



# **STORMWATER MANAGEMENT REPORT**

## **FOR**

**Sofia By Gomes**  
**525 Northfield Avenue**  
**Lot 1.01, Block 159.04**  
**Township of West Orange**  
**Essex County, New Jersey**

**Applicant**  
**525 Northfield Ave., LLC**  
91 KOSSUTH STREET  
NEWARK, NJ 07105  
pedro@bygomes.com

**Prepared by**  
**Jarmel Kizel Architects & Engineers, Inc.**

**Jarmel Kizel Project No. GOMESGR24-223**  
**Dated: October 22, 2025**  
**Revised January 28, 2026**  
**Revised March 30, 2026**

ARCHITECTURE  
ENGINEERING  
SPACE PLANNING  
INTERIOR DESIGN  
IMPLEMENTATION SERVICES

PRINCIPALS  
MARVIN JARMEL, IIDA  
MATTHEW B. JARMEL, AIA,  
MBA  
IRWIN H. KIZEL, AIA, PP  
RICHARD A. JARMEL, PE

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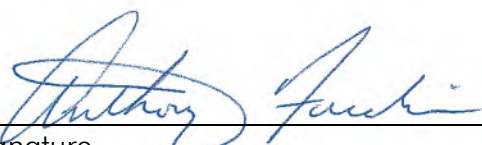
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PROFESSIONAL ENGINEERS  
AND LAND SURVEYORS  
CERTIFICATE OF  
AUTHORIZATION NUMBER  
GA278177

42 Okner Parkway  
Livingston, NJ 07039

TEL: (973) 994-9669  
FAX: (973) 994-4069

[www.jarmelkizel.com](http://www.jarmelkizel.com)

Anthony Facchino, PE, PLS  
Professional Engineer and Land Surveyor  
N.J. License No. GE042585

  
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Signature



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## **Introduction**

The purpose of this report is to present the stormwater runoff calculations performed for this development and to demonstrate compliance with the Townships Code 25-29 on Stormwater Control and NJDEP Best Management Practices (BMP) specifically regarding the four (4) components of a major development: stormwater quantity, stormwater quality, groundwater recharge, and erosion control.

The project site is located at 525 Northfield Avenue, and is the site of the Essex House restaurant. The property has been designated as Tax Lots 1.01, 1.02 and 1.03, Block 159.04 on the current Township Tax Maps. The site has a total land area of 2.530 acres. The site is located on the corner of Northfield Avenue and Sheridan Avenue in the B-2 zone district, and it backs up to Masson Place and Lenox Terrace. Across the street from the site is the Turtle Back Zoo and the South Mountain Arena in South Mountain Reservation.

## **Existing Site Conditions**

The site is currently occupied by a two-story masonry building with a parking lot for approximately 171 cars. The site is bisected by a 72" diameter concrete culvert pipe that flows east to west. The site's topography is such that the site receives off-site runoff from the residential properties to the northeast. Therefore, the drainage study considers a total area of 3.06 acres. The site slopes considerably from the northeast corner, southwesterly toward the intersection of Northfield Avenue and Sheridan Avenue. The site has excessive slopes of approximately 50% along its northern boundary. These slopes terminate at the edge of the existing parking lot. The parking lot currently has an average slope of 5%. The site is currently composed of 69.2% impervious areas and 30.8% pervious areas. The pervious areas are, for the most part, located in the rear of the site. The vegetation in this area is mostly woods and shrubs. Access to the site is available from Northfield Avenue and Sheridan Avenue. There is no access to the site from Masson Place and Lenox Terrace because of the steep slopes in that section of the site.

## **Proposed Site Conditions**

The proposed development requires to remove all existing building area, pavement, and site infrastructure for submission for preliminary and final site plans seeking approval to construct a multi-family 95-unit apartment building with an underground parking garage. The 44,541 square foot building will have (68) one-bedroom units, (22) two-bedroom units and (5) three-bedroom units. The building will also have 1,200sf retail space. The building will also have a total of (165) parking spaces.

The existing property has a total land area of 110,205 square feet (2.53 acres). The proposed conditions will have a reduction in impervious coverage by 5,807sf. In proposed conditions we are maintaining drainage patterns as close to existing conditions as possible. Do to the fact that the proposal will disturbance more than 1/2 acre of land, causes the project to meet the definition of a "Major Development" under the State and local regulations Code 25-29.



## **Soils**

From the Natural Resources Conservation Service, one soil type was found at the project site: BouB—Boonton substratum, 0 to 8 percent slopes. The soil is ranked with a hydraulic soil group C. For design purposes Hydrologic Soil Group C will be used for design comparison.

## **Nonstructural Best Management Practices (Bmps)**

Stormwater management is an important aspect of the project, not only for the safety and convenience of potential residents, but for the environment as well. Thus, it has been endeavored to include various stormwater management techniques that include both natural and structural means to accomplish that task.

The following low impact, nonstructural, development approaches to site design have been incorporated into this project as per Township code 25-29.4 and the NJDEP storm water management regulations 7:8-5.3; notably:

25-29.4(a) Land disturbance would be minimized by maintaining as much native vegetation around the site as possible.

25-29.4 (b) A Maintenance plan has been prepared to address ongoing maintenance of the project.

NJDEP 7:8-5.3 (b) 6. Much of the proposed building area has been previously disturbed and/or filled. It is these areas where most of the contemplated soil compaction would take place in order to construct the new buildings, parking areas, and drives. In other locations that have not seen extensive disturbance, rubber tired vehicles would be used to minimize compaction.

NJDEP 7:8-5.3 (b) 7. Extensive, supplemental landscaping would be added throughout the project site in the form of trees, shrubs, and ground cover.

## **Groundwater Recharge**

This section of the report describes the groundwater recharge provisions of the stormwater management system's design. The site falls within the State's Planning Area 1 (Metropolitan) and therefore the site can be considered as part of the urban redevelopment area. This groundwater recharge requirement does not apply to areas of the project that have been previously developed. Consequently, pursuant to 25-29.4 (q)3 and NJAC 7:8-5.4(b)2 the groundwater recharge requirements do not apply to this development. The reduction in impervious coverage would likely allow groundwater infiltration.

## **Water Quality Management**

As stated previously, since the project does not increase impervious cover by more than 0.25 acres (impervious cover is reduced in the proposed condition), the site does not drain to a water that has a total maximum daily load (TMDL) for TSS reduction, the regulatory requirements of the Code 25-29.4(r) and NJAC 7:8-5.5 are not applicable. Nevertheless, we believe implementation of the project will result in an improvement of runoff quality, when compared to existing site conditions and former use of the property. The anticipated improvement in water quality is based upon the net reduction in impervious cover, as well as a higher percentage of the post-project cover being comprised of mainly roof areas consisting of 44,541 square feet. The NJDEP considers roof runoff “clean,” not requiring TSS removal pursuant to State regulation.

## **Hydrology And Stormwater Management**

### Quantity Control (Peak Flow Attenuation)

Estimating runoff rates and volumes for quantity control purposes is done by utilizing what is referred to as the “NRCS Method”, which is also known as the “TR-55” methodology. This is described at length in Chapter 5 of the BMP Manual

According to the National Engineering Handbook, as published by the NRCS, the combination of a hydrologic soil group and a land use and treatment class is a hydrologic soil-cover complex, to which a runoff curve number (CN) can be assigned. The CN is an indication of the complex’s runoff potential. The Hydrologic Soil Group(s) for the project site were determined by referencing the NRCS’s Web Soil Survey for the appropriate county.

The Time of Concentration, “Tc”, for the existing and the proposed conditions have been calculated through modeling software and the paths are shown on the coverage maps. For the various ground covers, runoff coefficients, “CN”, used in the analysis were 98 for impervious areas such as buildings, parking lot, and walkways, and 71-74 for wooded/landscape areas.

The rainfall depths utilized for the project’s design were derived from NOAA Atlas 14, Volume 2, Version 3 point precipitation frequency estimates. An adjustment factor increasing the runoff factor by 1%-6% was applied in per 54 NJR 2187(a) for current storms and another 23% to 46% was added to arrive at a “future” storm intensity. Below is a summary of the storm rainfall depths used for both the existing and proposed conditions.

| Storm             | 2-year  | 10-year | 100-year  |
|-------------------|---------|---------|-----------|
| Current-Year-2020 | 3.47 in | 5.38 in | 9.18 in   |
| Future-Year-2050  | 4.09 in | 6.37 in | 11.52 in. |

The project's approach for compliance with the regulatory requirements for "quantity control" are set forth at Township Code 25-29.4(s) and Subpart 5.6(b)(2) of the Stormwater Management Regulations (NJAC 7:8), specifically "Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the current and projected two-, ten-, and 100-year storm events, as defined and determined pursuant to § 25-29.5c and d, respectively, of this section, and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;" As the project is divided into two primary drainage areas with two design points, quantity control considerations are evaluated for each design point.

The TR-55 calculations provided in Appendix No. A and Appendix No. B indicate the total peak runoff and total runoff volumes from the subject drainage areas under pre-project and post-project conditions respectively. Tables below provide a summary of the peak runoff rates and total runoff volumes for the regulated storms under existing and proposed conditions for both design points and the overall site, respectively. The following data verifies the project's compliance with the standards pertaining to "quantity control" as the peak runoff rates for post-project conditions never exceed the pre-project conditions. There is no increase in volume for post-conditions because we were able to maintain drainage areas with the use of roof drains, therefore, we will not increase flood damage at or downstream of the site. Our site currently connects to an existing 72" culvert pipe and a storm sewer system on Sheridan Avenue which will safely convey the runoff and minimize erosion.

| <b>Table No. 1</b> |                    |       |                          |        |
|--------------------|--------------------|-------|--------------------------|--------|
| Design Point #1    |                    |       |                          |        |
| Storm Freq.        | Runoff Rates (cfs) |       | Total Volume Runoff (cf) |        |
|                    | PRE                | POST  | PRE                      | POST   |
| 2-Year(2020)       | 3.38               | 3.22  | 23,104                   | 22,126 |
| 10-Year(2020)      | 5.73               | 5.54  | 39,586                   | 38,343 |
| 100-Year(2020)     | 10.64              | 10.42 | 74,249                   | 72,660 |
| 2-Year(2050)       | 4.16               | 3.99  | 28,336                   | 27,260 |
| 10-Year(2050)      | 7.06               | 6.87  | 48,450                   | 47,101 |
| 100-Year(2050)     | 13.86              | 13.63 | 96,150                   | 94,401 |

| <b>Table No. 2</b> |                    |      |                          |        |
|--------------------|--------------------|------|--------------------------|--------|
| Design Point #2    |                    |      |                          |        |
| Storm Freq.        | Runoff Rates (cfs) |      | Total Volume Runoff (cf) |        |
|                    | PRE                | POST | PRE                      | POST   |
| 2-Year(2020)       | 0.61               | 0.52 | 3,939                    | 3,361  |
| 10-Year(2020)      | 1.00               | 0.91 | 6,481                    | 5,818  |
| 100-Year(2020)     | 1.79               | 1.71 | 11,675                   | 10,992 |
| 2-Year(2050)       | 0.74               | 0.65 | 4,755                    | 4,140  |
| 10-Year(2050)      | 1.21               | 1.12 | 7,822                    | 7,141  |
| 100-Year(2050)     | 2.28               | 2.22 | 14,912                   | 14,261 |

| <b>Table No. 3</b>   |                    |       |                          |         |
|----------------------|--------------------|-------|--------------------------|---------|
| Overall Site (Total) |                    |       |                          |         |
| Storm Freq.          | Runoff Rates (cfs) |       | Total Volume Runoff (cf) |         |
|                      | PRE                | POST  | PRE                      | POST    |
| 2-Year(2020)         | 3.99               | 3.74  | 27,043                   | 25,487  |
| 10-Year(2020)        | 6.73               | 6.45  | 46,067                   | 44,160  |
| 100-Year(2020)       | 12.42              | 12.13 | 85,924                   | 85,652  |
| 2-Year(2050)         | 4.90               | 4.64  | 33,091                   | 31,400  |
| 10-Year(2050)        | 8.26               | 7.98  | 56,272                   | 54,242  |
| 100-Year(2050)       | 16.13              | 15.85 | 111,062                  | 108,662 |

## 5. Soil Erosion and Sediment Control Compliance

The project has also been designed to minimize erosion and sedimentation in accordance with The Standards for Soil Erosion and Sediment Control in New Jersey". "Soil Erosion and Sediment Control Plan" is included in the set of project plans, specifying numerous practices to achieve this goal. The project's "Soil Erosion and Sediment Control Plan" is subject to review and approval by the Hudson Essex Passaic Soil Conservation District (HEPSCD). The District's certification of the plan is required before any construction may commence, which provides further assurance that the project's implementation will minimize erosion and sedimentation.

## 6. Collection and Conveyance System Design

The project's storm water management system also includes a network of storm sewer pipes to convey the stormwater runoff to and from the various management facilities. Similarly, stormwater inlets are strategically located to collect runoff from the surface of the ground. The collection and conveyance systems (storm sewers) were designed for the peak rate of runoff during a **100-year storm** calculated per the Rational Method. Appendix No. C of this report contains the storm sewer design calculations.

The Proposed Inlet Area Map presents the inlet drainage areas for each proposed inlet collecting roof runoff via downspout leaders. There are multiple storm sewers systems proposed: system B-F encompasses Proposed Drainage Area to mimic existing condition drainage patterns.

## **Conclusion**

The proposed improvements are designed in accordance with local, county and state standards as specified herein. The measures and design provided herein are intended to prevent or limit the impact of the proposed development on the site and the surrounding areas with respect to stormwater quantity, quality, groundwater recharge, and erosion from stormwater runoff. The proposed project will not increase impervious surfaces within the property in question and will provide peak flow attenuation by reducing the peak flow and volume as compared to existing conditions.

As per the requirements for a major site development, there is a reduction in the existing peak runoff rates and volumes for stormwater leaving the site for the 2, 10, and 100-year storm events at each design point respectively. It is our opinion that the calculations provided and summarized above demonstrate compliance with the Township ordinance 25-29 Stormwater Control.

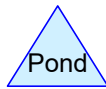
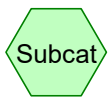
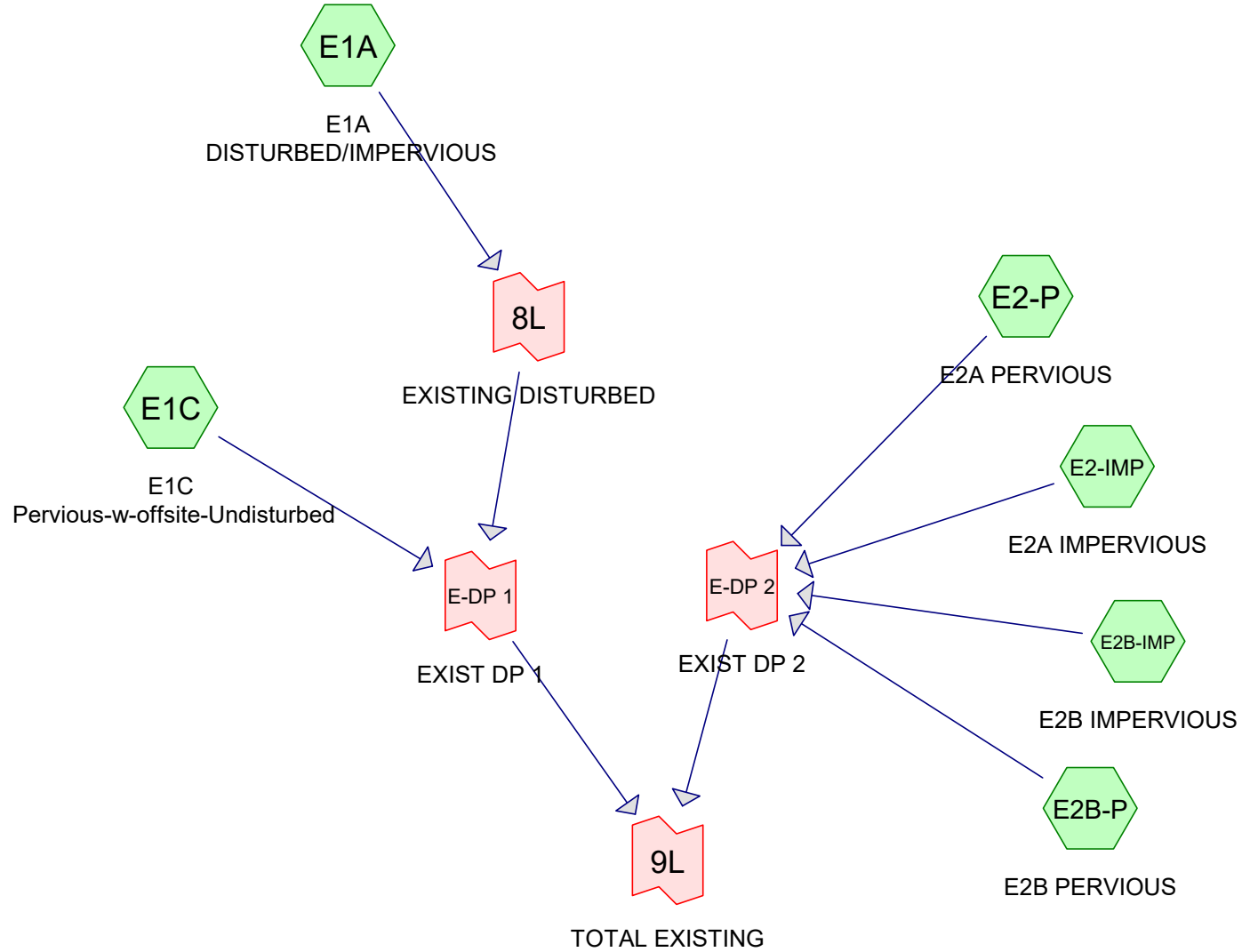


APPENDIX A

EXISTING DRAINAGE CALCULATIONS







# **Routing Diagram for 24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

Prepared by Jarmel Kizel Architects & Engrs, Printed 3/30/2026  
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## 24-223 DRAINAGE DESIGN-EXISTING-2026-03-30

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### Area Listing (all nodes)

| Area<br>(sq-ft) | CN | Description<br>(subcatchment-numbers)            |
|-----------------|----|--------------------------------------------------|
| 4,871           | 74 | >75% Grass cover, Good, HSG C (E1C, E2-P, E2B-P) |
| 1,220           | 98 | Impervious-offsite (E1C)                         |
| 2,721           | 71 | Meadow, non-grazed, HSG C (E1C)                  |
| 78,487          | 98 | Paved parking, HSG C (E1A, E2-IMP, E2B-IMP)      |
| 708             | 98 | Roof-offsite (E1C)                               |
| 4,643           | 98 | Roofs, HSG C (E2-IMP)                            |
| 7,928           | 72 | Woods/grass comb., Good, HSG C (E1C)             |
| 32,525          | 70 | wooded (E1C)                                     |

**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

Prepared by Jarmel Kizel Architects &amp; Engrs

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NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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**Summary for Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

Runoff = 2.94 cfs @ 12.01 hrs, Volume= 18,851 cf, Depth= 3.24"  
 Routed to Link 8L : EXISTING DISTURBED

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

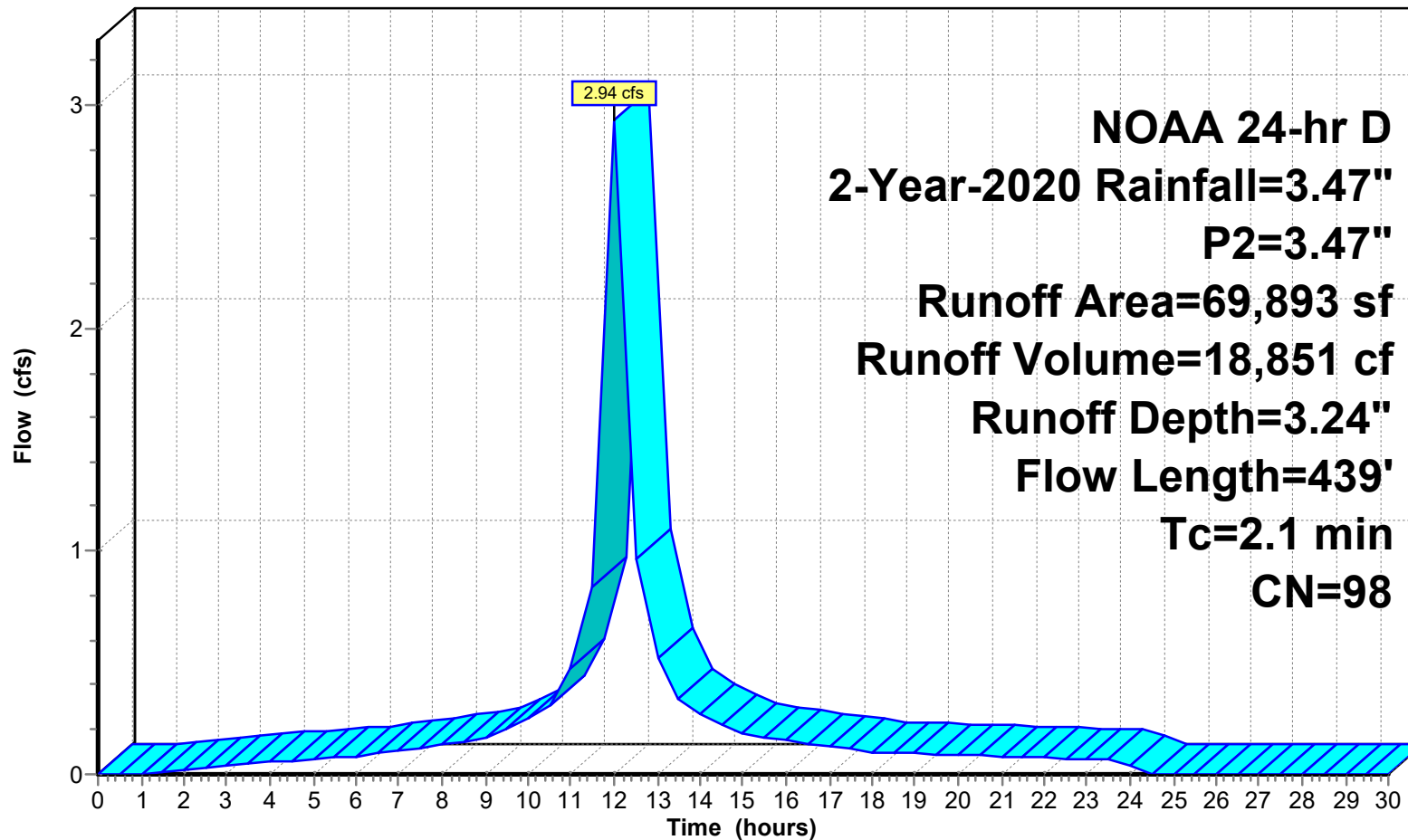
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 69,893    | 98 | Paved parking, HSG C    |
| 69,893    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 0.7      | 100           | 0.0650        | 2.30              |                | <b>Sheet Flow, Parking lot</b>                |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"            |
| 1.4      | 339           | 0.0420        | 4.16              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 2.1      | 439           | Total         |                   |                |                                               |

**Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

**Hydrograph**



**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

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NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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**Summary for Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed**

Runoff = 0.53 cfs @ 12.36 hrs, Volume= 4,253 cf, Depth= 1.10"  
 Routed to Link E-DP 1 : EXIST DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

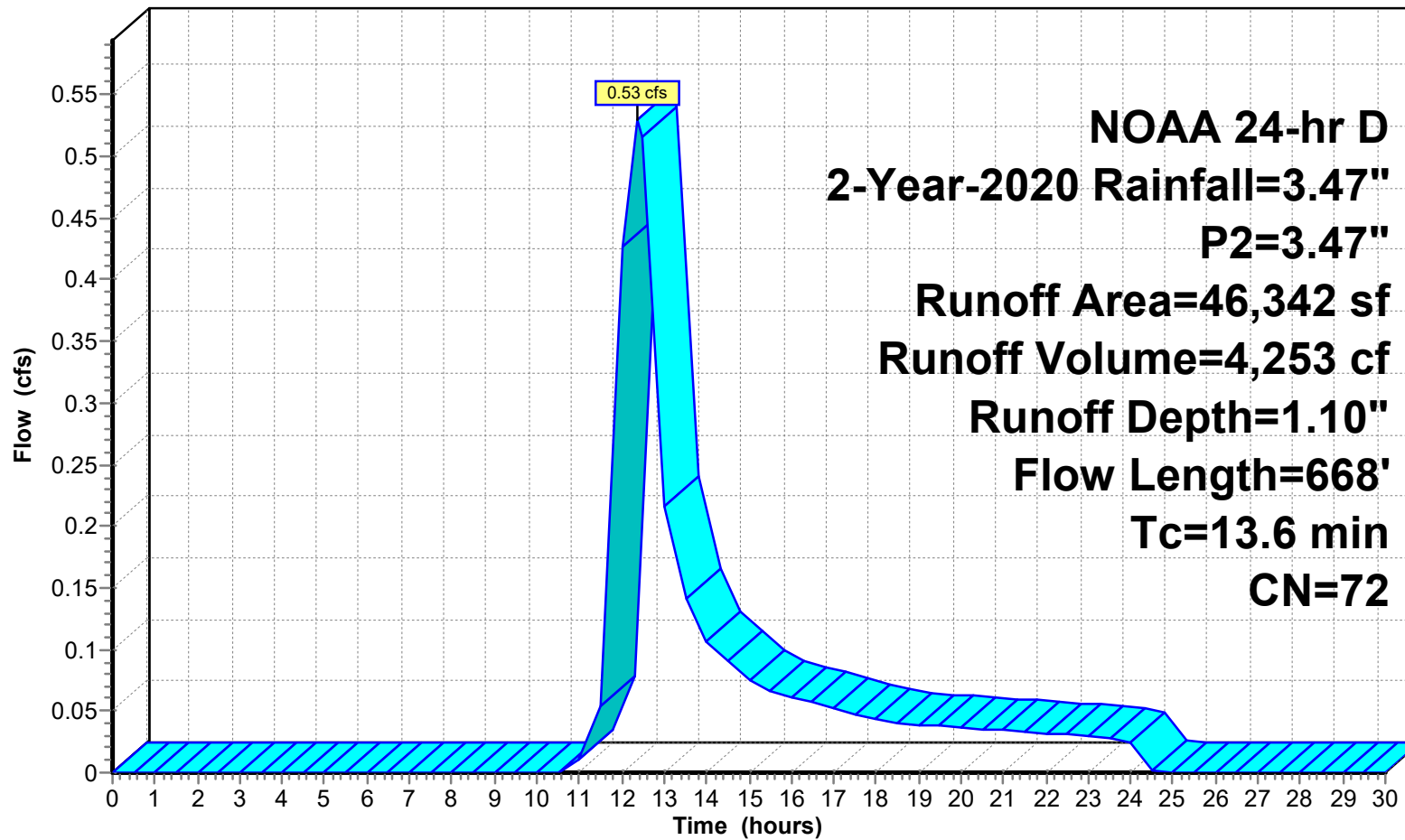
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,525  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,928   | 72 | Woods/grass comb., Good, HSG C |
| 46,342    | 72 | Weighted Average               |
| 44,414    |    | 95.84% Pervious Area           |
| 1,928     |    | 4.16% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 11.3     | 100           | 0.0900        | 0.15              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.47"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 13.6     | 668           | Total         |                   |                |                                               |

**Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed**

**Hydrograph**



**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

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NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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**Summary for Subcatchment E2-IMP: E2A IMPERVIOUS**

Runoff = 0.51 cfs @ 12.01 hrs, Volume= 3,246 cf, Depth= 3.24"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

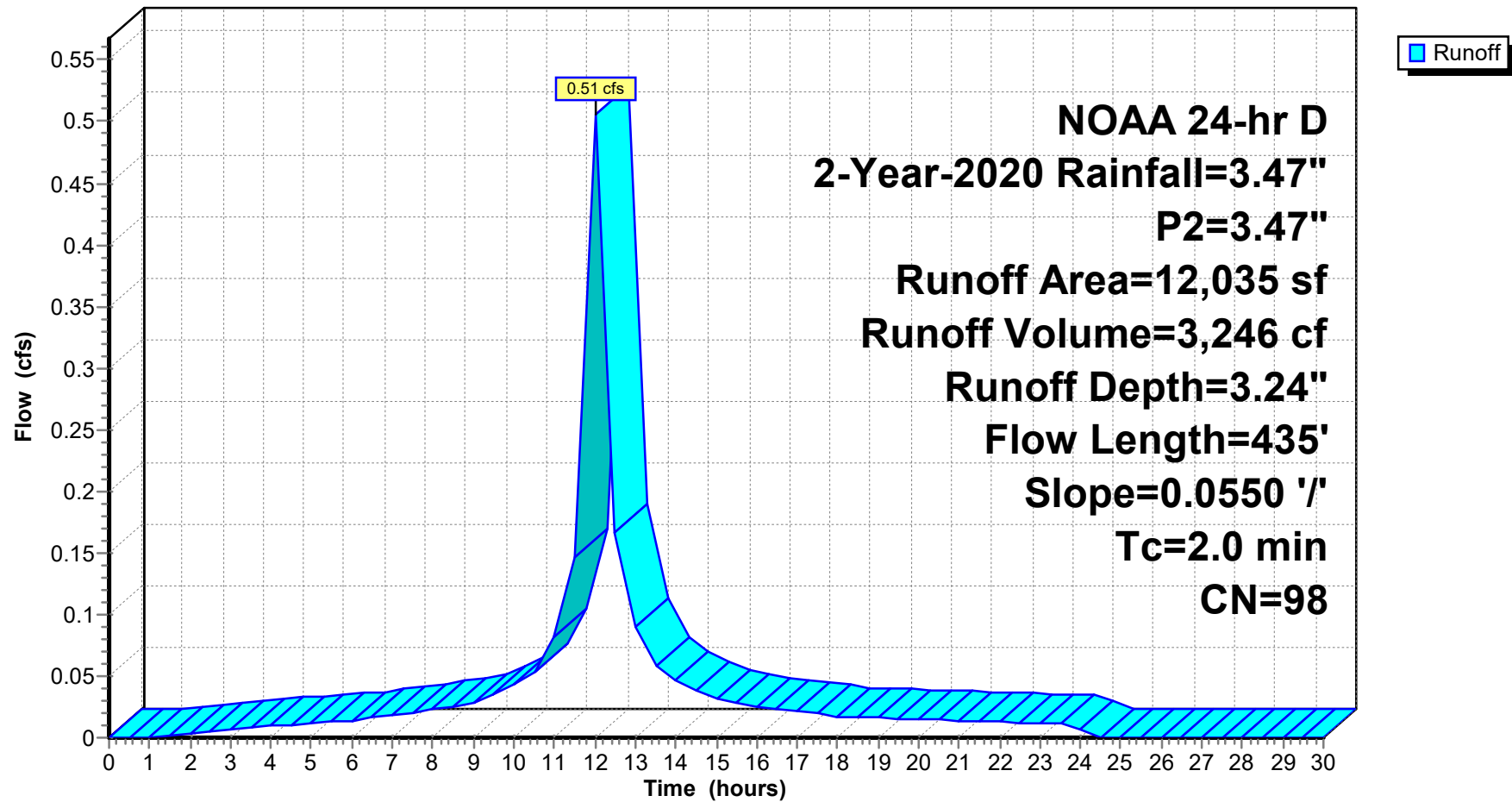
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 4,643     | 98 | Roofs, HSG C            |
| 7,392     | 98 | Paved parking, HSG C    |
| 12,035    | 98 | Weighted Average        |
| 12,035    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.8      | 100           | 0.0550        | 2.15              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 1.2      | 335           | 0.0550        | 4.76              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 2.0      | 435           | Total         |                   |                |                                                      |

Subcatchment E2-IMP: E2A IMPERVIOUS

Hydrograph





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**Summary for Subcatchment E2-P: E2A PERVIOUS**

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 213 cf, Depth= 1.22"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

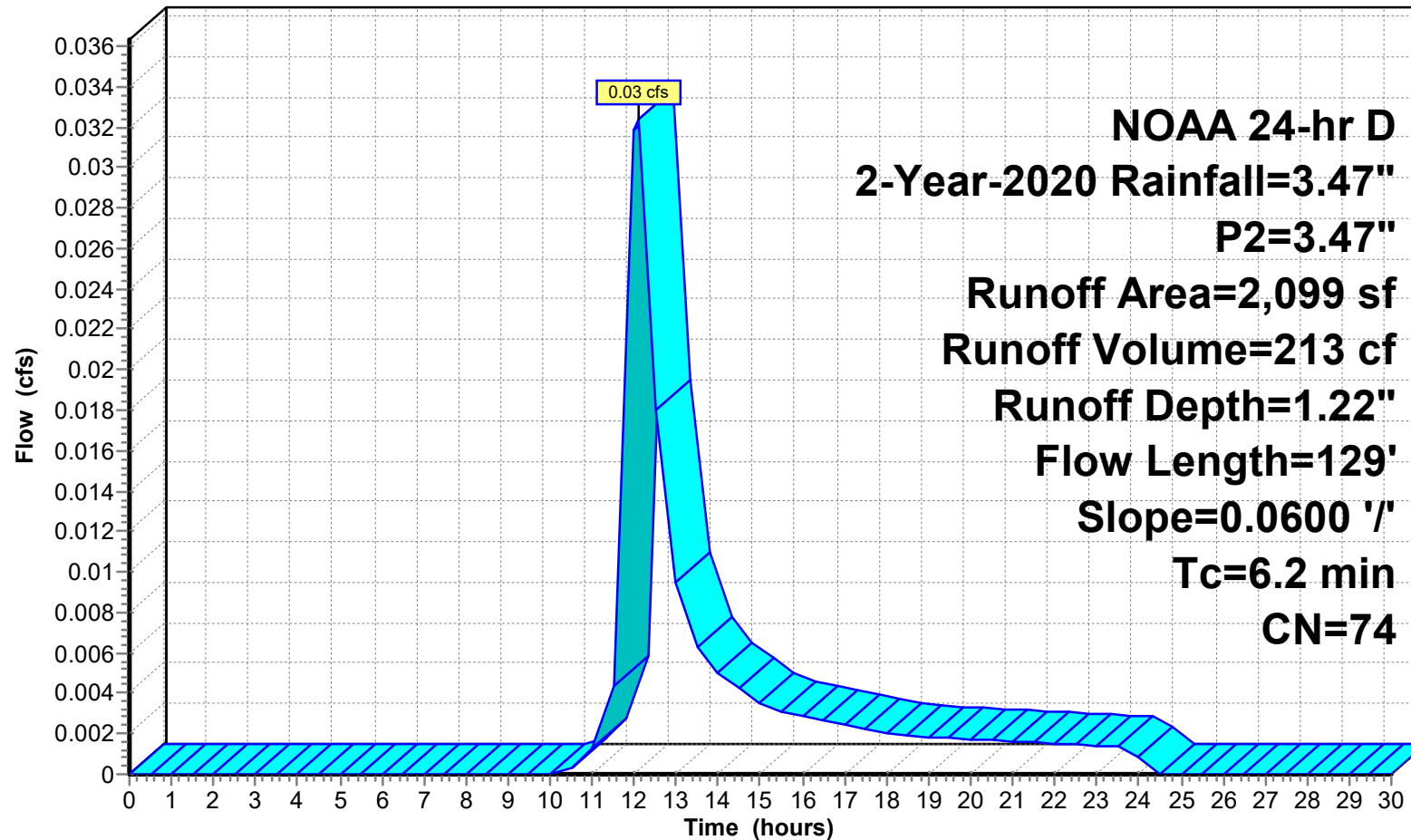
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,099     | 74 | >75% Grass cover, Good, HSG C |
| 2,099     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 6.1      | 100           | 0.0600        | 0.27              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.1      | 29            | 0.0600        | 3.94              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 6.2      | 129           | Total         |                   |                |                                        |

Subcatchment E2-P: E2A PERVIOUS

Hydrograph



**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

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NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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**Summary for Subcatchment E2B-IMP: E2B IMPERVIOUS**

Runoff = 0.05 cfs @ 12.00 hrs, Volume= 324 cf, Depth= 3.24"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

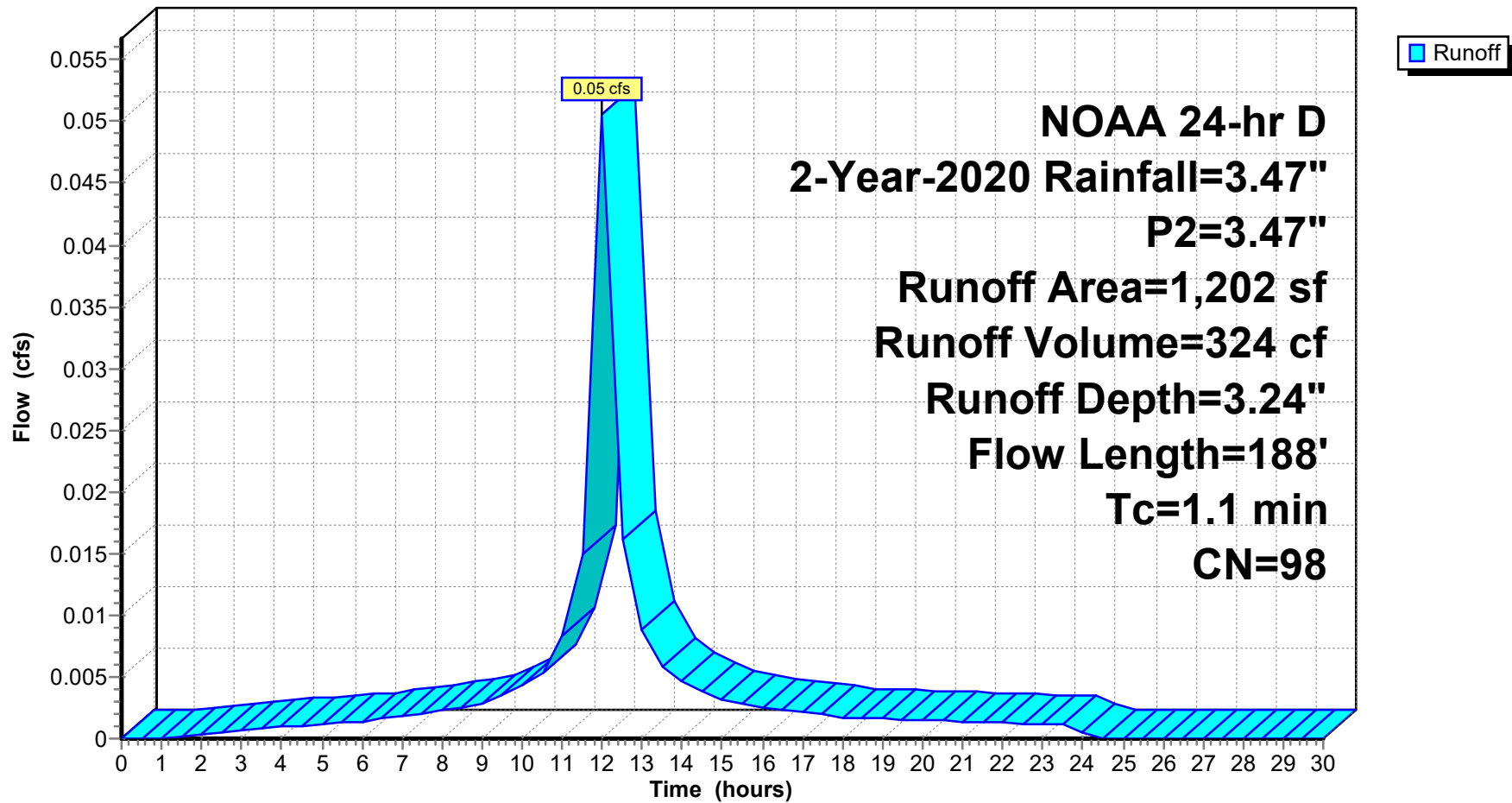
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 1,202     | 98 | Paved parking, HSG C    |
| 1,202     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.61              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 0.5      | 88            | 0.0250        | 3.21              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment E2B-IMP: E2B IMPERVIOUS

Hydrograph



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NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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**Summary for Subcatchment E2B-P: E2B PERVIOUS**

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 156 cf, Depth= 1.22"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

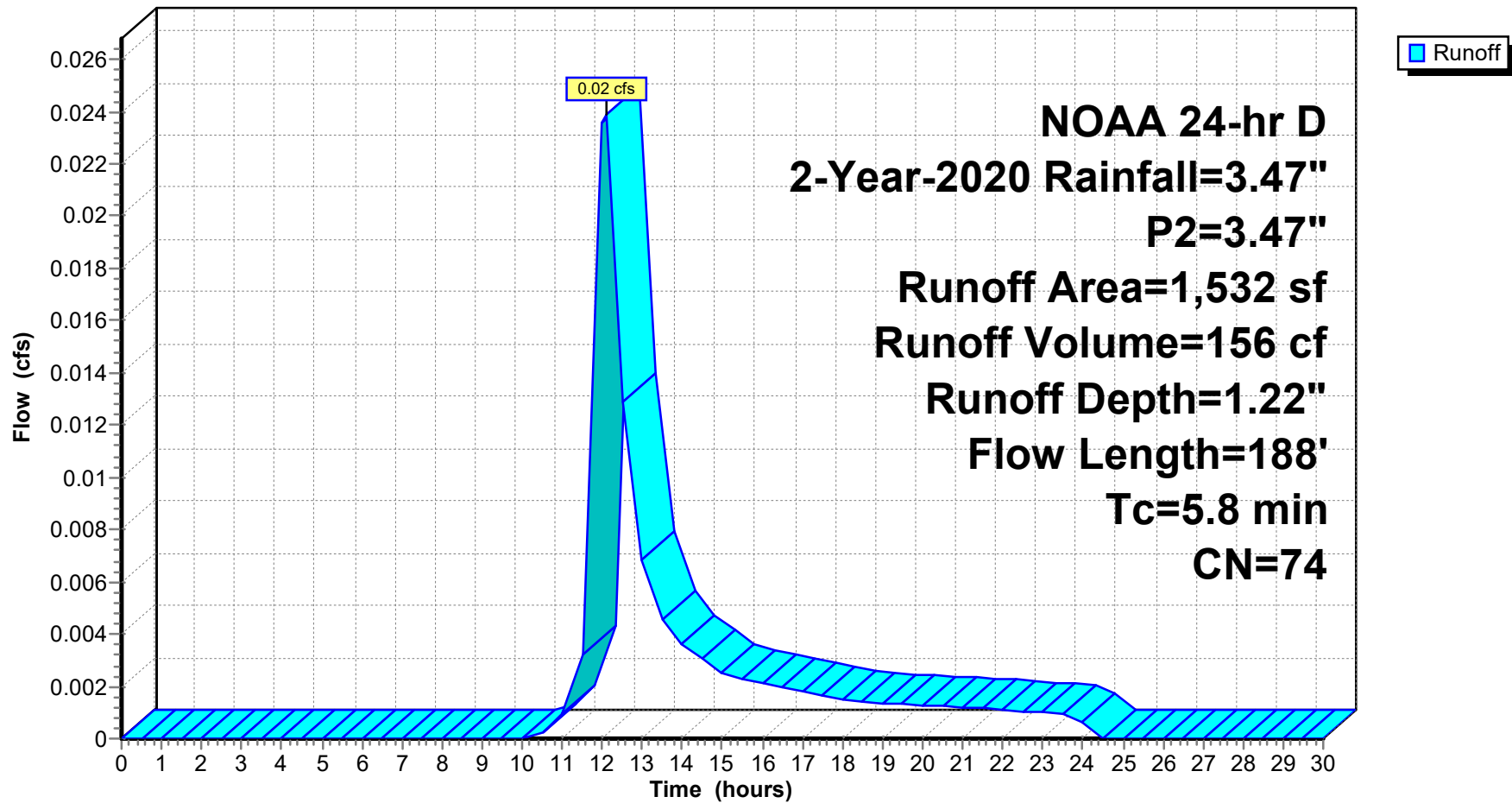
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,532     | 74 | >75% Grass cover, Good, HSG C |
| 1,532     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.2      | 100           | 0.0900        | 0.32              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.6      | 88            | 0.0250        | 2.55              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.8      | 188           | Total         |                   |                |                                        |

Subcatchment E2B-P: E2B PERVIOUS

Hydrograph



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NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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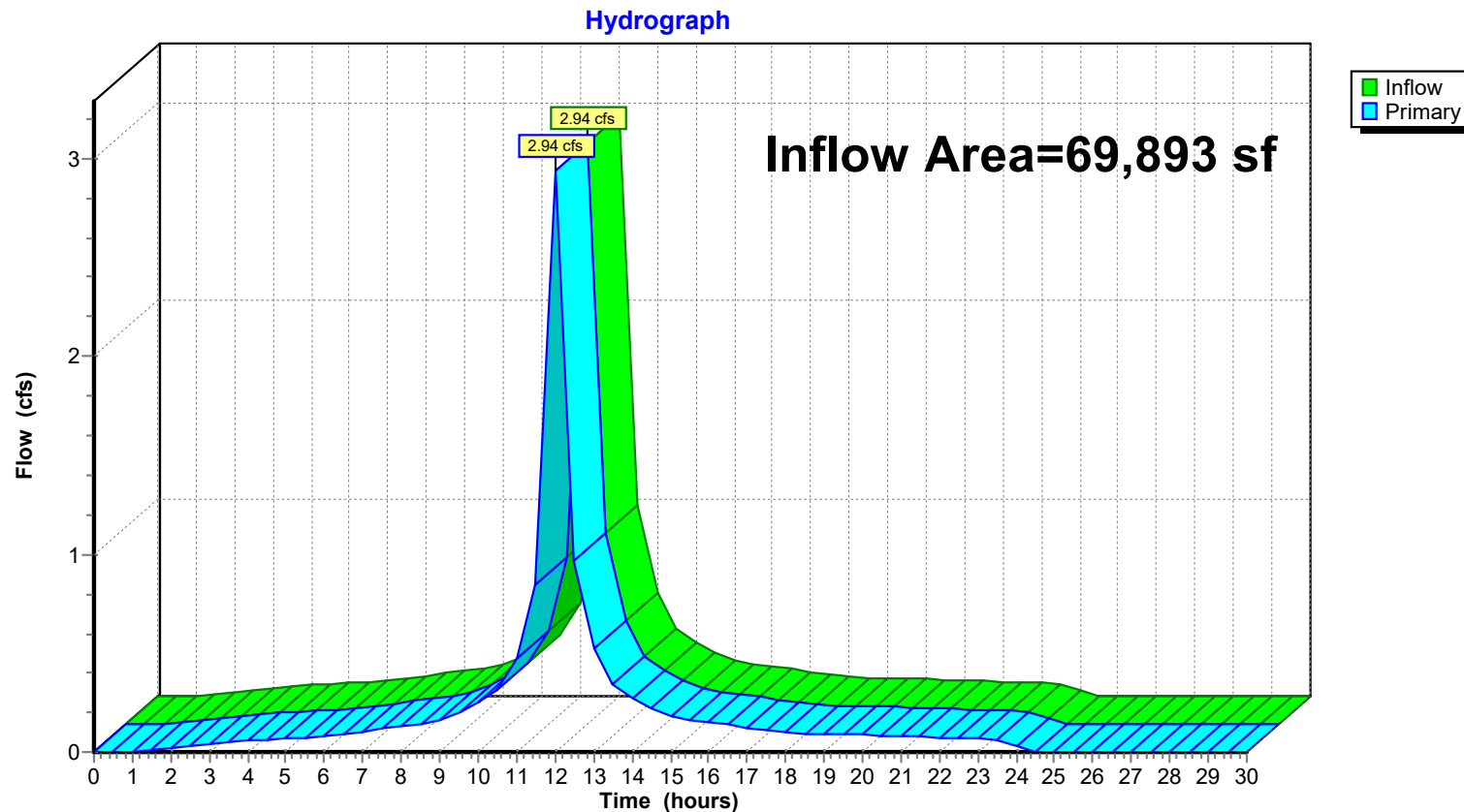
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### Summary for Link 8L: EXISTING DISTURBED

Inflow Area = 69,893 sf, 100.00% Impervious, Inflow Depth = 3.24" for 2-Year-2020 event  
Inflow = 2.94 cfs @ 12.01 hrs, Volume= 18,851 cf  
Primary = 2.94 cfs @ 12.01 hrs, Volume= 18,851 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link E-DP 1 : EXIST DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 8L: EXISTING DISTURBED



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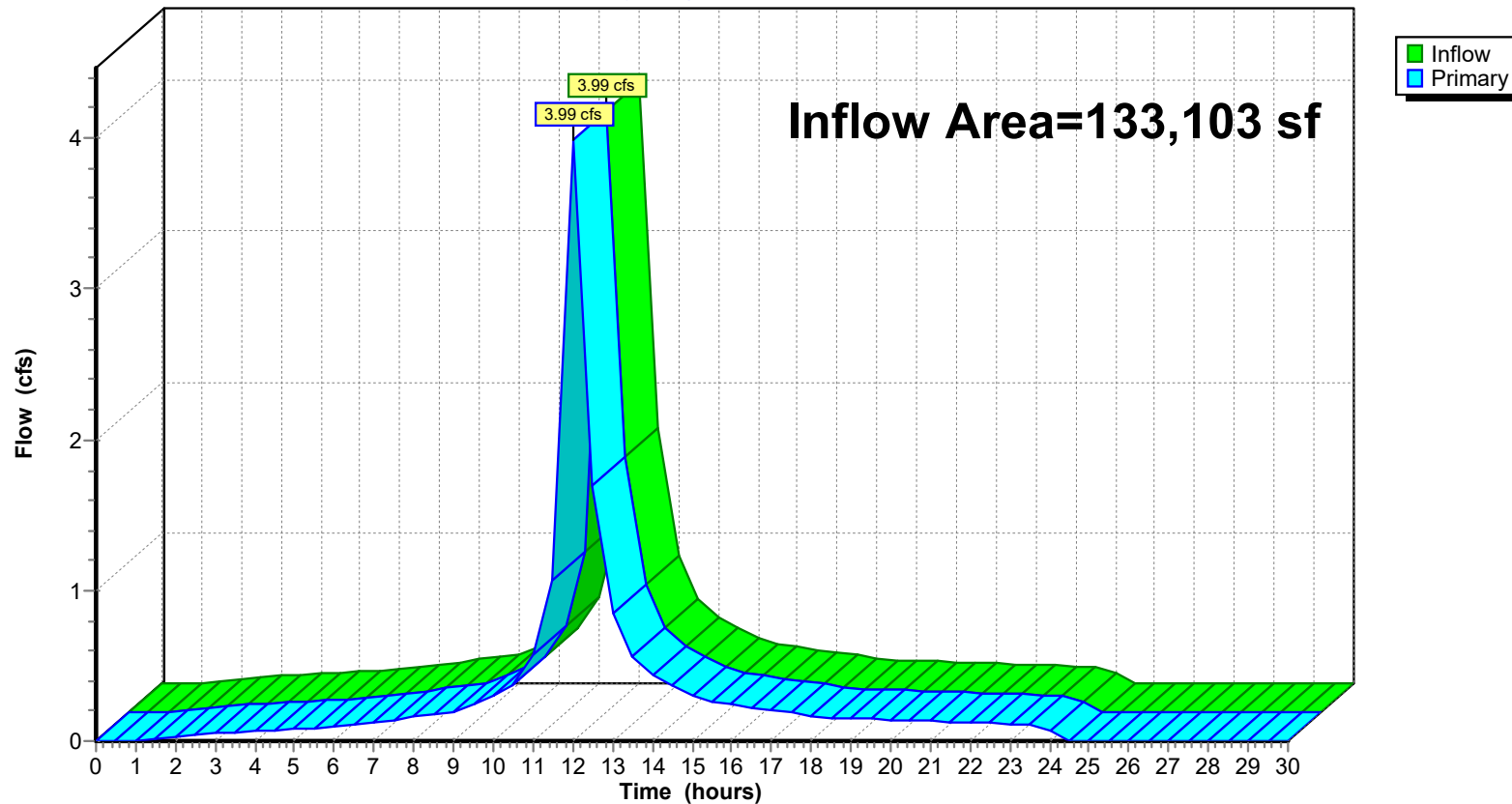
### Summary for Link 9L: TOTAL EXISTING

Inflow Area = 133,103 sf, 63.90% Impervious, Inflow Depth = 2.44" for 2-Year-2020 event  
Inflow = 3.99 cfs @ 12.03 hrs, Volume= 27,043 cf  
Primary = 3.99 cfs @ 12.03 hrs, Volume= 27,043 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 9L: TOTAL EXISTING

#### Hydrograph





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NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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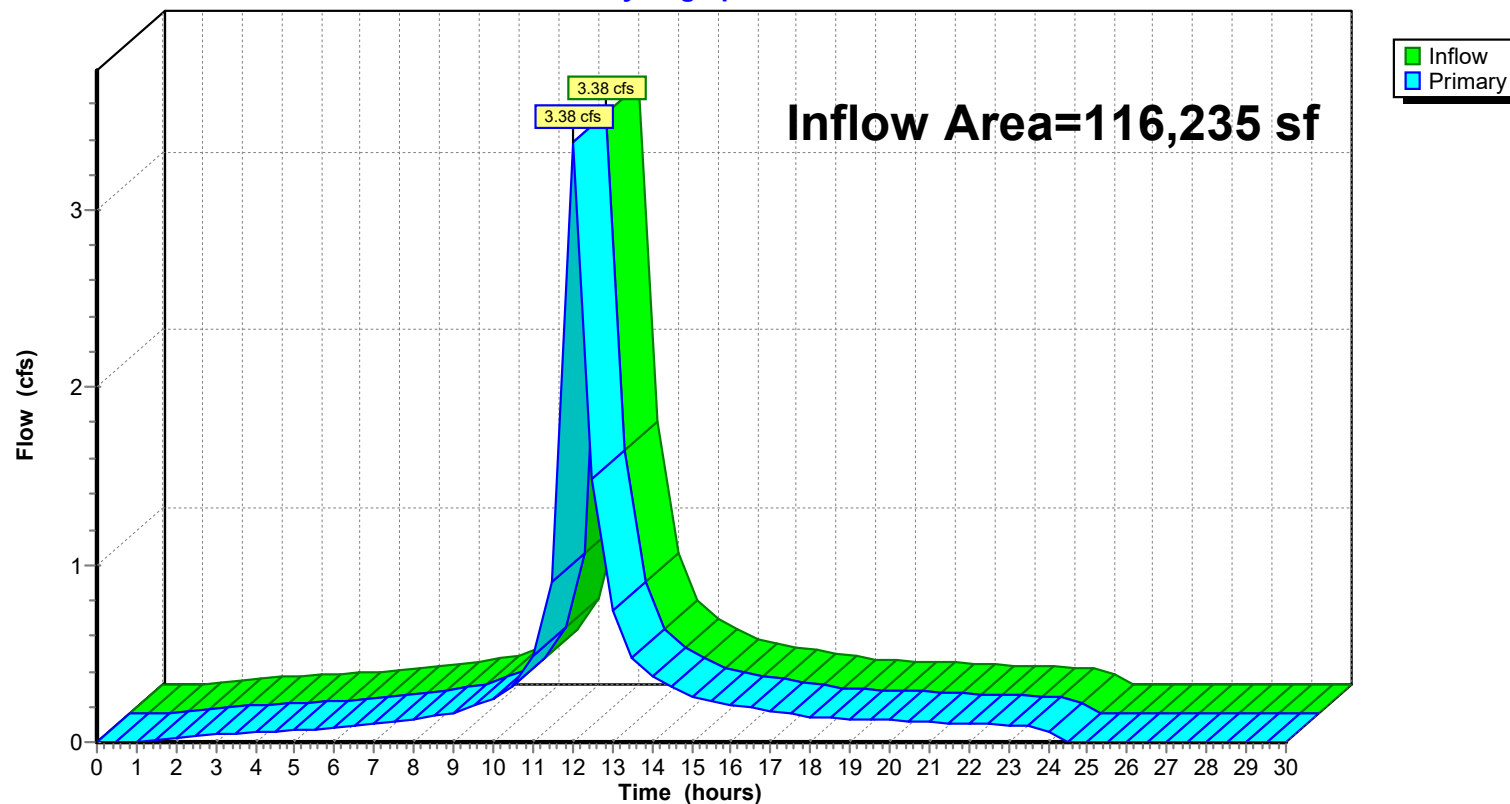
### Summary for Link E-DP 1: EXIST DP 1

Inflow Area = 116,235 sf, 61.79% Impervious, Inflow Depth = 2.39" for 2-Year-2020 event  
Inflow = 3.38 cfs @ 12.03 hrs, Volume= 23,104 cf  
Primary = 3.38 cfs @ 12.03 hrs, Volume= 23,104 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link E-DP 1: EXIST DP 1

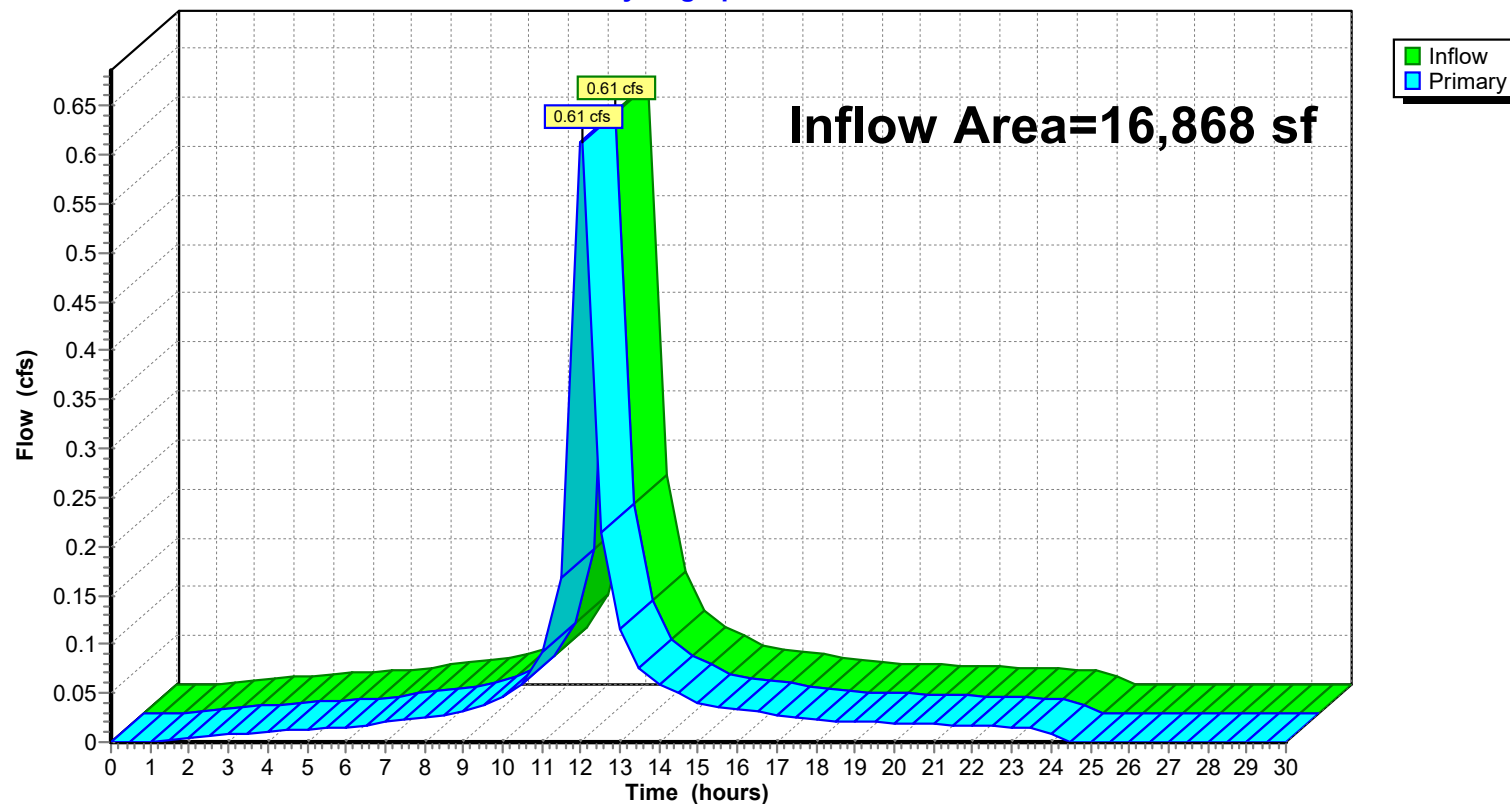
#### Hydrograph



**Summary for Link E-DP 2: EXIST DP 2**

Inflow Area = 16,868 sf, 78.47% Impervious, Inflow Depth = 2.80" for 2-Year-2020 event  
Inflow = 0.61 cfs @ 12.01 hrs, Volume= 3,939 cf  
Primary = 0.61 cfs @ 12.01 hrs, Volume= 3,939 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

**Link E-DP 2: EXIST DP 2****Hydrograph**

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NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

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**Summary for Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

Runoff = 4.59 cfs @ 12.01 hrs, Volume= 29,953 cf, Depth= 5.14"  
 Routed to Link 8L : EXISTING DISTURBED

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

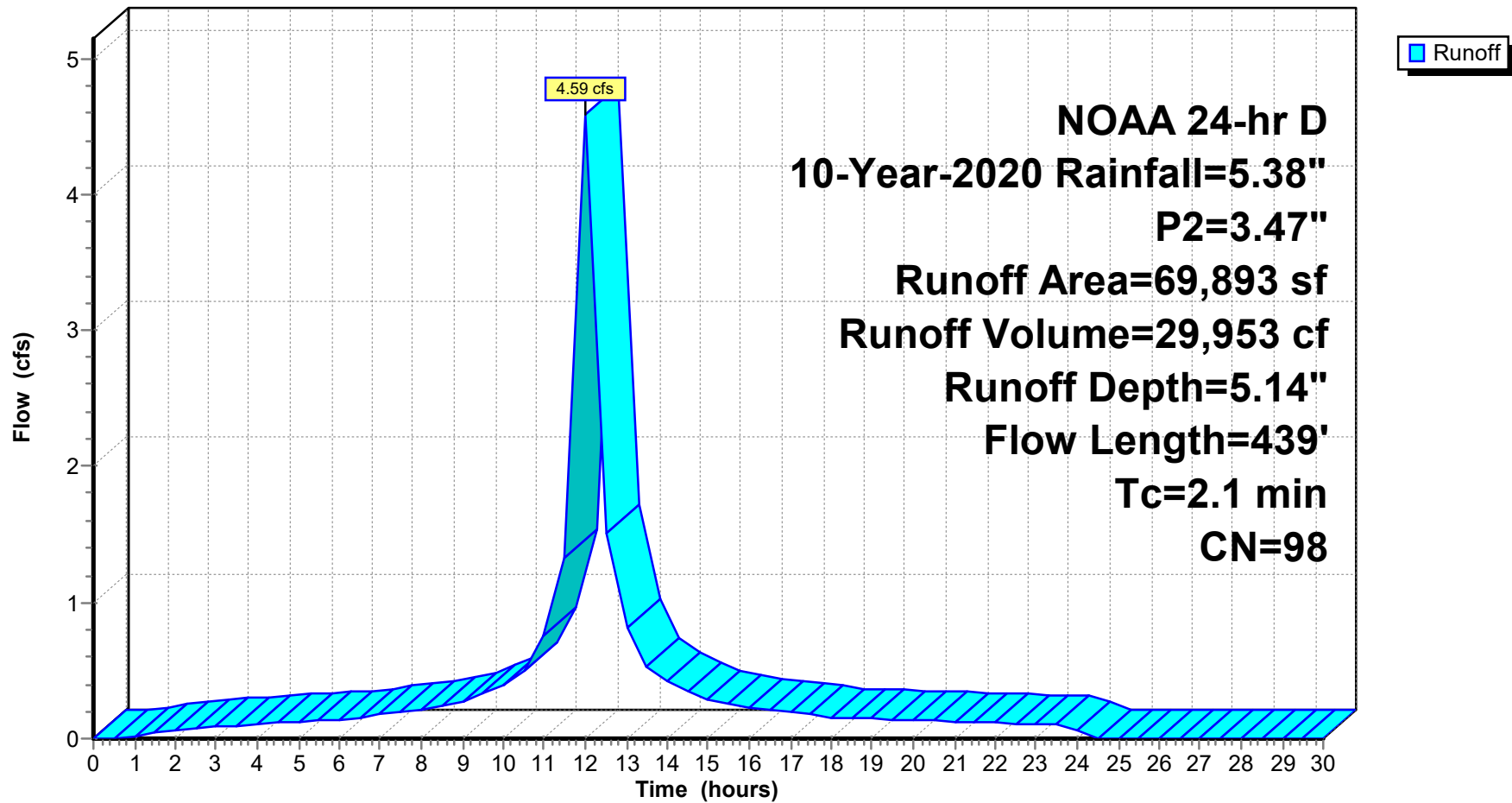
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 69,893    | 98 | Paved parking, HSG C    |
| 69,893    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 0.7      | 100           | 0.0650        | 2.30              |                | <b>Sheet Flow, Parking lot</b>                |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"            |
| 1.4      | 339           | 0.0420        | 4.16              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 2.1      | 439           | Total         |                   |                |                                               |

**Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

**Hydrograph**



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**Summary for Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed**

Runoff = 1.22 cfs @ 12.27 hrs, Volume= 9,633 cf, Depth= 2.49"  
 Routed to Link E-DP 1 : EXIST DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

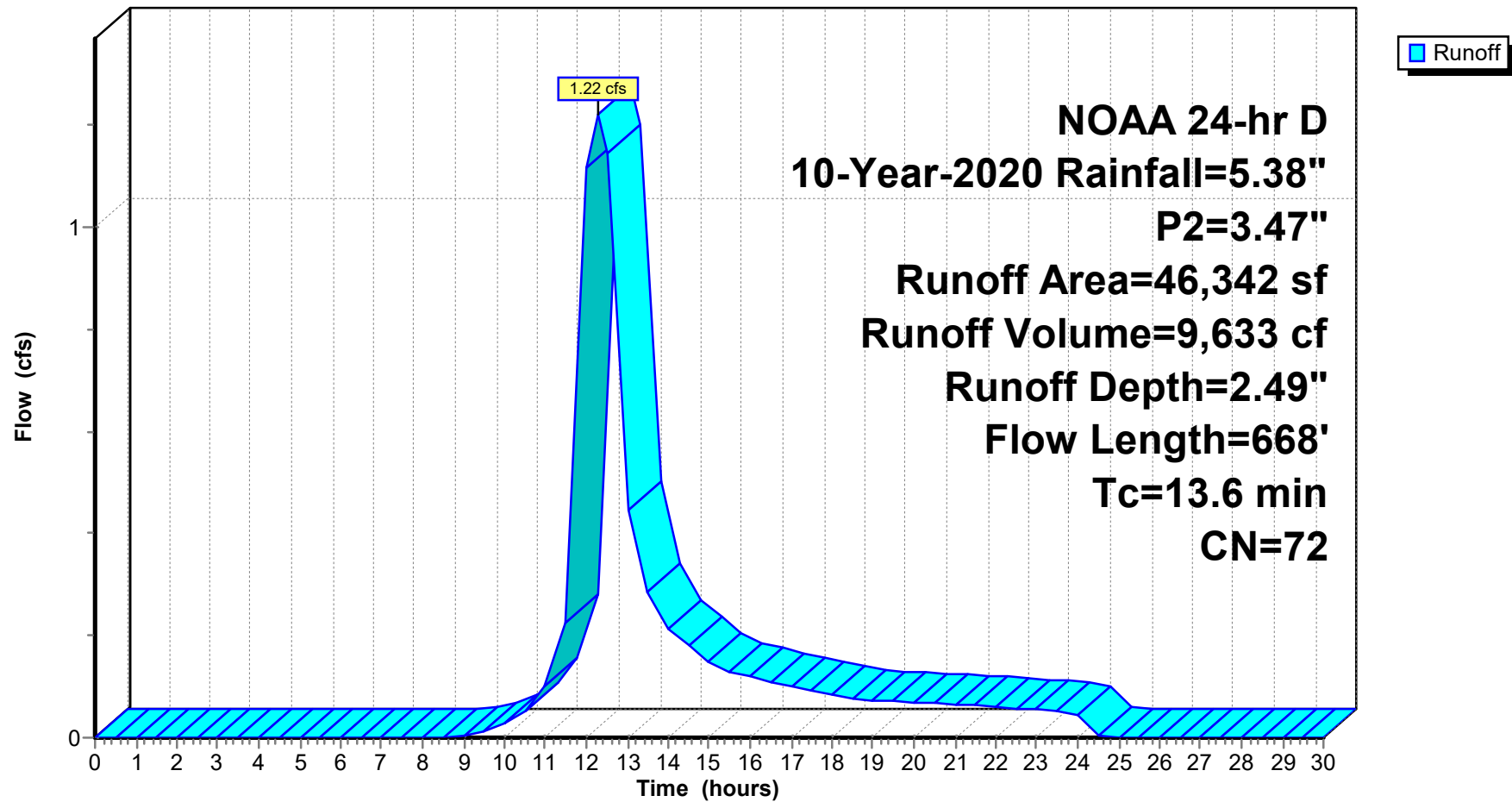
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,525  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,928   | 72 | Woods/grass comb., Good, HSG C |
| 46,342    | 72 | Weighted Average               |
| 44,414    |    | 95.84% Pervious Area           |
| 1,928     |    | 4.16% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 11.3     | 100           | 0.0900        | 0.15              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.47"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 13.6     | 668           | Total         |                   |                |                                               |

Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed

Hydrograph



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**Summary for Subcatchment E2-IMP: E2A IMPERVIOUS**

Runoff = 0.79 cfs @ 12.01 hrs, Volume= 5,158 cf, Depth= 5.14"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

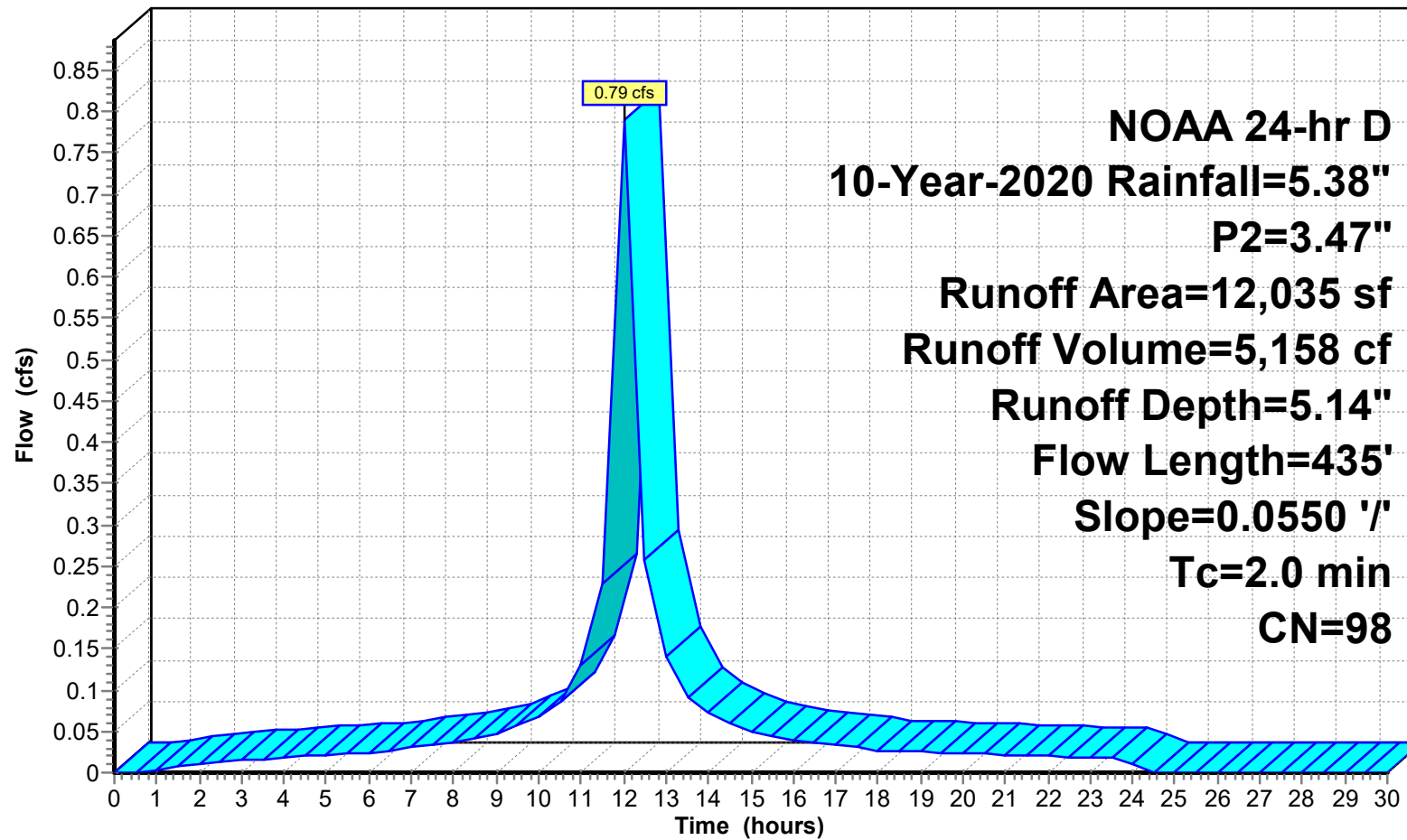
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 4,643     | 98 | Roofs, HSG C            |
| 7,392     | 98 | Paved parking, HSG C    |
| 12,035    | 98 | Weighted Average        |
| 12,035    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.8      | 100           | 0.0550        | 2.15              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 1.2      | 335           | 0.0550        | 4.76              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 2.0      | 435           | Total         |                   |                |                                                      |

Subcatchment E2-IMP: E2A IMPERVIOUS

Hydrograph





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**Summary for Subcatchment E2-P: E2A PERVIOUS**

Runoff = 0.08 cfs @ 12.06 hrs, Volume= 467 cf, Depth= 2.67"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

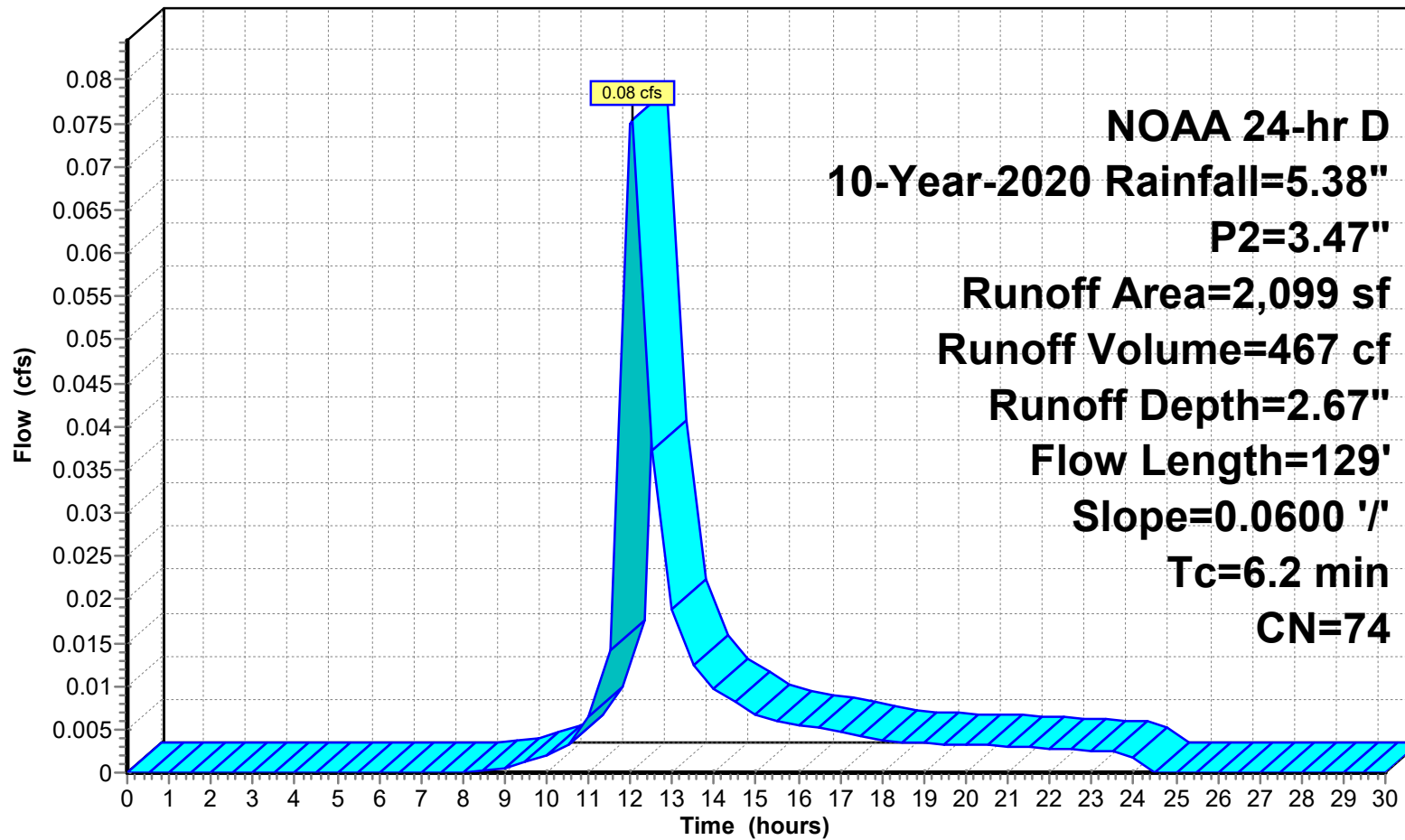
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,099     | 74 | >75% Grass cover, Good, HSG C |
| 2,099     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 6.1      | 100           | 0.0600        | 0.27              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.1      | 29            | 0.0600        | 3.94              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 6.2      | 129           | Total         |                   |                |                                        |

Subcatchment E2-P: E2A PERVIOUS

Hydrograph



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**Summary for Subcatchment E2B-IMP: E2B IMPERVIOUS**

Runoff = 0.08 cfs @ 12.00 hrs, Volume= 515 cf, Depth= 5.14"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

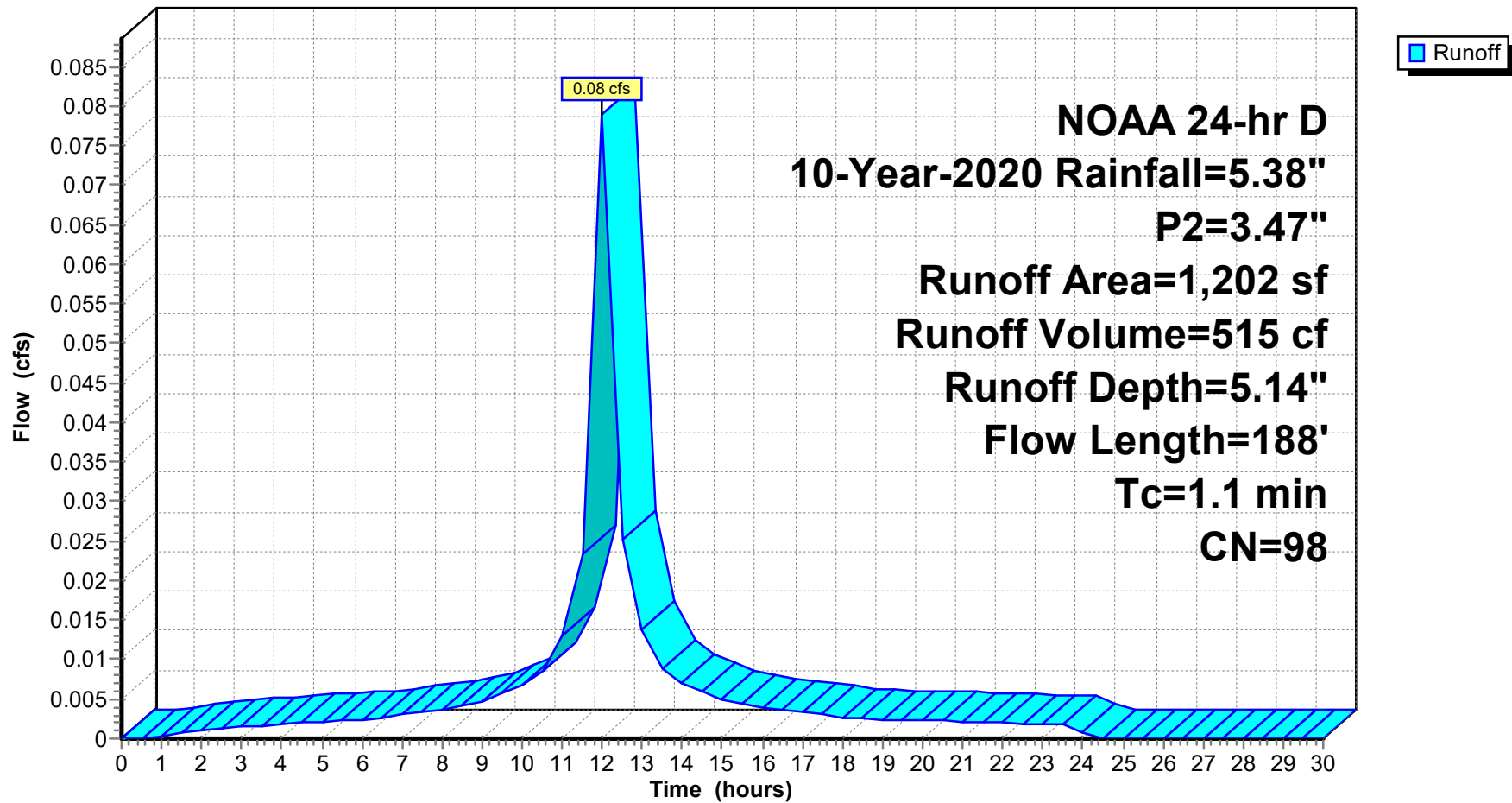
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 1,202     | 98 | Paved parking, HSG C    |
| 1,202     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.61              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 0.5      | 88            | 0.0250        | 3.21              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment E2B-IMP: E2B IMPERVIOUS

Hydrograph



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**Summary for Subcatchment E2B-P: E2B PERVIOUS**

Runoff = 0.06 cfs @ 12.05 hrs, Volume= 341 cf, Depth= 2.67"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

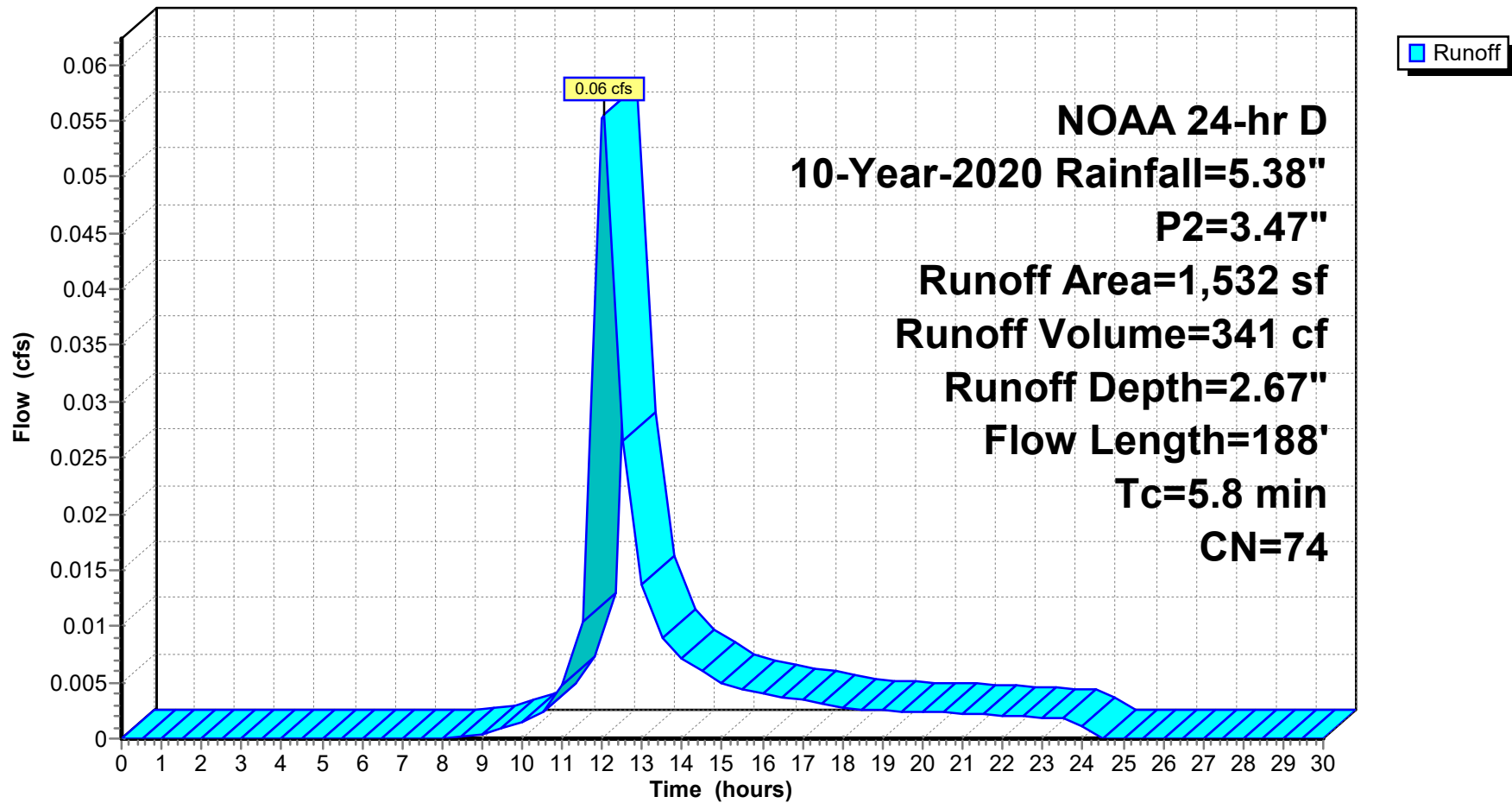
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,532     | 74 | >75% Grass cover, Good, HSG C |
| 1,532     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.2      | 100           | 0.0900        | 0.32              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.6      | 88            | 0.0250        | 2.55              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.8      | 188           | Total         |                   |                |                                        |

Subcatchment E2B-P: E2B PERVIOUS

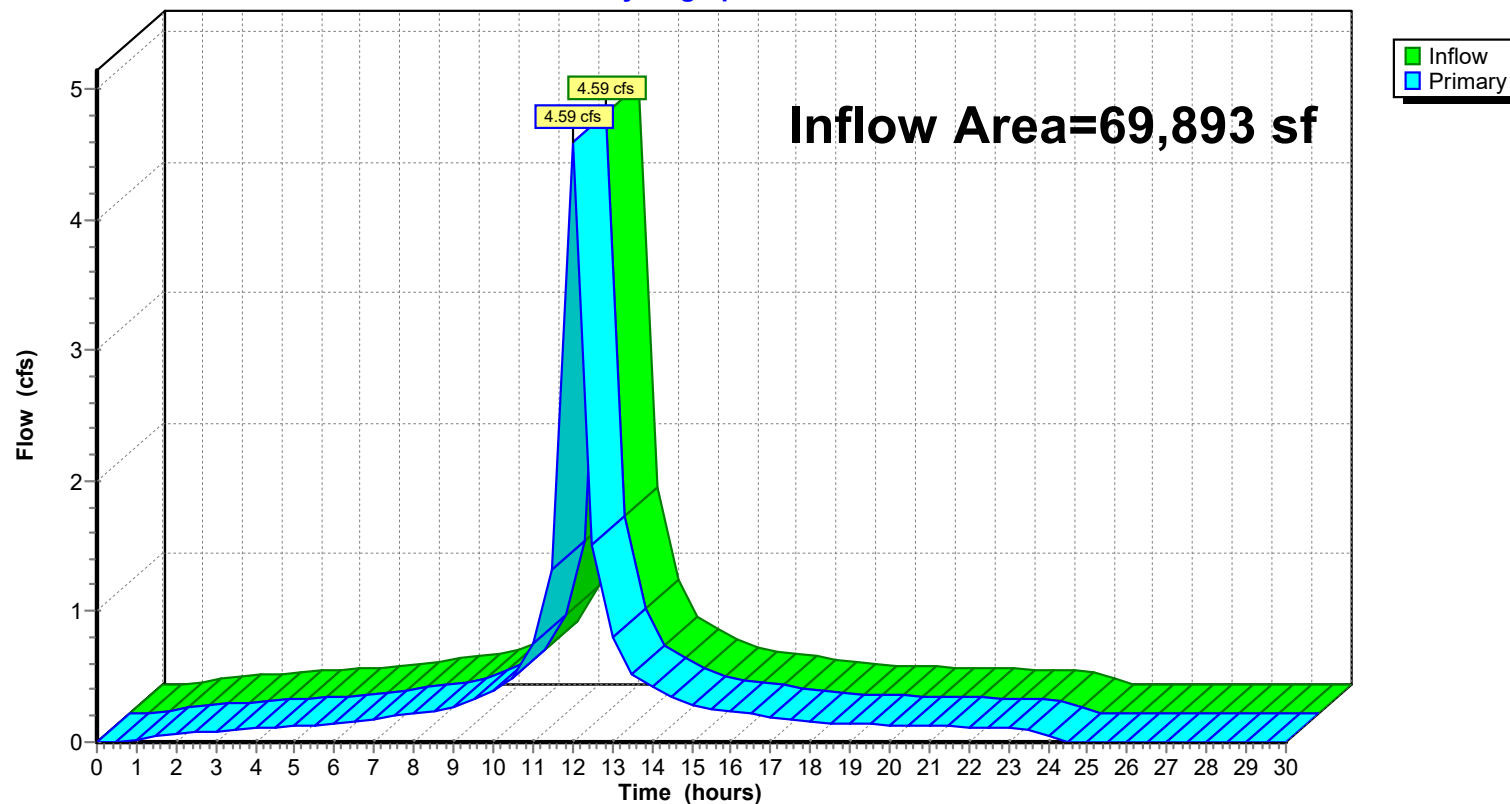
Hydrograph



**Summary for Link 8L: EXISTING DISTURBED**

Inflow Area = 69,893 sf, 100.00% Impervious, Inflow Depth = 5.14" for 10-Year-2020 event  
Inflow = 4.59 cfs @ 12.01 hrs, Volume= 29,953 cf  
Primary = 4.59 cfs @ 12.01 hrs, Volume= 29,953 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link E-DP 1 : EXIST DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

**Link 8L: EXISTING DISTURBED****Hydrograph**

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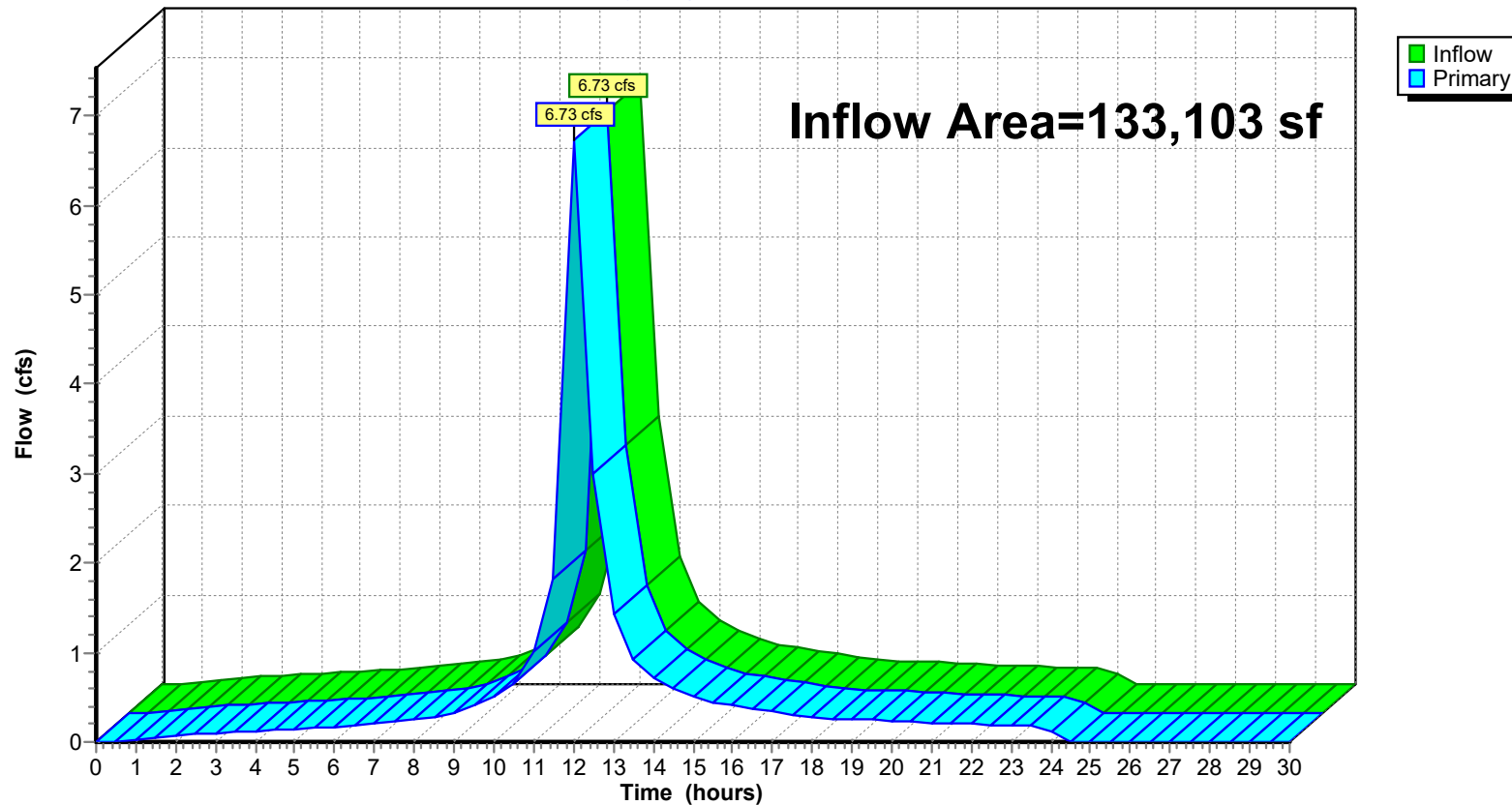
### Summary for Link 9L: TOTAL EXISTING

Inflow Area = 133,103 sf, 63.90% Impervious, Inflow Depth = 4.15" for 10-Year-2020 event  
Inflow = 6.73 cfs @ 12.03 hrs, Volume= 46,067 cf  
Primary = 6.73 cfs @ 12.03 hrs, Volume= 46,067 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 9L: TOTAL EXISTING

#### Hydrograph





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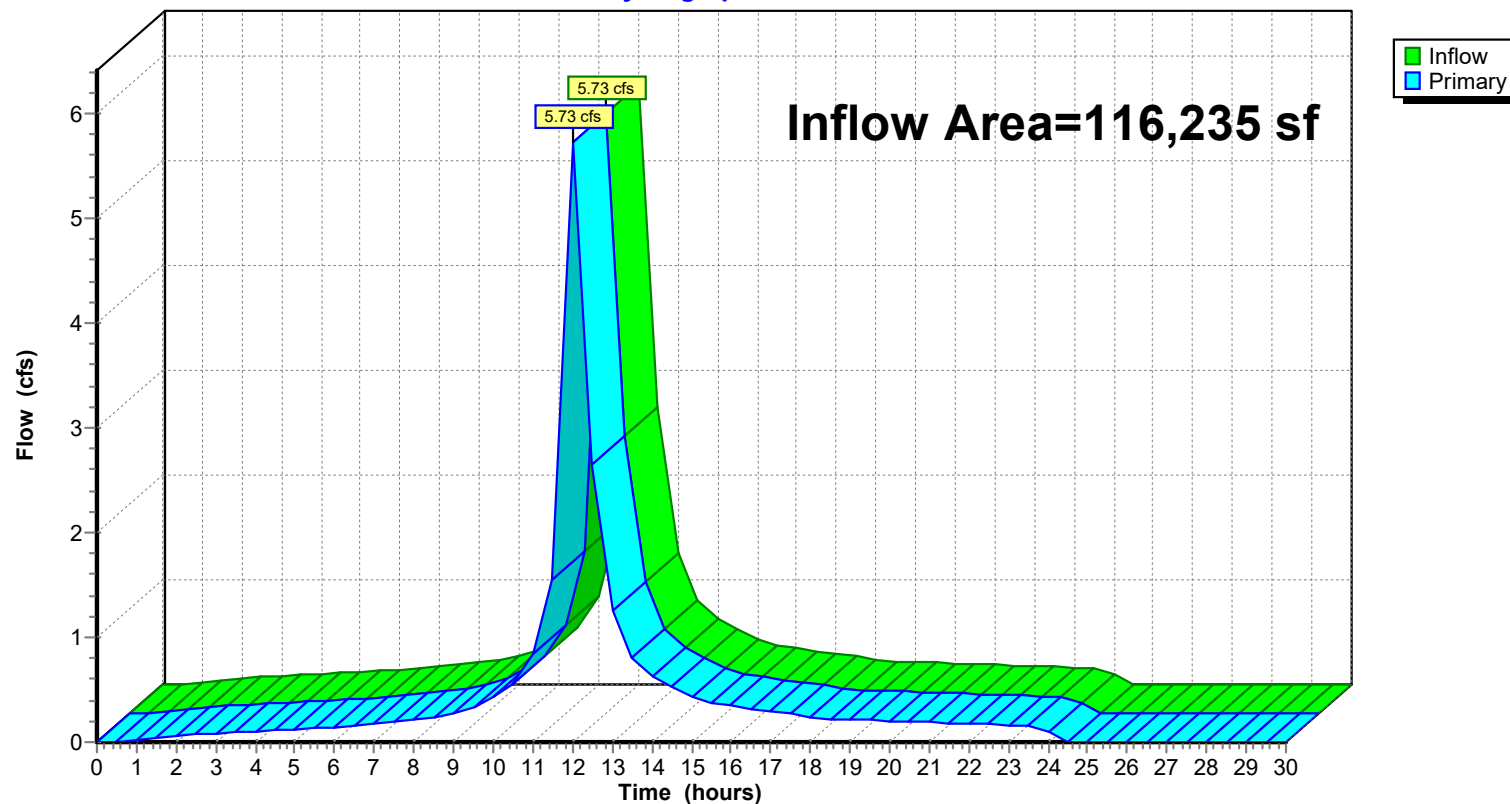
### Summary for Link E-DP 1: EXIST DP 1

