

HYDROLOGY REPORT

PREPARED FOR



Preliminary and Final Major Site Plan Application for 111 Ideation Way Parking Lot Nutley, NJ

LOCATED AT

**Existing Block 300 – Lot 1 and 1.05
Proposed Lot 1.05A
Township of Nutley**

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1.0 Introduction

This hydrology report was prepared for the proposed parking lot improvements for 111 Ideation Way, previously known as Building 102 of ON3 Development Campus, located within the Township of Nutley, New Jersey. The project parcel is identified as existing Block 300 – Lot 1 and Lot 1.05 on the Tax Map of the Township of Nutley. The majority of the proposed development is within Block 300 – Lot 1.05, which has an area of 4.09 acres and is bound by the Nutley-Clifton border to the north, the existing residential development to the east and south, and Ideation Way to the west.

The proposed site improvements consist of the milling and demolition of the existing paved driveway and parking area to the East of the building. There is proposed construction of a new paved parking lot on the East of the building, additional parallel parking along the driveway, rear back-in parking along Ideation Way in place of parallel parking, adding gates to control access to the site, and associated landscaping and storm drainage system improvements to be installed as part of the overall development of ON3 Campus.

The property is located in Zone X as shown on the FEMA Flood Insurance Rate Map (FIRM) for Essex County, NJ, Map No. 34013CD108F, Panel 108 of 200 and Map No. 34013CO109F, Panel 109 of 200, effective date June 4, 2007. The FEMA FIRM can be found in Appendix 1 of this report. There are no known wetlands within the limit of disturbance of this project.

The purpose of this report is to demonstrate the hydrologic impact by compare existing conditions with proposed conditions. In order to determine the overall impact to the discharge point before exiting the ON3 Campus and downstream developments, a hydrologic analysis has been performed to include the proposed improvements at 111 Ideation Way, and recently constructed Roadways, parking areas of Hackensack University Medical Center (HUMC), and parking garage of Seton Hall-Hackensack Meridian School of Medicine (SOM), which is currently under construction.

The site hydrology has been designed to the respective Township of Nutley stormwater management requirements.

The following items shall be addressed within the report:

- Narrative of existing and proposed site conditions with calculations to substantiate derived runoff coefficients.
 - Narrative on practicing Nonstructural Stormwater Management Strategies to achieve Low Impact Development.
 - Narrative and calculations of Water Quantity Control, Water Quality Control and Groundwater Recharge Requirements.
 - Commentary on the proposed storm drainage system for the project areas.
-

2.0 Stormwater Management

2.1 Existing Conditions

Under existing conditions, the site is fully developed with a vast majority being impervious coverage, such as roofed structures and paved areas. The overall hydrologic study area totals 32.73 acres. The general topography slopes southward from the northeast portion of project site to the southwest portion of project site. The majority of the site runoff sheet flows across the pavements into the existing storm drainage network and channels through an existing Nutley drainage system along Kingsland Street.

The Natural Resource Conservation Service (NRCS) Soil Survey of the site indicates that the majority of soils found on the project site are classified as Boonton (BooC) and Urban land (URBOOB & USBOOB). For the purpose for the hydrology analysis, the hydrologic soil group will be identified as soil group “D”, due to the minimal areas within soil group “C” within the proposed development. The soil survey can be found in Appendix 1 of this report.

As indicated in the previously approved roadway improvement project, the demolition work of the ON3 Campus has been ongoing for years under a separate permit. It was mutually agreed upon by municipality staffs and design engineers that an aerial image of the ON3 Campus from year 2012 displays the most logical representation of the lot coverage as existing conditions to be utilized for hydrologic analysis.

For this application, Drainage Area E1 is analyzed for hydrologic comparison, as the runoff within Drainage Area E1 generally travel across the pavement and is collected by the existing storm inlet structure throughout the site. The runoff ultimately exiting ON3 Campus through a 30-inch diameter drainage system and release into St. Pauls Brook off-site.

The breakdown of the lot coverage under the existing condition is summarized in the Table 1 below:

Table 1 Lot Coverage under Existing Conditions

Area Coverage	Roof Area	Paved Area	Gravel Area	Grass Area	Grass Area	Wood Area	Wood Area	Total
HSG	D	D	D	C	D	C	D	
Area (ac)	6.79	15.12	1.65	0.65	6.63	0.80	1.09	32.73

The runoff path and lot coverage breakdown have been identified on the attached Existing Drainage Area Map (EDA) in Appendix 4.

2.2 Proposed Conditions

The proposed development includes the new paved parking lot on the East of the 111 Ideation Way (previously known as Building 102 of the ON3 campus), additional parallel parking along the driveway, rear back-in parking along Ideation Way in place of parallel parking, adding gates to control access to the site, and associated landscaping and storm drainage system improvements. As the site is currently fully developed, removing and milling of the existing paved driveway and parking area to the East of the building and minor re-grading of the site will be required.

Under proposed conditions, the parking lots within the project site will sheet flow across the pavement toward the existing and proposed storm inlet structures within these proposed parking areas to the North and East of 111 Ideation and separately into the storm drainage systems along Ideation Way from HUMC Improvements and existing ON3 Campus drainage system. Both systems ultimately merged into the same drainage system at Metro Boulevard and exiting ON3 Campus through a 30-inch diameter pipe (study point).

The area to the south of 111 Ideation Way, including the existing loading dock, will remain generally unchanged from the existing conditions. The breakdown of the lot coverage under the existing condition is summarized in the Table 2 below:

Table 2 Lot Coverage under Proposed Conditions

Area Coverage	Roof Area	Paved Area	Gravel Area	Grass Area	Grass Area	Wood Area	Wood Area	Total
HSG	D	D	D	C	D	C	D	
Area (ac)	8.63	11.91	0	1.40	10.39	0	0.49	32.82

The lot coverage breakdown has been identified on the attached Proposed Drainage Area Map (PDA) in Appendix 4. As shown from the Table 2 above, although the overall drainage area is increased by 0.09 acres, the impervious area is reduced by 1.37 acres. There are no additional roofed areas proposed as part of this development.

This report will demonstrate that the anticipated runoff resulting from the proposed improvements will be managed to meet or exceed the required stormwater regulations set forward by the respective municipality and county, as well as state review agencies.

3.0 Stormwater Management Compliance

The following design criteria was referenced in order to determine the appropriate hydrology design for the project:

- Township on Nutley Code, Chapter 622: Stormwater Control
- New Jersey Administrative Code, Chapter 7:8 Stormwater Management
- New Jersey Stormwater Best Management Practices (BMP) Manual

The primary design guidelines utilized are found in the New Jersey Best Management Practices (BMP) Manual. As previously described, the proposed improvements of this project include the removal and milling of a portion of the existing driveway and parking area, construction of new pavement parking areas and associated site improvements, such as landscaping and a proposed drainage system. The following stormwater sizing criteria has been analyzed and calculations have been provided in this report to demonstrate that the on-site redevelopment is in compliance with the requirements:

- Water Quantity Requirement: Hydrograph comparison between the existing and proposed conditions
- Water Quality Requirement: 80% Total Suspended Solid Removal rate for the additional paved areas, if an additional one-quarter acre of impervious surface is being proposed under the proposed conditions.
- Groundwater Recharge Requirement: Exemption due to highly polluted area and located within the “urban redevelopment area”
- Erosion Control Requirement
- Stormwater Conveyance Piping System
- Nonstructural Stormwater Management Strategies

Methods Used

The USDA Natural Resources Conservation Service (NRCS) Technical Release No. 20 (TR-20), was selected to calculate the existing and proposed condition peak flows. The SCS Unit Hydrograph was selected to model the storm events. The Rational Method was used to size the stormwater conveyance pipes. The hydrology routing analysis will utilize HydroCAD by HydroCad Software Solutions LLC. The rainfall data for the TR-55 calculations was obtained from the National Oceanic and Atmospheric Administration (NOAA), which can be found in Appendix 1.

Water Quantity Requirement

In order to control stormwater runoff quantity impacts, this report will demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, the proposed runoff hydrographs for the 2, 10 and 100-year storm events do not exceed, at any point in time, the existing runoff hydrographs for the same storm events.

As previously mentioned, the analysis has included the proposed improvements for 111 Ideation Way parking lot, as well as the recently built roadways and ongoing parking garage construction. For comparison purposes, the study point for the drainage area is the same on both existing and proposed development condition scenarios.

Based on the routing analysis, the peak runoff rates for each design storm event under the existing and proposed conditions are listed in the table below:

Table 3 Runoff Peak Rate & Volume Comparison between Existing and Proposed Conditions

	Design Storm Event		
	2-year	10-year	100-year
Drainage Area Identification	Rate / Volume	Rate / Volume	Rate / Volume
E1	71.51 cfs / 6.758 acre-feet	115.86 cfs / 11.048 acre-feet	203.50 cfs / 19.656 acre-feet
P1	68.85 cfs / 6.484 acre-feet	113.24 cfs / 10.727 acre-feet	201.39 cfs / 19.299 acre-feet

As indicated in the table above, reduction in both peak runoff rate and volume are found under the proposed conditions in each storm event compared to the corresponding values under the existing conditions. The hydrograph comparison between the existing and proposed conditions also show that there is no increase in runoff rate nor runoff volume at any time during the design storm events. Therefore, the requirements for stormwater quantity control are met without additional stormwater quantity control measures.

The detailed routing analysis and hydrographs comparison are included in Appendix 2 of this report.

Water Quality Requirement

Stormwater management measures would be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm by 50% of the anticipated load applied to the existing impervious areas and by 80% of the anticipated load applied to the increase in impervious areas without any stormwater management measures, expressed as an annual average, if the impervious area under the proposed condition is at least a quarter acre greater than the impervious area under the existing conditions. Based on the lot coverage breakdown from Table 1 and Table 2, there will be a net decrease of 1.37 acres in impervious coverage under the proposed conditions from the existing conditions. Furthermore, 2.72 acres of impervious coverage under the proposed conditions are being converted from paved areas to roof areas to further reduce the resource of paved polluted areas. Therefore, the requirement of stormwater quality control is met without the addition of stormwater quality control measures.

Groundwater Recharge Requirement

A “major development” project, which is one that disturbs at least 1 acre of land or creates at least 0.25 acres of new or additional impervious surface, must include nonstructural and/or structural stormwater management measures that prevent the loss of groundwater recharge at the project. However, the groundwater recharge requirement does not apply to projects within the “urban redevelopment area,” or to projects subject to the following:

1. Stormwater from areas of high pollutant loading.
2. Industrial Stormwater exposed to “source material.”

According to the New Jersey State Plan Policy Map, the project site is within the limit of Metropolitan Planning Area (urban redevelopment area). Furthermore, the project site is also within the area that historically experienced high pollutant loading. Pursuant to our discussion with the municipal staffs, this project site is exempt from the groundwater recharge requirements.

Erosion Control Requirement

Approximately 1.74 acres of land will be disturbed by the construction activities for the 111 Ideation Way Parking Lot development. Multiple Soil Erosion and Sediment Control (SESC) measures are proposed within the limit of disturbance.

The following list describes the proposed SESC measures during and/or after construction:

1. Stabilized Construction Access
2. Sediment Barrier (silt fence)
3. Storm Sewer Inlet Protection
4. Dewatering (as needed)
5. Dust Control
6. Temporary Vegetation Cover for Soil Stabilization
7. Permanent Vegetation Cover for Soil Stabilization

Reference the Soil Erosion and Sediment Control Plan for details and operation specifications (Sheet 5.0 thru 5.2)

Storm Conveyance Piping System

The proposed stormwater conveyance system includes catch basins, and high-density polyethylene piping between storm structures. The tributary area for each catch basin is shown on the “Proposed Subdrainage Area Map” in Appendix 4. The proposed storm conveyance piping system is designed to convey the storm runoff from a 25-year storm event. The proposed storm conveyance piping system ultimately ties into the drainage system within Ideation Way. The downstream pipe section was also analyzed and included the other contributory flows upstream of the point of connection from the proposed development to ensure adequate pipe capacity to convey the additional flow from this proposed project. The details of the analyzed results can be found in Appendix 3.

Nonstructural Stormwater Management Strategies

It is recommended that the nonstructural stormwater management strategies are to be incorporated into the design to meet the stormwater management requirements, to the maximum extent practicable. Since this is a redevelopment project, the applicable nonstructural stormwater management strategies are limited. The following bullet points identify the key factors and our best effort to incorporate the nonstructural stormwater management strategies into the design and the explanation if it cannot be achieved:

1. *Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.*

The project site is mostly covered with impervious surfaces within the proposed work limit. In order to ensure no additional erosion occurs during the construction, soil erosion and sediment control (SESC) measures will be incorporated and ensure that no construction vehicle and/or equipment encroaches into areas beyond the limit of work.

2. *Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.*

The proposed improvements include curb islands throughout the project site limit and a series of catch basins to break up the flow of the runoff over the impervious surfaces to the maximum extent.

3. *Maximize the protection of natural drainage features and vegetation.*

SESC measures are to be installed during the construction to provide protection to the existing vegetation to the maximum extent possible. However, since the project site is covered with mostly impervious surfaces, the resulting impact will be limited.

4. *Minimize the decrease in the “time of concentration” from pre-construction to post-construction.*

The proposed improvements will utilize the proposed drainage system to convey and discharge the storm runoff from the project site. By proper grading to reduce the surface slope, it is our intention not to shorten the time of concentration from pre-construction to post-construction to a reasonable extent.

5. *Minimize land disturbance including cleaning and grading.*

The proposed work will only disturb areas that are designed for improvements. Construction fencing and SESC measures will be installed to ensure that no disturbance occurs beyond the limit of work.

6. *Minimize soil compaction.*

The proposed development will utilize the recommendations made by a geotechnical expert on pavement preparation to ensure the proper pavement design for the project. All landscaped areas shall be prepared with light duty machinery to minimize soil compaction.

7. *Provide low maintenance landscaping that encourages retention, planting of native vegetation, and minimize the use of lawns, fertilizers and pesticides.*

Due to the nature of previously developed site, the majority of vegetated areas within the work limit is covered with maintained lawn areas. The proposed improvement will utilize the permanent seeding specifications and the use of fertilizers and pesticides prepared by the local County Soil Conservation District to finalize and maintain the pervious areas within the work limit.

8. *Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas.*

Due to the nature of previously developed site, the opportunity of providing an open-channel conveyance system is not feasible. The proposed improvements will utilize the existing and proposed storm piping network to convey the storm runoff.

9. *Provide preventative source controls.*

The site will also adopt regular site maintenance consisting of street sweeping and trash collection. The use of fertilizer will be based on the recommendations made by the local County Soil Conservation Districts.

4.0 Summary

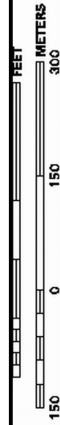
The proposed improvement has been designed with provisions for safe and efficient control of stormwater runoff in a manner that will not adversely impact the existing drainage patterns of adjacent parcels. This drainage report has been prepared in general accordance with the current requirements of the applicable stormwater jurisdictions and approving agencies. In addition, storm events, frequencies, runoff calculations, discharge criteria, pipe hydraulics, evaluation methods (including computer software applications), etc., have been based on the guidelines and requirements of the permitting entities and also reflect the application of generally accepted standards of engineering practices.

APPENDIX 1

SUPPORTING DOCUMENTATION

- FEMA FLOOD INSURANCE RATE MAP
 - SOIL SURVEY BY USDA NRCS
- RAINFALL PRECIPITATION FREQUENCY
- DRAINAGE AREA LOT COVERAGE BREAKDOWN

map revision history prior to countywide mapping, referable located in the Flood Insurance Study report for this jurisdiction if flood insurance is available in this community, contact the National Flood Insurance Program at (800) 638-6620.



PANEL 0109F

FIRM
FLOOD INSURANCE RATE MAP
ESSEX COUNTY,
NEW JERSEY
(ALL JURISDICTIONS)

PANEL 109 OF 200

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY:

JANUARY, 2007

NOTES, TOWNSHIP OF

0109

F

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



MAP NUMBER
34013C0109F

EFFECTIVE DATE:
JUNE 4, 2007

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov.





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 Essex County, New Jersey, and Passaic County, New Jersey

ON3 - Parking Lot Design



February 1, 2018

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).

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.

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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



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 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: Essex County, New Jersey
Survey Area Data: Version 13, Oct 6, 2017

Soil Survey Area: Passaic County, New Jersey
Survey Area Data: Version 12, Oct 6, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

MAP LEGEND

MAP INFORMATION

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

Date(s) aerial images were photographed: Aug 25, 2014—Sep 27, 2014

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BooC	Boonton silt loam, red sandstone lowland, 8 to 15 percent slopes	1.8	7.6%
URBOOB	Urban land, Boonton substratum, 0 to 8 percent slopes, red sandstone lowland	8.8	37.3%
USBOOB	Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 0 to 8 percent slopes	6.5	27.7%
USBOOC	Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 8 to 15 percent slopes	2.6	11.1%
Subtotals for Soil Survey Area		19.7	83.6%
Totals for Area of Interest		23.5	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
USBOOB	Urban land-Boonton complex, red sandstone lowland, 0 to 8 percent slopes	2.3	9.6%
USBOOC	Urban land-Boonton complex, red sandstone lowland, 8 to 15 percent slopes	1.6	6.7%
Subtotals for Soil Survey Area		3.8	16.4%
Totals for Area of Interest		23.5	100.0%

Map Unit Descriptions

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.

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.

Custom Soil Resource Report

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.

Essex County, New Jersey

BooC—Boonton silt loam, red sandstone lowland, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: qxj5

Mean annual precipitation: 30 to 64 inches

Mean annual air temperature: 46 to 79 degrees F

Frost-free period: 131 to 178 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Boonton, red sandstone lowland, and similar soils: 95 percent

Minor components: 5 percent

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

Description of Boonton, Red Sandstone Lowland

Setting

Landform: Ground moraines

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Coarse-loamy till derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 3 inches: silt loam

BE - 3 to 10 inches: loam

Bw - 10 to 27 inches: gravelly loam

Bx1 - 27 to 40 inches: gravelly fine sandy loam

Bx2 - 40 to 67 inches: gravelly fine sandy loam

BCx - 67 to 83 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 36 inches to fragipan

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Boonton moderately well drained, red sandstone lowland

Percent of map unit: 5 percent

Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountain flank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

URBOOB—Urban land, Boonton substratum, 0 to 8 percent slopes, red sandstone lowland

Map Unit Setting

National map unit symbol: w9d3
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, boonton red sandstone lowland substratum: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Urban Land, Boonton Red Sandstone Lowland Substratum

Setting

Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountain flank
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Typical profile

H1 - 0 to 12 inches: material
H2 - 12 to 67 inches: gravelly loam
2CB - 67 to 83 inches: gravelly sandy loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Boonton, red sandstone lowland

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Udorthents, boonton red sandstone lowland substratum

Percent of map unit: 5 percent

Landform: Ground moraines

Landform position (three-dimensional): Lower third of mountain flank

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

USBOOB—Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: w9c3

Mean annual precipitation: 30 to 64 inches

Mean annual air temperature: 46 to 79 degrees F

Frost-free period: 131 to 178 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land, boonton red sandstone lowland substratum: 60 percent

Boonton, red sandstone lowland, and similar soils: 30 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the map unit.

Description of Urban Land, Boonton Red Sandstone Lowland Substratum

Setting

Landform: Ground moraines

Landform position (three-dimensional): Lower third of mountain flank

Down-slope shape: Linear

Across-slope shape: Linear

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

Typical profile

H1 - 0 to 12 inches: material

H2 - 12 to 67 inches: gravelly loam

2CB - 67 to 83 inches: gravelly sandy loam

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Description of Boonton, Red Sandstone Lowland

Setting

Landform: Ground moraines

Down-slope shape: Convex

Across-slope shape: Linear

Custom Soil Resource Report

Parent material: Coarse-loamy till derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: silt loam
BE - 3 to 10 inches: loam
Bw - 10 to 27 inches: gravelly loam
Bx1 - 27 to 40 inches: gravelly fine sandy loam
Bx2 - 40 to 67 inches: gravelly fine sandy loam
BCx - 67 to 83 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Udorthents, boonton red sandstone lowland substratum

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

USBOOC—Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: w9c4
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, boonton red sandstone lowland substratum: 60 percent

Boonton, red sandstone lowland, and similar soils: 30 percent

Minor components: 10 percent

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

Description of Urban Land, Boonton Red Sandstone Lowland Substratum

Setting

Landform: Ground moraines

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Linear

Across-slope shape: Linear

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

Typical profile

H1 - 0 to 12 inches: material

H2 - 12 to 67 inches: gravelly loam

2CB - 67 to 83 inches: gravelly sandy loam

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Description of Boonton, Red Sandstone Lowland

Setting

Landform: Ground moraines

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy till derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 3 inches: silt loam

BE - 3 to 10 inches: loam

Bw - 10 to 27 inches: gravelly loam

Bx1 - 27 to 40 inches: gravelly fine sandy loam

Bx2 - 40 to 67 inches: gravelly fine sandy loam

BCx - 67 to 83 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 36 inches to fragipan

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Custom Soil Resource Report

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Udorthents, boonton red sandstone lowland substratum

Percent of map unit: 10 percent

Landform: Ground moraines

Landform position (three-dimensional): Lower third of mountain flank

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Passaic County, New Jersey

USBOOB—Urban land-Boonton complex, red sandstone lowland, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1krjx

Mean annual precipitation: 30 to 64 inches

Mean annual air temperature: 46 to 79 degrees F

Frost-free period: 131 to 178 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land, boonton red sandstone lowland substratum: 60 percent

Boonton, red sandstone lowland, and similar soils: 30 percent

Minor components: 10 percent

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

Description of Urban Land, Boonton Red Sandstone Lowland Substratum

Setting

Landform: Ground moraines

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Linear

Across-slope shape: Linear

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

Typical profile

H1 - 0 to 12 inches: material

H2 - 12 to 67 inches: gravelly loam

2CB - 67 to 83 inches: gravelly sandy loam

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Description of Boonton, Red Sandstone Lowland

Setting

Landform: Ground moraines

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy till derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 3 inches: silt loam

BE - 3 to 10 inches: loam

Bw - 10 to 27 inches: gravelly loam

Bx1 - 27 to 40 inches: gravelly fine sandy loam

Bx2 - 40 to 67 inches: gravelly fine sandy loam

BCx - 67 to 83 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Udorthents, boonton red sandstone lowland substratum

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

USBOOC—Urban land-Boonton complex, red sandstone lowland, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1krjy
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, boonton red sandstone lowland substratum: 60 percent
Boonton, red sandstone lowland, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Boonton Red Sandstone Lowland Substratum

Setting

Landform: Ground moraines

Custom Soil Resource Report

Landform position (three-dimensional): Lower third of mountain flank

Down-slope shape: Linear

Across-slope shape: Linear

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

Typical profile

H1 - 0 to 12 inches: material

H2 - 12 to 67 inches: gravelly loam

2CB - 67 to 83 inches: gravelly sandy loam

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Description of Boonton, Red Sandstone Lowland

Setting

Landform: Ground moraines

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Coarse-loamy till derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 3 inches: silt loam

BE - 3 to 10 inches: loam

Bw - 10 to 27 inches: gravelly loam

Bx1 - 27 to 40 inches: gravelly fine sandy loam

Bx2 - 40 to 67 inches: gravelly fine sandy loam

BCx - 67 to 83 inches: gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 36 inches to fragipan

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Udorthents, boonton red sandstone lowland substratum

Percent of map unit: 10 percent

Landform: Ground moraines

Landform position (three-dimensional): Lower third of mountain flank

Down-slope shape: Convex

Custom Soil Resource Report

Across-slope shape: Linear
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Depth to Any Soil Restrictive Layer

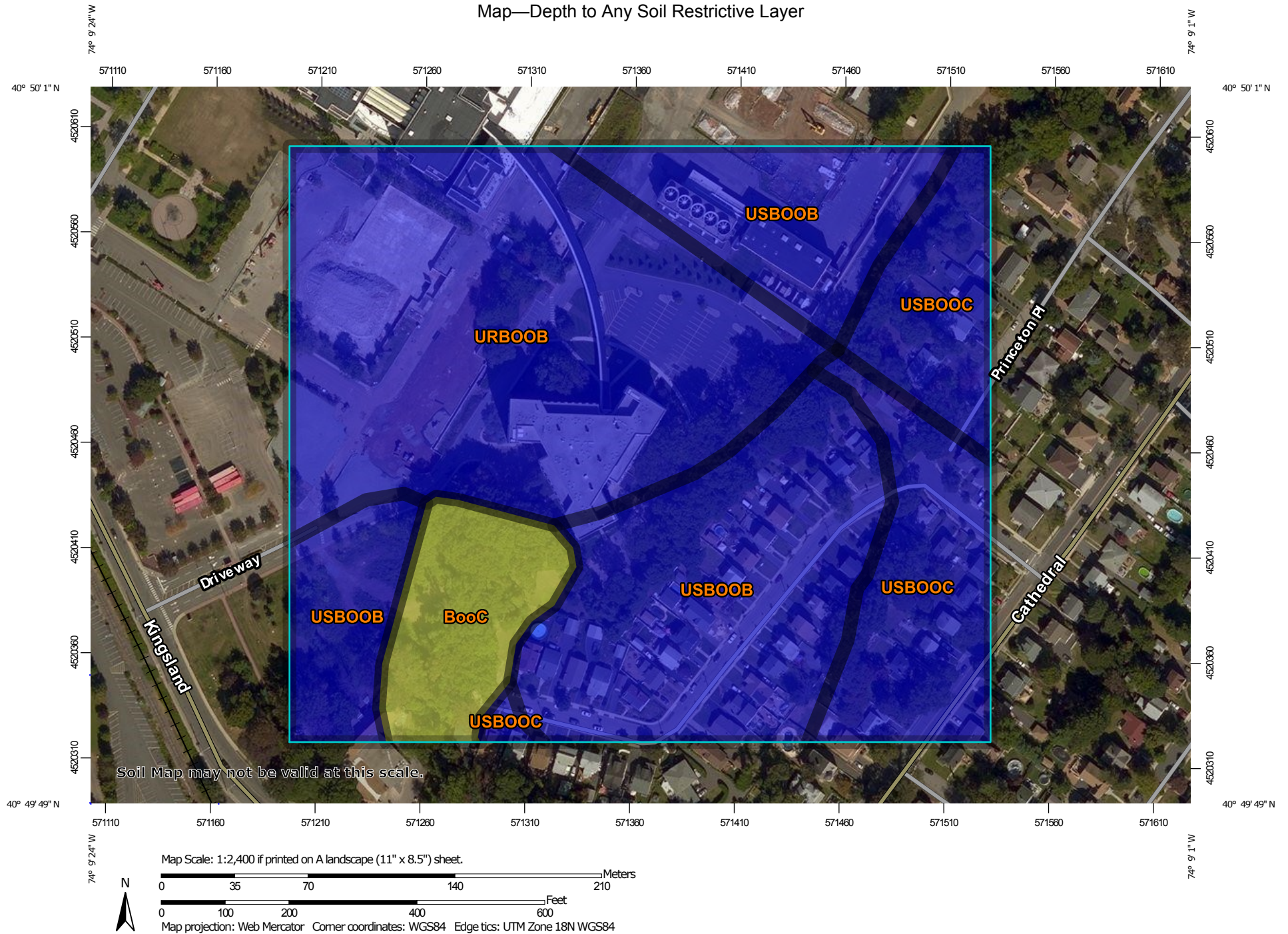
A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

This theme presents the depth to any type of restrictive layer that is described for each map unit. If more than one type of restrictive layer is described for an individual soil type, the depth to the shallowest one is presented. If no restrictive layer is described in a map unit, it is represented by the "> 200" depth class.

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

Custom Soil Resource Report

Map—Depth to Any Soil Restrictive Layer



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

 Not rated or not available

Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 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: Essex County, New Jersey
Survey Area Data: Version 13, Oct 6, 2017

Soil Survey Area: Passaic County, New Jersey
Survey Area Data: Version 12, Oct 6, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

MAP LEGEND

MAP INFORMATION

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

Date(s) aerial images were photographed: Aug 25, 2014—Sep 27, 2014

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.

