STORMWATER MANAGEMENT REPORT

for

PAWS AND ANCHOR

Located at

BLOCK 1105; LOT 5

In

TOWNSHIP OF NEPTUNE
MONMOUTH COUNTY, NJ

Has been prepared for

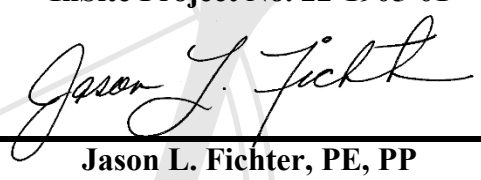
KEINWOLF PACK

710 BEACH AVENUE
BRADLEY BEACH, NJ 07720

On

October 31, 2022

InSite Project No. 22-1905-01



Jason L. Fichter, PE, PP
NJPE 43118– NJPP 5726

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TABLE OF CONTENTS

INTRODUCTION

This stormwater management report is being submitted as part of the development application for Paws and Anchor, located on Block 1105; Lot 5, as shown on Sheet 11 of the Official Tax Map of Neptune, Monmouth County, New Jersey. This report was prepared in accordance with the Township of Neptune, Monmouth County, the State Soil Conservation District (SCD) Standards, the New Jersey Department of Environmental Protection (NJDEP) as well as current industry standards and practices for stormwater management.

The project is not considered a "major development" in terms of stormwater because the project does not disturb one or more acres of land and does not create one quarter acre or more of new impervious surfaces. The development complies with the allowable impervious coverage for the zoning district. Therefore, the project is not major development and does not require stormwater quantity reductions, stormwater quality, and groundwater recharge.

PROJECT LOCATION

The property is zoned within the C-6 Route 33 East Commercial Zone where pet store, pet supplies and pet grooming services is a permitted use. The site is also in a hospital support overlay. The site has a frontage on Corlies Avenue (also known as NJ State Route 33). The surrounding area consists primarily commercial uses along Corlies Avenue and single-family residential uses.

FLOOD HAZARD AREA

According to FEMA's current Effective FIRM entitled, "FIRM Flood Insurance Rate Map", Map Number #34025C0334G, dated 06/15/22, the site is located in Zone X, with no base flood elevation. The site is not located in a flood hazard area.

SOIL CHARACTERISTICS

The existing soil classifications for the site are based on the USDA NRCS Web Soil Survey. The survey is useful at the planning level to draw general conclusions about the suitability of a site for certain land uses. Based on the NRCS data, the site consists of the following soil type:

SOIL NAME	HYDROLOGIC GROUP
KkhB – Klej loamy sand-Urban land complex, 0 to 5 % slopes	A

PRE-DEVELOPMENT CONDITIONS

The site has been developed with a one-story frame dwelling and gravel parking lot. Existing Drainage Area 1 flows towards the rear lot line while the Existing Drainage Area 2 flows into Corlies Avenue.

Refer to Appendix B for detailed calculations for each drainage area's runoff curve number (CN), hydrologic soil group(s) (HSG), associated areas, time of concentration (Tc), peak flow rates, and hydrographs. Refer to Appendix E for the Pre-Development Drainage Area Map.

POST-DEVELOPMENT CONDITIONS

The project proposes a second structure, the existing structure will remain along with utility improvements, lighting, and landscaping. Drainage patterns will roughly remain the same as the predevelopment conditions.

Refer to Appendix C for detailed calculations for each drainage area's runoff curve number (CN). As for the permeable paver parking lot, a reduced CN was calculated per Chapter 9.6 Pervious Paving Systems, in the Designing Pervious Paving Systems section. Refer to Appendix C for detailed calculations for each Hydrologic soil group(s) (HSG), associated areas, time of concentration (Tc), peak flow rates, and hydrographs as well. Refer to Appendix E for the Post-Development Drainage Area Map.

STORMWATER MANAGEMENT SUMMARY

Methods of determining stormwater runoff and peak discharge follow the procedures as outlined in "Urban Hydrology for Small Watersheds", Soil Conservation Service Technical Release No. 55. Rainfall data for each storm event is taken from New Jersey 24-hour Rainfall Frequency Data (NOAA Atlas 14 Volume 2). Stormwater hydrographs were performed using HydroCAD

Software Solutions' "HydroCAD 10.00" computer program. Pervious and impervious CN values are computed separately rather than a composite CN value. The following 24-hour storm events were studied using the SCS TR-20 runoff method, NOAA Region D rainfall distribution, and the Standard Unit Hydrograph (SCS):

West Long Branch NOAA Station, Monmouth County	
Storm Frequency (Years)	Rainfall (Inches)
2	3.49
10	5.41
25	6.75
100	9.26

Pre- and Post-development computations for the resultant hydrographs, routing computations, and runoff volumes are appended, respectively, to this report. For each drainage area, the following summaries were generated:

Pre- and Post-Development Flow Rates to Point of Analysis 1 (Neighbors)

Storm (Year)	Pre-Development Peak Flow (cfs)	Post-Development Peak Flow (cfs)	Difference (cfs)
2	0.1	0.0	-0.1
10	0.1	0.0	-0.1
25	0.2	0.0	-0.2
100	0.3	0.1	-0.2

The table above demonstrates that the post-development flows to this area meet existing flows or are reduced for all storm events.

Pre- and Post-Development Flow Rates to Point of Analysis 2 (Corlies Avenue aka Route 33)

Storm (Year)	Pre-Development Peak Flow (cfs)	Post-Development Peak Flow (cfs)	Difference (cfs)
2	0.2	0.4	+0.2
10	0.3	0.7	+0.4
25	0.4	1.0	+0.6
100	0.6	1.5	+0.9

The table above demonstrates that the post-development flows to this area are slightly increased from existing flows for all storm events, however, the right of way is the preferred destination for the stormwater since there is stormwater infrastructure within the roadway to collect and convey the water. The development complies with the allowable impervious coverage for the zoning district.

SOIL EROSION AND SEDIMENT CONTROL

In accordance with the Soil Erosion and Sediment Control Act, soil erosion measures will be incorporated into the design and graphically depicted on the Soil Erosion and Sediment Control Plans. These measures consist of, but are not limited to:

- Sediment Barriers and Silt Fences
- Stabilized Construction Access
- Topsoil Stockpiles
- Temporary and Permanent Stabilization

CONCLUSION

The project is not considered a "major development" in terms of stormwater because the project does not disturb one or more acres of land and does not create one quarter acre or more of new impervious surfaces. The development complies with the allowable impervious coverage for the zoning district. Therefore, the project is not major development and does not require stormwater quantity reductions, stormwater quality, and groundwater recharge.

APPENDIX A

Tax Map

USGS Map

Soils Map

FEMA Map

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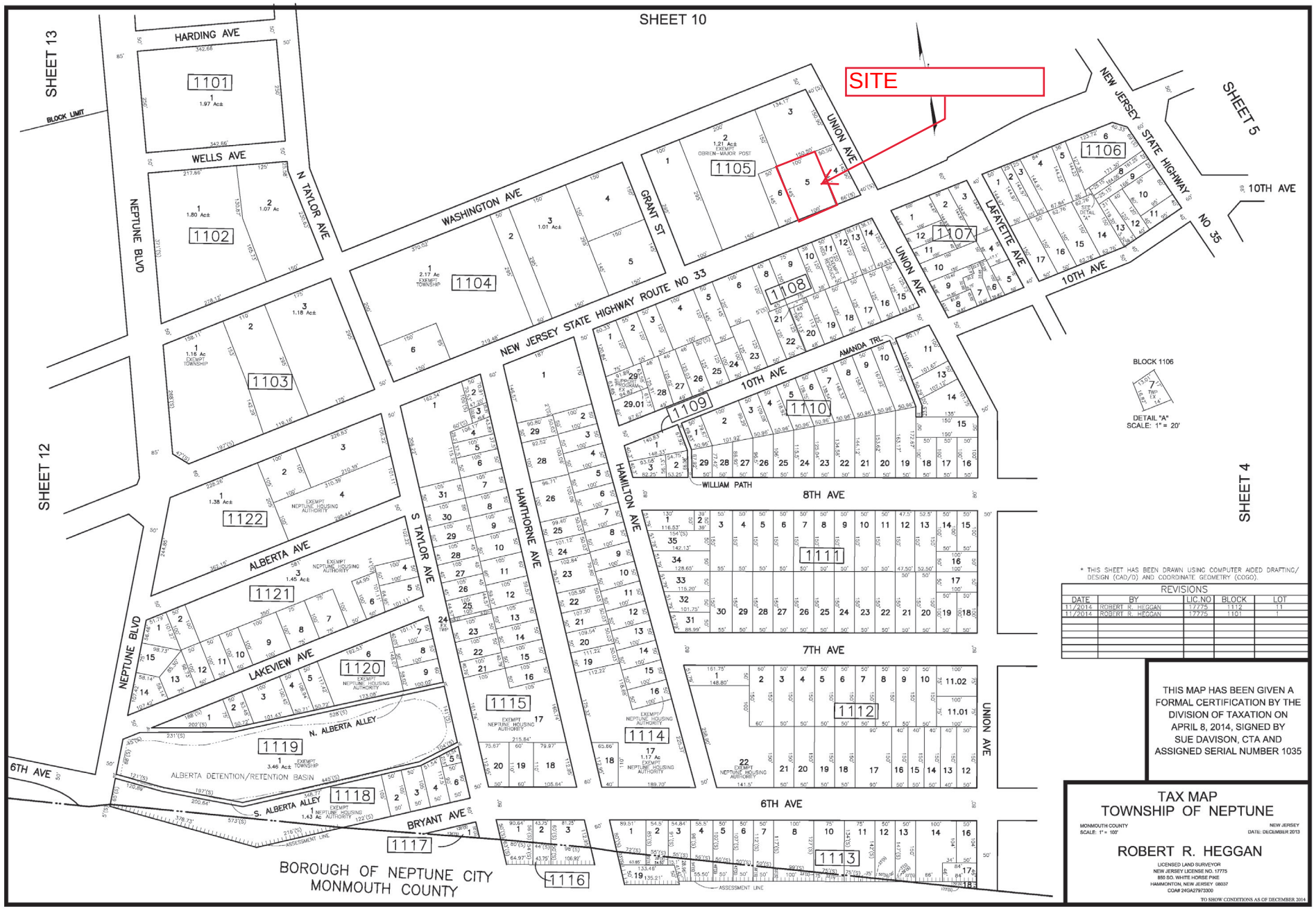


* THIS SHEET HAS BEEN DRAWN USING COMPUTER AIDED DRAFTING/ DESIGN (CAD/D) AND COORDINATE GEOMETRY (COGO).

REVISIONS

DATE	BY	LIC.NO	BLOCK	LOT
11/2014	ROBERT R. HEGGAN	17775	1112	11
11/2014	ROBERT R. HEGGAN	17775	1101	1

THIS MAP HAS BEEN GIVEN A FORMAL CERTIFICATION BY THE DIVISION OF TAXATION ON APRIL 8, 2014, SIGNED BY SUE DAVISON, CTA AND ASSIGNED SERIAL NUMBER 1035

TAX MAP
TOWNSHIP OF NEPTUNE

MONMOUTH COUNTY
SCALE: 1" = 100'

NEW JERSEY
DATE: DECEMBER 2013

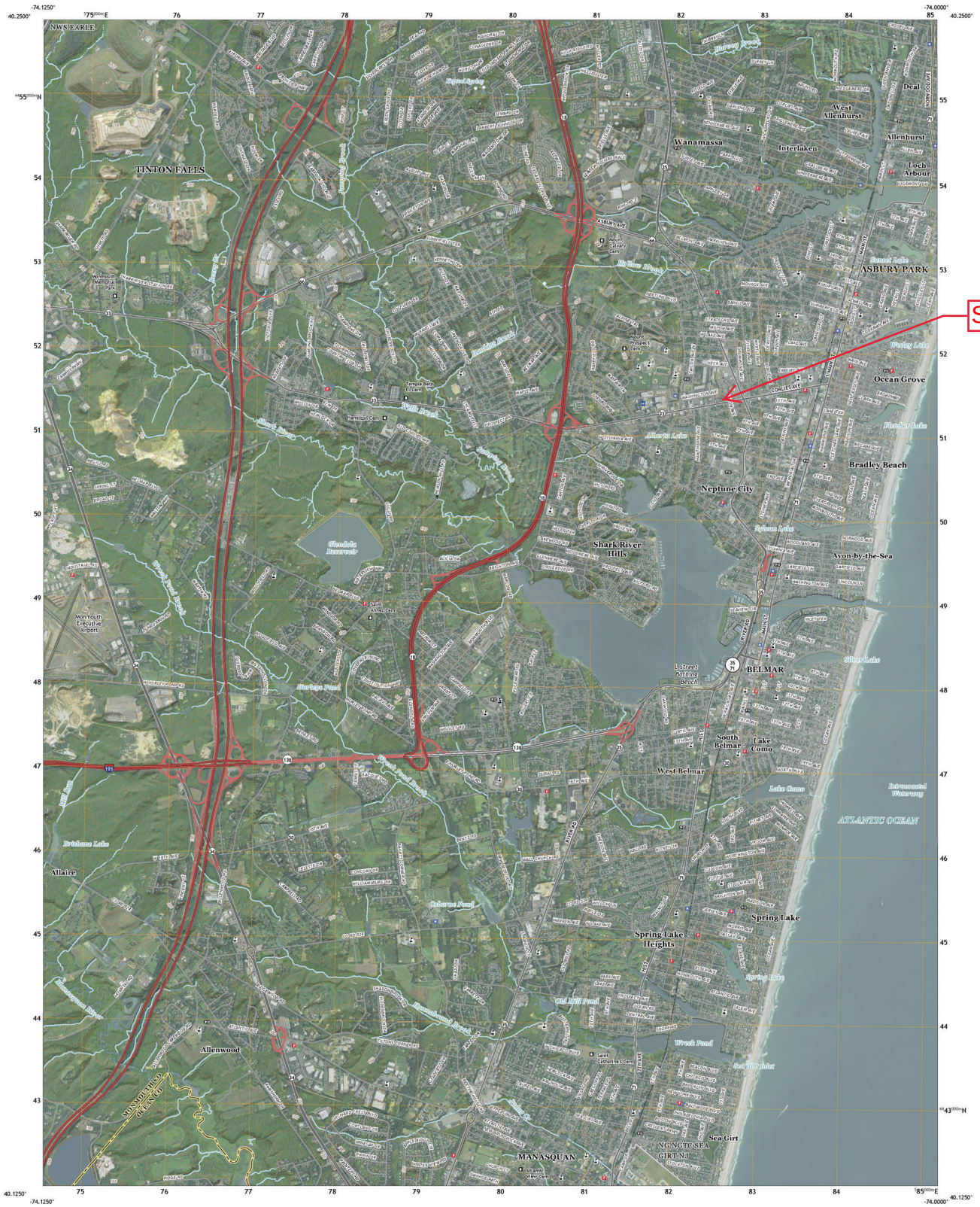
ROBERT R. HEGGAN
LICENSED LAND SURVEYOR
NEW JERSEY LICENSE NO. 17775
855 SO. WHITE HORSE PIKE
HAMMONTON, NEW JERSEY 08037
COA# 24GA27973300

TO SHOW CONDITIONS AS OF DECEMBER 2014

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

ASBURY PARK QUADRANGLE
NEW JERSEY
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 18T
This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2015 - September 2015
Roads.....U.S. Census Bureau, 2016
Names.....GNIS, 1979 - 2019
Hydrography.....National Hydrography Dataset, 2002 - 2009
Contours.....National Elevation Dataset, 2012
Boundaries.....Multiple sources; see metadata file 2017 - 2018

Wetlands.....FWS National Wetlands Inventory 2007 - 2008

UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
WK
Grid Zone Designation
18T

SCALE 1:24 000

KILOMETERS 0 0.5 1 2
METERS 0 500 1000 2000
MILES 0 0.5 1
FEET 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011. A metadata file associated with this product is draft version 0.6.18

QUADRANGLE LOCATION

ADJOINING QUADRANGLES
1 Marlboro
2 Long Branch West
3 Long Branch East
4 Farmingdale
5 Asbury Park OE E
6 Lakewood
7 Point Pleasant

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

ASBURY PARK, NJ
2019

NGA REF NO. USGS24K957167

Map Scale: 1:329 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 4 9 18 27

Feet: 0 15 30 60 90

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 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: Monmouth County, New Jersey
Survey Area Data: Version 15, Aug 31, 2021

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

Date(s) aerial images were photographed: Sep 25, 2020—Oct 15, 2020

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
KkhB	Klej loamy sand-Urban land complex, 0 to 5 percent slopes	A/D	0.4	100.0%
Totals for Area of Interest			**0.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was State Plane New Jersey FIPS 2900. The **horizontal datum** was NAD83, GRS 80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS). This information was derived from digital orthophotos produced at a scale of 1:2400 (1"=200') with a 1 foot pixel resolution from photography dated 2012.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

The AE Zone category has been divided by a **Limit of Moderate Wave Action (LiMWA)**. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the VE Zone and the LiMWA (or between the shoreline and the LiMWA for areas where VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

Contact the **FEMA Map Information eXchange** at 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Information eXchange may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

NOTE TO MAP USERS

This June 15th, 2022 map revision only updates flood hazard data within the Township of Neptune.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- New Jersey Flood Hazard Area Design Flood (NJFHADF)
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Limit of Moderate Wave Action
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- Cross section line
- Limited detail cross section line
- Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4376000mN — 1000-meter Universal Transverse Mercator grid values, zone 18N
- 600000 FT — 5000-foot grid values: New Jersey State Plane coordinate system (FIPSZONE 2900), Transverse Mercator projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 25, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
June 15, 2022 - to incorporate new detailed coastal flood hazard analyses, to add Base Flood Elevations, and Special Flood Hazard Areas; to change zone designations and Special Flood Hazard Areas; and to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdictions.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0334G

FIRM
FLOOD INSURANCE RATE MAP

MONMOUTH COUNTY, NEW JERSEY
(ALL JURISDICTIONS)

PANEL 334 OF 457

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ASBURY PARK, CITY OF	340285	0334	G
AVON-BY-THE-SEA, BOROUGH OF	340287	0334	G
BELMAR, BOROUGH OF	345283	0334	G
BRADLEY BEACH, BOROUGH OF	340289	0334	G
NEPTUNE CITY, BOROUGH OF	340316	0334	G
NEPTUNE, TOWNSHIP OF	340317	0334	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
34025C0334G

MAP REVISED
JUNE 15, 2022

Federal Emergency Management Agency

APPENDIX B

Pre-Development Flow Calculations

InSite Engineering, LLC
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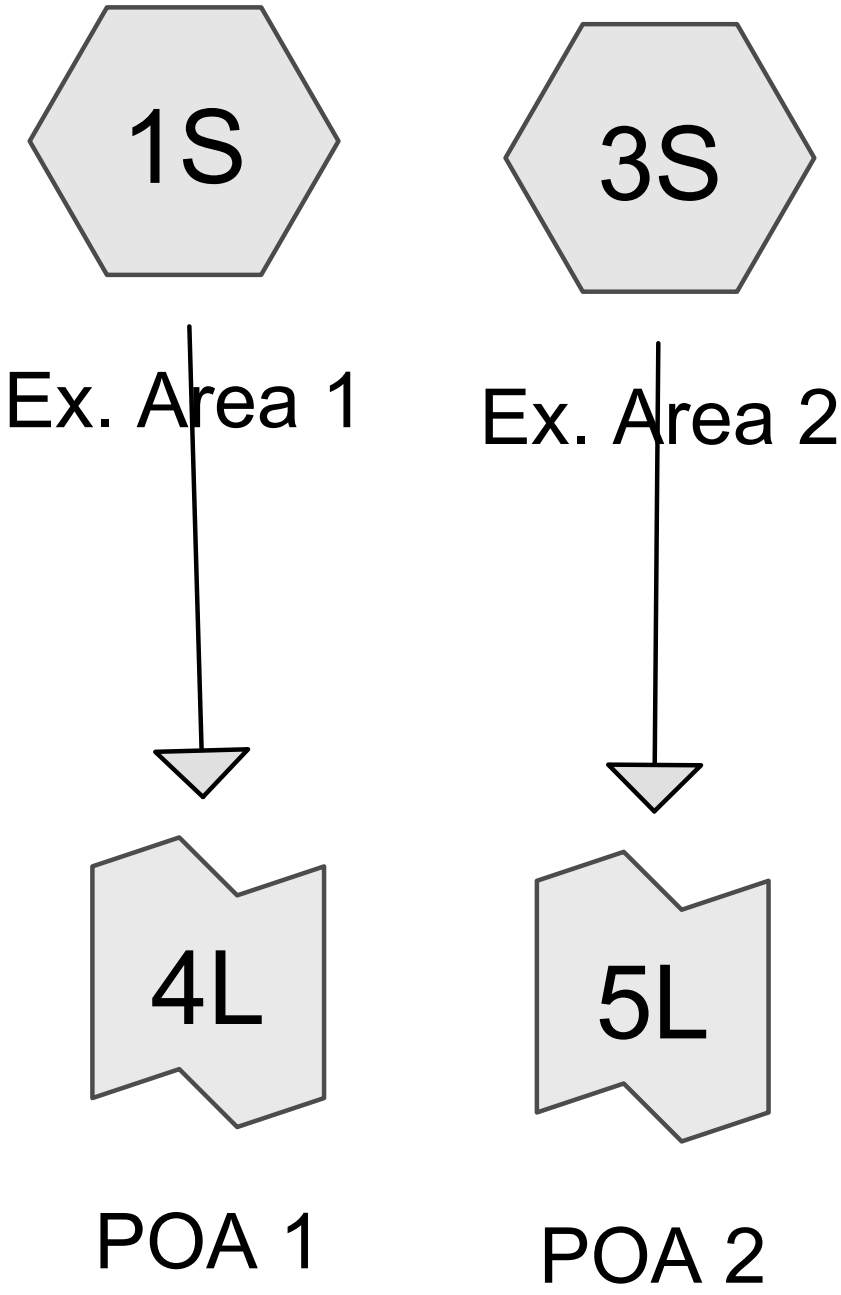


