STONEFIELD

STORMWATER MANAGEMENT REPORT

PROPOSED MIXED-USE REDEVELOPMENT PLAN
BLOCK 541, LOT 2
750 WALNUT AVENUE
TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY

PREPARED FOR:

HARTZ MOUNTAIN INDUSTRIES, INC.

PREPARED BY:

STONEFIELD ENGINEERING & DESIGN, LLC
OCTOBER 4, 2022
T-16509

ZACHARY CHAPLIN (PE)
NEW JERSEY PROFESSIONAL ENGINEER LICENSE # 53605

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1.0 PROJECT DESCRIPTION

Hartz Mountain Industries, Inc. is proposing the redevelopment of the above referenced property to accommodate two (2) flex warehouses 132,000 SF and 109,200 SF in size and two (2), 39,102 SF multi-family residential buildings. The subject property is designated Block 541, Lot 2, commonly known as 70 Walnut Avenue in the Township of Cranford. The site is bounded by the Hyatt Hills Golf Complex to the southwest, the Conrail rail line to the north and northwest, and Walnut Avenue to the east. Single-family residential uses are located across Walnut Avenue to the east of the property and across the Conrail rail line to the north of the property.

The total project area is 1,341,643 SF (30.8 AC), the total area of disturbance is 1,259,011 SF (28.9 acres), and the project will result in a reduction of 96,790 SF (2.22 acres) of impervious surfaces. Project Figures can be found in Appendix A of this Report.

This Stormwater Management Report has been prepared to analyze the potential stormwater runoff impacts of the proposed project and discuss the measures proposed to conform to the stormwater management requirements set forth by the Township of Cranford, Somerset Union County Soil Conservation District, and the New Jersey Department of Environmental Protection (NJDEP).

2.0 EXISTING CONDITIONS

The project site is currently developed and consists of two office buildings, a parking garage, and associated surface parking. The site is located north of Walnut Avenue and is serviced by two non-signalized driveways. The site is currently 65.5% impervious and contains two above ground stormwater management basins to manage the runoff on site.

2.1 EXISTING DRAINAGE AREAS

Under existing conditions, the site is comprised of three drainage areas.

About 30.8% of the site runoff is collected via catch basins and piped to an existing detention basin located at the northeast portion of Walnut Avenue. This basin discharges directly to an 18" RCP in Walnut Avenue, which is part of the municipal system. The remainder of the site is generally tributary to the basin located at the southern corner of the property. This basin also discharges directly to the municipal system within Walnut Avenue via a 42" RCP. For the purposes of this analysis, the calculation area for the site has been limited to the LOD of the proposed project.

TABLE 1: EXISTING DRAINAGE AREAS

Drainage Area	Description	Area Extents (SF)	Impervious Area (SF)	Time of Concentration (Min)
E-1	Existing Area Tributary to 42" RCP	795,160	630,944	6
E-2	Existing Area Tributary to 18" RCP	413,360	258,284	6
E-3	Undetained Runoff	133,123	4,040	6

** The minimum time of concentration was utilized. Refer to Section 4.0 for more information regarding design parameters.*

Existing Drainage Area E-1 accounts for approximately 60% of the entirety of the site and includes the existing structures on site and the vast majority of the area to the north and behind the existing building. The drainage area is ultimately tributary to the existing basin located within the southerly corner of the property which connects to the stormwater system within Walnut Avenue via a 42" RCP.

Existing Drainage Area E-2 accounts for approximately 31% of the site and contains the parking area in front of the existing building and portions of the landscaping buffer along Walnut Avenue to the north of the building. The drainage area is tributary to the existing basin located along the north eastern portion of the property and connects to the stormwater system with Walnut Avenue via an 18" RCP.

The remainder of the project area is not currently detained by either of the existing basins and freely flows off the property.

Additional information regarding each drainage area can be found on the Existing Drainage Area Map in Appendix E of this Report.

2.2 PROJECT SOILS

Per the National Resource Conservation Service (NRCS) data, the soil underlying the project site consists of:

TABLE 2: NRCS PROJECT SOILS

Soil Unit Code	Soil Description	Approximate Project Coverage	Hydrologic Soil Group
BovB	Boonton-Urban Land-Haledon complex, 0% to 8% slopes	42.8%	C
HatB	Haledon-Urban Land Hasbrouck complex, 0% to 8% slopes	14.2%	C
UR	Urban Land	43.0%	*

** Hydrologic soil group classification not defined by NRCS*

The hydrologic soil group classifications above have been utilized in the landcover data for the stormwater analysis performed on the project. The National Resource Conservation Service (NRCS) data does not provide hydrologic soil group classification for the Urban Land soils. For the purpose of analysis, it has been assumed to be hydrologic soil group D.

3.0 PROPOSED CONDITIONS

Under the proposed development plan, the project area will consist of two flex warehouses with 132,000 SF and 109,200 SF footprints and two multi-family residential buildings, both with a 39,102 SF footprint. Additional site improvements include loading docks, parking, a park area in front of the residential buildings, lighting, and landscaping. Five bioretention basins will be added to the site and both of the existing basins will be modified to increase the capacity of the basins. An additional basin will be provided to the north of the modified north east basin along Walnut Avenue to provide additional storage. The north east modified basin will be extended to the south to account for the proposed driveway. The existing outlet structures will not be modified.

3.1 PROPOSED DRAINAGE AREAS

Under proposed conditions the site is comprised of three drainage areas.

The general drainage patterns and ultimate point of interest will be maintained. A new conveyance system is proposed, and certain drainage areas are to be sent to various stormwater management features for water quality purposes as outlined in the next Report section. See below for a short summary of the drainage areas.

TABLE 3: PROPOSED DRAINAGE AREAS

Drainage Area	Description	Area Extents (SF)	Impervious Area (SF)	Time of Concentration (Min)
P-1	Proposed Area Tributary to 42" RCP	800,312	541,322	6
P-2	Proposed Area Tributary to 18" RCP	415,287	251,490	6
P-3	Undetained Runoff	126,044	3,666	6

** The minimum time of concentration was utilized. Refer to Section 4.0 for more information regarding design parameters.*

Proposed Drainage Area P-1 contains the majority of the residential portion of the development and park area, as well as the southerly flex building and portions of the industrial parking and loading areas and accounts for approximately 60% of the project site. Stormwater is collected via catchbasins and is ultimately piped to the southerly basin on site.

Proposed Drainage Area P-2 contains the northerly flex building and the remainder of the parking / loading areas within the industrial portion of the site, as well as a portion of the residential driveway and park area. The drainage area accounts for approximately 31% of the project site and is tributary to the north easterly basin and 18" RCP.

Proposed Drainage Area P-3 accounts for the remainder of the site and is undetained.

Detailed information regarding each drainage area can be found on the Proposed Drainage Area Map in Appendix E of this Report.

4.0 ANALYSIS METHODOLOGY & DESIGN PARAMETERS

4.1 HYDROLOGIC & HYDRAULIC ANALYSES

The existing and proposed drainage areas have been analyzed utilizing a modified version of the NRCS SCS TR-20 method. The analysis program "HydroCAD" Version 9.10 by HydroCAD Software Solutions LLC was used to calculate and plot the runoff hydrographs. The program incorporates the time of concentration, CN values, 24 hour rainfall events, and project drainage areas to calculate the runoff characteristics. Key variables utilized include the SCS Unit Hydrograph, a minimum time of concentration of 6 minutes, separate runoff calculations for impervious and pervious areas, and dynamic storage and conveyance routing to account for any variable tailwater conditions.

4.2 NEW JERSEY STORMWATER DESIGN PARAMETERS

The project is proposing to disturb 27.6 acres of land. Per the applicable stormwater standards, the project is classified as a Major Development and is subject to stormwater runoff quantity, quality, and groundwater recharge regulations.

TABLE 4: PROJECT STORMWATER DESIGN INTENT SUMMARY TABLE

Design Parameters	Design Intent For Compliance
Stormwater Quantity	Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2, 10, and 100 year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events.
Groundwater Recharge	The subject site is located within State Planning Area PA-1. As such, it is exempt from groundwater recharge requirements.
Stormwater Quality	Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality storm by 80% of the anticipated load from the area of the developed site equal to the new motor vehicle surfaces created, expressed as an annual average

4.3 SUBSURFACE STORMWATER INVESTIGATION

A subsurface stormwater investigation was conducted by Melick-Tully and Associates on 09/26/2018. A total of 14 tests were performed in compliance with the soil testing standards outlined within Appendix E of the NJDEP Best Management Practices (BMP) Manual. All proposed stormwater facilities meet or exceed the minimum separation depth from seasonal high groundwater. The full investigation report and testing results can be found in Appendix D of this Report.

5.0 PROJECT ANALYSIS RESULTS

5.1 STORMWATER QUANTITY CONTROL

As the proposed improvements result in a decrease in impervious surfaces, stormwater runoff quantity is naturally reduced. In addition to the reduction in impervious surfaces, the existing detention basins are scheduled to be modified, resulting in an increase in storage capacity. Compliance with quantity reduction requirements will be achieved due to the overall decrease in impervious coverage and by generally maintaining the existing quantity of runoff tributary to each basin. The tables below summarize the various drainage areas in relation to flow rates and runoff volume during regulatory storm events:

TABLE 5: QUANTITY COMPARISON POINTS OF INTEREST

Point of Interest	Area Description	Existing Tributary Drainage Areas	Proposed Tributary Drainage Areas
POI - 1	Drainage to 42" RCP	E-1	P-1
POI - 2	Drainage to 18" RCP	E-2	P-2
POI - 3	Undetained Runoff	E-3	P-3

The following tables summarize the results for the 2-year, 10-year, and 100-year storm events for each project point of interest:

TABLE 6: SUMMARY OF PROPOSED POI 1 FLOW RATES & VOLUMES

Storm Event	Pre-Development Flow Rate	Pre-Development Volume	Post-Development	Post-Development Volume
2-Year	52.31 CFS	184,447 CF	49.61 CFS	172,929 CF
10-Year	83.40 CFS	297,215 CF	80.93 CFS	284,177 CF
100-Year	145.54 CFS	525,168 CF	143.85 CFS	511,361 CF

TABLE 7: SUMMARY OF PROPOSED POI 2 FLOW RATES & VOLUMES

Storm Event	Pre-Development Flow Rate	Pre-Development Volume	Post-Development	Post-Development Volume
2-Year	24.02 CFS	83,771 CF	23.51 CFS	82,056 CF
10-Year	39.94 CFS	139,617 CF	39.40 CFS	137,514 CF
100-Year	72.37 CFS	255,123 CF	71.93 CFS	252,804 CF

TABLE 8: SUMMARY OF PROPOSED POI 3 FLOW RATES & VOLUMES

Storm Event	Pre-Development Flow Rate	Pre-Development Volume	Post-Development	Post-Development Volume
2-Year	4.51 CFS	14,235 CF	4.26 CFS	13,452 CF
10-Year	9.48 CFS	29,498 CF	8.97 CFS	27,898 CF
100-Year	20.15 CFS	63,819 CF	19.07 CFS	60,388 CF

Under post-development conditions stormwater quantity has been analyzed to meet the requirements of NJAC 7:8-5.4(a)3. Post-construction runoff hydrographs for the 2, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm. Detailed hydrologic calculations for each drainage area including comparison reports and comparison hydrographs can be found in Appendix C of this Report.

5.2 GROUNDWATER RECHARGE

As the site is reducing impervious coverage, groundwater recharge is naturally increased. Additionally, it is worth noting that the subject property is located within an Urban Planning Area defined by the NJDEP as the Metropolitan Planning Area (PA-1), where per NJAC 7:8-5.4, groundwater recharge requirements do not apply in portions of redeveloped area.

5.3 STORMWATER QUALITY CONTROL

As the site creates over a quarter acre of new motor vehicle surfaces, several green infrastructure stormwater BMP's are proposed on site to meet the total suspended solids removal (TSS) removal requirements as certified by the NJDEP BMP Manual. A total of five (5) bioretention facilities are proposed on site, four of which are located on the industrial portion of the project site. In addition to the proposed bioretention facilities, five (5) EcoPure Biofilter water quality units are proposed within the residential portion of the site. In reference to the new NJDEP water quality requirements for redevelopment, solely the areas of new motor vehicle surfaces, when compared to existing conditions, are treated to 80% TSS removal. The remaining vehicular surfaces will maintain the treatment that currently exists today via the existing basins. A detailed exhibit, quantifying the areas of new motor vehicle surfaces can be found in Appendix G of this report. A breakdown of the areas tributary to the proposed water quality devices / bioretention basins can be found in Appendix H of this report.

TABLE 9: STORMWATER BMP TSS REMOVAL EFFICIENCIES

Stormwater BMP Facility	NJDEP Certified Removal Efficiency	Treatment Train Removal Efficiency
Bioretention Facility	80%	N/A
EcoPure Biofilter	90%	N/A

The NJDEP Certification for the EcoPure Biofilter can be found in Appendix E of this report.

5.4 STORMWATER CONVEYANCE SYSTEMS

The stormwater conveyance system has been sized for the 25-year storm and is able to safely convey runoff to stormwater management facilities without overflowing.

5.5 SOIL EROSION & SEDIMENT CONTROL

A Soil Erosion & Sediment Control Plan has been prepared in accordance with the latest edition of the Standards for Soil Erosion and Sediment Control in New Jersey. Proposed temporary measures during construction include silt fencing, stabilized construction entrances, inlet filters, and cover for soil stabilization. Permanent post-construction measures include conduit outlet projection, native vegetation, and rip-rap lining. No land disturbance will occur until a permit has been obtained from the Somerset Union County Soil Conservation District.

5.6 STORMWATER OPERATIONS & MAINTENANCE

A Stormwater Operations & Maintenance Manual will be submitted for approval to the Township of Cranford prior to the start construction. Any required easements or covenants associated with the stormwater improvements will be recorded prior to the start of construction.

5.7 EXISTING AND MODIFIED BASIN ANALYSIS

At the request of the township engineer, an analysis of the capacity of the existing basins has been performed. Information regarding the available storage for each drainage area can be found in the table below:

TABLE 10: SUMMARY OF EXISTING AND MODIFIED / PROPOSED BASINS

Basin	Existing Storage Capacity	Proposed Storage Capacity	Additional Storage Provided
Southerly Basin	127,677 CF	127,722 CF	45 CF
North Easterly Basin	90,538 CF	95,725 CF	5,187 CF
North Easterly Basin Extension	--	20,992 CF	20,992 CF

As can be noted in the table above, the two existing basins have been modified to increase their respective storage capacity. An additional basin extension is also provided to provide additional storage for the North Easterly Basin to help contain the larger storm events. The modification of the existing basins, the basin

extension, and the reduced flow rates and water volume directed towards the basins due to the project development all result in a significant decrease in flooding on site during the larger storm events.

The southerly basin has an emergency spill way with an elevation of approximately 60.50, 1.88 FT above the basin bottom. The emergency spillway is found to be utilized under existing conditions during all storm events, releasing water to the southerly adjacent property. Under proposed conditions, the basin is expanded by 45 CF and the emergency spillway is raised to an elevation of 62.12, 3.5 FT above the basin bottom. The proposed modification to the southerly basin allows for the basin to fully contain the 2-year storm event and reduces the volume of water released by the emergency spillway for all other storm events. Existing and proposed hydrographs for the southerly basin can be found in Appendix 1 of this report.

Under existing conditions the north easterly basin is found to have a storage capacity of 90,538 CF. The proposed modification to the basin and the addition of the basin extension increases the storage amount under proposed conditions by 26,179 CF. The existing and modified basin and basin extension are capable of containing the 2, 10, and 25 year storm events. Under the 100-year storm event flooding occurs under both conditions. Existing and proposed hydrographs for the north easterly basin and basin extension can be found in Appendix I of this report.

6.0 CONCLUSIONS

The proposed project complies with all applicable stormwater management regulations and standards. As such, the project is not anticipated to have any adverse impacts or neighboring properties, downstream watercourses, or conveyance systems within the watershed.

APPENDIX A
PROJECT FIGURES

INVENTORY

AERIAL MAP

TAX AND ZONING MAP

USGS QUADRANGLE MAP

FEMA FLOOD INSURANCE RATE MAP (FIRM)

NJDEP GEOWEB – FRESHWATER WETLANDS MAP

NJDEP GEOWEB – SPECIES HABITAT MAP

NJDEP GEOWEB – WELLHEAD PROTECTION AREA MAP

AERIAL MAP

500' 0' 500' 1000'

GRAPHIC SCALE IN FEET

1"= 500'

SOURCE: GOOGLE EARTH PRO, IMAGERY DATED 04/19/2016

HARTZ MOUNTAIN

PROPOSED RESIDENTIAL REDEVELOPMENT

BLOCK 541, LOT 2
750 WALNUT AVENUE (COUNTY ROUTE 632)
TOWNSHIP OF CRANFORD,
UNION COUNTY, NJ

DRAWN BY:	CAM
CHECKED BY:	SO
DATE:	09/05/2018
SCALE:	1" = 500'
PROJECT ID:	T-16509

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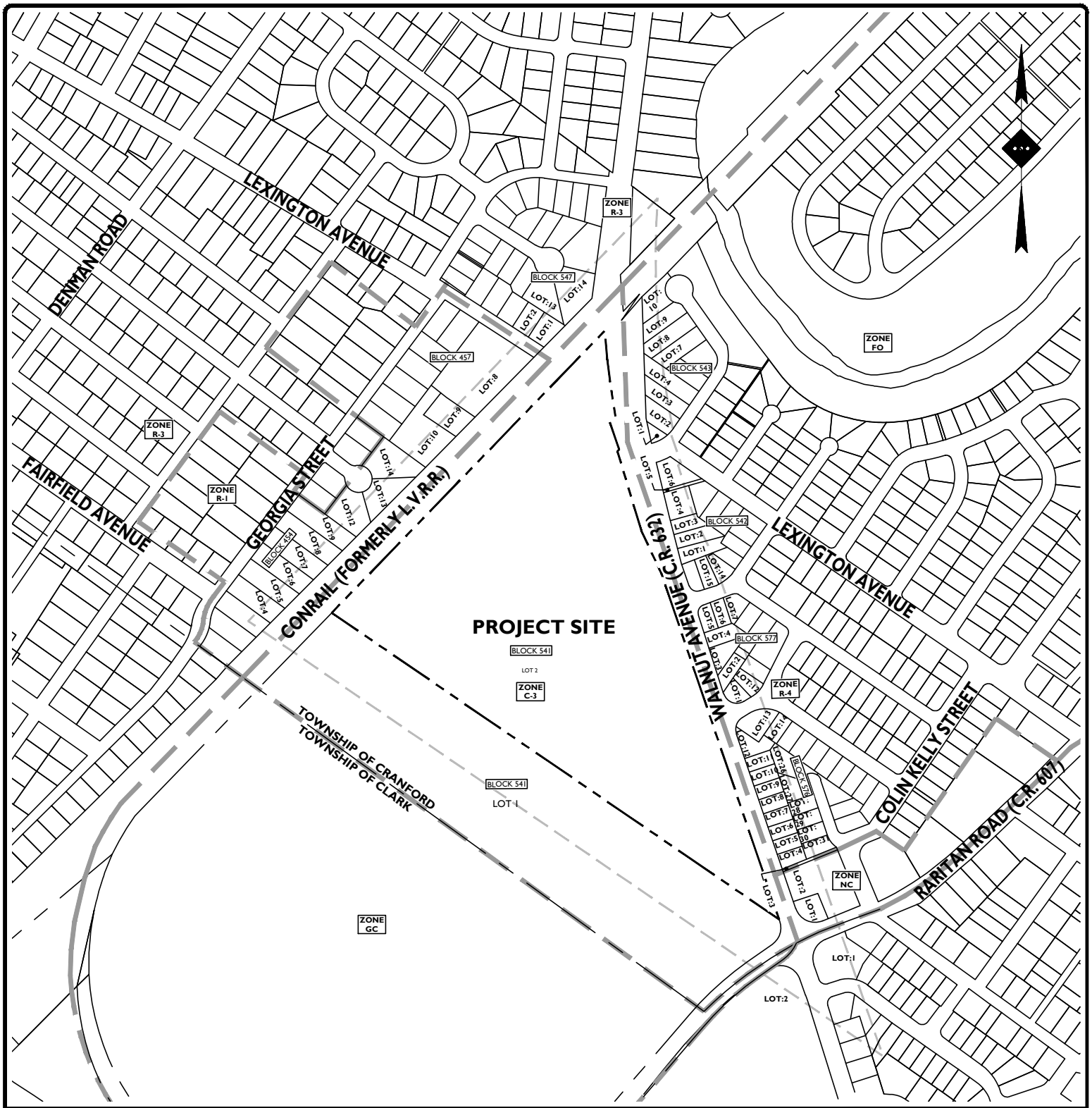

TAX AND ZONING MAP

500' 0' 500' 1000'

GRAPHIC SCALE IN FEET

1"= 500'

SOURCE: TOWNSHIP OF CRANFORD TAX MAP PAGES 96, 97, 129, 133, & 142, AND TOWNSHIP OF CRANFORD ZONING MAP

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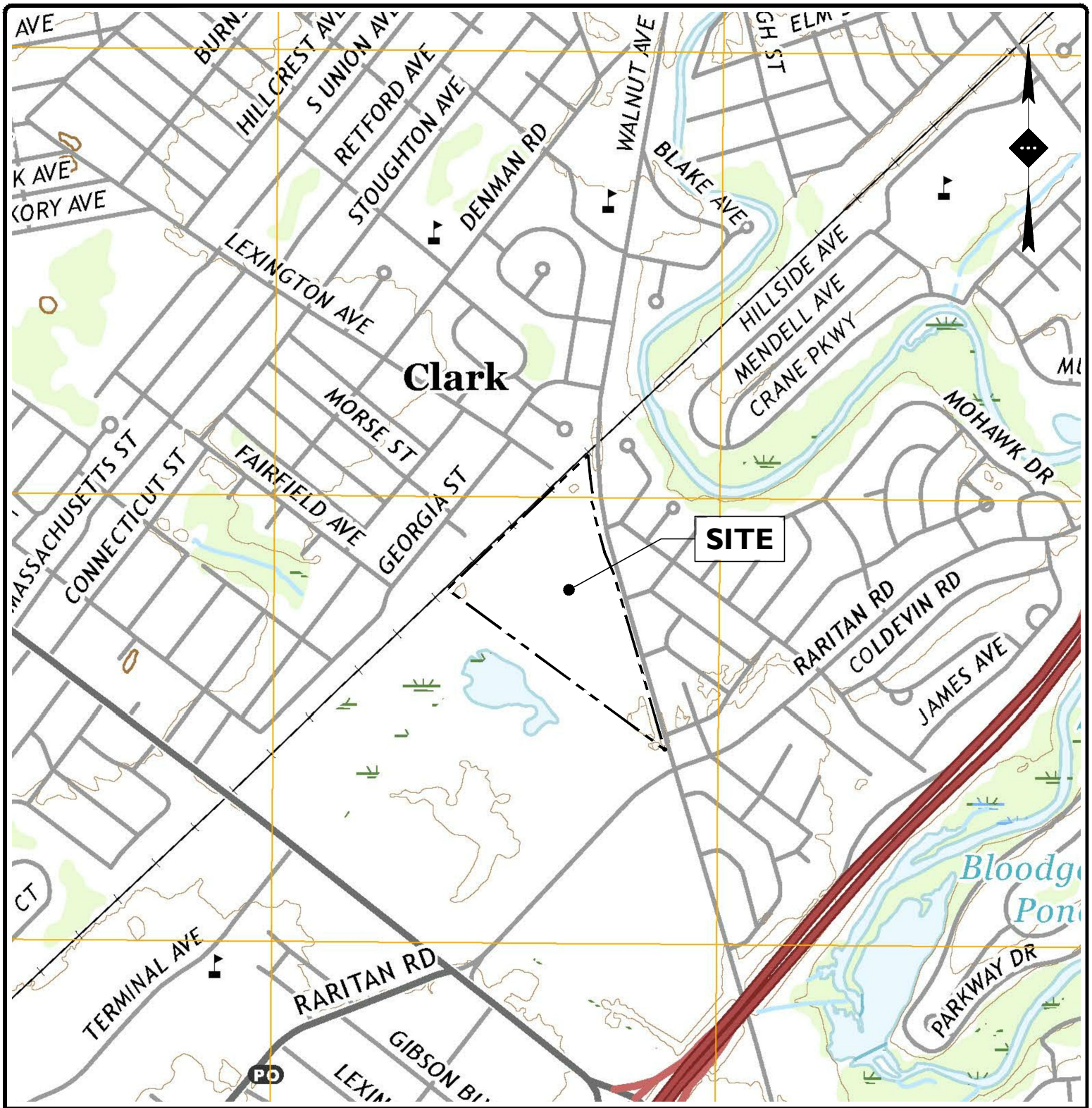

USGS QUADRANGLE MAP

1000' 0' 1000' 2000'

GRAPHIC SCALE IN FEET

1"= 1000'

SOURCE: USGS 7.5 MINUTE SERIES, ROSELLE, NJ QUADRANGLE MAP, DATED 2018 AND 7.5 MINUTE SERIES, PERTH AMBOY, NJ-NY QUADRANGLE MAP, DATED 2018

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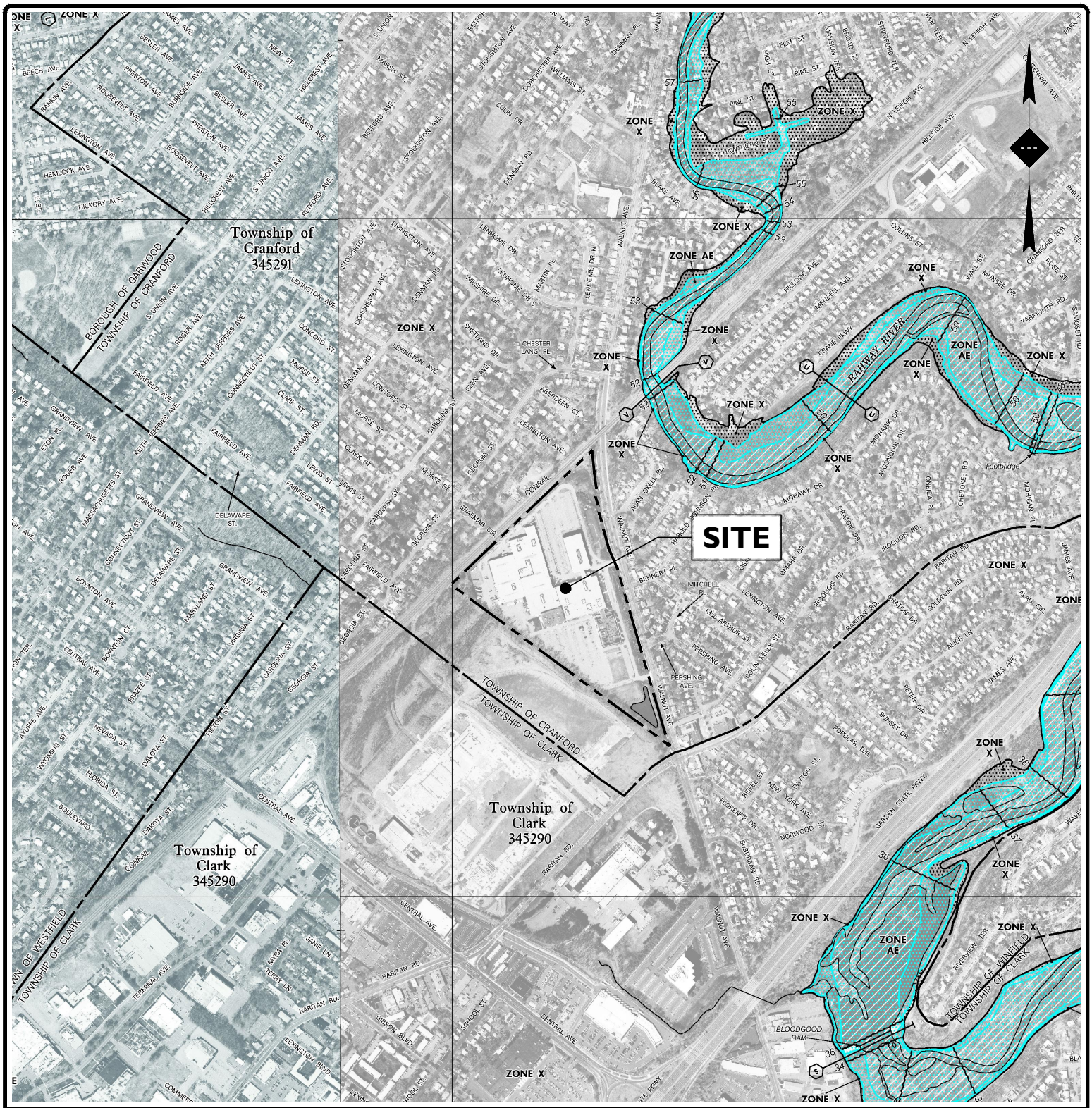

FEMA FLOOD INSURANCE RATE MAP (FIRM)

1000' 0' 1000' 2000'

GRAPHIC SCALE IN FEET

1"= 1000'

SOURCE: EFFECTIVE FEMA FIRM MAPS 34039C0031F & 34039C0032F, DATED 09/20/2006

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NJDEP GEOWEB - FRESHWATER WETLANDS MAP

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GRAPHIC SCALE IN FEET

1"= 1000'

SOURCE: NJDEP GEOWEB

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NJDEP GEOWEB - SPECIES HABITAT MAP

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SOURCE: NJDEP GEOWEB

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NJDEP GEOWEB - WELLHEAD PROTECTION AREA MAP

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GRAPHIC SCALE IN FEET

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SOURCE: NJDEP GEOWEB - WELLDRILLERS MAP

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APPENDIX B
NRCS COUNTY SOIL SURVEY

United States Department of Agriculture

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 Union County, New Jersey

July 30, 2021

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

Map Scale: 1:4,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Union County, New Jersey
Survey Area Data: Version 14, Jun 1, 2020

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

Date(s) aerial images were photographed: Jul 25, 2019—Jul 30, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BovB	Boonton-Urban land-Haledon complex, 0 to 8 percent slopes	21.0	42.8%
HatB	Haledon-Urban land-Hasbrouck complex, 0 to 8 percent slopes	7.0	14.2%
UR	Urban land	21.1	43.0%
Totals for Area of Interest		**49.1**	**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.

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.

Union County, New Jersey

BovB—Boonton-Urban land-Haledon complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1kgnb
Elevation: 50 to 500 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Boonton, moderately well drained, and similar soils: 50 percent
Urban land: 30 percent
Haledon and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boonton, Moderately Well Drained

Setting

Landform: Ground moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy till derived from basalt

Typical profile

Ap - 0 to 8 inches: loam
Bt - 8 to 36 inches: gravelly fine sandy loam
Bx - 36 to 51 inches: loam
C - 51 to 60 inches: loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
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: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Description of Urban Land

Setting

Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

Typical profile

C - 0 to 60 inches: variable

Interpretive groups

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

Description of Haledon

Setting

Landform: Ground moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy till derived from basalt

Typical profile

Ap - 0 to 9 inches: loam
Bt - 9 to 28 inches: silt loam
Bx - 28 to 44 inches: sandy loam
C - 44 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 24 to 36 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

HatB—Haledon-Urban land-Hasbrouck complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: b0tt
Elevation: 50 to 500 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Haledon and similar soils: 45 percent
Urban land: 25 percent
Hasbrouck and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Haledon

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy basal till derived from basalt

Typical profile

Ap - 0 to 9 inches: loam
Bt - 9 to 28 inches: silt loam
Bx - 28 to 44 inches: sandy loam
C - 44 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 24 to 36 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Ground moraines
Down-slope shape: Convex, 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

C - 0 to 60 inches: variable

Interpretive groups

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

Description of Hasbrouck

Setting

Landform: Flood plains, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Fine-loamy eroded and redeposited glacial material over glacial till

Typical profile

Oa - 0 to 2 inches: highly decomposed plant material
A - 2 to 12 inches: silt loam
Eg - 12 to 18 inches: sandy loam
Btg1 - 18 to 26 inches: loam
Btg2 - 26 to 32 inches: clay loam
Bx - 32 to 54 inches: loam
C - 54 to 62 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 18 to 36 inches to fragipan
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water capacity: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Udorthents, haledon substratum

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

Boonton

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (three-dimensional): Upper third of mountainflank, center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

UR—Urban land

Map Unit Setting

National map unit symbol: b0vf
Elevation: 0 to 170 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

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

Interpretive groups

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

Minor Components

Udorthents

Percent of map unit: 5 percent
Landform: Low hills
Down-slope shape: Linear
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.

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.

Map—Hydrologic Soil Group

Map Scale: 1:4,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

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

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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Soil Survey Area: Union County, New Jersey
Survey Area Data: Version 14, Jun 1, 2020

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

Date(s) aerial images were photographed: Jul 25, 2019—Jul 30, 2019

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BovB	Boonton-Urban land-Haledon complex, 0 to 8 percent slopes	C	21.0	42.8%
HatB	Haledon-Urban land-Hasbrouck complex, 0 to 8 percent slopes	C	7.0	14.2%
UR	Urban land		21.1	43.0%
Totals for Area of Interest			**49.1**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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 "greater than 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.

Map—Depth to Any Soil Restrictive Layer

Map Scale: 1:4,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

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Table—Depth to Any Soil Restrictive Layer

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
BovB	Boonton-Urban land-Haledon complex, 0 to 8 percent slopes	91	21.0	42.8%
HatB	Haledon-Urban land-Hasbrouck complex, 0 to 8 percent slopes	71	7.0	14.2%
UR	Urban land	>200	21.1	43.0%
Totals for Area of Interest			**49.1**	**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

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

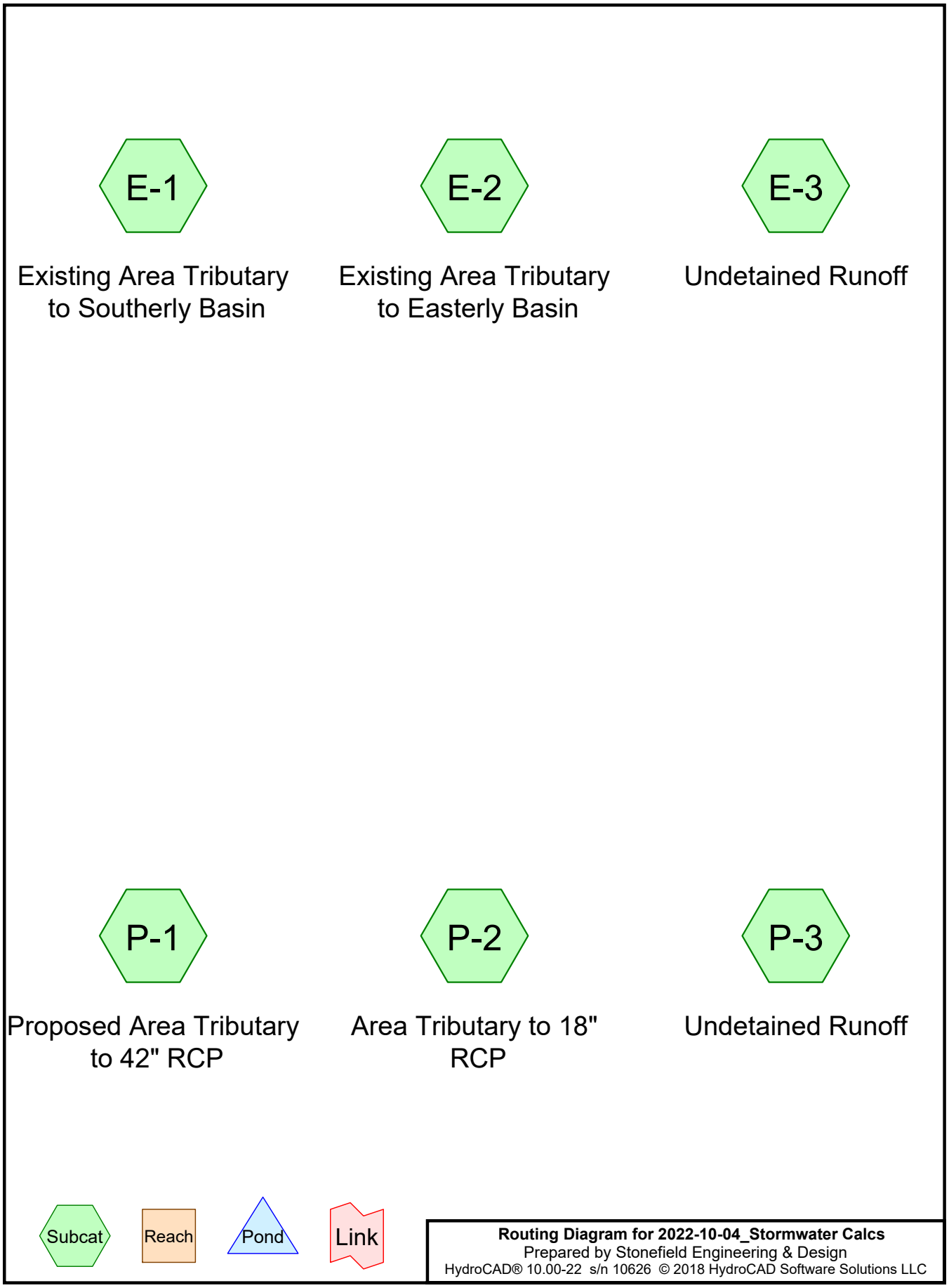
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

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

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C
DESIGN CALCULATIONS & DIAGRAMS

APPENDIX C-1
HYDROCAD ROUTING DIAGRAM



Routing Diagram for 2022-10-04_Stormwater Calcs
Prepared by Stonefield Engineering & Design
HydroCAD® 10.00-22 s/n 10626 © 2018 HydroCAD Software Solutions LLC

APPENDIX C-2
2-YEAR STORM EVENT HYDROGRAPHS

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
677,228	74	>75% Grass cover, Good, HSG C (E-1, E-2, E-3, P-1, P-2, P-3)
316,312	80	>75% Grass cover, Good, HSG D (E-1, E-2, E-3, P-1, P-2, P-3)
1,689,746	98	Paved parking, HSG D (E-1, E-2, E-3, P-1, P-2, P-3)
2,683,286	**90**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	677,228	316,312	0	993,540	>75% Grass cover, Good	
0	0	0	1,689,746	0	1,689,746	Paved parking	
0	**0**	**677,228**	**2,006,058**	**0**	**2,683,286**	**TOTAL AREA**	

Summary for Subcatchment E-1: Existing Area Tributary to Southerly Basin

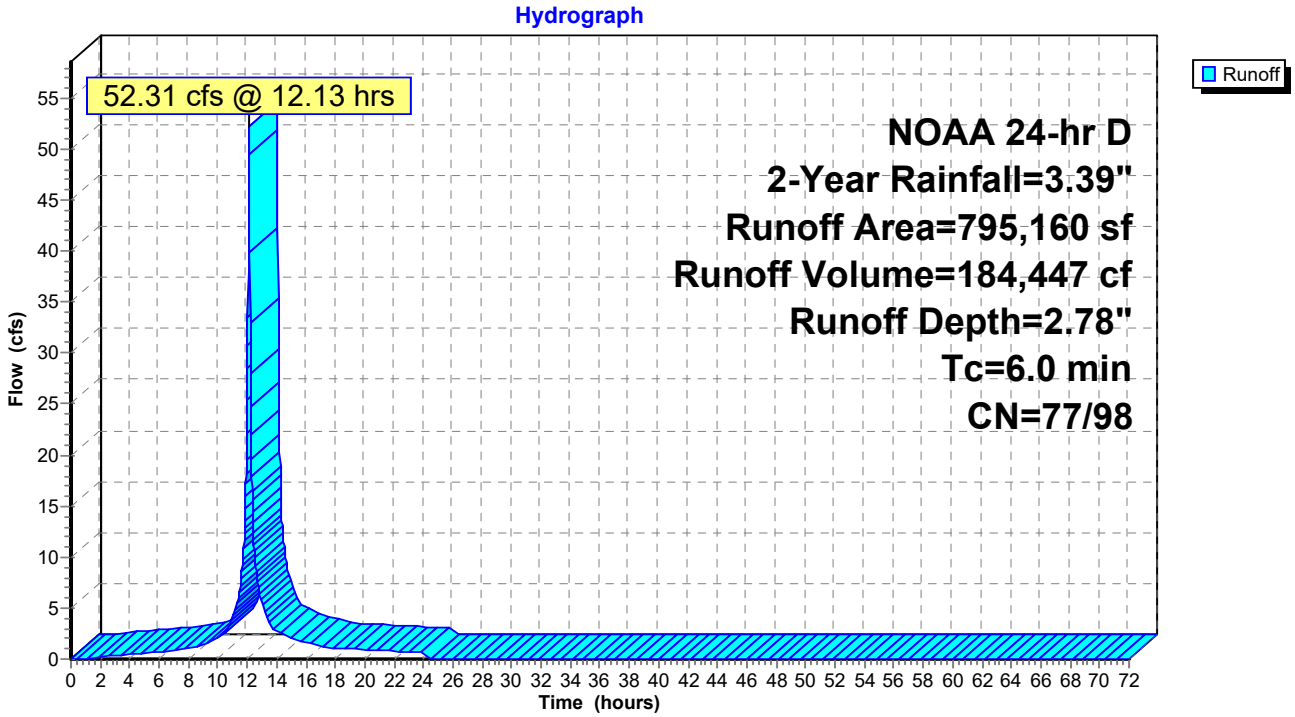
Runoff = 52.31 cfs @ 12.13 hrs, Volume= 184,447 cf, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
630,944	98	Paved parking, HSG D
85,682	74	>75% Grass cover, Good, HSG C
78,534	80	>75% Grass cover, Good, HSG D
795,160	94	Weighted Average
164,216	77	20.65% Pervious Area
630,944	98	79.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-1: Existing Area Tributary to Southerly Basin



Summary for Subcatchment E-2: Existing Area Tributary to Easterly Basin

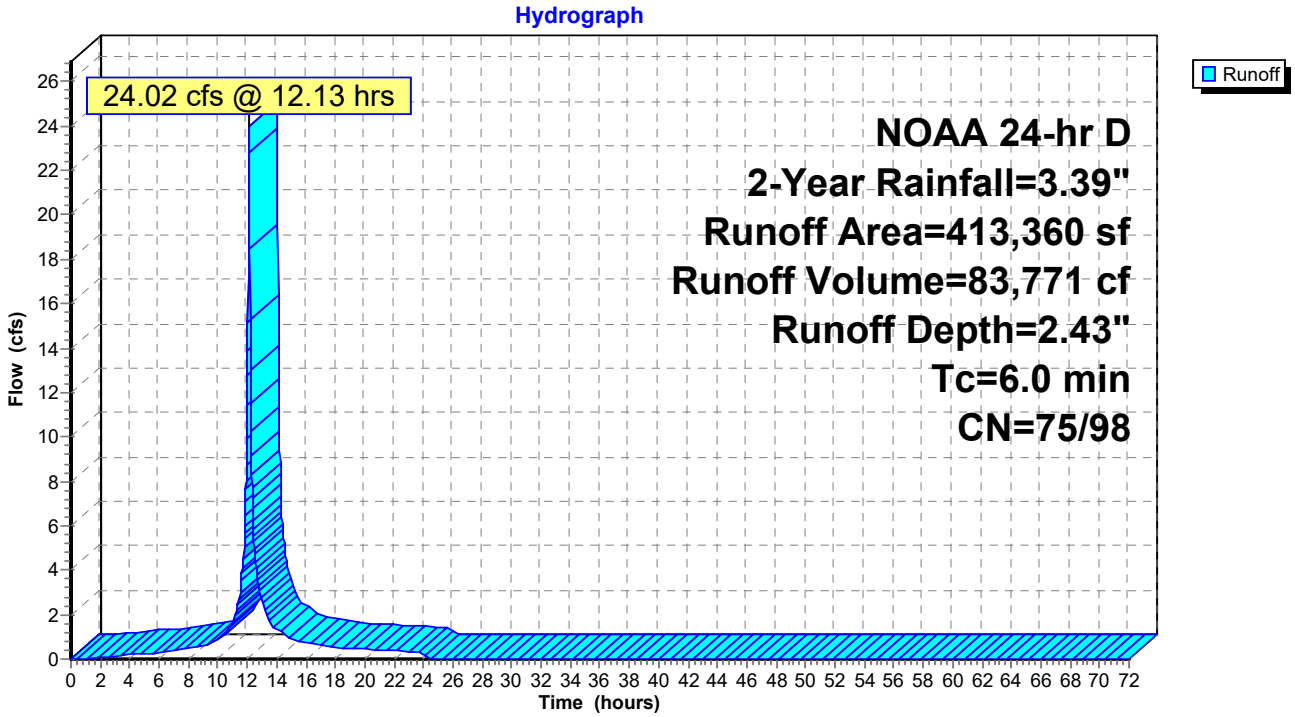
Runoff = 24.02 cfs @ 12.13 hrs, Volume= 83,771 cf, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
258,284	98	Paved parking, HSG D
125,156	74	>75% Grass cover, Good, HSG C
29,920	80	>75% Grass cover, Good, HSG D
413,360	89	Weighted Average
155,076	75	37.52% Pervious Area
258,284	98	62.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-2: Existing Area Tributary to Easterly Basin



Summary for Subcatchment E-3: Undetained Runoff

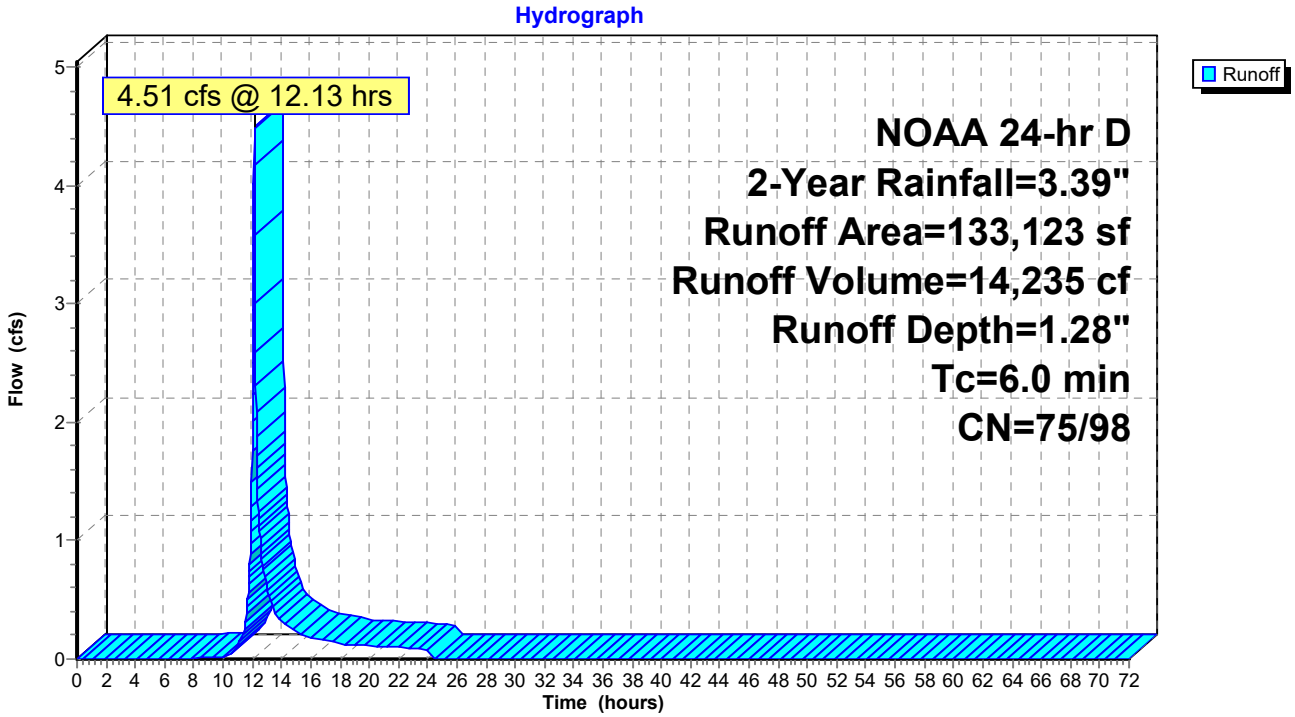
Runoff = 4.51 cfs @ 12.13 hrs, Volume= 14,235 cf, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
4,040	98	Paved parking, HSG D
115,648	74	>75% Grass cover, Good, HSG C
13,435	80	>75% Grass cover, Good, HSG D
133,123	75	Weighted Average
129,083	75	96.97% Pervious Area
4,040	98	3.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-3: Undetained Runoff



Summary for Subcatchment P-1: Proposed Area Tributary to 42" RCP

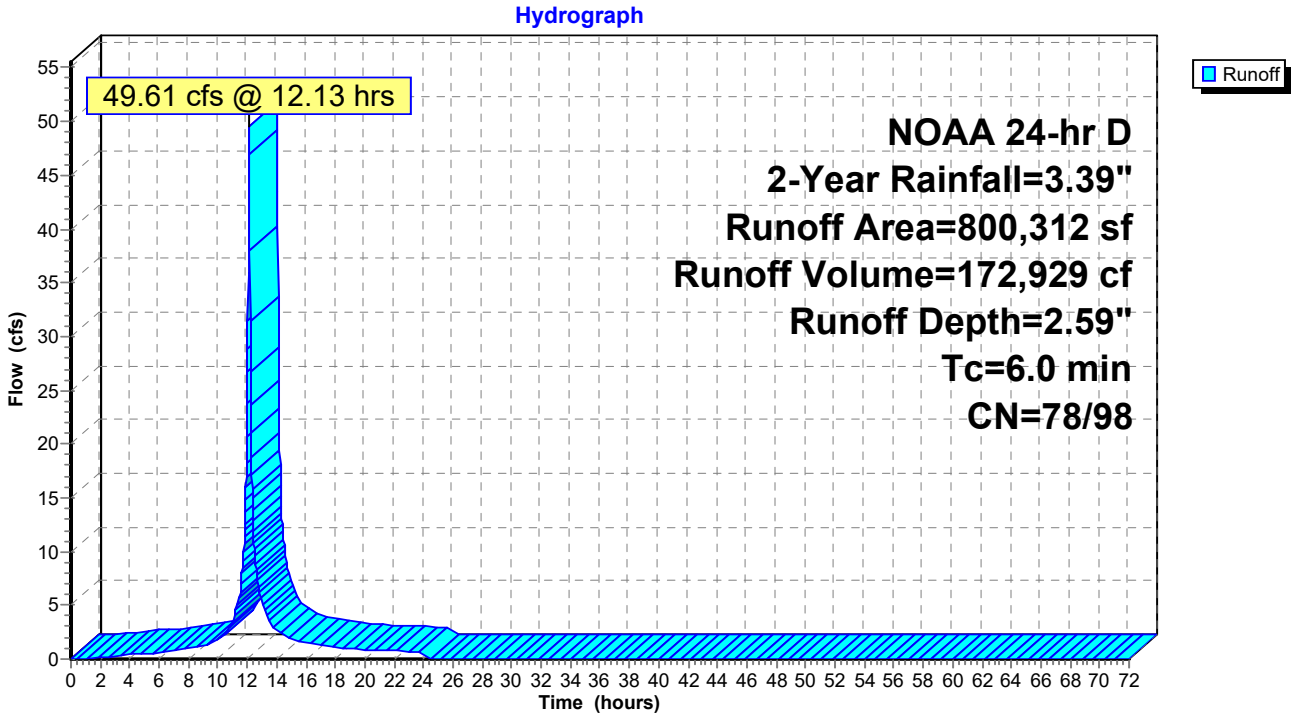
Runoff = 49.61 cfs @ 12.13 hrs, Volume= 172,929 cf, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
541,322	98	Paved parking, HSG D
89,531	74	>75% Grass cover, Good, HSG C
169,459	80	>75% Grass cover, Good, HSG D
800,312	92	Weighted Average
258,990	78	32.36% Pervious Area
541,322	98	67.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-1: Proposed Area Tributary to 42" RCP



Summary for Subcatchment P-2: Area Tributary to 18" RCP

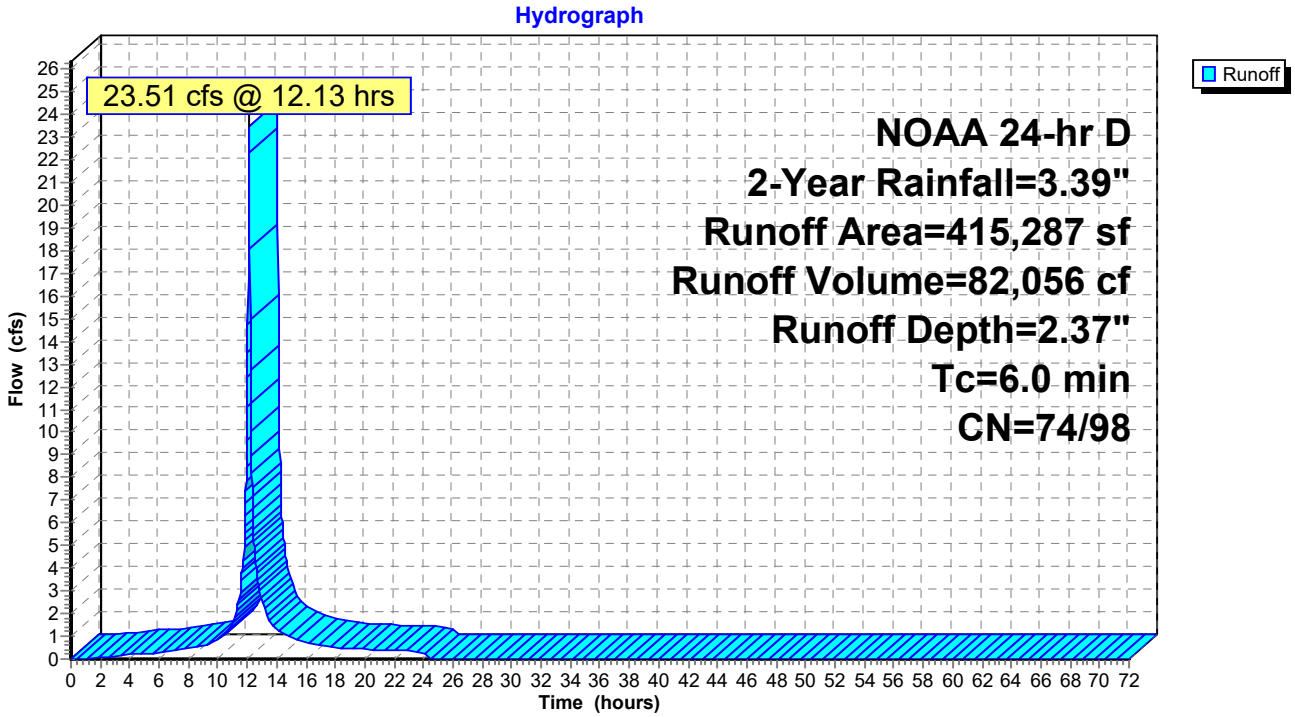
Runoff = 23.51 cfs @ 12.13 hrs, Volume= 82,056 cf, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
251,490	98	Paved parking, HSG D
153,839	74	>75% Grass cover, Good, HSG C
9,958	80	>75% Grass cover, Good, HSG D
415,287	89	Weighted Average
163,797	74	39.44% Pervious Area
251,490	98	60.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2: Area Tributary to 18" RCP



Summary for Subcatchment P-3: Undetained Runoff

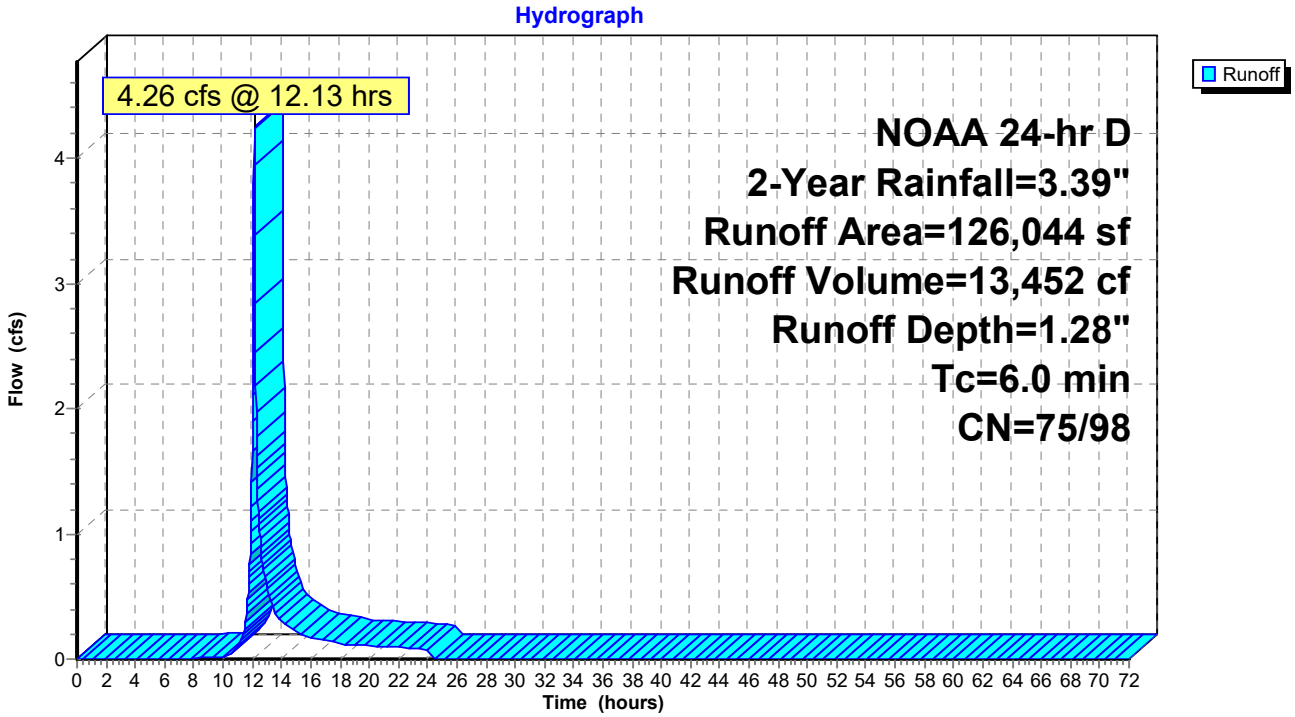
Runoff = 4.26 cfs @ 12.13 hrs, Volume= 13,452 cf, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
3,666	98	Paved parking, HSG D
107,372	74	>75% Grass cover, Good, HSG C
15,006	80	>75% Grass cover, Good, HSG D
126,044	75	Weighted Average
122,378	75	97.09% Pervious Area
3,666	98	2.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-3: Undetained Runoff



APPENDIX C-3
10-YEAR STORM EVENT HYDROGRAPHS

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
677,228	74	>75% Grass cover, Good, HSG C (E-1, E-2, E-3, P-1, P-2, P-3)
316,312	80	>75% Grass cover, Good, HSG D (E-1, E-2, E-3, P-1, P-2, P-3)
1,689,746	98	Paved parking, HSG D (E-1, E-2, E-3, P-1, P-2, P-3)
2,683,286	**90**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	677,228	316,312	0	993,540	>75% Grass cover, Good	
0	0	0	1,689,746	0	1,689,746	Paved parking	
0	**0**	**677,228**	**2,006,058**	**0**	**2,683,286**	**TOTAL AREA**	

Summary for Subcatchment E-1: Existing Area Tributary to Southerly Basin

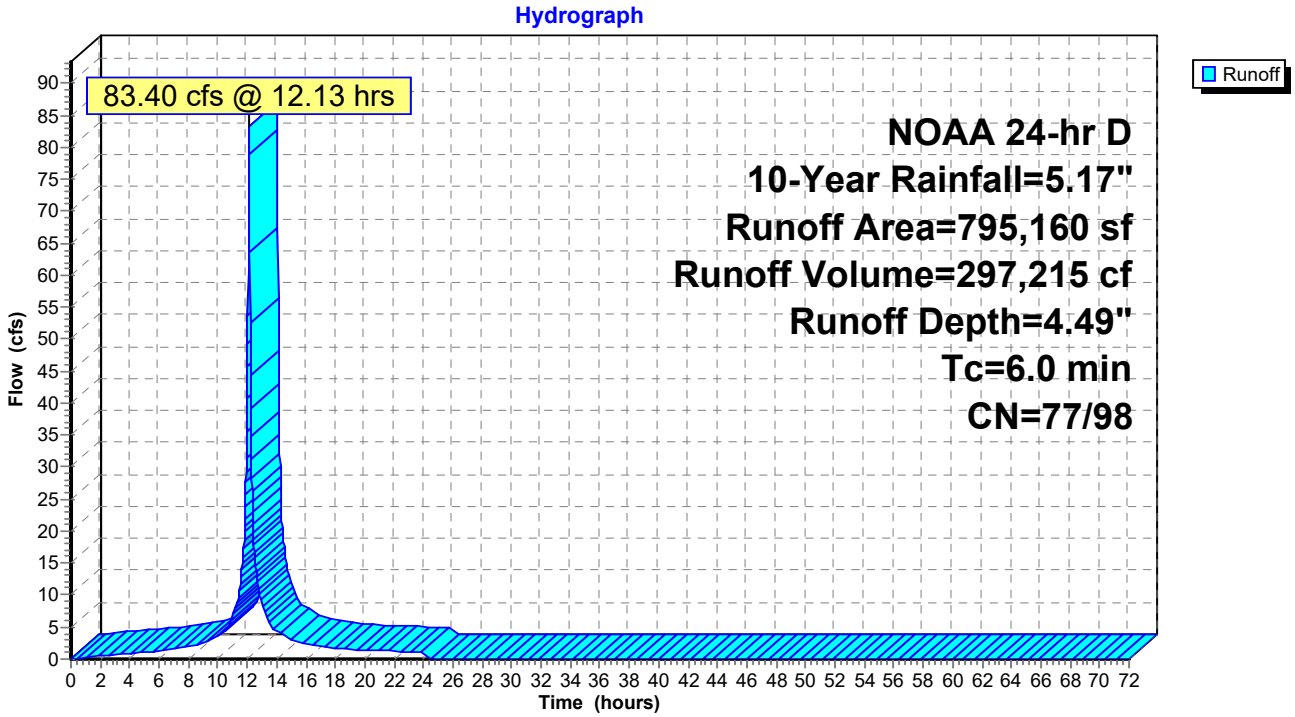
Runoff = 83.40 cfs @ 12.13 hrs, Volume= 297,215 cf, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
630,944	98	Paved parking, HSG D
85,682	74	>75% Grass cover, Good, HSG C
78,534	80	>75% Grass cover, Good, HSG D
795,160	94	Weighted Average
164,216	77	20.65% Pervious Area
630,944	98	79.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-1: Existing Area Tributary to Southerly Basin



Summary for Subcatchment E-2: Existing Area Tributary to Easterly Basin

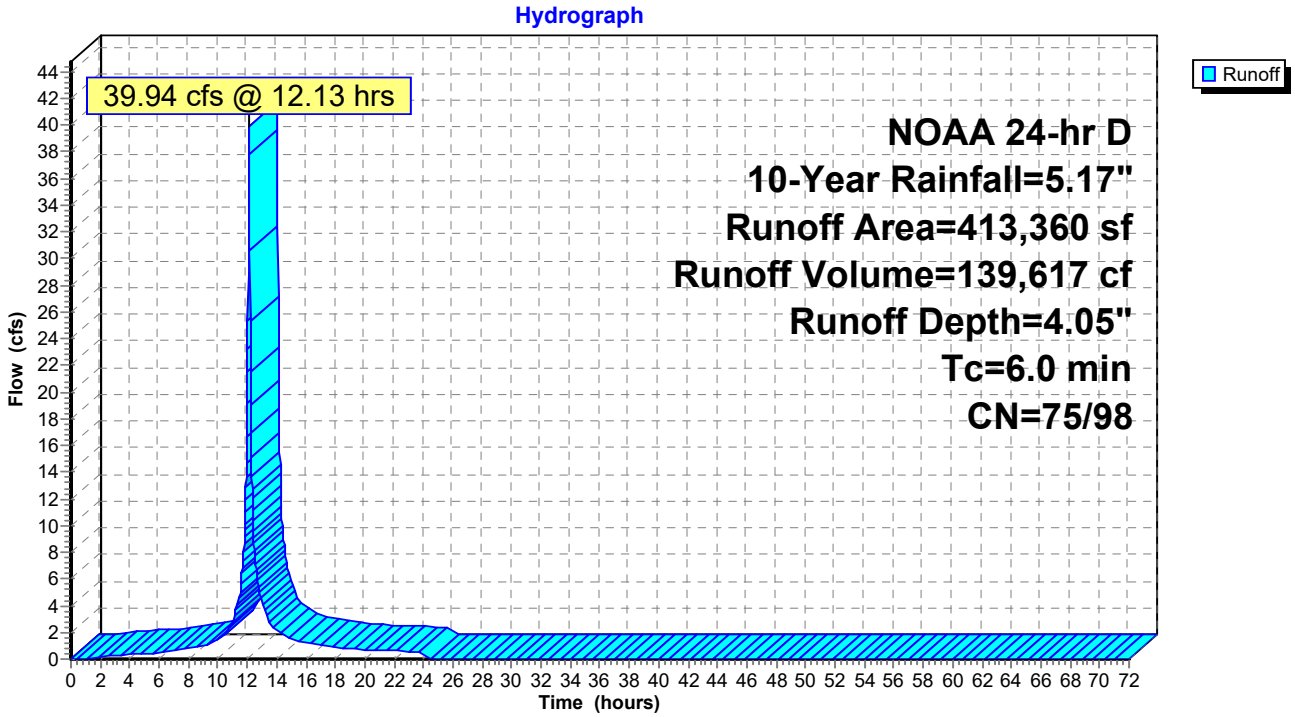
Runoff = 39.94 cfs @ 12.13 hrs, Volume= 139,617 cf, Depth= 4.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
258,284	98	Paved parking, HSG D
125,156	74	>75% Grass cover, Good, HSG C
29,920	80	>75% Grass cover, Good, HSG D
413,360	89	Weighted Average
155,076	75	37.52% Pervious Area
258,284	98	62.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-2: Existing Area Tributary to Easterly Basin



Summary for Subcatchment E-3: Undetained Runoff

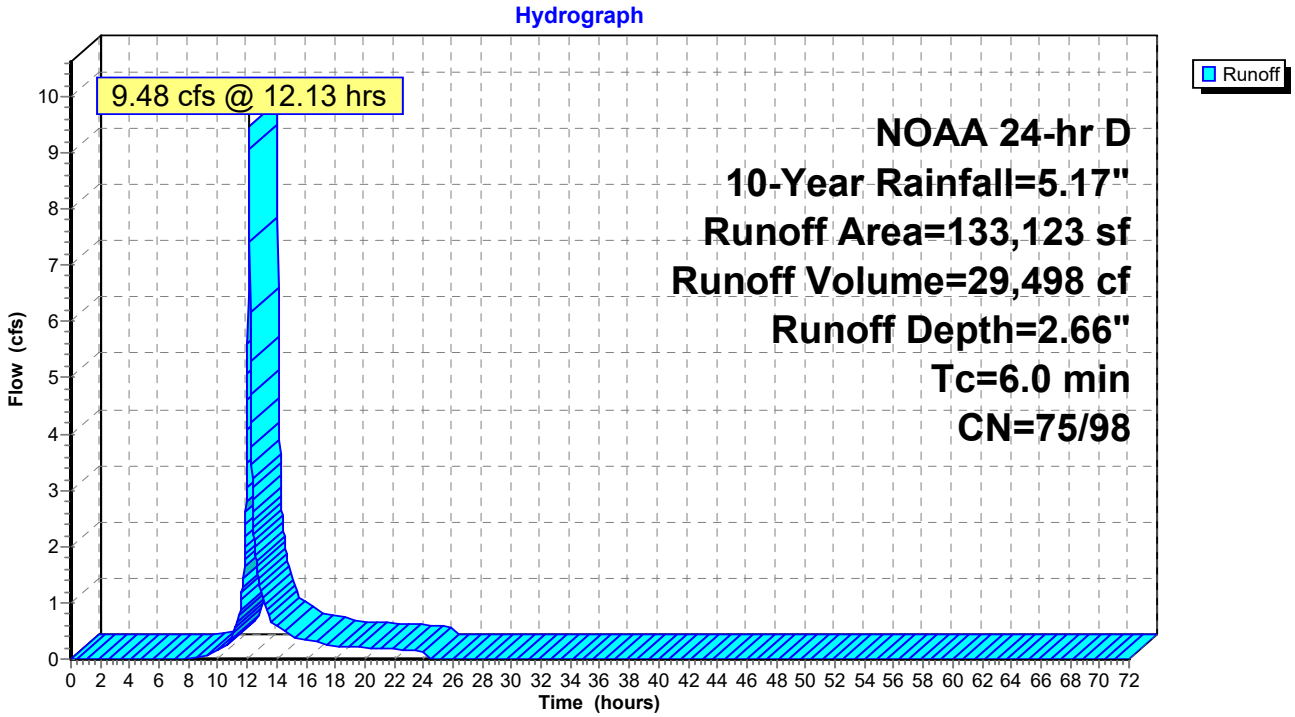
Runoff = 9.48 cfs @ 12.13 hrs, Volume= 29,498 cf, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
4,040	98	Paved parking, HSG D
115,648	74	>75% Grass cover, Good, HSG C
13,435	80	>75% Grass cover, Good, HSG D
133,123	75	Weighted Average
129,083	75	96.97% Pervious Area
4,040	98	3.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-3: Undetained Runoff



Summary for Subcatchment P-1: Proposed Area Tributary to 42" RCP

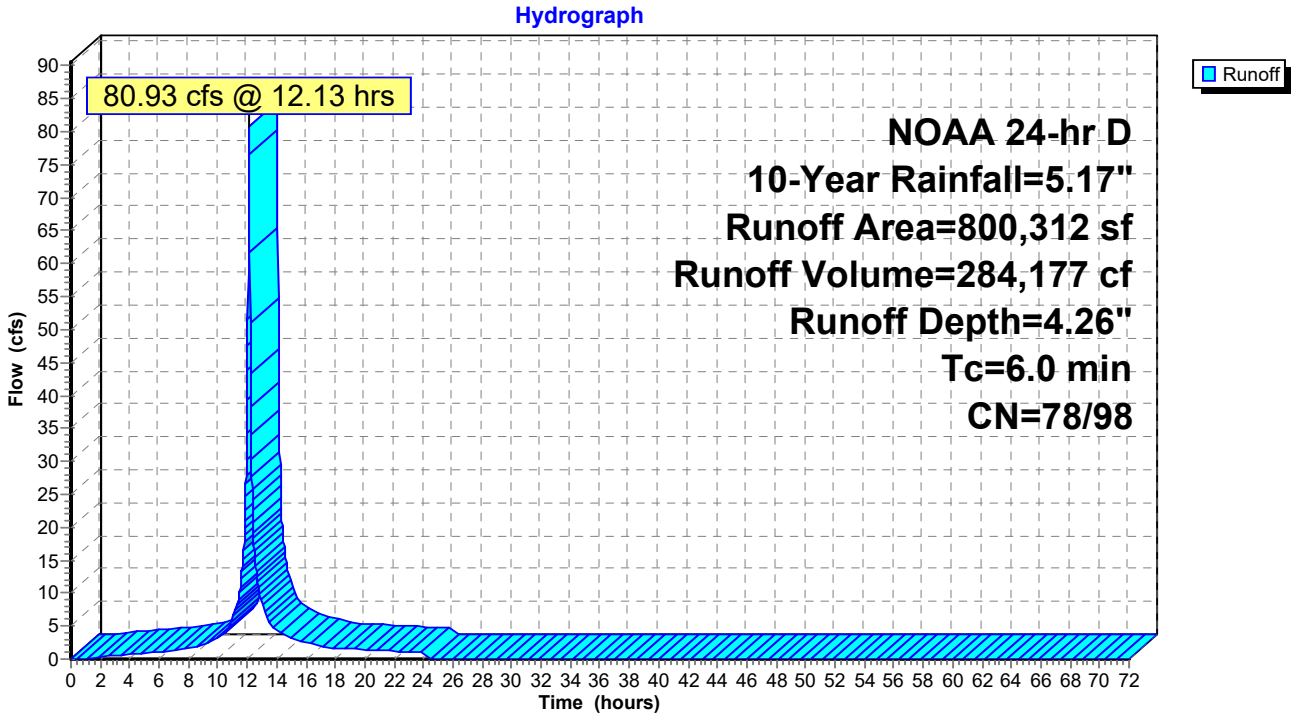
Runoff = 80.93 cfs @ 12.13 hrs, Volume= 284,177 cf, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
541,322	98	Paved parking, HSG D
89,531	74	>75% Grass cover, Good, HSG C
169,459	80	>75% Grass cover, Good, HSG D
800,312	92	Weighted Average
258,990	78	32.36% Pervious Area
541,322	98	67.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-1: Proposed Area Tributary to 42" RCP



Summary for Subcatchment P-2: Area Tributary to 18" RCP

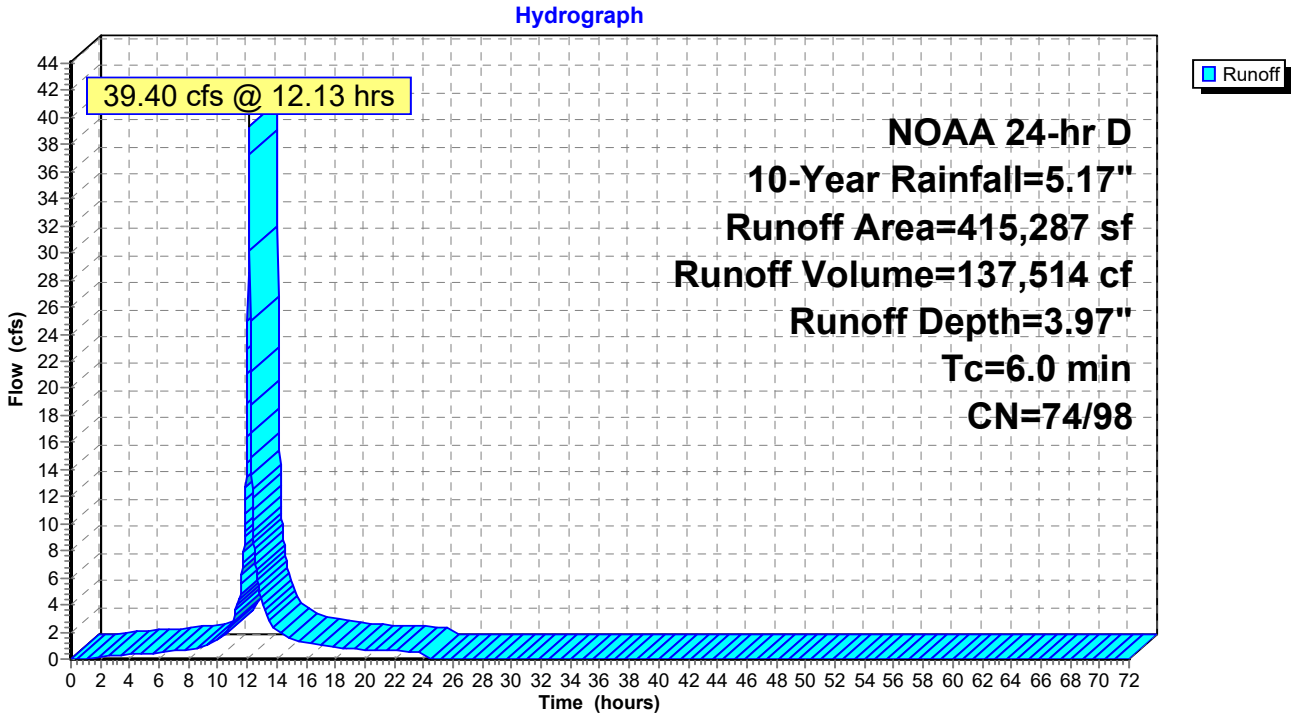
Runoff = 39.40 cfs @ 12.13 hrs, Volume= 137,514 cf, Depth= 3.97"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
251,490	98	Paved parking, HSG D
153,839	74	>75% Grass cover, Good, HSG C
9,958	80	>75% Grass cover, Good, HSG D
415,287	89	Weighted Average
163,797	74	39.44% Pervious Area
251,490	98	60.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2: Area Tributary to 18" RCP



Summary for Subcatchment P-3: Undetained Runoff

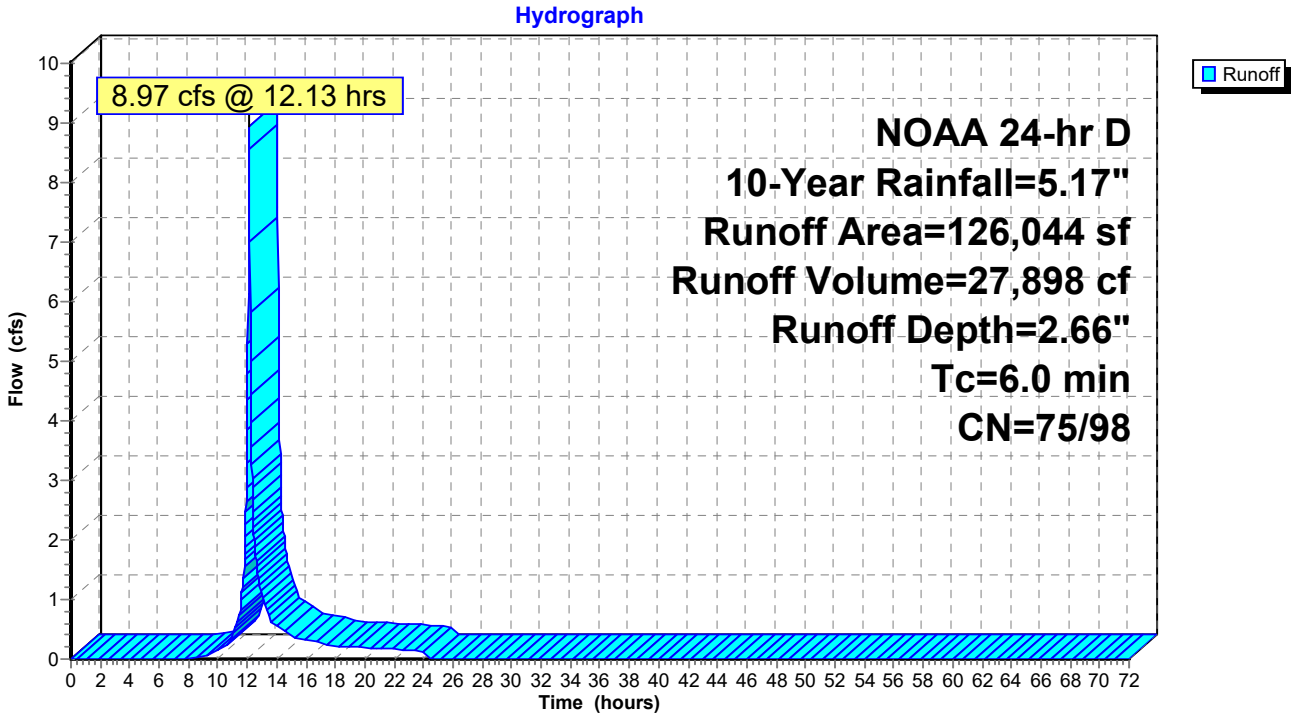
Runoff = 8.97 cfs @ 12.13 hrs, Volume= 27,898 cf, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
3,666	98	Paved parking, HSG D
107,372	74	>75% Grass cover, Good, HSG C
15,006	80	>75% Grass cover, Good, HSG D
126,044	75	Weighted Average
122,378	75	97.09% Pervious Area
3,666	98	2.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-3: Undetained Runoff



APPENDIX C-4
100-YEAR STORM EVENT HYDROGRAPHS

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
677,228	74	>75% Grass cover, Good, HSG C (E-1, E-2, E-3, P-1, P-2, P-3)
316,312	80	>75% Grass cover, Good, HSG D (E-1, E-2, E-3, P-1, P-2, P-3)
1,689,746	98	Paved parking, HSG D (E-1, E-2, E-3, P-1, P-2, P-3)
2,683,286	**90**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	677,228	316,312	0	993,540	>75% Grass cover, Good	
0	0	0	1,689,746	0	1,689,746	Paved parking	
0	**0**	**677,228**	**2,006,058**	**0**	**2,683,286**	**TOTAL AREA**	

