

**STORM WATER DRAINAGE
CALCULATIONS**

for

**PROPOSED
RESIDENTIAL DEVELOPMENT
64 NORMA AVENUE
FRANKLIN TOWNSHIP
SOMERSET COUNTY, NEW JERSEY**

September 2021
Revised November 18, 2021
February 17, 2022
December 29, 2022

FRANK H. LEHR ASSOCIATES
Consulting Civil Engineers
101 South Harrison Street
East Orange, New Jersey 07018-1799
Tel: 973/673-2520 Fax: 973/673-6623

Richard J. Adelson
Professional Engineer
NJ License GE035233

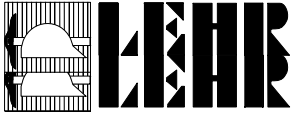
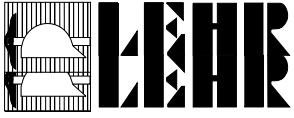


TABLE OF CONTENTS

| | |
|--|-----|
| Drainage Report | |
| Description of Site | 5 |
| Summary of Results | 7 |
| | |
| Soil Classification | 13 |
| | |
| Water Quantity Calculations | 33 |
| Existing Calculations | |
| Proposed Calculations | |
| Water Quality | 153 |
| | |
| Nonstructural Strategies Points System | 157 |



Description of Site

The Subject property has an area of 73,875 square feet, containing undeveloped land consisting primarily of trees and vegetation.

Grades at the site slope primarily from south to north with approximately 20 feet of grade change across the site.

Description of Proposed Improvements

The proposed construction consists of a high-rise development with 12 residential homes with parking garages. The site would provide an access road to the development along with common parking along the road.

Retaining walls are provided for grade transitions.

Purpose

The objective of the Stormwater Drainage Calculations is to provide supporting computations for the planned development in compliance with New Jersey's Stormwater Management Regulations—NJAC 7:8 and the Franklin Township Land Use Ordinance (Chapters 330: Stormwater Management.)

Drainage - Existing

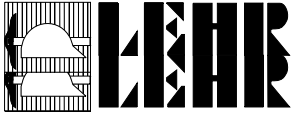
Existing on-site run off generally runs off by sheet flow to the North. The entire site is comprised of trees and vegetation. The soil is classified as Kkoc(Klinesville channery loam). The Hydrologic soil group is group D.

Drainage - Proposed

The post-development proposes to reduce and improve the existing runoff characteristics.

Proposed development consists of 12 residential homes with parking garages and an access road. A porous pavement system is proposed to capture runoff from a portion of the site. The system is equipped with an outlet structure to attenuate discharge to the stormwater main along Franklin Boulevard. The porous pavement provides approximately 11,000 cf in storage volume. The pavement will capture 100% of roof and 100% of pavement runoff on site, in addition to sidewalk and landscaped areas. An underdrain has been provided to slowly drain the basin into a downstream catch basin. The catch basin has a proposed orifice plate that has been designed to attenuate flow rates for multiple design storm events.

Inlets have been placed on the site as a precaution to capture runoff in the event the porous pavement becomes clogged. The inlets have subbase drains that will allow runoff to enter the stone reservoir when captured. The inlets do not connect to downstream basins as their intent is simply to distribute runoff into the basin. In the event of overflow, stormwater will run



to the downstream inlet/outlet structure located at the low point of the site and will go out through downstream piping.

Time of Concentration

The topology of the site was analyzed, and a critical flow path was determined. Time of concentration is calculated within Hydrocad for the critical path shown on the Drainage maps.

Methodology

The pre-developed and the post-developed runoff analysis were determined using the Soil Conservation Service Method, utilizing HydroCAD version 10.00-20 stormwater design software and utilizes a Type C storm distributions with NOAA rainfall amounts for 64 Norma Avenue. Runoff computations and modeling are based on the site specific 2-, 10-, & 100-year design storm events.

Water Quality

Water quality standards are triggered when a project proposes $\frac{1}{4}$ acre of new impervious surface.

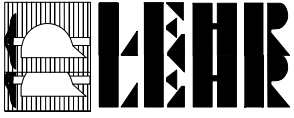
This project utilizes Porous Pavement to achieve water quality standards. The porous pavement collects stormwater runoff from the sidewalk, driveways, pavement, and a portion of landscaped area. The porous pavement is designed to achieve the 80% TSS requirement for water quality measures. This accounts for entirety of the motor vehicle surfaces.

Groundwater Recharge

This site is located in a Metropolitan Planning Area 1 and is exempt from groundwater recharge. Borings also show that the site does not have sufficient permeability for infiltration to be considered.

Results

The following table displays a summarized comparison between the existing condition and proposed condition. As shown, the proposed runoff flow connecting to the municipal system has been beneficially reduced. In addition, the proposed drainage system does not adversely affect the existing drainage system.



NOTE: Flow rates computed by SCS Method

| Event | Existing | Factor | Factored Exist | Proposed Outlet Structure (cfs) | |
|-------|----------|--------|----------------|---------------------------------|----|
| 1 | 1.74 | - | 1.74 | 0.80 | OK |
| 2 | 2.50 | 50% | 1.25 | 1.12 | OK |
| 10 | 4.98 | 75% | 3.74 | 2.17 | OK |
| 100 | 10.09 | 80% | 8.07 | 6.34 | OK |

Summary Table for Porous Pavement

Inflow area

The inflow area to the porous pavement is 43,744 sf. The asphalt area is approximately 11,000sf. According to the NJ BMP Manual, “*The maximum additional inflow contributory area to surface area of the pervious paving system is 3:1.*” Therefore, in addition to the 11,000 sf of porous pavement another $3 \times 11,000 \text{sf} = 33,000 \text{sf}$ of area is allowed to contribute inflow. This allows for 44,000 sf of allowable area (including the pavement itself). Therefore the 43,744 sf of inflow area is in line with BMP standards.

Water Quality Volume

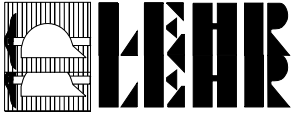
The volume of the water quality storm in the porous pavement is 2,570 cf. The porous pavement is designed to contain the entire water quality storm prior to reaching the outlet control orifice. The elevation of the Water quality story in the stone reservoir is 100.08.

Design infiltration rate

The porous pavement is designed to have an underdrain and therefore does not use infiltration. Note that the drain time for porous pavement is less than 72 hours.

Seasonal High water

The Geotechnical investigation is included in this stormwater report. In the area of porous pavement, no water was observed. In areas beyond the porous pavement, season high water was estimated to be at approximately elevation 88.5. The bottom of the porous pavement is designed to be at elevation 99.5. The NJBMP requires 1 foot of separation between the seasonal high-



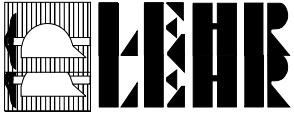
water table or bedrock when using an underdrain. The detail has been modified to ensure a 1-foot separation to be maintained from the shale layer.

Soil Testing Requirements

The porous pavement is designed to have an underdrain. Therefore, determining where the season high water table and bedrock is required. For 11,000sf of porous pavement which relies on infiltration, 3 Test pits are required. Although this project does not rely on infiltration, 4 Test pits were done in the area of pavement. According to the NJBMP, during the months of January to April, the SHWT can be measured directly through test pits. The test pits were done during the month of April and the Seasonal High Water Table measured directly.

Downstream Pipe Capacity

The 100 year storm from the site into the downstream existing inlet and 2.4' dia concrete pipe(see survey) is 6.34 cfs. The capacity of the pipe at the existing 3.83% is approximately 83 cfs.



Design Criteria

Runoff Calculations (Rational Method)

Design Storm Event = 2, 10, 25 100-Year Frequency

Runoff Coefficients:

- Lawns & Green Areas.....0.30
- Pavement.....0.90
- Roof.....0.90

*Runoff Flow: $Q = c*i*A$*

Where c = weighted Runoff Coefficient ratio, no units
 i = intensity, inches per hour
 A = Area in Acres
 Q is given in cubic feet per second

Runoff Calculations (SCS)

24 Hour Precipitation Values for 64 Norma Avenue:

2-year event: 3.32 inches

10-year event: 5.06 inches

100-year event: 8.48 inches

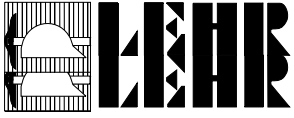
Stormwater Quality Design Storm: 1.25 inches

Curve Number Coefficients for HSG “D” Soils:

- Meadow/Forest.....78
- Landscaped (Heavily Treed).....78
- Open Space 80
- Pavement.....98
- Roof.....98

Manning’s “n” values:

- Reinforced Concrete Pipe [RCP].....0.013
- Polyvinyl Chloride Pipe [PVC]0.011
- High Density Polyethylene Pipe [HDPEP].....0.011

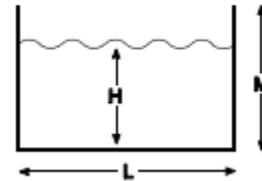


Sharp-Crested Rectangular Weir

The basic equation for a sharp-crested weir is derived in Open Channel Hydraulics p.362.

$$Q = C L_e H^{3/2} \text{ where } C = \frac{2}{3} \sqrt{2g} C_d \quad \text{Eq. 56}$$

C=Weir coefficient
L_e=Effective crest length
H=Head (above crest or invert elevation)
g=Gravitational constant
C_d=Discharge Coefficient

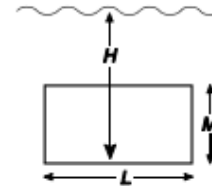


Rectangular Orifice in a Vertical Plane

For a rectangular opening in a vertical plane, the discharge under any head is derived from the discharge through a thin horizontal strip. (See Handbook of Hydraulics p.4-3.)

$$dQ = C_d L \sqrt{2gY} dY \quad \text{Eq. 68}$$

C_d=Discharge coefficient (Default is .60)
L=Strip length (width of orifice)
g=Gravitational constant
Y=Head over center of strip
dY=Height of horizontal strip



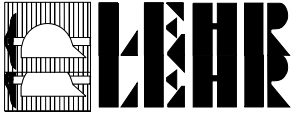
Integrating over the height of the orifice yields:

$$Q = \frac{2}{3} C_d L \sqrt{2g} (H^{3/2} - [H-M]^{3/2}) \quad \text{Eq. 69}$$

H=Head above invert elevation
M=Height of orifice

When the orifice is partially submerged (H<M) the term [H-M] becomes zero and this reduces to the rectangular weir equation:

$$Q = \frac{2}{3} C_d L \sqrt{2g} H^{3/2} = C L H^{3/2} \text{ (English units)} \quad \text{Eq. 70}$$

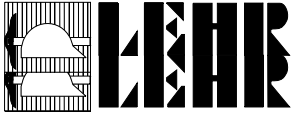


64 Norma Avenue
Franklin, NJ
Stormwater Drainage Calculations

Project # 9270
December 2022
By: RJA

References:

Design & Construction of Sanitary and Storm Sewers. ASCE Manual on Engineering Practice No. 37. American Society of Civil Engineers. New York. 1969.
New Jersey Stormwater Best Management Practices Manual
New Jersey Department of Environmental Protection, 2004.
Urban Hydrology for Small Wetlands, Technical Release 55
United States Department of Agriculture Soil Conservation Service, 1986.
Hydrocad Storm Water Modeling System, Owner's Manual, Version 10, 2011



64 Norma Avenue
Franklin, NJ
Stormwater Drainage Calculations

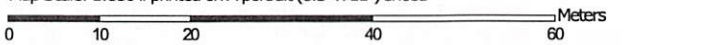
Project # 9270
December 2022
By: RJA

Soil Classification

Soil Map—Somerset County, New Jersey



Map Scale: 1:830 if printed on A portrait (8.5" x 11") sheet.




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

Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|------------------------------------|---|--------------|----------------|
| KkoC | Klinesville channery loam, 6 to 12 percent slopes | 1.8 | 100.0% |
| Totals for Area of Interest | | 1.8 | 100.0% |

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 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Somerset County, New Jersey
 Survey Area Data: Version 18, Jun 1, 2020

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

Date(s) aerial images were photographed: Jun 22, 2019—Jul 13, 2019

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.

Somerset County, New Jersey

KkoC—Klinesville channery loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 1jtb9
Elevation: 250 to 1,500 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: Farmland of local importance

Map Unit Composition

Klinesville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klinesville

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from shale

Typical profile

Ap - 0 to 9 inches: channery loam
C - 9 to 11 inches: very channery loam
R - 11 to 80 inches: weathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High
(2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Penn, eroded

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Berks, eroded

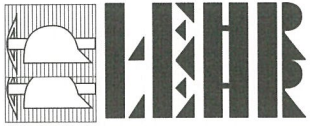
Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Bucks, eroded

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Somerset County, New Jersey
Survey Area Data: Version 18, Jun 1, 2020



FRANK H. LEHR ASSOCIATES
A NJ Corporation – Certificate of Authorization No. 24GA27950400
CONSULTING CIVIL ENGINEERS

May 23, 2022

64 Casa Esencia, LLC
570 Broad Street, Suite 1206
Newark, NJ 07102

ATT: Amira Hasan

RE: Our Project No. 9270
Report of Test Pits
Villas at Norma Park
Franklin Township, New Jersey

Ladies and Gentlemen:

In accordance with your request, we inspected the excavation of 6 test pits at the above-referenced site. The work was conducted on April 26, 2022. The test pits were located within the area of the proposed BMP facilities, namely the porous pavement in the upper, central portion of the site and the Bioretention Basin in the lower, northeast corner of the site. Test pits TP-1 to TP-4 were located in the pavement area, while test pits TP-5 and TP-6 were located in the bioretention area.

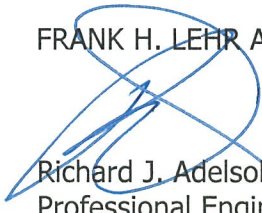
The test pits encountered fractured shale bedrock at shallow depths, typically 1 to 3 feet, becoming more massive and difficult to penetrate with the provided Komatsu PC55MR excavator. Practical refusal occurred at depths of 3.5 to 8 feet. The overburden soils generally consisted of thin layers of topsoil, fill or residual shale derived soils.

Groundwater was not encountered within the excavated depths of test pits TP-1 to TP-4; thus the estimated seasonal high groundwater level at these locations is deeper than 3.5 to 8 feet or below elevations +94 to +101.5 feet. At test pits TP-5 and TP-6, groundwater was encountered at depths of approximately 2.5 feet corresponding to estimated seasonal high groundwater levels of +88 to +88.5 feet. Pit bailing tests and/or basin flooding tests will be required to verify permeability.

Copies of the test pit logs and a location sketch are attached. If you have any questions, please do not hesitate to contact us.

Very truly yours,

FRANK H. LEHR ASSOCIATES


Richard J. Adelsohn
Professional Engineer
NJ License No. GE 035233

M. SULLIVAN/maf



TEST PIT LOGS

Surface elevations at the test pit locations are based on topographic data provided by others

Test pit logs make no representation or warranties either as to the presence or absence of obstructions other than those actually penetrated by the test pits or as to their nature and extent. Subsurface conditions other than those actually penetrated by the test pits, soil or rock, may vary with regard to elevations, composition, texture, structure, soundness, and other characteristics from the descriptions given in the logs and/or report.

TEST PIT LOG

PROJECT: Villas at Norma Park
LOCATION: Franklin Township, NJ
INSPECTOR: MJS
WATER DEPTH: No Water Observed

TEST PIT NO.: TP-1
DATE PERFORMED: 04/26/22
OUR PROJECT NO.: 9270
GROUND ELEV. ±105.5 Feet

ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH: Below 4.0' (approximate Elevation +101.5 feet)

| DEPTH | SAMPLE DESCRIPTION | REMARKS |
|-------|---|---------------------------|
| 1 | 12" Topsoil w/roots | |
| 2 | Reddish Brown (5YR 4/4) fractured Shale w/seams Silt Loam | 2" – 6" Pieces |
| 3 | | |
| 4 | Reddish Brown (5YR 4/4) fractured Shale | 4" – 8" Pieces Broken Off |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

BOTTOM OF TEST PIT @ 4' 0"
(Refusal)

TEST PIT LOG

PROJECT: Villas at Norma Park
LOCATION: Franklin Township, NJ
INSPECTOR: MJS
WATER DEPTH: No Water Observed

TEST PIT NO.: TP-2
DATE PERFORMED: 04/26/22
OUR PROJECT NO.: 9270
GROUND ELEV. ±105.5 Feet

ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH: Below 4.0' (approximate Elevation +101.5 feet)

| DEPTH | SAMPLE DESCRIPTION | REMARKS |
|-------|---|---------------------------|
| | FILL: 2" Topsoil over 4" Crushed Stone | Loose |
| 1 | FILL: Strong Brown (7.5YR 4/6) Loamy Sand | Loose |
| | 6" Topsoil | Loose |
| 2 | Reddish Brown (5YR 4/4) Silt Loam w/Shale fragments | Stiff |
| | Reddish Brown (5YR 4/4) fractured Shale w/seams Silt Loam | 2" – 4" Pieces |
| 3 | | |
| | Reddish Brown (5YR 4/4) Shale | 4" – 8" Pieces Broken Off |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

BOTTOM OF TEST PIT @ 4' 0"
(Refusal)

TEST PIT LOG

PROJECT: Villas at Norma Park
LOCATION: Franklin Township, NJ
INSPECTOR: MJS
WATER DEPTH: No Water Observed

TEST PIT NO.: TP-3
DATE PERFORMED: 04/26/22
OUR PROJECT NO.: 9270
GROUND ELEV. ±103.6 Feet

ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH: Below 3' 6" (approximate Elevation +100.1 feet)

| DEPTH | SAMPLE DESCRIPTION | REMARKS |
|-------|---|---------------------------|
| 1 | 12" Topsoil w/roots | |
| 2 | Reddish Brown (5YR 4/4) fractured Shale w/seams Silt Loam | 2" – 6" Pieces |
| 3 | Reddish Brown (5YR 4/4) Shale | 4" – 8" Pieces Broken Off |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

BOTTOM OF TEST PIT @ 3' 6"
(Refusal)

TEST PIT LOG

PROJECT: Villas at Norma Park
LOCATION: Franklin Township, NJ
INSPECTOR: MJS
WATER DEPTH: No Water Observed

TEST PIT NO.: TP-4
DATE PERFORMED: 04/26/22
OUR PROJECT NO.: 9270
GROUND ELEV. ±102 Feet

ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH: Below 8.0' (approximate Elevation +94 feet)

| DEPTH | SAMPLE DESCRIPTION | REMARKS |
|-------|--|---------------------------|
| | FILL: Topsoil & Crushed Stone | |
| 1 | Strong Brown (7.5YR 4/6) Loamy Sand w/frequent cobble sized Shale fragments | Loose |
| 2 | Dark Reddish Brown (5YR 3/3) Loamy Sand w/occasional roots | Medium Compact |
| 3 | | |
| 4 | Reddish Brown (5YR 4/4) fractured Shale w/seams Silt Loam NOTE: Occasional roots @ 3' | 2" – 12" Pieces |
| 5 | | |
| 6 | Reddish Brown (5YR 4/4) Shale | 4" – 8" Pieces Broken Off |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

BOTTOM OF TEST PIT @ 8' 0"
(Refusal)

TEST PIT LOG

| | | | |
|---------------------|--|-------------------------|------------|
| PROJECT: | Villas at Norma Park | TEST PIT NO.: | TP-5 |
| LOCATION: | Franklin Township, NJ | DATE PERFORMED: | 04/26/22 |
| INSPECTOR: | MJS | OUR PROJECT NO.: | 9270 |
| WATER DEPTH: | Very Slight Seepage @ 2' 6"; Accumulation of Water @ 3' 6" | GROUND ELEV. | ±90.5 Feet |

ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH: @ 2' 6" (approximate Elevation +88 feet)

| DEPTH | SAMPLE DESCRIPTION | REMARKS |
|-------|--|---------------------------|
| | 12" Topsoil & roots | |
| 1 | | |
| | Strong Brown (7.5YR 5/8) Silty Clay Loam w/Shale fragments | Loose |
| 2 | | |
| | Reddish Brown (5YR 4/4) & Reddish Gray (5YR 5/2) fractured Shale w/seams Silt Loam | 2" – 6" Pieces |
| 3 | | |
| | Reddish Brown (5YR 4/4) Shale | 6" – 8" Pieces Broken Off |
| 4 | | |
| | | |
| 5 | | |
| | | |
| 6 | | |
| | | |
| 7 | | |
| | | |
| 8 | | |
| | | |
| 9 | | |
| | | |
| 10 | | |

BOTTOM OF TEST PIT @ 4' 0"
(Refusal)

TEST PIT LOG

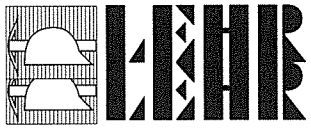
PROJECT: Villas at Norma Park
LOCATION: Franklin Township, NJ
INSPECTOR: MJS
WATER DEPTH: Very Slight Seepage @ 2' 6"

TEST PIT NO.: TP-6
DATE PERFORMED: 04/26/22
OUR PROJECT NO.: 9270
GROUND ELEV. ±91 Feet

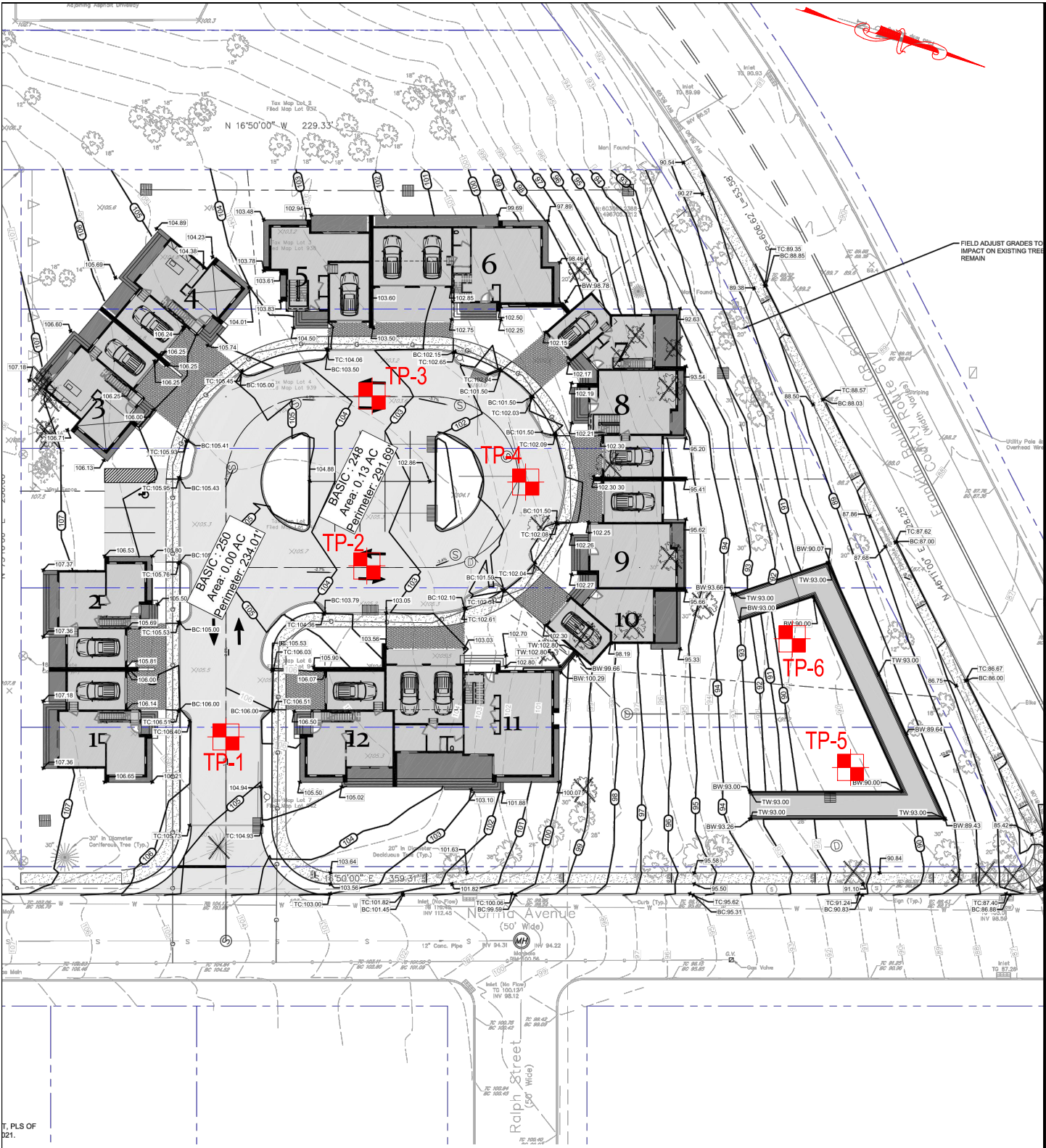
ESTIMATED SEASONAL HIGH GROUNDWATER DEPTH: @ 2' 6" (approximate Elevation +88.5 feet)

| DEPTH | SAMPLE DESCRIPTION | REMARKS |
|-------|---|-----------------|
| 1 | 16" Topsoil & frequent roots | |
| 2 | Strong Brown (7.5YR 4/6) Silty Clay Loam w/frequent roots | Soft |
| 3 | Reddish Brown (5YR 4/4) & Reddish Gray (5YR 5/2) Shale | 4" – 12" Pieces |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

BOTTOM OF TEST PIT @ 4' 0"
(Refusal)

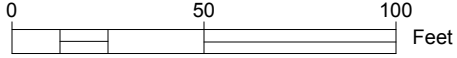


LOCATION PLAN



Test Pit Location Plan

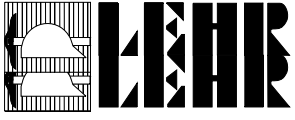
Scale: 1"=50'



FRANK H. LEHR ASSOCIATES
 CONSULTING CIVIL ENGINEERS
 101 South Harrison Street
 East Orange, New Jersey 07018

| | |
|-------------|--|
| Project: | Villas at Norma Park |
| Location: | 64 Norma Ave, Franklin Township, Somerset County, NJ |
| Subject: | Test Pit Location Plan |
| DRAWN BY: | noa |
| CHECKED BY: | mjs |
| DATE: | 05/24/22 |
| SCALE: | 1"=50' |

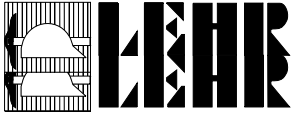
PROJECT NO.
9270



64 Norma Avenue
Franklin, NJ
Stormwater Drainage Calculations

Project # 9270
December 2022
By: RJA

Water Quantity Calculations

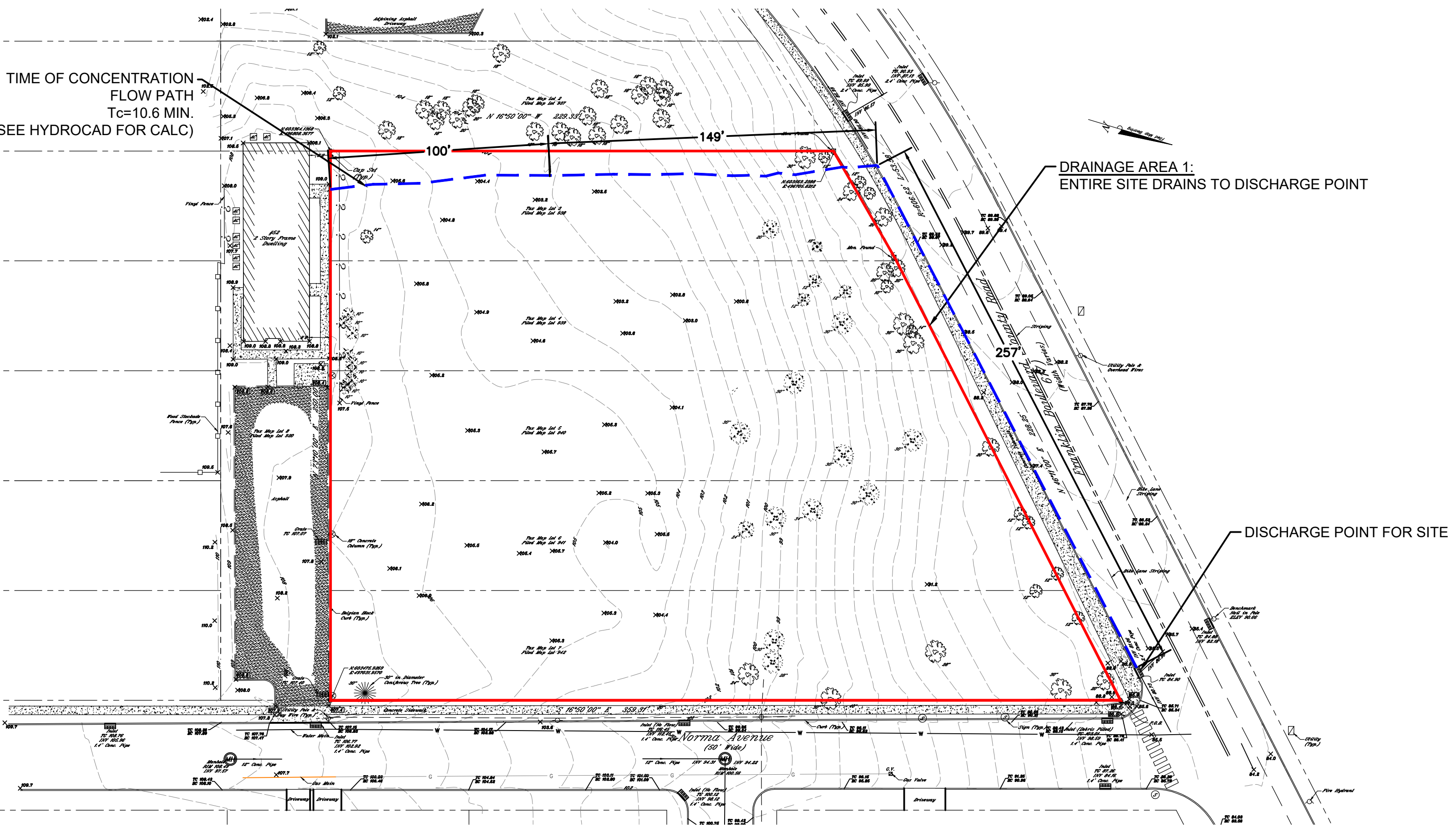


64 Norma Avenue
Franklin, NJ
Stormwater Drainage Calculations

Project # 9270
December 2022
By: RJA

EXISTING

TIME OF CONCENTRATION
FLOW PATH
T_c=10.6 MIN.
(SEE HYDROCAD FOR CALC)

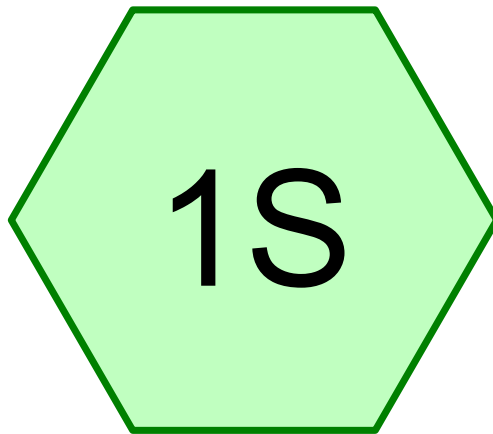


DRAINAGE AREA 1:
ENTIRE SITE DRAINS TO DISCHARGE POINT

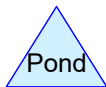
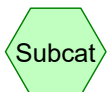
DISCHARGE POINT FOR SITE

EXISTING DRAINAGE AREAS
Scale: N.T.S.

NOTE: ENTIRE SITE IS COMPRISED OF TREES AND VEGETATION



Existing Lot



9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Printed 11/2/2022

Page 2

Project Notes

Defined 4 rainfall events from 64 Norma Street IDF

Defined 4 rainfall events from 64 Norma Street IDF

Defined 4 rainfall events from 64 norma IDF

9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Printed 11/2/2022

Page 3

Rainfall Events Listing

| Event# | Event Name | Storm Type | Curve | Mode | Duration (hours) | B/B | Depth (inches) | AMC |
|--------|------------|----------------|-------|---------|------------------|-----|----------------|-----|
| 1 | 1-yr | Type III 24-hr | | Default | 24.00 | 1 | 2.74 | 2 |
| 2 | 2-yr | Type III 24-hr | | Default | 24.00 | 1 | 3.32 | 2 |
| 3 | 10-yr | Type III 24-hr | | Default | 24.00 | 1 | 5.06 | 2 |
| 4 | 100-yr | Type III 24-hr | | Default | 24.00 | 1 | 8.48 | 2 |

9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Printed 11/2/2022

Page 4

Area Listing (all nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---------------------------------------|
| 73,875 | 80 | Forest/Meadow HSG D (1S) |
| 73,875 | 80 | TOTAL AREA |

9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Printed 11/2/2022

Page 5

Soil Listing (all nodes)

| Area (sq-ft) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|-------------------------|
| 0 | HSG A | |
| 0 | HSG B | |
| 0 | HSG C | |
| 73,875 | HSG D | 1S |
| 0 | Other | |
| 73,875 | | TOTAL AREA |

9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Printed 11/2/2022

Page 6

Ground Covers (all nodes)

| HSG-A (sq-ft) | HSG-B (sq-ft) | HSG-C (sq-ft) | HSG-D (sq-ft) | Other (sq-ft) | Total (sq-ft) | Ground Cover | Subcatchmen Numbers |
|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|------------------------|
| 0 | 0 | 0 | 73,875 | 0 | 73,875 | Forest/Meadow | 1 |
| 0 | 0 | 0 | 73,875 | 0 | 73,875 | TOTAL AREA | S |

9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 1-yr Rainfall=2.74"

Printed 11/2/2022

Page 7

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Lot

Runoff Area=73,875 sf 0.00% Impervious Runoff Depth=1.06"
Flow Length=557' Tc=10.6 min CN=80 Runoff=1.74 cfs 6,517 cf

Total Runoff Area = 73,875 sf Runoff Volume = 6,517 cf Average Runoff Depth = 1.06"
100.00% Pervious = 73,875 sf 0.00% Impervious = 0 sf

9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 1-yr Rainfall=2.74"

Printed 11/2/2022

Page 8

Summary for Subcatchment 1S: Existing Lot

Runoff = 1.74 cfs @ 12.16 hrs, Volume= 6,517 cf, Depth= 1.06"

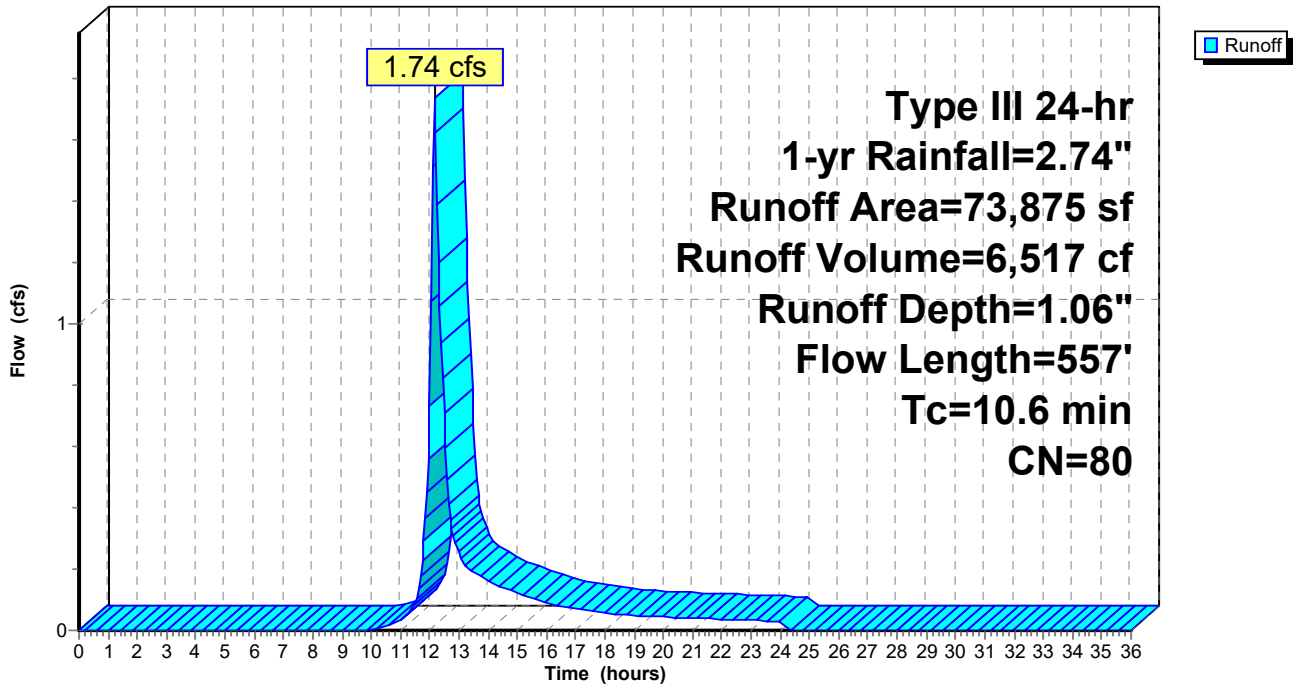
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.74"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 73,875 | 80 | Forest/Meadow HSG D |
| 73,875 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.0 | 100 | 0.0600 | 0.18 | | Sheet Flow, Grass: Dense n= 0.240 P2= 3.32" |
| 0.7 | 200 | 0.1000 | 5.09 | | Shallow Concentrated Flow, Unpaved Kv= 16.1 fps |
| 0.9 | 257 | 0.0500 | 4.54 | | Shallow Concentrated Flow, Cub Gutter Paved Kv= 20.3 fps |
| 10.6 | 557 | Total | | | |

Subcatchment 1S: Existing Lot

Hydrograph



9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 2-yr Rainfall=3.32"

Printed 11/2/2022

Page 9

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Lot

Runoff Area=73,875 sf 0.00% Impervious Runoff Depth=1.49"
Flow Length=557' Tc=10.6 min CN=80 Runoff=2.50 cfs 9,202 cf

Total Runoff Area = 73,875 sf Runoff Volume = 9,202 cf Average Runoff Depth = 1.49"
100.00% Pervious = 73,875 sf 0.00% Impervious = 0 sf

9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 2-yr Rainfall=3.32"

Printed 11/2/2022

Page 10

Summary for Subcatchment 1S: Existing Lot

Runoff = 2.50 cfs @ 12.16 hrs, Volume= 9,202 cf, Depth= 1.49"

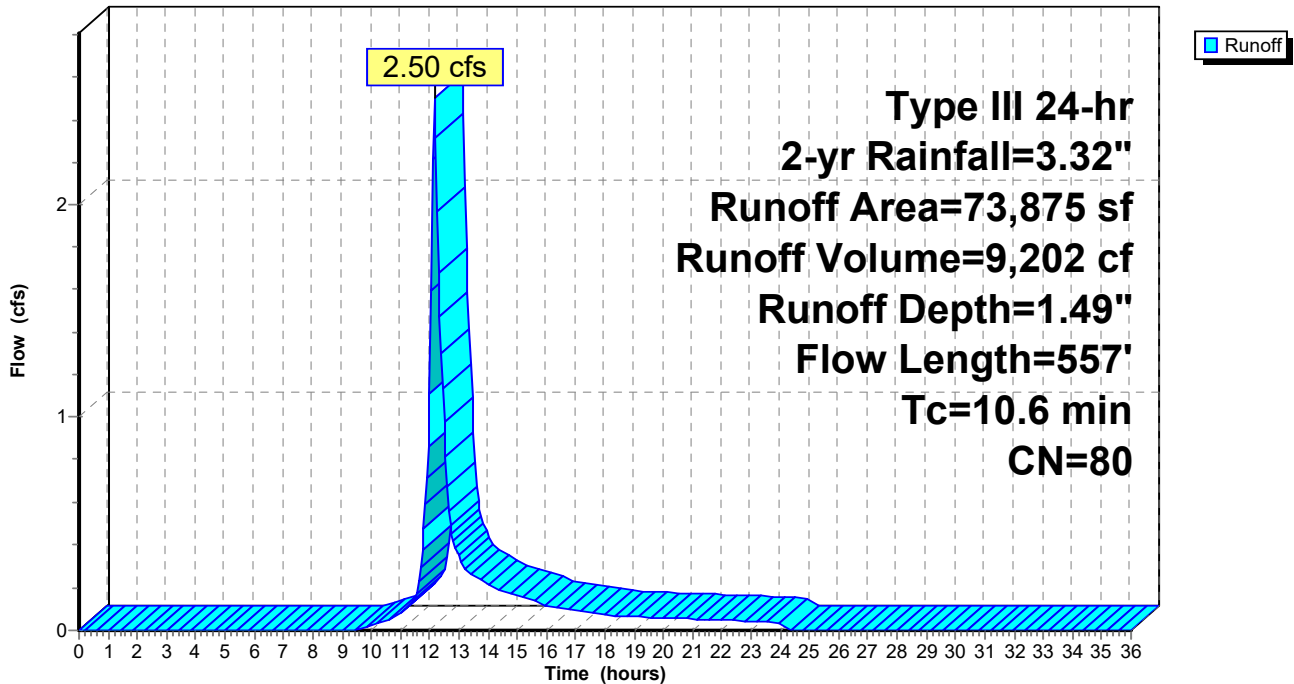
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.32"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 73,875 | 80 | Forest/Meadow HSG D |
| 73,875 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.0 | 100 | 0.0600 | 0.18 | | Sheet Flow, Grass: Dense n= 0.240 P2= 3.32" |
| 0.7 | 200 | 0.1000 | 5.09 | | Shallow Concentrated Flow, Unpaved Kv= 16.1 fps |
| 0.9 | 257 | 0.0500 | 4.54 | | Shallow Concentrated Flow, Cub Gutter Paved Kv= 20.3 fps |
| 10.6 | 557 | Total | | | |

Subcatchment 1S: Existing Lot

Hydrograph



9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 10-yr Rainfall=5.06"

Printed 11/2/2022

Page 11

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Lot

Runoff Area=73,875 sf 0.00% Impervious Runoff Depth=2.95"
Flow Length=557' Tc=10.6 min CN=80 Runoff=4.98 cfs 18,132 cf

Total Runoff Area = 73,875 sf Runoff Volume = 18,132 cf Average Runoff Depth = 2.95"
100.00% Pervious = 73,875 sf 0.00% Impervious = 0 sf

9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 10-yr Rainfall=5.06"

Printed 11/2/2022

Page 12

Summary for Subcatchment 1S: Existing Lot

Runoff = 4.98 cfs @ 12.15 hrs, Volume= 18,132 cf, Depth= 2.95"

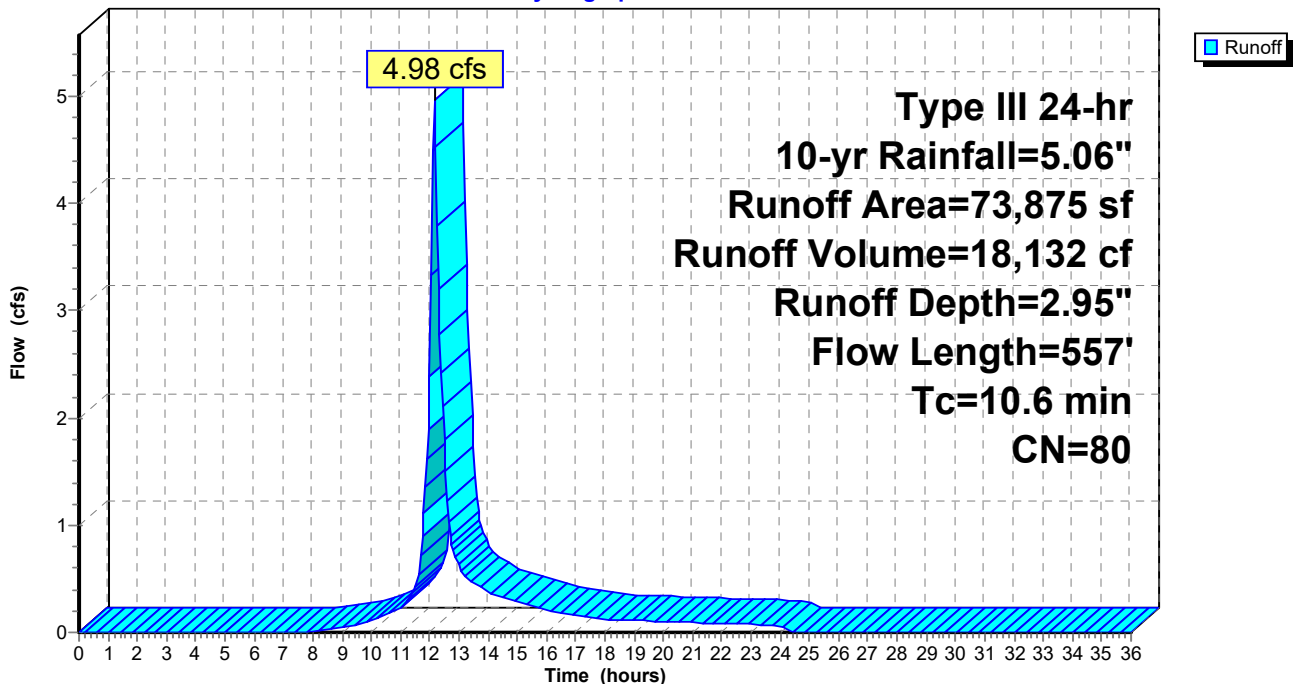
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=5.06"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 73,875 | 80 | Forest/Meadow HSG D |
| 73,875 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.0 | 100 | 0.0600 | 0.18 | | Sheet Flow, Grass: Dense n= 0.240 P2= 3.32" |
| 0.7 | 200 | 0.1000 | 5.09 | | Shallow Concentrated Flow, Unpaved Kv= 16.1 fps |
| 0.9 | 257 | 0.0500 | 4.54 | | Shallow Concentrated Flow, Cub Gutter Paved Kv= 20.3 fps |
| 10.6 | 557 | Total | | | |

Subcatchment 1S: Existing Lot

Hydrograph



9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 100-yr Rainfall=8.48"

Printed 11/2/2022

Page 13

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Lot

Runoff Area=73,875 sf 0.00% Impervious Runoff Depth=6.08"
Flow Length=557' Tc=10.6 min CN=80 Runoff=10.09 cfs 37,408 cf

Total Runoff Area = 73,875 sf Runoff Volume = 37,408 cf Average Runoff Depth = 6.08"
100.00% Pervious = 73,875 sf 0.00% Impervious = 0 sf

9270 Existing

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 100-yr Rainfall=8.48"

Printed 11/2/2022

Page 14

Summary for Subcatchment 1S: Existing Lot

Runoff = 10.09 cfs @ 12.15 hrs, Volume= 37,408 cf, Depth= 6.08"

