

# STORMWATER MANAGEMENT NARRATIVE

For

**United Shipping Alliance**

**Block 3903, Lot 3.02**

**Township of Neptune, Monmouth County, NJ**

**June 1, 2022**

**Revised: September 14, 2022**

By:



**KENNEDY CONSULTING ENGINEERS, L.L.C.**

211 MAPLE AVENUE

RED BANK, NJ 07701

PHONE: 732.212.9393 • FAX: 732.212.9399

COA: 24GA28049700

Prepared by:

A handwritten signature in black ink, appearing to read 'James A. Kennedy', is written over a horizontal line.

**JAMES A. KENNEDY, P.E.**

N.J. Professional Engineer No. 41275

# TABLE OF CONTENTS

<b>1. INTRODUCTION .....</b>	<b>2</b>
<b>2. EXISTING SITE CONDITIONS .....</b>	<b>2</b>
<b>3. PROPOSED SITE CONDITIONS.....</b>	<b>3</b>
<b>4. STORMWATER MANAGEMENT METHODOLOGY .....</b>	<b>3</b>
<b>5. STORMWATER MANAGEMENT COMPLIANCE.....</b>	<b>4</b>
<b>6. CONCLUSION.....</b>	<b>4</b>
<b>APPENDICES .....</b>	<b>5</b>
A.    Soils Information	
•    USDA/ NRCS Soils Information	
B.    Time of Concentration Calculations	
C.    Hydrograph Analysis Summary	
•    Hydrocad Node Diagram	
•    Hydrocad Printouts	
D.    Drainage Area Maps	
•    Existing Conditions Map	
•    Proposed Conditions Map	

## 1. INTRODUCTION

This stormwater management report is prepared to address the impacts of stormwater runoff from the development detailed on the site plans prepared by Kennedy Consulting Engineers, LLC (KCE). This report contains the calculation of peak stormwater runoff flow rates a single point of concern for the proposed development. This report provides conclusive information and shows no adverse impact from stormwater runoff to offsite areas as a result of this proposed development.

## 2. EXISTING SITE CONDITIONS

The subject 2.495-acre property ("the site") is substantially developed, with topography sloping from the west side of the property towards an inlet located on the east side of the property. The subject property is a single tax lot (Block 3903, Lot 3.02) in the Township of Neptune. The site is bounded to the north by a commercial property with frontage along Jumping Brook Road, and to the south by commercial lots with frontage along Route 66. An office building currently occupies this site and the remainder of the site is substantially developed with driveways, parking areas, walkways, and landscaped islands. The impervious areas total 2.123 Ac. There are also grassed areas and vegetation present within the property.

Based on the existing topography, the on-site stormwater runoff is directed towards a single of concern; to the west towards an existing inlet within the parking area and drive aisle (**Point 1**). The drainage area is depicted on the enclosed drainage area maps.

### **3. PROPOSED SITE CONDITIONS**

The applicant proposes to convert the existing office building to a warehouse use with a small 2,200 sf office portion to remain. The site improvements include parking area changes to accommodate better circulation and a building addition of 778 sf with the appropriate landscape buffering. All other existing improvements are to remain. In total, 0.188 acres of land will be disturbed. In the proposed condition, the total area of impervious is 2.114 acres, which represents a decrease of 0.009 acres. The proposed drainage patterns will remain as under existing conditions with **Point 1** (Existing Drainage Inlet) on the west side of the property remaining as the single point of analysis.

The United States Department of Agriculture methodology described in the Soil Conservation Service Technical Release No. 55 is used in developing the enclosed hydrograph-based hydrology model for the comparative peak flow analysis. A summary of the design storm events with return frequencies of 2, 10, and 100 years are included in the conclusion of this report.

### **4. STORMWATER MANAGEMENT METHODOLOGY**

This report compares the existing to the proposed runoff conditions in determining the effect of stormwater runoff as a result of this development. After determining the stormwater drainage areas, hydrologic parameters and point of concern, the direct calculation of peak stormwater runoff from the drainage areas under existing and proposed conditions can be computed.

Storm events with return frequencies of 2, 10, and 100 years are included in the peak flow computations shown in the appendix of this report. The TR-55 methodology is utilized for determining the times of concentration (TC) with a minimum TC of 10 minutes.

In accordance with the Soil Survey of Monmouth County, the on-site soils within the limit of disturbance are EveB/EveC "Evesboro Sand" or KkgB "Klej Loamy Sand". Therefore, a Hydrologic Soil Group of 'A' is used.

## 5. STORMWATER MANAGEMENT COMPLIANCE

Major Development is defined by N.J.A.C. 7:8-1.2 et. seq. "Major development" means any "development" that provides for ultimately disturbing one or more acres of land or the creation of one-quarter acre or more of "regulated impervious and motor vehicle surfaces".

As the project proposes to disturb approximately 0.188 acres and proposes a net decrease of 0.009 acres of new impervious surfaces, the project is not considered a major development per the state regulations and municipal ordinance. As such, this report documents the changes to peak stormwater runoff rates to the point of concern.

## 6. CONCLUSION

The table below shows a comparison of existing and developed runoff to the single point of concern. With respect to the flows at Point 1 (Existing Drainage Inlet), due to the decrease in impervious coverage on the property there is a slight decrease in peak flows during the 2, 10, and 100-year design storms. Due to the decrease in peak flows no adverse impacts to adjacent properties or existing off-site stormwater management system are anticipated.

**Flow Rate Comparison to Point 1  
(Existing Drainage Inlet)**

<b>Design Storm</b>	<b>Existing Runoff (cfs)</b>	<b>Developed Runoff (cfs)</b>	<b>Change in Runoff/ Reduction Percentage</b>
2 Year	5.52	5.49	-0.03 / (-0.54%)
10 Year	8.59	8.56	-0.03 / (-0.35%)
100 Year	15.17	15.11	-0.06 / (-0.40%)

## APPENDICES

**APPENDIX A**

---

**SOILS INFORMATION**



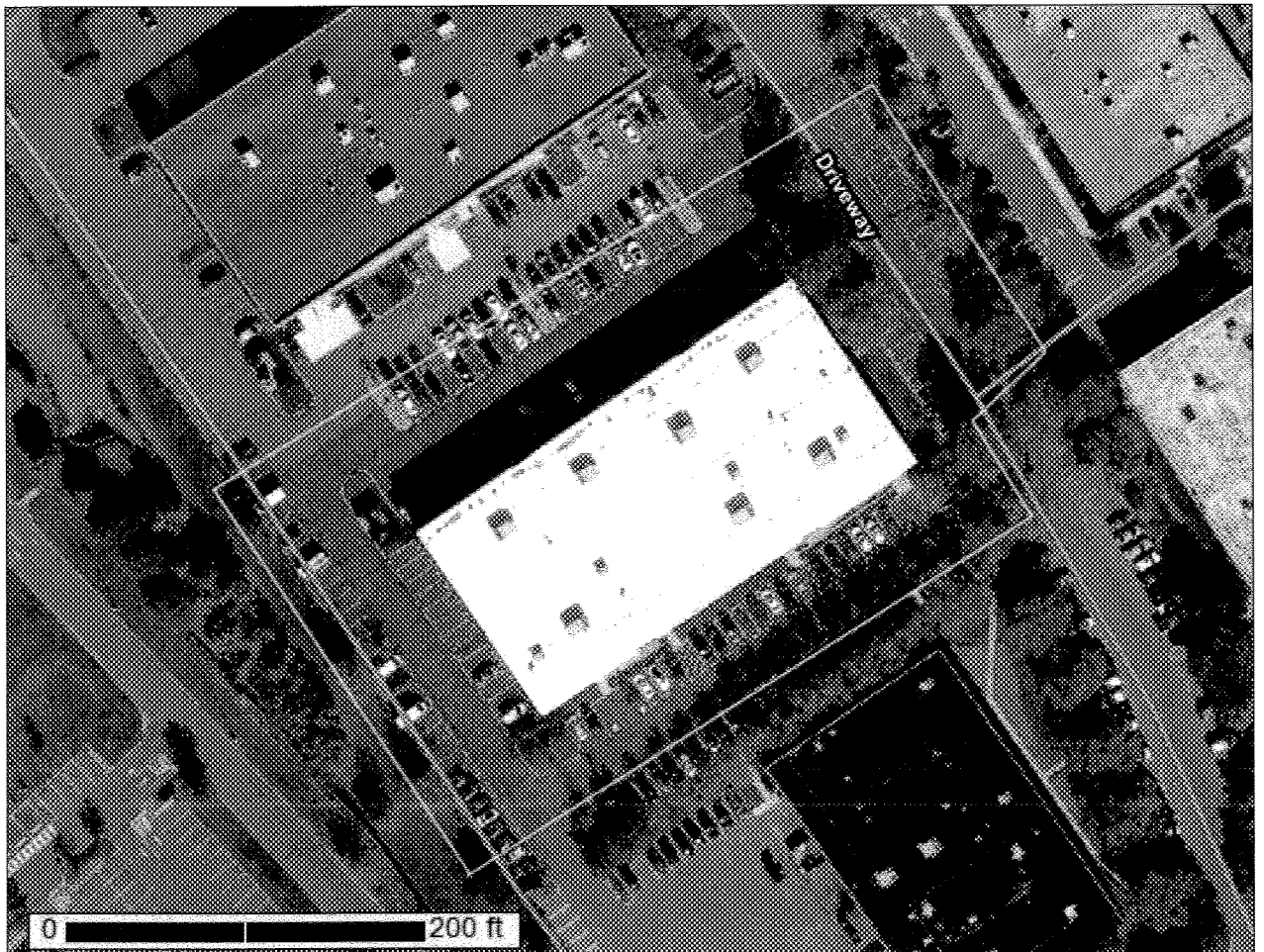
United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for **Monmouth County, New Jersey**





# Preface

---

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Contents

---

<b>Preface</b> .....	2
<b>How Soil Surveys Are Made</b> .....	5
<b>Soil Map</b> .....	8
Soil Map (1400 Jumping Brook Road).....	9
Legend.....	10
Map Unit Legend (1400 Jumping Brook Road).....	11
Map Unit Descriptions (1400 Jumping Brook Road).....	11
Monmouth County, New Jersey.....	13
EveB—Evesboro sand, 0 to 5 percent slopes.....	13
EveC—Evesboro sand, 5 to 10 percent slopes.....	14
KkgB—Klej loamy sand, 0 to 5 percent slopes.....	15
<b>References</b> .....	18

# How Soil Surveys Are Made

---

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

## Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

## Custom Soil Resource Report

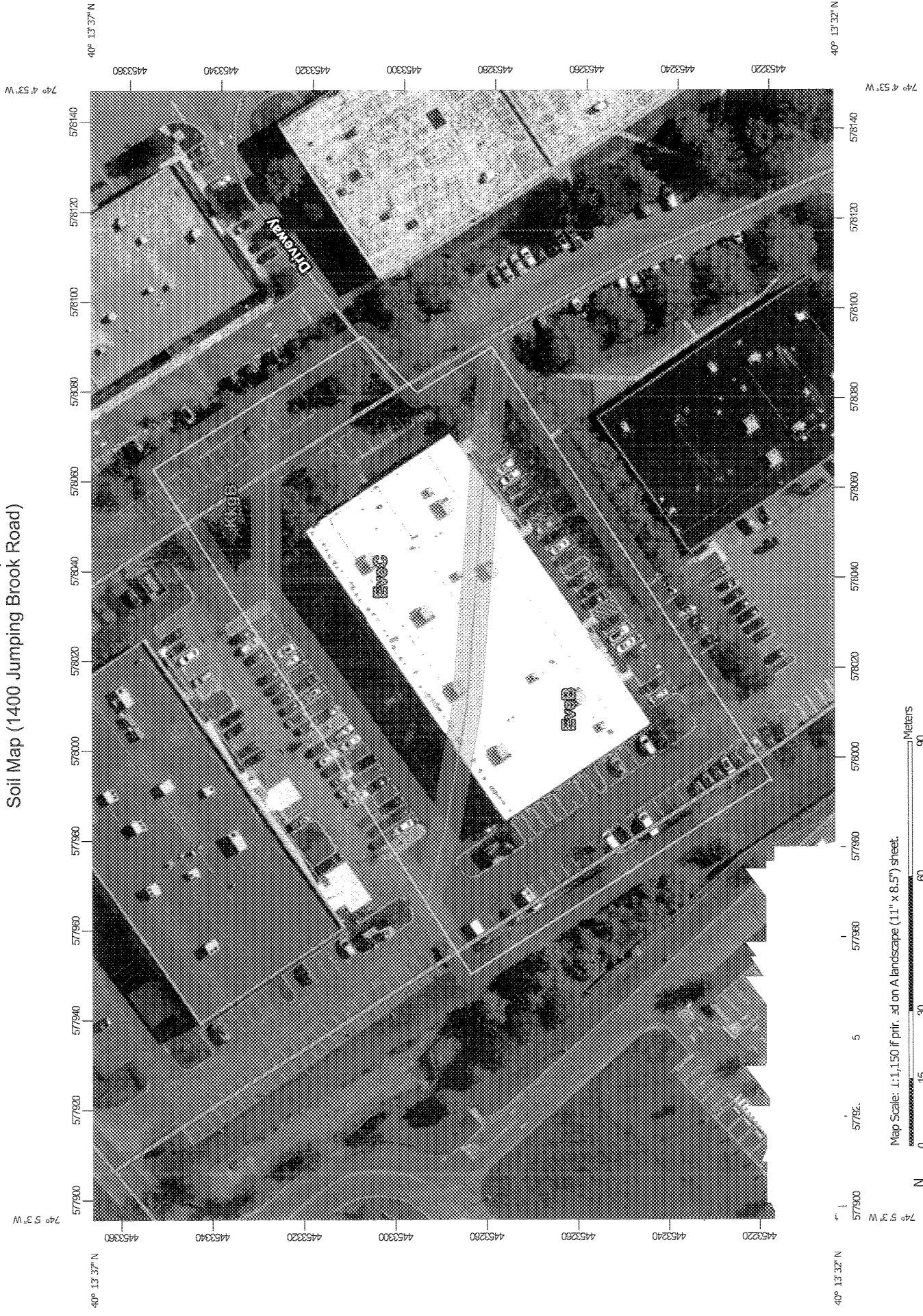
identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

---

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report  
 Soil Map (1400 Jumping Brook Road)



Map Scale: 1:1,150 if printed on A landscape (11" x 8.5") sheet.



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



## MAP LEGEND

	Area of Interest (AOI)		Spoil Area
	Soils		Stony Spot
	Soil Map Unit Polygons		Very Stony Spot
	Soil Map Unit Lines		Wet Spot
	Soil Map Unit Points		Other
	<b>Special Point Features</b>		Special Line Features
	Blowout		Streams and Canals
	Borrow Pit		<b>Transportation</b>
	Clay Spot		Rails
	Closed Depression		Interstate Highways
	Gravel Pit		US Routes
	Gravelly Spot		Major Roads
	Landfill		Local Roads
	Lava Flow		<b>Background</b>
	Marsh or swamp		Aerial Photography
	Mine or Quarry		
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

## MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Monmouth County, New Jersey  
 Survey Area Data: Version 15, Aug 31, 2021

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

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

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

## Map Unit Legend (1400 Jumping Brook Road)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EveB	Evesboro sand, 0 to 5 percent slopes	1.2	49.8%
EveC	Evesboro sand, 5 to 10 percent slopes	1.1	43.1%
KkgB	Klej loamy sand, 0 to 5 percent slopes	0.2	7.0%
<b>Totals for Area of Interest</b>		<b>2.5</b>	<b>100.0%</b>

## Map Unit Descriptions (1400 Jumping Brook Road)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

## Custom Soil Resource Report

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Monmouth County, New Jersey

### EveB—Evesboro sand, 0 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 4j74  
*Elevation:* 0 to 150 feet  
*Mean annual precipitation:* 28 to 59 inches  
*Mean annual air temperature:* 46 to 79 degrees F  
*Frost-free period:* 161 to 231 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Evesboro and similar soils:* 80 percent  
*Minor components:* 20 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Evesboro

##### Setting

*Landform:* Low hills  
*Landform position (three-dimensional):* Interfluve, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Parent material:* Sandy eolian deposits and/or sandy fluviomarine deposits

##### Typical profile

*A - 0 to 4 inches:* sand  
*AB - 4 to 17 inches:* sand  
*Bw - 17 to 31 inches:* sand  
*C - 31 to 80 inches:* stratified loamy sand to sand

##### Properties and qualities

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Excessively drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (2.00 to 20.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 4.2 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7s  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

#### Minor Components

##### Mullica, rarely flooded

*Percent of map unit:* 5 percent  
*Landform:* Flood plains, depressions, drainageways  
*Landform position (two-dimensional):* Toeslope

## Custom Soil Resource Report

*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear, concave  
*Across-slope shape:* Linear, concave  
*Hydric soil rating:* Yes

### **Downer**

*Percent of map unit:* 5 percent  
*Landform:* Knolls, low hills  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### **Atsion**

*Percent of map unit:* 5 percent  
*Landform:* Flats  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Dip, tal  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* Yes

### **Lakehurst**

*Percent of map unit:* 5 percent  
*Landform:* Flats, depressions  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear, concave  
*Across-slope shape:* Linear, concave  
*Hydric soil rating:* No

## **EveC—Evesboro sand, 5 to 10 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 4j75  
*Elevation:* 10 to 130 feet  
*Mean annual precipitation:* 28 to 59 inches  
*Mean annual air temperature:* 46 to 79 degrees F  
*Frost-free period:* 161 to 231 days  
*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Evesboro and similar soils:* 95 percent  
*Minor components:* 5 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Evesboro**

#### **Setting**

*Landform:* Low hills  
*Landform position (three-dimensional):* Interfluve, side slope

## Custom Soil Resource Report

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Parent material:* Sandy eolian deposits and/or sandy fluviomarine deposits

### Typical profile

*A - 0 to 4 inches:* sand

*AB - 4 to 17 inches:* sand

*Bw - 17 to 31 inches:* sand

*C - 31 to 80 inches:* stratified loamy sand to sand

### Properties and qualities

*Slope:* 5 to 10 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (2.00 to 20.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 4.2 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7s

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

### Minor Components

#### Downer

*Percent of map unit:* 5 percent

*Landform:* Knolls, low hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear, convex

*Hydric soil rating:* No

## KkgB—Klej loamy sand, 0 to 5 percent slopes

### Map Unit Setting

*National map unit symbol:* 1js1l

*Elevation:* 10 to 120 feet

*Mean annual precipitation:* 28 to 59 inches

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

*Frost-free period:* 161 to 231 days

*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Klej and similar soils:* 90 percent