Inflow Area = 116,235 sf, 61.79% Impervious, Inflow Depth = 4.09" for 10-Year-2020 event  
Inflow = 5.73 cfs @ 12.04 hrs, Volume= 39,586 cf  
Primary = 5.73 cfs @ 12.04 hrs, Volume= 39,586 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link E-DP 1: EXIST DP 1

#### Hydrograph



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NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

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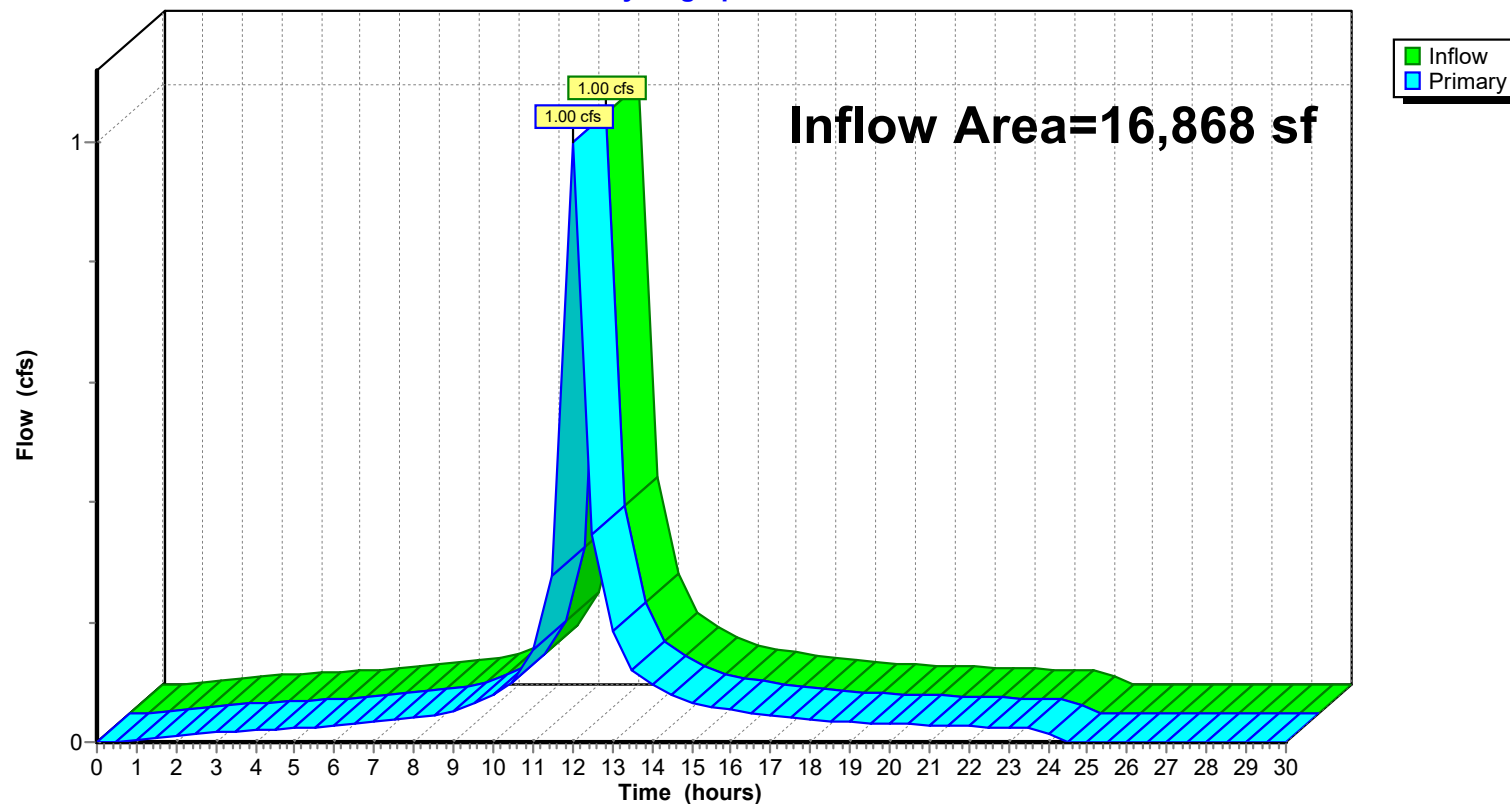
### Summary for Link E-DP 2: EXIST DP 2

Inflow Area = 16,868 sf, 78.47% Impervious, Inflow Depth = 4.61" for 10-Year-2020 event  
Inflow = 1.00 cfs @ 12.01 hrs, Volume= 6,481 cf  
Primary = 1.00 cfs @ 12.01 hrs, Volume= 6,481 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link E-DP 2: EXIST DP 2

#### Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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**Summary for Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

Runoff = 7.87 cfs @ 12.01 hrs, Volume= 52,068 cf, Depth= 8.94"  
 Routed to Link 8L : EXISTING DISTURBED

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

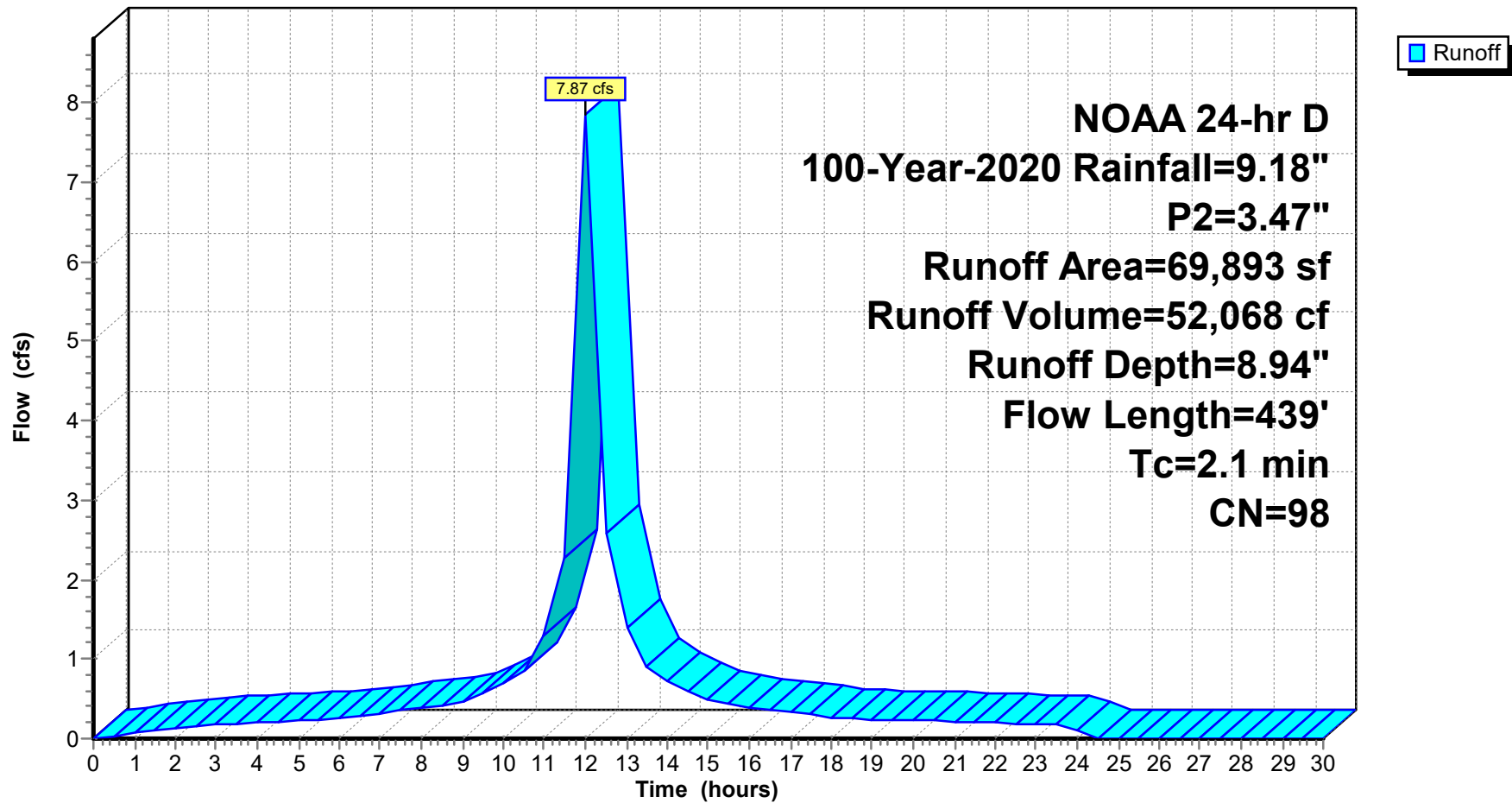
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 69,893    | 98 | Paved parking, HSG C    |
| 69,893    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 0.7      | 100           | 0.0650        | 2.30              |                | <b>Sheet Flow, Parking lot</b>                |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"            |
| 1.4      | 339           | 0.0420        | 4.16              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 2.1      | 439           | Total         |                   |                |                                               |

**Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

**Hydrograph**



**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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**Summary for Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed**

Runoff = 2.91 cfs @ 12.20 hrs, Volume= 22,181 cf, Depth= 5.74"  
 Routed to Link E-DP 1 : EXIST DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

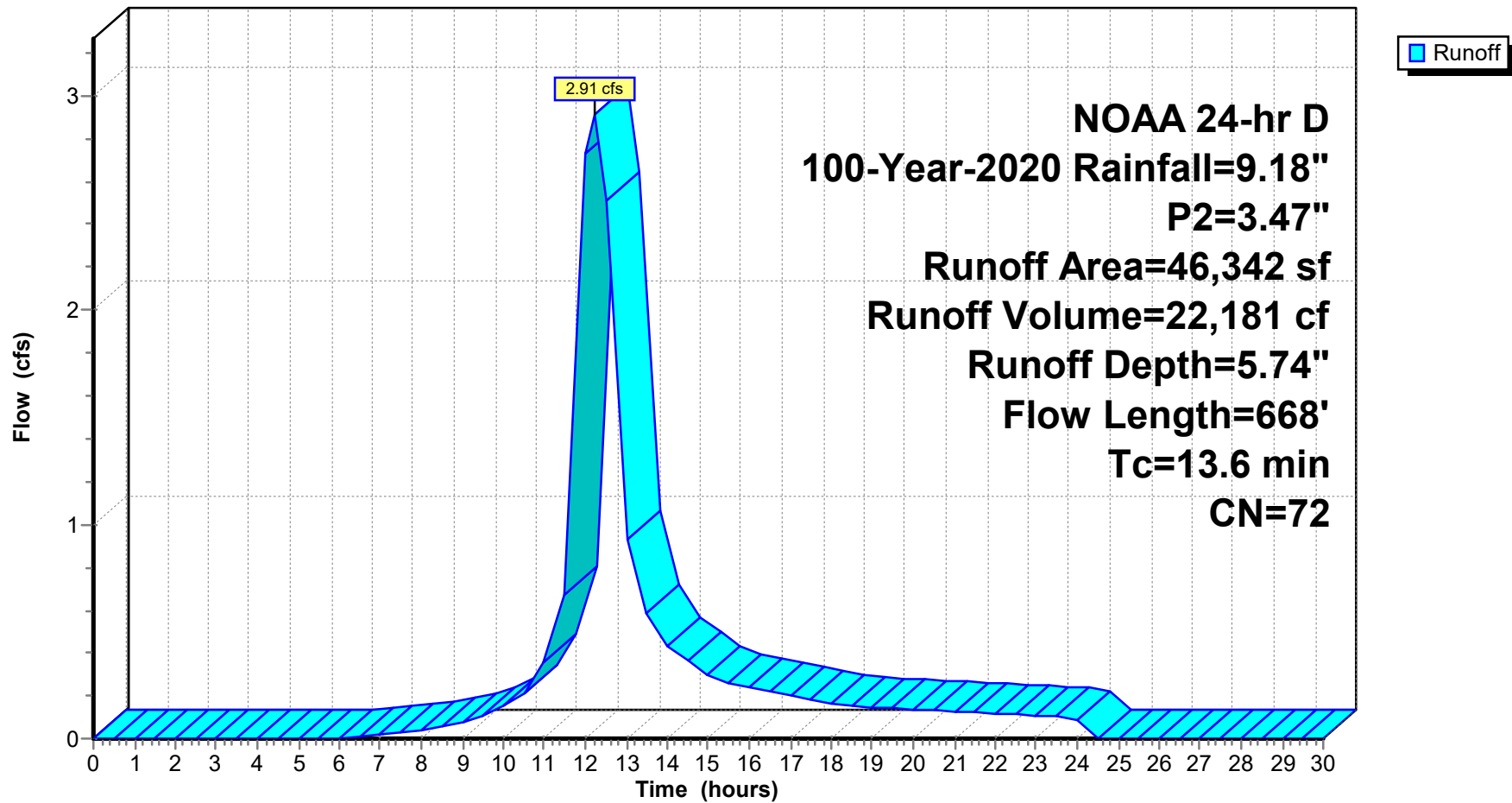
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,525  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,928   | 72 | Woods/grass comb., Good, HSG C |
| 46,342    | 72 | Weighted Average               |
| 44,414    |    | 95.84% Pervious Area           |
| 1,928     |    | 4.16% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 11.3     | 100           | 0.0900        | 0.15              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.47"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 13.6     | 668           | Total         |                   |                |                                               |

Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed

Hydrograph



**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

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**Summary for Subcatchment E2-IMP: E2A IMPERVIOUS**

Runoff = 1.35 cfs @ 12.01 hrs, Volume= 8,966 cf, Depth= 8.94"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

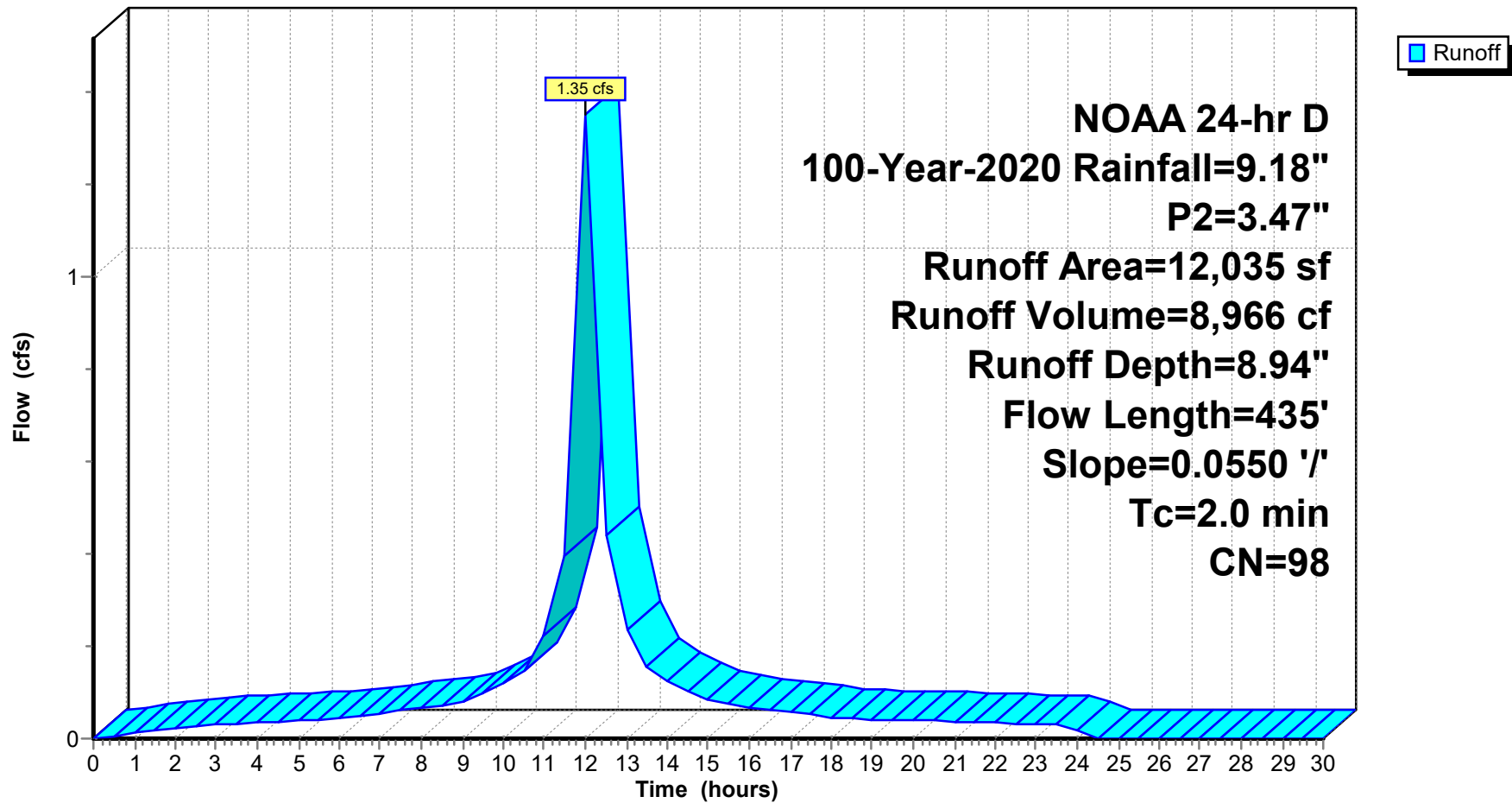
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 4,643     | 98 | Roofs, HSG C            |
| 7,392     | 98 | Paved parking, HSG C    |
| 12,035    | 98 | Weighted Average        |
| 12,035    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.8      | 100           | 0.0550        | 2.15              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 1.2      | 335           | 0.0550        | 4.76              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 2.0      | 435           | Total         |                   |                |                                                      |

Subcatchment E2-IMP: E2A IMPERVIOUS

Hydrograph





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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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**Summary for Subcatchment E2-P: E2A PERVIOUS**

Runoff = 0.17 cfs @ 12.04 hrs, Volume= 1,048 cf, Depth= 5.99"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

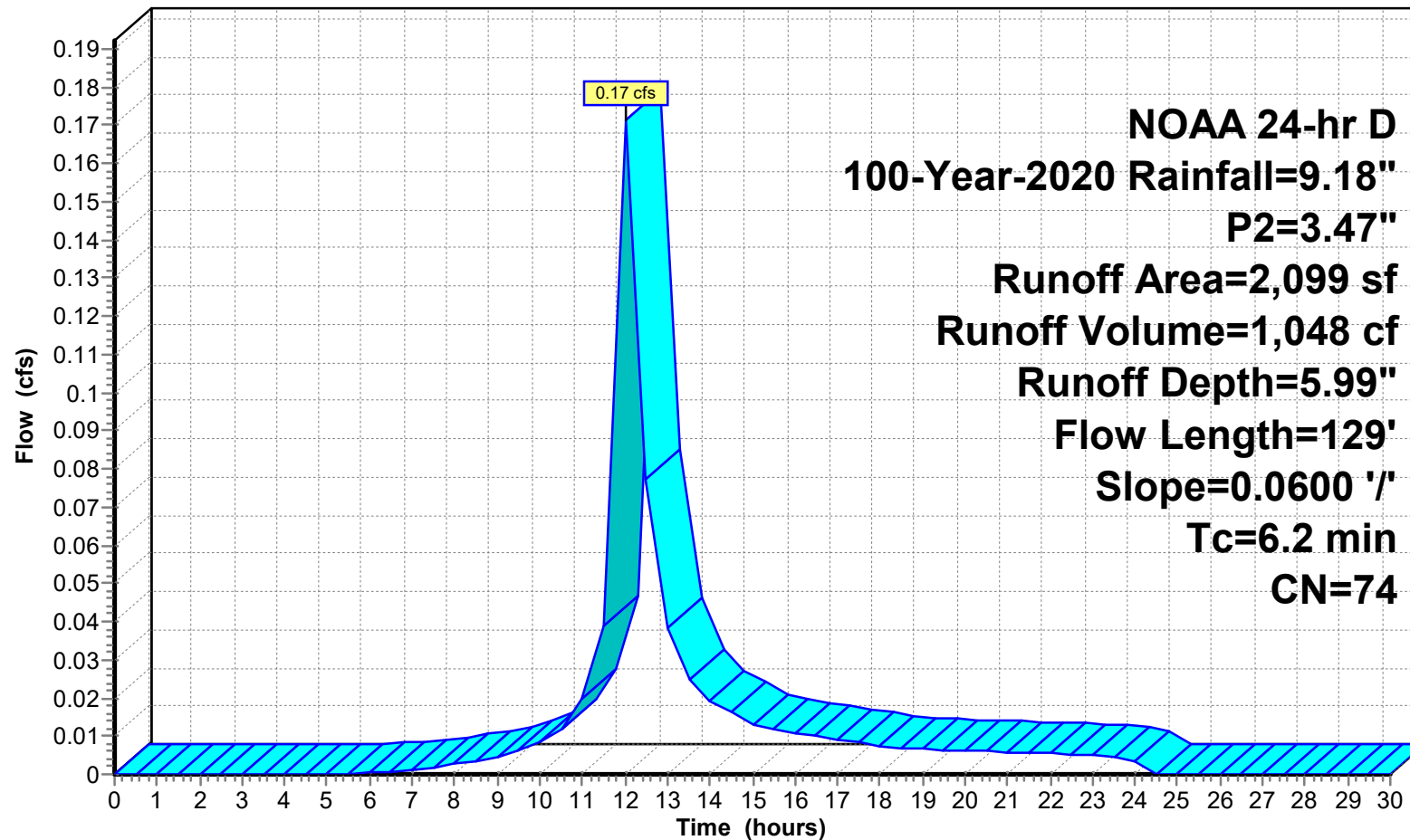
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,099     | 74 | >75% Grass cover, Good, HSG C |
| 2,099     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 6.1      | 100           | 0.0600        | 0.27              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.1      | 29            | 0.0600        | 3.94              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 6.2      | 129           | Total         |                   |                |                                        |

Subcatchment E2-P: E2A PERVIOUS

Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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**Summary for Subcatchment E2B-IMP: E2B IMPERVIOUS**

Runoff = 0.14 cfs @ 12.00 hrs, Volume= 895 cf, Depth= 8.94"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

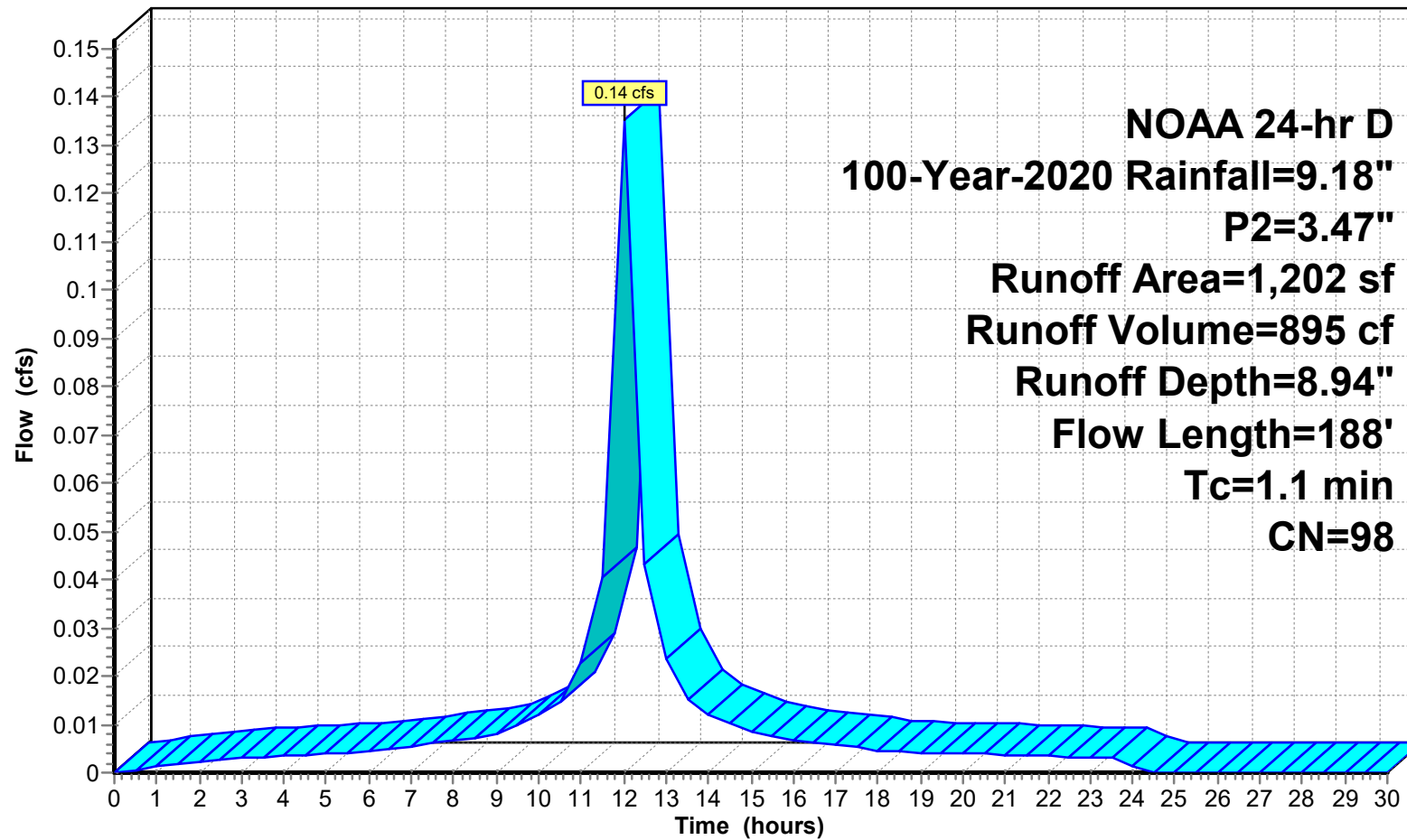
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 1,202     | 98 | Paved parking, HSG C    |
| 1,202     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.61              |                | <b>Sheet Flow, sidewalk</b><br>Smooth surfaces n= 0.011 P2= 3.47"          |
| 0.5      | 88            | 0.0250        | 3.21              |                | <b>Shallow Concentrated Flow, shadow concentrate</b><br>Paved Kv= 20.3 fps |
| 1.1      | 188           | Total         |                   |                |                                                                            |

Subcatchment E2B-IMP: E2B IMPERVIOUS

Hydrograph



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**Summary for Subcatchment E2B-P: E2B PERVIOUS**

Runoff = 0.13 cfs @ 12.04 hrs, Volume= 765 cf, Depth= 5.99"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

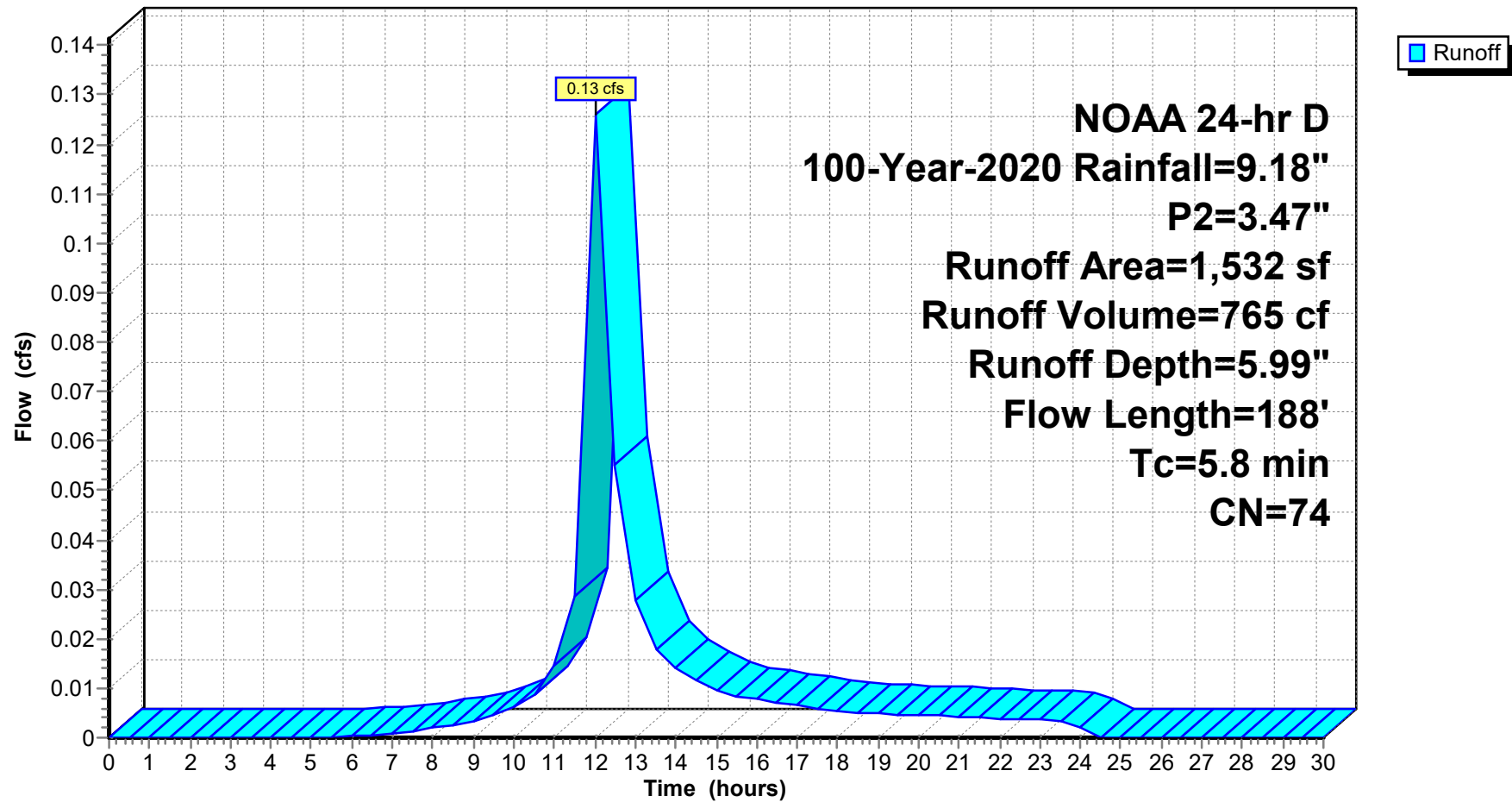
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,532     | 74 | >75% Grass cover, Good, HSG C |
| 1,532     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.2      | 100           | 0.0900        | 0.32              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.6      | 88            | 0.0250        | 2.55              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.8      | 188           | Total         |                   |                |                                        |

Subcatchment E2B-P: E2B PERVIOUS

Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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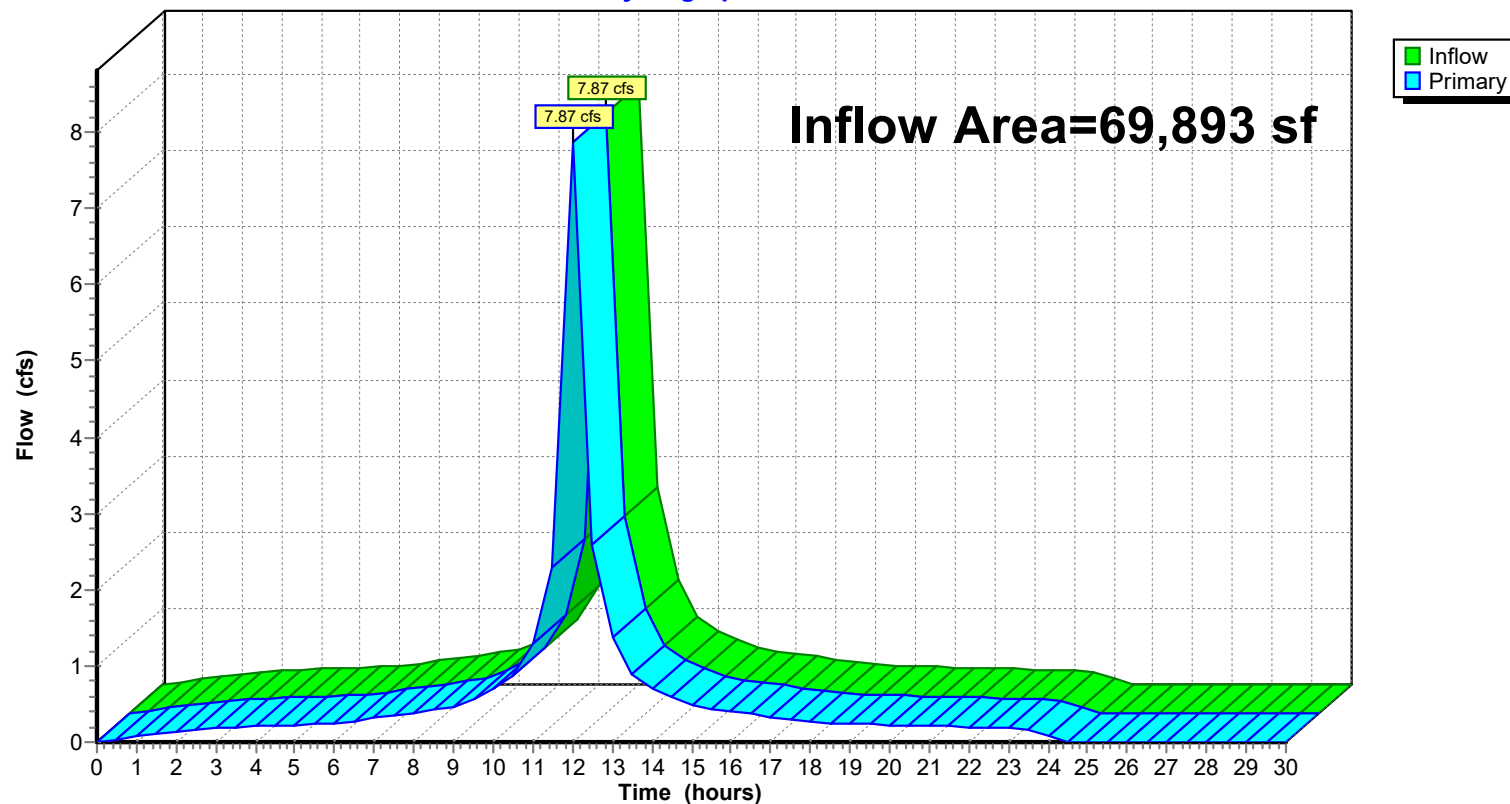
### Summary for Link 8L: EXISTING DISTURBED

Inflow Area = 69,893 sf, 100.00% Impervious, Inflow Depth = 8.94" for 100-Year-2020 event  
Inflow = 7.87 cfs @ 12.01 hrs, Volume= 52,068 cf  
Primary = 7.87 cfs @ 12.01 hrs, Volume= 52,068 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link E-DP 1 : EXIST DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 8L: EXISTING DISTURBED

#### Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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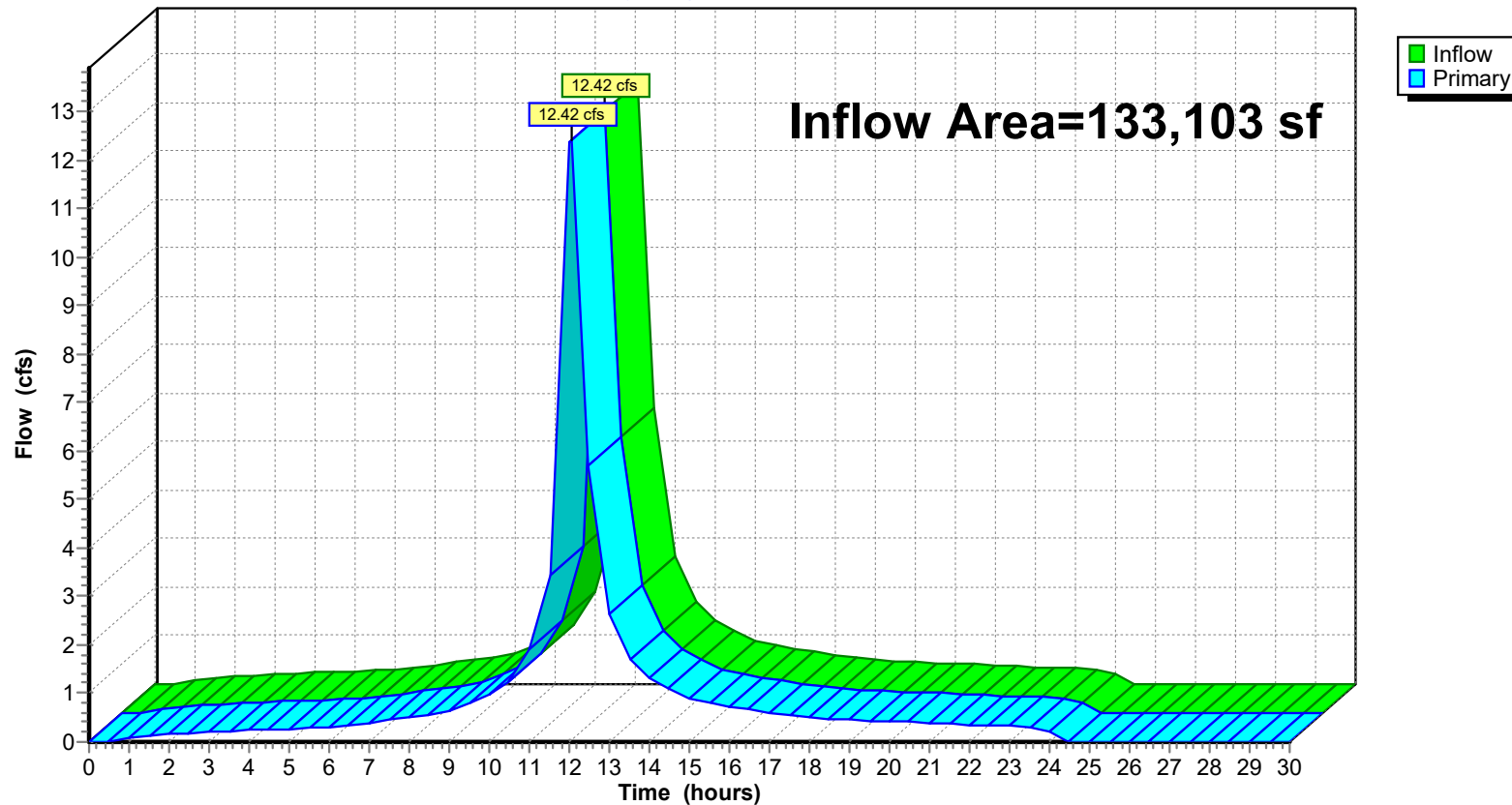
### Summary for Link 9L: TOTAL EXISTING

Inflow Area = 133,103 sf, 63.90% Impervious, Inflow Depth = 7.75" for 100-Year-2020 event  
Inflow = 12.42 cfs @ 12.04 hrs, Volume= 85,924 cf  
Primary = 12.42 cfs @ 12.04 hrs, Volume= 85,924 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 9L: TOTAL EXISTING

#### Hydrograph





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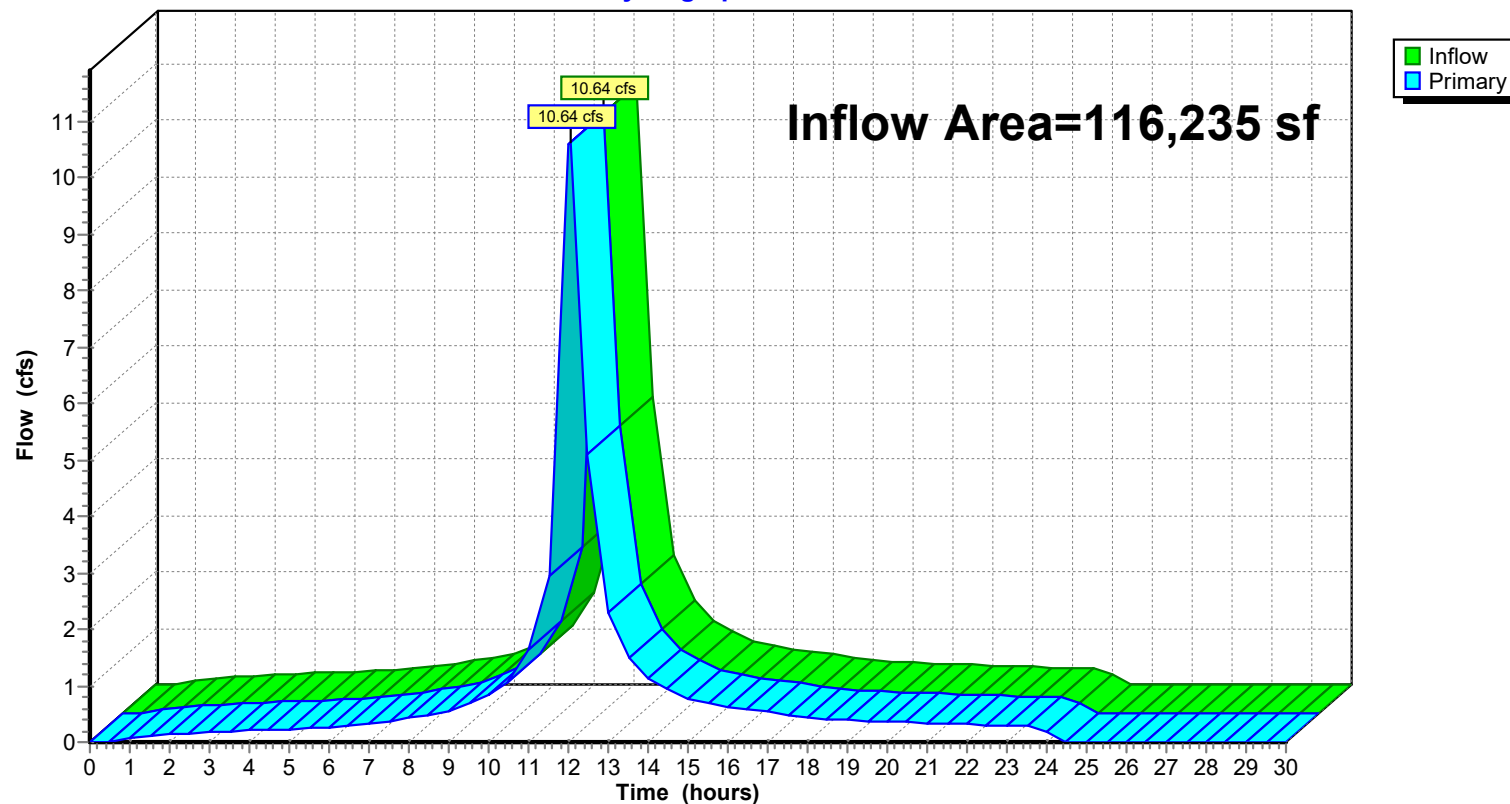
### Summary for Link E-DP 1: EXIST DP 1

Inflow Area = 116,235 sf, 61.79% Impervious, Inflow Depth = 7.67" for 100-Year-2020 event  
Inflow = 10.64 cfs @ 12.04 hrs, Volume= 74,249 cf  
Primary = 10.64 cfs @ 12.04 hrs, Volume= 74,249 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link E-DP 1: EXIST DP 1

#### Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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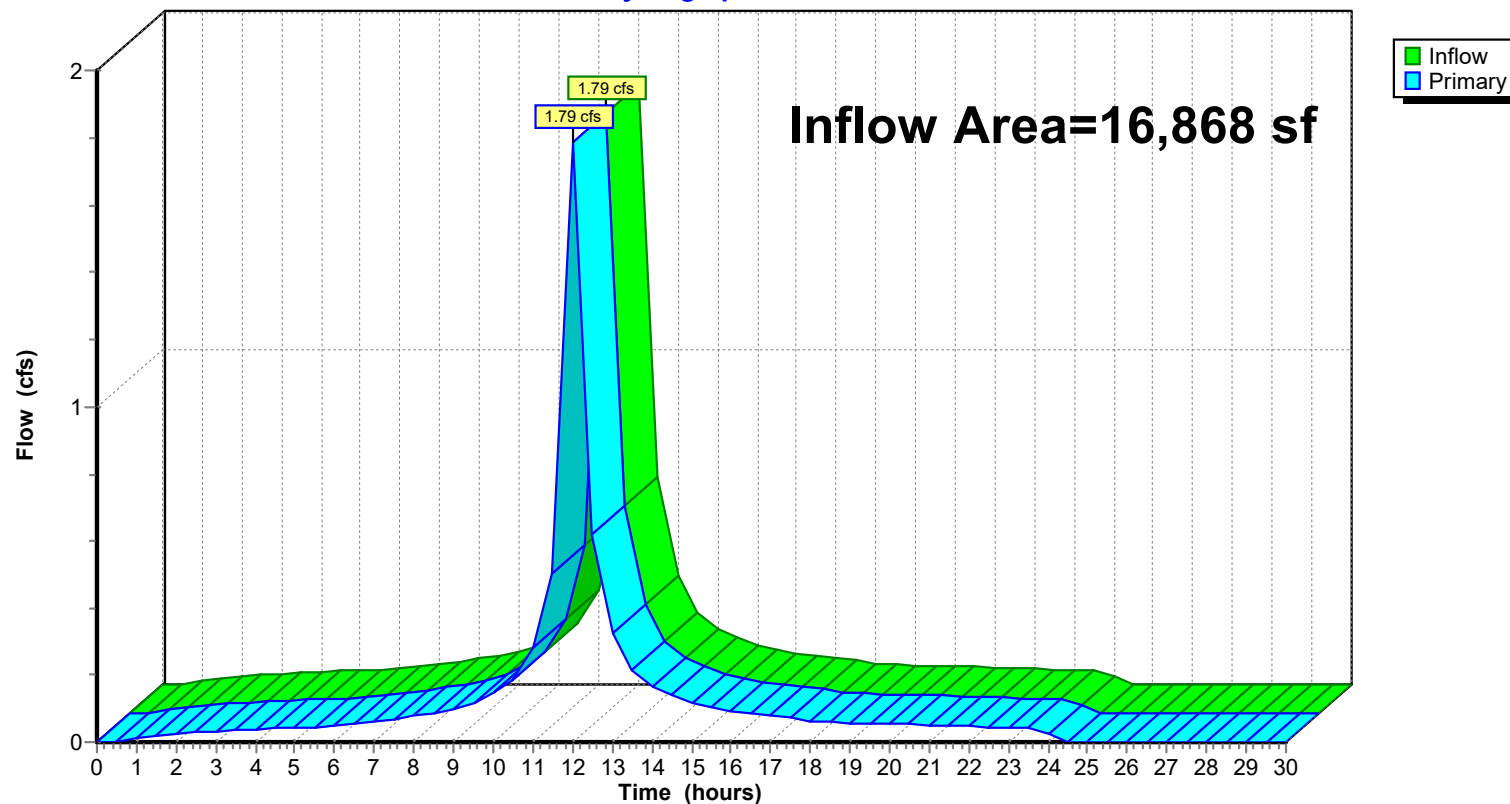
### Summary for Link E-DP 2: EXIST DP 2

Inflow Area = 16,868 sf, 78.47% Impervious, Inflow Depth = 8.31" for 100-Year-2020 event  
Inflow = 1.79 cfs @ 12.01 hrs, Volume= 11,675 cf  
Primary = 1.79 cfs @ 12.01 hrs, Volume= 11,675 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link E-DP 2: EXIST DP 2

#### Hydrograph



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NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

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**Summary for Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

Runoff = 3.48 cfs @ 12.01 hrs, Volume= 22,453 cf, Depth= 3.85"  
 Routed to Link 8L : EXISTING DISTURBED

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

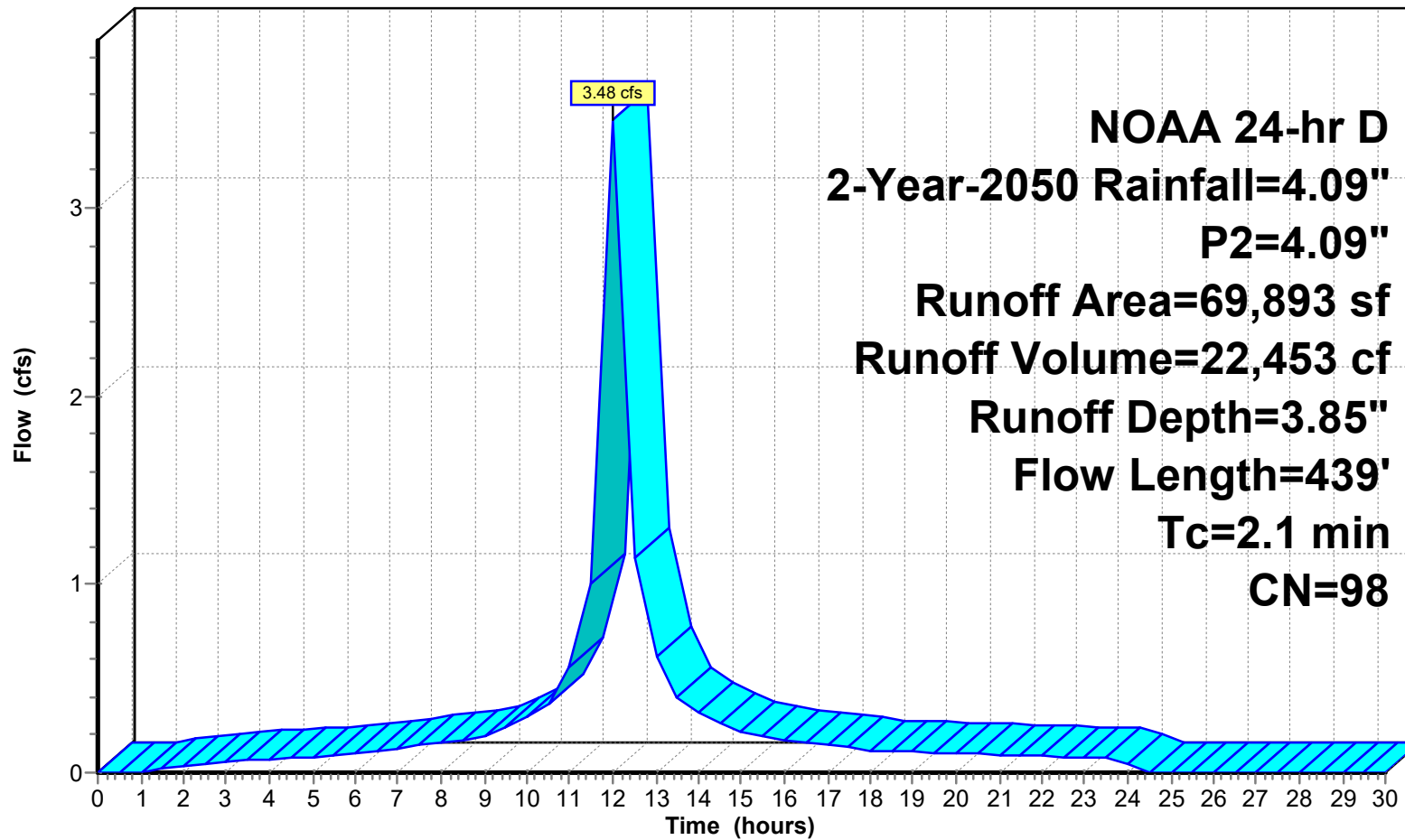
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 69,893    | 98 | Paved parking, HSG C    |
| 69,893    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 0.7      | 100           | 0.0650        | 2.49              |                | <b>Sheet Flow, Parking lot</b>                |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"            |
| 1.4      | 339           | 0.0420        | 4.16              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 2.1      | 439           | Total         |                   |                |                                               |

**Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

**Hydrograph**



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**Summary for Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed**

Runoff = 0.73 cfs @ 12.27 hrs, Volume= 5,883 cf, Depth= 1.52"  
 Routed to Link E-DP 1 : EXIST DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

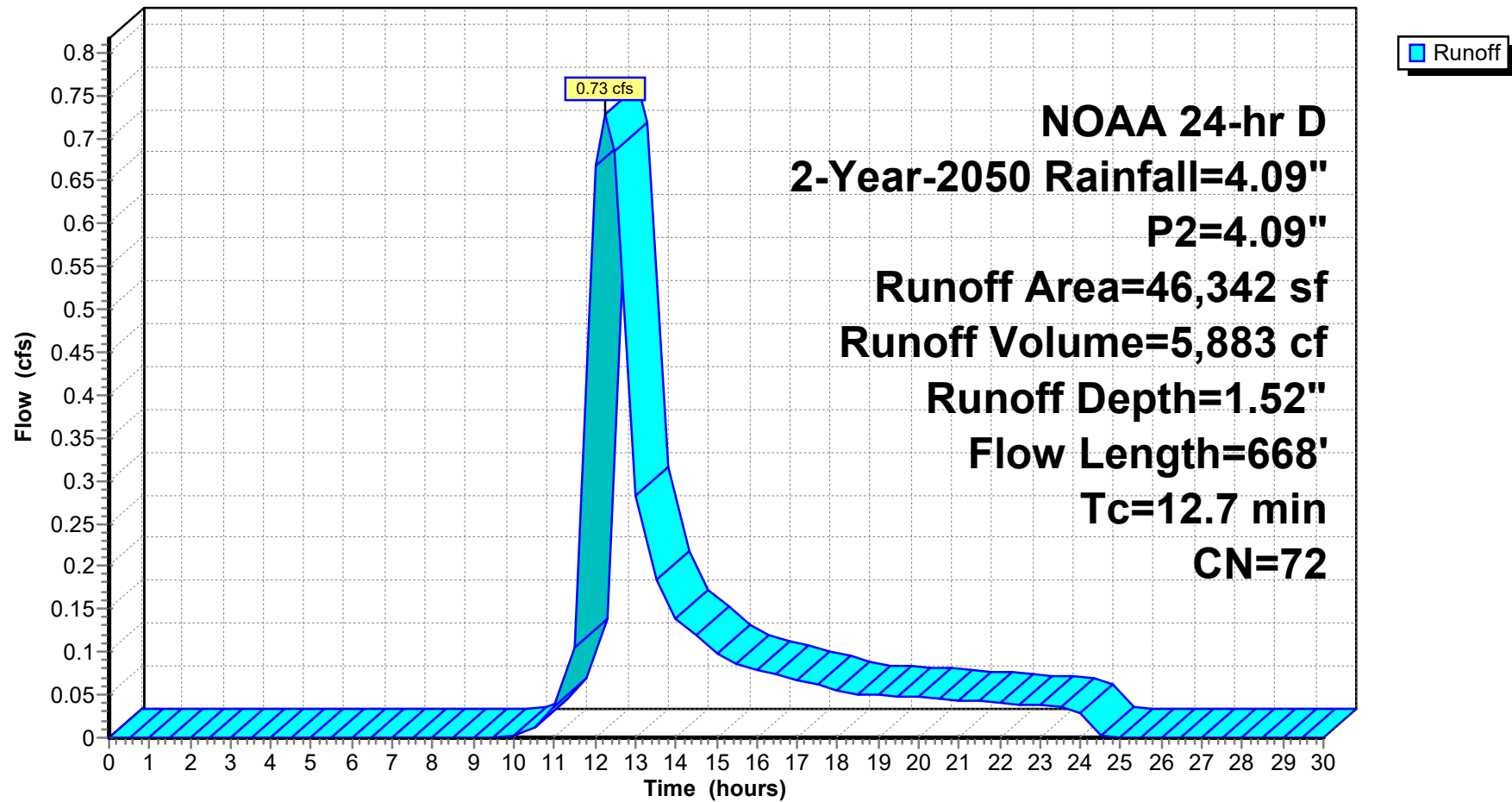
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,525  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,928   | 72 | Woods/grass comb., Good, HSG C |
| 46,342    | 72 | Weighted Average               |
| 44,414    |    | 95.84% Pervious Area           |
| 1,928     |    | 4.16% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 10.4     | 100           | 0.0900        | 0.16              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 4.09"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 12.7     | 668           | Total         |                   |                |                                               |

Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed

Hydrograph



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**Summary for Subcatchment E2-IMP: E2A IMPERVIOUS**

Runoff = 0.60 cfs @ 12.01 hrs, Volume= 3,866 cf, Depth= 3.85"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

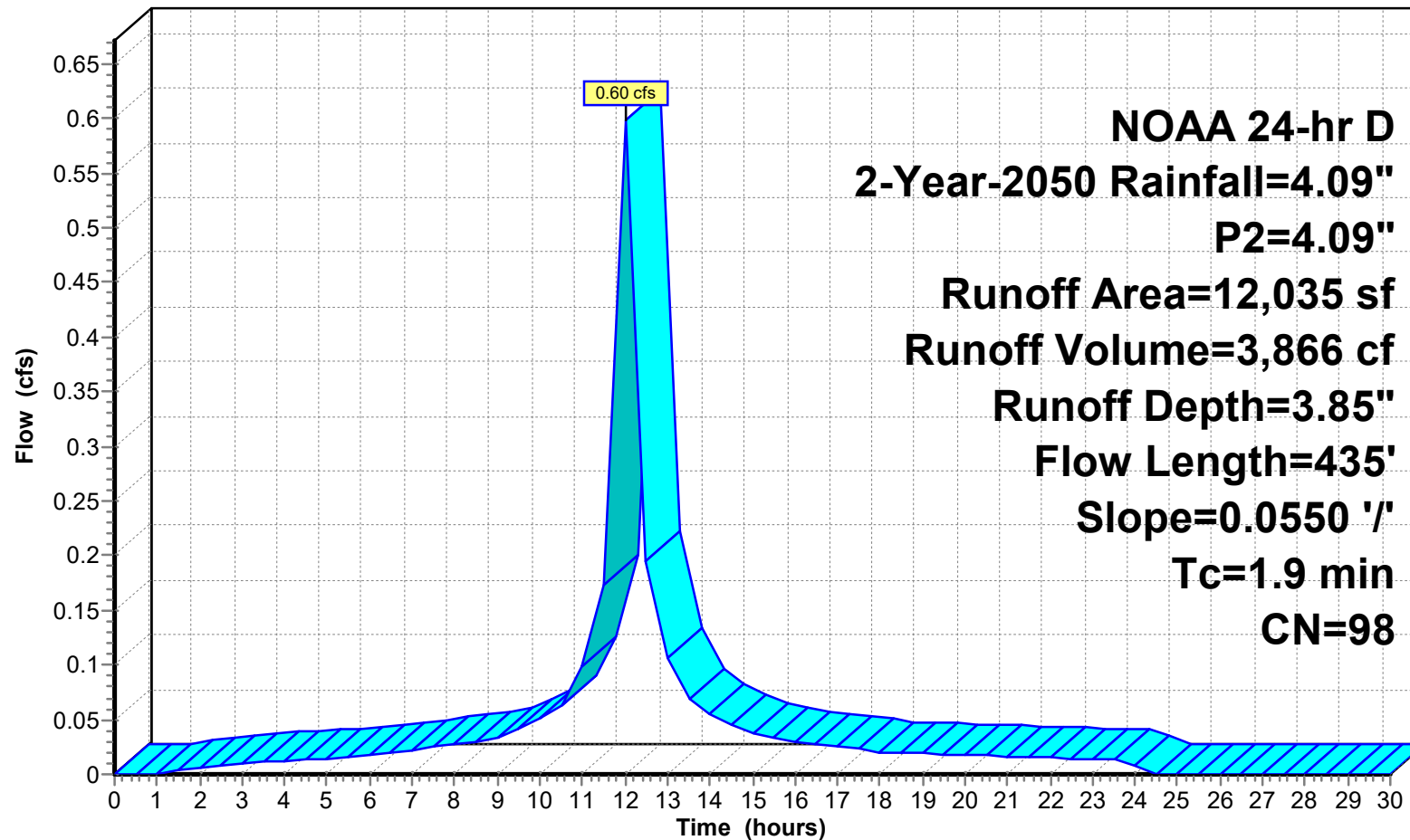
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 4,643     | 98 | Roofs, HSG C            |
| 7,392     | 98 | Paved parking, HSG C    |
| 12,035    | 98 | Weighted Average        |
| 12,035    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.7      | 100           | 0.0550        | 2.33              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 1.2      | 335           | 0.0550        | 4.76              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.9      | 435           | Total         |                   |                |                                                      |

Subcatchment E2-IMP: E2A IMPERVIOUS

Hydrograph





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**Summary for Subcatchment E2-P: E2A PERVIOUS**

Runoff = 0.05 cfs @ 12.07 hrs, Volume= 291 cf, Depth= 1.66"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

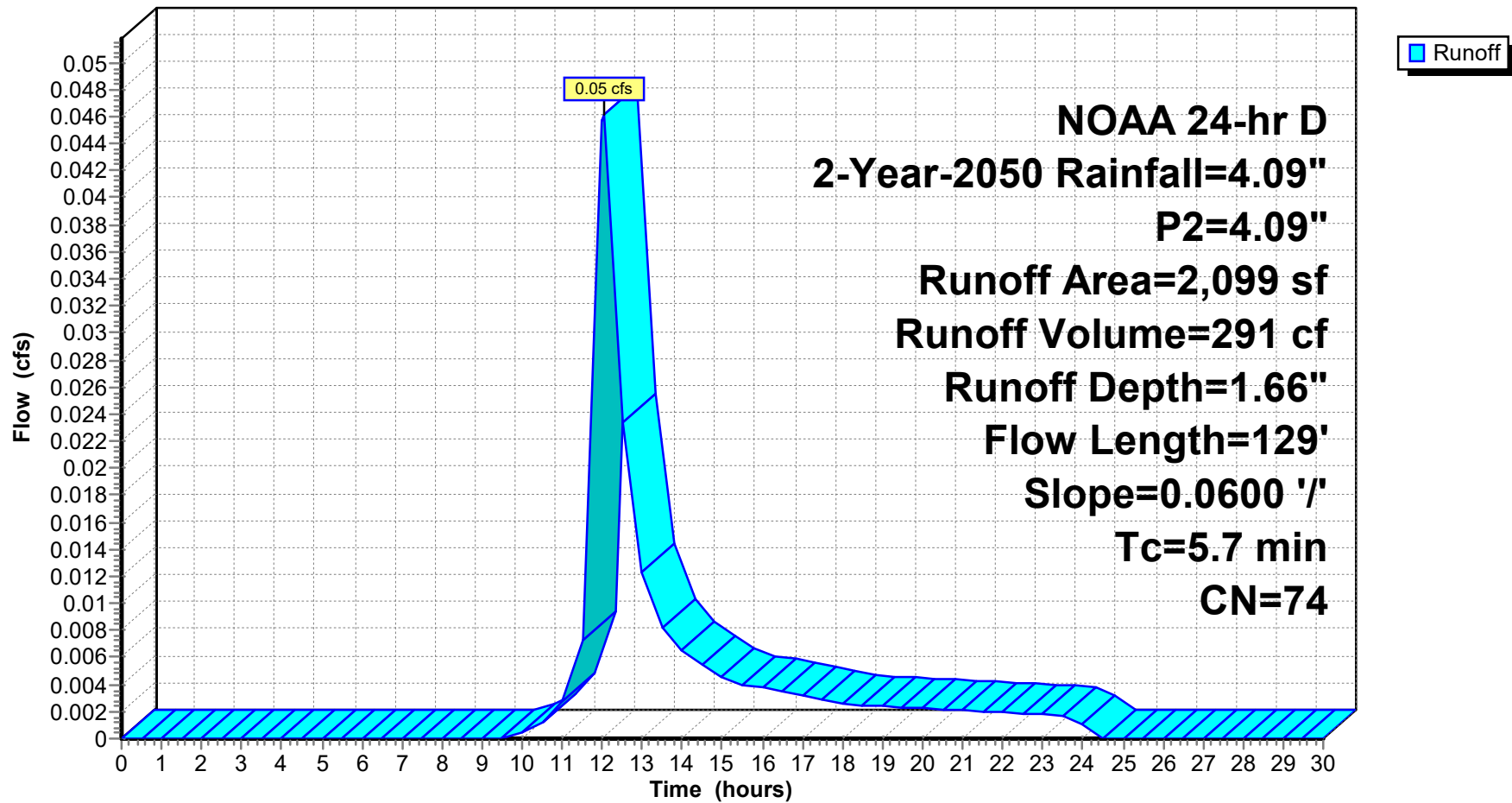
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,099     | 74 | >75% Grass cover, Good, HSG C |
| 2,099     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.6      | 100           | 0.0600        | 0.30              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.1      | 29            | 0.0600        | 3.94              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.7      | 129           | Total         |                   |                |                                        |

Subcatchment E2-P: E2A PERVIOUS

Hydrograph



**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

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NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

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**Summary for Subcatchment E2B-IMP: E2B IMPERVIOUS**

Runoff = 0.06 cfs @ 12.00 hrs, Volume= 386 cf, Depth= 3.85"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

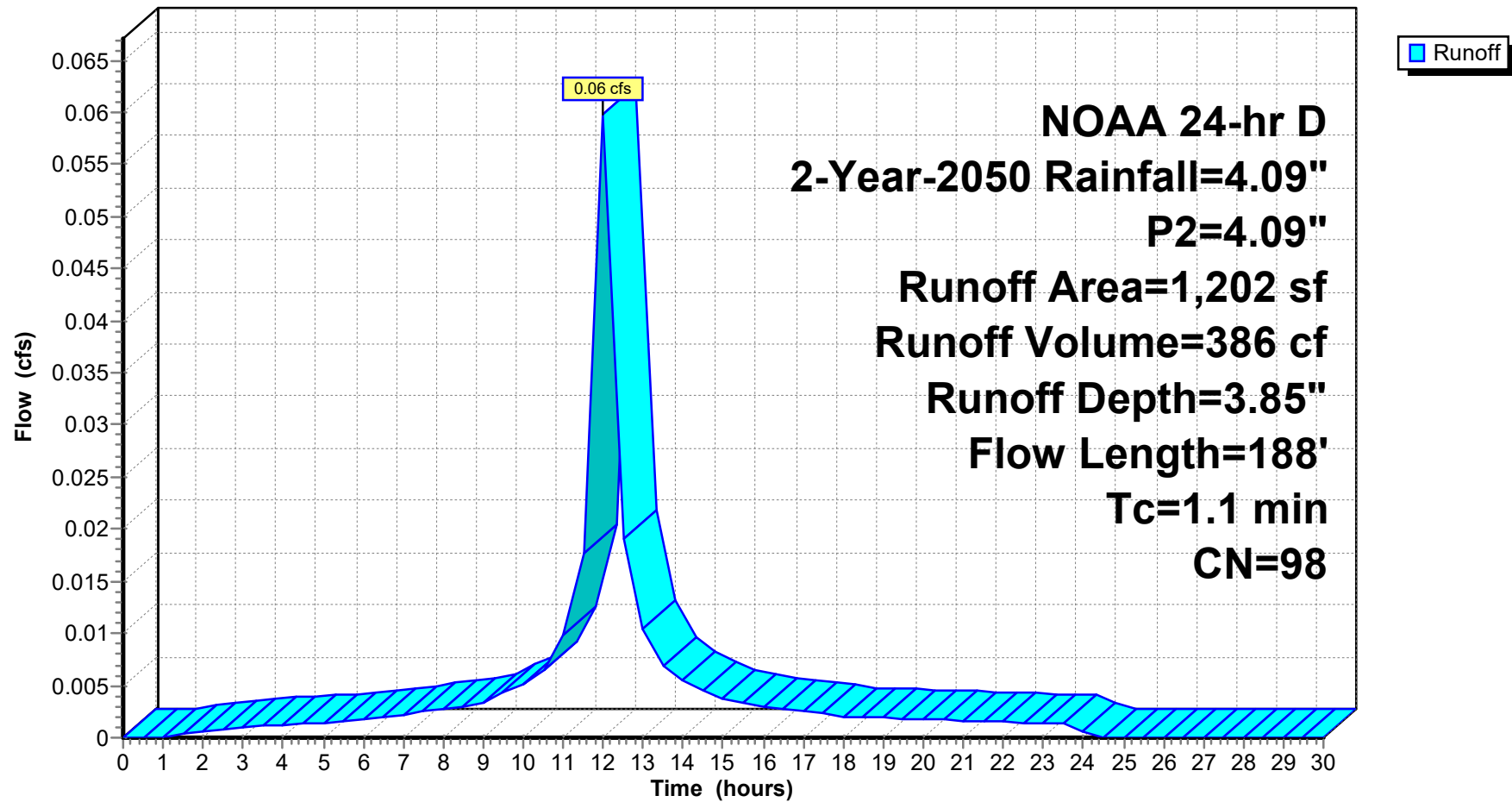
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 1,202     | 98 | Paved parking, HSG C    |
| 1,202     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.84              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 0.5      | 88            | 0.0250        | 3.21              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment E2B-IMP: E2B IMPERVIOUS

Hydrograph



**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

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NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

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**Summary for Subcatchment E2B-P: E2B PERVIOUS**

Runoff = 0.03 cfs @ 12.06 hrs, Volume= 212 cf, Depth= 1.66"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

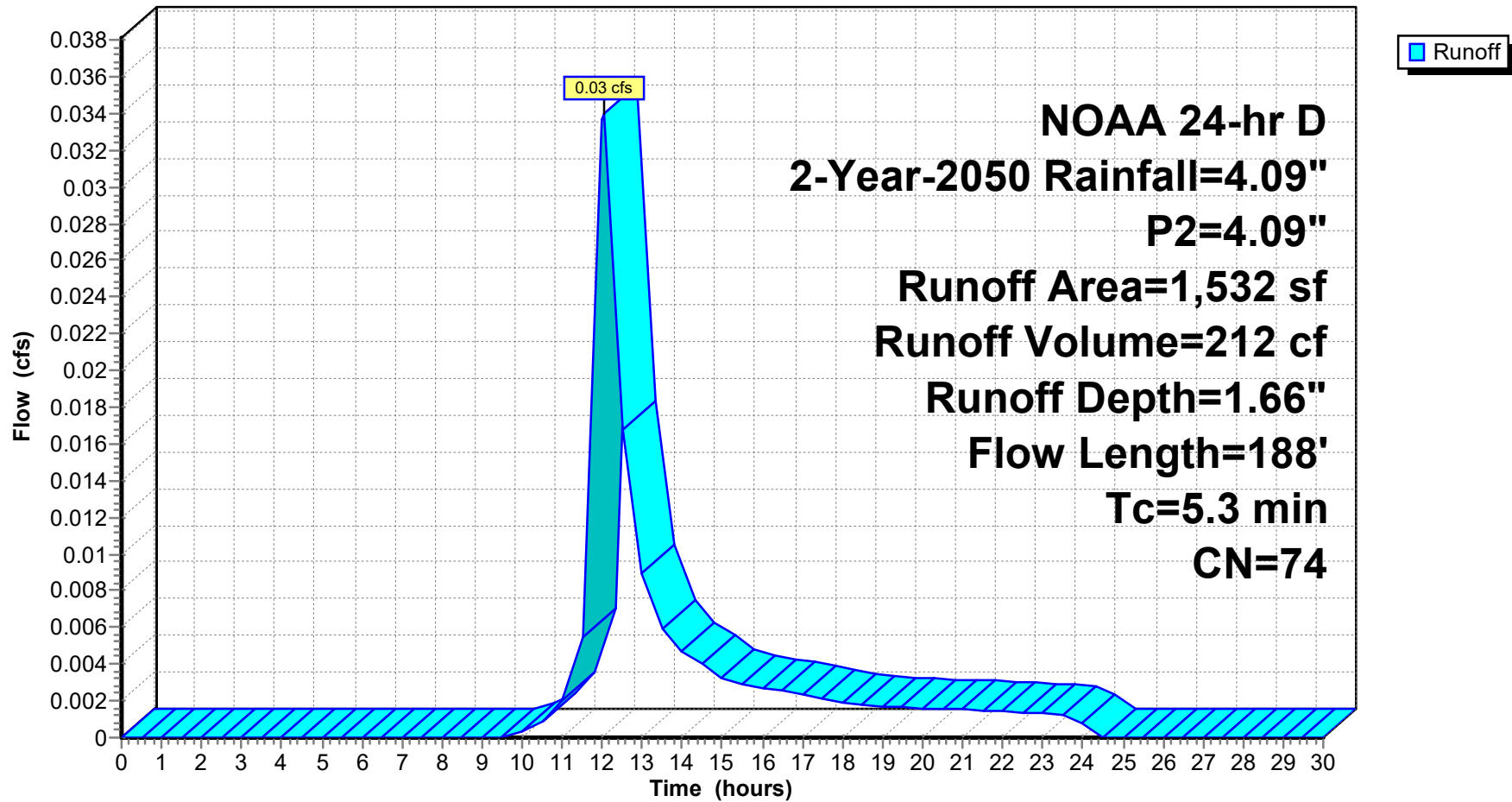
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,532     | 74 | >75% Grass cover, Good, HSG C |
| 1,532     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 4.7      | 100           | 0.0900        | 0.35              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.6      | 88            | 0.0250        | 2.55              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.3      | 188           | Total         |                   |                |                                        |

Subcatchment E2B-P: E2B PERVIOUS

Hydrograph



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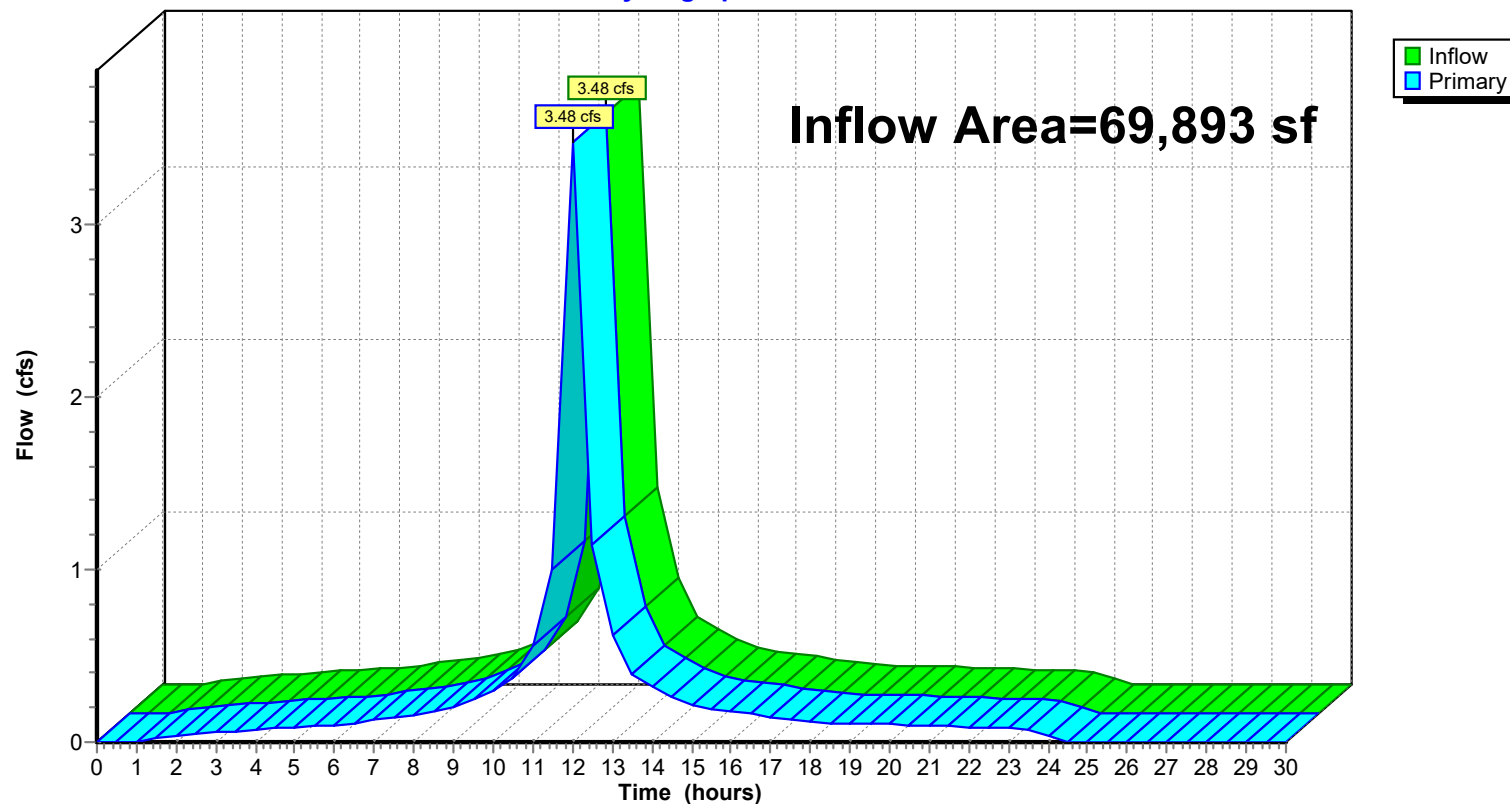
### Summary for Link 8L: EXISTING DISTURBED

Inflow Area = 69,893 sf, 100.00% Impervious, Inflow Depth = 3.85" for 2-Year-2050 event  
Inflow = 3.48 cfs @ 12.01 hrs, Volume= 22,453 cf  
Primary = 3.48 cfs @ 12.01 hrs, Volume= 22,453 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link E-DP 1 : EXIST DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 8L: EXISTING DISTURBED

#### Hydrograph



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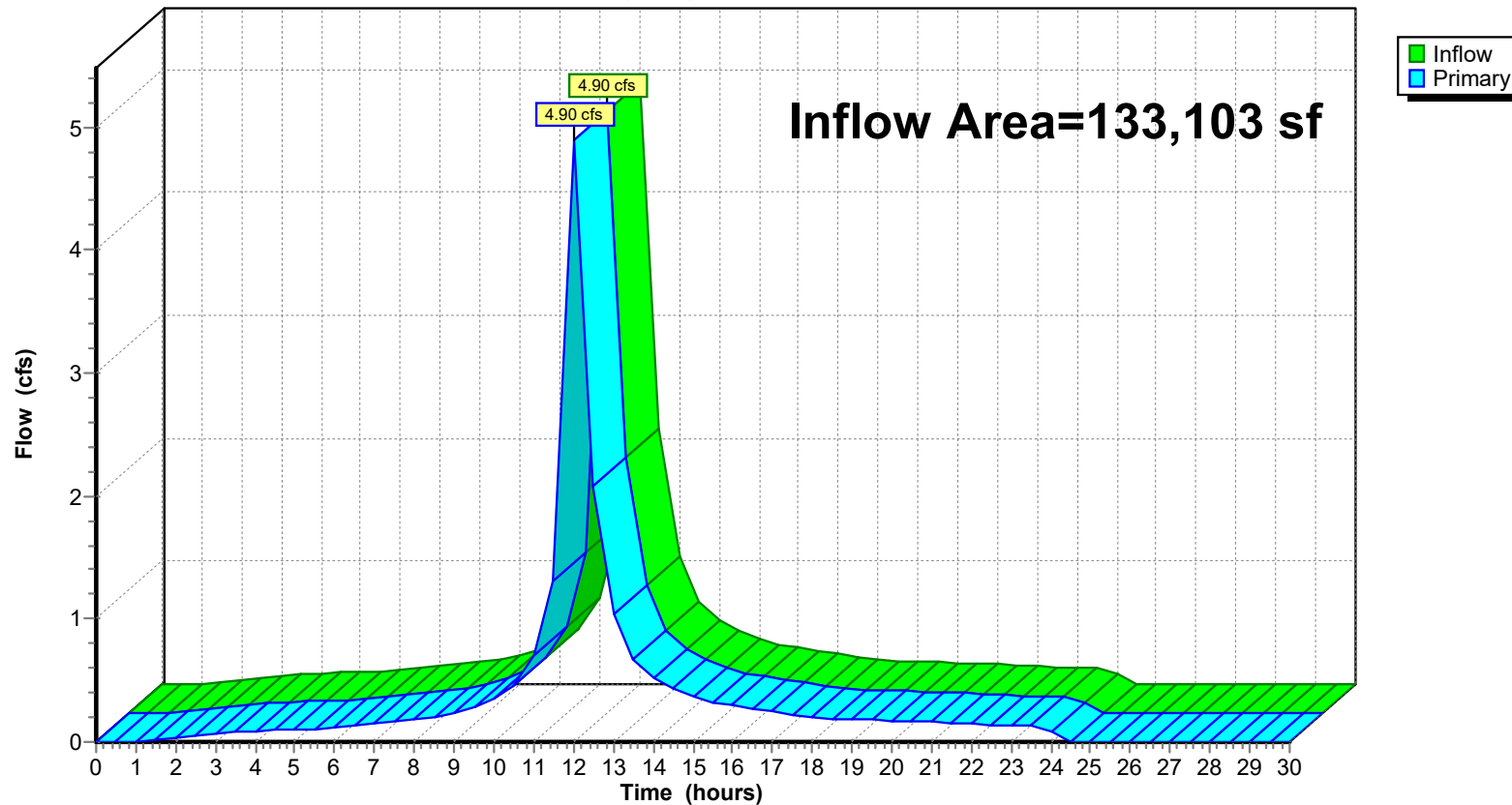
### Summary for Link 9L: TOTAL EXISTING

Inflow Area = 133,103 sf, 63.90% Impervious, Inflow Depth = 2.98" for 2-Year-2050 event  
Inflow = 4.90 cfs @ 12.03 hrs, Volume= 33,091 cf  
Primary = 4.90 cfs @ 12.03 hrs, Volume= 33,091 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 9L: TOTAL EXISTING

#### Hydrograph





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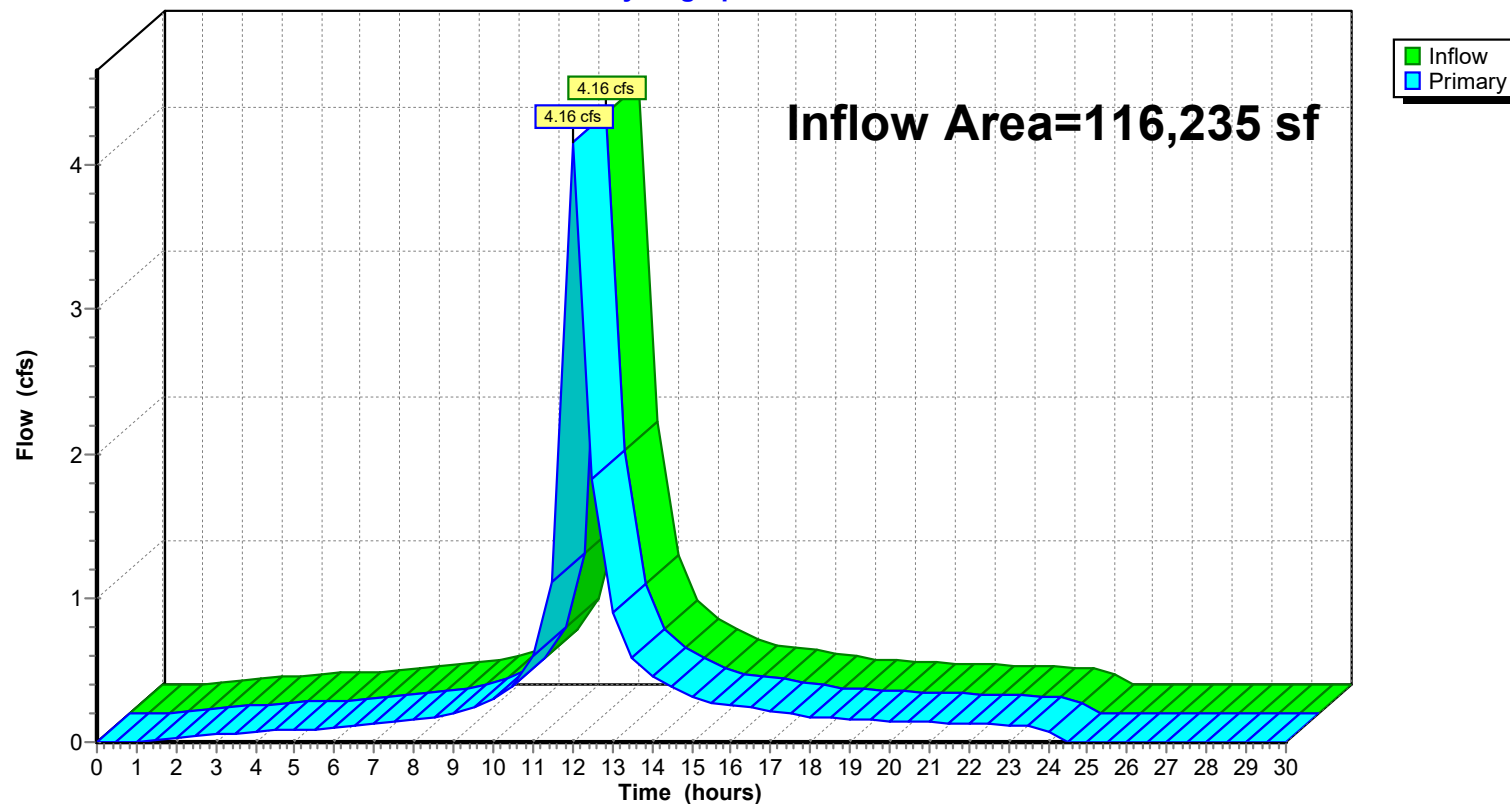
### Summary for Link E-DP 1: EXIST DP 1

Inflow Area = 116,235 sf, 61.79% Impervious, Inflow Depth = 2.93" for 2-Year-2050 event  
Inflow = 4.16 cfs @ 12.03 hrs, Volume= 28,336 cf  
Primary = 4.16 cfs @ 12.03 hrs, Volume= 28,336 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link E-DP 1: EXIST DP 1

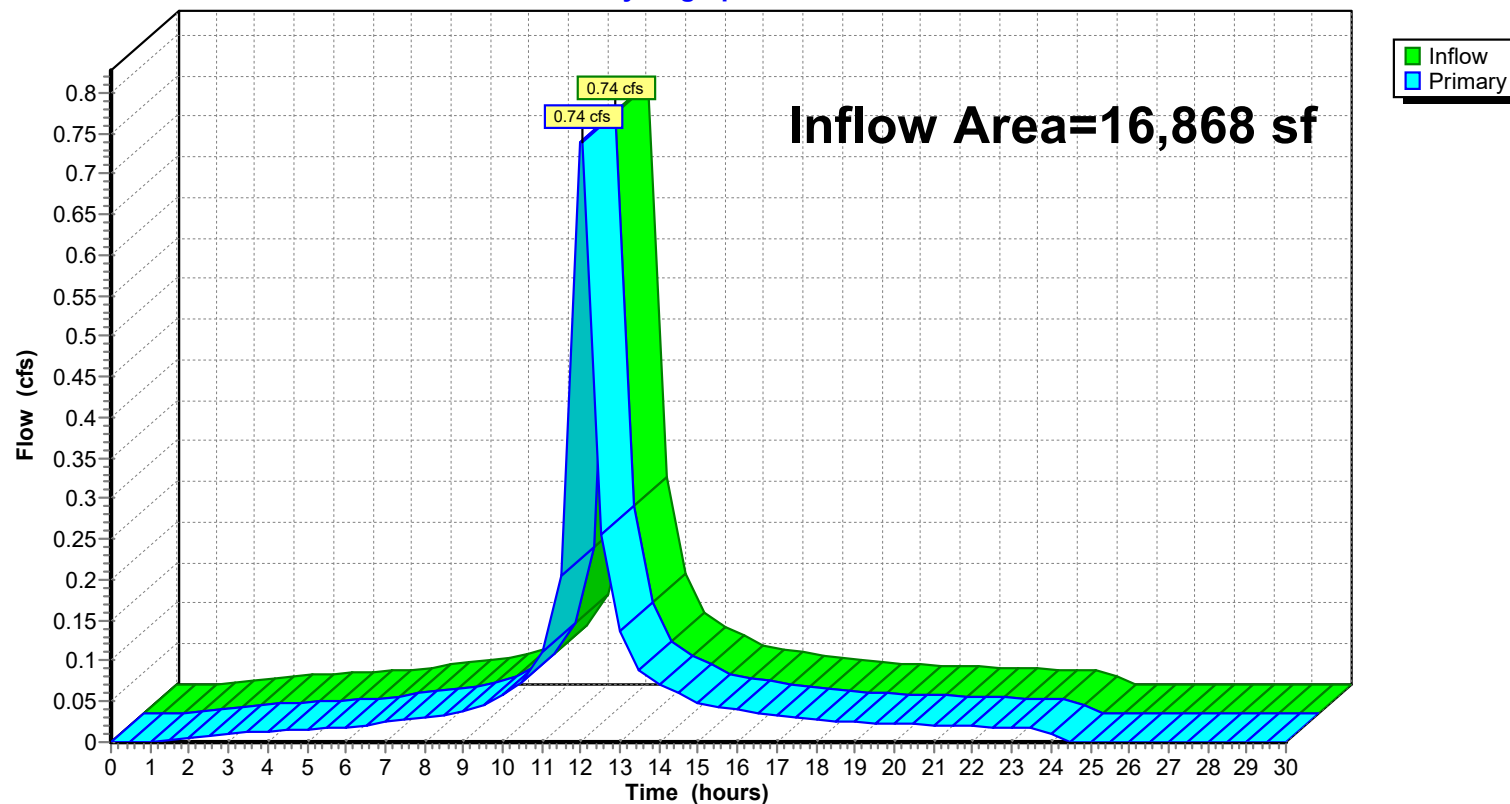
#### Hydrograph



**Summary for Link E-DP 2: EXIST DP 2**

Inflow Area = 16,868 sf, 78.47% Impervious, Inflow Depth = 3.38" for 2-Year-2050 event  
Inflow = 0.74 cfs @ 12.01 hrs, Volume= 4,755 cf  
Primary = 0.74 cfs @ 12.01 hrs, Volume= 4,755 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

**Link E-DP 2: EXIST DP 2****Hydrograph**

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**Summary for Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

Runoff = 5.45 cfs @ 12.01 hrs, Volume= 35,712 cf, Depth= 6.13"  
 Routed to Link 8L : EXISTING DISTURBED

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

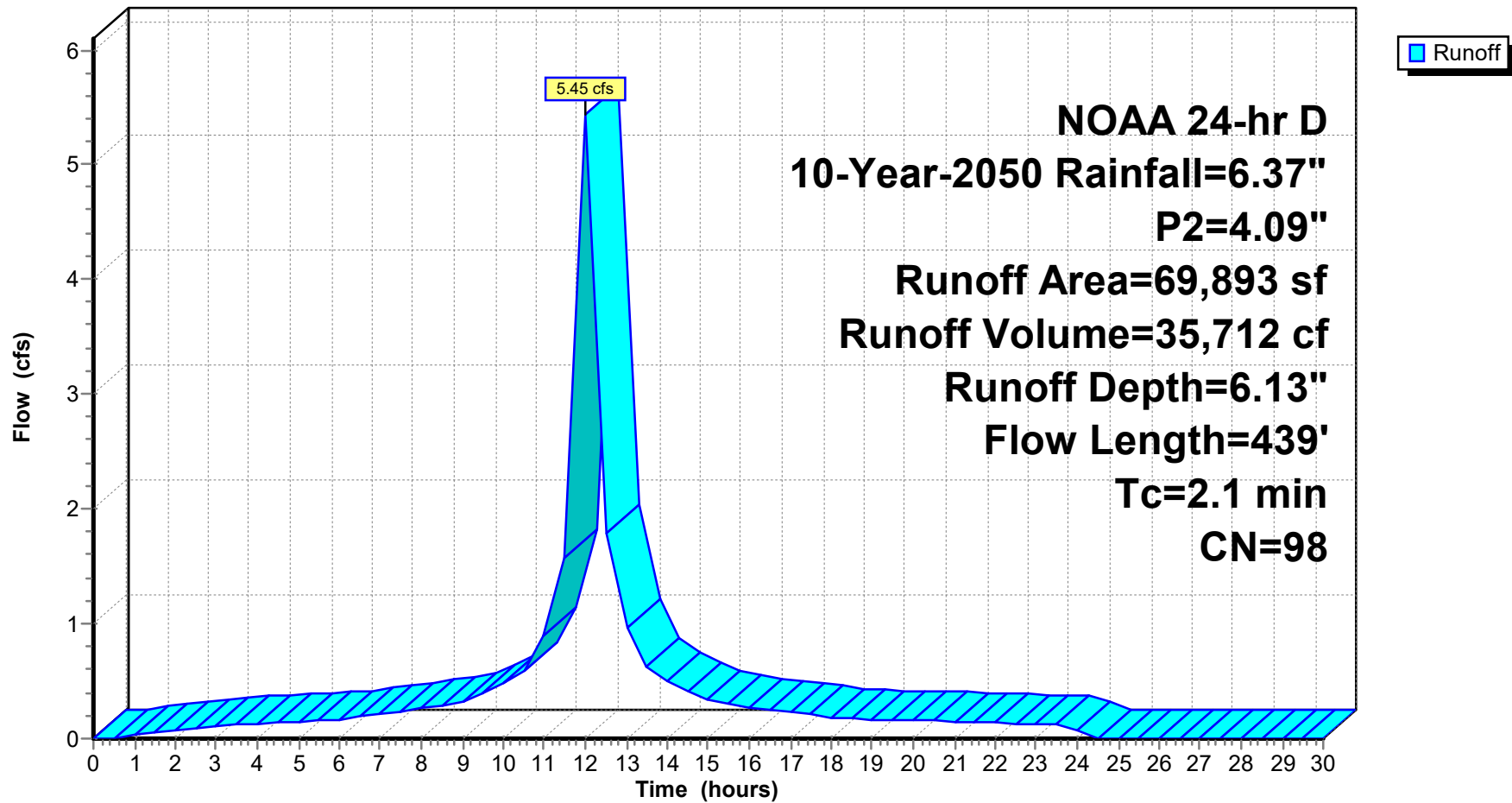
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 69,893    | 98 | Paved parking, HSG C    |
| 69,893    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 0.7      | 100           | 0.0650        | 2.49              |                | <b>Sheet Flow, Parking lot</b>                |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"            |
| 1.4      | 339           | 0.0420        | 4.16              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 2.1      | 439           | Total         |                   |                |                                               |

**Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

**Hydrograph**



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**Summary for Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed**

Runoff = 1.70 cfs @ 12.19 hrs, Volume= 12,738 cf, Depth= 3.30"  
 Routed to Link E-DP 1 : EXIST DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

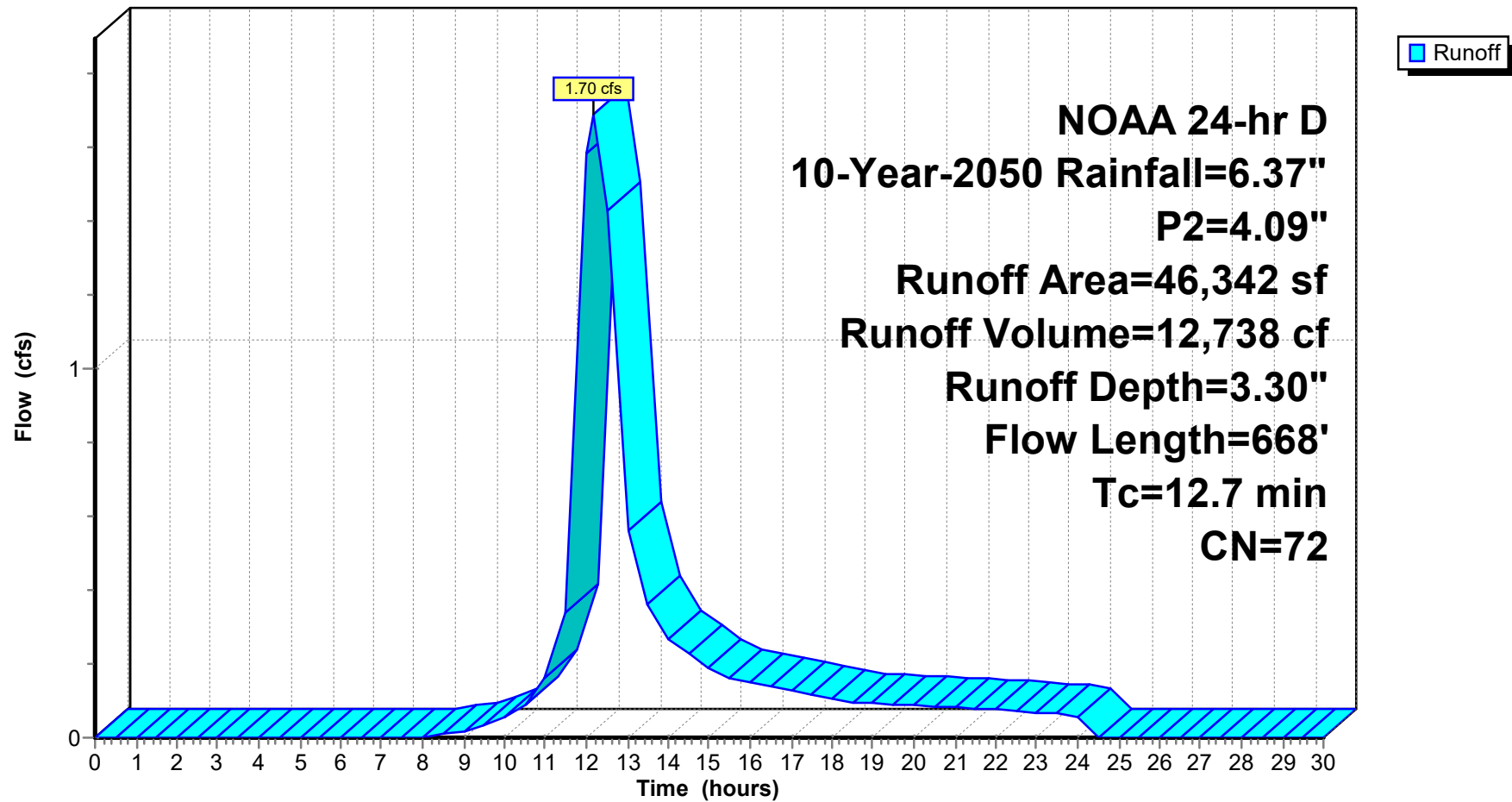
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,525  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,928   | 72 | Woods/grass comb., Good, HSG C |
| 46,342    | 72 | Weighted Average               |
| 44,414    |    | 95.84% Pervious Area           |
| 1,928     |    | 4.16% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 10.4     | 100           | 0.0900        | 0.16              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 4.09"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 12.7     | 668           | Total         |                   |                |                                               |

Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed

Hydrograph



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**Summary for Subcatchment E2-IMP: E2A IMPERVIOUS**

Runoff = 0.94 cfs @ 12.01 hrs, Volume= 6,149 cf, Depth= 6.13"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

