volume= 0.114 af, Depth= 3.78"
 Routed to Link P1A : Proposed 1A

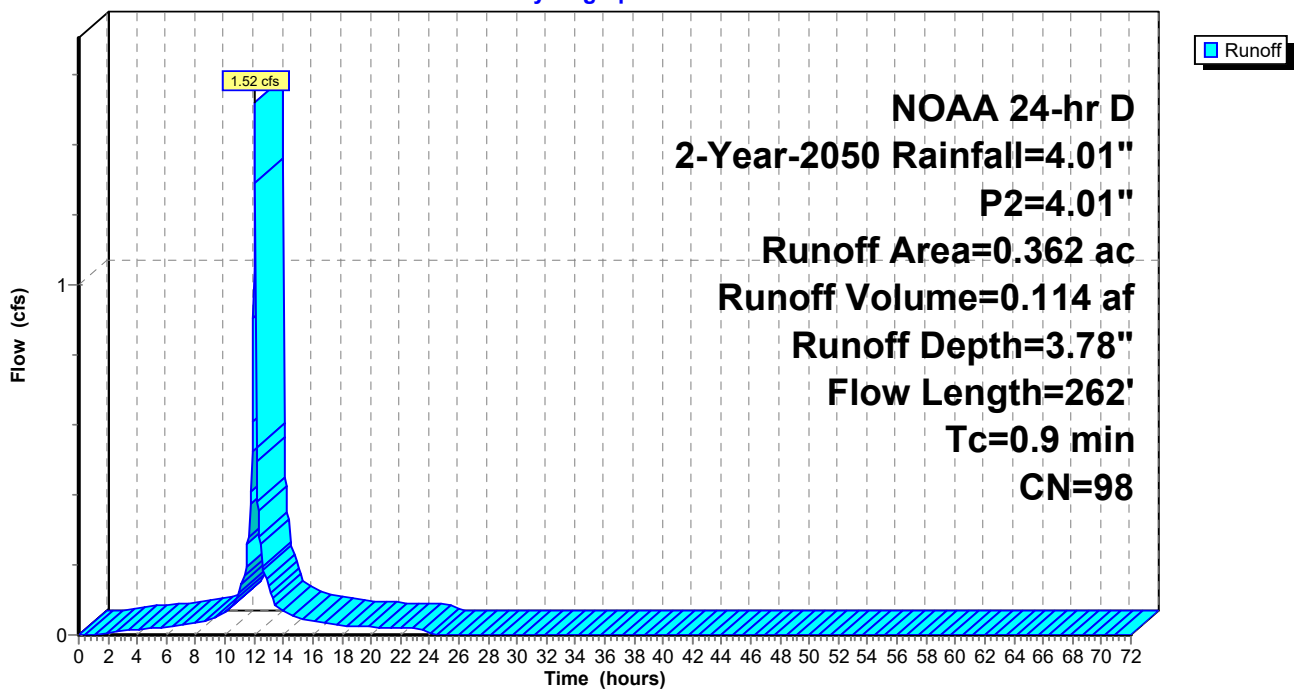
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.362	98	Paved parking, HSG D
0.362		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment PBYI: P1A - Bypass Imp

Hydrograph



EX-PR

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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment PBYP: P1A - Bypass Perv

Runoff = 0.08 cfs @ 12.14 hrs, Volume= 0.006 af, Depth= 1.67"
 Routed to Link P1A : Proposed 1A

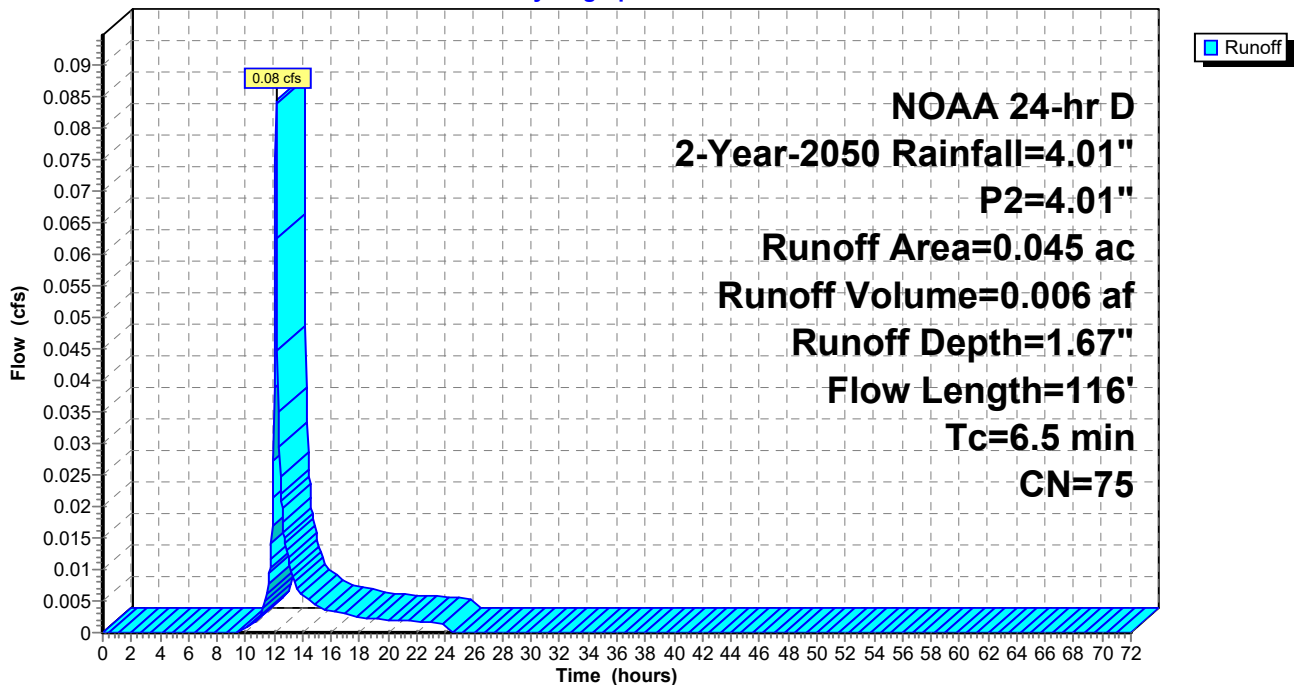
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.039	74	>75% Grass cover, Good, HSG C
0.006	80	>75% Grass cover, Good, HSG D
0.045	75	Weighted Average
0.045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	61	0.0320	0.21		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.9	22	0.3200	0.43		Sheet Flow, B-C Grass: Short n= 0.150 P2= 4.01"
0.7	17	0.3000	0.39		Sheet Flow, C-D Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
6.5	116	Total			

Subcatchment PBYP: P1A - Bypass Perv

Hydrograph



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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment POI: PRO - IMP

Runoff = 0.20 cfs @ 12.06 hrs, Volume= 0.015 af, Depth= 3.78"

Routed to Link PO : Proposed Offsite

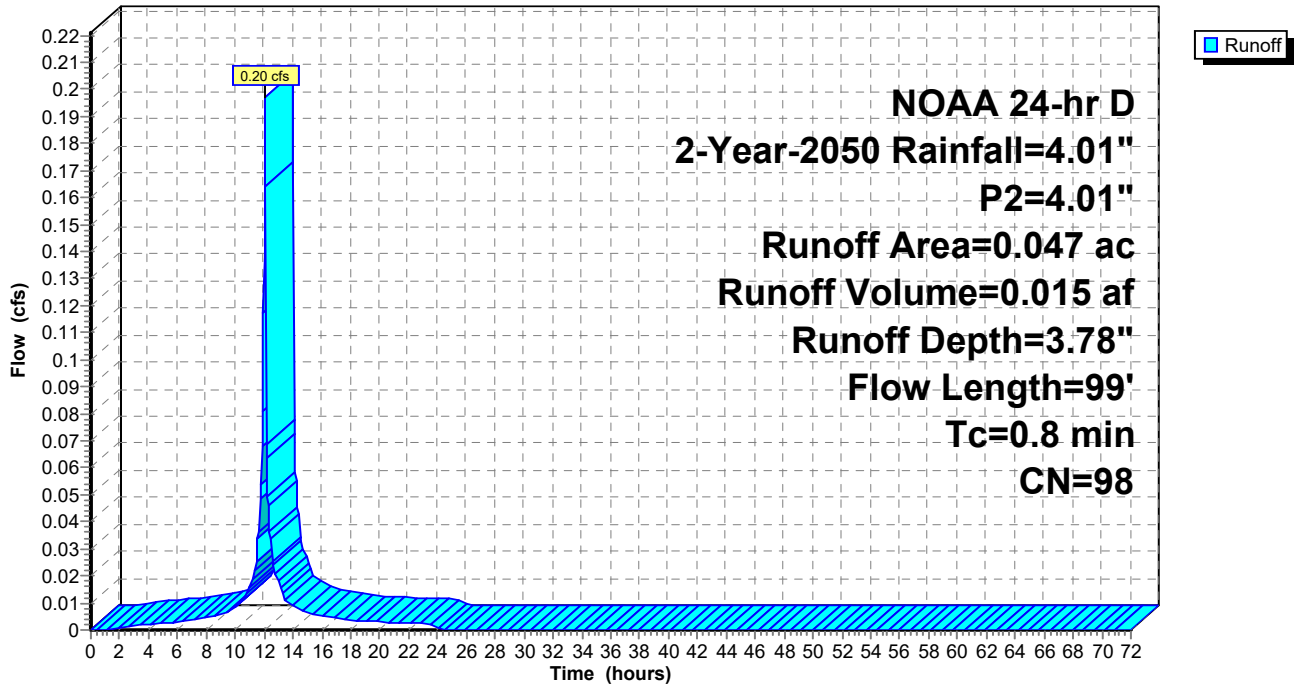
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.047	98	Paved parking, HSG D
0.047		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	1.08		Sheet Flow, D-B Smooth surfaces n= 0.011 P2= 4.01"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.8	99	Total			

Subcatchment POI: PRO - IMP

Hydrograph



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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Summary for Subcatchment POP: PRO - PERV

Runoff = 0.64 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 1.75"

Routed to Link PO : Proposed Offsite

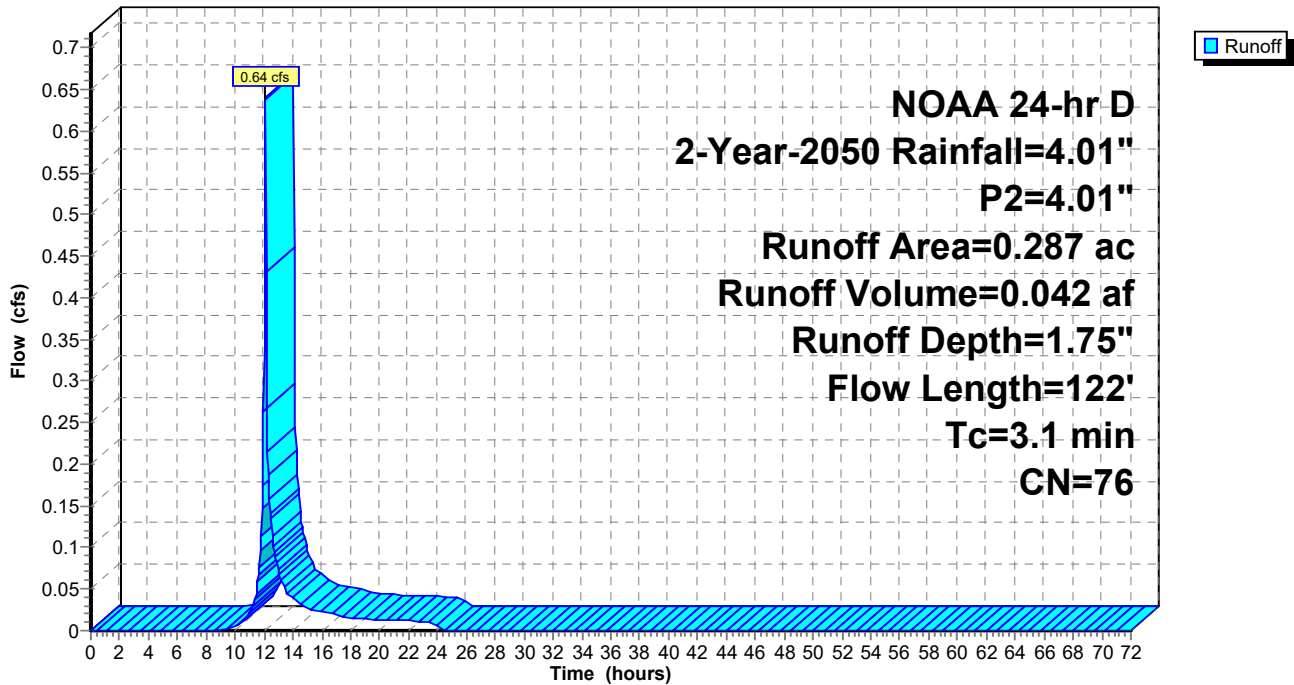
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.199	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.287	76	Weighted Average
0.287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	53	0.0950	0.31		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
3.1	122	Total			

Subcatchment POP: PRO - PERV

Hydrograph



Summary for Pond B1: BIORETENTION

Inflow Area = 0.876 ac, 29.57% Impervious, Inflow Depth = 2.56" for 2-Year-2050 event
 Inflow = 2.21 cfs @ 12.09 hrs, Volume= 0.187 af
 Outflow = 0.33 cfs @ 12.83 hrs, Volume= 0.155 af, Atten= 85%, Lag= 44.3 min
 Primary = 0.33 cfs @ 12.83 hrs, Volume= 0.155 af
 Routed to Link P1A : Proposed 1A

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 133.19' @ 12.83 hrs Surf.Area= 3,738 sf Storage= 4,129 cf

Plug-Flow detention time= 278.0 min calculated for 0.155 af (83% of inflow)
 Center-of-Mass det. time= 200.1 min (1,001.6 - 801.5)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	11,644 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	3,229	0	0
133.00	3,656	3,443	3,443
134.00	4,097	3,877	7,319
135.00	4,552	4,325	11,644

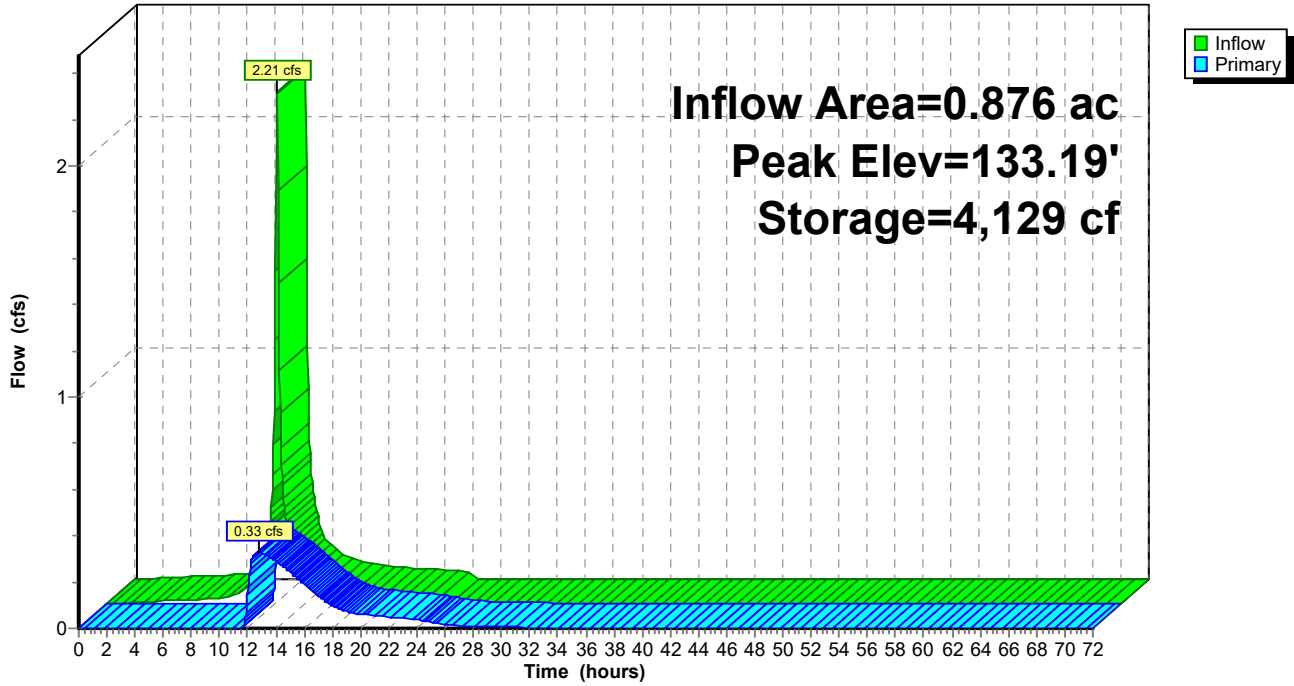
Device	Routing	Invert	Outlet Devices
#1	Primary	130.25'	18.0" Round Culvert L= 157.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.25' / 126.50' S= 0.0239 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	132.42'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.40'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.33 cfs @ 12.83 hrs HW=133.19' (Free Discharge)

- 1=Culvert (Passes 0.33 cfs of 9.93 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.33 cfs @ 3.73 fps)
- 3=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond B1: BIORETENTION

Hydrograph



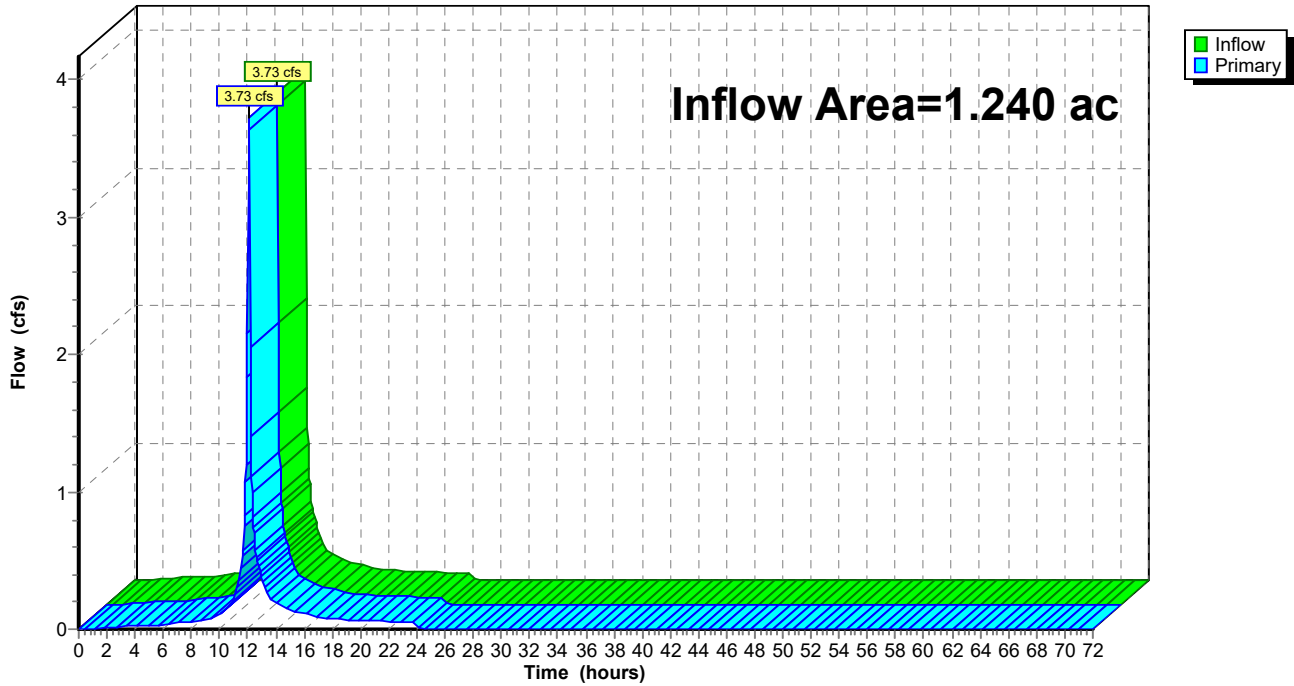
Summary for Link E1A: Existing 1A

Inflow Area = 1.240 ac, 45.16% Impervious, Inflow Depth = 2.58" for 2-Year-2050 event
Inflow = 3.73 cfs @ 12.08 hrs, Volume= 0.267 af
Primary = 3.73 cfs @ 12.08 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1A: Existing 1A

Hydrograph



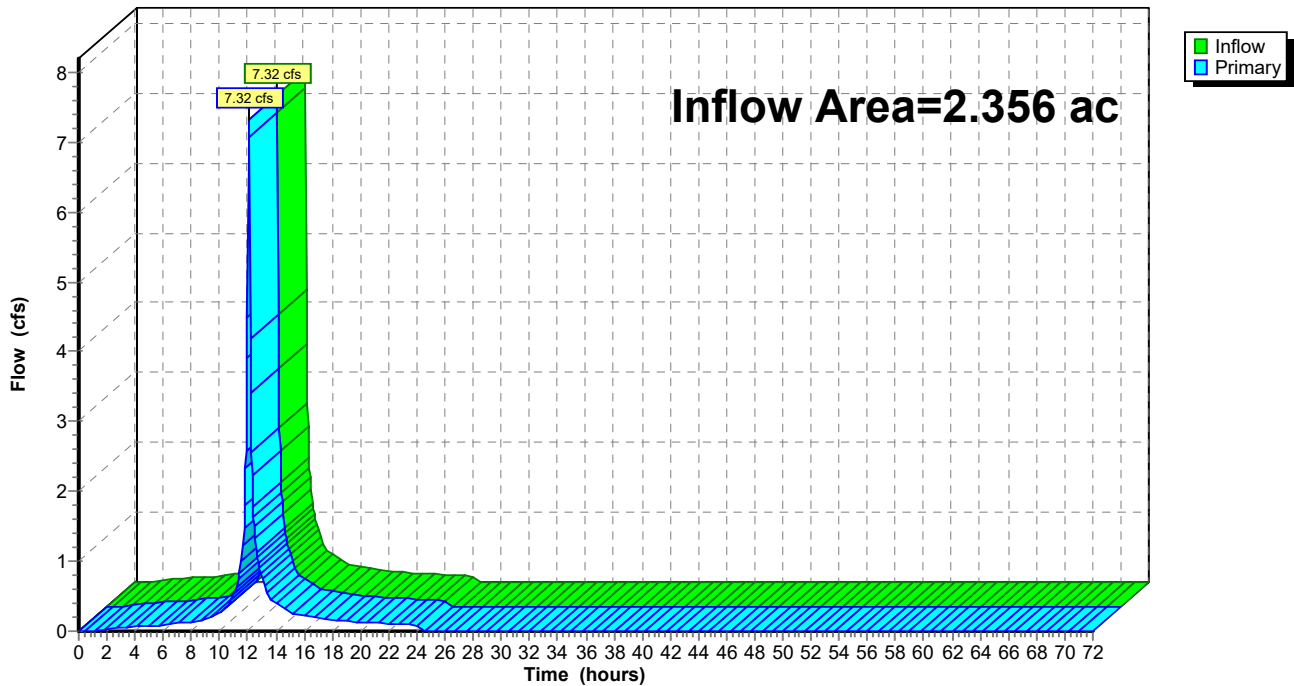
Summary for Link E1B: Existing 1B

Inflow Area = 2.356 ac, 59.97% Impervious, Inflow Depth = 2.93" for 2-Year-2050 event
Inflow = 7.32 cfs @ 12.08 hrs, Volume= 0.576 af
Primary = 7.32 cfs @ 12.08 hrs, Volume= 0.576 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1B: Existing 1B

Hydrograph



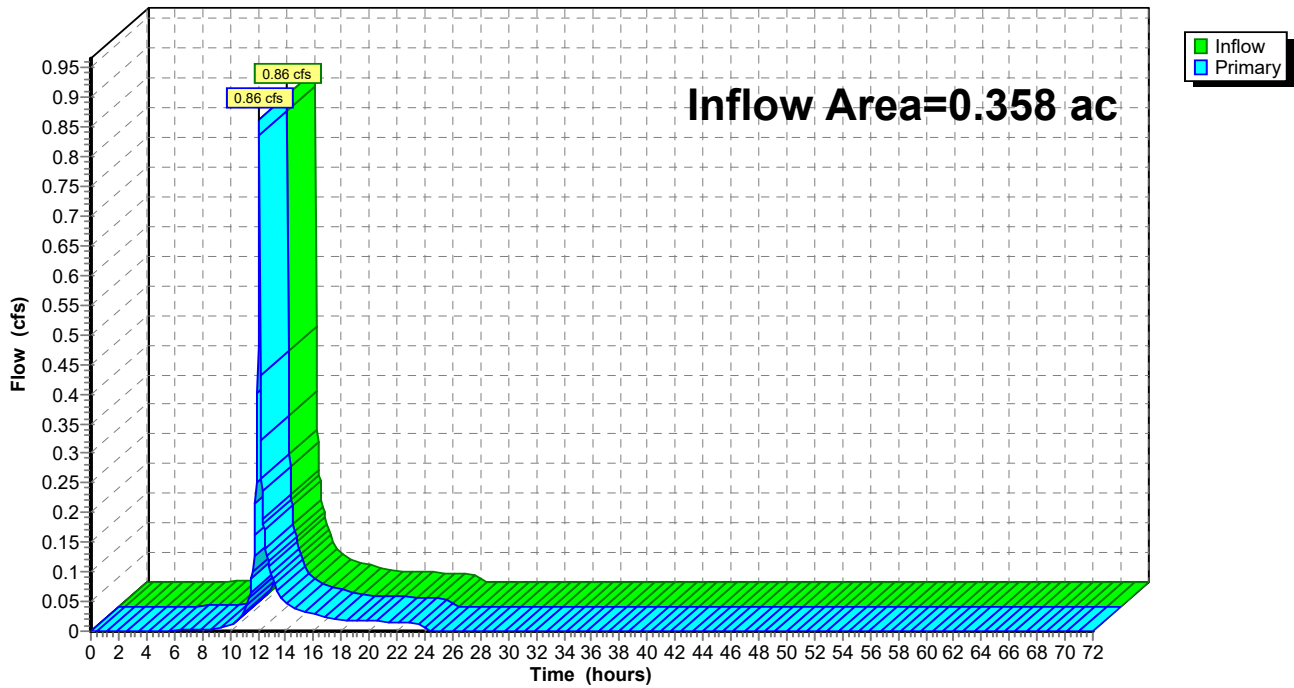
Summary for Link EO: Existing Offsite

Inflow Area = 0.358 ac, 6.15% Impervious, Inflow Depth = 1.87" for 2-Year-2050 event
Inflow = 0.86 cfs @ 12.08 hrs, Volume= 0.056 af
Primary = 0.86 cfs @ 12.08 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link EO: Existing Offsite

Hydrograph



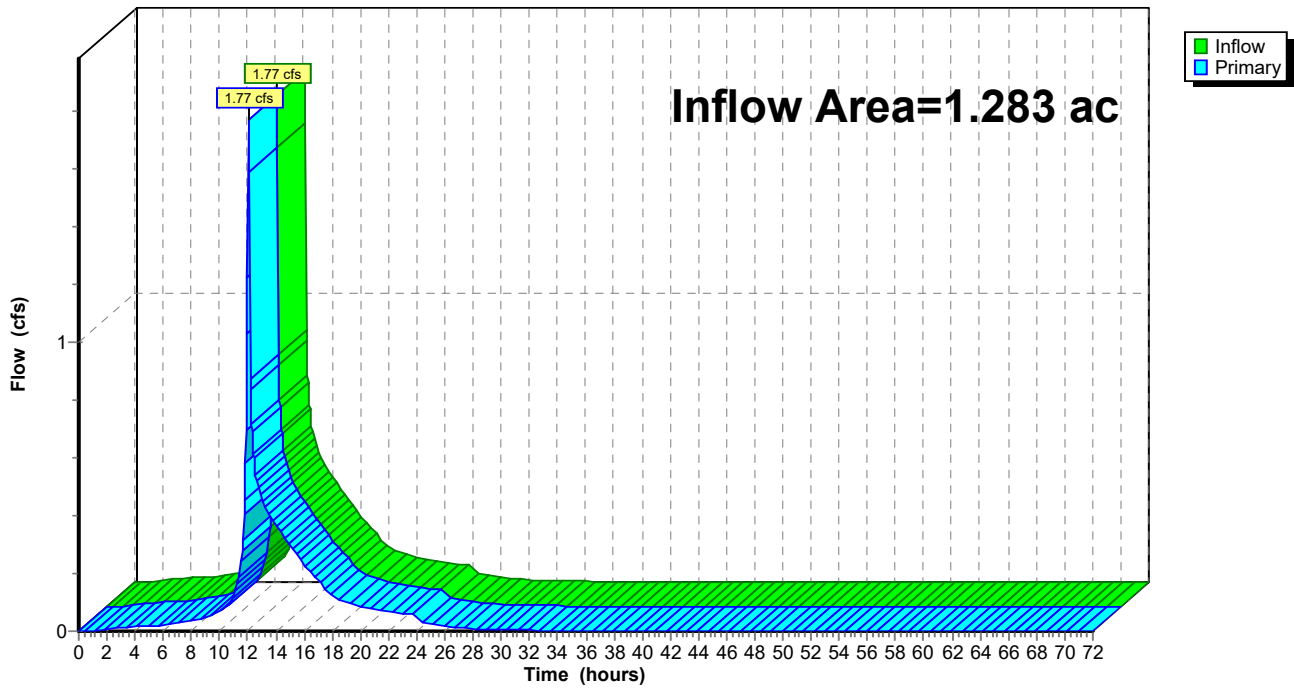
Summary for Link P1A: Proposed 1A

Inflow Area = 1.283 ac, 48.40% Impervious, Inflow Depth = 2.57" for 2-Year-2050 event
Inflow = 1.77 cfs @ 12.06 hrs, Volume= 0.275 af
Primary = 1.77 cfs @ 12.06 hrs, Volume= 0.275 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1A: Proposed 1A

Hydrograph



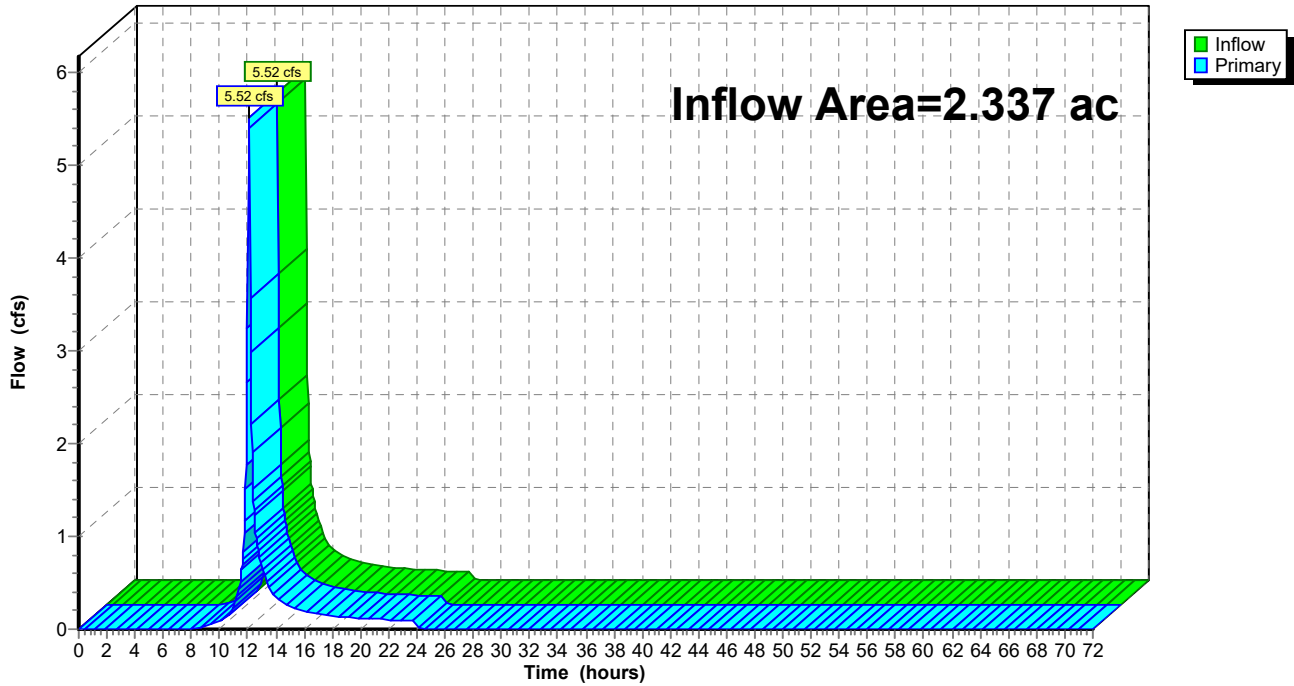
Summary for Link P1B: Proposed 1B

Inflow Area = 2.337 ac, 0.00% Impervious, Inflow Depth = 2.05" for 2-Year-2050 event
Inflow = 5.52 cfs @ 12.09 hrs, Volume= 0.399 af
Primary = 5.52 cfs @ 12.09 hrs, Volume= 0.399 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1B: Proposed 1B

Hydrograph



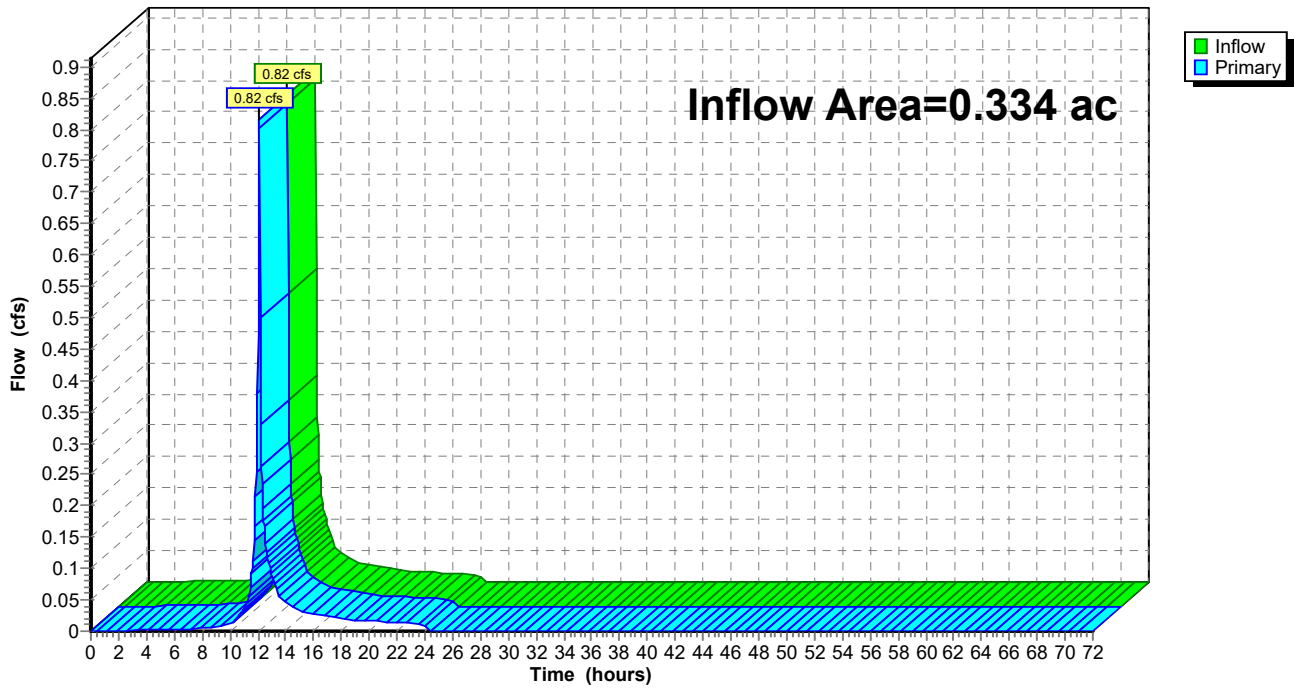
Summary for Link PO: Proposed Offsite

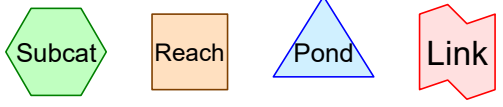
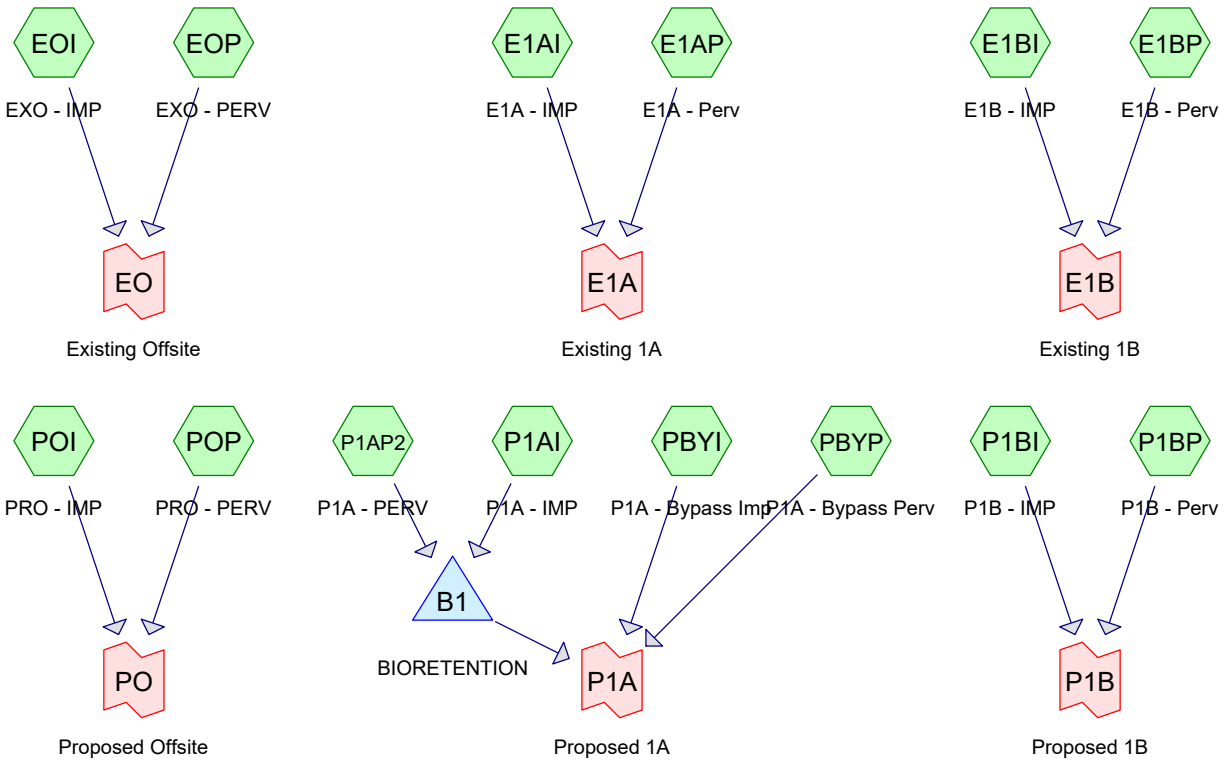
Inflow Area = 0.334 ac, 14.07% Impervious, Inflow Depth = 2.03" for 2-Year-2050 event
Inflow = 0.82 cfs @ 12.09 hrs, Volume= 0.057 af
Primary = 0.82 cfs @ 12.09 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PO: Proposed Offsite

Hydrograph





EX-PR

NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1AI: E1A - IMP	Runoff Area=0.560 ac 100.00% Impervious Runoff Depth=6.00" Flow Length=372' Tc=2.0 min CN=98 Runoff=3.72 cfs 0.280 af
SubcatchmentE1AP: E1A - Perv	Runoff Area=0.680 ac 0.00% Impervious Runoff Depth=3.39" Flow Length=409' Tc=3.3 min CN=74 Runoff=2.91 cfs 0.192 af
SubcatchmentE1BI: E1B - IMP	Runoff Area=1.413 ac 100.00% Impervious Runoff Depth=6.00" Flow Length=411' Tc=1.7 min CN=98 Runoff=9.20 cfs 0.707 af
SubcatchmentE1BP: E1B - Perv	Runoff Area=0.943 ac 0.00% Impervious Runoff Depth=3.49" Flow Length=690' Tc=7.2 min CN=75 Runoff=3.62 cfs 0.274 af
SubcatchmentEOI: EXO - IMP	Runoff Area=0.022 ac 100.00% Impervious Runoff Depth=6.00" Flow Length=107' Tc=0.7 min CN=98 Runoff=0.14 cfs 0.011 af
SubcatchmentEOP: EXO - PERV	Runoff Area=0.336 ac 0.00% Impervious Runoff Depth=3.59" Flow Length=138' Tc=2.2 min CN=76 Runoff=1.59 cfs 0.100 af
SubcatchmentP1AI: P1A - IMP	Runoff Area=0.259 ac 100.00% Impervious Runoff Depth=6.00" Flow Length=262' Tc=0.9 min CN=98 Runoff=1.70 cfs 0.130 af
SubcatchmentP1AP2: P1A - PERV	Runoff Area=0.617 ac 0.00% Impervious Runoff Depth=4.00" Flow Length=116' Tc=6.5 min CN=80 Runoff=2.73 cfs 0.206 af
SubcatchmentP1BI: P1B - IMP	Runoff Area=1.461 ac 0.00% Impervious Runoff Depth=4.00" Flow Length=388' Tc=1.4 min CN=80 Runoff=7.45 cfs 0.487 af
SubcatchmentP1BP: P1B - Perv	Runoff Area=0.876 ac 0.00% Impervious Runoff Depth=4.00" Flow Length=711' Tc=7.2 min CN=80 Runoff=3.81 cfs 0.292 af
SubcatchmentPBYI: P1A - Bypass Imp	Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=6.00" Flow Length=262' Tc=0.9 min CN=98 Runoff=2.38 cfs 0.181 af
SubcatchmentPBYP: P1A - Bypass Perv	Runoff Area=0.045 ac 0.00% Impervious Runoff Depth=3.49" Flow Length=116' Tc=6.5 min CN=75 Runoff=0.18 cfs 0.013 af
SubcatchmentPOI: PRO - IMP	Runoff Area=0.047 ac 100.00% Impervious Runoff Depth=6.00" Flow Length=99' Tc=0.8 min CN=98 Runoff=0.31 cfs 0.024 af
SubcatchmentPOP: PRO - PERV	Runoff Area=0.287 ac 0.00% Impervious Runoff Depth=3.59" Flow Length=122' Tc=3.1 min CN=76 Runoff=1.31 cfs 0.086 af
Pond B1: BIORETENTION	Peak Elev=133.66' Storage=5,945 cf Inflow=3.94 cfs 0.335 af Outflow=1.93 cfs 0.303 af
Link E1A: Existing 1A	Inflow=6.59 cfs 0.472 af Primary=6.59 cfs 0.472 af

EX-PR

NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

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Link E1B: Existing 1B

Inflow=12.24 cfs 0.981 af
Primary=12.24 cfs 0.981 af

Link EO: Existing Offsite

Inflow=1.72 cfs 0.111 af
Primary=1.72 cfs 0.111 af

Link P1A: Proposed 1A

Inflow=2.90 cfs 0.497 af
Primary=2.90 cfs 0.497 af

Link P1B: Proposed 1B

Inflow=10.59 cfs 0.779 af
Primary=10.59 cfs 0.779 af

Link PO: Proposed Offsite

Inflow=1.58 cfs 0.109 af
Primary=1.58 cfs 0.109 af

Total Runoff Area = 7.908 ac Runoff Volume = 2.982 af Average Runoff Depth = 4.52"
66.33% Pervious = 5.245 ac 33.67% Impervious = 2.663 ac

Summary for Subcatchment E1A: E1A - IMP

Runoff = 3.72 cfs @ 12.08 hrs, Volume= 0.280 af, Depth= 6.00"
 Routed to Link E1A : Existing 1A

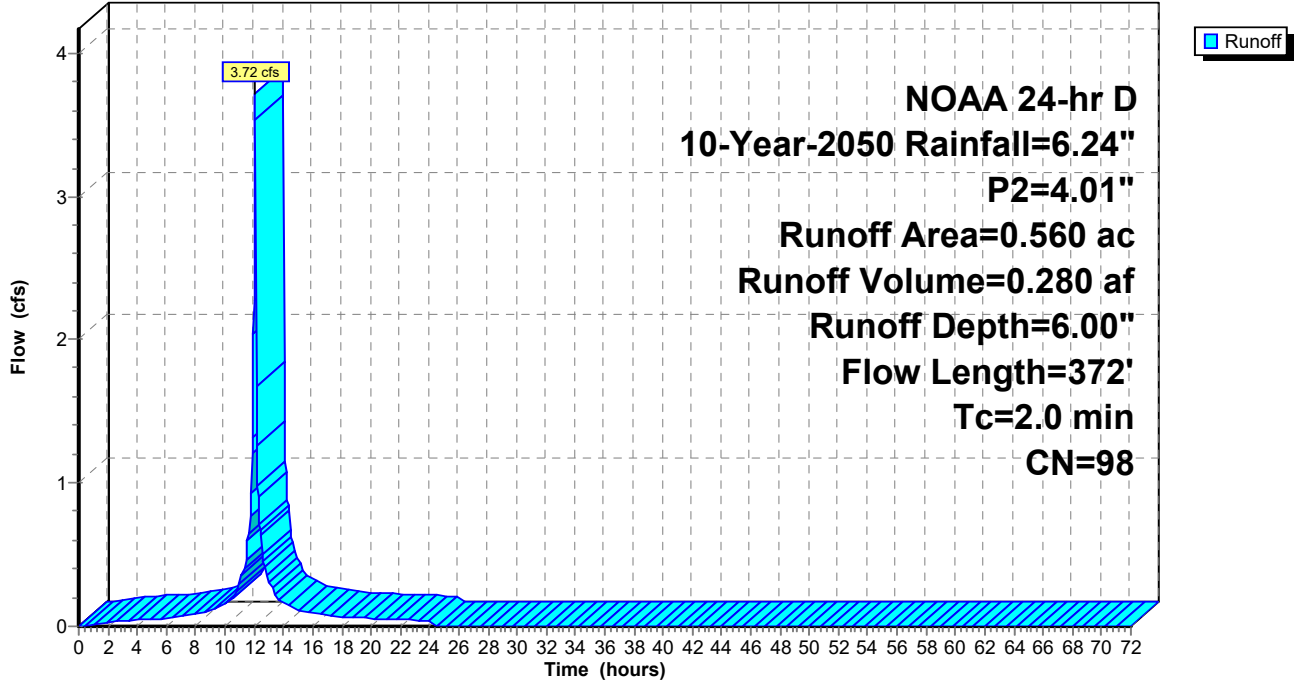
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.560	98	Paved parking, HSG D
0.560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	41	0.0060	0.80		Sheet Flow, H-I Smooth surfaces n= 0.011 P2= 4.01"
0.0	10	0.0300	3.52		Shallow Concentrated Flow, I-C Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
2.0	372	Total			

Subcatchment E1AI: E1A - IMP

Hydrograph



Summary for Subcatchment E1AP: E1A - Perv

Runoff = 2.91 cfs @ 12.10 hrs, Volume= 0.192 af, Depth= 3.39"

Routed to Link E1A : Existing 1A

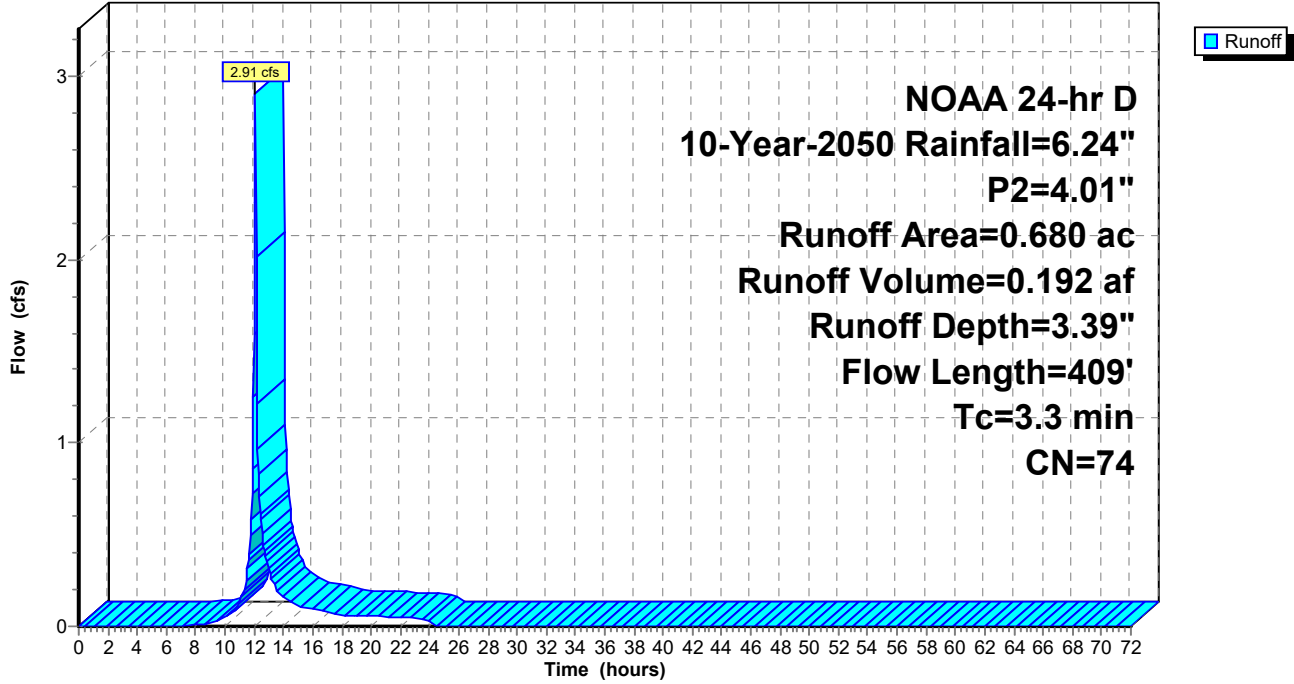
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.676	74	>75% Grass cover, Good, HSG C
0.004	80	>75% Grass cover, Good, HSG D
0.680	74	Weighted Average
0.680		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	35	0.1500	0.35		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.5	53	0.0090	1.93		Shallow Concentrated Flow, B-C
					Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F
					Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
3.3	409	Total			

Subcatchment E1AP: E1A - Perv

Hydrograph



Summary for Subcatchment E1BI: E1B - IMP

Runoff = 9.20 cfs @ 12.07 hrs, Volume= 0.707 af, Depth= 6.00"
 Routed to Link E1B : Existing 1B