Table—Depth to Any Soil Restrictive Layer

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
BooC	Boonton silt loam, red sandstone lowland, 8 to 15 percent slopes	69	1.8	7.6%
URBOOB	Urban land, Boonton substratum, 0 to 8 percent slopes, red sandstone lowland	>200	8.8	37.3%
USBOOB	Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 0 to 8 percent slopes	>200	6.5	27.7%
USBOOC	Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 8 to 15 percent slopes	>200	2.6	11.1%
Subtotals for Soil Survey Area			19.7	83.6%
Totals for Area of Interest			23.5	100.0%

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
USBOOB	Urban land-Boonton complex, red sandstone lowland, 0 to 8 percent slopes	>200	2.3	9.6%
USBOOC	Urban land-Boonton complex, red sandstone lowland, 8 to 15 percent slopes	>200	1.6	6.7%
Subtotals for Soil Survey Area			3.8	16.4%
Totals for Area of Interest			23.5	100.0%

Rating Options—Depth to Any Soil Restrictive Layer*Units of Measure:* centimeters*Aggregation Method:* Dominant Component*Component Percent Cutoff:* None Specified*Tie-break Rule:* Lower*Interpret Nulls as Zero:* No

Hydrologic Soil Group

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

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

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

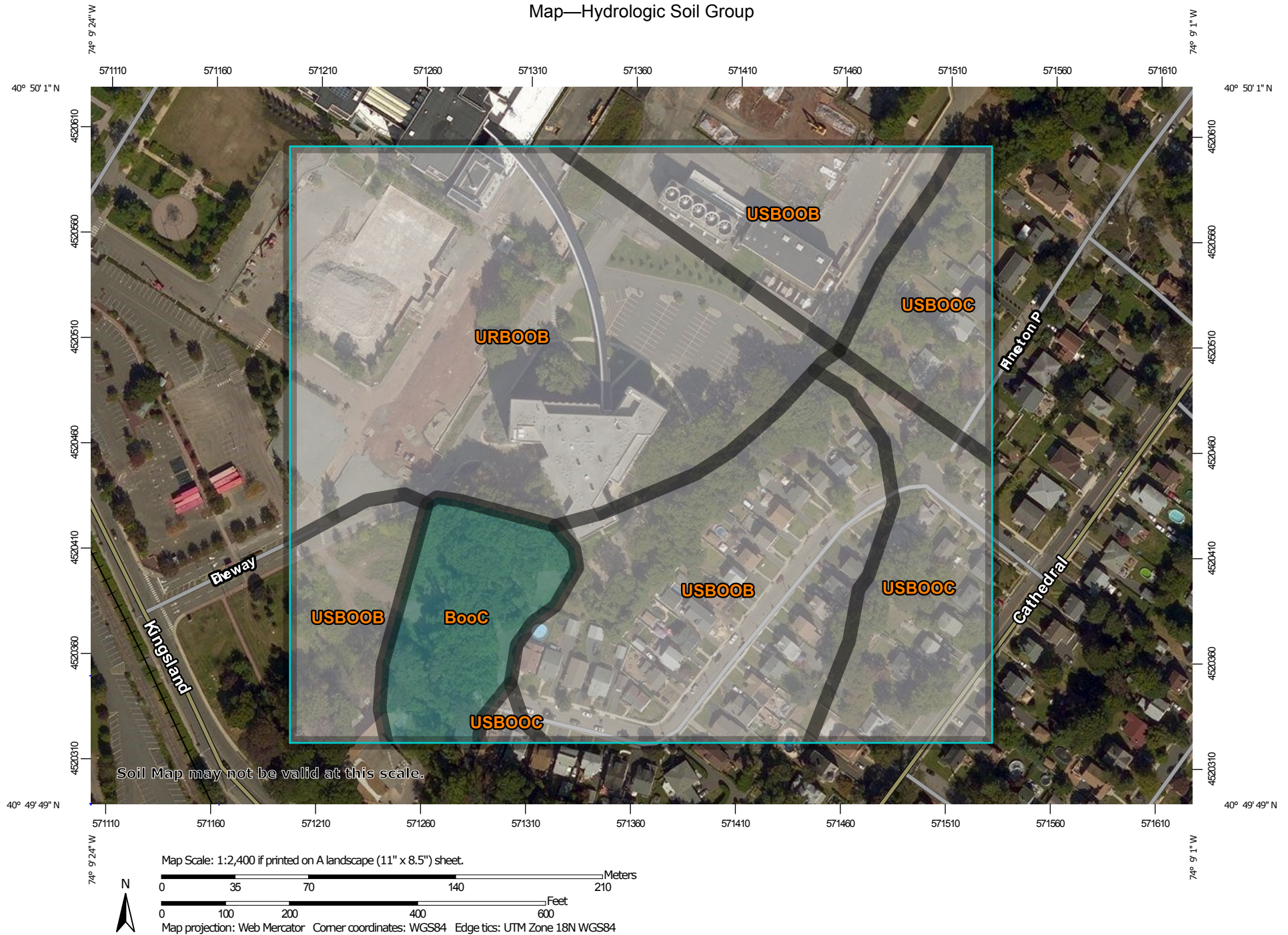
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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

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

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

Custom Soil Resource Report Map—Hydrologic Soil Group



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 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: Essex County, New Jersey
 Survey Area Data: Version 13, Oct 6, 2017

Soil Survey Area: Passaic County, New Jersey
 Survey Area Data: Version 12, Oct 6, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

MAP LEGEND

MAP INFORMATION

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

Date(s) aerial images were photographed: Aug 25, 2014—Sep 27, 2014

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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BooC	Boonton silt loam, red sandstone lowland, 8 to 15 percent slopes	C	1.8	7.6%
URBOOB	Urban land, Boonton substratum, 0 to 8 percent slopes, red sandstone lowland		8.8	37.3%
USBOOB	Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 0 to 8 percent slopes		6.5	27.7%
USBOOC	Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 8 to 15 percent slopes		2.6	11.1%
Subtotals for Soil Survey Area			19.7	83.6%
Totals for Area of Interest			23.5	100.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
USBOOB	Urban land-Boonton complex, red sandstone lowland, 0 to 8 percent slopes		2.3	9.6%
USBOOC	Urban land-Boonton complex, red sandstone lowland, 8 to 15 percent slopes		1.6	6.7%
Subtotals for Soil Survey Area			3.8	16.4%
Totals for Area of Interest			23.5	100.0%

Rating Options—Hydrologic Soil Group*Aggregation Method:* Dominant Condition*Component Percent Cutoff:* None Specified*Tie-break Rule:* Higher**Water Features**

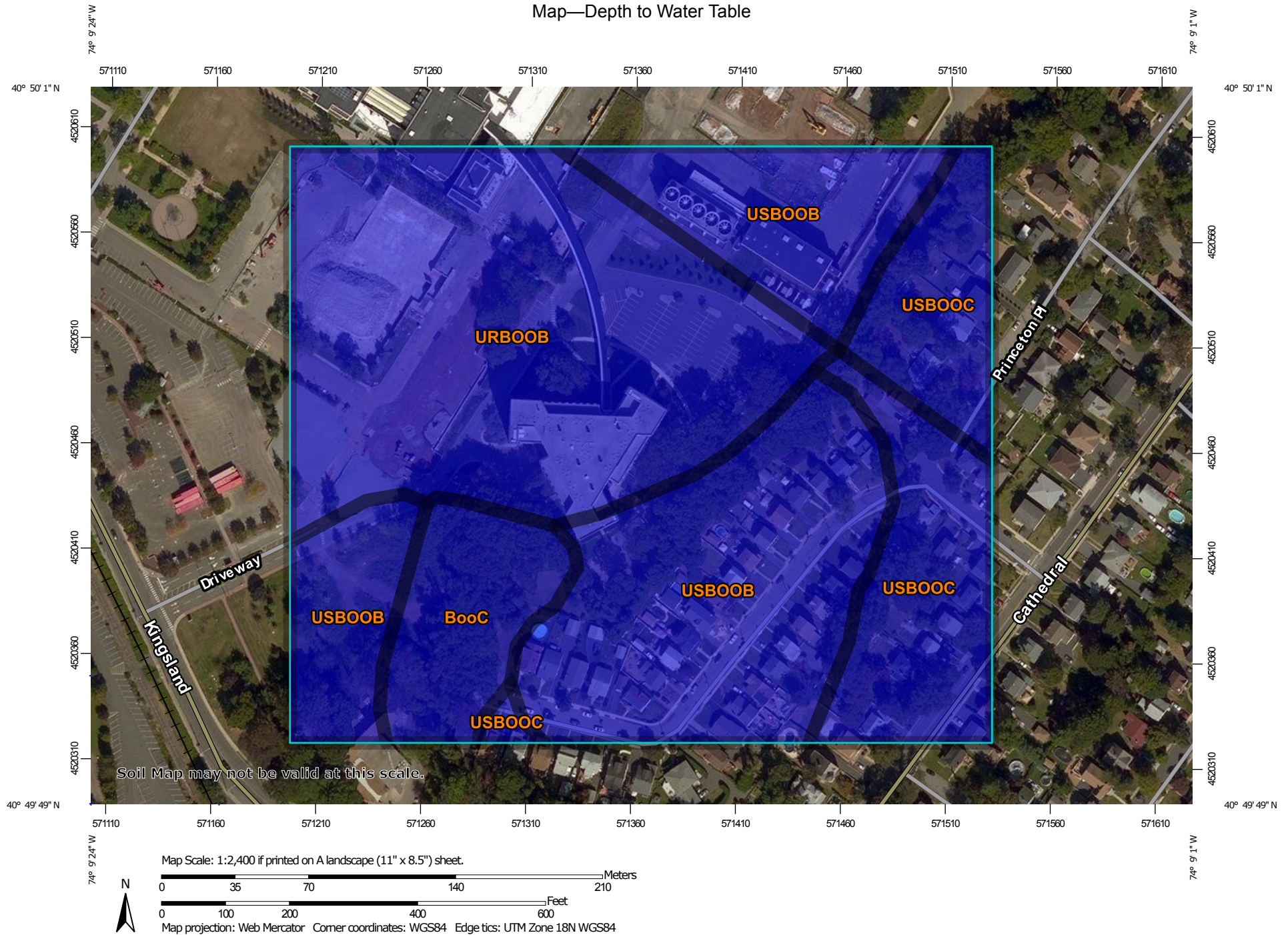
Water Features include ponding frequency, flooding frequency, and depth to water table.

Depth to Water Table

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

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

Custom Soil Resource Report
Map—Depth to Water Table



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 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: Essex County, New Jersey
 Survey Area Data: Version 13, Oct 6, 2017

Soil Survey Area: Passaic County, New Jersey
 Survey Area Data: Version 12, Oct 6, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

MAP LEGEND

MAP INFORMATION

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

Date(s) aerial images were photographed: Aug 25, 2014—Sep 27, 2014

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.

Table—Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
BooC	Boonton silt loam, red sandstone lowland, 8 to 15 percent slopes	>200	1.8	7.6%
URBOOB	Urban land, Boonton substratum, 0 to 8 percent slopes, red sandstone lowland	>200	8.8	37.3%
USBOOB	Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 0 to 8 percent slopes	>200	6.5	27.7%
USBOOC	Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 8 to 15 percent slopes	>200	2.6	11.1%
Subtotals for Soil Survey Area			19.7	83.6%
Totals for Area of Interest			23.5	100.0%

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
USBOOB	Urban land-Boonton complex, red sandstone lowland, 0 to 8 percent slopes	>200	2.3	9.6%
USBOOC	Urban land-Boonton complex, red sandstone lowland, 8 to 15 percent slopes	>200	1.6	6.7%
Subtotals for Soil Survey Area			3.8	16.4%
Totals for Area of Interest			23.5	100.0%

Rating Options—Depth to Water Table

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

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NOAA Atlas 14, Volume 2, Version 3
Location name: Clifton, New Jersey, USA*
Latitude: 40.8342°, Longitude: -74.1538°
Elevation: 118.87 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.336 (0.307-0.368)	0.401 (0.366-0.440)	0.477 (0.435-0.523)	0.530 (0.482-0.581)	0.600 (0.543-0.657)	0.647 (0.584-0.709)	0.695 (0.624-0.761)	0.741 (0.661-0.813)	0.796 (0.702-0.877)	0.839 (0.735-0.928)
10-min	0.533 (0.486-0.584)	0.638 (0.583-0.700)	0.757 (0.690-0.831)	0.841 (0.765-0.921)	0.944 (0.855-1.03)	1.02 (0.918-1.11)	1.09 (0.977-1.19)	1.16 (1.03-1.27)	1.24 (1.09-1.36)	1.29 (1.13-1.43)
15-min	0.664 (0.606-0.728)	0.796 (0.727-0.874)	0.950 (0.866-1.04)	1.06 (0.961-1.16)	1.19 (1.08-1.30)	1.28 (1.16-1.41)	1.37 (1.23-1.50)	1.45 (1.30-1.60)	1.55 (1.37-1.71)	1.62 (1.42-1.79)
30-min	0.902 (0.824-0.989)	1.09 (0.997-1.20)	1.34 (1.22-1.47)	1.52 (1.38-1.66)	1.74 (1.58-1.91)	1.91 (1.72-2.09)	2.07 (1.86-2.27)	2.23 (1.99-2.44)	2.43 (2.15-2.68)	2.58 (2.26-2.85)
60-min	1.12 (1.02-1.23)	1.36 (1.25-1.50)	1.71 (1.56-1.88)	1.96 (1.79-2.15)	2.31 (2.09-2.53)	2.57 (2.32-2.81)	2.84 (2.54-3.11)	3.10 (2.76-3.40)	3.46 (3.05-3.81)	3.73 (3.27-4.12)
2-hr	1.38 (1.25-1.51)	1.67 (1.53-1.84)	2.12 (1.93-2.33)	2.46 (2.24-2.71)	2.94 (2.65-3.23)	3.33 (2.99-3.66)	3.74 (3.33-4.10)	4.16 (3.68-4.57)	4.75 (4.14-5.22)	5.21 (4.50-5.75)
3-hr	1.53 (1.40-1.69)	1.86 (1.71-2.05)	2.37 (2.16-2.60)	2.75 (2.51-3.02)	3.29 (2.98-3.61)	3.74 (3.36-4.09)	4.19 (3.74-4.59)	4.67 (4.13-5.12)	5.33 (4.66-5.86)	5.87 (5.07-6.45)
6-hr	1.99 (1.82-2.17)	2.41 (2.21-2.64)	3.04 (2.78-3.32)	3.55 (3.23-3.88)	4.28 (3.87-4.66)	4.88 (4.39-5.32)	5.52 (4.92-6.01)	6.21 (5.47-6.76)	7.19 (6.25-7.85)	7.99 (6.87-8.75)
12-hr	2.46 (2.24-2.71)	2.98 (2.72-3.29)	3.78 (3.44-4.17)	4.45 (4.04-4.89)	5.42 (4.88-5.94)	6.26 (5.58-6.84)	7.15 (6.31-7.81)	8.13 (7.09-8.89)	9.58 (8.19-10.5)	10.8 (9.10-11.8)
24-hr	2.77 (2.57-3.02)	3.36 (3.11-3.65)	4.30 (3.97-4.68)	5.11 (4.70-5.55)	6.32 (5.77-6.84)	7.36 (6.68-7.98)	8.52 (7.65-9.24)	9.82 (8.71-10.7)	11.8 (10.3-12.8)	13.4 (11.6-14.7)
2-day	3.26 (3.01-3.56)	3.95 (3.64-4.32)	5.04 (4.64-5.51)	5.96 (5.47-6.51)	7.32 (6.67-7.97)	8.47 (7.67-9.23)	9.73 (8.74-10.6)	11.1 (9.89-12.2)	13.2 (11.5-14.5)	14.9 (12.8-16.5)
3-day	3.43 (3.17-3.73)	4.16 (3.85-4.52)	5.29 (4.88-5.75)	6.23 (5.74-6.77)	7.60 (6.96-8.26)	8.77 (7.97-9.52)	10.0 (9.04-10.9)	11.4 (10.2-12.4)	13.4 (11.8-14.7)	15.1 (13.1-16.7)
4-day	3.60 (3.34-3.90)	4.36 (4.05-4.73)	5.53 (5.12-5.99)	6.50 (6.00-7.04)	7.89 (7.24-8.54)	9.06 (8.26-9.81)	10.3 (9.34-11.2)	11.7 (10.5-12.7)	13.7 (12.1-14.9)	15.3 (13.4-16.8)
7-day	4.25 (3.96-4.59)	5.11 (4.76-5.51)	6.36 (5.91-6.86)	7.39 (6.85-7.96)	8.87 (8.18-9.54)	10.1 (9.26-10.9)	11.4 (10.4-12.3)	12.8 (11.6-13.9)	14.8 (13.2-16.2)	16.5 (14.5-18.1)
10-day	4.87 (4.55-5.23)	5.82 (5.44-6.25)	7.13 (6.66-7.66)	8.21 (7.64-8.81)	9.74 (9.02-10.5)	11.0 (10.1-11.8)	12.3 (11.3-13.3)	13.7 (12.5-14.8)	15.7 (14.1-17.1)	17.4 (15.3-18.9)
20-day	6.58 (6.18-7.01)	7.81 (7.33-8.32)	9.33 (8.75-9.93)	10.5 (9.85-11.2)	12.1 (11.3-12.9)	13.4 (12.4-14.3)	14.7 (13.6-15.7)	16.0 (14.7-17.1)	17.7 (16.1-19.0)	19.0 (17.2-20.6)
30-day	8.21 (7.75-8.69)	9.69 (9.15-10.3)	11.3 (10.7-12.0)	12.6 (11.9-13.4)	14.2 (13.4-15.1)	15.5 (14.5-16.4)	16.7 (15.6-17.8)	17.9 (16.6-19.1)	19.4 (17.9-20.8)	20.6 (18.9-22.1)
45-day	10.4 (9.88-11.0)	12.3 (11.6-12.9)	14.2 (13.4-14.9)	15.6 (14.8-16.4)	17.5 (16.5-18.4)	18.8 (17.7-19.9)	20.2 (18.9-21.3)	21.4 (20.1-22.7)	23.1 (21.4-24.5)	24.2 (22.4-25.8)
60-day	12.5 (11.9-13.2)	14.7 (13.9-15.5)	16.8 (15.9-17.7)	18.3 (17.4-19.3)	20.3 (19.2-21.4)	21.7 (20.5-22.9)	23.1 (21.7-24.4)	24.3 (22.9-25.7)	25.9 (24.2-27.4)	26.9 (25.1-28.6)

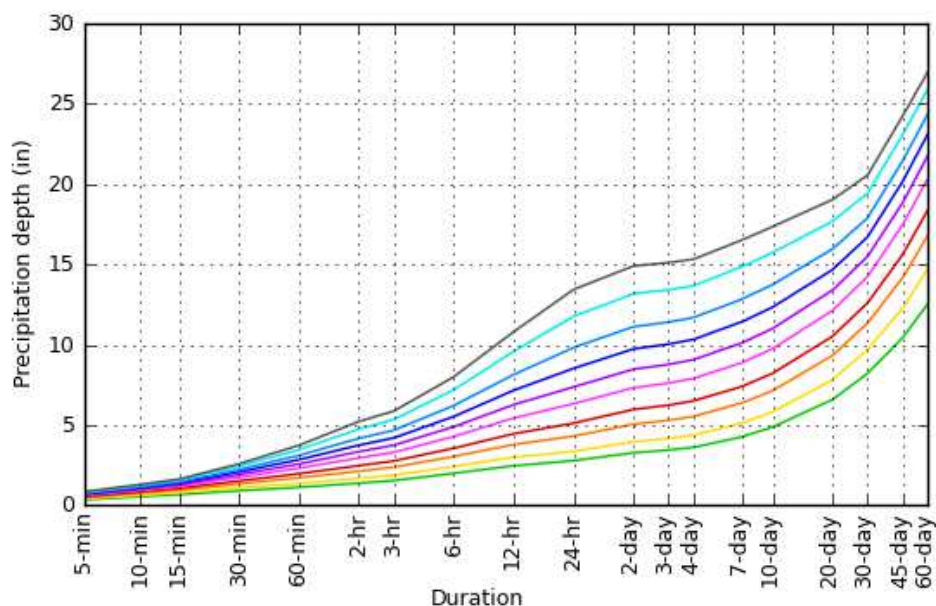
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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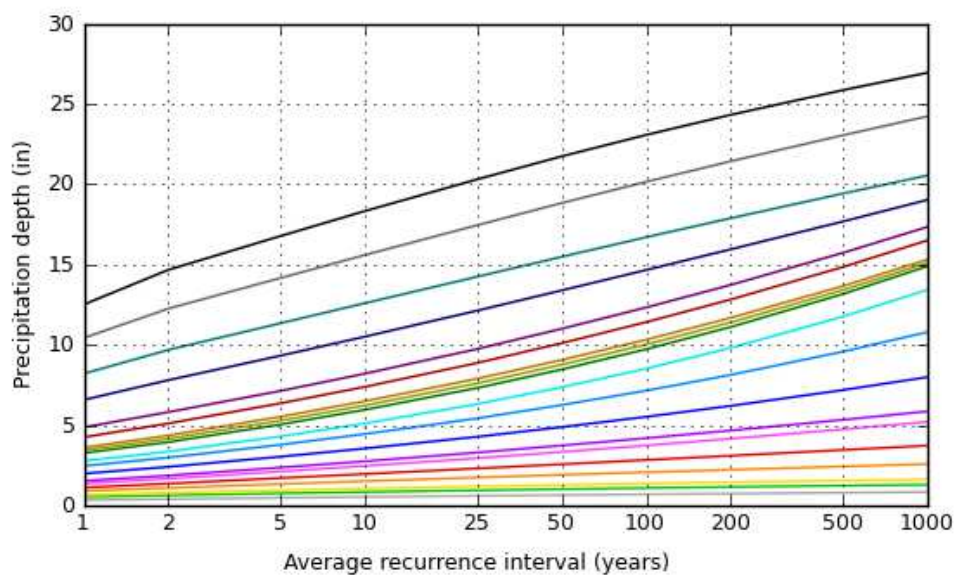
PF graphical

PDS-based depth-duration-frequency (DDF) curves

Latitude: 40.8342°, Longitude: -74.1538°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

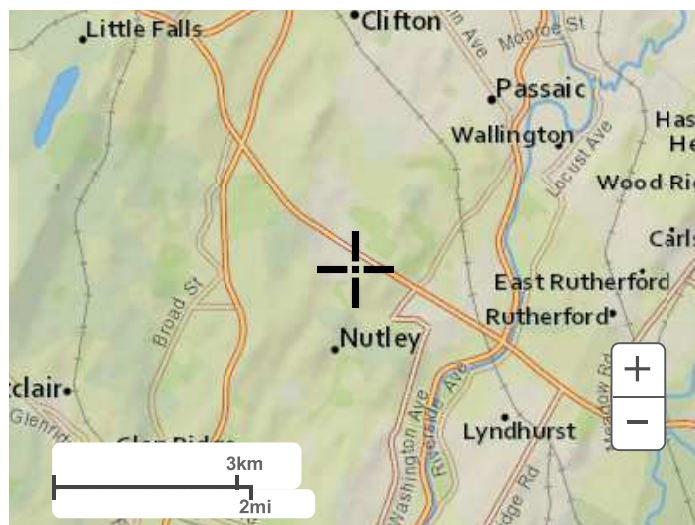
NOAA Atlas 14, Volume 2, Version 3

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Maps & aerials

Small scale terrain



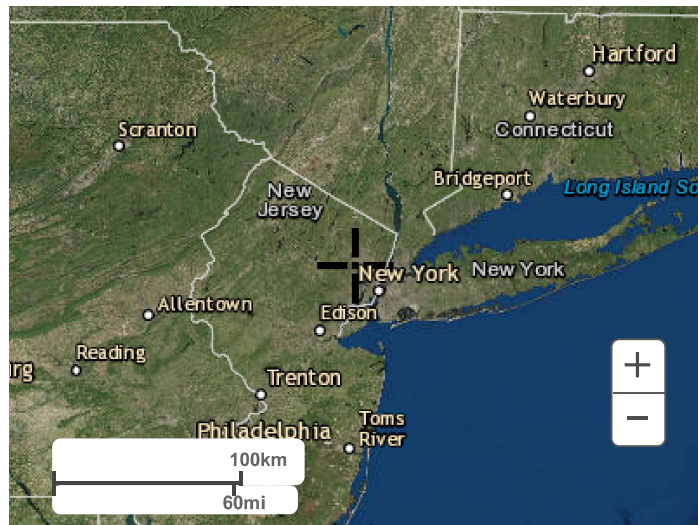
Large scale terrain



Large scale map



Large scale aerial



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Questions?: HDSC.Questions@noaa.gov

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NOAA Atlas 14, Volume 2, Version 3
Location name: Clifton, New Jersey, USA*
Latitude: 40.8339°, Longitude: -74.1545°
Elevation: 116.75 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.03 (3.68-4.42)	4.81 (4.39-5.28)	5.72 (5.22-6.28)	6.36 (5.78-6.97)	7.20 (6.52-7.88)	7.76 (7.01-8.51)	8.34 (7.49-9.13)	8.89 (7.93-9.76)	9.55 (8.42-10.5)	10.1 (8.82-11.1)
10-min	3.20 (2.92-3.50)	3.83 (3.50-4.20)	4.54 (4.14-4.99)	5.05 (4.59-5.53)	5.66 (5.13-6.20)	6.10 (5.51-6.69)	6.53 (5.86-7.16)	6.94 (6.19-7.61)	7.43 (6.55-8.18)	7.76 (6.80-8.59)
15-min	2.66 (2.42-2.91)	3.18 (2.91-3.50)	3.80 (3.46-4.17)	4.23 (3.84-4.63)	4.76 (4.31-5.22)	5.12 (4.62-5.62)	5.49 (4.93-6.02)	5.82 (5.18-6.38)	6.21 (5.48-6.84)	6.49 (5.68-7.18)
30-min	1.80 (1.65-1.98)	2.18 (1.99-2.40)	2.68 (2.44-2.94)	3.03 (2.76-3.32)	3.48 (3.16-3.82)	3.82 (3.44-4.18)	4.15 (3.72-4.54)	4.45 (3.97-4.89)	4.86 (4.29-5.36)	5.15 (4.51-5.70)
60-min	1.12 (1.02-1.23)	1.36 (1.25-1.50)	1.71 (1.56-1.88)	1.96 (1.79-2.15)	2.31 (2.09-2.53)	2.57 (2.32-2.81)	2.84 (2.54-3.11)	3.10 (2.76-3.40)	3.46 (3.05-3.81)	3.73 (3.27-4.12)
2-hr	0.688 (0.627-0.756)	0.836 (0.763-0.920)	1.06 (0.964-1.16)	1.23 (1.12-1.35)	1.47 (1.33-1.61)	1.67 (1.50-1.83)	1.87 (1.67-2.05)	2.08 (1.84-2.28)	2.37 (2.07-2.61)	2.61 (2.25-2.88)
3-hr	0.511 (0.467-0.561)	0.621 (0.568-0.684)	0.788 (0.719-0.865)	0.917 (0.834-1.01)	1.10 (0.992-1.20)	1.25 (1.12-1.36)	1.40 (1.25-1.53)	1.55 (1.38-1.70)	1.78 (1.55-1.95)	1.95 (1.69-2.15)
6-hr	0.331 (0.304-0.363)	0.402 (0.369-0.441)	0.508 (0.464-0.555)	0.593 (0.540-0.648)	0.714 (0.646-0.779)	0.815 (0.733-0.888)	0.922 (0.821-1.00)	1.04 (0.914-1.13)	1.20 (1.04-1.31)	1.33 (1.15-1.46)
12-hr	0.204 (0.186-0.225)	0.248 (0.226-0.273)	0.314 (0.286-0.346)	0.369 (0.335-0.406)	0.450 (0.405-0.493)	0.519 (0.463-0.567)	0.594 (0.523-0.648)	0.675 (0.589-0.738)	0.795 (0.680-0.870)	0.897 (0.755-0.982)
24-hr	0.116 (0.107-0.126)	0.140 (0.130-0.152)	0.179 (0.166-0.195)	0.213 (0.196-0.231)	0.263 (0.241-0.285)	0.307 (0.278-0.332)	0.355 (0.319-0.385)	0.409 (0.363-0.444)	0.490 (0.427-0.534)	0.560 (0.481-0.612)
2-day	0.068 (0.063-0.074)	0.082 (0.076-0.090)	0.105 (0.097-0.115)	0.124 (0.114-0.136)	0.152 (0.139-0.166)	0.176 (0.160-0.192)	0.203 (0.182-0.222)	0.232 (0.206-0.254)	0.274 (0.240-0.302)	0.310 (0.267-0.344)
3-day	0.048 (0.044-0.052)	0.058 (0.053-0.063)	0.073 (0.068-0.080)	0.087 (0.080-0.094)	0.106 (0.097-0.115)	0.122 (0.111-0.132)	0.139 (0.126-0.152)	0.158 (0.141-0.173)	0.186 (0.164-0.204)	0.210 (0.182-0.231)
4-day	0.038 (0.035-0.041)	0.045 (0.042-0.049)	0.058 (0.053-0.062)	0.068 (0.062-0.073)	0.082 (0.075-0.089)	0.094 (0.086-0.102)	0.108 (0.097-0.117)	0.122 (0.109-0.132)	0.142 (0.126-0.156)	0.160 (0.139-0.175)
7-day	0.025 (0.024-0.027)	0.030 (0.028-0.033)	0.038 (0.035-0.041)	0.044 (0.041-0.047)	0.053 (0.049-0.057)	0.060 (0.055-0.065)	0.068 (0.062-0.073)	0.076 (0.069-0.083)	0.088 (0.078-0.096)	0.098 (0.086-0.108)
10-day	0.020 (0.019-0.022)	0.024 (0.023-0.026)	0.030 (0.028-0.032)	0.034 (0.032-0.037)	0.041 (0.038-0.044)	0.046 (0.042-0.049)	0.051 (0.047-0.055)	0.057 (0.052-0.062)	0.066 (0.059-0.071)	0.072 (0.064-0.079)
20-day	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.019 (0.018-0.021)	0.022 (0.021-0.023)	0.025 (0.024-0.027)	0.028 (0.026-0.030)	0.031 (0.028-0.033)	0.033 (0.031-0.036)	0.037 (0.034-0.040)	0.040 (0.036-0.043)
30-day	0.011 (0.011-0.012)	0.013 (0.013-0.014)	0.016 (0.015-0.017)	0.017 (0.016-0.019)	0.020 (0.019-0.021)	0.021 (0.020-0.023)	0.023 (0.022-0.025)	0.025 (0.023-0.026)	0.027 (0.025-0.029)	0.029 (0.026-0.031)
45-day	0.010 (0.009-0.010)	0.011 (0.011-0.012)	0.013 (0.012-0.014)	0.014 (0.014-0.015)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.019 (0.018-0.020)	0.020 (0.019-0.021)	0.021 (0.020-0.023)	0.022 (0.021-0.024)
60-day	0.009 (0.008-0.009)	0.010 (0.010-0.011)	0.012 (0.011-0.012)	0.013 (0.012-0.013)	0.014 (0.013-0.015)	0.015 (0.014-0.016)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.019 (0.017-0.020)

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

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

Please refer to NOAA Atlas 14 document for more information.