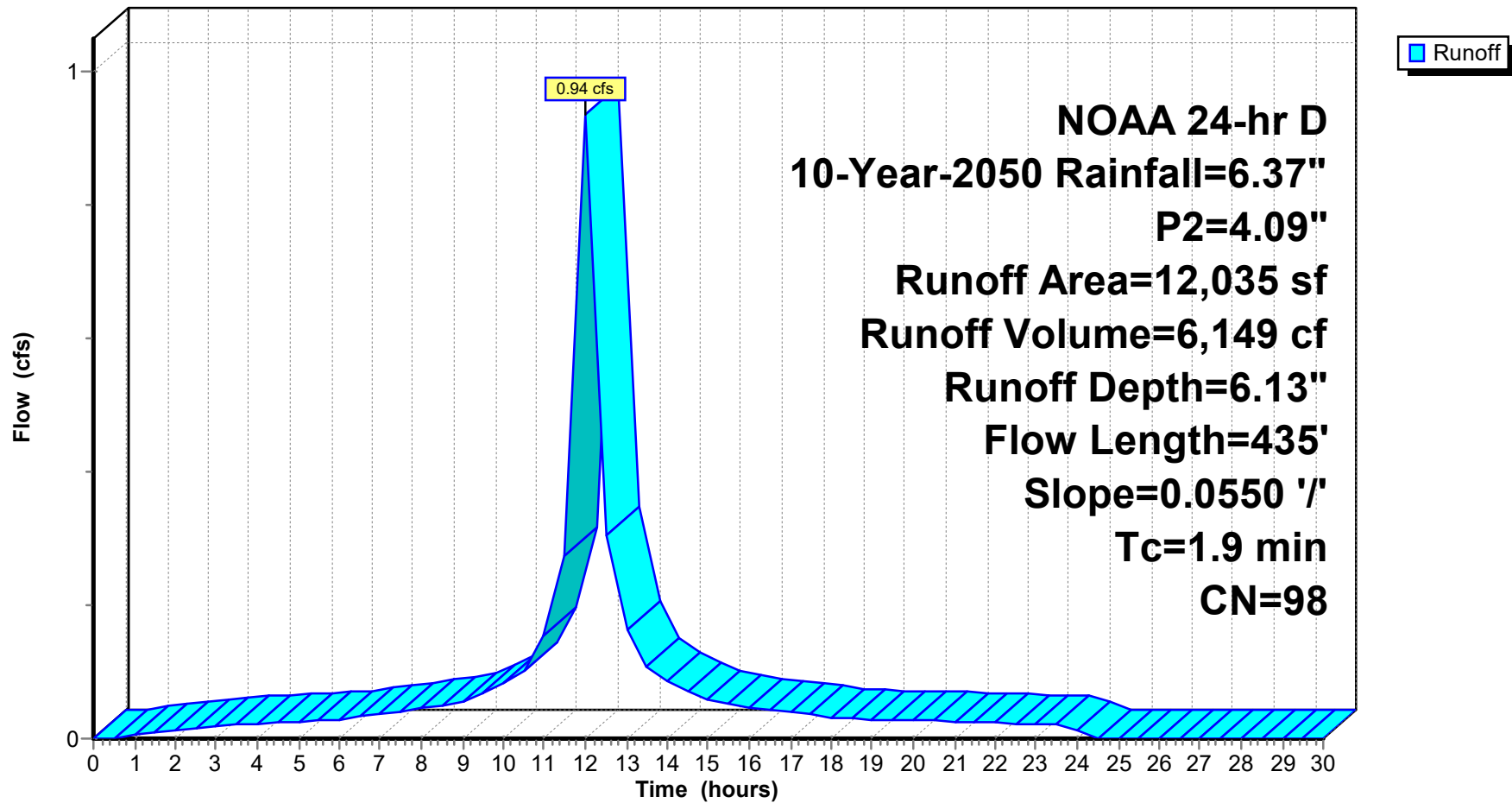
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 4,643     | 98 | Roofs, HSG C            |
| 7,392     | 98 | Paved parking, HSG C    |
| 12,035    | 98 | Weighted Average        |
| 12,035    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.7      | 100           | 0.0550        | 2.33              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 1.2      | 335           | 0.0550        | 4.76              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.9      | 435           | Total         |                   |                |                                                      |

Subcatchment E2-IMP: E2A IMPERVIOUS

Hydrograph





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**Summary for Subcatchment E2-P: E2A PERVIOUS**

Runoff = 0.10 cfs @ 12.05 hrs, Volume= 612 cf, Depth= 3.50"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

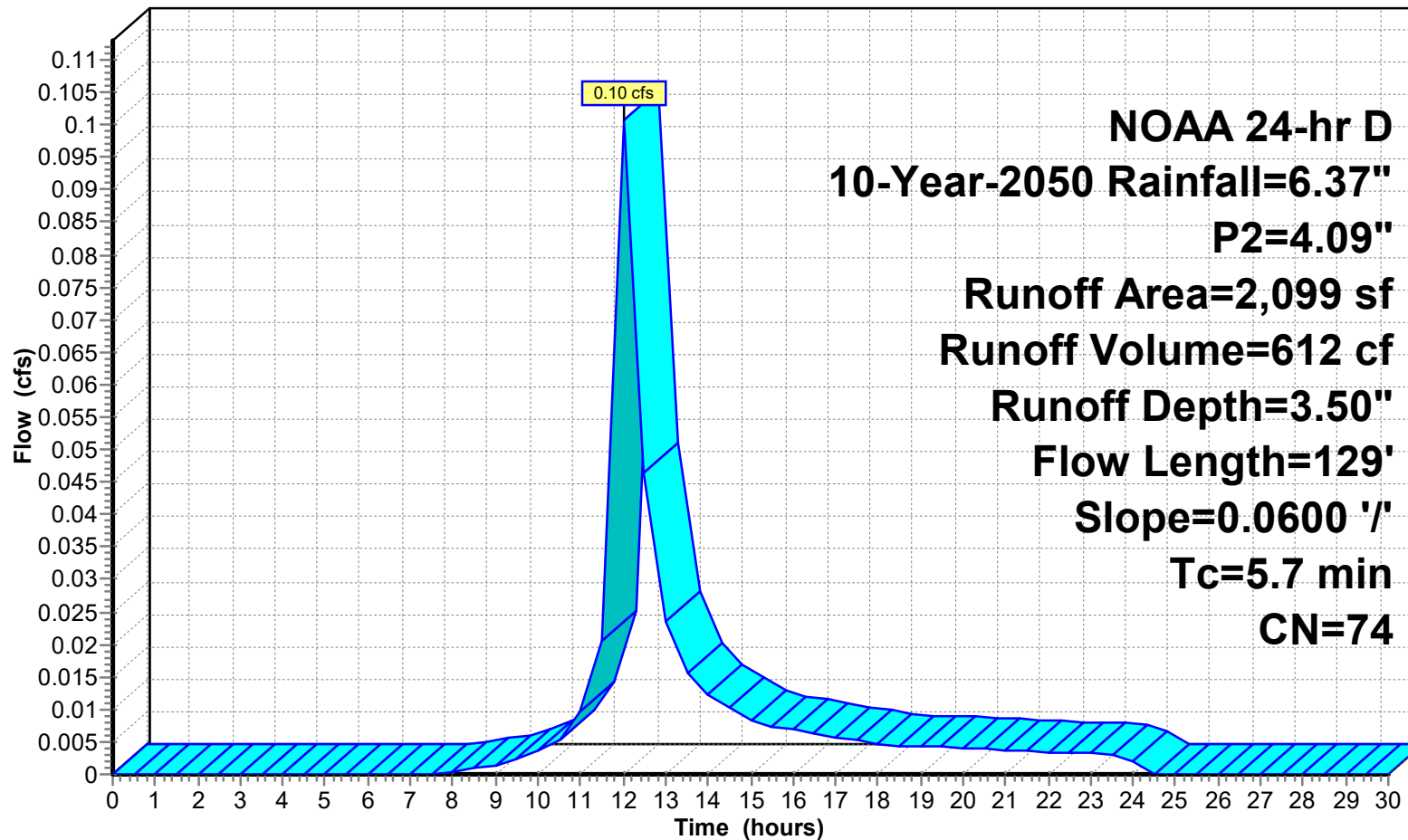
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,099     | 74 | >75% Grass cover, Good, HSG C |
| 2,099     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.6      | 100           | 0.0600        | 0.30              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.1      | 29            | 0.0600        | 3.94              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.7      | 129           | Total         |                   |                |                                        |

Subcatchment E2-P: E2A PERVIOUS

Hydrograph



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**Summary for Subcatchment E2B-IMP: E2B IMPERVIOUS**

Runoff = 0.09 cfs @ 12.00 hrs, Volume= 614 cf, Depth= 6.13"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

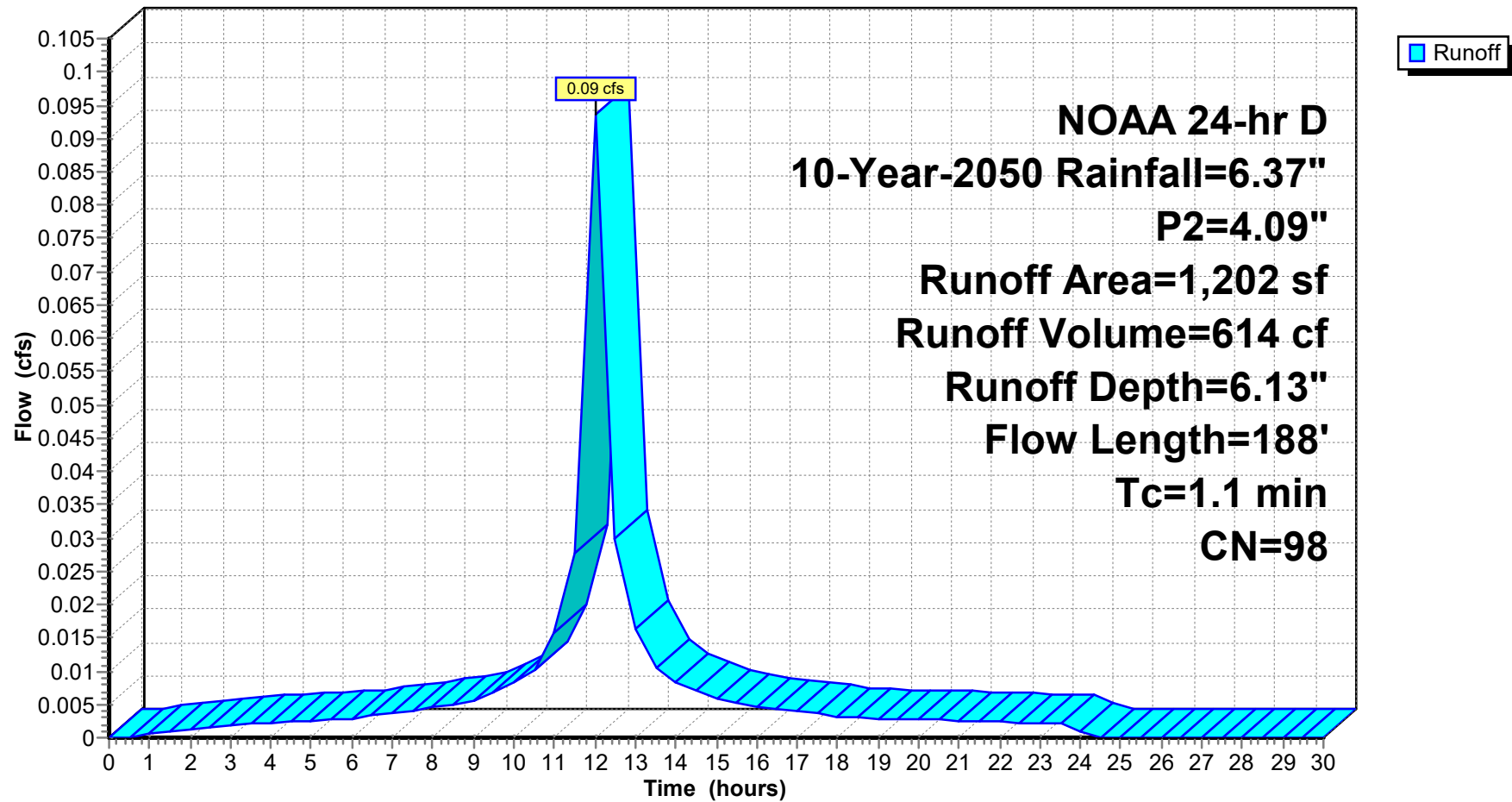
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 1,202     | 98 | Paved parking, HSG C    |
| 1,202     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.84              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 0.5      | 88            | 0.0250        | 3.21              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment E2B-IMP: E2B IMPERVIOUS

Hydrograph



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**Summary for Subcatchment E2B-P: E2B PERVIOUS**

Runoff = 0.07 cfs @ 12.05 hrs, Volume= 447 cf, Depth= 3.50"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

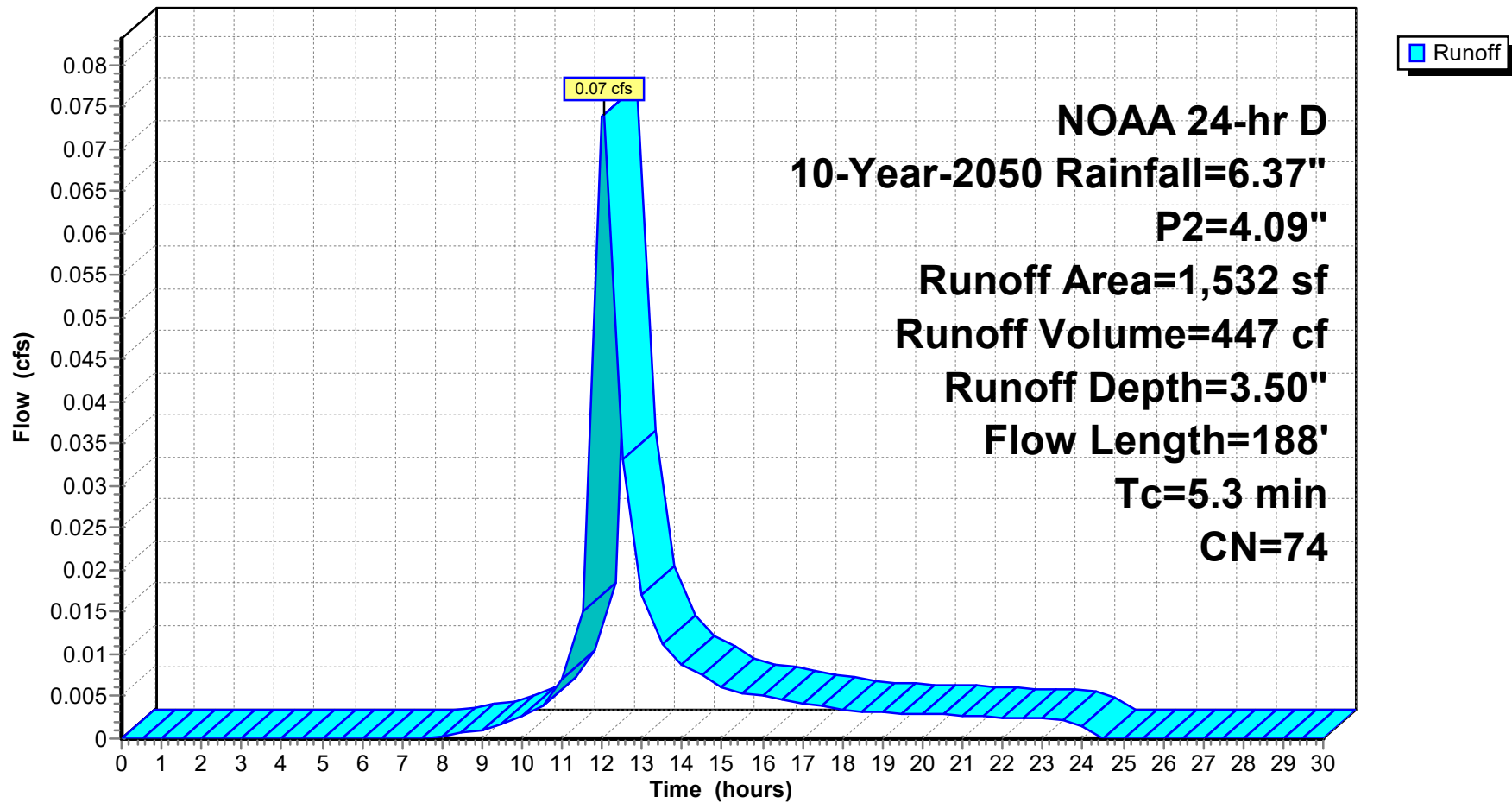
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,532     | 74 | >75% Grass cover, Good, HSG C |
| 1,532     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 4.7      | 100           | 0.0900        | 0.35              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.6      | 88            | 0.0250        | 2.55              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.3      | 188           | Total         |                   |                |                                        |

Subcatchment E2B-P: E2B PERVIOUS

Hydrograph



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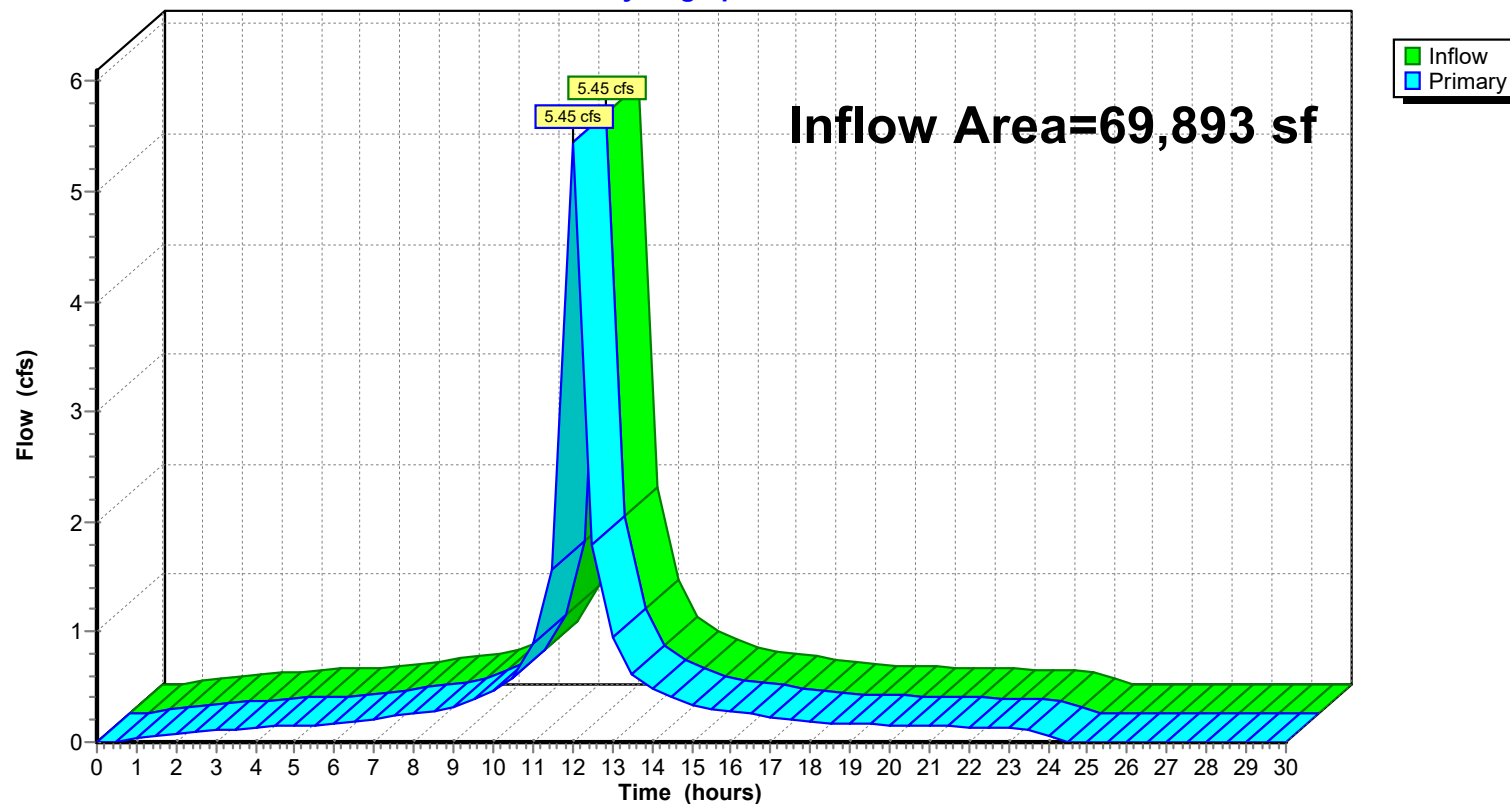
### Summary for Link 8L: EXISTING DISTURBED

Inflow Area = 69,893 sf, 100.00% Impervious, Inflow Depth = 6.13" for 10-Year-2050 event  
Inflow = 5.45 cfs @ 12.01 hrs, Volume= 35,712 cf  
Primary = 5.45 cfs @ 12.01 hrs, Volume= 35,712 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link E-DP 1 : EXIST DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 8L: EXISTING DISTURBED

#### Hydrograph



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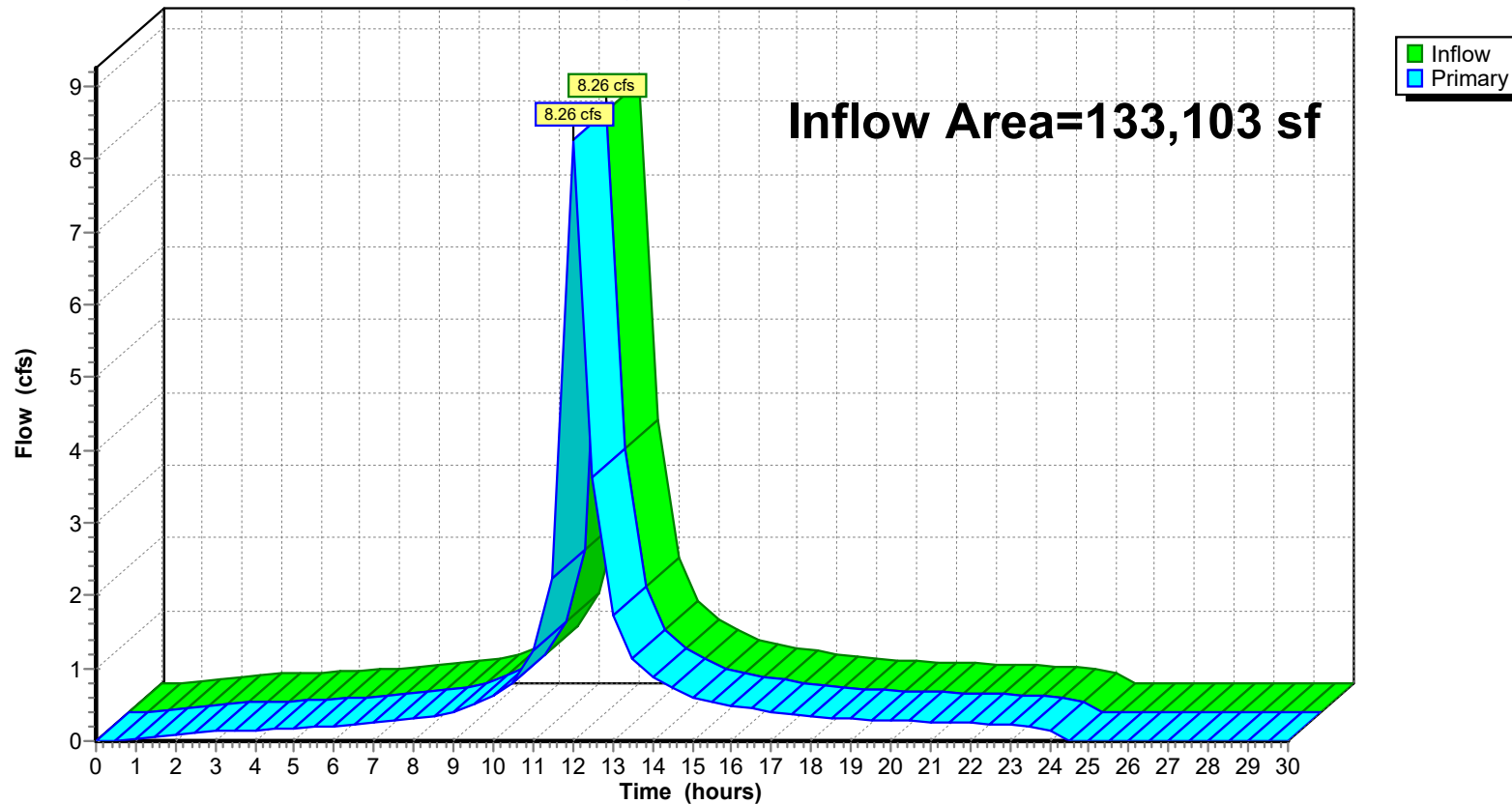
### Summary for Link 9L: TOTAL EXISTING

Inflow Area = 133,103 sf, 63.90% Impervious, Inflow Depth = 5.07" for 10-Year-2050 event  
Inflow = 8.26 cfs @ 12.03 hrs, Volume= 56,272 cf  
Primary = 8.26 cfs @ 12.03 hrs, Volume= 56,272 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 9L: TOTAL EXISTING

#### Hydrograph

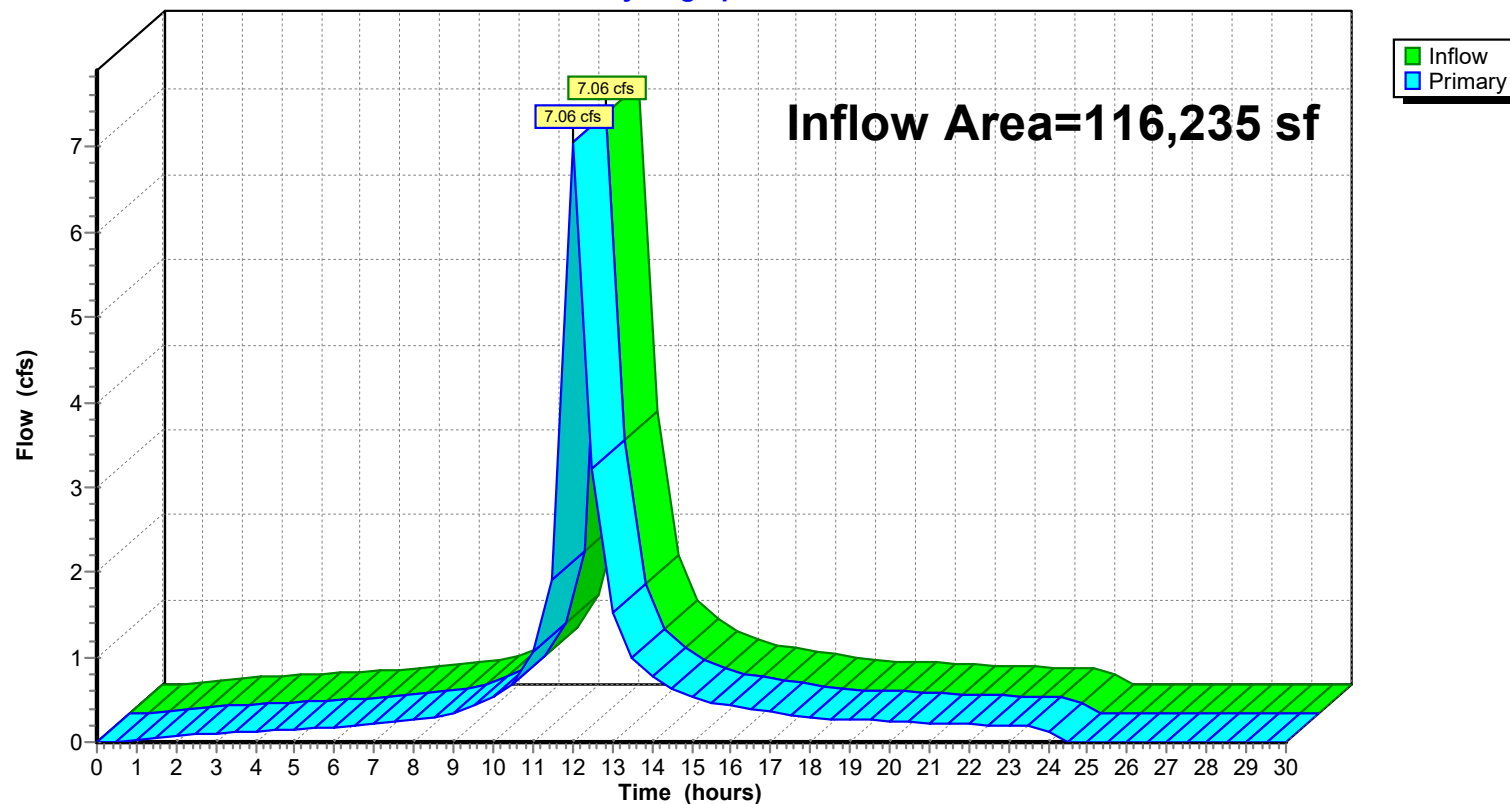




**Summary for Link E-DP 1: EXIST DP 1**

Inflow Area = 116,235 sf, 61.79% Impervious, Inflow Depth = 5.00" for 10-Year-2050 event  
Inflow = 7.06 cfs @ 12.04 hrs, Volume= 48,450 cf  
Primary = 7.06 cfs @ 12.04 hrs, Volume= 48,450 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

**Link E-DP 1: EXIST DP 1****Hydrograph**

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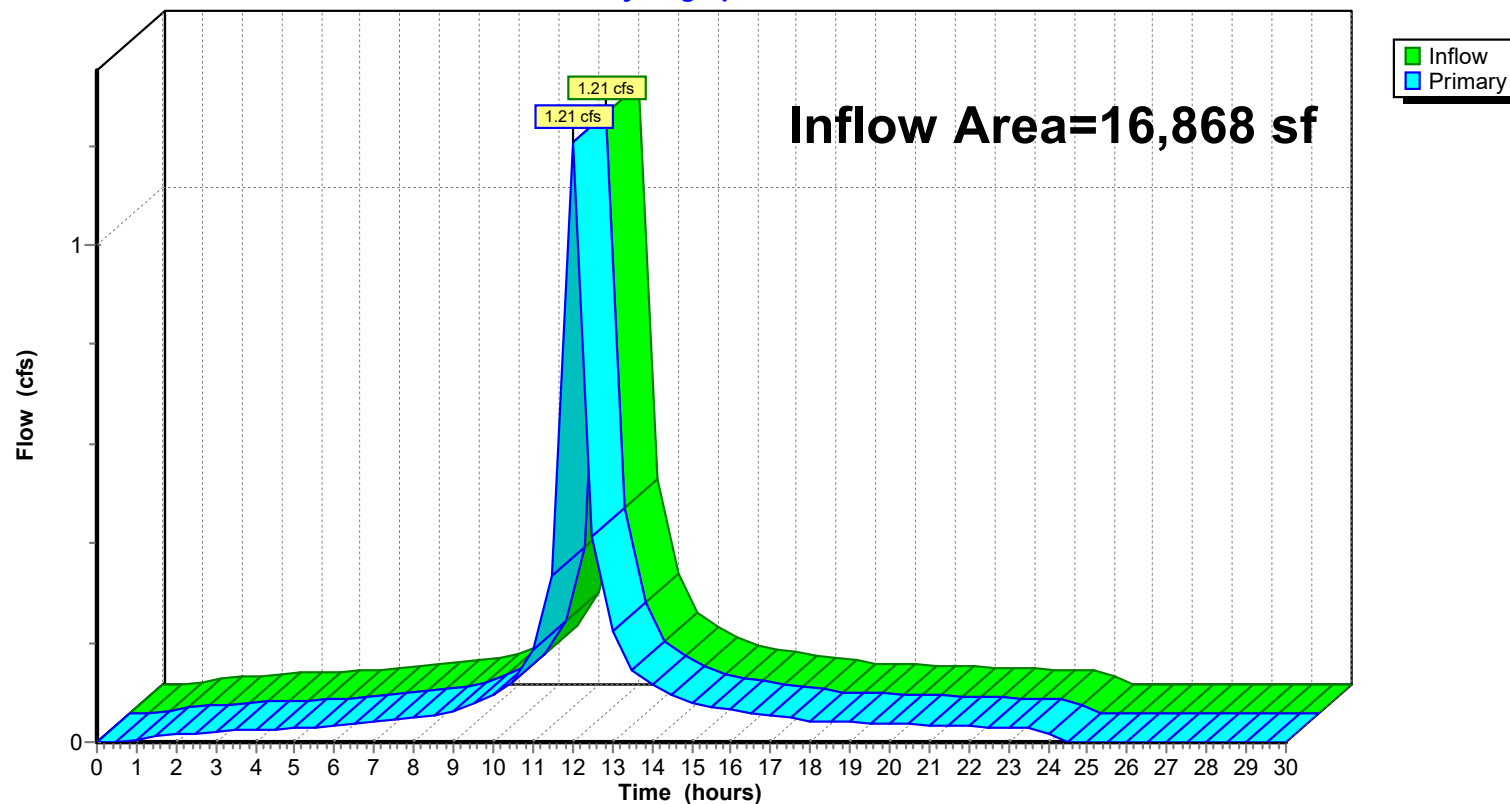
### Summary for Link E-DP 2: EXIST DP 2

Inflow Area = 16,868 sf, 78.47% Impervious, Inflow Depth = 5.56" for 10-Year-2050 event  
Inflow = 1.21 cfs @ 12.01 hrs, Volume= 7,822 cf  
Primary = 1.21 cfs @ 12.01 hrs, Volume= 7,822 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link E-DP 2: EXIST DP 2

#### Hydrograph



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**Summary for Subcatchment E1A: E1A DISTURBED/IMPERVIOUS**

Runoff = 9.88 cfs @ 12.01 hrs, Volume= 65,692 cf, Depth=11.28"  
 Routed to Link 8L : EXISTING DISTURBED

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

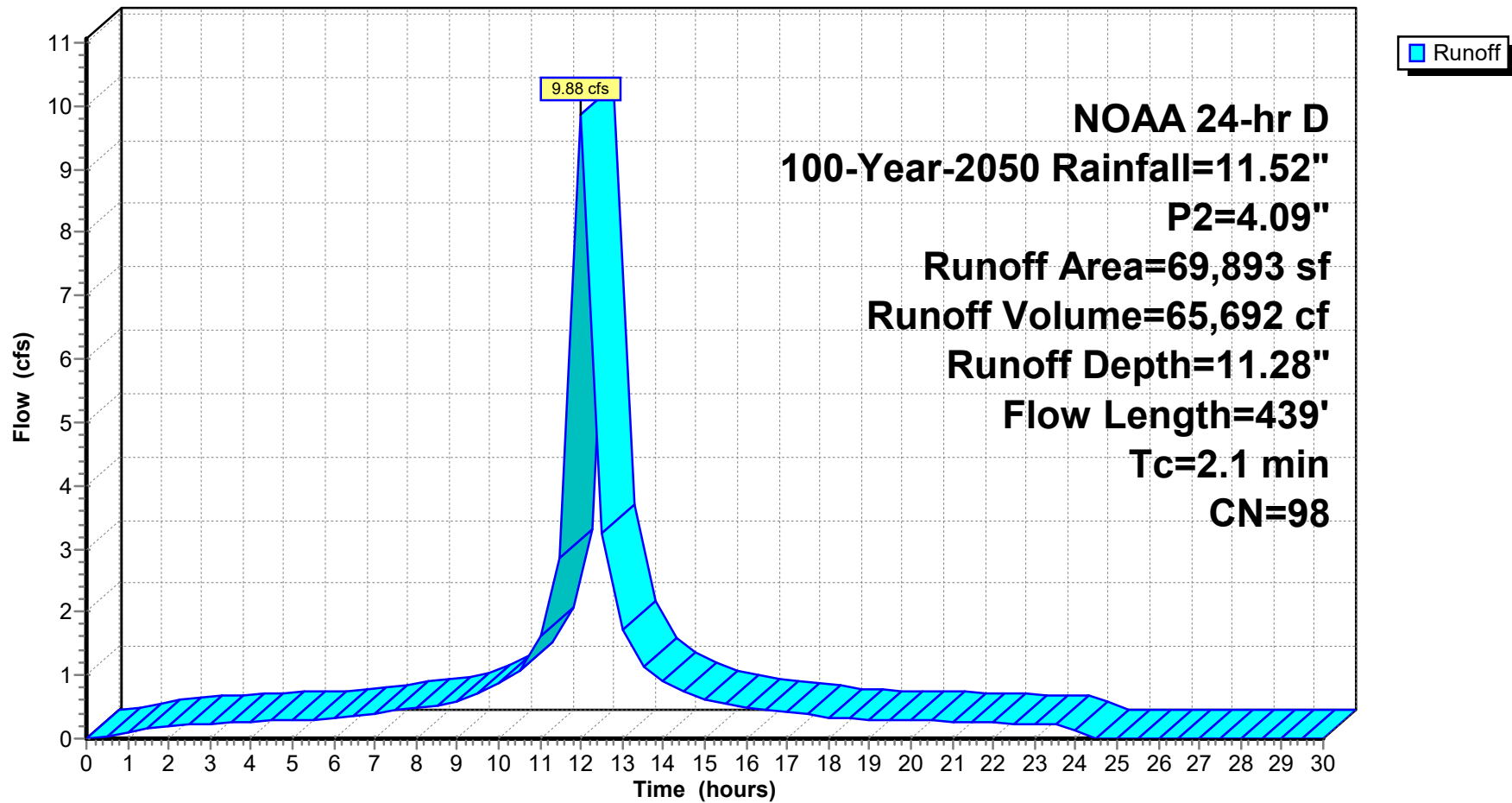
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 69,893    | 98 | Paved parking, HSG C    |
| 69,893    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 0.7      | 100           | 0.0650        | 2.49              |                | <b>Sheet Flow, Parking lot</b>                |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"            |
| 1.4      | 339           | 0.0420        | 4.16              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 2.1      | 439           | Total         |                   |                |                                               |

Subcatchment E1A: E1A DISTURBED/IMPERVIOUS

Hydrograph



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**Summary for Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed**

Runoff = 4.10 cfs @ 12.15 hrs, Volume= 30,458 cf, Depth= 7.89"  
 Routed to Link E-DP 1 : EXIST DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

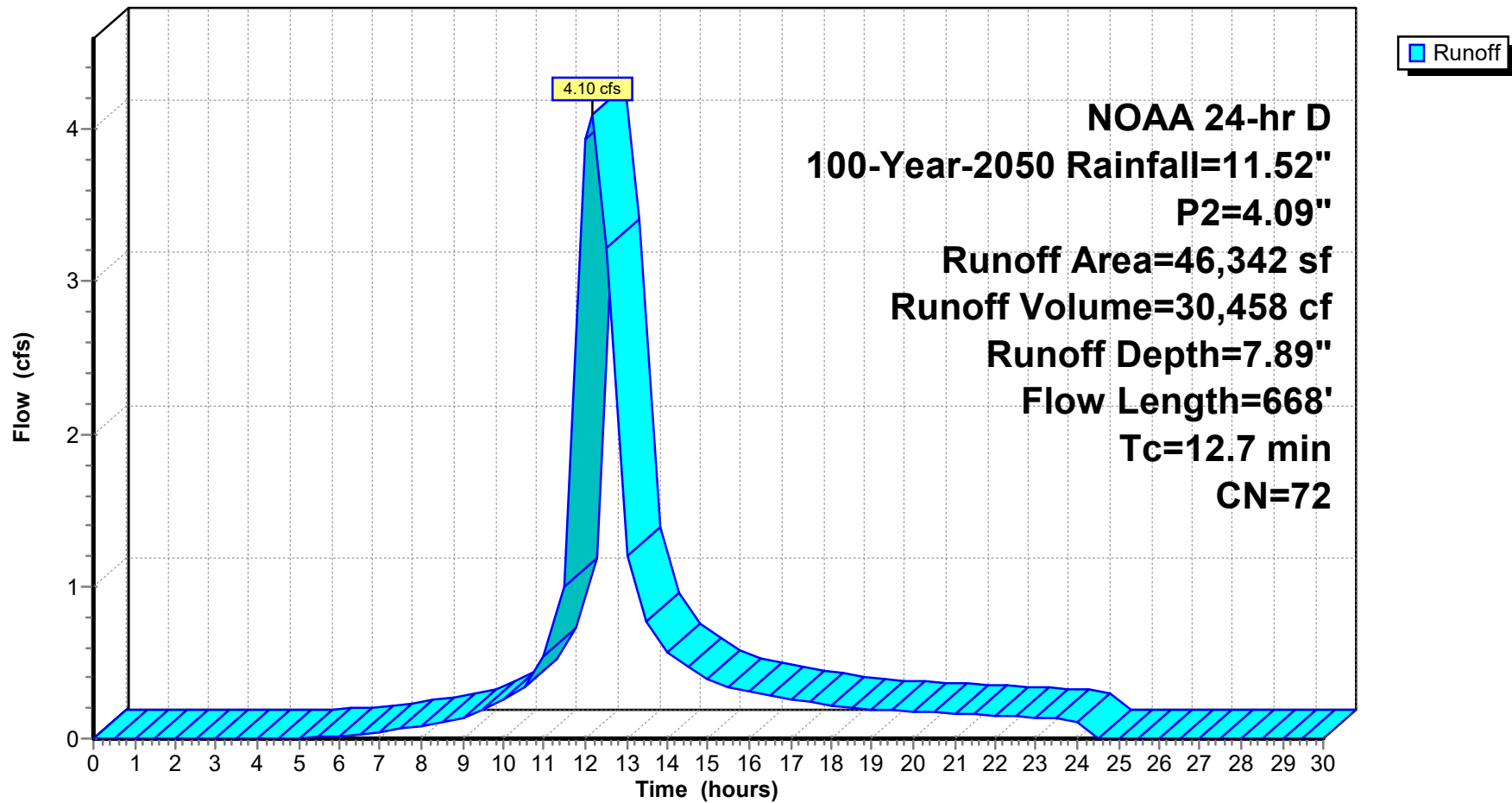
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,525  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,928   | 72 | Woods/grass comb., Good, HSG C |
| 46,342    | 72 | Weighted Average               |
| 44,414    |    | 95.84% Pervious Area           |
| 1,928     |    | 4.16% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 10.4     | 100           | 0.0900        | 0.16              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 4.09"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 12.7     | 668           | Total         |                   |                |                                               |

**Subcatchment E1C: E1C Pervious-w-offsite-Undisturbed**

**Hydrograph**



**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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**Summary for Subcatchment E2-IMP: E2A IMPERVIOUS**

Runoff = 1.70 cfs @ 12.01 hrs, Volume= 11,312 cf, Depth=11.28"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

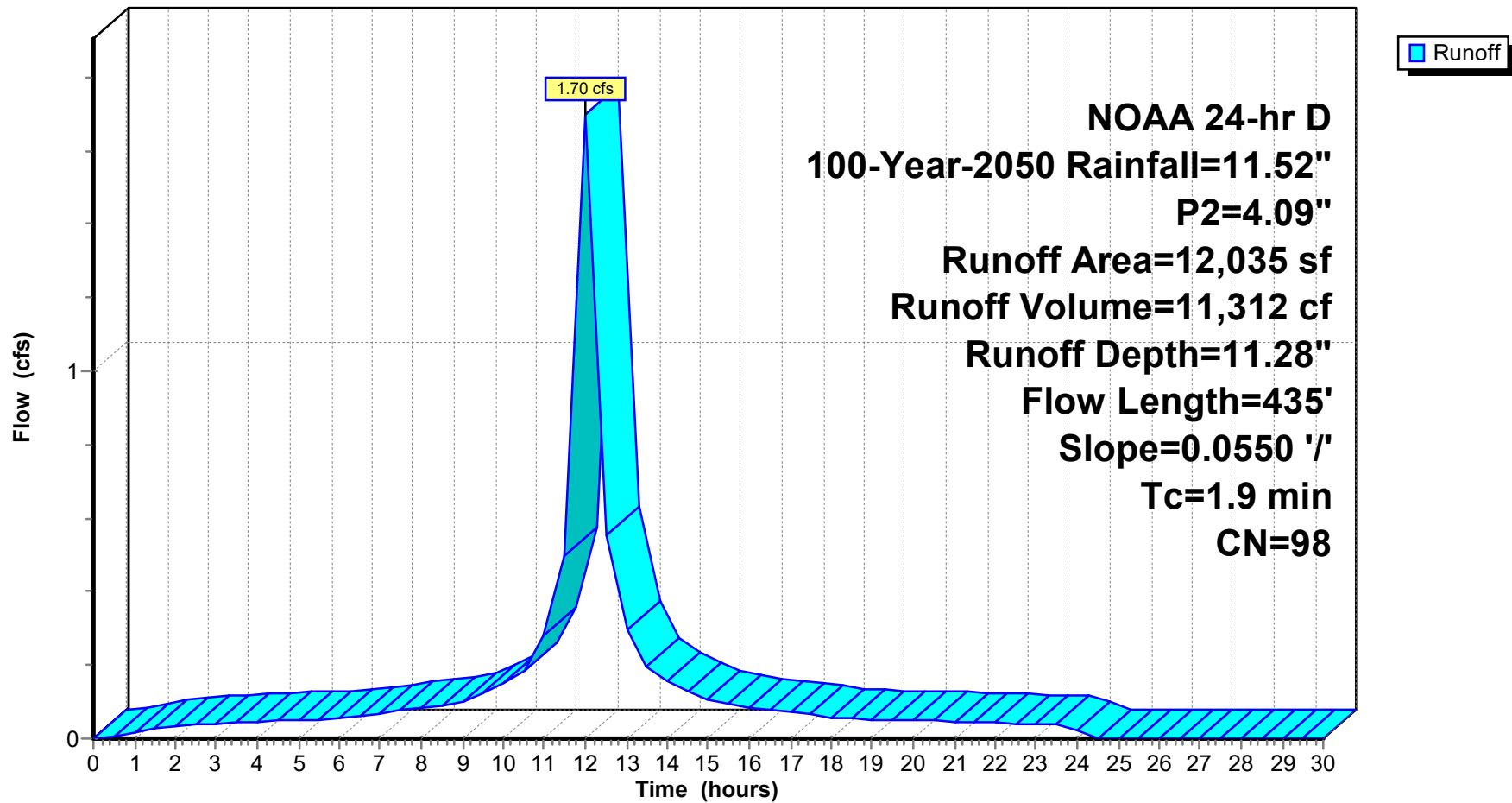
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 4,643     | 98 | Roofs, HSG C            |
| 7,392     | 98 | Paved parking, HSG C    |
| 12,035    | 98 | Weighted Average        |
| 12,035    |    | 100.00% Impervious Area |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                          |
|-------------|------------------|------------------|----------------------|-------------------|------------------------------------------------------|
| 0.7         | 100              | 0.0550           | 2.33                 |                   | <b>Sheet Flow, Pavement</b>                          |
|             |                  |                  |                      |                   | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 1.2         | 335              | 0.0550           | 4.76                 |                   | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|             |                  |                  |                      |                   | Paved Kv= 20.3 fps                                   |
| 1.9         | 435              | Total            |                      |                   |                                                      |

Subcatchment E2-IMP: E2A IMPERVIOUS

Hydrograph





**24-223 DRAINAGE DESIGN-EXISTING-2026-03-30**

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**Summary for Subcatchment E2-P: E2A PERVIOUS**

Runoff = 0.23 cfs @ 12.03 hrs, Volume= 1,428 cf, Depth= 8.17"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

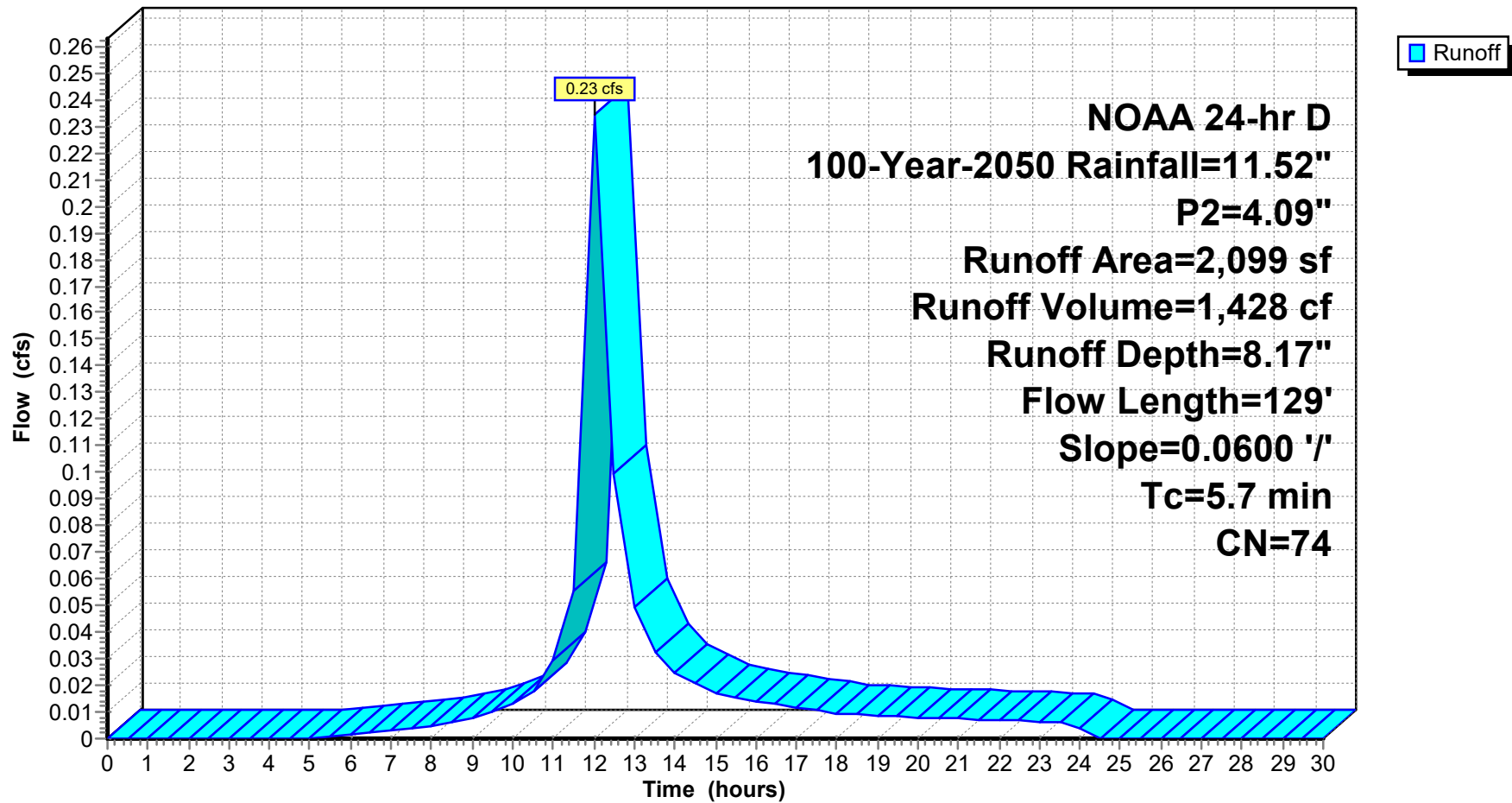
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,099     | 74 | >75% Grass cover, Good, HSG C |
| 2,099     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.6      | 100           | 0.0600        | 0.30              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.1      | 29            | 0.0600        | 3.94              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.7      | 129           | Total         |                   |                |                                        |

## Subcatchment E2-P: E2A PERVIOUS

## Hydrograph



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NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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**Summary for Subcatchment E2B-IMP: E2B IMPERVIOUS**

Runoff = 0.17 cfs @ 12.00 hrs, Volume= 1,130 cf, Depth=11.28"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

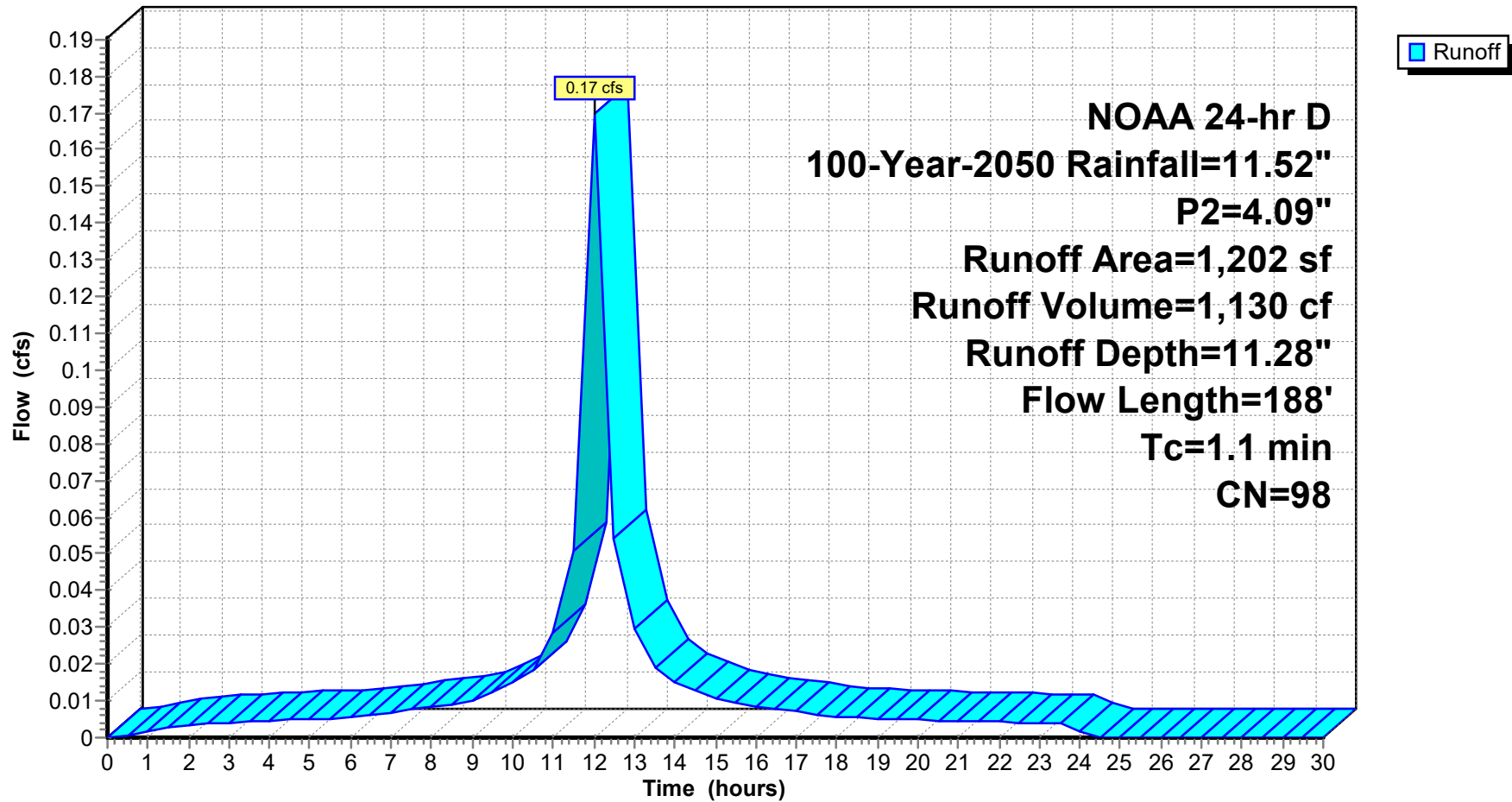
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 1,202     | 98 | Paved parking, HSG C    |
| 1,202     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.84              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 0.5      | 88            | 0.0250        | 3.21              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment E2B-IMP: E2B IMPERVIOUS

Hydrograph



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NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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**Summary for Subcatchment E2B-P: E2B PERVIOUS**

Runoff = 0.17 cfs @ 12.03 hrs, Volume= 1,042 cf, Depth= 8.17"  
 Routed to Link E-DP 2 : EXIST DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

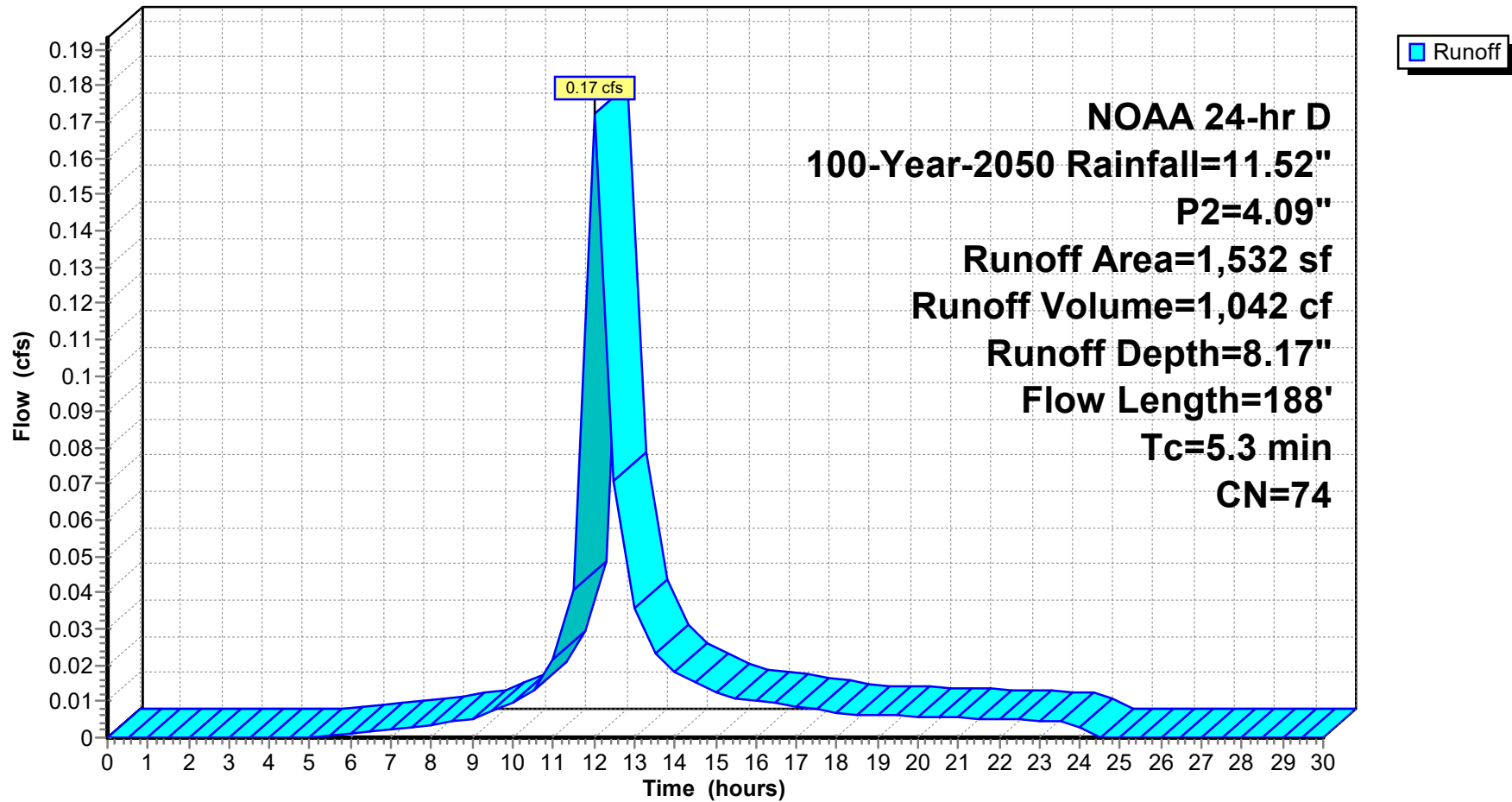
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,532     | 74 | >75% Grass cover, Good, HSG C |
| 1,532     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 4.7      | 100           | 0.0900        | 0.35              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.6      | 88            | 0.0250        | 2.55              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.3      | 188           | Total         |                   |                |                                        |

Subcatchment E2B-P: E2B PERVIOUS

Hydrograph



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NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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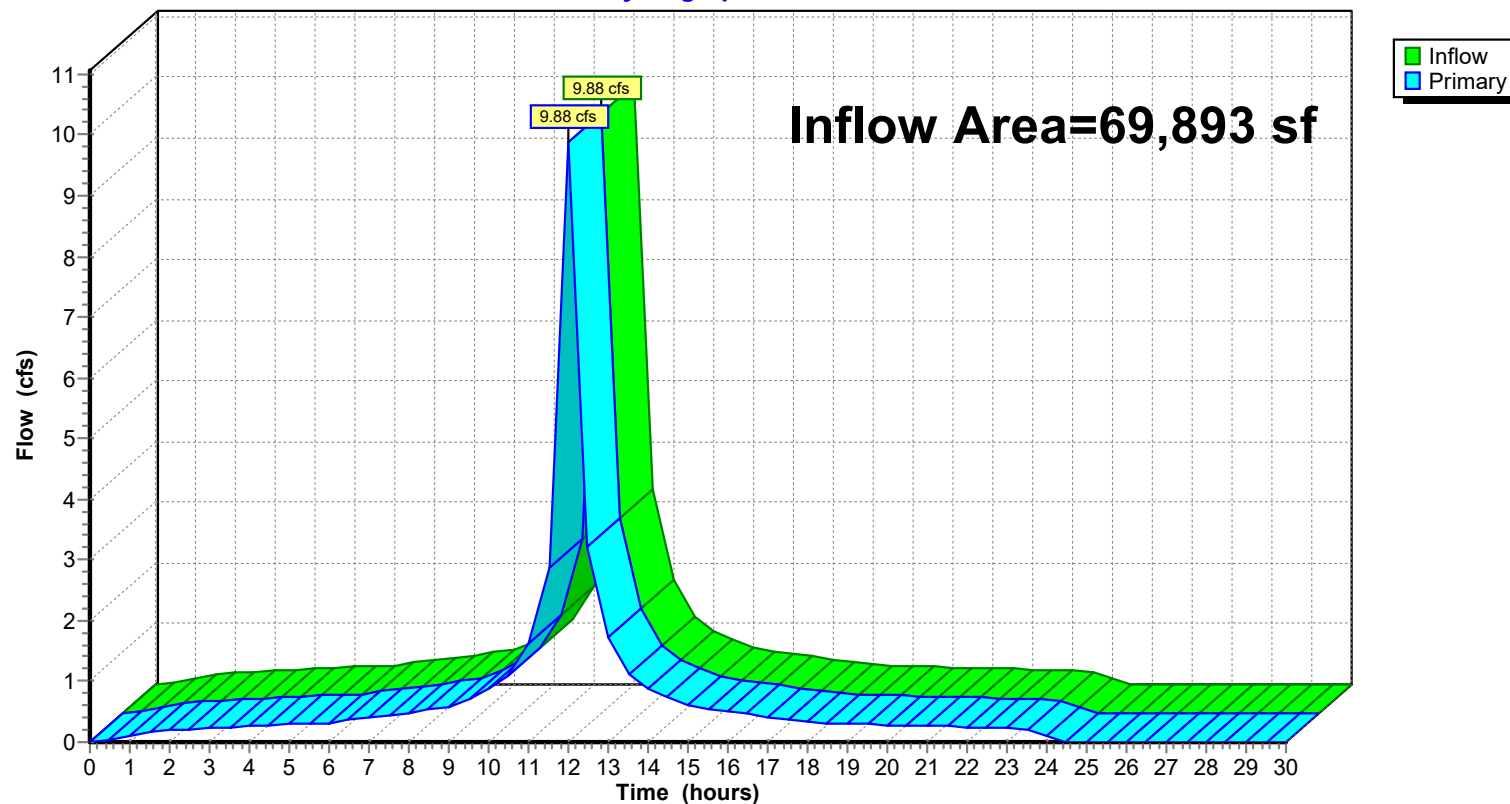
### Summary for Link 8L: EXISTING DISTURBED

Inflow Area = 69,893 sf, 100.00% Impervious, Inflow Depth = 11.28" for 100-Year-2050 event  
Inflow = 9.88 cfs @ 12.01 hrs, Volume= 65,692 cf  
Primary = 9.88 cfs @ 12.01 hrs, Volume= 65,692 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link E-DP 1 : EXIST DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 8L: EXISTING DISTURBED

#### Hydrograph



## 24-223 DRAINAGE DESIGN-EXISTING-2026-03-30

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NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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### Summary for Link 9L: TOTAL EXISTING

Inflow Area = 133,103 sf, 63.90% Impervious, Inflow Depth = 10.01" for 100-Year-2050 event

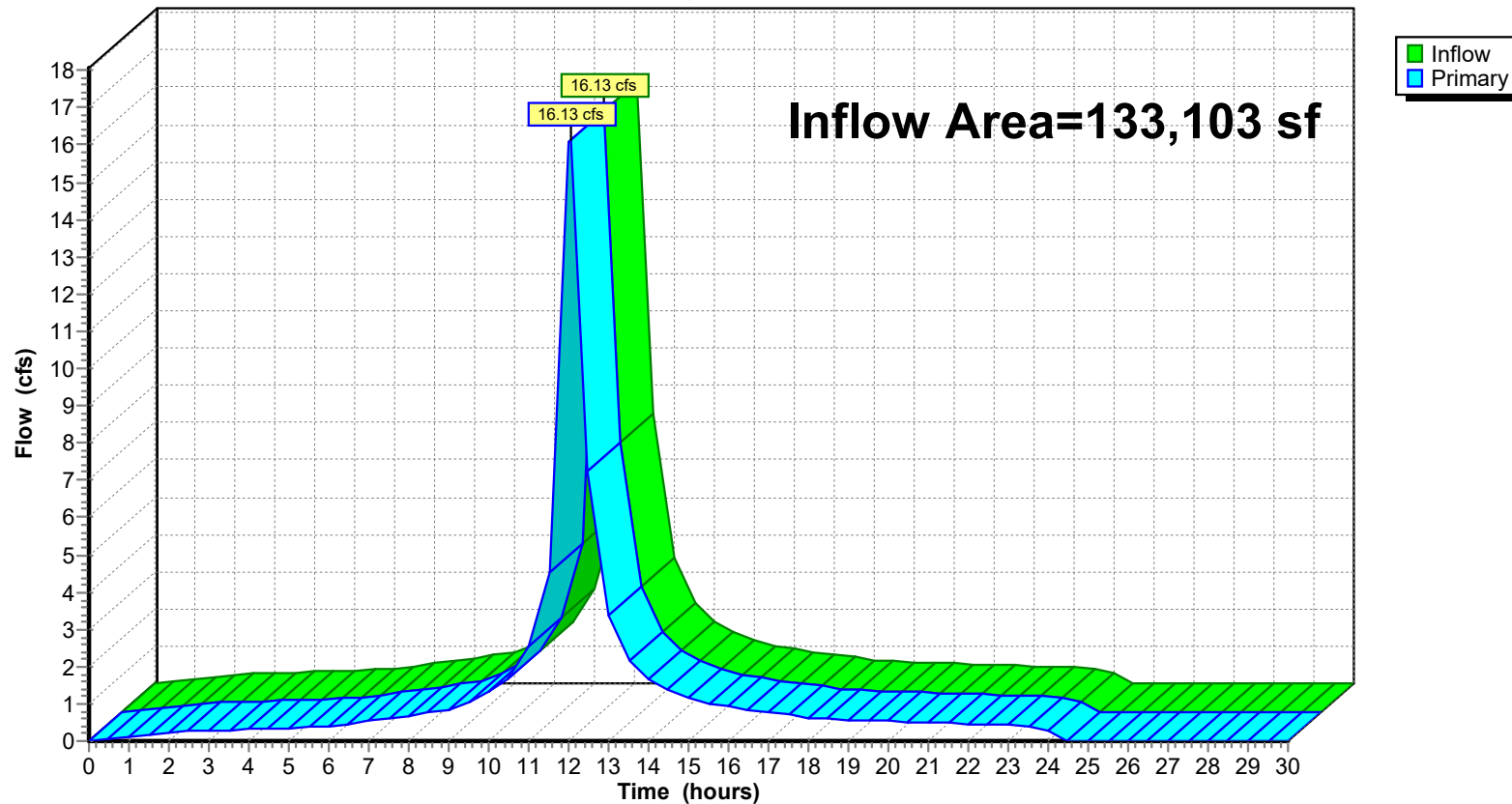
Inflow = 16.13 cfs @ 12.03 hrs, Volume= 111,062 cf

Primary = 16.13 cfs @ 12.03 hrs, Volume= 111,062 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 9L: TOTAL EXISTING

#### Hydrograph





## 24-223 DRAINAGE DESIGN-EXISTING-2026-03-30

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NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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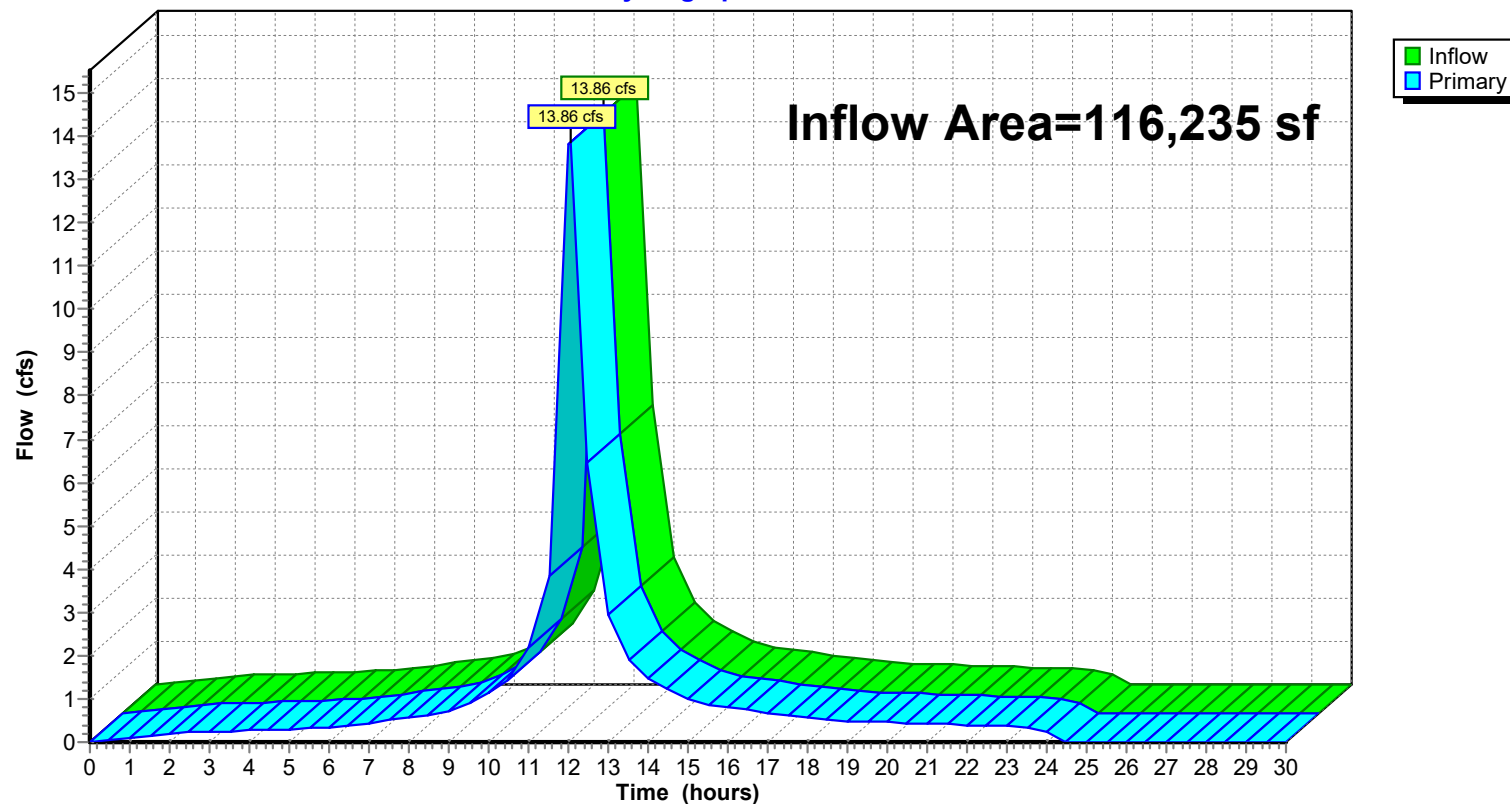
### Summary for Link E-DP 1: EXIST DP 1

Inflow Area = 116,235 sf, 61.79% Impervious, Inflow Depth = 9.93" for 100-Year-2050 event  
Inflow = 13.86 cfs @ 12.04 hrs, Volume= 96,150 cf  
Primary = 13.86 cfs @ 12.04 hrs, Volume= 96,150 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link E-DP 1: EXIST DP 1

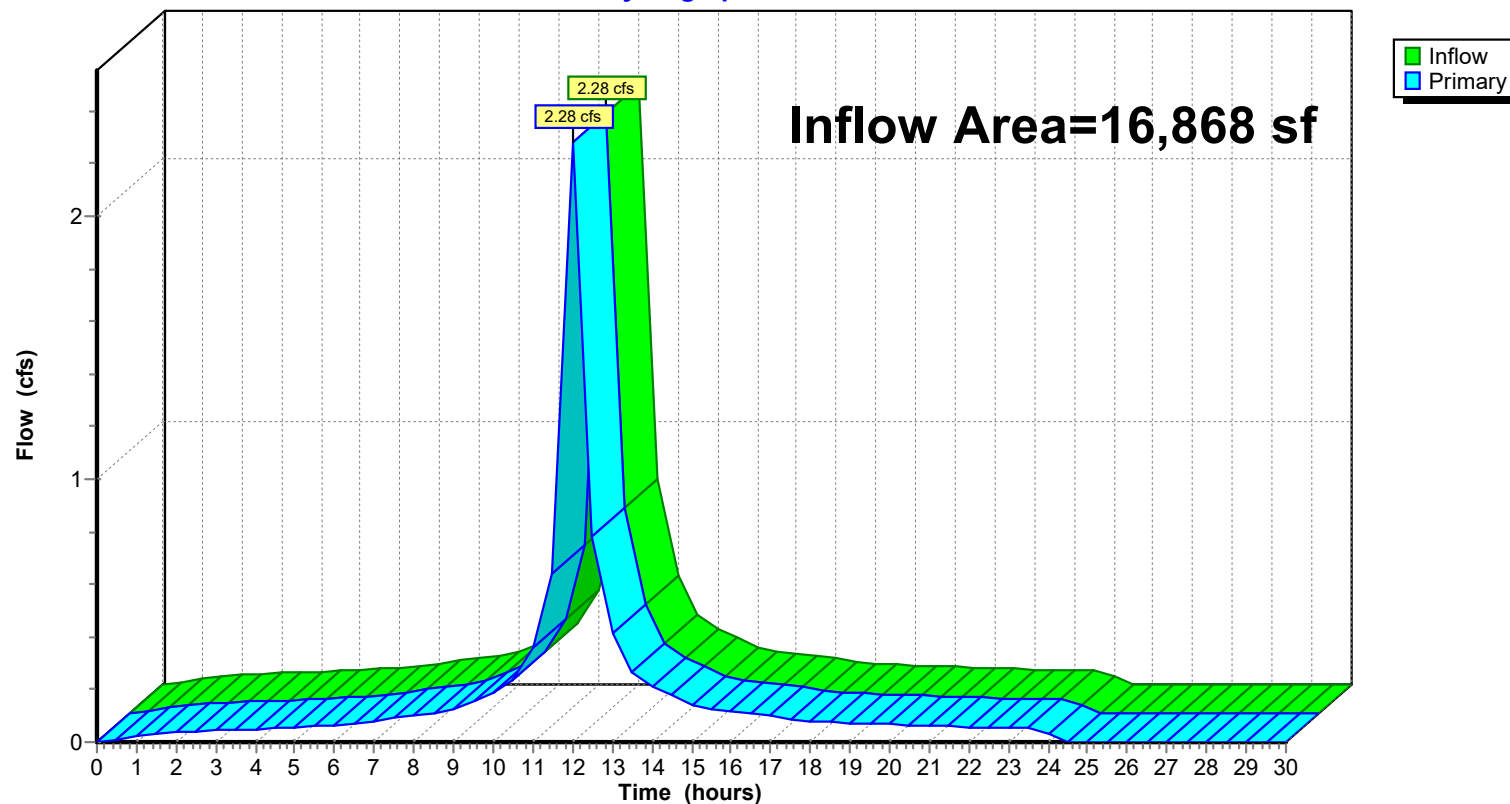
#### Hydrograph



**Summary for Link E-DP 2: EXIST DP 2**

Inflow Area = 16,868 sf, 78.47% Impervious, Inflow Depth = 10.61" for 100-Year-2050 event  
Inflow = 2.28 cfs @ 12.01 hrs, Volume= 14,912 cf  
Primary = 2.28 cfs @ 12.01 hrs, Volume= 14,912 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 9L : TOTAL EXISTING

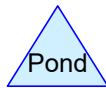
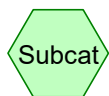
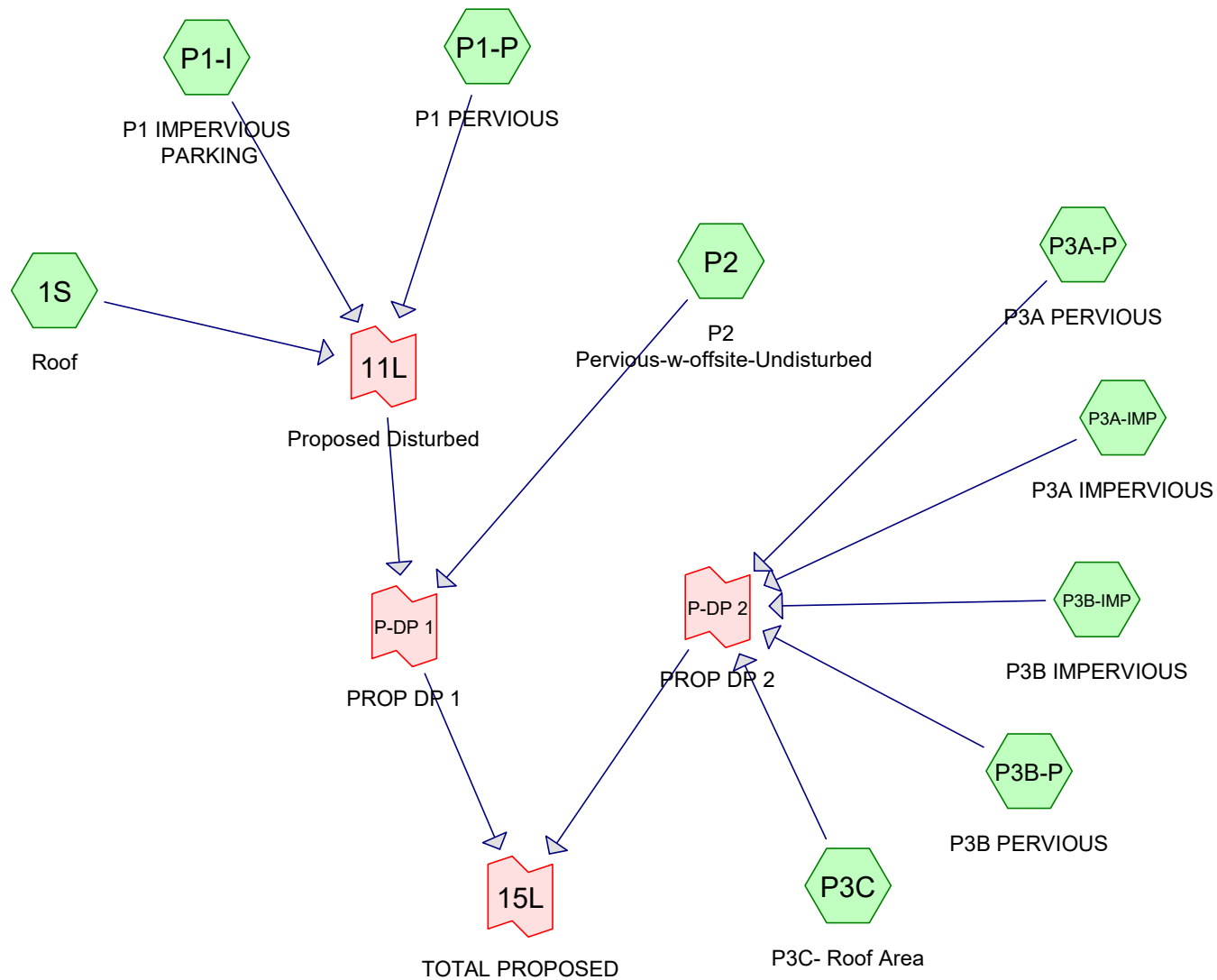
Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

**Link E-DP 2: EXIST DP 2****Hydrograph**

APPENDIX B

PROPOSED DRAINAGE CALCULATIONS





**Routing Diagram for 24-223 DRAINAGE DESIGN-PROPOSED-2026-03-30**

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### Area Listing (all nodes)

| Area<br>(sq-ft) | CN | Description<br>(subcatchment-numbers)                  |
|-----------------|----|--------------------------------------------------------|
| 14,429          | 74 | >75% Grass cover, Good, HSG C (P1-P, P2, P3A-P, P3B-P) |
| 4,040           | 98 | DRIVE/SIDEWALK (P3A-IMP)                               |
| 1,220           | 98 | Impervious-offsite (P2)                                |
| 2,721           | 71 | Meadow, non-grazed, HSG C (P2)                         |
| 44,540          | 98 | Roof and Amenity Area (1S, P3C)                        |
| 708             | 98 | Roof-offsite (P2)                                      |
| 980             | 98 | SIDEWALK AREA (P3B-IMP)                                |
| 24,295          | 98 | Uncovered Paved parking, HSG C (P1-I)                  |
| 7,915           | 72 | Woods/grass comb., Good, HSG C (P2)                    |
| 32,255          | 70 | wooded (P2)                                            |

**24-223 DRAINAGE DESIGN-PROPOSED-2026-03-30**

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NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

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**Summary for Subcatchment 1S: Roof**

Runoff = 1.69 cfs @ 12.01 hrs, Volume= 10,799 cf, Depth= 3.24"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

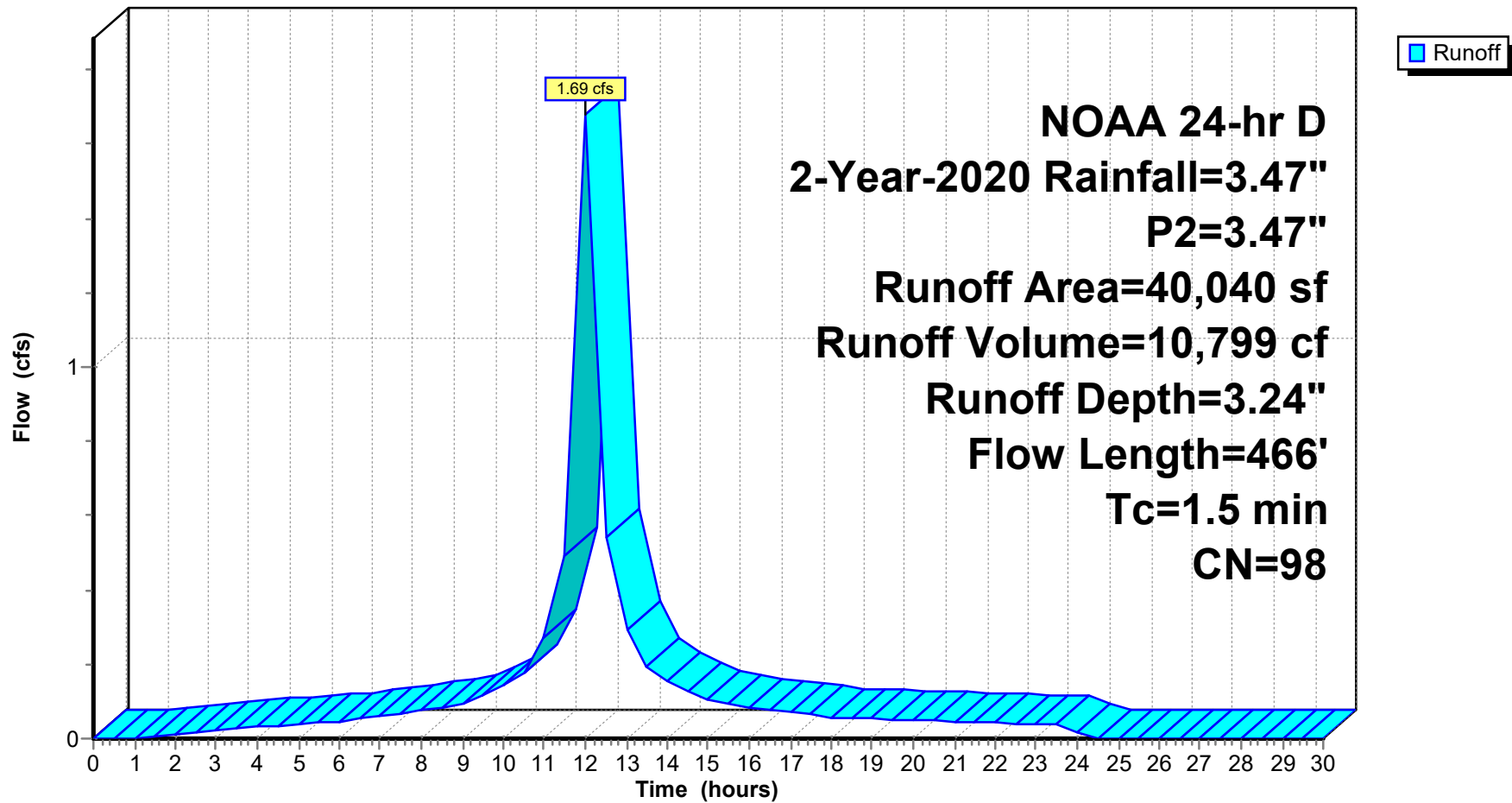
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 40,040  | 98 | Roof and Amenity Area   |
| 40,040    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 0.7      | 53            | 0.0200        | 1.26              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 3.47"                                   |
| 0.5      | 196           | 0.0200        | 6.95              | 5.46           | <b>Pipe Channel, 12 ROOF DRAIN</b><br>12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'<br>n= 0.012 |
| 0.3      | 217           | 0.0424        | 11.74             | 14.41          | <b>Pipe Channel, 15</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012            |
| 1.5      | 466           | Total         |                   |                |                                                                                                 |

Subcatchment 1S: Roof

Hydrograph





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**Summary for Subcatchment P1-I: P1 IMPERVIOUS PARKING**

Runoff = 1.02 cfs @ 12.01 hrs, Volume= 6,553 cf, Depth= 3.24"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

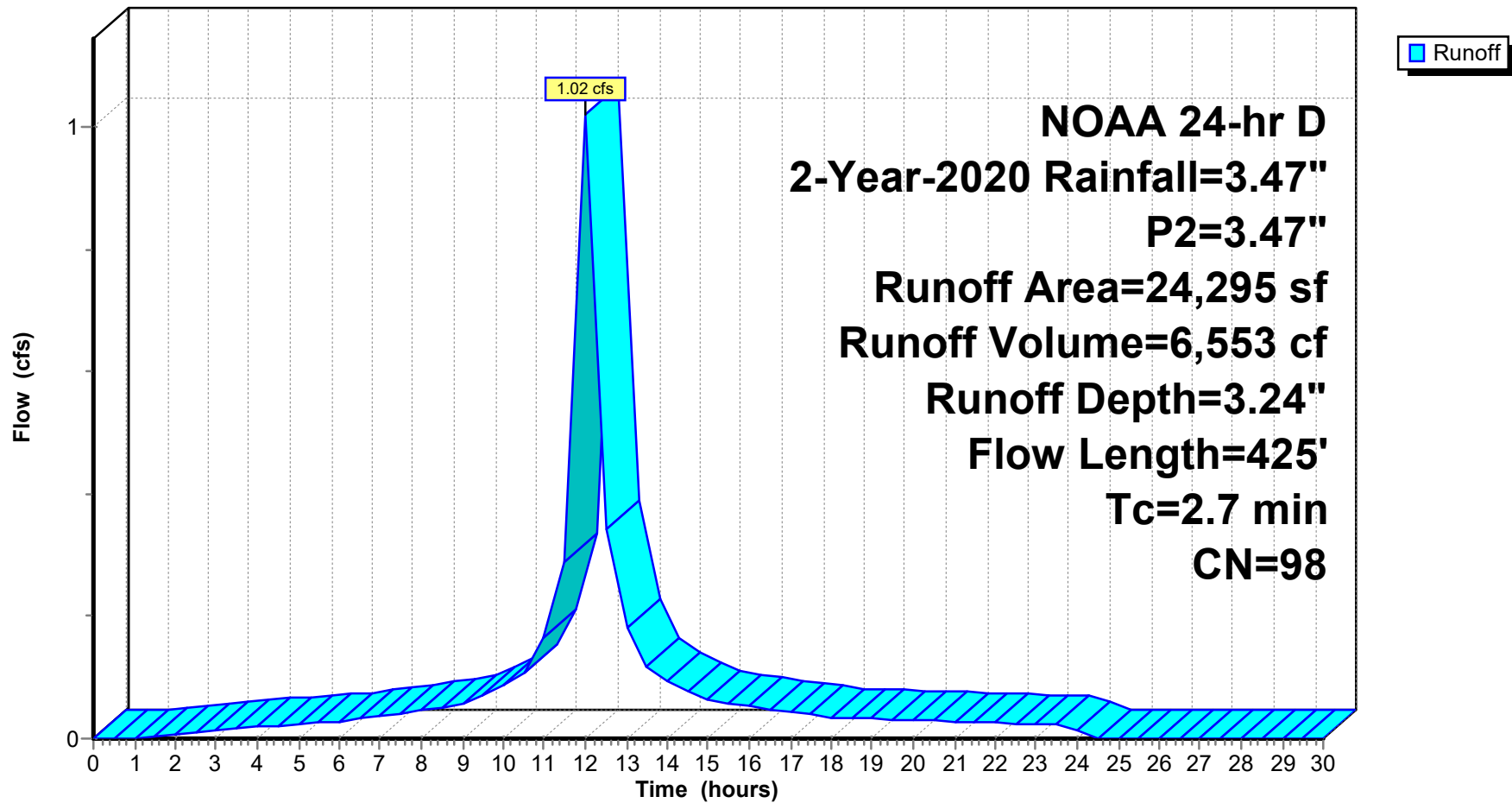
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 24,295  | 98 | Uncovered Paved parking, HSG C |
| 24,295    |    | 100.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                 |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------------|
| 1.5      | 100           | 0.0150        | 1.12              |                | <b>Sheet Flow, sheet flow Parking area</b><br>n= 0.013 P2= 3.47"                            |
| 0.9      | 127           | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow, parking area</b><br>Paved Kv= 20.3 fps                        |
| 0.3      | 198           | 0.0449        | 12.08             | 14.83          | <b>Pipe Channel, Pipe flow</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012 |
| 2.7      | 425           | Total         |                   |                |                                                                                             |

Subcatchment P1-I: P1 IMPERVIOUS PARKING

Hydrograph



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**Summary for Subcatchment P1-P: P1 PERVIOUS**

Runoff = 0.08 cfs @ 12.10 hrs, Volume= 547 cf, Depth= 1.22"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

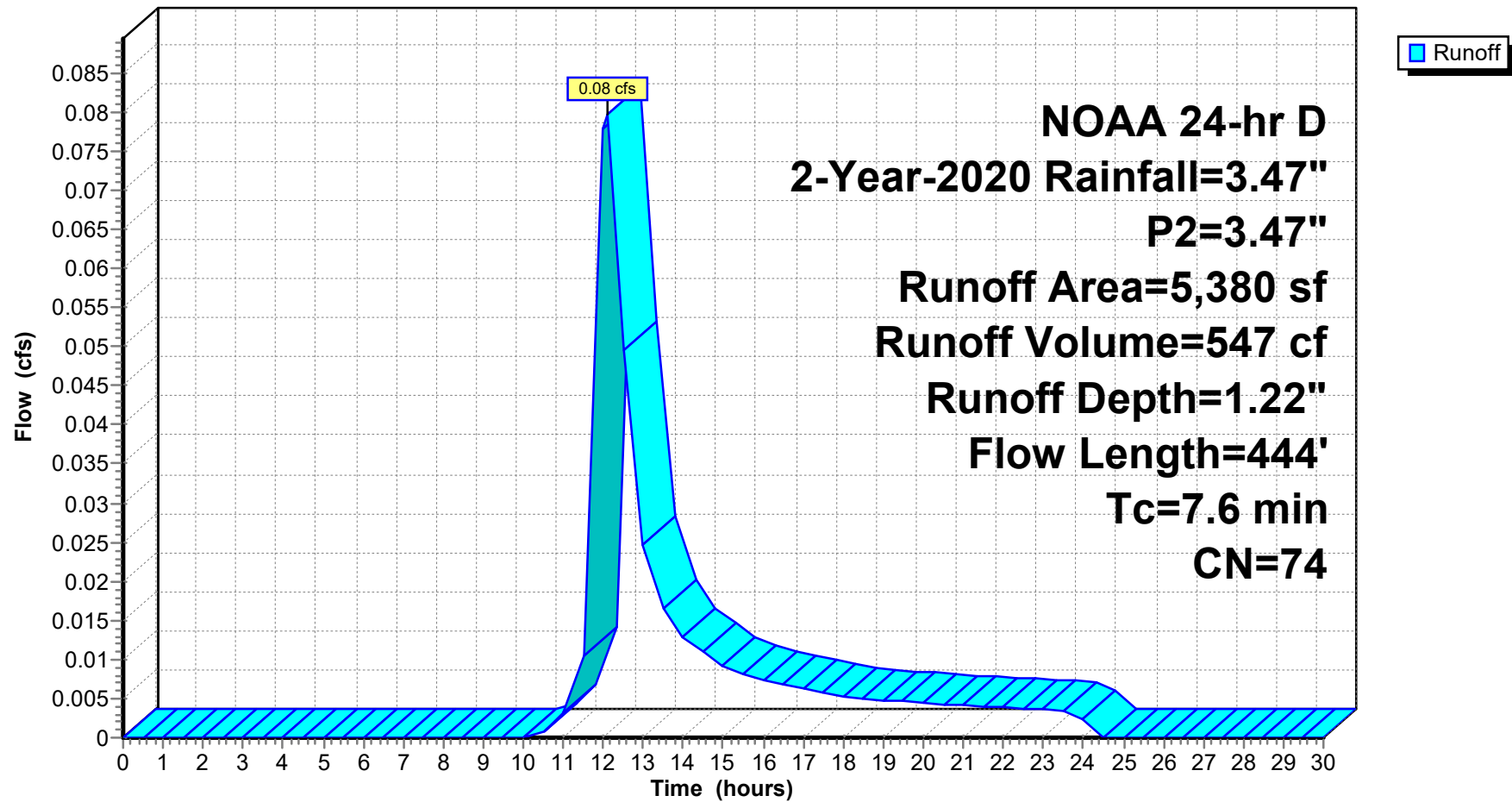
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,380     | 74 | >75% Grass cover, Good, HSG C |
| 5,380     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 7.3      | 83            | 0.0660        | 0.19              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.47"                                           |
| 0.1      | 36            | 0.0280        | 9.54              | 11.71          | <b>Pipe Channel, Yard Inlet</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012    |
| 0.2      | 325           | 0.0450        | 31.77             | 898.40         | <b>Pipe Channel, 72" Culvert</b><br>72.0" Round Area= 28.3 sf Perim= 18.8' r= 1.50'<br>n= 0.013 |
| 7.6      | 444           | Total         |                   |                |                                                                                                 |

Subcatchment P1-P: P1 PERVIOUS

Hydrograph



**24-223 DRAINAGE DESIGN-PROPOSED-2026-03-30**

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**Summary for Subcatchment P2: P2 Pervious-w-offsite-Undisturbed**

Runoff = 0.53 cfs @ 12.36 hrs, Volume= 4,227 cf, Depth= 1.10"  
 Routed to Link P-DP 1 : PROP DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

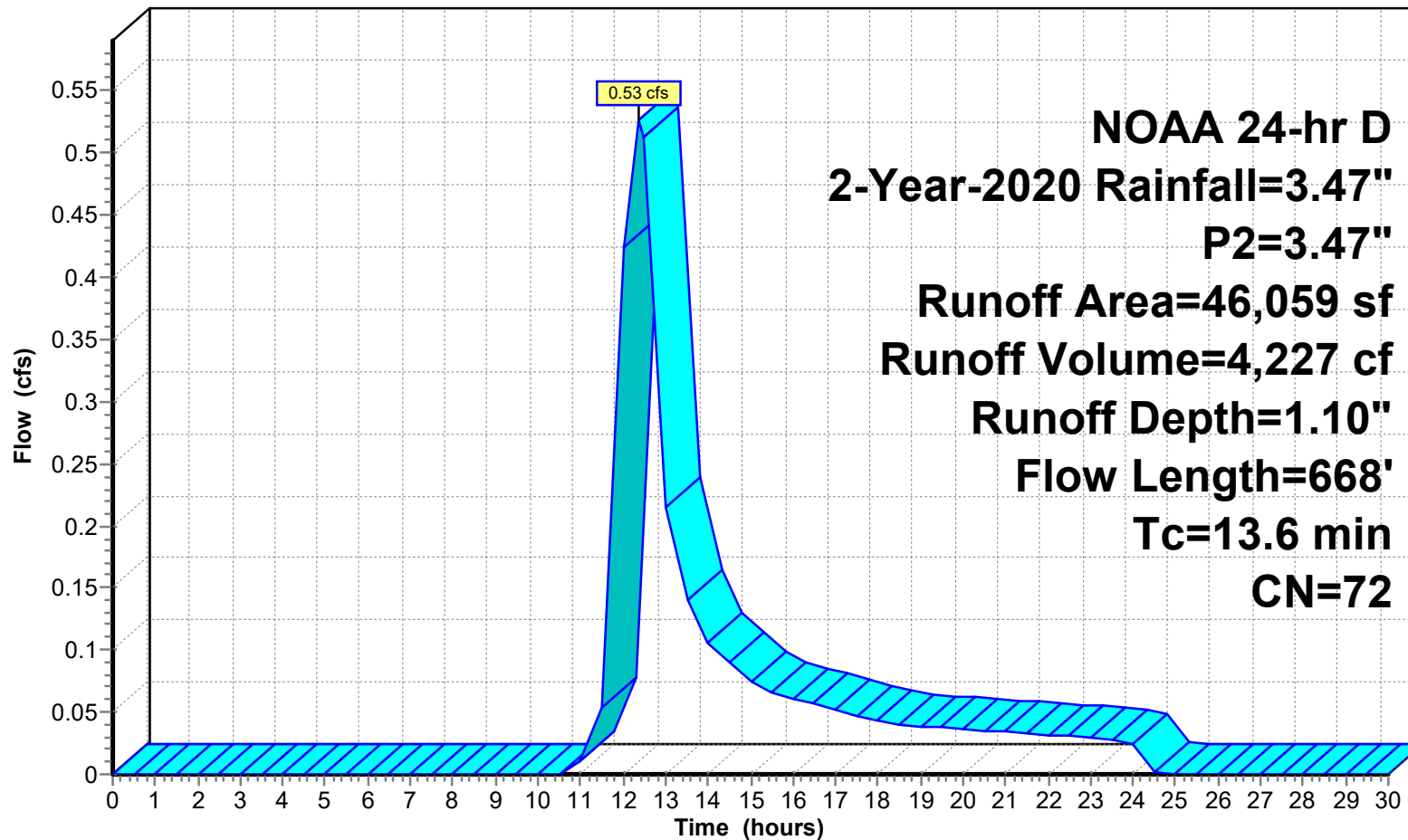
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,255  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,915   | 72 | Woods/grass comb., Good, HSG C |
| 46,059    | 72 | Weighted Average               |
| 44,131    |    | 95.81% Pervious Area           |
| 1,928     |    | 4.19% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 11.3     | 100           | 0.0900        | 0.15              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.47"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 13.6     | 668           | Total         |                   |                |                                               |