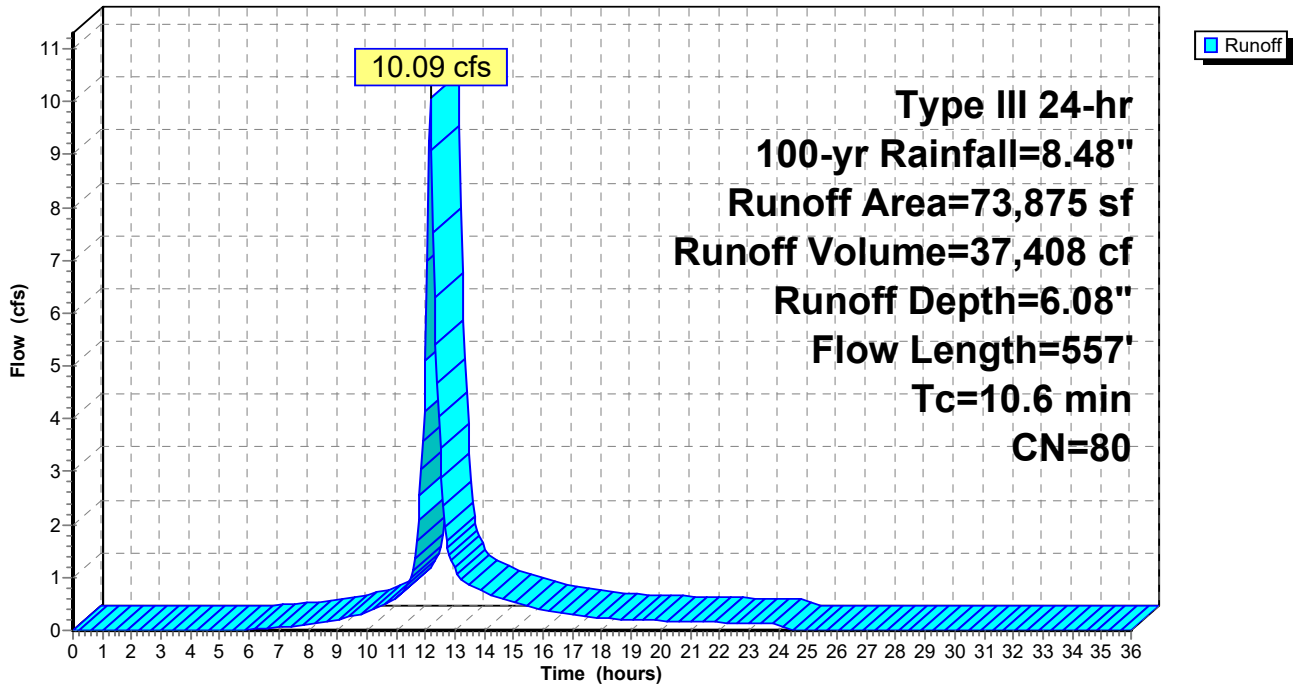
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.48"

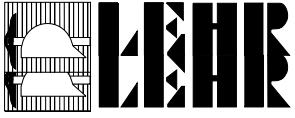
| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 73,875 | 80 | Forest/Meadow HSG D |
| 73,875 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.0 | 100 | 0.0600 | 0.18 | | Sheet Flow, Grass: Dense n= 0.240 P2= 3.32" |
| 0.7 | 200 | 0.1000 | 5.09 | | Shallow Concentrated Flow, Unpaved Kv= 16.1 fps |
| 0.9 | 257 | 0.0500 | 4.54 | | Shallow Concentrated Flow, Cub Gutter Paved Kv= 20.3 fps |
| 10.6 | 557 | Total | | | |

Subcatchment 1S: Existing Lot

Hydrograph

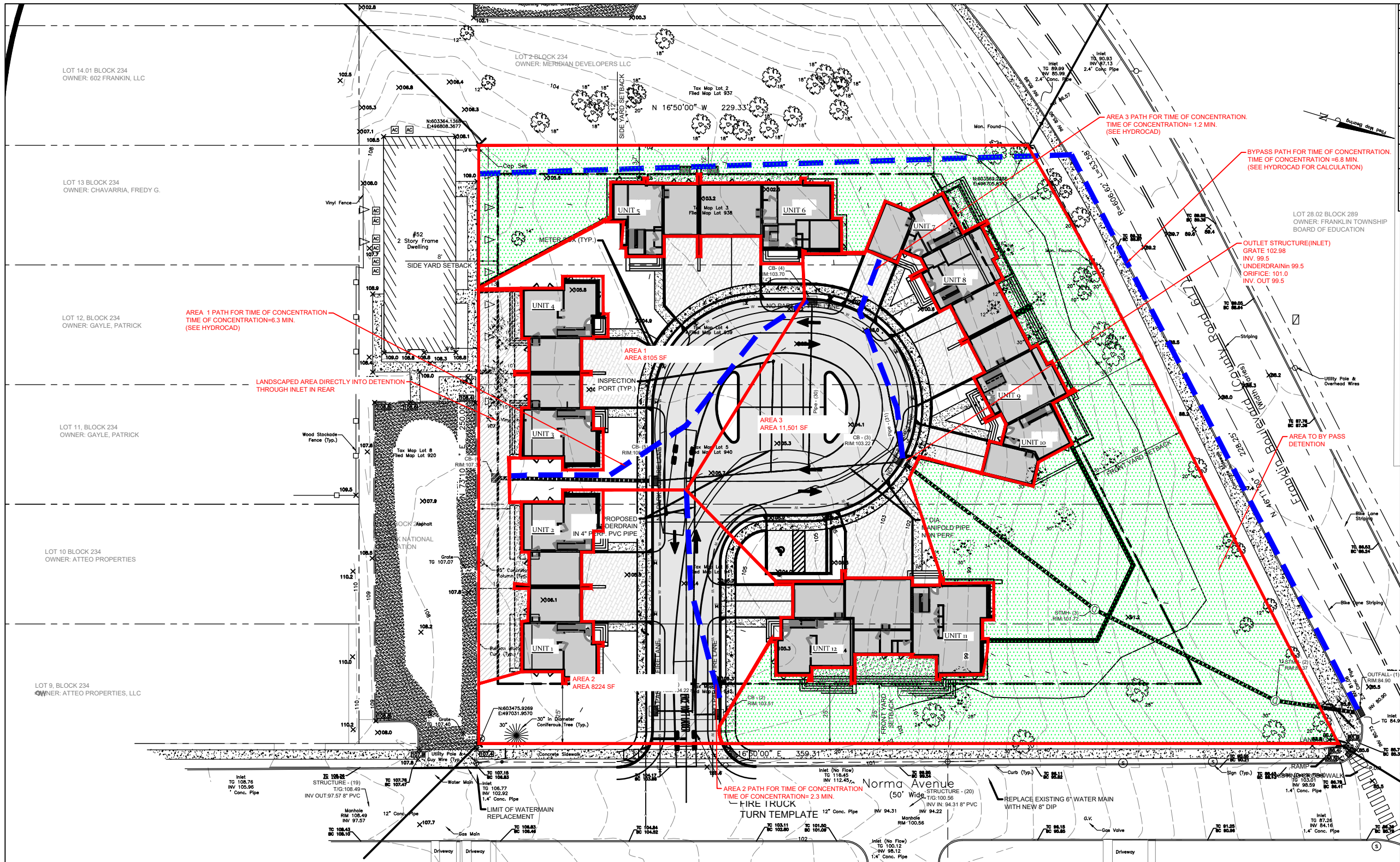




64 Norma Avenue
Franklin, NJ
Stormwater Drainage Calculations

Project # 9270
December 2022
By: RJA

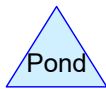
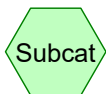
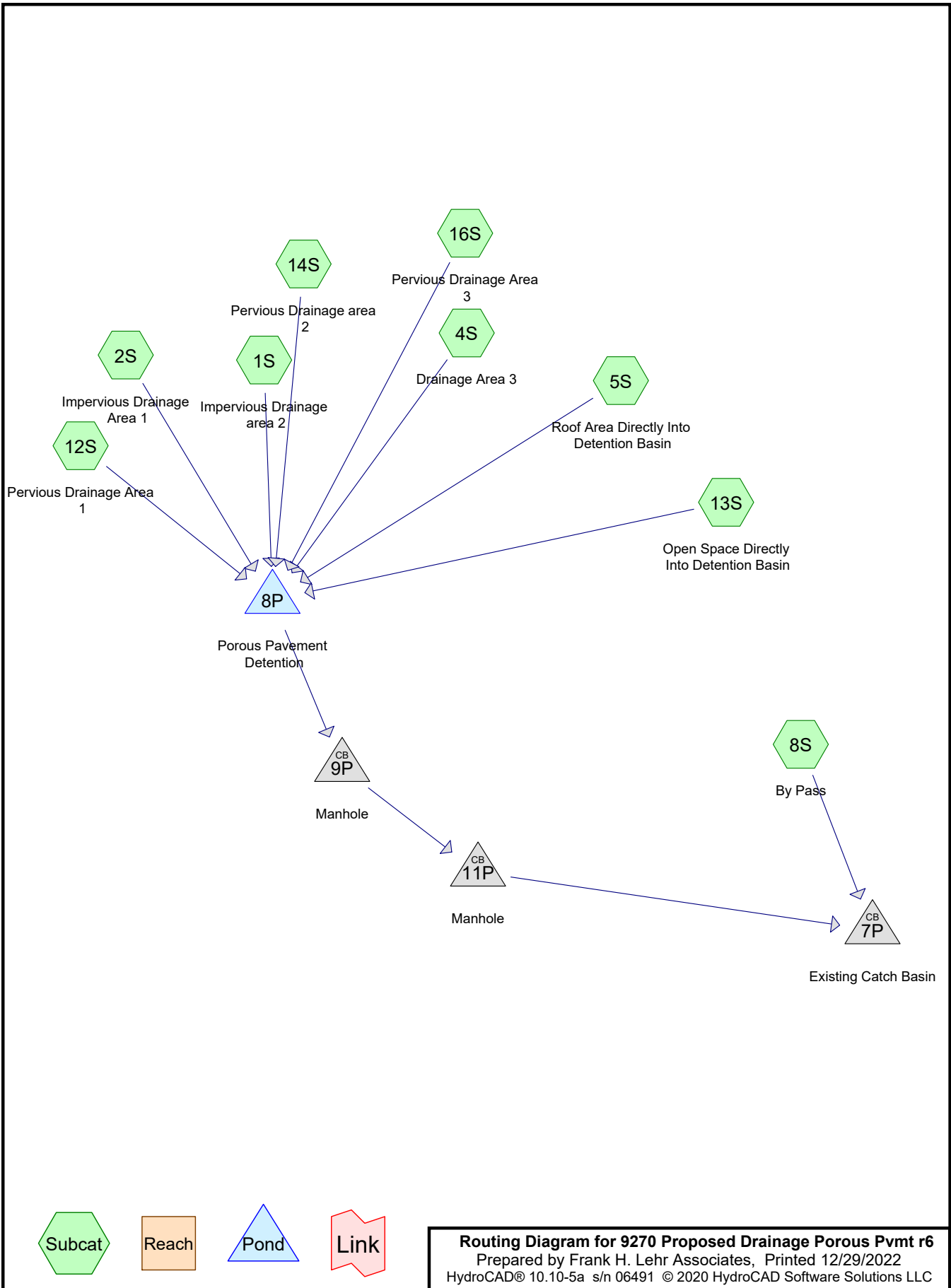
PROPOSED



PROPOSED DRAINAGE AREAS

Scale: 1"=20'

NOTE:
- PARTIAL LANDSCAPED AREAS BYPASS COLLECTION
AND COLLECT AT EXISTING INLET.



Routing Diagram for 9270 Proposed Drainage Porous Pvmt r6
 Prepared by Frank H. Lehr Associates, Printed 12/29/2022
 HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Printed 12/29/2022

Page 2

Project Notes

Defined 4 rainfall events from 64 Norma Street IDF

Defined 4 rainfall events from 64 Norma Street IDF

Defined 4 rainfall events from 64 norma IDF

Defined 4 rainfall events from 64 Norma Street IDF

Defined 4 rainfall events from 64 Norma Street IDF

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Printed 12/29/2022

Page 3

Rainfall Events Listing

| Event# | Event Name | Storm Type | Curve | Mode | Duration (hours) | B/B | Depth (inches) | AMC |
|--------|------------|-------------|-------|---------|------------------|-----|----------------|-----|
| 1 | 1-yr | NOAA 24-hr | C | Default | 24.00 | 1 | 2.74 | 2 |
| 2 | 2-yr | NOAA 24-hr | C | Default | 24.00 | 1 | 3.32 | 2 |
| 3 | 10-yr | NOAA 24-hr | C | Default | 24.00 | 1 | 5.06 | 2 |
| 4 | 100-yr | NOAA 24-hr | C | Default | 24.00 | 1 | 8.48 | 2 |
| 5 | WQ | NJ DEP 2-hr | | Default | 2.00 | 1 | 1.25 | 2 |

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Printed 12/29/2022

Page 4

Area Listing (all nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---------------------------------------|
| 12,967 | 98 | Building 1-12 Roof (5S) |
| 30,131 | 78 | Landscaped (Heavily Treed) (8S) |
| 12,061 | 80 | Open Space (12S, 13S, 14S, 16S) |
| 16,735 | 98 | Pavement (1S, 2S, 4S) |
| 1,981 | 98 | Sidewalk (1S, 2S, 4S) |
| 73,875 | 87 | TOTAL AREA |

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Printed 12/29/2022

Page 5

Soil Listing (all nodes)

| Area (sq-ft) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|--|
| 0 | HSG A | |
| 0 | HSG B | |
| 0 | HSG C | |
| 0 | HSG D | |
| 73,875 | Other | 1S, 2S, 4S, 5S, 8S, 12S, 13S, 14S, 16S |
| 73,875 | | TOTAL AREA |

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 6

Ground Covers (all nodes)

| HSG-A (sq-ft) | HSG-B (sq-ft) | HSG-C (sq-ft) | HSG-D (sq-ft) | Other (sq-ft) | Total (sq-ft) | Ground Cover |
|------------------|------------------|------------------|------------------|------------------|------------------|-------------------------------|
| 0 | 0 | 0 | 0 | 12,967 | 12,967 | Building 1-12 Roof |
| 0 | 0 | 0 | 0 | 30,131 | 30,131 | Landscaped (Heavily Treed) |
| 0 | 0 | 0 | 0 | 12,061 | 12,061 | Open Space |
| 0 | 0 | 0 | 0 | 16,735 | 16,735 | Pavement |
| 0 | 0 | 0 | 0 | 1,981 | 1,981 | Sidewalk |
| 0 | 0 | 0 | 0 | 73,875 | 73,875 | TOTAL AREA |

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 7

Pipe Listing (all nodes)

| Line# | Node Number | In-Invert (feet) | Out-Invert (feet) | Length (feet) | Slope (ft/ft) | n | Width (inches) | Diam/Height (inches) | Inside-Fill (inches) |
|-------|----------------|---------------------|----------------------|------------------|------------------|-------|-------------------|-------------------------|-------------------------|
| 1 | 7P | 80.73 | 74.61 | 160.0 | 0.0383 | 0.012 | 0.0 | 30.0 | 0.0 |
| 2 | 8P | 99.50 | 97.48 | 101.0 | 0.0200 | 0.011 | 0.0 | 15.0 | 0.0 |
| 3 | 8P | 99.50 | 99.50 | 77.0 | 0.0000 | 0.011 | 0.0 | 4.0 | 0.0 |
| 4 | 9P | 86.59 | 84.60 | 85.0 | 0.0234 | 0.011 | 0.0 | 15.0 | 0.0 |
| 5 | 11P | 81.60 | 80.90 | 35.0 | 0.0200 | 0.011 | 0.0 | 15.0 | 0.0 |

9270 Proposed Drainage Porous Pvmt r6

NOAA 24-hr C 1-yr Rainfall=2.74"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 8

Time span=0.00-75.00 hrs, dt=0.01 hrs, 7501 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Impervious Drainage Runoff Area=4,693 sf 100.00% Impervious Runoff Depth=2.51"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=98 Runoff=0.34 cfs 981 cf

Subcatchment 2S: Impervious Drainage Runoff Area=5,099 sf 100.00% Impervious Runoff Depth=2.51"
 Flow Length=144' Tc=6.3 min CN=98 Runoff=0.34 cfs 1,066 cf

Subcatchment 4S: Drainage Area 3 Runoff Area=8,924 sf 100.00% Impervious Runoff Depth=2.51"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=98 Runoff=0.65 cfs 1,866 cf

Subcatchment 5S: Roof Area Directly Into Runoff Area=12,967 sf 100.00% Impervious Runoff Depth=2.51"
 Flow Length=50' Slope=0.0100 '/' Tc=0.9 min CN=98 Runoff=0.95 cfs 2,712 cf

Subcatchment 8S: By Pass Runoff Area=30,131 sf 0.00% Impervious Runoff Depth=0.95"
 Flow Length=510' Tc=13.7 min CN=78 Runoff=0.63 cfs 2,379 cf

Subcatchment 12S: Pervious Drainage Area 1 Runoff Area=3,006 sf 0.00% Impervious Runoff Depth=1.06"
 Flow Length=144' Tc=6.3 min CN=80 Runoff=0.09 cfs 265 cf

Subcatchment 13S: Open Space Directly Into Runoff Area=2,947 sf 0.00% Impervious Runoff Depth=1.06"
 Flow Length=150' Slope=0.0400 '/' Tc=10.1 min CN=80 Runoff=0.08 cfs 260 cf

Subcatchment 14S: Pervious Drainage area 2 Runoff Area=3,531 sf 0.00% Impervious Runoff Depth=1.06"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=80 Runoff=0.13 cfs 311 cf

Subcatchment 16S: Pervious Drainage Area 3 Runoff Area=2,577 sf 0.00% Impervious Runoff Depth=1.06"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=80 Runoff=0.10 cfs 227 cf

Pond 7P: Existing Catch Basin Peak Elev=81.12' Inflow=0.80 cfs 9,844 cf
 30.0" Round Culvert n=0.012 L=160.0' S=0.0383 '/' Outflow=0.80 cfs 9,844 cf

Pond 8P: Porous Pavement Detention Peak Elev=100.52' Storage=4,498 cf Inflow=2.63 cfs 7,690 cf
 Outflow=0.19 cfs 7,464 cf

Pond 9P: Manhole Peak Elev=86.81' Inflow=0.19 cfs 7,464 cf
 15.0" Round Culvert n=0.011 L=85.0' S=0.0234 '/' Outflow=0.19 cfs 7,464 cf

Pond 11P: Manhole Peak Elev=81.82' Inflow=0.19 cfs 7,464 cf
 15.0" Round Culvert n=0.011 L=35.0' S=0.0200 '/' Outflow=0.19 cfs 7,464 cf

Total Runoff Area = 73,875 sf Runoff Volume = 10,069 cf Average Runoff Depth = 1.64"
57.11% Pervious = 42,192 sf 42.89% Impervious = 31,683 sf

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 9

Summary for Subcatchment 1S: Impervious Drainage area 2

Runoff = 0.34 cfs @ 12.10 hrs, Volume= 981 cf, Depth= 2.51"

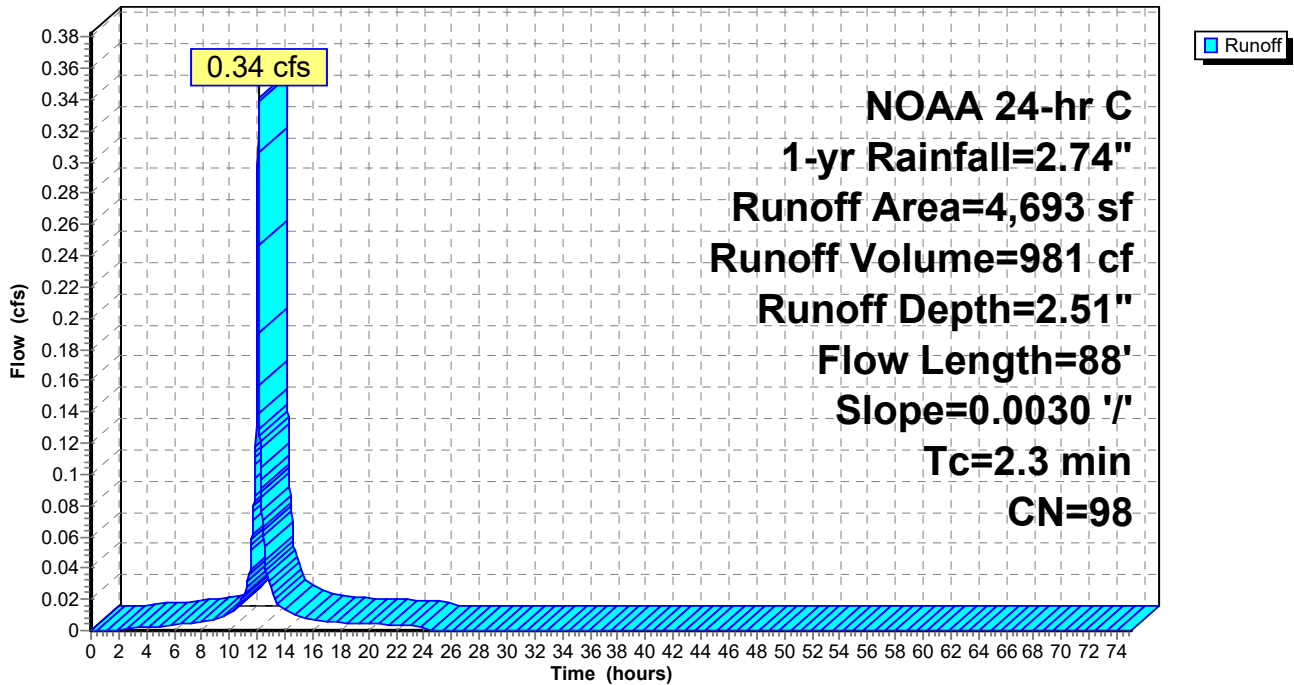
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 1-yr Rainfall=2.74"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 3,990 | 98 | Pavement |
| * | 703 | 98 | Sidewalk |
| | 4,693 | 98 | Weighted Average |
| | 4,693 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 1S: Impervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 10

Summary for Subcatchment 2S: Impervious Drainage Area 1

Runoff = 0.34 cfs @ 12.13 hrs, Volume= 1,066 cf, Depth= 2.51"

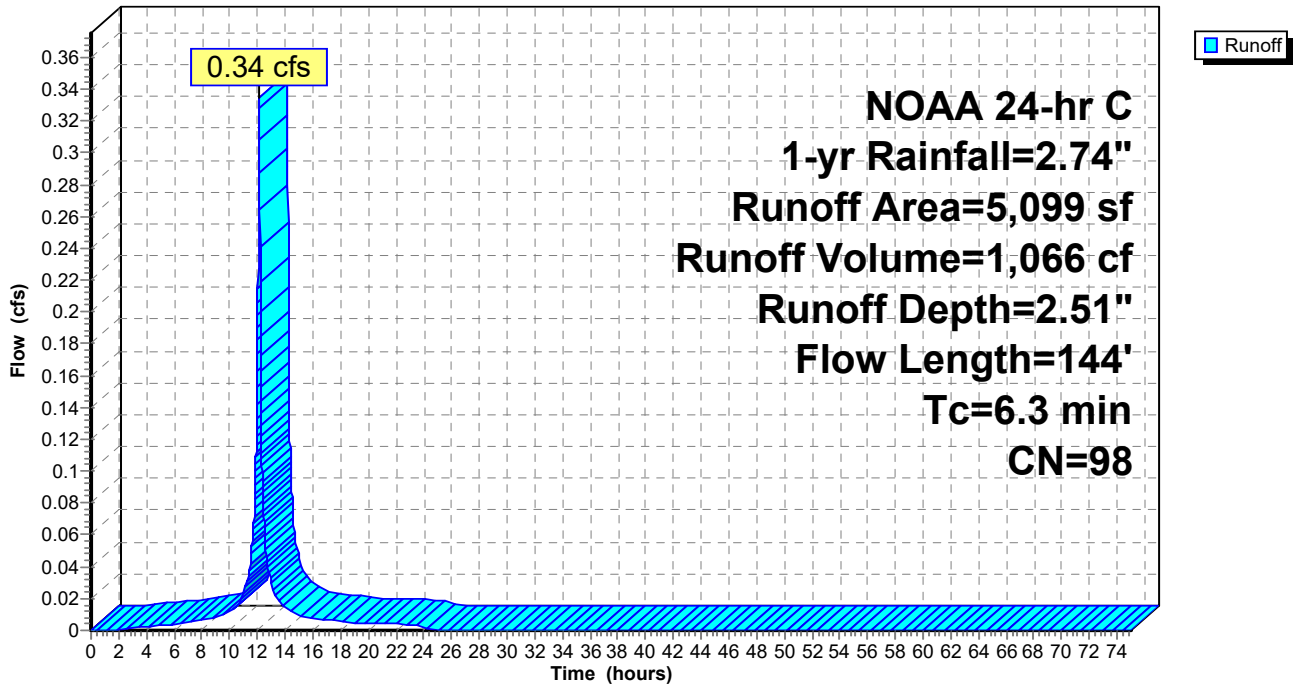
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 1-yr Rainfall=2.74"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 4,563 | 98 | Pavement |
| * | 536 | 98 | Sidewalk |
| | 5,099 | 98 | Weighted Average |
| | 5,099 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 2S: Impervious Drainage Area 1

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 11

Summary for Subcatchment 4S: Drainage Area 3

Runoff = 0.65 cfs @ 12.09 hrs, Volume= 1,866 cf, Depth= 2.51"

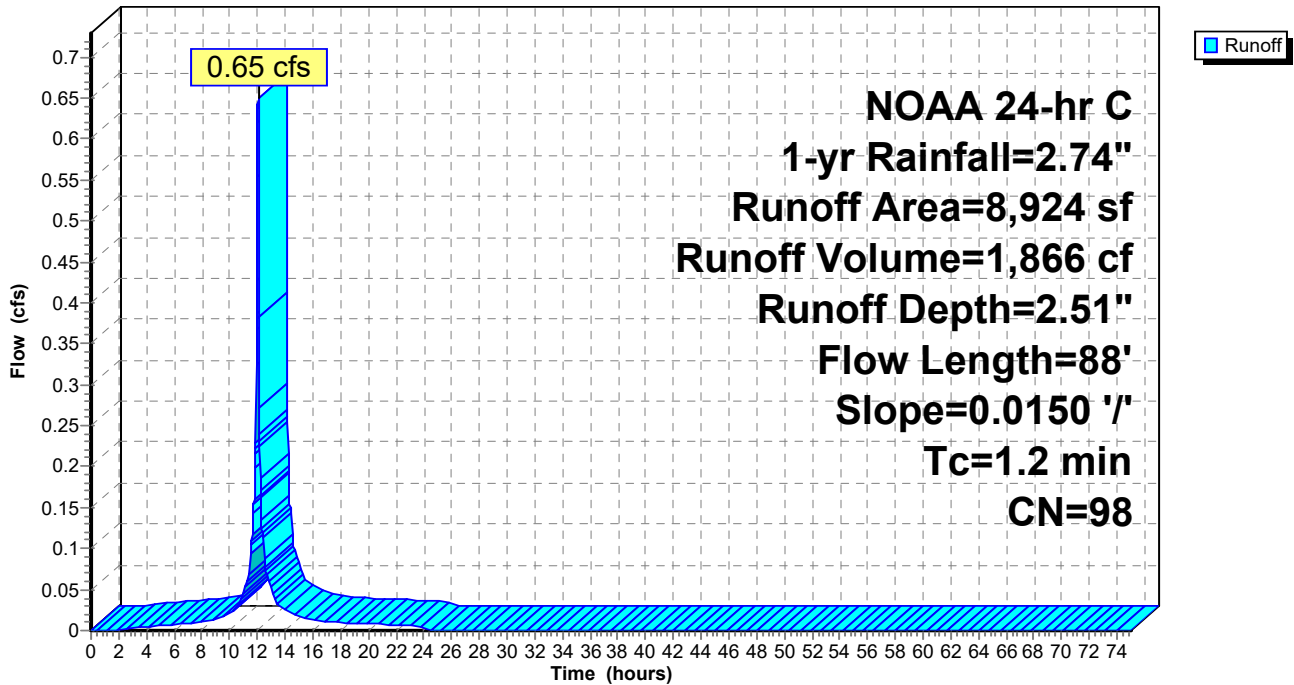
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 1-yr Rainfall=2.74"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 8,182 | 98 | Pavement |
| * | 742 | 98 | Sidewalk |
| | 8,924 | 98 | Weighted Average |
| | 8,924 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 4S: Drainage Area 3

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 12

Summary for Subcatchment 5S: Roof Area Directly Into Detention Basin

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.95 cfs @ 12.09 hrs, Volume= 2,712 cf, Depth= 2.51"

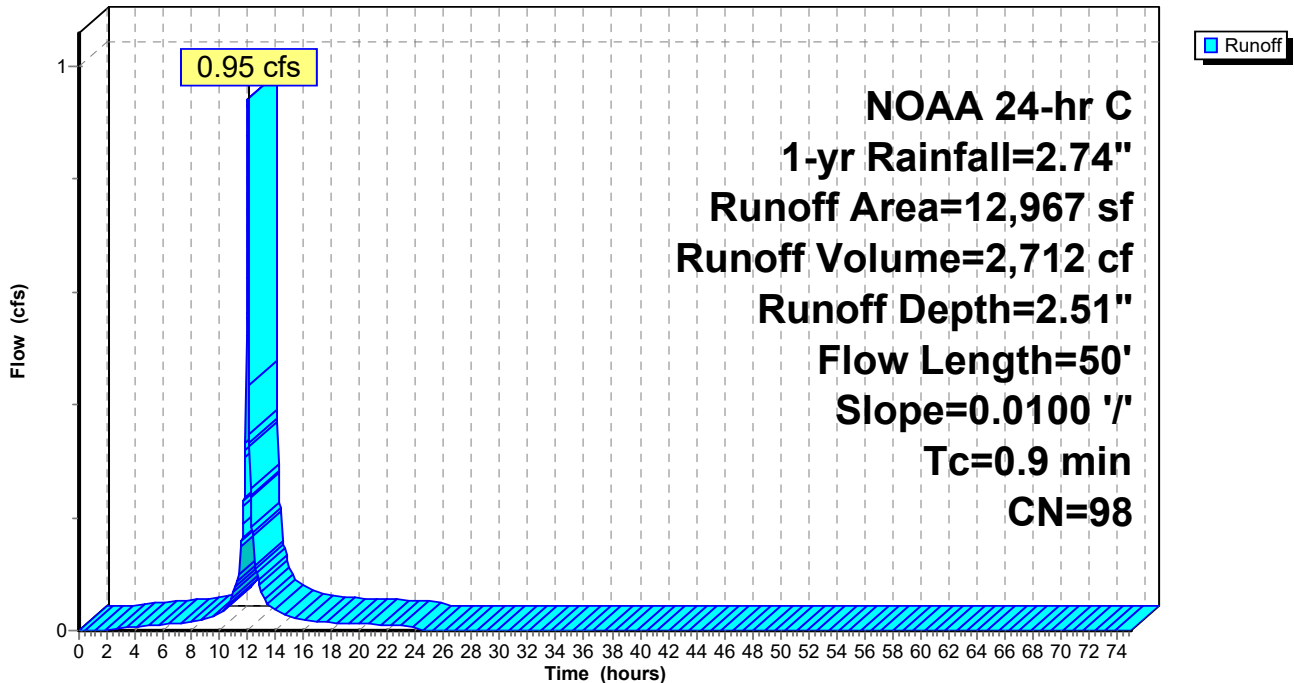
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 1-yr Rainfall=2.74"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 12,967 | 98 | Building 1-12 Roof |
| 12,967 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 0.9 | 50 | 0.0100 | 0.92 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 5S: Roof Area Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 13

Summary for Subcatchment 8S: By Pass

Runoff = 0.63 cfs @ 12.23 hrs, Volume= 2,379 cf, Depth= 0.95"

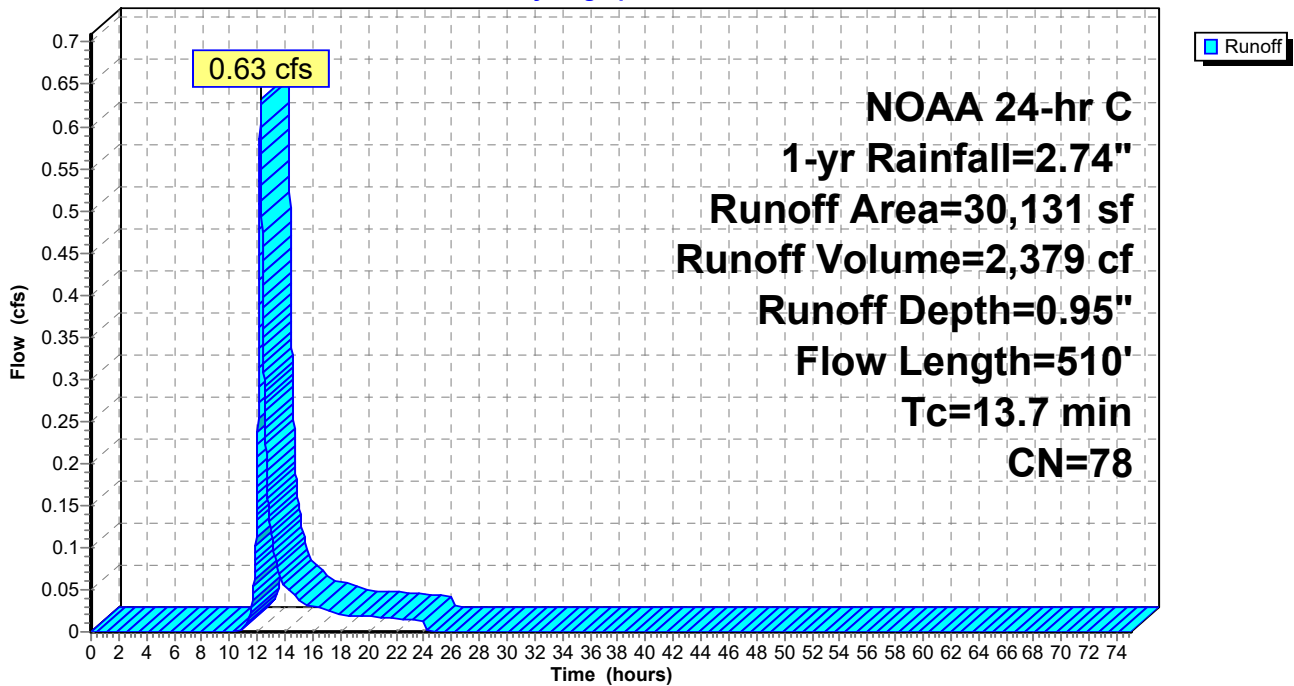
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 1-yr Rainfall=2.74"

| Area (sf) | CN | Description |
|-----------|----|----------------------------|
| * 30,131 | 78 | Landscaped (Heavily Treed) |
| 30,131 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 11.1 | 100 | | 0.15 | | Direct Entry, Sheet Flow Landscaped trees, shrubs, grass |
| 0.5 | 150 | 0.1000 | 5.09 | | Shallow Concentrated Flow, Shallow Concentrated landscaped Unpaved Kv= 16.1 fps |
| 2.1 | 260 | 0.0100 | 2.03 | | Shallow Concentrated Flow, Gutter Flow Paved Kv= 20.3 fps |
| 13.7 | 510 | Total | | | |

Subcatchment 8S: By Pass

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 14

Summary for Subcatchment 12S: Pervious Drainage Area 1

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 265 cf, Depth= 1.06"

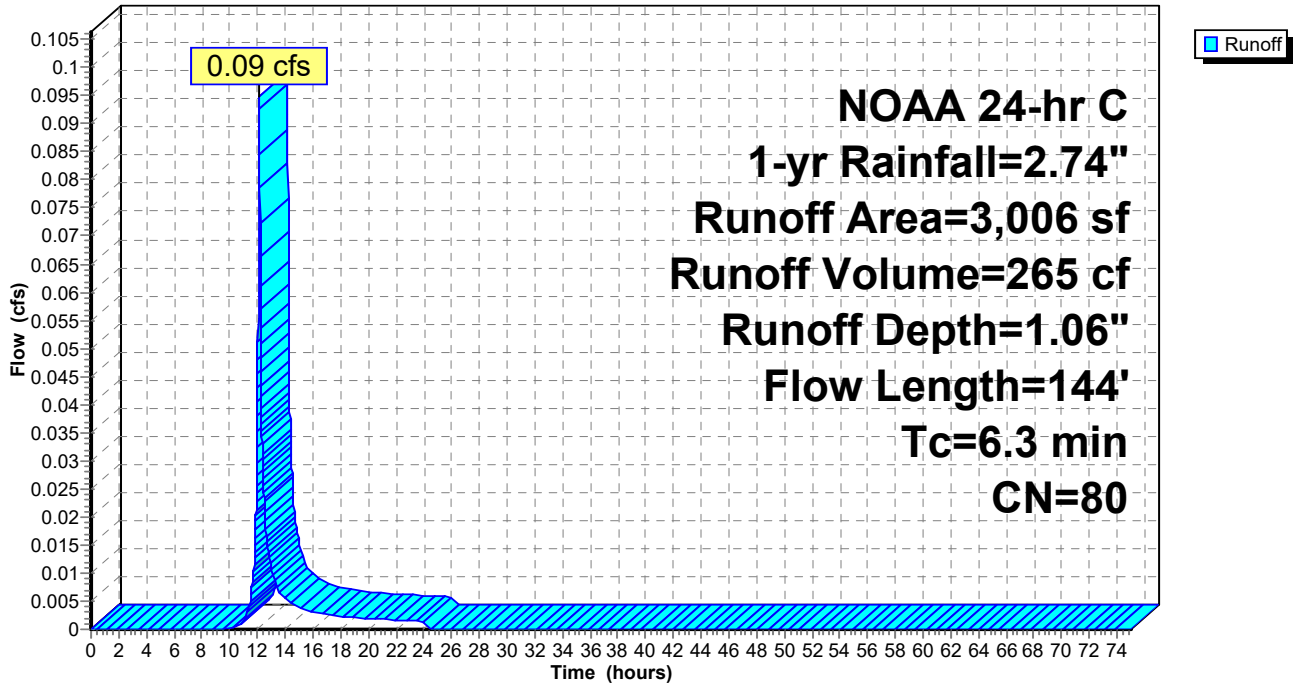
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 1-yr Rainfall=2.74"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,006 | 80 | Open Space |
| 3,006 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 12S: Pervious Drainage Area 1

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 15

Summary for Subcatchment 13S: Open Space Directly Into Detention Basin

Runoff = 0.08 cfs @ 12.18 hrs, Volume= 260 cf, Depth= 1.06"

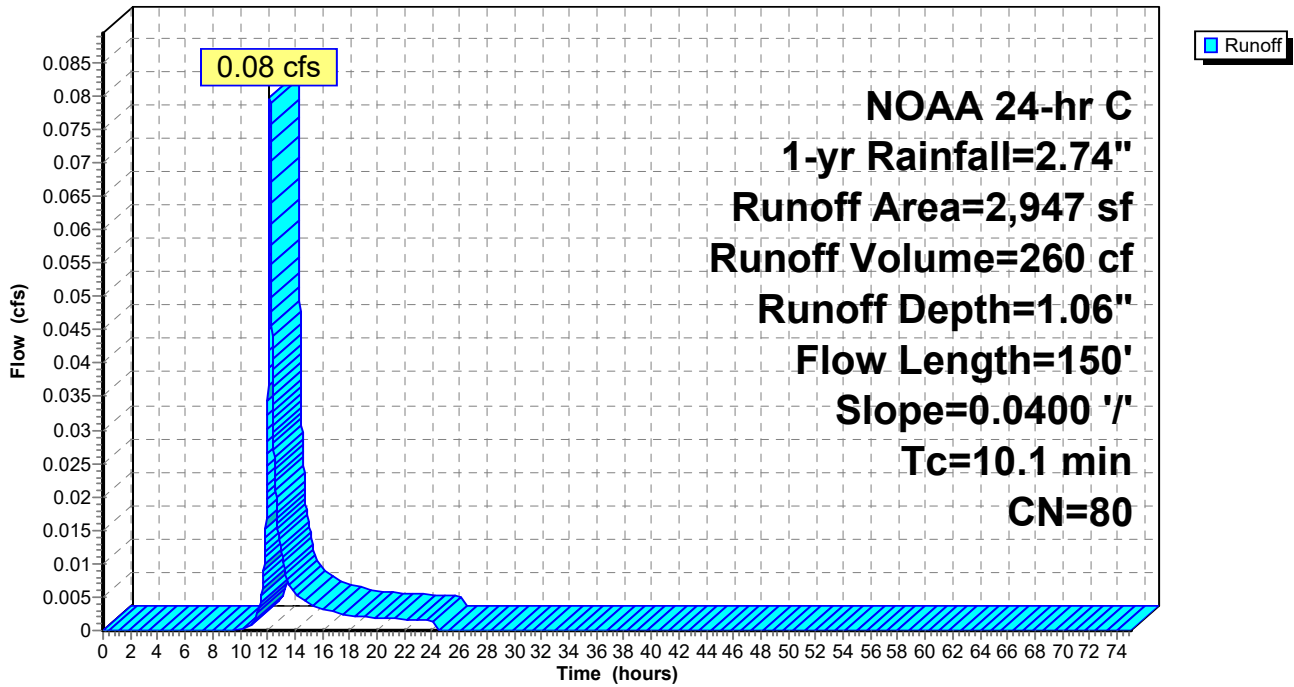
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 1-yr Rainfall=2.74"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,947 | 80 | Open Space |
| 2,947 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.1 | 150 | 0.0400 | 0.25 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |

Subcatchment 13S: Open Space Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 16

Summary for Subcatchment 14S: Pervious Drainage area 2

Runoff = 0.13 cfs @ 12.11 hrs, Volume= 311 cf, Depth= 1.06"

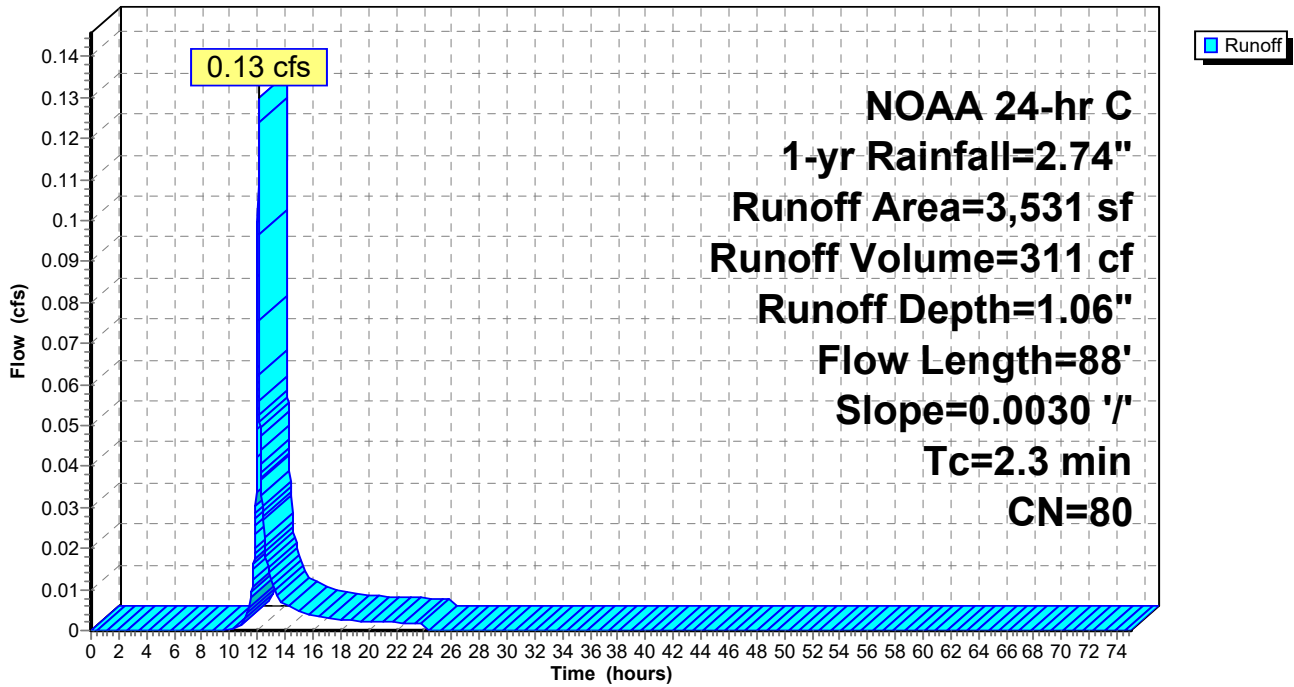
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 1-yr Rainfall=2.74"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,531 | 80 | Open Space |
| 3,531 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 14S: Pervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 17

Summary for Subcatchment 16S: Pervious Drainage Area 3

Runoff = 0.10 cfs @ 12.10 hrs, Volume= 227 cf, Depth= 1.06"

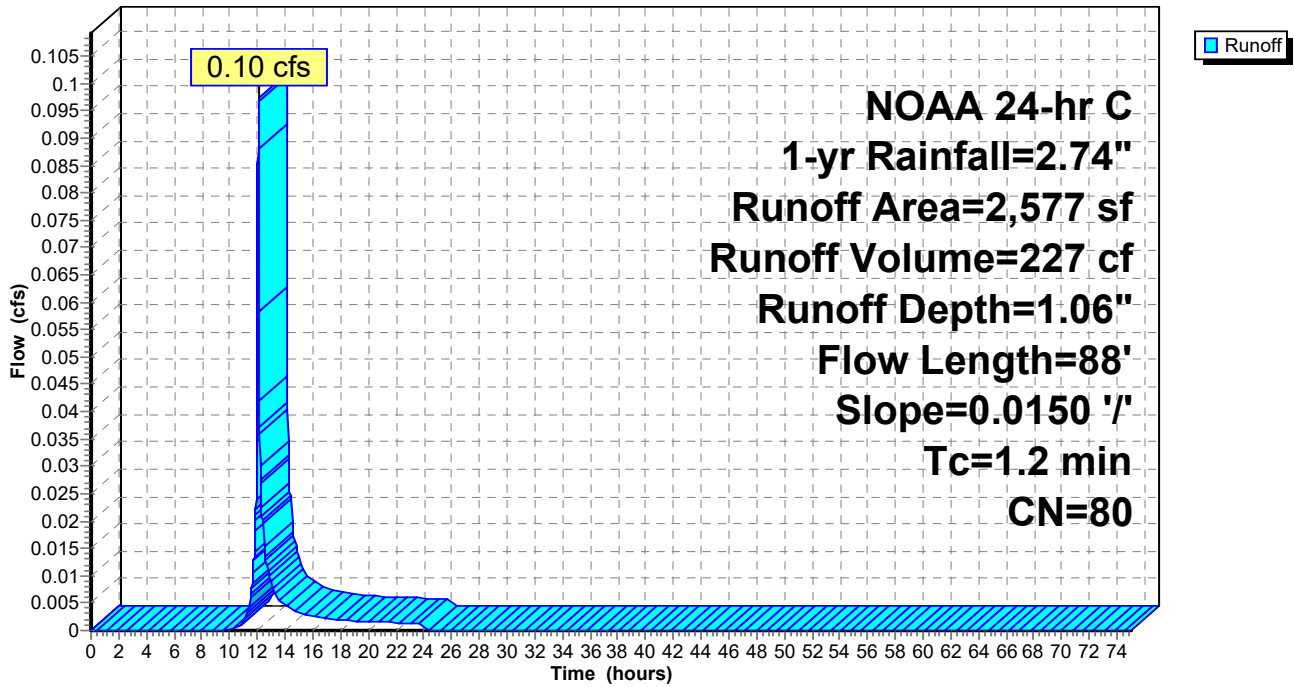
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 1-yr Rainfall=2.74"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,577 | 80 | Open Space |
| 2,577 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 16S: Pervious Drainage Area 3