*Minor components:* 10 percent

## Custom Soil Resource Report

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

### Description of Klej

#### Setting

*Landform: Dunes*

*Down-slope shape: Convex*

*Across-slope shape: Linear*

*Parent material: Unconsolidated sandy marine deposits*

#### Typical profile

*Oi - 0 to 3 inches: slightly decomposed plant material*

*Oe - 3 to 4 inches: moderately decomposed plant material*

*A - 4 to 14 inches: loamy sand*

*Bw1 - 14 to 24 inches: loamy sand*

*Bw2 - 24 to 40 inches: loamy sand*

*C - 40 to 64 inches: sand*

#### Properties and qualities

*Slope: 0 to 5 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Somewhat poorly drained*

*Runoff class: Very high*

*Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)*

*Depth to water table: About 12 to 24 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water supply, 0 to 60 inches: Low (about 5.7 inches)*

#### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 3w*

*Hydrologic Soil Group: A/D*

*Hydric soil rating: No*

### Minor Components

#### Humaquepts, frequently flooded

*Percent of map unit: 5 percent*

*Landform: Flood plains, river valleys*

*Down-slope shape: Linear*

*Across-slope shape: Linear*

*Hydric soil rating: Yes*

#### Atsion

*Percent of map unit: 5 percent*

*Landform: Depressions*

*Landform position (two-dimensional): Toeslope*

*Landform position (three-dimensional): Base slope*

*Down-slope shape: Concave*

*Across-slope shape: Concave*

*Hydric soil rating: Yes*

# References

---

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_054262](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262)
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053577](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577)
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053580](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580)
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2\\_053374](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374)
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>



## Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2\\_054242](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242)

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053624](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624)

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052290.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf)

## **APPENDIX B**

---

### **Time of Concentration Calculations**

**United Shipping Alliance**

NOAA 24-hr D 2-Year Rainfall=3.38"

Prepared by Kennedy Consulting Engineers, LLC

Printed 9/14/2022

HydroCAD® 10.10-7a s/n 04439 © 2021 HydroCAD Software Solutions LLC

---

**Summary for Subcatchment E-1: Ex. Area to Point 1**

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

Runoff = 5.52 cfs @ 12.18 hrs, Volume= 24,257 cf, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.10 hrs  
NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
* 2.123	98	Impervious
0.372	39	>75% Grass cover, Good, HSG A
2.495	89	Weighted Average
0.372		14.91% Pervious Area
2.123		85.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					<b>Direct Entry, Direct Entry: 10 Min.</b>

**Summary for Subcatchment P-1: Prop. Area to Point 1**

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

Runoff = 5.49 cfs @ 12.18 hrs, Volume= 24,154 cf, Depth= 2.67"  
 Routed to nonexistent node PT-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs,  $dt= 0.10$  hrs  
 NOAA 24-hr D 2-Year Rainfall=3.38"

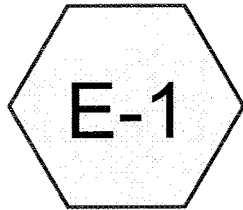
Area (ac)	CN	Description
* 2.114	98	Impervious
0.381	39	>75% Grass cover, Good, HSG A
2.495	89	Weighted Average
0.381		15.27% Pervious Area
2.114		84.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					<b>Direct Entry, Direct Entry: 10 Min.</b>

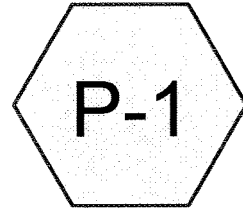
**APPENDIX C**

---

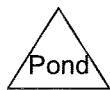
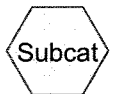
**HYDROGRAPH ANALYSIS SUMMARY**



Ex. Area to Point 1



Prop. Area to Point 1



**Summary for Subcatchment E-1: Ex. Area to Point 1**

Runoff = 5.52 cfs @ 12.18 hrs, Volume= 24,257 cf, Depth= 2.68"

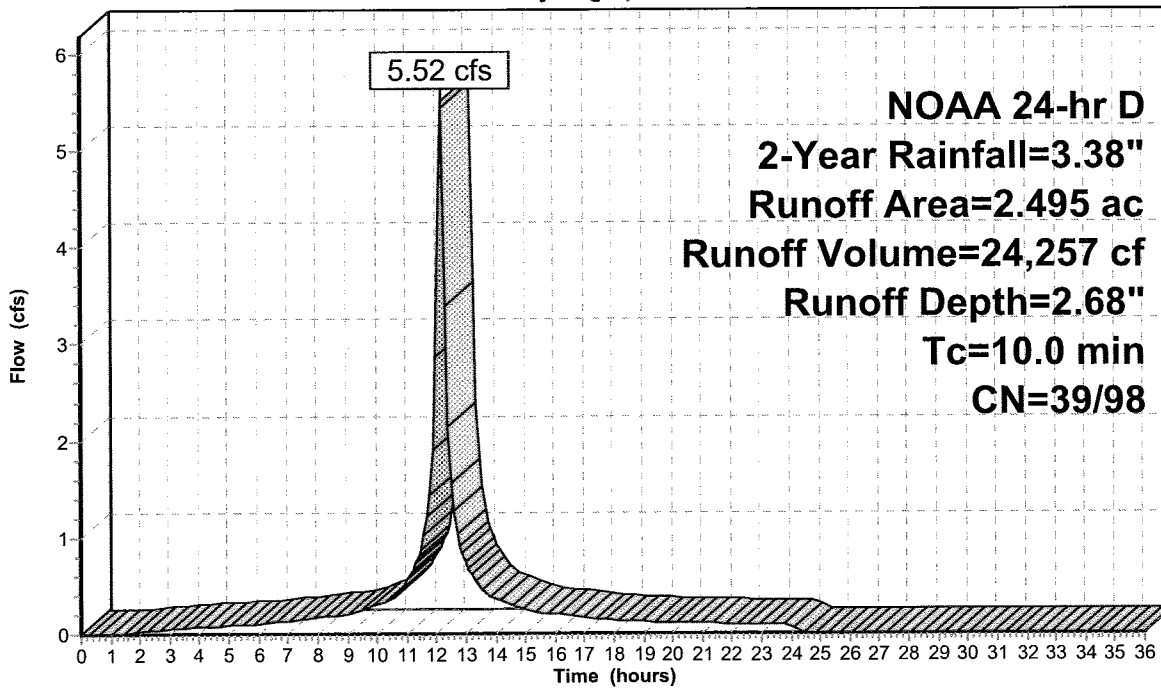
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.10 hrs  
 NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
* 2.123	98	Impervious
0.372	39	>75% Grass cover, Good, HSG A
2.495	89	Weighted Average
0.372		14.91% Pervious Area
2.123		85.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Direct Entry: 10 Min.

**Subcatchment E-1: Ex. Area to Point 1**

Hydrograph



**Hydrograph for Subcatchment E-1: Ex. Area to Point 1**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
0.10	0.00	0.00	0.00	0.00
0.20	0.01	0.00	0.00	0.00
0.30	0.01	0.00	0.00	0.00
0.40	0.02	0.00	0.00	0.00
0.50	0.02	0.00	0.00	0.00
0.60	0.02	0.00	0.00	0.00
0.70	0.03	0.00	0.00	0.00
0.80	0.03	0.00	0.00	0.00
0.90	0.03	0.00	0.00	0.00
1.00	0.04	0.00	0.00	0.00
1.10	0.04	0.00	0.00	0.00
1.20	0.05	0.00	0.00	0.00
1.30	0.05	0.00	0.00	0.00
1.40	0.06	0.00	0.00	0.01
1.50	0.06	0.00	0.00	0.01
1.60	0.06	0.00	0.00	0.01
1.70	0.07	0.00	0.00	0.02
1.80	0.07	0.00	0.00	0.02
1.90	0.08	0.00	0.01	0.02
2.00	0.08	0.00	0.01	0.02
2.10	0.09	0.00	0.01	0.03
2.20	0.09	0.00	0.01	0.03
2.30	0.09	0.00	0.01	0.03
2.40	0.10	0.00	0.01	0.04
2.50	0.10	0.00	0.01	0.04
2.60	0.11	0.00	0.02	0.04
2.70	0.11	0.00	0.02	0.04
2.80	0.12	0.00	0.02	0.04
2.90	0.12	0.00	0.02	0.05
3.00	0.13	0.00	0.03	0.05
3.10	0.13	0.00	0.03	0.05
3.20	0.14	0.00	0.03	0.05
3.30	0.14	0.00	0.03	0.06
3.40	0.15	0.00	0.04	0.06
3.50	0.15	0.00	0.04	0.06
3.60	0.16	0.00	0.04	0.06
3.70	0.16	0.00	0.05	0.06
3.80	0.17	0.00	0.05	0.06
3.90	0.17	0.00	0.05	0.07
4.00	0.18	0.00	0.05	0.07
4.10	0.18	0.00	0.06	0.07
4.20	0.19	0.00	0.06	0.07
4.30	0.19	0.00	0.07	0.07
4.40	0.20	0.00	0.07	0.08
4.50	0.20	0.00	0.07	0.08
4.60	0.21	0.00	0.08	0.08
4.70	0.21	0.00	0.08	0.08
4.80	0.22	0.00	0.08	0.08
4.90	0.23	0.00	0.09	0.08
5.00	0.23	0.00	0.09	0.08
5.10	0.24	0.00	0.10	0.09
5.20	0.24	0.00	0.10	0.09



**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
5.30	0.25	0.00	0.10	0.09
5.40	0.25	0.00	0.11	0.09
5.50	0.26	0.00	0.11	0.09
5.60	0.27	0.00	0.12	0.09
5.70	0.27	0.00	0.12	0.09
5.80	0.28	0.00	0.13	0.10
5.90	0.28	0.00	0.13	0.10
6.00	0.29	0.00	0.14	0.10
6.10	0.29	0.00	0.14	0.10
6.20	0.30	0.00	0.15	0.10
6.30	0.31	0.00	0.15	0.11
6.40	0.31	0.00	0.16	0.11
6.50	0.32	0.00	0.16	0.11
6.60	0.33	0.00	0.17	0.12
6.70	0.33	0.00	0.17	0.12
6.80	0.34	0.00	0.18	0.12
6.90	0.35	0.00	0.19	0.13
7.00	0.36	0.00	0.19	0.13
7.10	0.36	0.00	0.20	0.13
7.20	0.37	0.00	0.20	0.14
7.30	0.38	0.00	0.21	0.14
7.40	0.39	0.00	0.22	0.14
7.50	0.40	0.00	0.23	0.15
7.60	0.40	0.00	0.23	0.15
7.70	0.41	0.00	0.24	0.15
7.80	0.42	0.00	0.25	0.16
7.90	0.43	0.00	0.26	0.16
8.00	0.44	0.00	0.26	0.17
8.10	0.45	0.00	0.27	0.17
8.20	0.46	0.00	0.28	0.17
8.30	0.47	0.00	0.29	0.18
8.40	0.48	0.00	0.30	0.18
8.50	0.49	0.00	0.30	0.18
8.60	0.50	0.00	0.31	0.19
8.70	0.51	0.00	0.32	0.19
8.80	0.52	0.00	0.33	0.19
8.90	0.53	0.00	0.34	0.20
9.00	0.54	0.00	0.35	0.20
9.10	0.55	0.00	0.36	0.21
9.20	0.56	0.00	0.37	0.22
9.30	0.57	0.00	0.38	0.23
9.40	0.58	0.00	0.39	0.24
9.50	0.60	0.00	0.41	0.25
9.60	0.61	0.00	0.42	0.26
9.70	0.62	0.00	0.43	0.27
9.80	0.64	0.00	0.45	0.28
9.90	0.65	0.00	0.46	0.29
10.00	0.67	0.00	0.48	0.31
10.10	0.69	0.00	0.49	0.32
10.20	0.70	0.00	0.51	0.33
10.30	0.72	0.00	0.52	0.34
10.40	0.74	0.00	0.54	0.35
10.50	0.76	0.00	0.56	0.36

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
10.60	0.78	0.00	0.58	0.38
10.70	0.80	0.00	0.60	0.42
10.80	0.82	0.00	0.62	0.46
10.90	0.85	0.00	0.65	0.50
11.00	0.88	0.00	0.67	0.54
11.10	0.91	0.00	0.70	0.59
11.20	0.95	0.00	0.74	0.65
11.30	0.98	0.00	0.78	0.72
11.40	1.03	0.00	0.82	0.80
11.50	1.07	0.00	0.86	0.87
11.60	1.13	0.00	0.92	1.01
11.70	1.20	0.00	0.98	1.21
11.80	1.29	0.00	1.07	1.44
11.90	1.41	0.00	1.19	1.91
12.00	1.62	0.00	1.40	2.86
12.10	1.97	0.00	1.75	4.70
12.20	2.09	0.00	1.87	<b>5.44</b>
12.30	2.18	0.00	1.96	3.38
12.40	2.25	0.00	2.02	2.14
12.50	2.31	0.00	2.08	1.56
12.60	2.35	0.00	2.13	1.27
12.70	2.40	0.00	2.17	1.04
12.80	2.43	0.00	2.21	0.91
12.90	2.47	0.00	2.24	0.83
13.00	2.50	0.00	2.27	0.75
13.10	2.53	0.00	2.30	0.68
13.20	2.56	0.00	2.33	0.61
13.30	2.58	0.00	2.35	0.56
13.40	2.60	0.00	2.37	0.52
13.50	2.62	0.00	2.39	0.48
13.60	2.64	0.00	2.41	0.44
13.70	2.66	0.00	2.43	0.40
13.80	2.68	0.00	2.45	0.38
13.90	2.69	0.00	2.46	0.37
14.00	2.71	0.00	2.48	0.36
14.10	2.73	0.00	2.50	0.35
14.20	2.74	0.00	2.51	0.34
14.30	2.76	0.00	2.53	0.33
14.40	2.77	0.00	2.54	0.31
14.50	2.78	0.00	2.55	0.30
14.60	2.80	0.00	2.57	0.29
14.70	2.81	0.00	2.58	0.28
14.80	2.82	0.00	2.59	0.27
14.90	2.83	0.00	2.60	0.26
15.00	2.84	0.00	2.61	0.25
15.10	2.85	0.00	2.62	0.23
15.20	2.86	0.00	2.63	0.23
15.30	2.87	0.00	2.64	0.22
15.40	2.88	0.00	2.65	0.22
15.50	2.89	0.00	2.66	0.21
15.60	2.90	0.00	2.67	0.21
15.70	2.91	0.00	2.68	0.21
15.80	2.92	0.00	2.69	0.20

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
15.90	2.93	0.00	2.70	0.20
16.00	2.94	0.00	2.71	0.20
16.10	2.95	0.00	2.72	0.19
16.20	2.96	0.00	2.73	0.19
16.30	2.97	0.00	2.74	0.19
16.40	2.98	0.00	2.74	0.18
16.50	2.98	0.00	2.75	0.18
16.60	2.99	0.00	2.76	0.18
16.70	3.00	0.00	2.77	0.17
16.80	3.01	0.00	2.78	0.17
16.90	3.02	0.00	2.78	0.17
17.00	3.02	0.00	2.79	0.16
17.10	3.03	0.00	2.80	0.16
17.20	3.04	0.00	2.81	0.16
17.30	3.05	0.00	2.81	0.16
17.40	3.05	0.00	2.82	0.15
17.50	3.06	0.00	2.83	0.15
17.60	3.07	0.00	2.83	0.15
17.70	3.07	0.00	2.84	0.14
17.80	3.08	0.00	2.85	0.14
17.90	3.09	0.00	2.85	0.14
18.00	3.09	0.00	2.86	0.13
18.10	3.10	0.00	2.87	0.13
18.20	3.10	0.00	2.87	0.13
18.30	3.11	0.00	2.88	0.13
18.40	3.11	0.00	2.88	0.12
18.50	3.12	0.00	2.89	0.12
18.60	3.13	0.00	2.89	0.12
18.70	3.13	0.00	2.90	0.12
18.80	3.14	0.00	2.91	0.12
18.90	3.14	0.00	2.91	0.12
19.00	3.15	0.00	2.92	0.12
19.10	3.15	0.00	2.92	0.12
19.20	3.16	0.00	2.93	0.12
19.30	3.17	0.00	2.93	0.12
19.40	3.17	0.00	2.94	0.12
19.50	3.18	0.00	2.94	0.12
19.60	3.18	0.00	2.95	0.12
19.70	3.19	0.00	2.95	0.11
19.80	3.19	0.00	2.96	0.11
19.90	3.20	0.00	2.96	0.11
20.00	3.20	0.00	2.97	0.11
20.10	3.21	0.00	2.98	0.11
20.20	3.21	0.00	2.98	0.11
20.30	3.22	0.00	2.99	0.11
20.40	3.22	0.00	2.99	0.11
20.50	3.23	0.00	3.00	0.11
20.60	3.23	0.00	3.00	0.11
20.70	3.24	0.00	3.01	0.11
20.80	3.24	0.00	3.01	0.11
20.90	3.25	0.00	3.02	0.10
21.00	3.25	0.00	3.02	0.10
21.10	3.26	0.00	3.02	0.10

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
21.20	3.26	0.00	3.03	0.10
21.30	3.27	0.00	3.03	0.10
21.40	3.27	0.00	3.04	0.10
21.50	3.28	0.00	3.04	0.10
21.60	3.28	0.00	3.05	0.10
21.70	3.29	0.00	3.05	0.10
21.80	3.29	0.00	3.06	0.10
21.90	3.29	0.00	3.06	0.10
22.00	3.30	0.00	3.07	0.10
22.10	3.30	0.00	3.07	0.10
22.20	3.31	0.00	3.07	0.09
22.30	3.31	0.00	3.08	0.09
22.40	3.32	0.00	3.08	0.09
22.50	3.32	0.00	3.09	0.09
22.60	3.32	0.00	3.09	0.09
22.70	3.33	0.00	3.10	0.09
22.80	3.33	0.00	3.10	0.09
22.90	3.34	0.00	3.10	0.09
23.00	3.34	0.00	3.11	0.09
23.10	3.35	0.00	3.11	0.09
23.20	3.35	0.00	3.12	0.09
23.30	3.35	0.00	3.12	0.09
23.40	3.36	0.00	3.12	0.08
23.50	3.36	0.00	3.13	0.08
23.60	3.36	0.00	3.13	0.08
23.70	3.37	0.00	3.14	0.08
23.80	3.37	0.00	3.14	0.08
23.90	3.38	0.00	3.14	0.08
24.00	<b>3.38</b>	<b>0.00</b>	<b>3.15</b>	0.08
24.10	3.38	0.00	3.15	0.06
24.20	3.38	0.00	3.15	0.02
24.30	3.38	0.00	3.15	0.00
24.40	3.38	0.00	3.15	0.00
24.50	3.38	0.00	3.15	0.00
24.60	3.38	0.00	3.15	0.00
24.70	3.38	0.00	3.15	0.00
24.80	3.38	0.00	3.15	0.00
24.90	3.38	0.00	3.15	0.00
25.00	3.38	0.00	3.15	0.00
25.10	3.38	0.00	3.15	0.00
25.20	3.38	0.00	3.15	0.00
25.30	3.38	0.00	3.15	0.00
25.40	3.38	0.00	3.15	0.00
25.50	3.38	0.00	3.15	0.00
25.60	3.38	0.00	3.15	0.00
25.70	3.38	0.00	3.15	0.00
25.80	3.38	0.00	3.15	0.00
25.90	3.38	0.00	3.15	0.00
26.00	3.38	0.00	3.15	0.00
26.10	3.38	0.00	3.15	0.00
26.20	3.38	0.00	3.15	0.00
26.30	3.38	0.00	3.15	0.00
26.40	3.38	0.00	3.15	0.00