Subcatchment P2: P2 Pervious-w-offsite-Undisturbed

Hydrograph



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**Summary for Subcatchment P3A-IMP: P3A IMPERVIOUS**

Runoff = 0.17 cfs @ 12.01 hrs, Volume= 1,090 cf, Depth= 3.24"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

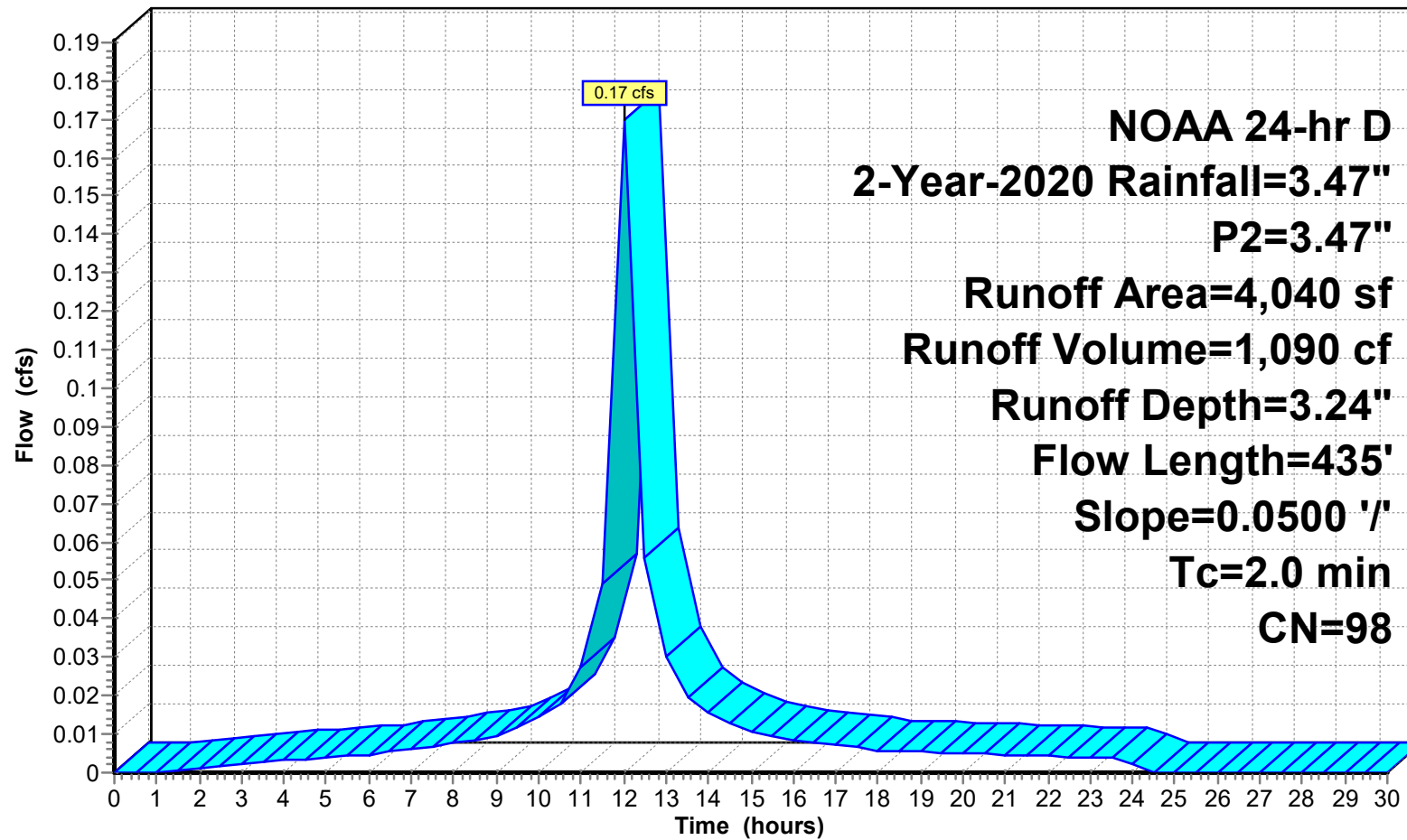
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,040   | 98 | DRIVE/SIDEWALK          |
| 4,040     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.8      | 100           | 0.0500        | 2.07              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 1.2      | 335           | 0.0500        | 4.54              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 2.0      | 435           | Total         |                   |                |                                                      |

Subcatchment P3A-IMP: P3A IMPERVIOUS

Hydrograph





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**Summary for Subcatchment P3A-P: P3A PERVIOUS**

Runoff = 0.09 cfs @ 12.08 hrs, Volume= 602 cf, Depth= 1.22"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

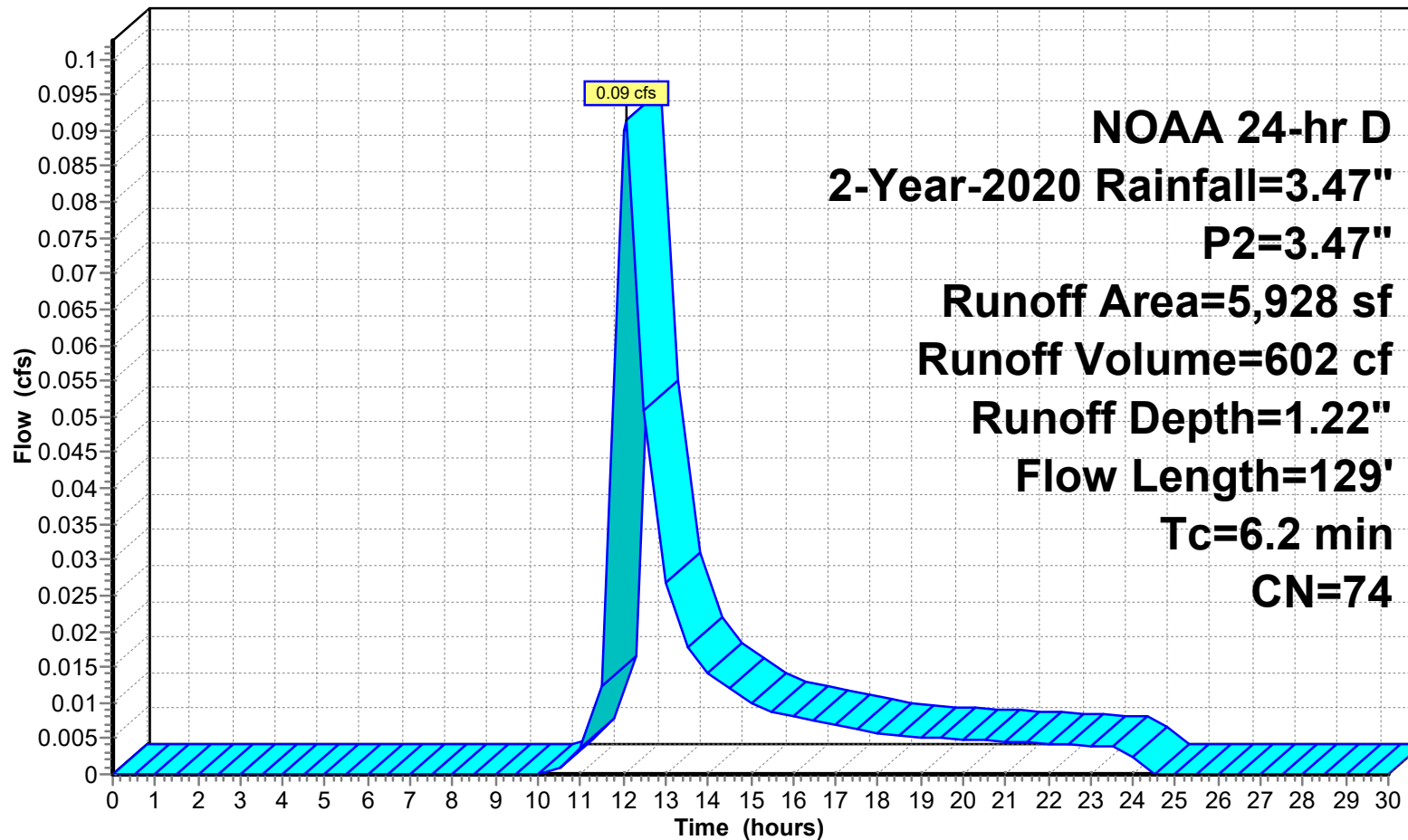
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,928     | 74 | >75% Grass cover, Good, HSG C |
| 5,928     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 6.1      | 100           | 0.0600        | 0.27              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.1      | 29            | 0.0550        | 3.78              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 6.2      | 129           | Total         |                   |                |                                        |

Subcatchment P3A-P: P3A PERVIOUS

Hydrograph



Runoff

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**Summary for Subcatchment P3B-IMP: P3B IMPERVIOUS**

Runoff = 0.04 cfs @ 12.00 hrs, Volume= 264 cf, Depth= 3.24"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

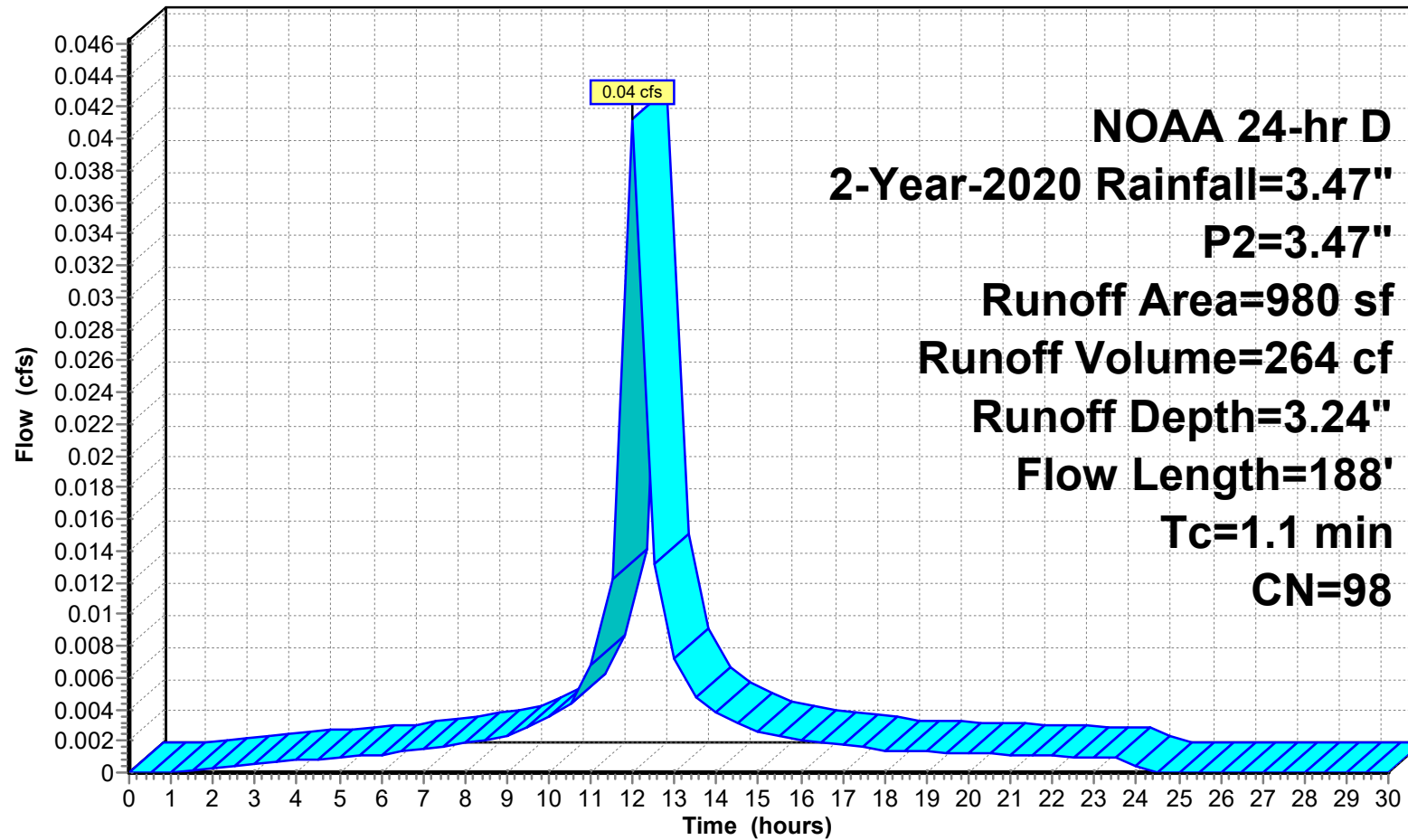
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 980     | 98 | SIDEWALK AREA           |
| 980       |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.61              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 0.5      | 88            | 0.0220        | 3.01              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment P3B-IMP: P3B IMPERVIOUS

Hydrograph



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**Summary for Subcatchment P3B-P: P3B PERVIOUS**

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 191 cf, Depth= 1.22"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

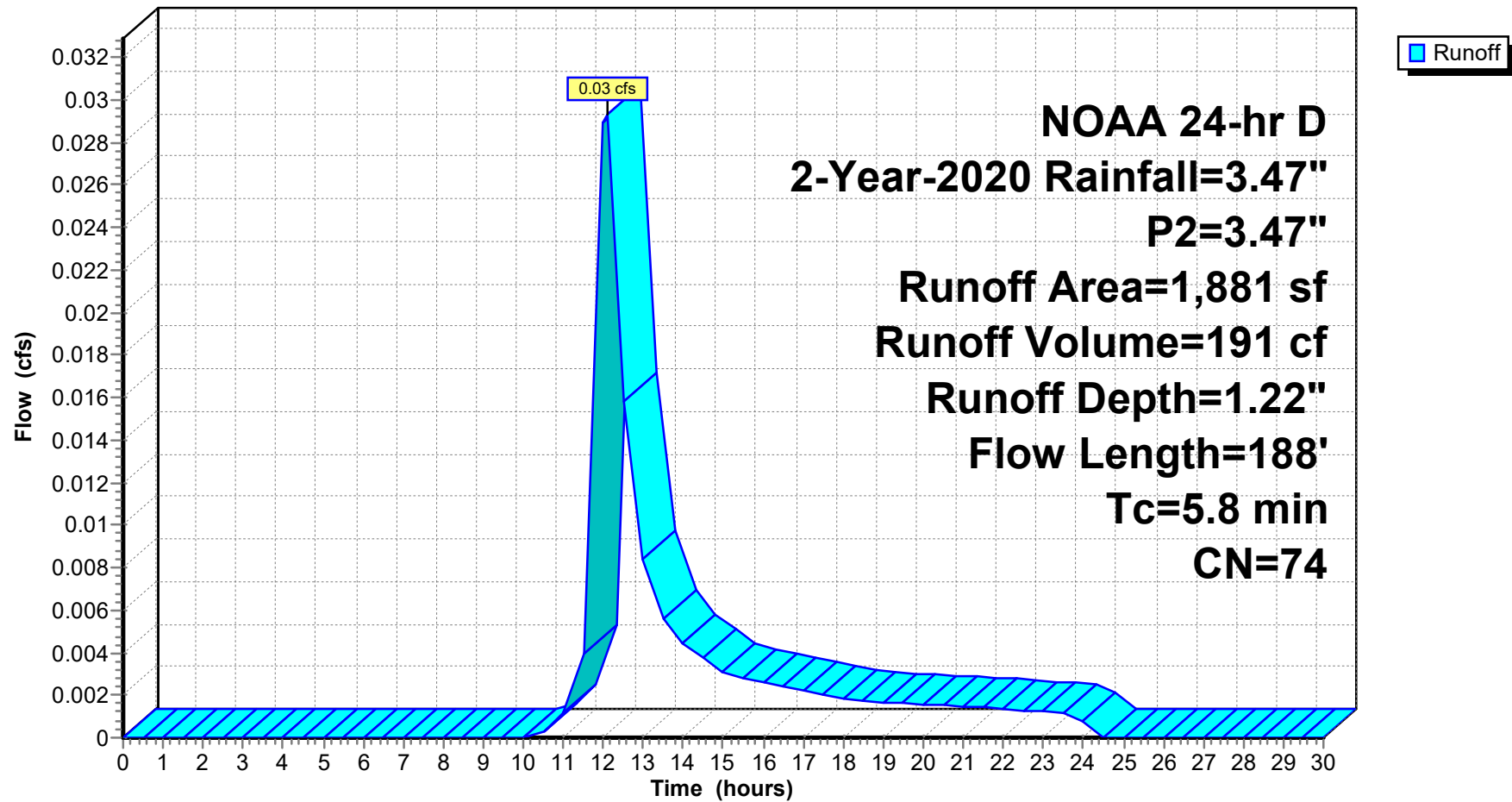
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,881     | 74 | >75% Grass cover, Good, HSG C |
| 1,881     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.2      | 100           | 0.0900        | 0.32              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.6      | 88            | 0.0230        | 2.44              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.8      | 188           | Total         |                   |                |                                        |

Subcatchment P3B-P: P3B PERVIOUS

Hydrograph



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**Summary for Subcatchment P3C: P3C- Roof Area**

Runoff = 0.19 cfs @ 12.00 hrs, Volume= 1,214 cf, Depth= 3.24"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2020 Rainfall=3.47", P2=3.47"

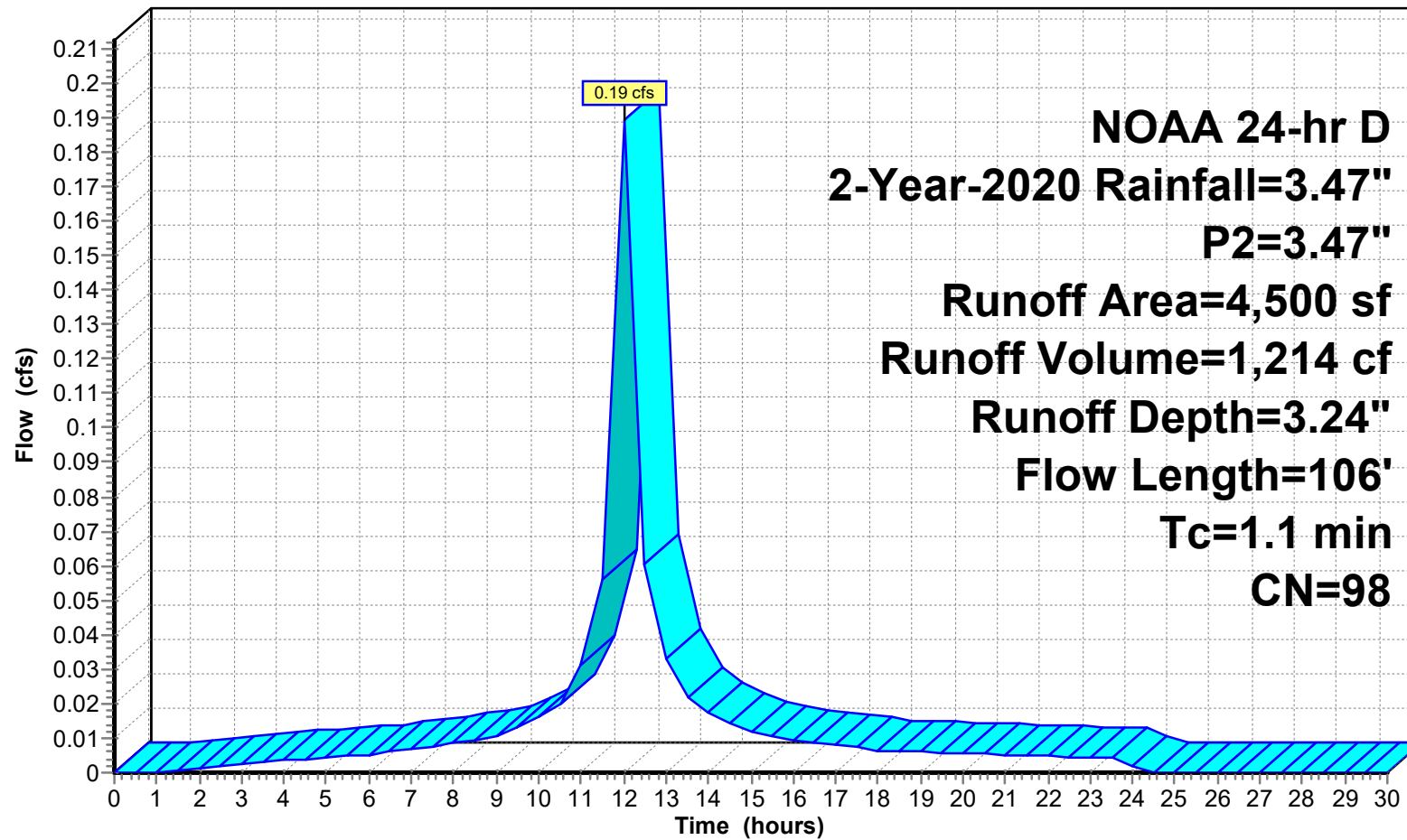
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,500   | 98 | Roof and Amenity Area   |
| 4,500     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 0.9      | 52            | 0.0100        | 0.95              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 3.47"                                 |
| 0.2      | 54            | 0.0216        | 5.51              | 1.92           | <b>Pipe Channel, 8 ROOF DRAIN</b><br>8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'<br>n= 0.012 |
| 1.1      | 106           | Total         |                   |                |                                                                                               |

Subcatchment P3C: P3C- Roof Area

Hydrograph





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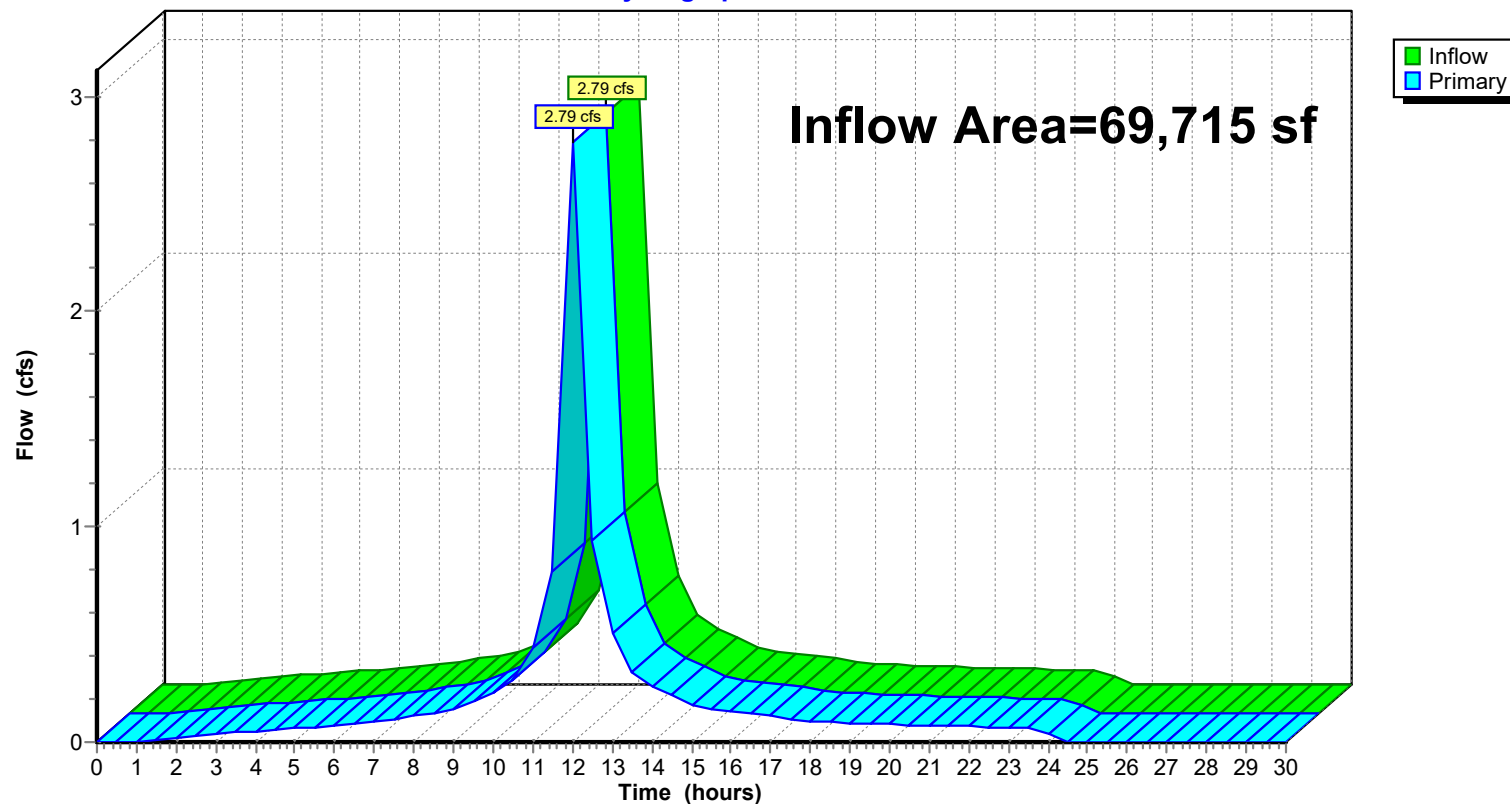
### Summary for Link 11L: Proposed Disturbed

Inflow Area = 69,715 sf, 92.28% Impervious, Inflow Depth = 3.08" for 2-Year-2020 event  
Inflow = 2.79 cfs @ 12.01 hrs, Volume= 17,899 cf  
Primary = 2.79 cfs @ 12.01 hrs, Volume= 17,899 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link P-DP 1 : PROP DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 11L: Proposed Disturbed

#### Hydrograph



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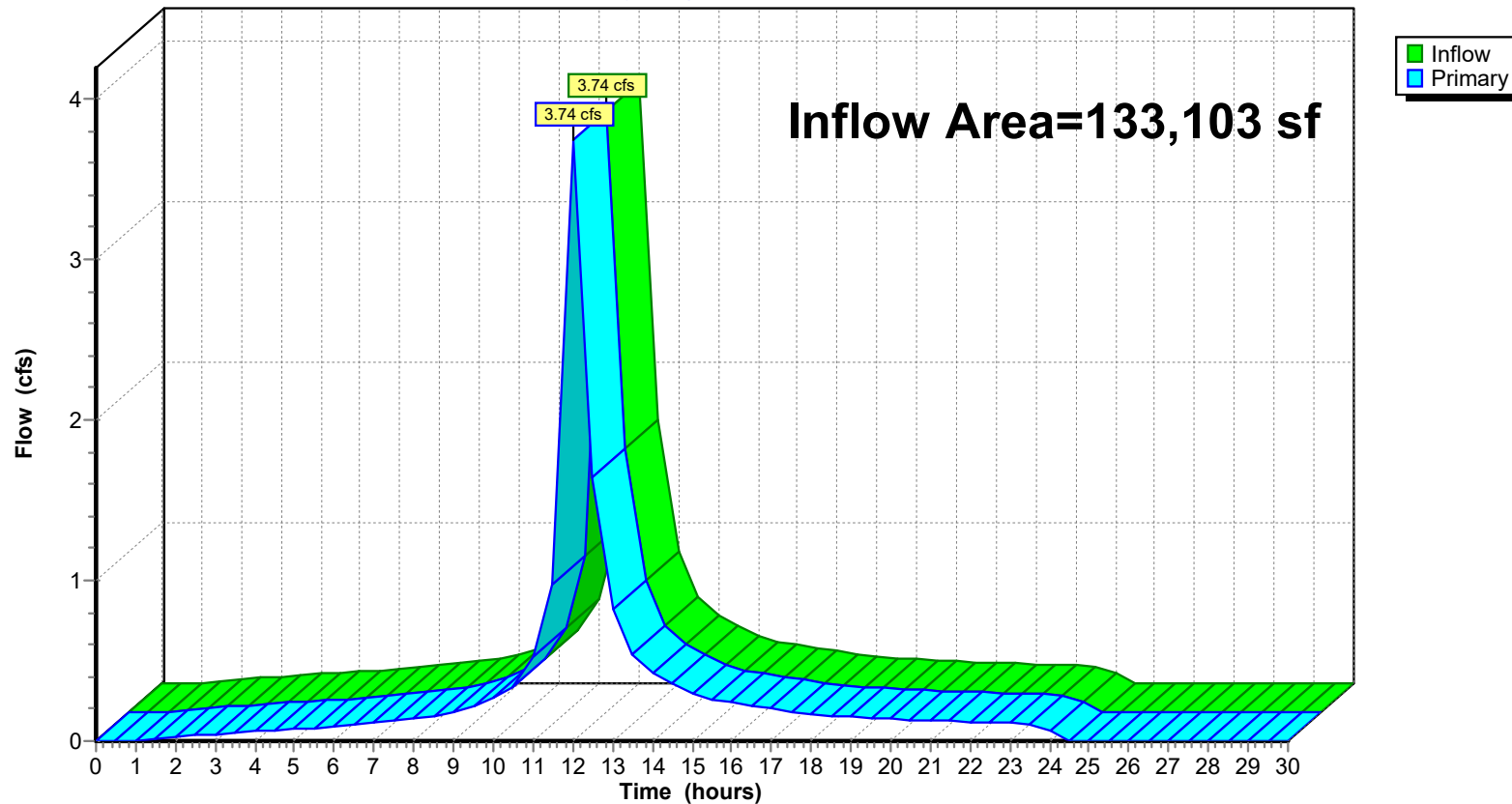
### Summary for Link 15L: TOTAL PROPOSED

Inflow Area = 133,103 sf, 56.94% Impervious, Inflow Depth = 2.30" for 2-Year-2020 event  
Inflow = 3.74 cfs @ 12.03 hrs, Volume= 25,487 cf  
Primary = 3.74 cfs @ 12.03 hrs, Volume= 25,487 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 15L: TOTAL PROPOSED

#### Hydrograph



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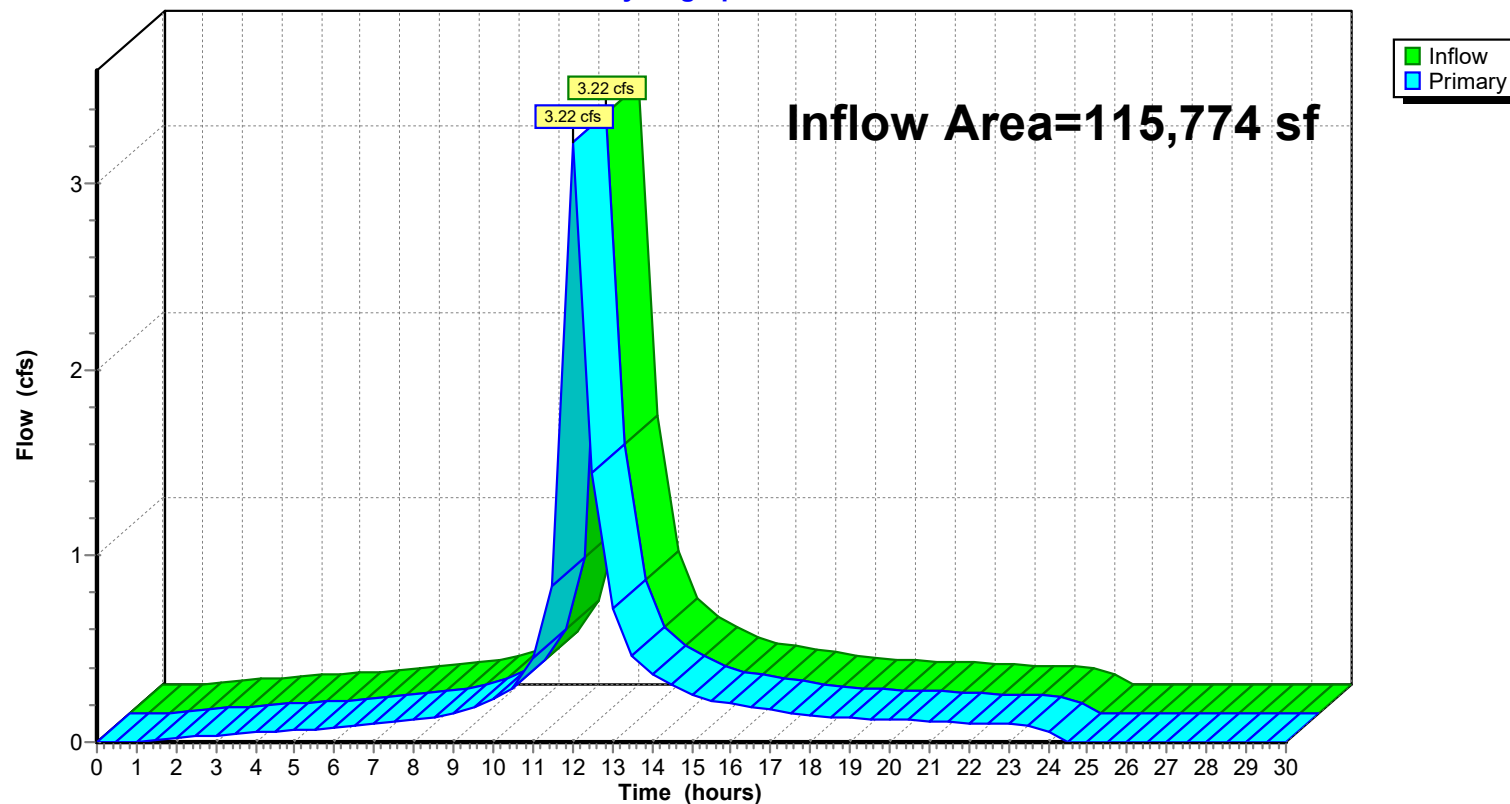
### Summary for Link P-DP 1: PROP DP 1

Inflow Area = 115,774 sf, 57.23% Impervious, Inflow Depth = 2.29" for 2-Year-2020 event  
Inflow = 3.22 cfs @ 12.04 hrs, Volume= 22,126 cf  
Primary = 3.22 cfs @ 12.04 hrs, Volume= 22,126 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 1: PROP DP 1

#### Hydrograph



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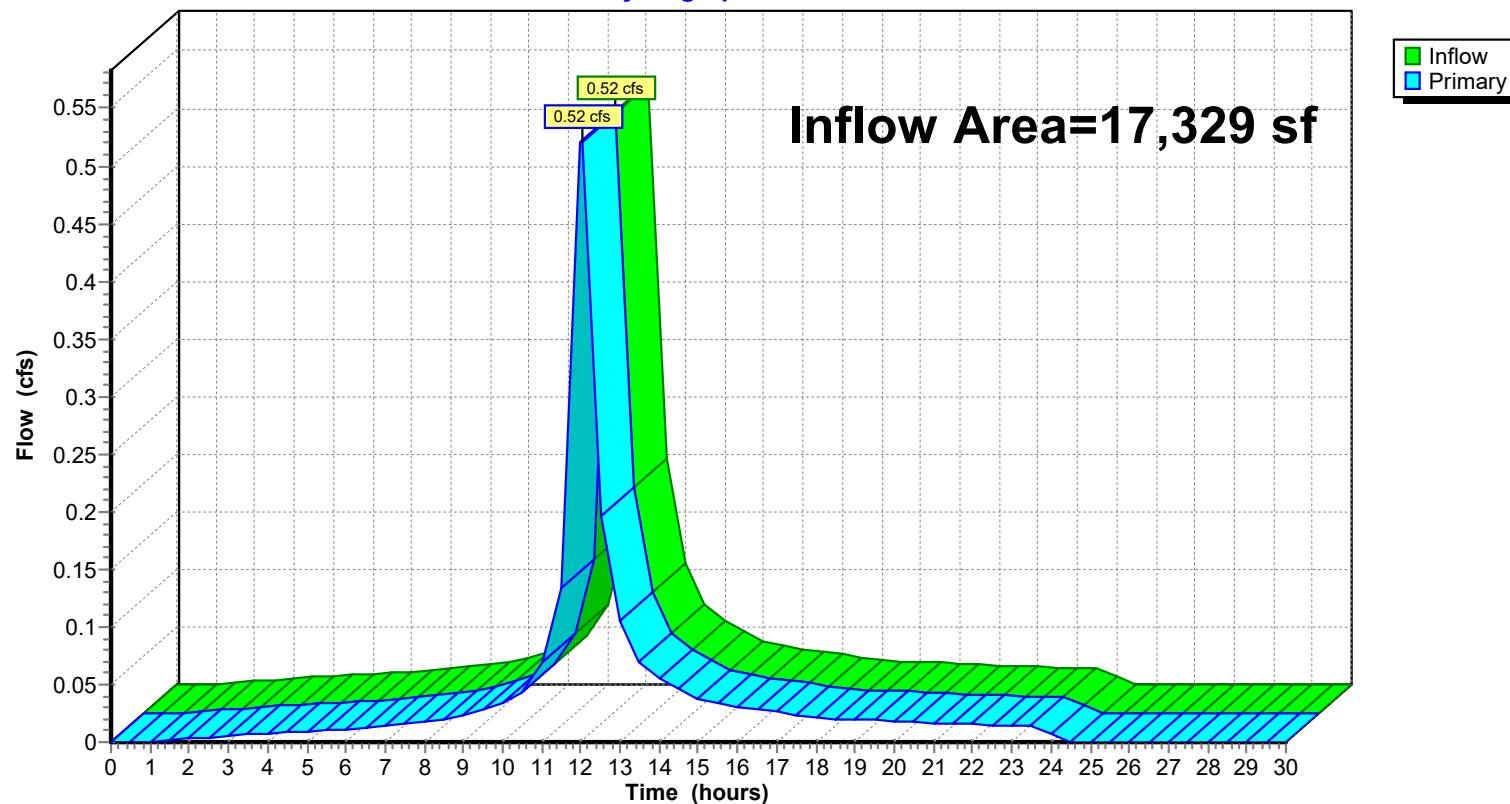
### Summary for Link P-DP 2: PROP DP 2

Inflow Area = 17,329 sf, 54.94% Impervious, Inflow Depth = 2.33" for 2-Year-2020 event  
Inflow = 0.52 cfs @ 12.02 hrs, Volume= 3,361 cf  
Primary = 0.52 cfs @ 12.02 hrs, Volume= 3,361 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 2: PROP DP 2

#### Hydrograph



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**Summary for Subcatchment 1S: Roof**

Runoff = 2.63 cfs @ 12.01 hrs, Volume= 17,159 cf, Depth= 5.14"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

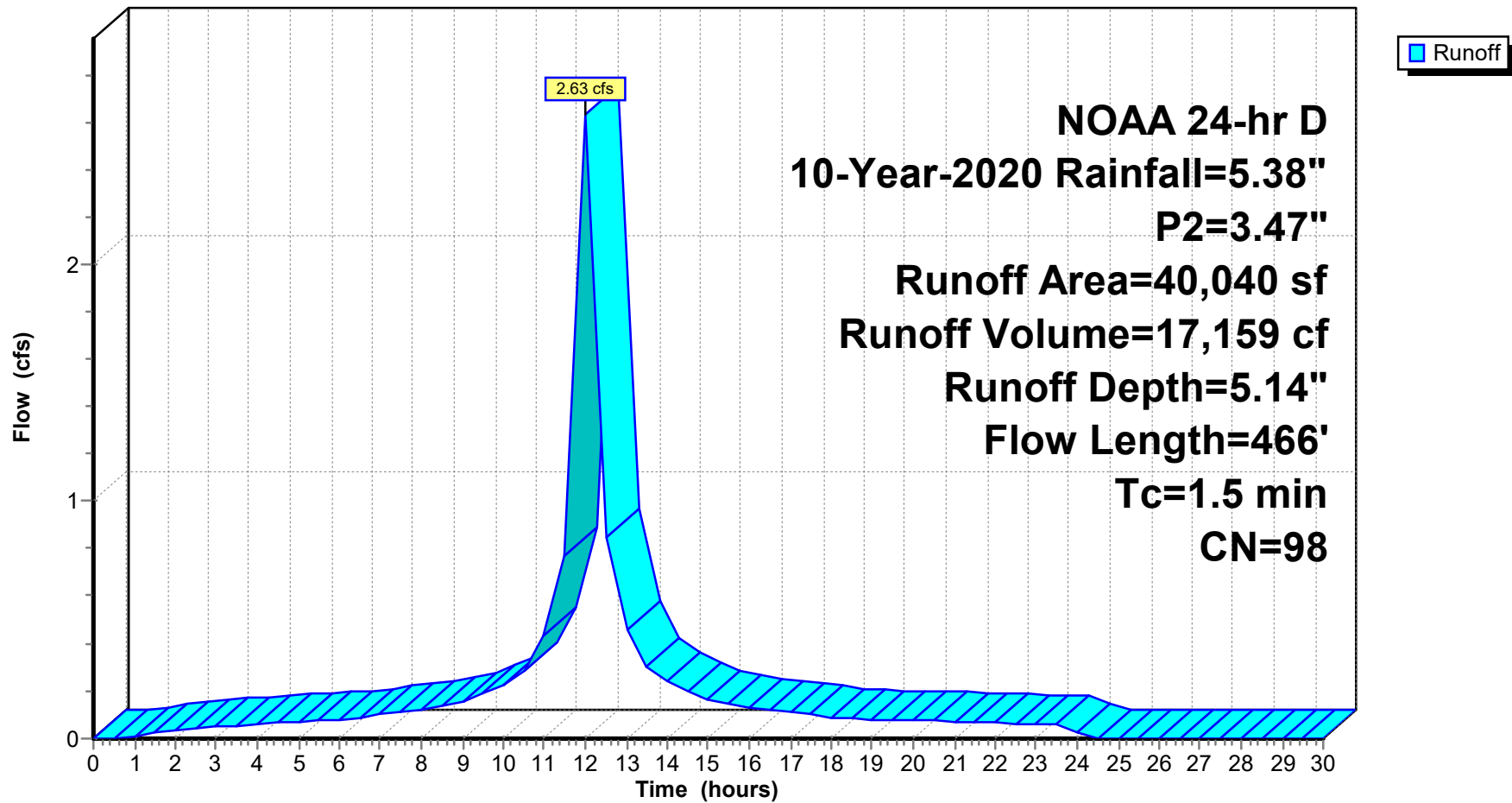
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 40,040  | 98 | Roof and Amenity Area   |
| 40,040    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 0.7      | 53            | 0.0200        | 1.26              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 3.47"                                   |
| 0.5      | 196           | 0.0200        | 6.95              | 5.46           | <b>Pipe Channel, 12 ROOF DRAIN</b><br>12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'<br>n= 0.012 |
| 0.3      | 217           | 0.0424        | 11.74             | 14.41          | <b>Pipe Channel, 15</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012            |
| 1.5      | 466           | Total         |                   |                |                                                                                                 |

Subcatchment 1S: Roof

Hydrograph



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**Summary for Subcatchment P1-I: P1 IMPERVIOUS PARKING**

Runoff = 1.59 cfs @ 12.01 hrs, Volume= 10,412 cf, Depth= 5.14"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

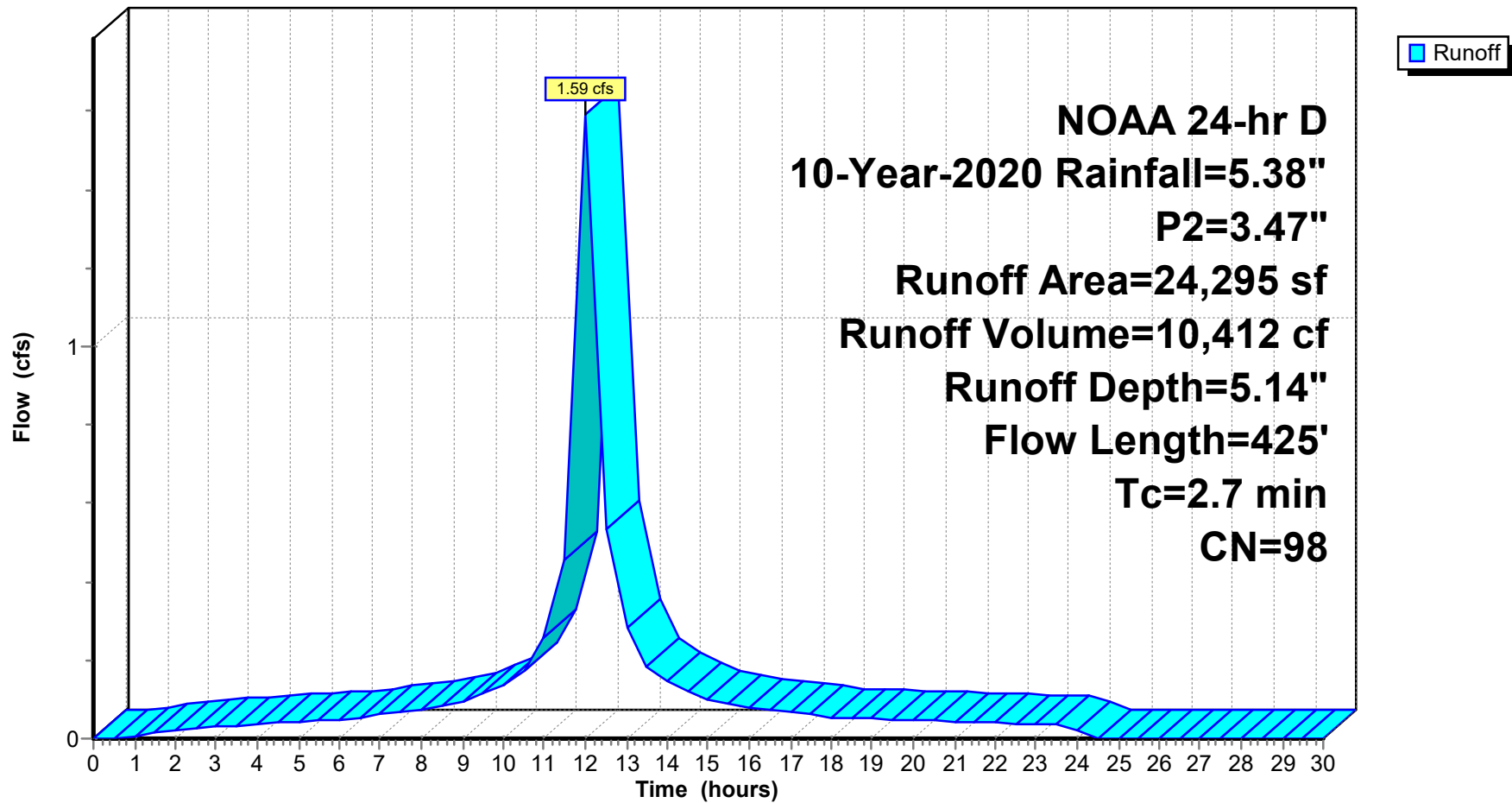
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 24,295  | 98 | Uncovered Paved parking, HSG C |
| 24,295    |    | 100.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                 |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------------|
| 1.5      | 100           | 0.0150        | 1.12              |                | <b>Sheet Flow, sheet flow Parking area</b><br>n= 0.013 P2= 3.47"                            |
| 0.9      | 127           | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow, parking area</b><br>Paved Kv= 20.3 fps                        |
| 0.3      | 198           | 0.0449        | 12.08             | 14.83          | <b>Pipe Channel, Pipe flow</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012 |
| 2.7      | 425           | Total         |                   |                |                                                                                             |

Subcatchment P1-I: P1 IMPERVIOUS PARKING

Hydrograph





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**Summary for Subcatchment P1-P: P1 PERVIOUS**

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 1,197 cf, Depth= 2.67"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

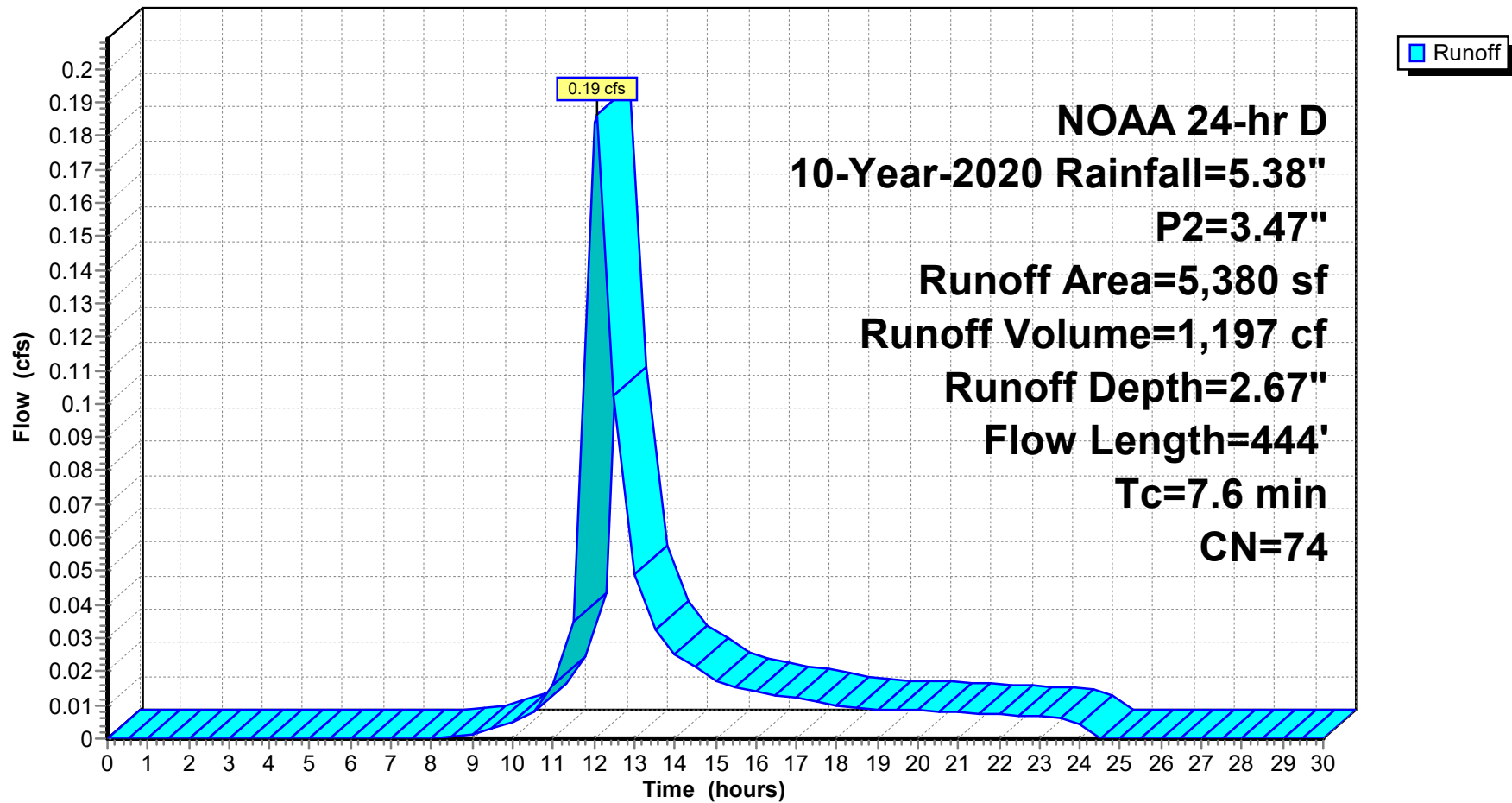
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,380     | 74 | >75% Grass cover, Good, HSG C |
| 5,380     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 7.3      | 83            | 0.0660        | 0.19              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.47"                                           |
| 0.1      | 36            | 0.0280        | 9.54              | 11.71          | <b>Pipe Channel, Yard Inlet</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012    |
| 0.2      | 325           | 0.0450        | 31.77             | 898.40         | <b>Pipe Channel, 72" Culvert</b><br>72.0" Round Area= 28.3 sf Perim= 18.8' r= 1.50'<br>n= 0.013 |
| 7.6      | 444           | Total         |                   |                |                                                                                                 |

Subcatchment P1-P: P1 PERVIOUS

Hydrograph



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**Summary for Subcatchment P2: P2 Pervious-w-offsite-Undisturbed**

Runoff = 1.22 cfs @ 12.27 hrs, Volume= 9,574 cf, Depth= 2.49"  
 Routed to Link P-DP 1 : PROP DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

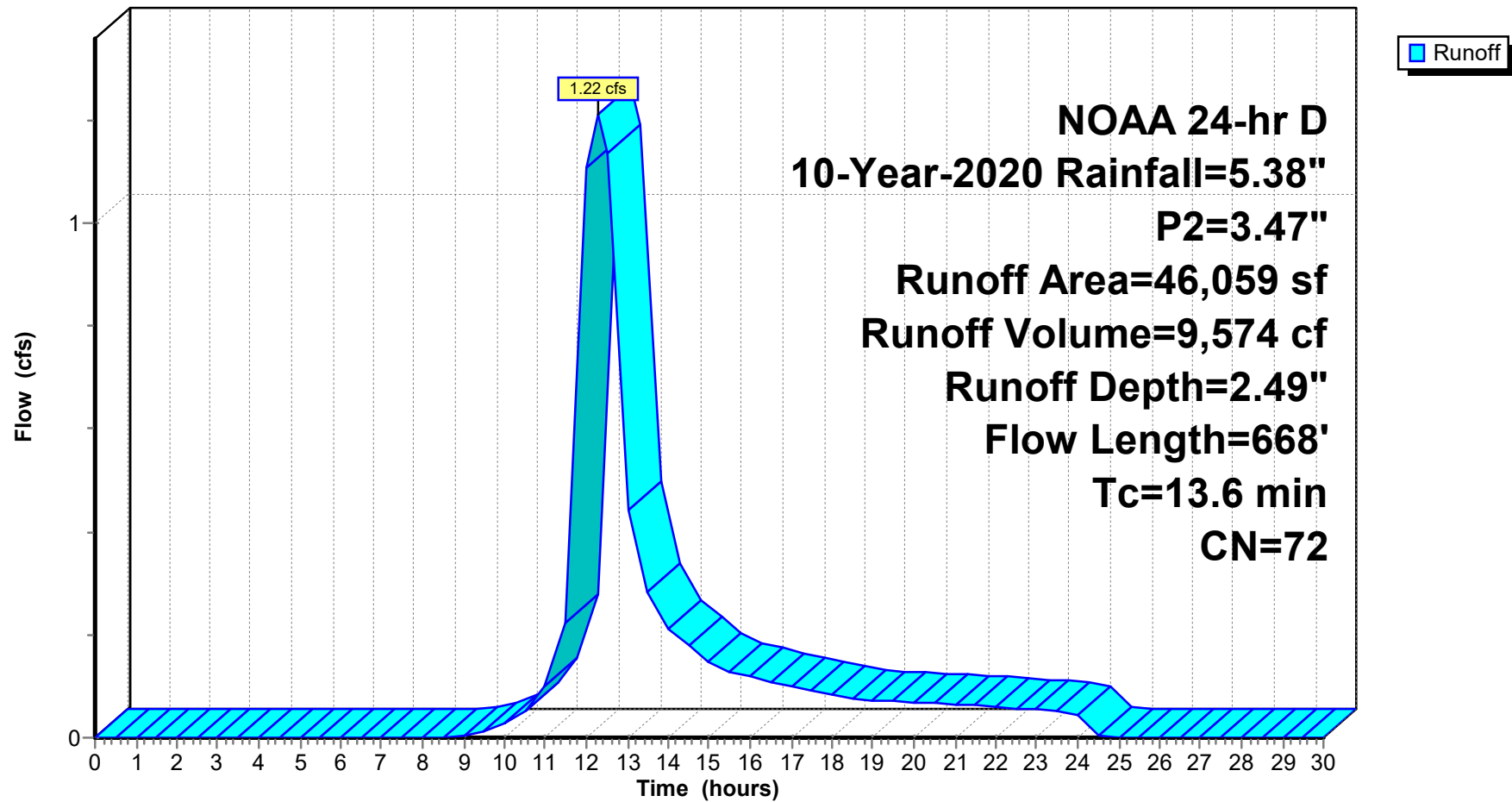
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,255  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,915   | 72 | Woods/grass comb., Good, HSG C |
| 46,059    | 72 | Weighted Average               |
| 44,131    |    | 95.81% Pervious Area           |
| 1,928     |    | 4.19% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 11.3     | 100           | 0.0900        | 0.15              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.47"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 13.6     | 668           | Total         |                   |                |                                               |

Subcatchment P2: P2 Pervious-w-offsite-Undisturbed

Hydrograph



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**Summary for Subcatchment P3A-IMP: P3A IMPERVIOUS**

Runoff = 0.27 cfs @ 12.01 hrs, Volume= 1,731 cf, Depth= 5.14"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

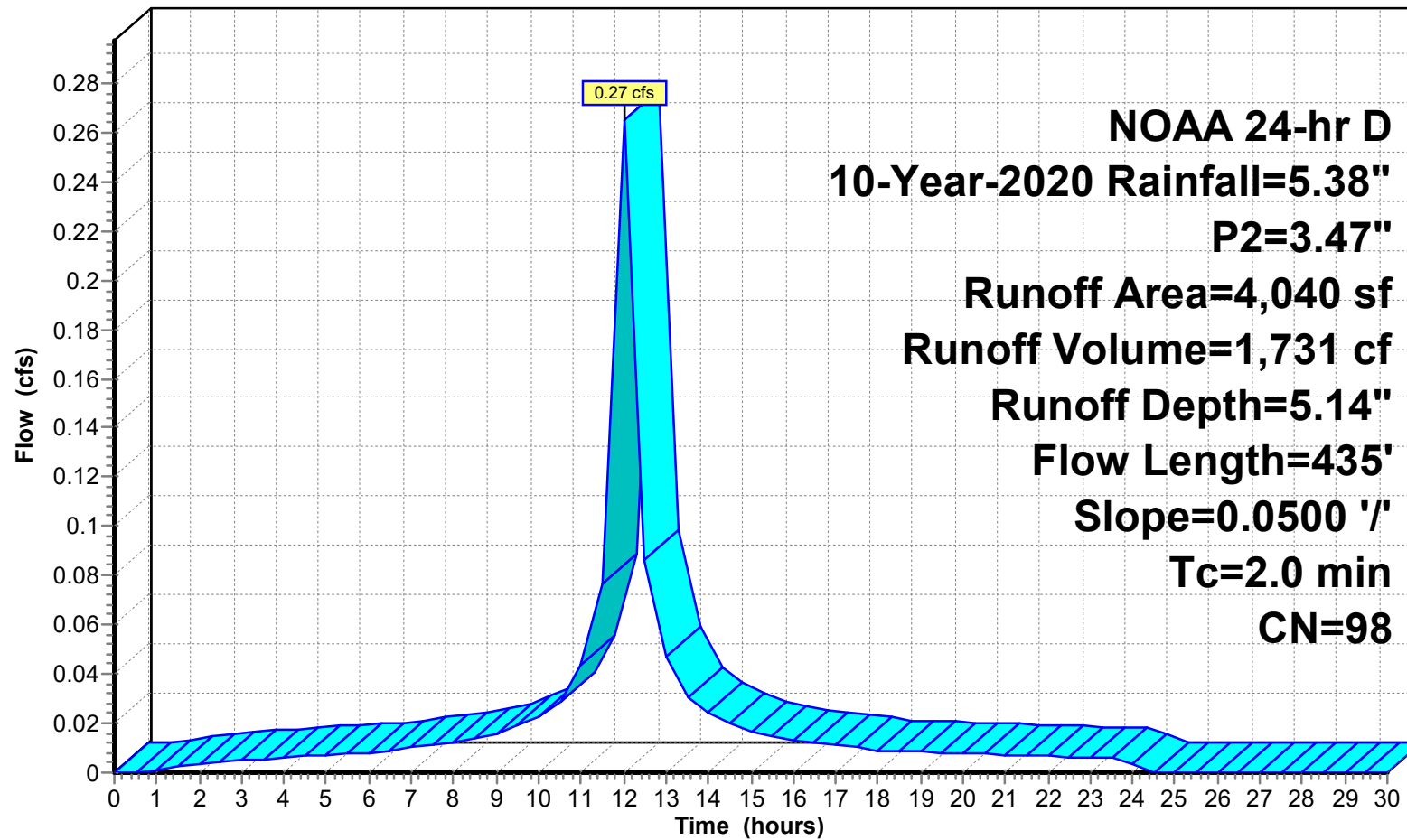
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,040   | 98 | DRIVE/SIDEWALK          |
| 4,040     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.8      | 100           | 0.0500        | 2.07              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 1.2      | 335           | 0.0500        | 4.54              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 2.0      | 435           | Total         |                   |                |                                                      |

Subcatchment P3A-IMP: P3A IMPERVIOUS

Hydrograph



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**Summary for Subcatchment P3A-P: P3A PERVIOUS**

Runoff = 0.21 cfs @ 12.06 hrs, Volume= 1,319 cf, Depth= 2.67"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

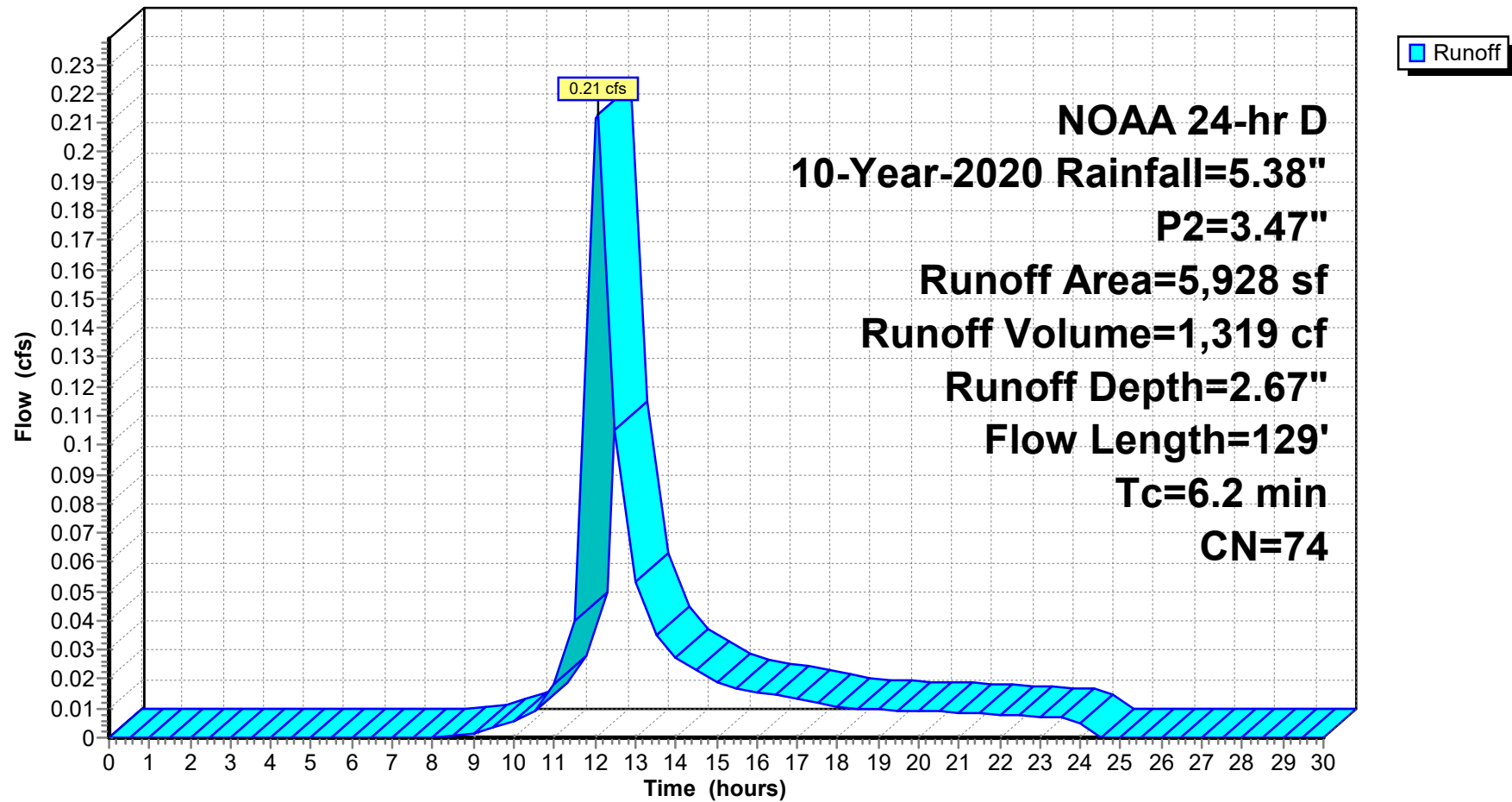
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,928     | 74 | >75% Grass cover, Good, HSG C |
| 5,928     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 6.1      | 100           | 0.0600        | 0.27              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.1      | 29            | 0.0550        | 3.78              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 6.2      | 129           | Total         |                   |                |                                        |

Subcatchment P3A-P: P3A PERVIOUS

Hydrograph





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**Summary for Subcatchment P3B-IMP: P3B IMPERVIOUS**

Runoff = 0.06 cfs @ 12.00 hrs, Volume= 420 cf, Depth= 5.14"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

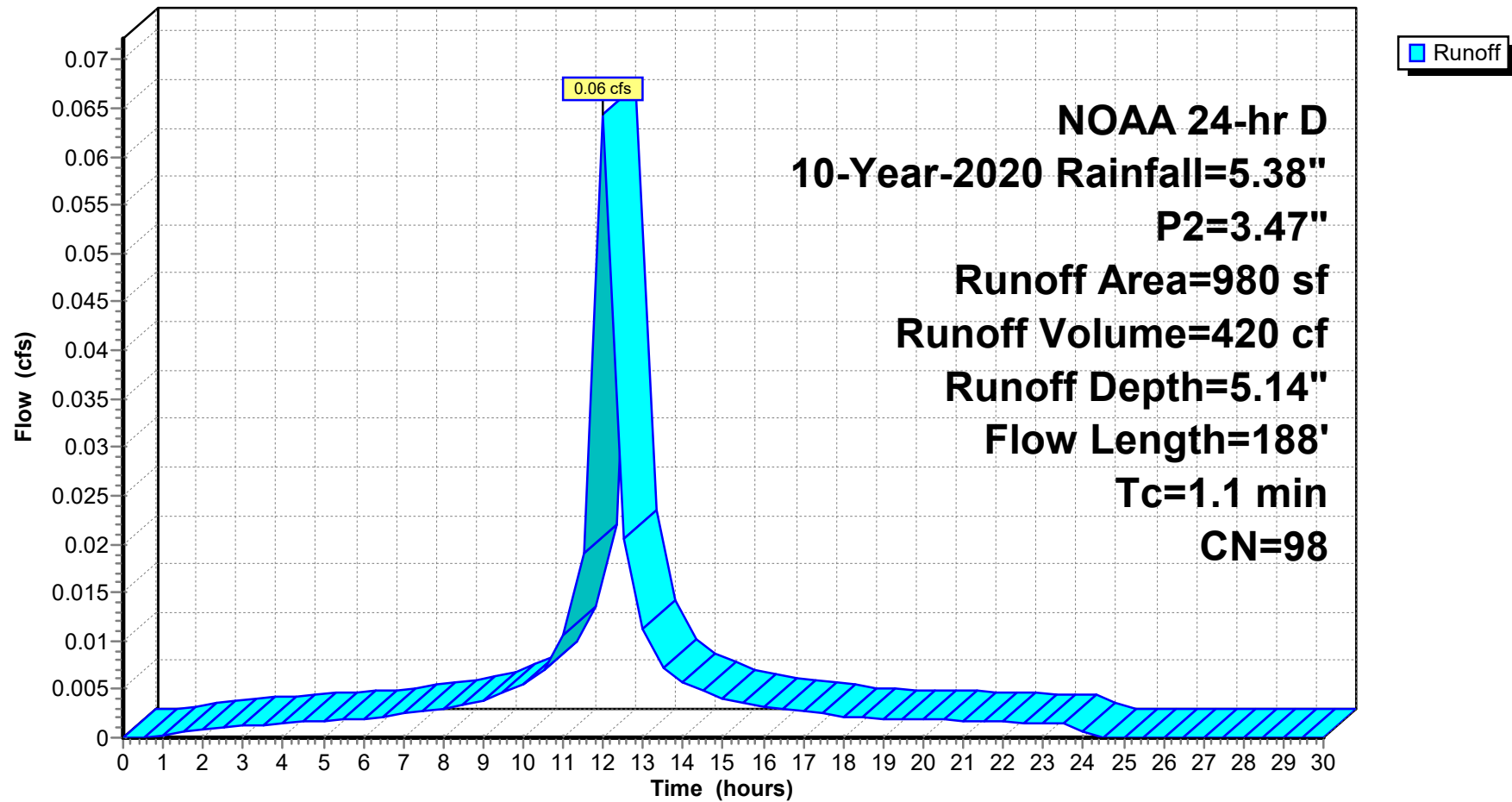
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 980     | 98 | SIDEWALK AREA           |
| 980       |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.61              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 0.5      | 88            | 0.0220        | 3.01              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment P3B-IMP: P3B IMPERVIOUS

Hydrograph



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**Summary for Subcatchment P3B-P: P3B PERVIOUS**

Runoff = 0.07 cfs @ 12.05 hrs, Volume= 419 cf, Depth= 2.67"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

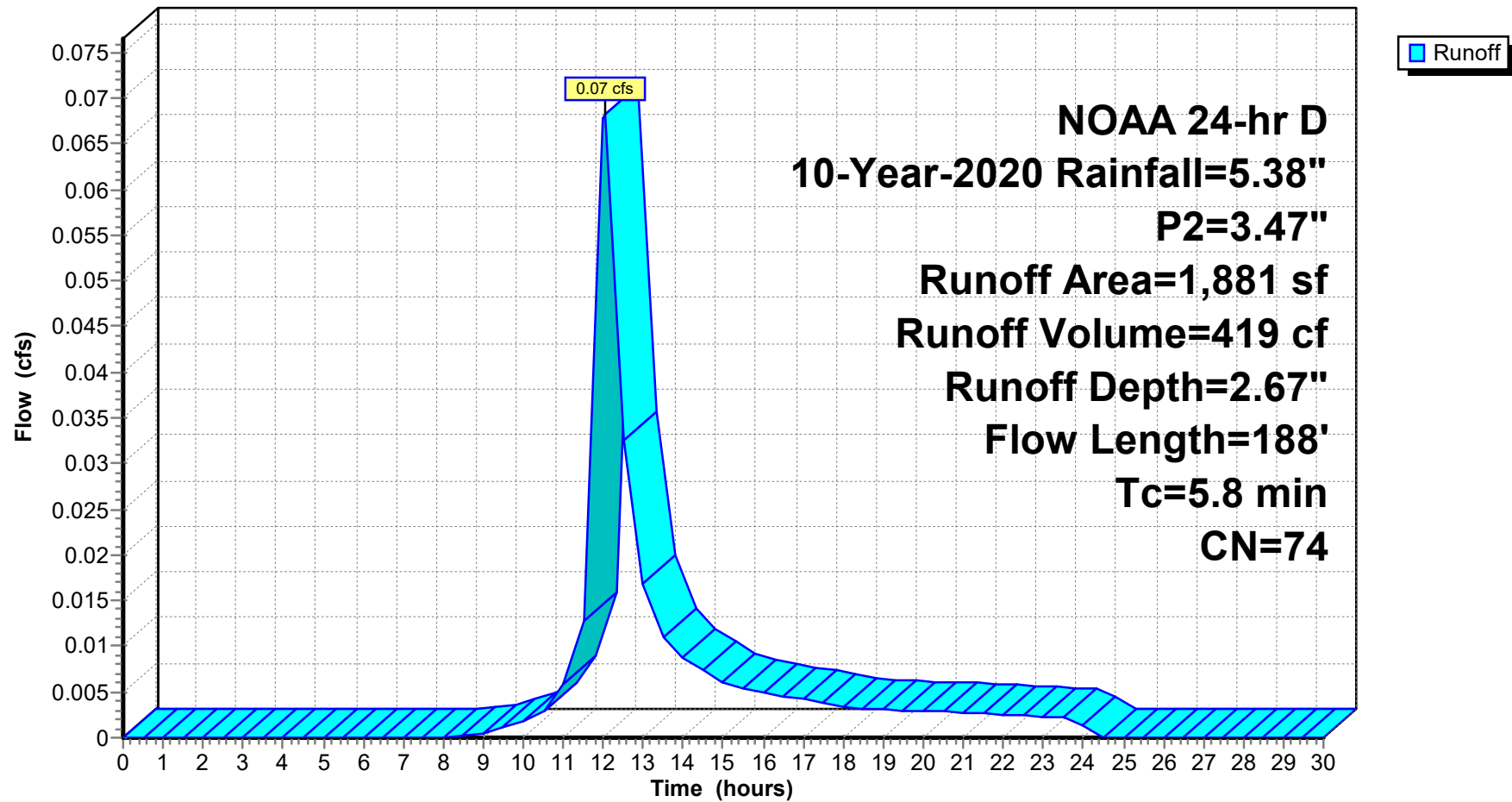
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,881     | 74 | >75% Grass cover, Good, HSG C |
| 1,881     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.2      | 100           | 0.0900        | 0.32              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.6      | 88            | 0.0230        | 2.44              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.8      | 188           | Total         |                   |                |                                        |

Subcatchment P3B-P: P3B PERVIOUS

Hydrograph



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**Summary for Subcatchment P3C: P3C- Roof Area**

Runoff = 0.30 cfs @ 12.00 hrs, Volume= 1,928 cf, Depth= 5.14"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2020 Rainfall=5.38", P2=3.47"

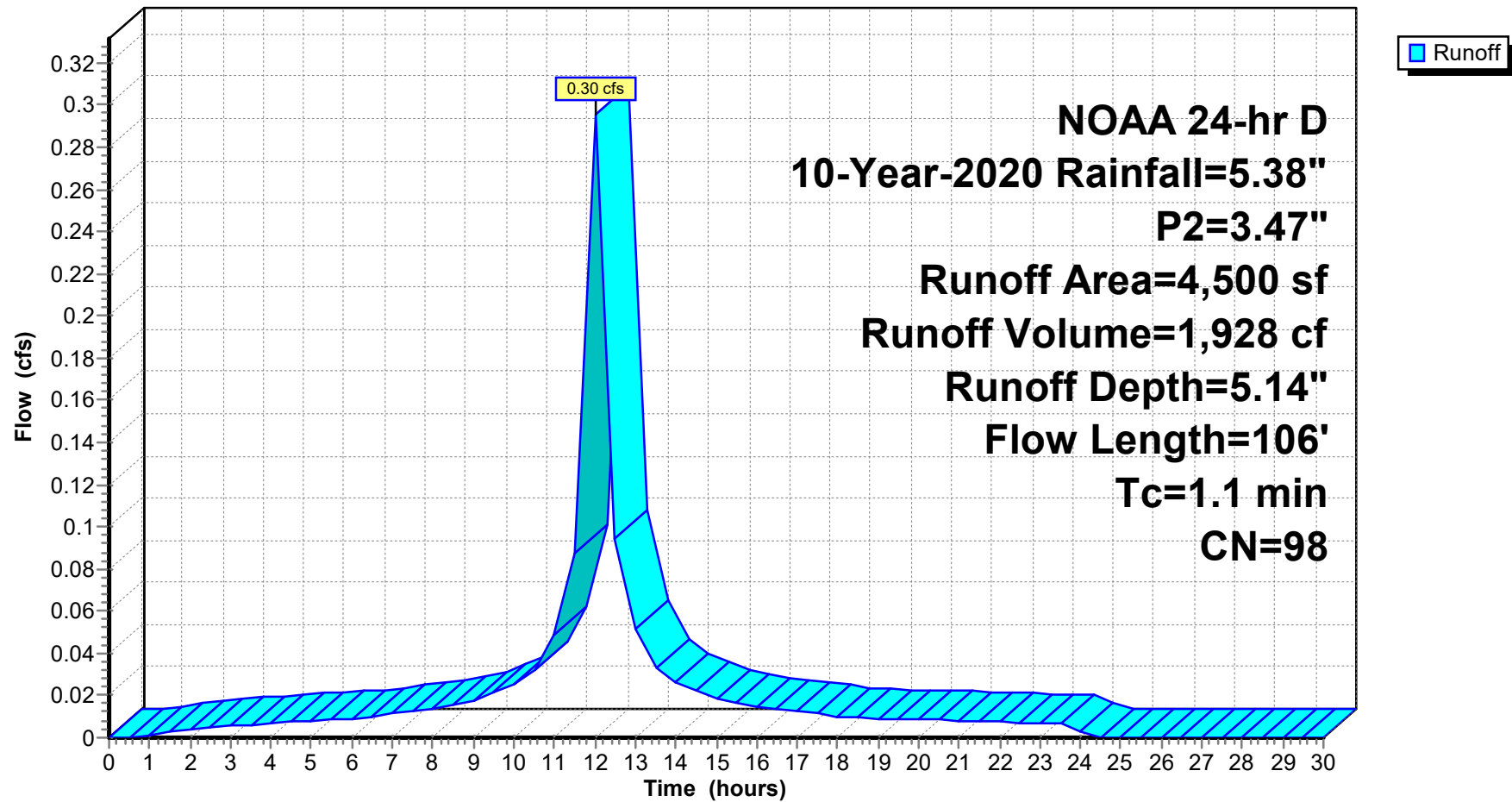
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,500   | 98 | Roof and Amenity Area   |
| 4,500     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 0.9      | 52            | 0.0100        | 0.95              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 3.47"                                 |
| 0.2      | 54            | 0.0216        | 5.51              | 1.92           | <b>Pipe Channel, 8 ROOF DRAIN</b><br>8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'<br>n= 0.012 |
| 1.1      | 106           | Total         |                   |                |                                                                                               |

Subcatchment P3C: P3C- Roof Area

Hydrograph



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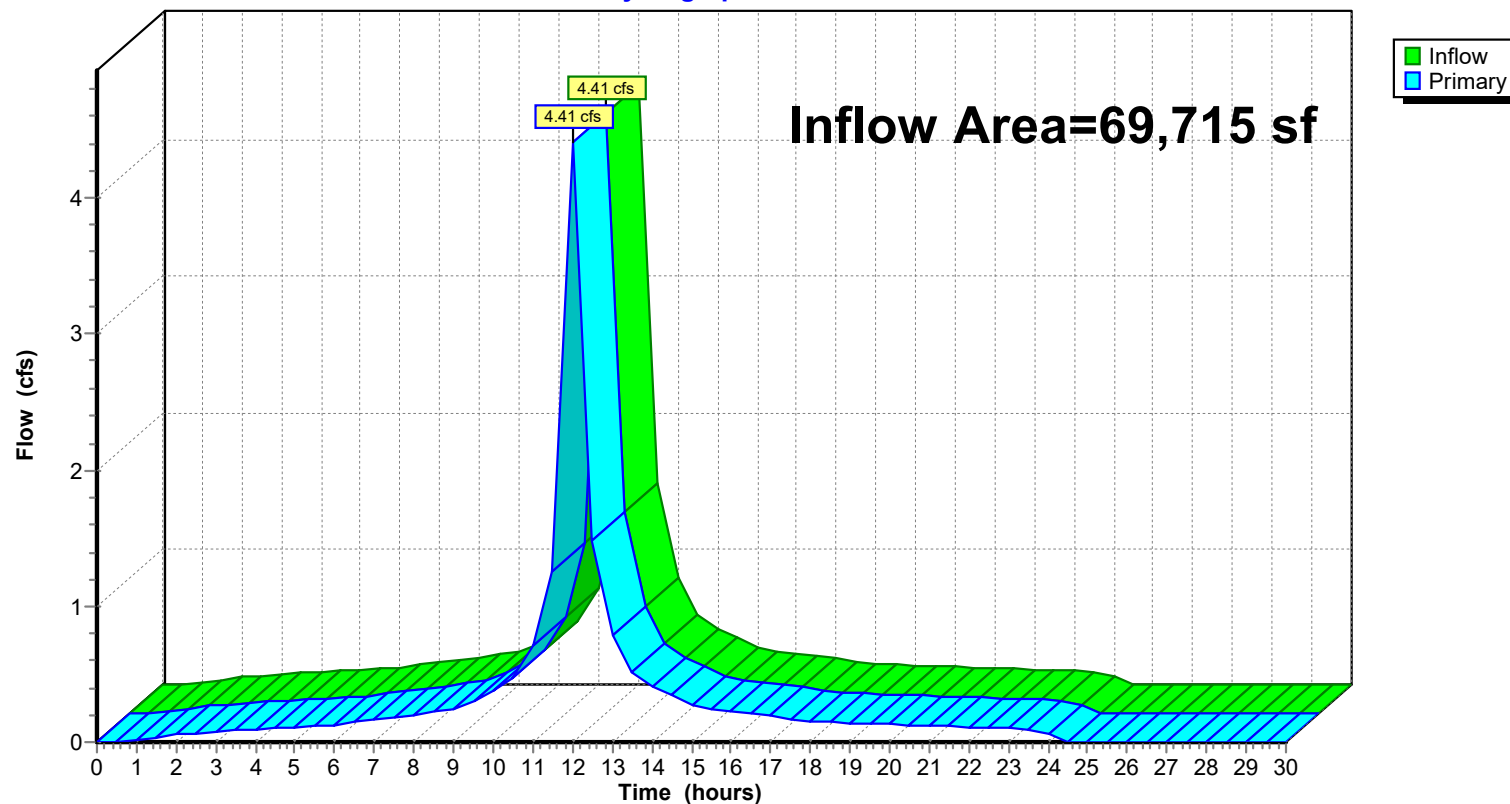
### Summary for Link 11L: Proposed Disturbed

Inflow Area = 69,715 sf, 92.28% Impervious, Inflow Depth = 4.95" for 10-Year-2020 event  
Inflow = 4.41 cfs @ 12.01 hrs, Volume= 28,768 cf  
Primary = 4.41 cfs @ 12.01 hrs, Volume= 28,768 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link P-DP 1 : PROP DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 11L: Proposed Disturbed

#### Hydrograph



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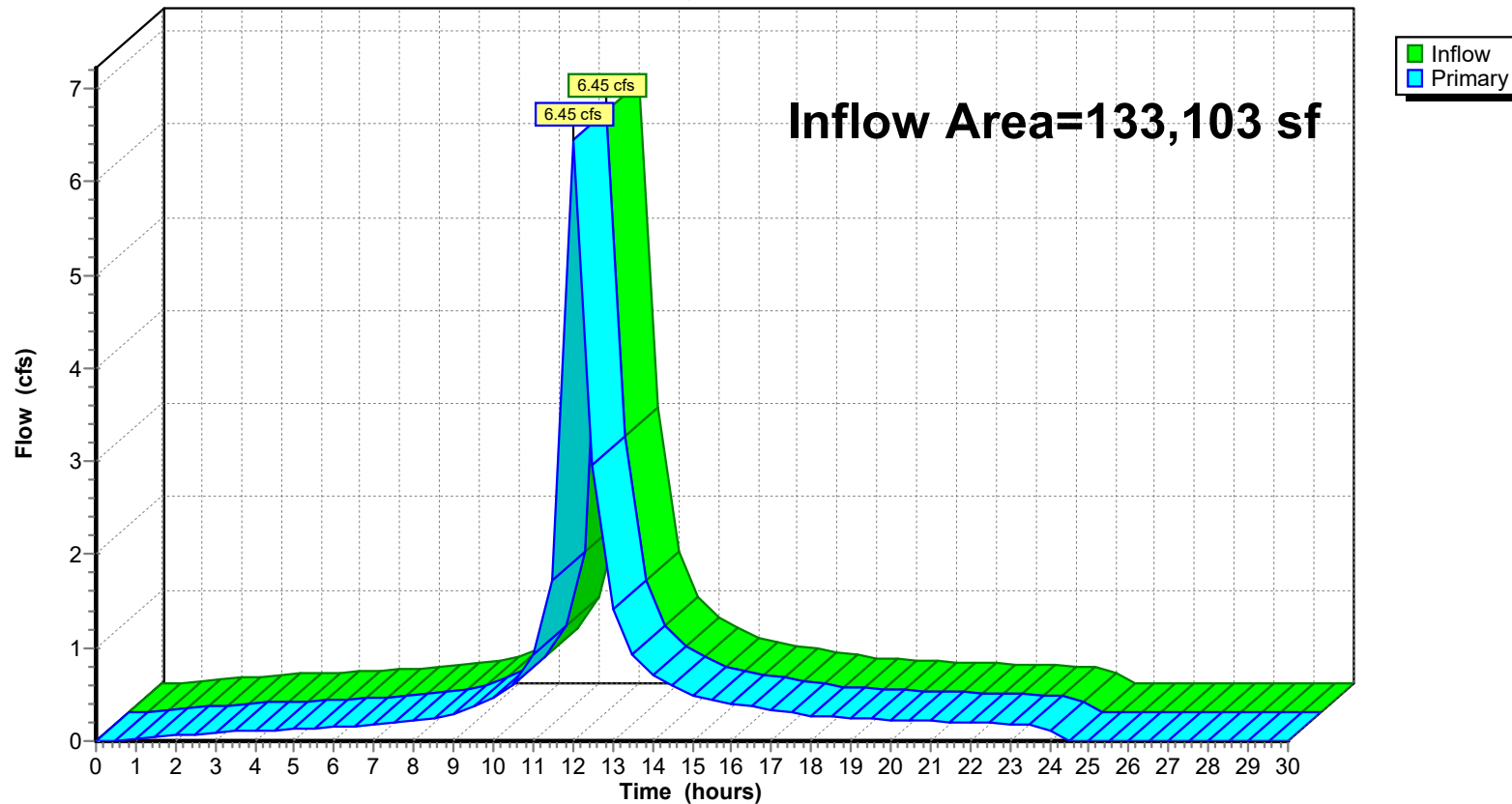
### Summary for Link 15L: TOTAL PROPOSED

Inflow Area = 133,103 sf, 56.94% Impervious, Inflow Depth = 3.98" for 10-Year-2020 event  
Inflow = 6.45 cfs @ 12.04 hrs, Volume= 44,160 cf  
Primary = 6.45 cfs @ 12.04 hrs, Volume= 44,160 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 15L: TOTAL PROPOSED

#### Hydrograph





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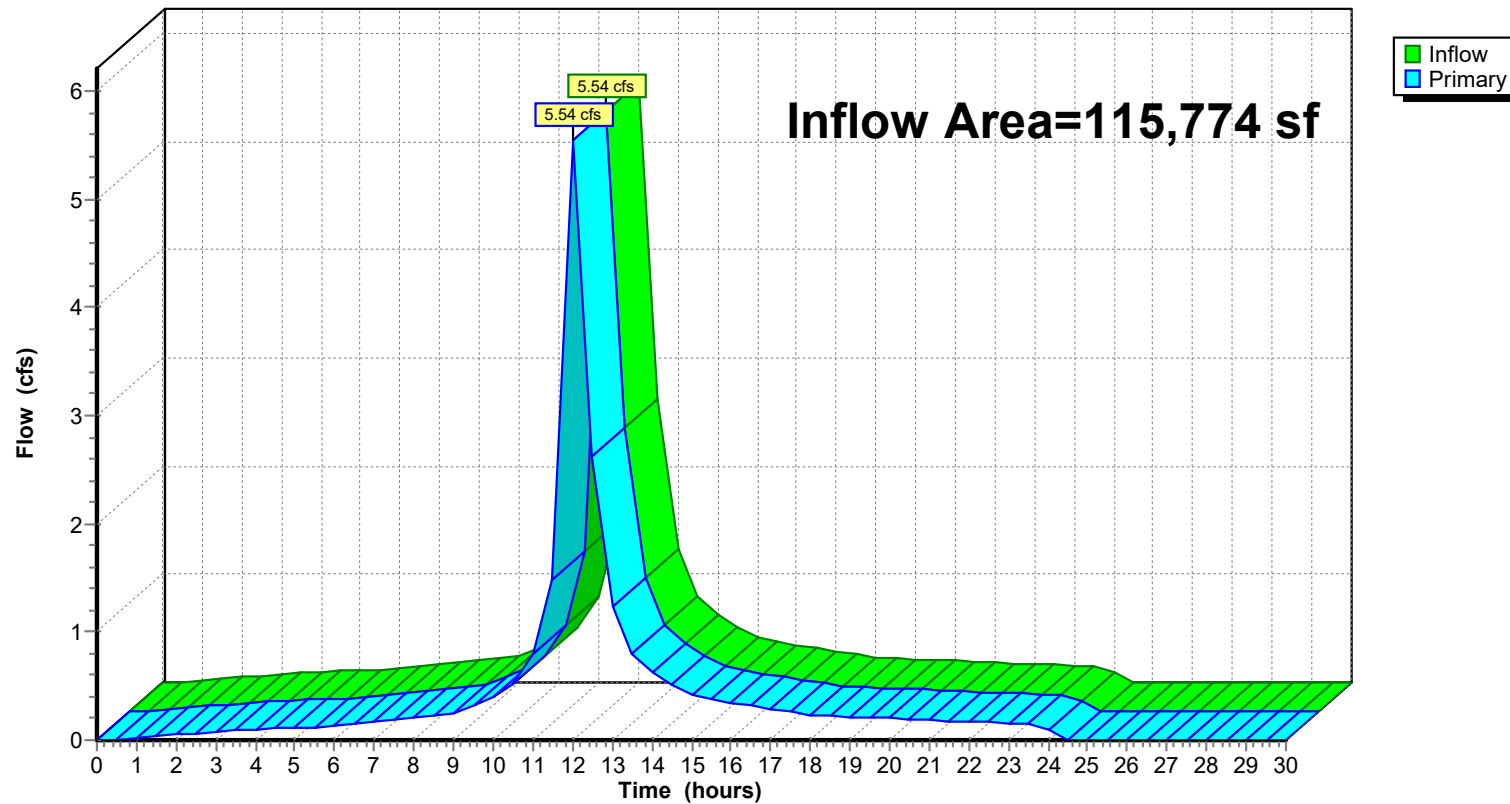
### Summary for Link P-DP 1: PROP DP 1

Inflow Area = 115,774 sf, 57.23% Impervious, Inflow Depth = 3.97" for 10-Year-2020 event  
Inflow = 5.54 cfs @ 12.04 hrs, Volume= 38,343 cf  
Primary = 5.54 cfs @ 12.04 hrs, Volume= 38,343 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 1: PROP DP 1

#### Hydrograph



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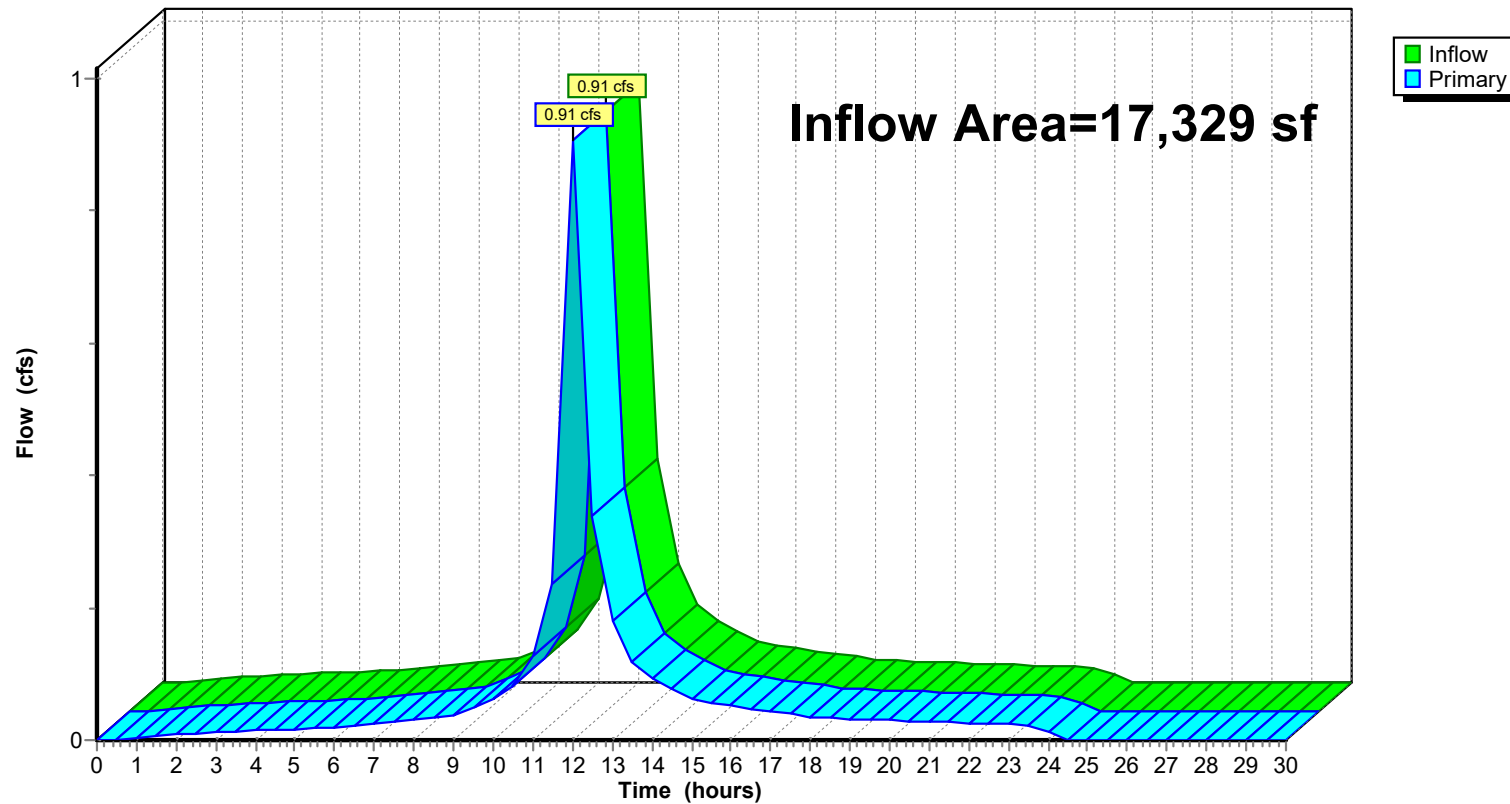
### Summary for Link P-DP 2: PROP DP 2

Inflow Area = 17,329 sf, 54.94% Impervious, Inflow Depth = 4.03" for 10-Year-2020 event  
Inflow = 0.91 cfs @ 12.02 hrs, Volume= 5,818 cf  
Primary = 0.91 cfs @ 12.02 hrs, Volume= 5,818 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 2: PROP DP 2

#### Hydrograph



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**Summary for Subcatchment 1S: Roof**

Runoff = 4.51 cfs @ 12.00 hrs, Volume= 29,828 cf, Depth= 8.94"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

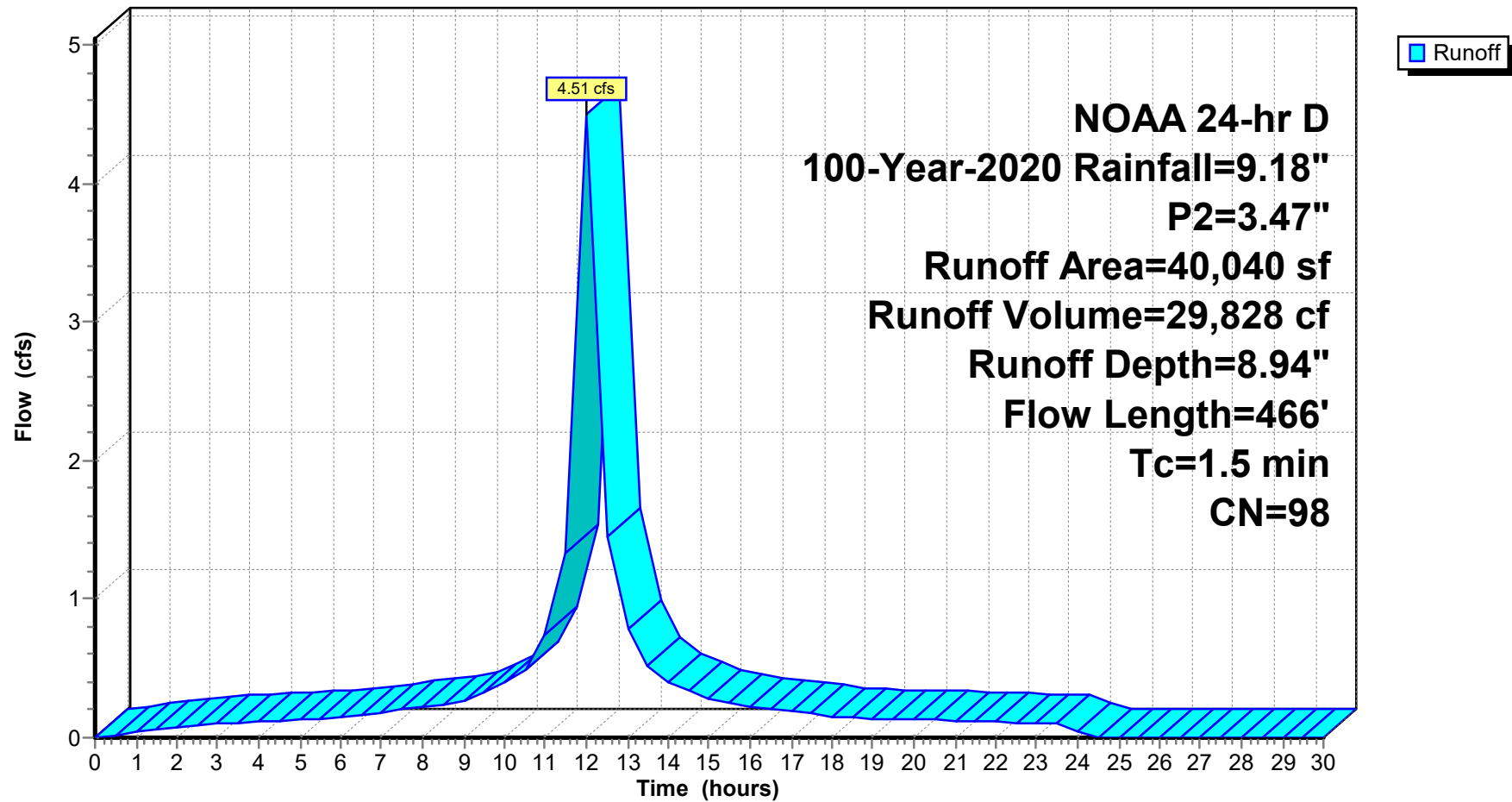
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 40,040  | 98 | Roof and Amenity Area   |
| 40,040    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 0.7      | 53            | 0.0200        | 1.26              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 3.47"                                   |
| 0.5      | 196           | 0.0200        | 6.95              | 5.46           | <b>Pipe Channel, 12 ROOF DRAIN</b><br>12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'<br>n= 0.012 |
| 0.3      | 217           | 0.0424        | 11.74             | 14.41          | <b>Pipe Channel, 15</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012            |
| 1.5      | 466           | Total         |                   |                |                                                                                                 |