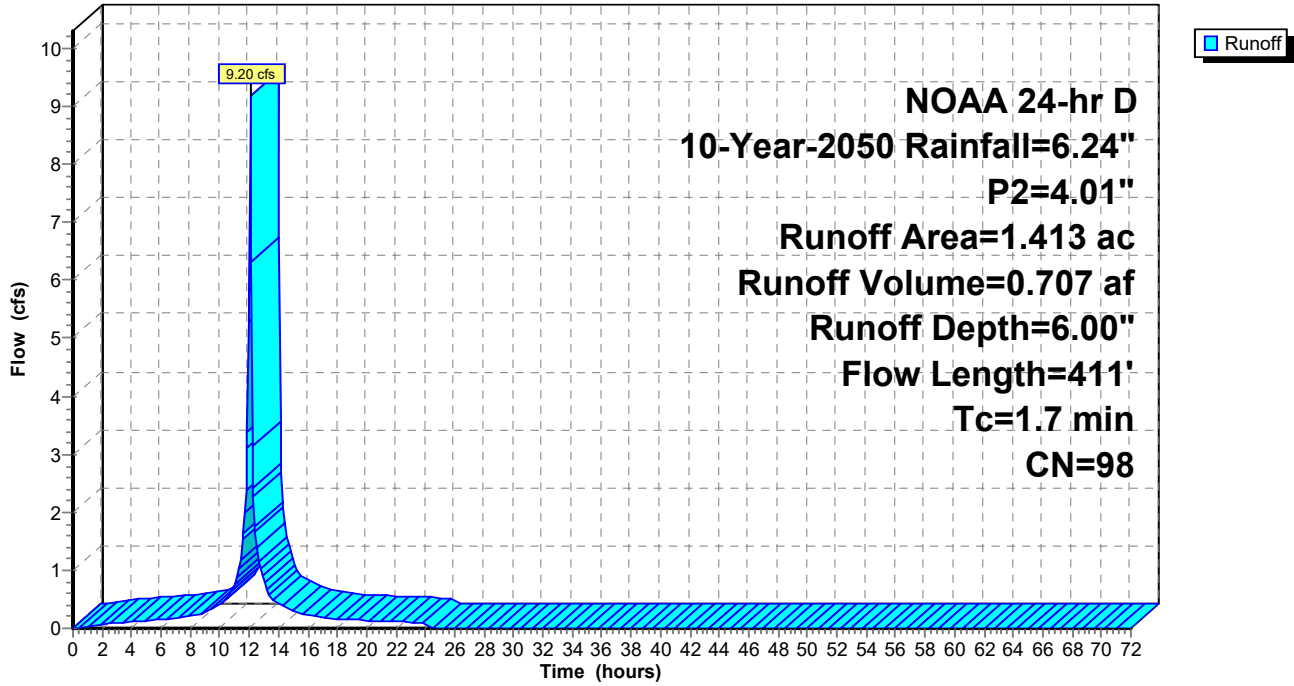
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
1.413	98	Paved parking, HSG D
1.413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.7	411	Total			

Subcatchment E1BI: E1B - IMP

Hydrograph



Summary for Subcatchment E1BP: E1B - Perv

Runoff = 3.62 cfs @ 12.14 hrs, Volume= 0.274 af, Depth= 3.49"
 Routed to Link E1B : Existing 1B

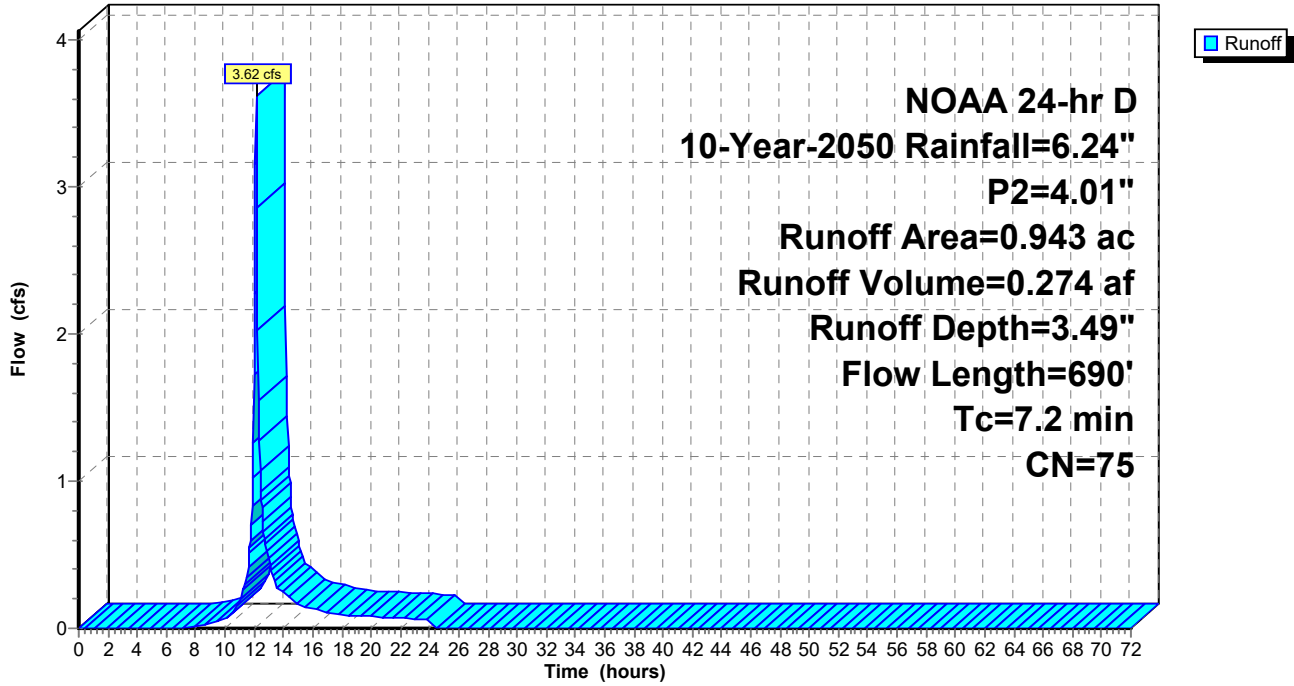
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.805	74	>75% Grass cover, Good, HSG C
0.138	80	>75% Grass cover, Good, HSG D
0.943	75	Weighted Average
0.943		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.0900	0.35		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.5	125	0.0700	4.26		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.2	54	0.0850	4.69		Shallow Concentrated Flow, C-K Unpaved Kv= 16.1 fps
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
7.2	690	Total			

Subcatchment E1BP: E1B - Perv

Hydrograph



EX-PR

Prepared by Bohler

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NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

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Summary for Subcatchment EOI: EXO - IMP

Runoff = 0.14 cfs @ 12.06 hrs, Volume= 0.011 af, Depth= 6.00"

Routed to Link EO : Existing Offsite

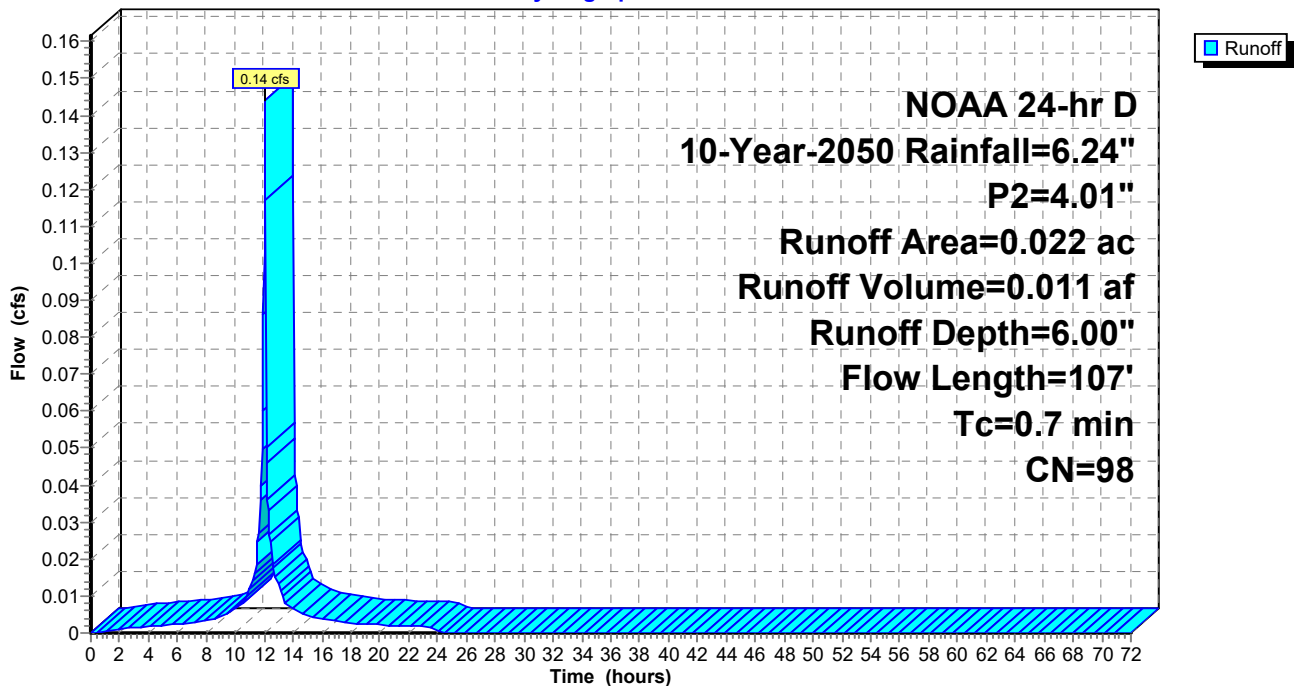
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.022	98	Paved parking, HSG D
0.022		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.7	107	Total			

Subcatchment EOI: EXO - IMP

Hydrograph



Summary for Subcatchment EOP: EXO - PERV

Runoff = 1.59 cfs @ 12.08 hrs, Volume= 0.100 af, Depth= 3.59"
 Routed to Link EO : Existing Offsite

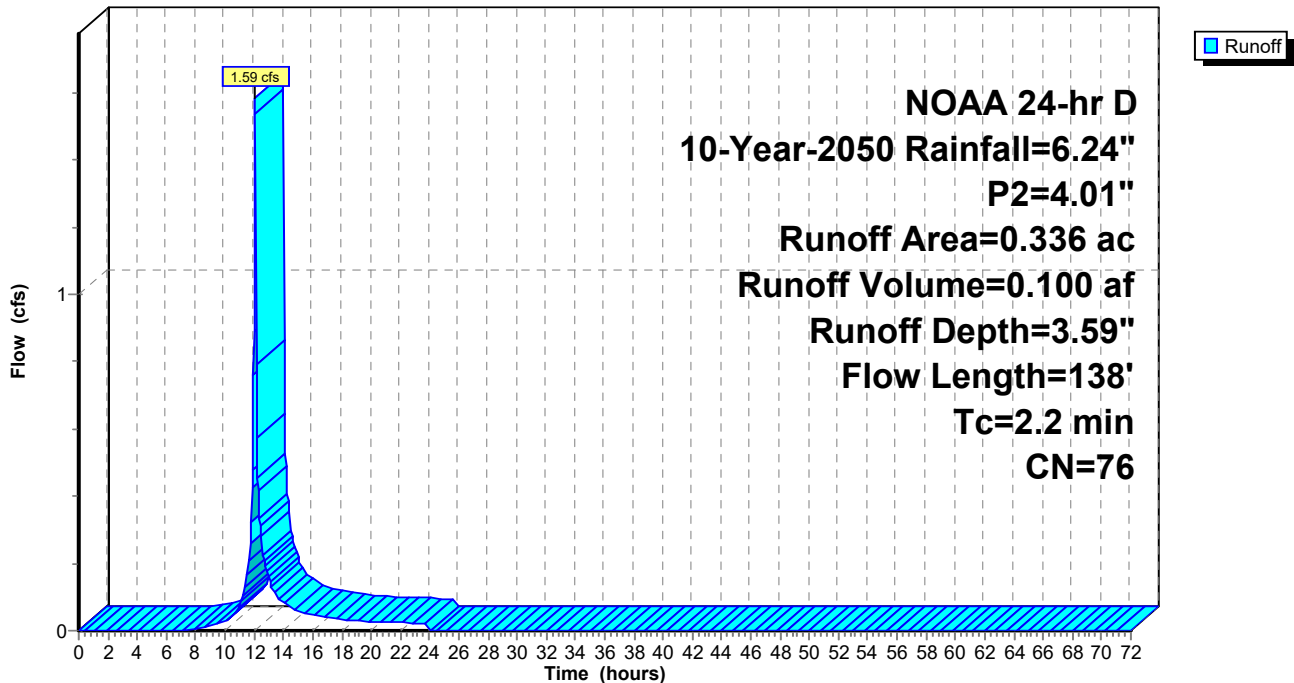
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.248	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.336	76	Weighted Average
0.336		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	31	0.1700	0.35		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
2.2	138	Total			

Subcatchment EOP: EXO - PERV

Hydrograph



Summary for Subcatchment P1AI: P1A - IMP

Runoff = 1.70 cfs @ 12.06 hrs, Volume= 0.130 af, Depth= 6.00"
 Routed to Pond B1 : BIORETENTION

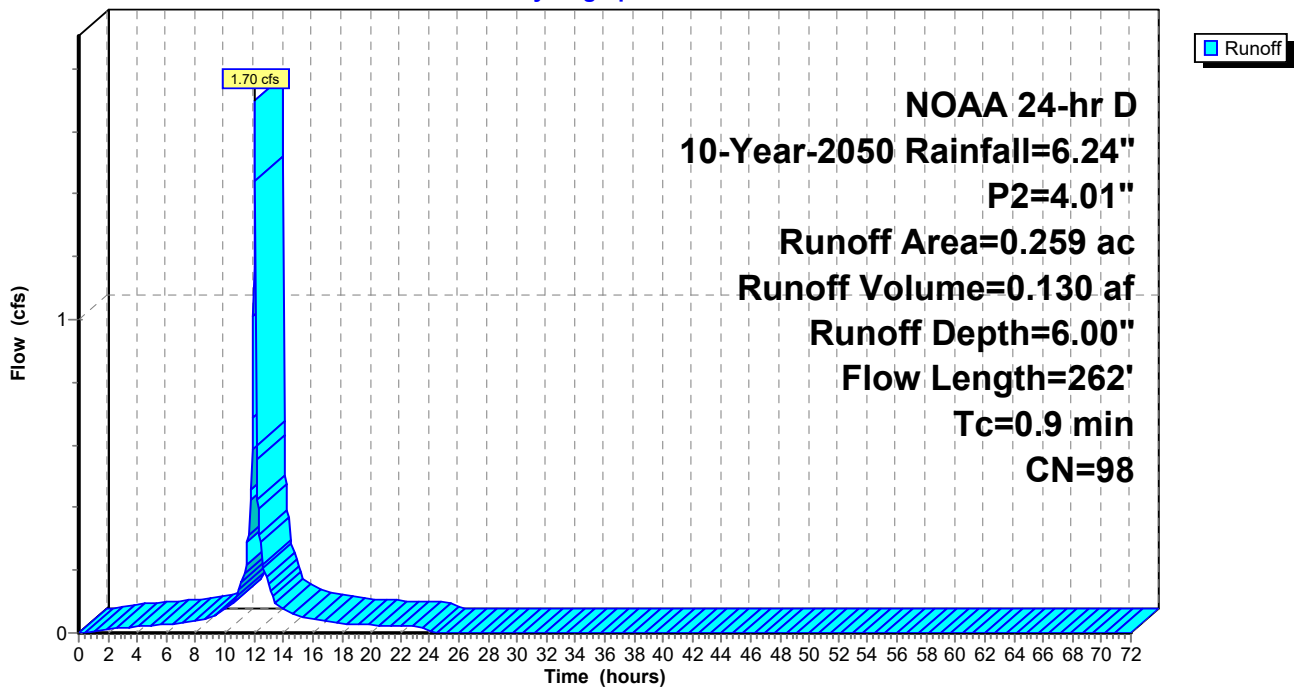
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.259	98	Paved parking, HSG D
0.259		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment P1AI: P1A - IMP

Hydrograph



Summary for Subcatchment P1AP2: P1A - PERV

Runoff = 2.73 cfs @ 12.14 hrs, Volume= 0.206 af, Depth= 4.00"
 Routed to Pond B1 : BIORETENTION

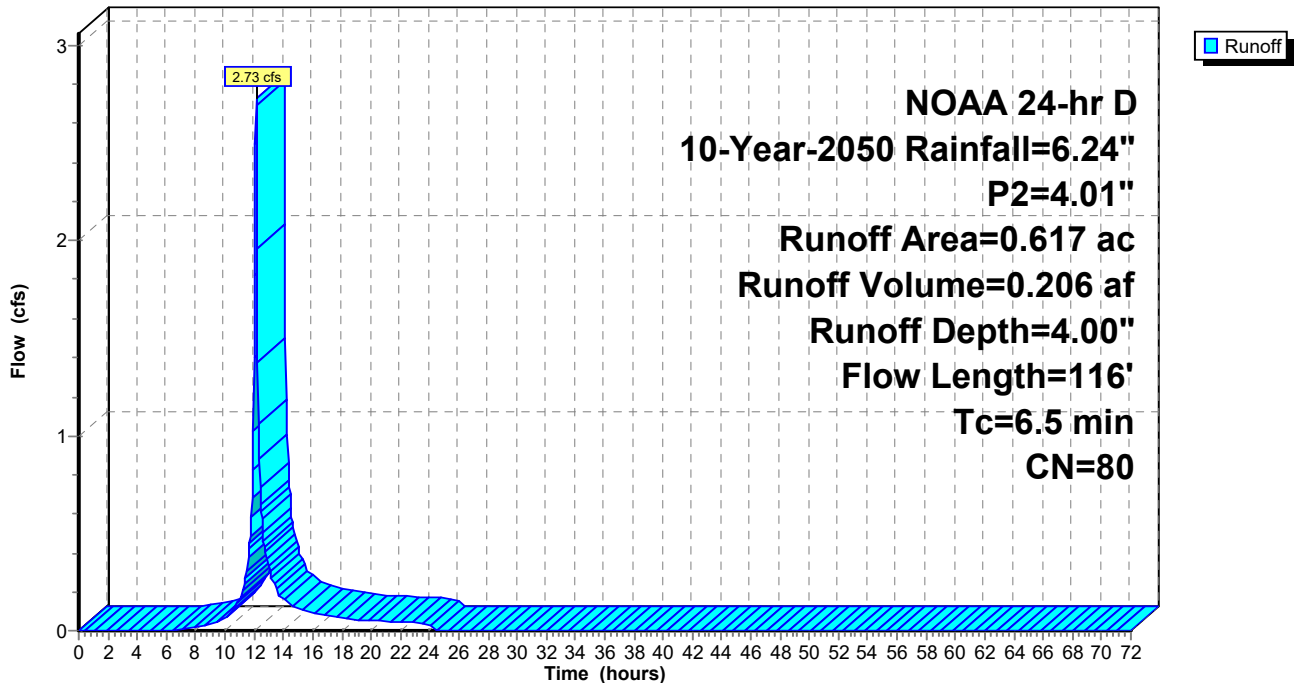
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.617	80	>75% Grass cover, Good, HSG D
0.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	61	0.0320	0.21		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.9	22	0.3200	0.43		Sheet Flow, B-C Grass: Short n= 0.150 P2= 4.01"
0.7	17	0.3000	0.39		Sheet Flow, C-D Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
6.5	116	Total			

Subcatchment P1AP2: P1A - PERV

Hydrograph



Summary for Subcatchment P1BI: P1B - IMP

Runoff = 7.45 cfs @ 12.07 hrs, Volume= 0.487 af, Depth= 4.00"
 Routed to Link P1B : Proposed 1B

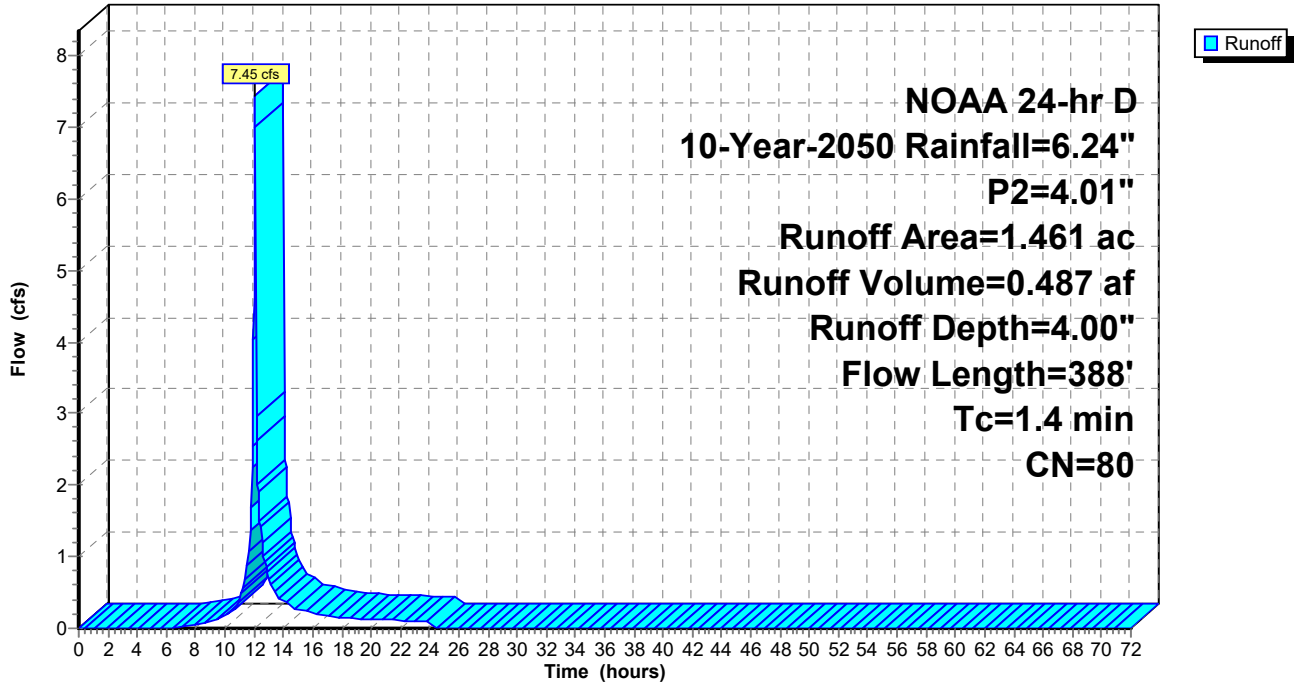
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
1.461	80	>75% Grass cover, Good, HSG D
1.461		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.4	388	Total			

Subcatchment P1BI: P1B - IMP

Hydrograph



Summary for Subcatchment P1BP: P1B - Perv

Runoff = 3.81 cfs @ 12.14 hrs, Volume= 0.292 af, Depth= 4.00"
 Routed to Link P1B : Proposed 1B

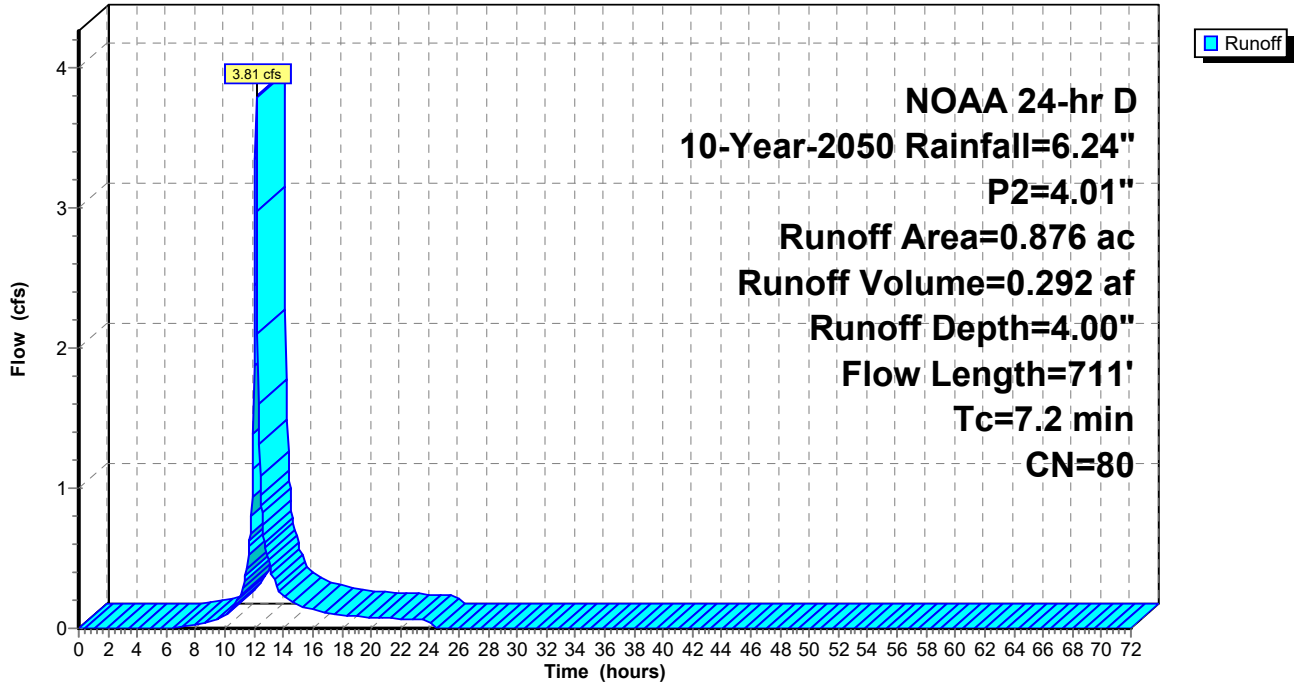
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.750	80	>75% Grass cover, Good, HSG D
0.126	80	>75% Grass cover, Good, HSG D
0.876	80	Weighted Average
0.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.0900	0.35		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.5	127	0.0700	4.26		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
0.2	55	0.0800	4.55		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.2	31	0.0300	2.79		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	10	0.0150	2.49		Shallow Concentrated Flow, E-F
					Paved Kv= 20.3 fps
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H
					Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I
					Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K
					Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
7.2	711	Total			

Subcatchment P1BP: P1B - Perv

Hydrograph



Summary for Subcatchment PBYI: P1A - Bypass Imp

Runoff = 2.38 cfs @ 12.06 hrs, Volume= 0.181 af, Depth= 6.00"

Routed to Link P1A : Proposed 1A

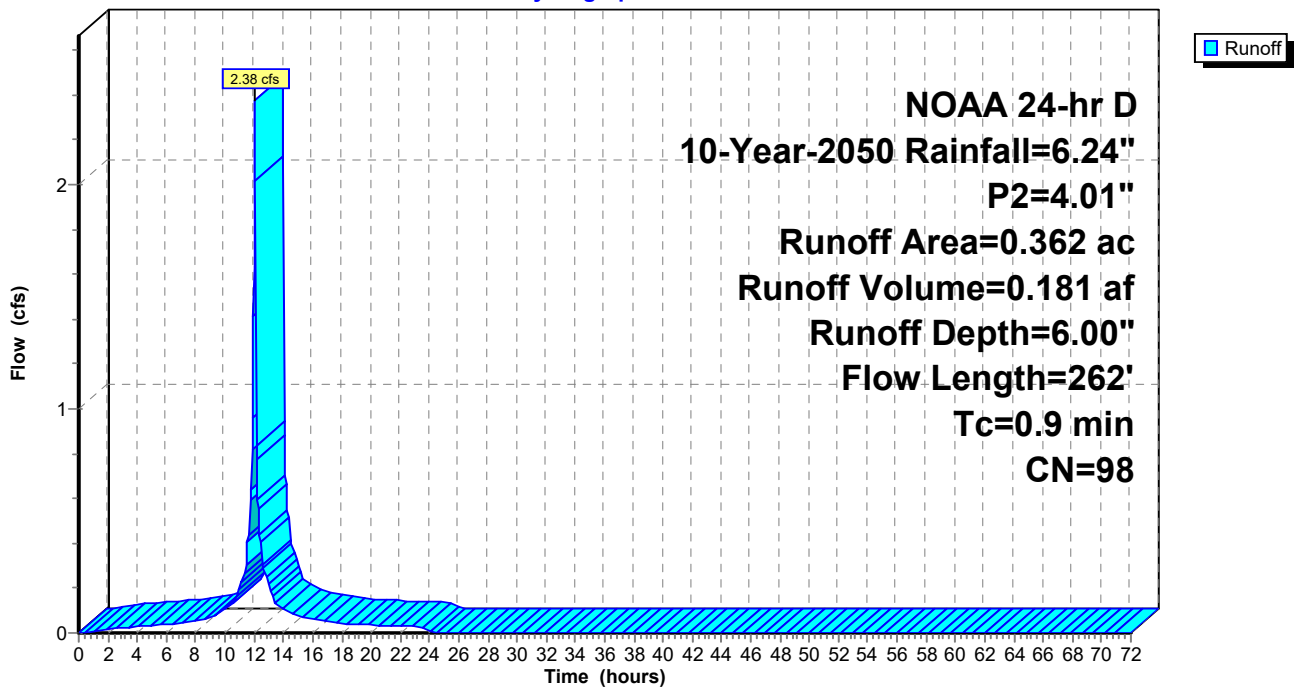
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.362	98	Paved parking, HSG D
0.362		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment PBYI: P1A - Bypass Imp

Hydrograph



Summary for Subcatchment PBYP: P1A - Bypass Perv

Runoff = 0.18 cfs @ 12.14 hrs, Volume= 0.013 af, Depth= 3.49"
 Routed to Link P1A : Proposed 1A

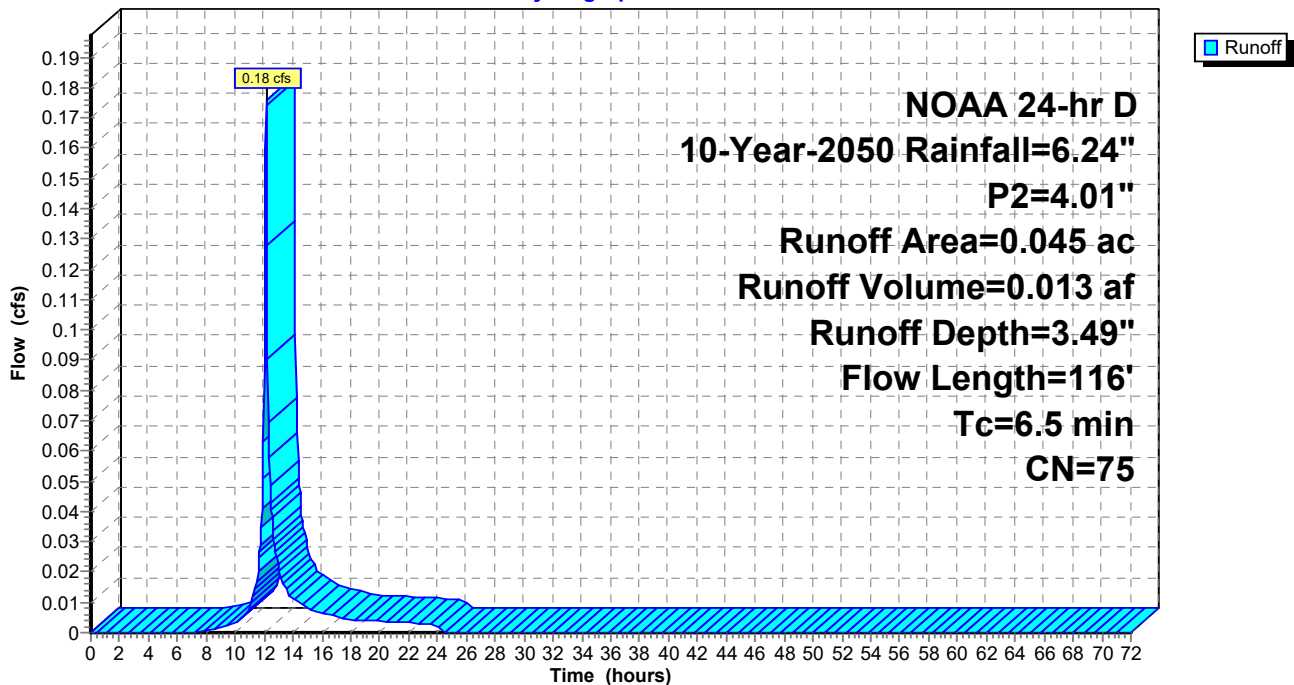
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.039	74	>75% Grass cover, Good, HSG C
0.006	80	>75% Grass cover, Good, HSG D
0.045	75	Weighted Average
0.045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	61	0.0320	0.21		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.9	22	0.3200	0.43		Sheet Flow, B-C Grass: Short n= 0.150 P2= 4.01"
0.7	17	0.3000	0.39		Sheet Flow, C-D Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
6.5	116	Total			

Subcatchment PBYP: P1A - Bypass Perv

Hydrograph



EX-PR

Prepared by Bohler

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NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

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Summary for Subcatchment POI: PRO - IMP

Runoff = 0.31 cfs @ 12.06 hrs, Volume= 0.024 af, Depth= 6.00"
Routed to Link PO : Proposed Offsite

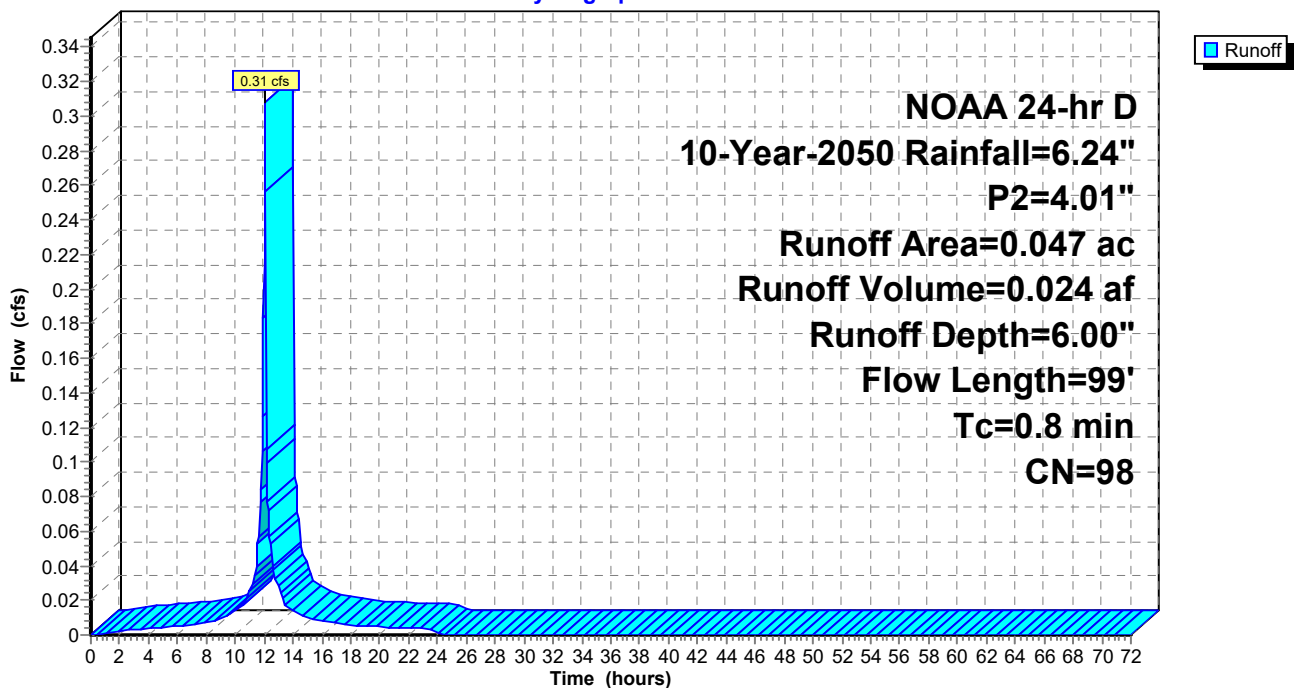
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.047	98	Paved parking, HSG D
0.047		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	1.08		Sheet Flow, D-B Smooth surfaces n= 0.011 P2= 4.01"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.8	99	Total			

Subcatchment POI: PRO - IMP

Hydrograph



Summary for Subcatchment POP: PRO - PERV

Runoff = 1.31 cfs @ 12.09 hrs, Volume= 0.086 af, Depth= 3.59"
 Routed to Link PO : Proposed Offsite

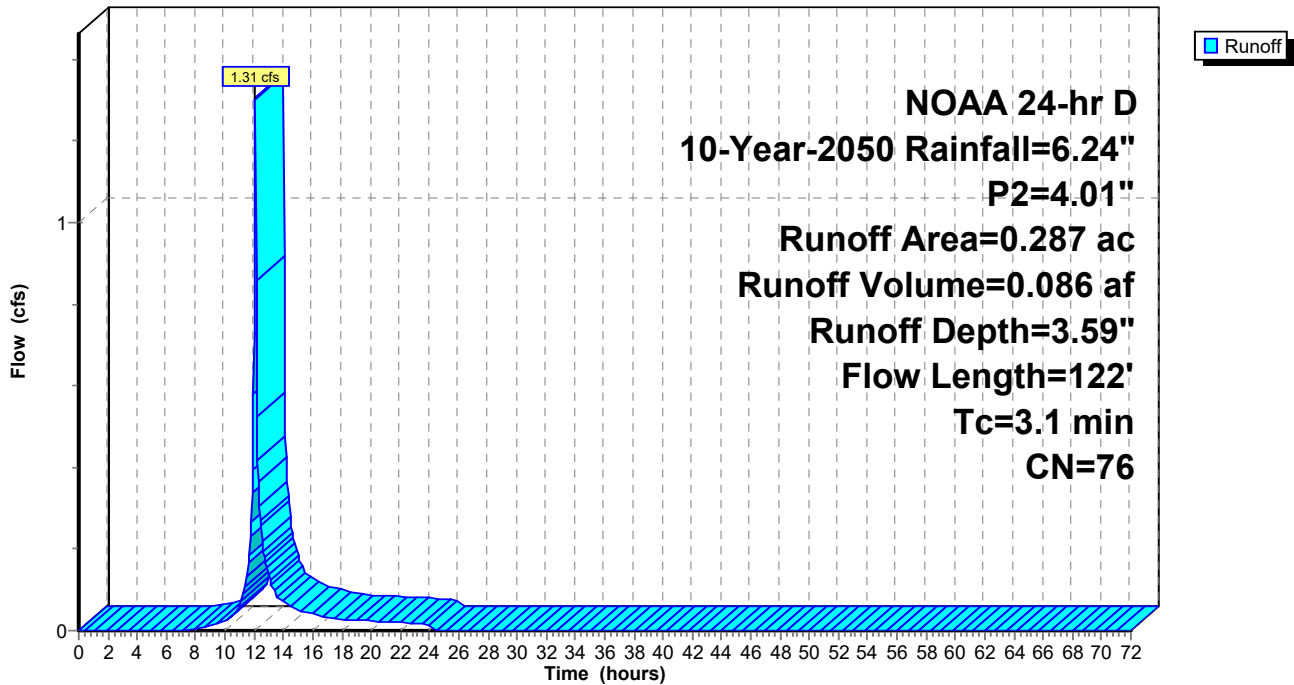
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.199	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.287	76	Weighted Average
0.287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	53	0.0950	0.31		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
3.1	122	Total			

Subcatchment POP: PRO - PERV

Hydrograph



Summary for Pond B1: BIORETENTION

Inflow Area = 0.876 ac, 29.57% Impervious, Inflow Depth = 4.59" for 10-Year-2050 event
 Inflow = 3.94 cfs @ 12.09 hrs, Volume= 0.335 af
 Outflow = 1.93 cfs @ 12.25 hrs, Volume= 0.303 af, Atten= 51%, Lag= 9.4 min
 Primary = 1.93 cfs @ 12.25 hrs, Volume= 0.303 af
 Routed to Link P1A : Proposed 1A

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 133.66' @ 12.25 hrs Surf.Area= 3,946 sf Storage= 5,945 cf

Plug-Flow detention time= 205.5 min calculated for 0.303 af (90% of inflow)
 Center-of-Mass det. time= 156.7 min (946.7 - 790.0)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	11,644 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	3,229	0	0
133.00	3,656	3,443	3,443
134.00	4,097	3,877	7,319
135.00	4,552	4,325	11,644

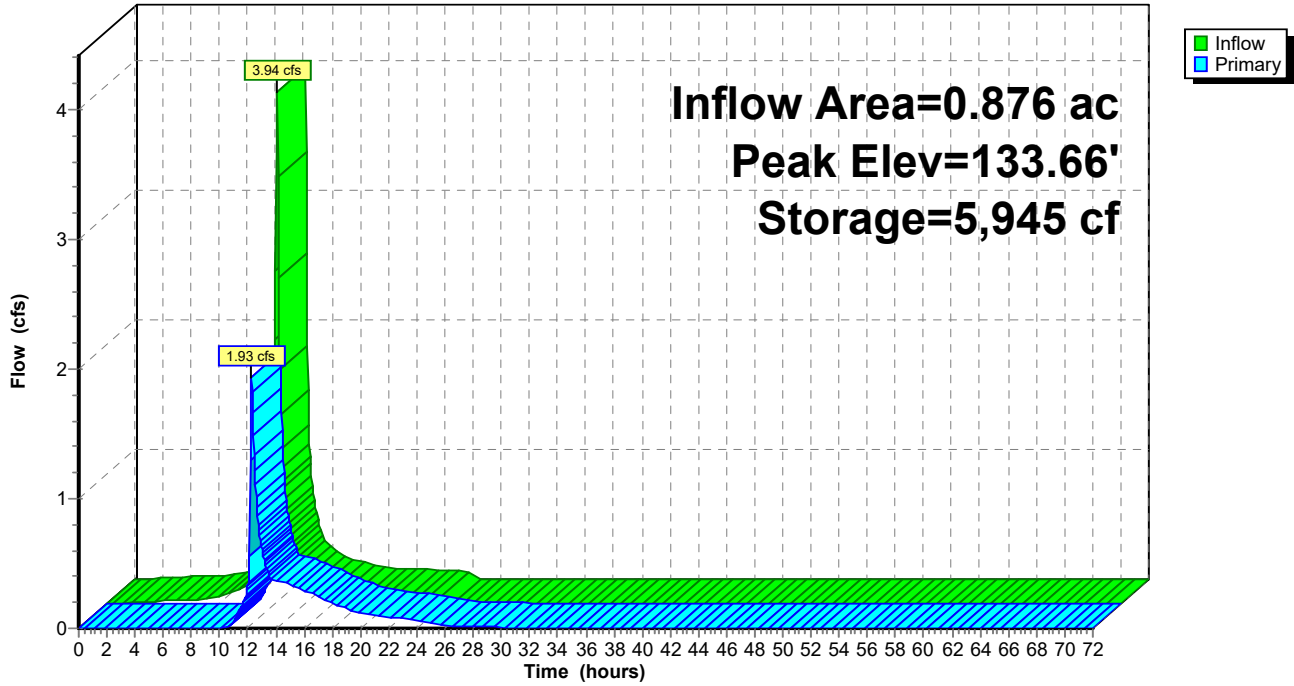
Device	Routing	Invert	Outlet Devices
#1	Primary	130.25'	18.0" Round Culvert L= 157.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.25' / 126.50' S= 0.0239 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	132.42'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.40'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.92 cfs @ 12.25 hrs HW=133.66' (Free Discharge)

- 1=Culvert (Passes 1.92 cfs of 10.95 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.43 cfs @ 4.98 fps)
- 3=Broad-Crested Rectangular Weir(Weir Controls 1.48 cfs @ 1.44 fps)

Pond B1: BIORETENTION

Hydrograph



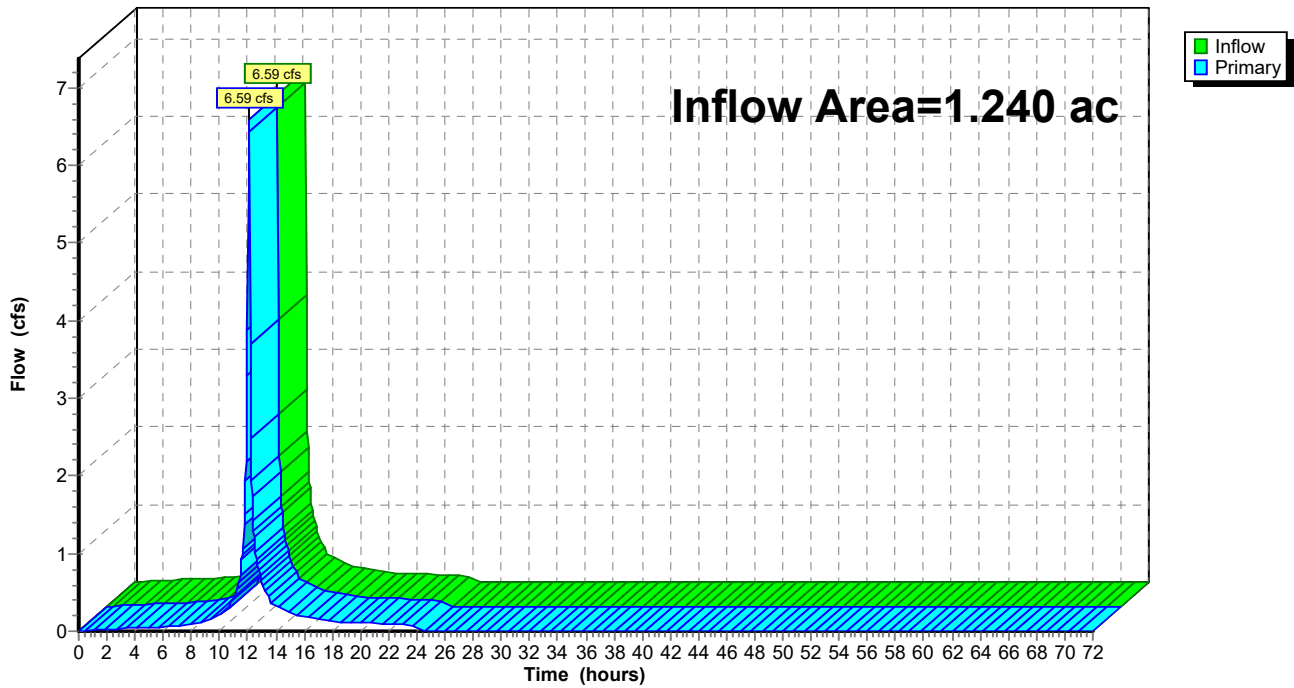
Summary for Link E1A: Existing 1A

Inflow Area = 1.240 ac, 45.16% Impervious, Inflow Depth = 4.57" for 10-Year-2050 event
Inflow = 6.59 cfs @ 12.09 hrs, Volume= 0.472 af
Primary = 6.59 cfs @ 12.09 hrs, Volume= 0.472 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1A: Existing 1A

Hydrograph



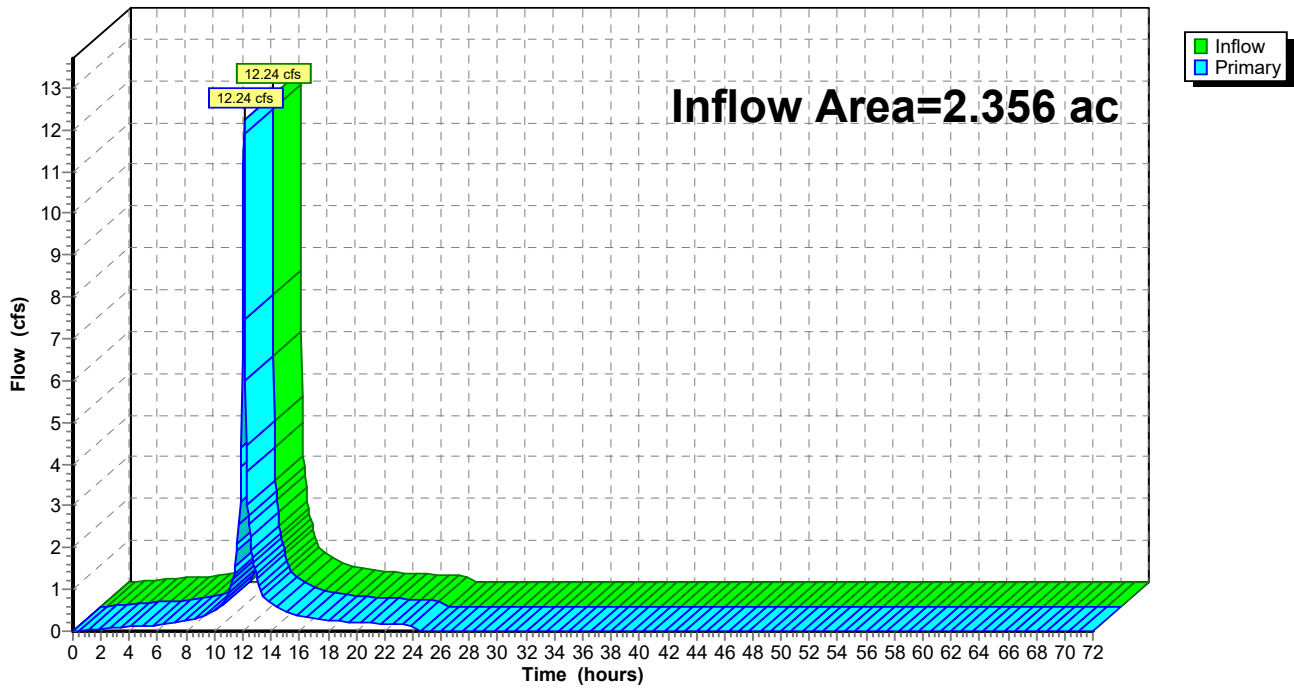
Summary for Link E1B: Existing 1B

Inflow Area = 2.356 ac, 59.97% Impervious, Inflow Depth = 5.00" for 10-Year-2050 event
Inflow = 12.24 cfs @ 12.08 hrs, Volume= 0.981 af
Primary = 12.24 cfs @ 12.08 hrs, Volume= 0.981 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1B: Existing 1B