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 18

Summary for Pond 7P: Existing Catch Basin

Inflow Area = 73,875 sf, 42.89% Impervious, Inflow Depth > 1.60" for 1-yr event
 Inflow = 0.80 cfs @ 12.23 hrs, Volume= 9,844 cf
 Outflow = 0.80 cfs @ 12.23 hrs, Volume= 9,844 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.80 cfs @ 12.23 hrs, Volume= 9,844 cf

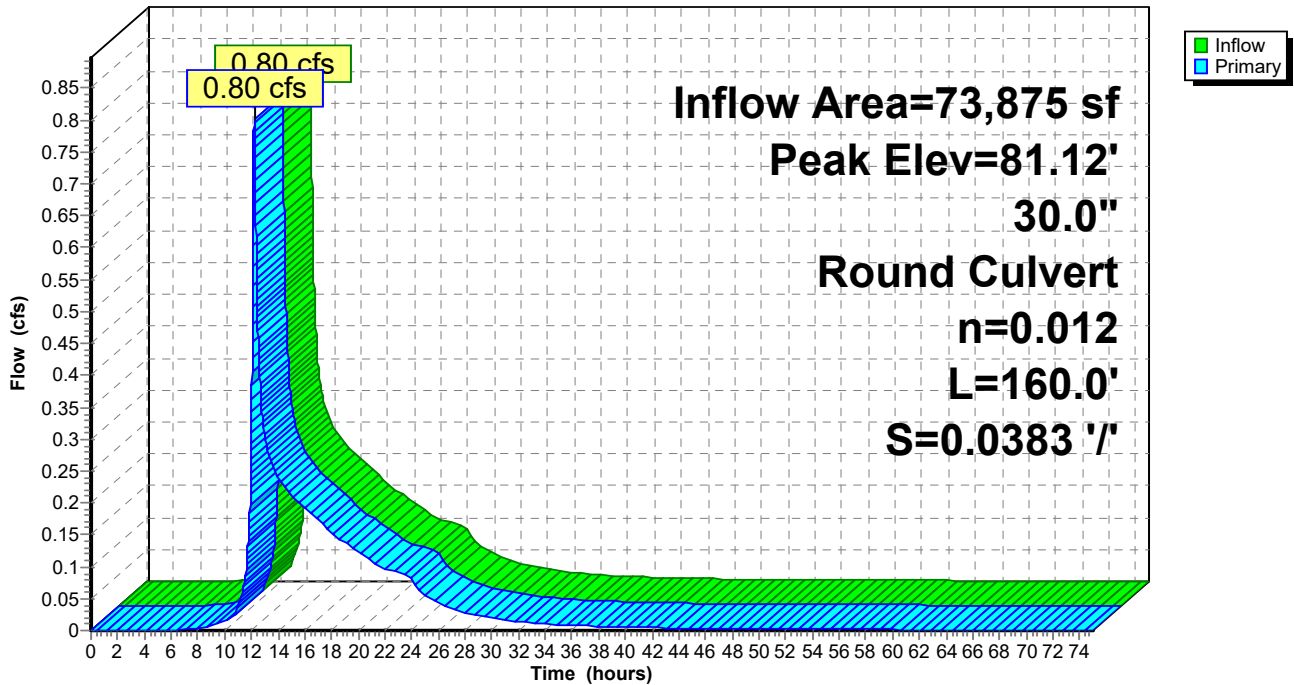
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 81.12' @ 12.23 hrs
 Flood Elev= 85.30'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|---|
| #1 | Primary | 80.73' | 30.0" Round Culvert L= 160.0' Ke= 0.900 Inlet / Outlet Invert= 80.73' / 74.61' S= 0.0383 '/ Cc= 0.900 n= 0.012, Flow Area= 4.91 sf |

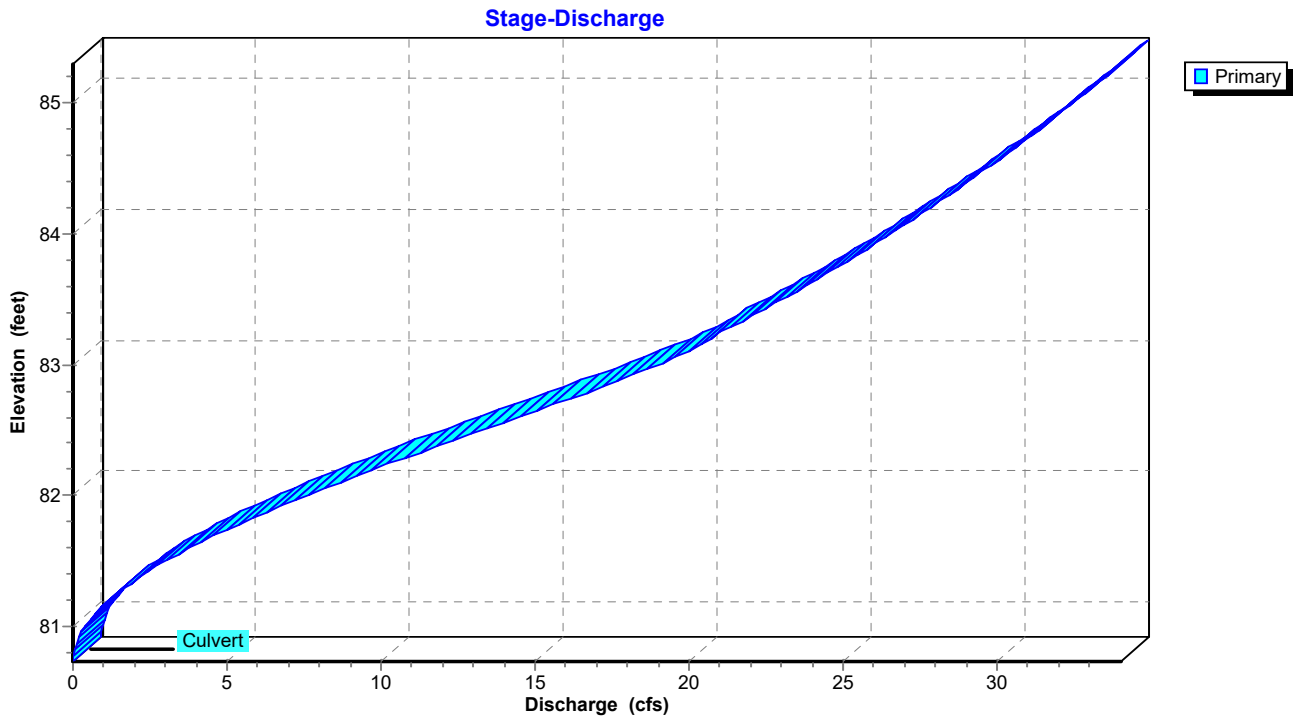
Primary OutFlow Max=0.80 cfs @ 12.23 hrs HW=81.12' (Free Discharge)
 ←1=Culvert (Inlet Controls 0.80 cfs @ 1.67 fps)

Pond 7P: Existing Catch Basin

Hydrograph



Pond 7P: Existing Catch Basin



9270 Proposed Drainage Porous Pvmt r6

NOAA 24-hr C 1-yr Rainfall=2.74"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 20

Summary for Pond 8P: Porous Pavement Detention

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth = 2.11" for 1-yr event
 Inflow = 2.63 cfs @ 12.10 hrs, Volume= 7,690 cf
 Outflow = 0.19 cfs @ 13.13 hrs, Volume= 7,464 cf, Atten= 93%, Lag= 61.9 min
 Primary = 0.19 cfs @ 13.13 hrs, Volume= 7,464 cf

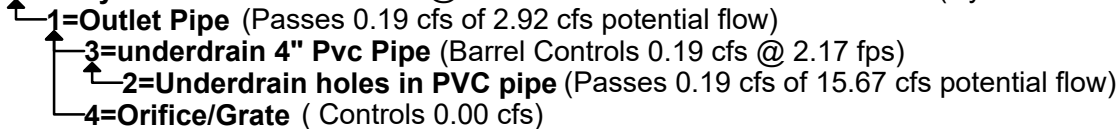
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 100.52' @ 13.13 hrs Surf.Area= 11,000 sf Storage= 4,498 cf

Plug-Flow detention time= 427.5 min calculated for 7,464 cf (97% of inflow)
 Center-of-Mass det. time= 409.2 min (1,179.9 - 770.7)

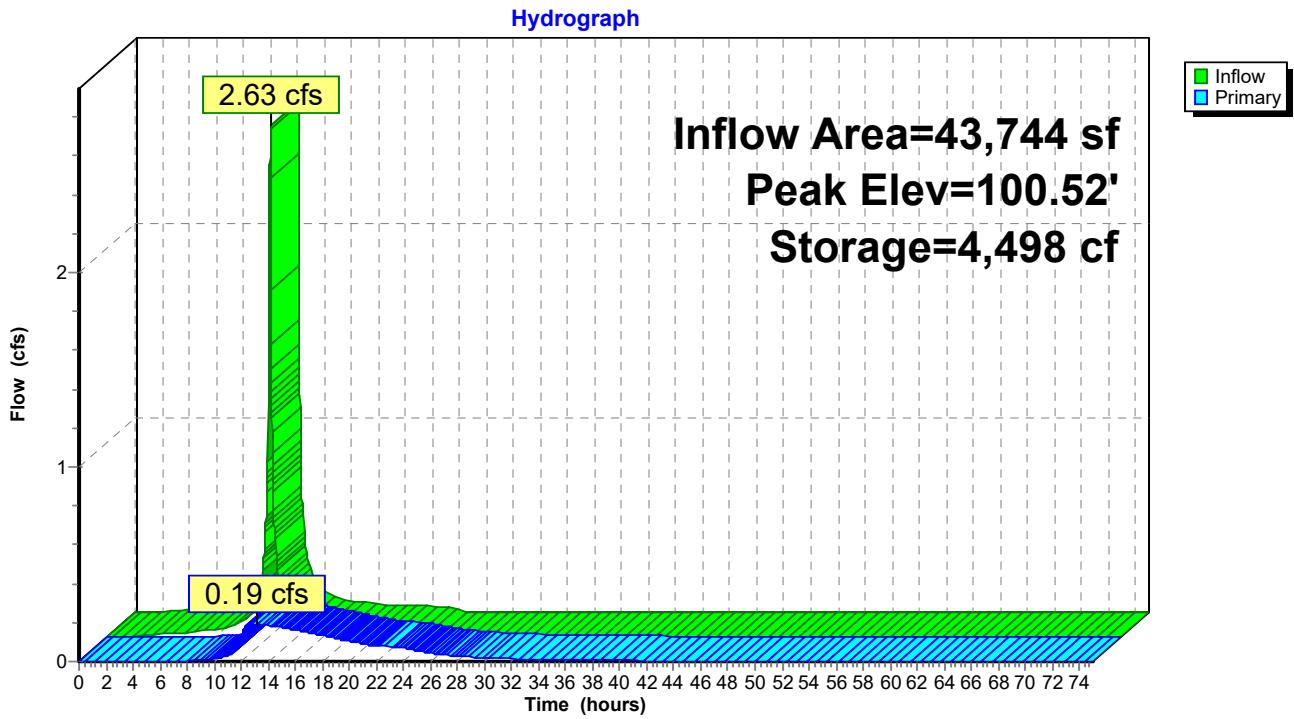
| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|---|
| #1 | 99.50' | 13,200 cf | 100.00'W x 110.00'L x 3.00'H Prismatoid 33,000 cf Overall x 40.0% Voids |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|---|
| #1 | Primary | 99.50' | 15.0" Round Outlet Pipe L= 101.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 97.48' S= 0.0200 1/ S= 0.0200 1/ Cc= 0.900 n= 0.011, Flow Area= 1.23 sf |
| #2 | Device 3 | 99.50' | 1.0" Horiz. Underdrain holes in PVC pipe X 590.00 C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 99.50' | 4.0" Round underdrain 4" Pvc Pipe L= 77.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 99.50' S= 0.0000 1/ S= 0.0000 1/ Cc= 0.900 n= 0.011, Flow Area= 0.09 sf |
| #4 | Device 1 | 101.50' | 18.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

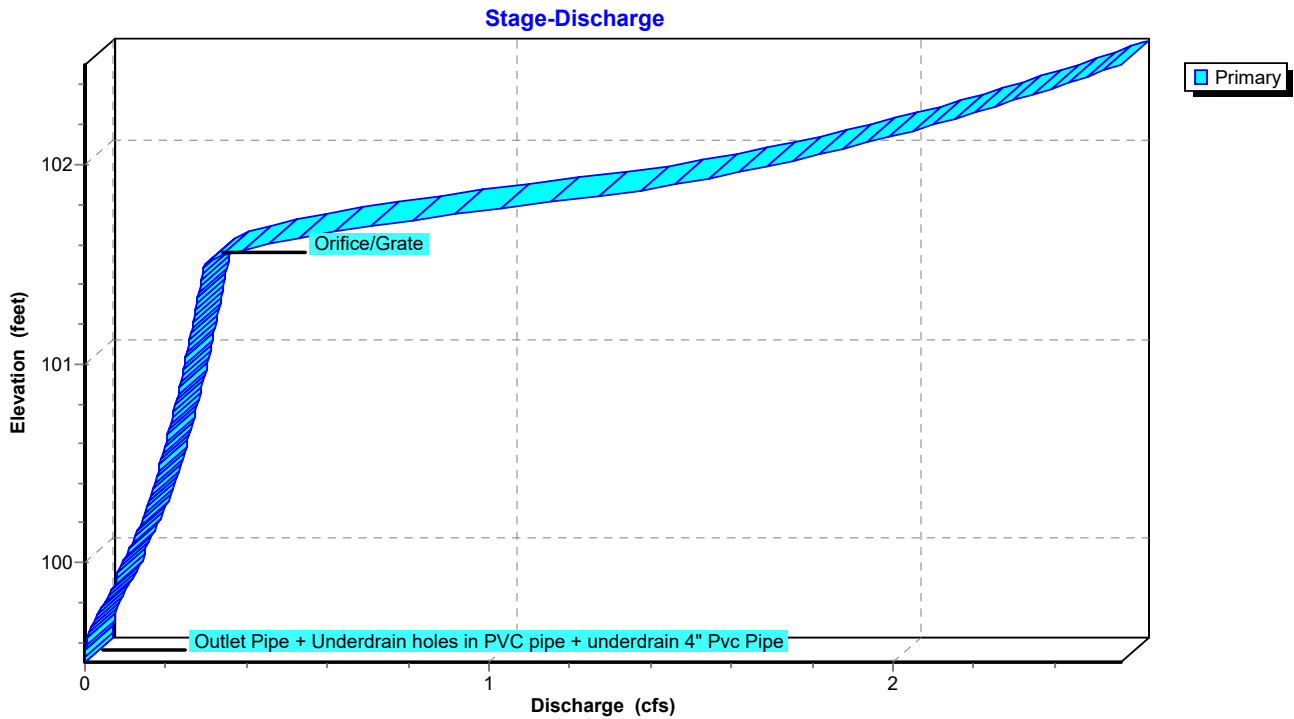
Primary OutFlow Max=0.19 cfs @ 13.13 hrs HW=100.52' TW=86.81' (Dynamic Tailwater)



Pond 8P: Porous Pavement Detention



Pond 8P: Porous Pavement Detention



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 22

Summary for Pond 9P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 2.05" for 1-yr event
 Inflow = 0.19 cfs @ 13.13 hrs, Volume= 7,464 cf
 Outflow = 0.19 cfs @ 13.13 hrs, Volume= 7,464 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.19 cfs @ 13.13 hrs, Volume= 7,464 cf

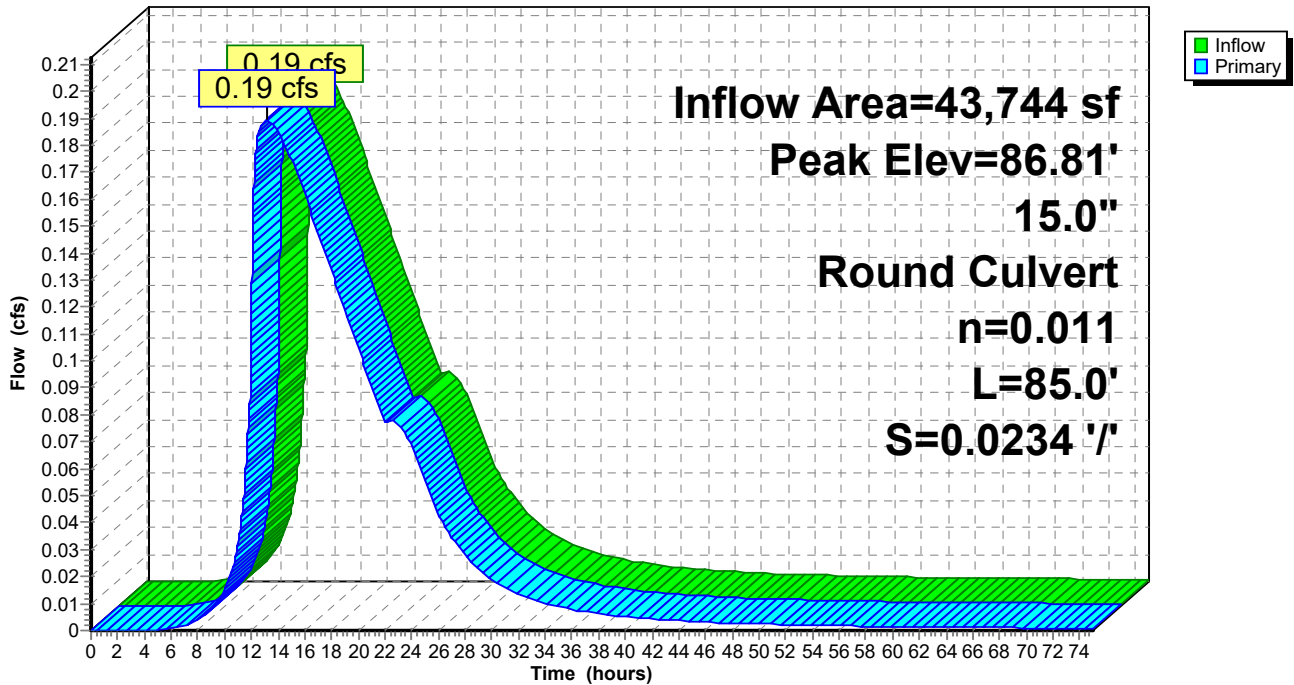
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 86.81' @ 13.13 hrs
 Flood Elev= 102.50'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|--|
| #1 | Primary | 86.59' | 15.0" Round Culvert L= 85.0' Ke= 0.900 Inlet / Outlet Invert= 86.59' / 84.60' S= 0.0234 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

Primary OutFlow Max=0.19 cfs @ 13.13 hrs HW=86.81' TW=81.82' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.19 cfs @ 1.27 fps)

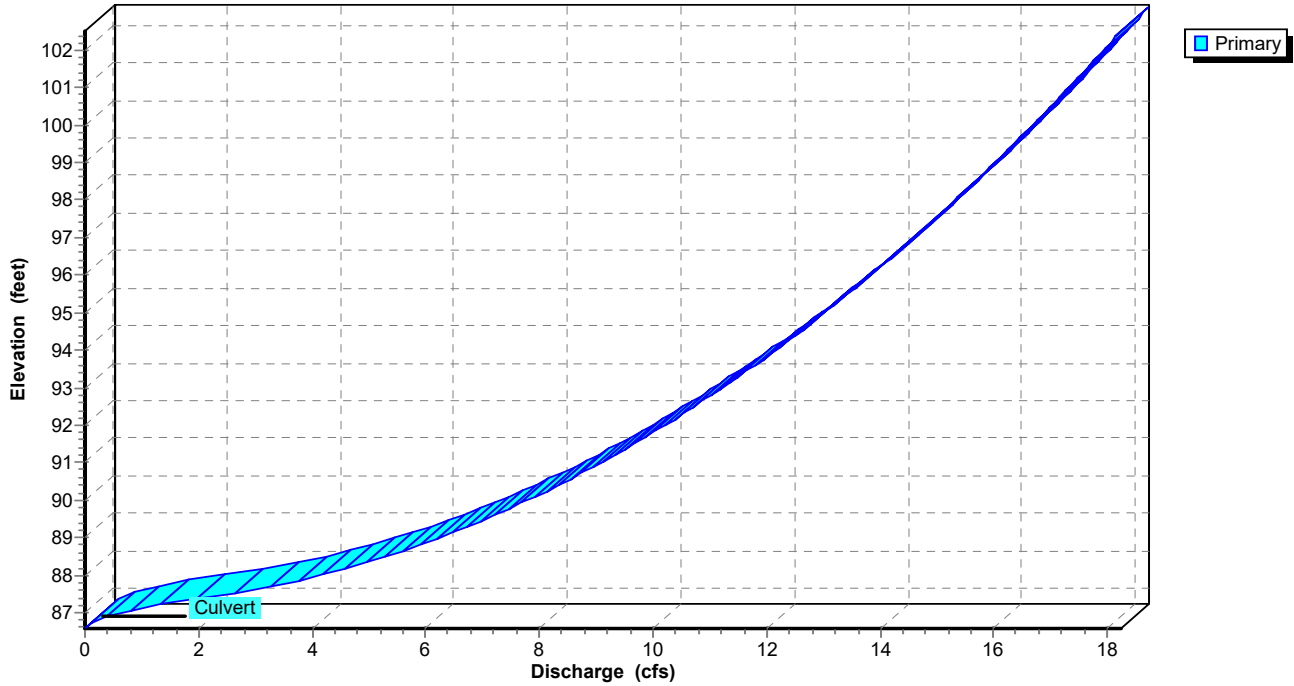
Pond 9P: Manhole

Hydrograph



Pond 9P: Manhole

Stage-Discharge



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 1-yr Rainfall=2.74"

Printed 12/29/2022

Page 24

Summary for Pond 11P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 2.05" for 1-yr event
 Inflow = 0.19 cfs @ 13.13 hrs, Volume= 7,464 cf
 Outflow = 0.19 cfs @ 13.13 hrs, Volume= 7,464 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.19 cfs @ 13.13 hrs, Volume= 7,464 cf

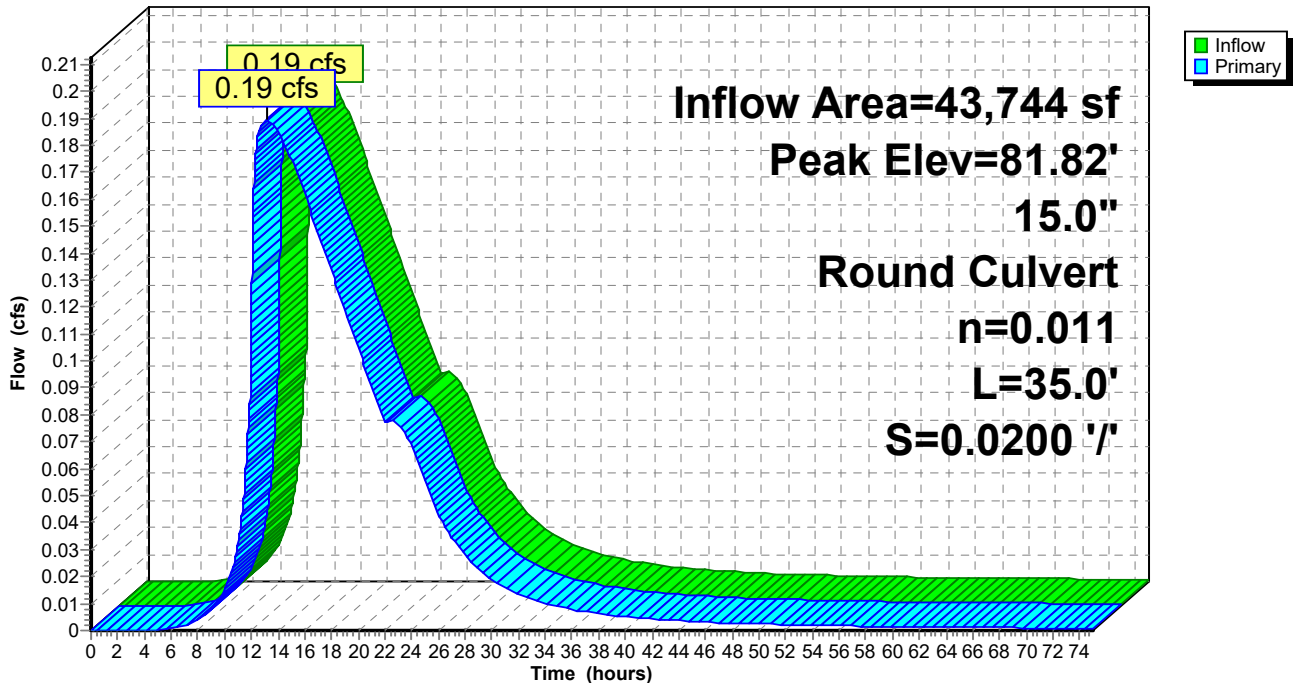
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 81.82' @ 13.13 hrs
 Flood Elev= 89.20'

| Device # | Routing | Invert | Outlet Devices |
|----------|---------|--------|--|
| #1 | Primary | 81.60' | 15.0" Round Culvert L= 35.0' Ke= 0.900 Inlet / Outlet Invert= 81.60' / 80.90' S= 0.0200 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

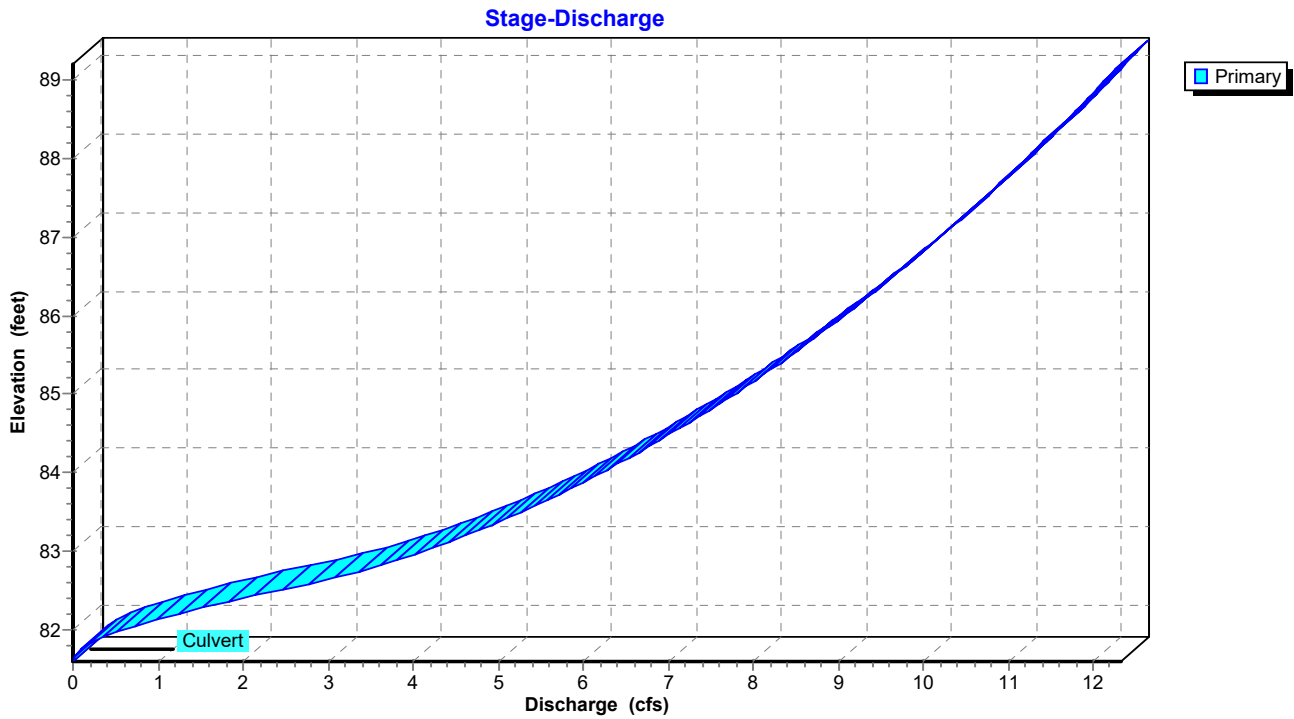
Primary OutFlow Max=0.19 cfs @ 13.13 hrs HW=81.82' TW=80.96' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.19 cfs @ 1.27 fps)

Pond 11P: Manhole

Hydrograph



Pond 11P: Manhole



9270 Proposed Drainage Porous Pvmt r6

NOAA 24-hr C 2-yr Rainfall=3.32"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 26

Time span=0.00-75.00 hrs, dt=0.01 hrs, 7501 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Impervious Drainage Runoff Area=4,693 sf 100.00% Impervious Runoff Depth=3.09"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=98 Runoff=0.42 cfs 1,207 cf

Subcatchment 2S: Impervious Drainage Runoff Area=5,099 sf 100.00% Impervious Runoff Depth=3.09"
 Flow Length=144' Tc=6.3 min CN=98 Runoff=0.41 cfs 1,312 cf

Subcatchment 4S: Drainage Area 3 Runoff Area=8,924 sf 100.00% Impervious Runoff Depth=3.09"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=98 Runoff=0.79 cfs 2,296 cf

Subcatchment 5S: Roof Area Directly Into Runoff Area=12,967 sf 100.00% Impervious Runoff Depth=3.09"
 Flow Length=50' Slope=0.0100 '/' Tc=0.9 min CN=98 Runoff=1.15 cfs 3,336 cf

Subcatchment 8S: By Pass Runoff Area=30,131 sf 0.00% Impervious Runoff Depth=1.36"
 Flow Length=510' Tc=13.7 min CN=78 Runoff=0.93 cfs 3,420 cf

Subcatchment 12S: Pervious Drainage Area 1 Runoff Area=3,006 sf 0.00% Impervious Runoff Depth=1.49"
 Flow Length=144' Tc=6.3 min CN=80 Runoff=0.13 cfs 374 cf

Subcatchment 13S: Open Space Directly Into Runoff Area=2,947 sf 0.00% Impervious Runoff Depth=1.49"
 Flow Length=150' Slope=0.0400 '/' Tc=10.1 min CN=80 Runoff=0.11 cfs 367 cf

Subcatchment 14S: Pervious Drainage area 2 Runoff Area=3,531 sf 0.00% Impervious Runoff Depth=1.49"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=80 Runoff=0.18 cfs 440 cf

Subcatchment 16S: Pervious Drainage Area 3 Runoff Area=2,577 sf 0.00% Impervious Runoff Depth=1.49"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=80 Runoff=0.14 cfs 321 cf

Pond 7P: Existing Catch Basin Peak Elev=81.19' Inflow=1.13 cfs 12,843 cf
 30.0" Round Culvert n=0.012 L=160.0' S=0.0383 '/' Outflow=1.13 cfs 12,843 cf

Pond 8P: Porous Pavement Detention Peak Elev=100.78' Storage=5,652 cf Inflow=3.28 cfs 9,653 cf
 Outflow=0.22 cfs 9,423 cf

Pond 9P: Manhole Peak Elev=86.83' Inflow=0.22 cfs 9,423 cf
 15.0" Round Culvert n=0.011 L=85.0' S=0.0234 '/' Outflow=0.22 cfs 9,423 cf

Pond 11P: Manhole Peak Elev=81.84' Inflow=0.22 cfs 9,423 cf
 15.0" Round Culvert n=0.011 L=35.0' S=0.0200 '/' Outflow=0.22 cfs 9,423 cf

Total Runoff Area = 73,875 sf Runoff Volume = 13,073 cf Average Runoff Depth = 2.12"
57.11% Pervious = 42,192 sf 42.89% Impervious = 31,683 sf

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 27

Summary for Subcatchment 1S: Impervious Drainage area 2

Runoff = 0.42 cfs @ 12.10 hrs, Volume= 1,207 cf, Depth= 3.09"

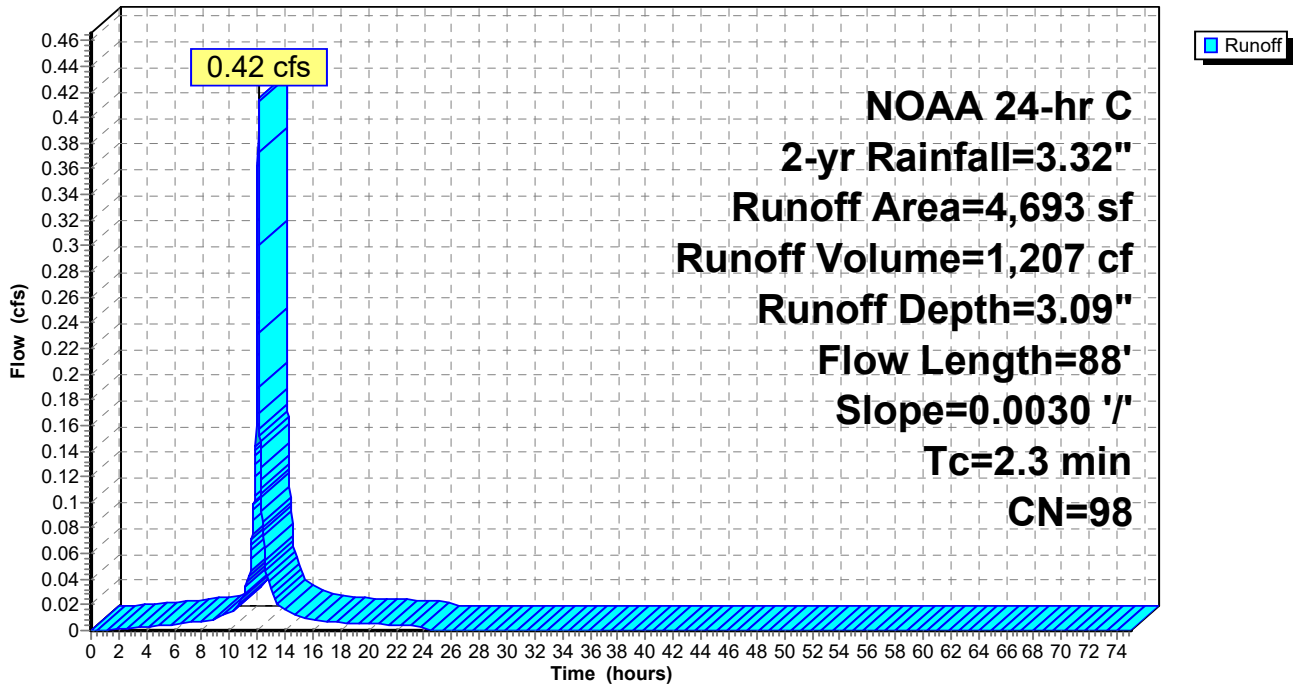
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 2-yr Rainfall=3.32"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 3,990 | 98 | Pavement |
| * | 703 | 98 | Sidewalk |
| | 4,693 | 98 | Weighted Average |
| | 4,693 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 1S: Impervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 28

Summary for Subcatchment 2S: Impervious Drainage Area 1

Runoff = 0.41 cfs @ 12.13 hrs, Volume= 1,312 cf, Depth= 3.09"

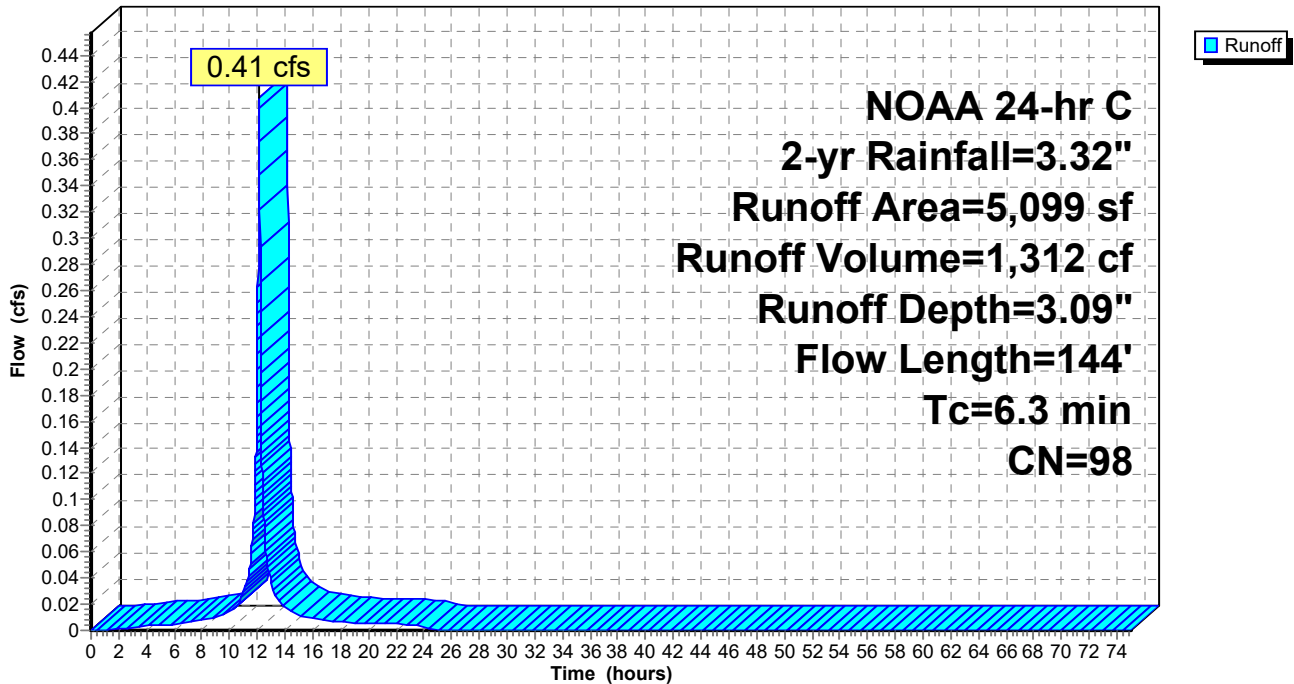
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 2-yr Rainfall=3.32"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 4,563 | 98 | Pavement |
| * | 536 | 98 | Sidewalk |
| | 5,099 | 98 | Weighted Average |
| | 5,099 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 2S: Impervious Drainage Area 1

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 29

Summary for Subcatchment 4S: Drainage Area 3

Runoff = 0.79 cfs @ 12.09 hrs, Volume= 2,296 cf, Depth= 3.09"

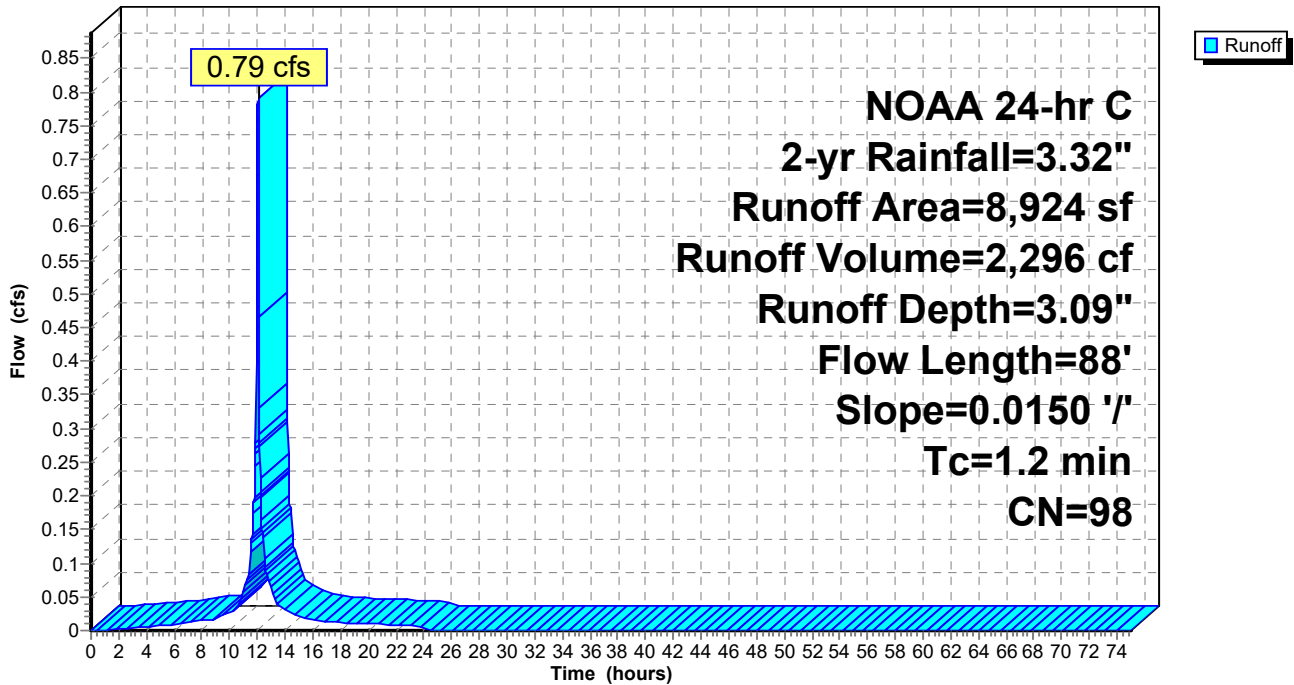
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 2-yr Rainfall=3.32"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 8,182 | 98 | Pavement |
| * | 742 | 98 | Sidewalk |
| | 8,924 | 98 | Weighted Average |
| | 8,924 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 4S: Drainage Area 3

Hydrograph



Summary for Subcatchment 5S: Roof Area Directly Into Detention Basin

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.15 cfs @ 12.09 hrs, Volume= 3,336 cf, Depth= 3.09"

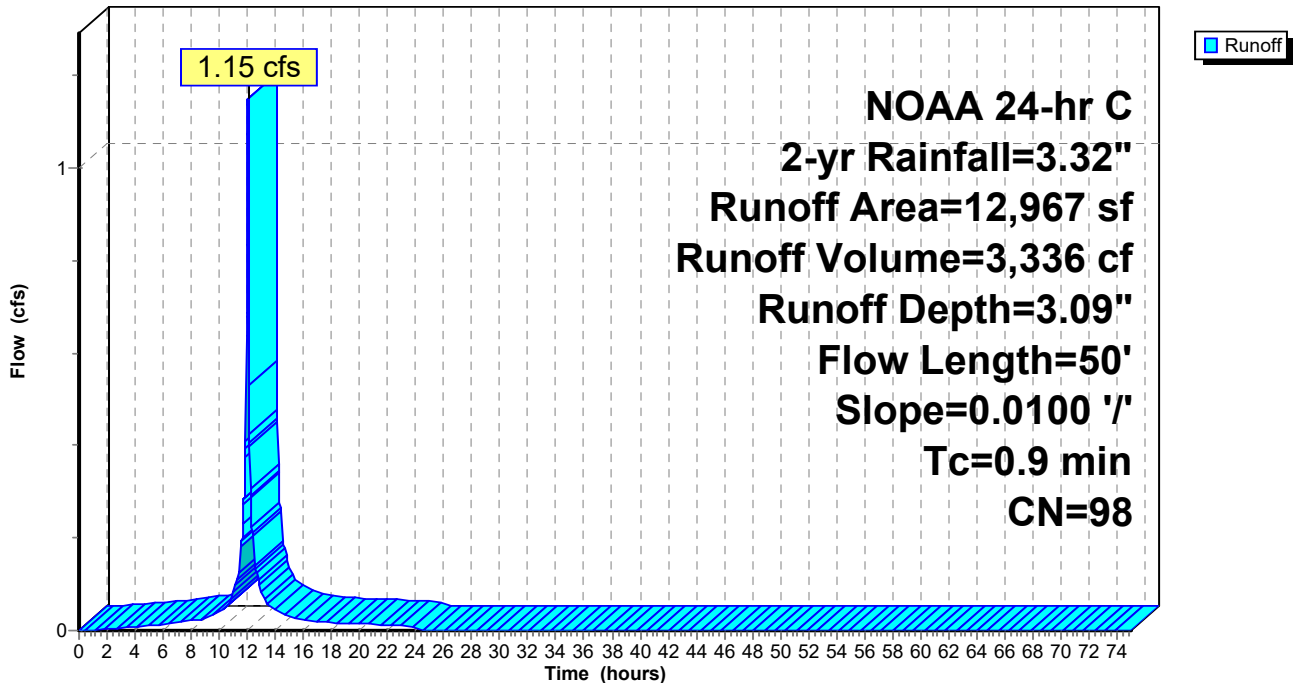
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 2-yr Rainfall=3.32"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 12,967 | 98 | Building 1-12 Roof |
| 12,967 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 0.9 | 50 | 0.0100 | 0.92 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 5S: Roof Area Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 31

Summary for Subcatchment 8S: By Pass

Runoff = 0.93 cfs @ 12.22 hrs, Volume= 3,420 cf, Depth= 1.36"

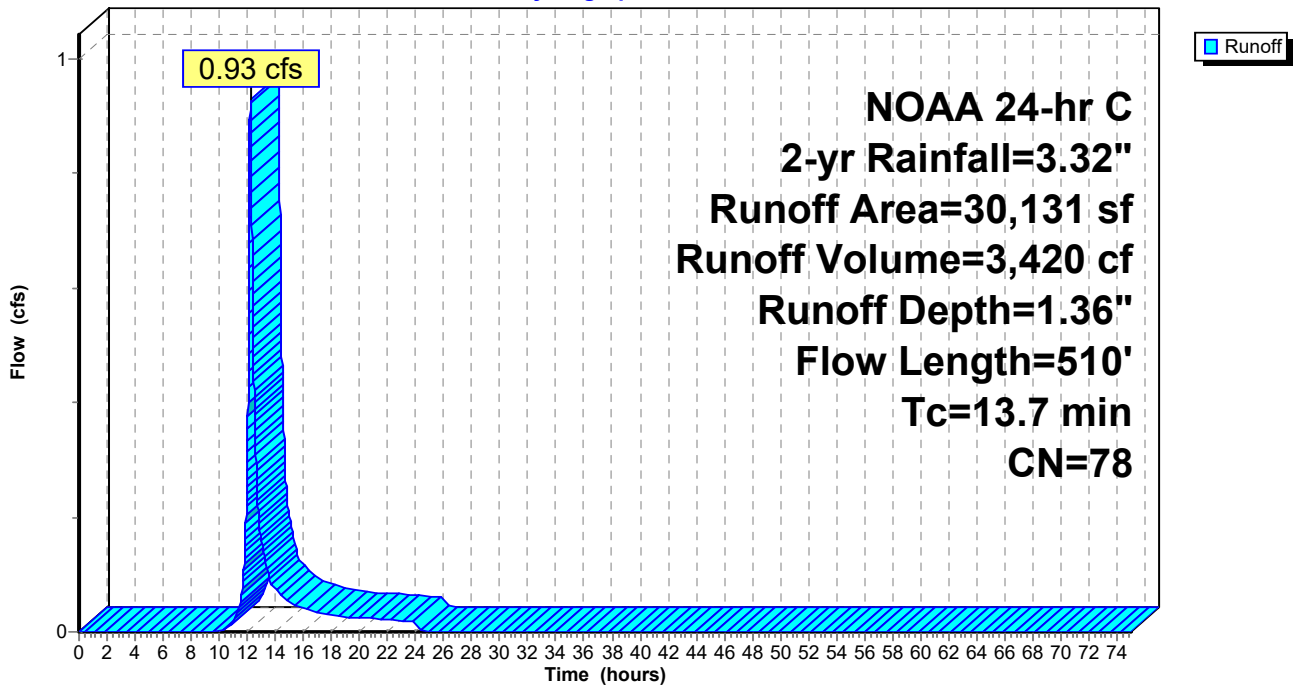
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 2-yr Rainfall=3.32"

| Area (sf) | CN | Description |
|-----------|----|----------------------------|
| * 30,131 | 78 | Landscaped (Heavily Treed) |
| 30,131 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 11.1 | 100 | | 0.15 | | Direct Entry, Sheet Flow Landscaped trees, shrubs, grass |
| 0.5 | 150 | 0.1000 | 5.09 | | Shallow Concentrated Flow, Shallow Concentrated landscaped |
| | | | | | Unpaved Kv= 16.1 fps |
| 2.1 | 260 | 0.0100 | 2.03 | | Shallow Concentrated Flow, Gutter Flow |
| | | | | | Paved Kv= 20.3 fps |
| 13.7 | 510 | Total | | | |

