

STORMWATER MANAGEMENT STATEMENT

For:

Proposed Mixed-Use Development Bergenfield, NJ

Prepared for:

Famco, LLC & New West Properties, LLC

Block 126, Lots 9-12 & 14-16
10 South Washington Avenue
Borough of Bergenfield
Bergen County, New Jersey

Prepared by:

BOHLER //

N.J. Certificate of Authorization 24GA28161700

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1. Introduction

The intent of this study is to analyze the stormwater drainage conditions that will occur as a result of the proposed improvements at the existing lots located at 10 South Washington Ave. in the Borough of Bergenfield, Bergen County, New Jersey, which is further identified as Block 126, Lots 9-12 & 14-16 on the Borough's Tax Map Sheet 9. Said lots shall hereby be referenced as 'the site' and is depicted on the USGS Map and the Site Location Map within Appendix A of this report. The site consists of a strip of existing retail shops with associated drive aisles, parking areas, sidewalks, drainage, and utility infrastructure, with minimal landscape areas. The site is bordered to the north by West Main Street and various retail shops, to the east by South Washington Avenue and various retail shops, to the south by various retail shops, restaurants, and parking areas, and to the west by Portland Avenue, various retail shops and further by New Jersey Transit Railroad.

The proposed development consists of a mixed-use development and associated parking, sidewalks, and utilities. This project is a major development due to proposed disturbance greater than one acre. Please note, even though this project is a major development, it results in a decrease of impervious surface and a decrease in regulated motor vehicle surface area.

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	25**	100
NOAA Atlas 14 Rainfall (inches)	3.34	5.07	6.28	8.47
Adjustment Factor	1.20	1.23	1.26	1.37
Future Adjusted Rainfall (inches)	4.01	6.24	7.94	11.60

** NJAC 7:8 does not contain adjustment factors for the 25-year storm. The factors listed have been obtained from NJ Extreme Precipitation Projection Tool (<https://njprojectedprecipitationchanges.com/>) in order to estimate the increased rainfall.

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 2.2. The soils consist of hydrologic soil group (HSG) Urban Land, therefore the CN values used in calculations are undefined. 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
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 2.3.

TABLE 2.4 - CN Values

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

2.4 Time of Concentration

The time of concentration (Tc) 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 Tc 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 2.203 acres in size and consists of two unique drainage areas: Existing Drainage Area #1 and Existing Drainage Area #2, which are described in more detail below. In the pre-development condition, the site is The site consists of a strip of existing retail shops with associated drive aisles, parking areas, sidewalks, drainage, and utility infrastructure, with no existing landscape areas. Currently, the runoff generated on site outfalls to the Portland Avenue Drainage system via overland flow and ultimately flows to the stormwater infrastructure within the West Main Street right-of-way. The Existing Drainage Area Map in

Appendix F illustrates the limits of each existing drainage area and how they relate to the existing site conditions.

3.1 Point of Analysis #1

Existing Drainage Area #1 flows to Point of Analysis #1 located within the West Main Street right-of-way. The Existing Drainage Area Map in Appendix F illustrates the identified point of analysis and how it relates to the existing topography on the site.

3.2 Point of Analysis #2

Existing Drainage Area #2 flows to Point of Analysis #2 located within the South Washington Avenue right-of-way. The Existing Drainage Area Map in Appendix F illustrates the identified point of analysis and how it relates to the existing topography on the site.

3.2.1 Existing Drainage Area #1

Existing Drainage Area #1 contains 1.994 acres of land, of which 100% of the area is impervious surface, and includes the entire site. The runoff from Existing Drainage Area #1 flows from east to west and ultimately discharges to Point of Analysis #1.

3.2.2 Existing Drainage Area #2

Existing Drainage Area #2 contains 0.209 acres of land, of which 100% of the area is impervious surface, and includes a portion of South Washington Avenue adjacent to the site. The runoff from Existing Drainage Area #2 flows from north to south and ultimately discharges to Point of Analysis #2.

4. Post-Development Site Conditions

The post-development condition for the site includes the construction of a multi-use residential building with associated parking garages, driveways, 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 2.203-acre area that was studied in the pre-development condition and consists of two unique drainage areas: Proposed Drainage Area #1 and Proposed Drainage Area #2, which are described in more detail below.

A proposed stormwater conveyance system will collect the runoff from the proposed buildings and impervious areas via inlets, and stormwater piping and redirect it to stormwater infrastructure within West Main Street. A proposed porous concrete and paver sidewalk will collect runoff within the South Washington Avenue right-of-way. Construction of the proposed improvements will disturb approximately 2.26 acres of land and will result in a reduction of impervious coverage on the site in the post-development condition. The Proposed Drainage Area Map in Appendix F illustrates the limits of each proposed drainage area and how they relate to the proposed site conditions.

4.1 Point of Analysis #1

The two drainage areas in the post development condition flow to the same Point of Analysis #1 and #2 identified in the existing condition. The proposed runoff to Point of Analysis #1 meets the stormwater management criteria set forth in *NJDEP Stormwater Management Regulations* by having the post-construction hydrograph not exceed the pre-construction hydrograph at any point for the two-, 10-, and 100-year storm events. The proposed runoff to Point of Analysis #2 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. 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 #1

Proposed Drainage Area #1 consists of approximately 1.879 acres of land, of which 1.731 acres are impervious surface, and includes the proposed residential building, parking garage, sidewalks, driveways, stormwater and utility infrastructure. The drainage area also contains grass and landscape areas. The runoff from Proposed Drainage Area #1 flows to the West Main Street right-of-way and Point of Analysis #1.

4.1.2 Proposed Drainage Area #2

Proposed Drainage Area #2 consists of approximately 0.325 acres of land, of which 0.298 acres are impervious surface, and includes the South Washington Avenue road widening. The drainage area also contains grass and landscape areas. The runoff from Proposed Drainage Area #2 flows to the South Washington Avenue right-of-way and Point of Analysis #2.

4.2 Stormwater Quantity Controls

The following stormwater quantity standard technique from the *NJDEP Stormwater Management Regulations* is being applied to each drainage area as noted in Section 4.1:

1. For stormwater runoff leaving the site in drainage area #1, 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 will be applied to drainage areas that, under proposed conditions, will remain unchanged or have a net decrease in impervious coverage.

**Table 4.1 - Point of Analysis #1 Existing vs. Proposed Comparison
Current Adjusted Precipitation Depths**

	Existing Peak Flow	Proposed Peak Flow
	CFS	CFS
2-Year Storm	6.77	6.27
10-Year Storm	10.55	9.86
100-Year Storm	18.21	17.17

See Appendix A for Comparison Hydrographs.

**Table 4.2 - Point of Analysis #1 Existing vs. Proposed Comparison
Future Adjusted Precipitation Depths**

	Existing Peak Flow	Proposed Peak Flow
	CFS	CFS
2-Year Storm	8.11	7.52
10-Year Storm	12.68	11.86
100-Year Storm	23.63	22.28

See Appendix B for Comparison Hydrographs.

- For stormwater runoff leaving the site in drainage area #2, 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

**Table 4.3 - Point of Analysis #2 Existing vs. Proposed Comparison
Current Adjusted Precipitation Depths**

	Existing Peak Flow	Maximum Permitted Peak Flow		Proposed Peak Flow
	CFS	% of Existing	CFS	CFS
2-Year Storm	0.73	50%	0.36	0.36
10-Year Storm	1.13	75%	0.84	0.53
100-Year Storm	1.56	80%	1.56	0.85

**Table 4.4 - Point of Analysis #2 Existing vs. Proposed Comparison
Future Adjusted Precipitation Depths**

	Existing Peak Flow	Maximum Permitted Peak Flow		Proposed Peak Flow
	CFS	% of Existing	CFS	CFS
2-Year Storm	0.87	50%	0.43	0.42
10-Year Storm	1.35	75%	1.01	0.62
100-Year Storm	2.53	80%	2.02	1.07

4.3 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 decrease of new motor vehicle surfaces and therefore water quality controls do not apply.

4.4 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 and this project will result in a decrease in impervious surfaces. Due to the conditions described above, no groundwater recharge is proposed as part of the stormwater management facilities on site.

4.5 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 County Soil Conservation District for approval.

4.6 Low-Impact Development and Non-Structural 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 non-structural 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 disturbed areas.

2. 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.

3. 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. Trash receptacles are proposed throughout the site at key points.

- ii. 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 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.

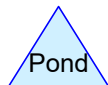
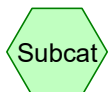
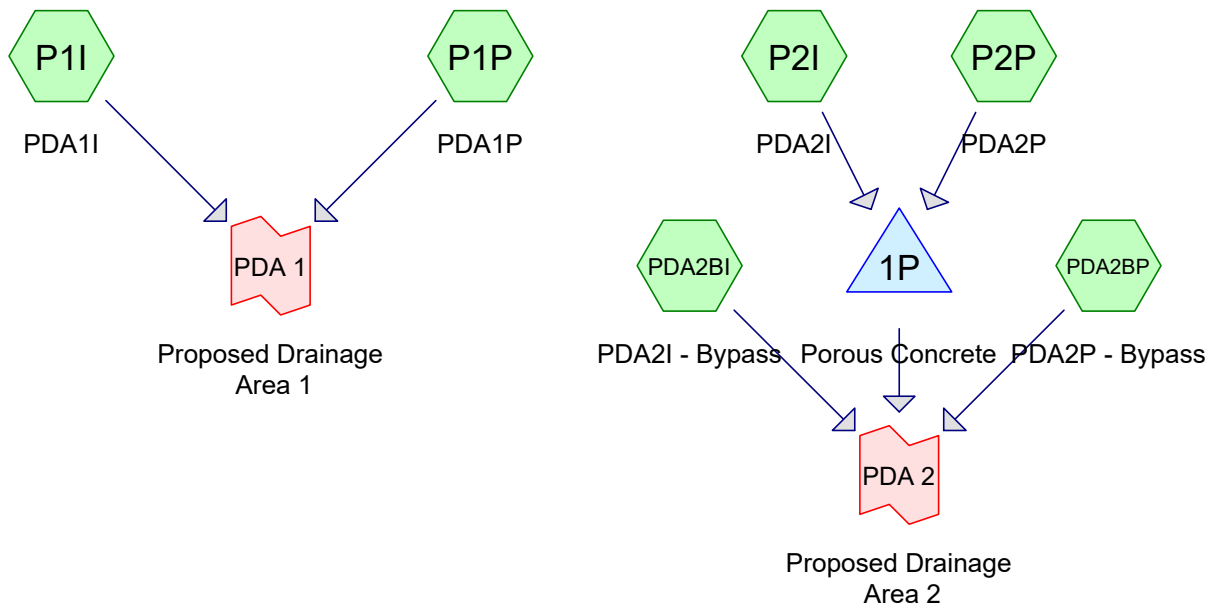
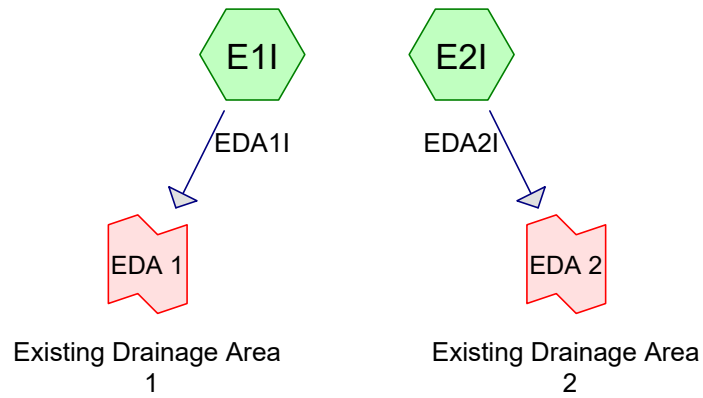
5. Conclusions

As demonstrated in the above sections, the stormwater management plan for the proposed development meets the current *Borough of Bergenfield’s 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.

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



EX - PR

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

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Time span=1.00-72.00 hrs, dt=0.05 hrs, 1421 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1I: EDA1I	Runoff Area=1.994 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=746' Tc=3.5 min CN=98 Runoff=6.77 cfs 0.521 af
SubcatchmentE2I: EDA2I	Runoff Area=0.209 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=455' Tc=2.9 min CN=98 Runoff=0.73 cfs 0.055 af
SubcatchmentP1I: PDA1I	Runoff Area=1.731 ac 100.00% Impervious Runoff Depth>3.14" Flow Length=256' Tc=0.8 min CN=98 Runoff=6.09 cfs 0.452 af
SubcatchmentP1P: PDA1P	Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=1.53" Flow Length=420' Tc=5.8 min CN=80 Runoff=0.26 cfs 0.019 af
SubcatchmentP2I: PDA2I	Runoff Area=0.243 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=336' Tc=2.7 min CN=98 Runoff=0.85 cfs 0.064 af
SubcatchmentP2P: PDA2P	Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=1.53" Flow Length=9' Slope=0.0180 '/' Tc=1.5 min CN=80 Runoff=0.04 cfs 0.003 af
SubcatchmentPDA2BI: PDA2I - Bypass	Runoff Area=0.055 ac 100.00% Impervious Runoff Depth=3.14" Flow Length=474' Tc=3.4 min CN=98 Runoff=0.19 cfs 0.014 af
SubcatchmentPDA2BP: PDA2P - Bypass	Runoff Area=0.007 ac 0.00% Impervious Runoff Depth=1.53" Flow Length=324' Tc=3.4 min CN=80 Runoff=0.01 cfs 0.001 af
Pond 1P: Porous Concrete	Peak Elev=82.33' Storage=1,195 cf Inflow=0.89 cfs 0.066 af Outflow=0.18 cfs 0.060 af
Link EDA 1: Existing Drainage Area 1	Inflow=6.77 cfs 0.521 af Primary=6.77 cfs 0.521 af
Link EDA 2: Existing Drainage Area 2	Inflow=0.73 cfs 0.055 af Primary=0.73 cfs 0.055 af
Link PDA 1: Proposed Drainage Area 1	Inflow=6.27 cfs 0.471 af Primary=6.27 cfs 0.471 af
Link PDA 2: Proposed Drainage Area 2	Inflow=0.36 cfs 0.075 af Primary=0.36 cfs 0.075 af

Total Runoff Area = 4.407 ac Runoff Volume = 1.129 af Average Runoff Depth = 3.07"
3.97% Pervious = 0.175 ac 96.03% Impervious = 4.232 ac

EX - PR

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

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Summary for Subcatchment E1I: EDA1I

Runoff = 6.77 cfs @ 12.09 hrs, Volume= 0.521 af, Depth= 3.14"
 Routed to Link EDA 1 : Existing Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
1.994	98	Paved parking, HSG D
1.994		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0375	1.82		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.0	292	0.0530	4.67		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.2	45	0.0230	3.08		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
3.5	746	Total			

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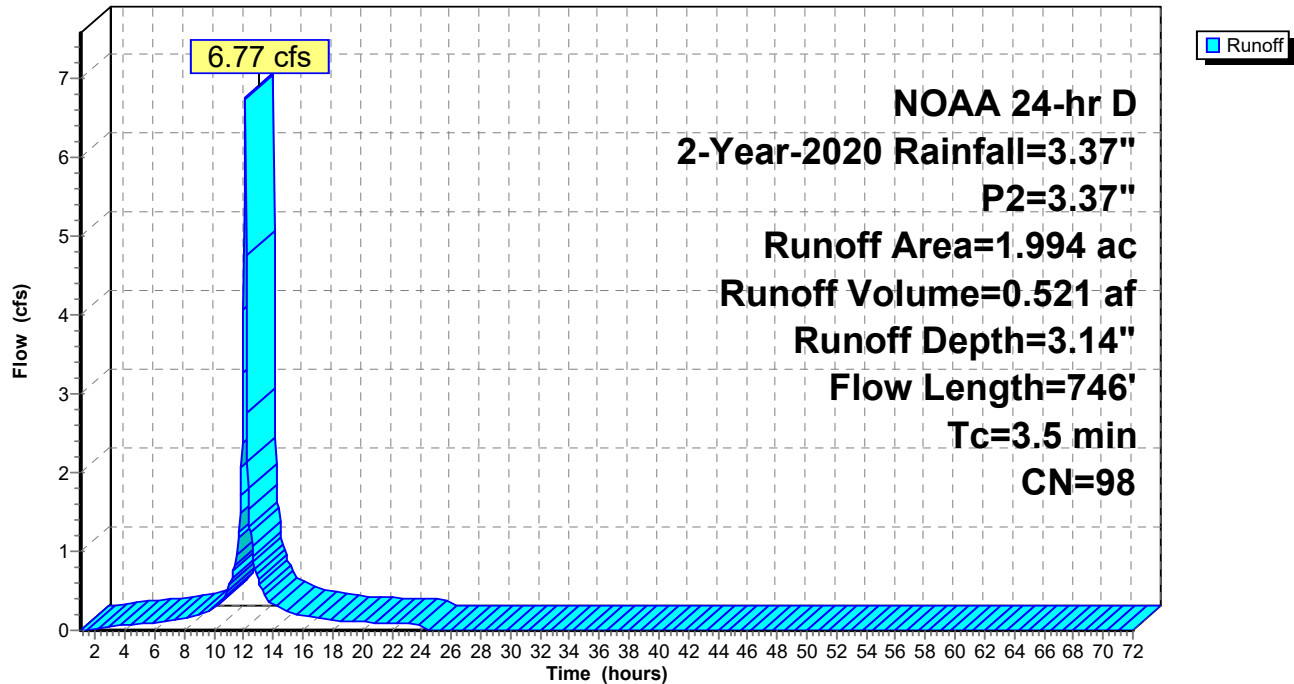
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Subcatchment E1I: EDA1I

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 E2I: EDA2I

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.055 af, Depth= 3.14"
Routed to Link EDA 2 : Existing Drainage Area 2

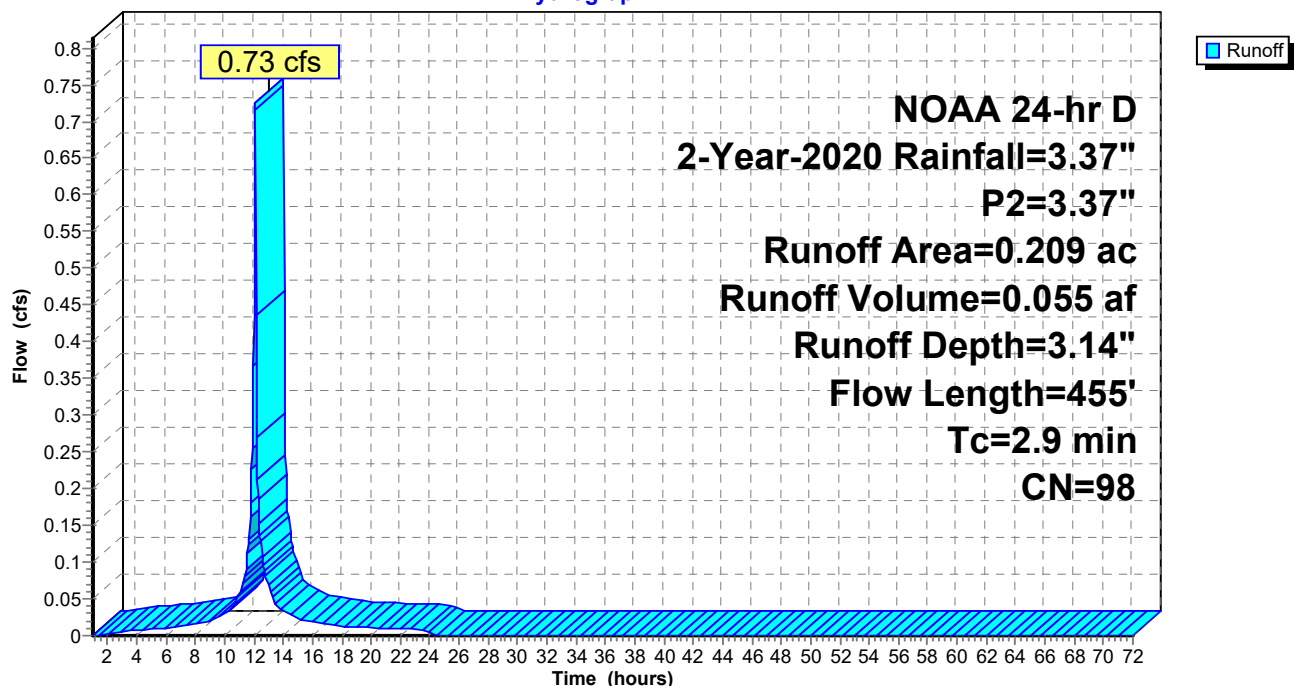
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.209	98	Paved parking, HSG D
0.209		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	24	0.0280	1.21		Sheet Flow, G-H Smooth surfaces n= 0.011 P2= 3.37"
1.9	299	0.0162	2.58		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.1	31	0.0260	4.98	8.81	Pipe Channel, I-J 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
0.6	101	0.0100	2.74	3.36	Pipe Channel, J-K 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.9	455	Total			

Subcatchment E2I: EDA2I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1I: PDA1I

Runoff = 6.09 cfs @ 12.06 hrs, Volume= 0.452 af, Depth> 3.14"

Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
1.731	98	Paved parking, HSG D
1.731		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0150	0.69		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
0.3	19	0.0060	1.25		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	28	0.0340	3.74		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.1	56	0.0200	7.58	5.95	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	64	0.0880	15.90	12.49	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	84	0.0600	13.13	10.31	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.8	256	Total			

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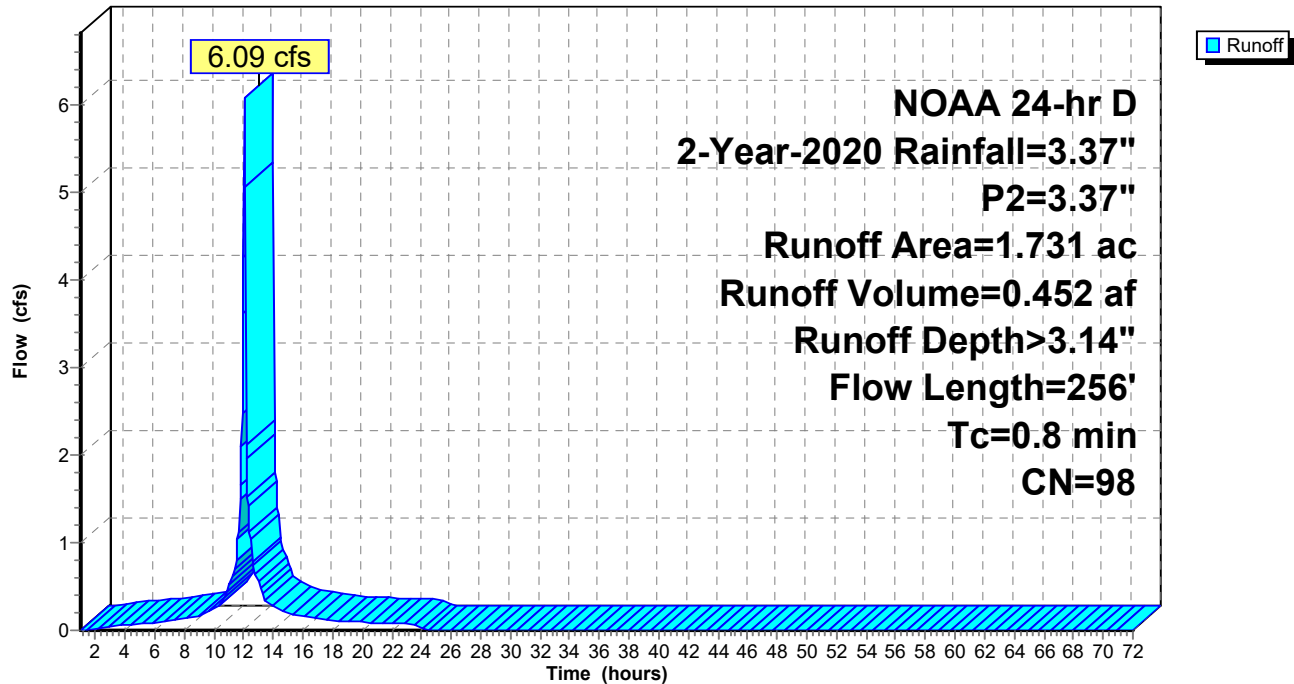
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Subcatchment P1I: PDA1I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1P: PDA1P

Runoff = 0.26 cfs @ 12.13 hrs, Volume= 0.019 af, Depth= 1.53"

Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.148	80	>75% Grass cover, Good, HSG D
0.148		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	80	0.0875	0.30		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.1300	5.80		Shallow Concentrated Flow, I-J Unpaved Kv= 16.1 fps
0.0	7	0.0340	2.97		Shallow Concentrated Flow, J-K Unpaved Kv= 16.1 fps
0.0	8	0.0425	3.32		Shallow Concentrated Flow, K-L Unpaved Kv= 16.1 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, L-M 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, N-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
5.8	420	Total			

EX - PR

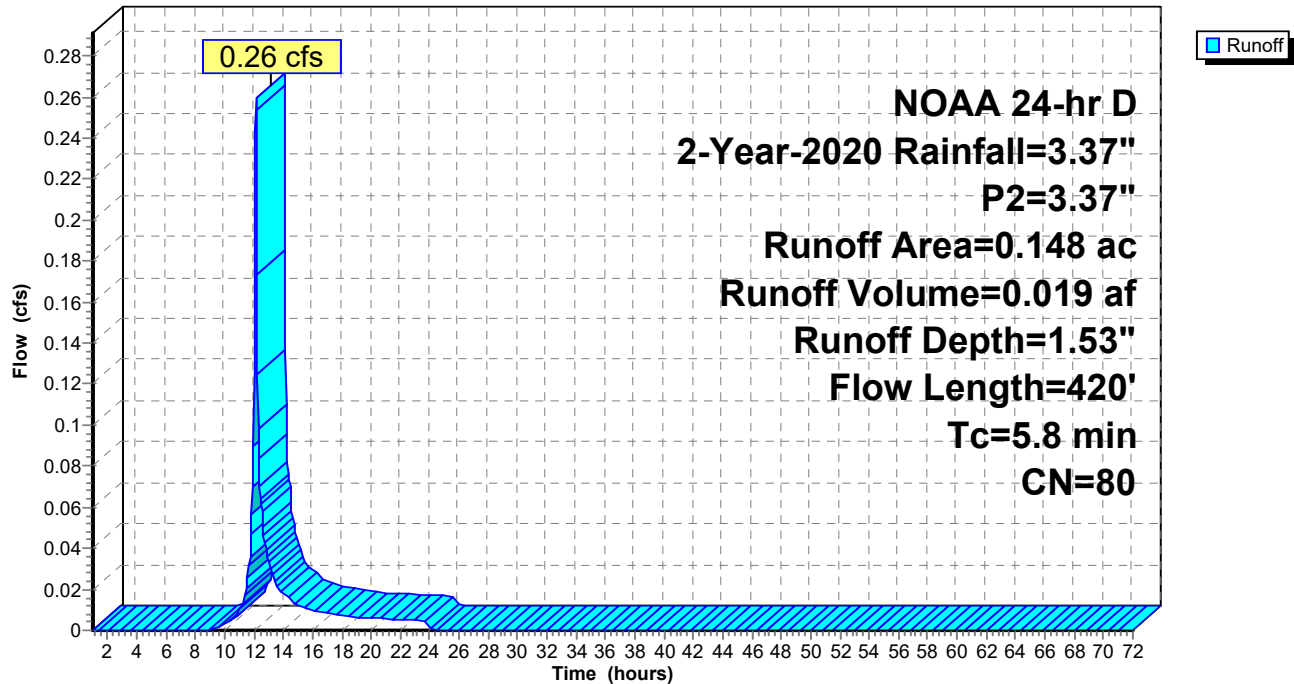
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NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Subcatchment P1P: PDA1P**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 P2I: PDA2I

Runoff = 0.85 cfs @ 12.09 hrs, Volume= 0.064 af, Depth= 3.14"
 Routed to Pond 1P : Porous Concrete

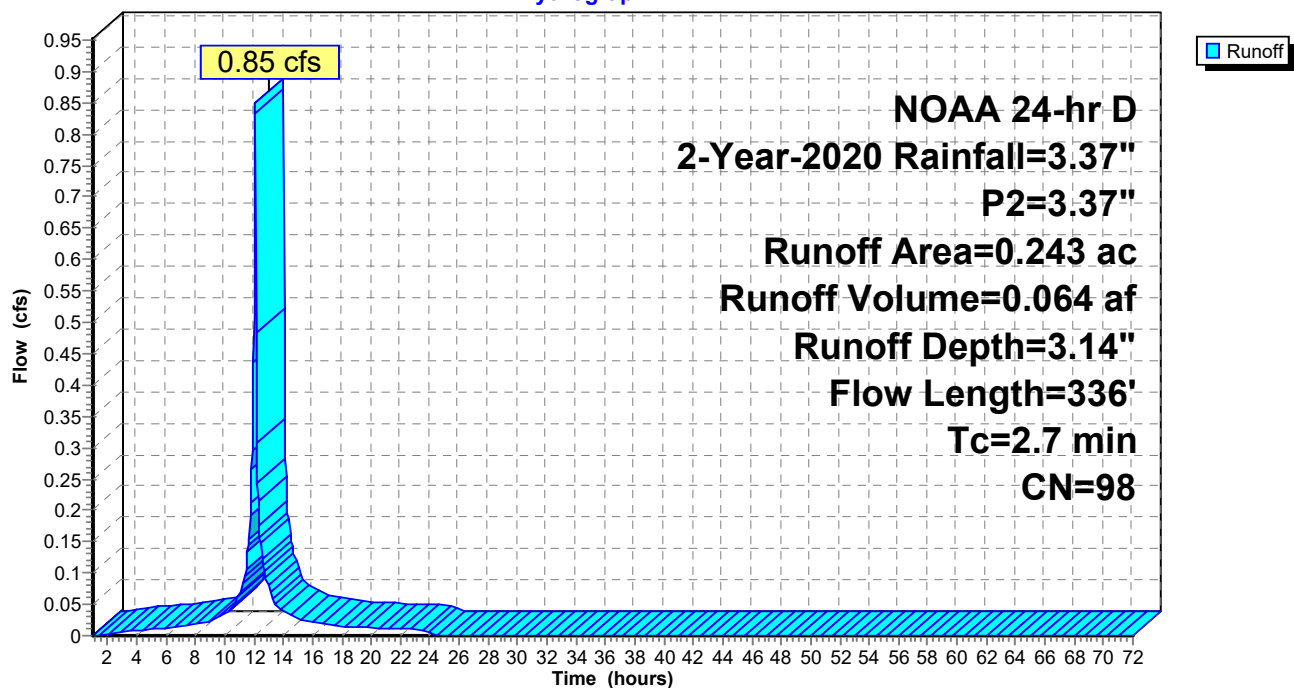
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG D
0.243		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	49	0.0190	1.20		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
2.7	336	Total			

Subcatchment P2I: PDA2I

Hydrograph



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Summary for Subcatchment P2P: PDA2P

Runoff = 0.04 cfs @ 12.08 hrs, Volume= 0.003 af, Depth= 1.53"
Routed to Pond 1P : Porous Concrete

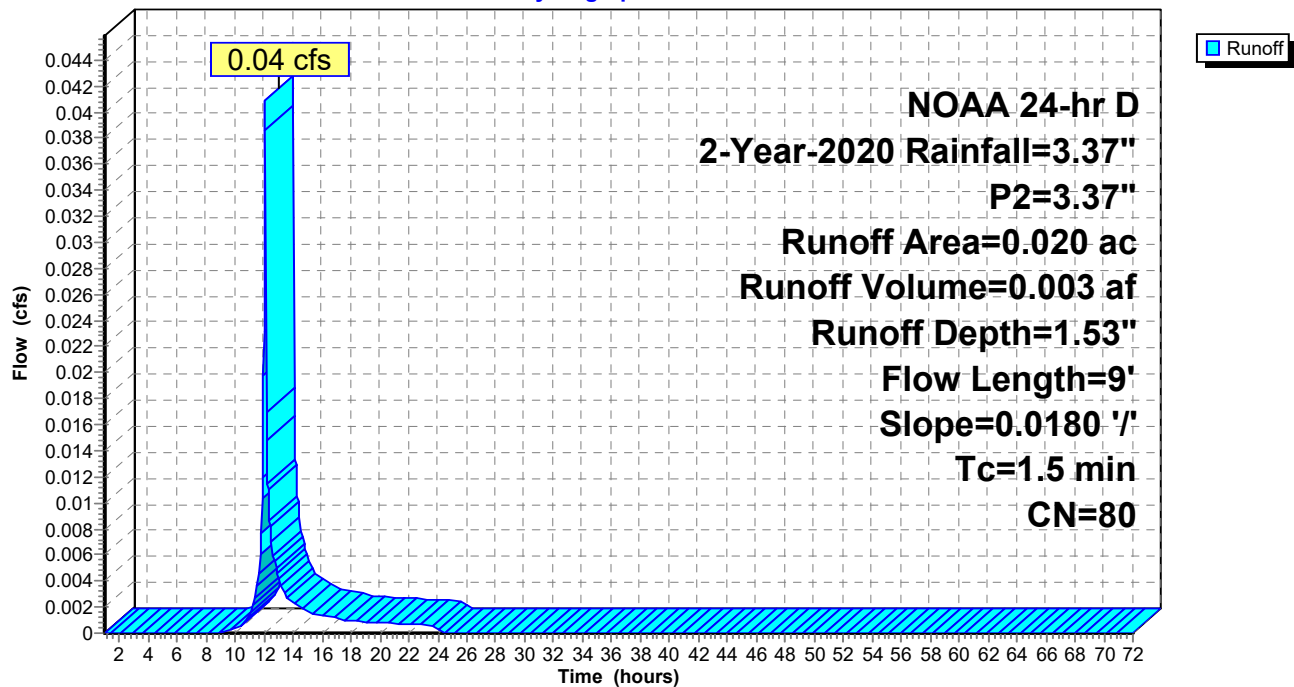
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.020	80	>75% Grass cover, Good, HSG D
0.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	9	0.0180	0.10		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"

Subcatchment P2P: PDA2P

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 PDA2BI: PDA2I - Bypass

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 3.14"

Routed to Link PDA 2 : Proposed Drainage Area 2

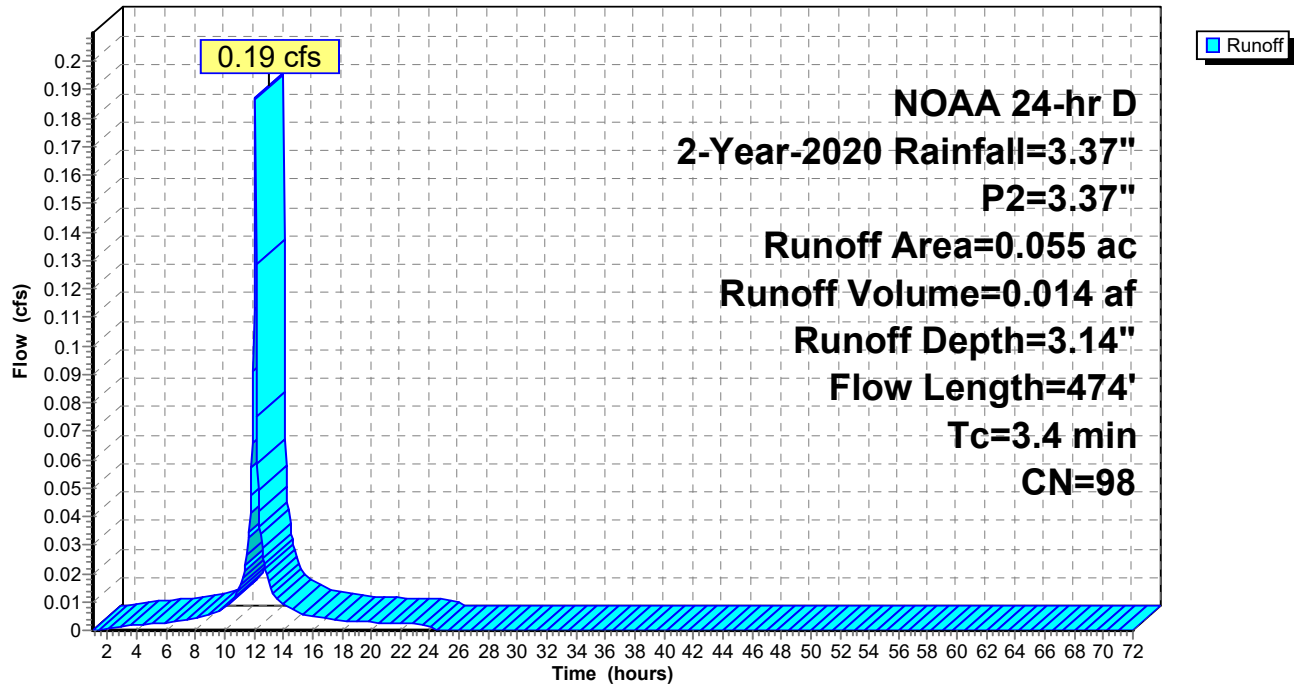
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.055	98	Paved parking, HSG D
0.055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	49	0.0190	1.20		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.4	474	Total			

Subcatchment PDA2BI: PDA2I - Bypass

Hydrograph



EX - PR

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

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Summary for Subcatchment PDA2BP: PDA2P - Bypass

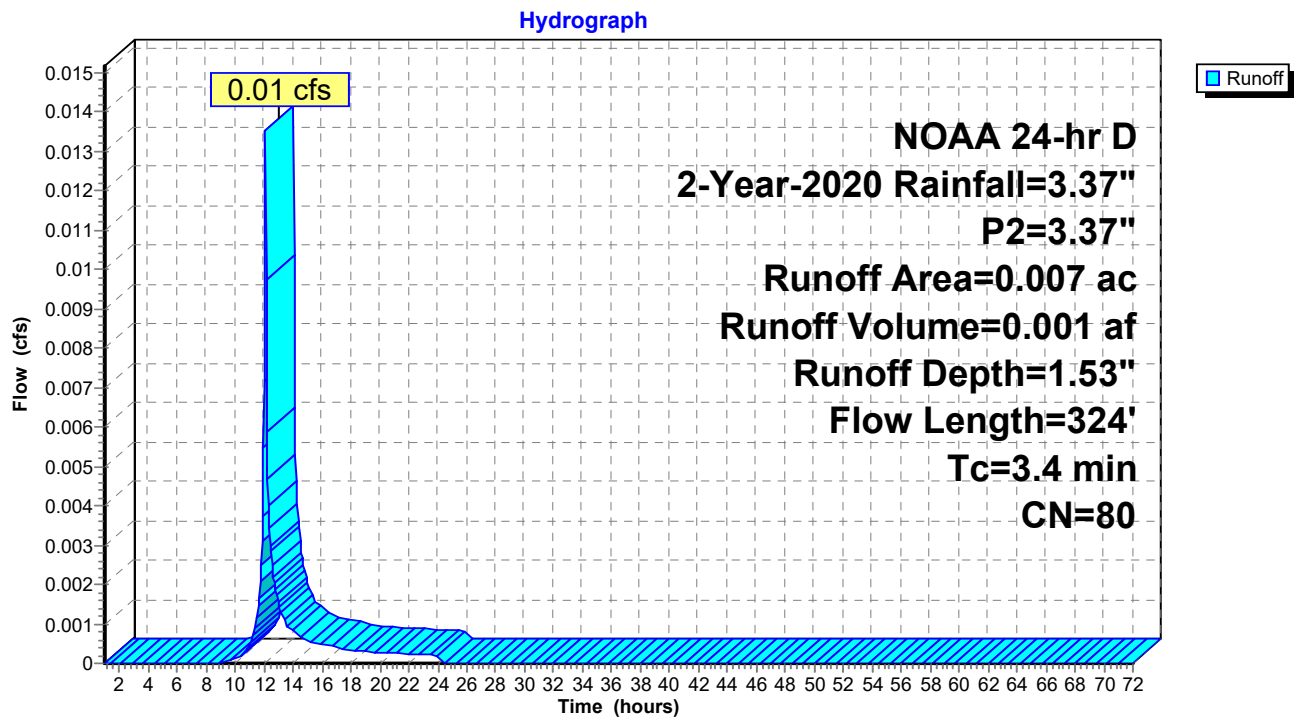
Runoff = 0.01 cfs @ 12.10 hrs, Volume= 0.001 af, Depth= 1.53"

Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

Area (ac)	CN	Description
0.007	80	>75% Grass cover, Good, HSG D
0.007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	9	0.0180	0.10		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"
0.1	18	0.0180	2.72		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.2	26	0.0150	2.49		Shallow Concentrated Flow, J-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.4	324	Total			

Subcatchment PDA2BP: PDA2P - Bypass

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Summary for Pond 1P: Porous Concrete

Inflow Area = 0.263 ac, 92.40% Impervious, Inflow Depth = 3.01" for 2-Year-2020 event
 Inflow = 0.89 cfs @ 12.09 hrs, Volume= 0.066 af
 Outflow = 0.18 cfs @ 12.37 hrs, Volume= 0.060 af, Atten= 80%, Lag= 17.0 min
 Primary = 0.18 cfs @ 12.37 hrs, Volume= 0.060 af
 Routed to Link PDA 2 : Proposed Drainage Area 2

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 82.33' @ 12.37 hrs Surf.Area= 3,335 sf Storage= 1,195 cf

Plug-Flow detention time= 182.6 min calculated for 0.060 af (91% of inflow)
 Center-of-Mass det. time= 133.9 min (891.6 - 757.7)

Volume	Invert	Avail.Storage	Storage Description
#1	81.43'	5,963 cf	Porous Paving Storage Area (Prismatic) , listed below (Recalc) 14,907 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.43	3,335	0	0
85.90	3,335	14,907	14,907

Device	Routing	Invert	Outlet Devices
#1	Primary	81.58'	15.0" Round Culvert L= 38.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 81.58' / 81.20' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	81.63'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	84.15'	0.5' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.18 cfs @ 12.37 hrs HW=82.32' (Free Discharge)

1=Culvert (Passes 0.18 cfs of 2.33 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.18 cfs @ 3.64 fps)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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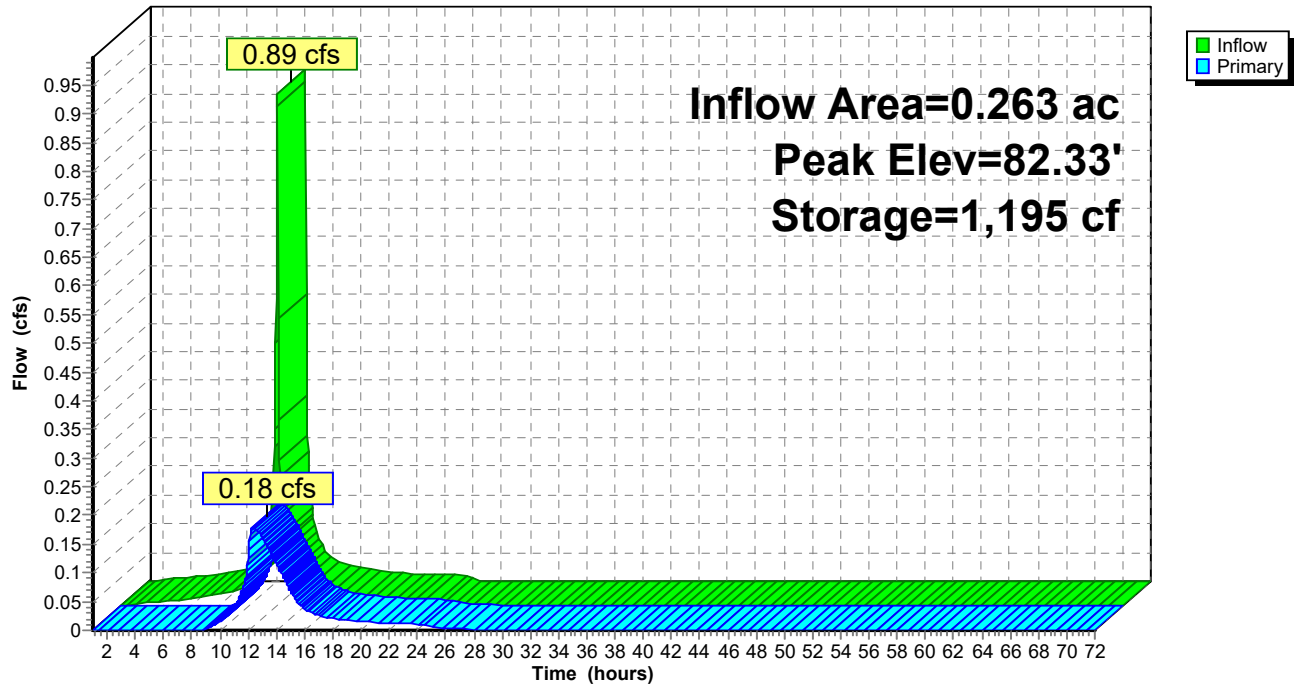
NOAA 24-hr D 2-Year-2020 Rainfall=3.37", P2=3.37"

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Pond 1P: Porous Concrete

Hydrograph



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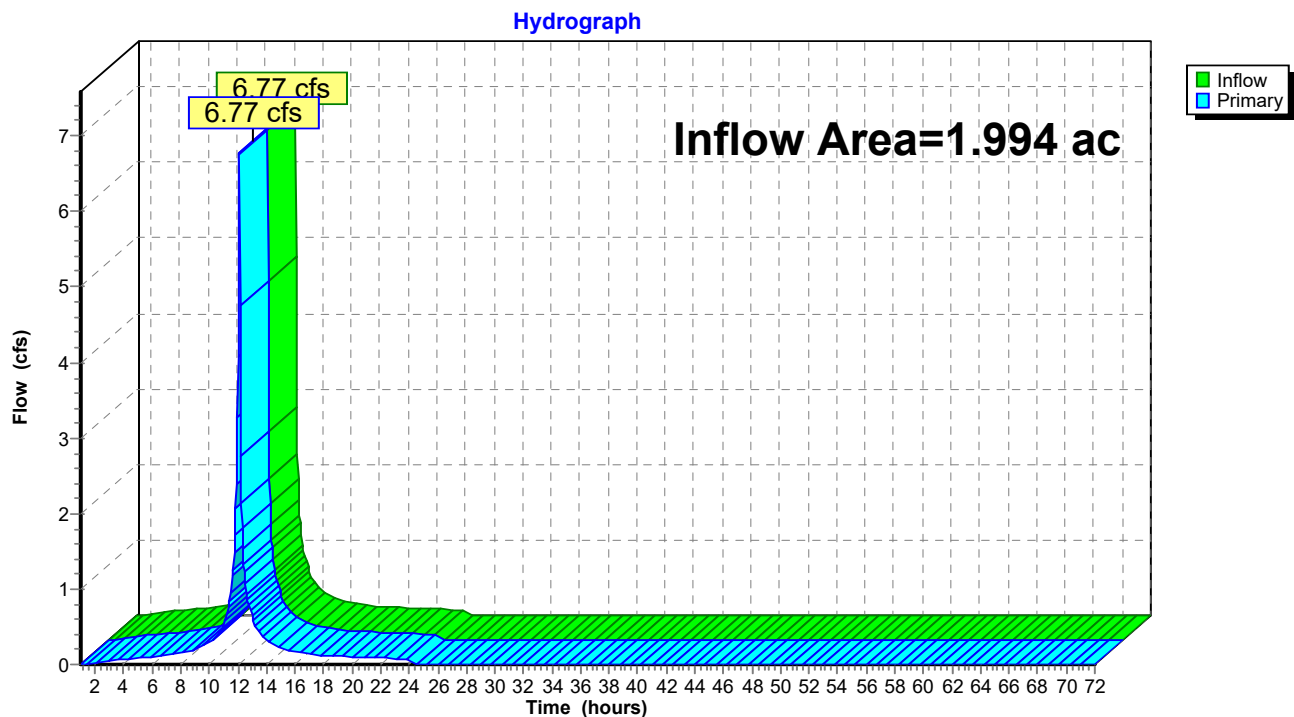
Page 18

Summary for Link EDA 1: Existing Drainage Area 1

Inflow Area = 1.994 ac, 100.00% Impervious, Inflow Depth = 3.14" for 2-Year-2020 event
Inflow = 6.77 cfs @ 12.09 hrs, Volume= 0.521 af
Primary = 6.77 cfs @ 12.09 hrs, Volume= 0.521 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 1: Existing Drainage Area 1



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

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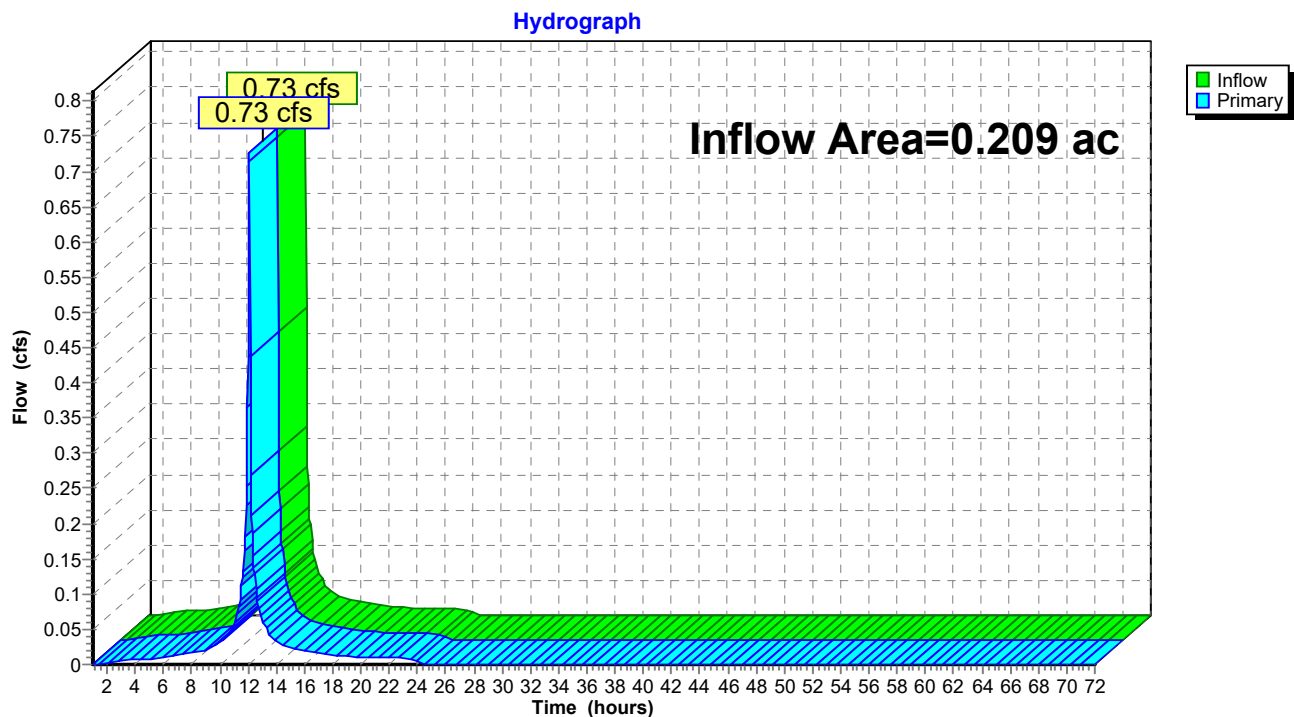
Page 19

Summary for Link EDA 2: Existing Drainage Area 2

Inflow Area = 0.209 ac, 100.00% Impervious, Inflow Depth = 3.14" for 2-Year-2020 event
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 0.055 af
Primary = 0.73 cfs @ 12.09 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 2: Existing Drainage Area 2



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

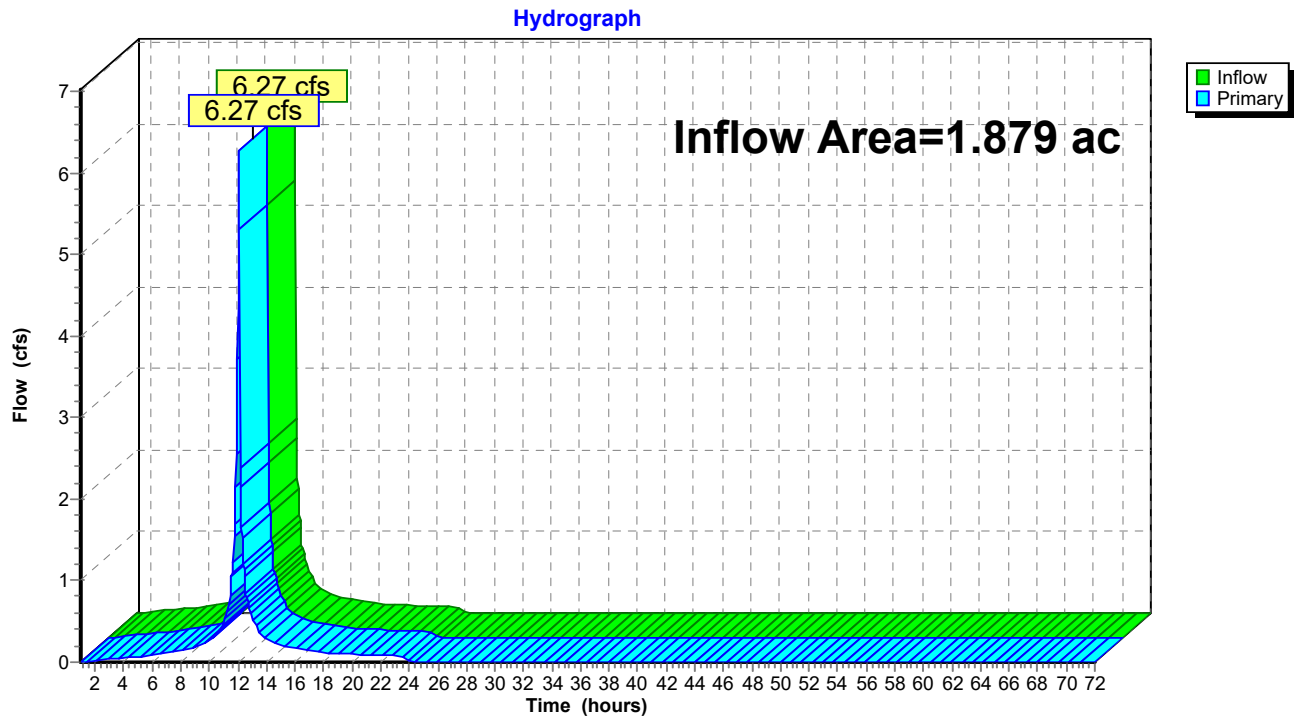
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Summary for Link PDA 1: Proposed Drainage Area 1

Inflow Area = 1.879 ac, 92.12% Impervious, Inflow Depth > 3.01" for 2-Year-2020 event
Inflow = 6.27 cfs @ 12.06 hrs, Volume= 0.471 af
Primary = 6.27 cfs @ 12.06 hrs, Volume= 0.471 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 1: Proposed Drainage Area 1

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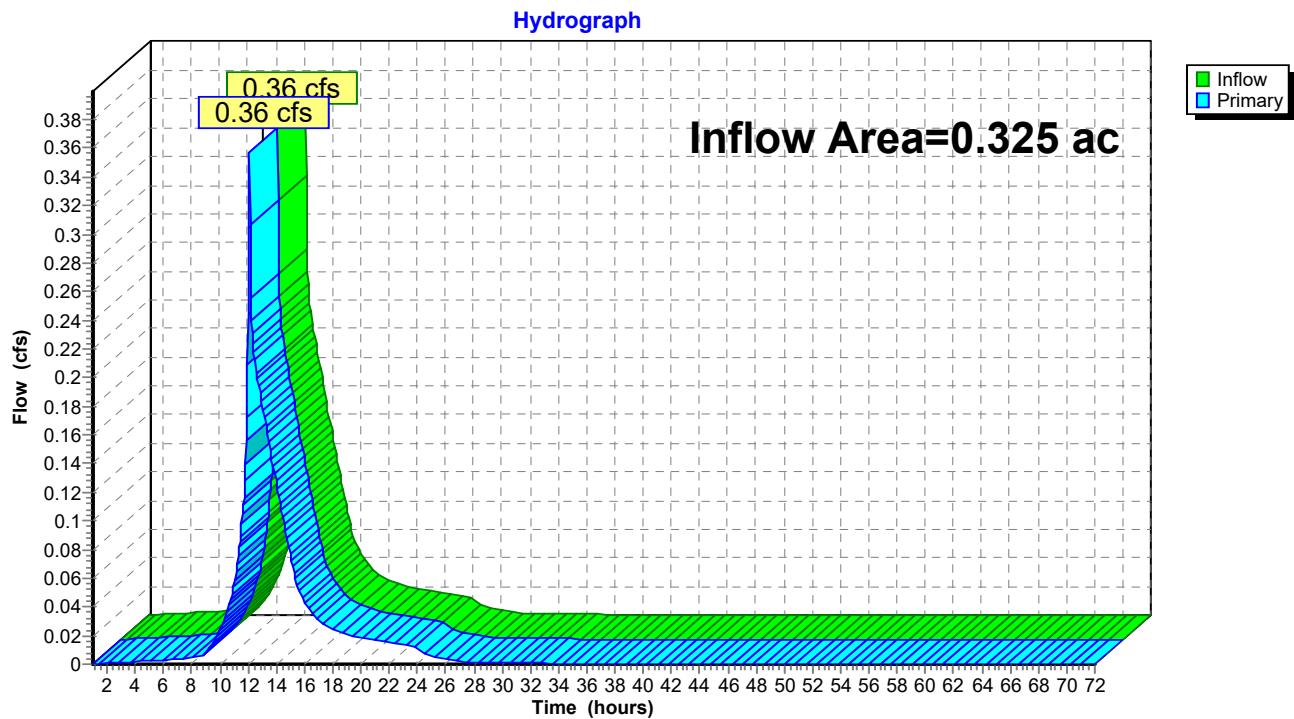
Page 21