Subcatchment 1S: Roof

Hydrograph



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**Summary for Subcatchment P1-I: P1 IMPERVIOUS PARKING**

Runoff = 2.73 cfs @ 12.01 hrs, Volume= 18,099 cf, Depth= 8.94"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

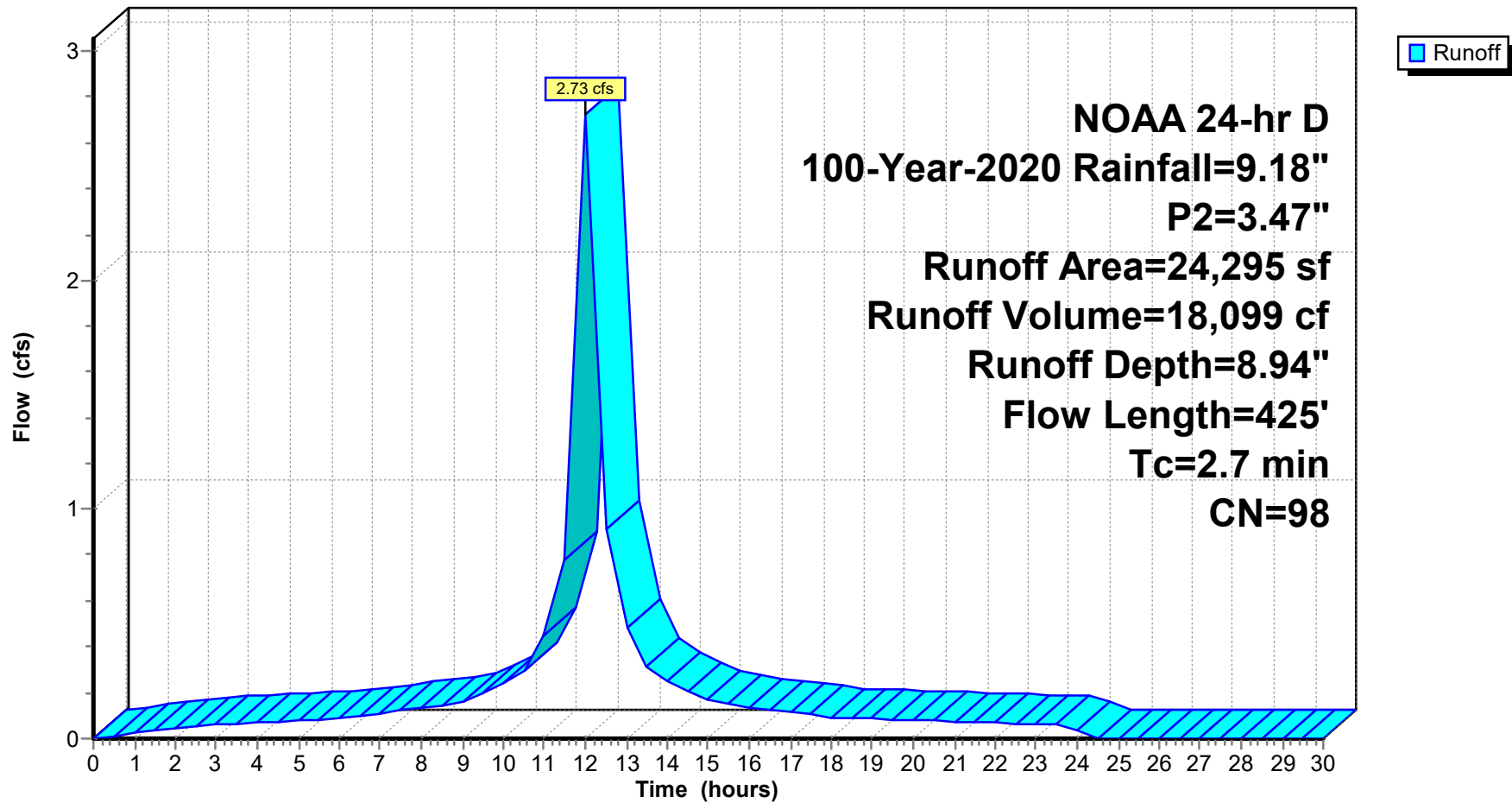
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 24,295  | 98 | Uncovered Paved parking, HSG C |
| 24,295    |    | 100.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                 |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------------|
| 1.5      | 100           | 0.0150        | 1.12              |                | <b>Sheet Flow, sheet flow Parking area</b><br>n= 0.013 P2= 3.47"                            |
| 0.9      | 127           | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow, parking area</b><br>Paved Kv= 20.3 fps                        |
| 0.3      | 198           | 0.0449        | 12.08             | 14.83          | <b>Pipe Channel, Pipe flow</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012 |
| 2.7      | 425           | Total         |                   |                |                                                                                             |

Subcatchment P1-I: P1 IMPERVIOUS PARKING

Hydrograph



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**Summary for Subcatchment P1-P: P1 PERVIOUS**

Runoff = 0.43 cfs @ 12.06 hrs, Volume= 2,687 cf, Depth= 5.99"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

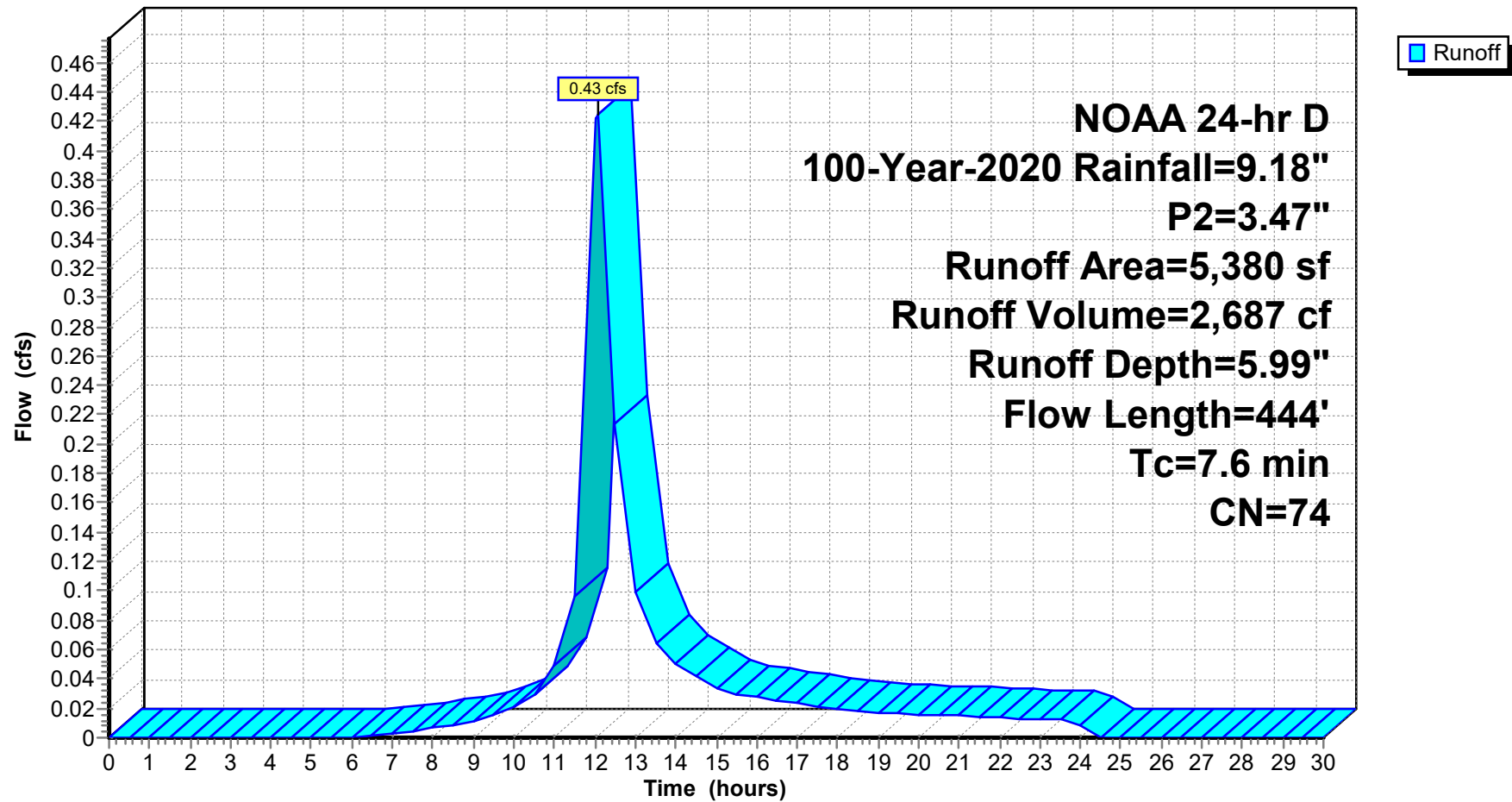
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,380     | 74 | >75% Grass cover, Good, HSG C |
| 5,380     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 7.3      | 83            | 0.0660        | 0.19              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.47"                                           |
| 0.1      | 36            | 0.0280        | 9.54              | 11.71          | <b>Pipe Channel, Yard Inlet</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012    |
| 0.2      | 325           | 0.0450        | 31.77             | 898.40         | <b>Pipe Channel, 72" Culvert</b><br>72.0" Round Area= 28.3 sf Perim= 18.8' r= 1.50'<br>n= 0.013 |
| 7.6      | 444           | Total         |                   |                |                                                                                                 |

Subcatchment P1-P: P1 PERVIOUS

Hydrograph





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**Summary for Subcatchment P2: P2 Pervious-w-offsite-Undisturbed**

Runoff = 2.90 cfs @ 12.20 hrs, Volume= 22,046 cf, Depth= 5.74"  
 Routed to Link P-DP 1 : PROP DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

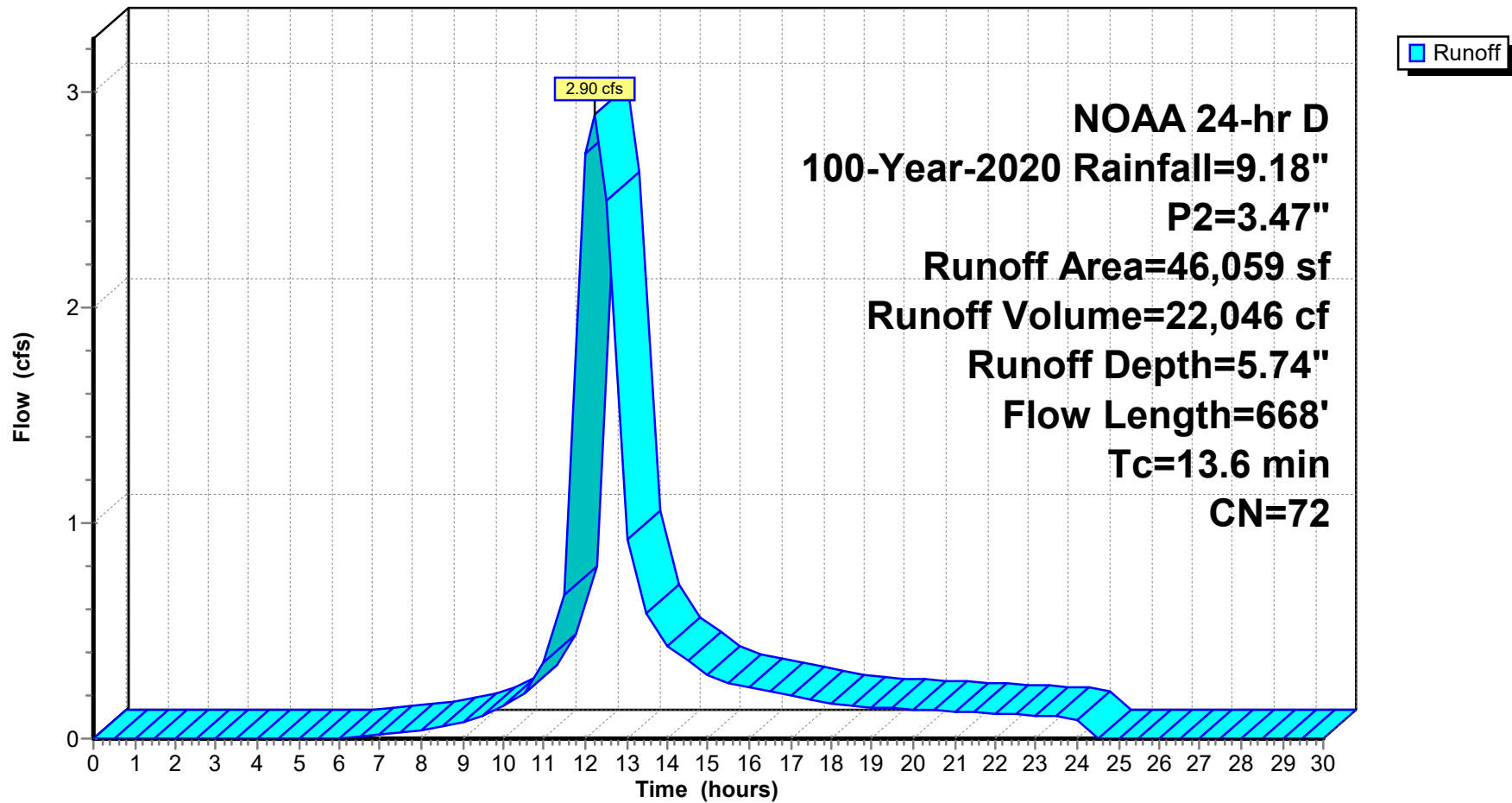
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,255  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,915   | 72 | Woods/grass comb., Good, HSG C |
| 46,059    | 72 | Weighted Average               |
| 44,131    |    | 95.81% Pervious Area           |
| 1,928     |    | 4.19% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 11.3     | 100           | 0.0900        | 0.15              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.47"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 13.6     | 668           | Total         |                   |                |                                               |

Subcatchment P2: P2 Pervious-w-offsite-Undisturbed

Hydrograph



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**Summary for Subcatchment P3A-IMP: P3A IMPERVIOUS**

Runoff = 0.45 cfs @ 12.01 hrs, Volume= 3,010 cf, Depth= 8.94"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

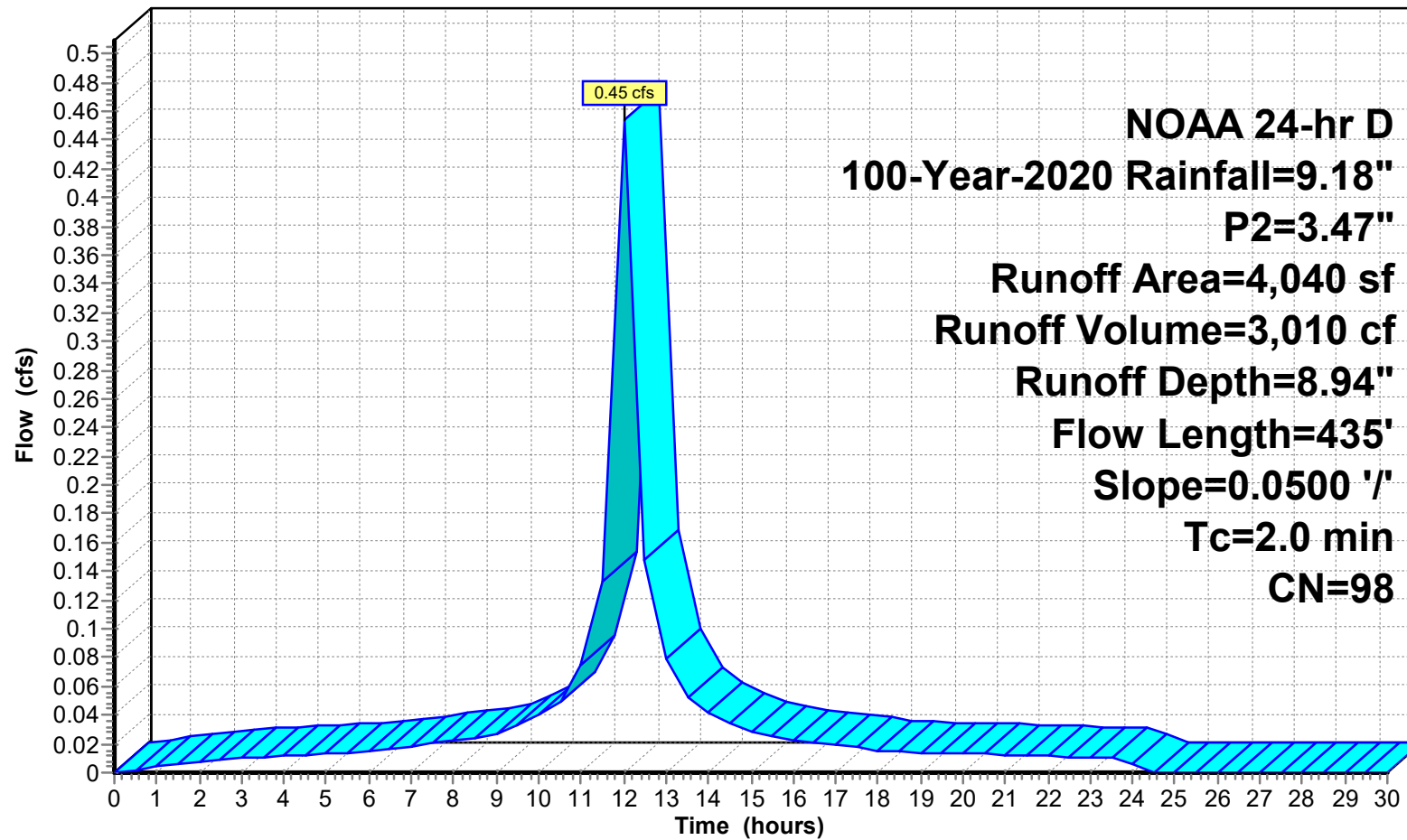
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,040   | 98 | DRIVE/SIDEWALK          |
| 4,040     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.8      | 100           | 0.0500        | 2.07              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 3.47"                   |
| 1.2      | 335           | 0.0500        | 4.54              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 2.0      | 435           | Total         |                   |                |                                                      |

**Subcatchment P3A-IMP: P3A IMPERVIOUS**

**Hydrograph**



Runoff

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**Summary for Subcatchment P3A-P: P3A PERVIOUS**

Runoff = 0.48 cfs @ 12.04 hrs, Volume= 2,961 cf, Depth= 5.99"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

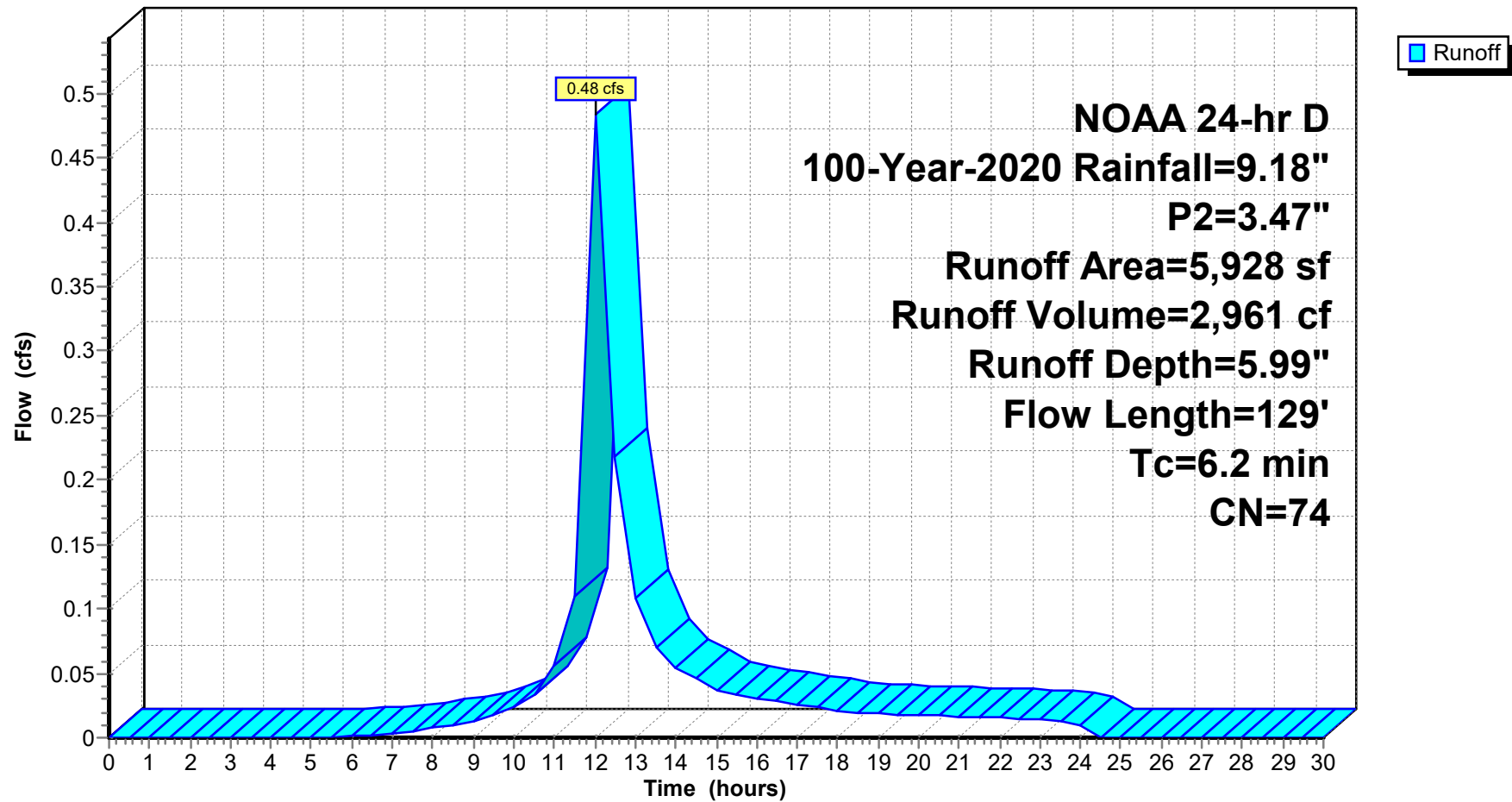
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,928     | 74 | >75% Grass cover, Good, HSG C |
| 5,928     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 6.1      | 100           | 0.0600        | 0.27              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.1      | 29            | 0.0550        | 3.78              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 6.2      | 129           | Total         |                   |                |                                        |

Subcatchment P3A-P: P3A PERVIOUS

Hydrograph



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**Summary for Subcatchment P3B-IMP: P3B IMPERVIOUS**

Runoff = 0.11 cfs @ 12.00 hrs, Volume= 730 cf, Depth= 8.94"  
Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

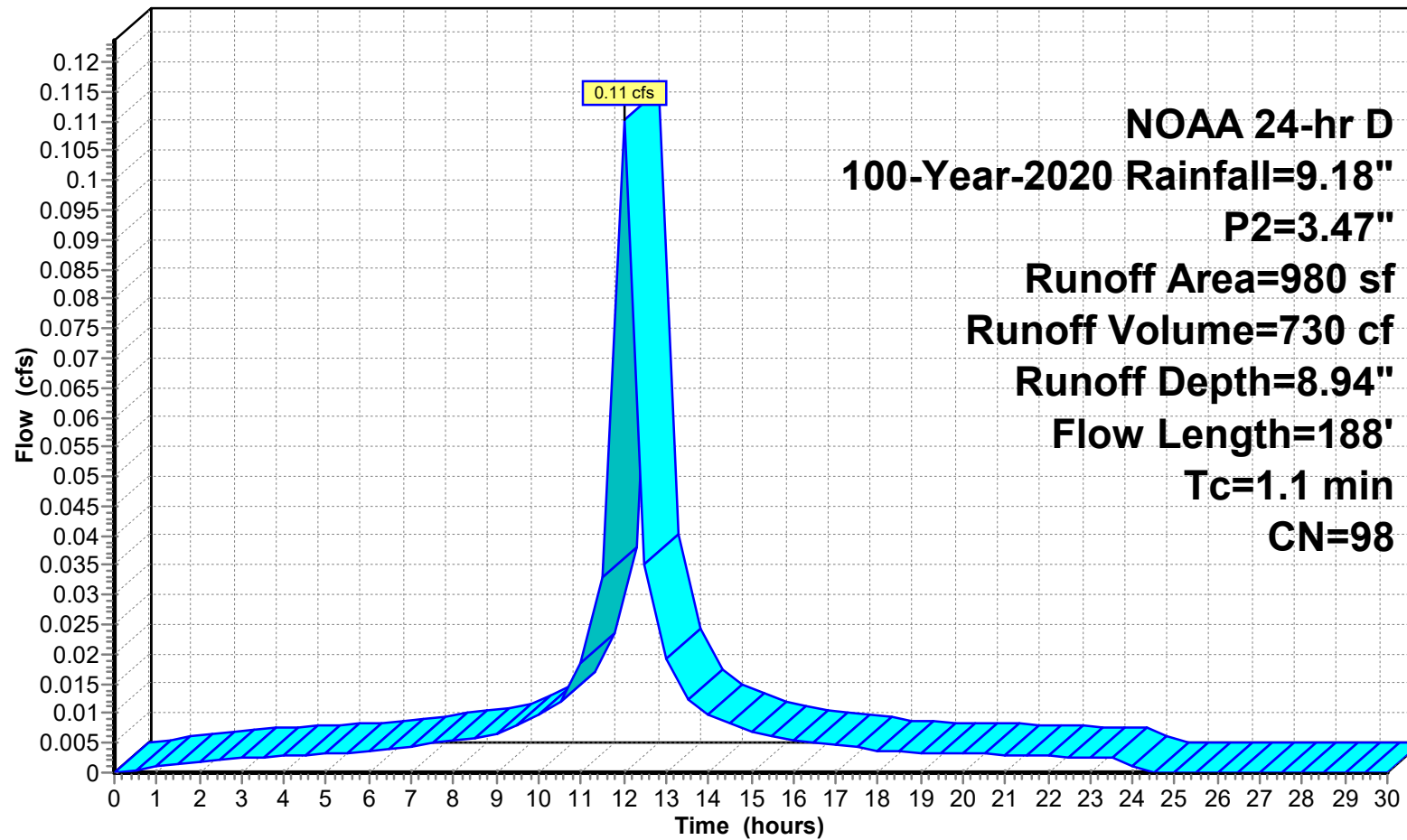
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 980     | 98 | SIDEWALK AREA           |
| 980       |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.61              |                | <b>Sheet Flow, sidewalk</b><br>Smooth surfaces n= 0.011 P2= 3.47"          |
| 0.5      | 88            | 0.0220        | 3.01              |                | <b>Shallow Concentrated Flow, shadow concentrate</b><br>Paved Kv= 20.3 fps |
| 1.1      | 188           | Total         |                   |                |                                                                            |

Subcatchment P3B-IMP: P3B IMPERVIOUS

Hydrograph



Runoff



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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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**Summary for Subcatchment P3B-P: P3B PERVIOUS**

Runoff = 0.15 cfs @ 12.04 hrs, Volume= 939 cf, Depth= 5.99"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

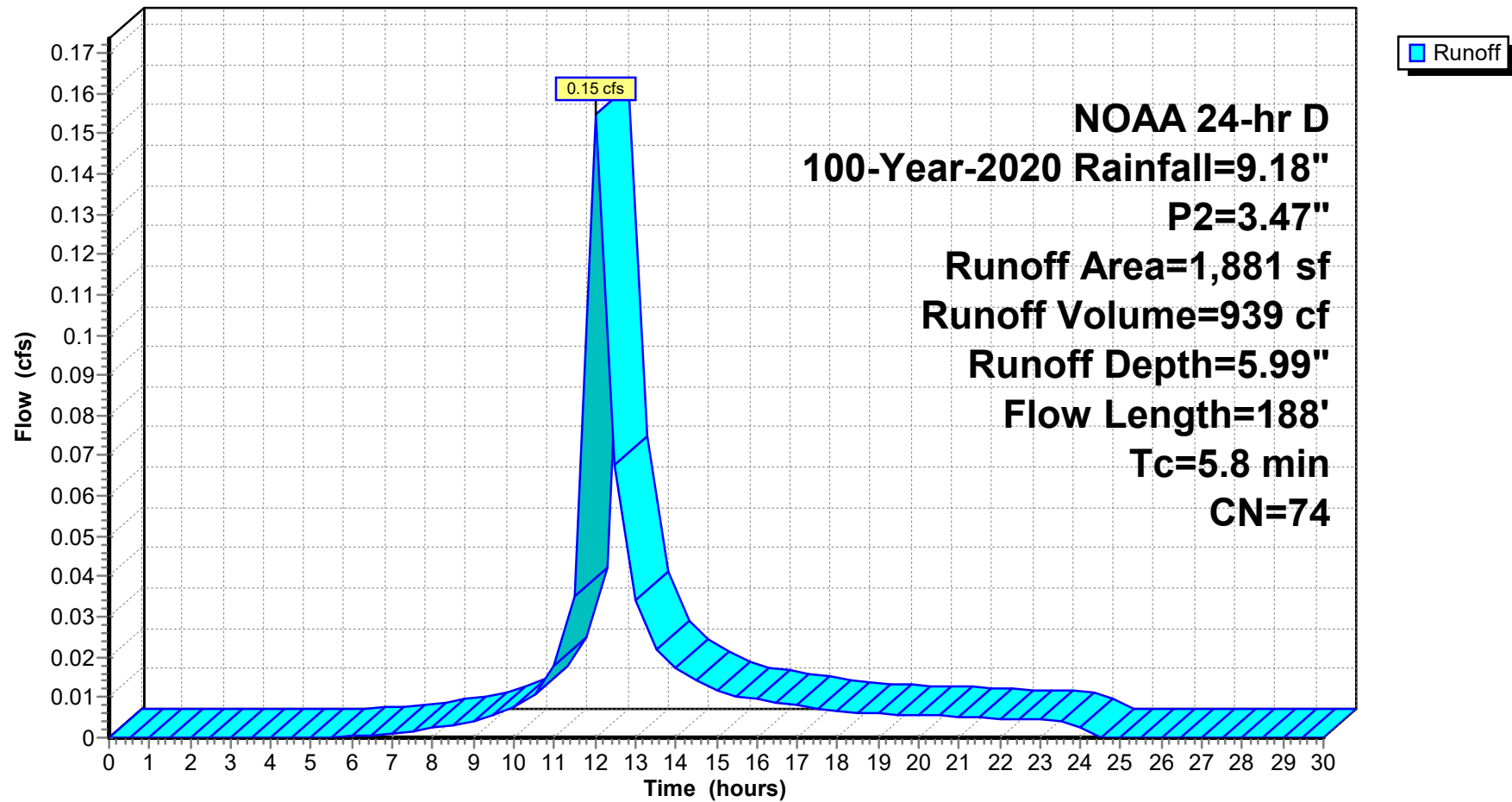
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,881     | 74 | >75% Grass cover, Good, HSG C |
| 1,881     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.2      | 100           | 0.0900        | 0.32              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 3.47"        |
| 0.6      | 88            | 0.0230        | 2.44              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.8      | 188           | Total         |                   |                |                                        |

Subcatchment P3B-P: P3B PERVIOUS

Hydrograph



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**Summary for Subcatchment P3C: P3C- Roof Area**

Runoff = 0.51 cfs @ 12.00 hrs, Volume= 3,352 cf, Depth= 8.94"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

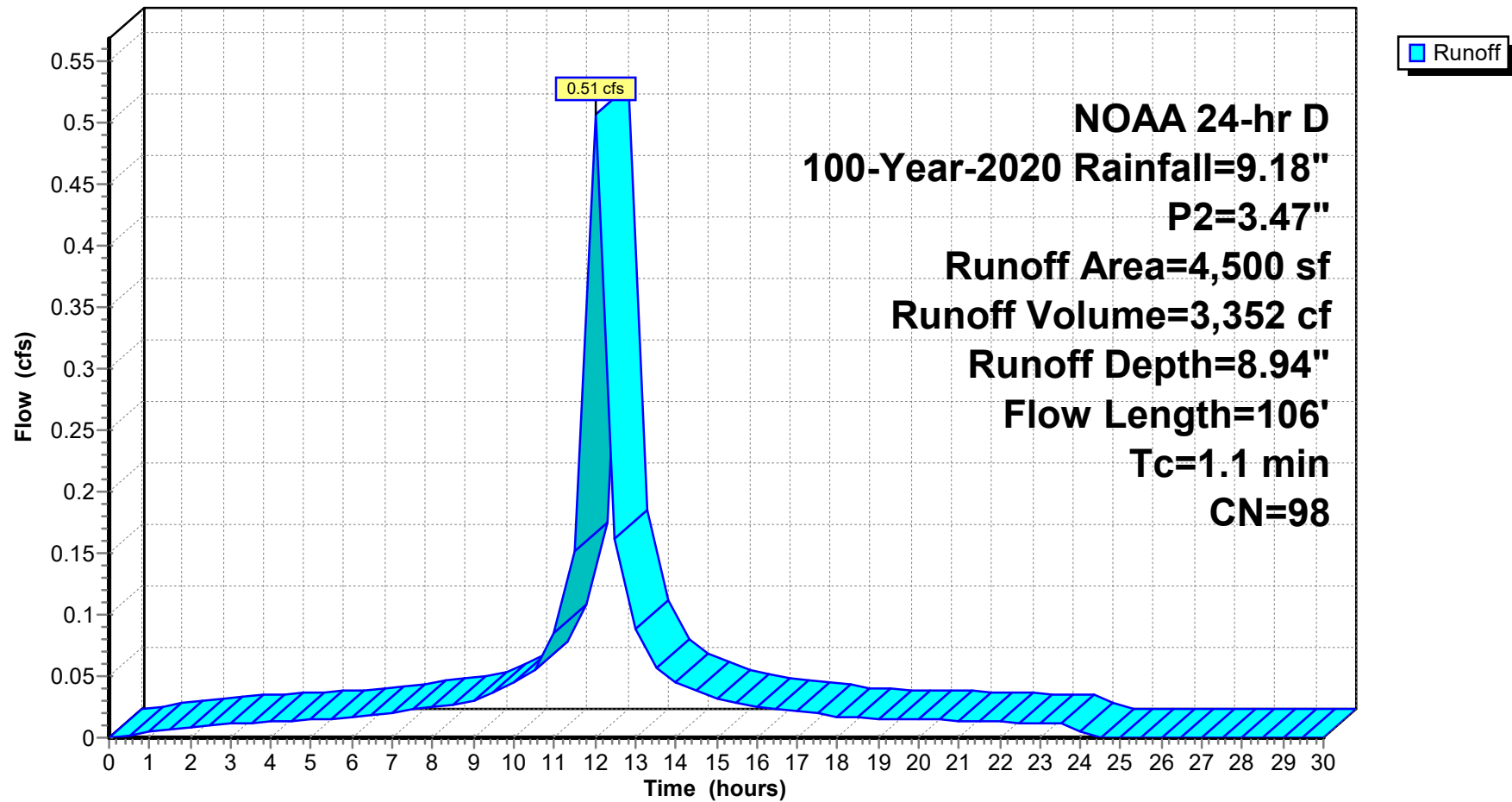
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,500   | 98 | Roof and Amenity Area   |
| 4,500     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 0.9      | 52            | 0.0100        | 0.95              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 3.47"                                 |
| 0.2      | 54            | 0.0216        | 5.51              | 1.92           | <b>Pipe Channel, 8 ROOF DRAIN</b><br>8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'<br>n= 0.012 |
| 1.1      | 106           | Total         |                   |                |                                                                                               |

Subcatchment P3C: P3C- Roof Area

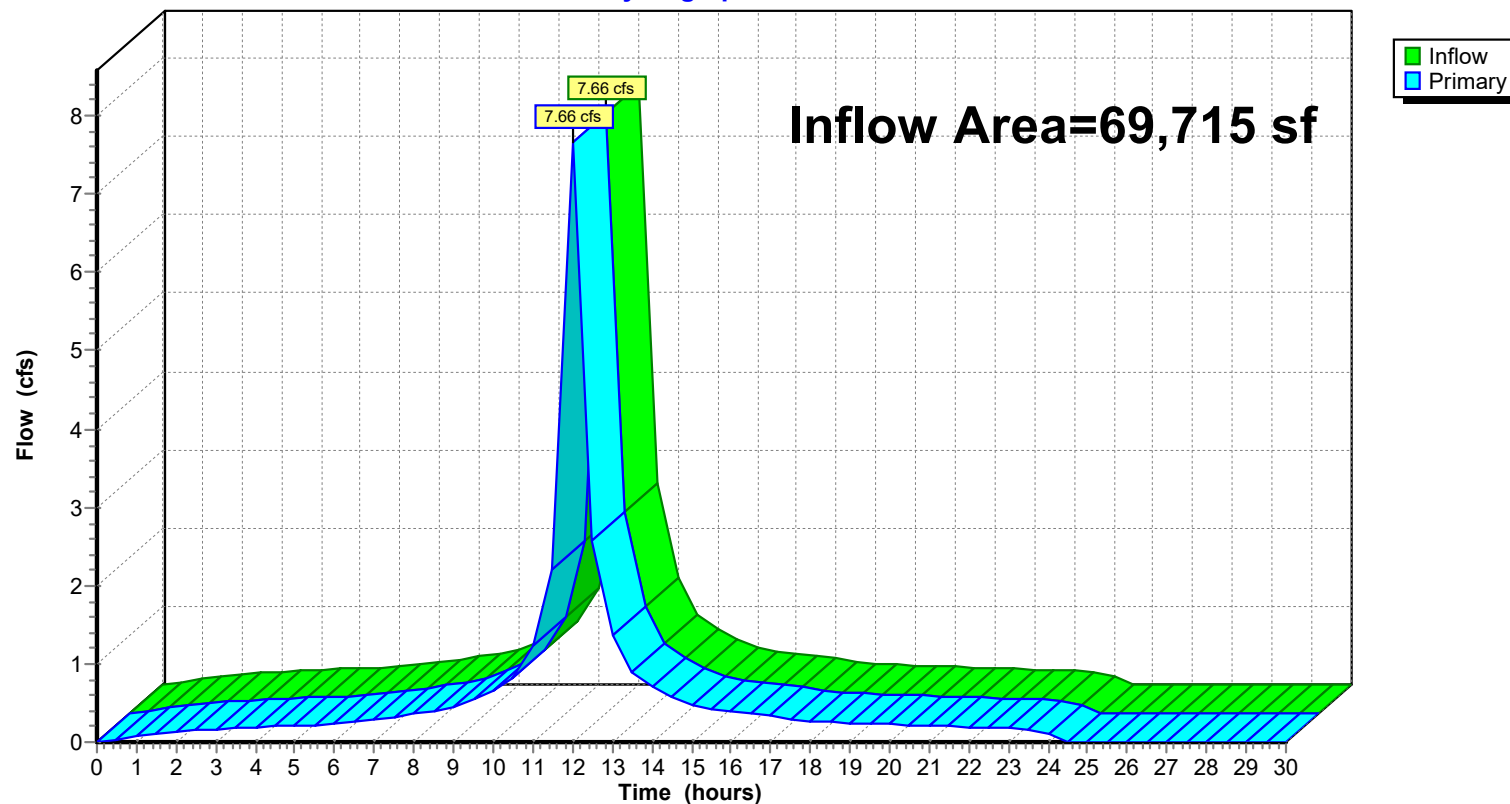
Hydrograph



**Summary for Link 11L: Proposed Disturbed**

Inflow Area = 69,715 sf, 92.28% Impervious, Inflow Depth = 8.71" for 100-Year-2020 event  
Inflow = 7.66 cfs @ 12.01 hrs, Volume= 50,614 cf  
Primary = 7.66 cfs @ 12.01 hrs, Volume= 50,614 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link P-DP 1 : PROP DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

**Link 11L: Proposed Disturbed****Hydrograph**

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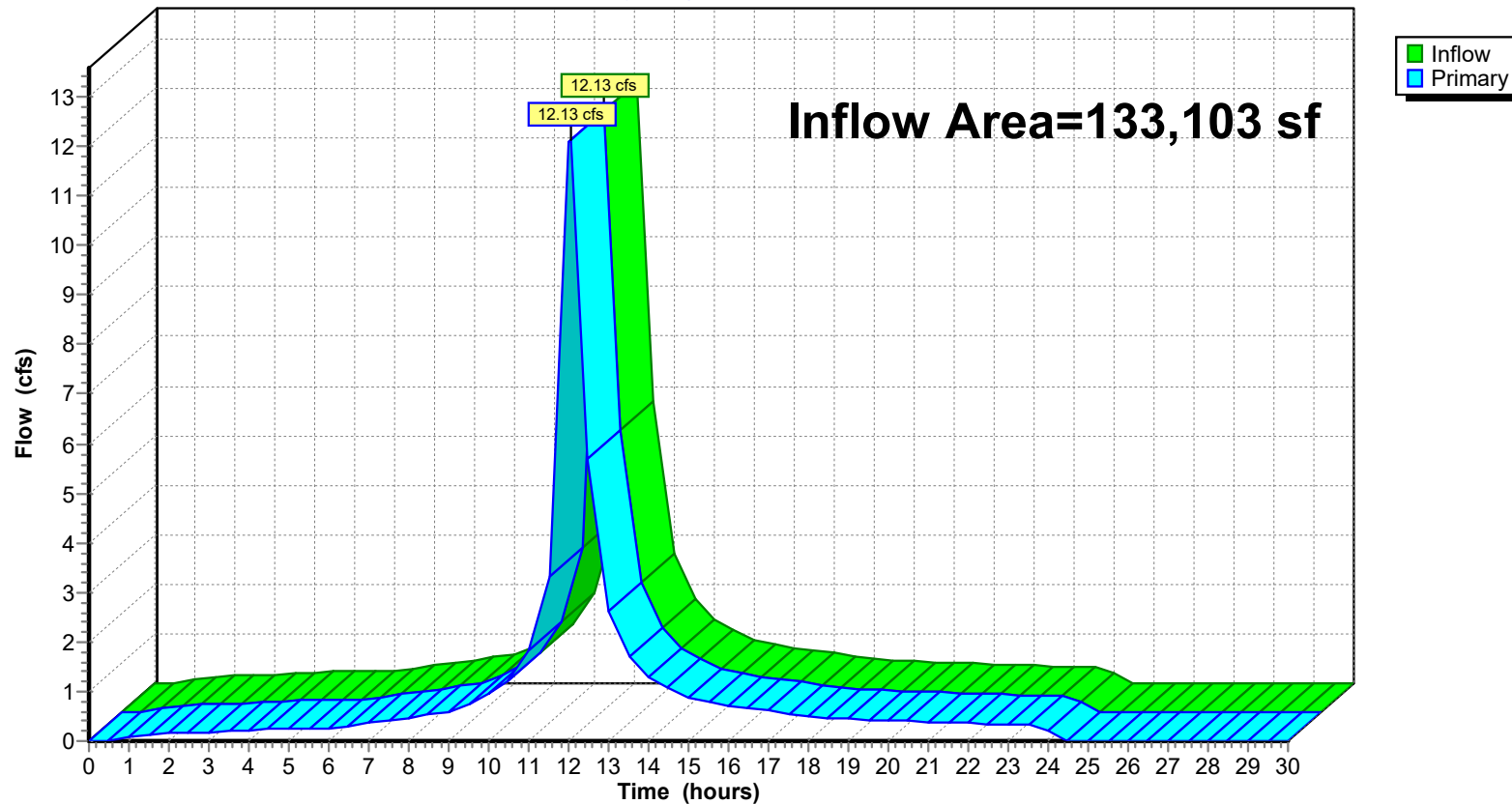
### Summary for Link 15L: TOTAL PROPOSED

Inflow Area = 133,103 sf, 56.94% Impervious, Inflow Depth = 7.54" for 100-Year-2020 event  
Inflow = 12.13 cfs @ 12.04 hrs, Volume= 83,652 cf  
Primary = 12.13 cfs @ 12.04 hrs, Volume= 83,652 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 15L: TOTAL PROPOSED

#### Hydrograph



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NOAA 24-hr D 100-Year-2020 Rainfall=9.18", P2=3.47"

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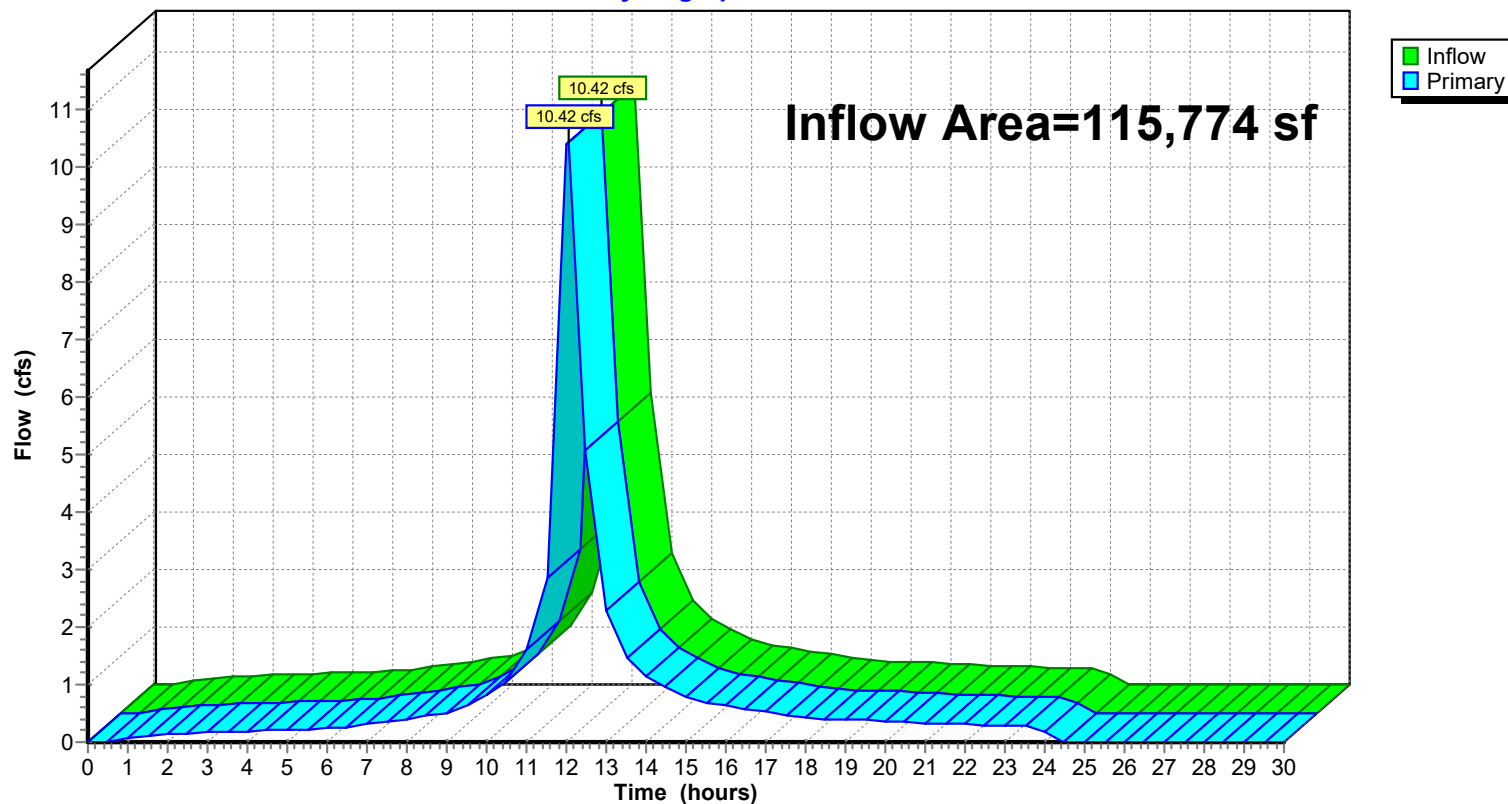
### Summary for Link P-DP 1: PROP DP 1

Inflow Area = 115,774 sf, 57.23% Impervious, Inflow Depth = 7.53" for 100-Year-2020 event  
Inflow = 10.42 cfs @ 12.04 hrs, Volume= 72,660 cf  
Primary = 10.42 cfs @ 12.04 hrs, Volume= 72,660 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 1: PROP DP 1

Hydrograph



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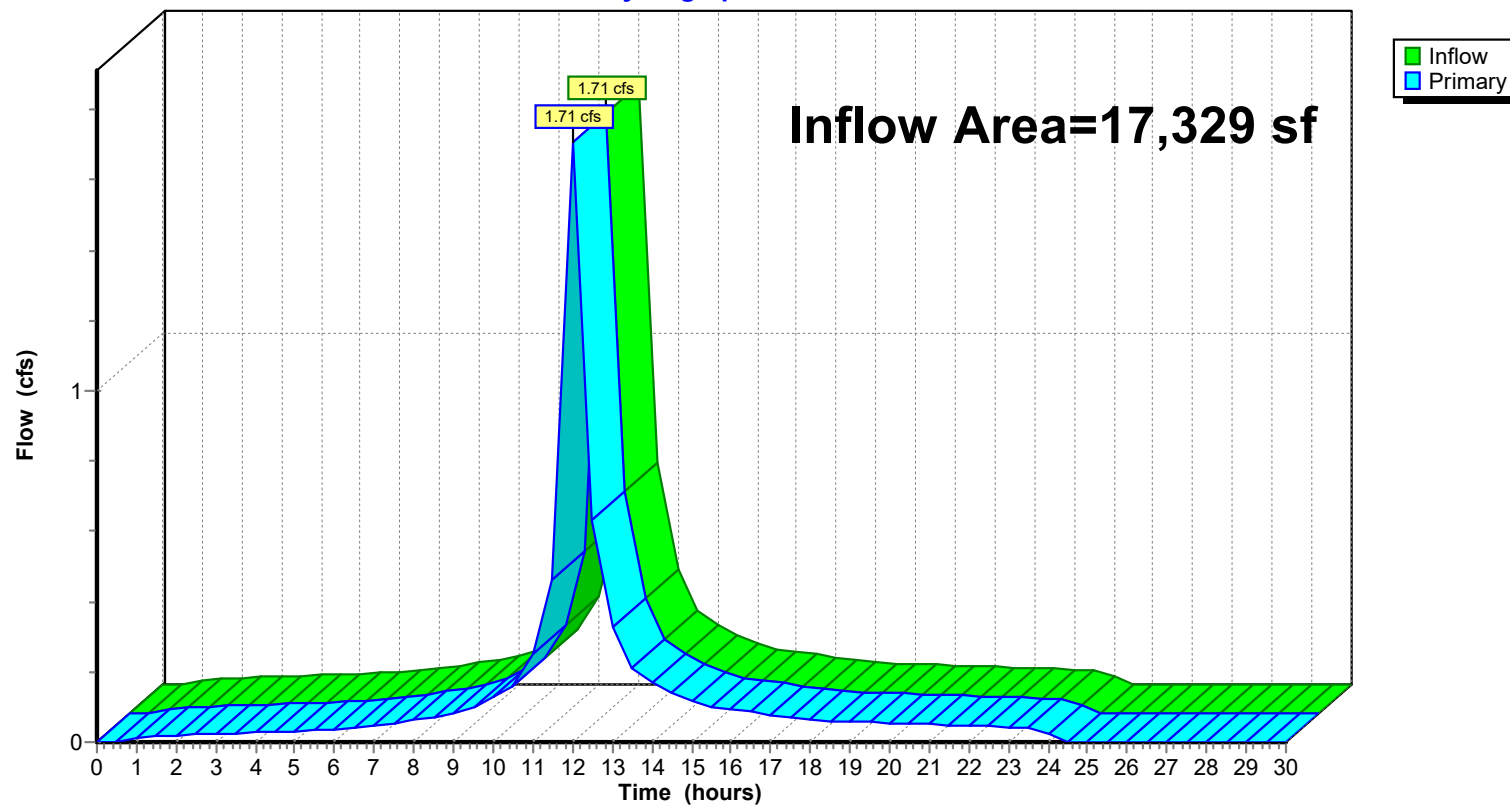
### Summary for Link P-DP 2: PROP DP 2

Inflow Area = 17,329 sf, 54.94% Impervious, Inflow Depth = 7.61" for 100-Year-2020 event  
Inflow = 1.71 cfs @ 12.02 hrs, Volume= 10,992 cf  
Primary = 1.71 cfs @ 12.02 hrs, Volume= 10,992 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 2: PROP DP 2

#### Hydrograph





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**Summary for Subcatchment 1S: Roof**

Runoff = 1.99 cfs @ 12.01 hrs, Volume= 12,862 cf, Depth= 3.85"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

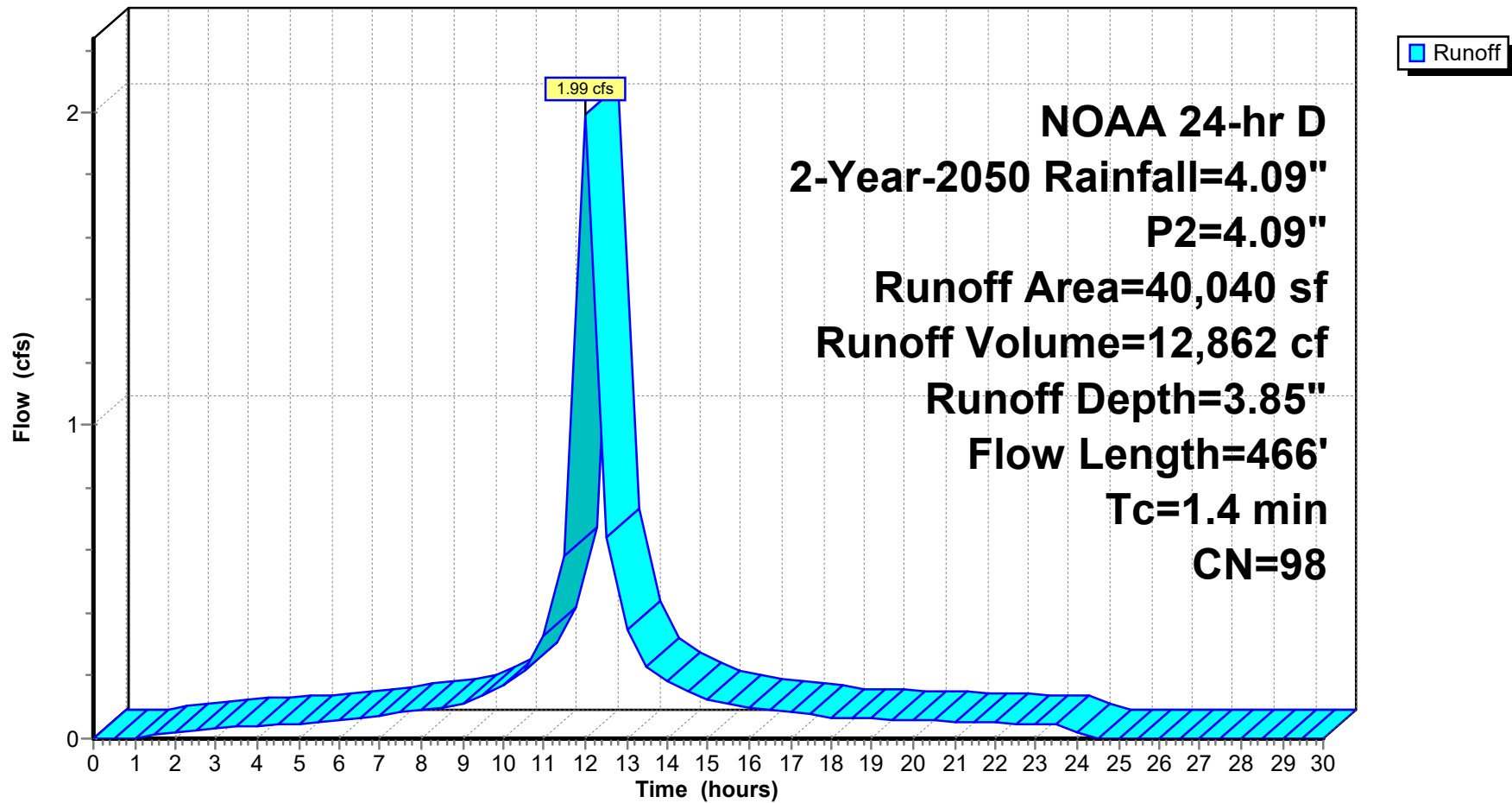
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 40,040  | 98 | Roof and Amenity Area   |
| 40,040    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 0.6      | 53            | 0.0200        | 1.37              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 4.09"                                   |
| 0.5      | 196           | 0.0200        | 6.95              | 5.46           | <b>Pipe Channel, 12 ROOF DRAIN</b><br>12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'<br>n= 0.012 |
| 0.3      | 217           | 0.0424        | 11.74             | 14.41          | <b>Pipe Channel, 15</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012            |
| 1.4      | 466           | Total         |                   |                |                                                                                                 |

Subcatchment 1S: Roof

Hydrograph



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**Summary for Subcatchment P1-I: P1 IMPERVIOUS PARKING**

Runoff = 1.21 cfs @ 12.01 hrs, Volume= 7,805 cf, Depth= 3.85"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

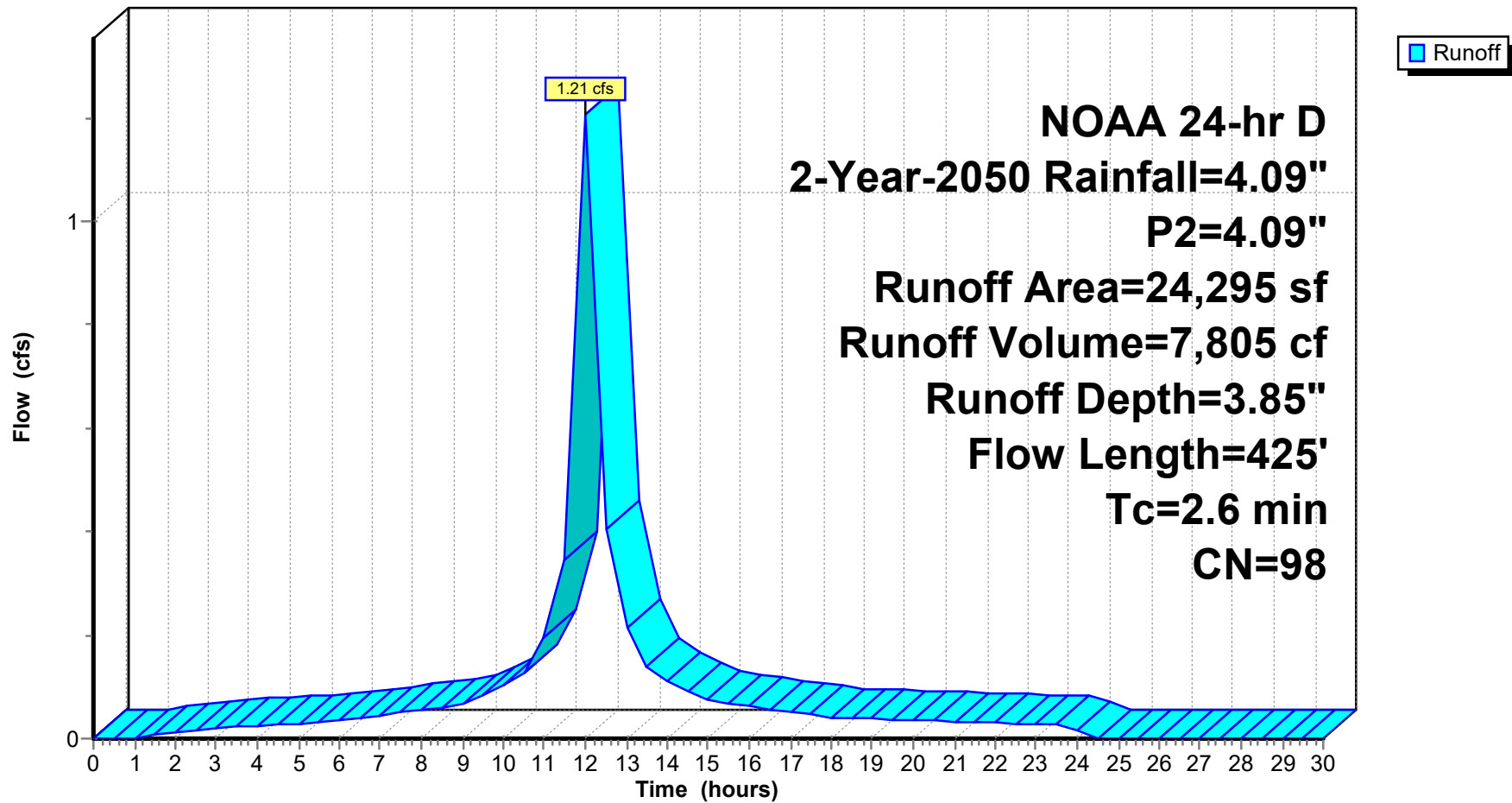
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 24,295  | 98 | Uncovered Paved parking, HSG C |
| 24,295    |    | 100.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                 |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------------|
| 1.4      | 100           | 0.0150        | 1.21              |                | <b>Sheet Flow, sheet flow Parking area</b><br>n= 0.013 P2= 4.09"                            |
| 0.9      | 127           | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow, parking area</b><br>Paved Kv= 20.3 fps                        |
| 0.3      | 198           | 0.0449        | 12.08             | 14.83          | <b>Pipe Channel, Pipe flow</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012 |
| 2.6      | 425           | Total         |                   |                |                                                                                             |

Subcatchment P1-I: P1 IMPERVIOUS PARKING

Hydrograph



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**Summary for Subcatchment P1-P: P1 PERVIOUS**

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 745 cf, Depth= 1.66"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

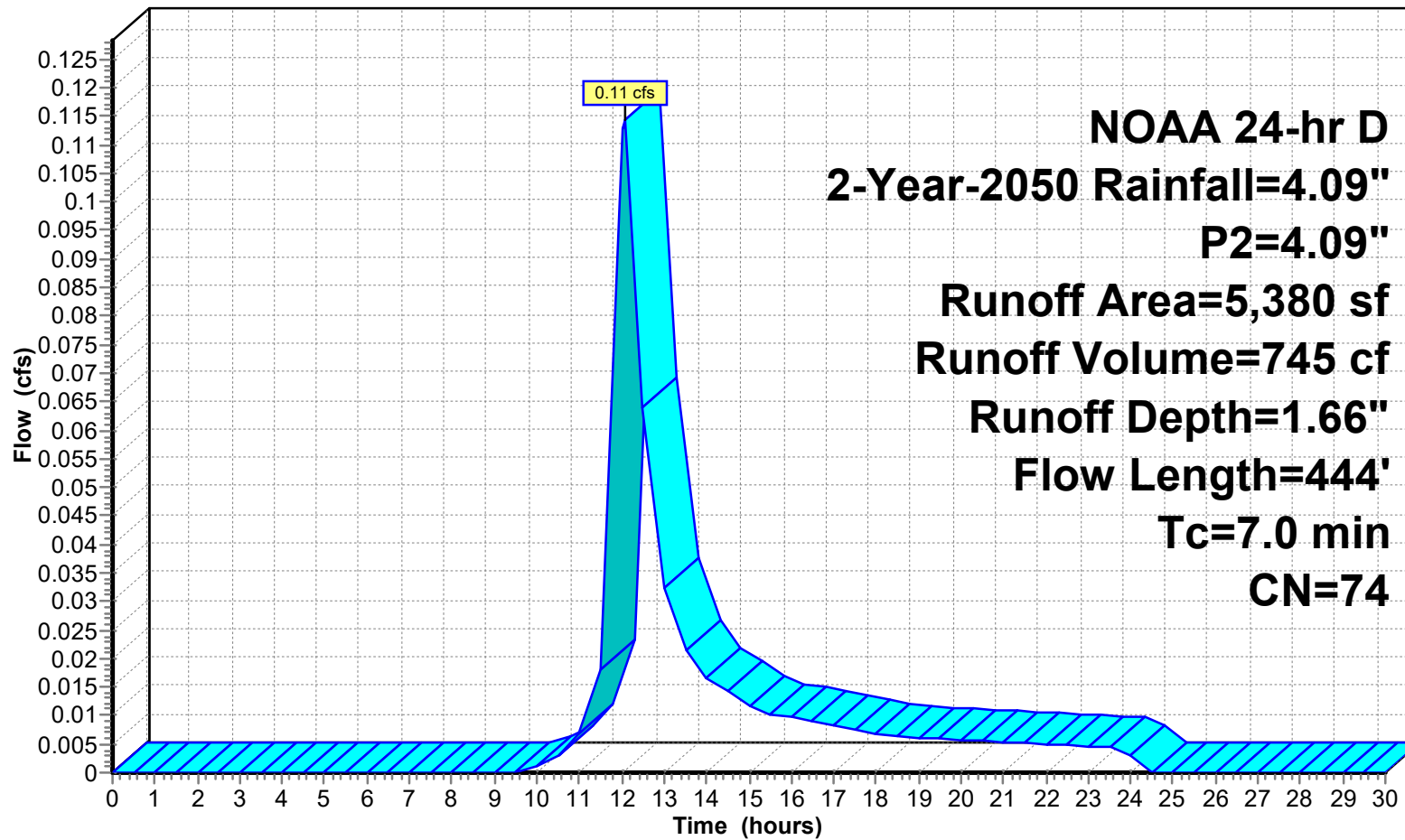
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,380     | 74 | >75% Grass cover, Good, HSG C |
| 5,380     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 6.7      | 83            | 0.0660        | 0.21              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 4.09"                                           |
| 0.1      | 36            | 0.0280        | 9.54              | 11.71          | <b>Pipe Channel, Yard Inlet</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012    |
| 0.2      | 325           | 0.0450        | 31.77             | 898.40         | <b>Pipe Channel, 72" Culvert</b><br>72.0" Round Area= 28.3 sf Perim= 18.8' r= 1.50'<br>n= 0.013 |
| 7.0      | 444           | Total         |                   |                |                                                                                                 |

Subcatchment P1-P: P1 PERVIOUS

Hydrograph



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**Summary for Subcatchment P2: P2 Pervious-w-offsite-Undisturbed**

Runoff = 0.72 cfs @ 12.27 hrs, Volume= 5,848 cf, Depth= 1.52"  
 Routed to Link P-DP 1 : PROP DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

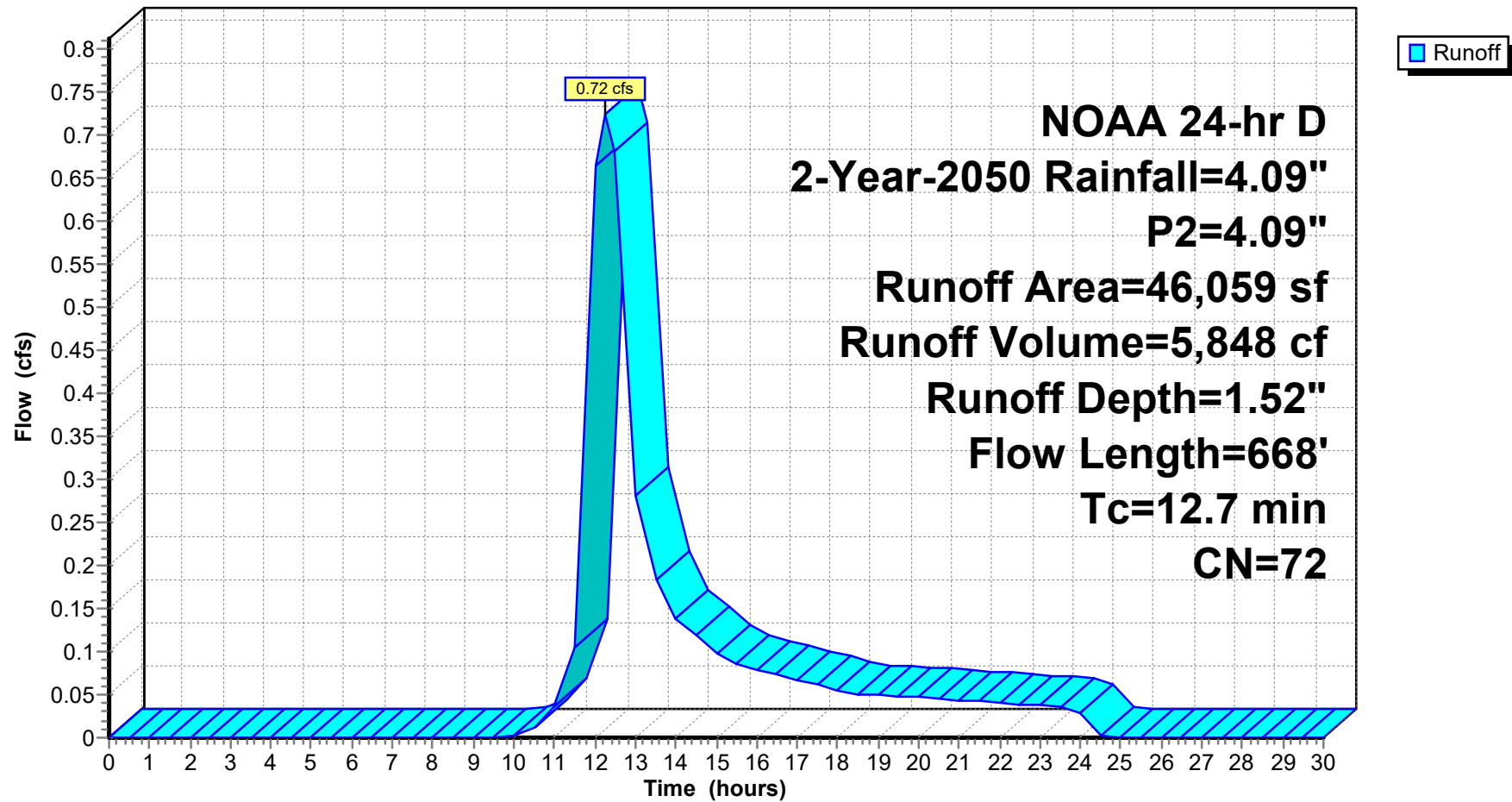
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,255  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,915   | 72 | Woods/grass comb., Good, HSG C |
| 46,059    | 72 | Weighted Average               |
| 44,131    |    | 95.81% Pervious Area           |
| 1,928     |    | 4.19% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 10.4     | 100           | 0.0900        | 0.16              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 4.09"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 12.7     | 668           | Total         |                   |                |                                               |

Subcatchment P2: P2 Pervious-w-offsite-Undisturbed

Hydrograph





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**Summary for Subcatchment P3A-IMP: P3A IMPERVIOUS**

Runoff = 0.20 cfs @ 12.01 hrs, Volume= 1,298 cf, Depth= 3.85"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

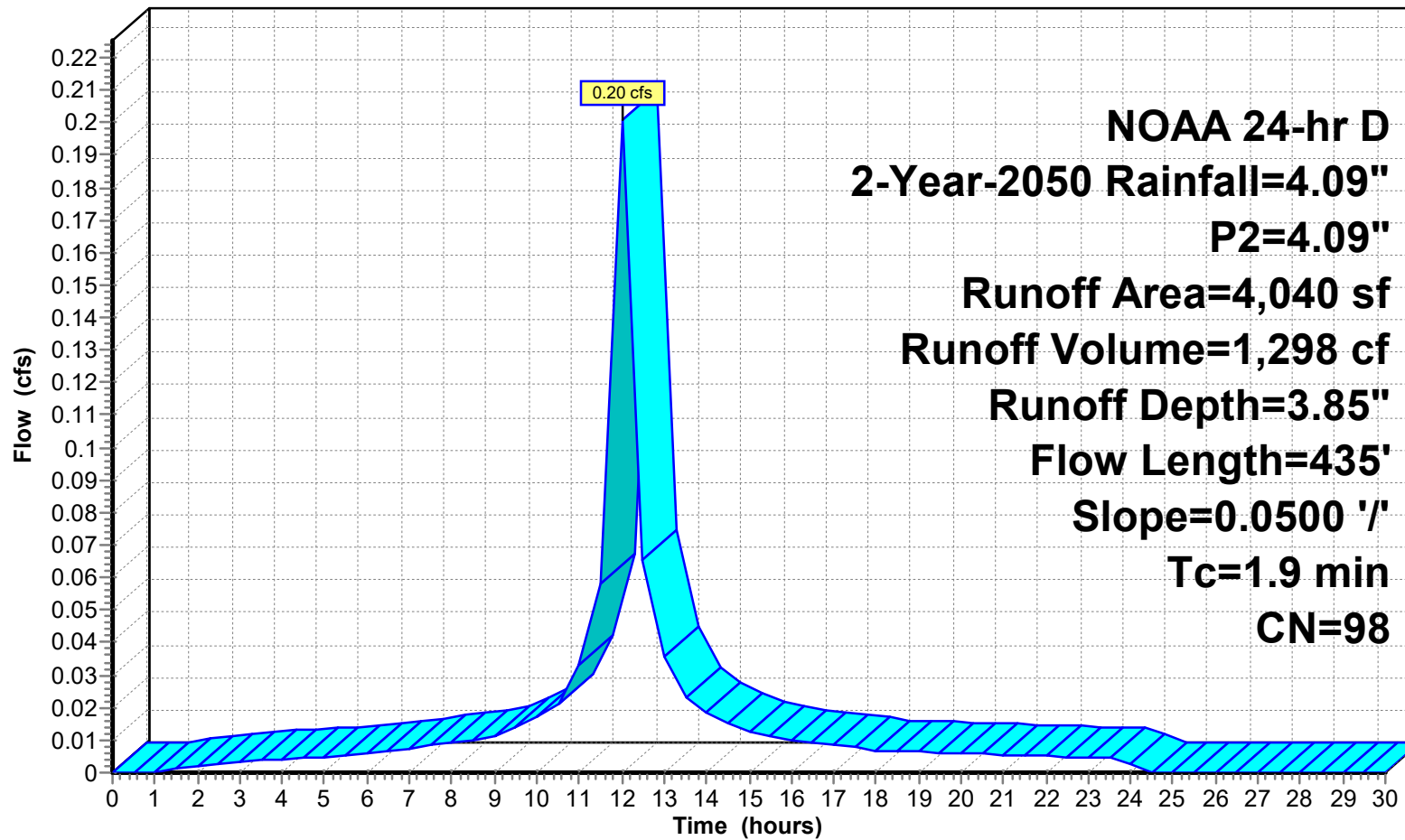
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,040   | 98 | DRIVE/SIDEWALK          |
| 4,040     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.7      | 100           | 0.0500        | 2.24              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 1.2      | 335           | 0.0500        | 4.54              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.9      | 435           | Total         |                   |                |                                                      |

Subcatchment P3A-IMP: P3A IMPERVIOUS

Hydrograph



Runoff

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**Summary for Subcatchment P3A-P: P3A PERVIOUS**

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 821 cf, Depth= 1.66"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

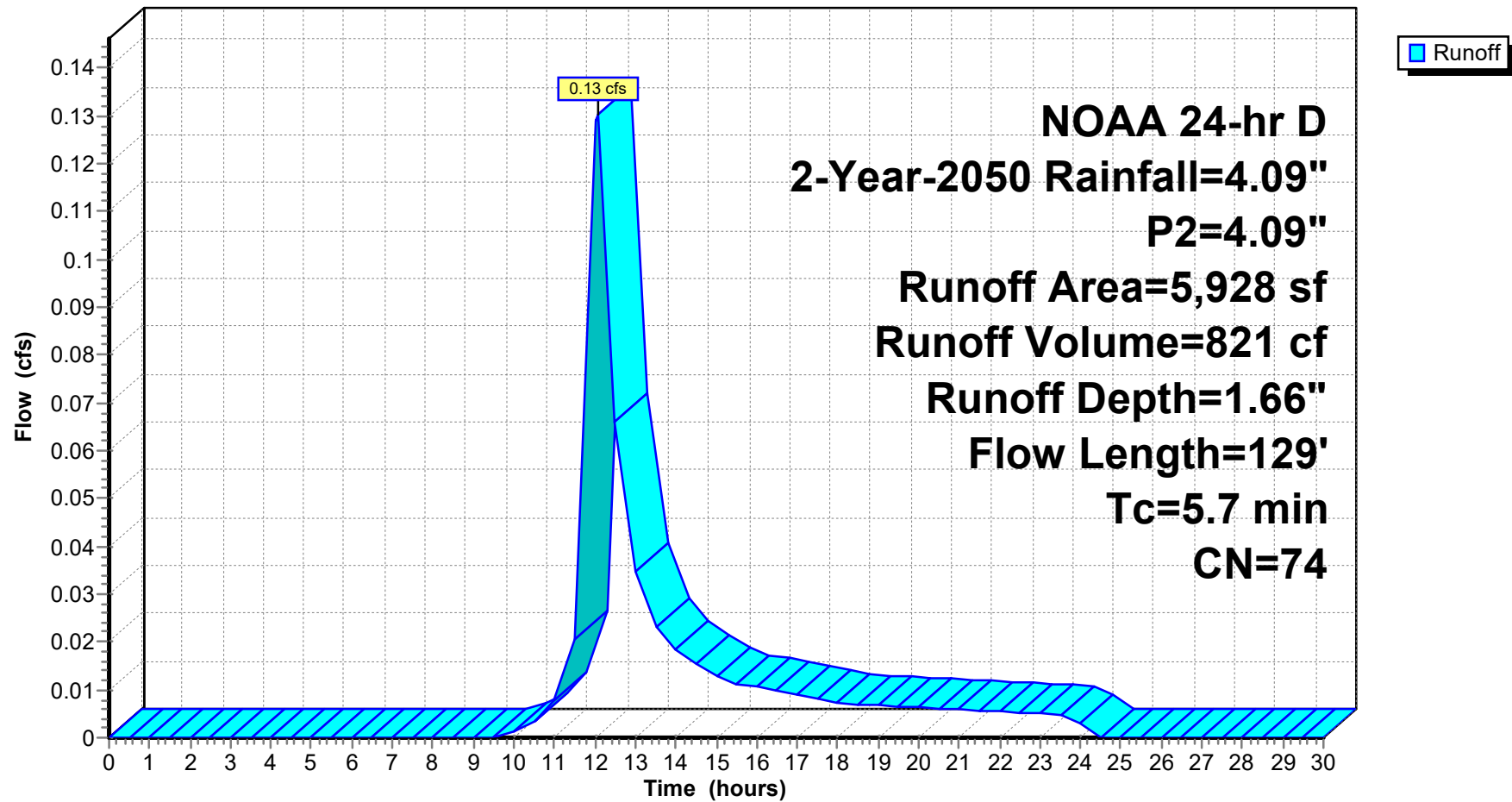
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,928     | 74 | >75% Grass cover, Good, HSG C |
| 5,928     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.6      | 100           | 0.0600        | 0.30              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.1      | 29            | 0.0550        | 3.78              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.7      | 129           | Total         |                   |                |                                        |

Subcatchment P3A-P: P3A PERVIOUS

Hydrograph



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**Summary for Subcatchment P3B-IMP: P3B IMPERVIOUS**

Runoff = 0.05 cfs @ 12.00 hrs, Volume= 315 cf, Depth= 3.85"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

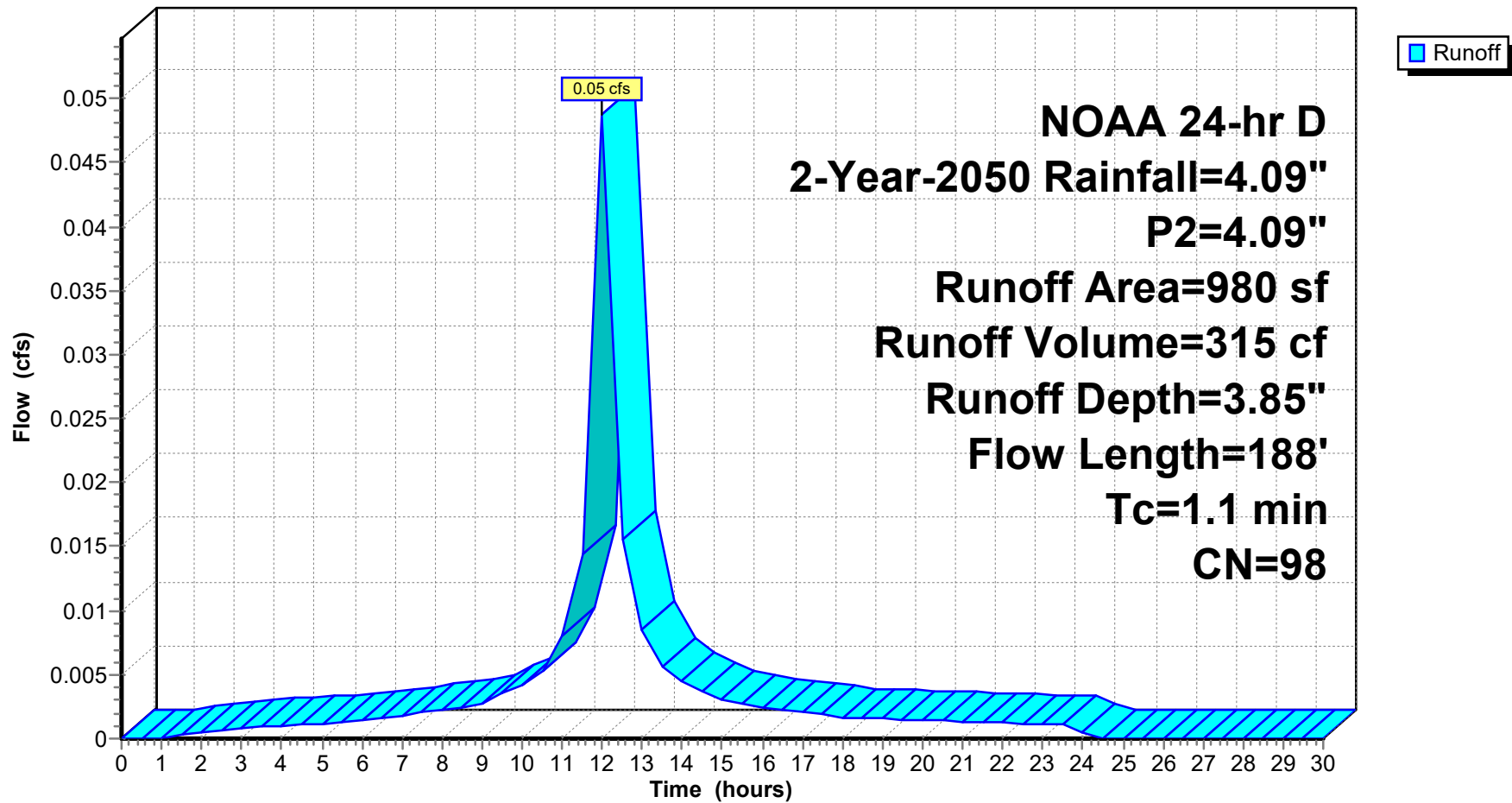
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 980     | 98 | SIDEWALK AREA           |
| 980       |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.84              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 0.5      | 88            | 0.0220        | 3.01              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment P3B-IMP: P3B IMPERVIOUS

Hydrograph



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**Summary for Subcatchment P3B-P: P3B PERVIOUS**

Runoff = 0.04 cfs @ 12.06 hrs, Volume= 261 cf, Depth= 1.66"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

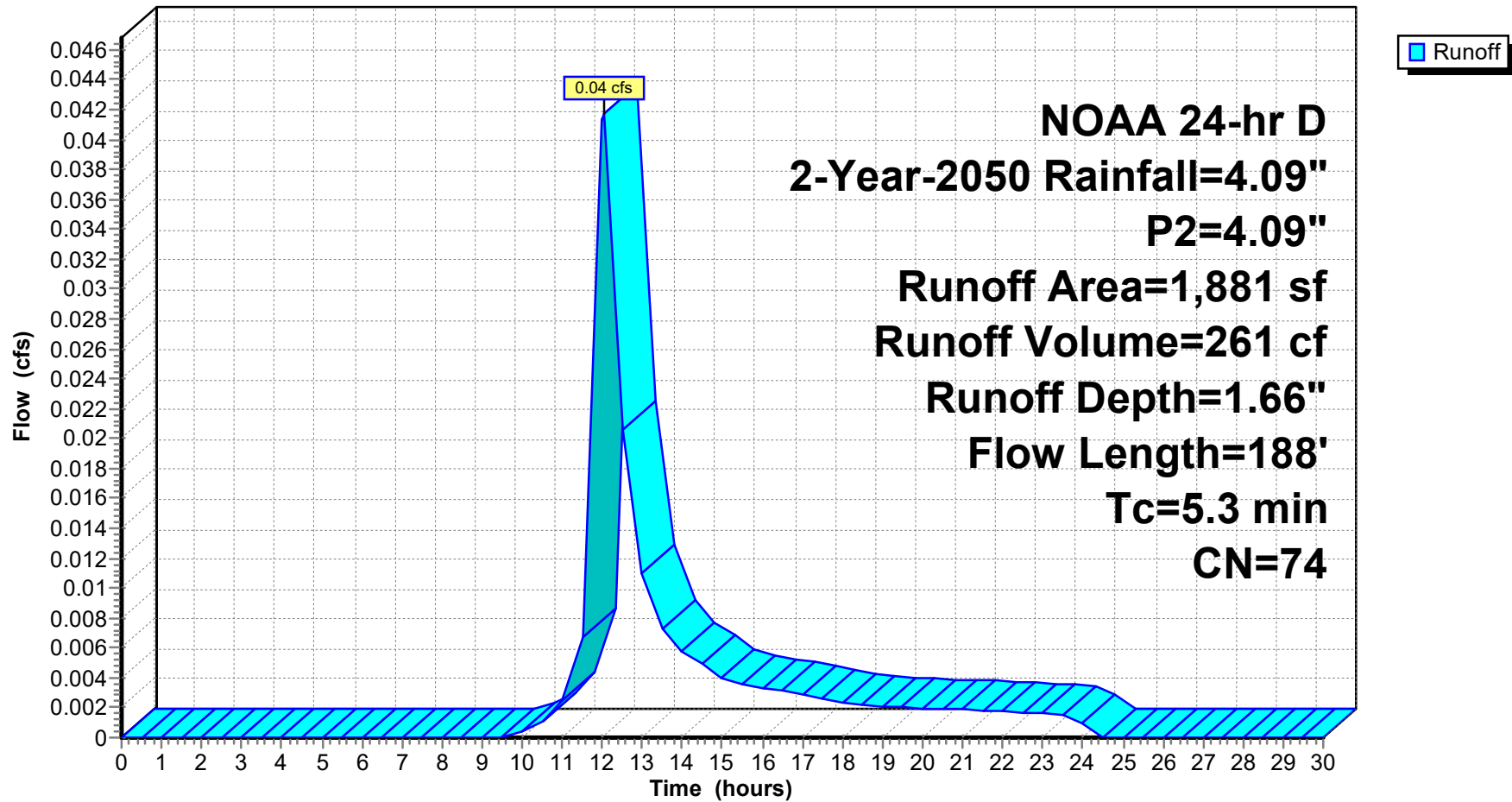
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,881     | 74 | >75% Grass cover, Good, HSG C |
| 1,881     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 4.7      | 100           | 0.0900        | 0.35              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.6      | 88            | 0.0230        | 2.44              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.3      | 188           | Total         |                   |                |                                        |

Subcatchment P3B-P: P3B PERVIOUS

Hydrograph





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**Summary for Subcatchment P3C: P3C- Roof Area**

Runoff = 0.22 cfs @ 12.00 hrs, Volume= 1,446 cf, Depth= 3.85"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 2-Year-2050 Rainfall=4.09", P2=4.09"

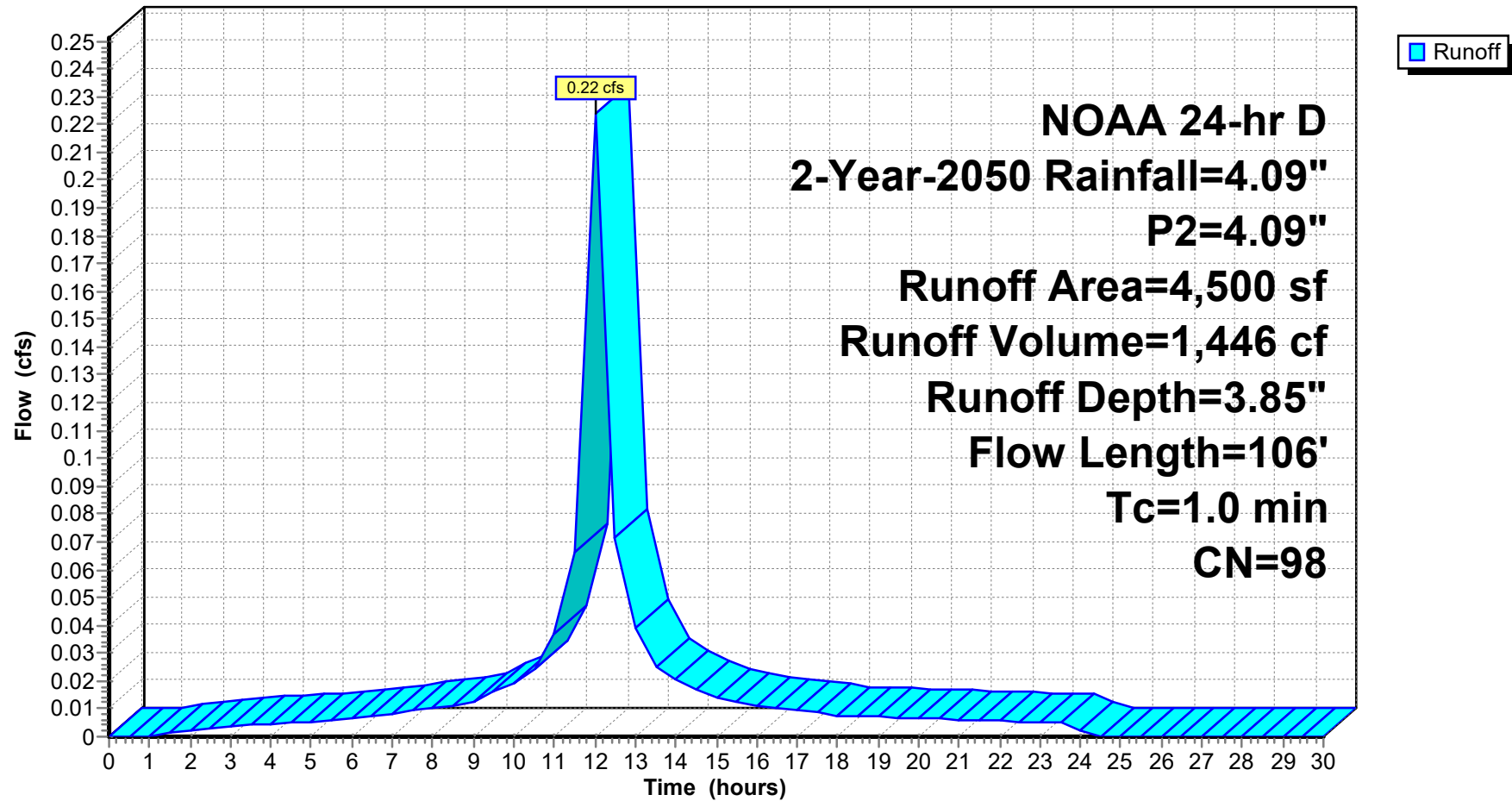
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,500   | 98 | Roof and Amenity Area   |
| 4,500     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 0.8      | 52            | 0.0100        | 1.03              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 4.09"                                 |
| 0.2      | 54            | 0.0216        | 5.51              | 1.92           | <b>Pipe Channel, 8 ROOF DRAIN</b><br>8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'<br>n= 0.012 |
| 1.0      | 106           | Total         |                   |                |                                                                                               |

Subcatchment P3C: P3C- Roof Area

Hydrograph



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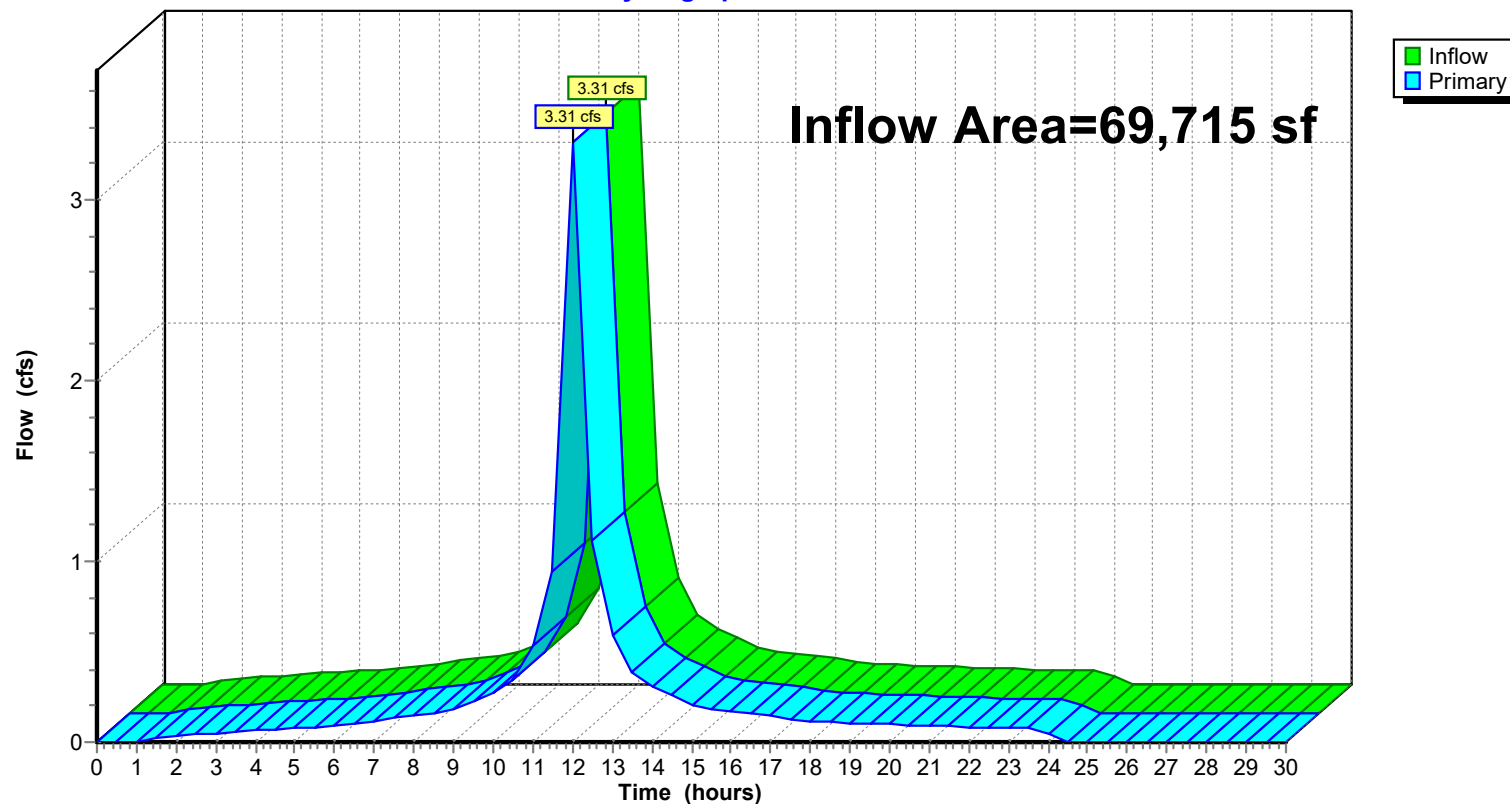
### Summary for Link 11L: Proposed Disturbed

Inflow Area = 69,715 sf, 92.28% Impervious, Inflow Depth = 3.69" for 2-Year-2050 event  
Inflow = 3.31 cfs @ 12.01 hrs, Volume= 21,412 cf  
Primary = 3.31 cfs @ 12.01 hrs, Volume= 21,412 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link P-DP 1 : PROP DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 11L: Proposed Disturbed