Hydrograph



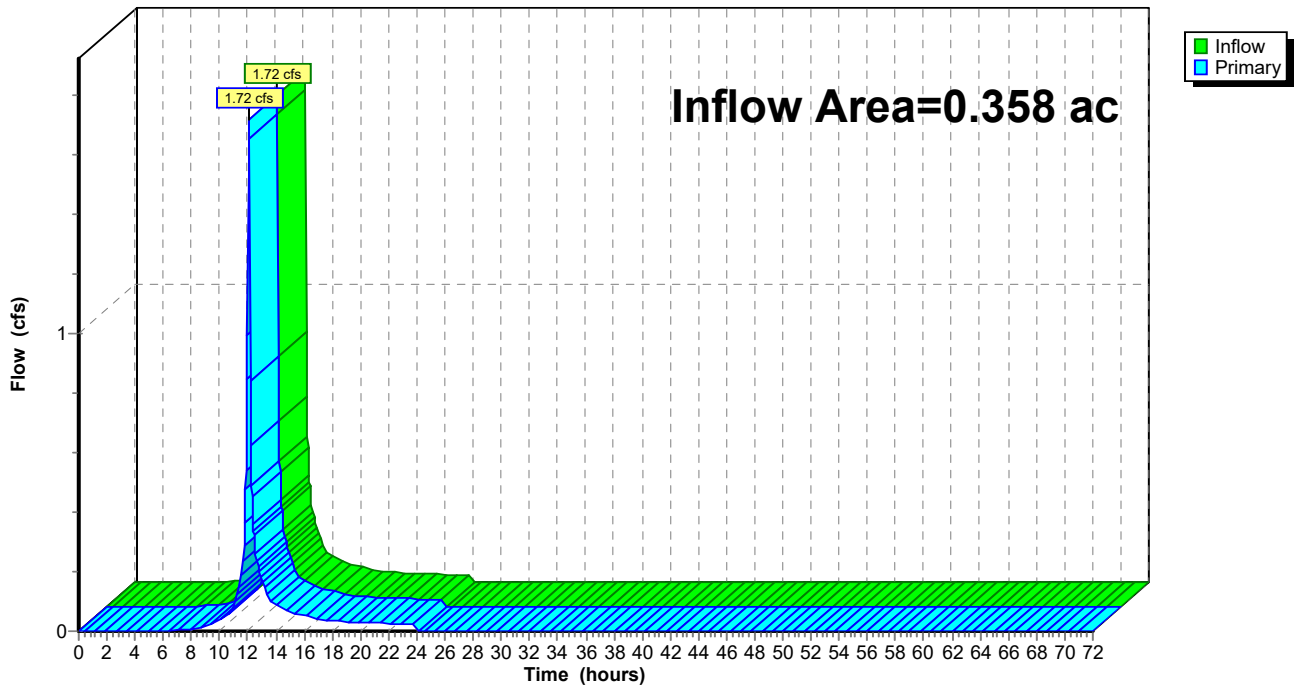
Summary for Link EO: Existing Offsite

Inflow Area = 0.358 ac, 6.15% Impervious, Inflow Depth = 3.74" for 10-Year-2050 event
Inflow = 1.72 cfs @ 12.08 hrs, Volume= 0.111 af
Primary = 1.72 cfs @ 12.08 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link EO: Existing Offsite

Hydrograph



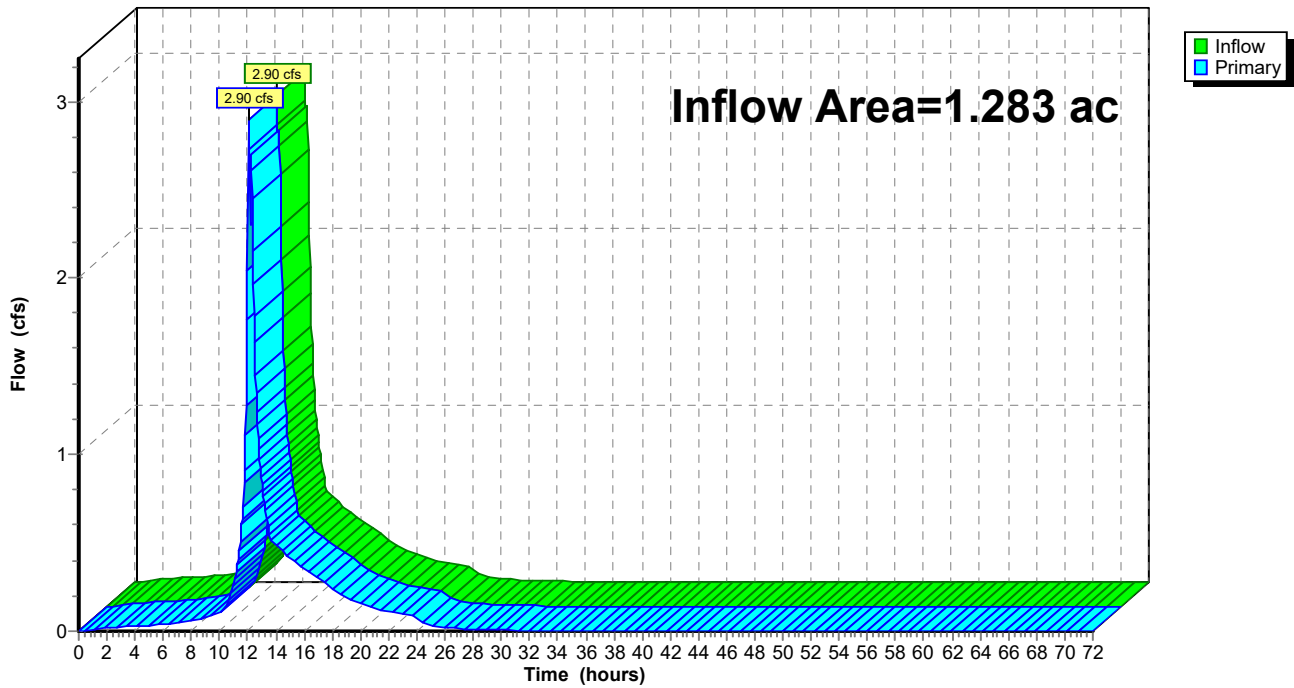
Summary for Link P1A: Proposed 1A

Inflow Area = 1.283 ac, 48.40% Impervious, Inflow Depth = 4.65" for 10-Year-2050 event
Inflow = 2.90 cfs @ 12.07 hrs, Volume= 0.497 af
Primary = 2.90 cfs @ 12.07 hrs, Volume= 0.497 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1A: Proposed 1A

Hydrograph



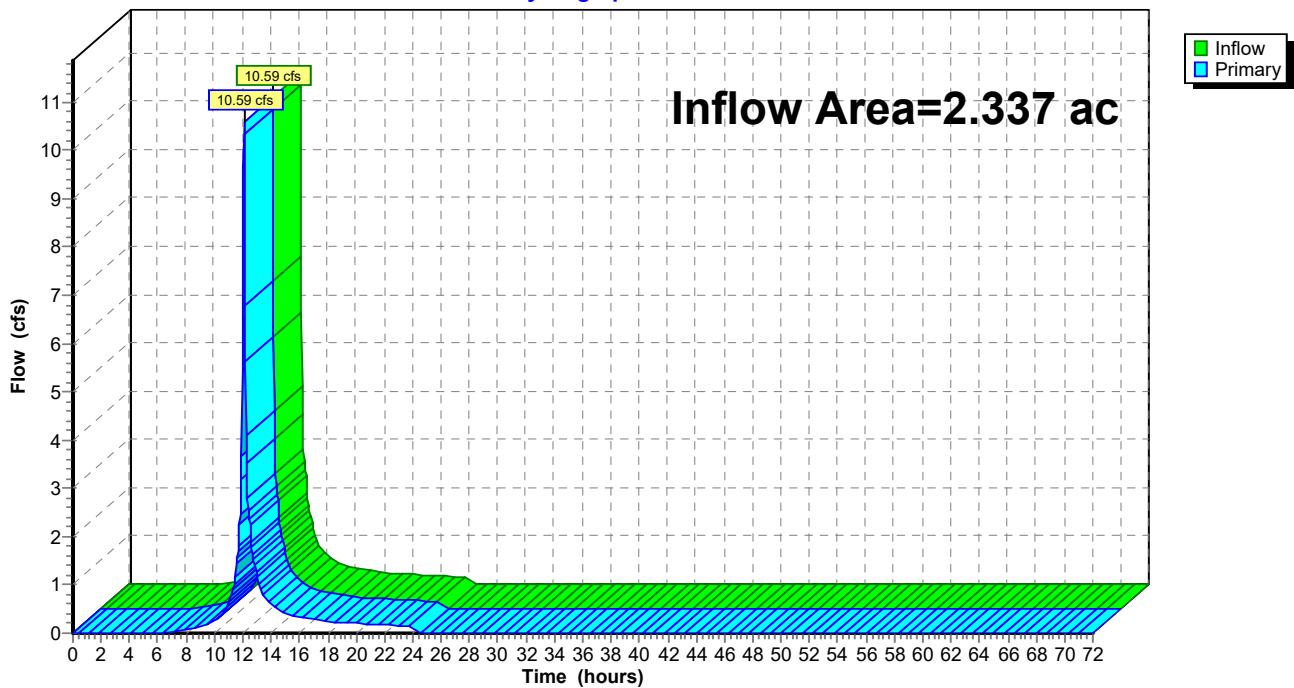
Summary for Link P1B: Proposed 1B

Inflow Area = 2.337 ac, 0.00% Impervious, Inflow Depth = 4.00" for 10-Year-2050 event
Inflow = 10.59 cfs @ 12.08 hrs, Volume= 0.779 af
Primary = 10.59 cfs @ 12.08 hrs, Volume= 0.779 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1B: Proposed 1B

Hydrograph



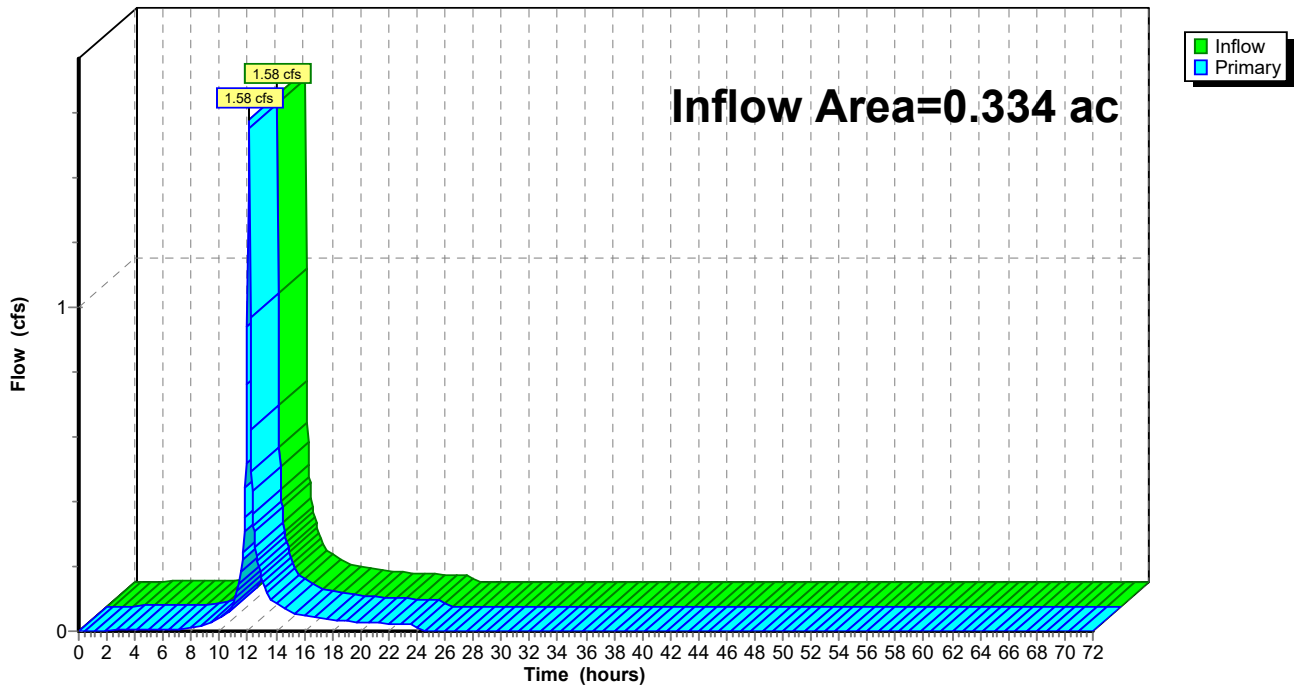
Summary for Link PO: Proposed Offsite

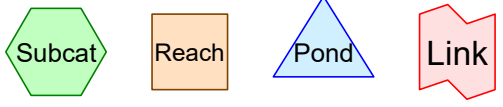
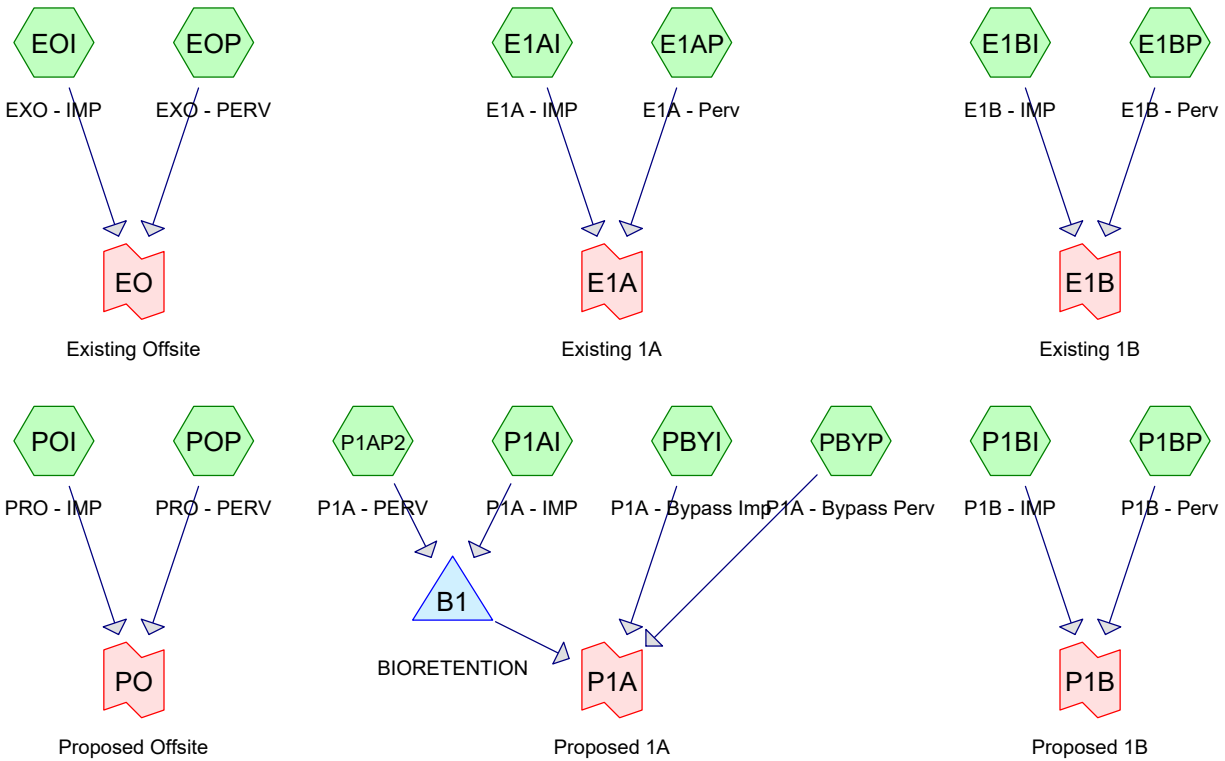
Inflow Area = 0.334 ac, 14.07% Impervious, Inflow Depth = 3.93" for 10-Year-2050 event
Inflow = 1.58 cfs @ 12.09 hrs, Volume= 0.109 af
Primary = 1.58 cfs @ 12.09 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PO: Proposed Offsite

Hydrograph





Routing Diagram for EX-PR
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EX-PR

NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Prepared by Bohler

Printed 7/16/2025

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1AI: E1A - IMP	Runoff Area=0.560 ac 100.00% Impervious Runoff Depth=11.36" Flow Length=372' Tc=2.0 min CN=98 Runoff=6.94 cfs 0.530 af
SubcatchmentE1AP: E1A - Perv	Runoff Area=0.680 ac 0.00% Impervious Runoff Depth=8.24" Flow Length=409' Tc=3.3 min CN=74 Runoff=6.85 cfs 0.467 af
SubcatchmentE1BI: E1B - IMP	Runoff Area=1.413 ac 100.00% Impervious Runoff Depth=11.36" Flow Length=411' Tc=1.7 min CN=98 Runoff=17.14 cfs 1.337 af
SubcatchmentE1BP: E1B - Perv	Runoff Area=0.943 ac 0.00% Impervious Runoff Depth=8.38" Flow Length=690' Tc=7.2 min CN=75 Runoff=8.42 cfs 0.658 af
SubcatchmentEOI: EXO - IMP	Runoff Area=0.022 ac 100.00% Impervious Runoff Depth=11.36" Flow Length=107' Tc=0.7 min CN=98 Runoff=0.27 cfs 0.021 af
SubcatchmentEOP: EXO - PERV	Runoff Area=0.336 ac 0.00% Impervious Runoff Depth=8.52" Flow Length=138' Tc=2.2 min CN=76 Runoff=3.61 cfs 0.238 af
SubcatchmentP1AI: P1A - IMP	Runoff Area=0.259 ac 100.00% Impervious Runoff Depth=11.36" Flow Length=262' Tc=0.9 min CN=98 Runoff=3.17 cfs 0.245 af
SubcatchmentP1AP2: P1A - PERV	Runoff Area=0.617 ac 0.00% Impervious Runoff Depth=9.06" Flow Length=116' Tc=6.5 min CN=80 Runoff=5.94 cfs 0.466 af
SubcatchmentP1BI: P1B - IMP	Runoff Area=1.461 ac 0.00% Impervious Runoff Depth=9.06" Flow Length=388' Tc=1.4 min CN=80 Runoff=16.16 cfs 1.103 af
SubcatchmentP1BP: P1B - Perv	Runoff Area=0.876 ac 0.00% Impervious Runoff Depth=9.06" Flow Length=711' Tc=7.2 min CN=80 Runoff=8.28 cfs 0.661 af
SubcatchmentPBYI: P1A - Bypass Imp	Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=11.36" Flow Length=262' Tc=0.9 min CN=98 Runoff=4.43 cfs 0.343 af
SubcatchmentPBYP: P1A - Bypass Perv	Runoff Area=0.045 ac 0.00% Impervious Runoff Depth=8.38" Flow Length=116' Tc=6.5 min CN=75 Runoff=0.41 cfs 0.031 af
SubcatchmentPOI: PRO - IMP	Runoff Area=0.047 ac 100.00% Impervious Runoff Depth=11.36" Flow Length=99' Tc=0.8 min CN=98 Runoff=0.57 cfs 0.044 af
SubcatchmentPOP: PRO - PERV	Runoff Area=0.287 ac 0.00% Impervious Runoff Depth=8.52" Flow Length=122' Tc=3.1 min CN=76 Runoff=2.98 cfs 0.204 af
Pond B1: BIORETENTION	Peak Elev=134.04' Storage=7,499 cf Inflow=8.17 cfs 0.711 af Outflow=6.97 cfs 0.679 af
Link E1A: Existing 1A	Inflow=13.70 cfs 0.997 af Primary=13.70 cfs 0.997 af

EX-PR

NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

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Link E1B: Existing 1B

Inflow=24.31 cfs 1.996 af
Primary=24.31 cfs 1.996 af

Link EO: Existing Offsite

Inflow=3.85 cfs 0.259 af
Primary=3.85 cfs 0.259 af

Link P1A: Proposed 1A

Inflow=10.41 cfs 1.053 af
Primary=10.41 cfs 1.053 af

Link P1B: Proposed 1B

Inflow=22.98 cfs 1.764 af
Primary=22.98 cfs 1.764 af

Link PO: Proposed Offsite

Inflow=3.50 cfs 0.248 af
Primary=3.50 cfs 0.248 af

Total Runoff Area = 7.908 ac Runoff Volume = 6.350 af Average Runoff Depth = 9.64"
66.33% Pervious = 5.245 ac 33.67% Impervious = 2.663 ac

Summary for Subcatchment E1AI: E1A - IMP

Runoff = 6.94 cfs @ 12.08 hrs, Volume= 0.530 af, Depth=11.36"

Routed to Link E1A : Existing 1A

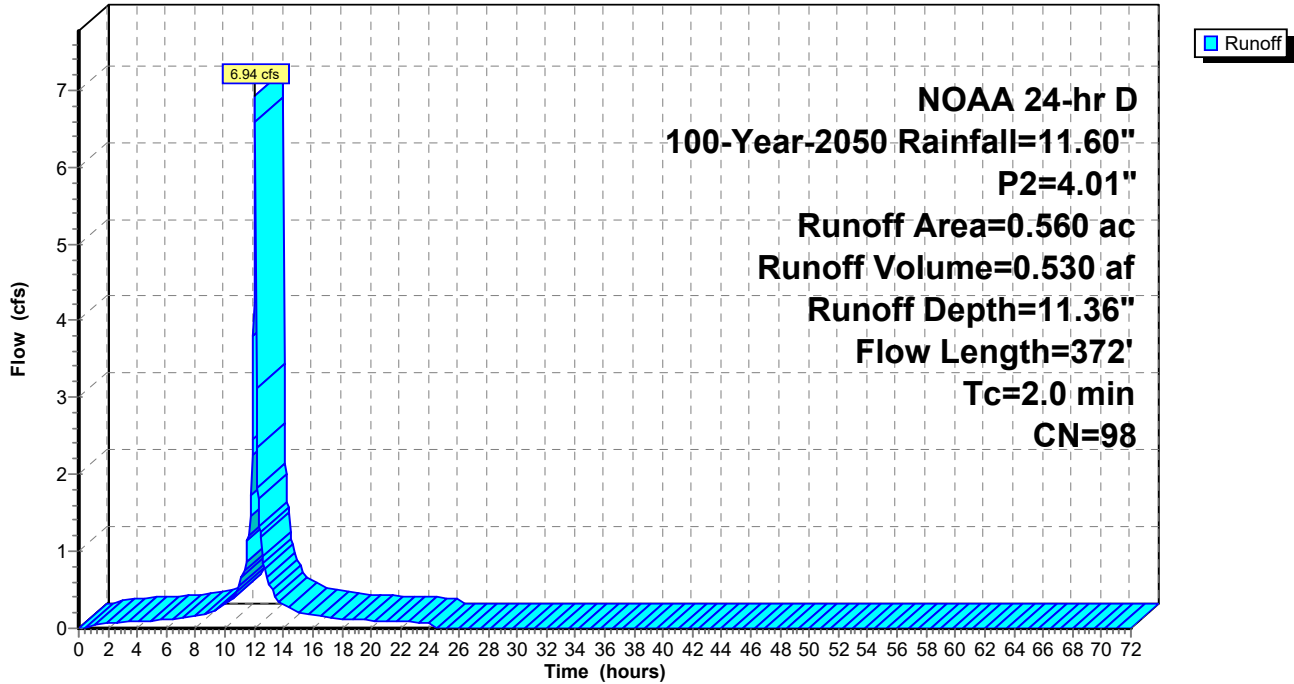
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.560	98	Paved parking, HSG D
0.560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	41	0.0060	0.80		Sheet Flow, H-I Smooth surfaces n= 0.011 P2= 4.01"
0.0	10	0.0300	3.52		Shallow Concentrated Flow, I-C Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
2.0	372	Total			

Subcatchment E1AI: E1A - IMP

Hydrograph



Summary for Subcatchment E1AP: E1A - Perv

Runoff = 6.85 cfs @ 12.09 hrs, Volume= 0.467 af, Depth= 8.24"
 Routed to Link E1A : Existing 1A

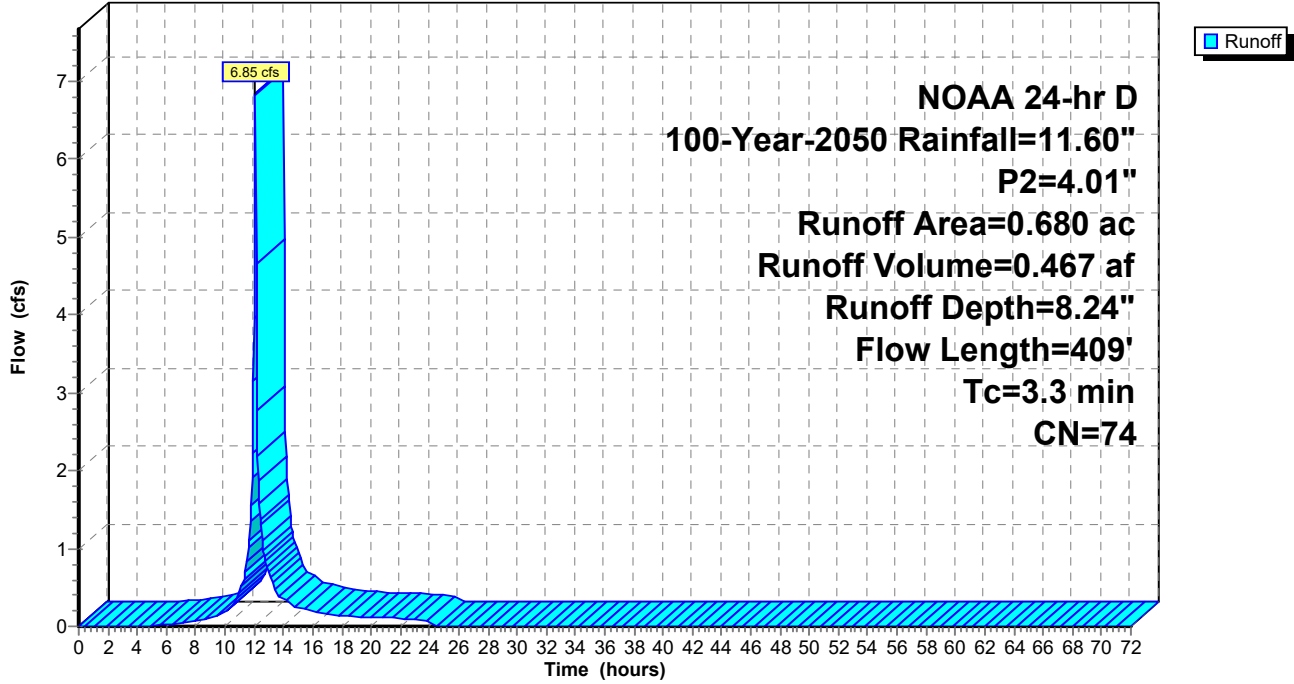
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.676	74	>75% Grass cover, Good, HSG C
0.004	80	>75% Grass cover, Good, HSG D
0.680	74	Weighted Average
0.680		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	35	0.1500	0.35		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.5	53	0.0090	1.93		Shallow Concentrated Flow, B-C
					Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F
					Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
3.3	409	Total			

Subcatchment E1AP: E1A - Perv

Hydrograph



Summary for Subcatchment E1BI: E1B - IMP

Runoff = 17.14 cfs @ 12.07 hrs, Volume= 1.337 af, Depth=11.36"
 Routed to Link E1B : Existing 1B

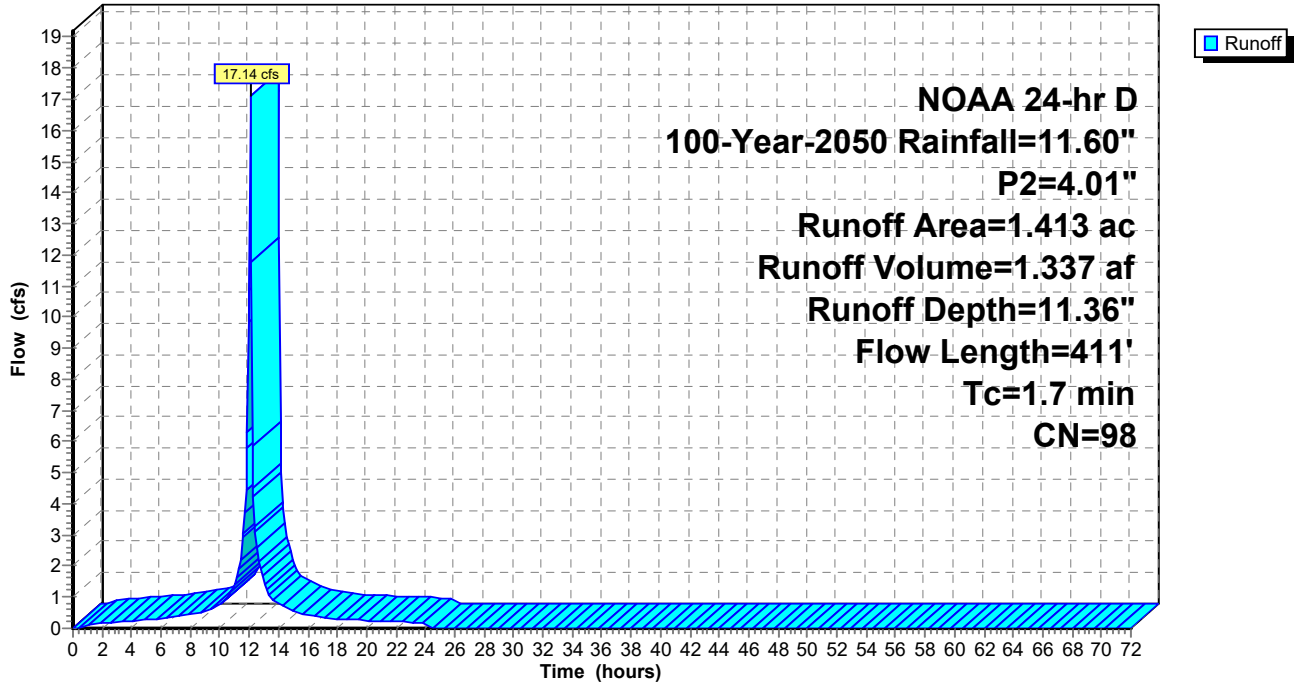
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
1.413	98	Paved parking, HSG D
1.413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.7	411	Total			

Subcatchment E1BI: E1B - IMP

Hydrograph



Summary for Subcatchment E1BP: E1B - Perv

Runoff = 8.42 cfs @ 12.14 hrs, Volume= 0.658 af, Depth= 8.38"
 Routed to Link E1B : Existing 1B

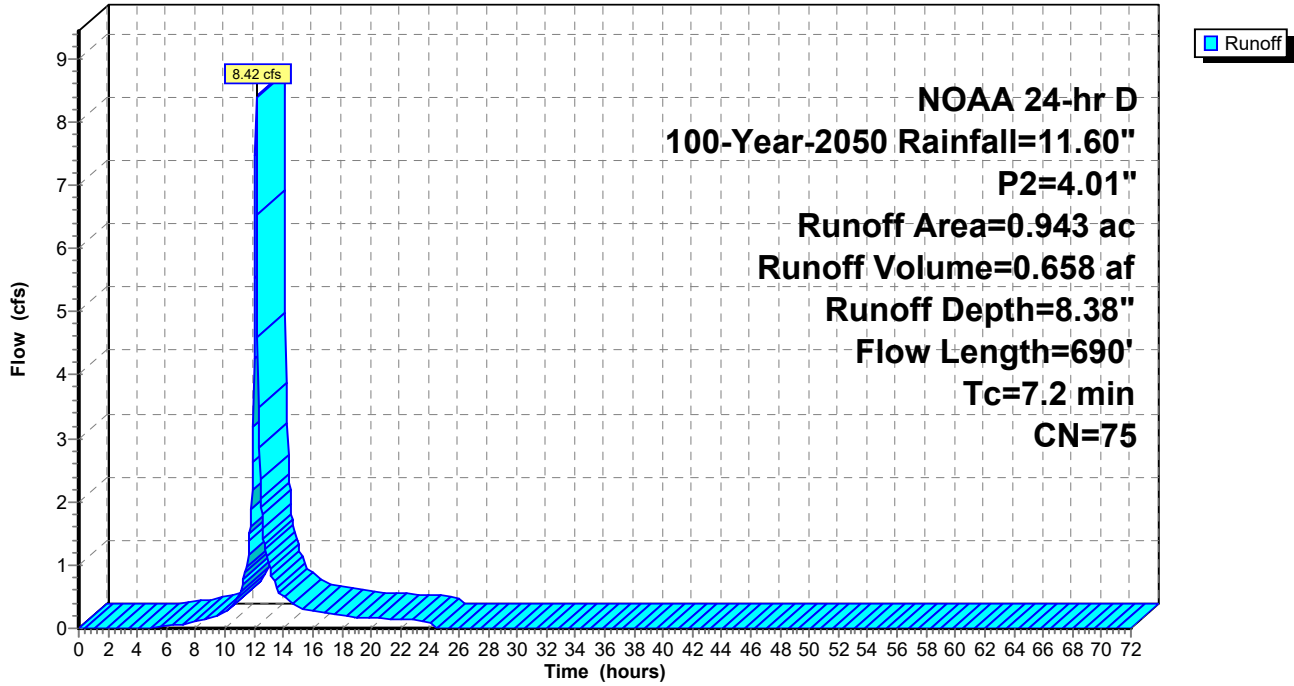
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.805	74	>75% Grass cover, Good, HSG C
0.138	80	>75% Grass cover, Good, HSG D
0.943	75	Weighted Average
0.943		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.0900	0.35		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.5	125	0.0700	4.26		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.2	54	0.0850	4.69		Shallow Concentrated Flow, C-K Unpaved Kv= 16.1 fps
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
7.2	690	Total			

Subcatchment E1BP: E1B - Perv

Hydrograph



EX-PR

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NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

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Summary for Subcatchment EOI: EXO - IMP

Runoff = 0.27 cfs @ 12.06 hrs, Volume= 0.021 af, Depth=11.36"

Routed to Link EO : Existing Offsite

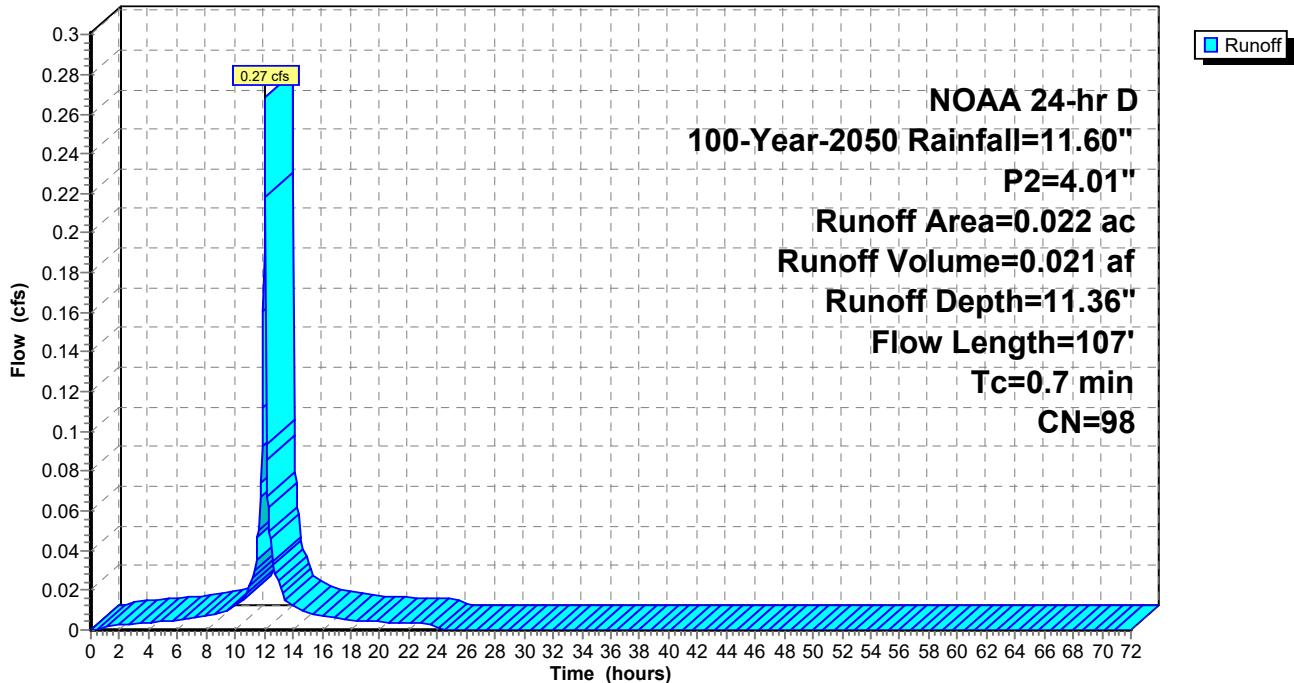
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.022	98	Paved parking, HSG D
0.022		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.7	107	Total			

Subcatchment EOI: EXO - IMP

Hydrograph



EX-PR

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NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

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Summary for Subcatchment EOP: EXO - PERV

Runoff = 3.61 cfs @ 12.08 hrs, Volume= 0.238 af, Depth= 8.52"

Routed to Link EO : Existing Offsite

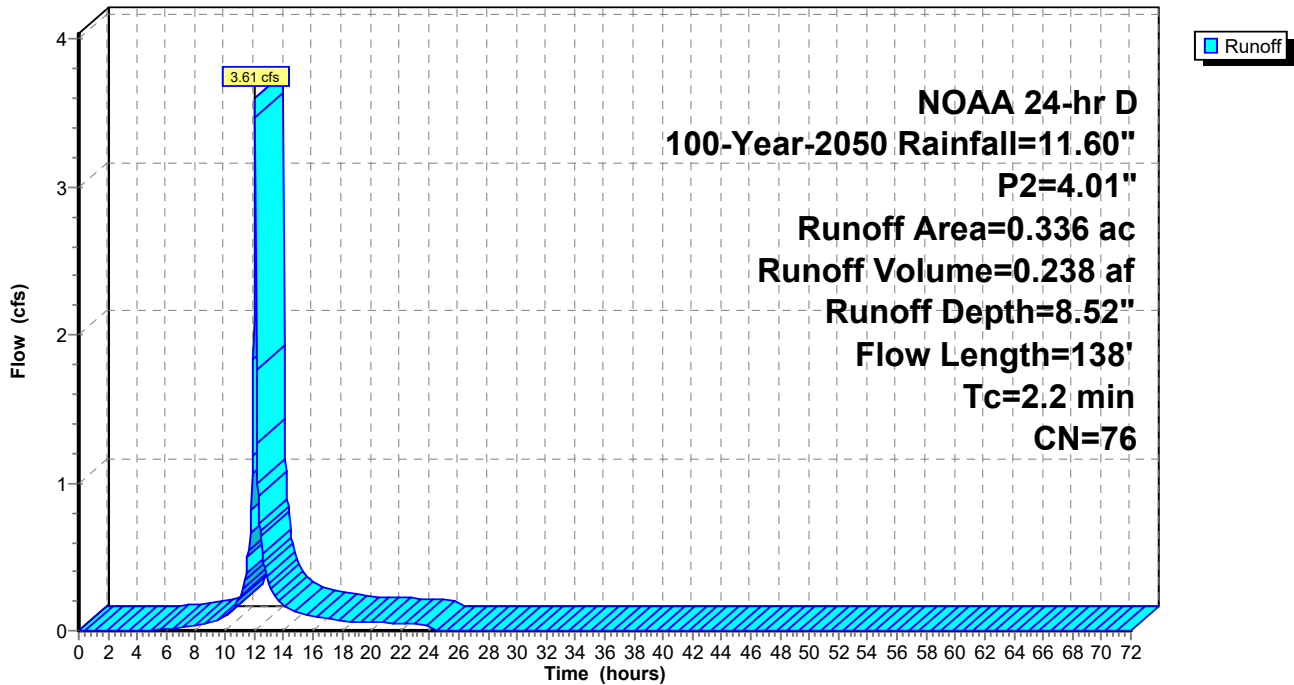
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.248	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.336	76	Weighted Average
0.336		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	31	0.1700	0.35		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
2.2	138	Total			

Subcatchment EOP: EXO - PERV

Hydrograph



Summary for Subcatchment P1AI: P1A - IMP

Runoff = 3.17 cfs @ 12.06 hrs, Volume= 0.245 af, Depth=11.36"
 Routed to Pond B1 : BIORETENTION

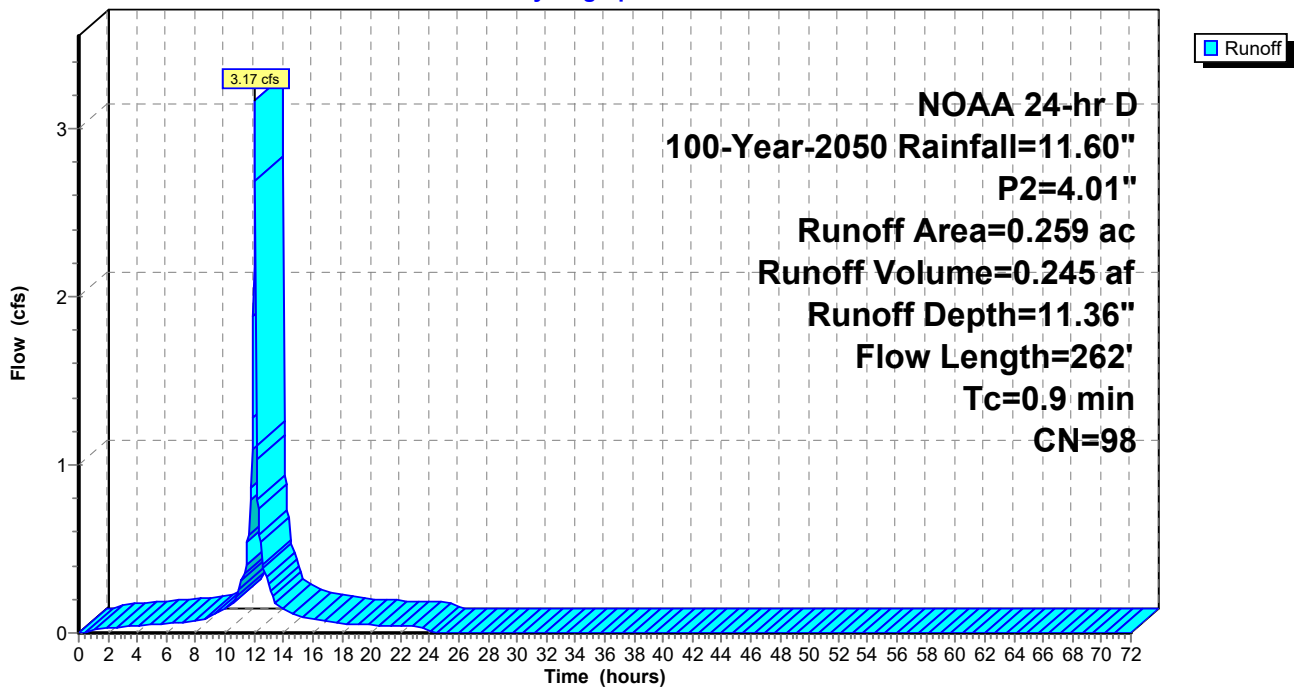
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.259	98	Paved parking, HSG D
0.259		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment P1AI: P1A - IMP

Hydrograph



Summary for Subcatchment P1AP2: P1A - PERV

Runoff = 5.94 cfs @ 12.13 hrs, Volume= 0.466 af, Depth= 9.06"
 Routed to Pond B1 : BIORETENTION

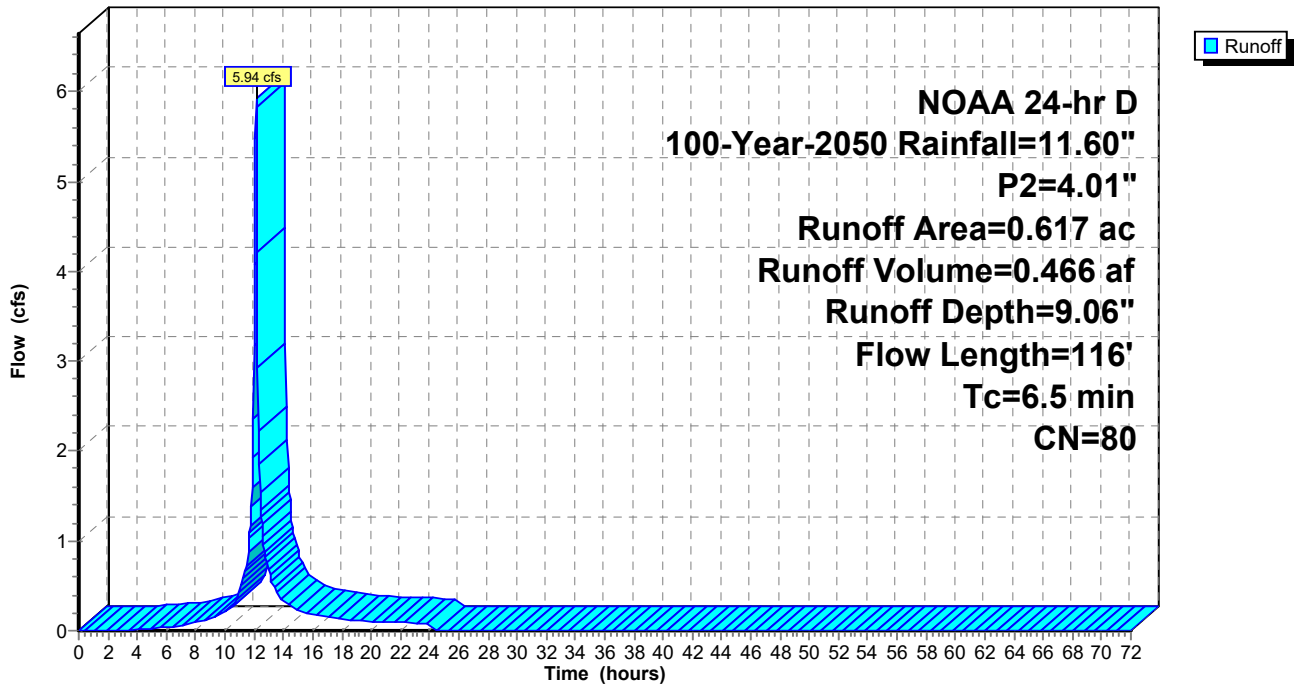
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.617	80	>75% Grass cover, Good, HSG D
0.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	61	0.0320	0.21		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.9	22	0.3200	0.43		Sheet Flow, B-C Grass: Short n= 0.150 P2= 4.01"
0.7	17	0.3000	0.39		Sheet Flow, C-D Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
6.5	116	Total			

Subcatchment P1AP2: P1A - PERV

Hydrograph



Summary for Subcatchment P1BI: P1B - IMP

Runoff = 16.16 cfs @ 12.07 hrs, Volume= 1.103 af, Depth= 9.06"

Routed to Link P1B : Proposed 1B

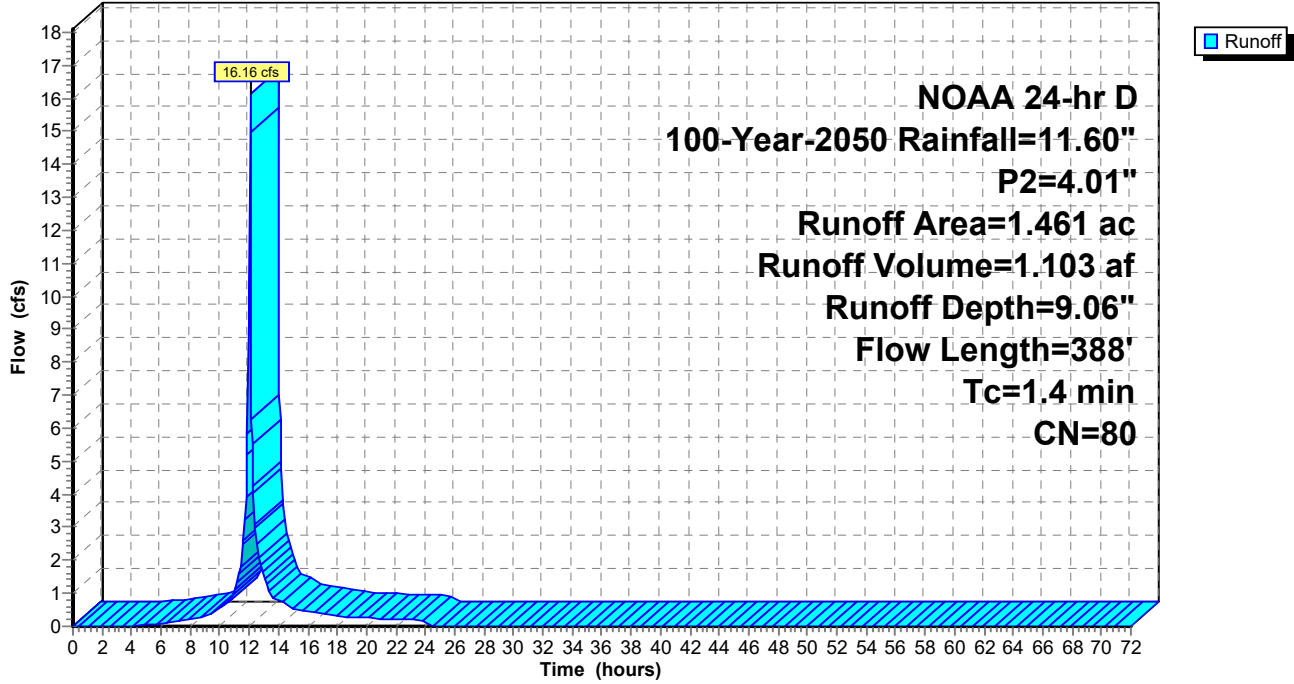
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
1.461	80	>75% Grass cover, Good, HSG D
1.461		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.4	388	Total			

Subcatchment P1BI: P1B - IMP

Hydrograph



EX-PR

NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

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Summary for Subcatchment P1BP: P1B - Perv

Runoff = 8.28 cfs @ 12.14 hrs, Volume= 0.661 af, Depth= 9.06"
 Routed to Link P1B : Proposed 1B

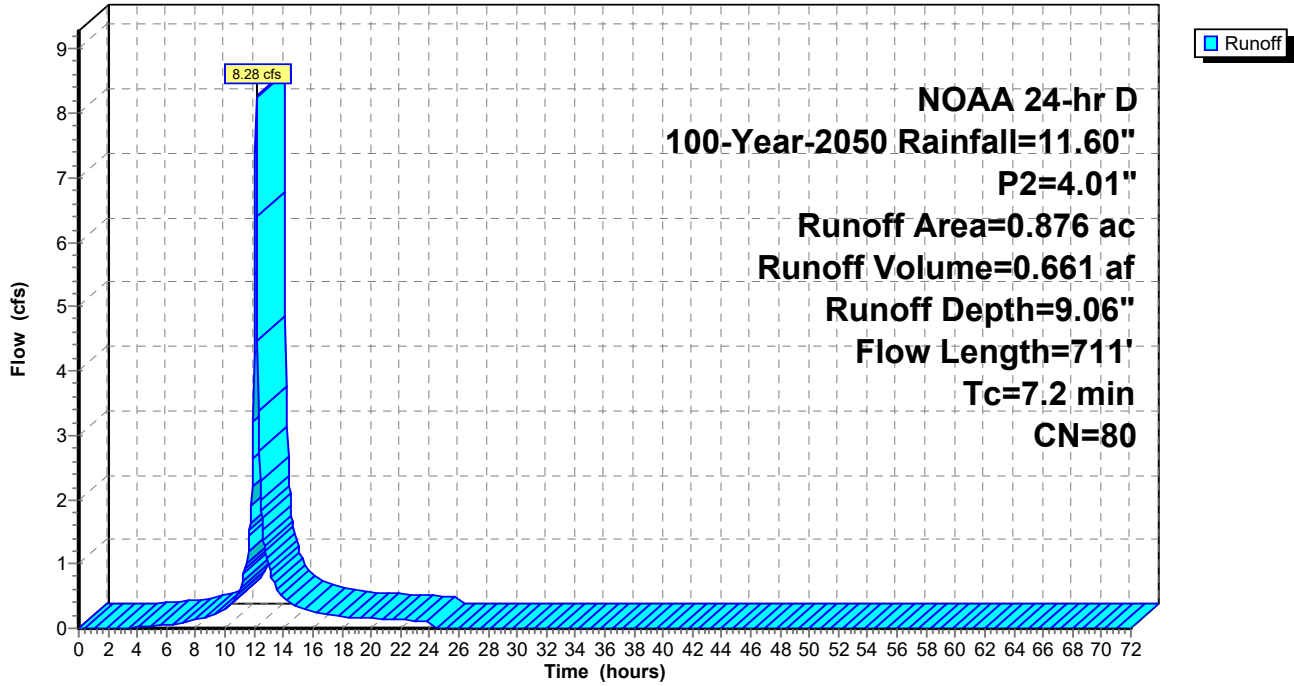
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.750	80	>75% Grass cover, Good, HSG D
0.126	80	>75% Grass cover, Good, HSG D
0.876	80	Weighted Average
0.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.0900	0.35		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.5	127	0.0700	4.26		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
0.2	55	0.0800	4.55		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.2	31	0.0300	2.79		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	10	0.0150	2.49		Shallow Concentrated Flow, E-F
					Paved Kv= 20.3 fps
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H
					Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I
					Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K
					Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
7.2	711	Total			