Subcat Reach Pond Link

Routing Diagram for 221031 r0 Monmouth County
Prepared by InSite Engineering LLC, Printed 10/28/2022

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Ex. Area 1 Runoff Area=6,437 sf 14.26% Impervious Runoff Depth=0.47"
Flow Length=85' Tc=10.0 min CN=39/98 Runoff=0.1 cfs 0.006 af

Subcatchment 3S: Ex. Area 2 Runoff Area=8,063 sf 32.74% Impervious Runoff Depth=1.07"
Flow Length=94' Tc=10.0 min CN=39/98 Runoff=0.2 cfs 0.017 af

Link 4L: POA 1 Inflow=0.1 cfs 0.006 af
Primary=0.1 cfs 0.006 af

Link 5L: POA 2 Inflow=0.2 cfs 0.017 af
Primary=0.2 cfs 0.017 af

Total Runoff Area = 0.333 ac Runoff Volume = 0.022 af Average Runoff Depth = 0.81"
75.46% Pervious = 0.251 ac 24.54% Impervious = 0.082 ac

Summary for Subcatchment 1S: Ex. Area 1

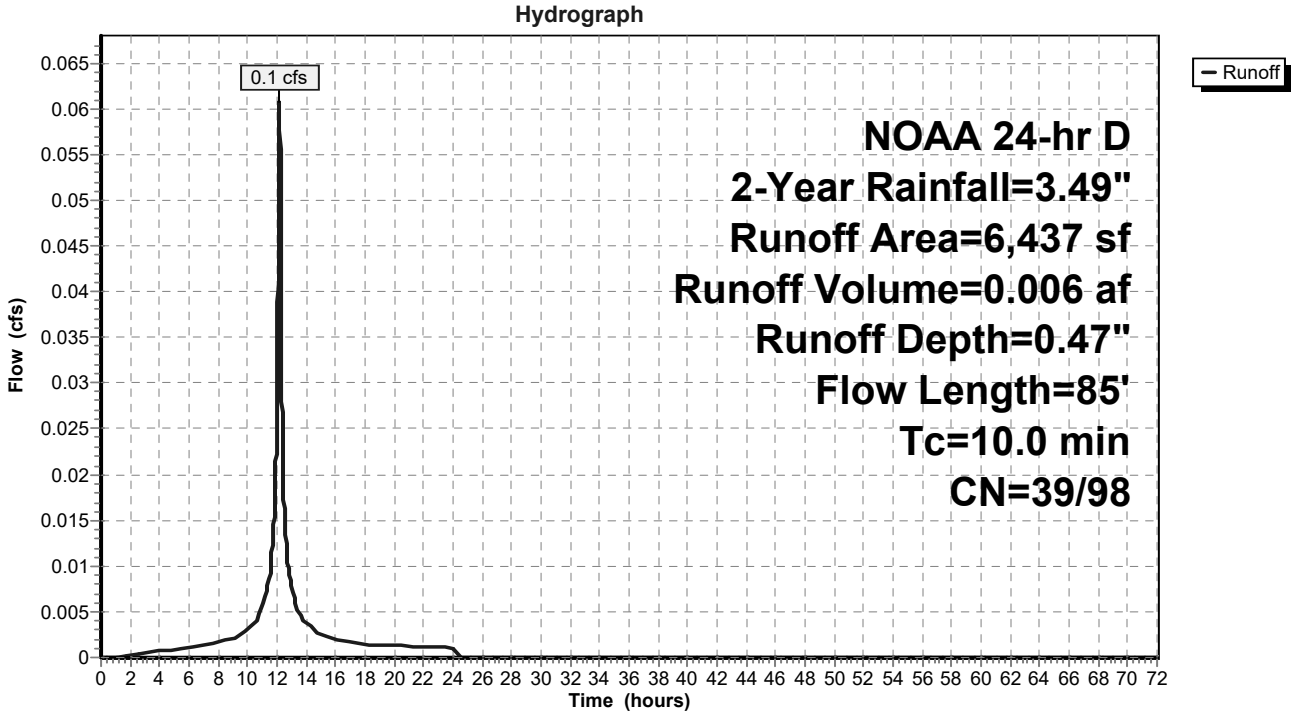
Runoff = 0.1 cfs @ 12.17 hrs, Volume= 0.006 af, Depth= 0.47"
Routed to Link 4L : POA 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.49"

Area (sf)	CN	Description
918	98	Paved parking, HSG A
5,519	39	>75% Grass cover, Good, HSG A
6,437	47	Weighted Average
5,519	39	85.74% Pervious Area
918	98	14.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	46	0.0135	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.1	25	0.0232	3.09		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	14	0.0292	1.20		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	85	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: Ex. Area 1



Summary for Subcatchment 3S: Ex. Area 2

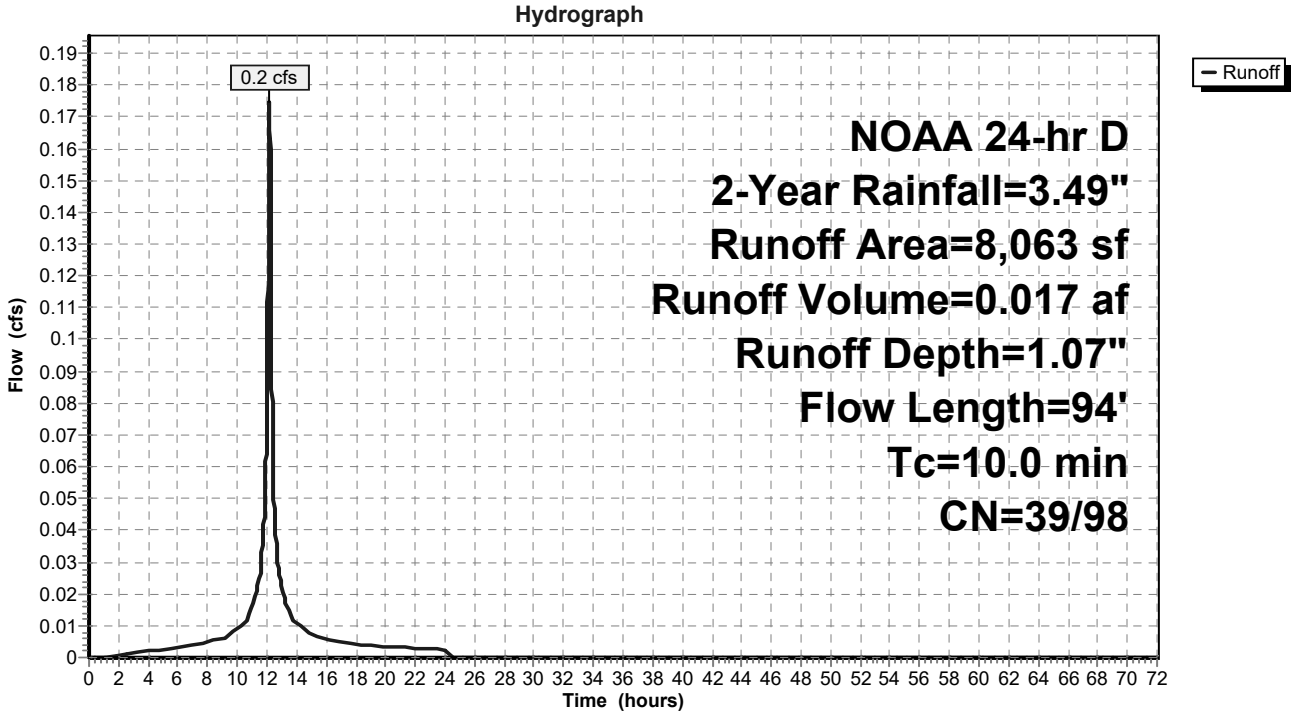
Runoff = 0.2 cfs @ 12.17 hrs, Volume= 0.017 af, Depth= 1.07"
Routed to Link 5L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.49"

Area (sf)	CN	Description
2,640	98	Paved parking, HSG A
5,423	39	>75% Grass cover, Good, HSG A
8,063	58	Weighted Average
5,423	39	67.26% Pervious Area
2,640	98	32.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	57	0.0114	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.1	20	0.0165	2.61		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	17	0.0124	0.78		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	94	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 3S: Ex. Area 2

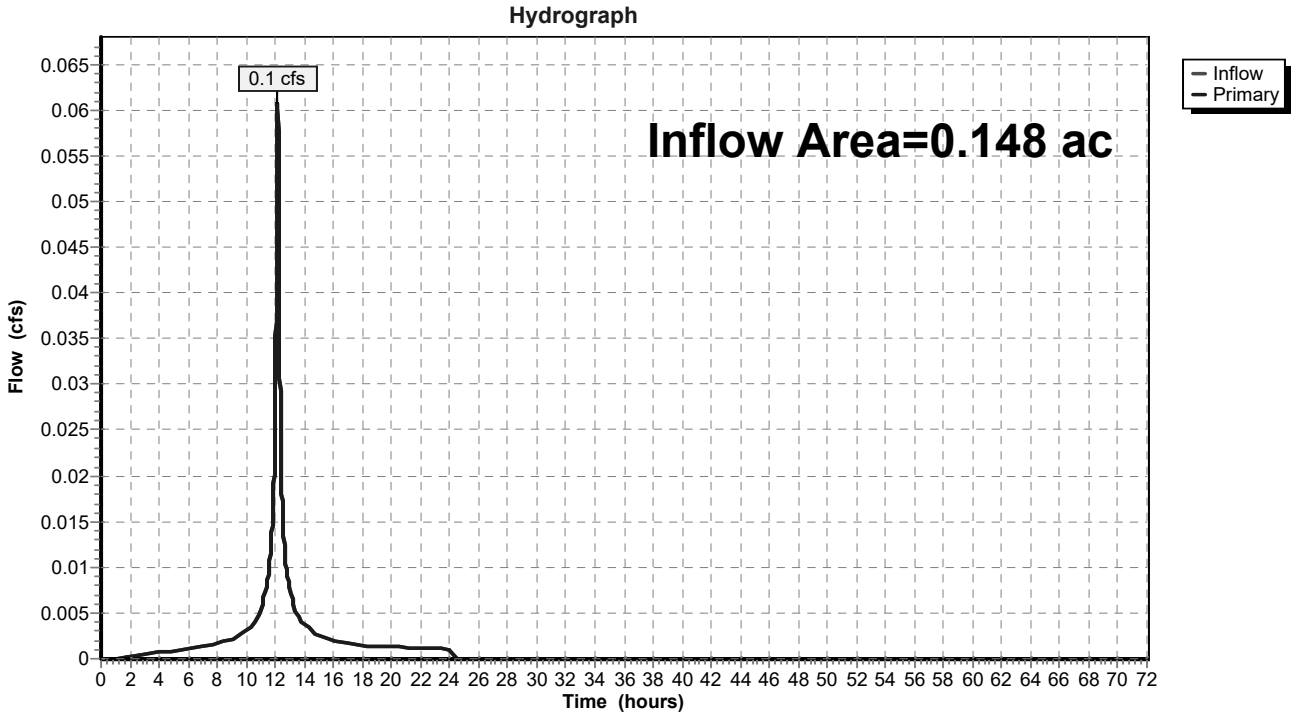


Summary for Link 4L: POA 1

Inflow Area = 0.148 ac, 14.26% Impervious, Inflow Depth = 0.47" for 2-Year event
Inflow = 0.1 cfs @ 12.17 hrs, Volume= 0.006 af
Primary = 0.1 cfs @ 12.17 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 4L: POA 1

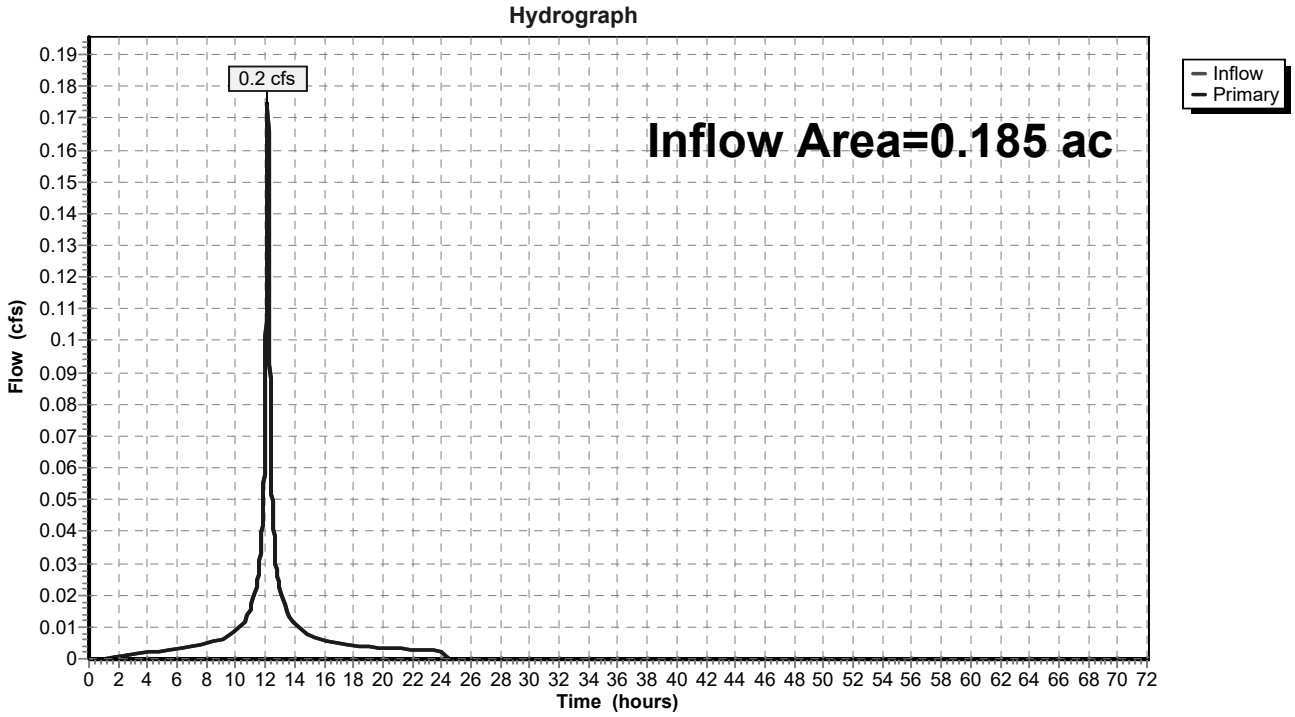


Summary for Link 5L: POA 2

Inflow Area = 0.185 ac, 32.74% Impervious, Inflow Depth = 1.07" for 2-Year event
Inflow = 0.2 cfs @ 12.17 hrs, Volume= 0.017 af
Primary = 0.2 cfs @ 12.17 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 5L: POA 2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Ex. Area 1 Runoff Area=6,437 sf 14.26% Impervious Runoff Depth=0.99"
Flow Length=85' Tc=10.0 min CN=39/98 Runoff=0.1 cfs 0.012 af

Subcatchment 3S: Ex. Area 2 Runoff Area=8,063 sf 32.74% Impervious Runoff Depth=1.89"
Flow Length=94' Tc=10.0 min CN=39/98 Runoff=0.3 cfs 0.029 af

Link 4L: POA 1 Inflow=0.1 cfs 0.012 af
Primary=0.1 cfs 0.012 af

Link 5L: POA 2 Inflow=0.3 cfs 0.029 af
Primary=0.3 cfs 0.029 af

Total Runoff Area = 0.333 ac Runoff Volume = 0.041 af Average Runoff Depth = 1.49"
75.46% Pervious = 0.251 ac 24.54% Impervious = 0.082 ac

Summary for Subcatchment 1S: Ex. Area 1

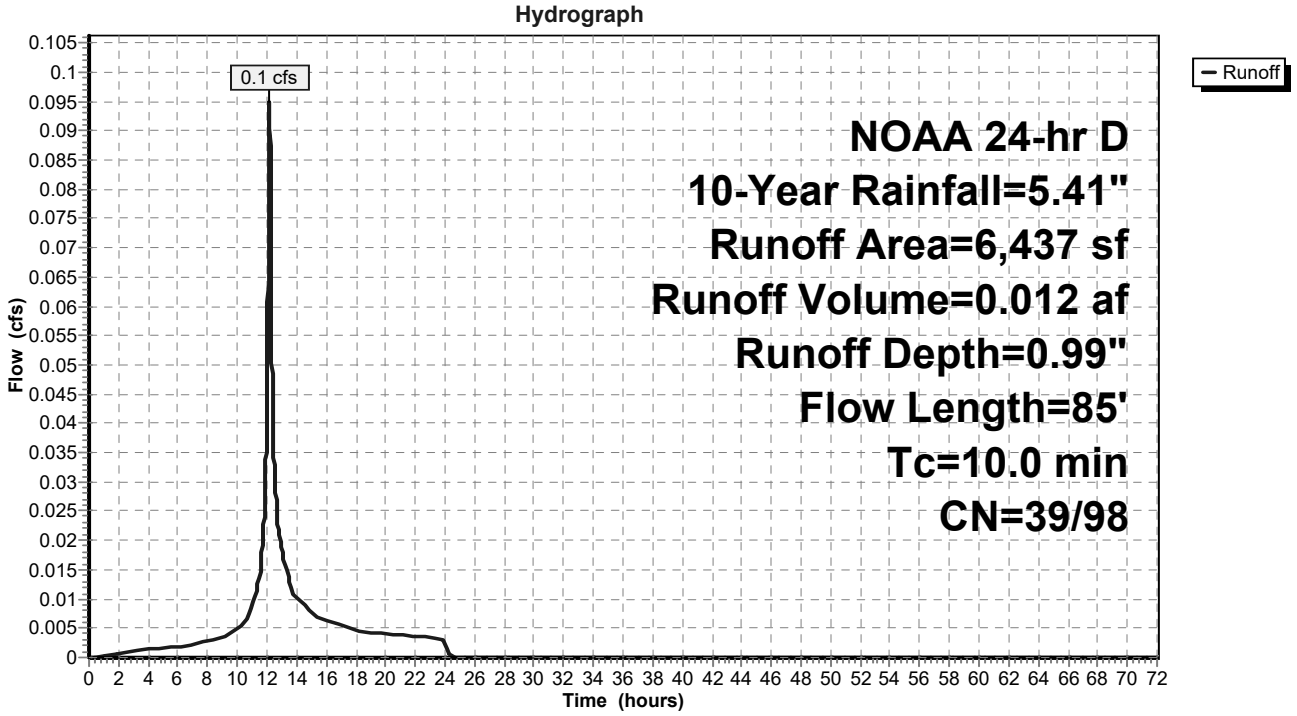
Runoff = 0.1 cfs @ 12.17 hrs, Volume= 0.012 af, Depth= 0.99"
Routed to Link 4L : POA 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.41"