#### Hydrograph



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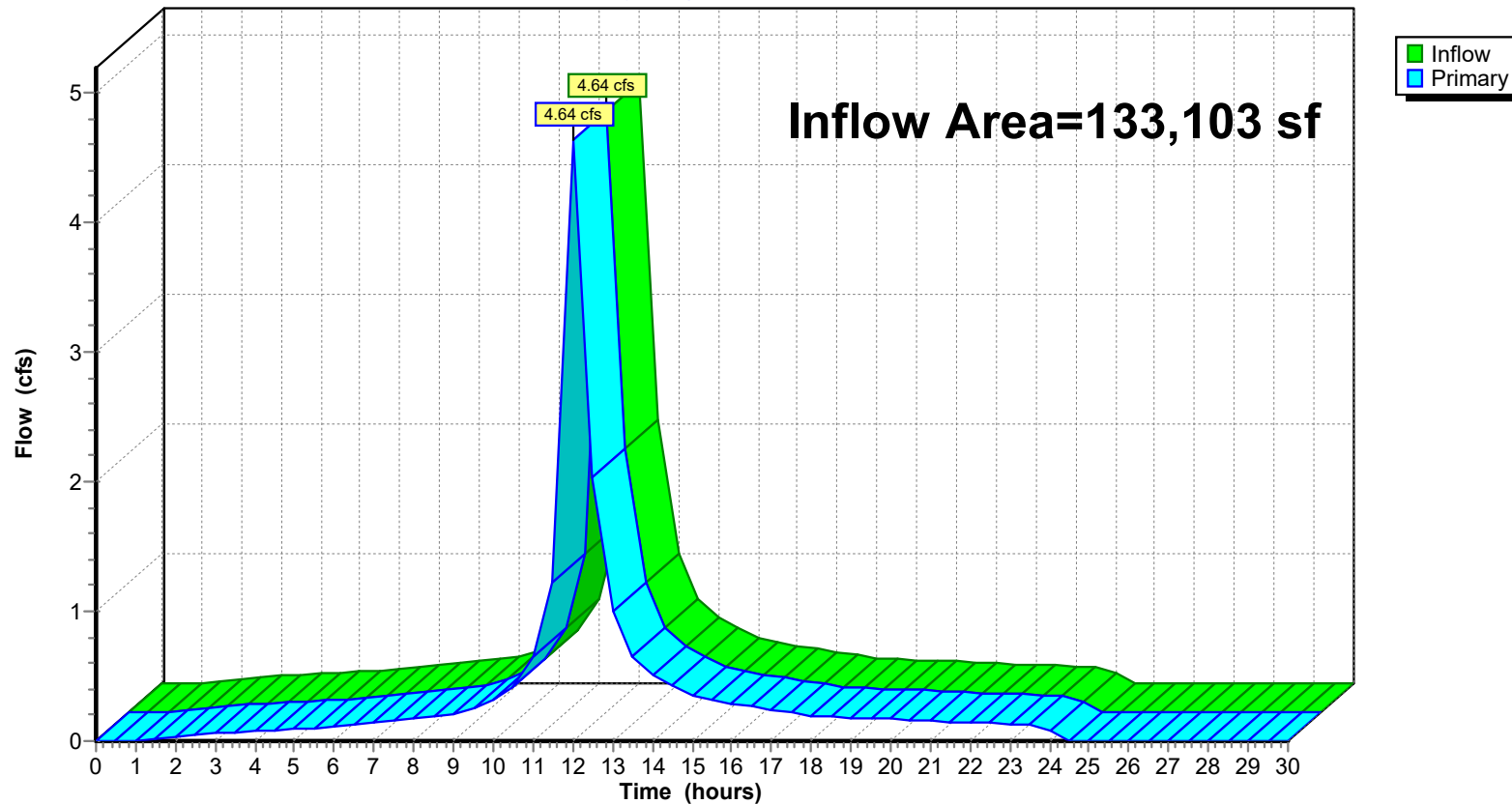
### Summary for Link 15L: TOTAL PROPOSED

Inflow Area = 133,103 sf, 56.94% Impervious, Inflow Depth = 2.83" for 2-Year-2050 event  
Inflow = 4.64 cfs @ 12.03 hrs, Volume= 31,400 cf  
Primary = 4.64 cfs @ 12.03 hrs, Volume= 31,400 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 15L: TOTAL PROPOSED

#### Hydrograph



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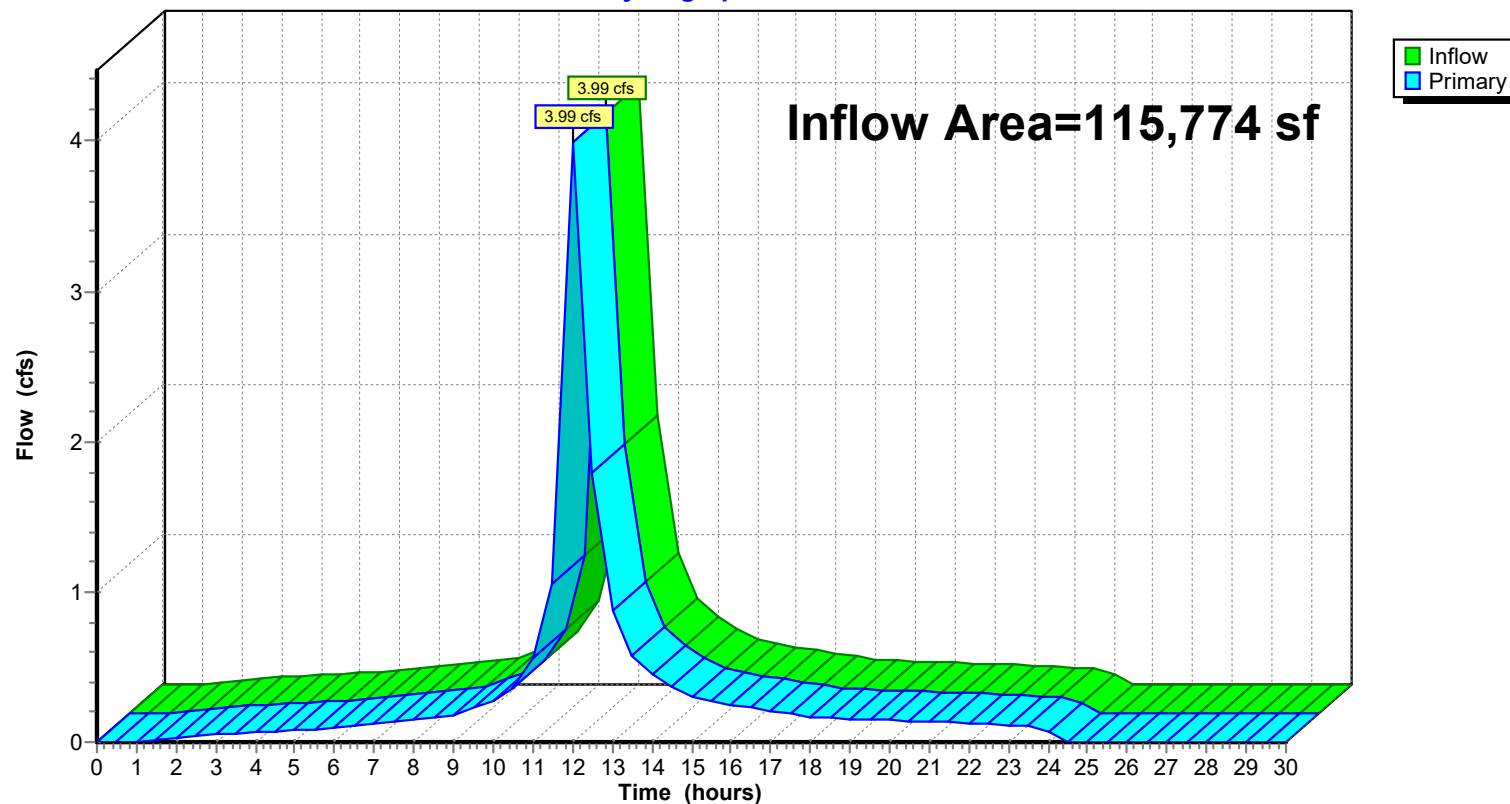
### Summary for Link P-DP 1: PROP DP 1

Inflow Area = 115,774 sf, 57.23% Impervious, Inflow Depth = 2.83" for 2-Year-2050 event  
Inflow = 3.99 cfs @ 12.04 hrs, Volume= 27,260 cf  
Primary = 3.99 cfs @ 12.04 hrs, Volume= 27,260 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 1: PROP DP 1

#### Hydrograph



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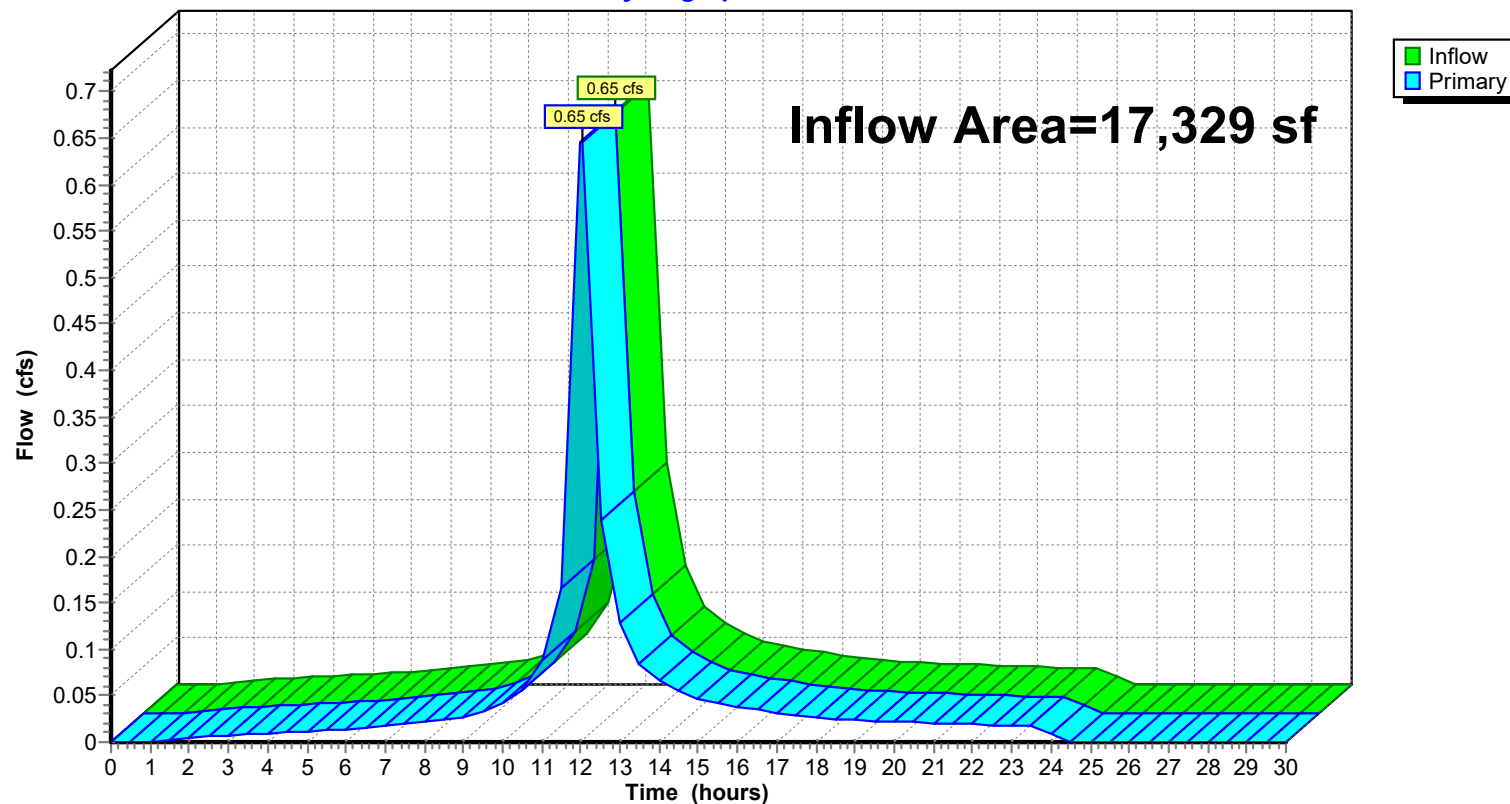
### Summary for Link P-DP 2: PROP DP 2

Inflow Area = 17,329 sf, 54.94% Impervious, Inflow Depth = 2.87" for 2-Year-2050 event  
Inflow = 0.65 cfs @ 12.02 hrs, Volume= 4,140 cf  
Primary = 0.65 cfs @ 12.02 hrs, Volume= 4,140 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 2: PROP DP 2

#### Hydrograph



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**Summary for Subcatchment 1S: Roof**

Runoff = 3.12 cfs @ 12.00 hrs, Volume= 20,459 cf, Depth= 6.13"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

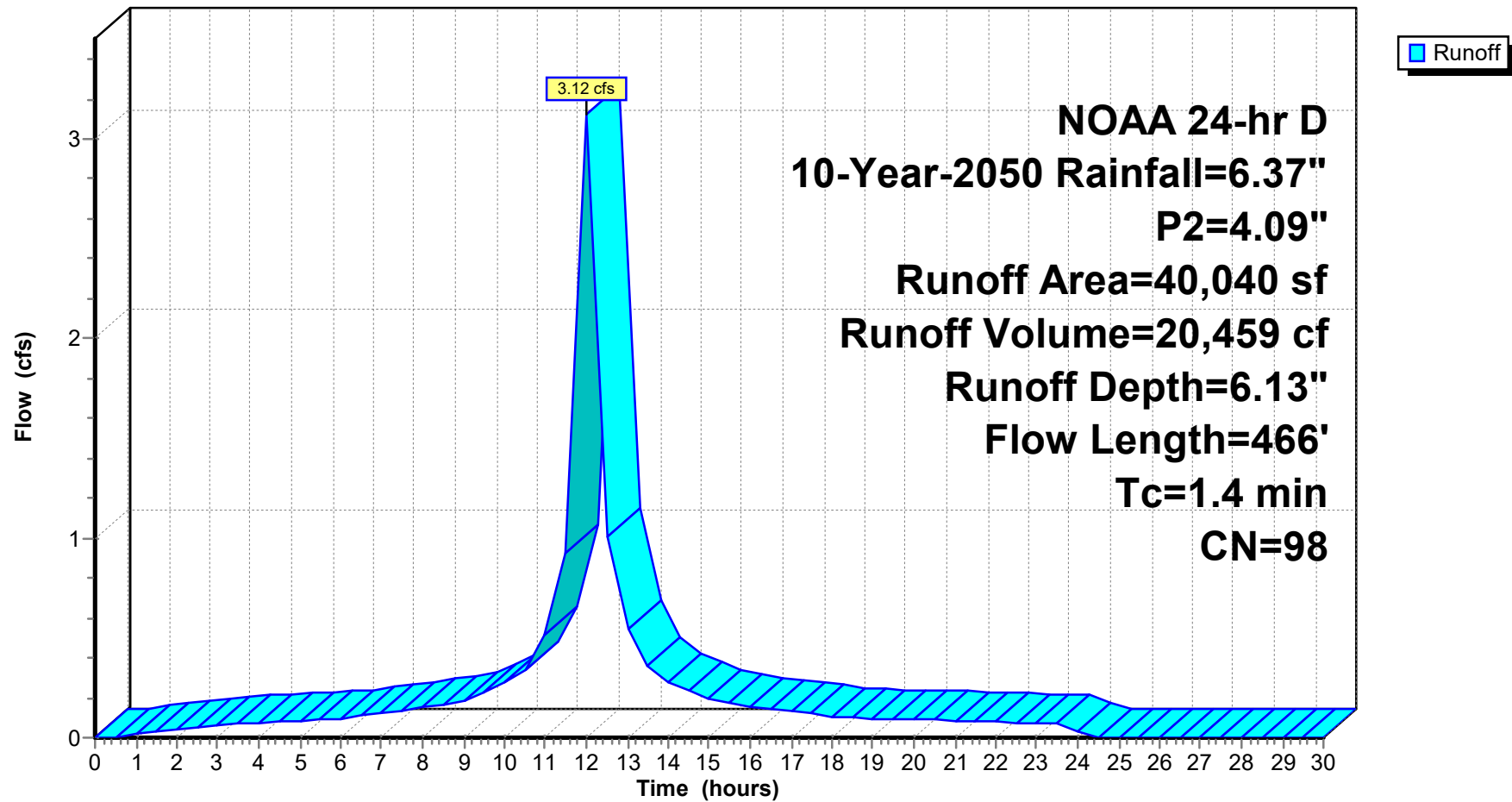
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 40,040  | 98 | Roof and Amenity Area   |
| 40,040    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 0.6      | 53            | 0.0200        | 1.37              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 4.09"                                   |
| 0.5      | 196           | 0.0200        | 6.95              | 5.46           | <b>Pipe Channel, 12 ROOF DRAIN</b><br>12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'<br>n= 0.012 |
| 0.3      | 217           | 0.0424        | 11.74             | 14.41          | <b>Pipe Channel, 15</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012            |
| 1.4      | 466           | Total         |                   |                |                                                                                                 |

Subcatchment 1S: Roof

Hydrograph





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**Summary for Subcatchment P1-I: P1 IMPERVIOUS PARKING**

Runoff = 1.89 cfs @ 12.01 hrs, Volume= 12,414 cf, Depth= 6.13"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

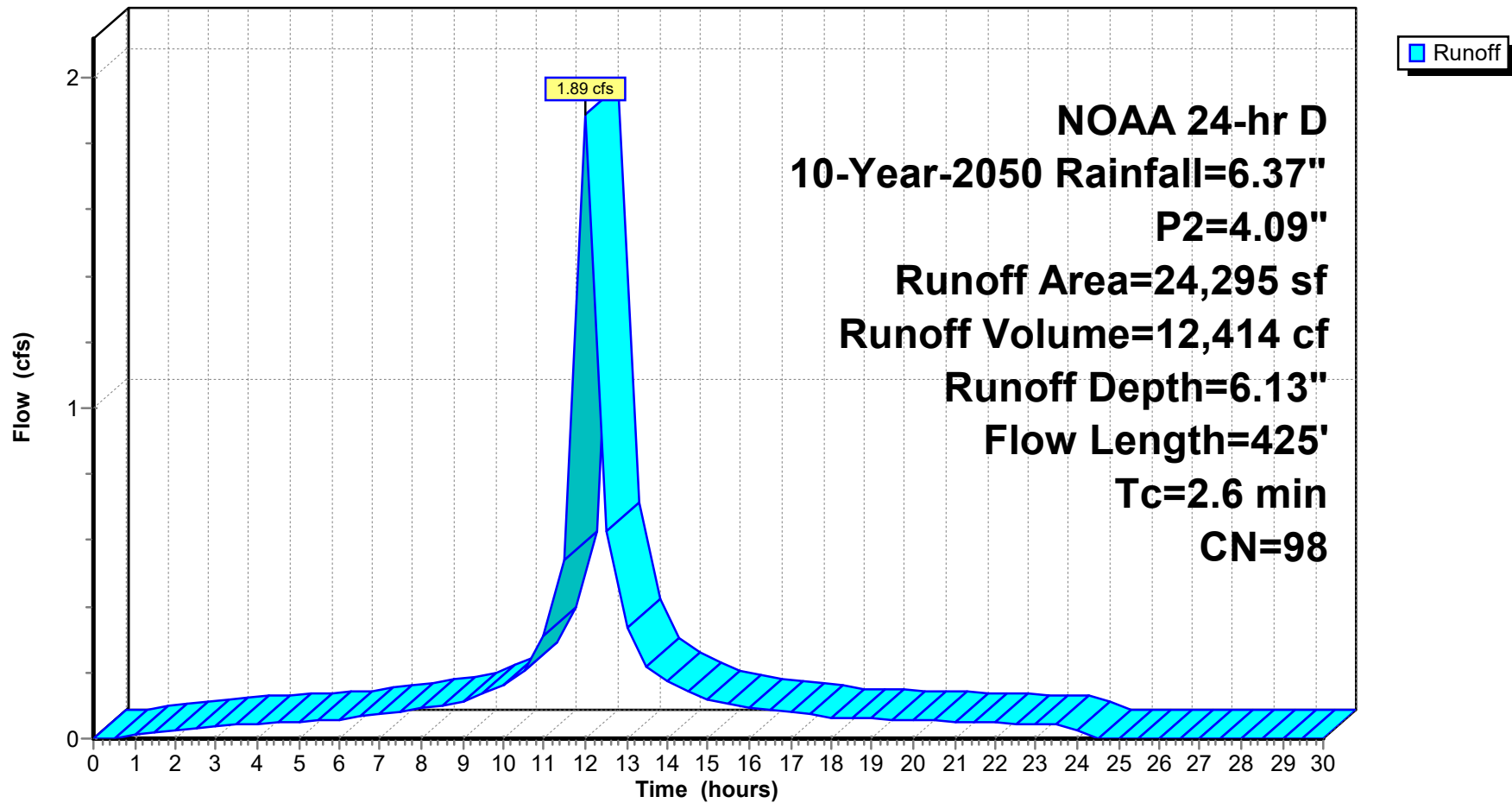
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 24,295  | 98 | Uncovered Paved parking, HSG C |
| 24,295    |    | 100.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                 |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------------|
| 1.4      | 100           | 0.0150        | 1.21              |                | <b>Sheet Flow, sheet flow Parking area</b><br>n= 0.013 P2= 4.09"                            |
| 0.9      | 127           | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow, parking area</b><br>Paved Kv= 20.3 fps                        |
| 0.3      | 198           | 0.0449        | 12.08             | 14.83          | <b>Pipe Channel, Pipe flow</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012 |
| 2.6      | 425           | Total         |                   |                |                                                                                             |

Subcatchment P1-I: P1 IMPERVIOUS PARKING

Hydrograph



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**Summary for Subcatchment P1-P: P1 PERVIOUS**

Runoff = 0.25 cfs @ 12.06 hrs, Volume= 1,568 cf, Depth= 3.50"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

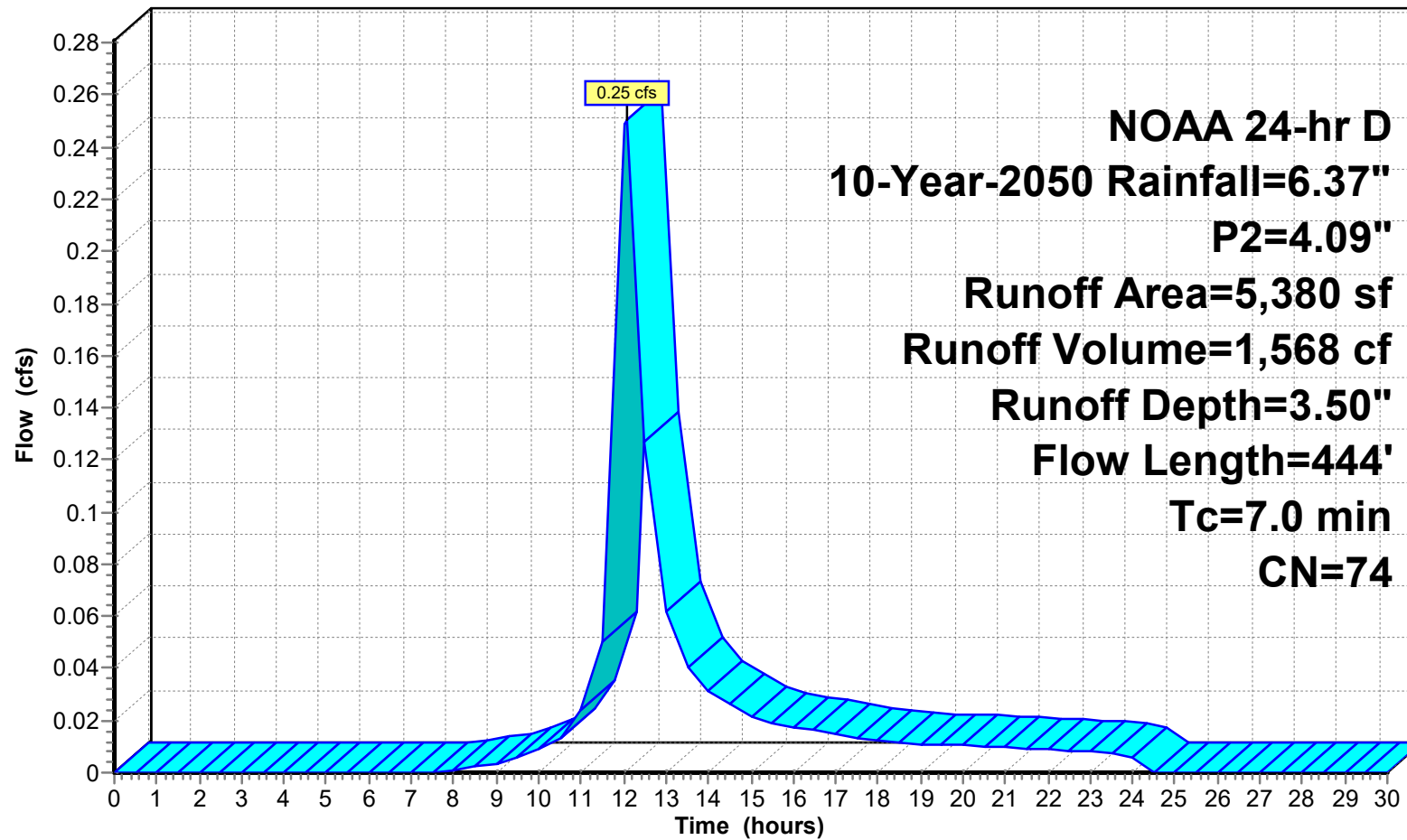
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,380     | 74 | >75% Grass cover, Good, HSG C |
| 5,380     |    | 100.00% Pervious Area         |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                                     |
|-------------|------------------|------------------|----------------------|-------------------|-------------------------------------------------------------------------------------------------|
| 6.7         | 83               | 0.0660           | 0.21                 |                   | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 4.09"                                           |
| 0.1         | 36               | 0.0280           | 9.54                 | 11.71             | <b>Pipe Channel, Yard Inlet</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012    |
| 0.2         | 325              | 0.0450           | 31.77                | 898.40            | <b>Pipe Channel, 72" Culvert</b><br>72.0" Round Area= 28.3 sf Perim= 18.8' r= 1.50'<br>n= 0.013 |
| 7.0         | 444              | Total            |                      |                   |                                                                                                 |

Subcatchment P1-P: P1 PERVIOUS

Hydrograph



Runoff

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**Summary for Subcatchment P2: P2 Pervious-w-offsite-Undisturbed**

Runoff = 1.68 cfs @ 12.19 hrs, Volume= 12,660 cf, Depth= 3.30"  
 Routed to Link P-DP 1 : PROP DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

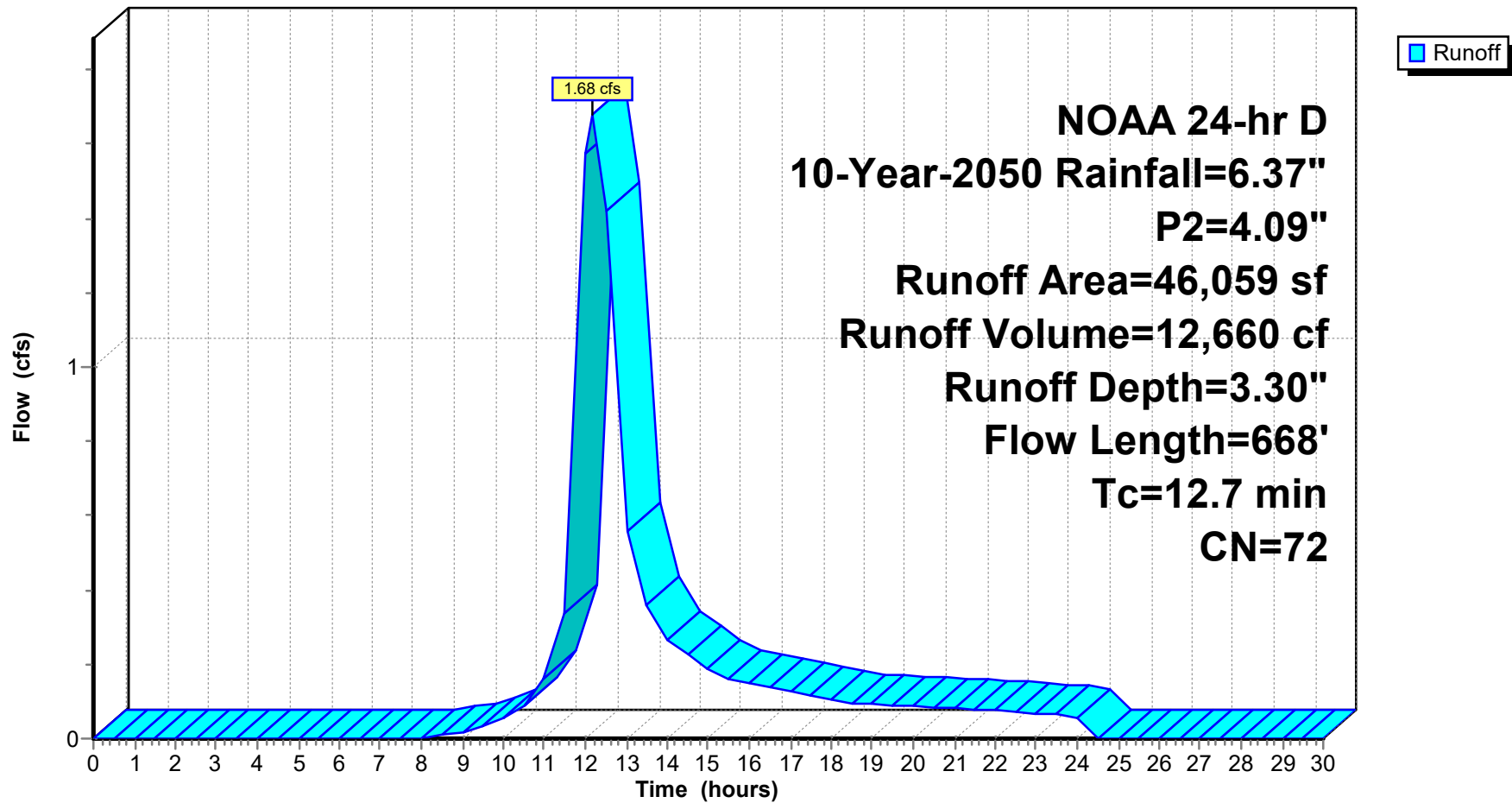
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,255  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,915   | 72 | Woods/grass comb., Good, HSG C |
| 46,059    | 72 | Weighted Average               |
| 44,131    |    | 95.81% Pervious Area           |
| 1,928     |    | 4.19% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 10.4     | 100           | 0.0900        | 0.16              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 4.09"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 12.7     | 668           | Total         |                   |                |                                               |

Subcatchment P2: P2 Pervious-w-offsite-Undisturbed

Hydrograph



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**Summary for Subcatchment P3A-IMP: P3A IMPERVIOUS**

Runoff = 0.31 cfs @ 12.01 hrs, Volume= 2,064 cf, Depth= 6.13"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

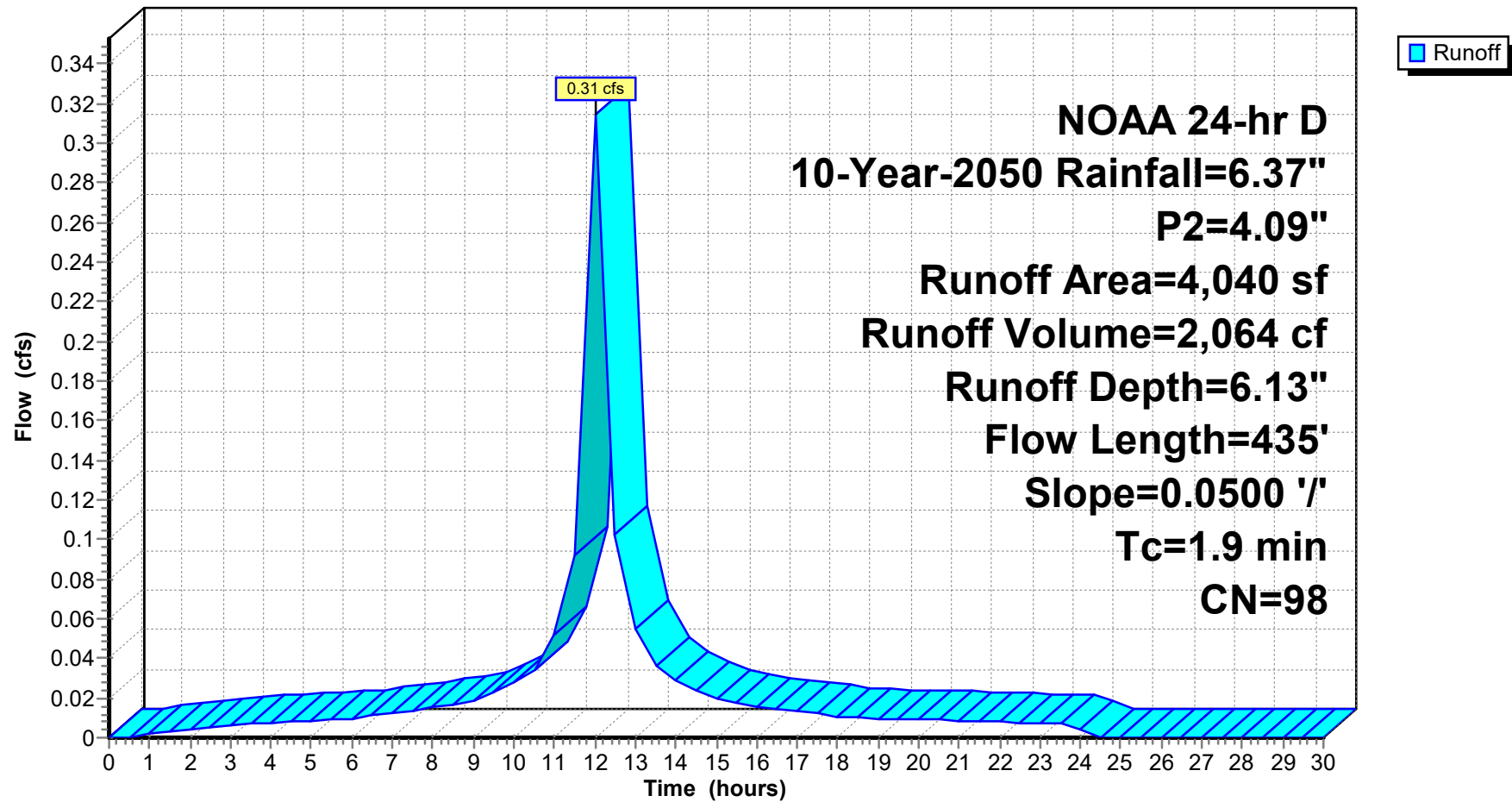
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,040   | 98 | DRIVE/SIDEWALK          |
| 4,040     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.7      | 100           | 0.0500        | 2.24              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 1.2      | 335           | 0.0500        | 4.54              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.9      | 435           | Total         |                   |                |                                                      |

Subcatchment P3A-IMP: P3A IMPERVIOUS

Hydrograph





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**Summary for Subcatchment P3A-P: P3A PERVIOUS**

Runoff = 0.28 cfs @ 12.05 hrs, Volume= 1,728 cf, Depth= 3.50"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

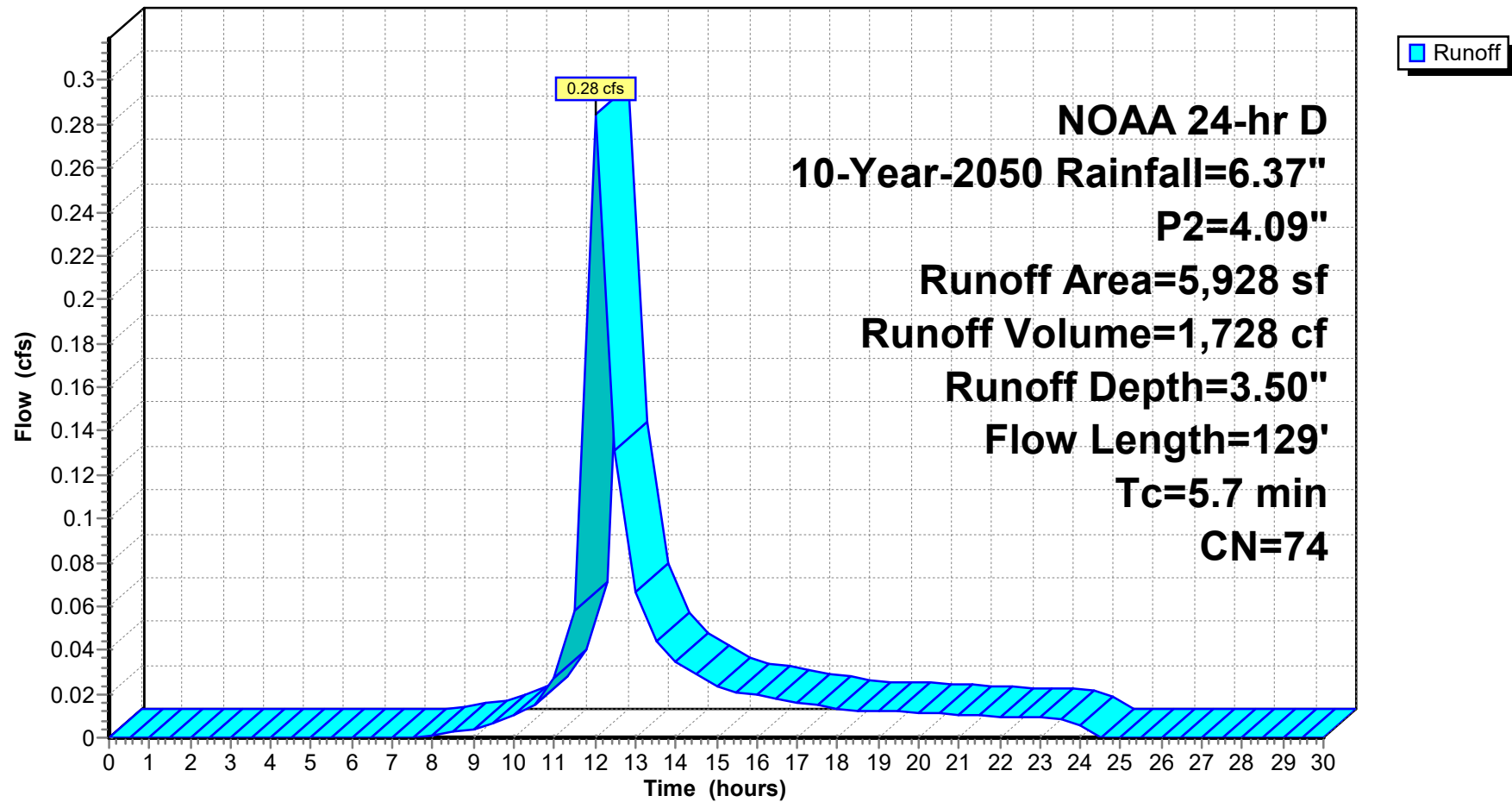
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,928     | 74 | >75% Grass cover, Good, HSG C |
| 5,928     |    | 100.00% Pervious Area         |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                            |
|-------------|------------------|------------------|----------------------|-------------------|----------------------------------------|
| 5.6         | 100              | 0.0600           | 0.30                 |                   | <b>Sheet Flow, sheet flow</b>          |
|             |                  |                  |                      |                   | Grass: Short n= 0.150 P2= 4.09"        |
| 0.1         | 29               | 0.0550           | 3.78                 |                   | <b>Shallow Concentrated Flow, Lawn</b> |
|             |                  |                  |                      |                   | Unpaved Kv= 16.1 fps                   |
| 5.7         | 129              | Total            |                      |                   |                                        |

Subcatchment P3A-P: P3A PERVIOUS

Hydrograph



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**Summary for Subcatchment P3B-IMP: P3B IMPERVIOUS**

Runoff = 0.08 cfs @ 12.00 hrs, Volume= 501 cf, Depth= 6.13"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

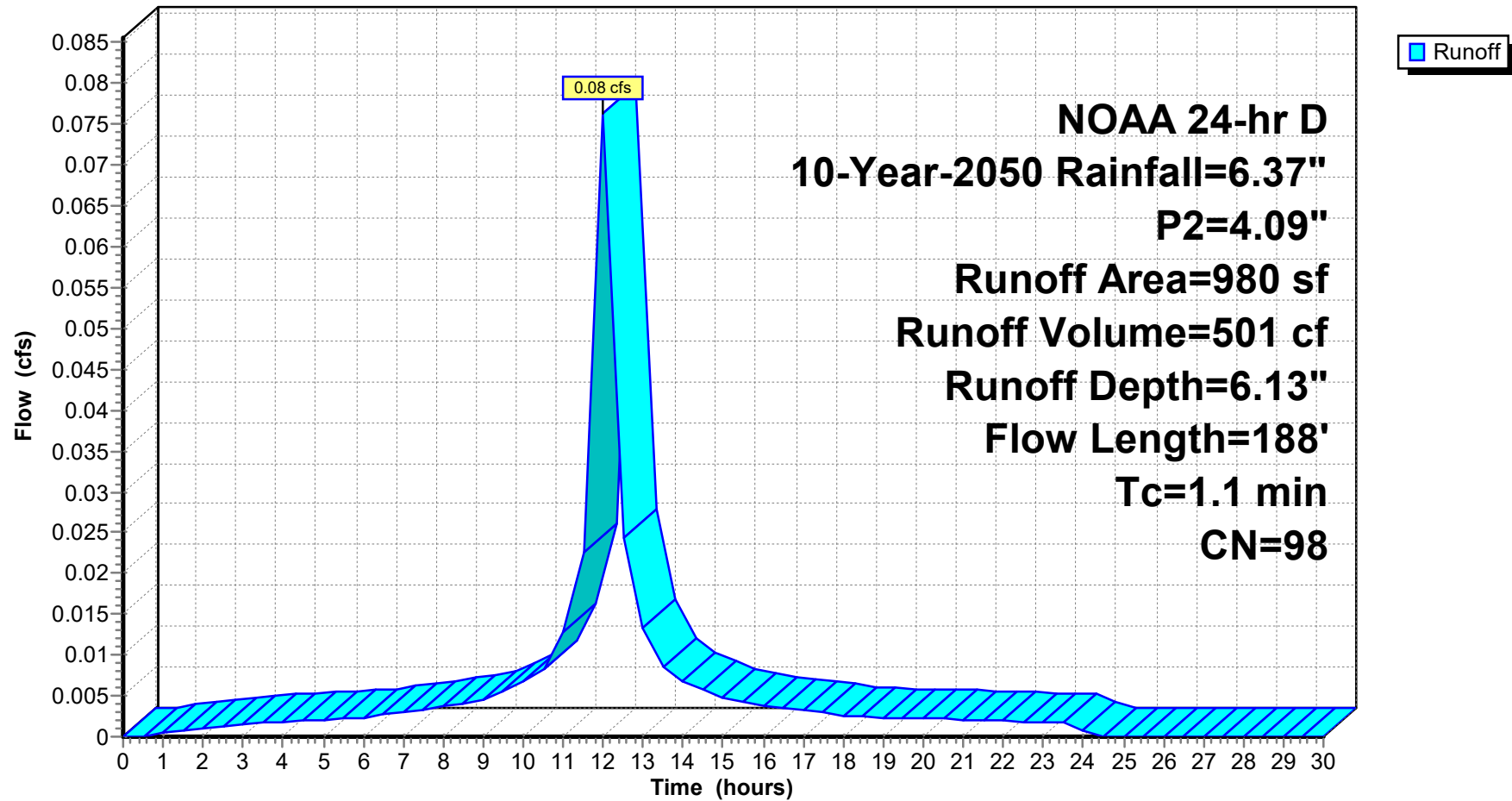
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 980     | 98 | SIDEWALK AREA           |
| 980       |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.84              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 0.5      | 88            | 0.0220        | 3.01              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment P3B-IMP: P3B IMPERVIOUS

Hydrograph



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**Summary for Subcatchment P3B-P: P3B PERVIOUS**

Runoff = 0.09 cfs @ 12.05 hrs, Volume= 548 cf, Depth= 3.50"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

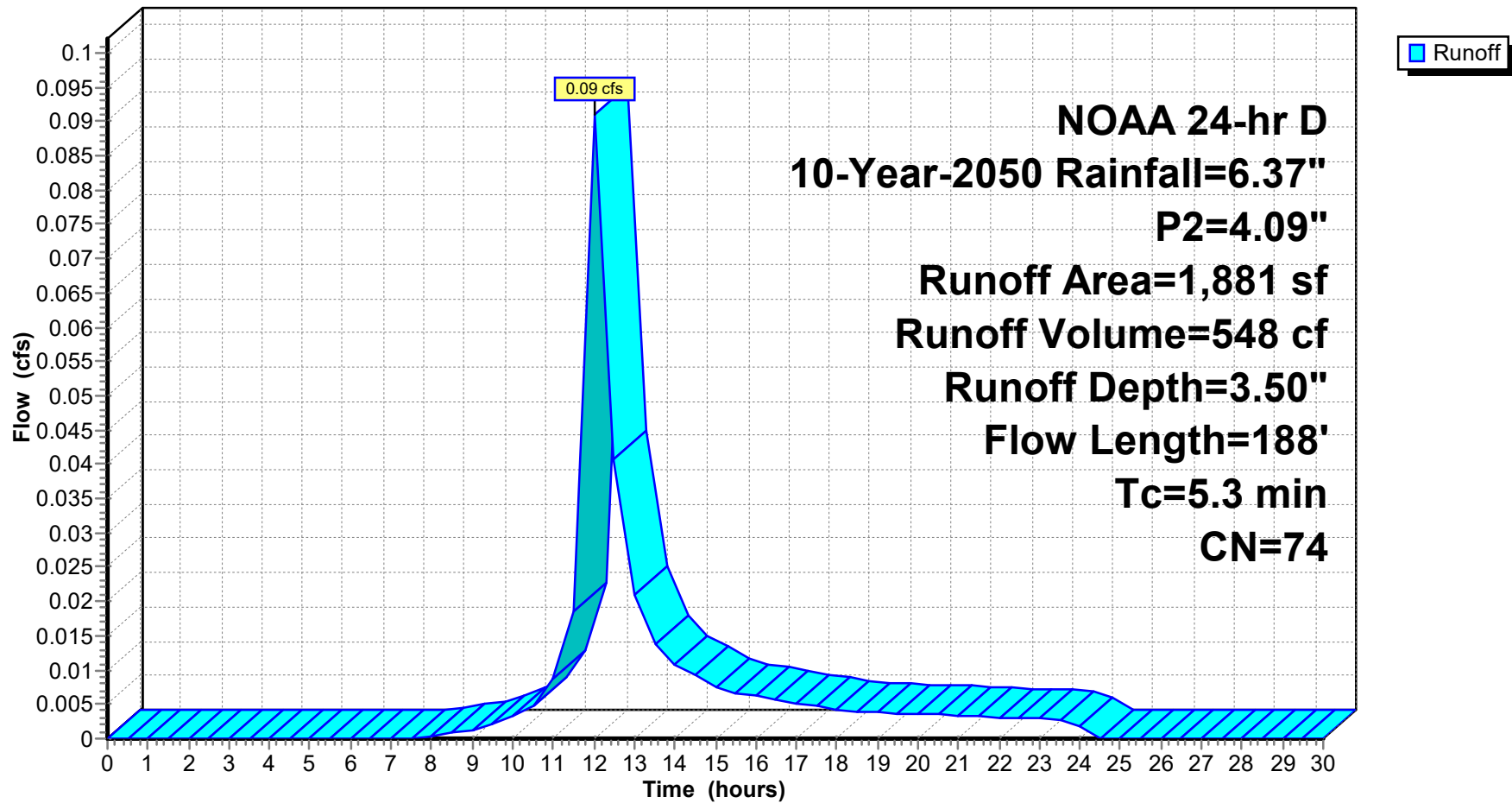
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,881     | 74 | >75% Grass cover, Good, HSG C |
| 1,881     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 4.7      | 100           | 0.0900        | 0.35              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.6      | 88            | 0.0230        | 2.44              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.3      | 188           | Total         |                   |                |                                        |

Subcatchment P3B-P: P3B PERVIOUS

Hydrograph



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**Summary for Subcatchment P3C: P3C- Roof Area**

Runoff = 0.35 cfs @ 12.00 hrs, Volume= 2,299 cf, Depth= 6.13"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 10-Year-2050 Rainfall=6.37", P2=4.09"

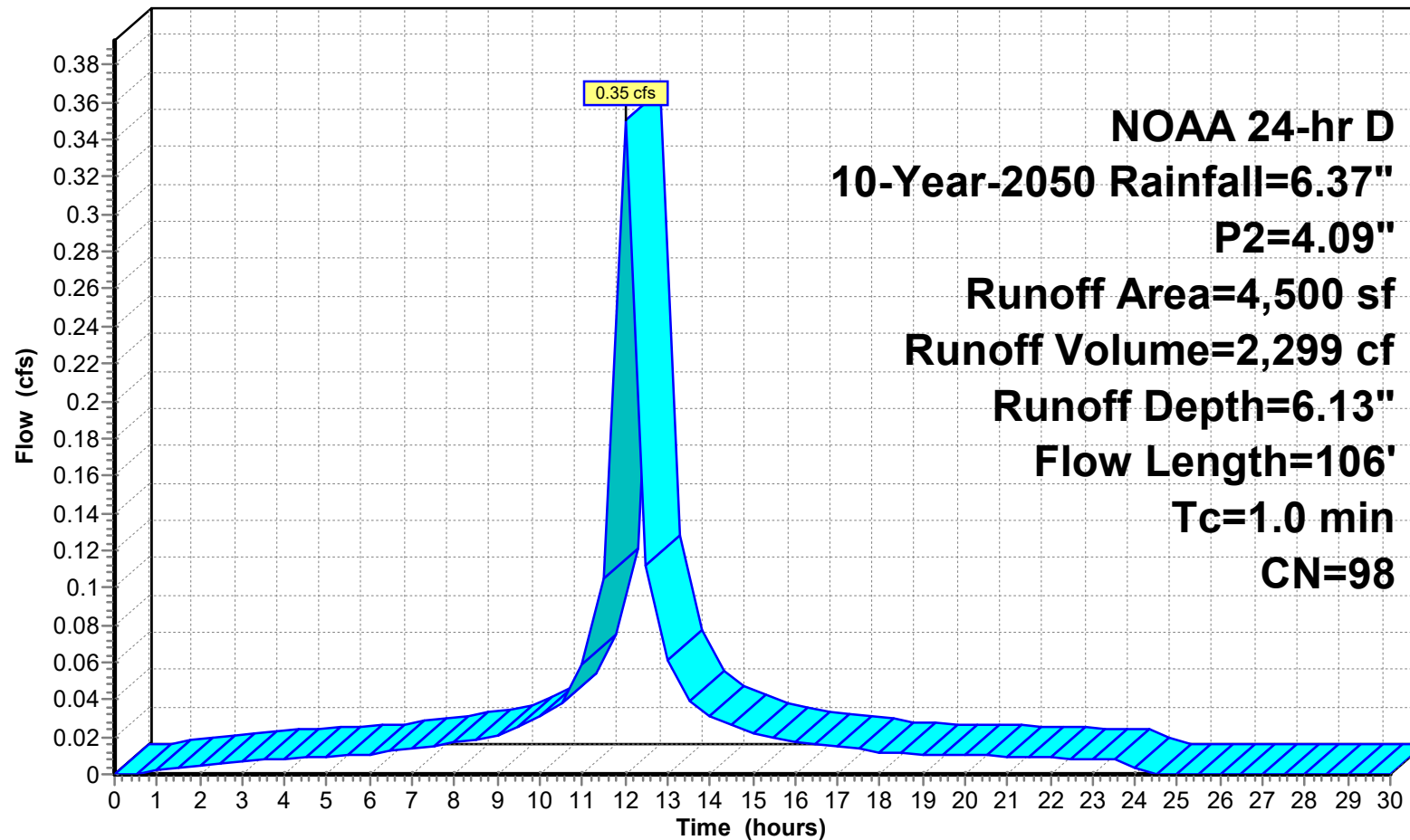
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,500   | 98 | Roof and Amenity Area   |
| 4,500     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 0.8      | 52            | 0.0100        | 1.03              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 4.09"                                 |
| 0.2      | 54            | 0.0216        | 5.51              | 1.92           | <b>Pipe Channel, 8 ROOF DRAIN</b><br>8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'<br>n= 0.012 |
| 1.0      | 106           | Total         |                   |                |                                                                                               |

Subcatchment P3C: P3C- Roof Area

Hydrograph





## 24-223 DRAINAGE DESIGN-PROPOSED-2026-03-30

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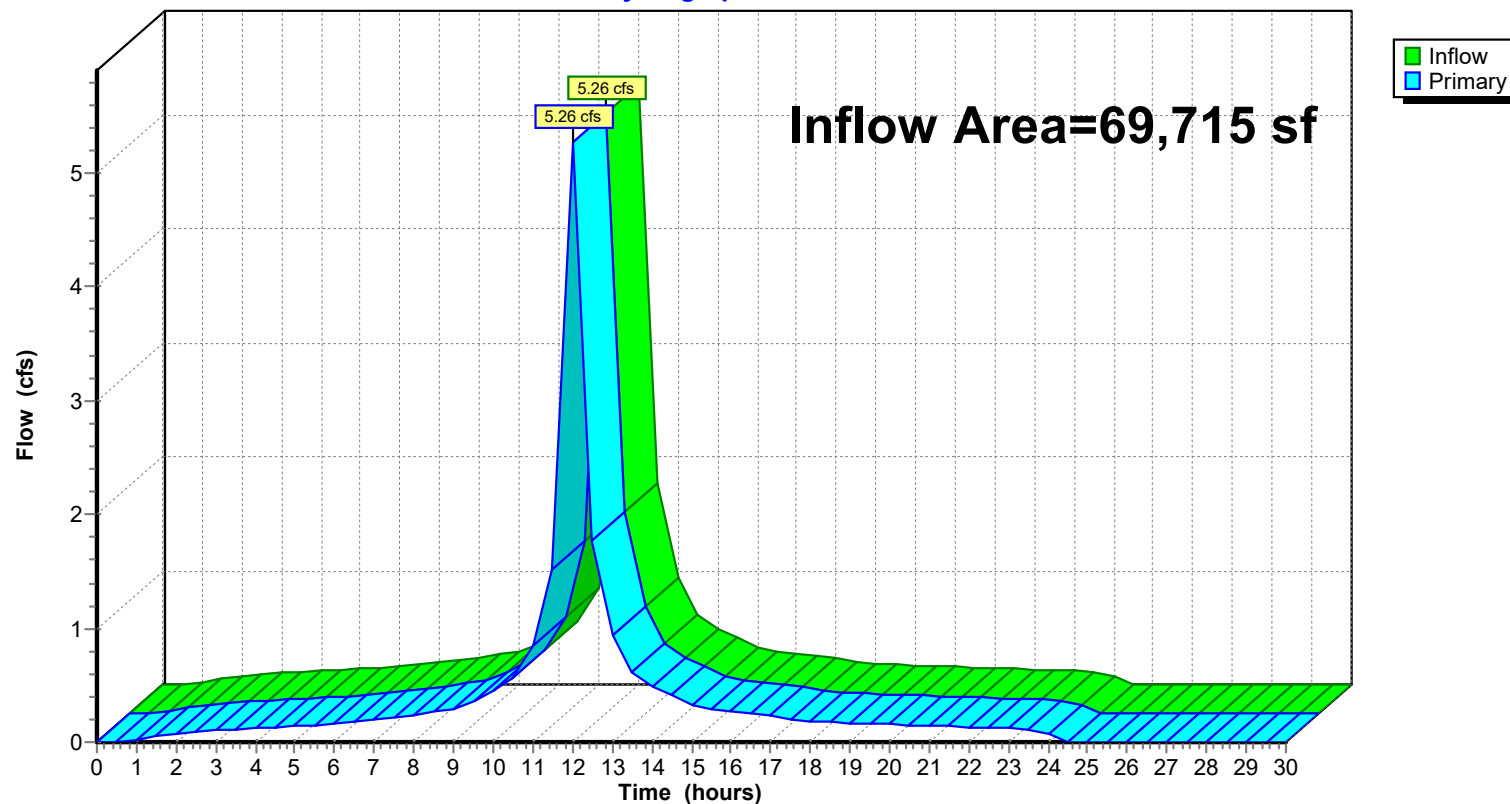
### Summary for Link 11L: Proposed Disturbed

Inflow Area = 69,715 sf, 92.28% Impervious, Inflow Depth = 5.93" for 10-Year-2050 event  
Inflow = 5.26 cfs @ 12.01 hrs, Volume= 34,441 cf  
Primary = 5.26 cfs @ 12.01 hrs, Volume= 34,441 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link P-DP 1 : PROP DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 11L: Proposed Disturbed

#### Hydrograph



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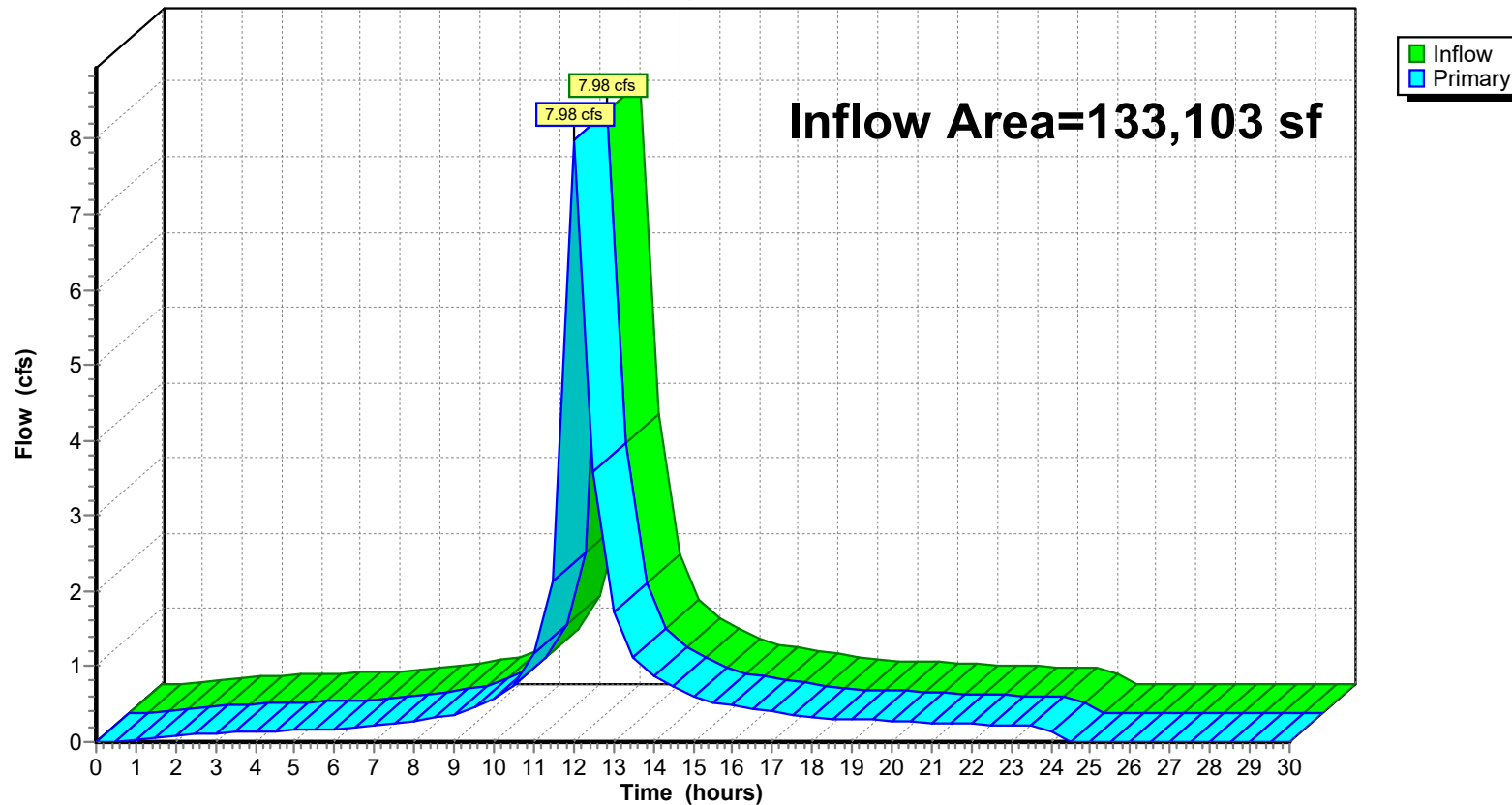
### Summary for Link 15L: TOTAL PROPOSED

Inflow Area = 133,103 sf, 56.94% Impervious, Inflow Depth = 4.89" for 10-Year-2050 event  
Inflow = 7.98 cfs @ 12.04 hrs, Volume= 54,242 cf  
Primary = 7.98 cfs @ 12.04 hrs, Volume= 54,242 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 15L: TOTAL PROPOSED

#### Hydrograph



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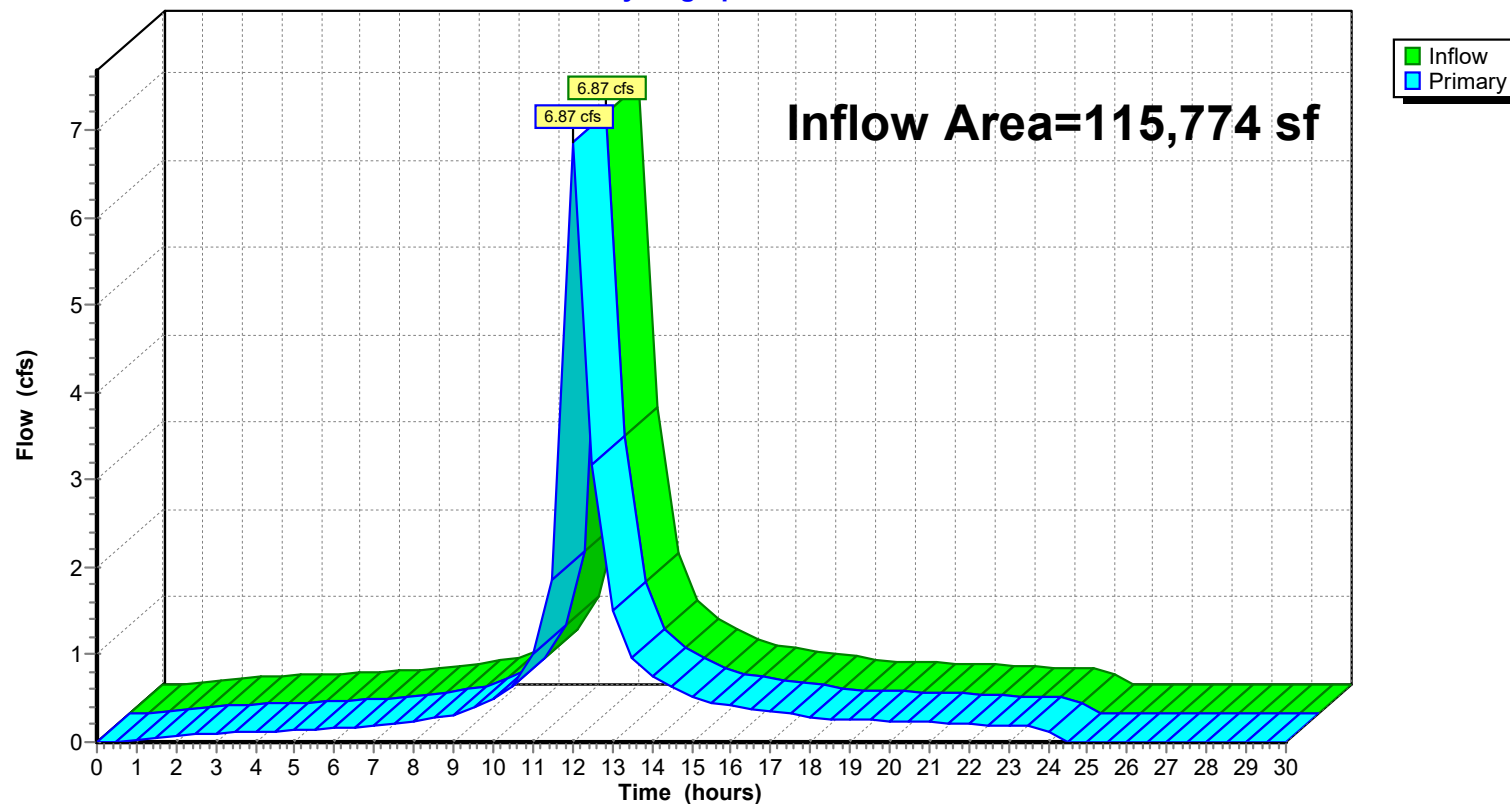
### Summary for Link P-DP 1: PROP DP 1

Inflow Area = 115,774 sf, 57.23% Impervious, Inflow Depth = 4.88" for 10-Year-2050 event  
Inflow = 6.87 cfs @ 12.04 hrs, Volume= 47,101 cf  
Primary = 6.87 cfs @ 12.04 hrs, Volume= 47,101 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 1: PROP DP 1

Hydrograph



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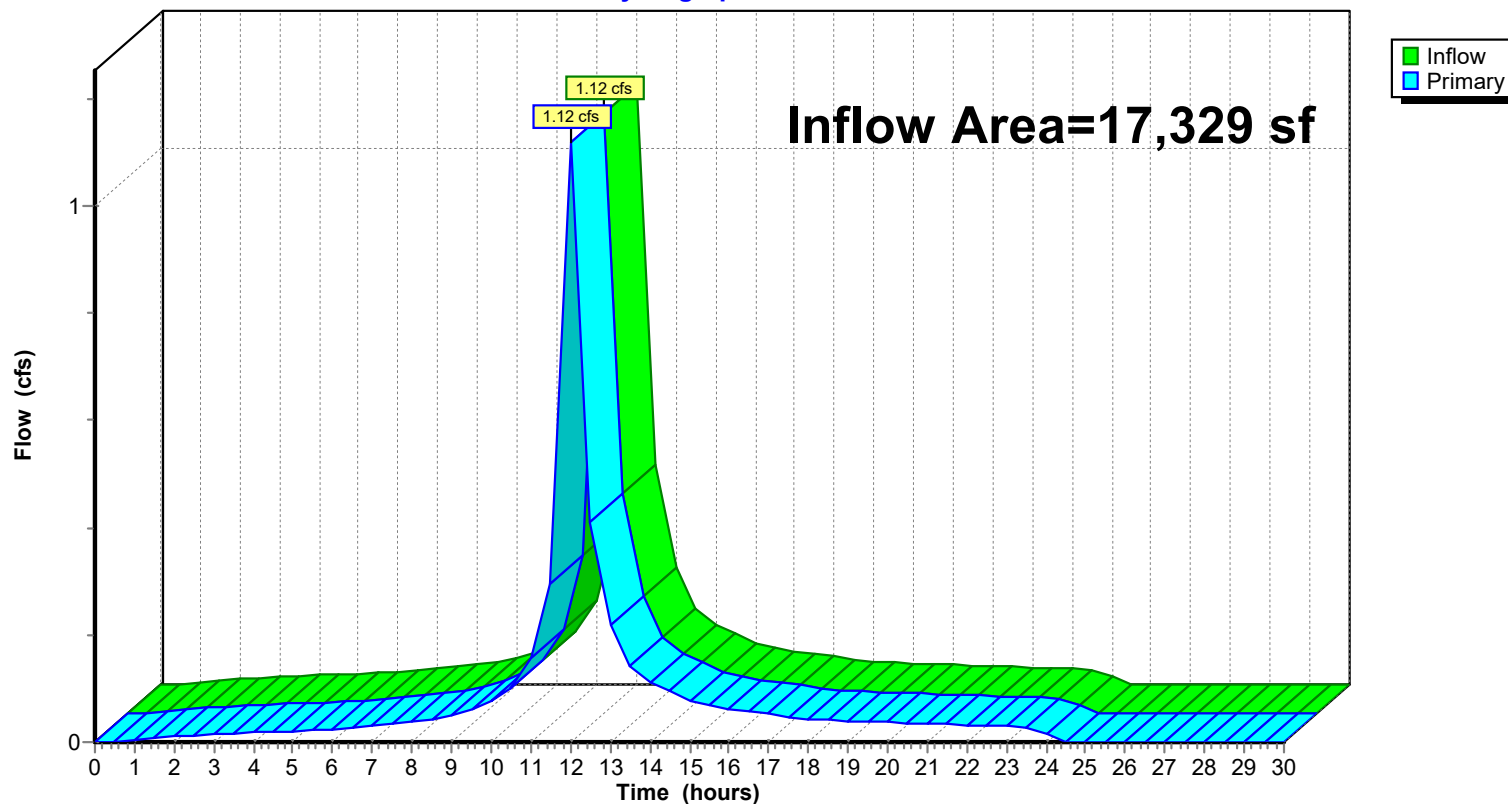
### Summary for Link P-DP 2: PROP DP 2

Inflow Area = 17,329 sf, 54.94% Impervious, Inflow Depth = 4.94" for 10-Year-2050 event  
Inflow = 1.12 cfs @ 12.02 hrs, Volume= 7,141 cf  
Primary = 1.12 cfs @ 12.02 hrs, Volume= 7,141 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 2: PROP DP 2

#### Hydrograph



**24-223 DRAINAGE DESIGN-PROPOSED-2026-03-30**

NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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**Summary for Subcatchment 1S: Roof**

Runoff = 5.66 cfs @ 12.00 hrs, Volume= 37,633 cf, Depth=11.28"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

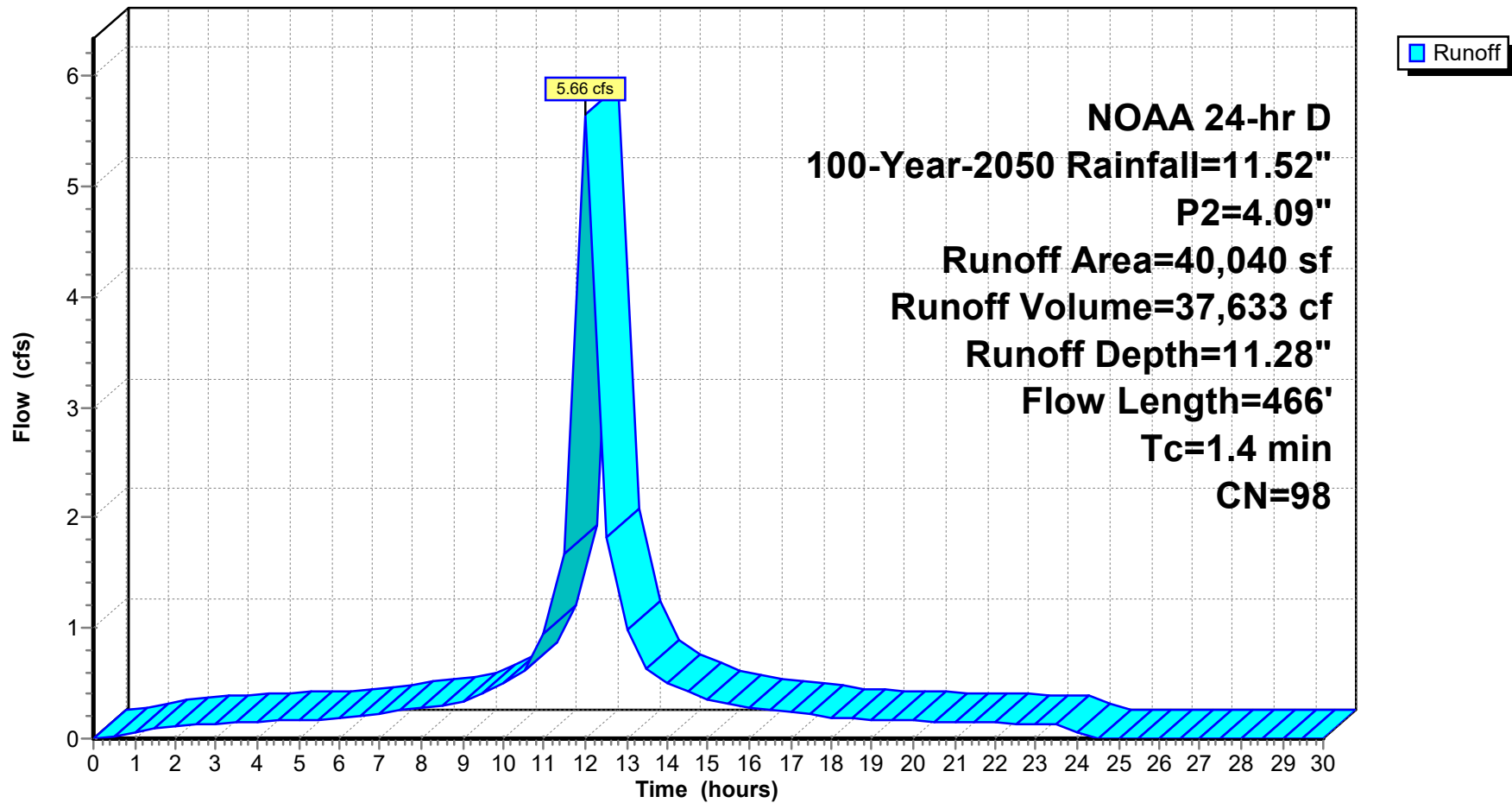
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 40,040  | 98 | Roof and Amenity Area   |
| 40,040    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                     |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------------------------------|
| 0.6      | 53            | 0.0200        | 1.37              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 4.09"                                   |
| 0.5      | 196           | 0.0200        | 6.95              | 5.46           | <b>Pipe Channel, 12 ROOF DRAIN</b><br>12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'<br>n= 0.012 |
| 0.3      | 217           | 0.0424        | 11.74             | 14.41          | <b>Pipe Channel, 15</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012            |
| 1.4      | 466           | Total         |                   |                |                                                                                                 |

Subcatchment 1S: Roof

Hydrograph



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**Summary for Subcatchment P1-I: P1 IMPERVIOUS PARKING**

Runoff = 3.43 cfs @ 12.01 hrs, Volume= 22,835 cf, Depth=11.28"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

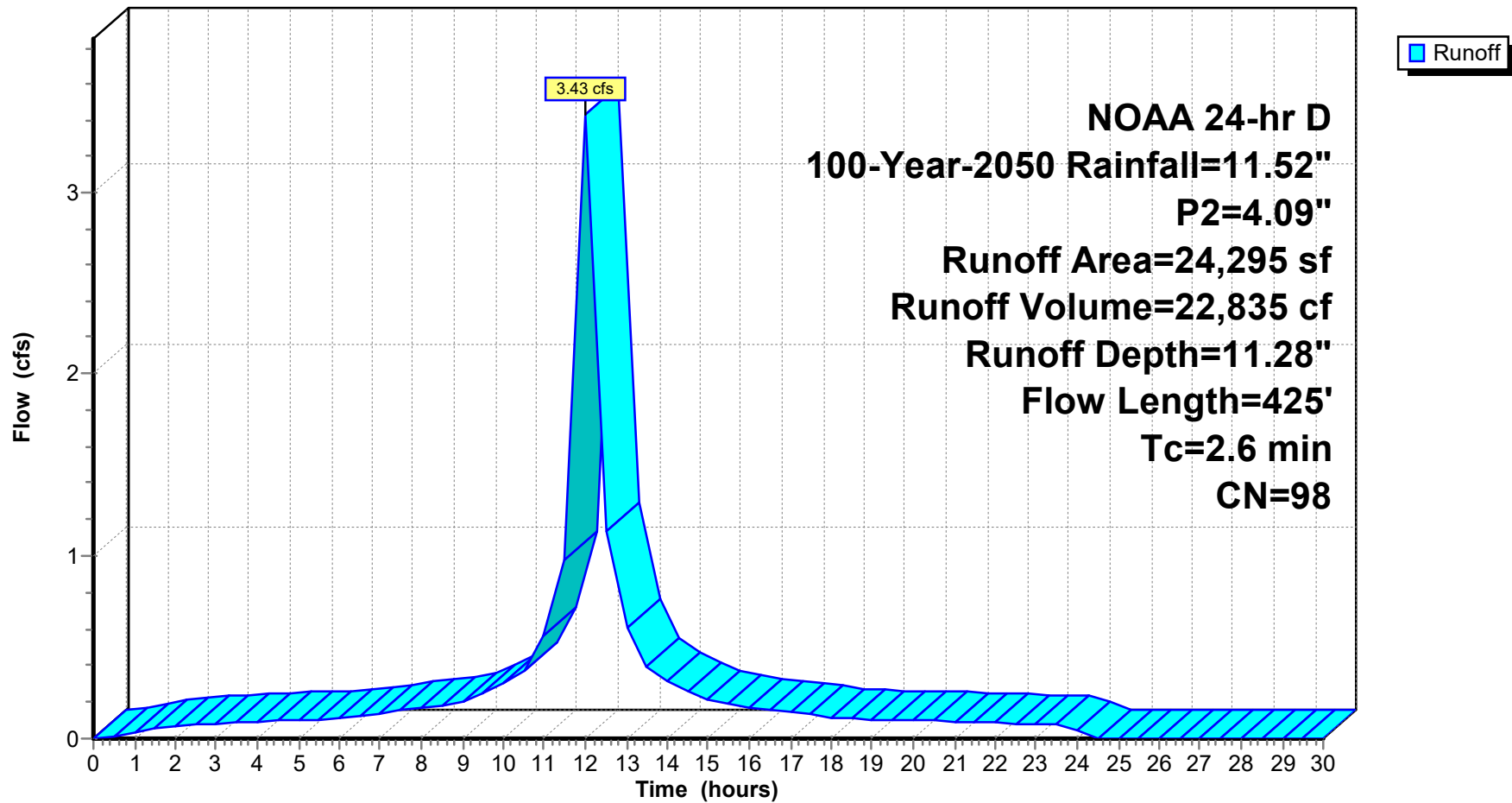
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 24,295  | 98 | Uncovered Paved parking, HSG C |
| 24,295    |    | 100.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                 |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------------------|
| 1.4      | 100           | 0.0150        | 1.21              |                | <b>Sheet Flow, sheet flow Parking area</b><br>n= 0.013 P2= 4.09"                            |
| 0.9      | 127           | 0.0150        | 2.49              |                | <b>Shallow Concentrated Flow, parking area</b><br>Paved Kv= 20.3 fps                        |
| 0.3      | 198           | 0.0449        | 12.08             | 14.83          | <b>Pipe Channel, Pipe flow</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012 |
| 2.6      | 425           | Total         |                   |                |                                                                                             |

Subcatchment P1-I: P1 IMPERVIOUS PARKING

Hydrograph





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**Summary for Subcatchment P1-P: P1 PERVIOUS**

Runoff = 0.59 cfs @ 12.04 hrs, Volume= 3,661 cf, Depth= 8.17"  
 Routed to Link 11L : Proposed Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

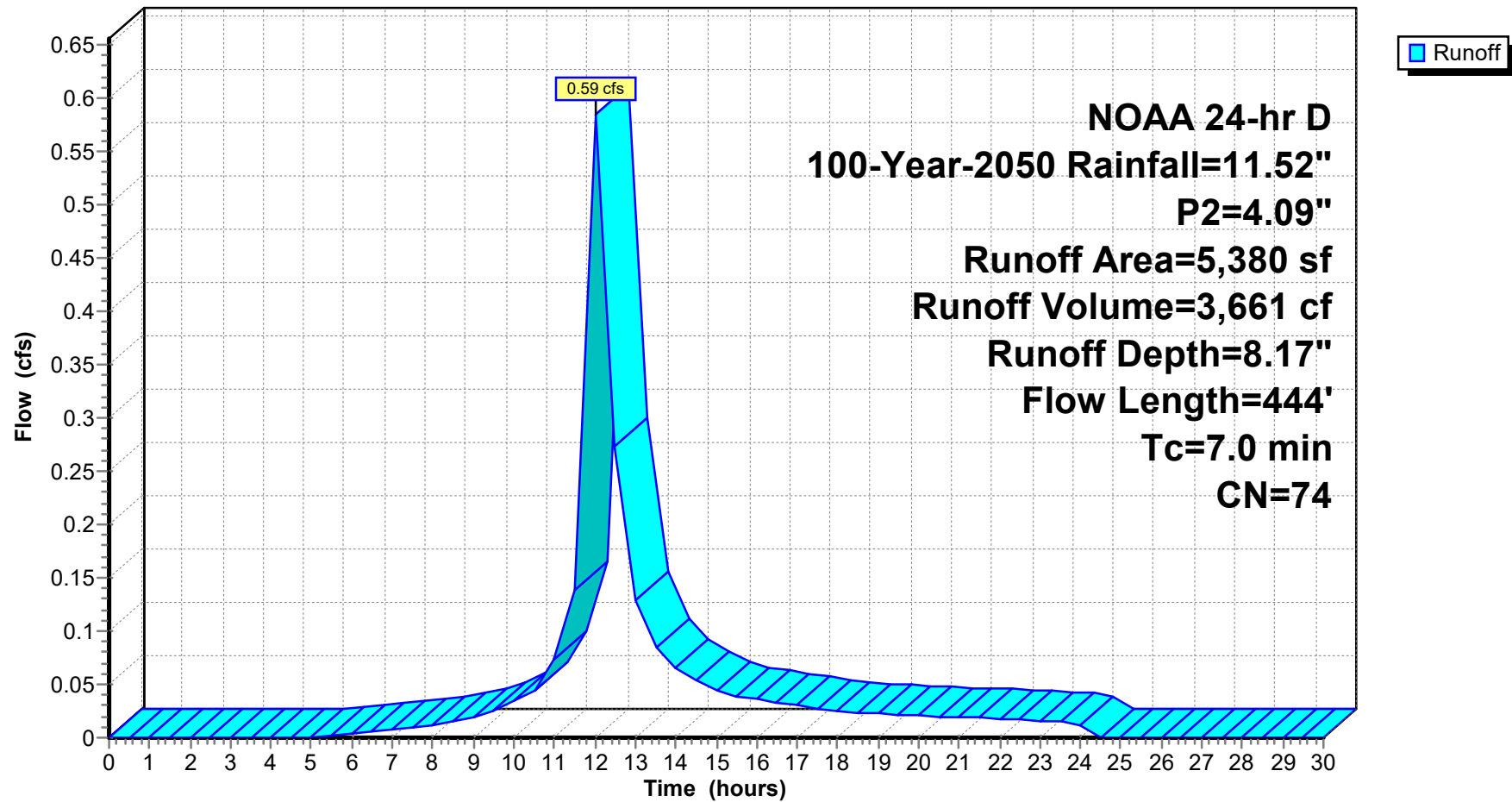
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,380     | 74 | >75% Grass cover, Good, HSG C |
| 5,380     |    | 100.00% Pervious Area         |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                                     |
|-------------|------------------|------------------|----------------------|-------------------|-------------------------------------------------------------------------------------------------|
| 6.7         | 83               | 0.0660           | 0.21                 |                   | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 4.09"                                           |
| 0.1         | 36               | 0.0280           | 9.54                 | 11.71             | <b>Pipe Channel, Yard Inlet</b><br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.012    |
| 0.2         | 325              | 0.0450           | 31.77                | 898.40            | <b>Pipe Channel, 72" Culvert</b><br>72.0" Round Area= 28.3 sf Perim= 18.8' r= 1.50'<br>n= 0.013 |
| 7.0         | 444              | Total            |                      |                   |                                                                                                 |

Subcatchment P1-P: P1 PERVIOUS

Hydrograph



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**Summary for Subcatchment P2: P2 Pervious-w-offsite-Undisturbed**

Runoff = 4.08 cfs @ 12.15 hrs, Volume= 30,272 cf, Depth= 7.89"  
 Routed to Link P-DP 1 : PROP DP 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

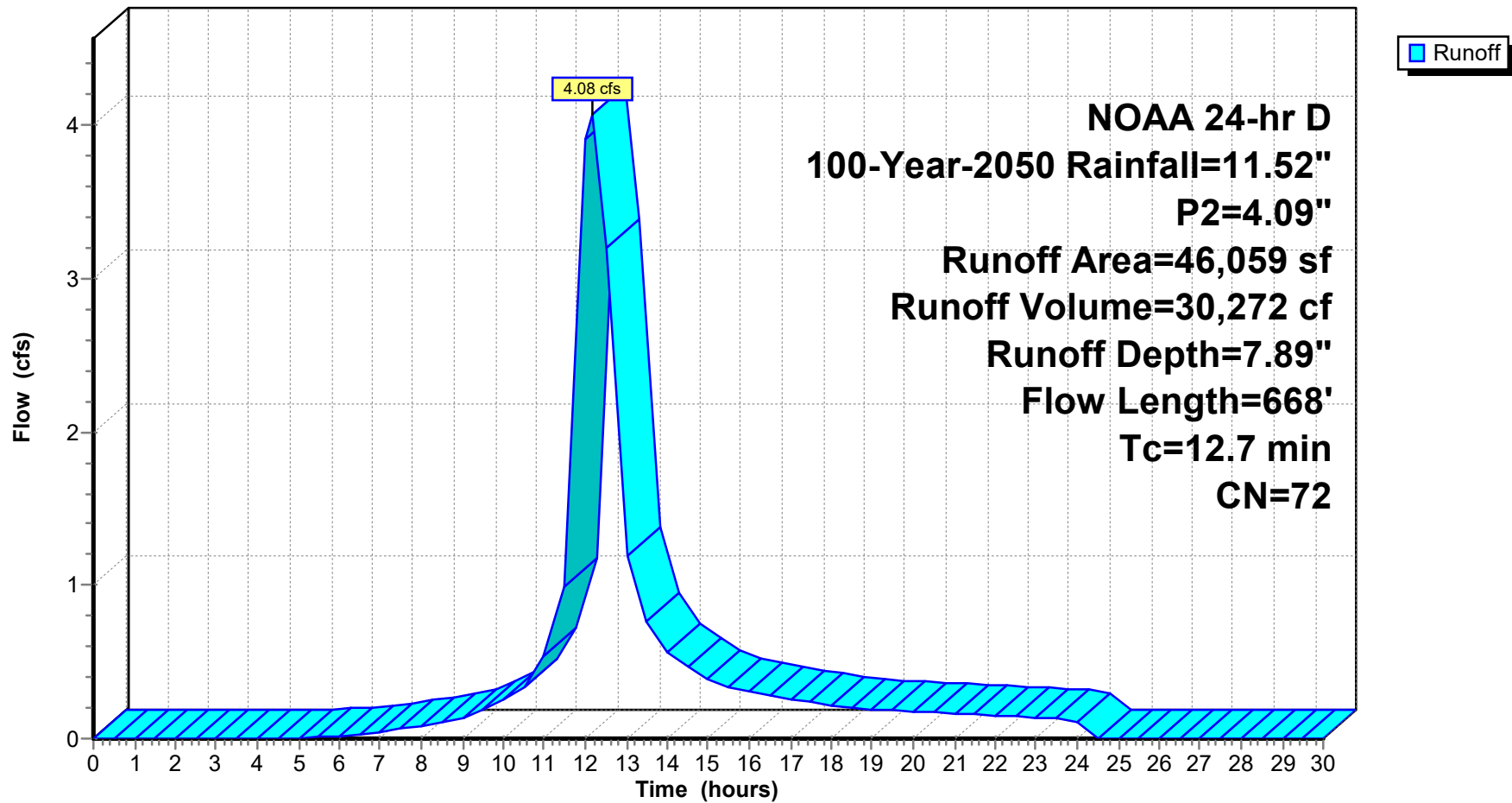
| Area (sf) | CN | Description                    |
|-----------|----|--------------------------------|
| * 708     | 98 | Roof-offsite                   |
| * 1,220   | 98 | Impervious-offsite             |
| 2,721     | 71 | Meadow, non-grazed, HSG C      |
| * 32,255  | 70 | wooded                         |
| 1,240     | 74 | >75% Grass cover, Good, HSG C  |
| * 7,915   | 72 | Woods/grass comb., Good, HSG C |
| 46,059    | 72 | Weighted Average               |
| 44,131    |    | 95.81% Pervious Area           |
| 1,928     |    | 4.19% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------|
| 10.4     | 100           | 0.0900        | 0.16              |                | <b>Sheet Flow, sheet flow</b>                 |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 4.09"    |
| 0.6      | 123           | 0.5000        | 3.54              |                | <b>Shallow Concentrated Flow, SC</b>          |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                          |
| 1.7      | 445           | 0.0470        | 4.40              |                | <b>Shallow Concentrated Flow, Parking lot</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                            |
| 12.7     | 668           | Total         |                   |                |                                               |

Subcatchment P2: P2 Pervious-w-offsite-Undisturbed

Hydrograph



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**Summary for Subcatchment P3A-IMP: P3A IMPERVIOUS**

Runoff = 0.57 cfs @ 12.01 hrs, Volume= 3,797 cf, Depth=11.28"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

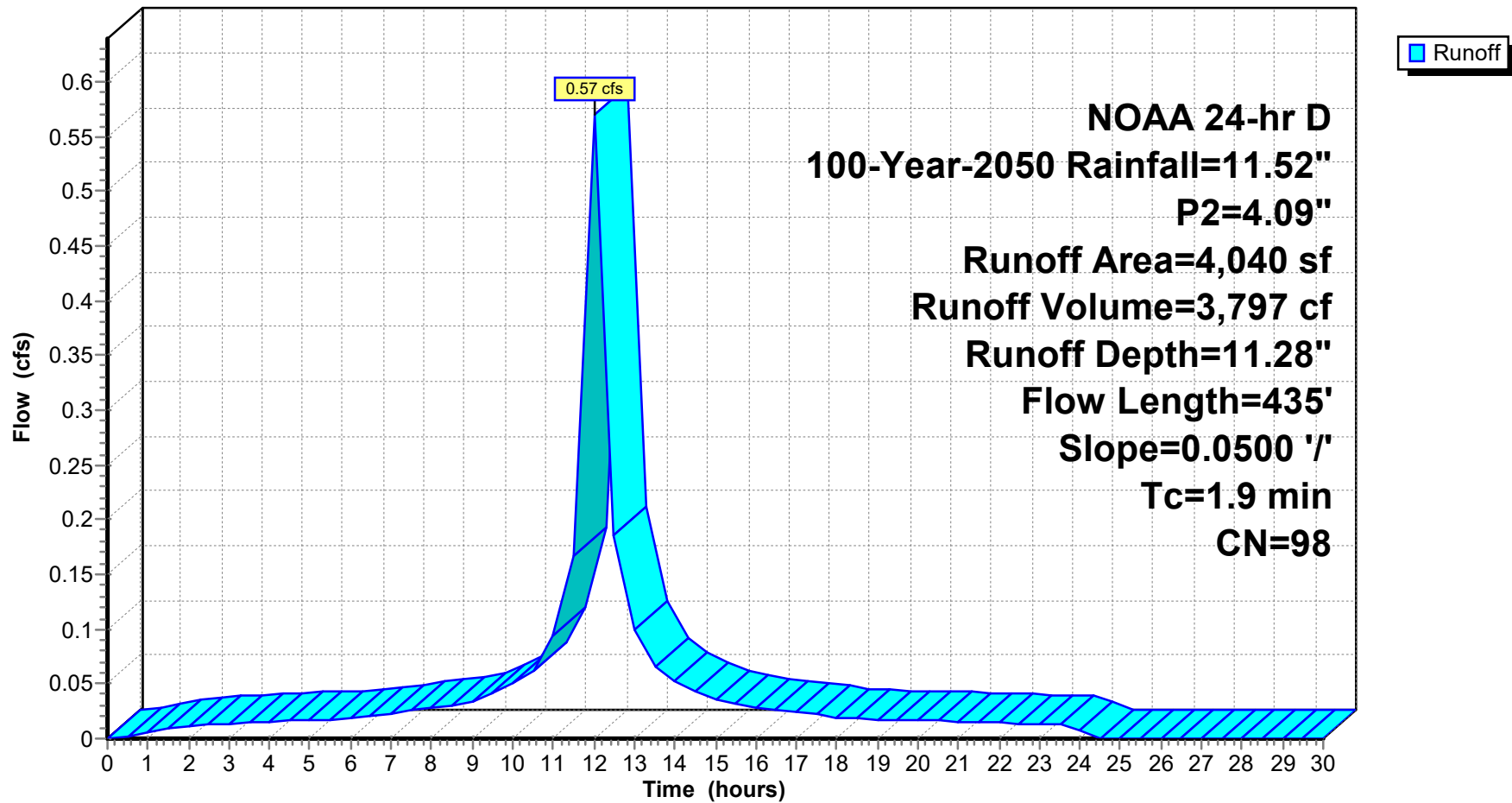
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,040   | 98 | DRIVE/SIDEWALK          |
| 4,040     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.7      | 100           | 0.0500        | 2.24              |                | <b>Sheet Flow, Pavement</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 1.2      | 335           | 0.0500        | 4.54              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.9      | 435           | Total         |                   |                |                                                      |

Subcatchment P3A-IMP: P3A IMPERVIOUS

Hydrograph



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NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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**Summary for Subcatchment P3A-P: P3A PERVIOUS**

Runoff = 0.66 cfs @ 12.03 hrs, Volume= 4,034 cf, Depth= 8.17"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

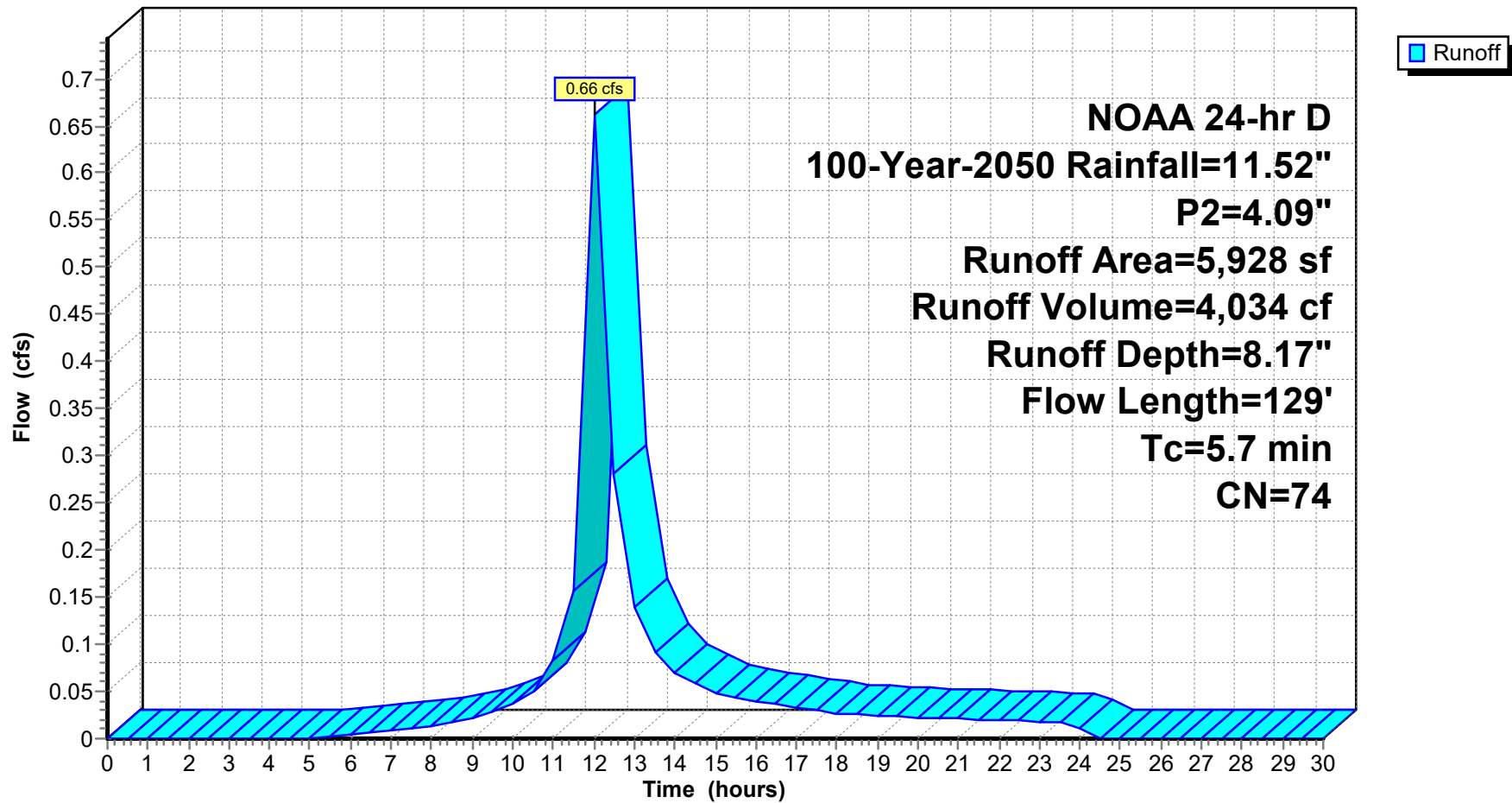
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 5,928     | 74 | >75% Grass cover, Good, HSG C |
| 5,928     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 5.6      | 100           | 0.0600        | 0.30              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.1      | 29            | 0.0550        | 3.78              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.7      | 129           | Total         |                   |                |                                        |

Subcatchment P3A-P: P3A PERVIOUS

Hydrograph





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**Summary for Subcatchment P3B-IMP: P3B IMPERVIOUS**

Runoff = 0.14 cfs @ 12.00 hrs, Volume= 921 cf, Depth=11.28"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

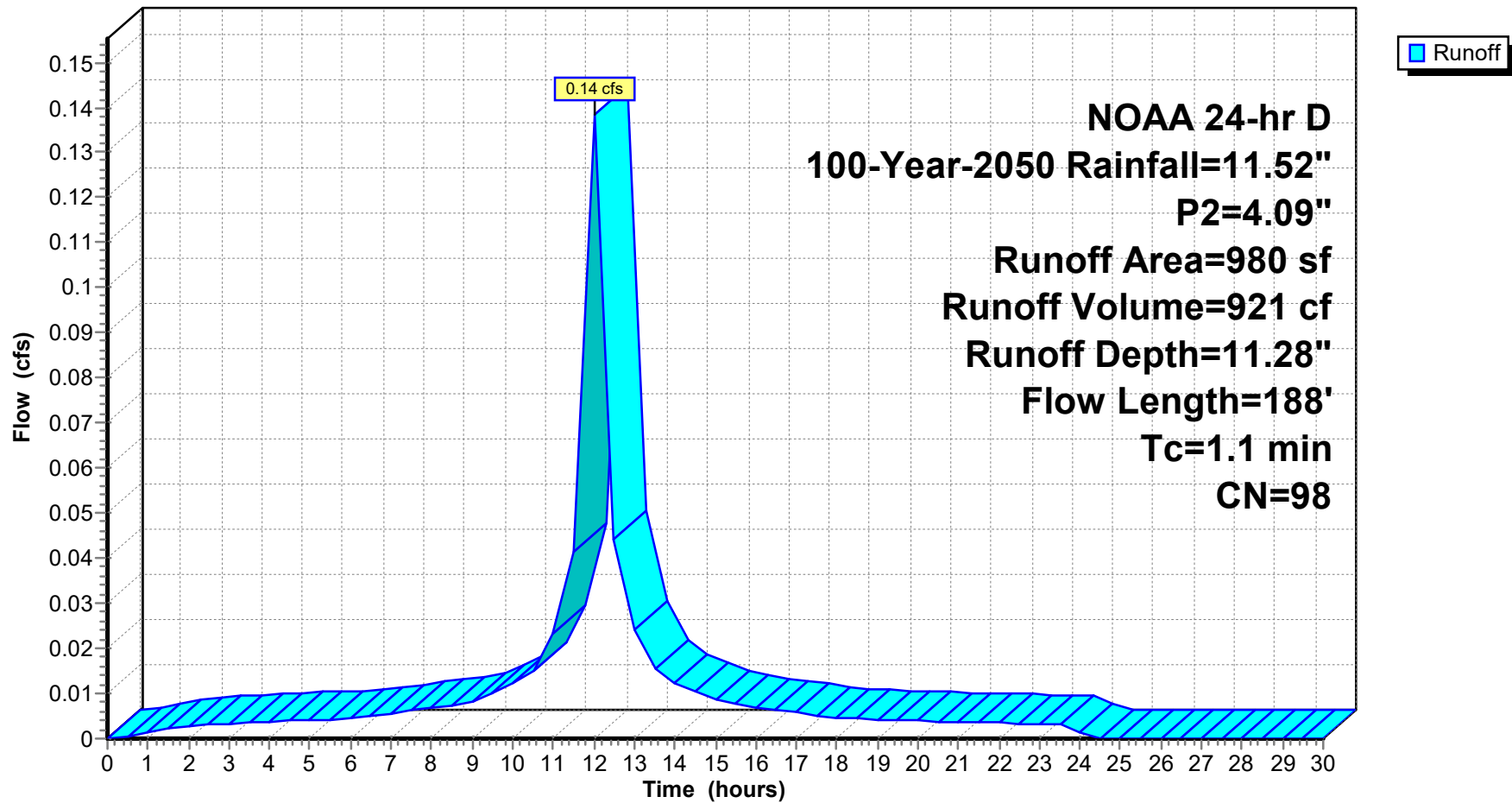
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 980     | 98 | SIDEWALK AREA           |
| 980       |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                          |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------|
| 0.6      | 100           | 0.0900        | 2.84              |                | <b>Sheet Flow, sidewalk</b>                          |
|          |               |               |                   |                | Smooth surfaces n= 0.011 P2= 4.09"                   |
| 0.5      | 88            | 0.0220        | 3.01              |                | <b>Shallow Concentrated Flow, shadow concentrate</b> |
|          |               |               |                   |                | Paved Kv= 20.3 fps                                   |
| 1.1      | 188           | Total         |                   |                |                                                      |