Summary for Subcatchment E-1: Existing Area Tributary to Southerly Basin

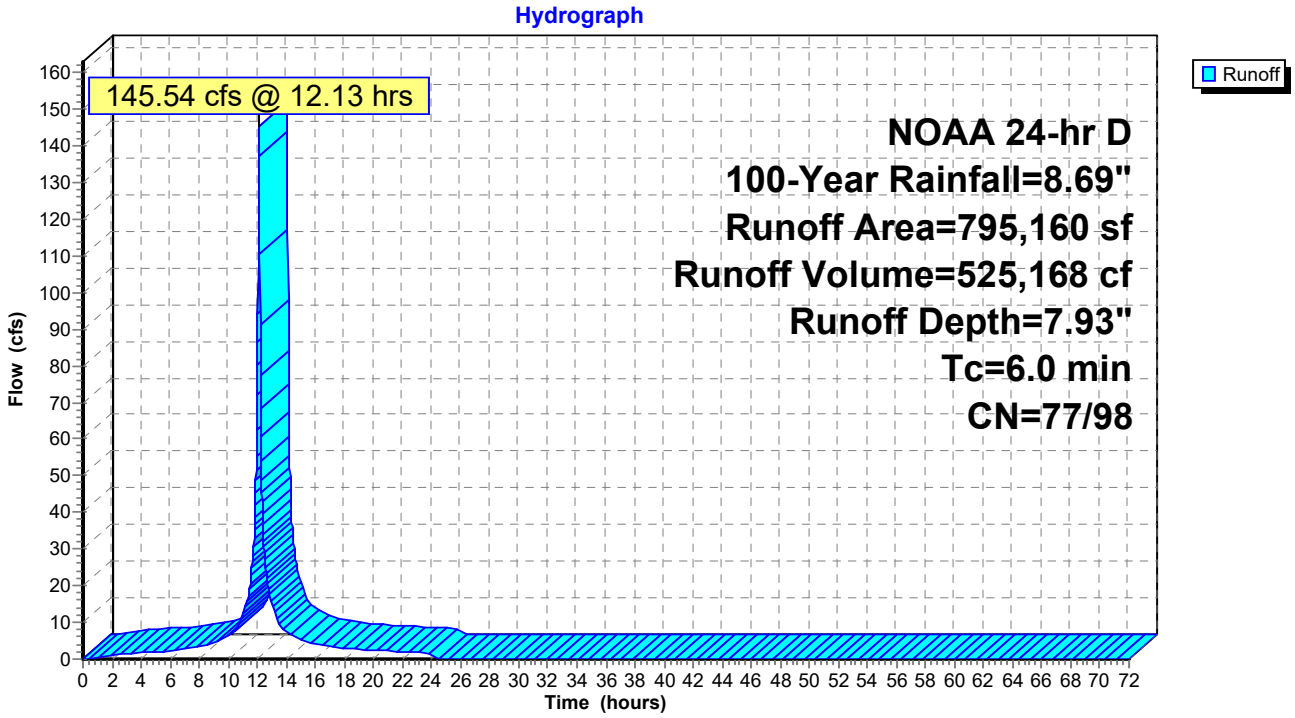
Runoff = 145.54 cfs @ 12.13 hrs, Volume= 525,168 cf, Depth= 7.93"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
630,944	98	Paved parking, HSG D
85,682	74	>75% Grass cover, Good, HSG C
78,534	80	>75% Grass cover, Good, HSG D
795,160	94	Weighted Average
164,216	77	20.65% Pervious Area
630,944	98	79.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-1: Existing Area Tributary to Southerly Basin



Summary for Subcatchment E-2: Existing Area Tributary to Easterly Basin

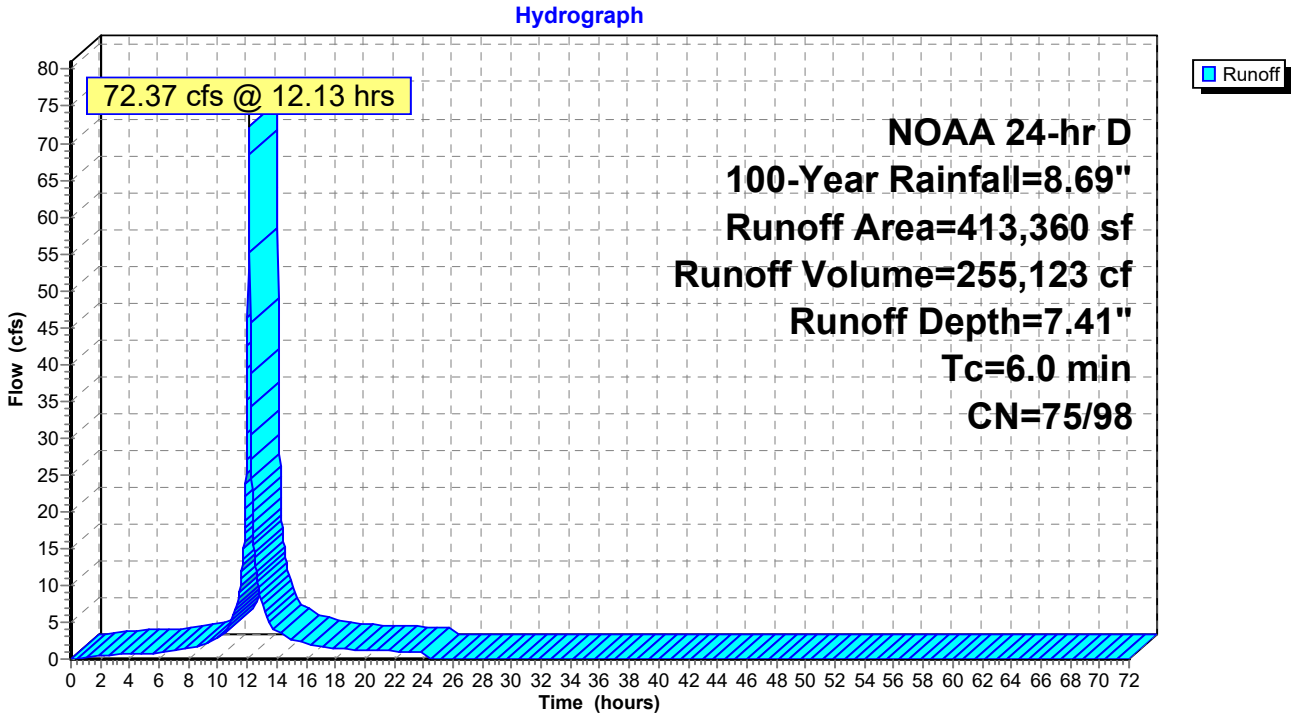
Runoff = 72.37 cfs @ 12.13 hrs, Volume= 255,123 cf, Depth= 7.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
258,284	98	Paved parking, HSG D
125,156	74	>75% Grass cover, Good, HSG C
29,920	80	>75% Grass cover, Good, HSG D
413,360	89	Weighted Average
155,076	75	37.52% Pervious Area
258,284	98	62.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-2: Existing Area Tributary to Easterly Basin



Summary for Subcatchment E-3: Undetained Runoff

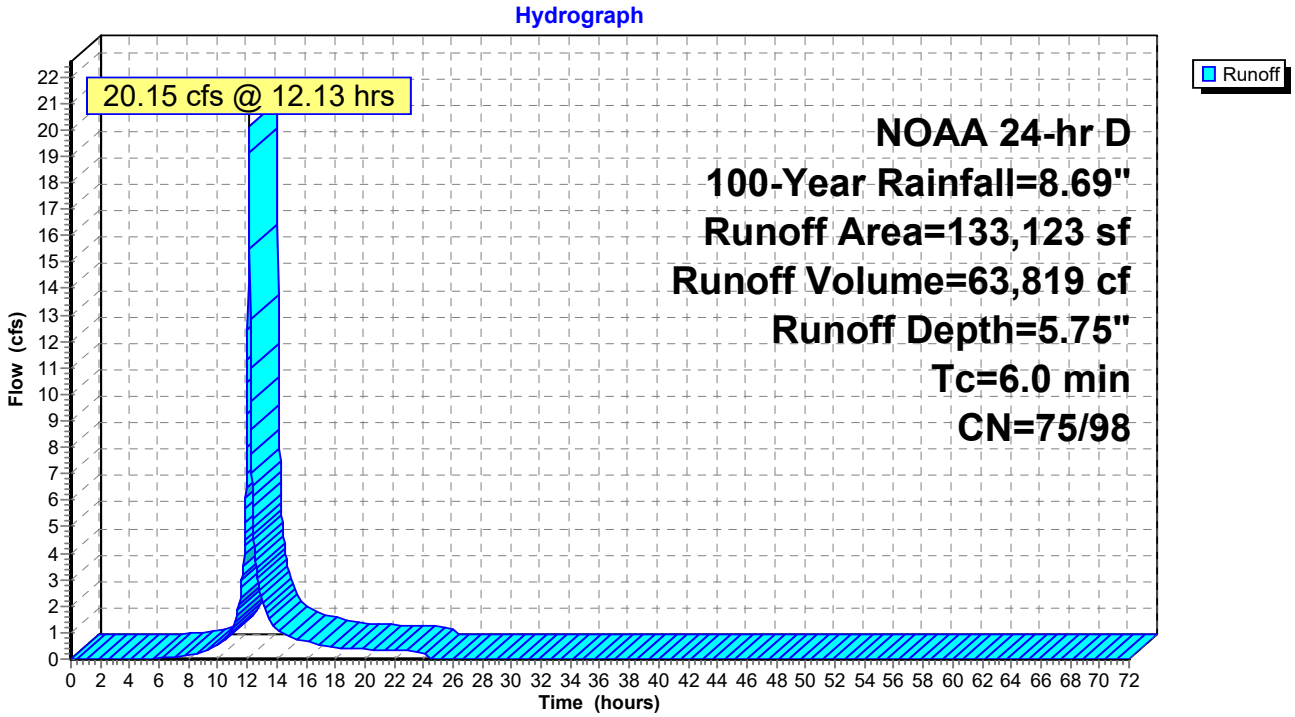
Runoff = 20.15 cfs @ 12.13 hrs, Volume= 63,819 cf, Depth= 5.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
4,040	98	Paved parking, HSG D
115,648	74	>75% Grass cover, Good, HSG C
13,435	80	>75% Grass cover, Good, HSG D
133,123	75	Weighted Average
129,083	75	96.97% Pervious Area
4,040	98	3.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-3: Undetained Runoff



Summary for Subcatchment P-1: Proposed Area Tributary to 42" RCP

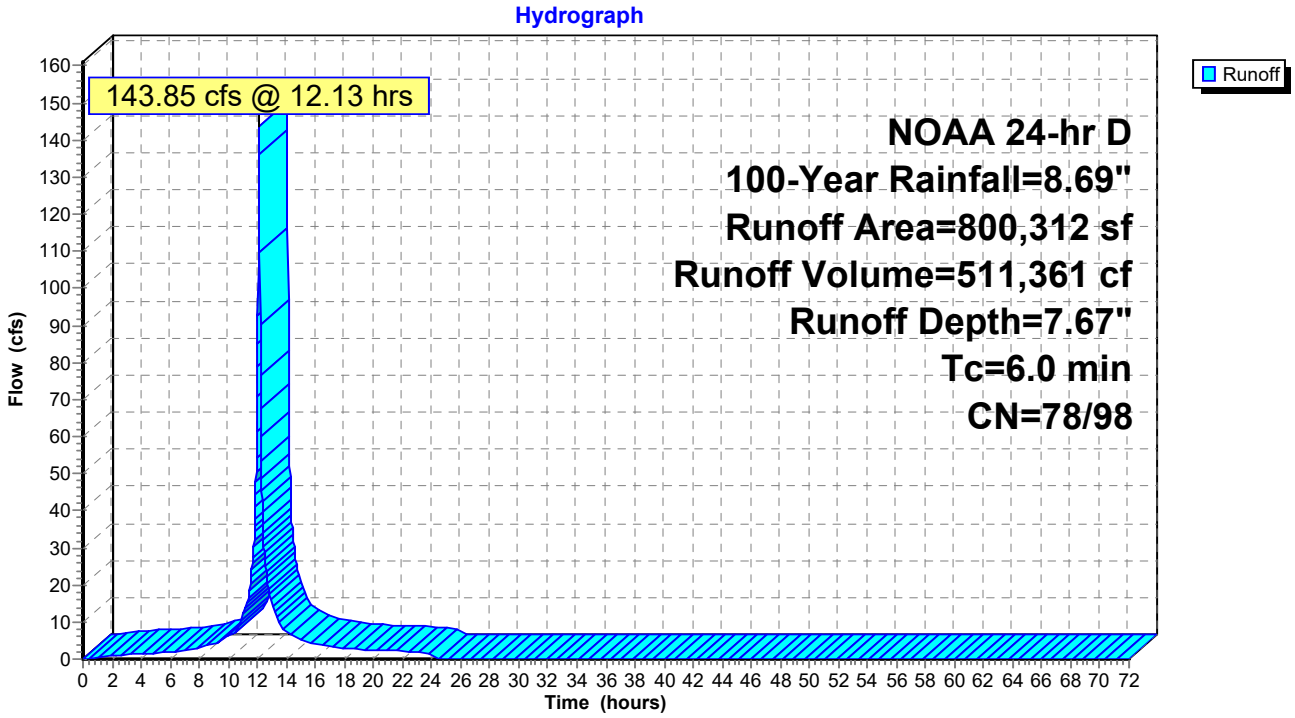
Runoff = 143.85 cfs @ 12.13 hrs, Volume= 511,361 cf, Depth= 7.67"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
541,322	98	Paved parking, HSG D
89,531	74	>75% Grass cover, Good, HSG C
169,459	80	>75% Grass cover, Good, HSG D
800,312	92	Weighted Average
258,990	78	32.36% Pervious Area
541,322	98	67.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-1: Proposed Area Tributary to 42" RCP



Summary for Subcatchment P-2: Area Tributary to 18" RCP

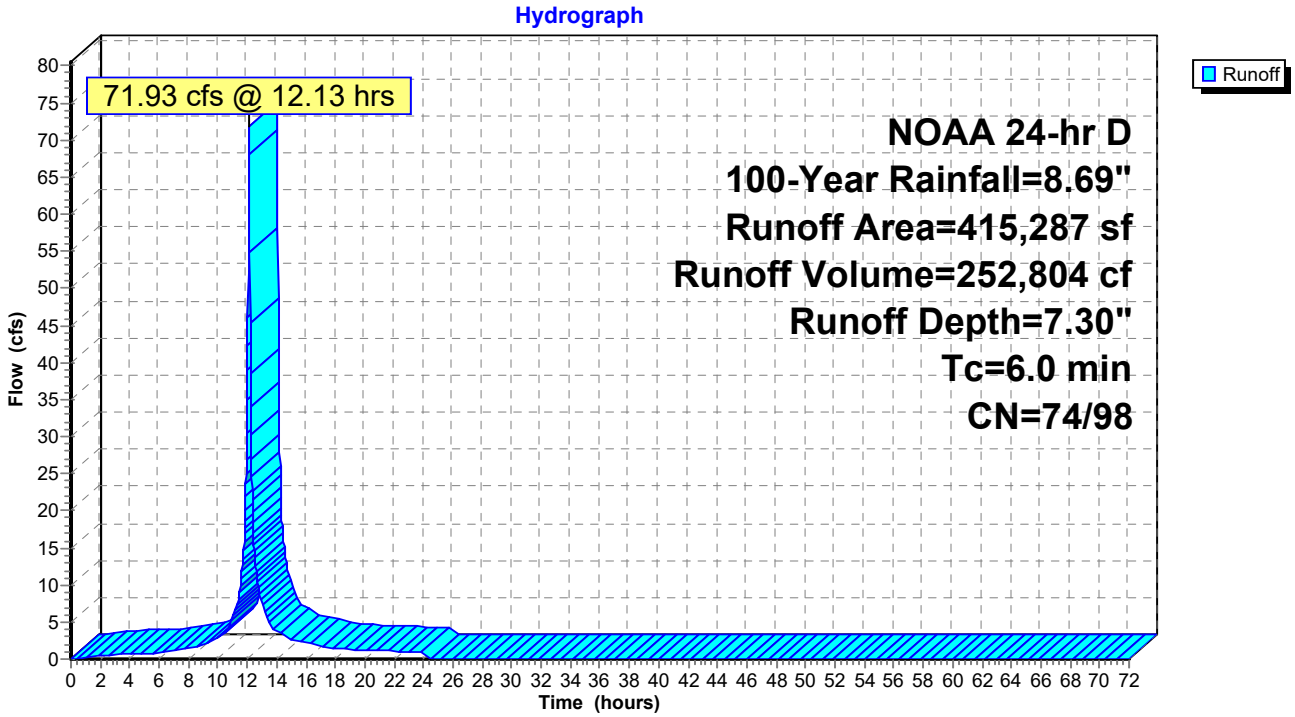
Runoff = 71.93 cfs @ 12.13 hrs, Volume= 252,804 cf, Depth= 7.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
251,490	98	Paved parking, HSG D
153,839	74	>75% Grass cover, Good, HSG C
9,958	80	>75% Grass cover, Good, HSG D
415,287	89	Weighted Average
163,797	74	39.44% Pervious Area
251,490	98	60.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2: Area Tributary to 18" RCP



Summary for Subcatchment P-3: Undetained Runoff

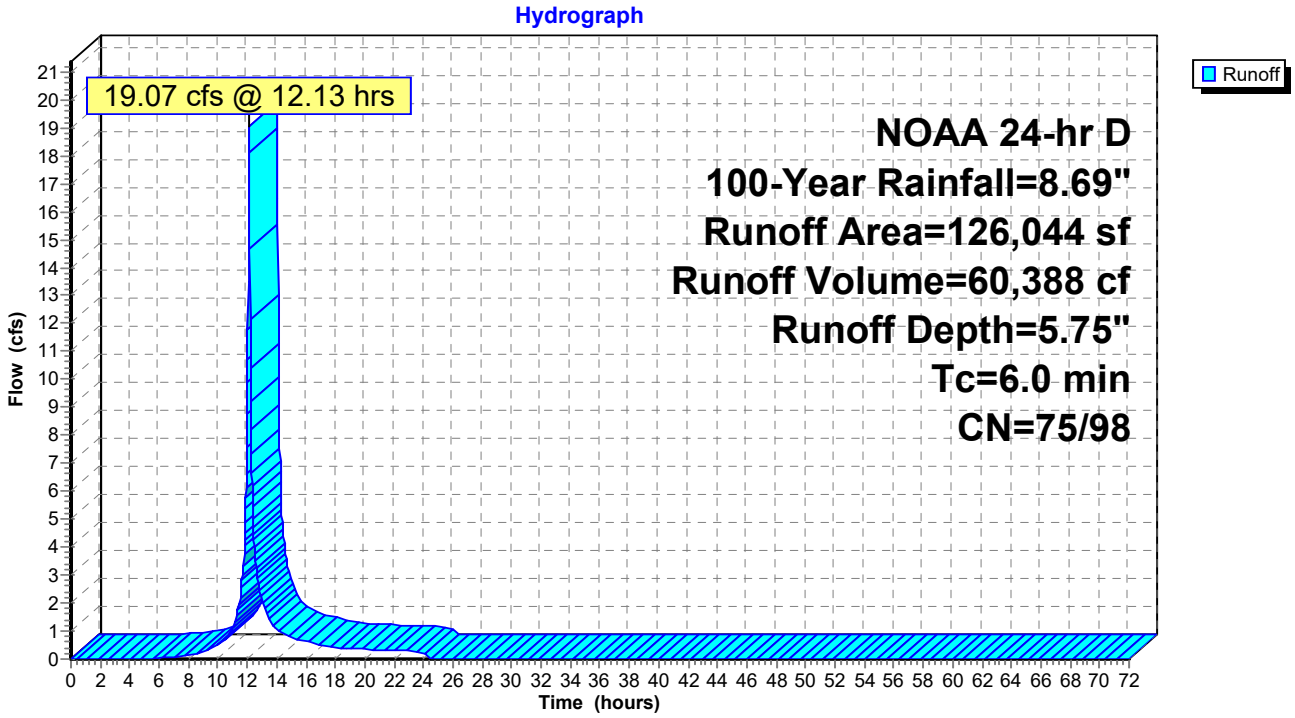
Runoff = 19.07 cfs @ 12.13 hrs, Volume= 60,388 cf, Depth= 5.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
3,666	98	Paved parking, HSG D
107,372	74	>75% Grass cover, Good, HSG C
15,006	80	>75% Grass cover, Good, HSG D
126,044	75	Weighted Average
122,378	75	97.09% Pervious Area
3,666	98	2.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-3: Undetained Runoff



APPENDIX C-5
WQ STORM EVENT HYDROGRAPHS

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
677,228	74	>75% Grass cover, Good, HSG C (E-1, E-2, E-3, P-1, P-2, P-3)
316,312	80	>75% Grass cover, Good, HSG D (E-1, E-2, E-3, P-1, P-2, P-3)
1,689,746	98	Paved parking, HSG D (E-1, E-2, E-3, P-1, P-2, P-3)
2,683,286	**90**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	677,228	316,312	0	993,540	>75% Grass cover, Good	
0	0	0	1,689,746	0	1,689,746	Paved parking	
0	**0**	**677,228**	**2,006,058**	**0**	**2,683,286**	**TOTAL AREA**	

Summary for Subcatchment E-1: Existing Area Tributary to Southerly Basin

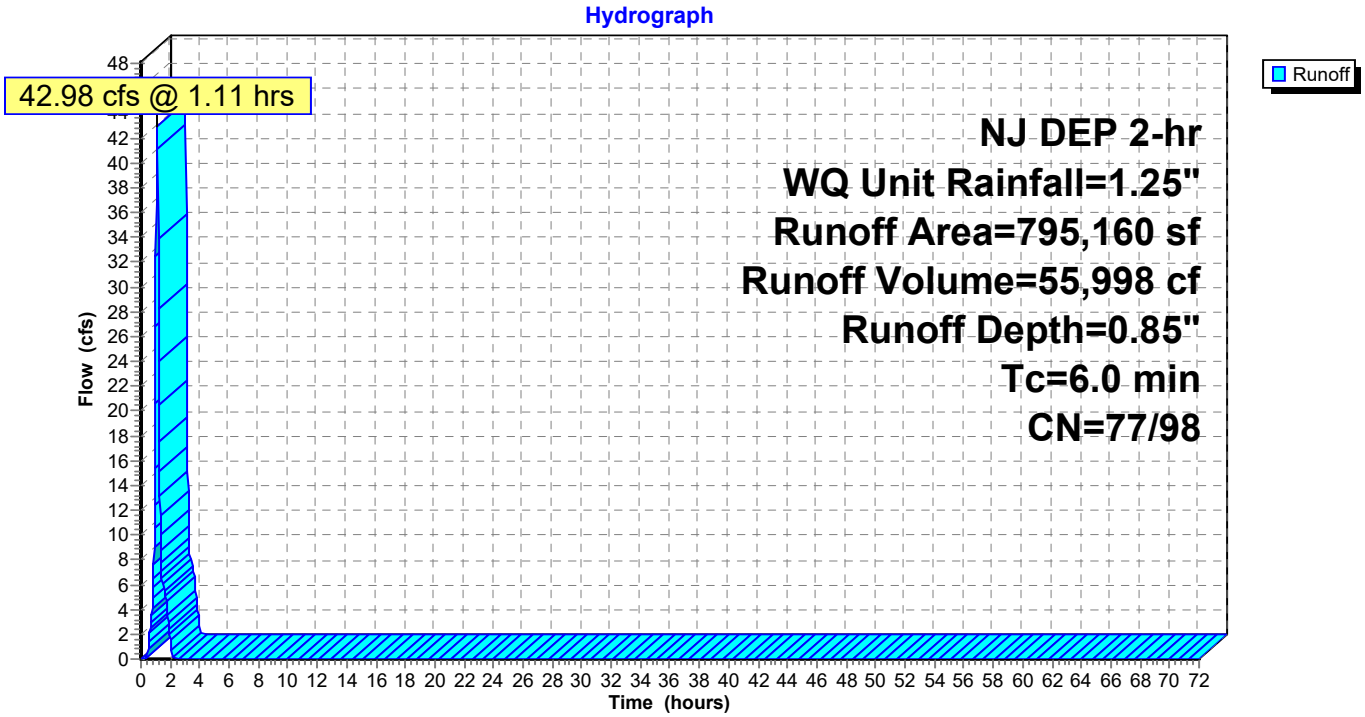
Runoff = 42.98 cfs @ 1.11 hrs, Volume= 55,998 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
630,944	98	Paved parking, HSG D
85,682	74	>75% Grass cover, Good, HSG C
78,534	80	>75% Grass cover, Good, HSG D
795,160	94	Weighted Average
164,216	77	20.65% Pervious Area
630,944	98	79.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-1: Existing Area Tributary to Southerly Basin



Summary for Subcatchment E-2: Existing Area Tributary to Easterly Basin

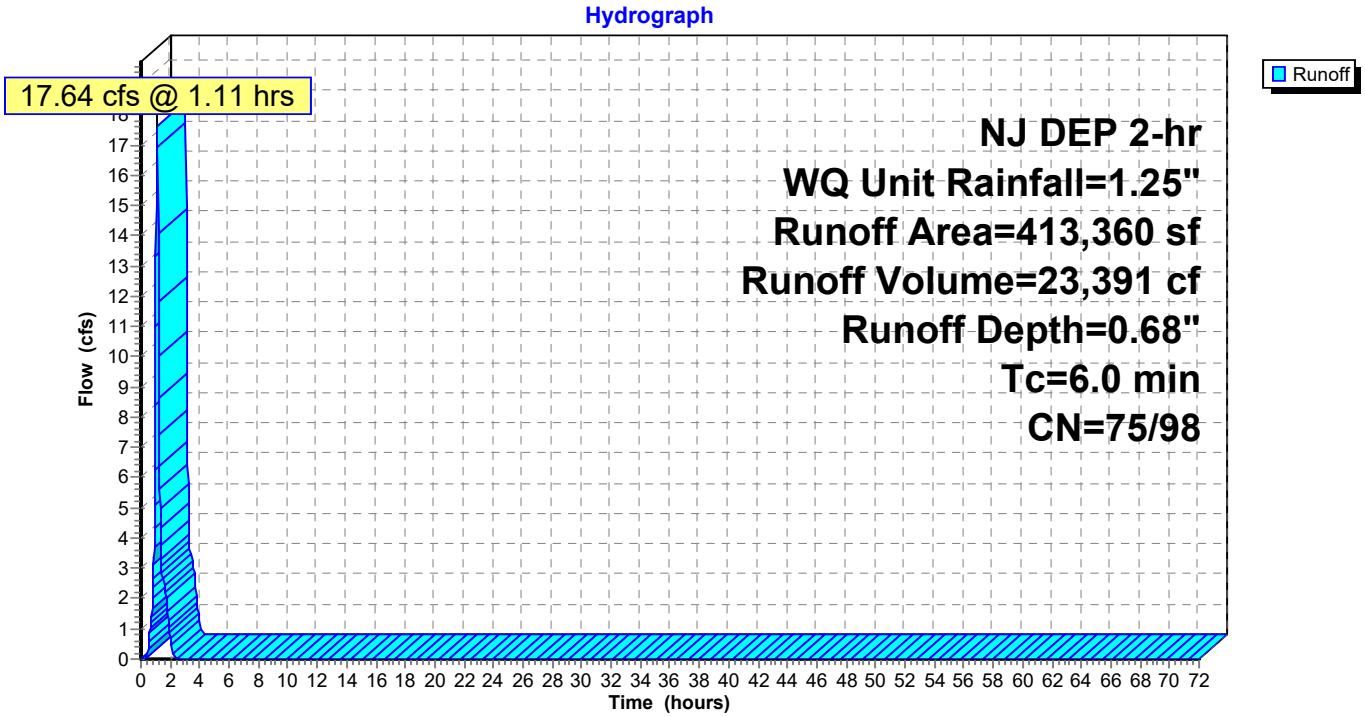
Runoff = 17.64 cfs @ 1.11 hrs, Volume= 23,391 cf, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
258,284	98	Paved parking, HSG D
125,156	74	>75% Grass cover, Good, HSG C
29,920	80	>75% Grass cover, Good, HSG D
413,360	89	Weighted Average
155,076	75	37.52% Pervious Area
258,284	98	62.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-2: Existing Area Tributary to Easterly Basin



Summary for Subcatchment E-3: Undetained Runoff

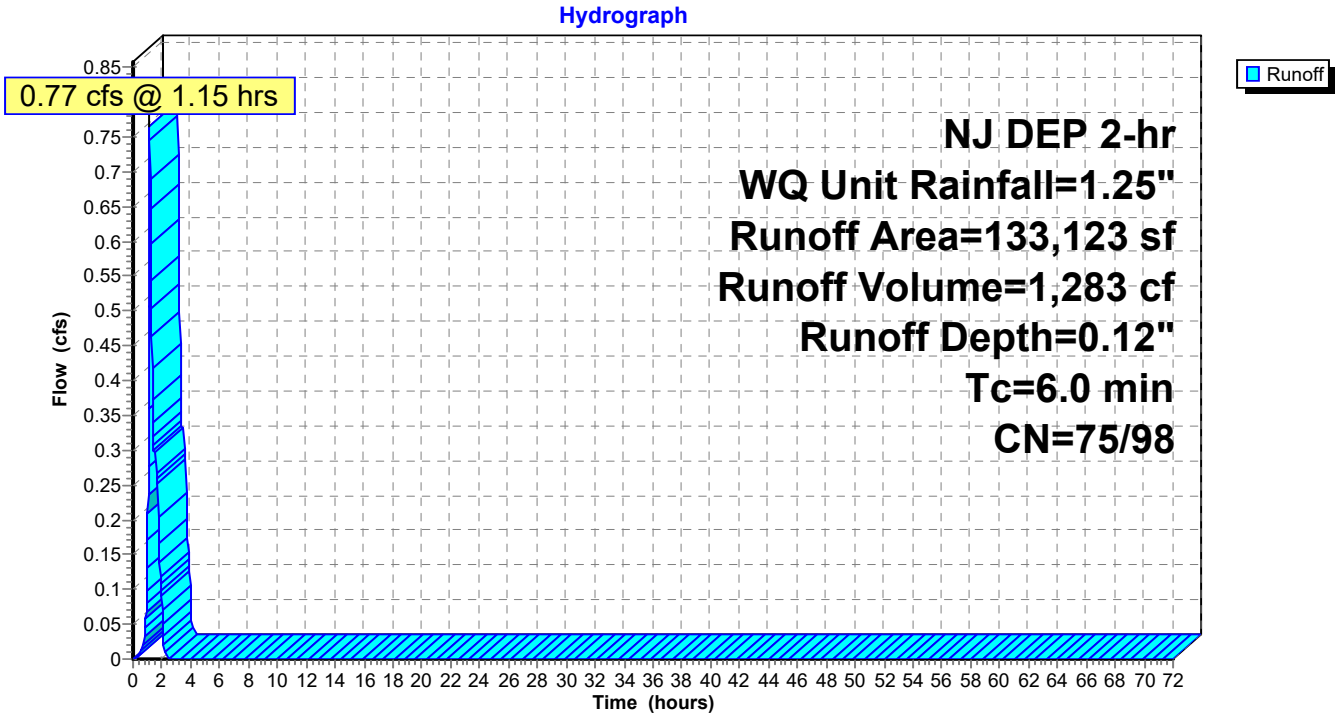
Runoff = 0.77 cfs @ 1.15 hrs, Volume= 1,283 cf, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
4,040	98	Paved parking, HSG D
115,648	74	>75% Grass cover, Good, HSG C
13,435	80	>75% Grass cover, Good, HSG D
133,123	75	Weighted Average
129,083	75	96.97% Pervious Area
4,040	98	3.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-3: Undetained Runoff



Summary for Subcatchment P-1: Proposed Area Tributary to 42" RCP

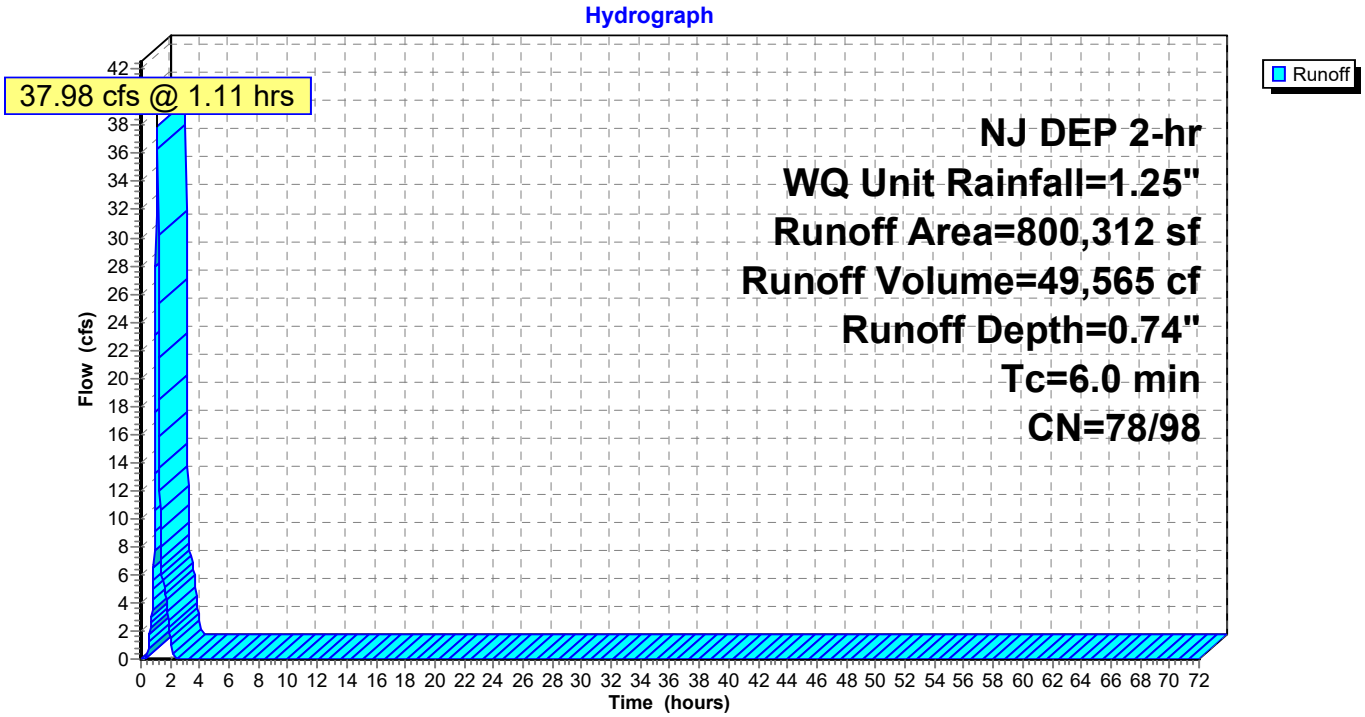
Runoff = 37.98 cfs @ 1.11 hrs, Volume= 49,565 cf, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
541,322	98	Paved parking, HSG D
89,531	74	>75% Grass cover, Good, HSG C
169,459	80	>75% Grass cover, Good, HSG D
800,312	92	Weighted Average
258,990	78	32.36% Pervious Area
541,322	98	67.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-1: Proposed Area Tributary to 42" RCP



Summary for Subcatchment P-2: Area Tributary to 18" RCP

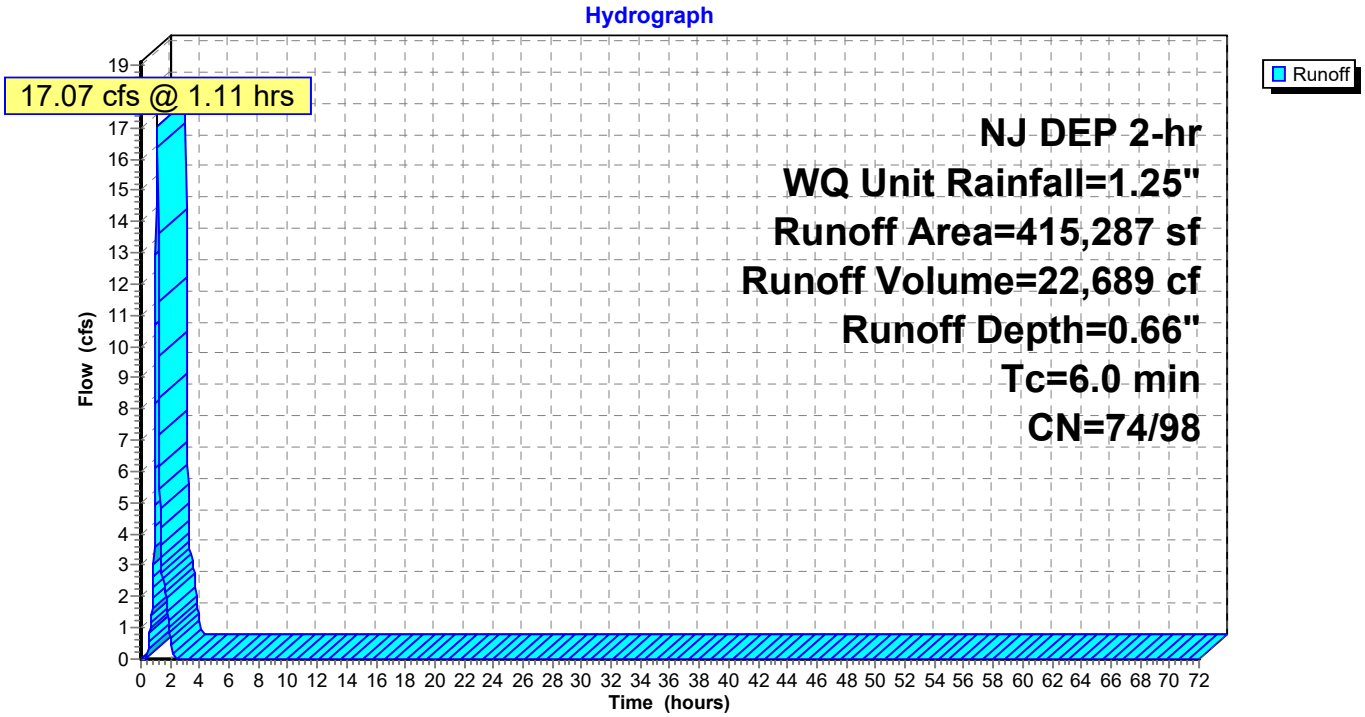
Runoff = 17.07 cfs @ 1.11 hrs, Volume= 22,689 cf, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
251,490	98	Paved parking, HSG D
153,839	74	>75% Grass cover, Good, HSG C
9,958	80	>75% Grass cover, Good, HSG D
415,287	89	Weighted Average
163,797	74	39.44% Pervious Area
251,490	98	60.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2: Area Tributary to 18" RCP



Summary for Subcatchment P-3: Undetained Runoff

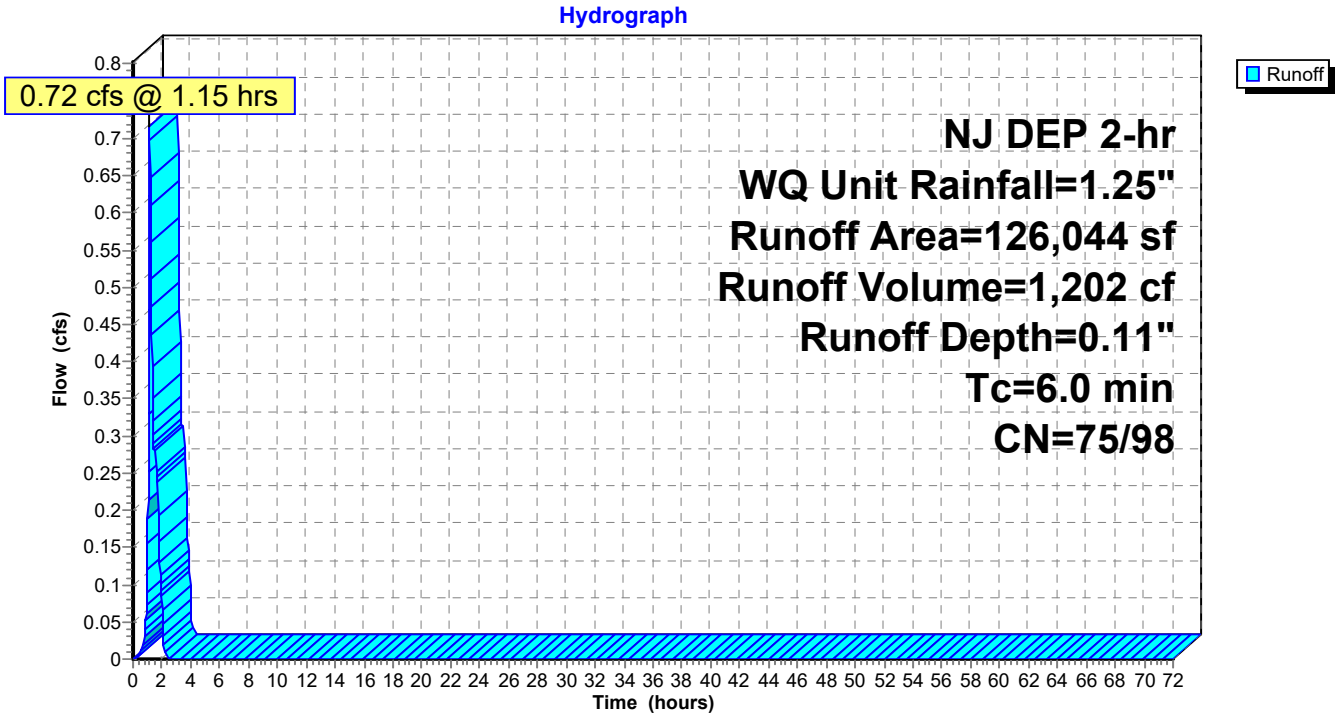
Runoff = 0.72 cfs @ 1.15 hrs, Volume= 1,202 cf, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

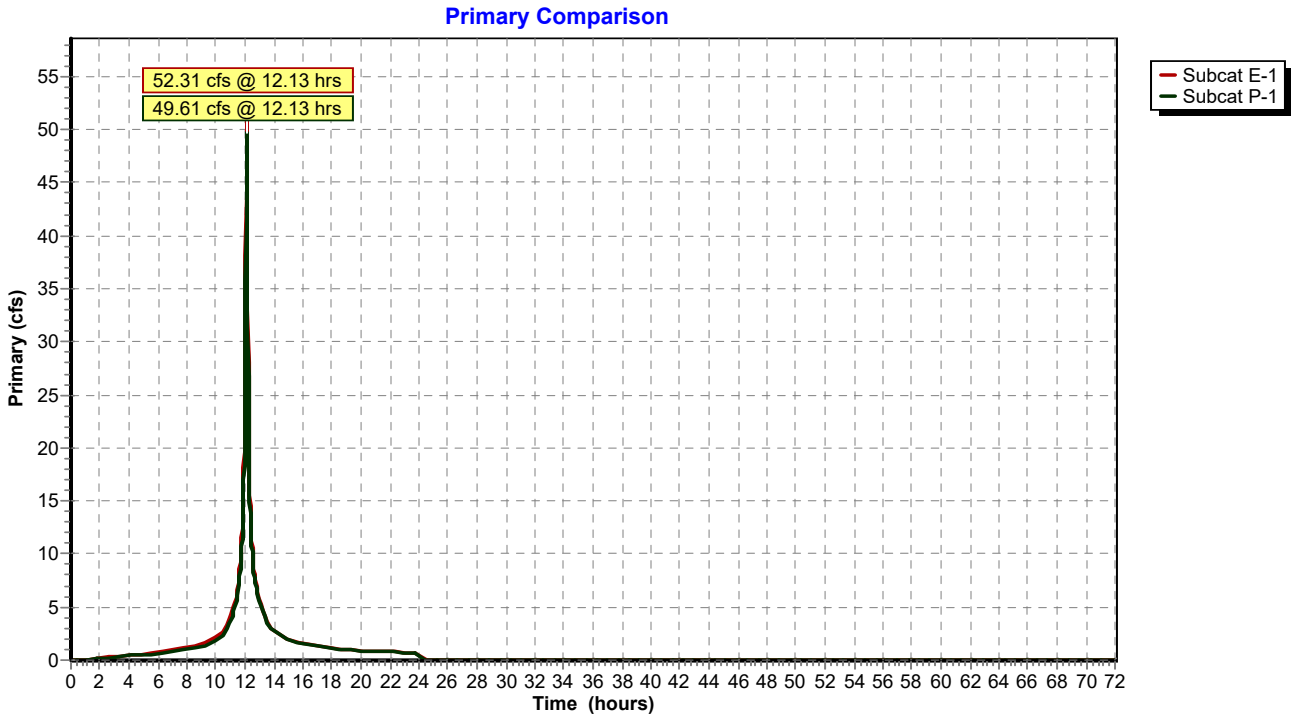
Area (sf)	CN	Description
3,666	98	Paved parking, HSG D
107,372	74	>75% Grass cover, Good, HSG C
15,006	80	>75% Grass cover, Good, HSG D
126,044	75	Weighted Average
122,378	75	97.09% Pervious Area
3,666	98	2.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-3: Undetained Runoff



APPENDIX C-6
2 – YEAR STORM EVENT COMPARISON HYDROGRAPHS


Primary Comparison
52.31 cfs @ 12.13 hrs
49.61 cfs @ 12.13 hrs
Subcat E-1
Subcat P-1
Primary (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Primary Comparison

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
0.00	0.00	0.00	5.30	0.62	0.53	10.60	2.82	2.51
0.10	0.00	0.00	5.40	0.63	0.54	10.70	3.11	2.77
0.20	0.00	0.00	5.50	0.64	0.55	10.80	3.41	3.05
0.30	0.00	0.00	5.60	0.65	0.55	10.90	3.72	3.33
0.40	0.00	0.00	5.70	0.66	0.56	11.00	4.02	3.61
0.50	0.00	0.00	5.80	0.67	0.57	11.10	4.48	4.03
0.60	0.00	0.00	5.90	0.68	0.58	11.20	5.01	4.52
0.70	0.00	0.00	6.00	0.68	0.59	11.30	5.56	5.03
0.80	0.00	0.00	6.10	0.70	0.60	11.40	6.11	5.55
0.90	0.00	0.00	6.20	0.72	0.62	11.50	6.68	6.09
1.00	0.00	0.00	6.30	0.75	0.64	11.60	8.46	7.74
1.10	0.00	0.00	6.40	0.77	0.66	11.70	9.65	8.87
1.20	0.01	0.01	6.50	0.79	0.68	11.80	12.37	11.42
1.30	0.04	0.03	6.60	0.82	0.70	11.90	17.23	16.00
1.40	0.06	0.05	6.70	0.84	0.72	12.00	28.48	26.65
1.50	0.08	0.07	6.80	0.86	0.74	12.10	**48.76**	**46.11**
1.60	0.10	0.09	6.90	0.88	0.76	12.20	**32.99**	**31.43**
1.70	0.12	0.10	7.00	0.91	0.78	12.30	17.79	17.03
1.80	0.14	0.12	7.10	0.93	0.80	12.40	12.41	11.92
1.90	0.16	0.14	7.20	0.96	0.82	12.50	10.58	10.18
2.00	0.18	0.15	7.30	0.98	0.84	12.60	8.61	8.29
2.10	0.20	0.17	7.40	1.00	0.86	12.70	7.36	7.10
2.20	0.22	0.19	7.50	1.03	0.88	12.80	6.74	6.51
2.30	0.23	0.20	7.60	1.05	0.90	12.90	6.16	5.95
2.40	0.25	0.22	7.70	1.07	0.92	13.00	5.59	5.41
2.50	0.27	0.23	7.80	1.10	0.94	13.10	5.01	4.85
2.60	0.28	0.24	7.90	1.12	0.96	13.20	4.60	4.45
2.70	0.30	0.26	8.00	1.15	0.98	13.30	4.26	4.13
2.80	0.31	0.27	8.10	1.17	1.01	13.40	3.93	3.81
2.90	0.33	0.28	8.20	1.20	1.03	13.50	3.60	3.49
3.00	0.34	0.29	8.30	1.22	1.04	13.60	3.27	3.17
3.10	0.36	0.31	8.40	1.25	1.07	13.70	3.10	3.00
3.20	0.37	0.32	8.50	1.27	1.09	13.80	3.00	2.91
3.30	0.39	0.33	8.60	1.29	1.11	13.90	2.91	2.82
3.40	0.40	0.34	8.70	1.32	1.13	14.00	2.82	2.74
3.50	0.41	0.36	8.80	1.34	1.15	14.10	2.73	2.65
3.60	0.43	0.37	8.90	1.36	1.17	14.20	2.64	2.57
3.70	0.44	0.38	9.00	1.39	1.19	14.30	2.55	2.48
3.80	0.45	0.39	9.10	1.45	1.24	14.40	2.46	2.39
3.90	0.46	0.40	9.20	1.52	1.30	14.50	2.37	2.30
4.00	0.48	0.41	9.30	1.60	1.37	14.60	2.28	2.22
4.10	0.49	0.42	9.40	1.67	1.44	14.70	2.19	2.13
4.20	0.50	0.43	9.50	1.75	1.51	14.80	2.10	2.04
4.30	0.51	0.44	9.60	1.83	1.59	14.90	2.01	1.95
4.40	0.52	0.45	9.70	1.91	1.66	15.00	1.92	1.87
4.50	0.53	0.46	9.80	2.00	1.74	15.10	1.83	1.78
4.60	0.55	0.47	9.90	2.08	1.82	15.20	1.78	1.73
4.70	0.56	0.48	10.00	2.16	1.90	15.30	1.75	1.70
4.80	0.57	0.49	10.10	2.25	1.98	15.40	1.73	1.68
4.90	0.58	0.50	10.20	2.34	2.05	15.50	1.70	1.66
5.00	0.59	0.50	10.30	2.42	2.14	15.60	1.67	1.63
5.10	0.60	0.51	10.40	2.51	2.22	15.70	1.65	1.61
5.20	0.61	0.52	10.50	2.60	2.30	15.80	1.62	1.58

Primary Comparison (continued)

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
15.90	1.60	1.55	21.20	0.83	0.81	26.50	0.00	0.00
16.00	1.57	1.53	21.30	0.82	0.80	26.60	0.00	0.00
16.10	1.55	1.51	21.40	0.82	0.80	26.70	0.00	0.00
16.20	1.52	1.48	21.50	0.81	0.79	26.80	0.00	0.00
16.30	1.50	1.46	21.60	0.80	0.78	26.90	0.00	0.00
16.40	1.47	1.43	21.70	0.79	0.78	27.00	0.00	0.00
16.50	1.44	1.41	21.80	0.79	0.77	27.10	0.00	0.00
16.60	1.42	1.38	21.90	0.78	0.77	27.20	0.00	0.00
16.70	1.39	1.36	22.00	0.78	0.76	27.30	0.00	0.00
16.80	1.37	1.33	22.10	0.77	0.75	27.40	0.00	0.00
16.90	1.34	1.31	22.20	0.76	0.75	27.50	0.00	0.00
17.00	1.32	1.28	22.30	0.76	0.74	27.60	0.00	0.00
17.10	1.29	1.26	22.40	0.75	0.73	27.70	0.00	0.00
17.20	1.26	1.23	22.50	0.74	0.73	27.80	0.00	0.00
17.30	1.24	1.21	22.60	0.74	0.72	27.90	0.00	0.00
17.40	1.21	1.18	22.70	0.73	0.71	28.00	0.00	0.00
17.50	1.19	1.16	22.80	0.72	0.71	28.10	0.00	0.00
17.60	1.16	1.13	22.90	0.72	0.70	28.20	0.00	0.00
17.70	1.14	1.11	23.00	0.71	0.69	28.30	0.00	0.00
17.80	1.11	1.09	23.10	0.71	0.69	28.40	0.00	0.00
17.90	1.08	1.06	23.20	0.70	0.68	28.50	0.00	0.00
18.00	1.06	1.03	23.30	0.69	0.68	28.60	0.00	0.00
18.10	1.03	1.01	23.40	0.68	0.67	28.70	0.00	0.00
18.20	1.02	1.00	23.50	0.68	0.66	28.80	0.00	0.00
18.30	1.01	0.99	23.60	0.67	0.66	28.90	0.00	0.00
18.40	1.01	0.98	23.70	0.67	0.65	29.00	0.00	0.00
18.50	1.00	0.97	23.80	0.66	0.64	29.10	0.00	0.00
18.60	0.99	0.97	23.90	0.65	0.64	29.20	0.00	0.00
18.70	0.99	0.96	24.00	0.65	0.64	29.30	0.00	0.00
18.80	0.98	0.96	24.10	0.23	0.22	29.40	0.00	0.00
18.90	0.97	0.95	24.20	0.02	0.02	29.50	0.00	0.00
19.00	0.97	0.94	24.30	0.00	0.00	29.60	0.00	0.00
19.10	0.96	0.94	24.40	0.00	0.00	29.70	0.00	0.00
19.20	0.96	0.93	24.50	0.00	0.00	29.80	0.00	0.00
19.30	0.95	0.93	24.60	0.00	0.00	29.90	0.00	0.00
19.40	0.94	0.92	24.70	0.00	0.00	30.00	0.00	0.00
19.50	0.94	0.92	24.80	0.00	0.00	30.10	0.00	0.00
19.60	0.93	0.91	24.90	0.00	0.00	30.20	0.00	0.00
19.70	0.92	0.90	25.00	0.00	0.00	30.30	0.00	0.00
19.80	0.92	0.90	25.10	0.00	0.00	30.40	0.00	0.00
19.90	0.91	0.89	25.20	0.00	0.00	30.50	0.00	0.00
20.00	0.90	0.88	25.30	0.00	0.00	30.60	0.00	0.00
20.10	0.90	0.88	25.40	0.00	0.00	30.70	0.00	0.00
20.20	0.89	0.87	25.50	0.00	0.00	30.80	0.00	0.00
20.30	0.88	0.86	25.60	0.00	0.00	30.90	0.00	0.00
20.40	0.88	0.86	25.70	0.00	0.00	31.00	0.00	0.00
20.50	0.87	0.85	25.80	0.00	0.00	31.10	0.00	0.00
20.60	0.87	0.85	25.90	0.00	0.00	31.20	0.00	0.00
20.70	0.86	0.84	26.00	0.00	0.00	31.30	0.00	0.00
20.80	0.85	0.83	26.10	0.00	0.00	31.40	0.00	0.00
20.90	0.85	0.83	26.20	0.00	0.00	31.50	0.00	0.00
21.00	0.84	0.82	26.30	0.00	0.00	31.60	0.00	0.00
21.10	0.83	0.81	26.40	0.00	0.00	31.70	0.00	0.00

Primary Comparison (continued)

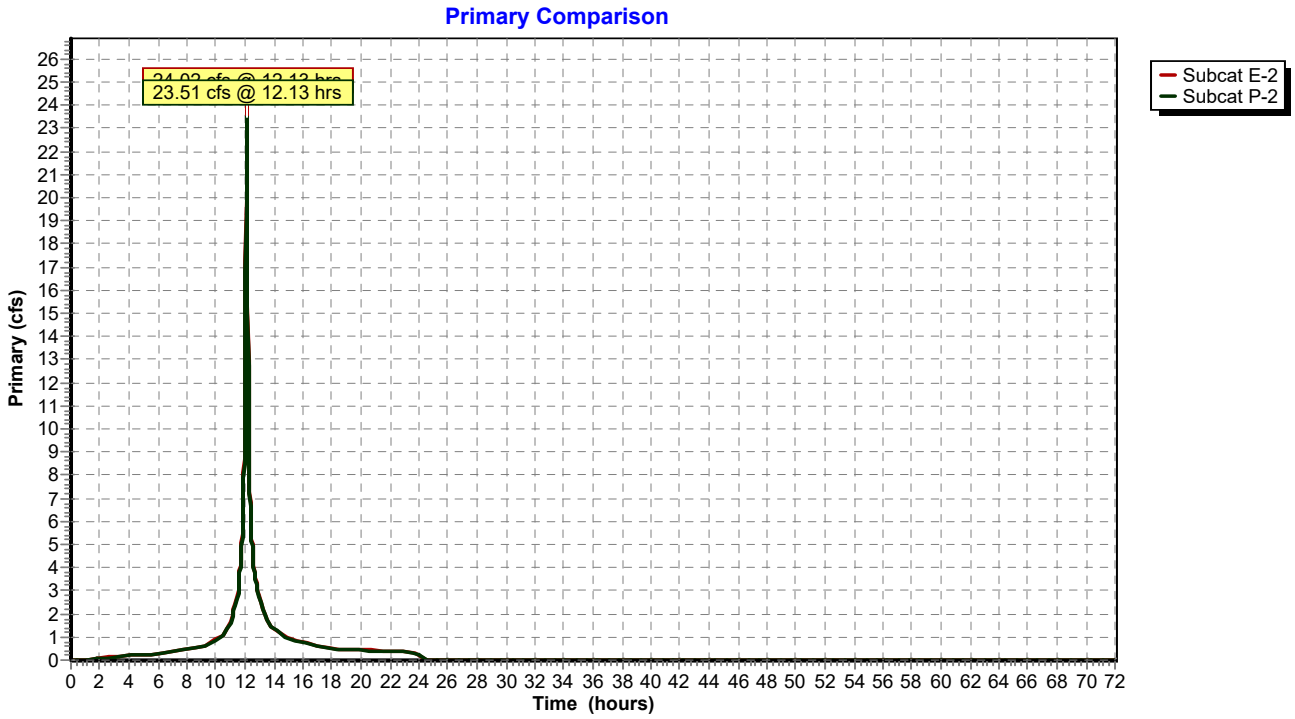
Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
31.80	0.00	0.00	37.10	0.00	0.00	42.40	0.00	0.00
31.90	0.00	0.00	37.20	0.00	0.00	42.50	0.00	0.00
32.00	0.00	0.00	37.30	0.00	0.00	42.60	0.00	0.00
32.10	0.00	0.00	37.40	0.00	0.00	42.70	0.00	0.00
32.20	0.00	0.00	37.50	0.00	0.00	42.80	0.00	0.00
32.30	0.00	0.00	37.60	0.00	0.00	42.90	0.00	0.00
32.40	0.00	0.00	37.70	0.00	0.00	43.00	0.00	0.00
32.50	0.00	0.00	37.80	0.00	0.00	43.10	0.00	0.00
32.60	0.00	0.00	37.90	0.00	0.00	43.20	0.00	0.00
32.70	0.00	0.00	38.00	0.00	0.00	43.30	0.00	0.00
32.80	0.00	0.00	38.10	0.00	0.00	43.40	0.00	0.00
32.90	0.00	0.00	38.20	0.00	0.00	43.50	0.00	0.00
33.00	0.00	0.00	38.30	0.00	0.00	43.60	0.00	0.00
33.10	0.00	0.00	38.40	0.00	0.00	43.70	0.00	0.00
33.20	0.00	0.00	38.50	0.00	0.00	43.80	0.00	0.00
33.30	0.00	0.00	38.60	0.00	0.00	43.90	0.00	0.00
33.40	0.00	0.00	38.70	0.00	0.00	44.00	0.00	0.00
33.50	0.00	0.00	38.80	0.00	0.00	44.10	0.00	0.00
33.60	0.00	0.00	38.90	0.00	0.00	44.20	0.00	0.00
33.70	0.00	0.00	39.00	0.00	0.00	44.30	0.00	0.00
33.80	0.00	0.00	39.10	0.00	0.00	44.40	0.00	0.00
33.90	0.00	0.00	39.20	0.00	0.00	44.50	0.00	0.00
34.00	0.00	0.00	39.30	0.00	0.00	44.60	0.00	0.00
34.10	0.00	0.00	39.40	0.00	0.00	44.70	0.00	0.00
34.20	0.00	0.00	39.50	0.00	0.00	44.80	0.00	0.00
34.30	0.00	0.00	39.60	0.00	0.00	44.90	0.00	0.00
34.40	0.00	0.00	39.70	0.00	0.00	45.00	0.00	0.00
34.50	0.00	0.00	39.80	0.00	0.00	45.10	0.00	0.00
34.60	0.00	0.00	39.90	0.00	0.00	45.20	0.00	0.00
34.70	0.00	0.00	40.00	0.00	0.00	45.30	0.00	0.00
34.80	0.00	0.00	40.10	0.00	0.00	45.40	0.00	0.00
34.90	0.00	0.00	40.20	0.00	0.00	45.50	0.00	0.00
35.00	0.00	0.00	40.30	0.00	0.00	45.60	0.00	0.00
35.10	0.00	0.00	40.40	0.00	0.00	45.70	0.00	0.00
35.20	0.00	0.00	40.50	0.00	0.00	45.80	0.00	0.00
35.30	0.00	0.00	40.60	0.00	0.00	45.90	0.00	0.00
35.40	0.00	0.00	40.70	0.00	0.00	46.00	0.00	0.00
35.50	0.00	0.00	40.80	0.00	0.00	46.10	0.00	0.00
35.60	0.00	0.00	40.90	0.00	0.00	46.20	0.00	0.00
35.70	0.00	0.00	41.00	0.00	0.00	46.30	0.00	0.00
35.80	0.00	0.00	41.10	0.00	0.00	46.40	0.00	0.00
35.90	0.00	0.00	41.20	0.00	0.00	46.50	0.00	0.00
36.00	0.00	0.00	41.30	0.00	0.00	46.60	0.00	0.00
36.10	0.00	0.00	41.40	0.00	0.00	46.70	0.00	0.00
36.20	0.00	0.00	41.50	0.00	0.00	46.80	0.00	0.00
36.30	0.00	0.00	41.60	0.00	0.00	46.90	0.00	0.00
36.40	0.00	0.00	41.70	0.00	0.00	47.00	0.00	0.00
36.50	0.00	0.00	41.80	0.00	0.00	47.10	0.00	0.00
36.60	0.00	0.00	41.90	0.00	0.00	47.20	0.00	0.00
36.70	0.00	0.00	42.00	0.00	0.00	47.30	0.00	0.00
36.80	0.00	0.00	42.10	0.00	0.00	47.40	0.00	0.00
36.90	0.00	0.00	42.20	0.00	0.00	47.50	0.00	0.00
37.00	0.00	0.00	42.30	0.00	0.00	47.60	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
47.70	0.00	0.00	53.00	0.00	0.00	58.30	0.00	0.00
47.80	0.00	0.00	53.10	0.00	0.00	58.40	0.00	0.00
47.90	0.00	0.00	53.20	0.00	0.00	58.50	0.00	0.00
48.00	0.00	0.00	53.30	0.00	0.00	58.60	0.00	0.00
48.10	0.00	0.00	53.40	0.00	0.00	58.70	0.00	0.00
48.20	0.00	0.00	53.50	0.00	0.00	58.80	0.00	0.00
48.30	0.00	0.00	53.60	0.00	0.00	58.90	0.00	0.00
48.40	0.00	0.00	53.70	0.00	0.00	59.00	0.00	0.00
48.50	0.00	0.00	53.80	0.00	0.00	59.10	0.00	0.00
48.60	0.00	0.00	53.90	0.00	0.00	59.20	0.00	0.00
48.70	0.00	0.00	54.00	0.00	0.00	59.30	0.00	0.00
48.80	0.00	0.00	54.10	0.00	0.00	59.40	0.00	0.00
48.90	0.00	0.00	54.20	0.00	0.00	59.50	0.00	0.00
49.00	0.00	0.00	54.30	0.00	0.00	59.60	0.00	0.00
49.10	0.00	0.00	54.40	0.00	0.00	59.70	0.00	0.00
49.20	0.00	0.00	54.50	0.00	0.00	59.80	0.00	0.00
49.30	0.00	0.00	54.60	0.00	0.00	59.90	0.00	0.00
49.40	0.00	0.00	54.70	0.00	0.00	60.00	0.00	0.00
49.50	0.00	0.00	54.80	0.00	0.00	60.10	0.00	0.00
49.60	0.00	0.00	54.90	0.00	0.00	60.20	0.00	0.00
49.70	0.00	0.00	55.00	0.00	0.00	60.30	0.00	0.00
49.80	0.00	0.00	55.10	0.00	0.00	60.40	0.00	0.00
49.90	0.00	0.00	55.20	0.00	0.00	60.50	0.00	0.00
50.00	0.00	0.00	55.30	0.00	0.00	60.60	0.00	0.00
50.10	0.00	0.00	55.40	0.00	0.00	60.70	0.00	0.00
50.20	0.00	0.00	55.50	0.00	0.00	60.80	0.00	0.00
50.30	0.00	0.00	55.60	0.00	0.00	60.90	0.00	0.00
50.40	0.00	0.00	55.70	0.00	0.00	61.00	0.00	0.00
50.50	0.00	0.00	55.80	0.00	0.00	61.10	0.00	0.00
50.60	0.00	0.00	55.90	0.00	0.00	61.20	0.00	0.00
50.70	0.00	0.00	56.00	0.00	0.00	61.30	0.00	0.00
50.80	0.00	0.00	56.10	0.00	0.00	61.40	0.00	0.00
50.90	0.00	0.00	56.20	0.00	0.00	61.50	0.00	0.00
51.00	0.00	0.00	56.30	0.00	0.00	61.60	0.00	0.00
51.10	0.00	0.00	56.40	0.00	0.00	61.70	0.00	0.00
51.20	0.00	0.00	56.50	0.00	0.00	61.80	0.00	0.00
51.30	0.00	0.00	56.60	0.00	0.00	61.90	0.00	0.00
51.40	0.00	0.00	56.70	0.00	0.00	62.00	0.00	0.00
51.50	0.00	0.00	56.80	0.00	0.00	62.10	0.00	0.00
51.60	0.00	0.00	56.90	0.00	0.00	62.20	0.00	0.00
51.70	0.00	0.00	57.00	0.00	0.00	62.30	0.00	0.00
51.80	0.00	0.00	57.10	0.00	0.00	62.40	0.00	0.00
51.90	0.00	0.00	57.20	0.00	0.00	62.50	0.00	0.00
52.00	0.00	0.00	57.30	0.00	0.00	62.60	0.00	0.00
52.10	0.00	0.00	57.40	0.00	0.00	62.70	0.00	0.00
52.20	0.00	0.00	57.50	0.00	0.00	62.80	0.00	0.00
52.30	0.00	0.00	57.60	0.00	0.00	62.90	0.00	0.00
52.40	0.00	0.00	57.70	0.00	0.00	63.00	0.00	0.00
52.50	0.00	0.00	57.80	0.00	0.00	63.10	0.00	0.00
52.60	0.00	0.00	57.90	0.00	0.00	63.20	0.00	0.00
52.70	0.00	0.00	58.00	0.00	0.00	63.30	0.00	0.00
52.80	0.00	0.00	58.10	0.00	0.00	63.40	0.00	0.00
52.90	0.00	0.00	58.20	0.00	0.00	63.50	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
63.60	0.00	0.00
63.70	0.00	0.00
63.80	0.00	0.00
63.90	0.00	0.00
64.00	0.00	0.00
64.10	0.00	0.00
64.20	0.00	0.00
64.30	0.00	0.00
64.40	0.00	0.00
64.50	0.00	0.00
64.60	0.00	0.00
64.70	0.00	0.00
64.80	0.00	0.00
64.90	0.00	0.00
65.00	0.00	0.00
65.10	0.00	0.00
65.20	0.00	0.00
65.30	0.00	0.00
65.40	0.00	0.00
65.50	0.00	0.00
65.60	0.00	0.00
65.70	0.00	0.00
65.80	0.00	0.00
65.90	0.00	0.00
66.00	0.00	0.00
66.10	0.00	0.00
66.20	0.00	0.00
66.30	0.00	0.00
66.40	0.00	0.00
66.50	0.00	0.00
66.60	0.00	0.00
66.70	0.00	0.00
66.80	0.00	0.00
66.90	0.00	0.00
67.00	0.00	0.00
67.10	0.00	0.00
67.20	0.00	0.00
67.30	0.00	0.00
67.40	0.00	0.00
67.50	0.00	0.00
67.60	0.00	0.00
67.70	0.00	0.00
67.80	0.00	0.00
67.90	0.00	0.00
68.00	0.00	0.00
68.10	0.00	0.00
68.20	0.00	0.00
68.30	0.00	0.00
68.40	0.00	0.00
68.50	0.00	0.00
68.60	0.00	0.00
68.70	0.00	0.00
68.80	0.00	0.00
68.90	0.00	0.00
69.00	0.00	0.00
69.10	0.00	0.00
69.20	0.00	0.00
69.30	0.00	0.00
69.40	0.00	0.00
69.50	0.00	0.00
69.60	0.00	0.00
69.70	0.00	0.00
69.80	0.00	0.00
69.90	0.00	0.00
70.00	0.00	0.00
70.10	0.00	0.00
70.20	0.00	0.00
70.30	0.00	0.00
70.40	0.00	0.00
70.50	0.00	0.00
70.60	0.00	0.00
70.70	0.00	0.00
70.80	0.00	0.00
70.90	0.00	0.00
71.00	0.00	0.00
71.10	0.00	0.00
71.20	0.00	0.00
71.30	0.00	0.00
71.40	0.00	0.00
71.50	0.00	0.00
71.60	0.00	0.00
71.70	0.00	0.00
71.80	0.00	0.00
71.90	0.00	0.00
72.00	0.00	0.00


Primary Comparison
23.51 cfs @ 12.13 hrs
Subcat E-2
Subcat P-2
Primary (cfs)
Time (hours)

Primary Comparison

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
0.00	0.00	0.00	5.30	0.25	0.25	10.60	1.16	1.12
0.10	0.00	0.00	5.40	0.26	0.25	10.70	1.29	1.24
0.20	0.00	0.00	5.50	0.26	0.25	10.80	1.42	1.37
0.30	0.00	0.00	5.60	0.26	0.26	10.90	1.55	1.49
0.40	0.00	0.00	5.70	0.27	0.26	11.00	1.69	1.63
0.50	0.00	0.00	5.80	0.27	0.27	11.10	1.88	1.82
0.60	0.00	0.00	5.90	0.28	0.27	11.20	2.12	2.05
0.70	0.00	0.00	6.00	0.28	0.27	11.30	2.36	2.28
0.80	0.00	0.00	6.10	0.29	0.28	11.40	2.61	2.53
0.90	0.00	0.00	6.20	0.30	0.29	11.50	2.87	2.78
1.00	0.00	0.00	6.30	0.31	0.30	11.60	3.66	3.55
1.10	0.00	0.00	6.40	0.32	0.31	11.70	4.20	4.08
1.20	0.01	0.01	6.50	0.32	0.32	11.80	5.43	5.27
1.30	0.02	0.01	6.60	0.33	0.33	11.90	7.63	7.43
1.40	0.02	0.02	6.70	0.34	0.33	12.00	12.78	12.46
1.50	0.03	0.03	6.80	0.35	0.34	12.10	**22.27**	**21.78**
1.60	0.04	0.04	6.90	0.36	0.35	12.20	**15.27**	**14.97**
1.70	0.05	0.05	7.00	0.37	0.36	12.30	8.31	8.16
1.80	0.06	0.06	7.10	0.38	0.37	12.40	5.83	5.73
1.90	0.07	0.06	7.20	0.39	0.38	12.50	4.98	4.90
2.00	0.07	0.07	7.30	0.40	0.39	12.60	4.06	4.00
2.10	0.08	0.08	7.40	0.41	0.40	12.70	3.48	3.43
2.20	0.09	0.09	7.50	0.42	0.41	12.80	3.19	3.14
2.30	0.10	0.09	7.60	0.43	0.42	12.90	2.92	2.88
2.40	0.10	0.10	7.70	0.44	0.43	13.00	2.66	2.62
2.50	0.11	0.11	7.80	0.45	0.44	13.10	2.38	2.35
2.60	0.12	0.11	7.90	0.46	0.45	13.20	2.19	2.16
2.70	0.12	0.12	8.00	0.47	0.46	13.30	2.03	2.00
2.80	0.13	0.13	8.10	0.48	0.47	13.40	1.88	1.85
2.90	0.14	0.13	8.20	0.49	0.48	13.50	1.72	1.70
3.00	0.14	0.14	8.30	0.50	0.49	13.60	1.56	1.54
3.10	0.15	0.14	8.40	0.51	0.50	13.70	1.48	1.46
3.20	0.15	0.15	8.50	0.52	0.50	13.80	1.44	1.42
3.30	0.16	0.15	8.60	0.53	0.51	13.90	1.39	1.37
3.40	0.16	0.16	8.70	0.54	0.52	14.00	1.35	1.33
3.50	0.17	0.17	8.80	0.55	0.53	14.10	1.31	1.29
3.60	0.17	0.17	8.90	0.56	0.54	14.20	1.27	1.25
3.70	0.18	0.18	9.00	0.57	0.55	14.30	1.22	1.21
3.80	0.18	0.18	9.10	0.59	0.58	14.40	1.18	1.17
3.90	0.19	0.19	9.20	0.62	0.61	14.50	1.14	1.12
4.00	0.20	0.19	9.30	0.65	0.64	14.60	1.10	1.08
4.10	0.20	0.19	9.40	0.69	0.67	14.70	1.05	1.04
4.20	0.20	0.20	9.50	0.72	0.70	14.80	1.01	1.00
4.30	0.21	0.20	9.60	0.75	0.73	14.90	0.97	0.95
4.40	0.21	0.21	9.70	0.78	0.76	15.00	0.92	0.91
4.50	0.22	0.21	9.80	0.81	0.79	15.10	0.88	0.87
4.60	0.22	0.22	9.90	0.84	0.82	15.20	0.86	0.84
4.70	0.23	0.22	10.00	0.88	0.85	15.30	0.84	0.83
4.80	0.23	0.23	10.10	0.91	0.88	15.40	0.83	0.82
4.90	0.24	0.23	10.20	0.95	0.92	15.50	0.82	0.81
5.00	0.24	0.23	10.30	0.99	0.95	15.60	0.81	0.80
5.10	0.24	0.24	10.40	1.03	0.99	15.70	0.80	0.79
5.20	0.25	0.24	10.50	1.07	1.03	15.80	0.78	0.77

Primary Comparison (continued)

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
15.90	0.77	0.76	21.20	0.40	0.40	26.50	0.00	0.00
16.00	0.76	0.75	21.30	0.40	0.39	26.60	0.00	0.00
16.10	0.75	0.74	21.40	0.40	0.39	26.70	0.00	0.00
16.20	0.73	0.72	21.50	0.39	0.39	26.80	0.00	0.00
16.30	0.72	0.71	21.60	0.39	0.39	26.90	0.00	0.00
16.40	0.71	0.70	21.70	0.39	0.38	27.00	0.00	0.00
16.50	0.70	0.69	21.80	0.38	0.38	27.10	0.00	0.00
16.60	0.69	0.68	21.90	0.38	0.38	27.20	0.00	0.00
16.70	0.67	0.67	22.00	0.38	0.37	27.30	0.00	0.00
16.80	0.66	0.65	22.10	0.37	0.37	27.40	0.00	0.00
16.90	0.65	0.64	22.20	0.37	0.37	27.50	0.00	0.00
17.00	0.64	0.63	22.30	0.37	0.36	27.60	0.00	0.00
17.10	0.62	0.62	22.40	0.36	0.36	27.70	0.00	0.00
17.20	0.61	0.60	22.50	0.36	0.36	27.80	0.00	0.00
17.30	0.60	0.59	22.60	0.36	0.36	27.90	0.00	0.00
17.40	0.59	0.58	22.70	0.36	0.35	28.00	0.00	0.00
17.50	0.57	0.57	22.80	0.35	0.35	28.10	0.00	0.00
17.60	0.56	0.56	22.90	0.35	0.35	28.20	0.00	0.00
17.70	0.55	0.54	23.00	0.35	0.34	28.30	0.00	0.00
17.80	0.54	0.53	23.10	0.34	0.34	28.40	0.00	0.00
17.90	0.53	0.52	23.20	0.34	0.34	28.50	0.00	0.00
18.00	0.51	0.51	23.30	0.34	0.33	28.60	0.00	0.00
18.10	0.50	0.49	23.40	0.33	0.33	28.70	0.00	0.00
18.20	0.49	0.49	23.50	0.33	0.33	28.80	0.00	0.00
18.30	0.49	0.49	23.60	0.33	0.32	28.90	0.00	0.00
18.40	0.49	0.48	23.70	0.32	0.32	29.00	0.00	0.00
18.50	0.48	0.48	23.80	0.32	0.32	29.10	0.00	0.00
18.60	0.48	0.48	23.90	0.32	0.32	29.20	0.00	0.00
18.70	0.48	0.47	24.00	0.32	0.31	29.30	0.00	0.00
18.80	0.48	0.47	24.10	0.11	0.11	29.40	0.00	0.00
18.90	0.47	0.47	24.20	0.01	0.01	29.50	0.00	0.00
19.00	0.47	0.46	24.30	0.00	0.00	29.60	0.00	0.00
19.10	0.47	0.46	24.40	0.00	0.00	29.70	0.00	0.00
19.20	0.46	0.46	24.50	0.00	0.00	29.80	0.00	0.00
19.30	0.46	0.46	24.60	0.00	0.00	29.90	0.00	0.00
19.40	0.46	0.45	24.70	0.00	0.00	30.00	0.00	0.00
19.50	0.45	0.45	24.80	0.00	0.00	30.10	0.00	0.00
19.60	0.45	0.45	24.90	0.00	0.00	30.20	0.00	0.00
19.70	0.45	0.44	25.00	0.00	0.00	30.30	0.00	0.00
19.80	0.45	0.44	25.10	0.00	0.00	30.40	0.00	0.00
19.90	0.44	0.44	25.20	0.00	0.00	30.50	0.00	0.00
20.00	0.44	0.43	25.30	0.00	0.00	30.60	0.00	0.00
20.10	0.44	0.43	25.40	0.00	0.00	30.70	0.00	0.00
20.20	0.43	0.43	25.50	0.00	0.00	30.80	0.00	0.00
20.30	0.43	0.42	25.60	0.00	0.00	30.90	0.00	0.00
20.40	0.43	0.42	25.70	0.00	0.00	31.00	0.00	0.00
20.50	0.42	0.42	25.80	0.00	0.00	31.10	0.00	0.00
20.60	0.42	0.42	25.90	0.00	0.00	31.20	0.00	0.00
20.70	0.42	0.41	26.00	0.00	0.00	31.30	0.00	0.00
20.80	0.41	0.41	26.10	0.00	0.00	31.40	0.00	0.00
20.90	0.41	0.41	26.20	0.00	0.00	31.50	0.00	0.00
21.00	0.41	0.40	26.30	0.00	0.00	31.60	0.00	0.00
21.10	0.40	0.40	26.40	0.00	0.00	31.70	0.00	0.00

Primary Comparison (continued)