Area (sf)	CN	Description
918	98	Paved parking, HSG A
5,519	39	>75% Grass cover, Good, HSG A
6,437	47	Weighted Average
5,519	39	85.74% Pervious Area
918	98	14.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	46	0.0135	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.1	25	0.0232	3.09		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	14	0.0292	1.20		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	85	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: Ex. Area 1



Summary for Subcatchment 3S: Ex. Area 2

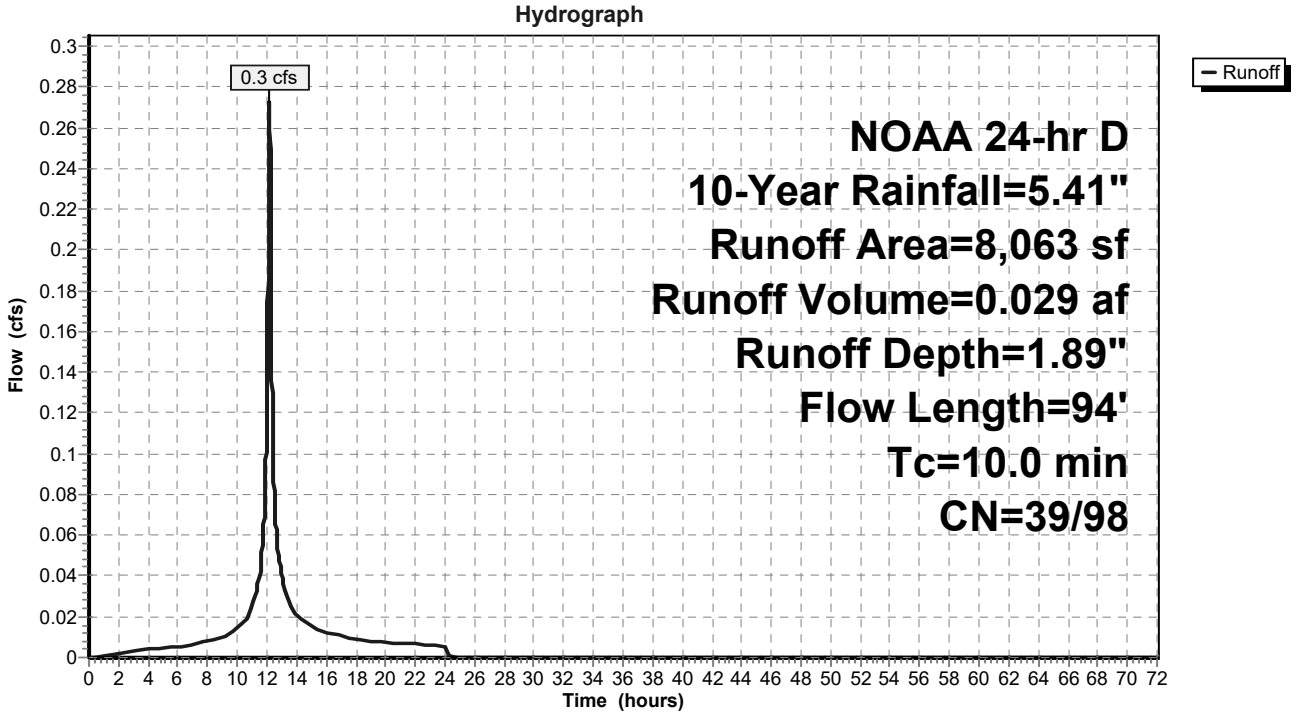
Runoff = 0.3 cfs @ 12.17 hrs, Volume= 0.029 af, Depth= 1.89"
Routed to Link 5L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.41"

Area (sf)	CN	Description
2,640	98	Paved parking, HSG A
5,423	39	>75% Grass cover, Good, HSG A
8,063	58	Weighted Average
5,423	39	67.26% Pervious Area
2,640	98	32.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	57	0.0114	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.1	20	0.0165	2.61		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	17	0.0124	0.78		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	94	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 3S: Ex. Area 2

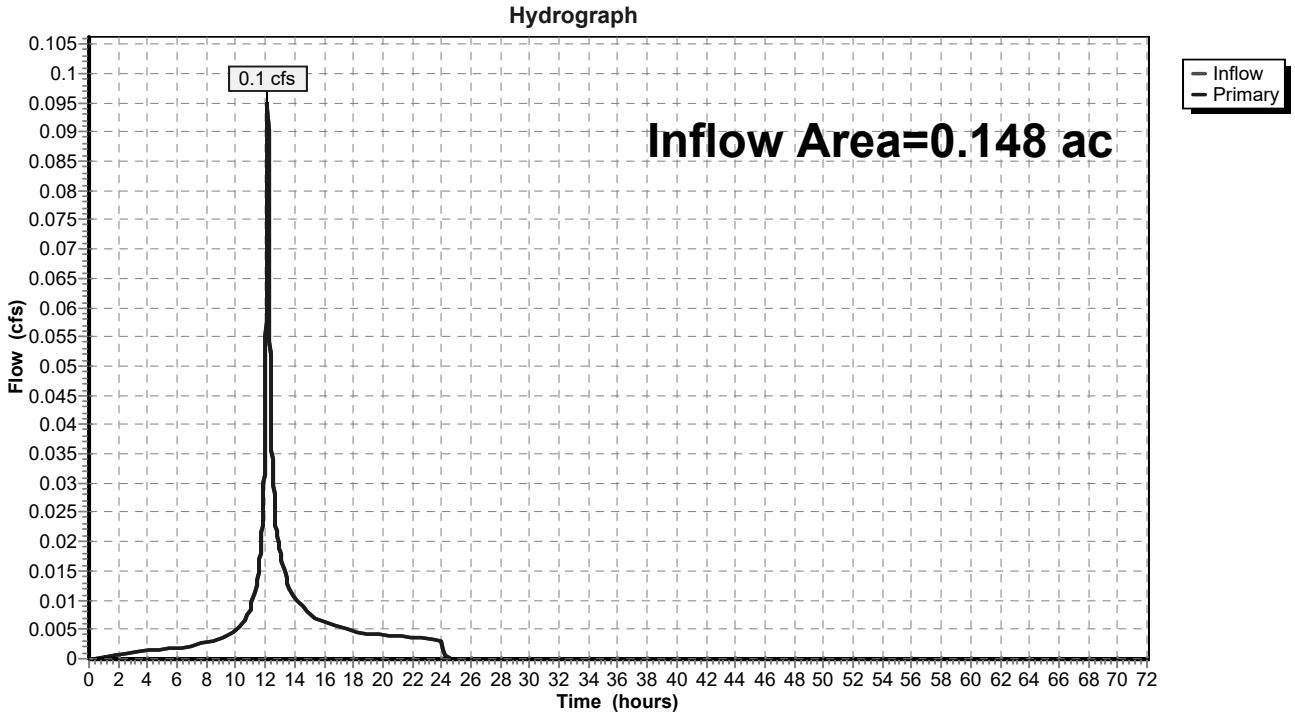


Summary for Link 4L: POA 1

Inflow Area = 0.148 ac, 14.26% Impervious, Inflow Depth = 0.99" for 10-Year event
Inflow = 0.1 cfs @ 12.17 hrs, Volume= 0.012 af
Primary = 0.1 cfs @ 12.17 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 4L: POA 1

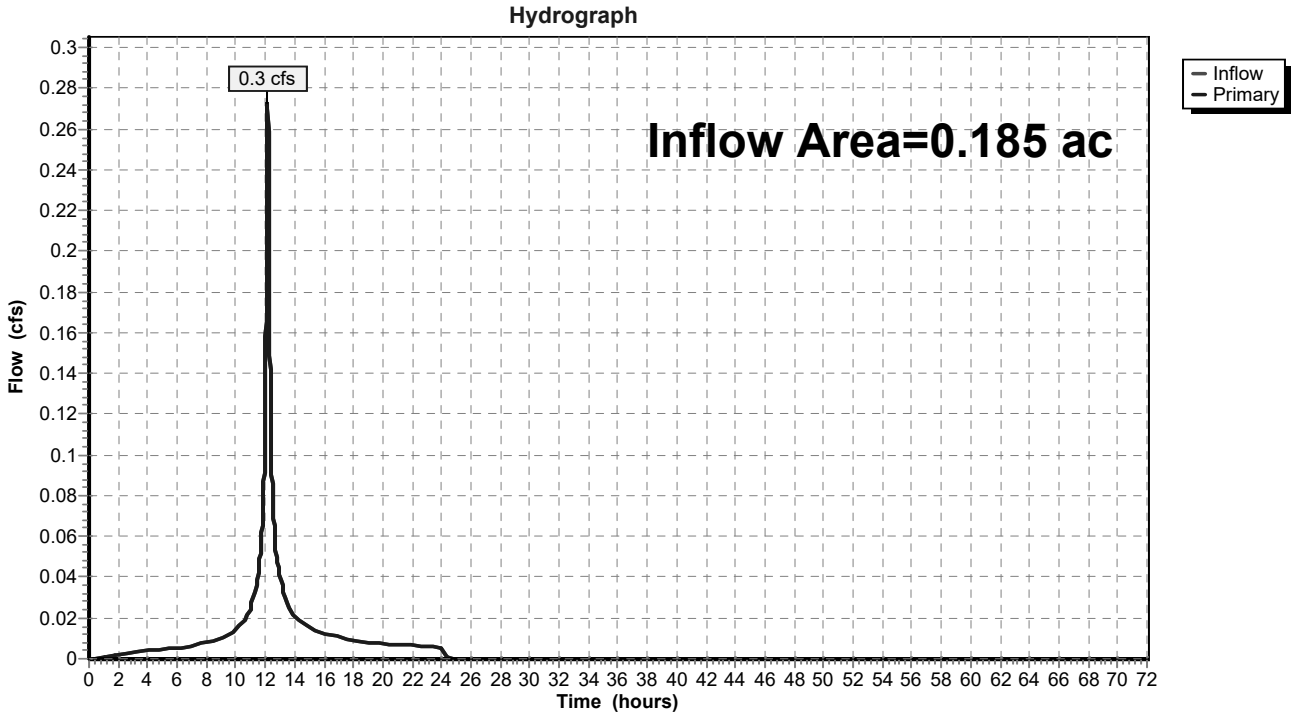


Summary for Link 5L: POA 2

Inflow Area = 0.185 ac, 32.74% Impervious, Inflow Depth = 1.89" for 10-Year event
Inflow = 0.3 cfs @ 12.17 hrs, Volume= 0.029 af
Primary = 0.3 cfs @ 12.17 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 5L: POA 2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Ex. Area 1 Runoff Area=6,437 sf 14.26% Impervious Runoff Depth=1.51"
Flow Length=85' Tc=10.0 min CN=39/98 Runoff=0.2 cfs 0.019 af

Subcatchment 3S: Ex. Area 2 Runoff Area=8,063 sf 32.74% Impervious Runoff Depth=2.59"
Flow Length=94' Tc=10.0 min CN=39/98 Runoff=0.4 cfs 0.040 af

Link 4L: POA 1 Inflow=0.2 cfs 0.019 af
Primary=0.2 cfs 0.019 af

Link 5L: POA 2 Inflow=0.4 cfs 0.040 af
Primary=0.4 cfs 0.040 af

Total Runoff Area = 0.333 ac Runoff Volume = 0.059 af Average Runoff Depth = 2.11"
75.46% Pervious = 0.251 ac 24.54% Impervious = 0.082 ac

Summary for Subcatchment 1S: Ex. Area 1

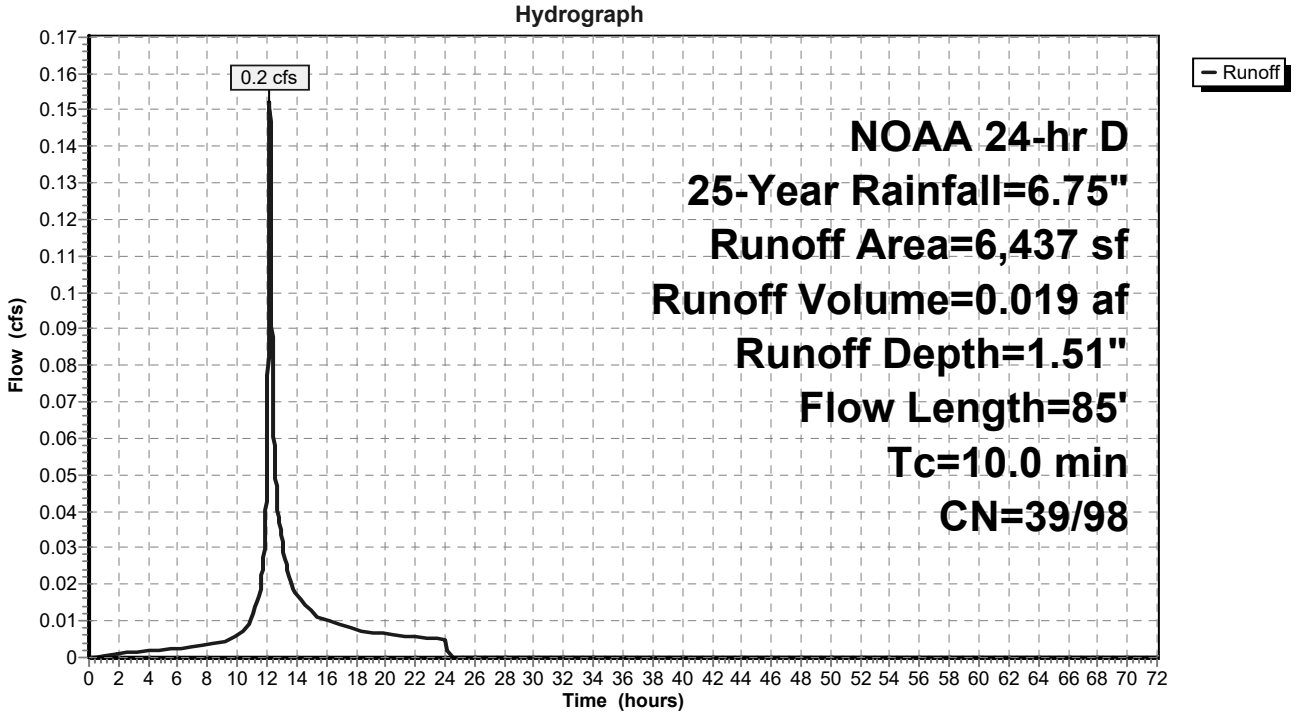
Runoff = 0.2 cfs @ 12.19 hrs, Volume= 0.019 af, Depth= 1.51"
Routed to Link 4L : POA 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.75"

Area (sf)	CN	Description
918	98	Paved parking, HSG A
5,519	39	>75% Grass cover, Good, HSG A
6,437	47	Weighted Average
5,519	39	85.74% Pervious Area
918	98	14.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	46	0.0135	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.1	25	0.0232	3.09		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	14	0.0292	1.20		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	85	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: Ex. Area 1



Summary for Subcatchment 3S: Ex. Area 2

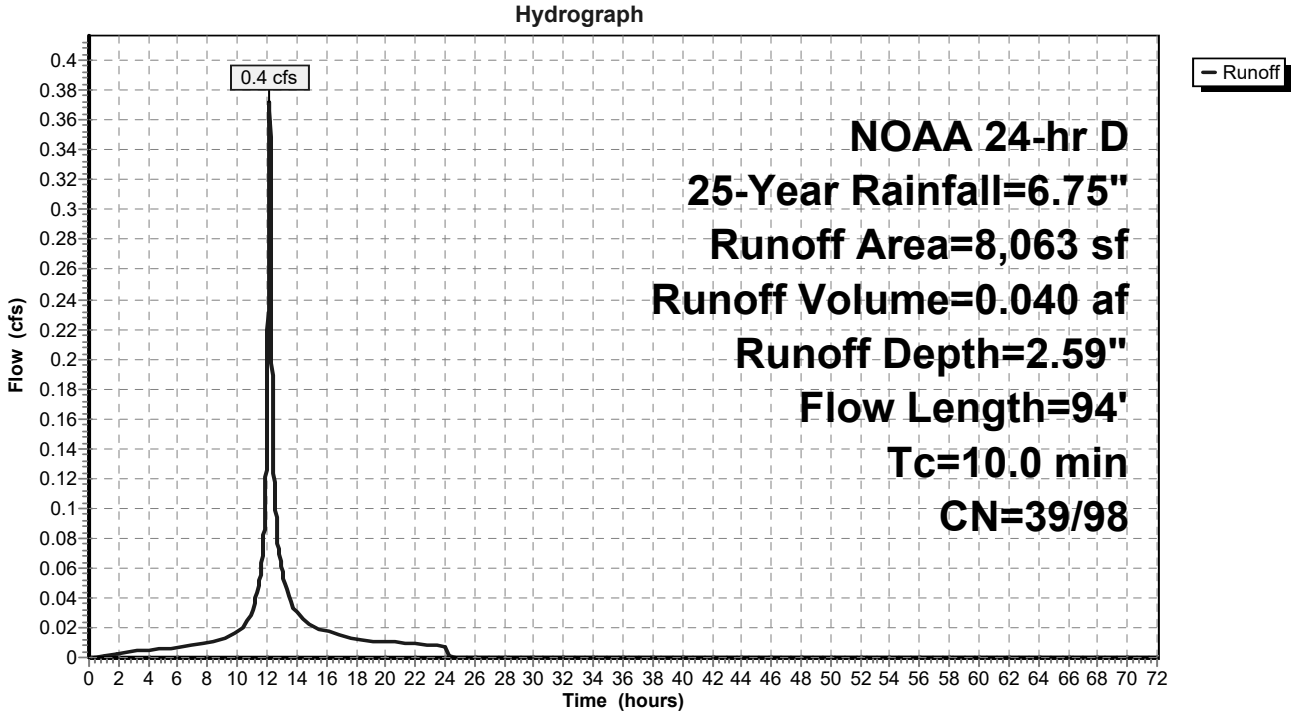
Runoff = 0.4 cfs @ 12.18 hrs, Volume= 0.040 af, Depth= 2.59"
Routed to Link 5L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.75"

Area (sf)	CN	Description
2,640	98	Paved parking, HSG A
5,423	39	>75% Grass cover, Good, HSG A
8,063	58	Weighted Average
5,423	39	67.26% Pervious Area
2,640	98	32.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	57	0.0114	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.1	20	0.0165	2.61		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	17	0.0124	0.78		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	94	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 3S: Ex. Area 2

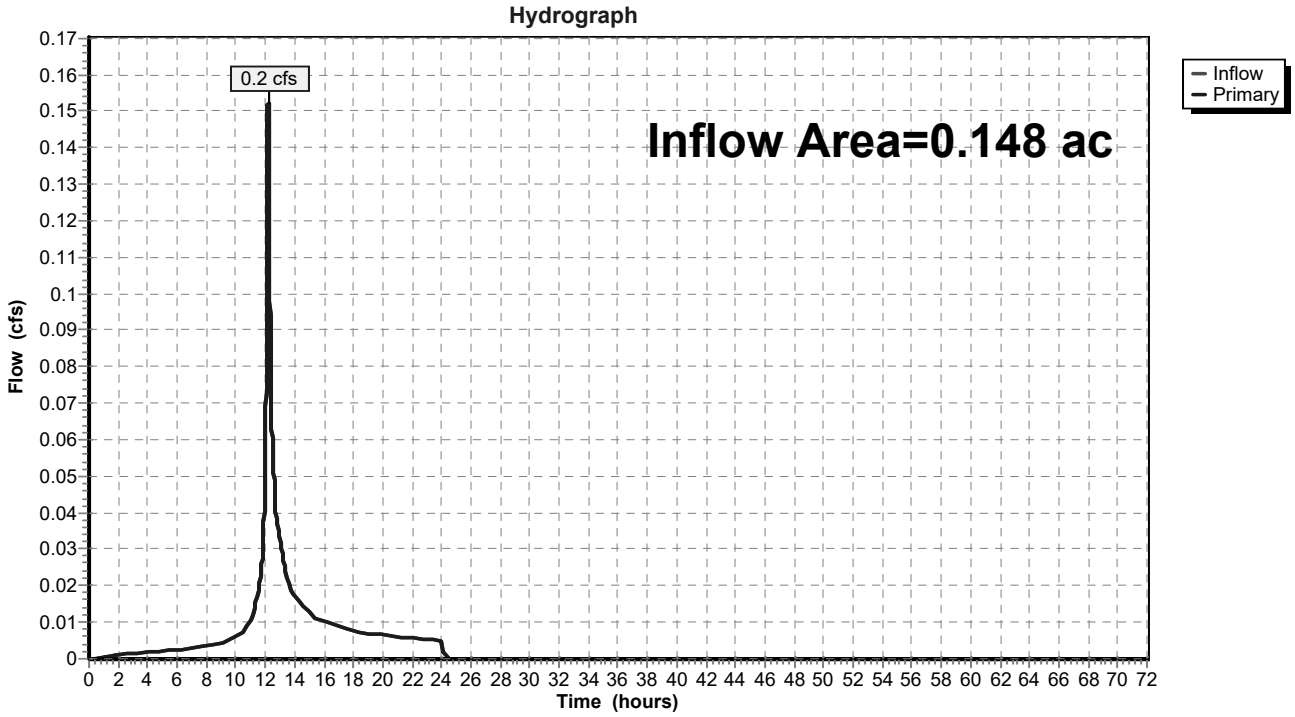


Summary for Link 4L: POA 1

Inflow Area = 0.148 ac, 14.26% Impervious, Inflow Depth = 1.51" for 25-Year event
Inflow = 0.2 cfs @ 12.19 hrs, Volume= 0.019 af
Primary = 0.2 cfs @ 12.19 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 4L: POA 1