Summary for Link PDA 2: Proposed Drainage Area 2

Inflow Area = 0.325 ac, 91.69% Impervious, Inflow Depth = 2.78" for 2-Year-2020 event
Inflow = 0.36 cfs @ 12.10 hrs, Volume= 0.075 af
Primary = 0.36 cfs @ 12.10 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 2: Proposed Drainage Area 2



EX - PR

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

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Time span=1.00-72.00 hrs, dt=0.05 hrs, 1421 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1I: EDA1I	Runoff Area=1.994 ac 100.00% Impervious Runoff Depth>4.98" Flow Length=746' Tc=3.5 min CN=98 Runoff=10.55 cfs 0.828 af
SubcatchmentE2I: EDA2I	Runoff Area=0.209 ac 100.00% Impervious Runoff Depth>4.98" Flow Length=455' Tc=2.9 min CN=98 Runoff=1.13 cfs 0.087 af
SubcatchmentP1I: PDA1I	Runoff Area=1.731 ac 100.00% Impervious Runoff Depth>4.98" Flow Length=256' Tc=0.8 min CN=98 Runoff=9.49 cfs 0.719 af
SubcatchmentP1P: PDA1P	Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=3.09" Flow Length=420' Tc=5.8 min CN=80 Runoff=0.52 cfs 0.038 af
SubcatchmentP2I: PDA2I	Runoff Area=0.243 ac 100.00% Impervious Runoff Depth>4.98" Flow Length=336' Tc=2.7 min CN=98 Runoff=1.33 cfs 0.101 af
SubcatchmentP2P: PDA2P	Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=3.09" Flow Length=9' Slope=0.0180 '/' Tc=1.5 min CN=80 Runoff=0.08 cfs 0.005 af
SubcatchmentPDA2BI: PDA2I - Bypass	Runoff Area=0.055 ac 100.00% Impervious Runoff Depth>4.98" Flow Length=474' Tc=3.4 min CN=98 Runoff=0.29 cfs 0.023 af
SubcatchmentPDA2BP: PDA2P - Bypass	Runoff Area=0.007 ac 0.00% Impervious Runoff Depth=3.09" Flow Length=324' Tc=3.4 min CN=80 Runoff=0.03 cfs 0.002 af
Pond 1P: Porous Concrete	Peak Elev=82.78' Storage=1,797 cf Inflow=1.41 cfs 0.106 af Outflow=0.24 cfs 0.100 af
Link EDA 1: Existing Drainage Area 1	Inflow=10.55 cfs 0.828 af Primary=10.55 cfs 0.828 af
Link EDA 2: Existing Drainage Area 2	Inflow=1.13 cfs 0.087 af Primary=1.13 cfs 0.087 af
Link PDA 1: Proposed Drainage Area 1	Inflow=9.86 cfs 0.757 af Primary=9.86 cfs 0.757 af
Link PDA 2: Proposed Drainage Area 2	Inflow=0.53 cfs 0.125 af Primary=0.53 cfs 0.125 af

Total Runoff Area = 4.407 ac Runoff Volume = 1.802 af Average Runoff Depth = 4.91"
3.97% Pervious = 0.175 ac 96.03% Impervious = 4.232 ac

EX - PR

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

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Summary for Subcatchment E1I: EDA1I

Runoff = 10.55 cfs @ 12.09 hrs, Volume= 0.828 af, Depth> 4.98"
 Routed to Link EDA 1 : Existing Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
1.994	98	Paved parking, HSG D
1.994		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0375	1.82		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.0	292	0.0530	4.67		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.2	45	0.0230	3.08		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
3.5	746	Total			

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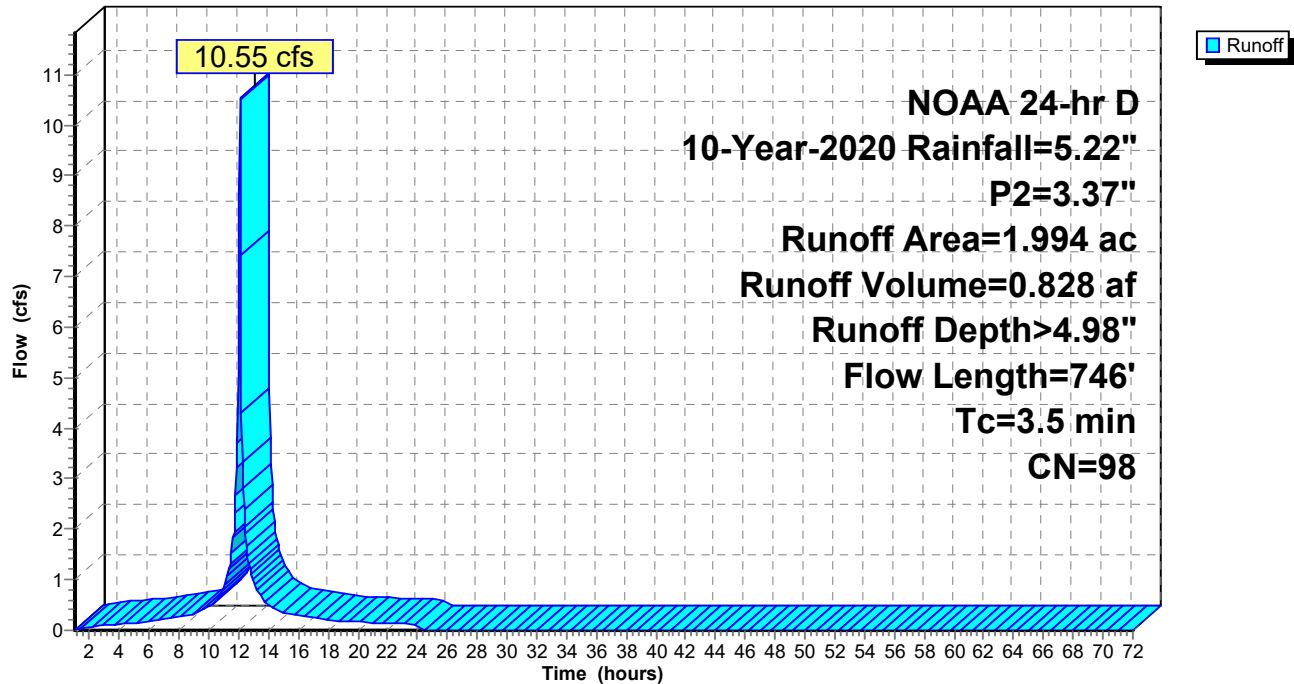
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Subcatchment E1I: EDA1I

Hydrograph



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Summary for Subcatchment E2I: EDA2I

Runoff = 1.13 cfs @ 12.09 hrs, Volume= 0.087 af, Depth> 4.98"
 Routed to Link EDA 2 : Existing Drainage Area 2

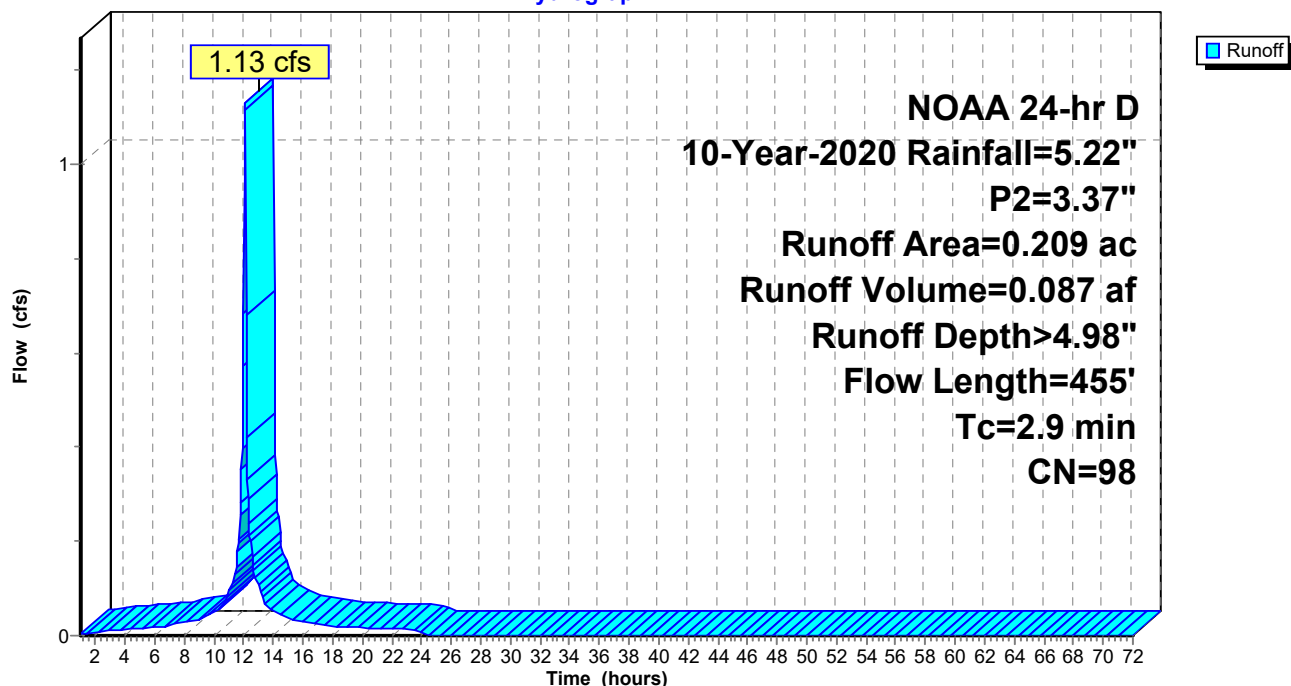
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.209	98	Paved parking, HSG D
0.209		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	24	0.0280	1.21		Sheet Flow, G-H Smooth surfaces n= 0.011 P2= 3.37"
1.9	299	0.0162	2.58		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.1	31	0.0260	4.98	8.81	Pipe Channel, I-J 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
0.6	101	0.0100	2.74	3.36	Pipe Channel, J-K 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.9	455	Total			

Subcatchment E2I: EDA2I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1I: PDA1I

Runoff = 9.49 cfs @ 12.06 hrs, Volume= 0.719 af, Depth> 4.98"

Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
1.731	98	Paved parking, HSG D
1.731		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0150	0.69		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
0.3	19	0.0060	1.25		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	28	0.0340	3.74		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.1	56	0.0200	7.58	5.95	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	64	0.0880	15.90	12.49	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	84	0.0600	13.13	10.31	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.8	256	Total			

EX - PR

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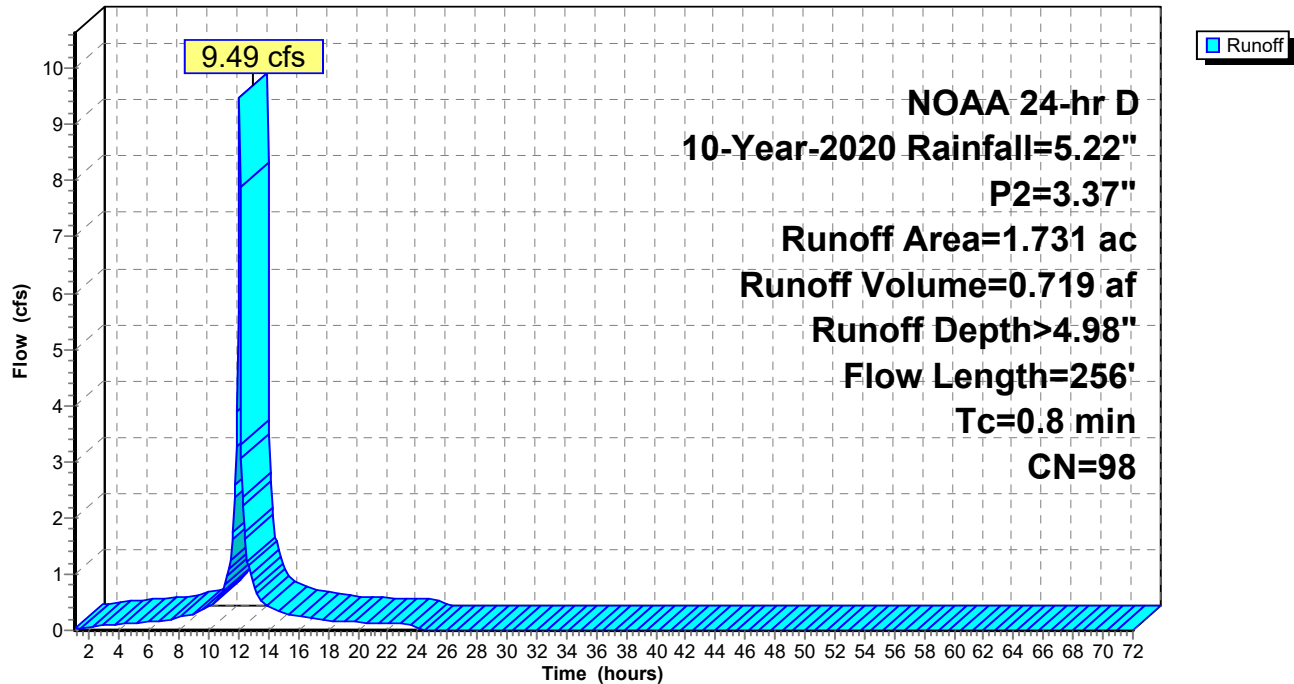
NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

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Subcatchment P1I: PDA1I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1P: PDA1P

Runoff = 0.52 cfs @ 12.13 hrs, Volume= 0.038 af, Depth= 3.09"
 Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.148	80	>75% Grass cover, Good, HSG D
0.148		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	80	0.0875	0.30		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.1300	5.80		Shallow Concentrated Flow, I-J Unpaved Kv= 16.1 fps
0.0	7	0.0340	2.97		Shallow Concentrated Flow, J-K Unpaved Kv= 16.1 fps
0.0	8	0.0425	3.32		Shallow Concentrated Flow, K-L Unpaved Kv= 16.1 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, L-M 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, N-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
5.8	420	Total			

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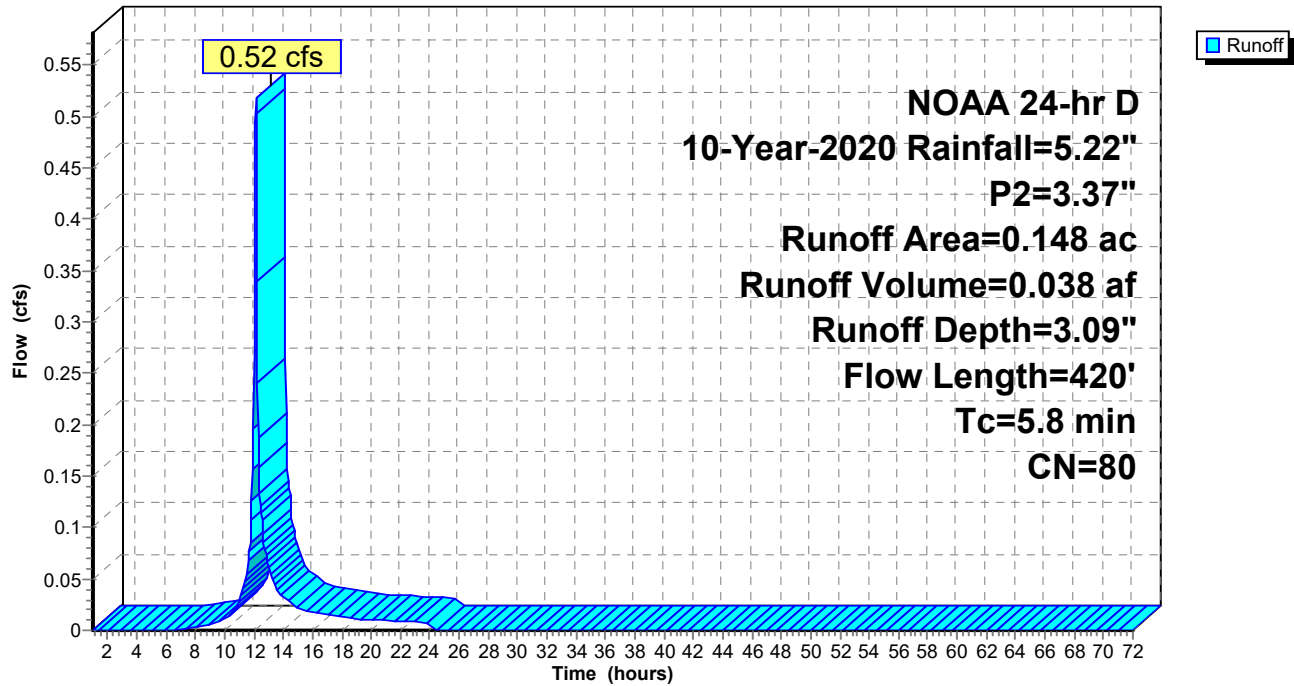
NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

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Subcatchment P1P: PDA1P

Hydrograph



EX - PR

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

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Summary for Subcatchment P2I: PDA2I

Runoff = 1.33 cfs @ 12.09 hrs, Volume= 0.101 af, Depth> 4.98"
 Routed to Pond 1P : Porous Concrete

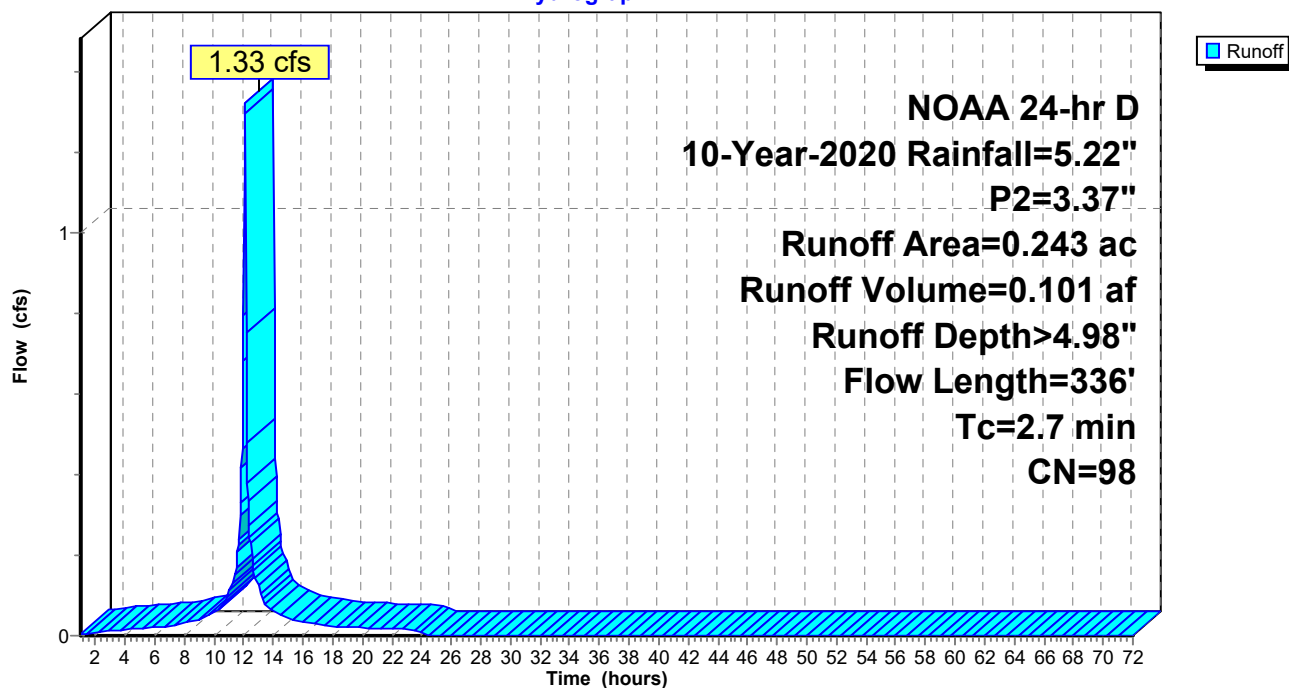
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG D
0.243		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	49	0.0190	1.20		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
2.7	336	Total			

Subcatchment P2I: PDA2I

Hydrograph



EX - PR

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

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Summary for Subcatchment P2P: PDA2P

Runoff = 0.08 cfs @ 12.07 hrs, Volume= 0.005 af, Depth= 3.09"
Routed to Pond 1P : Porous Concrete

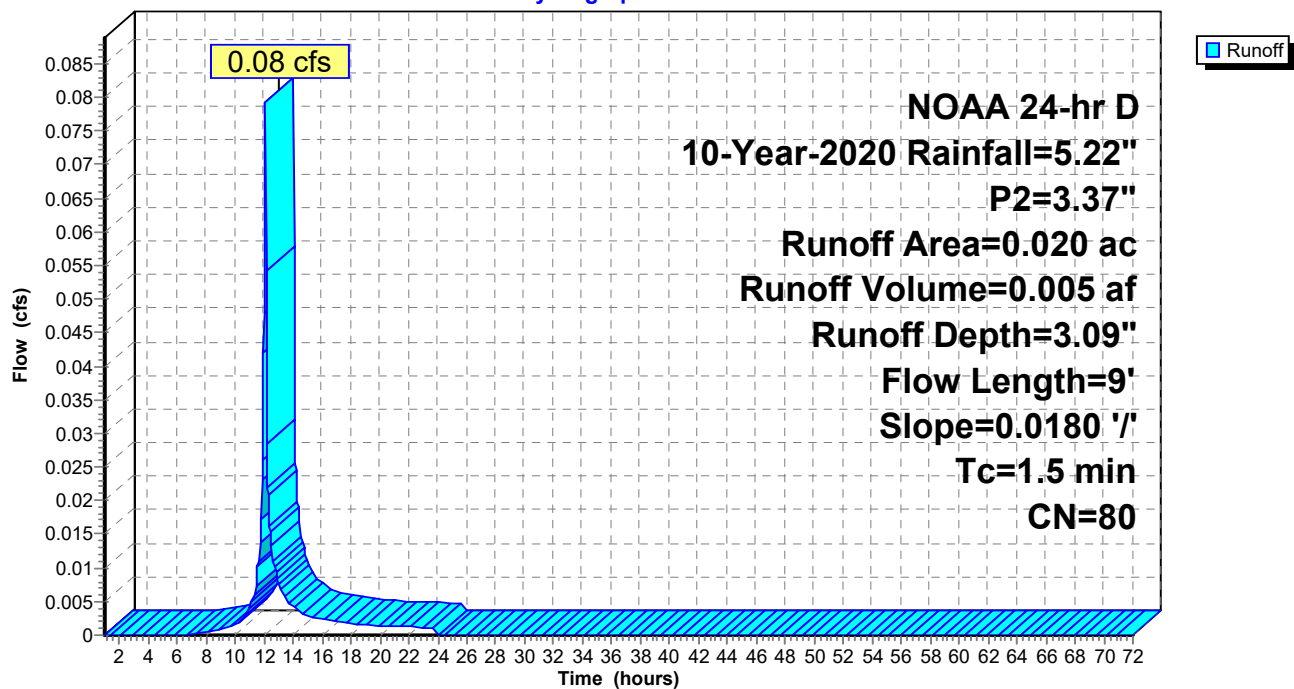
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.020	80	>75% Grass cover, Good, HSG D
0.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	9	0.0180	0.10		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"

Subcatchment P2P: PDA2P

Hydrograph



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

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Summary for Subcatchment PDA2BI: PDA2I - Bypass

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.023 af, Depth> 4.98"
 Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.055	98	Paved parking, HSG D
0.055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	49	0.0190	1.20		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.4	474	Total			

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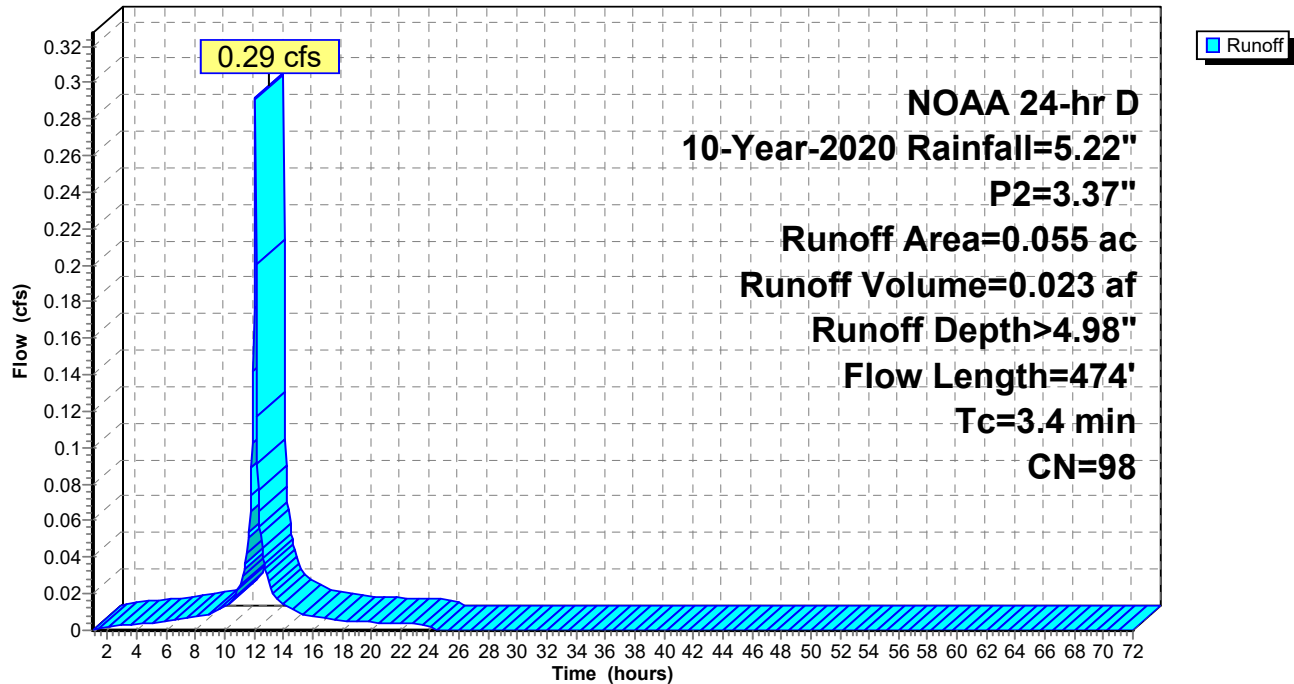
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Subcatchment PDA2BI: PDA2I - Bypass

Hydrograph



EX - PR

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Summary for Subcatchment PDA2BP: PDA2P - Bypass

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Depth= 3.09"
 Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2020 Rainfall=5.22", P2=3.37"

Area (ac)	CN	Description
0.007	80	>75% Grass cover, Good, HSG D
0.007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	9	0.0180	0.10		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"
0.1	18	0.0180	2.72		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.2	26	0.0150	2.49		Shallow Concentrated Flow, J-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.4	324	Total			

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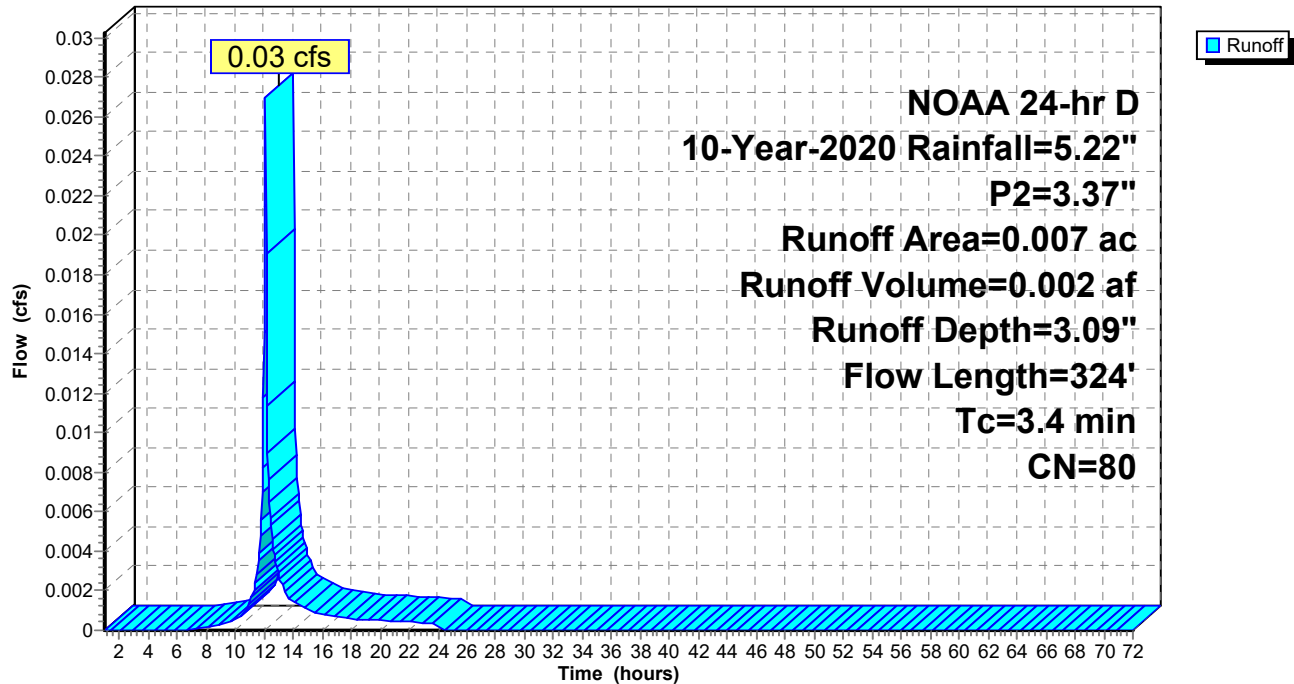
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Subcatchment PDA2BP: PDA2P - Bypass

Hydrograph



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Summary for Pond 1P: Porous Concrete

Inflow Area = 0.263 ac, 92.40% Impervious, Inflow Depth > 4.84" for 10-Year-2020 event
 Inflow = 1.41 cfs @ 12.08 hrs, Volume= 0.106 af
 Outflow = 0.24 cfs @ 12.49 hrs, Volume= 0.100 af, Atten= 83%, Lag= 24.5 min
 Primary = 0.24 cfs @ 12.49 hrs, Volume= 0.100 af
 Routed to Link PDA 2 : Proposed Drainage Area 2

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 82.78' @ 12.49 hrs Surf.Area= 3,335 sf Storage= 1,797 cf

Plug-Flow detention time= 157.0 min calculated for 0.100 af (94% of inflow)
 Center-of-Mass det. time= 123.7 min (873.1 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1	81.43'	5,963 cf	Porous Paving Storage Area (Prismatic) , listed below (Recalc) 14,907 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.43	3,335	0	0
85.90	3,335	14,907	14,907

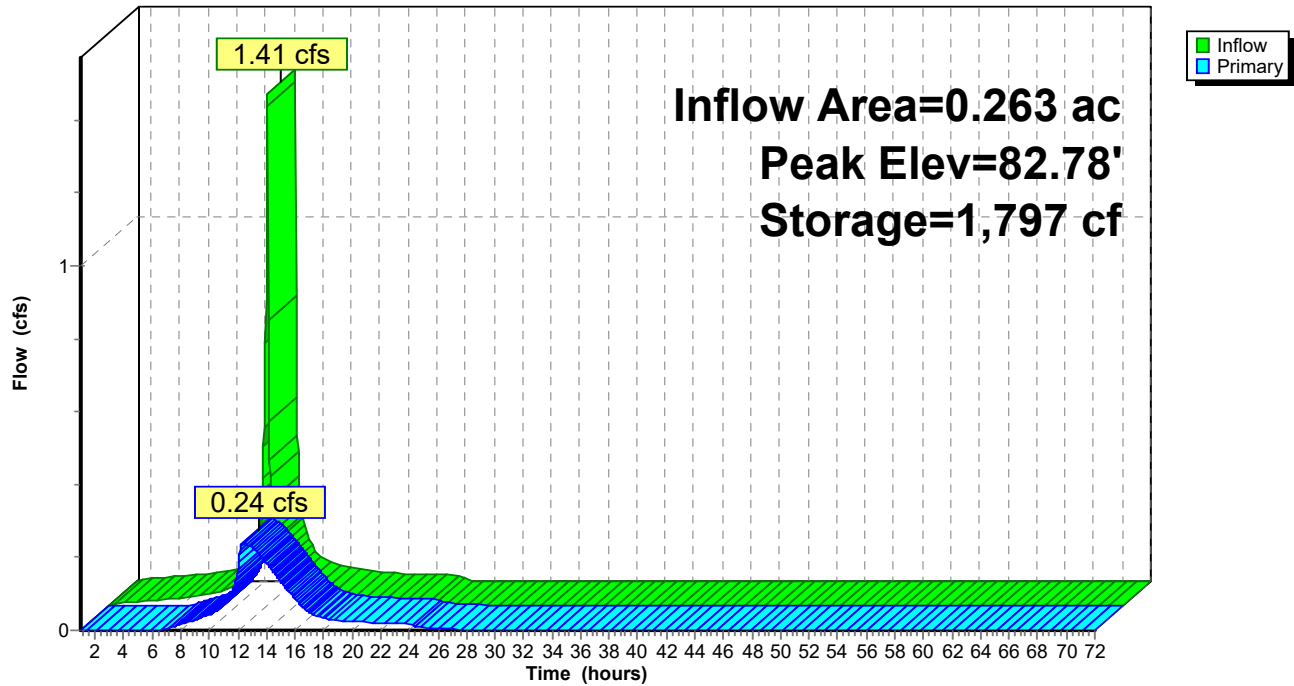
Device	Routing	Invert	Outlet Devices
#1	Primary	81.58'	15.0" Round Culvert L= 38.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 81.58' / 81.20' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	81.63'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	84.15'	0.5' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.24 cfs @ 12.49 hrs HW=82.78' (Free Discharge)

1=Culvert (Passes 0.24 cfs of 4.78 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.24 cfs @ 4.87 fps)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P: Porous Concrete

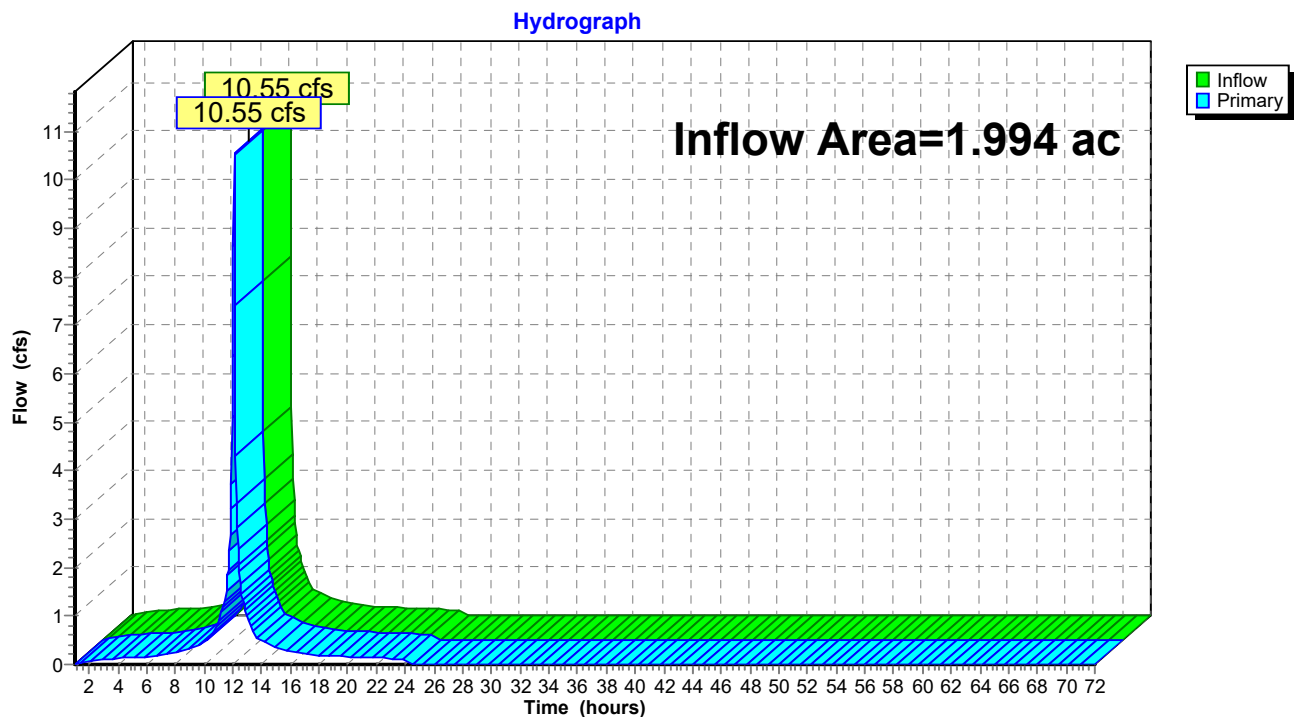
Hydrograph



Summary for Link EDA 1: Existing Drainage Area 1

Inflow Area = 1.994 ac, 100.00% Impervious, Inflow Depth > 4.98" for 10-Year-2020 event
Inflow = 10.55 cfs @ 12.09 hrs, Volume= 0.828 af
Primary = 10.55 cfs @ 12.09 hrs, Volume= 0.828 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 1: Existing Drainage Area 1

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

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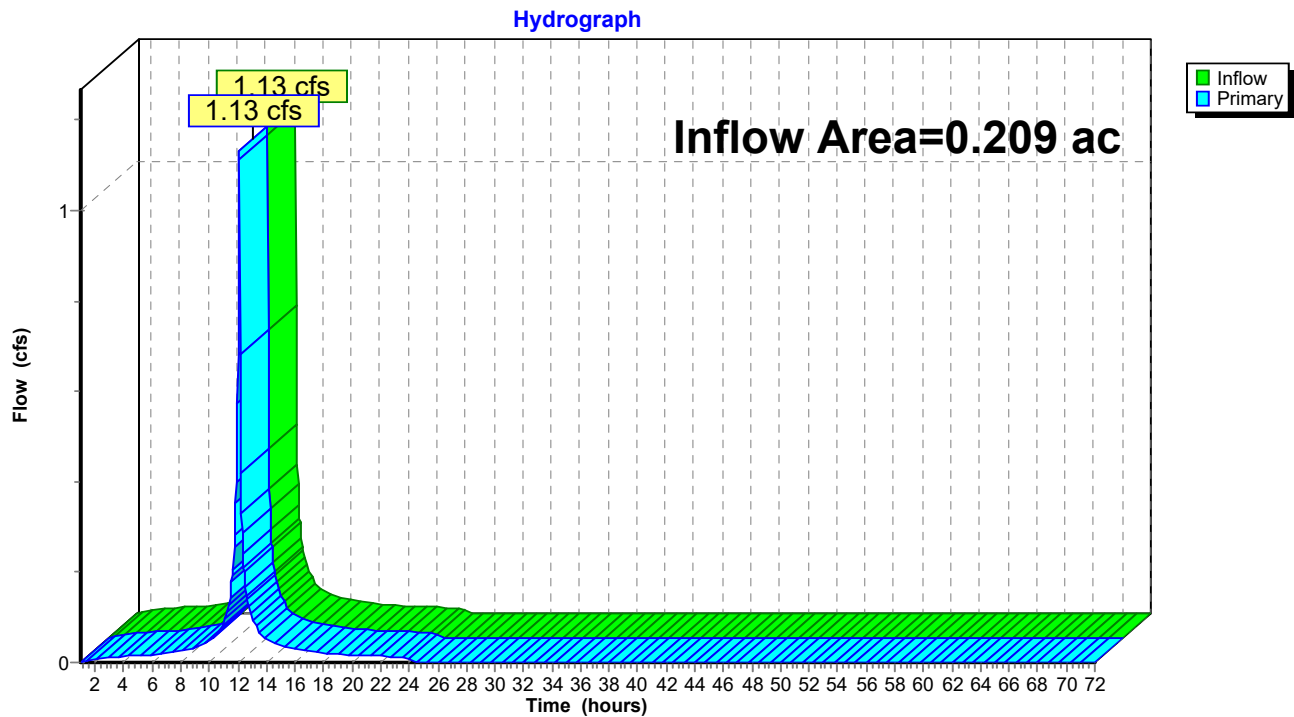
Page 39

Summary for Link EDA 2: Existing Drainage Area 2

Inflow Area = 0.209 ac, 100.00% Impervious, Inflow Depth > 4.98" for 10-Year-2020 event
Inflow = 1.13 cfs @ 12.09 hrs, Volume= 0.087 af
Primary = 1.13 cfs @ 12.09 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 2: Existing Drainage Area 2



EX - PR

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

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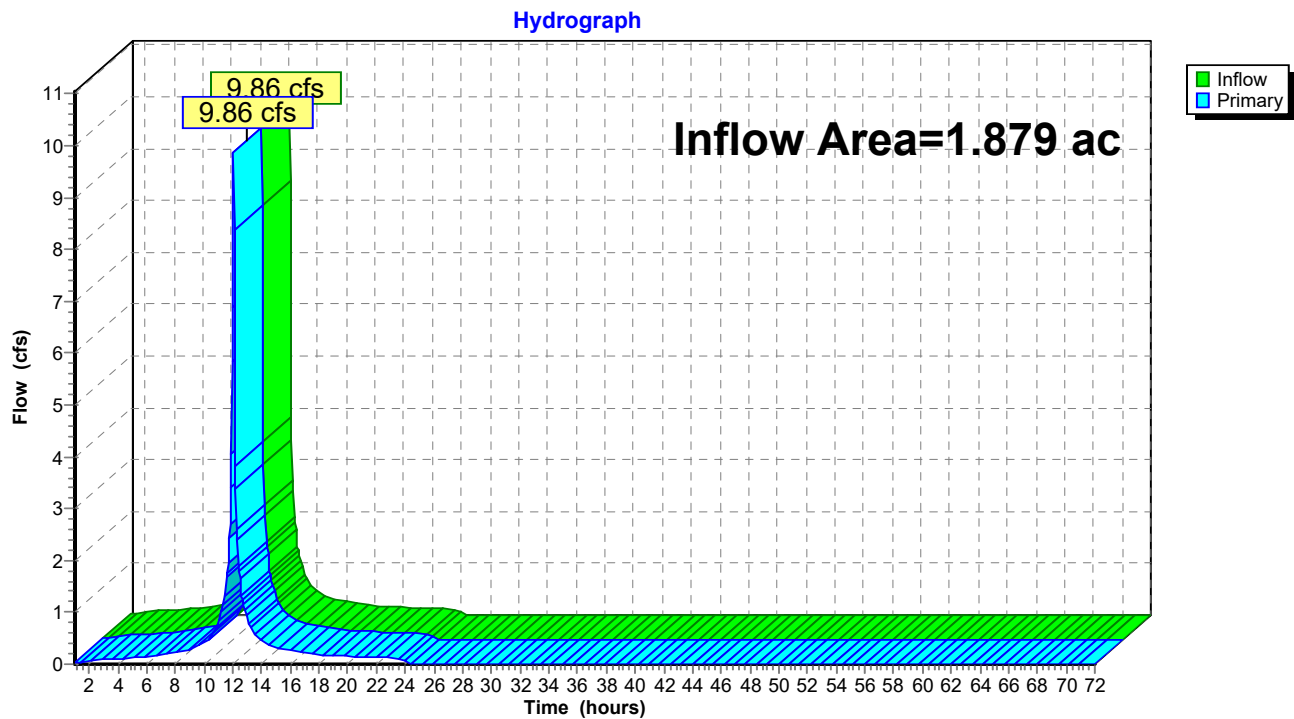
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Summary for Link PDA 1: Proposed Drainage Area 1

Inflow Area = 1.879 ac, 92.12% Impervious, Inflow Depth > 4.83" for 10-Year-2020 event
Inflow = 9.86 cfs @ 12.06 hrs, Volume= 0.757 af
Primary = 9.86 cfs @ 12.06 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 1: Proposed Drainage Area 1

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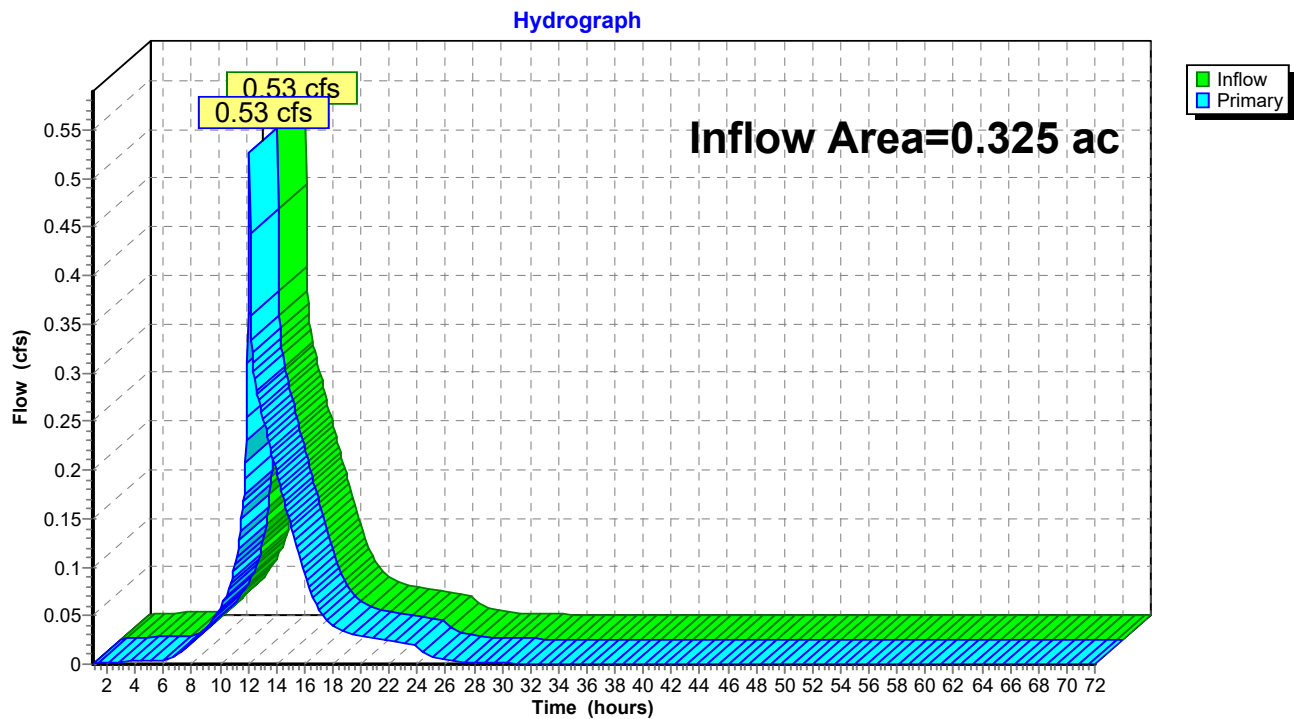
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Summary for Link PDA 2: Proposed Drainage Area 2

Inflow Area = 0.325 ac, 91.69% Impervious, Inflow Depth > 4.60" for 10-Year-2020 event
Inflow = 0.53 cfs @ 12.10 hrs, Volume= 0.125 af
Primary = 0.53 cfs @ 12.10 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 2: Proposed Drainage Area 2



EX - PR

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

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Time span=1.00-72.00 hrs, dt=0.05 hrs, 1421 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1I: EDA1I	Runoff Area=1.994 ac 100.00% Impervious Runoff Depth>8.73" Flow Length=746' Tc=3.5 min CN=98 Runoff=18.21 cfs 1.450 af
SubcatchmentE2I: EDA2I	Runoff Area=0.209 ac 100.00% Impervious Runoff Depth>8.73" Flow Length=455' Tc=2.9 min CN=98 Runoff=1.95 cfs 0.152 af
SubcatchmentP1I: PDA1I	Runoff Area=1.731 ac 100.00% Impervious Runoff Depth>8.73" Flow Length=256' Tc=0.8 min CN=98 Runoff=16.38 cfs 1.259 af
SubcatchmentP1P: PDA1P	Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=6.55" Flow Length=420' Tc=5.8 min CN=80 Runoff=1.07 cfs 0.081 af
SubcatchmentP2I: PDA2I	Runoff Area=0.243 ac 100.00% Impervious Runoff Depth>8.73" Flow Length=336' Tc=2.7 min CN=98 Runoff=2.29 cfs 0.177 af
SubcatchmentP2P: PDA2P	Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=6.55" Flow Length=9' Slope=0.0180 '/' Tc=1.5 min CN=80 Runoff=0.16 cfs 0.011 af
SubcatchmentPDA2BI: PDA2I - Bypass	Runoff Area=0.055 ac 100.00% Impervious Runoff Depth>8.73" Flow Length=474' Tc=3.4 min CN=98 Runoff=0.50 cfs 0.040 af
SubcatchmentPDA2BP: PDA2P - Bypass	Runoff Area=0.007 ac 0.00% Impervious Runoff Depth=6.55" Flow Length=324' Tc=3.4 min CN=80 Runoff=0.06 cfs 0.004 af
Pond 1P: Porous Concrete	Peak Elev=83.80' Storage=3,157 cf Inflow=2.45 cfs 0.188 af Outflow=0.34 cfs 0.182 af
Link EDA 1: Existing Drainage Area 1	Inflow=18.21 cfs 1.450 af Primary=18.21 cfs 1.450 af
Link EDA 2: Existing Drainage Area 2	Inflow=1.95 cfs 0.152 af Primary=1.95 cfs 0.152 af
Link PDA 1: Proposed Drainage Area 1	Inflow=17.17 cfs 1.340 af Primary=17.17 cfs 1.340 af
Link PDA 2: Proposed Drainage Area 2	Inflow=0.85 cfs 0.225 af Primary=0.85 cfs 0.225 af

Total Runoff Area = 4.407 ac Runoff Volume = 3.174 af Average Runoff Depth = 8.64"
3.97% Pervious = 0.175 ac 96.03% Impervious = 4.232 ac

EX - PR

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

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Summary for Subcatchment E1I: EDA1I

Runoff = 18.21 cfs @ 12.09 hrs, Volume= 1.450 af, Depth> 8.73"
 Routed to Link EDA 1 : Existing Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
1.994	98	Paved parking, HSG D
1.994		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0375	1.82		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.0	292	0.0530	4.67		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.2	45	0.0230	3.08		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
3.5	746	Total			

EX - PR

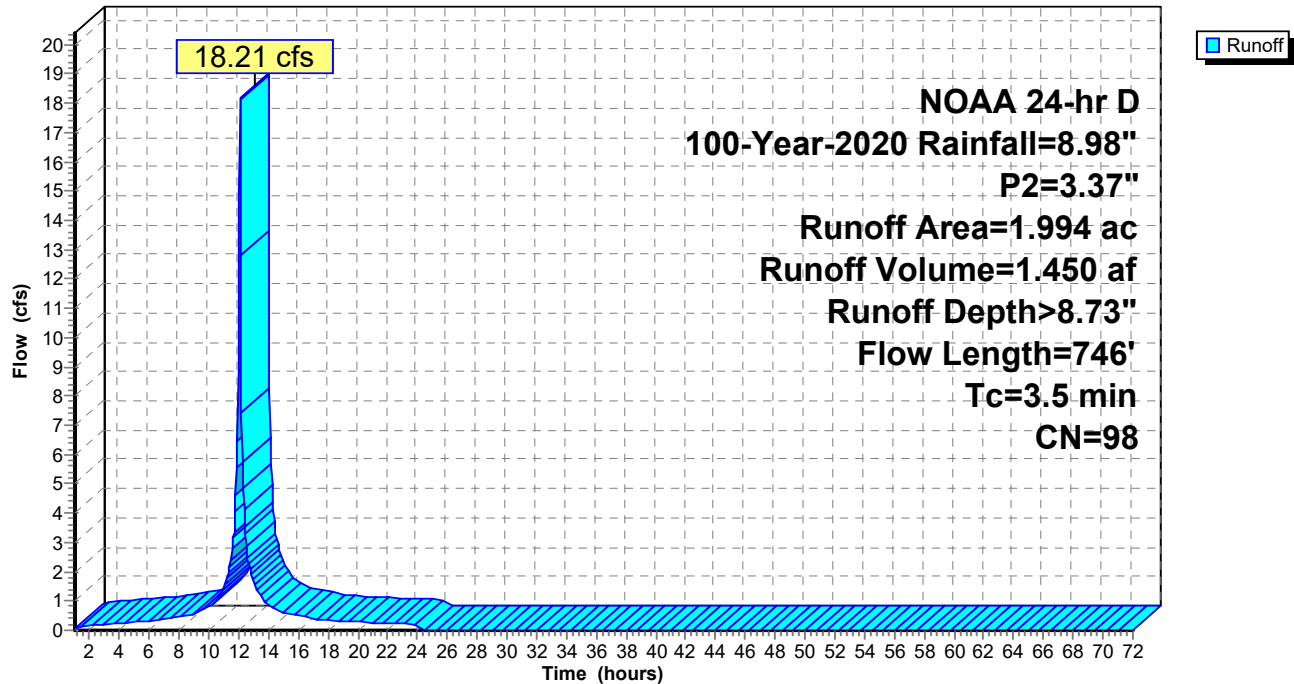
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Subcatchment E1I: EDA1I**Hydrograph**

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Summary for Subcatchment E2I: EDA2I

Runoff = 1.95 cfs @ 12.09 hrs, Volume= 0.152 af, Depth> 8.73"
 Routed to Link EDA 2 : Existing Drainage Area 2

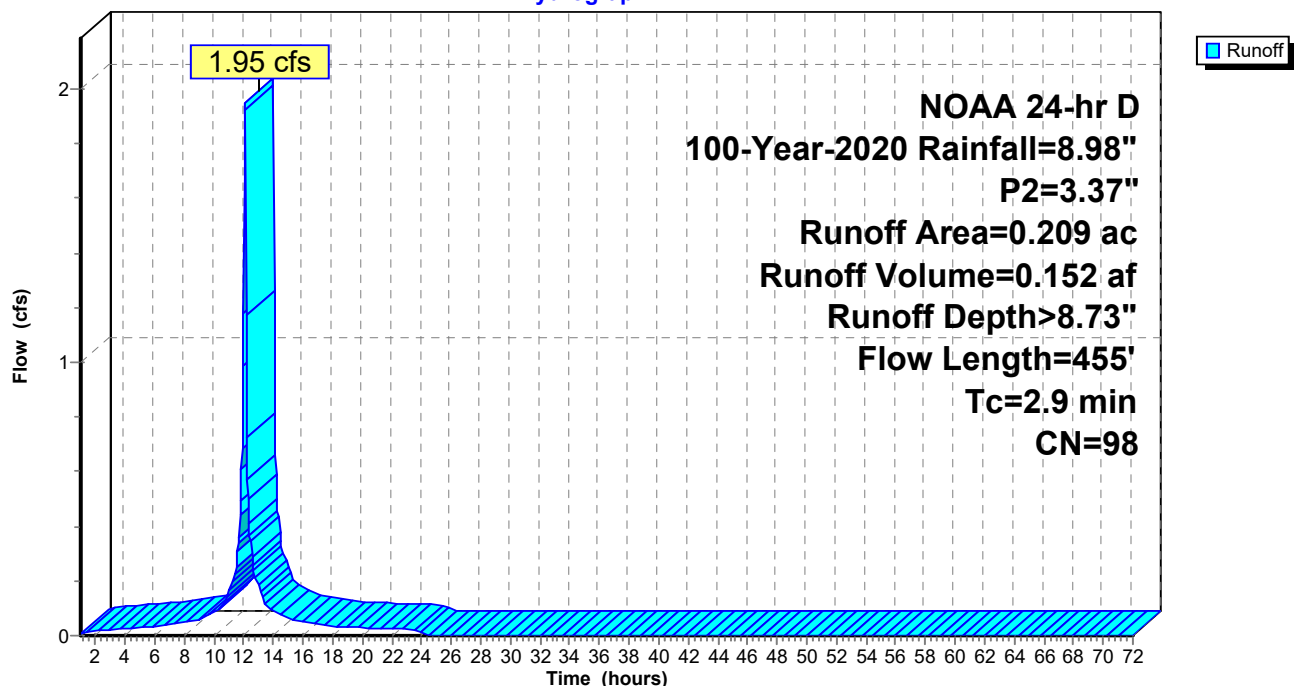
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.209	98	Paved parking, HSG D
0.209		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	24	0.0280	1.21		Sheet Flow, G-H Smooth surfaces n= 0.011 P2= 3.37"
1.9	299	0.0162	2.58		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.1	31	0.0260	4.98	8.81	Pipe Channel, I-J 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
0.6	101	0.0100	2.74	3.36	Pipe Channel, J-K 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.9	455	Total			