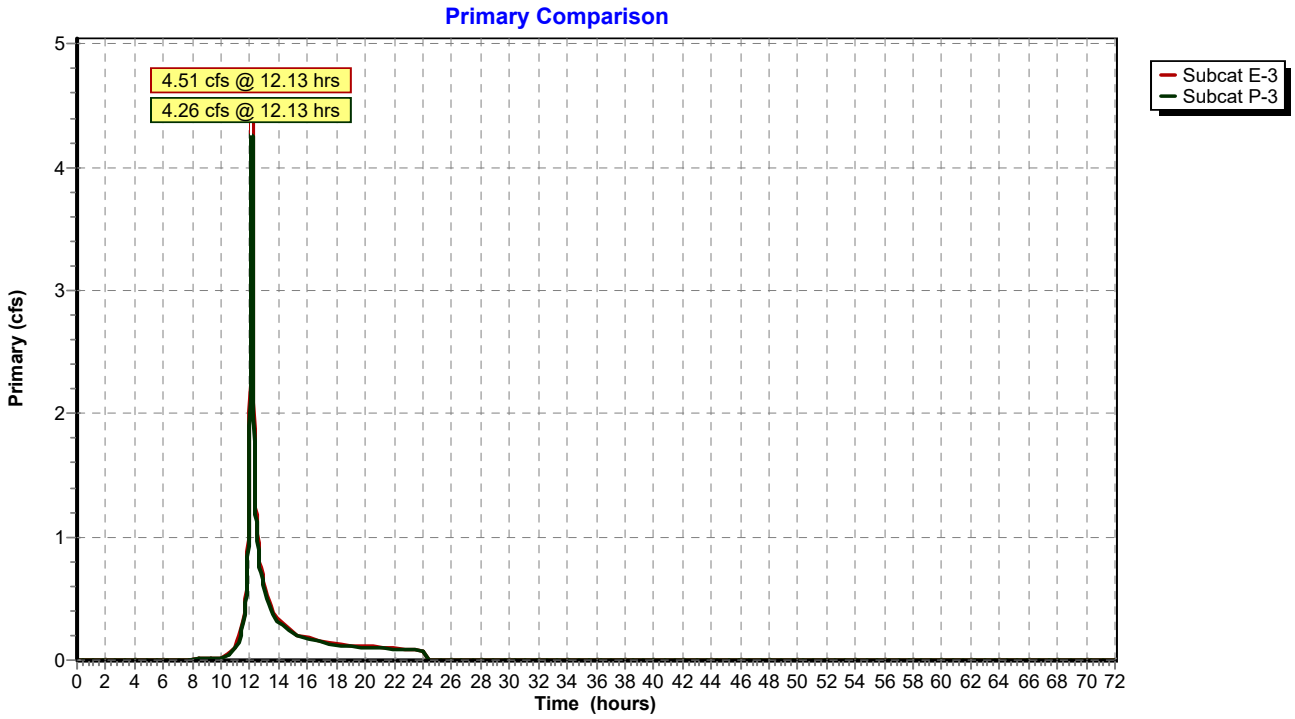
Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
31.80	0.00	0.00	37.10	0.00	0.00	42.40	0.00	0.00
31.90	0.00	0.00	37.20	0.00	0.00	42.50	0.00	0.00
32.00	0.00	0.00	37.30	0.00	0.00	42.60	0.00	0.00
32.10	0.00	0.00	37.40	0.00	0.00	42.70	0.00	0.00
32.20	0.00	0.00	37.50	0.00	0.00	42.80	0.00	0.00
32.30	0.00	0.00	37.60	0.00	0.00	42.90	0.00	0.00
32.40	0.00	0.00	37.70	0.00	0.00	43.00	0.00	0.00
32.50	0.00	0.00	37.80	0.00	0.00	43.10	0.00	0.00
32.60	0.00	0.00	37.90	0.00	0.00	43.20	0.00	0.00
32.70	0.00	0.00	38.00	0.00	0.00	43.30	0.00	0.00
32.80	0.00	0.00	38.10	0.00	0.00	43.40	0.00	0.00
32.90	0.00	0.00	38.20	0.00	0.00	43.50	0.00	0.00
33.00	0.00	0.00	38.30	0.00	0.00	43.60	0.00	0.00
33.10	0.00	0.00	38.40	0.00	0.00	43.70	0.00	0.00
33.20	0.00	0.00	38.50	0.00	0.00	43.80	0.00	0.00
33.30	0.00	0.00	38.60	0.00	0.00	43.90	0.00	0.00
33.40	0.00	0.00	38.70	0.00	0.00	44.00	0.00	0.00
33.50	0.00	0.00	38.80	0.00	0.00	44.10	0.00	0.00
33.60	0.00	0.00	38.90	0.00	0.00	44.20	0.00	0.00
33.70	0.00	0.00	39.00	0.00	0.00	44.30	0.00	0.00
33.80	0.00	0.00	39.10	0.00	0.00	44.40	0.00	0.00
33.90	0.00	0.00	39.20	0.00	0.00	44.50	0.00	0.00
34.00	0.00	0.00	39.30	0.00	0.00	44.60	0.00	0.00
34.10	0.00	0.00	39.40	0.00	0.00	44.70	0.00	0.00
34.20	0.00	0.00	39.50	0.00	0.00	44.80	0.00	0.00
34.30	0.00	0.00	39.60	0.00	0.00	44.90	0.00	0.00
34.40	0.00	0.00	39.70	0.00	0.00	45.00	0.00	0.00
34.50	0.00	0.00	39.80	0.00	0.00	45.10	0.00	0.00
34.60	0.00	0.00	39.90	0.00	0.00	45.20	0.00	0.00
34.70	0.00	0.00	40.00	0.00	0.00	45.30	0.00	0.00
34.80	0.00	0.00	40.10	0.00	0.00	45.40	0.00	0.00
34.90	0.00	0.00	40.20	0.00	0.00	45.50	0.00	0.00
35.00	0.00	0.00	40.30	0.00	0.00	45.60	0.00	0.00
35.10	0.00	0.00	40.40	0.00	0.00	45.70	0.00	0.00
35.20	0.00	0.00	40.50	0.00	0.00	45.80	0.00	0.00
35.30	0.00	0.00	40.60	0.00	0.00	45.90	0.00	0.00
35.40	0.00	0.00	40.70	0.00	0.00	46.00	0.00	0.00
35.50	0.00	0.00	40.80	0.00	0.00	46.10	0.00	0.00
35.60	0.00	0.00	40.90	0.00	0.00	46.20	0.00	0.00
35.70	0.00	0.00	41.00	0.00	0.00	46.30	0.00	0.00
35.80	0.00	0.00	41.10	0.00	0.00	46.40	0.00	0.00
35.90	0.00	0.00	41.20	0.00	0.00	46.50	0.00	0.00
36.00	0.00	0.00	41.30	0.00	0.00	46.60	0.00	0.00
36.10	0.00	0.00	41.40	0.00	0.00	46.70	0.00	0.00
36.20	0.00	0.00	41.50	0.00	0.00	46.80	0.00	0.00
36.30	0.00	0.00	41.60	0.00	0.00	46.90	0.00	0.00
36.40	0.00	0.00	41.70	0.00	0.00	47.00	0.00	0.00
36.50	0.00	0.00	41.80	0.00	0.00	47.10	0.00	0.00
36.60	0.00	0.00	41.90	0.00	0.00	47.20	0.00	0.00
36.70	0.00	0.00	42.00	0.00	0.00	47.30	0.00	0.00
36.80	0.00	0.00	42.10	0.00	0.00	47.40	0.00	0.00
36.90	0.00	0.00	42.20	0.00	0.00	47.50	0.00	0.00
37.00	0.00	0.00	42.30	0.00	0.00	47.60	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
47.70	0.00	0.00	53.00	0.00	0.00	58.30	0.00	0.00
47.80	0.00	0.00	53.10	0.00	0.00	58.40	0.00	0.00
47.90	0.00	0.00	53.20	0.00	0.00	58.50	0.00	0.00
48.00	0.00	0.00	53.30	0.00	0.00	58.60	0.00	0.00
48.10	0.00	0.00	53.40	0.00	0.00	58.70	0.00	0.00
48.20	0.00	0.00	53.50	0.00	0.00	58.80	0.00	0.00
48.30	0.00	0.00	53.60	0.00	0.00	58.90	0.00	0.00
48.40	0.00	0.00	53.70	0.00	0.00	59.00	0.00	0.00
48.50	0.00	0.00	53.80	0.00	0.00	59.10	0.00	0.00
48.60	0.00	0.00	53.90	0.00	0.00	59.20	0.00	0.00
48.70	0.00	0.00	54.00	0.00	0.00	59.30	0.00	0.00
48.80	0.00	0.00	54.10	0.00	0.00	59.40	0.00	0.00
48.90	0.00	0.00	54.20	0.00	0.00	59.50	0.00	0.00
49.00	0.00	0.00	54.30	0.00	0.00	59.60	0.00	0.00
49.10	0.00	0.00	54.40	0.00	0.00	59.70	0.00	0.00
49.20	0.00	0.00	54.50	0.00	0.00	59.80	0.00	0.00
49.30	0.00	0.00	54.60	0.00	0.00	59.90	0.00	0.00
49.40	0.00	0.00	54.70	0.00	0.00	60.00	0.00	0.00
49.50	0.00	0.00	54.80	0.00	0.00	60.10	0.00	0.00
49.60	0.00	0.00	54.90	0.00	0.00	60.20	0.00	0.00
49.70	0.00	0.00	55.00	0.00	0.00	60.30	0.00	0.00
49.80	0.00	0.00	55.10	0.00	0.00	60.40	0.00	0.00
49.90	0.00	0.00	55.20	0.00	0.00	60.50	0.00	0.00
50.00	0.00	0.00	55.30	0.00	0.00	60.60	0.00	0.00
50.10	0.00	0.00	55.40	0.00	0.00	60.70	0.00	0.00
50.20	0.00	0.00	55.50	0.00	0.00	60.80	0.00	0.00
50.30	0.00	0.00	55.60	0.00	0.00	60.90	0.00	0.00
50.40	0.00	0.00	55.70	0.00	0.00	61.00	0.00	0.00
50.50	0.00	0.00	55.80	0.00	0.00	61.10	0.00	0.00
50.60	0.00	0.00	55.90	0.00	0.00	61.20	0.00	0.00
50.70	0.00	0.00	56.00	0.00	0.00	61.30	0.00	0.00
50.80	0.00	0.00	56.10	0.00	0.00	61.40	0.00	0.00
50.90	0.00	0.00	56.20	0.00	0.00	61.50	0.00	0.00
51.00	0.00	0.00	56.30	0.00	0.00	61.60	0.00	0.00
51.10	0.00	0.00	56.40	0.00	0.00	61.70	0.00	0.00
51.20	0.00	0.00	56.50	0.00	0.00	61.80	0.00	0.00
51.30	0.00	0.00	56.60	0.00	0.00	61.90	0.00	0.00
51.40	0.00	0.00	56.70	0.00	0.00	62.00	0.00	0.00
51.50	0.00	0.00	56.80	0.00	0.00	62.10	0.00	0.00
51.60	0.00	0.00	56.90	0.00	0.00	62.20	0.00	0.00
51.70	0.00	0.00	57.00	0.00	0.00	62.30	0.00	0.00
51.80	0.00	0.00	57.10	0.00	0.00	62.40	0.00	0.00
51.90	0.00	0.00	57.20	0.00	0.00	62.50	0.00	0.00
52.00	0.00	0.00	57.30	0.00	0.00	62.60	0.00	0.00
52.10	0.00	0.00	57.40	0.00	0.00	62.70	0.00	0.00
52.20	0.00	0.00	57.50	0.00	0.00	62.80	0.00	0.00
52.30	0.00	0.00	57.60	0.00	0.00	62.90	0.00	0.00
52.40	0.00	0.00	57.70	0.00	0.00	63.00	0.00	0.00
52.50	0.00	0.00	57.80	0.00	0.00	63.10	0.00	0.00
52.60	0.00	0.00	57.90	0.00	0.00	63.20	0.00	0.00
52.70	0.00	0.00	58.00	0.00	0.00	63.30	0.00	0.00
52.80	0.00	0.00	58.10	0.00	0.00	63.40	0.00	0.00
52.90	0.00	0.00	58.20	0.00	0.00	63.50	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
63.60	0.00	0.00
63.70	0.00	0.00
63.80	0.00	0.00
63.90	0.00	0.00
64.00	0.00	0.00
64.10	0.00	0.00
64.20	0.00	0.00
64.30	0.00	0.00
64.40	0.00	0.00
64.50	0.00	0.00
64.60	0.00	0.00
64.70	0.00	0.00
64.80	0.00	0.00
64.90	0.00	0.00
65.00	0.00	0.00
65.10	0.00	0.00
65.20	0.00	0.00
65.30	0.00	0.00
65.40	0.00	0.00
65.50	0.00	0.00
65.60	0.00	0.00
65.70	0.00	0.00
65.80	0.00	0.00
65.90	0.00	0.00
66.00	0.00	0.00
66.10	0.00	0.00
66.20	0.00	0.00
66.30	0.00	0.00
66.40	0.00	0.00
66.50	0.00	0.00
66.60	0.00	0.00
66.70	0.00	0.00
66.80	0.00	0.00
66.90	0.00	0.00
67.00	0.00	0.00
67.10	0.00	0.00
67.20	0.00	0.00
67.30	0.00	0.00
67.40	0.00	0.00
67.50	0.00	0.00
67.60	0.00	0.00
67.70	0.00	0.00
67.80	0.00	0.00
67.90	0.00	0.00
68.00	0.00	0.00
68.10	0.00	0.00
68.20	0.00	0.00
68.30	0.00	0.00
68.40	0.00	0.00
68.50	0.00	0.00
68.60	0.00	0.00
68.70	0.00	0.00
68.80	0.00	0.00
68.90	0.00	0.00
69.00	0.00	0.00
69.10	0.00	0.00
69.20	0.00	0.00
69.30	0.00	0.00
69.40	0.00	0.00
69.50	0.00	0.00
69.60	0.00	0.00
69.70	0.00	0.00
69.80	0.00	0.00
69.90	0.00	0.00
70.00	0.00	0.00
70.10	0.00	0.00
70.20	0.00	0.00
70.30	0.00	0.00
70.40	0.00	0.00
70.50	0.00	0.00
70.60	0.00	0.00
70.70	0.00	0.00
70.80	0.00	0.00
70.90	0.00	0.00
71.00	0.00	0.00
71.10	0.00	0.00
71.20	0.00	0.00
71.30	0.00	0.00
71.40	0.00	0.00
71.50	0.00	0.00
71.60	0.00	0.00
71.70	0.00	0.00
71.80	0.00	0.00
71.90	0.00	0.00
72.00	0.00	0.00


Primary Comparison
4.51 cfs @ 12.13 hrs
4.26 cfs @ 12.13 hrs
Subcat E-3
Subcat P-3
Primary (cfs)
Time (hours)
0
1
2
3
4
5
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Primary Comparison

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
0.00	0.00	0.00	5.30	0.00	0.00	10.60	0.05	0.05
0.10	0.00	0.00	5.40	0.00	0.00	10.70	0.06	0.06
0.20	0.00	0.00	5.50	0.00	0.00	10.80	0.08	0.07
0.30	0.00	0.00	5.60	0.00	0.00	10.90	0.09	0.09
0.40	0.00	0.00	5.70	0.00	0.00	11.00	0.11	0.10
0.50	0.00	0.00	5.80	0.00	0.00	11.10	0.14	0.13
0.60	0.00	0.00	5.90	0.00	0.00	11.20	0.17	0.16
0.70	0.00	0.00	6.00	0.00	0.00	11.30	0.20	0.19
0.80	0.00	0.00	6.10	0.00	0.00	11.40	0.24	0.23
0.90	0.00	0.00	6.20	0.00	0.00	11.50	0.29	0.27
1.00	0.00	0.00	6.30	0.00	0.00	11.60	0.40	0.38
1.10	0.00	0.00	6.40	0.00	0.00	11.70	0.50	0.47
1.20	0.00	0.00	6.50	0.01	0.00	11.80	0.70	0.66
1.30	0.00	0.00	6.60	0.01	0.00	11.90	1.08	1.02
1.40	0.00	0.00	6.70	0.01	0.00	12.00	2.02	1.90
1.50	0.00	0.00	6.80	0.01	0.01	12.10	**4.01**	**3.79**
1.60	0.00	0.00	6.90	0.01	0.01	12.20	**3.01**	**2.84**
1.70	0.00	0.00	7.00	0.01	0.01	12.30	1.72	1.63
1.80	0.00	0.00	7.10	0.01	0.01	12.40	1.24	1.18
1.90	0.00	0.00	7.20	0.01	0.01	12.50	1.08	1.02
2.00	0.00	0.00	7.30	0.01	0.01	12.60	0.89	0.85
2.10	0.00	0.00	7.40	0.01	0.01	12.70	0.77	0.73
2.20	0.00	0.00	7.50	0.01	0.01	12.80	0.72	0.68
2.30	0.00	0.00	7.60	0.01	0.01	12.90	0.66	0.63
2.40	0.00	0.00	7.70	0.01	0.01	13.00	0.61	0.57
2.50	0.00	0.00	7.80	0.01	0.01	13.10	0.55	0.52
2.60	0.00	0.00	7.90	0.01	0.01	13.20	0.50	0.48
2.70	0.00	0.00	8.00	0.01	0.01	13.30	0.47	0.44
2.80	0.00	0.00	8.10	0.01	0.01	13.40	0.44	0.41
2.90	0.00	0.00	8.20	0.01	0.01	13.50	0.40	0.38
3.00	0.00	0.00	8.30	0.01	0.01	13.60	0.37	0.35
3.10	0.00	0.00	8.40	0.01	0.01	13.70	0.35	0.33
3.20	0.00	0.00	8.50	0.01	0.01	13.80	0.34	0.32
3.30	0.00	0.00	8.60	0.01	0.01	13.90	0.33	0.31
3.40	0.00	0.00	8.70	0.01	0.01	14.00	0.32	0.30
3.50	0.00	0.00	8.80	0.01	0.01	14.10	0.31	0.29
3.60	0.00	0.00	8.90	0.01	0.01	14.20	0.30	0.28
3.70	0.00	0.00	9.00	0.01	0.01	14.30	0.29	0.28
3.80	0.00	0.00	9.10	0.01	0.01	14.40	0.28	0.27
3.90	0.00	0.00	9.20	0.01	0.01	14.50	0.27	0.26
4.00	0.00	0.00	9.30	0.01	0.01	14.60	0.26	0.25
4.10	0.00	0.00	9.40	0.01	0.01	14.70	0.25	0.24
4.20	0.00	0.00	9.50	0.01	0.01	14.80	0.24	0.23
4.30	0.00	0.00	9.60	0.01	0.01	14.90	0.23	0.22
4.40	0.00	0.00	9.70	0.01	0.01	15.00	0.22	0.21
4.50	0.00	0.00	9.80	0.01	0.01	15.10	0.21	0.20
4.60	0.00	0.00	9.90	0.01	0.01	15.20	0.21	0.20
4.70	0.00	0.00	10.00	0.01	0.01	15.30	0.20	0.19
4.80	0.00	0.00	10.10	0.02	0.01	15.40	0.20	0.19
4.90	0.00	0.00	10.20	0.02	0.02	15.50	0.20	0.19
5.00	0.00	0.00	10.30	0.03	0.03	15.60	0.20	0.19
5.10	0.00	0.00	10.40	0.03	0.03	15.70	0.19	0.18
5.20	0.00	0.00	10.50	0.04	0.04	15.80	0.19	0.18

Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
15.90	0.19	0.18	21.20	0.10	0.10	26.50	0.00	0.00
16.00	0.19	0.18	21.30	0.10	0.10	26.60	0.00	0.00
16.10	0.18	0.17	21.40	0.10	0.10	26.70	0.00	0.00
16.20	0.18	0.17	21.50	0.10	0.09	26.80	0.00	0.00
16.30	0.18	0.17	21.60	0.10	0.09	26.90	0.00	0.00
16.40	0.17	0.17	21.70	0.10	0.09	27.00	0.00	0.00
16.50	0.17	0.16	21.80	0.10	0.09	27.10	0.00	0.00
16.60	0.17	0.16	21.90	0.10	0.09	27.20	0.00	0.00
16.70	0.17	0.16	22.00	0.10	0.09	27.30	0.00	0.00
16.80	0.16	0.15	22.10	0.10	0.09	27.40	0.00	0.00
16.90	0.16	0.15	22.20	0.09	0.09	27.50	0.00	0.00
17.00	0.16	0.15	22.30	0.09	0.09	27.60	0.00	0.00
17.10	0.15	0.15	22.40	0.09	0.09	27.70	0.00	0.00
17.20	0.15	0.14	22.50	0.09	0.09	27.80	0.00	0.00
17.30	0.15	0.14	22.60	0.09	0.09	27.90	0.00	0.00
17.40	0.15	0.14	22.70	0.09	0.09	28.00	0.00	0.00
17.50	0.14	0.14	22.80	0.09	0.09	28.10	0.00	0.00
17.60	0.14	0.13	22.90	0.09	0.08	28.20	0.00	0.00
17.70	0.14	0.13	23.00	0.09	0.08	28.30	0.00	0.00
17.80	0.13	0.13	23.10	0.09	0.08	28.40	0.00	0.00
17.90	0.13	0.12	23.20	0.09	0.08	28.50	0.00	0.00
18.00	0.13	0.12	23.30	0.09	0.08	28.60	0.00	0.00
18.10	0.12	0.12	23.40	0.09	0.08	28.70	0.00	0.00
18.20	0.12	0.12	23.50	0.08	0.08	28.80	0.00	0.00
18.30	0.12	0.12	23.60	0.08	0.08	28.90	0.00	0.00
18.40	0.12	0.12	23.70	0.08	0.08	29.00	0.00	0.00
18.50	0.12	0.11	23.80	0.08	0.08	29.10	0.00	0.00
18.60	0.12	0.11	23.90	0.08	0.08	29.20	0.00	0.00
18.70	0.12	0.11	24.00	0.08	0.08	29.30	0.00	0.00
18.80	0.12	0.11	24.10	0.03	0.03	29.40	0.00	0.00
18.90	0.12	0.11	24.20	0.00	0.00	29.50	0.00	0.00
19.00	0.12	0.11	24.30	0.00	0.00	29.60	0.00	0.00
19.10	0.12	0.11	24.40	0.00	0.00	29.70	0.00	0.00
19.20	0.12	0.11	24.50	0.00	0.00	29.80	0.00	0.00
19.30	0.12	0.11	24.60	0.00	0.00	29.90	0.00	0.00
19.40	0.11	0.11	24.70	0.00	0.00	30.00	0.00	0.00
19.50	0.11	0.11	24.80	0.00	0.00	30.10	0.00	0.00
19.60	0.11	0.11	24.90	0.00	0.00	30.20	0.00	0.00
19.70	0.11	0.11	25.00	0.00	0.00	30.30	0.00	0.00
19.80	0.11	0.11	25.10	0.00	0.00	30.40	0.00	0.00
19.90	0.11	0.11	25.20	0.00	0.00	30.50	0.00	0.00
20.00	0.11	0.10	25.30	0.00	0.00	30.60	0.00	0.00
20.10	0.11	0.10	25.40	0.00	0.00	30.70	0.00	0.00
20.20	0.11	0.10	25.50	0.00	0.00	30.80	0.00	0.00
20.30	0.11	0.10	25.60	0.00	0.00	30.90	0.00	0.00
20.40	0.11	0.10	25.70	0.00	0.00	31.00	0.00	0.00
20.50	0.11	0.10	25.80	0.00	0.00	31.10	0.00	0.00
20.60	0.11	0.10	25.90	0.00	0.00	31.20	0.00	0.00
20.70	0.11	0.10	26.00	0.00	0.00	31.30	0.00	0.00
20.80	0.11	0.10	26.10	0.00	0.00	31.40	0.00	0.00
20.90	0.10	0.10	26.20	0.00	0.00	31.50	0.00	0.00
21.00	0.10	0.10	26.30	0.00	0.00	31.60	0.00	0.00
21.10	0.10	0.10	26.40	0.00	0.00	31.70	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
31.80	0.00	0.00	37.10	0.00	0.00	42.40	0.00	0.00
31.90	0.00	0.00	37.20	0.00	0.00	42.50	0.00	0.00
32.00	0.00	0.00	37.30	0.00	0.00	42.60	0.00	0.00
32.10	0.00	0.00	37.40	0.00	0.00	42.70	0.00	0.00
32.20	0.00	0.00	37.50	0.00	0.00	42.80	0.00	0.00
32.30	0.00	0.00	37.60	0.00	0.00	42.90	0.00	0.00
32.40	0.00	0.00	37.70	0.00	0.00	43.00	0.00	0.00
32.50	0.00	0.00	37.80	0.00	0.00	43.10	0.00	0.00
32.60	0.00	0.00	37.90	0.00	0.00	43.20	0.00	0.00
32.70	0.00	0.00	38.00	0.00	0.00	43.30	0.00	0.00
32.80	0.00	0.00	38.10	0.00	0.00	43.40	0.00	0.00
32.90	0.00	0.00	38.20	0.00	0.00	43.50	0.00	0.00
33.00	0.00	0.00	38.30	0.00	0.00	43.60	0.00	0.00
33.10	0.00	0.00	38.40	0.00	0.00	43.70	0.00	0.00
33.20	0.00	0.00	38.50	0.00	0.00	43.80	0.00	0.00
33.30	0.00	0.00	38.60	0.00	0.00	43.90	0.00	0.00
33.40	0.00	0.00	38.70	0.00	0.00	44.00	0.00	0.00
33.50	0.00	0.00	38.80	0.00	0.00	44.10	0.00	0.00
33.60	0.00	0.00	38.90	0.00	0.00	44.20	0.00	0.00
33.70	0.00	0.00	39.00	0.00	0.00	44.30	0.00	0.00
33.80	0.00	0.00	39.10	0.00	0.00	44.40	0.00	0.00
33.90	0.00	0.00	39.20	0.00	0.00	44.50	0.00	0.00
34.00	0.00	0.00	39.30	0.00	0.00	44.60	0.00	0.00
34.10	0.00	0.00	39.40	0.00	0.00	44.70	0.00	0.00
34.20	0.00	0.00	39.50	0.00	0.00	44.80	0.00	0.00
34.30	0.00	0.00	39.60	0.00	0.00	44.90	0.00	0.00
34.40	0.00	0.00	39.70	0.00	0.00	45.00	0.00	0.00
34.50	0.00	0.00	39.80	0.00	0.00	45.10	0.00	0.00
34.60	0.00	0.00	39.90	0.00	0.00	45.20	0.00	0.00
34.70	0.00	0.00	40.00	0.00	0.00	45.30	0.00	0.00
34.80	0.00	0.00	40.10	0.00	0.00	45.40	0.00	0.00
34.90	0.00	0.00	40.20	0.00	0.00	45.50	0.00	0.00
35.00	0.00	0.00	40.30	0.00	0.00	45.60	0.00	0.00
35.10	0.00	0.00	40.40	0.00	0.00	45.70	0.00	0.00
35.20	0.00	0.00	40.50	0.00	0.00	45.80	0.00	0.00
35.30	0.00	0.00	40.60	0.00	0.00	45.90	0.00	0.00
35.40	0.00	0.00	40.70	0.00	0.00	46.00	0.00	0.00
35.50	0.00	0.00	40.80	0.00	0.00	46.10	0.00	0.00
35.60	0.00	0.00	40.90	0.00	0.00	46.20	0.00	0.00
35.70	0.00	0.00	41.00	0.00	0.00	46.30	0.00	0.00
35.80	0.00	0.00	41.10	0.00	0.00	46.40	0.00	0.00
35.90	0.00	0.00	41.20	0.00	0.00	46.50	0.00	0.00
36.00	0.00	0.00	41.30	0.00	0.00	46.60	0.00	0.00
36.10	0.00	0.00	41.40	0.00	0.00	46.70	0.00	0.00
36.20	0.00	0.00	41.50	0.00	0.00	46.80	0.00	0.00
36.30	0.00	0.00	41.60	0.00	0.00	46.90	0.00	0.00
36.40	0.00	0.00	41.70	0.00	0.00	47.00	0.00	0.00
36.50	0.00	0.00	41.80	0.00	0.00	47.10	0.00	0.00
36.60	0.00	0.00	41.90	0.00	0.00	47.20	0.00	0.00
36.70	0.00	0.00	42.00	0.00	0.00	47.30	0.00	0.00
36.80	0.00	0.00	42.10	0.00	0.00	47.40	0.00	0.00
36.90	0.00	0.00	42.20	0.00	0.00	47.50	0.00	0.00
37.00	0.00	0.00	42.30	0.00	0.00	47.60	0.00	0.00

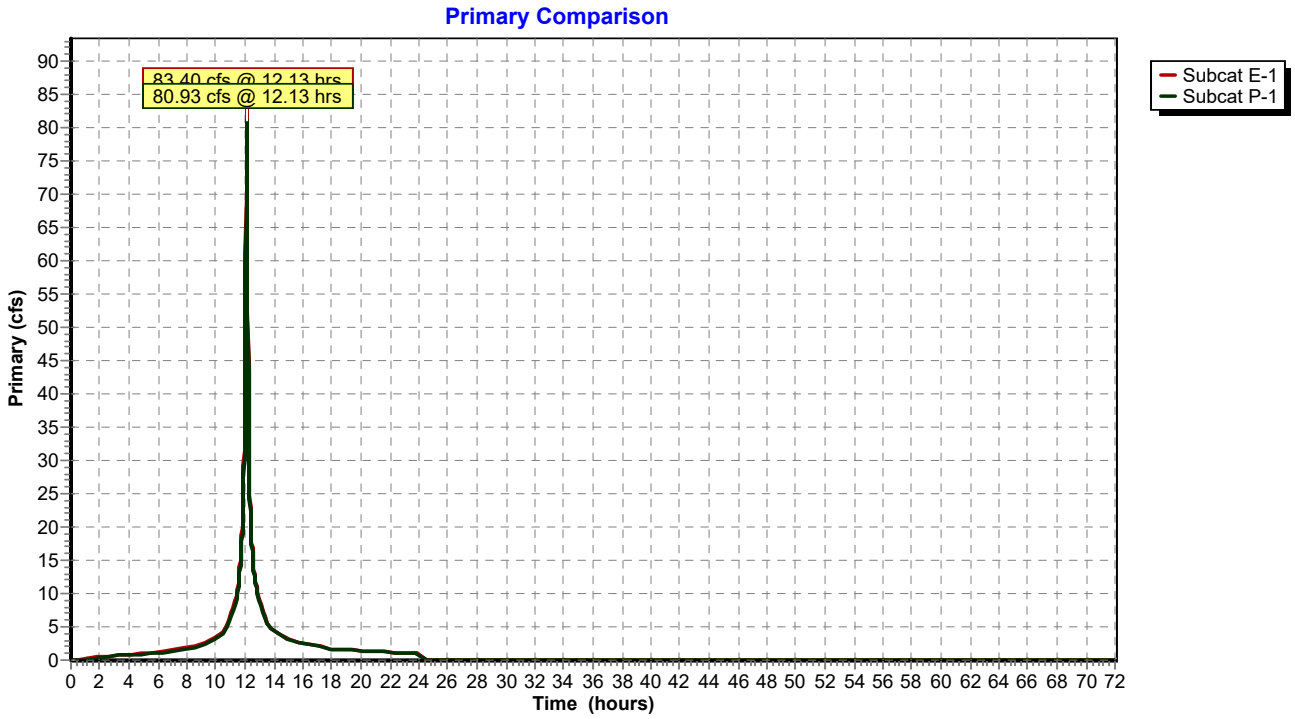
Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
47.70	0.00	0.00	53.00	0.00	0.00	58.30	0.00	0.00
47.80	0.00	0.00	53.10	0.00	0.00	58.40	0.00	0.00
47.90	0.00	0.00	53.20	0.00	0.00	58.50	0.00	0.00
48.00	0.00	0.00	53.30	0.00	0.00	58.60	0.00	0.00
48.10	0.00	0.00	53.40	0.00	0.00	58.70	0.00	0.00
48.20	0.00	0.00	53.50	0.00	0.00	58.80	0.00	0.00
48.30	0.00	0.00	53.60	0.00	0.00	58.90	0.00	0.00
48.40	0.00	0.00	53.70	0.00	0.00	59.00	0.00	0.00
48.50	0.00	0.00	53.80	0.00	0.00	59.10	0.00	0.00
48.60	0.00	0.00	53.90	0.00	0.00	59.20	0.00	0.00
48.70	0.00	0.00	54.00	0.00	0.00	59.30	0.00	0.00
48.80	0.00	0.00	54.10	0.00	0.00	59.40	0.00	0.00
48.90	0.00	0.00	54.20	0.00	0.00	59.50	0.00	0.00
49.00	0.00	0.00	54.30	0.00	0.00	59.60	0.00	0.00
49.10	0.00	0.00	54.40	0.00	0.00	59.70	0.00	0.00
49.20	0.00	0.00	54.50	0.00	0.00	59.80	0.00	0.00
49.30	0.00	0.00	54.60	0.00	0.00	59.90	0.00	0.00
49.40	0.00	0.00	54.70	0.00	0.00	60.00	0.00	0.00
49.50	0.00	0.00	54.80	0.00	0.00	60.10	0.00	0.00
49.60	0.00	0.00	54.90	0.00	0.00	60.20	0.00	0.00
49.70	0.00	0.00	55.00	0.00	0.00	60.30	0.00	0.00
49.80	0.00	0.00	55.10	0.00	0.00	60.40	0.00	0.00
49.90	0.00	0.00	55.20	0.00	0.00	60.50	0.00	0.00
50.00	0.00	0.00	55.30	0.00	0.00	60.60	0.00	0.00
50.10	0.00	0.00	55.40	0.00	0.00	60.70	0.00	0.00
50.20	0.00	0.00	55.50	0.00	0.00	60.80	0.00	0.00
50.30	0.00	0.00	55.60	0.00	0.00	60.90	0.00	0.00
50.40	0.00	0.00	55.70	0.00	0.00	61.00	0.00	0.00
50.50	0.00	0.00	55.80	0.00	0.00	61.10	0.00	0.00
50.60	0.00	0.00	55.90	0.00	0.00	61.20	0.00	0.00
50.70	0.00	0.00	56.00	0.00	0.00	61.30	0.00	0.00
50.80	0.00	0.00	56.10	0.00	0.00	61.40	0.00	0.00
50.90	0.00	0.00	56.20	0.00	0.00	61.50	0.00	0.00
51.00	0.00	0.00	56.30	0.00	0.00	61.60	0.00	0.00
51.10	0.00	0.00	56.40	0.00	0.00	61.70	0.00	0.00
51.20	0.00	0.00	56.50	0.00	0.00	61.80	0.00	0.00
51.30	0.00	0.00	56.60	0.00	0.00	61.90	0.00	0.00
51.40	0.00	0.00	56.70	0.00	0.00	62.00	0.00	0.00
51.50	0.00	0.00	56.80	0.00	0.00	62.10	0.00	0.00
51.60	0.00	0.00	56.90	0.00	0.00	62.20	0.00	0.00
51.70	0.00	0.00	57.00	0.00	0.00	62.30	0.00	0.00
51.80	0.00	0.00	57.10	0.00	0.00	62.40	0.00	0.00
51.90	0.00	0.00	57.20	0.00	0.00	62.50	0.00	0.00
52.00	0.00	0.00	57.30	0.00	0.00	62.60	0.00	0.00
52.10	0.00	0.00	57.40	0.00	0.00	62.70	0.00	0.00
52.20	0.00	0.00	57.50	0.00	0.00	62.80	0.00	0.00
52.30	0.00	0.00	57.60	0.00	0.00	62.90	0.00	0.00
52.40	0.00	0.00	57.70	0.00	0.00	63.00	0.00	0.00
52.50	0.00	0.00	57.80	0.00	0.00	63.10	0.00	0.00
52.60	0.00	0.00	57.90	0.00	0.00	63.20	0.00	0.00
52.70	0.00	0.00	58.00	0.00	0.00	63.30	0.00	0.00
52.80	0.00	0.00	58.10	0.00	0.00	63.40	0.00	0.00
52.90	0.00	0.00	58.20	0.00	0.00	63.50	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
63.60	0.00	0.00
63.70	0.00	0.00
63.80	0.00	0.00
63.90	0.00	0.00
64.00	0.00	0.00
64.10	0.00	0.00
64.20	0.00	0.00
64.30	0.00	0.00
64.40	0.00	0.00
64.50	0.00	0.00
64.60	0.00	0.00
64.70	0.00	0.00
64.80	0.00	0.00
64.90	0.00	0.00
65.00	0.00	0.00
65.10	0.00	0.00
65.20	0.00	0.00
65.30	0.00	0.00
65.40	0.00	0.00
65.50	0.00	0.00
65.60	0.00	0.00
65.70	0.00	0.00
65.80	0.00	0.00
65.90	0.00	0.00
66.00	0.00	0.00
66.10	0.00	0.00
66.20	0.00	0.00
66.30	0.00	0.00
66.40	0.00	0.00
66.50	0.00	0.00
66.60	0.00	0.00
66.70	0.00	0.00
66.80	0.00	0.00
66.90	0.00	0.00
67.00	0.00	0.00
67.10	0.00	0.00
67.20	0.00	0.00
67.30	0.00	0.00
67.40	0.00	0.00
67.50	0.00	0.00
67.60	0.00	0.00
67.70	0.00	0.00
67.80	0.00	0.00
67.90	0.00	0.00
68.00	0.00	0.00
68.10	0.00	0.00
68.20	0.00	0.00
68.30	0.00	0.00
68.40	0.00	0.00
68.50	0.00	0.00
68.60	0.00	0.00
68.70	0.00	0.00
68.80	0.00	0.00
68.90	0.00	0.00
69.00	0.00	0.00
69.10	0.00	0.00
69.20	0.00	0.00
69.30	0.00	0.00
69.40	0.00	0.00
69.50	0.00	0.00
69.60	0.00	0.00
69.70	0.00	0.00
69.80	0.00	0.00
69.90	0.00	0.00
70.00	0.00	0.00
70.10	0.00	0.00
70.20	0.00	0.00
70.30	0.00	0.00
70.40	0.00	0.00
70.50	0.00	0.00
70.60	0.00	0.00
70.70	0.00	0.00
70.80	0.00	0.00
70.90	0.00	0.00
71.00	0.00	0.00
71.10	0.00	0.00
71.20	0.00	0.00
71.30	0.00	0.00
71.40	0.00	0.00
71.50	0.00	0.00
71.60	0.00	0.00
71.70	0.00	0.00
71.80	0.00	0.00
71.90	0.00	0.00
72.00	0.00	0.00

APPENDIX C-7
10 – YEAR STORM EVENT COMPARISON HYDROGRAPHS


Primary Comparison
83.40 cfs @ 12.13 hrs
80.93 cfs @ 12.13 hrs
Subcat E-1
Subcat P-1
Primary (cfs)
Time (hours)

Primary Comparison

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
0.00	0.00	0.00	5.30	1.08	0.93	10.60	4.63	4.26
0.10	0.00	0.00	5.40	1.09	0.93	10.70	5.10	4.71
0.20	0.00	0.00	5.50	1.10	0.95	10.80	5.59	5.17
0.30	0.00	0.00	5.60	1.11	0.96	10.90	6.08	5.63
0.40	0.00	0.00	5.70	1.13	0.97	11.00	6.57	6.10
0.50	0.00	0.00	5.80	1.14	0.98	11.10	7.31	6.81
0.60	0.00	0.00	5.90	1.15	0.99	11.20	8.17	7.62
0.70	0.00	0.00	6.00	1.16	1.00	11.30	9.04	8.46
0.80	0.01	0.01	6.10	1.19	1.02	11.40	9.93	9.32
0.90	0.05	0.05	6.20	1.23	1.05	11.50	10.83	10.19
1.00	0.10	0.09	6.30	1.26	1.08	11.60	13.70	12.94
1.10	0.15	0.13	6.40	1.30	1.11	11.70	15.61	14.79
1.20	0.19	0.16	6.50	1.33	1.14	11.80	19.96	18.98
1.30	0.23	0.20	6.60	1.36	1.17	11.90	27.73	26.49
1.40	0.27	0.23	6.70	1.40	1.20	12.00	45.68	43.90
1.50	0.30	0.26	6.80	1.43	1.23	12.10	**77.85**	**75.39**
1.60	0.34	0.29	6.90	1.47	1.26	12.20	**52.46**	**51.08**
1.70	0.37	0.32	7.00	1.51	1.29	12.30	28.22	27.57
1.80	0.40	0.35	7.10	1.54	1.32	12.40	19.66	19.25
1.90	0.44	0.37	7.20	1.58	1.35	12.50	16.74	16.41
2.00	0.46	0.40	7.30	1.61	1.39	12.60	13.61	13.35
2.10	0.49	0.42	7.40	1.65	1.42	12.70	11.64	11.42
2.20	0.52	0.45	7.50	1.68	1.46	12.80	10.65	10.46
2.30	0.55	0.47	7.60	1.72	1.49	12.90	9.73	9.56
2.40	0.57	0.49	7.70	1.76	1.53	13.00	8.83	8.68
2.50	0.60	0.51	7.80	1.80	1.57	13.10	7.91	7.78
2.60	0.62	0.53	7.90	1.84	1.61	13.20	7.25	7.14
2.70	0.64	0.55	8.00	1.88	1.65	13.30	6.72	6.61
2.80	0.66	0.57	8.10	1.92	1.69	13.40	6.20	6.11
2.90	0.69	0.59	8.20	1.96	1.73	13.50	5.68	5.59
3.00	0.71	0.60	8.30	2.00	1.76	13.60	5.16	5.08
3.10	0.73	0.62	8.40	2.05	1.81	13.70	4.88	4.80
3.20	0.75	0.64	8.50	2.08	1.84	13.80	4.73	4.66
3.30	0.77	0.66	8.60	2.12	1.88	13.90	4.58	4.52
3.40	0.78	0.67	8.70	2.17	1.93	14.00	4.44	4.38
3.50	0.80	0.69	8.80	2.21	1.97	14.10	4.30	4.24
3.60	0.82	0.70	8.90	2.25	2.00	14.20	4.16	4.10
3.70	0.84	0.72	9.00	2.29	2.05	14.30	4.02	3.96
3.80	0.85	0.73	9.10	2.39	2.14	14.40	3.87	3.82
3.90	0.87	0.75	9.20	2.51	2.25	14.50	3.73	3.68
4.00	0.89	0.76	9.30	2.65	2.37	14.60	3.59	3.54
4.10	0.90	0.78	9.40	2.78	2.49	14.70	3.44	3.40
4.20	0.92	0.79	9.50	2.91	2.62	14.80	3.31	3.26
4.30	0.93	0.80	9.60	3.04	2.74	14.90	3.16	3.12
4.40	0.95	0.82	9.70	3.17	2.86	15.00	3.02	2.98
4.50	0.96	0.83	9.80	3.31	3.00	15.10	2.87	2.84
4.60	0.98	0.84	9.90	3.44	3.12	15.20	2.79	2.76
4.70	0.99	0.85	10.00	3.58	3.25	15.30	2.75	2.72
4.80	1.01	0.87	10.10	3.72	3.39	15.40	2.71	2.68
4.90	1.02	0.88	10.20	3.85	3.52	15.50	2.67	2.64
5.00	1.04	0.89	10.30	3.99	3.65	15.60	2.63	2.60
5.10	1.05	0.90	10.40	4.13	3.79	15.70	2.59	2.56
5.20	1.06	0.91	10.50	4.27	3.92	15.80	2.55	2.52

Primary Comparison (continued)

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
15.90	2.51	2.48	21.20	1.30	1.28	26.50	0.00	0.00
16.00	2.47	2.44	21.30	1.28	1.27	26.60	0.00	0.00
16.10	2.43	2.41	21.40	1.28	1.27	26.70	0.00	0.00
16.20	2.39	2.36	21.50	1.26	1.25	26.80	0.00	0.00
16.30	2.35	2.32	21.60	1.25	1.24	26.90	0.00	0.00
16.40	2.31	2.28	21.70	1.24	1.23	27.00	0.00	0.00
16.50	2.27	2.24	21.80	1.23	1.22	27.10	0.00	0.00
16.60	2.23	2.20	21.90	1.23	1.21	27.20	0.00	0.00
16.70	2.19	2.16	22.00	1.22	1.21	27.30	0.00	0.00
16.80	2.15	2.12	22.10	1.20	1.19	27.40	0.00	0.00
16.90	2.11	2.08	22.20	1.20	1.18	27.50	0.00	0.00
17.00	2.07	2.04	22.30	1.18	1.17	27.60	0.00	0.00
17.10	2.03	2.00	22.40	1.17	1.16	27.70	0.00	0.00
17.20	1.98	1.96	22.50	1.16	1.15	27.80	0.00	0.00
17.30	1.94	1.92	22.60	1.15	1.14	27.90	0.00	0.00
17.40	1.90	1.88	22.70	1.14	1.13	28.00	0.00	0.00
17.50	1.86	1.84	22.80	1.13	1.12	28.10	0.00	0.00
17.60	1.82	1.80	22.90	1.12	1.12	28.20	0.00	0.00
17.70	1.78	1.76	23.00	1.11	1.10	28.30	0.00	0.00
17.80	1.74	1.73	23.10	1.10	1.09	28.40	0.00	0.00
17.90	1.70	1.68	23.20	1.09	1.08	28.50	0.00	0.00
18.00	1.66	1.65	23.30	1.08	1.07	28.60	0.00	0.00
18.10	1.62	1.60	23.40	1.07	1.06	28.70	0.00	0.00
18.20	1.60	1.58	23.50	1.06	1.05	28.80	0.00	0.00
18.30	1.59	1.57	23.60	1.05	1.04	28.90	0.00	0.00
18.40	1.58	1.56	23.70	1.04	1.03	29.00	0.00	0.00
18.50	1.56	1.55	23.80	1.03	1.02	29.10	0.00	0.00
18.60	1.56	1.54	23.90	1.02	1.01	29.20	0.00	0.00
18.70	1.55	1.53	24.00	1.02	1.01	29.30	0.00	0.00
18.80	1.54	1.52	24.10	0.36	0.35	29.40	0.00	0.00
18.90	1.53	1.51	24.20	0.03	0.03	29.50	0.00	0.00
19.00	1.52	1.50	24.30	0.00	0.00	29.60	0.00	0.00
19.10	1.51	1.49	24.40	0.00	0.00	29.70	0.00	0.00
19.20	1.50	1.48	24.50	0.00	0.00	29.80	0.00	0.00
19.30	1.49	1.47	24.60	0.00	0.00	29.90	0.00	0.00
19.40	1.47	1.46	24.70	0.00	0.00	30.00	0.00	0.00
19.50	1.47	1.45	24.80	0.00	0.00	30.10	0.00	0.00
19.60	1.46	1.44	24.90	0.00	0.00	30.20	0.00	0.00
19.70	1.45	1.44	25.00	0.00	0.00	30.30	0.00	0.00
19.80	1.44	1.42	25.10	0.00	0.00	30.40	0.00	0.00
19.90	1.43	1.41	25.20	0.00	0.00	30.50	0.00	0.00
20.00	1.42	1.40	25.30	0.00	0.00	30.60	0.00	0.00
20.10	1.41	1.39	25.40	0.00	0.00	30.70	0.00	0.00
20.20	1.40	1.38	25.50	0.00	0.00	30.80	0.00	0.00
20.30	1.38	1.37	25.60	0.00	0.00	30.90	0.00	0.00
20.40	1.38	1.36	25.70	0.00	0.00	31.00	0.00	0.00
20.50	1.36	1.35	25.80	0.00	0.00	31.10	0.00	0.00
20.60	1.36	1.35	25.90	0.00	0.00	31.20	0.00	0.00
20.70	1.35	1.33	26.00	0.00	0.00	31.30	0.00	0.00
20.80	1.33	1.32	26.10	0.00	0.00	31.40	0.00	0.00
20.90	1.33	1.31	26.20	0.00	0.00	31.50	0.00	0.00
21.00	1.32	1.30	26.30	0.00	0.00	31.60	0.00	0.00
21.10	1.30	1.29	26.40	0.00	0.00	31.70	0.00	0.00

Primary Comparison (continued)

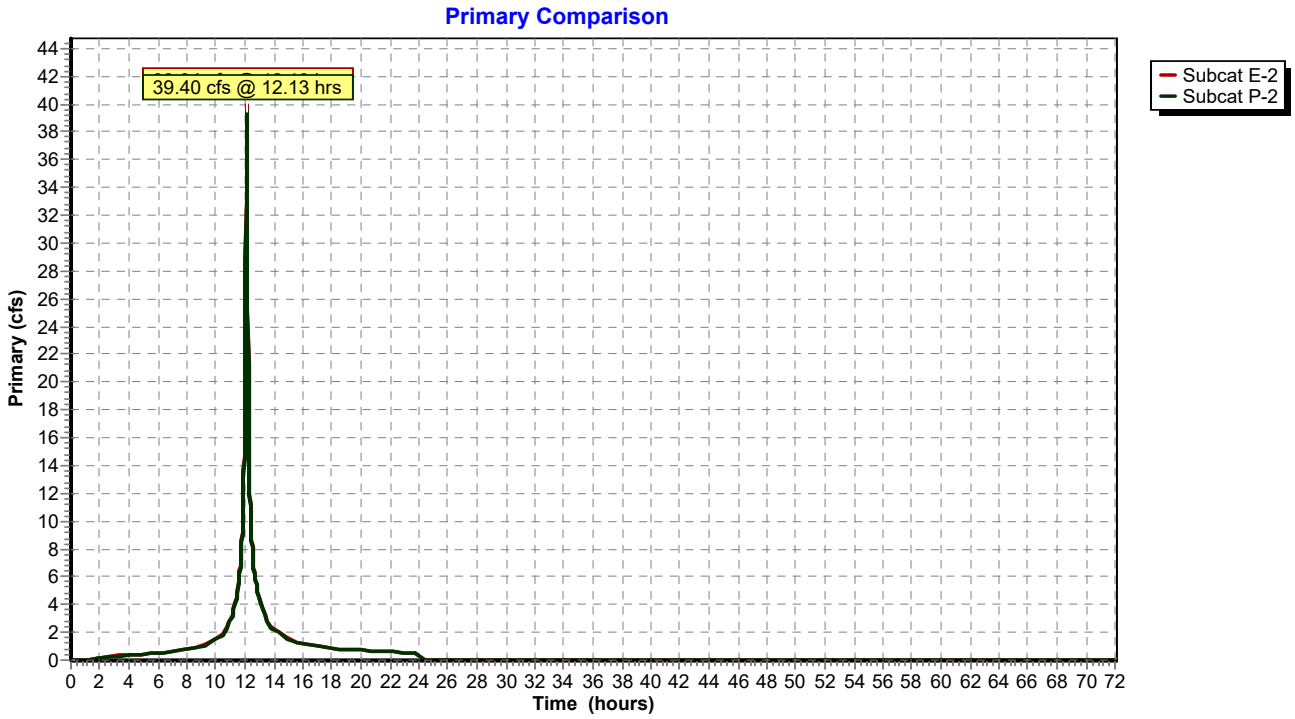
Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
31.80	0.00	0.00	37.10	0.00	0.00	42.40	0.00	0.00
31.90	0.00	0.00	37.20	0.00	0.00	42.50	0.00	0.00
32.00	0.00	0.00	37.30	0.00	0.00	42.60	0.00	0.00
32.10	0.00	0.00	37.40	0.00	0.00	42.70	0.00	0.00
32.20	0.00	0.00	37.50	0.00	0.00	42.80	0.00	0.00
32.30	0.00	0.00	37.60	0.00	0.00	42.90	0.00	0.00
32.40	0.00	0.00	37.70	0.00	0.00	43.00	0.00	0.00
32.50	0.00	0.00	37.80	0.00	0.00	43.10	0.00	0.00
32.60	0.00	0.00	37.90	0.00	0.00	43.20	0.00	0.00
32.70	0.00	0.00	38.00	0.00	0.00	43.30	0.00	0.00
32.80	0.00	0.00	38.10	0.00	0.00	43.40	0.00	0.00
32.90	0.00	0.00	38.20	0.00	0.00	43.50	0.00	0.00
33.00	0.00	0.00	38.30	0.00	0.00	43.60	0.00	0.00
33.10	0.00	0.00	38.40	0.00	0.00	43.70	0.00	0.00
33.20	0.00	0.00	38.50	0.00	0.00	43.80	0.00	0.00
33.30	0.00	0.00	38.60	0.00	0.00	43.90	0.00	0.00
33.40	0.00	0.00	38.70	0.00	0.00	44.00	0.00	0.00
33.50	0.00	0.00	38.80	0.00	0.00	44.10	0.00	0.00
33.60	0.00	0.00	38.90	0.00	0.00	44.20	0.00	0.00
33.70	0.00	0.00	39.00	0.00	0.00	44.30	0.00	0.00
33.80	0.00	0.00	39.10	0.00	0.00	44.40	0.00	0.00
33.90	0.00	0.00	39.20	0.00	0.00	44.50	0.00	0.00
34.00	0.00	0.00	39.30	0.00	0.00	44.60	0.00	0.00
34.10	0.00	0.00	39.40	0.00	0.00	44.70	0.00	0.00
34.20	0.00	0.00	39.50	0.00	0.00	44.80	0.00	0.00
34.30	0.00	0.00	39.60	0.00	0.00	44.90	0.00	0.00
34.40	0.00	0.00	39.70	0.00	0.00	45.00	0.00	0.00
34.50	0.00	0.00	39.80	0.00	0.00	45.10	0.00	0.00
34.60	0.00	0.00	39.90	0.00	0.00	45.20	0.00	0.00
34.70	0.00	0.00	40.00	0.00	0.00	45.30	0.00	0.00
34.80	0.00	0.00	40.10	0.00	0.00	45.40	0.00	0.00
34.90	0.00	0.00	40.20	0.00	0.00	45.50	0.00	0.00
35.00	0.00	0.00	40.30	0.00	0.00	45.60	0.00	0.00
35.10	0.00	0.00	40.40	0.00	0.00	45.70	0.00	0.00
35.20	0.00	0.00	40.50	0.00	0.00	45.80	0.00	0.00
35.30	0.00	0.00	40.60	0.00	0.00	45.90	0.00	0.00
35.40	0.00	0.00	40.70	0.00	0.00	46.00	0.00	0.00
35.50	0.00	0.00	40.80	0.00	0.00	46.10	0.00	0.00
35.60	0.00	0.00	40.90	0.00	0.00	46.20	0.00	0.00
35.70	0.00	0.00	41.00	0.00	0.00	46.30	0.00	0.00
35.80	0.00	0.00	41.10	0.00	0.00	46.40	0.00	0.00
35.90	0.00	0.00	41.20	0.00	0.00	46.50	0.00	0.00
36.00	0.00	0.00	41.30	0.00	0.00	46.60	0.00	0.00
36.10	0.00	0.00	41.40	0.00	0.00	46.70	0.00	0.00
36.20	0.00	0.00	41.50	0.00	0.00	46.80	0.00	0.00
36.30	0.00	0.00	41.60	0.00	0.00	46.90	0.00	0.00
36.40	0.00	0.00	41.70	0.00	0.00	47.00	0.00	0.00
36.50	0.00	0.00	41.80	0.00	0.00	47.10	0.00	0.00
36.60	0.00	0.00	41.90	0.00	0.00	47.20	0.00	0.00
36.70	0.00	0.00	42.00	0.00	0.00	47.30	0.00	0.00
36.80	0.00	0.00	42.10	0.00	0.00	47.40	0.00	0.00
36.90	0.00	0.00	42.20	0.00	0.00	47.50	0.00	0.00
37.00	0.00	0.00	42.30	0.00	0.00	47.60	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
47.70	0.00	0.00	53.00	0.00	0.00	58.30	0.00	0.00
47.80	0.00	0.00	53.10	0.00	0.00	58.40	0.00	0.00
47.90	0.00	0.00	53.20	0.00	0.00	58.50	0.00	0.00
48.00	0.00	0.00	53.30	0.00	0.00	58.60	0.00	0.00
48.10	0.00	0.00	53.40	0.00	0.00	58.70	0.00	0.00
48.20	0.00	0.00	53.50	0.00	0.00	58.80	0.00	0.00
48.30	0.00	0.00	53.60	0.00	0.00	58.90	0.00	0.00
48.40	0.00	0.00	53.70	0.00	0.00	59.00	0.00	0.00
48.50	0.00	0.00	53.80	0.00	0.00	59.10	0.00	0.00
48.60	0.00	0.00	53.90	0.00	0.00	59.20	0.00	0.00
48.70	0.00	0.00	54.00	0.00	0.00	59.30	0.00	0.00
48.80	0.00	0.00	54.10	0.00	0.00	59.40	0.00	0.00
48.90	0.00	0.00	54.20	0.00	0.00	59.50	0.00	0.00
49.00	0.00	0.00	54.30	0.00	0.00	59.60	0.00	0.00
49.10	0.00	0.00	54.40	0.00	0.00	59.70	0.00	0.00
49.20	0.00	0.00	54.50	0.00	0.00	59.80	0.00	0.00
49.30	0.00	0.00	54.60	0.00	0.00	59.90	0.00	0.00
49.40	0.00	0.00	54.70	0.00	0.00	60.00	0.00	0.00
49.50	0.00	0.00	54.80	0.00	0.00	60.10	0.00	0.00
49.60	0.00	0.00	54.90	0.00	0.00	60.20	0.00	0.00
49.70	0.00	0.00	55.00	0.00	0.00	60.30	0.00	0.00
49.80	0.00	0.00	55.10	0.00	0.00	60.40	0.00	0.00
49.90	0.00	0.00	55.20	0.00	0.00	60.50	0.00	0.00
50.00	0.00	0.00	55.30	0.00	0.00	60.60	0.00	0.00
50.10	0.00	0.00	55.40	0.00	0.00	60.70	0.00	0.00
50.20	0.00	0.00	55.50	0.00	0.00	60.80	0.00	0.00
50.30	0.00	0.00	55.60	0.00	0.00	60.90	0.00	0.00
50.40	0.00	0.00	55.70	0.00	0.00	61.00	0.00	0.00
50.50	0.00	0.00	55.80	0.00	0.00	61.10	0.00	0.00
50.60	0.00	0.00	55.90	0.00	0.00	61.20	0.00	0.00
50.70	0.00	0.00	56.00	0.00	0.00	61.30	0.00	0.00
50.80	0.00	0.00	56.10	0.00	0.00	61.40	0.00	0.00
50.90	0.00	0.00	56.20	0.00	0.00	61.50	0.00	0.00
51.00	0.00	0.00	56.30	0.00	0.00	61.60	0.00	0.00
51.10	0.00	0.00	56.40	0.00	0.00	61.70	0.00	0.00
51.20	0.00	0.00	56.50	0.00	0.00	61.80	0.00	0.00
51.30	0.00	0.00	56.60	0.00	0.00	61.90	0.00	0.00
51.40	0.00	0.00	56.70	0.00	0.00	62.00	0.00	0.00
51.50	0.00	0.00	56.80	0.00	0.00	62.10	0.00	0.00
51.60	0.00	0.00	56.90	0.00	0.00	62.20	0.00	0.00
51.70	0.00	0.00	57.00	0.00	0.00	62.30	0.00	0.00
51.80	0.00	0.00	57.10	0.00	0.00	62.40	0.00	0.00
51.90	0.00	0.00	57.20	0.00	0.00	62.50	0.00	0.00
52.00	0.00	0.00	57.30	0.00	0.00	62.60	0.00	0.00
52.10	0.00	0.00	57.40	0.00	0.00	62.70	0.00	0.00
52.20	0.00	0.00	57.50	0.00	0.00	62.80	0.00	0.00
52.30	0.00	0.00	57.60	0.00	0.00	62.90	0.00	0.00
52.40	0.00	0.00	57.70	0.00	0.00	63.00	0.00	0.00
52.50	0.00	0.00	57.80	0.00	0.00	63.10	0.00	0.00
52.60	0.00	0.00	57.90	0.00	0.00	63.20	0.00	0.00
52.70	0.00	0.00	58.00	0.00	0.00	63.30	0.00	0.00
52.80	0.00	0.00	58.10	0.00	0.00	63.40	0.00	0.00
52.90	0.00	0.00	58.20	0.00	0.00	63.50	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
63.60	0.00	0.00
63.70	0.00	0.00
63.80	0.00	0.00
63.90	0.00	0.00
64.00	0.00	0.00
64.10	0.00	0.00
64.20	0.00	0.00
64.30	0.00	0.00
64.40	0.00	0.00
64.50	0.00	0.00
64.60	0.00	0.00
64.70	0.00	0.00
64.80	0.00	0.00
64.90	0.00	0.00
65.00	0.00	0.00
65.10	0.00	0.00
65.20	0.00	0.00
65.30	0.00	0.00
65.40	0.00	0.00
65.50	0.00	0.00
65.60	0.00	0.00
65.70	0.00	0.00
65.80	0.00	0.00
65.90	0.00	0.00
66.00	0.00	0.00
66.10	0.00	0.00
66.20	0.00	0.00
66.30	0.00	0.00
66.40	0.00	0.00
66.50	0.00	0.00
66.60	0.00	0.00
66.70	0.00	0.00
66.80	0.00	0.00
66.90	0.00	0.00
67.00	0.00	0.00
67.10	0.00	0.00
67.20	0.00	0.00
67.30	0.00	0.00
67.40	0.00	0.00
67.50	0.00	0.00
67.60	0.00	0.00
67.70	0.00	0.00
67.80	0.00	0.00
67.90	0.00	0.00
68.00	0.00	0.00
68.10	0.00	0.00
68.20	0.00	0.00
68.30	0.00	0.00
68.40	0.00	0.00
68.50	0.00	0.00
68.60	0.00	0.00
68.70	0.00	0.00
68.80	0.00	0.00
68.90	0.00	0.00
69.00	0.00	0.00
69.10	0.00	0.00
69.20	0.00	0.00
69.30	0.00	0.00
69.40	0.00	0.00
69.50	0.00	0.00
69.60	0.00	0.00
69.70	0.00	0.00
69.80	0.00	0.00
69.90	0.00	0.00
70.00	0.00	0.00
70.10	0.00	0.00
70.20	0.00	0.00
70.30	0.00	0.00
70.40	0.00	0.00
70.50	0.00	0.00
70.60	0.00	0.00
70.70	0.00	0.00
70.80	0.00	0.00
70.90	0.00	0.00
71.00	0.00	0.00
71.10	0.00	0.00
71.20	0.00	0.00
71.30	0.00	0.00
71.40	0.00	0.00
71.50	0.00	0.00
71.60	0.00	0.00
71.70	0.00	0.00
71.80	0.00	0.00
71.90	0.00	0.00
72.00	0.00	0.00


Primary Comparison
39.40 cfs @ 12.13 hrs
Subcat E-2
Subcat P-2
Primary (cfs)
Time (hours)

Primary Comparison

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
0.00	0.00	0.00	5.30	0.44	0.43	10.60	2.02	1.96
0.10	0.00	0.00	5.40	0.45	0.43	10.70	2.23	2.17
0.20	0.00	0.00	5.50	0.45	0.44	10.80	2.46	2.39
0.30	0.00	0.00	5.60	0.46	0.44	10.90	2.68	2.61
0.40	0.00	0.00	5.70	0.46	0.45	11.00	2.91	2.83
0.50	0.00	0.00	5.80	0.47	0.45	11.10	3.25	3.16
0.60	0.00	0.00	5.90	0.47	0.46	11.20	3.65	3.55
0.70	0.00	0.00	6.00	0.48	0.46	11.30	4.06	3.96
0.80	0.00	0.00	6.10	0.49	0.48	11.40	4.48	4.37
0.90	0.02	0.02	6.20	0.50	0.49	11.50	4.91	4.79
1.00	0.04	0.04	6.30	0.52	0.50	11.60	6.24	6.10
1.10	0.06	0.06	6.40	0.53	0.52	11.70	7.15	7.00
1.20	0.08	0.08	6.50	0.54	0.53	11.80	9.21	9.02
1.30	0.09	0.09	6.60	0.56	0.54	11.90	12.90	12.65
1.40	0.11	0.11	6.70	0.57	0.56	12.00	21.48	21.11
1.50	0.12	0.12	6.80	0.59	0.57	12.10	**37.13**	**36.60**
1.60	0.14	0.14	6.90	0.60	0.59	12.20	**25.29**	**24.98**
1.70	0.15	0.15	7.00	0.62	0.60	12.30	13.70	13.55
1.80	0.17	0.16	7.10	0.63	0.61	12.40	9.58	9.48
1.90	0.18	0.17	7.20	0.65	0.63	12.50	8.18	8.10
2.00	0.19	0.18	7.30	0.66	0.64	12.60	6.66	6.60
2.10	0.20	0.20	7.40	0.68	0.66	12.70	5.70	5.65
2.20	0.21	0.21	7.50	0.69	0.67	12.80	5.22	5.18
2.30	0.22	0.22	7.60	0.70	0.68	12.90	4.78	4.74
2.40	0.23	0.23	7.70	0.72	0.70	13.00	4.34	4.30
2.50	0.24	0.24	7.80	0.73	0.71	13.10	3.89	3.86
2.60	0.25	0.25	7.90	0.75	0.73	13.20	3.57	3.54
2.70	0.26	0.26	8.00	0.76	0.74	13.30	3.31	3.29
2.80	0.27	0.26	8.10	0.78	0.76	13.40	3.06	3.03
2.90	0.28	0.27	8.20	0.80	0.77	13.50	2.80	2.78
3.00	0.29	0.28	8.30	0.81	0.78	13.60	2.55	2.53
3.10	0.30	0.29	8.40	0.84	0.80	13.70	2.41	2.39
3.20	0.31	0.30	8.50	0.85	0.82	13.80	2.34	2.32
3.30	0.31	0.31	8.60	0.87	0.84	13.90	2.26	2.25
3.40	0.32	0.31	8.70	0.89	0.86	14.00	2.20	2.18
3.50	0.33	0.32	8.80	0.91	0.88	14.10	2.13	2.11
3.60	0.34	0.33	8.90	0.93	0.90	14.20	2.06	2.04
3.70	0.34	0.33	9.00	0.95	0.92	14.30	1.99	1.97
3.80	0.35	0.34	9.10	1.00	0.96	14.40	1.92	1.90
3.90	0.36	0.35	9.20	1.05	1.01	14.50	1.85	1.83
4.00	0.36	0.35	9.30	1.11	1.07	14.60	1.78	1.77
4.10	0.37	0.36	9.40	1.17	1.13	14.70	1.71	1.69
4.20	0.38	0.37	9.50	1.22	1.18	14.80	1.64	1.63
4.30	0.38	0.37	9.60	1.28	1.24	14.90	1.56	1.55
4.40	0.39	0.38	9.70	1.34	1.30	15.00	1.50	1.49
4.50	0.40	0.38	9.80	1.41	1.36	15.10	1.42	1.42
4.60	0.40	0.39	9.90	1.47	1.42	15.20	1.39	1.38
4.70	0.41	0.40	10.00	1.53	1.48	15.30	1.36	1.36
4.80	0.41	0.40	10.10	1.59	1.54	15.40	1.35	1.34
4.90	0.42	0.41	10.20	1.66	1.61	15.50	1.33	1.32
5.00	0.42	0.41	10.30	1.73	1.67	15.60	1.30	1.30
5.10	0.43	0.42	10.40	1.79	1.74	15.70	1.29	1.28
5.20	0.43	0.42	10.50	1.86	1.80	15.80	1.27	1.26

Primary Comparison (continued)

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
15.90	1.25	1.24	21.20	0.65	0.64	26.50	0.00	0.00
16.00	1.23	1.22	21.30	0.64	0.64	26.60	0.00	0.00
16.10	1.21	1.20	21.40	0.64	0.64	26.70	0.00	0.00
16.20	1.19	1.18	21.50	0.63	0.63	26.80	0.00	0.00
16.30	1.17	1.16	21.60	0.63	0.62	26.90	0.00	0.00
16.40	1.15	1.14	21.70	0.62	0.62	27.00	0.00	0.00
16.50	1.13	1.12	21.80	0.62	0.61	27.10	0.00	0.00
16.60	1.11	1.10	21.90	0.61	0.61	27.20	0.00	0.00
16.70	1.09	1.08	22.00	0.61	0.61	27.30	0.00	0.00
16.80	1.07	1.06	22.10	0.60	0.60	27.40	0.00	0.00
16.90	1.05	1.04	22.20	0.60	0.59	27.50	0.00	0.00
17.00	1.03	1.02	22.30	0.59	0.59	27.60	0.00	0.00
17.10	1.01	1.00	22.40	0.59	0.58	27.70	0.00	0.00
17.20	0.99	0.98	22.50	0.58	0.58	27.80	0.00	0.00
17.30	0.97	0.96	22.60	0.58	0.57	27.90	0.00	0.00
17.40	0.95	0.94	22.70	0.57	0.57	28.00	0.00	0.00
17.50	0.93	0.92	22.80	0.57	0.56	28.10	0.00	0.00
17.60	0.91	0.90	22.90	0.56	0.56	28.20	0.00	0.00
17.70	0.89	0.88	23.00	0.56	0.55	28.30	0.00	0.00
17.80	0.87	0.86	23.10	0.55	0.55	28.40	0.00	0.00
17.90	0.85	0.84	23.20	0.55	0.54	28.50	0.00	0.00
18.00	0.83	0.82	23.30	0.54	0.54	28.60	0.00	0.00
18.10	0.81	0.80	23.40	0.54	0.53	28.70	0.00	0.00
18.20	0.80	0.79	23.50	0.53	0.53	28.80	0.00	0.00
18.30	0.79	0.79	23.60	0.53	0.52	28.90	0.00	0.00
18.40	0.79	0.78	23.70	0.52	0.52	29.00	0.00	0.00
18.50	0.78	0.78	23.80	0.51	0.51	29.10	0.00	0.00
18.60	0.78	0.77	23.90	0.51	0.51	29.20	0.00	0.00
18.70	0.77	0.77	24.00	0.51	0.51	29.30	0.00	0.00
18.80	0.77	0.76	24.10	0.18	0.18	29.40	0.00	0.00
18.90	0.76	0.76	24.20	0.01	0.01	29.50	0.00	0.00
19.00	0.76	0.75	24.30	0.00	0.00	29.60	0.00	0.00
19.10	0.75	0.75	24.40	0.00	0.00	29.70	0.00	0.00
19.20	0.75	0.74	24.50	0.00	0.00	29.80	0.00	0.00
19.30	0.74	0.74	24.60	0.00	0.00	29.90	0.00	0.00
19.40	0.74	0.73	24.70	0.00	0.00	30.00	0.00	0.00
19.50	0.73	0.73	24.80	0.00	0.00	30.10	0.00	0.00
19.60	0.73	0.72	24.90	0.00	0.00	30.20	0.00	0.00
19.70	0.72	0.72	25.00	0.00	0.00	30.30	0.00	0.00
19.80	0.72	0.71	25.10	0.00	0.00	30.40	0.00	0.00
19.90	0.71	0.71	25.20	0.00	0.00	30.50	0.00	0.00
20.00	0.71	0.70	25.30	0.00	0.00	30.60	0.00	0.00
20.10	0.70	0.70	25.40	0.00	0.00	30.70	0.00	0.00
20.20	0.70	0.69	25.50	0.00	0.00	30.80	0.00	0.00
20.30	0.69	0.69	25.60	0.00	0.00	30.90	0.00	0.00
20.40	0.69	0.68	25.70	0.00	0.00	31.00	0.00	0.00
20.50	0.68	0.68	25.80	0.00	0.00	31.10	0.00	0.00
20.60	0.68	0.68	25.90	0.00	0.00	31.20	0.00	0.00
20.70	0.67	0.67	26.00	0.00	0.00	31.30	0.00	0.00
20.80	0.67	0.66	26.10	0.00	0.00	31.40	0.00	0.00
20.90	0.66	0.66	26.20	0.00	0.00	31.50	0.00	0.00
21.00	0.66	0.65	26.30	0.00	0.00	31.60	0.00	0.00
21.10	0.65	0.65	26.40	0.00	0.00	31.70	0.00	0.00

Primary Comparison (continued)

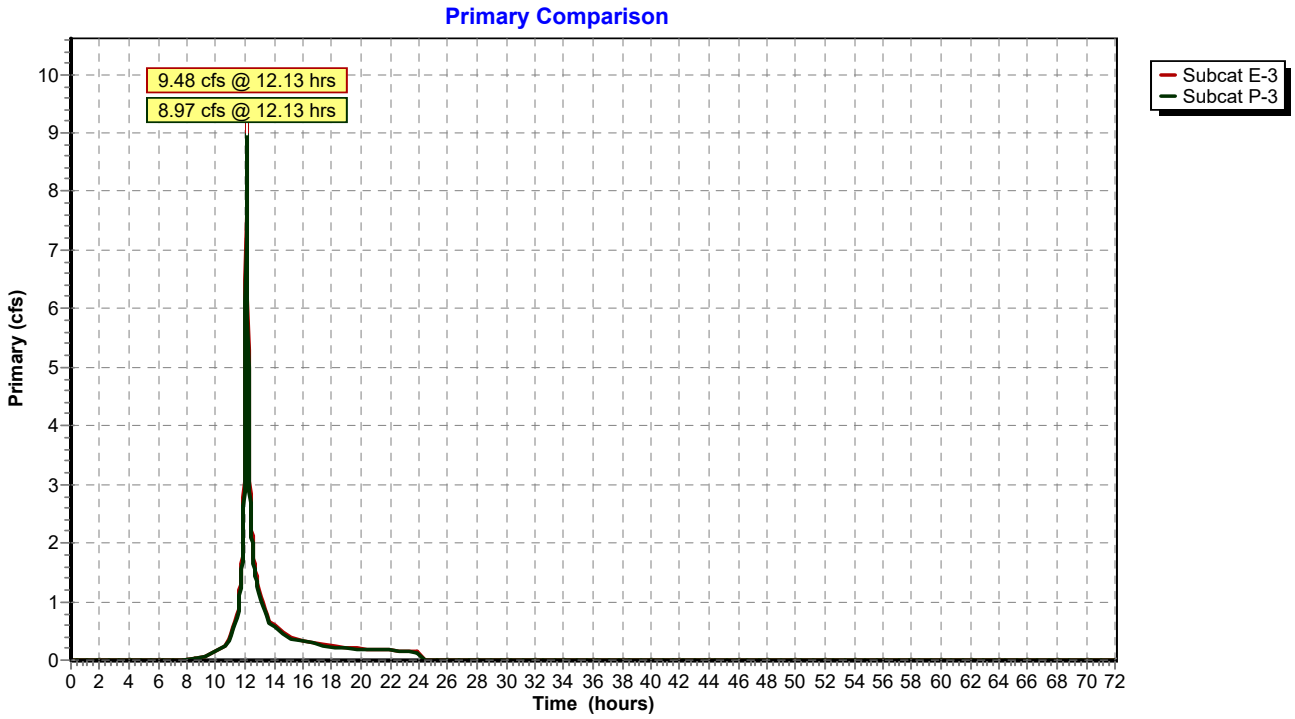
Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
31.80	0.00	0.00	37.10	0.00	0.00	42.40	0.00	0.00
31.90	0.00	0.00	37.20	0.00	0.00	42.50	0.00	0.00
32.00	0.00	0.00	37.30	0.00	0.00	42.60	0.00	0.00
32.10	0.00	0.00	37.40	0.00	0.00	42.70	0.00	0.00
32.20	0.00	0.00	37.50	0.00	0.00	42.80	0.00	0.00
32.30	0.00	0.00	37.60	0.00	0.00	42.90	0.00	0.00
32.40	0.00	0.00	37.70	0.00	0.00	43.00	0.00	0.00
32.50	0.00	0.00	37.80	0.00	0.00	43.10	0.00	0.00
32.60	0.00	0.00	37.90	0.00	0.00	43.20	0.00	0.00
32.70	0.00	0.00	38.00	0.00	0.00	43.30	0.00	0.00
32.80	0.00	0.00	38.10	0.00	0.00	43.40	0.00	0.00
32.90	0.00	0.00	38.20	0.00	0.00	43.50	0.00	0.00
33.00	0.00	0.00	38.30	0.00	0.00	43.60	0.00	0.00
33.10	0.00	0.00	38.40	0.00	0.00	43.70	0.00	0.00
33.20	0.00	0.00	38.50	0.00	0.00	43.80	0.00	0.00
33.30	0.00	0.00	38.60	0.00	0.00	43.90	0.00	0.00
33.40	0.00	0.00	38.70	0.00	0.00	44.00	0.00	0.00
33.50	0.00	0.00	38.80	0.00	0.00	44.10	0.00	0.00
33.60	0.00	0.00	38.90	0.00	0.00	44.20	0.00	0.00
33.70	0.00	0.00	39.00	0.00	0.00	44.30	0.00	0.00
33.80	0.00	0.00	39.10	0.00	0.00	44.40	0.00	0.00
33.90	0.00	0.00	39.20	0.00	0.00	44.50	0.00	0.00
34.00	0.00	0.00	39.30	0.00	0.00	44.60	0.00	0.00
34.10	0.00	0.00	39.40	0.00	0.00	44.70	0.00	0.00
34.20	0.00	0.00	39.50	0.00	0.00	44.80	0.00	0.00
34.30	0.00	0.00	39.60	0.00	0.00	44.90	0.00	0.00
34.40	0.00	0.00	39.70	0.00	0.00	45.00	0.00	0.00
34.50	0.00	0.00	39.80	0.00	0.00	45.10	0.00	0.00
34.60	0.00	0.00	39.90	0.00	0.00	45.20	0.00	0.00
34.70	0.00	0.00	40.00	0.00	0.00	45.30	0.00	0.00
34.80	0.00	0.00	40.10	0.00	0.00	45.40	0.00	0.00
34.90	0.00	0.00	40.20	0.00	0.00	45.50	0.00	0.00
35.00	0.00	0.00	40.30	0.00	0.00	45.60	0.00	0.00
35.10	0.00	0.00	40.40	0.00	0.00	45.70	0.00	0.00
35.20	0.00	0.00	40.50	0.00	0.00	45.80	0.00	0.00
35.30	0.00	0.00	40.60	0.00	0.00	45.90	0.00	0.00
35.40	0.00	0.00	40.70	0.00	0.00	46.00	0.00	0.00
35.50	0.00	0.00	40.80	0.00	0.00	46.10	0.00	0.00
35.60	0.00	0.00	40.90	0.00	0.00	46.20	0.00	0.00
35.70	0.00	0.00	41.00	0.00	0.00	46.30	0.00	0.00
35.80	0.00	0.00	41.10	0.00	0.00	46.40	0.00	0.00
35.90	0.00	0.00	41.20	0.00	0.00	46.50	0.00	0.00
36.00	0.00	0.00	41.30	0.00	0.00	46.60	0.00	0.00
36.10	0.00	0.00	41.40	0.00	0.00	46.70	0.00	0.00
36.20	0.00	0.00	41.50	0.00	0.00	46.80	0.00	0.00
36.30	0.00	0.00	41.60	0.00	0.00	46.90	0.00	0.00
36.40	0.00	0.00	41.70	0.00	0.00	47.00	0.00	0.00
36.50	0.00	0.00	41.80	0.00	0.00	47.10	0.00	0.00
36.60	0.00	0.00	41.90	0.00	0.00	47.20	0.00	0.00
36.70	0.00	0.00	42.00	0.00	0.00	47.30	0.00	0.00
36.80	0.00	0.00	42.10	0.00	0.00	47.40	0.00	0.00
36.90	0.00	0.00	42.20	0.00	0.00	47.50	0.00	0.00
37.00	0.00	0.00	42.30	0.00	0.00	47.60	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
47.70	0.00	0.00	53.00	0.00	0.00	58.30	0.00	0.00
47.80	0.00	0.00	53.10	0.00	0.00	58.40	0.00	0.00
47.90	0.00	0.00	53.20	0.00	0.00	58.50	0.00	0.00
48.00	0.00	0.00	53.30	0.00	0.00	58.60	0.00	0.00
48.10	0.00	0.00	53.40	0.00	0.00	58.70	0.00	0.00
48.20	0.00	0.00	53.50	0.00	0.00	58.80	0.00	0.00
48.30	0.00	0.00	53.60	0.00	0.00	58.90	0.00	0.00
48.40	0.00	0.00	53.70	0.00	0.00	59.00	0.00	0.00
48.50	0.00	0.00	53.80	0.00	0.00	59.10	0.00	0.00
48.60	0.00	0.00	53.90	0.00	0.00	59.20	0.00	0.00
48.70	0.00	0.00	54.00	0.00	0.00	59.30	0.00	0.00
48.80	0.00	0.00	54.10	0.00	0.00	59.40	0.00	0.00
48.90	0.00	0.00	54.20	0.00	0.00	59.50	0.00	0.00
49.00	0.00	0.00	54.30	0.00	0.00	59.60	0.00	0.00
49.10	0.00	0.00	54.40	0.00	0.00	59.70	0.00	0.00
49.20	0.00	0.00	54.50	0.00	0.00	59.80	0.00	0.00
49.30	0.00	0.00	54.60	0.00	0.00	59.90	0.00	0.00
49.40	0.00	0.00	54.70	0.00	0.00	60.00	0.00	0.00
49.50	0.00	0.00	54.80	0.00	0.00	60.10	0.00	0.00
49.60	0.00	0.00	54.90	0.00	0.00	60.20	0.00	0.00
49.70	0.00	0.00	55.00	0.00	0.00	60.30	0.00	0.00
49.80	0.00	0.00	55.10	0.00	0.00	60.40	0.00	0.00
49.90	0.00	0.00	55.20	0.00	0.00	60.50	0.00	0.00
50.00	0.00	0.00	55.30	0.00	0.00	60.60	0.00	0.00
50.10	0.00	0.00	55.40	0.00	0.00	60.70	0.00	0.00
50.20	0.00	0.00	55.50	0.00	0.00	60.80	0.00	0.00
50.30	0.00	0.00	55.60	0.00	0.00	60.90	0.00	0.00
50.40	0.00	0.00	55.70	0.00	0.00	61.00	0.00	0.00
50.50	0.00	0.00	55.80	0.00	0.00	61.10	0.00	0.00
50.60	0.00	0.00	55.90	0.00	0.00	61.20	0.00	0.00
50.70	0.00	0.00	56.00	0.00	0.00	61.30	0.00	0.00
50.80	0.00	0.00	56.10	0.00	0.00	61.40	0.00	0.00
50.90	0.00	0.00	56.20	0.00	0.00	61.50	0.00	0.00
51.00	0.00	0.00	56.30	0.00	0.00	61.60	0.00	0.00
51.10	0.00	0.00	56.40	0.00	0.00	61.70	0.00	0.00
51.20	0.00	0.00	56.50	0.00	0.00	61.80	0.00	0.00
51.30	0.00	0.00	56.60	0.00	0.00	61.90	0.00	0.00
51.40	0.00	0.00	56.70	0.00	0.00	62.00	0.00	0.00
51.50	0.00	0.00	56.80	0.00	0.00	62.10	0.00	0.00
51.60	0.00	0.00	56.90	0.00	0.00	62.20	0.00	0.00
51.70	0.00	0.00	57.00	0.00	0.00	62.30	0.00	0.00
51.80	0.00	0.00	57.10	0.00	0.00	62.40	0.00	0.00
51.90	0.00	0.00	57.20	0.00	0.00	62.50	0.00	0.00
52.00	0.00	0.00	57.30	0.00	0.00	62.60	0.00	0.00
52.10	0.00	0.00	57.40	0.00	0.00	62.70	0.00	0.00
52.20	0.00	0.00	57.50	0.00	0.00	62.80	0.00	0.00
52.30	0.00	0.00	57.60	0.00	0.00	62.90	0.00	0.00
52.40	0.00	0.00	57.70	0.00	0.00	63.00	0.00	0.00
52.50	0.00	0.00	57.80	0.00	0.00	63.10	0.00	0.00
52.60	0.00	0.00	57.90	0.00	0.00	63.20	0.00	0.00
52.70	0.00	0.00	58.00	0.00	0.00	63.30	0.00	0.00
52.80	0.00	0.00	58.10	0.00	0.00	63.40	0.00	0.00
52.90	0.00	0.00	58.20	0.00	0.00	63.50	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
63.60	0.00	0.00
63.70	0.00	0.00
63.80	0.00	0.00
63.90	0.00	0.00
64.00	0.00	0.00
64.10	0.00	0.00
64.20	0.00	0.00
64.30	0.00	0.00
64.40	0.00	0.00
64.50	0.00	0.00
64.60	0.00	0.00
64.70	0.00	0.00
64.80	0.00	0.00
64.90	0.00	0.00
65.00	0.00	0.00
65.10	0.00	0.00
65.20	0.00	0.00
65.30	0.00	0.00
65.40	0.00	0.00
65.50	0.00	0.00
65.60	0.00	0.00
65.70	0.00	0.00
65.80	0.00	0.00
65.90	0.00	0.00
66.00	0.00	0.00
66.10	0.00	0.00
66.20	0.00	0.00
66.30	0.00	0.00
66.40	0.00	0.00
66.50	0.00	0.00
66.60	0.00	0.00
66.70	0.00	0.00
66.80	0.00	0.00
66.90	0.00	0.00
67.00	0.00	0.00
67.10	0.00	0.00
67.20	0.00	0.00
67.30	0.00	0.00
67.40	0.00	0.00
67.50	0.00	0.00
67.60	0.00	0.00
67.70	0.00	0.00
67.80	0.00	0.00
67.90	0.00	0.00
68.00	0.00	0.00
68.10	0.00	0.00
68.20	0.00	0.00
68.30	0.00	0.00
68.40	0.00	0.00
68.50	0.00	0.00
68.60	0.00	0.00
68.70	0.00	0.00
68.80	0.00	0.00
68.90	0.00	0.00
69.00	0.00	0.00
69.10	0.00	0.00
69.20	0.00	0.00
69.30	0.00	0.00
69.40	0.00	0.00
69.50	0.00	0.00
69.60	0.00	0.00
69.70	0.00	0.00
69.80	0.00	0.00
69.90	0.00	0.00
70.00	0.00	0.00
70.10	0.00	0.00
70.20	0.00	0.00
70.30	0.00	0.00
70.40	0.00	0.00
70.50	0.00	0.00
70.60	0.00	0.00
70.70	0.00	0.00
70.80	0.00	0.00
70.90	0.00	0.00
71.00	0.00	0.00
71.10	0.00	0.00
71.20	0.00	0.00
71.30	0.00	0.00
71.40	0.00	0.00
71.50	0.00	0.00
71.60	0.00	0.00
71.70	0.00	0.00
71.80	0.00	0.00
71.90	0.00	0.00
72.00	0.00	0.00