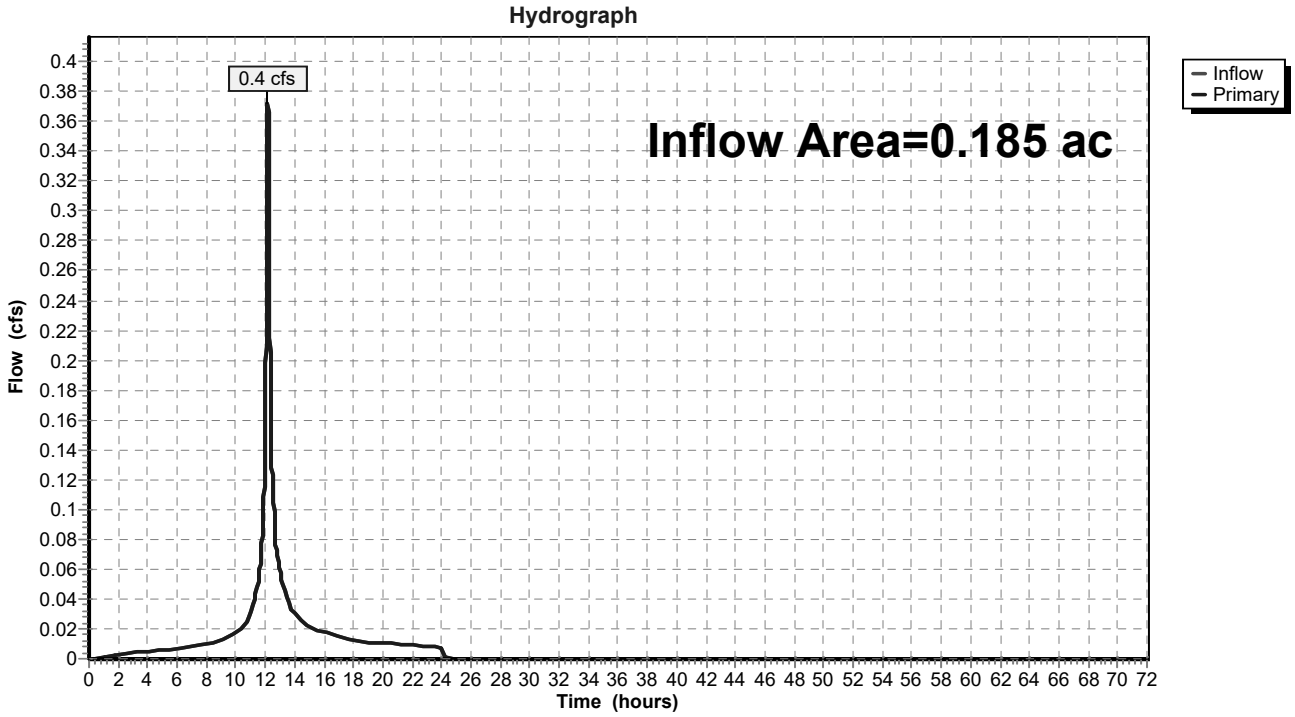


Summary for Link 5L: POA 2

Inflow Area = 0.185 ac, 32.74% Impervious, Inflow Depth = 2.59" for 25-Year event
Inflow = 0.4 cfs @ 12.18 hrs, Volume= 0.040 af
Primary = 0.4 cfs @ 12.18 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 5L: POA 2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Ex. Area 1 Runoff Area=6,437 sf 14.26% Impervious Runoff Depth=2.77"
Flow Length=85' Tc=10.0 min CN=39/98 Runoff=0.3 cfs 0.034 af

Subcatchment 3S: Ex. Area 2 Runoff Area=8,063 sf 32.74% Impervious Runoff Depth=4.11"
Flow Length=94' Tc=10.0 min CN=39/98 Runoff=0.6 cfs 0.063 af

Link 4L: POA 1 Inflow=0.3 cfs 0.034 af
Primary=0.3 cfs 0.034 af

Link 5L: POA 2 Inflow=0.6 cfs 0.063 af
Primary=0.6 cfs 0.063 af

Total Runoff Area = 0.333 ac Runoff Volume = 0.098 af Average Runoff Depth = 3.52"
75.46% Pervious = 0.251 ac 24.54% Impervious = 0.082 ac

Summary for Subcatchment 1S: Ex. Area 1

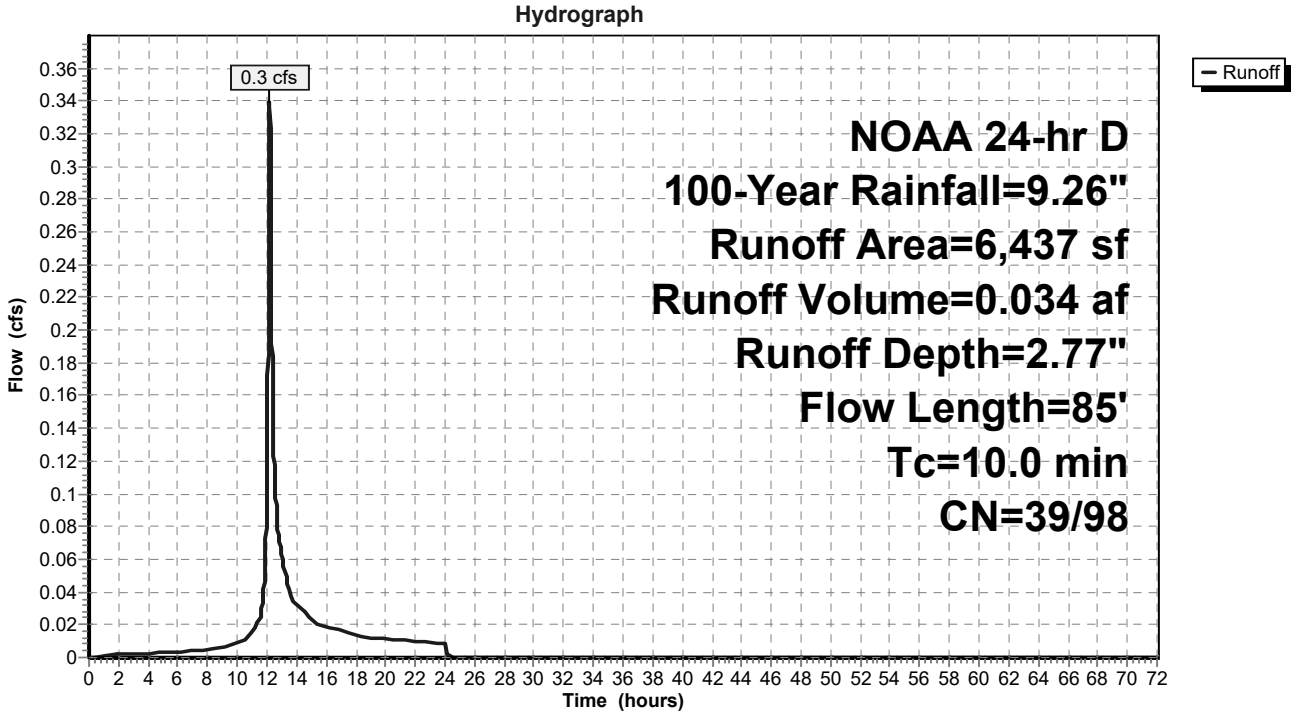
Runoff = 0.3 cfs @ 12.18 hrs, Volume= 0.034 af, Depth= 2.77"
Routed to Link 4L : POA 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.26"

Area (sf)	CN	Description
918	98	Paved parking, HSG A
5,519	39	>75% Grass cover, Good, HSG A
6,437	47	Weighted Average
5,519	39	85.74% Pervious Area
918	98	14.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	46	0.0135	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.1	25	0.0232	3.09		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	14	0.0292	1.20		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	85	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: Ex. Area 1



Summary for Subcatchment 3S: Ex. Area 2

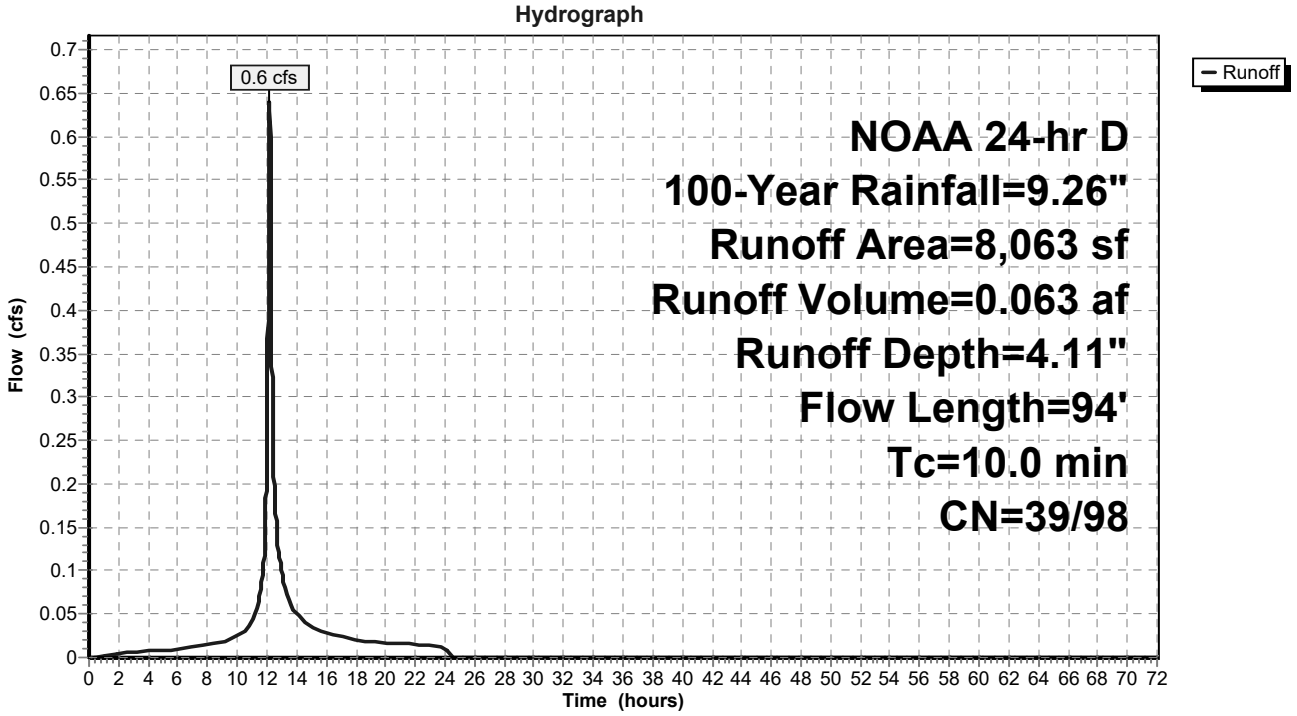
Runoff = 0.6 cfs @ 12.18 hrs, Volume= 0.063 af, Depth= 4.11"
Routed to Link 5L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.26"

Area (sf)	CN	Description
2,640	98	Paved parking, HSG A
5,423	39	>75% Grass cover, Good, HSG A
8,063	58	Weighted Average
5,423	39	67.26% Pervious Area
2,640	98	32.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	57	0.0114	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
0.1	20	0.0165	2.61		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	17	0.0124	0.78		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	94	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 3S: Ex. Area 2

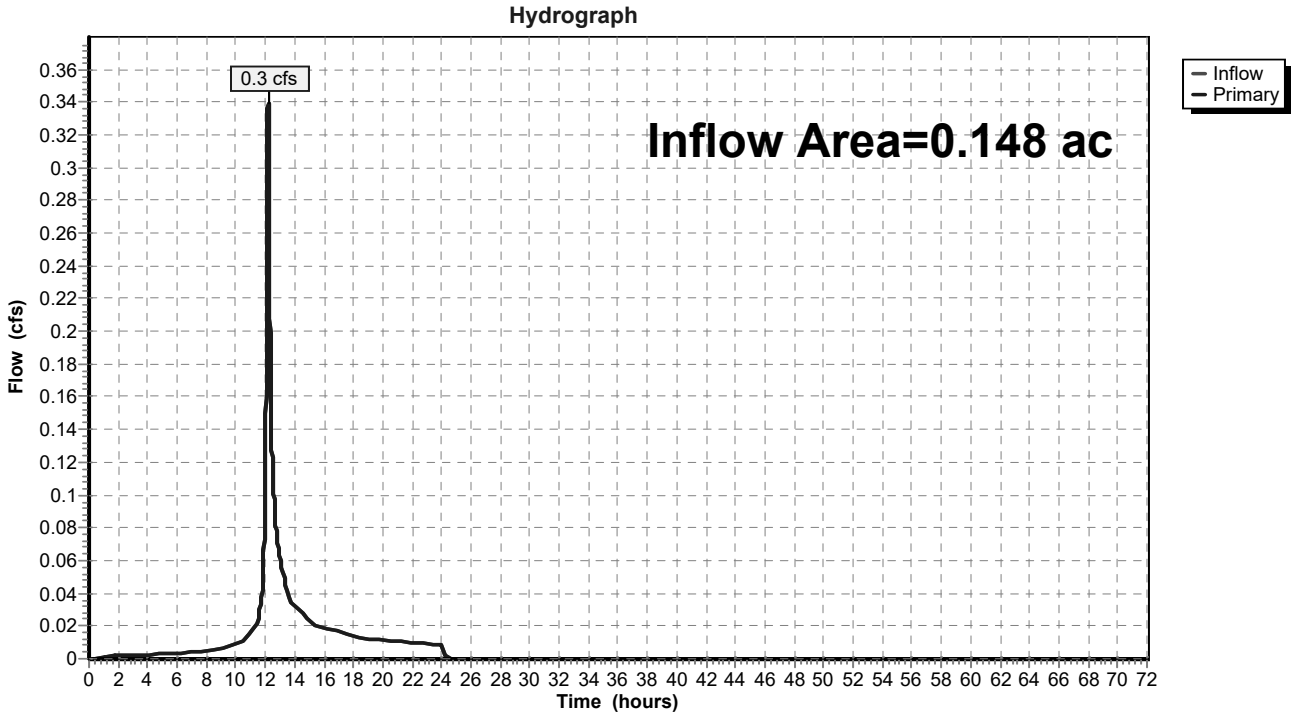


Summary for Link 4L: POA 1

Inflow Area = 0.148 ac, 14.26% Impervious, Inflow Depth = 2.77" for 100-Year event
Inflow = 0.3 cfs @ 12.18 hrs, Volume= 0.034 af
Primary = 0.3 cfs @ 12.18 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 4L: POA 1

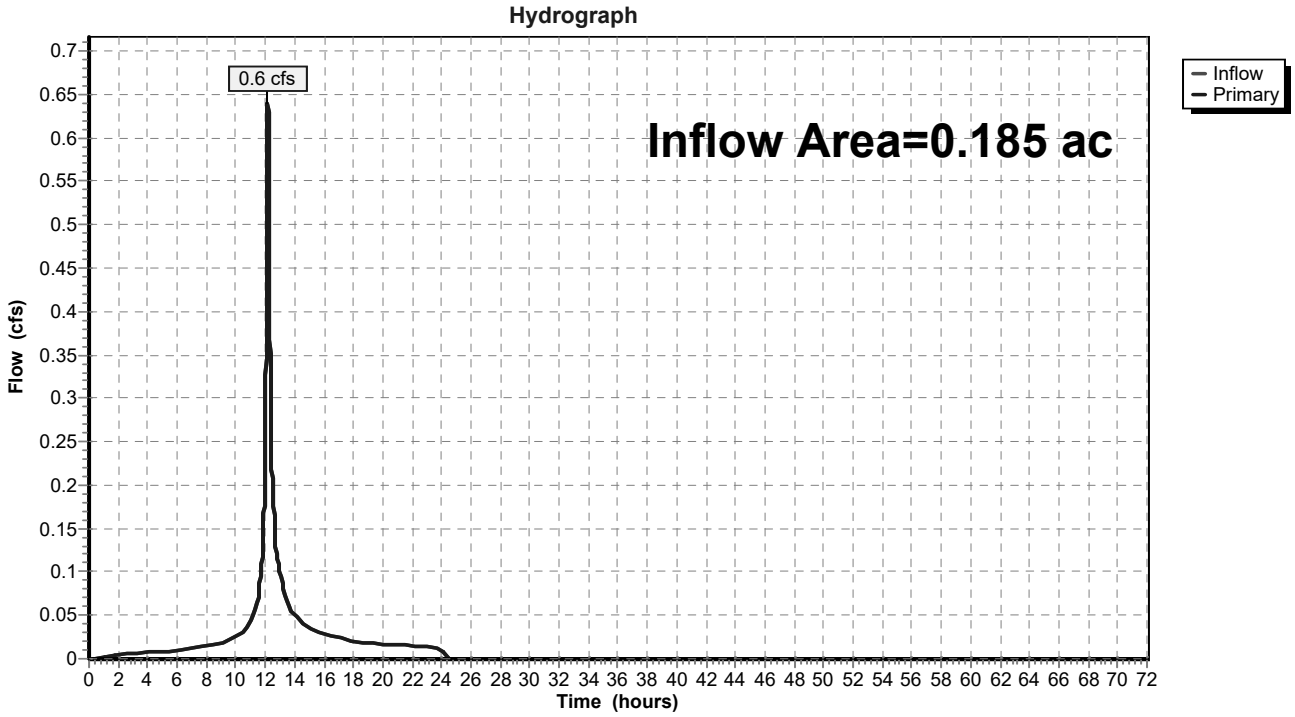


Summary for Link 5L: POA 2

Inflow Area = 0.185 ac, 32.74% Impervious, Inflow Depth = 4.11" for 100-Year event
Inflow = 0.6 cfs @ 12.18 hrs, Volume= 0.063 af
Primary = 0.6 cfs @ 12.18 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 5L: POA 2



APPENDIX C

Post-Development Flow Calculations

InSite Engineering, LLC
1955 Route 34, Suite 1A • Wall, NJ 07719
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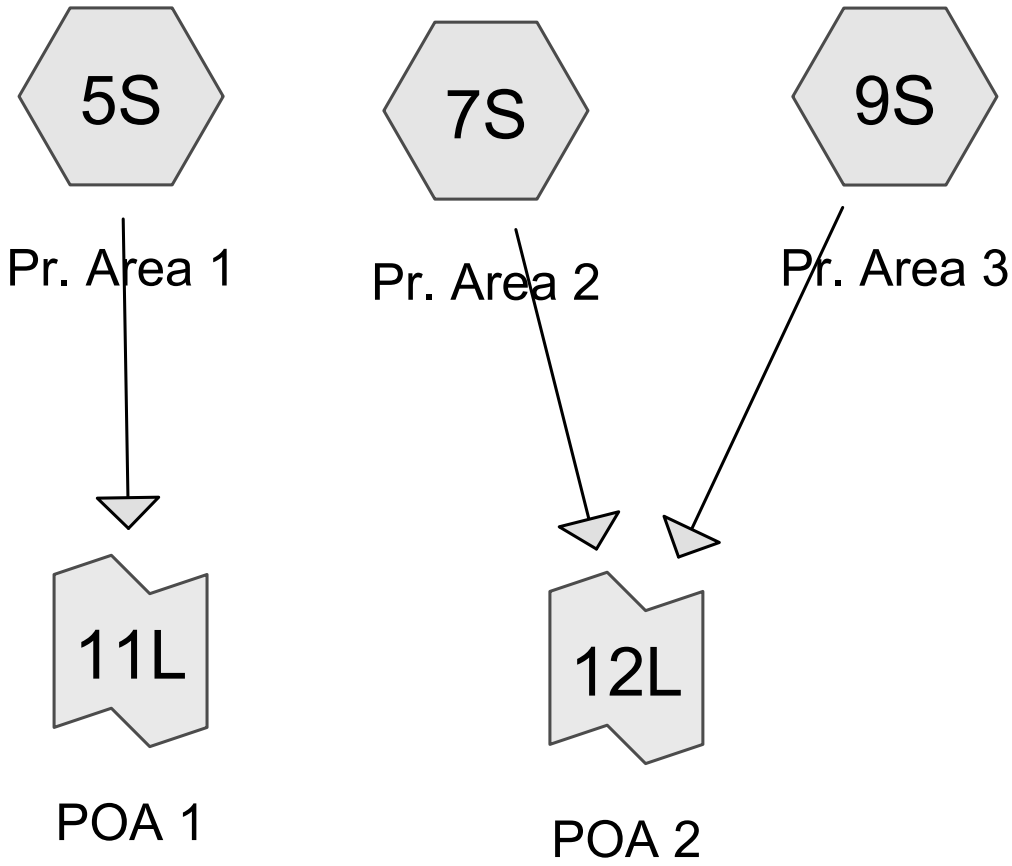
Licensed in NJ, PA, DE, NY, CT, NC, DC, & CO