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111 Ideation Way Parking Lot

Existing Site Conditions

Overall Area		Roof		Lawn (HSG C)		Lawn (HSG D)		Wood (HSG C)		Wood (HSG D)		Gravel		Pavement	
SF	Acre	SF	Acre	SF	Acre	SF	Acre	SF	Acre	SF	Acre	SF	Acre	SF	Acre
1426053	32.73	295886	6.79	28530	0.65	288748	6.63	34748	0.80	47436	1.09	71894	1.65	658811	15.12

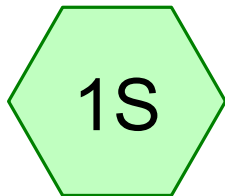
Proposed Site Conditions

Overall Area		Roof		Lawn (HSG C)		Lawn (HSG D)		Wood (HSG C)		Wood (HSG D)		Gravel		Pavement	
SF	Acre	SF	Acre	SF	Acre	SF	Acre	SF	Acre	SF	Acre	SF	Acre	SF	Acre
1430105	32.82	375932	8.63	60857	1.40	452800	10.39	0	0.00	21561	0.49	0	0.00	518955	11.91

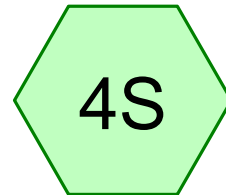
APPENDIX 2

HYDROLOGY ANALYSIS

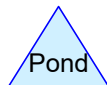
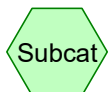
- PEAK RUNOFF RATE AND VOLUME FOR 2, 10 AND 100-YEAR STORM EVENTS UNDER EXISTING AND PROPOSED CONDITIONS
- HYDROGRAPHS COMPARISON BETWEEN EXISTING AND PROPOSED CONDITIONS FOR 2, 10, AND 100 YEAR-STORM EVENTS



Existing Drainage Area
E1



Proposed Drainage Area
P1



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Type III 24-hr 2-year Rainfall=3.36"

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Summary for Subcatchment 1S: Existing Drainage Area E1

Runoff = 71.51 cfs @ 12.18 hrs, Volume= 6.758 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-year Rainfall=3.36"

Area (ac)	CN	Description
6.790	98	Roofs, HSG D
15.120	98	Paved parking, HSG D
1.650	91	Gravel roads, HSG D
0.650	74	>75% Grass cover, Good, HSG C
6.630	80	>75% Grass cover, Good, HSG D
0.800	72	Woods/grass comb., Good, HSG C
1.090	79	Woods/grass comb., Good, HSG D
32.730		Weighted Average
10.820	81	33.06% Pervious Area
21.910	98	66.94% Impervious Area

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Type III 24-hr 2-year Rainfall=3.36"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	50	0.1800	0.37		Sheet Flow, Unpaved Surface Grass: Short n= 0.150 P2= 3.36"
0.5	50	0.0500	1.77		Sheet Flow, Paved Surface Smooth surfaces n= 0.011 P2= 3.36"
0.1	22	0.0600	4.97		Shallow Concentrated Flow, Paved Surface Paved Kv= 20.3 fps
0.0	21	0.2000	7.20		Shallow Concentrated Flow, Unpaved Surface Unpaved Kv= 16.1 fps
0.7	165	0.0350	3.80		Shallow Concentrated Flow, Paved Area (Gravel) Paved Kv= 20.3 fps
0.4	75	0.0200	2.87		Shallow Concentrated Flow, Paved Surface Paved Kv= 20.3 fps
0.0	52	0.4562	23.38	8.16	Pipe Channel, Conveyance Pipe - 8-inch RCP 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013
0.2	58	0.0200	4.90	1.71	Pipe Channel, Conveyance Pipe - 8-inch RCP 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013
0.1	17	0.0053	2.92	1.60	Pipe Channel, Conveyance Pipe - 10-inch RCP 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.013
0.6	185	0.0114	4.84	3.80	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.1	20	0.0125	5.07	3.98	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
0.4	107	0.0125	5.07	3.98	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	259	0.0059	3.48	2.74	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.2	37	0.0051	3.24	2.54	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.5	90	0.0050	3.21	2.52	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
2.3	126	0.0004	0.91	0.71	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.0	21	0.0338	7.74	6.08	Pipe Channel, Conveyance Pipe - 12-inch DIP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.014 Cast iron, coated
0.4	146	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	103	0.0083	7.98	56.42	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'

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Type III 24-hr 2-year Rainfall=3.36"

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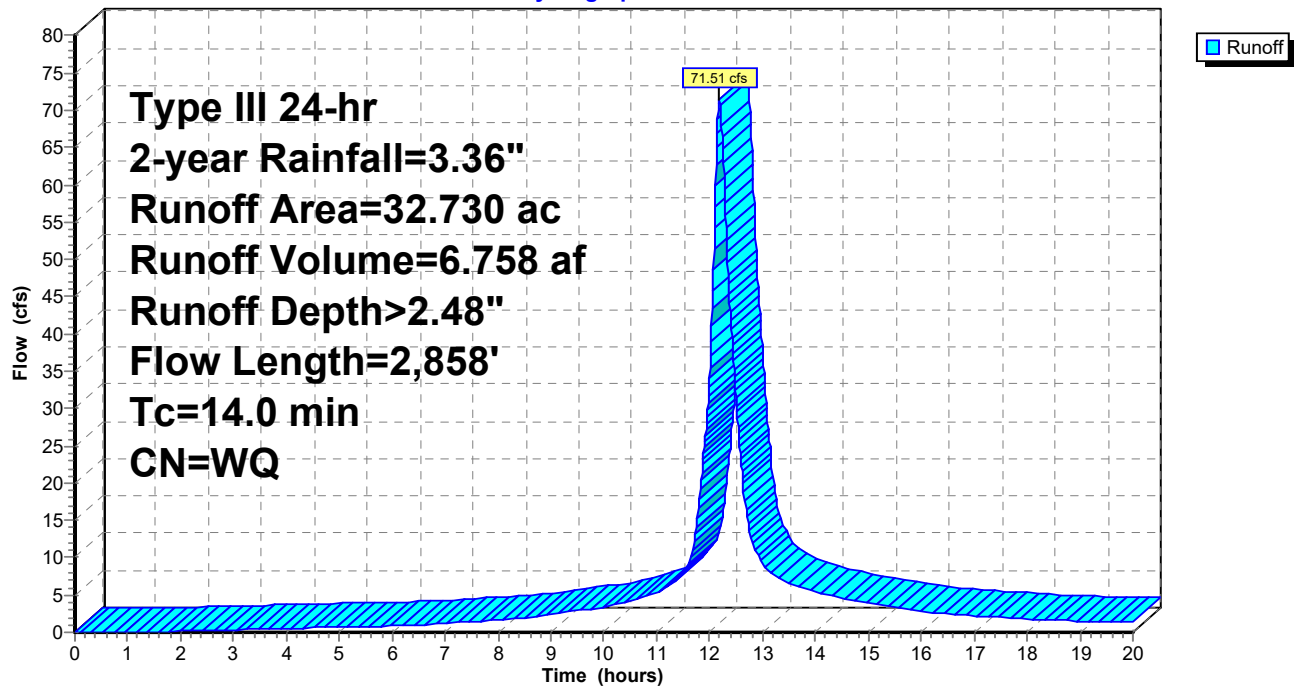
n= 0.014 Cast iron, coated

0.4	166	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	90	0.0110	9.90	69.95	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.4	168	0.0068	7.78	55.00	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.0	8	0.0075	8.17	57.76	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.1	58	0.0345	17.53	123.89	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.9	169	0.0015	3.24	15.89	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.1	54	0.0139	9.85	48.36	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.8	207	0.0026	4.47	31.58	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.6	227	0.0054	6.44	45.51	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.3	107	0.0050	6.20	43.79	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated

14.0 2,858 Total

Subcatchment 1S: Existing Drainage Area E1

Hydrograph



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Type III 24-hr 2-year Rainfall=3.36"

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Hydrograph for Subcatchment 1S: Existing Drainage Area E1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	10.40	0.71	0.20	4.06
0.20	0.01	0.00	0.00	10.60	0.75	0.23	4.48
0.40	0.01	0.00	0.00	10.80	0.79	0.26	4.92
0.60	0.02	0.00	0.00	11.00	0.84	0.29	5.39
0.80	0.03	0.00	0.00	11.20	0.90	0.33	6.02
1.00	0.03	0.00	0.00	11.40	0.96	0.38	7.41
1.20	0.04	0.00	0.00	11.60	1.06	0.44	9.18
1.40	0.05	0.00	0.01	11.80	1.25	0.60	17.59
1.60	0.05	0.00	0.04	12.00	1.68	0.95	34.09
1.80	0.06	0.00	0.08	12.20	2.11	1.33	71.00
2.00	0.07	0.00	0.12	12.40	2.30	1.51	41.78
2.20	0.07	0.00	0.16	12.60	2.40	1.60	22.30
2.40	0.08	0.00	0.20	12.80	2.46	1.66	12.27
2.60	0.09	0.00	0.23	13.00	2.52	1.71	9.34
2.80	0.10	0.00	0.27	13.20	2.57	1.76	7.63
3.00	0.10	0.00	0.31	13.40	2.61	1.80	6.88
3.20	0.11	0.00	0.35	13.60	2.65	1.84	6.38
3.40	0.12	0.00	0.39	13.80	2.69	1.87	5.92
3.60	0.13	0.00	0.43	14.00	2.72	1.90	5.44
3.80	0.14	0.00	0.46	14.20	2.76	1.93	5.01
4.00	0.14	0.00	0.50	14.40	2.79	1.96	4.73
4.20	0.15	0.00	0.54	14.60	2.82	1.99	4.50
4.40	0.16	0.00	0.57	14.80	2.84	2.01	4.27
4.60	0.17	0.00	0.61	15.00	2.87	2.04	4.04
4.80	0.18	0.00	0.65	15.20	2.89	2.06	3.82
5.00	0.19	0.00	0.68	15.40	2.92	2.08	3.58
5.20	0.20	0.00	0.72	15.60	2.94	2.10	3.36
5.40	0.21	0.00	0.75	15.80	2.96	2.12	3.12
5.60	0.22	0.00	0.79	16.00	2.98	2.14	2.89
5.80	0.23	0.00	0.82	16.20	2.99	2.16	2.68
6.00	0.24	0.00	0.86	16.40	3.01	2.17	2.55
6.20	0.25	0.01	0.90	16.60	3.03	2.19	2.45
6.40	0.26	0.01	0.96	16.80	3.04	2.20	2.35
6.60	0.28	0.01	1.04	17.00	3.06	2.21	2.25
6.80	0.29	0.01	1.12	17.20	3.07	2.23	2.15
7.00	0.30	0.02	1.20	17.40	3.08	2.24	2.05
7.20	0.32	0.02	1.28	17.60	3.10	2.25	1.95
7.40	0.33	0.02	1.36	17.80	3.11	2.26	1.84
7.60	0.35	0.03	1.44	18.00	3.12	2.27	1.74
7.80	0.37	0.03	1.53	18.20	3.13	2.28	1.65
8.00	0.38	0.04	1.61	18.40	3.14	2.29	1.61
8.20	0.40	0.05	1.71	18.60	3.15	2.30	1.58
8.40	0.42	0.05	1.86	18.80	3.16	2.31	1.55
8.60	0.44	0.06	2.04	19.00	3.17	2.32	1.52
8.80	0.47	0.07	2.22	19.20	3.18	2.33	1.48
9.00	0.49	0.08	2.40	19.40	3.19	2.34	1.46
9.20	0.52	0.10	2.58	19.60	3.20	2.35	1.42
9.40	0.54	0.11	2.78	19.80	3.21	2.36	1.40
9.60	0.57	0.13	2.99	20.00	3.22	2.37	1.36
9.80	0.60	0.14	3.20				
10.00	0.64	0.16	3.42				
10.20	0.67	0.18	3.67				

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Type III 24-hr 2-year Rainfall=3.36"

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Summary for Subcatchment 4S: Proposed Drainage Area P1

Runoff = 68.85 cfs @ 12.18 hrs, Volume= 6.484 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-year Rainfall=3.36"

Area (ac)	CN	Description
8.630	98	Roofs, HSG D
11.910	98	Paved parking, HSG D
1.400	74	>75% Grass cover, Good, HSG C
10.390	80	>75% Grass cover, Good, HSG D
0.490	79	Woods/grass comb., Good, HSG D
32.820		Weighted Average
12.280	79	37.42% Pervious Area
20.540	98	62.58% Impervious Area

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Type III 24-hr 2-year Rainfall=3.36"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	100	0.2700	0.49		Sheet Flow, Landscape Area Grass: Short n= 0.150 P2= 3.36"
0.3	83	0.0620	4.01		Shallow Concentrated Flow, Landscape Area Unpaved Kv= 16.1 fps
2.9	265	0.0088	1.51		Shallow Concentrated Flow, Landscape Area Unpaved Kv= 16.1 fps
2.5	356	0.0140	2.40		Shallow Concentrated Flow, Paved Area Paved Kv= 20.3 fps
0.4	119	0.0074	5.11	9.04	Pipe Channel, Conveyance Pipe - 18-inch RCP 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, straight & clean
0.1	56	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.0	24	0.0090	8.95	63.28	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.4	146	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	103	0.0083	7.98	56.42	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.4	166	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	90	0.0110	9.90	69.95	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.4	168	0.0068	7.78	55.00	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.0	8	0.0075	8.17	57.76	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.1	58	0.0345	17.53	123.89	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.9	169	0.0015	3.24	15.89	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.1	54	0.0139	9.85	48.36	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.8	207	0.0026	4.47	31.58	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.6	227	0.0054	6.44	45.51	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated

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Type III 24-hr 2-year Rainfall=3.36"

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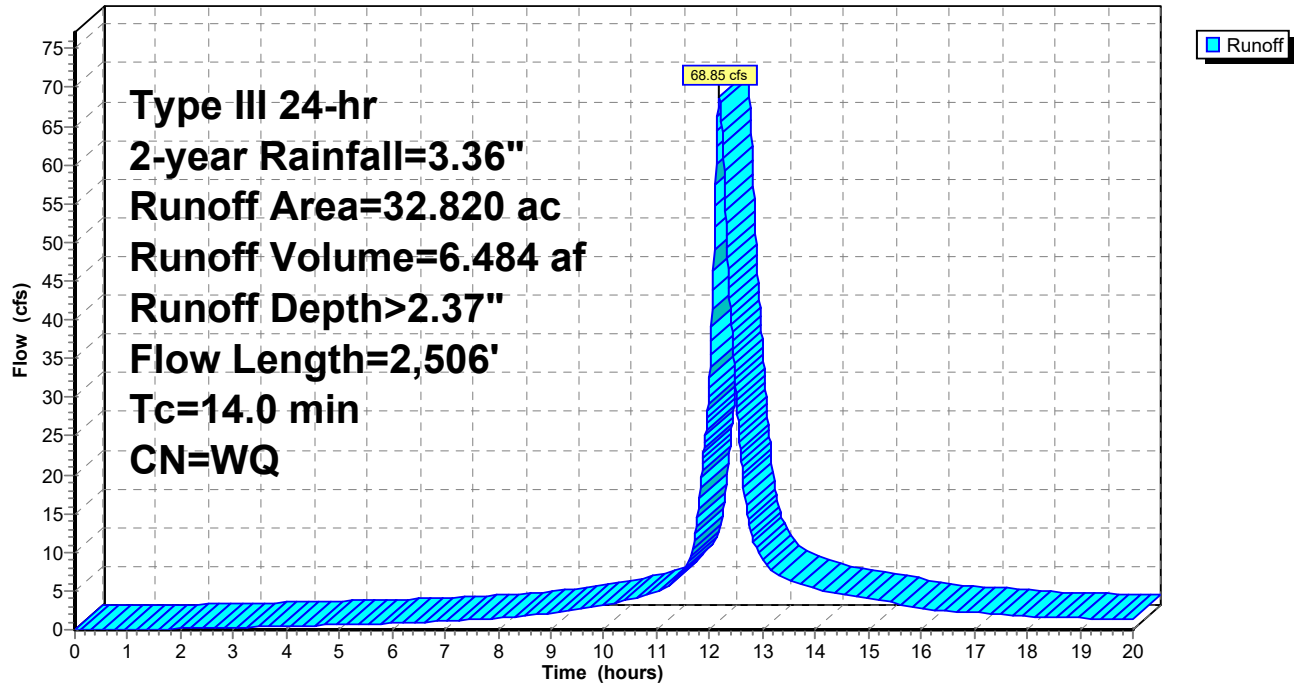
Page 9

0.3 107 0.0050 6.20 43.79 **Pipe Channel, Conveyance Pipe - 36-inch DIP**
36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
n= 0.014 Cast iron, coated

14.0 2,506 Total

Subcatchment 4S: Proposed Drainage Area P1

Hydrograph



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Type III 24-hr 2-year Rainfall=3.36"

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Hydrograph for Subcatchment 4S: Proposed Drainage Area P1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	10.40	0.71	0.17	3.73
0.20	0.01	0.00	0.00	10.60	0.75	0.20	4.14
0.40	0.01	0.00	0.00	10.80	0.79	0.22	4.56
0.60	0.02	0.00	0.00	11.00	0.84	0.25	5.01
0.80	0.03	0.00	0.00	11.20	0.90	0.29	5.61
1.00	0.03	0.00	0.00	11.40	0.96	0.33	6.93
1.20	0.04	0.00	0.00	11.60	1.06	0.40	8.62
1.40	0.05	0.00	0.01	11.80	1.25	0.55	16.62
1.60	0.05	0.00	0.04	12.00	1.68	0.89	32.47
1.80	0.06	0.00	0.08	12.20	2.11	1.26	68.40
2.00	0.07	0.00	0.11	12.40	2.30	1.43	40.53
2.20	0.07	0.00	0.15	12.60	2.40	1.52	21.71
2.40	0.08	0.00	0.18	12.80	2.46	1.58	11.97
2.60	0.09	0.00	0.22	13.00	2.52	1.63	9.13
2.80	0.10	0.00	0.26	13.20	2.57	1.67	7.46
3.00	0.10	0.00	0.29	13.40	2.61	1.71	6.74
3.20	0.11	0.00	0.33	13.60	2.65	1.75	6.25
3.40	0.12	0.00	0.36	13.80	2.69	1.78	5.79
3.60	0.13	0.00	0.40	14.00	2.72	1.82	5.33
3.80	0.14	0.00	0.43	14.20	2.76	1.85	4.91
4.00	0.14	0.00	0.47	14.40	2.79	1.87	4.63
4.20	0.15	0.00	0.50	14.60	2.82	1.90	4.41
4.40	0.16	0.00	0.54	14.80	2.84	1.93	4.19
4.60	0.17	0.00	0.57	15.00	2.87	1.95	3.96
4.80	0.18	0.00	0.61	15.20	2.89	1.97	3.74
5.00	0.19	0.00	0.64	15.40	2.92	1.99	3.52
5.20	0.20	0.00	0.67	15.60	2.94	2.01	3.30
5.40	0.21	0.00	0.70	15.80	2.96	2.03	3.07
5.60	0.22	0.00	0.73	16.00	2.98	2.05	2.84
5.80	0.23	0.00	0.77	16.20	2.99	2.07	2.63
6.00	0.24	0.00	0.80	16.40	3.01	2.08	2.51
6.20	0.25	0.00	0.83	16.60	3.03	2.10	2.41
6.40	0.26	0.00	0.89	16.80	3.04	2.11	2.31
6.60	0.28	0.01	0.96	17.00	3.06	2.12	2.21
6.80	0.29	0.01	1.03	17.20	3.07	2.14	2.11
7.00	0.30	0.01	1.10	17.40	3.08	2.15	2.01
7.20	0.32	0.01	1.18	17.60	3.10	2.16	1.91
7.40	0.33	0.02	1.25	17.80	3.11	2.17	1.81
7.60	0.35	0.02	1.32	18.00	3.12	2.18	1.72
7.80	0.37	0.02	1.40	18.20	3.13	2.19	1.62
8.00	0.38	0.03	1.47	18.40	3.14	2.20	1.58
8.20	0.40	0.03	1.56	18.60	3.15	2.21	1.55
8.40	0.42	0.04	1.70	18.80	3.16	2.22	1.52
8.60	0.44	0.05	1.86	19.00	3.17	2.23	1.49
8.80	0.47	0.06	2.02	19.20	3.18	2.24	1.46
9.00	0.49	0.07	2.18	19.40	3.19	2.25	1.43
9.20	0.52	0.08	2.34	19.60	3.20	2.26	1.40
9.40	0.54	0.09	2.52	19.80	3.21	2.26	1.37
9.60	0.57	0.10	2.72	20.00	3.22	2.27	1.34
9.80	0.60	0.12	2.92				
10.00	0.64	0.13	3.14				
10.20	0.67	0.15	3.37				

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Type III 24-hr 10-year Rainfall=5.11"

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Summary for Subcatchment 1S: Existing Drainage Area E1

Runoff = 115.86 cfs @ 12.18 hrs, Volume= 11.048 af, Depth> 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-year Rainfall=5.11"

Area (ac)	CN	Description
6.790	98	Roofs, HSG D
15.120	98	Paved parking, HSG D
1.650	91	Gravel roads, HSG D
0.650	74	>75% Grass cover, Good, HSG C
6.630	80	>75% Grass cover, Good, HSG D
0.800	72	Woods/grass comb., Good, HSG C
1.090	79	Woods/grass comb., Good, HSG D
32.730		Weighted Average
10.820	81	33.06% Pervious Area
21.910	98	66.94% Impervious Area

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Type III 24-hr 10-year Rainfall=5.11"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	50	0.1800	0.37		Sheet Flow, Unpaved Surface Grass: Short n= 0.150 P2= 3.36"
0.5	50	0.0500	1.77		Sheet Flow, Paved Surface Smooth surfaces n= 0.011 P2= 3.36"
0.1	22	0.0600	4.97		Shallow Concentrated Flow, Paved Surface Paved Kv= 20.3 fps
0.0	21	0.2000	7.20		Shallow Concentrated Flow, Unpaved Surface Unpaved Kv= 16.1 fps
0.7	165	0.0350	3.80		Shallow Concentrated Flow, Paved Area (Gravel) Paved Kv= 20.3 fps
0.4	75	0.0200	2.87		Shallow Concentrated Flow, Paved Surface Paved Kv= 20.3 fps
0.0	52	0.4562	23.38	8.16	Pipe Channel, Conveyance Pipe - 8-inch RCP 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013
0.2	58	0.0200	4.90	1.71	Pipe Channel, Conveyance Pipe - 8-inch RCP 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013
0.1	17	0.0053	2.92	1.60	Pipe Channel, Conveyance Pipe - 10-inch RCP 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.013
0.6	185	0.0114	4.84	3.80	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.1	20	0.0125	5.07	3.98	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
0.4	107	0.0125	5.07	3.98	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	259	0.0059	3.48	2.74	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.2	37	0.0051	3.24	2.54	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.5	90	0.0050	3.21	2.52	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
2.3	126	0.0004	0.91	0.71	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.0	21	0.0338	7.74	6.08	Pipe Channel, Conveyance Pipe - 12-inch DIP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.014 Cast iron, coated
0.4	146	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	103	0.0083	7.98	56.42	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'

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Type III 24-hr 10-year Rainfall=5.11"

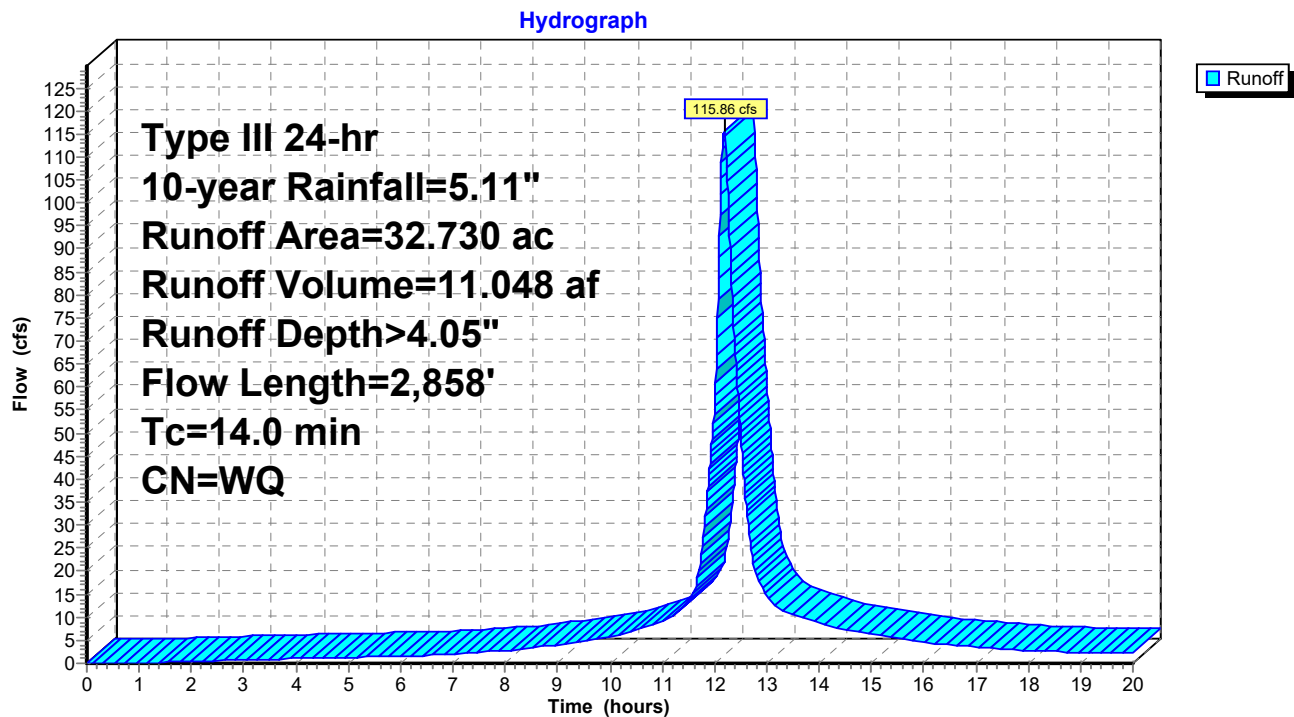
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n= 0.014 Cast iron, coated

0.4	166	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	90	0.0110	9.90	69.95	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.4	168	0.0068	7.78	55.00	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.0	8	0.0075	8.17	57.76	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.1	58	0.0345	17.53	123.89	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.9	169	0.0015	3.24	15.89	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.1	54	0.0139	9.85	48.36	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.8	207	0.0026	4.47	31.58	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.6	227	0.0054	6.44	45.51	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.3	107	0.0050	6.20	43.79	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated

14.0 2,858 Total

Subcatchment 1S: Existing Drainage Area E1

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Type III 24-hr 10-year Rainfall=5.11"

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Hydrograph for Subcatchment 1S: Existing Drainage Area E1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	10.40	1.08	0.46	6.88
0.20	0.01	0.00	0.00	10.60	1.14	0.51	7.59
0.40	0.02	0.00	0.00	10.80	1.21	0.56	8.32
0.60	0.03	0.00	0.00	11.00	1.28	0.62	9.07
0.80	0.04	0.00	0.00	11.20	1.36	0.69	10.10
1.00	0.05	0.00	0.02	11.40	1.46	0.77	12.38
1.20	0.06	0.00	0.10	11.60	1.61	0.89	15.28
1.40	0.07	0.00	0.19	11.80	1.91	1.15	29.11
1.60	0.08	0.00	0.27	12.00	2.55	1.74	55.92
1.80	0.09	0.00	0.34	12.20	3.20	2.35	114.94
2.00	0.10	0.00	0.40	12.40	3.50	2.64	67.10
2.20	0.11	0.00	0.46	12.60	3.65	2.78	35.63
2.40	0.12	0.00	0.52	12.80	3.75	2.88	19.55
2.60	0.13	0.00	0.58	13.00	3.83	2.96	14.87
2.80	0.15	0.00	0.65	13.20	3.90	3.03	12.13
3.00	0.16	0.00	0.71	13.40	3.97	3.09	10.93
3.20	0.17	0.00	0.77	13.60	4.03	3.15	10.13
3.40	0.18	0.00	0.82	13.80	4.09	3.21	9.38
3.60	0.19	0.00	0.88	14.00	4.14	3.26	8.62
3.80	0.21	0.00	0.94	14.20	4.19	3.30	7.93
4.00	0.22	0.00	0.99	14.40	4.24	3.35	7.49
4.20	0.23	0.00	1.05	14.60	4.28	3.39	7.12
4.40	0.25	0.01	1.11	14.80	4.33	3.43	6.76
4.60	0.26	0.01	1.16	15.00	4.37	3.47	6.39
4.80	0.28	0.01	1.22	15.20	4.40	3.51	6.03
5.00	0.29	0.01	1.27	15.40	4.44	3.54	5.66
5.20	0.30	0.02	1.32	15.60	4.47	3.57	5.30
5.40	0.32	0.02	1.37	15.80	4.50	3.60	4.93
5.60	0.34	0.03	1.42	16.00	4.53	3.63	4.57
5.80	0.35	0.03	1.47	16.20	4.55	3.65	4.23
6.00	0.37	0.04	1.52	16.40	4.58	3.68	4.03
6.20	0.38	0.04	1.58	16.60	4.60	3.70	3.87
6.40	0.40	0.05	1.69	16.80	4.63	3.72	3.70
6.60	0.42	0.05	1.81	17.00	4.65	3.75	3.55
6.80	0.44	0.06	1.93	17.20	4.67	3.77	3.39
7.00	0.46	0.07	2.05	17.40	4.69	3.79	3.23
7.20	0.48	0.08	2.18	17.60	4.71	3.80	3.07
7.40	0.51	0.09	2.30	17.80	4.73	3.82	2.91
7.60	0.53	0.10	2.43	18.00	4.74	3.84	2.75
7.80	0.56	0.12	2.58	18.20	4.76	3.85	2.60
8.00	0.58	0.13	2.72	18.40	4.77	3.87	2.53
8.20	0.61	0.15	2.89	18.60	4.79	3.88	2.48
8.40	0.64	0.16	3.16	18.80	4.81	3.90	2.44
8.60	0.67	0.18	3.47	19.00	4.82	3.91	2.39
8.80	0.71	0.20	3.78	19.20	4.83	3.93	2.34
9.00	0.74	0.23	4.10	19.40	4.85	3.94	2.29
9.20	0.78	0.25	4.43	19.60	4.86	3.96	2.24
9.40	0.83	0.28	4.77	19.80	4.88	3.97	2.20
9.60	0.87	0.31	5.12	20.00	4.89	3.98	2.15
9.80	0.92	0.34	5.47				
10.00	0.97	0.38	5.84				
10.20	1.02	0.42	6.25				

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Type III 24-hr 10-year Rainfall=5.11"

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Summary for Subcatchment 4S: Proposed Drainage Area P1

Runoff = 113.24 cfs @ 12.18 hrs, Volume= 10.727 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-year Rainfall=5.11"

Area (ac)	CN	Description
8.630	98	Roofs, HSG D
11.910	98	Paved parking, HSG D
1.400	74	>75% Grass cover, Good, HSG C
10.390	80	>75% Grass cover, Good, HSG D
0.490	79	Woods/grass comb., Good, HSG D
32.820		Weighted Average
12.280	79	37.42% Pervious Area
20.540	98	62.58% Impervious Area