Primary Comparison
9.48 cfs @ 12.13 hrs
8.97 cfs @ 12.13 hrs
Subcat E-3
Subcat P-3
Primary (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Primary Comparison

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
0.00	0.00	0.00	5.30	0.01	0.01	10.60	0.25	0.23
0.10	0.00	0.00	5.40	0.01	0.01	10.70	0.28	0.27
0.20	0.00	0.00	5.50	0.01	0.01	10.80	0.32	0.30
0.30	0.00	0.00	5.60	0.01	0.01	10.90	0.36	0.34
0.40	0.00	0.00	5.70	0.01	0.01	11.00	0.41	0.39
0.50	0.00	0.00	5.80	0.01	0.01	11.10	0.48	0.45
0.60	0.00	0.00	5.90	0.01	0.01	11.20	0.55	0.52
0.70	0.00	0.00	6.00	0.01	0.01	11.30	0.64	0.60
0.80	0.00	0.00	6.10	0.01	0.01	11.40	0.73	0.69
0.90	0.00	0.00	6.20	0.01	0.01	11.50	0.83	0.79
1.00	0.00	0.00	6.30	0.01	0.01	11.60	1.10	1.04
1.10	0.00	0.00	6.40	0.01	0.01	11.70	1.32	1.25
1.20	0.00	0.00	6.50	0.01	0.01	11.80	1.77	1.68
1.30	0.00	0.00	6.60	0.01	0.01	11.90	2.61	2.47
1.40	0.00	0.00	6.70	0.01	0.01	12.00	4.62	4.37
1.50	0.00	0.00	6.80	0.01	0.01	12.10	**8.61**	**8.14**
1.60	0.00	0.00	6.90	0.01	0.01	12.20	**6.17**	**5.84**
1.70	0.00	0.00	7.00	0.01	0.01	12.30	3.44	3.26
1.80	0.00	0.00	7.10	0.01	0.01	12.40	2.45	2.32
1.90	0.00	0.00	7.20	0.01	0.01	12.50	2.11	2.00
2.00	0.00	0.00	7.30	0.01	0.01	12.60	1.73	1.64
2.10	0.00	0.00	7.40	0.01	0.01	12.70	1.49	1.41
2.20	0.00	0.00	7.50	0.01	0.01	12.80	1.38	1.30
2.30	0.00	0.00	7.60	0.01	0.01	12.90	1.26	1.20
2.40	0.00	0.00	7.70	0.01	0.01	13.00	1.15	1.09
2.50	0.00	0.00	7.80	0.01	0.01	13.10	1.04	0.98
2.60	0.00	0.00	7.90	0.01	0.01	13.20	0.95	0.90
2.70	0.00	0.00	8.00	0.01	0.01	13.30	0.89	0.84
2.80	0.00	0.00	8.10	0.01	0.01	13.40	0.82	0.78
2.90	0.00	0.00	8.20	0.02	0.02	13.50	0.75	0.71
3.00	0.00	0.00	8.30	0.02	0.02	13.60	0.69	0.65
3.10	0.00	0.00	8.40	0.03	0.02	13.70	0.65	0.62
3.20	0.00	0.00	8.50	0.03	0.03	13.80	0.63	0.60
3.30	0.00	0.00	8.60	0.03	0.03	13.90	0.61	0.58
3.40	0.01	0.00	8.70	0.04	0.04	14.00	0.60	0.56
3.50	0.01	0.00	8.80	0.04	0.04	14.10	0.58	0.55
3.60	0.01	0.00	8.90	0.05	0.04	14.20	0.56	0.53
3.70	0.01	0.00	9.00	0.05	0.05	14.30	0.54	0.51
3.80	0.01	0.00	9.10	0.06	0.05	14.40	0.52	0.50
3.90	0.01	0.01	9.20	0.06	0.06	14.50	0.51	0.48
4.00	0.01	0.01	9.30	0.07	0.07	14.60	0.49	0.46
4.10	0.01	0.01	9.40	0.08	0.08	14.70	0.47	0.44
4.20	0.01	0.01	9.50	0.09	0.09	14.80	0.45	0.43
4.30	0.01	0.01	9.60	0.10	0.09	14.90	0.43	0.41
4.40	0.01	0.01	9.70	0.11	0.10	15.00	0.41	0.39
4.50	0.01	0.01	9.80	0.12	0.11	15.10	0.39	0.37
4.60	0.01	0.01	9.90	0.13	0.13	15.20	0.38	0.36
4.70	0.01	0.01	10.00	0.15	0.14	15.30	0.38	0.36
4.80	0.01	0.01	10.10	0.16	0.15	15.40	0.37	0.35
4.90	0.01	0.01	10.20	0.17	0.16	15.50	0.37	0.35
5.00	0.01	0.01	10.30	0.19	0.18	15.60	0.36	0.34
5.10	0.01	0.01	10.40	0.20	0.19	15.70	0.36	0.34
5.20	0.01	0.01	10.50	0.22	0.20	15.80	0.35	0.33

Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
15.90	0.34	0.33	21.20	0.18	0.17	26.50	0.00	0.00
16.00	0.34	0.32	21.30	0.18	0.17	26.60	0.00	0.00
16.10	0.34	0.32	21.40	0.18	0.17	26.70	0.00	0.00
16.20	0.33	0.31	21.50	0.18	0.17	26.80	0.00	0.00
16.30	0.32	0.31	21.60	0.18	0.17	26.90	0.00	0.00
16.40	0.32	0.30	21.70	0.18	0.17	27.00	0.00	0.00
16.50	0.31	0.30	21.80	0.18	0.17	27.10	0.00	0.00
16.60	0.31	0.29	21.90	0.17	0.16	27.20	0.00	0.00
16.70	0.30	0.29	22.00	0.17	0.16	27.30	0.00	0.00
16.80	0.30	0.28	22.10	0.17	0.16	27.40	0.00	0.00
16.90	0.29	0.28	22.20	0.17	0.16	27.50	0.00	0.00
17.00	0.29	0.27	22.30	0.17	0.16	27.60	0.00	0.00
17.10	0.28	0.27	22.40	0.17	0.16	27.70	0.00	0.00
17.20	0.28	0.26	22.50	0.17	0.16	27.80	0.00	0.00
17.30	0.27	0.26	22.60	0.16	0.16	27.90	0.00	0.00
17.40	0.26	0.25	22.70	0.16	0.15	28.00	0.00	0.00
17.50	0.26	0.25	22.80	0.16	0.15	28.10	0.00	0.00
17.60	0.25	0.24	22.90	0.16	0.15	28.20	0.00	0.00
17.70	0.25	0.23	23.00	0.16	0.15	28.30	0.00	0.00
17.80	0.24	0.23	23.10	0.16	0.15	28.40	0.00	0.00
17.90	0.24	0.22	23.20	0.16	0.15	28.50	0.00	0.00
18.00	0.23	0.22	23.30	0.15	0.15	28.60	0.00	0.00
18.10	0.23	0.21	23.40	0.15	0.14	28.70	0.00	0.00
18.20	0.22	0.21	23.50	0.15	0.14	28.80	0.00	0.00
18.30	0.22	0.21	23.60	0.15	0.14	28.90	0.00	0.00
18.40	0.22	0.21	23.70	0.15	0.14	29.00	0.00	0.00
18.50	0.22	0.21	23.80	0.15	0.14	29.10	0.00	0.00
18.60	0.22	0.21	23.90	0.15	0.14	29.20	0.00	0.00
18.70	0.22	0.20	24.00	0.14	0.14	29.30	0.00	0.00
18.80	0.22	0.20	24.10	0.05	0.05	29.40	0.00	0.00
18.90	0.21	0.20	24.20	0.00	0.00	29.50	0.00	0.00
19.00	0.21	0.20	24.30	0.00	0.00	29.60	0.00	0.00
19.10	0.21	0.20	24.40	0.00	0.00	29.70	0.00	0.00
19.20	0.21	0.20	24.50	0.00	0.00	29.80	0.00	0.00
19.30	0.21	0.20	24.60	0.00	0.00	29.90	0.00	0.00
19.40	0.21	0.20	24.70	0.00	0.00	30.00	0.00	0.00
19.50	0.21	0.20	24.80	0.00	0.00	30.10	0.00	0.00
19.60	0.20	0.19	24.90	0.00	0.00	30.20	0.00	0.00
19.70	0.20	0.19	25.00	0.00	0.00	30.30	0.00	0.00
19.80	0.20	0.19	25.10	0.00	0.00	30.40	0.00	0.00
19.90	0.20	0.19	25.20	0.00	0.00	30.50	0.00	0.00
20.00	0.20	0.19	25.30	0.00	0.00	30.60	0.00	0.00
20.10	0.20	0.19	25.40	0.00	0.00	30.70	0.00	0.00
20.20	0.20	0.19	25.50	0.00	0.00	30.80	0.00	0.00
20.30	0.20	0.18	25.60	0.00	0.00	30.90	0.00	0.00
20.40	0.19	0.18	25.70	0.00	0.00	31.00	0.00	0.00
20.50	0.19	0.18	25.80	0.00	0.00	31.10	0.00	0.00
20.60	0.19	0.18	25.90	0.00	0.00	31.20	0.00	0.00
20.70	0.19	0.18	26.00	0.00	0.00	31.30	0.00	0.00
20.80	0.19	0.18	26.10	0.00	0.00	31.40	0.00	0.00
20.90	0.19	0.18	26.20	0.00	0.00	31.50	0.00	0.00
21.00	0.19	0.18	26.30	0.00	0.00	31.60	0.00	0.00
21.10	0.18	0.17	26.40	0.00	0.00	31.70	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
31.80	0.00	0.00	37.10	0.00	0.00	42.40	0.00	0.00
31.90	0.00	0.00	37.20	0.00	0.00	42.50	0.00	0.00
32.00	0.00	0.00	37.30	0.00	0.00	42.60	0.00	0.00
32.10	0.00	0.00	37.40	0.00	0.00	42.70	0.00	0.00
32.20	0.00	0.00	37.50	0.00	0.00	42.80	0.00	0.00
32.30	0.00	0.00	37.60	0.00	0.00	42.90	0.00	0.00
32.40	0.00	0.00	37.70	0.00	0.00	43.00	0.00	0.00
32.50	0.00	0.00	37.80	0.00	0.00	43.10	0.00	0.00
32.60	0.00	0.00	37.90	0.00	0.00	43.20	0.00	0.00
32.70	0.00	0.00	38.00	0.00	0.00	43.30	0.00	0.00
32.80	0.00	0.00	38.10	0.00	0.00	43.40	0.00	0.00
32.90	0.00	0.00	38.20	0.00	0.00	43.50	0.00	0.00
33.00	0.00	0.00	38.30	0.00	0.00	43.60	0.00	0.00
33.10	0.00	0.00	38.40	0.00	0.00	43.70	0.00	0.00
33.20	0.00	0.00	38.50	0.00	0.00	43.80	0.00	0.00
33.30	0.00	0.00	38.60	0.00	0.00	43.90	0.00	0.00
33.40	0.00	0.00	38.70	0.00	0.00	44.00	0.00	0.00
33.50	0.00	0.00	38.80	0.00	0.00	44.10	0.00	0.00
33.60	0.00	0.00	38.90	0.00	0.00	44.20	0.00	0.00
33.70	0.00	0.00	39.00	0.00	0.00	44.30	0.00	0.00
33.80	0.00	0.00	39.10	0.00	0.00	44.40	0.00	0.00
33.90	0.00	0.00	39.20	0.00	0.00	44.50	0.00	0.00
34.00	0.00	0.00	39.30	0.00	0.00	44.60	0.00	0.00
34.10	0.00	0.00	39.40	0.00	0.00	44.70	0.00	0.00
34.20	0.00	0.00	39.50	0.00	0.00	44.80	0.00	0.00
34.30	0.00	0.00	39.60	0.00	0.00	44.90	0.00	0.00
34.40	0.00	0.00	39.70	0.00	0.00	45.00	0.00	0.00
34.50	0.00	0.00	39.80	0.00	0.00	45.10	0.00	0.00
34.60	0.00	0.00	39.90	0.00	0.00	45.20	0.00	0.00
34.70	0.00	0.00	40.00	0.00	0.00	45.30	0.00	0.00
34.80	0.00	0.00	40.10	0.00	0.00	45.40	0.00	0.00
34.90	0.00	0.00	40.20	0.00	0.00	45.50	0.00	0.00
35.00	0.00	0.00	40.30	0.00	0.00	45.60	0.00	0.00
35.10	0.00	0.00	40.40	0.00	0.00	45.70	0.00	0.00
35.20	0.00	0.00	40.50	0.00	0.00	45.80	0.00	0.00
35.30	0.00	0.00	40.60	0.00	0.00	45.90	0.00	0.00
35.40	0.00	0.00	40.70	0.00	0.00	46.00	0.00	0.00
35.50	0.00	0.00	40.80	0.00	0.00	46.10	0.00	0.00
35.60	0.00	0.00	40.90	0.00	0.00	46.20	0.00	0.00
35.70	0.00	0.00	41.00	0.00	0.00	46.30	0.00	0.00
35.80	0.00	0.00	41.10	0.00	0.00	46.40	0.00	0.00
35.90	0.00	0.00	41.20	0.00	0.00	46.50	0.00	0.00
36.00	0.00	0.00	41.30	0.00	0.00	46.60	0.00	0.00
36.10	0.00	0.00	41.40	0.00	0.00	46.70	0.00	0.00
36.20	0.00	0.00	41.50	0.00	0.00	46.80	0.00	0.00
36.30	0.00	0.00	41.60	0.00	0.00	46.90	0.00	0.00
36.40	0.00	0.00	41.70	0.00	0.00	47.00	0.00	0.00
36.50	0.00	0.00	41.80	0.00	0.00	47.10	0.00	0.00
36.60	0.00	0.00	41.90	0.00	0.00	47.20	0.00	0.00
36.70	0.00	0.00	42.00	0.00	0.00	47.30	0.00	0.00
36.80	0.00	0.00	42.10	0.00	0.00	47.40	0.00	0.00
36.90	0.00	0.00	42.20	0.00	0.00	47.50	0.00	0.00
37.00	0.00	0.00	42.30	0.00	0.00	47.60	0.00	0.00

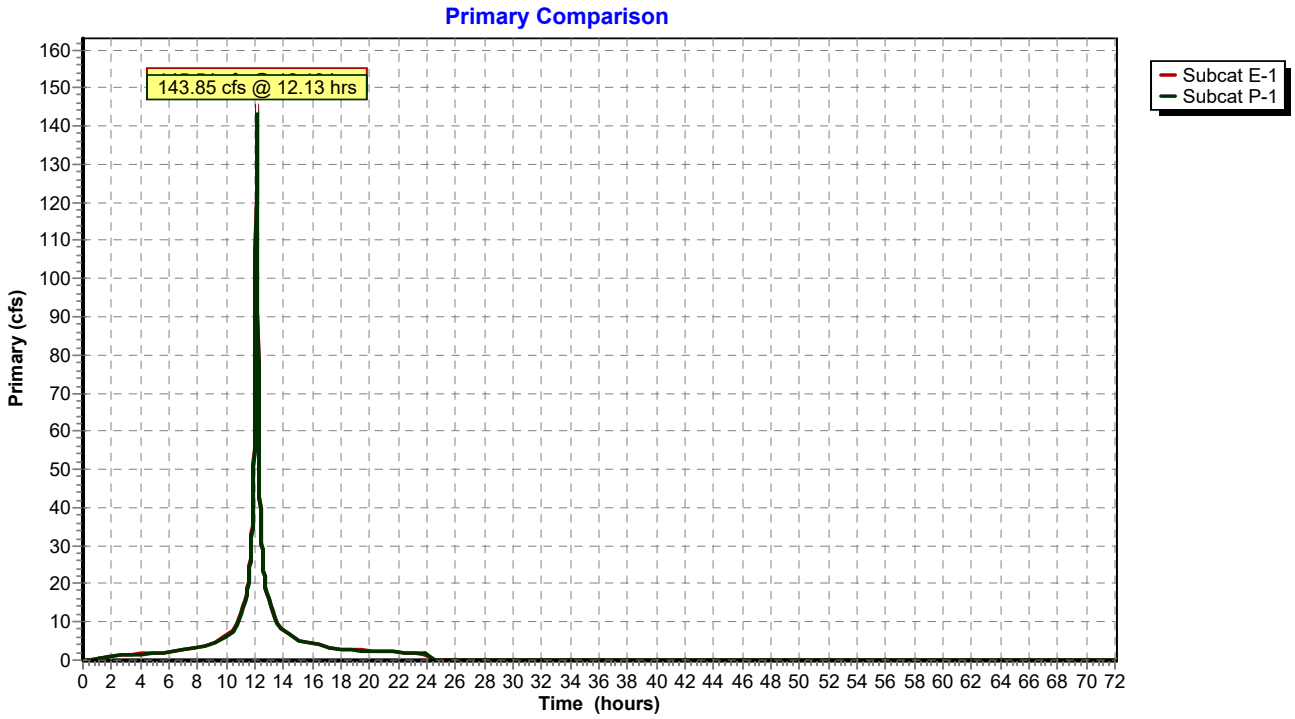
Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
47.70	0.00	0.00	53.00	0.00	0.00	58.30	0.00	0.00
47.80	0.00	0.00	53.10	0.00	0.00	58.40	0.00	0.00
47.90	0.00	0.00	53.20	0.00	0.00	58.50	0.00	0.00
48.00	0.00	0.00	53.30	0.00	0.00	58.60	0.00	0.00
48.10	0.00	0.00	53.40	0.00	0.00	58.70	0.00	0.00
48.20	0.00	0.00	53.50	0.00	0.00	58.80	0.00	0.00
48.30	0.00	0.00	53.60	0.00	0.00	58.90	0.00	0.00
48.40	0.00	0.00	53.70	0.00	0.00	59.00	0.00	0.00
48.50	0.00	0.00	53.80	0.00	0.00	59.10	0.00	0.00
48.60	0.00	0.00	53.90	0.00	0.00	59.20	0.00	0.00
48.70	0.00	0.00	54.00	0.00	0.00	59.30	0.00	0.00
48.80	0.00	0.00	54.10	0.00	0.00	59.40	0.00	0.00
48.90	0.00	0.00	54.20	0.00	0.00	59.50	0.00	0.00
49.00	0.00	0.00	54.30	0.00	0.00	59.60	0.00	0.00
49.10	0.00	0.00	54.40	0.00	0.00	59.70	0.00	0.00
49.20	0.00	0.00	54.50	0.00	0.00	59.80	0.00	0.00
49.30	0.00	0.00	54.60	0.00	0.00	59.90	0.00	0.00
49.40	0.00	0.00	54.70	0.00	0.00	60.00	0.00	0.00
49.50	0.00	0.00	54.80	0.00	0.00	60.10	0.00	0.00
49.60	0.00	0.00	54.90	0.00	0.00	60.20	0.00	0.00
49.70	0.00	0.00	55.00	0.00	0.00	60.30	0.00	0.00
49.80	0.00	0.00	55.10	0.00	0.00	60.40	0.00	0.00
49.90	0.00	0.00	55.20	0.00	0.00	60.50	0.00	0.00
50.00	0.00	0.00	55.30	0.00	0.00	60.60	0.00	0.00
50.10	0.00	0.00	55.40	0.00	0.00	60.70	0.00	0.00
50.20	0.00	0.00	55.50	0.00	0.00	60.80	0.00	0.00
50.30	0.00	0.00	55.60	0.00	0.00	60.90	0.00	0.00
50.40	0.00	0.00	55.70	0.00	0.00	61.00	0.00	0.00
50.50	0.00	0.00	55.80	0.00	0.00	61.10	0.00	0.00
50.60	0.00	0.00	55.90	0.00	0.00	61.20	0.00	0.00
50.70	0.00	0.00	56.00	0.00	0.00	61.30	0.00	0.00
50.80	0.00	0.00	56.10	0.00	0.00	61.40	0.00	0.00
50.90	0.00	0.00	56.20	0.00	0.00	61.50	0.00	0.00
51.00	0.00	0.00	56.30	0.00	0.00	61.60	0.00	0.00
51.10	0.00	0.00	56.40	0.00	0.00	61.70	0.00	0.00
51.20	0.00	0.00	56.50	0.00	0.00	61.80	0.00	0.00
51.30	0.00	0.00	56.60	0.00	0.00	61.90	0.00	0.00
51.40	0.00	0.00	56.70	0.00	0.00	62.00	0.00	0.00
51.50	0.00	0.00	56.80	0.00	0.00	62.10	0.00	0.00
51.60	0.00	0.00	56.90	0.00	0.00	62.20	0.00	0.00
51.70	0.00	0.00	57.00	0.00	0.00	62.30	0.00	0.00
51.80	0.00	0.00	57.10	0.00	0.00	62.40	0.00	0.00
51.90	0.00	0.00	57.20	0.00	0.00	62.50	0.00	0.00
52.00	0.00	0.00	57.30	0.00	0.00	62.60	0.00	0.00
52.10	0.00	0.00	57.40	0.00	0.00	62.70	0.00	0.00
52.20	0.00	0.00	57.50	0.00	0.00	62.80	0.00	0.00
52.30	0.00	0.00	57.60	0.00	0.00	62.90	0.00	0.00
52.40	0.00	0.00	57.70	0.00	0.00	63.00	0.00	0.00
52.50	0.00	0.00	57.80	0.00	0.00	63.10	0.00	0.00
52.60	0.00	0.00	57.90	0.00	0.00	63.20	0.00	0.00
52.70	0.00	0.00	58.00	0.00	0.00	63.30	0.00	0.00
52.80	0.00	0.00	58.10	0.00	0.00	63.40	0.00	0.00
52.90	0.00	0.00	58.20	0.00	0.00	63.50	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
63.60	0.00	0.00
63.70	0.00	0.00
63.80	0.00	0.00
63.90	0.00	0.00
64.00	0.00	0.00
64.10	0.00	0.00
64.20	0.00	0.00
64.30	0.00	0.00
64.40	0.00	0.00
64.50	0.00	0.00
64.60	0.00	0.00
64.70	0.00	0.00
64.80	0.00	0.00
64.90	0.00	0.00
65.00	0.00	0.00
65.10	0.00	0.00
65.20	0.00	0.00
65.30	0.00	0.00
65.40	0.00	0.00
65.50	0.00	0.00
65.60	0.00	0.00
65.70	0.00	0.00
65.80	0.00	0.00
65.90	0.00	0.00
66.00	0.00	0.00
66.10	0.00	0.00
66.20	0.00	0.00
66.30	0.00	0.00
66.40	0.00	0.00
66.50	0.00	0.00
66.60	0.00	0.00
66.70	0.00	0.00
66.80	0.00	0.00
66.90	0.00	0.00
67.00	0.00	0.00
67.10	0.00	0.00
67.20	0.00	0.00
67.30	0.00	0.00
67.40	0.00	0.00
67.50	0.00	0.00
67.60	0.00	0.00
67.70	0.00	0.00
67.80	0.00	0.00
67.90	0.00	0.00
68.00	0.00	0.00
68.10	0.00	0.00
68.20	0.00	0.00
68.30	0.00	0.00
68.40	0.00	0.00
68.50	0.00	0.00
68.60	0.00	0.00
68.70	0.00	0.00
68.80	0.00	0.00
68.90	0.00	0.00
69.00	0.00	0.00
69.10	0.00	0.00
69.20	0.00	0.00
69.30	0.00	0.00
69.40	0.00	0.00
69.50	0.00	0.00
69.60	0.00	0.00
69.70	0.00	0.00
69.80	0.00	0.00
69.90	0.00	0.00
70.00	0.00	0.00
70.10	0.00	0.00
70.20	0.00	0.00
70.30	0.00	0.00
70.40	0.00	0.00
70.50	0.00	0.00
70.60	0.00	0.00
70.70	0.00	0.00
70.80	0.00	0.00
70.90	0.00	0.00
71.00	0.00	0.00
71.10	0.00	0.00
71.20	0.00	0.00
71.30	0.00	0.00
71.40	0.00	0.00
71.50	0.00	0.00
71.60	0.00	0.00
71.70	0.00	0.00
71.80	0.00	0.00
71.90	0.00	0.00
72.00	0.00	0.00

APPENDIX C-8
100 – YEAR STORM EVENT COMPARISON HYDROGRAPHS


Primary Comparison
143.85 cfs @ 12.13 hrs
Subcat E-1
Subcat P-1
Primary (cfs)
Time (hours)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Primary Comparison

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
0.00	0.00	0.00	5.30	1.99	1.73	10.60	8.34	7.96
0.10	0.00	0.00	5.40	2.01	1.75	10.70	9.18	8.78
0.20	0.00	0.00	5.50	2.03	1.78	10.80	10.05	9.62
0.30	0.00	0.00	5.60	2.05	1.80	10.90	10.92	10.47
0.40	0.00	0.00	5.70	2.08	1.83	11.00	11.79	11.32
0.50	0.01	0.01	5.80	2.10	1.85	11.10	13.09	12.60
0.60	0.12	0.10	5.90	2.13	1.88	11.20	14.60	14.08
0.70	0.23	0.20	6.00	2.15	1.90	11.30	16.15	15.59
0.80	0.34	0.29	6.10	2.20	1.95	11.40	17.71	17.14
0.90	0.44	0.38	6.20	2.26	2.01	11.50	19.27	18.69
1.00	0.53	0.45	6.30	2.33	2.07	11.60	24.34	23.66
1.10	0.61	0.52	6.40	2.39	2.13	11.70	27.67	26.95
1.20	0.68	0.59	6.50	2.45	2.19	11.80	35.31	34.47
1.30	0.76	0.65	6.60	2.52	2.26	11.90	48.92	47.90
1.40	0.82	0.70	6.70	2.59	2.32	12.00	80.27	78.89
1.50	0.88	0.75	6.80	2.66	2.38	12.10	**136.07**	**134.33**
1.60	0.93	0.80	6.90	2.72	2.45	12.20	**91.30**	**90.42**
1.70	0.98	0.84	7.00	2.79	2.52	12.30	48.99	48.61
1.80	1.03	0.89	7.10	2.86	2.58	12.40	34.07	33.84
1.90	1.08	0.93	7.20	2.93	2.65	12.50	28.99	28.81
2.00	1.12	0.96	7.30	2.99	2.71	12.60	23.54	23.41
2.10	1.17	1.00	7.40	3.07	2.78	12.70	20.12	20.01
2.20	1.21	1.04	7.50	3.13	2.85	12.80	18.40	18.31
2.30	1.24	1.07	7.60	3.20	2.91	12.90	16.80	16.73
2.40	1.28	1.10	7.70	3.27	2.98	13.00	15.24	15.17
2.50	1.31	1.13	7.80	3.35	3.06	13.10	13.64	13.59
2.60	1.35	1.15	7.90	3.41	3.12	13.20	12.51	12.46
2.70	1.38	1.19	8.00	3.48	3.19	13.30	11.59	11.55
2.80	1.41	1.21	8.10	3.56	3.27	13.40	10.69	10.65
2.90	1.44	1.24	8.20	3.62	3.33	13.50	9.78	9.75
3.00	1.46	1.26	8.30	3.69	3.40	13.60	8.89	8.86
3.10	1.49	1.28	8.40	3.77	3.48	13.70	8.40	8.37
3.20	1.52	1.31	8.50	3.83	3.54	13.80	8.15	8.12
3.30	1.55	1.33	8.60	3.91	3.61	13.90	7.89	7.87
3.40	1.57	1.35	8.70	3.98	3.69	14.00	7.65	7.63
3.50	1.60	1.38	8.80	4.05	3.76	14.10	7.40	7.38
3.60	1.62	1.39	8.90	4.12	3.83	14.20	7.16	7.14
3.70	1.65	1.42	9.00	4.20	3.91	14.30	6.91	6.90
3.80	1.67	1.43	9.10	4.37	4.08	14.40	6.66	6.65
3.90	1.69	1.45	9.20	4.59	4.29	14.50	6.42	6.40
4.00	1.72	1.47	9.30	4.83	4.52	14.60	6.17	6.16
4.10	1.74	1.49	9.40	5.06	4.74	14.70	5.92	5.91
4.20	1.76	1.51	9.50	5.29	4.97	14.80	5.68	5.67
4.30	1.78	1.53	9.60	5.53	5.20	14.90	5.43	5.42
4.40	1.81	1.55	9.70	5.76	5.42	15.00	5.19	5.17
4.50	1.82	1.56	9.80	6.01	5.66	15.10	4.94	4.93
4.60	1.84	1.58	9.90	6.24	5.89	15.20	4.80	4.79
4.70	1.86	1.59	10.00	6.48	6.13	15.30	4.73	4.72
4.80	1.88	1.61	10.10	6.73	6.37	15.40	4.67	4.66
4.90	1.90	1.63	10.20	6.96	6.61	15.50	4.59	4.58
5.00	1.92	1.66	10.30	7.22	6.85	15.60	4.52	4.51
5.10	1.94	1.68	10.40	7.46	7.10	15.70	4.46	4.45
5.20	1.96	1.70	10.50	7.70	7.34	15.80	4.38	4.37

Primary Comparison (continued)

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
15.90	4.31	4.30	21.20	2.22	2.22	26.50	0.00	0.00
16.00	4.24	4.24	21.30	2.20	2.20	26.60	0.00	0.00
16.10	4.18	4.17	21.40	2.19	2.19	26.70	0.00	0.00
16.20	4.10	4.09	21.50	2.17	2.17	26.80	0.00	0.00
16.30	4.04	4.03	21.60	2.15	2.15	26.90	0.00	0.00
16.40	3.97	3.96	21.70	2.13	2.13	27.00	0.00	0.00
16.50	3.89	3.88	21.80	2.12	2.11	27.10	0.00	0.00
16.60	3.82	3.82	21.90	2.10	2.10	27.20	0.00	0.00
16.70	3.76	3.75	22.00	2.08	2.08	27.30	0.00	0.00
16.80	3.69	3.68	22.10	2.06	2.06	27.40	0.00	0.00
16.90	3.62	3.61	22.20	2.05	2.05	27.50	0.00	0.00
17.00	3.55	3.54	22.30	2.03	2.02	27.60	0.00	0.00
17.10	3.48	3.47	22.40	2.01	2.01	27.70	0.00	0.00
17.20	3.41	3.40	22.50	1.99	1.99	27.80	0.00	0.00
17.30	3.34	3.33	22.60	1.97	1.97	27.90	0.00	0.00
17.40	3.27	3.26	22.70	1.96	1.96	28.00	0.00	0.00
17.50	3.20	3.19	22.80	1.94	1.94	28.10	0.00	0.00
17.60	3.12	3.12	22.90	1.93	1.93	28.20	0.00	0.00
17.70	3.06	3.05	23.00	1.90	1.90	28.30	0.00	0.00
17.80	2.99	2.99	23.10	1.89	1.89	28.40	0.00	0.00
17.90	2.92	2.92	23.20	1.87	1.87	28.50	0.00	0.00
18.00	2.85	2.85	23.30	1.85	1.85	28.60	0.00	0.00
18.10	2.78	2.78	23.40	1.83	1.83	28.70	0.00	0.00
18.20	2.74	2.74	23.50	1.82	1.82	28.80	0.00	0.00
18.30	2.72	2.72	23.60	1.80	1.80	28.90	0.00	0.00
18.40	2.71	2.71	23.70	1.79	1.78	29.00	0.00	0.00
18.50	2.68	2.68	23.80	1.76	1.76	29.10	0.00	0.00
18.60	2.67	2.67	23.90	1.75	1.75	29.20	0.00	0.00
18.70	2.65	2.65	24.00	1.74	1.74	29.30	0.00	0.00
18.80	2.64	2.64	24.10	0.61	0.61	29.40	0.00	0.00
18.90	2.62	2.62	24.20	0.05	0.05	29.50	0.00	0.00
19.00	2.60	2.60	24.30	0.00	0.00	29.60	0.00	0.00
19.10	2.58	2.58	24.40	0.00	0.00	29.70	0.00	0.00
19.20	2.57	2.57	24.50	0.00	0.00	29.80	0.00	0.00
19.30	2.55	2.55	24.60	0.00	0.00	29.90	0.00	0.00
19.40	2.53	2.53	24.70	0.00	0.00	30.00	0.00	0.00
19.50	2.52	2.51	24.80	0.00	0.00	30.10	0.00	0.00
19.60	2.50	2.49	24.90	0.00	0.00	30.20	0.00	0.00
19.70	2.48	2.48	25.00	0.00	0.00	30.30	0.00	0.00
19.80	2.46	2.46	25.10	0.00	0.00	30.40	0.00	0.00
19.90	2.44	2.44	25.20	0.00	0.00	30.50	0.00	0.00
20.00	2.43	2.43	25.30	0.00	0.00	30.60	0.00	0.00
20.10	2.41	2.41	25.40	0.00	0.00	30.70	0.00	0.00
20.20	2.40	2.40	25.50	0.00	0.00	30.80	0.00	0.00
20.30	2.37	2.37	25.60	0.00	0.00	30.90	0.00	0.00
20.40	2.36	2.36	25.70	0.00	0.00	31.00	0.00	0.00
20.50	2.34	2.34	25.80	0.00	0.00	31.10	0.00	0.00
20.60	2.33	2.33	25.90	0.00	0.00	31.20	0.00	0.00
20.70	2.31	2.31	26.00	0.00	0.00	31.30	0.00	0.00
20.80	2.29	2.29	26.10	0.00	0.00	31.40	0.00	0.00
20.90	2.27	2.27	26.20	0.00	0.00	31.50	0.00	0.00
21.00	2.26	2.25	26.30	0.00	0.00	31.60	0.00	0.00
21.10	2.23	2.23	26.40	0.00	0.00	31.70	0.00	0.00

Primary Comparison (continued)

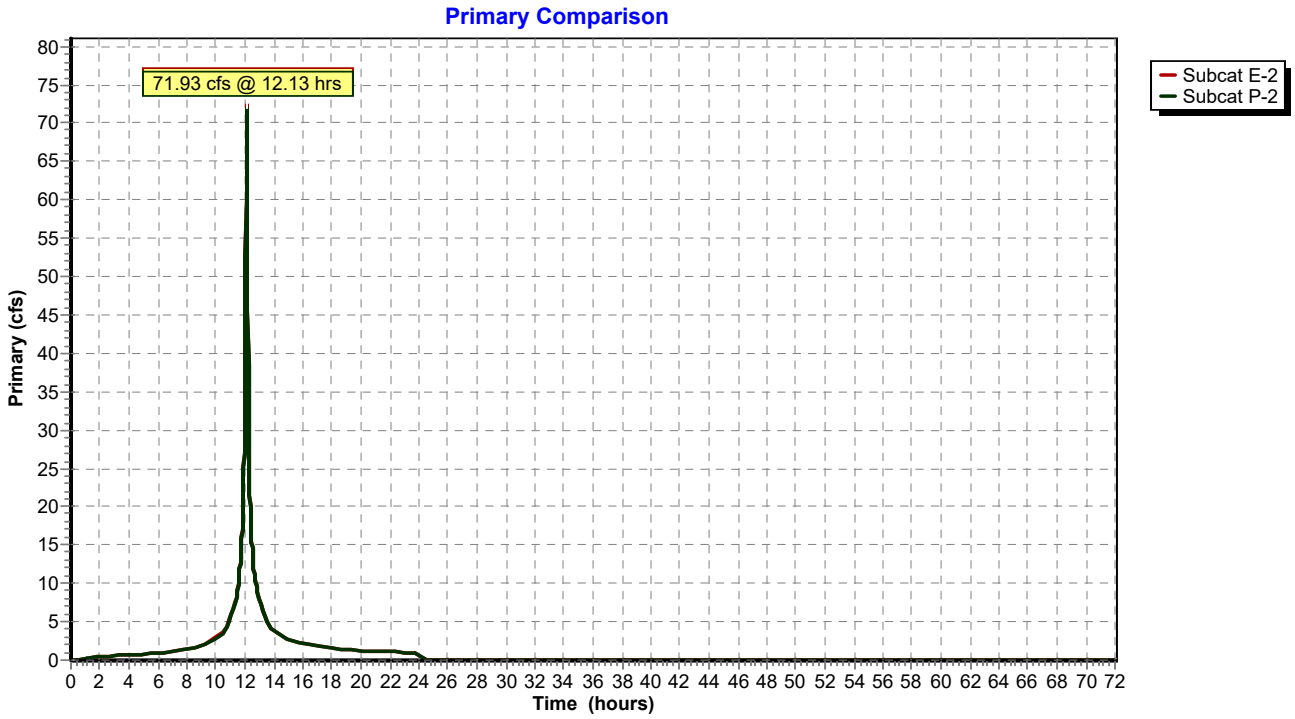
Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
31.80	0.00	0.00	37.10	0.00	0.00	42.40	0.00	0.00
31.90	0.00	0.00	37.20	0.00	0.00	42.50	0.00	0.00
32.00	0.00	0.00	37.30	0.00	0.00	42.60	0.00	0.00
32.10	0.00	0.00	37.40	0.00	0.00	42.70	0.00	0.00
32.20	0.00	0.00	37.50	0.00	0.00	42.80	0.00	0.00
32.30	0.00	0.00	37.60	0.00	0.00	42.90	0.00	0.00
32.40	0.00	0.00	37.70	0.00	0.00	43.00	0.00	0.00
32.50	0.00	0.00	37.80	0.00	0.00	43.10	0.00	0.00
32.60	0.00	0.00	37.90	0.00	0.00	43.20	0.00	0.00
32.70	0.00	0.00	38.00	0.00	0.00	43.30	0.00	0.00
32.80	0.00	0.00	38.10	0.00	0.00	43.40	0.00	0.00
32.90	0.00	0.00	38.20	0.00	0.00	43.50	0.00	0.00
33.00	0.00	0.00	38.30	0.00	0.00	43.60	0.00	0.00
33.10	0.00	0.00	38.40	0.00	0.00	43.70	0.00	0.00
33.20	0.00	0.00	38.50	0.00	0.00	43.80	0.00	0.00
33.30	0.00	0.00	38.60	0.00	0.00	43.90	0.00	0.00
33.40	0.00	0.00	38.70	0.00	0.00	44.00	0.00	0.00
33.50	0.00	0.00	38.80	0.00	0.00	44.10	0.00	0.00
33.60	0.00	0.00	38.90	0.00	0.00	44.20	0.00	0.00
33.70	0.00	0.00	39.00	0.00	0.00	44.30	0.00	0.00
33.80	0.00	0.00	39.10	0.00	0.00	44.40	0.00	0.00
33.90	0.00	0.00	39.20	0.00	0.00	44.50	0.00	0.00
34.00	0.00	0.00	39.30	0.00	0.00	44.60	0.00	0.00
34.10	0.00	0.00	39.40	0.00	0.00	44.70	0.00	0.00
34.20	0.00	0.00	39.50	0.00	0.00	44.80	0.00	0.00
34.30	0.00	0.00	39.60	0.00	0.00	44.90	0.00	0.00
34.40	0.00	0.00	39.70	0.00	0.00	45.00	0.00	0.00
34.50	0.00	0.00	39.80	0.00	0.00	45.10	0.00	0.00
34.60	0.00	0.00	39.90	0.00	0.00	45.20	0.00	0.00
34.70	0.00	0.00	40.00	0.00	0.00	45.30	0.00	0.00
34.80	0.00	0.00	40.10	0.00	0.00	45.40	0.00	0.00
34.90	0.00	0.00	40.20	0.00	0.00	45.50	0.00	0.00
35.00	0.00	0.00	40.30	0.00	0.00	45.60	0.00	0.00
35.10	0.00	0.00	40.40	0.00	0.00	45.70	0.00	0.00
35.20	0.00	0.00	40.50	0.00	0.00	45.80	0.00	0.00
35.30	0.00	0.00	40.60	0.00	0.00	45.90	0.00	0.00
35.40	0.00	0.00	40.70	0.00	0.00	46.00	0.00	0.00
35.50	0.00	0.00	40.80	0.00	0.00	46.10	0.00	0.00
35.60	0.00	0.00	40.90	0.00	0.00	46.20	0.00	0.00
35.70	0.00	0.00	41.00	0.00	0.00	46.30	0.00	0.00
35.80	0.00	0.00	41.10	0.00	0.00	46.40	0.00	0.00
35.90	0.00	0.00	41.20	0.00	0.00	46.50	0.00	0.00
36.00	0.00	0.00	41.30	0.00	0.00	46.60	0.00	0.00
36.10	0.00	0.00	41.40	0.00	0.00	46.70	0.00	0.00
36.20	0.00	0.00	41.50	0.00	0.00	46.80	0.00	0.00
36.30	0.00	0.00	41.60	0.00	0.00	46.90	0.00	0.00
36.40	0.00	0.00	41.70	0.00	0.00	47.00	0.00	0.00
36.50	0.00	0.00	41.80	0.00	0.00	47.10	0.00	0.00
36.60	0.00	0.00	41.90	0.00	0.00	47.20	0.00	0.00
36.70	0.00	0.00	42.00	0.00	0.00	47.30	0.00	0.00
36.80	0.00	0.00	42.10	0.00	0.00	47.40	0.00	0.00
36.90	0.00	0.00	42.20	0.00	0.00	47.50	0.00	0.00
37.00	0.00	0.00	42.30	0.00	0.00	47.60	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)	Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
47.70	0.00	0.00	53.00	0.00	0.00	58.30	0.00	0.00
47.80	0.00	0.00	53.10	0.00	0.00	58.40	0.00	0.00
47.90	0.00	0.00	53.20	0.00	0.00	58.50	0.00	0.00
48.00	0.00	0.00	53.30	0.00	0.00	58.60	0.00	0.00
48.10	0.00	0.00	53.40	0.00	0.00	58.70	0.00	0.00
48.20	0.00	0.00	53.50	0.00	0.00	58.80	0.00	0.00
48.30	0.00	0.00	53.60	0.00	0.00	58.90	0.00	0.00
48.40	0.00	0.00	53.70	0.00	0.00	59.00	0.00	0.00
48.50	0.00	0.00	53.80	0.00	0.00	59.10	0.00	0.00
48.60	0.00	0.00	53.90	0.00	0.00	59.20	0.00	0.00
48.70	0.00	0.00	54.00	0.00	0.00	59.30	0.00	0.00
48.80	0.00	0.00	54.10	0.00	0.00	59.40	0.00	0.00
48.90	0.00	0.00	54.20	0.00	0.00	59.50	0.00	0.00
49.00	0.00	0.00	54.30	0.00	0.00	59.60	0.00	0.00
49.10	0.00	0.00	54.40	0.00	0.00	59.70	0.00	0.00
49.20	0.00	0.00	54.50	0.00	0.00	59.80	0.00	0.00
49.30	0.00	0.00	54.60	0.00	0.00	59.90	0.00	0.00
49.40	0.00	0.00	54.70	0.00	0.00	60.00	0.00	0.00
49.50	0.00	0.00	54.80	0.00	0.00	60.10	0.00	0.00
49.60	0.00	0.00	54.90	0.00	0.00	60.20	0.00	0.00
49.70	0.00	0.00	55.00	0.00	0.00	60.30	0.00	0.00
49.80	0.00	0.00	55.10	0.00	0.00	60.40	0.00	0.00
49.90	0.00	0.00	55.20	0.00	0.00	60.50	0.00	0.00
50.00	0.00	0.00	55.30	0.00	0.00	60.60	0.00	0.00
50.10	0.00	0.00	55.40	0.00	0.00	60.70	0.00	0.00
50.20	0.00	0.00	55.50	0.00	0.00	60.80	0.00	0.00
50.30	0.00	0.00	55.60	0.00	0.00	60.90	0.00	0.00
50.40	0.00	0.00	55.70	0.00	0.00	61.00	0.00	0.00
50.50	0.00	0.00	55.80	0.00	0.00	61.10	0.00	0.00
50.60	0.00	0.00	55.90	0.00	0.00	61.20	0.00	0.00
50.70	0.00	0.00	56.00	0.00	0.00	61.30	0.00	0.00
50.80	0.00	0.00	56.10	0.00	0.00	61.40	0.00	0.00
50.90	0.00	0.00	56.20	0.00	0.00	61.50	0.00	0.00
51.00	0.00	0.00	56.30	0.00	0.00	61.60	0.00	0.00
51.10	0.00	0.00	56.40	0.00	0.00	61.70	0.00	0.00
51.20	0.00	0.00	56.50	0.00	0.00	61.80	0.00	0.00
51.30	0.00	0.00	56.60	0.00	0.00	61.90	0.00	0.00
51.40	0.00	0.00	56.70	0.00	0.00	62.00	0.00	0.00
51.50	0.00	0.00	56.80	0.00	0.00	62.10	0.00	0.00
51.60	0.00	0.00	56.90	0.00	0.00	62.20	0.00	0.00
51.70	0.00	0.00	57.00	0.00	0.00	62.30	0.00	0.00
51.80	0.00	0.00	57.10	0.00	0.00	62.40	0.00	0.00
51.90	0.00	0.00	57.20	0.00	0.00	62.50	0.00	0.00
52.00	0.00	0.00	57.30	0.00	0.00	62.60	0.00	0.00
52.10	0.00	0.00	57.40	0.00	0.00	62.70	0.00	0.00
52.20	0.00	0.00	57.50	0.00	0.00	62.80	0.00	0.00
52.30	0.00	0.00	57.60	0.00	0.00	62.90	0.00	0.00
52.40	0.00	0.00	57.70	0.00	0.00	63.00	0.00	0.00
52.50	0.00	0.00	57.80	0.00	0.00	63.10	0.00	0.00
52.60	0.00	0.00	57.90	0.00	0.00	63.20	0.00	0.00
52.70	0.00	0.00	58.00	0.00	0.00	63.30	0.00	0.00
52.80	0.00	0.00	58.10	0.00	0.00	63.40	0.00	0.00
52.90	0.00	0.00	58.20	0.00	0.00	63.50	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-1 (cfs)	Subcat P-1 (cfs)
63.60	0.00	0.00
63.70	0.00	0.00
63.80	0.00	0.00
63.90	0.00	0.00
64.00	0.00	0.00
64.10	0.00	0.00
64.20	0.00	0.00
64.30	0.00	0.00
64.40	0.00	0.00
64.50	0.00	0.00
64.60	0.00	0.00
64.70	0.00	0.00
64.80	0.00	0.00
64.90	0.00	0.00
65.00	0.00	0.00
65.10	0.00	0.00
65.20	0.00	0.00
65.30	0.00	0.00
65.40	0.00	0.00
65.50	0.00	0.00
65.60	0.00	0.00
65.70	0.00	0.00
65.80	0.00	0.00
65.90	0.00	0.00
66.00	0.00	0.00
66.10	0.00	0.00
66.20	0.00	0.00
66.30	0.00	0.00
66.40	0.00	0.00
66.50	0.00	0.00
66.60	0.00	0.00
66.70	0.00	0.00
66.80	0.00	0.00
66.90	0.00	0.00
67.00	0.00	0.00
67.10	0.00	0.00
67.20	0.00	0.00
67.30	0.00	0.00
67.40	0.00	0.00
67.50	0.00	0.00
67.60	0.00	0.00
67.70	0.00	0.00
67.80	0.00	0.00
67.90	0.00	0.00
68.00	0.00	0.00
68.10	0.00	0.00
68.20	0.00	0.00
68.30	0.00	0.00
68.40	0.00	0.00
68.50	0.00	0.00
68.60	0.00	0.00
68.70	0.00	0.00
68.80	0.00	0.00
68.90	0.00	0.00
69.00	0.00	0.00
69.10	0.00	0.00
69.20	0.00	0.00
69.30	0.00	0.00
69.40	0.00	0.00
69.50	0.00	0.00
69.60	0.00	0.00
69.70	0.00	0.00
69.80	0.00	0.00
69.90	0.00	0.00
70.00	0.00	0.00
70.10	0.00	0.00
70.20	0.00	0.00
70.30	0.00	0.00
70.40	0.00	0.00
70.50	0.00	0.00
70.60	0.00	0.00
70.70	0.00	0.00
70.80	0.00	0.00
70.90	0.00	0.00
71.00	0.00	0.00
71.10	0.00	0.00
71.20	0.00	0.00
71.30	0.00	0.00
71.40	0.00	0.00
71.50	0.00	0.00
71.60	0.00	0.00
71.70	0.00	0.00
71.80	0.00	0.00
71.90	0.00	0.00
72.00	0.00	0.00


Primary Comparison
71.93 cfs @ 12.13 hrs
Subcat E-2
Subcat P-2
Primary (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Primary Comparison

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
0.00	0.00	0.00	5.30	0.81	0.79	10.60	3.87	3.80
0.10	0.00	0.00	5.40	0.82	0.79	10.70	4.27	4.19
0.20	0.00	0.00	5.50	0.82	0.80	10.80	4.69	4.60
0.30	0.00	0.00	5.60	0.83	0.81	10.90	5.11	5.02
0.40	0.00	0.00	5.70	0.84	0.82	11.00	5.54	5.44
0.50	0.01	0.01	5.80	0.86	0.82	11.10	6.17	6.07
0.60	0.05	0.05	5.90	0.87	0.83	11.20	6.90	6.79
0.70	0.10	0.09	6.00	0.88	0.85	11.30	7.66	7.55
0.80	0.14	0.14	6.10	0.90	0.87	11.40	8.44	8.31
0.90	0.18	0.17	6.20	0.93	0.90	11.50	9.22	9.09
1.00	0.22	0.21	6.30	0.96	0.93	11.60	11.69	11.54
1.10	0.25	0.24	6.40	0.99	0.95	11.70	13.35	13.18
1.20	0.28	0.27	6.50	1.02	0.98	11.80	17.11	16.92
1.30	0.31	0.30	6.60	1.05	1.01	11.90	23.85	23.60
1.40	0.34	0.33	6.70	1.08	1.04	12.00	39.43	39.09
1.50	0.36	0.35	6.80	1.11	1.07	12.10	**67.48**	**67.03**
1.60	0.38	0.37	6.90	1.14	1.10	12.20	**45.60**	**45.36**
1.70	0.40	0.39	7.00	1.18	1.14	12.30	24.57	24.46
1.80	0.42	0.41	7.10	1.21	1.17	12.40	17.13	17.07
1.90	0.44	0.43	7.20	1.24	1.20	12.50	14.59	14.54
2.00	0.46	0.45	7.30	1.27	1.23	12.60	11.87	11.83
2.10	0.48	0.46	7.40	1.31	1.26	12.70	10.15	10.12
2.20	0.49	0.48	7.50	1.34	1.30	12.80	9.29	9.26
2.30	0.51	0.50	7.60	1.37	1.33	12.90	8.49	8.47
2.40	0.52	0.51	7.70	1.41	1.36	13.00	7.70	7.68
2.50	0.54	0.52	7.80	1.44	1.40	13.10	6.90	6.88
2.60	0.55	0.54	7.90	1.47	1.43	13.20	6.33	6.32
2.70	0.57	0.55	8.00	1.51	1.46	13.30	5.87	5.85
2.80	0.58	0.56	8.10	1.55	1.50	13.40	5.41	5.40
2.90	0.59	0.57	8.20	1.58	1.53	13.50	4.96	4.95
3.00	0.60	0.58	8.30	1.61	1.56	13.60	4.50	4.49
3.10	0.61	0.60	8.40	1.65	1.60	13.70	4.26	4.25
3.20	0.62	0.61	8.50	1.68	1.64	13.80	4.13	4.12
3.30	0.63	0.62	8.60	1.72	1.67	13.90	4.00	3.99
3.40	0.64	0.63	8.70	1.76	1.71	14.00	3.88	3.87
3.50	0.66	0.64	8.80	1.79	1.75	14.10	3.75	3.75
3.60	0.66	0.65	8.90	1.83	1.78	14.20	3.63	3.62
3.70	0.68	0.66	9.00	1.87	1.82	14.30	3.51	3.50
3.80	0.68	0.66	9.10	1.95	1.90	14.40	3.38	3.38
3.90	0.69	0.67	9.20	2.05	2.00	14.50	3.26	3.25
4.00	0.70	0.68	9.30	2.16	2.11	14.60	3.13	3.13
4.10	0.71	0.69	9.40	2.27	2.22	14.70	3.01	3.00
4.20	0.72	0.70	9.50	2.38	2.33	14.80	2.89	2.88
4.30	0.73	0.71	9.60	2.50	2.44	14.90	2.76	2.75
4.40	0.74	0.72	9.70	2.61	2.55	15.00	2.63	2.63
4.50	0.75	0.73	9.80	2.73	2.66	15.10	2.51	2.51
4.60	0.75	0.74	9.90	2.84	2.78	15.20	2.44	2.44
4.70	0.76	0.74	10.00	2.96	2.89	15.30	2.40	2.40
4.80	0.77	0.75	10.10	3.08	3.01	15.40	2.37	2.37
4.90	0.78	0.76	10.20	3.20	3.13	15.50	2.33	2.33
5.00	0.79	0.77	10.30	3.32	3.25	15.60	2.30	2.29
5.10	0.79	0.77	10.40	3.44	3.37	15.70	2.27	2.26
5.20	0.80	0.78	10.50	3.57	3.49	15.80	2.23	2.22

Primary Comparison (continued)

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
15.90	2.19	2.19	21.20	1.13	1.13	26.50	0.00	0.00
16.00	2.16	2.16	21.30	1.12	1.12	26.60	0.00	0.00
16.10	2.13	2.12	21.40	1.12	1.12	26.70	0.00	0.00
16.20	2.09	2.08	21.50	1.11	1.11	26.80	0.00	0.00
16.30	2.05	2.05	21.60	1.10	1.10	26.90	0.00	0.00
16.40	2.02	2.02	21.70	1.09	1.09	27.00	0.00	0.00
16.50	1.98	1.98	21.80	1.08	1.08	27.10	0.00	0.00
16.60	1.95	1.94	21.90	1.07	1.07	27.20	0.00	0.00
16.70	1.91	1.91	22.00	1.06	1.06	27.30	0.00	0.00
16.80	1.88	1.88	22.10	1.05	1.05	27.40	0.00	0.00
16.90	1.84	1.84	22.20	1.05	1.04	27.50	0.00	0.00
17.00	1.81	1.80	22.30	1.03	1.03	27.60	0.00	0.00
17.10	1.77	1.77	22.40	1.02	1.02	27.70	0.00	0.00
17.20	1.73	1.73	22.50	1.02	1.02	27.80	0.00	0.00
17.30	1.70	1.70	22.60	1.01	1.01	27.90	0.00	0.00
17.40	1.66	1.66	22.70	1.00	1.00	28.00	0.00	0.00
17.50	1.63	1.63	22.80	0.99	0.99	28.10	0.00	0.00
17.60	1.59	1.59	22.90	0.98	0.98	28.20	0.00	0.00
17.70	1.56	1.56	23.00	0.97	0.97	28.30	0.00	0.00
17.80	1.52	1.52	23.10	0.96	0.96	28.40	0.00	0.00
17.90	1.49	1.49	23.20	0.95	0.95	28.50	0.00	0.00
18.00	1.45	1.45	23.30	0.94	0.94	28.60	0.00	0.00
18.10	1.42	1.41	23.40	0.94	0.94	28.70	0.00	0.00
18.20	1.40	1.40	23.50	0.93	0.93	28.80	0.00	0.00
18.30	1.39	1.39	23.60	0.92	0.92	28.90	0.00	0.00
18.40	1.38	1.38	23.70	0.91	0.91	29.00	0.00	0.00
18.50	1.37	1.37	23.80	0.90	0.90	29.10	0.00	0.00
18.60	1.36	1.36	23.90	0.89	0.89	29.20	0.00	0.00
18.70	1.35	1.35	24.00	0.89	0.89	29.30	0.00	0.00
18.80	1.35	1.35	24.10	0.31	0.31	29.40	0.00	0.00
18.90	1.34	1.33	24.20	0.03	0.03	29.50	0.00	0.00
19.00	1.33	1.32	24.30	0.00	0.00	29.60	0.00	0.00
19.10	1.32	1.32	24.40	0.00	0.00	29.70	0.00	0.00
19.20	1.31	1.31	24.50	0.00	0.00	29.80	0.00	0.00
19.30	1.30	1.30	24.60	0.00	0.00	29.90	0.00	0.00
19.40	1.29	1.29	24.70	0.00	0.00	30.00	0.00	0.00
19.50	1.28	1.28	24.80	0.00	0.00	30.10	0.00	0.00
19.60	1.27	1.27	24.90	0.00	0.00	30.20	0.00	0.00
19.70	1.27	1.27	25.00	0.00	0.00	30.30	0.00	0.00
19.80	1.26	1.26	25.10	0.00	0.00	30.40	0.00	0.00
19.90	1.25	1.25	25.20	0.00	0.00	30.50	0.00	0.00
20.00	1.24	1.24	25.30	0.00	0.00	30.60	0.00	0.00
20.10	1.23	1.23	25.40	0.00	0.00	30.70	0.00	0.00
20.20	1.22	1.22	25.50	0.00	0.00	30.80	0.00	0.00
20.30	1.21	1.21	25.60	0.00	0.00	30.90	0.00	0.00
20.40	1.20	1.20	25.70	0.00	0.00	31.00	0.00	0.00
20.50	1.19	1.19	25.80	0.00	0.00	31.10	0.00	0.00
20.60	1.19	1.19	25.90	0.00	0.00	31.20	0.00	0.00
20.70	1.18	1.18	26.00	0.00	0.00	31.30	0.00	0.00
20.80	1.17	1.17	26.10	0.00	0.00	31.40	0.00	0.00
20.90	1.16	1.16	26.20	0.00	0.00	31.50	0.00	0.00
21.00	1.15	1.15	26.30	0.00	0.00	31.60	0.00	0.00
21.10	1.14	1.14	26.40	0.00	0.00	31.70	0.00	0.00

Primary Comparison (continued)

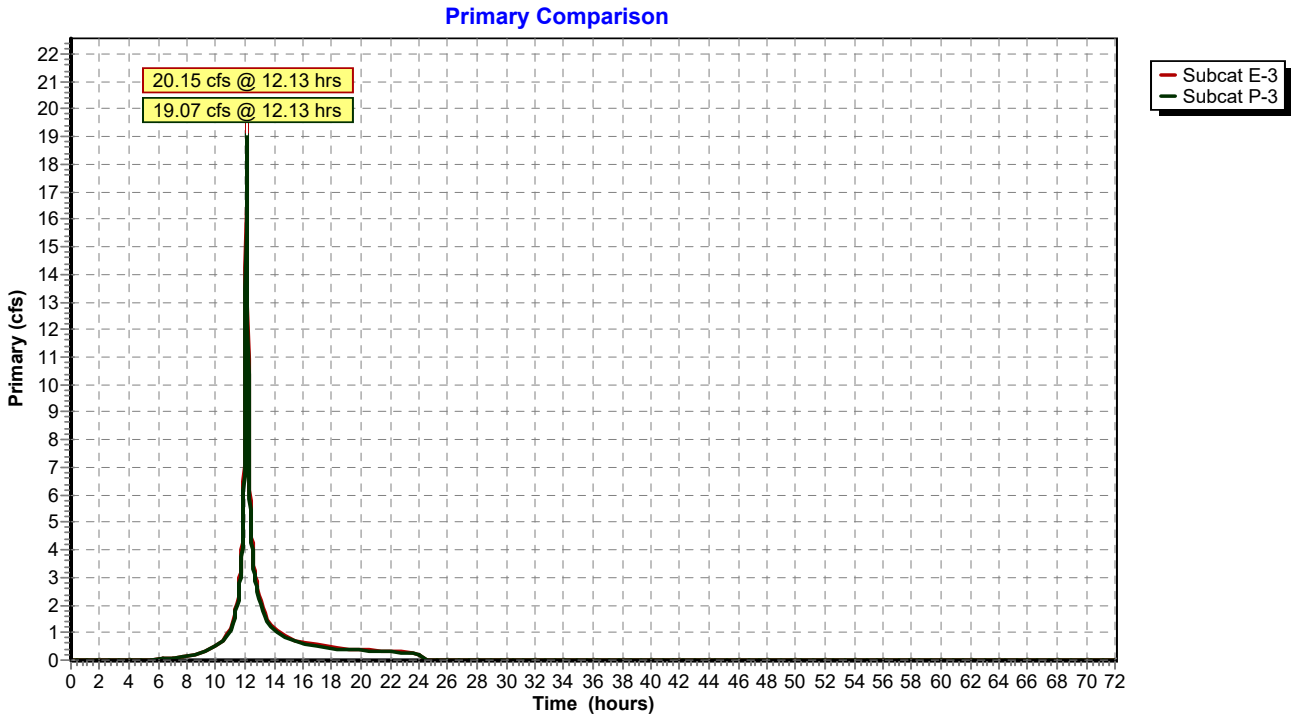
Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
31.80	0.00	0.00	37.10	0.00	0.00	42.40	0.00	0.00
31.90	0.00	0.00	37.20	0.00	0.00	42.50	0.00	0.00
32.00	0.00	0.00	37.30	0.00	0.00	42.60	0.00	0.00
32.10	0.00	0.00	37.40	0.00	0.00	42.70	0.00	0.00
32.20	0.00	0.00	37.50	0.00	0.00	42.80	0.00	0.00
32.30	0.00	0.00	37.60	0.00	0.00	42.90	0.00	0.00
32.40	0.00	0.00	37.70	0.00	0.00	43.00	0.00	0.00
32.50	0.00	0.00	37.80	0.00	0.00	43.10	0.00	0.00
32.60	0.00	0.00	37.90	0.00	0.00	43.20	0.00	0.00
32.70	0.00	0.00	38.00	0.00	0.00	43.30	0.00	0.00
32.80	0.00	0.00	38.10	0.00	0.00	43.40	0.00	0.00
32.90	0.00	0.00	38.20	0.00	0.00	43.50	0.00	0.00
33.00	0.00	0.00	38.30	0.00	0.00	43.60	0.00	0.00
33.10	0.00	0.00	38.40	0.00	0.00	43.70	0.00	0.00
33.20	0.00	0.00	38.50	0.00	0.00	43.80	0.00	0.00
33.30	0.00	0.00	38.60	0.00	0.00	43.90	0.00	0.00
33.40	0.00	0.00	38.70	0.00	0.00	44.00	0.00	0.00
33.50	0.00	0.00	38.80	0.00	0.00	44.10	0.00	0.00
33.60	0.00	0.00	38.90	0.00	0.00	44.20	0.00	0.00
33.70	0.00	0.00	39.00	0.00	0.00	44.30	0.00	0.00
33.80	0.00	0.00	39.10	0.00	0.00	44.40	0.00	0.00
33.90	0.00	0.00	39.20	0.00	0.00	44.50	0.00	0.00
34.00	0.00	0.00	39.30	0.00	0.00	44.60	0.00	0.00
34.10	0.00	0.00	39.40	0.00	0.00	44.70	0.00	0.00
34.20	0.00	0.00	39.50	0.00	0.00	44.80	0.00	0.00
34.30	0.00	0.00	39.60	0.00	0.00	44.90	0.00	0.00
34.40	0.00	0.00	39.70	0.00	0.00	45.00	0.00	0.00
34.50	0.00	0.00	39.80	0.00	0.00	45.10	0.00	0.00
34.60	0.00	0.00	39.90	0.00	0.00	45.20	0.00	0.00
34.70	0.00	0.00	40.00	0.00	0.00	45.30	0.00	0.00
34.80	0.00	0.00	40.10	0.00	0.00	45.40	0.00	0.00
34.90	0.00	0.00	40.20	0.00	0.00	45.50	0.00	0.00
35.00	0.00	0.00	40.30	0.00	0.00	45.60	0.00	0.00
35.10	0.00	0.00	40.40	0.00	0.00	45.70	0.00	0.00
35.20	0.00	0.00	40.50	0.00	0.00	45.80	0.00	0.00
35.30	0.00	0.00	40.60	0.00	0.00	45.90	0.00	0.00
35.40	0.00	0.00	40.70	0.00	0.00	46.00	0.00	0.00
35.50	0.00	0.00	40.80	0.00	0.00	46.10	0.00	0.00
35.60	0.00	0.00	40.90	0.00	0.00	46.20	0.00	0.00
35.70	0.00	0.00	41.00	0.00	0.00	46.30	0.00	0.00
35.80	0.00	0.00	41.10	0.00	0.00	46.40	0.00	0.00
35.90	0.00	0.00	41.20	0.00	0.00	46.50	0.00	0.00
36.00	0.00	0.00	41.30	0.00	0.00	46.60	0.00	0.00
36.10	0.00	0.00	41.40	0.00	0.00	46.70	0.00	0.00
36.20	0.00	0.00	41.50	0.00	0.00	46.80	0.00	0.00
36.30	0.00	0.00	41.60	0.00	0.00	46.90	0.00	0.00
36.40	0.00	0.00	41.70	0.00	0.00	47.00	0.00	0.00
36.50	0.00	0.00	41.80	0.00	0.00	47.10	0.00	0.00
36.60	0.00	0.00	41.90	0.00	0.00	47.20	0.00	0.00
36.70	0.00	0.00	42.00	0.00	0.00	47.30	0.00	0.00
36.80	0.00	0.00	42.10	0.00	0.00	47.40	0.00	0.00
36.90	0.00	0.00	42.20	0.00	0.00	47.50	0.00	0.00
37.00	0.00	0.00	42.30	0.00	0.00	47.60	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)	Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
47.70	0.00	0.00	53.00	0.00	0.00	58.30	0.00	0.00
47.80	0.00	0.00	53.10	0.00	0.00	58.40	0.00	0.00
47.90	0.00	0.00	53.20	0.00	0.00	58.50	0.00	0.00
48.00	0.00	0.00	53.30	0.00	0.00	58.60	0.00	0.00
48.10	0.00	0.00	53.40	0.00	0.00	58.70	0.00	0.00
48.20	0.00	0.00	53.50	0.00	0.00	58.80	0.00	0.00
48.30	0.00	0.00	53.60	0.00	0.00	58.90	0.00	0.00
48.40	0.00	0.00	53.70	0.00	0.00	59.00	0.00	0.00
48.50	0.00	0.00	53.80	0.00	0.00	59.10	0.00	0.00
48.60	0.00	0.00	53.90	0.00	0.00	59.20	0.00	0.00
48.70	0.00	0.00	54.00	0.00	0.00	59.30	0.00	0.00
48.80	0.00	0.00	54.10	0.00	0.00	59.40	0.00	0.00
48.90	0.00	0.00	54.20	0.00	0.00	59.50	0.00	0.00
49.00	0.00	0.00	54.30	0.00	0.00	59.60	0.00	0.00
49.10	0.00	0.00	54.40	0.00	0.00	59.70	0.00	0.00
49.20	0.00	0.00	54.50	0.00	0.00	59.80	0.00	0.00
49.30	0.00	0.00	54.60	0.00	0.00	59.90	0.00	0.00
49.40	0.00	0.00	54.70	0.00	0.00	60.00	0.00	0.00
49.50	0.00	0.00	54.80	0.00	0.00	60.10	0.00	0.00
49.60	0.00	0.00	54.90	0.00	0.00	60.20	0.00	0.00
49.70	0.00	0.00	55.00	0.00	0.00	60.30	0.00	0.00
49.80	0.00	0.00	55.10	0.00	0.00	60.40	0.00	0.00
49.90	0.00	0.00	55.20	0.00	0.00	60.50	0.00	0.00
50.00	0.00	0.00	55.30	0.00	0.00	60.60	0.00	0.00
50.10	0.00	0.00	55.40	0.00	0.00	60.70	0.00	0.00
50.20	0.00	0.00	55.50	0.00	0.00	60.80	0.00	0.00
50.30	0.00	0.00	55.60	0.00	0.00	60.90	0.00	0.00
50.40	0.00	0.00	55.70	0.00	0.00	61.00	0.00	0.00
50.50	0.00	0.00	55.80	0.00	0.00	61.10	0.00	0.00
50.60	0.00	0.00	55.90	0.00	0.00	61.20	0.00	0.00
50.70	0.00	0.00	56.00	0.00	0.00	61.30	0.00	0.00
50.80	0.00	0.00	56.10	0.00	0.00	61.40	0.00	0.00
50.90	0.00	0.00	56.20	0.00	0.00	61.50	0.00	0.00
51.00	0.00	0.00	56.30	0.00	0.00	61.60	0.00	0.00
51.10	0.00	0.00	56.40	0.00	0.00	61.70	0.00	0.00
51.20	0.00	0.00	56.50	0.00	0.00	61.80	0.00	0.00
51.30	0.00	0.00	56.60	0.00	0.00	61.90	0.00	0.00
51.40	0.00	0.00	56.70	0.00	0.00	62.00	0.00	0.00
51.50	0.00	0.00	56.80	0.00	0.00	62.10	0.00	0.00
51.60	0.00	0.00	56.90	0.00	0.00	62.20	0.00	0.00
51.70	0.00	0.00	57.00	0.00	0.00	62.30	0.00	0.00
51.80	0.00	0.00	57.10	0.00	0.00	62.40	0.00	0.00
51.90	0.00	0.00	57.20	0.00	0.00	62.50	0.00	0.00
52.00	0.00	0.00	57.30	0.00	0.00	62.60	0.00	0.00
52.10	0.00	0.00	57.40	0.00	0.00	62.70	0.00	0.00
52.20	0.00	0.00	57.50	0.00	0.00	62.80	0.00	0.00
52.30	0.00	0.00	57.60	0.00	0.00	62.90	0.00	0.00
52.40	0.00	0.00	57.70	0.00	0.00	63.00	0.00	0.00
52.50	0.00	0.00	57.80	0.00	0.00	63.10	0.00	0.00
52.60	0.00	0.00	57.90	0.00	0.00	63.20	0.00	0.00
52.70	0.00	0.00	58.00	0.00	0.00	63.30	0.00	0.00
52.80	0.00	0.00	58.10	0.00	0.00	63.40	0.00	0.00
52.90	0.00	0.00	58.20	0.00	0.00	63.50	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-2 (cfs)	Subcat P-2 (cfs)
63.60	0.00	0.00
63.70	0.00	0.00
63.80	0.00	0.00
63.90	0.00	0.00
64.00	0.00	0.00
64.10	0.00	0.00
64.20	0.00	0.00
64.30	0.00	0.00
64.40	0.00	0.00
64.50	0.00	0.00
64.60	0.00	0.00
64.70	0.00	0.00
64.80	0.00	0.00
64.90	0.00	0.00
65.00	0.00	0.00
65.10	0.00	0.00
65.20	0.00	0.00
65.30	0.00	0.00
65.40	0.00	0.00
65.50	0.00	0.00
65.60	0.00	0.00
65.70	0.00	0.00
65.80	0.00	0.00
65.90	0.00	0.00
66.00	0.00	0.00
66.10	0.00	0.00
66.20	0.00	0.00
66.30	0.00	0.00
66.40	0.00	0.00
66.50	0.00	0.00
66.60	0.00	0.00
66.70	0.00	0.00
66.80	0.00	0.00
66.90	0.00	0.00
67.00	0.00	0.00
67.10	0.00	0.00
67.20	0.00	0.00
67.30	0.00	0.00
67.40	0.00	0.00
67.50	0.00	0.00
67.60	0.00	0.00
67.70	0.00	0.00
67.80	0.00	0.00
67.90	0.00	0.00
68.00	0.00	0.00
68.10	0.00	0.00
68.20	0.00	0.00
68.30	0.00	0.00
68.40	0.00	0.00
68.50	0.00	0.00
68.60	0.00	0.00
68.70	0.00	0.00
68.80	0.00	0.00
68.90	0.00	0.00
69.00	0.00	0.00
69.10	0.00	0.00
69.20	0.00	0.00
69.30	0.00	0.00
69.40	0.00	0.00
69.50	0.00	0.00
69.60	0.00	0.00
69.70	0.00	0.00
69.80	0.00	0.00
69.90	0.00	0.00
70.00	0.00	0.00
70.10	0.00	0.00
70.20	0.00	0.00
70.30	0.00	0.00
70.40	0.00	0.00
70.50	0.00	0.00
70.60	0.00	0.00
70.70	0.00	0.00
70.80	0.00	0.00
70.90	0.00	0.00
71.00	0.00	0.00
71.10	0.00	0.00
71.20	0.00	0.00
71.30	0.00	0.00
71.40	0.00	0.00
71.50	0.00	0.00
71.60	0.00	0.00
71.70	0.00	0.00
71.80	0.00	0.00
71.90	0.00	0.00
72.00	0.00	0.00


Primary Comparison
20.15 cfs @ 12.13 hrs
19.07 cfs @ 12.13 hrs
Subcat E-3
Subcat P-3
Primary (cfs)
Time (hours)

Primary Comparison

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
0.00	0.00	0.00	5.30	0.01	0.01	10.60	0.77	0.73
0.10	0.00	0.00	5.40	0.01	0.01	10.70	0.87	0.82
0.20	0.00	0.00	5.50	0.01	0.01	10.80	0.97	0.92
0.30	0.00	0.00	5.60	0.01	0.01	10.90	1.07	1.02
0.40	0.00	0.00	5.70	0.02	0.02	11.00	1.18	1.12
0.50	0.00	0.00	5.80	0.02	0.02	11.10	1.34	1.27
0.60	0.00	0.00	5.90	0.03	0.02	11.20	1.53	1.45
0.70	0.00	0.00	6.00	0.03	0.03	11.30	1.73	1.64
0.80	0.00	0.00	6.10	0.03	0.03	11.40	1.94	1.84
0.90	0.00	0.00	6.20	0.04	0.04	11.50	2.16	2.05
1.00	0.00	0.00	6.30	0.04	0.04	11.60	2.80	2.65
1.10	0.00	0.00	6.40	0.05	0.05	11.70	3.26	3.09
1.20	0.00	0.00	6.50	0.06	0.05	11.80	4.28	4.05
1.30	0.00	0.00	6.60	0.06	0.06	11.90	6.11	5.78
1.40	0.01	0.00	6.70	0.07	0.06	12.00	10.43	9.87
1.50	0.01	0.01	6.80	0.07	0.07	12.10	**18.55**	**17.56**
1.60	0.01	0.01	6.90	0.08	0.08	12.20	**12.87**	**12.18**
1.70	0.01	0.01	7.00	0.09	0.08	12.30	7.04	6.67
1.80	0.01	0.01	7.10	0.10	0.09	12.40	4.95	4.69
1.90	0.01	0.01	7.20	0.10	0.10	12.50	4.24	4.01
2.00	0.01	0.01	7.30	0.11	0.10	12.60	3.46	3.28
2.10	0.01	0.01	7.40	0.12	0.11	12.70	2.97	2.81
2.20	0.01	0.01	7.50	0.13	0.12	12.80	2.73	2.58
2.30	0.01	0.01	7.60	0.13	0.13	12.90	2.50	2.36
2.40	0.01	0.01	7.70	0.14	0.14	13.00	2.27	2.15
2.50	0.01	0.01	7.80	0.15	0.14	13.10	2.04	1.93
2.60	0.01	0.01	7.90	0.16	0.15	13.20	1.87	1.77
2.70	0.01	0.01	8.00	0.17	0.16	13.30	1.74	1.64
2.80	0.01	0.01	8.10	0.18	0.17	13.40	1.60	1.52
2.90	0.01	0.01	8.20	0.19	0.18	13.50	1.47	1.39
3.00	0.01	0.01	8.30	0.20	0.19	13.60	1.34	1.27
3.10	0.01	0.01	8.40	0.21	0.20	13.70	1.27	1.20
3.20	0.01	0.01	8.50	0.22	0.21	13.80	1.23	1.16
3.30	0.01	0.01	8.60	0.23	0.22	13.90	1.19	1.13
3.40	0.01	0.01	8.70	0.24	0.23	14.00	1.16	1.09
3.50	0.01	0.01	8.80	0.25	0.24	14.10	1.12	1.06
3.60	0.01	0.01	8.90	0.26	0.25	14.20	1.08	1.03
3.70	0.01	0.01	9.00	0.27	0.26	14.30	1.05	0.99
3.80	0.01	0.01	9.10	0.29	0.28	14.40	1.01	0.96
3.90	0.01	0.01	9.20	0.31	0.30	14.50	0.97	0.92
4.00	0.01	0.01	9.30	0.34	0.32	14.60	0.94	0.89
4.10	0.01	0.01	9.40	0.36	0.34	14.70	0.90	0.85
4.20	0.01	0.01	9.50	0.39	0.37	14.80	0.86	0.82
4.30	0.01	0.01	9.60	0.42	0.39	14.90	0.83	0.78
4.40	0.01	0.01	9.70	0.44	0.42	15.00	0.79	0.75
4.50	0.01	0.01	9.80	0.47	0.45	15.10	0.75	0.71
4.60	0.01	0.01	9.90	0.50	0.47	15.20	0.73	0.69
4.70	0.01	0.01	10.00	0.53	0.50	15.30	0.72	0.68
4.80	0.01	0.01	10.10	0.56	0.53	15.40	0.71	0.67
4.90	0.01	0.01	10.20	0.60	0.56	15.50	0.70	0.66
5.00	0.01	0.01	10.30	0.63	0.60	15.60	0.69	0.65
5.10	0.01	0.01	10.40	0.66	0.63	15.70	0.68	0.64
5.20	0.01	0.01	10.50	0.70	0.66	15.80	0.67	0.63

Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
15.90	0.66	0.62	21.20	0.34	0.33	26.50	0.00	0.00
16.00	0.65	0.62	21.30	0.34	0.32	26.60	0.00	0.00
16.10	0.64	0.61	21.40	0.34	0.32	26.70	0.00	0.00
16.20	0.63	0.59	21.50	0.34	0.32	26.80	0.00	0.00
16.30	0.62	0.59	21.60	0.33	0.32	26.90	0.00	0.00
16.40	0.61	0.58	21.70	0.33	0.31	27.00	0.00	0.00
16.50	0.60	0.56	21.80	0.33	0.31	27.10	0.00	0.00
16.60	0.59	0.56	21.90	0.33	0.31	27.20	0.00	0.00
16.70	0.58	0.55	22.00	0.32	0.31	27.30	0.00	0.00
16.80	0.57	0.54	22.10	0.32	0.30	27.40	0.00	0.00
16.90	0.56	0.53	22.20	0.32	0.30	27.50	0.00	0.00
17.00	0.55	0.52	22.30	0.31	0.30	27.60	0.00	0.00
17.10	0.53	0.51	22.40	0.31	0.30	27.70	0.00	0.00
17.20	0.52	0.50	22.50	0.31	0.29	27.80	0.00	0.00
17.30	0.51	0.49	22.60	0.31	0.29	27.90	0.00	0.00
17.40	0.50	0.48	22.70	0.30	0.29	28.00	0.00	0.00
17.50	0.49	0.47	22.80	0.30	0.29	28.10	0.00	0.00
17.60	0.48	0.46	22.90	0.30	0.28	28.20	0.00	0.00
17.70	0.47	0.45	23.00	0.30	0.28	28.30	0.00	0.00
17.80	0.46	0.44	23.10	0.29	0.28	28.40	0.00	0.00
17.90	0.45	0.43	23.20	0.29	0.28	28.50	0.00	0.00
18.00	0.44	0.42	23.30	0.29	0.27	28.60	0.00	0.00
18.10	0.43	0.41	23.40	0.29	0.27	28.70	0.00	0.00
18.20	0.42	0.40	23.50	0.28	0.27	28.80	0.00	0.00
18.30	0.42	0.40	23.60	0.28	0.27	28.90	0.00	0.00
18.40	0.42	0.40	23.70	0.28	0.26	29.00	0.00	0.00
18.50	0.41	0.39	23.80	0.27	0.26	29.10	0.00	0.00
18.60	0.41	0.39	23.90	0.27	0.26	29.20	0.00	0.00
18.70	0.41	0.39	24.00	0.27	0.26	29.30	0.00	0.00
18.80	0.41	0.39	24.10	0.10	0.09	29.40	0.00	0.00
18.90	0.40	0.38	24.20	0.01	0.01	29.50	0.00	0.00
19.00	0.40	0.38	24.30	0.00	0.00	29.60	0.00	0.00
19.10	0.40	0.38	24.40	0.00	0.00	29.70	0.00	0.00
19.20	0.40	0.38	24.50	0.00	0.00	29.80	0.00	0.00
19.30	0.39	0.37	24.60	0.00	0.00	29.90	0.00	0.00
19.40	0.39	0.37	24.70	0.00	0.00	30.00	0.00	0.00
19.50	0.39	0.37	24.80	0.00	0.00	30.10	0.00	0.00
19.60	0.39	0.37	24.90	0.00	0.00	30.20	0.00	0.00
19.70	0.38	0.36	25.00	0.00	0.00	30.30	0.00	0.00
19.80	0.38	0.36	25.10	0.00	0.00	30.40	0.00	0.00
19.90	0.38	0.36	25.20	0.00	0.00	30.50	0.00	0.00
20.00	0.38	0.36	25.30	0.00	0.00	30.60	0.00	0.00
20.10	0.37	0.35	25.40	0.00	0.00	30.70	0.00	0.00
20.20	0.37	0.35	25.50	0.00	0.00	30.80	0.00	0.00
20.30	0.37	0.35	25.60	0.00	0.00	30.90	0.00	0.00
20.40	0.37	0.35	25.70	0.00	0.00	31.00	0.00	0.00
20.50	0.36	0.34	25.80	0.00	0.00	31.10	0.00	0.00
20.60	0.36	0.34	25.90	0.00	0.00	31.20	0.00	0.00
20.70	0.36	0.34	26.00	0.00	0.00	31.30	0.00	0.00
20.80	0.35	0.34	26.10	0.00	0.00	31.40	0.00	0.00
20.90	0.35	0.33	26.20	0.00	0.00	31.50	0.00	0.00
21.00	0.35	0.33	26.30	0.00	0.00	31.60	0.00	0.00
21.10	0.35	0.33	26.40	0.00	0.00	31.70	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
31.80	0.00	0.00	37.10	0.00	0.00	42.40	0.00	0.00
31.90	0.00	0.00	37.20	0.00	0.00	42.50	0.00	0.00
32.00	0.00	0.00	37.30	0.00	0.00	42.60	0.00	0.00
32.10	0.00	0.00	37.40	0.00	0.00	42.70	0.00	0.00
32.20	0.00	0.00	37.50	0.00	0.00	42.80	0.00	0.00
32.30	0.00	0.00	37.60	0.00	0.00	42.90	0.00	0.00
32.40	0.00	0.00	37.70	0.00	0.00	43.00	0.00	0.00
32.50	0.00	0.00	37.80	0.00	0.00	43.10	0.00	0.00
32.60	0.00	0.00	37.90	0.00	0.00	43.20	0.00	0.00
32.70	0.00	0.00	38.00	0.00	0.00	43.30	0.00	0.00
32.80	0.00	0.00	38.10	0.00	0.00	43.40	0.00	0.00
32.90	0.00	0.00	38.20	0.00	0.00	43.50	0.00	0.00
33.00	0.00	0.00	38.30	0.00	0.00	43.60	0.00	0.00
33.10	0.00	0.00	38.40	0.00	0.00	43.70	0.00	0.00
33.20	0.00	0.00	38.50	0.00	0.00	43.80	0.00	0.00
33.30	0.00	0.00	38.60	0.00	0.00	43.90	0.00	0.00
33.40	0.00	0.00	38.70	0.00	0.00	44.00	0.00	0.00
33.50	0.00	0.00	38.80	0.00	0.00	44.10	0.00	0.00
33.60	0.00	0.00	38.90	0.00	0.00	44.20	0.00	0.00
33.70	0.00	0.00	39.00	0.00	0.00	44.30	0.00	0.00
33.80	0.00	0.00	39.10	0.00	0.00	44.40	0.00	0.00
33.90	0.00	0.00	39.20	0.00	0.00	44.50	0.00	0.00
34.00	0.00	0.00	39.30	0.00	0.00	44.60	0.00	0.00
34.10	0.00	0.00	39.40	0.00	0.00	44.70	0.00	0.00
34.20	0.00	0.00	39.50	0.00	0.00	44.80	0.00	0.00
34.30	0.00	0.00	39.60	0.00	0.00	44.90	0.00	0.00
34.40	0.00	0.00	39.70	0.00	0.00	45.00	0.00	0.00
34.50	0.00	0.00	39.80	0.00	0.00	45.10	0.00	0.00
34.60	0.00	0.00	39.90	0.00	0.00	45.20	0.00	0.00
34.70	0.00	0.00	40.00	0.00	0.00	45.30	0.00	0.00
34.80	0.00	0.00	40.10	0.00	0.00	45.40	0.00	0.00
34.90	0.00	0.00	40.20	0.00	0.00	45.50	0.00	0.00
35.00	0.00	0.00	40.30	0.00	0.00	45.60	0.00	0.00
35.10	0.00	0.00	40.40	0.00	0.00	45.70	0.00	0.00
35.20	0.00	0.00	40.50	0.00	0.00	45.80	0.00	0.00
35.30	0.00	0.00	40.60	0.00	0.00	45.90	0.00	0.00
35.40	0.00	0.00	40.70	0.00	0.00	46.00	0.00	0.00
35.50	0.00	0.00	40.80	0.00	0.00	46.10	0.00	0.00
35.60	0.00	0.00	40.90	0.00	0.00	46.20	0.00	0.00
35.70	0.00	0.00	41.00	0.00	0.00	46.30	0.00	0.00
35.80	0.00	0.00	41.10	0.00	0.00	46.40	0.00	0.00
35.90	0.00	0.00	41.20	0.00	0.00	46.50	0.00	0.00
36.00	0.00	0.00	41.30	0.00	0.00	46.60	0.00	0.00
36.10	0.00	0.00	41.40	0.00	0.00	46.70	0.00	0.00
36.20	0.00	0.00	41.50	0.00	0.00	46.80	0.00	0.00
36.30	0.00	0.00	41.60	0.00	0.00	46.90	0.00	0.00
36.40	0.00	0.00	41.70	0.00	0.00	47.00	0.00	0.00
36.50	0.00	0.00	41.80	0.00	0.00	47.10	0.00	0.00
36.60	0.00	0.00	41.90	0.00	0.00	47.20	0.00	0.00
36.70	0.00	0.00	42.00	0.00	0.00	47.30	0.00	0.00
36.80	0.00	0.00	42.10	0.00	0.00	47.40	0.00	0.00
36.90	0.00	0.00	42.20	0.00	0.00	47.50	0.00	0.00
37.00	0.00	0.00	42.30	0.00	0.00	47.60	0.00	0.00

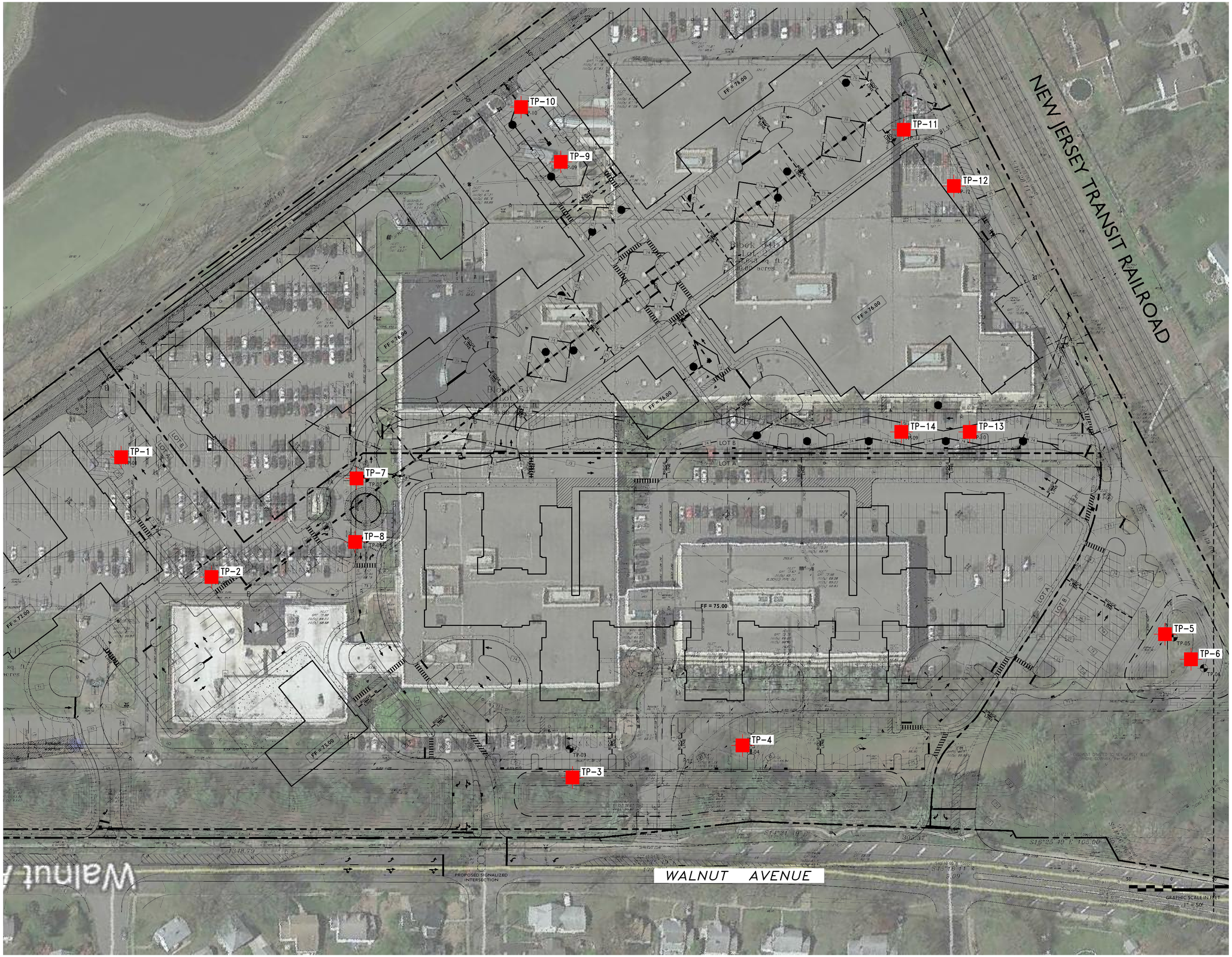
Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)	Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
47.70	0.00	0.00	53.00	0.00	0.00	58.30	0.00	0.00
47.80	0.00	0.00	53.10	0.00	0.00	58.40	0.00	0.00
47.90	0.00	0.00	53.20	0.00	0.00	58.50	0.00	0.00
48.00	0.00	0.00	53.30	0.00	0.00	58.60	0.00	0.00
48.10	0.00	0.00	53.40	0.00	0.00	58.70	0.00	0.00
48.20	0.00	0.00	53.50	0.00	0.00	58.80	0.00	0.00
48.30	0.00	0.00	53.60	0.00	0.00	58.90	0.00	0.00
48.40	0.00	0.00	53.70	0.00	0.00	59.00	0.00	0.00
48.50	0.00	0.00	53.80	0.00	0.00	59.10	0.00	0.00
48.60	0.00	0.00	53.90	0.00	0.00	59.20	0.00	0.00
48.70	0.00	0.00	54.00	0.00	0.00	59.30	0.00	0.00
48.80	0.00	0.00	54.10	0.00	0.00	59.40	0.00	0.00
48.90	0.00	0.00	54.20	0.00	0.00	59.50	0.00	0.00
49.00	0.00	0.00	54.30	0.00	0.00	59.60	0.00	0.00
49.10	0.00	0.00	54.40	0.00	0.00	59.70	0.00	0.00
49.20	0.00	0.00	54.50	0.00	0.00	59.80	0.00	0.00
49.30	0.00	0.00	54.60	0.00	0.00	59.90	0.00	0.00
49.40	0.00	0.00	54.70	0.00	0.00	60.00	0.00	0.00
49.50	0.00	0.00	54.80	0.00	0.00	60.10	0.00	0.00
49.60	0.00	0.00	54.90	0.00	0.00	60.20	0.00	0.00
49.70	0.00	0.00	55.00	0.00	0.00	60.30	0.00	0.00
49.80	0.00	0.00	55.10	0.00	0.00	60.40	0.00	0.00
49.90	0.00	0.00	55.20	0.00	0.00	60.50	0.00	0.00
50.00	0.00	0.00	55.30	0.00	0.00	60.60	0.00	0.00
50.10	0.00	0.00	55.40	0.00	0.00	60.70	0.00	0.00
50.20	0.00	0.00	55.50	0.00	0.00	60.80	0.00	0.00
50.30	0.00	0.00	55.60	0.00	0.00	60.90	0.00	0.00
50.40	0.00	0.00	55.70	0.00	0.00	61.00	0.00	0.00
50.50	0.00	0.00	55.80	0.00	0.00	61.10	0.00	0.00
50.60	0.00	0.00	55.90	0.00	0.00	61.20	0.00	0.00
50.70	0.00	0.00	56.00	0.00	0.00	61.30	0.00	0.00
50.80	0.00	0.00	56.10	0.00	0.00	61.40	0.00	0.00
50.90	0.00	0.00	56.20	0.00	0.00	61.50	0.00	0.00
51.00	0.00	0.00	56.30	0.00	0.00	61.60	0.00	0.00
51.10	0.00	0.00	56.40	0.00	0.00	61.70	0.00	0.00
51.20	0.00	0.00	56.50	0.00	0.00	61.80	0.00	0.00
51.30	0.00	0.00	56.60	0.00	0.00	61.90	0.00	0.00
51.40	0.00	0.00	56.70	0.00	0.00	62.00	0.00	0.00
51.50	0.00	0.00	56.80	0.00	0.00	62.10	0.00	0.00
51.60	0.00	0.00	56.90	0.00	0.00	62.20	0.00	0.00
51.70	0.00	0.00	57.00	0.00	0.00	62.30	0.00	0.00
51.80	0.00	0.00	57.10	0.00	0.00	62.40	0.00	0.00
51.90	0.00	0.00	57.20	0.00	0.00	62.50	0.00	0.00
52.00	0.00	0.00	57.30	0.00	0.00	62.60	0.00	0.00
52.10	0.00	0.00	57.40	0.00	0.00	62.70	0.00	0.00
52.20	0.00	0.00	57.50	0.00	0.00	62.80	0.00	0.00
52.30	0.00	0.00	57.60	0.00	0.00	62.90	0.00	0.00
52.40	0.00	0.00	57.70	0.00	0.00	63.00	0.00	0.00
52.50	0.00	0.00	57.80	0.00	0.00	63.10	0.00	0.00
52.60	0.00	0.00	57.90	0.00	0.00	63.20	0.00	0.00
52.70	0.00	0.00	58.00	0.00	0.00	63.30	0.00	0.00
52.80	0.00	0.00	58.10	0.00	0.00	63.40	0.00	0.00
52.90	0.00	0.00	58.20	0.00	0.00	63.50	0.00	0.00

Primary Comparison (continued)

Time (hours)	Subcat E-3 (cfs)	Subcat P-3 (cfs)
63.60	0.00	0.00
63.70	0.00	0.00
63.80	0.00	0.00
63.90	0.00	0.00
64.00	0.00	0.00
64.10	0.00	0.00
64.20	0.00	0.00
64.30	0.00	0.00
64.40	0.00	0.00
64.50	0.00	0.00
64.60	0.00	0.00
64.70	0.00	0.00
64.80	0.00	0.00
64.90	0.00	0.00
65.00	0.00	0.00
65.10	0.00	0.00
65.20	0.00	0.00
65.30	0.00	0.00
65.40	0.00	0.00
65.50	0.00	0.00
65.60	0.00	0.00
65.70	0.00	0.00
65.80	0.00	0.00
65.90	0.00	0.00
66.00	0.00	0.00
66.10	0.00	0.00
66.20	0.00	0.00
66.30	0.00	0.00
66.40	0.00	0.00
66.50	0.00	0.00
66.60	0.00	0.00
66.70	0.00	0.00
66.80	0.00	0.00
66.90	0.00	0.00
67.00	0.00	0.00
67.10	0.00	0.00
67.20	0.00	0.00
67.30	0.00	0.00
67.40	0.00	0.00
67.50	0.00	0.00
67.60	0.00	0.00
67.70	0.00	0.00
67.80	0.00	0.00
67.90	0.00	0.00
68.00	0.00	0.00
68.10	0.00	0.00
68.20	0.00	0.00
68.30	0.00	0.00
68.40	0.00	0.00
68.50	0.00	0.00
68.60	0.00	0.00
68.70	0.00	0.00
68.80	0.00	0.00
68.90	0.00	0.00
69.00	0.00	0.00
69.10	0.00	0.00
69.20	0.00	0.00
69.30	0.00	0.00
69.40	0.00	0.00
69.50	0.00	0.00
69.60	0.00	0.00
69.70	0.00	0.00
69.80	0.00	0.00
69.90	0.00	0.00
70.00	0.00	0.00
70.10	0.00	0.00
70.20	0.00	0.00
70.30	0.00	0.00
70.40	0.00	0.00
70.50	0.00	0.00
70.60	0.00	0.00
70.70	0.00	0.00
70.80	0.00	0.00
70.90	0.00	0.00
71.00	0.00	0.00
71.10	0.00	0.00
71.20	0.00	0.00
71.30	0.00	0.00
71.40	0.00	0.00
71.50	0.00	0.00
71.60	0.00	0.00
71.70	0.00	0.00
71.80	0.00	0.00
71.90	0.00	0.00
72.00	0.00	0.00

APPENDIX D
SUBSURFACE STORMWATER INVESTIGATION RESULTS



GRAPHIC SCALE

50 0 25 50 100

1 inch = 50 ft.

KEY:

TP-1 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of Melick-Tully and Associates, a Division of GZA, Report No. 26.0091513.00 and should be read together with the report for complete evaluation.

2. General layout was obtained from a drawing prepared by Stonefield Eng., entitled "Proposed Residential Redevelopment", dated 8/16/18, scale 1"= 50', and an aerial photo downloaded from Google Earth Pro.

PLOT PLAN

PROPOSED STORMWATER BASINS
CRANFORD, NEW JERSEY
HARTZ MOUNTAIN INDUSTRIES

MELICK-TULLY AND ASSOCIATES
A Division of GZA
Geotechnical Engineers & Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356-3400

JOB NO.	FILE NO.
26.0091513.00	–

DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	CDM	9/26/18	1"=50'	1

LOG OF TEST PIT

TEST PIT NO. 1

COMPLETION DATE: 9/19/18 | SURFACE ELEVATION: +71 ft. (±) | WATER LEVEL: *

JOB NUMBER: 25.0091513.00 | READING DATE: 9/19/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
			0-10	Fill - 6" Asphalt atop 4" crushed stone	
				Red (2.5YR, 4/6) silt loam, 10% gravel, 5% cobbles, weak fine massive, moist, friable, few coarse distinct pink (5YR, 7/4) mottles encountered @ 60 inches	
5	S1, T1		10-123		5
10					10
				Test pit completed @ 10'-3" *Groundwater seepage not encountered	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3A

MELICK-TULLY AND ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

LOG OF TEST PIT

TEST PIT NO. 2

COMPLETION DATE: 9/19/18 | SURFACE ELEVATION: +73 ft. (±) | WATER LEVEL: *

JOB NUMBER: 25.0091513.00 | READING DATE: 9/19/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
			0-11	Fill - 6" Asphalt atop 5" crushed stone	
5	S1, T1		11-120	Reddish brown (2.5YR, 4/4) silt loam, 5% cobbles, weak medium massive, moist, firm, common coarse distinct white (5YR, 8/1) mottles encountered @ 14 inches to 32 inches	5
10				Test pit completed @ 10' *Groundwater seepage not encountered	10
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3B

MELICK-TULLY AND ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

LOG OF TEST PIT

TEST PIT NO. 3

COMPLETION DATE: 9/20/18
JOB NUMBER: 25.0091513.00

SURFACE ELEVATION: +72 ft. (±)

WATER LEVEL: *
READING DATE: 9/20/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
			0-18	Fill - Reddish brown (5YR, 4/3) clay loam, moderate medium angular blocky, moist, friable, gradual irregular boundary, few fine roots	
			18-66	Reddish gray (5YR, 5/2) clay loam, moderate medium angular blocky, moist, friable, gradual irregular boundary, few fine roots	
5	S1, T1				5
	S2, T2		66-132	Red (2.5YR, 4/6) clay loam, 15% gravel, moderate medium angular blocky, moist, friable, few fine faint gray (10YR, 6/1) mottles encountered @ 66 inches to 132 inches	
	S3, T3				
10					10
				Test pit completed @ 11' *Groundwater seepage not encountered	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3C

MELICK-TULLY AND ASSOCIATES,
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LOG OF TEST PIT

TEST PIT NO. 4

COMPLETION DATE: 9/21/18
JOB NUMBER: 25.0091513.00

SURFACE ELEVATION: +71.5 ft. (±)

WATER LEVEL: *
READING DATE: 9/21/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
				Topsoil - Reddish brown (5YR, 4/4) silt loam, weak fine angular blocky, moist, friable, abrupt smooth boundary, few fine roots	
			4-48	Fill - Reddish brown (2.5YR, 4/4) silt loam, 10% gravel, 10% cobbles, moderate medium angular blocky, moist, friable, gradual irregular boundary	
			48-54	Brown (10YR, 4/3) silt loam, weak fine angular blocky, moist, friable, clear wavy boundary	
5	S1, T1		54-72	Brownish yellow (10YR, 6/6) clay loam, moderate medium angular blocky, moist, friable, clear wavy boundary	5
	S2, T2		72-120	Reddish brown (2.5YR, 4/4) sandy loam to silt loam, 10% gravel, weak fine angular blocky, moist, friable, few fine faint gray (10YR, 6/1) mottles encountered @ 96 inches to 120 inches	
10				Test pit completed @ 10' *Groundwater seepage not encountered	10
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3D

MELICK-TULLY AND ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

LOG OF TEST PIT

TEST PIT NO. 5

COMPLETION DATE: 9/21/18 | SURFACE ELEVATION: +75 ft. (±) | WATER LEVEL: *

JOB NUMBER: 25.0091513.00 | READING DATE: 9/21/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
			0-9	Topsoil - Reddish brown (5YR, 4/4) silt loam, weak fine angular blocky, moist, friable, abrupt smooth boundary, few fine roots	
	S1, T1		9-40	Weak red (10R, 4/4) clay loam, moderate medium angular blocky, moist, friable, clear wavy boundary, common medium distinct gray (10YR, 6/2) mottles encountered @ 36 inches to 40 inches	
5	S2, T2		40-128	Weak red (10R, 4/4) silt loam, 10% gravel, 10% cobbles, moderate medium angular blocky, moist, friable, few gray (10YR, 6/7) mottles encountered @ 40 inches to 128 inches	5
10					10
				Test pit completed @ 10'-6" *Groundwater seepage not encountered	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3E

MELICK-TULLY AND ASSOCIATES,
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LOG OF TEST PIT

TEST PIT NO. 6

COMPLETION DATE: 9/21/18
JOB NUMBER: 25.0091513.00

SURFACE ELEVATION: +75 ft. (±)

WATER LEVEL: *
READING DATE: 9/21/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
	S1, T1		4-24	Topsoil - Reddish brown (5YR, 4/4) silt loam, weak fine angular blocky, moist, friable, abrupt smooth boundary, few fine to medium roots	
			24-120	Reddish brown (2.5YR, 4/4) silt loam, 10% gravel, moderate medium angular blocky, moist, friable, clear wavy boundary, few fine roots	
5	S2, T2			Reddish brown (2.5YR, 4/4) silt loam, 15% gravel, 10% cobbles, moderate medium angular blocky, moist, firm, common medium distinct gray (10YR, 6/1) mottles encountered @ 24 inches to 120 inches	5
10				Test pit completed @ 10' *Groundwater seepage not encountered	10
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3F

MELICK-TULLY AND ASSOCIATES,
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LOG OF TEST PIT

TEST PIT NO. 7

COMPLETION DATE: 9/26/18
JOB NUMBER: 25.0091513.00

SURFACE ELEVATION: +74 ft. (±)

WATER LEVEL: *
READING DATE: 9/26/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
			0-12	Topsoil - Weak red (2.5YR, 4/2) silt loam, weak fine angular blocky, moist, friable, abrupt smooth boundary, few fine roots	
	S1, T1		12-84	Fill - Brown (10YR, 5/3) sandy loam to silt loam, moderate medium angular blocky, moist, friable, gradual irrgular boundary	
5	S2, T2				5
	S3, T3		84-120	Dusky red (10R, 3/4) silt loam, 10% gravel, 5% cobbles, moderate medium angular blocky, moist, friable, few fine faint gray (10YR, 6/1) mottles encountered @ 84 inches to 120 inches	
10					10
				Test pit completed @ 10' *Groundwater seepage not encountered	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3G

MELICK-TULLY AND ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

LOG OF TEST PIT

TEST PIT NO. 8

COMPLETION DATE: 9/20/18
JOB NUMBER: 25.0091513.00

SURFACE ELEVATION: +74 ft. (±)

WATER LEVEL: *
READING DATE: 9/20/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
			0-4	Topsoil - Weak red (2.5YR, 4/2) silt loam, moderate medium angular blocky, moist, friable, abrupt smooth boundary, few fine roots	
	S1, T1		4-120	Dusky red (10R, 3/4) silt loam, 15% gravel, moderate medium, moist, friable, few fine faint gray (10YR, 6/1) mottles encountered @ 42 inches to 120 inches	
5	S2, T2				5
	T3				
10				Test pit completed @ 10' *Groundwater seepage not encountered	10
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3H

MELICK-TULLY AND ASSOCIATES,
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LOG OF TEST PIT

TEST PIT NO. 9

COMPLETION DATE: 9/20/18
JOB NUMBER: 25.0091513.00

SURFACE ELEVATION: +75 ft. (±)

WATER LEVEL: *
READING DATE: 9/20/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
				6" Asphalt	
			6-24	Fill - 2.5" Crushed stone	
	S1, T1		24-36	Light reddish brown (2.5YR, 6/3) clay loam, moderate medium angular blocky, moist, firm, clear wavy boundary	
5	S2, T2		36-132	Weak red (10R, 4/4) silt loam, 10% gravel, 5% cobbles, moderate medium angular blocky, moist, friable, few fine faint gray (10YR, 5/1) mottles encountered @ 36 inches to 132 inches	5
	S3, T3				
10					10
				Test pit completed @ 11' *Groundwater seepage not encountered	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3I

MELICK-TULLY AND ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

LOG OF TEST PIT

TEST PIT NO. 10

COMPLETION DATE: 9/20/18 | SURFACE ELEVATION: +74 ft. (±) | WATER LEVEL: 4'

JOB NUMBER: 25.0091513.00 | READING DATE: 9/20/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
			0-10	10" Asphalt	
	S1, T1		10-24	Fill - 2.5" Crushed stone	
			24-48	Brown (7.5YR, 4/4) clay loam, moderate medium angular blocky, moist, firm, gradual irregular boundary, many coarse prominent gray (10YR, 6/1) mottles encountered @ 24 inches to 48 inches	
5	S2, T2		48-132	Weak red (10R, 4/4) silt loam, 10% gravel, moderate medium angular blocky, moist to wet, friable, friable, few fine faint gray (10YR, 6/1) mottles encountered @ 48 inches to 132 inches	5
10	T3				10
				Test pit completed @ 11' Slight groundwater seepage encountered @ 4'	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3J

MELICK-TULLY AND ASSOCIATES,
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LOG OF TEST PIT

TEST PIT NO. 11

COMPLETION DATE: 9/20/18 | SURFACE ELEVATION: +76 ft. (±) | WATER LEVEL: 4'

JOB NUMBER: 25.0091513.00 | READING DATE: 9/20/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
				5" Asphalt	
			5-12	Topsoil - Dark Brown (7.5YR, 3/4) silt loam, moderate medium angular blocky, moist, friable, abrupt smooth boundary	
	S1, T1		12-36	Reddish brown (2.5YR, 4/4) clay loam, moderate medium angular blocky, moist, firm, clear wavy boundary, few fine faint gray (10YR, 6/1) mottles encountered @ 12 inches to 36 inches	
5	S2, T2		36-132	Weak red (10R, 4/4) sandy loam to silt loam, 10% gravel, moderate medium angular blocky, wet, friable, friable, few fine faint gray (10YR, 6/1) mottles encountered @ 36 inches to 132 inches	5
10	S3, T3				10
				Test pit completed @ 11'	
				Slight groundwater seepage encountered @ 4'	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3K

MELICK-TULLY AND ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

LOG OF TEST PIT

TEST PIT NO. 12

COMPLETION DATE: 9/20/18 | SURFACE ELEVATION: +75 ft. (±) | WATER LEVEL: *

JOB NUMBER: 25.0091513.00 | READING DATE: 9/20/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
				6" Asphalt	
			6-12	Reddish brown (5YR, 4/3) sandy loam, 10% gravel, moderate medium angular, moist, friable, abrupt smooth boundary, few fine roots	
	S1, T1		12-30	Red (2.5YR, 4/6) clay loam, 15% gravel, moderate medium angular blocky, moist, firm, gradual irregular boundary, few fine faint gray (10YR, 6/1) mottles encountered @ 18 inches to 30 inches	
5	S2, T2		30-132	Reddish brown (2.5YR, 4/4) clay loam, 10% gravel, 5% cobbles, moderate medium angular blocky, moist, friable, few fine faint light gray (10YR, 7/1) mottles encountered @ 30 inches to 132 inches	5
	T3				
10					10
				Test pit completed @ 11'	
				*Groundwater seepage not encountered	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3L

MELICK-TULLY AND ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

LOG OF TEST PIT

TEST PIT NO. 13

COMPLETION DATE: 9/21/18 | SURFACE ELEVATION: +75 ft. (±) | WATER LEVEL: *

JOB NUMBER: 25.0091513.00 | READING DATE: 9/21/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
				6" Asphalt	
	S1, T1		6-36	Fill - Reddish brown (5YR, 4/4) clay loam, moderate medium angular blocky moist, friable, gradual irregular boundary	
	S2		36-42	Fill - Crushed stone	
5	S3, T2		42-120	Reddish brown (2.5YR, 4/4) sandy clay loam, 10% gravel, 10% cobbles, moderate medium angular blocky, moist, firm, few fine faint light gray (10YR, 6/1) mottles encountered @ 66 inches to 120 inches	5
10					10
				Test pit completed @ 10'	
				*Groundwater seepage not encountered	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3M

MELICK-TULLY AND ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

LOG OF TEST PIT

TEST PIT NO. 14

COMPLETION DATE: 9/21/18 | SURFACE ELEVATION: +75 ft. (±) | WATER LEVEL: *

JOB NUMBER: 25.0091513.00 | READING DATE: 9/21/18

DEPTH	SAMPLES (1)	MOISTURE CONTENT (%)	DEPTH (INCHES)	DESCRIPTION	DEPTH
			0-6	6" Asphalt	
	S1, T1		6-36	Fill - Reddish brown (5YR, 4/4) clay loam, moderate medium angular blocky moist, firm, gradual irregular boundary	
	S2		36-48	Fill - Crushed stone	
5	S3, T2		48-132	Reddish brown (2.5YR, 4/4) sandy clay loam, 20% gravel, 10% cobbles, moderate medium angular blocky, moist, friable, few fine faint light gray (10YR, 6/1) mottles encountered @ 68 inches to 132 inches	5
10					10
				Test pit completed @ 11' *Groundwater seepage not encountered	
15					15
20					20

NOTES FOR COLUMNS:
1. SAMPLE AT AVERAGE SAMPLING DEPTH

SOIL DESCRIPTION MODIFIERS:
TRACE 0 - 10%
LITTLE 10 - 20%
SOME 20 - 35%
AND OVER 35%

Typist/Date: CDM/pm 9/18

Sheet: 1 of 1 PLATE: 3N

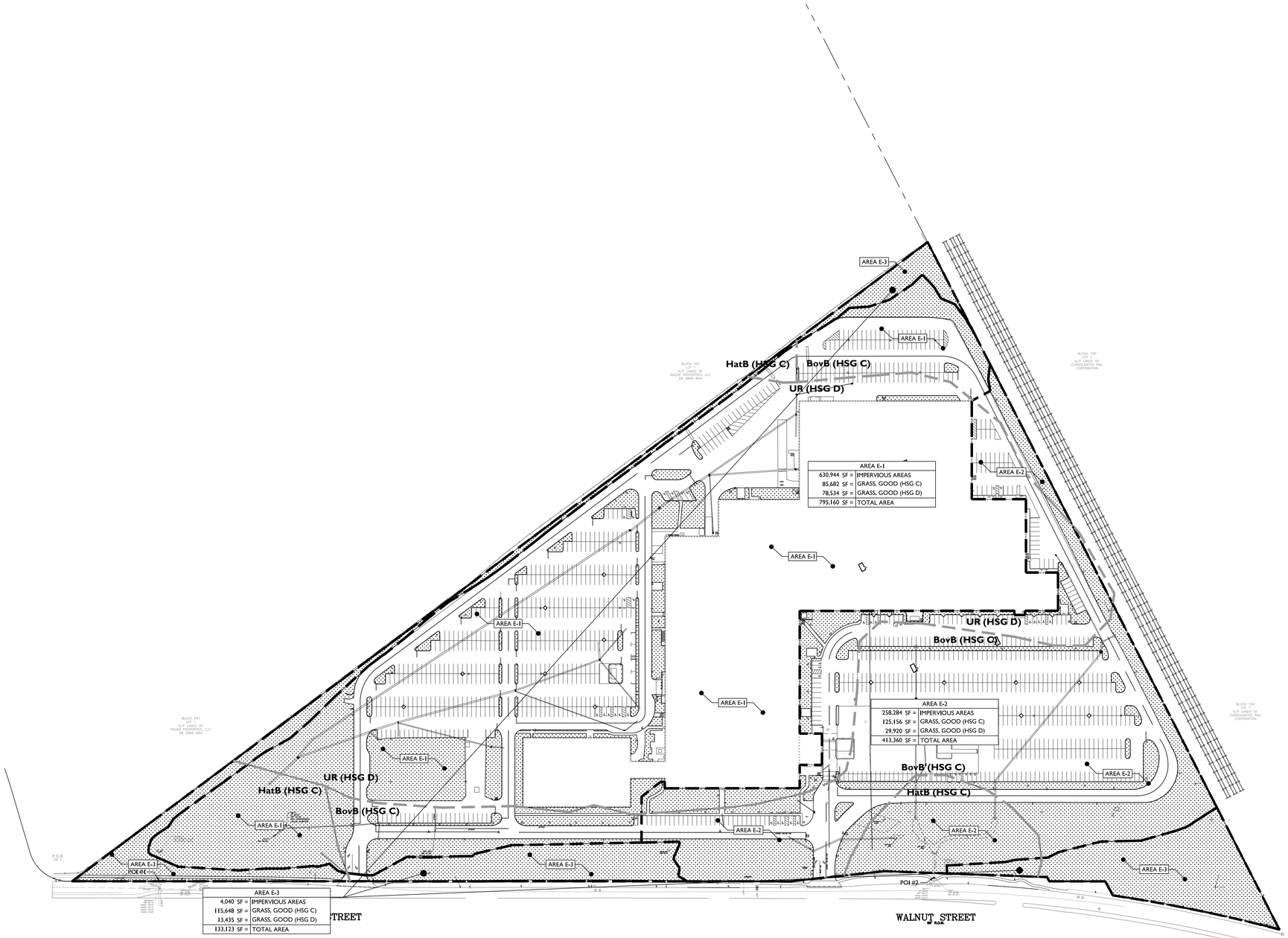
MELICK-TULLY AND ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

APPENDIX E
DRAINAGE AREA MAPS

INVENTORY

EXISTING DRAINAGE AREA MAP

PROPOSED DRAINAGE AREA MAP



AREA E-1	
630,944 SF =	IMPERVIOUS AREAS
85,682 SF =	GRASS, GOOD (HSG C)
78,534 SF =	GRASS, GOOD (HSG D)
795,160 SF =	TOTAL AREA

AREA E-2	
258,284 SF =	IMPERVIOUS AREAS
125,156 SF =	GRASS, GOOD (HSG C)
29,920 SF =	GRASS, GOOD (HSG D)
413,360 SF =	TOTAL AREA

AREA E-3	
4,040 SF =	IMPERVIOUS AREAS
115,648 SF =	GRASS, GOOD (HSG C)
13,435 SF =	GRASS, GOOD (HSG D)
133,123 SF =	TOTAL AREA

SYMBOL	DESCRIPTION
	EXISTING DRAINAGE AREA
	SOIL TYPE BOUNDARY
	EXISTING GRASSED AREA

100' 0' 100' 200'

GRAPHIC SCALE IN FEET
1" = 100'

ISSUE	DATE	BY	DESCRIPTION
1	10/04/2022	FT	ISSUED FOR REVIEW

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design
Rutherford, NJ · Princeton, NJ · Long Island City, NY · Royal Oak, MI
www.stonefieldeng.com
Headquarters: 92 Park Avenue, Rutherford, NJ 07070
Phone 201.340.4468 · Fax 201.340.4472

DRAINAGE AREA MAPS

HARTZ MOUNTAIN INDUSTRIES
PROPOSED REDEVELOPMENT PLAN

BLOCK 541, LOT 2
750 WALNUT AVENUE
TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY

JEFFREY A. MARTELL, P.E.
NEW JERSEY LICENSE No. 47290
LICENSED PROFESSIONAL ENGINEER

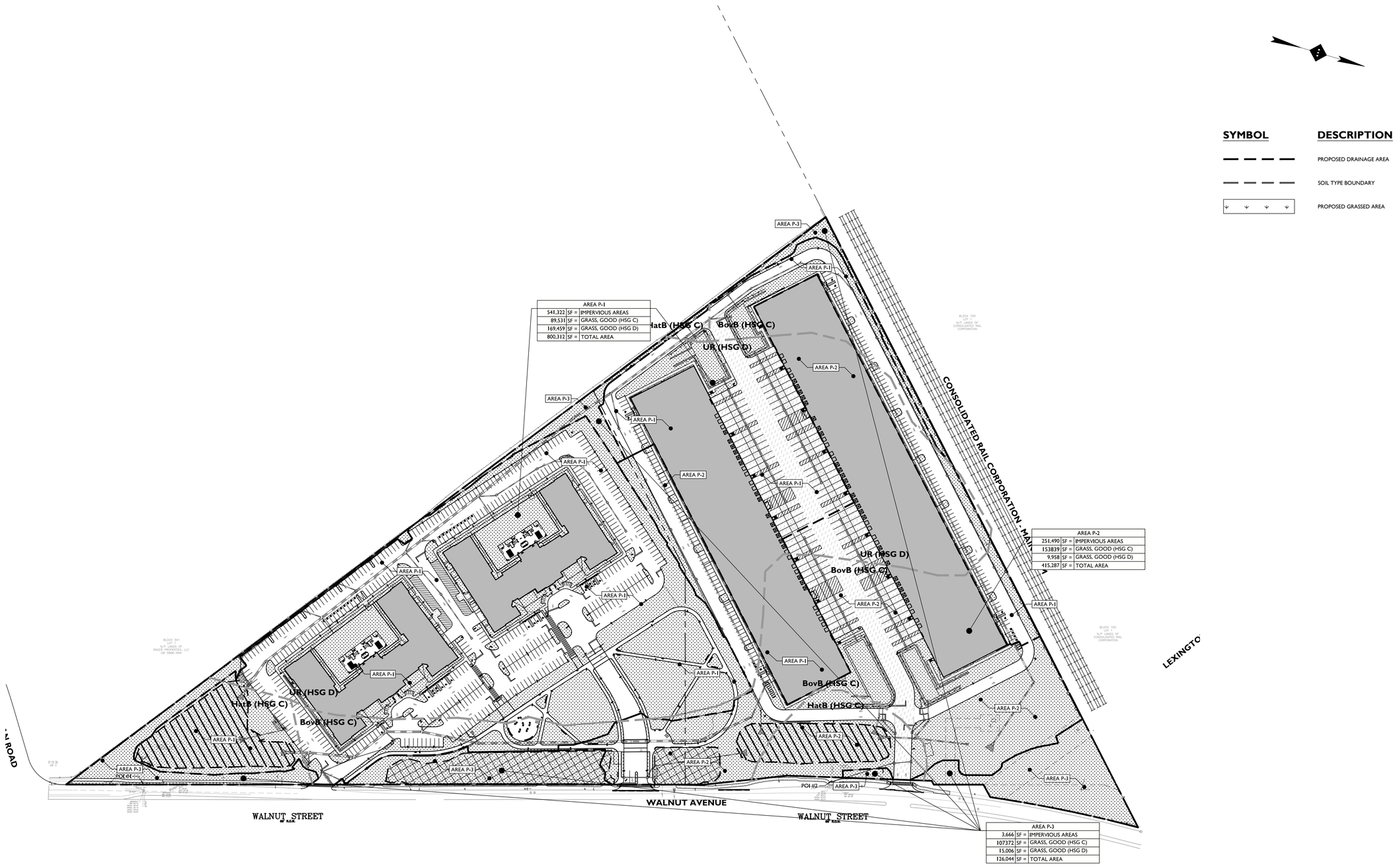
STONEFIELD engineering & design

SCALE: 1" = 100' | PROJECT ID: T-16509

TITLE:
EXISTING DRAINAGE AREA MAP

DRAWING:
1 OF 2

T:\2016\T-16509 HARTZ MOUNTAIN - 750 WALNUT AVENUE, CRANFORD, NJ\CADD\DWG\BT\2022-04-08_ITS\DRAINAGE AREA MAPS.DWG



AREA P-1		
541,322	SF =	IMPERVIOUS AREAS
89,531	SF =	GRASS, GOOD (HSG C)
169,459	SF =	GRASS, GOOD (HSG D)
800,312	SF =	TOTAL AREA

AREA P-2		
251,490	SF =	IMPERVIOUS AREAS
153839	SF =	GRASS, GOOD (HSG C)
9,958	SF =	GRASS, GOOD (HSG D)
415,287	SF =	TOTAL AREA

AREA P-3		
3,666	SF =	IMPERVIOUS AREAS
107372	SF =	GRASS, GOOD (HSG C)
15,006	SF =	GRASS, GOOD (HSG D)
126,044	SF =	TOTAL AREA

SYMBOL	DESCRIPTION
	PROPOSED DRAINAGE AREA
	SOIL TYPE BOUNDARY
	PROPOSED GRASSED AREA

GRAPHIC SCALE IN FEET
1" = 100'

ISSUE	DATE	BY	DESCRIPTION
1	10/04/2022	FT	ISSUED FOR REVIEW

NOT APPROVED FOR CONSTRUCTION

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TITLE:
PROPOSED DRAINAGE AREA MAP

DRAWING:
2 OF 2

T:\2016\T16509 HARTZ MOUNTAIN - 750 WALNUT AVENUE, CRANFORD, NJ\CADD\DRAWINGS\2022-04-08_(FT)-DRAINAGE AREA MAP.DWG

APPENDIX F
EcoPure Certification

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

DIVISION OF WATERSHED PROTECTION AND RESTORATION
BUREAU OF NJPDES STORMWATER PERMITTING & WATER QUALITY MANAGEMENT
P.O. Box 420 Mail Code 401-02B
Trenton, New Jersey 08625-0420
609-633-7021 / Fax: 609-777-0432
www.njstormwater.org

SHAWN M. LATOURETTE
Commissioner

August 4, 2021

Daniel J. Figola, P.E.
Director of Sustainability Development
Advanced Drainage Systems, Inc.
4640 Trueman Boulevard
Hilliard, OH 43026

Re: Revised MTD Lab Certification
EcoPure BioFilter™ Filtration System
Online Installation

TSS Removal Rate 80%

Dear Mr. Figola:

This revised certification letter supersedes the Department's prior certification dated August 3, 2020. This revision was completed as a result of a change to size of the models. No other modifications were made to this certification.

The Stormwater Management rules under N.J.A.C. 7:8-5.2(f) and 5.2(j) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Advanced Drainage Systems, Inc. has requested a Laboratory Certification for the EcoPure BioFilter™ Filtration System (EcoPure BioFilter™).

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated April 2020 and revised July 2021) for this device is published online at http://www.njcat.org/verification-process/technology-verification-database.html.

The NJDEP certifies the use of the EcoPure BioFilter™ by Advanced Drainage Systems, Inc. at a TSS removal rate of 80% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5. The MTFR is calculated based on a verified loading rate of 2 gpm/ft^2 of effective filtration treatment area.

2. The EcoPure BioFilter™ shall be installed using the same configuration reviewed by NJCAT, and sized in accordance with the criteria specified in item 7 below.

3. This device cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. Additional design criteria for MTDs can be found in Chapter 11.3 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual, which can be found online at www.njstormwater.org.

5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the EcoPure BioFilter™. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at https://www.adspipe.com/water-management-solutions/water-quality/greeninfrastructure/ecopure-biofilter#additional-assets for any changes to the maintenance requirements.

6. For an MTD to be considered "green infrastructure" in accordance with the March 2, 2020 amendments to the Stormwater Management rules at N.J.A.C. 7:8, the MTD must meet the GI definition noted at amended N.J.A.C. 7:8-1.2. Specifically, the MTD shall (1) infiltrate into the subsoil; and/or (2) treat stormwater runoff through filtration by vegetation or soil. Any configuration that uses a bio-filtration media and can be configured "above ground" and incorporate a tree box, planter box, or shrubs, etc., would meet the GI definition. Any MTD with bio-filtration media that would be placed "below ground" as a vault without any vegetation can be considered GI (for NJ purposes) only if the device infiltrates the entire Water Quality Design Storm into the subsoil. Further, the below ground device (vault) would need to meet the NJDEP Stormwater BMP Manual conditions of having the soil below the MTD meet the minimum tested infiltration rate of one inch per hour, have at least two feet of separation from the seasonal high water table, and infiltrate into the subsoil. The EcoPure BioFilter™ is a stormwater treatment system that filters polluted stormwater through bioretention filter media driven by hydrostatic head. The EcoPure BioFilter™ can be installed with a curb, gutter, grated inlet, or straight-in pipe inlet, and can be installed above (i.e. planter box), or at grade with a planting bed to allow maximum design flexibility.

7. Sizing Requirement:

   The example below demonstrates the sizing procedure for the EcoPure BioFilter™:

   Example: A 0.25-acre impervious site is to be treated to 80% TSS removal using an EcoPure BioFilter™. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs or 354.58 gpm.

The selection of the appropriate model of an EcoPure BioFilter™ is based upon both the maximum inflow drainage area and the MTFR. It is necessary to calculate the required model using both methods and to use the largest model determined by the two methods.

Inflow Drainage Area Evaluation:

The drainage area to the EcoPure BioFilter™ in this example is 0.25 acres. Based upon the information in Table 1 below, all of the EcoPure BioFilter™ models would be able to treat runoff without exceeding the maximum allowable drainage area.

Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:

time of concentration = 10 minutes
i = 3.2 in/hr (page 21, Fig. 5-10 of Chapter 5 of the NJ Stormwater BMP Manual)
c = 0.99 (runoff coefficient for impervious)
Q = ciA = 0.99 x 3.2 x 0.25 = 0.79 cfs (354.58 gpm)
(Note: 1 cfs = 448.83 gpm)

Given the site runoff is 0.79 cfs and based on Table 1 below, the minimum size unit to be used to treat the runoff without exceeding the MTFR is the EcoPure BioFilter™ Model 10 x 20.

The MTFR evaluation results will be used since that method results in the highest minimum configuration determined by the two methods.

The sizing table corresponding to the available system models is noted below:

Table 1. EcoPure BioFilter™ Model MTFRs and Maximum Allowable Drainage Area.

Dimensions (ft x ft)	Effective Filtration Treatment Area (ft^2)	MTFR (cfs)	Maximum Allowable Drainage Area (acres)
4 x 8	60	0.13	0.324
5 x 13	120	0.27	0.648
5 x 20	180	0.40	0.972
10 x 13	240	0.54	1.297
10 x 20	360	0.80	1.945

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all of the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Lisa Schaefer of my office at lisa.schaefer@dep.nj.gov.

Sincerely,

Gabriel Mahon

Gabriel Mahon, Chief
Bureau of NJPDES Stormwater Permitting & Water Quality Management
Division of Watershed Protection and Restoration
New Jersey Department of Environmental Protection

Attachment: Maintenance Plan

cc: Richard Magee, NJCAT

Maintenance Guide

EcoPure BioFilter™

June 2020

The EcoPure BioFilter system requires periodic inspection and maintenance for it to operate at the design efficiency. The inspection process helps in deciding when and what level of maintenance will be needed to bring the unit up to or near peak efficiency. As with ADS' other water quality products, the maintenance cycle of the EcoPure BioFilter system will be driven mostly by the actual solids and trash/debris load brought into the system.

ADS recommends inspecting the EcoPure BioFilter quarterly for the first year of service, and after every significant storm event occurring during the first six months. The definition of a significant storm event will vary depending on the geographic area, but if the event is greater than 1 inch of intensity within an hour or 3 inches within a 24-hour period, the system should be inspected. After the first year, systems should be inspected at least bi-annually and ideally before the spring or rainy season and after the summer season, or prior to fall or winter seasons. It is recommended that some general "good housekeeping" maintenance be performed at the beginning of the rainy or spring season every year. Since stormwater solids loads can be variable, it is possible that the maintenance cycle could be more or less than the projected duration.

For most maintenance needs, the EcoPure BioFilter planting component follows the practices used for handling standard bioretention systems (i.e., general landscaping, cover management, and replacement planting of surface plants).

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It may be advisable to “water” or irrigate the EcoPure BioFilter plant area in geographical regions experiencing droughts or prolong periods without rainfall during the first year of service. Watering the plant life will help to ensure the plants can take hold and be established for future growth and treatment capabilities.

Inspection and General Maintenance Equipment

The following is a list of equipment recommended for inspection and general maintenance.

- Personal Protection Equipment (pants, steel-toed shoes, safety glasses, gloves, safety vest, hard hat, etc.)
- Manhole Hook
- Traffic Cones and Signage
- Stadia Rod and Tape Measure
- Inspection Operation and Maintenance Log or other recording method (included at end of guide)
- Flashlight
- Trash Removal “Net” Device
- Shovel, rake, broom and trash receptacle
- Vactor Truck (if more extensive maintenance is required)
- Light Duty Construction Equipment (if bioretention media replacement is required)

General Inspection and Maintenance Procedures

Routine inspection will ensure that the system is performing at optimal conditions and that the risk of public flooding is low. EcoPure BioFilter inspection involves a visual inspection of the plant surface area, structure inlet, pretreatment cell, clean-out ports, and the tertiary cell (if applicable). This can all be done at the surface and requires no confined-space entry into the EcoPure BioFilter unit. An Inspection O&M log should be used, and dates and weather conditions should be noted.

If the EcoPure BioFilter is located in a traffic area (i.e. roadway or automobile travel way), and inspection is not possible without entering the vehicular area, safety measures should be employed -- safety cones set up, etc. -- prior to performing the inspection and maintenance.

Inspection and Maintenance for the Pretreatment Cell and Chamber Cavity

For inspection of the pretreatment cell, the manhole cover should be safely removed (i.e., using a manhole hook). A visual inspection of the condition of the surface concrete and any inlet grates should be noted. If grates are missing or inlets are damaged, contact ADS for recommendation of repair. The suspended trash grate area should be relatively clear of debris. If excessive debris is observed, a trash capture net should be employed, and debris removed. Next a stadia rod should be sent down to the bottom of the pretreatment cell and the level of debris should be recorded in the maintenance log. The trash “tray” will have to be unfolded and opened to allow this to happen. The trash screen has lifting “ports” to pull up and fold the horizontal portion of the screen to the sides of the unit. At the sides, there are “locking” tabs to hold the screen panels to the concrete wall. When the debris in the sump reaches 10” (250mm) in average depth, a vactor truck should be used to remove the accumulated sump debris. Employing a vactor track for cleaning the pretreatment cell follows the typical guidelines used for cleaning underground BMPs, e.g., hydrodynamic stormwater devices.

For inspection and cleaning of the chamber section of the EcoPure BioFilter (open cavity under the media cell), it is generally recommended that if the 10” (250mm) sediment mark has been reached in the pre-treatment cell, the owner or O&M contractor should backwash the chamber section of the media cell. With the pre-treatment cell

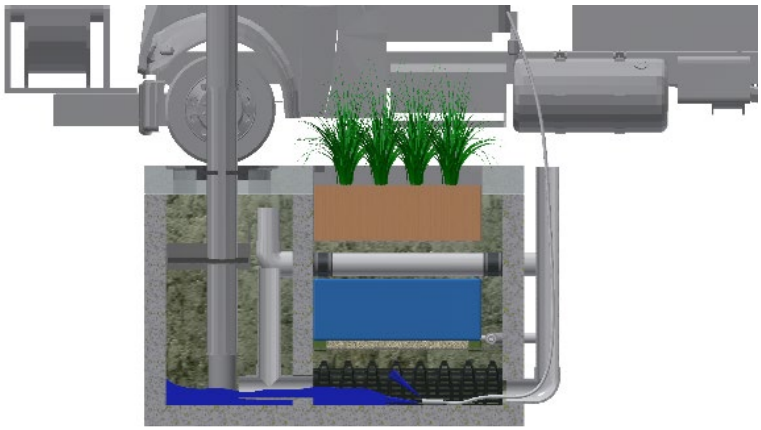
© Advanced Drainage Systems 2020

cleaned and dewatered, the cleanout risers should be exercised and low-pressure water (60-80 psi) should be introduced to force and move sediment within the chamber cavities into the pretreatment cell. (The riser tees have a removable cap or “duckbill” valve to facilitate a “bottom” exit at the floor of the chamber cell to the pretreatment cell). See the O&M video for details of backflushing this unit.

Once it is deemed that most of the chamber “floor” sediment from the planting cell has been backflushed, the introduction of the “cleaning” water flow should cease. The pretreatment cell should be vacuumed dry (during this backflushing procedure), the trash rack reinstalled/repositioned, and the manhole cover replaced. The backflushing process may require confined space entry and all rules and precautions should be adhered to, based on the local jurisdiction regulations or requirements.

Inspection and Maintenance for the Planting and Bioretention Media Layer

A visual inspection of the general appearance of the EcoPure BioFilter should be performed, and notes should be taken detailing the condition of the surface plant life, invasive species intrusion, vandalism, erosion in the planting area and any signs of standing water or disturbed or “shifted” surface soil bed area. This general system condition should be noted in the inspection/maintenance log.



If the plant life and surface media show signs of distress, general landscaping O&M should be performed, i.e., raking, weeding (removal of invasive plants), and general planting replacement to maximize the cover area in the planting bed/media treatment cell. If ponding of water is present in the media treatment cell and the last rain event was greater than 24 hours prior, further inspection should be performed to ensure the effluent pipe is not blocked. All blocked pipes should be cleared and cleaned. If the inspection results in the conclusion that the media is compromised or has reached its service life, total replacement of the media treatment cell is recommended. ADS should be contacted for material specifications and replacement parts. Media cell replacement will involve utilizing small construction excavation equipment.

Disposal of material from the pretreatment cell, trash debris rack, and chamber cavity should be in accordance with the local municipality’s requirements. Typically, traditional municipal landfills can be used for disposal of solids and trash obtained from servicing the EcoPure BioFilter. The same disposal methods should be used if the media cell is replaced. Call ADS at 800-821-6710 for further information.

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EcoPure BioFilter Inspection and O&M Log Sheet

Project Name: _____

Location: _____

Date	Inspection or O&M	Observation/Actions:	Operator comments and general description	Inspector

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Maintenance Guide

EcoPure BioFilter™

June 2020

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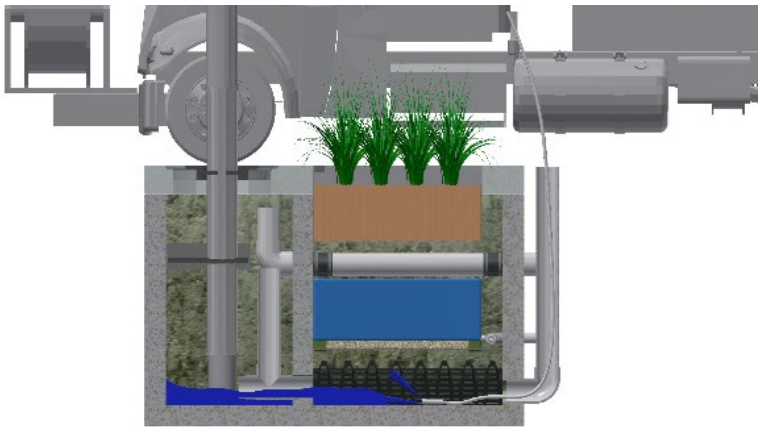

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EcoPure BioFilter Inspection and O&M Log Sheet

Project Name: _____

Location: _____

Date	Inspection or O&M	Observation/Actions:	Operator comments and general description	Inspector

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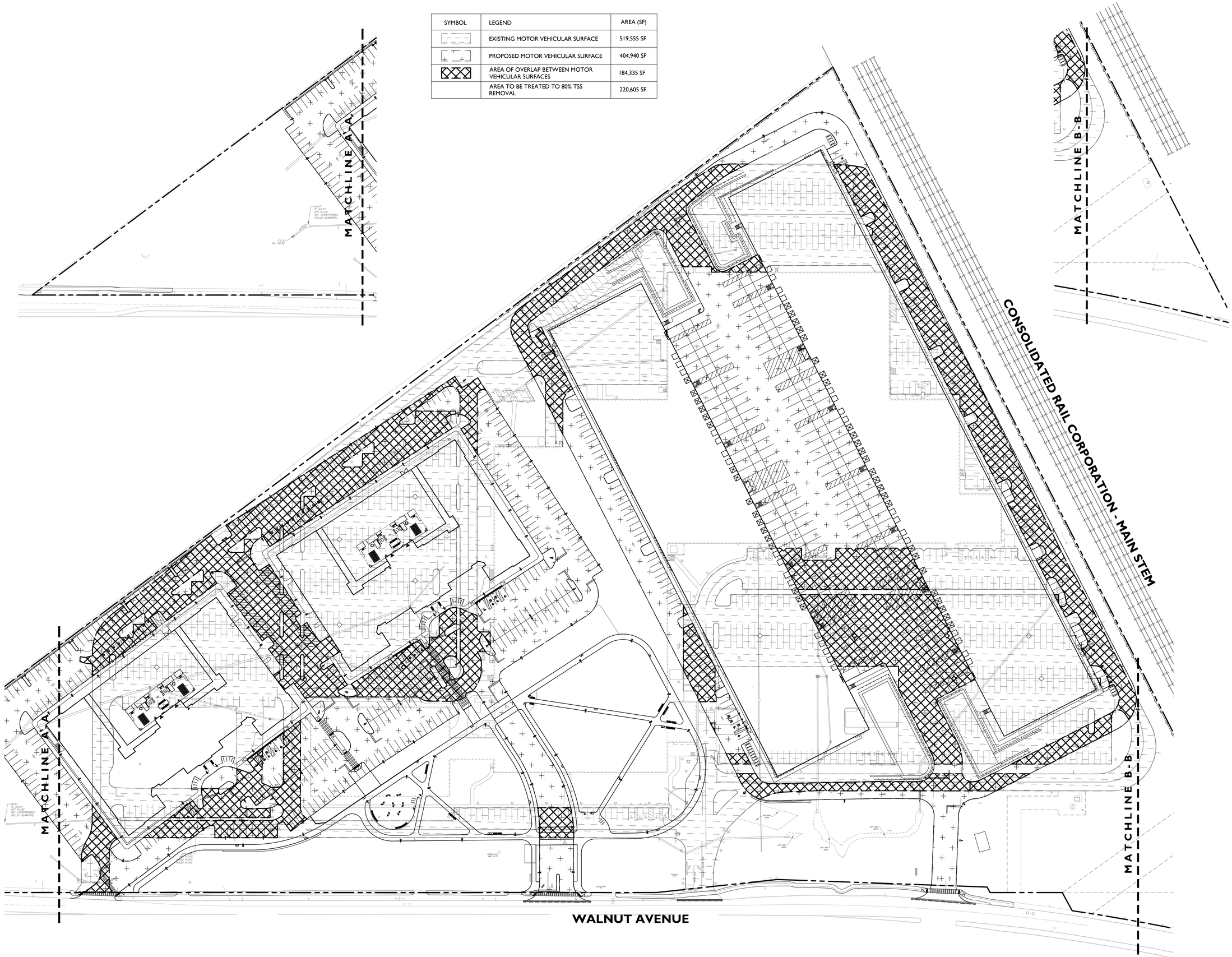
APPENDIX G
MOTOR VEHICLE SURFACES EXHIBIT

SYMBOL	LEGEND	AREA (SF)
	EXISTING MOTOR VEHICULAR SURFACE	519,555 SF
	PROPOSED MOTOR VEHICULAR SURFACE	404,940 SF
	AREA OF OVERLAP BETWEEN MOTOR VEHICULAR SURFACES	184,335 SF
	AREA TO BE TREATED TO 80% TSS REMOVAL	220,605 SF



HARTZ MOUNTAIN INDUSTRIES
500 PLAZA DRIVE
P.O. BOX 1515
SECAUCUS, N.J. 07096–1515

STONEFIELD engineering & design
Rutherford, NJ · New York, NY · Boston, MA
Princeton, NJ · Tampa, FL · Detroit, MI
www.stonefieldeng.com

584 Broadway, Suite 310, New York, NY 10012
Phone 718.606.8305

NOTES :

SITE LEGEND

- PROPERTY BOUNDARY
- EXISTING MOTOR VEHICULAR SURFACE
- PROPOSED MOTOR VEHICULAR SURFACE
- AREA OF OVERLAP BETWEEN MOTOR VEHICULAR SURFACES

50' 0' 50' 100'
GRAPHIC SCALE IN FEET
1" = 50'

NO.	BY	DATE	ISSUE OR REVISION
01	FT	10/04/22	ISSUED FOR REVIEW

REVISION :

PROJECT :

PROPOSED MIXED–USE REDEVELOPMENT
750 WALNUT AVENUE
CRANFORD, N.J.

DRAWING TITLE :

MOTOR VEHICULAR SURFACES EXHIBIT

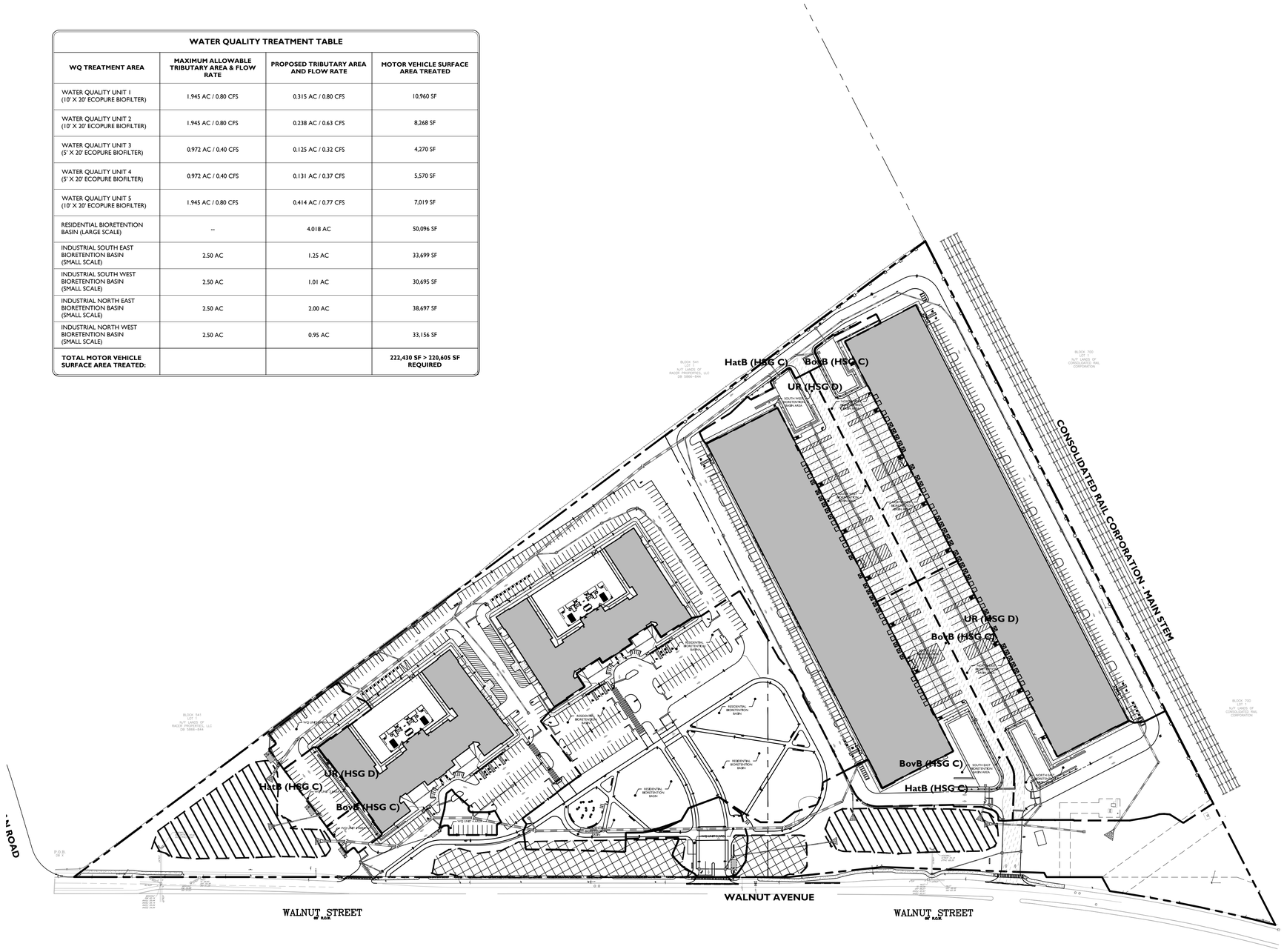
ENGINEER
ZACHARY E. CHAPLIN
NJ PE # 53605

DATE : 08/26/2022
PROJECT NO. : T-16509
DRAWING BY: FT
CHK BY: ZC
DWG NO:
1 OF 1
CADD FILE NO:
1 OF 1

APPENDIX H
WATER QUALITY TREATMENT MAP

WATER QUALITY TREATMENT TABLE

WQ TREATMENT AREA	MAXIMUM ALLOWABLE TRIBUTARY AREA & FLOW RATE	PROPOSED TRIBUTARY AREA AND FLOW RATE	MOTOR VEHICLE SURFACE AREA TREATED
WATER QUALITY UNIT 1 (10' X 20' ECOPURE BIOFILTER)	1.945 AC / 0.80 CFS	0.315 AC / 0.80 CFS	10,960 SF
WATER QUALITY UNIT 2 (10' X 20' ECOPURE BIOFILTER)	1.945 AC / 0.80 CFS	0.238 AC / 0.63 CFS	8,268 SF
WATER QUALITY UNIT 3 (5' X 20' ECOPURE BIOFILTER)	0.972 AC / 0.40 CFS	0.125 AC / 0.32 CFS	4,270 SF
WATER QUALITY UNIT 4 (5' X 20' ECOPURE BIOFILTER)	0.972 AC / 0.40 CFS	0.131 AC / 0.37 CFS	5,570 SF
WATER QUALITY UNIT 5 (10' X 20' ECOPURE BIOFILTER)	1.945 AC / 0.80 CFS	0.414 AC / 0.77 CFS	7,019 SF
RESIDENTIAL BIORETENTION BASIN (LARGE SCALE)	--	4.018 AC	50,096 SF
INDUSTRIAL SOUTH EAST BIORETENTION BASIN (SMALL SCALE)	2.50 AC	1.25 AC	33,699 SF
INDUSTRIAL SOUTH WEST BIORETENTION BASIN (SMALL SCALE)	2.50 AC	1.01 AC	30,695 SF
INDUSTRIAL NORTH EAST BIORETENTION BASIN (SMALL SCALE)	2.50 AC	2.00 AC	38,697 SF
INDUSTRIAL NORTH WEST BIORETENTION BASIN (SMALL SCALE)	2.50 AC	0.95 AC	33,156 SF
TOTAL MOTOR VEHICLE SURFACE AREA TREATED:			**222,430 SF > 220,605 SF REQUIRED**



SYMBOL	DESCRIPTION
— — — —	PROPOSED WQ TREATEMENT AREA
— — — —	SOIL TYPE BOUNDARY

100' 0' 100' 200'
GRAPHIC SCALE IN FEET
1" = 100'

ISSUE	DATE	BY	DESCRIPTION
1	10/04/2022	FT	ISSUED FOR REVIEW

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design
Rutherford, NJ · Princeton, NJ · Long Island City, NY · Royal Oak, MI
www.stonefieldeng.com
Headquarters: 92 Park Avenue, Rutherford, NJ 07070
Phone 201.340.4468 · Fax 201.340.4472

EXHIBIT

HARTZ MOUNTAIN INDUSTRIES
PROPOSED REDEVELOPMENT PLAN

BLOCK 541, LOT 3
750 WALNUT AVENUE
TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY

JEFFREY A. MARTELL, P.E.
NEW JERSEY LICENSE No. 47290
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 100' | PROJECT ID: T-16509

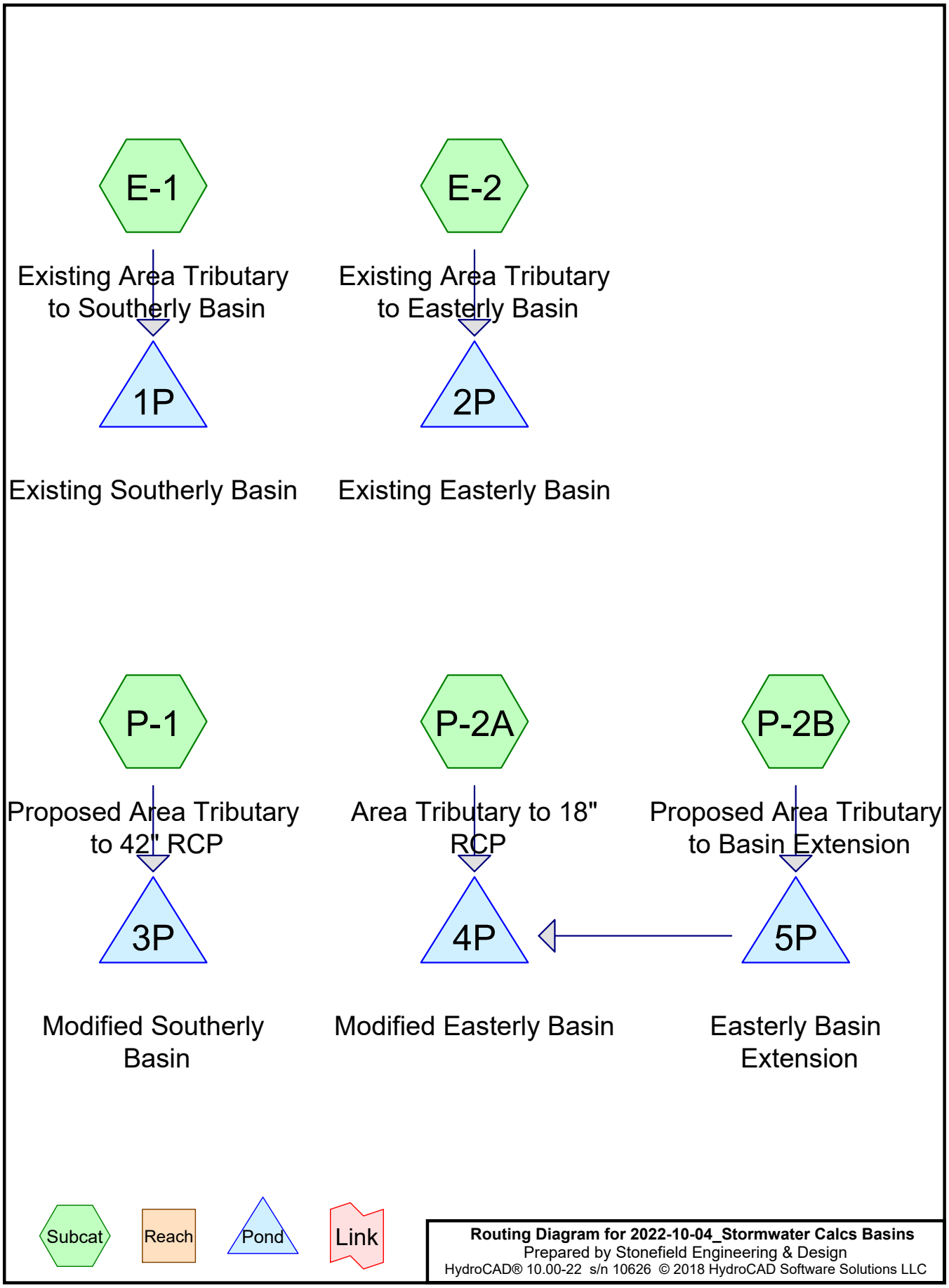
TITLE:
WATER QUALITY TREATMENT MAP

DRAWING:
1 OF 1

T:\2016\T16509 HARTZ MOUNTAIN - 750 WALNUT AVENUE, CRANFORD, NJ\CADD\DRAWINGS\2022-10-04_(FS)-WATER QUALITY TREATMENT MAP.DWG

APPENDIX I
BASIN MODIFICATION CALCULATIONS

APPENDIX I-1
HYDROCAD ROUTING DIAGRAM



Routing Diagram for 2022-10-04_Stormwater Calcs Basins
Prepared by Stonefield Engineering & Design
HydroCAD® 10.00-22 s/n 10626 © 2018 HydroCAD Software Solutions LLC

APPENDIX I-2
2-YEAR STORM EVENT HYDROGRAPHS

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
454,208	74	>75% Grass cover, Good, HSG C (E-1, E-2, P-1, P-2A, P-2B)
287,871	80	>75% Grass cover, Good, HSG D (E-1, E-2, P-1, P-2A)
1,682,040	98	Paved parking, HSG D (E-1, E-2, P-1, P-2A, P-2B)
2,424,119	**91**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	454,208	287,871	0	742,079	>75% Grass cover, Good	
0	0	0	1,682,040	0	1,682,040	Paved parking	
0	**0**	**454,208**	**1,969,911**	**0**	**2,424,119**	**TOTAL AREA**	

Summary for Subcatchment E-1: Existing Area Tributary to Southerly Basin

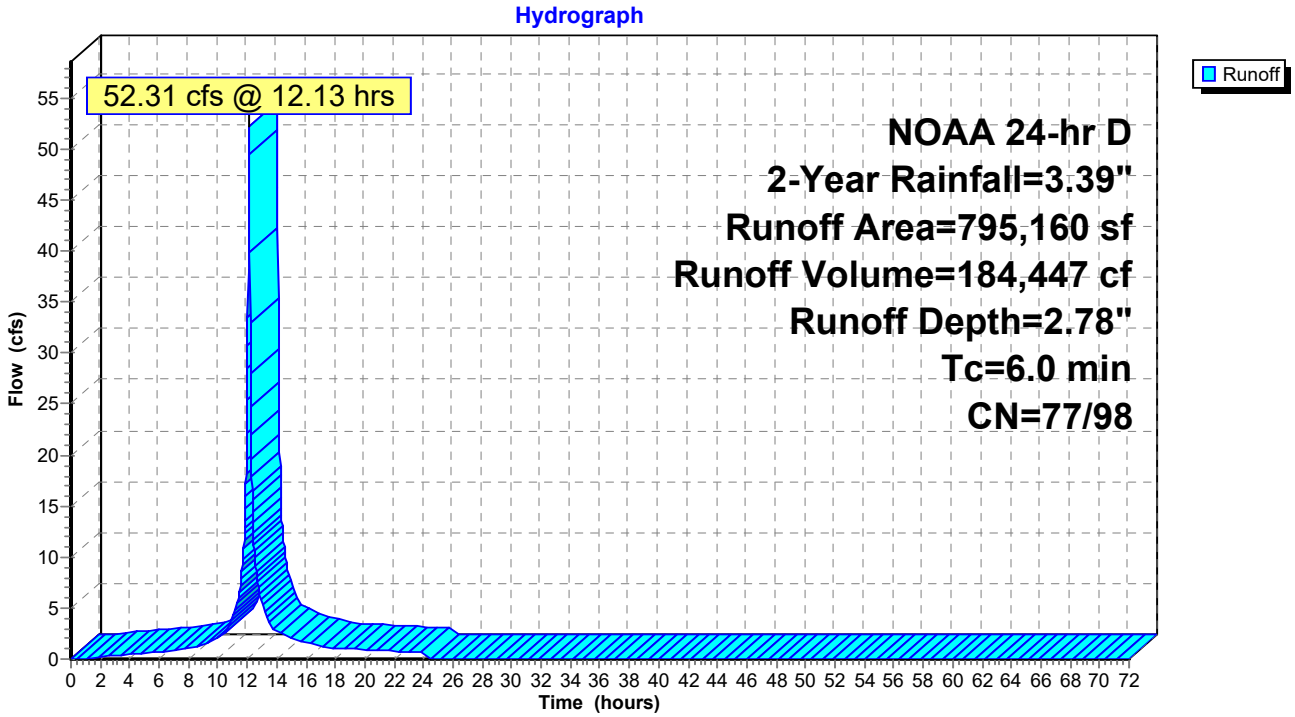
Runoff = 52.31 cfs @ 12.13 hrs, Volume= 184,447 cf, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
630,944	98	Paved parking, HSG D
85,682	74	>75% Grass cover, Good, HSG C
78,534	80	>75% Grass cover, Good, HSG D
795,160	94	Weighted Average
164,216	77	20.65% Pervious Area
630,944	98	79.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-1: Existing Area Tributary to Southerly Basin