Subcatchment E2I: EDA2I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1I: PDA1I

Runoff = 16.38 cfs @ 12.06 hrs, Volume= 1.259 af, Depth> 8.73"

Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
1.731	98	Paved parking, HSG D
1.731		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0150	0.69		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
0.3	19	0.0060	1.25		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	28	0.0340	3.74		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.1	56	0.0200	7.58	5.95	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	64	0.0880	15.90	12.49	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	84	0.0600	13.13	10.31	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.8	256	Total			

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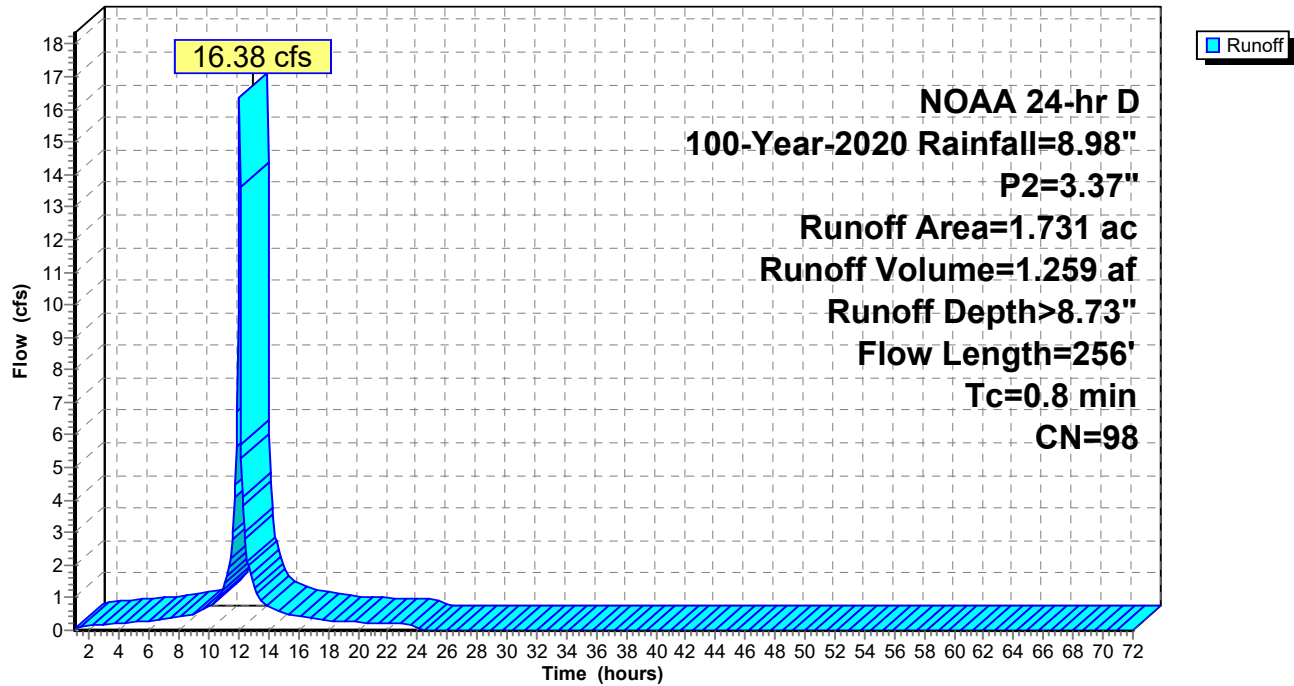
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Subcatchment P1I: PDA1I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1P: PDA1P

Runoff = 1.07 cfs @ 12.13 hrs, Volume= 0.081 af, Depth= 6.55"

Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.148	80	>75% Grass cover, Good, HSG D
0.148		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	80	0.0875	0.30		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.1300	5.80		Shallow Concentrated Flow, I-J Unpaved Kv= 16.1 fps
0.0	7	0.0340	2.97		Shallow Concentrated Flow, J-K Unpaved Kv= 16.1 fps
0.0	8	0.0425	3.32		Shallow Concentrated Flow, K-L Unpaved Kv= 16.1 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, L-M 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, N-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
5.8	420	Total			

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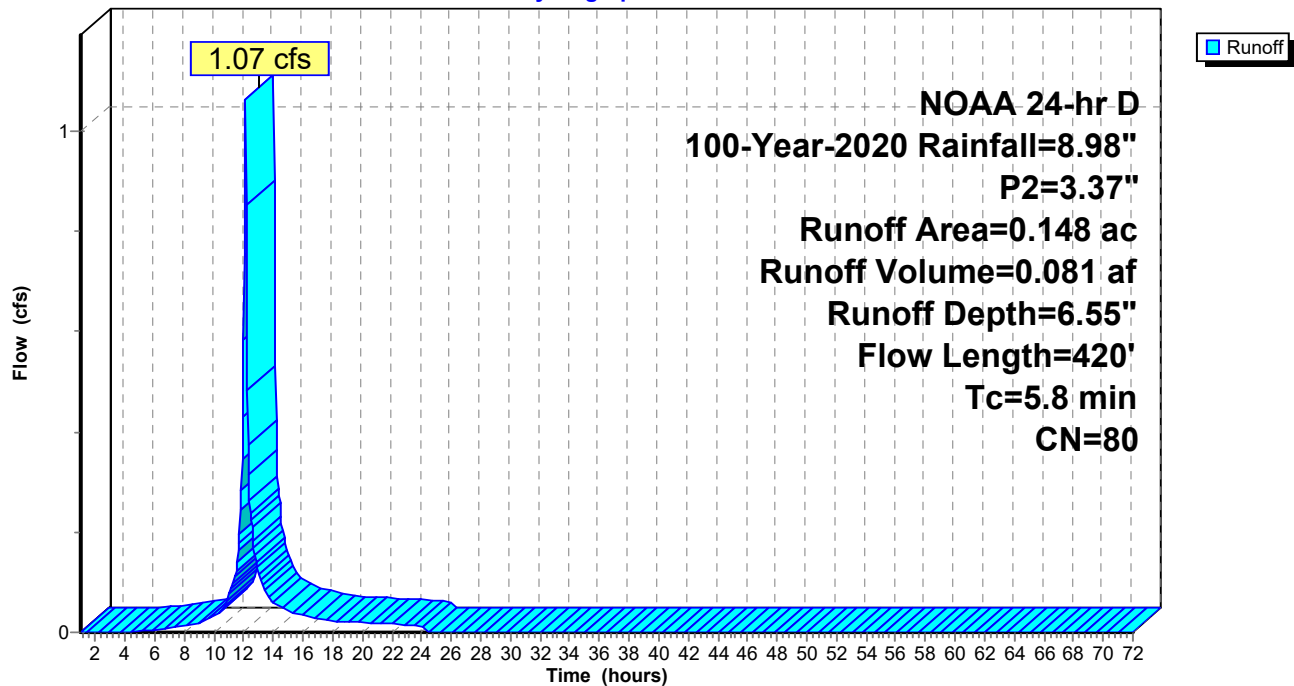
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Subcatchment P1P: PDA1P

Hydrograph



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Summary for Subcatchment P2I: PDA2I

Runoff = 2.29 cfs @ 12.09 hrs, Volume= 0.177 af, Depth> 8.73"
Routed to Pond 1P : Porous Concrete

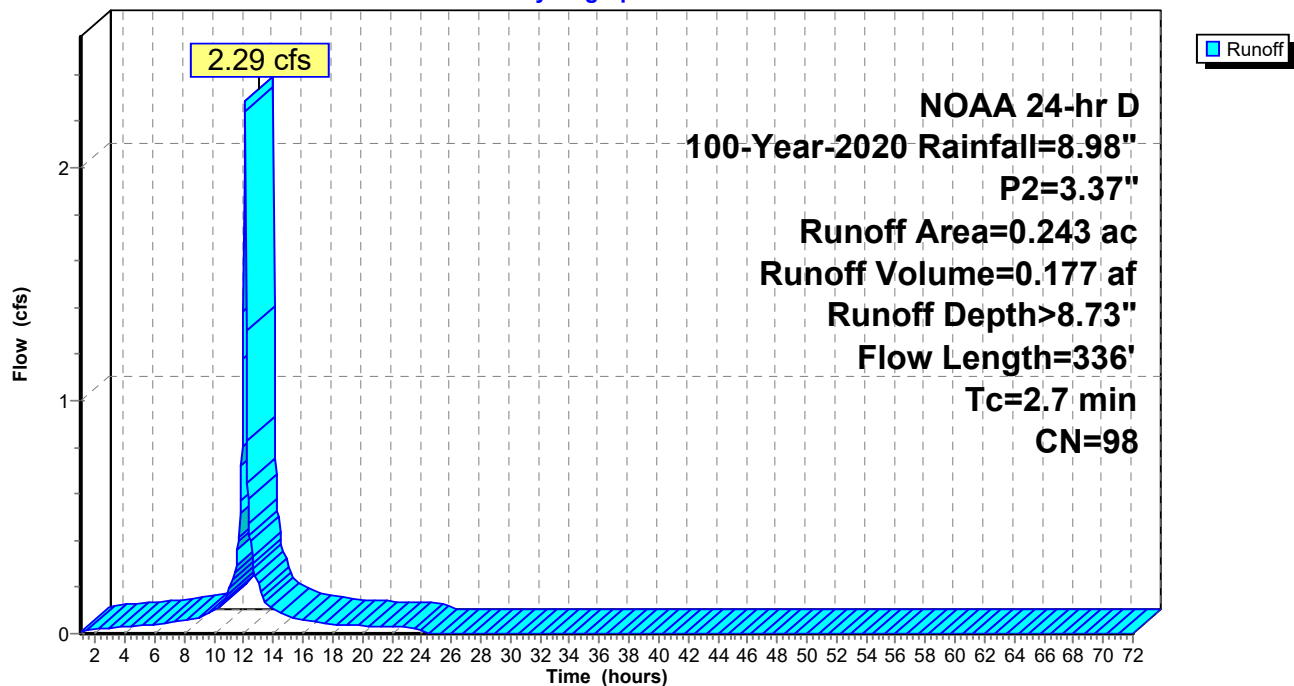
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG D
0.243		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	49	0.0190	1.20		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
2.7	336	Total			

Subcatchment P2I: PDA2I

Hydrograph



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Summary for Subcatchment P2P: PDA2P

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 0.011 af, Depth= 6.55"
Routed to Pond 1P : Porous Concrete

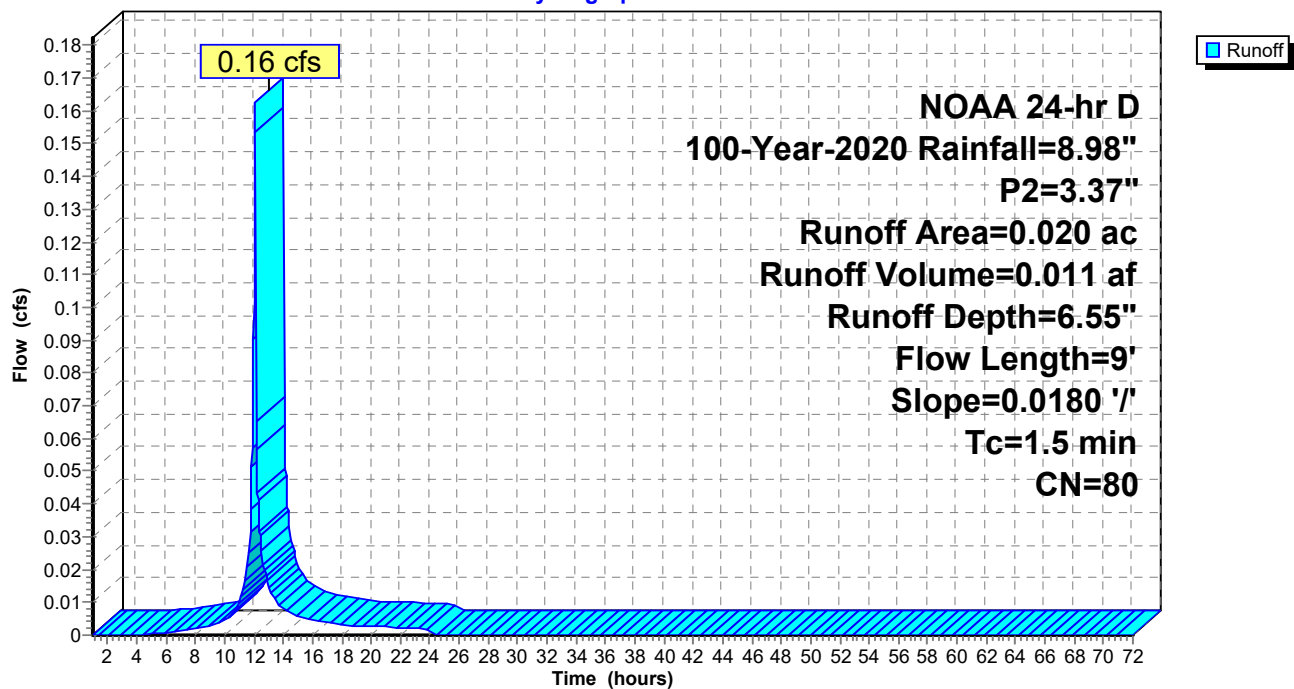
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.020	80	>75% Grass cover, Good, HSG D
0.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	9	0.0180	0.10		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"

Subcatchment P2P: PDA2P

Hydrograph



EX - PR

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

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Summary for Subcatchment PDA2BI: PDA2I - Bypass

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.040 af, Depth> 8.73"

Routed to Link PDA 2 : Proposed Drainage Area 2

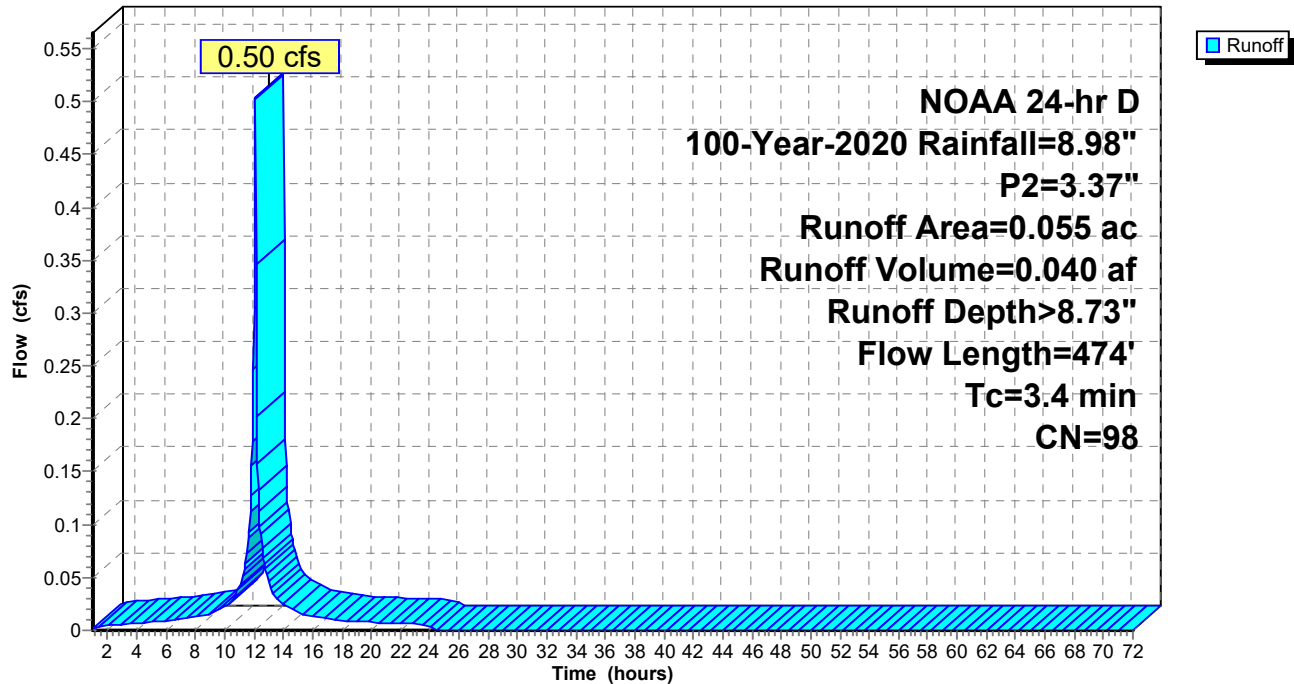
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.055	98	Paved parking, HSG D
0.055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	49	0.0190	1.20		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.4	474	Total			

Subcatchment PDA2BI: PDA2I - Bypass

Hydrograph



EX - PR

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

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Summary for Subcatchment PDA2BP: PDA2P - Bypass

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 6.55"

Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

Area (ac)	CN	Description
0.007	80	>75% Grass cover, Good, HSG D
0.007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	9	0.0180	0.10		Sheet Flow, H-I
					Grass: Short n= 0.150 P2= 3.37"
0.1	18	0.0180	2.72		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.2	26	0.0150	2.49		Shallow Concentrated Flow, J-C
					Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D
					Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E
					Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
3.4	324	Total			

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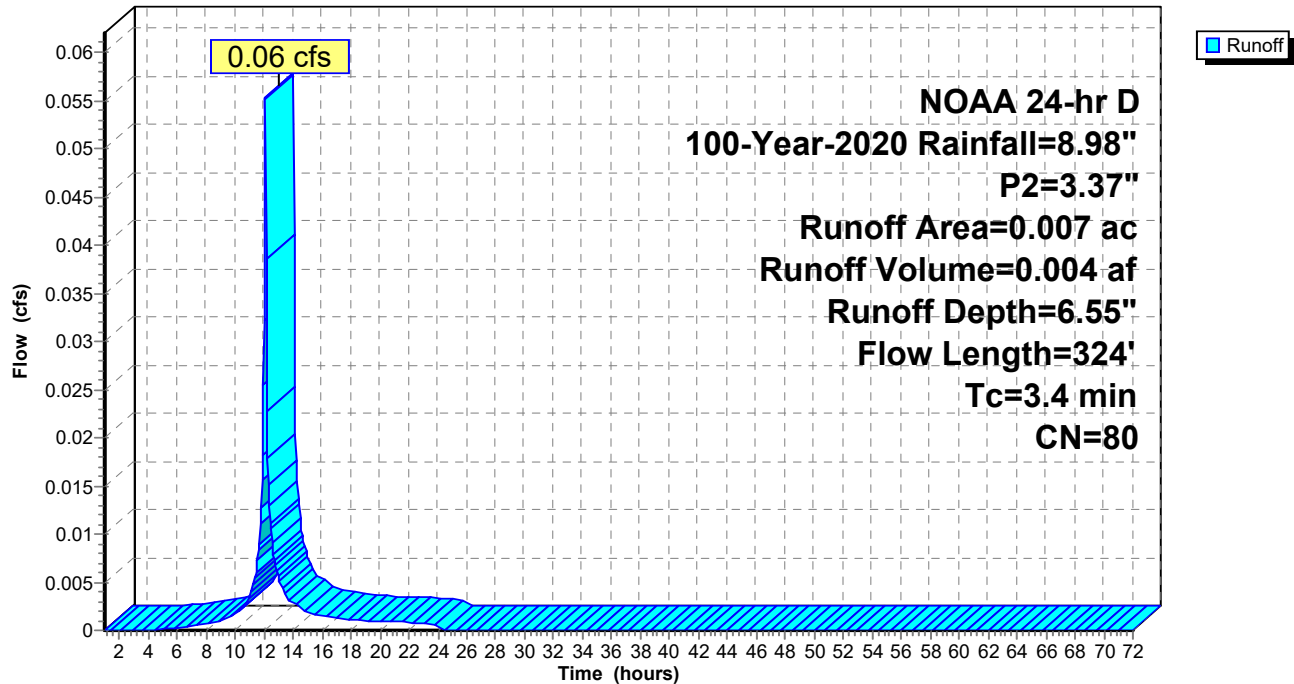
NOAA 24-hr D 100-Year-2020 Rainfall=8.98", P2=3.37"

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Subcatchment PDA2BP: PDA2P - Bypass

Hydrograph



EX - PR

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

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Summary for Pond 1P: Porous Concrete

Inflow Area = 0.263 ac, 92.40% Impervious, Inflow Depth > 8.56" for 100-Year-2020 event
 Inflow = 2.45 cfs @ 12.08 hrs, Volume= 0.188 af
 Outflow = 0.34 cfs @ 12.57 hrs, Volume= 0.182 af, Atten= 86%, Lag= 29.3 min
 Primary = 0.34 cfs @ 12.57 hrs, Volume= 0.182 af
 Routed to Link PDA 2 : Proposed Drainage Area 2

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 83.80' @ 12.57 hrs Surf.Area= 3,335 sf Storage= 3,157 cf

Plug-Flow detention time= 145.8 min calculated for 0.182 af (97% of inflow)
 Center-of-Mass det. time= 124.3 min (866.3 - 742.0)

Volume	Invert	Avail.Storage	Storage Description
#1	81.43'	5,963 cf	Porous Paving Storage Area (Prismatic) , listed below (Recalc) 14,907 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.43	3,335	0	0
85.90	3,335	14,907	14,907

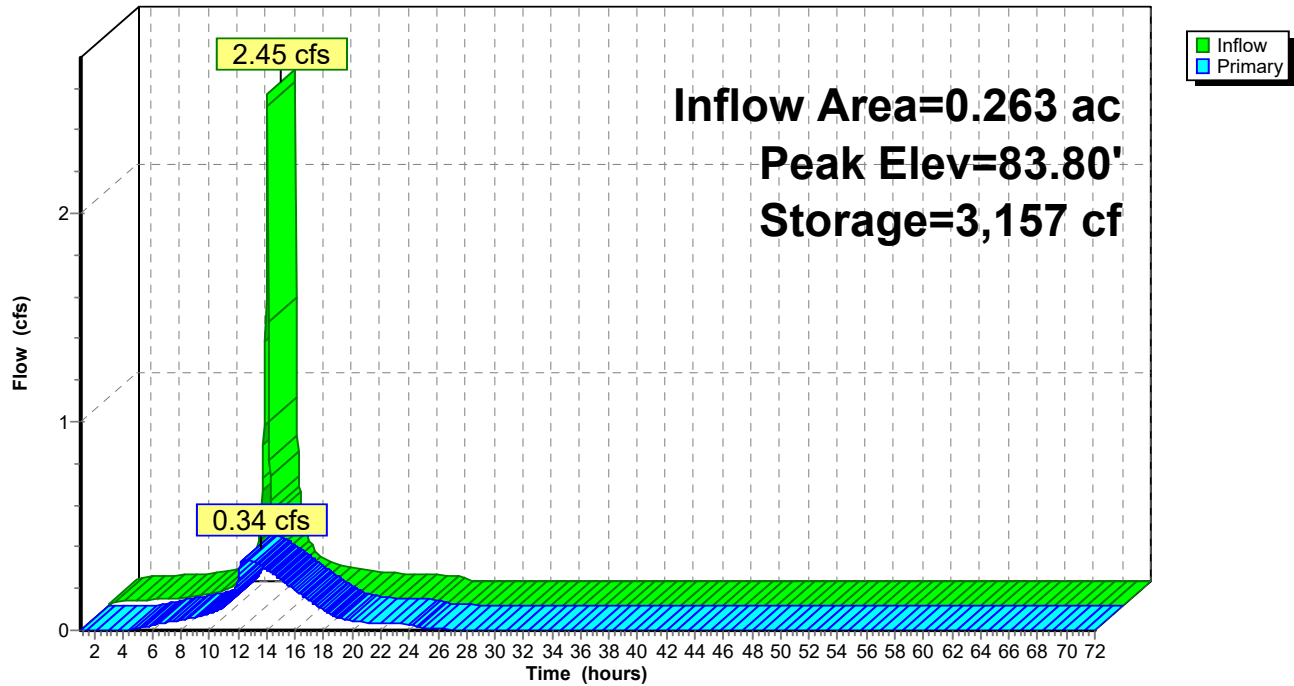
Device	Routing	Invert	Outlet Devices
#1	Primary	81.58'	15.0" Round Culvert L= 38.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 81.58' / 81.20' S= 0.0100 ' / Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	81.63'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	84.15'	0.5' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.34 cfs @ 12.57 hrs HW=83.80' (Free Discharge)

1=Culvert (Passes 0.34 cfs of 8.43 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.34 cfs @ 6.88 fps)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P: Porous Concrete

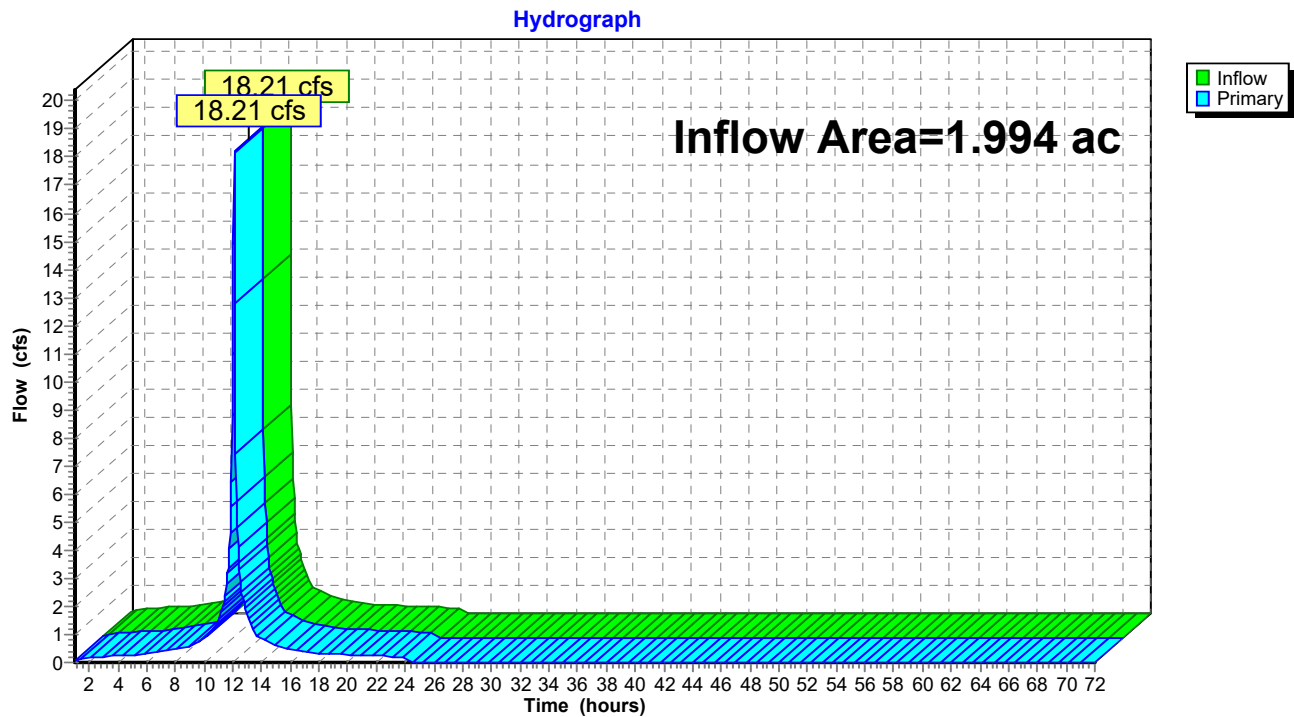
Hydrograph



Summary for Link EDA 1: Existing Drainage Area 1

Inflow Area = 1.994 ac, 100.00% Impervious, Inflow Depth > 8.73" for 100-Year-2020 event
Inflow = 18.21 cfs @ 12.09 hrs, Volume= 1.450 af
Primary = 18.21 cfs @ 12.09 hrs, Volume= 1.450 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

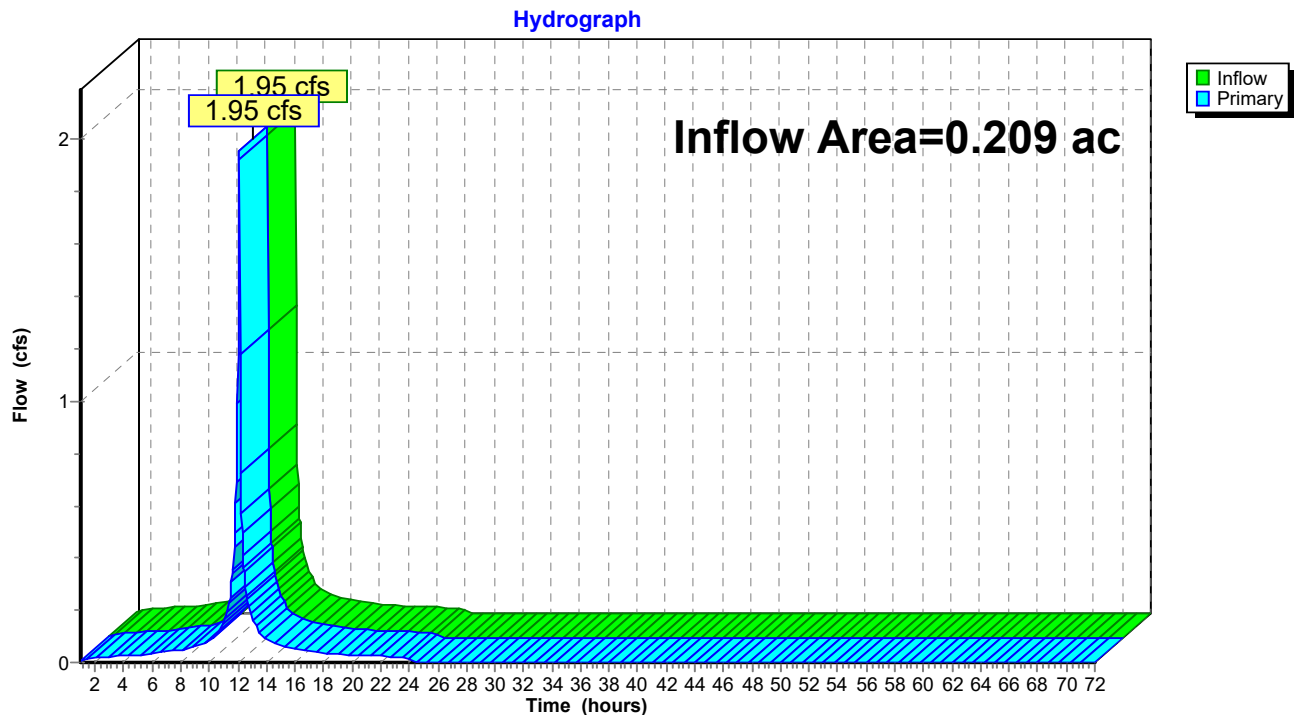
Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 1: Existing Drainage Area 1

Summary for Link EDA 2: Existing Drainage Area 2

Inflow Area = 0.209 ac, 100.00% Impervious, Inflow Depth > 8.73" for 100-Year-2020 event
Inflow = 1.95 cfs @ 12.09 hrs, Volume= 0.152 af
Primary = 1.95 cfs @ 12.09 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 2: Existing Drainage Area 2

EX - PR

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

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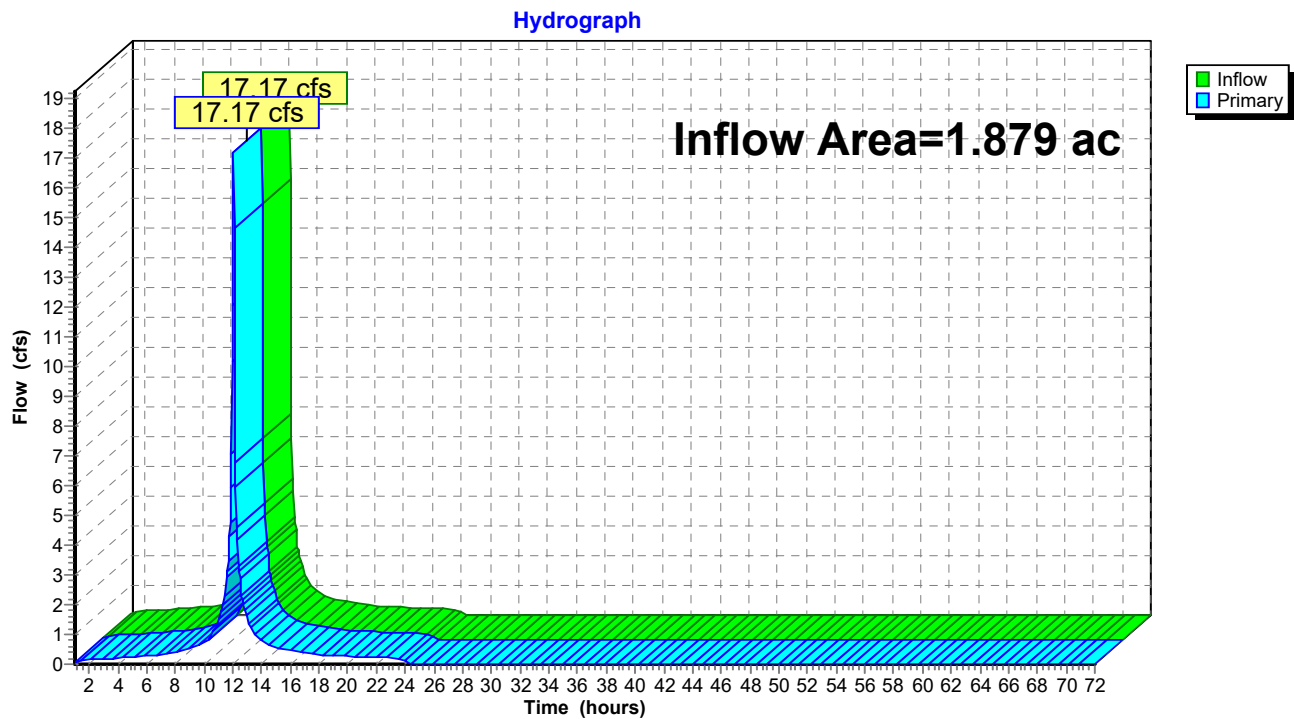
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Summary for Link PDA 1: Proposed Drainage Area 1

Inflow Area = 1.879 ac, 92.12% Impervious, Inflow Depth > 8.56" for 100-Year-2020 event
Inflow = 17.17 cfs @ 12.06 hrs, Volume= 1.340 af
Primary = 17.17 cfs @ 12.06 hrs, Volume= 1.340 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 1: Proposed Drainage Area 1

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

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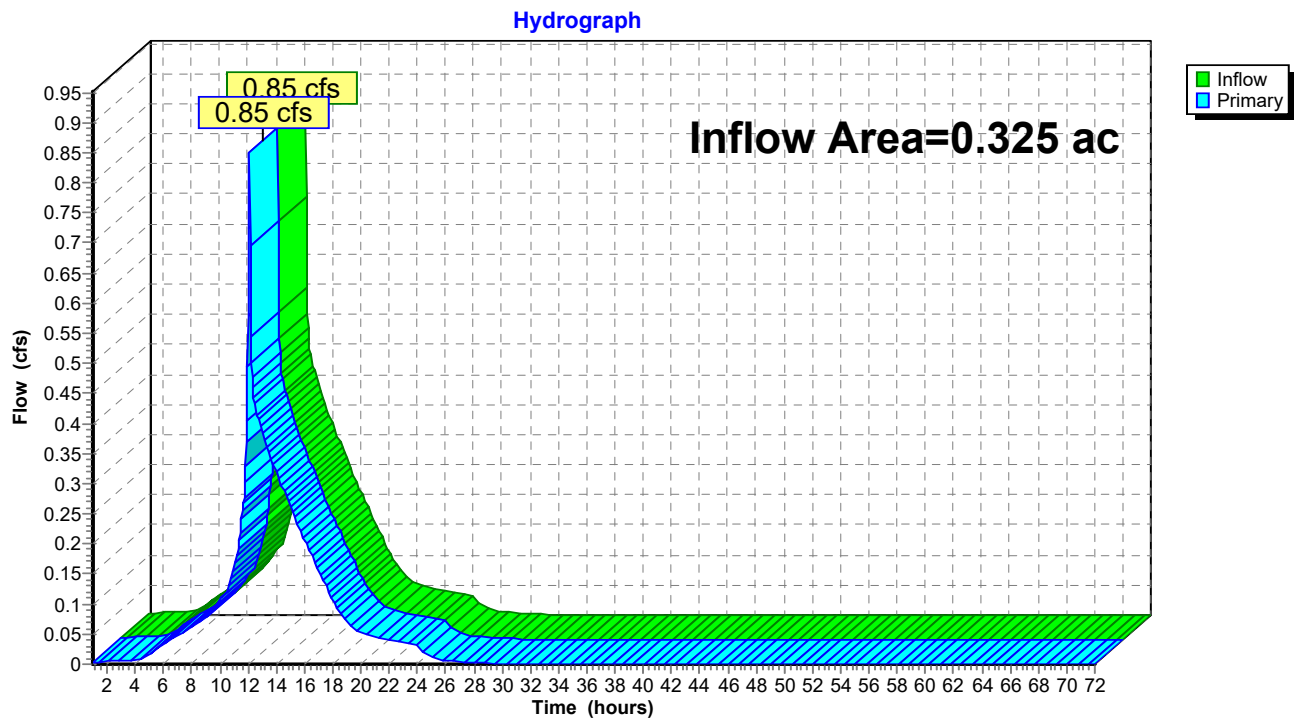
Page 61

Summary for Link PDA 2: Proposed Drainage Area 2

Inflow Area = 0.325 ac, 91.69% Impervious, Inflow Depth > 8.32" for 100-Year-2020 event
Inflow = 0.85 cfs @ 12.10 hrs, Volume= 0.225 af
Primary = 0.85 cfs @ 12.10 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

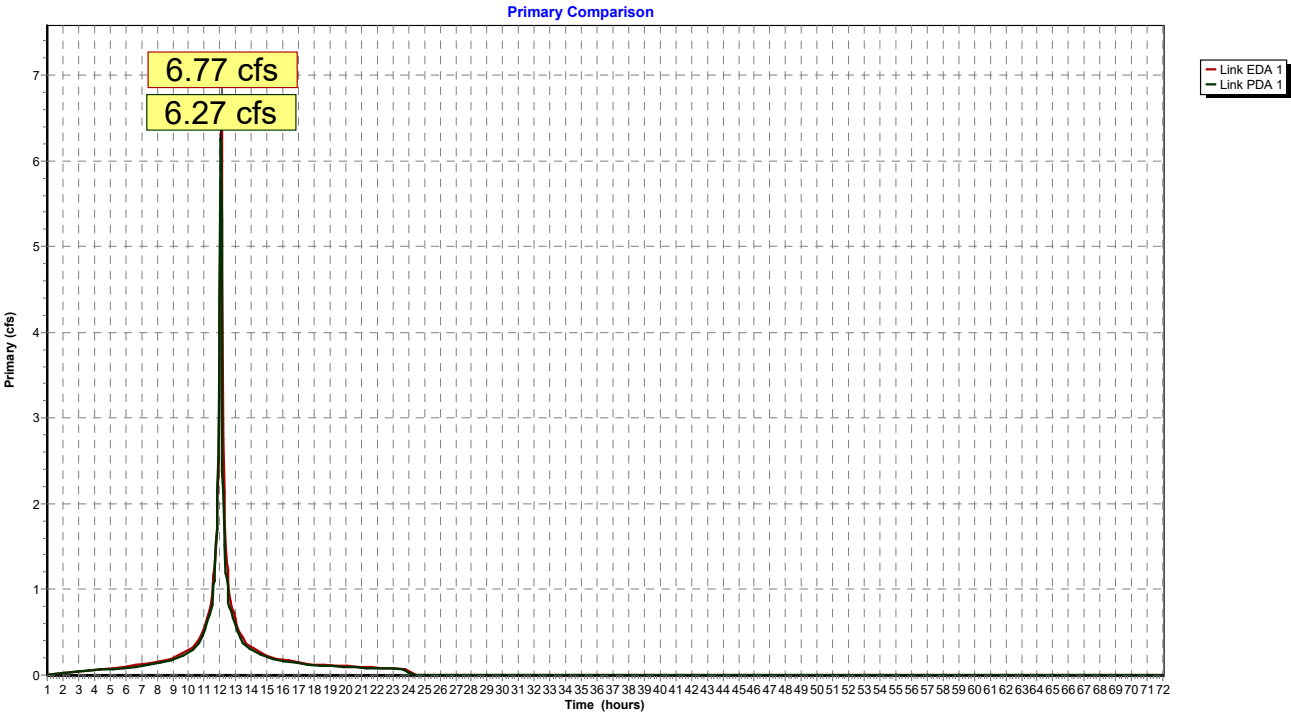
Link PDA 2: Proposed Drainage Area 2



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

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Primary Comparison

Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)
1.00	0.00	0.00	27.00	0.00	0.00	53.00	0.00	0.00
1.50	0.01	0.01	27.50	0.00	0.00	53.50	0.00	0.00
2.00	0.03	0.02	28.00	0.00	0.00	54.00	0.00	0.00
2.50	0.04	0.03	28.50	0.00	0.00	54.50	0.00	0.00
3.00	0.05	0.04	29.00	0.00	0.00	55.00	0.00	0.00
3.50	0.06	0.05	29.50	0.00	0.00	55.50	0.00	0.00
4.00	0.07	0.06	30.00	0.00	0.00	56.00	0.00	0.00
4.50	0.07	0.06	30.50	0.00	0.00	56.50	0.00	0.00
5.00	0.08	0.07	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.09	0.08	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.09	0.08	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.11	0.10	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.13	0.11	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.14	0.12	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.16	0.14	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.17	0.15	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.19	0.17	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.24	0.22	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.30	0.26	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.35	0.32	36.50	0.00	0.00	62.50	0.00	0.00
11.00	0.54	0.50	37.00	0.00	0.00	63.00	0.00	0.00
11.50	0.88	0.86	37.50	0.00	0.00	63.50	0.00	0.00
12.00	4.08	4.38	38.00	0.00	0.00	64.00	0.00	0.00
12.50	1.22	1.05	38.50	0.00	0.00	64.50	0.00	0.00
13.00	0.64	0.57	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.41	0.37	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.33	0.30	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.27	0.25	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.22	0.20	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.20	0.18	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.18	0.17	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.17	0.15	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.15	0.14	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.14	0.13	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.12	0.11	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.11	0.11	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.11	0.10	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.11	0.10	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.10	0.10	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.10	0.09	46.50	0.00	0.00			
21.00	0.10	0.09	47.00	0.00	0.00			
21.50	0.09	0.09	47.50	0.00	0.00			
22.00	0.09	0.08	48.00	0.00	0.00			
22.50	0.09	0.08	48.50	0.00	0.00			
23.00	0.08	0.08	49.00	0.00	0.00			
23.50	0.08	0.07	49.50	0.00	0.00			
24.00	0.07	0.05	50.00	0.00	0.00			
24.50	0.00	0.00	50.50	0.00	0.00			
25.00	0.00	0.00	51.00	0.00	0.00			
25.50	0.00	0.00	51.50	0.00	0.00			
26.00	0.00	0.00	52.00	0.00	0.00			
26.50	0.00	0.00	52.50	0.00	0.00			

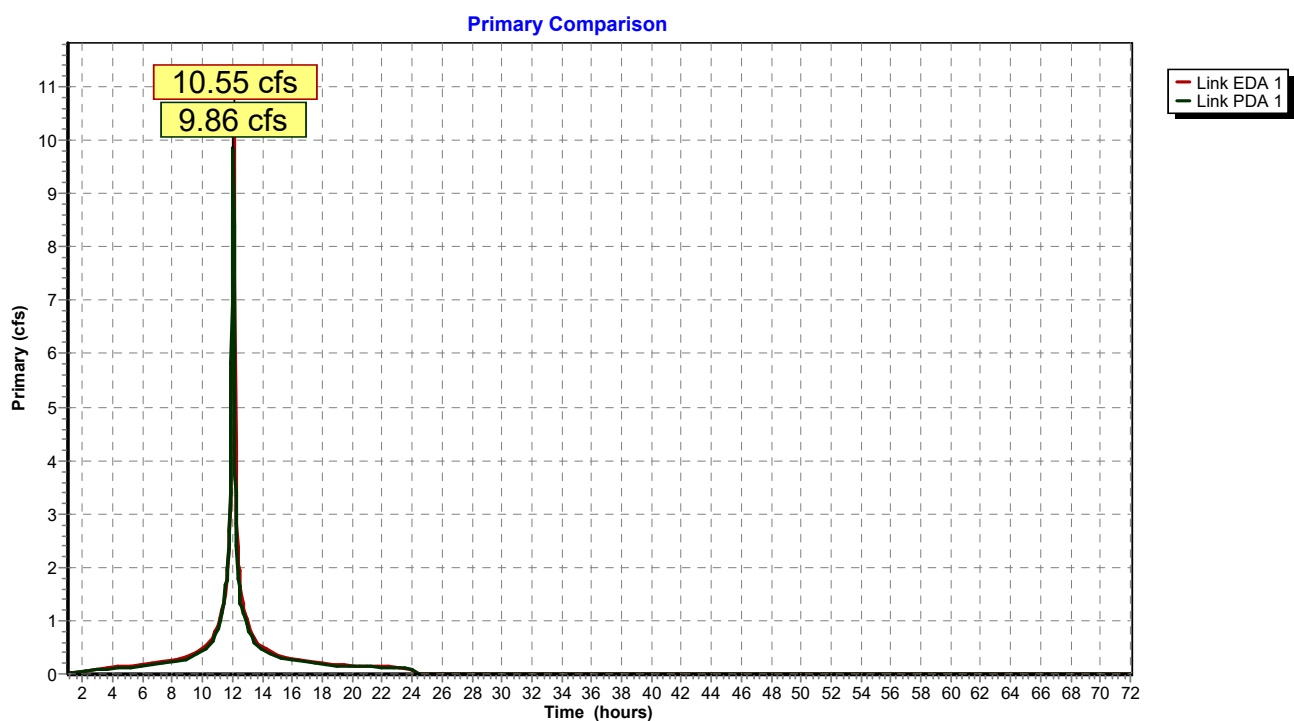
EX - PR

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

Printed 11/3/2025



EX - PR

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

Prepared by Bohler Engineering, PC

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Primary Comparison

Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)
1.00	0.02	0.02	27.00	0.00	0.00	53.00	0.00	0.00
1.50	0.04	0.04	27.50	0.00	0.00	53.50	0.00	0.00
2.00	0.07	0.06	28.00	0.00	0.00	54.00	0.00	0.00
2.50	0.08	0.07	28.50	0.00	0.00	54.50	0.00	0.00
3.00	0.10	0.09	29.00	0.00	0.00	55.00	0.00	0.00
3.50	0.11	0.10	29.50	0.00	0.00	55.50	0.00	0.00
4.00	0.12	0.11	30.00	0.00	0.00	56.00	0.00	0.00
4.50	0.14	0.12	30.50	0.00	0.00	56.50	0.00	0.00
5.00	0.15	0.13	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.15	0.13	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.16	0.14	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.19	0.16	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.21	0.19	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.24	0.21	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.26	0.23	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.28	0.25	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.31	0.28	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.39	0.35	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.47	0.43	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.56	0.51	36.50	0.00	0.00	62.50	0.00	0.00
11.00	0.86	0.80	37.00	0.00	0.00	63.00	0.00	0.00
11.50	1.39	1.37	37.50	0.00	0.00	63.50	0.00	0.00
12.00	6.37	6.91	38.00	0.00	0.00	64.00	0.00	0.00
12.50	1.90	1.65	38.50	0.00	0.00	64.50	0.00	0.00
13.00	0.99	0.89	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.64	0.58	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.51	0.47	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.42	0.39	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.34	0.31	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.31	0.28	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.28	0.26	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.26	0.24	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.24	0.22	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.21	0.20	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.19	0.17	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.18	0.17	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.17	0.16	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.17	0.16	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.16	0.15	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.16	0.14	46.50	0.00	0.00			
21.00	0.15	0.14	47.00	0.00	0.00			
21.50	0.14	0.13	47.50	0.00	0.00			
22.00	0.14	0.13	48.00	0.00	0.00			
22.50	0.13	0.12	48.50	0.00	0.00			
23.00	0.13	0.12	49.00	0.00	0.00			
23.50	0.12	0.11	49.50	0.00	0.00			
24.00	0.11	0.08	50.00	0.00	0.00			
24.50	0.00	0.00	50.50	0.00	0.00			
25.00	0.00	0.00	51.00	0.00	0.00			
25.50	0.00	0.00	51.50	0.00	0.00			
26.00	0.00	0.00	52.00	0.00	0.00			
26.50	0.00	0.00	52.50	0.00	0.00			

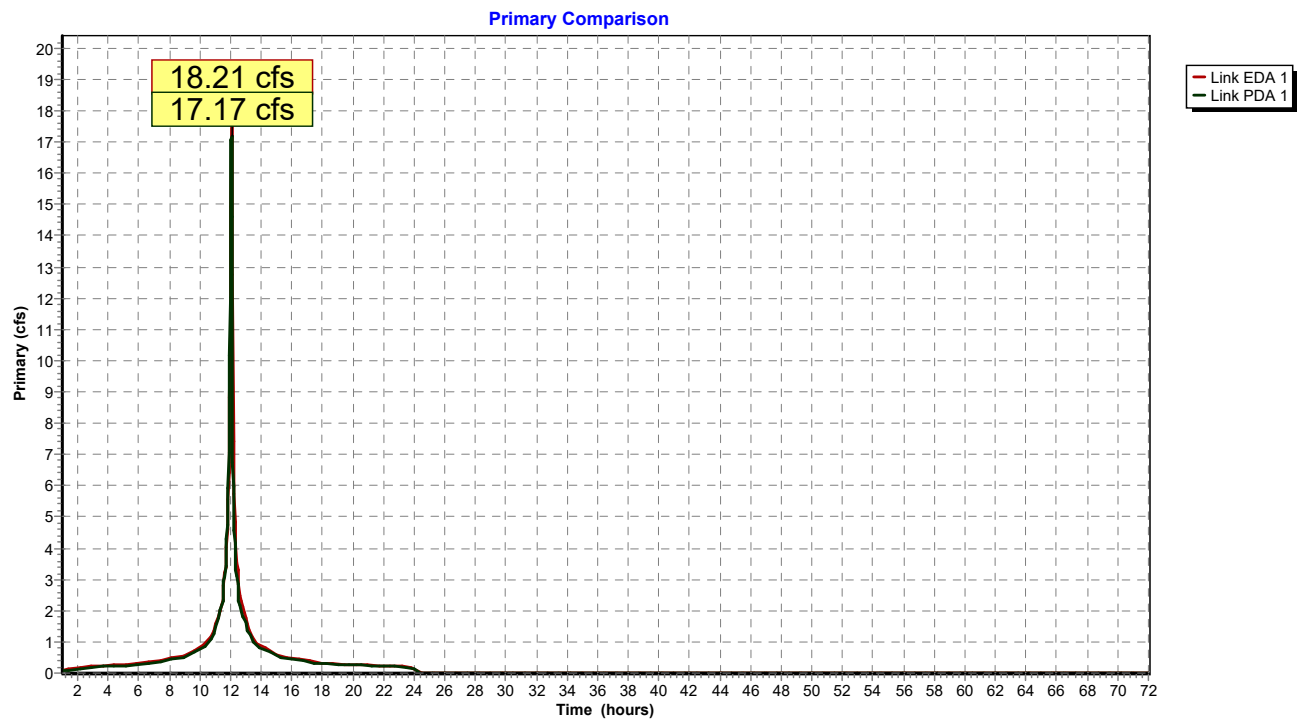
EX - PR

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

Printed 11/3/2025



EX - PR

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

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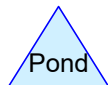
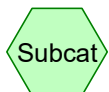
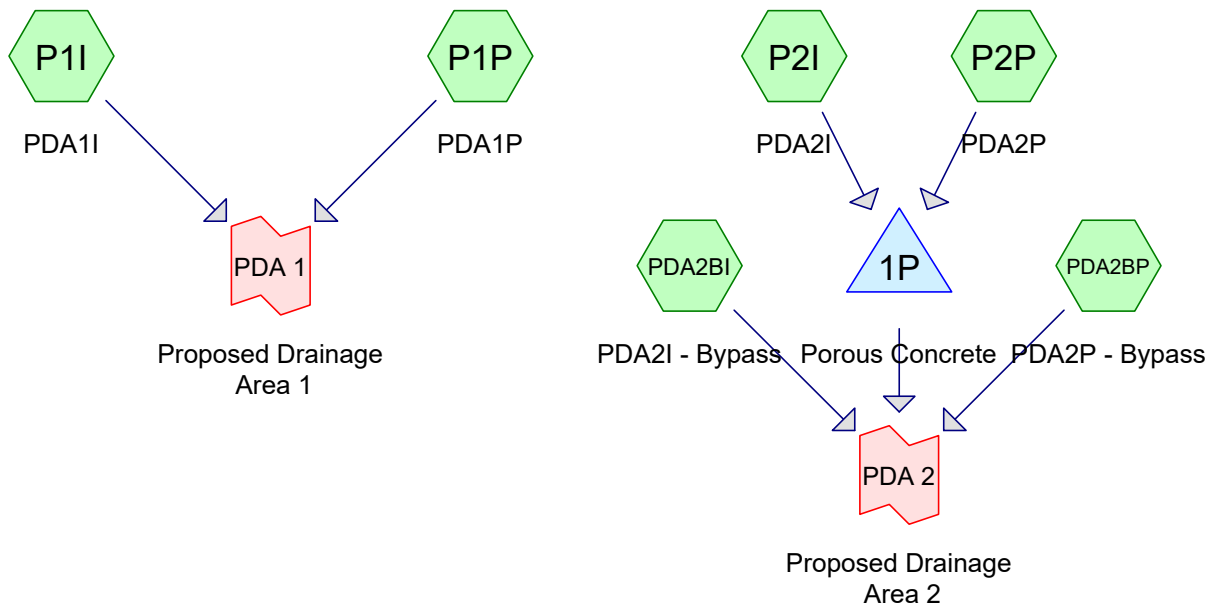
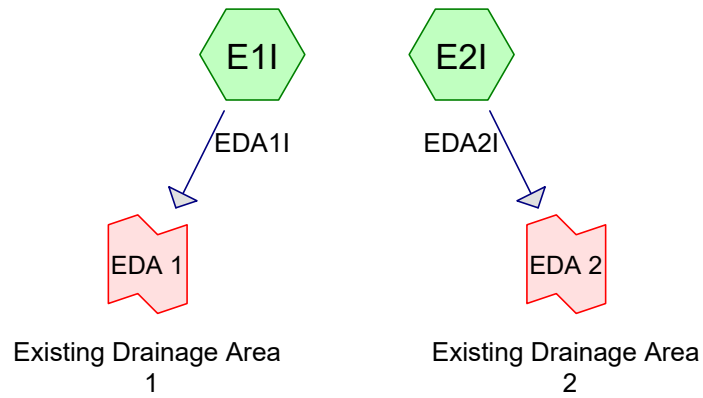
Primary Comparison

Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)
1.00	0.08	0.08	27.00	0.00	0.00	53.00	0.00	0.00
1.50	0.13	0.12	27.50	0.00	0.00	53.50	0.00	0.00
2.00	0.16	0.14	28.00	0.00	0.00	54.00	0.00	0.00
2.50	0.19	0.17	28.50	0.00	0.00	54.50	0.00	0.00
3.00	0.21	0.18	29.00	0.00	0.00	55.00	0.00	0.00
3.50	0.23	0.20	29.50	0.00	0.00	55.50	0.00	0.00
4.00	0.25	0.22	30.00	0.00	0.00	56.00	0.00	0.00
4.50	0.26	0.23	30.50	0.00	0.00	56.50	0.00	0.00
5.00	0.28	0.24	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.29	0.25	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.30	0.27	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.34	0.30	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.38	0.34	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.42	0.38	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.47	0.42	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.51	0.46	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.55	0.50	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.69	0.63	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.83	0.76	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.98	0.91	36.50	0.00	0.00	62.50	0.00	0.00
11.00	1.49	1.41	37.00	0.00	0.00	63.00	0.00	0.00
11.50	2.41	2.41	37.50	0.00	0.00	63.50	0.00	0.00
12.00	11.00	12.05	38.00	0.00	0.00	64.00	0.00	0.00
12.50	3.27	2.87	38.50	0.00	0.00	64.50	0.00	0.00
13.00	1.70	1.55	39.00	0.00	0.00	65.00	0.00	0.00
13.50	1.10	1.00	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.87	0.81	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.73	0.68	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.59	0.54	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.53	0.49	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.49	0.45	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.44	0.41	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.40	0.38	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.36	0.34	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.33	0.30	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.31	0.29	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.30	0.28	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.29	0.27	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.28	0.26	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.27	0.25	46.50	0.00	0.00			
21.00	0.26	0.24	47.00	0.00	0.00			
21.50	0.25	0.23	47.50	0.00	0.00			
22.00	0.24	0.22	48.00	0.00	0.00			
22.50	0.23	0.21	48.50	0.00	0.00			
23.00	0.22	0.20	49.00	0.00	0.00			
23.50	0.21	0.19	49.50	0.00	0.00			
24.00	0.20	0.14	50.00	0.00	0.00			
24.50	0.00	0.00	50.50	0.00	0.00			
25.00	0.00	0.00	51.00	0.00	0.00			
25.50	0.00	0.00	51.50	0.00	0.00			
26.00	0.00	0.00	52.00	0.00	0.00			
26.50	0.00	0.00	52.50	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

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

Prepared by Bohler Engineering, PC

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Page 2

Time span=1.00-72.00 hrs, dt=0.05 hrs, 1421 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1I: EDA1I	Runoff Area=1.994 ac 100.00% Impervious Runoff Depth>3.78" Flow Length=746' Tc=3.4 min CN=98 Runoff=8.11 cfs 0.627 af
SubcatchmentE2I: EDA2I	Runoff Area=0.209 ac 100.00% Impervious Runoff Depth>3.78" Flow Length=455' Tc=2.9 min CN=98 Runoff=0.87 cfs 0.066 af
SubcatchmentP1I: PDA1I	Runoff Area=1.731 ac 100.00% Impervious Runoff Depth>3.78" Flow Length=256' Tc=0.8 min CN=98 Runoff=7.27 cfs 0.545 af
SubcatchmentP1P: PDA1P	Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=2.05" Flow Length=420' Tc=5.5 min CN=80 Runoff=0.35 cfs 0.025 af
SubcatchmentP2I: PDA2I	Runoff Area=0.243 ac 100.00% Impervious Runoff Depth>3.78" Flow Length=336' Tc=2.6 min CN=98 Runoff=1.02 cfs 0.076 af
SubcatchmentP2P: PDA2P	Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=2.05" Flow Length=9' Slope=0.0180 '/' Tc=1.3 min CN=80 Runoff=0.05 cfs 0.003 af
SubcatchmentPDA2BI: PDA2I - Bypass	Runoff Area=0.055 ac 100.00% Impervious Runoff Depth>3.78" Flow Length=474' Tc=3.3 min CN=98 Runoff=0.22 cfs 0.017 af
SubcatchmentPDA2BP: PDA2P - Bypass	Runoff Area=0.007 ac 0.00% Impervious Runoff Depth=2.05" Flow Length=324' Tc=3.2 min CN=80 Runoff=0.02 cfs 0.001 af
Pond 1P: Porous Concrete	Peak Elev=82.48' Storage=1,396 cf Inflow=1.07 cfs 0.080 af Outflow=0.20 cfs 0.074 af
Link EDA 1: Existing Drainage Area 1	Inflow=8.11 cfs 0.627 af Primary=8.11 cfs 0.627 af
Link EDA 2: Existing Drainage Area 2	Inflow=0.87 cfs 0.066 af Primary=0.87 cfs 0.066 af
Link PDA 1: Proposed Drainage Area 1	Inflow=7.52 cfs 0.570 af Primary=7.52 cfs 0.570 af
Link PDA 2: Proposed Drainage Area 2	Inflow=0.42 cfs 0.092 af Primary=0.42 cfs 0.092 af

Total Runoff Area = 4.407 ac Runoff Volume = 1.361 af Average Runoff Depth = 3.71"
3.97% Pervious = 0.175 ac 96.03% Impervious = 4.232 ac

EX - PR

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

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Page 3

Summary for Subcatchment E1I: EDA1I

Runoff = 8.11 cfs @ 12.09 hrs, Volume= 0.627 af, Depth> 3.78"

Routed to Link EDA 1 : Existing Drainage Area 1

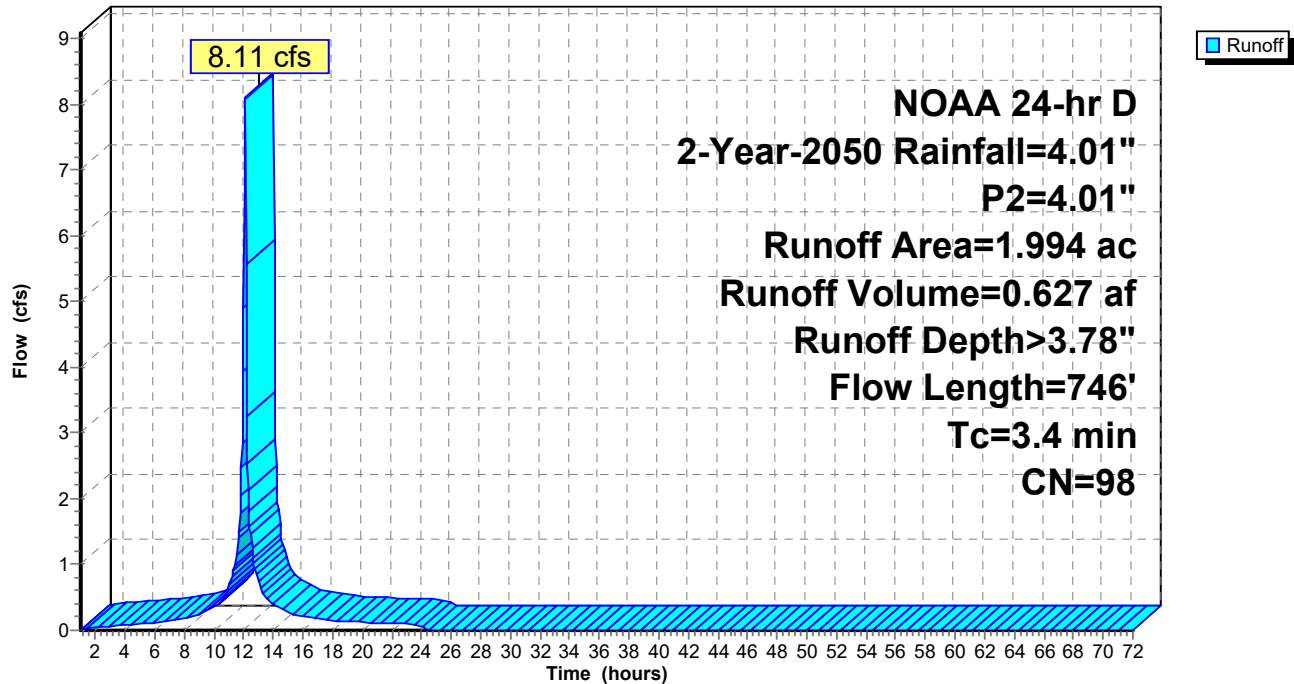
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
1.994	98	Paved parking, HSG D
1.994		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0375	1.98		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
1.0	292	0.0530	4.67		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.2	45	0.0230	3.08		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
3.4	746	Total			

Subcatchment E1I: EDA1I

Hydrograph



EX - PR

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

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Page 5

Summary for Subcatchment E2I: EDA2I

Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.066 af, Depth> 3.78"
 Routed to Link EDA 2 : Existing Drainage Area 2

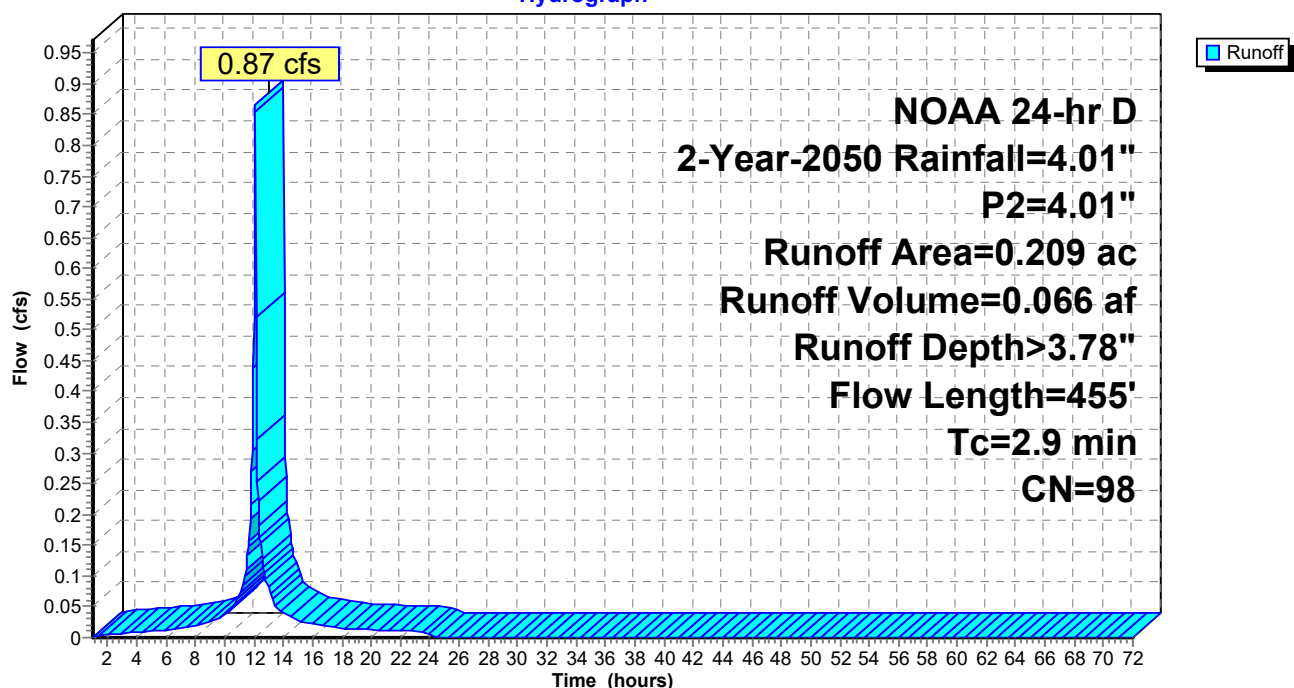
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.209	98	Paved parking, HSG D
0.209		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	24	0.0280	1.32		Sheet Flow, G-H Smooth surfaces n= 0.011 P2= 4.01"
1.9	299	0.0162	2.58		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.1	31	0.0260	4.98	8.81	Pipe Channel, I-J 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
0.6	101	0.0100	2.74	3.36	Pipe Channel, J-K 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.9	455	Total			

Subcatchment E2I: EDA2I

Hydrograph



EX - PR

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

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Page 6

Summary for Subcatchment P1I: PDA1I

Runoff = 7.27 cfs @ 12.06 hrs, Volume= 0.545 af, Depth> 3.78"

Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
1.731	98	Paved parking, HSG D
1.731		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0150	0.75		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
0.3	19	0.0060	1.25		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	28	0.0340	3.74		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.1	56	0.0200	7.58	5.95	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	64	0.0880	15.90	12.49	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	84	0.0600	13.13	10.31	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.8	256	Total			

EX - PR

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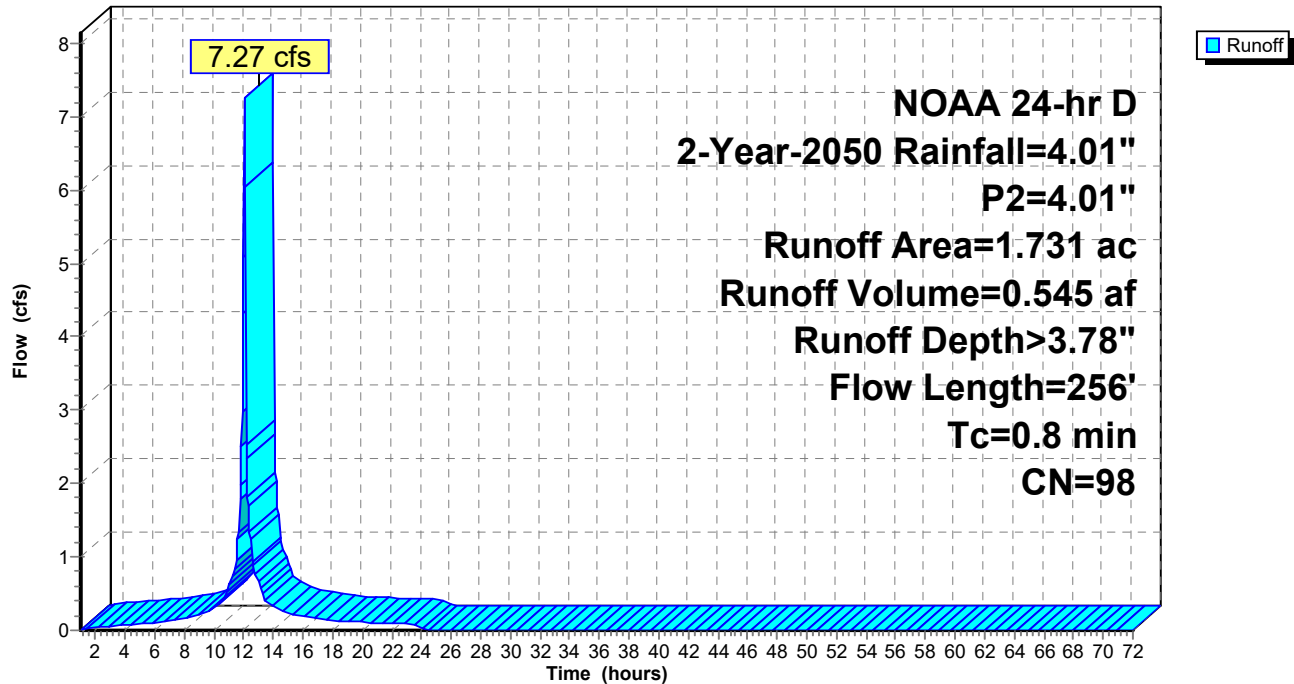
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Page 7

Subcatchment P1I: PDA1I

Hydrograph



EX - PR

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

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Page 8

Summary for Subcatchment P1P: PDA1P

Runoff = 0.35 cfs @ 12.13 hrs, Volume= 0.025 af, Depth= 2.05"
 Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.148	80	>75% Grass cover, Good, HSG D
0.148		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	80	0.0875	0.33		Sheet Flow, H-I Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.1300	5.80		Shallow Concentrated Flow, I-J Unpaved Kv= 16.1 fps
0.0	7	0.0340	2.97		Shallow Concentrated Flow, J-K Unpaved Kv= 16.1 fps
0.0	8	0.0425	3.32		Shallow Concentrated Flow, K-L Unpaved Kv= 16.1 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, L-M 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, N-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
5.5	420	Total			

EX - PR

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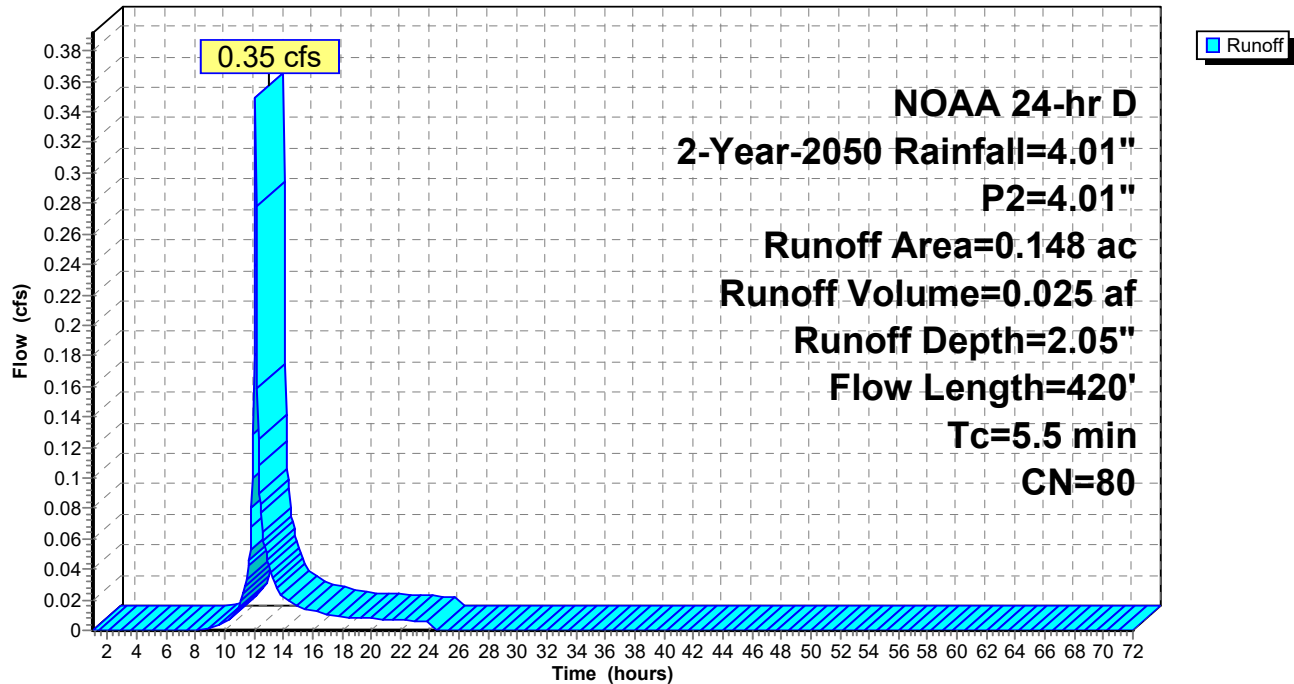
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Subcatchment P1P: PDA1P

Hydrograph



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Summary for Subcatchment P2I: PDA2I

Runoff = 1.02 cfs @ 12.08 hrs, Volume= 0.076 af, Depth> 3.78"
Routed to Pond 1P : Porous Concrete

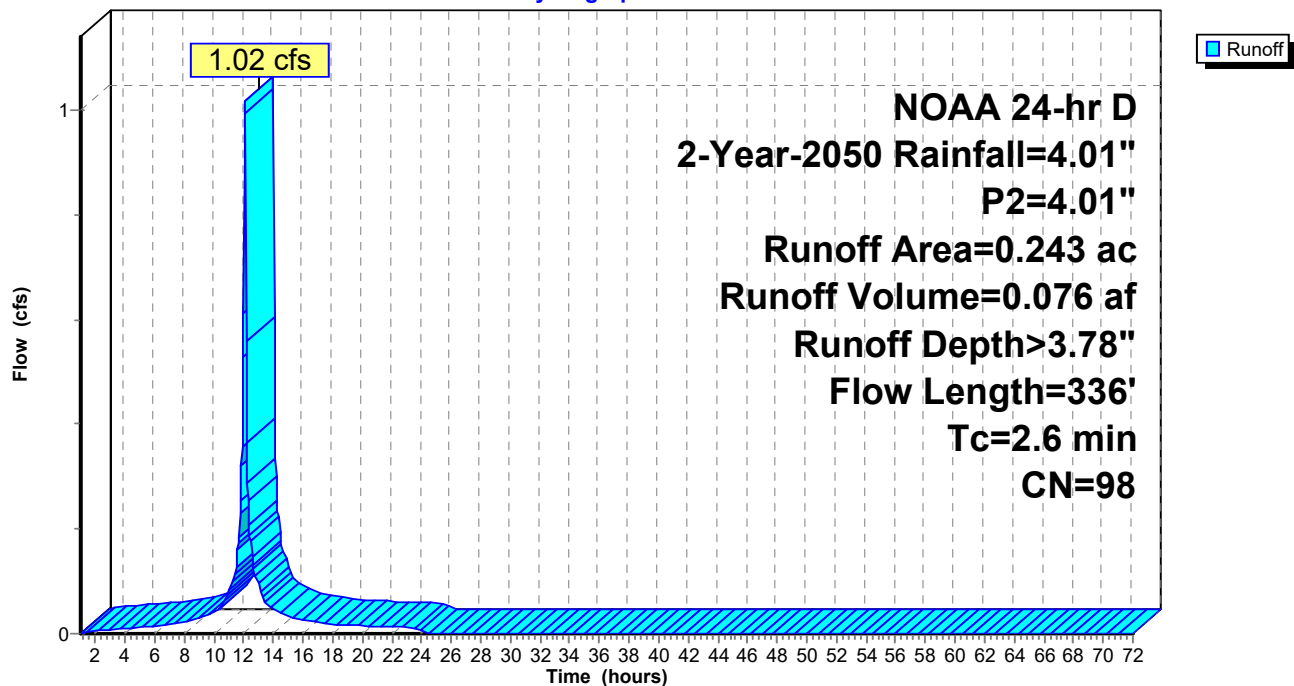
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG D
0.243		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	49	0.0190	1.31		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
2.6	336	Total			

Subcatchment P2I: PDA2I

Hydrograph



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Summary for Subcatchment P2P: PDA2P

Runoff = 0.05 cfs @ 12.07 hrs, Volume= 0.003 af, Depth= 2.05"
Routed to Pond 1P : Porous Concrete

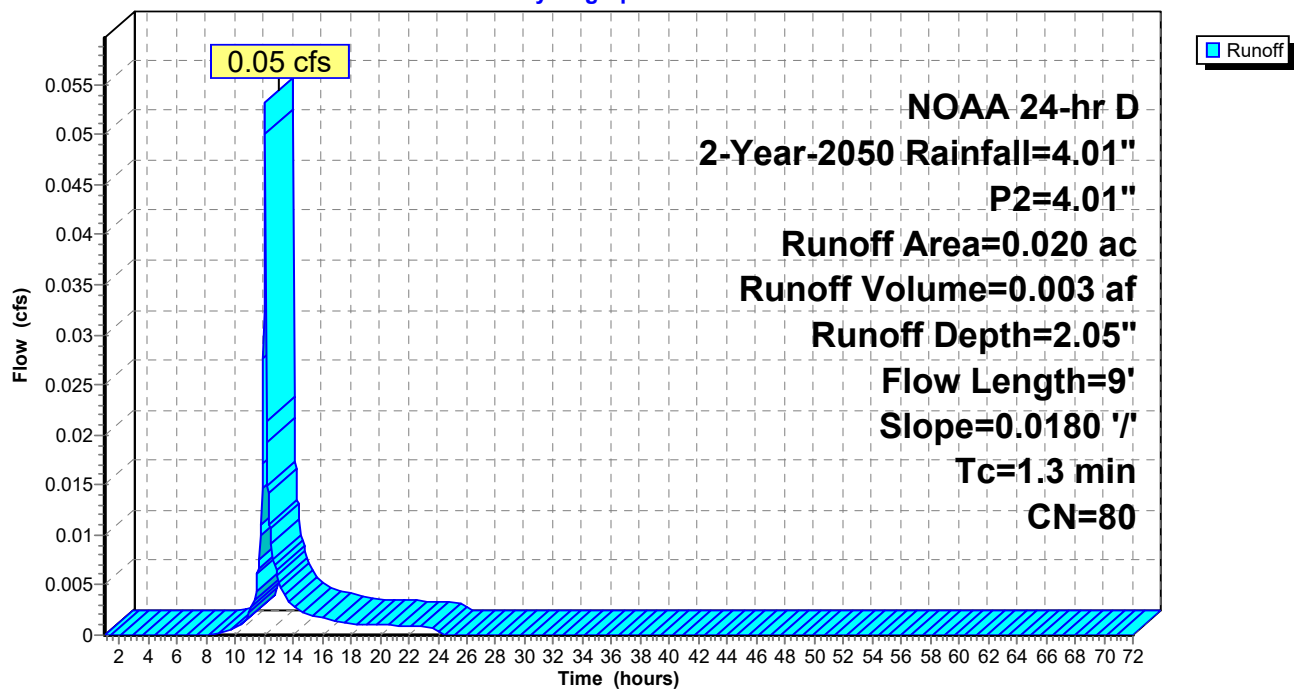
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.020	80	>75% Grass cover, Good, HSG D
0.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	9	0.0180	0.11		Sheet Flow, H-I Grass: Short n= 0.150 P2= 4.01"

Subcatchment P2P: PDA2P

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 PDA2BI: PDA2I - Bypass

Runoff = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 3.78"

Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.055	98	Paved parking, HSG D
0.055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	49	0.0190	1.31		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.3	474	Total			

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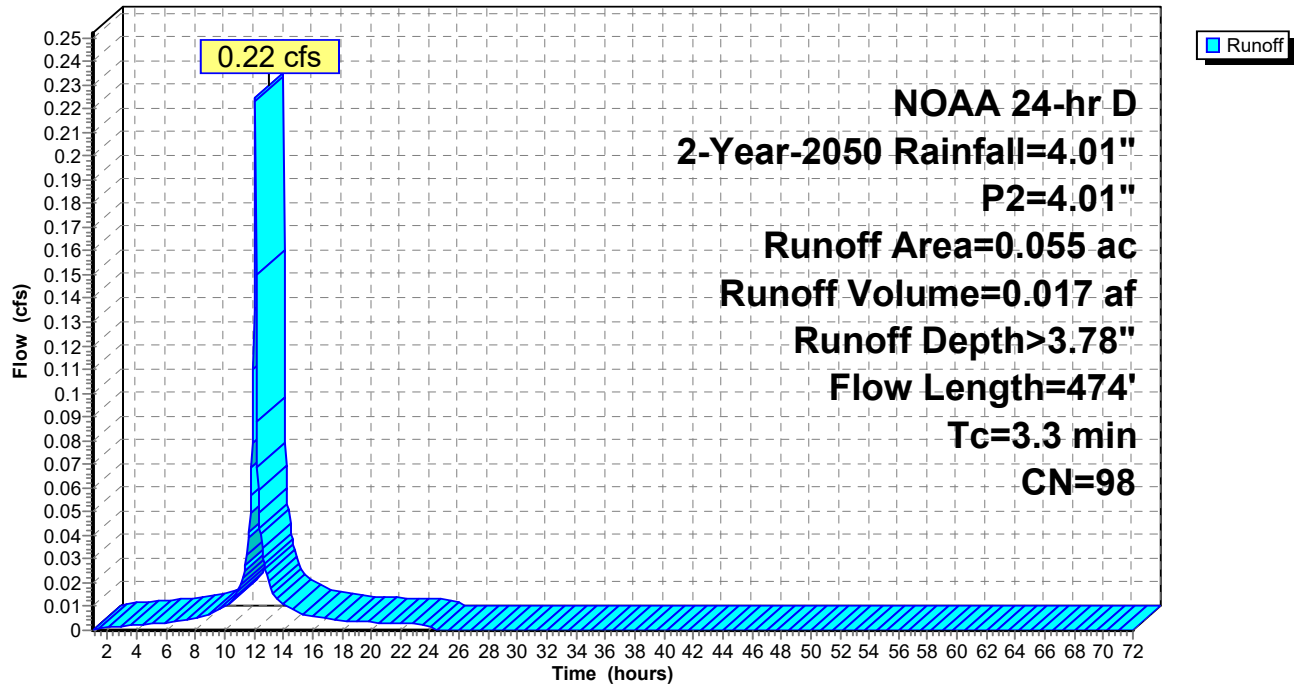
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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Subcatchment PDA2BI: PDA2I - Bypass

Hydrograph



EX - PR

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

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Summary for Subcatchment PDA2BP: PDA2P - Bypass

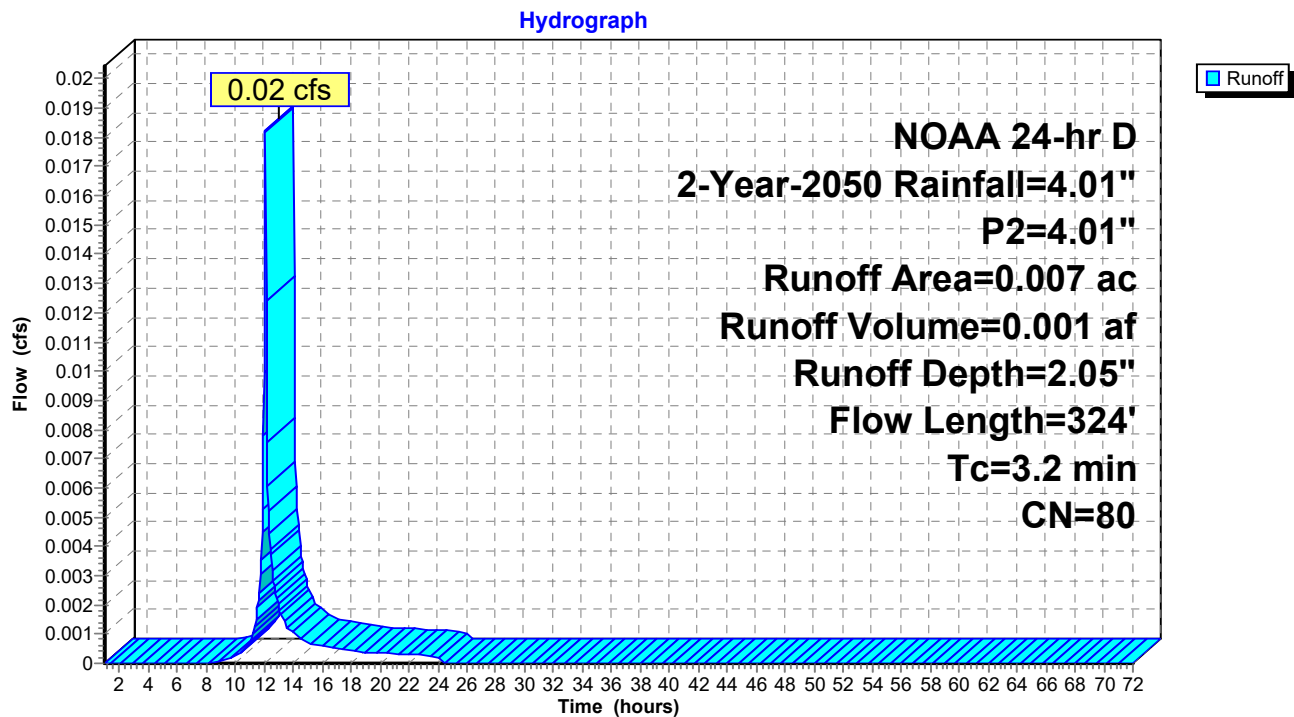
Runoff = 0.02 cfs @ 12.09 hrs, Volume= 0.001 af, Depth= 2.05"

Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

Area (ac)	CN	Description
0.007	80	>75% Grass cover, Good, HSG D
0.007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	9	0.0180	0.11		Sheet Flow, H-I
					Grass: Short n= 0.150 P2= 4.01"
0.1	18	0.0180	2.72		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.2	26	0.0150	2.49		Shallow Concentrated Flow, J-C
					Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D
					Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E
					Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
3.2	324	Total			

Subcatchment PDA2BP: PDA2P - Bypass

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

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Summary for Pond 1P: Porous Concrete

Inflow Area = 0.263 ac, 92.40% Impervious, Inflow Depth > 3.64" for 2-Year-2050 event
 Inflow = 1.07 cfs @ 12.08 hrs, Volume= 0.080 af
 Outflow = 0.20 cfs @ 12.40 hrs, Volume= 0.074 af, Atten= 81%, Lag= 19.1 min
 Primary = 0.20 cfs @ 12.40 hrs, Volume= 0.074 af
 Routed to Link PDA 2 : Proposed Drainage Area 2

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 82.48' @ 12.40 hrs Surf.Area= 3,335 sf Storage= 1,396 cf

Plug-Flow detention time= 172.5 min calculated for 0.074 af (92% of inflow)
 Center-of-Mass det. time= 128.7 min (882.8 - 754.1)

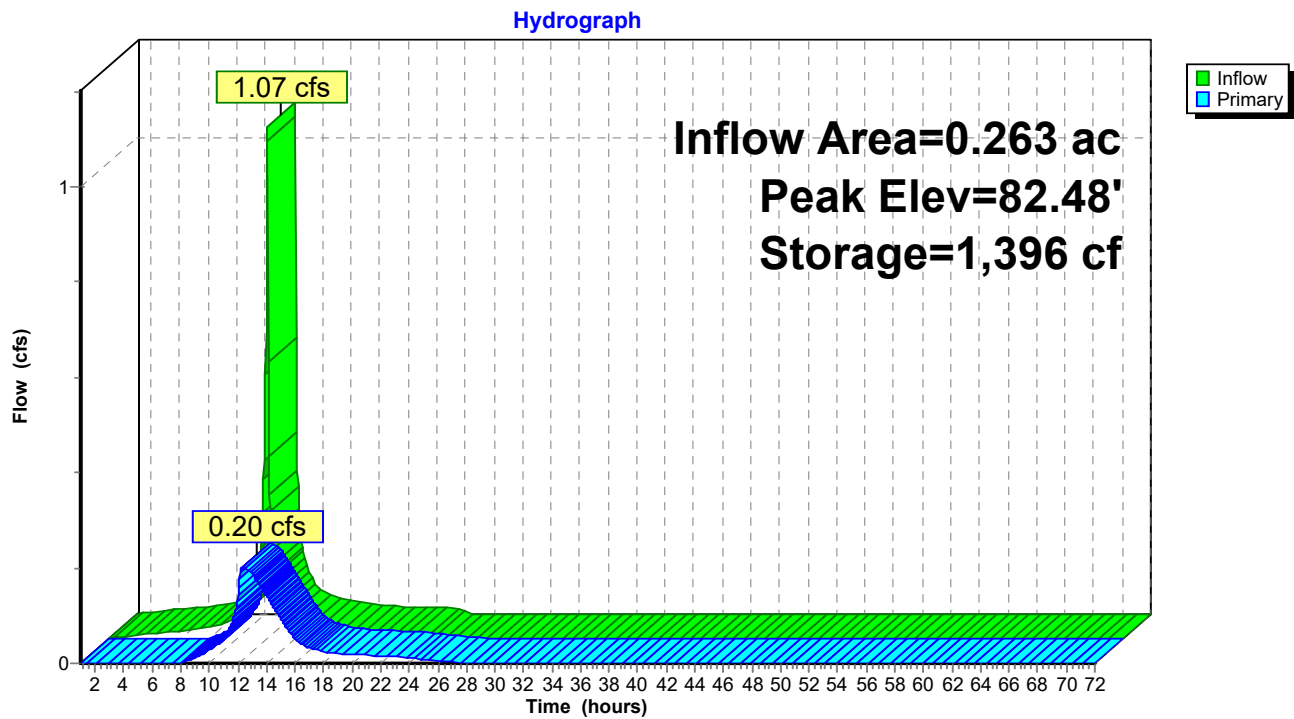
Volume	Invert	Avail.Storage	Storage Description
#1	81.43'	5,963 cf	Porous Paving Storage Area (Prismatic) , listed below (Recalc) 14,907 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.43	3,335	0	0
85.90	3,335	14,907	14,907

Device	Routing	Invert	Outlet Devices
#1	Primary	81.58'	15.0" Round Culvert L= 38.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 81.58' / 81.20' S= 0.0100 ' / Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	81.63'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	84.15'	0.5' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.20 cfs @ 12.40 hrs HW=82.48' (Free Discharge)

1=Culvert (Passes 0.20 cfs of 3.13 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.20 cfs @ 4.09 fps)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P: Porous Concrete

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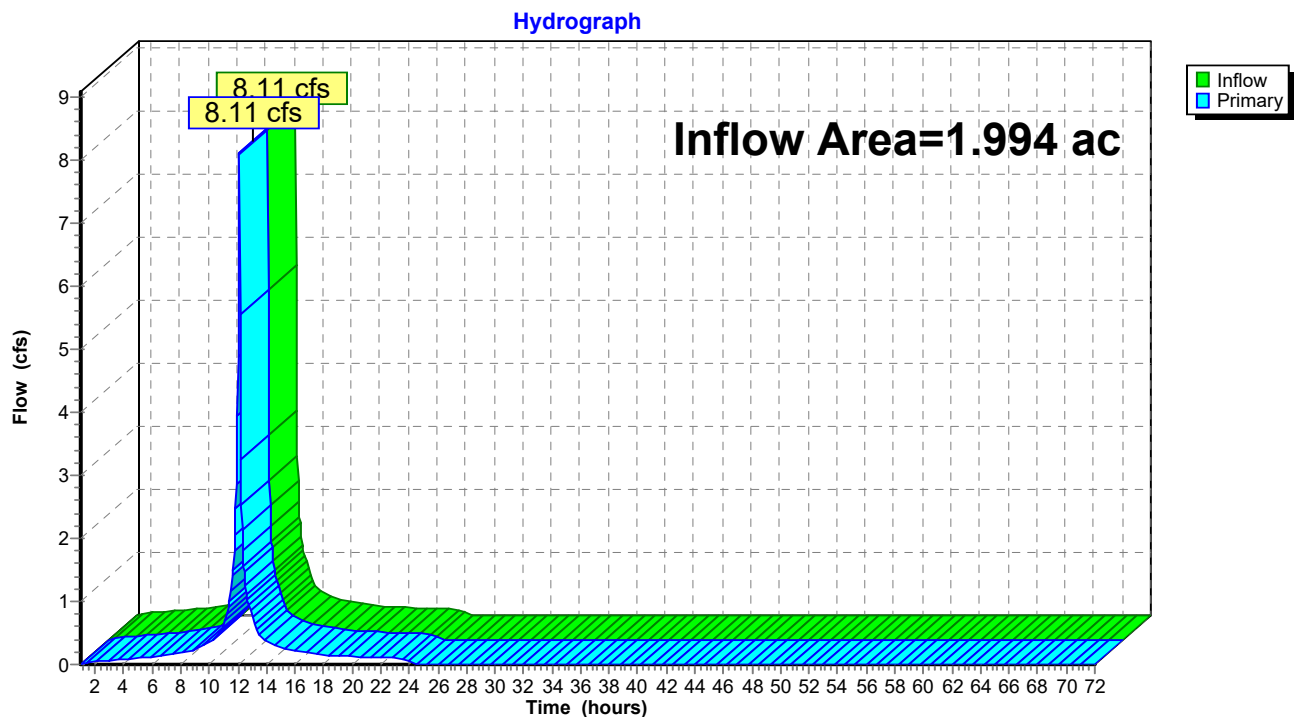
Page 18

Summary for Link EDA 1: Existing Drainage Area 1

Inflow Area = 1.994 ac, 100.00% Impervious, Inflow Depth > 3.78" for 2-Year-2050 event
Inflow = 8.11 cfs @ 12.09 hrs, Volume= 0.627 af
Primary = 8.11 cfs @ 12.09 hrs, Volume= 0.627 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 1: Existing Drainage Area 1



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

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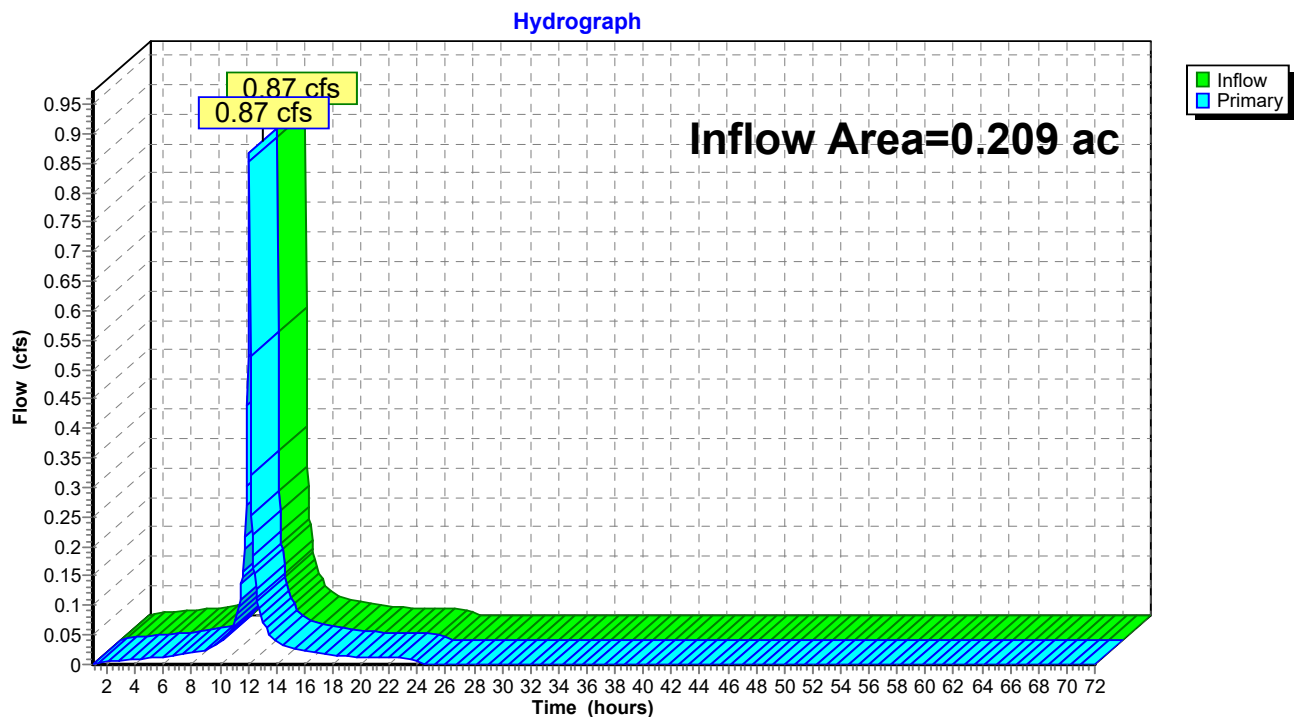
Page 19

Summary for Link EDA 2: Existing Drainage Area 2

Inflow Area = 0.209 ac, 100.00% Impervious, Inflow Depth > 3.78" for 2-Year-2050 event
Inflow = 0.87 cfs @ 12.09 hrs, Volume= 0.066 af
Primary = 0.87 cfs @ 12.09 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 2: Existing Drainage Area 2



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

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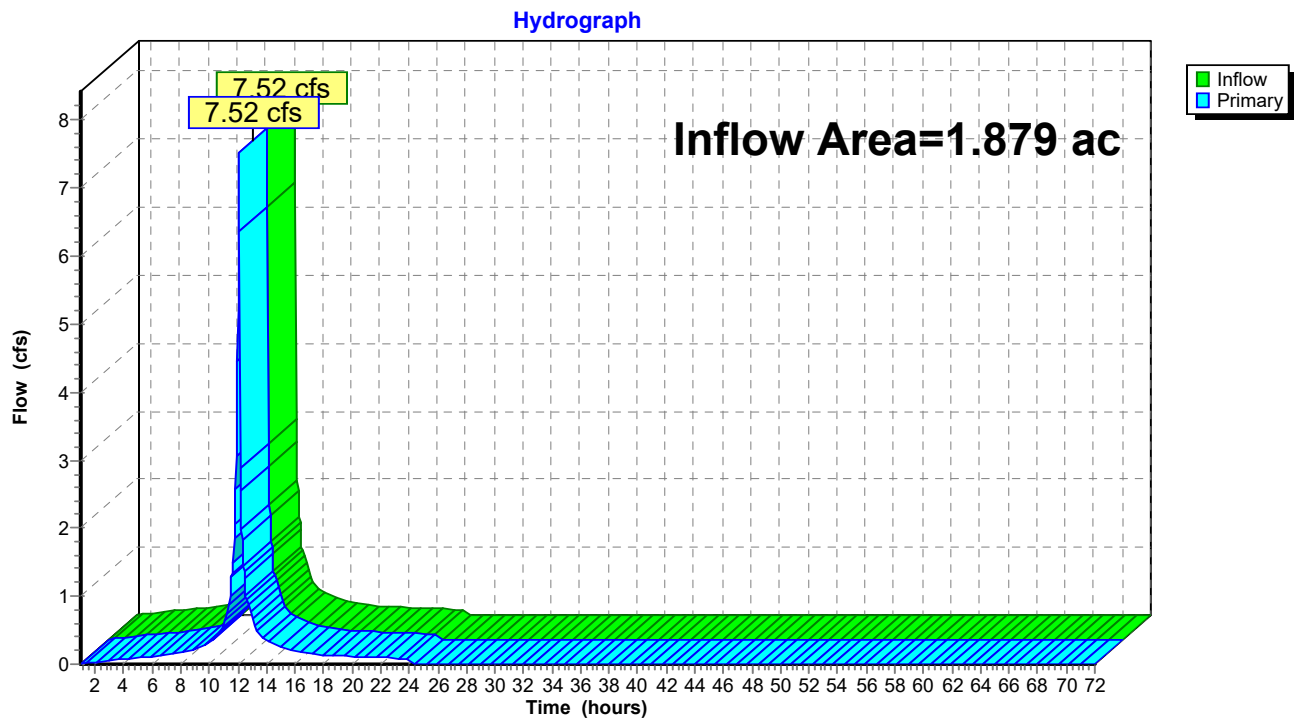
Page 20

Summary for Link PDA 1: Proposed Drainage Area 1

Inflow Area = 1.879 ac, 92.12% Impervious, Inflow Depth > 3.64" for 2-Year-2050 event
Inflow = 7.52 cfs @ 12.06 hrs, Volume= 0.570 af
Primary = 7.52 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 1: Proposed Drainage Area 1



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

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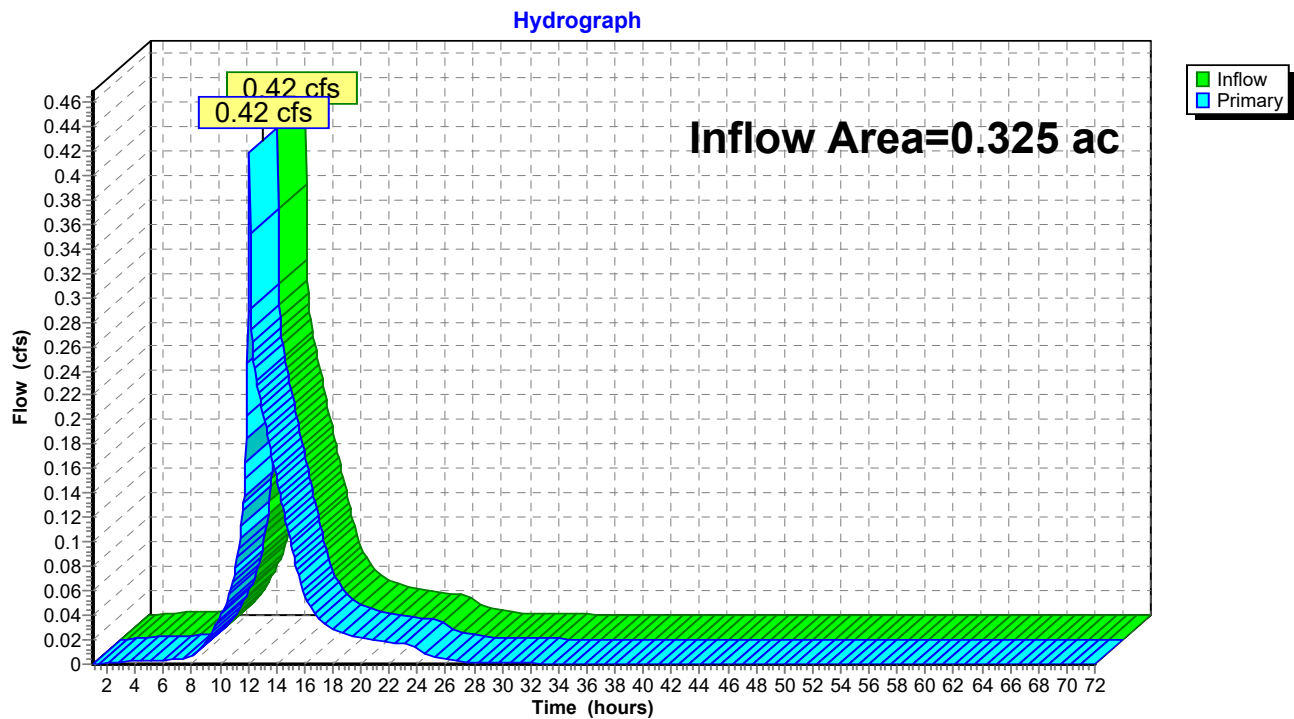
Page 21

Summary for Link PDA 2: Proposed Drainage Area 2

Inflow Area = 0.325 ac, 91.69% Impervious, Inflow Depth > 3.41" for 2-Year-2050 event
Inflow = 0.42 cfs @ 12.10 hrs, Volume= 0.092 af
Primary = 0.42 cfs @ 12.10 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 2: Proposed Drainage Area 2



EX - PR

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

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Time span=1.00-72.00 hrs, dt=0.05 hrs, 1421 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1I: EDA1I	Runoff Area=1.994 ac 100.00% Impervious Runoff Depth>6.00" Flow Length=746' Tc=3.4 min CN=98 Runoff=12.68 cfs 0.997 af
SubcatchmentE2I: EDA2I	Runoff Area=0.209 ac 100.00% Impervious Runoff Depth>6.00" Flow Length=455' Tc=2.9 min CN=98 Runoff=1.35 cfs 0.104 af
SubcatchmentP1I: PDA1I	Runoff Area=1.731 ac 100.00% Impervious Runoff Depth>6.00" Flow Length=256' Tc=0.8 min CN=98 Runoff=11.36 cfs 0.865 af
SubcatchmentP1P: PDA1P	Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=4.00" Flow Length=420' Tc=5.5 min CN=80 Runoff=0.67 cfs 0.049 af
SubcatchmentP2I: PDA2I	Runoff Area=0.243 ac 100.00% Impervious Runoff Depth>6.00" Flow Length=336' Tc=2.6 min CN=98 Runoff=1.59 cfs 0.121 af
SubcatchmentP2P: PDA2P	Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=4.00" Flow Length=9' Slope=0.0180 '/' Tc=1.3 min CN=80 Runoff=0.10 cfs 0.007 af
SubcatchmentPDA2BI: PDA2I - Bypass	Runoff Area=0.055 ac 100.00% Impervious Runoff Depth>6.00" Flow Length=474' Tc=3.3 min CN=98 Runoff=0.35 cfs 0.027 af
SubcatchmentPDA2BP: PDA2P - Bypass	Runoff Area=0.007 ac 0.00% Impervious Runoff Depth=4.00" Flow Length=324' Tc=3.2 min CN=80 Runoff=0.03 cfs 0.002 af
Pond 1P: Porous Concrete	Peak Elev=83.04' Storage=2,151 cf Inflow=1.69 cfs 0.128 af Outflow=0.27 cfs 0.122 af
Link EDA 1: Existing Drainage Area 1	Inflow=12.68 cfs 0.997 af Primary=12.68 cfs 0.997 af
Link EDA 2: Existing Drainage Area 2	Inflow=1.35 cfs 0.104 af Primary=1.35 cfs 0.104 af
Link PDA 1: Proposed Drainage Area 1	Inflow=11.86 cfs 0.915 af Primary=11.86 cfs 0.915 af
Link PDA 2: Proposed Drainage Area 2	Inflow=0.62 cfs 0.152 af Primary=0.62 cfs 0.152 af

Total Runoff Area = 4.407 ac Runoff Volume = 2.174 af Average Runoff Depth = 5.92"
3.97% Pervious = 0.175 ac 96.03% Impervious = 4.232 ac

EX - PR

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

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Summary for Subcatchment E1I: EDA1I

Runoff = 12.68 cfs @ 12.09 hrs, Volume= 0.997 af, Depth> 6.00"

Routed to Link EDA 1 : Existing Drainage Area 1

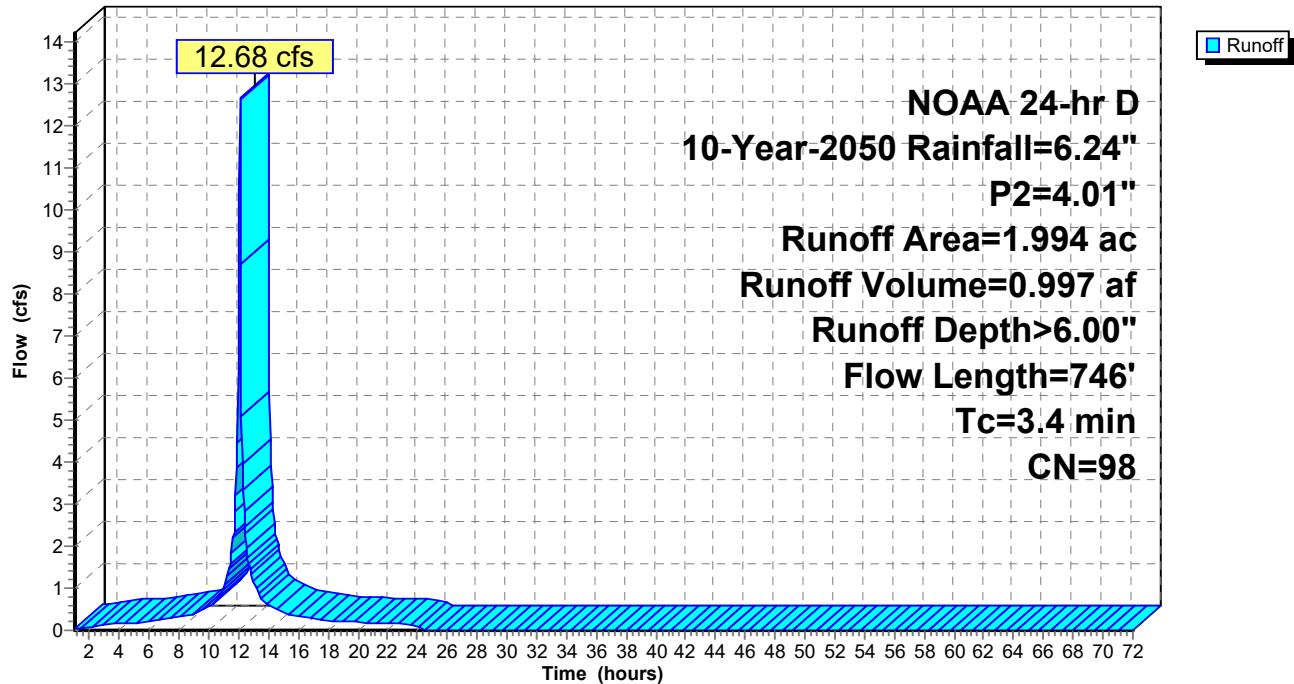
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
1.994	98	Paved parking, HSG D
1.994		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0375	1.98		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
1.0	292	0.0530	4.67		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.2	45	0.0230	3.08		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
3.4	746	Total			

Subcatchment E1I: EDA1I

Hydrograph



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

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Summary for Subcatchment E2I: EDA2I

Runoff = 1.35 cfs @ 12.09 hrs, Volume= 0.104 af, Depth> 6.00"
 Routed to Link EDA 2 : Existing Drainage Area 2