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
26.50	3.38	0.00	3.15	0.00
26.60	3.38	0.00	3.15	0.00
26.70	3.38	0.00	3.15	0.00
26.80	3.38	0.00	3.15	0.00
26.90	3.38	0.00	3.15	0.00
27.00	3.38	0.00	3.15	0.00
27.10	3.38	0.00	3.15	0.00
27.20	3.38	0.00	3.15	0.00
27.30	3.38	0.00	3.15	0.00
27.40	3.38	0.00	3.15	0.00
27.50	3.38	0.00	3.15	0.00
27.60	3.38	0.00	3.15	0.00
27.70	3.38	0.00	3.15	0.00
27.80	3.38	0.00	3.15	0.00
27.90	3.38	0.00	3.15	0.00
28.00	3.38	0.00	3.15	0.00
28.10	3.38	0.00	3.15	0.00
28.20	3.38	0.00	3.15	0.00
28.30	3.38	0.00	3.15	0.00
28.40	3.38	0.00	3.15	0.00
28.50	3.38	0.00	3.15	0.00
28.60	3.38	0.00	3.15	0.00
28.70	3.38	0.00	3.15	0.00
28.80	3.38	0.00	3.15	0.00
28.90	3.38	0.00	3.15	0.00
29.00	3.38	0.00	3.15	0.00
29.10	3.38	0.00	3.15	0.00
29.20	3.38	0.00	3.15	0.00
29.30	3.38	0.00	3.15	0.00
29.40	3.38	0.00	3.15	0.00
29.50	3.38	0.00	3.15	0.00
29.60	3.38	0.00	3.15	0.00
29.70	3.38	0.00	3.15	0.00
29.80	3.38	0.00	3.15	0.00
29.90	3.38	0.00	3.15	0.00
30.00	3.38	0.00	3.15	0.00
30.10	3.38	0.00	3.15	0.00
30.20	3.38	0.00	3.15	0.00
30.30	3.38	0.00	3.15	0.00
30.40	3.38	0.00	3.15	0.00
30.50	3.38	0.00	3.15	0.00
30.60	3.38	0.00	3.15	0.00
30.70	3.38	0.00	3.15	0.00
30.80	3.38	0.00	3.15	0.00
30.90	3.38	0.00	3.15	0.00
31.00	3.38	0.00	3.15	0.00
31.10	3.38	0.00	3.15	0.00
31.20	3.38	0.00	3.15	0.00
31.30	3.38	0.00	3.15	0.00
31.40	3.38	0.00	3.15	0.00
31.50	3.38	0.00	3.15	0.00
31.60	3.38	0.00	3.15	0.00
31.70	3.38	0.00	3.15	0.00

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
31.80	3.38	0.00	3.15	0.00
31.90	3.38	0.00	3.15	0.00
32.00	3.38	0.00	3.15	0.00
32.10	3.38	0.00	3.15	0.00
32.20	3.38	0.00	3.15	0.00
32.30	3.38	0.00	3.15	0.00
32.40	3.38	0.00	3.15	0.00
32.50	3.38	0.00	3.15	0.00
32.60	3.38	0.00	3.15	0.00
32.70	3.38	0.00	3.15	0.00
32.80	3.38	0.00	3.15	0.00
32.90	3.38	0.00	3.15	0.00
33.00	3.38	0.00	3.15	0.00
33.10	3.38	0.00	3.15	0.00
33.20	3.38	0.00	3.15	0.00
33.30	3.38	0.00	3.15	0.00
33.40	3.38	0.00	3.15	0.00
33.50	3.38	0.00	3.15	0.00
33.60	3.38	0.00	3.15	0.00
33.70	3.38	0.00	3.15	0.00
33.80	3.38	0.00	3.15	0.00
33.90	3.38	0.00	3.15	0.00
34.00	3.38	0.00	3.15	0.00
34.10	3.38	0.00	3.15	0.00
34.20	3.38	0.00	3.15	0.00
34.30	3.38	0.00	3.15	0.00
34.40	3.38	0.00	3.15	0.00
34.50	3.38	0.00	3.15	0.00
34.60	3.38	0.00	3.15	0.00
34.70	3.38	0.00	3.15	0.00
34.80	3.38	0.00	3.15	0.00
34.90	3.38	0.00	3.15	0.00
35.00	3.38	0.00	3.15	0.00
35.10	3.38	0.00	3.15	0.00
35.20	3.38	0.00	3.15	0.00
35.30	3.38	0.00	3.15	0.00
35.40	3.38	0.00	3.15	0.00
35.50	3.38	0.00	3.15	0.00
35.60	3.38	0.00	3.15	0.00
35.70	3.38	0.00	3.15	0.00
35.80	3.38	0.00	3.15	0.00
35.90	3.38	0.00	3.15	0.00
36.00	3.38	0.00	3.15	0.00

**Summary for Subcatchment P-1: Prop. Area to Point 1**

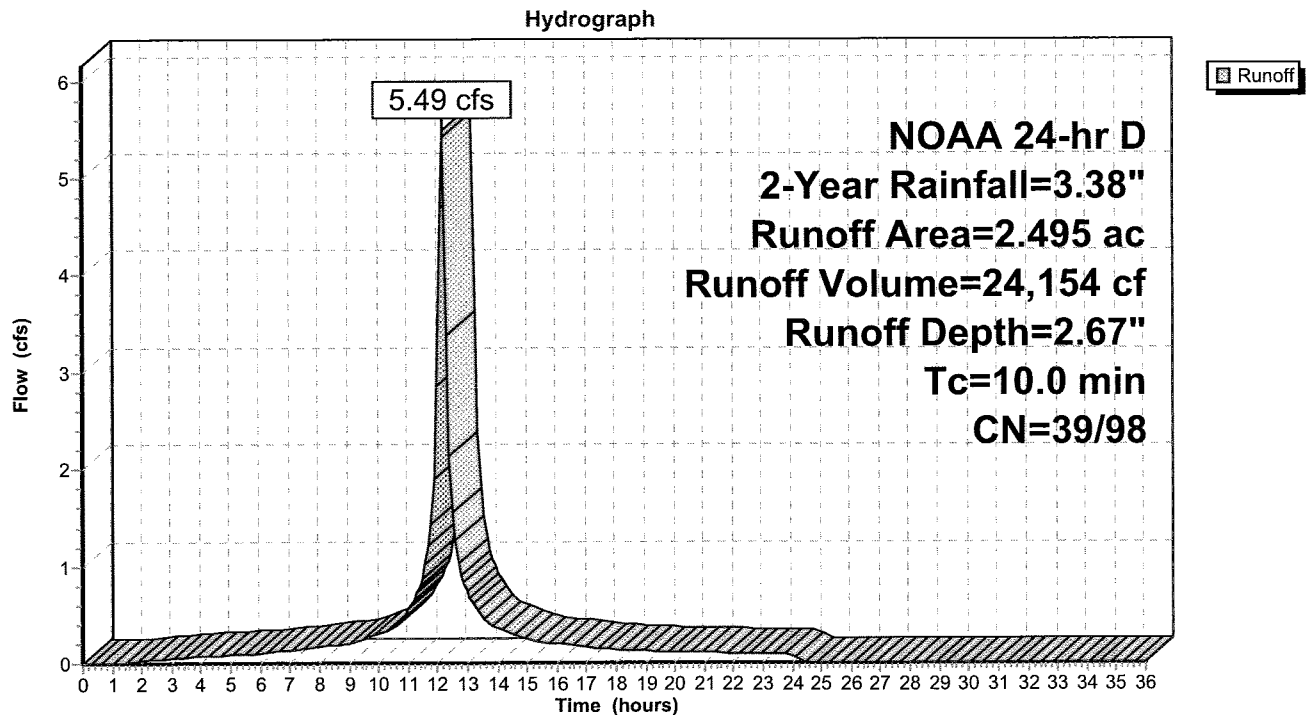
Runoff = 5.49 cfs @ 12.18 hrs, Volume= 24,154 cf, Depth= 2.67"  
 Routed to nonexistent node PT-1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.10 hrs  
 NOAA 24-hr D 2-Year Rainfall=3.38"

Area (ac)	CN	Description
* 2.114	98	Impervious
0.381	39	>75% Grass cover, Good, HSG A
2.495	89	Weighted Average
0.381		15.27% Pervious Area
2.114		84.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Direct Entry: 10 Min.

**Subcatchment P-1: Prop. Area to Point 1**



**Hydrograph for Subcatchment P-1: Prop. Area to Point 1**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
0.10	0.00	0.00	0.00	0.00
0.20	0.01	0.00	0.00	0.00
0.30	0.01	0.00	0.00	0.00
0.40	0.02	0.00	0.00	0.00
0.50	0.02	0.00	0.00	0.00
0.60	0.02	0.00	0.00	0.00
0.70	0.03	0.00	0.00	0.00
0.80	0.03	0.00	0.00	0.00
0.90	0.03	0.00	0.00	0.00
1.00	0.04	0.00	0.00	0.00
1.10	0.04	0.00	0.00	0.00
1.20	0.05	0.00	0.00	0.00
1.30	0.05	0.00	0.00	0.00
1.40	0.06	0.00	0.00	0.01
1.50	0.06	0.00	0.00	0.01
1.60	0.06	0.00	0.00	0.01
1.70	0.07	0.00	0.00	0.02
1.80	0.07	0.00	0.00	0.02
1.90	0.08	0.00	0.01	0.02
2.00	0.08	0.00	0.01	0.02
2.10	0.09	0.00	0.01	0.03
2.20	0.09	0.00	0.01	0.03
2.30	0.09	0.00	0.01	0.03
2.40	0.10	0.00	0.01	0.03
2.50	0.10	0.00	0.01	0.04
2.60	0.11	0.00	0.02	0.04
2.70	0.11	0.00	0.02	0.04
2.80	0.12	0.00	0.02	0.04
2.90	0.12	0.00	0.02	0.05
3.00	0.13	0.00	0.03	0.05
3.10	0.13	0.00	0.03	0.05
3.20	0.14	0.00	0.03	0.05
3.30	0.14	0.00	0.03	0.05
3.40	0.15	0.00	0.04	0.06
3.50	0.15	0.00	0.04	0.06
3.60	0.16	0.00	0.04	0.06
3.70	0.16	0.00	0.05	0.06
3.80	0.17	0.00	0.05	0.06
3.90	0.17	0.00	0.05	0.07
4.00	0.18	0.00	0.05	0.07
4.10	0.18	0.00	0.06	0.07
4.20	0.19	0.00	0.06	0.07
4.30	0.19	0.00	0.07	0.07
4.40	0.20	0.00	0.07	0.08
4.50	0.20	0.00	0.07	0.08
4.60	0.21	0.00	0.08	0.08
4.70	0.21	0.00	0.08	0.08
4.80	0.22	0.00	0.08	0.08
4.90	0.23	0.00	0.09	0.08
5.00	0.23	0.00	0.09	0.08
5.10	0.24	0.00	0.10	0.09
5.20	0.24	0.00	0.10	0.09



**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
5.30	0.25	0.00	0.10	0.09
5.40	0.25	0.00	0.11	0.09
5.50	0.26	0.00	0.11	0.09
5.60	0.27	0.00	0.12	0.09
5.70	0.27	0.00	0.12	0.09
5.80	0.28	0.00	0.13	0.10
5.90	0.28	0.00	0.13	0.10
6.00	0.29	0.00	0.14	0.10
6.10	0.29	0.00	0.14	0.10
6.20	0.30	0.00	0.15	0.10
6.30	0.31	0.00	0.15	0.11
6.40	0.31	0.00	0.16	0.11
6.50	0.32	0.00	0.16	0.11
6.60	0.33	0.00	0.17	0.12
6.70	0.33	0.00	0.17	0.12
6.80	0.34	0.00	0.18	0.12
6.90	0.35	0.00	0.19	0.13
7.00	0.36	0.00	0.19	0.13
7.10	0.36	0.00	0.20	0.13
7.20	0.37	0.00	0.20	0.14
7.30	0.38	0.00	0.21	0.14
7.40	0.39	0.00	0.22	0.14
7.50	0.40	0.00	0.23	0.15
7.60	0.40	0.00	0.23	0.15
7.70	0.41	0.00	0.24	0.15
7.80	0.42	0.00	0.25	0.16
7.90	0.43	0.00	0.26	0.16
8.00	0.44	0.00	0.26	0.16
8.10	0.45	0.00	0.27	0.17
8.20	0.46	0.00	0.28	0.17
8.30	0.47	0.00	0.29	0.17
8.40	0.48	0.00	0.30	0.18
8.50	0.49	0.00	0.30	0.18
8.60	0.50	0.00	0.31	0.19
8.70	0.51	0.00	0.32	0.19
8.80	0.52	0.00	0.33	0.19
8.90	0.53	0.00	0.34	0.20
9.00	0.54	0.00	0.35	0.20
9.10	0.55	0.00	0.36	0.21
9.20	0.56	0.00	0.37	0.21
9.30	0.57	0.00	0.38	0.22
9.40	0.58	0.00	0.39	0.24
9.50	0.60	0.00	0.41	0.25
9.60	0.61	0.00	0.42	0.26
9.70	0.62	0.00	0.43	0.27
9.80	0.64	0.00	0.45	0.28
9.90	0.65	0.00	0.46	0.29
10.00	0.67	0.00	0.48	0.30
10.10	0.69	0.00	0.49	0.32
10.20	0.70	0.00	0.51	0.33
10.30	0.72	0.00	0.52	0.34
10.40	0.74	0.00	0.54	0.35
10.50	0.76	0.00	0.56	0.36

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
10.60	0.78	0.00	0.58	0.38
10.70	0.80	0.00	0.60	0.41
10.80	0.82	0.00	0.62	0.45
10.90	0.85	0.00	0.65	0.49
11.00	0.88	0.00	0.67	0.54
11.10	0.91	0.00	0.70	0.58
11.20	0.95	0.00	0.74	0.65
11.30	0.98	0.00	0.78	0.72
11.40	1.03	0.00	0.82	0.79
11.50	1.07	0.00	0.86	0.87
11.60	1.13	0.00	0.92	1.00
11.70	1.20	0.00	0.98	1.21
11.80	1.29	0.00	1.07	1.43
11.90	1.41	0.00	1.19	1.90
12.00	1.62	0.00	1.40	2.85
12.10	1.97	0.00	1.75	4.68
12.20	2.09	0.00	1.87	<b>5.42</b>
12.30	2.18	0.00	1.96	3.37
12.40	2.25	0.00	2.02	2.13
12.50	2.31	0.00	2.08	1.55
12.60	2.35	0.00	2.13	1.27
12.70	2.40	0.00	2.17	1.03
12.80	2.43	0.00	2.21	0.91
12.90	2.47	0.00	2.24	0.82
13.00	2.50	0.00	2.27	0.75
13.10	2.53	0.00	2.30	0.68
13.20	2.56	0.00	2.33	0.61
13.30	2.58	0.00	2.35	0.56
13.40	2.60	0.00	2.37	0.52
13.50	2.62	0.00	2.39	0.48
13.60	2.64	0.00	2.41	0.43
13.70	2.66	0.00	2.43	0.40
13.80	2.68	0.00	2.45	0.38
13.90	2.69	0.00	2.46	0.37
14.00	2.71	0.00	2.48	0.36
14.10	2.73	0.00	2.50	0.35
14.20	2.74	0.00	2.51	0.34
14.30	2.76	0.00	2.53	0.32
14.40	2.77	0.00	2.54	0.31
14.50	2.78	0.00	2.55	0.30
14.60	2.80	0.00	2.57	0.29
14.70	2.81	0.00	2.58	0.28
14.80	2.82	0.00	2.59	0.27
14.90	2.83	0.00	2.60	0.26
15.00	2.84	0.00	2.61	0.24
15.10	2.85	0.00	2.62	0.23
15.20	2.86	0.00	2.63	0.22
15.30	2.87	0.00	2.64	0.22
15.40	2.88	0.00	2.65	0.22
15.50	2.89	0.00	2.66	0.21
15.60	2.90	0.00	2.67	0.21
15.70	2.91	0.00	2.68	0.21
15.80	2.92	0.00	2.69	0.20

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
15.90	2.93	0.00	2.70	0.20
16.00	2.94	0.00	2.71	0.20
16.10	2.95	0.00	2.72	0.19
16.20	2.96	0.00	2.73	0.19
16.30	2.97	0.00	2.74	0.19
16.40	2.98	0.00	2.74	0.18
16.50	2.98	0.00	2.75	0.18
16.60	2.99	0.00	2.76	0.18
16.70	3.00	0.00	2.77	0.17
16.80	3.01	0.00	2.78	0.17
16.90	3.02	0.00	2.78	0.17
17.00	3.02	0.00	2.79	0.16
17.10	3.03	0.00	2.80	0.16
17.20	3.04	0.00	2.81	0.16
17.30	3.05	0.00	2.81	0.15
17.40	3.05	0.00	2.82	0.15
17.50	3.06	0.00	2.83	0.15
17.60	3.07	0.00	2.83	0.14
17.70	3.07	0.00	2.84	0.14
17.80	3.08	0.00	2.85	0.14
17.90	3.09	0.00	2.85	0.14
18.00	3.09	0.00	2.86	0.13
18.10	3.10	0.00	2.87	0.13
18.20	3.10	0.00	2.87	0.13
18.30	3.11	0.00	2.88	0.13
18.40	3.11	0.00	2.88	0.12
18.50	3.12	0.00	2.89	0.12
18.60	3.13	0.00	2.89	0.12
18.70	3.13	0.00	2.90	0.12
18.80	3.14	0.00	2.91	0.12
18.90	3.14	0.00	2.91	0.12
19.00	3.15	0.00	2.92	0.12
19.10	3.15	0.00	2.92	0.12
19.20	3.16	0.00	2.93	0.12
19.30	3.17	0.00	2.93	0.12
19.40	3.17	0.00	2.94	0.12
19.50	3.18	0.00	2.94	0.12
19.60	3.18	0.00	2.95	0.11
19.70	3.19	0.00	2.95	0.11
19.80	3.19	0.00	2.96	0.11
19.90	3.20	0.00	2.96	0.11
20.00	3.20	0.00	2.97	0.11
20.10	3.21	0.00	2.98	0.11
20.20	3.21	0.00	2.98	0.11
20.30	3.22	0.00	2.99	0.11
20.40	3.22	0.00	2.99	0.11
20.50	3.23	0.00	3.00	0.11
20.60	3.23	0.00	3.00	0.11
20.70	3.24	0.00	3.01	0.11
20.80	3.24	0.00	3.01	0.11
20.90	3.25	0.00	3.02	0.10
21.00	3.25	0.00	3.02	0.10
21.10	3.26	0.00	3.02	0.10