Subcatchment 8S: By Pass

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 32

Summary for Subcatchment 12S: Pervious Drainage Area 1

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 374 cf, Depth= 1.49"

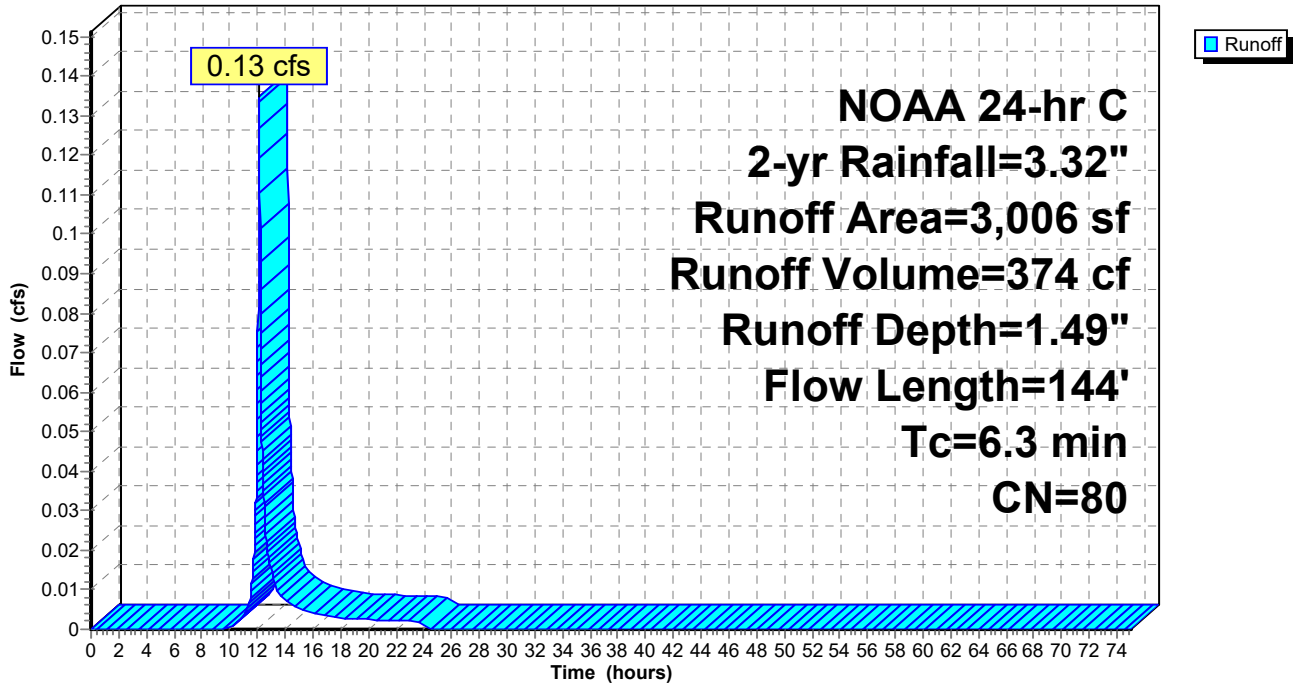
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 2-yr Rainfall=3.32"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,006 | 80 | Open Space |
| 3,006 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 12S: Pervious Drainage Area 1

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 33

Summary for Subcatchment 13S: Open Space Directly Into Detention Basin

Runoff = 0.11 cfs @ 12.18 hrs, Volume= 367 cf, Depth= 1.49"

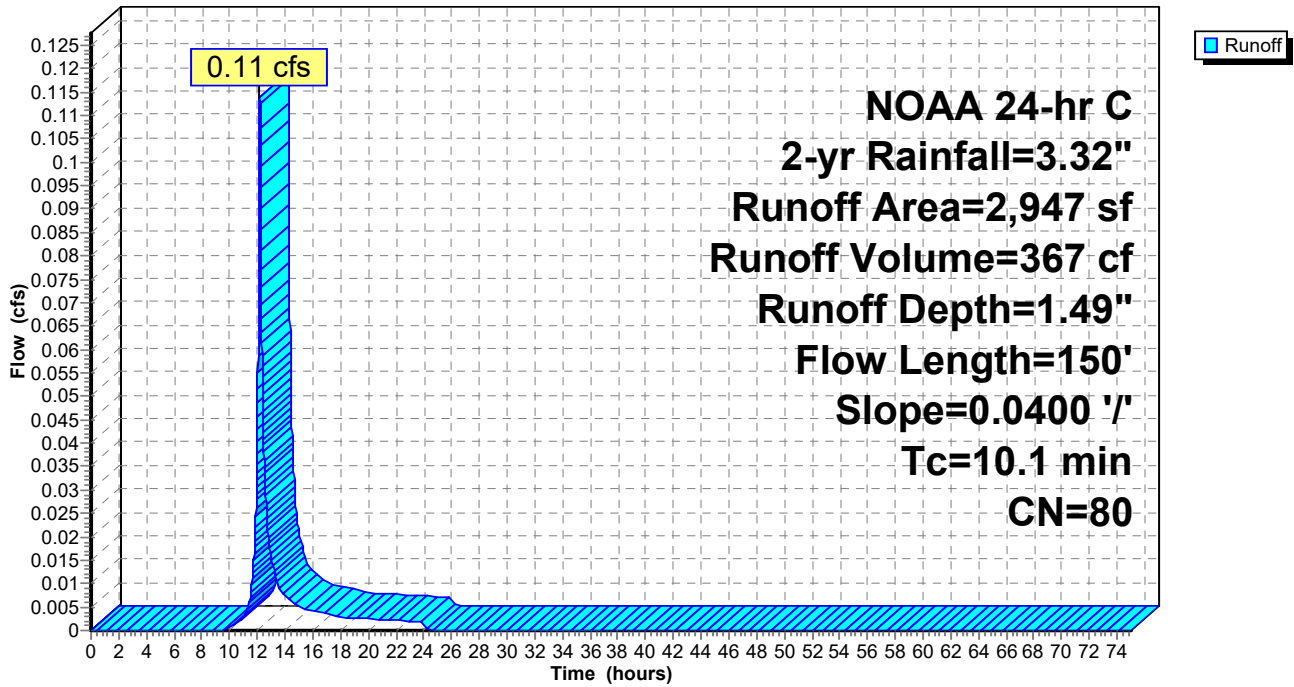
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 2-yr Rainfall=3.32"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,947 | 80 | Open Space |
| 2,947 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.1 | 150 | 0.0400 | 0.25 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |

Subcatchment 13S: Open Space Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 34

Summary for Subcatchment 14S: Pervious Drainage area 2

Runoff = 0.18 cfs @ 12.11 hrs, Volume= 440 cf, Depth= 1.49"

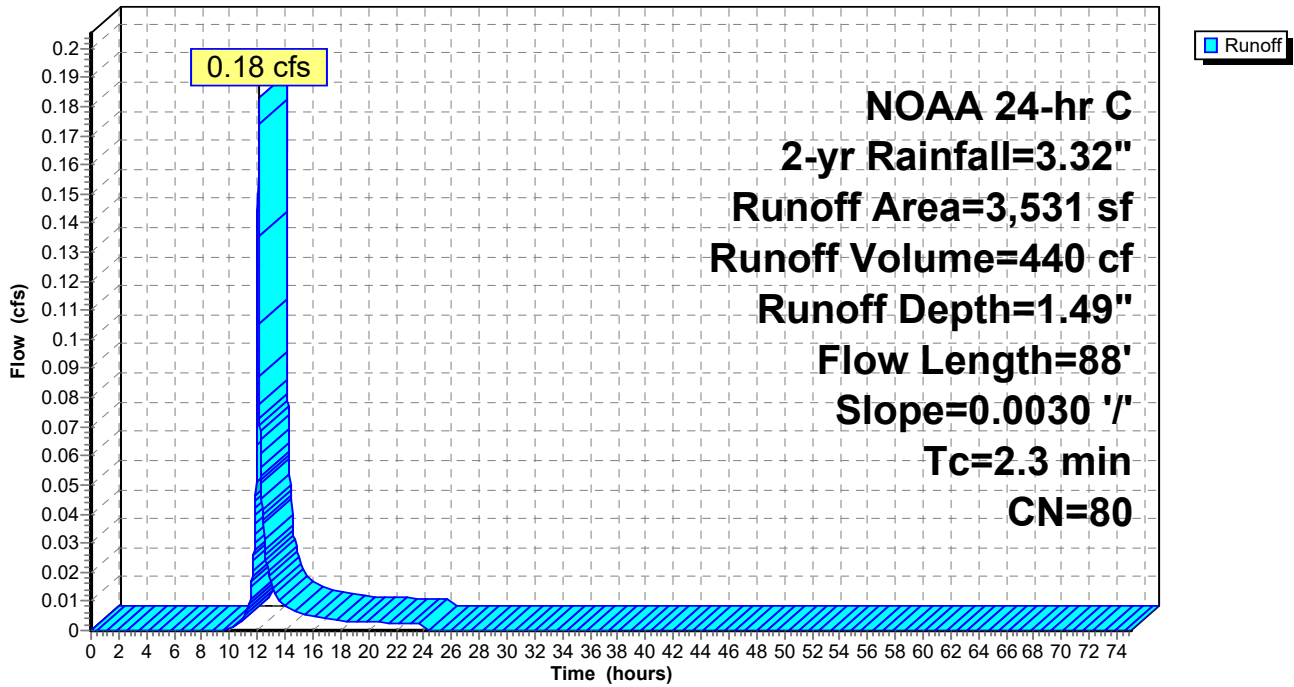
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 2-yr Rainfall=3.32"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,531 | 80 | Open Space |
| 3,531 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 14S: Pervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 35

Summary for Subcatchment 16S: Pervious Drainage Area 3

Runoff = 0.14 cfs @ 12.10 hrs, Volume= 321 cf, Depth= 1.49"

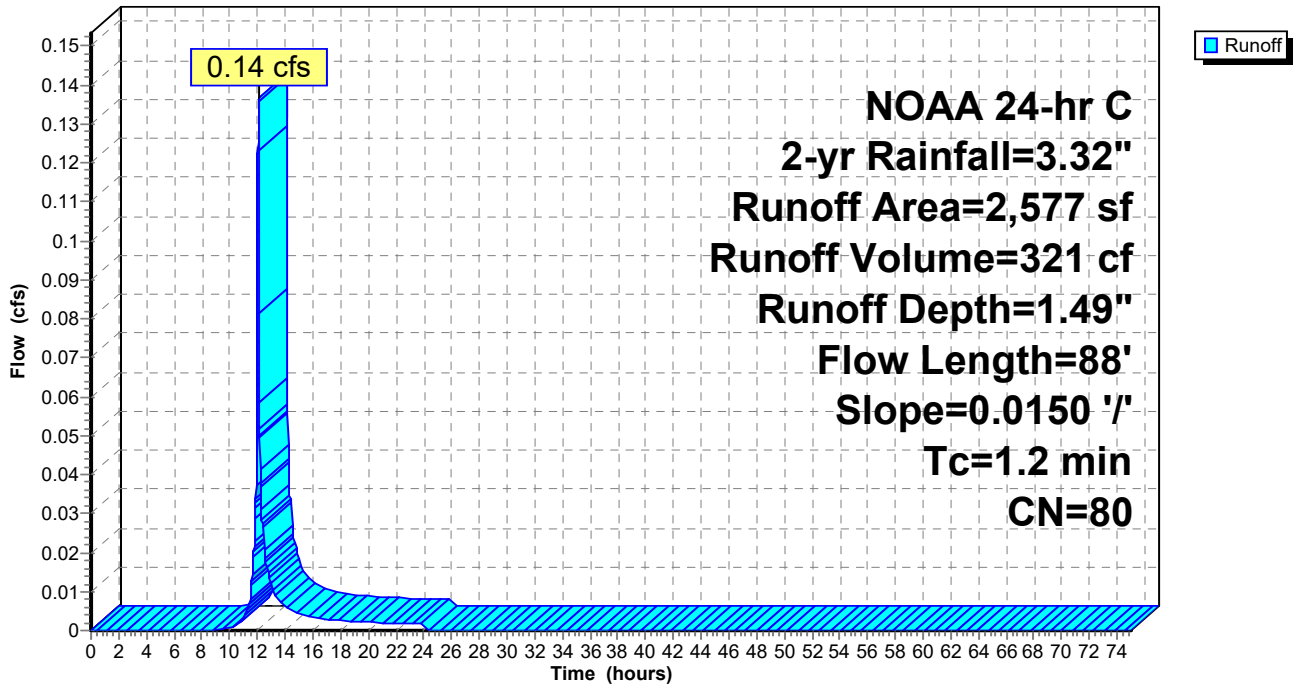
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-yr Rainfall=3.32"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,577 | 80 | Open Space |
| 2,577 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 16S: Pervious Drainage Area 3

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 36

Summary for Pond 7P: Existing Catch Basin

Inflow Area = 73,875 sf, 42.89% Impervious, Inflow Depth > 2.09" for 2-yr event
Inflow = 1.13 cfs @ 12.22 hrs, Volume= 12,843 cf
Outflow = 1.13 cfs @ 12.22 hrs, Volume= 12,843 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.22 hrs, Volume= 12,843 cf

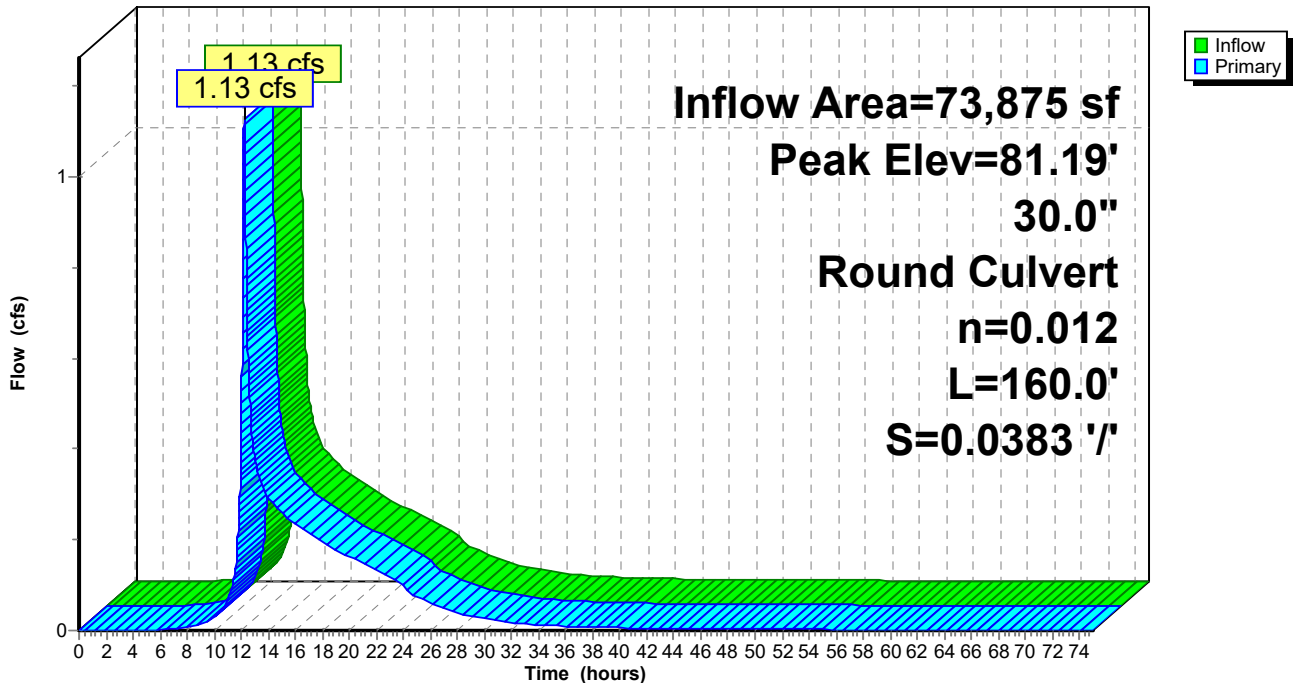
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.19' @ 12.22 hrs
Flood Elev= 85.30'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|---|
| #1 | Primary | 80.73' | 30.0" Round Culvert L= 160.0' Ke= 0.900 Inlet / Outlet Invert= 80.73' / 74.61' S= 0.0383 '/ Cc= 0.900 n= 0.012, Flow Area= 4.91 sf |

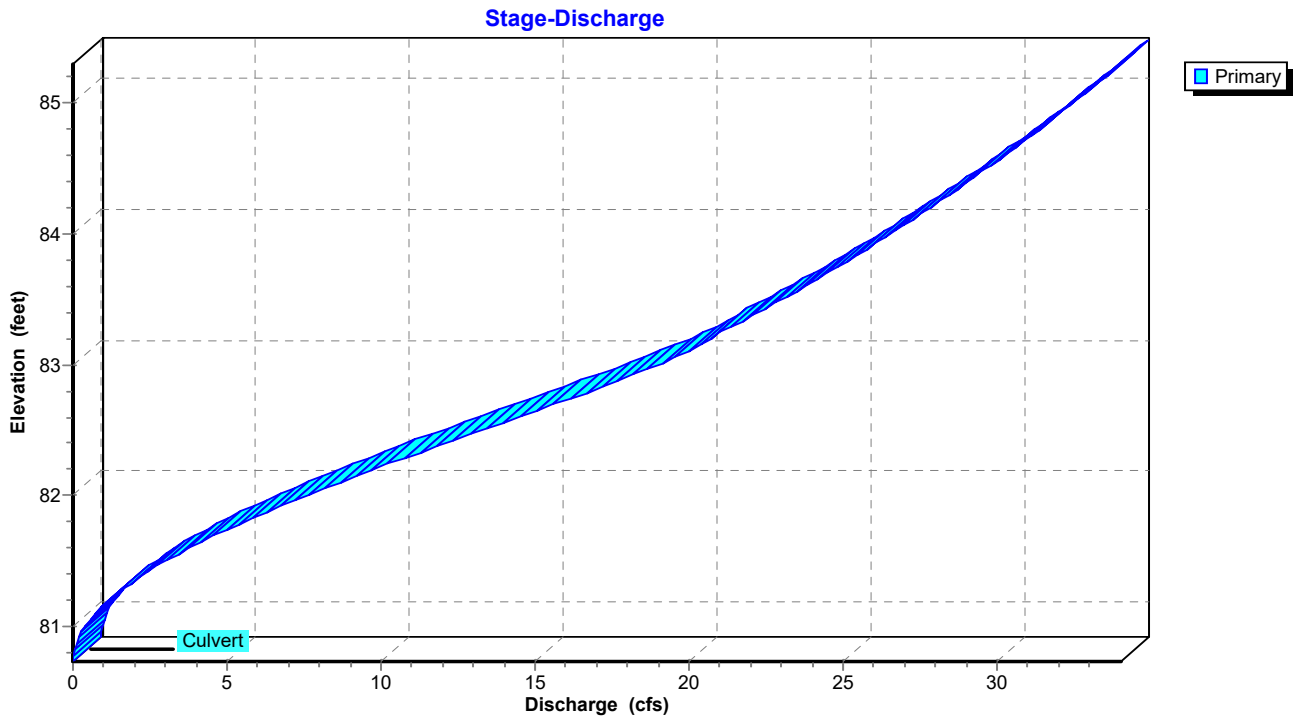
Primary OutFlow Max=1.13 cfs @ 12.22 hrs HW=81.19' (Free Discharge)
↑**1=Culvert** (Inlet Controls 1.13 cfs @ 1.82 fps)

Pond 7P: Existing Catch Basin

Hydrograph



Pond 7P: Existing Catch Basin



Summary for Pond 8P: Porous Pavement Detention

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth = 2.65" for 2-yr event
 Inflow = 3.28 cfs @ 12.10 hrs, Volume= 9,653 cf
 Outflow = 0.22 cfs @ 13.21 hrs, Volume= 9,423 cf, Atten= 93%, Lag= 67.1 min
 Primary = 0.22 cfs @ 13.21 hrs, Volume= 9,423 cf

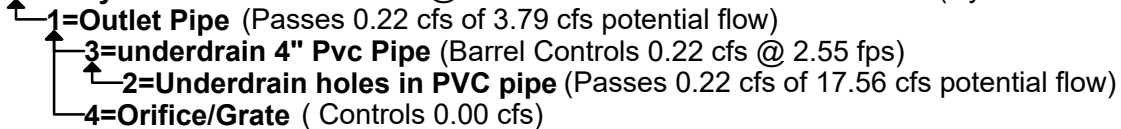
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 100.78' @ 13.21 hrs Surf.Area= 11,000 sf Storage= 5,652 cf

Plug-Flow detention time= 424.4 min calculated for 9,422 cf (98% of inflow)
 Center-of-Mass det. time= 409.7 min (1,176.8 - 767.1)

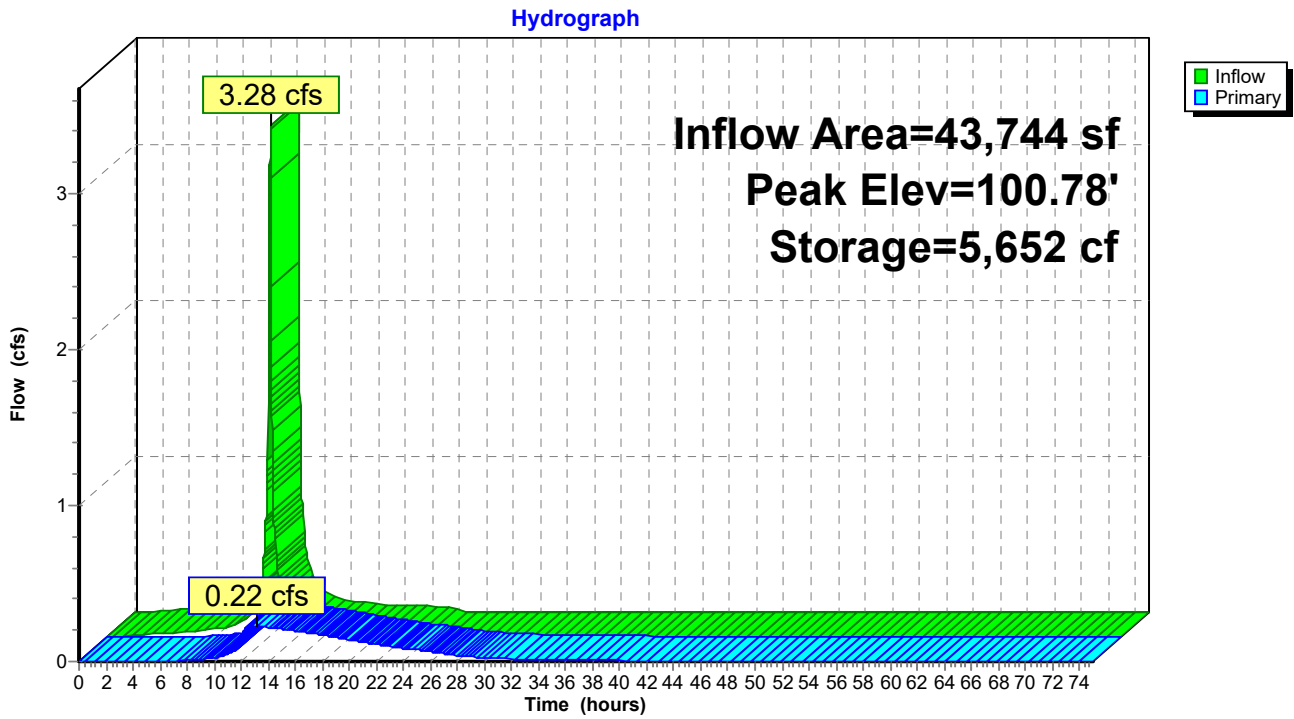
| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 99.50' | 13,200 cf | 100.00'W x 110.00'L x 3.00'H Prismatic 33,000 cf Overall x 40.0% Voids |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|--|
| #1 | Primary | 99.50' | 15.0" Round Outlet Pipe L= 101.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 97.48' S= 0.0200 1/ S= 0.0200 1/ Cc= 0.900 n= 0.011, Flow Area= 1.23 sf |
| #2 | Device 3 | 99.50' | 1.0" Horiz. Underdrain holes in PVC pipe X 590.00 C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 99.50' | 4.0" Round underdrain 4" Pvc Pipe L= 77.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 99.50' S= 0.0000 1/ Cc= 0.900 n= 0.011, Flow Area= 0.09 sf |
| #4 | Device 1 | 101.50' | 18.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

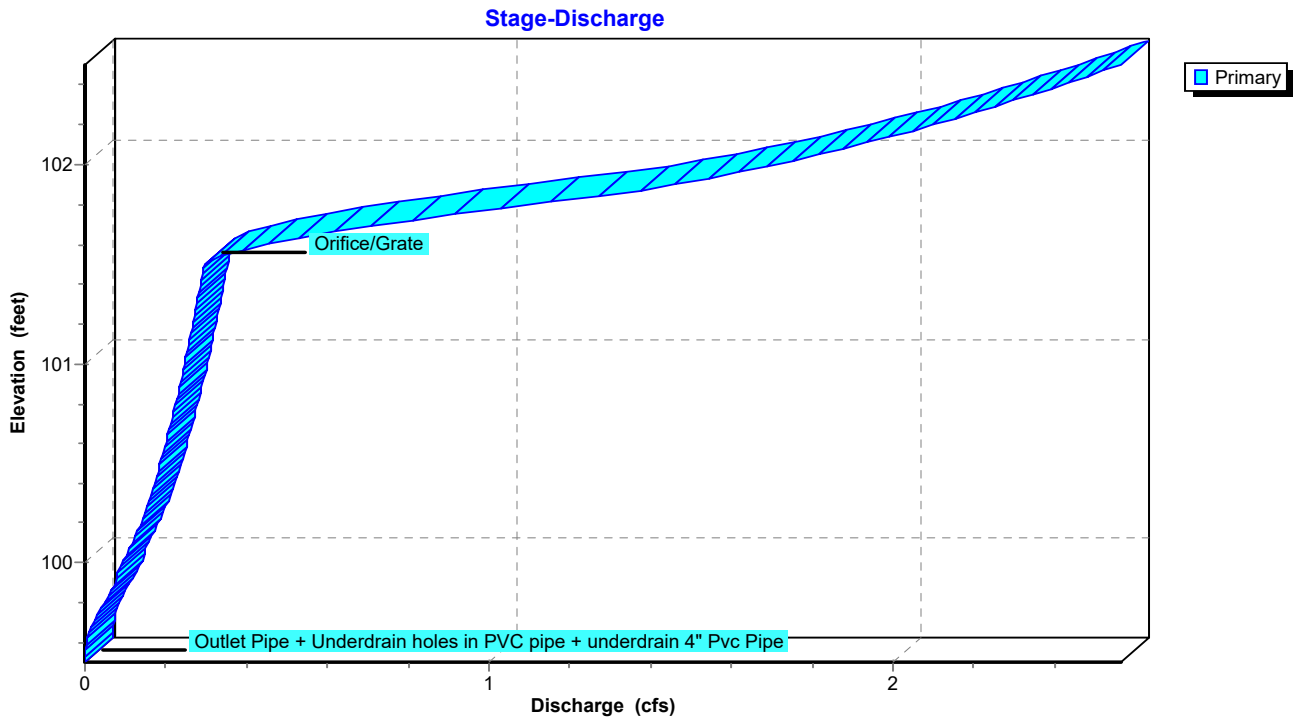
Primary OutFlow Max=0.22 cfs @ 13.21 hrs HW=100.78' TW=86.83' (Dynamic Tailwater)



Pond 8P: Porous Pavement Detention



Pond 8P: Porous Pavement Detention



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 40

Summary for Pond 9P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 2.59" for 2-yr event
Inflow = 0.22 cfs @ 13.21 hrs, Volume= 9,423 cf
Outflow = 0.22 cfs @ 13.21 hrs, Volume= 9,423 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.22 cfs @ 13.21 hrs, Volume= 9,423 cf

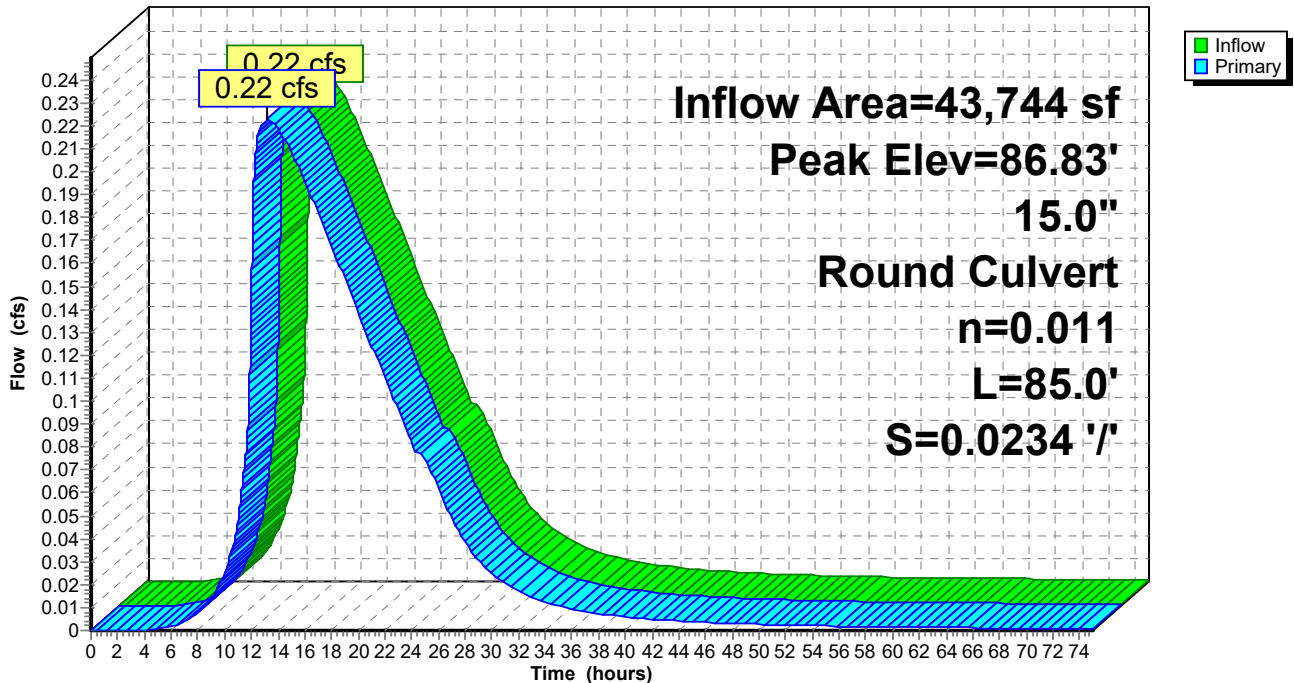
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 86.83' @ 13.21 hrs
Flood Elev= 102.50'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|--|
| #1 | Primary | 86.59' | 15.0" Round Culvert L= 85.0' Ke= 0.900 Inlet / Outlet Invert= 86.59' / 84.60' S= 0.0234 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

Primary OutFlow Max=0.22 cfs @ 13.21 hrs HW=86.83' TW=81.84' (Dynamic Tailwater)
↑1=Culvert (Inlet Controls 0.22 cfs @ 1.33 fps)

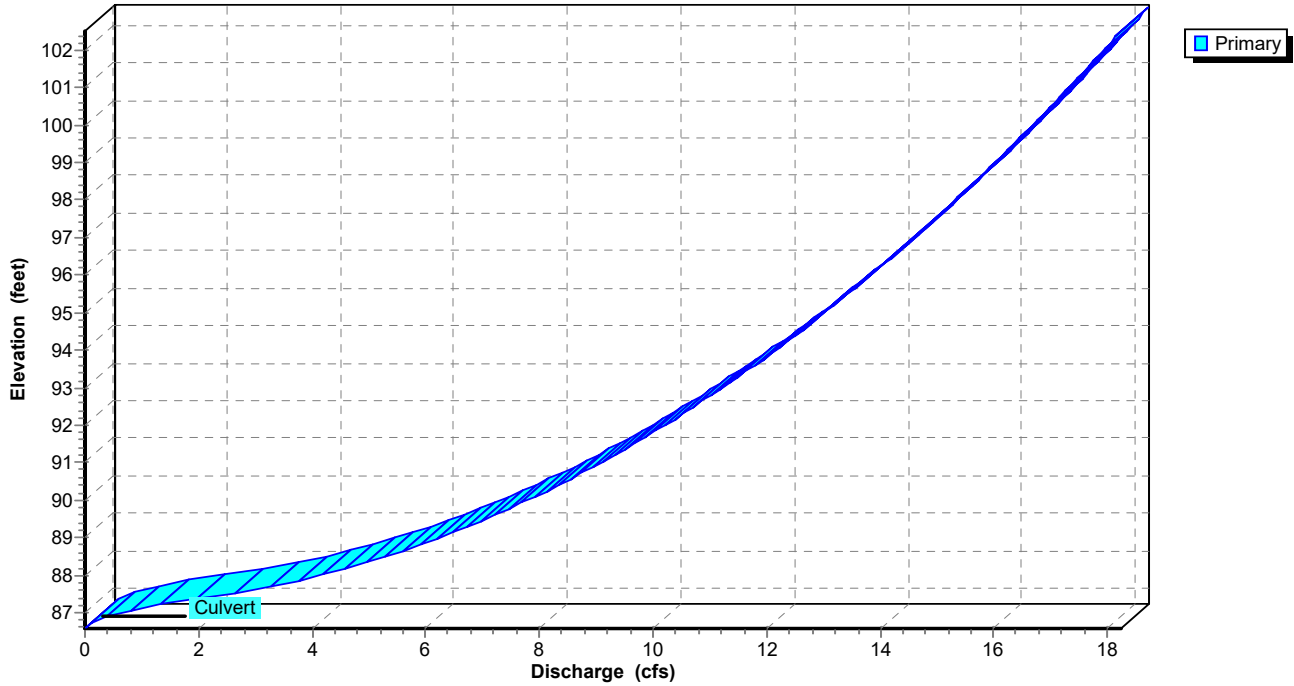
Pond 9P: Manhole

Hydrograph



Pond 9P: Manhole

Stage-Discharge



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 2-yr Rainfall=3.32"

Printed 12/29/2022

Page 42

Summary for Pond 11P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 2.59" for 2-yr event
 Inflow = 0.22 cfs @ 13.21 hrs, Volume= 9,423 cf
 Outflow = 0.22 cfs @ 13.21 hrs, Volume= 9,423 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.22 cfs @ 13.21 hrs, Volume= 9,423 cf

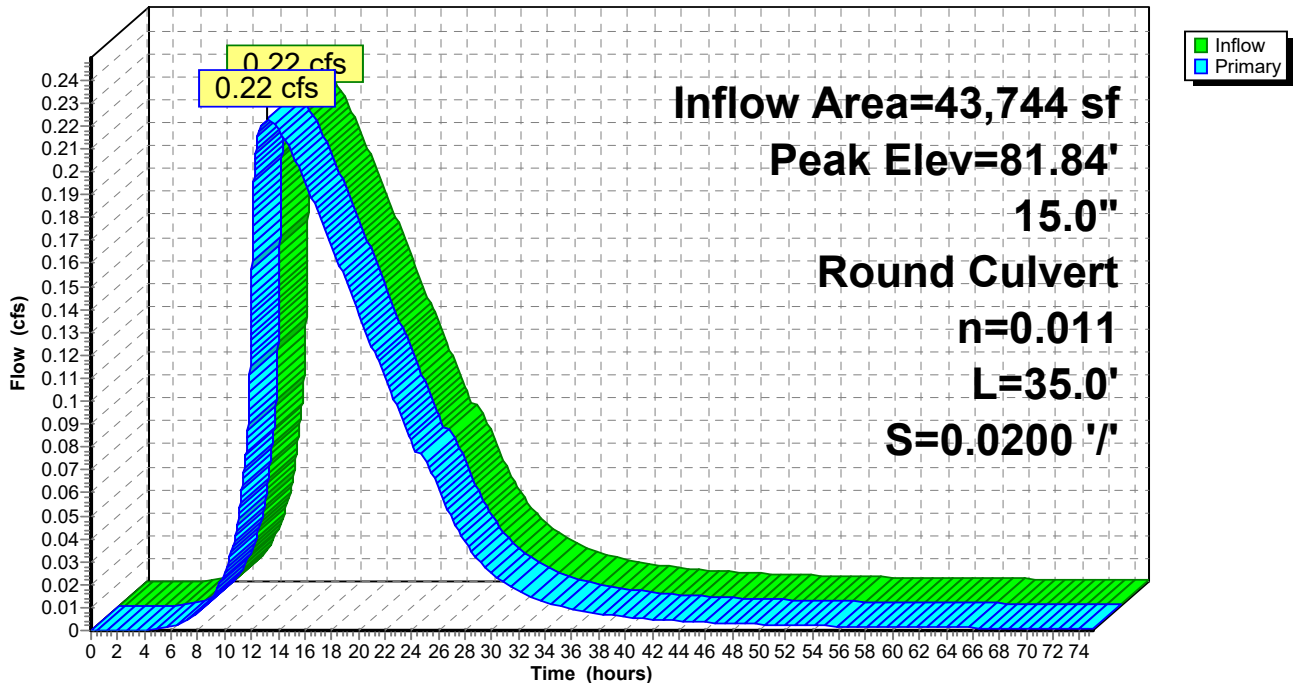
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 81.84' @ 13.21 hrs
 Flood Elev= 89.20'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|--|
| #1 | Primary | 81.60' | 15.0" Round Culvert L= 35.0' Ke= 0.900 Inlet / Outlet Invert= 81.60' / 80.90' S= 0.0200 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

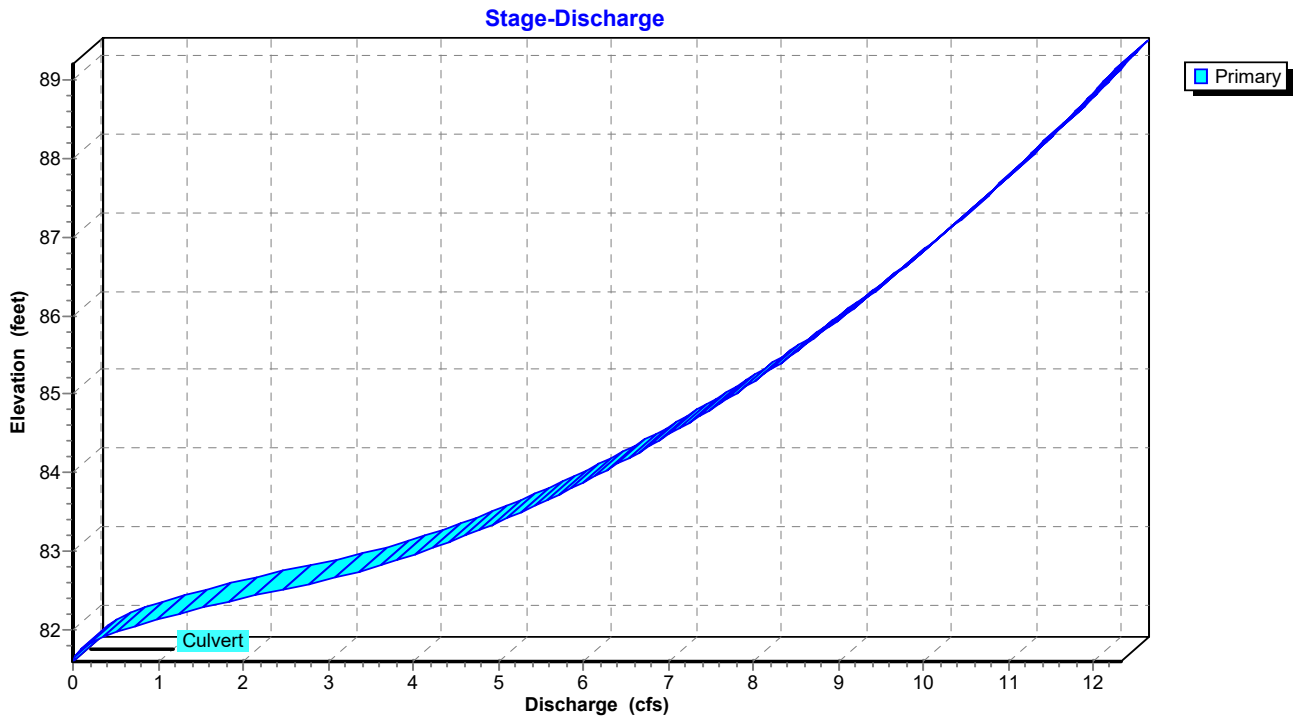
Primary OutFlow Max=0.22 cfs @ 13.21 hrs HW=81.84' TW=80.98' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.22 cfs @ 1.33 fps)

Pond 11P: Manhole

Hydrograph



Pond 11P: Manhole



9270 Proposed Drainage Porous Pvmt r6

NOAA 24-hr C 10-yr Rainfall=5.06"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 44

Time span=0.00-75.00 hrs, dt=0.01 hrs, 7501 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Impervious Drainage Runoff Area=4,693 sf 100.00% Impervious Runoff Depth=4.82"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=98 Runoff=0.64 cfs 1,886 cf

Subcatchment 2S: Impervious Drainage Runoff Area=5,099 sf 100.00% Impervious Runoff Depth=4.82"
 Flow Length=144' Tc=6.3 min CN=98 Runoff=0.63 cfs 2,049 cf

Subcatchment 4S: Drainage Area 3 Runoff Area=8,924 sf 100.00% Impervious Runoff Depth=4.82"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=98 Runoff=1.21 cfs 3,587 cf

Subcatchment 5S: Roof Area Directly Into Runoff Area=12,967 sf 100.00% Impervious Runoff Depth=4.82"
 Flow Length=50' Slope=0.0100 '/' Tc=0.9 min CN=98 Runoff=1.76 cfs 5,212 cf

Subcatchment 8S: By Pass Runoff Area=30,131 sf 0.00% Impervious Runoff Depth=2.76"
 Flow Length=510' Tc=13.7 min CN=78 Runoff=1.91 cfs 6,937 cf

Subcatchment 12S: Pervious Drainage Area 1 Runoff Area=3,006 sf 0.00% Impervious Runoff Depth=2.95"
 Flow Length=144' Tc=6.3 min CN=80 Runoff=0.26 cfs 738 cf

Subcatchment 13S: Open Space Directly Into Runoff Area=2,947 sf 0.00% Impervious Runoff Depth=2.95"
 Flow Length=150' Slope=0.0400 '/' Tc=10.1 min CN=80 Runoff=0.22 cfs 723 cf

Subcatchment 14S: Pervious Drainage area 2 Runoff Area=3,531 sf 0.00% Impervious Runoff Depth=2.95"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=80 Runoff=0.35 cfs 867 cf

Subcatchment 16S: Pervious Drainage Area 3 Runoff Area=2,577 sf 0.00% Impervious Runoff Depth=2.95"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=80 Runoff=0.26 cfs 632 cf

Pond 7P: Existing Catch Basin Peak Elev=81.38' Inflow=2.18 cfs 22,390 cf
 30.0" Round Culvert n=0.012 L=160.0' S=0.0383 '/' Outflow=2.18 cfs 22,390 cf

Pond 8P: Porous Pavement Detention Peak Elev=101.57' Storage=9,130 cf Inflow=5.24 cfs 15,694 cf
 Outflow=0.40 cfs 15,453 cf

Pond 9P: Manhole Peak Elev=86.92' Inflow=0.40 cfs 15,453 cf
 15.0" Round Culvert n=0.011 L=85.0' S=0.0234 '/' Outflow=0.40 cfs 15,453 cf

Pond 11P: Manhole Peak Elev=81.93' Inflow=0.40 cfs 15,453 cf
 15.0" Round Culvert n=0.011 L=35.0' S=0.0200 '/' Outflow=0.40 cfs 15,453 cf

Total Runoff Area = 73,875 sf Runoff Volume = 22,631 cf Average Runoff Depth = 3.68"
57.11% Pervious = 42,192 sf 42.89% Impervious = 31,683 sf

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 45

Summary for Subcatchment 1S: Impervious Drainage area 2

Runoff = 0.64 cfs @ 12.10 hrs, Volume= 1,886 cf, Depth= 4.82"

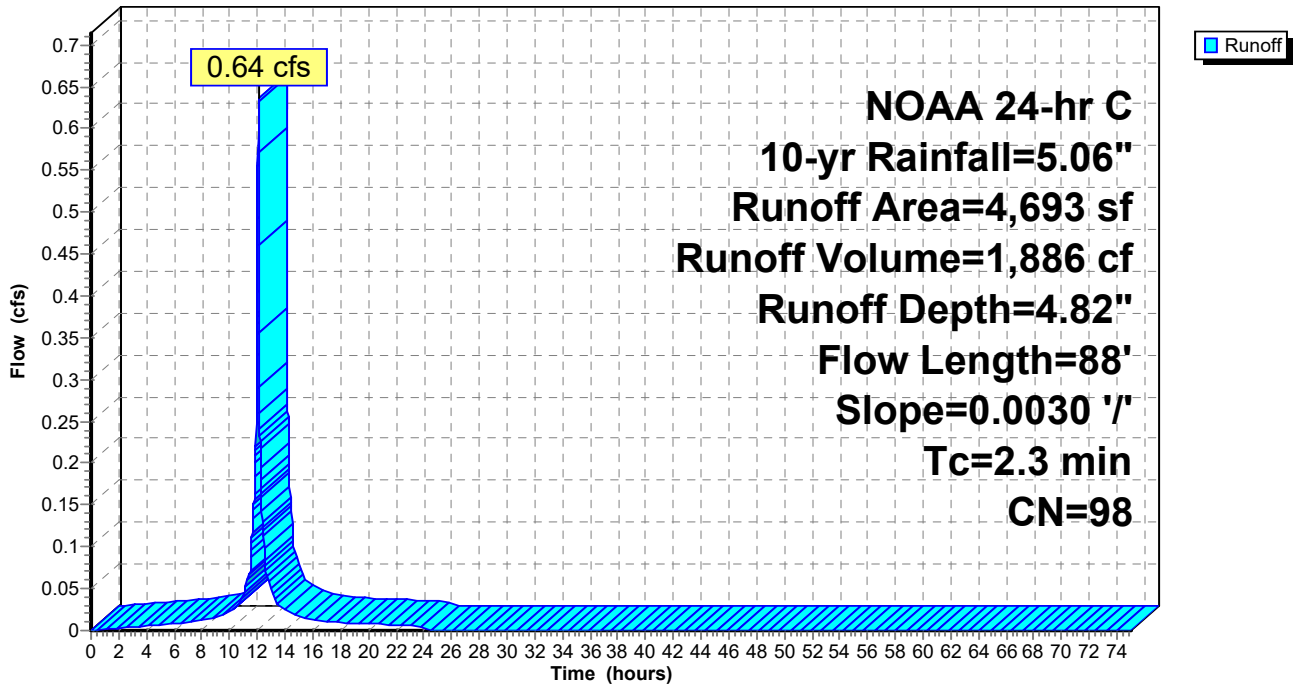
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 10-yr Rainfall=5.06"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 3,990 | 98 | Pavement |
| * | 703 | 98 | Sidewalk |
| | 4,693 | 98 | Weighted Average |
| | 4,693 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 1S: Impervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 46