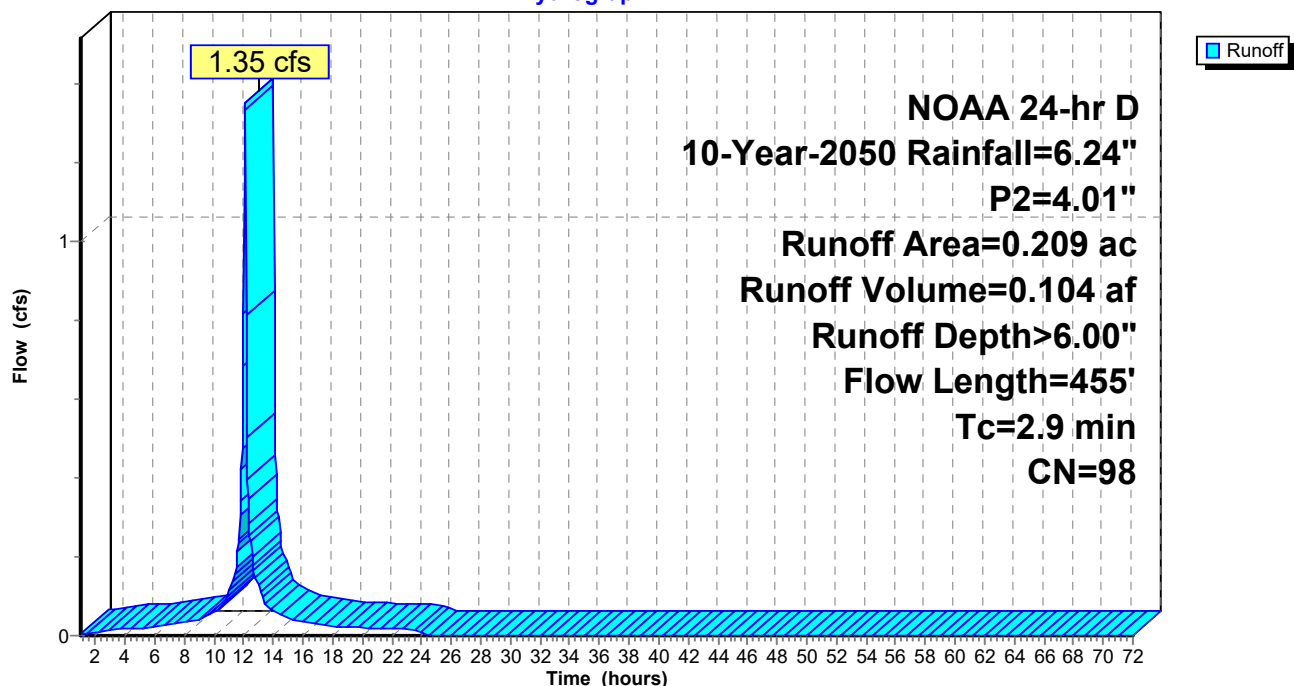
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.209	98	Paved parking, HSG D
0.209		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	24	0.0280	1.32		Sheet Flow, G-H Smooth surfaces n= 0.011 P2= 4.01"
1.9	299	0.0162	2.58		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.1	31	0.0260	4.98	8.81	Pipe Channel, I-J 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
0.6	101	0.0100	2.74	3.36	Pipe Channel, J-K 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.9	455	Total			

Subcatchment E2I: EDA2I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1I: PDA1I

Runoff = 11.36 cfs @ 12.06 hrs, Volume= 0.865 af, Depth> 6.00"

Routed to Link PDA 1 : Proposed Drainage Area 1

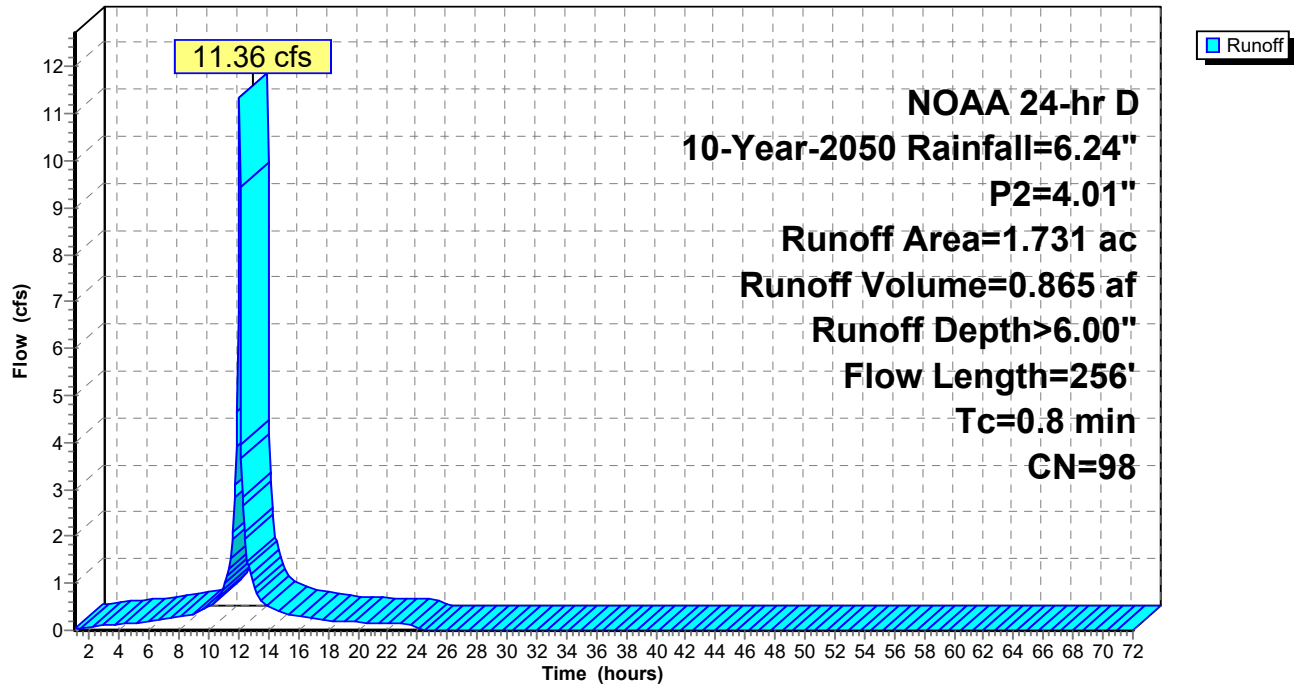
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
1.731	98	Paved parking, HSG D
1.731		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0150	0.75		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
0.3	19	0.0060	1.25		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	28	0.0340	3.74		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.1	56	0.0200	7.58	5.95	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	64	0.0880	15.90	12.49	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	84	0.0600	13.13	10.31	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.8	256	Total			

Subcatchment P1I: PDA1I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1P: PDA1P

Runoff = 0.67 cfs @ 12.12 hrs, Volume= 0.049 af, Depth= 4.00"

Routed to Link PDA 1 : Proposed Drainage Area 1

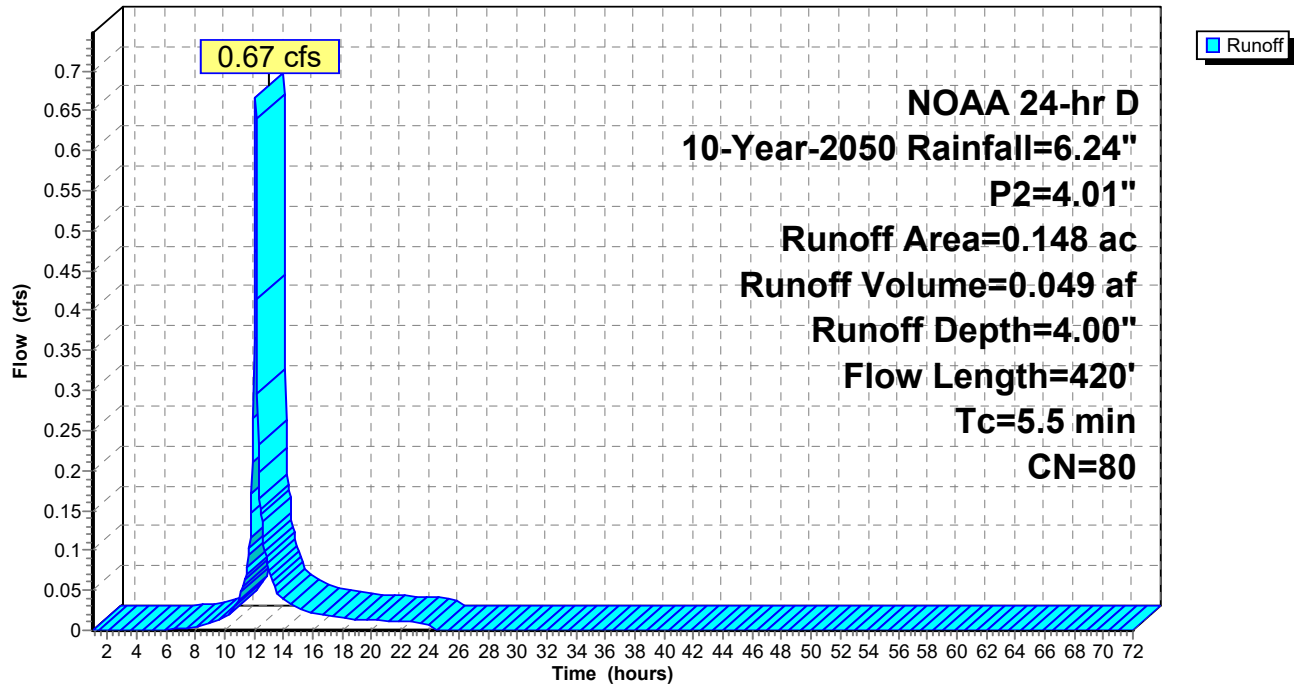
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.148	80	>75% Grass cover, Good, HSG D
0.148		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	80	0.0875	0.33		Sheet Flow, H-I Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.1300	5.80		Shallow Concentrated Flow, I-J Unpaved Kv= 16.1 fps
0.0	7	0.0340	2.97		Shallow Concentrated Flow, J-K Unpaved Kv= 16.1 fps
0.0	8	0.0425	3.32		Shallow Concentrated Flow, K-L Unpaved Kv= 16.1 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, L-M 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, N-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
5.5	420	Total			

Subcatchment P1P: PDA1P

Hydrograph



EX - PR

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

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Summary for Subcatchment P2I: PDA2I

Runoff = 1.59 cfs @ 12.08 hrs, Volume= 0.121 af, Depth> 6.00"
Routed to Pond 1P : Porous Concrete

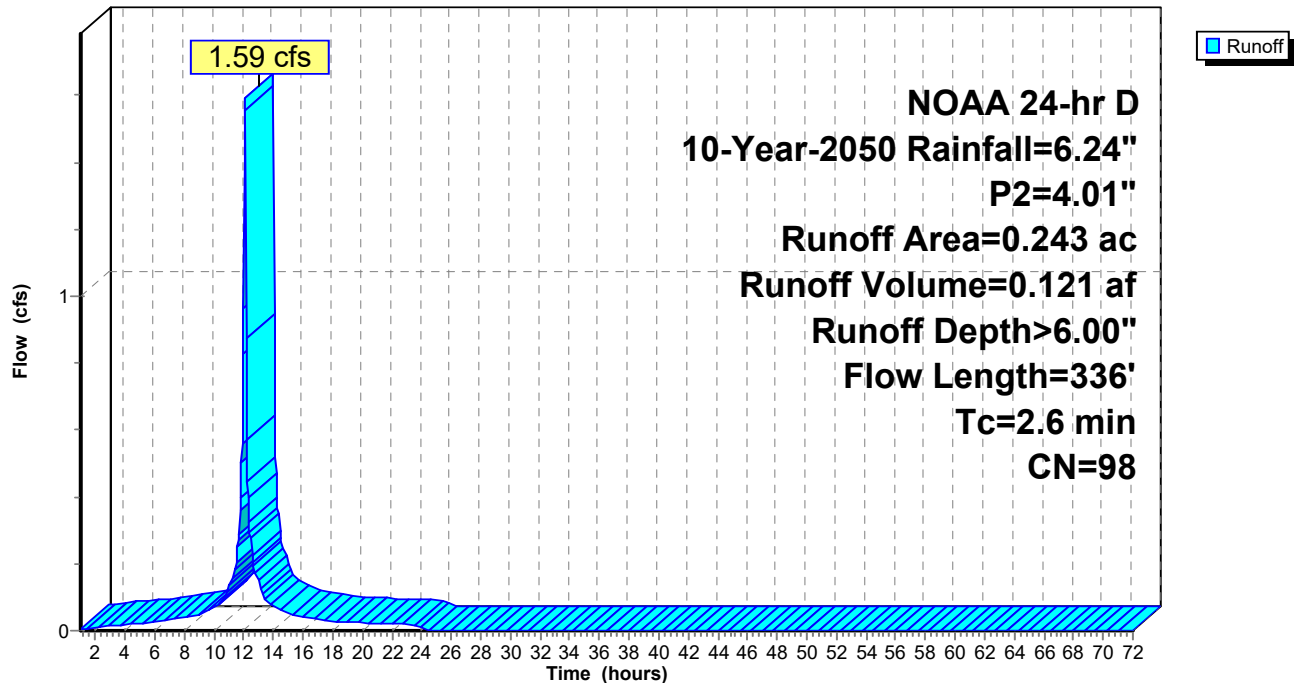
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG D
0.243		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	49	0.0190	1.31		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
2.6	336	Total			

Subcatchment P2I: PDA2I

Hydrograph



EX - PR

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

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Summary for Subcatchment P2P: PDA2P

Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 4.00"
Routed to Pond 1P : Porous Concrete

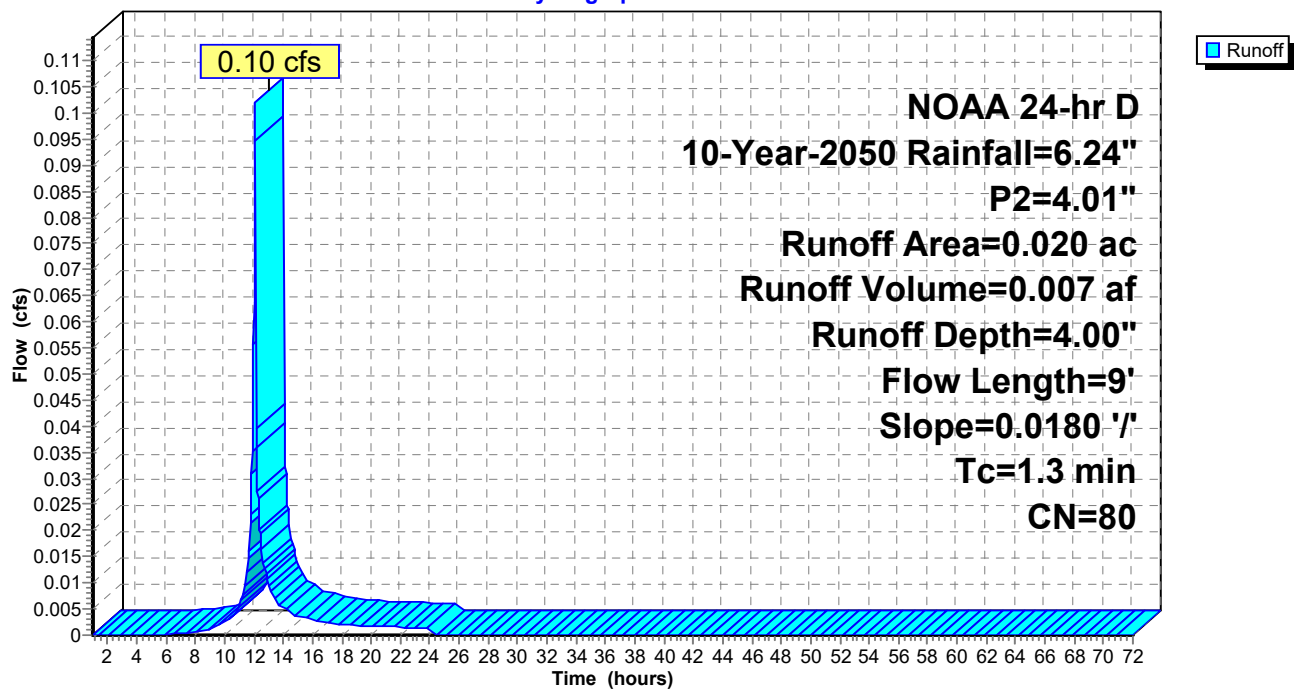
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.020	80	>75% Grass cover, Good, HSG D
0.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	9	0.0180	0.11		Sheet Flow, H-I Grass: Short n= 0.150 P2= 4.01"

Subcatchment P2P: PDA2P

Hydrograph



EX - PR

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

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Summary for Subcatchment PDA2BI: PDA2I - Bypass

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.027 af, Depth> 6.00"
 Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.055	98	Paved parking, HSG D
0.055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	49	0.0190	1.31		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.3	474	Total			

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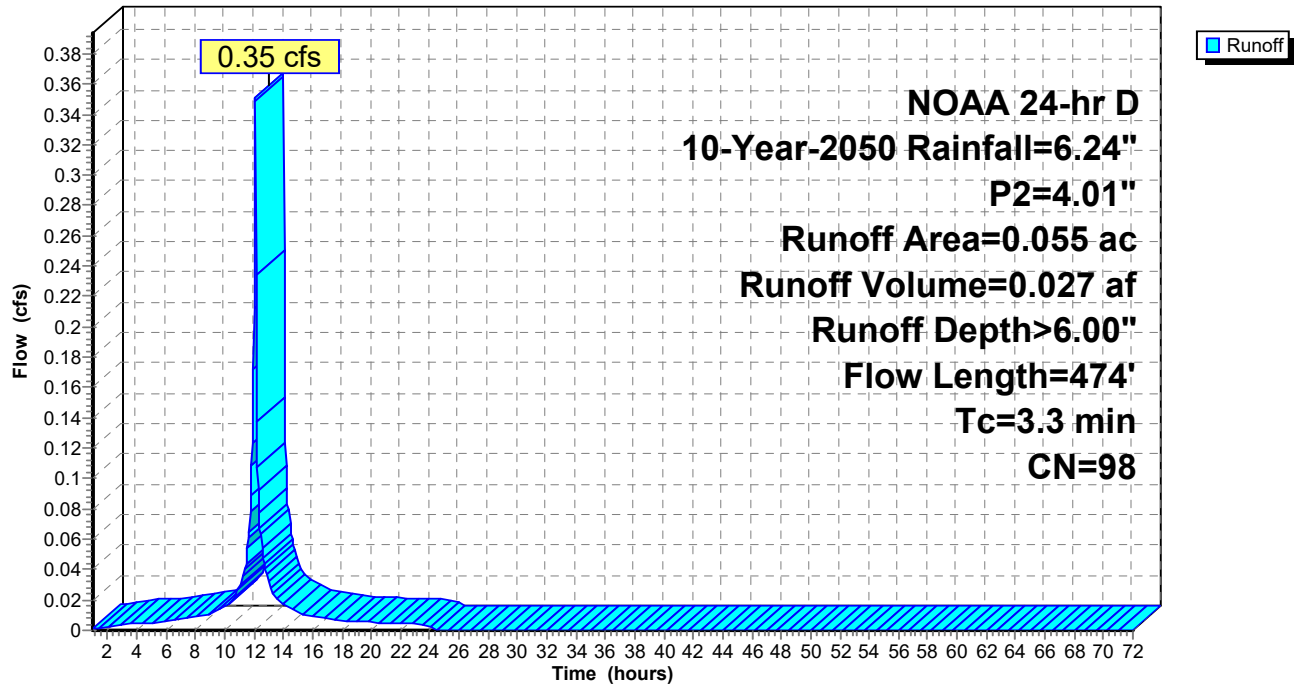
NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

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Subcatchment PDA2BI: PDA2I - Bypass

Hydrograph



EX - PR

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

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Summary for Subcatchment PDA2BP: PDA2P - Bypass

Runoff = 0.03 cfs @ 12.09 hrs, Volume= 0.002 af, Depth= 4.00"

Routed to Link PDA 2 : Proposed Drainage Area 2

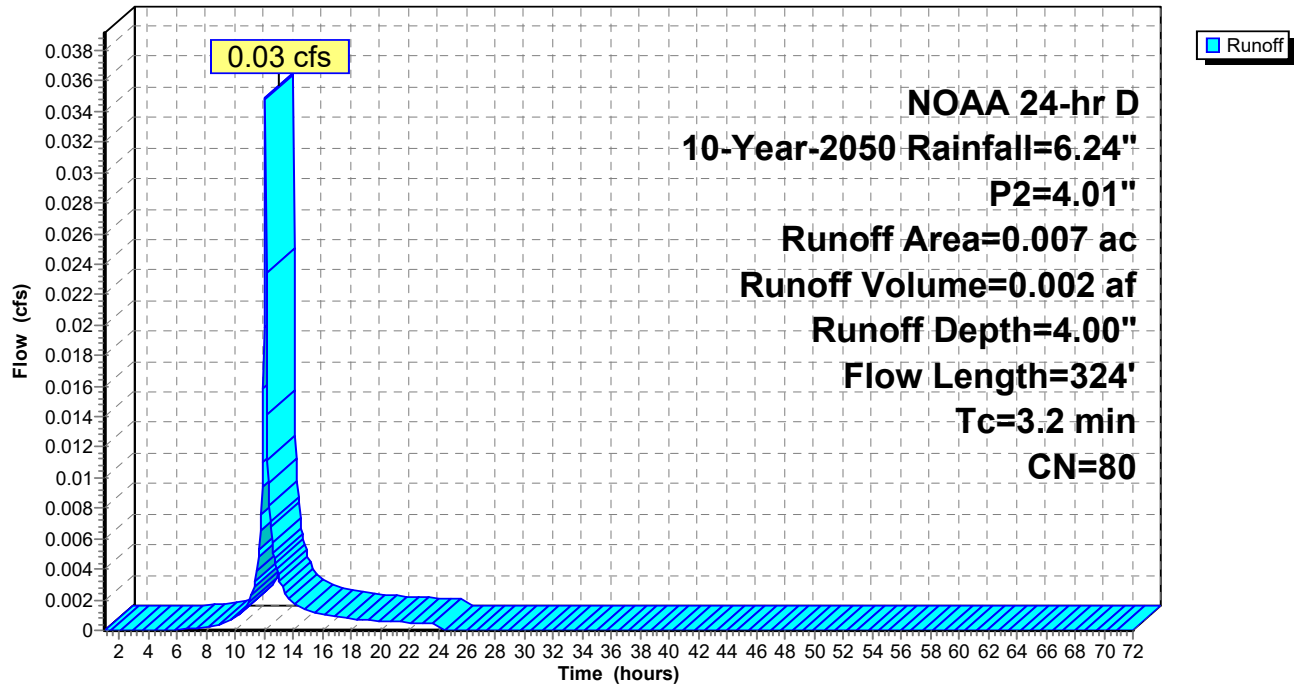
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

Area (ac)	CN	Description
0.007	80	>75% Grass cover, Good, HSG D
0.007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	9	0.0180	0.11		Sheet Flow, H-I Grass: Short n= 0.150 P2= 4.01"
0.1	18	0.0180	2.72		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.2	26	0.0150	2.49		Shallow Concentrated Flow, J-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.2	324	Total			

Subcatchment PDA2BP: PDA2P - Bypass

Hydrograph



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

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Summary for Pond 1P: Porous Concrete

Inflow Area = 0.263 ac, 92.40% Impervious, Inflow Depth > 5.85" for 10-Year-2050 event
 Inflow = 1.69 cfs @ 12.08 hrs, Volume= 0.128 af
 Outflow = 0.27 cfs @ 12.52 hrs, Volume= 0.122 af, Atten= 84%, Lag= 26.4 min
 Primary = 0.27 cfs @ 12.52 hrs, Volume= 0.122 af
 Routed to Link PDA 2 : Proposed Drainage Area 2

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 83.04' @ 12.52 hrs Surf.Area= 3,335 sf Storage= 2,151 cf

Plug-Flow detention time= 151.9 min calculated for 0.122 af (95% of inflow)
 Center-of-Mass det. time= 122.2 min (868.8 - 746.6)

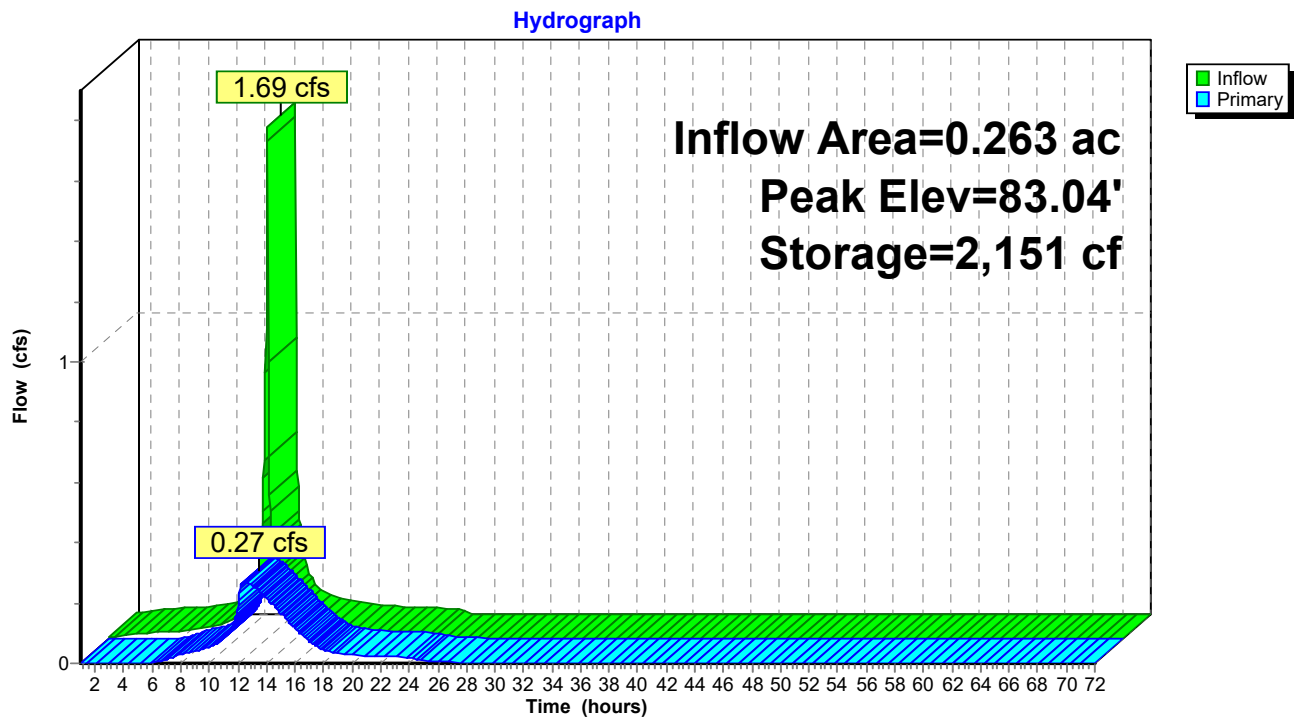
Volume	Invert	Avail.Storage	Storage Description
#1	81.43'	5,963 cf	Porous Paving Storage Area (Prismatic) , listed below (Recalc) 14,907 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.43	3,335	0	0
85.90	3,335	14,907	14,907

Device	Routing	Invert	Outlet Devices
#1	Primary	81.58'	15.0" Round Culvert L= 38.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 81.58' / 81.20' S= 0.0100 ' / Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	81.63'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	84.15'	0.5' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.27 cfs @ 12.52 hrs HW=83.04' (Free Discharge)

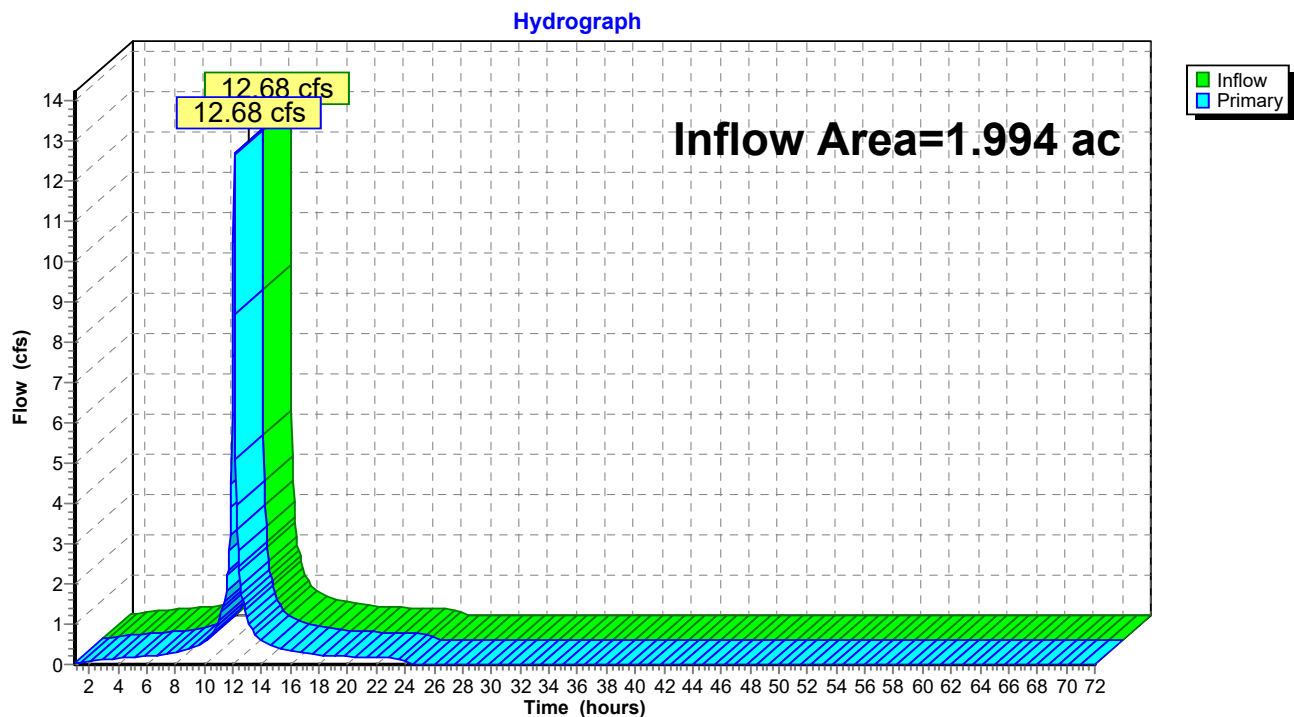
1=Culvert (Passes 0.27 cfs of 6.07 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.27 cfs @ 5.46 fps)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1P: Porous Concrete

Summary for Link EDA 1: Existing Drainage Area 1

Inflow Area = 1.994 ac, 100.00% Impervious, Inflow Depth > 6.00" for 10-Year-2050 event
Inflow = 12.68 cfs @ 12.09 hrs, Volume= 0.997 af
Primary = 12.68 cfs @ 12.09 hrs, Volume= 0.997 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 1: Existing Drainage Area 1

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

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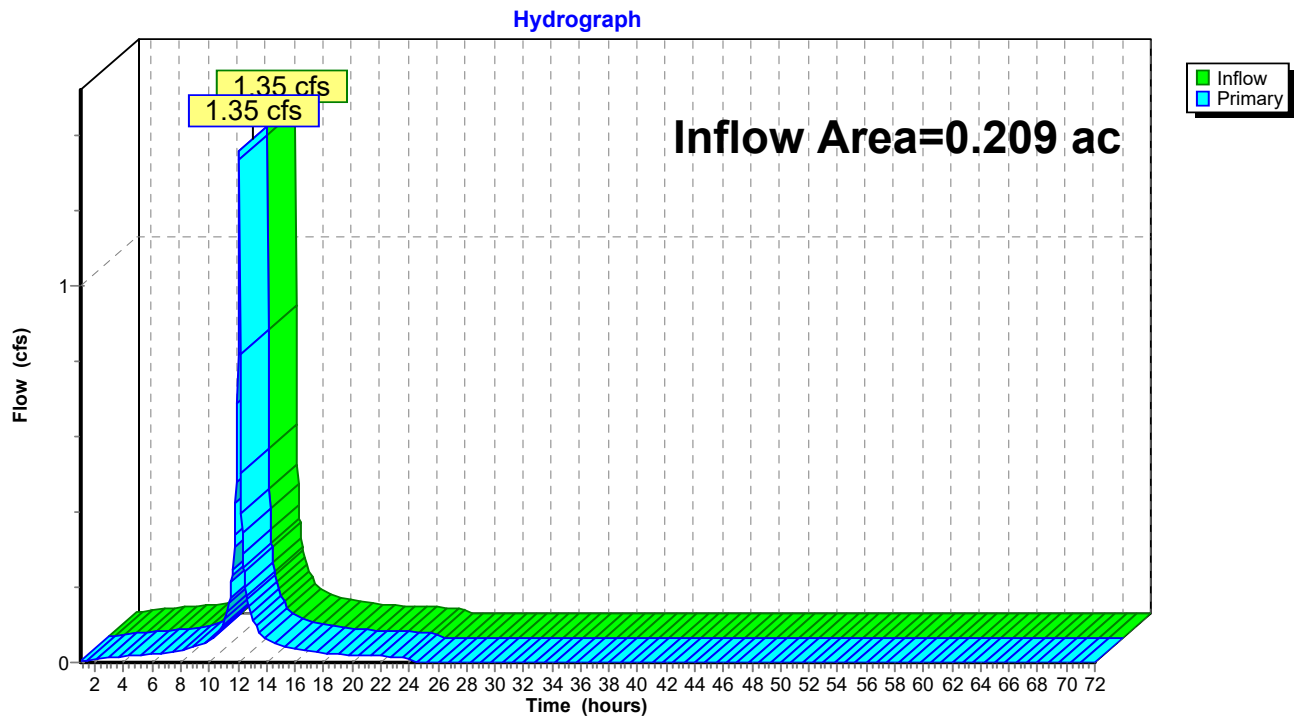
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Summary for Link EDA 2: Existing Drainage Area 2

Inflow Area = 0.209 ac, 100.00% Impervious, Inflow Depth > 6.00" for 10-Year-2050 event
Inflow = 1.35 cfs @ 12.09 hrs, Volume= 0.104 af
Primary = 1.35 cfs @ 12.09 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 2: Existing Drainage Area 2



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

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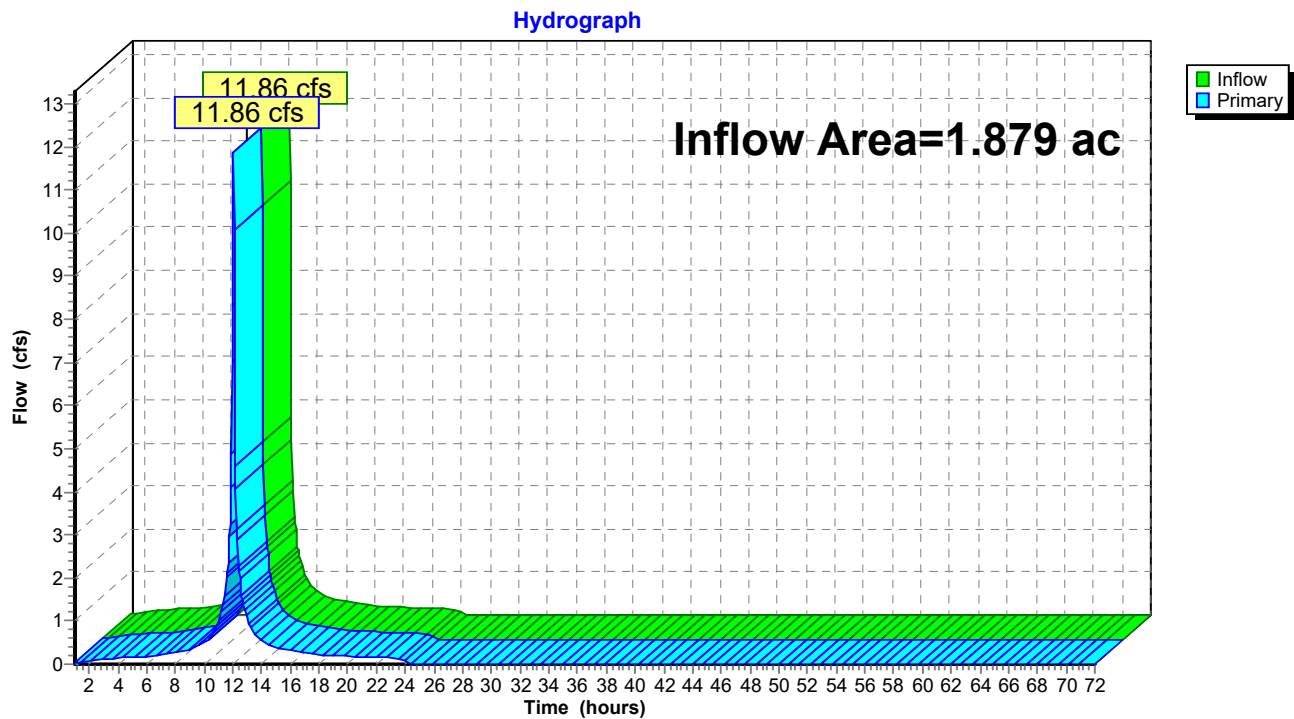
Page 40

Summary for Link PDA 1: Proposed Drainage Area 1

Inflow Area = 1.879 ac, 92.12% Impervious, Inflow Depth > 5.84" for 10-Year-2050 event
Inflow = 11.86 cfs @ 12.06 hrs, Volume= 0.915 af
Primary = 11.86 cfs @ 12.06 hrs, Volume= 0.915 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 1: Proposed Drainage Area 1



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

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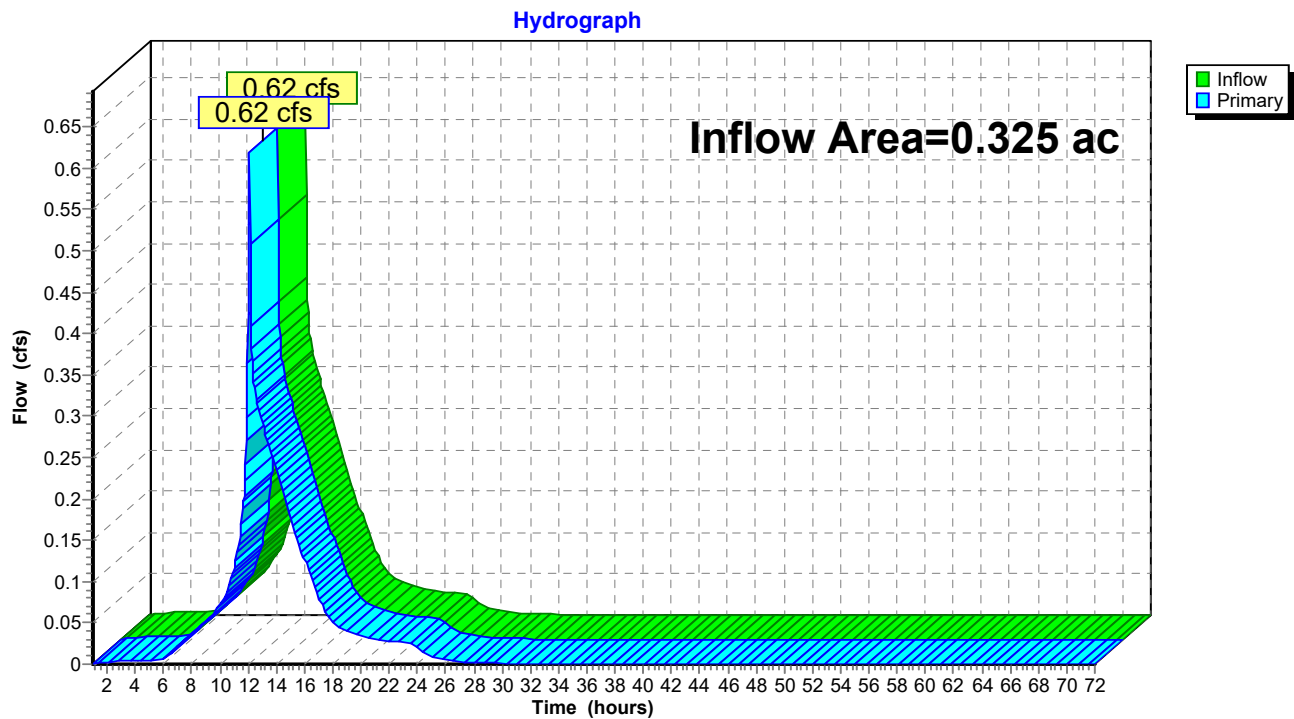
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Summary for Link PDA 2: Proposed Drainage Area 2

Inflow Area = 0.325 ac, 91.69% Impervious, Inflow Depth > 5.61" for 10-Year-2050 event
Inflow = 0.62 cfs @ 12.10 hrs, Volume= 0.152 af
Primary = 0.62 cfs @ 12.10 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 2: Proposed Drainage Area 2



EX - PR

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

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Time span=1.00-72.00 hrs, dt=0.05 hrs, 1421 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1I: EDA1I	Runoff Area=1.994 ac 100.00% Impervious Runoff Depth>11.34" Flow Length=746' Tc=3.4 min CN=98 Runoff=23.63 cfs 1.884 af
SubcatchmentE2I: EDA2I	Runoff Area=0.209 ac 100.00% Impervious Runoff Depth>11.33" Flow Length=455' Tc=2.9 min CN=98 Runoff=2.53 cfs 0.197 af
SubcatchmentP1I: PDA1I	Runoff Area=1.731 ac 100.00% Impervious Runoff Depth>11.33" Flow Length=256' Tc=0.8 min CN=98 Runoff=21.17 cfs 1.635 af
SubcatchmentP1P: PDA1P	Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=9.06" Flow Length=420' Tc=5.5 min CN=80 Runoff=1.45 cfs 0.112 af
SubcatchmentP2I: PDA2I	Runoff Area=0.243 ac 100.00% Impervious Runoff Depth>11.33" Flow Length=336' Tc=2.6 min CN=98 Runoff=2.97 cfs 0.230 af
SubcatchmentP2P: PDA2P	Runoff Area=0.020 ac 0.00% Impervious Runoff Depth=9.06" Flow Length=9' Slope=0.0180 '/' Tc=1.3 min CN=80 Runoff=0.22 cfs 0.015 af
SubcatchmentPDA2BI: PDA2I - Bypass	Runoff Area=0.055 ac 100.00% Impervious Runoff Depth>11.34" Flow Length=474' Tc=3.3 min CN=98 Runoff=0.66 cfs 0.052 af
SubcatchmentPDA2BP: PDA2P - Bypass	Runoff Area=0.007 ac 0.00% Impervious Runoff Depth=9.06" Flow Length=324' Tc=3.2 min CN=80 Runoff=0.08 cfs 0.005 af
Pond 1P: Porous Concrete	Peak Elev=84.42' Storage=3,994 cf Inflow=3.19 cfs 0.245 af Outflow=0.56 cfs 0.238 af
Link EDA 1: Existing Drainage Area 1	Inflow=23.63 cfs 1.884 af Primary=23.63 cfs 1.884 af
Link EDA 2: Existing Drainage Area 2	Inflow=2.53 cfs 0.197 af Primary=2.53 cfs 0.197 af
Link PDA 1: Proposed Drainage Area 1	Inflow=22.28 cfs 1.746 af Primary=22.28 cfs 1.746 af
Link PDA 2: Proposed Drainage Area 2	Inflow=1.07 cfs 0.296 af Primary=1.07 cfs 0.296 af

Total Runoff Area = 4.407 ac Runoff Volume = 4.129 af Average Runoff Depth = 11.24"
3.97% Pervious = 0.175 ac 96.03% Impervious = 4.232 ac

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

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Summary for Subcatchment E1I: EDA1I

Runoff = 23.63 cfs @ 12.09 hrs, Volume= 1.884 af, Depth>11.34"
 Routed to Link EDA 1 : Existing Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
1.994	98	Paved parking, HSG D
1.994		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.0375	1.98		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
1.0	292	0.0530	4.67		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.2	45	0.0230	3.08		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
3.4	746	Total			

EX - PR

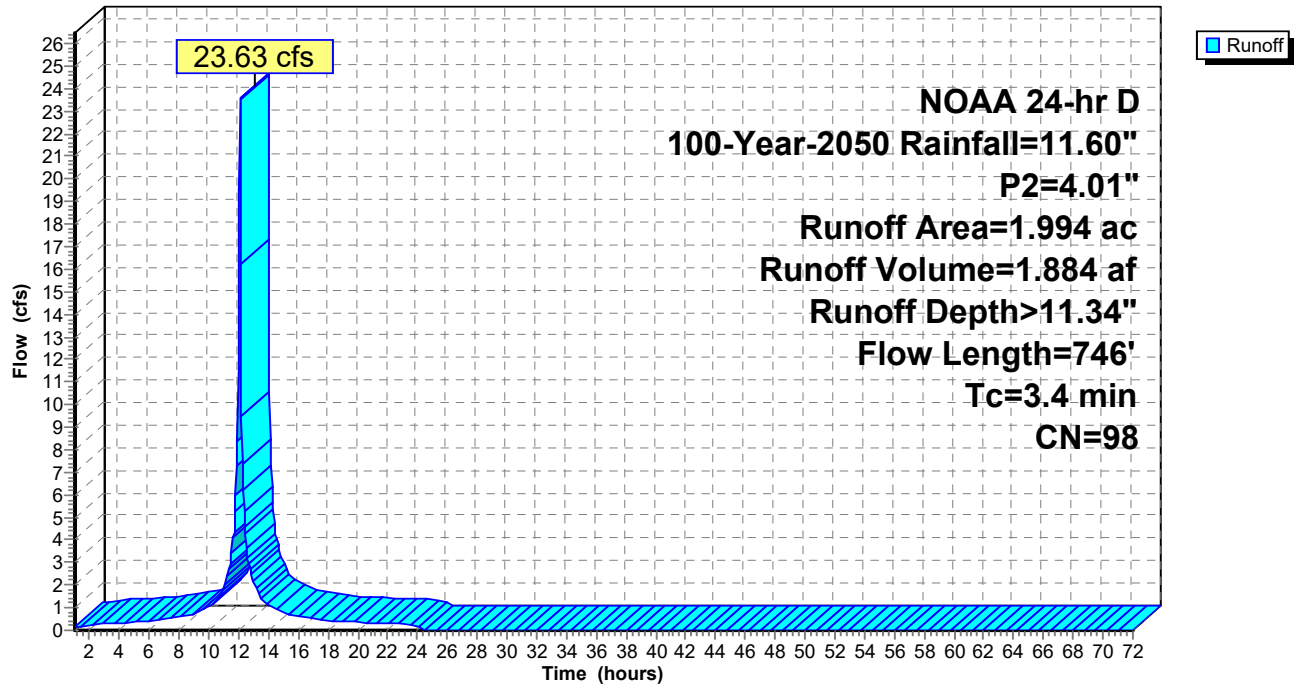
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NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

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Subcatchment E1I: EDA1I**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 E2I: EDA2I

Runoff = 2.53 cfs @ 12.09 hrs, Volume= 0.197 af, Depth>11.33"
 Routed to Link EDA 2 : Existing Drainage Area 2

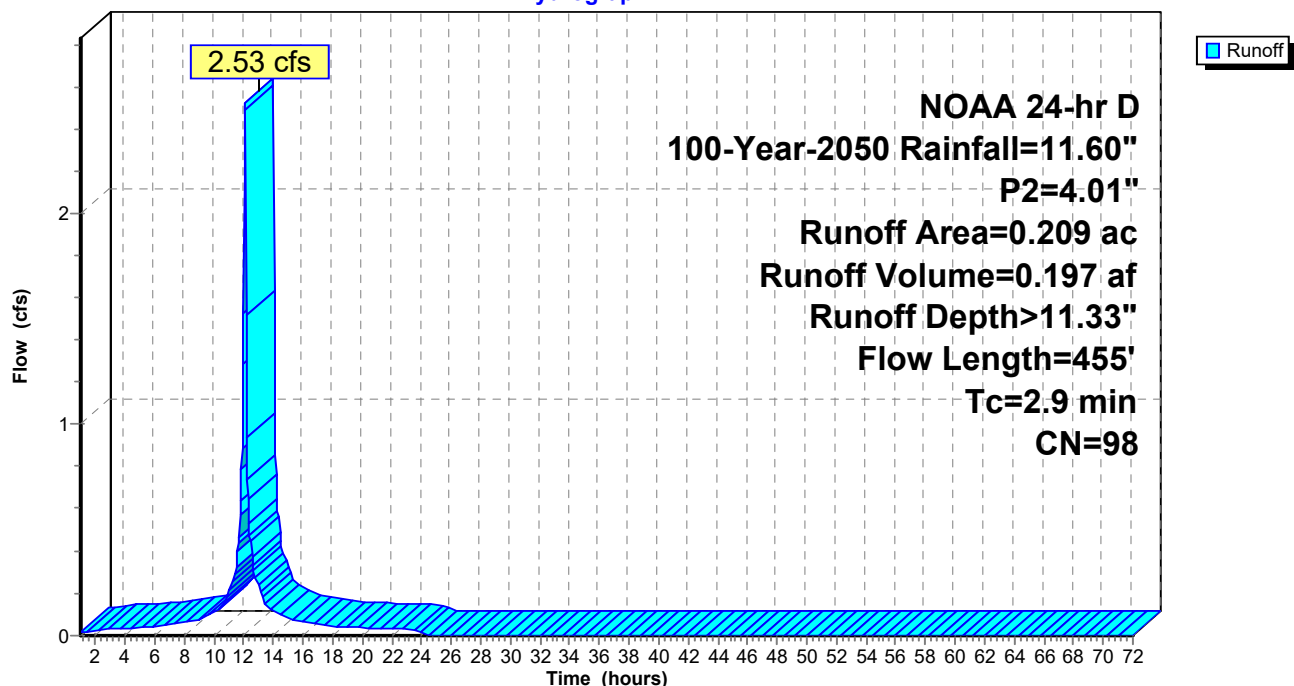
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.209	98	Paved parking, HSG D
0.209		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	24	0.0280	1.32		Sheet Flow, G-H Smooth surfaces n= 0.011 P2= 4.01"
1.9	299	0.0162	2.58		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.1	31	0.0260	4.98	8.81	Pipe Channel, I-J 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
0.6	101	0.0100	2.74	3.36	Pipe Channel, J-K 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.9	455	Total			

Subcatchment E2I: EDA2I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1I: PDA1I

Runoff = 21.17 cfs @ 12.06 hrs, Volume= 1.635 af, Depth>11.33"

Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
1.731	98	Paved parking, HSG D
1.731		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0150	0.75		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
0.3	19	0.0060	1.25		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	28	0.0340	3.74		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.1	56	0.0200	7.58	5.95	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	64	0.0880	15.90	12.49	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	84	0.0600	13.13	10.31	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.8	256	Total			

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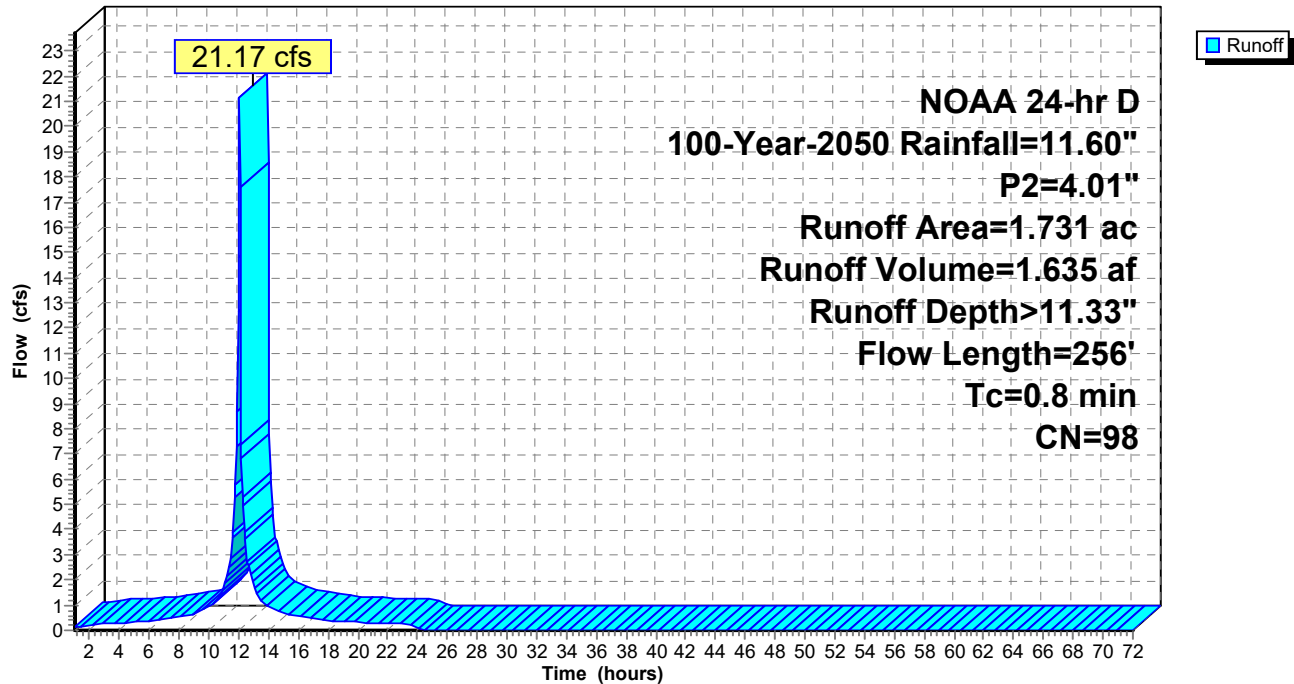
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

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Subcatchment P1I: PDA1I

Hydrograph



EX - PR

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

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Summary for Subcatchment P1P: PDA1P

Runoff = 1.45 cfs @ 12.12 hrs, Volume= 0.112 af, Depth= 9.06"

Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.148	80	>75% Grass cover, Good, HSG D
0.148		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	80	0.0875	0.33		Sheet Flow, H-I Grass: Short n= 0.150 P2= 4.01"
0.0	16	0.1300	5.80		Shallow Concentrated Flow, I-J Unpaved Kv= 16.1 fps
0.0	7	0.0340	2.97		Shallow Concentrated Flow, J-K Unpaved Kv= 16.1 fps
0.0	8	0.0425	3.32		Shallow Concentrated Flow, K-L Unpaved Kv= 16.1 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, L-M 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, N-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
5.5	420	Total			

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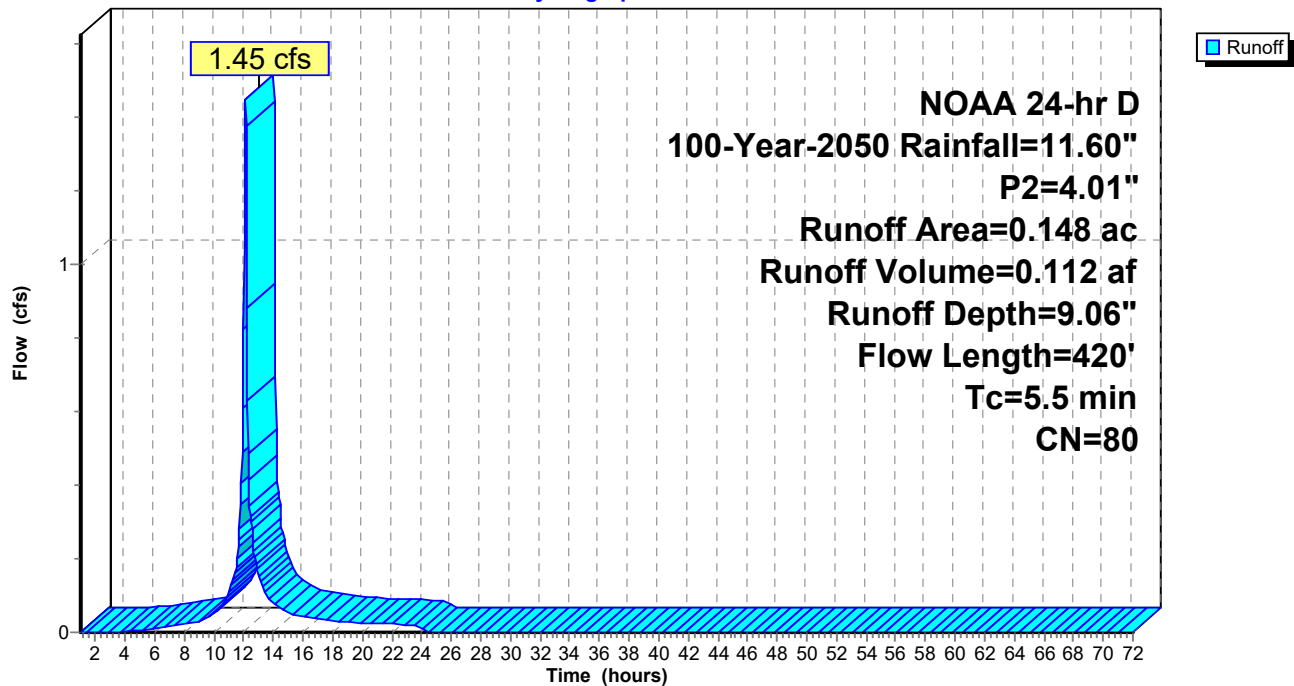
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

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Subcatchment P1P: PDA1P

Hydrograph



EX - PR

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

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Summary for Subcatchment P2I: PDA2I

Runoff = 2.97 cfs @ 12.08 hrs, Volume= 0.230 af, Depth>11.33"
 Routed to Pond 1P : Porous Concrete