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
21.20	3.26	0.00	3.03	0.10
21.30	3.27	0.00	3.03	0.10
21.40	3.27	0.00	3.04	0.10
21.50	3.28	0.00	3.04	0.10
21.60	3.28	0.00	3.05	0.10
21.70	3.29	0.00	3.05	0.10
21.80	3.29	0.00	3.06	0.10
21.90	3.29	0.00	3.06	0.10
22.00	3.30	0.00	3.07	0.10
22.10	3.30	0.00	3.07	0.09
22.20	3.31	0.00	3.07	0.09
22.30	3.31	0.00	3.08	0.09
22.40	3.32	0.00	3.08	0.09
22.50	3.32	0.00	3.09	0.09
22.60	3.32	0.00	3.09	0.09
22.70	3.33	0.00	3.10	0.09
22.80	3.33	0.00	3.10	0.09
22.90	3.34	0.00	3.10	0.09
23.00	3.34	0.00	3.11	0.09
23.10	3.35	0.00	3.11	0.09
23.20	3.35	0.00	3.12	0.09
23.30	3.35	0.00	3.12	0.09
23.40	3.36	0.00	3.12	0.08
23.50	3.36	0.00	3.13	0.08
23.60	3.36	0.00	3.13	0.08
23.70	3.37	0.00	3.14	0.08
23.80	3.37	0.00	3.14	0.08
23.90	3.38	0.00	3.14	0.08
24.00	<b>3.38</b>	<b>0.00</b>	<b>3.15</b>	0.08
24.10	3.38	0.00	3.15	0.06
24.20	3.38	0.00	3.15	0.02
24.30	3.38	0.00	3.15	0.00
24.40	3.38	0.00	3.15	0.00
24.50	3.38	0.00	3.15	0.00
24.60	3.38	0.00	3.15	0.00
24.70	3.38	0.00	3.15	0.00
24.80	3.38	0.00	3.15	0.00
24.90	3.38	0.00	3.15	0.00
25.00	3.38	0.00	3.15	0.00
25.10	3.38	0.00	3.15	0.00
25.20	3.38	0.00	3.15	0.00
25.30	3.38	0.00	3.15	0.00
25.40	3.38	0.00	3.15	0.00
25.50	3.38	0.00	3.15	0.00
25.60	3.38	0.00	3.15	0.00
25.70	3.38	0.00	3.15	0.00
25.80	3.38	0.00	3.15	0.00
25.90	3.38	0.00	3.15	0.00
26.00	3.38	0.00	3.15	0.00
26.10	3.38	0.00	3.15	0.00
26.20	3.38	0.00	3.15	0.00
26.30	3.38	0.00	3.15	0.00
26.40	3.38	0.00	3.15	0.00

**United Shipping Alliance**

NOAA 24-hr D 2-Year Rainfall=3.38"

Prepared by Kennedy Consulting Engineers, LLC

Printed 9/14/2022

HydroCAD® 10.10-7a s/n 04439 © 2021 HydroCAD Software Solutions LLC

Page 15

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
26.50	3.38	0.00	3.15	0.00
26.60	3.38	0.00	3.15	0.00
26.70	3.38	0.00	3.15	0.00
26.80	3.38	0.00	3.15	0.00
26.90	3.38	0.00	3.15	0.00
27.00	3.38	0.00	3.15	0.00
27.10	3.38	0.00	3.15	0.00
27.20	3.38	0.00	3.15	0.00
27.30	3.38	0.00	3.15	0.00
27.40	3.38	0.00	3.15	0.00
27.50	3.38	0.00	3.15	0.00
27.60	3.38	0.00	3.15	0.00
27.70	3.38	0.00	3.15	0.00
27.80	3.38	0.00	3.15	0.00
27.90	3.38	0.00	3.15	0.00
28.00	3.38	0.00	3.15	0.00
28.10	3.38	0.00	3.15	0.00
28.20	3.38	0.00	3.15	0.00
28.30	3.38	0.00	3.15	0.00
28.40	3.38	0.00	3.15	0.00
28.50	3.38	0.00	3.15	0.00
28.60	3.38	0.00	3.15	0.00
28.70	3.38	0.00	3.15	0.00
28.80	3.38	0.00	3.15	0.00
28.90	3.38	0.00	3.15	0.00
29.00	3.38	0.00	3.15	0.00
29.10	3.38	0.00	3.15	0.00
29.20	3.38	0.00	3.15	0.00
29.30	3.38	0.00	3.15	0.00
29.40	3.38	0.00	3.15	0.00
29.50	3.38	0.00	3.15	0.00
29.60	3.38	0.00	3.15	0.00
29.70	3.38	0.00	3.15	0.00
29.80	3.38	0.00	3.15	0.00
29.90	3.38	0.00	3.15	0.00
30.00	3.38	0.00	3.15	0.00
30.10	3.38	0.00	3.15	0.00
30.20	3.38	0.00	3.15	0.00
30.30	3.38	0.00	3.15	0.00
30.40	3.38	0.00	3.15	0.00
30.50	3.38	0.00	3.15	0.00
30.60	3.38	0.00	3.15	0.00
30.70	3.38	0.00	3.15	0.00
30.80	3.38	0.00	3.15	0.00
30.90	3.38	0.00	3.15	0.00
31.00	3.38	0.00	3.15	0.00
31.10	3.38	0.00	3.15	0.00
31.20	3.38	0.00	3.15	0.00
31.30	3.38	0.00	3.15	0.00
31.40	3.38	0.00	3.15	0.00
31.50	3.38	0.00	3.15	0.00
31.60	3.38	0.00	3.15	0.00
31.70	3.38	0.00	3.15	0.00

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
31.80	3.38	0.00	3.15	0.00
31.90	3.38	0.00	3.15	0.00
32.00	3.38	0.00	3.15	0.00
32.10	3.38	0.00	3.15	0.00
32.20	3.38	0.00	3.15	0.00
32.30	3.38	0.00	3.15	0.00
32.40	3.38	0.00	3.15	0.00
32.50	3.38	0.00	3.15	0.00
32.60	3.38	0.00	3.15	0.00
32.70	3.38	0.00	3.15	0.00
32.80	3.38	0.00	3.15	0.00
32.90	3.38	0.00	3.15	0.00
33.00	3.38	0.00	3.15	0.00
33.10	3.38	0.00	3.15	0.00
33.20	3.38	0.00	3.15	0.00
33.30	3.38	0.00	3.15	0.00
33.40	3.38	0.00	3.15	0.00
33.50	3.38	0.00	3.15	0.00
33.60	3.38	0.00	3.15	0.00
33.70	3.38	0.00	3.15	0.00
33.80	3.38	0.00	3.15	0.00
33.90	3.38	0.00	3.15	0.00
34.00	3.38	0.00	3.15	0.00
34.10	3.38	0.00	3.15	0.00
34.20	3.38	0.00	3.15	0.00
34.30	3.38	0.00	3.15	0.00
34.40	3.38	0.00	3.15	0.00
34.50	3.38	0.00	3.15	0.00
34.60	3.38	0.00	3.15	0.00
34.70	3.38	0.00	3.15	0.00
34.80	3.38	0.00	3.15	0.00
34.90	3.38	0.00	3.15	0.00
35.00	3.38	0.00	3.15	0.00
35.10	3.38	0.00	3.15	0.00
35.20	3.38	0.00	3.15	0.00
35.30	3.38	0.00	3.15	0.00
35.40	3.38	0.00	3.15	0.00
35.50	3.38	0.00	3.15	0.00
35.60	3.38	0.00	3.15	0.00
35.70	3.38	0.00	3.15	0.00
35.80	3.38	0.00	3.15	0.00
35.90	3.38	0.00	3.15	0.00
36.00	3.38	0.00	3.15	0.00

**Summary for Subcatchment E-1: Ex. Area to Point 1**

Runoff = 8.59 cfs @ 12.18 hrs, Volume= 38,813 cf, Depth= 4.29"

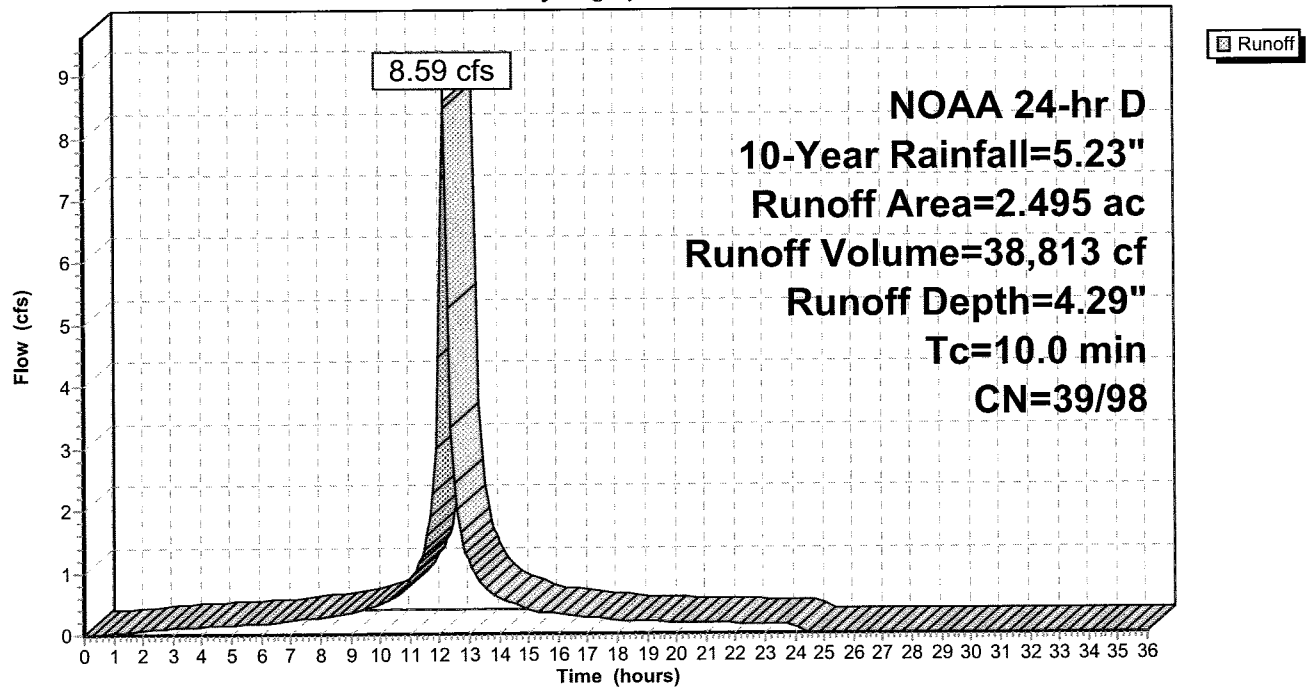
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.10 hrs  
 NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
* 2.123	98	Impervious
0.372	39	>75% Grass cover, Good, HSG A
2.495	89	Weighted Average
0.372		14.91% Pervious Area
2.123		85.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Direct Entry: 10 Min.

**Subcatchment E-1: Ex. Area to Point 1**

Hydrograph



**Hydrograph for Subcatchment E-1: Ex. Area to Point 1**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
0.10	0.01	0.00	0.00	0.00
0.20	0.01	0.00	0.00	0.00
0.30	0.02	0.00	0.00	0.00
0.40	0.02	0.00	0.00	0.00
0.50	0.03	0.00	0.00	0.00
0.60	0.04	0.00	0.00	0.00
0.70	0.04	0.00	0.00	0.00
0.80	0.05	0.00	0.00	0.00
0.90	0.05	0.00	0.00	0.01
1.00	0.06	0.00	0.00	0.01
1.10	0.07	0.00	0.00	0.02
1.20	0.07	0.00	0.00	0.02
1.30	0.08	0.00	0.01	0.03
1.40	0.09	0.00	0.01	0.04
1.50	0.09	0.00	0.01	0.04
1.60	0.10	0.00	0.01	0.05
1.70	0.11	0.00	0.02	0.05
1.80	0.11	0.00	0.02	0.06
1.90	0.12	0.00	0.02	0.06
2.00	0.13	0.00	0.02	0.07
2.10	0.13	0.00	0.03	0.07
2.20	0.14	0.00	0.03	0.08
2.30	0.15	0.00	0.04	0.08
2.40	0.15	0.00	0.04	0.08
2.50	0.16	0.00	0.04	0.09
2.60	0.17	0.00	0.05	0.09
2.70	0.17	0.00	0.05	0.09
2.80	0.18	0.00	0.06	0.10
2.90	0.19	0.00	0.06	0.10
3.00	0.20	0.00	0.07	0.10
3.10	0.20	0.00	0.07	0.11
3.20	0.21	0.00	0.08	0.11
3.30	0.22	0.00	0.08	0.11
3.40	0.23	0.00	0.09	0.12
3.50	0.23	0.00	0.09	0.12
3.60	0.24	0.00	0.10	0.12
3.70	0.25	0.00	0.11	0.12
3.80	0.26	0.00	0.11	0.13
3.90	0.27	0.00	0.12	0.13
4.00	0.27	0.00	0.12	0.13
4.10	0.28	0.00	0.13	0.13
4.20	0.29	0.00	0.14	0.14
4.30	0.30	0.00	0.14	0.14
4.40	0.31	0.00	0.15	0.14
4.50	0.32	0.00	0.16	0.14
4.60	0.32	0.00	0.16	0.14
4.70	0.33	0.00	0.17	0.15
4.80	0.34	0.00	0.18	0.15
4.90	0.35	0.00	0.19	0.15
5.00	0.36	0.00	0.19	0.15
5.10	0.37	0.00	0.20	0.15
5.20	0.37	0.00	0.21	0.16



**United Shipping Alliance**

Prepared by Kennedy Consulting Engineers, LLC

HydroCAD® 10.10-7a s/n 04439 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 10-Year Rainfall=5.23"

Printed 9/14/2022

Page 19

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
5.30	0.38	0.00	0.21	0.16
5.40	0.39	0.00	0.22	0.16
5.50	0.40	0.00	0.23	0.16
5.60	0.41	0.00	0.24	0.16
5.70	0.42	0.00	0.25	0.17
5.80	0.43	0.00	0.25	0.17
5.90	0.44	0.00	0.26	0.17
6.00	0.45	0.00	0.27	0.17
6.10	0.46	0.00	0.28	0.17
6.20	0.47	0.00	0.29	0.18
6.30	0.48	0.00	0.30	0.18
6.40	0.49	0.00	0.30	0.19
6.50	0.50	0.00	0.31	0.19
6.60	0.51	0.00	0.32	0.20
6.70	0.52	0.00	0.33	0.20
6.80	0.53	0.00	0.34	0.21
6.90	0.54	0.00	0.35	0.21
7.00	0.55	0.00	0.36	0.22
7.10	0.56	0.00	0.38	0.23
7.20	0.57	0.00	0.39	0.23
7.30	0.59	0.00	0.40	0.24
7.40	0.60	0.00	0.41	0.24
7.50	0.61	0.00	0.42	0.25
7.60	0.62	0.00	0.43	0.25
7.70	0.64	0.00	0.44	0.26
7.80	0.65	0.00	0.46	0.26
7.90	0.66	0.00	0.47	0.27
8.00	0.68	0.00	0.48	0.27
8.10	0.69	0.00	0.50	0.28
8.20	0.71	0.00	0.51	0.28
8.30	0.72	0.00	0.52	0.29
8.40	0.74	0.00	0.54	0.29
8.50	0.75	0.00	0.55	0.30
8.60	0.77	0.00	0.57	0.30
8.70	0.78	0.00	0.58	0.31
8.80	0.80	0.00	0.60	0.32
8.90	0.81	0.00	0.61	0.32
9.00	0.83	0.00	0.63	0.33
9.10	0.85	0.00	0.64	0.33
9.20	0.86	0.00	0.66	0.35
9.30	0.88	0.00	0.68	0.37
9.40	0.90	0.00	0.70	0.38
9.50	0.92	0.00	0.72	0.40
9.60	0.94	0.00	0.74	0.42
9.70	0.97	0.00	0.76	0.44
9.80	0.99	0.00	0.78	0.45
9.90	1.01	0.00	0.80	0.47
10.00	1.04	0.00	0.83	0.49
10.10	1.06	0.00	0.85	0.51
10.20	1.09	0.00	0.88	0.52
10.30	1.12	0.00	0.90	0.54
10.40	1.14	0.00	0.93	0.56
10.50	1.17	0.00	0.96	0.58

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
10.60	1.20	0.00	0.99	0.61
10.70	1.24	0.00	1.02	0.66
10.80	1.28	0.00	1.06	0.72
10.90	1.32	0.00	1.10	0.79
11.00	1.36	0.00	1.14	0.85
11.10	1.41	0.00	1.19	0.93
11.20	1.46	0.00	1.24	1.03
11.30	1.52	0.00	1.30	1.14
11.40	1.59	0.00	1.37	1.25
11.50	1.66	0.00	1.44	1.37
11.60	1.75	0.00	1.53	1.58
11.70	1.85	0.00	1.63	1.90
11.80	1.99	0.00	1.76	2.26
11.90	2.18	0.00	1.95	2.99
12.00	2.51	0.00	2.28	4.47
12.10	3.05	0.00	2.82	7.34
12.20	3.24	0.00	3.01	<b>8.47</b>
12.30	3.38	0.00	3.14	5.26
12.40	3.48	0.01	3.24	3.33
12.50	3.57	0.01	3.34	2.43
12.60	3.64	0.02	3.41	2.00
12.70	3.71	0.02	3.47	1.63
12.80	3.77	0.03	3.53	1.43
12.90	3.82	0.03	3.59	1.30
13.00	3.87	0.03	3.64	1.18
13.10	3.91	0.04	3.68	1.07
13.20	3.95	0.04	3.72	0.97
13.30	3.99	0.05	3.76	0.89
13.40	4.03	0.05	3.79	0.82
13.50	4.06	0.05	3.82	0.76
13.60	4.09	0.06	3.85	0.69
13.70	4.11	0.06	3.88	0.64
13.80	4.14	0.06	3.91	0.61
13.90	4.17	0.06	3.93	0.59
14.00	4.19	0.07	3.96	0.57
14.10	4.22	0.07	3.98	0.55
14.20	4.24	0.07	4.01	0.53
14.30	4.26	0.08	4.03	0.52
14.40	4.29	0.08	4.05	0.50
14.50	4.31	0.08	4.07	0.48
14.60	4.33	0.09	4.09	0.46
14.70	4.35	0.09	4.11	0.44
14.80	4.37	0.09	4.13	0.43
14.90	4.38	0.09	4.15	0.41
15.00	4.40	0.10	4.16	0.39
15.10	4.42	0.10	4.18	0.37
15.20	4.43	0.10	4.20	0.36
15.30	4.45	0.10	4.21	0.35
15.40	4.46	0.11	4.23	0.34
15.50	4.48	0.11	4.24	0.34
15.60	4.49	0.11	4.26	0.33
15.70	4.51	0.11	4.27	0.33
15.80	4.52	0.11	4.29	0.32