Subcatchment P3B-IMP: P3B IMPERVIOUS

Hydrograph



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NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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**Summary for Subcatchment P3B-P: P3B PERVIOUS**

Runoff = 0.21 cfs @ 12.03 hrs, Volume= 1,280 cf, Depth= 8.17"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

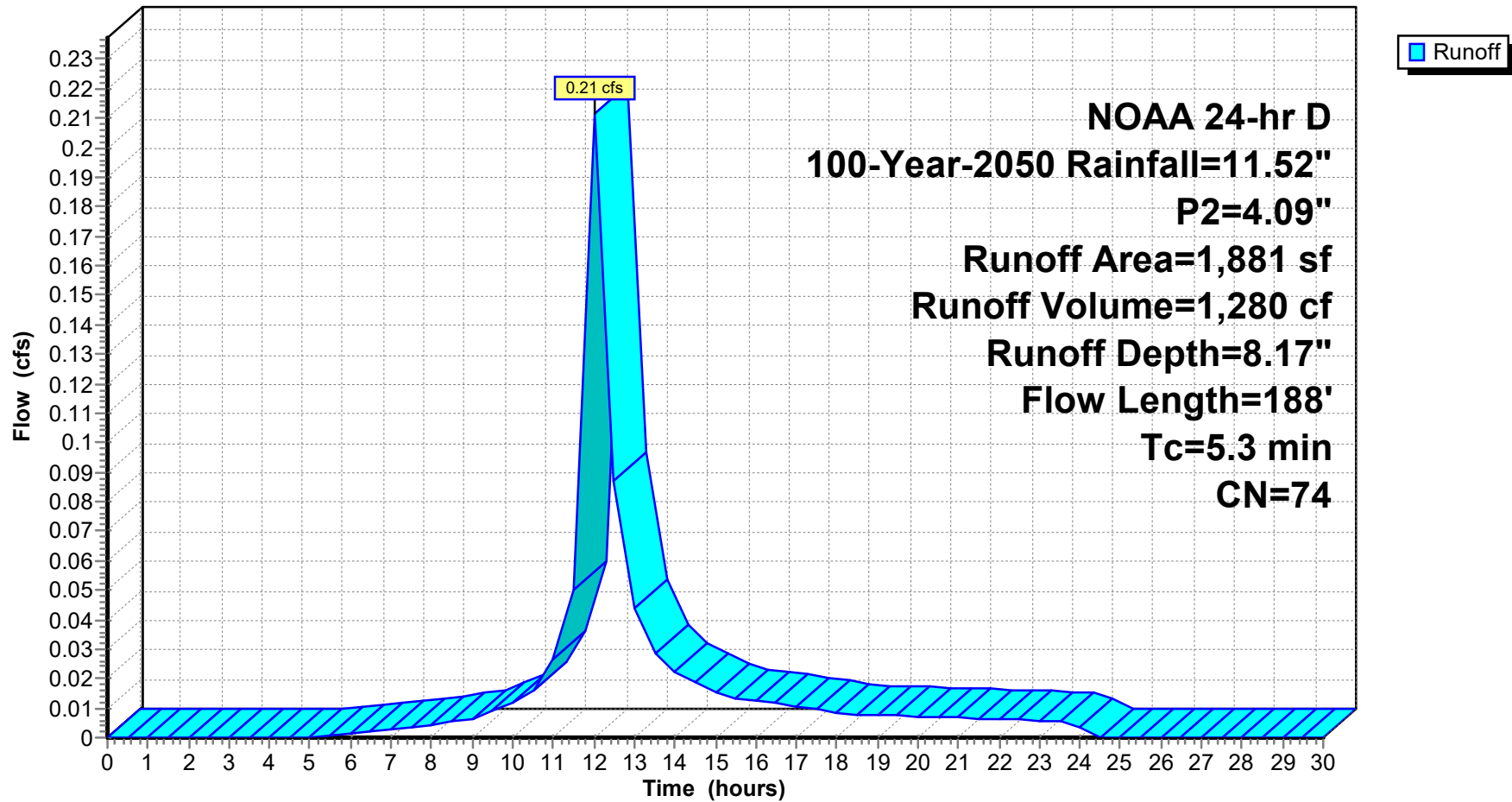
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,881     | 74 | >75% Grass cover, Good, HSG C |
| 1,881     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                            |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------|
| 4.7      | 100           | 0.0900        | 0.35              |                | <b>Sheet Flow, sheet flow</b>          |
|          |               |               |                   |                | Grass: Short n= 0.150 P2= 4.09"        |
| 0.6      | 88            | 0.0230        | 2.44              |                | <b>Shallow Concentrated Flow, Lawn</b> |
|          |               |               |                   |                | Unpaved Kv= 16.1 fps                   |
| 5.3      | 188           | Total         |                   |                |                                        |

Subcatchment P3B-P: P3B PERVIOUS

Hydrograph



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**Summary for Subcatchment P3C: P3C- Roof Area**

Runoff = 0.64 cfs @ 12.00 hrs, Volume= 4,230 cf, Depth=11.28"  
 Routed to Link P-DP 2 : PROP DP 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs  
 NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

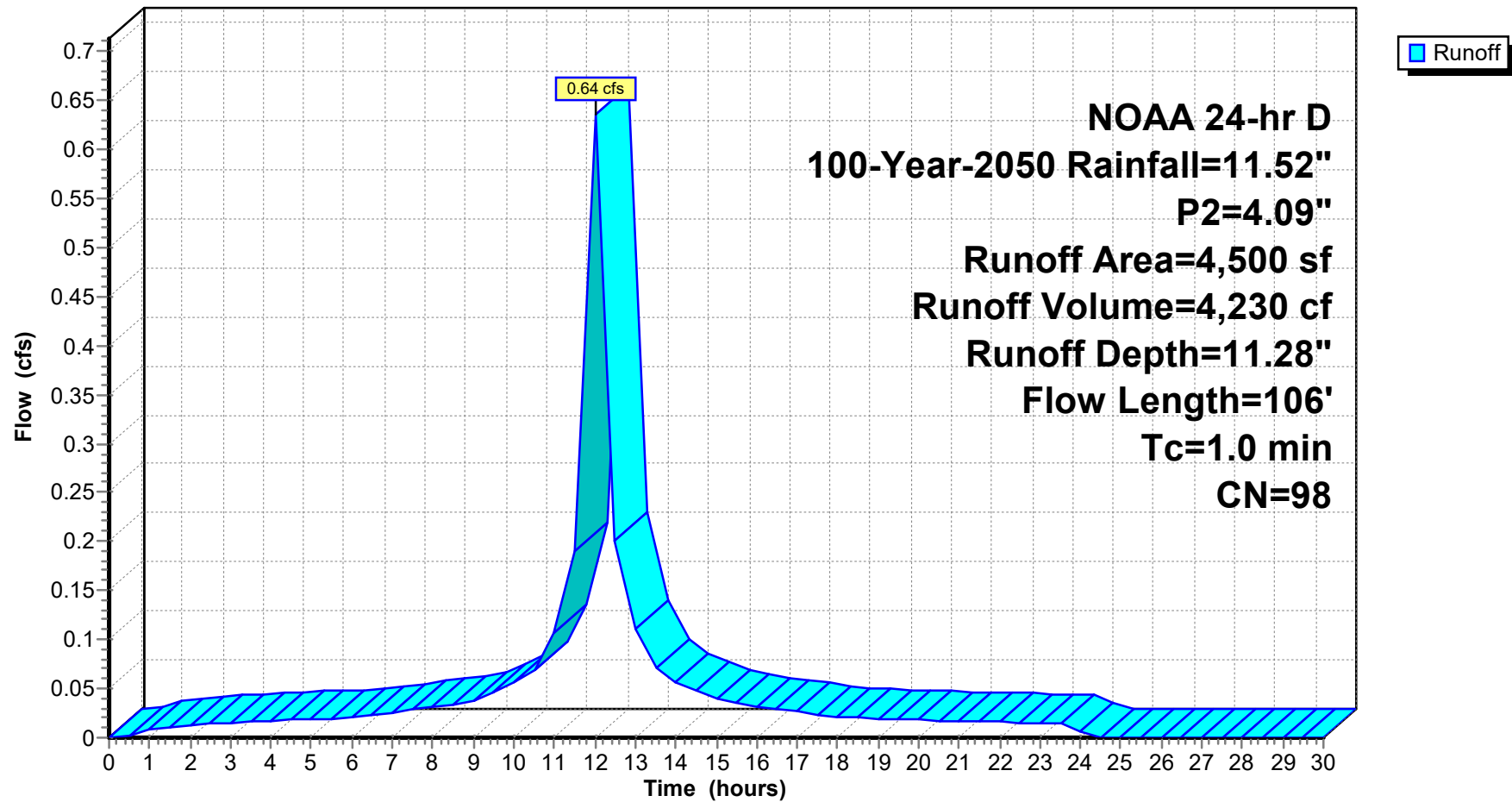
| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| * 4,500   | 98 | Roof and Amenity Area   |
| 4,500     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 0.8      | 52            | 0.0100        | 1.03              |                | <b>Sheet Flow, ROOF</b><br>Smooth surfaces n= 0.011 P2= 4.09"                                 |
| 0.2      | 54            | 0.0216        | 5.51              | 1.92           | <b>Pipe Channel, 8 ROOF DRAIN</b><br>8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'<br>n= 0.012 |
| 1.0      | 106           | Total         |                   |                |                                                                                               |

Subcatchment P3C: P3C- Roof Area

Hydrograph



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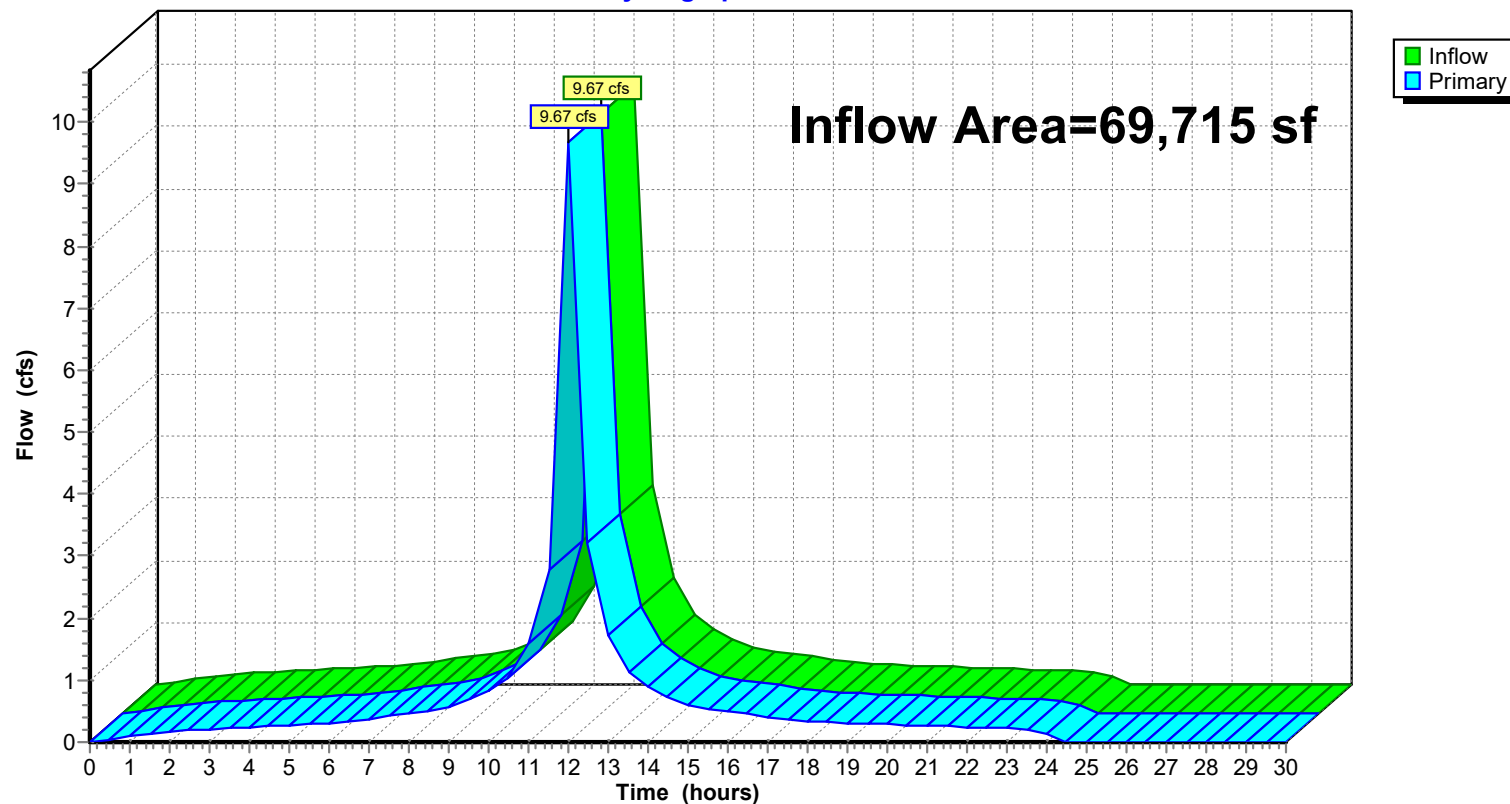
### Summary for Link 11L: Proposed Disturbed

Inflow Area = 69,715 sf, 92.28% Impervious, Inflow Depth = 11.04" for 100-Year-2050 event  
Inflow = 9.67 cfs @ 12.01 hrs, Volume= 64,128 cf  
Primary = 9.67 cfs @ 12.01 hrs, Volume= 64,128 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link P-DP 1 : PROP DP 1

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 11L: Proposed Disturbed

#### Hydrograph



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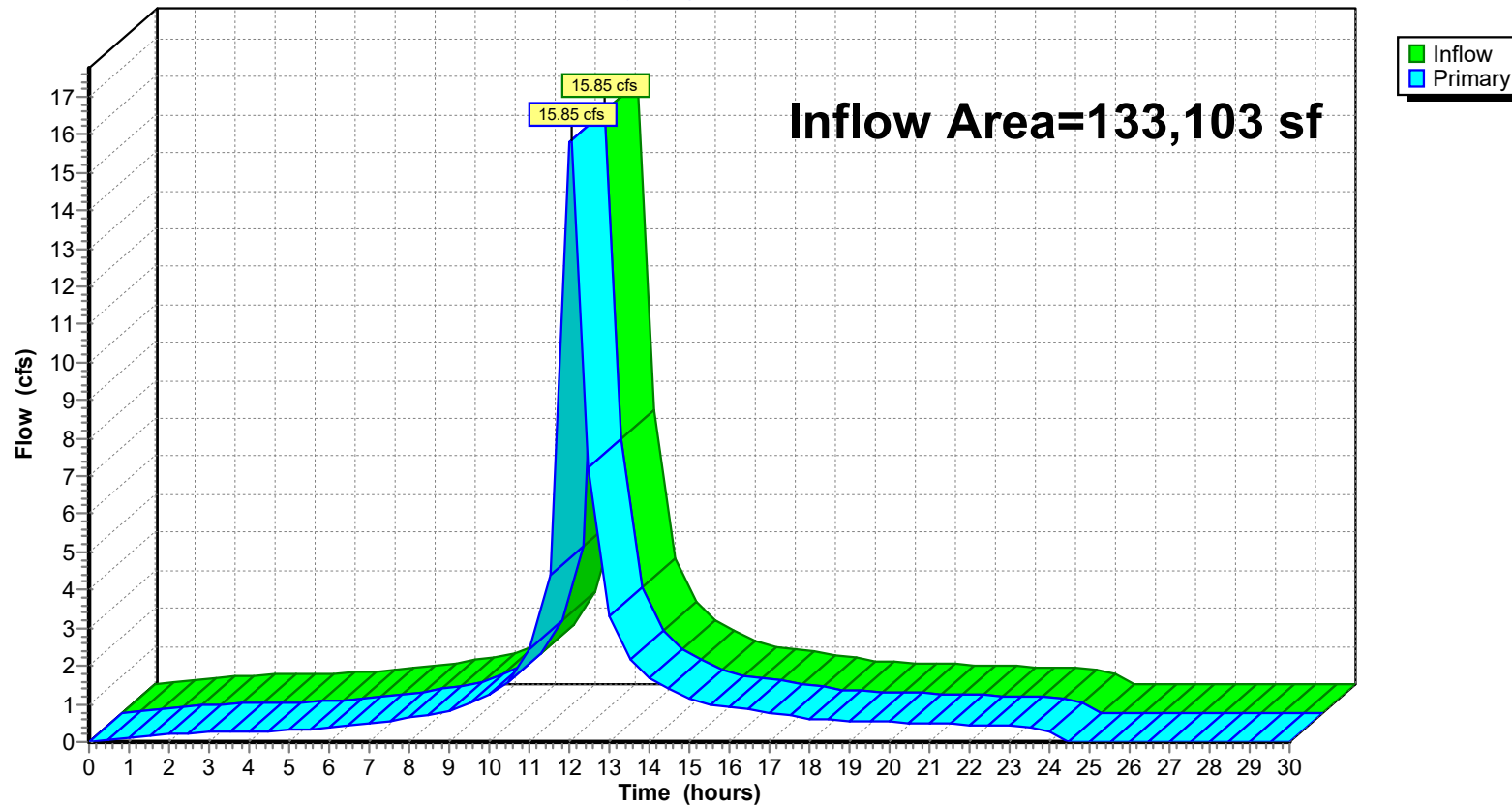
### Summary for Link 15L: TOTAL PROPOSED

Inflow Area = 133,103 sf, 56.94% Impervious, Inflow Depth = 9.80" for 100-Year-2050 event  
Inflow = 15.85 cfs @ 12.04 hrs, Volume= 108,662 cf  
Primary = 15.85 cfs @ 12.04 hrs, Volume= 108,662 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link 15L: TOTAL PROPOSED

#### Hydrograph





## 24-223 DRAINAGE DESIGN-PROPOSED-2026-03-30

Prepared by Jarmel Kizel Architects & Eng'rs

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NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

Printed 3/30/2026

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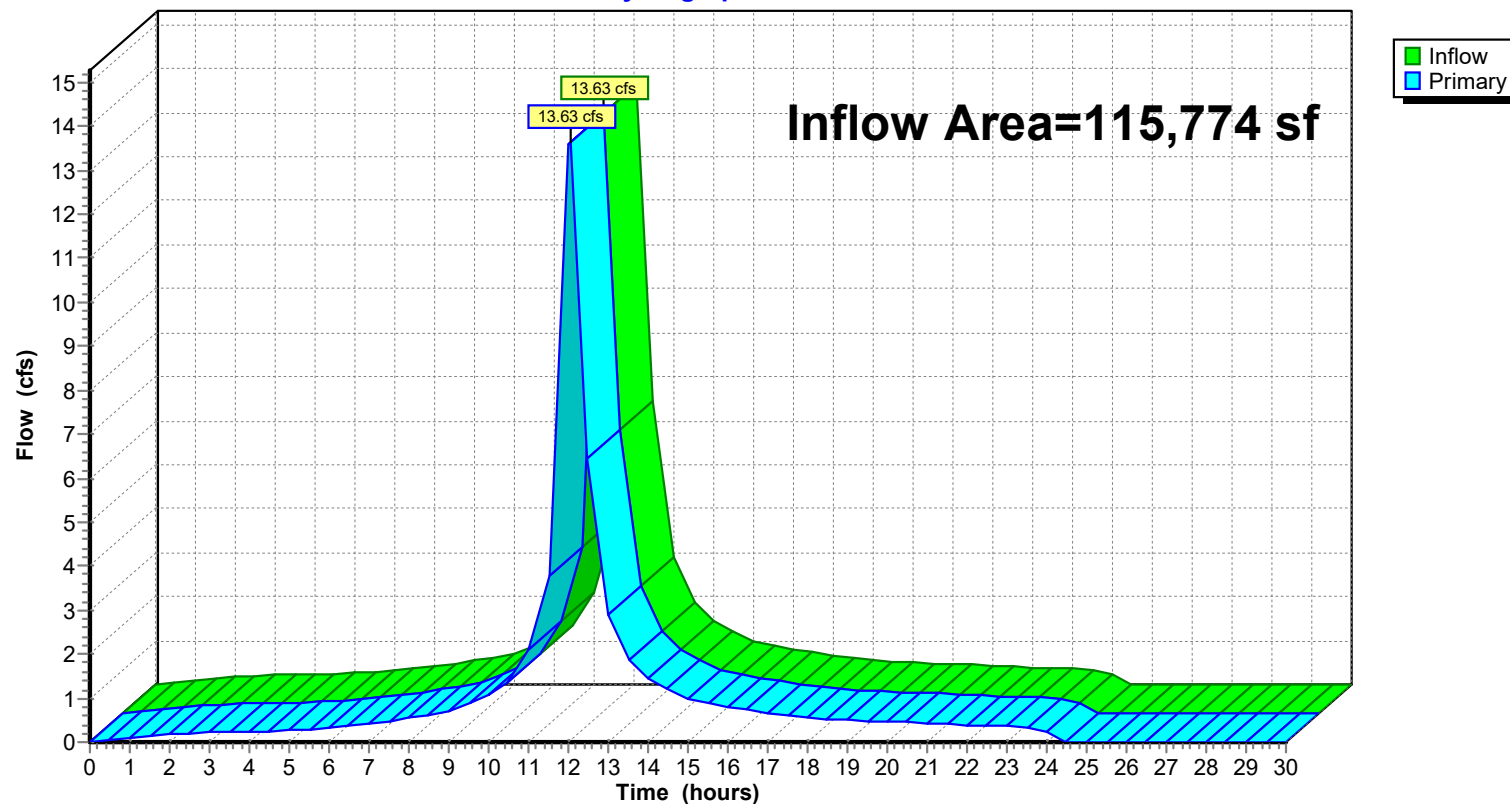
### Summary for Link P-DP 1: PROP DP 1

Inflow Area = 115,774 sf, 57.23% Impervious, Inflow Depth = 9.78" for 100-Year-2050 event  
Inflow = 13.63 cfs @ 12.04 hrs, Volume= 94,401 cf  
Primary = 13.63 cfs @ 12.04 hrs, Volume= 94,401 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 1: PROP DP 1

Hydrograph



## 24-223 DRAINAGE DESIGN-PROPOSED-2026-03-30

Prepared by Jarmel Kizel Architects & Engnr's

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NOAA 24-hr D 100-Year-2050 Rainfall=11.52", P2=4.09"

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Page 134

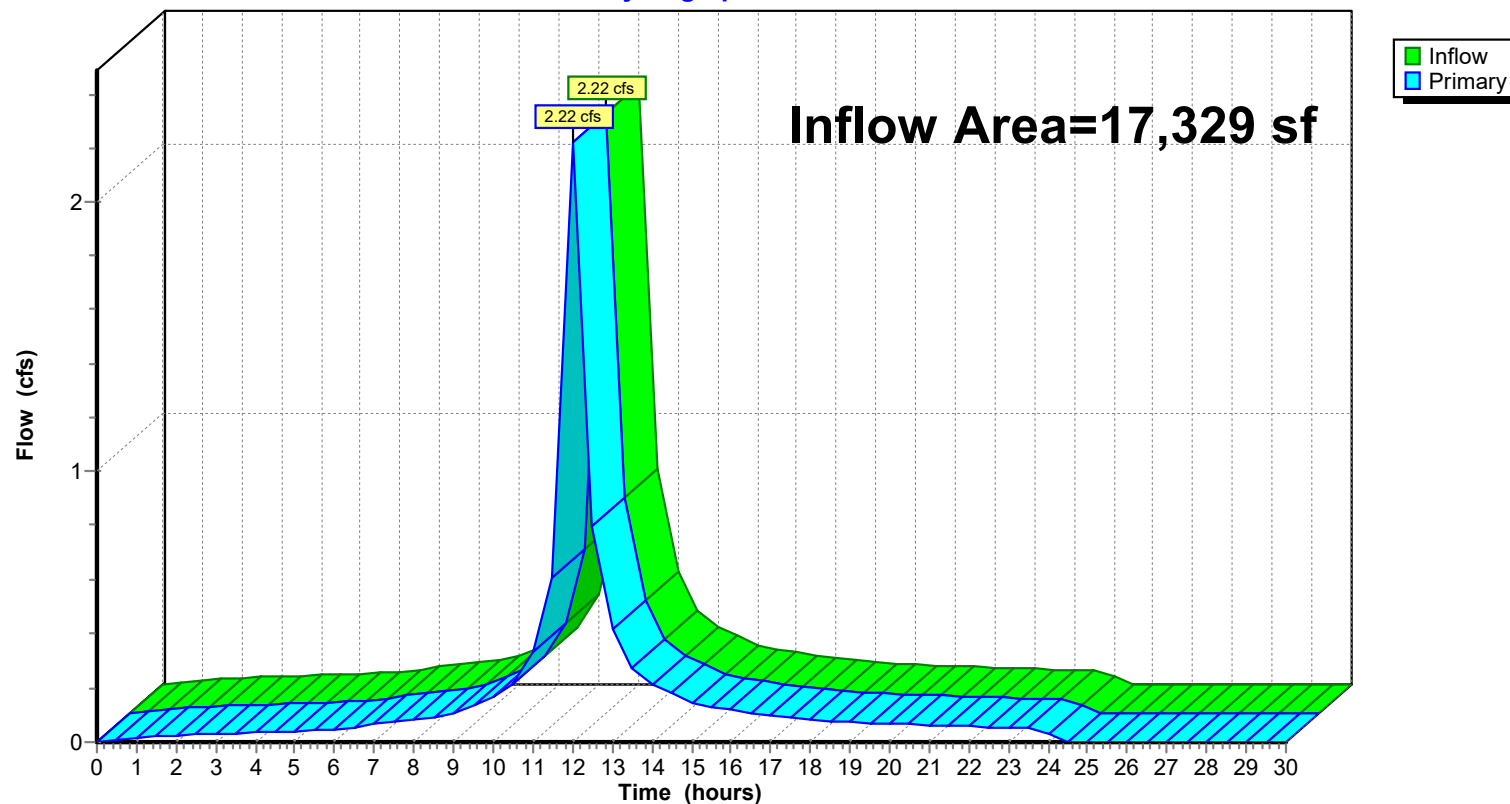
### Summary for Link P-DP 2: PROP DP 2

Inflow Area = 17,329 sf, 54.94% Impervious, Inflow Depth = 9.88" for 100-Year-2050 event  
Inflow = 2.22 cfs @ 12.02 hrs, Volume= 14,261 cf  
Primary = 2.22 cfs @ 12.02 hrs, Volume= 14,261 cf, Atten= 0%, Lag= 0.0 min  
Routed to Link 15L : TOTAL PROPOSED

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.50 hrs

### Link P-DP 2: PROP DP 2

#### Hydrograph

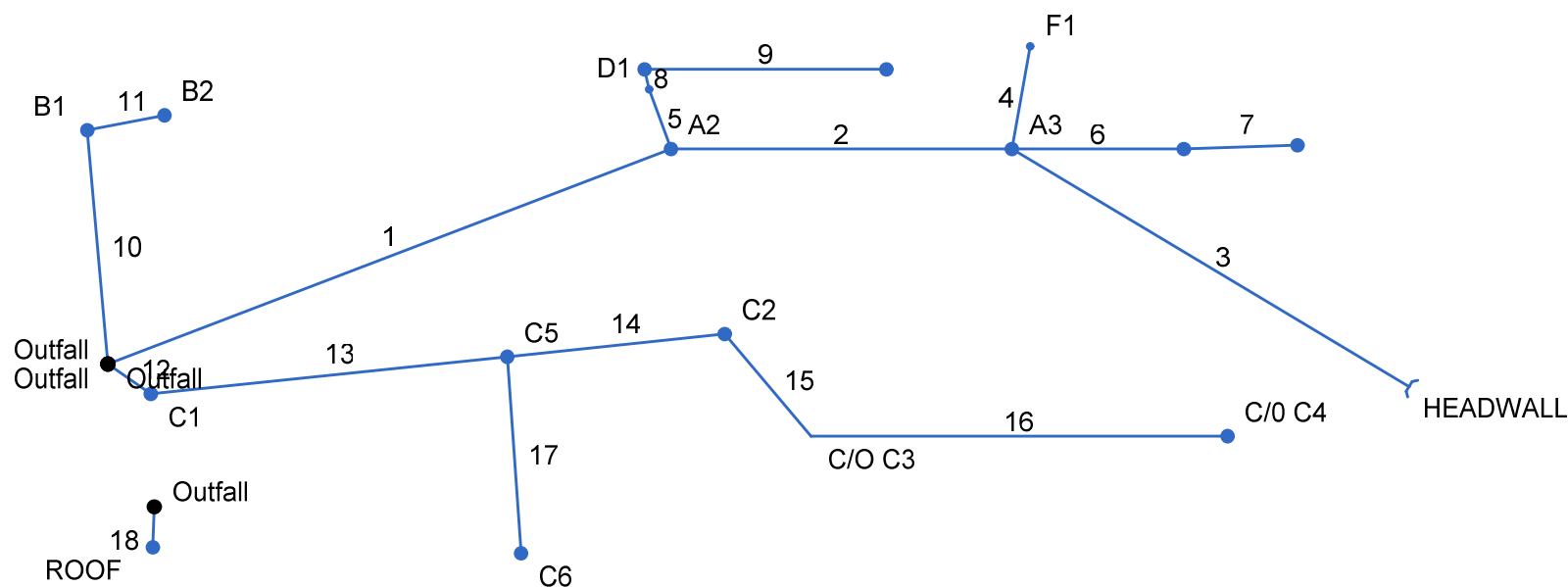


APPENDIX C

STORM SEWER CAPACITY CALCULATIONS



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



# Storm Sewer Tabulation

| Station                                                                                                     |            | Len<br><br>(ft) | Drng Area        |                   | Rnoff<br>coeff<br><br>(C) | Area x C          |                    | Tc                 |                   | Rain<br>(I)<br><br>(in/hr) | Total<br>flow<br><br>(cfs) | Cap<br>full<br><br>(cfs) | Vel<br><br>(ft/s) | Pipe             |                  | Invert Elev         |                | HGL Elev       |                | Grnd / Rim Elev     |                | Line ID        |
|-------------------------------------------------------------------------------------------------------------|------------|-----------------|------------------|-------------------|---------------------------|-------------------|--------------------|--------------------|-------------------|----------------------------|----------------------------|--------------------------|-------------------|------------------|------------------|---------------------|----------------|----------------|----------------|---------------------|----------------|----------------|
| Line                                                                                                        | To<br>Line |                 | Incr<br><br>(ac) | Total<br><br>(ac) |                           | Incr<br><br>(min) | Total<br><br>(min) | Inlet<br><br>(min) | Syst<br><br>(min) |                            |                            |                          |                   | Size<br><br>(in) | Slope<br><br>(%) | Dn<br><br>(ft)      | Up<br><br>(ft) | Dn<br><br>(ft) | Up<br><br>(ft) | Dn<br><br>(ft)      | Up<br><br>(ft) |                |
| 1                                                                                                           | End        | 207             | 0.00             | 0.93              | 0.99                      | 0.00              | 0.49               | 6.0                | 60.3              | 2.9                        | 456.4                      | 926.3                    | 16.71             | 72               | 4.78             | 370.30              | 380.20         | 375.85         | 385.75         | 382.22              | 391.30         | A2-A1          |
| 2                                                                                                           | 1          | 117             | 0.00             | 0.48              | 0.99                      | 0.00              | 0.23               | 6.0                | 60.2              | 2.9                        | 455.7                      | 901.5                    | 16.69             | 72               | 4.53             | 380.20              | 385.50         | 385.75         | 391.05         | 391.30              | 398.00         | A3-A2          |
| 3                                                                                                           | 2          | 159             | 0.00             | 0.00              | 0.00                      | 0.00              | 0.00               | 60.0               | 60.0              | 0.0                        | 455.0                      | 976.5                    | 16.67             | 72               | 5.31             | 385.50              | 393.95         | 391.05         | 399.50         | 398.00              | 403.50         | HEADWALL-A3    |
| 4                                                                                                           | 2          | 36              | 0.31             | 0.31              | 0.47                      | 0.15              | 0.15               | 6.0                | 6.0               | 9.1                        | 1.33                       | 11.72                    | 4.81              | 15               | 2.81             | 394.00              | 395.01         | 394.28         | 395.46         | 398.00              | 397.50         | F1-A3          |
| 5                                                                                                           | 1          | 22              | 0.28             | 0.45              | 0.65                      | 0.18              | 0.26               | 6.0                | 8.5               | 8.2                        | 2.15                       | 9.43                     | 5.02              | 15               | 1.82             | 386.50              | 386.90         | 386.91         | 387.49         | 391.30              | 391.50         | D1-A2          |
| 6                                                                                                           | 2          | 59              | 0.00             | 0.17              | 0.00                      | 0.00              | 0.08               | 0.0                | 7.1               | 8.7                        | 0.69                       | 15.77                    | 4.59              | 15               | 5.08             | 394.00              | 397.00         | 394.18         | 397.33         | 398.00              | 401.00         | F2-A3          |
| 7                                                                                                           | 6          | 39              | 0.17             | 0.17              | 0.47                      | 0.08              | 0.08               | 6.0                | 6.0               | 9.1                        | 0.73                       | 13.25                    | 2.81              | 15               | 3.59             | 397.00              | 398.40         | 397.33         | 398.73         | 401.00              | 402.50         | F3-F2          |
| 8                                                                                                           | 5          | 7               | 0.00             | 0.17              | 0.00                      | 0.00              | 0.08               | 0.0                | 8.3               | 8.3                        | 0.66                       | 19.25                    | 2.10              | 15               | 7.57             | 387.00              | 387.53         | 387.49         | 387.85         | 391.50              | 392.57         | D2-D1          |
| 9                                                                                                           | 8          | 83              | 0.17             | 0.17              | 0.47                      | 0.08              | 0.08               | 6.0                | 6.0               | 9.1                        | 0.73                       | 13.28                    | 4.28              | 15               | 3.60             | 389.00              | 391.99         | 389.20         | 392.32         | 392.57              | 395.80         | D3-D2          |
| 10                                                                                                          | End        | 81              | 0.00             | 0.02              | 0.00                      | 0.00              | 0.01               | 6.0                | 12.5              | 7.2                        | 0.07                       | 19.13                    | 0.77              | 15               | 7.48             | 378.29              | 384.35         | 380.81         | 384.45         | 382.22              | 390.20         | MH B1-A1       |
| 11                                                                                                          | 10         | 27              | 0.02             | 0.02              | 0.47                      | 0.01              | 0.01               | 6.0                | 6.0               | 9.1                        | 0.09                       | 16.82                    | 2.57              | 15               | 5.78             | 384.45              | 386.01         | 384.51         | 386.12         | 390.20              | 389.00         | B2-B1          |
| 12                                                                                                          | End        | 18              | 0.58             | 1.42              | 0.99                      | 0.57              | 1.40               | 2.0                | 6.6               | 8.9                        | 12.40                      | 26.54                    | 7.02              | 18               | 5.44             | 378.50              | 379.48         | 395.19         | 395.40         | 382.22              | 383.73         | C1-A1          |
| 13                                                                                                          | 12         | 123             | 0.00             | 0.84              | 0.00                      | 0.00              | 0.82               | 0.0                | 6.3               | 9.0                        | 7.41                       | 14.41                    | 6.04              | 15               | 4.24             | 379.60              | 384.82         | 396.22         | 397.59         | 383.73              | 388.08         | C5-C1          |
| 14                                                                                                          | 13         | 75              | 0.20             | 0.64              | 0.95                      | 0.19              | 0.63               | 6.0                | 6.0               | 9.1                        | 5.69                       | 14.45                    | 4.64              | 15               | 4.27             | 384.80              | 388.00         | 398.16         | 398.66         | 388.08              | 400.04         | C2-C5          |
| 15                                                                                                          | 14         | 46              | 0.00             | 0.44              | 0.00                      | 0.00              | 0.44               | 0.0                | 2.5               | 9.5                        | 4.14                       | 6.94                     | 5.27              | 12               | 3.24             | 394.50              | 395.99         | 398.95         | 399.48         | 400.04              | 400.29         | C3-C2          |
| 16                                                                                                          | 15         | 143             | 0.44             | 0.44              | 0.99                      | 0.44              | 0.44               | 2.0                | 2.0               | 9.5                        | 4.14                       | 6.03                     | 5.27              | 12               | 2.44             | 396.00              | 399.49         | 399.82         | 401.47         | 400.29              | 402.49         | C4-C3          |
| 17                                                                                                          | 13         | 68              | 0.20             | 0.20              | 0.99                      | 0.20              | 0.20               | 2.0                | 2.0               | 9.5                        | 1.88                       | 4.66                     | 2.39              | 12               | 1.46             | 385.00              | 385.99         | 398.16         | 398.32         | 388.08              | 388.50         | C6-C5          |
| 18                                                                                                          | End        | 14              | 0.10             | 0.10              | 0.99                      | 0.10              | 0.10               | 2.0                | 2.0               | 9.5                        | 0.94                       | 1.92                     | 3.66              | 8                | 2.14             | 378.00              | 378.30         | 378.46         | 378.76         | 379.77              | 382.00         | Build to inlet |
| Project File: INLET-NEW.stm                                                                                 |            |                 |                  |                   |                           |                   |                    |                    |                   |                            |                            |                          |                   |                  |                  | Number of lines: 18 |                |                |                | Run Date: 3/30/2026 |                |                |
| NOTES:Intensity = 150.20 / (Inlet time + 15.60) ^ 0.91; Return period =Yrs. 100 ; c = cir e = ellip b = box |            |                 |                  |                   |                           |                   |                    |                    |                   |                            |                            |                          |                   |                  |                  |                     |                |                |                |                     |                |                |

APPENDIX D

NRCS SOIL MAPPING DATA

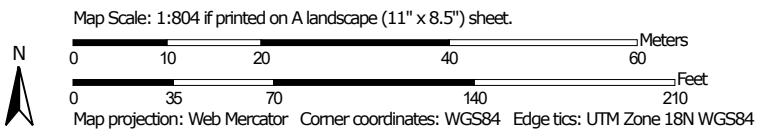




# Soil Map—Essex County, New Jersey



Soil Map may not be valid at this scale.



**Natural Resources  
Conservation Service**

Web Soil Survey  
National Cooperative Soil Survey

10/10/2025  
Page 1 of 3

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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: Essex County, New Jersey

Survey Area Data: Version 21, 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.

## Map Unit Legend

| Map Unit Symbol                    | Map Unit Name                                                           | Acres in AOI | Percent of AOI |
|------------------------------------|-------------------------------------------------------------------------|--------------|----------------|
| BouB                               | Boonton - Urban land, Boonton substratum complex, 0 to 8 percent slopes | 2.6          | 100.0%         |
| <b>Totals for Area of Interest</b> |                                                                         | <b>2.6</b>   | <b>100.0%</b>  |

## Essex County, New Jersey

### **BouB—Boonton - Urban land, Boonton substratum complex, 0 to 8 percent slopes**

#### **Map Unit Setting**

*National map unit symbol:* b12f

*Elevation:* 50 to 500 feet

*Mean annual precipitation:* 30 to 64 inches

*Mean annual air temperature:* 46 to 79 degrees F

*Frost-free period:* 131 to 178 days

*Farmland classification:* Not prime farmland

#### **Map Unit Composition**

*Boonton and similar soils:* 50 percent

*Urban land, boonton substratum:* 40 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### **Description of Boonton**

##### **Setting**

*Landform:* Ground moraines

*Landform position (three-dimensional):* Upper third of mountainflank, center third of mountainflank

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Parent material:* Coarse-loamy basal till derived from basalt

##### **Typical profile**

*A - 0 to 5 inches:* loam

*BA - 5 to 8 inches:* silt loam

*BE - 8 to 17 inches:* silt loam

*Bt - 17 to 30 inches:* silt loam

*Btx1 - 30 to 40 inches:* gravelly fine sandy loam

*Btx2 - 40 to 47 inches:* fine sandy loam

*CBt1 - 47 to 58 inches:* loamy sand

*CBt2 - 58 to 72 inches:* loamy sand

##### **Properties and qualities**

*Slope:* 0 to 8 percent

*Depth to restrictive feature:* 20 to 36 inches to fragipan

*Drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 4.4 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

*Hydrologic Soil Group:* C

*Ecological site:* F144AY037MA - Moist Dense Till Uplands

*Hydric soil rating:* No

### **Description of Urban Land, Boonton Substratum**

#### **Setting**

*Landform:* Ground moraines

*Landform position (three-dimensional):* Lower third of mountainflank, upper third of mountainflank, center third of mountainflank

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Parent material:* Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

#### **Typical profile**

*H1 - 0 to 12 inches:* material

*H2 - 12 to 47 inches:* silt loam

*2CBt1 - 47 to 58 inches:* loamy sand

*2CBt2 - 58 to 72 inches:* loamy sand

### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydric soil rating:* Unranked

### **Minor Components**

#### **Udorthents, boonton substratum**

*Percent of map unit:* 10 percent

*Landform:* Ground moraines

*Landform position (three-dimensional):* Lower third of mountainflank, upper third of mountainflank, center third of mountainflank

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Hydric soil rating:* No

## **Data Source Information**

Soil Survey Area: Essex County, New Jersey

Survey Area Data: Version 21, Aug 28, 2025

APPENDIX E

GEOTECHNICAL REPORT







**CONSULTANTS, INC.**  
4405 South Clinton Avenue  
South Plainfield, NJ 07080

**Tel: (800) 545-ATUL**  
**(908) 754-8383**  
**Fax: (908) 754-8633**

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September 03, 2024

Gomes Management  
P.O. Box 5277  
Newark, NJ 07105

Attn: Mr. Jose Pacheco

Re: **Subsurface Soil Investigation & Foundation Recommendation Report**  
Proposed 1-story retail building  
525 Northfield Avenue  
West Orange, NJ 07052  
Block # 159.04, Lot # 1.01, 1.02 & 1.03

Dear Mr. Pacheco,

Enclosed, please find three (3) copies of the Subsurface Soil Investigation & Foundation Recommendation Report for the total of eight (8) Soil Borings performed on August 19, 2024; August 20, 2024 and August 21, 2024 at the project referenced above.

Soil samples collected during soil boring program will be discarded after thirty (30) days from the date of this report, if not requested in advance to do otherwise. We thank you very much for providing us an opportunity to service you on this project.

Should you have any questions or require additional information, please do not hesitate to contact the undersigned at (908)754-8383.

Sincerely,  
ANS Consultants, Inc.

Atulkumar N. Shah, PE, PP, F. ASCE  
President  
NJ PE License #24GE03443900  
ANS/RM

Reported: Gomes Management– (3); File – (1)

File: ANV-6549\_01.SB



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September 03, 2024

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Newark, NJ 07105

Attn: Mr. Jose Pacheco

Re: **Subsurface Soil Investigation & Foundation Recommendation Report**  
Proposed 1-story retail building  
525 Northfield Avenue  
West Orange, NJ 07052  
Block # 159.04, Lot # 1.01, 1.02 & 1.03

Dear Mr. Pacheco,

Enclosed, please find three (3) copies of the Subsurface Soil Investigation & Foundation Recommendation Report for the total of eight (8) Soil Borings performed on August 19, 2024; August 20, 2024 and August 21, 2024 at the project referenced above. The soil boring work was performed in accordance with our signed revised proposal dated July 25, 2024.

Our **Scope of Services** included the following:

1. Drilling and full-time inspection of total of eight (8) borings, down to 27'-0" deep or to refusal whichever comes first, recording of groundwater level or depth to bedrock if encountered in the contracted depth.
2. Performance of engineering evaluation to determine the stratification and physical properties of the subsurface materials and to develop and recommend appropriate type of foundation systems.
3. Preparation of a written report summarizing all findings and recommendations.

**PROPOSED CONSTRUCTION:**

The project site is located at 525 Northfield Avenue, West Orange, NJ in Essex County. At the present time, the subject site consists of 2-story masonry restaurant building with parking lot. We understand that a 1-story retail building is proposed at the subject site. Our recommendations are based upon NJ IBC-2021 ASCE 7-22 and construction material loads for the Building Construction based upon American National Standards. Please see location plan in Appendix-A for the exact location and photographs in Appendix-C for the existing site conditions.

**SITE CONDITIONS:**

The subject site is located towards north side of Northfield Avenue. The site was noted to be fairly leveled during soil boring activities. The subject site is noted to be primarily surrounded by commercial and residential properties. The subject property is located at approximately Latitude N 40° 46' 13.75", Longitude W 74° 16' 38.96" on the USGS Digital elevation Model. It is at an approximate elevation of 385' above mean sea level. See the site location plan in Appendix-A for more details.



## **FIELD INVESTIGATION**

The soil boring locations were selected and marked by an ANS field representative based upon the location plan provided by the client and also based upon the equipment access. Surface utility mark-out was performed by New Jersey One-Call System. Underground utilities were also cleared by GPR solutions, a Private Utility Mark out Company on August 19, 2024. Once cleared, the soil boring work began on August 19, 2024.

A total of eight (8) soil borings, B-1 to B-8 were drilled during the geo-technical investigation at the site are as follows:

| Boring Number | Date Performed | Depth to Groundwater (feet) | Depth of Refusal (feet) |
|---------------|----------------|-----------------------------|-------------------------|
| B-1           | 8/21/2024      | -                           | 11'-4"                  |
| B-2/2A        | 8/21/2024      | Hole collapsed at 7'-5"     | 11'-4"                  |
| B-3           | 8/21/2024      | Hole collapsed at 7'-2"     | 9'-5"                   |
| B-4           | 8/20/2024      | Hole collapsed at 4'-4"     | 11'-2"                  |
| B-5/5A        | 8/20/2024      | Hole collapsed at 9'-2"     | 19'-9"                  |
| B-6           | 8/20/2024      | 11'-1"                      | 25'-7"                  |
| B-7           | 8/19/2024      | -                           | 14'-2"                  |
| B-8           | 8/19/2024      | 8'-9"                       | 19'-2"                  |

The soil boring locations are shown in the Soil Boring Location Plan which is included in Appendix-A. Soil boring work was performed under the direction and supervision of field Engineer Mr. Syed Abbas and Mr. Krunal Parmar. The borings were drilled using a 3" diameter hollow stem auger. Soil encountered was sampled continuously down to a depth of 12'-0" and then at 5'-0" interval down to auger refusal noted between 9'-5" to 19'-9" depth in borings B-1 to B-5, B-7 & B-8. Soil encountered was sampled continuously down to a depth of 12'-0" and then at 5'-0" interval down to spoon refusal noted at 25'-7" depth in boring B-6. Soil samples were extracted using a 2" diameter split spoon sampler as per the procedure specified in ASTM 1586-99.

Samples for the boring were obtained by the Standard Penetration Test (SPT) Method (ASTM D 1586), which consists of driving a 2-inch outside-diameter split-spoon sampler into the soil with a 140-pound weight falling freely from a distance of 30 inches. The samplers were driven in four successive 6-inch increments, with the number of blows per increment being recorded. The number of blows required to advance the sampler in the middle 12 inches is termed as the Standard Penetration Resistance (N-value) and is presented on the Field Test Boring Logs in Appendix-A.

During drilling operations, extracted soil samples were visually examined and classified by our Field Engineer. The soil sample description, Standard penetration test (SPT) blow counts and locations, strata changes, groundwater depth and other pertinent information were recorded on a detailed field log. Soil samples obtained from the split spoon sampler were visually classified according to the Unified Soil Classification System (USCS).

## **LABORATORY TESTING:**

A total of eight (8) soil samples, one each from borings B-1 to B-8 were laboratory tested to determine in-place moisture content and to classify the soil as per Unified Soil Classification System, ASTM-D2487-93. The findings are summarized below. Laboratory test report are enclosed in Appendix -B.



| Soil Boring Number | Soil Sample No. | Depth collected | Moisture Content (%) | Fines thru #200 Sieve | USCS Symbol |
|--------------------|-----------------|-----------------|----------------------|-----------------------|-------------|
| B-1                | S-1             | 2'- 4'          | 10.9                 | 31.1                  | GM          |
| B-2A               | S-2             | 4' - 6'         | 10.1                 | 19.1                  | SM          |
| B-3                | S-3             | 6'- 8'          | 5.5                  | 1.9                   | GP          |
| B-4                | S-4             | 8'- 10'         | 8.2                  | 21.0                  | GM          |
| B-5A               | S-5             | 10'- 12'        | 5.8                  | 24.7                  | SM          |
| B-6                | S-6             | 15'- 17'        | 13.3                 | 28.8                  | SM          |
| B-7                | S-7             | 4'- 6'          | 7.5                  | 23.7                  | SM          |
| B-8                | S-8             | 6'- 8'          | 14.2                 | 26.3                  | SM          |

GM: silty gravels

SM: silty sands

GP: poorly graded gravels

### SUBSURFACE CONDITIONS:

Detailed description of the soil encountered in the test boring is documented in the boring log which is presented in Appendix-A. The following gives a general description of the subsurface conditions encountered at the borings. While the borings may indicate that the subsurface conditions appear to be relatively uniform across the site, it should be recognized that the size of borings was small compared to the size of the site, and that the existence of anomalies cannot be precluded.

According to NJ Geoweb website, the geological formation is Rahway Till and geologic age is late Pleistocene, late Wisconsinan deposited directly from glacial ice during the late Wisconsinan glaciation. It consists of clayey silt to sandy silt with some to many pebbles and cobbles and few boulders; reddish brown, reddish yellow, yellowish brown, brown. As much as 100 feet thick, generally less than 40 feet thick.

Based on the results of soil borings and our geo-technical laboratory testing, we estimate the general stratigraphy of the site to consist of the following major units, in an increasing order of depth.

**Stratum-1:** Fill material containing very dark gray, brown/black silt, trace f/c sand, trace f/c gravel, trace wood chip, trace fragments of concrete, and fill material containing brown, black silty f/c sand, trace f/c gravel, trace fragments of asphalt & glass, plastic and fill material containing grayish brown f/c sand, trace silt, some f/c gray crushed stone and fill material containing dark gray, greenish gray clayey silt, trace f/c sand, trace fine gravel, trace fragments of asphalt was noted under this stratum in top 2'-6" in boring B-1, in top 4' in B-2/2A, in top 4'-11" in B-3, in top 5" in B-4, in top 2' in B-5/5A and in top 9" in B-8. No fill was noted in boring B-6 & B-7. The relative density of this material varied between loose to medium dense condition. The relative stiffness of this material varied between soft to medium stiff condition.

**Stratum-2:** Brown silt, trace f/c sand, reddish brown silty f/c sand & f/c gravel, trace silt and reddish brown silt, trace f/c sand, trace f/m gravel was noted under this stratum between 4 feet to spoon refusal @ 4'-3" in boring B-1, between 10 feet to spoon refusal @ 10'-9" in boring B-2/2A, between 2 feet to 4 feet & then between 6 feet to 10 feet in B-4, between 4 feet to down to spoon refusal @ 15'-3" in B-5/5A, between 2 feet to down to spoon refusal @ 25'-7" in B-6, down to 12 feet in B-7, between 2 feet to 11 feet & then between 15 feet to 17 feet in B-8. The relative density of this material varied between very loose to very dense condition. The relative stiffness of this material varied between soft to stiff condition.



**Stratum-3:** Reddish brown, purple f/c sand & f/c gravel, trace silt, was noted under this stratum between 6 feet to 10 feet in B-1, between 6 feet to 10 feet in boring B-2, between 8 feet to down to 9'-2" in B-3, between 10 feet to down to spoon refusal @ 10'-10" in B-4. The relative density of this material varied between medium dense to dense condition.

**Stratum-4:** Brown f/c sand, trace silt, some f/m gravel, f/c fragments of gray stone, some f/c gravel was noted under this stratum between 10 feet to down to spoon refusal @ 10'-8" in boring B-1, between 6 feet to 8 feet in boring B-3 and in top 24 inches in B-6. The relative density of this material was noted to be in medium dense condition.

**Stratum-5:** Augur Refusal indicating possible bedrock was encountered between 9'-5" to 19'-9" depth in borings B-1 to B-5, B-7 & B-8.

### **SUMMARY OF FINDINGS:**

| Boring Number | Depth in (feet) | Penetration Resistance N-Value | Soil Type | In-Place Soil Bearing Capacity (PSF) | Recommended Soil Bearing Capacity (PSF) |
|---------------|-----------------|--------------------------------|-----------|--------------------------------------|-----------------------------------------|
| B-1           | 0 – 2           | 6                              | FILL      | 1200                                 | 1000                                    |
| B-1           | 2 – 4           | 13                             | FILL      | 2600                                 | 2500                                    |
| B-1           | 4 – 4'-3"       | 50/3                           | SM/GM     | +5000                                | 4000                                    |
| B-1           | 6 – 7'-5"       | 137/11                         | SP/GP     | +5000                                | 5000                                    |
| B-1           | 8 – 10          | 53                             | SP/GP     | +5000                                | 5000                                    |
| B-1           | 10 – 10'-8"     | 50/2                           | SP-SM     | +5000                                | 5000                                    |
| B-1           | @11'-4"         | Augur Refusal                  | -         | +5000                                | 8000                                    |

| Boring Number | Depth in (feet) | Penetration Resistance N-Value | Soil Type | In-Place Soil Bearing Capacity (PSF) | Recommended Soil Bearing Capacity (PSF) |
|---------------|-----------------|--------------------------------|-----------|--------------------------------------|-----------------------------------------|
| B-2/2A        | 0 – 1'-11"      | 25                             | FILL      | 5000                                 | 2500                                    |
| B-2/2A        | 2 – 4           | 12                             | FILL      | 2400                                 | 2500                                    |
| B-2/2A        | 4 – 6           | 25                             | FILL      | 5000                                 | 4000                                    |
| B-2/2A        | 6 – 8           | 21                             | SP/GP     | 4200                                 | 4000                                    |
| B-2/2A        | 8 – 10          | 39                             | SP/GP     | +5000                                | 4500                                    |
| B-2/2A        | 10 – 10'-9"     | 54/3                           | SM/GM     | +5000                                | 5000                                    |
| B-2/2A        | @11'-4"         | Augur Refusal                  | -         | +5000                                | 8000                                    |

| Boring Number | Depth in (feet) | Penetration Resistance N-Value | Soil Type | In-Place Soil Bearing Capacity (PSF) | Recommended Soil Bearing Capacity (PSF) |
|---------------|-----------------|--------------------------------|-----------|--------------------------------------|-----------------------------------------|
| B-3           | 0 – 2           | 14                             | FILL      | 2800                                 | 1500                                    |
| B-3           | 2 – 4           | 7                              | FILL      | 1400                                 | 1500                                    |
| B-3           | 4 – 6           | 30                             | FILL      | +5000                                | 4000                                    |
| B-3           | 6 – 8           | 19                             | SP-SM     | 3800                                 | 4000                                    |
| B-3           | 8 – 9'-2"       | 44/2                           | SP/GP     | +5000                                | 5000                                    |
| B-3           | @ 9'-5"         | Augur Refusal                  | -         | +5000                                | 8000                                    |

| Boring Number | Depth in (feet) | Penetration Resistance N-Value | Soil Type | In-Place Soil Bearing Capacity (PSF) | Recommended Soil Bearing Capacity (PSF) |
|---------------|-----------------|--------------------------------|-----------|--------------------------------------|-----------------------------------------|
| B-4           | 0 – 2           | 9                              | FILL      | 1800                                 | 1000                                    |



|     |              |               |       |       |      |
|-----|--------------|---------------|-------|-------|------|
| B-4 | 2 – 4        | 15            | SM/GM | 3000  | 2500 |
| B-4 | 4 – 5'-2"    | 45/2          | GM-SM | +5000 | 4500 |
| B-4 | 6 – 8        | 62            | SM/GM | +5000 | 5000 |
| B-4 | 8 – 10       | 94            | SM/GM | +5000 | 5000 |
| B-4 | 10 – 10'-10" | 52/4          | SP/GP | +5000 | 5000 |
| B-4 | @11'-2"      | Augur Refusal | -     | +5000 | 8000 |

| Boring Number | Depth in (feet) | Penetration Resistance N-Value | Soil Type | In-Place Soil Bearing Capacity (PSF) | Recommended Soil Bearing Capacity (PSF) |
|---------------|-----------------|--------------------------------|-----------|--------------------------------------|-----------------------------------------|
| B-5/5A        | 0 – 1'-8"       | 26                             | FILL      | +5000                                | 1500                                    |
| B-5/5A        | 2 – 4           | 6                              | FILL      | 1200                                 | 1500                                    |
| B-5/5A        | 4 – 6           | 15                             | SM/GM     | 3000                                 | 3000                                    |
| B-5/5A        | 6 – 8           | 19                             | SM/GM     | 3800                                 | 4000                                    |
| B-5/5A        | 8 – 10          | 55                             | SM/GM     | +5000                                | 5000                                    |
| B-5/5A        | 10 – 11'-1"     | 93/7                           | SM/GM     | +5000                                | 5000                                    |
| B-5/5A        | 15 – 15'-3"     | 78/3                           | SM/GM     | +5000                                | 5000                                    |
| B-5/5A        | @19'-9"         | Augur Refusal                  | -         | +5000                                | 8000                                    |

| Boring Number | Depth in (feet) | Penetration Resistance N-Value | Soil Type | In-Place Soil Bearing Capacity (PSF) | Recommended Soil Bearing Capacity (PSF) |
|---------------|-----------------|--------------------------------|-----------|--------------------------------------|-----------------------------------------|
| B-6           | 0 – 2           | 21                             | SP-SM     | 4200                                 | 1500                                    |
| B-6           | 2 – 4           | 8                              | SM/GM     | 1600                                 | 1500                                    |
| B-6           | 4 – 6           | 6                              | SM/GM     | 1200                                 | 1500                                    |
| B-6           | 6 – 8           | 5                              | SM/GM     | 1000                                 | 1000                                    |
| B-6           | 8 – 10          | 13                             | SM/GM     | 2600                                 | 2500                                    |
| B-6           | 10 – 12         | 28                             | SM/GM     | +5000                                | 5000                                    |
| B-6           | 15 – 17         | 52                             | SM/GM     | +5000                                | 5000                                    |
| B-6           | 20 – 22         | 47                             | SM/GM     | +5000                                | 5000                                    |
| B-6           | 25 – 25'-7"     | 50/1                           | SM/GM     | +5000                                | 6000                                    |

| Boring Number | Depth in (feet) | Penetration Resistance N-Value | Soil Type | In-Place Soil Bearing Capacity (PSF) | Recommended Soil Bearing Capacity (PSF) |
|---------------|-----------------|--------------------------------|-----------|--------------------------------------|-----------------------------------------|
| B-7           | 0 – 2           | 16                             | SM/GM     | 3200                                 | 3000                                    |
| B-7           | 2 – 4           | 17                             | SM/GM     | 3400                                 | 3500                                    |
| B-7           | 4 – 6           | 23                             | SM/GM     | 4600                                 | 4000                                    |
| B-7           | 6 – 8           | 7                              | SM/GM     | 1400                                 | 1500                                    |
| B-7           | 8 – 10          | 10                             | SM/GM     | 2000                                 | 2000                                    |
| B-7           | 10 – 12         | 18                             | SM/GM     | 3600                                 | 4000                                    |
| B-7           | @14'-2"         | Augur Refusal                  | -         | +5000                                | 8000                                    |

| Boring Number | Depth in (feet) | Penetration Resistance N-Value | Soil Type | In-Place Soil Bearing Capacity (PSF) | Recommended Soil Bearing Capacity (PSF) |
|---------------|-----------------|--------------------------------|-----------|--------------------------------------|-----------------------------------------|
| B-8           | 0 – 2           | 15                             | FILL      | 3000                                 | 1500                                    |
| B-8           | 2 – 4           | 25                             | SM/GM     | 5000                                 | 1500                                    |
| B-8           | 4 – 6           | 5                              | SM/GM     | 1000                                 | 1000                                    |
| B-8           | 6 – 7'-9"       | 5                              | SM/GM     | 1000                                 | 1000                                    |
| B-8           | 9 – 11          | 6                              | SM/GM     | 1200                                 | 1500                                    |
| B-8           | 11 – 13         | 19                             | SP/GP     | 3800                                 | 3500                                    |
| B-8           | 15 – 17         | 44                             | SM/GM     | +5000                                | 4500                                    |
| B-8           | @19'-2"         | Augur Refusal                  | -         | +5000                                | 6000                                    |



### GROUNDWATER:

Groundwater was encountered in only two borings B-6 & B-8 below existing grade surface as follows:

| Boring Number | Depth to Groundwater (feet) | Boring Number | Depth to Groundwater (feet) |
|---------------|-----------------------------|---------------|-----------------------------|
| B-1           | -                           | B-5           | Hole collapsed at 9'-2"     |
| B-2           | Hole collapsed at 7'-5"     | B-6           | 11'-1"                      |
| B-3           | Hole collapsed at 7'-2"     | B-7           | -                           |
| B-4           | Hole collapsed at 4'-4"     | B-8           | 8'-9"                       |

It should be noted that groundwater level will fluctuate due to variations in rainfall or other factors not evident at the time of our investigation.

### SEASONAL HIGH WATER TABLE:

Signs of black mottling was noted at 6 feet depth in only boring B-7, indicating SHWT below 6 feet.

### CONCLUSIONS:

1. Groundwater was encountered at 11'- 1" in B-6 and at 8'- 9" in B-8 below existing grade surface. Consequently, we anticipate that groundwater management during construction will be critical.
2. Signs of black mottling was noted at 6 feet depth in only boring B-7, indicating SHWT below 6 feet.
3. Fill was noted in top 2'-6" in boring B-1, in top 4' in B-2/2A, in top 4'-11" in B-3, in top 5" in B-4, in top 2' in B-5/5A and in top 9" in B-8. Below fill, the majority of the on-site soil consists of silt with trace f/c sand & trace f/m gravel. The onsite soil will be suitable as structural fill. Depending upon the time of the year when the actual construction takes place, drying of excavated sandy soil and aeration may be required to reduce the moisture content. In-situ moisture content of soil varied between 5.5 % to 14.2 % which is generally considered moist.
4. The following parameters should be used for seismic design of the building in accordance with **IBC-2021 ASCE 7-22**:

| Description                                                              | Parameter       | Recommended value           |
|--------------------------------------------------------------------------|-----------------|-----------------------------|
| Mapped Spectral Acceleration for short periods:                          | S <sub>s</sub>  | 0.27                        |
| Mapped Spectral Acceleration for 1-sec period:                           | S <sub>1</sub>  | 0.05                        |
| Site Class:                                                              | C               | Very dense Soil & Soft Rock |
| 5 percent damped Design spectral response acceleration at short periods: | S <sub>DS</sub> | 0.18                        |
| 5 percent damped Design spectral response acceleration at 1-sec periods: | S <sub>D1</sub> | 0.043                       |

The following parameters should be used for seismic design of the building in accordance with **IBC-2018- ASCE 7-16**:



| Description                                                              | Parameter       | Recommended Value           |
|--------------------------------------------------------------------------|-----------------|-----------------------------|
| Mapped Spectral Acceleration for short periods:                          | S <sub>s</sub>  | 0.282                       |
| Mapped Spectral Acceleration for 1-sec period:                           | S <sub>1</sub>  | 0.059                       |
| Site Class:                                                              | C               | Very dense Soil & Soft Rock |
| Site Coefficient:                                                        | F <sub>a</sub>  | 1.3                         |
| Site Coefficient:                                                        | F <sub>v</sub>  | 1.5                         |
| 5 percent damped Design spectral response acceleration at short periods: | S <sub>DS</sub> | 0.245                       |
| 5 percent damped Design spectral response acceleration at 1-sec periods: | S <sub>D1</sub> | 0.059                       |

5. Any fill used as backfill material within the building and pavement areas should consist of approved portions of the on-site granular soils, which have been maintained at moisture contents suitable for compaction or select fill should be imported. All fill should be placed in lift in the order of twelve (12) inches in loose thickness and be uniformly compacted to at least 95% of its maximum dry density as determined by the modified proctor density values derived based upon ASTM D-1557-98 test procedure.

In addition, we recommend that backfill soil placed in confined areas, such as foundation or utility excavations, should be spread in lifts in the order of six (6) to eight (8) inches in loose thickness and it should be compacted to the same degree using manually operated vibratory compaction equipment. We recommend that temporary construction slopes be established at one vertical to two horizontal, or flatter, or as required by the governing safety codes.

#### **FOUNDATION DESIGN CRITERIA:**

As per the [r2-coastal-fema.hub.arcgis.com](https://r2-coastal-fema.hub.arcgis.com) website and FIRM-(flood insurance rate map), the Effective Flood Zone of the subject property is AE. The properties in these flood zones have a 1% chance of flooding each year.

Fill was noted in top 2'-6" in boring B-1, in top 4' in B-2/2A, in top 4'-11" in B-3, in top 5" in B-4, in top 2' in B-5/5A and in top 9" in B-8. We recommend that the foundation for the proposed 1-story retail building shall be supported by conventional shallow foundations established on the medium dense soil noted at 4' to 6' depth below grade. Foundation should be designed to impose maximum allowable net bearing pressure of 2,000 pounds per square foot. Excavation down to 10 feet depth will be required in borings B-6, B-7 & B-8 to get net bearing pressure of 4,000 psf. A complete removal of fill is recommended.

Any pockets of localized unsuitable soil encountered during foundation excavation should be completely removed. The over excavated area should be backfilled utilizing either controlled compacted fill or 3/4" size clean gravels. Any footing or slab placed in this area will require over excavation, removal of unsuitable material and backfilling with 3/4 size stones or controlled compacted fill. Placing additional reinforcing steel to strength the footing over soft soil may be required.

We recommend that exterior foundations be established at least three feet six inches below the adjacent exterior grade, or as required by local ordinance, to provide protection from frost penetration. The maximum post-construction settlements of foundations designed and constructed in accordance with our recommendations will be in the order of 3/4" or less.



### **FLOOR SLAB DESIGN CRITERIA:**

Removal of fill from top 2'-6" in boring B-1, from top 4' in B-2/2A, from top 4'-11" in B-3, from top 5" in B-4, from top 2' in B-5/5A and from top 9" in B-8 will be required. The floor slab or patio slab shall be supported directly on the compacted sub-grade of onsite material or controlled compacted structural fill. Compaction of the sand below the floor slab sub-grade to 95% of its optimum density will be required. We recommend performing compaction test at the rate of one test per 200-sq.ft area. Recommended Modulus of Sub-Grade reaction is 75 pci.

Any back fill required for the structural area to be off site or  $\frac{3}{4}$ " clean crushed stones may be utilized to minimize the influence of moisture on the first fill layer. All off-site fill should be composed of relatively well graded sand and gravel containing less than 15% by weight passing U.S. Standard #200 sieve and having a maximum particle size of six inches.

Acceptable soil materials for backfill and fill should be free of clay, rock or gravel larger than six (6) inches in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter and it should comply with ASTM D-2487-91 soil classification groups GW, GP, SM, SW and SP.

All fill should be placed in lifts in the order of twelve (12) inches in loose thickness and it should be uniformly compacted to at least 95% of its maximum dry density as determined by the modified proctor density values derived based upon ASTM D-1557-93 test procedure. In addition, we recommend that backfill soils placed in confined areas, such as foundation or utility excavations, should be spread in lifts in the order of six to eight inches in loose thickness and be compacted to the same degree using manually operated vibratory compaction equipment.

### **BELOW GRADE WALLS:**

We recommend that the exterior building walls should be constructed with a continuous perimeter foundation drain to convey localized groundwater seepage away from the building and prevent the hydrostatic pressures built-up against the walls. The drain could consist of a 6 to 8 inch diameter PVC pipe surrounded on all sides by a minimum of six (6) inches of clean  $\frac{3}{8}$ " crushed gravel. The pipe should drain by gravity to the site storm water system, if feasible, or should be connected to a sump pit where any water could be removed by pumping.

|                                        |            |
|----------------------------------------|------------|
| Soil Unit weight (total):              | 120 pcf    |
| Angle of Internal Friction:            | 31 degrees |
| Coefficient of sliding friction:       | 0.4        |
| Coefficient of active earth pressure:  | 0.28       |
| Coefficient of passive earth pressure: | 3.57       |

### **RECOMMENDATIONS FOR THE EARTHWORK FOUNDATION CONSTRUCTION:**

**Clearing and Stripping:** Clearing and stripping would include removing vegetation and any boulders or any loose or unsuitable soil at the distance of 5 feet beyond the limits of the proposed building excavation, structure and paved areas. Limits of stripping should conform to construction permit limitations.

**Soil Erosion and Sediment Control:** Clearing and stripping should be performed in accordance with the requirements of the soil erosion and sediment control plan and environment permits.



**Protection of Utilities:** Existing utilities, in the area of construction should be marked to protect from damage during excavation and foundation construction. Excavations should be stopped if they could potentially undermine existing utilities.

**Excavation & side slope:** An unbraced excavation slope of 2.0 horizontal to 1 vertical or flatter may be considered in the planning for construction. Sheet piling and bracing, and or slope stabilization systems should be used wherever the unbraced slope passes beneath utilities or structures, the active roadway abutments and/or where it is found to be necessary or more cost effective to use sheet piling in order to limit the size of the excavations and maintain traffic. Sheet piling and bracing systems and excavation slopes may be designed using the soil properties presented in summary table provided earlier.

**Proof rolling and compaction of Pavement and Fill Subgrades:** Following stripping or excavation to plan elevations, all subgrades for placement of new foundation or parking lot pavement should be proof rolled using a vibratory roller with minimum 1 ton static weight in confined areas along side walls and 10 tons static weight in the footprint of the building and general roadway paved areas. Footing subgrades should be compacted with small area vibratory plate compactors. Proof rolling should be observed and evaluated by a qualified Geotechnical engineer or technician familiar with site conditions.

#### **MINIMUM PAVEMENT DESIGN SECTIONS:**

##### **ACCESS ROAD AND TRUCK TRAFFIC AREAS**

|                                                |                  |
|------------------------------------------------|------------------|
| Bituminous Concrete Surface Course (NJDOT I-5) | 2 inches         |
| Bituminous Concrete Base Course (NJDOT I-2)    | 4 inches         |
| Quarry Process Sub-Base Course (NJ DOT DGA)    | 6 inches         |
| <b>TOTAL SECTION THICKNESS</b>                 | <b>12 inches</b> |

##### **AUTOMOBILE PARKING AREAS**

|                                                |                 |
|------------------------------------------------|-----------------|
| Bituminous Concrete Surface Course (NJDOT I-5) | 2 inches        |
| Bituminous Concrete Base Course (NJDOT I-2)    | 3 inches        |
| Quarry Process Sub-Base Course (NJ DOT DGA)    | 4 inches        |
| <b>TOTAL SECTION THICKNESS</b>                 | <b>9 inches</b> |

As previously discussed, it is recommended that the loose soils at the surface should be proof rolled and densified with a heavy vibratory compactor. With this recommended compaction, a CBR value of six (6) would be appropriate for use in the design of flexible pavements over site soils with imported granular fill, the CBR could be about eight (8).

#### **RECOMMENDED SERVICES:**

It is recommended that we should be retained to provide continuous observation and Soil engineering services during the excavation and foundation construction phases of the work. This is to observe compliance with the design concepts, specifications and recommendations, and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

#### **LIMITATIONS:**

The recommendations contained in this report are our best professional judgment as

to be followed in the design and construction of the proposed project. There may be subsurface conditions not disclosed by the explorations adequately identify subsurface conditions for the purpose of this study. If during construction any differences are found between the report of the explorations and the actual subsurface conditions, they should be brought to our attention immediately so that the effect in our recommendations can be evaluated.

This report has been prepared in accordance with generally accepted Geo-technical Engineering practices for the exclusive use of our client, Gomes Management and their designated representative(s). No other warranty, express or implied, is made. Contractors' wishes to use the soil boring information may do at their own risk. Unless specifically indicated to the contrary in this report, this report does not address environmental considerations, which may affect the site development. The conclusions and recommendations of this report are not intended to supersede or overlook any N.J.D.E.P. Environmental conditions, which should be reflected in the site planning.

Should you have any questions or require additional information, please do not hesitate to contact the undersigned at (908)754-8383.

Sincerely,  
ANS Consultants, Inc.



Atulkumar N. Shah, PE, PP, F. ASCE  
President  
NJ PE License #24GE03443900  
ANS/RM

Reported: Gomes Management– (3); File – (1)

## **Appendix - A**



GOOGLE MAP

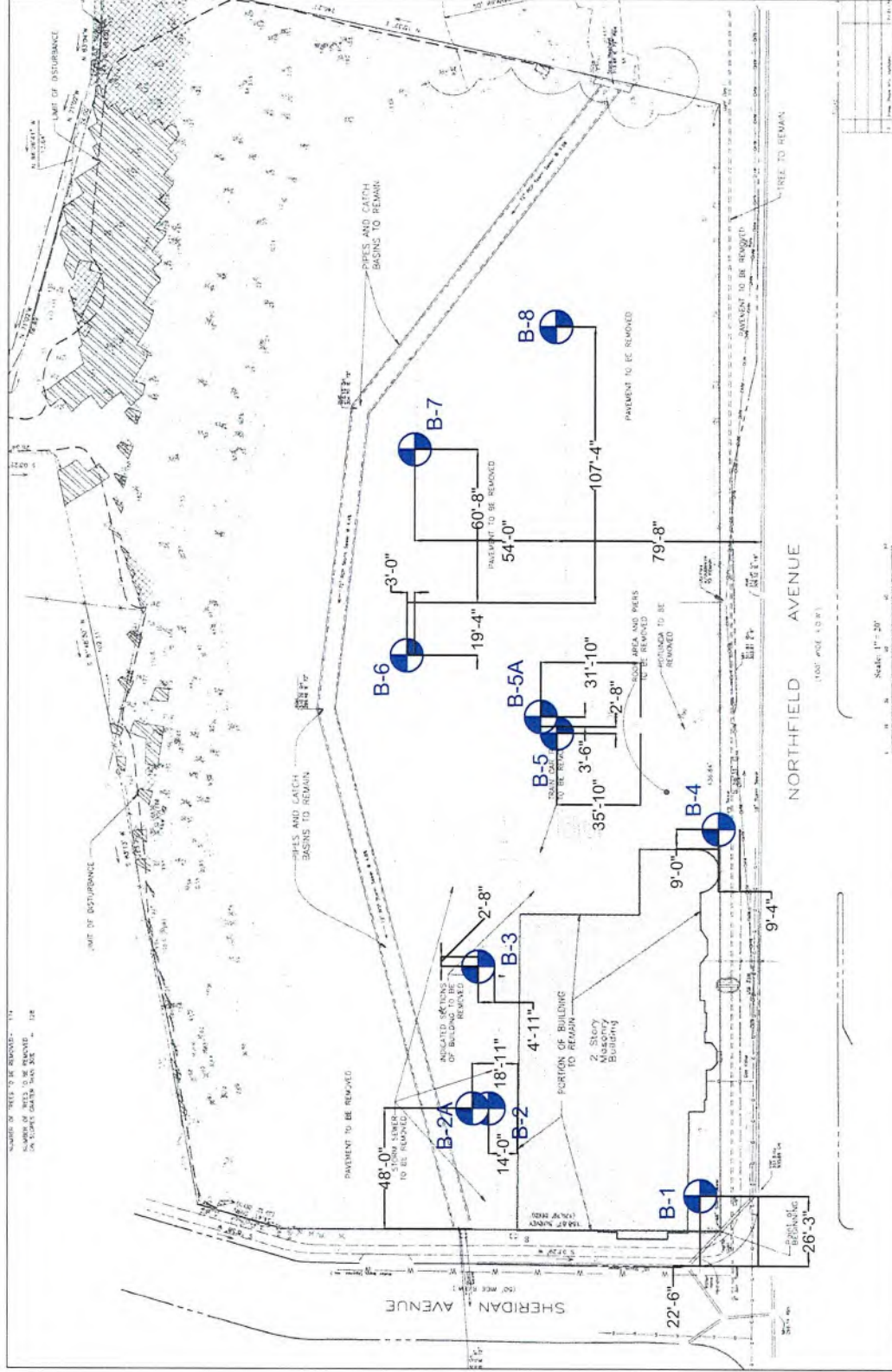


**Client: Gomes Management**  
**Project: 525 Northfield Avenue**  
**West Orange, NJ**



**CONSULTANTS, INC.**  
4405 South Clinton Avenue  
South Plainfield, NJ 07080





**LEGEND:**

Soil Boring Location

**SOIL BORING LOCATION PLAN**  
SCALE: N.T.S

CLIENT: Gomes Management  
PROJECT: 525 Northfield Ave, West Orange, NJ  
ANS CONSULTANTS INC.  
4405 SOUTH CLINTON AVE  
SO. PLAINFIELD, NJ, 07080  
PHONE: (908)-754-8383 FAX: (908)-754-8633  
BY: Manav Doshi  
DATE: 9/3/2024  
Project No: ANV-6549

# DRILL HOLE LOG

## BORING NO.: B-1

PROJECT: Proposed 1-story retail building  
 CLIENT: Gomes Management  
 LOCATION: 525 Northfield Avenue, West Orange, NJ  
 DRILLER: JESUS, David & A. SHAH  
 DRILL RIG: ACKER XLS  
 DEPTH TO WATER> INITIAL  $\nabla$  :

PROJECT NO.: ANV-6549  
 DATE: 8-21-2024  
 ELEVATION: N/A  
 LOGGED BY: Krunal Parmar

AT COMPLETION  $\nabla$  :

| ELEVATION/<br>DEPTH | WELL<br>DETAIL | SOIL SYMBOLS,<br>SAMPLERS<br>AND TEST DATA | USCS  | Description                                                                                                                                                                          | NM | DD | STANDARD PENETRATION TEST |     |          |
|---------------------|----------------|--------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---------------------------|-----|----------|
|                     |                |                                            |       |                                                                                                                                                                                      |    |    | DEPTH                     | N   | CURVE    |
| 0                   |                |                                            |       |                                                                                                                                                                                      |    |    |                           |     | 10 30 50 |
|                     |                | 2-<br>3-<br>3-<br>1                        | FILL  | Fill material containing very dark gray, brown silt, trace f/c gravel, trace wood chip, moist, soft.                                                                                 |    |    | 0'-2'                     | 6   |          |
|                     |                | 2-<br>3-<br>10<br>-<br>26                  | FILL  | Fill material containing brown, black silt, trace fine gravel, trace wooden chip, moist, medium stiff.<br>@ 2'-7": Brown silt, trace f/c sand, some f/c gravel, moist, medium stiff. |    |    | 2'-4'                     | 13  |          |
| 3                   |                | 50/<br>3                                   | SM/GM | Brown silt, trace f/c sand, coarse gravel at tip of the spoon, moist, dense.                                                                                                         |    |    | 4'-4'3"                   | 50/ |          |
| 6                   |                | 30-<br>60-                                 | SP/GP | Spoon Refusal @ 4'-3".<br>Augured down to 6 feet.                                                                                                                                    |    |    | 6'-7'5"                   | 137 | 137      |
|                     |                | 77/<br>5                                   | SP/GP | Reddish brown and purple f/c sand and f/c gravel, trace silt, slightly moist, very dense.                                                                                            |    |    | 8'-10'                    | 53  |          |
| 9                   |                | 28-<br>28-<br>25-<br>45                    | SP/GP | Spoon Refusal @ 7'-5".<br>Augured down to 8 feet.<br>Reddish brown f/c sand and f/c gravel, trace silt, slightly moist, very dense.                                                  |    |    | 10'-10'8"                 | 50/ |          |
|                     |                | 63-<br>50/<br>2                            | SP-SM | Brown f/c sand, trace silt, some f/m gravel, slightly moist.                                                                                                                         |    |    |                           |     |          |
| 12                  |                |                                            |       | Spoon Refusal @ 10'-8".<br>Augur Refusal @ 11'-4".<br>End of boring.                                                                                                                 |    |    |                           |     |          |
| 15                  |                |                                            |       |                                                                                                                                                                                      |    |    |                           |     |          |
| 18                  |                |                                            |       |                                                                                                                                                                                      |    |    |                           |     |          |
| 21                  |                |                                            |       |                                                                                                                                                                                      |    |    |                           |     |          |

This information pertains only to this boring and should not be interpreted as being indicative of the site.

# DRILL HOLE LOG

## BORING NO.: B-2/B-2A

PROJECT: Proposed 1-story retail building  
 CLIENT: Gomes Management  
 LOCATION: 525 Northfield Avenue, West Orange, NJ  
 DRILLER: JESUS, David & A. SHAH  
 DRILL RIG: ACKER XLS  
 DEPTH TO WATER> INITIAL  $\nabla$  :

PROJECT NO.: ANV-6549  
 DATE: 8-21-2024  
 ELEVATION: N/A  
 LOGGED BY: Krunal Parmar

AT COMPLETION  $\nabla$  :

| ELEVATION/<br>DEPTH | WELL<br>DETAIL | SOIL SYMBOLS,<br>SAMPLERS<br>AND TEST DATA | USCS  | Description                                                                                                               | NM | DD | STANDARD PENETRATION TEST |     |          |
|---------------------|----------------|--------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------|----|----|---------------------------|-----|----------|
|                     |                |                                            |       |                                                                                                                           |    |    | DEPTH                     | N   | CURVE    |
| 0                   |                |                                            |       |                                                                                                                           |    |    |                           |     | 10 30 50 |
|                     |                | 11-11-                                     | FILL  | Asphalt: 4.5".                                                                                                            |    |    | 0'-1'11"                  | 25  |          |
|                     |                | 14-29/5                                    | FILL  | Fill material containing reddish brown f/c sand, trace silt, some f/c gravel, moist.                                      |    |    |                           |     |          |
|                     |                | 4-5-                                       | FILL  | Spoon refusal @ 1'-11".                                                                                                   |    |    | 2'-4'                     | 12  |          |
|                     |                | 5-7-                                       |       | Augur refusal @ 1'-11"                                                                                                    |    |    |                           |     |          |
| 3                   |                | 5-                                         |       | Augured down to 2 feet.                                                                                                   |    |    |                           |     |          |
|                     |                | 6-10-                                      | FILL  | Fill material containing brown silt, trace f/c sand, trace fine gravel, trace fragments of concrete, moist, medium stiff. |    |    | 4'-6'                     | 25  |          |
|                     |                | 15-5-                                      |       | Fill material containing brown, black silty f/c sand, trace f/c gravel, trace fragments of asphalt, moist, medium dense.  |    |    | 6'-8'                     | 21  |          |
| 6                   |                | 4-7-                                       | SP/GP |                                                                                                                           |    |    |                           |     |          |
|                     |                | 14-                                        |       | Reddish brown f/c sand and f/c gravel, trace silt, moist, medium dense.                                                   |    |    |                           |     |          |
|                     |                | 16-                                        |       |                                                                                                                           |    |    |                           |     |          |
|                     |                | 17-21-                                     | SP/GP | Reddish brown f/c sand and f/c gravel, trace silt, moist, dense.                                                          |    |    | 8'-10'                    | 39  |          |
| 9                   |                | 18-33                                      |       |                                                                                                                           |    |    |                           |     |          |
|                     |                | 26-54/3                                    | SM/GM | Reddish brown silty f/c sand and f/c gravel, trace silt, moist, very dense.                                               |    |    | 10'-10'9"                 | 54/ |          |
|                     |                |                                            |       | Spoon Refusal @ 10'-9".                                                                                                   |    |    |                           |     |          |
|                     |                |                                            |       | Augur Refusal @ 11'-4".                                                                                                   |    |    |                           |     |          |
| 12                  |                |                                            |       | End of boring.                                                                                                            |    |    |                           |     |          |
|                     |                |                                            |       |                                                                                                                           |    |    |                           |     |          |
| 15                  |                |                                            |       |                                                                                                                           |    |    |                           |     |          |
|                     |                |                                            |       |                                                                                                                           |    |    |                           |     |          |
| 18                  |                |                                            |       |                                                                                                                           |    |    |                           |     |          |
|                     |                |                                            |       |                                                                                                                           |    |    |                           |     |          |
| 21                  |                |                                            |       |                                                                                                                           |    |    |                           |     |          |

Augur refusal was encountered at 1'-11" at B-2 location, so the location was moved to B-2A.  
 (Please refer location plan).

Hole collapsed at 7'-5" for Ground Water.

This information pertains only to this boring and should not be interpreted as being indicative of the site.



# DRILL HOLE LOG

## BORING NO.: B-3

PROJECT: Proposed 1-story retail building  
CLIENT: Gomes Management  
LOCATION: 525 Northfield Avenue, West Orange, NJ  
DRILLER: JESUS, David & A. SHAH  
DRILL RIG: ACKER XLS  
DEPTH TO WATER> INITIAL  $\nabla$  :

PROJECT NO.: ANV-6549  
DATE: 8-21-2024  
ELEVATION: N/A  
LOGGED BY: Krunal Parmar

DEPTH TO WATER> INITIAL  :

[illegible]

*Note: Hole collapsed at 7'-2" for Ground Water.*

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

# DRILL HOLE LOG

## BORING NO.: B-4

PROJECT: Proposed 1-story retail building  
 CLIENT: Gomes Management  
 LOCATION: 525 Northfield Avenue, West Orange, NJ  
 DRILLER: JESUS, David & A. SHAH  
 DRILL RIG: ACKER XLS  
 DEPTH TO WATER> INITIAL  $\nabla$  :

PROJECT NO.: ANV-6549  
 DATE: 8-20-2024  
 ELEVATION: N/A  
 LOGGED BY: Krunal Parmar

AT COMPLETION  $\nabla$  :

| ELEVATION/<br>DEPTH | WELL<br>DETAIL | SOIL SYMBOLS,<br>SAMPLERS<br>AND TEST DATA | USCS  | Description                                                                                                                  | NM | DD | STANDARD PENETRATION TEST |     |          |
|---------------------|----------------|--------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------|----|----|---------------------------|-----|----------|
|                     |                |                                            |       |                                                                                                                              |    |    | DEPTH                     | N   | CURVE    |
| 0                   |                |                                            |       |                                                                                                                              |    |    |                           |     | 10 30 50 |
|                     |                | 11-<br>7-<br>2-<br>6                       | FILL  | Asphalt-4".<br>Fill material containing grayish brown<br>f/c sand, trace silt, some f/c gray<br>crushed stone, moist, loose. |    |    | 0'-2'                     | 9   |          |
|                     |                | 5-<br>6-<br>9-<br>13                       | SM/GM | @ 6": Brown clayey silt, trace f/c<br>sand, trace f/m gravel, slightly wet,<br>soft.                                         |    |    | 2'-4'                     | 15  |          |
| 3                   |                | 4-<br>10-<br>35/<br>2                      | GM-SM | Reddish brown silt, trace f/c sand,<br>trace f/m gravel, moist, medium stiff.<br>Augured down to 4 feet.                     |    |    | 4'-5'2"                   | 45/ |          |
| 6                   |                | 20-<br>33-<br>29-<br>28                    | SM/GM | Reddish brown silt, little f/c gravel,<br>trace f/c sand, moist, dense.<br>Spoon Refusal @ 5'-2".<br>Augured down to 6 feet. |    |    | 6'-8'                     | 62  | 62       |
|                     |                | 17-<br>24-<br>70-<br>60                    | SM/GM | Reddish brown silty f/c sand and f/c<br>gravel, slightly wet to moist, very<br>dense.                                        |    |    | 8'-10'                    | 94  | 94       |
| 9                   |                | 60-<br>52/<br>4                            | SP/GP | Reddish brown f/c sand and f/c gravel,<br>trace silt, moist, very dense.                                                     |    |    | 10'-10'9"                 | 52/ |          |
| 12                  |                |                                            |       | Spoon Refusal @ 10'-10".<br>Augur Refusal @ 11'-2".<br>End of boring.                                                        |    |    |                           |     |          |
| 15                  |                |                                            |       |                                                                                                                              |    |    |                           |     |          |
| 18                  |                |                                            |       |                                                                                                                              |    |    |                           |     |          |
| 21                  |                |                                            |       |                                                                                                                              |    |    |                           |     |          |

Hole collapsed at 4'-4" for Ground Water.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

# DRILL HOLE LOG

## BORING NO.: B-5/B-5A

PROJECT: Proposed 1-story retail building  
 CLIENT: Gomes Management  
 LOCATION: 525 Northfield Avenue, West Orange, NJ  
 DRILLER: JESUS, David & A. SHAH  
 DRILL RIG: ACKER XLS  
 DEPTH TO WATER> INITIAL  $\nabla$  :

PROJECT NO.: ANV-6549  
 DATE: 8-20-2024  
 ELEVATION: N/A  
 LOGGED BY: Krunal Parmar

AT COMPLETION  $\nabla$  :

| ELEVATION/<br>DEPTH | WELL<br>DETAIL | SOIL SYMBOLS,<br>SAMPLERS<br>AND TEST DATA | USCS  | Description                                                                                                      | NM | DD | STANDARD PENETRATION TEST |     |          |
|---------------------|----------------|--------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------|----|----|---------------------------|-----|----------|
|                     |                |                                            |       |                                                                                                                  |    |    | DEPTH                     | N   | CURVE    |
| 0                   |                |                                            |       |                                                                                                                  |    |    |                           |     | 10 30 50 |
|                     |                | 8-11-                                      | FILL  | Asphalt-3".                                                                                                      |    |    | 0'-1'8"                   | 26  |          |
|                     |                | 15-10/2                                    | FILL  | Fill material containing reddish brown silty f/m sand and f/c gravel, moist, medium dense. Spoon refusal @ 1'-8" |    |    |                           |     |          |
|                     |                | 1-2-                                       |       | Augur refusal @ 1'-8"                                                                                            |    |    | 2'-4'                     | 6   |          |
| 3                   |                | 2-4-19                                     |       | Augured down to 2 feet.                                                                                          |    |    |                           |     |          |
|                     |                |                                            |       | Fill material containing dark brown silty f/c sand, little f/c gravel, trace fragments of asphalt, moist, loose. |    |    | 4'-6'                     | 15  |          |
|                     |                | 21-8-7-7                                   | SM/GM | Reddish brown silty f/c sand, some f/c gravel, moist, slightly compact. Augured down to 6 feet.                  |    |    |                           |     |          |
| 6                   |                | 4-7-12-12                                  | SM/GM | Reddish brown silt, little f/c sand, trace f/c gravel, moist, stiff.                                             |    |    | 6'-8'                     | 19  |          |
|                     |                | 12-25-                                     | SM/GM | Reddish brown silty f/c sand, some f/c gravel, moist, very dense.                                                |    |    | 8'-10'                    | 55  |          |
| 9                   |                | 30-35                                      |       |                                                                                                                  |    |    |                           |     |          |
|                     |                | 26-62-                                     | SM/GM | Reddish brown silty f/c sand, little f/c gravel, moist, very dense.                                              |    |    | 10'-11'                   | 93/ | 93/-     |
|                     |                | 31/1                                       |       | Spoon Refusal @ 11'-1". Augured down to 15 feet.                                                                 |    |    |                           |     |          |
| 12                  |                |                                            |       |                                                                                                                  |    |    |                           |     |          |
|                     |                |                                            |       |                                                                                                                  |    |    |                           |     |          |
| 15                  |                | 78/3                                       | SM/GM | Reddish brown silty f/c sand, little f/m gravel, moist. Spoon Refusal @ 15'-3". Augur Refusal @ 19'-9".          |    |    | 15'-15'3"                 | 78/ | 78/-     |
| 18                  |                |                                            |       |                                                                                                                  |    |    |                           |     |          |
|                     |                |                                            |       |                                                                                                                  |    |    |                           |     |          |
| 21                  |                |                                            |       | End of boring.                                                                                                   |    |    |                           |     |          |

Augur refusal was encountered @ 1'-8" at B-5 location, so the location was moved to B-5A location.  
 (Please refer location plan).

Hole collapsed at 9'-2" for Ground Water.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

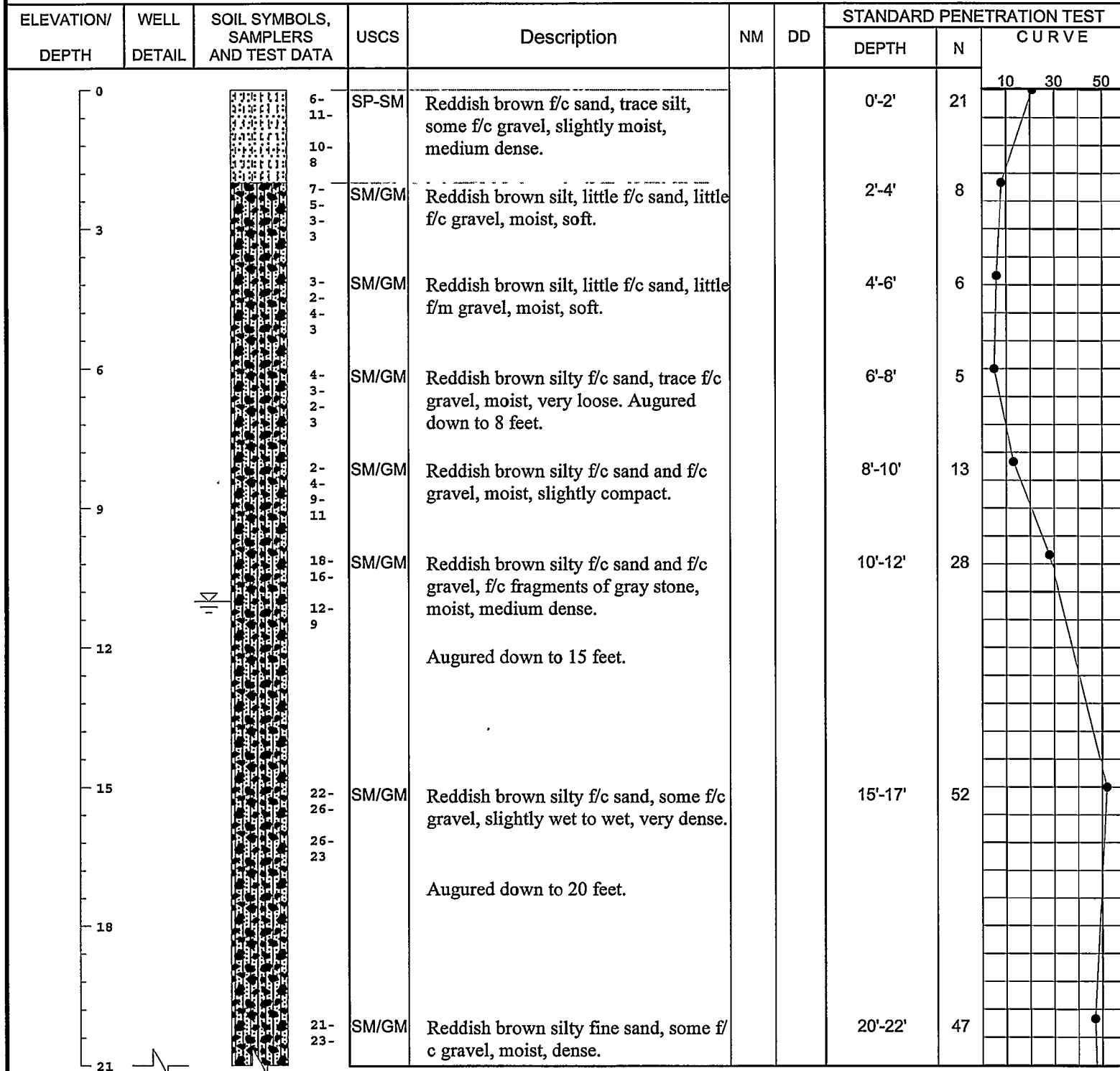
# DRILL HOLE LOG

## BORING NO.: B-6

PROJECT: Proposed 1-story retail building  
 CLIENT: Gomes Management  
 LOCATION: 525 Northfield Avenue, West Orange, NJ  
 DRILLER: JESUS, David & A. SHAH  
 DRILL RIG: ACKER XLS  
 DEPTH TO WATER> INITIAL  $\nabla$  : 11'-1"

PROJECT NO.: ANV-6549  
 DATE: 8-20-2024  
 ELEVATION: N/A  
 LOGGED BY: Krunal Parmar

AT COMPLETION  $\nabla$  :



This information pertains only to this boring and should not be interpreted as being indicative of the site.