Subcatchment P1BP: P1B - Perv

Hydrograph



Summary for Subcatchment PBYI: P1A - Bypass Imp

Runoff = 4.43 cfs @ 12.06 hrs, Volume= 0.343 af, Depth=11.36"
 Routed to Link P1A : Proposed 1A

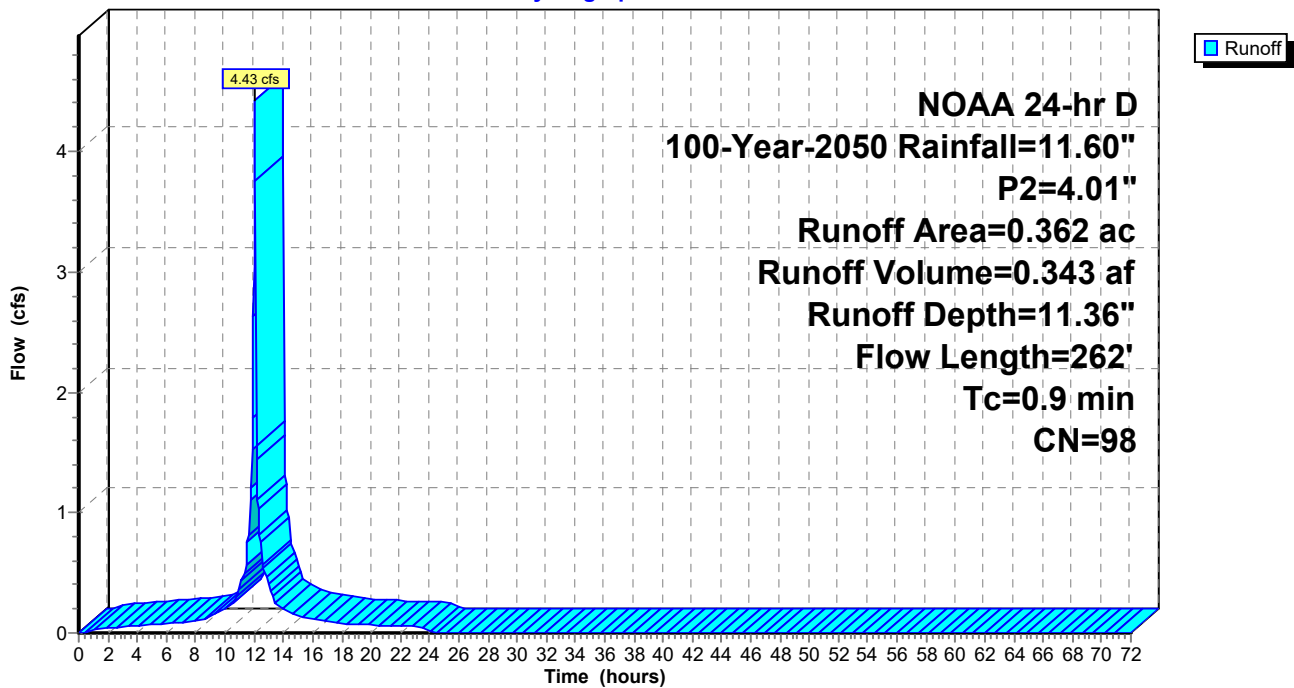
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.362	98	Paved parking, HSG D
0.362		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment PBYI: P1A - Bypass Imp

Hydrograph



Summary for Subcatchment PBYP: P1A - Bypass Perv

Runoff = 0.41 cfs @ 12.13 hrs, Volume= 0.031 af, Depth= 8.38"
 Routed to Link P1A : Proposed 1A

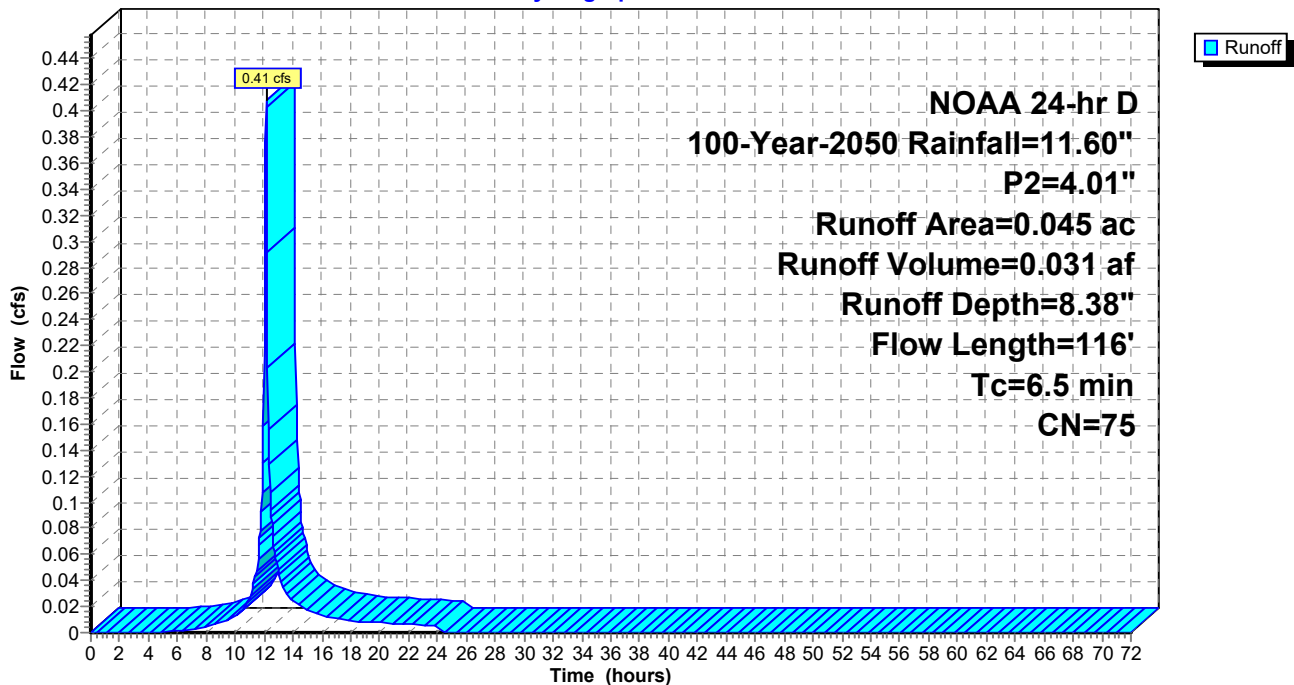
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.039	74	>75% Grass cover, Good, HSG C
0.006	80	>75% Grass cover, Good, HSG D
0.045	75	Weighted Average
0.045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	61	0.0320	0.21		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.9	22	0.3200	0.43		Sheet Flow, B-C Grass: Short n= 0.150 P2= 4.01"
0.7	17	0.3000	0.39		Sheet Flow, C-D Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
6.5	116	Total			

Subcatchment PBYP: P1A - Bypass Perv

Hydrograph



Summary for Subcatchment POI: PRO - IMP

Runoff = 0.57 cfs @ 12.06 hrs, Volume= 0.044 af, Depth=11.36"

Routed to Link PO : Proposed Offsite

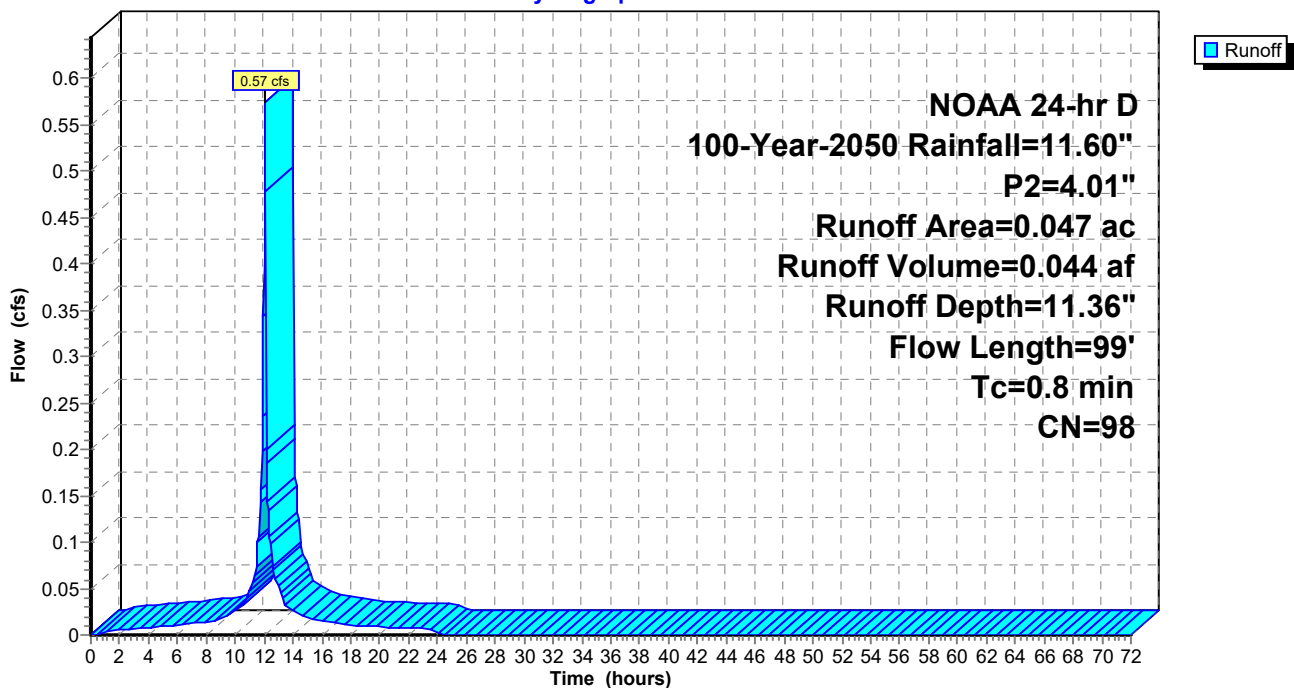
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.047	98	Paved parking, HSG D
0.047		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	1.08		Sheet Flow, D-B Smooth surfaces n= 0.011 P2= 4.01"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.8	99	Total			

Subcatchment POI: PRO - IMP

Hydrograph



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NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

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Summary for Subcatchment POP: PRO - PERV

Runoff = 2.98 cfs @ 12.09 hrs, Volume= 0.204 af, Depth= 8.52"

Routed to Link PO : Proposed Offsite

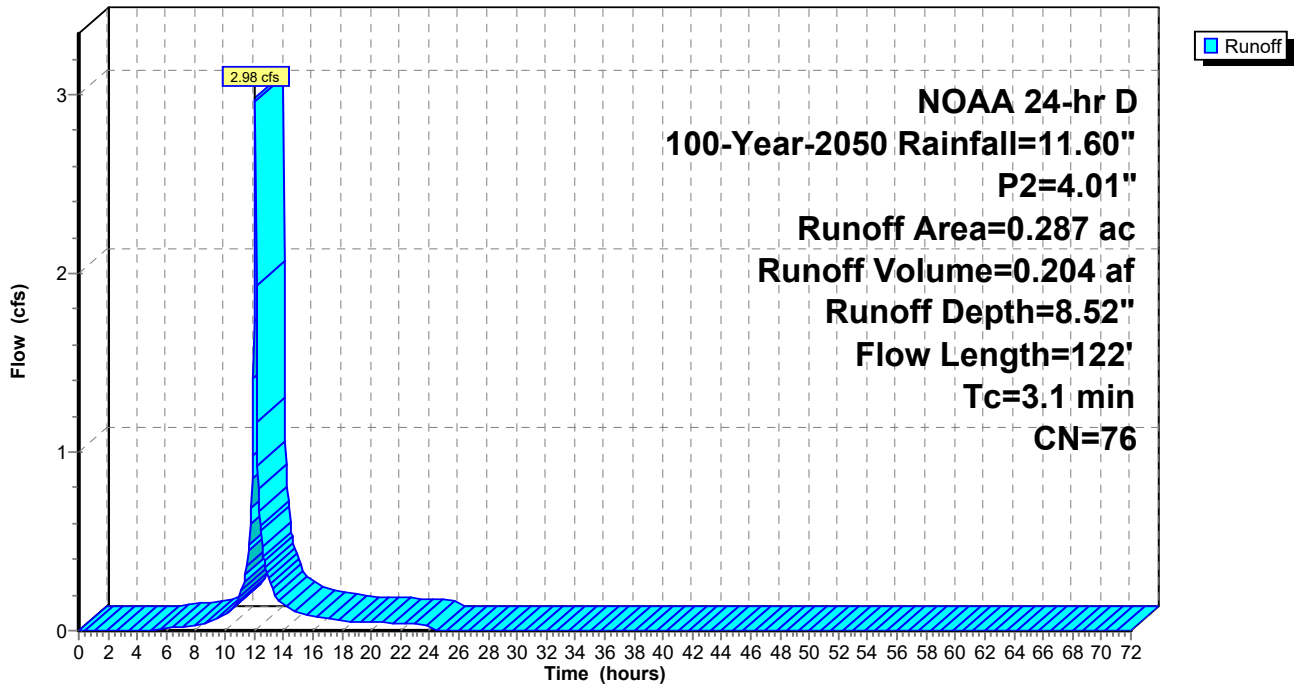
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.199	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.287	76	Weighted Average
0.287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	53	0.0950	0.31		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
3.1	122	Total			

Subcatchment POP: PRO - PERV

Hydrograph



Summary for Pond B1: BIORETENTION

Inflow Area = 0.876 ac, 29.57% Impervious, Inflow Depth = 9.74" for 100-Year-2050 event
 Inflow = 8.17 cfs @ 12.10 hrs, Volume= 0.711 af
 Outflow = 6.97 cfs @ 12.15 hrs, Volume= 0.679 af, Atten= 15%, Lag= 3.5 min
 Primary = 6.97 cfs @ 12.15 hrs, Volume= 0.679 af
 Routed to Link P1A : Proposed 1A

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 134.04' @ 12.15 hrs Surf.Area= 4,117 sf Storage= 7,499 cf

Plug-Flow detention time= 133.1 min calculated for 0.678 af (95% of inflow)
 Center-of-Mass det. time= 107.5 min (881.5 - 774.0)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	11,644 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	3,229	0	0
133.00	3,656	3,443	3,443
134.00	4,097	3,877	7,319
135.00	4,552	4,325	11,644

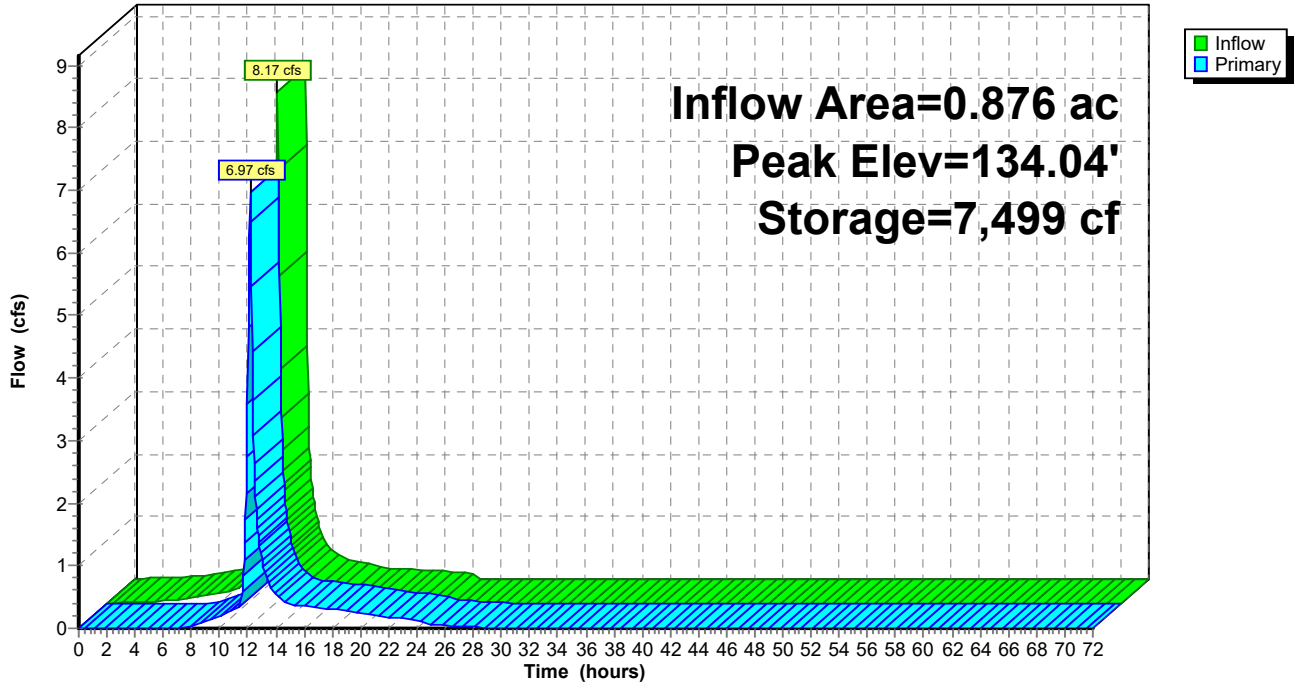
Device	Routing	Invert	Outlet Devices
#1	Primary	130.25'	18.0" Round Culvert L= 157.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.25' / 126.50' S= 0.0239 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	132.42'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.40'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.92 cfs @ 12.15 hrs HW=134.04' (Free Discharge)

- 1=Culvert (Passes 6.92 cfs of 11.71 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.51 cfs @ 5.81 fps)
- 3=Broad-Crested Rectangular Weir(Weir Controls 6.41 cfs @ 2.50 fps)

Pond B1: BIORETENTION

Hydrograph



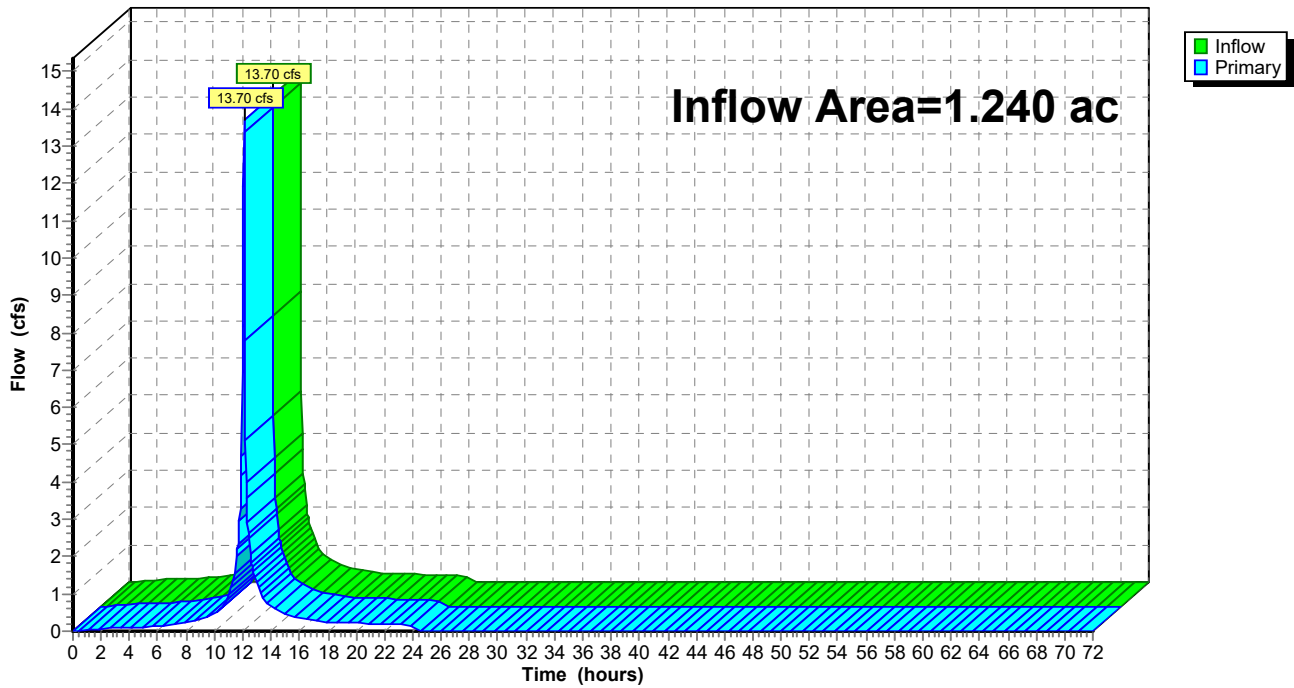
Summary for Link E1A: Existing 1A

Inflow Area = 1.240 ac, 45.16% Impervious, Inflow Depth = 9.65" for 100-Year-2050 event
Inflow = 13.70 cfs @ 12.09 hrs, Volume= 0.997 af
Primary = 13.70 cfs @ 12.09 hrs, Volume= 0.997 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1A: Existing 1A

Hydrograph



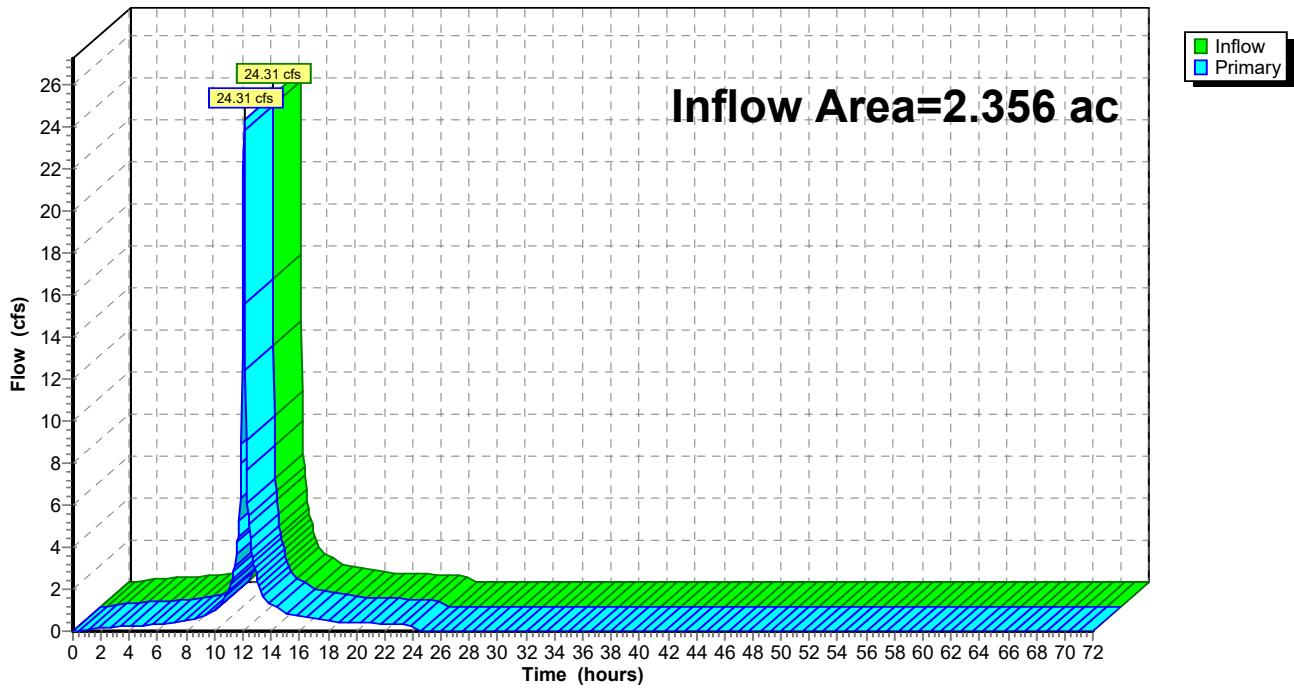
Summary for Link E1B: Existing 1B

Inflow Area = 2.356 ac, 59.97% Impervious, Inflow Depth = 10.17" for 100-Year-2050 event
Inflow = 24.31 cfs @ 12.08 hrs, Volume= 1.996 af
Primary = 24.31 cfs @ 12.08 hrs, Volume= 1.996 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1B: Existing 1B

Hydrograph



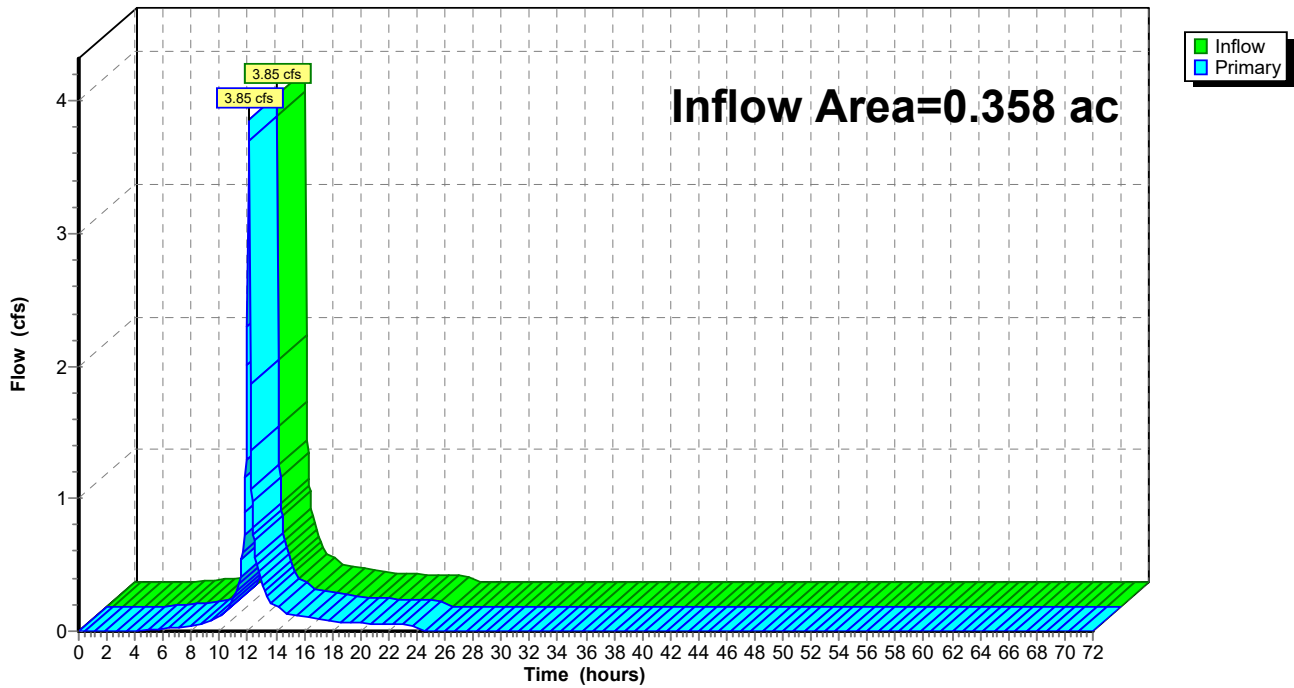
Summary for Link EO: Existing Offsite

Inflow Area = 0.358 ac, 6.15% Impervious, Inflow Depth = 8.69" for 100-Year-2050 event
Inflow = 3.85 cfs @ 12.08 hrs, Volume= 0.259 af
Primary = 3.85 cfs @ 12.08 hrs, Volume= 0.259 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link EO: Existing Offsite

Hydrograph



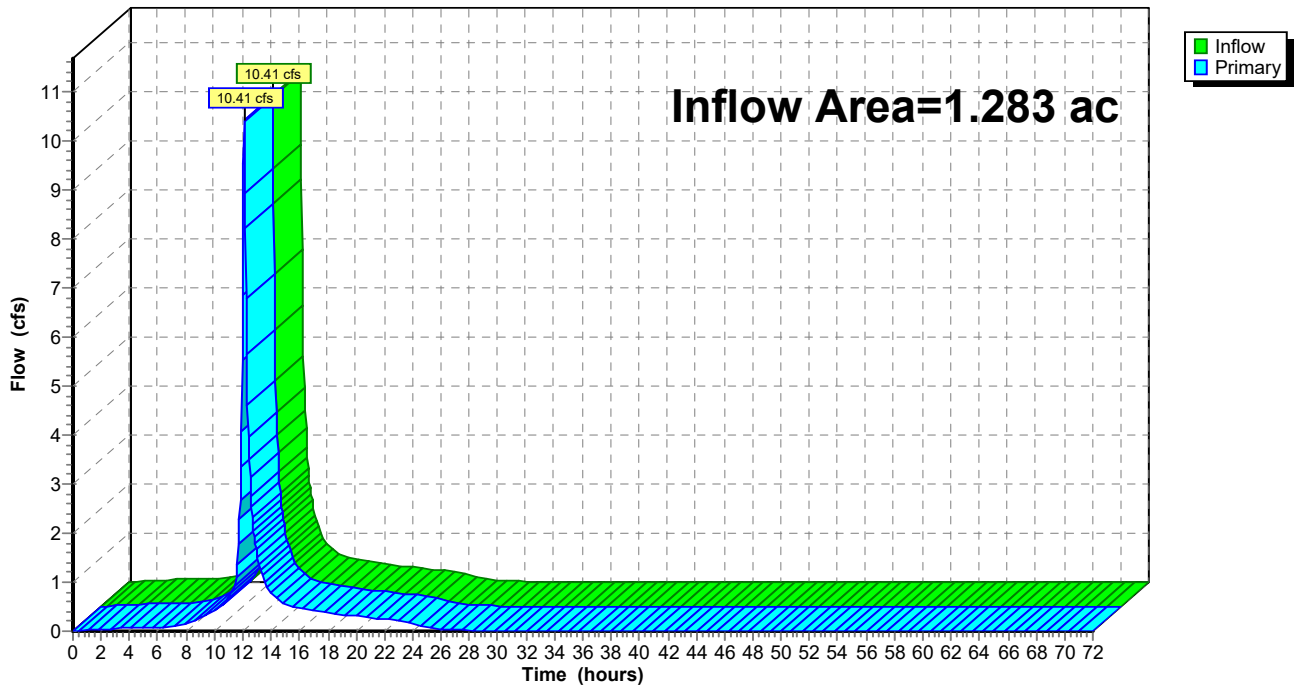
Summary for Link P1A: Proposed 1A

Inflow Area = 1.283 ac, 48.40% Impervious, Inflow Depth = 9.85" for 100-Year-2050 event
Inflow = 10.41 cfs @ 12.09 hrs, Volume= 1.053 af
Primary = 10.41 cfs @ 12.09 hrs, Volume= 1.053 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1A: Proposed 1A

Hydrograph



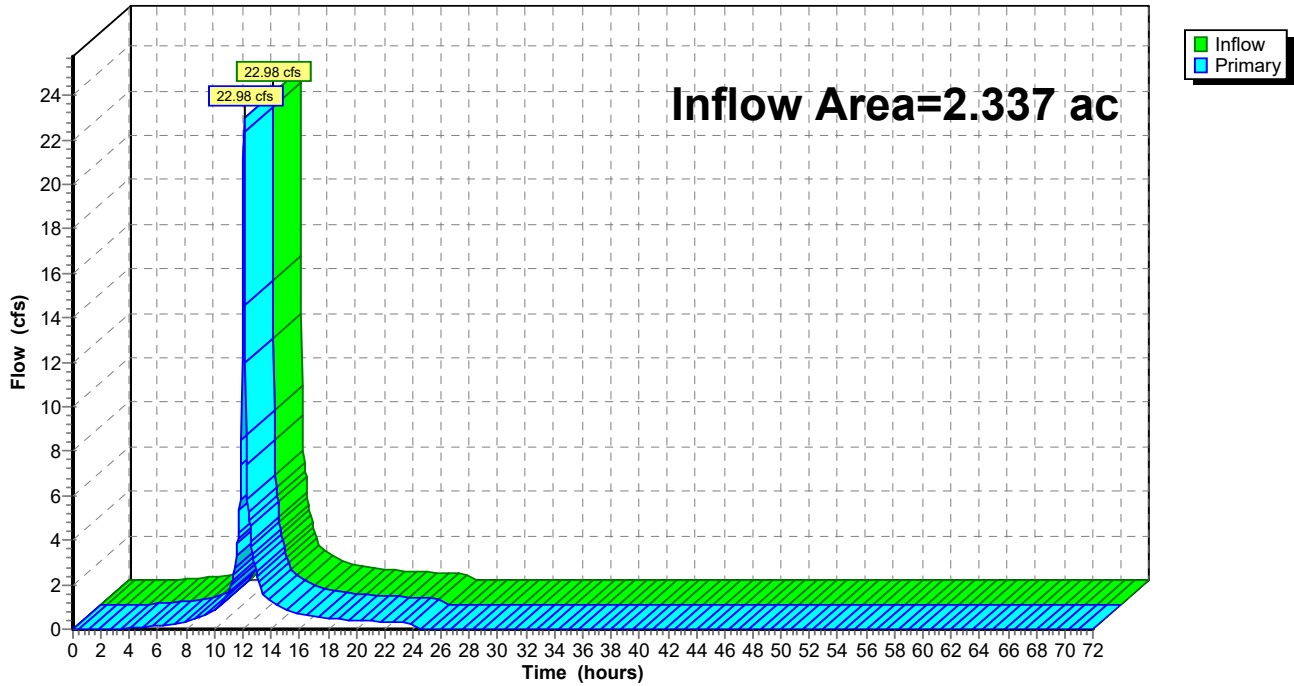
Summary for Link P1B: Proposed 1B

Inflow Area = 2.337 ac, 0.00% Impervious, Inflow Depth = 9.06" for 100-Year-2050 event
Inflow = 22.98 cfs @ 12.08 hrs, Volume= 1.764 af
Primary = 22.98 cfs @ 12.08 hrs, Volume= 1.764 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1B: Proposed 1B

Hydrograph



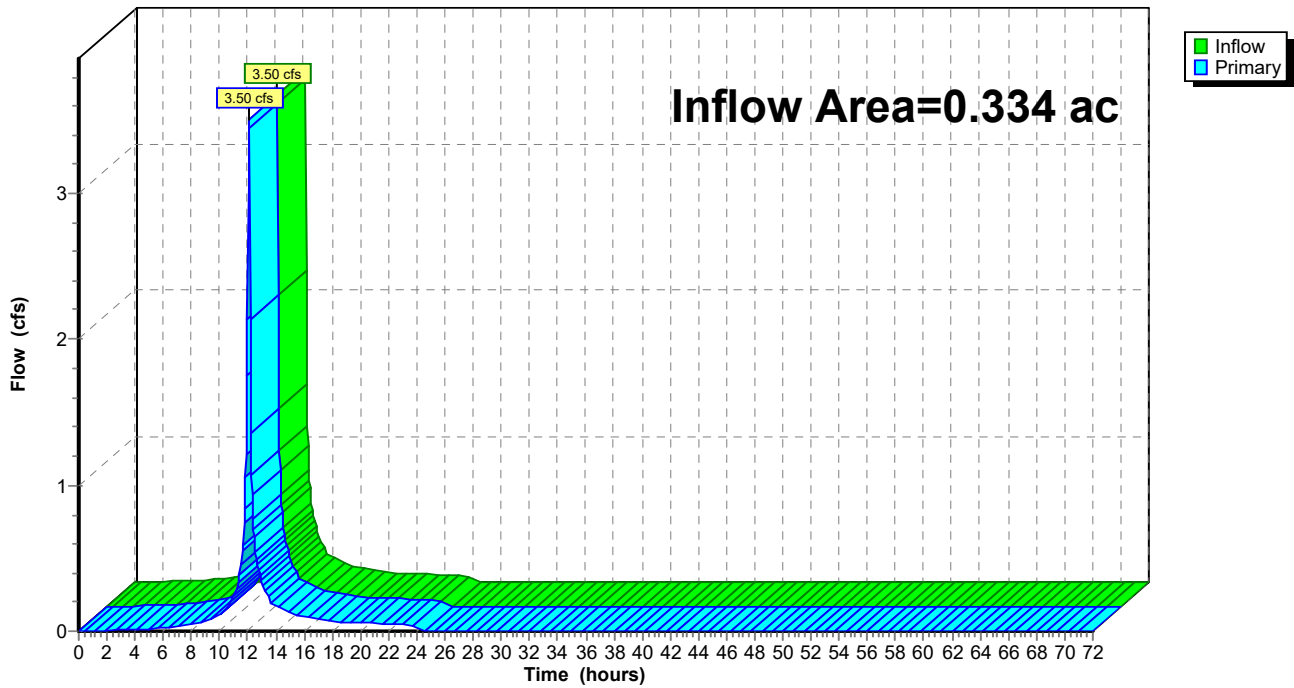
Summary for Link PO: Proposed Offsite

Inflow Area = 0.334 ac, 14.07% Impervious, Inflow Depth = 8.92" for 100-Year-2050 event
Inflow = 3.50 cfs @ 12.09 hrs, Volume= 0.248 af
Primary = 3.50 cfs @ 12.09 hrs, Volume= 0.248 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PO: Proposed Offsite

Hydrograph



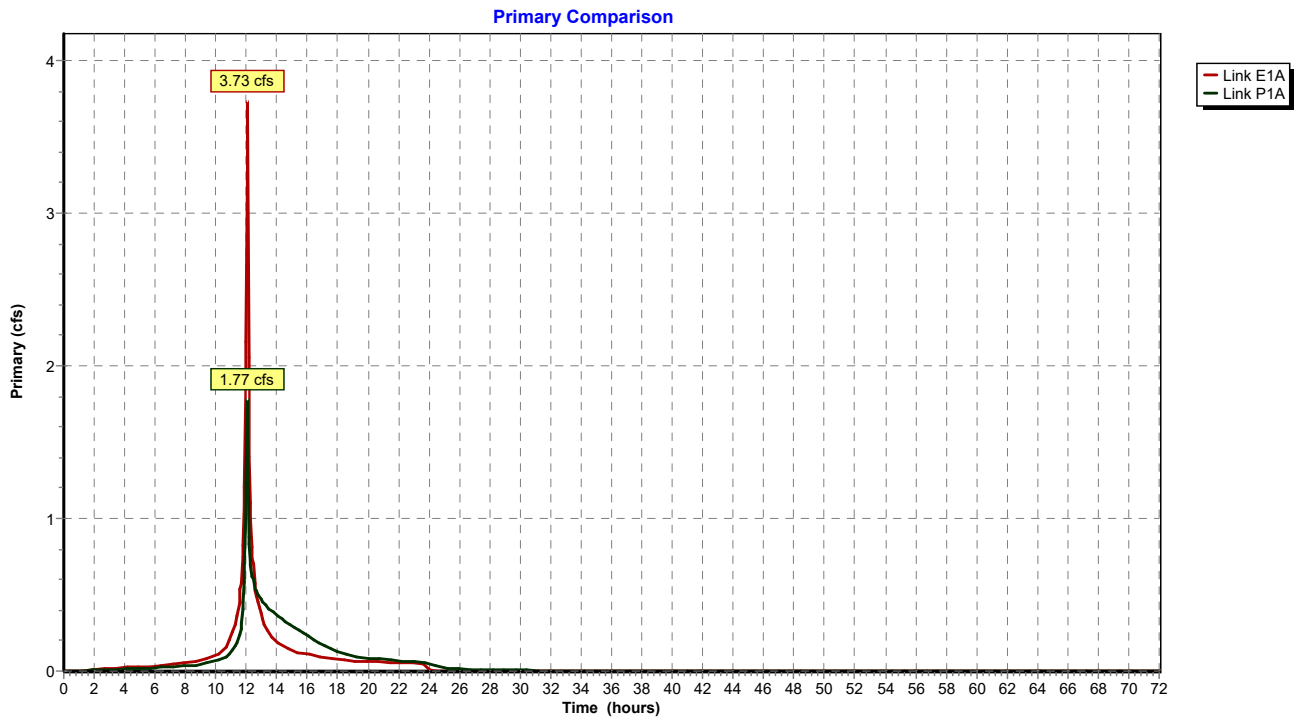
EX-PR

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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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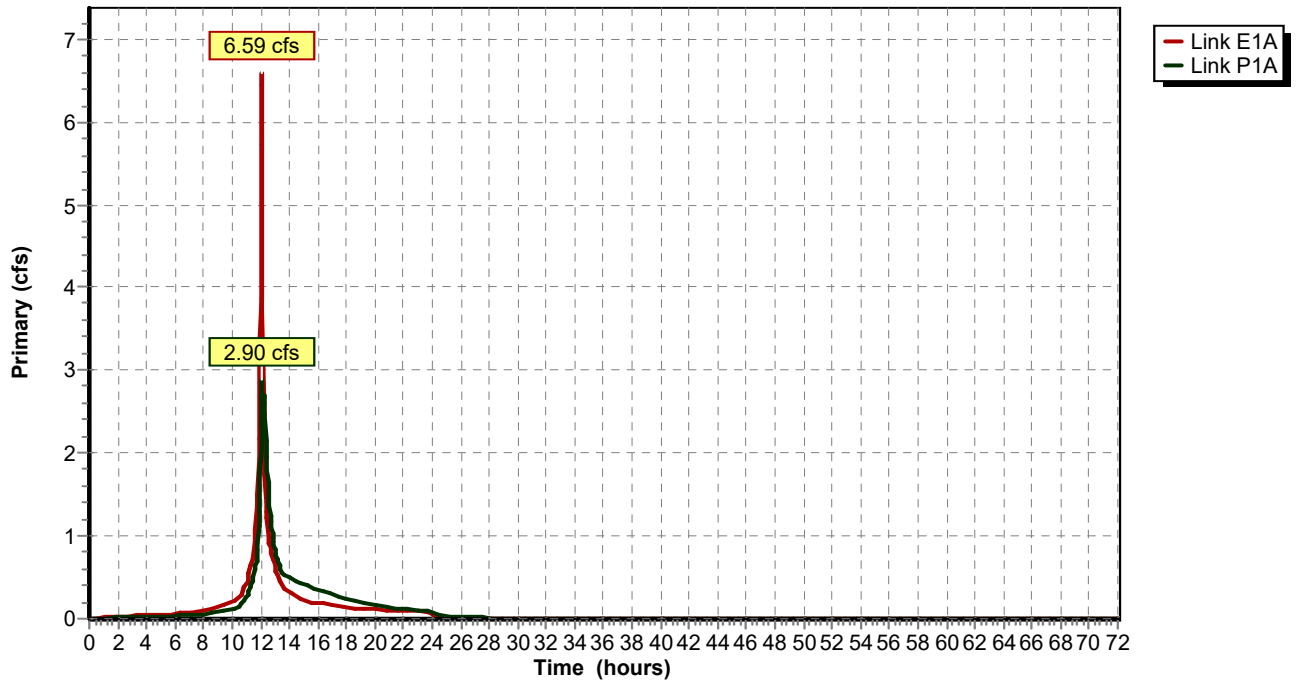
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Printed 7/16/2025

Primary Comparison

Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)
0.00	0.00	0.00	26.00	0.00	0.02	52.00	0.00	0.00
0.50	0.00	0.00	26.50	0.00	0.01	52.50	0.00	0.00
1.00	0.00	0.00	27.00	0.00	0.01	53.00	0.00	0.00
1.50	0.01	0.00	27.50	0.00	0.01	53.50	0.00	0.00
2.00	0.01	0.01	28.00	0.00	0.01	54.00	0.00	0.00
2.50	0.01	0.01	28.50	0.00	0.01	54.50	0.00	0.00
3.00	0.02	0.01	29.00	0.00	0.01	55.00	0.00	0.00
3.50	0.02	0.01	29.50	0.00	0.01	55.50	0.00	0.00
4.00	0.02	0.02	30.00	0.00	0.01	56.00	0.00	0.00
4.50	0.03	0.02	30.50	0.00	0.00	56.50	0.00	0.00
5.00	0.03	0.02	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.03	0.02	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.03	0.02	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.04	0.02	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.04	0.03	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.05	0.03	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.05	0.04	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.06	0.04	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.07	0.04	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.08	0.05	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.11	0.07	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.13	0.08	36.50	0.00	0.00	62.50	0.00	0.00
11.00	0.22	0.12	37.00	0.00	0.00	63.00	0.00	0.00
11.50	0.40	0.21	37.50	0.00	0.00	63.50	0.00	0.00
12.00	2.16	1.23	38.00	0.00	0.00	64.00	0.00	0.00
12.50	0.70	0.59	38.50	0.00	0.00	64.50	0.00	0.00
13.00	0.37	0.47	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.24	0.41	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.20	0.37	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.17	0.33	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.13	0.29	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.12	0.26	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.11	0.23	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.10	0.21	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.09	0.18	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.08	0.15	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.08	0.13	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.07	0.11	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.07	0.10	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.07	0.09	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.07	0.09	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.06	0.08	46.50	0.00	0.00			
21.00	0.06	0.08	47.00	0.00	0.00			
21.50	0.06	0.07	47.50	0.00	0.00			
22.00	0.06	0.07	48.00	0.00	0.00			
22.50	0.05	0.07	48.50	0.00	0.00			
23.00	0.05	0.06	49.00	0.00	0.00			
23.50	0.05	0.06	49.50	0.00	0.00			
24.00	0.05	0.05	50.00	0.00	0.00			
24.50	0.00	0.03	50.50	0.00	0.00			
25.00	0.00	0.02	51.00	0.00	0.00			
25.50	0.00	0.02	51.50	0.00	0.00			

Primary Comparison



EX-PR

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NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Printed 7/16/2025

Primary Comparison

Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)
0.00	0.00	0.00	26.00	0.00	0.02	52.00	0.00	0.00
0.50	0.00	0.00	26.50	0.00	0.02	52.50	0.00	0.00
1.00	0.01	0.01	27.00	0.00	0.02	53.00	0.00	0.00
1.50	0.02	0.01	27.50	0.00	0.01	53.50	0.00	0.00
2.00	0.03	0.02	28.00	0.00	0.01	54.00	0.00	0.00
2.50	0.03	0.02	28.50	0.00	0.01	54.50	0.00	0.00
3.00	0.04	0.02	29.00	0.00	0.01	55.00	0.00	0.00
3.50	0.04	0.03	29.50	0.00	0.01	55.50	0.00	0.00
4.00	0.04	0.03	30.00	0.00	0.01	56.00	0.00	0.00
4.50	0.05	0.03	30.50	0.00	0.01	56.50	0.00	0.00
5.00	0.05	0.03	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.05	0.03	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.06	0.04	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.06	0.04	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.07	0.05	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.08	0.05	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.10	0.06	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.11	0.06	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.12	0.07	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.16	0.09	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.21	0.11	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.26	0.14	36.50	0.00	0.00	62.50	0.00	0.00
11.00	0.42	0.26	37.00	0.00	0.00	63.00	0.00	0.00
11.50	0.74	0.51	37.50	0.00	0.00	63.50	0.00	0.00
12.00	3.87	2.05	38.00	0.00	0.00	64.00	0.00	0.00
12.50	1.21	1.64	38.50	0.00	0.00	64.50	0.00	0.00
13.00	0.64	0.84	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.42	0.56	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.33	0.49	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.28	0.45	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.23	0.42	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.20	0.39	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.19	0.36	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.17	0.33	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.16	0.30	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.14	0.27	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.13	0.24	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.12	0.22	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.12	0.19	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.11	0.17	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.11	0.16	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.11	0.14	46.50	0.00	0.00			
21.00	0.10	0.13	47.00	0.00	0.00			
21.50	0.10	0.12	47.50	0.00	0.00			
22.00	0.09	0.12	48.00	0.00	0.00			
22.50	0.09	0.11	48.50	0.00	0.00			
23.00	0.09	0.10	49.00	0.00	0.00			
23.50	0.08	0.10	49.50	0.00	0.00			
24.00	0.08	0.09	50.00	0.00	0.00			
24.50	0.00	0.05	50.50	0.00	0.00			
25.00	0.00	0.04	51.00	0.00	0.00			
25.50	0.00	0.03	51.50	0.00	0.00			

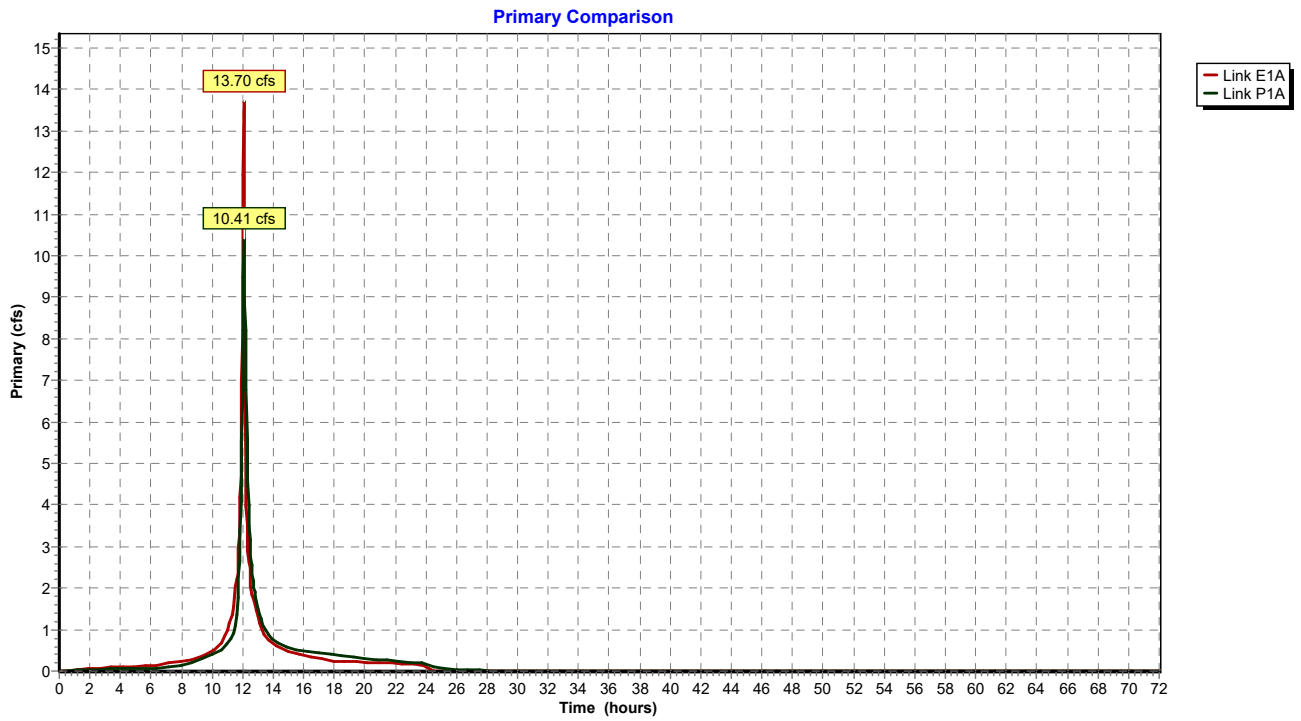
EX-PR

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NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Printed 7/16/2025