**United Shipping Alliance**

NOAA 24-hr D 10-Year Rainfall=5.23"

Prepared by Kennedy Consulting Engineers, LLC

Printed 9/14/2022

HydroCAD® 10.10-7a s/n 04439 © 2021 HydroCAD Software Solutions LLC

Page 21

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
15.90	4.54	0.12	4.30	0.32
16.00	4.55	0.12	4.32	0.31
16.10	4.57	0.12	4.33	0.31
16.20	4.58	0.12	4.34	0.30
16.30	4.59	0.13	4.36	0.30
16.40	4.61	0.13	4.37	0.29
16.50	4.62	0.13	4.38	0.29
16.60	4.63	0.13	4.39	0.28
16.70	4.64	0.13	4.41	0.28
16.80	4.66	0.14	4.42	0.27
16.90	4.67	0.14	4.43	0.27
17.00	4.68	0.14	4.44	0.26
17.10	4.69	0.14	4.45	0.26
17.20	4.70	0.14	4.47	0.25
17.30	4.71	0.15	4.48	0.25
17.40	4.72	0.15	4.49	0.24
17.50	4.73	0.15	4.50	0.24
17.60	4.74	0.15	4.51	0.23
17.70	4.75	0.15	4.52	0.23
17.80	4.76	0.15	4.53	0.22
17.90	4.77	0.16	4.54	0.22
18.00	4.78	0.16	4.55	0.21
18.10	4.79	0.16	4.56	0.21
18.20	4.80	0.16	4.57	0.20
18.30	4.81	0.16	4.57	0.20
18.40	4.82	0.17	4.58	0.20
18.50	4.83	0.17	4.59	0.20
18.60	4.84	0.17	4.60	0.20
18.70	4.85	0.17	4.61	0.20
18.80	4.86	0.17	4.62	0.19
18.90	4.86	0.17	4.63	0.19
19.00	4.87	0.18	4.64	0.19
19.10	4.88	0.18	4.64	0.19
19.20	4.89	0.18	4.65	0.19
19.30	4.90	0.18	4.66	0.19
19.40	4.91	0.18	4.67	0.19
19.50	4.91	0.18	4.68	0.19
19.60	4.92	0.18	4.69	0.18
19.70	4.93	0.19	4.69	0.18
19.80	4.94	0.19	4.70	0.18
19.90	4.95	0.19	4.71	0.18
20.00	4.96	0.19	4.72	0.18
20.10	4.96	0.19	4.73	0.18
20.20	4.97	0.19	4.73	0.18
20.30	4.98	0.20	4.74	0.18
20.40	4.99	0.20	4.75	0.17
20.50	5.00	0.20	4.76	0.17
20.60	5.00	0.20	4.77	0.17
20.70	5.01	0.20	4.77	0.17
20.80	5.02	0.20	4.78	0.17
20.90	5.03	0.21	4.79	0.17
21.00	5.03	0.21	4.80	0.17
21.10	5.04	0.21	4.80	0.17

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
21.20	5.05	0.21	4.81	0.16
21.30	5.06	0.21	4.82	0.16
21.40	5.06	0.21	4.83	0.16
21.50	5.07	0.21	4.83	0.16
21.60	5.08	0.22	4.84	0.16
21.70	5.08	0.22	4.85	0.16
21.80	5.09	0.22	4.85	0.16
21.90	5.10	0.22	4.86	0.16
22.00	5.10	0.22	4.87	0.15
22.10	5.11	0.22	4.87	0.15
22.20	5.12	0.22	4.88	0.15
22.30	5.12	0.23	4.89	0.15
22.40	5.13	0.23	4.89	0.15
22.50	5.14	0.23	4.90	0.15
22.60	5.14	0.23	4.91	0.15
22.70	5.15	0.23	4.91	0.15
22.80	5.16	0.23	4.92	0.14
22.90	5.16	0.23	4.93	0.14
23.00	5.17	0.24	4.93	0.14
23.10	5.18	0.24	4.94	0.14
23.20	5.18	0.24	4.95	0.14
23.30	5.19	0.24	4.95	0.14
23.40	5.19	0.24	4.96	0.14
23.50	5.20	0.24	4.96	0.13
23.60	5.21	0.24	4.97	0.13
23.70	5.21	0.25	4.98	0.13
23.80	5.22	0.25	4.98	0.13
23.90	5.22	0.25	4.99	0.13
24.00	<b>5.23</b>	<b>0.25</b>	<b>4.99</b>	0.13
24.10	5.23	0.25	4.99	0.10
24.20	5.23	0.25	4.99	0.03
24.30	5.23	0.25	4.99	0.01
24.40	5.23	0.25	4.99	0.00
24.50	5.23	0.25	4.99	0.00
24.60	5.23	0.25	4.99	0.00
24.70	5.23	0.25	4.99	0.00
24.80	5.23	0.25	4.99	0.00
24.90	5.23	0.25	4.99	0.00
25.00	5.23	0.25	4.99	0.00
25.10	5.23	0.25	4.99	0.00
25.20	5.23	0.25	4.99	0.00
25.30	5.23	0.25	4.99	0.00
25.40	5.23	0.25	4.99	0.00
25.50	5.23	0.25	4.99	0.00
25.60	5.23	0.25	4.99	0.00
25.70	5.23	0.25	4.99	0.00
25.80	5.23	0.25	4.99	0.00
25.90	5.23	0.25	4.99	0.00
26.00	5.23	0.25	4.99	0.00
26.10	5.23	0.25	4.99	0.00
26.20	5.23	0.25	4.99	0.00
26.30	5.23	0.25	4.99	0.00
26.40	5.23	0.25	4.99	0.00

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
26.50	5.23	0.25	4.99	0.00
26.60	5.23	0.25	4.99	0.00
26.70	5.23	0.25	4.99	0.00
26.80	5.23	0.25	4.99	0.00
26.90	5.23	0.25	4.99	0.00
27.00	5.23	0.25	4.99	0.00
27.10	5.23	0.25	4.99	0.00
27.20	5.23	0.25	4.99	0.00
27.30	5.23	0.25	4.99	0.00
27.40	5.23	0.25	4.99	0.00
27.50	5.23	0.25	4.99	0.00
27.60	5.23	0.25	4.99	0.00
27.70	5.23	0.25	4.99	0.00
27.80	5.23	0.25	4.99	0.00
27.90	5.23	0.25	4.99	0.00
28.00	5.23	0.25	4.99	0.00
28.10	5.23	0.25	4.99	0.00
28.20	5.23	0.25	4.99	0.00
28.30	5.23	0.25	4.99	0.00
28.40	5.23	0.25	4.99	0.00
28.50	5.23	0.25	4.99	0.00
28.60	5.23	0.25	4.99	0.00
28.70	5.23	0.25	4.99	0.00
28.80	5.23	0.25	4.99	0.00
28.90	5.23	0.25	4.99	0.00
29.00	5.23	0.25	4.99	0.00
29.10	5.23	0.25	4.99	0.00
29.20	5.23	0.25	4.99	0.00
29.30	5.23	0.25	4.99	0.00
29.40	5.23	0.25	4.99	0.00
29.50	5.23	0.25	4.99	0.00
29.60	5.23	0.25	4.99	0.00
29.70	5.23	0.25	4.99	0.00
29.80	5.23	0.25	4.99	0.00
29.90	5.23	0.25	4.99	0.00
30.00	5.23	0.25	4.99	0.00
30.10	5.23	0.25	4.99	0.00
30.20	5.23	0.25	4.99	0.00
30.30	5.23	0.25	4.99	0.00
30.40	5.23	0.25	4.99	0.00
30.50	5.23	0.25	4.99	0.00
30.60	5.23	0.25	4.99	0.00
30.70	5.23	0.25	4.99	0.00
30.80	5.23	0.25	4.99	0.00
30.90	5.23	0.25	4.99	0.00
31.00	5.23	0.25	4.99	0.00
31.10	5.23	0.25	4.99	0.00
31.20	5.23	0.25	4.99	0.00
31.30	5.23	0.25	4.99	0.00
31.40	5.23	0.25	4.99	0.00
31.50	5.23	0.25	4.99	0.00
31.60	5.23	0.25	4.99	0.00
31.70	5.23	0.25	4.99	0.00

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
31.80	5.23	0.25	4.99	0.00
31.90	5.23	0.25	4.99	0.00
32.00	5.23	0.25	4.99	0.00
32.10	5.23	0.25	4.99	0.00
32.20	5.23	0.25	4.99	0.00
32.30	5.23	0.25	4.99	0.00
32.40	5.23	0.25	4.99	0.00
32.50	5.23	0.25	4.99	0.00
32.60	5.23	0.25	4.99	0.00
32.70	5.23	0.25	4.99	0.00
32.80	5.23	0.25	4.99	0.00
32.90	5.23	0.25	4.99	0.00
33.00	5.23	0.25	4.99	0.00
33.10	5.23	0.25	4.99	0.00
33.20	5.23	0.25	4.99	0.00
33.30	5.23	0.25	4.99	0.00
33.40	5.23	0.25	4.99	0.00
33.50	5.23	0.25	4.99	0.00
33.60	5.23	0.25	4.99	0.00
33.70	5.23	0.25	4.99	0.00
33.80	5.23	0.25	4.99	0.00
33.90	5.23	0.25	4.99	0.00
34.00	5.23	0.25	4.99	0.00
34.10	5.23	0.25	4.99	0.00
34.20	5.23	0.25	4.99	0.00
34.30	5.23	0.25	4.99	0.00
34.40	5.23	0.25	4.99	0.00
34.50	5.23	0.25	4.99	0.00
34.60	5.23	0.25	4.99	0.00
34.70	5.23	0.25	4.99	0.00
34.80	5.23	0.25	4.99	0.00
34.90	5.23	0.25	4.99	0.00
35.00	5.23	0.25	4.99	0.00
35.10	5.23	0.25	4.99	0.00
35.20	5.23	0.25	4.99	0.00
35.30	5.23	0.25	4.99	0.00
35.40	5.23	0.25	4.99	0.00
35.50	5.23	0.25	4.99	0.00
35.60	5.23	0.25	4.99	0.00
35.70	5.23	0.25	4.99	0.00
35.80	5.23	0.25	4.99	0.00
35.90	5.23	0.25	4.99	0.00
36.00	5.23	0.25	4.99	0.00

**Summary for Subcatchment P-1: Prop. Area to Point 1**

Runoff = 8.56 cfs @ 12.18 hrs, Volume= 38,658 cf, Depth= 4.27"  
 Routed to nonexistent node PT-1

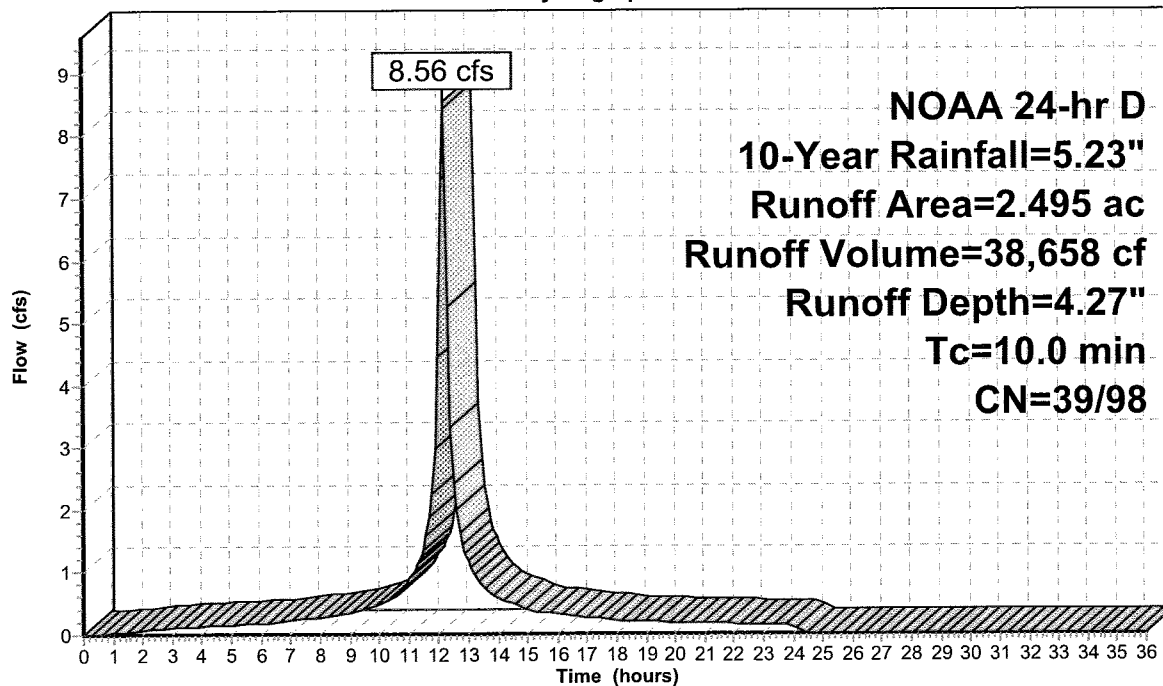
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.10 hrs  
 NOAA 24-hr D 10-Year Rainfall=5.23"

Area (ac)	CN	Description
* 2.114	98	Impervious
0.381	39	>75% Grass cover, Good, HSG A
2.495	89	Weighted Average
0.381		15.27% Pervious Area
2.114		84.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Direct Entry: 10 Min.

**Subcatchment P-1: Prop. Area to Point 1**

Hydrograph



**Hydrograph for Subcatchment P-1: Prop. Area to Point 1**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
0.10	0.01	0.00	0.00	0.00
0.20	0.01	0.00	0.00	0.00
0.30	0.02	0.00	0.00	0.00
0.40	0.02	0.00	0.00	0.00
0.50	0.03	0.00	0.00	0.00
0.60	0.04	0.00	0.00	0.00
0.70	0.04	0.00	0.00	0.00
0.80	0.05	0.00	0.00	0.00
0.90	0.05	0.00	0.00	0.01
1.00	0.06	0.00	0.00	0.01
1.10	0.07	0.00	0.00	0.02
1.20	0.07	0.00	0.00	0.02
1.30	0.08	0.00	0.01	0.03
1.40	0.09	0.00	0.01	0.04
1.50	0.09	0.00	0.01	0.04
1.60	0.10	0.00	0.01	0.05
1.70	0.11	0.00	0.02	0.05
1.80	0.11	0.00	0.02	0.06
1.90	0.12	0.00	0.02	0.06
2.00	0.13	0.00	0.02	0.07
2.10	0.13	0.00	0.03	0.07
2.20	0.14	0.00	0.03	0.08
2.30	0.15	0.00	0.04	0.08
2.40	0.15	0.00	0.04	0.08
2.50	0.16	0.00	0.04	0.09
2.60	0.17	0.00	0.05	0.09
2.70	0.17	0.00	0.05	0.09
2.80	0.18	0.00	0.06	0.10
2.90	0.19	0.00	0.06	0.10
3.00	0.20	0.00	0.07	0.10
3.10	0.20	0.00	0.07	0.11
3.20	0.21	0.00	0.08	0.11
3.30	0.22	0.00	0.08	0.11
3.40	0.23	0.00	0.09	0.11
3.50	0.23	0.00	0.09	0.12
3.60	0.24	0.00	0.10	0.12
3.70	0.25	0.00	0.11	0.12
3.80	0.26	0.00	0.11	0.13
3.90	0.27	0.00	0.12	0.13
4.00	0.27	0.00	0.12	0.13
4.10	0.28	0.00	0.13	0.13
4.20	0.29	0.00	0.14	0.13
4.30	0.30	0.00	0.14	0.14
4.40	0.31	0.00	0.15	0.14
4.50	0.32	0.00	0.16	0.14
4.60	0.32	0.00	0.16	0.14
4.70	0.33	0.00	0.17	0.15
4.80	0.34	0.00	0.18	0.15
4.90	0.35	0.00	0.19	0.15
5.00	0.36	0.00	0.19	0.15
5.10	0.37	0.00	0.20	0.15
5.20	0.37	0.00	0.21	0.16



**United Shipping Alliance**

Prepared by Kennedy Consulting Engineers, LLC

HydroCAD® 10.10-7a s/n 04439 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 10-Year Rainfall=5.23"

Printed 9/14/2022

Page 27

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
5.30	0.38	0.00	0.21	0.16
5.40	0.39	0.00	0.22	0.16
5.50	0.40	0.00	0.23	0.16
5.60	0.41	0.00	0.24	0.16
5.70	0.42	0.00	0.25	0.17
5.80	0.43	0.00	0.25	0.17
5.90	0.44	0.00	0.26	0.17
6.00	0.45	0.00	0.27	0.17
6.10	0.46	0.00	0.28	0.17
6.20	0.47	0.00	0.29	0.18
6.30	0.48	0.00	0.30	0.18
6.40	0.49	0.00	0.30	0.19
6.50	0.50	0.00	0.31	0.19
6.60	0.51	0.00	0.32	0.20
6.70	0.52	0.00	0.33	0.20
6.80	0.53	0.00	0.34	0.21
6.90	0.54	0.00	0.35	0.21
7.00	0.55	0.00	0.36	0.22
7.10	0.56	0.00	0.38	0.22
7.20	0.57	0.00	0.39	0.23
7.30	0.59	0.00	0.40	0.23
7.40	0.60	0.00	0.41	0.24
7.50	0.61	0.00	0.42	0.25
7.60	0.62	0.00	0.43	0.25
7.70	0.64	0.00	0.44	0.26
7.80	0.65	0.00	0.46	0.26
7.90	0.66	0.00	0.47	0.27
8.00	0.68	0.00	0.48	0.27
8.10	0.69	0.00	0.50	0.28
8.20	0.71	0.00	0.51	0.28
8.30	0.72	0.00	0.52	0.29
8.40	0.74	0.00	0.54	0.29
8.50	0.75	0.00	0.55	0.30
8.60	0.77	0.00	0.57	0.30
8.70	0.78	0.00	0.58	0.31
8.80	0.80	0.00	0.60	0.31
8.90	0.81	0.00	0.61	0.32
9.00	0.83	0.00	0.63	0.32
9.10	0.85	0.00	0.64	0.33
9.20	0.86	0.00	0.66	0.35
9.30	0.88	0.00	0.68	0.36
9.40	0.90	0.00	0.70	0.38
9.50	0.92	0.00	0.72	0.40
9.60	0.94	0.00	0.74	0.42
9.70	0.97	0.00	0.76	0.43
9.80	0.99	0.00	0.78	0.45
9.90	1.01	0.00	0.80	0.47
10.00	1.04	0.00	0.83	0.49
10.10	1.06	0.00	0.85	0.50
10.20	1.09	0.00	0.88	0.52
10.30	1.12	0.00	0.90	0.54
10.40	1.14	0.00	0.93	0.56
10.50	1.17	0.00	0.96	0.58