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Type III 24-hr 10-year Rainfall=5.11"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	100	0.2700	0.49		Sheet Flow, Landscape Area Grass: Short n= 0.150 P2= 3.36"
0.3	83	0.0620	4.01		Shallow Concentrated Flow, Landscape Area Unpaved Kv= 16.1 fps
2.9	265	0.0088	1.51		Shallow Concentrated Flow, Landscape Area Unpaved Kv= 16.1 fps
2.5	356	0.0140	2.40		Shallow Concentrated Flow, Paved Area Paved Kv= 20.3 fps
0.4	119	0.0074	5.11	9.04	Pipe Channel, Conveyance Pipe - 18-inch RCP 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, straight & clean
0.1	56	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.0	24	0.0090	8.95	63.28	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.4	146	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	103	0.0083	7.98	56.42	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.4	166	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	90	0.0110	9.90	69.95	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.4	168	0.0068	7.78	55.00	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.0	8	0.0075	8.17	57.76	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.1	58	0.0345	17.53	123.89	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.9	169	0.0015	3.24	15.89	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.1	54	0.0139	9.85	48.36	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.8	207	0.0026	4.47	31.58	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.6	227	0.0054	6.44	45.51	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated

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Type III 24-hr 10-year Rainfall=5.11"

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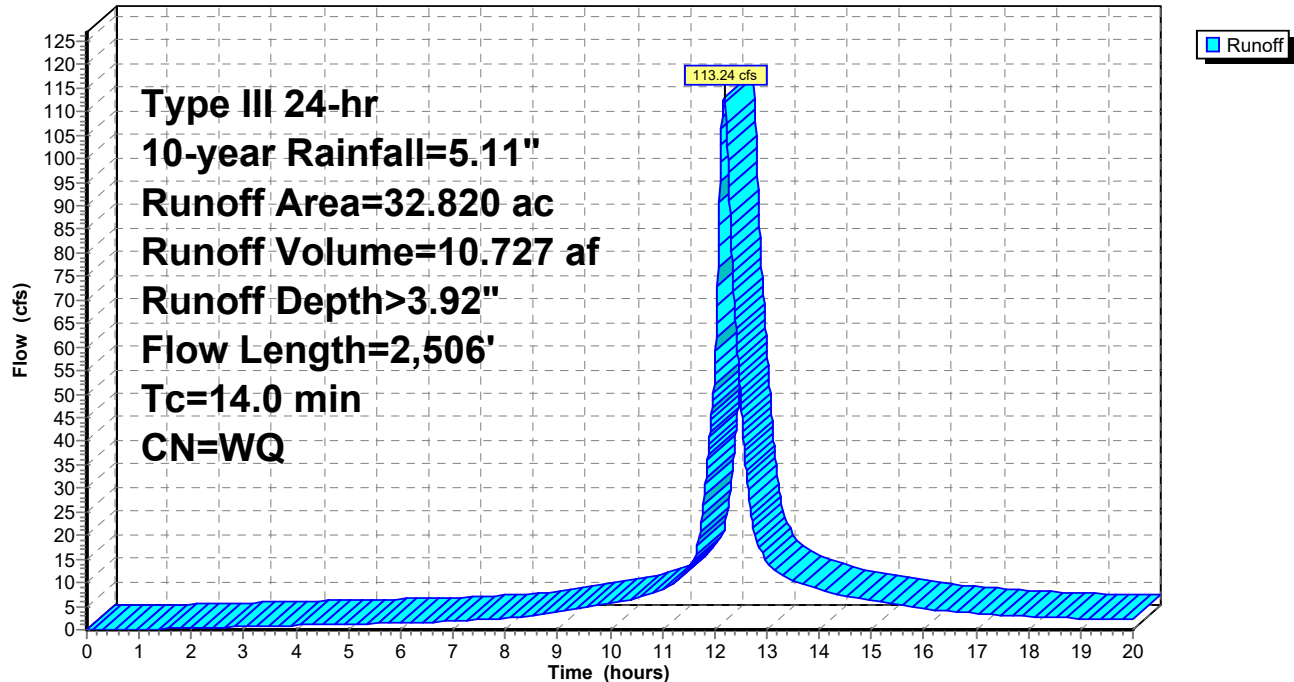
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0.3	107	0.0050	6.20	43.79	Pipe Channel, Conveyance Pipe - 36-inch DIP
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.014 Cast iron, coated

14.0 2,506 Total

Subcatchment 4S: Proposed Drainage Area P1

Hydrograph



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Type III 24-hr 10-year Rainfall=5.11"

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Hydrograph for Subcatchment 4S: Proposed Drainage Area P1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	10.40	1.08	0.41	6.48
0.20	0.01	0.00	0.00	10.60	1.14	0.46	7.17
0.40	0.02	0.00	0.00	10.80	1.21	0.51	7.87
0.60	0.03	0.00	0.00	11.00	1.28	0.56	8.61
0.80	0.04	0.00	0.00	11.20	1.36	0.63	9.62
1.00	0.05	0.00	0.02	11.40	1.46	0.71	11.83
1.20	0.06	0.00	0.09	11.60	1.61	0.83	14.64
1.40	0.07	0.00	0.18	11.80	1.91	1.08	28.03
1.60	0.08	0.00	0.25	12.00	2.55	1.66	54.20
1.80	0.09	0.00	0.32	12.20	3.20	2.26	112.40
2.00	0.10	0.00	0.38	12.40	3.50	2.54	65.94
2.20	0.11	0.00	0.43	12.60	3.65	2.68	35.11
2.40	0.12	0.00	0.49	12.80	3.75	2.78	19.29
2.60	0.13	0.00	0.55	13.00	3.83	2.86	14.68
2.80	0.15	0.00	0.61	13.20	3.90	2.93	11.98
3.00	0.16	0.00	0.66	13.40	3.97	2.99	10.81
3.20	0.17	0.00	0.72	13.60	4.03	3.05	10.02
3.40	0.18	0.00	0.77	13.80	4.09	3.11	9.28
3.60	0.19	0.00	0.83	14.00	4.14	3.16	8.53
3.80	0.21	0.00	0.88	14.20	4.19	3.20	7.85
4.00	0.22	0.00	0.93	14.40	4.24	3.25	7.41
4.20	0.23	0.00	0.98	14.60	4.28	3.29	7.05
4.40	0.25	0.00	1.03	14.80	4.33	3.33	6.69
4.60	0.26	0.00	1.08	15.00	4.37	3.37	6.33
4.80	0.28	0.01	1.13	15.20	4.40	3.40	5.98
5.00	0.29	0.01	1.17	15.40	4.44	3.44	5.61
5.20	0.30	0.01	1.22	15.60	4.47	3.47	5.25
5.40	0.32	0.01	1.27	15.80	4.50	3.50	4.89
5.60	0.34	0.02	1.31	16.00	4.53	3.52	4.53
5.80	0.35	0.02	1.35	16.20	4.55	3.55	4.20
6.00	0.37	0.02	1.40	16.40	4.58	3.57	3.99
6.20	0.38	0.03	1.45	16.60	4.60	3.60	3.83
6.40	0.40	0.04	1.54	16.80	4.63	3.62	3.67
6.60	0.42	0.04	1.65	17.00	4.65	3.64	3.52
6.80	0.44	0.05	1.76	17.20	4.67	3.66	3.36
7.00	0.46	0.06	1.87	17.40	4.69	3.68	3.20
7.20	0.48	0.06	1.98	17.60	4.71	3.70	3.04
7.40	0.51	0.07	2.09	17.80	4.73	3.72	2.88
7.60	0.53	0.08	2.21	18.00	4.74	3.73	2.73
7.80	0.56	0.10	2.34	18.20	4.76	3.75	2.58
8.00	0.58	0.11	2.48	18.40	4.77	3.76	2.51
8.20	0.61	0.12	2.65	18.60	4.79	3.78	2.46
8.40	0.64	0.14	2.90	18.80	4.81	3.79	2.42
8.60	0.67	0.15	3.18	19.00	4.82	3.81	2.37
8.80	0.71	0.17	3.48	19.20	4.83	3.82	2.32
9.00	0.74	0.19	3.79	19.40	4.85	3.84	2.28
9.20	0.78	0.22	4.11	19.60	4.86	3.85	2.23
9.40	0.83	0.24	4.43	19.80	4.88	3.86	2.18
9.60	0.87	0.27	4.77	20.00	4.89	3.88	2.13
9.80	0.92	0.30	5.11				
10.00	0.97	0.34	5.47				
10.20	1.02	0.37	5.87				

111 Ideation Way*Type III 24-hr 100-year Rainfall=8.52"*

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Summary for Subcatchment 1S: Existing Drainage Area E1

Runoff = 203.50 cfs @ 12.18 hrs, Volume= 19.656 af, Depth> 7.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-year Rainfall=8.52"

Area (ac)	CN	Description
6.790	98	Roofs, HSG D
15.120	98	Paved parking, HSG D
1.650	91	Gravel roads, HSG D
0.650	74	>75% Grass cover, Good, HSG C
6.630	80	>75% Grass cover, Good, HSG D
0.800	72	Woods/grass comb., Good, HSG C
1.090	79	Woods/grass comb., Good, HSG D
32.730		Weighted Average
10.820	81	33.06% Pervious Area
21.910	98	66.94% Impervious Area

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Type III 24-hr 100-year Rainfall=8.52"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	50	0.1800	0.37		Sheet Flow, Unpaved Surface Grass: Short n= 0.150 P2= 3.36"
0.5	50	0.0500	1.77		Sheet Flow, Paved Surface Smooth surfaces n= 0.011 P2= 3.36"
0.1	22	0.0600	4.97		Shallow Concentrated Flow, Paved Surface Paved Kv= 20.3 fps
0.0	21	0.2000	7.20		Shallow Concentrated Flow, Unpaved Surface Unpaved Kv= 16.1 fps
0.7	165	0.0350	3.80		Shallow Concentrated Flow, Paved Area (Gravel) Paved Kv= 20.3 fps
0.4	75	0.0200	2.87		Shallow Concentrated Flow, Paved Surface Paved Kv= 20.3 fps
0.0	52	0.4562	23.38	8.16	Pipe Channel, Conveyance Pipe - 8-inch RCP 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013
0.2	58	0.0200	4.90	1.71	Pipe Channel, Conveyance Pipe - 8-inch RCP 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013
0.1	17	0.0053	2.92	1.60	Pipe Channel, Conveyance Pipe - 10-inch RCP 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.013
0.6	185	0.0114	4.84	3.80	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.1	20	0.0125	5.07	3.98	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
0.4	107	0.0125	5.07	3.98	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	259	0.0059	3.48	2.74	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.2	37	0.0051	3.24	2.54	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.5	90	0.0050	3.21	2.52	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
2.3	126	0.0004	0.91	0.71	Pipe Channel, Conveyance Pipe - 12-inch RCP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.0	21	0.0338	7.74	6.08	Pipe Channel, Conveyance Pipe - 12-inch DIP 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.014 Cast iron, coated
0.4	146	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	103	0.0083	7.98	56.42	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'

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Type III 24-hr 100-year Rainfall=8.52"

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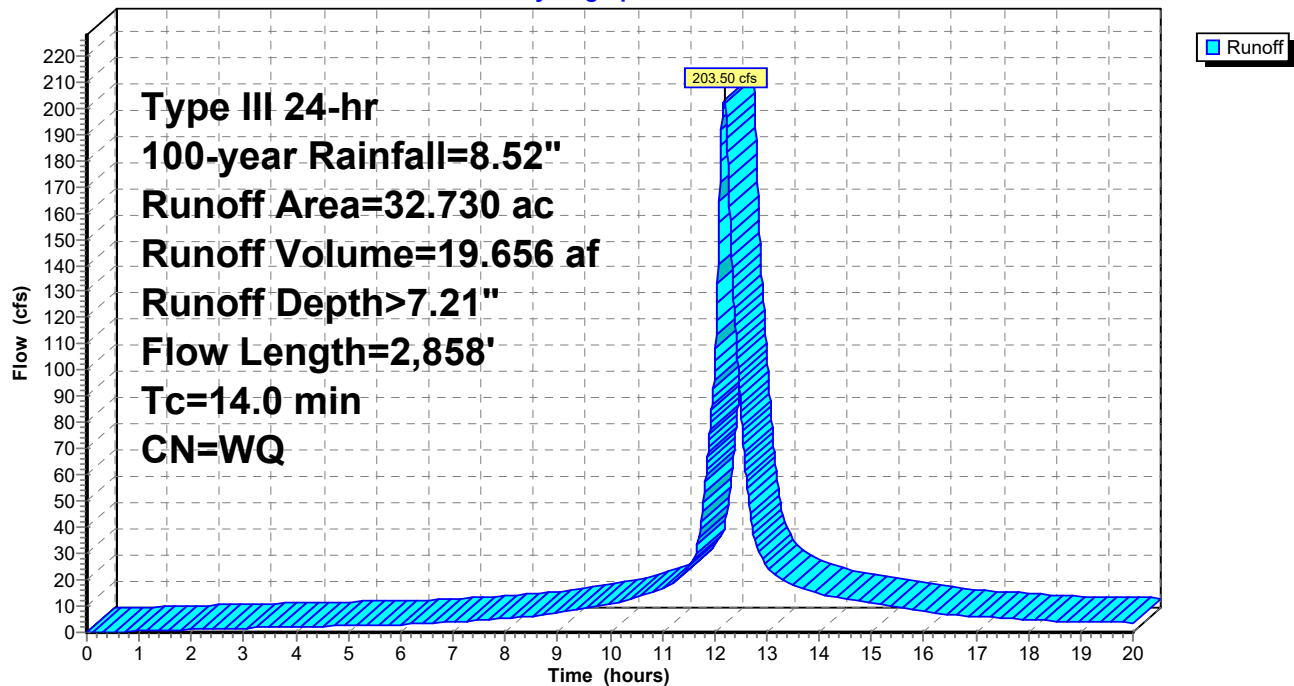
n= 0.014 Cast iron, coated

0.4	166	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	90	0.0110	9.90	69.95	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.4	168	0.0068	7.78	55.00	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.0	8	0.0075	8.17	57.76	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.1	58	0.0345	17.53	123.89	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.9	169	0.0015	3.24	15.89	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.1	54	0.0139	9.85	48.36	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.8	207	0.0026	4.47	31.58	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.6	227	0.0054	6.44	45.51	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.3	107	0.0050	6.20	43.79	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated

14.0 2,858 Total

Subcatchment 1S: Existing Drainage Area E1

Hydrograph



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Type III 24-hr 100-year Rainfall=8.52"

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Hydrograph for Subcatchment 1S: Existing Drainage Area E1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	10.40	1.79	1.05	12.73
0.20	0.02	0.00	0.00	10.60	1.90	1.15	13.99
0.40	0.03	0.00	0.00	10.80	2.01	1.25	15.27
0.60	0.05	0.00	0.01	11.00	2.13	1.35	16.60
0.80	0.07	0.00	0.17	11.20	2.27	1.48	18.42
1.00	0.09	0.00	0.40	11.40	2.44	1.64	22.49
1.20	0.10	0.00	0.59	11.60	2.68	1.86	27.63
1.40	0.12	0.00	0.75	11.80	3.18	2.33	52.32
1.60	0.14	0.00	0.89	12.00	4.26	3.37	99.50
1.80	0.15	0.00	1.00	12.20	5.34	4.42	201.70
2.00	0.17	0.00	1.09	12.40	5.84	4.91	116.78
2.20	0.19	0.00	1.18	12.60	6.08	5.15	61.71
2.40	0.21	0.00	1.27	12.80	6.25	5.32	33.77
2.60	0.22	0.00	1.38	13.00	6.39	5.45	25.64
2.80	0.24	0.01	1.48	13.20	6.51	5.57	20.89
3.00	0.26	0.01	1.58	13.40	6.62	5.68	18.83
3.20	0.28	0.01	1.68	13.60	6.73	5.78	17.43
3.40	0.30	0.02	1.77	13.80	6.82	5.88	16.14
3.60	0.32	0.02	1.86	14.00	6.91	5.97	14.82
3.80	0.34	0.03	1.95	14.20	6.99	6.05	13.63
4.00	0.37	0.03	2.04	14.40	7.07	6.12	12.85
4.20	0.39	0.04	2.13	14.60	7.14	6.20	12.22
4.40	0.41	0.05	2.21	14.80	7.21	6.26	11.59
4.60	0.44	0.06	2.29	15.00	7.28	6.33	10.96
4.80	0.46	0.07	2.37	15.20	7.34	6.39	10.34
5.00	0.48	0.08	2.45	15.40	7.40	6.45	9.70
5.20	0.51	0.09	2.53	15.60	7.45	6.50	9.09
5.40	0.53	0.11	2.62	15.80	7.50	6.55	8.45
5.60	0.56	0.12	2.71	16.00	7.55	6.60	7.82
5.80	0.59	0.13	2.81	16.20	7.59	6.64	7.25
6.00	0.61	0.15	2.90	16.40	7.63	6.68	6.90
6.20	0.64	0.16	3.02	16.60	7.67	6.72	6.62
6.40	0.67	0.18	3.22	16.80	7.71	6.76	6.34
6.60	0.70	0.20	3.45	17.00	7.75	6.80	6.07
6.80	0.74	0.22	3.69	17.20	7.78	6.83	5.79
7.00	0.77	0.24	3.93	17.40	7.82	6.86	5.52
7.20	0.81	0.27	4.18	17.60	7.85	6.89	5.25
7.40	0.85	0.29	4.43	17.80	7.88	6.92	4.97
7.60	0.89	0.32	4.70	18.00	7.91	6.95	4.70
7.80	0.93	0.35	4.96	18.20	7.93	6.98	4.45
8.00	0.97	0.38	5.23	18.40	7.96	7.00	4.33
8.20	1.02	0.42	5.54	18.60	7.99	7.03	4.24
8.40	1.07	0.45	6.04	18.80	8.01	7.05	4.16
8.60	1.12	0.49	6.60	19.00	8.04	7.08	4.08
8.80	1.18	0.54	7.18	19.20	8.06	7.10	4.00
9.00	1.24	0.59	7.77	19.40	8.08	7.13	3.92
9.20	1.31	0.64	8.37	19.60	8.11	7.15	3.83
9.40	1.38	0.70	8.98	19.80	8.13	7.17	3.75
9.60	1.45	0.76	9.61	20.00	8.15	7.20	3.67
9.80	1.53	0.83	10.23				
10.00	1.61	0.89	10.87				
10.20	1.70	0.97	11.60				

111 Ideation Way*Type III 24-hr 100-year Rainfall=8.52"*

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Summary for Subcatchment 4S: Proposed Drainage Area P1

Runoff = 201.39 cfs @ 12.18 hrs, Volume= 19.299 af, Depth> 7.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.52"

Area (ac)	CN	Description
8.630	98	Roofs, HSG D
11.910	98	Paved parking, HSG D
1.400	74	>75% Grass cover, Good, HSG C
10.390	80	>75% Grass cover, Good, HSG D
0.490	79	Woods/grass comb., Good, HSG D
32.820		Weighted Average
12.280	79	37.42% Pervious Area
20.540	98	62.58% Impervious Area

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Type III 24-hr 100-year Rainfall=8.52"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	100	0.2700	0.49		Sheet Flow, Landscape Area Grass: Short n= 0.150 P2= 3.36"
0.3	83	0.0620	4.01		Shallow Concentrated Flow, Landscape Area Unpaved Kv= 16.1 fps
2.9	265	0.0088	1.51		Shallow Concentrated Flow, Landscape Area Unpaved Kv= 16.1 fps
2.5	356	0.0140	2.40		Shallow Concentrated Flow, Paved Area Paved Kv= 20.3 fps
0.4	119	0.0074	5.11	9.04	Pipe Channel, Conveyance Pipe - 18-inch RCP 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, straight & clean
0.1	56	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.0	24	0.0090	8.95	63.28	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.4	146	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	103	0.0083	7.98	56.42	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.4	166	0.0050	6.67	47.16	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.2	90	0.0110	9.90	69.95	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
0.4	168	0.0068	7.78	55.00	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.0	8	0.0075	8.17	57.76	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.1	58	0.0345	17.53	123.89	Pipe Channel, Conveyance Pipe - 36-inch RCP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, straight & clean
0.9	169	0.0015	3.24	15.89	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.1	54	0.0139	9.85	48.36	Pipe Channel, Conveyance Pipe - 30-inch RCP 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Concrete pipe, straight & clean
0.8	207	0.0026	4.47	31.58	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated
0.6	227	0.0054	6.44	45.51	Pipe Channel, Conveyance Pipe - 36-inch DIP 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.014 Cast iron, coated

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Type III 24-hr 100-year Rainfall=8.52"

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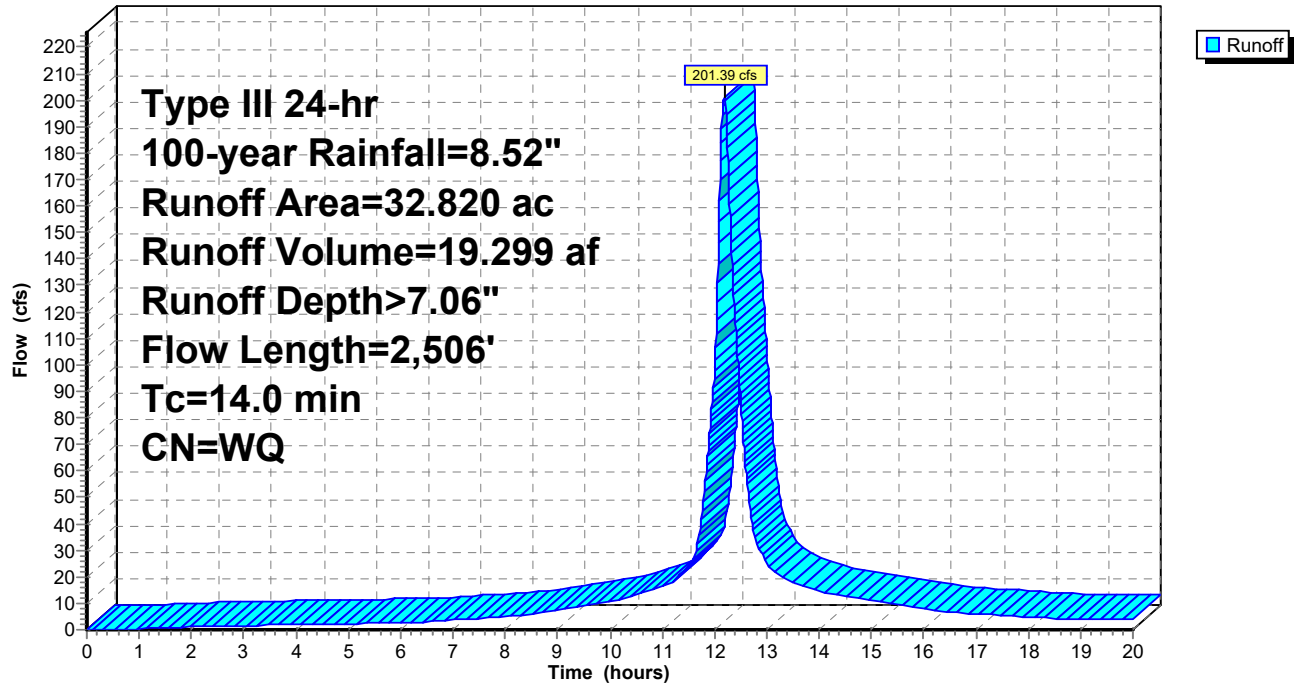
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0.3	107	0.0050	6.20	43.79	Pipe Channel, Conveyance Pipe - 36-inch DIP
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.014 Cast iron, coated

14.0 2,506 Total

Subcatchment 4S: Proposed Drainage Area P1

Hydrograph



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Type III 24-hr 100-year Rainfall=8.52"

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Hydrograph for Subcatchment 4S: Proposed Drainage Area P1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	10.40	1.79	0.99	12.28
0.20	0.02	0.00	0.00	10.60	1.90	1.07	13.52
0.40	0.03	0.00	0.00	10.80	2.01	1.17	14.79
0.60	0.05	0.00	0.01	11.00	2.13	1.28	16.11
0.80	0.07	0.00	0.16	11.20	2.27	1.40	17.91
1.00	0.09	0.00	0.37	11.40	2.44	1.56	21.92
1.20	0.10	0.00	0.56	11.60	2.68	1.77	26.99
1.40	0.12	0.00	0.71	11.80	3.18	2.24	51.27
1.60	0.14	0.00	0.83	12.00	4.26	3.27	97.96
1.80	0.15	0.00	0.94	12.20	5.34	4.31	199.68
2.00	0.17	0.00	1.02	12.40	5.84	4.80	115.94
2.20	0.19	0.00	1.10	12.60	6.08	5.03	61.37
2.40	0.21	0.00	1.19	12.80	6.25	5.20	33.61
2.60	0.22	0.00	1.29	13.00	6.39	5.34	25.53
2.80	0.24	0.00	1.38	13.20	6.51	5.46	20.81
3.00	0.26	0.00	1.47	13.40	6.62	5.57	18.75
3.20	0.28	0.01	1.55	13.60	6.73	5.67	17.37
3.40	0.30	0.01	1.64	13.80	6.82	5.76	16.08
3.60	0.32	0.01	1.72	14.00	6.91	5.85	14.77
3.80	0.34	0.02	1.80	14.20	6.99	5.93	13.59
4.00	0.37	0.02	1.87	14.40	7.07	6.01	12.81
4.20	0.39	0.03	1.95	14.60	7.14	6.08	12.18
4.40	0.41	0.04	2.02	14.80	7.21	6.15	11.56
4.60	0.44	0.05	2.09	15.00	7.28	6.21	10.93
4.80	0.46	0.05	2.16	15.20	7.34	6.27	10.31
5.00	0.48	0.06	2.23	15.40	7.40	6.33	9.68
5.20	0.51	0.07	2.30	15.60	7.45	6.38	9.06
5.40	0.53	0.09	2.38	15.80	7.50	6.43	8.43
5.60	0.56	0.10	2.46	16.00	7.55	6.48	7.80
5.80	0.59	0.11	2.56	16.20	7.59	6.52	7.23
6.00	0.61	0.12	2.65	16.40	7.63	6.56	6.88
6.20	0.64	0.14	2.76	16.60	7.67	6.60	6.61
6.40	0.67	0.15	2.96	16.80	7.71	6.64	6.33
6.60	0.70	0.17	3.17	17.00	7.75	6.68	6.06
6.80	0.74	0.19	3.41	17.20	7.78	6.71	5.78
7.00	0.77	0.21	3.64	17.40	7.82	6.74	5.51
7.20	0.81	0.23	3.88	17.60	7.85	6.78	5.24
7.40	0.85	0.26	4.13	17.80	7.88	6.80	4.96
7.60	0.89	0.28	4.38	18.00	7.91	6.83	4.69
7.80	0.93	0.31	4.64	18.20	7.93	6.86	4.44
8.00	0.97	0.34	4.90	18.40	7.96	6.89	4.33
8.20	1.02	0.37	5.21	18.60	7.99	6.91	4.24
8.40	1.07	0.41	5.69	18.80	8.01	6.94	4.15
8.60	1.12	0.45	6.23	19.00	8.04	6.96	4.07
8.80	1.18	0.49	6.79	19.20	8.06	6.98	3.99
9.00	1.24	0.54	7.37	19.40	8.08	7.01	3.91
9.20	1.31	0.59	7.96	19.60	8.11	7.03	3.82
9.40	1.38	0.64	8.56	19.80	8.13	7.05	3.75
9.60	1.45	0.70	9.18	20.00	8.15	7.08	3.66
9.80	1.53	0.76	9.79				
10.00	1.61	0.83	10.44				
10.20	1.70	0.90	11.16				

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Type III 24-hr 2-year Rainfall=3.36"

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Primary Comparison

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
0.00	0.00	0.00	1.04	0.00	0.00	2.08	0.14	0.13
0.02	0.00	0.00	1.06	0.00	0.00	2.10	0.14	0.13
0.04	0.00	0.00	1.08	0.00	0.00	2.12	0.14	0.13
0.06	0.00	0.00	1.10	0.00	0.00	2.14	0.15	0.14
0.08	0.00	0.00	1.12	0.00	0.00	2.16	0.15	0.14
0.10	0.00	0.00	1.14	0.00	0.00	2.18	0.15	0.14
0.12	0.00	0.00	1.16	0.00	0.00	2.20	0.16	0.15
0.14	0.00	0.00	1.18	0.00	0.00	2.22	0.16	0.15
0.16	0.00	0.00	1.20	0.00	0.00	2.24	0.17	0.15
0.18	0.00	0.00	1.22	0.00	0.00	2.26	0.17	0.16
0.20	0.00	0.00	1.24	0.00	0.00	2.28	0.17	0.16
0.22	0.00	0.00	1.26	0.00	0.00	2.30	0.18	0.17
0.24	0.00	0.00	1.28	0.00	0.00	2.32	0.18	0.17
0.26	0.00	0.00	1.30	0.00	0.00	2.34	0.18	0.17
0.28	0.00	0.00	1.32	0.00	0.00	2.36	0.19	0.18
0.30	0.00	0.00	1.34	0.00	0.00	2.38	0.19	0.18
0.32	0.00	0.00	1.36	0.00	0.00	2.40	0.20	0.18
0.34	0.00	0.00	1.38	0.00	0.00	2.42	0.20	0.19
0.36	0.00	0.00	1.40	0.01	0.01	2.44	0.20	0.19
0.38	0.00	0.00	1.42	0.01	0.01	2.46	0.21	0.19
0.40	0.00	0.00	1.44	0.01	0.01	2.48	0.21	0.20
0.42	0.00	0.00	1.46	0.01	0.01	2.50	0.22	0.20
0.44	0.00	0.00	1.48	0.02	0.02	2.52	0.22	0.21
0.46	0.00	0.00	1.50	0.02	0.02	2.54	0.22	0.21
0.48	0.00	0.00	1.52	0.02	0.02	2.56	0.23	0.21
0.50	0.00	0.00	1.54	0.03	0.03	2.58	0.23	0.22
0.52	0.00	0.00	1.56	0.03	0.03	2.60	0.23	0.22
0.54	0.00	0.00	1.58	0.04	0.03	2.62	0.24	0.22
0.56	0.00	0.00	1.60	0.04	0.04	2.64	0.24	0.23
0.58	0.00	0.00	1.62	0.04	0.04	2.66	0.25	0.23
0.60	0.00	0.00	1.64	0.05	0.05	2.68	0.25	0.23
0.62	0.00	0.00	1.66	0.05	0.05	2.70	0.25	0.24
0.64	0.00	0.00	1.68	0.06	0.05	2.72	0.26	0.24
0.66	0.00	0.00	1.70	0.06	0.06	2.74	0.26	0.25
0.68	0.00	0.00	1.72	0.07	0.06	2.76	0.27	0.25
0.70	0.00	0.00	1.74	0.07	0.07	2.78	0.27	0.25
0.72	0.00	0.00	1.76	0.07	0.07	2.80	0.27	0.26
0.74	0.00	0.00	1.78	0.08	0.07	2.82	0.28	0.26
0.76	0.00	0.00	1.80	0.08	0.08	2.84	0.28	0.26
0.78	0.00	0.00	1.82	0.09	0.08	2.86	0.28	0.27
0.80	0.00	0.00	1.84	0.09	0.08	2.88	0.29	0.27
0.82	0.00	0.00	1.86	0.09	0.09	2.90	0.29	0.27
0.84	0.00	0.00	1.88	0.10	0.09	2.92	0.30	0.28
0.86	0.00	0.00	1.90	0.10	0.10	2.94	0.30	0.28
0.88	0.00	0.00	1.92	0.11	0.10	2.96	0.30	0.29
0.90	0.00	0.00	1.94	0.11	0.10	2.98	0.31	0.29
0.92	0.00	0.00	1.96	0.11	0.11	3.00	0.31	0.29
0.94	0.00	0.00	1.98	0.12	0.11	3.02	0.32	0.30
0.96	0.00	0.00	2.00	0.12	0.11	3.04	0.32	0.30
0.98	0.00	0.00	2.02	0.12	0.12	3.06	0.32	0.30
1.00	0.00	0.00	2.04	0.13	0.12	3.08	0.33	0.31
1.02	0.00	0.00	2.06	0.13	0.12	3.10	0.33	0.31