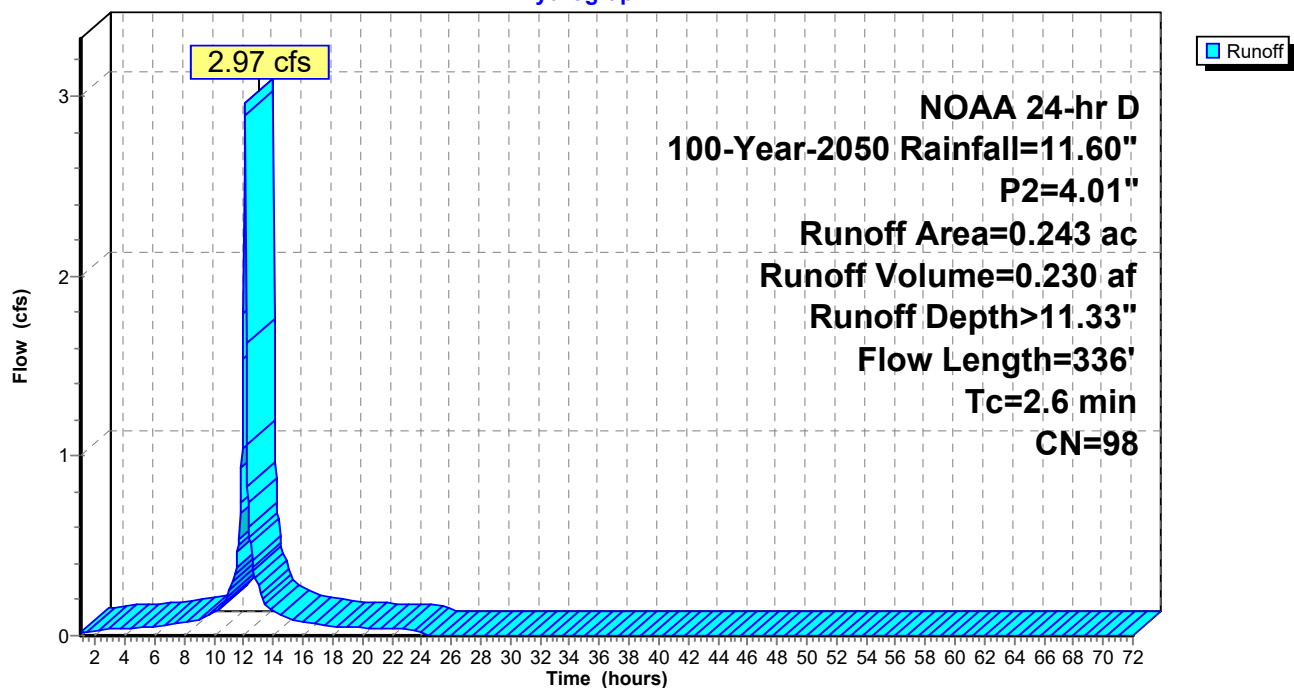
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG D
0.243		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	49	0.0190	1.31		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
2.6	336	Total			

Subcatchment P2I: PDA2I

Hydrograph



EX - PR

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

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Summary for Subcatchment P2P: PDA2P

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.015 af, Depth= 9.06"
Routed to Pond 1P : Porous Concrete

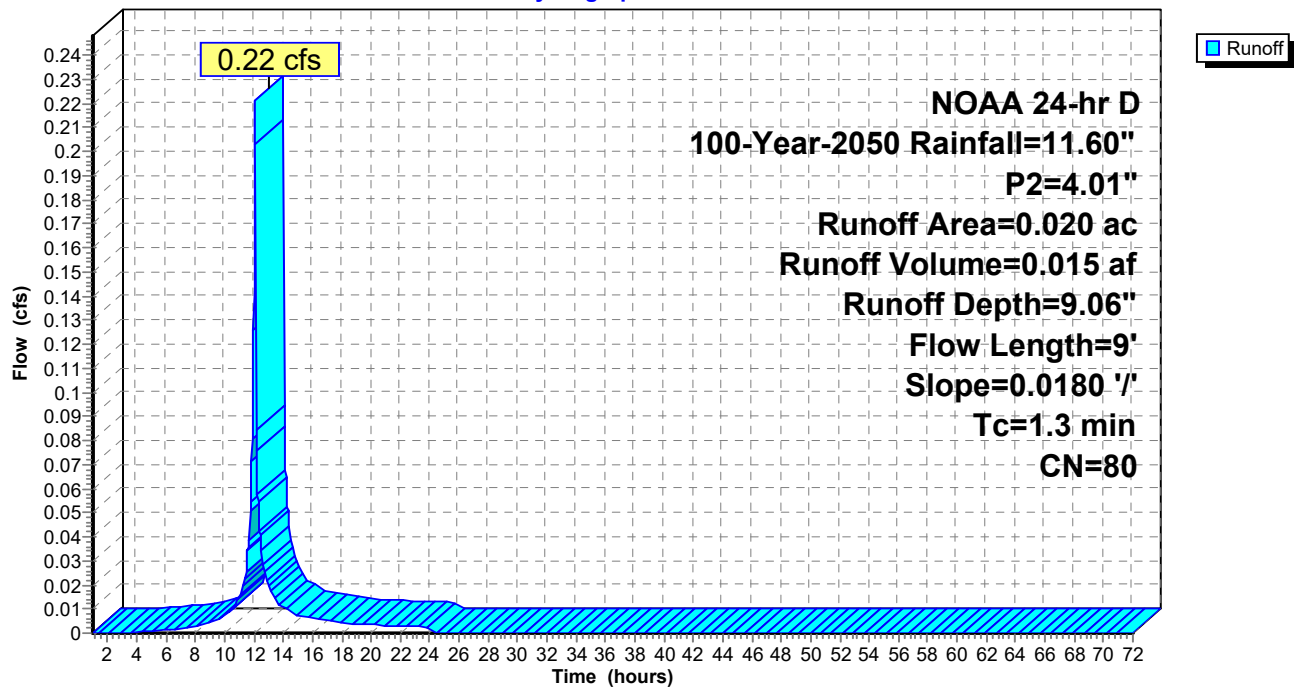
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.020	80	>75% Grass cover, Good, HSG D
0.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	9	0.0180	0.11		Sheet Flow, H-I Grass: Short n= 0.150 P2= 4.01"

Subcatchment P2P: PDA2P

Hydrograph



EX - PR

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

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Summary for Subcatchment PDA2BI: PDA2I - Bypass

Runoff = 0.66 cfs @ 12.09 hrs, Volume= 0.052 af, Depth>11.34"

Routed to Link PDA 2 : Proposed Drainage Area 2

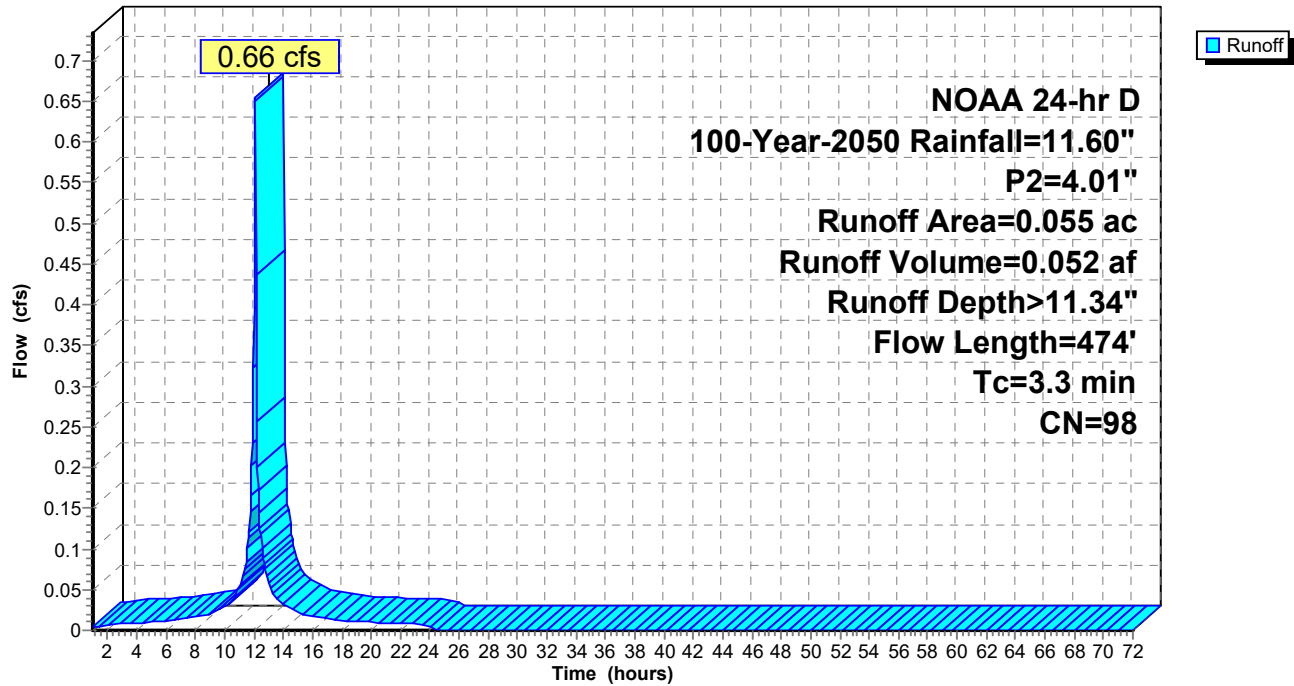
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.055	98	Paved parking, HSG D
0.055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	49	0.0190	1.31		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 4.01"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.3	474	Total			

Subcatchment PDA2BI: PDA2I - Bypass

Hydrograph



EX - PR

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

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Summary for Subcatchment PDA2BP: PDA2P - Bypass

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.005 af, Depth= 9.06"

Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

Area (ac)	CN	Description
0.007	80	>75% Grass cover, Good, HSG D
0.007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	9	0.0180	0.11		Sheet Flow, H-I
					Grass: Short n= 0.150 P2= 4.01"
0.1	18	0.0180	2.72		Shallow Concentrated Flow, I-J
					Paved Kv= 20.3 fps
0.2	26	0.0150	2.49		Shallow Concentrated Flow, J-C
					Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D
					Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E
					Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F
					18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'
					n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.025 Corrugated metal
3.2	324	Total			

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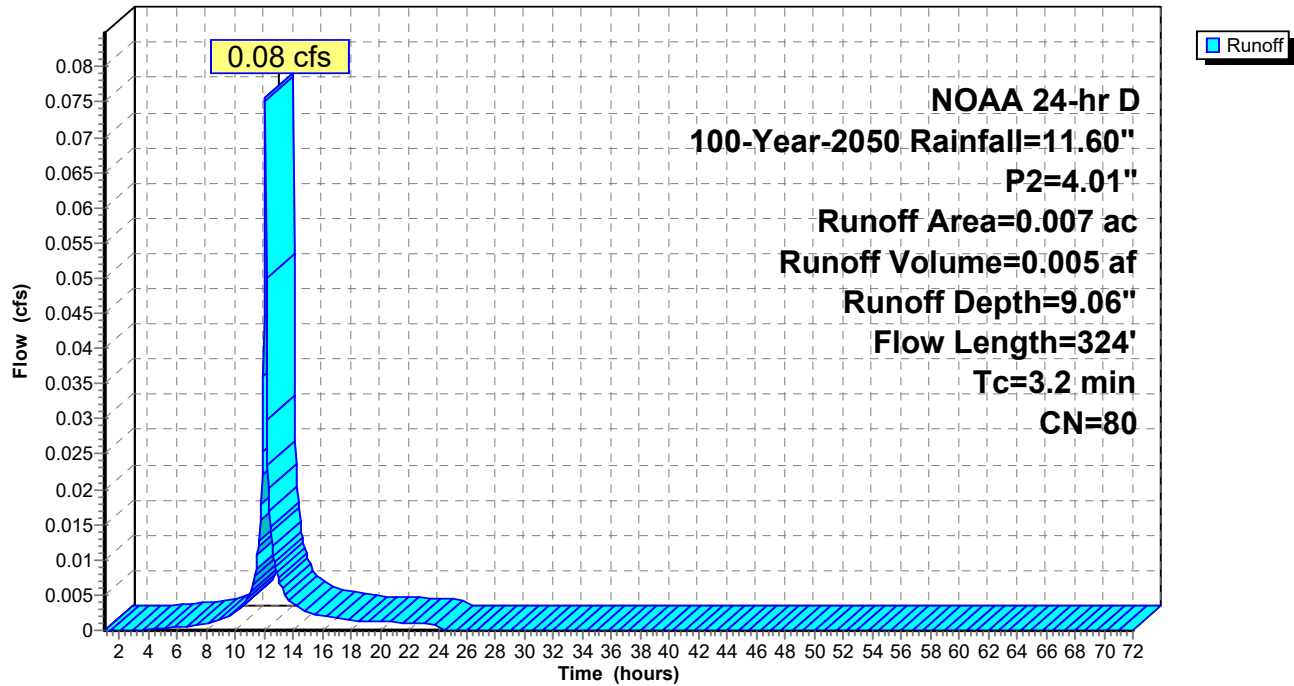
NOAA 24-hr D 100-Year-2050 Rainfall=11.60", P2=4.01"

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Subcatchment PDA2BP: PDA2P - Bypass

Hydrograph



EX - PR

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

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Summary for Pond 1P: Porous Concrete

Inflow Area = 0.263 ac, 92.40% Impervious, Inflow Depth > 11.16" for 100-Year-2050 event
 Inflow = 3.19 cfs @ 12.08 hrs, Volume= 0.245 af
 Outflow = 0.56 cfs @ 12.46 hrs, Volume= 0.238 af, Atten= 82%, Lag= 22.7 min
 Primary = 0.56 cfs @ 12.46 hrs, Volume= 0.238 af
 Routed to Link PDA 2 : Proposed Drainage Area 2

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 84.42' @ 12.46 hrs Surf.Area= 3,335 sf Storage= 3,994 cf

Plug-Flow detention time= 140.3 min calculated for 0.238 af (97% of inflow)
 Center-of-Mass det. time= 123.3 min (862.7 - 739.4)

Volume	Invert	Avail.Storage	Storage Description
#1	81.43'	5,963 cf	Porous Paving Storage Area (Prismatic) , listed below (Recalc) 14,907 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.43	3,335	0	0
85.90	3,335	14,907	14,907

Device	Routing	Invert	Outlet Devices
#1	Primary	81.58'	15.0" Round Culvert L= 38.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 81.58' / 81.20' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	81.63'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	84.15'	0.5' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.56 cfs @ 12.46 hrs HW=84.42' (Free Discharge)

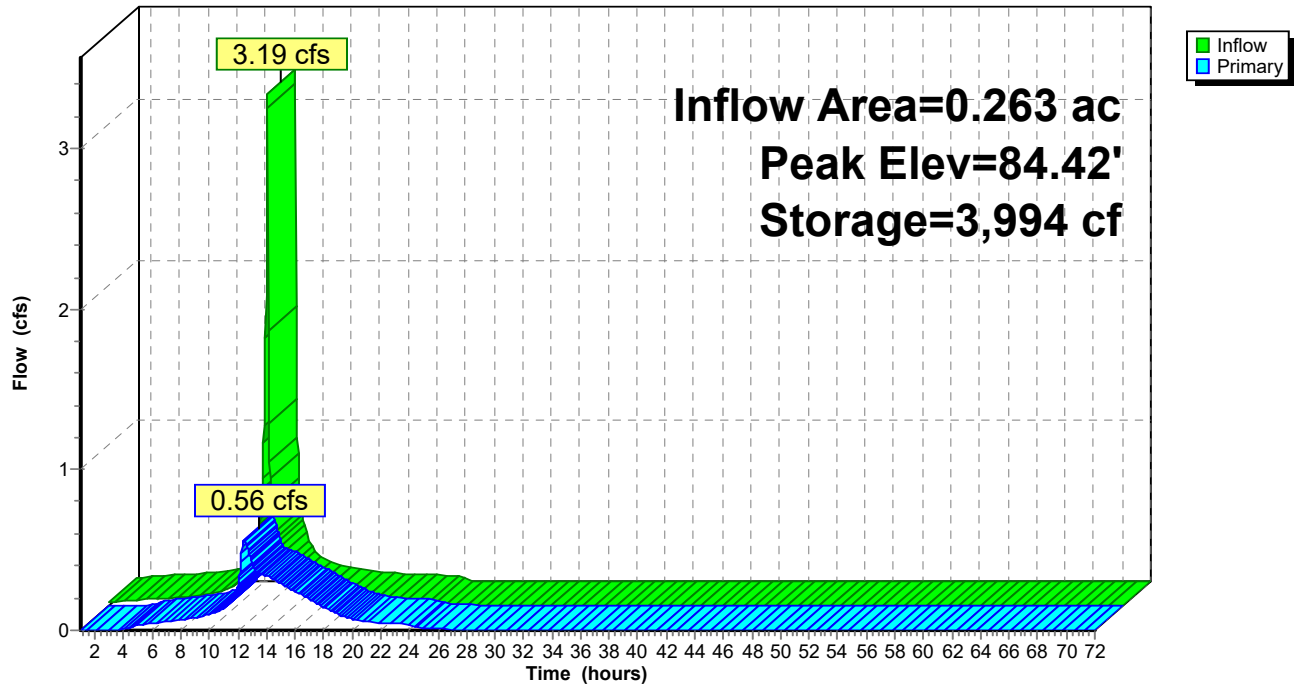
1=Culvert (Passes 0.56 cfs of 10.22 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.39 cfs @ 7.87 fps)

3=Broad-Crested Rectangular Weir (Weir Controls 0.17 cfs @ 1.28 fps)

Pond 1P: Porous Concrete

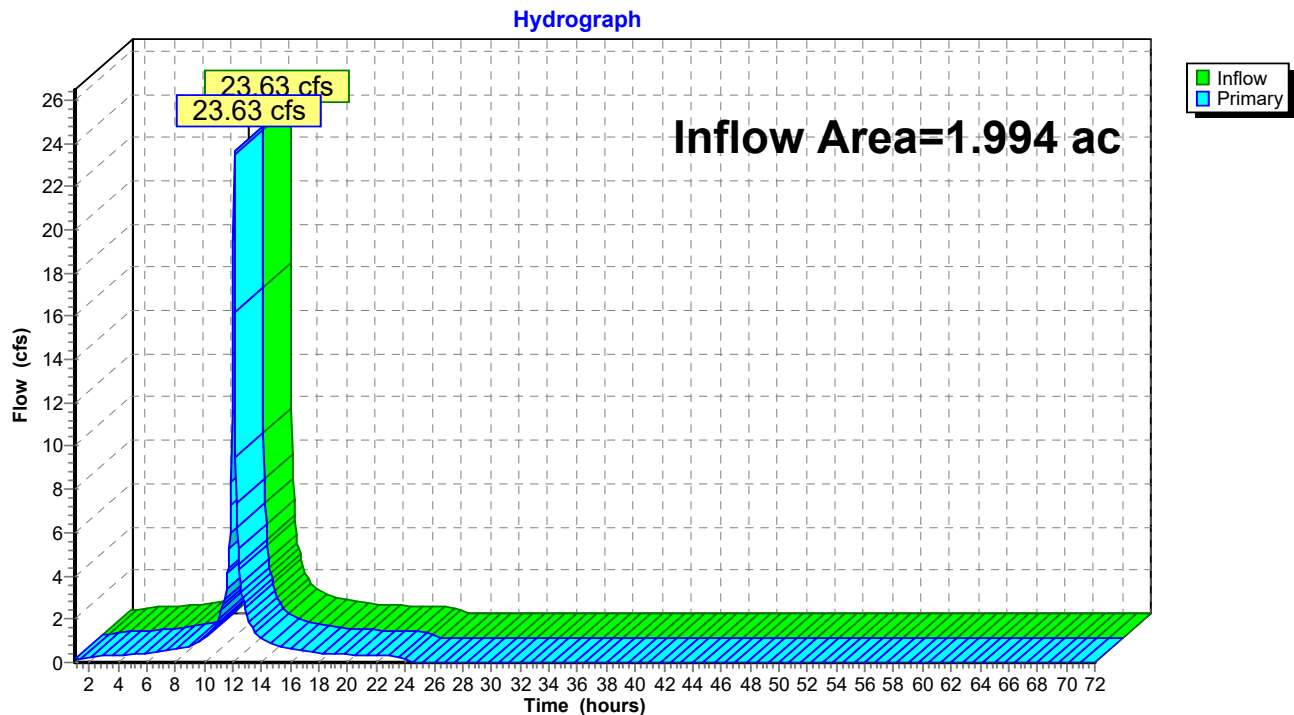
Hydrograph



Summary for Link EDA 1: Existing Drainage Area 1

Inflow Area = 1.994 ac, 100.00% Impervious, Inflow Depth > 11.34" for 100-Year-2050 event
Inflow = 23.63 cfs @ 12.09 hrs, Volume= 1.884 af
Primary = 23.63 cfs @ 12.09 hrs, Volume= 1.884 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

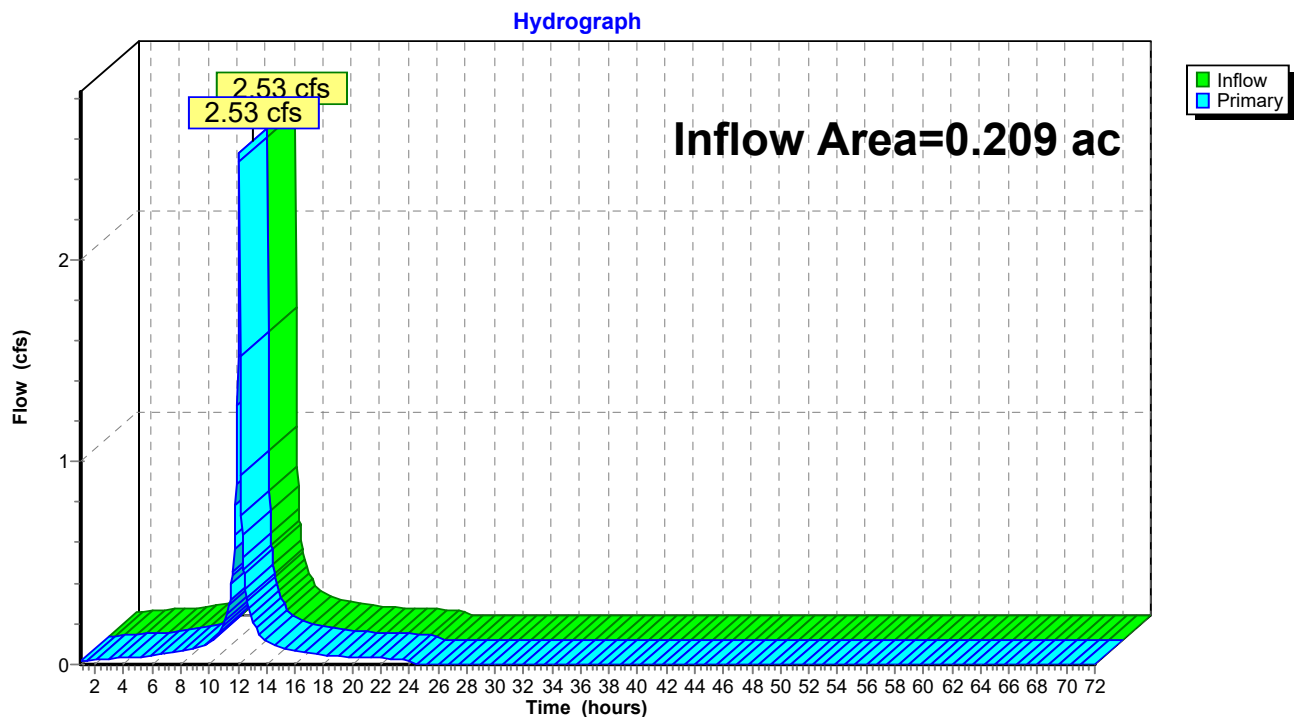
Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 1: Existing Drainage Area 1

Summary for Link EDA 2: Existing Drainage Area 2

Inflow Area = 0.209 ac, 100.00% Impervious, Inflow Depth > 11.33" for 100-Year-2050 event
Inflow = 2.53 cfs @ 12.09 hrs, Volume= 0.197 af
Primary = 2.53 cfs @ 12.09 hrs, Volume= 0.197 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 2: Existing Drainage Area 2

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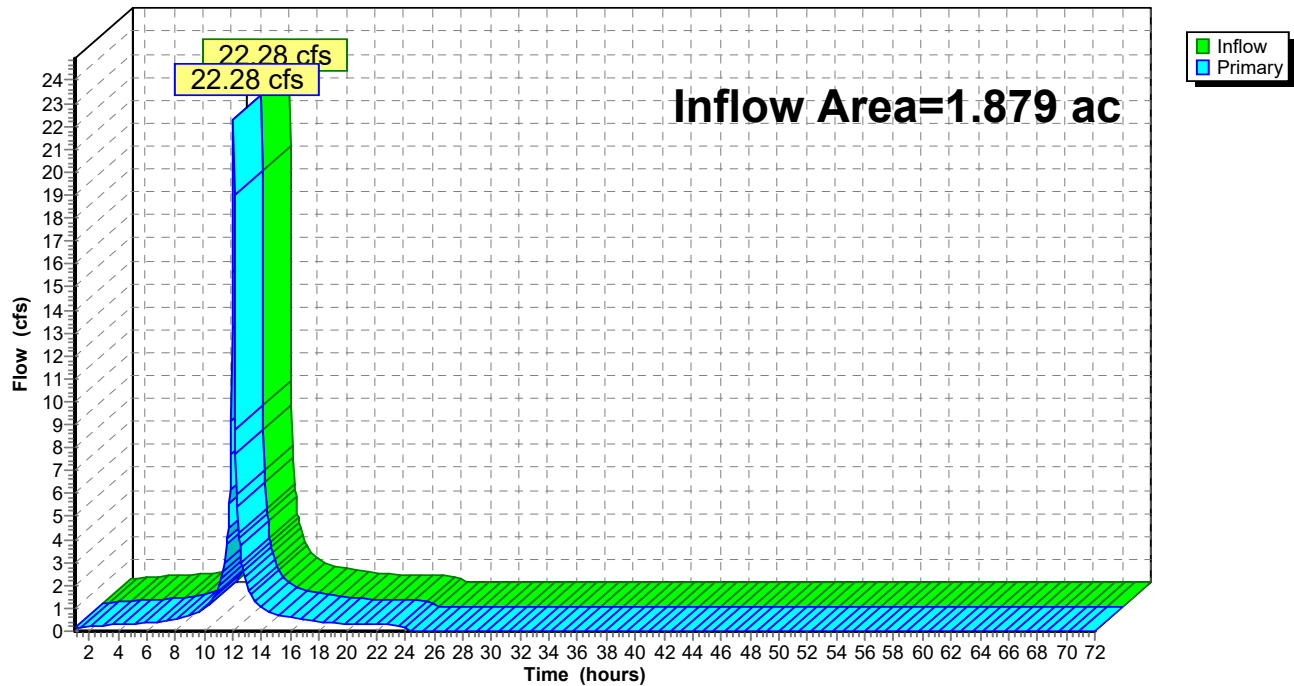
Summary for Link PDA 1: Proposed Drainage Area 1

Inflow Area = 1.879 ac, 92.12% Impervious, Inflow Depth > 11.15" for 100-Year-2050 event
Inflow = 22.28 cfs @ 12.06 hrs, Volume= 1.746 af
Primary = 22.28 cfs @ 12.06 hrs, Volume= 1.746 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 1: Proposed Drainage Area 1

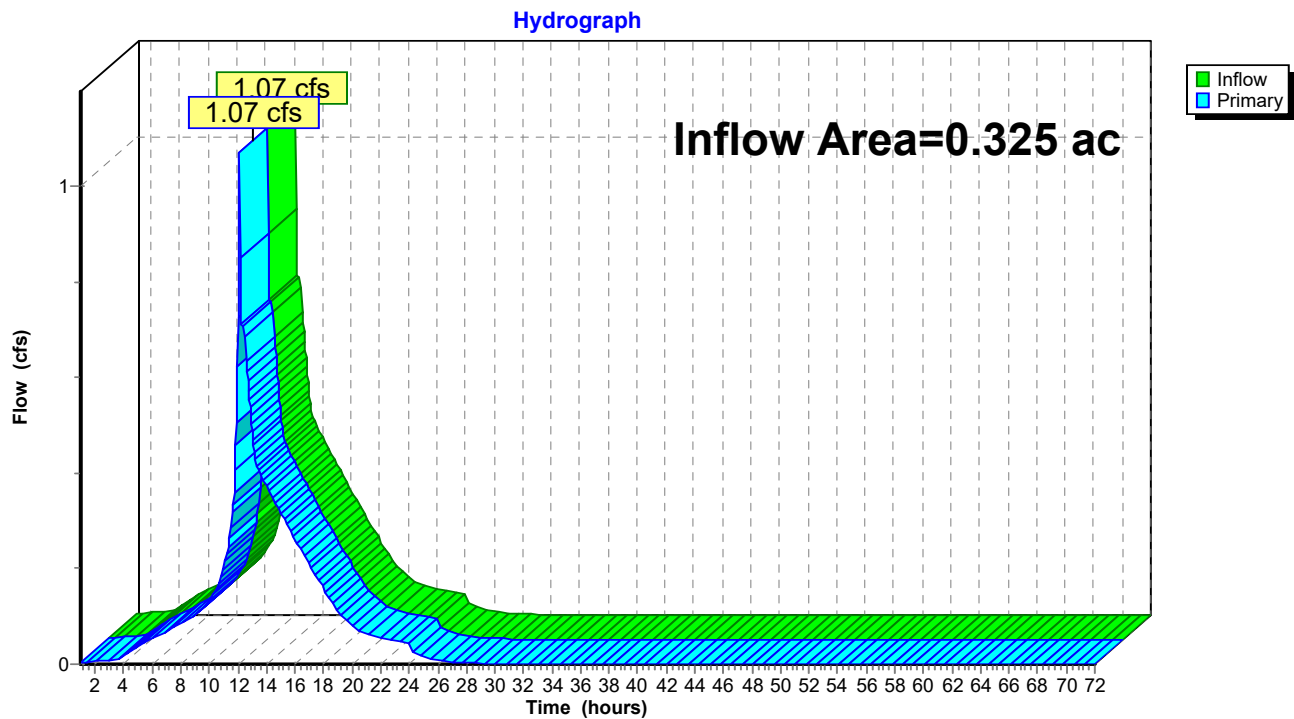
Hydrograph



Summary for Link PDA 2: Proposed Drainage Area 2

Inflow Area = 0.325 ac, 91.69% Impervious, Inflow Depth > 10.92" for 100-Year-2050 event
Inflow = 1.07 cfs @ 12.10 hrs, Volume= 0.296 af
Primary = 1.07 cfs @ 12.10 hrs, Volume= 0.296 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 2: Proposed Drainage Area 2

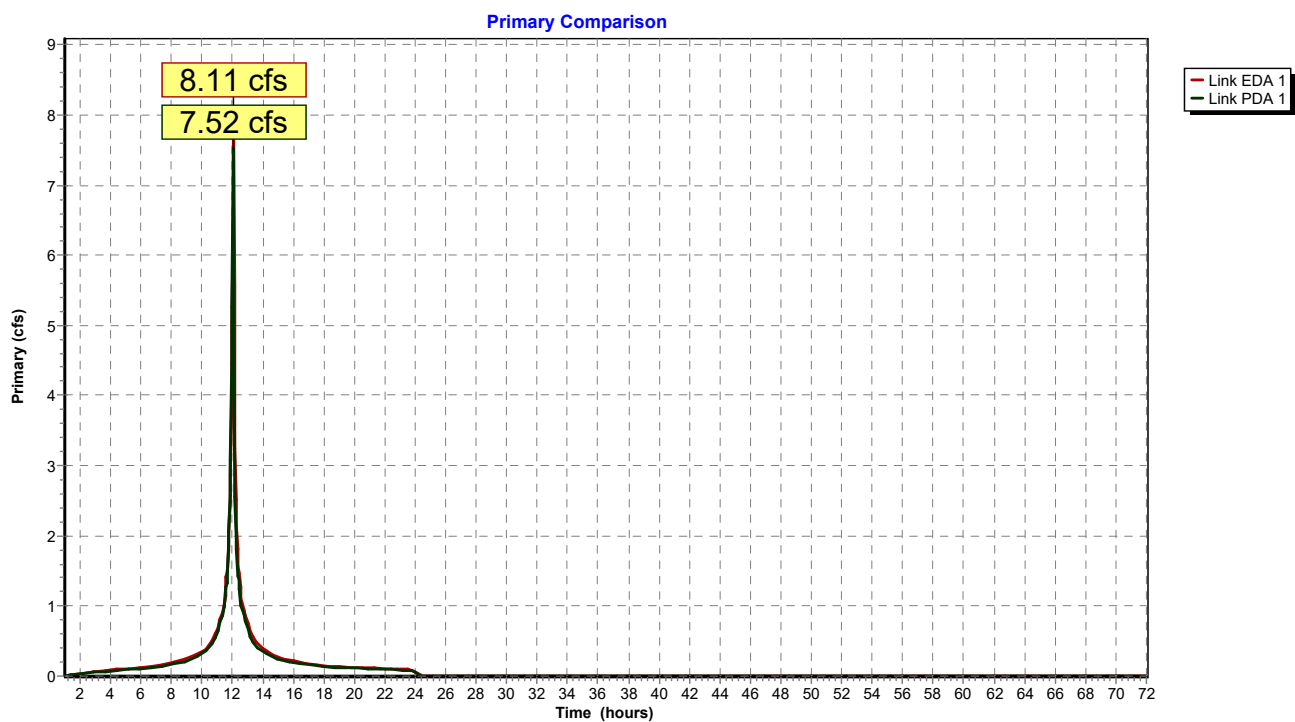
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NOAA 24-hr D 2-Year-2050 Rainfall=4.01", P2=4.01"

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

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Primary Comparison

Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)
1.00	0.00	0.00	27.00	0.00	0.00	53.00	0.00	0.00
1.50	0.02	0.02	27.50	0.00	0.00	53.50	0.00	0.00
2.00	0.04	0.03	28.00	0.00	0.00	54.00	0.00	0.00
2.50	0.05	0.05	28.50	0.00	0.00	54.50	0.00	0.00
3.00	0.06	0.06	29.00	0.00	0.00	55.00	0.00	0.00
3.50	0.08	0.07	29.50	0.00	0.00	55.50	0.00	0.00
4.00	0.09	0.08	30.00	0.00	0.00	56.00	0.00	0.00
4.50	0.09	0.08	30.50	0.00	0.00	56.50	0.00	0.00
5.00	0.10	0.09	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.11	0.10	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.12	0.10	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.14	0.12	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.16	0.14	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.17	0.15	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.19	0.17	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.21	0.19	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.23	0.21	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.29	0.26	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.36	0.32	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.42	0.39	36.50	0.00	0.00	62.50	0.00	0.00
11.00	0.65	0.60	37.00	0.00	0.00	63.00	0.00	0.00
11.50	1.06	1.03	37.50	0.00	0.00	63.50	0.00	0.00
12.00	4.89	5.26	38.00	0.00	0.00	64.00	0.00	0.00
12.50	1.45	1.26	38.50	0.00	0.00	64.50	0.00	0.00
13.00	0.76	0.68	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.49	0.44	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.39	0.36	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.33	0.30	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.26	0.24	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.23	0.22	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.22	0.20	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.20	0.18	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.18	0.17	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.16	0.15	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.14	0.13	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.14	0.13	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.13	0.12	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.13	0.12	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.12	0.11	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.12	0.11	46.50	0.00	0.00			
21.00	0.12	0.11	47.00	0.00	0.00			
21.50	0.11	0.10	47.50	0.00	0.00			
22.00	0.11	0.10	48.00	0.00	0.00			
22.50	0.10	0.09	48.50	0.00	0.00			
23.00	0.10	0.09	49.00	0.00	0.00			
23.50	0.09	0.09	49.50	0.00	0.00			
24.00	0.09	0.06	50.00	0.00	0.00			
24.50	0.00	0.00	50.50	0.00	0.00			
25.00	0.00	0.00	51.00	0.00	0.00			
25.50	0.00	0.00	51.50	0.00	0.00			
26.00	0.00	0.00	52.00	0.00	0.00			
26.50	0.00	0.00	52.50	0.00	0.00			

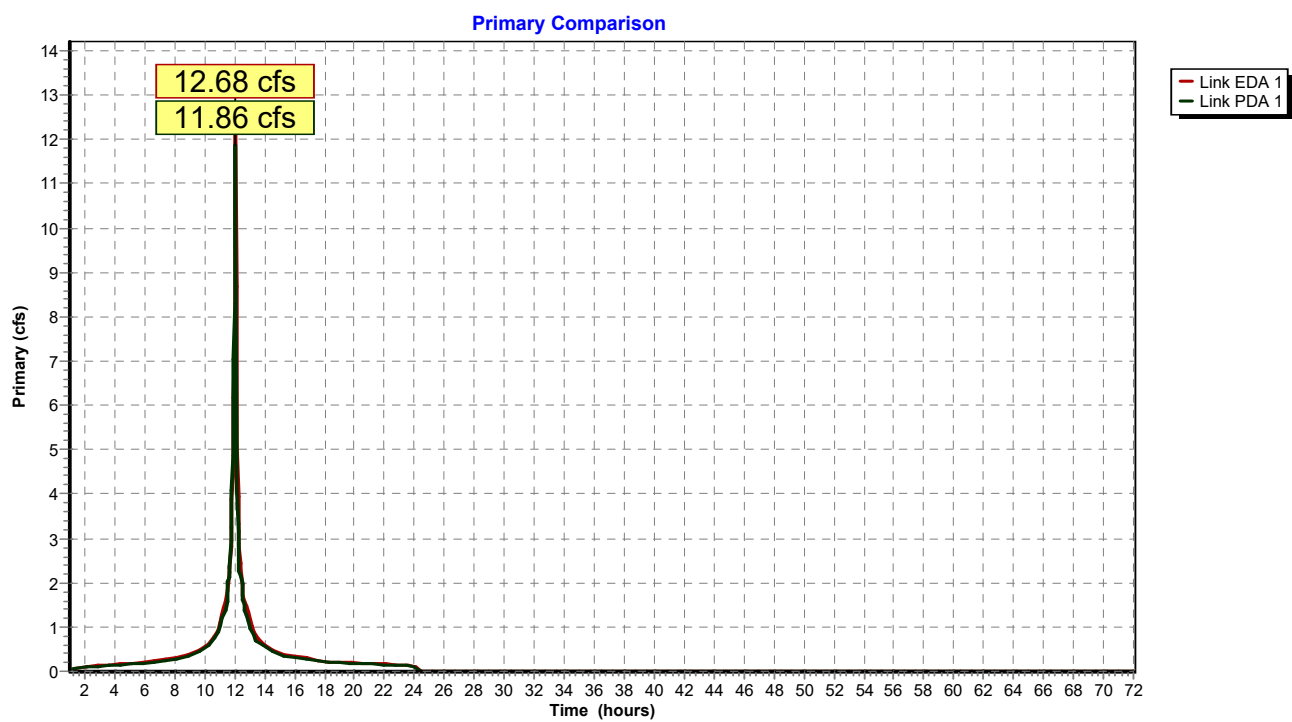
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NOAA 24-hr D 10-Year-2050 Rainfall=6.24", P2=4.01"

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

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Primary Comparison

Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)
1.00	0.03	0.03	27.00	0.00	0.00	53.00	0.00	0.00
1.50	0.07	0.06	27.50	0.00	0.00	53.50	0.00	0.00
2.00	0.09	0.08	28.00	0.00	0.00	54.00	0.00	0.00
2.50	0.11	0.10	28.50	0.00	0.00	54.50	0.00	0.00
3.00	0.13	0.11	29.00	0.00	0.00	55.00	0.00	0.00
3.50	0.15	0.13	29.50	0.00	0.00	55.50	0.00	0.00
4.00	0.16	0.14	30.00	0.00	0.00	56.00	0.00	0.00
4.50	0.17	0.15	30.50	0.00	0.00	56.50	0.00	0.00
5.00	0.18	0.16	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.19	0.17	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.20	0.18	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.23	0.20	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.26	0.23	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.29	0.25	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.32	0.28	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.35	0.31	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.38	0.34	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.47	0.43	35.50	0.00	0.00	61.50	0.00	0.00
10.00	0.57	0.52	36.00	0.00	0.00	62.00	0.00	0.00
10.50	0.67	0.62	36.50	0.00	0.00	62.50	0.00	0.00
11.00	1.03	0.96	37.00	0.00	0.00	63.00	0.00	0.00
11.50	1.67	1.65	37.50	0.00	0.00	63.50	0.00	0.00
12.00	7.66	8.31	38.00	0.00	0.00	64.00	0.00	0.00
12.50	2.27	1.98	38.50	0.00	0.00	64.50	0.00	0.00
13.00	1.18	1.07	39.00	0.00	0.00	65.00	0.00	0.00
13.50	0.76	0.69	39.50	0.00	0.00	65.50	0.00	0.00
14.00	0.61	0.56	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.51	0.47	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.41	0.38	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.36	0.34	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.34	0.31	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.31	0.29	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.28	0.26	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.25	0.24	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.23	0.21	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.21	0.20	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.21	0.19	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.20	0.19	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.19	0.18	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.19	0.17	46.50	0.00	0.00			
21.00	0.18	0.17	47.00	0.00	0.00			
21.50	0.17	0.16	47.50	0.00	0.00			
22.00	0.17	0.15	48.00	0.00	0.00			
22.50	0.16	0.15	48.50	0.00	0.00			
23.00	0.15	0.14	49.00	0.00	0.00			
23.50	0.14	0.13	49.50	0.00	0.00			
24.00	0.14	0.10	50.00	0.00	0.00			
24.50	0.00	0.00	50.50	0.00	0.00			
25.00	0.00	0.00	51.00	0.00	0.00			
25.50	0.00	0.00	51.50	0.00	0.00			
26.00	0.00	0.00	52.00	0.00	0.00			
26.50	0.00	0.00	52.50	0.00	0.00			

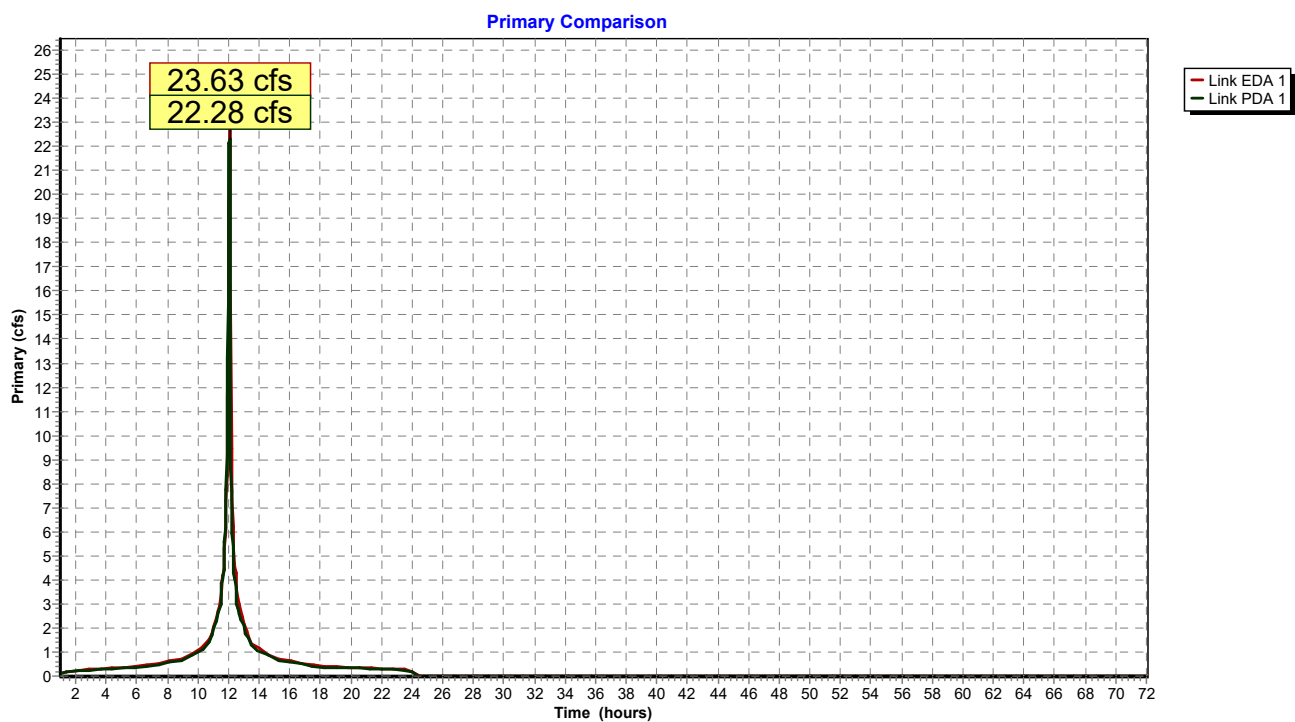
EX - PR

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

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EX - PR

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

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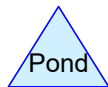
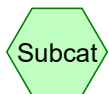
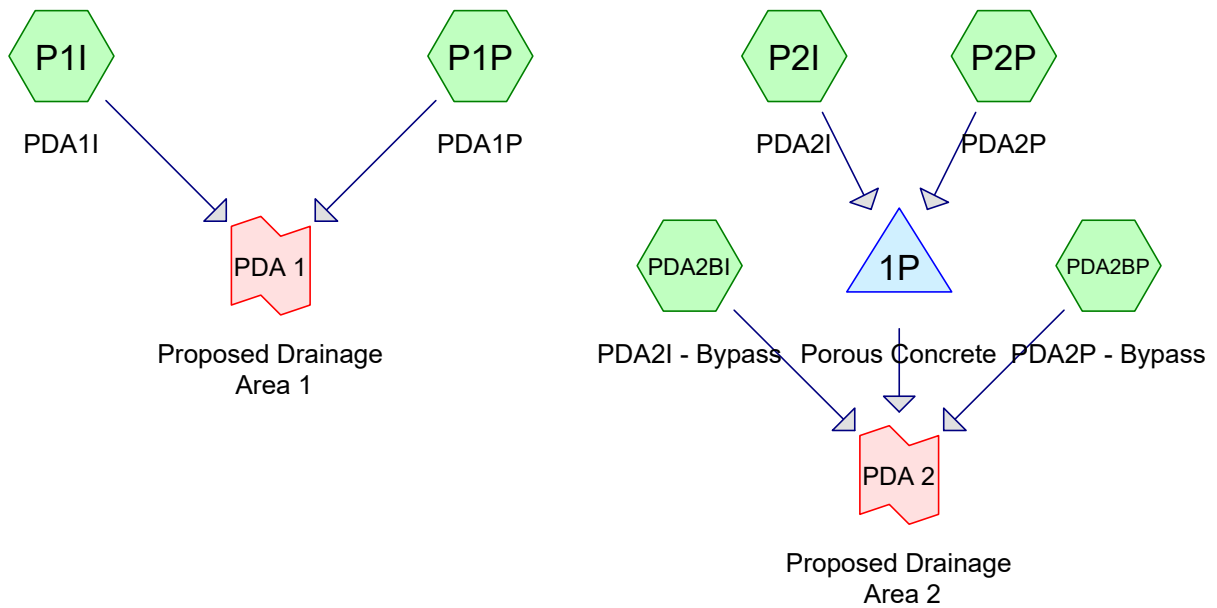
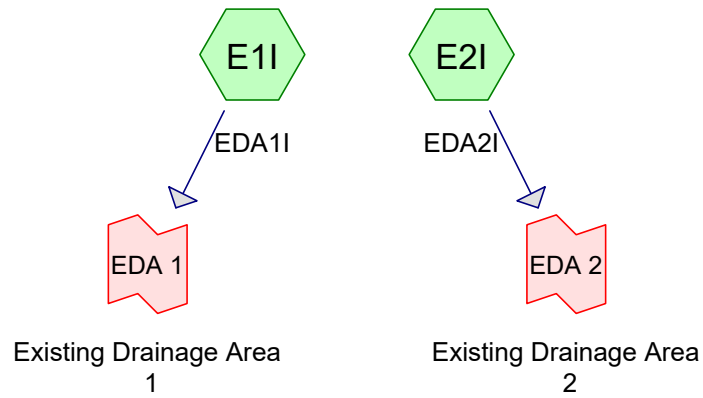
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Primary Comparison

Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)	Time (hours)	Link EDA 1 (cfs)	Link PDA 1 (cfs)
1.00	0.14	0.13	27.00	0.00	0.00	53.00	0.00	0.00
1.50	0.20	0.17	27.50	0.00	0.00	53.50	0.00	0.00
2.00	0.24	0.21	28.00	0.00	0.00	54.00	0.00	0.00
2.50	0.27	0.23	28.50	0.00	0.00	54.50	0.00	0.00
3.00	0.29	0.25	29.00	0.00	0.00	55.00	0.00	0.00
3.50	0.31	0.27	29.50	0.00	0.00	55.50	0.00	0.00
4.00	0.33	0.29	30.00	0.00	0.00	56.00	0.00	0.00
4.50	0.35	0.31	30.50	0.00	0.00	56.50	0.00	0.00
5.00	0.36	0.32	31.00	0.00	0.00	57.00	0.00	0.00
5.50	0.38	0.34	31.50	0.00	0.00	57.50	0.00	0.00
6.00	0.40	0.35	32.00	0.00	0.00	58.00	0.00	0.00
6.50	0.45	0.40	32.50	0.00	0.00	58.50	0.00	0.00
7.00	0.50	0.45	33.00	0.00	0.00	59.00	0.00	0.00
7.50	0.55	0.50	33.50	0.00	0.00	59.50	0.00	0.00
8.00	0.61	0.55	34.00	0.00	0.00	60.00	0.00	0.00
8.50	0.66	0.60	34.50	0.00	0.00	60.50	0.00	0.00
9.00	0.71	0.66	35.00	0.00	0.00	61.00	0.00	0.00
9.50	0.90	0.83	35.50	0.00	0.00	61.50	0.00	0.00
10.00	1.08	1.00	36.00	0.00	0.00	62.00	0.00	0.00
10.50	1.27	1.19	36.50	0.00	0.00	62.50	0.00	0.00
11.00	1.93	1.84	37.00	0.00	0.00	63.00	0.00	0.00
11.50	3.12	3.14	37.50	0.00	0.00	63.50	0.00	0.00
12.00	14.29	15.64	38.00	0.00	0.00	64.00	0.00	0.00
12.50	4.22	3.72	38.50	0.00	0.00	64.50	0.00	0.00
13.00	2.20	2.00	39.00	0.00	0.00	65.00	0.00	0.00
13.50	1.42	1.29	39.50	0.00	0.00	65.50	0.00	0.00
14.00	1.13	1.05	40.00	0.00	0.00	66.00	0.00	0.00
14.50	0.94	0.88	40.50	0.00	0.00	66.50	0.00	0.00
15.00	0.76	0.70	41.00	0.00	0.00	67.00	0.00	0.00
15.50	0.68	0.63	41.50	0.00	0.00	67.50	0.00	0.00
16.00	0.63	0.59	42.00	0.00	0.00	68.00	0.00	0.00
16.50	0.57	0.54	42.50	0.00	0.00	68.50	0.00	0.00
17.00	0.52	0.49	43.00	0.00	0.00	69.00	0.00	0.00
17.50	0.47	0.44	43.50	0.00	0.00	69.50	0.00	0.00
18.00	0.42	0.39	44.00	0.00	0.00	70.00	0.00	0.00
18.50	0.40	0.37	44.50	0.00	0.00	70.50	0.00	0.00
19.00	0.38	0.36	45.00	0.00	0.00	71.00	0.00	0.00
19.50	0.37	0.35	45.50	0.00	0.00	71.50	0.00	0.00
20.00	0.36	0.34	46.00	0.00	0.00	72.00	0.00	0.00
20.50	0.35	0.32	46.50	0.00	0.00			
21.00	0.33	0.31	47.00	0.00	0.00			
21.50	0.32	0.30	47.50	0.00	0.00			
22.00	0.31	0.29	48.00	0.00	0.00			
22.50	0.29	0.28	48.50	0.00	0.00			
23.00	0.28	0.26	49.00	0.00	0.00			
23.50	0.27	0.25	49.50	0.00	0.00			
24.00	0.25	0.18	50.00	0.00	0.00			
24.50	0.00	0.00	50.50	0.00	0.00			
25.00	0.00	0.00	51.00	0.00	0.00			
25.50	0.00	0.00	51.50	0.00	0.00			
26.00	0.00	0.00	52.00	0.00	0.00			
26.50	0.00	0.00	52.50	0.00	0.00			

C. WATER QUALITY

- ◆ **Water Quality Storm Hydrograph**



EX - PR

NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Page 2

Time span=1.00-72.00 hrs, dt=0.05 hrs, 1421 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1I: EDA1I	Runoff Area=1.994 ac 100.00% Impervious Runoff Depth>0.82" Flow Length=746' Tc=3.5 min CN=98 Runoff=5.91 cfs 0.135 af
SubcatchmentE2I: EDA2I	Runoff Area=0.209 ac 100.00% Impervious Runoff Depth>0.80" Flow Length=455' Tc=2.9 min CN=98 Runoff=0.63 cfs 0.014 af
SubcatchmentP1I: PDA1I	Runoff Area=1.731 ac 100.00% Impervious Runoff Depth>0.71" Flow Length=256' Tc=0.8 min CN=98 Runoff=5.30 cfs 0.103 af
SubcatchmentP1P: PDA1P	Runoff Area=0.148 ac 0.00% Impervious Runoff Depth>0.17" Flow Length=420' Tc=5.8 min CN=80 Runoff=0.07 cfs 0.002 af
SubcatchmentP2I: PDA2I	Runoff Area=0.243 ac 100.00% Impervious Runoff Depth>0.79" Flow Length=336' Tc=2.7 min CN=98 Runoff=0.73 cfs 0.016 af
SubcatchmentP2P: PDA2P	Runoff Area=0.020 ac 0.00% Impervious Runoff Depth>0.17" Flow Length=9' Slope=0.0180 '/' Tc=1.5 min CN=80 Runoff=0.01 cfs 0.000 af
SubcatchmentPDA2BI: PDA2I - Bypass	Runoff Area=0.055 ac 100.00% Impervious Runoff Depth>0.81" Flow Length=474' Tc=3.4 min CN=98 Runoff=0.16 cfs 0.004 af
SubcatchmentPDA2BP: PDA2P - Bypass	Runoff Area=0.007 ac 0.00% Impervious Runoff Depth>0.17" Flow Length=324' Tc=3.4 min CN=80 Runoff=0.00 cfs 0.000 af
Pond 1P: Porous Concrete	Peak Elev=81.84' Storage=547 cf Inflow=0.74 cfs 0.016 af Outflow=0.07 cfs 0.010 af
Link EDA 1: Existing Drainage Area 1	Inflow=5.91 cfs 0.135 af Primary=5.91 cfs 0.135 af
Link EDA 2: Existing Drainage Area 2	Inflow=0.63 cfs 0.014 af Primary=0.63 cfs 0.014 af
Link PDA 1: Proposed Drainage Area 1	Inflow=5.32 cfs 0.105 af Primary=5.32 cfs 0.105 af
Link PDA 2: Proposed Drainage Area 2	Inflow=0.17 cfs 0.014 af Primary=0.17 cfs 0.014 af

Total Runoff Area = 4.407 ac Runoff Volume = 0.274 af Average Runoff Depth = 0.75"
3.97% Pervious = 0.175 ac 96.03% Impervious = 4.232 ac

EX - PR

NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Page 3

Summary for Subcatchment E1I: EDA1I

Runoff = 5.91 cfs @ 1.05 hrs, Volume= 0.135 af, Depth> 0.82"
 Routed to Link EDA 1 : Existing Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

Area (ac)	CN	Description
1.994	98	Paved parking, HSG D
1.994		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0375	1.82		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.0	292	0.0530	4.67		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.2	45	0.0230	3.08		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
3.5	746	Total			