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
10.60	1.20	0.00	0.99	0.60
10.70	1.24	0.00	1.02	0.66
10.80	1.28	0.00	1.06	0.72
10.90	1.32	0.00	1.10	0.78
11.00	1.36	0.00	1.14	0.85
11.10	1.41	0.00	1.19	0.92
11.20	1.46	0.00	1.24	1.03
11.30	1.52	0.00	1.30	1.14
11.40	1.59	0.00	1.37	1.25
11.50	1.66	0.00	1.44	1.36
11.60	1.75	0.00	1.53	1.57
11.70	1.85	0.00	1.63	1.90
11.80	1.99	0.00	1.76	2.25
11.90	2.18	0.00	1.95	2.98
12.00	2.51	0.00	2.28	4.45
12.10	3.05	0.00	2.82	7.31
12.20	3.24	0.00	3.01	<b>8.43</b>
12.30	3.38	0.00	3.14	5.24
12.40	3.48	0.01	3.24	3.32
12.50	3.57	0.01	3.34	2.42
12.60	3.64	0.02	3.41	1.99
12.70	3.71	0.02	3.47	1.62
12.80	3.77	0.03	3.53	1.43
12.90	3.82	0.03	3.59	1.30
13.00	3.87	0.03	3.64	1.18
13.10	3.91	0.04	3.68	1.06
13.20	3.95	0.04	3.72	0.96
13.30	3.99	0.05	3.76	0.89
13.40	4.03	0.05	3.79	0.82
13.50	4.06	0.05	3.82	0.75
13.60	4.09	0.06	3.85	0.69
13.70	4.11	0.06	3.88	0.63
13.80	4.14	0.06	3.91	0.61
13.90	4.17	0.06	3.93	0.59
14.00	4.19	0.07	3.96	0.57
14.10	4.22	0.07	3.98	0.55
14.20	4.24	0.07	4.01	0.53
14.30	4.26	0.08	4.03	0.51
14.40	4.29	0.08	4.05	0.50
14.50	4.31	0.08	4.07	0.48
14.60	4.33	0.09	4.09	0.46
14.70	4.35	0.09	4.11	0.44
14.80	4.37	0.09	4.13	0.43
14.90	4.38	0.09	4.15	0.41
15.00	4.40	0.10	4.16	0.39
15.10	4.42	0.10	4.18	0.37
15.20	4.43	0.10	4.20	0.36
15.30	4.45	0.10	4.21	0.35
15.40	4.46	0.11	4.23	0.34
15.50	4.48	0.11	4.24	0.34
15.60	4.49	0.11	4.26	0.33
15.70	4.51	0.11	4.27	0.33
15.80	4.52	0.11	4.29	0.32

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
15.90	4.54	0.12	4.30	0.32
16.00	4.55	0.12	4.32	0.31
16.10	4.57	0.12	4.33	0.31
16.20	4.58	0.12	4.34	0.30
16.30	4.59	0.13	4.36	0.30
16.40	4.61	0.13	4.37	0.29
16.50	4.62	0.13	4.38	0.29
16.60	4.63	0.13	4.39	0.28
16.70	4.64	0.13	4.41	0.28
16.80	4.66	0.14	4.42	0.27
16.90	4.67	0.14	4.43	0.27
17.00	4.68	0.14	4.44	0.26
17.10	4.69	0.14	4.45	0.26
17.20	4.70	0.14	4.47	0.25
17.30	4.71	0.15	4.48	0.25
17.40	4.72	0.15	4.49	0.24
17.50	4.73	0.15	4.50	0.24
17.60	4.74	0.15	4.51	0.23
17.70	4.75	0.15	4.52	0.23
17.80	4.76	0.15	4.53	0.22
17.90	4.77	0.16	4.54	0.22
18.00	4.78	0.16	4.55	0.21
18.10	4.79	0.16	4.56	0.21
18.20	4.80	0.16	4.57	0.20
18.30	4.81	0.16	4.57	0.20
18.40	4.82	0.17	4.58	0.20
18.50	4.83	0.17	4.59	0.20
18.60	4.84	0.17	4.60	0.20
18.70	4.85	0.17	4.61	0.20
18.80	4.86	0.17	4.62	0.19
18.90	4.86	0.17	4.63	0.19
19.00	4.87	0.18	4.64	0.19
19.10	4.88	0.18	4.64	0.19
19.20	4.89	0.18	4.65	0.19
19.30	4.90	0.18	4.66	0.19
19.40	4.91	0.18	4.67	0.19
19.50	4.91	0.18	4.68	0.18
19.60	4.92	0.18	4.69	0.18
19.70	4.93	0.19	4.69	0.18
19.80	4.94	0.19	4.70	0.18
19.90	4.95	0.19	4.71	0.18
20.00	4.96	0.19	4.72	0.18
20.10	4.96	0.19	4.73	0.18
20.20	4.97	0.19	4.73	0.18
20.30	4.98	0.20	4.74	0.18
20.40	4.99	0.20	4.75	0.17
20.50	5.00	0.20	4.76	0.17
20.60	5.00	0.20	4.77	0.17
20.70	5.01	0.20	4.77	0.17
20.80	5.02	0.20	4.78	0.17
20.90	5.03	0.21	4.79	0.17
21.00	5.03	0.21	4.80	0.17
21.10	5.04	0.21	4.80	0.16

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
21.20	5.05	0.21	4.81	0.16
21.30	5.06	0.21	4.82	0.16
21.40	5.06	0.21	4.83	0.16
21.50	5.07	0.21	4.83	0.16
21.60	5.08	0.22	4.84	0.16
21.70	5.08	0.22	4.85	0.16
21.80	5.09	0.22	4.85	0.16
21.90	5.10	0.22	4.86	0.15
22.00	5.10	0.22	4.87	0.15
22.10	5.11	0.22	4.87	0.15
22.20	5.12	0.22	4.88	0.15
22.30	5.12	0.23	4.89	0.15
22.40	5.13	0.23	4.89	0.15
22.50	5.14	0.23	4.90	0.15
22.60	5.14	0.23	4.91	0.15
22.70	5.15	0.23	4.91	0.14
22.80	5.16	0.23	4.92	0.14
22.90	5.16	0.23	4.93	0.14
23.00	5.17	0.24	4.93	0.14
23.10	5.18	0.24	4.94	0.14
23.20	5.18	0.24	4.95	0.14
23.30	5.19	0.24	4.95	0.14
23.40	5.19	0.24	4.96	0.14
23.50	5.20	0.24	4.96	0.13
23.60	5.21	0.24	4.97	0.13
23.70	5.21	0.25	4.98	0.13
23.80	5.22	0.25	4.98	0.13
23.90	5.22	0.25	4.99	0.13
24.00	<b>5.23</b>	<b>0.25</b>	<b>4.99</b>	0.13
24.10	5.23	0.25	4.99	0.10
24.20	5.23	0.25	4.99	0.03
24.30	5.23	0.25	4.99	0.01
24.40	5.23	0.25	4.99	0.00
24.50	5.23	0.25	4.99	0.00
24.60	5.23	0.25	4.99	0.00
24.70	5.23	0.25	4.99	0.00
24.80	5.23	0.25	4.99	0.00
24.90	5.23	0.25	4.99	0.00
25.00	5.23	0.25	4.99	0.00
25.10	5.23	0.25	4.99	0.00
25.20	5.23	0.25	4.99	0.00
25.30	5.23	0.25	4.99	0.00
25.40	5.23	0.25	4.99	0.00
25.50	5.23	0.25	4.99	0.00
25.60	5.23	0.25	4.99	0.00
25.70	5.23	0.25	4.99	0.00
25.80	5.23	0.25	4.99	0.00
25.90	5.23	0.25	4.99	0.00
26.00	5.23	0.25	4.99	0.00
26.10	5.23	0.25	4.99	0.00
26.20	5.23	0.25	4.99	0.00
26.30	5.23	0.25	4.99	0.00
26.40	5.23	0.25	4.99	0.00

**United Shipping Alliance**

Prepared by Kennedy Consulting Engineers, LLC

HydroCAD® 10.10-7a s/n 04439 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 10-Year Rainfall=5.23"

Printed 9/14/2022

Page 31

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
26.50	5.23	0.25	4.99	0.00
26.60	5.23	0.25	4.99	0.00
26.70	5.23	0.25	4.99	0.00
26.80	5.23	0.25	4.99	0.00
26.90	5.23	0.25	4.99	0.00
27.00	5.23	0.25	4.99	0.00
27.10	5.23	0.25	4.99	0.00
27.20	5.23	0.25	4.99	0.00
27.30	5.23	0.25	4.99	0.00
27.40	5.23	0.25	4.99	0.00
27.50	5.23	0.25	4.99	0.00
27.60	5.23	0.25	4.99	0.00
27.70	5.23	0.25	4.99	0.00
27.80	5.23	0.25	4.99	0.00
27.90	5.23	0.25	4.99	0.00
28.00	5.23	0.25	4.99	0.00
28.10	5.23	0.25	4.99	0.00
28.20	5.23	0.25	4.99	0.00
28.30	5.23	0.25	4.99	0.00
28.40	5.23	0.25	4.99	0.00
28.50	5.23	0.25	4.99	0.00
28.60	5.23	0.25	4.99	0.00
28.70	5.23	0.25	4.99	0.00
28.80	5.23	0.25	4.99	0.00
28.90	5.23	0.25	4.99	0.00
29.00	5.23	0.25	4.99	0.00
29.10	5.23	0.25	4.99	0.00
29.20	5.23	0.25	4.99	0.00
29.30	5.23	0.25	4.99	0.00
29.40	5.23	0.25	4.99	0.00
29.50	5.23	0.25	4.99	0.00
29.60	5.23	0.25	4.99	0.00
29.70	5.23	0.25	4.99	0.00
29.80	5.23	0.25	4.99	0.00
29.90	5.23	0.25	4.99	0.00
30.00	5.23	0.25	4.99	0.00
30.10	5.23	0.25	4.99	0.00
30.20	5.23	0.25	4.99	0.00
30.30	5.23	0.25	4.99	0.00
30.40	5.23	0.25	4.99	0.00
30.50	5.23	0.25	4.99	0.00
30.60	5.23	0.25	4.99	0.00
30.70	5.23	0.25	4.99	0.00
30.80	5.23	0.25	4.99	0.00
30.90	5.23	0.25	4.99	0.00
31.00	5.23	0.25	4.99	0.00
31.10	5.23	0.25	4.99	0.00
31.20	5.23	0.25	4.99	0.00
31.30	5.23	0.25	4.99	0.00
31.40	5.23	0.25	4.99	0.00
31.50	5.23	0.25	4.99	0.00
31.60	5.23	0.25	4.99	0.00
31.70	5.23	0.25	4.99	0.00

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
31.80	5.23	0.25	4.99	0.00
31.90	5.23	0.25	4.99	0.00
32.00	5.23	0.25	4.99	0.00
32.10	5.23	0.25	4.99	0.00
32.20	5.23	0.25	4.99	0.00
32.30	5.23	0.25	4.99	0.00
32.40	5.23	0.25	4.99	0.00
32.50	5.23	0.25	4.99	0.00
32.60	5.23	0.25	4.99	0.00
32.70	5.23	0.25	4.99	0.00
32.80	5.23	0.25	4.99	0.00
32.90	5.23	0.25	4.99	0.00
33.00	5.23	0.25	4.99	0.00
33.10	5.23	0.25	4.99	0.00
33.20	5.23	0.25	4.99	0.00
33.30	5.23	0.25	4.99	0.00
33.40	5.23	0.25	4.99	0.00
33.50	5.23	0.25	4.99	0.00
33.60	5.23	0.25	4.99	0.00
33.70	5.23	0.25	4.99	0.00
33.80	5.23	0.25	4.99	0.00
33.90	5.23	0.25	4.99	0.00
34.00	5.23	0.25	4.99	0.00
34.10	5.23	0.25	4.99	0.00
34.20	5.23	0.25	4.99	0.00
34.30	5.23	0.25	4.99	0.00
34.40	5.23	0.25	4.99	0.00
34.50	5.23	0.25	4.99	0.00
34.60	5.23	0.25	4.99	0.00
34.70	5.23	0.25	4.99	0.00
34.80	5.23	0.25	4.99	0.00
34.90	5.23	0.25	4.99	0.00
35.00	5.23	0.25	4.99	0.00
35.10	5.23	0.25	4.99	0.00
35.20	5.23	0.25	4.99	0.00
35.30	5.23	0.25	4.99	0.00
35.40	5.23	0.25	4.99	0.00
35.50	5.23	0.25	4.99	0.00
35.60	5.23	0.25	4.99	0.00
35.70	5.23	0.25	4.99	0.00
35.80	5.23	0.25	4.99	0.00
35.90	5.23	0.25	4.99	0.00
36.00	5.23	0.25	4.99	0.00

**Summary for Subcatchment E-1: Ex. Area to Point 1**

Runoff = 15.17 cfs @ 12.18 hrs, Volume= 69,170 cf, Depth= 7.64"

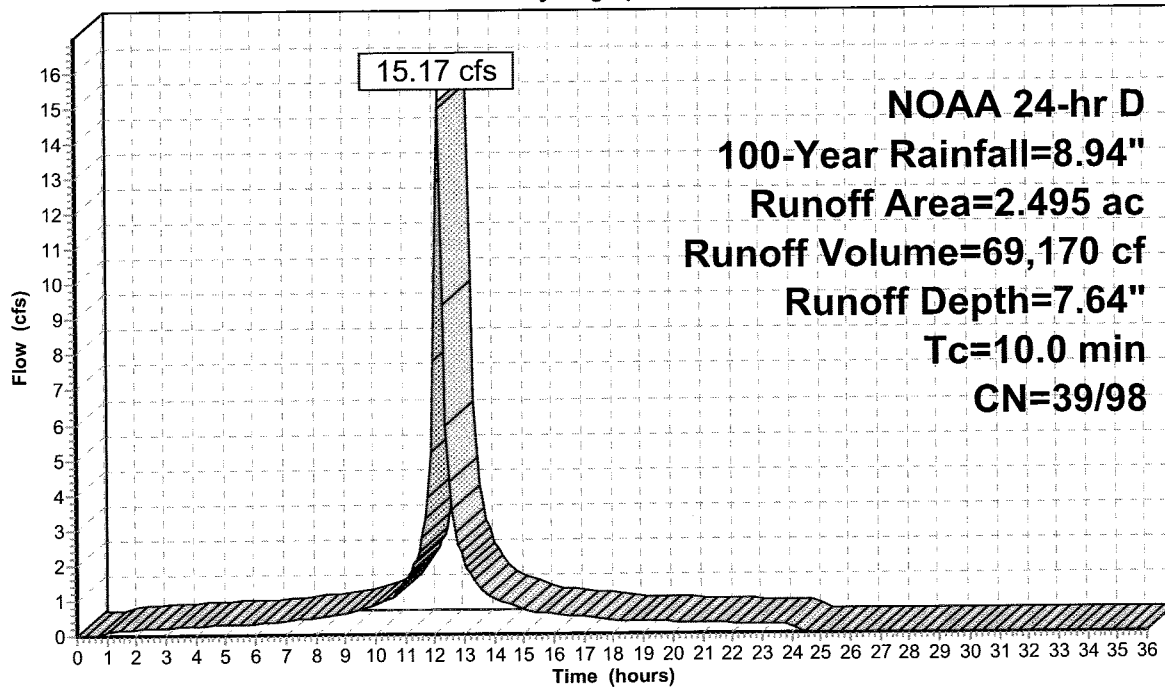
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.10 hrs  
 NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
* 2.123	98	Impervious
0.372	39	>75% Grass cover, Good, HSG A
2.495	89	Weighted Average
0.372		14.91% Pervious Area
2.123		85.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Direct Entry: 10 Min.