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Type III 24-hr 2-year Rainfall=3.36"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
3.12	0.33	0.31	4.16	0.53	0.50	5.20	0.72	0.67
3.14	0.34	0.32	4.18	0.53	0.50	5.22	0.72	0.67
3.16	0.34	0.32	4.20	0.54	0.50	5.24	0.72	0.68
3.18	0.35	0.32	4.22	0.54	0.51	5.26	0.73	0.68
3.20	0.35	0.33	4.24	0.54	0.51	5.28	0.73	0.68
3.22	0.35	0.33	4.26	0.55	0.51	5.30	0.73	0.69
3.24	0.36	0.34	4.28	0.55	0.52	5.32	0.74	0.69
3.26	0.36	0.34	4.30	0.56	0.52	5.34	0.74	0.69
3.28	0.37	0.34	4.32	0.56	0.52	5.36	0.74	0.70
3.30	0.37	0.35	4.34	0.56	0.53	5.38	0.75	0.70
3.32	0.37	0.35	4.36	0.57	0.53	5.40	0.75	0.70
3.34	0.38	0.35	4.38	0.57	0.53	5.42	0.75	0.71
3.36	0.38	0.36	4.40	0.57	0.54	5.44	0.76	0.71
3.38	0.38	0.36	4.42	0.58	0.54	5.46	0.76	0.71
3.40	0.39	0.36	4.44	0.58	0.54	5.48	0.76	0.72
3.42	0.39	0.37	4.46	0.59	0.55	5.50	0.77	0.72
3.44	0.40	0.37	4.48	0.59	0.55	5.52	0.77	0.72
3.46	0.40	0.37	4.50	0.59	0.56	5.54	0.78	0.73
3.48	0.40	0.38	4.52	0.60	0.56	5.56	0.78	0.73
3.50	0.41	0.38	4.54	0.60	0.56	5.58	0.78	0.73
3.52	0.41	0.39	4.56	0.60	0.57	5.60	0.79	0.73
3.54	0.41	0.39	4.58	0.61	0.57	5.62	0.79	0.74
3.56	0.42	0.39	4.60	0.61	0.57	5.64	0.79	0.74
3.58	0.42	0.40	4.62	0.61	0.58	5.66	0.80	0.74
3.60	0.43	0.40	4.64	0.62	0.58	5.68	0.80	0.75
3.62	0.43	0.40	4.66	0.62	0.58	5.70	0.80	0.75
3.64	0.43	0.41	4.68	0.62	0.59	5.72	0.81	0.75
3.66	0.44	0.41	4.70	0.63	0.59	5.74	0.81	0.76
3.68	0.44	0.41	4.72	0.63	0.59	5.76	0.81	0.76
3.70	0.44	0.42	4.74	0.64	0.60	5.78	0.82	0.76
3.72	0.45	0.42	4.76	0.64	0.60	5.80	0.82	0.77
3.74	0.45	0.42	4.78	0.64	0.60	5.82	0.82	0.77
3.76	0.46	0.43	4.80	0.65	0.61	5.84	0.83	0.77
3.78	0.46	0.43	4.82	0.65	0.61	5.86	0.83	0.78
3.80	0.46	0.43	4.84	0.65	0.61	5.88	0.83	0.78
3.82	0.47	0.44	4.86	0.66	0.62	5.90	0.84	0.78
3.84	0.47	0.44	4.88	0.66	0.62	5.92	0.84	0.79
3.86	0.47	0.44	4.90	0.66	0.62	5.94	0.85	0.79
3.88	0.48	0.45	4.92	0.67	0.62	5.96	0.85	0.79
3.90	0.48	0.45	4.94	0.67	0.63	5.98	0.85	0.79
3.92	0.49	0.46	4.96	0.67	0.63	6.00	0.86	0.80
3.94	0.49	0.46	4.98	0.68	0.63	6.02	0.86	0.80
3.96	0.49	0.46	5.00	0.68	0.64	6.04	0.86	0.80
3.98	0.50	0.47	5.02	0.68	0.64	6.06	0.87	0.81
4.00	0.50	0.47	5.04	0.69	0.64	6.08	0.87	0.81
4.02	0.50	0.47	5.06	0.69	0.65	6.10	0.87	0.81
4.04	0.51	0.48	5.08	0.69	0.65	6.12	0.88	0.82
4.06	0.51	0.48	5.10	0.70	0.65	6.14	0.88	0.82
4.08	0.52	0.48	5.12	0.70	0.66	6.16	0.89	0.82
4.10	0.52	0.49	5.14	0.71	0.66	6.18	0.89	0.83
4.12	0.52	0.49	5.16	0.71	0.66	6.20	0.90	0.83
4.14	0.53	0.49	5.18	0.71	0.67	6.22	0.90	0.84

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Type III 24-hr 2-year Rainfall=3.36"

Printed 7/10/2020

Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
6.24	0.91	0.84	7.28	1.31	1.21	8.32	1.80	1.64
6.26	0.91	0.85	7.30	1.32	1.21	8.34	1.81	1.66
6.28	0.92	0.86	7.32	1.33	1.22	8.36	1.83	1.67
6.30	0.93	0.86	7.34	1.33	1.23	8.38	1.85	1.69
6.32	0.93	0.87	7.36	1.34	1.24	8.40	1.86	1.70
6.34	0.94	0.87	7.38	1.35	1.24	8.42	1.88	1.72
6.36	0.95	0.88	7.40	1.36	1.25	8.44	1.90	1.73
6.38	0.96	0.89	7.42	1.37	1.26	8.46	1.91	1.75
6.40	0.96	0.89	7.44	1.37	1.26	8.48	1.93	1.76
6.42	0.97	0.90	7.46	1.38	1.27	8.50	1.95	1.78
6.44	0.98	0.91	7.48	1.39	1.28	8.52	1.97	1.79
6.46	0.99	0.91	7.50	1.40	1.29	8.54	1.99	1.81
6.48	0.99	0.92	7.52	1.41	1.29	8.56	2.00	1.82
6.50	1.00	0.93	7.54	1.42	1.30	8.58	2.02	1.84
6.52	1.01	0.94	7.56	1.42	1.31	8.60	2.04	1.86
6.54	1.02	0.94	7.58	1.43	1.32	8.62	2.05	1.87
6.56	1.02	0.95	7.60	1.44	1.32	8.64	2.07	1.89
6.58	1.03	0.96	7.62	1.45	1.33	8.66	2.09	1.91
6.60	1.04	0.96	7.64	1.46	1.34	8.68	2.11	1.92
6.62	1.05	0.97	7.66	1.47	1.35	8.70	2.13	1.94
6.64	1.05	0.98	7.68	1.47	1.35	8.72	2.14	1.95
6.66	1.06	0.98	7.70	1.48	1.36	8.74	2.16	1.97
6.68	1.07	0.99	7.72	1.49	1.37	8.76	2.18	1.99
6.70	1.08	1.00	7.74	1.50	1.38	8.78	2.20	2.00
6.72	1.08	1.00	7.76	1.51	1.39	8.80	2.22	2.02
6.74	1.09	1.01	7.78	1.52	1.39	8.82	2.24	2.03
6.76	1.10	1.02	7.80	1.53	1.40	8.84	2.25	2.05
6.78	1.11	1.03	7.82	1.53	1.41	8.86	2.27	2.06
6.80	1.12	1.03	7.84	1.54	1.41	8.88	2.29	2.08
6.82	1.12	1.04	7.86	1.55	1.42	8.90	2.31	2.10
6.84	1.13	1.05	7.88	1.56	1.43	8.92	2.33	2.11
6.86	1.14	1.05	7.90	1.57	1.44	8.94	2.34	2.13
6.88	1.15	1.06	7.92	1.58	1.45	8.96	2.36	2.14
6.90	1.16	1.07	7.94	1.58	1.45	8.98	2.38	2.16
6.92	1.16	1.08	7.96	1.59	1.46	9.00	2.40	2.18
6.94	1.17	1.08	7.98	1.60	1.47	9.02	2.41	2.19
6.96	1.18	1.09	8.00	1.61	1.47	9.04	2.44	2.21
6.98	1.19	1.10	8.02	1.62	1.48	9.06	2.45	2.23
7.00	1.20	1.10	8.04	1.63	1.49	9.08	2.47	2.24
7.02	1.20	1.11	8.06	1.64	1.50	9.10	2.49	2.26
7.04	1.21	1.12	8.08	1.65	1.51	9.12	2.51	2.28
7.06	1.22	1.13	8.10	1.65	1.51	9.14	2.53	2.29
7.08	1.23	1.13	8.12	1.66	1.52	9.16	2.55	2.31
7.10	1.24	1.14	8.14	1.67	1.53	9.18	2.56	2.32
7.12	1.24	1.15	8.16	1.68	1.54	9.20	2.58	2.34
7.14	1.25	1.16	8.18	1.70	1.55	9.22	2.60	2.36
7.16	1.26	1.16	8.20	1.71	1.56	9.24	2.62	2.37
7.18	1.27	1.17	8.22	1.72	1.57	9.26	2.64	2.39
7.20	1.28	1.18	8.24	1.74	1.59	9.28	2.66	2.41
7.22	1.28	1.18	8.26	1.75	1.60	9.30	2.68	2.43
7.24	1.29	1.19	8.28	1.77	1.61	9.32	2.70	2.45
7.26	1.30	1.20	8.30	1.78	1.63	9.34	2.72	2.47

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Type III 24-hr 2-year Rainfall=3.36"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
9.36	2.74	2.48	10.40	4.06	3.73	11.44	7.72	7.23
9.38	2.76	2.51	10.42	4.10	3.77	11.46	7.89	7.39
9.40	2.78	2.52	10.44	4.14	3.81	11.48	8.04	7.54
9.42	2.80	2.54	10.46	4.18	3.85	11.50	8.21	7.70
9.44	2.82	2.56	10.48	4.22	3.89	11.52	8.38	7.86
9.46	2.84	2.58	10.50	4.27	3.94	11.54	8.54	8.01
9.48	2.86	2.60	10.52	4.31	3.97	11.56	8.73	8.19
9.50	2.88	2.62	10.54	4.35	4.01	11.58	8.93	8.38
9.52	2.90	2.64	10.56	4.40	4.06	11.60	9.18	8.62
9.54	2.92	2.66	10.58	4.44	4.10	11.62	9.51	8.93
9.56	2.95	2.68	10.60	4.48	4.14	11.64	9.92	9.33
9.58	2.96	2.70	10.62	4.53	4.18	11.66	10.47	9.85
9.60	2.99	2.72	10.64	4.57	4.22	11.68	11.14	10.49
9.62	3.01	2.74	10.66	4.62	4.27	11.70	11.94	11.24
9.64	3.03	2.76	10.68	4.66	4.31	11.72	12.87	12.13
9.66	3.05	2.78	10.70	4.70	4.35	11.74	13.92	13.12
9.68	3.07	2.80	10.72	4.75	4.39	11.76	15.05	14.20
9.70	3.09	2.82	10.74	4.79	4.44	11.78	16.29	15.38
9.72	3.12	2.84	10.76	4.83	4.48	11.80	17.59	16.62
9.74	3.14	2.86	10.78	4.88	4.52	11.82	18.94	17.90
9.76	3.16	2.88	10.80	4.92	4.56	11.84	20.37	19.26
9.78	3.18	2.90	10.82	4.97	4.61	11.86	21.81	20.65
9.80	3.20	2.92	10.84	5.02	4.65	11.88	23.30	22.07
9.82	3.23	2.95	10.86	5.06	4.69	11.90	24.85	23.56
9.84	3.25	2.97	10.88	5.11	4.74	11.92	26.39	25.04
9.86	3.27	2.99	10.90	5.16	4.79	11.94	28.00	26.59
9.88	3.29	3.01	10.92	5.20	4.83	11.96	29.74	28.27
9.90	3.31	3.03	10.94	5.25	4.87	11.98	31.68	30.14
9.92	3.33	3.05	10.96	5.29	4.92	12.00	34.09	32.47
9.94	3.36	3.07	10.98	5.34	4.96	12.02	37.13	35.41
9.96	3.38	3.09	11.00	5.39	5.01	12.04	41.03	39.17
9.98	3.40	3.11	11.02	5.43	5.05	12.06	45.86	43.84
10.00	3.42	3.14	11.04	5.48	5.09	12.08	51.36	49.17
10.02	3.44	3.15	11.06	5.53	5.15	12.10	57.13	54.76
10.04	3.47	3.18	11.08	5.57	5.19	12.12	62.61	60.08
10.06	3.49	3.20	11.10	5.63	5.24	12.14	67.02	64.39
10.08	3.51	3.22	11.12	5.69	5.30	12.16	70.02	67.34
10.10	3.54	3.24	11.14	5.75	5.36	12.18	71.47	68.80
10.12	3.56	3.27	11.16	5.84	5.44	12.20	71.00	68.40
10.14	3.59	3.29	11.18	5.93	5.53	12.22	69.26	66.78
10.16	3.62	3.32	11.20	6.02	5.61	12.24	66.54	64.21
10.18	3.64	3.34	11.22	6.13	5.72	12.26	63.05	60.89
10.20	3.67	3.37	11.24	6.25	5.84	12.28	59.46	57.46
10.22	3.71	3.41	11.26	6.38	5.95	12.30	55.89	54.05
10.24	3.74	3.44	11.28	6.52	6.09	12.32	52.50	50.80
10.26	3.78	3.47	11.30	6.65	6.21	12.34	49.48	47.91
10.28	3.82	3.51	11.32	6.79	6.35	12.36	46.70	45.24
10.30	3.85	3.54	11.34	6.95	6.50	12.38	44.12	42.77
10.32	3.89	3.58	11.36	7.09	6.63	12.40	41.78	40.53
10.34	3.94	3.62	11.38	7.25	6.78	12.42	39.51	38.34
10.36	3.97	3.65	11.40	7.41	6.93	12.44	37.35	36.27
10.38	4.02	3.70	11.42	7.56	7.08	12.46	35.33	34.32

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Type III 24-hr 2-year Rainfall=3.36"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
12.48	33.30	32.36	13.52	6.58	6.44	14.56	4.54	4.45
12.50	31.37	30.49	13.54	6.53	6.39	14.58	4.52	4.43
12.52	29.49	28.68	13.56	6.48	6.34	14.60	4.50	4.41
12.54	27.60	26.85	13.58	6.44	6.30	14.62	4.47	4.39
12.56	25.80	25.11	13.60	6.38	6.25	14.64	4.45	4.37
12.58	24.03	23.39	13.62	6.34	6.20	14.66	4.43	4.34
12.60	22.30	21.71	13.64	6.29	6.16	14.68	4.40	4.32
12.62	20.72	20.18	13.66	6.24	6.11	14.70	4.39	4.30
12.64	19.22	18.73	13.68	6.20	6.07	14.72	4.36	4.28
12.66	17.87	17.41	13.70	6.15	6.02	14.74	4.34	4.25
12.68	16.70	16.27	13.72	6.10	5.97	14.76	4.32	4.23
12.70	15.65	15.26	13.74	6.06	5.93	14.78	4.29	4.21
12.72	14.75	14.38	13.76	6.01	5.88	14.80	4.27	4.19
12.74	13.99	13.64	13.78	5.96	5.83	14.82	4.25	4.17
12.76	13.32	12.99	13.80	5.92	5.79	14.84	4.22	4.14
12.78	12.75	12.44	13.82	5.87	5.74	14.86	4.20	4.12
12.80	12.27	11.97	13.84	5.82	5.70	14.88	4.18	4.10
12.82	11.82	11.54	13.86	5.78	5.66	14.90	4.15	4.08
12.84	11.45	11.18	13.88	5.72	5.61	14.92	4.14	4.06
12.86	11.12	10.85	13.90	5.68	5.56	14.94	4.11	4.03
12.88	10.80	10.54	13.92	5.63	5.52	14.96	4.09	4.01
12.90	10.53	10.28	13.94	5.58	5.47	14.98	4.07	3.99
12.92	10.27	10.02	13.96	5.54	5.42	15.00	4.04	3.96
12.94	10.01	9.78	13.98	5.49	5.38	15.02	4.02	3.94
12.96	9.79	9.56	14.00	5.44	5.33	15.04	4.00	3.92
12.98	9.56	9.34	14.02	5.40	5.29	15.06	3.97	3.90
13.00	9.34	9.13	14.04	5.35	5.24	15.08	3.95	3.88
13.02	9.15	8.94	14.06	5.30	5.19	15.10	3.93	3.86
13.04	8.93	8.73	14.08	5.26	5.15	15.12	3.90	3.83
13.06	8.74	8.54	14.10	5.21	5.10	15.14	3.88	3.81
13.08	8.56	8.36	14.12	5.16	5.06	15.16	3.86	3.79
13.10	8.36	8.17	14.14	5.12	5.02	15.18	3.83	3.76
13.12	8.20	8.01	14.16	5.08	4.98	15.20	3.82	3.74
13.14	8.03	7.85	14.18	5.04	4.94	15.22	3.79	3.72
13.16	7.88	7.70	14.20	5.01	4.91	15.24	3.77	3.70
13.18	7.75	7.58	14.22	4.97	4.87	15.26	3.75	3.68
13.20	7.63	7.46	14.24	4.94	4.84	15.28	3.72	3.65
13.22	7.52	7.35	14.26	4.91	4.81	15.30	3.70	3.63
13.24	7.43	7.26	14.28	4.88	4.78	15.32	3.68	3.61
13.26	7.34	7.17	14.30	4.86	4.76	15.34	3.65	3.58
13.28	7.26	7.10	14.32	4.83	4.73	15.36	3.63	3.56
13.30	7.19	7.03	14.34	4.80	4.71	15.38	3.61	3.54
13.32	7.12	6.96	14.36	4.78	4.69	15.40	3.58	3.52
13.34	7.06	6.90	14.38	4.75	4.66	15.42	3.56	3.50
13.36	7.00	6.85	14.40	4.73	4.63	15.44	3.54	3.47
13.38	6.94	6.78	14.42	4.71	4.62	15.46	3.51	3.45
13.40	6.88	6.74	14.44	4.68	4.59	15.48	3.49	3.43
13.42	6.83	6.68	14.46	4.66	4.57	15.50	3.47	3.41
13.44	6.77	6.63	14.48	4.64	4.55	15.52	3.44	3.38
13.46	6.73	6.58	14.50	4.61	4.52	15.54	3.43	3.36
13.48	6.68	6.53	14.52	4.59	4.50	15.56	3.40	3.34
13.50	6.62	6.48	14.54	4.57	4.48	15.58	3.38	3.32

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Type III 24-hr 2-year Rainfall=3.36"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
15.60	3.36	3.30	16.64	2.43	2.39	17.68	1.91	1.87
15.62	3.33	3.27	16.66	2.42	2.38	17.70	1.89	1.86
15.64	3.31	3.25	16.68	2.41	2.37	17.72	1.89	1.85
15.66	3.29	3.23	16.70	2.40	2.36	17.74	1.87	1.84
15.68	3.26	3.20	16.72	2.39	2.35	17.76	1.86	1.83
15.70	3.24	3.18	16.74	2.38	2.34	17.78	1.86	1.83
15.72	3.22	3.16	16.76	2.37	2.33	17.80	1.84	1.81
15.74	3.19	3.13	16.78	2.36	2.32	17.82	1.83	1.80
15.76	3.17	3.11	16.80	2.35	2.31	17.84	1.83	1.80
15.78	3.15	3.09	16.82	2.34	2.30	17.86	1.81	1.78
15.80	3.12	3.07	16.84	2.33	2.29	17.88	1.80	1.77
15.82	3.10	3.05	16.86	2.32	2.28	17.90	1.79	1.77
15.84	3.08	3.02	16.88	2.31	2.27	17.92	1.78	1.75
15.86	3.05	3.00	16.90	2.30	2.26	17.94	1.77	1.75
15.88	3.03	2.98	16.92	2.29	2.25	17.96	1.76	1.73
15.90	3.01	2.95	16.94	2.28	2.24	17.98	1.75	1.72
15.92	2.99	2.93	16.96	2.27	2.23	18.00	1.74	1.72
15.94	2.96	2.91	16.98	2.26	2.22	18.02	1.73	1.70
15.96	2.94	2.88	17.00	2.25	2.21	18.04	1.72	1.69
15.98	2.92	2.86	17.02	2.24	2.20	18.06	1.71	1.69
16.00	2.89	2.84	17.04	2.23	2.19	18.08	1.70	1.67
16.02	2.87	2.82	17.06	2.22	2.18	18.10	1.69	1.67
16.04	2.85	2.80	17.08	2.21	2.17	18.12	1.68	1.66
16.06	2.82	2.77	17.10	2.20	2.16	18.14	1.67	1.65
16.08	2.80	2.75	17.12	2.19	2.15	18.16	1.67	1.64
16.10	2.78	2.73	17.14	2.18	2.14	18.18	1.66	1.63
16.12	2.76	2.71	17.16	2.17	2.13	18.20	1.65	1.62
16.14	2.74	2.69	17.18	2.16	2.12	18.22	1.65	1.62
16.16	2.72	2.67	17.20	2.15	2.11	18.24	1.64	1.61
16.18	2.70	2.65	17.22	2.14	2.10	18.26	1.64	1.61
16.20	2.68	2.63	17.24	2.13	2.09	18.28	1.63	1.61
16.22	2.67	2.62	17.26	2.12	2.08	18.30	1.63	1.60
16.24	2.65	2.60	17.28	2.11	2.07	18.32	1.62	1.60
16.26	2.64	2.59	17.30	2.10	2.06	18.34	1.62	1.59
16.28	2.62	2.58	17.32	2.09	2.05	18.36	1.61	1.59
16.30	2.61	2.56	17.34	2.08	2.04	18.38	1.61	1.58
16.32	2.60	2.55	17.36	2.07	2.03	18.40	1.61	1.58
16.34	2.59	2.54	17.38	2.06	2.02	18.42	1.60	1.58
16.36	2.57	2.53	17.40	2.05	2.01	18.44	1.60	1.58
16.38	2.57	2.52	17.42	2.04	2.00	18.46	1.60	1.57
16.40	2.55	2.51	17.44	2.03	1.99	18.48	1.59	1.57
16.42	2.54	2.50	17.46	2.02	1.98	18.50	1.59	1.57
16.44	2.53	2.49	17.48	2.01	1.97	18.52	1.59	1.56
16.46	2.52	2.48	17.50	2.00	1.96	18.54	1.58	1.56
16.48	2.51	2.47	17.52	1.99	1.95	18.56	1.58	1.56
16.50	2.50	2.46	17.54	1.98	1.94	18.58	1.58	1.55
16.52	2.49	2.45	17.56	1.97	1.93	18.60	1.58	1.55
16.54	2.48	2.44	17.58	1.96	1.92	18.62	1.57	1.55
16.56	2.47	2.43	17.60	1.95	1.91	18.64	1.57	1.54
16.58	2.46	2.42	17.62	1.94	1.90	18.66	1.57	1.54
16.60	2.45	2.41	17.64	1.92	1.89	18.68	1.56	1.54
16.62	2.44	2.40	17.66	1.92	1.88	18.70	1.56	1.53

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Type III 24-hr 2-year Rainfall=3.36"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
18.72	1.56	1.53	19.76	1.40	1.38
18.74	1.56	1.53	19.78	1.40	1.38
18.76	1.55	1.53	19.80	1.40	1.37
18.78	1.55	1.52	19.82	1.39	1.37
18.80	1.55	1.52	19.84	1.39	1.37
18.82	1.54	1.52	19.86	1.39	1.36
18.84	1.54	1.52	19.88	1.38	1.36
18.86	1.54	1.51	19.90	1.38	1.36
18.88	1.53	1.51	19.92	1.38	1.36
18.90	1.53	1.51	19.94	1.37	1.35
18.92	1.53	1.50	19.96	1.37	1.35
18.94	1.52	1.50	19.98	1.37	1.35
18.96	1.52	1.50	20.00	1.36	1.34
18.98	1.52	1.49			
19.00	1.52	1.49			
19.02	1.51	1.49			
19.04	1.51	1.48			
19.06	1.51	1.48			
19.08	1.50	1.48			
19.10	1.50	1.48			
19.12	1.50	1.47			
19.14	1.49	1.47			
19.16	1.49	1.47			
19.18	1.49	1.47			
19.20	1.48	1.46			
19.22	1.48	1.46			
19.24	1.48	1.46			
19.26	1.48	1.45			
19.28	1.47	1.45			
19.30	1.47	1.45			
19.32	1.47	1.44			
19.34	1.46	1.44			
19.36	1.46	1.44			
19.38	1.46	1.43			
19.40	1.46	1.43			
19.42	1.45	1.43			
19.44	1.45	1.43			
19.46	1.45	1.42			
19.48	1.44	1.42			
19.50	1.44	1.42			
19.52	1.44	1.42			
19.54	1.43	1.41			
19.56	1.43	1.41			
19.58	1.43	1.41			
19.60	1.42	1.40			
19.62	1.42	1.40			
19.64	1.42	1.40			
19.66	1.42	1.39			
19.68	1.41	1.39			
19.70	1.41	1.39			
19.72	1.41	1.38			
19.74	1.40	1.38			

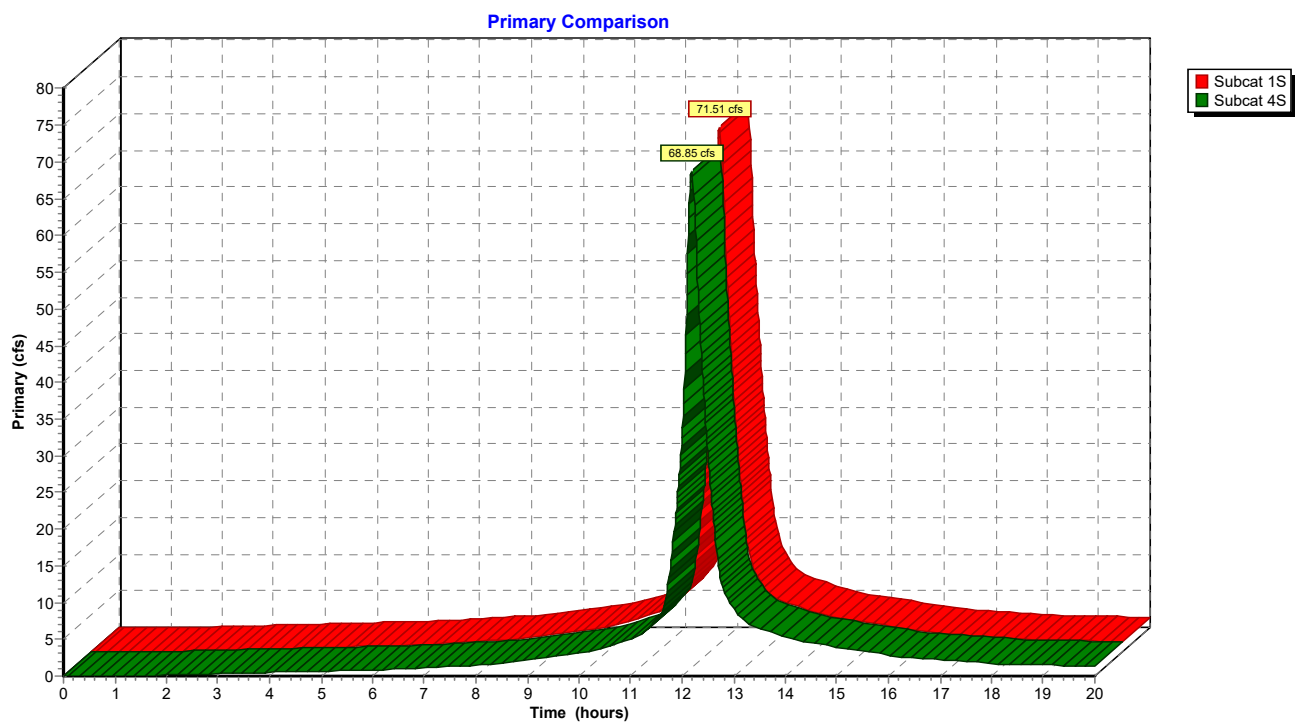
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Type III 24-hr 2-year Rainfall=3.36"

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Type III 24-hr 10-year Rainfall=5.11"