EX - PR

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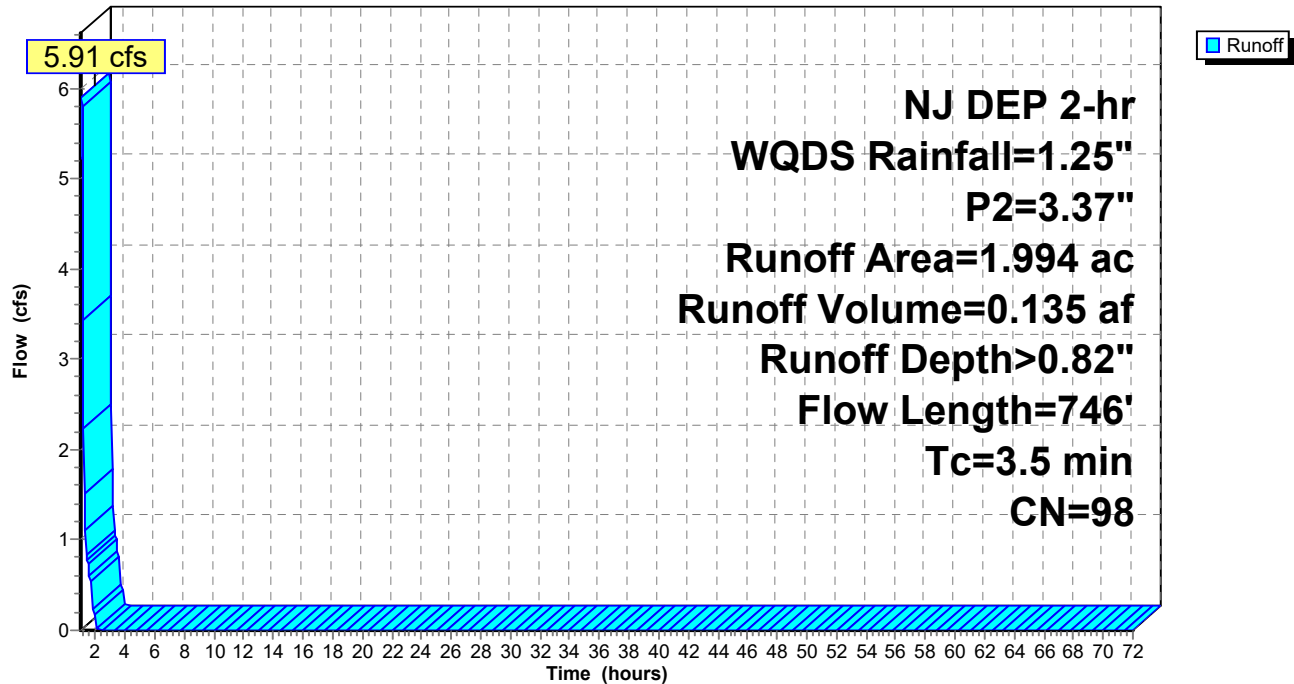
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Page 4

Subcatchment E1I: EDA1I

Hydrograph



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NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Summary for Subcatchment E2I: EDA2I

Runoff = 0.63 cfs @ 1.05 hrs, Volume= 0.014 af, Depth> 0.80"
 Routed to Link EDA 2 : Existing Drainage Area 2

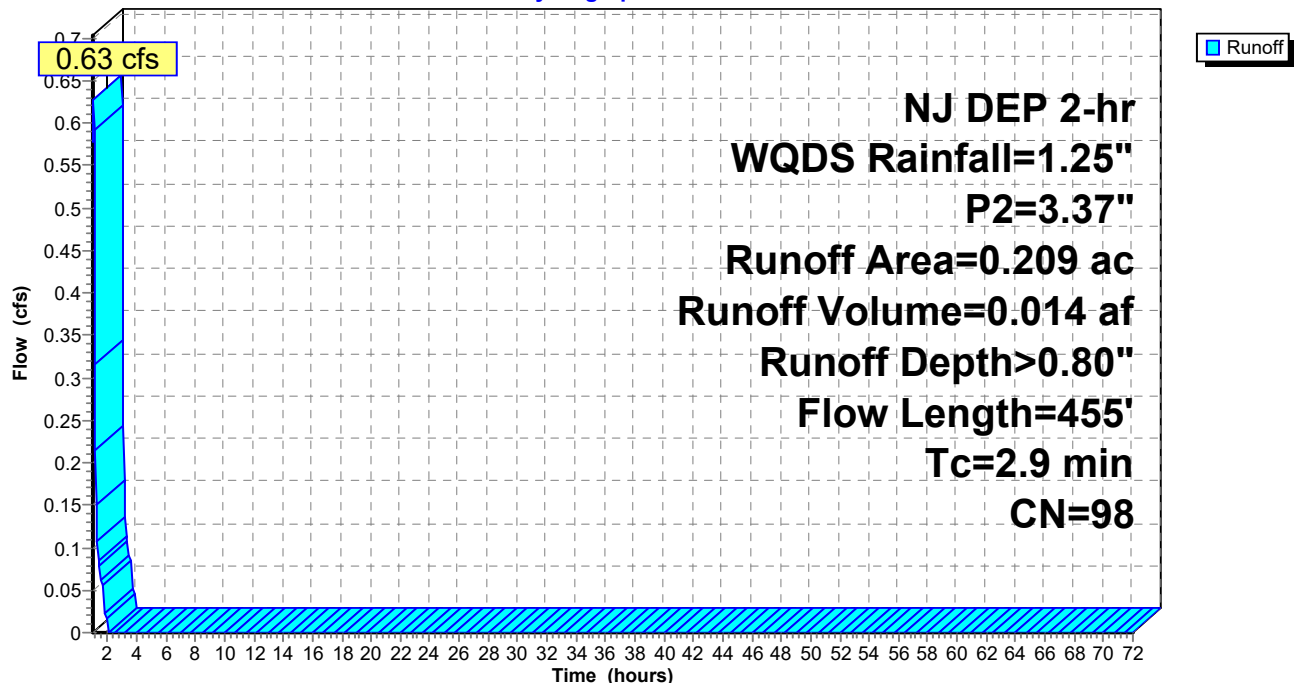
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

Area (ac)	CN	Description
0.209	98	Paved parking, HSG D
0.209		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	24	0.0280	1.21		Sheet Flow, G-H Smooth surfaces n= 0.011 P2= 3.37"
1.9	299	0.0162	2.58		Shallow Concentrated Flow, H-I Paved Kv= 20.3 fps
0.1	31	0.0260	4.98	8.81	Pipe Channel, I-J 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
0.6	101	0.0100	2.74	3.36	Pipe Channel, J-K 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.9	455	Total			

Subcatchment E2I: EDA2I

Hydrograph



EX - PR

NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Page 6

Summary for Subcatchment P1I: PDA1I

Runoff = 5.30 cfs @ 1.05 hrs, Volume= 0.103 af, Depth> 0.71"
 Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

Area (ac)	CN	Description
1.731	98	Paved parking, HSG D
1.731		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0150	0.69		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
0.3	19	0.0060	1.25		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.1	28	0.0340	3.74		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.1	56	0.0200	7.58	5.95	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	64	0.0880	15.90	12.49	Pipe Channel, E-F 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	84	0.0600	13.13	10.31	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.8	256	Total			

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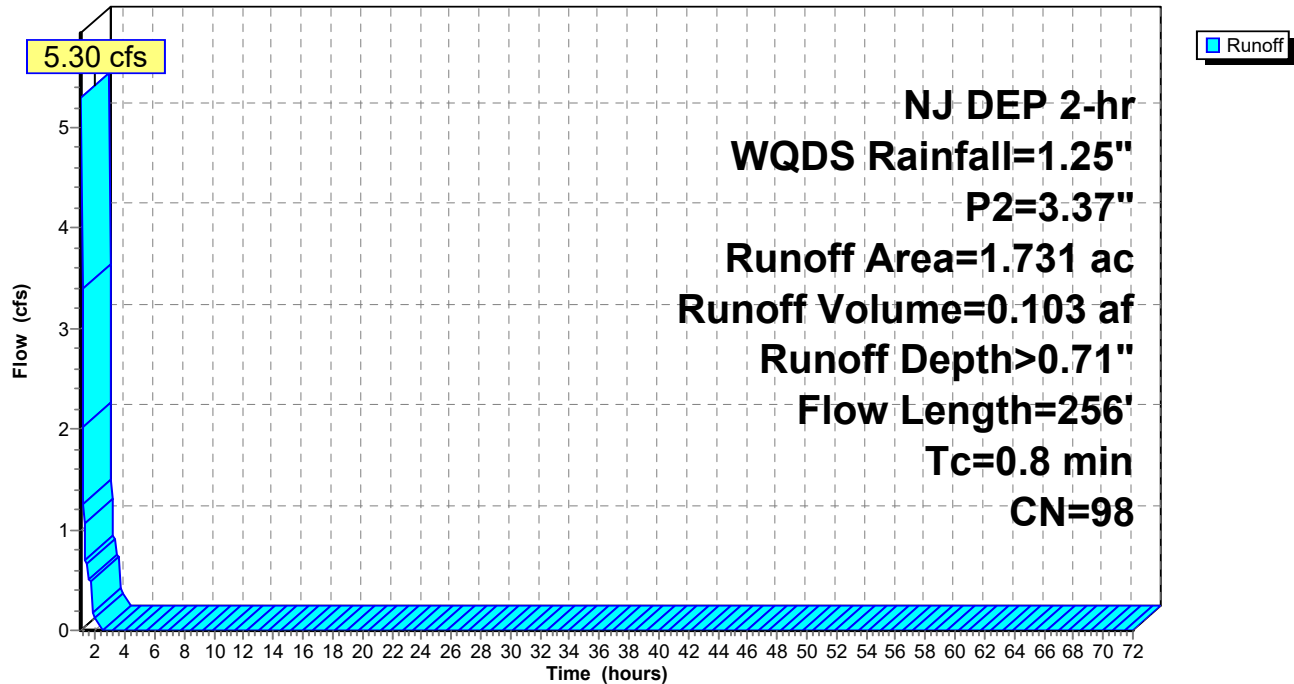
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Subcatchment P1I: PDA1I

Hydrograph



EX - PR

NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Summary for Subcatchment P1P: PDA1P

Runoff = 0.07 cfs @ 1.15 hrs, Volume= 0.002 af, Depth> 0.17"

Routed to Link PDA 1 : Proposed Drainage Area 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

Area (ac)	CN	Description
0.148	80	>75% Grass cover, Good, HSG D
0.148		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	80	0.0875	0.30		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"
0.0	16	0.1300	5.80		Shallow Concentrated Flow, I-J Unpaved Kv= 16.1 fps
0.0	7	0.0340	2.97		Shallow Concentrated Flow, J-K Unpaved Kv= 16.1 fps
0.0	8	0.0425	3.32		Shallow Concentrated Flow, K-L Unpaved Kv= 16.1 fps
1.3	260	0.0038	3.30	2.60	Pipe Channel, L-M 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
0.1	49	0.0220	7.95	6.25	Pipe Channel, N-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
5.8	420	Total			

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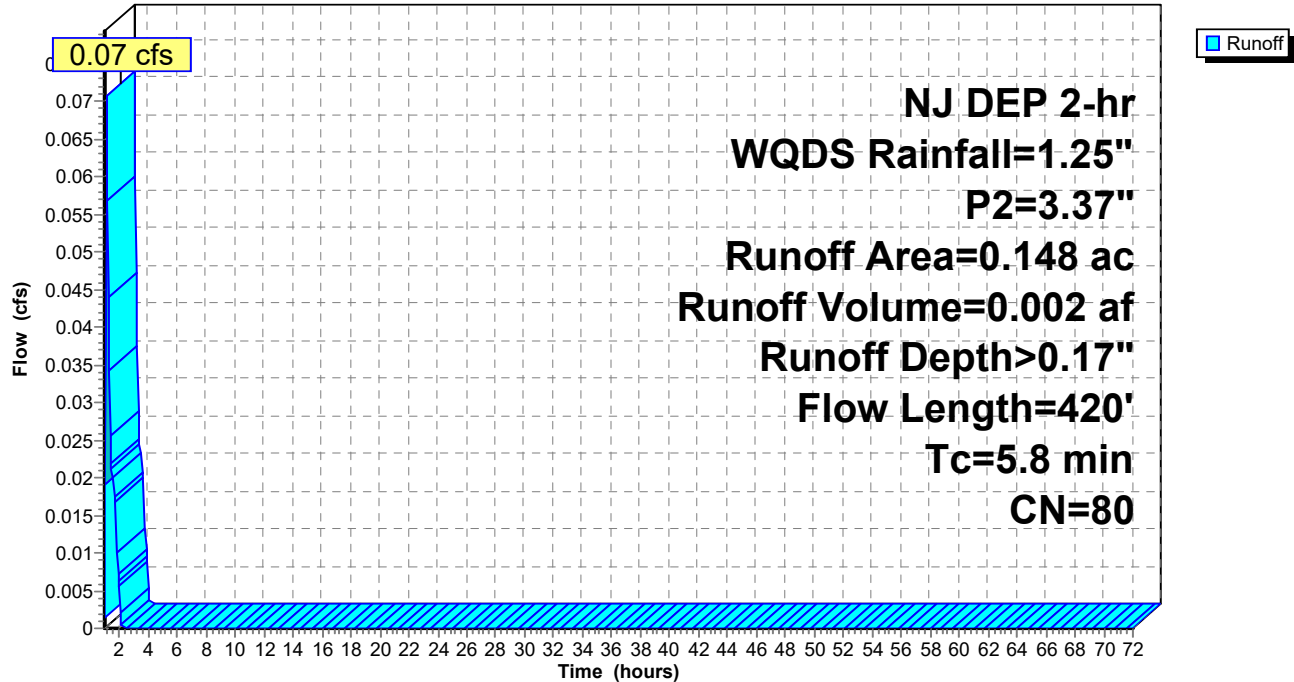
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Subcatchment P1P: PDA1P

Hydrograph



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NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Summary for Subcatchment P2I: PDA2I

Runoff = 0.73 cfs @ 1.05 hrs, Volume= 0.016 af, Depth> 0.79"
Routed to Pond 1P : Porous Concrete

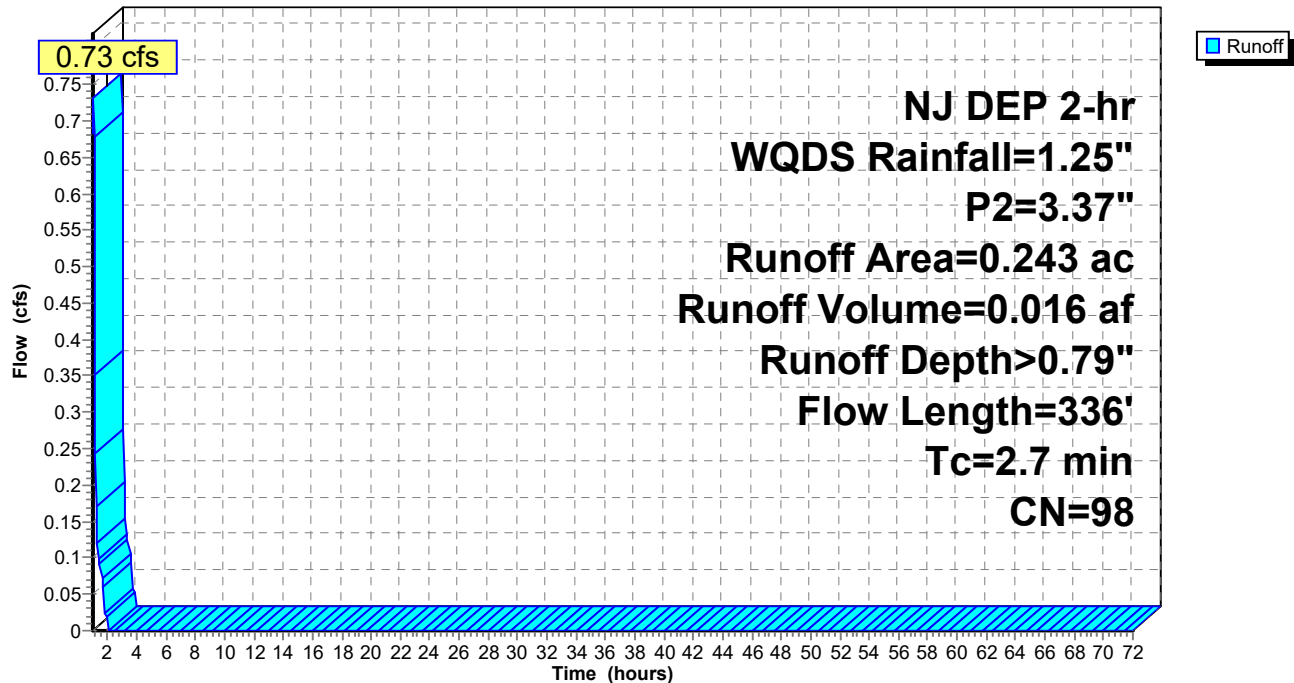
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

Area (ac)	CN	Description
0.243	98	Paved parking, HSG D
0.243		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	49	0.0190	1.20		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
2.7	336	Total			

Subcatchment P2I: PDA2I

Hydrograph



EX - PR

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NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Summary for Subcatchment P2P: PDA2P

Runoff = 0.01 cfs @ 1.09 hrs, Volume= 0.000 af, Depth> 0.17"
Routed to Pond 1P : Porous Concrete

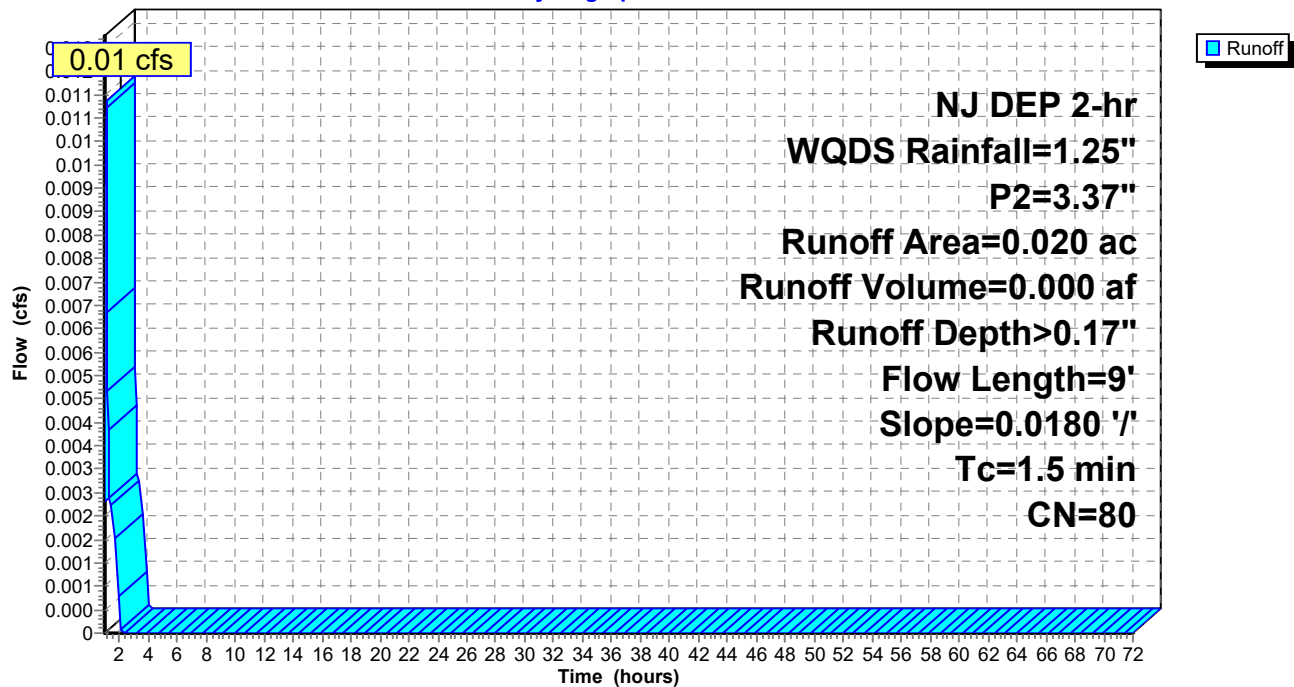
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

Area (ac)	CN	Description
0.020	80	>75% Grass cover, Good, HSG D
0.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	9	0.0180	0.10		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"

Subcatchment P2P: PDA2P

Hydrograph



EX - PR

NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Summary for Subcatchment PDA2BI: PDA2I - Bypass

Runoff = 0.16 cfs @ 1.05 hrs, Volume= 0.004 af, Depth> 0.81"

Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

Area (ac)	CN	Description
0.055	98	Paved parking, HSG D
0.055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	49	0.0190	1.20		Sheet Flow, A-B Smooth surfaces n= 0.011 P2= 3.37"
1.1	154	0.0140	2.40		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.4	474	Total			

EX - PR

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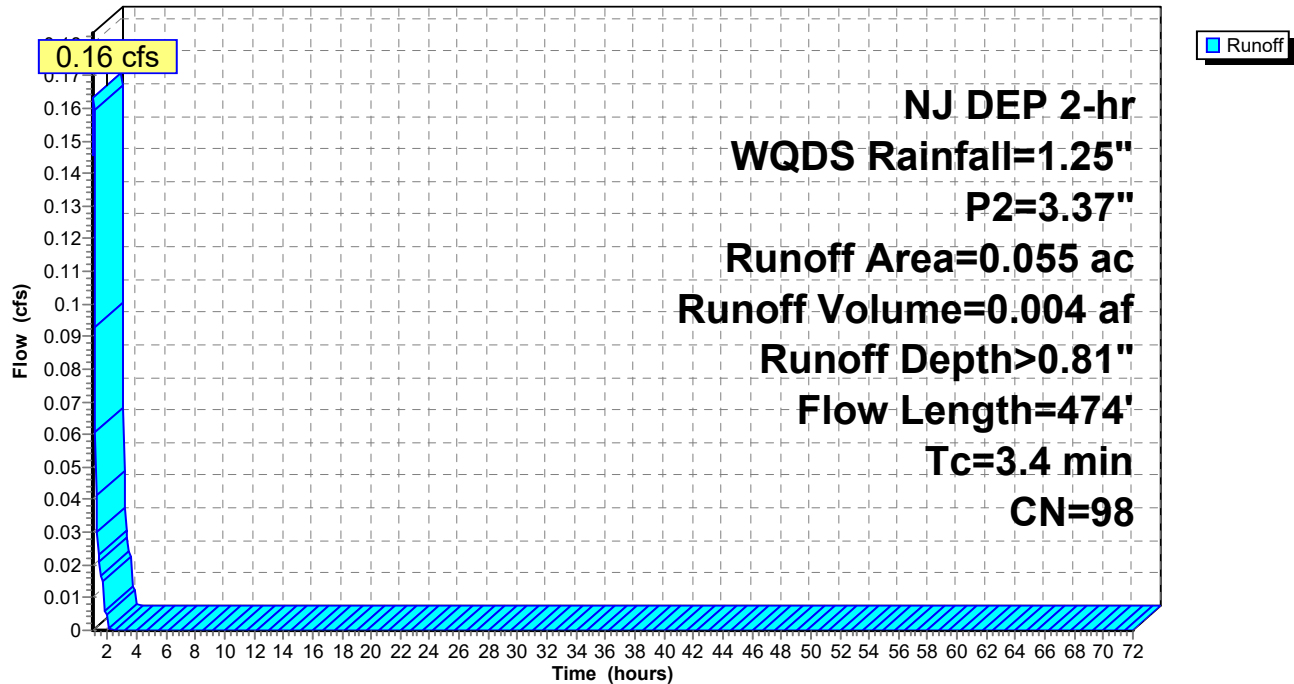
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Subcatchment PDA2BI: PDA2I - Bypass

Hydrograph



EX - PR

NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Summary for Subcatchment PDA2BP: PDA2P - Bypass

Runoff = 0.00 cfs @ 1.11 hrs, Volume= 0.000 af, Depth> 0.17"

Routed to Link PDA 2 : Proposed Drainage Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

Area (ac)	CN	Description
0.007	80	>75% Grass cover, Good, HSG D
0.007		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	9	0.0180	0.10		Sheet Flow, H-I Grass: Short n= 0.150 P2= 3.37"
0.1	18	0.0180	2.72		Shallow Concentrated Flow, I-J Paved Kv= 20.3 fps
0.2	26	0.0150	2.49		Shallow Concentrated Flow, J-C Paved Kv= 20.3 fps
0.1	9	0.0110	2.13		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
0.8	124	0.0180	2.72		Shallow Concentrated Flow, D-E Paved Kv= 20.3 fps
0.1	38	0.0284	11.84	20.92	Pipe Channel, E-F 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.011 Concrete pipe, straight & clean
0.6	100	0.0100	2.74	3.36	Pipe Channel, F-G 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
3.4	324	Total			

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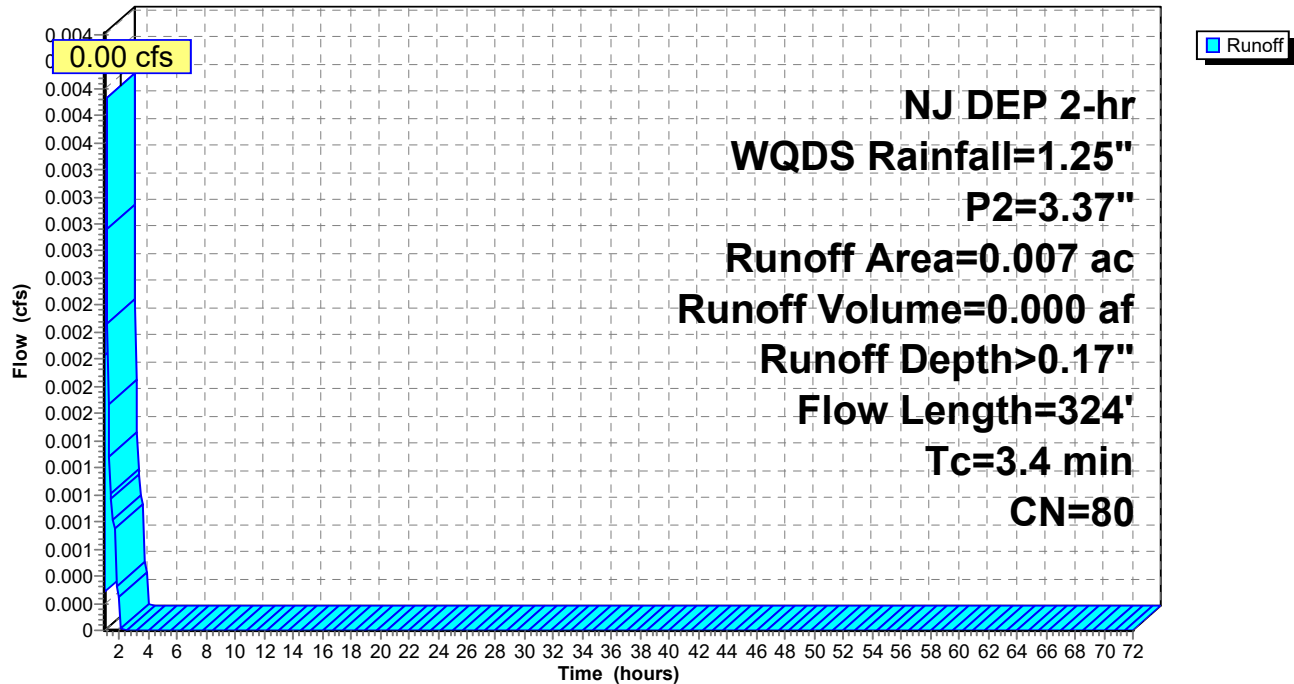
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Subcatchment PDA2BP: PDA2P - Bypass

Hydrograph



EX - PR

NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Summary for Pond 1P: Porous Concrete

Inflow Area = 0.263 ac, 92.40% Impervious, Inflow Depth > 0.74" for WQDS event
 Inflow = 0.74 cfs @ 1.05 hrs, Volume= 0.016 af
 Outflow = 0.07 cfs @ 1.74 hrs, Volume= 0.010 af, Atten= 91%, Lag= 41.5 min
 Primary = 0.07 cfs @ 1.74 hrs, Volume= 0.010 af
 Routed to Link PDA 2 : Proposed Drainage Area 2

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 81.84' @ 1.74 hrs Surf.Area= 3,335 sf Storage= 547 cf

Plug-Flow detention time= 162.1 min calculated for 0.009 af (54% of inflow)
 Center-of-Mass det. time= 131.7 min (204.4 - 72.7)

Volume	Invert	Avail.Storage	Storage Description
#1	81.43'	5,963 cf	Porous Paving Storage Area (Prismatic) , listed below (Recalc) 14,907 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.43	3,335	0	0
85.90	3,335	14,907	14,907

Device	Routing	Invert	Outlet Devices
#1	Primary	81.58'	15.0" Round Culvert L= 38.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 81.58' / 81.20' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	81.63'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	84.15'	0.5' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.07 cfs @ 1.74 hrs HW=81.84' (Free Discharge)

1=Culvert (Passes 0.07 cfs of 0.35 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.07 cfs @ 1.56 fps)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

EX - PR

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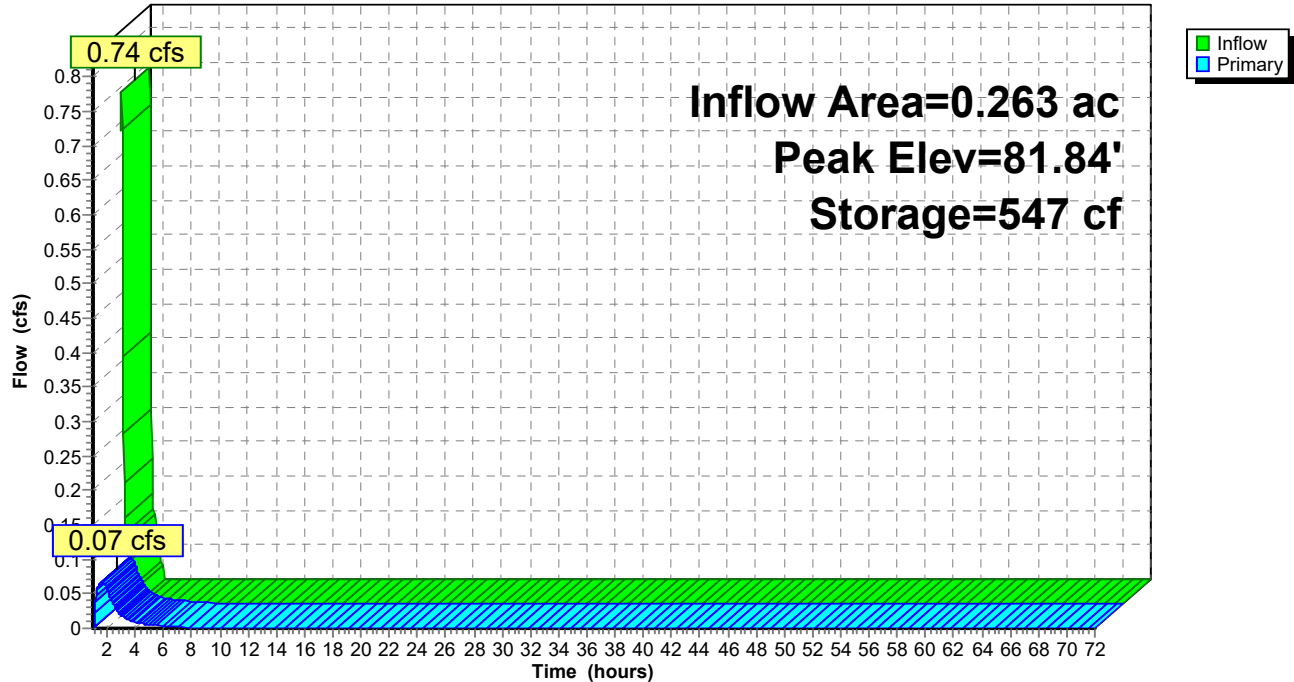
NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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Pond 1P: Porous Concrete

Hydrograph



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NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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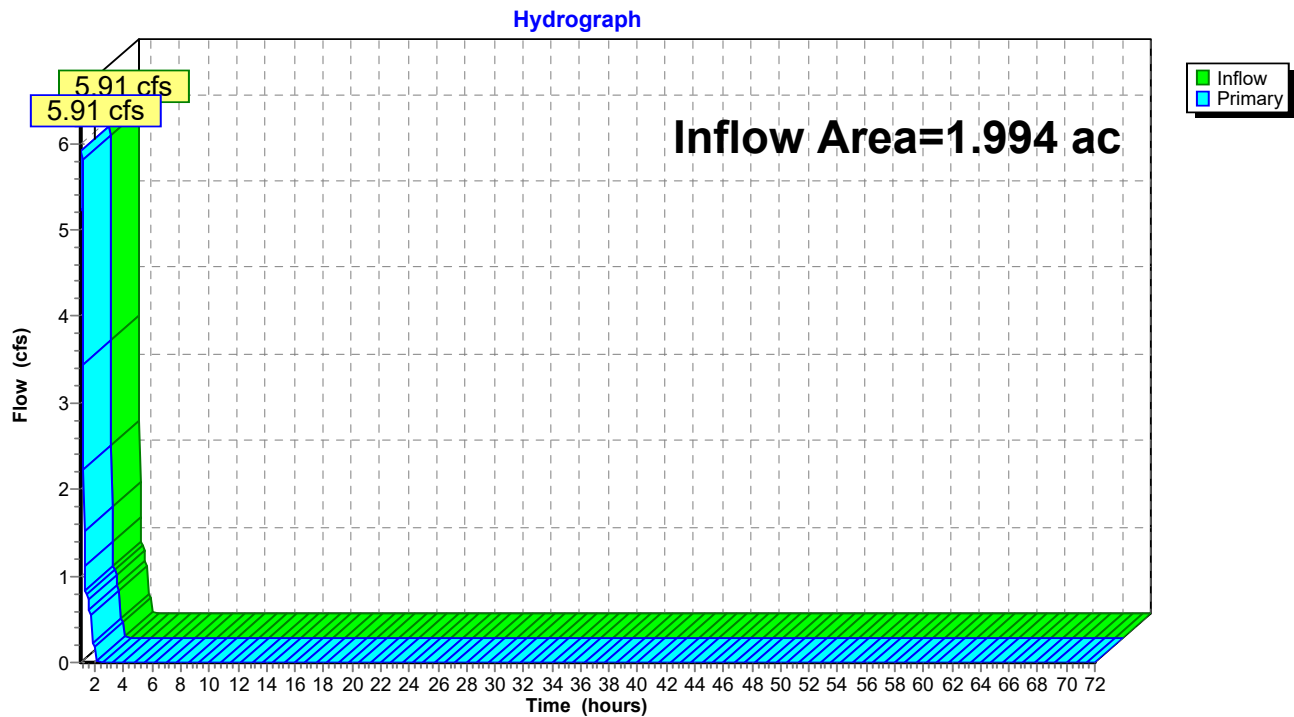
Page 18

Summary for Link EDA 1: Existing Drainage Area 1

Inflow Area = 1.994 ac, 100.00% Impervious, Inflow Depth > 0.82" for WQDS event
Inflow = 5.91 cfs @ 1.05 hrs, Volume= 0.135 af
Primary = 5.91 cfs @ 1.05 hrs, Volume= 0.135 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

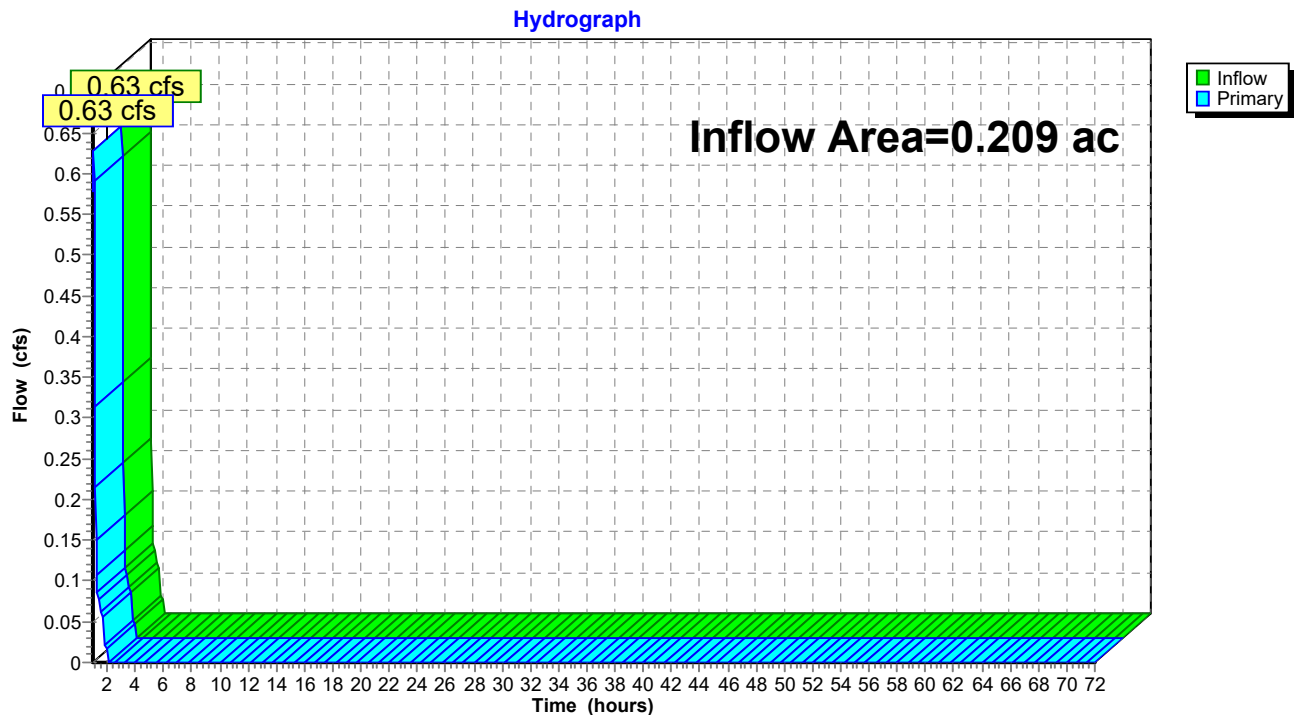
Link EDA 1: Existing Drainage Area 1



Summary for Link EDA 2: Existing Drainage Area 2

Inflow Area = 0.209 ac, 100.00% Impervious, Inflow Depth > 0.80" for WQDS event
Inflow = 0.63 cfs @ 1.05 hrs, Volume= 0.014 af
Primary = 0.63 cfs @ 1.05 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node EX

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link EDA 2: Existing Drainage Area 2

EX - PR

NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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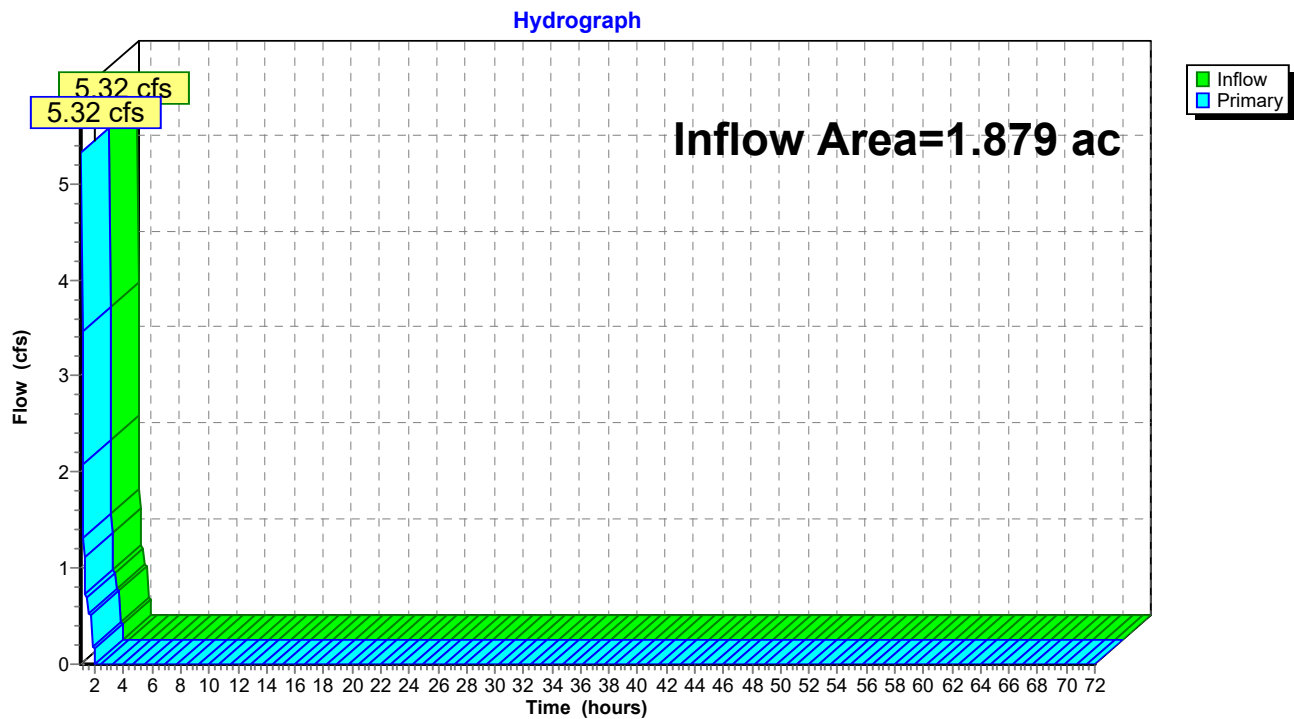
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Summary for Link PDA 1: Proposed Drainage Area 1

Inflow Area = 1.879 ac, 92.12% Impervious, Inflow Depth > 0.67" for WQDS event
Inflow = 5.32 cfs @ 1.05 hrs, Volume= 0.105 af
Primary = 5.32 cfs @ 1.05 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 1: Proposed Drainage Area 1

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NJ DEP 2-hr WQDS Rainfall=1.25", P2=3.37"

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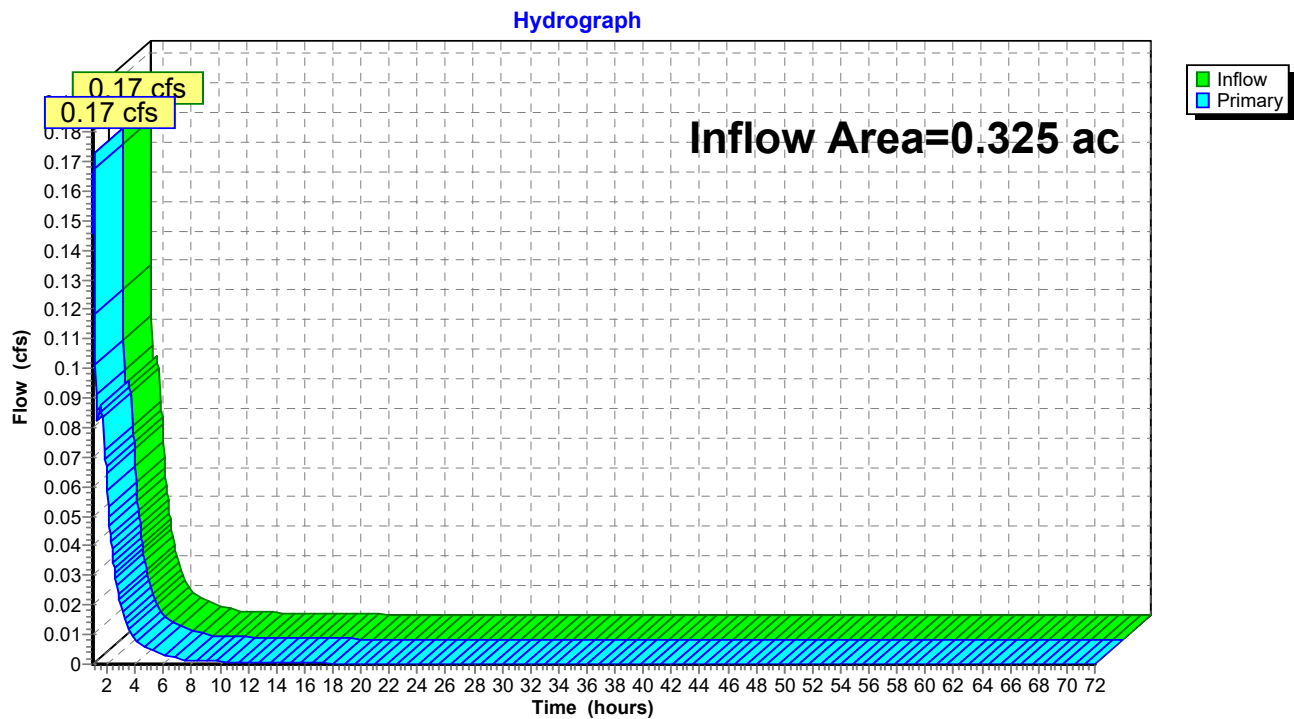
Page 21

Summary for Link PDA 2: Proposed Drainage Area 2

Inflow Area = 0.325 ac, 91.69% Impervious, Inflow Depth > 0.52" for WQDS event
Inflow = 0.17 cfs @ 1.08 hrs, Volume= 0.014 af
Primary = 0.17 cfs @ 1.08 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-72.00 hrs, dt= 0.05 hrs

Link PDA 2: Proposed Drainage Area 2



D. CONVEYANCE CALCULATIONS

- ◆ **Pipe Sizing**



35 Technology Drive, Warren, NJ 07059
(908) 668-8300

Date: 11/4/2025
Project: Bergenfield, NJ
Project No: J211080

Calculated By: RND
Checked By: BC

Manning's Equation

Design Parameters:

Pipe Diameter, D	12 in
Pipe Material	RCP
Slope, s	8.76 %
Flow Depth, y	FULL

Calculations:

Cross-Sectional Area, $A = D^2/8 [\theta - \sin(\theta)] =$	0.79 ft ²
Manning's Coefficient, n	0.013
Hydraulic Radius, R	0.25 ft
Angle, $\theta =$	6.28 radians
Wetted Perimeter, $P = \theta D/2$	3.14 ft
Flow Depth, y	1.00 ft
Flow Top Width, $T = 2[y(D-y)]^{1/2}$	0.00 ft
Gravity Constant, g	32.174 ft/s ²
Froude Number, F	0.00

Subcritical Flow

• Flow & Velocity:

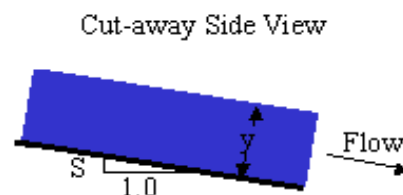
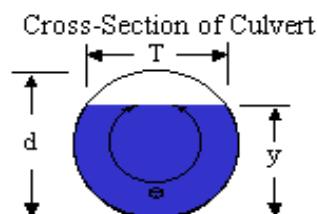
Flow, $Q_o = \frac{1.486 \cdot R^{2/3} s^{1/2} A}{n}$

10.54 cfs

6.82 MGD

Velocity, $V = Q/A$

13.43 fps



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

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

E. SUPPORTING DOCUMENTS

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

May 3, 2024

via email

BOHLER ENGINEERING NJ, LLC
30 Garber Square
Ridgewood, New Jersey 07450

Attention: Benjamin Crowder, PE, LEED AP BD+C
Principal

**Regarding: PRELIMINARY GEOTECHNICAL INVESTIGATION &
PRELIMINARY SWM AREA EVALUATION
PROPOSED MIXED-USE REDEVELOPMENT
10 SOUTH WASHINGTON AVENUE
BLOCK 126, LOTS 9 - 12 & 14 - 16
BERGENFIELD, BERGEN COUNTY, NEW JERSEY
WHITESTONE PROJECT NO.: GJ2421615.000**

Dear Mr. Crowder:

Whitestone Associates, Inc. (Whitestone) has completed a preliminary geotechnical investigation and preliminary stormwater management (SWM) area evaluation at the above-referenced site. The results of the limited evaluation and preliminary recommendations presented below are based on the soil conditions disclosed from a limited number of subsurface tests conducted during Whitestone's field investigation. Recommendations for further investigation also are included herein.

The purpose of the preliminary subsurface soils investigation was to assess anticipated geologic features, shallow groundwater and/or rock, refusal depths, existing fill, and the potential feasibility of shallow foundations and/or expected earthwork requirements. While the scope of this preliminary investigation will not be sufficient to formulate detailed design recommendations and a more comprehensive geotechnical investigation ultimately will be required, this preliminary investigation may be used to assess potentially development impactive geotechnical issues to support preliminary studies regarding the feasibility of developing the property.

1.0 SUMMARY OF FINDINGS

In general, the subsurface conditions preliminarily indicate conditions suitable for conventional shallow foundations and a ground-supported floor slab. The exploration indicated the presence of moisture-sensitive soils within portions of the site and relatively shallow groundwater that will impact the planned construction. Based on past experience with similar soils, earthwork activities will require stringent soil moisture control efforts. Depending on the time of year of construction, site work should anticipate overexcavation of moisture sensitive soils in structural areas, using mechanical and/or chemical subgrade stabilization techniques, and exercising detailed attention to construction methods while maintaining strict moisture control. Difficult excavation should be anticipated across the subject site, particularly within areas where deeper cuts are proposed. Additional subsurface investigation should be conducted once proposed grading is finalized.

Office Locations:

2.0 PROJECT DESCRIPTION

2.1 Site Location & Existing Conditions

The subject property located at 10 South Washington Avenue (Block 126, Lots 9 through 12 and 14 through 16) in Bergenfield, Bergen County, New Jersey currently houses multiple retail structures with associated pavements, landscaping areas, and utilities. Based on the July 27, 2022 *ALTA/NSPS Land Title Survey* prepared by Control Point Associates, Inc. (CPA), the site has grade changes of approximately 22 feet with a high elevation of approximately 90 feet above the North American Vertical Datum of 1988 (NAVD 88) at the northeastern corner of the site and a low elevation of approximately 68 feet above NAVD 88 at the western portion of the site.

2.2 Site Geology

The subject property is situated in the Newark Basin Geomorphic Province of New Jersey. Specifically, this area is underlain by the Lower Jurassic-age and Upper Triassic-age Passaic Formation Sandstone and Siltstone facies, which is predominantly composed of reddish brown to brownish purple and grayish-red argillaceous siltstone; silty mudstone; argillaceous, very fine-grained sandstone; and shale. 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 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. Overburden materials also include man-made fill associated with past and present development of the subject site.

2.3 Proposed Construction

Based on information provided by Bohler Engineering NJ, LLC (Bohler) including the August 1, 2022 (last revised) *Redevelopment Plan Concept* prepared by Bohler, the proposed redevelopment is anticipated to include demolishing the existing site structures and constructing an approximately 70,000-square feet (maximum footprint), six-story mixed-use building with new SWM facilities and associated pavements, landscaped areas, and utilities. The top four levels of the proposed building are anticipated to consist of residential space, and the bottom two levels of the proposed building are anticipated to consist of parking. Based on the existing topography, Whitestone assumes that the eastern portion of the proposed garage level parking will be below-grade.

Detailed structural loading or grading information has not been provided. Whitestone assumes cuts on the order of 20 feet within the eastern portion of the site will be required based on existing topography. Structural loading is anticipated to be less than 450 kips for columns, 6.0 kips per linear foot for walls, and 125 pounds per square foot for floor slabs. The overall building height is anticipated to be greater than 40 feet.

Any revisions to the design details enumerated in this report should be brought to the attention of Whitestone for additional evaluation as warranted.

3.0 FIELD & LABORATORY WORK

3.1 Field Exploration

Field exploration at the project site was conducted by means of three borings (identified as B-1 through B-3) and four soil profile pits (identified as SPP-1 through SPP-4). The borings were conducted with a truck-mounted CME-45 drill rig using hollow-stem auger drilling methods, split-spoon, and rock core sampling

techniques. The soil profile pits were conducted with a track-mounted excavator. The subsurface tests were conducted at the test locations provided by Bohler and indicated on the March 27, 2024 *TP Location on Survey* prepared by Bohler, to depths ranging from approximately eight feet below ground surface (fbgs) to 33 fbgs. The subsurface tests subsequently were backfilled to the surface with excavated soils from the investigation or grout, where required. The borings were patched surficially with asphaltic concrete cold patch or Portland concrete cement, where appropriate. Four soil profile pits were surficially restored with hot-mix asphalt, as requested. The locations of the subsurface tests are shown on the accompanying *Test Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A.

The subsurface tests were conducted in the presence of a Whitestone engineer who conducted field tests, recorded visual classifications, and collected samples of the various strata encountered. The 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. Rock was sampled using a NQ-sized diamond bit. The rock core description, recovery, Rock Quality Designation (RQD), and other pertinent information were recorded on the boring logs and are included in Appendix A on the *Records of Subsurface Exploration*. The RQD values reflect the quality and fracture spacing of the rock and are calculated by summing all unbroken samples that are four inches or longer divided by the total length of the run. The percentage of core recovery and RQD values provide an understanding of the physical and engineering properties of the rock.

Groundwater level observations, where 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.

3.2 Laboratory Program

Representative samples of the various strata encountered were subjected to a laboratory program that included 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-1	S-2	2.0 - 4.0	27.8	13.0	NP	NP	SM
B-1	S-4	6.0 - 8.0	26.5	10.2	NP	NP	SM
B-2	S-5	8.0 - 10.0	34.8	9.9	NP	NP	SM

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. Laboratory test results are provided in Appendix B.

4.0 SUBSURFACE CONDITIONS

The subsurface soil conditions encountered within the subsurface tests consisted of the following generalized strata in order of increasing depth. *Records of Subsurface Exploration* are provided in Appendix A.

Surface Cover Materials: The subsurface tests were conducted within accessible areas of the proposed redevelopment and encountered either approximately six inches of asphaltic concrete pavement with no apparent subbase materials or existing fill at the surface.

Existing Fill: Underlying the surface cover or at the surface, all subsurface tests encountered existing fill consisting of either silty sand or sandy silt with variable amounts of gravel and cobbles. The existing fill extended to depths ranging from approximately two fbgs to six fbgs. SPT N-values within this stratum ranged between six blows per foot (bpf) and 29 bpf and averaged approximately 12 bpf.

Glacial Deposits: Underlying the existing fill, the subsurface tests encountered natural glacial deposits generally consisting of silty sand (USCS: SM) with variable amounts of gravel and cobbles. Auger/split-spoon refusal was encountered within the glacial deposits within borings B-1 through B-3 at depths ranging from 15 fbgs to 22 fbgs, indicating top of apparent weathered rock/bedrock. SPT N-values within this stratum ranged between 16 bpf and refusal (refusal defined as greater than 50 blows per six inches of split-spoon sampler advancement) and averaged approximately 30 bpf.

Weathered Rock/Bedrock: Top of apparent weathered rock was encountered within the borings at depths ranging from approximately 15 fbgs to 22 fbgs. SPT N-values within this stratum were generally in the refusal range. The rock coring efforts resulted in recovery rates of 76.7 percent of rock. RQD values obtained from the coring efforts was approximately 25 percent, generally corresponding to poor rock quality. The results rock coring efforts are summarized in the following table:

ROCK CORING SUMMARY TABLE						
Test Number	Top of Bedrock Depth (fbgs)	Rock Core Data				Rock Quality
		Run	Run Depth (feet)	Recovery (%)	RQD (%)	Classification Based on RQD
B-3	28.0	R1	28.0 - 33.0	76.7	25.0	Poor

Groundwater: Groundwater, where encountered, was encountered at depths ranging from approximately seven fbgs to nine fbgs, corresponding to elevations ranging from approximately 62 feet above NAVD 88 and 73 feet above NAVD 88. Groundwater was not encountered within soil profile pits SPP-3 and SPP-4. Groundwater levels should be expected to fluctuate seasonally and following periods of precipitation.

5.0 CONCLUSIONS & RECOMMENDATIONS

The following discussion is based on the subsurface conditions encountered during Whitestone's limited subsurface investigation for the proposed redevelopment and is intended to provide general characteristics of the subsurface conditions for preliminary planning purposes and should not be utilized for final design of structural foundations, floor slabs, or pavements. These preliminary considerations and site development options should be confirmed or revised upon development of the final project design concept and completion of a site-specific subsurface investigation and engineering analyses.

Foundations: Whitestone preliminarily anticipates that the structures may be supported on conventional spread and continuous wall footings designed to bear within the underlying natural materials and/or controlled structural fill materials placed above the natural materials that are properly evaluated, placed, compacted, and prepared in order to control their moisture content. Existing fill should be overexcavated where encountered beneath proposed foundation bearing elevations and the resulting excavation should be restored with approved structural backfill. Foundations bearing within the above materials may be preliminarily designed to impart a maximum allowable net bearing pressure in the range of 2,000 pounds per square foot (psf) to 4,000 psf, depending on final design column and wall loading, column spacing, settlement tolerances, and the final geotechnical investigation.

Floor Slabs and Pavements: Whitestone preliminarily anticipates that the properly evaluated, prepared and approved site soils and/or controlled structural imported fill will be suitable for support of the proposed floor slabs and pavements. 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. Subgrade stabilization and protection may be necessary during wet conditions to obtain a stable surface. Subgrade protection may be achieved through the use of separation geotextiles, geogrids, and/or the addition of lime-cement to the subgrade.