Subcat Reach Pond Link

Routing Diagram for 221031 r0 Monmouth County
Prepared by InSite Engineering LLC, Printed 10/28/2022

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Pr. Area 1 Runoff Area=2,842 sf 6.16% Impervious Runoff Depth=0.21"
Flow Length=22' Slope=0.0636 '/' Tc=10.0 min CN=39/98 Runoff=0.0 cfs 0.001 af

Subcatchment 7S: Pr. Area 2 Runoff Area=10,384 sf 37.30% Impervious Runoff Depth=1.68"
Flow Length=135' Tc=10.0 min CN=65/98 Runoff=0.4 cfs 0.033 af

Subcatchment 9S: Pr. Area 3 Runoff Area=1,274 sf 24.49% Impervious Runoff Depth=0.80"
Flow Length=11' Slope=0.0100 '/' Tc=10.0 min CN=39/98 Runoff=0.0 cfs 0.002 af

Link 11L: POA 1 Inflow=0.0 cfs 0.001 af
Primary=0.0 cfs 0.001 af

Link 12L: POA 2 Inflow=0.4 cfs 0.035 af
Primary=0.4 cfs 0.035 af

Total Runoff Area = 0.333 ac Runoff Volume = 0.037 af Average Runoff Depth = 1.32"
69.93% Pervious = 0.233 ac 30.07% Impervious = 0.100 ac

Summary for Subcatchment 5S: Pr. Area 1

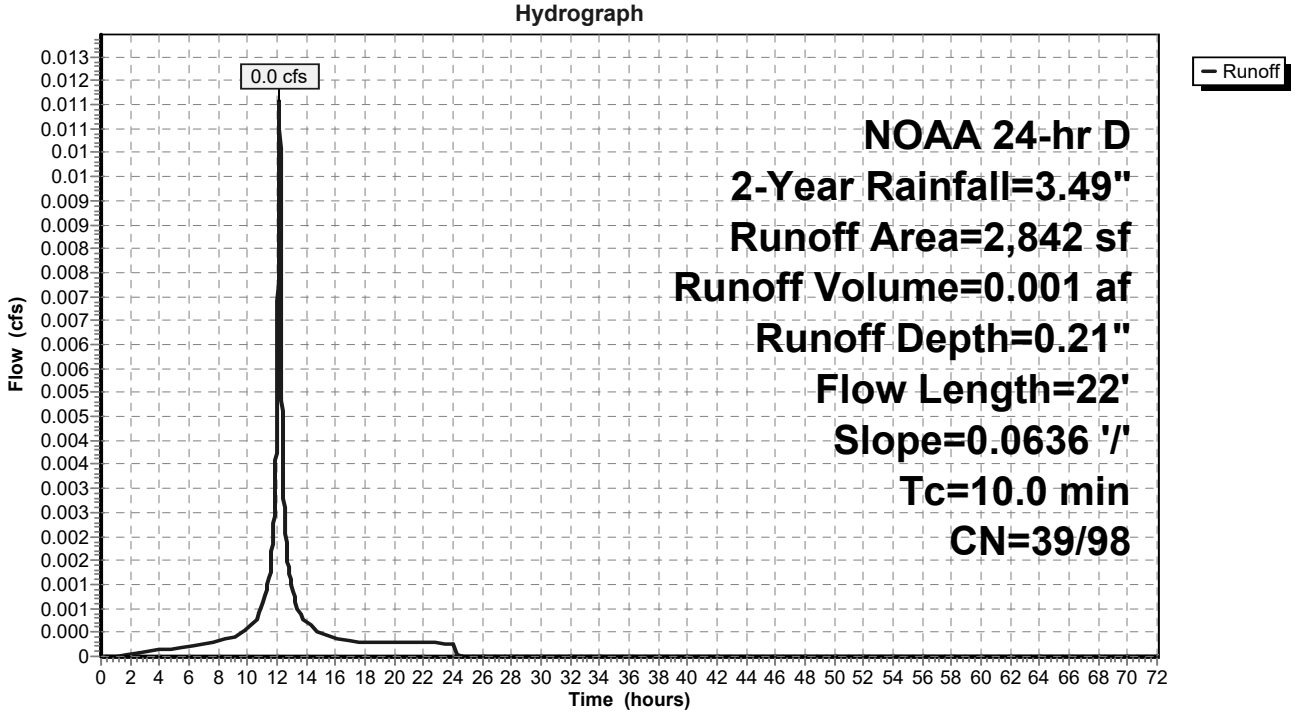
Runoff = 0.0 cfs @ 12.17 hrs, Volume= 0.001 af, Depth= 0.21"
Routed to Link 11L : POA 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.49"

Area (sf)	CN	Description
175	98	Paved parking, HSG A
2,667	39	>75% Grass cover, Good, HSG A
2,842	43	Weighted Average
2,667	39	93.84% Pervious Area
175	98	6.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	22	0.0636	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
1.8	22	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 5S: Pr. Area 1



Summary for Subcatchment 7S: Pr. Area 2

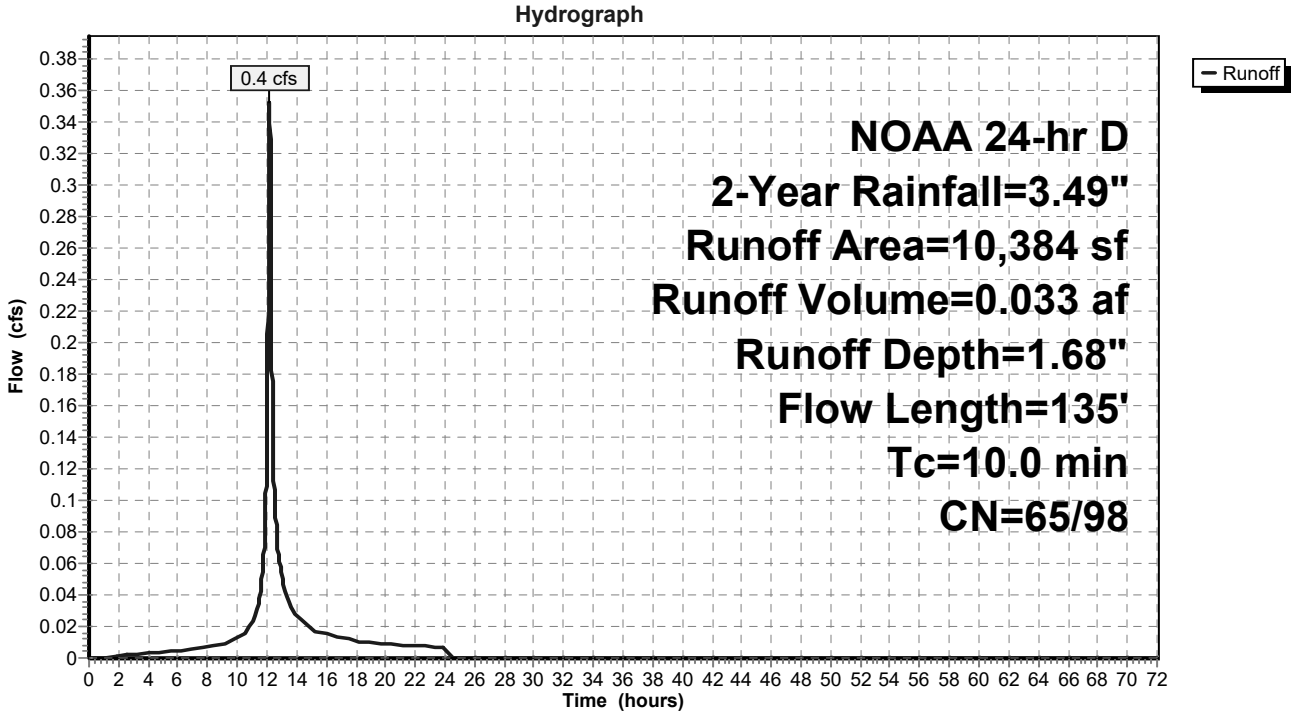
Runoff = 0.4 cfs @ 12.17 hrs, Volume= 0.033 af, Depth= 1.68"
Routed to Link 12L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.49"

Area (sf)	CN	Description
3,873	98	Roofs, HSG A
4,526	76	Gravel roads, HSG A
1,985	39	>75% Grass cover, Good, HSG A
10,384	77	Weighted Average
6,511	65	62.70% Pervious Area
3,873	98	37.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	72	0.0133	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.3	63	0.0244	3.17		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	135	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 7S: Pr. Area 2



Summary for Subcatchment 9S: Pr. Area 3

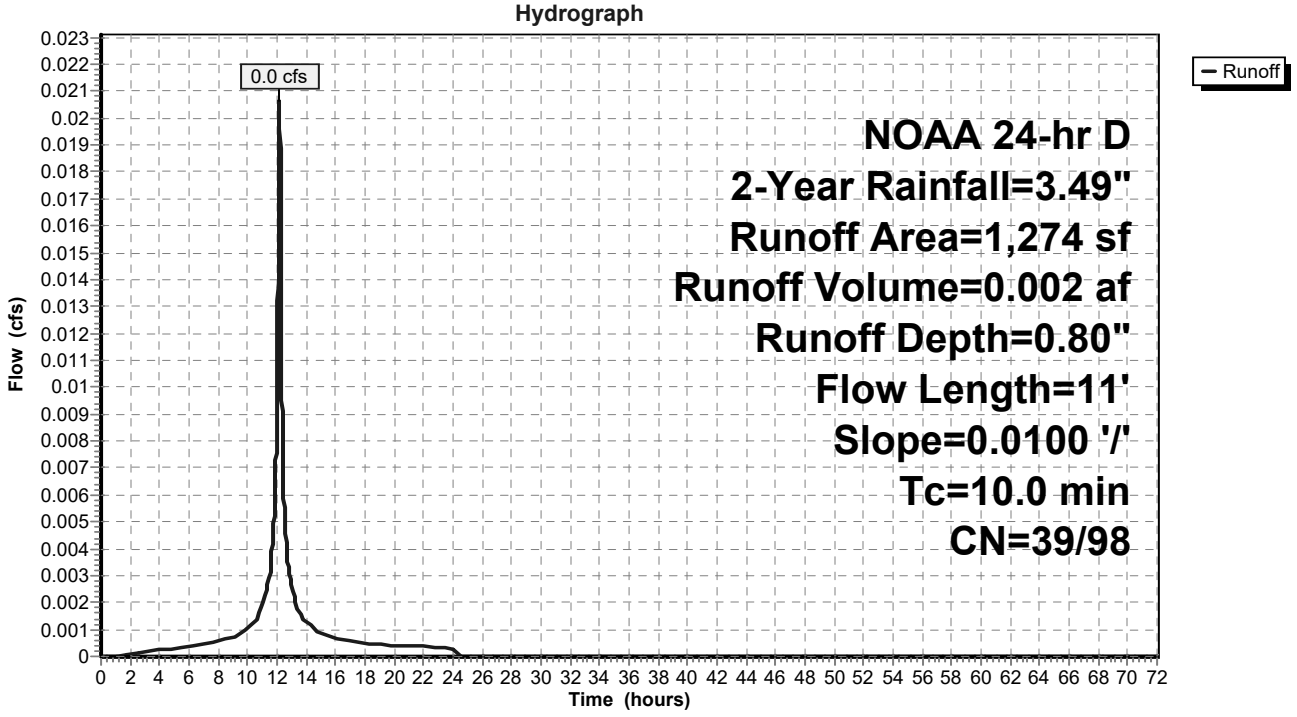
Runoff = 0.0 cfs @ 12.17 hrs, Volume= 0.002 af, Depth= 0.80"
Routed to Link 12L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-Year Rainfall=3.49"

Area (sf)	CN	Description
312	98	Paved parking, HSG A
962	39	>75% Grass cover, Good, HSG A
1,274	53	Weighted Average
962	39	75.51% Pervious Area
312	98	24.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	11	0.0100	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.1	11	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 9S: Pr. Area 3

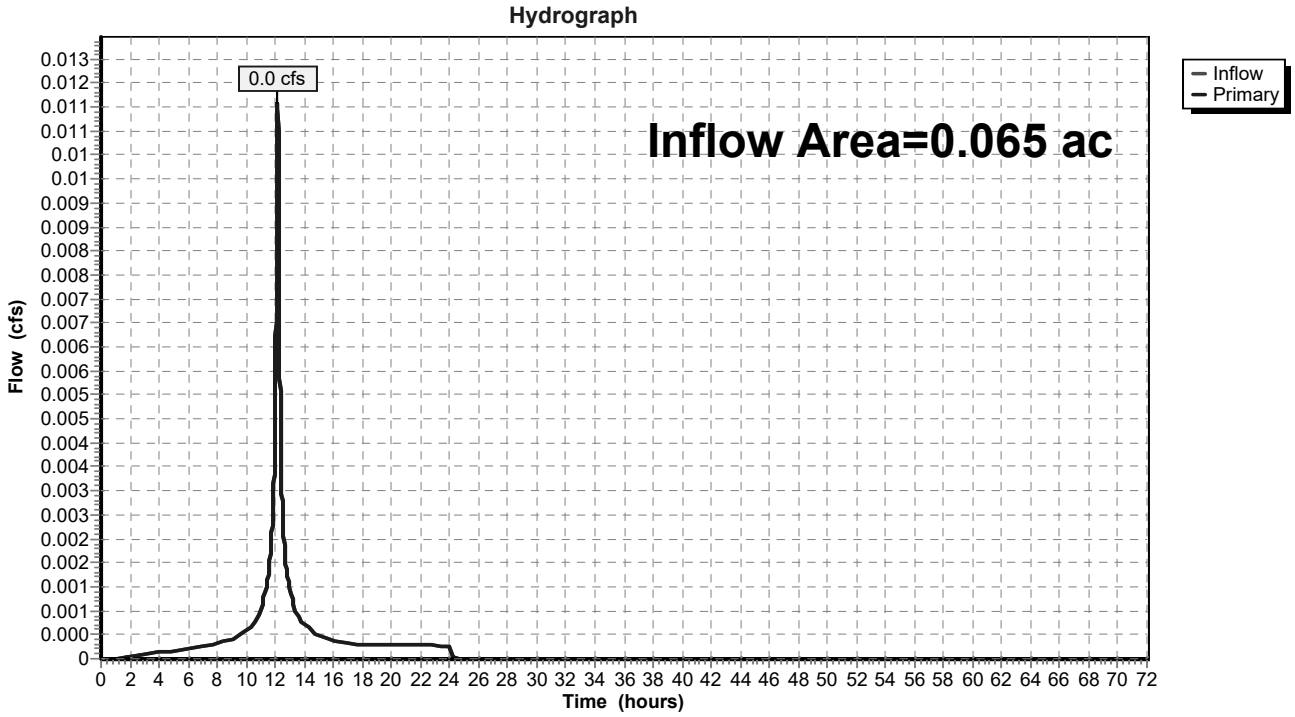


Summary for Link 11L: POA 1

Inflow Area = 0.065 ac, 6.16% Impervious, Inflow Depth = 0.21" for 2-Year event
Inflow = 0.0 cfs @ 12.17 hrs, Volume= 0.001 af
Primary = 0.0 cfs @ 12.17 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 11L: POA 1

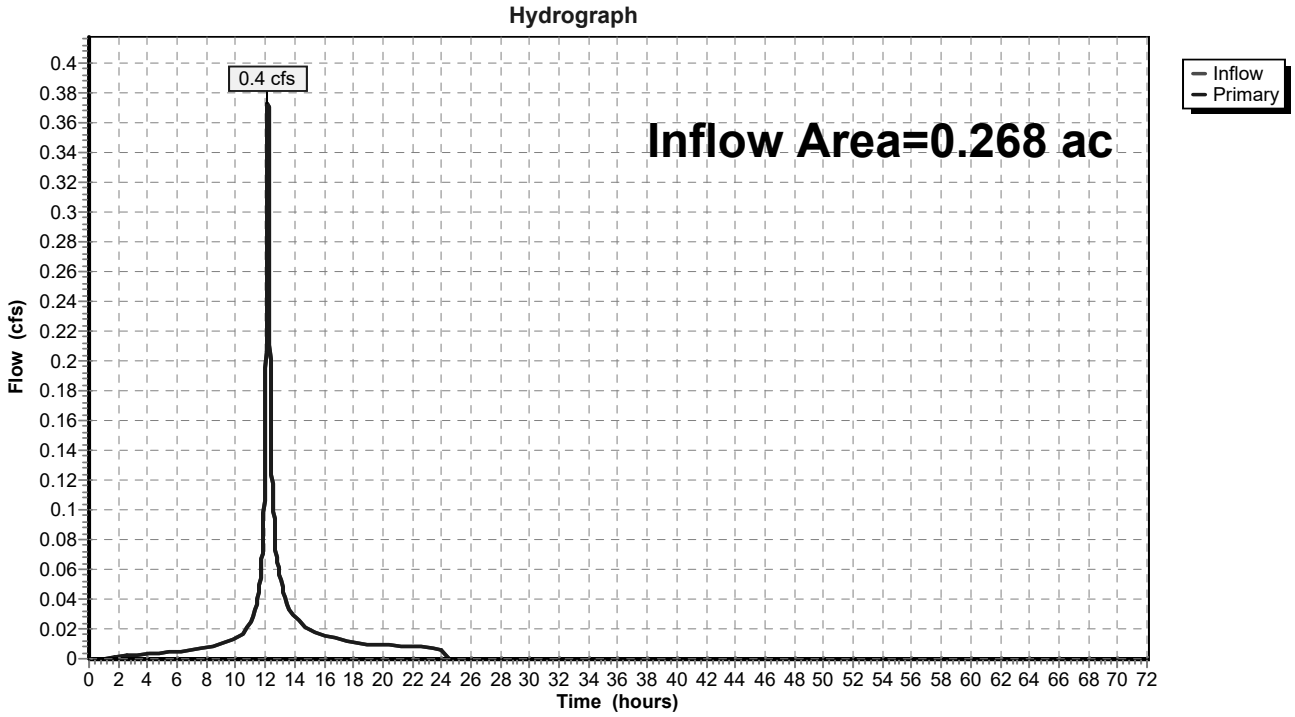


Summary for Link 12L: POA 2

Inflow Area = 0.268 ac, 35.90% Impervious, Inflow Depth = 1.59" for 2-Year event
Inflow = 0.4 cfs @ 12.17 hrs, Volume= 0.035 af
Primary = 0.4 cfs @ 12.17 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 12L: POA 2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Pr. Area 1 Runoff Area=2,842 sf 6.16% Impervious Runoff Depth=0.59"
Flow Length=22' Slope=0.0636 '/' Tc=10.0 min CN=39/98 Runoff=0.0 cfs 0.003 af

Subcatchment 7S: Pr. Area 2 Runoff Area=10,384 sf 37.30% Impervious Runoff Depth=3.14"
Flow Length=135' Tc=10.0 min CN=65/98 Runoff=0.7 cfs 0.062 af

Subcatchment 9S: Pr. Area 3 Runoff Area=1,274 sf 24.49% Impervious Runoff Depth=1.49"
Flow Length=11' Slope=0.0100 '/' Tc=10.0 min CN=39/98 Runoff=0.0 cfs 0.004 af