Summary for Subcatchment 2S: Impervious Drainage Area 1

Runoff = 0.63 cfs @ 12.13 hrs, Volume= 2,049 cf, Depth= 4.82"

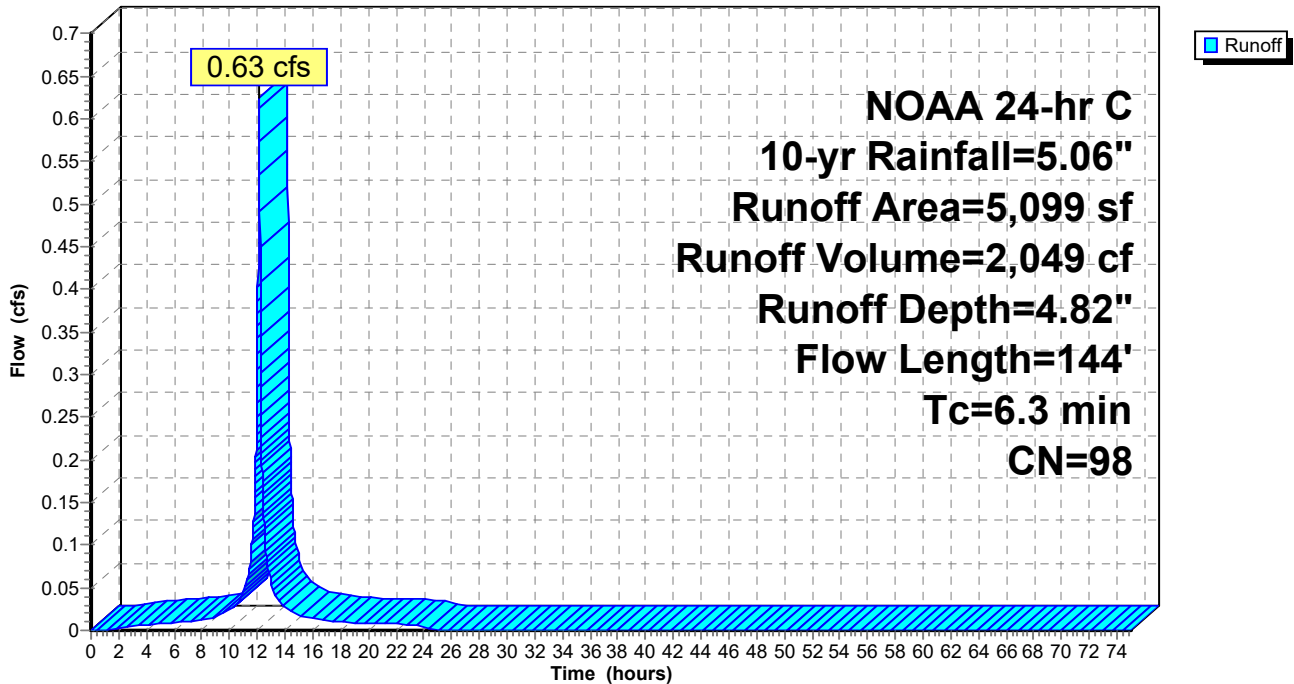
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 10-yr Rainfall=5.06"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 4,563 | 98 | Pavement |
| * | 536 | 98 | Sidewalk |
| | 5,099 | 98 | Weighted Average |
| | 5,099 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 2S: Impervious Drainage Area 1

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 47

Summary for Subcatchment 4S: Drainage Area 3

Runoff = 1.21 cfs @ 12.09 hrs, Volume= 3,587 cf, Depth= 4.82"

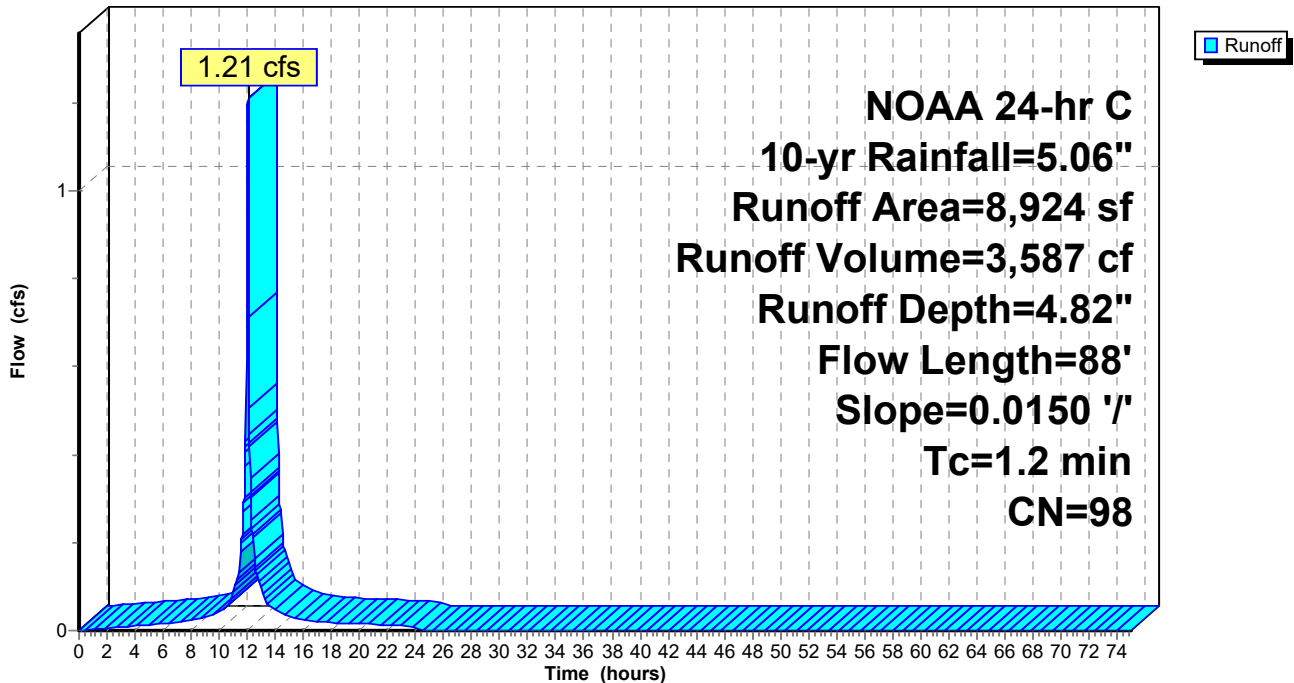
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 10-yr Rainfall=5.06"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 8,182 | 98 | Pavement |
| * | 742 | 98 | Sidewalk |
| | 8,924 | 98 | Weighted Average |
| | 8,924 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 4S: Drainage Area 3

Hydrograph



Summary for Subcatchment 5S: Roof Area Directly Into Detention Basin

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.76 cfs @ 12.09 hrs, Volume= 5,212 cf, Depth= 4.82"

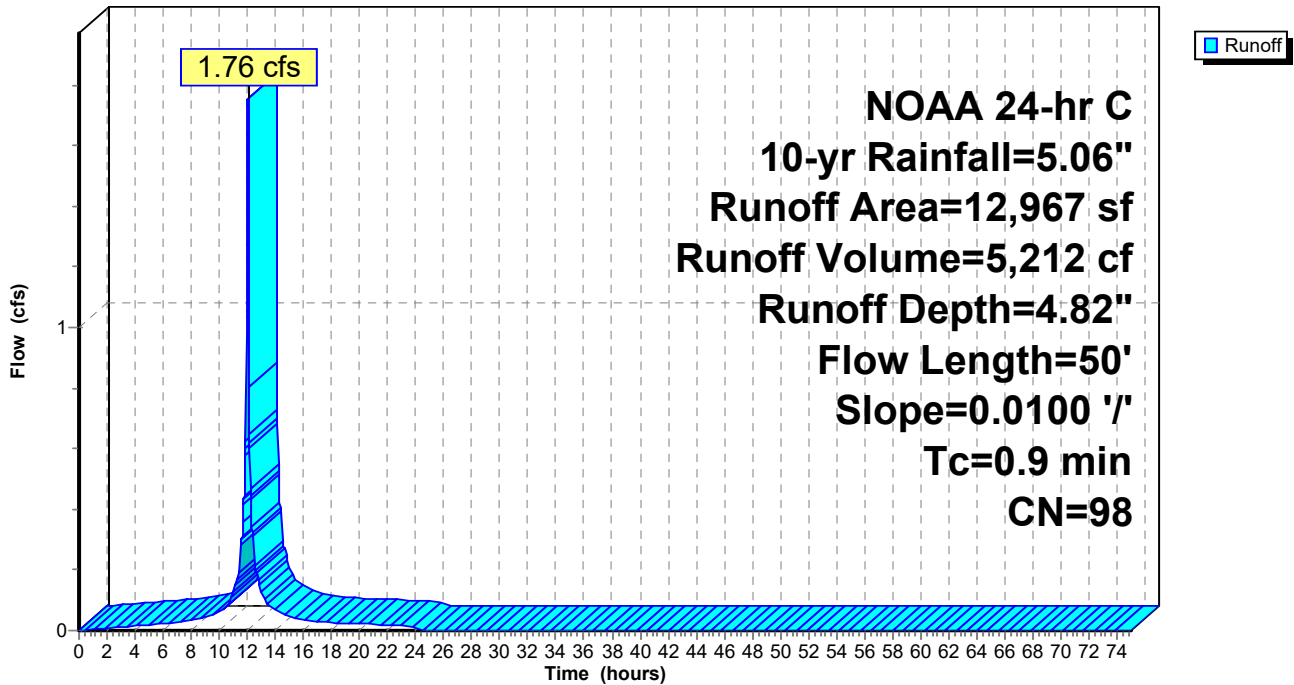
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 10-yr Rainfall=5.06"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 12,967 | 98 | Building 1-12 Roof |
| 12,967 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 0.9 | 50 | 0.0100 | 0.92 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 5S: Roof Area Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 49

Summary for Subcatchment 8S: By Pass

Runoff = 1.91 cfs @ 12.22 hrs, Volume= 6,937 cf, Depth= 2.76"

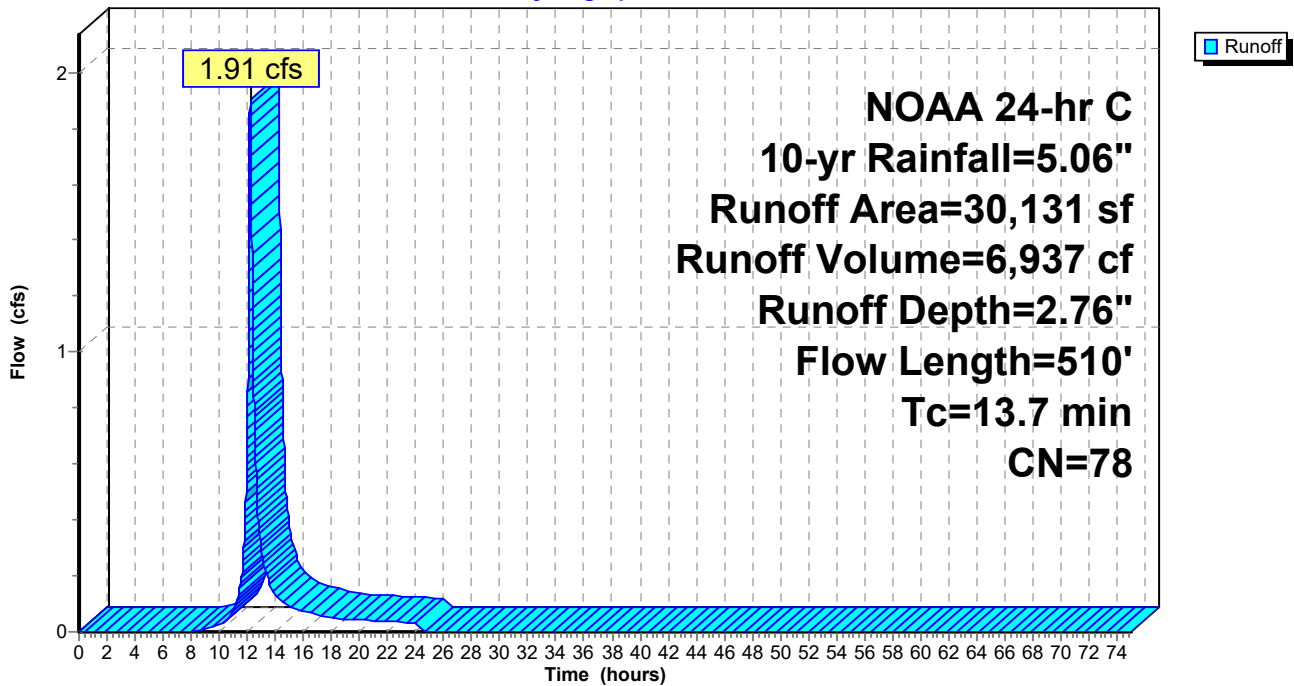
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 10-yr Rainfall=5.06"

| Area (sf) | CN | Description |
|-----------|----|----------------------------|
| * 30,131 | 78 | Landscaped (Heavily Treed) |
| 30,131 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 11.1 | 100 | | 0.15 | | Direct Entry, Sheet Flow Landscaped trees, shrubs, grass |
| 0.5 | 150 | 0.1000 | 5.09 | | Shallow Concentrated Flow, Shallow Concentrated landscaped |
| | | | | | Unpaved Kv= 16.1 fps |
| 2.1 | 260 | 0.0100 | 2.03 | | Shallow Concentrated Flow, Gutter Flow |
| | | | | | Paved Kv= 20.3 fps |
| 13.7 | 510 | Total | | | |

Subcatchment 8S: By Pass

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 50

Summary for Subcatchment 12S: Pervious Drainage Area 1

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 738 cf, Depth= 2.95"

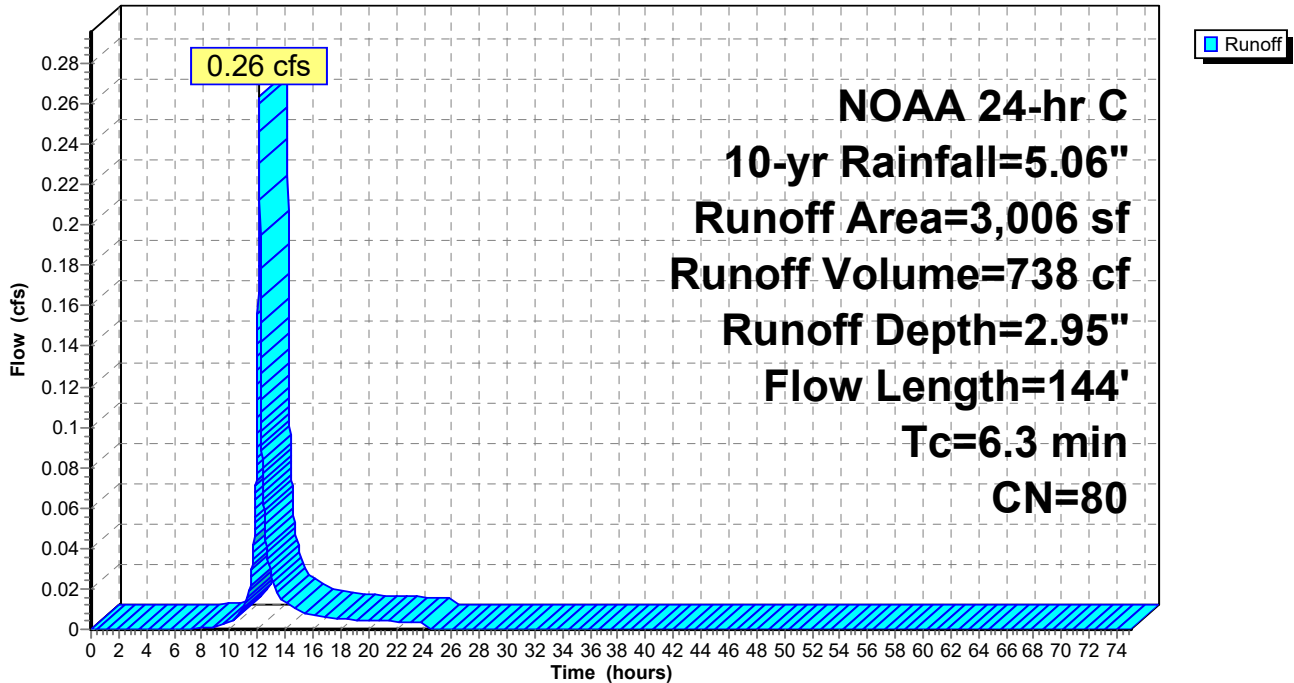
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 10-yr Rainfall=5.06"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,006 | 80 | Open Space |
| 3,006 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 12S: Pervious Drainage Area 1

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 51

Summary for Subcatchment 13S: Open Space Directly Into Detention Basin

Runoff = 0.22 cfs @ 12.18 hrs, Volume= 723 cf, Depth= 2.95"

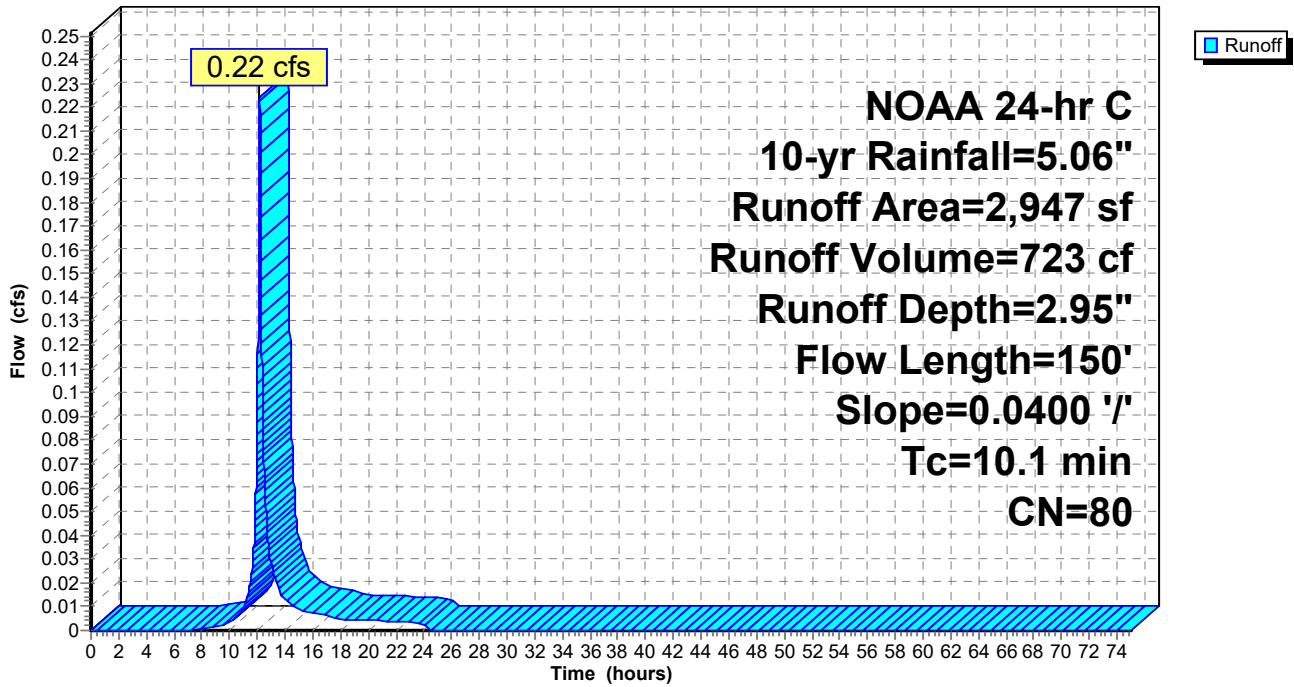
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-yr Rainfall=5.06"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,947 | 80 | Open Space |
| 2,947 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.1 | 150 | 0.0400 | 0.25 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |

Subcatchment 13S: Open Space Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 52

Summary for Subcatchment 14S: Pervious Drainage area 2

Runoff = 0.35 cfs @ 12.10 hrs, Volume= 867 cf, Depth= 2.95"

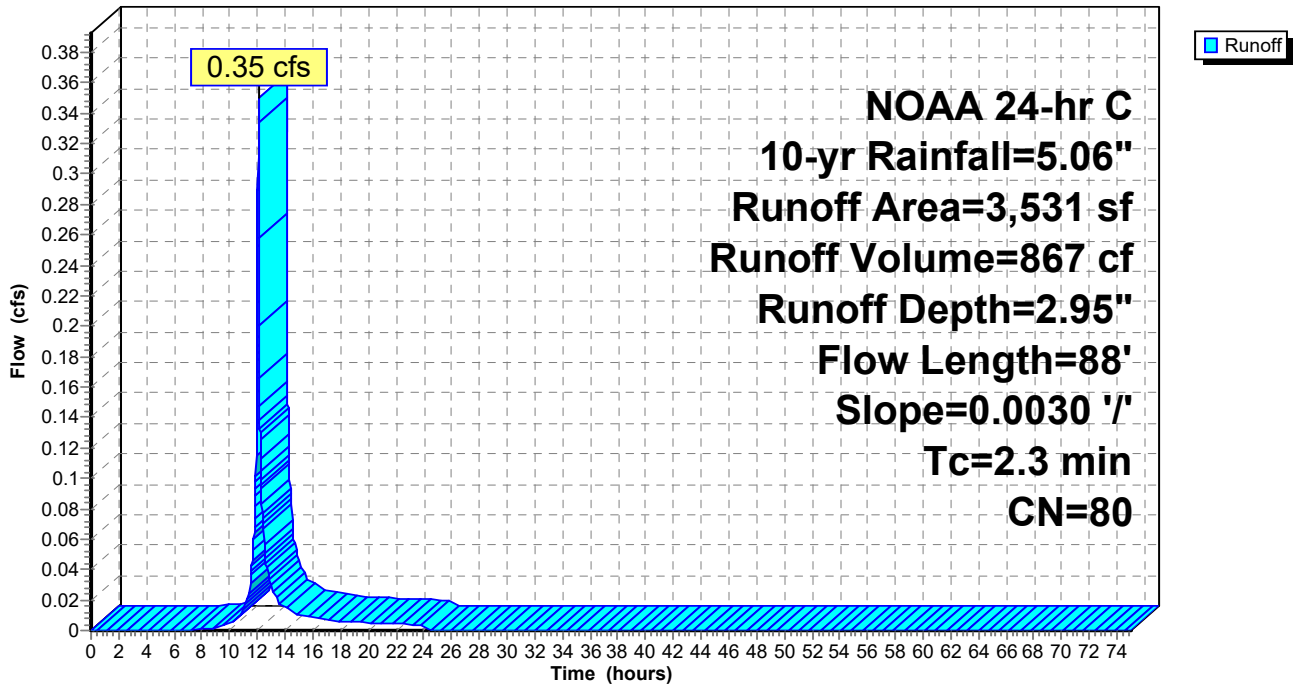
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 10-yr Rainfall=5.06"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,531 | 80 | Open Space |
| 3,531 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 14S: Pervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 53

Summary for Subcatchment 16S: Pervious Drainage Area 3

Runoff = 0.26 cfs @ 12.10 hrs, Volume= 632 cf, Depth= 2.95"

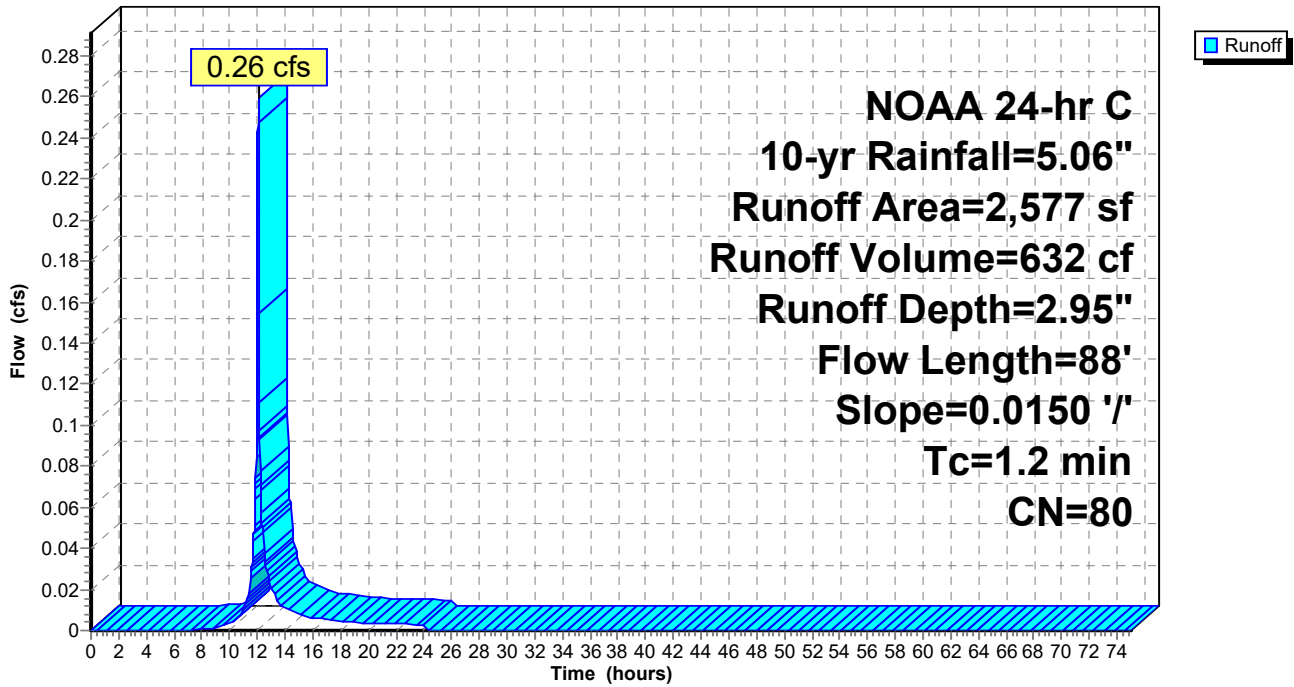
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 10-yr Rainfall=5.06"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,577 | 80 | Open Space |
| 2,577 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 16S: Pervious Drainage Area 3

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 54

Summary for Pond 7P: Existing Catch Basin

Inflow Area = 73,875 sf, 42.89% Impervious, Inflow Depth > 3.64" for 10-yr event
Inflow = 2.18 cfs @ 12.22 hrs, Volume= 22,390 cf
Outflow = 2.18 cfs @ 12.22 hrs, Volume= 22,390 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.18 cfs @ 12.22 hrs, Volume= 22,390 cf

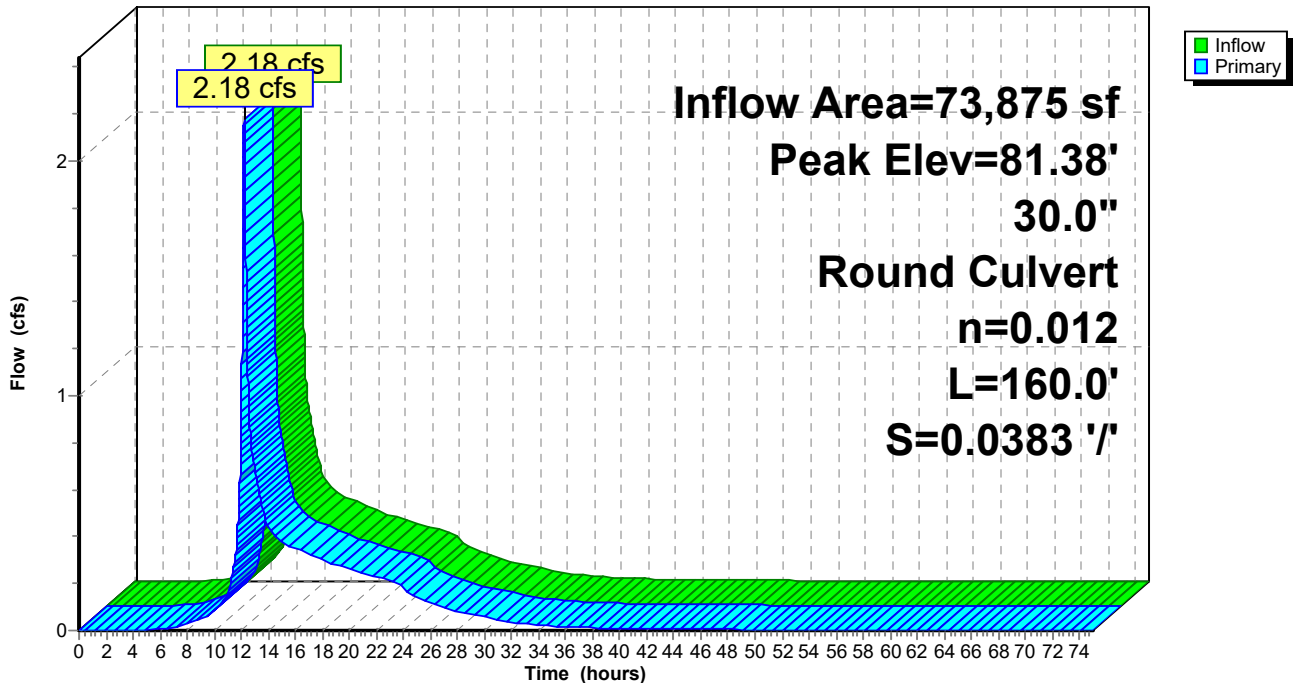
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.38' @ 12.22 hrs
Flood Elev= 85.30'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|---|
| #1 | Primary | 80.73' | 30.0" Round Culvert L= 160.0' Ke= 0.900 Inlet / Outlet Invert= 80.73' / 74.61' S= 0.0383 '/ Cc= 0.900 n= 0.012, Flow Area= 4.91 sf |

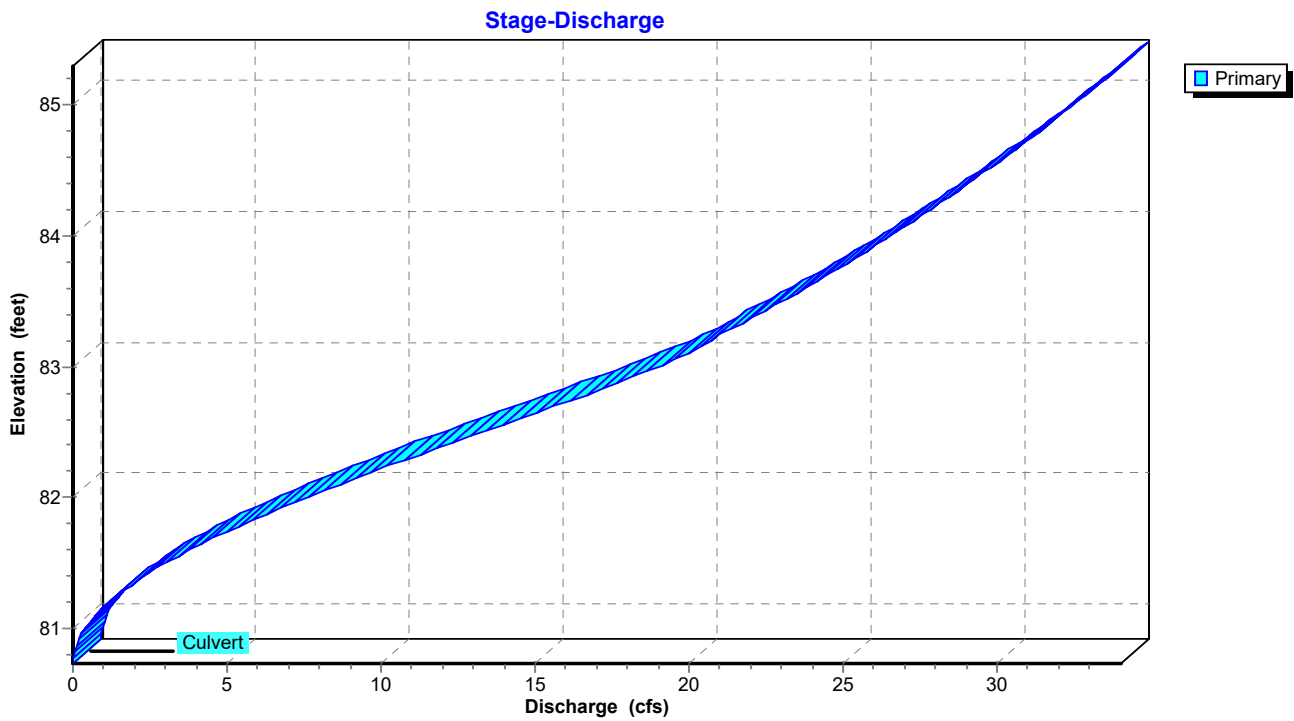
Primary OutFlow Max=2.18 cfs @ 12.22 hrs HW=81.38' (Free Discharge)
↑1=Culvert (Inlet Controls 2.18 cfs @ 2.16 fps)

Pond 7P: Existing Catch Basin

Hydrograph



Pond 7P: Existing Catch Basin



Summary for Pond 8P: Porous Pavement Detention

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth = 4.31" for 10-yr event
 Inflow = 5.24 cfs @ 12.10 hrs, Volume= 15,694 cf
 Outflow = 0.40 cfs @ 13.05 hrs, Volume= 15,453 cf, Atten= 92%, Lag= 57.4 min
 Primary = 0.40 cfs @ 13.05 hrs, Volume= 15,453 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 101.57' @ 13.05 hrs Surf.Area= 11,000 sf Storage= 9,130 cf

Plug-Flow detention time= 436.6 min calculated for 15,451 cf (98% of inflow)
 Center-of-Mass det. time= 426.9 min (1,186.7 - 759.8)

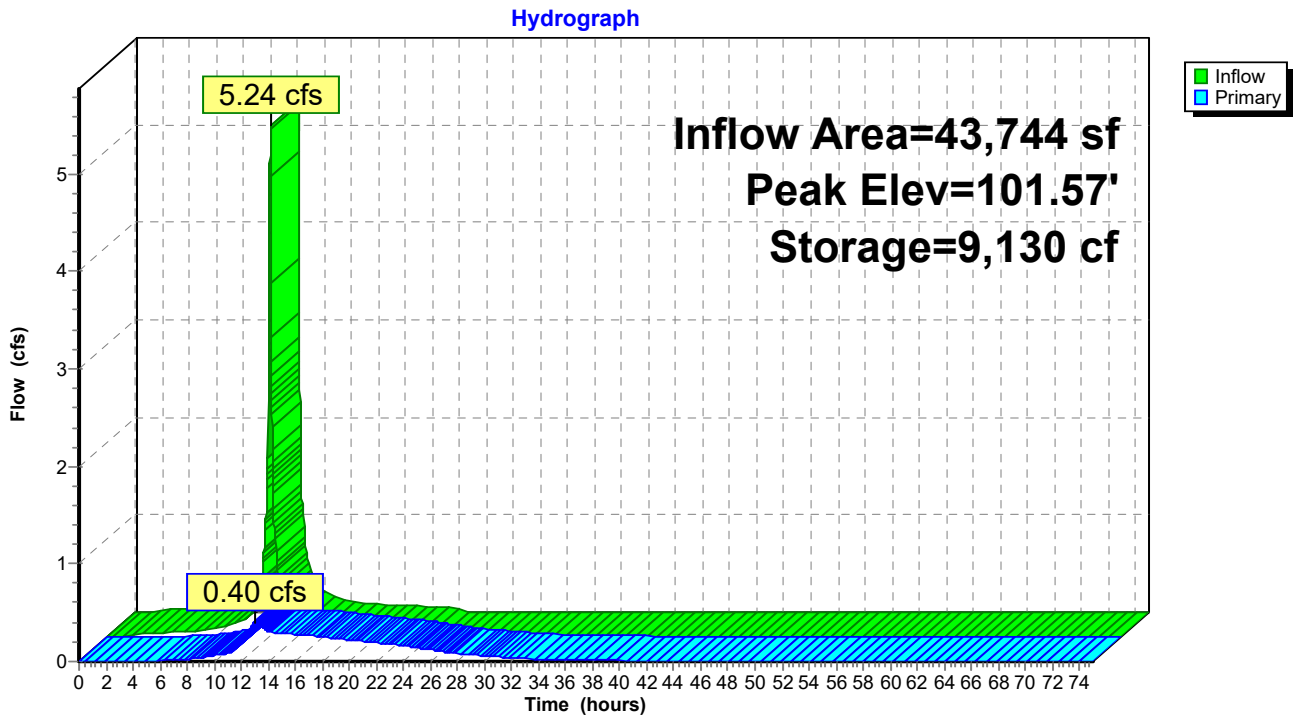
| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|---|
| #1 | 99.50' | 13,200 cf | 100.00'W x 110.00'L x 3.00'H Prismatoid 33,000 cf Overall x 40.0% Voids |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|---|
| #1 | Primary | 99.50' | 15.0" Round Outlet Pipe L= 101.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 97.48' S= 0.0200 1/ S= 0.0200 1/ Cc= 0.900 n= 0.011, Flow Area= 1.23 sf |
| #2 | Device 3 | 99.50' | 1.0" Horiz. Underdrain holes in PVC pipe X 590.00 C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 99.50' | 4.0" Round underdrain 4" Pvc Pipe L= 77.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 99.50' S= 0.0000 1/ S= 0.0000 1/ Cc= 0.900 n= 0.011, Flow Area= 0.09 sf |
| #4 | Device 1 | 101.50' | 18.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

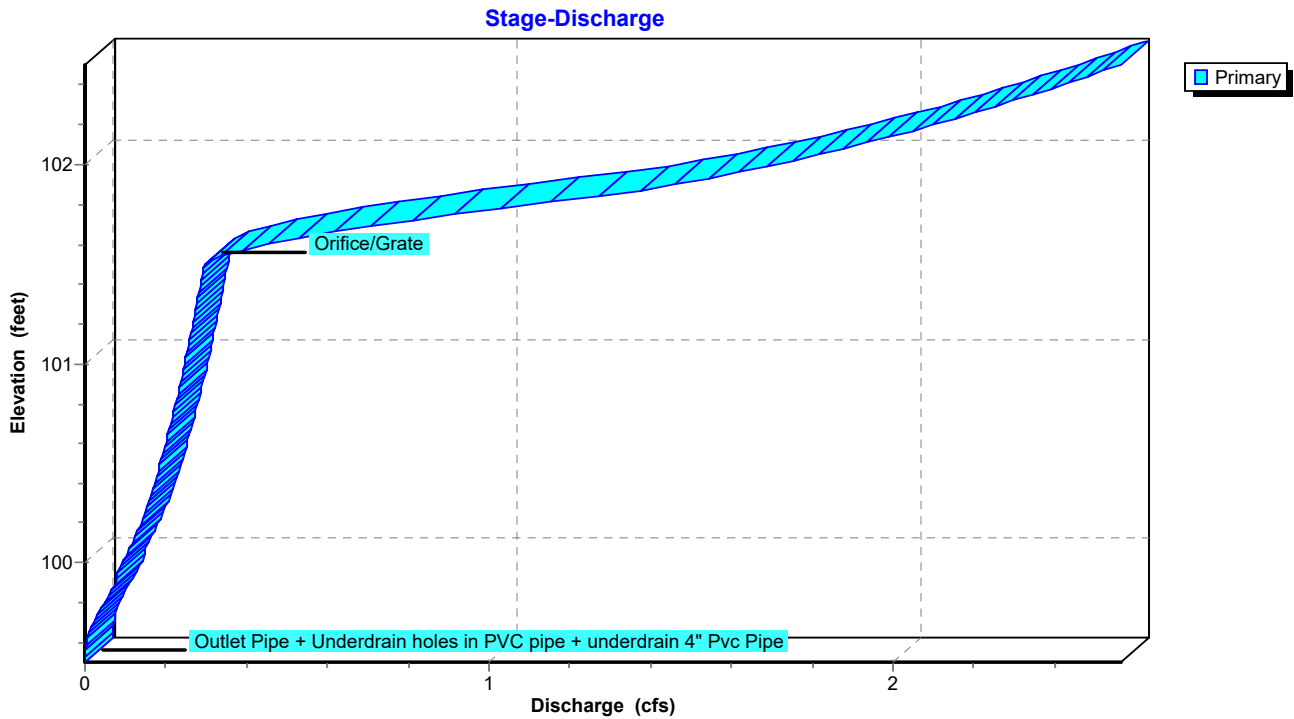
Primary OutFlow Max=0.40 cfs @ 13.05 hrs HW=101.57' TW=86.92' (Dynamic Tailwater)

- 1=Outlet Pipe (Passes 0.40 cfs of 5.62 cfs potential flow)
- 3=underdrain 4" Pvc Pipe (Barrel Controls 0.30 cfs @ 3.46 fps)
- 2=Underdrain holes in PVC pipe (Passes 0.30 cfs of 22.32 cfs potential flow)
- 4=Orifice/Grate (Orifice Controls 0.10 cfs @ 0.88 fps)

Pond 8P: Porous Pavement Detention



Pond 8P: Porous Pavement Detention



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 58

Summary for Pond 9P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 4.24" for 10-yr event
 Inflow = 0.40 cfs @ 13.05 hrs, Volume= 15,453 cf
 Outflow = 0.40 cfs @ 13.05 hrs, Volume= 15,453 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.40 cfs @ 13.05 hrs, Volume= 15,453 cf

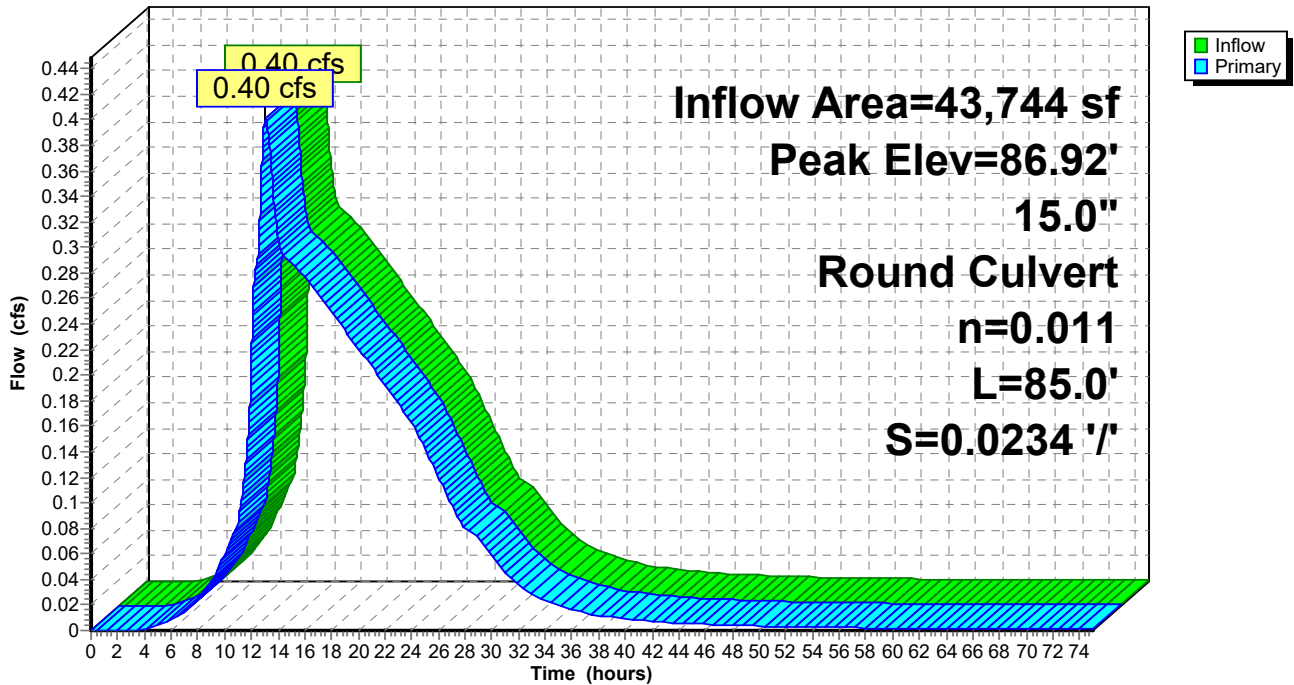
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 86.92' @ 13.05 hrs
 Flood Elev= 102.50'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|---|
| #1 | Primary | 86.59' | 15.0" Round Culvert L= 85.0' Ke= 0.900 Inlet / Outlet Invert= 86.59' / 84.60' S= 0.0234 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

Primary OutFlow Max=0.40 cfs @ 13.05 hrs HW=86.92' TW=81.93' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.40 cfs @ 1.54 fps)

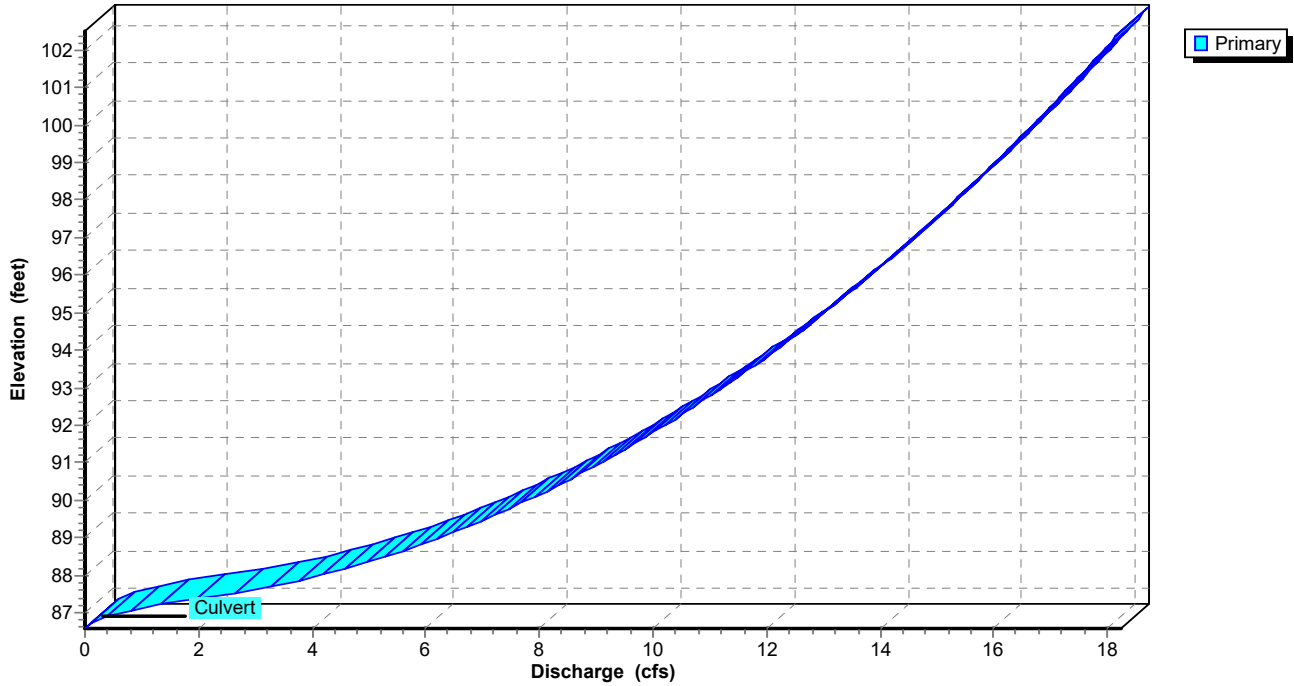
Pond 9P: Manhole

Hydrograph



Pond 9P: Manhole

Stage-Discharge



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 10-yr Rainfall=5.06"