Summary for Subcatchment E-2: Existing Area Tributary to Easterly Basin

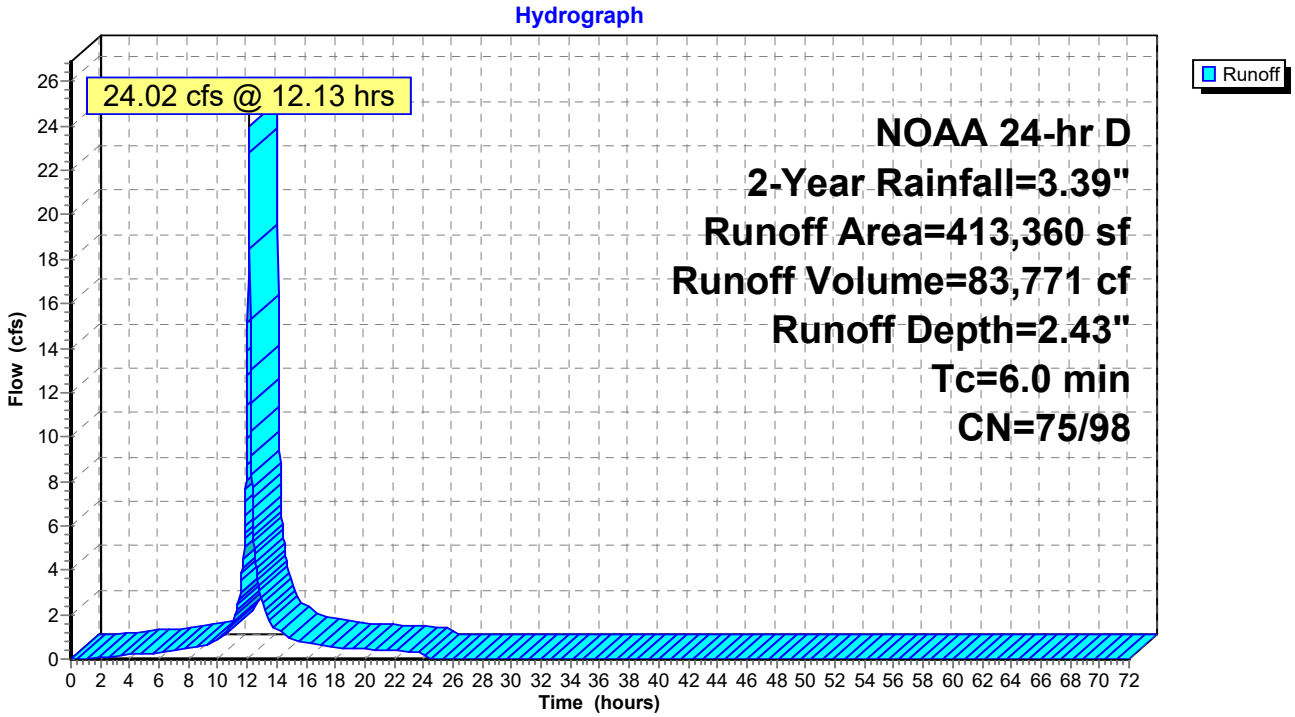
Runoff = 24.02 cfs @ 12.13 hrs, Volume= 83,771 cf, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
258,284	98	Paved parking, HSG D
125,156	74	>75% Grass cover, Good, HSG C
29,920	80	>75% Grass cover, Good, HSG D
413,360	89	Weighted Average
155,076	75	37.52% Pervious Area
258,284	98	62.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-2: Existing Area Tributary to Easterly Basin



Summary for Subcatchment P-1: Proposed Area Tributary to 42" RCP

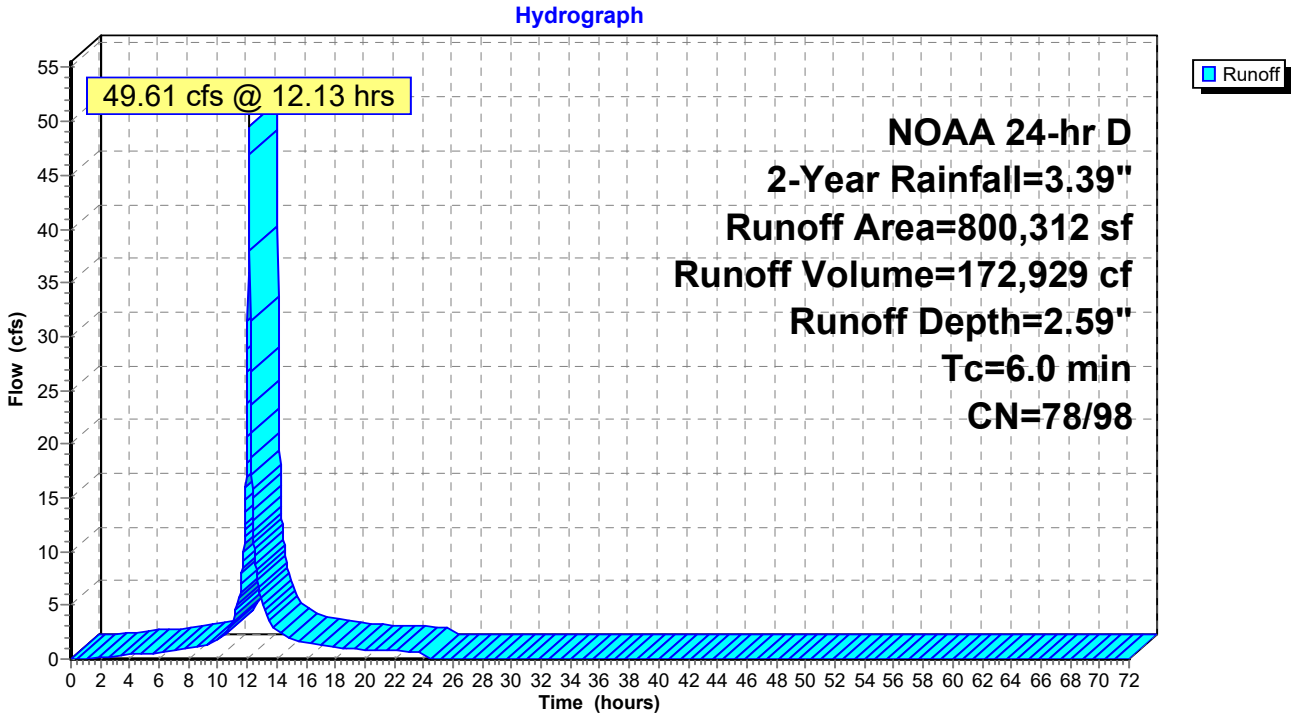
Runoff = 49.61 cfs @ 12.13 hrs, Volume= 172,929 cf, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
541,322	98	Paved parking, HSG D
89,531	74	>75% Grass cover, Good, HSG C
169,459	80	>75% Grass cover, Good, HSG D
800,312	92	Weighted Average
258,990	78	32.36% Pervious Area
541,322	98	67.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-1: Proposed Area Tributary to 42" RCP



Summary for Subcatchment P-2A: Area Tributary to 18" RCP

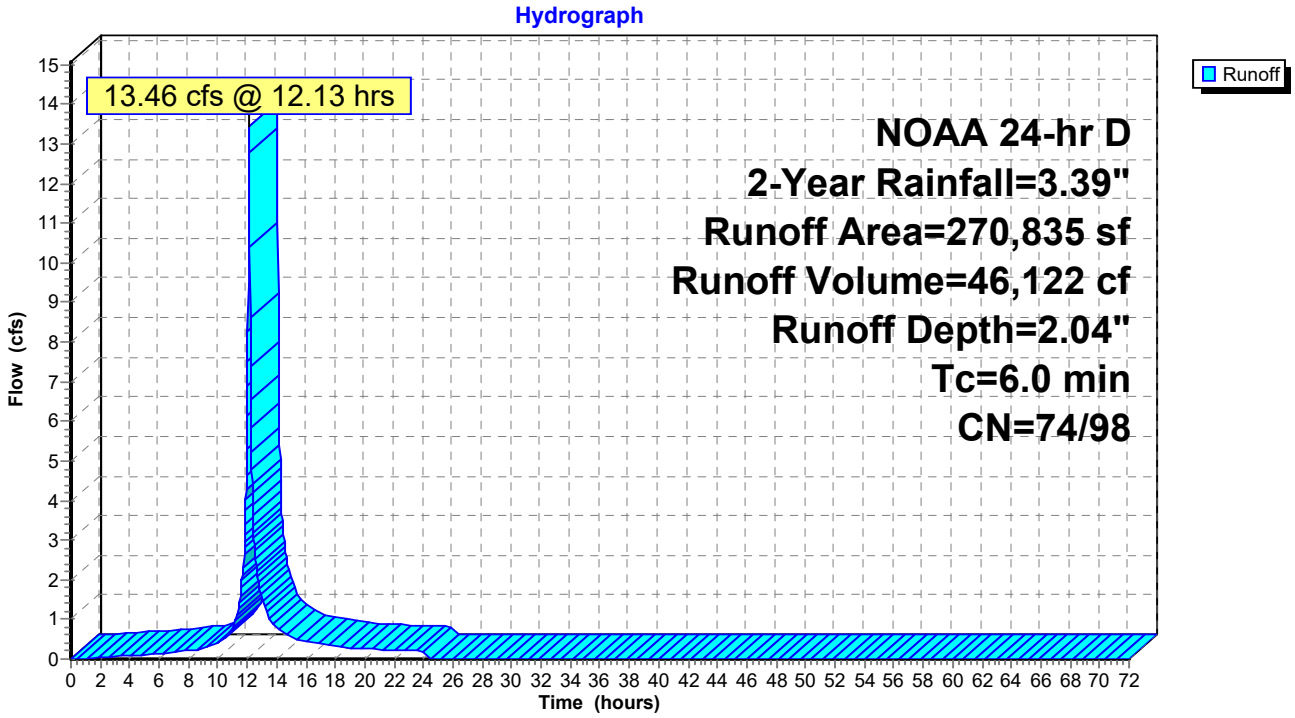
Runoff = 13.46 cfs @ 12.13 hrs, Volume= 46,122 cf, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
119,490	98	Paved parking, HSG D
141,387	74	>75% Grass cover, Good, HSG C
9,958	80	>75% Grass cover, Good, HSG D
270,835	85	Weighted Average
151,345	74	55.88% Pervious Area
119,490	98	44.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2A: Area Tributary to 18" RCP



Summary for Subcatchment P-2B: Proposed Area Tributary to Basin Extension

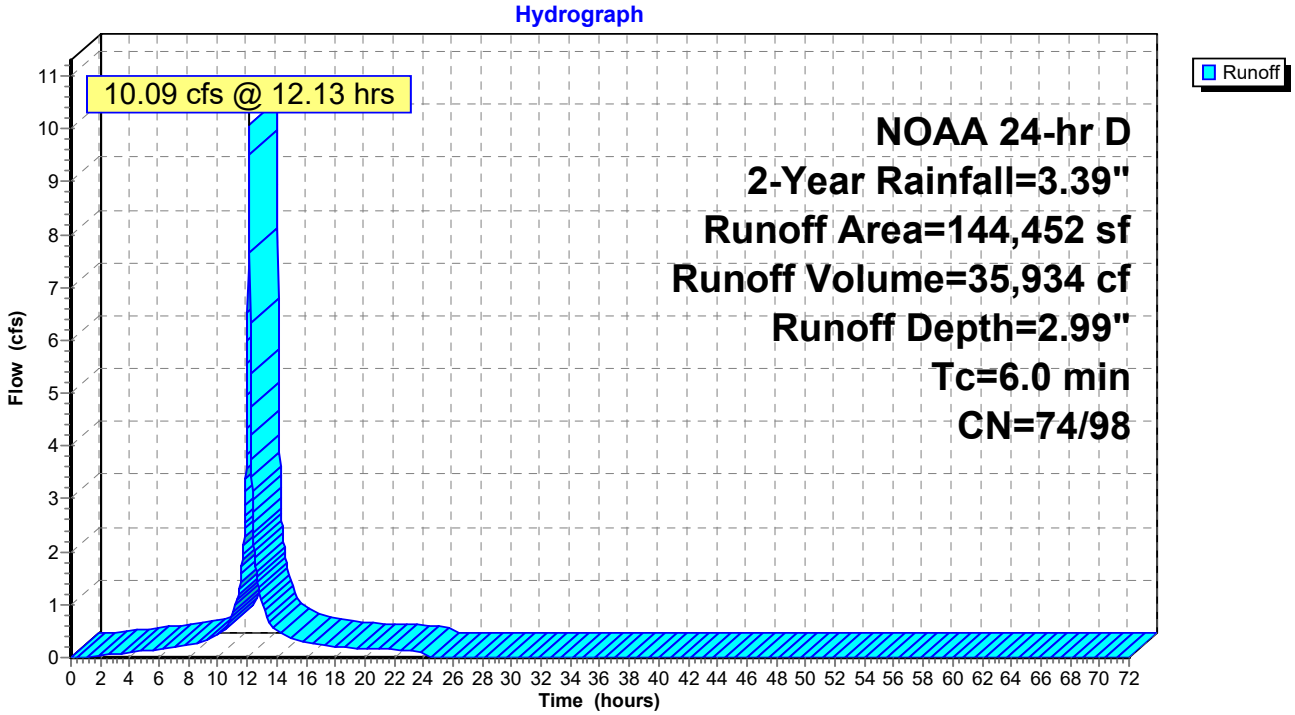
Runoff = 10.09 cfs @ 12.13 hrs, Volume= 35,934 cf, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 2-Year Rainfall=3.39"

Area (sf)	CN	Description
132,000	98	Paved parking, HSG D
12,452	74	>75% Grass cover, Good, HSG C
144,452	96	Weighted Average
12,452	74	8.62% Pervious Area
132,000	98	91.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2B: Proposed Area Tributary to Basin Extension



Summary for Pond 1P: Existing Southerly Basin

Inflow Area = 795,160 sf, 79.35% Impervious, Inflow Depth = 2.78" for 2-Year event
Inflow = 52.31 cfs @ 12.13 hrs, Volume= 184,447 cf
Outflow = 30.93 cfs @ 12.21 hrs, Volume= 180,058 cf, Atten= 41%, Lag= 4.8 min
Primary = 4.12 cfs @ 12.21 hrs, Volume= 107,409 cf
Secondary = 26.81 cfs @ 12.21 hrs, Volume= 72,648 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 61.30' @ 12.21 hrs Surf.Area= 29,873 sf Storage= 72,637 cf

Plug-Flow detention time= 334.7 min calculated for 180,058 cf (98% of inflow)
Center-of-Mass det. time= 319.5 min (1,087.0 - 767.5)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,677 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

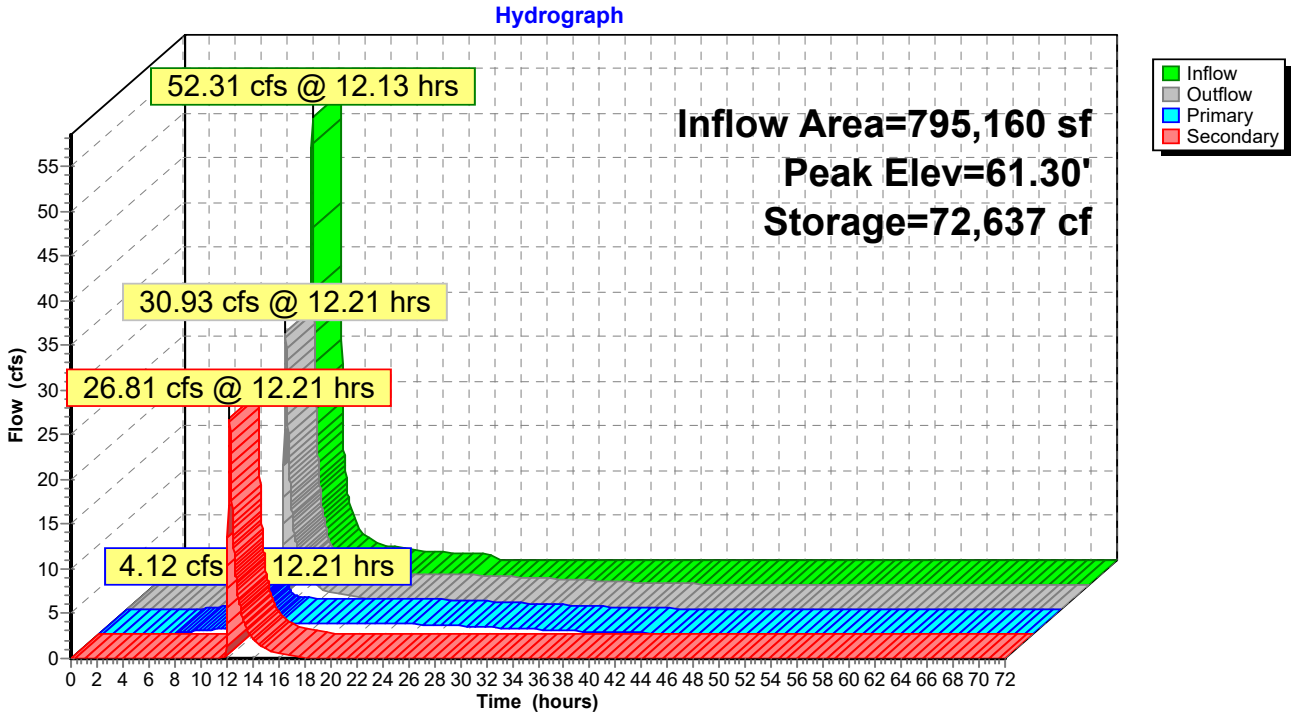
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,088	875.0	27,795	63,798	60,199
62.00	31,748	882.0	30,408	94,206	61,514
63.00	35,223	930.0	33,470	127,677	68,495

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	60.50'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.50 2.50 Width (feet) 9.00 12.50 27.00 38.00

Primary OutFlow Max=4.10 cfs @ 12.21 hrs HW=61.30' (Free Discharge)
└─**1=Culvert** (Passes 4.10 cfs of 19.59 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.47 cfs @ 7.50 fps)
  └─**3=Orifice/Grate** (Orifice Controls 2.63 cfs @ 2.80 fps)

Secondary OutFlow Max=26.70 cfs @ 12.21 hrs HW=61.30' (Free Discharge)
└─**4=Emergency Spillway** (Weir Controls 26.70 cfs @ 2.74 fps)

Pond 1P: Existing Southerly Basin



Summary for Pond 2P: Existing Easterly Basin

Inflow Area = 413,360 sf, 62.48% Impervious, Inflow Depth = 2.43" for 2-Year event
Inflow = 24.02 cfs @ 12.13 hrs, Volume= 83,771 cf
Outflow = 2.06 cfs @ 13.28 hrs, Volume= 68,179 cf, Atten= 91%, Lag= 69.3 min
Primary = 2.06 cfs @ 13.28 hrs, Volume= 68,179 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 70.22' @ 13.28 hrs Surf.Area= 20,863 sf Storage= 49,492 cf

Plug-Flow detention time= 395.4 min calculated for 68,160 cf (81% of inflow)
Center-of-Mass det. time= 313.8 min (1,091.7 - 778.0)

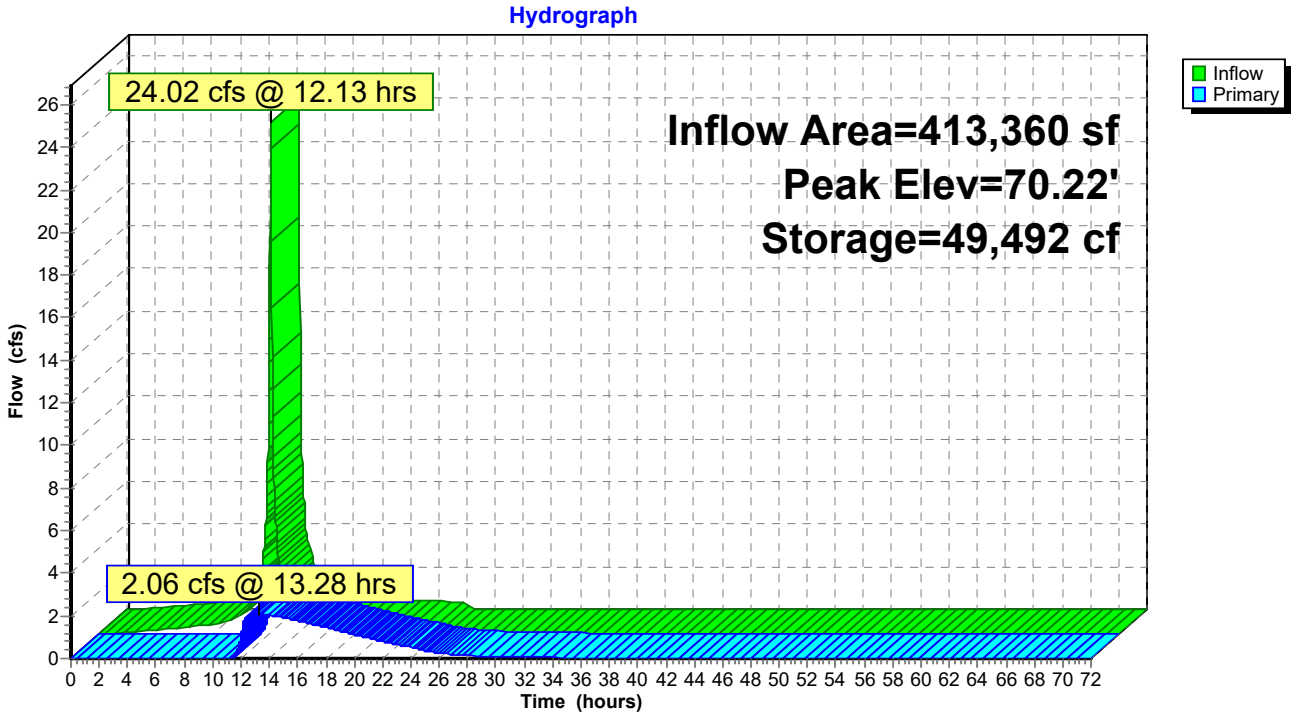
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	90,538 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	16,122	665.0	8,716	8,716	29,510
69.00	18,119	699.0	17,111	25,827	33,263
70.00	20,368	703.0	19,233	45,059	34,094
71.00	22,720	726.0	21,533	66,593	36,806
72.00	25,192	749.0	23,945	90,538	39,604

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.06 cfs @ 13.28 hrs HW=70.22' (Free Discharge)
└─**1=Culvert** (Passes 2.06 cfs of 6.47 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.05 cfs @ 5.88 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.64 fps)

Pond 2P: Existing Easterly Basin



Summary for Pond 3P: Modified Southerly Basin

Inflow Area = 800,312 sf, 67.64% Impervious, Inflow Depth = 2.59" for 2-Year event
Inflow = 49.61 cfs @ 12.13 hrs, Volume= 172,929 cf
Outflow = 8.17 cfs @ 12.61 hrs, Volume= 168,519 cf, Atten= 84%, Lag= 28.7 min
Primary = 8.17 cfs @ 12.61 hrs, Volume= 168,519 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 61.74' @ 12.61 hrs Surf.Area= 31,135 sf Storage= 86,249 cf

Plug-Flow detention time= 422.4 min calculated for 168,519 cf (97% of inflow)
Center-of-Mass det. time= 406.3 min (1,181.1 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,722 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

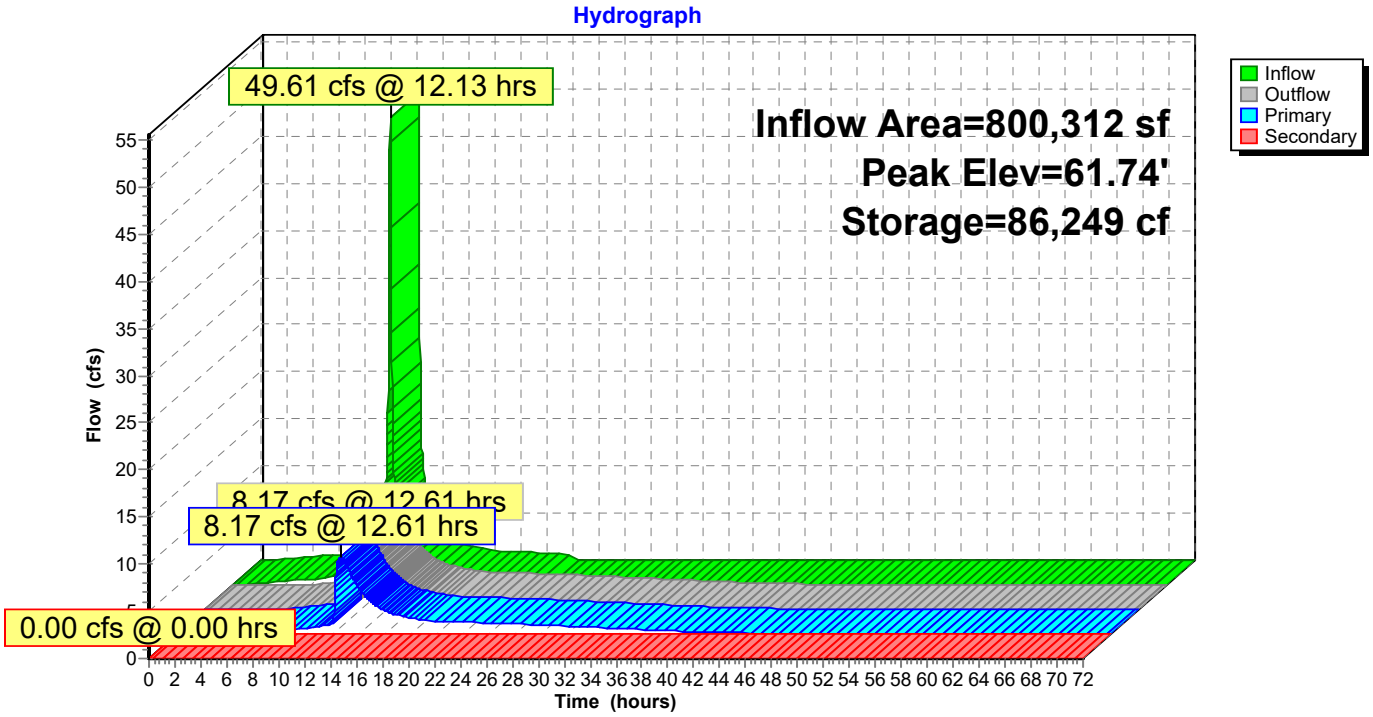
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,133	876.0	27,817	63,820	60,335
62.00	31,837	876.0	30,475	94,295	61,211
63.00	35,042	922.0	33,427	127,722	67,854

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	62.12'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 50.00 52.00

Primary OutFlow Max=8.17 cfs @ 12.61 hrs HW=61.74' (Free Discharge)
└─**1=Culvert** (Passes 8.17 cfs of 22.05 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.60 cfs @ 8.16 fps)
  └─**3=Orifice/Grate** (Orifice Controls 6.57 cfs @ 3.61 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=58.00' (Free Discharge)
└─**4=Emergency Spillway** (Controls 0.00 cfs)

Pond 3P: Modified Southerly Basin



Summary for Pond 4P: Modified Easterly Basin

Inflow Area = 415,287 sf, 60.56% Impervious, Inflow Depth = 2.37" for 2-Year event
Inflow = 20.85 cfs @ 12.14 hrs, Volume= 82,044 cf
Outflow = 1.89 cfs @ 13.44 hrs, Volume= 65,407 cf, Atten= 91%, Lag= 78.0 min
Primary = 1.89 cfs @ 13.44 hrs, Volume= 65,407 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 69.98' @ 13.44 hrs Surf.Area= 21,562 sf Storage= 47,723 cf

Plug-Flow detention time= 416.0 min calculated for 65,407 cf (80% of inflow)
Center-of-Mass det. time= 325.4 min (1,119.1 - 793.7)

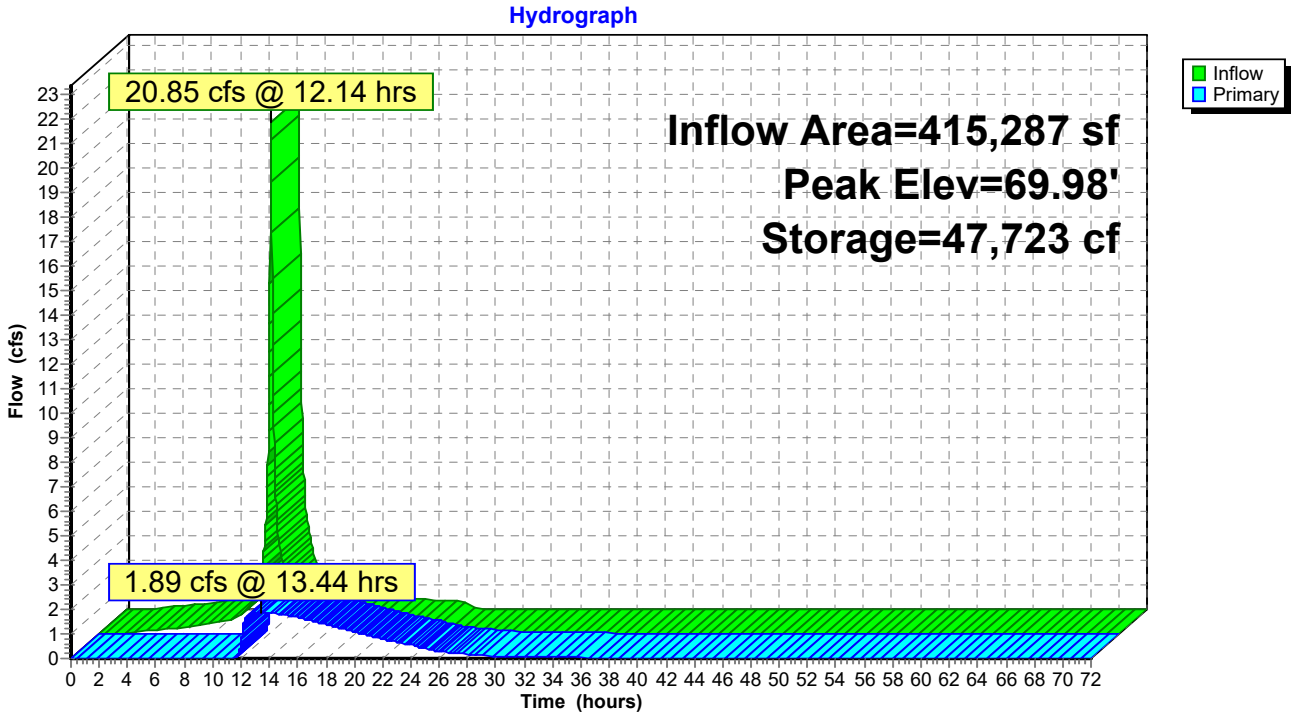
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	95,725 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	17,330	701.0	9,204	9,204	33,423
69.00	19,413	732.0	18,362	27,566	37,030
70.00	21,597	435.0	20,495	48,061	64,618
71.00	23,820	853.0	22,699	70,761	107,466
72.00	26,126	772.0	24,964	95,725	117,972

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.89 cfs @ 13.44 hrs HW=69.98' (Free Discharge)
└─**1=Culvert** (Passes 1.89 cfs of 5.82 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.89 cfs @ 5.41 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: Modified Easterly Basin



Summary for Pond 5P: Easterly Basin Extension

Inflow Area = 144,452 sf, 91.38% Impervious, Inflow Depth = 2.99" for 2-Year event
Inflow = 10.09 cfs @ 12.13 hrs, Volume= 35,934 cf
Outflow = 8.05 cfs @ 12.17 hrs, Volume= 35,922 cf, Atten= 20%, Lag= 2.8 min
Primary = 8.05 cfs @ 12.17 hrs, Volume= 35,922 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 70.65' @ 12.18 hrs Surf.Area= 3,803 sf Storage= 3,916 cf

Plug-Flow detention time= 32.9 min calculated for 35,912 cf (100% of inflow)
Center-of-Mass det. time= 33.2 min (794.1 - 760.9)

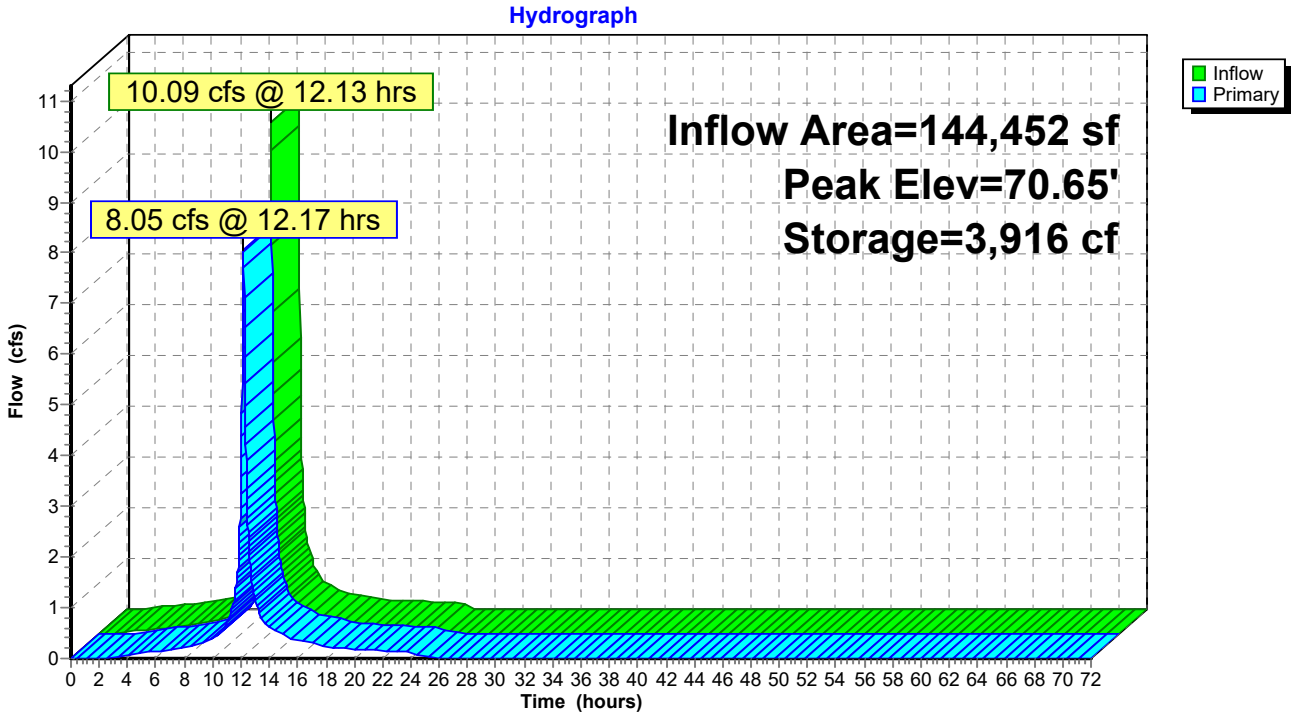
Volume	Invert	Avail.Storage	Storage Description
#1	69.50'	20,992 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
69.50	3,027	214.0	0	0	3,027
70.00	3,356	224.0	1,595	1,595	3,392
71.00	4,056	243.0	3,700	5,296	4,136
72.00	4,812	262.0	4,429	9,724	4,940
73.00	5,625	280.0	5,213	14,937	5,763
74.00	6,494	299.0	6,054	20,992	6,685

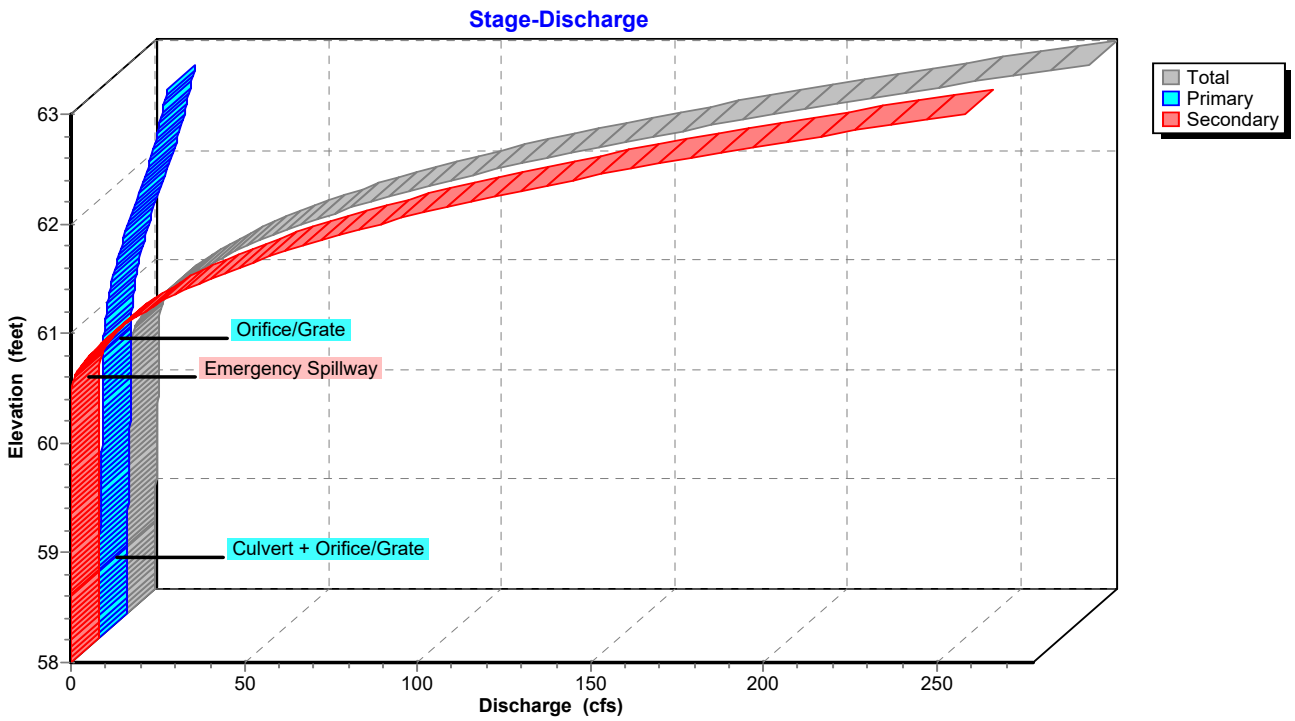
Device	Routing	Invert	Outlet Devices
#1	Primary	69.50'	**30.0" Round Culvert** L= 110.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.27' S= 0.0112 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	69.50'	**30.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	72.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.96 cfs @ 12.17 hrs HW=70.65' TW=69.34' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 7.96 cfs @ 5.32 fps)
  ├─**2=Orifice/Grate** (Passes 7.96 cfs of 8.00 cfs potential flow)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Easterly Basin Extension



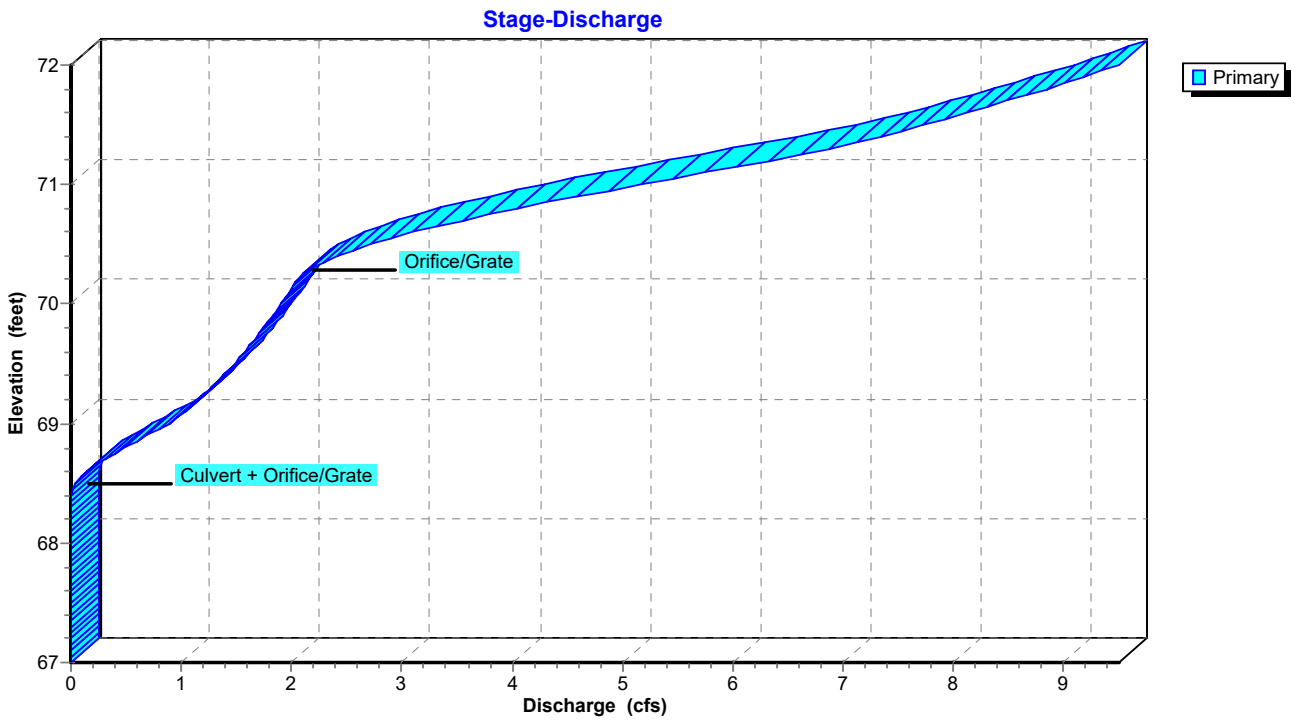
Pond 1P: Existing Southerly Basin



Stage-Discharge for Pond 1P: Existing Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	2.20	1.24	0.96
60.70	4.12	1.32	2.80
60.80	6.81	1.52	5.30
60.90	10.21	1.83	8.38
61.00	14.29	2.25	12.04
61.10	19.07	2.78	16.29
61.20	24.60	3.40	21.20
61.30	30.94	4.12	26.82
61.40	38.12	4.91	33.21
61.50	46.17	5.79	40.38
61.60	55.10	6.72	48.38
61.70	64.95	7.71	57.24
61.80	75.73	8.75	66.98
61.90	87.47	9.82	77.64
62.00	100.16	10.92	89.24
62.10	113.82	12.02	101.80
62.20	128.42	13.12	115.30
62.30	143.93	14.18	129.75
62.40	160.34	15.19	145.15
62.50	177.61	16.11	161.51
62.60	195.69	16.85	178.84
62.70	214.72	17.57	197.15
62.80	234.77	18.31	216.46
62.90	255.80	19.01	236.78
63.00	**277.81**	**19.69**	**258.12**

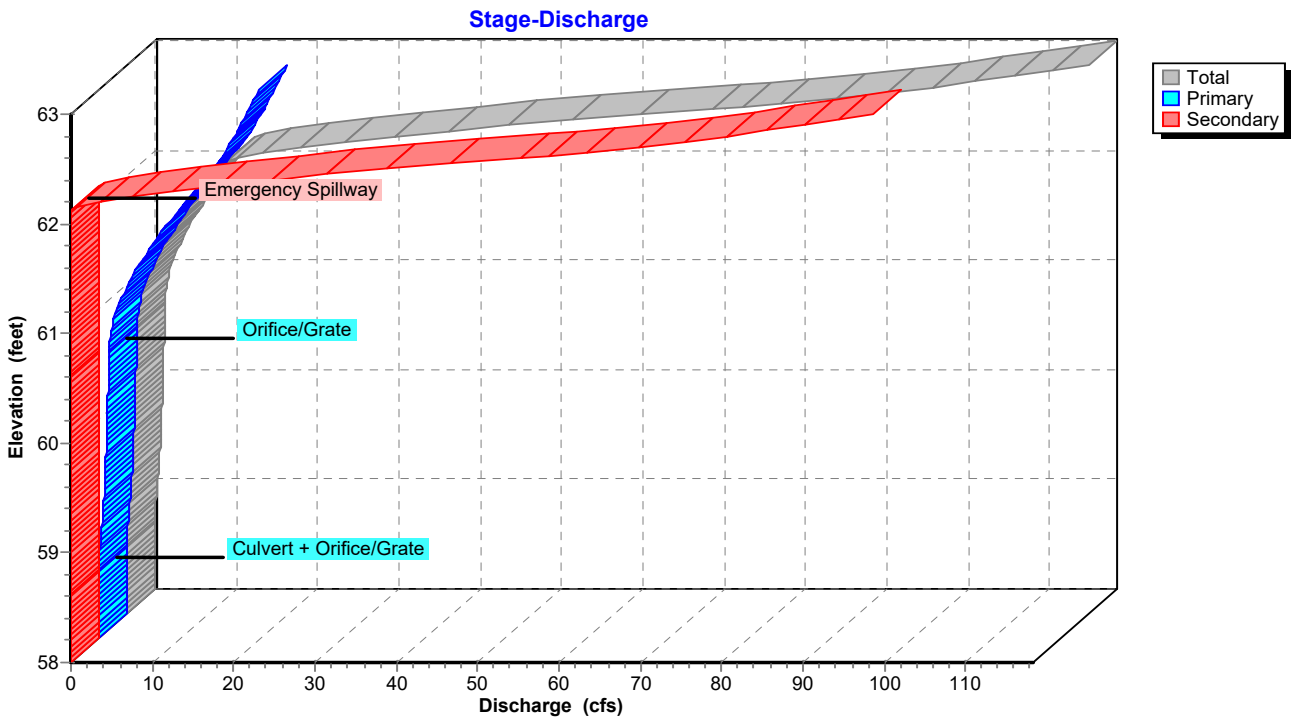
Pond 2P: Existing Easterly Basin



Stage-Discharge for Pond 2P: Existing Easterly Basin

Elevation (feet)	Primary (cfs)
67.00	0.00
67.10	0.00
67.20	0.00
67.30	0.00
67.40	0.00
67.50	0.00
67.60	0.00
67.70	0.00
67.80	0.00
67.90	0.00
68.00	0.00
68.10	0.00
68.20	0.00
68.30	0.00
68.40	0.00
68.50	0.04
68.60	0.15
68.70	0.30
68.80	0.49
68.90	0.70
69.00	0.89
69.10	1.03
69.20	1.16
69.30	1.28
69.40	1.38
69.50	1.48
69.60	1.57
69.70	1.66
69.80	1.74
69.90	1.82
70.00	1.90
70.10	1.97
70.20	2.04
70.30	2.18
70.40	2.41
70.50	2.72
70.60	3.10
70.70	3.55
70.80	4.05
70.90	4.59
71.00	5.17
71.10	5.75
71.20	6.33
71.30	6.88
71.40	7.34
71.50	7.73
71.60	8.12
71.70	8.49
71.80	8.84
71.90	9.18
72.00	**9.50**

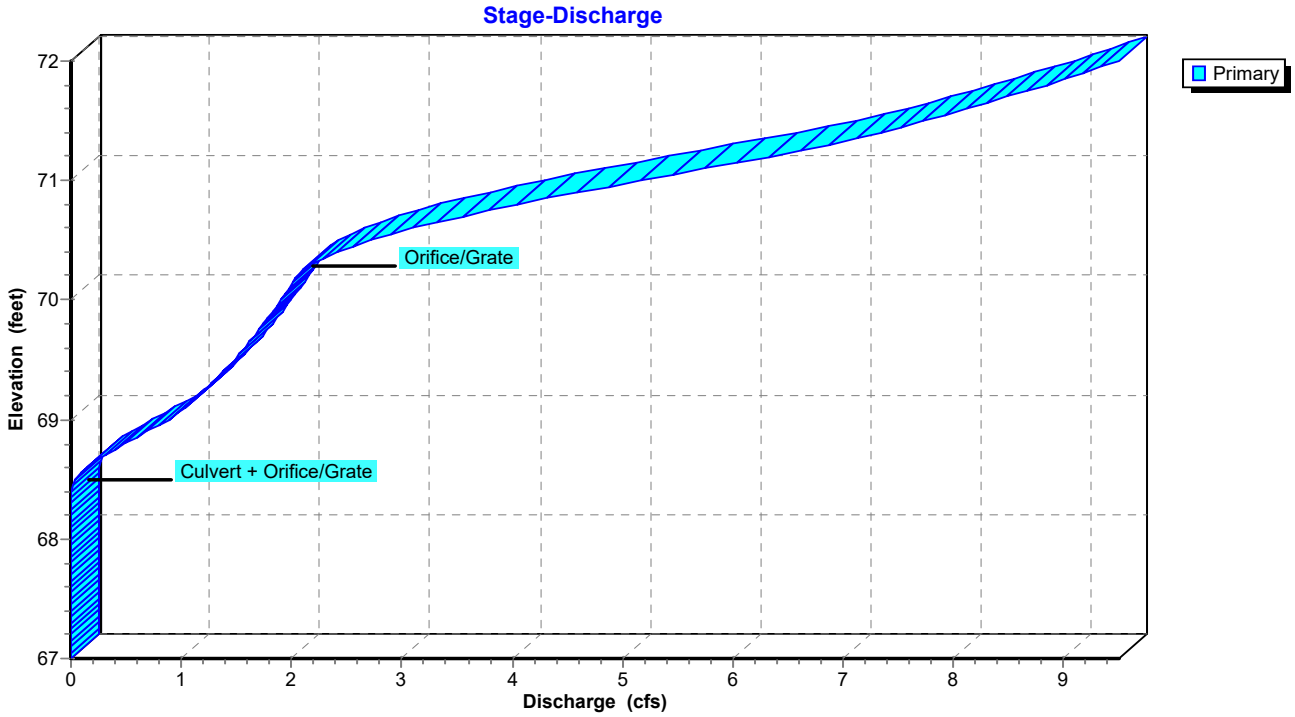
Pond 3P: Modified Southerly Basin



Stage-Discharge for Pond 3P: Modified Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	1.24	1.24	0.00
60.70	1.32	1.32	0.00
60.80	1.52	1.52	0.00
60.90	1.83	1.83	0.00
61.00	2.25	2.25	0.00
61.10	2.78	2.78	0.00
61.20	3.40	3.40	0.00
61.30	4.12	4.12	0.00
61.40	4.91	4.91	0.00
61.50	5.79	5.79	0.00
61.60	6.72	6.72	0.00
61.70	7.71	7.71	0.00
61.80	8.75	8.75	0.00
61.90	9.82	9.82	0.00
62.00	10.92	10.92	0.00
62.10	12.02	12.02	0.00
62.20	16.83	13.12	3.71
62.30	26.76	14.18	12.58
62.40	39.67	15.19	24.48
62.50	54.93	16.11	38.82
62.60	72.14	16.85	55.29
62.70	87.38	17.57	69.81
62.80	99.05	18.31	80.74
62.90	109.18	19.01	90.17
63.00	**118.32**	**19.69**	**98.63**

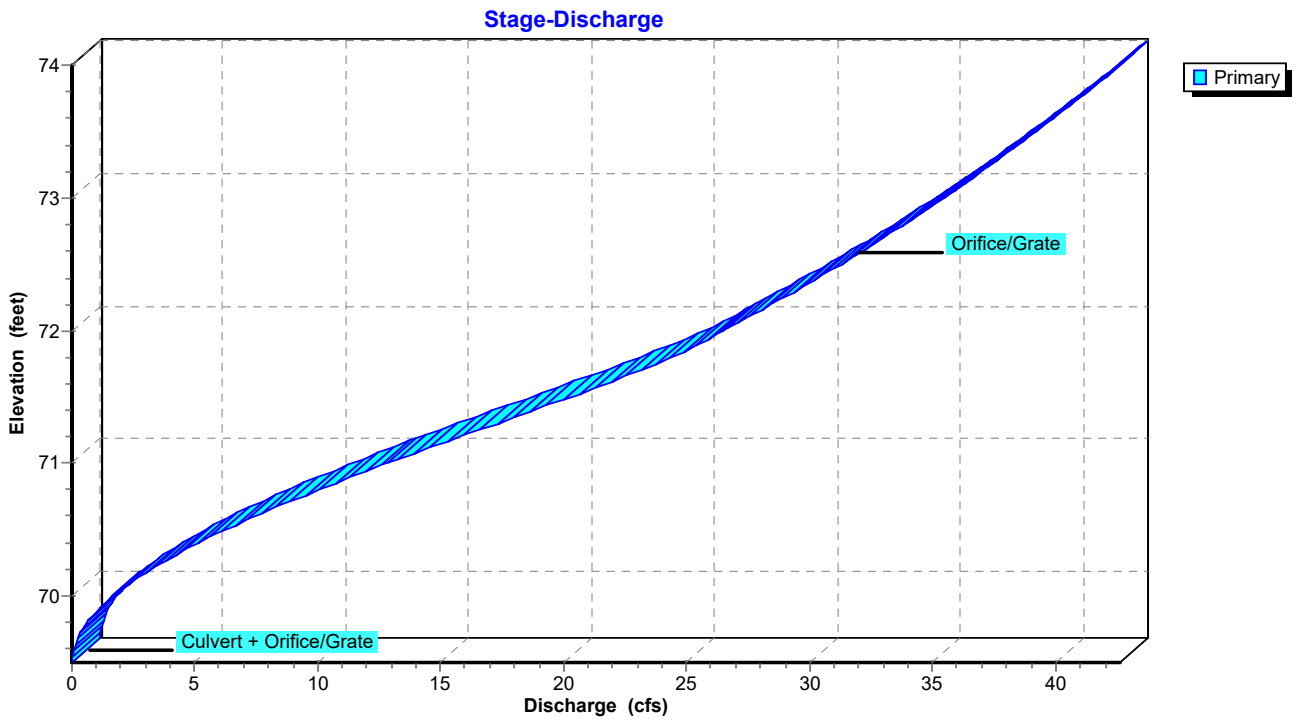
Pond 4P: Modified Easterly Basin



Stage-Discharge for Pond 4P: Modified Easterly Basin

Elevation (feet)	Primary (cfs)
67.00	0.00
67.10	0.00
67.20	0.00
67.30	0.00
67.40	0.00
67.50	0.00
67.60	0.00
67.70	0.00
67.80	0.00
67.90	0.00
68.00	0.00
68.10	0.00
68.20	0.00
68.30	0.00
68.40	0.00
68.50	0.04
68.60	0.15
68.70	0.30
68.80	0.49
68.90	0.70
69.00	0.89
69.10	1.03
69.20	1.16
69.30	1.28
69.40	1.38
69.50	1.48
69.60	1.57
69.70	1.66
69.80	1.74
69.90	1.82
70.00	1.90
70.10	1.97
70.20	2.04
70.30	2.18
70.40	2.41
70.50	2.72
70.60	3.10
70.70	3.55
70.80	4.05
70.90	4.59
71.00	5.17
71.10	5.75
71.20	6.33
71.30	6.88
71.40	7.34
71.50	7.73
71.60	8.12
71.70	8.49
71.80	8.84
71.90	9.18
72.00	**9.50**

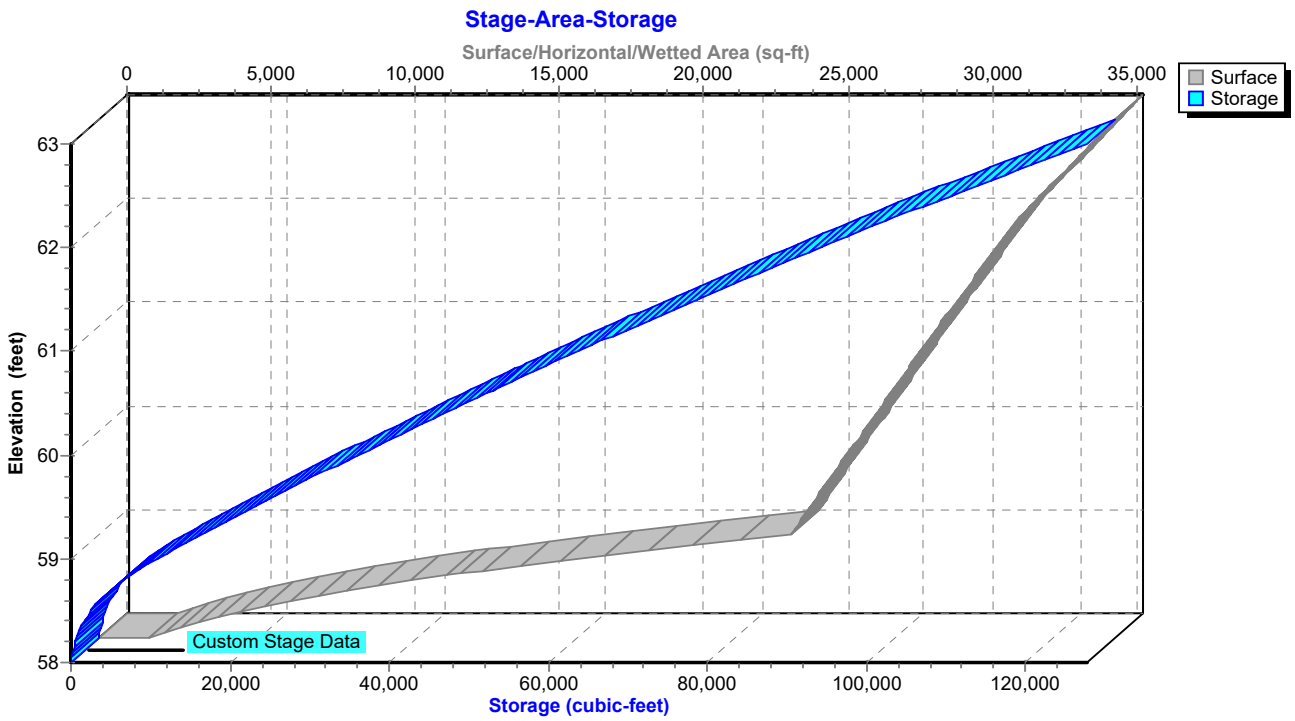
Pond 5P: Easterly Basin Extension



Stage-Discharge for Pond 5P: Easterly Basin Extension

Elevation (feet)	Primary (cfs)
69.50	0.00
69.60	0.07
69.70	0.28
69.80	0.62
69.90	1.09
70.00	1.68
70.10	2.39
70.20	3.21
70.30	4.12
70.40	5.14
70.50	6.24
70.60	7.43
70.70	8.69
70.80	10.01
70.90	11.39
71.00	12.82
71.10	14.29
71.20	15.78
71.30	17.28
71.40	18.79
71.50	20.27
71.60	21.72
71.70	23.10
71.80	24.40
71.90	25.54
72.00	26.43
72.10	27.46
72.20	28.46
72.30	29.43
72.40	30.36
72.50	31.27
72.60	32.15
72.70	33.01
72.80	33.84
72.90	34.66
73.00	35.45
73.10	36.23
73.20	37.00
73.30	37.74
73.40	38.48
73.50	39.19
73.60	39.90
73.70	40.60
73.80	41.28
73.90	41.95
74.00	**42.61**

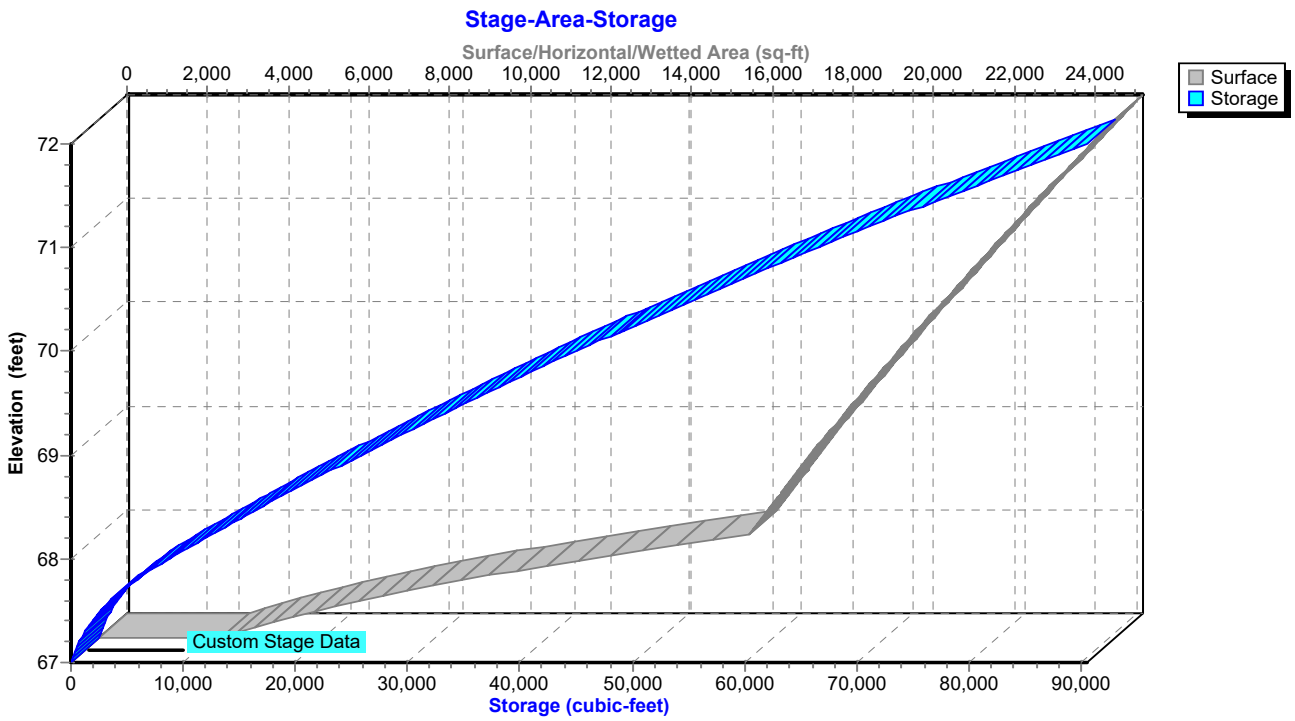
Pond 1P: Existing Southerly Basin



Stage-Area-Storage for Pond 1P: Existing Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,772	38,668
60.20	27,025	41,358
60.30	27,279	44,073
60.40	27,534	46,813
60.50	27,790	49,580
60.60	28,047	52,371
60.70	28,305	55,189
60.80	28,565	58,033
60.90	28,826	60,902
61.00	29,088	63,798
61.10	29,349	66,720
61.20	29,611	69,668
61.30	29,874	72,642
61.40	30,138	75,642
61.50	30,403	78,669
61.60	30,670	81,723
61.70	30,938	84,804
61.80	31,207	87,911
61.90	31,477	91,045
62.00	31,748	94,206
62.10	32,087	97,398
62.20	32,429	100,624
62.30	32,772	103,884
62.40	33,116	107,178
62.50	33,463	110,507
62.60	33,811	113,871
62.70	34,162	117,269
62.80	34,514	120,703
62.90	34,867	124,172
63.00	**35,223**	**127,677**

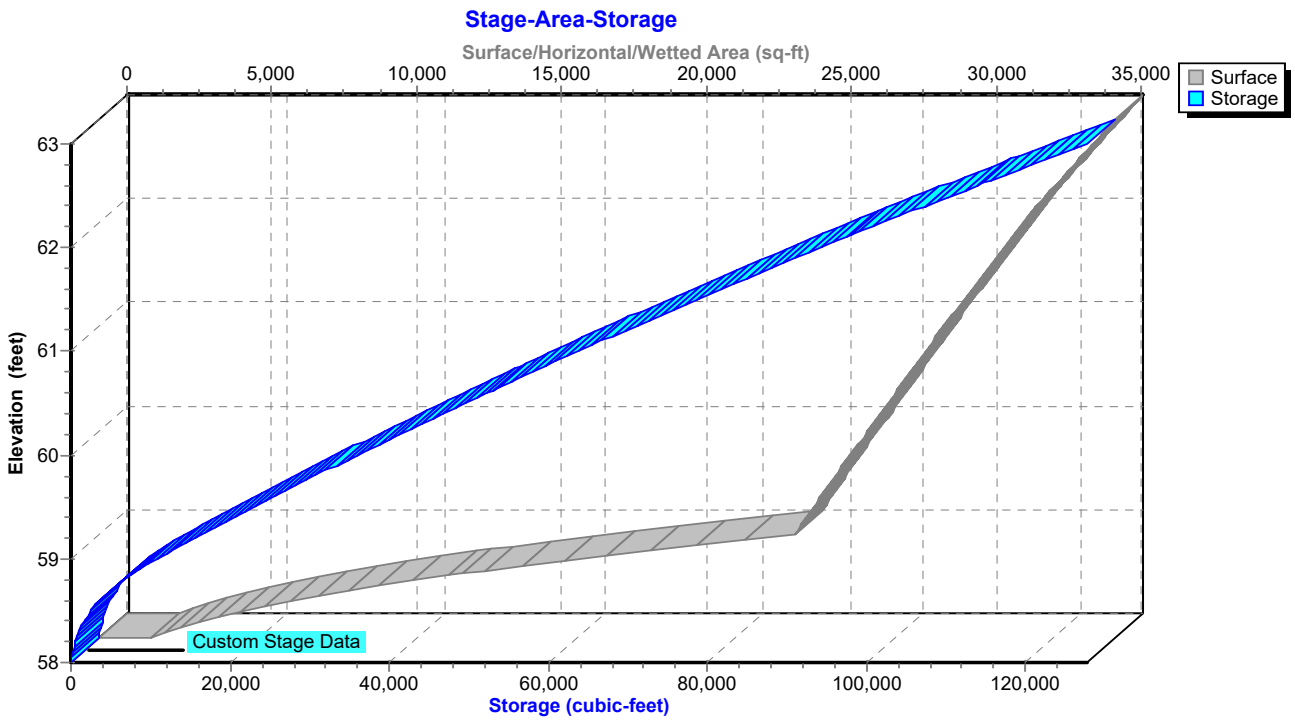
Pond 2P: Existing Easterly Basin



Stage-Area-Storage for Pond 2P: Existing Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0
67.10	3,877	345
67.20	4,824	779
67.30	5,874	1,313
67.40	7,028	1,957
67.50	8,285	2,722
67.60	9,646	3,618
67.70	11,110	4,654
67.80	12,677	5,843
67.90	14,348	7,193
68.00	16,122	8,716
68.10	16,316	10,338
68.20	16,512	11,979
68.30	16,709	13,640
68.40	16,907	15,321
68.50	17,106	17,022
68.60	17,306	18,742
68.70	17,508	20,483
68.80	17,710	22,244
68.90	17,914	24,025
69.00	18,119	25,827
69.10	18,338	27,650
69.20	18,558	29,494
69.30	18,780	31,361
69.40	19,003	33,250
69.50	19,227	35,162
69.60	19,453	37,096
69.70	19,679	39,052
69.80	19,908	41,032
69.90	20,137	43,034
70.00	20,368	45,059
70.10	20,597	47,107
70.20	20,828	49,179
70.30	21,060	51,273
70.40	21,293	53,391
70.50	21,528	55,532
70.60	21,764	57,696
70.70	22,001	59,885
70.80	22,239	62,097
70.90	22,479	64,333
71.00	22,720	66,593
71.10	22,961	68,877
71.20	23,204	71,185
71.30	23,448	73,517
71.40	23,693	75,875
71.50	23,940	78,256
71.60	24,188	80,663
71.70	24,437	83,094
71.80	24,687	85,550
71.90	24,939	88,031
72.00	**25,192**	**90,538**

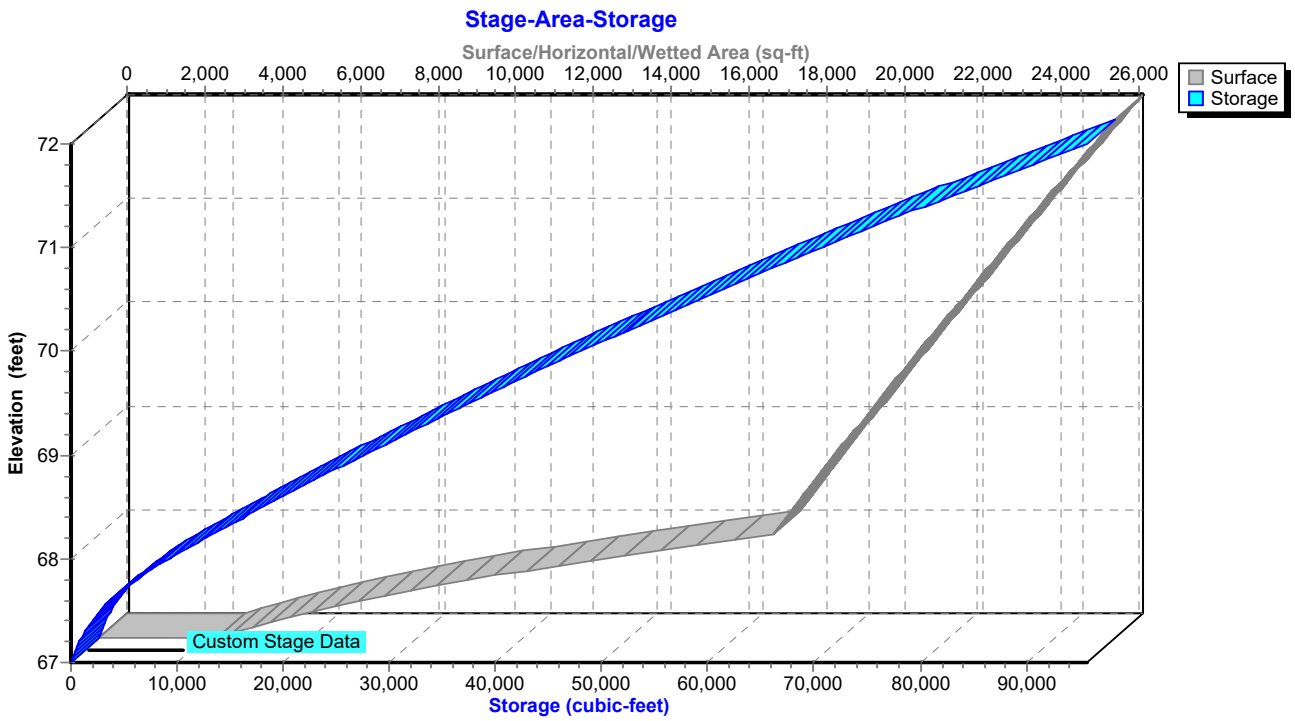
Pond 3P: Modified Southerly Basin



Stage-Area-Storage for Pond 3P: Modified Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,777	38,668
60.20	27,034	41,359
60.30	27,292	44,075
60.40	27,551	46,817
60.50	27,812	49,585
60.60	28,073	52,379
60.70	28,337	55,200
60.80	28,601	58,047
60.90	28,866	60,920
61.00	29,133	63,820
61.10	29,398	66,747
61.20	29,664	69,700
61.30	29,932	72,679
61.40	30,200	75,686
61.50	30,470	78,719
61.60	30,741	81,780
61.70	31,013	84,868
61.80	31,287	87,983
61.90	31,561	91,125
62.00	31,837	94,295
62.10	32,151	97,494
62.20	32,466	100,725
62.30	32,782	103,988
62.40	33,101	107,282
62.50	33,420	110,608
62.60	33,742	113,966
62.70	34,064	117,356
62.80	34,389	120,779
62.90	34,715	124,234
63.00	**35,042**	**127,722**

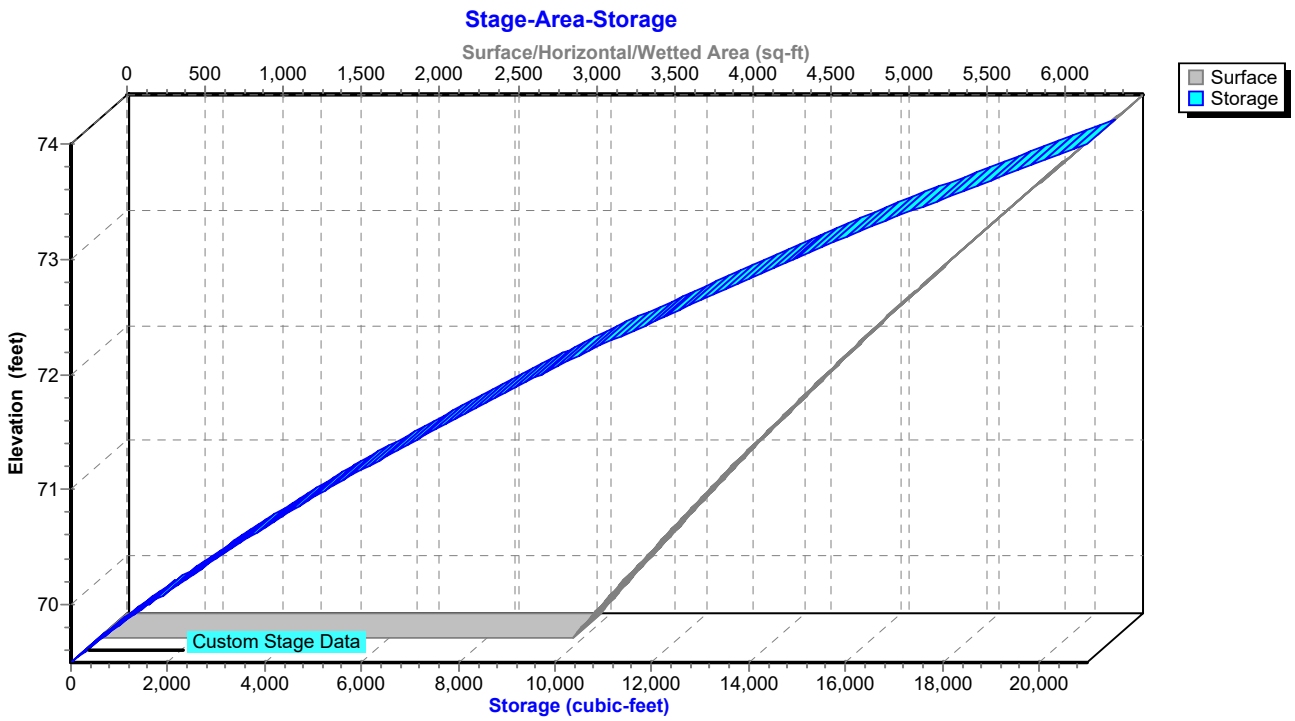
Pond 4P: Modified Easterly Basin



Stage-Area-Storage for Pond 4P: Modified Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0
67.10	3,935	347
67.20	4,954	791
67.30	6,091	1,342
67.40	7,345	2,013
67.50	8,716	2,815
67.60	10,204	3,760
67.70	11,810	4,860
67.80	13,533	6,126
67.90	15,373	7,570
68.00	17,330	9,204
68.10	17,533	10,947
68.20	17,737	12,711
68.30	17,942	14,495
68.40	18,149	16,299
68.50	18,357	18,125
68.60	18,566	19,971
68.70	18,776	21,838
68.80	18,987	23,726
68.90	19,199	25,635
69.00	19,413	27,566
69.10	19,626	29,518
69.20	19,840	31,491
69.30	20,056	33,486
69.40	20,273	35,502
69.50	20,490	37,541
69.60	20,709	39,601
69.70	20,930	41,683
69.80	21,151	43,787
69.90	21,373	45,913
70.00	21,597	48,061
70.10	21,814	50,232
70.20	22,033	52,424
70.30	22,252	54,638
70.40	22,473	56,875
70.50	22,695	59,133
70.60	22,918	61,414
70.70	23,142	63,717
70.80	23,367	66,042
70.90	23,593	68,390
71.00	23,820	70,761
71.10	24,046	73,154
71.20	24,273	75,570
71.30	24,501	78,009
71.40	24,730	80,470
71.50	24,960	82,955
71.60	25,191	85,462
71.70	25,423	87,993
71.80	25,656	90,547
71.90	25,891	93,124
72.00	**26,126**	**95,725**

Pond 5P: Easterly Basin Extension



Stage-Area-Storage for Pond 5P: Easterly Basin Extension

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
69.50	3,027	0
69.60	3,091	306
69.70	3,157	618
69.80	3,222	937
69.90	3,289	1,263
70.00	3,356	1,595
70.10	3,423	1,934
70.20	3,491	2,280
70.30	3,559	2,632
70.40	3,628	2,991
70.50	3,698	3,358
70.60	3,768	3,731
70.70	3,839	4,111
70.80	3,911	4,499
70.90	3,983	4,894
71.00	4,056	5,296
71.10	4,129	5,705
71.20	4,202	6,121
71.30	4,276	6,545
71.40	4,351	6,977
71.50	4,426	7,415
71.60	4,502	7,862
71.70	4,578	8,316
71.80	4,656	8,777
71.90	4,733	9,247
72.00	4,812	9,724
72.10	4,890	10,209
72.20	4,970	10,702
72.30	5,049	11,203
72.40	5,130	11,712
72.50	5,211	12,229
72.60	5,292	12,754
72.70	5,374	13,288
72.80	5,457	13,829
72.90	5,541	14,379
73.00	5,625	14,937
73.10	5,709	15,504
73.20	5,794	16,079
73.30	5,879	16,663
73.40	5,965	17,255
73.50	6,052	17,856
73.60	6,139	18,465
73.70	6,227	19,084
73.80	6,315	19,711
73.90	6,404	20,347
74.00	**6,494**	**20,992**

APPENDIX I-3
10-YEAR STORM EVENT HYDROGRAPHS

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
454,208	74	>75% Grass cover, Good, HSG C (E-1, E-2, P-1, P-2A, P-2B)
287,871	80	>75% Grass cover, Good, HSG D (E-1, E-2, P-1, P-2A)
1,682,040	98	Paved parking, HSG D (E-1, E-2, P-1, P-2A, P-2B)
2,424,119	**91**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	454,208	287,871	0	742,079	>75% Grass cover, Good	
0	0	0	1,682,040	0	1,682,040	Paved parking	
0	**0**	**454,208**	**1,969,911**	**0**	**2,424,119**	**TOTAL AREA**	

Summary for Subcatchment E-1: Existing Area Tributary to Southerly Basin

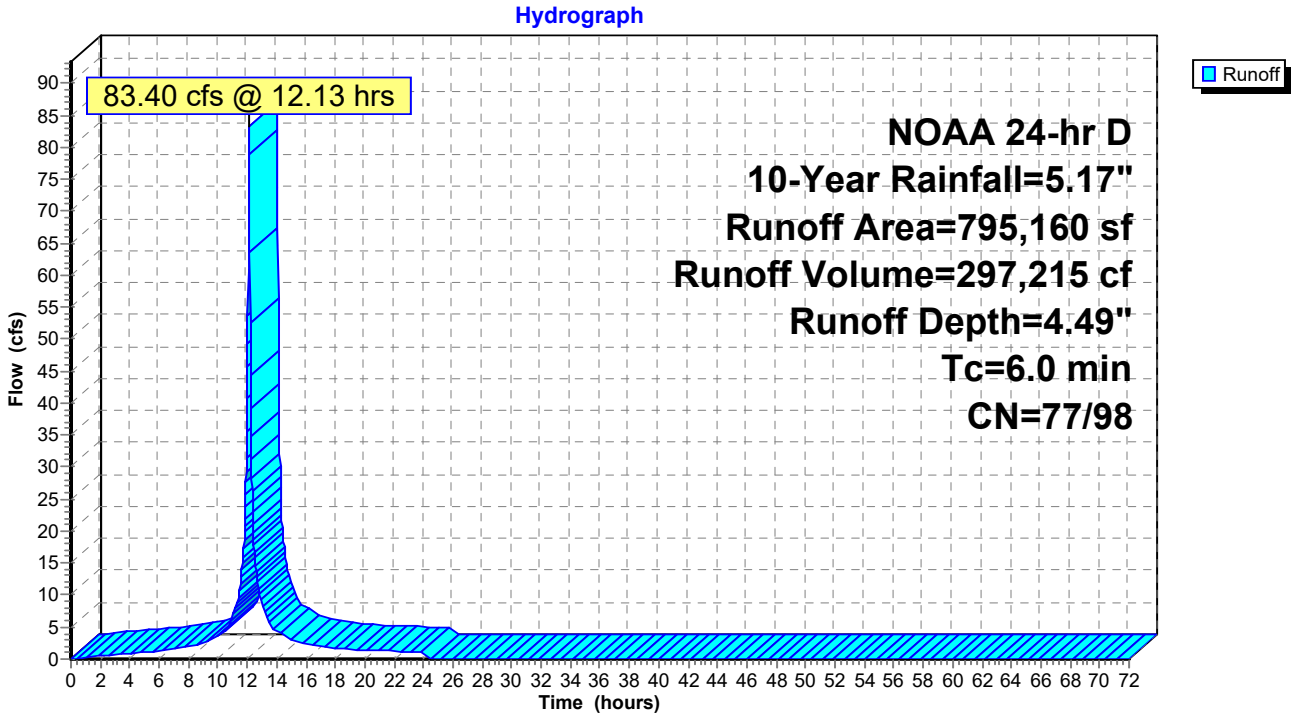
Runoff = 83.40 cfs @ 12.13 hrs, Volume= 297,215 cf, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
630,944	98	Paved parking, HSG D
85,682	74	>75% Grass cover, Good, HSG C
78,534	80	>75% Grass cover, Good, HSG D
795,160	94	Weighted Average
164,216	77	20.65% Pervious Area
630,944	98	79.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-1: Existing Area Tributary to Southerly Basin