**BORING NO.: B-6**

PROJECT NO.: ANV-6549

**ANS CONSULTANTS. INC.**

# DRILL HOLE LOG

## BORING NO.: B-7

PROJECT: Proposed 1-story retail building  
 CLIENT: Gomes Management  
 LOCATION: 525 Northfield Avenue, West Orange, NJ  
 DRILLER: JESUS, David & A. SHAH  
 DRILL RIG: ACKER XLS  
 DEPTH TO WATER> INITIAL  $\nabla$  :

PROJECT NO.: ANV-6549  
 DATE: 8-19-2024  
 ELEVATION: N/A  
 LOGGED BY: Krunal Parmar

AT COMPLETION  $\nabla$  :

| ELEVATION/<br>DEPTH | WELL<br>DETAIL | SOIL SYMBOLS,<br>SAMPLERS<br>AND TEST DATA | USCS  | Description                                                                                 | NM | DD | STANDARD PENETRATION TEST |    |          |
|---------------------|----------------|--------------------------------------------|-------|---------------------------------------------------------------------------------------------|----|----|---------------------------|----|----------|
|                     |                |                                            |       |                                                                                             |    |    | DEPTH                     | N  | CURVE    |
| 0                   |                |                                            |       |                                                                                             |    |    |                           |    | 10 30 50 |
|                     |                | 16-10-                                     | SM/GM | Asphalt-2.5".<br>Dark brown silty f/c sand, some f/c gravel, moist, slightly compact.       |    |    | 0'-2'                     | 16 |          |
|                     |                | 6-7                                        |       |                                                                                             |    |    |                           |    |          |
|                     |                | 9-8-                                       | SM/GM | Reddish brown silty f/c sand and f/c gravel, moist, medium dense.                           |    |    | 2'-4'                     | 17 |          |
| 3                   |                | 9-5                                        |       |                                                                                             |    |    |                           |    |          |
|                     |                | 6-9-14-                                    | SM/GM | Reddish brown silty f/c sand, some f/c gravel, moist, medium dense. Augured donw to 6 feet. |    |    | 4'-6'                     | 23 |          |
|                     |                | 7                                          |       |                                                                                             |    |    |                           |    |          |
| 6                   |                | 6-4-3-5                                    | SM/GM | Brown silty f/c sand, some f/c gravel, black sign of mottling, moist, loose.                |    |    | 6'-8'                     | 7  |          |
|                     |                |                                            |       |                                                                                             |    |    |                           |    |          |
|                     |                | 5-4-6-5                                    | SM/GM | Reddish brown silty f/c sand, little f/c gravel, moist, loose.                              |    |    | 8'-10'                    | 10 |          |
| 9                   |                |                                            |       |                                                                                             |    |    |                           |    |          |
|                     |                | 10-9-9-17                                  | SM/GM | Dark brown silty f/c sand, some f/c gravel, moist to slightly moist, medium dense.          |    |    | 10'-12'                   | 18 |          |
|                     |                |                                            |       |                                                                                             |    |    |                           |    |          |
| 12                  |                |                                            |       | Augur Refusal @ 14'-2".                                                                     |    |    |                           |    |          |
|                     |                |                                            |       |                                                                                             |    |    |                           |    |          |
| 15                  |                |                                            |       | End of boring.                                                                              |    |    |                           |    |          |
|                     |                |                                            |       |                                                                                             |    |    |                           |    |          |
| 18                  |                |                                            |       |                                                                                             |    |    |                           |    |          |
|                     |                |                                            |       |                                                                                             |    |    |                           |    |          |
| 21                  |                |                                            |       |                                                                                             |    |    |                           |    |          |

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

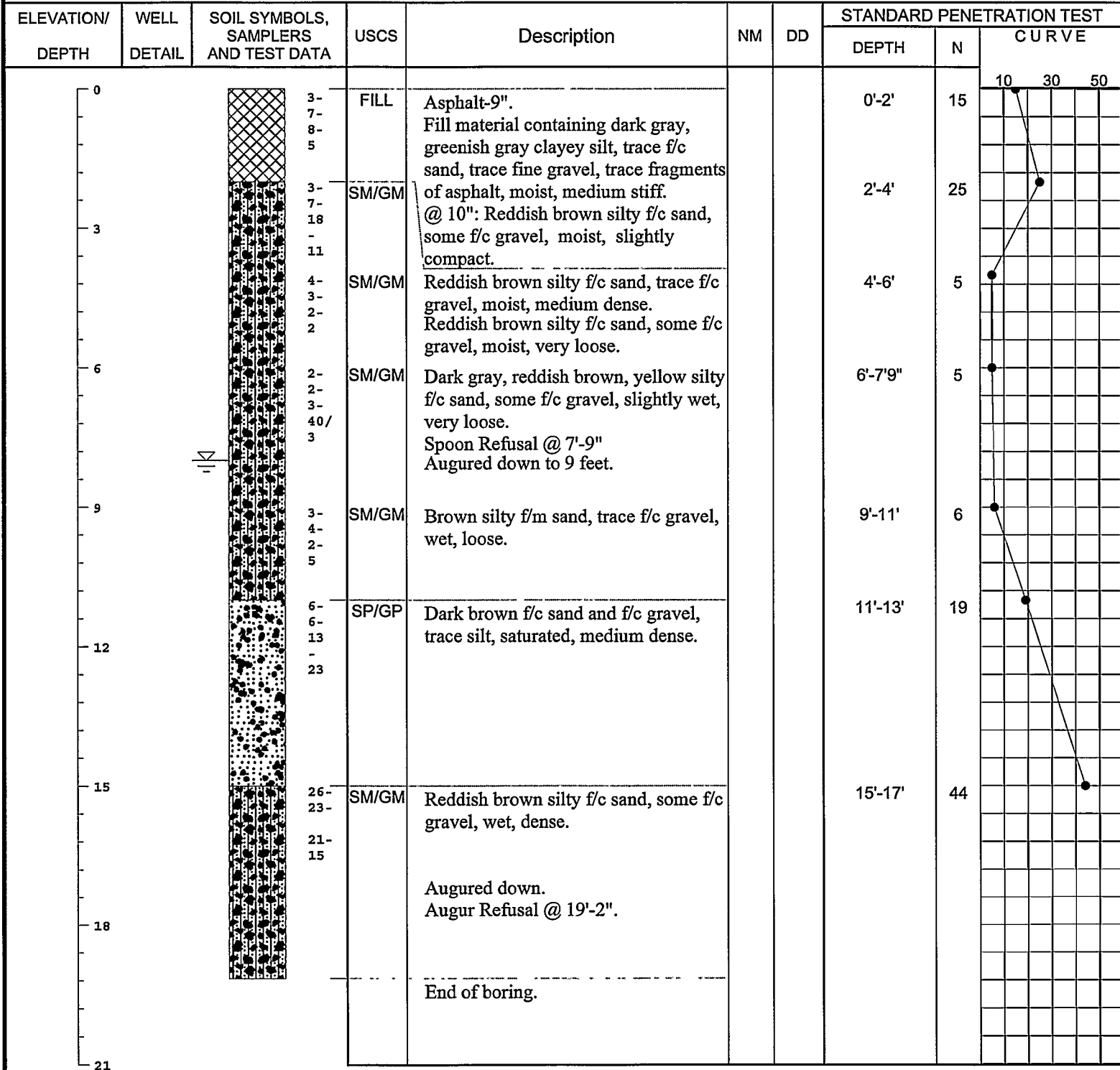
# DRILL HOLE LOG

## BORING NO.: B-8

PROJECT: Proposed 1-story retail building  
 CLIENT: Gomes Management  
 LOCATION: 525 Northfield Avenue, West Orange, NJ  
 DRILLER: JESUS, David & A. SHAH  
 DRILL RIG: ACKER XLS  
 DEPTH TO WATER> INITIAL  $\nabla$  : 8'-9"

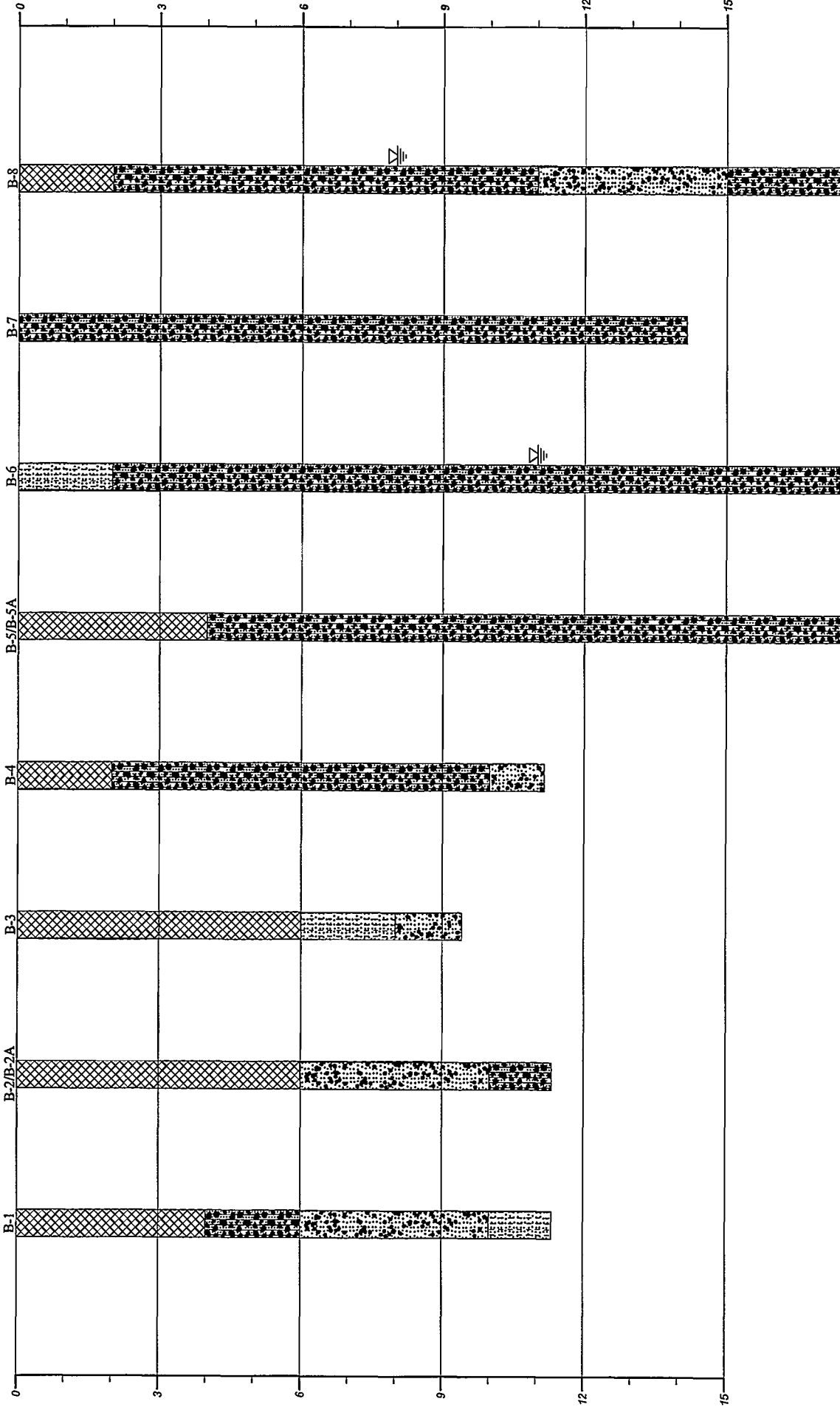
PROJECT NO.: ANV-6549  
 DATE: 8-19-2024  
 ELEVATION: N/A  
 LOGGED BY: Krunal Parmar

AT COMPLETION  $\nabla$  :



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth in Feet



Plan View

Strata symbols

Blank

- Fill
- Silty sand and gravel
- Poorly graded sand and gravel
- Poorly graded sand with silt

ANS CONSULTANTS, INC.  
GENERALIZED SOIL PROFILE

|                         |                      |            |
|-------------------------|----------------------|------------|
| HORIZONTAL SCALE: 1"=3' | DRAWN BY/APPROVED BY | DATE DRAWN |
| VERTICAL SCALE: 1"=3'   | PPP                  | 9/3/2024   |

Proposed 1-story retail building

PROJECT NO. ANV-6549

FIGURE NUMBER



# KEY TO SYMBOLS

Symbol Description

## Strata symbols



Fill



Silty sand and gravel



Poorly graded sand  
and gravel



Poorly graded sand  
with silt



Blank

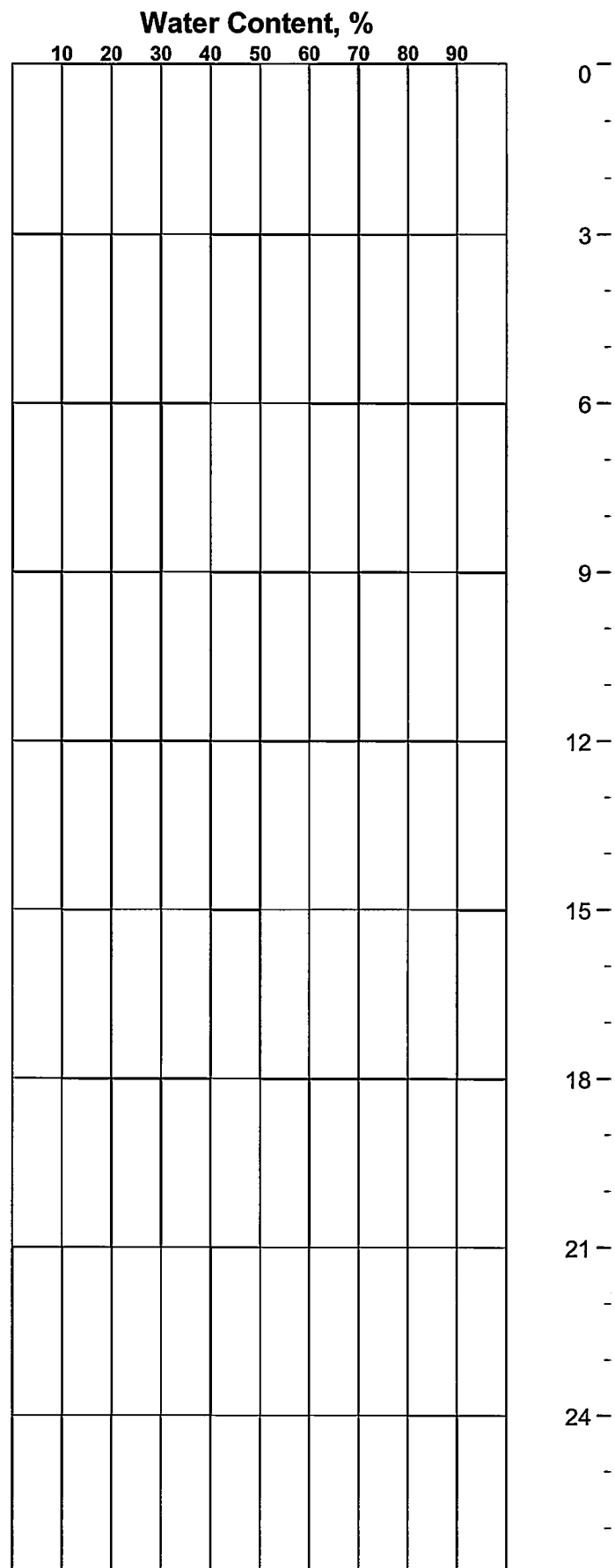
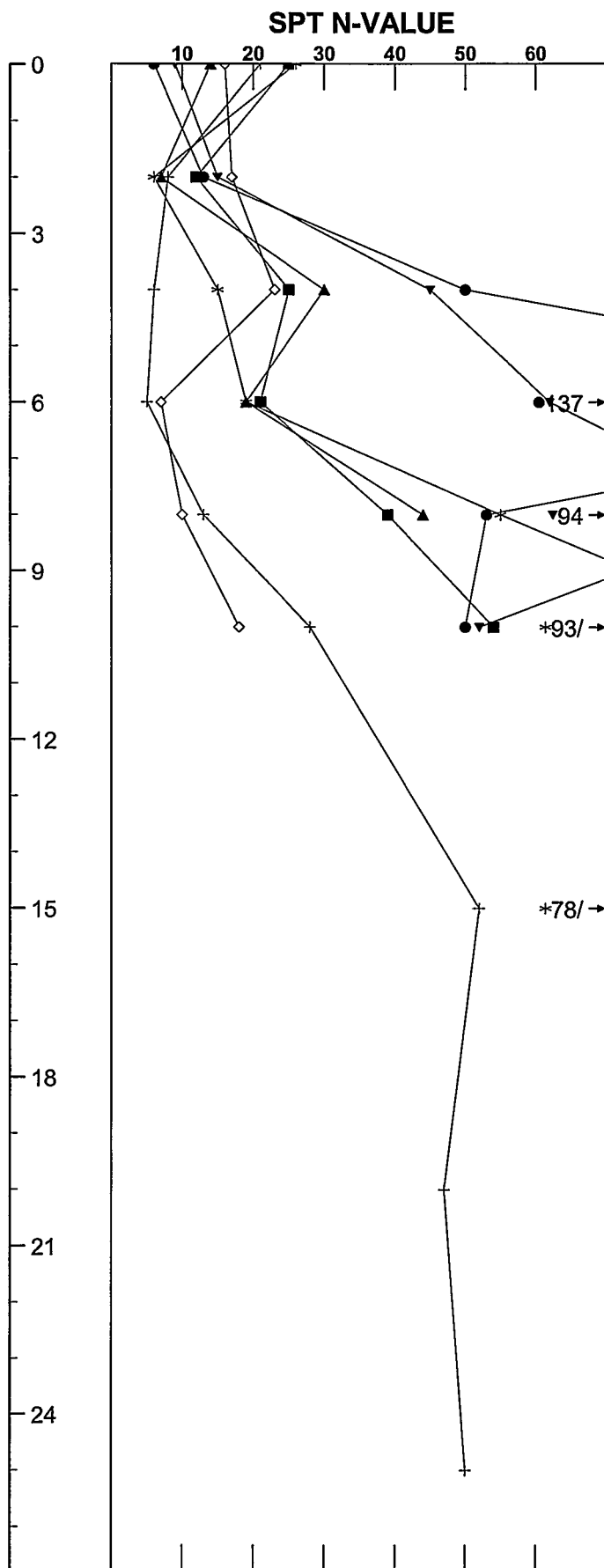
## Misc. Symbols



Water table during  
drilling

## Notes:

1. Exploratory borings were drilled on 8-19-2024 using a 4-inch diameter continuous flight power auger.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.



**Key to Borings**

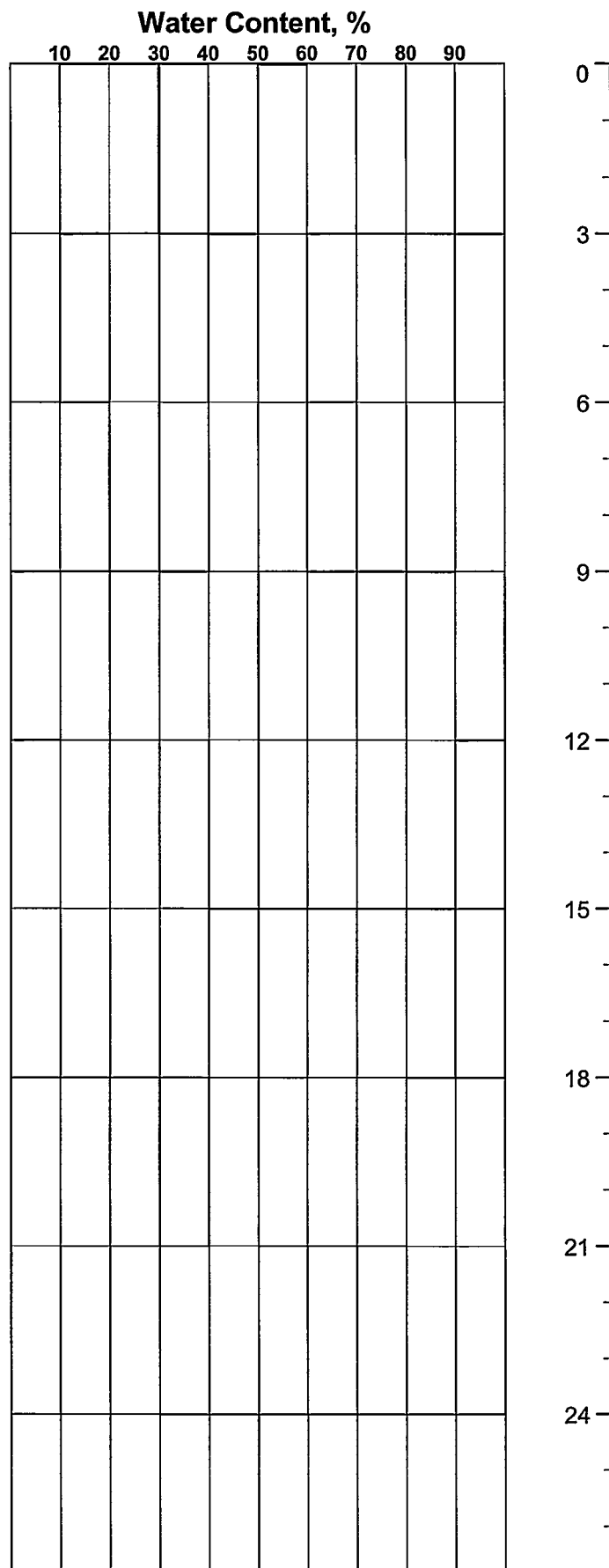
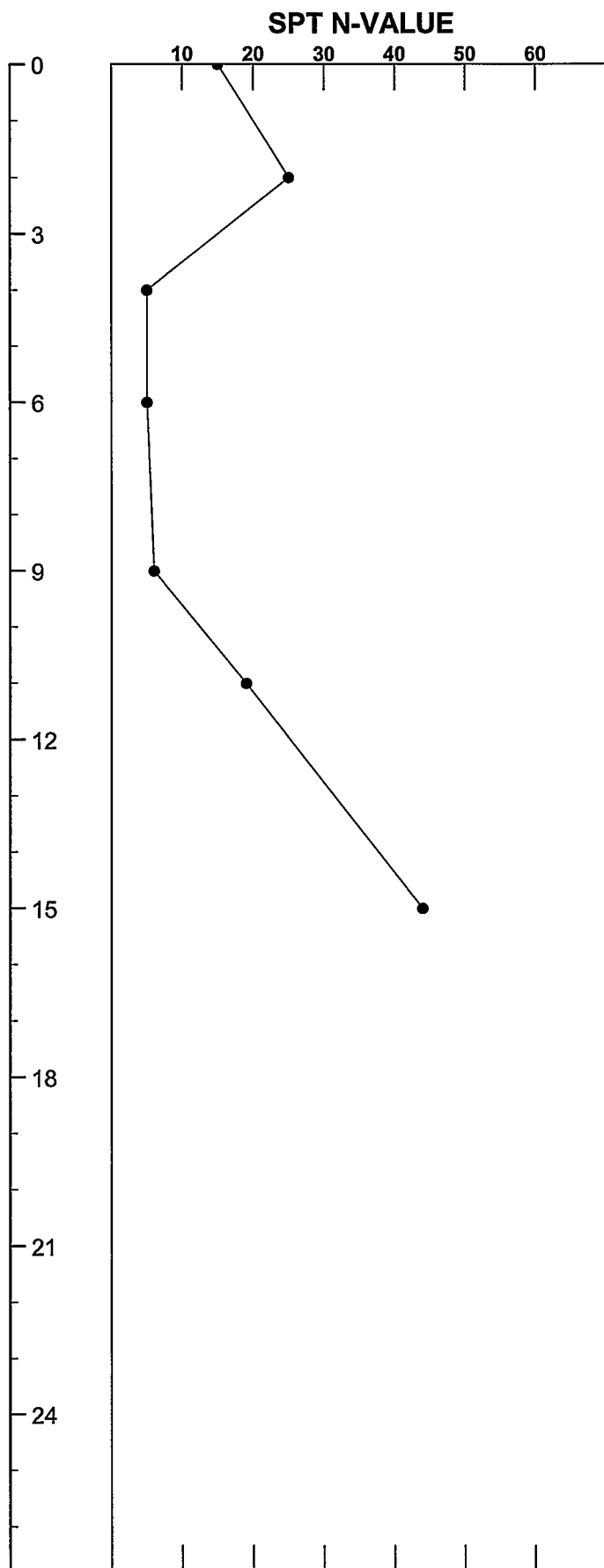
- B-1      ▲ B-3      \* B-5/B-5A      ◇ B-7
- B-2/B-2A      ▼ B-4      + B-6

**ANS CONSULTANTS, INC.**

**Proposed 1-story retail building**

Vertical Scale: 1 to 3

Figure:



**Key to Borings**

- B-8

**ANS CONSULTANTS, INC.**

**Proposed 1-story retail building**

Vertical Scale: 1 to 3

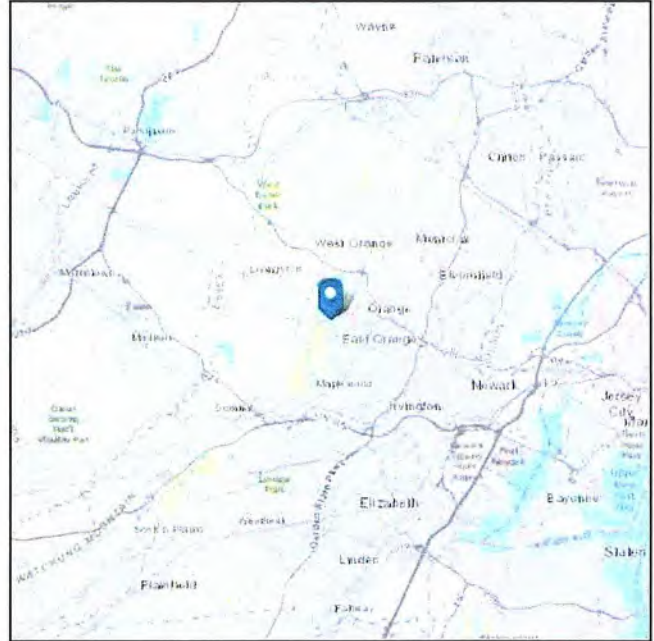
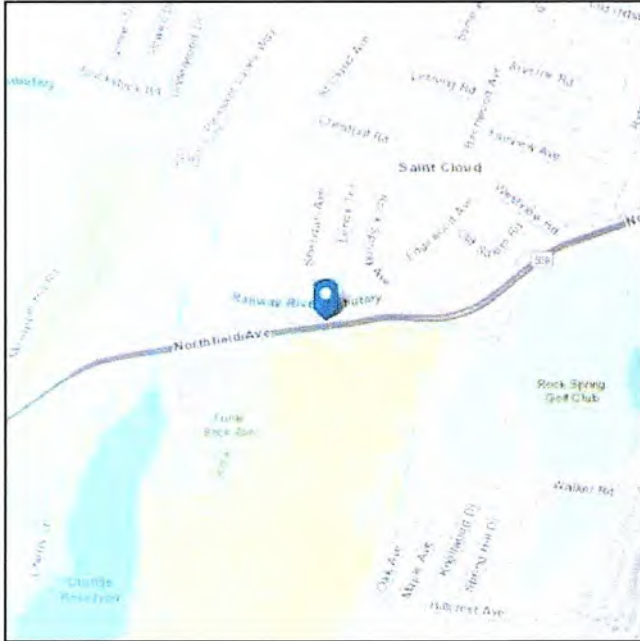
Figure:

# ASCE Hazards Report

**Address:**  
525 Northfield Ave  
West Orange, New Jersey  
07052

**Standard:** ASCE/SEI 7-22  
**Risk Category:** II  
**Soil Class:** C - Very Dense  
Soil and Soft Rock

**Latitude:** 40.770448  
**Longitude:** -74.277032  
**Elevation:** 391.14172377309643 ft  
(NAVD 88)

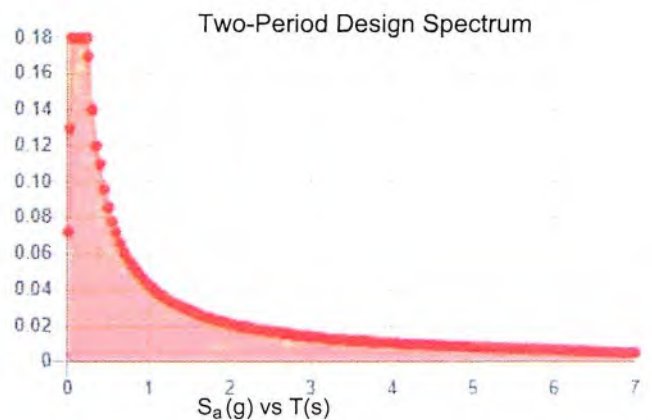
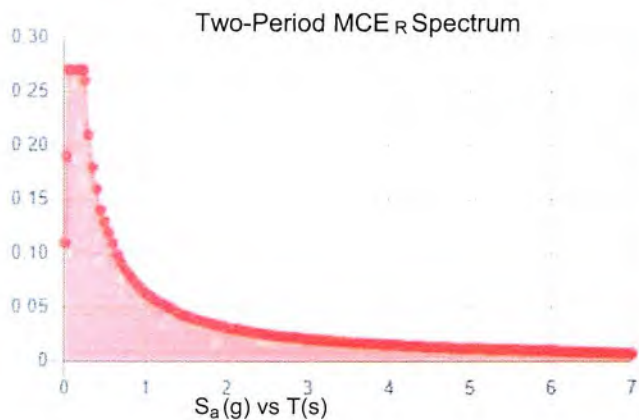
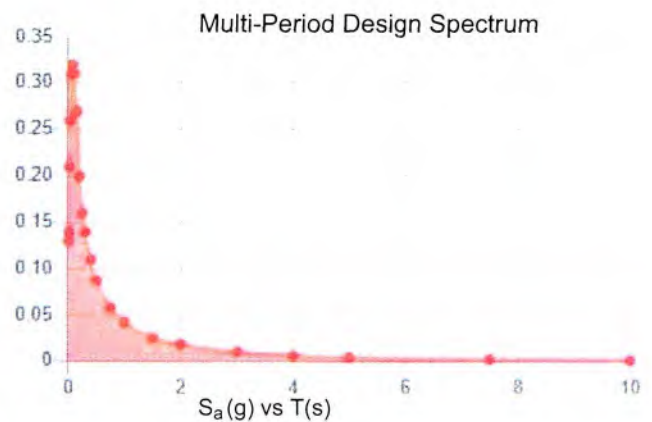
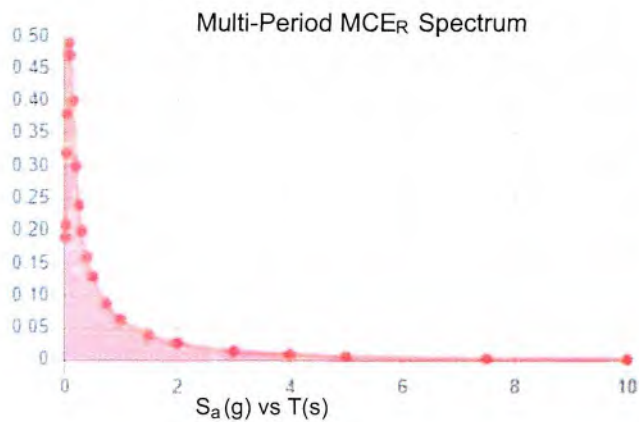


**Site Soil Class:** C - Very Dense Soil and Soft Rock

**Results:**

|                    |       |                    |      |
|--------------------|-------|--------------------|------|
| PGA <sub>M</sub> : | 0.17  | T <sub>L</sub> :   | 6    |
| S <sub>MS</sub> :  | 0.27  | S <sub>s</sub> :   | 0.27 |
| S <sub>M1</sub> :  | 0.064 | S <sub>1</sub> :   | 0.05 |
| S <sub>DS</sub> :  | 0.18  | V <sub>S30</sub> : | 530  |
| S <sub>D1</sub> :  | 0.043 |                    |      |

**Seismic Design Category: B**



**MCE<sub>R</sub> Vertical Response Spectrum**

Vertical ground motion data has not yet been made available by USGS.

**Design Vertical Response Spectrum**

Vertical ground motion data has not yet been made available by USGS.



**Data Accessed:** Tue Aug 27 2024

**Date Source:**

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

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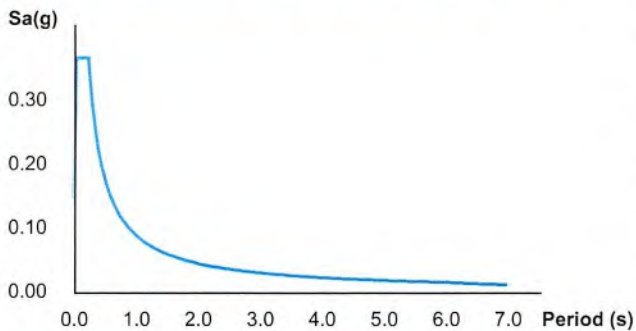
## ATC Hazards by Location

### Search Information

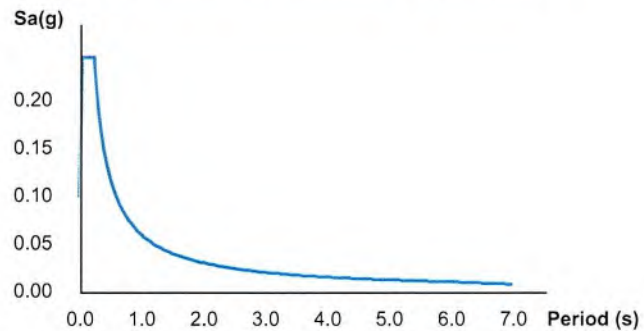
**Address:** 525 Northfield Ave, West Orange, NJ 07052, USA  
**Coordinates:** 40.7705012, -74.2774591  
**Elevation:** 385 ft  
**Timestamp:** 2024-08-27T17:48:58.307Z  
**Hazard Type:** Seismic  
**Reference Document:** ASCE7-16  
**Risk Category:** II  
**Site Class:** C



### MCER Horizontal Response Spectrum



### Design Horizontal Response Spectrum



### Basic Parameters

| Name     | Value | Description                                  |
|----------|-------|----------------------------------------------|
| $S_S$    | 0.282 | MCE <sub>R</sub> ground motion (period=0.2s) |
| $S_1$    | 0.059 | MCE <sub>R</sub> ground motion (period=1.0s) |
| $S_{MS}$ | 0.367 | Site-modified spectral acceleration value    |
| $S_{M1}$ | 0.089 | Site-modified spectral acceleration value    |
| $S_{DS}$ | 0.245 | Numeric seismic design value at 0.2s SA      |
| $S_{D1}$ | 0.059 | Numeric seismic design value at 1.0s SA      |

### Additional Information

| Name   | Value | Description                               |
|--------|-------|-------------------------------------------|
| SDC    | B     | Seismic design category                   |
| $F_a$  | 1.3   | Site amplification factor at 0.2s         |
| $F_v$  | 1.5   | Site amplification factor at 1.0s         |
| $CR_S$ | 0.935 | Coefficient of risk (0.2s)                |
| $CR_1$ | 0.944 | Coefficient of risk (1.0s)                |
| PGA    | 0.173 | MCE <sub>G</sub> peak ground acceleration |



|           |       |                                                                                          |
|-----------|-------|------------------------------------------------------------------------------------------|
| $F_{PGA}$ | 1.227 | Site amplification factor at PGA                                                         |
| $PGA_M$   | 0.213 | Site modified peak ground acceleration                                                   |
| $T_L$     | 6     | Long-period transition period (s)                                                        |
| $SsRT$    | 0.282 | Probabilistic risk-targeted ground motion (0.2s)                                         |
| $SsUH$    | 0.302 | Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years) |
| $SsD$     | 1.5   | Factored deterministic acceleration value (0.2s)                                         |
| $S1RT$    | 0.059 | Probabilistic risk-targeted ground motion (1.0s)                                         |
| $S1UH$    | 0.063 | Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years) |
| $S1D$     | 0.6   | Factored deterministic acceleration value (1.0s)                                         |
| $PGAd$    | 0.5   | Factored deterministic acceleration value (PGA)                                          |

*The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.*

*Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. [Find out why.](#)*

## Disclaimer

Hazard loads are provided by the U.S. Geological Survey [Seismic Design Web Services](#).

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## FIELD SOIL CLASSIFICATION SYSTEM

### PARTICLE SIZE IDENTIFICATION

Boulders..... 8 inch diameter or greater  
Cobbles..... 3 to 8 inch diameter  
Gravel ..... Coarse -- 1 to 3 inch  
Medium -- 1/2 to 1 inch  
Fine -- 4.75 mm to 1/2 inch  
Sand..... Coarse -- 2.0 mm to 4.75 mm  
(dia. of pencil lead)  
Medium -- 0.425 mm to 2.0 mm  
(dia. of broom straw)  
Fine -- 0.075 mm to 0.425 mm  
(dia. of human hair)  
Silt & Clay. . . Smaller than 0.075 mm

### RELATIVE PORTIONS

| Descriptive Term     | Percent |
|----------------------|---------|
| Trace - tr .....     | 1 - 10  |
| Some - sm .....      | 11 - 20 |
| Adjective - ly ..... | 21 - 35 |
| And - & .....        | 36 - 50 |

### ABBREVIATIONS

|                       |                    |
|-----------------------|--------------------|
| Bn - Brown            |                    |
| Gy - Gray             |                    |
| Blk - Black           |                    |
| Rd - Red              |                    |
| Or - Orange           |                    |
| Bl - Blue             |                    |
| Lt - Light            | Coarse grained - c |
| Dk - Dark             | Medium grained - m |
| Multi - Multi colored | Fine grained- f    |

### COHESIONLESS SOIL

(Gravel, Sand, Silt and Combinations)

### DENSITY

Very Loose ..... 05 blows / ft or less  
Loose ..... 06 to 10 blows / ft  
Medium Dense ..... 11 to 30 blows / ft  
Dense ..... 31 to 50 blows / ft  
Very Dense ..... 51 blows / ft or more

### COHESIVE SOIL

(Clay Silt and Combinations)

### CONSISTENCY

Very Soft ..... 01 blow / ft or less  
Soft..... 02 to 4 blows / ft  
Medium Stiff ..... 05 to 8 blows / ft  
Stiff..... 09 to 15 blows / ft  
Very Stiff ..... 16 to 30 blows / ft  
Hard ..... 31 blows / ft or greater

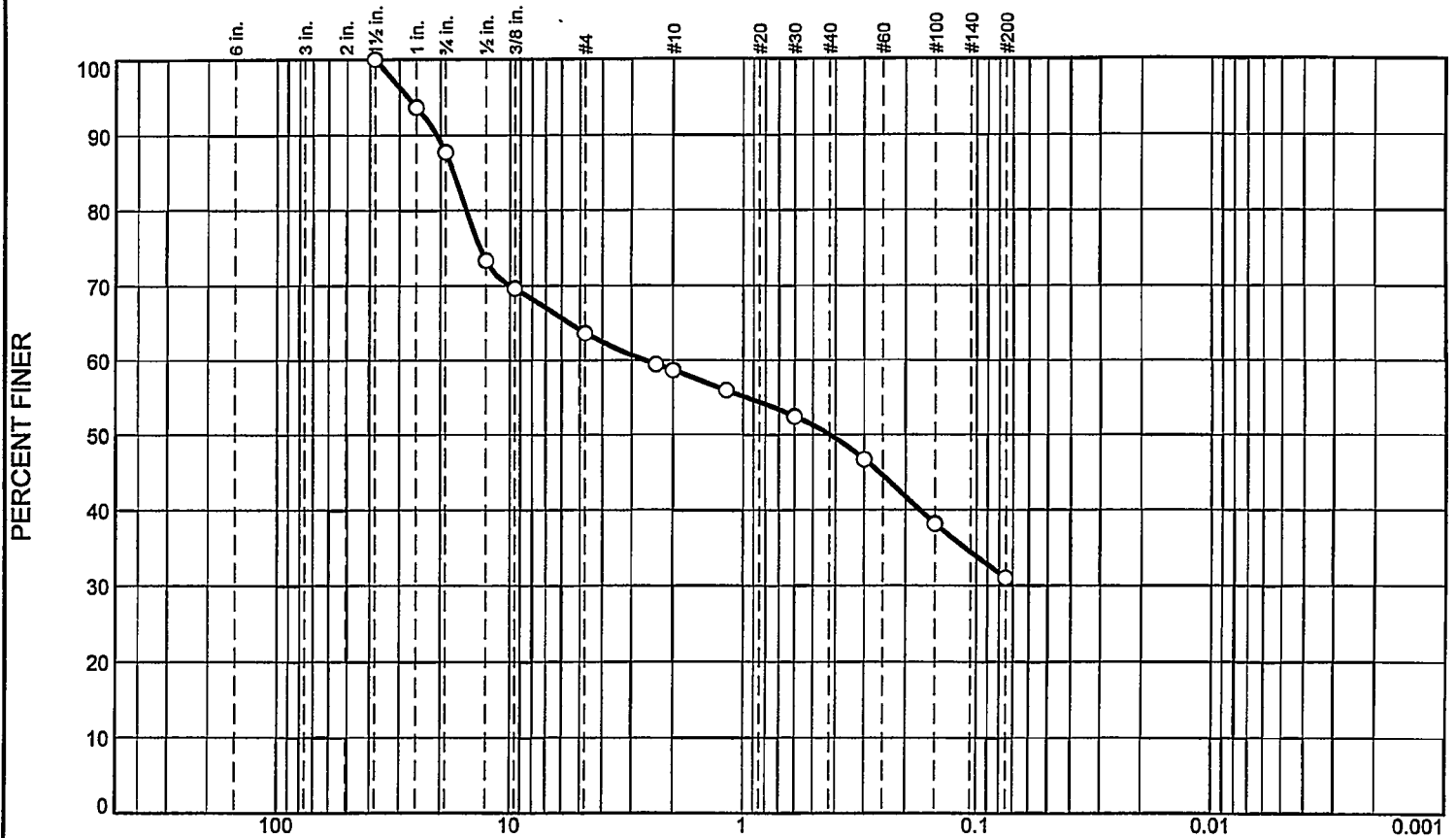
### ROCK

| R.Q.D.          | Rock Quality |
|-----------------|--------------|
| 00 - 25 .....   | Very Poor    |
| 25 - 50% .....  | Poor         |
| 50 - 75% .....  | Fair         |
| 75 - 90% .....  | Good         |
| 90 - 100% ..... | Excellent    |

HSA - Hollow Stem Auger  
SS- Split Spoon Sampler  
WOR - Weight of Rods  
WOH - Weight of Hammer  
NR - No Recovery of Sample

## Appendix-B

# Particle Size Distribution Report As per ASTM D 6913



GRAIN SIZE - mm.

| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 12.2     | 24.1 | 5.0    | 8.7    | 18.9 | 31.1    |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.5        | 100.0         |                |              |
| 1          | 93.7          |                |              |
| 3/4        | 87.8          |                |              |
| 1/2        | 73.3          |                |              |
| 3/8        | 69.7          |                |              |
| #4         | 63.7          |                |              |
| #8         | 59.5          |                |              |
| #10        | 58.7          |                |              |
| #16        | 56.0          |                |              |
| #30        | 52.5          |                |              |
| #50        | 46.7          |                |              |
| #100       | 38.2          |                |              |
| #200       | 31.1          |                |              |

\* (no specification provided)

## Material Description

Brown in color, silty gravel with sand

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 20.7274

D<sub>85</sub>= 17.5640

D<sub>60</sub>= 2.6310

D<sub>50</sub>= 0.4243

D<sub>30</sub>=

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= GM

AASHTO= A-2-4(0)

## Remarks

Sample was collected on 08/21/24 and tested on 08/26/24. In-Situ %MC=10.9  
F.M.=3.26

Location: B-1

Sample Number: S-1

Depth: 2'-4'

Date: 08/26/2024

**ANS CONSULTANTS, INC.**

**South Plainfield, New Jersey**

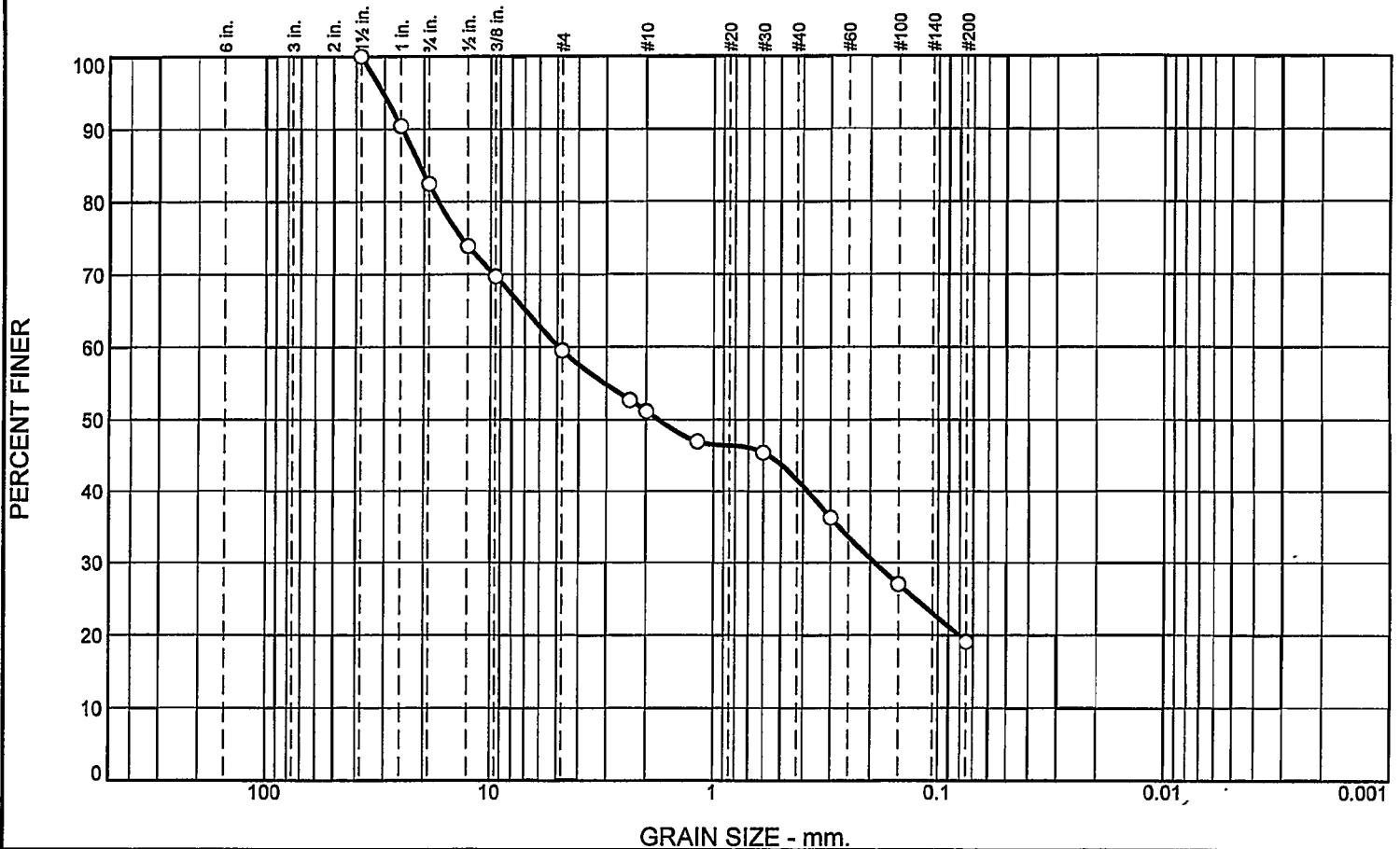
Client: Gomes Management

Project: 625 Northfield Avenue, West Orange, NJ Block 159.04, Lot # 1.01, 1.02 & 1.03

Project No: ANV-6549

Figure 1 F 1

# Particle Size Distribution Report As per ASTM D 6913



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 17.5     | 22.9 | 8.4    | 9.6    | 22.5 | 19.1    |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.5        | 100.0         |                |              |
| 1          | 90.4          |                |              |
| 3/4        | 82.5          |                |              |
| 1/2        | 73.9          |                |              |
| 3/8        | 69.8          |                |              |
| #4         | 59.6          |                |              |
| #8         | 52.7          |                |              |
| #10        | 51.2          |                |              |
| #16        | 47.0          |                |              |
| #30        | 45.4          |                |              |
| #50        | 36.3          |                |              |
| #100       | 27.0          |                |              |
| #200       | 19.1          |                |              |

\* (no specification provided)

## Material Description

Dark brown in color. silty sand with gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 25.0083

D<sub>85</sub>= 20.9050

D<sub>60</sub>= 4.9198

D<sub>50</sub>= 1.7641

D<sub>30</sub>= 0.1912

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-1-b

## Remarks

Sample was collected on 08/21/24 and tested on 08/26/24. In-Situ  
%MC=10.1  
F.M.=3.80

Location: B-2A

Sample Number: S-2

Depth: 4'-6'

Date: 08/26/2024

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Client: Gomes Management

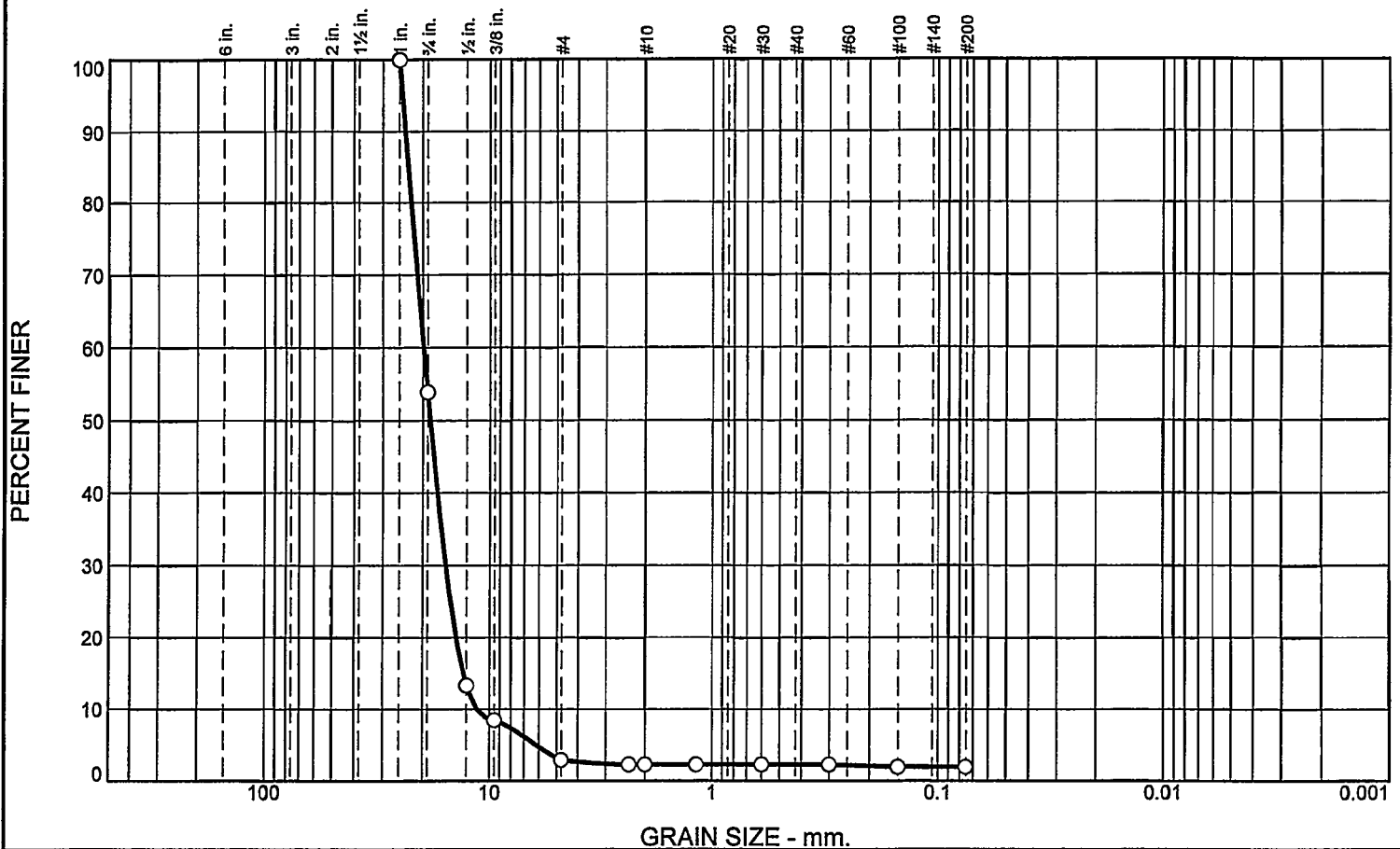
Project: 625 Northfield Avenue, West Orange, NJ Block 159.04, Lot # 1.01, 1.02 & 1.03

**South Plainfield, New Jersey**

Project No: ANV-6549

Figure 2 F 1

# Particle Size Distribution Report As per ASTM D 6913



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 46.1     | 51.0 | 0.6    | 0.0    | 0.4  | 1.9     |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1          | 100.0         |                |              |
| 3/4        | 53.9          |                |              |
| 1/2        | 13.3          |                |              |
| 3/8        | 8.4           |                |              |
| #4         | 2.9           |                |              |
| #8         | 2.3           |                |              |
| #10        | 2.3           |                |              |
| #16        | 2.3           |                |              |
| #30        | 2.3           |                |              |
| #50        | 2.3           |                |              |
| #100       | 1.9           |                |              |
| #200       | 1.9           |                |              |

\* (no specification provided)

## Material Description

Grey in color. poorly graded gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 23.9319

D<sub>85</sub>= 23.2246

D<sub>60</sub>= 19.8550

D<sub>50</sub>= 18.5338

D<sub>30</sub>= 15.7605

D<sub>15</sub>= 13.1263

D<sub>10</sub>= 11.4351

C<sub>u</sub>= 1.74

C<sub>c</sub>= 1.09

## Classification

USCS= GP

AASHTO= A-1-a

## Remarks

Sample was collected on 08/21/24 and tested on 08/26/24. In-Situ  
%MC=5.5  
F.M.=7.24

Location: B-3

Sample Number: S-3

Depth: 6'-8'

Date: 08/26/2024

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Client: Gomes Management

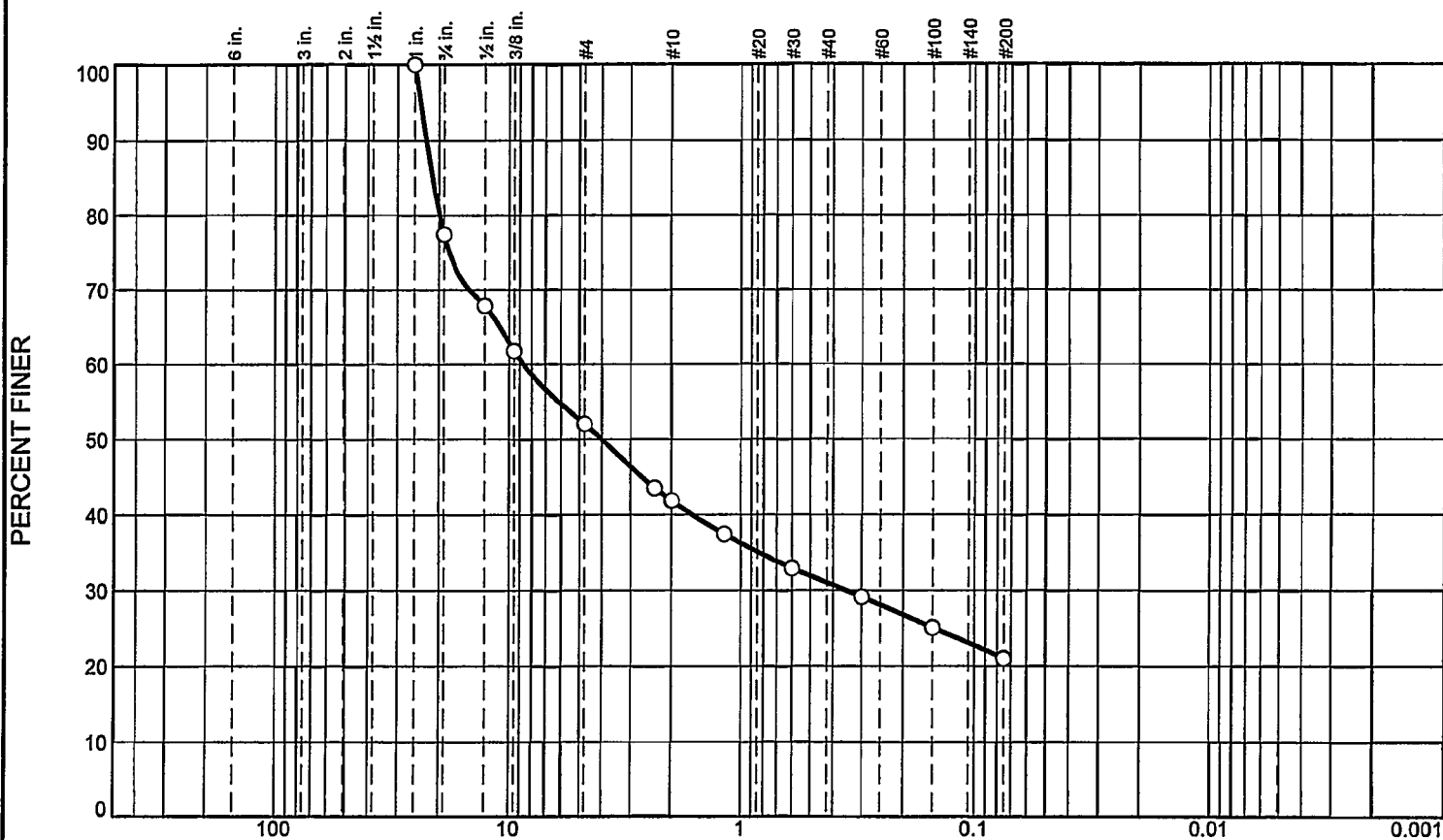
Project: 625 Northfield Avenue, West Orange, NJ Block 159.04, Lot # 1.01, 1.02 & 1.03

**South Plainfield, New Jersey**

Project No: ANV-6549

Figure 3 F 1

# Particle Size Distribution Report As per ASTM D 6913



GRAIN SIZE - mm.

| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 22.5     | 25.5 | 10.1   | 10.9   | 10.0 | 21.0    |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1          | 100.0         |                |              |
| 3/4        | 77.5          |                |              |
| 1/2        | 67.9          |                |              |
| 3/8        | 61.8          |                |              |
| #4         | 52.0          |                |              |
| #8         | 43.5          |                |              |
| #10        | 41.9          |                |              |
| #16        | 37.4          |                |              |
| #30        | 32.9          |                |              |
| #50        | 29.1          |                |              |
| #100       | 25.1          |                |              |
| #200       | 21.0          |                |              |

\* (no specification provided)

## Material Description

Brown in color. silty gravel with sand

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 22.6921

D<sub>85</sub>= 21.3376

D<sub>60</sub>= 8.7032

D<sub>50</sub>= 4.0095

D<sub>30</sub>= 0.3519

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= GM

AASHTO= A-1-b

## Remarks

Sample was collected on 08/20/24 and tested on 08/26/24 In-Situ  
%MC=8.2  
F.M.=4.41

Location: B-4

Sample Number: S-4

Depth: 8'-10'

Date: 08/26/2024

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Client: Gomes Management

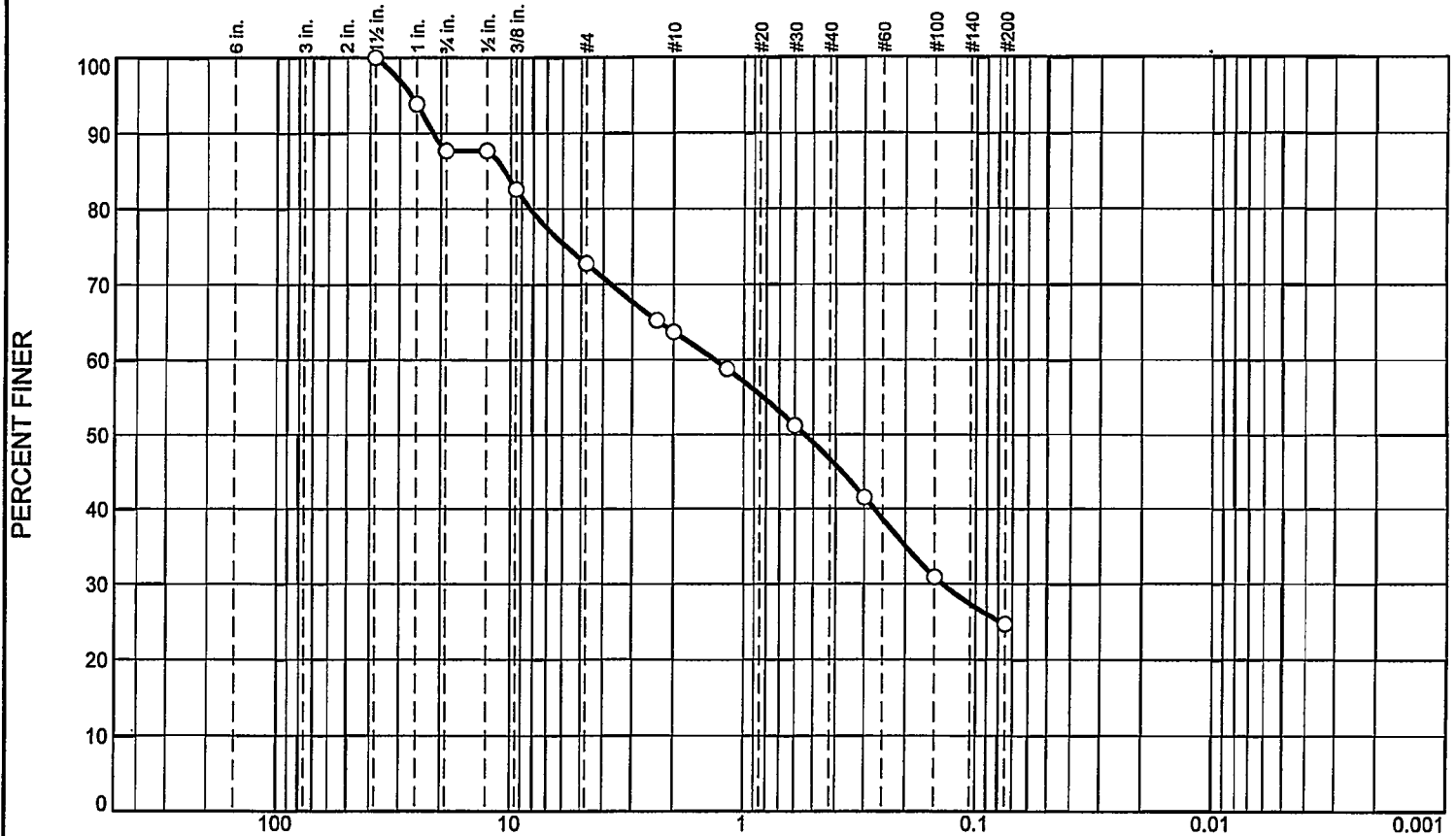
Project: 625 Northfield Avenue, West Orange, NJ Block 159.04, Lot # 1.01, 1.02 & 1.03

**South Plainfield, New Jersey**

Project No: ANV-6549

Figure 4 F 1

# Particle Size Distribution Report As per ASTM D 6913



GRAIN SIZE - mm.

| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 12.3     | 14.9 | 9.1    | 17.0   | 22.0 | 24.7    |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.5        | 100.0         |                |              |
| 1          | 93.9          |                |              |
| 3/4        | 87.7          |                |              |
| 1/2        | 87.7          |                |              |
| 3/8        | 82.6          |                |              |
| #4         | 72.8          |                |              |
| #8         | 65.2          |                |              |
| #10        | 63.7          |                |              |
| #16        | 58.8          |                |              |
| #30        | 51.2          |                |              |
| #50        | 41.6          |                |              |
| #100       | 30.9          |                |              |
| #200       | 24.7          |                |              |

\* (no specification provided)

## Material Description

brown in color. silty sand with gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 21.6696

D<sub>85</sub>= 10.6461

D<sub>60</sub>= 1.3349

D<sub>50</sub>= 0.5441

D<sub>30</sub>= 0.1389

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-1-b

## Remarks

Sample was collected on 08/20/24 and tested on 08/26/24. In-Situ  
%MC=5.8  
F.M.=3.09

Location: B-5A

Sample Number: S-5

Depth: 10'-12'

Date: 08/26/2024

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Client: Gomes Management

Project: 625 Northfield Avenue, West Orange, NJ Block 159.04, Lot # 1.01, 1.02 & 1.03

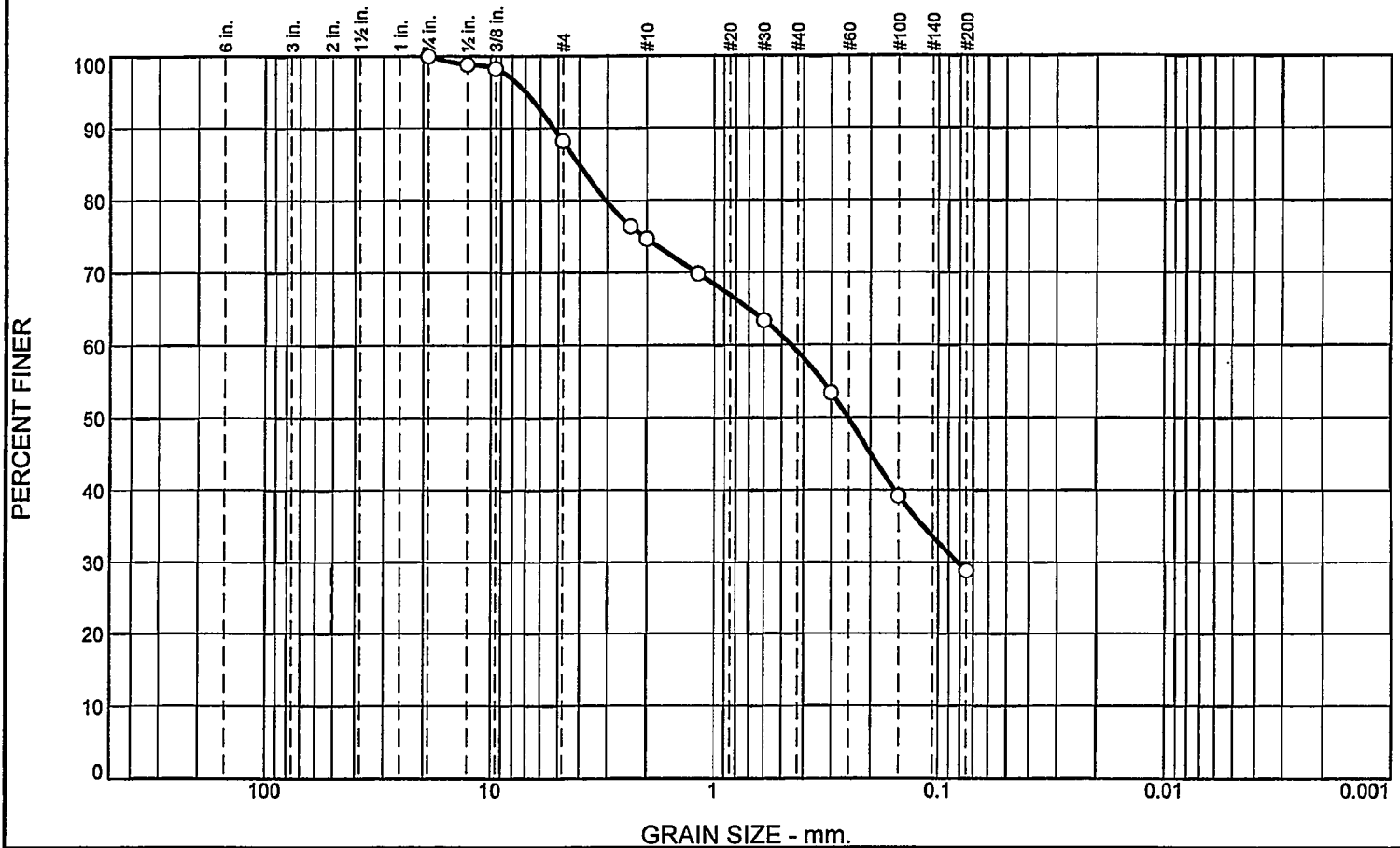
**South Plainfield, New Jersey**

Project No: ANV-6549

Figure 5 F 1



# Particle Size Distribution Report As per ASTM D 6913



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 0.0      | 11.9 | 13.5   | 15.5   | 30.3 | 28.8    |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 3/4        | 100.0         |                |              |
| 1/2        | 98.8          |                |              |
| 3/8        | 98.2          |                |              |
| #4         | 88.1          |                |              |
| #8         | 76.3          |                |              |
| #10        | 74.6          |                |              |
| #16        | 69.8          |                |              |
| #30        | 63.4          |                |              |
| #50        | 53.4          |                |              |
| #100       | 39.2          |                |              |
| #200       | 28.8          |                |              |

\* (no specification provided)

| <u>Material Description</u>                                                               |                          |                          |
|-------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| Brown in color. silty sand                                                                |                          |                          |
| <u>Atterberg Limits</u>                                                                   |                          |                          |
| PL= NP                                                                                    | LL= NV                   | PI= NP                   |
| <u>Coefficients</u>                                                                       |                          |                          |
| D <sub>90</sub> = 5.2325                                                                  | D <sub>85</sub> = 4.0345 | D <sub>60</sub> = 0.4539 |
| D <sub>50</sub> = 0.2524                                                                  | D <sub>30</sub> = 0.0820 | D <sub>15</sub> =        |
| D <sub>10</sub> =                                                                         | C <sub>u</sub> =         | C <sub>c</sub> =         |
| <u>Classification</u>                                                                     |                          |                          |
| USCS= SM                                                                                  | AASHTO= A-2-4(0)         |                          |
| <u>Remarks</u>                                                                            |                          |                          |
| Sample was collected on 08/20/24 and tested on 08/26/24. In-Situ<br>%MC=13.3<br>F.M.=2.11 |                          |                          |

Location: B-6

Sample Number: S-6

Depth: 15'-17'

Date: 08/26/2024

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**South Plainfield, New Jersey**

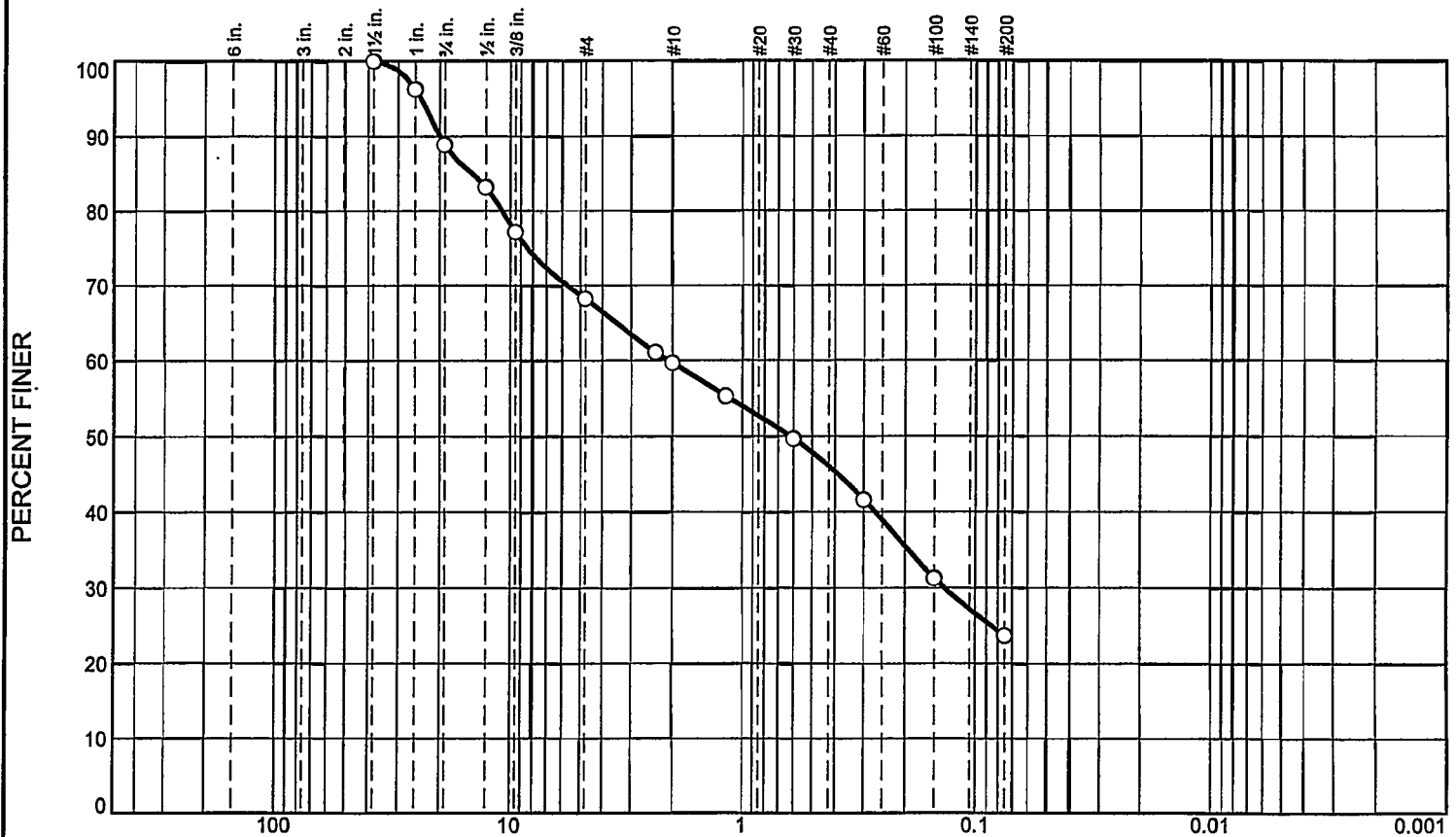
Client: Gomes Management

Project: 625 Northfield Avenue, West Orange, NJ Block 159.04, Lot # 1.01, 1.02 & 1.03

Project No: ANV-6549

Figure 6 F 1

# Particle Size Distribution Report As per ASTM D 6913



GRAIN SIZE - mm.

| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 11.2     | 20.6 | 8.5    | 13.6   | 22.4 | 23.7    |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.5        | 100.0         |                |              |
| 1          | 96.3          |                |              |
| 3/4        | 88.8          |                |              |
| 1/2        | 83.2          |                |              |
| 3/8        | 77.2          |                |              |
| #4         | 68.2          |                |              |
| #8         | 61.1          |                |              |
| #10        | 59.7          |                |              |
| #16        | 55.3          |                |              |
| #30        | 49.7          |                |              |
| #50        | 41.6          |                |              |
| #100       | 31.3          |                |              |
| #200       | 23.7          |                |              |

\* (no specification provided)

## Material Description

Brown in color. silty sand with gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 20.0068

D<sub>85</sub>= 14.5408

D<sub>60</sub>= 2.0845

D<sub>50</sub>= 0.6227

D<sub>30</sub>= 0.1357

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-1-b

## Remarks

Sample was collected on 08/19/24 and tested on 08/26/24. In-Situ  
%MC=7.5  
F.M.=3.27

Location: B-7

Sample Number: S-7

Depth: 4'-6'

Date: 08/26/2024

**ANS CONSULTANTS, INC.**

Client: Gomes Management

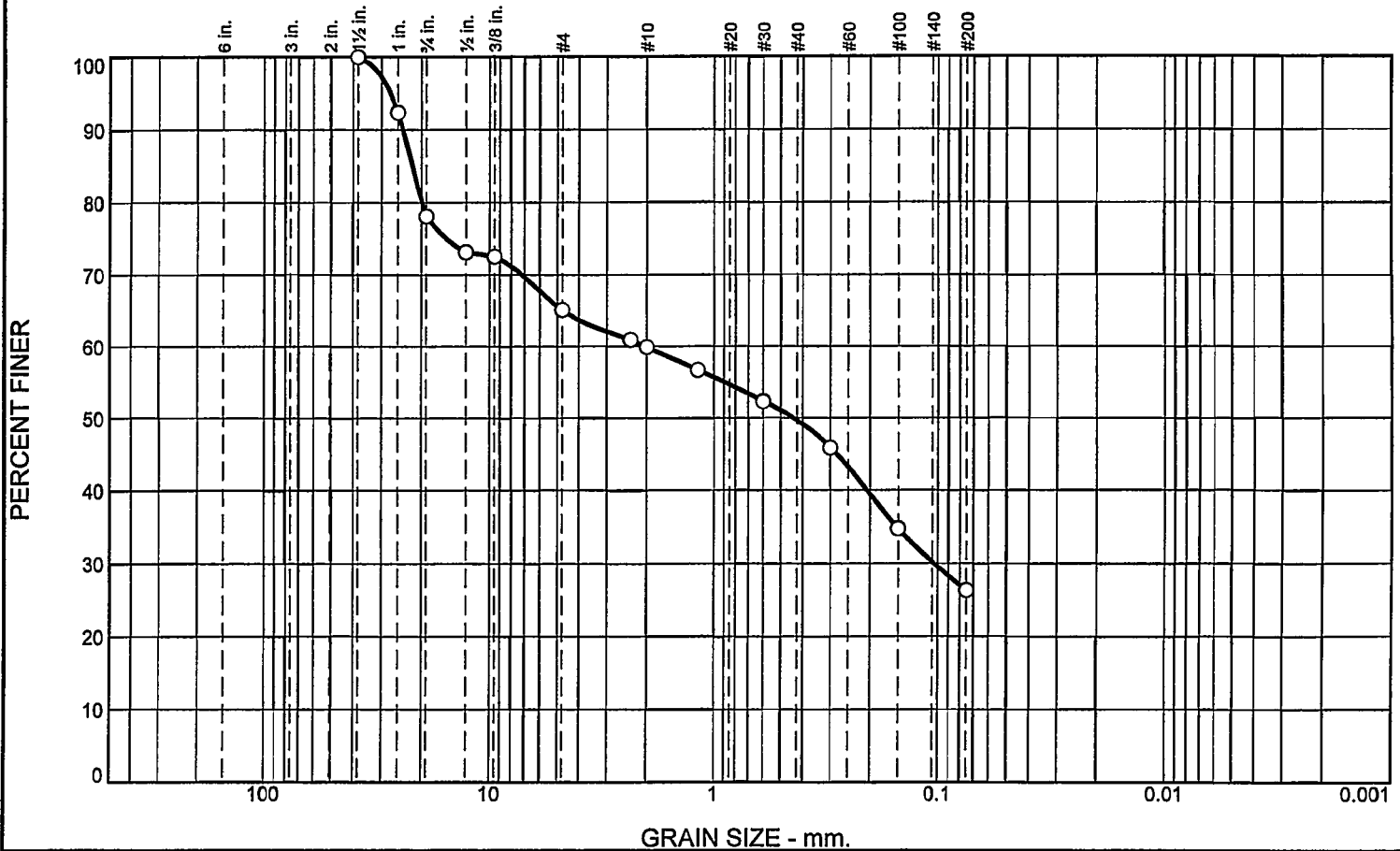
Project: 625 Northfield Avenue, West Orange, NJ Block 159.04, Lot # 1.01, 1.02 & 1.03

South Plainfield, New Jersey

Project No: ANV-6549

Figure 7 F 1

# Particle Size Distribution Report As per ASTM D 6913



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 21.9     | 13.0 | 5.2    | 10.2   | 23.4 | 26.3    |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.5        | 100.0         |                |              |
| 1          | 92.4          |                |              |
| 3/4        | 78.1          |                |              |
| 1/2        | 73.1          |                |              |
| 3/8        | 72.5          |                |              |
| #4         | 65.1          |                |              |
| #8         | 60.9          |                |              |
| #10        | 59.9          |                |              |
| #16        | 56.7          |                |              |
| #30        | 52.3          |                |              |
| #50        | 45.9          |                |              |
| #100       | 34.8          |                |              |
| #200       | 26.3          |                |              |

\* (no specification provided)

## Material Description

Brown in color, silty sand with gravel

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 24.1282

D<sub>85</sub>= 21.9511

D<sub>60</sub>= 2.0305

D<sub>50</sub>= 0.4411

D<sub>30</sub>= 0.1044

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= SM

AASHTO= A-2-4(0)

## Remarks

Sample was collected on 08/19/24 and tested on 08/26/24. In-Situ  
 %MC=14.2  
 F.M.=3.34

Location: B-8

Sample Number: S-8

Depth: 6'-8'

Date: 08/26/2024

**ANS CONSULTANTS, INC.**

**South Plainfield, New Jersey**

Client: Gomes Management

Project: 625 Northfield Avenue, West Orange, NJ Block 159.04, Lot # 1.01, 1.02 & 1.03

Project No: ANV-6549

Figure 8 F 1

## **Appendix-C**



CONSULTANTS, INC.  
4405 South Clinton Avenue  
South Plainfield, NJ 07080

**Client: Gomes Management**

**Project: 525 Northfield Avenue, West Orange, NJ**



Sample procurement using split spoon samplers and augurs



Sample recovery from split spoon samplers





CONSULTANTS, INC.  
4405 South Clinton Avenue  
South Plainfield, NJ 07080

**Client: Gomes Management**

**Project: 525 Northfield Avenue, West Orange, NJ**



Sample procurement using split spoon samplers and augurs



Sample recovery from split spoon samplers

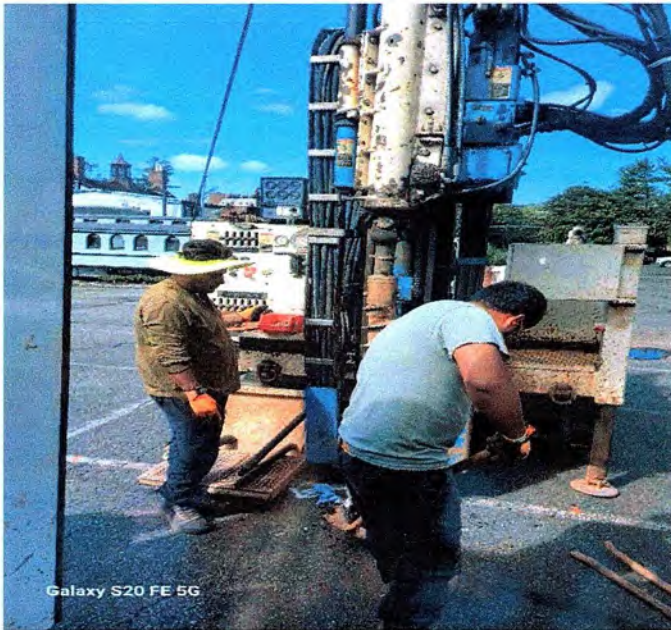




CONSULTANTS, INC.  
4405 South Clinton Avenue  
South Plainfield, NJ 07080

**Client: Gomes Management**

**Project: 525 Northfield Avenue, West Orange, NJ**



Sample procurement using split spoon samplers and augurs



Sample recovery from split spoon samplers





CONSULTANTS, INC.  
4405 South Clinton Avenue  
South Plainfield, NJ 07080

**Client: Gomes Management**

**Project: 525 Northfield Avenue, West Orange, NJ**



Sample procurement using split spoon samplers and augurs



Sample recovery from split spoon samplers



APPENDIX F

DRAINAGE AREA MAPS







**Jarmel Kizel**  
ARCHITECTS AND ENGINEERS INC.

42 OKNER PARKWAY  
LIVINGSTON, NEW JERSEY 07039  
TEL: 973-994-9669  
FAX: 973-994-4069

www.jarmelkizel.com

Architecture  
Engineering  
Interior Design  
Implementation Services

NJ State Board of Architects: Jarmel Kizel, No. 21400016100  
NJ State Board of Engineers & Land Surveyors: Jarmel Kizel, No. 24042953000

#### ISSUE

| NO. | DATE       | DESCRIPTION           | INT. |
|-----|------------|-----------------------|------|
| 1   | 01-28-2020 | PER TWP. REVIEW MEMOS | AF   |
| 2   | 03-30-2020 | PER. NEW BUILD DESIGN | AF   |

PROGRESS DRAWINGS  
NOT FOR CONSTRUCTION

#### REVISION

| NO. | DATE       | DESCRIPTION           | INT. |
|-----|------------|-----------------------|------|
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#### PRINCIPALS

MATTHEW B. JARMEL, AIA, MBA  
RICHARD A. JARMEL, PE  
IRWIN H. KIZEL, AIA, PP

#### ARCHITECTS & ENGINEERS

BEATRIZ BARBERIS, RA  
JEREMY D. BOYER, AIA  
ANDRZEJ B. BROZOWSKI, PE  
SHAMON CROCKFORD, PE  
THOMAS DAFONCECA, PE

ANDRZEJ E. DUBIE, PE  
ANTHONY FACCHINO, PE, PLS, PP  
GERARDO J. GESSANO, PE  
JOHANNAN KOTABA, AIA  
KAROLINA PODKONCZAK, AIA  
RENATA MALUDKOWSKA, E. REZKOWSKA, AIA, LEED AP  
CHERYL SCHWENGER, AIA  
STEVEN J. VAZ, PE  
AHMED YOUSSEF, AIA

Project:  
525 NORTHFIELD AVENUE  
PRELIMINARY / FINAL SITE PLAN  
TOWNSHIP OF WEST ORANGE  
ESSEX COUNTY, NEW JERSEY  
TAX MAP #94, BLOCK 159.04 LOT 1.01

Scale:

GOMESGR24-223

Drawn By: # Approved By: AF

Drawing Name:

EXISTING  
DRAINAGE AREA  
MAP

Drawing Number:

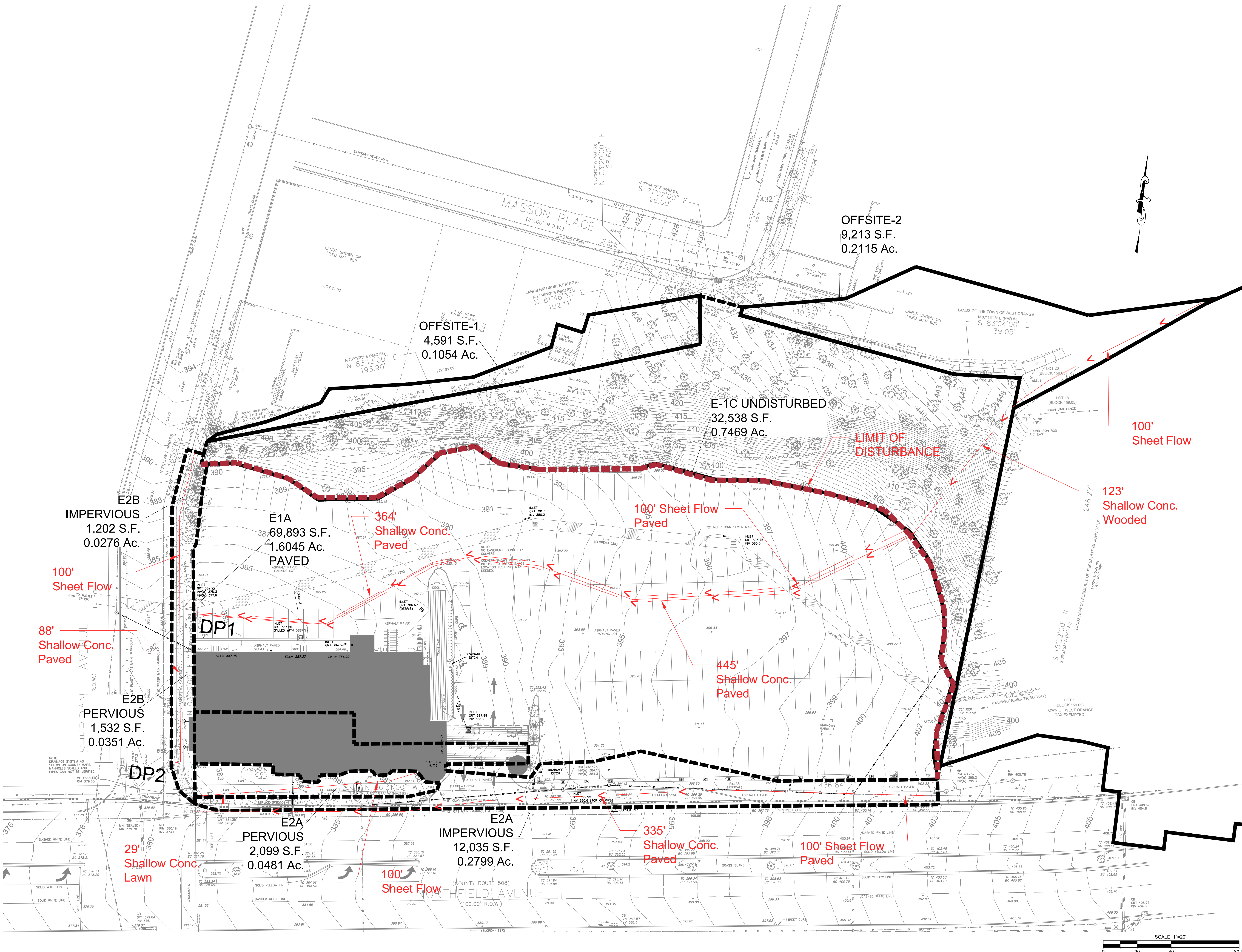
DA-1

1 OF 3

Initial Date: OCTOBER 22, 2020

#### ENGINEER OF RECORD

*Anthony Facchino*  
ANTHONY FACCHINO, PE, PLS  
No. 24042953000



S:\PROJECTS\GOMESGR24-223 - 525 NORTHFIELD AVE. WEST ORANGE\NDESIGN DATA\SWM\24-223-EXISTING DRAINAGE.TG.DWG ANTHONY FACCHINO PLOTTED: 3/30/2020 2:59 PM





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FAX: 973-994-4069

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SHAMON CROWDER, PE  
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GERARD P. GERSHARD, PE  
JONATHAN KUTYDA, AIA  
KAROLINA PODKONCZAK, AIA  
RENATA MAJLUNDOWA, E. REZINE, AIA, LEED AP  
CHERYL SCHWEIGER, AIA  
STEVEN J. VAZ, PE  
ARMED YOUSSEF, AIA

Project:  
525 NORTHFIELD AVENUE  
PRELIMINARY / FINAL SITE PLAN  
TOWNSHIP OF WEST ORANGE  
ESSEX COUNTY, NEW JERSEY  
TAX MAP #94, BLOCK 159.04 LOT 1.01

Scale: 1" = 20'

Project Number: GOMESGR24-223

Drawn By: AF

Approved By: AF

Drawing Name: PROPOSED DRAINAGE AREA MAP

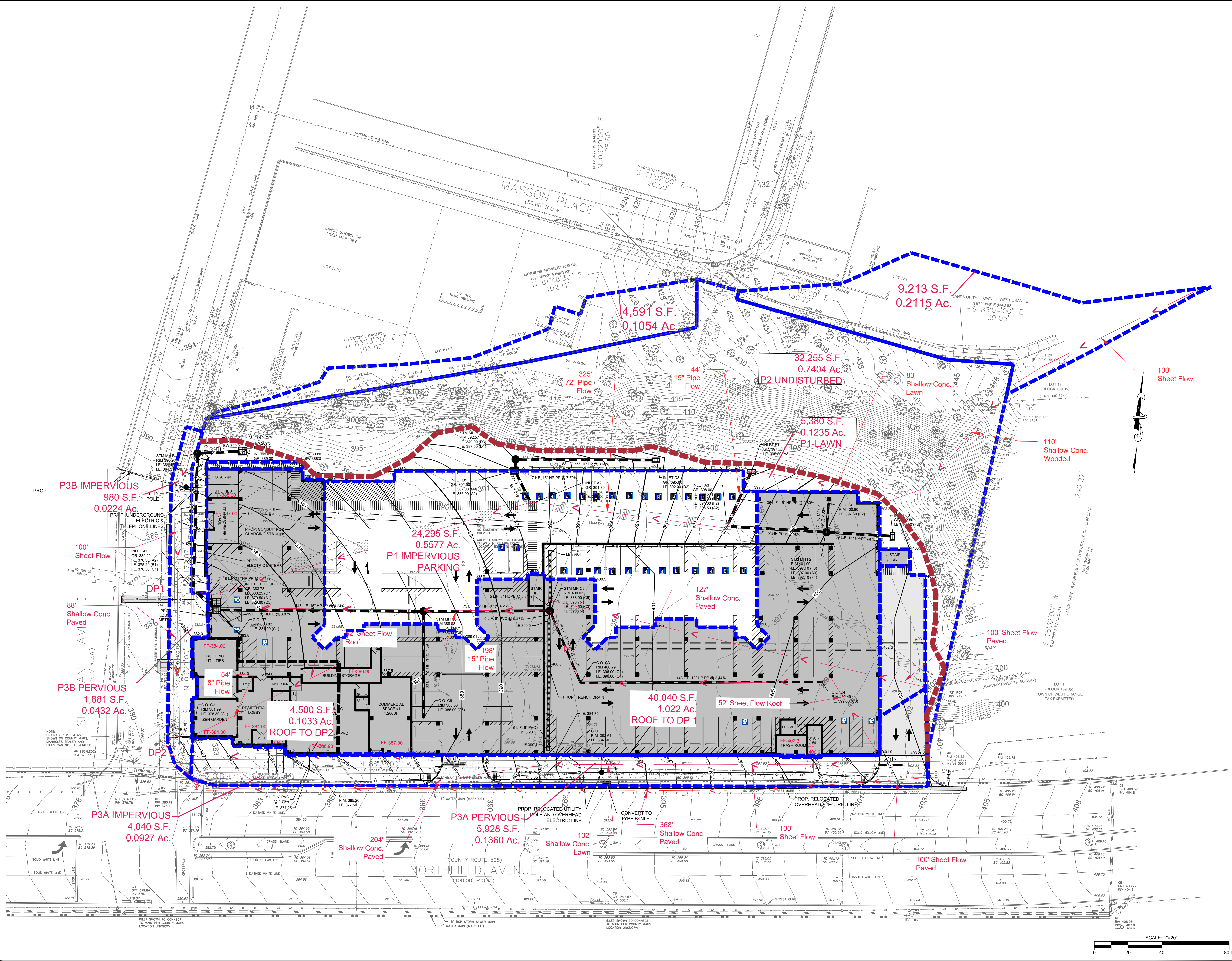
Drawing Number: DA-2

2 OF 3

Initial Date: OCTOBER 22, 2025

#### ENGINEER OF RECORD

ANTHONY FACCHINO, PE, PLS  
NYC 240692500



SCALE: 1"=20'  
0 20 40 80 ft.





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| 1   | 01-28-2020 | PER TWP. REVIEW MEMOS | AF   |
| 2   | 03/30/2020 | PER. NEW BUILD DESIGN | AF   |

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PRELIMINARY / FINAL SITE PLAN  
TOWNSHIP OF WEST ORANGE  
ESSEX COUNTY, NEW JERSEY  
TAX MAP #94, BLOCK 159.04 LOT 1.01

Scale: 1" = 20'

Project Number: GOMESGR24-223

Drawn By: AF

Approved By: AF

Drawing Name:

PROPOSED INLET  
DRAINAGE AREA  
MAP

Drawing Number:

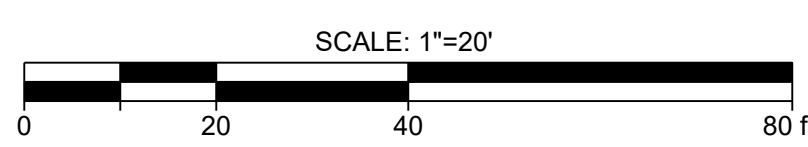
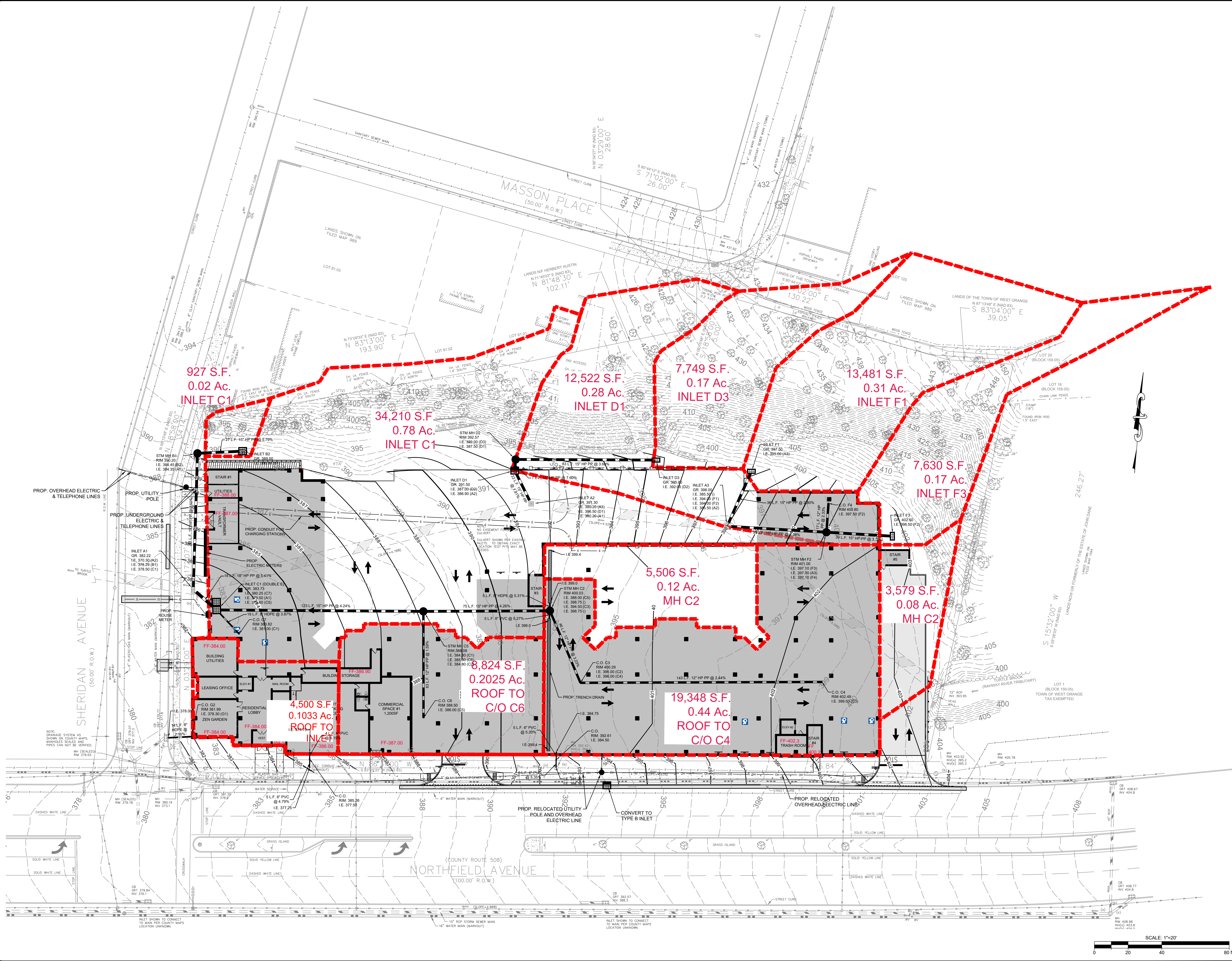
DA-3

3 OF 3

Initial Date: OCTOBER 22, 2020

#### ENGINEER OF RECORD

ANTHONY FACCHINO, PE, PLS  
NY State Board of Architects Authorization No. 21400016100  
NJ State Board of Engineers & Land Surveyors Authorization No. 24042953000



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