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NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

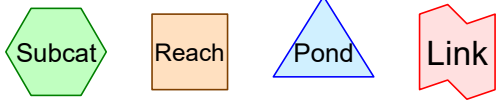
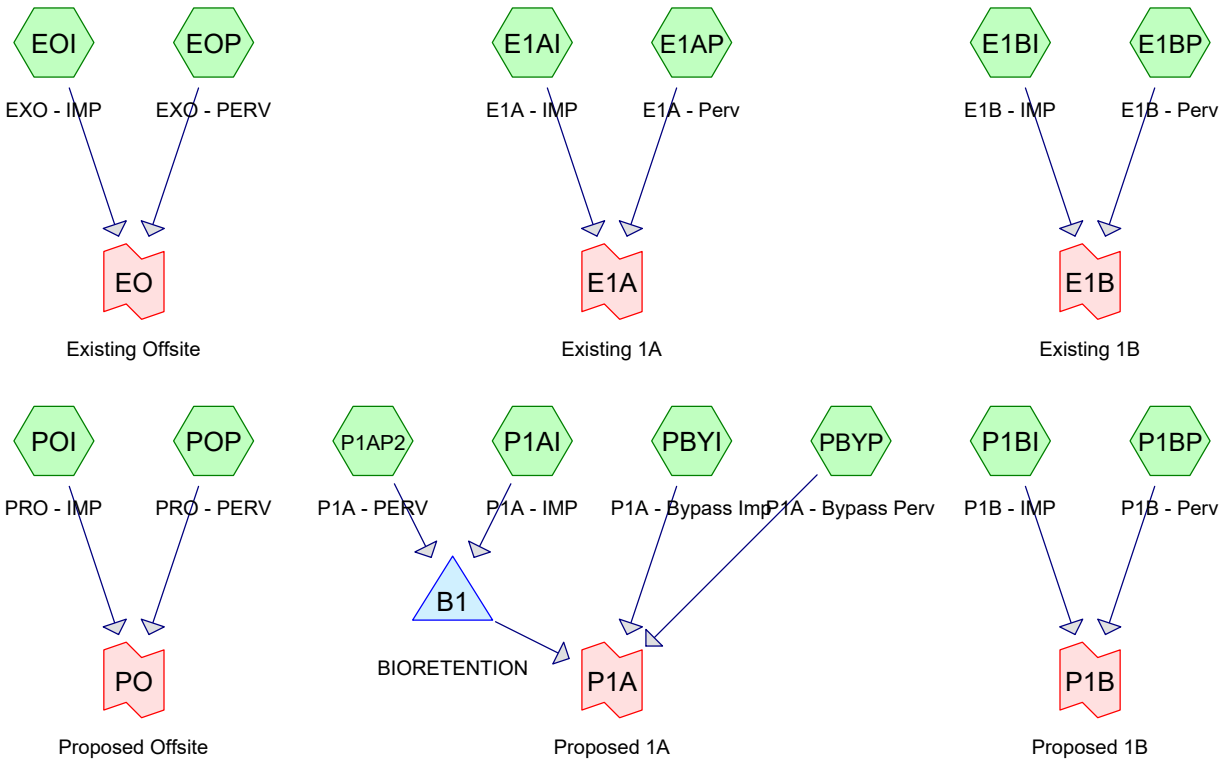
Printed 7/16/2025

Primary Comparison

Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)	Time (hours)	Link E1A (cfs)	Link P1A (cfs)
0.00	0.00	0.00	26.00	0.00	0.04	52.00	0.00	0.00
0.50	0.01	0.01	26.50	0.00	0.03	52.50	0.00	0.00
1.00	0.04	0.03	27.00	0.00	0.02	53.00	0.00	0.00
1.50	0.06	0.04	27.50	0.00	0.02	53.50	0.00	0.00
2.00	0.07	0.04	28.00	0.00	0.02	54.00	0.00	0.00
2.50	0.08	0.05	28.50	0.00	0.01	54.50	0.00	0.00
3.00	0.08	0.05	29.00	0.00	0.01	55.00	0.00	0.00
3.50	0.09	0.06	29.50	0.00	0.01	55.50	0.00	0.00
4.00	0.09	0.06	30.00	0.00	0.01	56.00	0.00	0.00
4.50	0.10	0.06	30.50	0.00	0.01	56.50	0.00	0.00
5.00	0.11	0.07	31.00	0.00	0.01	57.00	0.00	0.00
5.50	0.12	0.07	31.50	0.00	0.01	57.50	0.00	0.00
6.00	0.13	0.07	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.16	0.08	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.18	0.09	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.21	0.11	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.24	0.15	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.27	0.20	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.31	0.25	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.40	0.33	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.50	0.40	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.61	0.48	36.50	0.00	0.00	62.50	0.00	0.00
11.00	0.97	0.67	37.00	0.00	0.00	63.00	0.00	0.00
11.50	1.64	1.02	37.50	0.00	0.00	63.50	0.00	0.00
12.00	8.19	6.86	38.00	0.00	0.00	64.00	0.00	0.00
12.50	2.45	3.15	38.50	0.00	0.00	64.50	0.00	0.00
13.00	1.29	1.55	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.83	1.01	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.67	0.76	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.56	0.64	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.45	0.54	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.40	0.51	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.37	0.49	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.34	0.47	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.31	0.44	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.28	0.42	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.25	0.39	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.24	0.37	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.23	0.35	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.22	0.33	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.22	0.31	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.21	0.29	46.50	0.00	0.00			
21.00	0.20	0.28	47.00	0.00	0.00			
21.50	0.19	0.26	47.50	0.00	0.00			
22.00	0.18	0.24	48.00	0.00	0.00			
22.50	0.18	0.23	48.50	0.00	0.00			
23.00	0.17	0.22	49.00	0.00	0.00			
23.50	0.16	0.20	49.50	0.00	0.00			
24.00	0.15	0.18	50.00	0.00	0.00			
24.50	0.00	0.10	50.50	0.00	0.00			
25.00	0.00	0.07	51.00	0.00	0.00			
25.50	0.00	0.05	51.50	0.00	0.00			

C. WATER QUALITY

- ◆ **Water Quality Storm Hydrograph**
- ◆ **Water Quality Storm Basin Drain Time**



EX-PR

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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1AI: E1A - IMP	Runoff Area=0.560 ac 100.00% Impervious Runoff Depth=1.03" Flow Length=372' Tc=2.0 min CN=98 Runoff=1.71 cfs 0.048 af
SubcatchmentE1AP: E1A - Perv	Runoff Area=0.680 ac 0.00% Impervious Runoff Depth=0.07" Flow Length=409' Tc=3.3 min CN=74 Runoff=0.11 cfs 0.004 af
SubcatchmentE1BI: E1B - IMP	Runoff Area=1.413 ac 100.00% Impervious Runoff Depth=1.03" Flow Length=411' Tc=1.7 min CN=98 Runoff=4.36 cfs 0.122 af
SubcatchmentE1BP: E1B - Perv	Runoff Area=0.943 ac 0.00% Impervious Runoff Depth=0.09" Flow Length=690' Tc=7.2 min CN=75 Runoff=0.17 cfs 0.007 af
SubcatchmentEOI: EXO - IMP	Runoff Area=0.022 ac 100.00% Impervious Runoff Depth=1.03" Flow Length=107' Tc=0.7 min CN=98 Runoff=0.07 cfs 0.002 af
SubcatchmentEOP: EXO - PERV	Runoff Area=0.336 ac 0.00% Impervious Runoff Depth=0.10" Flow Length=138' Tc=2.2 min CN=76 Runoff=0.10 cfs 0.003 af
SubcatchmentP1AI: P1A - IMP	Runoff Area=0.259 ac 100.00% Impervious Runoff Depth=1.03" Flow Length=262' Tc=0.9 min CN=98 Runoff=0.82 cfs 0.022 af
SubcatchmentP1AP2: P1A - PERV	Runoff Area=0.617 ac 0.00% Impervious Runoff Depth=0.17" Flow Length=116' Tc=6.5 min CN=80 Runoff=0.29 cfs 0.009 af
SubcatchmentP1BI: P1B - IMP	Runoff Area=1.461 ac 0.00% Impervious Runoff Depth=0.17" Flow Length=388' Tc=1.4 min CN=80 Runoff=0.82 cfs 0.021 af
SubcatchmentP1BP: P1B - Perv	Runoff Area=0.876 ac 0.00% Impervious Runoff Depth=0.17" Flow Length=711' Tc=7.2 min CN=80 Runoff=0.40 cfs 0.013 af
SubcatchmentPBYI: P1A - Bypass Imp	Runoff Area=0.362 ac 100.00% Impervious Runoff Depth=1.03" Flow Length=262' Tc=0.9 min CN=98 Runoff=1.15 cfs 0.031 af
SubcatchmentPBYP: P1A - Bypass Perv	Runoff Area=0.045 ac 0.00% Impervious Runoff Depth=0.09" Flow Length=116' Tc=6.5 min CN=75 Runoff=0.01 cfs 0.000 af
SubcatchmentPOI: PRO - IMP	Runoff Area=0.047 ac 100.00% Impervious Runoff Depth=1.03" Flow Length=99' Tc=0.8 min CN=98 Runoff=0.15 cfs 0.004 af
SubcatchmentPOP: PRO - PERV	Runoff Area=0.287 ac 0.00% Impervious Runoff Depth=0.10" Flow Length=122' Tc=3.1 min CN=76 Runoff=0.08 cfs 0.002 af
Pond B1: BIORETENTION	Peak Elev=132.41' Storage=1,360 cf Inflow=0.86 cfs 0.031 af Outflow=0.00 cfs 0.000 af
Link E1A: Existing 1A	Inflow=1.71 cfs 0.052 af Primary=1.71 cfs 0.052 af

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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Link E1B: Existing 1B

Inflow=4.36 cfs 0.129 af
Primary=4.36 cfs 0.129 af

Link EO: Existing Offsite

Inflow=0.14 cfs 0.005 af
Primary=0.14 cfs 0.005 af

Link P1A: Proposed 1A

Inflow=1.14 cfs 0.032 af
Primary=1.14 cfs 0.032 af

Link P1B: Proposed 1B

Inflow=1.06 cfs 0.034 af
Primary=1.06 cfs 0.034 af

Link PO: Proposed Offsite

Inflow=0.17 cfs 0.006 af
Primary=0.17 cfs 0.006 af

Total Runoff Area = 7.908 ac Runoff Volume = 0.289 af Average Runoff Depth = 0.44"
66.33% Pervious = 5.245 ac 33.67% Impervious = 2.663 ac

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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment E1A1: E1A - IMP

Runoff = 1.71 cfs @ 1.04 hrs, Volume= 0.048 af, Depth= 1.03"

Routed to Link E1A : Existing 1A

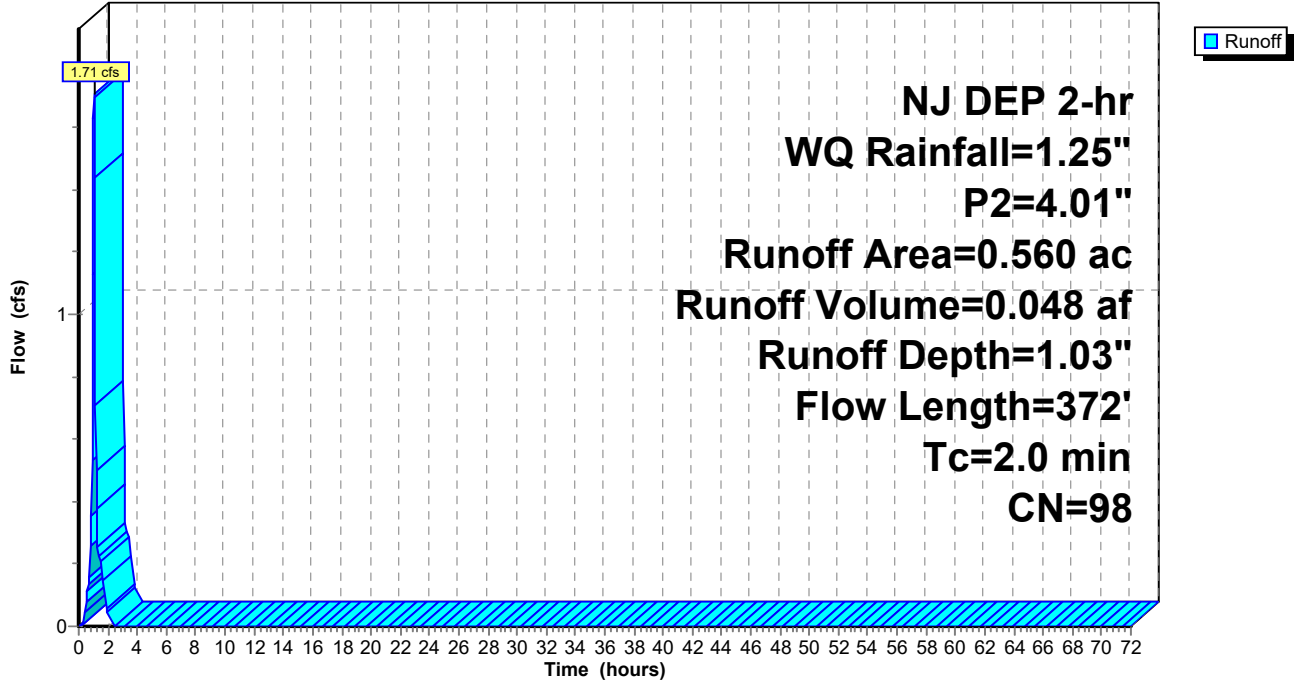
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.560	98	Paved parking, HSG D
0.560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	41	0.0060	0.80		Sheet Flow, H-I Smooth surfaces n= 0.011 P2= 4.01"
0.0	10	0.0300	3.52		Shallow Concentrated Flow, I-C Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
2.0	372	Total			

Subcatchment E1AI: E1A - IMP

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment E1AP: E1A - Perv

Runoff = 0.11 cfs @ 1.16 hrs, Volume= 0.004 af, Depth= 0.07"

Routed to Link E1A : Existing 1A

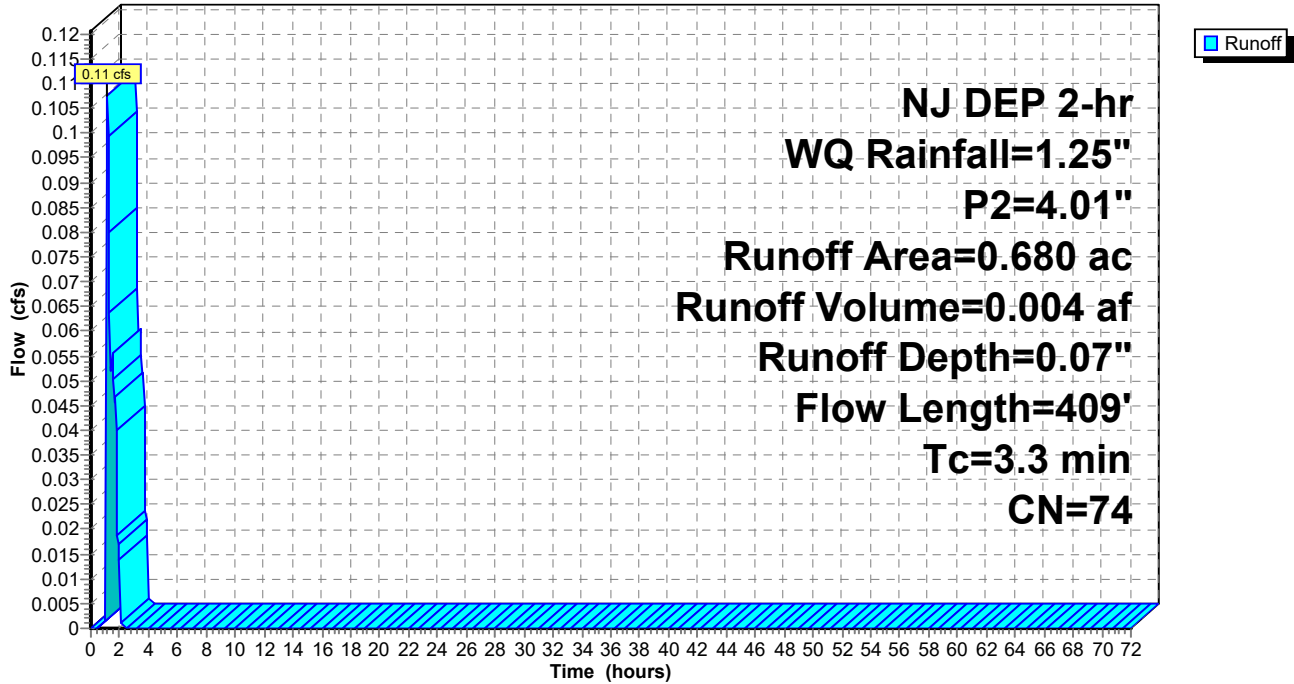
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.676	74	>75% Grass cover, Good, HSG C
0.004	80	>75% Grass cover, Good, HSG D
0.680	74	Weighted Average
0.680		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	35	0.1500	0.35		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.5	53	0.0090	1.93		Shallow Concentrated Flow, B-C
					Paved Kv= 20.3 fps
0.4	131	0.1200	5.58		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.1	20	0.1000	5.09		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	33	0.1200	5.58		Shallow Concentrated Flow, E-F
					Unpaved Kv= 16.1 fps
0.5	137	0.0600	4.97		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
3.3	409	Total			

Subcatchment E1AP: E1A - Perv

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment E1BI: E1B - IMP

Runoff = 4.36 cfs @ 1.03 hrs, Volume= 0.122 af, Depth= 1.03"

Routed to Link E1B : Existing 1B

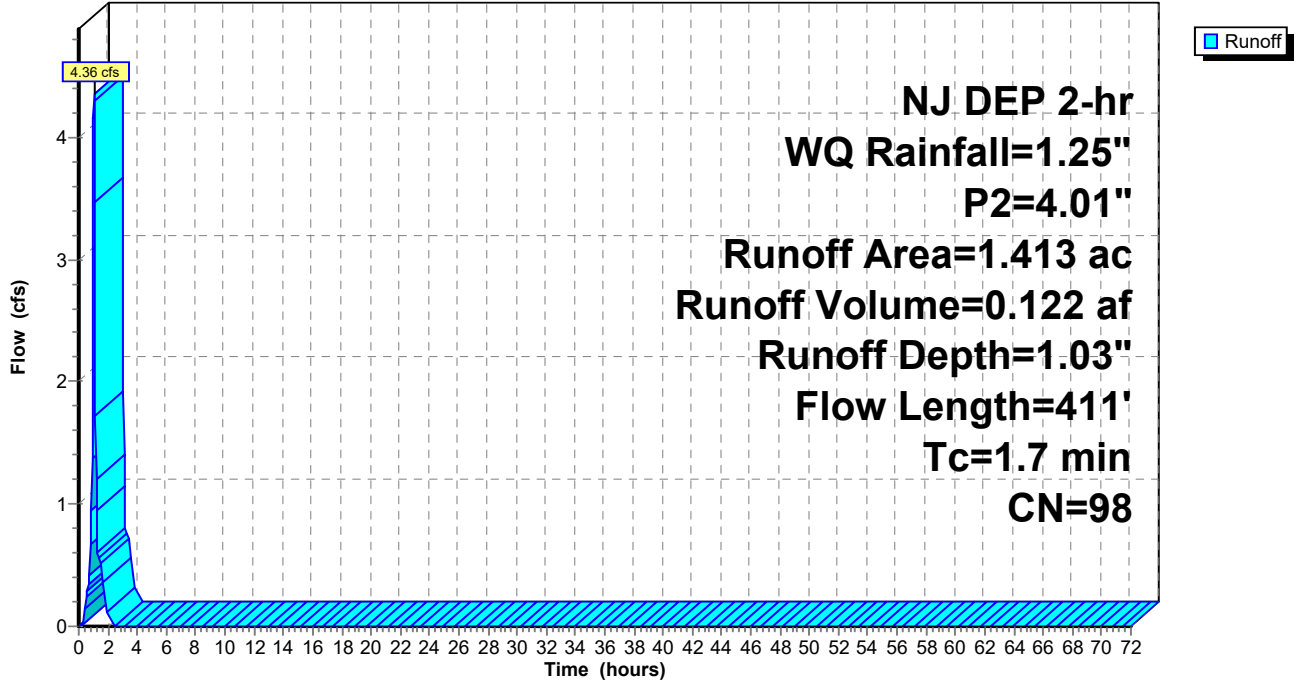
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
1.413	98	Paved parking, HSG D
1.413		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.7	411	Total			

Subcatchment E1BI: E1B - IMP

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment E1BP: E1B - Perv

Runoff = 0.17 cfs @ 1.21 hrs, Volume= 0.007 af, Depth= 0.09"

Routed to Link E1B : Existing 1B

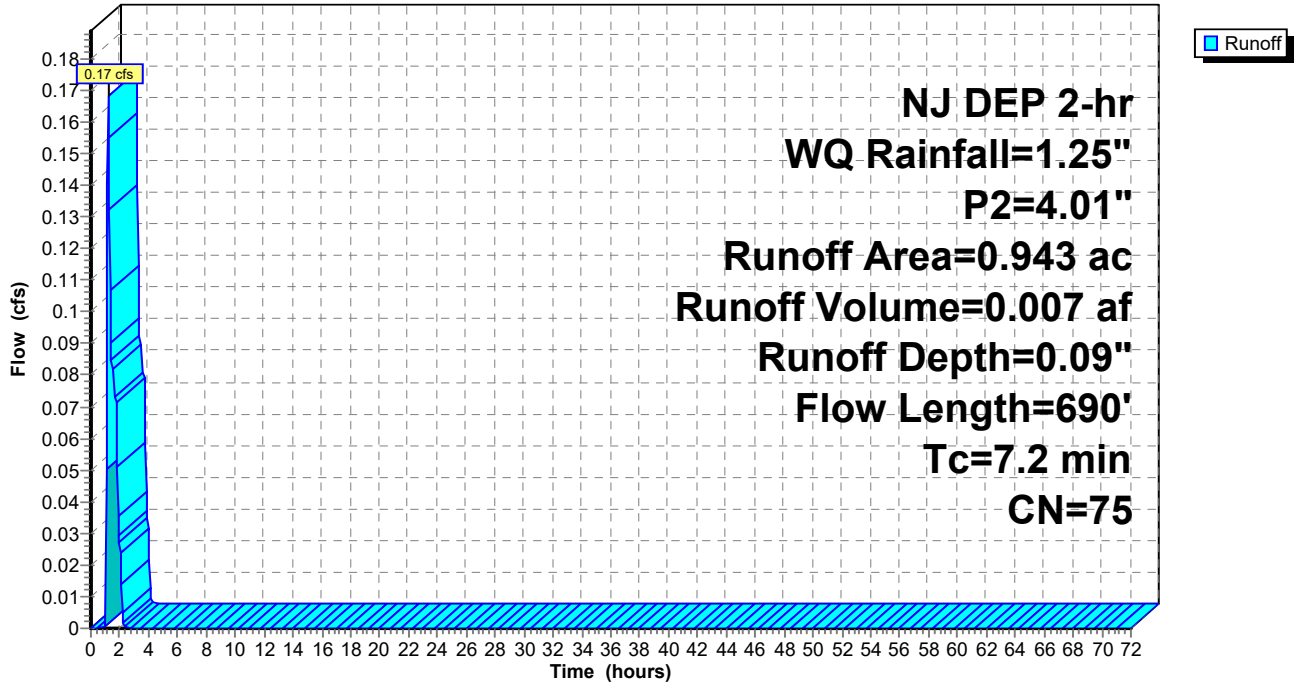
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.805	74	>75% Grass cover, Good, HSG C
0.138	80	>75% Grass cover, Good, HSG D
0.943	75	Weighted Average
0.943		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.0900	0.35		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.5	125	0.0700	4.26		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.2	54	0.0850	4.69		Shallow Concentrated Flow, C-K Unpaved Kv= 16.1 fps
0.3	30	0.0150	1.97		Shallow Concentrated Flow, K-D Unpaved Kv= 16.1 fps
0.2	55	0.1200	5.58		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.8	213	0.0440	4.26		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.2	40	0.0350	3.80		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, H-I 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, I-J 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
7.2	690	Total			

Subcatchment E1BP: E1B - Perv

Hydrograph



EX-PR

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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment EOI: EXO - IMP

Runoff = 0.07 cfs @ 1.03 hrs, Volume= 0.002 af, Depth= 1.03"

Routed to Link EO : Existing Offsite

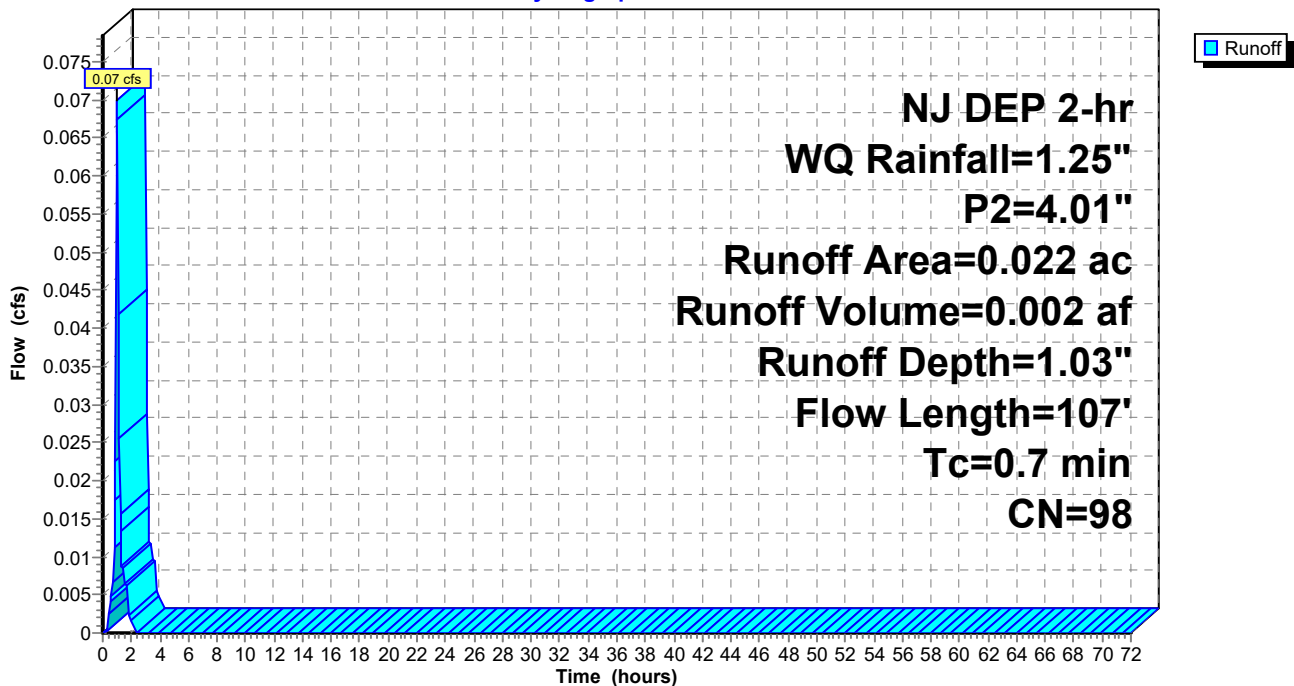
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.022	98	Paved parking, HSG D
0.022		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.7	107	Total			

Subcatchment EOI: EXO - IMP

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment EOP: EXO - PERV

Runoff = 0.10 cfs @ 1.11 hrs, Volume= 0.003 af, Depth= 0.10"
 Routed to Link EO : Existing Offsite

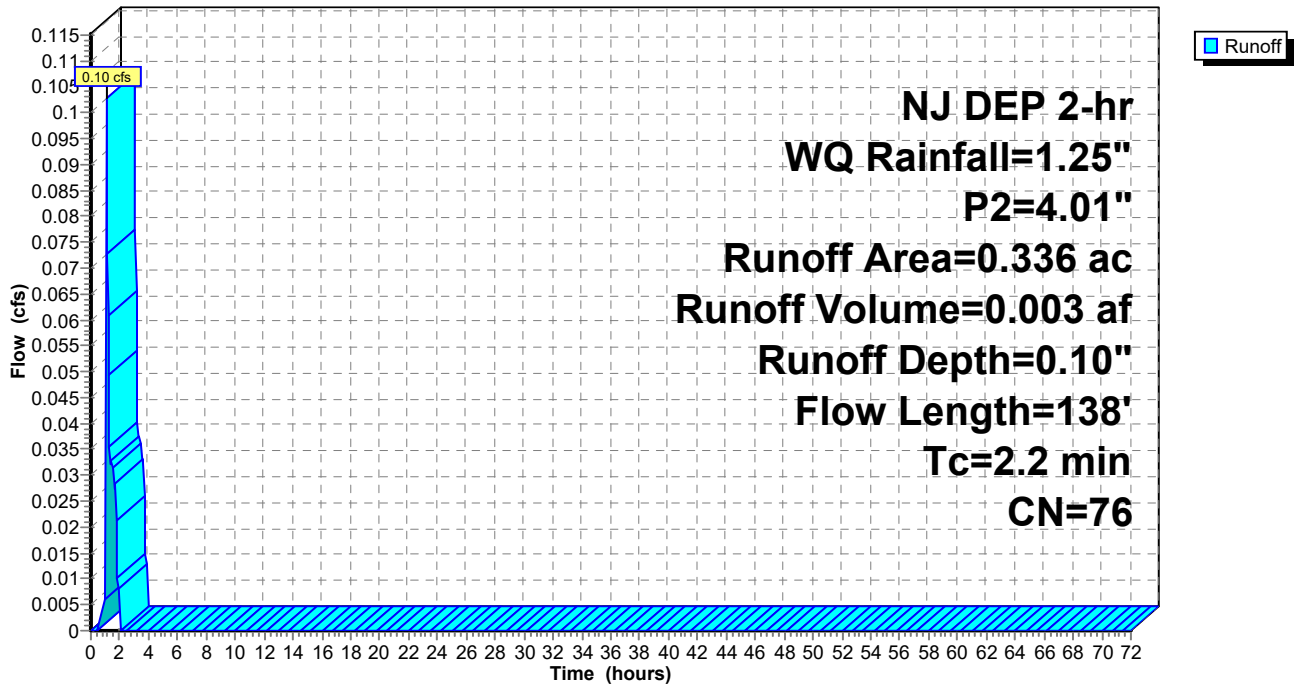
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.248	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.336	76	Weighted Average
0.336		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	31	0.1700	0.35		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.3	22	0.0050	1.44		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.4	85	0.0560	3.81		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
2.2	138	Total			

Subcatchment EOP: EXO - PERV

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment P1AI: P1A - IMP

Runoff = 0.82 cfs @ 1.03 hrs, Volume= 0.022 af, Depth= 1.03"
 Routed to Pond B1 : BIORETENTION

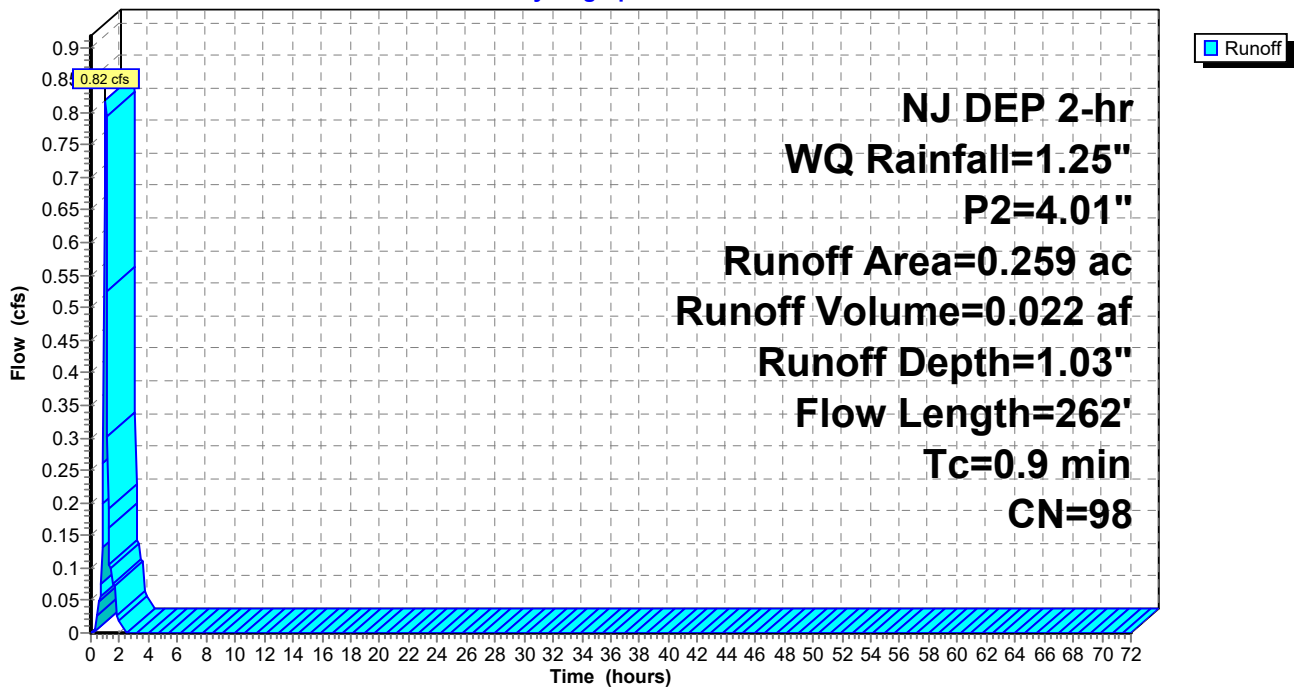
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.259	98	Paved parking, HSG D
0.259		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment P1AI: P1A - IMP

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment P1AP2: P1A - PERV

Runoff = 0.29 cfs @ 1.16 hrs, Volume= 0.009 af, Depth= 0.17"
 Routed to Pond B1 : BIORETENTION

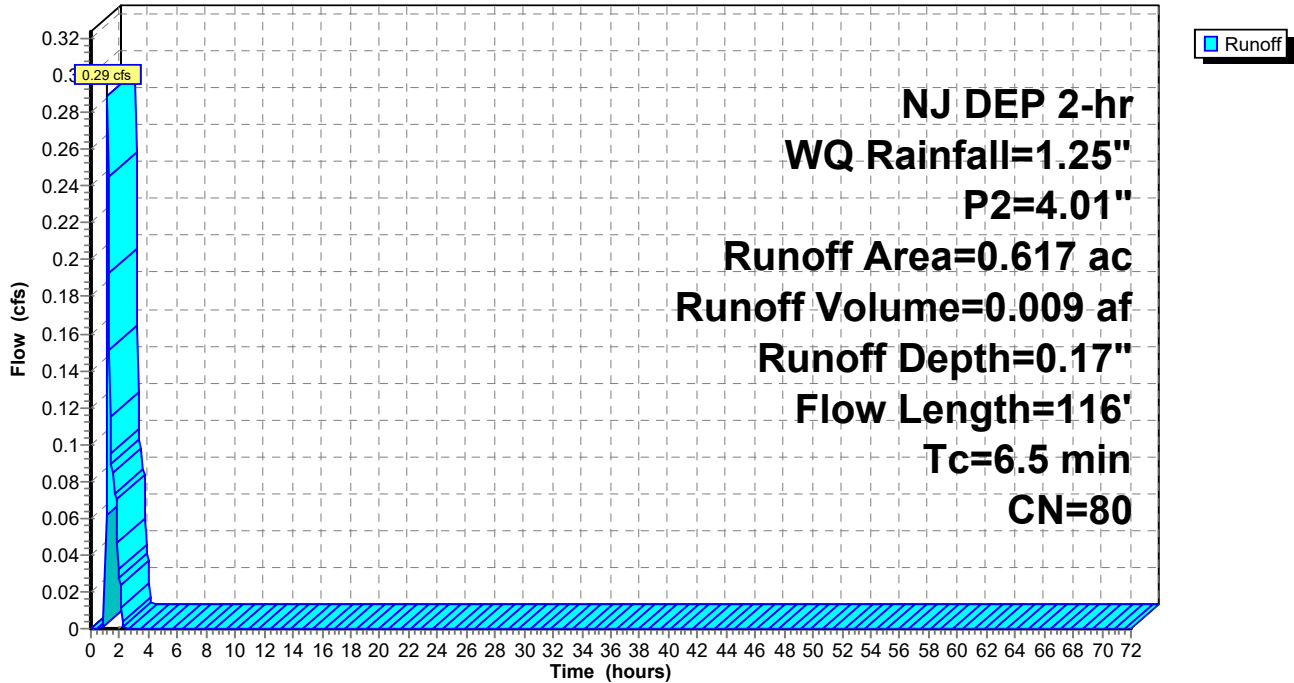
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.617	80	>75% Grass cover, Good, HSG D
0.617		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	61	0.0320	0.21		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.9	22	0.3200	0.43		Sheet Flow, B-C Grass: Short n= 0.150 P2= 4.01"
0.7	17	0.3000	0.39		Sheet Flow, C-D Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
6.5	116	Total			

Subcatchment P1AP2: P1A - PERV

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment P1BI: P1B - IMP

Runoff = 0.82 cfs @ 1.09 hrs, Volume= 0.021 af, Depth= 0.17"

Routed to Link P1B : Proposed 1B

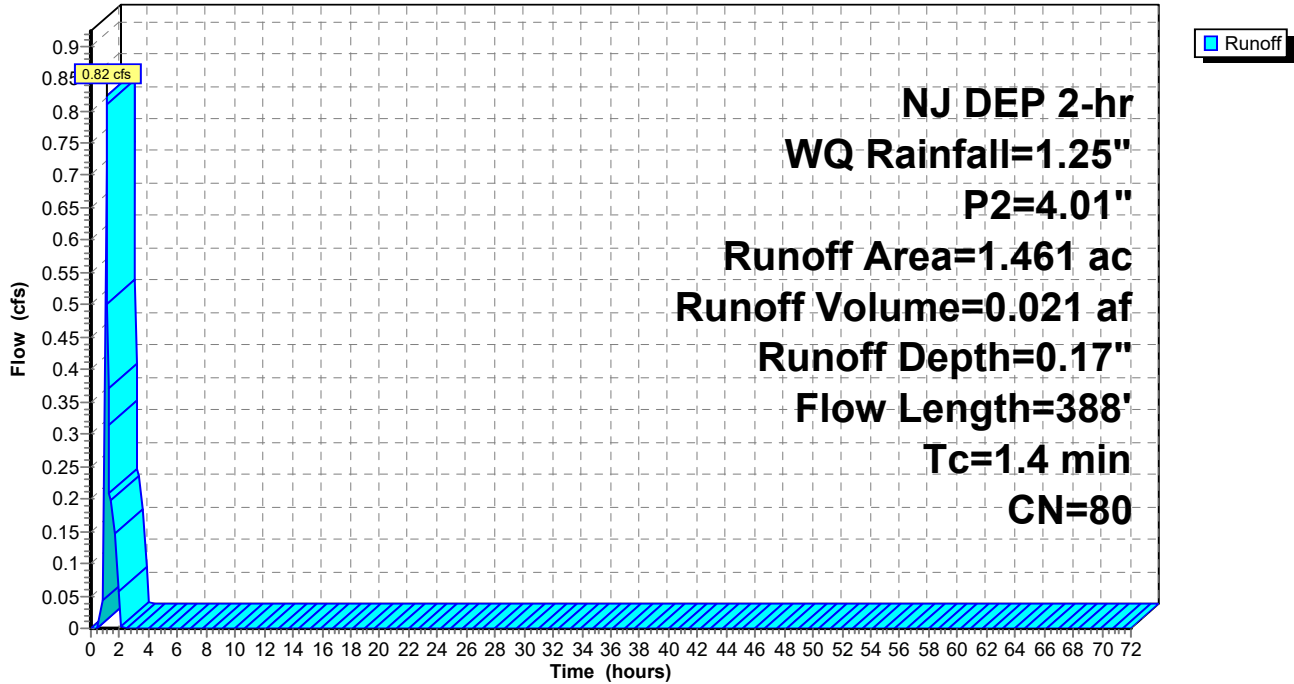
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
1.461	80	>75% Grass cover, Good, HSG D
1.461		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
1.4	388	Total			

Subcatchment P1BI: P1B - IMP

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment P1BP: P1B - Perv

Runoff = 0.40 cfs @ 1.17 hrs, Volume= 0.013 af, Depth= 0.17"

Routed to Link P1B : Proposed 1B

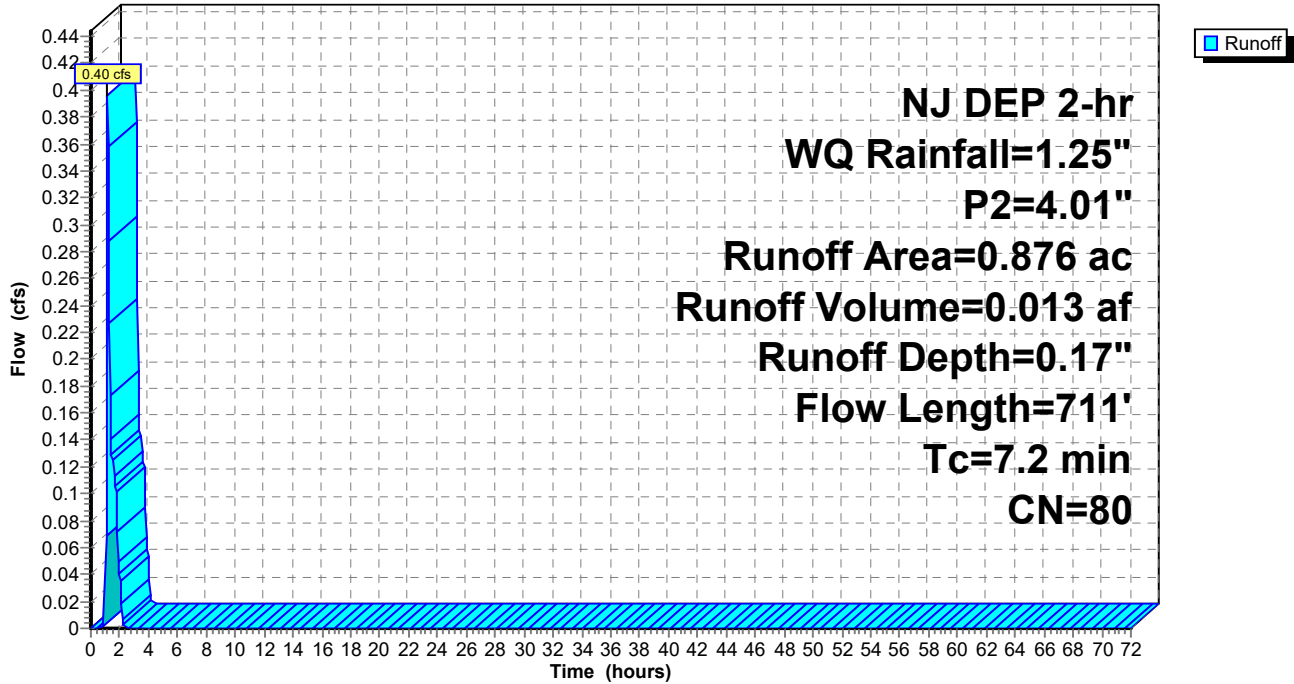
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.750	80	>75% Grass cover, Good, HSG D
0.126	80	>75% Grass cover, Good, HSG D
0.876	80	Weighted Average
0.876		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.0900	0.35		Sheet Flow, A-B
					Grass: Short n= 0.150 P2= 4.01"
0.5	127	0.0700	4.26		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
0.2	55	0.0800	4.55		Shallow Concentrated Flow, C-D
					Unpaved Kv= 16.1 fps
0.2	31	0.0300	2.79		Shallow Concentrated Flow, D-E
					Unpaved Kv= 16.1 fps
0.1	10	0.0150	2.49		Shallow Concentrated Flow, E-F
					Paved Kv= 20.3 fps
0.1	34	0.0450	4.31		Shallow Concentrated Flow, F-G
					Paved Kv= 20.3 fps
0.1	24	0.0300	3.52		Shallow Concentrated Flow, G-H
					Paved Kv= 20.3 fps
0.0	7	0.0150	2.49		Shallow Concentrated Flow, H-I
					Paved Kv= 20.3 fps
0.3	88	0.0500	4.54		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.7	169	0.0400	4.06		Shallow Concentrated Flow, J-K
					Paved Kv= 20.3 fps
0.1	31	0.0030	3.85	6.80	Pipe Channel, K-L
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.1	35	0.0430	5.68	6.97	Pipe Channel, L-M
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
7.2	711	Total			

Subcatchment P1BP: P1B - Perv

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment PBYI: P1A - Bypass Imp

Runoff = 1.15 cfs @ 1.03 hrs, Volume= 0.031 af, Depth= 1.03"

Routed to Link P1A : Proposed 1A

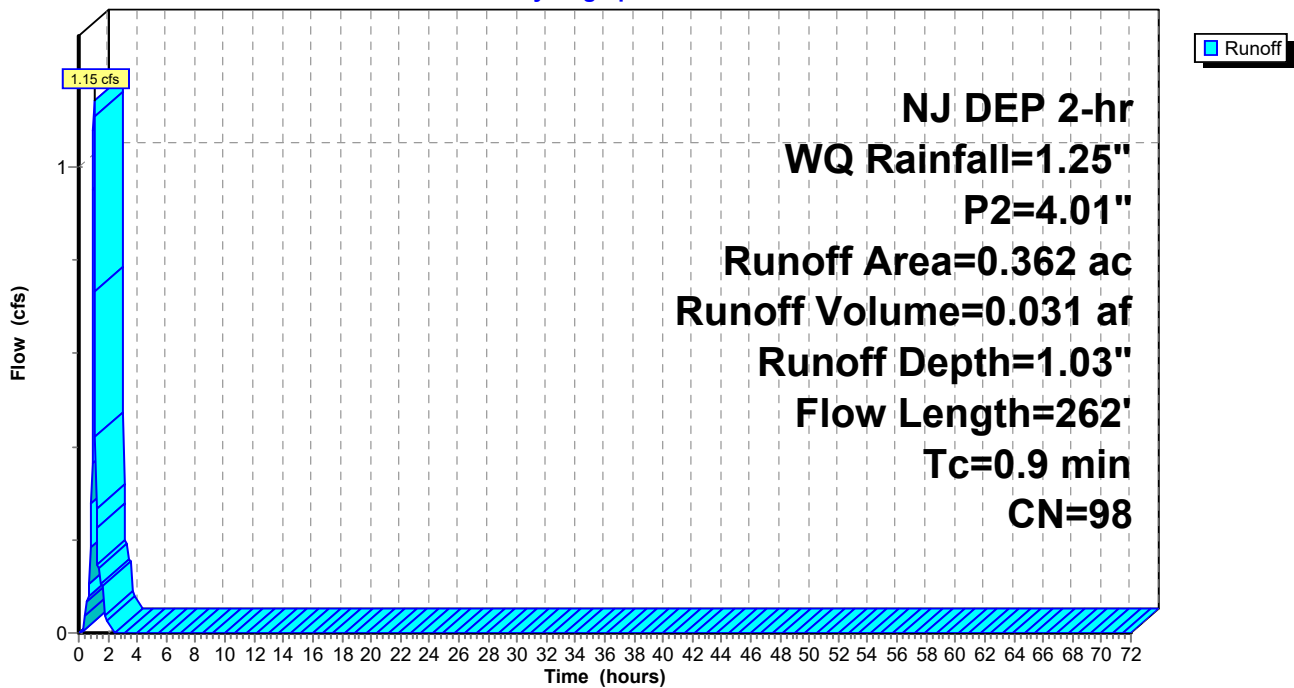
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.362	98	Paved parking, HSG D
0.362		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	37	0.0100	2.03		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	42	0.1100	5.34		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
0.5	167	0.0770	5.63		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.0	16	0.0100	5.70	7.00	Pipe Channel, E-F 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Corrugated PP, smooth interior
0.9	262	Total			

Subcatchment PBYI: P1A - Bypass Imp

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment PBYP: P1A - Bypass Perv

Runoff = 0.01 cfs @ 1.20 hrs, Volume= 0.000 af, Depth= 0.09"
 Routed to Link P1A : Proposed 1A