Summary for Subcatchment E-2: Existing Area Tributary to Easterly Basin

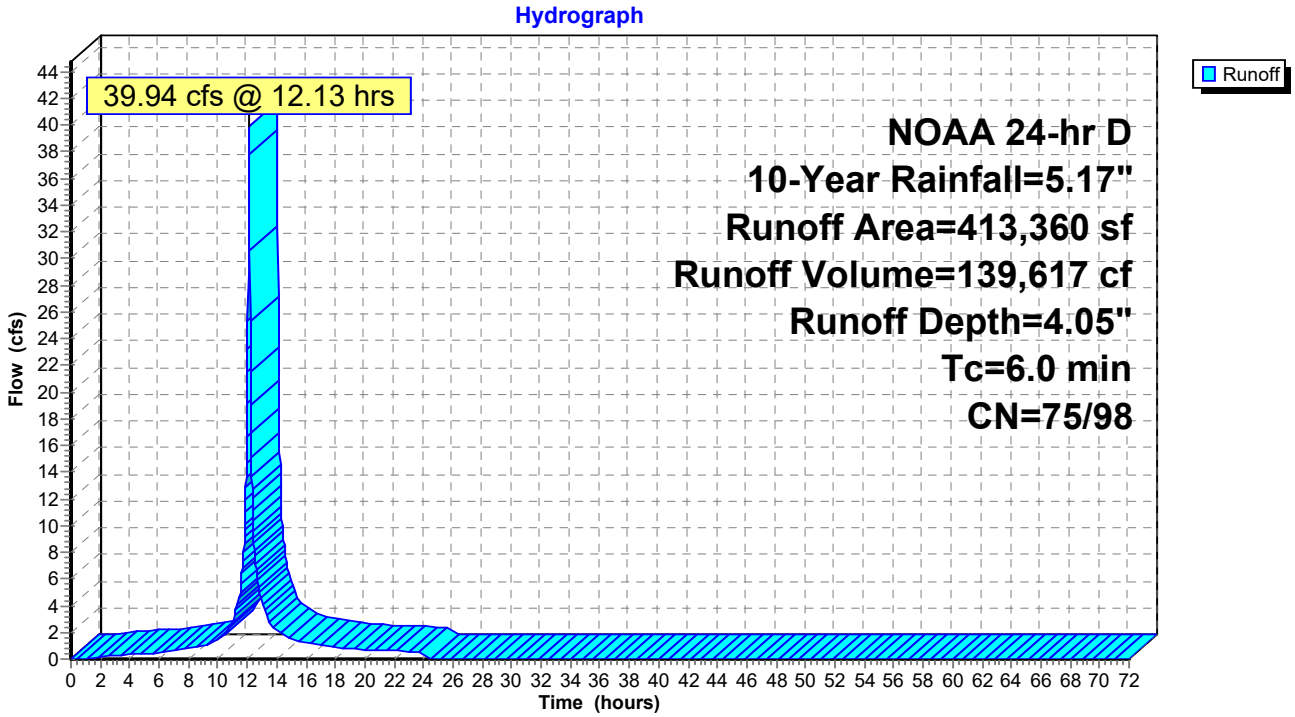
Runoff = 39.94 cfs @ 12.13 hrs, Volume= 139,617 cf, Depth= 4.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
258,284	98	Paved parking, HSG D
125,156	74	>75% Grass cover, Good, HSG C
29,920	80	>75% Grass cover, Good, HSG D
413,360	89	Weighted Average
155,076	75	37.52% Pervious Area
258,284	98	62.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-2: Existing Area Tributary to Easterly Basin



Summary for Subcatchment P-1: Proposed Area Tributary to 42" RCP

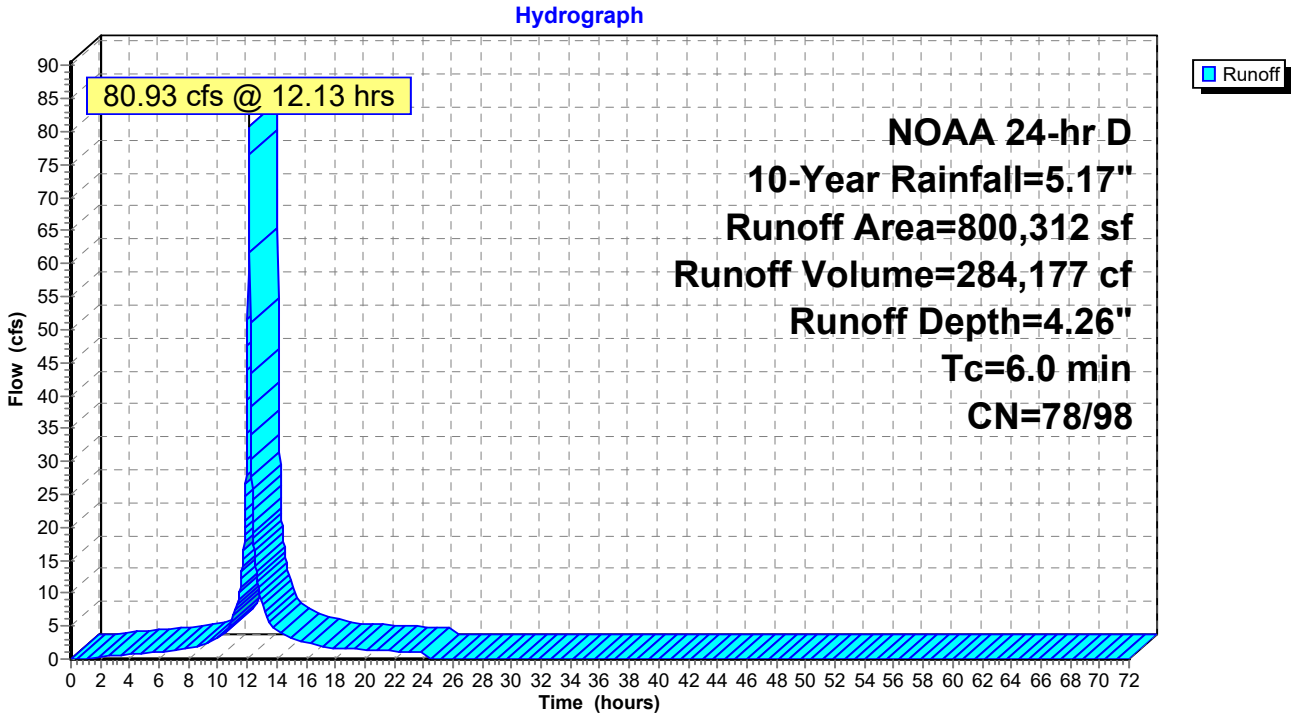
Runoff = 80.93 cfs @ 12.13 hrs, Volume= 284,177 cf, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
541,322	98	Paved parking, HSG D
89,531	74	>75% Grass cover, Good, HSG C
169,459	80	>75% Grass cover, Good, HSG D
800,312	92	Weighted Average
258,990	78	32.36% Pervious Area
541,322	98	67.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-1: Proposed Area Tributary to 42" RCP



Summary for Subcatchment P-2A: Area Tributary to 18" RCP

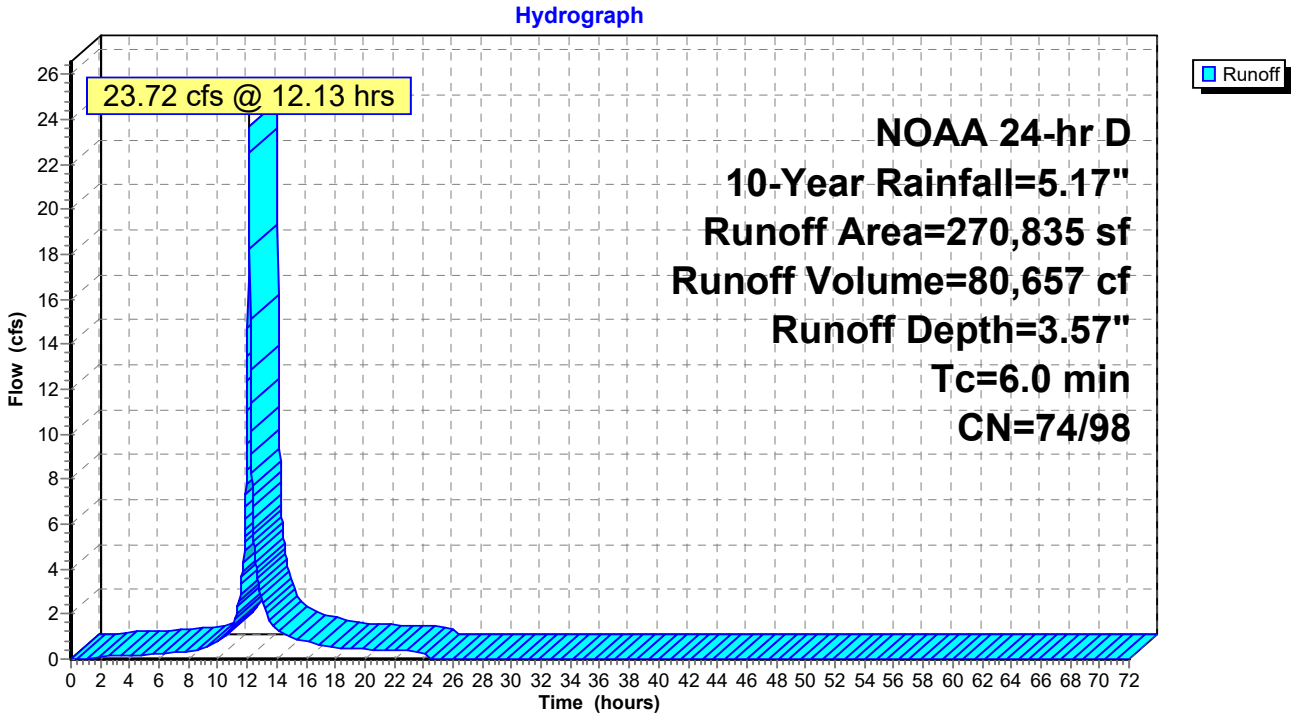
Runoff = 23.72 cfs @ 12.13 hrs, Volume= 80,657 cf, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
119,490	98	Paved parking, HSG D
141,387	74	>75% Grass cover, Good, HSG C
9,958	80	>75% Grass cover, Good, HSG D
270,835	85	Weighted Average
151,345	74	55.88% Pervious Area
119,490	98	44.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2A: Area Tributary to 18" RCP



Summary for Subcatchment P-2B: Proposed Area Tributary to Basin Extension

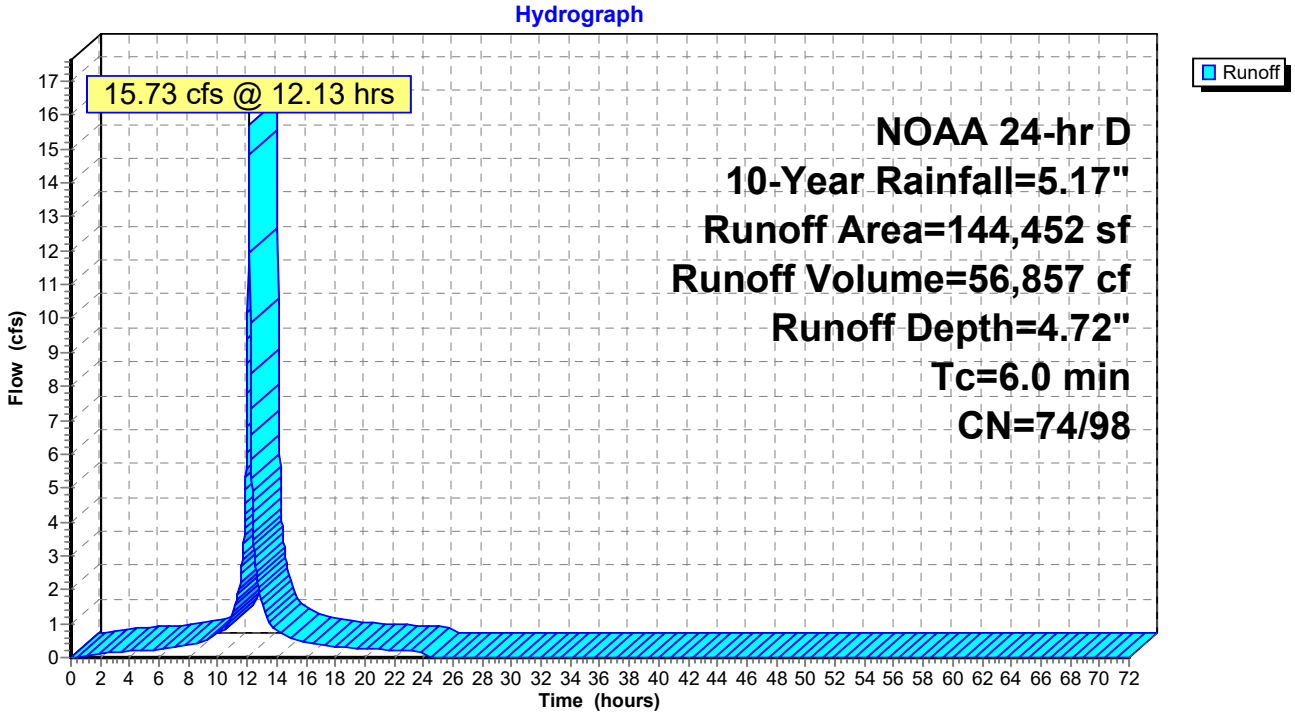
Runoff = 15.73 cfs @ 12.13 hrs, Volume= 56,857 cf, Depth= 4.72"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 10-Year Rainfall=5.17"

Area (sf)	CN	Description
132,000	98	Paved parking, HSG D
12,452	74	>75% Grass cover, Good, HSG C
144,452	96	Weighted Average
12,452	74	8.62% Pervious Area
132,000	98	91.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2B: Proposed Area Tributary to Basin Extension



Summary for Pond 1P: Existing Southerly Basin

Inflow Area = 795,160 sf, 79.35% Impervious, Inflow Depth = 4.49" for 10-Year event
Inflow = 83.40 cfs @ 12.13 hrs, Volume= 297,215 cf
Outflow = 64.78 cfs @ 12.18 hrs, Volume= 292,803 cf, Atten= 22%, Lag= 3.0 min
Primary = 7.70 cfs @ 12.18 hrs, Volume= 130,376 cf
Secondary = 57.08 cfs @ 12.18 hrs, Volume= 162,428 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 61.70' @ 12.18 hrs Surf.Area= 30,933 sf Storage= 84,751 cf

Plug-Flow detention time= 242.4 min calculated for 292,722 cf (98% of inflow)
Center-of-Mass det. time= 233.3 min (993.3 - 760.1)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,677 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

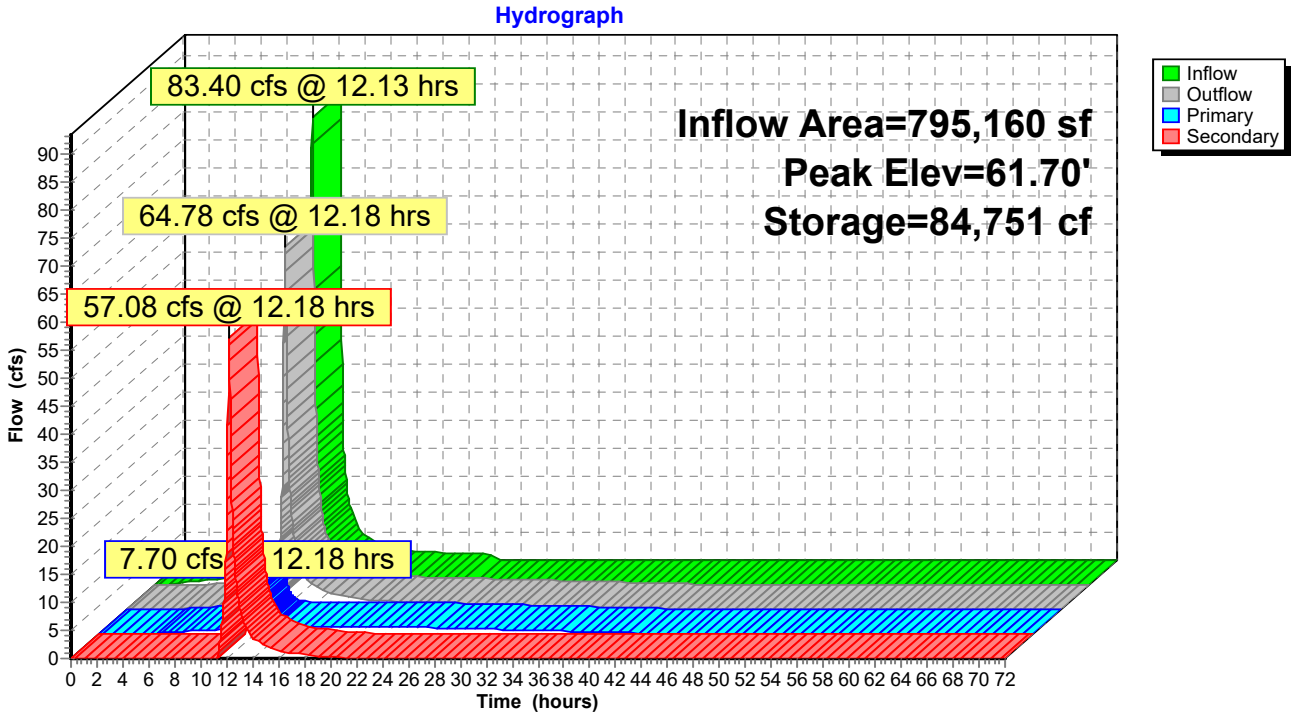
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,088	875.0	27,795	63,798	60,199
62.00	31,748	882.0	30,408	94,206	61,514
63.00	35,223	930.0	33,470	127,677	68,495

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	60.50'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.50 2.50 Width (feet) 9.00 12.50 27.00 38.00

Primary OutFlow Max=7.69 cfs @ 12.18 hrs HW=61.70' (Free Discharge)
└─**1=Culvert** (Passes 7.69 cfs of 21.80 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.59 cfs @ 8.10 fps)
  └─**3=Orifice/Grate** (Orifice Controls 6.10 cfs @ 3.53 fps)

Secondary OutFlow Max=57.03 cfs @ 12.18 hrs HW=61.70' (Free Discharge)
└─**4=Emergency Spillway** (Weir Controls 57.03 cfs @ 3.24 fps)

Pond 1P: Existing Southerly Basin



Summary for Pond 2P: Existing Easterly Basin

Inflow Area = 413,360 sf, 62.48% Impervious, Inflow Depth = 4.05" for 10-Year event
Inflow = 39.94 cfs @ 12.13 hrs, Volume= 139,617 cf
Outflow = 6.57 cfs @ 12.61 hrs, Volume= 124,008 cf, Atten= 84%, Lag= 28.7 min
Primary = 6.57 cfs @ 12.61 hrs, Volume= 124,008 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 71.24' @ 12.61 hrs Surf.Area= 23,307 sf Storage= 72,168 cf

Plug-Flow detention time= 322.3 min calculated for 123,974 cf (89% of inflow)
Center-of-Mass det. time= 265.0 min (1,036.4 - 771.4)

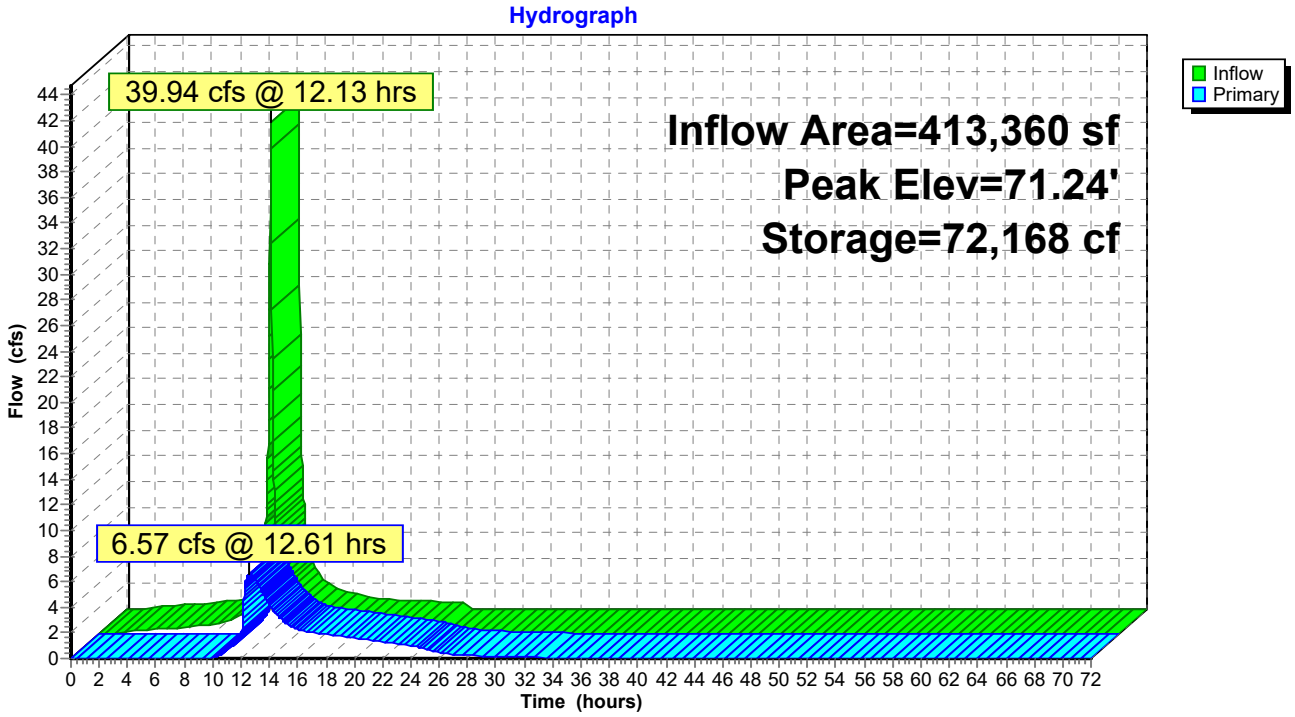
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	90,538 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	16,122	665.0	8,716	8,716	29,510
69.00	18,119	699.0	17,111	25,827	33,263
70.00	20,368	703.0	19,233	45,059	34,094
71.00	22,720	726.0	21,533	66,593	36,806
72.00	25,192	749.0	23,945	90,538	39,604

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=6.57 cfs @ 12.61 hrs HW=71.24' (Free Discharge)
└─**1=Culvert** (Passes 6.57 cfs of 8.82 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.67 cfs @ 7.64 fps)
  └─**3=Orifice/Grate** (Orifice Controls 3.90 cfs @ 3.51 fps)

Pond 2P: Existing Easterly Basin



Summary for Pond 3P: Modified Southerly Basin

Inflow Area = 800,312 sf, 67.64% Impervious, Inflow Depth = 4.26" for 10-Year event
Inflow = 80.93 cfs @ 12.13 hrs, Volume= 284,177 cf
Outflow = 55.01 cfs @ 12.19 hrs, Volume= 279,742 cf, Atten= 32%, Lag= 3.9 min
Primary = 16.11 cfs @ 12.19 hrs, Volume= 246,736 cf
Secondary = 38.90 cfs @ 12.19 hrs, Volume= 33,006 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 62.50' @ 12.19 hrs Surf.Area= 33,422 sf Storage= 110,624 cf

Plug-Flow detention time= 304.6 min calculated for 279,664 cf (98% of inflow)
Center-of-Mass det. time= 295.2 min (1,062.6 - 767.4)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,722 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

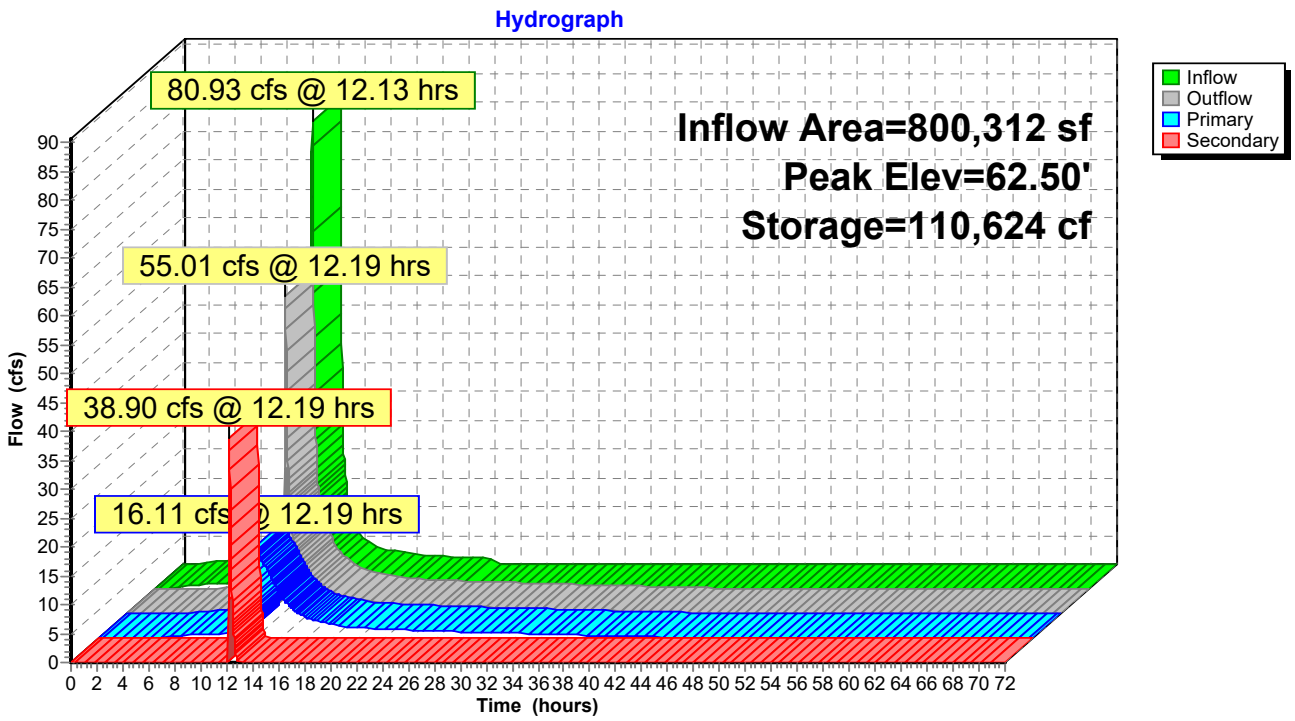
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,133	876.0	27,817	63,820	60,335
62.00	31,837	876.0	30,475	94,295	61,211
63.00	35,042	922.0	33,427	127,722	67,854

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	62.12'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 50.00 52.00

Primary OutFlow Max=16.10 cfs @ 12.19 hrs HW=62.50' (Free Discharge)
└─**1=Culvert** (Passes 16.10 cfs of 25.66 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.80 cfs @ 9.17 fps)
  └─**3=Orifice/Grate** (Orifice Controls 14.30 cfs @ 4.67 fps)

Secondary OutFlow Max=38.62 cfs @ 12.19 hrs HW=62.50' (Free Discharge)
└─**4=Emergency Spillway** (Weir Controls 38.62 cfs @ 2.01 fps)

Pond 3P: Modified Southerly Basin



Summary for Pond 4P: Modified Easterly Basin

Inflow Area = 415,287 sf, 60.56% Impervious, Inflow Depth = 3.97" for 10-Year event
Inflow = 34.71 cfs @ 12.14 hrs, Volume= 137,502 cf
Outflow = 5.08 cfs @ 12.83 hrs, Volume= 120,841 cf, Atten= 85%, Lag= 41.9 min
Primary = 5.08 cfs @ 12.83 hrs, Volume= 120,841 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 70.99' @ 12.83 hrs Surf.Area= 23,786 sf Storage= 70,405 cf

Plug-Flow detention time= 357.1 min calculated for 120,841 cf (88% of inflow)
Center-of-Mass det. time= 293.2 min (1,082.9 - 789.7)

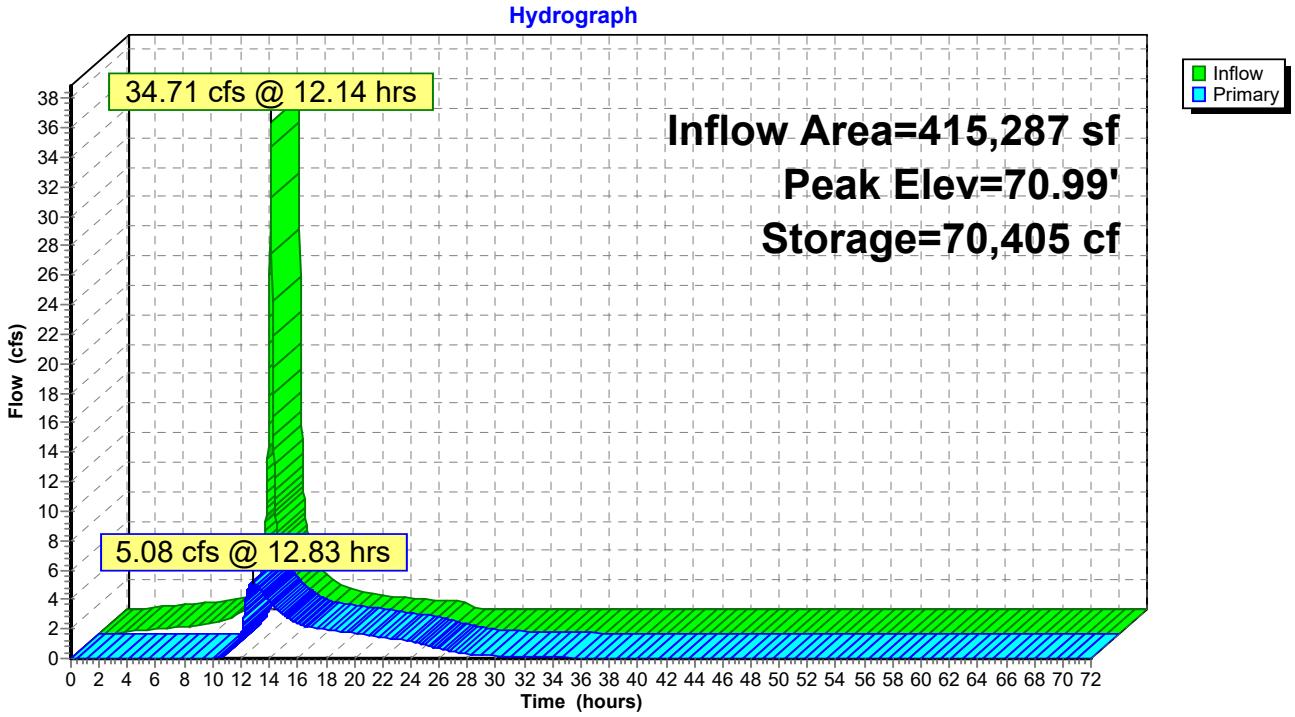
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	95,725 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	17,330	701.0	9,204	9,204	33,423
69.00	19,413	732.0	18,362	27,566	37,030
70.00	21,597	435.0	20,495	48,061	64,618
71.00	23,820	853.0	22,699	70,761	107,466
72.00	26,126	772.0	24,964	95,725	117,972

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=5.08 cfs @ 12.83 hrs HW=70.99' (Free Discharge)
└─**1=Culvert** (Passes 5.08 cfs of 8.29 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.53 cfs @ 7.24 fps)
  └─**3=Orifice/Grate** (Orifice Controls 2.55 cfs @ 3.05 fps)

Pond 4P: Modified Easterly Basin



Summary for Pond 5P: Easterly Basin Extension

Inflow Area = 144,452 sf, 91.38% Impervious, Inflow Depth = 4.72" for 10-Year event
Inflow = 15.73 cfs @ 12.13 hrs, Volume= 56,857 cf
Outflow = 11.55 cfs @ 12.16 hrs, Volume= 56,845 cf, Atten= 27%, Lag= 2.1 min
Primary = 11.55 cfs @ 12.16 hrs, Volume= 56,845 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 71.16' @ 12.19 hrs Surf.Area= 4,175 sf Storage= 5,968 cf

Plug-Flow detention time= 40.2 min calculated for 56,829 cf (100% of inflow)
Center-of-Mass det. time= 40.5 min (793.7 - 753.2)

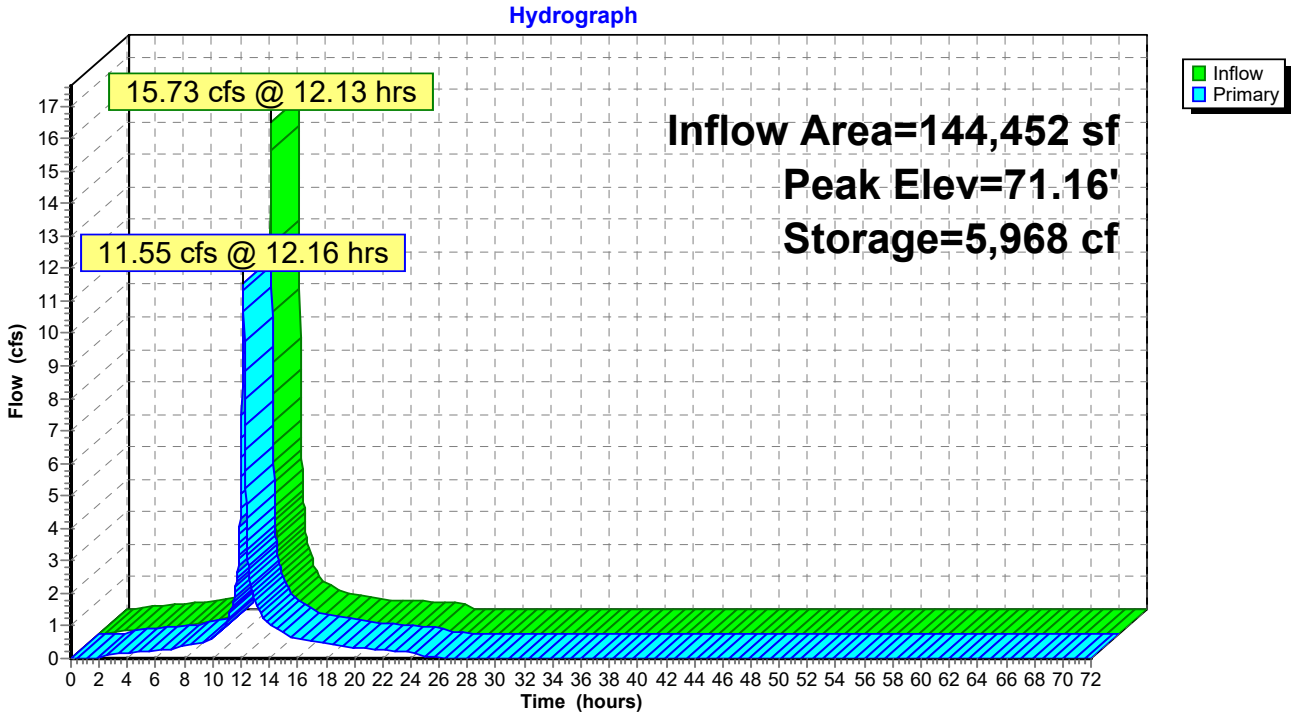
Volume	Invert	Avail.Storage	Storage Description
#1	69.50'	20,992 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
69.50	3,027	214.0	0	0	3,027
70.00	3,356	224.0	1,595	1,595	3,392
71.00	4,056	243.0	3,700	5,296	4,136
72.00	4,812	262.0	4,429	9,724	4,940
73.00	5,625	280.0	5,213	14,937	5,763
74.00	6,494	299.0	6,054	20,992	6,685

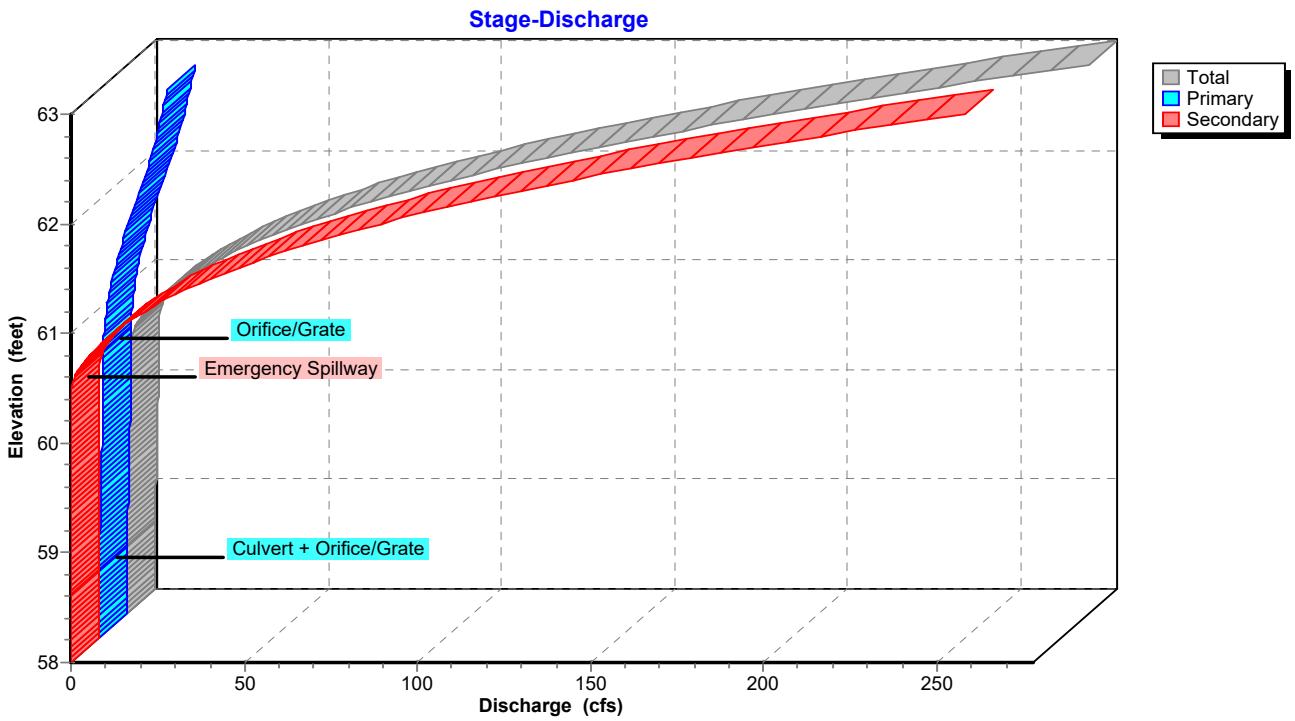
Device	Routing	Invert	Outlet Devices
#1	Primary	69.50'	**30.0" Round Culvert** L= 110.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.27' S= 0.0112 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	69.50'	**30.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	72.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.86 cfs @ 12.16 hrs HW=71.14' TW=70.33' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 10.86 cfs @ 4.53 fps)
  ├─**2=Orifice/Grate** (Passes 10.86 cfs of 14.73 cfs potential flow)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Easterly Basin Extension



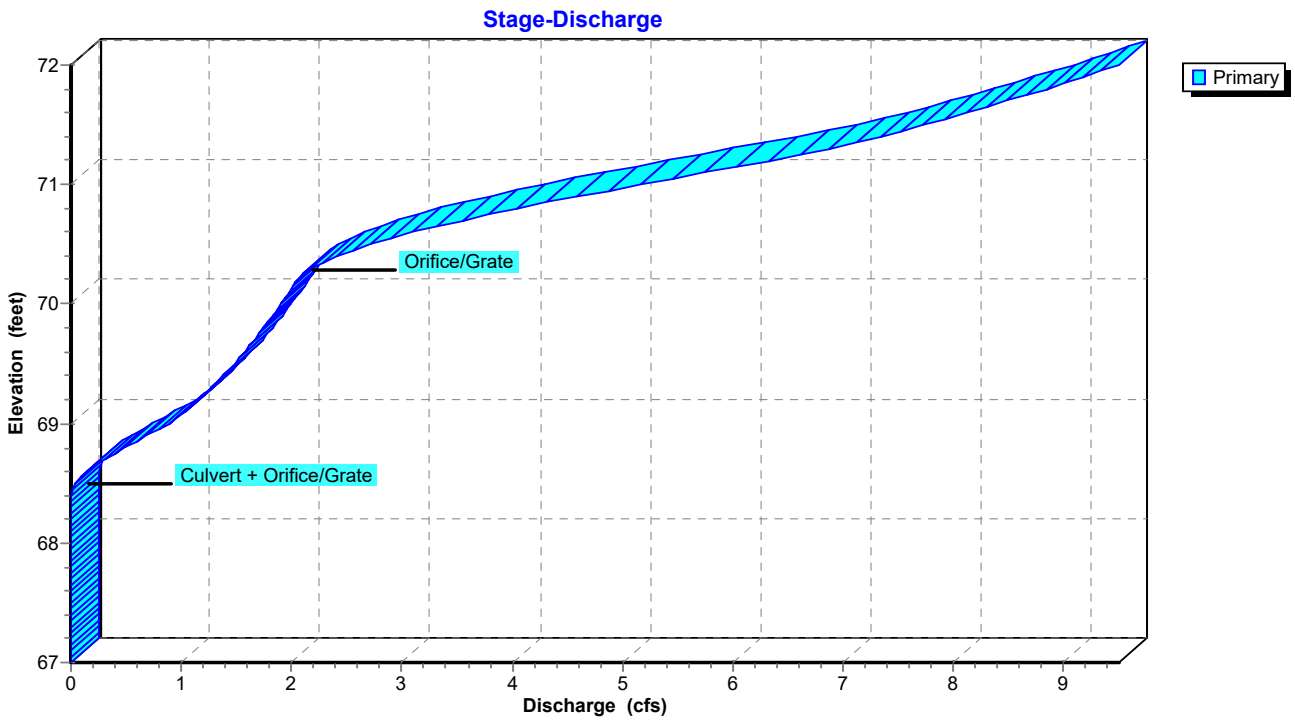
Pond 1P: Existing Southerly Basin



Stage-Discharge for Pond 1P: Existing Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	2.20	1.24	0.96
60.70	4.12	1.32	2.80
60.80	6.81	1.52	5.30
60.90	10.21	1.83	8.38
61.00	14.29	2.25	12.04
61.10	19.07	2.78	16.29
61.20	24.60	3.40	21.20
61.30	30.94	4.12	26.82
61.40	38.12	4.91	33.21
61.50	46.17	5.79	40.38
61.60	55.10	6.72	48.38
61.70	64.95	7.71	57.24
61.80	75.73	8.75	66.98
61.90	87.47	9.82	77.64
62.00	100.16	10.92	89.24
62.10	113.82	12.02	101.80
62.20	128.42	13.12	115.30
62.30	143.93	14.18	129.75
62.40	160.34	15.19	145.15
62.50	177.61	16.11	161.51
62.60	195.69	16.85	178.84
62.70	214.72	17.57	197.15
62.80	234.77	18.31	216.46
62.90	255.80	19.01	236.78
63.00	**277.81**	**19.69**	**258.12**

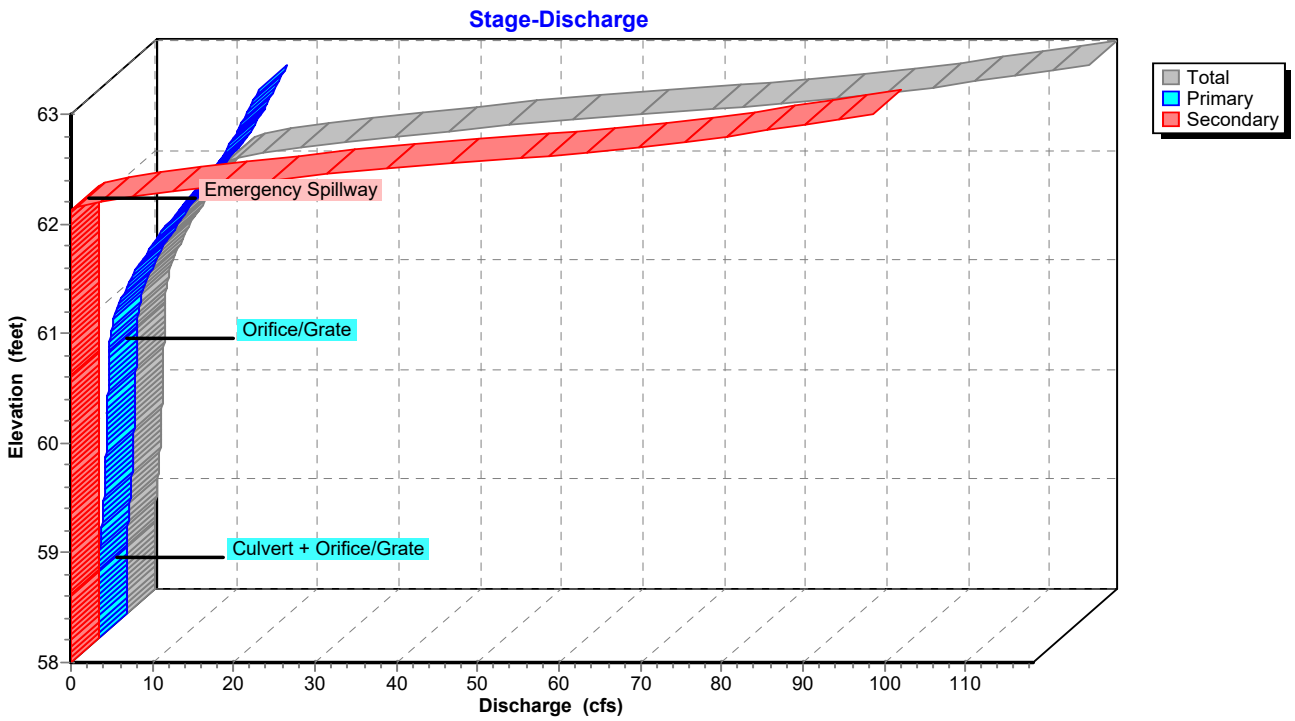
Pond 2P: Existing Easterly Basin



Stage-Discharge for Pond 2P: Existing Easterly Basin

Elevation (feet)	Primary (cfs)
67.00	0.00
67.10	0.00
67.20	0.00
67.30	0.00
67.40	0.00
67.50	0.00
67.60	0.00
67.70	0.00
67.80	0.00
67.90	0.00
68.00	0.00
68.10	0.00
68.20	0.00
68.30	0.00
68.40	0.00
68.50	0.04
68.60	0.15
68.70	0.30
68.80	0.49
68.90	0.70
69.00	0.89
69.10	1.03
69.20	1.16
69.30	1.28
69.40	1.38
69.50	1.48
69.60	1.57
69.70	1.66
69.80	1.74
69.90	1.82
70.00	1.90
70.10	1.97
70.20	2.04
70.30	2.18
70.40	2.41
70.50	2.72
70.60	3.10
70.70	3.55
70.80	4.05
70.90	4.59
71.00	5.17
71.10	5.75
71.20	6.33
71.30	6.88
71.40	7.34
71.50	7.73
71.60	8.12
71.70	8.49
71.80	8.84
71.90	9.18
72.00	**9.50**

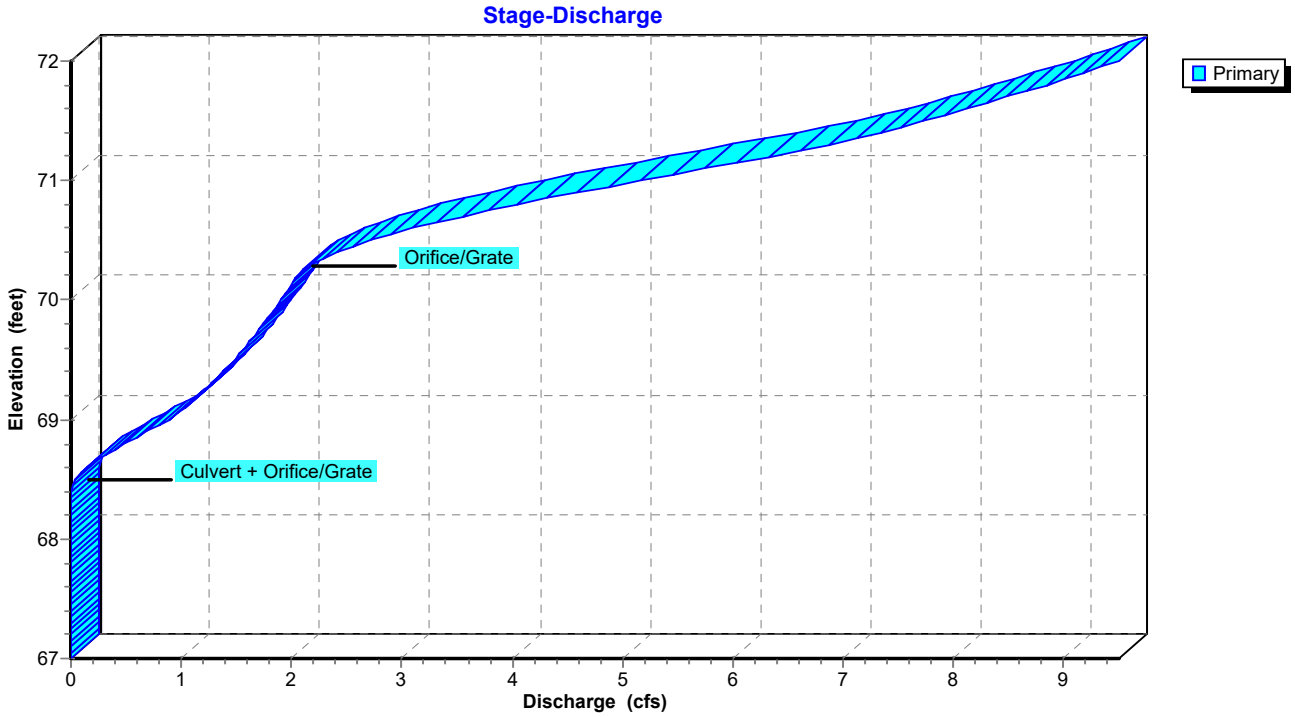
Pond 3P: Modified Southerly Basin



Stage-Discharge for Pond 3P: Modified Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	1.24	1.24	0.00
60.70	1.32	1.32	0.00
60.80	1.52	1.52	0.00
60.90	1.83	1.83	0.00
61.00	2.25	2.25	0.00
61.10	2.78	2.78	0.00
61.20	3.40	3.40	0.00
61.30	4.12	4.12	0.00
61.40	4.91	4.91	0.00
61.50	5.79	5.79	0.00
61.60	6.72	6.72	0.00
61.70	7.71	7.71	0.00
61.80	8.75	8.75	0.00
61.90	9.82	9.82	0.00
62.00	10.92	10.92	0.00
62.10	12.02	12.02	0.00
62.20	16.83	13.12	3.71
62.30	26.76	14.18	12.58
62.40	39.67	15.19	24.48
62.50	54.93	16.11	38.82
62.60	72.14	16.85	55.29
62.70	87.38	17.57	69.81
62.80	99.05	18.31	80.74
62.90	109.18	19.01	90.17
63.00	**118.32**	**19.69**	**98.63**

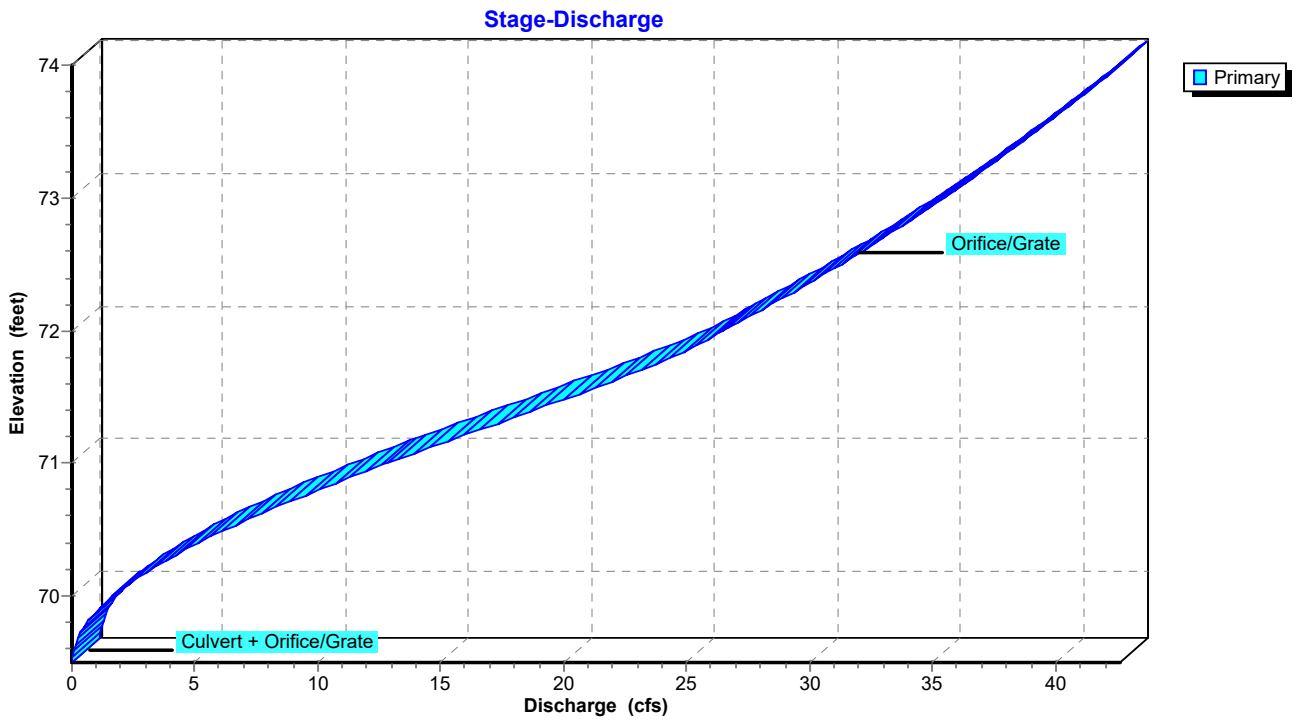
Pond 4P: Modified Easterly Basin



Stage-Discharge for Pond 4P: Modified Easterly Basin

Elevation (feet)	Primary (cfs)
67.00	0.00
67.10	0.00
67.20	0.00
67.30	0.00
67.40	0.00
67.50	0.00
67.60	0.00
67.70	0.00
67.80	0.00
67.90	0.00
68.00	0.00
68.10	0.00
68.20	0.00
68.30	0.00
68.40	0.00
68.50	0.04
68.60	0.15
68.70	0.30
68.80	0.49
68.90	0.70
69.00	0.89
69.10	1.03
69.20	1.16
69.30	1.28
69.40	1.38
69.50	1.48
69.60	1.57
69.70	1.66
69.80	1.74
69.90	1.82
70.00	1.90
70.10	1.97
70.20	2.04
70.30	2.18
70.40	2.41
70.50	2.72
70.60	3.10
70.70	3.55
70.80	4.05
70.90	4.59
71.00	5.17
71.10	5.75
71.20	6.33
71.30	6.88
71.40	7.34
71.50	7.73
71.60	8.12
71.70	8.49
71.80	8.84
71.90	9.18
72.00	**9.50**

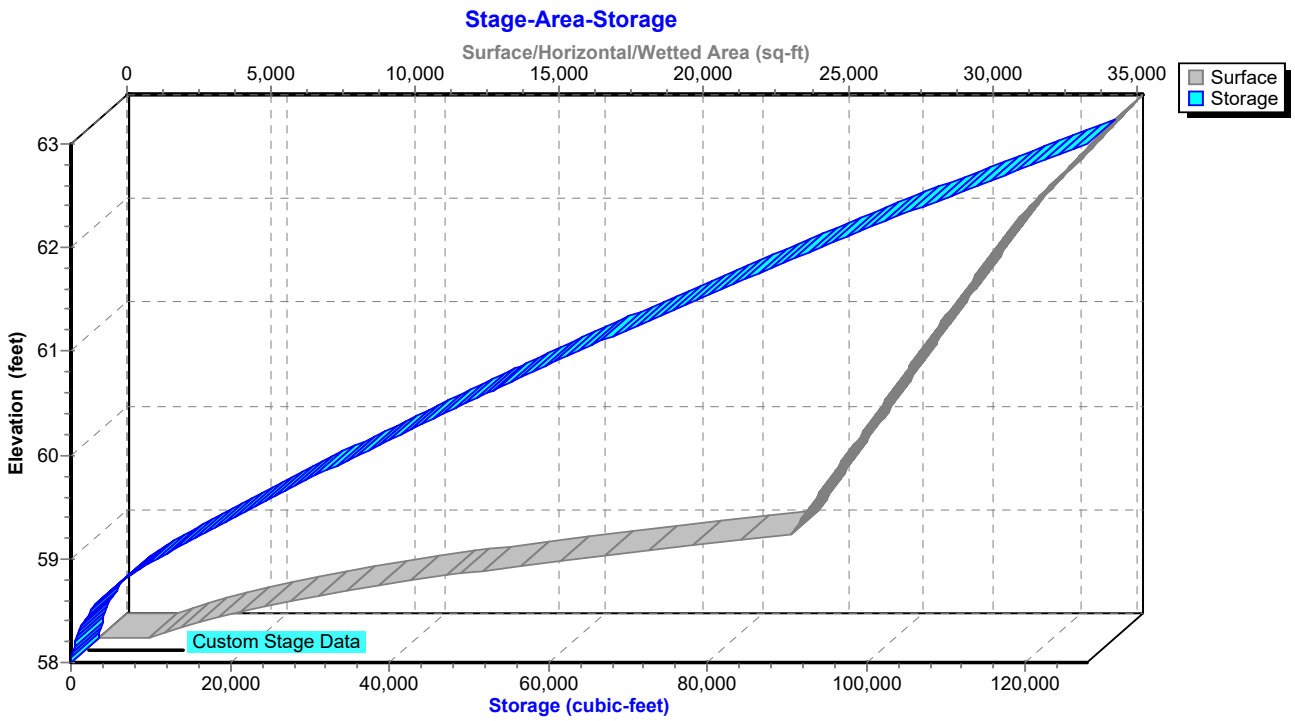
Pond 5P: Easterly Basin Extension



Stage-Discharge for Pond 5P: Easterly Basin Extension

Elevation (feet)	Primary (cfs)
69.50	0.00
69.60	0.07
69.70	0.28
69.80	0.62
69.90	1.09
70.00	1.68
70.10	2.39
70.20	3.21
70.30	4.12
70.40	5.14
70.50	6.24
70.60	7.43
70.70	8.69
70.80	10.01
70.90	11.39
71.00	12.82
71.10	14.29
71.20	15.78
71.30	17.28
71.40	18.79
71.50	20.27
71.60	21.72
71.70	23.10
71.80	24.40
71.90	25.54
72.00	26.43
72.10	27.46
72.20	28.46
72.30	29.43
72.40	30.36
72.50	31.27
72.60	32.15
72.70	33.01
72.80	33.84
72.90	34.66
73.00	35.45
73.10	36.23
73.20	37.00
73.30	37.74
73.40	38.48
73.50	39.19
73.60	39.90
73.70	40.60
73.80	41.28
73.90	41.95
74.00	**42.61**

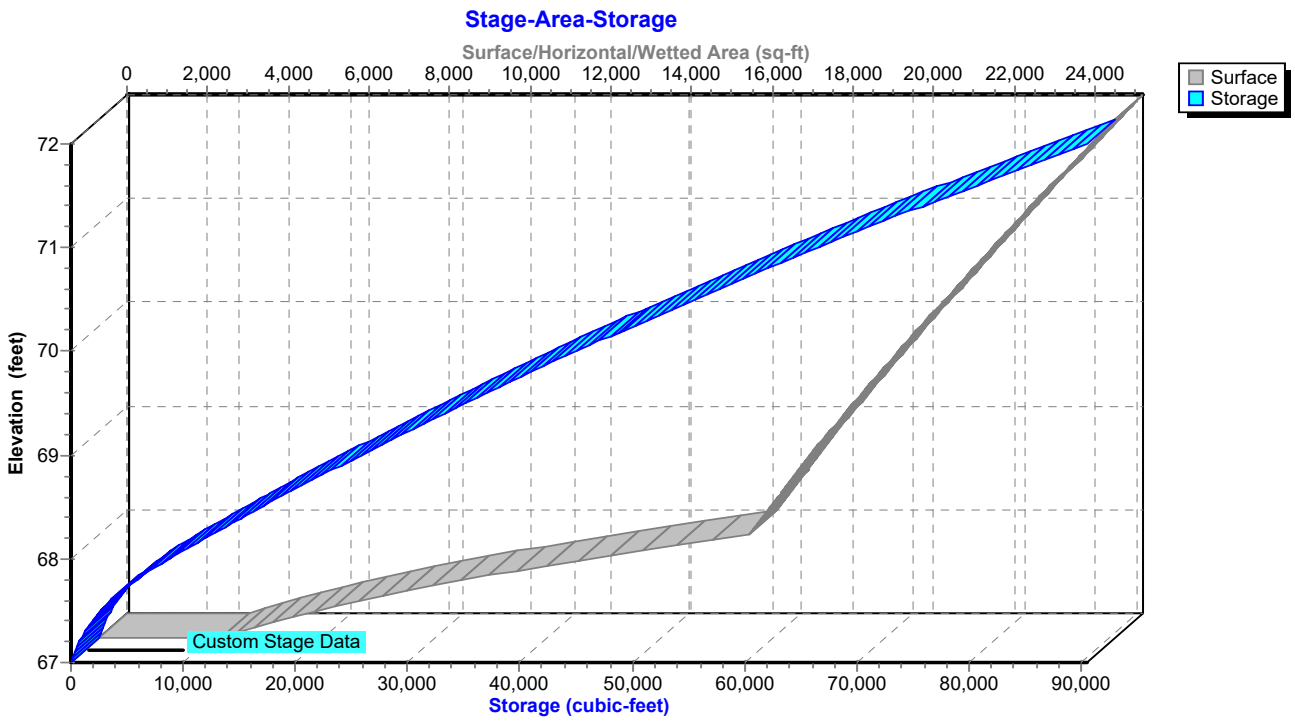
Pond 1P: Existing Southerly Basin



Stage-Area-Storage for Pond 1P: Existing Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,772	38,668
60.20	27,025	41,358
60.30	27,279	44,073
60.40	27,534	46,813
60.50	27,790	49,580
60.60	28,047	52,371
60.70	28,305	55,189
60.80	28,565	58,033
60.90	28,826	60,902
61.00	29,088	63,798
61.10	29,349	66,720
61.20	29,611	69,668
61.30	29,874	72,642
61.40	30,138	75,642
61.50	30,403	78,669
61.60	30,670	81,723
61.70	30,938	84,804
61.80	31,207	87,911
61.90	31,477	91,045
62.00	31,748	94,206
62.10	32,087	97,398
62.20	32,429	100,624
62.30	32,772	103,884
62.40	33,116	107,178
62.50	33,463	110,507
62.60	33,811	113,871
62.70	34,162	117,269
62.80	34,514	120,703
62.90	34,867	124,172
63.00	**35,223**	**127,677**

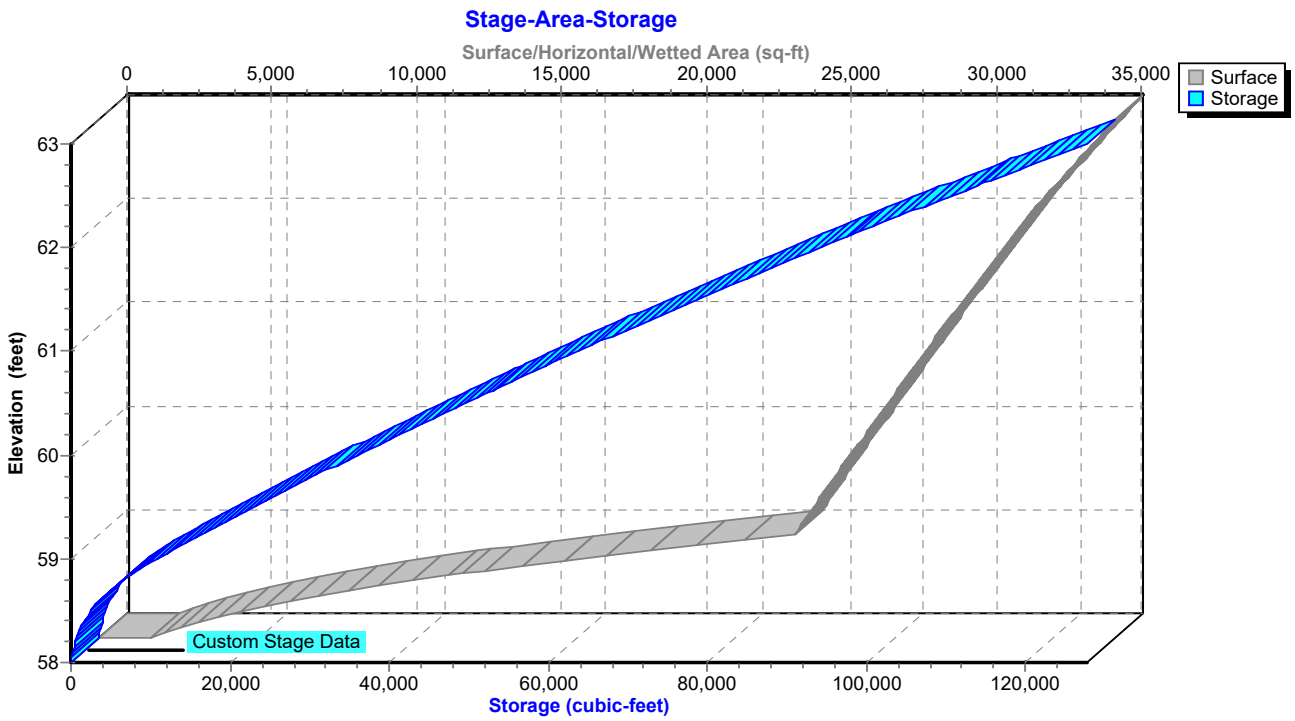
Pond 2P: Existing Easterly Basin



Stage-Area-Storage for Pond 2P: Existing Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0
67.10	3,877	345
67.20	4,824	779
67.30	5,874	1,313
67.40	7,028	1,957
67.50	8,285	2,722
67.60	9,646	3,618
67.70	11,110	4,654
67.80	12,677	5,843
67.90	14,348	7,193
68.00	16,122	8,716
68.10	16,316	10,338
68.20	16,512	11,979
68.30	16,709	13,640
68.40	16,907	15,321
68.50	17,106	17,022
68.60	17,306	18,742
68.70	17,508	20,483
68.80	17,710	22,244
68.90	17,914	24,025
69.00	18,119	25,827
69.10	18,338	27,650
69.20	18,558	29,494
69.30	18,780	31,361
69.40	19,003	33,250
69.50	19,227	35,162
69.60	19,453	37,096
69.70	19,679	39,052
69.80	19,908	41,032
69.90	20,137	43,034
70.00	20,368	45,059
70.10	20,597	47,107
70.20	20,828	49,179
70.30	21,060	51,273
70.40	21,293	53,391
70.50	21,528	55,532
70.60	21,764	57,696
70.70	22,001	59,885
70.80	22,239	62,097
70.90	22,479	64,333
71.00	22,720	66,593
71.10	22,961	68,877
71.20	23,204	71,185
71.30	23,448	73,517
71.40	23,693	75,875
71.50	23,940	78,256
71.60	24,188	80,663
71.70	24,437	83,094
71.80	24,687	85,550
71.90	24,939	88,031
72.00	**25,192**	**90,538**

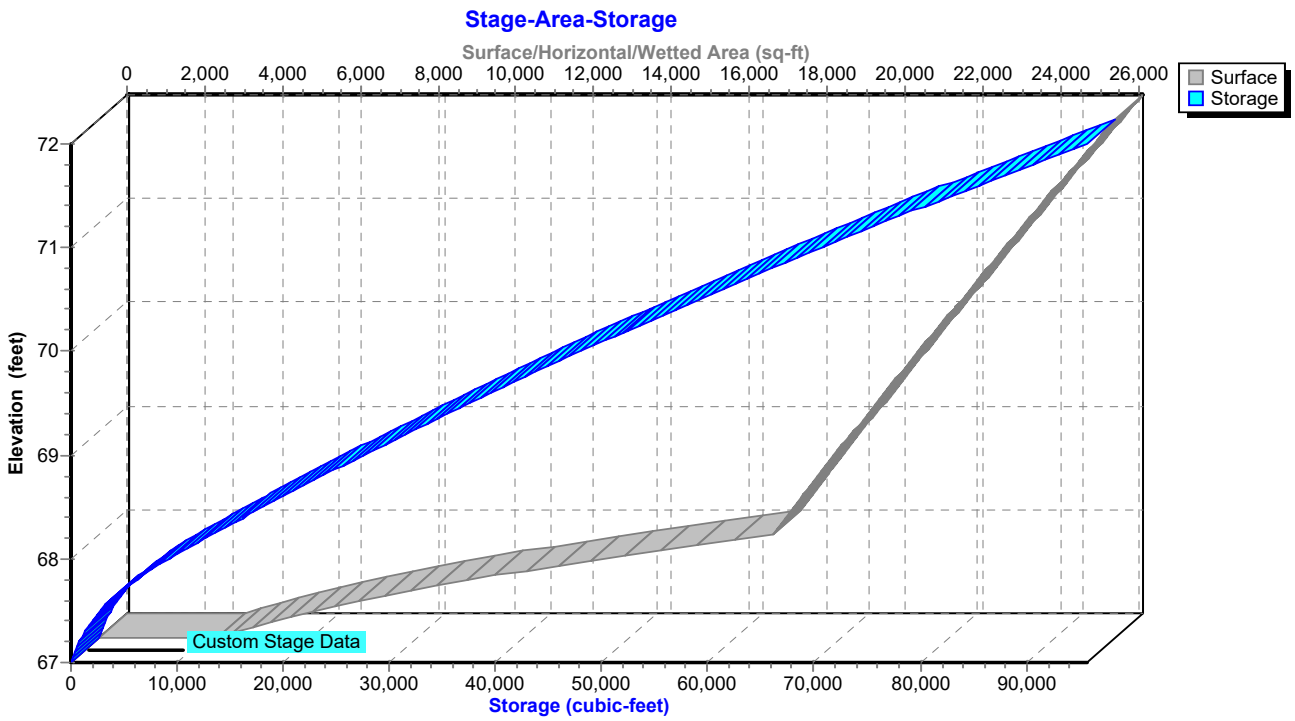
Pond 3P: Modified Southerly Basin



Stage-Area-Storage for Pond 3P: Modified Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,777	38,668
60.20	27,034	41,359
60.30	27,292	44,075
60.40	27,551	46,817
60.50	27,812	49,585
60.60	28,073	52,379
60.70	28,337	55,200
60.80	28,601	58,047
60.90	28,866	60,920
61.00	29,133	63,820
61.10	29,398	66,747
61.20	29,664	69,700
61.30	29,932	72,679
61.40	30,200	75,686
61.50	30,470	78,719
61.60	30,741	81,780
61.70	31,013	84,868
61.80	31,287	87,983
61.90	31,561	91,125
62.00	31,837	94,295
62.10	32,151	97,494
62.20	32,466	100,725
62.30	32,782	103,988
62.40	33,101	107,282
62.50	33,420	110,608
62.60	33,742	113,966
62.70	34,064	117,356
62.80	34,389	120,779
62.90	34,715	124,234
63.00	**35,042**	**127,722**

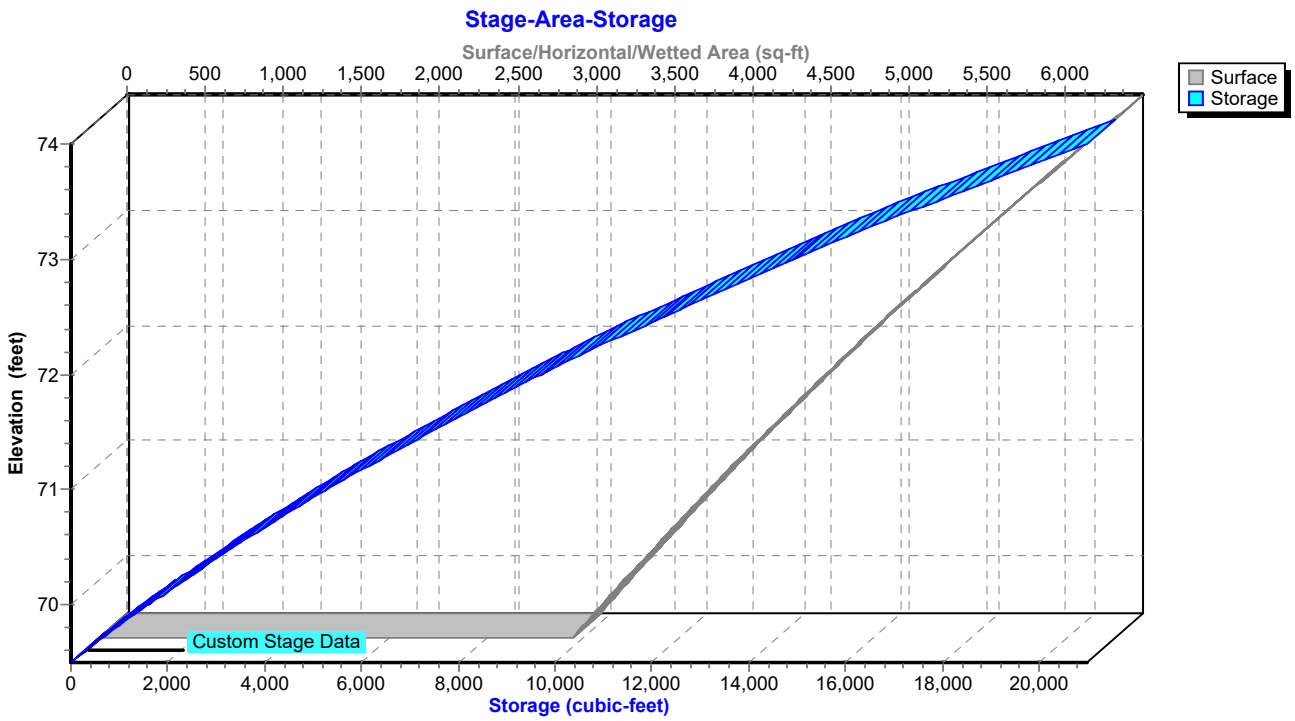
Pond 4P: Modified Easterly Basin



Stage-Area-Storage for Pond 4P: Modified Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0
67.10	3,935	347
67.20	4,954	791
67.30	6,091	1,342
67.40	7,345	2,013
67.50	8,716	2,815
67.60	10,204	3,760
67.70	11,810	4,860
67.80	13,533	6,126
67.90	15,373	7,570
68.00	17,330	9,204
68.10	17,533	10,947
68.20	17,737	12,711
68.30	17,942	14,495
68.40	18,149	16,299
68.50	18,357	18,125
68.60	18,566	19,971
68.70	18,776	21,838
68.80	18,987	23,726
68.90	19,199	25,635
69.00	19,413	27,566
69.10	19,626	29,518
69.20	19,840	31,491
69.30	20,056	33,486
69.40	20,273	35,502
69.50	20,490	37,541
69.60	20,709	39,601
69.70	20,930	41,683
69.80	21,151	43,787
69.90	21,373	45,913
70.00	21,597	48,061
70.10	21,814	50,232
70.20	22,033	52,424
70.30	22,252	54,638
70.40	22,473	56,875
70.50	22,695	59,133
70.60	22,918	61,414
70.70	23,142	63,717
70.80	23,367	66,042
70.90	23,593	68,390
71.00	23,820	70,761
71.10	24,046	73,154
71.20	24,273	75,570
71.30	24,501	78,009
71.40	24,730	80,470
71.50	24,960	82,955
71.60	25,191	85,462
71.70	25,423	87,993
71.80	25,656	90,547
71.90	25,891	93,124
72.00	**26,126**	**95,725**

Pond 5P: Easterly Basin Extension



Stage-Area-Storage for Pond 5P: Easterly Basin Extension

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
69.50	3,027	0
69.60	3,091	306
69.70	3,157	618
69.80	3,222	937
69.90	3,289	1,263
70.00	3,356	1,595
70.10	3,423	1,934
70.20	3,491	2,280
70.30	3,559	2,632
70.40	3,628	2,991
70.50	3,698	3,358
70.60	3,768	3,731
70.70	3,839	4,111
70.80	3,911	4,499
70.90	3,983	4,894
71.00	4,056	5,296
71.10	4,129	5,705
71.20	4,202	6,121
71.30	4,276	6,545
71.40	4,351	6,977
71.50	4,426	7,415
71.60	4,502	7,862
71.70	4,578	8,316
71.80	4,656	8,777
71.90	4,733	9,247
72.00	4,812	9,724
72.10	4,890	10,209
72.20	4,970	10,702
72.30	5,049	11,203
72.40	5,130	11,712
72.50	5,211	12,229
72.60	5,292	12,754
72.70	5,374	13,288
72.80	5,457	13,829
72.90	5,541	14,379
73.00	5,625	14,937
73.10	5,709	15,504
73.20	5,794	16,079
73.30	5,879	16,663
73.40	5,965	17,255
73.50	6,052	17,856
73.60	6,139	18,465
73.70	6,227	19,084
73.80	6,315	19,711
73.90	6,404	20,347
74.00	**6,494**	**20,992**

APPENDIX I-4
25-YEAR STORM EVENT HYDROGRAPHS

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
454,208	74	>75% Grass cover, Good, HSG C (E-1, E-2, P-1, P-2A, P-2B)
287,871	80	>75% Grass cover, Good, HSG D (E-1, E-2, P-1, P-2A)
1,682,040	98	Paved parking, HSG D (E-1, E-2, P-1, P-2A, P-2B)
2,424,119	**91**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	454,208	287,871	0	742,079	>75% Grass cover, Good	
0	0	0	1,682,040	0	1,682,040	Paved parking	
0	**0**	**454,208**	**1,969,911**	**0**	**2,424,119**	**TOTAL AREA**	