Printed 12/29/2022

Page 60

Summary for Pond 11P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 4.24" for 10-yr event
 Inflow = 0.40 cfs @ 13.05 hrs, Volume= 15,453 cf
 Outflow = 0.40 cfs @ 13.05 hrs, Volume= 15,453 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.40 cfs @ 13.05 hrs, Volume= 15,453 cf

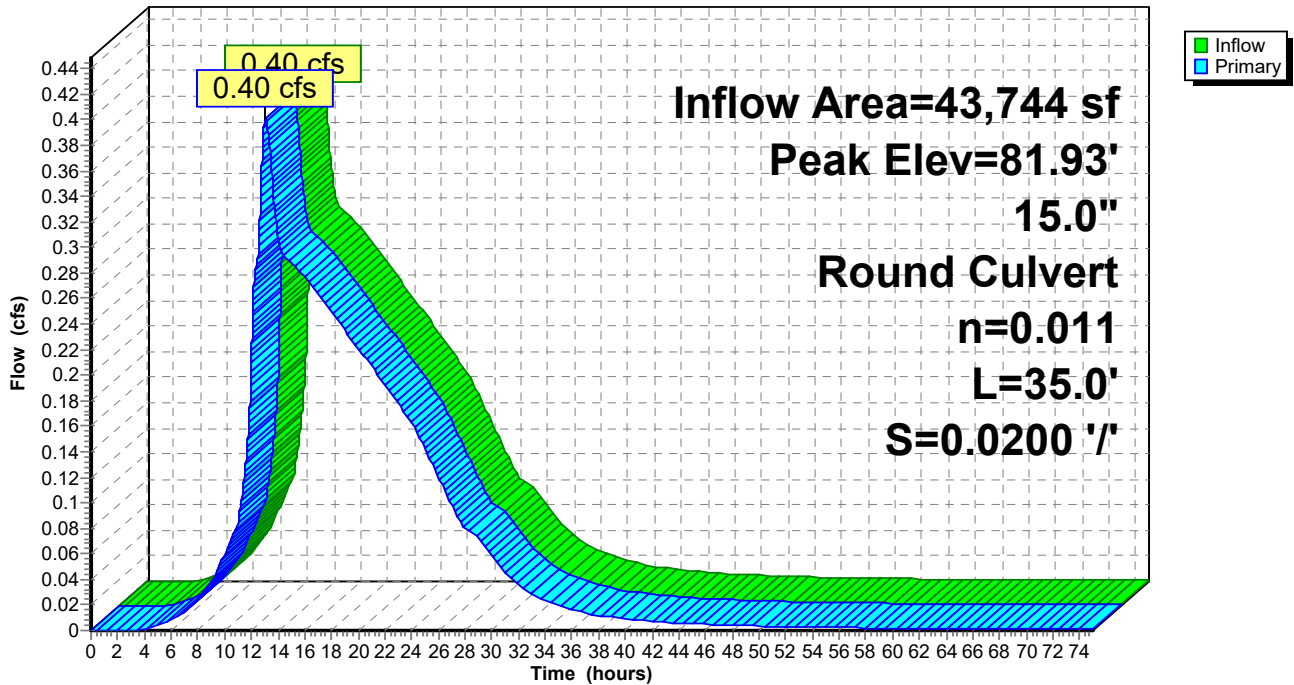
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 81.93' @ 13.05 hrs
 Flood Elev= 89.20'

| Device #1 | Routing | Invert | Outlet Devices |
|-----------|---------|--------|--|
| | Primary | 81.60' | 15.0" Round Culvert L= 35.0' Ke= 0.900 Inlet / Outlet Invert= 81.60' / 80.90' S= 0.0200 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

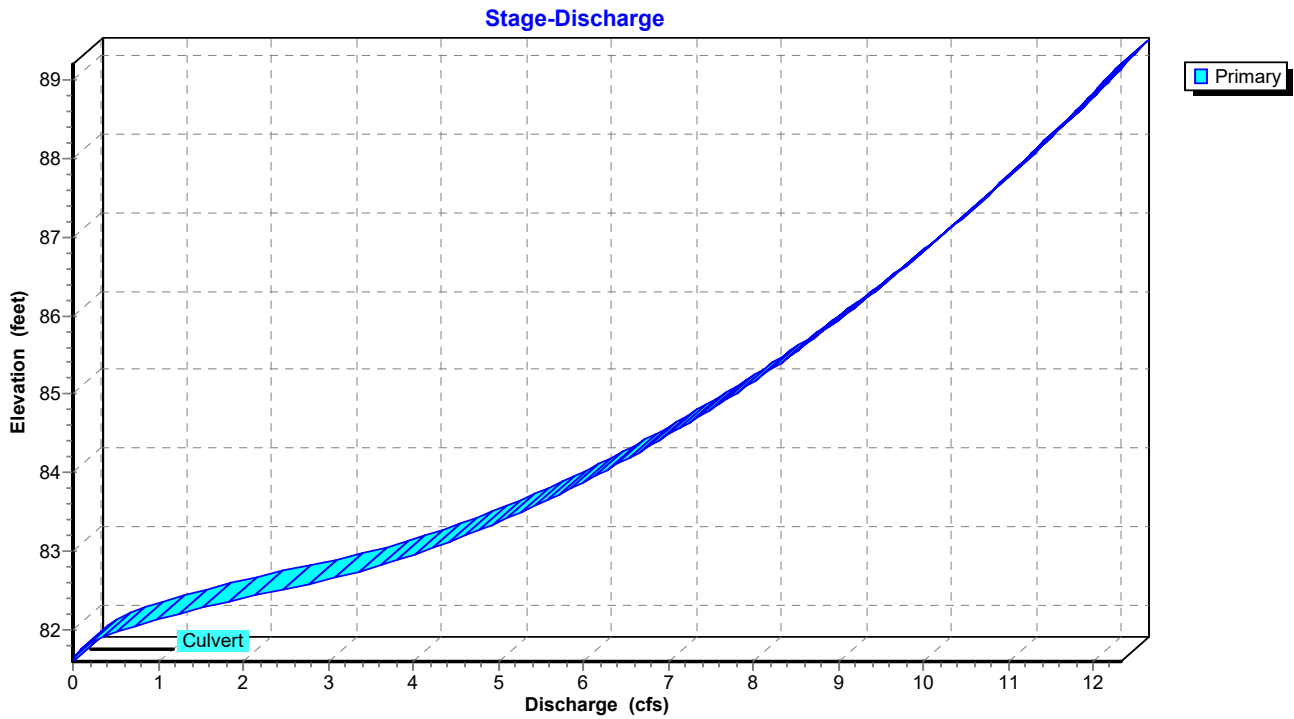
Primary OutFlow Max=0.40 cfs @ 13.05 hrs HW=81.93' TW=81.08' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.40 cfs @ 1.54 fps)

Pond 11P: Manhole

Hydrograph



Pond 11P: Manhole



9270 Proposed Drainage Porous Pvmt r6

NOAA 24-hr C 100-yr Rainfall=8.48"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 62

Time span=0.00-75.00 hrs, dt=0.01 hrs, 7501 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Impervious Drainage Runoff Area=4,693 sf 100.00% Impervious Runoff Depth=8.24"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=98 Runoff=1.07 cfs 3,222 cf

Subcatchment 2S: Impervious Drainage Runoff Area=5,099 sf 100.00% Impervious Runoff Depth=8.24"
 Flow Length=144' Tc=6.3 min CN=98 Runoff=1.05 cfs 3,501 cf

Subcatchment 4S: Drainage Area 3 Runoff Area=8,924 sf 100.00% Impervious Runoff Depth=8.24"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=98 Runoff=2.04 cfs 6,128 cf

Subcatchment 5S: Roof Area Directly Into Runoff Area=12,967 sf 100.00% Impervious Runoff Depth=8.24"
 Flow Length=50' Slope=0.0100 '/' Tc=0.9 min CN=98 Runoff=2.97 cfs 8,904 cf

Subcatchment 8S: By Pass Runoff Area=30,131 sf 0.00% Impervious Runoff Depth=5.84"
 Flow Length=510' Tc=13.7 min CN=78 Runoff=3.96 cfs 14,655 cf

Subcatchment 12S: Pervious Drainage Area 1 Runoff Area=3,006 sf 0.00% Impervious Runoff Depth=6.08"
 Flow Length=144' Tc=6.3 min CN=80 Runoff=0.53 cfs 1,522 cf

Subcatchment 13S: Open Space Directly Into Runoff Area=2,947 sf 0.00% Impervious Runoff Depth=6.08"
 Flow Length=150' Slope=0.0400 '/' Tc=10.1 min CN=80 Runoff=0.45 cfs 1,492 cf

Subcatchment 14S: Pervious Drainage area 2 Runoff Area=3,531 sf 0.00% Impervious Runoff Depth=6.08"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=80 Runoff=0.69 cfs 1,788 cf

Subcatchment 16S: Pervious Drainage Area 3 Runoff Area=2,577 sf 0.00% Impervious Runoff Depth=6.08"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=80 Runoff=0.51 cfs 1,305 cf

Pond 7P: Existing Catch Basin Peak Elev=81.88' Inflow=6.35 cfs 42,268 cf
 30.0" Round Culvert n=0.012 L=160.0' S=0.0383 '/' Outflow=6.35 cfs 42,268 cf

Pond 8P: Porous Pavement Detention Peak Elev=102.41' Storage=12,801 cf Inflow=9.14 cfs 27,863 cf
 Outflow=2.44 cfs 27,614 cf

Pond 9P: Manhole Peak Elev=87.50' Inflow=2.44 cfs 27,614 cf
 15.0" Round Culvert n=0.011 L=85.0' S=0.0234 '/' Outflow=2.44 cfs 27,614 cf

Pond 11P: Manhole Peak Elev=82.51' Inflow=2.44 cfs 27,614 cf
 15.0" Round Culvert n=0.011 L=35.0' S=0.0200 '/' Outflow=2.44 cfs 27,614 cf

Total Runoff Area = 73,875 sf Runoff Volume = 42,517 cf Average Runoff Depth = 6.91"
57.11% Pervious = 42,192 sf 42.89% Impervious = 31,683 sf

9270 Proposed Drainage Porous Pvmt r6

NOAA 24-hr C 100-yr Rainfall=8.48"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 63

Summary for Subcatchment 1S: Impervious Drainage area 2

Runoff = 1.07 cfs @ 12.10 hrs, Volume= 3,222 cf, Depth= 8.24"

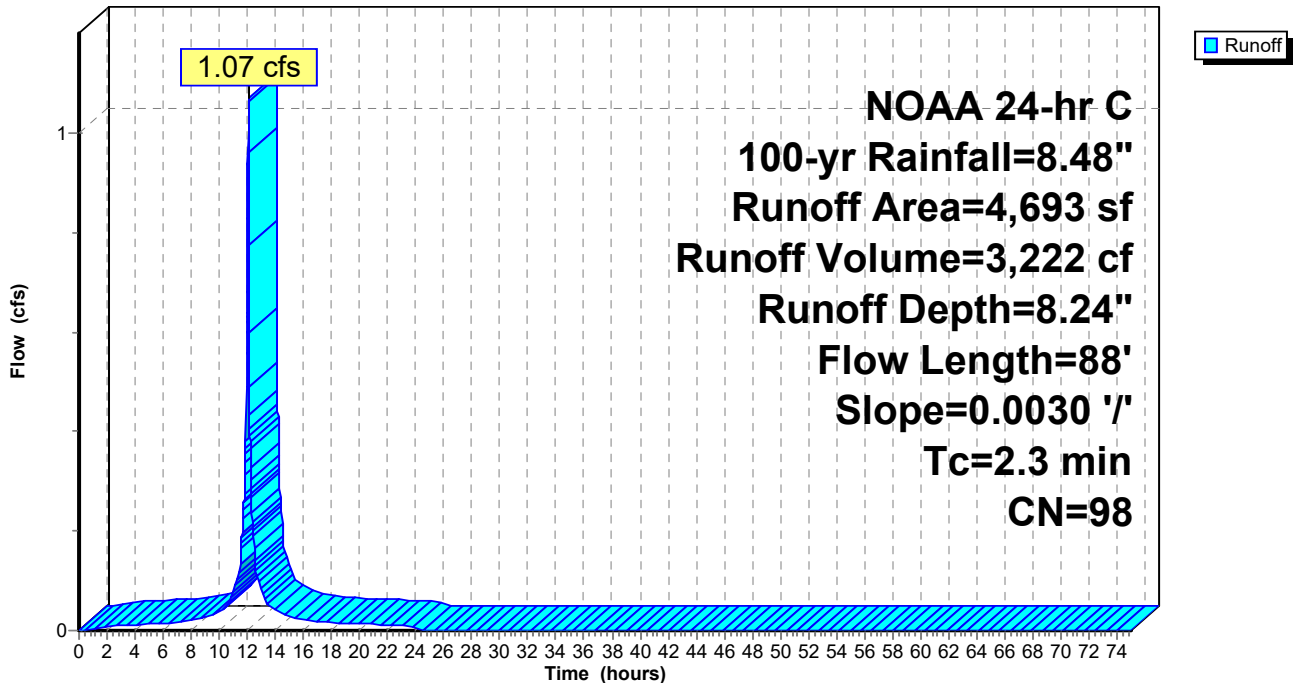
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 100-yr Rainfall=8.48"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 3,990 | 98 | Pavement |
| * | 703 | 98 | Sidewalk |
| | 4,693 | 98 | Weighted Average |
| | 4,693 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 1S: Impervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 100-yr Rainfall=8.48"

Printed 12/29/2022

Page 64

Summary for Subcatchment 2S: Impervious Drainage Area 1

Runoff = 1.05 cfs @ 12.13 hrs, Volume= 3,501 cf, Depth= 8.24"

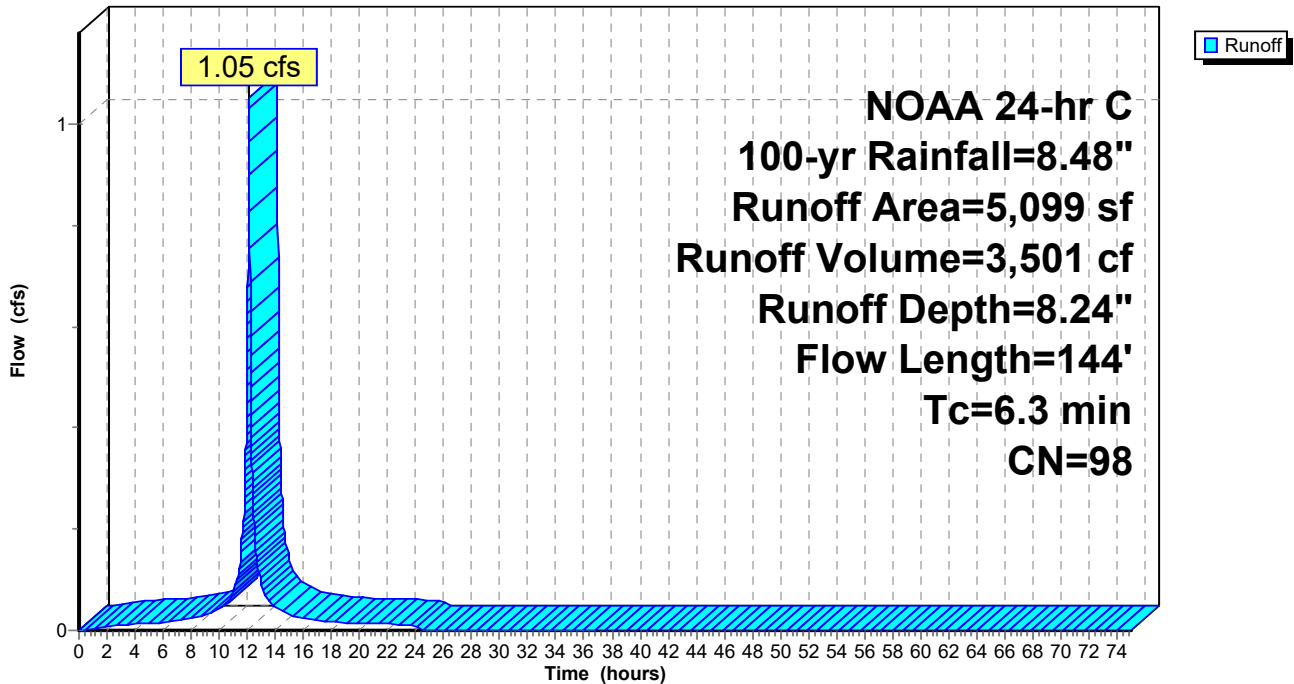
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 100-yr Rainfall=8.48"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 4,563 | 98 | Pavement |
| * | 536 | 98 | Sidewalk |
| | 5,099 | 98 | Weighted Average |
| | 5,099 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 2S: Impervious Drainage Area 1

Hydrograph



Summary for Subcatchment 4S: Drainage Area 3

Runoff = 2.04 cfs @ 12.09 hrs, Volume= 6,128 cf, Depth= 8.24"

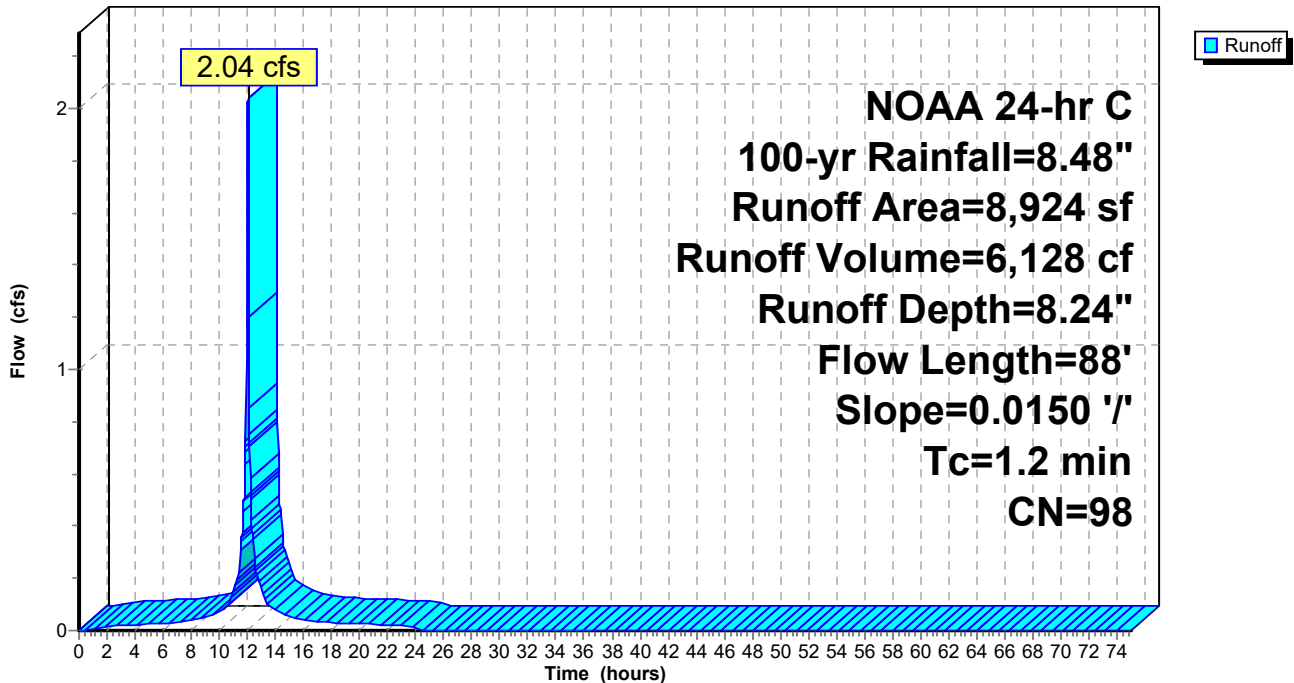
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 100-yr Rainfall=8.48"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 8,182 | 98 | Pavement |
| * | 742 | 98 | Sidewalk |
| | 8,924 | 98 | Weighted Average |
| | 8,924 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 4S: Drainage Area 3

Hydrograph



Summary for Subcatchment 5S: Roof Area Directly Into Detention Basin

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.97 cfs @ 12.09 hrs, Volume= 8,904 cf, Depth= 8.24"

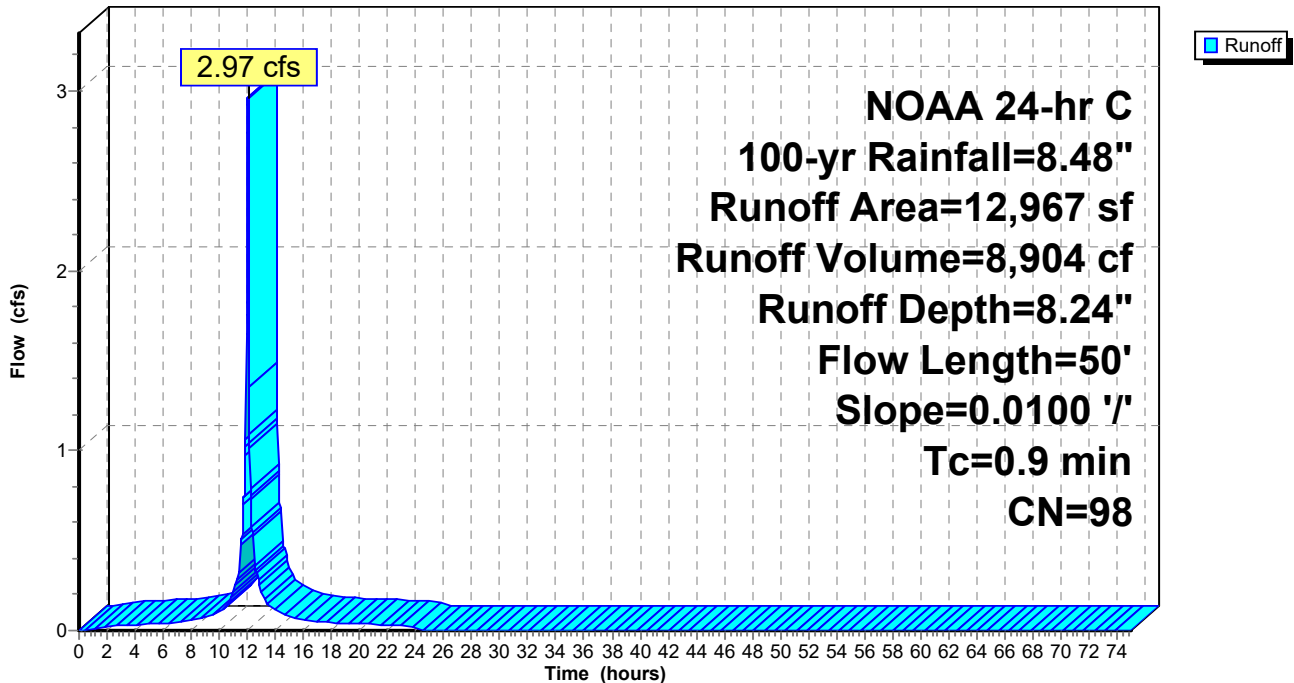
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 100-yr Rainfall=8.48"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 12,967 | 98 | Building 1-12 Roof |
| 12,967 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 0.9 | 50 | 0.0100 | 0.92 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 5S: Roof Area Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 100-yr Rainfall=8.48"

Printed 12/29/2022

Page 67

Summary for Subcatchment 8S: By Pass

Runoff = 3.96 cfs @ 12.22 hrs, Volume= 14,655 cf, Depth= 5.84"

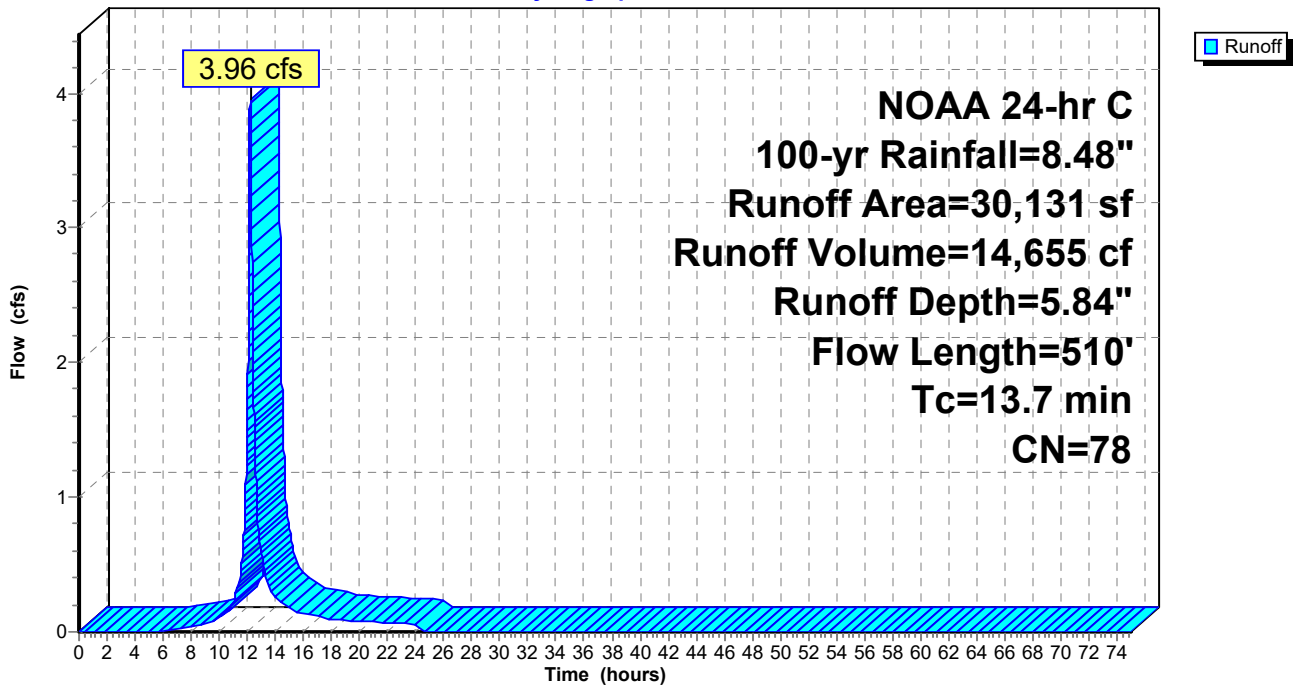
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 100-yr Rainfall=8.48"

| Area (sf) | CN | Description |
|-----------|----|----------------------------|
| * 30,131 | 78 | Landscaped (Heavily Treed) |
| 30,131 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 11.1 | 100 | | 0.15 | | Direct Entry, Sheet Flow Landscaped trees, shrubs, grass |
| 0.5 | 150 | 0.1000 | 5.09 | | Shallow Concentrated Flow, Shallow Concentrated landscaped Unpaved Kv= 16.1 fps |
| 2.1 | 260 | 0.0100 | 2.03 | | Shallow Concentrated Flow, Gutter Flow Paved Kv= 20.3 fps |
| 13.7 | 510 | Total | | | |

Subcatchment 8S: By Pass

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 100-yr Rainfall=8.48"

Printed 12/29/2022

Page 68

Summary for Subcatchment 12S: Pervious Drainage Area 1

Runoff = 0.53 cfs @ 12.13 hrs, Volume= 1,522 cf, Depth= 6.08"

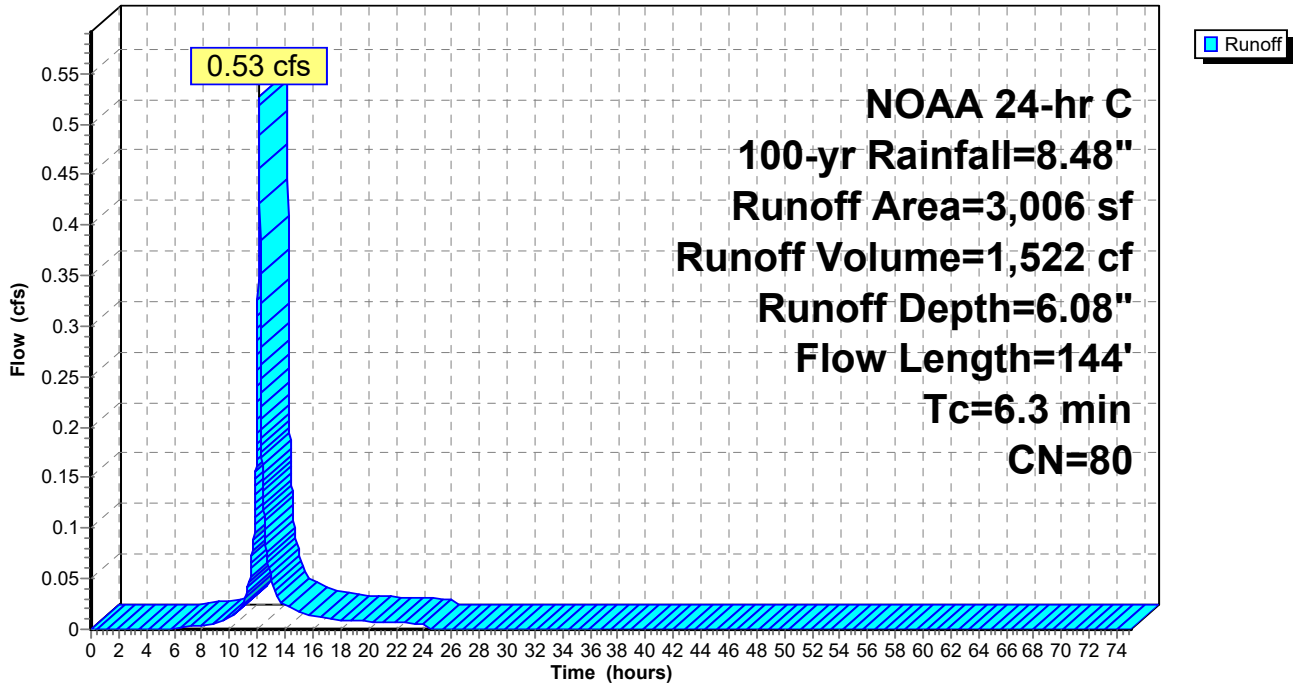
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 100-yr Rainfall=8.48"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,006 | 80 | Open Space |
| 3,006 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 12S: Pervious Drainage Area 1

Hydrograph



Summary for Subcatchment 13S: Open Space Directly Into Detention Basin

Runoff = 0.45 cfs @ 12.17 hrs, Volume= 1,492 cf, Depth= 6.08"

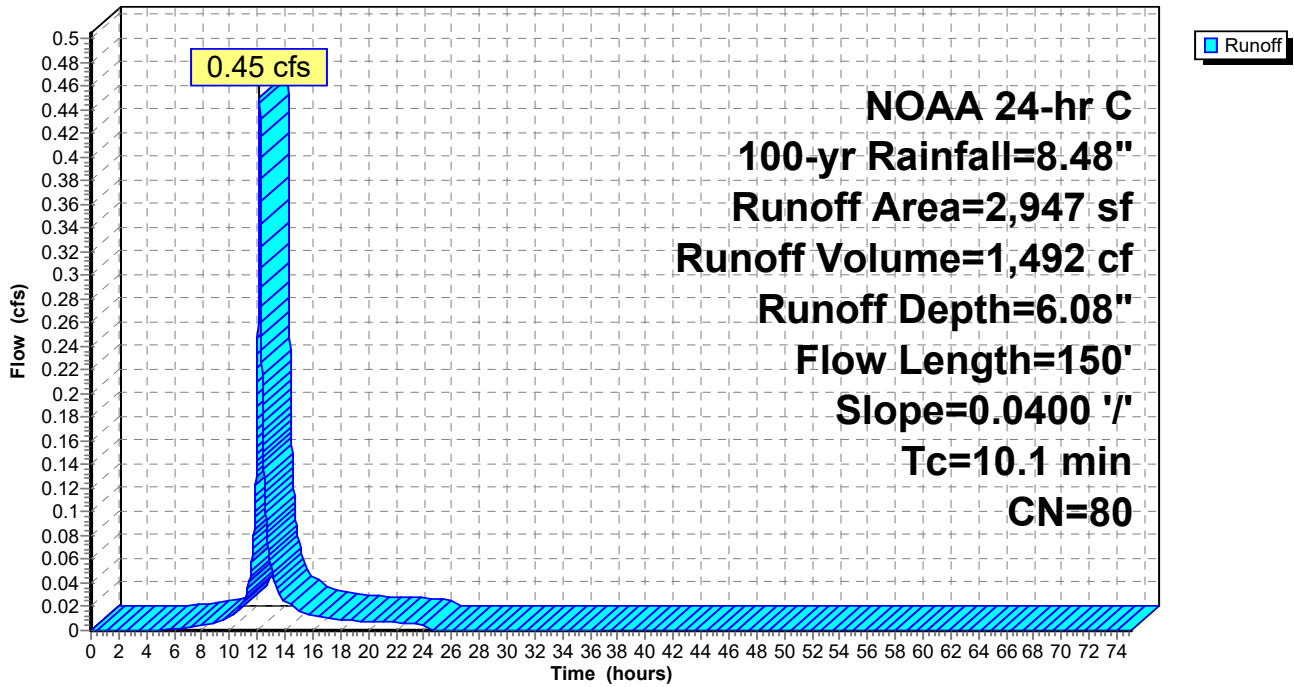
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NOAA 24-hr C 100-yr Rainfall=8.48"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,947 | 80 | Open Space |
| 2,947 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.1 | 150 | 0.0400 | 0.25 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |

Subcatchment 13S: Open Space Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 100-yr Rainfall=8.48"

Printed 12/29/2022

Page 70

Summary for Subcatchment 14S: Pervious Drainage area 2

Runoff = 0.69 cfs @ 12.10 hrs, Volume= 1,788 cf, Depth= 6.08"

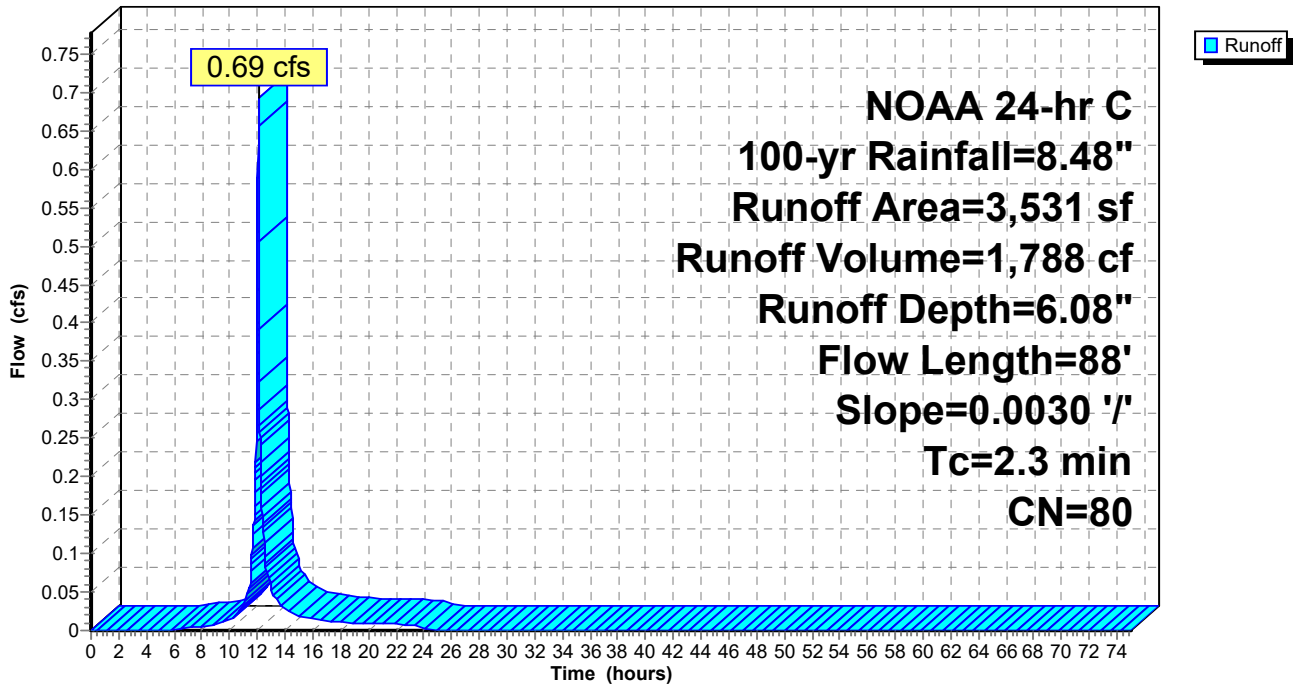
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-yr Rainfall=8.48"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,531 | 80 | Open Space |
| 3,531 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 14S: Pervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

NOAA 24-hr C 100-yr Rainfall=8.48"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 71

Summary for Subcatchment 16S: Pervious Drainage Area 3

Runoff = 0.51 cfs @ 12.10 hrs, Volume= 1,305 cf, Depth= 6.08"

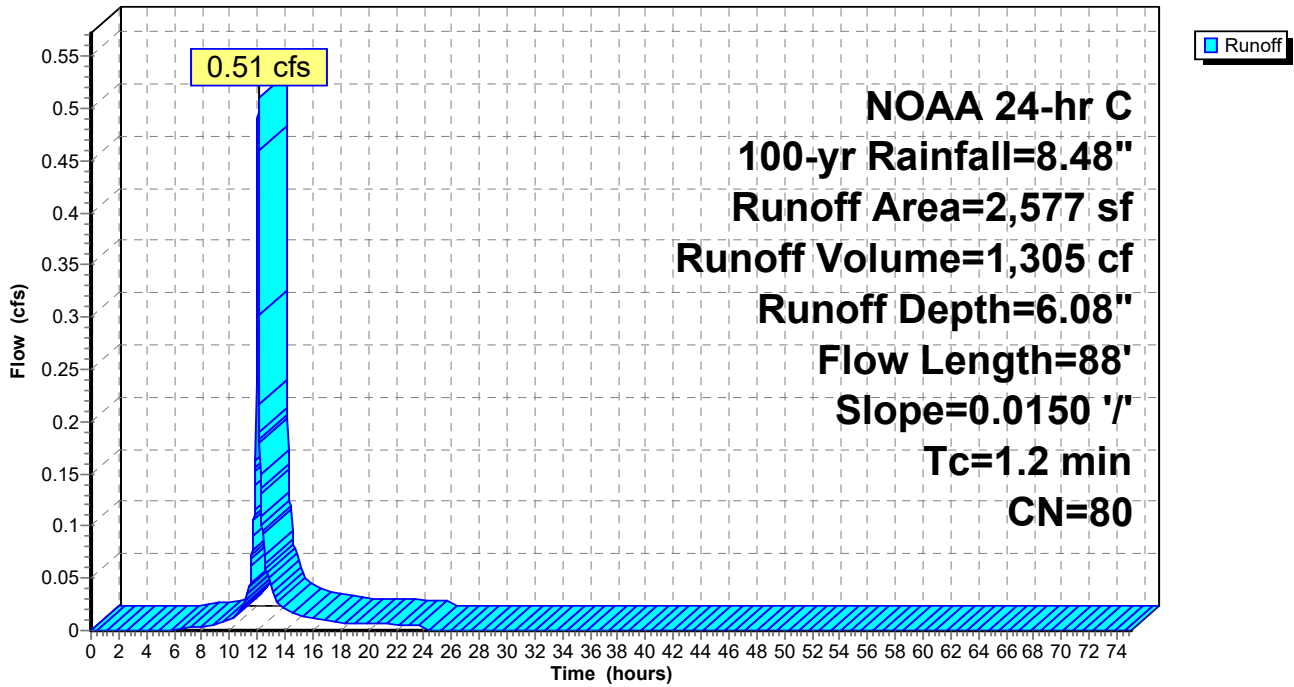
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-yr Rainfall=8.48"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,577 | 80 | Open Space |
| 2,577 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 16S: Pervious Drainage Area 3

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 100-yr Rainfall=8.48"

Printed 12/29/2022

Page 72

Summary for Pond 7P: Existing Catch Basin

Inflow Area = 73,875 sf, 42.89% Impervious, Inflow Depth > 6.87" for 100-yr event
Inflow = 6.35 cfs @ 12.22 hrs, Volume= 42,268 cf
Outflow = 6.35 cfs @ 12.22 hrs, Volume= 42,268 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.35 cfs @ 12.22 hrs, Volume= 42,268 cf

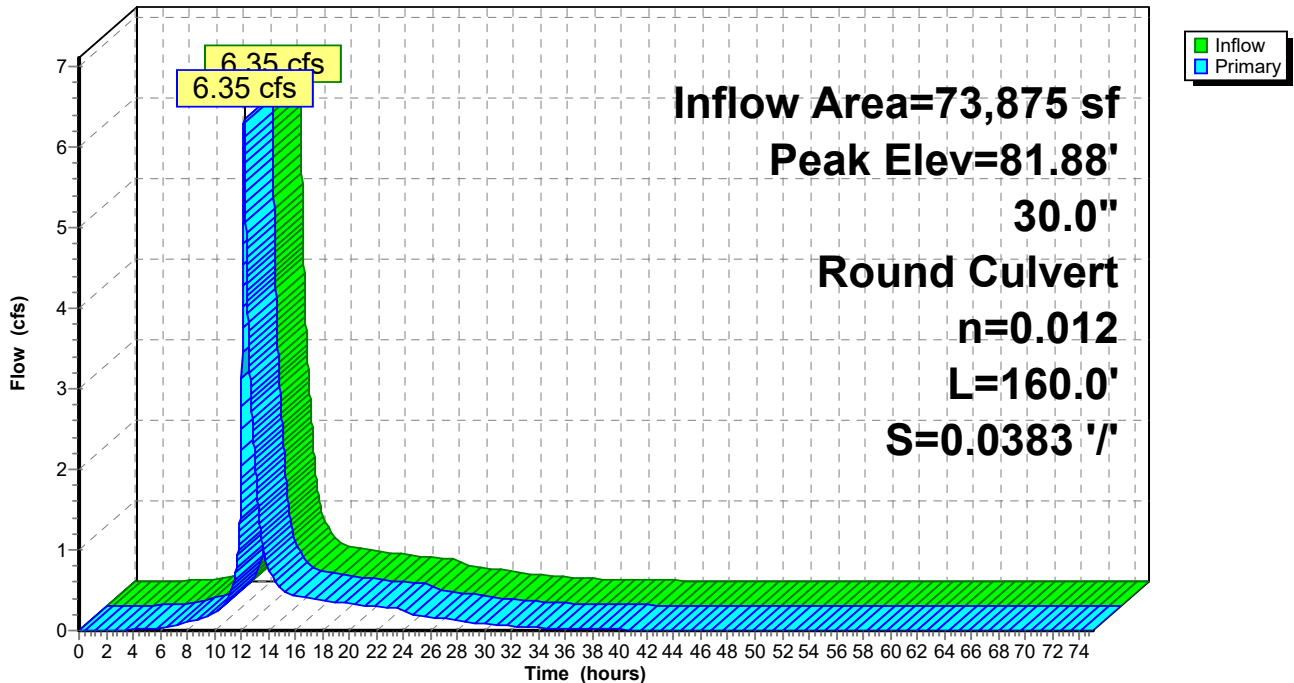
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.88' @ 12.22 hrs
Flood Elev= 85.30'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|---|
| #1 | Primary | 80.73' | 30.0" Round Culvert L= 160.0' Ke= 0.900 Inlet / Outlet Invert= 80.73' / 74.61' S= 0.0383 '/ Cc= 0.900 n= 0.012, Flow Area= 4.91 sf |

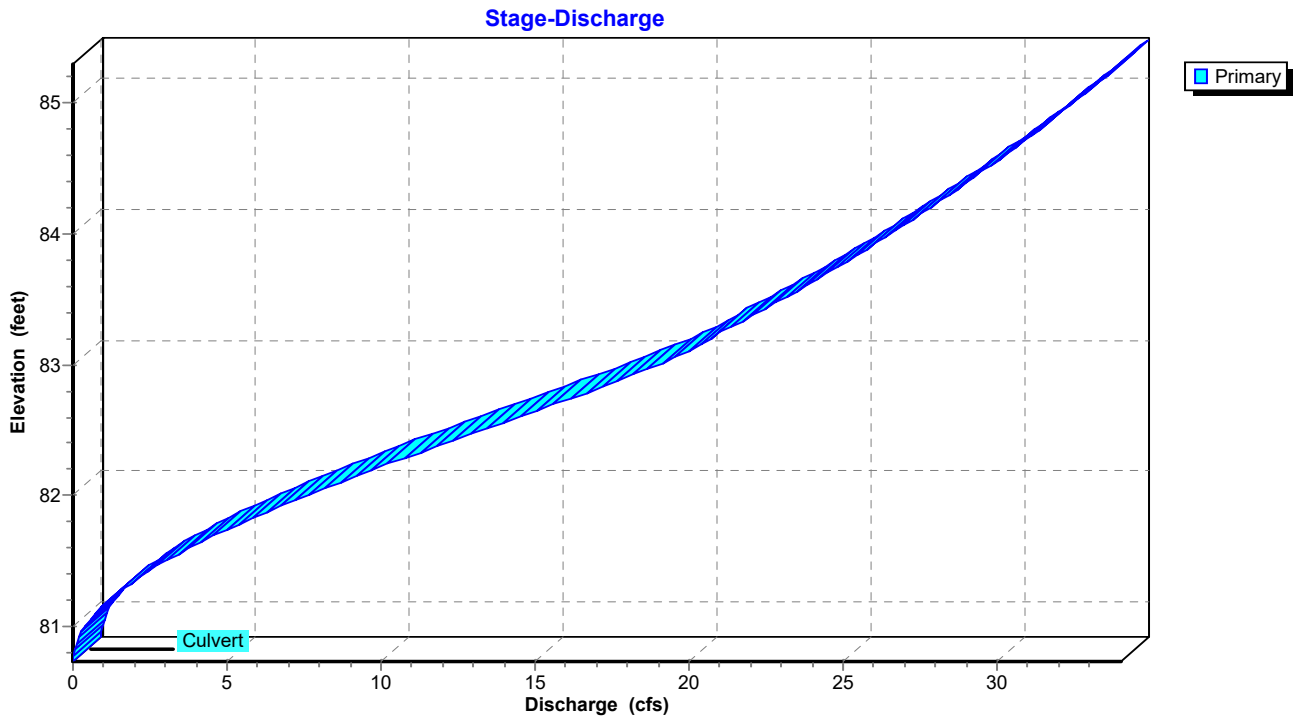
Primary OutFlow Max=6.35 cfs @ 12.22 hrs HW=81.88' (Free Discharge)
←1=Culvert (Inlet Controls 6.35 cfs @ 2.88 fps)