Link 11L: POA 1 Inflow=0.0 cfs 0.003 af
Primary=0.0 cfs 0.003 af

Link 12L: POA 2 Inflow=0.7 cfs 0.066 af
Primary=0.7 cfs 0.066 af

Total Runoff Area = 0.333 ac Runoff Volume = 0.069 af Average Runoff Depth = 2.50"
69.93% Pervious = 0.233 ac 30.07% Impervious = 0.100 ac

Summary for Subcatchment 5S: Pr. Area 1

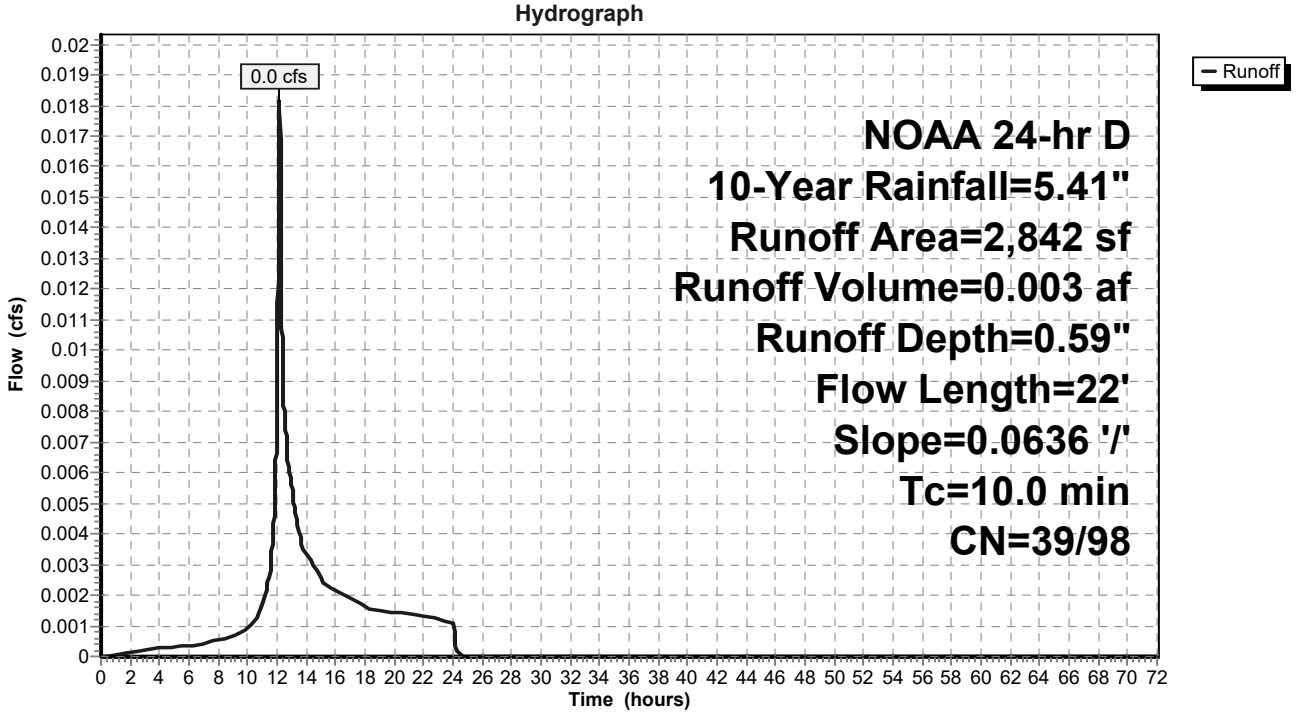
Runoff = 0.0 cfs @ 12.17 hrs, Volume= 0.003 af, Depth= 0.59"
Routed to Link 11L : POA 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.41"

Area (sf)	CN	Description
175	98	Paved parking, HSG A
2,667	39	>75% Grass cover, Good, HSG A
2,842	43	Weighted Average
2,667	39	93.84% Pervious Area
175	98	6.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	22	0.0636	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
1.8	22	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 5S: Pr. Area 1



Summary for Subcatchment 7S: Pr. Area 2

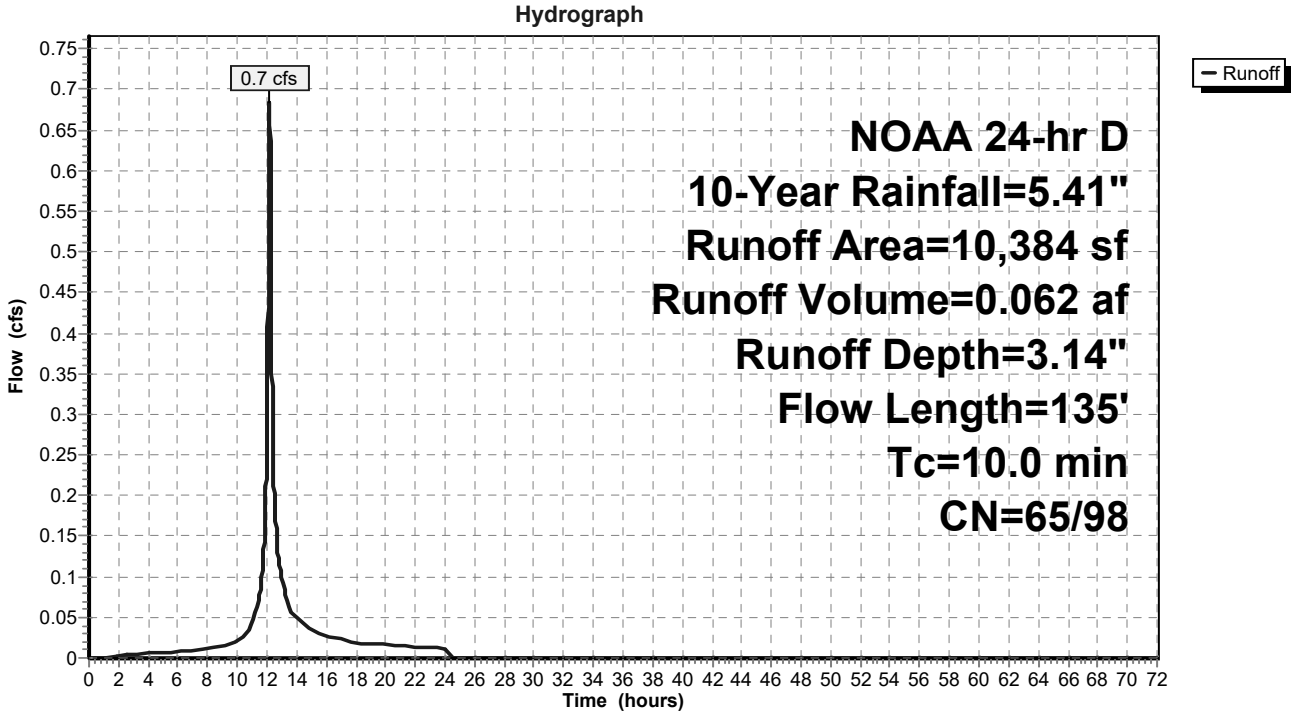
Runoff = 0.7 cfs @ 12.17 hrs, Volume= 0.062 af, Depth= 3.14"
Routed to Link 12L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.41"

Area (sf)	CN	Description
3,873	98	Roofs, HSG A
4,526	76	Gravel roads, HSG A
1,985	39	>75% Grass cover, Good, HSG A
10,384	77	Weighted Average
6,511	65	62.70% Pervious Area
3,873	98	37.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	72	0.0133	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.3	63	0.0244	3.17		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	135	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 7S: Pr. Area 2



Summary for Subcatchment 9S: Pr. Area 3

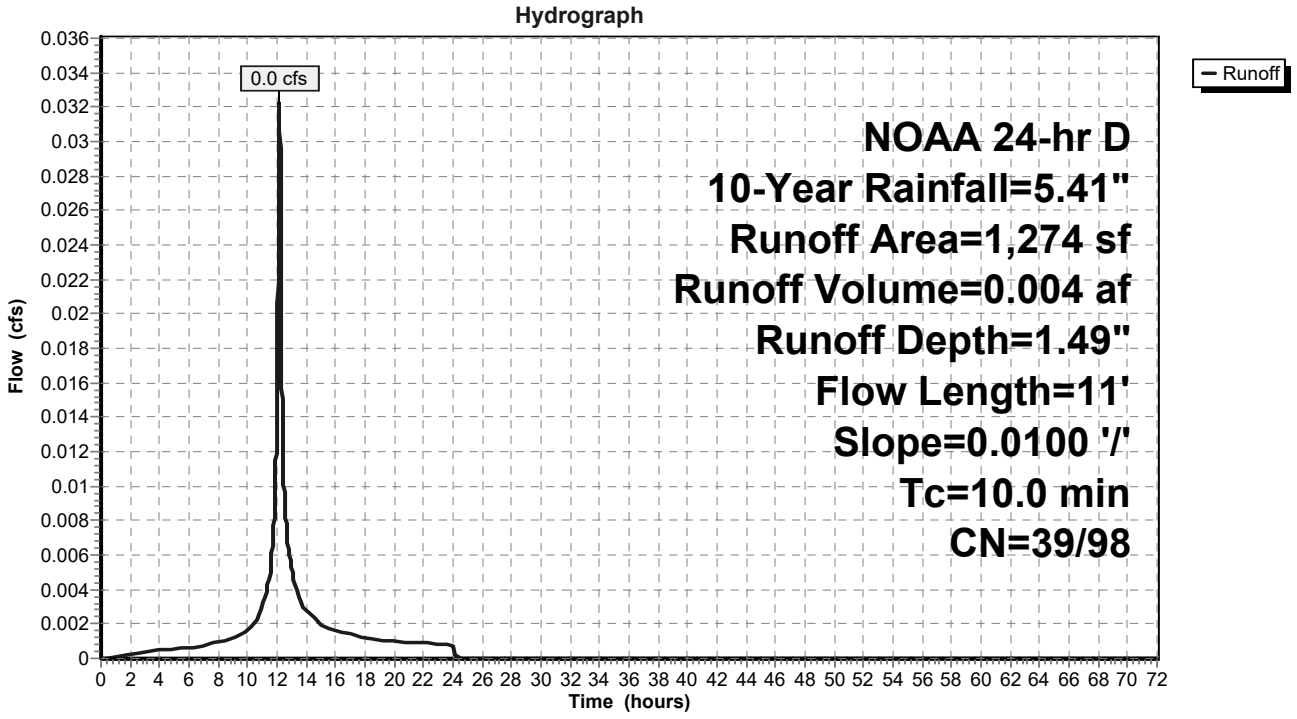
Runoff = 0.0 cfs @ 12.17 hrs, Volume= 0.004 af, Depth= 1.49"
Routed to Link 12L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-Year Rainfall=5.41"

Area (sf)	CN	Description
312	98	Paved parking, HSG A
962	39	>75% Grass cover, Good, HSG A
1,274	53	Weighted Average
962	39	75.51% Pervious Area
312	98	24.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	11	0.0100	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.1	11	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 9S: Pr. Area 3

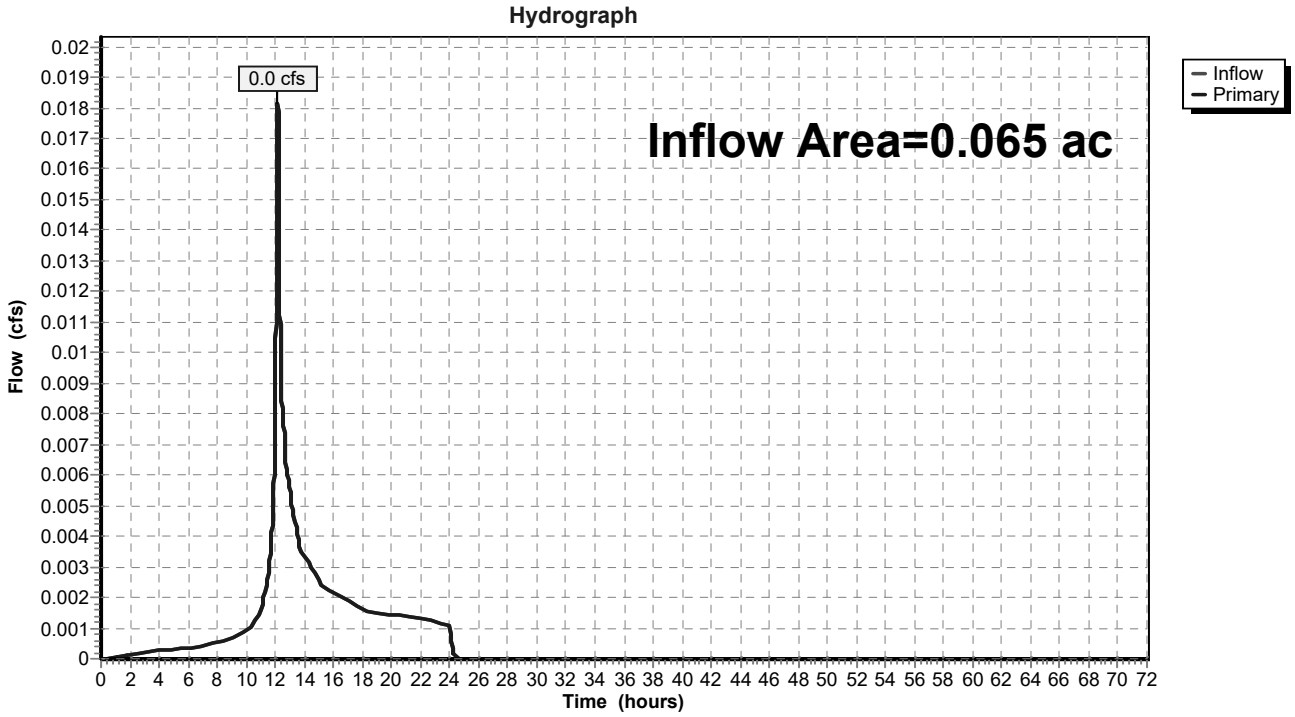


Summary for Link 11L: POA 1

Inflow Area = 0.065 ac, 6.16% Impervious, Inflow Depth = 0.59" for 10-Year event
Inflow = 0.0 cfs @ 12.17 hrs, Volume= 0.003 af
Primary = 0.0 cfs @ 12.17 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 11L: POA 1

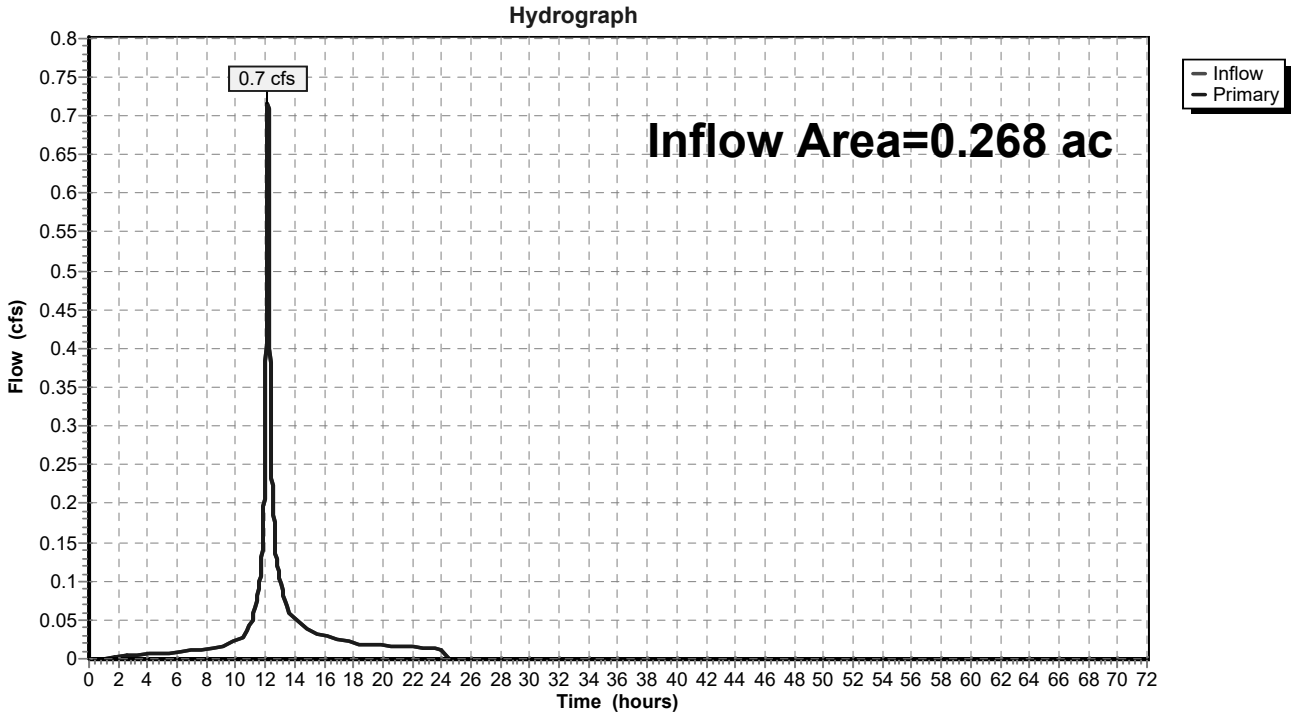


Summary for Link 12L: POA 2

Inflow Area = 0.268 ac, 35.90% Impervious, Inflow Depth = 2.96" for 10-Year event
Inflow = 0.7 cfs @ 12.17 hrs, Volume= 0.066 af
Primary = 0.7 cfs @ 12.17 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 12L: POA 2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Pr. Area 1 Runoff Area=2,842 sf 6.16% Impervious Runoff Depth=1.04"
Flow Length=22' Slope=0.0636 '/' Tc=10.0 min CN=39/98 Runoff=0.0 cfs 0.006 af

Subcatchment 7S: Pr. Area 2 Runoff Area=10,384 sf 37.30% Impervious Runoff Depth=4.25"
Flow Length=135' Tc=10.0 min CN=65/98 Runoff=0.9 cfs 0.084 af

Subcatchment 9S: Pr. Area 3 Runoff Area=1,274 sf 24.49% Impervious Runoff Depth=2.11"
Flow Length=11' Slope=0.0100 '/' Tc=10.0 min CN=39/98 Runoff=0.0 cfs 0.005 af

Link 11L: POA 1 Inflow=0.0 cfs 0.006 af
Primary=0.0 cfs 0.006 af

Link 12L: POA 2 Inflow=1.0 cfs 0.090 af
Primary=1.0 cfs 0.090 af

Total Runoff Area = 0.333 ac Runoff Volume = 0.095 af Average Runoff Depth = 3.44"
69.93% Pervious = 0.233 ac 30.07% Impervious = 0.100 ac

Summary for Subcatchment 5S: Pr. Area 1

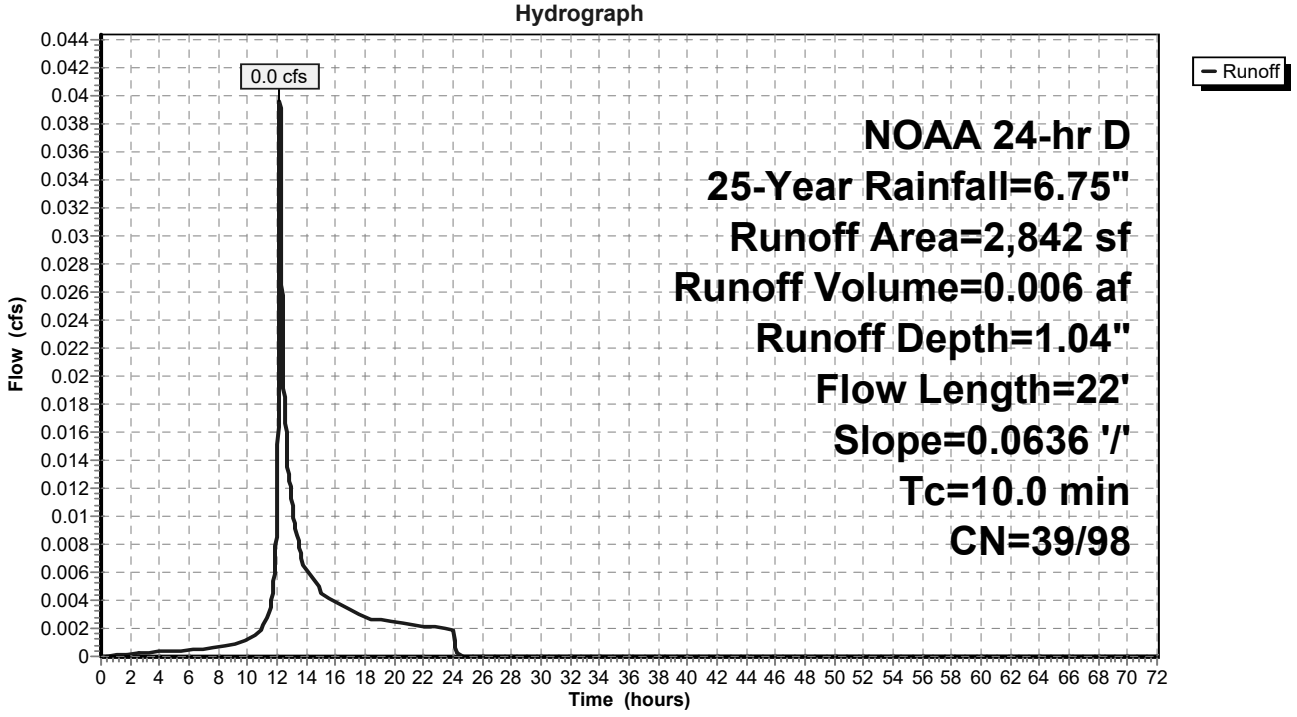
Runoff = 0.0 cfs @ 12.20 hrs, Volume= 0.006 af, Depth= 1.04"
Routed to Link 11L : POA 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.75"