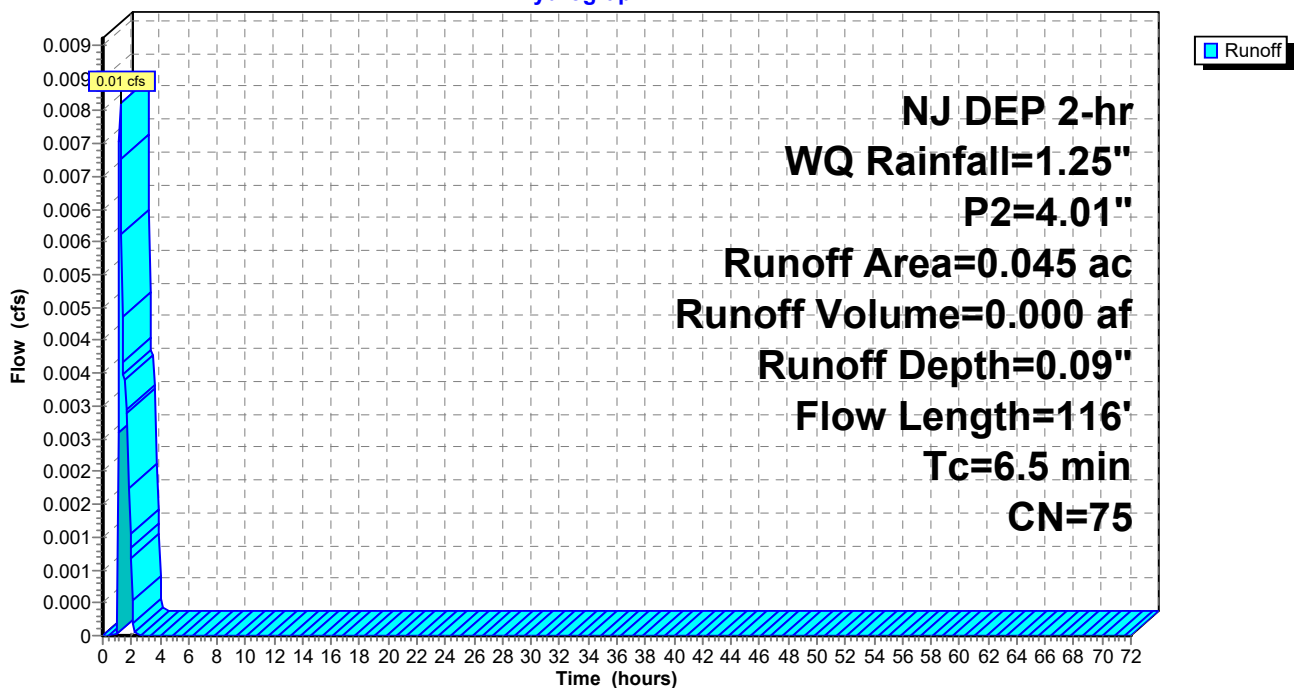
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.039	74	>75% Grass cover, Good, HSG C
0.006	80	>75% Grass cover, Good, HSG D
0.045	75	Weighted Average
0.045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	61	0.0320	0.21		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.9	22	0.3200	0.43		Sheet Flow, B-C Grass: Short n= 0.150 P2= 4.01"
0.7	17	0.3000	0.39		Sheet Flow, C-D Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.3300	9.25		Shallow Concentrated Flow, D-E Unpaved Kv= 16.1 fps
6.5	116	Total			

Subcatchment PBYP: P1A - Bypass Perv

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment POI: PRO - IMP

Runoff = 0.15 cfs @ 1.03 hrs, Volume= 0.004 af, Depth= 1.03"

Routed to Link PO : Proposed Offsite

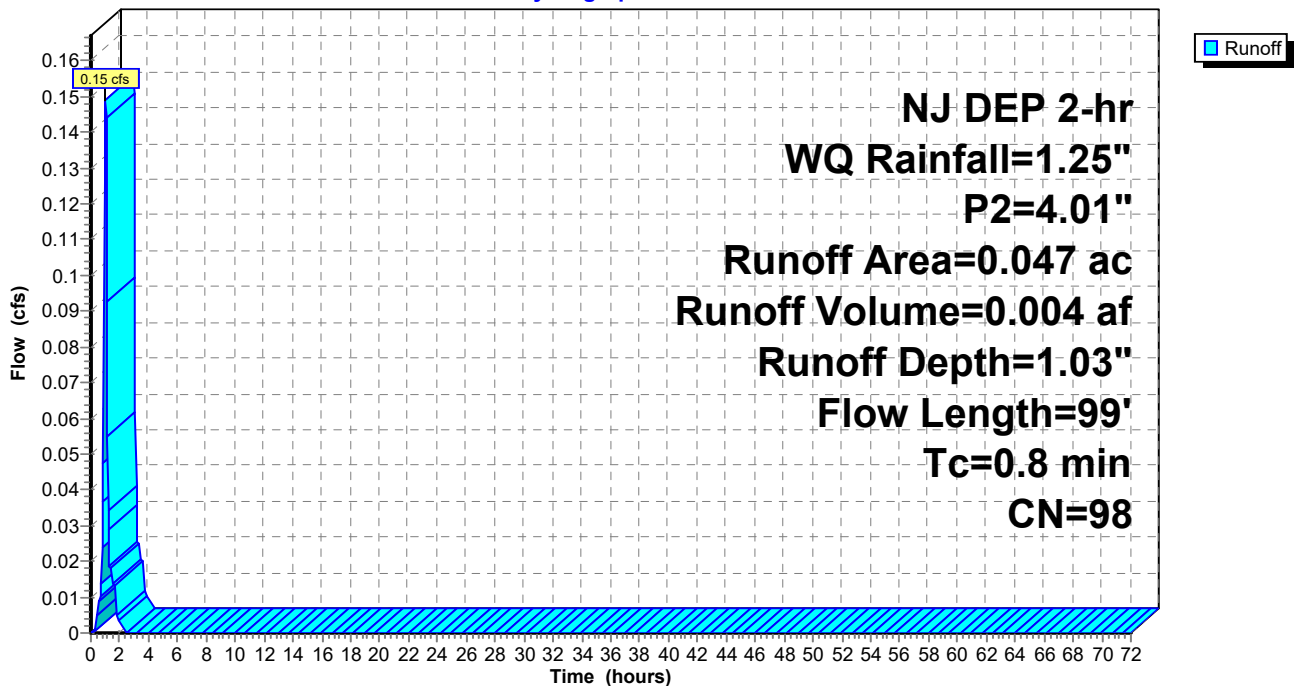
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.047	98	Paved parking, HSG D
0.047		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	1.08		Sheet Flow, D-B Smooth surfaces n= 0.011 P2= 4.01"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.8	99	Total			

Subcatchment POI: PRO - IMP

Hydrograph



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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

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Summary for Subcatchment POP: PRO - PERV

Runoff = 0.08 cfs @ 1.12 hrs, Volume= 0.002 af, Depth= 0.10"

Routed to Link PO : Proposed Offsite

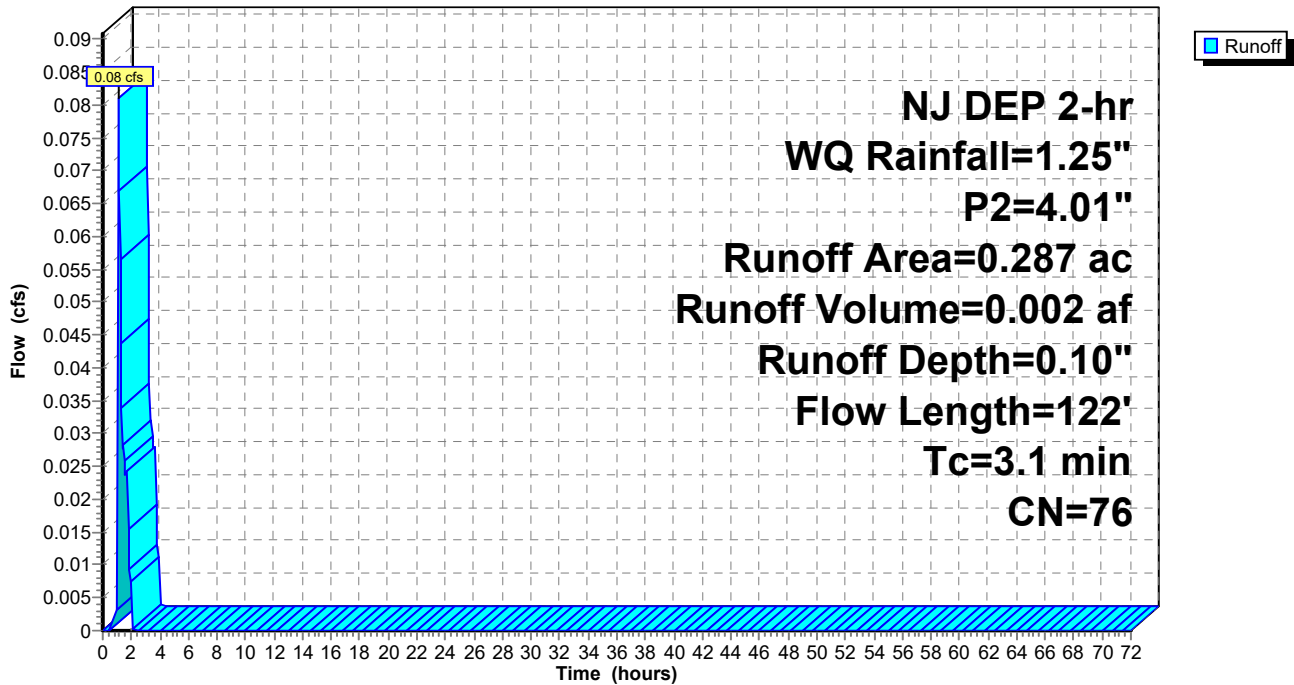
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Area (ac)	CN	Description
0.199	74	>75% Grass cover, Good, HSG C
0.088	80	>75% Grass cover, Good, HSG D
0.287	76	Weighted Average
0.287		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	53	0.0950	0.31		Sheet Flow, A-B Grass: Short n= 0.150 P2= 4.01"
0.3	69	0.0670	4.17		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
3.1	122	Total			

Subcatchment POP: PRO - PERV

Hydrograph



Summary for Pond B1: BIORETENTION

Inflow Area = 0.876 ac, 29.57% Impervious, Inflow Depth = 0.43" for WQ event
 Inflow = 0.86 cfs @ 1.04 hrs, Volume= 0.031 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link P1A : Proposed 1A

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 132.41' @ 2.40 hrs Surf.Area= 3,404 sf Storage= 1,360 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	132.00'	11,644 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	3,229	0	0
133.00	3,656	3,443	3,443
134.00	4,097	3,877	7,319
135.00	4,552	4,325	11,644

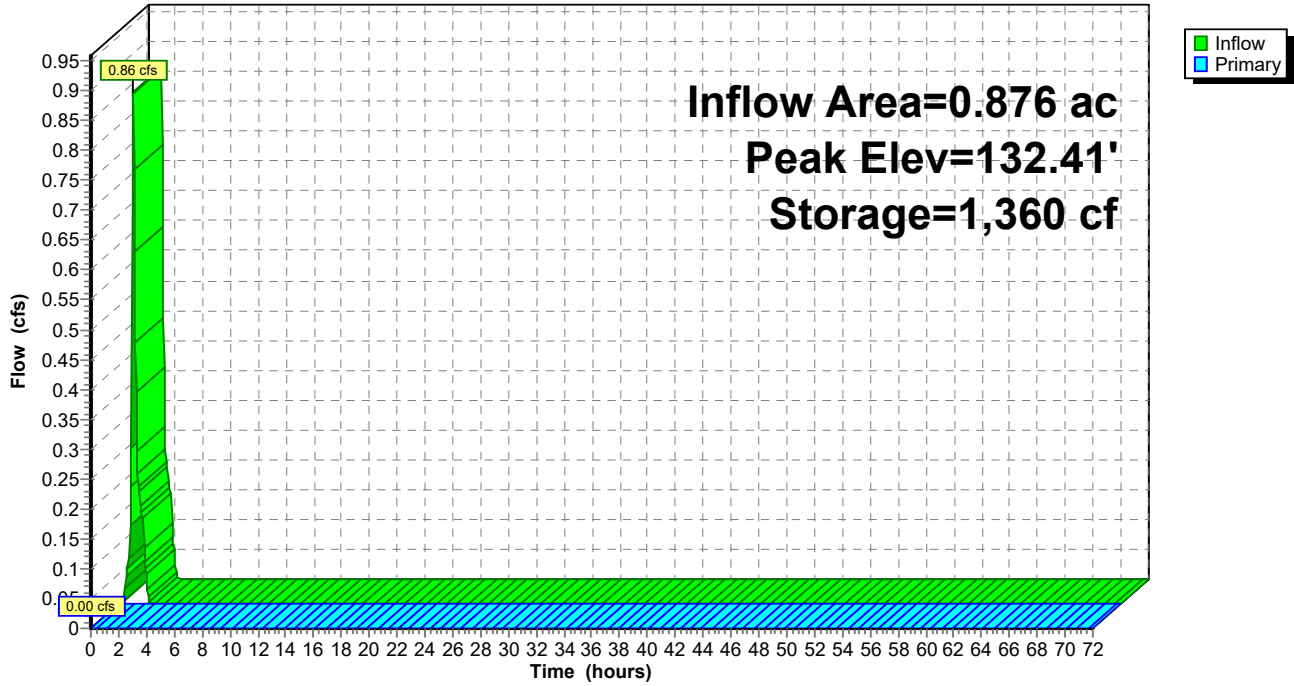
Device	Routing	Invert	Outlet Devices
#1	Primary	130.25'	18.0" Round Culvert L= 176.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.25' / 126.50' S= 0.0213 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	132.42'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.50'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=132.00' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.00 cfs of 6.72 cfs potential flow)
- ↑ **2=Orifice/Grate** (Controls 0.00 cfs)
- ↑ **3=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond B1: BIORETENTION

Hydrograph



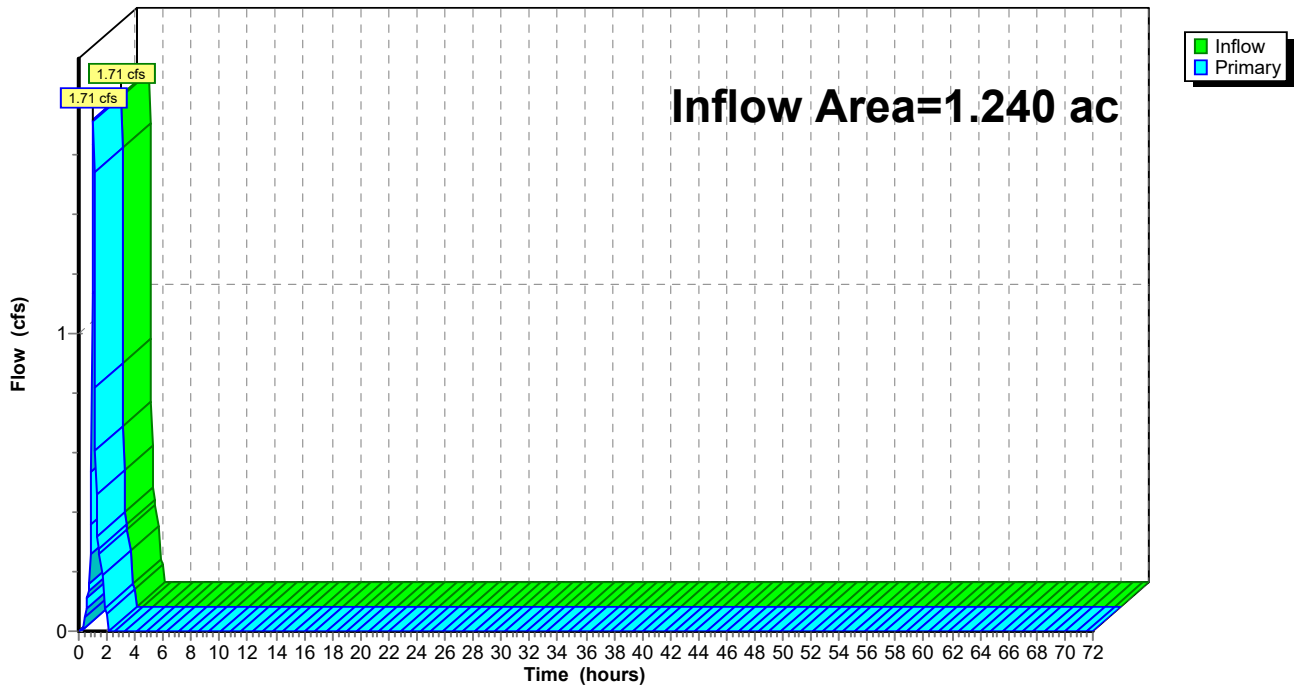
Summary for Link E1A: Existing 1A

Inflow Area = 1.240 ac, 45.16% Impervious, Inflow Depth = 0.51" for WQ event
Inflow = 1.71 cfs @ 1.04 hrs, Volume= 0.052 af
Primary = 1.71 cfs @ 1.04 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1A: Existing 1A

Hydrograph



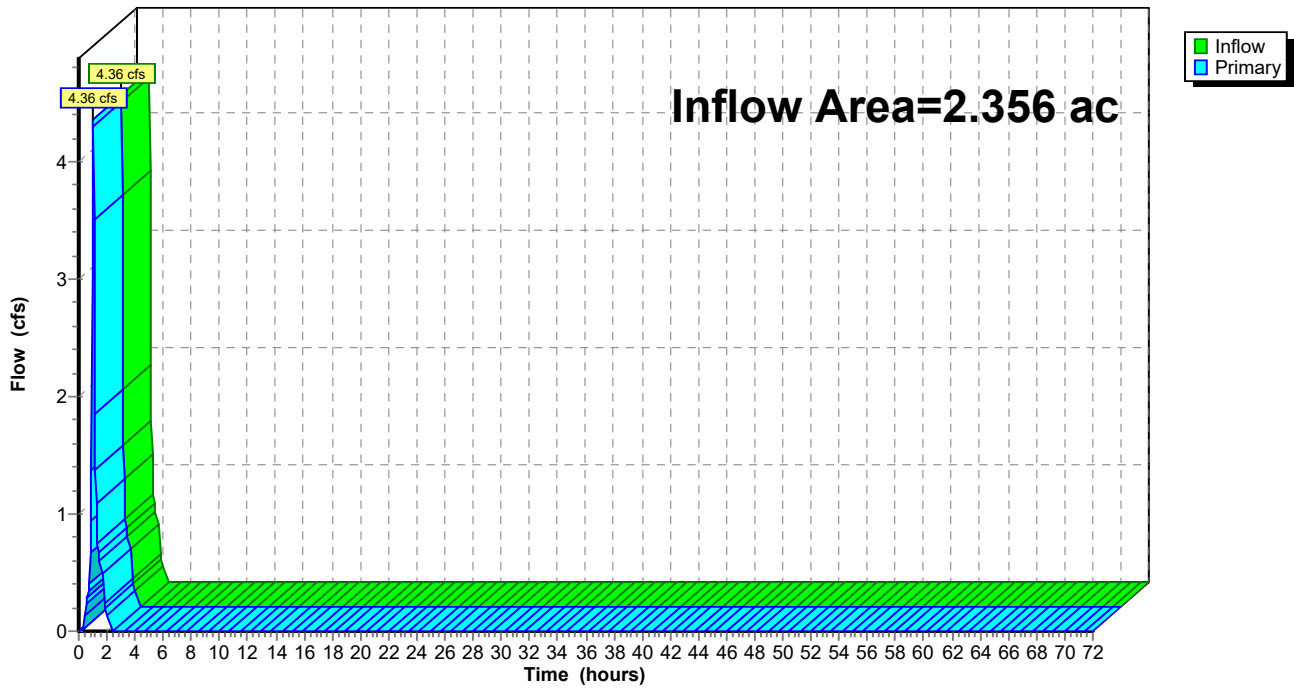
Summary for Link E1B: Existing 1B

Inflow Area = 2.356 ac, 59.97% Impervious, Inflow Depth = 0.66" for WQ event
Inflow = 4.36 cfs @ 1.03 hrs, Volume= 0.129 af
Primary = 4.36 cfs @ 1.03 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link E1B: Existing 1B

Hydrograph



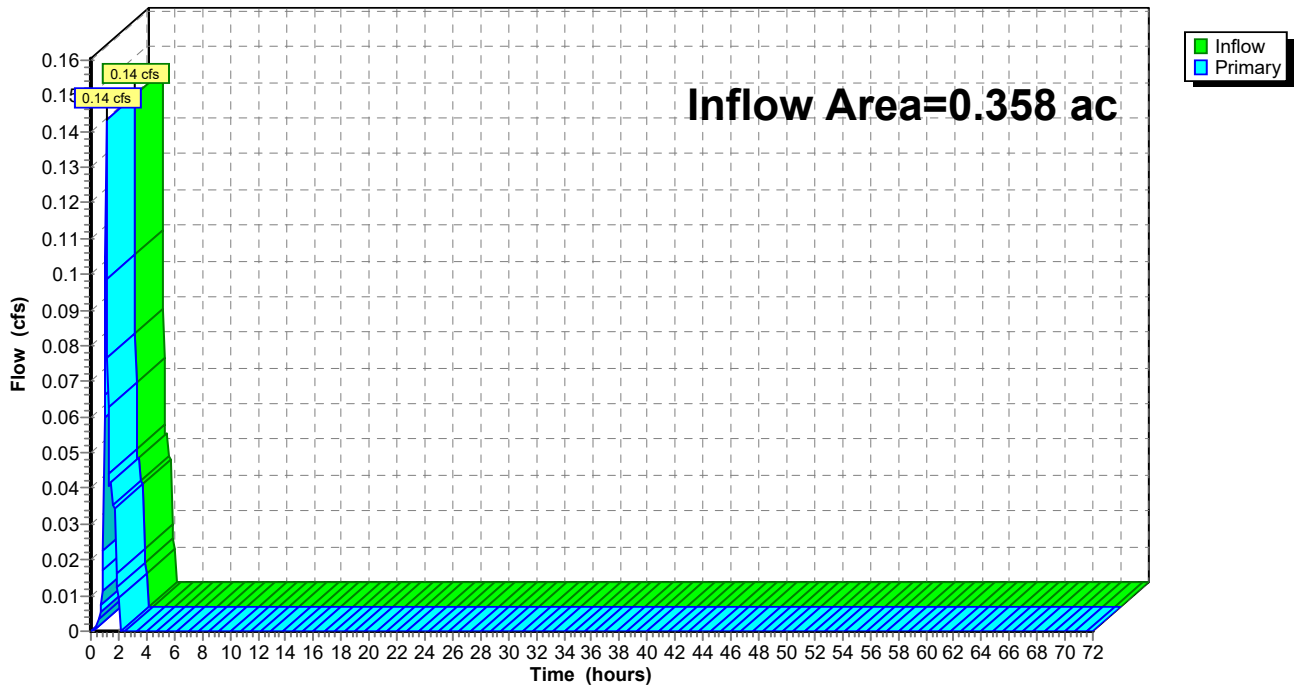
Summary for Link EO: Existing Offsite

Inflow Area = 0.358 ac, 6.15% Impervious, Inflow Depth = 0.16" for WQ event
Inflow = 0.14 cfs @ 1.10 hrs, Volume= 0.005 af
Primary = 0.14 cfs @ 1.10 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link EO: Existing Offsite

Hydrograph



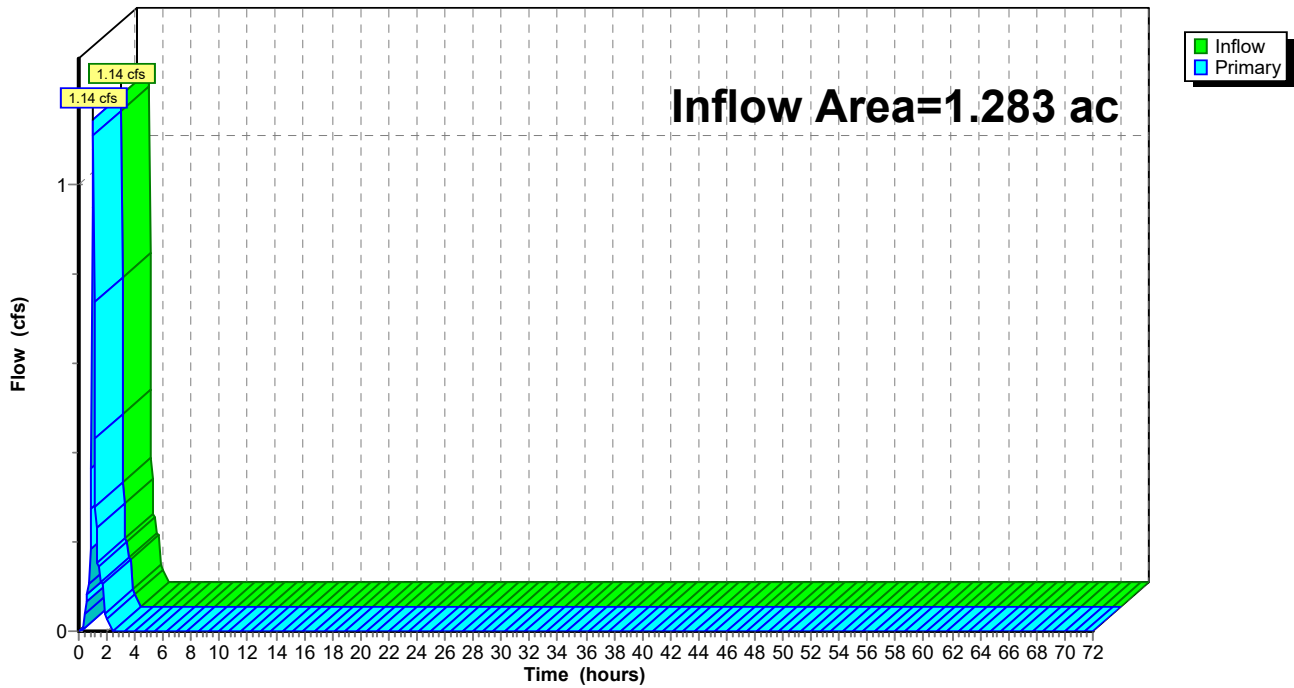
Summary for Link P1A: Proposed 1A

Inflow Area = 1.283 ac, 48.40% Impervious, Inflow Depth = 0.29" for WQ event
Inflow = 1.14 cfs @ 1.03 hrs, Volume= 0.032 af
Primary = 1.14 cfs @ 1.03 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1A: Proposed 1A

Hydrograph



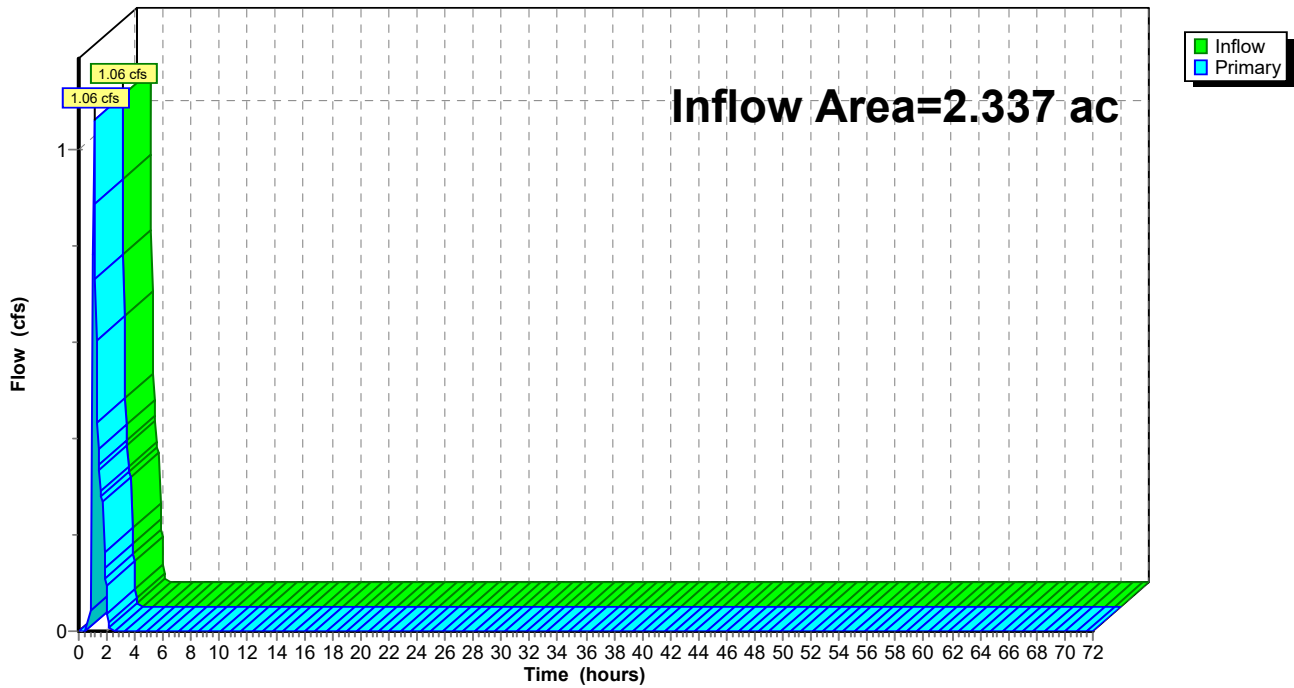
Summary for Link P1B: Proposed 1B

Inflow Area = 2.337 ac, 0.00% Impervious, Inflow Depth = 0.17" for WQ event
Inflow = 1.06 cfs @ 1.11 hrs, Volume= 0.034 af
Primary = 1.06 cfs @ 1.11 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link P1B: Proposed 1B

Hydrograph



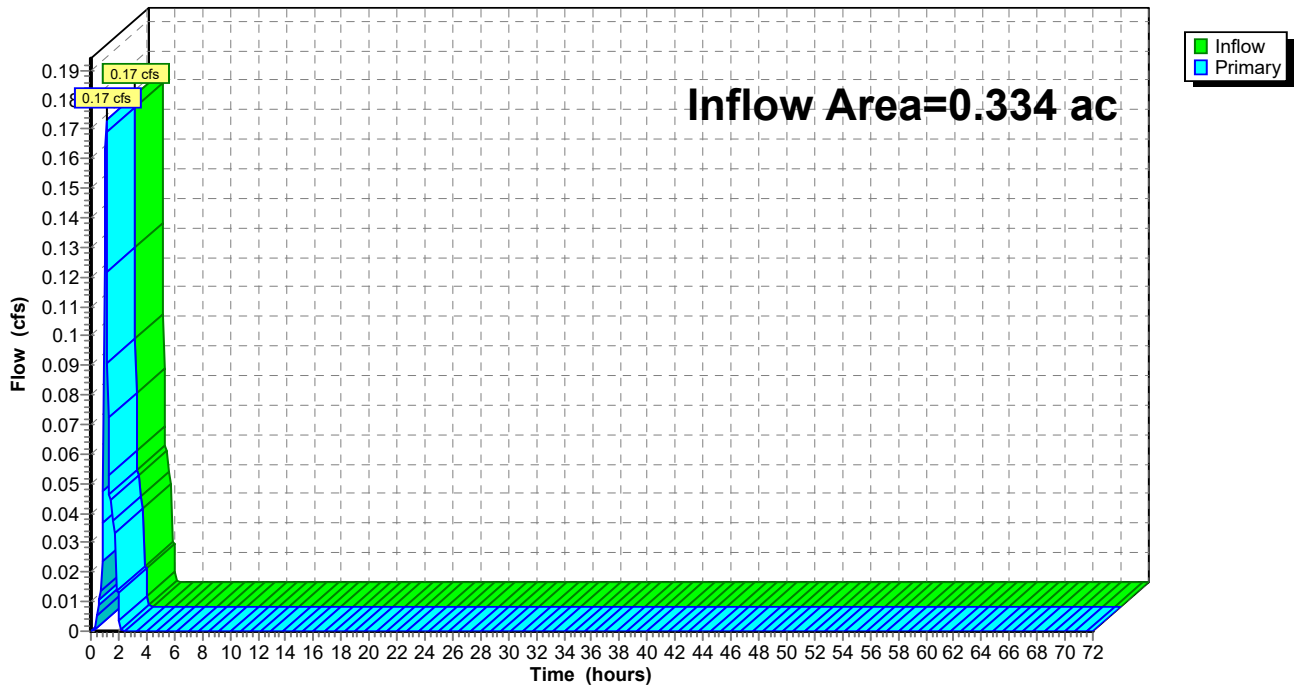
Summary for Link PO: Proposed Offsite

Inflow Area = 0.334 ac, 14.07% Impervious, Inflow Depth = 0.23" for WQ event
Inflow = 0.17 cfs @ 1.08 hrs, Volume= 0.006 af
Primary = 0.17 cfs @ 1.08 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PO: Proposed Offsite

Hydrograph



EX-PR

Prepared by Bohler

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NJ DEP 2-hr WQ Rainfall=1.25", P2=4.01"

Printed 7/2/2025

Hydrograph for Pond B1: BIORETENTION

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	132.00	0.00
0.25	0.00	0	132.00	0.00
0.50	0.03	11	132.00	0.00
0.75	0.08	63	132.02	0.00
1.00	0.78	369	132.11	0.00
1.25	0.35	941	132.29	0.00
1.50	0.18	1,143	132.35	0.00
1.75	0.14	1,283	132.39	0.00
2.00	0.05	1,349	132.41	0.00
2.25	0.00	1,360	132.41	0.00
2.50	0.00	1,360	132.41	0.00
2.75	0.00	1,360	132.41	0.00
3.00	0.00	1,360	132.41	0.00
3.25	0.00	1,360	132.41	0.00
3.50	0.00	1,360	132.41	0.00
3.75	0.00	1,360	132.41	0.00
4.00	0.00	1,360	132.41	0.00
4.25	0.00	1,360	132.41	0.00
4.50	0.00	1,360	132.41	0.00
4.75	0.00	1,360	132.41	0.00
5.00	0.00	1,360	132.41	0.00
5.25	0.00	1,360	132.41	0.00
5.50	0.00	1,360	132.41	0.00
5.75	0.00	1,360	132.41	0.00
6.00	0.00	1,360	132.41	0.00
6.25	0.00	1,360	132.41	0.00
6.50	0.00	1,360	132.41	0.00
6.75	0.00	1,360	132.41	0.00
7.00	0.00	1,360	132.41	0.00
7.25	0.00	1,360	132.41	0.00
7.50	0.00	1,360	132.41	0.00
7.75	0.00	1,360	132.41	0.00
8.00	0.00	1,360	132.41	0.00
8.25	0.00	1,360	132.41	0.00
8.50	0.00	1,360	132.41	0.00
8.75	0.00	1,360	132.41	0.00
9.00	0.00	1,360	132.41	0.00
9.25	0.00	1,360	132.41	0.00
9.50	0.00	1,360	132.41	0.00
9.75	0.00	1,360	132.41	0.00
10.00	0.00	1,360	132.41	0.00
10.25	0.00	1,360	132.41	0.00
10.50	0.00	1,360	132.41	0.00
10.75	0.00	1,360	132.41	0.00
11.00	0.00	1,360	132.41	0.00
11.25	0.00	1,360	132.41	0.00
11.50	0.00	1,360	132.41	0.00
11.75	0.00	1,360	132.41	0.00
12.00	0.00	1,360	132.41	0.00
12.25	0.00	1,360	132.41	0.00
12.50	0.00	1,360	132.41	0.00
12.75	0.00	1,360	132.41	0.00

**BASIN DRAIN TIME =
2.25 HRS - 1.00 HRS =
1.25 HRS < 72 HRS, OKAY**

D. DESIGN CALCULATIONS

- ◆ **Basin Drain Time**
- ◆ **Emergency Spillway**

EX-PR

NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Prepared by Bohler

Printed 7/11/2025

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Summary for Pond B1: BIORETENTION

Inflow Area = 0.876 ac, 29.57% Impervious, Inflow Depth = 9.74" for 100-Year-2050 event
 Inflow = 8.17 cfs @ 12.10 hrs, Volume= 0.711 af
 Outflow = 6.94 cfs @ 12.16 hrs, Volume= 0.679 af, Atten= 15%, Lag= 3.5 min
 Primary = 6.94 cfs @ 12.16 hrs, Volume= 0.679 af
 Routed to Link P1A : Proposed 1A

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 134.14' @ 12.16 hrs Surf.Area= 4,161 sf Storage= 7,900 cf

Plug-Flow detention time= 139.6 min calculated for 0.679 af (95% of inflow)
 Center-of-Mass det. time= 112.5 min (886.4 - 774.0)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	11,644 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	3,229	0	0
133.00	3,656	3,443	3,443
134.00	4,097	3,877	7,319
135.00	4,552	4,325	11,644

Device	Routing	Invert	Outlet Devices
#1	Primary	130.25'	18.0" Round Culvert L= 157.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.25' / 126.50' S= 0.0239 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	132.42'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.50'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.87 cfs @ 12.16 hrs HW=134.14' (Free Discharge)

- ↑ **1=Culvert** (Passes 6.87 cfs of 11.90 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.52 cfs @ 6.00 fps)
- ↑ **3=Broad-Crested Rectangular Weir**(Weir Controls 6.35 cfs @ 2.49 fps)

EX-PR

NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Prepared by Bohler

Printed 7/2/2025

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Hydrograph for Pond B1: BIORETENTION

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	132.00	0.00
0.25	0.00	0	132.00	0.00
0.50	0.01	2	132.00	0.00
0.75	0.01	11	132.00	0.00
1.00	0.02	26	132.01	0.00
1.25	0.02	45	132.01	0.00
1.50	0.03	67	132.02	0.00
1.75	0.03	92	132.03	0.00
2.00	0.03	119	132.04	0.00
2.25	0.03	148	132.05	0.00
2.50	0.03	178	132.05	0.00
2.75	0.04	210	132.06	0.00
3.00	0.04	244	132.08	0.00
3.25	0.04	279	132.09	0.00
3.50	0.04	315	132.10	0.00
3.75	0.05	354	132.11	0.00
4.00	0.05	398	132.12	0.00
4.25	0.06	445	132.14	0.00
4.50	0.06	498	132.15	0.00
4.75	0.07	554	132.17	0.00
5.00	0.07	615	132.19	0.00
5.25	0.07	679	132.21	0.00
5.50	0.08	748	132.23	0.00
5.75	0.08	821	132.25	0.00
6.00	0.09	899	132.27	0.00
6.25	0.10	982	132.30	0.00
6.50	0.11	1,074	132.33	0.00
6.75	0.12	1,174	132.36	0.00
7.00	0.13	1,284	132.39	0.00
7.25	0.14	1,402	132.42	0.00
7.50	0.15	1,529	132.46	0.00
7.75	0.16	1,659	132.50	0.01
8.00	0.17	1,787	132.53	0.03
8.25	0.18	1,909	132.57	0.05
8.50	0.19	2,024	132.60	0.07
8.75	0.21	2,130	132.63	0.09
9.00	0.22	2,229	132.66	0.11
9.25	0.25	2,329	132.69	0.13
9.50	0.29	2,441	132.72	0.16
9.75	0.32	2,566	132.76	0.17
10.00	0.36	2,707	132.80	0.19
10.25	0.40	2,865	132.84	0.21
10.50	0.44	3,041	132.89	0.23
10.75	0.56	3,269	132.95	0.25
11.00	0.69	3,589	133.04	0.28
11.25	0.92	4,040	133.16	0.32
11.50	1.18	4,669	133.33	0.36
11.75	1.97	5,672	133.59	0.72
12.00	5.37	6,923	133.90	3.47
12.25	3.71	7,520	134.05	5.45
12.50	1.79	6,512	133.80	2.35
12.75	1.19	6,125	133.70	1.48

EX-PR

NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Prepared by Bohler

Printed 7/2/2025

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Hydrograph for Pond B1: BIORETENTION (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
13.00	0.95	5,933	133.66	1.12
13.25	0.75	5,790	133.62	0.89
13.50	0.61	5,678	133.59	0.73
13.75	0.52	5,581	133.57	0.61
14.00	0.48	5,519	133.55	0.54
14.25	0.44	5,470	133.54	0.49
14.50	0.40	5,425	133.53	0.46
14.75	0.36	5,372	133.51	0.43
15.00	0.33	5,312	133.50	0.40
15.25	0.30	5,233	133.48	0.40
15.50	0.29	5,145	133.45	0.39
15.75	0.28	5,051	133.43	0.39
16.00	0.27	4,953	133.40	0.38
16.25	0.26	4,850	133.38	0.37
16.50	0.25	4,744	133.35	0.37
16.75	0.24	4,633	133.32	0.36
17.00	0.22	4,520	133.29	0.35
17.25	0.21	4,403	133.26	0.34
17.50	0.20	4,283	133.23	0.34
17.75	0.19	4,162	133.19	0.33
18.00	0.18	4,038	133.16	0.32
18.25	0.17	3,914	133.13	0.31
18.50	0.17	3,794	133.10	0.30
18.75	0.17	3,681	133.06	0.29
19.00	0.16	3,573	133.04	0.28
19.25	0.16	3,471	133.01	0.27
19.50	0.16	3,374	132.98	0.26
19.75	0.16	3,283	132.96	0.26
20.00	0.15	3,196	132.93	0.25
20.25	0.15	3,115	132.91	0.24
20.50	0.15	3,038	132.89	0.23
20.75	0.15	2,966	132.87	0.22
21.00	0.14	2,899	132.85	0.22
21.25	0.14	2,835	132.83	0.21
21.50	0.14	2,776	132.82	0.20
21.75	0.13	2,721	132.80	0.19
22.00	0.13	2,669	132.79	0.19
22.25	0.13	2,621	132.77	0.18
22.50	0.13	2,575	132.76	0.17
22.75	0.12	2,533	132.75	0.17
23.00	0.12	2,494	132.74	0.16
23.25	0.12	2,457	132.73	0.16
23.50	0.12	2,422	132.72	0.15
23.75	0.11	2,391	132.71	0.15
24.00	0.10	2,362	132.70	0.14
24.25	0.00	2,273	132.67	0.12
24.50	0.00	2,172	132.65	0.10
24.75	0.00	2,089	132.62	0.08
25.00	0.00	2,020	132.60	0.07
25.25	0.00	1,961	132.58	0.06
25.50	0.00	1,912	132.57	0.05
25.75	0.00	1,869	132.56	0.04

**BASIN DRAIN TIME =
24.25 HRS - 12.00 HRS =
12.25 HRS < 72 HRS, OKAY**

Emergency Spillway

NOAA 24-hr D 1.5x 100 Year Rainfall=17.40", P2=4.01"

Prepared by Bohler

Printed 7/16/2025

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Summary for Pond B1: BIORETENTION

Inflow Area = 0.876 ac, 29.57% Impervious, Inflow Depth = 15.44" for 1.5x 100 Year event
 Inflow = 12.71 cfs @ 12.10 hrs, Volume= 1.127 af
 Outflow = 12.65 cfs @ 12.11 hrs, Volume= 0.987 af, Atten= 0%, Lag= 0.5 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link P1A : Proposed 1A
 Secondary = 12.65 cfs @ 12.11 hrs, Volume= 0.987 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Starting Elev= 134.14' Surf.Area= 4,161 sf Storage= 7,897 cf
 Peak Elev= 135.62' @ 12.11 hrs Surf.Area= 4,929 sf Storage= 14,593 cf (6,696 cf above start)

Plug-Flow detention time= 184.5 min calculated for 0.806 af (71% of inflow)
 Center-of-Mass det. time= 49.8 min (814.1 - 764.3)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	21,903 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	3,229	0	0
133.00	3,656	3,443	3,443
134.00	4,097	3,877	7,319
135.00	4,552	4,325	11,644
136.00	5,158	4,855	16,499
137.00	5,651	5,405	21,903

Device	Routing	Invert	Outlet Devices
#1	Primary	130.25'	18.0" Round Culvert X 0.00 L= 176.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.25' / 126.50' S= 0.0213 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Device 1	132.42'	4.0" Vert. Orifice/Grate X 0.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	133.40'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 0.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Secondary	135.50'	120.0' long 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=0.00 cfs @ 0.00 hrs HW=134.14' (Free Discharge)

- ↑ 1=Culvert (Controls 0.00 cfs)
- ↑ 2=Orifice/Grate (Controls 0.00 cfs)
- ↑ 3=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Secondary OutFlow Max=12.28 cfs @ 12.11 hrs HW=135.62' (Free Discharge)

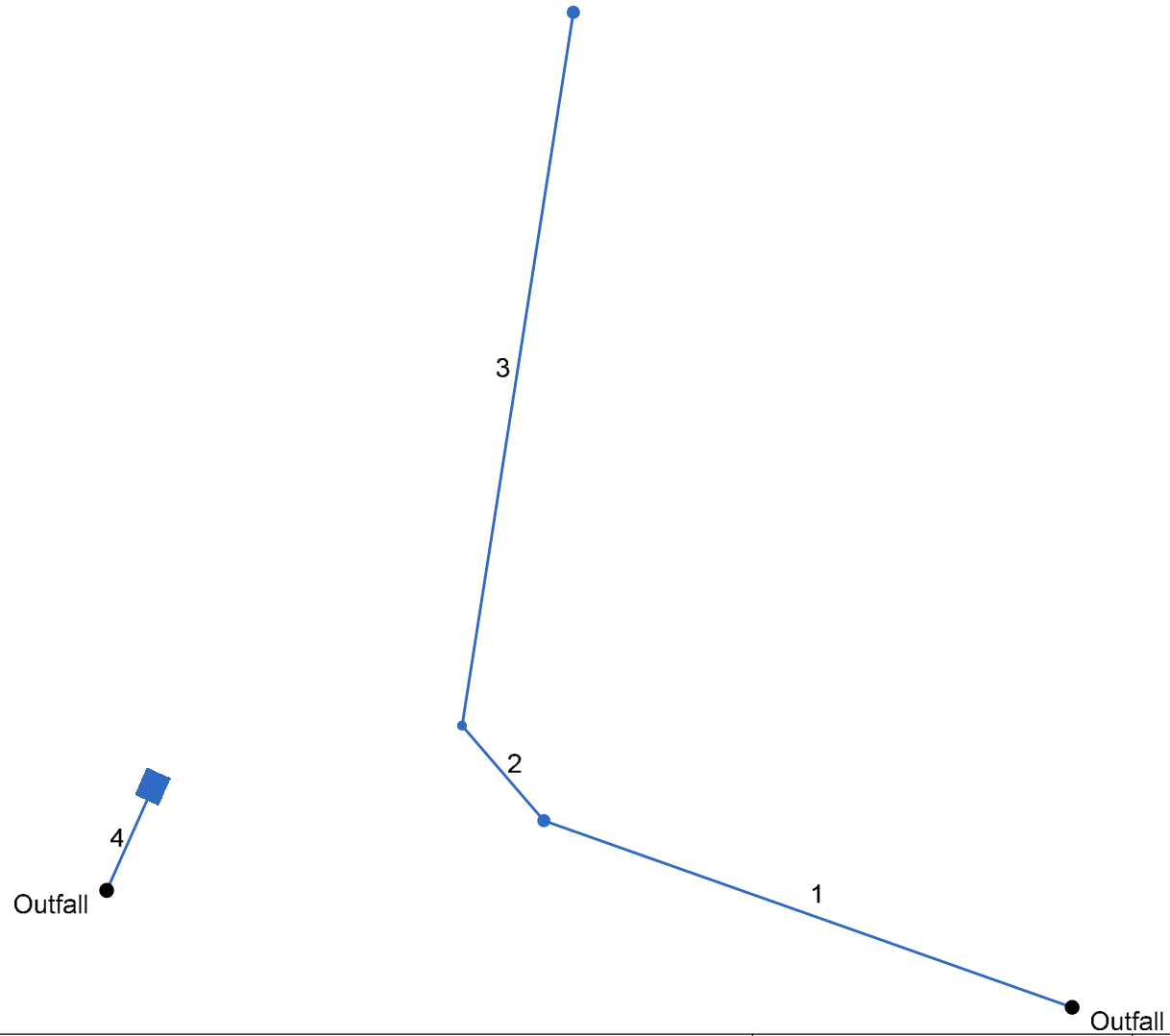
- ↑ 4=Broad-Crested Rectangular Weir(Weir Controls 12.28 cfs @ 0.85 fps)

Per Section 12 of the New Jersey Soil Erosion Control Standards, the allowable velocity for discharge is 2.5 fps (for Sandy Loam) without outlet conduit protection.
 Velocity over emergency spillway is 0.86 fps < 2.5 fps. OK to have grass spillway.

E. CONVEYANCE CALCULATIONS

- ◆ **Pipe Sizing**
 - **Run 1**
- ◆ **Underdrains**
- ◆ **Rip Rap Sizing Calculations**

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: New.stm

Number of lines: 4

Date: 7/1/2025

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	78.423	0.00	0.30	0.00	0.00	0.23	10.0	10.9	6.3	1.42	3.85	4.05	12	0.99	127.70	128.48	128.12	128.98	131.34	134.77	O-A30
2	1	17.609	0.13	0.30	0.74	0.10	0.23	10.0	10.7	6.3	1.42	3.90	4.08	12	1.02	131.44	131.62	131.86	132.12	134.77	135.15	A30-A20
3	2	101.493	0.17	0.17	0.76	0.13	0.13	10.0	10.0	6.5	0.84	1.85	3.22	8	2.00	131.62	133.65	132.12	134.08	135.15	143.07	A20-A10
4	End	16.024	0.39	0.39	0.85	0.33	0.33	10.0	10.0	6.5	2.14	4.94	3.85	15	0.50	130.31	130.39	130.89	130.97	132.27	138.78	O-A75

Project File: New.stm

Number of lines: 4

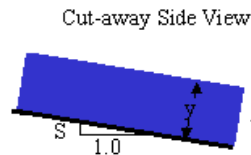
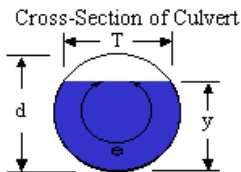
Run Date: 7/1/2025

NOTES: Intensity = 182.59 / (Inlet time + 19.10) ^ 0.99; Return period = Yrs. 25 ; c = cir e = ellip b = box

Bioretention Basin Underdrain Sizing Calculations using Mannings Equation

Bioretention Basin:	#1	#2	#3	#4	#5	#6	#7	#8
BMP Infiltration Area (sf)	4552							
Soil Bed Infiltration Rate (in/hr)	1							
Design Permeability of Soil Bed (in/hr)	0.25							
Number of Underdrains	1							
Min. Underdrain Capacity (cfs)	0.05							
Prop. Underdrain Capacity (cfs)	0.23							
	OKAY							

Bioretention Basin #	Discharge	Pipe Design						
		Q (cfs)	Pipe Size (in)	Pipe Material	Slope (ft/ft)	Mannings 'n'	Pipe Cap. (full) (cfs)	Velocity (full) (fps)
Bioretention Basin #1	0.05	6	PVC	0.001	0.010	0.23	1.17	0.82
Bioretention Basin #2								
Bioretention Basin #3								
Bioretention Basin #4								
Bioretention Basin #5								
Bioretention Basin #6								
Bioretention Basin #7								
Bioretention Basin #8								



$$Q = VA \quad V = \frac{k}{n} R^{2/3} S^{1/2} \quad R = \frac{A}{P} \quad A = \frac{d^2}{8} (\theta - \sin(\theta))$$

$$P = \frac{\theta d}{2} \quad y = \frac{d}{2} \left[1 - \cos\left(\frac{\theta}{2}\right) \right] \quad T = 2 \sqrt{y(d-y)} \quad F = V \sqrt{\frac{T}{gA \cos(\tan^{-1} S)}}$$

Requirement:

1. The network of pipes for a bioretention basin with underdrains must have a conveyance rate at least twice the design permeability of the sand layer. Where the sand permeability is twice the design permeability rate of the soil bed.