**Subcatchment E-1: Ex. Area to Point 1**

Hydrograph



**Hydrograph for Subcatchment E-1: Ex. Area to Point 1**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
0.10	0.01	0.00	0.00	0.00
0.20	0.02	0.00	0.00	0.00
0.30	0.03	0.00	0.00	0.00
0.40	0.04	0.00	0.00	0.00
0.50	0.05	0.00	0.00	0.00
0.60	0.06	0.00	0.00	0.01
0.70	0.07	0.00	0.00	0.03
0.80	0.08	0.00	0.01	0.04
0.90	0.09	0.00	0.01	0.06
1.00	0.10	0.00	0.01	0.07
1.10	0.11	0.00	0.02	0.09
1.20	0.12	0.00	0.02	0.10
1.30	0.13	0.00	0.03	0.11
1.40	0.15	0.00	0.04	0.12
1.50	0.16	0.00	0.04	0.13
1.60	0.17	0.00	0.05	0.14
1.70	0.18	0.00	0.06	0.15
1.80	0.19	0.00	0.06	0.15
1.90	0.20	0.00	0.07	0.16
2.00	0.21	0.00	0.08	0.17
2.10	0.23	0.00	0.09	0.17
2.20	0.24	0.00	0.10	0.18
2.30	0.25	0.00	0.11	0.19
2.40	0.26	0.00	0.12	0.19
2.50	0.27	0.00	0.12	0.20
2.60	0.29	0.00	0.13	0.20
2.70	0.30	0.00	0.14	0.21
2.80	0.31	0.00	0.15	0.21
2.90	0.32	0.00	0.16	0.22
3.00	0.34	0.00	0.18	0.22
3.10	0.35	0.00	0.19	0.22
3.20	0.36	0.00	0.20	0.23
3.30	0.38	0.00	0.21	0.23
3.40	0.39	0.00	0.22	0.24
3.50	0.40	0.00	0.23	0.24
3.60	0.41	0.00	0.24	0.24
3.70	0.43	0.00	0.25	0.25
3.80	0.44	0.00	0.27	0.25
3.90	0.46	0.00	0.28	0.25
4.00	0.47	0.00	0.29	0.26
4.10	0.48	0.00	0.30	0.26
4.20	0.50	0.00	0.31	0.26
4.30	0.51	0.00	0.33	0.27
4.40	0.52	0.00	0.34	0.27
4.50	0.54	0.00	0.35	0.27
4.60	0.55	0.00	0.37	0.28
4.70	0.57	0.00	0.38	0.28
4.80	0.58	0.00	0.39	0.28
4.90	0.60	0.00	0.41	0.29
5.00	0.61	0.00	0.42	0.29
5.10	0.63	0.00	0.43	0.29
5.20	0.64	0.00	0.45	0.29



**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
5.30	0.66	0.00	0.46	0.30
5.40	0.67	0.00	0.48	0.30
5.50	0.69	0.00	0.49	0.30
5.60	0.70	0.00	0.50	0.31
5.70	0.72	0.00	0.52	0.31
5.80	0.73	0.00	0.53	0.31
5.90	0.75	0.00	0.55	0.31
6.00	0.76	0.00	0.56	0.32
6.10	0.78	0.00	0.58	0.32
6.20	0.80	0.00	0.59	0.33
6.30	0.81	0.00	0.61	0.34
6.40	0.83	0.00	0.63	0.34
6.50	0.85	0.00	0.64	0.35
6.60	0.87	0.00	0.66	0.36
6.70	0.88	0.00	0.68	0.37
6.80	0.90	0.00	0.70	0.38
6.90	0.92	0.00	0.72	0.39
7.00	0.94	0.00	0.73	0.40
7.10	0.96	0.00	0.75	0.41
7.20	0.98	0.00	0.77	0.41
7.30	1.00	0.00	0.79	0.42
7.40	1.02	0.00	0.81	0.43
7.50	1.05	0.00	0.84	0.44
7.60	1.07	0.00	0.86	0.45
7.70	1.09	0.00	0.88	0.46
7.80	1.11	0.00	0.90	0.47
7.90	1.14	0.00	0.92	0.48
8.00	1.16	0.00	0.95	0.48
8.10	1.18	0.00	0.97	0.49
8.20	1.21	0.00	0.99	0.50
8.30	1.23	0.00	1.02	0.51
8.40	1.26	0.00	1.04	0.52
8.50	1.28	0.00	1.07	0.53
8.60	1.31	0.00	1.09	0.54
8.70	1.34	0.00	1.12	0.55
8.80	1.36	0.00	1.15	0.55
8.90	1.39	0.00	1.17	0.56
9.00	1.42	0.00	1.20	0.57
9.10	1.45	0.00	1.23	0.59
9.20	1.48	0.00	1.26	0.61
9.30	1.51	0.00	1.29	0.64
9.40	1.54	0.00	1.32	0.67
9.50	1.58	0.00	1.36	0.70
9.60	1.61	0.00	1.39	0.73
9.70	1.65	0.00	1.43	0.76
9.80	1.69	0.00	1.47	0.79
9.90	1.73	0.00	1.51	0.82
10.00	1.77	0.00	1.55	0.85
10.10	1.82	0.00	1.59	0.88
10.20	1.86	0.00	1.64	0.91
10.30	1.91	0.00	1.68	0.94
10.40	1.95	0.00	1.73	0.97
10.50	2.00	0.00	1.78	1.00

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
10.60	2.06	0.00	1.83	1.05
10.70	2.12	0.00	1.89	1.15
10.80	2.18	0.00	1.95	1.25
10.90	2.25	0.00	2.02	1.36
11.00	2.32	0.00	2.10	1.47
11.10	2.41	0.00	2.18	1.60
11.20	2.50	0.00	2.27	1.78
11.30	2.60	0.00	2.37	1.97
11.40	2.71	0.00	2.48	2.16
11.50	2.83	0.00	2.60	2.36
11.60	3.00	0.00	2.76	2.73
11.70	3.17	0.00	2.93	3.28
11.80	3.40	0.00	3.17	3.89
11.90	3.72	0.02	3.49	5.17
12.00	4.28	0.08	4.05	7.76
12.10	5.22	0.25	4.98	12.86
12.20	5.54	0.32	5.30	<b>14.97</b>
12.30	5.77	0.38	5.54	9.35
12.40	5.94	0.43	5.71	5.94
12.50	6.11	0.48	5.87	4.34
12.60	6.23	0.51	5.99	3.56
12.70	6.34	0.55	6.10	2.90
12.80	6.44	0.58	6.20	2.55
12.90	6.53	0.61	6.29	2.32
13.00	6.62	0.64	6.38	2.11
13.10	6.69	0.66	6.45	1.91
13.20	6.76	0.68	6.52	1.72
13.30	6.82	0.71	6.59	1.59
13.40	6.88	0.73	6.64	1.47
13.50	6.94	0.75	6.70	1.35
13.60	6.99	0.76	6.75	1.23
13.70	7.03	0.78	6.79	1.14
13.80	7.08	0.80	6.84	1.08
13.90	7.12	0.81	6.89	1.05
14.00	7.17	0.83	6.93	1.02
14.10	7.21	0.84	6.97	0.98
14.20	7.25	0.86	7.01	0.95
14.30	7.29	0.87	7.05	0.92
14.40	7.33	0.89	7.09	0.89
14.50	7.36	0.90	7.12	0.86
14.60	7.40	0.92	7.16	0.82
14.70	7.43	0.93	7.19	0.79
14.80	7.46	0.94	7.22	0.76
14.90	7.49	0.95	7.25	0.73
15.00	7.52	0.96	7.28	0.70
15.10	7.55	0.97	7.31	0.67
15.20	7.58	0.98	7.34	0.64
15.30	7.60	1.00	7.36	0.62
15.40	7.63	1.01	7.39	0.61
15.50	7.66	1.02	7.42	0.61
15.60	7.68	1.03	7.44	0.60
15.70	7.71	1.04	7.47	0.59
15.80	7.73	1.05	7.49	0.58

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
15.90	7.76	1.06	7.52	0.57
16.00	7.78	1.07	7.54	0.56
16.10	7.80	1.08	7.56	0.55
16.20	7.83	1.09	7.59	0.54
16.30	7.85	1.09	7.61	0.53
16.40	7.87	1.10	7.63	0.52
16.50	7.89	1.11	7.65	0.51
16.60	7.92	1.12	7.68	0.51
16.70	7.94	1.13	7.70	0.50
16.80	7.96	1.14	7.72	0.49
16.90	7.98	1.15	7.74	0.48
17.00	8.00	1.16	7.76	0.47
17.10	8.02	1.16	7.78	0.46
17.20	8.04	1.17	7.80	0.45
17.30	8.06	1.18	7.82	0.44
17.40	8.07	1.19	7.83	0.43
17.50	8.09	1.20	7.85	0.42
17.60	8.11	1.20	7.87	0.41
17.70	8.13	1.21	7.89	0.41
17.80	8.14	1.22	7.90	0.40
17.90	8.16	1.23	7.92	0.39
18.00	8.18	1.23	7.94	0.38
18.10	8.19	1.24	7.95	0.37
18.20	8.21	1.25	7.97	0.36
18.30	8.22	1.25	7.98	0.36
18.40	8.24	1.26	8.00	0.36
18.50	8.25	1.27	8.01	0.35
18.60	8.27	1.27	8.03	0.35
18.70	8.28	1.28	8.04	0.35
18.80	8.30	1.28	8.06	0.35
18.90	8.31	1.29	8.07	0.35
19.00	8.33	1.30	8.09	0.34
19.10	8.34	1.30	8.10	0.34
19.20	8.36	1.31	8.12	0.34
19.30	8.37	1.32	8.13	0.34
19.40	8.39	1.32	8.15	0.33
19.50	8.40	1.33	8.16	0.33
19.60	8.42	1.34	8.18	0.33
19.70	8.43	1.34	8.19	0.33
19.80	8.44	1.35	8.20	0.32
19.90	8.46	1.35	8.22	0.32
20.00	8.47	1.36	8.23	0.32
20.10	8.48	1.37	8.24	0.32
20.20	8.50	1.37	8.26	0.32
20.30	8.51	1.38	8.27	0.31
20.40	8.53	1.38	8.28	0.31
20.50	8.54	1.39	8.30	0.31
20.60	8.55	1.40	8.31	0.31
20.70	8.56	1.40	8.32	0.30
20.80	8.58	1.41	8.34	0.30
20.90	8.59	1.41	8.35	0.30
21.00	8.60	1.42	8.36	0.30
21.10	8.62	1.43	8.38	0.29

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
21.20	8.63	1.43	8.39	0.29
21.30	8.64	1.44	8.40	0.29
21.40	8.65	1.44	8.41	0.29
21.50	8.67	1.45	8.43	0.29
21.60	8.68	1.45	8.44	0.28
21.70	8.69	1.46	8.45	0.28
21.80	8.70	1.46	8.46	0.28
21.90	8.71	1.47	8.47	0.28
22.00	8.73	1.48	8.49	0.27
22.10	8.74	1.48	8.50	0.27
22.20	8.75	1.49	8.51	0.27
22.30	8.76	1.49	8.52	0.27
22.40	8.77	1.50	8.53	0.27
22.50	8.78	1.50	8.54	0.26
22.60	8.79	1.51	8.55	0.26
22.70	8.81	1.51	8.56	0.26
22.80	8.82	1.52	8.58	0.26
22.90	8.83	1.52	8.59	0.25
23.00	8.84	1.53	8.60	0.25
23.10	8.85	1.53	8.61	0.25
23.20	8.86	1.54	8.62	0.25
23.30	8.87	1.54	8.63	0.24
23.40	8.88	1.55	8.64	0.24
23.50	8.89	1.55	8.65	0.24
23.60	8.90	1.56	8.66	0.24
23.70	8.91	1.56	8.67	0.24
23.80	8.92	1.57	8.68	0.23
23.90	8.93	1.57	8.69	0.23
24.00	<b>8.94</b>	<b>1.57</b>	<b>8.70</b>	0.23
24.10	8.94	1.57	8.70	0.17
24.20	8.94	1.57	8.70	0.05
24.30	8.94	1.57	8.70	0.01
24.40	8.94	1.57	8.70	0.00
24.50	8.94	1.57	8.70	0.00
24.60	8.94	1.57	8.70	0.00
24.70	8.94	1.57	8.70	0.00
24.80	8.94	1.57	8.70	0.00
24.90	8.94	1.57	8.70	0.00
25.00	8.94	1.57	8.70	0.00
25.10	8.94	1.57	8.70	0.00
25.20	8.94	1.57	8.70	0.00
25.30	8.94	1.57	8.70	0.00
25.40	8.94	1.57	8.70	0.00
25.50	8.94	1.57	8.70	0.00
25.60	8.94	1.57	8.70	0.00
25.70	8.94	1.57	8.70	0.00
25.80	8.94	1.57	8.70	0.00
25.90	8.94	1.57	8.70	0.00
26.00	8.94	1.57	8.70	0.00
26.10	8.94	1.57	8.70	0.00
26.20	8.94	1.57	8.70	0.00
26.30	8.94	1.57	8.70	0.00
26.40	8.94	1.57	8.70	0.00

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
26.50	8.94	1.57	8.70	0.00
26.60	8.94	1.57	8.70	0.00
26.70	8.94	1.57	8.70	0.00
26.80	8.94	1.57	8.70	0.00
26.90	8.94	1.57	8.70	0.00
27.00	8.94	1.57	8.70	0.00
27.10	8.94	1.57	8.70	0.00
27.20	8.94	1.57	8.70	0.00
27.30	8.94	1.57	8.70	0.00
27.40	8.94	1.57	8.70	0.00
27.50	8.94	1.57	8.70	0.00
27.60	8.94	1.57	8.70	0.00
27.70	8.94	1.57	8.70	0.00
27.80	8.94	1.57	8.70	0.00
27.90	8.94	1.57	8.70	0.00
28.00	8.94	1.57	8.70	0.00
28.10	8.94	1.57	8.70	0.00
28.20	8.94	1.57	8.70	0.00
28.30	8.94	1.57	8.70	0.00
28.40	8.94	1.57	8.70	0.00
28.50	8.94	1.57	8.70	0.00
28.60	8.94	1.57	8.70	0.00
28.70	8.94	1.57	8.70	0.00
28.80	8.94	1.57	8.70	0.00
28.90	8.94	1.57	8.70	0.00
29.00	8.94	1.57	8.70	0.00
29.10	8.94	1.57	8.70	0.00
29.20	8.94	1.57	8.70	0.00
29.30	8.94	1.57	8.70	0.00
29.40	8.94	1.57	8.70	0.00
29.50	8.94	1.57	8.70	0.00
29.60	8.94	1.57	8.70	0.00
29.70	8.94	1.57	8.70	0.00
29.80	8.94	1.57	8.70	0.00
29.90	8.94	1.57	8.70	0.00
30.00	8.94	1.57	8.70	0.00
30.10	8.94	1.57	8.70	0.00
30.20	8.94	1.57	8.70	0.00
30.30	8.94	1.57	8.70	0.00
30.40	8.94	1.57	8.70	0.00
30.50	8.94	1.57	8.70	0.00
30.60	8.94	1.57	8.70	0.00
30.70	8.94	1.57	8.70	0.00
30.80	8.94	1.57	8.70	0.00
30.90	8.94	1.57	8.70	0.00
31.00	8.94	1.57	8.70	0.00
31.10	8.94	1.57	8.70	0.00
31.20	8.94	1.57	8.70	0.00
31.30	8.94	1.57	8.70	0.00
31.40	8.94	1.57	8.70	0.00
31.50	8.94	1.57	8.70	0.00
31.60	8.94	1.57	8.70	0.00
31.70	8.94	1.57	8.70	0.00

**Hydrograph for Subcatchment E-1: Ex. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
31.80	8.94	1.57	8.70	0.00
31.90	8.94	1.57	8.70	0.00
32.00	8.94	1.57	8.70	0.00
32.10	8.94	1.57	8.70	0.00
32.20	8.94	1.57	8.70	0.00
32.30	8.94	1.57	8.70	0.00
32.40	8.94	1.57	8.70	0.00
32.50	8.94	1.57	8.70	0.00
32.60	8.94	1.57	8.70	0.00
32.70	8.94	1.57	8.70	0.00
32.80	8.94	1.57	8.70	0.00
32.90	8.94	1.57	8.70	0.00
33.00	8.94	1.57	8.70	0.00
33.10	8.94	1.57	8.70	0.00
33.20	8.94	1.57	8.70	0.00
33.30	8.94	1.57	8.70	0.00
33.40	8.94	1.57	8.70	0.00
33.50	8.94	1.57	8.70	0.00
33.60	8.94	1.57	8.70	0.00
33.70	8.94	1.57	8.70	0.00
33.80	8.94	1.57	8.70	0.00
33.90	8.94	1.57	8.70	0.00
34.00	8.94	1.57	8.70	0.00
34.10	8.94	1.57	8.70	0.00
34.20	8.94	1.57	8.70	0.00
34.30	8.94	1.57	8.70	0.00
34.40	8.94	1.57	8.70	0.00
34.50	8.94	1.57	8.70	0.00
34.60	8.94	1.57	8.70	0.00
34.70	8.94	1.57	8.70	0.00
34.80	8.94	1.57	8.70	0.00
34.90	8.94	1.57	8.70	0.00
35.00	8.94	1.57	8.70	0.00
35.10	8.94	1.57	8.70	0.00
35.20	8.94	1.57	8.70	0.00
35.30	8.94	1.57	8.70	0.00
35.40	8.94	1.57	8.70	0.00
35.50	8.94	1.57	8.70	0.00
35.60	8.94	1.57	8.70	0.00
35.70	8.94	1.57	8.70	0.00
35.80	8.94	1.57	8.70	0.00
35.90	8.94	1.57	8.70	0.00
36.00	8.94	1.57	8.70	0.00

**Summary for Subcatchment P-1: Prop. Area to Point 1**

Runoff = 15.11 cfs @ 12.18 hrs, Volume= 68,937 cf, Depth= 7.61"  
 Routed to nonexistent node PT-1

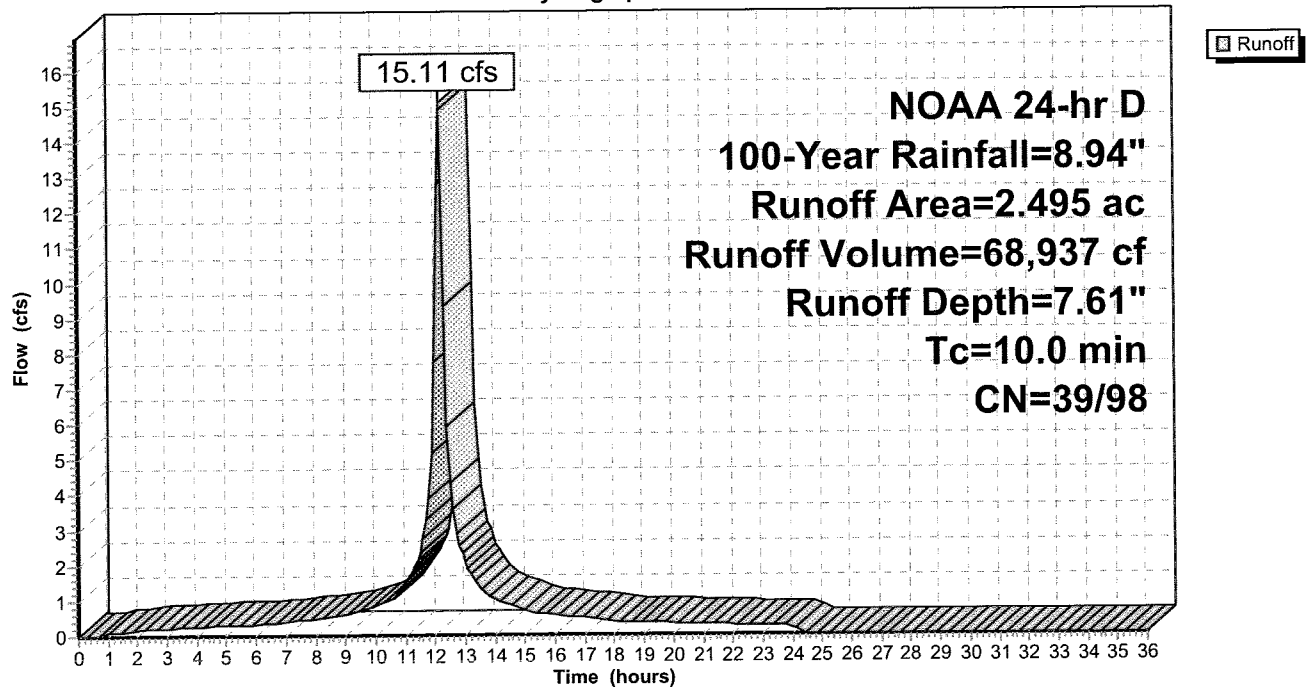
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.10 hrs  
 NOAA 24-hr D 100-Year Rainfall=8.94"

Area (ac)	CN	Description
* 2.114	98	Impervious
0.381	39	>75% Grass cover, Good, HSG A
2.495	89	Weighted Average
0.381		15.27% Pervious Area
2.114		84.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, Direct Entry: 10 Min.