Area (sf)	CN	Description
175	98	Paved parking, HSG A
2,667	39	>75% Grass cover, Good, HSG A
2,842	43	Weighted Average
2,667	39	93.84% Pervious Area
175	98	6.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	22	0.0636	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
1.8	22	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 5S: Pr. Area 1



Summary for Subcatchment 7S: Pr. Area 2

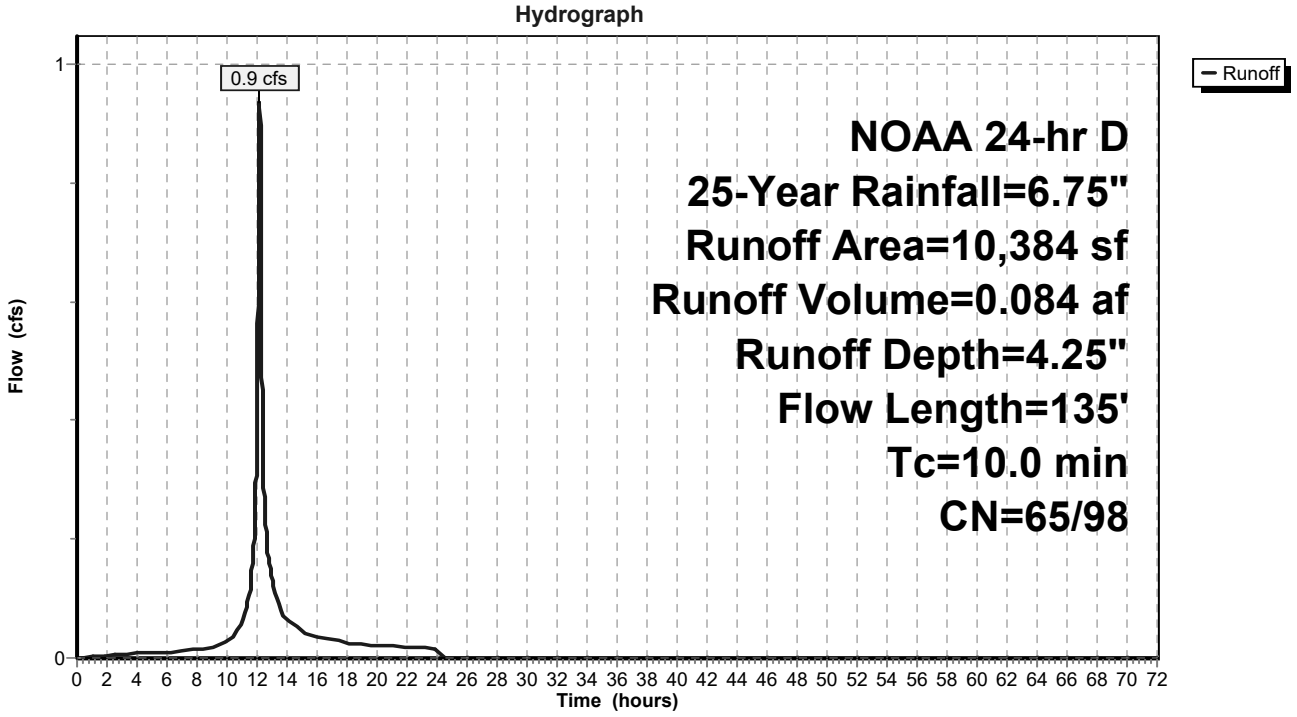
Runoff = 0.9 cfs @ 12.17 hrs, Volume= 0.084 af, Depth= 4.25"
Routed to Link 12L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.75"

Area (sf)	CN	Description
3,873	98	Roofs, HSG A
4,526	76	Gravel roads, HSG A
1,985	39	>75% Grass cover, Good, HSG A
10,384	77	Weighted Average
6,511	65	62.70% Pervious Area
3,873	98	37.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	72	0.0133	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.3	63	0.0244	3.17		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	135	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 7S: Pr. Area 2



Summary for Subcatchment 9S: Pr. Area 3

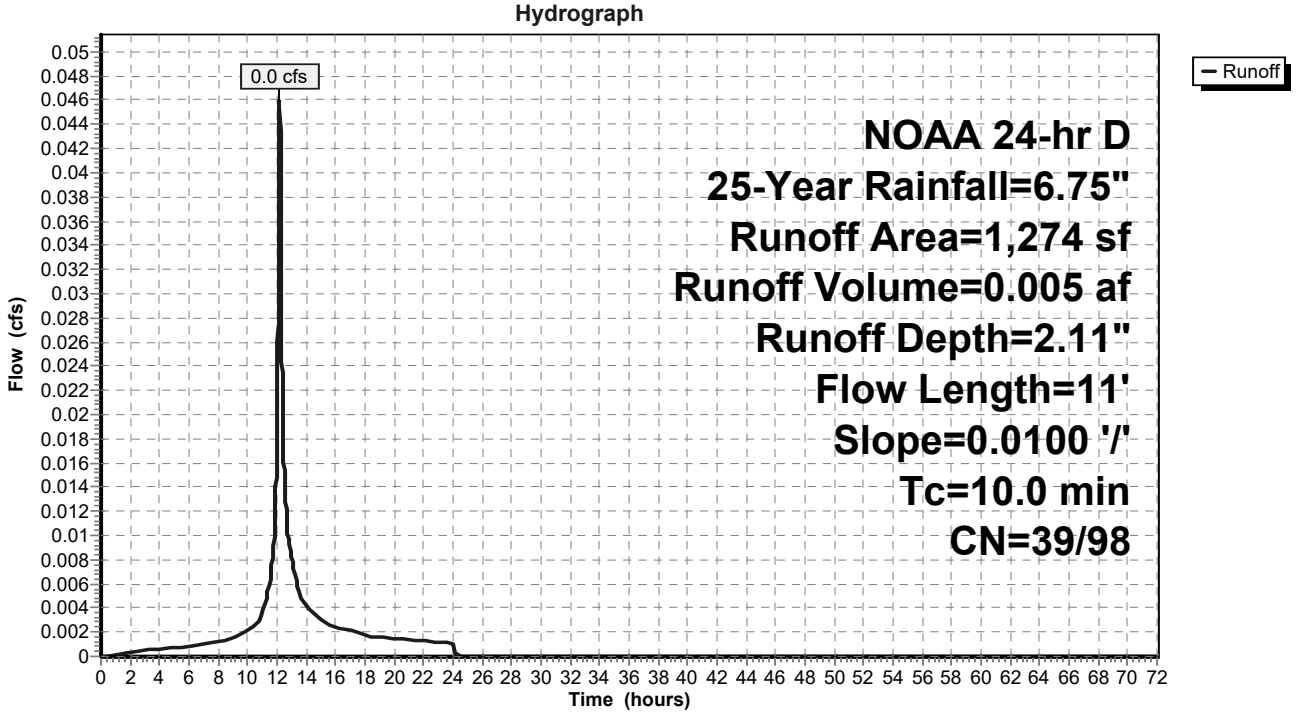
Runoff = 0.0 cfs @ 12.18 hrs, Volume= 0.005 af, Depth= 2.11"
Routed to Link 12L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-Year Rainfall=6.75"

Area (sf)	CN	Description
312	98	Paved parking, HSG A
962	39	>75% Grass cover, Good, HSG A
1,274	53	Weighted Average
962	39	75.51% Pervious Area
312	98	24.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	11	0.0100	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.1	11	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 9S: Pr. Area 3

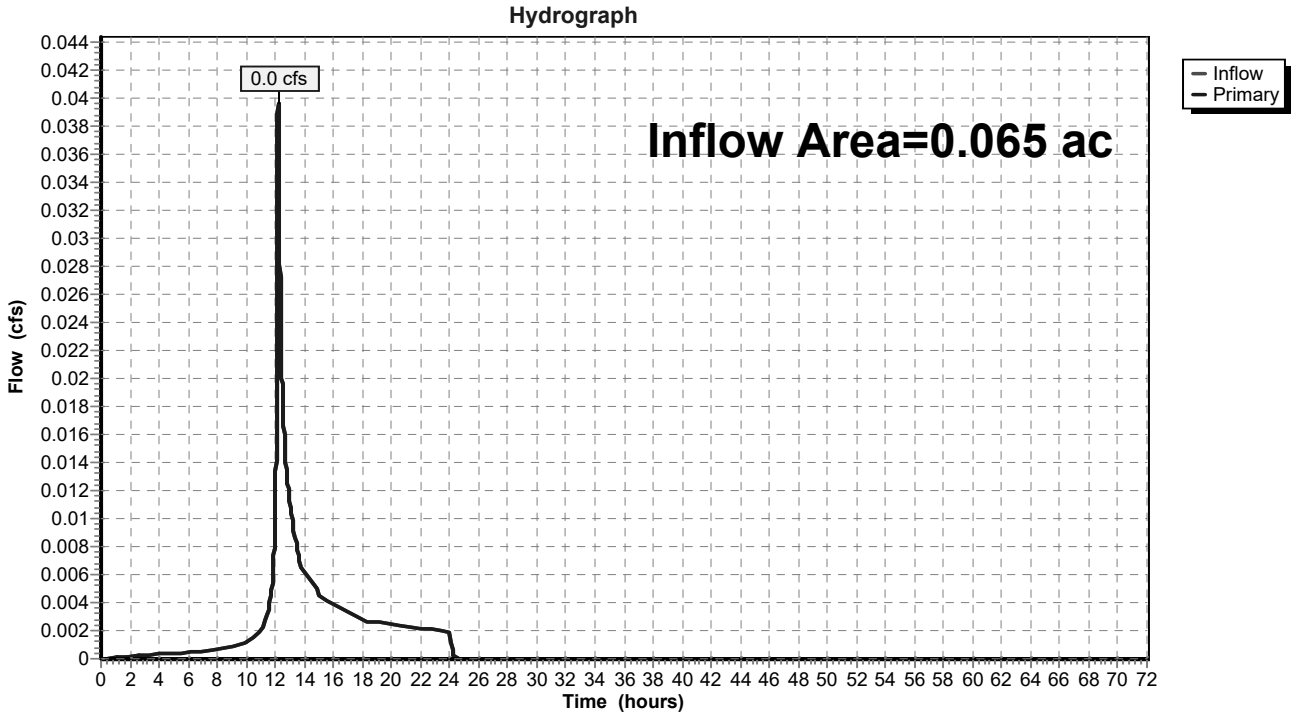


Summary for Link 11L: POA 1

Inflow Area = 0.065 ac, 6.16% Impervious, Inflow Depth = 1.04" for 25-Year event
Inflow = 0.0 cfs @ 12.20 hrs, Volume= 0.006 af
Primary = 0.0 cfs @ 12.20 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 11L: POA 1

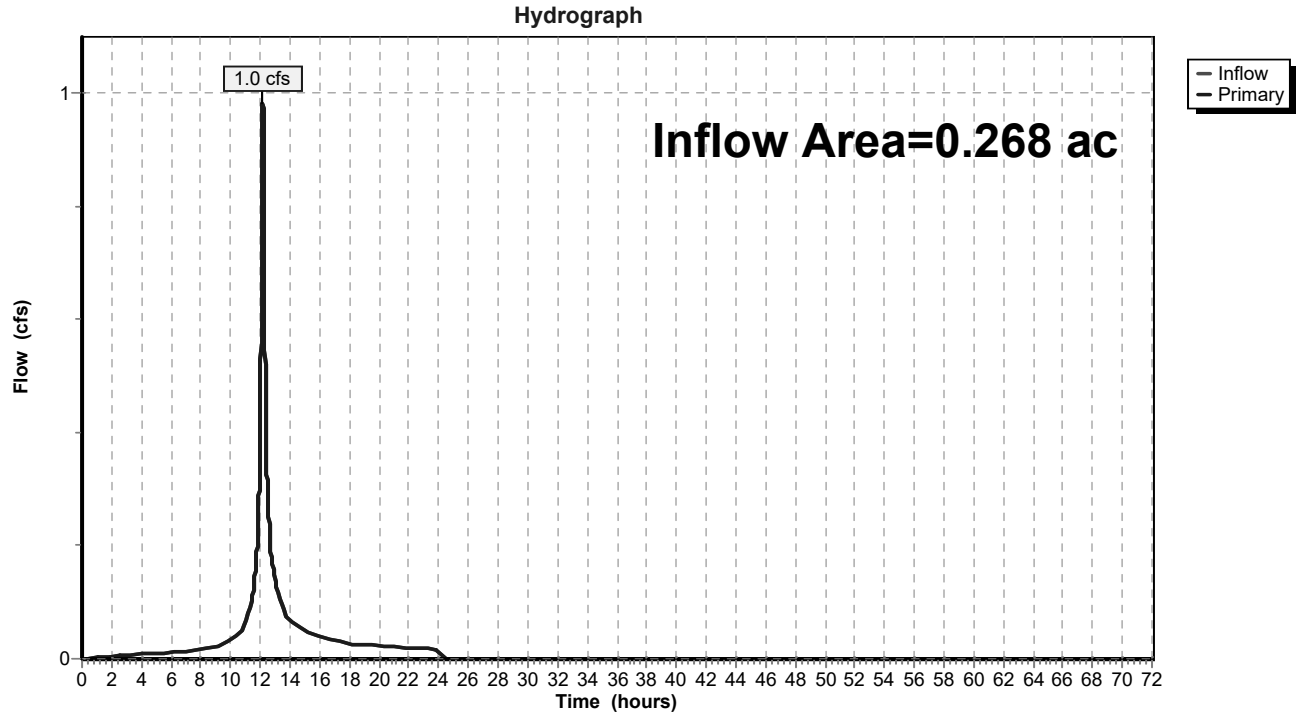


Summary for Link 12L: POA 2

Inflow Area = 0.268 ac, 35.90% Impervious, Inflow Depth = 4.02" for 25-Year event
Inflow = 1.0 cfs @ 12.17 hrs, Volume= 0.090 af
Primary = 1.0 cfs @ 12.17 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 12L: POA 2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Pr. Area 1 Runoff Area=2,842 sf 6.16% Impervious Runoff Depth=2.18"
Flow Length=22' Slope=0.0636 '/' Tc=10.0 min CN=39/98 Runoff=0.1 cfs 0.012 af

Subcatchment 7S: Pr. Area 2 Runoff Area=10,384 sf 37.30% Impervious Runoff Depth=6.46"
Flow Length=135' Tc=10.0 min CN=65/98 Runoff=1.4 cfs 0.128 af

Subcatchment 9S: Pr. Area 3 Runoff Area=1,274 sf 24.49% Impervious Runoff Depth=3.51"
Flow Length=11' Slope=0.0100 '/' Tc=10.0 min CN=39/98 Runoff=0.1 cfs 0.009 af

Link 11L: POA 1 Inflow=0.1 cfs 0.012 af
Primary=0.1 cfs 0.012 af

Link 12L: POA 2 Inflow=1.5 cfs 0.137 af
Primary=1.5 cfs 0.137 af

Total Runoff Area = 0.333 ac Runoff Volume = 0.149 af Average Runoff Depth = 5.36"
69.93% Pervious = 0.233 ac 30.07% Impervious = 0.100 ac

Summary for Subcatchment 5S: Pr. Area 1

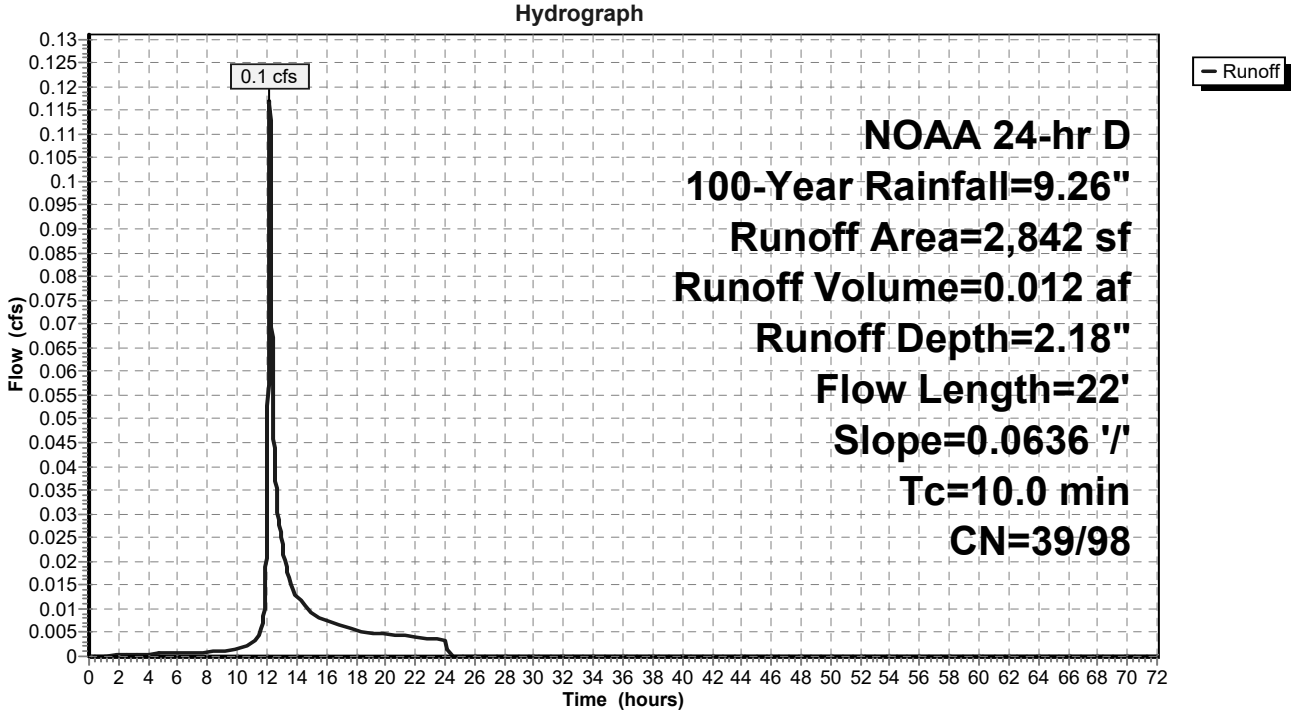
Runoff = 0.1 cfs @ 12.19 hrs, Volume= 0.012 af, Depth= 2.18"
Routed to Link 11L : POA 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.26"

Area (sf)	CN	Description
175	98	Paved parking, HSG A
2,667	39	>75% Grass cover, Good, HSG A
2,842	43	Weighted Average
2,667	39	93.84% Pervious Area
175	98	6.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	22	0.0636	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
1.8	22	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 5S: Pr. Area 1