Printed 7/10/2020

Primary Comparison

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
0.00	0.00	0.00	1.04	0.03	0.03	2.08	0.42	0.40
0.02	0.00	0.00	1.06	0.04	0.03	2.10	0.43	0.40
0.04	0.00	0.00	1.08	0.05	0.04	2.12	0.44	0.41
0.06	0.00	0.00	1.10	0.05	0.05	2.14	0.44	0.41
0.08	0.00	0.00	1.12	0.06	0.06	2.16	0.45	0.42
0.10	0.00	0.00	1.14	0.07	0.07	2.18	0.45	0.42
0.12	0.00	0.00	1.16	0.08	0.08	2.20	0.46	0.43
0.14	0.00	0.00	1.18	0.09	0.08	2.22	0.47	0.44
0.16	0.00	0.00	1.20	0.10	0.09	2.24	0.47	0.44
0.18	0.00	0.00	1.22	0.11	0.10	2.26	0.48	0.45
0.20	0.00	0.00	1.24	0.12	0.11	2.28	0.48	0.45
0.22	0.00	0.00	1.26	0.13	0.12	2.30	0.49	0.46
0.24	0.00	0.00	1.28	0.14	0.13	2.32	0.50	0.47
0.26	0.00	0.00	1.30	0.14	0.14	2.34	0.50	0.47
0.28	0.00	0.00	1.32	0.15	0.14	2.36	0.51	0.48
0.30	0.00	0.00	1.34	0.16	0.15	2.38	0.52	0.48
0.32	0.00	0.00	1.36	0.17	0.16	2.40	0.52	0.49
0.34	0.00	0.00	1.38	0.18	0.17	2.42	0.53	0.49
0.36	0.00	0.00	1.40	0.19	0.18	2.44	0.53	0.50
0.38	0.00	0.00	1.42	0.20	0.18	2.46	0.54	0.51
0.40	0.00	0.00	1.44	0.21	0.19	2.48	0.55	0.51
0.42	0.00	0.00	1.46	0.21	0.20	2.50	0.55	0.52
0.44	0.00	0.00	1.48	0.22	0.21	2.52	0.56	0.52
0.46	0.00	0.00	1.50	0.23	0.22	2.54	0.57	0.53
0.48	0.00	0.00	1.52	0.24	0.22	2.56	0.57	0.54
0.50	0.00	0.00	1.54	0.25	0.23	2.58	0.58	0.54
0.52	0.00	0.00	1.56	0.25	0.24	2.60	0.58	0.55
0.54	0.00	0.00	1.58	0.26	0.24	2.62	0.59	0.55
0.56	0.00	0.00	1.60	0.27	0.25	2.64	0.60	0.56
0.58	0.00	0.00	1.62	0.28	0.26	2.66	0.60	0.57
0.60	0.00	0.00	1.64	0.28	0.27	2.68	0.61	0.57
0.62	0.00	0.00	1.66	0.29	0.27	2.70	0.62	0.58
0.64	0.00	0.00	1.68	0.30	0.28	2.72	0.62	0.58
0.66	0.00	0.00	1.70	0.31	0.29	2.74	0.63	0.59
0.68	0.00	0.00	1.72	0.31	0.29	2.76	0.63	0.59
0.70	0.00	0.00	1.74	0.32	0.30	2.78	0.64	0.60
0.72	0.00	0.00	1.76	0.33	0.31	2.80	0.65	0.61
0.74	0.00	0.00	1.78	0.33	0.31	2.82	0.65	0.61
0.76	0.00	0.00	1.80	0.34	0.32	2.84	0.66	0.62
0.78	0.00	0.00	1.82	0.35	0.32	2.86	0.66	0.62
0.80	0.00	0.00	1.84	0.35	0.33	2.88	0.67	0.63
0.82	0.00	0.00	1.86	0.36	0.34	2.90	0.68	0.63
0.84	0.00	0.00	1.88	0.37	0.34	2.92	0.68	0.64
0.86	0.00	0.00	1.90	0.37	0.35	2.94	0.69	0.65
0.88	0.00	0.00	1.92	0.38	0.35	2.96	0.69	0.65
0.90	0.00	0.00	1.94	0.38	0.36	2.98	0.70	0.66
0.92	0.00	0.00	1.96	0.39	0.37	3.00	0.71	0.66
0.94	0.00	0.00	1.98	0.40	0.37	3.02	0.71	0.67
0.96	0.01	0.01	2.00	0.40	0.38	3.04	0.72	0.67
0.98	0.01	0.01	2.02	0.41	0.38	3.06	0.73	0.68
1.00	0.02	0.02	2.04	0.41	0.39	3.08	0.73	0.68
1.02	0.02	0.02	2.06	0.42	0.39	3.10	0.74	0.69

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Type III 24-hr 10-year Rainfall=5.11"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
3.12	0.74	0.70	4.16	1.04	0.97	5.20	1.32	1.22
3.14	0.75	0.70	4.18	1.05	0.98	5.22	1.33	1.22
3.16	0.76	0.71	4.20	1.05	0.98	5.24	1.33	1.23
3.18	0.76	0.71	4.22	1.06	0.99	5.26	1.34	1.23
3.20	0.77	0.72	4.24	1.06	0.99	5.28	1.34	1.24
3.22	0.77	0.72	4.26	1.07	1.00	5.30	1.35	1.24
3.24	0.78	0.73	4.28	1.07	1.00	5.32	1.35	1.25
3.26	0.78	0.74	4.30	1.08	1.01	5.34	1.36	1.25
3.28	0.79	0.74	4.32	1.08	1.01	5.36	1.36	1.26
3.30	0.80	0.75	4.34	1.09	1.02	5.38	1.37	1.26
3.32	0.80	0.75	4.36	1.10	1.02	5.40	1.37	1.27
3.34	0.81	0.76	4.38	1.10	1.03	5.42	1.38	1.27
3.36	0.81	0.76	4.40	1.11	1.03	5.44	1.38	1.27
3.38	0.82	0.77	4.42	1.11	1.03	5.46	1.39	1.28
3.40	0.82	0.77	4.44	1.12	1.04	5.48	1.39	1.28
3.42	0.83	0.78	4.46	1.12	1.05	5.50	1.40	1.29
3.44	0.84	0.78	4.48	1.13	1.05	5.52	1.40	1.29
3.46	0.84	0.79	4.50	1.13	1.06	5.54	1.41	1.30
3.48	0.85	0.79	4.52	1.14	1.06	5.56	1.41	1.30
3.50	0.85	0.80	4.54	1.14	1.06	5.58	1.42	1.31
3.52	0.86	0.81	4.56	1.15	1.07	5.60	1.42	1.31
3.54	0.86	0.81	4.58	1.16	1.07	5.62	1.43	1.31
3.56	0.87	0.82	4.60	1.16	1.08	5.64	1.43	1.32
3.58	0.88	0.82	4.62	1.17	1.08	5.66	1.44	1.32
3.60	0.88	0.83	4.64	1.17	1.09	5.68	1.44	1.33
3.62	0.89	0.83	4.66	1.18	1.09	5.70	1.45	1.33
3.64	0.89	0.84	4.68	1.18	1.10	5.72	1.45	1.34
3.66	0.90	0.84	4.70	1.19	1.10	5.74	1.46	1.34
3.68	0.90	0.85	4.72	1.19	1.11	5.76	1.46	1.34
3.70	0.91	0.85	4.74	1.20	1.11	5.78	1.47	1.35
3.72	0.92	0.86	4.76	1.20	1.12	5.80	1.47	1.35
3.74	0.92	0.86	4.78	1.21	1.12	5.82	1.48	1.36
3.76	0.93	0.87	4.80	1.22	1.13	5.84	1.48	1.36
3.78	0.93	0.87	4.82	1.22	1.13	5.86	1.49	1.37
3.80	0.94	0.88	4.84	1.23	1.14	5.88	1.49	1.37
3.82	0.94	0.88	4.86	1.23	1.14	5.90	1.50	1.38
3.84	0.95	0.89	4.88	1.24	1.15	5.92	1.50	1.38
3.86	0.95	0.89	4.90	1.24	1.15	5.94	1.51	1.38
3.88	0.96	0.90	4.92	1.25	1.15	5.96	1.51	1.39
3.90	0.97	0.91	4.94	1.25	1.16	5.98	1.52	1.39
3.92	0.97	0.91	4.96	1.26	1.16	6.00	1.52	1.40
3.94	0.98	0.92	4.98	1.26	1.17	6.02	1.53	1.40
3.96	0.98	0.92	5.00	1.27	1.17	6.04	1.53	1.41
3.98	0.99	0.93	5.02	1.27	1.18	6.06	1.54	1.41
4.00	0.99	0.93	5.04	1.28	1.18	6.08	1.54	1.42
4.02	1.00	0.94	5.06	1.28	1.19	6.10	1.55	1.42
4.04	1.01	0.94	5.08	1.29	1.19	6.12	1.55	1.42
4.06	1.01	0.95	5.10	1.29	1.20	6.14	1.56	1.43
4.08	1.02	0.95	5.12	1.30	1.20	6.16	1.57	1.43
4.10	1.02	0.96	5.14	1.31	1.21	6.18	1.58	1.44
4.12	1.03	0.96	5.16	1.31	1.21	6.20	1.58	1.45
4.14	1.03	0.97	5.18	1.32	1.22	6.22	1.59	1.46

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Type III 24-hr 10-year Rainfall=5.11"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
6.24	1.60	1.47	7.28	2.22	2.02	8.32	3.05	2.79
6.26	1.61	1.47	7.30	2.24	2.03	8.34	3.07	2.81
6.28	1.62	1.48	7.32	2.25	2.04	8.36	3.10	2.84
6.30	1.63	1.49	7.34	2.26	2.05	8.38	3.13	2.87
6.32	1.64	1.50	7.36	2.28	2.07	8.40	3.16	2.90
6.34	1.65	1.51	7.38	2.29	2.08	8.42	3.19	2.93
6.36	1.67	1.52	7.40	2.30	2.09	8.44	3.22	2.95
6.38	1.68	1.53	7.42	2.32	2.10	8.46	3.25	2.98
6.40	1.69	1.54	7.44	2.33	2.11	8.48	3.28	3.01
6.42	1.70	1.55	7.46	2.34	2.12	8.50	3.31	3.04
6.44	1.71	1.56	7.48	2.35	2.13	8.52	3.34	3.07
6.46	1.72	1.57	7.50	2.36	2.14	8.54	3.37	3.10
6.48	1.73	1.58	7.52	2.38	2.16	8.56	3.40	3.12
6.50	1.75	1.59	7.54	2.39	2.17	8.58	3.43	3.15
6.52	1.76	1.61	7.56	2.40	2.18	8.60	3.47	3.18
6.54	1.77	1.62	7.58	2.42	2.20	8.62	3.49	3.21
6.56	1.78	1.63	7.60	2.43	2.21	8.64	3.53	3.24
6.58	1.80	1.64	7.62	2.45	2.22	8.66	3.56	3.27
6.60	1.81	1.65	7.64	2.46	2.24	8.68	3.59	3.30
6.62	1.82	1.66	7.66	2.47	2.25	8.70	3.62	3.33
6.64	1.83	1.67	7.68	2.49	2.26	8.72	3.65	3.36
6.66	1.84	1.68	7.70	2.50	2.28	8.74	3.68	3.39
6.68	1.85	1.69	7.72	2.52	2.29	8.76	3.72	3.42
6.70	1.87	1.70	7.74	2.53	2.30	8.78	3.75	3.45
6.72	1.88	1.71	7.76	2.55	2.32	8.80	3.78	3.48
6.74	1.89	1.73	7.78	2.56	2.33	8.82	3.81	3.51
6.76	1.90	1.74	7.80	2.58	2.34	8.84	3.84	3.54
6.78	1.91	1.75	7.82	2.59	2.36	8.86	3.87	3.57
6.80	1.93	1.76	7.84	2.60	2.37	8.88	3.91	3.60
6.82	1.94	1.77	7.86	2.62	2.38	8.90	3.94	3.63
6.84	1.95	1.78	7.88	2.63	2.40	8.92	3.97	3.66
6.86	1.97	1.79	7.90	2.65	2.41	8.94	4.00	3.69
6.88	1.98	1.80	7.92	2.66	2.43	8.96	4.03	3.72
6.90	1.99	1.81	7.94	2.68	2.44	8.98	4.07	3.76
6.92	2.00	1.82	7.96	2.69	2.45	9.00	4.10	3.79
6.94	2.01	1.83	7.98	2.71	2.47	9.02	4.13	3.82
6.96	2.03	1.84	8.00	2.72	2.48	9.04	4.17	3.85
6.98	2.04	1.86	8.02	2.74	2.50	9.06	4.20	3.88
7.00	2.05	1.87	8.04	2.75	2.51	9.08	4.23	3.91
7.02	2.06	1.88	8.06	2.77	2.52	9.10	4.27	3.95
7.04	2.08	1.89	8.08	2.78	2.54	9.12	4.30	3.97
7.06	2.09	1.90	8.10	2.80	2.55	9.14	4.33	4.01
7.08	2.10	1.91	8.12	2.81	2.57	9.16	4.37	4.04
7.10	2.11	1.92	8.14	2.83	2.59	9.18	4.40	4.07
7.12	2.13	1.93	8.16	2.85	2.60	9.20	4.43	4.11
7.14	2.14	1.94	8.18	2.87	2.62	9.22	4.47	4.14
7.16	2.15	1.95	8.20	2.89	2.65	9.24	4.50	4.17
7.18	2.16	1.97	8.22	2.92	2.67	9.26	4.53	4.20
7.20	2.18	1.98	8.24	2.94	2.69	9.28	4.57	4.24
7.22	2.19	1.99	8.26	2.97	2.71	9.30	4.60	4.27
7.24	2.20	2.00	8.28	2.99	2.74	9.32	4.64	4.30
7.26	2.21	2.01	8.30	3.02	2.76	9.34	4.67	4.33

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Type III 24-hr 10-year Rainfall=5.11"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
9.36	4.70	4.37	10.40	6.88	6.48	11.44	12.90	12.33
9.38	4.74	4.40	10.42	6.95	6.55	11.46	13.17	12.59
9.40	4.77	4.43	10.44	7.02	6.62	11.48	13.42	12.84
9.42	4.80	4.47	10.46	7.09	6.68	11.50	13.70	13.11
9.44	4.84	4.50	10.48	7.16	6.75	11.52	13.97	13.37
9.46	4.87	4.53	10.50	7.24	6.82	11.54	14.24	13.63
9.48	4.91	4.57	10.52	7.30	6.89	11.56	14.55	13.93
9.50	4.94	4.60	10.54	7.37	6.96	11.58	14.87	14.25
9.52	4.98	4.63	10.56	7.45	7.03	11.60	15.28	14.64
9.54	5.01	4.67	10.58	7.51	7.09	11.62	15.82	15.16
9.56	5.05	4.70	10.60	7.59	7.17	11.64	16.50	15.83
9.58	5.08	4.73	10.62	7.66	7.24	11.66	17.40	16.69
9.60	5.12	4.77	10.64	7.73	7.30	11.68	18.51	17.77
9.62	5.15	4.80	10.66	7.81	7.38	11.70	19.82	19.03
9.64	5.19	4.84	10.68	7.88	7.45	11.72	21.36	20.52
9.66	5.23	4.88	10.70	7.95	7.52	11.74	23.08	22.18
9.68	5.26	4.91	10.72	8.03	7.59	11.76	24.94	23.98
9.70	5.29	4.94	10.74	8.10	7.66	11.78	26.98	25.96
9.72	5.33	4.98	10.76	8.17	7.73	11.80	29.11	28.03
9.74	5.36	5.01	10.78	8.25	7.81	11.82	31.32	30.17
9.76	5.40	5.05	10.80	8.32	7.87	11.84	33.66	32.44
9.78	5.44	5.08	10.82	8.39	7.95	11.86	36.02	34.73
9.80	5.47	5.11	10.84	8.47	8.03	11.88	38.44	37.10
9.82	5.51	5.15	10.86	8.54	8.09	11.90	40.96	39.55
9.84	5.55	5.19	10.88	8.62	8.17	11.92	43.46	42.00
9.86	5.58	5.22	10.90	8.69	8.24	11.94	46.08	44.55
9.88	5.62	5.26	10.92	8.76	8.31	11.96	48.89	47.31
9.90	5.65	5.29	10.94	8.84	8.39	11.98	52.02	50.37
9.92	5.69	5.32	10.96	8.91	8.46	12.00	55.92	54.20
9.94	5.73	5.36	10.98	8.98	8.53	12.02	60.83	59.01
9.96	5.76	5.39	11.00	9.07	8.61	12.04	67.11	65.17
9.98	5.80	5.43	11.02	9.14	8.68	12.06	74.90	72.81
10.00	5.84	5.47	11.04	9.21	8.75	12.08	83.77	81.52
10.02	5.87	5.50	11.06	9.30	8.84	12.10	93.03	90.63
10.04	5.91	5.54	11.08	9.37	8.91	12.12	101.81	99.27
10.06	5.95	5.58	11.10	9.46	9.00	12.14	108.85	106.22
10.08	5.98	5.61	11.12	9.56	9.10	12.16	113.58	110.93
10.10	6.02	5.65	11.14	9.66	9.19	12.18	115.82	113.18
10.12	6.06	5.69	11.16	9.80	9.32	12.20	114.94	112.40
10.14	6.10	5.73	11.18	9.95	9.47	12.22	112.03	109.62
10.16	6.15	5.78	11.20	10.10	9.62	12.24	107.53	105.27
10.18	6.20	5.82	11.22	10.29	9.80	12.26	101.80	99.72
10.20	6.25	5.87	11.24	10.48	9.99	12.28	95.92	94.01
10.22	6.31	5.93	11.26	10.68	10.18	12.30	90.09	88.33
10.24	6.36	5.98	11.28	10.92	10.41	12.32	84.56	82.95
10.26	6.42	6.04	11.30	11.14	10.62	12.34	79.63	78.16
10.28	6.49	6.10	11.32	11.37	10.85	12.36	75.10	73.74
10.30	6.55	6.16	11.34	11.63	11.09	12.38	70.90	69.64
10.32	6.61	6.22	11.36	11.86	11.32	12.40	67.10	65.94
10.34	6.68	6.29	11.38	12.12	11.57	12.42	63.41	62.34
10.36	6.74	6.35	11.40	12.38	11.83	12.44	59.91	58.92
10.38	6.82	6.42	11.42	12.63	12.07	12.46	56.63	55.71

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Type III 24-hr 10-year Rainfall=5.11"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
12.48	53.34	52.49	13.52	10.45	10.33	14.56	7.19	7.12
12.50	50.23	49.44	13.54	10.36	10.25	14.58	7.16	7.09
12.52	47.20	46.47	13.56	10.28	10.17	14.60	7.12	7.05
12.54	44.15	43.48	13.58	10.22	10.10	14.62	7.08	7.01
12.56	41.25	40.64	13.60	10.13	10.02	14.64	7.05	6.98
12.58	38.41	37.85	13.62	10.06	9.94	14.66	7.01	6.94
12.60	35.63	35.11	13.64	9.99	9.88	14.68	6.97	6.90
12.62	33.09	32.62	13.66	9.90	9.79	14.70	6.94	6.87
12.64	30.70	30.26	13.68	9.83	9.72	14.72	6.90	6.83
12.66	28.53	28.13	13.70	9.76	9.65	14.74	6.86	6.80
12.68	26.65	26.28	13.72	9.67	9.57	14.76	6.83	6.76
12.70	24.97	24.63	13.74	9.61	9.50	14.78	6.79	6.72
12.72	23.52	23.20	13.76	9.53	9.43	14.80	6.76	6.69
12.74	22.31	22.01	13.78	9.45	9.35	14.82	6.72	6.66
12.76	21.23	20.95	13.80	9.38	9.28	14.84	6.68	6.61
12.78	20.33	20.06	13.82	9.30	9.20	14.86	6.65	6.58
12.80	19.55	19.29	13.84	9.23	9.13	14.88	6.61	6.55
12.82	18.84	18.59	13.86	9.16	9.06	14.90	6.57	6.51
12.84	18.25	18.01	13.88	9.07	8.98	14.92	6.54	6.48
12.86	17.71	17.48	13.90	9.00	8.91	14.94	6.50	6.44
12.88	17.20	16.98	13.92	8.93	8.84	14.96	6.46	6.40
12.90	16.76	16.55	13.94	8.85	8.75	14.98	6.43	6.37
12.92	16.34	16.14	13.96	8.78	8.68	15.00	6.39	6.33
12.94	15.94	15.74	13.98	8.70	8.61	15.02	6.36	6.29
12.96	15.58	15.39	14.00	8.62	8.53	15.04	6.32	6.26
12.98	15.21	15.03	14.02	8.55	8.46	15.06	6.28	6.22
13.00	14.87	14.68	14.04	8.48	8.39	15.08	6.25	6.19
13.02	14.55	14.37	14.06	8.40	8.31	15.10	6.21	6.15
13.04	14.21	14.04	14.08	8.33	8.24	15.12	6.17	6.11
13.06	13.90	13.73	14.10	8.25	8.17	15.14	6.14	6.08
13.08	13.61	13.44	14.12	8.18	8.09	15.16	6.10	6.05
13.10	13.30	13.14	14.14	8.12	8.03	15.18	6.06	6.01
13.12	13.03	12.87	14.16	8.05	7.96	15.20	6.03	5.98
13.14	12.77	12.62	14.18	7.99	7.90	15.22	5.99	5.94
13.16	12.52	12.38	14.20	7.93	7.85	15.24	5.95	5.90
13.18	12.32	12.18	14.22	7.87	7.79	15.26	5.92	5.87
13.20	12.13	11.98	14.24	7.83	7.75	15.28	5.88	5.83
13.22	11.94	11.80	14.26	7.78	7.70	15.30	5.85	5.79
13.24	11.80	11.66	14.28	7.73	7.65	15.32	5.81	5.76
13.26	11.66	11.52	14.30	7.69	7.61	15.34	5.77	5.72
13.28	11.53	11.40	14.32	7.65	7.57	15.36	5.74	5.69
13.30	11.42	11.29	14.34	7.60	7.53	15.38	5.70	5.65
13.32	11.31	11.18	14.36	7.57	7.49	15.40	5.66	5.61
13.34	11.21	11.08	14.38	7.53	7.45	15.42	5.63	5.58
13.36	11.12	10.99	14.40	7.49	7.41	15.44	5.59	5.54
13.38	11.02	10.89	14.42	7.45	7.38	15.46	5.55	5.50
13.40	10.93	10.81	14.44	7.41	7.34	15.48	5.52	5.47
13.42	10.85	10.73	14.46	7.37	7.30	15.50	5.48	5.43
13.44	10.76	10.63	14.48	7.34	7.27	15.52	5.44	5.39
13.46	10.68	10.56	14.50	7.30	7.22	15.54	5.41	5.36
13.48	10.60	10.48	14.52	7.26	7.19	15.56	5.37	5.32
13.50	10.51	10.40	14.54	7.23	7.16	15.58	5.34	5.29

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Type III 24-hr 10-year Rainfall=5.11"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
15.60	5.30	5.25	16.64	3.83	3.80	17.68	3.00	2.98
15.62	5.26	5.21	16.66	3.82	3.79	17.70	2.99	2.96
15.64	5.23	5.18	16.68	3.80	3.77	17.72	2.97	2.95
15.66	5.19	5.14	16.70	3.79	3.75	17.74	2.96	2.93
15.68	5.15	5.10	16.72	3.77	3.74	17.76	2.94	2.92
15.70	5.12	5.07	16.74	3.75	3.72	17.78	2.93	2.90
15.72	5.08	5.03	16.76	3.74	3.71	17.80	2.91	2.88
15.74	5.04	5.00	16.78	3.72	3.69	17.82	2.89	2.87
15.76	5.01	4.96	16.80	3.70	3.67	17.84	2.88	2.85
15.78	4.97	4.93	16.82	3.69	3.66	17.86	2.86	2.84
15.80	4.93	4.89	16.84	3.67	3.64	17.88	2.84	2.82
15.82	4.90	4.86	16.86	3.66	3.63	17.90	2.83	2.81
15.84	4.86	4.82	16.88	3.64	3.61	17.92	2.81	2.79
15.86	4.82	4.78	16.90	3.63	3.60	17.94	2.80	2.77
15.88	4.79	4.75	16.92	3.61	3.58	17.96	2.78	2.76
15.90	4.75	4.71	16.94	3.60	3.57	17.98	2.76	2.74
15.92	4.71	4.67	16.96	3.58	3.55	18.00	2.75	2.73
15.94	4.68	4.64	16.98	3.56	3.53	18.02	2.73	2.71
15.96	4.64	4.60	17.00	3.55	3.52	18.04	2.71	2.69
15.98	4.61	4.56	17.02	3.53	3.50	18.06	2.70	2.68
16.00	4.57	4.53	17.04	3.52	3.49	18.08	2.68	2.66
16.02	4.53	4.49	17.06	3.50	3.47	18.10	2.67	2.65
16.04	4.50	4.46	17.08	3.48	3.45	18.12	2.66	2.63
16.06	4.46	4.42	17.10	3.47	3.44	18.14	2.64	2.62
16.08	4.42	4.38	17.12	3.45	3.42	18.16	2.63	2.61
16.10	4.39	4.35	17.14	3.43	3.41	18.18	2.62	2.60
16.12	4.35	4.31	17.16	3.42	3.39	18.20	2.60	2.58
16.14	4.32	4.28	17.18	3.40	3.37	18.22	2.60	2.58
16.16	4.29	4.25	17.20	3.39	3.36	18.24	2.59	2.57
16.18	4.26	4.22	17.22	3.37	3.35	18.26	2.58	2.56
16.20	4.23	4.20	17.24	3.35	3.33	18.28	2.57	2.55
16.22	4.21	4.17	17.26	3.34	3.31	18.30	2.56	2.54
16.24	4.18	4.14	17.28	3.33	3.30	18.32	2.56	2.54
16.26	4.16	4.13	17.30	3.31	3.28	18.34	2.55	2.53
16.28	4.14	4.10	17.32	3.29	3.26	18.36	2.54	2.52
16.30	4.12	4.08	17.34	3.28	3.25	18.38	2.54	2.52
16.32	4.10	4.07	17.36	3.26	3.23	18.40	2.53	2.51
16.34	4.08	4.05	17.38	3.24	3.22	18.42	2.53	2.51
16.36	4.06	4.03	17.40	3.23	3.20	18.44	2.52	2.50
16.38	4.05	4.01	17.42	3.21	3.18	18.46	2.52	2.50
16.40	4.03	3.99	17.44	3.20	3.17	18.48	2.51	2.49
16.42	4.01	3.98	17.46	3.18	3.15	18.50	2.51	2.49
16.44	4.00	3.96	17.48	3.16	3.14	18.52	2.50	2.48
16.46	3.98	3.94	17.50	3.15	3.12	18.54	2.50	2.48
16.48	3.96	3.93	17.52	3.13	3.11	18.56	2.49	2.47
16.50	3.95	3.91	17.54	3.12	3.09	18.58	2.49	2.47
16.52	3.93	3.89	17.56	3.10	3.08	18.60	2.48	2.46
16.54	3.92	3.88	17.58	3.08	3.06	18.62	2.48	2.46
16.56	3.90	3.87	17.60	3.07	3.04	18.64	2.47	2.45
16.58	3.88	3.85	17.62	3.05	3.03	18.66	2.47	2.45
16.60	3.87	3.83	17.64	3.03	3.01	18.68	2.47	2.45
16.62	3.85	3.82	17.66	3.02	3.00	18.70	2.46	2.44

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Type III 24-hr 10-year Rainfall=5.11"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
18.72	2.45	2.44	19.76	2.20	2.19
18.74	2.45	2.43	19.78	2.20	2.18
18.76	2.44	2.42	19.80	2.20	2.18
18.78	2.44	2.42	19.82	2.19	2.17
18.80	2.44	2.42	19.84	2.19	2.17
18.82	2.43	2.41	19.86	2.18	2.17
18.84	2.43	2.41	19.88	2.18	2.16
18.86	2.42	2.40	19.90	2.17	2.16
18.88	2.42	2.40	19.92	2.17	2.15
18.90	2.41	2.39	19.94	2.16	2.14
18.92	2.41	2.39	19.96	2.16	2.14
18.94	2.40	2.38	19.98	2.15	2.14
18.96	2.40	2.38	20.00	2.15	2.13
18.98	2.39	2.37			
19.00	2.39	2.37			
19.02	2.38	2.36			
19.04	2.38	2.36			
19.06	2.37	2.36			
19.08	2.37	2.35			
19.10	2.36	2.34			
19.12	2.36	2.34			
19.14	2.35	2.34			
19.16	2.35	2.33			
19.18	2.35	2.33			
19.20	2.34	2.32			
19.22	2.33	2.32			
19.24	2.33	2.31			
19.26	2.32	2.31			
19.28	2.32	2.30			
19.30	2.32	2.30			
19.32	2.31	2.29			
19.34	2.31	2.29			
19.36	2.30	2.28			
19.38	2.30	2.28			
19.40	2.29	2.28			
19.42	2.29	2.27			
19.44	2.28	2.26			
19.46	2.28	2.26			
19.48	2.27	2.25			
19.50	2.27	2.25			
19.52	2.26	2.25			
19.54	2.26	2.24			
19.56	2.25	2.24			
19.58	2.25	2.23			
19.60	2.24	2.23			
19.62	2.24	2.22			
19.64	2.23	2.22			
19.66	2.23	2.21			
19.68	2.23	2.21			
19.70	2.22	2.20			
19.72	2.21	2.20			
19.74	2.21	2.19			

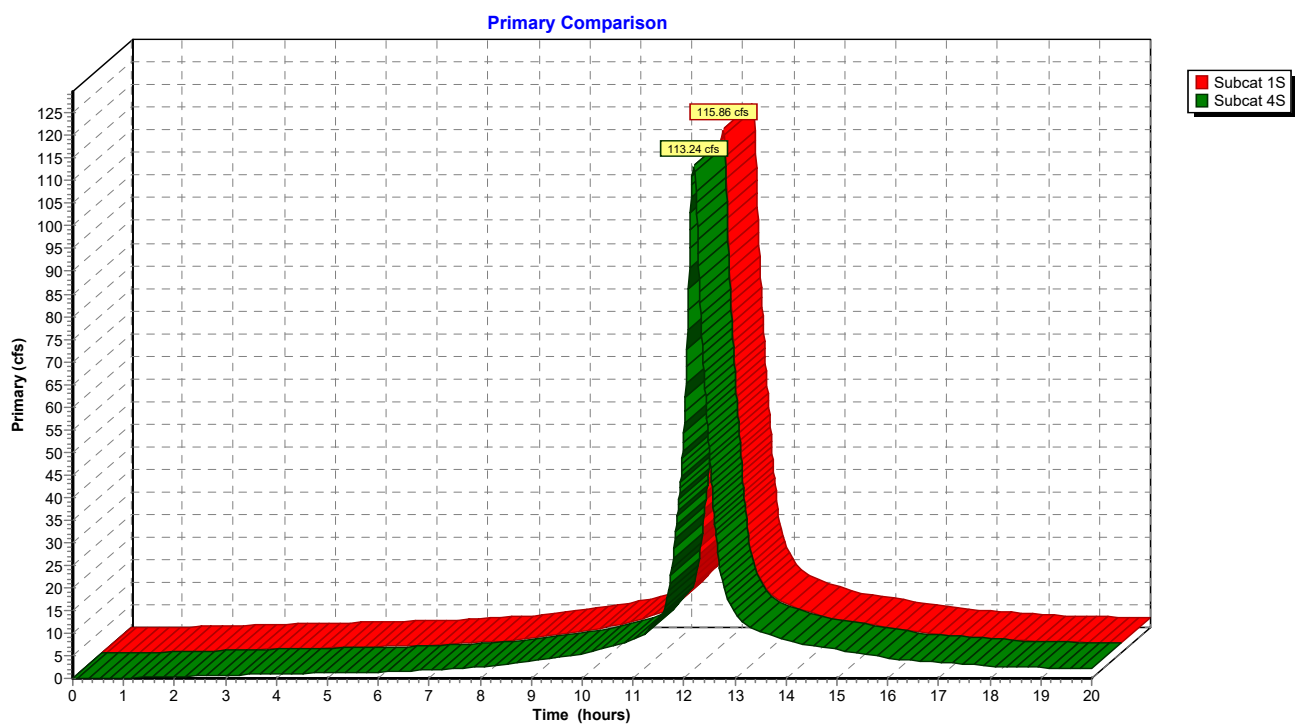
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Type III 24-hr 10-year Rainfall=5.11"