Pond 7P: Existing Catch Basin

Hydrograph



Pond 7P: Existing Catch Basin



Summary for Pond 8P: Porous Pavement Detention

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth = 7.64" for 100-yr event
 Inflow = 9.14 cfs @ 12.10 hrs, Volume= 27,863 cf
 Outflow = 2.44 cfs @ 12.31 hrs, Volume= 27,614 cf, Atten= 73%, Lag= 13.0 min
 Primary = 2.44 cfs @ 12.31 hrs, Volume= 27,614 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 102.41' @ 12.31 hrs Surf.Area= 11,000 sf Storage= 12,801 cf

Plug-Flow detention time= 312.5 min calculated for 27,610 cf (99% of inflow)
 Center-of-Mass det. time= 306.9 min (1,058.5 - 751.7)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 99.50' | 13,200 cf | 100.00'W x 110.00'L x 3.00'H Prismatic 33,000 cf Overall x 40.0% Voids |

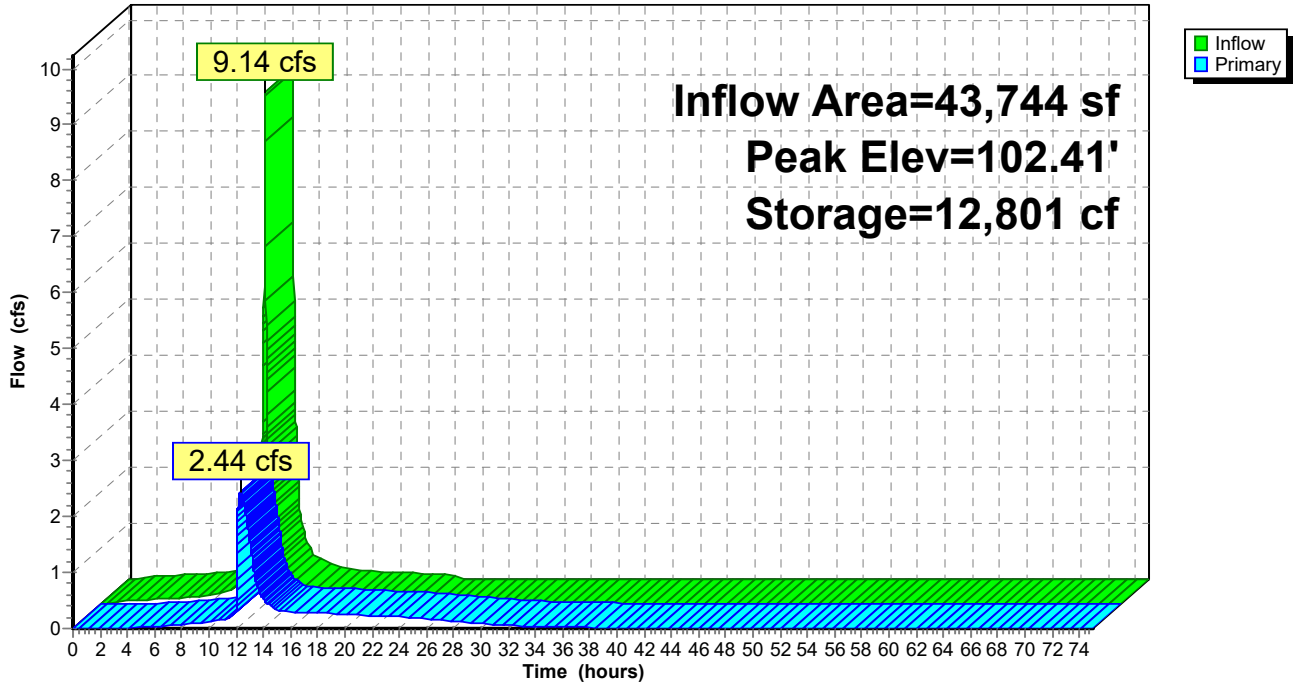
| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|---|
| #1 | Primary | 99.50' | 15.0" Round Outlet Pipe L= 101.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 97.48' S= 0.0200 1/ S= 0.0200 1/ Cc= 0.900 n= 0.011, Flow Area= 1.23 sf |
| #2 | Device 3 | 99.50' | 1.0" Horiz. Underdrain holes in PVC pipe X 590.00 C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 99.50' | 4.0" Round underdrain 4" Pvc Pipe L= 77.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 99.50' S= 0.0000 1/ S= 0.0000 1/ Cc= 0.900 n= 0.011, Flow Area= 0.09 sf |
| #4 | Device 1 | 101.50' | 18.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=2.44 cfs @ 12.31 hrs HW=102.41' TW=87.50' (Dynamic Tailwater)

- 1=Outlet Pipe (Passes 2.44 cfs of 7.05 cfs potential flow)
- 3=underdrain 4" Pvc Pipe (Barrel Controls 0.37 cfs @ 4.20 fps)
- 2=Underdrain holes in PVC pipe (Passes 0.37 cfs of 26.43 cfs potential flow)
- 4=Orifice/Grate (Orifice Controls 2.07 cfs @ 4.14 fps)

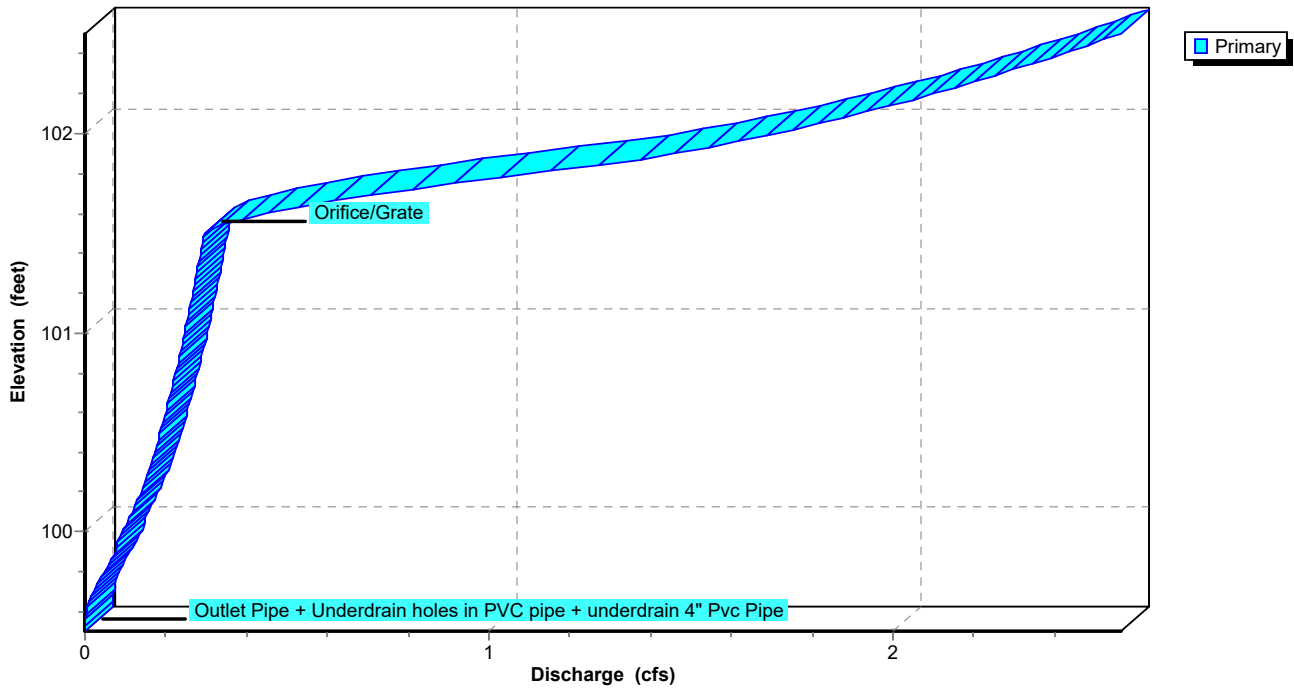
Pond 8P: Porous Pavement Detention

Hydrograph



Pond 8P: Porous Pavement Detention

Stage-Discharge



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NOAA 24-hr C 100-yr Rainfall=8.48"

Printed 12/29/2022

Page 76

Summary for Pond 9P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 7.58" for 100-yr event
Inflow = 2.44 cfs @ 12.31 hrs, Volume= 27,614 cf
Outflow = 2.44 cfs @ 12.31 hrs, Volume= 27,614 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.44 cfs @ 12.31 hrs, Volume= 27,614 cf

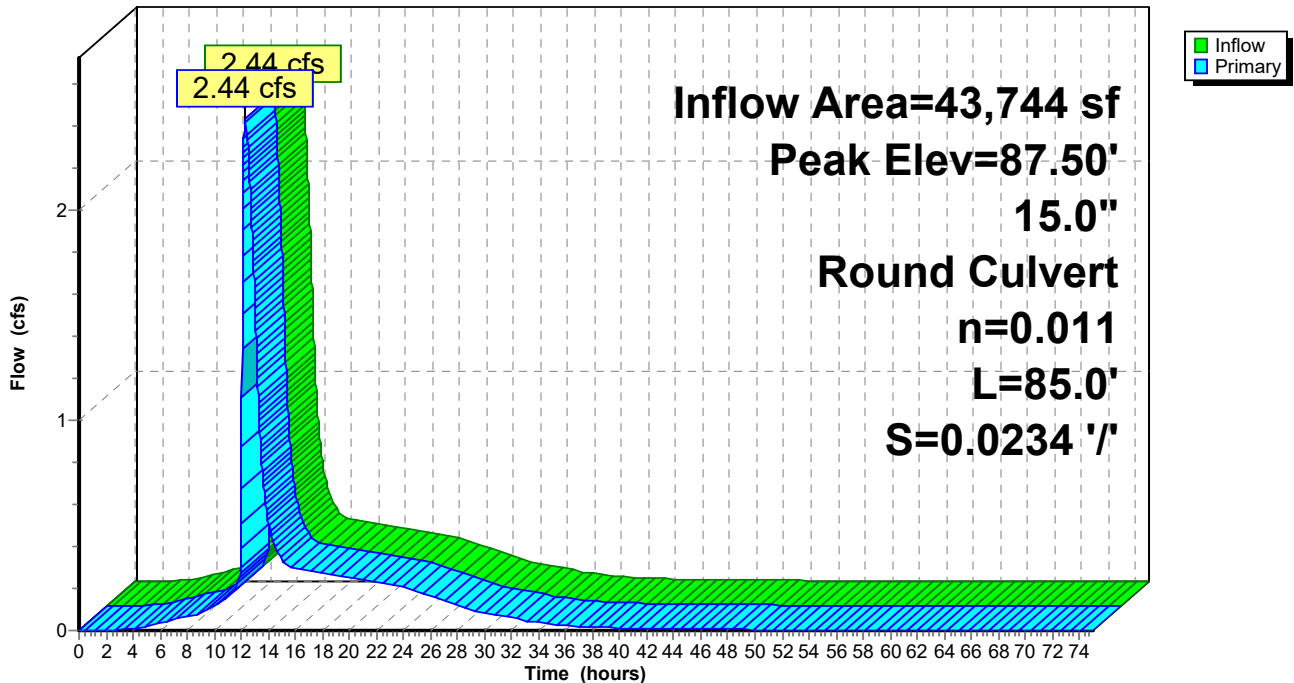
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 87.50' @ 12.31 hrs
Flood Elev= 102.50'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|--|
| #1 | Primary | 86.59' | 15.0" Round Culvert L= 85.0' Ke= 0.900 Inlet / Outlet Invert= 86.59' / 84.60' S= 0.0234 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

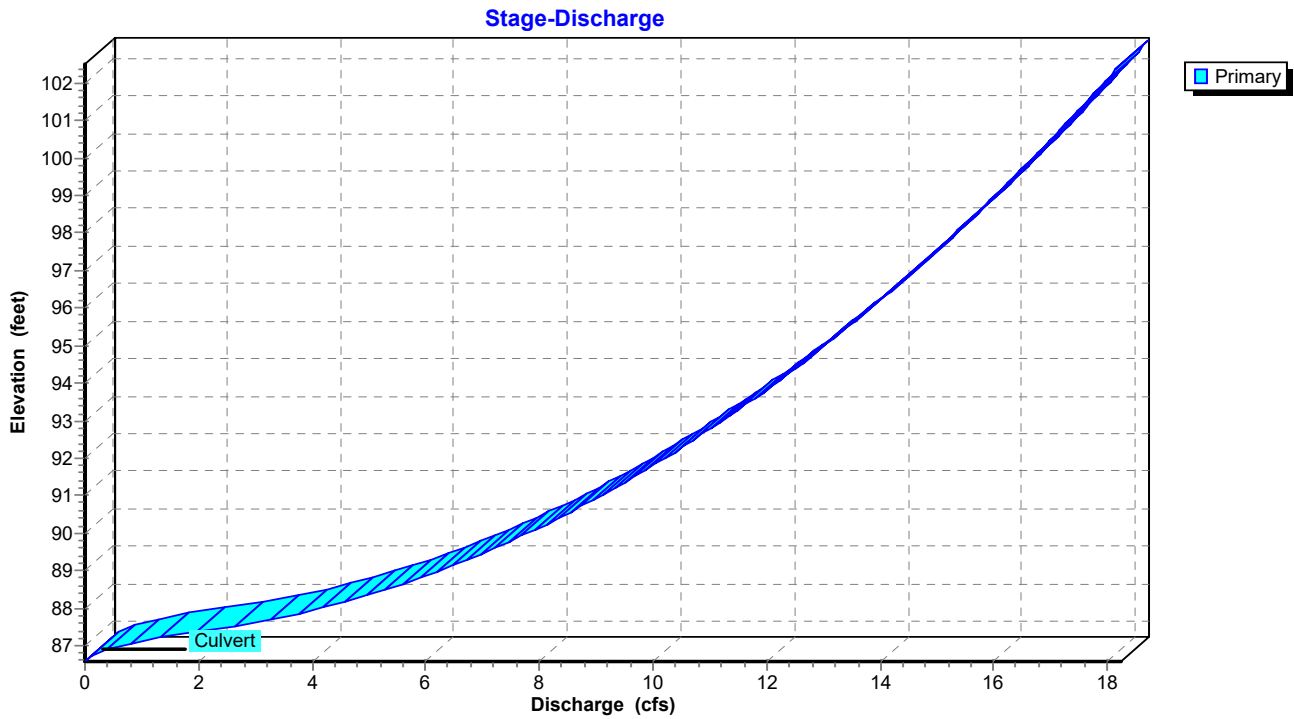
Primary OutFlow Max=2.44 cfs @ 12.31 hrs HW=87.50' TW=82.51' (Dynamic Tailwater)
↑1=Culvert (Inlet Controls 2.44 cfs @ 2.56 fps)

Pond 9P: Manhole

Hydrograph



Pond 9P: Manhole



9270 Proposed Drainage Porous Pvmt r6

NOAA 24-hr C 100-yr Rainfall=8.48"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 78

Summary for Pond 11P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 7.58" for 100-yr event
 Inflow = 2.44 cfs @ 12.31 hrs, Volume= 27,614 cf
 Outflow = 2.44 cfs @ 12.31 hrs, Volume= 27,614 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.44 cfs @ 12.31 hrs, Volume= 27,614 cf

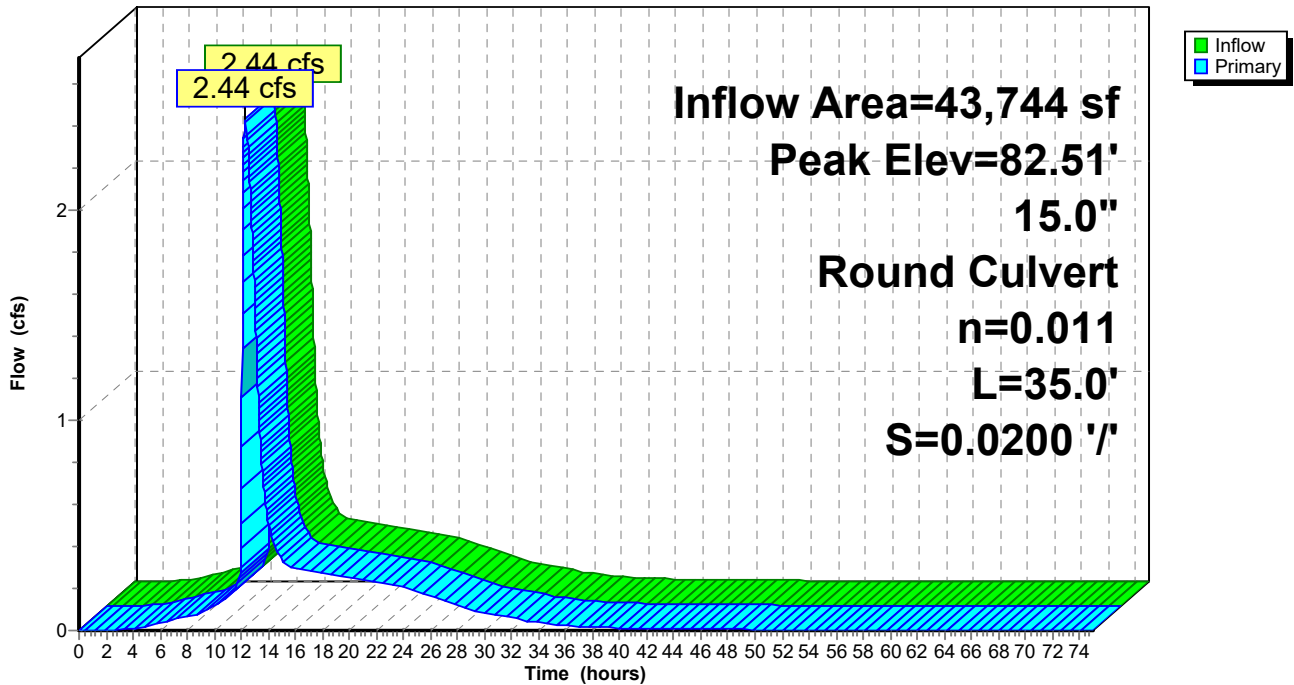
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 82.51' @ 12.31 hrs
 Flood Elev= 89.20'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|--|
| #1 | Primary | 81.60' | 15.0" Round Culvert L= 35.0' Ke= 0.900 Inlet / Outlet Invert= 81.60' / 80.90' S= 0.0200 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

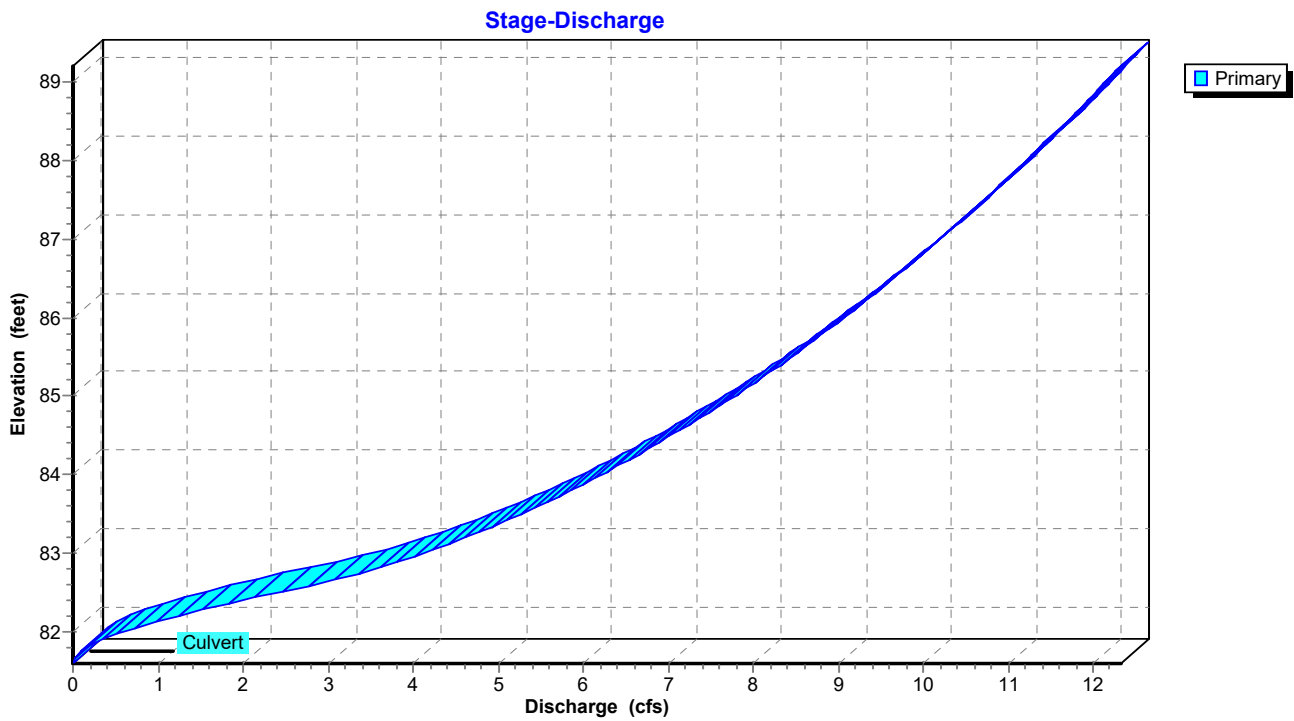
Primary OutFlow Max=2.44 cfs @ 12.31 hrs HW=82.51' TW=81.79' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 2.44 cfs @ 2.56 fps)

Pond 11P: Manhole

Hydrograph



Pond 11P: Manhole



9270 Proposed Drainage Porous Pvmt r6

NJ DEP 2-hr WQ Rainfall=1.25"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 80

Time span=0.00-75.00 hrs, dt=0.01 hrs, 7501 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Impervious Drainage Runoff Area=4,693 sf 100.00% Impervious Runoff Depth=1.03"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=98 Runoff=0.33 cfs 405 cf

Subcatchment 2S: Impervious Drainage Runoff Area=5,099 sf 100.00% Impervious Runoff Depth=1.03"
 Flow Length=144' Tc=6.3 min CN=98 Runoff=0.34 cfs 440 cf

Subcatchment 4S: Drainage Area 3 Runoff Area=8,924 sf 100.00% Impervious Runoff Depth=1.03"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=98 Runoff=0.63 cfs 769 cf

Subcatchment 5S: Roof Area Directly Into Runoff Area=12,967 sf 100.00% Impervious Runoff Depth=1.03"
 Flow Length=50' Slope=0.0100 '/' Tc=0.9 min CN=98 Runoff=0.92 cfs 1,118 cf

Subcatchment 8S: By Pass Runoff Area=30,131 sf 0.00% Impervious Runoff Depth=0.13"
 Flow Length=510' Tc=13.7 min CN=78 Runoff=0.17 cfs 337 cf

Subcatchment 12S: Pervious Drainage Area 1 Runoff Area=3,006 sf 0.00% Impervious Runoff Depth=0.17"
 Flow Length=144' Tc=6.3 min CN=80 Runoff=0.03 cfs 43 cf

Subcatchment 13S: Open Space Directly Into Runoff Area=2,947 sf 0.00% Impervious Runoff Depth=0.17"
 Flow Length=150' Slope=0.0400 '/' Tc=10.1 min CN=80 Runoff=0.03 cfs 43 cf

Subcatchment 14S: Pervious Drainage area 2 Runoff Area=3,531 sf 0.00% Impervious Runoff Depth=0.17"
 Flow Length=88' Slope=0.0030 '/' Tc=2.3 min CN=80 Runoff=0.05 cfs 51 cf

Subcatchment 16S: Pervious Drainage Area 3 Runoff Area=2,577 sf 0.00% Impervious Runoff Depth=0.17"
 Flow Length=88' Slope=0.0150 '/' Tc=1.2 min CN=80 Runoff=0.04 cfs 37 cf

Pond 7P: Existing Catch Basin Peak Elev=80.95' Inflow=0.27 cfs 3,059 cf
 30.0" Round Culvert n=0.012 L=160.0' S=0.0383 '/' Outflow=0.27 cfs 3,059 cf

Pond 8P: Porous Pavement Detention Peak Elev=100.08' Storage=2,553 cf Inflow=2.33 cfs 2,905 cf
 Outflow=0.11 cfs 2,722 cf

Pond 9P: Manhole Peak Elev=86.76' Inflow=0.11 cfs 2,722 cf
 15.0" Round Culvert n=0.011 L=85.0' S=0.0234 '/' Outflow=0.11 cfs 2,722 cf

Pond 11P: Manhole Peak Elev=81.77' Inflow=0.11 cfs 2,722 cf
 15.0" Round Culvert n=0.011 L=35.0' S=0.0200 '/' Outflow=0.11 cfs 2,722 cf

Total Runoff Area = 73,875 sf Runoff Volume = 3,242 cf Average Runoff Depth = 0.53"
57.11% Pervious = 42,192 sf 42.89% Impervious = 31,683 sf

9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 81

Summary for Subcatchment 1S: Impervious Drainage area 2

Runoff = 0.33 cfs @ 1.08 hrs, Volume= 405 cf, Depth= 1.03"

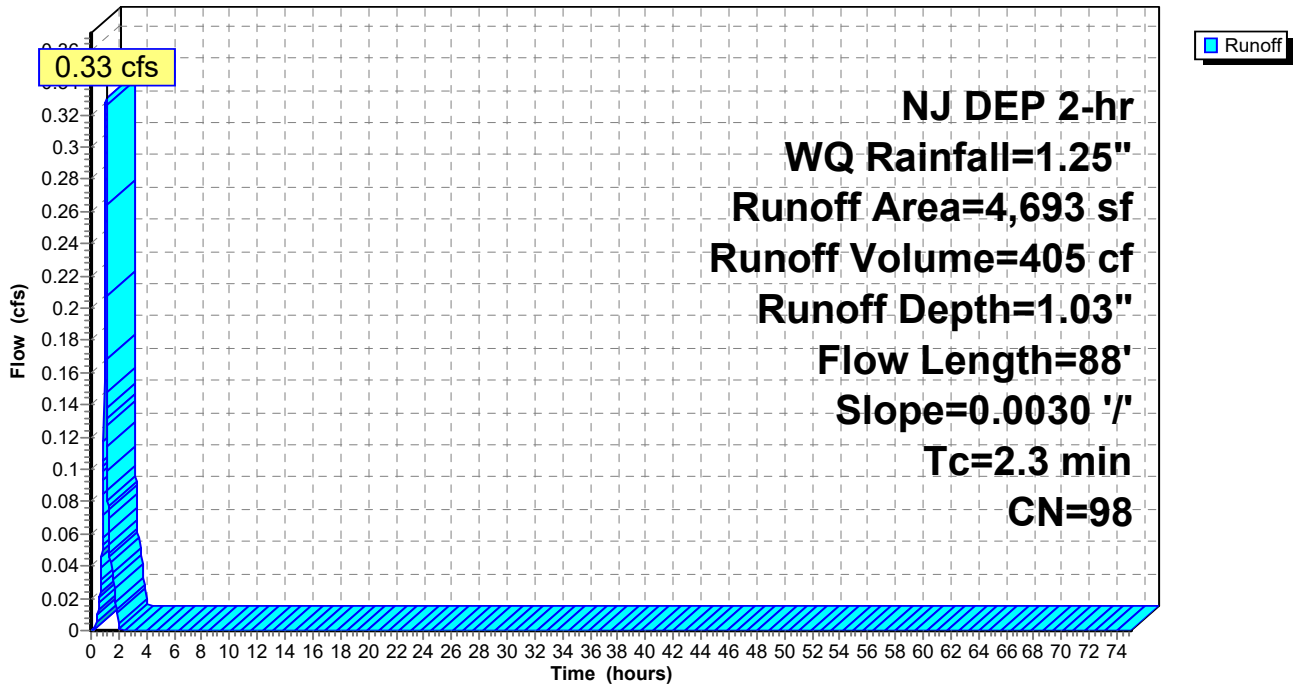
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 3,990 | 98 | Pavement |
| * | 703 | 98 | Sidewalk |
| | 4,693 | 98 | Weighted Average |
| | 4,693 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 1S: Impervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 82

Summary for Subcatchment 2S: Impervious Drainage Area 1

Runoff = 0.34 cfs @ 1.11 hrs, Volume= 440 cf, Depth= 1.03"

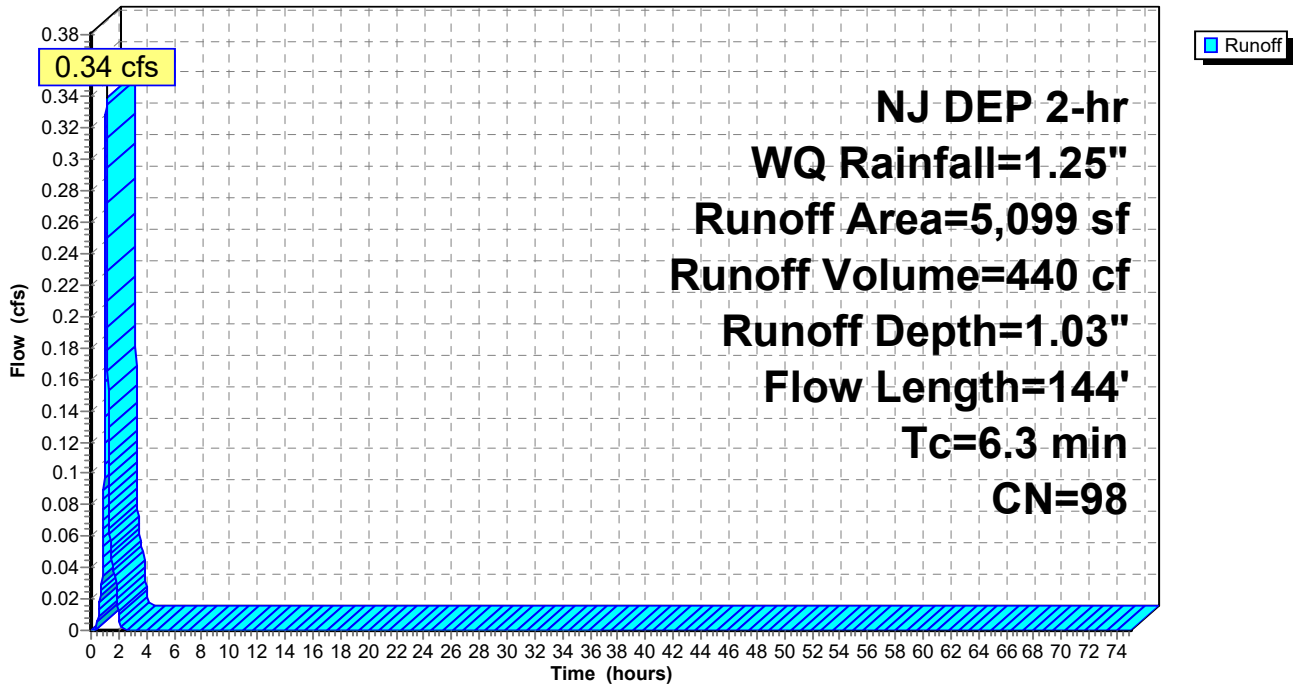
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 4,563 | 98 | Pavement |
| * | 536 | 98 | Sidewalk |
| | 5,099 | 98 | Weighted Average |
| | 5,099 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 2S: Impervious Drainage Area 1

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 83

Summary for Subcatchment 4S: Drainage Area 3

Runoff = 0.63 cfs @ 1.08 hrs, Volume= 769 cf, Depth= 1.03"

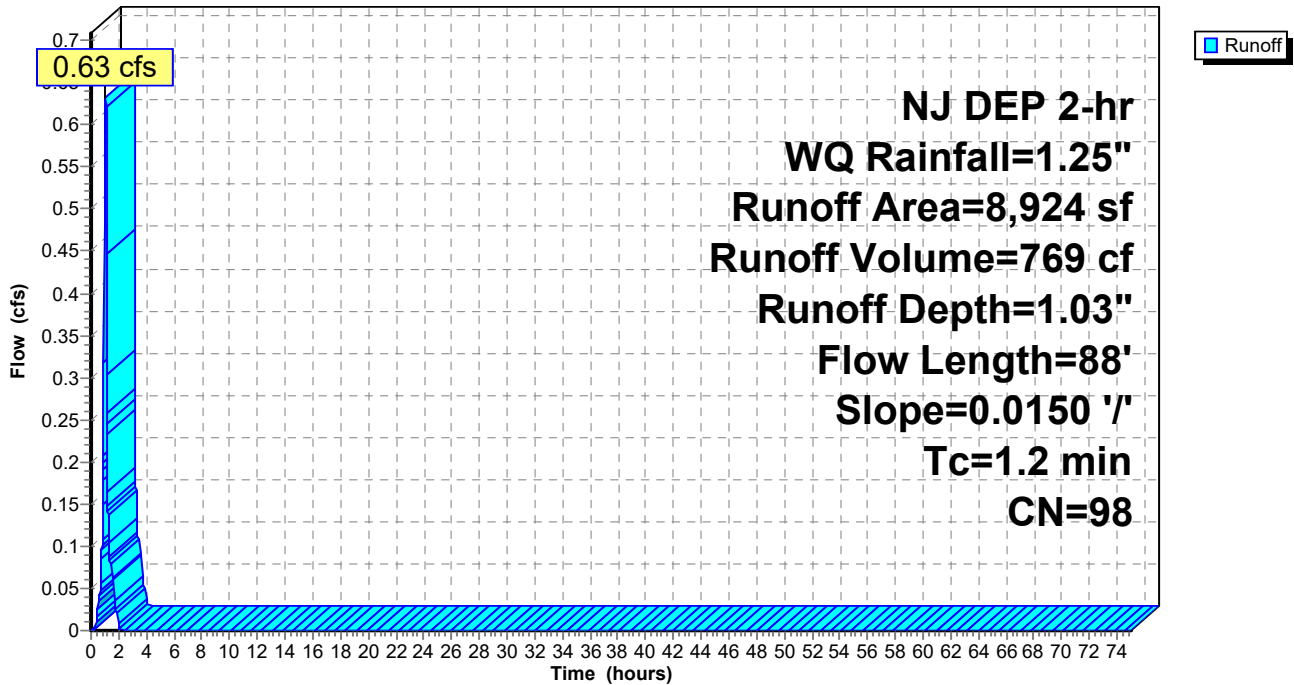
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 8,182 | 98 | Pavement |
| * | 742 | 98 | Sidewalk |
| | 8,924 | 98 | Weighted Average |
| | 8,924 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 4S: Drainage Area 3

Hydrograph



Summary for Subcatchment 5S: Roof Area Directly Into Detention Basin

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.92 cfs @ 1.08 hrs, Volume= 1,118 cf, Depth= 1.03"

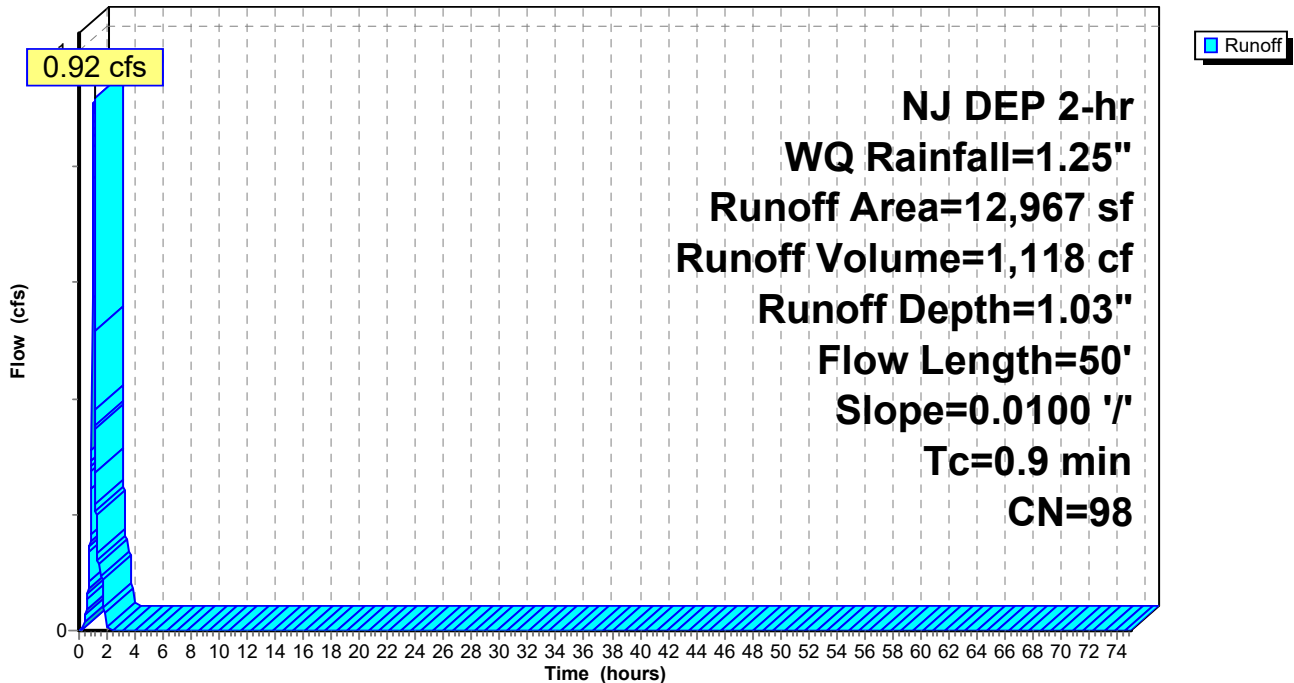
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 12,967 | 98 | Building 1-12 Roof |
| 12,967 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 0.9 | 50 | 0.0100 | 0.92 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 5S: Roof Area Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 85

Summary for Subcatchment 8S: By Pass

Runoff = 0.17 cfs @ 1.28 hrs, Volume= 337 cf, Depth= 0.13"

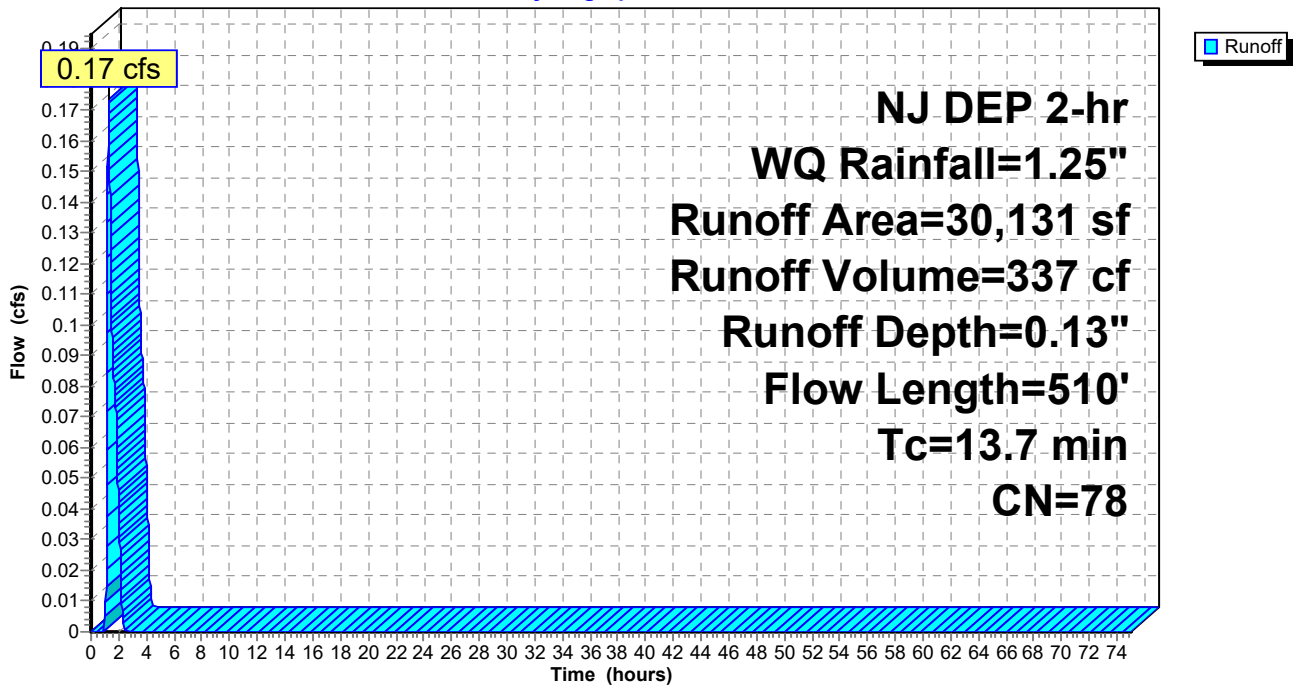
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

| Area (sf) | CN | Description |
|-----------|----|----------------------------|
| * 30,131 | 78 | Landscaped (Heavily Treed) |
| 30,131 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 11.1 | 100 | | 0.15 | | Direct Entry, Sheet Flow Landscaped trees, shrubs, grass |
| 0.5 | 150 | 0.1000 | 5.09 | | Shallow Concentrated Flow, Shallow Concentrated landscaped |
| | | | | | Unpaved Kv= 16.1 fps |
| 2.1 | 260 | 0.0100 | 2.03 | | Shallow Concentrated Flow, Gutter Flow |
| | | | | | Paved Kv= 20.3 fps |
| 13.7 | 510 | Total | | | |

Subcatchment 8S: By Pass

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 86

Summary for Subcatchment 12S: Pervious Drainage Area 1

Runoff = 0.03 cfs @ 1.14 hrs, Volume= 43 cf, Depth= 0.17"

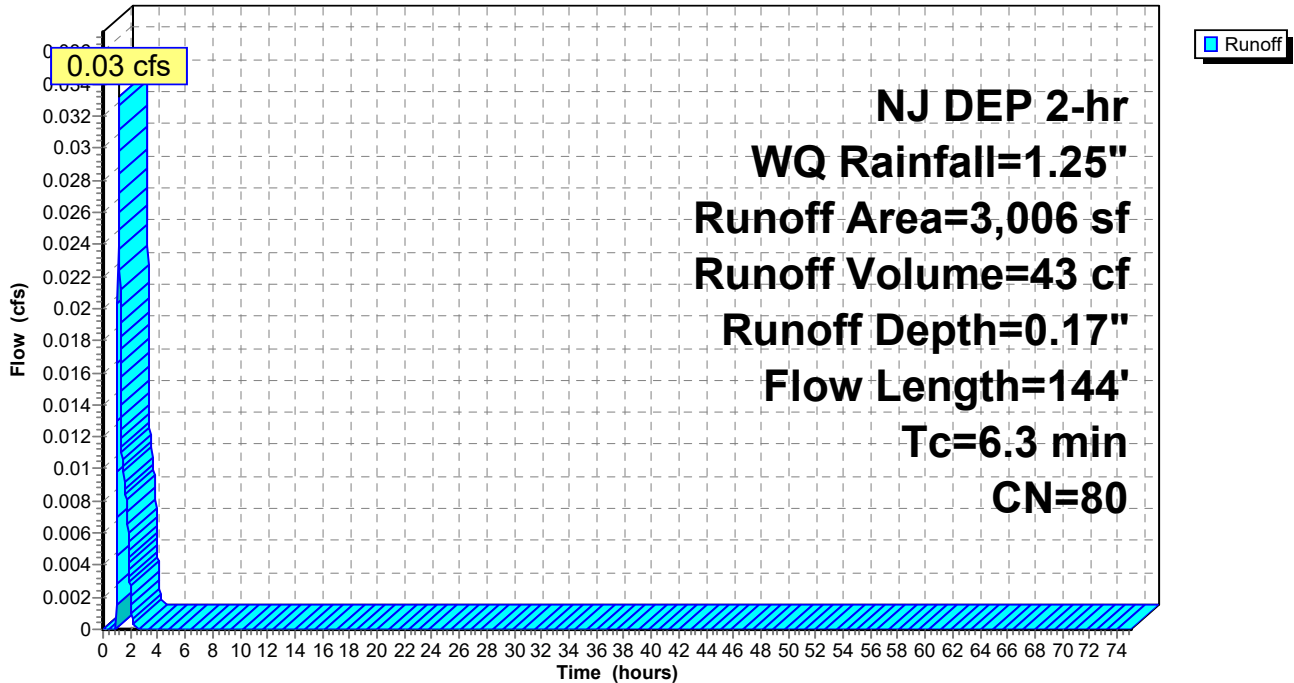
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,006 | 80 | Open Space |
| 3,006 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.4 | 60 | 0.0300 | 0.18 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |
| 0.9 | 84 | 0.0250 | 1.48 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |
| 6.3 | 144 | Total | | | |

Subcatchment 12S: Pervious Drainage Area 1

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 87

Summary for Subcatchment 13S: Open Space Directly Into Detention Basin

Runoff = 0.03 cfs @ 1.21 hrs, Volume= 43 cf, Depth= 0.17"

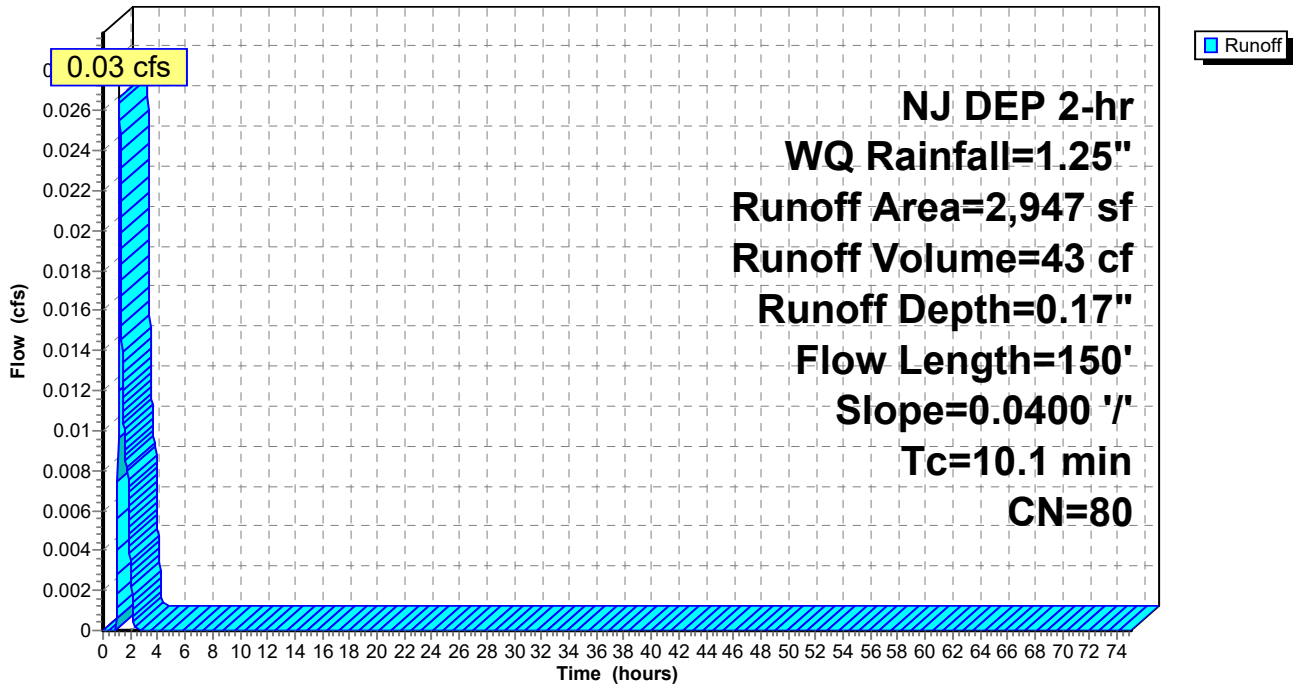
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,947 | 80 | Open Space |
| 2,947 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 10.1 | 150 | 0.0400 | 0.25 | | Sheet Flow, Grass: Short n= 0.150 P2= 3.32" |