Conduit Outlet Protection Calculations

Rip Rap Pad # 1

Design Parameters:

Design Storm Flow for 25 Year, Q	2.14 cfs
Vertical Dimension of Outlet Pipe, D_o	15 in
Horizontal Dimension of Outlet Pipe, W_o	15 in
Tailwater Depth, TW^1	1.19 ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/W_o = 1.71$ cfs per foot

• **Case I: $TW < 1/2 D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o =$

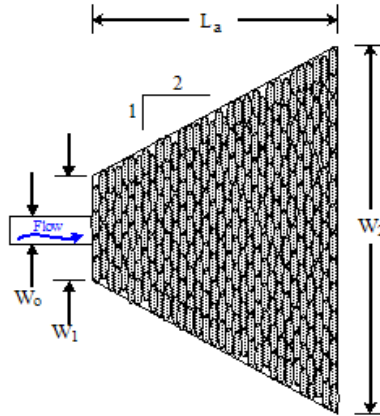
$L_a =$

Width, $W_1 = 3W_o =$

$W_1 =$

Width, $W_2 = 3W_o + L_a =$

$W_2 =$



• **Case II: $TW \geq 1/2 D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} = 4.59$ ft

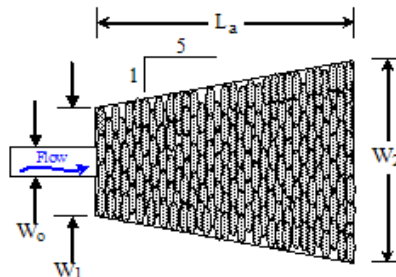
or $L_a = 5$ ft

Width, $W_1 = 3W_o = 3.75$ ft

or $W_1 = 4$ ft

Width, $W_2 = 3W_o + 0.4L_a = 5.59$ ft

or $W_2 = 6$ ft



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} = 0.41$ in

$d_{50} = 6$ in

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50} . The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.

2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

F. SUPPORTING DOCUMENTS

- ◆ **Geotechnical Report**
- ◆ **NOAA Atlas 14 Precipitation Estimate Report**

REPORT OF GEOTECHNICAL INVESTIGATION

**PROPOSED IMPROVEMENTS
SIX SOUTH MONROE STREET
BLOCKS 2403 & 2404, LOTS 17.01 & 3
RIDGEWOOD, BERGEN COUNTY, NEW JERSEY**



Prepared for:

**BOHLER, LLC
30 Garber Square
Ridgewood, New Jersey 07450**

Prepared by:

**WHITESTONE ASSOCIATES, INC.
30 Garber Square
Ridgewood, New Jersey 07450**

**Mudar Khantamr, PE
Regional Manager**

**Laurence W. Keller, PE
Vice President**

**Whitestone Project No.: GJ2523671.000
July 14, 2025**

Office Locations:



THE PEASE BUILDING
30 GARBER SQUARE
RIDGEWOOD, NJ 07450
908.668.7777
whitestoneassoc.com

July 14, 2025

via email

BOHLER, LLC
30 Garber Square
Ridgewood, New Jersey 07450

Attention: Ms. Jossy Fouad
Assistant Project Manager

**Regarding: REPORT OF GEOTECHNICAL INVESTIGATION
PROPOSED IMPROVEMENTS
SIX SOUTH MONROE STREET
BLOCKS 2403 & 2404, LOTS 17.01 & 3
RIDGEWOOD, BERGEN COUNTY, NEW JERSEY
WHITESTONE PROJECT NO.: GJ2523671.000**

Dear Ms. Fouad:

Whitestone Associates Inc. (Whitestone) is pleased to submit the *Report of Geotechnical Investigation* for the above-referenced project. The attached report presents the results of Whitestone's soils exploration efforts and presents recommendations for design of the proposed structural foundations, floor slab, pavements, stormwater management (SWM) facilities and related earthwork associated with the proposed improvements.

Whitestone's Geotechnical Division appreciates the opportunity to be of continued service to Bohler, LLC (Bohler). Please note that Whitestone has the capability to conduct the additional geotechnical engineering services recommended herein.

Please contact us at (908) 668-7777 with any questions regarding the enclosed report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Mudar Khantamr, PE
Regional Manager

Laurence W. Keller, PE
Vice President

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Enclosures
Copy: Benjamin Crowder, PE, LEED AP BD+C, Bohler, LLC
Michael F. Dwyer, Bohler, LLC
Rich D'Onofrio, Bohler, LLC

Office Locations:

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REPORT OF GEOTECHNICAL INVESTIGATION

Proposed Improvements Six South Monroe Street Ridgewood, Bergen County, New Jersey

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REPORT OF GEOTECHNICAL INVESTIGATION

Proposed Improvements Six South Monroe Street Ridgewood, Bergen County, New Jersey

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APPENDIX C Pavement Condition Survey Results
APPENDIX D Supplemental Information (USCS, Terms & Symbols)

SECTION 1.0

Summary of Findings

Whitestone has conducted an exploration and evaluation of the subsurface conditions at the site in support of the proposed redevelopment located at Six South Monroe Street (Blocks 2403 & 2404, Lots 17.01 & 3) in Ridgewood, Bergen County, New Jersey. The site of the proposed construction is shown on the *Test Location Plan* included as Figure 1.

At the time of Whitestone's exploration, the subject site housed a paved parking lot and a support building with associated pavements, landscaping, and utilities associated with the West Side Presbyterian Church. Based on the January 15, 2025 *Concept Plan* prepared by Bohler, the site has an existing high elevation of 165 feet above an unknown datum (UD) within the northwestern portion of the site and an existing low elevation of 122 feet above UD within the southeastern portion of the site.

Based on the *Concept Plan*, the proposed improvements will include clearing the project area and construction of an approximately 3,000-square feet (footprint) barn building with improved pavement and pedestrian access areas, SWM areas, landscaping, and utilities.

Based on the *Concept Plan*, Whitestone anticipates that the proposed site will be redeveloped with maximum cuts and fills up to five feet. The proposed SWM facilities are preliminary anticipated to be situated up to approximately eight feet below existing grades.

The subsurface exploration included conducting a reconnaissance of the project site, drilling test borings and excavating test pits and soil profile pits and conducting infiltration testing within accessible portions of the subject site, and collecting soil samples for laboratory analyses. The data from this exploration and analysis were analyzed by Whitestone in light of the provided project information.

A summary of Whitestone's findings is presented in the following:

- ▶ **Subsurface Materials:** The subsurface tests were conducted within existing pavement and landscaped areas and disclosed between three inches and four inches of asphalt underlain by six inches of granular subbase materials or between four inches and six inches of topsoil at the surface. Beneath the surface cover, the subsurface tests encountered natural residual soils generally consisting of silty sand (USCS: SM) with variable amounts of gravel and/or lean clay (USCS: CL) with variable amounts of sand. Borings B-1 and B-4 encountered auger refusal within the residual soils at depths ranging between approximately five feet below ground surface (fbgs) and 5.5 fbgs presumedly on very dense natural residual soils and/or the top of the weathered rock layer. The remaining borings encountered the residual soils to depths ranging from five fbgs to nine fbgs, where the top of weathered rock was encountered. The remaining borings encountered the weathered rock to maximum termination depths ranging between 7.3 fbgs and 13.4 fbgs. Static and perched/trapped groundwater was not encountered during the investigation. Static and perched/trapped groundwater are expected to fluctuate seasonally and following periods of precipitation.

Recommendations developed upon consideration of these findings are summarized below and presented in greater detail in the following sections of the report.

- ▶ **Foundations:** Whitestone recommends supporting the proposed structures on conventional shallow spread and continuous wall footings bearing within approved portions of the natural residual soils and/or structural fill provided the soils are properly evaluated, placed, and compacted as described herein. Foundations bearing within these materials may be designed using a maximum allowable net bearing pressure of 3,000 pounds per square foot (psf). Due to anticipated disturbance of upper portions of the subgrade soils during footing excavations, all footing bottoms should be improved by in-trench compaction in the presence of the geotechnical engineer.

- ▶ **Floor Slab and Pavements:** Whitestone anticipates that proposed floor slab and pavements may be supported on improved and approved natural residual soils and/or controlled structural fill materials subject to supplemental evaluation and subgrade preparation as described herein.

- ▶ **Soil Reusability:** Whitestone anticipates that the majority of the natural residual site soils will be suitable for selective reuse as structural fill and/or backfill provided moisture contents are controlled within two percent of the optimum during favorable weather conditions and objectionable deleterious materials are segregated. The reuse of the granular site materials with greater than 12 percent fines (USCS: SM) and fine-grained soils (USCS: CL) typically is possible only during extended periods of warm, dry weather conditions. Reuse of these soils is expected to require mixing with a granular material, extensive moisture conditioning, and/or drying to facilitate their reuse, workability, and compaction in fill areas. The on-site soils will become increasingly difficult to reuse and compact where wetted beyond the optimum moisture content. Immediate reuse of on-site soil should not be anticipated. Materials that become exceedingly wet likely will require discing and aerating, which may not be practical during wet conditions. Alternatively, imported fill materials may be used to attain the desired grades and expedite earthwork operations where weather conditions or site area availability preclude moisture control operations. The stripped asphalt and topsoil should not be used as fill or backfill.

SECTION 2.0

Introduction

2.1 AUTHORIZATION

Ms. Jossy Fouad with Bohler issued authorization to Whitestone to conduct the geotechnical investigation at the site relevant to the proposed improvements located at Six South Monroe Street (Blocks 2403 & 2404, Lots 17.01 & 3) in Ridgewood, Bergen County, New Jersey. The geotechnical investigation was conducted in general accordance with Whitestone's proposal to Bohler dated February 10, 2025.

2.2 PURPOSE

The purpose of this subsurface exploration and analysis was to:

- ▶ ascertain the various soil profile components at test locations;
- ▶ estimate the engineering characteristics of the proposed foundation bearing and subgrade materials;
- ▶ provide geotechnical criteria for use by the design engineers in preparing the foundation, floor slab, pavement, and SWM designs;
- ▶ provide recommendations for required earthwork and subgrade preparation;
- ▶ record groundwater and bedrock levels (where encountered) at the time of the investigation and discuss the potential impact on the proposed construction; and
- ▶ recommend additional investigation and/or analysis (if warranted).

2.3 SCOPE

The scope of the exploration and analysis included the subsurface exploration; field testing and sampling; laboratory analysis; and an engineering analysis and evaluation of the foundation materials. This *Report of Geotechnical Investigation* is limited to addressing the site conditions related to the physical support of the proposed construction. Any references to suspicious odors, materials, or conditions are provided strictly for the client's information.

2.3.1 Field Exploration

Whitestone's field exploration of the project site was conducted by means of six borings (identified as B-1 through B-6) and two soil profile pits (identified as SPP-1 and SPP-2) within accessible locations of the proposed redevelopment areas to depths ranging from approximately five fbg to 13.4 fbg. The borings

were advanced with an all-terrain vehicle (ATV)-mounted drill rig equipped with hollow stem augers and split-spoon sampling techniques and the soil profile pits and test pits were conducted using a track-mounted excavator. The subsurface tests were backfilled with excavated soils generated from the investigation and restored surficially using asphaltic cold patch, where necessary. The locations of the tests are shown on the *Test Location Plan* included as Figure 1.

A visual evaluation was also conducted to assess the current condition of the existing site parking lot. The visual evaluation included mapping and quantifying apparent distress types, severity, and locations. The results of the condition survey were combined to formulate an overall pavement condition index (good, fair, and poor). The overall condition index is helpful for identifying patterns of distress severity and is useful toward developing appropriate rehabilitation strategies and maintenance programs.

General descriptions of pavement distress types, severity levels and overall condition index are provided on the attached *Pavement Condition Survey* included as Appendix C. Detailed mapping of individual pavement survey areas and the test locations are provided on the attached *Test Location Plan* included as Figure 1.

The subsurface tests were conducted in the presence of Whitestone personnel who conducted field tests, recorded visual classifications, and collected samples of the various strata encountered. The subsurface tests were located in the field using normal taping procedures and estimated right angles. These locations are presumed to be accurate within a few feet.

The borings and Standard Penetration Tests (SPTs) were conducted in general accordance with ASTM International (ASTM) designation D-1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations.

Groundwater level observations, although not encountered, were recorded during and immediately after the completion of field operations prior to backfilling the subsurface tests. Seasonal variations, temperature effects, man-made effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

2.3.2 Laboratory Program

In addition to the field investigation, a laboratory program was conducted to determine additional, pertinent engineering characteristics of representative samples of on-site soils. The laboratory program was conducted in general accordance with applicable ASTM standard test methods and included physical testing of representative samples of various strata.

Physical/Textural Analyses: Representative samples of selected strata encountered were subjected to a laboratory program that included Atterberg Limit determinations (ASTM D-4318), moisture content determinations (ASTM D-2216), and washed gradation analyses (ASTM D-422) in order to conduct supplementary engineering soil classifications in general accordance with ASTM D-2487. The soil strata tested were classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table. Quantitative test results are provided in Appendix B.

PHYSICAL/TEXTURAL ANALYSES SUMMARY							
Boring	Sample	Depth (fbgs)	% Passing No. 200 Sieve	Moisture Content (%)	Liquid Limit	Plastic Index	USCS Classification
B-5	S-3	4.0 - 6.0	27.4	7.5	NP	NP	SM
B-6	S-2	2.0 - 4.0	77.2	18.3	28	8	CL

NP - Non-Plastic

The engineering classifications are useful when considered in conjunction with the additional site data to estimate properties of the soil types encountered and to predict the soil's behavior under construction and service loads.

2.3.3 Existing Pavement Evaluation

AC Pavement Mechanisms: AC pavement is unique in comparison to other pavement types because of flexibility and ability to distribute loading. AC pavement achieves flexibility from asphalt cement that binds aggregate particles to create asphalt concrete. Asphalt cement is a sticky, black, and highly viscous liquid or semi-solid form of petroleum. In general, as asphalt cement ages, viscosity increases and the material becomes more stiff and brittle (cement fatigue) resulting in AC pavement cracking. In addition to aging, pavement distress can result from other factors, or combination of, including excessive traffic loading, repeated temperature change, environmental effects, inadequate design, impeded drainage, and subgrade soil failure. Additionally, unrepaired pavement cracks allow water to penetrate the soil subgrade materials and in turn can result in strength loss of the subgrade soils and subsequent pavement distress.

The understanding of pavement distress occurrence is important to develop the appropriate rehabilitation strategy, enhance a pavement performance, and extend the service life. In general, most AC pavements for retail and commercial facilities are designed for a service life of approximately 15 years to 20 years with regular maintenance. Additionally, the understanding of the owner's expectation regarding the pavement appearance and life-service enhancement also is considered for the development of the pavement rehabilitation program.

Visual Evaluation: The results of the visual evaluation indicated that the majority of the existing asphaltic concrete parking lot are generally in poor structural condition with areas generally exhibiting moderate to severe distress including longitudinal/transverse/fatigue (alligator) cracking, and potholes. General descriptions of pavement distress types, severity levels and overall condition index are provided on the attached *Pavement Condition Survey* included as Appendix C.

SECTION 3.0

Site Description

3.1 LOCATION AND DESCRIPTION

The subject property located is located at Six South Monroe Street in Ridgewood, Bergen County, New Jersey. The site is further identified as Blocks 2403 & 2404, Lots 17.01 & 3. The site is bound to the north by the West Side Presbyterian Church, to the south by athletic fields followed by Godwin Avenue and residential properties, to the east by South Monroe Street followed by George Washington Middle School, and to the west by residential properties. The site of the proposed construction is shown on the *Test Location Plan* included as Figure 1.

3.2 EXISTING CONDITIONS

Surface Cover/Development: At the time of Whitestone's exploration, the subject site housed a paved parking lot and a support building with associated pavements, landscaping, and utilities associated with the West Side Presbyterian Church.

Topography: Based on the *Concept Plan* prepared by Bohler, the site has an existing high elevation of 165 feet above UD within the northwestern portion of the site and an existing low elevation of 122 feet above UD within the southeastern portion of the site.

Utilities: At the time of Whitestone's subsurface field investigation, the subject site was observed to be serviced by public and private utilities including underground electric, water, natural gas, sewer, and stormwater lines. Other utilities were not observed at the subject site by Whitestone, however, may be present. The utility information contained in this report is presented for general discussion only and is not intended for construction purposes.

Site Drainage: Surface run-off for the site generally follows existing topography draining towards SWM inlets located within the existing site pavements and adjacent right-of ways. The termini of these inlets is unknown.

3.3 SITE GEOLOGY

The subject property is situated within a section of the Piedmont Physiographic Province known as the Newark Basin. Specifically, the subject site is underlain by the Lower Jurassic-age and Upper Triassic-age Quartzite Conglomerate member of the Passaic Formation, which is part of the Brunswick Group. The Quartzite Conglomerate generally consists of reddish-brown pebble conglomerate, medium-grained to coarse-grained feldspathic and pebbly sandstone.

The overburden materials at the site include Rahway Till associated with the Wisconsin Glacier that presumably reached its most southerly advance approximately 20,000 years ago and ended approximately 10,000 years ago. The glacial deposits are expected to overlay the weathered rock. Glacial till in the area typically contains a heterogeneous mixture of sand, silt, clay and gravel mixed with variable amounts of boulders and cobbles.

3.4 PROPOSED CONSTRUCTION

Based on the *Concept Plan*, the proposed improvements will include clearing the project area and construction of an approximately 3,000-square feet (footprint) barn building with improved pavement and pedestrian access areas, SWM areas, landscaping, and utilities. Whitestone anticipates that the proposed site will be redeveloped with maximum cuts and fills up to five feet. The proposed SWM facilities are preliminarily anticipated to be situated up to approximately eight feet below existing grades.

The anticipated maximum loads are expected to be as follows:

- ▶ column loads - 75 kips;
- ▶ wall loads - 2.0 kips per lineal foot; and
- ▶ floor slabs - 125 psf.

The scope of Whitestone's investigation and the professional advice contained in this report were generated based on the project details and loading noted herein. Any revisions or additions to the design details enumerated in this report should be brought to the attention of Whitestone for additional evaluation as warranted.

SECTION 4.0

Subsurface Conditions

Details of the subsurface materials encountered are presented on the *Records of Subsurface Exploration* presented in Appendix A of this report. The subsurface soil conditions encountered in the subsurface tests consisted of the following generalized strata in order of increasing depth.

4.1 SUBSURFACE SOIL CONDITIONS

Surface Cover Materials: The subsurface tests were conducted within existing pavement and landscaped areas and disclosed between three inches and four inches of asphalt underlain by six inches of granular subbase materials or between four inches and six inches of topsoil at the surface.

Residual Soils: Beneath the surface cover, the subsurface tests encountered natural residual soils generally consisting of silty sand (USCS: SM) with variable amounts of gravel and/or lean clay (USCS: CL) with variable amounts of sand. Borings B-1 and B-4 encountered auger refusal within the residual soils at depths ranging between approximately five fbgs and 5.5 fbgs presumedly on very dense natural residual soils and/or the top of the weathered rock layer. The remaining borings encountered the residual soils to depths ranging from five fbgs to nine fbgs, where the top of weathered rock was encountered. SPT N-values within this stratum ranged between eight blows per foot (bpf) and refusal (generally defined as greater than 50 SPT hammer-blows per six-inch split-spoon sampler advancement), generally indicating loose to very dense relative densities, and averaged approximately 29 bpf. Pocket penetrometer measurements within the fine-grained portions of the stratum ranged between 0.75 ton per square foot (tsf) and greater than 4.5 tsf, generally indicating medium stiff to very hard relative consistencies, and averaged approximately 1.75 tsf.

Weathered Rock: The remaining borings encountered the weathered rock to maximum termination depths ranging between 7.3 fbgs and 13.4 fbgs. The relative densities within the weathered rock were in the very dense range.

4.2 GROUNDWATER

Static and perched/trapped groundwater was not encountered during the investigation. Static and perched/trapped groundwater are expected to fluctuate seasonally and following periods of precipitation.

SECTION 5.0

Conclusions and Recommendations

5.1 GENERAL

Whitestone recommends supporting the proposed structures on conventional shallow foundations bearing within the approved portions of the natural residual soils and/or controlled structural fill soils provided they are properly inspected, placed, and compacted in accordance with Sections 5.2, 5.3, and 5.11 of this report.

Whitestone anticipates that proposed floor slab and pavements may be supported on approved natural residual soils and/or controlled structural fill provided these materials are prepared in accordance with the recommendations herein.

All fill or backfill placed in structural areas during any site remediation or demolition operation, particularly following removal of existing building foundations, should be placed as structural fill in maximum nine-inch loose lifts and compacted to 95 percent of the modified proctor maximum dry density within two percentage points of the optimum moisture content under the supervision of the owner's geotechnical engineer.

5.2 SITE PREPARATION AND EARTHWORK

Surface Cover Stripping: Prior to stripping operations, all utilities should be identified and secured. The existing building and surface cover to be demolished and stripped should be removed from within and at least five feet beyond the limits of areas requiring structural backfill, where possible. Any structural elements, such as foundation walls, or any concrete foundations, walls or slabs, if encountered during excavations, should be removed entirely from below proposed foundations and their zones of influence (as determined by lines extending at least one foot laterally beyond footing edges for each vertical foot of depth) and excavated to at least two feet below proposed construction subgrade levels elsewhere. Foundations and slabs may remain in place below these depths below landscaped areas, provided interference with future construction is avoided, however, any existing slab to remain should be thoroughly broken to allow vertical drainage of infiltrating water. The resulting excavations should be backfilled to elevations consistent with proposed construction subgrades in accordance with the recommendations of Section 5.3. The demolition contractor should be required to conduct all earthwork in accordance with the recommendations in this report.

Excavation Difficulties: Weathered rock was encountered across the subject property at depths ranging between five fbg's and nine fbg's that may present difficult excavation during deeper utility excavations. Heavy excavating equipment with ripping tools will typically be effective in removing dense/hard weathered soils, transition materials, and cobble/boulder-sized rock fragments during site mass grading.

The speed and ease of excavation will depend on the type of grading equipment, the skill of the equipment operators, and the geologic structure of the material itself, such as the direction of planes of weakness and spacing between discontinuities. Planned excavation in confined excavations, such as for utility trenches, may require ripping tools and/or pneumatic hammers.

Surface Preparation/Proofrolling: Prior to placing any fill or subbase materials to raise or restore grades to the desired subgrade elevations, the existing exposed soils should be compacted to a firm surface with several passes in two perpendicular directions of a minimum 10-ton roller. The surface then should be proofrolled with a loaded tandem axle truck in the presence of the geotechnical engineer to help identify soft or loose pockets which may require removal and replacement or further investigation. Proofrolling should be conducted after a suitable period of dry weather to avoid degrading an otherwise stable subgrade. Any fill or backfill should be placed and compacted in accordance with Section 5.3.

Weather Performance Criteria: Portions of the on-site soils are moderately- to highly-moisture sensitive (USCS: SM & CL) and will soften when exposed to water, every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations and prepared subgrades to rainfall. Accordingly, excavation and fill placement procedures should be conducted during favorable weather conditions. Overexcavation of saturated soils and replacement with controlled structural fill per Section 5.3 of this report may be required prior to resuming work on disturbed subgrade soils.

Subgrade Protection and Maintenance: Every effort should be made to minimize disturbance of the site soils by construction traffic and surface runoff. The site soils will deteriorate when subjected to repeated wetting and construction traffic and likely will require removal and replacement or further investigation. Proofrolling should be conducted after a suitable period of dry weather to avoid degrading an otherwise acceptable subgrade. Site materials placed as fill should be sealed on a daily basis using a smooth drum roller to promote drainage and prevent ponding of stormwater. Materials that become exceedingly wet likely will require discing, aerating, and possibly drying during favorable weather. Alternatively, imported fill materials or subgrade stabilization procedures may be required to attain the desired grades and expedite earthwork operations during wet weather periods. The owner's geotechnical engineer should be retained to inspect soil conditions during construction and verify the suitability of prepared foundations, floor slab, and pavement subgrades for support of design loads. The site contractors should employ appropriate means and methods to protect subgrade including, however, not limited to the following:

- ▶ leaving the existing pavement in place as long as practical to protect the subgrade from freeze-thaw cycles and exposure to inclement weather;
- ▶ sealing exposed subgrade soils on a daily basis with a smooth drum roller operated in static mode;
- ▶ regrading the site as needed to maintain positive drainage away from open earthwork construction areas and to prevent standing water;

- ▶ removing wet surficial soils and ruts immediately; and
- ▶ limiting exposure to construction traffic especially following inclement weather and subgrade thawing.

5.3 STRUCTURAL FILL AND BACKFILL

Imported Fill Material: Any imported material placed as structural fill or backfill to raise elevations or restore design grades should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 15 percent of material finer than a #200 sieve. Imported fill material placed within the upper four feet of the building area should have a maximum plasticity index of 12 percent and a maximum liquid limit of 40 percent. Imported fill material placed below the upper four feet of the building area and any of the structural areas should have a maximum plasticity index of 20 percent and a maximum liquid limit of 50 percent. The material should be free of clay lumps, organics and deleterious material.

On-Site Materials: Based on the conditions disclosed by the subsurface tests, Whitestone anticipates that the majority of the natural site soils will be marginally suitable for selective reuse as structural fill and/or backfill provided moisture contents are controlled within two percent of the optimum during favorable weather conditions and objectionable deleterious materials are segregated. The reuse of granular site materials with greater than 12 percent fines (USCS: SM) and fine-grained site soils (USCS: CL) typically is possible only during extended periods of warm, dry weather conditions. Reuse of these soils is expected to require mixing with a granular material, extensive moisture conditioning, and/or drying to facilitate their reuse, workability, and compaction in fill areas. The on-site soils will become increasingly difficult to reuse and compact where wetted beyond the optimum moisture content. Immediate re-use of on-site soil should not be anticipated. Materials that become exceedingly wet likely will require discing and aerating, which may not be practical during wet conditions. Alternatively, imported fill materials may be used to attain the desired grades and expedite earthwork operations where weather conditions or site area availability preclude moisture control operations. Stripped asphalt and/or topsoil should not be used as fill or backfill.

Cobble- and boulder-sized weathered rock/bedrock materials or similarly sized materials greater than three inches in diameter will need to be separated from on-site soils to be placed as structural fill or backfill. Cobble-sized materials between three inches to 12 inches may be crushed or individually placed in structural fill or backfill layers deeper than two feet below proposed foundation and pavement subgraded levels. Care must be taken to individually seat any large particles and to compact soil around large particles with hand operated equipment to minimize risk of void formation. Boulder-sized greater than 12 inches in diameter need to be crushed prior to replacement as structural fill materials. Materials greater than three inches in size should be placed a minimum of three feet from utilities.

Demolition Material: Demolition material, free of environmental restrictions, may be used as fill material provided the material is properly segregated and processed as recommended herein. Concrete masonry materials should be crushed to a well graded blend with a maximum size of three inches in diameter. Stripped asphaltic materials and deleterious building materials such as wood, insulation, metal shingles etc. should not be used as general structural fill material. Milled or reclaimed asphalt pavement (RAP) may be re-used as granular base or stabilizing materials provided that the RAP particle size meets New Jersey Department of Transportation (NJDOT) standard specifications for granular base and no more than 50 percent of the pavement granular base contains RAP.

Compaction and Placement Requirements: All structural fill and backfill should be placed in maximum nine-inch loose lifts and compacted to 95 percent of the maximum dry density within two percent of the optimum moisture content as determined by ASTM D-1557 (Modified Proctor). Whitestone recommends using a vibratory drum roller to compact the existing coarse-grained site soils or a small hand held vibratory compactor within excavations.

Structural Fill Testing: A sample of the imported fill material or any on-site material proposed for reuse as structural fill or backfill should be submitted to the geotechnical engineer for analysis and approval at least one week prior to its use. The placement of all fill and backfill should be monitored by a qualified engineering technician to ensure that the specified material and lift thicknesses are properly installed. A sufficient number of in-place density tests should be conducted to ensure that the specified compaction is achieved throughout the height of the fill or backfill.

5.4 GROUNDWATER CONTROL

Static groundwater was not encountered during the investigation. Accordingly, based on anticipated redevelopment grades, Whitestone does not anticipate the need for extensive dewatering or groundwater control. However, perched/trapped water may be anticipated within existing fill, at the existing fill/natural soil interface, within fine-grained portions of the natural site soils, and/or above the weathered rock, especially following precipitation events. As such, construction phase dewatering primarily is anticipated to consist of removing surface water runoff and trapped water that should be expected during site excavations. A gravity fed sump pump should be suitable for minor temporary dewatering of any trapped water or surface runoff encountered during construction.

Proper grading and drainage must be incorporated into the site design and construction phase grading to discourage ponding of surface runoff. Every effort must be made to maintain drainage of surface run-off away from construction areas by grading. The contractor should limit exposure of excavations and prepared subgrades to rainfall. Overexcavation of saturated soils and replacement with controlled structural fill per Section 5.3 of this report may be required prior to resuming work on disturbed subgrade soils.

5.5 FOUNDATIONS

Shallow Foundation Design Criteria: Whitestone recommends supporting the proposed structures on conventional spread and continuous wall footings designed to bear within approved portions of the natural residual site soils and/or on properly placed and compacted structural fill provided these materials are properly evaluated, placed and compacted in accordance with Sections 5.2, 5.3, and 5.11 of this report. Foundations bearing within these materials may be designed to impart a maximum allowable net bearing pressure of 3,000 psf. All footing bottoms should be improved by in-trench compaction in the presence of the geotechnical engineer. Regardless of loading conditions, proposed foundations should be sized no less than minimum dimensions of 24 inches for continuous wall footings and 36 inches for isolated column footings.

Inspection/Overexcavation Criteria: Whitestone recommends that the suitability of the bearing soils along and below the footing bottoms be verified by a geotechnical engineer prior to placing concrete for the footings. Where areas of unsuitable materials are encountered in footing excavations, overexcavation and recompaction or replacement of the materials will be necessary to provide a suitable footing subgrade. Any overexcavation to be restored with structural fill will need to extend at least one foot laterally beyond footing edges for each vertical foot of overexcavation. Lateral overexcavation may be reduced if grade is restored with lean concrete. The bottom of overexcavations should be compacted with static smooth drum rollers, walk-behind compactors, vibrating plates, or plate tampers (“jumping jacks”), as appropriate, to compact locally disturbed materials.

Settlement: Whitestone estimates post construction settlements of individual foundation elements to be less than one inch if the recommendations outlined in this report are properly implemented. Differential settlements of building foundations should be less than one-half inch.

Frost Coverage: Footings subject to frost action should be placed at least 36 inches below adjacent exterior grades or the depth required by local building codes to provide protection from frost penetration. Interior footings not subject to frost action may be placed at a minimum depth of 18 inches below the slab subgrade.

5.6 FLOOR SLAB

Whitestone anticipates that approved natural residual site soils and/or controlled structural fill will be suitable for support of the proposed floor slabs provided these materials are properly evaluated, compacted, and proofrolled in accordance with Sections 5.2, 5.3, and 5.11 of this report. Any areas that become softened or disturbed as a result of wetting and/or repeated exposure to construction traffic should be removed and replaced with compacted structural fill. The properly prepared on-site soils are expected to yield a minimum subgrade modulus (k) of 150 psi/in.

A minimum four-inch layer of coarse aggregate, such as AASHTO #57 stone, dense graded aggregate, or equal, should be installed below ground-supported floor slabs to provide a capillary break. An impervious membrane also should be provided as a moisture vapor barrier beneath all floor slabs.

5.7 PAVEMENT DESIGN CRITERIA

General: Whitestone anticipates that approved natural residual soils, and/or controlled structural fill materials are expected to be suitable for support of the proposed pavements provided these materials are properly evaluated, compacted, and proofrolled in accordance with Sections 5.2, 5.3, and 5.11 of this report during favorable weather conditions. Any areas that become softened or disturbed as a result of wetting and/or repeated exposure to construction traffic should be removed and replaced with compacted structural backfill. Pavement subgrade soils should be recompacted to at least 95 percent of the maximum dry density as determined by the Modified Proctor. Although not encountered, where existing fill remains below proposed subgrades, increased maintenance, possibly including crack sealing, patching or more frequent re-paving, may be necessary.

A biaxial geogrid, such as Tensar BX-1200 or an engineer-approved equivalent, may be used within pavement subgrade areas to stabilize the subgrade and also to reduce the depth of overexcavation. If the risk of increased maintenance is not acceptable, more extensive subgrade preparation recommendations can be developed. The following pavement section recommendations are based on the assumption that such an allowed risk is acceptable. Whitestone would be pleased to prepare alternative recommendations for more substantial subgrade improvements.

Design Criteria: A design California Bearing Ratio of five has been determined based on climatic considerations for the properly prepared subgrade soils for pavement design purposes. This value was correlated with pertinent soil support values and specified traffic loads to prepare flexible and rigid pavement designs per the AASHTO *Guide for the Design of Pavement Structures*.

Design traffic loads were assumed based on typical volumes for similar facilities and correlated with 18-kip equivalent single axle loads (ESAL) for a 20-year life. An estimated maximum load of 25,000 ESAL for all pavement areas assuming the pavement primarily will accommodate both automobile and limited heavier truck traffic. Actual pavement loads should be less than this value.

Pavement Sections: The following recommended flexible pavement section is presented below:

FLEXIBLE PAVEMENT SECTIONS		
Layer	Material	Standard Duty Thickness (Inches)
Asphalt Surface	NJDOT I-5 Surface	1.5
Asphalt Base	NJDOT I-2 Base	2.5
Granular Subbase	NJDOT DGA Base Course	6.0

A rigid concrete pavement should be used to provide suitable support at areas of high traffic or severe turns. The recommended minimum rigid pavement is presented below in tabular format:

RIGID PAVEMENT SECTIONS		
Layer	Material	Standard Duty Thickness (Inches)
Surface	4,000 psi air-entrained concrete	5.0 ¹
Base	NJDOT DGA Base Course	6.0

Note¹: The outer edges of concrete pavements are susceptible to damage as trucks move from rigid pavement to adjacent flexible pavement. Accordingly, the thickness at the outer two feet of the rigid concrete pavement should be 12 inches.

Additional Design Considerations: The pavement section thickness designs presented in this report are based on the design parameters detailed herein and are contingent on proper construction, inspection, and maintenance. Additional pavement thickness may be required by local code. The designs are contingent on achieving the minimum soil support value in the field. To accomplish this requirement, all subgrade soil and supporting fill or backfill must be placed, compacted, and evaluated in accordance with Sections 5.2, 5.3, and 5.11 of this report. Proper drainage must be provided for the pavement structure including appropriate grading and surface water control.

The performance of the pavement also will depend on the quality of materials and workmanship. Whitestone recommends that NJDOT standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials. All rigid concrete pavements should be suitably air-entrained, jointed, and reinforced.

5.8 LATERAL EARTH PRESSURES

Site retaining walls were not identified on the *Concept Plan*, however, Whitestone anticipates that they may be necessary for the proposed redevelopment and lateral earth pressure design will be required.

The following soil parameters apply to the anticipated properly compacted imported granular fill or site soils in a well-drained, level backfill condition and may be used for foundation designs dependent upon lateral earth resistance:

LATERAL EARTH PRESSURE PARAMETERS		
Parameters	Site Soils	Imported Granular Fill Materials
Moist Density (γ_{moist})	130 pcf	140 pcf
Internal Friction Angle (ϕ)	28°	30°
Active Earth Pressure Coefficient (K_a)	0.36	0.33
Passive Earth Pressure Coefficient (K_p)	2.77	3.00
At-Rest Earth Pressure Coefficient (K_o)	0.53	0.50

pcf: pounds per cubic foot

Backfill Criteria: Whitestone recommends that granular soils be used to backfill behind the proposed below-grade walls. The granular backfill materials should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 15 percent of material finer than a #200 sieve. The material should be free of clay lumps, organics, and deleterious material. The natural site soils or weathered rock are not anticipated to be suitable for below-grade wall backfill. Accordingly, imported granular soils may be required. A maximum density of 140 pcf should not be exceeded to avoid creating excessive lateral pressure on the walls during compaction operations.

Whitestone recommends that backfill directly behind any walls be compacted with light, hand-held compactors. Heavy compactors and grading equipment should not be allowed to operate within a zone of influence measured at a 45-degree angle from the base of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

Wall Drainage: Positive gravity drainage of the backfill should be provided at the base of the below-grade walls by a series of perforated pipes surrounded by at least 18 inches of clean crushed stone that discharges into a stormwater sewer or daylight to appropriate site surface drainage. Whitestone recommends that a two-foot wide zone of clean crushed stone or washed sand, separated from the backfill by a filter fabric, be constructed adjacent to the back of the wall. This zone should prevent the buildup of hydrostatic pressures and pressures from freezing moisture in the backfill above the groundwater level. The vertical drain should be tied into the gravity drainage system (perforated pipe) installed at the base of the wall. Alternatively, below-grade walls may include weep holes instead of a drain tied to the site drainage system. Where wall drainage is not provided, the wall should be designed to withstand full hydrostatic pressure.

Whitestone should be notified if any other retaining structures or design considerations requiring lateral earth pressure estimations are proposed. Specific recommendations for temporary retaining structures are beyond Whitestone's scope of work.

5.9 SEISMIC AND LIQUEFACTION CONSIDERATIONS

Based on a review of the subsurface conditions relevant to the *International Building Code 2021, New Jersey Edition* the subject site may be assigned a Site Class C. Based on the seismic zone and soil profile liquefaction considerations are not expected to have a substantial impact on design. Based on review of the Geologic Map of New Jersey, no seismic hazard zones or fault zones are identified on this site.

5.10 EXCAVATIONS

The soils encountered during this investigation within anticipated excavation depths are at least consistent with Type C Soil Conditions as defined by 29 CFR Part 1926 (OSHA) which require a maximum unbraced excavation angle of 1.5:1 (horizontal: vertical). Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA) to ensure that safe excavation methods and/or shoring and bracing requirements are implemented.

5.11 SUPPLEMENTAL POST INVESTIGATION SERVICES

Construction Inspection and Monitoring: The owner’s geotechnical engineer with specific knowledge of the subsurface conditions and design intent should conduct inspection, testing, and consultation during construction as described in previous sections of this report. Monitoring and testing should also be conducted to verify that the existing structures are properly demolished, any encountered underground structures are properly backfilled, the existing surface cover materials are properly removed, and suitable materials used for controlled fill are properly placed and compacted over suitable subgrade soils. The overexcavation of unsuitable materials, where required, and proofrolling of subgrades prior to structural support should be witnessed and documented by the owner’s geotechnical engineer.

5.12 PRELIMINARY SWM AREA EVALUATION

General: A preliminary evaluation of the subsurface conditions, including limiting zones and estimated seasonal high groundwater (ESHGW) levels, was conducted in support of the proposed SWM system. The investigation and infiltration testing were conducted in general accordance with standards presented in the New Jersey Department of Environmental Protection (NJDEP) *Stormwater Best Management Practices Manual* (BMP Manual). The preliminary investigation included conducting two soil profile pits (identified as SPP-1 through SPP-2) and conducting laboratory tube permeameter testing on representative samples. The subsurface test locations are shown on the *Test Location Plan* included as Figure 1.

Estimated Seasonal High Groundwater Levels: The methods used in determining the seasonal high groundwater level include evaluating the soil morphology within a test excavation and identifying irregular spots or blotches of different colors or minerals unlike that of the surrounding soil (mottles). A summary of the ESHGW observations, although not encountered, as well as field infiltration test results from the evaluation are included in the following table.

ESHGW/INFILTRATION TEST SUMMARY				
Test Location	ESHGW (fbgs)	USDA Classification @ Test	Field Infiltration Test Results	
			Depth (fbgs)	Rate (in/hour)
SPP-1	Not Encountered	Sandy Loam	3.0	0.98
SPP-2	Not Encountered	Sandy Loam	5.0	0.22

USDA: United States Department of Agriculture

Tested Soil Infiltration Rates: Representative samples within select subsurface tests were subjected to laboratory tube permeameter testing as detailed in the BMP Manual. Infiltration rates ranged between approximately 0.22 inches per hour (iph) and 0.98 iph. *Records of Subsurface Exploration* are included in Appendix A, and detailed laboratory tube permeameter test results are provided in Appendix B.

SECTION 6.0

General Comments

Supplemental recommendations may be required upon finalization of construction plans or if significant changes are made in the characteristics or location of the proposed structure. Soil bearing conditions should be checked at the appropriate time for consistency with those conditions encountered during Whitestone's geotechnical investigation.

The recommendations presented herein should be utilized by a qualified engineer in preparing the project plans and specifications. The engineer should consider these recommendations as minimum physical standards which may be superseded by local and regional building codes and structural considerations. These recommendations are prepared for the sole use of Bohler, LLC for the specific project detailed and should not be used by any third party. These recommendations are relevant to the design phase and should not be substituted for construction specifications.

The possibility exists that conditions between borings and profile pits may differ from those at specific test locations, and conditions may not be as anticipated by the designers or contractors. In addition, the construction process may alter soil and rock conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered.

Whitestone assumes that a qualified contractor will be employed to conduct the construction work, and that the contractor will be required to exercise care to ensure all excavations are conducted in accordance with applicable regulations and good practice. Particular attention should be paid to avoiding damaging or undermining adjacent properties and maintaining slope stability.

Whitestone recommends that the services of the geotechnical engineer be engaged to test and evaluate the soils in the footing excavations prior to concreting in order to determine that the soils will support the bearing capacities. Monitoring and testing also should be conducted to verify that suitable materials are used for controlled fills and that they are properly placed and compacted over suitable subgrade soils.

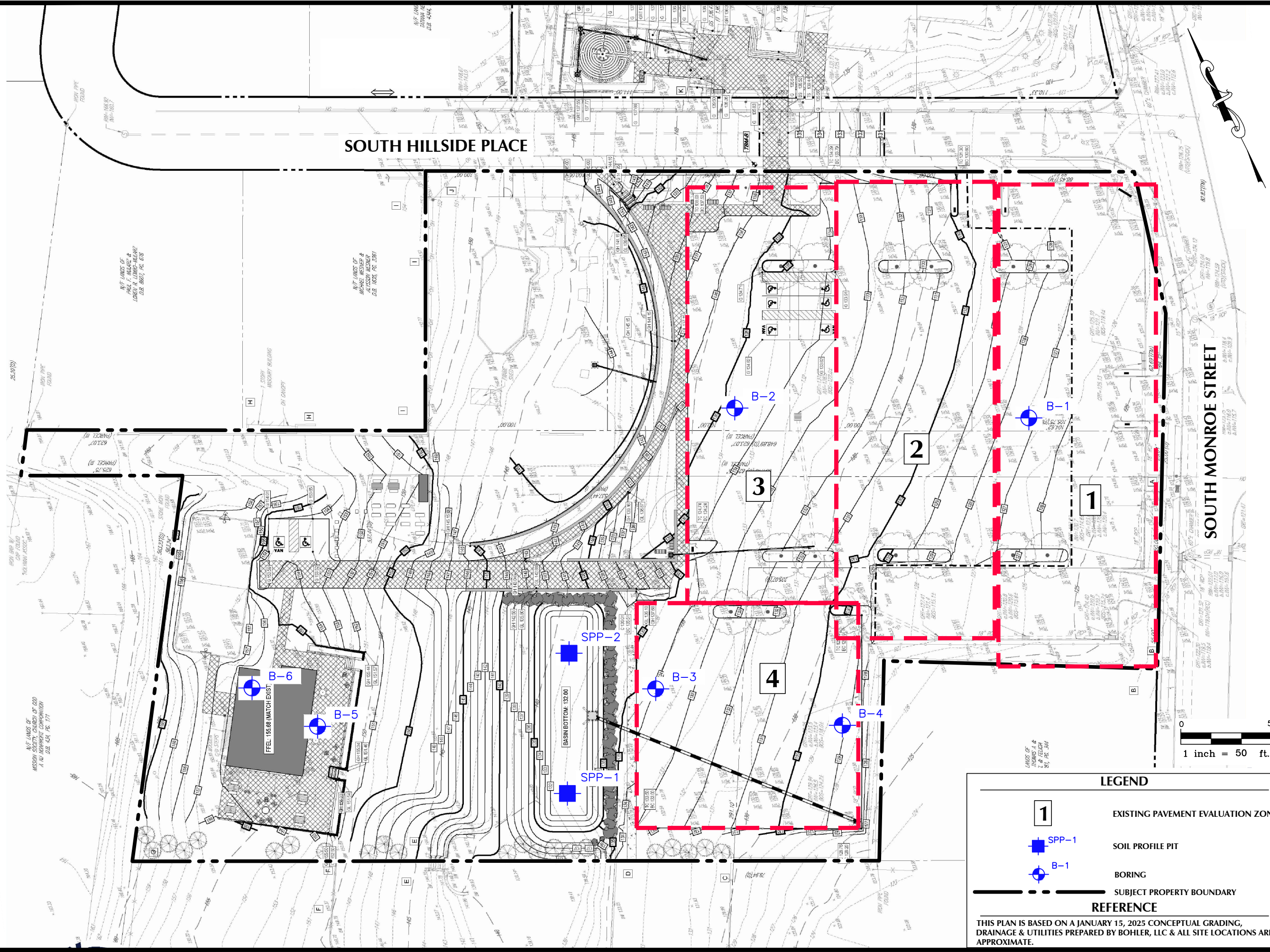
The exploration and analysis of the foundation conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the foundation design. The recommendations submitted for the proposed construction are based on the available soil information and the design details furnished by Bohler, LLC. Deviations from the noted subsurface conditions encountered during construction should be brought to the attention of the geotechnical engineer.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.



FIGURE 1
Test Location Plan

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LEGEND

- 1 EXISTING PAVEMENT EVALUATION ZONE
- SPP-1 SOIL PROFILE PIT
- ⊕ B-1 BORING
- SUBJECT PROPERTY BOUNDARY

REFERENCE

THIS PLAN IS BASED ON A JANUARY 15, 2025 CONCEPTUAL GRADING, DRAINAGE & UTILITIES PREPARED BY BOHLER, LLC & ALL SITE LOCATIONS ARE APPROXIMATE.