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Type III 24-hr 100-year Rainfall=8.52"

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Primary Comparison

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
0.00	0.00	0.00	1.04	0.44	0.41	2.08	1.12	1.05
0.02	0.00	0.00	1.06	0.46	0.43	2.10	1.13	1.06
0.04	0.00	0.00	1.08	0.48	0.45	2.12	1.14	1.07
0.06	0.00	0.00	1.10	0.50	0.47	2.14	1.15	1.08
0.08	0.00	0.00	1.12	0.52	0.49	2.16	1.16	1.09
0.10	0.00	0.00	1.14	0.54	0.50	2.18	1.17	1.09
0.12	0.00	0.00	1.16	0.56	0.52	2.20	1.18	1.10
0.14	0.00	0.00	1.18	0.57	0.54	2.22	1.19	1.11
0.16	0.00	0.00	1.20	0.59	0.56	2.24	1.19	1.12
0.18	0.00	0.00	1.22	0.61	0.57	2.26	1.21	1.13
0.20	0.00	0.00	1.24	0.63	0.59	2.28	1.21	1.14
0.22	0.00	0.00	1.26	0.65	0.60	2.30	1.22	1.15
0.24	0.00	0.00	1.28	0.66	0.62	2.32	1.24	1.16
0.26	0.00	0.00	1.30	0.68	0.64	2.34	1.24	1.17
0.28	0.00	0.00	1.32	0.69	0.65	2.36	1.25	1.18
0.30	0.00	0.00	1.34	0.71	0.66	2.38	1.27	1.19
0.32	0.00	0.00	1.36	0.72	0.68	2.40	1.27	1.19
0.34	0.00	0.00	1.38	0.74	0.69	2.42	1.29	1.20
0.36	0.00	0.00	1.40	0.75	0.71	2.44	1.30	1.21
0.38	0.00	0.00	1.42	0.77	0.72	2.46	1.31	1.22
0.40	0.00	0.00	1.44	0.78	0.73	2.48	1.32	1.23
0.42	0.00	0.00	1.46	0.80	0.75	2.50	1.33	1.24
0.44	0.00	0.00	1.48	0.81	0.76	2.52	1.34	1.25
0.46	0.00	0.00	1.50	0.82	0.77	2.54	1.35	1.26
0.48	0.00	0.00	1.52	0.84	0.78	2.56	1.36	1.27
0.50	0.00	0.00	1.54	0.85	0.80	2.58	1.37	1.28
0.52	0.00	0.00	1.56	0.86	0.81	2.60	1.38	1.29
0.54	0.00	0.00	1.58	0.88	0.82	2.62	1.39	1.30
0.56	0.00	0.00	1.60	0.89	0.83	2.64	1.40	1.31
0.58	0.00	0.00	1.62	0.90	0.84	2.66	1.41	1.32
0.60	0.01	0.01	1.64	0.91	0.85	2.68	1.42	1.33
0.62	0.01	0.01	1.66	0.92	0.87	2.70	1.43	1.34
0.64	0.02	0.02	1.68	0.93	0.88	2.72	1.44	1.35
0.66	0.03	0.03	1.70	0.95	0.89	2.74	1.45	1.35
0.68	0.05	0.04	1.72	0.96	0.90	2.76	1.46	1.36
0.70	0.06	0.06	1.74	0.97	0.91	2.78	1.47	1.37
0.72	0.08	0.08	1.76	0.98	0.92	2.80	1.48	1.38
0.74	0.10	0.09	1.78	0.99	0.93	2.82	1.49	1.39
0.76	0.12	0.11	1.80	1.00	0.94	2.84	1.50	1.40
0.78	0.14	0.13	1.82	1.01	0.95	2.86	1.51	1.41
0.80	0.17	0.16	1.84	1.02	0.95	2.88	1.52	1.42
0.82	0.19	0.18	1.86	1.03	0.96	2.90	1.53	1.43
0.84	0.21	0.20	1.88	1.04	0.97	2.92	1.54	1.43
0.86	0.24	0.22	1.90	1.05	0.98	2.94	1.55	1.44
0.88	0.26	0.24	1.92	1.06	0.99	2.96	1.56	1.45
0.90	0.28	0.27	1.94	1.07	1.00	2.98	1.57	1.46
0.92	0.31	0.29	1.96	1.07	1.01	3.00	1.58	1.47
0.94	0.33	0.31	1.98	1.08	1.02	3.02	1.59	1.48
0.96	0.35	0.33	2.00	1.09	1.02	3.04	1.60	1.49
0.98	0.37	0.35	2.02	1.10	1.03	3.06	1.61	1.50
1.00	0.40	0.37	2.04	1.11	1.04	3.08	1.62	1.50
1.02	0.42	0.39	2.06	1.12	1.05	3.10	1.63	1.51

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Type III 24-hr 100-year Rainfall=8.52"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
3.12	1.64	1.52	4.16	2.11	1.93	5.20	2.53	2.30
3.14	1.65	1.53	4.18	2.12	1.94	5.22	2.54	2.30
3.16	1.66	1.54	4.20	2.13	1.95	5.24	2.55	2.31
3.18	1.67	1.55	4.22	2.14	1.96	5.26	2.56	2.32
3.20	1.68	1.55	4.24	2.14	1.96	5.28	2.57	2.33
3.22	1.69	1.56	4.26	2.15	1.97	5.30	2.57	2.33
3.24	1.70	1.57	4.28	2.16	1.98	5.32	2.58	2.34
3.26	1.71	1.58	4.30	2.17	1.98	5.34	2.59	2.35
3.28	1.72	1.59	4.32	2.18	1.99	5.36	2.60	2.36
3.30	1.72	1.60	4.34	2.19	2.00	5.38	2.61	2.37
3.32	1.73	1.60	4.36	2.19	2.00	5.40	2.62	2.38
3.34	1.74	1.61	4.38	2.20	2.01	5.42	2.63	2.38
3.36	1.75	1.62	4.40	2.21	2.02	5.44	2.63	2.39
3.38	1.76	1.63	4.42	2.22	2.03	5.46	2.65	2.40
3.40	1.77	1.64	4.44	2.23	2.03	5.48	2.65	2.41
3.42	1.78	1.64	4.46	2.24	2.04	5.50	2.66	2.42
3.44	1.79	1.65	4.48	2.24	2.05	5.52	2.67	2.43
3.46	1.80	1.66	4.50	2.25	2.06	5.54	2.68	2.44
3.48	1.81	1.67	4.52	2.26	2.06	5.56	2.69	2.45
3.50	1.82	1.68	4.54	2.27	2.07	5.58	2.70	2.46
3.52	1.83	1.69	4.56	2.28	2.08	5.60	2.71	2.46
3.54	1.84	1.69	4.58	2.28	2.08	5.62	2.72	2.48
3.56	1.85	1.70	4.60	2.29	2.09	5.64	2.73	2.48
3.58	1.85	1.71	4.62	2.30	2.10	5.66	2.74	2.49
3.60	1.86	1.72	4.64	2.31	2.10	5.68	2.75	2.50
3.62	1.87	1.73	4.66	2.32	2.11	5.70	2.76	2.51
3.64	1.88	1.73	4.68	2.33	2.12	5.72	2.77	2.52
3.66	1.89	1.74	4.70	2.33	2.13	5.74	2.78	2.53
3.68	1.90	1.75	4.72	2.34	2.13	5.76	2.78	2.54
3.70	1.91	1.76	4.74	2.35	2.14	5.78	2.80	2.55
3.72	1.92	1.77	4.76	2.36	2.15	5.80	2.81	2.56
3.74	1.93	1.77	4.78	2.37	2.16	5.82	2.81	2.57
3.76	1.93	1.78	4.80	2.37	2.16	5.84	2.82	2.58
3.78	1.95	1.79	4.82	2.38	2.17	5.86	2.83	2.59
3.80	1.95	1.80	4.84	2.39	2.18	5.88	2.84	2.59
3.82	1.96	1.80	4.86	2.40	2.18	5.90	2.85	2.61
3.84	1.97	1.81	4.88	2.41	2.19	5.92	2.86	2.61
3.86	1.98	1.82	4.90	2.42	2.20	5.94	2.87	2.62
3.88	1.99	1.83	4.92	2.42	2.20	5.96	2.88	2.63
3.90	2.00	1.84	4.94	2.43	2.21	5.98	2.89	2.64
3.92	2.00	1.84	4.96	2.44	2.22	6.00	2.90	2.65
3.94	2.02	1.85	4.98	2.44	2.22	6.02	2.91	2.66
3.96	2.02	1.86	5.00	2.45	2.23	6.04	2.92	2.67
3.98	2.03	1.86	5.02	2.46	2.24	6.06	2.93	2.68
4.00	2.04	1.87	5.04	2.47	2.24	6.08	2.94	2.69
4.02	2.05	1.88	5.06	2.48	2.25	6.10	2.95	2.70
4.04	2.06	1.89	5.08	2.49	2.26	6.12	2.96	2.71
4.06	2.07	1.90	5.10	2.49	2.26	6.14	2.97	2.72
4.08	2.07	1.90	5.12	2.50	2.27	6.16	2.98	2.73
4.10	2.08	1.91	5.14	2.51	2.28	6.18	3.00	2.75
4.12	2.09	1.92	5.16	2.52	2.28	6.20	3.02	2.76
4.14	2.10	1.92	5.18	2.53	2.29	6.22	3.03	2.78

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
6.24	3.05	2.80	7.28	4.28	3.98	8.32	5.83	5.49
6.26	3.07	2.82	7.30	4.31	4.01	8.34	5.88	5.53
6.28	3.09	2.83	7.32	4.33	4.03	8.36	5.93	5.59
6.30	3.11	2.86	7.34	4.36	4.05	8.38	5.99	5.64
6.32	3.13	2.87	7.36	4.39	4.08	8.40	6.04	5.69
6.34	3.15	2.89	7.38	4.41	4.10	8.42	6.10	5.74
6.36	3.18	2.92	7.40	4.43	4.13	8.44	6.15	5.80
6.38	3.19	2.93	7.42	4.46	4.16	8.46	6.20	5.85
6.40	3.22	2.96	7.44	4.49	4.18	8.48	6.26	5.91
6.42	3.24	2.98	7.46	4.51	4.20	8.50	6.32	5.96
6.44	3.26	3.00	7.48	4.54	4.23	8.52	6.37	6.01
6.46	3.29	3.02	7.50	4.56	4.25	8.54	6.43	6.07
6.48	3.31	3.04	7.52	4.59	4.28	8.56	6.48	6.12
6.50	3.33	3.06	7.54	4.62	4.31	8.58	6.54	6.18
6.52	3.36	3.09	7.56	4.64	4.33	8.60	6.60	6.23
6.54	3.38	3.11	7.58	4.67	4.36	8.62	6.65	6.28
6.56	3.40	3.13	7.60	4.70	4.38	8.64	6.72	6.34
6.58	3.43	3.16	7.62	4.72	4.41	8.66	6.77	6.40
6.60	3.45	3.17	7.64	4.75	4.44	8.68	6.83	6.45
6.62	3.47	3.20	7.66	4.77	4.46	8.70	6.89	6.51
6.64	3.50	3.22	7.68	4.80	4.48	8.72	6.95	6.57
6.66	3.52	3.24	7.70	4.83	4.51	8.74	7.00	6.62
6.68	3.54	3.27	7.72	4.85	4.53	8.76	7.07	6.68
6.70	3.57	3.29	7.74	4.88	4.56	8.78	7.12	6.74
6.72	3.59	3.31	7.76	4.91	4.59	8.80	7.18	6.79
6.74	3.62	3.34	7.78	4.93	4.61	8.82	7.24	6.85
6.76	3.64	3.36	7.80	4.96	4.64	8.84	7.29	6.91
6.78	3.66	3.38	7.82	4.99	4.67	8.86	7.35	6.96
6.80	3.69	3.41	7.84	5.01	4.69	8.88	7.42	7.03
6.82	3.71	3.43	7.86	5.04	4.72	8.90	7.47	7.08
6.84	3.73	3.45	7.88	5.07	4.74	8.92	7.53	7.14
6.86	3.76	3.48	7.90	5.09	4.77	8.94	7.59	7.20
6.88	3.78	3.50	7.92	5.12	4.80	8.96	7.65	7.25
6.90	3.81	3.52	7.94	5.15	4.82	8.98	7.71	7.31
6.92	3.84	3.55	7.96	5.17	4.85	9.00	7.77	7.37
6.94	3.86	3.57	7.98	5.20	4.88	9.02	7.82	7.42
6.96	3.88	3.59	8.00	5.23	4.90	9.04	7.89	7.49
6.98	3.91	3.62	8.02	5.25	4.93	9.06	7.95	7.54
7.00	3.93	3.64	8.04	5.28	4.96	9.08	8.00	7.60
7.02	3.96	3.66	8.06	5.31	4.98	9.10	8.07	7.67
7.04	3.98	3.69	8.08	5.34	5.01	9.12	8.12	7.72
7.06	4.00	3.71	8.10	5.37	5.04	9.14	8.19	7.78
7.08	4.03	3.74	8.12	5.39	5.06	9.16	8.25	7.84
7.10	4.06	3.76	8.14	5.43	5.10	9.18	8.30	7.90
7.12	4.08	3.78	8.16	5.46	5.13	9.20	8.37	7.96
7.14	4.11	3.81	8.18	5.50	5.17	9.22	8.43	8.02
7.16	4.13	3.83	8.20	5.54	5.21	9.24	8.49	8.07
7.18	4.16	3.86	8.22	5.58	5.25	9.26	8.55	8.14
7.20	4.18	3.88	8.24	5.63	5.29	9.28	8.61	8.20
7.22	4.20	3.90	8.26	5.68	5.34	9.30	8.67	8.25
7.24	4.23	3.93	8.28	5.72	5.38	9.32	8.74	8.32
7.26	4.26	3.96	8.30	5.77	5.43	9.34	8.80	8.38

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Type III 24-hr 100-year Rainfall=8.52"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
9.36	8.85	8.44	10.40	12.73	12.28	11.44	23.41	22.83
9.38	8.92	8.50	10.42	12.85	12.39	11.46	23.89	23.30
9.40	8.98	8.56	10.44	12.99	12.52	11.48	24.34	23.74
9.42	9.04	8.62	10.46	13.10	12.64	11.50	24.84	24.23
9.44	9.11	8.69	10.48	13.22	12.76	11.52	25.31	24.70
9.46	9.16	8.74	10.50	13.36	12.90	11.54	25.78	25.17
9.48	9.23	8.81	10.52	13.48	13.01	11.56	26.33	25.71
9.50	9.29	8.87	10.54	13.61	13.14	11.58	26.91	26.28
9.52	9.35	8.92	10.56	13.74	13.27	11.60	27.63	26.99
9.54	9.42	8.99	10.58	13.85	13.38	11.62	28.60	27.94
9.56	9.48	9.05	10.60	13.99	13.52	11.64	29.82	29.14
9.58	9.53	9.11	10.62	14.12	13.65	11.66	31.42	30.72
9.60	9.61	9.18	10.64	14.24	13.76	11.68	33.41	32.67
9.62	9.66	9.23	10.66	14.38	13.90	11.70	35.74	34.97
9.64	9.72	9.29	10.68	14.50	14.03	11.72	38.50	37.67
9.66	9.79	9.36	10.70	14.62	14.14	11.74	41.57	40.69
9.68	9.85	9.42	10.72	14.77	14.29	11.76	44.89	43.96
9.70	9.91	9.48	10.74	14.89	14.41	11.78	48.53	47.54
9.72	9.98	9.55	10.76	15.01	14.53	11.80	52.32	51.27
9.74	10.04	9.60	10.78	15.16	14.67	11.82	56.24	55.14
9.76	10.11	9.67	10.80	15.27	14.79	11.84	60.38	59.22
9.78	10.17	9.74	10.82	15.41	14.92	11.86	64.56	63.34
9.80	10.23	9.79	10.84	15.55	15.06	11.88	68.84	67.58
9.82	10.30	9.86	10.86	15.66	15.18	11.90	73.28	71.97
9.84	10.36	9.92	10.88	15.80	15.31	11.92	77.68	76.33
9.86	10.42	9.98	10.90	15.94	15.45	11.94	82.27	80.87
9.88	10.49	10.06	10.92	16.06	15.57	11.96	87.21	85.77
9.90	10.55	10.11	10.94	16.20	15.71	11.98	92.67	91.19
9.92	10.61	10.17	10.96	16.33	15.84	12.00	99.50	97.96
9.94	10.68	10.25	10.98	16.45	15.96	12.02	108.09	106.48
9.96	10.74	10.30	11.00	16.60	16.11	12.04	119.07	117.37
9.98	10.80	10.37	11.02	16.72	16.23	12.06	132.67	130.87
10.00	10.87	10.44	11.04	16.85	16.36	12.08	148.13	146.21
10.02	10.93	10.49	11.06	17.00	16.51	12.10	164.27	162.24
10.04	11.00	10.56	11.08	17.13	16.63	12.12	179.50	177.39
10.06	11.07	10.63	11.10	17.28	16.79	12.14	191.65	189.50
10.08	11.12	10.68	11.12	17.47	16.97	12.16	199.75	197.59
10.10	11.20	10.76	11.14	17.64	17.15	12.18	203.44	201.33
10.12	11.27	10.83	11.16	17.88	17.38	12.20	201.70	199.68
10.14	11.34	10.90	11.18	18.14	17.64	12.22	196.39	194.50
10.16	11.43	10.99	11.20	18.42	17.91	12.24	188.33	186.57
10.18	11.51	11.07	11.22	18.76	18.24	12.26	178.14	176.54
10.20	11.60	11.16	11.24	19.10	18.58	12.28	167.71	166.25
10.22	11.71	11.26	11.26	19.46	18.94	12.30	157.37	156.05
10.24	11.80	11.36	11.28	19.88	19.34	12.32	147.59	146.39
10.26	11.91	11.46	11.30	20.27	19.74	12.34	138.89	137.79
10.28	12.03	11.58	11.32	20.69	20.15	12.36	130.88	129.88
10.30	12.13	11.68	11.34	21.14	20.59	12.38	123.47	122.56
10.32	12.25	11.80	11.36	21.57	21.01	12.40	116.78	115.94
10.34	12.37	11.92	11.38	22.02	21.46	12.42	110.28	109.52
10.36	12.48	12.03	11.40	22.49	21.92	12.44	104.13	103.43
10.38	12.61	12.16	11.42	22.93	22.35	12.46	98.37	97.73

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Type III 24-hr 100-year Rainfall=8.52"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
12.48	92.61	92.02	13.52	17.98	17.91	14.56	12.34	12.30
12.50	87.16	86.62	13.54	17.83	17.77	14.58	12.28	12.25
12.52	81.87	81.38	13.56	17.70	17.63	14.60	12.22	12.18
12.54	76.55	76.09	13.58	17.58	17.51	14.62	12.15	12.11
12.56	71.50	71.09	13.60	17.43	17.37	14.64	12.10	12.06
12.58	66.55	66.17	13.62	17.30	17.24	14.66	12.03	11.99
12.60	61.71	61.37	13.64	17.18	17.12	14.68	11.96	11.93
12.62	57.30	56.98	13.66	17.03	16.97	14.70	11.91	11.87
12.64	53.14	52.85	13.68	16.91	16.85	14.72	11.84	11.80
12.66	49.36	49.10	13.70	16.79	16.73	14.74	11.78	11.74
12.68	46.10	45.86	13.72	16.64	16.58	14.76	11.72	11.69
12.70	43.18	42.96	13.74	16.53	16.47	14.78	11.65	11.61
12.72	40.67	40.46	13.76	16.39	16.33	14.80	11.59	11.56
12.74	38.56	38.36	13.78	16.25	16.19	14.82	11.53	11.50
12.76	36.68	36.50	13.80	16.14	16.08	14.84	11.46	11.43
12.78	35.12	34.95	13.82	16.00	15.94	14.86	11.41	11.37
12.80	33.77	33.61	13.84	15.86	15.81	14.88	11.34	11.31
12.82	32.53	32.38	13.86	15.75	15.69	14.90	11.27	11.24
12.84	31.50	31.36	13.88	15.60	15.55	14.92	11.22	11.19
12.86	30.57	30.43	13.90	15.48	15.42	14.94	11.15	11.12
12.88	29.68	29.55	13.92	15.36	15.30	14.96	11.09	11.05
12.90	28.93	28.80	13.94	15.21	15.16	14.98	11.03	11.00
12.92	28.20	28.07	13.96	15.09	15.04	15.00	10.96	10.93
12.94	27.50	27.37	13.98	14.96	14.91	15.02	10.90	10.87
12.96	26.88	26.76	14.00	14.82	14.77	15.04	10.84	10.81
12.98	26.24	26.13	14.02	14.70	14.65	15.06	10.77	10.74
13.00	25.64	25.53	14.04	14.57	14.52	15.08	10.72	10.69
13.02	25.09	24.98	14.06	14.43	14.38	15.10	10.66	10.63
13.04	24.51	24.40	14.08	14.31	14.27	15.12	10.58	10.55
13.06	23.97	23.87	14.10	14.18	14.13	15.14	10.53	10.50
13.08	23.46	23.36	14.12	14.05	14.01	15.16	10.46	10.44
13.10	22.93	22.83	14.14	13.95	13.90	15.18	10.40	10.37
13.12	22.46	22.37	14.16	13.82	13.78	15.20	10.34	10.31
13.14	22.02	21.93	14.18	13.72	13.68	15.22	10.27	10.25
13.16	21.59	21.50	14.20	13.63	13.59	15.24	10.21	10.18
13.18	21.23	21.15	14.22	13.52	13.48	15.26	10.16	10.13
13.20	20.89	20.81	14.24	13.44	13.40	15.28	10.08	10.06
13.22	20.58	20.50	14.26	13.37	13.32	15.30	10.02	10.00
13.24	20.34	20.25	14.28	13.27	13.23	15.32	9.97	9.94
13.26	20.08	20.00	14.30	13.21	13.17	15.34	9.89	9.87
13.28	19.86	19.78	14.32	13.14	13.09	15.36	9.84	9.81
13.30	19.68	19.60	14.34	13.06	13.01	15.38	9.78	9.75
13.32	19.47	19.40	14.36	13.00	12.96	15.40	9.70	9.68
13.34	19.30	19.23	14.38	12.92	12.88	15.42	9.65	9.62
13.36	19.15	19.07	14.40	12.85	12.81	15.44	9.59	9.56
13.38	18.97	18.89	14.42	12.80	12.76	15.46	9.52	9.49
13.40	18.83	18.75	14.44	12.72	12.68	15.48	9.46	9.44
13.42	18.68	18.61	14.46	12.66	12.62	15.50	9.39	9.37
13.44	18.52	18.45	14.48	12.60	12.57	15.52	9.33	9.31
13.46	18.39	18.32	14.50	12.53	12.49	15.54	9.28	9.25
13.48	18.25	18.18	14.52	12.47	12.43	15.56	9.20	9.18
13.50	18.10	18.03	14.54	12.41	12.37	15.58	9.14	9.12

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Type III 24-hr 100-year Rainfall=8.52"

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
15.60	9.09	9.06	16.64	6.56	6.55	17.68	5.14	5.13
15.62	9.01	8.99	16.66	6.54	6.52	17.70	5.11	5.10
15.64	8.96	8.93	16.68	6.51	6.49	17.72	5.09	5.08
15.66	8.90	8.87	16.70	6.48	6.46	17.74	5.06	5.04
15.68	8.83	8.80	16.72	6.46	6.44	17.76	5.03	5.02
15.70	8.77	8.75	16.74	6.42	6.41	17.78	5.00	4.99
15.72	8.71	8.68	16.76	6.40	6.38	17.80	4.97	4.96
15.74	8.64	8.61	16.78	6.37	6.36	17.82	4.95	4.94
15.76	8.58	8.56	16.80	6.34	6.33	17.84	4.92	4.91
15.78	8.51	8.49	16.82	6.32	6.30	17.86	4.89	4.88
15.80	8.45	8.43	16.84	6.29	6.28	17.88	4.86	4.85
15.82	8.39	8.37	16.86	6.26	6.24	17.90	4.84	4.83
15.84	8.32	8.30	16.88	6.24	6.22	17.92	4.81	4.80
15.86	8.26	8.24	16.90	6.21	6.19	17.94	4.78	4.77
15.88	8.21	8.18	16.92	6.18	6.16	17.96	4.75	4.74
15.90	8.13	8.11	16.94	6.16	6.14	17.98	4.72	4.71
15.92	8.08	8.06	16.96	6.12	6.11	18.00	4.70	4.69
15.94	8.02	7.99	16.98	6.10	6.08	18.02	4.67	4.66
15.96	7.94	7.92	17.00	6.07	6.06	18.04	4.64	4.63
15.98	7.89	7.87	17.02	6.04	6.03	18.06	4.62	4.61
16.00	7.82	7.80	17.04	6.02	6.00	18.08	4.59	4.58
16.02	7.76	7.74	17.06	5.99	5.98	18.10	4.56	4.55
16.04	7.70	7.68	17.08	5.96	5.94	18.12	4.54	4.53
16.06	7.63	7.61	17.10	5.94	5.92	18.14	4.51	4.50
16.08	7.57	7.55	17.12	5.91	5.89	18.16	4.49	4.48
16.10	7.52	7.50	17.14	5.88	5.86	18.18	4.47	4.46
16.12	7.45	7.43	17.16	5.85	5.84	18.20	4.45	4.44
16.14	7.40	7.38	17.18	5.82	5.81	18.22	4.44	4.43
16.16	7.35	7.33	17.20	5.79	5.78	18.24	4.42	4.41
16.18	7.29	7.27	17.22	5.77	5.76	18.26	4.41	4.40
16.20	7.25	7.23	17.24	5.74	5.73	18.28	4.40	4.39
16.22	7.21	7.19	17.26	5.71	5.70	18.30	4.38	4.37
16.24	7.16	7.14	17.28	5.69	5.68	18.32	4.37	4.36
16.26	7.13	7.11	17.30	5.66	5.64	18.34	4.36	4.35
16.28	7.09	7.07	17.32	5.63	5.62	18.36	4.35	4.34
16.30	7.05	7.04	17.34	5.61	5.59	18.38	4.34	4.33
16.32	7.03	7.01	17.36	5.57	5.56	18.40	4.33	4.33
16.34	6.99	6.97	17.38	5.55	5.54	18.42	4.32	4.31
16.36	6.96	6.94	17.40	5.52	5.51	18.44	4.31	4.31
16.38	6.93	6.92	17.42	5.49	5.48	18.46	4.31	4.30
16.40	6.90	6.88	17.44	5.47	5.46	18.48	4.29	4.28
16.42	6.87	6.85	17.46	5.44	5.43	18.50	4.29	4.28
16.44	6.85	6.83	17.48	5.41	5.40	18.52	4.28	4.27
16.46	6.81	6.79	17.50	5.39	5.38	18.54	4.27	4.26
16.48	6.79	6.77	17.52	5.36	5.34	18.56	4.26	4.26
16.50	6.76	6.74	17.54	5.33	5.32	18.58	4.25	4.24
16.52	6.73	6.71	17.56	5.31	5.29	18.60	4.24	4.24
16.54	6.70	6.69	17.58	5.27	5.26	18.62	4.24	4.23
16.56	6.67	6.66	17.60	5.25	5.24	18.64	4.23	4.22
16.58	6.64	6.63	17.62	5.22	5.21	18.66	4.22	4.21
16.60	6.62	6.61	17.64	5.19	5.18	18.68	4.21	4.21
16.62	6.59	6.57	17.66	5.17	5.16	18.70	4.20	4.19

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Primary Comparison (continued)

Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)	Time (hours)	Subcat 1S (cfs)	Subcat 4S (cfs)
18.72	4.20	4.19	19.76	3.77	3.76
18.74	4.19	4.18	19.78	3.76	3.75
18.76	4.18	4.17	19.80	3.75	3.75
18.78	4.17	4.16	19.82	3.74	3.73
18.80	4.16	4.15	19.84	3.74	3.73
18.82	4.15	4.14	19.86	3.73	3.72
18.84	4.15	4.14	19.88	3.72	3.71
18.86	4.14	4.13	19.90	3.71	3.71
18.88	4.13	4.12	19.92	3.70	3.70
18.90	4.12	4.12	19.94	3.69	3.69
18.92	4.11	4.10	19.96	3.69	3.68
18.94	4.10	4.10	19.98	3.68	3.67
18.96	4.10	4.09	20.00	3.67	3.66
18.98	4.09	4.08			
19.00	4.08	4.07			
19.02	4.07	4.07			
19.04	4.06	4.05			
19.06	4.06	4.05			
19.08	4.05	4.04			
19.10	4.04	4.03			
19.12	4.03	4.03			
19.14	4.02	4.01			
19.16	4.01	4.01			
19.18	4.01	4.00			
19.20	4.00	3.99			
19.22	3.99	3.98			
19.24	3.98	3.98			
19.26	3.97	3.96			
19.28	3.97	3.96			
19.30	3.96	3.95			
19.32	3.95	3.94			
19.34	3.94	3.93			
19.36	3.93	3.93			
19.38	3.92	3.91			
19.40	3.92	3.91			
19.42	3.91	3.90			
19.44	3.90	3.89			
19.46	3.89	3.89			
19.48	3.88	3.87			
19.50	3.87	3.87			
19.52	3.87	3.86			
19.54	3.86	3.85			
19.56	3.85	3.84			
19.58	3.84	3.84			
19.60	3.83	3.82			
19.62	3.83	3.82			
19.64	3.82	3.81			
19.66	3.81	3.80			
19.68	3.80	3.80			
19.70	3.79	3.79			
19.72	3.78	3.78			
19.74	3.78	3.77			