**Subcatchment P-1: Prop. Area to Point 1**

Hydrograph



**Hydrograph for Subcatchment P-1: Prop. Area to Point 1**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
0.10	0.01	0.00	0.00	0.00
0.20	0.02	0.00	0.00	0.00
0.30	0.03	0.00	0.00	0.00
0.40	0.04	0.00	0.00	0.00
0.50	0.05	0.00	0.00	0.00
0.60	0.06	0.00	0.00	0.01
0.70	0.07	0.00	0.00	0.03
0.80	0.08	0.00	0.01	0.04
0.90	0.09	0.00	0.01	0.06
1.00	0.10	0.00	0.01	0.07
1.10	0.11	0.00	0.02	0.09
1.20	0.12	0.00	0.02	0.10
1.30	0.13	0.00	0.03	0.11
1.40	0.15	0.00	0.04	0.12
1.50	0.16	0.00	0.04	0.13
1.60	0.17	0.00	0.05	0.14
1.70	0.18	0.00	0.06	0.15
1.80	0.19	0.00	0.06	0.15
1.90	0.20	0.00	0.07	0.16
2.00	0.21	0.00	0.08	0.17
2.10	0.23	0.00	0.09	0.17
2.20	0.24	0.00	0.10	0.18
2.30	0.25	0.00	0.11	0.19
2.40	0.26	0.00	0.12	0.19
2.50	0.27	0.00	0.12	0.20
2.60	0.29	0.00	0.13	0.20
2.70	0.30	0.00	0.14	0.21
2.80	0.31	0.00	0.15	0.21
2.90	0.32	0.00	0.16	0.22
3.00	0.34	0.00	0.18	0.22
3.10	0.35	0.00	0.19	0.22
3.20	0.36	0.00	0.20	0.23
3.30	0.38	0.00	0.21	0.23
3.40	0.39	0.00	0.22	0.24
3.50	0.40	0.00	0.23	0.24
3.60	0.41	0.00	0.24	0.24
3.70	0.43	0.00	0.25	0.25
3.80	0.44	0.00	0.27	0.25
3.90	0.46	0.00	0.28	0.25
4.00	0.47	0.00	0.29	0.26
4.10	0.48	0.00	0.30	0.26
4.20	0.50	0.00	0.31	0.26
4.30	0.51	0.00	0.33	0.27
4.40	0.52	0.00	0.34	0.27
4.50	0.54	0.00	0.35	0.27
4.60	0.55	0.00	0.37	0.28
4.70	0.57	0.00	0.38	0.28
4.80	0.58	0.00	0.39	0.28
4.90	0.60	0.00	0.41	0.28
5.00	0.61	0.00	0.42	0.29
5.10	0.63	0.00	0.43	0.29
5.20	0.64	0.00	0.45	0.29



**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
5.30	0.66	0.00	0.46	0.30
5.40	0.67	0.00	0.48	0.30
5.50	0.69	0.00	0.49	0.30
5.60	0.70	0.00	0.50	0.30
5.70	0.72	0.00	0.52	0.31
5.80	0.73	0.00	0.53	0.31
5.90	0.75	0.00	0.55	0.31
6.00	0.76	0.00	0.56	0.31
6.10	0.78	0.00	0.58	0.32
6.20	0.80	0.00	0.59	0.33
6.30	0.81	0.00	0.61	0.33
6.40	0.83	0.00	0.63	0.34
6.50	0.85	0.00	0.64	0.35
6.60	0.87	0.00	0.66	0.36
6.70	0.88	0.00	0.68	0.37
6.80	0.90	0.00	0.70	0.38
6.90	0.92	0.00	0.72	0.39
7.00	0.94	0.00	0.73	0.39
7.10	0.96	0.00	0.75	0.40
7.20	0.98	0.00	0.77	0.41
7.30	1.00	0.00	0.79	0.42
7.40	1.02	0.00	0.81	0.43
7.50	1.05	0.00	0.84	0.44
7.60	1.07	0.00	0.86	0.45
7.70	1.09	0.00	0.88	0.46
7.80	1.11	0.00	0.90	0.47
7.90	1.14	0.00	0.92	0.47
8.00	1.16	0.00	0.95	0.48
8.10	1.18	0.00	0.97	0.49
8.20	1.21	0.00	0.99	0.50
8.30	1.23	0.00	1.02	0.51
8.40	1.26	0.00	1.04	0.52
8.50	1.28	0.00	1.07	0.53
8.60	1.31	0.00	1.09	0.53
8.70	1.34	0.00	1.12	0.54
8.80	1.36	0.00	1.15	0.55
8.90	1.39	0.00	1.17	0.56
9.00	1.42	0.00	1.20	0.57
9.10	1.45	0.00	1.23	0.58
9.20	1.48	0.00	1.26	0.61
9.30	1.51	0.00	1.29	0.64
9.40	1.54	0.00	1.32	0.67
9.50	1.58	0.00	1.36	0.70
9.60	1.61	0.00	1.39	0.73
9.70	1.65	0.00	1.43	0.76
9.80	1.69	0.00	1.47	0.79
9.90	1.73	0.00	1.51	0.82
10.00	1.77	0.00	1.55	0.85
10.10	1.82	0.00	1.59	0.88
10.20	1.86	0.00	1.64	0.91
10.30	1.91	0.00	1.68	0.94
10.40	1.95	0.00	1.73	0.97
10.50	2.00	0.00	1.78	1.00

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
10.60	2.06	0.00	1.83	1.05
10.70	2.12	0.00	1.89	1.14
10.80	2.18	0.00	1.95	1.25
10.90	2.25	0.00	2.02	1.36
11.00	2.32	0.00	2.10	1.47
11.10	2.41	0.00	2.18	1.60
11.20	2.50	0.00	2.27	1.77
11.30	2.60	0.00	2.37	1.96
11.40	2.71	0.00	2.48	2.15
11.50	2.83	0.00	2.60	2.35
11.60	3.00	0.00	2.76	2.71
11.70	3.17	0.00	2.93	3.26
11.80	3.40	0.00	3.17	3.87
11.90	3.72	0.02	3.49	5.15
12.00	4.28	0.08	4.05	7.73
12.10	5.22	0.25	4.98	12.81
12.20	5.54	0.32	5.30	<b>14.92</b>
12.30	5.77	0.38	5.54	9.32
12.40	5.94	0.43	5.71	5.92
12.50	6.11	0.48	5.87	4.33
12.60	6.23	0.51	5.99	3.55
12.70	6.34	0.55	6.10	2.89
12.80	6.44	0.58	6.20	2.55
12.90	6.53	0.61	6.29	2.31
13.00	6.62	0.64	6.38	2.10
13.10	6.69	0.66	6.45	1.90
13.20	6.76	0.68	6.52	1.72
13.30	6.82	0.71	6.59	1.58
13.40	6.88	0.73	6.64	1.46
13.50	6.94	0.75	6.70	1.35
13.60	6.99	0.76	6.75	1.23
13.70	7.03	0.78	6.79	1.13
13.80	7.08	0.80	6.84	1.08
13.90	7.12	0.81	6.89	1.05
14.00	7.17	0.83	6.93	1.01
14.10	7.21	0.84	6.97	0.98
14.20	7.25	0.86	7.01	0.95
14.30	7.29	0.87	7.05	0.92
14.40	7.33	0.89	7.09	0.89
14.50	7.36	0.90	7.12	0.85
14.60	7.40	0.92	7.16	0.82
14.70	7.43	0.93	7.19	0.79
14.80	7.46	0.94	7.22	0.76
14.90	7.49	0.95	7.25	0.73
15.00	7.52	0.96	7.28	0.69
15.10	7.55	0.97	7.31	0.66
15.20	7.58	0.98	7.34	0.64
15.30	7.60	1.00	7.36	0.62
15.40	7.63	1.01	7.39	0.61
15.50	7.66	1.02	7.42	0.60
15.60	7.68	1.03	7.44	0.59
15.70	7.71	1.04	7.47	0.59
15.80	7.73	1.05	7.49	0.58

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
15.90	7.76	1.06	7.52	0.57
16.00	7.78	1.07	7.54	0.56
16.10	7.80	1.08	7.56	0.55
16.20	7.83	1.09	7.59	0.54
16.30	7.85	1.09	7.61	0.53
16.40	7.87	1.10	7.63	0.52
16.50	7.89	1.11	7.65	0.51
16.60	7.92	1.12	7.68	0.50
16.70	7.94	1.13	7.70	0.50
16.80	7.96	1.14	7.72	0.49
16.90	7.98	1.15	7.74	0.48
17.00	8.00	1.16	7.76	0.47
17.10	8.02	1.16	7.78	0.46
17.20	8.04	1.17	7.80	0.45
17.30	8.06	1.18	7.82	0.44
17.40	8.07	1.19	7.83	0.43
17.50	8.09	1.20	7.85	0.42
17.60	8.11	1.20	7.87	0.41
17.70	8.13	1.21	7.89	0.40
17.80	8.14	1.22	7.90	0.40
17.90	8.16	1.23	7.92	0.39
18.00	8.18	1.23	7.94	0.38
18.10	8.19	1.24	7.95	0.37
18.20	8.21	1.25	7.97	0.36
18.30	8.22	1.25	7.98	0.36
18.40	8.24	1.26	8.00	0.36
18.50	8.25	1.27	8.01	0.35
18.60	8.27	1.27	8.03	0.35
18.70	8.28	1.28	8.04	0.35
18.80	8.30	1.28	8.06	0.35
18.90	8.31	1.29	8.07	0.34
19.00	8.33	1.30	8.09	0.34
19.10	8.34	1.30	8.10	0.34
19.20	8.36	1.31	8.12	0.34
19.30	8.37	1.32	8.13	0.34
19.40	8.39	1.32	8.15	0.33
19.50	8.40	1.33	8.16	0.33
19.60	8.42	1.34	8.18	0.33
19.70	8.43	1.34	8.19	0.33
19.80	8.44	1.35	8.20	0.32
19.90	8.46	1.35	8.22	0.32
20.00	8.47	1.36	8.23	0.32
20.10	8.48	1.37	8.24	0.32
20.20	8.50	1.37	8.26	0.31
20.30	8.51	1.38	8.27	0.31
20.40	8.53	1.38	8.28	0.31
20.50	8.54	1.39	8.30	0.31
20.60	8.55	1.40	8.31	0.31
20.70	8.56	1.40	8.32	0.30
20.80	8.58	1.41	8.34	0.30
20.90	8.59	1.41	8.35	0.30
21.00	8.60	1.42	8.36	0.30
21.10	8.62	1.43	8.38	0.29

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
21.20	8.63	1.43	8.39	0.29
21.30	8.64	1.44	8.40	0.29
21.40	8.65	1.44	8.41	0.29
21.50	8.67	1.45	8.43	0.29
21.60	8.68	1.45	8.44	0.28
21.70	8.69	1.46	8.45	0.28
21.80	8.70	1.46	8.46	0.28
21.90	8.71	1.47	8.47	0.28
22.00	8.73	1.48	8.49	0.27
22.10	8.74	1.48	8.50	0.27
22.20	8.75	1.49	8.51	0.27
22.30	8.76	1.49	8.52	0.27
22.40	8.77	1.50	8.53	0.26
22.50	8.78	1.50	8.54	0.26
22.60	8.79	1.51	8.55	0.26
22.70	8.81	1.51	8.56	0.26
22.80	8.82	1.52	8.58	0.26
22.90	8.83	1.52	8.59	0.25
23.00	8.84	1.53	8.60	0.25
23.10	8.85	1.53	8.61	0.25
23.20	8.86	1.54	8.62	0.25
23.30	8.87	1.54	8.63	0.24
23.40	8.88	1.55	8.64	0.24
23.50	8.89	1.55	8.65	0.24
23.60	8.90	1.56	8.66	0.24
23.70	8.91	1.56	8.67	0.24
23.80	8.92	1.57	8.68	0.23
23.90	8.93	1.57	8.69	0.23
24.00	<b>8.94</b>	<b>1.57</b>	<b>8.70</b>	0.23
24.10	8.94	1.57	8.70	0.17
24.20	8.94	1.57	8.70	0.05
24.30	8.94	1.57	8.70	0.01
24.40	8.94	1.57	8.70	0.00
24.50	8.94	1.57	8.70	0.00
24.60	8.94	1.57	8.70	0.00
24.70	8.94	1.57	8.70	0.00
24.80	8.94	1.57	8.70	0.00
24.90	8.94	1.57	8.70	0.00
25.00	8.94	1.57	8.70	0.00
25.10	8.94	1.57	8.70	0.00
25.20	8.94	1.57	8.70	0.00
25.30	8.94	1.57	8.70	0.00
25.40	8.94	1.57	8.70	0.00
25.50	8.94	1.57	8.70	0.00
25.60	8.94	1.57	8.70	0.00
25.70	8.94	1.57	8.70	0.00
25.80	8.94	1.57	8.70	0.00
25.90	8.94	1.57	8.70	0.00
26.00	8.94	1.57	8.70	0.00
26.10	8.94	1.57	8.70	0.00
26.20	8.94	1.57	8.70	0.00
26.30	8.94	1.57	8.70	0.00
26.40	8.94	1.57	8.70	0.00

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
26.50	8.94	1.57	8.70	0.00
26.60	8.94	1.57	8.70	0.00
26.70	8.94	1.57	8.70	0.00
26.80	8.94	1.57	8.70	0.00
26.90	8.94	1.57	8.70	0.00
27.00	8.94	1.57	8.70	0.00
27.10	8.94	1.57	8.70	0.00
27.20	8.94	1.57	8.70	0.00
27.30	8.94	1.57	8.70	0.00
27.40	8.94	1.57	8.70	0.00
27.50	8.94	1.57	8.70	0.00
27.60	8.94	1.57	8.70	0.00
27.70	8.94	1.57	8.70	0.00
27.80	8.94	1.57	8.70	0.00
27.90	8.94	1.57	8.70	0.00
28.00	8.94	1.57	8.70	0.00
28.10	8.94	1.57	8.70	0.00
28.20	8.94	1.57	8.70	0.00
28.30	8.94	1.57	8.70	0.00
28.40	8.94	1.57	8.70	0.00
28.50	8.94	1.57	8.70	0.00
28.60	8.94	1.57	8.70	0.00
28.70	8.94	1.57	8.70	0.00
28.80	8.94	1.57	8.70	0.00
28.90	8.94	1.57	8.70	0.00
29.00	8.94	1.57	8.70	0.00
29.10	8.94	1.57	8.70	0.00
29.20	8.94	1.57	8.70	0.00
29.30	8.94	1.57	8.70	0.00
29.40	8.94	1.57	8.70	0.00
29.50	8.94	1.57	8.70	0.00
29.60	8.94	1.57	8.70	0.00
29.70	8.94	1.57	8.70	0.00
29.80	8.94	1.57	8.70	0.00
29.90	8.94	1.57	8.70	0.00
30.00	8.94	1.57	8.70	0.00
30.10	8.94	1.57	8.70	0.00
30.20	8.94	1.57	8.70	0.00
30.30	8.94	1.57	8.70	0.00
30.40	8.94	1.57	8.70	0.00
30.50	8.94	1.57	8.70	0.00
30.60	8.94	1.57	8.70	0.00
30.70	8.94	1.57	8.70	0.00
30.80	8.94	1.57	8.70	0.00
30.90	8.94	1.57	8.70	0.00
31.00	8.94	1.57	8.70	0.00
31.10	8.94	1.57	8.70	0.00
31.20	8.94	1.57	8.70	0.00
31.30	8.94	1.57	8.70	0.00
31.40	8.94	1.57	8.70	0.00
31.50	8.94	1.57	8.70	0.00
31.60	8.94	1.57	8.70	0.00
31.70	8.94	1.57	8.70	0.00

**Hydrograph for Subcatchment P-1: Prop. Area to Point 1 (continued)**

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
31.80	8.94	1.57	8.70	0.00
31.90	8.94	1.57	8.70	0.00
32.00	8.94	1.57	8.70	0.00
32.10	8.94	1.57	8.70	0.00
32.20	8.94	1.57	8.70	0.00
32.30	8.94	1.57	8.70	0.00
32.40	8.94	1.57	8.70	0.00
32.50	8.94	1.57	8.70	0.00
32.60	8.94	1.57	8.70	0.00
32.70	8.94	1.57	8.70	0.00
32.80	8.94	1.57	8.70	0.00
32.90	8.94	1.57	8.70	0.00
33.00	8.94	1.57	8.70	0.00
33.10	8.94	1.57	8.70	0.00
33.20	8.94	1.57	8.70	0.00
33.30	8.94	1.57	8.70	0.00
33.40	8.94	1.57	8.70	0.00
33.50	8.94	1.57	8.70	0.00
33.60	8.94	1.57	8.70	0.00
33.70	8.94	1.57	8.70	0.00
33.80	8.94	1.57	8.70	0.00
33.90	8.94	1.57	8.70	0.00
34.00	8.94	1.57	8.70	0.00
34.10	8.94	1.57	8.70	0.00
34.20	8.94	1.57	8.70	0.00
34.30	8.94	1.57	8.70	0.00
34.40	8.94	1.57	8.70	0.00
34.50	8.94	1.57	8.70	0.00
34.60	8.94	1.57	8.70	0.00
34.70	8.94	1.57	8.70	0.00
34.80	8.94	1.57	8.70	0.00
34.90	8.94	1.57	8.70	0.00
35.00	8.94	1.57	8.70	0.00
35.10	8.94	1.57	8.70	0.00
35.20	8.94	1.57	8.70	0.00
35.30	8.94	1.57	8.70	0.00
35.40	8.94	1.57	8.70	0.00
35.50	8.94	1.57	8.70	0.00
35.60	8.94	1.57	8.70	0.00
35.70	8.94	1.57	8.70	0.00
35.80	8.94	1.57	8.70	0.00
35.90	8.94	1.57	8.70	0.00
36.00	8.94	1.57	8.70	0.00

**APPENDIX D**

---

**DRAINAGE AREA MAPS**