DRAWING TITLE: TEST LOCATION PLAN	
CLIENT: BOHLER, LLC	
PROJECT: PROPOSED IMPROVEMENTS SIX SOUTH MONROE STREET RIDGEWOOD, BERGEN COUNTY, NJ	
PROJECT #: GJ2523671.000	
DESIGNED BY: GR	PROJ. MGR.: MK
DATE: 7/10/25	FIGURE: 1
SCALE: 1" = 50'	



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30 INDEPENDENCE BOULEVARD, SUITE 250, WARREN, NJ 07059
908.668.7777 WHITESTONEASSOC.COM

APPENDIX A
Records of Subsurface Exploration



RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-1

Page 1 of 1

Project: Proposed Improvements		WAI Project No.: GJ2523671.000	
Location: Six South Monroe Street, Ridgewood, Bergen County, NJ		Client: Bohler, LLC	
Surface Elevation: ± 127.0 feet	Date Started: 6/17/2025	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 5.2 feet bgs	Date Completed: 6/17/2025	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Pavement	Logged By: CS / FS	During: NE --- ▼	At Completion: 5.0 122.0
Drill / Test Method: HSA / SPT	Contractor: ACC	At Completion: NE --- ▼	
	Equipment: ATV	24 Hours: --- --- ▼	24 Hours: --- ---

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	PAVEMENT	4" Pavement, 6" Subbase	
						0.8	RESIDUAL		
1 - 3	S-1		2 - 2 - 2 - 2	6	4			Brown Lean Clay, Moist, Medium Stiff (CL)	Qu = 0.75 tsf
3 - 5	S-2		5 - 10 - 17 - 27	12	27			Reddish-Brown Silty Sand with Some Gravel, Moist, Medium Dense (SM)	
5 - 5.2	S-3		50/2"	NR	50/2"			As Above, Very Dense (SM)	
						10.0			
						15.0			
						20.0			
						25.0			
Boring Log B-1 Terminated at a Depth of 5.2 Feet Below Ground Surface Due to Auger and Spoon Refusal									

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-2
Page 1 of 1

Project: Proposed Improvements		WAI Project No.: GJ2523671.000	
Location: Six South Monroe Street; Ridgewood, Bergen County, NJ		Client: Bohler, LLC	
Surface Elevation: ± 134.0 feet	Date Started: 6/17/2025	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 7.3 feet bgs	Date Completed: 6/17/2025	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Pavement	Logged By: CS / FS	During: NE --- ▼	At Completion: 5.0 129.0
Drill / Test Method: HSA / SPT	Contractor: ACC	At Completion: NE --- ▼	
	Equipment: ATV	24 Hours: --- --- ▼	24 Hours: --- ---

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	PAVEMENT	3" Pavement, 6" Subbase	
1 - 3	S-1		5 - 6 - 5 - 6	16	11	0.8	RESIDUAL	Brown Lean Clay, Moist, Stiff (CL)	Qu = 1.5 tsf
3 - 4.8	S-2		15 - 20 - 23 - 50/3"	20	43	3.0		Reddish-Brown Silty Sand with Some Gravel, Moist, Dense (SM)	
5 - 5.2	S-3		50/2"	NR	50/2'	5.0	WEATHERED ROCK	No Recovery, Resumed as Below (WR)	
7 - 7.3	S-4		50/4"	4	50/4"	7.0		Reddish-Brown Weathered Rock, Dry, Very Dense (WR)	
								Boring Log B-2 Terminated at a Depth of 7.3 Feet Below Ground Surface Due to Auger Refusal	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-3
Page 1 of 1

Project: Proposed Improvements		WAI Project No.: GJ2523671.000	
Location: Six South Monroe Street; Ridgewood, Bergen County, NJ		Client: Bohler, LLC	
Surface Elevation: ± 135.0 feet	Date Started: 6/17/2025	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 9.7 feet bgs	Date Completed: 6/17/2025	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Pavement	Logged By: CS / FS	During: NE --- ▾	At Completion: 3.0 132.0
Drill / Test Method: HSA / SPT	Contractor: ACC	At Completion: NE --- ▾	
	Equipment: ATV	24 Hours: --- --- ▾	

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	PAVEMENT	4" Pavement, 6" Subbase	
						0.8	RESIDUAL	 Reddish-Brown Lean Clay, Moist, Hard (CL)	Qu = >4.5 tsf
1 - 3	S-1	X	6 - 6 - 6 - 7	8	12				
3 - 5	S-2	X	12 - 17 - 15 - 17	16	32				
5 - 7	S-3	X	19 - 25 - 27 - 33	12	52				
7 - 9	S-4	X	41 - 37 - 32 - 40	12	69		As Above (SM)		
9 - 9.7	S-5	X	20 - 50/2"	NR	50/2"	9.0	WEATHERED ROCK	No Recovery, Presumed Weathered Rock, Moist, Very Hard (WR)	
						10.0		Boring Log B-3 Terminated at a Depth of 9.7 Feet Below Ground Surface Due to Auger Refusal	
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-4
Page 1 of 1

Project: Proposed Improvements		WAI Project No.: GJ2523671.000	
Location: Six South Monroe Street; Ridgewood, Bergen County, NJ		Client: Bohler, LLC	
Surface Elevation: ± 129.0 feet	Date Started: 6/17/2025	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 5.0 feet bgs	Date Completed: 6/17/2025	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Pavement	Logged By: CS / FS	During: NE --- ▼	At Completion: 2.0 127.0 <input type="checkbox"/>
Drill / Test Method: HSA / SPT	Contractor: ACC	At Completion: NE --- ▼	
	Equipment: ATV	24 Hours: --- --- ▼	

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	PAVEMENT	4" Pavement, 6" Subbase	
						0.8	RESIDUAL	 Reddish-Brown Silty Sand with Some Gravel, Moist, Medium Dense (SM)	
1 - 3	S-1	X	2 - 7 - 20 - 27	16	27				
3 - 5	S-2	X	8 - 15 - 12 - 12	14	27				As Above (SM)
						5.0		Boring Log B-4 Terminated at a Depth of 5.0 Feet Below Ground Surface	
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION



Boring No.: B-5
Page 1 of 1














Project: Proposed Improvements		WAI Project No.: GJ2523671.000	
Location: Six South Monroe Street; Ridgewood, Bergen County, NJ		Client: Bohler, LLC	
Surface Elevation: ± 153.0 feet	Date Started: 6/17/2025	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 13.2 feet bgs	Date Completed: 6/17/2025	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Barn	Logged By: CS / FS	During: NE --- ▾	At Completion: 10.0 143.0 <input type="checkbox"/>
Drill / Test Method: HSA / SPT	Contractor: ACC	At Completion: NE --- ▾	
	Equipment: ATV	24 Hours: --- --- ▾	24 Hours: --- --- <input type="checkbox"/>

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0	TOPSOIL	4" Topsoil	
0 - 2	S-1	X	1 - 2 - 2 - 2	16	4	0.3	RESIDUAL	Reddish-Brown Lean Clay, Moist, Medium Stiff (CL)	Qu = 0.75 tsf
2 - 4	S-2	X	3 - 4 - 4 - 7	12	8	2.0		Reddish-Brown Silty Sand with Some Gravel, Moist, Loose (SM)	
4 - 6	S-3	X	8 - 20 - 32 - 37	16	52	5.0		As Above, Very Dense (SM)	
6 - 6.8	S-4	X	32 - 50/4"	6	50/4"	8.0		As Above (SM)	
8 - 8.9	S-5	X	7 - 50/5"	10	50/5"	10.0	WEATHERED ROCK	Reddish-Brown Weathered Rock, Moist, Very Dense (WR)	
						13.0		No Recovery, Presumed As Above (WR)	
13 - 13.2	S-6	X	50/2"	NR	50/2"	13.2		Boring Log B-5 Terminated at a Depth of 13.2 Feet Below Ground Surface Due to Auger Refusal	
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

Project: Proposed Improvements		WAI Project No.: GJ2523671.000	
Location: Six South Monroe Street, Ridgewood, Bergen County, NJ		Client: Bohler, LLC	
Surface Elevation: ± 156.0 feet	Date Started: 6/17/2025	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 13.4 feet bgs	Date Completed: 6/17/2025	Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: CS / FS	During: NE --- ▾	At Completion: 12.0 144.0 
Drill / Test Method: HSA / SPT	Contractor: ACC	At Completion: NE --- ▾	
	Equipment: ATV	24 Hours: --- --- ▾	24 Hours: --- --- 

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N				
						0.0			
						0.5	TOPSOIL 	6" Topsoil	
0 - 2	S-1		2 - 2 - 2 - 2	16	4		RESIDUAL 	Brown Lean Clay with Sand, Moist, Stiff (CL)	Qu = 1.5 tsf
2 - 3.7	S-2		2 - 6 - 7 - 50/ 2"	12	13			As Above (CL)	Qu = 1.5 tsf
4 - 5.8	S-3		14 - 13 - 16 - 50/ 4"	16	29			Reddish-Brown Silty Sand with Some Gravel, Moist, Medium Dense (SM)	
6 - 8	S-4		10 - 12 - 17 - 15	18	29			As Above (SM)	
8 - 8.9	S-5		25 - 50/5"	5	50/5"		WEATHERED ROCK 	Reddish-Brown Weathered Rock, Moist, Very Dense (WR)	
13 - 13.4	S-6		50/5"	4	50/5"			As Above (WR)	
						15.0		Boring Log B-6 Terminated at a Depth of 13.4 Feet Below Ground Surface Due to Auger Refusal	
						20.0			
						25.0			



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-1

Page 1 of 1

Project: Proposed Improvements		WAI Project No.: GJ2523671.000	
Location: Six South Monroe Street, Ridgewood, Bergen County, NJ		Client: Bohler, LLC	
Surface Elevation: ± 138.0 feet	Date Started: 6/17/2025	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 5.0 feet bgs	Date Completed: 6/17/2025		
Proposed Location: SWM	Logged By: CS / FS	During: NE --- ▼	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: ACC	At Completion: NE --- ▼	
Test Method: Visual Observation	Rig Type: Excavator	24 Hours: --- --- ▼	

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
3.0	T-1A/B	TUBES	0.0	0 - 0.5	TOPSOIL	6" Topsoil
			0.5	0.5 - 5	RESIDUAL	Dark Reddish-Brown (5YR 3/4) SANDY LOAM; 10% Gravel, 10% Boulder; Moist; Moderate, Fine to Medium Granular Structure; Friable; No Roots
			1.0			
			2.0			
			3.0			
			4.0			
			5.0			
			6.0			Soil Profile Pit SPP-1 Terminated at a Depth of 5.0 Feet Below Ground Surface Due to Bucket Refusal
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: SPP-2

Page 1 of 1

Project: Proposed Improvements		WAI Project No.: GJ2523671.000	
Location: Six South Monroe Street, Ridgewood, Bergen County, NJ		Client: Bohler, LLC	
Surface Elevation: ± 139.0 feet	Date Started: 6/17/2025	Water Depth Elevation (feet bgs) (feet)	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 7.0 feet bgs	Date Completed: 6/17/2025		
Proposed Location: SWM	Logged By: CS / FS	During: NE --- ▼	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: ACC	At Completion: NE --- ▼	
Test Method: Visual Observation	Rig Type: Excavator	24 Hours: --- --- ▼	

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS	
Depth (feet)	Number	Type	feet				
			0.0	0 - 0.5	TOPSOIL	6" Topsoil	
			0.5 - 4	RESIDUAL	Dark Reddish-Brown (5YR 3/6) SANDY LOAM; 10% Gravel, 20% Boulder; Moist; Moderate, Fine to Medium Granular Structure; Friable; No Roots		
5.0	T-1A/B	TUBES	4 - 7		As Above, Reddish-Brown (5YR 4/4)		
			8.0		Soil Profile Pit SPP-2 Terminated at a Depth of 7.0 Feet Below Ground Surface Due to Bucket Refusal		
			9.0				
			10.0				
			11.0				
			12.0				
			13.0				
			14.0				
			15.0				

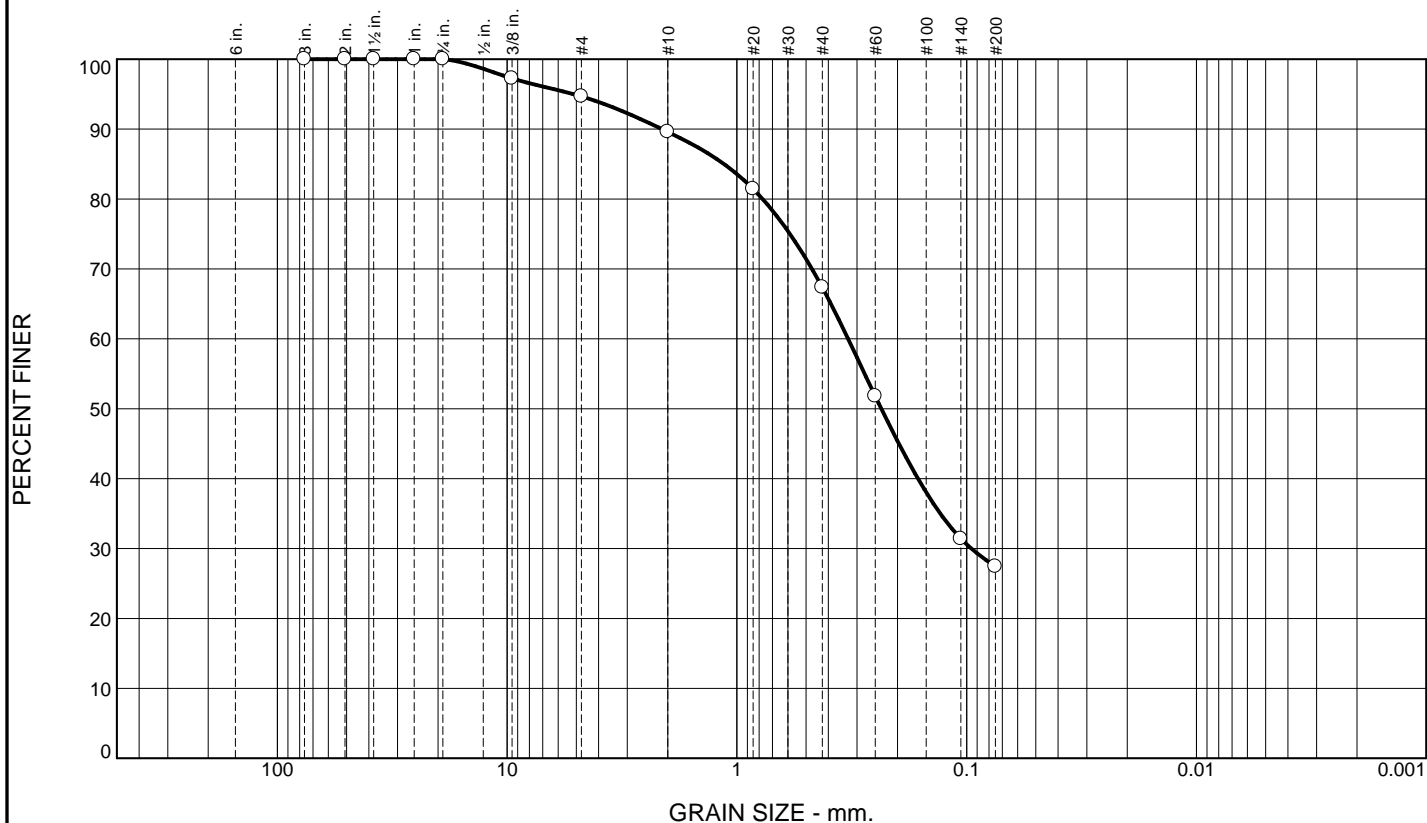
NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



APPENDIX B

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.3	5.1	22.2	40.0	27.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	97.3		
#4	94.7		
#10	89.6		
#20	81.4		
#40	67.4		
#60	51.8		
#140	31.4		
#200	27.4		

Material Description

Silty Sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 2.1205 D₈₅= 1.1378 D₆₀= 0.3282
D₅₀= 0.2351 D₃₀= 0.0954 D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

W_n = 7.5%

* (no specification provided)

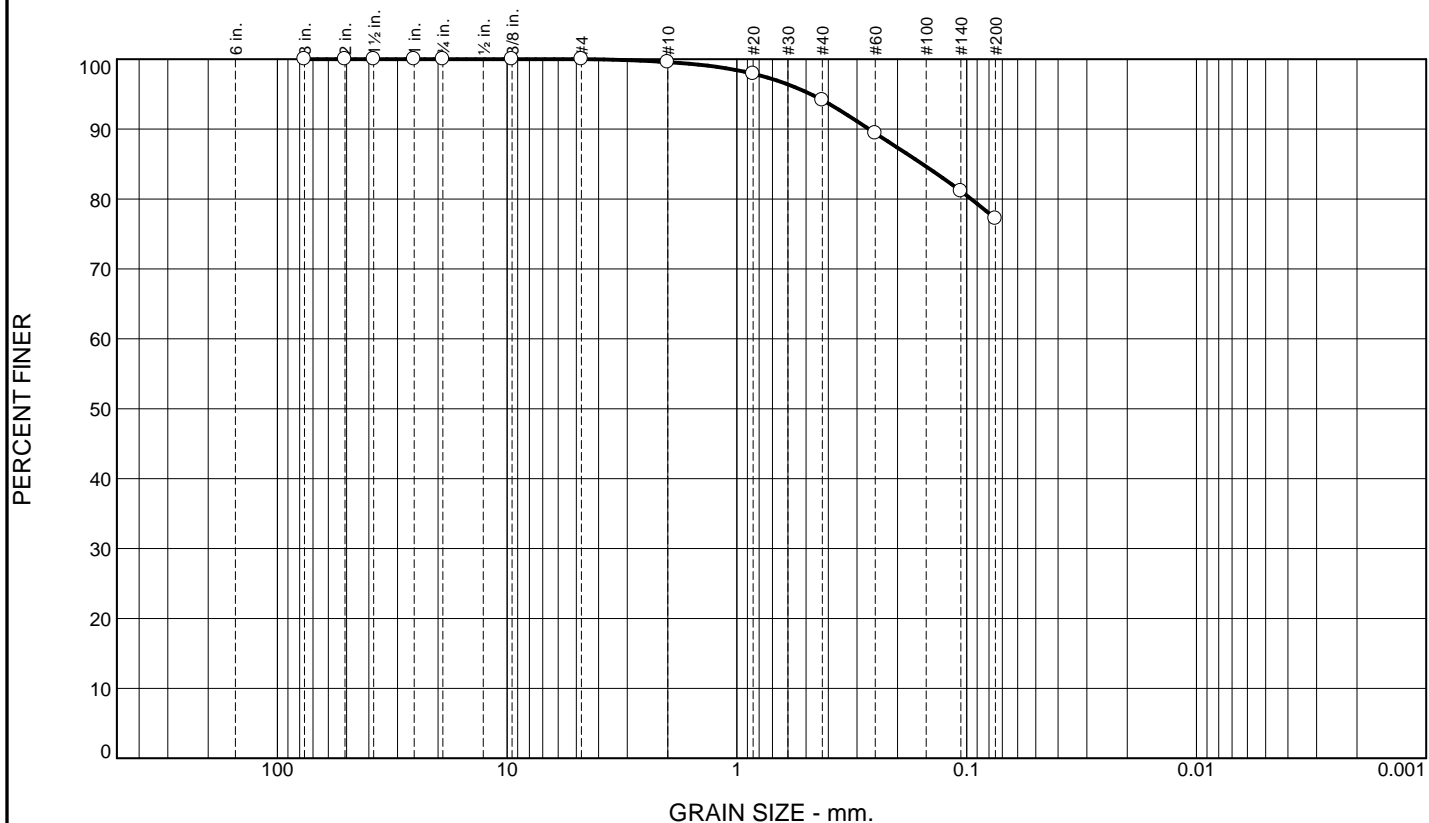
Source of Sample: B-5 Depth: 4.0' - 6.0'
Sample Number: S-3

Date: 7/10/2025

WHITESTONE ASSOCIATES, INC. Warren, New Jersey	Client: Bohler, LLC Project: Proposed Improvements Six South Monroe Street, Ridgewood, Bergen County, New Jersey Project No: GJ2523671.000
--	--

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	5.5	16.9	77.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.6		
#20	97.9		
#40	94.1		
#60	89.4		
#140	81.1		
#200	77.2		

Material Description

Lean Clay with Sand

Atterberg Limits
 PL= 20 LL= 28 PI= 8

Coefficients
 D₉₀= 0.2662 D₈₅= 0.1557 D₆₀=
 D₅₀= D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= CL AASHTO= A-4(5)

Remarks
 W_n = 18.3%

* (no specification provided)

Source of Sample: B-6 Depth: 2.0' - 4.0'
 Sample Number: S-2

Date: 7/10/2025

WHITESTONE ASSOCIATES, INC. Warren, New Jersey	Client: Bohler, LLC Project: Proposed Improvements Six South Monroe Street, Ridgewood, Bergen County, New Jersey Project No: GJ2523671.000
--	--

Figure

Tube Permeameter Test Data

Job Number: GJ2523671.000
Project: Proposed Improvements
Client: Bohler, LLC
Lab Tech:

Sample ID: _____ **Profile Pit No.:** SPP-2 **Sample No.:** T-1 **Depth:** 5.0'

COUNTY/MUNICIPALITY Ridgewood, Bergen County, New Jersey BLOCK 2403 & 2404 LOT 17.01 & 3

1. Test Number 1 Replicate (letter) A Date Collected 6/17/2025

2. Material Tested: _____ Fill X Test in Native Soil

3. Type of Sample: X Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 1.91
 Length of Sample, L, in inches 3.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams 0.00

Wt. of Tube Containing Sample _____
 Wt. of Empty Tube _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 86.83

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: _____ No _____ Yes, Indicate Internal Radius, cm.

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
 At the End of Each Test Interval, H2 4.75

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
10:25:00	11:07:00	42.00
11:07:00	11:48:00	41.00
11:48:00	12:30:00	42.00

12. Calculation of Permeability: $K, (in/hr) = 60 \text{ min/hr} \times r^2/R^2 \times L(in)/T(\text{min}) \times \ln(H1/H2)$ T= 41.67

K (in/hr) = 0.22 **Classification:** **K1**

13. Defects in the Sample (Check appropriate items):

_____ None
 _____ Soil/Tube Contact _____ Large Gravel _____ Large Roots
 _____ Dry Soil _____ Smearing _____ Compaction
 _____ Other - Specify _____

APPENDIX C
Pavement Condition Survey



PAVEMENT CONDITION SURVEY

Client: Bohler, LLC

Date: 6/17/2025

Project: Proposed Improvements

File No.: GJ2523671.000

Location: Six South Monroe Street
Ridgewood, Bergen County, New Jersey

Field Engineer: CS / FS

Grid Number	Distress Type	Distress Severity Level	Overall Condition Index
1	Transversal Crack	Severe	Poor
	Longitudinal Cracking	Severe	
	Potholes	Moderate	
2	Transversal Crack	Severe	Poor
	Longitudinal Cracking	Severe	
	Alligator	Moderate	
3	Longitudinal Cracking	Moderate	Poor
	Alligator	Severe	
4	Potholes	Moderate	Poor
	Longitudinal Cracking	Severe	
	Alligator	Moderate	

APPENDIX D
Supplemental Information
(USCS, Terms & Symbols)

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS <u>LARGER</u> THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION <u>PASSING</u> NO. 4 SIEVE	SM	SILTY SANDS, SAND-SILT MIXTURES	
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>LESS</u> THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS* Sand and/or Gravel

RELATIVE DENSITY

LOOSE..... 0% TO 40%
MEDIUM DENSE..... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY* Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

* VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

L:\Geotechnical Forms and References\Reports\USCSTRMSSYM NJ.docx

Office Locations:

NEW JERSEY

PENNSYLVANIA

MASSACHUSETTS

CONNECTICUT

FLORIDA

NEW HAMPSHIRE

NEW YORK

GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

- N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
 Qu: Unconfined compressive strength, TSF.
 Qp: Penetrometer value, unconfined compressive strength, TSF.
 Mc: Moisture content, %.
 LL: Liquid limit, %.
 PI: Plasticity index, %.
 δd: Natural dry density, PCF.
 ▽: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

- NE: Not Encountered (Groundwater was not encountered).
 SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
 ST: Shelby Tube - 3" O.D., except where noted.
 AU: Auger Sample.
 OB: Diamond Bit.
 CB: Carbide Bit
 WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

<u>Term (Non-Cohesive Soils)</u>	<u>Standard Penetration Resistance</u>
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

<u>Term (Cohesive Soils)</u>	<u>Qu (TSF)</u>
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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Office Locations:

Current Precipitation Adjustment Factors

County	2-year Design Storm			10-year Design Storm			100-year Design Storm			County
	NOAA Atlas 14 (inches)	Adjustment Factor	Current (inches)	NOAA Atlas 14 (inches)	Adjustment Factor	Current (inches)	NOAA Atlas 14 (inches)	Adjustment Factor	Current (inches)	
Atlantic	3.31	1.01	3.34	5.16	1.02	5.26	8.90	1.03	9.17	Atlantic
Bergen	3.34	1.01	3.37	5.07	1.03	5.22	8.47	1.06	8.98	Bergen
Burlington	3.36	0.99	3.33	5.18	1.01	5.23	8.81	1.04	9.16	Burlington
Camden	3.31	1.03	3.41	5.06	1.04	5.26	8.52	1.05	8.95	Camden
Cape May	3.25	1.03	3.35	5.07	1.03	5.22	8.73	1.04	9.08	Cape May
Cumberland	3.27	1.03	3.37	5.09	1.03	5.24	8.76	1.01	8.85	Cumberland
Essex	3.44	1.01	3.47	5.22	1.03	5.38	8.66	1.06	9.18	Essex
Gloucester	3.29	1.05	3.45	5.05	1.06	5.35	8.55	1.06	9.06	Gloucester
Hudson	3.31	1.03	3.41	5.02	1.05	5.27	8.31	1.09	9.06	Hudson
Hunterdon	3.38	1.02	3.45	5.00	1.05	5.25	8.03	1.13	9.07	Hunterdon
Mercer	3.31	1.01	3.34	5.01	1.02	5.11	8.33	1.04	8.66	Mercer
Middlesex	3.35	1.00	3.35	5.12	1.01	5.17	8.63	1.03	8.89	Middlesex
Monmouth	3.38	1.00	3.38	5.23	1.01	5.28	8.94	1.02	9.12	Monmouth
Morris	3.54	1.01	3.58	5.24	1.03	5.40	8.35	1.06	8.85	Morris
Ocean	3.42	1.00	3.42	5.33	1.01	5.38	9.20	1.03	9.48	Ocean
Passaic	3.47	1.00	3.47	5.23	1.02	5.33	8.62	1.05	9.05	Passaic
Salem	3.26	1.02	3.33	5.00	1.03	5.15	8.45	1.03	8.70	Salem
Somerset	3.34	1.00	3.34	5.01	1.03	5.16	8.21	1.09	8.95	Somerset
Sussex	3.22	1.03	3.32	4.70	1.04	4.89	7.58	1.07	8.11	Sussex
Union	3.39	1.01	3.42	5.17	1.03	5.33	8.69	1.06	9.21	Union
Warren	3.34	1.02	3.41	4.89	1.07	5.23	7.82	1.15	8.99	Warren

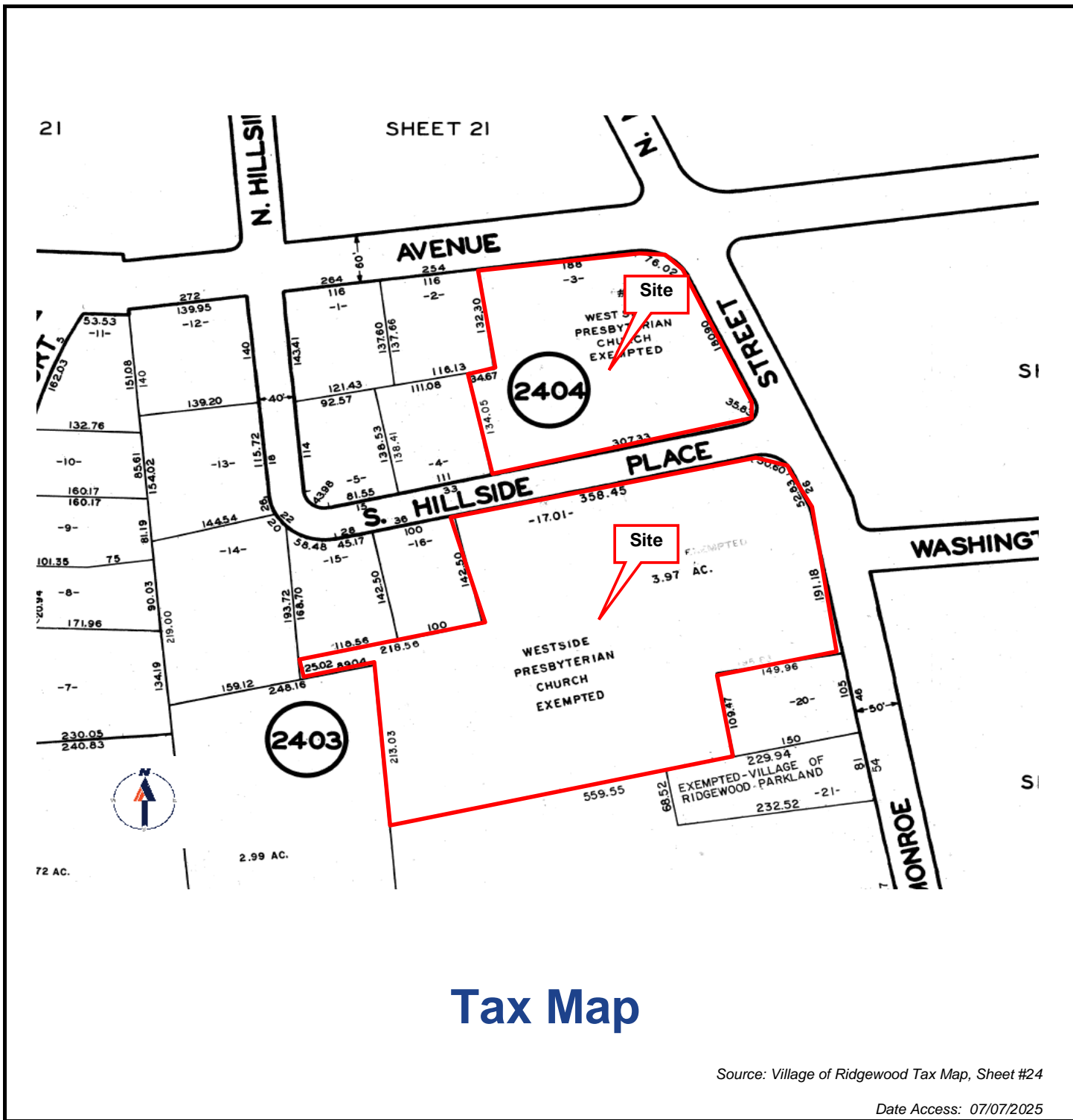
Future/Projected Precipitation Adjustment Factors

County	2-year Design Storm			10-year Design Storm			25-year Design Storm*			100-year Design Storm			County
	NOAA Atlas 14 (inches)	Adjustment Factor	Future (inches)	NOAA Atlas 14 (inches)	Adjustment Factor	Future (inches)	NOAA Atlas 14 (inches)	Adjustment Factor*	Future (inches)	NOAA Atlas 14 (inches)	Adjustment Factor	Future (inches)	
Atlantic	3.31	1.22	4.04	5.16	1.24	6.40	6.46	1.27	8.21	8.90	1.39	12.37	Atlantic
Bergen	3.34	1.20	4.01	5.07	1.23	6.24	6.28	1.26	7.94	8.47	1.37	11.60	Bergen
Burlington	3.36	1.17	3.93	5.18	1.18	6.11	6.45	1.22	7.84	8.81	1.32	11.63	Burlington
Camden	3.31	1.18	3.91	5.06	1.22	6.17	6.28	1.27	7.96	8.52	1.39	11.84	Camden
Cape May	3.25	1.21	3.93	5.07	1.24	6.29	6.34	1.26	7.99	8.73	1.32	11.52	Cape May
Cumberland	3.27	1.20	3.92	5.09	1.21	6.16	6.37	1.26	8.03	8.76	1.39	12.18	Cumberland
Essex	3.44	1.19	4.09	5.22	1.22	6.37	6.44	1.25	8.02	8.66	1.33	11.52	Essex
Gloucester	3.29	1.19	3.92	5.05	1.23	6.21	6.29	1.27	8.01	8.55	1.41	12.06	Gloucester
Hudson	3.31	1.19	3.94	5.02	1.19	5.97	6.19	1.20	7.41	8.31	1.23	10.22	Hudson
Hunterdon	3.38	1.19	4.02	5.00	1.23	6.15	6.09	1.28	7.82	8.03	1.42	11.40	Hunterdon
Mercer	3.31	1.16	3.84	5.01	1.17	5.86	6.19	1.22	7.55	8.33	1.36	11.33	Mercer
Middlesex	3.35	1.19	3.99	5.12	1.21	6.20	6.36	1.24	7.91	8.63	1.33	11.48	Middlesex
Monmouth	3.38	1.19	4.02	5.23	1.19	6.22	6.53	1.20	7.86	8.94	1.26	11.26	Monmouth
Morris	3.54	1.23	4.35	5.24	1.28	6.71	6.37	1.35	8.59	8.35	1.46	12.19	Morris
Ocean	3.42	1.18	4.04	5.33	1.19	6.34	6.68	1.20	8.00	9.20	1.24	11.41	Ocean
Passaic	3.47	1.21	4.20	5.23	1.27	6.64	6.43	1.33	8.53	8.62	1.50	12.93	Passaic
Salem	3.26	1.20	3.91	5.00	1.23	6.15	6.22	1.25	7.77	8.45	1.32	11.15	Salem
Somerset	3.34	1.19	3.97	5.01	1.24	6.21	6.15	1.32	8.11	8.21	1.48	12.15	Somerset
Sussex	3.22	1.24	3.99	4.70	1.29	6.06	5.72	1.35	7.73	7.58	1.50	11.37	Sussex
Union	3.39	1.20	4.07	5.17	1.23	6.36	6.42	1.27	8.16	8.69	1.35	11.73	Union
Warren	3.34	1.20	4.01	4.89	1.25	6.11	5.93	1.30	7.68	7.82	1.37	10.71	Warren

* Note - NJAC 7:8 & 7:13 do not contain adjustment factors for the 25-year storm. The factors listed have been obtained from NJ Extreme Precipitation Projection Tool (<https://njprojectedprecipitationchanges.com/>)

G. MAPS

- ◆ **Tax Map**
- ◆ **Aerial Map**
- ◆ **Soil Map**
- ◆ **Depth to Water Table Map**
- ◆ **USGS Map**
- ◆ **HUC14 Map**
- ◆ **FEMA FIRM Map**
- ◆ **Drainage Area Maps**
 - **Existing Drainage Area Map**
 - **Proposed Drainage Area Map**
 - **Inlet Drainage Area Map**



Tax Map

Source: Village of Ridgewood Tax Map, Sheet #24

Date Access: 07/07/2025

West Side Presbyterian Church of Ridgewood, New Jersey	
6 South Monroe Street Block 2404; Lot 3 & Block 2403, Lot 17.01	
Village of Ridgewood, Bergen County, NJ	
BENJ #NJD240053.00	
Prepared by: ES	Date: 7/7/2025
Checked by: RD	Scale: NTS
BOHLER //	



Aerial Map

Source: NJ GeoWeb

Date Access: 07/07/2025

West Side Presbyterian Church of Ridgewood, New Jersey

6 South Monroe Street
Block 2404; Lot 3 & Block 2403, Lot 17.01

Village of Ridgewood, Bergen County, NJ

BENJ #NJD240053.00

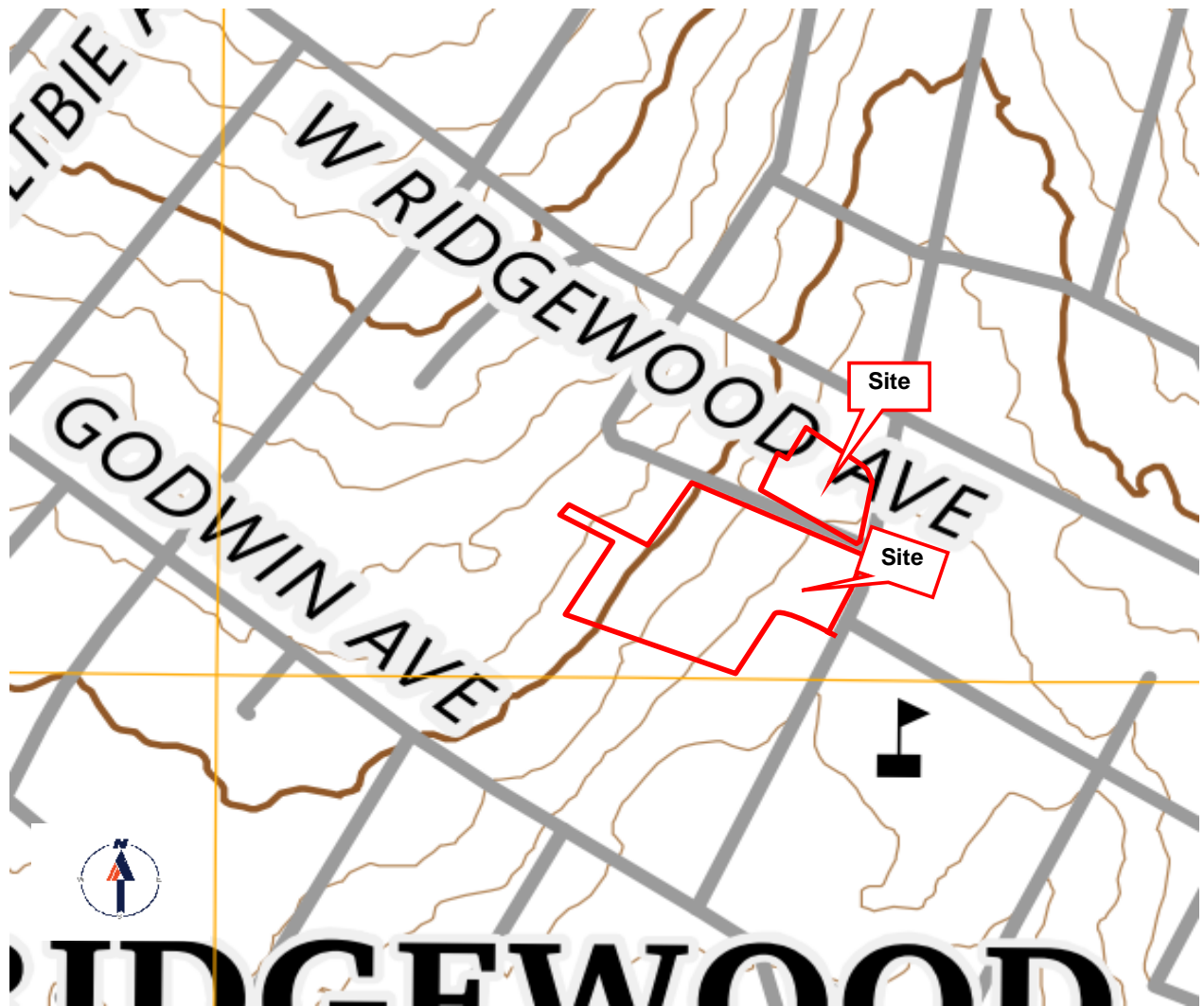
Prepared by: ES

Date: 7/7/2025

Checked by: RD

Scale: NTS

BOHLER //



USGS Map
594,834-ft. E; 782,929-ft. N
Paterson Quadrangle

Source: USGS, 1986

Date Access: 07/07/2025

West Side Presbyterian Church of Ridgewood, New Jersey

6 South Monroe Street
 Block 2404; Lot 3 & Block 2403, Lot 17.01

Village of Ridgewood, Bergen County, NJ

BENJ #NJD240053.00

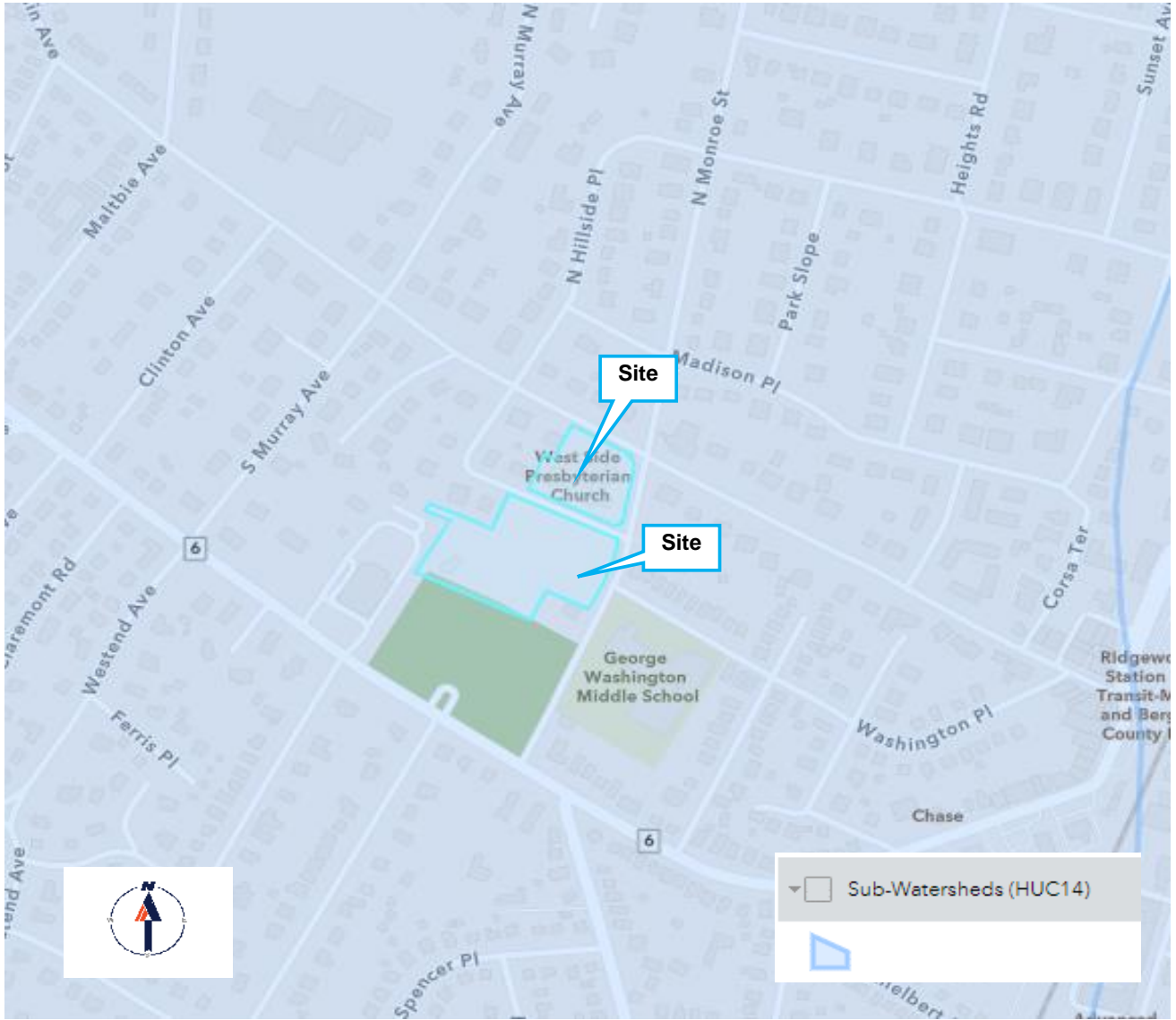
Prepared by: ES

Date: 7/7/2025

Checked by: RD

Scale: NTS

BOHLER //



HUC-14 Sub-Watershed Map

Source: NJ GeoWeb

Date Access: 07/07/2025

West Side Presbyterian Church of Ridgewood, New Jersey

6 South Monroe Street
Block 2404; Lot 3 & Block 2403, Lot 17.01

Village of Ridgewood, Bergen County, NJ

BENJ #NJD240053.00

Prepared by: ES

Date: 7/7/2025

Checked by: RD

Scale: NTS

BOHLER //



NFIP PANEL 0157J

FIRM
FLOOD INSURANCE RATE MAP

**BERGEN COUNTY,
NEW JERSEY
(ALL JURISDICTIONS)**

PANEL 157 OF 332
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

JURISDICTION	COMMUNITY NUMBER	PANEL NUMBER	SUFFIX
GLEN ROCK, BOROUGH OF	34003	0157	1
ROCKAWAY TOWNSHIP OF	34007	0157	1
WYCKOFF TOWNSHIP OF	34008	0157	1

Notes to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
34003C0157J

MAP REVISED
AUGUST 28, 2019

Federal Emergency Management Agency

FEMA Flood Map

Source: FEMA FIRM Map #34003C0157J, Date 08/28/2019

Date Access: 07/07/2025

West Side Presbyterian Church of Ridgewood, New Jersey	
6 South Monroe Street Block 2404; Lot 3 & Block 2403, Lot 17.01	Village of Ridgewood, Bergen County, NJ
BENJ #NJD240053.00	
Prepared by: ES	Date: 7/7/2025
Checked by: RD	Scale: NTS
BOHLER //	

Bergen County, New Jersey (NJ003)			
Bergen County, New Jersey (NJ003)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UR	Urban land	3.4	58.7%
WeuC	Wethersfield-Urban land complex, 8 to 15 percent slopes	2.4	41.3%
Totals for Area of Interest		5.7	100.0%



Soils Map

Source: NRCS Web Soil Survey, 2012

Date Access: 07/07/2025

West Side Presbyterian Church of Ridgewood, New Jersey

6 South Monroe Street
Block 2404; Lot 3 & Block 2403, Lot 17.01

Village of Ridgewood, Bergen County, NJ

BENJ #NJD240053.00

Prepared by: ES

Date: 7/7/2025

Checked by: RD

Scale: NTS

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Summary by Map Unit — Bergen County, New Jersey (NJ003)		Rating (centimeters)	Acres in AOI	Percent of AOI
UR	Urban land	>200	3.4	58.7%
WeUC	Wethersfield-Urban land complex, 8 to 15 percent slopes	>200	2.4	41.3%
Totals for Area of Interest			5.7	100.0%



Depth to Seasonal High Water Table

Source: NRCS Web Soil Survey, 2012

Date Access: 07/07/2025

West Side Presbyterian Church of Ridgewood, New Jersey

6 South MonMonroe Street
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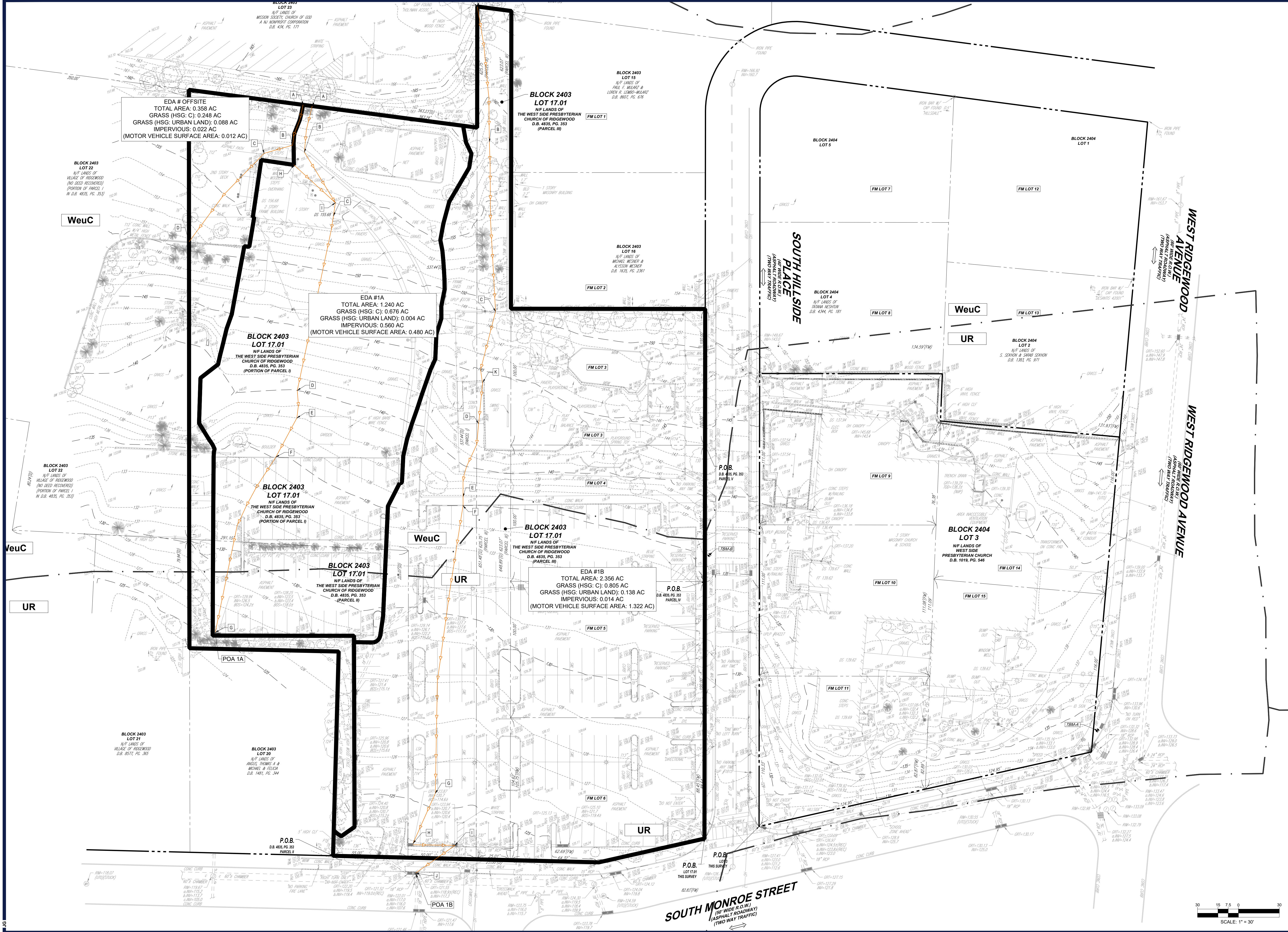
Village of Ridgewood, Bergen County, NJ

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PROJECT No.: NJD240053-00-0A
 DRAWN BY: JDR/RND
 CHECKED BY: MID/BC
 DATE: 06/30/2025
 CAD ID: P-DMAP-EXST

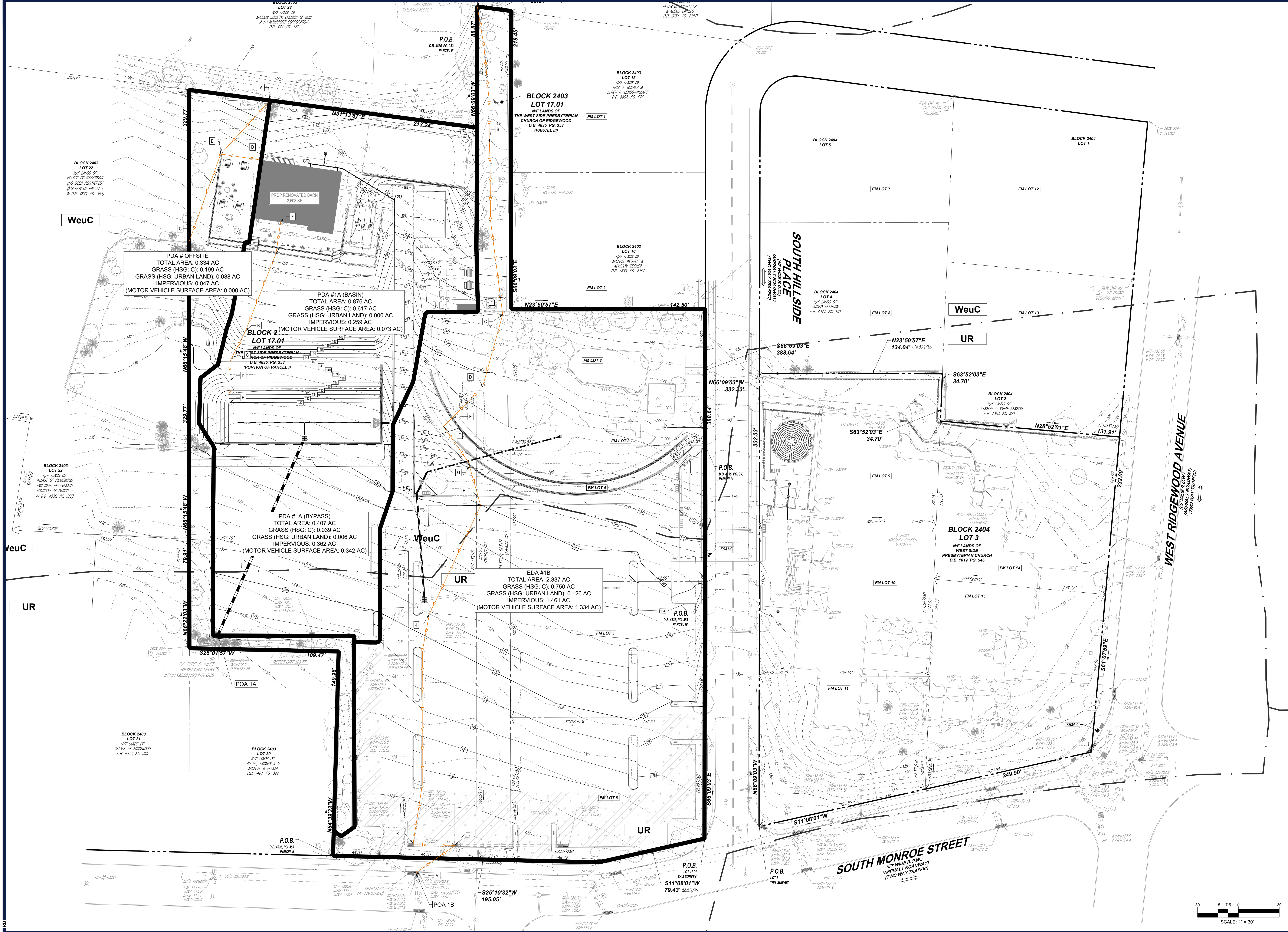
PRELIMINARY / FINAL SITE PLANS
 FOR
WEST SIDE PRESBYTERIAN CHURCH OF RIDGEWOOD
 PROPOSED CAMPUS MASTER PLAN IMPROVEMENTS
 BLOCK 2404, LOT 3 & BLOCK 2403, LOT 17.01
 6 SOUTH MONROE STREET
 VILLAGE OF RIDGEWOOD
 BERGEN COUNTY, NEW JERSEY

BOHLER
 BOHLER, LLC
 30 INDEPENDENCE BLVD., SUITE 200
 WARREN, NJ 07059
 Phone: (908) 685-6300
 Fax: (908) 754-4401
 www.BohlerEngineering.com
 NJ CERT. OF AUTHORIZATION NO. 246A28409600 & M6000122

B.S. CROWDER
 PROFESSIONAL ENGINEER
 NEW JERSEY LICENSE No. 52263
 PENNSYLVANIA LICENSE No. 088764
 NEW YORK LICENSE No. 100802

SHEET TITLE:
EXISTING DRAINAGE AREA MAP
 SHEET NUMBER:
EX-101
 ORG. DATE - 06/30/2025

G:\2025\NJ\240053-00\CAD\DRAWINGS\PLAN SET\DRAINAGE AREA MAP\BP-DMAP-EXST-NJD240053-00-0A-10-10-25\LAYOUT\EX101.DWG



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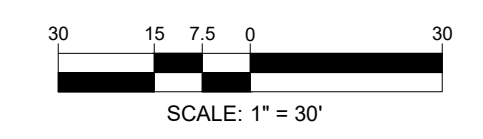
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SHEET TITLE:
PROPOSED DRAINAGE AREA MAP
 SHEET NUMBER:
EX-102
 ORG. DATE - 06/30/2025



BOHLER ENGINEERING, INC. PROJECT: 240053-00-0A DRAWING: PLAN SET - DRAINAGE AREA MAPS - P-DMAP-PROP - NJD240053-00-0A - LAYOUT: EX-102.PRDIN