Summary for Subcatchment 7S: Pr. Area 2

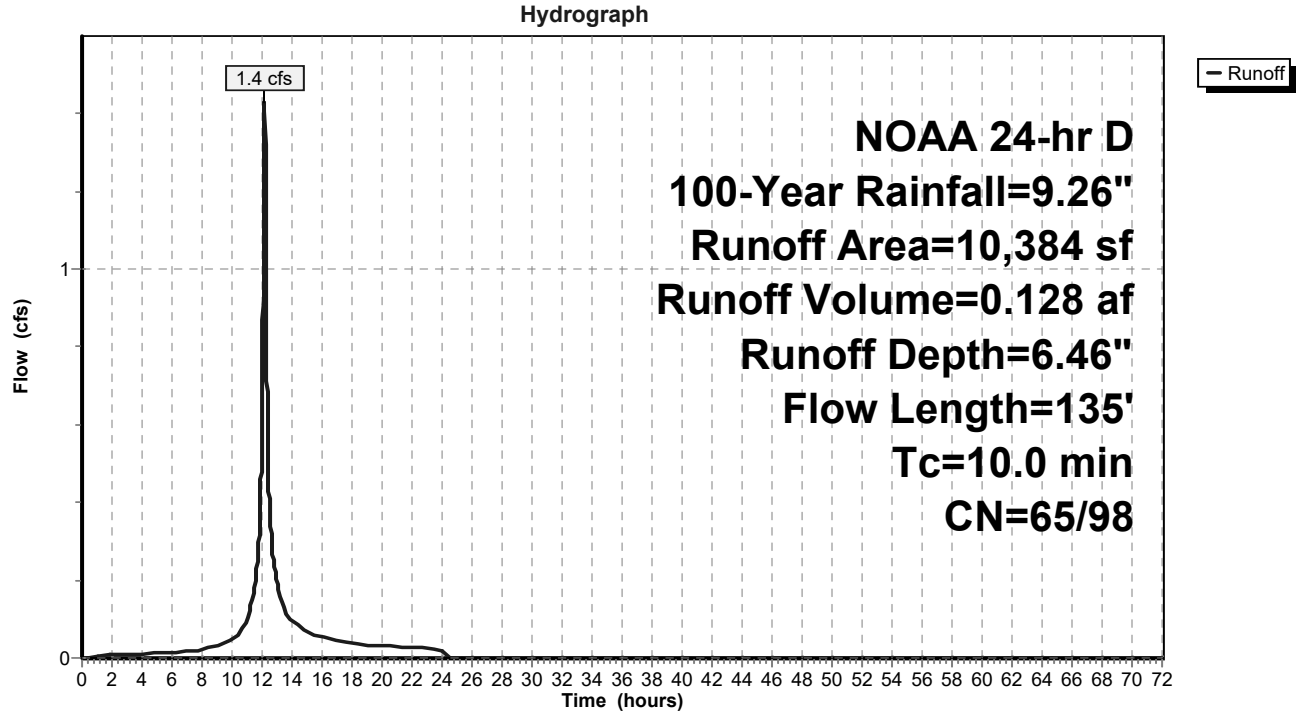
Runoff = 1.4 cfs @ 12.17 hrs, Volume= 0.128 af, Depth= 6.46"
Routed to Link 12L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.26"

Area (sf)	CN	Description
3,873	98	Roofs, HSG A
4,526	76	Gravel roads, HSG A
1,985	39	>75% Grass cover, Good, HSG A
10,384	77	Weighted Average
6,511	65	62.70% Pervious Area
3,873	98	37.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	72	0.0133	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.3	63	0.0244	3.17		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	135	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 7S: Pr. Area 2



Summary for Subcatchment 9S: Pr. Area 3

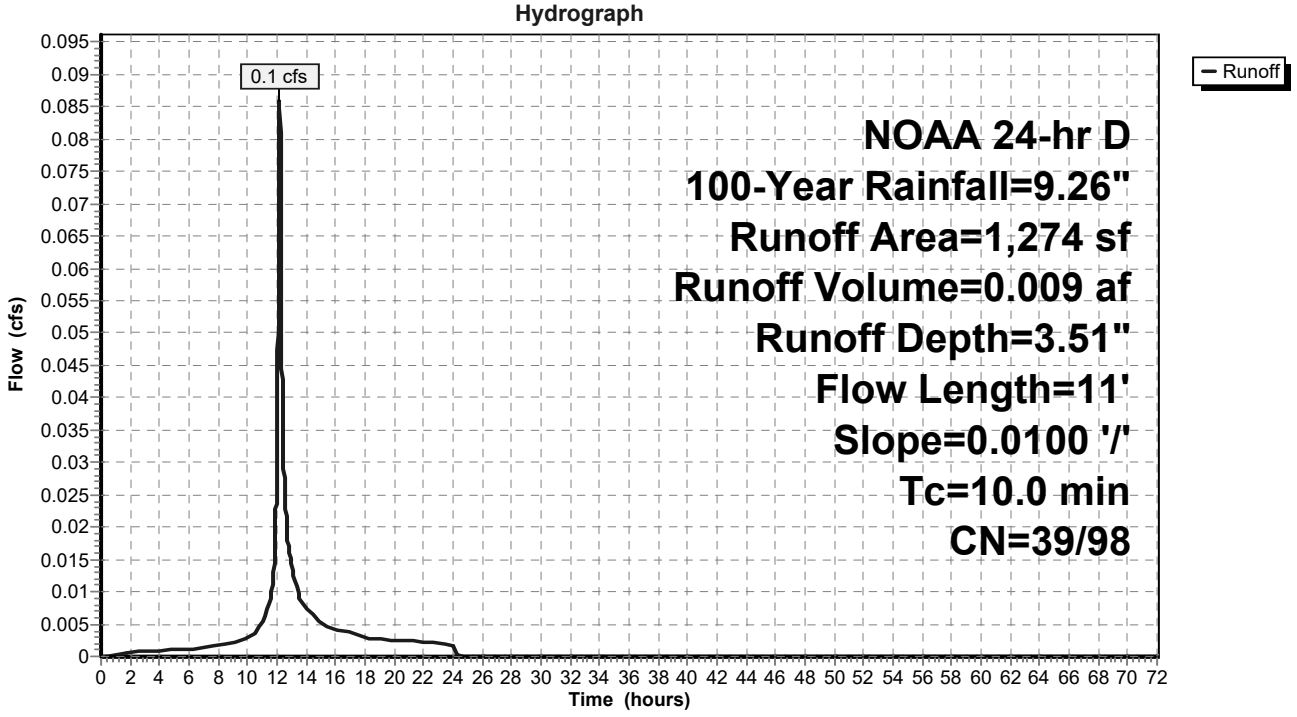
Runoff = 0.1 cfs @ 12.18 hrs, Volume= 0.009 af, Depth= 3.51"
Routed to Link 12L : POA 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-Year Rainfall=9.26"

Area (sf)	CN	Description
312	98	Paved parking, HSG A
962	39	>75% Grass cover, Good, HSG A
1,274	53	Weighted Average
962	39	75.51% Pervious Area
312	98	24.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	11	0.0100	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.1	11	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 9S: Pr. Area 3

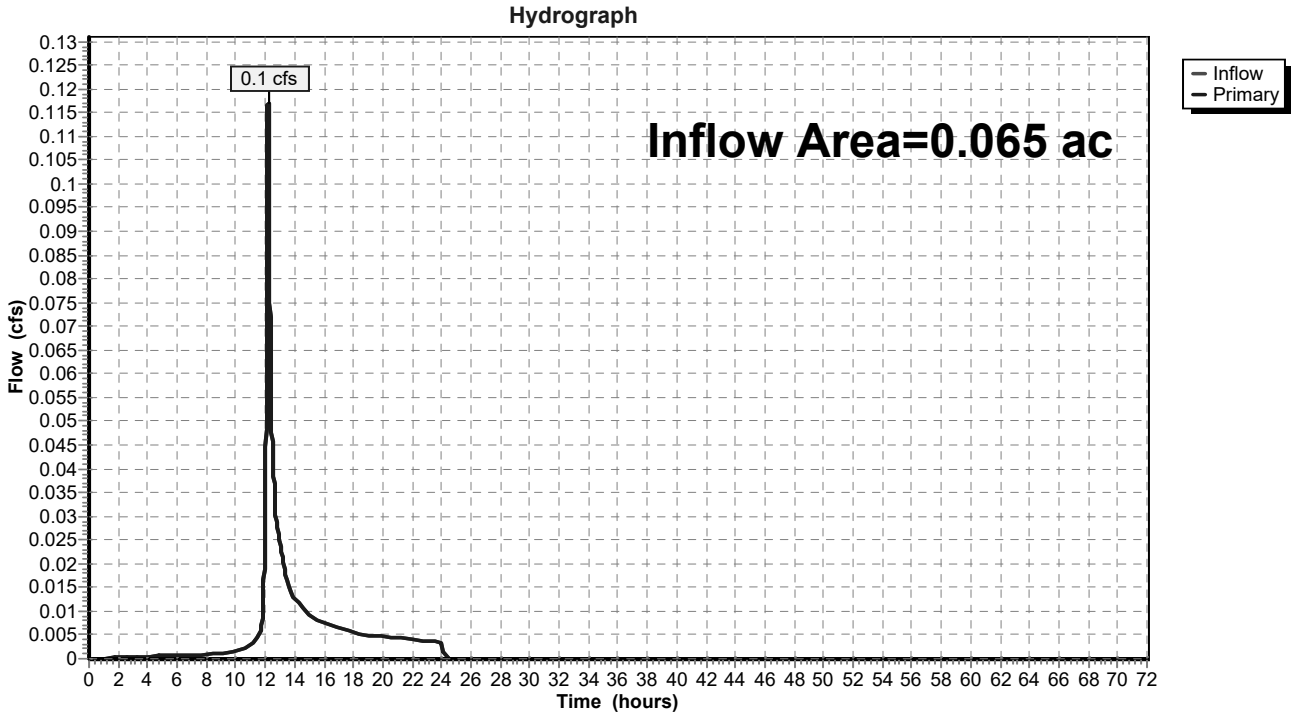


Summary for Link 11L: POA 1

Inflow Area = 0.065 ac, 6.16% Impervious, Inflow Depth = 2.18" for 100-Year event
Inflow = 0.1 cfs @ 12.19 hrs, Volume= 0.012 af
Primary = 0.1 cfs @ 12.19 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 11L: POA 1

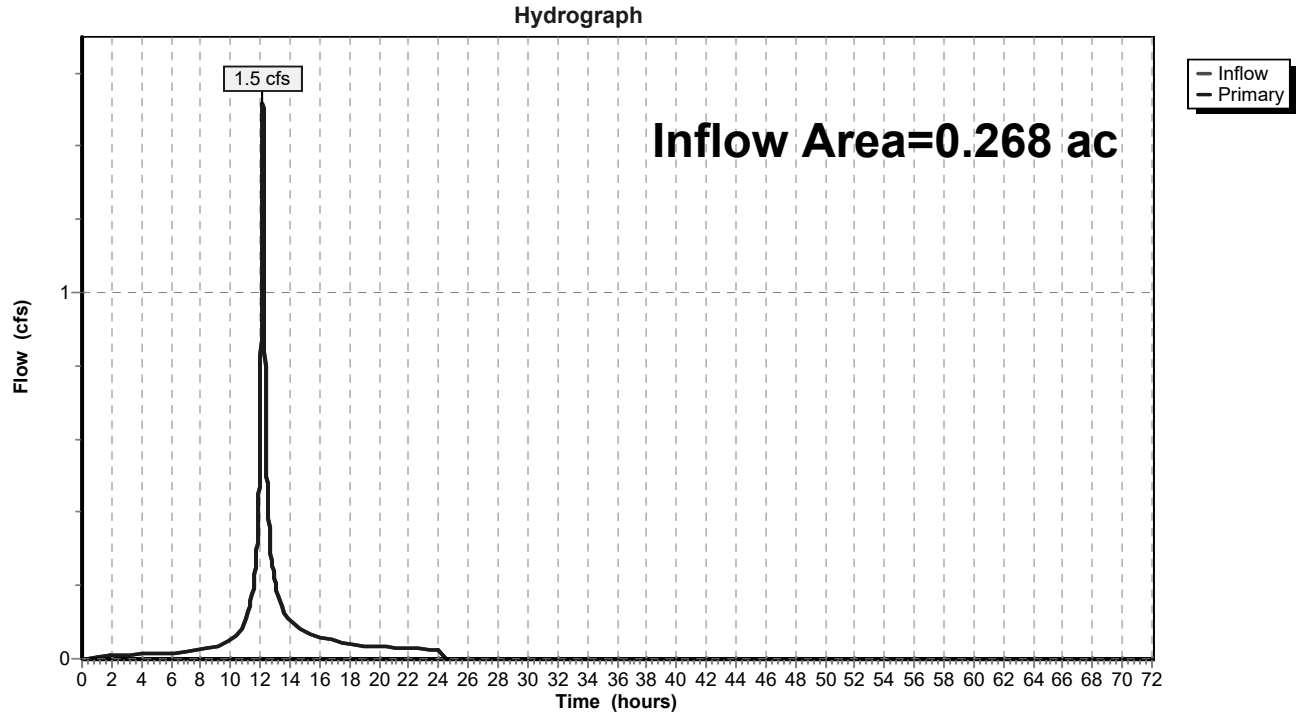


Summary for Link 12L: POA 2

Inflow Area = 0.268 ac, 35.90% Impervious, Inflow Depth = 6.14" for 100-Year event
Inflow = 1.5 cfs @ 12.17 hrs, Volume= 0.137 af
Primary = 1.5 cfs @ 12.17 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 12L: POA 2



APPENDIX D

NOAA Precipitation Frequency Data

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Licensed in NJ, PA, DE, NY, CT, NC, DC, & CO

NOAA Atlas 14, Volume 2, Version 3
Location name: Neptune, New Jersey, USA*
Latitude: 40.2091°, Longitude: -74.0301°
Elevation: 21.63 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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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	**0.342** (0.308-0.379)	**0.408** (0.369-0.453)	**0.484** (0.436-0.537)	**0.539** (0.485-0.599)	**0.609** (0.544-0.675)	**0.658** (0.585-0.730)	**0.708** (0.627-0.788)	**0.755** (0.664-0.842)	**0.814** (0.707-0.913)	**0.860** (0.741-0.968)
10-min	**0.546** (0.492-0.606)	**0.653** (0.589-0.725)	**0.775** (0.698-0.861)	**0.863** (0.776-0.958)	**0.970** (0.867-1.08)	**1.05** (0.932-1.16)	**1.13** (0.996-1.25)	**1.20** (1.05-1.33)	**1.29** (1.12-1.44)	**1.35** (1.17-1.53)
15-min	**0.682** (0.615-0.757)	**0.820** (0.741-0.912)	**0.980** (0.883-1.09)	**1.09** (0.981-1.21)	**1.23** (1.10-1.36)	**1.33** (1.18-1.47)	**1.42** (1.26-1.58)	**1.51** (1.33-1.68)	**1.62** (1.41-1.82)	**1.70** (1.46-1.91)
30-min	**0.935** (0.844-1.04)	**1.13** (1.02-1.26)	**1.39** (1.25-1.55)	**1.58** (1.42-1.76)	**1.82** (1.63-2.02)	**2.00** (1.78-2.22)	**2.18** (1.93-2.42)	**2.35** (2.07-2.62)	**2.58** (2.24-2.89)	**2.75** (2.37-3.10)
60-min	**1.17** (1.05-1.29)	**1.42** (1.28-1.58)	**1.79** (1.61-1.98)	**2.06** (1.85-2.29)	**2.42** (2.17-2.69)	**2.71** (2.41-3.00)	**3.00** (2.66-3.34)	**3.30** (2.90-3.68)	**3.70** (3.22-4.15)	**4.02** (3.46-4.53)
2-hr	**1.44** (1.30-1.61)	**1.76** (1.58-1.96)	**2.23** (2.00-2.48)	**2.59** (2.32-2.88)	**3.09** (2.75-3.44)	**3.50** (3.10-3.89)	**3.92** (3.45-4.37)	**4.36** (3.81-4.87)	**4.98** (4.29-5.59)	**5.48** (4.68-6.18)
3-hr	**1.60** (1.44-1.78)	**1.95** (1.76-2.18)	**2.47** (2.23-2.76)	**2.88** (2.59-3.21)	**3.46** (3.08-3.85)	**3.93** (3.47-4.37)	**4.42** (3.88-4.92)	**4.93** (4.29-5.51)	**5.66** (4.85-6.35)	**6.26** (5.30-7.06)
6-hr	**2.03** (1.82-2.28)	**2.47** (2.22-2.76)	**3.13** (2.79-3.49)	**3.65** (3.26-4.07)	**4.41** (3.90-4.91)	**5.05** (4.43-5.62)	**5.72** (4.97-6.38)	**6.45** (5.55-7.20)	**7.51** (6.35-8.42)	**8.38** (7.00-9.44)
12-hr	**2.47** (2.22-2.77)	**3.00** (2.69-3.36)	**3.82** (3.41-4.27)	**4.50** (4.01-5.02)	**5.51** (4.86-6.14)	**6.38** (5.59-7.10)	**7.33** (6.34-8.16)	**8.38** (7.14-9.35)	**9.93** (8.32-11.1)	**11.3** (9.28-12.7)
24-hr	**2.88** (2.64-3.15)	**3.49** (3.21-3.83)	**4.52** (4.15-4.95)	**5.41** (4.94-5.91)	**6.75** (6.13-7.35)	**7.93** (7.14-8.61)	**9.26** (8.26-10.0)	**10.8** (9.49-11.7)	**13.0** (11.3-14.1)	**15.0** (12.8-16.3)
2-day	**3.37** (3.09-3.72)	**4.10** (3.76-4.52)	**5.29** (4.84-5.83)	**6.31** (5.74-6.93)	**7.84** (7.09-8.61)	**9.16** (8.23-10.1)	**10.6** (9.48-11.7)	**12.3** (10.8-13.5)	**14.8** (12.8-16.3)	**17.0** (14.5-18.7)
3-day	**3.55** (3.28-3.88)	**4.31** (3.98-4.71)	**5.54** (5.10-6.05)	**6.58** (6.04-7.17)	**8.13** (7.41-8.86)	**9.47** (8.58-10.3)	**11.0** (9.84-11.9)	**12.6** (11.2-13.7)	**15.1** (13.2-16.4)	**17.2** (14.9-18.8)
4-day	**3.73** (3.46-4.04)	**4.52** (4.20-4.91)	**5.79** (5.36-6.27)	**6.85** (6.33-7.42)	**8.43** (7.74-9.11)	**9.78** (8.93-10.6)	**11.3** (10.2-12.2)	**12.9** (11.6-14.0)	**15.4** (13.6-16.6)	**17.4** (15.2-18.9)
7-day	**4.30** (4.01-4.63)	**5.19** (4.83-5.58)	**6.52** (6.07-7.02)	**7.65** (7.10-8.22)	**9.30** (8.59-9.97)	**10.7** (9.82-11.5)	**12.2** (11.1-13.1)	**13.9** (12.5-14.9)	**16.3** (14.5-17.6)	**18.4** (16.2-19.8)
10-day	**4.83** (4.54-5.17)	**5.80** (5.44-6.20)	**7.19** (6.74-7.69)	**8.33** (7.79-8.91)	**9.97** (9.28-10.7)	**11.3** (10.5-12.1)	**12.8** (11.8-13.7)	**14.4** (13.1-15.4)	**16.7** (15.1-18.0)	**18.7** (16.7-20.1)
20-day	**6.56** (6.20-6.94)	**7.80** (7.37-8.26)	**9.38** (8.87-9.93)	**10.7** (10.1-11.3)	**12.4** (11.7-13.1)	**13.8** (12.9-14.6)	**15.2** (14.2-16.1)	**16.7** (15.5-17.7)	**18.7** (17.3-19.9)	**20.4** (18.6-21.7)
30-day	**8.11** (7.71-8.53)	**9.59** (9.14-10.1)	**11.3** (10.8-11.9)	**12.7** (12.1-13.4)	**14.6** (13.8-15.3)	**16.0** (15.1-16.8)	**17.5** (16.4-18.3)	**18.9** (17.7-19.9)	**20.8** (19.4-22.0)	**22.3** (20.6-23.6)
45-day	**10.3** (9.82-10.8)	**12.2** (11.6-12.7)	**14.2** (13.5-14.8)	**15.7** (14.9-16.4)	**17.7** (16.8-18.5)	**19.2** (18.2-20.1)	**20.7** (19.6-21.6)	**22.1** (20.8-23.2)	**23.9** (22.5-25.2)	**25.3** (23.6-26.7)
60-day	**12.3** (11.8-12.9)	**14.5** (13.8-15.2)	**16.7** (15.9-17.5)	**18.3** (17.5-19.2)	**20.4** (19.4-21.3)	**21.9** (20.8-22.9)	**23.4** (22.2-24.4)	**24.7** (23.4-25.9)	**26.4** (24.9-27.8)	**27.7** (26.0-29.1)

[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

APPENDIX E

Pre-Development Drainage Map

Post-Development Drainage Map

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