Subcatchment 13S: Open Space Directly Into Detention Basin

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 88

Summary for Subcatchment 14S: Pervious Drainage area 2

Runoff = 0.05 cfs @ 1.10 hrs, Volume= 51 cf, Depth= 0.17"

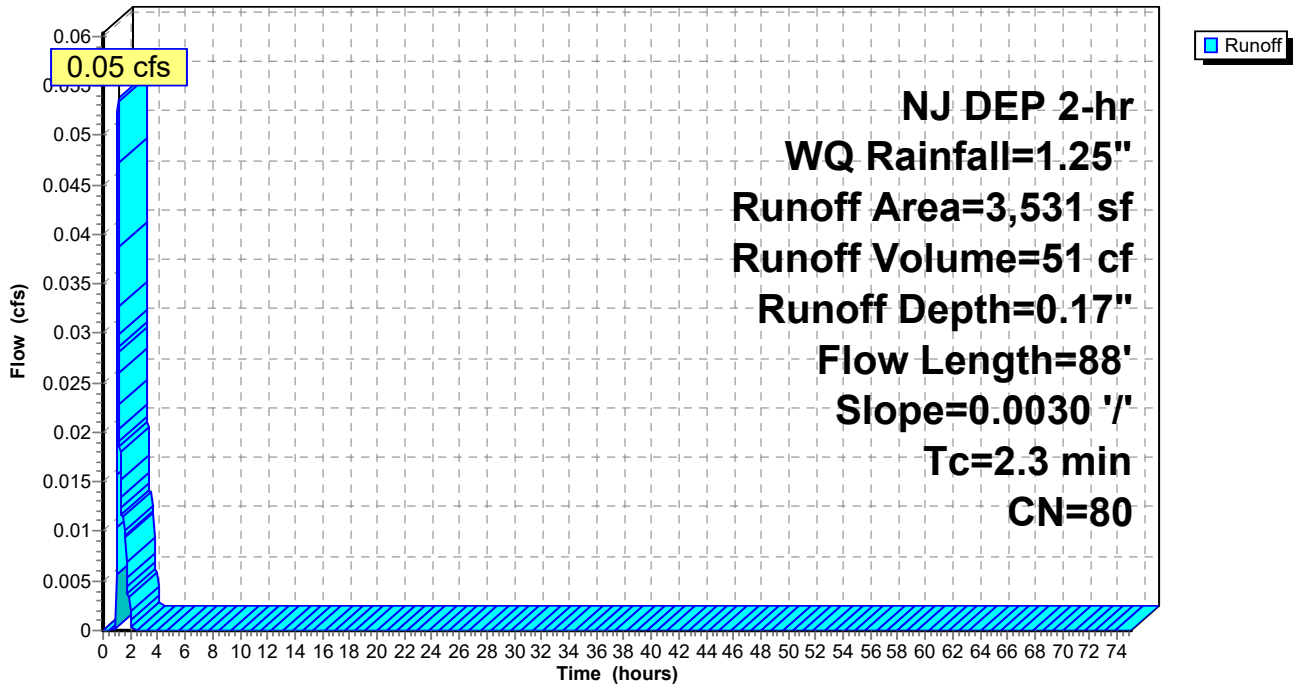
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 3,531 | 80 | Open Space |
| 3,531 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 2.3 | 88 | 0.0030 | 0.64 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 14S: Pervious Drainage area 2

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 89

Summary for Subcatchment 16S: Pervious Drainage Area 3

Runoff = 0.04 cfs @ 1.09 hrs, Volume= 37 cf, Depth= 0.17"

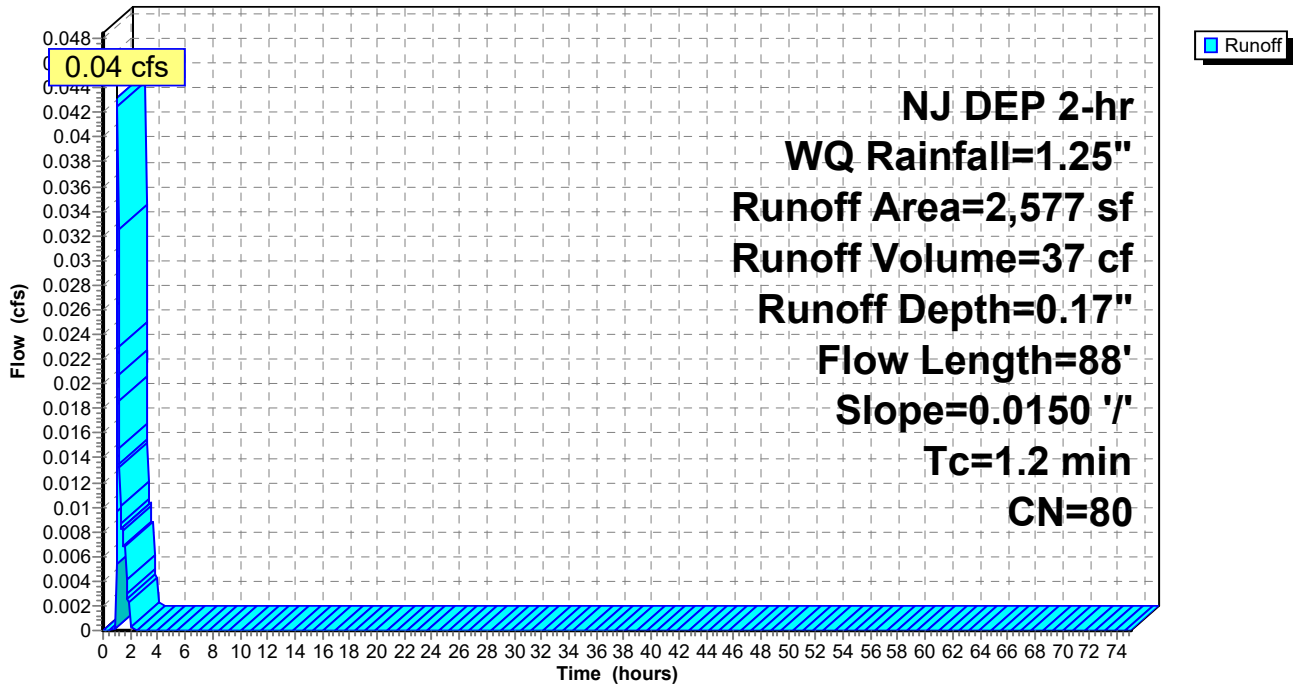
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs
 NJ DEP 2-hr WQ Rainfall=1.25"

| Area (sf) | CN | Description |
|-----------|----|-----------------------|
| * 2,577 | 80 | Open Space |
| 2,577 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 1.2 | 88 | 0.0150 | 1.22 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.32" |

Subcatchment 16S: Pervious Drainage Area 3

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 90

Summary for Pond 7P: Existing Catch Basin

Inflow Area = 73,875 sf, 42.89% Impervious, Inflow Depth > 0.50" for WQ event
 Inflow = 0.27 cfs @ 1.29 hrs, Volume= 3,059 cf
 Outflow = 0.27 cfs @ 1.29 hrs, Volume= 3,059 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.27 cfs @ 1.29 hrs, Volume= 3,059 cf

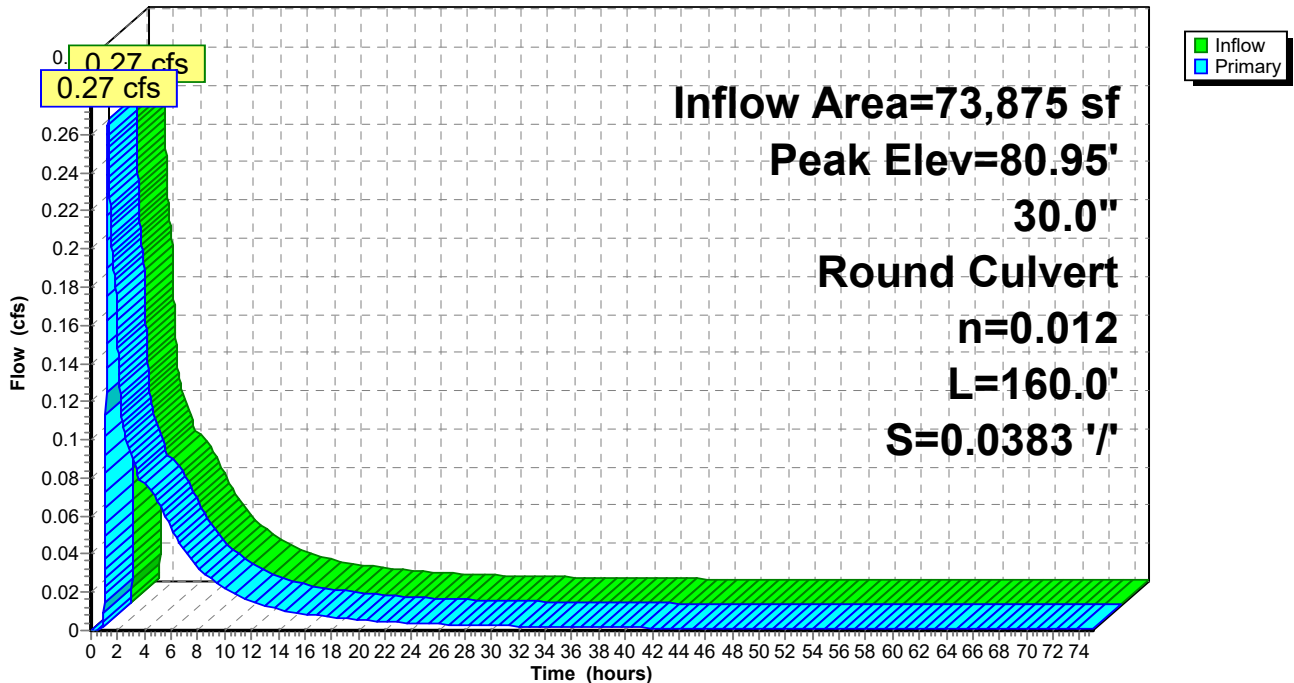
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 80.95' @ 1.29 hrs
 Flood Elev= 85.30'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|---|
| #1 | Primary | 80.73' | 30.0" Round Culvert L= 160.0' Ke= 0.900 Inlet / Outlet Invert= 80.73' / 74.61' S= 0.0383 '/ Cc= 0.900 n= 0.012, Flow Area= 4.91 sf |

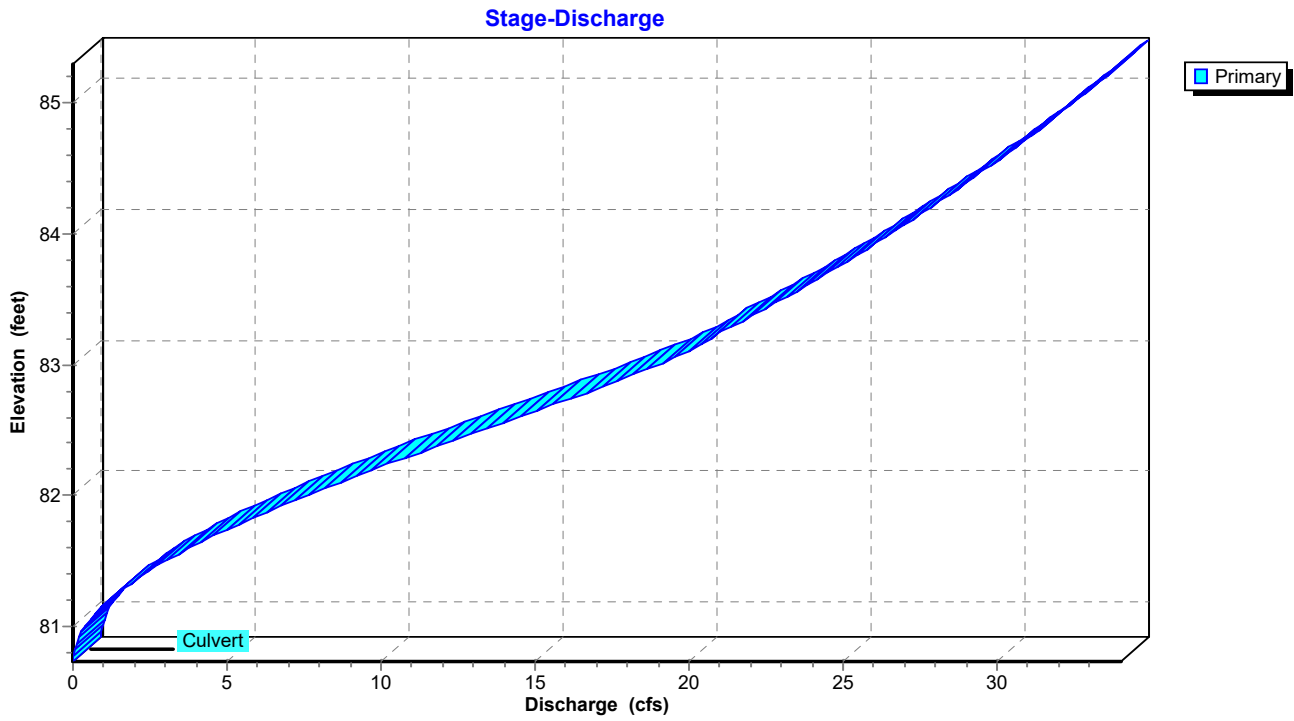
Primary OutFlow Max=0.27 cfs @ 1.29 hrs HW=80.95' (Free Discharge)
 ←1=Culvert (Inlet Controls 0.27 cfs @ 1.26 fps)

Pond 7P: Existing Catch Basin

Hydrograph



Pond 7P: Existing Catch Basin



9270 Proposed Drainage Porous Pvmt r6

NJ DEP 2-hr WQ Rainfall=1.25"

Prepared by Frank H. Lehr Associates

Printed 12/29/2022

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

Page 92

Summary for Pond 8P: Porous Pavement Detention

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth = 0.80" for WQ event
 Inflow = 2.33 cfs @ 1.08 hrs, Volume= 2,905 cf
 Outflow = 0.11 cfs @ 1.81 hrs, Volume= 2,722 cf, Atten= 95%, Lag= 44.0 min
 Primary = 0.11 cfs @ 1.81 hrs, Volume= 2,722 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 100.08' @ 1.81 hrs Surf.Area= 11,000 sf Storage= 2,553 cf

Plug-Flow detention time= 500.5 min calculated for 2,722 cf (94% of inflow)
 Center-of-Mass det. time= 497.7 min (565.3 - 67.5)

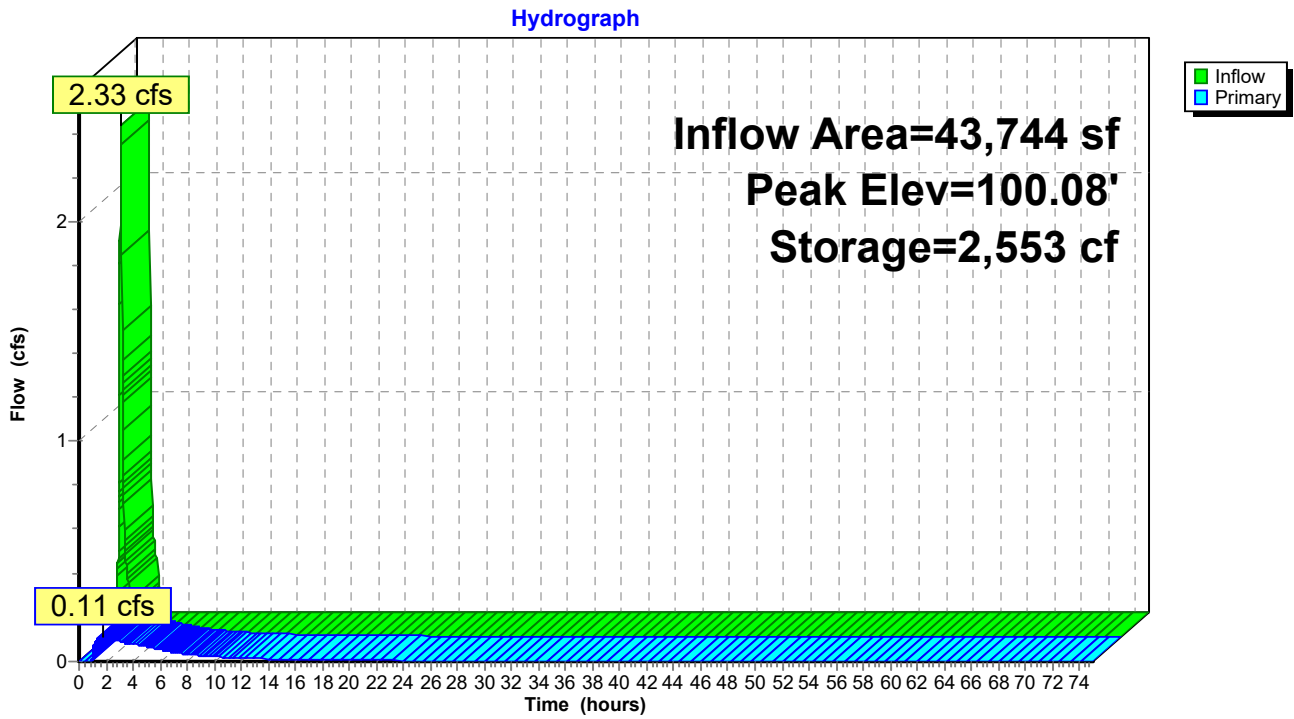
| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|---|
| #1 | 99.50' | 13,200 cf | 100.00'W x 110.00'L x 3.00'H Prisma 33,000 cf Overall x 40.0% Voids |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|---|
| #1 | Primary | 99.50' | 15.0" Round Outlet Pipe L= 101.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 97.48' S= 0.0200 1/ S= 0.0200 1/ Cc= 0.900 n= 0.011, Flow Area= 1.23 sf |
| #2 | Device 3 | 99.50' | 1.0" Horiz. Underdrain holes in PVC pipe X 590.00 C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 99.50' | 4.0" Round underdrain 4" Pvc Pipe L= 77.0' Ke= 0.900 Inlet / Outlet Invert= 99.50' / 99.50' S= 0.0000 1/ S= 0.0000 1/ Cc= 0.900 n= 0.011, Flow Area= 0.09 sf |
| #4 | Device 1 | 101.50' | 18.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

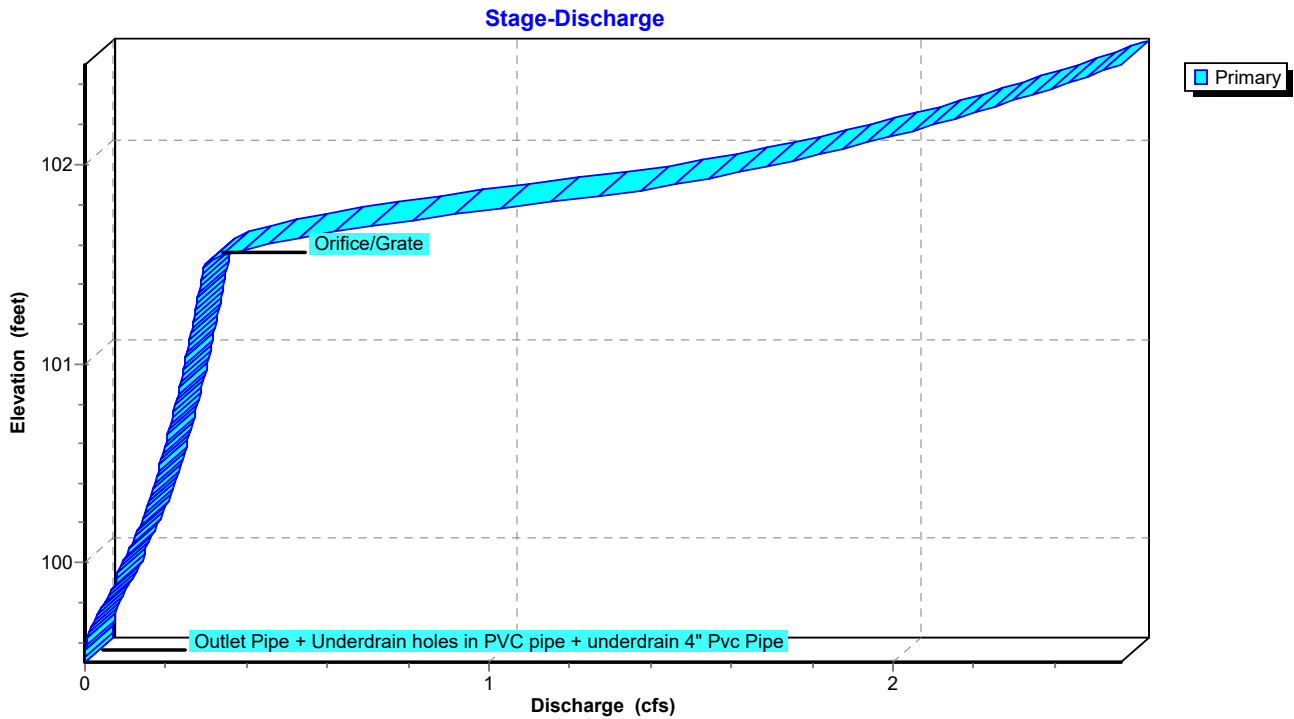
Primary OutFlow Max=0.11 cfs @ 1.81 hrs HW=100.08' TW=86.76' (Dynamic Tailwater)

- 1=Outlet Pipe (Passes 0.11 cfs of 1.14 cfs potential flow)
- 3=underdrain 4" Pvc Pipe (Barrel Controls 0.11 cfs @ 1.30 fps)
- 2=Underdrain holes in PVC pipe (Passes 0.11 cfs of 11.80 cfs potential flow)
- 4=Orifice/Grate (Controls 0.00 cfs)

Pond 8P: Porous Pavement Detention



Pond 8P: Porous Pavement Detention



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 94

Summary for Pond 9P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 0.75" for WQ event
 Inflow = 0.11 cfs @ 1.81 hrs, Volume= 2,722 cf
 Outflow = 0.11 cfs @ 1.81 hrs, Volume= 2,722 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.11 cfs @ 1.81 hrs, Volume= 2,722 cf

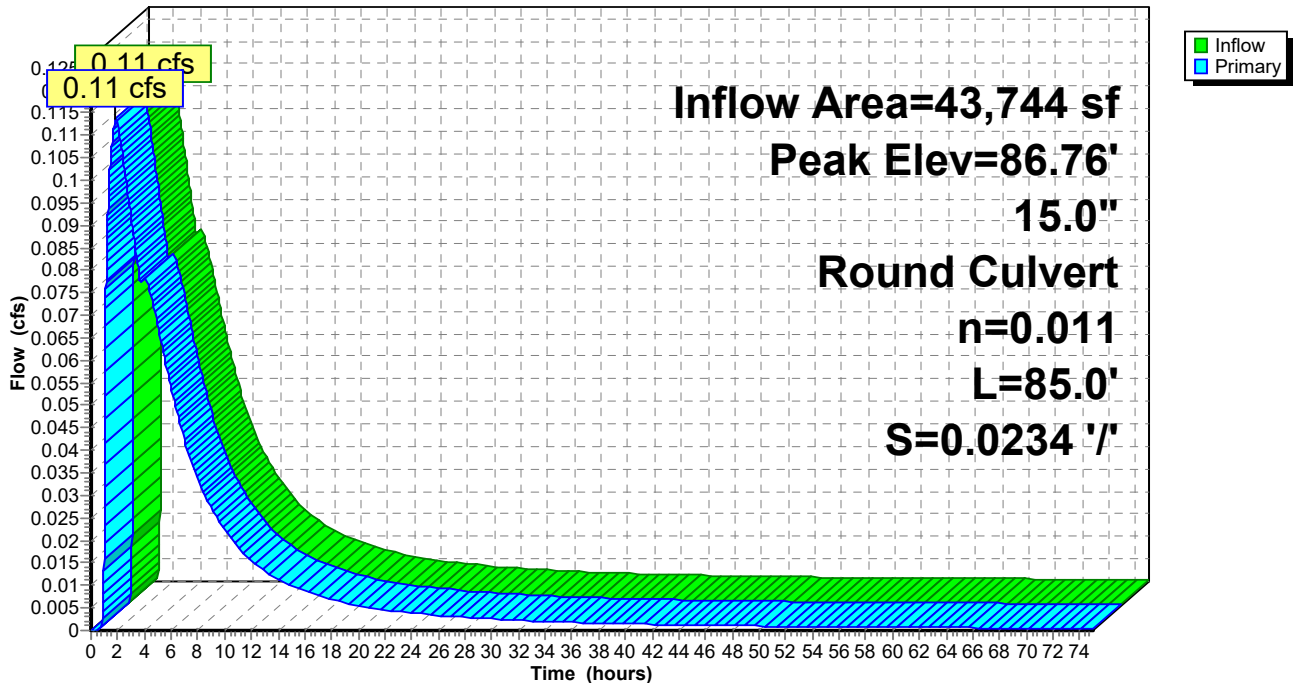
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 86.76' @ 1.81 hrs
 Flood Elev= 102.50'

| Device # | Routing | Invert | Outlet Devices |
|----------|---------|--------|--|
| #1 | Primary | 86.59' | 15.0" Round Culvert L= 85.0' Ke= 0.900 Inlet / Outlet Invert= 86.59' / 84.60' S= 0.0234 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

Primary OutFlow Max=0.11 cfs @ 1.81 hrs HW=86.76' TW=81.77' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.11 cfs @ 1.11 fps)

Pond 9P: Manhole

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

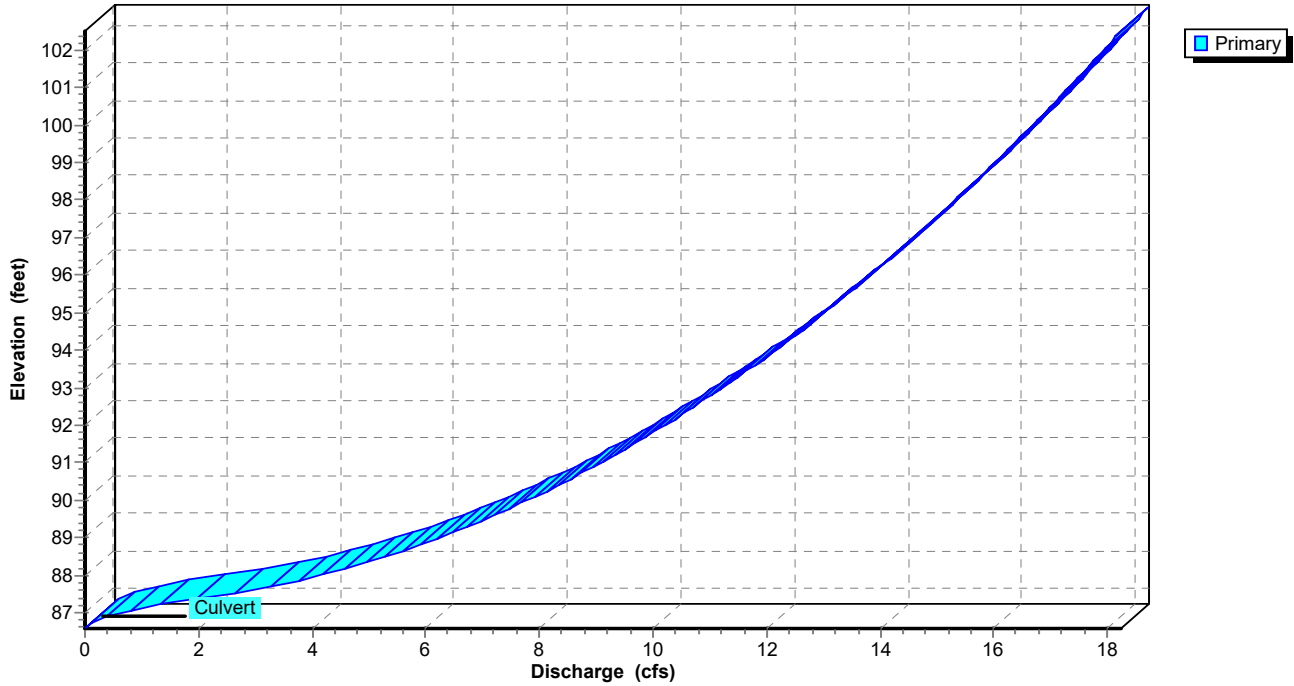
NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 95

Pond 9P: Manhole

Stage-Discharge



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

NJ DEP 2-hr WQ Rainfall=1.25"

Printed 12/29/2022

Page 96

Summary for Pond 11P: Manhole

Inflow Area = 43,744 sf, 72.43% Impervious, Inflow Depth > 0.75" for WQ event
 Inflow = 0.11 cfs @ 1.81 hrs, Volume= 2,722 cf
 Outflow = 0.11 cfs @ 1.81 hrs, Volume= 2,722 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.11 cfs @ 1.81 hrs, Volume= 2,722 cf

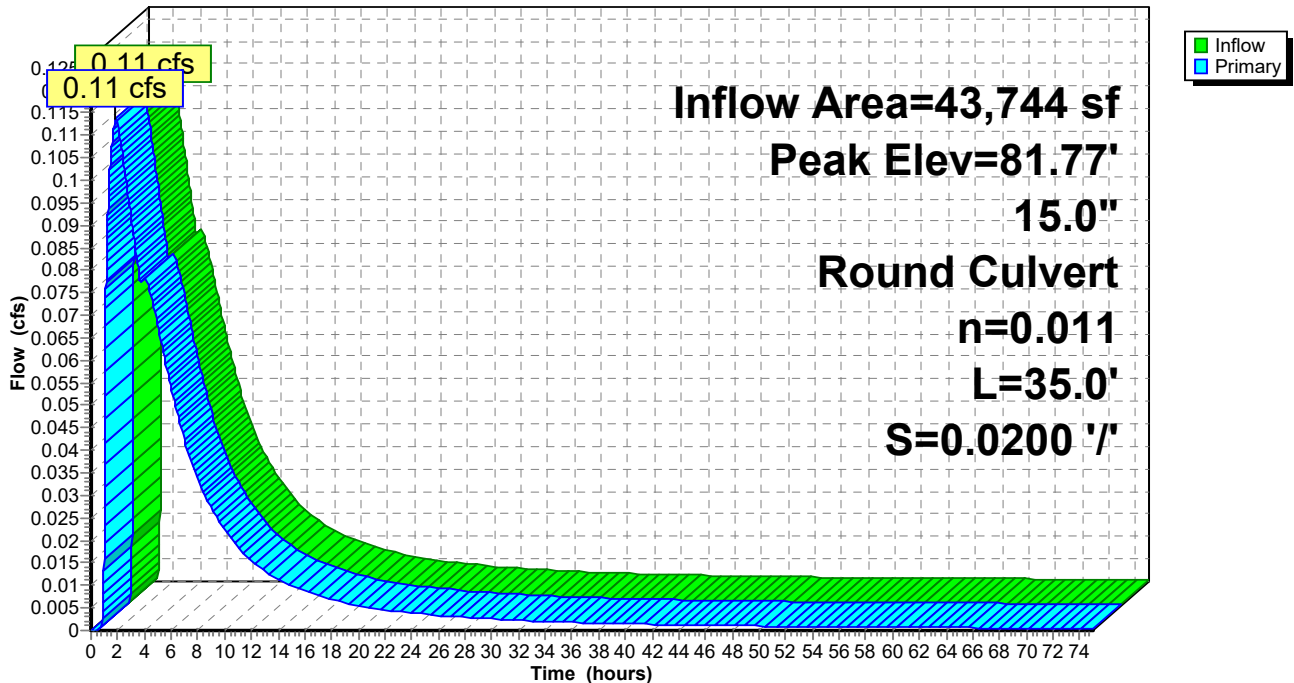
Routing by Dyn-Stor-Ind method, Time Span= 0.00-75.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 81.77' @ 1.81 hrs
 Flood Elev= 89.20'

| Device # | Routing | Invert | Outlet Devices |
|----------|---------|--------|--|
| #1 | Primary | 81.60' | 15.0" Round Culvert L= 35.0' Ke= 0.900 Inlet / Outlet Invert= 81.60' / 80.90' S= 0.0200 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf |

Primary OutFlow Max=0.11 cfs @ 1.81 hrs HW=81.77' TW=80.91' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.11 cfs @ 1.11 fps)

Pond 11P: Manhole

Hydrograph



9270 Proposed Drainage Porous Pvmt r6

Prepared by Frank H. Lehr Associates

HydroCAD® 10.10-5a s/n 06491 © 2020 HydroCAD Software Solutions LLC

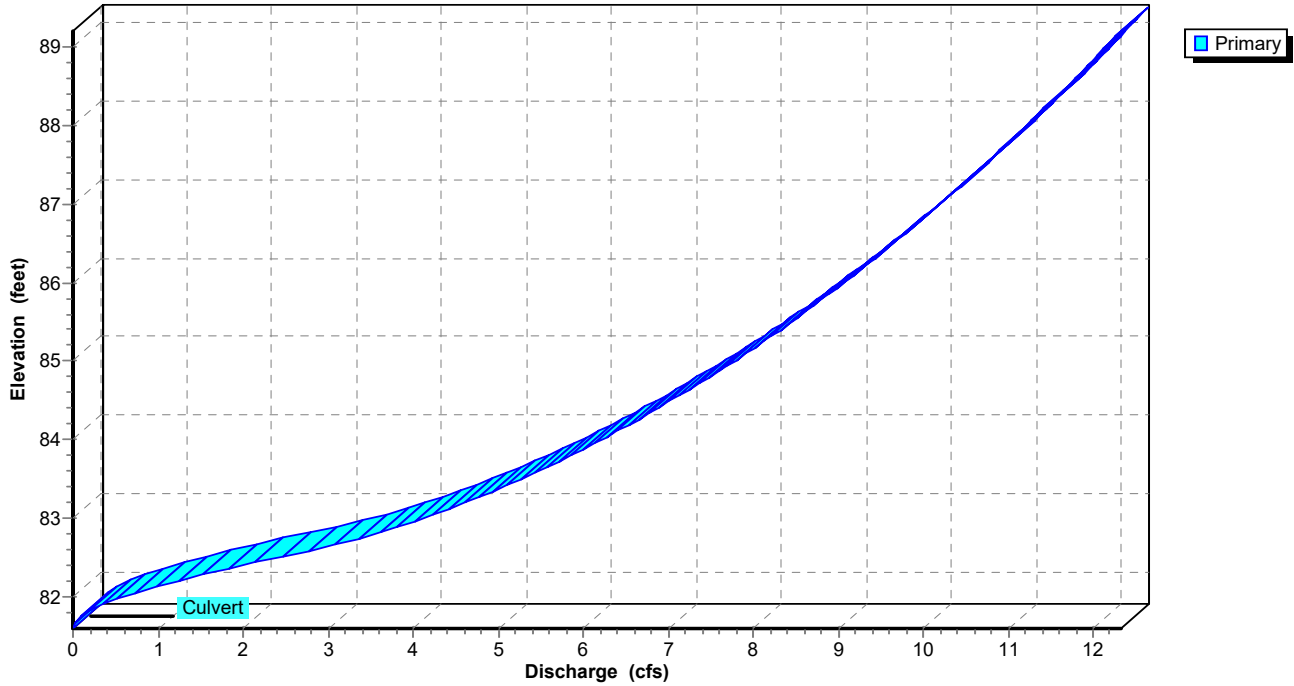
NJ DEP 2-hr WQ Rainfall=1.25"

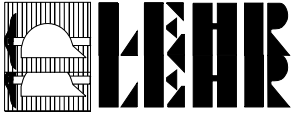
Printed 12/29/2022

Page 97

Pond 11P: Manhole

Stage-Discharge





Calculation for Flow Through Perforated Pipes at Inlets

The Stormwater design of this project allows for stormwater to enter a stone detention basin through porous pavement. As a cautionary measure, inlets have been added to the design to allow for stormwater to enter the stone detention in the event the surface of the porous pavement becomes clogged. These inlets have outlet drains that connect to the underdrain system of the porous pavement. The perforations of the outlet drains are to allow the stormwater to enter the stone detention. Note that the porous pavement underdrain is attached to the outlet structure on site. The calculation below shows that the perforated outlet pipes from each inlet have the capacity to distribute the stormwater into the stone detention.

Factors:

Each pipe is 4" PVC perforated pipe. Two 1/2" perforations are provided at 5" o.c.

There is a minimum of 4' of head at each inlet from grate to outlet.

Each 1/2" hole has a capacity of 5.89 GPM. (See chart below)

| Pressure Head (ft) | Discharge Rate (gallons per minute) based on Hole Diameters (inches) | | | | |
|-----------------------|---|------|------|------|------|
| | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 |
| 2.5 | 1.18 | 1.85 | 2.66 | 3.63 | 4.73 |
| 3.0 | 1.28 | 1.99 | 2.87 | 3.91 | 5.10 |
| 3.5 | 1.40 | 2.19 | 3.15 | 4.29 | 5.60 |
| 4.0 | 1.47 | 2.30 | 3.31 | 4.51 | 5.89 |
| 4.5 | 1.59 | 2.48 | 3.57 | 4.86 | 6.35 |
| 5.0 | 1.65 | 2.57 | 3.71 | 5.04 | 6.59 |

5.89 gpm=0.01 cfs

For Drainage Area 1:

100 yr storm= 1.58 cfs

1.58 cfs/0.01 cfs = 158 holes needed.

158 holes/(4 holes per foot)= **39.5 ft of pipe required.**

For Drainage Area 2:

100 yr storm= 1.77 cfs

1.77 cfs/0.01 cfs = 177 holes needed.

177 holes/(4 holes per foot)= **44.25 ft of pipe required.**

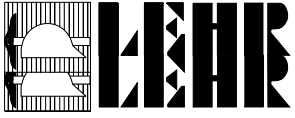
For Drainage Area 3:

100 yr storm= 2.55 cfs

2.55 cfs/0.01 cfs = 255 holes needed.

255 holes/(4 holes per foot)= **63.75 ft of pipe required.**

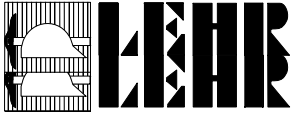
Each of the pipes from the inlets have the minimum required length of pipe to distribute the stormwater to the stone detention basin.



64 Norma Avenue
Franklin, NJ
Stormwater Drainage Calculations

Project # 9270
December 2022
By: RJA

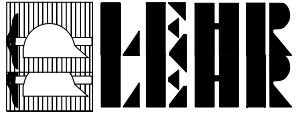
STORMWATER QUALITY



Stormwater Quality

To meet Stormwater Quality requirements, a porous pavement system has been proposed. The porous pavement achieves the minimum 80% TSS for water quality measures. The entirety of the street pavement area is designated as porous pavement. The porous pavement collects stormwater from the sidewalk, driveways, and pavement, and building roof leaders are routed to the detention below the porous pavement. This accounts for entirety of the impervious surfaces. The remainder of the site remains landscaped.

The surface area to porous pavement is approximately 11,000 sf. The area routed to the porous pavement is 43,744 sf. Per the NJBMP guidelines, the additional area allowed to porous pavement is 3 times the surface area. The inflow area is allowable. Note that 12,967 sf of this is clean water through the roof. The drainage time for the 100 year storm is 48 hours.



64 Norma Avenue
Franklin, NJ
Stormwater Drainage Calculations

Project # 9270
December 2022
By: RJA

NONSTRUCTURAL STRATEGIES POINT SYSTEM

NJDEP Nonstructural Strategies Points System (NSPS)

Version: January 31, 2006

Note: Input Values in Yellow Cells Only

Project:

Date:

User:

Notes:

| |
|--|
| |
| |
| |
| |

Step 1 - Provide Basic Major Development Site Information

A. Specify Total Area in Acres of Development Site Described in Steps 2 and 3 = Acres

B. Specify by Percent the Various Planning Areas Located within the Development Site:

| State Plan Planning Area: | PA-1 | PA-2 | PA-3 | PA-4 | PA-4B | PA-5 | Total % Area |
|--|-------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------------------------|
| Percent of Each Planning Area within Site: | <input type="text" value="100.0%"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text" value="100.0%"/> |

Note: See User's Guide for Equivalent Zones within Designated Centers and the NJ Meadowlands, Pinelands, and Highlands Districts

Step 2 - Describe Existing or Pre-Developed Site Conditions

A. Specify Existing Land Use/Land Cover Descriptions and Areas:

| Site Segment | Land Use/Land Cover Description | Specify Land Use/Land Cover in Acres for Each HSG | | | | Use/Cover | Points |
|-------------------------------|--|---|-------|-------|--------|-----------|--|
| | | HSG A | HSG B | HSG C | HSG D | Subtotals | |
| 1 | Wetlands and Undisturbed Stream Buffers | | | | | 0.0 | 0 |
| 2 | Lawn and Open Space | | | | | 0.0 | 0 |
| 3 | Brush and Shrub | | | | | 0.0 | 0 |
| 4 | Meadow, Pasture, Grassland, or Range | | | | | 0.0 | 0 |
| 5 | Row Crop | | | | | 0.0 | 0 |
| 6 | Small Grain and Legumes | | | | | 0.0 | 0 |
| 7 | Woods - Indigenous | | | | 1.7 | 1.7 | 253 |
| 8 | Woods - Planted | | | | | 0.0 | 0 |
| 9 | Woods and Grass Combination | | | | | 0.0 | 0 |
| 10 | Ponds, Lakes, and Other Open Water | | | | | 0.0 | 0 |
| 11 | Gravel and Dirt | | | | | 0.0 | 0 |
| 12 | Porous and Permeable Paving | | | | | 0.0 | 0 |
| 13 | Directly Connected Impervious | | | | | 0.0 | 0 |
| 14 | Unconnected Impervious with Small D/S Pervious | | | | | 0.0 | 0 |
| 15 | Unconnected Impervious with Large D/S Pervious | | | | | 0.0 | 0 |
| HSG Subtotals (Acres): | | 0.0 | 0.0 | 0.0 | 1.7 | | Total Area: 1.7 |
| HSG Subtotals (%): | | 0.0% | 0.0% | 0.0% | 100.0% | | Total % Area: 100.0% |
| | | | | | | | Points Subtotal: 253 |
| | | | | | | | Total Existing Site Points: 253 |

Step 3 - Describe Proposed or Post-Developed Site Conditions

A. Specify Proposed Land Use/Land Cover Descriptions and Areas:

| Site Segment | Land Use/Land Cover Description | Specify Land Use/Land Cover in Acres for Each HSG | | | | Use/Cover | Points |
|-------------------------------|--|---|-------|-------|--------|-----------|-----------------------------|
| | | HSG A | HSG B | HSG C | HSG D | Subtotals | |
| 1 | Wetlands and Undisturbed Stream Buffers | | | | | 0.0 | 0 |
| 2 | Lawn and Open Space | | | | 0.3 | 0.3 | 32 |
| 3 | Brush and Shrub | | | | | 0.0 | 0 |
| 4 | Meadow, Pasture, Grassland, or Range | | | | | 0.0 | 0 |
| 5 | Row Crop | | | | | 0.0 | 0 |
| 6 | Small Grain and Legumes | | | | | 0.0 | 0 |
| 7 | Woods - Indigenous | | | | | 0.0 | 0 |
| 8 | Woods - Planted | | | | 0.7 | 0.7 | 97 |
| 9 | Woods and Grass Combination | | | | | 0.0 | 0 |
| 10 | Ponds, Lakes, and Other Open Water | | | | | 0.0 | 0 |
| 11 | Gravel and Dirt | | | | | 0.0 | 0 |
| 12 | Porous and Permeable Paving | | | | 0.4 | 0.4 | 43 |
| 13 | Directly Connected Impervious | | | | 0.3 | 0.3 | 0 |
| 14 | Unconnected Impervious with Small D/S Pervious | | | | | 0.0 | 0 |
| 15 | Unconnected Impervious with Large D/S Pervious | | | | | 0.0 | 0 |
| HSG Subtotals (Acres): | | 0.0 | 0.0 | 0.0 | 1.7 | | Total Area: 1.7 |
| HSG Subtotals (%): | | 0.0% | 0.0% | 0.0% | 100.0% | | Total % Area: 100.0% |
| | | | | | | | Points Subtotal: 171 |

B. Compare Proposed Impervious Coverage with Maximum Allowable Impervious Coverage:

| | | |
|---|-----|-----------|
| Total Directly Connected Impervious Coverage = | 18% | % of Site |
| Total Unconnected Impervious Coverage with Small D/S Pervious = | 0% | % of Site |
| Total Unconnected Impervious Coverage with Large D/S Pervious = | 0% | % of Site |
| Total Site Impervious Coverage = | 18% | % of Site |
| Effective Site Impervious Coverage = | 18% | % of Site |

Specify Source of Maximum Allowable Impervious Coverage: Table (None or Table)

Allowable Site Impervious Cover from Maximum Impervious Cover Table: 0%
 Note: See Maximum Impervious Cover Table Worksheet for Details

Points Subtotal: 0

C. Compare Proposed Site Disturbance with Maximum Allowable Site Disturbance:

| | | |
|---|------|-----------|
| Total Proposed Site Disturbance = | 100% | % of Site |
| Maximum Allowable Site Disturbance by Municipal Ordinance = | 100% | % of Site |

Points Subtotal: 0

D. Describe Proposed Runoff Conveyance System:

| | | |
|---|----|------|
| Total Length of Runoff Conveyance System = | | Feet |
| Length of Vegetated Runoff Conveyance System = | | Feet |
| % of Total Runoff Conveyance System That is Vegetated = | 0% | |

Points Subtotal: 0

E. Residential Lot Clustering:

| | | |
|--|--|-----------------------------|
| Percent of Total Site Area that will be Clustered = | | % of Site |
| Minimum Standard Lot Size as Per Zoning (Note: 1/2 Acre or Greater) = | | Acres |
| Maximum Proposed Cluster Lot Size (Note: 1/4 Acre or Less) = | | Acres |
| Percent of Clustered Portion of Site to be Preserved as Vegetated Open Space = | | % of Clustered Site Portion |

Points Subtotal: 0

F. Will the Following be Utilized to Minimize Soil Compaction?

Proposed Lawn Areas will be Graded with Lightweight Construction Equipment:
Percent of Proposed Lawn Areas to be Graded with Such Equipment:

| | |
|----|-----------------|
| No | (Yes or No) |
| | % of Lawn Areas |

Points Subtotal: **0**

G. Are Any of the Following Stormwater Management Standards Met Using Only Nonstructural Strategies and Measures?

Groundwater Recharge Standards (NJAC 7:8-5.4-a-2):
Stormwater Runoff Quality Standards (NJAC 7:8-5.5):
Stormwater Runoff Quantity Standards (NJAC 7:8-5.4-a-3):

| | |
|-----|-------------|
| No | (Yes or No) |
| Yes | (Yes or No) |
| Yes | (Yes or No) |

Points Subtotal: **114**

Note: If the Answers to All Three Questions at G Above are "Yes", Adequate Nonstructural Measures have been Utilized.

Total Proposed Site Points: 285

Ratio of Proposed to Existing Site Points: 113%

Required Site Points Ratio: 68%

Nonstructural Point System Results:

Proposed Nonstructural Measures are Adequate