On-Site Soil Reusability: Based on the conditions disclosed by the preliminary subsurface investigation, Whitestone preliminarily anticipates that majority of the site soils above the groundwater table will be suitable for selective reuse as structural fill/backfill material provided that soil moisture contents are controlled within two percent of optimum moisture level and objectionable materials (where encountered) are removed. Reuse of the existing fill will be contingent upon careful inspection in the field by the owner's geotechnical engineer by visual observation and/or test pit excavations during construction as recommended herein. The reuse of these granular site soils with greater than 12 percent of plastic fines (USCS: SM) typically is possible only during ideal weather conditions. Immediate reuse of on-site material should not be expected, especially following inclement weather or if construction occurs during winter/early spring. Materials that are or become exceedingly wet will likely require discing and aerating. Alternatively, imported fill materials may be used to attain the desired grades and expedite earthwork operations during wet weather periods. The contractor should cover stockpiled soils, seal subgrades, and provide proper surface drainage prior to forecasted wet weather.

Rock fragments and cobble/boulder-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 subgrade 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.

Groundwater Control: Groundwater was encountered within the majority of the subsurface test locations at depths ranging from approximately seven fbgs to nine fbgs. As such, temporary groundwater control should be preliminarily anticipated during construction and permanently within the proposed garage parking level. The extent of the groundwater control measures should be further evaluated following finalization of the design concept and site grading as well as the final geotechnical investigation.

Difficult Excavation Considerations: Very dense soil, weathered rock, and apparent bedrock were encountered during this subsurface investigation at variable depths. Depending on final site grading, removal of weathered rock and intact rock should be anticipated during construction. Excavation difficulties will be more prevalent in confined excavations, such as foundations and utilities, footing and utility excavations may inadvertently become oversized due to the presence of boulders, and require additional backfill materials. The speed and ease of excavation will depend on the type of grading equipment, the equipment operator, and the geologic structure of the material, such as planes of weakness and spacing between discontinuities. Based on local experience and the results of test boring efforts, Whitestone expects that the upper few feet of the weathered rock materials typically can be removed with a large excavator equipped with ripping tools and extreme service buckets with rock teeth without considerable difficulty during mass grading operations. However, planned excavations beyond a few feet into the weathered materials and refusal depths in confined excavations are expected to require the use of large excavation machinery equipped with ripping tools and/or pneumatic hammers.

Final Design Investigation and Plan Review: Whitestone recommends that a supplemental subsurface investigation designed to address site-specific conditions for proposed construction should be conducted following finalization of the design concept, structural loading, grading, and general site layout. The final subsurface investigation and geotechnical evaluation should be conducted to obtain subsurface information across the site at more closely spaced intervals within the building footprint, cut/fill areas, new pavements areas, site retaining walls (if any), and along deeper utility alignments. The final design investigation should include a review of the final structural and civil plans.

6.0 PRELIMINARY SWM AREA EVALUATION

Estimated Seasonal High Groundwater Levels & Infiltration Test Results: The methods used in determining the estimated seasonal high groundwater (ESHGW) 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 soils (mottles). Mottling is the result of the oxidation of minerals within a soil structure as the water level slowly fluctuates. A summary of the estimated seasonal high groundwater observations, where encountered, as well as infiltration test results and soil infiltration rates are included in the following table.

ESHGW/INFILTRATION TEST SUMMARY					
Test Location	Approximate Surface Elevation (feet*)	ESHGW (fbgs / feet*)	USDA Classification @ Test Depth	Infiltration Test Results	
				Test Depth (fbgs / feet*)	Rate (in/hour)
SPP-1	69.0	7.0 / 62.0	Sandy Loam	4.0 / 65.0	0.38
SPP-2	69.0	7.0 / 62.0	Sandy Loam	3.5 / 65.5	0.24
SPP-3	79.0	NE	Silt Loam	4.0 / 75.0	< 0.2
SPP-4	80.0	NE	Silt Loam	4.5 / 75.5	< 0.2

USDA - United States Department of Agriculture; NE - Not Encountered

Tested Soil Infiltration Rates: Laboratory tube permeameter testing was conducted in general conformance with methodologies detailed in the *New Jersey Stormwater Best Practices Manual* and indicated rates ranging from less than approximately 0.2 inches per hour (iph) to 0.38 iph. Soil Profile Pit Logs are included in Appendix A. Individual laboratory tube permeameter test results associated with the investigation are provided in Appendix B.

7.0 CLOSING

Whitestone appreciates the opportunity to be of continued service to Bohler Engineering NJ, LLC and Elite Management, LLC. Please note that Whitestone has the capability to conduct the additional geotechnical engineering services recommended herein. Please contact us with any questions or comments regarding this report.

Sincerely,

WHITESTONE ASSOCIATES, INC.



Mudar Khantamr, P.E.
Senior Associate

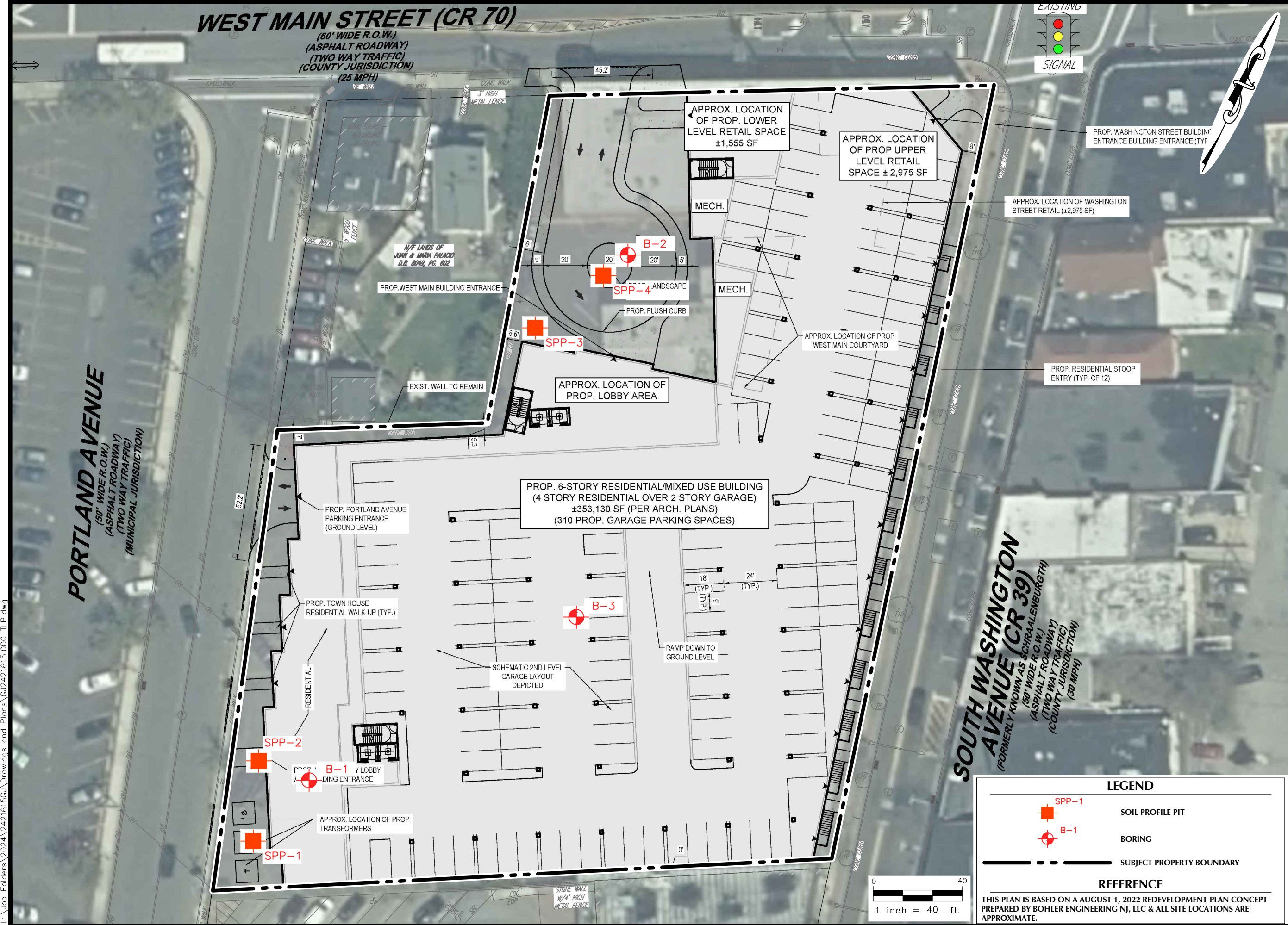


Laurence W. Keller, P.E.
Vice President

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Enclosures
Copy: Nora Ahmed, PE, Bohler Engineering NJ, LLC

FIGURE 1
Test Location Plan

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WHITESTONE

An Employee-Owned Company

30 INDEPENDENCE BOULEVARD, SUITE 250, WARREN, NJ 07059
908.668.7777 WHITESTONEASSOC.COM

DRAWING TITLE:
TEST LOCATION PLAN

CLIENT:
BOHLER ENGINEERING NJ, LLC

PROJECT:
PROPOSED MIXED-USED REDEVELOPMENT
10 SOUTH WASHINGTON AVENUE
BERGENFIELD, BERGEN COUNTY, NJ

PROJECT #:
GJ2421615.000

DESIGNED BY:
GR

DATE:
4/24/24

SCALE:
1" = 40'

PROJ. MGR.:
MK

FIGURE:
1

**SPP-1**

SOIL PROFILE PIT

**B-1**

BORING



SUBJECT PROPERTY BOUNDARY

REFERENCE

THIS PLAN IS BASED ON A AUGUST 1, 2022 REDEVELOPMENT PLAN CONCEPT PREPARED BY BOHLER ENGINEERING NJ, LLC & ALL SITE LOCATIONS ARE APPROXIMATE.



APPENDIX A

Records of Subsurface Exploration



RECORD OF SUBSURFACE EXPLORATION

Boring No.: **B-1**

Page **1** of **1**

Project: Proposed Mixed-Use Redevelopment		WAI Project No.: GJ2421615.000	
Location: 10 South Washington Avenue; Bergenfield, Bergen County, NJ		Client: Bohler Engineering NJ, LLC	
Surface Elevation: ± 71.0 feet	Date Started: 4/10/2024	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 22.0 feet bgs	Date Completed: 4/10/2024	During: 7.0 64.0 ▼	At Completion: 7.0 64.0 ▼
Proposed Location: Building	Logged By: ML	24 Hours: --- --- ▼	At Completion: NE ---
Drill / Test Method: HSA / SPT	Contractor: MR		24 Hours: --- ---
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
0 - 2	S-1		18 - 22 - 7 - 3	12	29		FILL	Dark Grayish-Brown Silty Sand with Gravel, Moist (FILL)	
						2.0			
2 - 4	S-2		10 - 10 - 12 - 15	15	22		GLACIAL DEPOSITS	Reddish-Brown Silty Sand, Moist, Medium Dense (SM)	
						5.0		As Above, Dense (SM)	
4 - 6	S-3		25 - 21 - 22 - 21	15	43				
						6.0			
6 - 8	S-4		14 - 15 - 16 - 20	15	31			As Above, with Gravel, Moist to Wet (SM)	
						8.0			
8 - 10	S-5		6 - 14 - 15 - 21	15	29			As Above, Wet, Medium Dense (SM)	
						10.0			
13 - 15	S-6		20 - 12 - 8 - 10	15	20			As Above (SM)	
						15.0			
18 - 20	S-7		23 - 35 - 24 - 32	15	59			As Above, Very Dense (SM)	
						20.0			
						22.0			
								Boring Log B-1 Terminated at a Depth of 22.0 Feet Below Ground Surface Due to Auger Refusal	
						25.0			

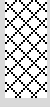
NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

Boring No.: **B-2**

Page 1 of 1

Project: Proposed Mixed-Use Redevelopment			WAI Project No.: GJ2421615.000		
Location: 10 South Washington Avenue; Bergenfield, Bergen County, NJ			Client: Bohler Engineering NJ, LLC		
Surface Elevation: ± 81.0 feet		Date Started: 4/10/2024		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 15.0 feet bgs		Date Completed: 4/10/2024		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building		Logged By: ML		During: 9.0 72.0 ▼	
Drill / Test Method: HSA / SPT		Contractor: MR		At Completion: 9.0 72.0 ▼	
		Equipment: CME-45		24 Hours: --- --- ▼	
				At Completion: NE --- 	
				24 Hours: --- --- 	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
0 - 2	S-1		14 - 8 - 4 - 3	15	12		FILL		Olive-Brown Silty Sand with Gravel, Moist (FILL)
2 - 4	S-2		2 - 3 - 3 - 4	15	6				Sandy Silt with Gravel, Moist (FILL)
						4.0			
4 - 6	S-3		16 - 25 - 21 - 30	12	46		GLACIAL DEPOSITS		Reddish-Brown Silty Sand with Gravel, Moist, Dense (SM)
6 - 8	S-4		15 - 14 - 14 - 9	15	28				As Above, Medium Dense (SM)
8 - 10	S-5		8 - 7 - 8 - 8	18	15				As Above, Moist to Wet (SM)
						10.0			
13 - 15	S-6		25 - 27 - 30 - 31	15	57				As Above, Wet, Very Dense (SM)
						15.0			
									Boring Log B-2 Terminated at a Depth of 15.0 Feet Below Ground Surface Due to Auger Refusal
						20.0			
						25.0			

RECORD OF SUBSURFACE EXPLORATION

Boring No.: **B-3**

Page 1 of 2

Project: Proposed Mixed-Use Redevelopment		WAI Project No.: GJ2421615.000	
Location: 10 South Washington Avenue; Bergenfield, Bergen County, NJ		Client: Bohler Engineering NJ, LLC	
Surface Elevation: ± 82.0 feet	Date Started: 4/10/2024	Water Depth Elevation (feet bgs) (feet)	Cave-In Depth Elevation (feet bgs) (feet)
Termination Depth: 33.0 feet bgs	Date Completed: 4/10/2024	During: 9.0 73.0 ▼	At Completion: 9.0 73.0 ▼
Proposed Location: Building	Logged By: ML	24 Hours: --- --- ▼	At Completion: NE --- 
Drill / Test Method: HSA / SPT / ROCK CORE	Contractor: MR		24 Hours: --- --- 
	Equipment: CME-45		

SAMPLE INFORMATION						DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS	
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N					
						0.0				
0 - 2	S-1		15 - 6 - 6 - 7	10	12		FILL		Olive-Brown Silty Sand with Gravel, Moist (FILL)	
2 - 4	S-2		2 - 5 - 3 - 3	6	8				As Above, Reddish-Brown (FILL)	
4 - 6	S-3		2 - 3 - 6 - 11	6	9	5.0			As Above, Olive-Brown (FILL)	
						6.0				
6 - 8	S-4		15 - 14 - 14 - 14	12	28		GLACIAL DEPOSITS		Reddish-Brown Silty Sand with Gravel, Moist, Medium Dense (SM)	
8 - 10	S-5		12 - 14 - 21 - 24	15	35				As Above, Moist to Wet, Dense (SM)	
10 - 12	S-6		17 - 17 - 17 - 27	15	34	10.0			As Above, Wet (SM)	
						15.0				
15 - 17	S-7		40 - 56 - 41 - 54	10	97				As Above, Very Dense (SM)	
						20.0				
20 - 20.4	S-8		50/5"	4	50/5"		WEATHERED ROCK		Reddish-Brown Weathered Rock, Friable to Silty Sand with Gravel, Wet, Very Dense (WR)	
										
						25.0				

RECORD OF SUBSURFACE EXPLORATION

Boring No.: **B-3**

Page 2 of 2

Project: Proposed Mixed-Use Redevelopment			WAI Project No.: GJ2421615.000		
Location: 10 South Washington Avenue; Bergenfield, Bergen County, NJ			Client: Bohler Engineering NJ, LLC		
Surface Elevation: ± 82.0 feet		Date Started: 4/10/2024		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 33.0 feet bgs		Date Completed: 4/10/2024		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: Building		Logged By: ML		During: 9.0 73.0 ▼	
Drill / Test Method: HSA / SPT / ROCK CORE		Contractor: MR		At Completion: 9.0 73.0 ▼	
		Equipment: CME-45		24 Hours: --- --- ▼	
				At Completion: NE --- 	
				24 Hours: --- --- 	

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						25.0	WEATHERED ROCK		No Recovery, Presumed as Above, Reddish-Brown Weathered Rock (Sand Stone). Friable to Silty Sand with Gravel, Wet, Very Dense (WR)	
25 - 25.1	S-9	✕	50/0"	NR	50/0"					
						28.0				
		Total Elapsed Cut Time/Cut Time Per Ft.			REC	RQD				
28 - 33	R1	NQ	3.5 / 3.5	46/60 = 76.7 %	15/60 = 25%		ROCK		Reddish-Brown Sandstone, Hard, Highly Weathered, Thinly Bedded, Broken, Poor Rock Quality	
			3.5 / 7.0							
			5.0 / 12.0							
			5.5 / 17.5							
			6.0 / 23.5			33.0				
						35.0			Boring Log B-3 Terminated at a Depth of 33.0 Feet Below Ground Surface	
						40.0				

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-1**

Page 1 of 1

Project: Proposed Mixed-Use Redevelopment			WAI Project No.: GJ2421615.000		
Location: 10 South Washington Avenue; Bergenfield, Bergen County, NJ			Client: Bohler Engineering NJ, LLC		
Surface Elevation: ± 69.0 feet		Date Started: 4/10/2024	Water Depth Elevation (feet bgs) (feet)		Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 8.0 feet bgs		Date Completed: 4/10/2024			
Proposed Location: SWM		Logged By: ML	During: 7.0 62.0 ▼	At Completion: 7.0 62.0	
Excavating Method: Test Pit Excavation		Contractor: MC	At Completion: 7.0 62.0 ▼		
Test Method: Visual Observation		Rig Type: Deere 751P	24 Hours: --- --- ▼		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
4.0	T-1	TUBE	0.0			
			0 - 0.5	PAVEMENT	6" Asphalt, with No Apparent Subbase	
			0.5 - 2	FILL	Grayish-Brown LOAMY SAND; 20% Gravel; Moist; Weak, Granular Structure; Friable; No Roots	
			2.0			
			2 - 8	GLACIAL DEPOSITS	Reddish-Brown SANDY LOAM; 15% Gravel with Cobbles and Boulders; Moist; Weak, Granular Structure; Friable; No Roots	
			3.0			
			4.0			
			5.0			
			6.0			
			7.0			
			7.0			Groundwater @ 7.0 fbgs
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			
					Soil Profile Pit SPP-1 Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Sidewall Collapse	

RECORD OF SUBSURFACE EXPLORATION

 Soil Profile Pit No.: **SPP-2**

 Page 1 of 1

Project: Proposed Mixed-Use Redevelopment			WAI Project No.: GJ2421615.000		
Location: 10 South Washington Avenue; Bergenfield, Bergen County, NJ			Client: Bohler Engineering NJ, LLC		
Surface Elevation: ± 69.0 feet		Date Started: 4/10/2024	Water Depth Elevation (feet bgs) (feet)		Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)
Termination Depth: 8.0 feet bgs		Date Completed: 4/10/2024			
Proposed Location: SWM		Logged By: ML	During: 7.0 62.0 ▼	At Completion: 7.0 62.0	
Excavating Method: Test Pit Excavation		Contractor: MC	At Completion: 7.0 62.0 ▼		
Test Method: Visual Observation		Rig Type: Deere 751P	24 Hours: --- --- ▼		

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
3.5	T-1	TUBE	0.0			
			0 - 0.5	PAVEMENT	6" Asphalt, with No Apparent Subbase	
			0.5 - 2	FILL	Grayish-Brown LOAMY SAND; 20% Gravel; Moist; Weak, Granular Structure; Friable; No Roots	
			1.0			
			2.0			
			2 - 8	GLACIAL DEPOSITS	Reddish-Brown SANDY LOAM; 15% Gravel with Cobbles and Boulders; Moist; Weak, Granular Structure; Friable; No Roots	
			3.0			
			4.0			
			5.0			
			6.0			
			7.0			Groundwater @ 7.0 fbgs
			8.0			
			9.0		Soil Profile Pit SPP-2 Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Sidewall Collapse	
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			



RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-3**

Page 1 of 1

Project: Proposed Mixed-Use Redevelopment		WAI Project No.: GJ2421615.000	
Location: 10 South Washington Avenue; Bergenfield, Bergen County, NJ		Client: Bohler Engineering NJ, LLC	
Surface Elevation: ± 79.0 feet	Date Started: 4/10/2024	Water Depth Elevation (feet bgs) (feet)	
Termination Depth: 8.0 feet bgs	Date Completed: 4/10/2024	Estimated Seasonal High Groundwater Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: ML	During: NE ---	At Completion: NE ---
Excavating Method: Test Pit Excavation	Contractor: MC	At Completion: --- ---	
Test Method: Visual Observation	Rig Type: Deere 751P	24 Hours: --- ---	

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
4.0	T-1	TUBE	0.0			
			0 - 0.5	PAVEMENT	6" Asphalt with No apparent Subbase	
			0.5 - 4	FILL	Olive-Brown LOAMY SAND; 20% Gravel; Moist; Weak, Granular Structure; Friable; No Roots	
			1.0			
			2.0			
			3.0			
			4.0			
			4 - 8	GLACIAL DEPOSITS	Reddish-Brown SILT LOAM; 15% Gravel with Cobbles and Boulders; Moist; Weak, Granular Structure; Friable; No Roots	
			5.0			
			6.0			
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			
					Soil Profile Pit SPP-3 Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Sidewall Collapse	

RECORD OF SUBSURFACE EXPLORATION

Soil Profile Pit No.: **SPP-4**

Page 1 of 1

Project: Proposed Mixed-Use Redevelopment			WAI Project No.: GJ2421615.000		
Location: 10 South Washington Avenue; Bergenfield, Bergen County, NJ			Client: Bohler Engineering NJ, LLC		
Surface Elevation: ± 80.0 feet	Date Started: 4/10/2024	Water Depth Elevation (feet bgs) (feet)		Estimated Seasonal High	
Termination Depth: 8.0 feet bgs	Date Completed: 4/10/2024			Groundwater Depth Elevation (feet bgs) (feet)	
Proposed Location: Building	Logged By: ML	During: NE --- ▼		At Completion: NE ---	
Excavating Method: Test Pit Excavation	Contractor: MC	At Completion: --- --- ▼			
Test Method: Visual Observation	Rig Type: Deere 751P	24 Hours: --- --- ▼			

SAMPLE INFORMATION			DEPTH	HORIZON	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	Number	Type	feet			
4.5	T-1	TUBE	0.0			
			0 - 0.5	PAVEMENT	6" Asphalt with No Apparent Subbase	
			0.5 - 4	FILL	Olive-Brown LOAMY SAND; 20% Gravel; Moist; Weak, Granular Structure; Friable; No Roots	
			1.0			
			2.0			
			3.0			
			4.0			
			4 - 8	GLACIAL DEPOSITS	Reddish-Brown SILT LOAM; 15% Gravel with Cobbles and Boulders; Moist; Weak, Granular Structure; Friable; No Roots	
			5.0			
			6.0			
			7.0			
			8.0			
			9.0			
			10.0			
			11.0			
			12.0			
			13.0			
			14.0			
			15.0			
					Soil Profile Pit SPP-4 Terminated at a Depth of 8.0 Feet Below Ground Surface Due to Sidewall Collapse	



APPENDIX B

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.9	9.4	6.2	23.5	30.2	27.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	97.1		
.375	91.8		
#4	87.7		
#10	81.5		
#20	71.4		
#40	58.0		
#60	33.9		
#140	28.1		
#200	27.8		

<u>Material Description</u>		
Silty Sand		
<u>Atterberg Limits</u>		
PL= NP	LL= NV	PI= NP
<u>Coefficients</u>		
D ₉₀ = 7.0886	D ₈₅ = 3.0577	D ₆₀ = 0.4486
D ₅₀ = 0.3558	D ₃₀ = 0.1595	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= SM	AASHTO= A-2-4(0)	
<u>Remarks</u>		
W _n = 13.0 %		

* (no specification provided)

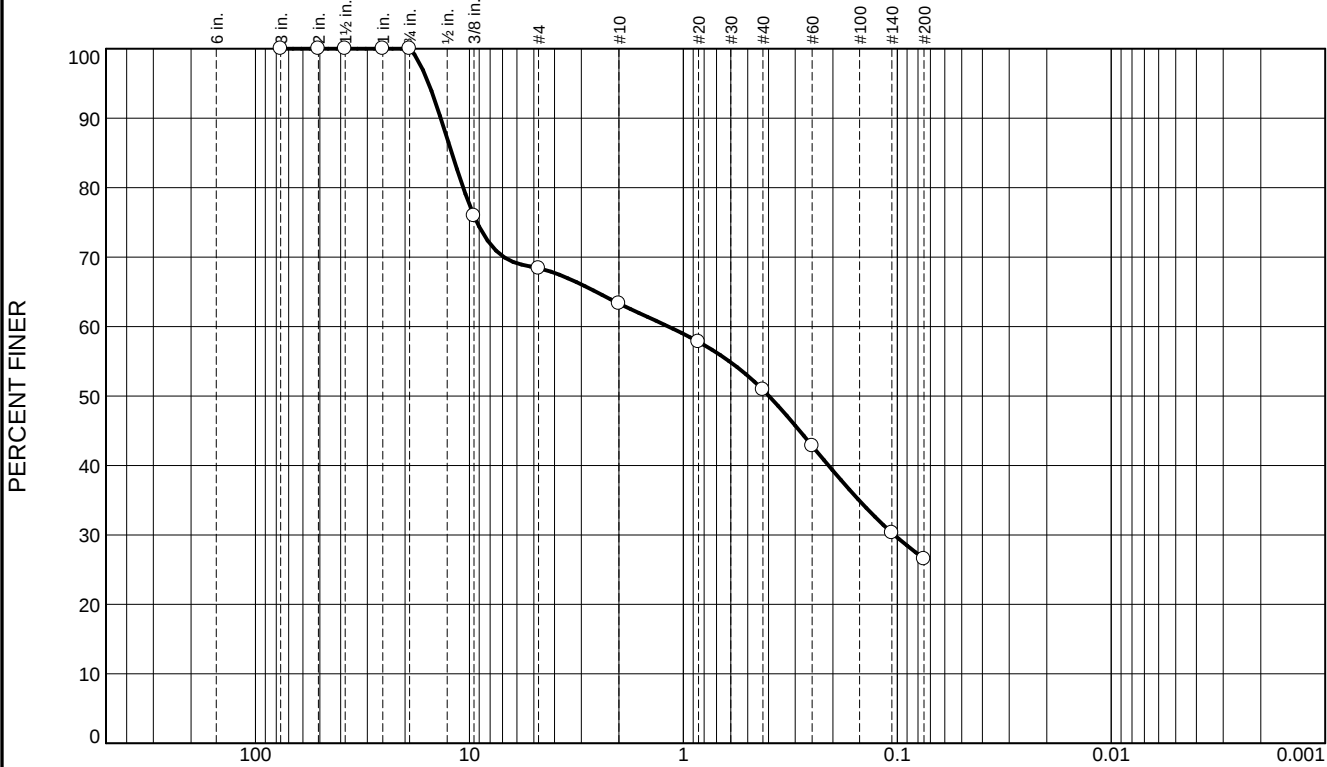
Source of Sample: B-1 Depth: 2.0' - 4.0'
Sample Number: S-2

Date: 04/24/2024

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Bohler Engineering NJ, LLC
Project: Proposed Mixed-Use Redevelopment
10 South Washington Avenue, Bergenfield, Bergen County, NJ
Project No: GJ2421615.000 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	31.6	5.1	12.4	24.4	26.5	

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	75.9		
#4	68.4		
#10	63.3		
#20	57.8		
#40	50.9		
#60	42.8		
#140	30.3		
#200	26.5		

* (no specification provided)

<u>Material Description</u>		
Silty Sand with Gravel		
<u>Atterberg Limits</u>		
PL= NP	LL= NV	PI= NP
<u>Coefficients</u>		
D ₉₀ = 13.6157	D ₈₅ = 12.0913	D ₆₀ = 1.1747
D ₅₀ = 0.3979	D ₃₀ = 0.1033	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= SM	AASHTO= A-2-4(0)	
<u>Remarks</u>		
W _n = 10.2 %		

Source of Sample: B-1 Depth: 6.0' - 8.0'
Sample Number: S-4

Date: 04/24/2024

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Bohler Engineering NJ, LLC
Project: Proposed Mixed-Use Redevelopment
10 South Washington Avenue, Bergenfield, Bergen County, NJ
Project No: GJ2421615.000
Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.8	2.9	3.8	10.9	33.8	34.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	86.2		
.375	86.2		
#4	83.3		
#10	79.5		
#20	75.4		
#40	68.6		
#60	58.5		
#140	40.7		
#200	34.8		

Material Description		
Silty Sand with Gravel		
PL= NP	Atterberg Limits LL= NV	PI= NP
D90= 20.6237	Coefficients D85= 7.0480	D60= 0.2685
D50= 0.1686	D30=	D15=
D10=	Cu=	Cc=
USCS= SM	Classification AASHTO= A-2-4(0)	
W _n = 9.9 %	Remarks	

* (no specification provided)

Source of Sample: B-2
Sample Number: S-5

Depth: 8.0' - 10.0'

Date: 04/24/2024

WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey

Client: Bohler Engineering NJ, LLC

Project: Proposed Mixed-Use Redevelopment
10 South Washington Avenue, Bergenfield, Bergen County, NJ

Project No: GJ2421615.000

Figure

Job Number: GJ2421615.000
Project: Proposed Mixed-Use Development
Client: Bohler Engineering NJ, LLC
Lab Tech: ML

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data**Job Number:** GJ2421615.000**Project:** Proposed Mixed-Use Development**Client:** Bohler Engineering NJ, LLC**Lab Tech:** ML

Sample ID: _____ **Profile Pit No.:** SPP-1 **Sample No.:** _____ **T-1** **Depth:** 4.0'
COUNTY/MUNICIPALITY Bergenfield, Bergen County **BLOCK** 126 **LOT** 9 - 12 & 14 - 16

1. Test Number 1 Replicate (letter) B Date Collected 4/10/2024

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 3.50

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 _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 101.30

Wt. of Empty Tube _____

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: _____ Yes, Indicate Internal Radius, cm. N/A

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
1:50:00	2:18:00	28.00
2:18:00	2:46:00	28.00
2:46:00	3:14:00	28.00
3:14:00	3:42:00	28.00

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 28.00

K (in/hr) = 0.38 **Classification:** **K1**

13. Defects in the Sample (Check appropriate items):

_____ None
_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots
_____ Dry Soil _____ Smearing _____ Compaction
_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2421615.000

Project: Proposed Mixed-Use Development

Client: Bohler Engineering NJ, LLC

Lab Tech: ML

Sample ID: Profile Pit No.: SPP-2 Sample No.: T-1 Depth: 3.5'

COUNTY/MUNICIPALITY Bergenfield, Bergen County BLOCK 126 LOT 9 - 12 & 14 - 16

1. Test Number 1 Replicate (letter) A Date Collected 4/10/2024

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 3.50

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. 101.30

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: Yes, Indicate Internal Radius, cm. N/A

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
1:50:00	2:29:00	39.00
2:29:00	3:08:00	39.00
3:08:00	3:48:00	40.00
3:48:00	4:28:00	40.00

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r²/R² x L(in)/T(min) x ln (H1/H2) T= 39.50

K (in/hr) = 0.27 Classification: K1

13. Defects in the Sample (Check appropriate items):

None
Soil/Tube Contact Large Gravel Large Roots
Dry Soil Smearing Compaction
Other - Specify

Job Number: GJ2421615.000
Project: Proposed Mixed-Use Development
Client: Bohler Engineering NJ, LLC
Lab Tech: ML

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2421615.000

Project: Proposed Mixed-Use Development

Client: Bohler Engineering NJ, LLC

Lab Tech: ML

Sample ID: _____ **Profile Pit No.:** SPP-3 **Sample No.:** _____ **T-1** **Depth:** 4.0'
COUNTY/MUNICIPALITY Bergenfield, Bergen County **BLOCK** 126 **LOT** 9 - 12 & 14 - 16

1. Test Number 1 Replicate (letter) A Date Collected 4/10/2024

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 3.50

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 _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 101.30

Wt. of Empty Tube _____

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: _____ Yes, Indicate Internal Radius, cm. N/A

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 4.99

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
1:50:00	3:50:00	120.00

No Movement after 120 mins

12. Calculation of Permeability: $K, (in/hr) = 60 \text{ min/hr} \times r^2/R^2 \times L(in)/T(min) \times \ln (H1/H2)$ T= 120.00

K (in/hr) = 0.00 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

_____ None
_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots
_____ Dry Soil _____ Smearing _____ Compaction
_____ Other - Specify _____

Tube Permeameter Test Data**Job Number:** GJ2421615.000**Project:** Proposed Mixed-Use Development**Client:** Bohler Engineering NJ, LLC**Lab Tech:** ML

Sample ID: _____ **Profile Pit No.:** SPP-3 **Sample No.:** _____ **T-1** **Depth:** 4.0'
COUNTY/MUNICIPALITY Bergenfield, Bergen County **BLOCK** 126 **LOT** 9 - 12 & 14 - 16

1. Test Number 1 Replicate (letter) B Date Collected 4/10/2024

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 _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 86.83

Wt. of Empty Tube _____

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: _____ Yes, Indicate Internal Radius, cm. N/A

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 4.99

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
1:50:00	3:50:00	120.00

No Movement after 120 mins

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 120.00

K (in/hr) = 0.00 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: GJ2421615.000

Project: Proposed Mixed-Use Development

Client: Bohler Engineering NJ, LLC

Lab Tech: ML

Sample ID: _____ **Profile Pit No.:** SPP-4 **Sample No.:** _____ **T-1** **Depth:** 4.5'
COUNTY/MUNICIPALITY Bergenfield, Bergen County **BLOCK** 126 **LOT** 9 - 12 & 14 - 16

1. Test Number 1 Replicate (letter) A Date Collected 4/10/2024

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 3.50

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 _____

7. Sample Volume (L x 2.54 cm./inch x 3.14R²), cc. 101.30

Wt. of Empty Tube _____

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. 0 > 1.2

9. Standpipe Used: _____ Yes, Indicate Internal Radius, cm. N/A

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 4.99

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
1:50:00	3:50:00	120.00

No Movement after 120 mins

12. Calculation of Permeability: $K, (\text{in/hr}) = 60 \text{ min/hr} \times r^2/R^2 \times L(\text{in})/T(\text{min}) \times \ln(H1/H2)$ T= 120.00

K (in/hr) = 0.00 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

_____ None
 _____ Soil/Tube Contact _____ Large Gravel _____ Large Roots
 _____ Dry Soil _____ Smearing _____ Compaction
 _____ Other - Specify _____

Job Number: GJ2421615.000
Project: Proposed Mixed-Use Development
Client: Bohler Engineering NJ, LLC
Lab Tech: ML

_____ None

_____ Soil/Tube Contact _____ Large Gravel _____ Large Roots

_____ Dry Soil _____ Smearing _____ Compaction

_____ Other - Specify _____



APPENDIX C

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
	MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		CLEAN SAND (LITTLE OR NO FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	SAND AND SANDY SOILS	MORE THAN 50% OF COARSE FRACTION <u>PASSING</u> NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GC
			SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS <u>LARGER</u> THAN NO. 200 SIEVE SIZE			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY 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
MORE THAN 50% OF MATERIAL IS <u>SMALLER</u> THAN NO. 200 SIEVE SIZE	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
HIGHLY ORGANIC SOILS			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
			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.

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Office Locations:

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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:



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aeriels](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.341 (0.309-0.377)	0.408 (0.370-0.451)	0.485 (0.438-0.535)	0.541 (0.488-0.597)	0.610 (0.548-0.673)	0.661 (0.591-0.729)	0.712 (0.633-0.787)	0.759 (0.672-0.842)	0.819 (0.717-0.913)	0.865 (0.750-0.970)
10-min	0.545 (0.494-0.603)	0.652 (0.592-0.721)	0.776 (0.702-0.857)	0.865 (0.781-0.954)	0.972 (0.874-1.07)	1.05 (0.942-1.16)	1.13 (1.01-1.25)	1.20 (1.06-1.34)	1.30 (1.13-1.44)	1.36 (1.18-1.53)
15-min	0.682 (0.618-0.753)	0.820 (0.744-0.906)	0.982 (0.888-1.08)	1.09 (0.988-1.21)	1.23 (1.11-1.36)	1.33 (1.19-1.47)	1.43 (1.27-1.58)	1.52 (1.34-1.68)	1.63 (1.43-1.82)	1.71 (1.48-1.92)
30-min	0.934 (0.847-1.03)	1.13 (1.03-1.25)	1.40 (1.26-1.54)	1.58 (1.43-1.75)	1.83 (1.64-2.01)	2.01 (1.80-2.22)	2.19 (1.95-2.42)	2.36 (2.09-2.62)	2.59 (2.27-2.89)	2.77 (2.40-3.10)
60-min	1.16 (1.06-1.29)	1.42 (1.29-1.57)	1.79 (1.62-1.97)	2.06 (1.86-2.28)	2.43 (2.18-2.68)	2.72 (2.43-3.00)	3.02 (2.68-3.33)	3.32 (2.93-3.68)	3.72 (3.26-4.15)	4.04 (3.51-4.53)
2-hr	1.42 (1.28-1.57)	1.72 (1.56-1.91)	2.19 (1.98-2.41)	2.54 (2.29-2.80)	3.03 (2.71-3.33)	3.42 (3.05-3.77)	3.82 (3.39-4.22)	4.24 (3.73-4.70)	4.82 (4.20-5.38)	5.28 (4.55-5.92)
3-hr	1.56 (1.40-1.73)	1.89 (1.71-2.11)	2.40 (2.16-2.68)	2.80 (2.51-3.12)	3.36 (3.00-3.73)	3.80 (3.38-4.23)	4.28 (3.77-4.77)	4.78 (4.16-5.33)	5.46 (4.70-6.13)	6.03 (5.12-6.80)
6-hr	1.96 (1.77-2.20)	2.38 (2.14-2.67)	3.02 (2.70-3.37)	3.53 (3.15-3.94)	4.28 (3.78-4.78)	4.90 (4.30-5.46)	5.57 (4.84-6.22)	6.29 (5.41-7.04)	7.34 (6.20-8.25)	8.21 (6.84-9.28)
12-hr	2.38 (2.13-2.70)	2.88 (2.58-3.27)	3.67 (3.27-4.15)	4.34 (3.86-4.90)	5.34 (4.70-6.01)	6.21 (5.42-6.99)	7.16 (6.17-8.06)	8.22 (6.97-9.28)	9.81 (8.15-11.1)	11.2 (9.11-12.7)
24-hr	2.75 (2.52-3.02)	3.33 (3.05-3.66)	4.25 (3.89-4.66)	5.03 (4.59-5.51)	6.20 (5.61-6.78)	7.22 (6.48-7.88)	8.34 (7.42-9.10)	9.58 (8.43-10.5)	11.4 (9.90-12.5)	13.0 (11.1-14.3)
2-day	3.18 (2.91-3.50)	3.86 (3.53-4.24)	4.93 (4.50-5.42)	5.82 (5.30-6.39)	7.14 (6.45-7.81)	8.26 (7.41-9.03)	9.48 (8.45-10.4)	10.8 (9.54-11.9)	12.8 (11.1-14.1)	14.5 (12.4-16.0)
3-day	3.37 (3.10-3.68)	4.08 (3.76-4.46)	5.18 (4.77-5.66)	6.10 (5.59-6.66)	7.43 (6.77-8.10)	8.56 (7.75-9.32)	9.78 (8.79-10.6)	11.1 (9.90-12.1)	13.1 (11.5-14.3)	14.7 (12.8-16.1)
4-day	3.56 (3.30-3.87)	4.31 (3.99-4.68)	5.44 (5.03-5.92)	6.38 (5.88-6.92)	7.73 (7.09-8.38)	8.87 (8.08-9.60)	10.1 (9.13-10.9)	11.4 (10.2-12.4)	13.3 (11.8-14.5)	14.9 (13.1-16.2)
7-day	4.17 (3.86-4.53)	5.02 (4.64-5.45)	6.24 (5.77-6.78)	7.26 (6.70-7.89)	8.73 (8.02-9.46)	9.97 (9.10-10.8)	11.3 (10.2-12.2)	12.7 (11.4-13.7)	14.7 (13.1-16.0)	16.4 (14.5-17.9)
10-day	4.75 (4.43-5.13)	5.68 (5.30-6.13)	6.97 (6.49-7.52)	8.02 (7.46-8.65)	9.51 (8.79-10.2)	10.7 (9.88-11.5)	12.0 (11.0-12.9)	13.3 (12.1-14.4)	15.2 (13.7-16.5)	16.8 (15.0-18.2)
20-day	6.42 (6.04-6.83)	7.62 (7.18-8.11)	9.13 (8.58-9.71)	10.3 (9.69-11.0)	11.9 (11.2-12.7)	13.2 (12.4-14.0)	14.5 (13.5-15.4)	15.9 (14.7-16.9)	17.6 (16.2-18.8)	19.0 (17.4-20.3)
30-day	7.99 (7.57-8.43)	9.43 (8.94-9.95)	11.1 (10.5-11.7)	12.3 (11.7-13.0)	14.0 (13.2-14.8)	15.3 (14.4-16.1)	16.6 (15.6-17.5)	17.9 (16.7-18.8)	19.5 (18.1-20.6)	20.8 (19.2-22.0)
45-day	10.2 (9.69-10.7)	12.0 (11.4-12.6)	13.9 (13.2-14.6)	15.3 (14.5-16.0)	17.1 (16.2-17.9)	18.4 (17.4-19.4)	19.7 (18.6-20.7)	21.0 (19.7-22.1)	22.5 (21.1-23.8)	23.7 (22.1-25.0)
60-day	12.2 (11.7-12.8)	14.3 (13.7-15.0)	16.4 (15.6-17.2)	17.9 (17.1-18.8)	19.9 (18.9-20.8)	21.3 (20.2-22.3)	22.6 (21.5-23.7)	23.9 (22.6-25.1)	25.4 (24.0-26.7)	26.5 (24.9-27.9)

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

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

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

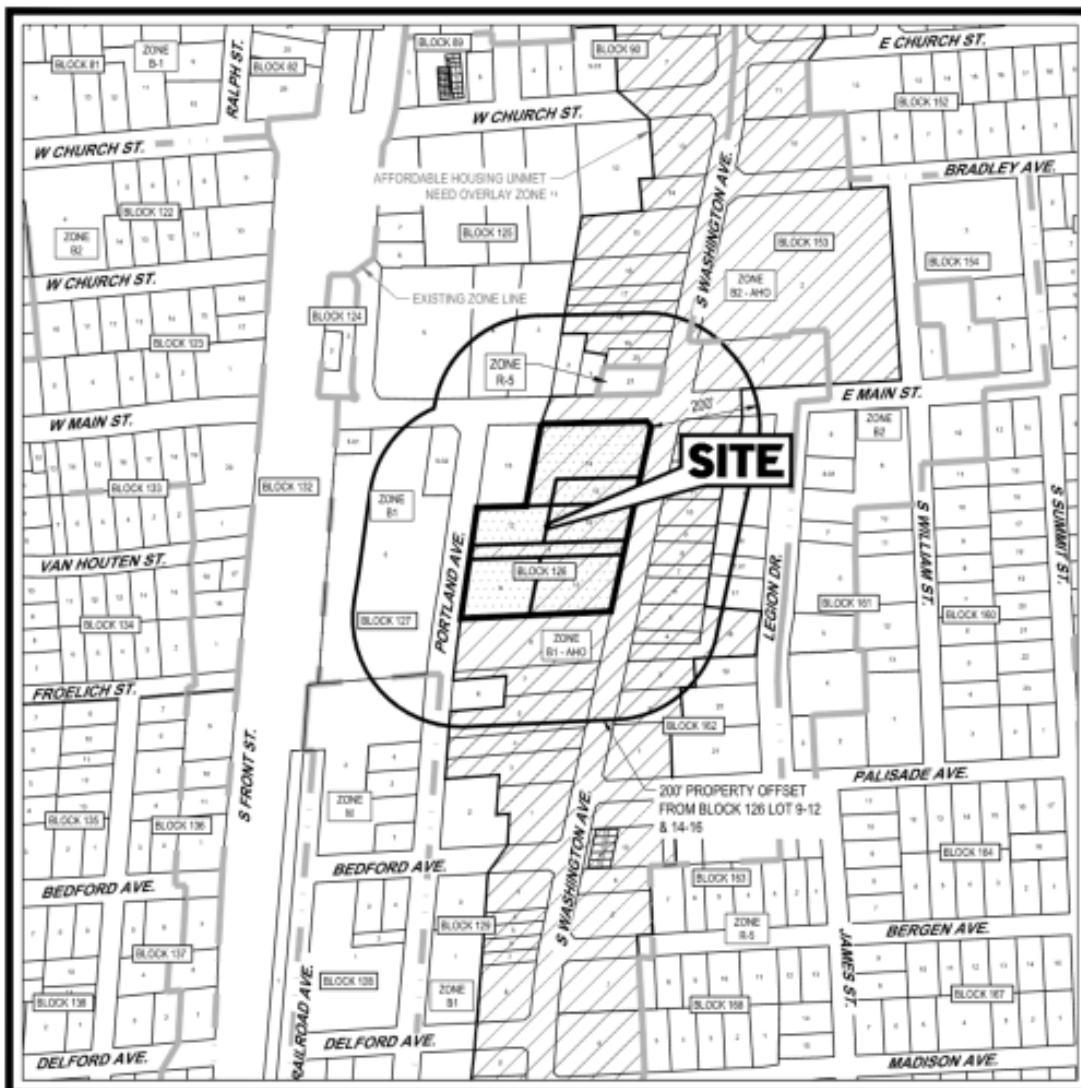
Current Precipitation Adjustment Factors										
County	2-year Design Storm			10-year Design Storm			100-year Design Storm			County
	NOAA Atlas 14 (inches)	Adjustment Factor	Current (inches)	NOAA Atlas 14 (inches)	Adjustment Factor	Current (inches)	NOAA Atlas 14 (inches)	Adjustment Factor	Current (inches)	
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/>)

F. MAPS

- ◆ Tax Map
- ◆ Aerial Map
- ◆ Depth to Water Table Map
- ◆ USGS Map
- ◆ Drainage Area Maps
 - Existing Drainage Area Map
 - Proposed Drainage Area Map

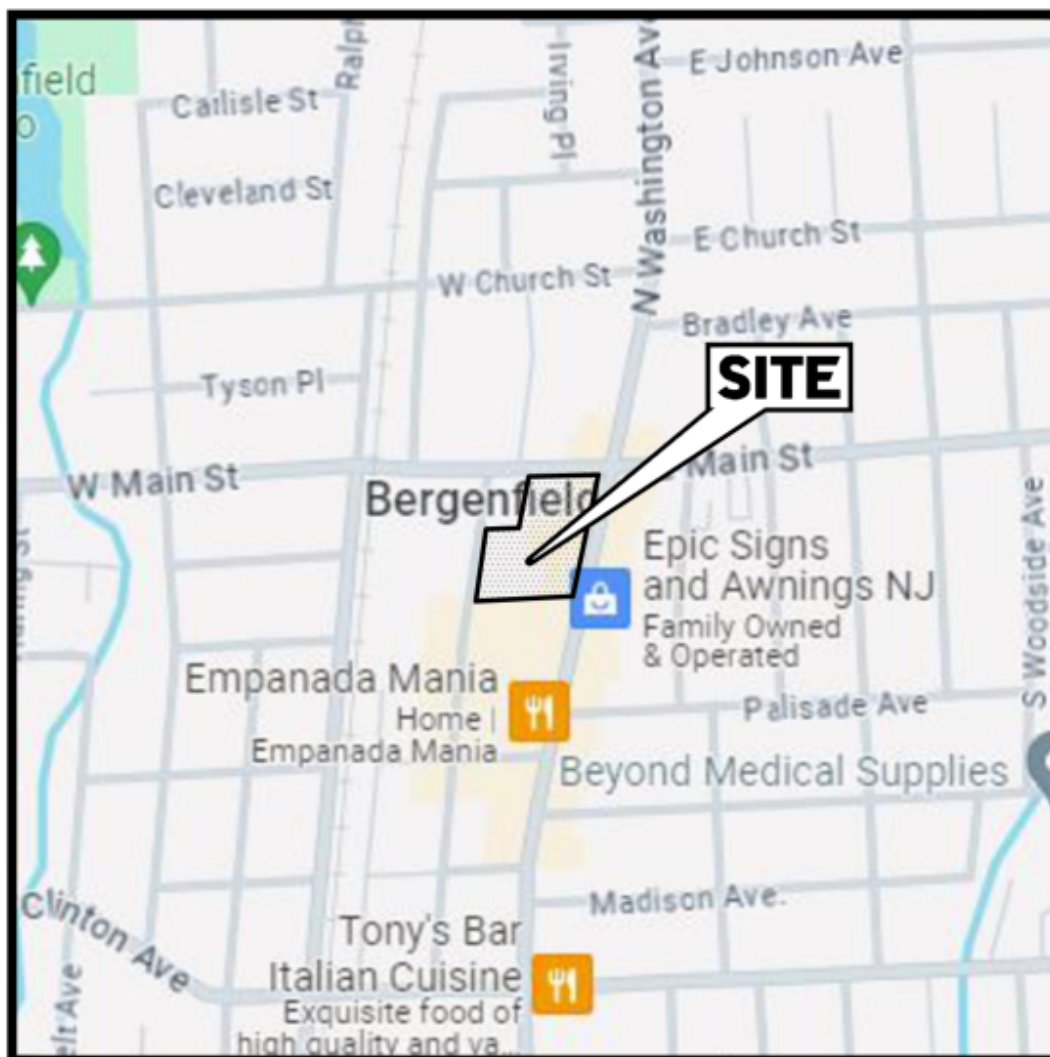


TAX MAP



SCALE: 1" = 300'

SOURCE: NJGIN INFORMATION NEWTWORK



KEY MAP

SCALE: 1" = 500'
SOURCE: GOOGLE MAPS

Depth to Water Table—Bergen County, New Jersey (Soil Group)



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

Soil Rating Lines

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200
-  Not rated or not available

Soil Rating Points

-  0 - 25
-  25 - 50
-  50 - 100
-  100 - 150
-  150 - 200
-  > 200

 Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Bergen County, New Jersey
Survey Area Data: Version 22, Aug 28, 2025

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

Date(s) aerial images were photographed: Oct 10, 2022—Oct 16, 2022

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

Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
UR	Urban land	>200	0.3	100.0%
Totals for Area of Interest			0.3	100.0%

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

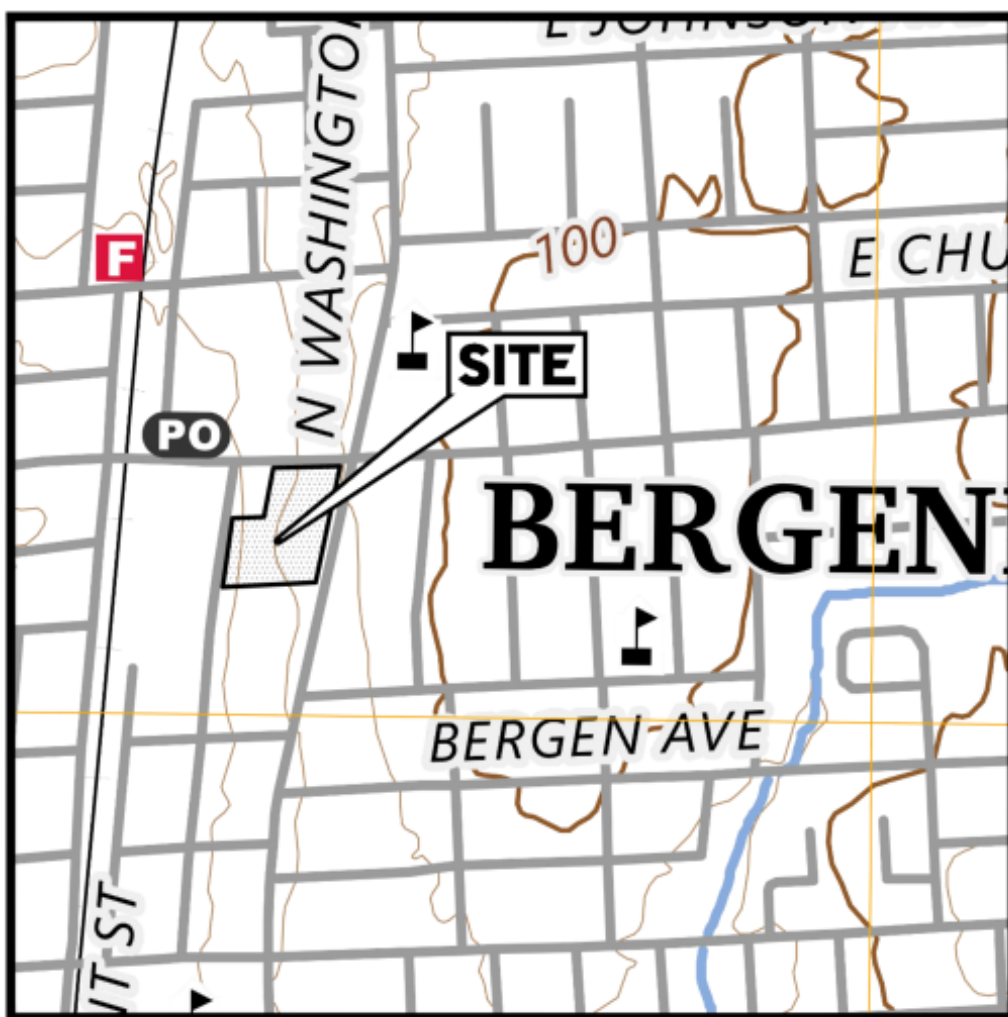
Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

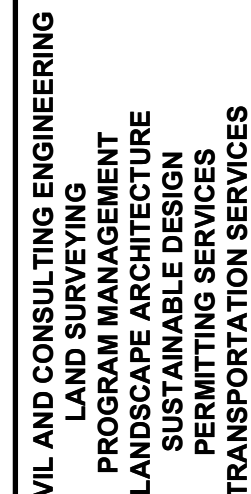
Ending Month: December



USGS MAP

SCALE: 1" = 500'

SOURCE: US GEOLOGICAL SURVEY

[illegible]

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PROJECT No.: J2110
DRAWN BY: C
CHECKED BY: JH/W
DATE: 09/05/20
CAD I.D.: J211080-EDAM-

PROJECT:

**FAMCO, LLC
& NEW WEST
PROPERTIES, LLC**
PROPOSED MIXED-USE
REDEVELOPMENT

ON BEHALF OF
THE POINTE AT MAIN, AN URBAN
RENEWAL ENTITY
MAP: 9 | BLK: 126 | LOTS: 9-12 & 14-
4, 10-12, 18, 22, & 24-30 SOUTH
WASHINGTON AVENUE
BOROUGH OF BERGENFIELD
BERGEN COUNTY, NEW JERSEY
AREA 'D' REDEVELOPMENT PLAN

BOHLER //

30 GARBER SQUARE
RIDGEWOOD, NJ 07450
Phone: (551) 307-1400

www.BohlerEngineering.com

NJ CERT. OF AUTHORIZATION NO. 24GA28161700 & MH0

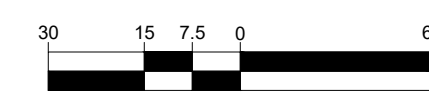
PROFESSIONAL ENGINEER:
NEW JERSEY LICENSE No. 52263
PENNSYLVANIA LICENSE No. 086764
NEW YORK LICENSE No. 100602

SHEET TITLE:

SHEET NUMBER

C-01

REVISION 1 - 10/24/2025



SCALE: 1" = 30'



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REVISIONS

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PROJECT No.: J211080
DRAWN BY: C
CHECKED BY: JH/B
DATE: 09/05/202
CAD I.D.: J211080-PDAM-1A

PROJECT: **PRELIMINARY &
FINAL MAJOR
SITE PLANS**
FOR
**FAMCO, LLC
& NEW WEST
PROPERTIES, LLC**
PROPOSED MIXED-USE
REDEVELOPMENT
ON BEHALF OF
THE POINTE AT MAIN, AN URBAN
RENEWAL ENTITY
MAP: 9 | BLK: 126 | LOTS: 9-12 & 14-16
4, 10-12, 21, 22, 23 & 30 SOUTH
WASHINGTON AVENUE
BOROUGH OF BERGENFIELD
BERGEN COUNTY, NEW JERSEY
AREA 'D' REDEVELOPMENT PLAN

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PROPOSED DRAINAGE AREA MAP

SHEET NUMBER:

C-02

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