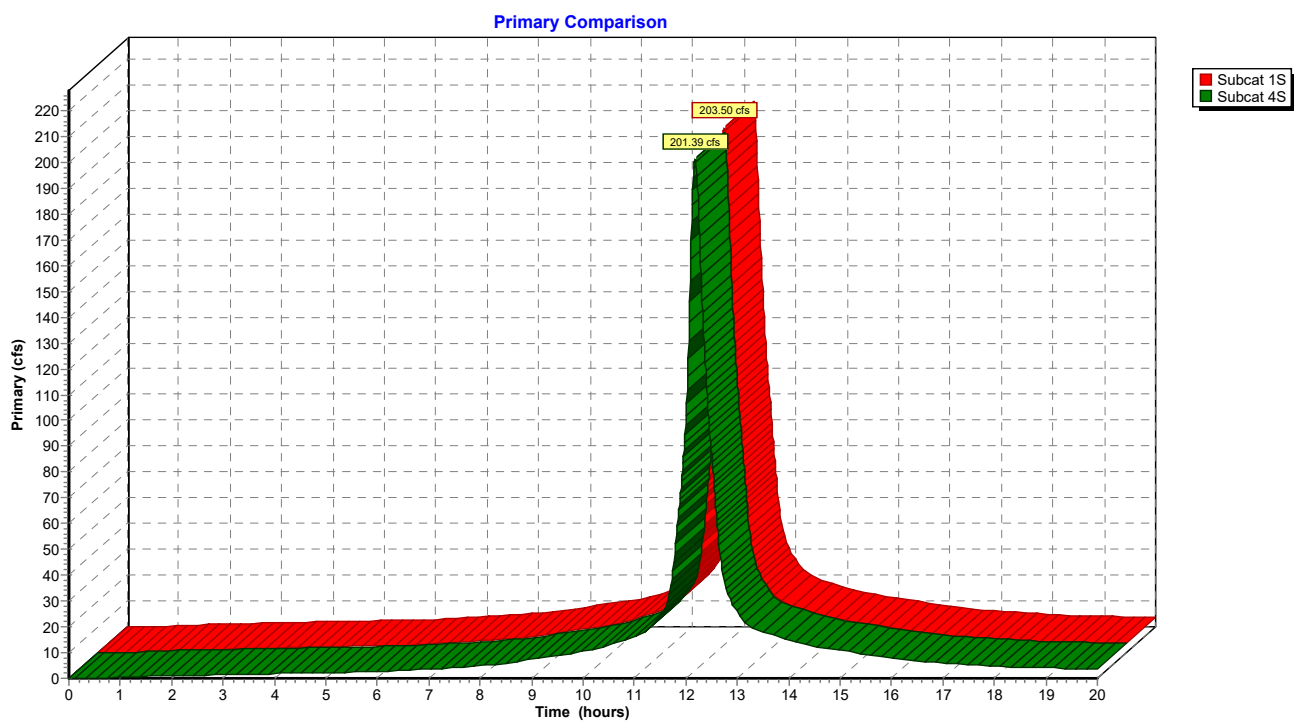
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Type III 24-hr 100-year Rainfall=8.52"

Printed 7/10/2020



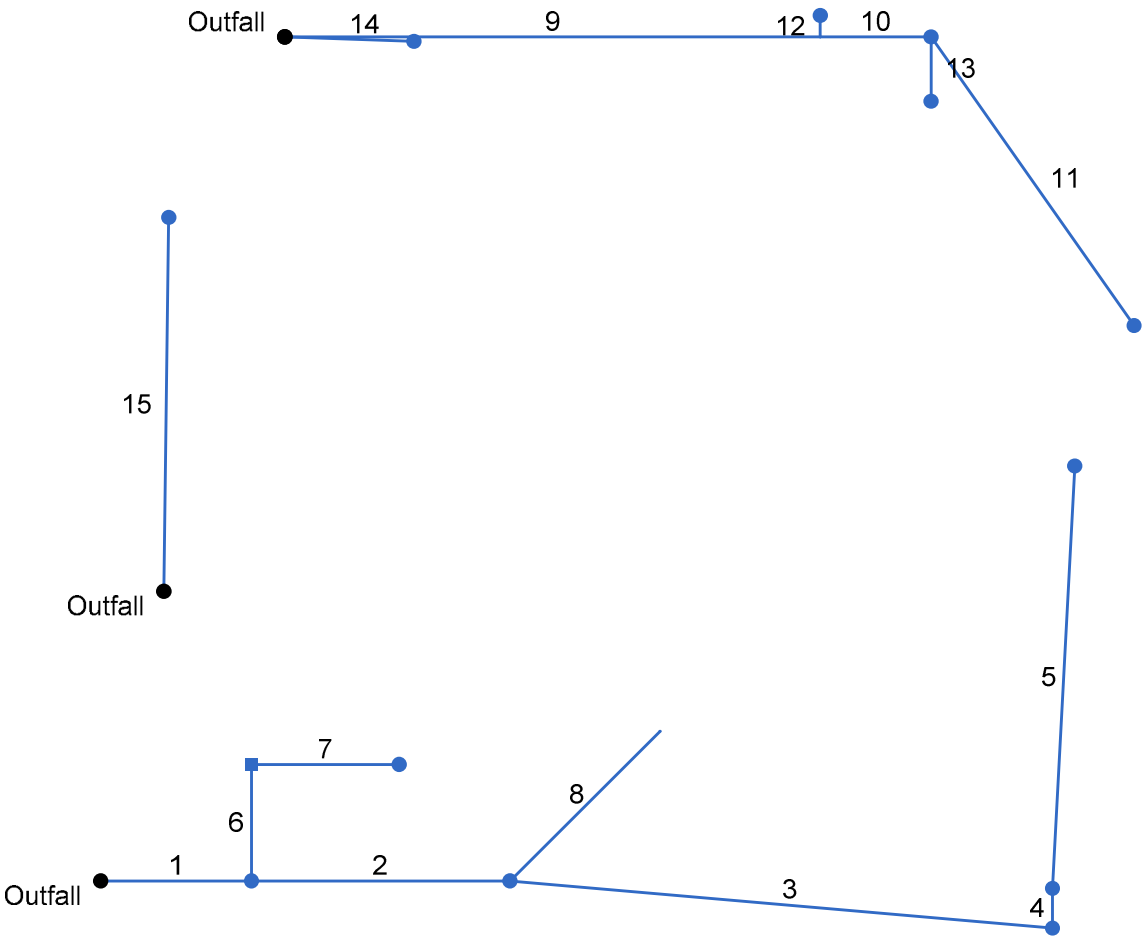
APPENDIX 3

STORMWATER DRAINAGE SYSTEM:

- SUBDRAINAGE AREA COVERAGE BREAKDOWN
 - PIPING CAPACITY ANALYSIS

111 Ideation Way Subdrainage Area Breakdown							
Subdrainage Area	Impervious Area (C=0.99)		Pervious Area (HSG D) (C=0.65)		Total Area		C
	SF	Acre	SF	Acre	SF	Acre	
5014S	275	0.01	0	0.00	275	0.01	0.99
5013S	10,921	0.25	5,014	0.12	15,935	0.37	0.88
5016S	11,992	0.28	8,728	0.20	20,720	0.48	0.85
5018S	9,720	0.22	1,099	0.03	10,819	0.25	0.96
2.6	16,491	0.38	6,180	0.14	22,671	0.52	0.90
A.1	2,189	0.05	0	0.00	2,189	0.05	0.99
EX Loading Dock CB	6,203	0.14	9,772	0.22	15,975	0.37	0.78
EX Parking Lot CB	29,743	0.68	1,560	0.04	31,303	0.72	0.97
Roof Drain	27,643	0.63	0	0.00	27,643	0.63	0.99
VS-41A	279	0.01	8,041	0.18	8,320	0.19	0.66

111 Ideation Way



Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	49.000	0.000	MH	0.00	0.00	0.00	6.0	120.05	10.94	125.41	12	Cir	0.012	1.00	131.41	MHD VS37 - MHD VS3
2	1	84.000	0.000	MH	0.00	0.00	0.00	6.0	125.51	6.25	130.76	12	Cir	0.012	0.75	138.81	MHD VS38 - MHD VS4
3	2	177.000	5.000	Grate	0.00	0.01	0.99	6.0	133.96	3.15	139.54	10	Cir	0.012	1.50	144.84	MHD VS40 - CB 5014
4	3	13.000	-95.000	Grate	0.00	0.37	0.88	6.0	139.54	2.38	139.85	10	Cir	0.012	0.50	144.75	CB 5014S - CB 5013
5	4	138.000	3.000	Grate	0.00	0.05	0.99	6.0	140.05	1.01	141.45	10	Cir	0.012	1.00	147.00	CB 5013S - CB A.1
6	1	38.000	-90.000	MH	0.00	0.00	0.00	6.0	125.41	0.58	125.63	12	Cir	0.010	1.00	128.30	MHD VS38 - VAULT
7	6	48.000	90.000	Grate	0.00	0.37	0.78	6.0	125.63	0.56	125.90	10	Cir	0.010	1.00	127.85	VAULT - LD CB
8	2	69.000	-45.000	None	0.00	0.63	0.99	6.0	133.81	10.39	140.98	12	Cir	0.012	1.00	146.50	MHD VS40 - ROOF
9	End	174.000	0.000	None	0.00	0.00	0.00	6.0	133.17	2.57	137.65	12	Cir	0.012	1.00	147.90	CB 5019S - TEE
10	9	36.000	0.000	MH	0.00	0.00	0.00	6.0	137.65	2.58	138.58	12	Cir	0.012	1.00	148.38	TEE - MHD VS-41
11	10	115.000	55.000	Grate	0.00	0.48	0.85	6.0	138.68	4.86	144.27	9	Cir	0.012	1.00	148.25	MHD VS-41- CB 5016
12	9	7.000	-90.000	Grate	0.00	0.25	0.96	6.0	137.95	46.00	141.17	8	Cir	0.012	1.00	147.17	TEE - CB 5018S
13	10	21.000	90.000	Grate	0.00	0.19	0.66	6.0	138.68	1.24	138.94	10	Cir	0.012	1.00	148.94	MHD VS-41 - CB VS-
14	End	42.000	2.000	Grate	0.00	0.72	0.97	6.0	133.17	2.17	134.08	12	Cir	0.012	1.00	143.10	CB 5019S - PL CB
15	End	122.000	-89.238	Curb	22.84	0.52	0.90	6.0	119.82	2.20	122.50	30	Cir	0.012	1.00	139.28	MH 2.5 - CB 2.6
111 Ideation Way												Number of lines: 15				Date: 7/13/2020	

Storm Sewer Tabulation

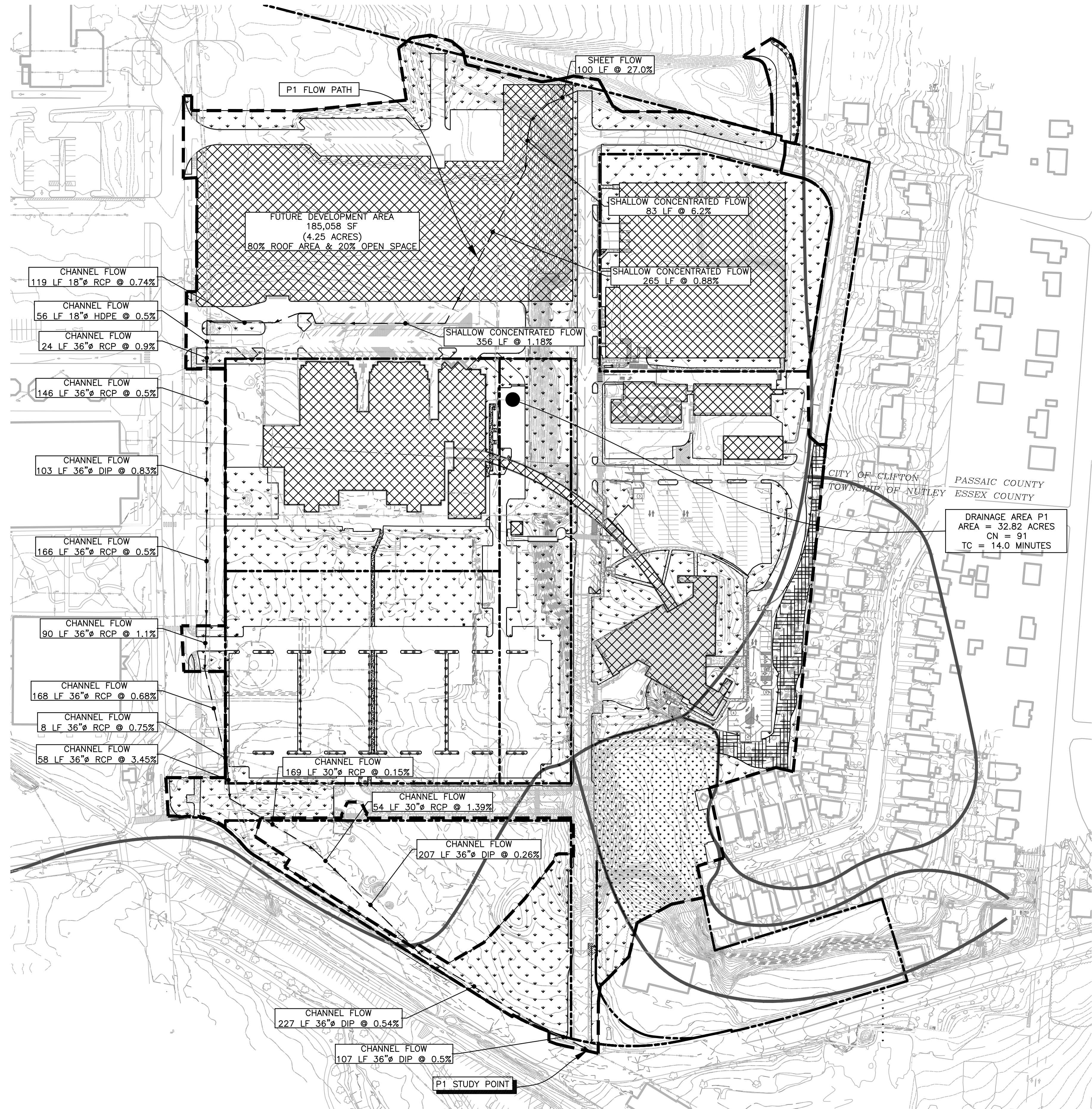
Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr (min)	Total (min)	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	49.000	0.00	1.43	0.00	0.00	1.30	6.0	10.5	5.7	7.38	12.76	13.06	12	10.94	120.05	125.41	120.60	126.39	124.70	131.41	MHD VS37 - MHD
2	1	84.000	0.00	1.06	0.00	0.00	1.01	6.0	10.4	5.7	5.78	9.65	7.70	12	6.25	125.51	130.76	126.39	131.71	131.41	138.81	MHD VS38 - MHD
3	2	177.000	0.01	0.43	0.99	0.01	0.39	6.0	9.7	5.9	2.26	4.21	6.33	10	3.15	133.96	139.54	134.39	140.21	138.81	144.84	MHD VS40 - CB 5
4	3	13.000	0.37	0.42	0.88	0.33	0.38	6.0	9.7	5.9	2.20	3.66	4.71	10	2.38	139.54	139.85	140.21	140.51	144.84	144.75	CB 5014S - CB 50
5	4	138.000	0.05	0.05	0.99	0.05	0.05	6.0	6.0	6.9	0.34	2.39	1.76	10	1.01	140.05	141.45	140.51	141.70	144.75	147.00	CB 5013S - CB A.
6	1	38.000	0.00	0.37	0.00	0.00	0.29	6.0	6.2	6.8	1.96	3.52	3.26	12	0.58	125.41	125.63	126.39	126.23	131.41	128.30	MHD VS38 - VAU
7	6	48.000	0.37	0.37	0.78	0.29	0.29	6.0	6.0	6.9	1.98	2.14	4.45	10	0.56	125.63	125.90	126.26	126.53	128.30	127.85	VAULT - LD CB
8	2	69.000	0.63	0.63	0.99	0.62	0.62	6.0	6.0	6.9	4.28	12.44	10.13	12	10.39	133.81	140.98	134.21	141.85	138.81	146.50	MHD VS40 - ROO
9	End	174.000	0.00	0.92	0.00	0.00	0.77	6.0	6.4	6.7	5.20	6.19	7.84	12	2.57	133.17	137.65	133.87	138.58	142.10	147.90	CB 5019S - TEE
10	9	36.000	0.00	0.67	0.00	0.00	0.53	6.0	6.3	6.8	3.61	6.20	5.02	12	2.58	137.65	138.58	138.58	139.39	147.90	148.38	TEE - MHD VS-41
11	10	115.000	0.48	0.48	0.85	0.41	0.41	6.0	6.0	6.9	2.80	3.95	6.47	9	4.86	138.68	144.27	139.39	144.98	148.38	148.25	MHD VS-41- CB 5
12	9	7.000	0.25	0.25	0.96	0.24	0.24	6.0	6.0	6.9	1.65	8.87	4.93	8	46.00	137.95	141.17	138.58	141.76	147.90	147.17	TEE - CB 5018S
13	10	21.000	0.19	0.19	0.66	0.13	0.13	6.0	6.0	6.9	0.86	2.64	2.48	10	1.24	138.68	138.94	139.39	139.35	148.38	148.94	MHD VS-41 - CB
14	End	42.000	0.72	0.72	0.97	0.70	0.70	6.0	6.0	6.9	4.79	5.68	6.26	12	2.17	133.17	134.08	134.17	134.98	142.10	143.10	CB 5019S - PL C
15	End	122.000	0.52	0.52	0.90	0.47	0.47	6.0	6.0	6.9	26.05	65.85	6.23	30	2.20	119.82	122.50	122.32	124.24	133.62	139.28	MH 2.5 - CB 2.6
111 Ideation Way																Number of lines: 15				Run Date: 7/13/2020		
NOTES:Intensity = 50.06 / (Inlet time + 9.50) ^ 0.73; Return period =Yrs. 25 ; c = cir e = ellip b = box																						

APPENDIX 4

DRAINAGE AREA MAPS:

- EXISTING DRAINAGE AREA MAP
- PROPOSED DRAINAGE AREA MAP
- PROPOSED SUB-DRAINAGE AREA MAP

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PROPOSED DRAINAGE AREA MAP

SCALE: 1" = 100'

1
PDA

LEGEND:

- PROPERTY BOUNDARY
- COUNTY BOUNDARY
- DRAINAGE AREA BOUNDARY
- HYDROLOGIC SOIL BOUNDARY

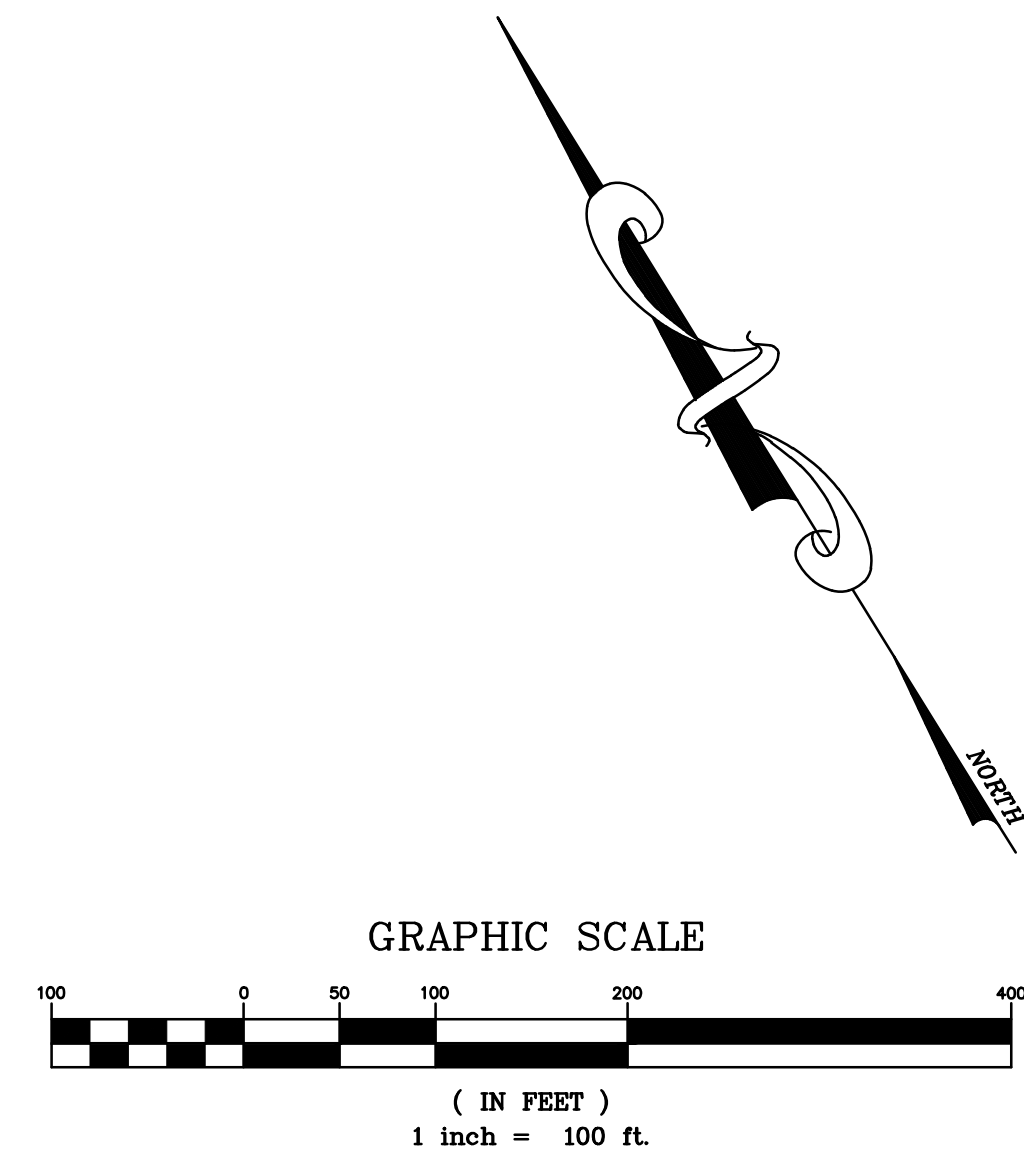
HYDROLOGIC SOIL GROUP:

HYDROLOGIC SOIL GROUP

BooC	Boon silt loam	HSG C
URB00B	Urban land, Boon substratum	HSG D (Presumed)
USB00B	Urban land, Boon substratum	HSG D (Presumed)
USB00C	Urban land, Boon substratum	HSG D (Presumed)

LOT COVERAGE BREAKDOWN:

- ROOFED AREA (WITHIN HYDROLOGY SOIL GROUP D SOIL BOUNDARY LIMIT)
W/ 80% ROOF AREA FROM FUTURE DEVELOPMENT AREA
= 8.63 ACRES
- PAVED AREA (WITHIN HYDROLOGY SOIL GROUP D SOIL BOUNDARY LIMIT)
= 11.91 ACRES
- OPEN SPACE AREA (WITHIN HYDROLOGY SOIL GROUP C SOIL BOUNDARY LIMIT)
= 1.40 ACRES
- OPEN SPACE AREA (WITHIN HYDROLOGY SOIL GROUP D SOIL BOUNDARY LIMIT)
W/ 20% OPEN SPACE AREA FROM FUTURE DEVELOPMENT AREA
= 10.39 ACRES
- WOOD AREA (WITHIN HYDROLOGY SOIL GROUP D SOIL BOUNDARY LIMIT)
= 0.49 ACRES



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ISSUE/REVISION RECORD

DATE	DESCRIPTION
07/07/2020	BID SET
07/21/2020	PLANNING BOARD SUBMISSION

PROFESSIONAL SEAL



PROFESSIONAL IN CHARGE
STEPHEN POWERS
PROFESSIONAL ENGINEER
LICENSE NO. 24GE04773100

PROJECT MANAGER
RICHARD PROCANIK

QUALITY CONTROL
RICHARD PROCANIK

DRAWN BY
THOMAS WIENCKOWSKI

PROJECT NAME
**111 IDEATION WAY
PARKING LOT**

**NUTLEY
NEW JERSEY**

EXISTING BLOCK 300 LOT 1 & 1.05
PROPOSED LOT 1.05A
TOWNSHIP OF NUTLEY
ESSEX COUNTY, NJ
ZONING DISTRICT: RRP-2A
ROOFE
REDEVELOPMENT
PLAN PHASE IIA

PROJECT NUMBER
20161711.0

SHEET TITLE

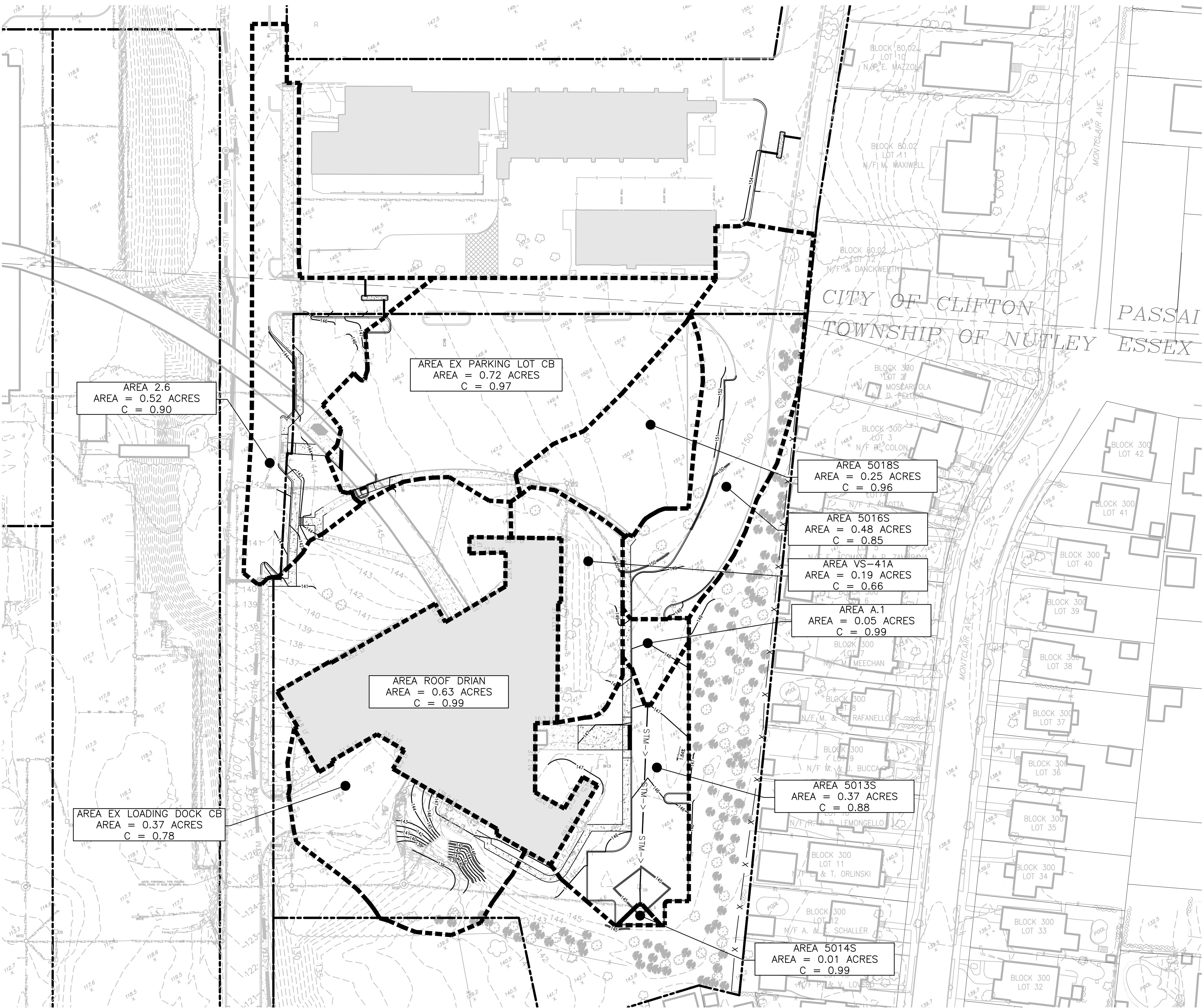
**PROPOSED
DRAINAGE
AREA MAP**

SHEET NUMBER

PDA

LEGEND:

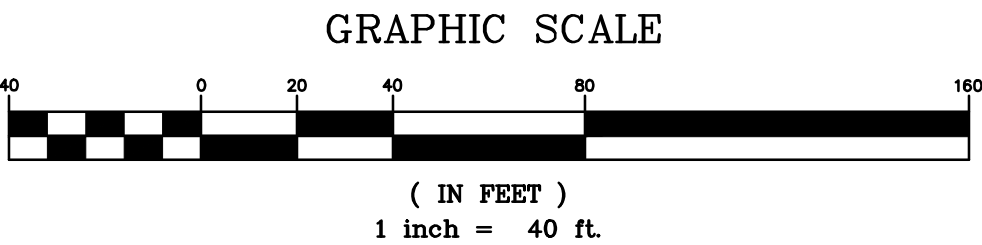
LIMITS OF SUBDRAINAGE AREA



PROPOSED SUBDRAINAGE AREA MAP

SCALE: 1" = 40'

1
SDA

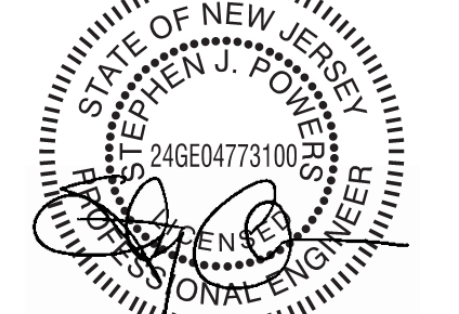


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ESSEX COUNTY, NJ
ZONING DISTRICT: RRP-2A
ROCHE
REDEVELOPMENT
PLAN PHASE IIA

PROJECT NUMBER
20161711.0

SHEET TITLE

**PROPOSED
SUBDRAINAGE
AREA MAP**

SHEET NUMBER

SDA