Summary for Subcatchment E-1: Existing Area Tributary to Southerly Basin

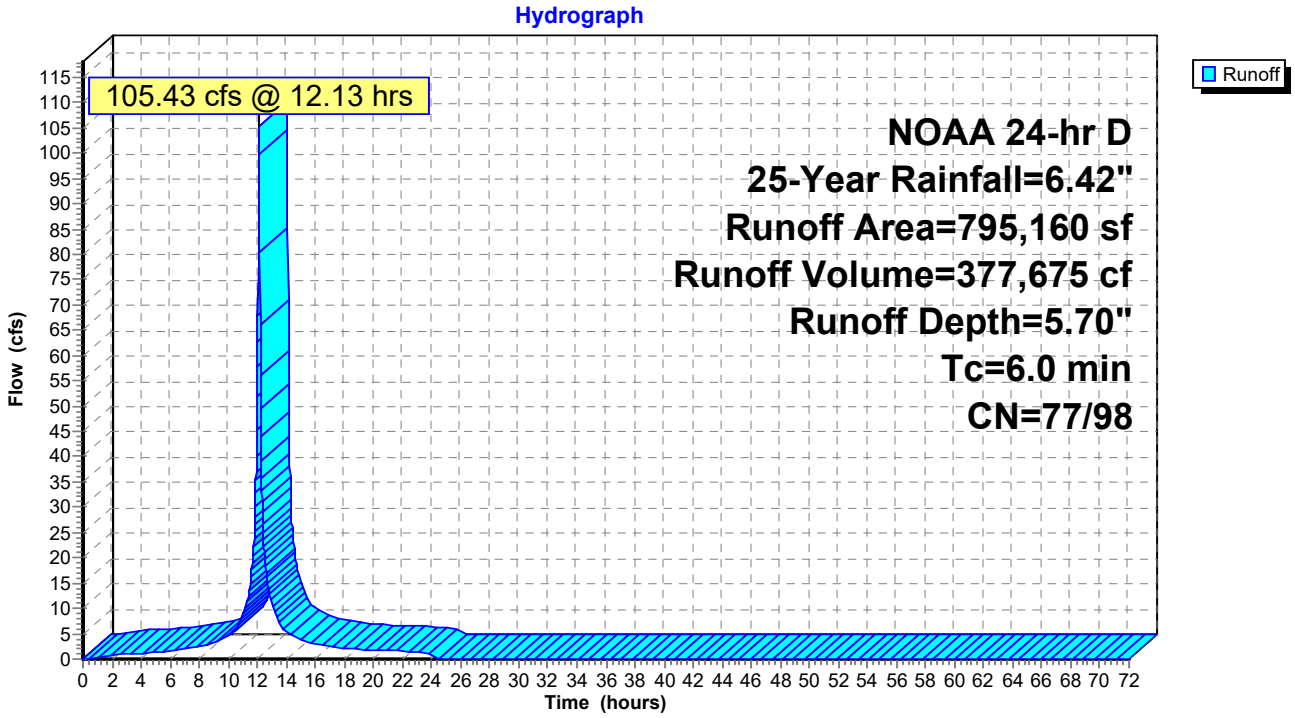
Runoff = 105.43 cfs @ 12.13 hrs, Volume= 377,675 cf, Depth= 5.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 25-Year Rainfall=6.42"

Area (sf)	CN	Description
630,944	98	Paved parking, HSG D
85,682	74	>75% Grass cover, Good, HSG C
78,534	80	>75% Grass cover, Good, HSG D
795,160	94	Weighted Average
164,216	77	20.65% Pervious Area
630,944	98	79.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-1: Existing Area Tributary to Southerly Basin



Summary for Subcatchment E-2: Existing Area Tributary to Easterly Basin

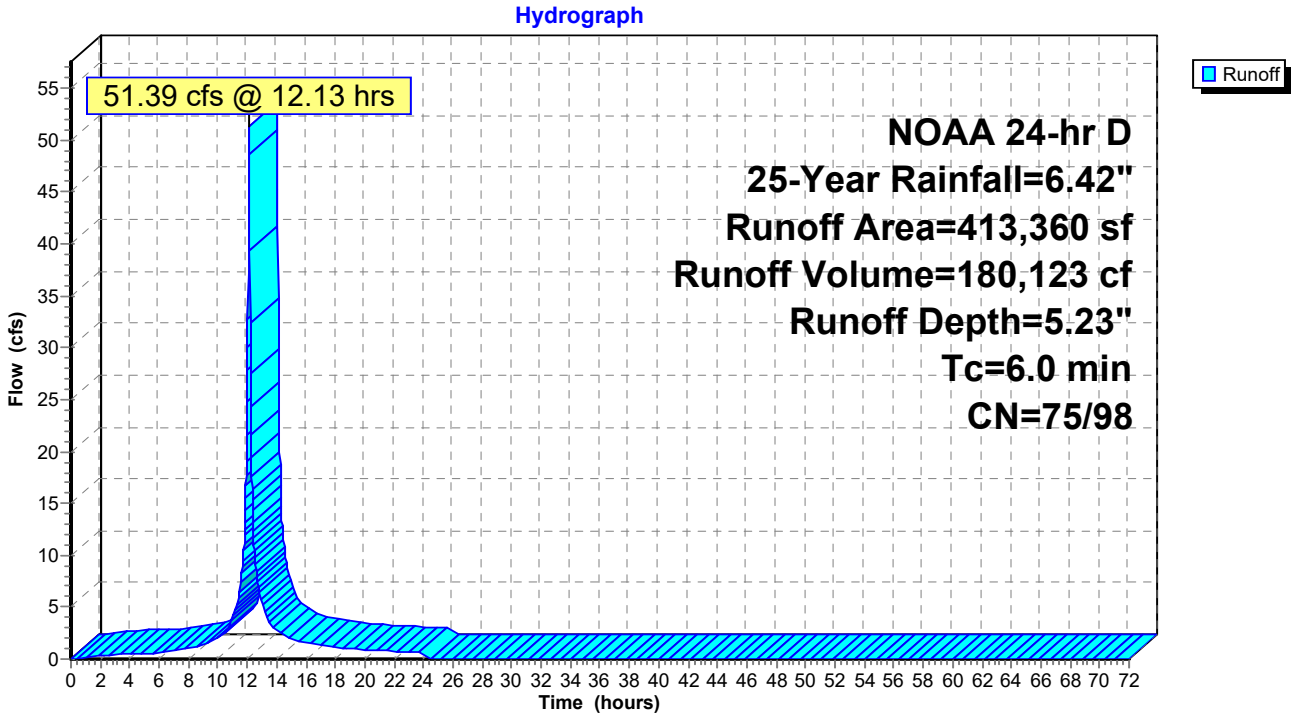
Runoff = 51.39 cfs @ 12.13 hrs, Volume= 180,123 cf, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 25-Year Rainfall=6.42"

Area (sf)	CN	Description
258,284	98	Paved parking, HSG D
125,156	74	>75% Grass cover, Good, HSG C
29,920	80	>75% Grass cover, Good, HSG D
413,360	89	Weighted Average
155,076	75	37.52% Pervious Area
258,284	98	62.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-2: Existing Area Tributary to Easterly Basin



Summary for Subcatchment P-1: Proposed Area Tributary to 42" RCP

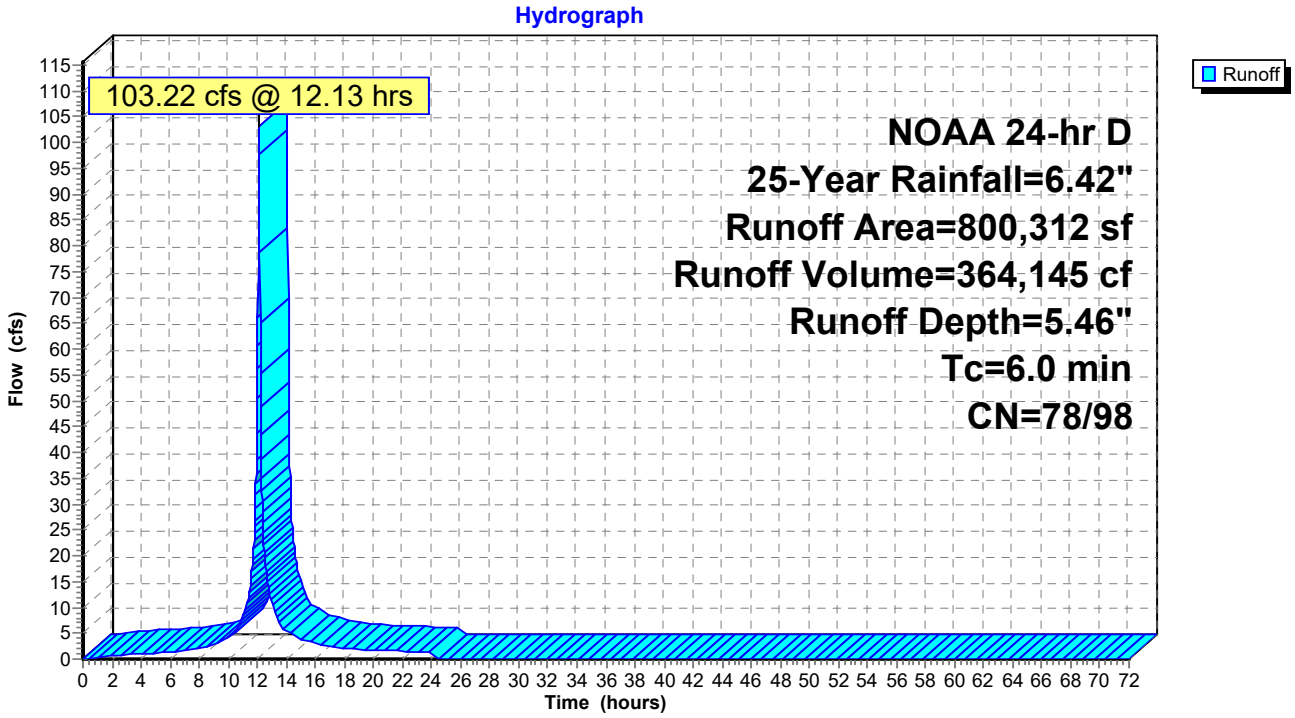
Runoff = 103.22 cfs @ 12.13 hrs, Volume= 364,145 cf, Depth= 5.46"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 25-Year Rainfall=6.42"

Area (sf)	CN	Description
541,322	98	Paved parking, HSG D
89,531	74	>75% Grass cover, Good, HSG C
169,459	80	>75% Grass cover, Good, HSG D
800,312	92	Weighted Average
258,990	78	32.36% Pervious Area
541,322	98	67.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-1: Proposed Area Tributary to 42" RCP



Summary for Subcatchment P-2A: Area Tributary to 18" RCP

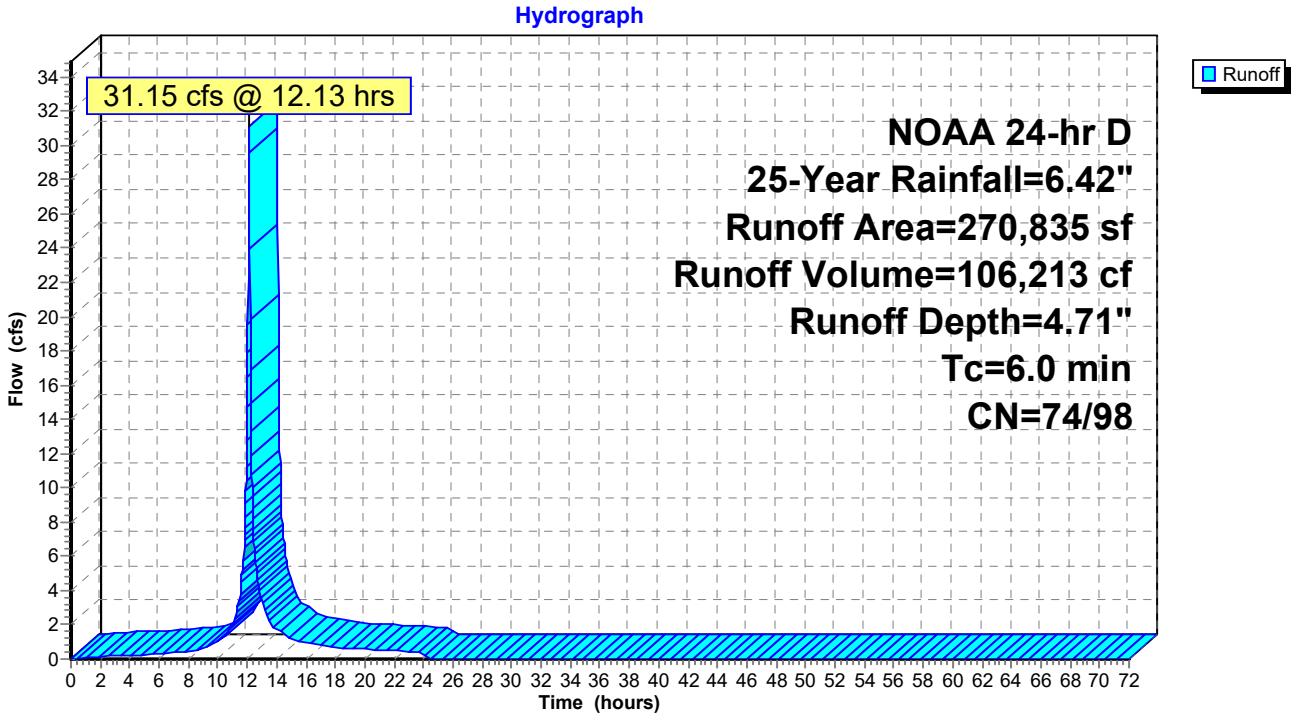
Runoff = 31.15 cfs @ 12.13 hrs, Volume= 106,213 cf, Depth= 4.71"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 25-Year Rainfall=6.42"

Area (sf)	CN	Description
119,490	98	Paved parking, HSG D
141,387	74	>75% Grass cover, Good, HSG C
9,958	80	>75% Grass cover, Good, HSG D
270,835	85	Weighted Average
151,345	74	55.88% Pervious Area
119,490	98	44.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2A: Area Tributary to 18" RCP



Summary for Subcatchment P-2B: Proposed Area Tributary to Basin Extension

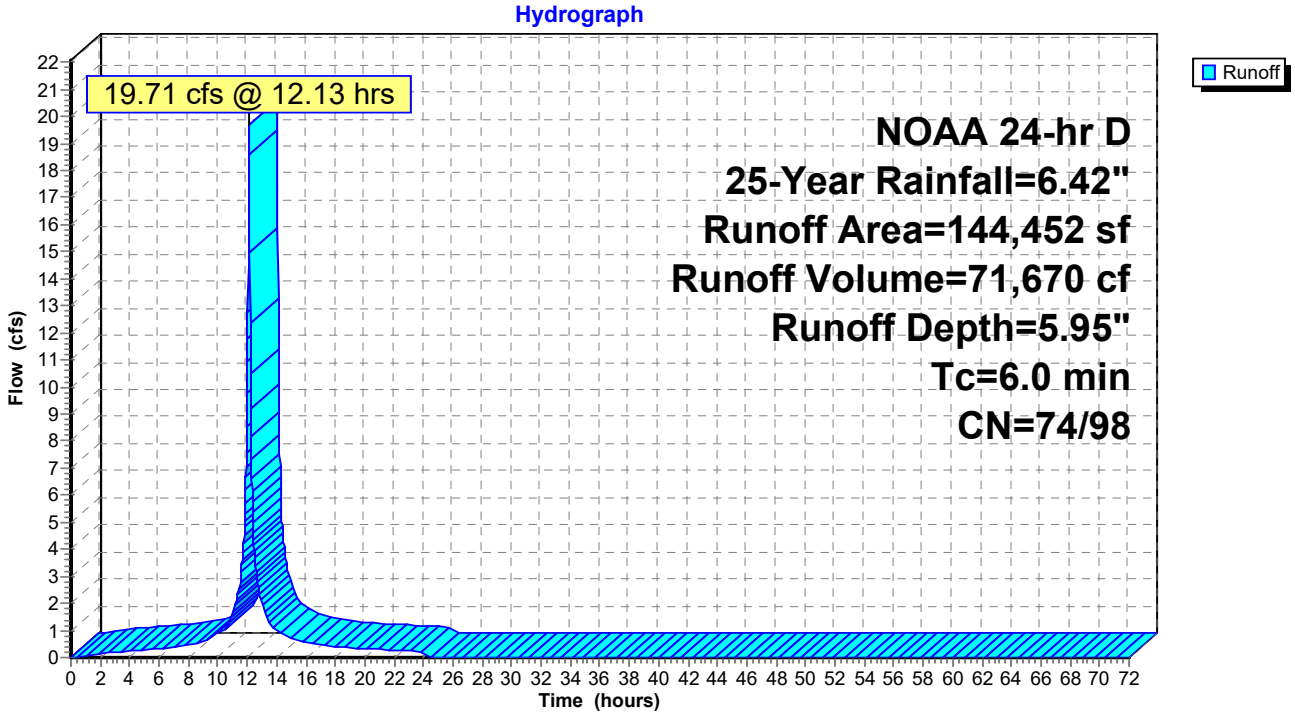
Runoff = 19.71 cfs @ 12.13 hrs, Volume= 71,670 cf, Depth= 5.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 25-Year Rainfall=6.42"

Area (sf)	CN	Description
132,000	98	Paved parking, HSG D
12,452	74	>75% Grass cover, Good, HSG C
144,452	96	Weighted Average
12,452	74	8.62% Pervious Area
132,000	98	91.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2B: Proposed Area Tributary to Basin Extension



Summary for Pond 1P: Existing Southerly Basin

Inflow Area = 795,160 sf, 79.35% Impervious, Inflow Depth = 5.70" for 25-Year event
Inflow = 105.43 cfs @ 12.13 hrs, Volume= 377,675 cf
Outflow = 85.26 cfs @ 12.17 hrs, Volume= 373,259 cf, Atten= 19%, Lag= 2.8 min
Primary = 9.63 cfs @ 12.17 hrs, Volume= 141,764 cf
Secondary = 75.64 cfs @ 12.17 hrs, Volume= 231,495 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 61.88' @ 12.17 hrs Surf.Area= 31,428 sf Storage= 90,474 cf

Plug-Flow detention time= 202.4 min calculated for 373,155 cf (99% of inflow)
Center-of-Mass det. time= 195.4 min (952.0 - 756.6)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,677 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

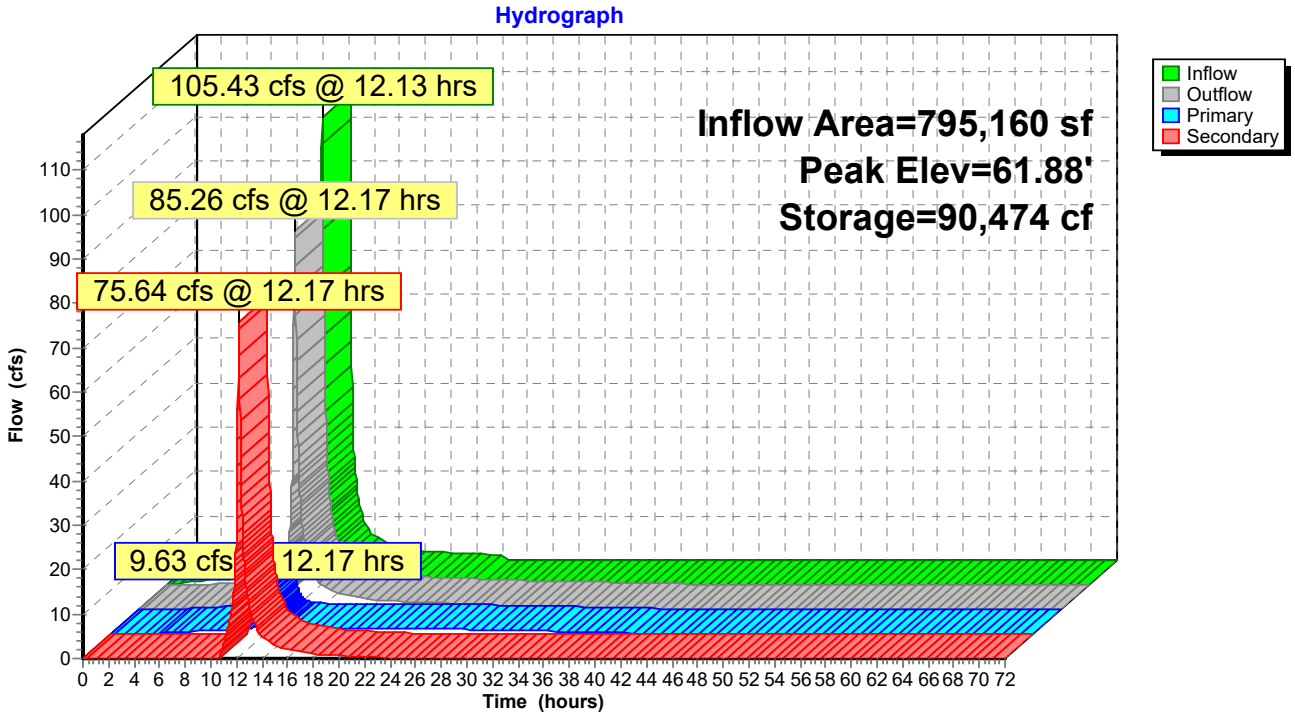
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,088	875.0	27,795	63,798	60,199
62.00	31,748	882.0	30,408	94,206	61,514
63.00	35,223	930.0	33,470	127,677	68,495

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	60.50'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.50 2.50 Width (feet) 9.00 12.50 27.00 38.00

Primary OutFlow Max=9.59 cfs @ 12.17 hrs HW=61.88' (Free Discharge)
└─**1=Culvert** (Passes 9.59 cfs of 22.73 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.64 cfs @ 8.35 fps)
  └─**3=Orifice/Grate** (Orifice Controls 7.95 cfs @ 3.82 fps)

Secondary OutFlow Max=75.30 cfs @ 12.17 hrs HW=61.88' (Free Discharge)
└─**4=Emergency Spillway** (Weir Controls 75.30 cfs @ 3.43 fps)

Pond 1P: Existing Southerly Basin



Summary for Pond 2P: Existing Easterly Basin

Inflow Area = 413,360 sf, 62.48% Impervious, Inflow Depth = 5.23" for 25-Year event
Inflow = 51.39 cfs @ 12.13 hrs, Volume= 180,123 cf
Outflow = 9.25 cfs @ 12.57 hrs, Volume= 164,506 cf, Atten= 82%, Lag= 26.6 min
Primary = 9.25 cfs @ 12.57 hrs, Volume= 164,506 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 71.92' @ 12.57 hrs Surf.Area= 24,993 sf Storage= 88,564 cf

Plug-Flow detention time= 286.6 min calculated for 164,460 cf (91% of inflow)
Center-of-Mass det. time= 239.5 min (1,007.5 - 768.0)

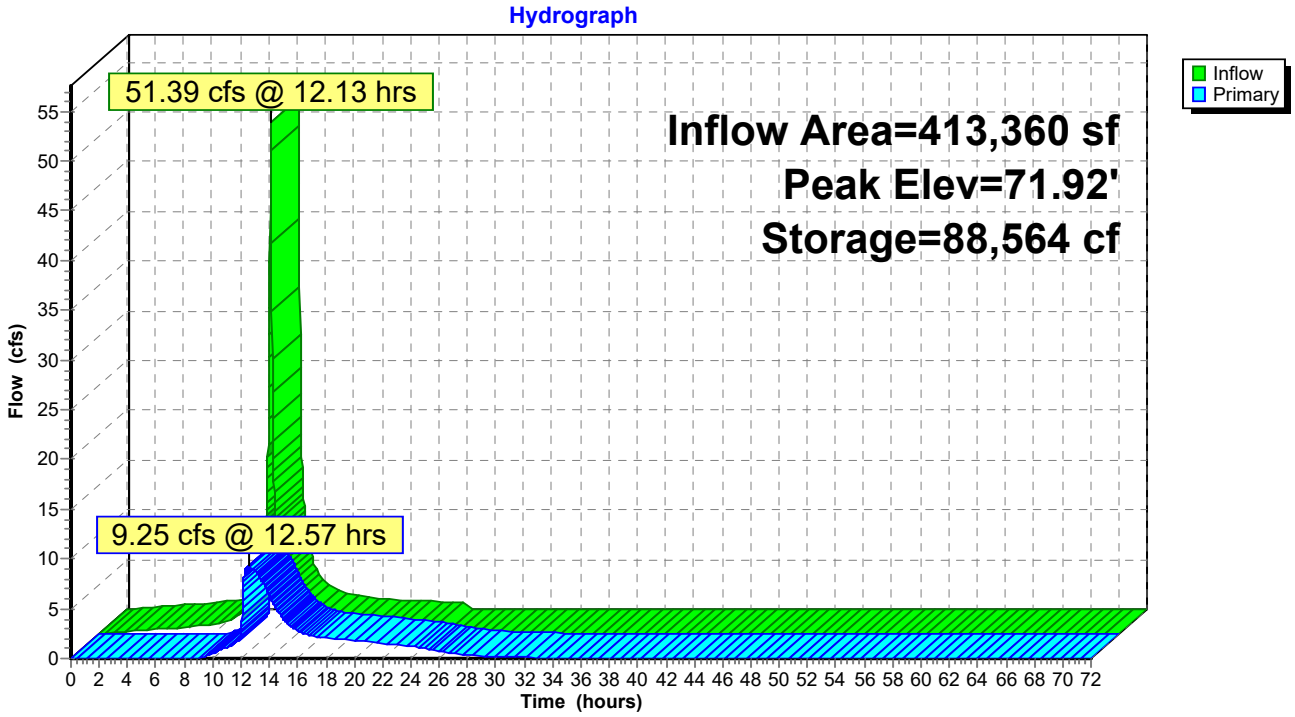
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	90,538 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	16,122	665.0	8,716	8,716	29,510
69.00	18,119	699.0	17,111	25,827	33,263
70.00	20,368	703.0	19,233	45,059	34,094
71.00	22,720	726.0	21,533	66,593	36,806
72.00	25,192	749.0	23,945	90,538	39,604

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=9.25 cfs @ 12.57 hrs HW=71.92' (Free Discharge)
└─**1=Culvert** (Passes 9.25 cfs of 10.07 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 3.01 cfs @ 8.61 fps)
  └─**3=Orifice/Grate** (Orifice Controls 6.24 cfs @ 5.09 fps)

Pond 2P: Existing Easterly Basin



Summary for Pond 3P: Modified Southerly Basin

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 800,312 sf, 67.64% Impervious, Inflow Depth = 5.46" for 25-Year event
Inflow = 103.22 cfs @ 12.13 hrs, Volume= 364,145 cf
Outflow = 87.42 cfs @ 12.17 hrs, Volume= 359,700 cf, Atten= 15%, Lag= 2.4 min
Primary = 17.57 cfs @ 12.17 hrs, Volume= 288,169 cf
Secondary = 69.85 cfs @ 12.17 hrs, Volume= 71,532 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 62.70' @ 12.17 hrs Surf.Area= 34,065 sf Storage= 117,362 cf

Plug-Flow detention time= 256.8 min calculated for 359,600 cf (99% of inflow)
Center-of-Mass det. time= 249.4 min (1,013.2 - 763.8)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,722 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

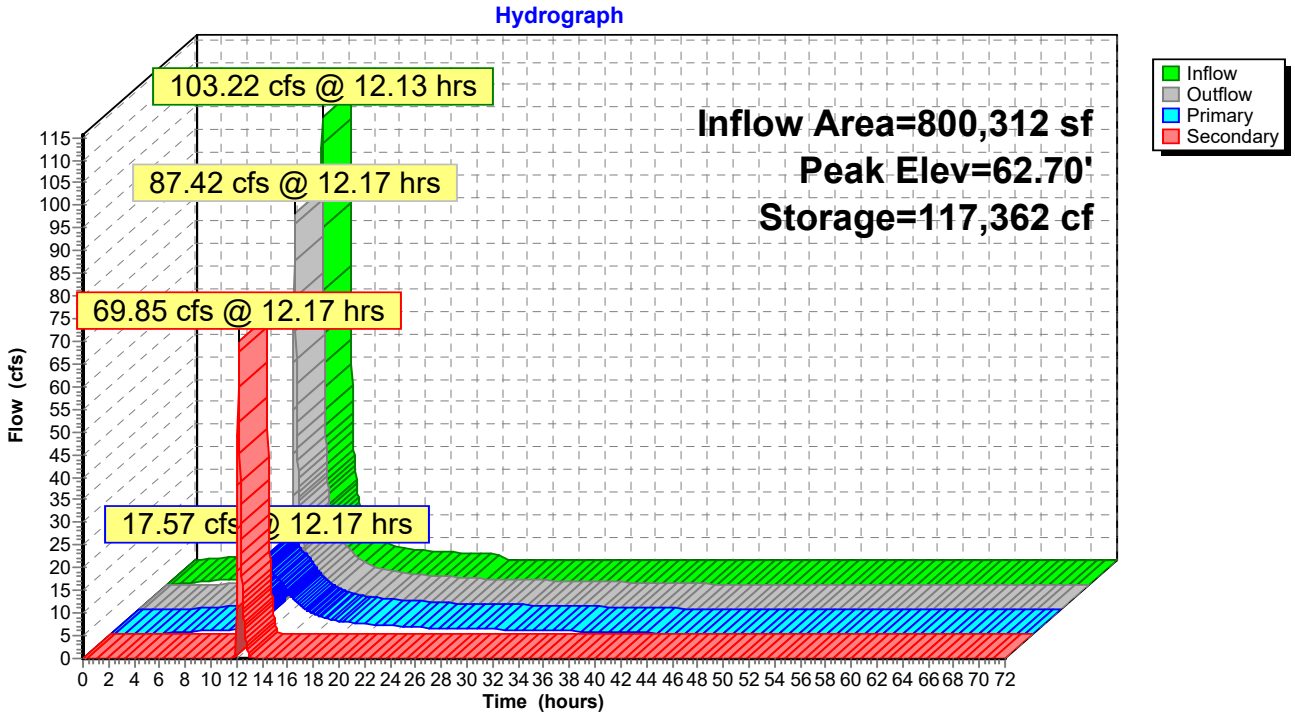
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,133	876.0	27,817	63,820	60,335
62.00	31,837	876.0	30,475	94,295	61,211
63.00	35,042	922.0	33,427	127,722	67,854

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	62.12'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 50.00 52.00

Primary OutFlow Max=17.55 cfs @ 12.17 hrs HW=62.70' (Free Discharge)
└─**1=Culvert** (Passes 17.55 cfs of 26.53 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.85 cfs @ 9.42 fps)
  └─**3=Orifice/Grate** (Orifice Controls 15.70 cfs @ 5.00 fps)

Secondary OutFlow Max=69.42 cfs @ 12.17 hrs HW=62.70' (Free Discharge)
└─**4=Emergency Spillway** (Orifice Controls 69.42 cfs @ 2.72 fps)

Pond 3P: Modified Southerly Basin



Summary for Pond 4P: Modified Easterly Basin

Inflow Area = 415,287 sf, 60.56% Impervious, Inflow Depth = 5.14" for 25-Year event
Inflow = 44.42 cfs @ 12.14 hrs, Volume= 177,871 cf
Outflow = 7.96 cfs @ 12.63 hrs, Volume= 161,199 cf, Atten= 82%, Lag= 29.8 min
Primary = 7.96 cfs @ 12.63 hrs, Volume= 161,199 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 71.56' @ 12.63 hrs Surf.Area= 25,097 sf Storage= 84,448 cf

Plug-Flow detention time= 314.0 min calculated for 161,199 cf (91% of inflow)
Center-of-Mass det. time= 261.5 min (1,047.7 - 786.2)

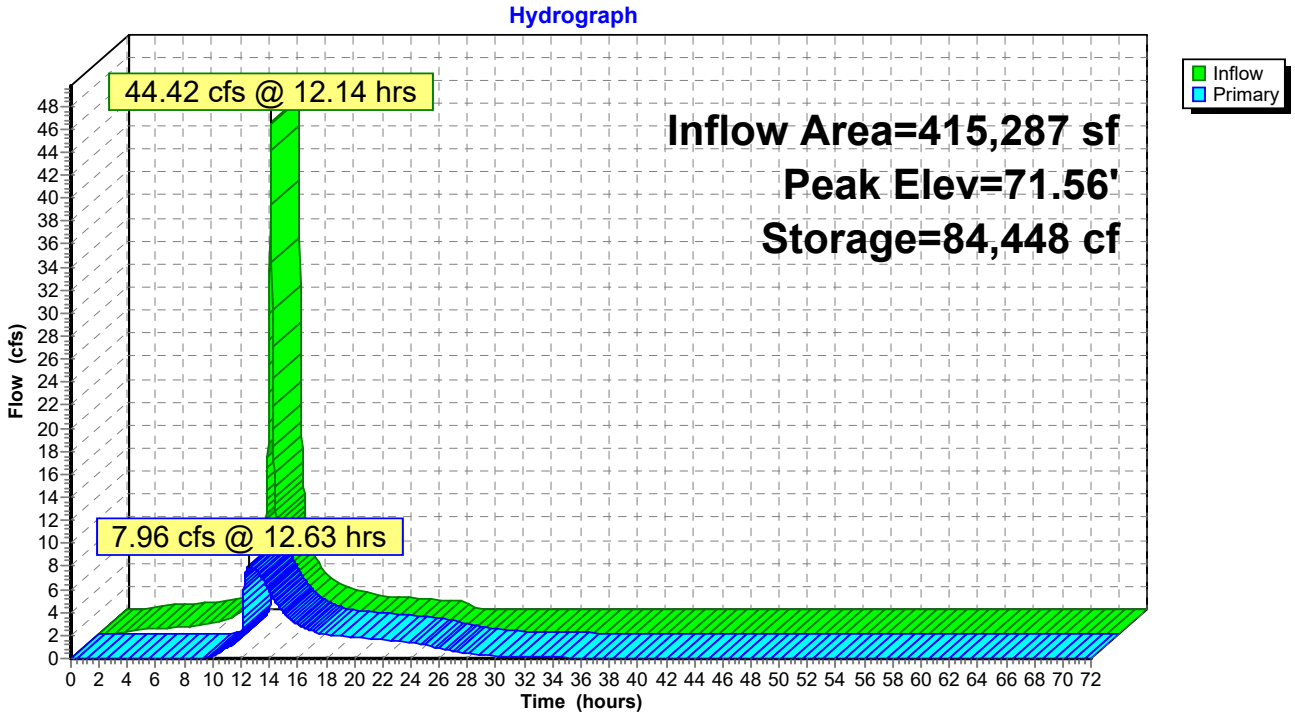
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	95,725 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	17,330	701.0	9,204	9,204	33,423
69.00	19,413	732.0	18,362	27,566	37,030
70.00	21,597	435.0	20,495	48,061	64,618
71.00	23,820	853.0	22,699	70,761	107,466
72.00	26,126	772.0	24,964	95,725	117,972

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=7.96 cfs @ 12.63 hrs HW=71.56' (Free Discharge)
└─**1=Culvert** (Passes 7.96 cfs of 9.43 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.83 cfs @ 8.11 fps)
  └─**3=Orifice/Grate** (Orifice Controls 5.13 cfs @ 4.18 fps)

Pond 4P: Modified Easterly Basin



Summary for Pond 5P: Easterly Basin Extension

Inflow Area = 144,452 sf, 91.38% Impervious, Inflow Depth = 5.95" for 25-Year event
Inflow = 19.71 cfs @ 12.13 hrs, Volume= 71,670 cf
Outflow = 13.79 cfs @ 12.16 hrs, Volume= 71,658 cf, Atten= 30%, Lag= 1.9 min
Primary = 13.79 cfs @ 12.16 hrs, Volume= 71,658 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 71.59' @ 12.20 hrs Surf.Area= 4,497 sf Storage= 7,830 cf

Plug-Flow detention time= 40.8 min calculated for 71,638 cf (100% of inflow)
Center-of-Mass det. time= 41.1 min (790.9 - 749.8)

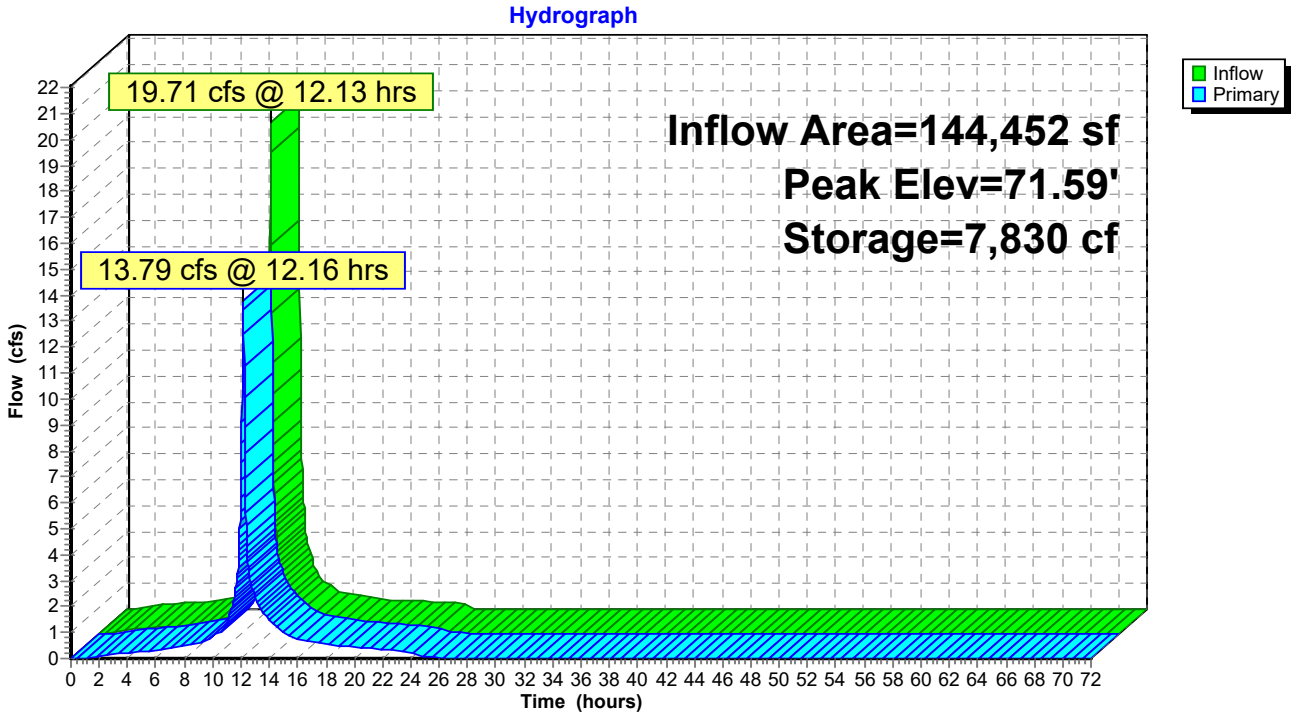
Volume	Invert	Avail.Storage	Storage Description
#1	69.50'	20,992 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
69.50	3,027	214.0	0	0	3,027
70.00	3,356	224.0	1,595	1,595	3,392
71.00	4,056	243.0	3,700	5,296	4,136
72.00	4,812	262.0	4,429	9,724	4,940
73.00	5,625	280.0	5,213	14,937	5,763
74.00	6,494	299.0	6,054	20,992	6,685

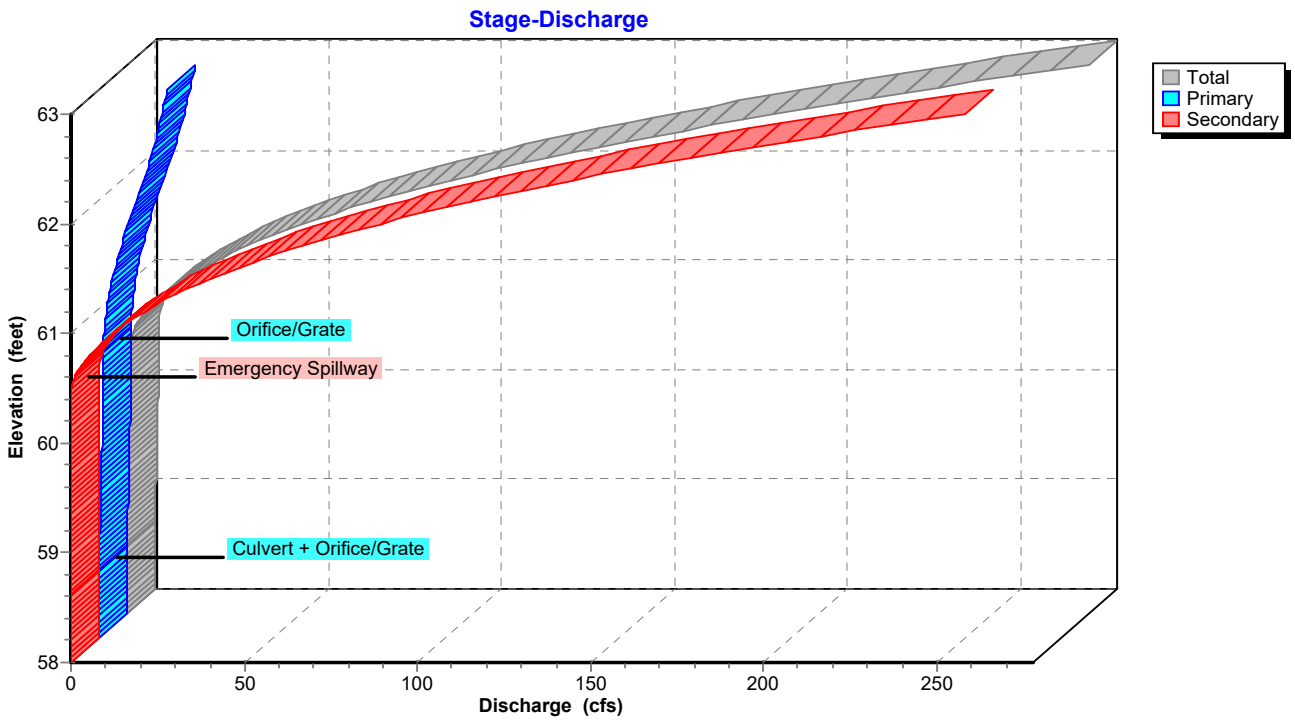
Device	Routing	Invert	Outlet Devices
#1	Primary	69.50'	**30.0" Round Culvert** L= 110.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.27' S= 0.0112 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	69.50'	**30.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	72.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=12.58 cfs @ 12.16 hrs HW=71.54' TW=70.94' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 12.58 cfs @ 4.01 fps)
  ├─**2=Orifice/Grate** (Passes 12.58 cfs of 15.86 cfs potential flow)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Easterly Basin Extension



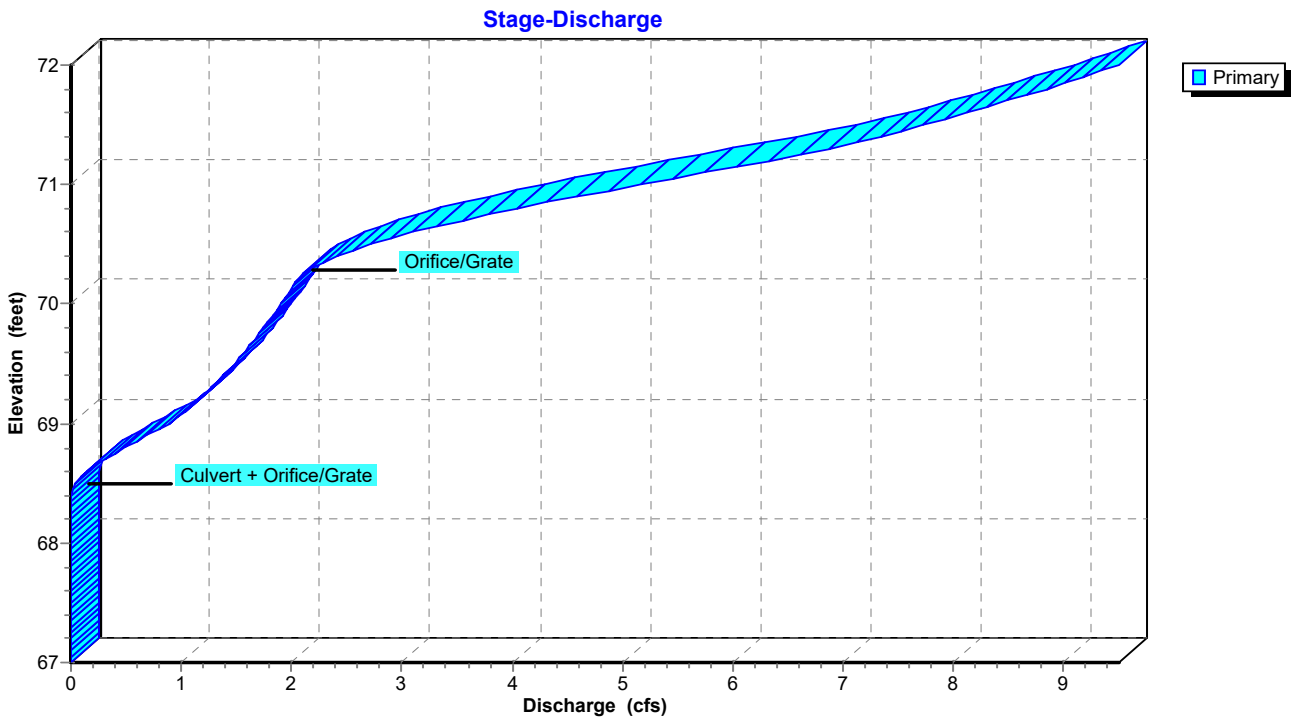
Pond 1P: Existing Southerly Basin



Stage-Discharge for Pond 1P: Existing Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	2.20	1.24	0.96
60.70	4.12	1.32	2.80
60.80	6.81	1.52	5.30
60.90	10.21	1.83	8.38
61.00	14.29	2.25	12.04
61.10	19.07	2.78	16.29
61.20	24.60	3.40	21.20
61.30	30.94	4.12	26.82
61.40	38.12	4.91	33.21
61.50	46.17	5.79	40.38
61.60	55.10	6.72	48.38
61.70	64.95	7.71	57.24
61.80	75.73	8.75	66.98
61.90	87.47	9.82	77.64
62.00	100.16	10.92	89.24
62.10	113.82	12.02	101.80
62.20	128.42	13.12	115.30
62.30	143.93	14.18	129.75
62.40	160.34	15.19	145.15
62.50	177.61	16.11	161.51
62.60	195.69	16.85	178.84
62.70	214.72	17.57	197.15
62.80	234.77	18.31	216.46
62.90	255.80	19.01	236.78
63.00	**277.81**	**19.69**	**258.12**

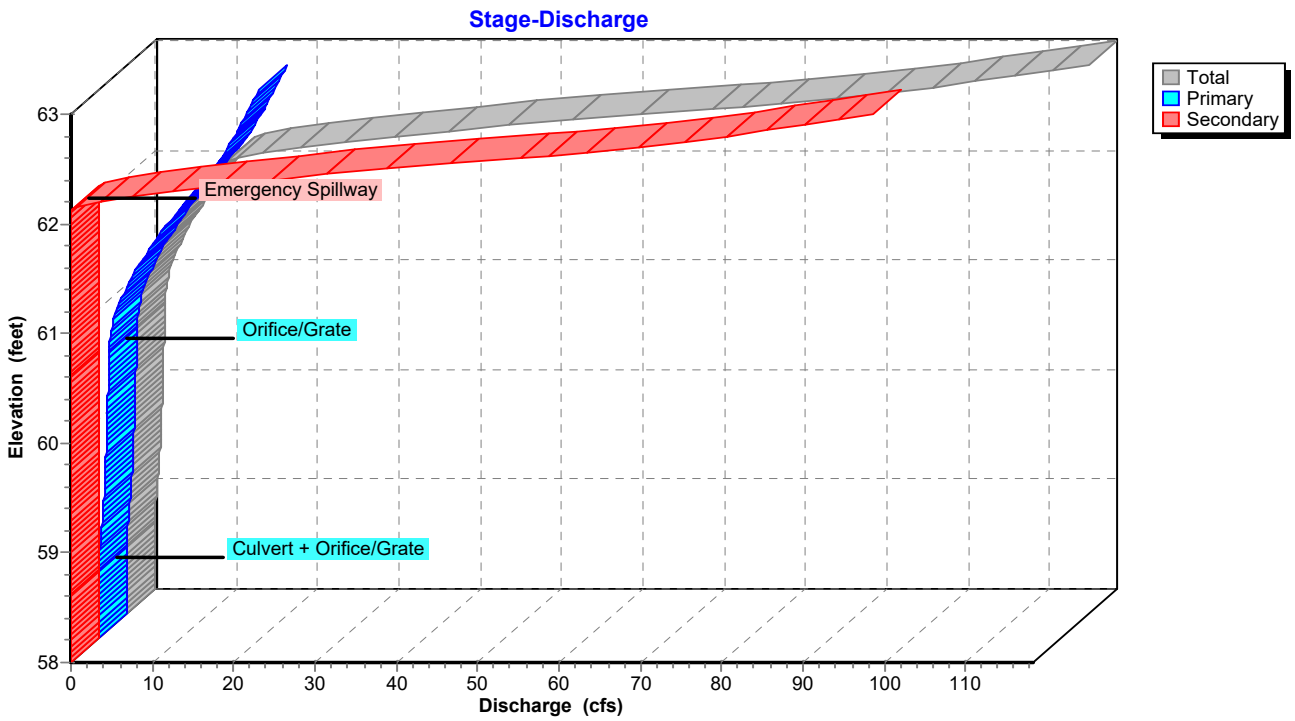
Pond 2P: Existing Easterly Basin



Stage-Discharge for Pond 2P: Existing Easterly Basin

Elevation (feet)	Primary (cfs)
67.00	0.00
67.10	0.00
67.20	0.00
67.30	0.00
67.40	0.00
67.50	0.00
67.60	0.00
67.70	0.00
67.80	0.00
67.90	0.00
68.00	0.00
68.10	0.00
68.20	0.00
68.30	0.00
68.40	0.00
68.50	0.04
68.60	0.15
68.70	0.30
68.80	0.49
68.90	0.70
69.00	0.89
69.10	1.03
69.20	1.16
69.30	1.28
69.40	1.38
69.50	1.48
69.60	1.57
69.70	1.66
69.80	1.74
69.90	1.82
70.00	1.90
70.10	1.97
70.20	2.04
70.30	2.18
70.40	2.41
70.50	2.72
70.60	3.10
70.70	3.55
70.80	4.05
70.90	4.59
71.00	5.17
71.10	5.75
71.20	6.33
71.30	6.88
71.40	7.34
71.50	7.73
71.60	8.12
71.70	8.49
71.80	8.84
71.90	9.18
72.00	**9.50**

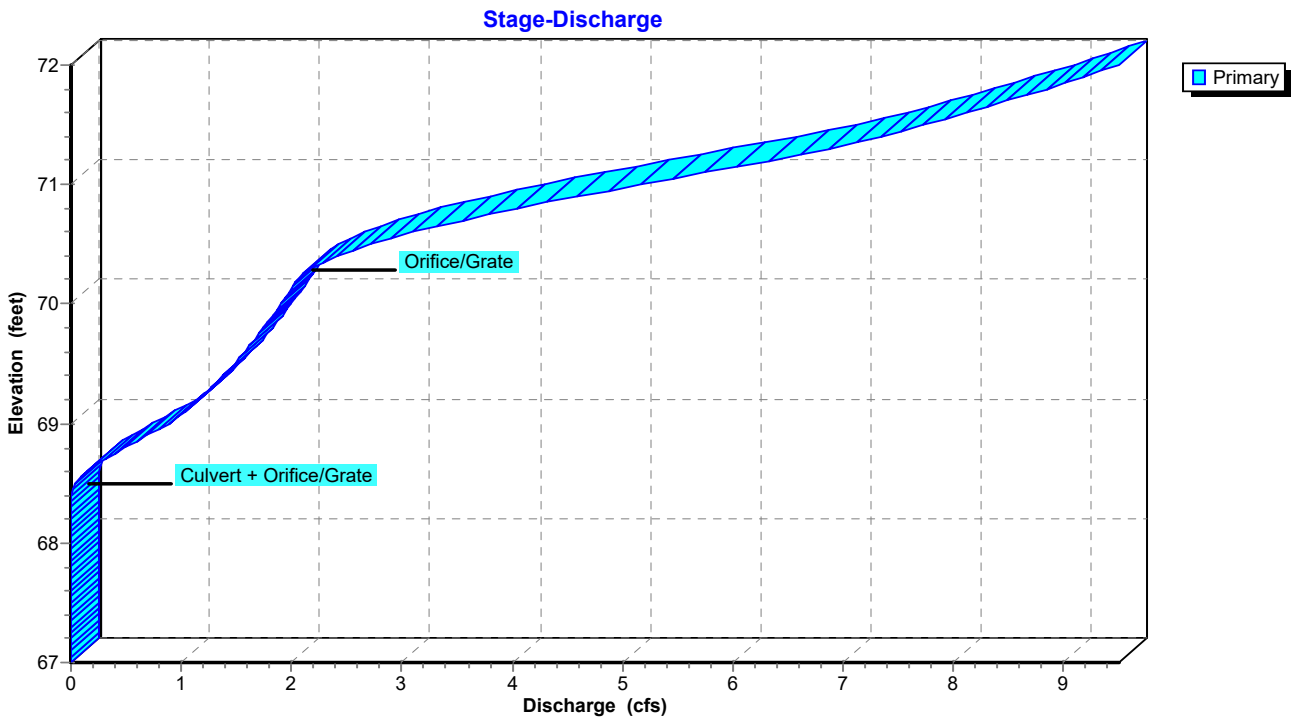
Pond 3P: Modified Southerly Basin



Stage-Discharge for Pond 3P: Modified Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	1.24	1.24	0.00
60.70	1.32	1.32	0.00
60.80	1.52	1.52	0.00
60.90	1.83	1.83	0.00
61.00	2.25	2.25	0.00
61.10	2.78	2.78	0.00
61.20	3.40	3.40	0.00
61.30	4.12	4.12	0.00
61.40	4.91	4.91	0.00
61.50	5.79	5.79	0.00
61.60	6.72	6.72	0.00
61.70	7.71	7.71	0.00
61.80	8.75	8.75	0.00
61.90	9.82	9.82	0.00
62.00	10.92	10.92	0.00
62.10	12.02	12.02	0.00
62.20	16.83	13.12	3.71
62.30	26.76	14.18	12.58
62.40	39.67	15.19	24.48
62.50	54.93	16.11	38.82
62.60	72.14	16.85	55.29
62.70	87.38	17.57	69.81
62.80	99.05	18.31	80.74
62.90	109.18	19.01	90.17
63.00	**118.32**	**19.69**	**98.63**

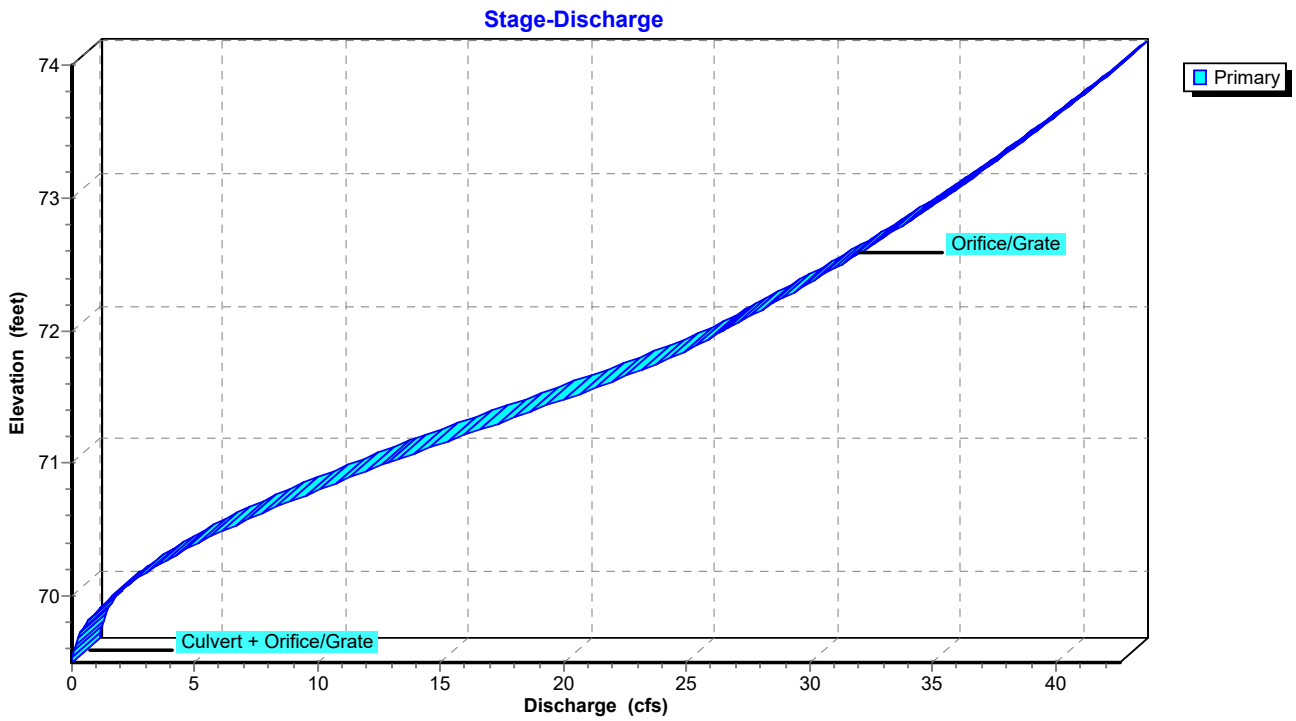
Pond 4P: Modified Easterly Basin



Stage-Discharge for Pond 4P: Modified Easterly Basin

Elevation (feet)	Primary (cfs)
67.00	0.00
67.10	0.00
67.20	0.00
67.30	0.00
67.40	0.00
67.50	0.00
67.60	0.00
67.70	0.00
67.80	0.00
67.90	0.00
68.00	0.00
68.10	0.00
68.20	0.00
68.30	0.00
68.40	0.00
68.50	0.04
68.60	0.15
68.70	0.30
68.80	0.49
68.90	0.70
69.00	0.89
69.10	1.03
69.20	1.16
69.30	1.28
69.40	1.38
69.50	1.48
69.60	1.57
69.70	1.66
69.80	1.74
69.90	1.82
70.00	1.90
70.10	1.97
70.20	2.04
70.30	2.18
70.40	2.41
70.50	2.72
70.60	3.10
70.70	3.55
70.80	4.05
70.90	4.59
71.00	5.17
71.10	5.75
71.20	6.33
71.30	6.88
71.40	7.34
71.50	7.73
71.60	8.12
71.70	8.49
71.80	8.84
71.90	9.18
72.00	**9.50**

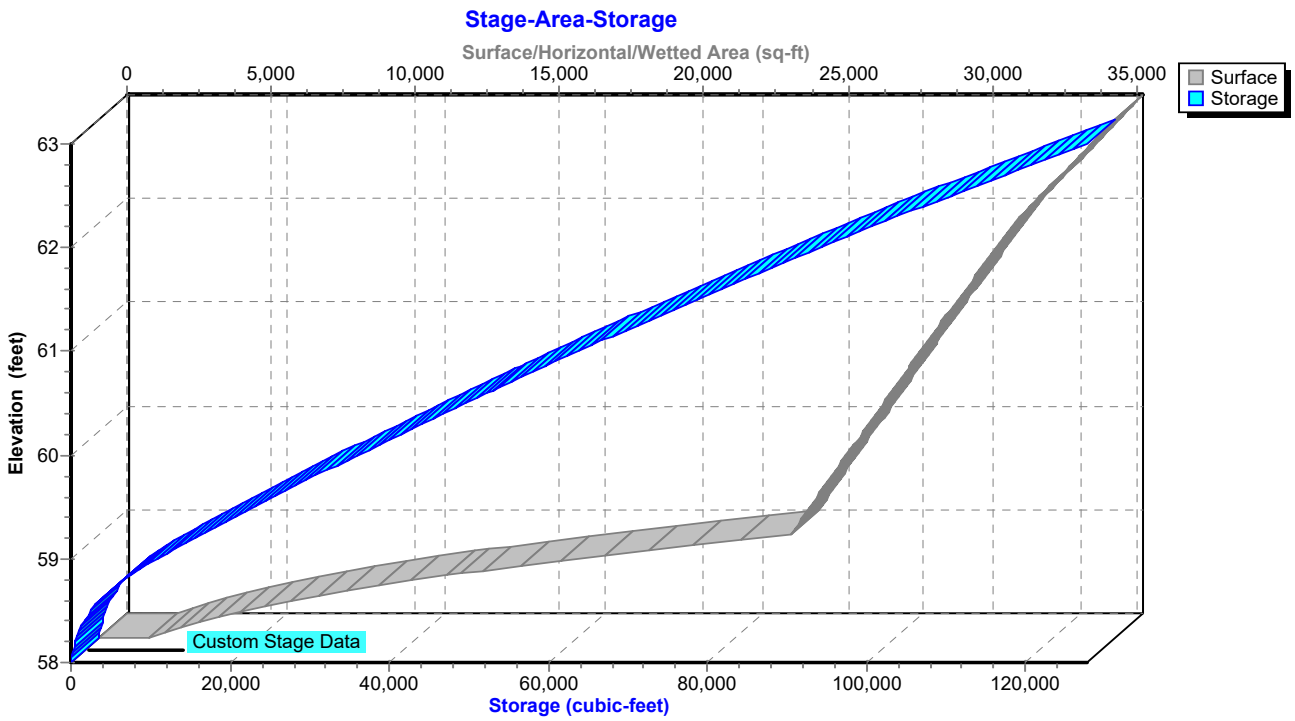
Pond 5P: Easterly Basin Extension



Stage-Discharge for Pond 5P: Easterly Basin Extension

Elevation (feet)	Primary (cfs)
69.50	0.00
69.60	0.07
69.70	0.28
69.80	0.62
69.90	1.09
70.00	1.68
70.10	2.39
70.20	3.21
70.30	4.12
70.40	5.14
70.50	6.24
70.60	7.43
70.70	8.69
70.80	10.01
70.90	11.39
71.00	12.82
71.10	14.29
71.20	15.78
71.30	17.28
71.40	18.79
71.50	20.27
71.60	21.72
71.70	23.10
71.80	24.40
71.90	25.54
72.00	26.43
72.10	27.46
72.20	28.46
72.30	29.43
72.40	30.36
72.50	31.27
72.60	32.15
72.70	33.01
72.80	33.84
72.90	34.66
73.00	35.45
73.10	36.23
73.20	37.00
73.30	37.74
73.40	38.48
73.50	39.19
73.60	39.90
73.70	40.60
73.80	41.28
73.90	41.95
74.00	**42.61**

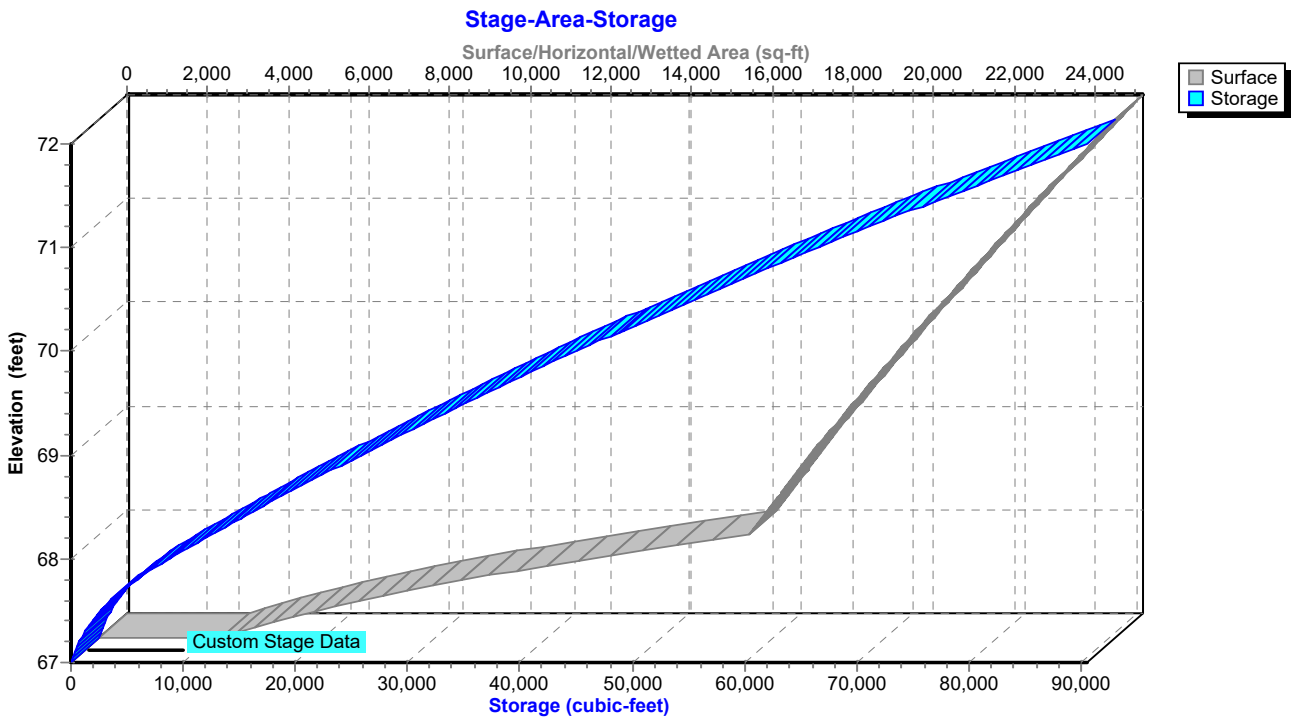
Pond 1P: Existing Southerly Basin



Stage-Area-Storage for Pond 1P: Existing Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,772	38,668
60.20	27,025	41,358
60.30	27,279	44,073
60.40	27,534	46,813
60.50	27,790	49,580
60.60	28,047	52,371
60.70	28,305	55,189
60.80	28,565	58,033
60.90	28,826	60,902
61.00	29,088	63,798
61.10	29,349	66,720
61.20	29,611	69,668
61.30	29,874	72,642
61.40	30,138	75,642
61.50	30,403	78,669
61.60	30,670	81,723
61.70	30,938	84,804
61.80	31,207	87,911
61.90	31,477	91,045
62.00	31,748	94,206
62.10	32,087	97,398
62.20	32,429	100,624
62.30	32,772	103,884
62.40	33,116	107,178
62.50	33,463	110,507
62.60	33,811	113,871
62.70	34,162	117,269
62.80	34,514	120,703
62.90	34,867	124,172
63.00	**35,223**	**127,677**

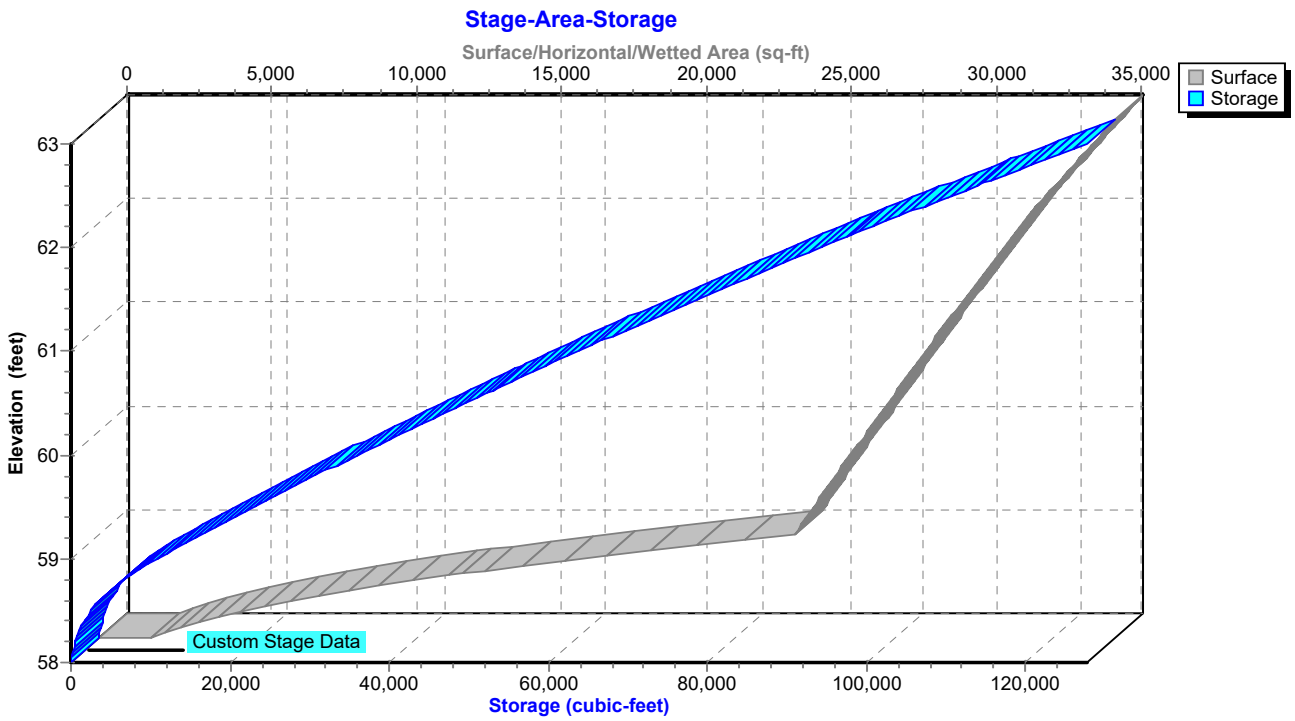
Pond 2P: Existing Easterly Basin



Stage-Area-Storage for Pond 2P: Existing Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0
67.10	3,877	345
67.20	4,824	779
67.30	5,874	1,313
67.40	7,028	1,957
67.50	8,285	2,722
67.60	9,646	3,618
67.70	11,110	4,654
67.80	12,677	5,843
67.90	14,348	7,193
68.00	16,122	8,716
68.10	16,316	10,338
68.20	16,512	11,979
68.30	16,709	13,640
68.40	16,907	15,321
68.50	17,106	17,022
68.60	17,306	18,742
68.70	17,508	20,483
68.80	17,710	22,244
68.90	17,914	24,025
69.00	18,119	25,827
69.10	18,338	27,650
69.20	18,558	29,494
69.30	18,780	31,361
69.40	19,003	33,250
69.50	19,227	35,162
69.60	19,453	37,096
69.70	19,679	39,052
69.80	19,908	41,032
69.90	20,137	43,034
70.00	20,368	45,059
70.10	20,597	47,107
70.20	20,828	49,179
70.30	21,060	51,273
70.40	21,293	53,391
70.50	21,528	55,532
70.60	21,764	57,696
70.70	22,001	59,885
70.80	22,239	62,097
70.90	22,479	64,333
71.00	22,720	66,593
71.10	22,961	68,877
71.20	23,204	71,185
71.30	23,448	73,517
71.40	23,693	75,875
71.50	23,940	78,256
71.60	24,188	80,663
71.70	24,437	83,094
71.80	24,687	85,550
71.90	24,939	88,031
72.00	**25,192**	**90,538**

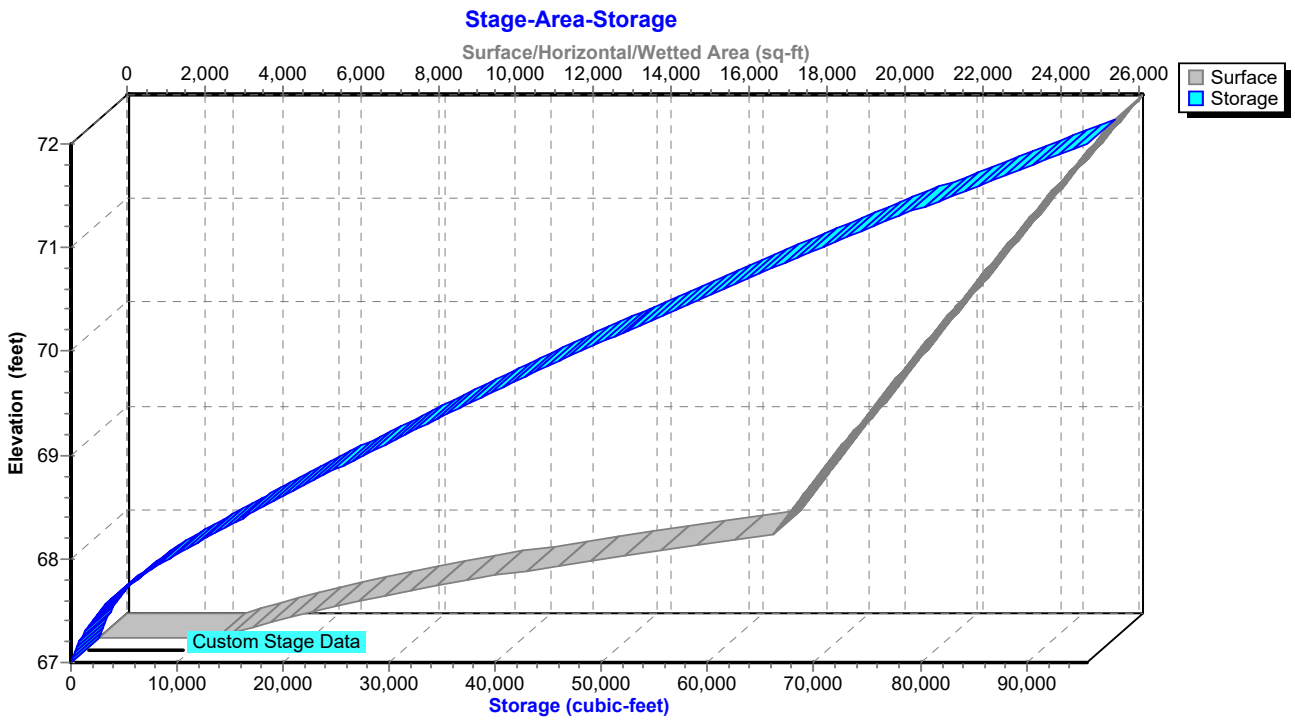
Pond 3P: Modified Southerly Basin



Stage-Area-Storage for Pond 3P: Modified Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,777	38,668
60.20	27,034	41,359
60.30	27,292	44,075
60.40	27,551	46,817
60.50	27,812	49,585
60.60	28,073	52,379
60.70	28,337	55,200
60.80	28,601	58,047
60.90	28,866	60,920
61.00	29,133	63,820
61.10	29,398	66,747
61.20	29,664	69,700
61.30	29,932	72,679
61.40	30,200	75,686
61.50	30,470	78,719
61.60	30,741	81,780
61.70	31,013	84,868
61.80	31,287	87,983
61.90	31,561	91,125
62.00	31,837	94,295
62.10	32,151	97,494
62.20	32,466	100,725
62.30	32,782	103,988
62.40	33,101	107,282
62.50	33,420	110,608
62.60	33,742	113,966
62.70	34,064	117,356
62.80	34,389	120,779
62.90	34,715	124,234
63.00	**35,042**	**127,722**

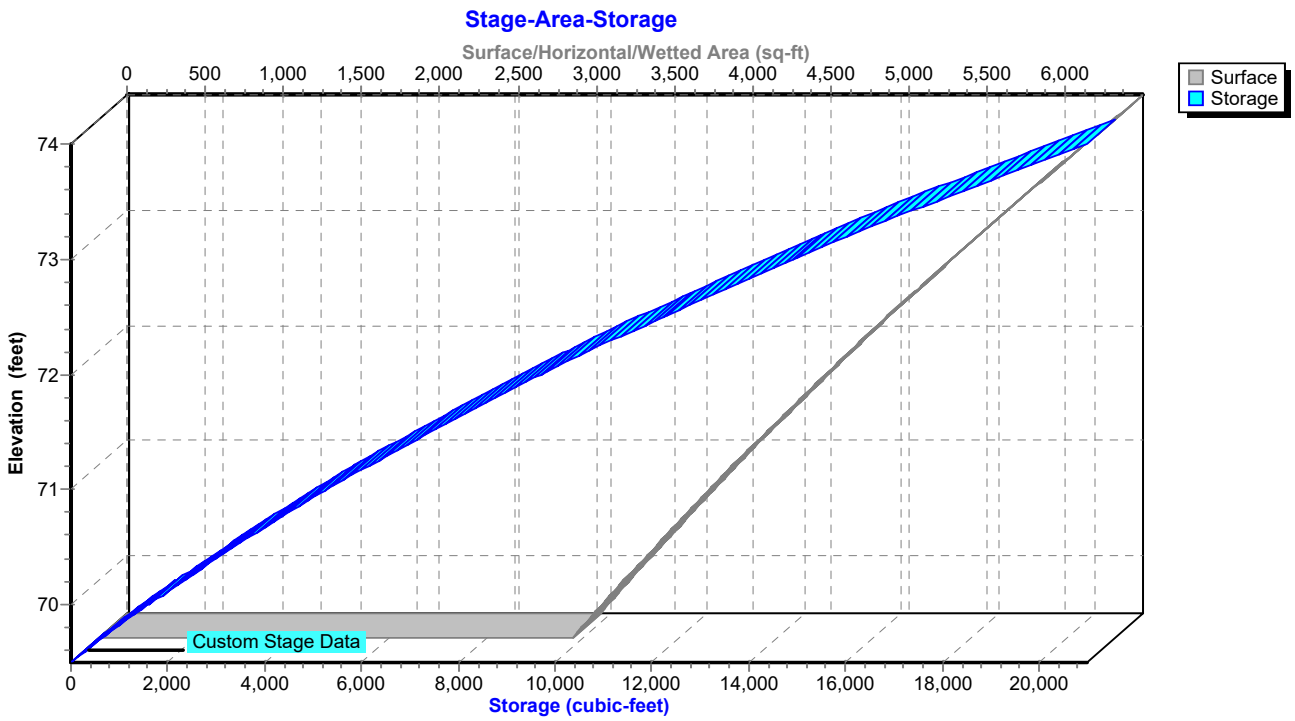
Pond 4P: Modified Easterly Basin



Stage-Area-Storage for Pond 4P: Modified Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0
67.10	3,935	347
67.20	4,954	791
67.30	6,091	1,342
67.40	7,345	2,013
67.50	8,716	2,815
67.60	10,204	3,760
67.70	11,810	4,860
67.80	13,533	6,126
67.90	15,373	7,570
68.00	17,330	9,204
68.10	17,533	10,947
68.20	17,737	12,711
68.30	17,942	14,495
68.40	18,149	16,299
68.50	18,357	18,125
68.60	18,566	19,971
68.70	18,776	21,838
68.80	18,987	23,726
68.90	19,199	25,635
69.00	19,413	27,566
69.10	19,626	29,518
69.20	19,840	31,491
69.30	20,056	33,486
69.40	20,273	35,502
69.50	20,490	37,541
69.60	20,709	39,601
69.70	20,930	41,683
69.80	21,151	43,787
69.90	21,373	45,913
70.00	21,597	48,061
70.10	21,814	50,232
70.20	22,033	52,424
70.30	22,252	54,638
70.40	22,473	56,875
70.50	22,695	59,133
70.60	22,918	61,414
70.70	23,142	63,717
70.80	23,367	66,042
70.90	23,593	68,390
71.00	23,820	70,761
71.10	24,046	73,154
71.20	24,273	75,570
71.30	24,501	78,009
71.40	24,730	80,470
71.50	24,960	82,955
71.60	25,191	85,462
71.70	25,423	87,993
71.80	25,656	90,547
71.90	25,891	93,124
72.00	**26,126**	**95,725**

Pond 5P: Easterly Basin Extension



Stage-Area-Storage for Pond 5P: Easterly Basin Extension

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
69.50	3,027	0
69.60	3,091	306
69.70	3,157	618
69.80	3,222	937
69.90	3,289	1,263
70.00	3,356	1,595
70.10	3,423	1,934
70.20	3,491	2,280
70.30	3,559	2,632
70.40	3,628	2,991
70.50	3,698	3,358
70.60	3,768	3,731
70.70	3,839	4,111
70.80	3,911	4,499
70.90	3,983	4,894
71.00	4,056	5,296
71.10	4,129	5,705
71.20	4,202	6,121
71.30	4,276	6,545
71.40	4,351	6,977
71.50	4,426	7,415
71.60	4,502	7,862
71.70	4,578	8,316
71.80	4,656	8,777
71.90	4,733	9,247
72.00	4,812	9,724
72.10	4,890	10,209
72.20	4,970	10,702
72.30	5,049	11,203
72.40	5,130	11,712
72.50	5,211	12,229
72.60	5,292	12,754
72.70	5,374	13,288
72.80	5,457	13,829
72.90	5,541	14,379
73.00	5,625	14,937
73.10	5,709	15,504
73.20	5,794	16,079
73.30	5,879	16,663
73.40	5,965	17,255
73.50	6,052	17,856
73.60	6,139	18,465
73.70	6,227	19,084
73.80	6,315	19,711
73.90	6,404	20,347
74.00	**6,494**	**20,992**

APPENDIX I-5
100-YEAR STORM EVENT HYDROGRAPHS

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
454,208	74	>75% Grass cover, Good, HSG C (E-1, E-2, P-1, P-2A, P-2B)
287,871	80	>75% Grass cover, Good, HSG D (E-1, E-2, P-1, P-2A)
1,682,040	98	Paved parking, HSG D (E-1, E-2, P-1, P-2A, P-2B)
2,424,119	**91**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	454,208	287,871	0	742,079	>75% Grass cover, Good	
0	0	0	1,682,040	0	1,682,040	Paved parking	
0	**0**	**454,208**	**1,969,911**	**0**	**2,424,119**	**TOTAL AREA**	

Summary for Subcatchment E-1: Existing Area Tributary to Southerly Basin

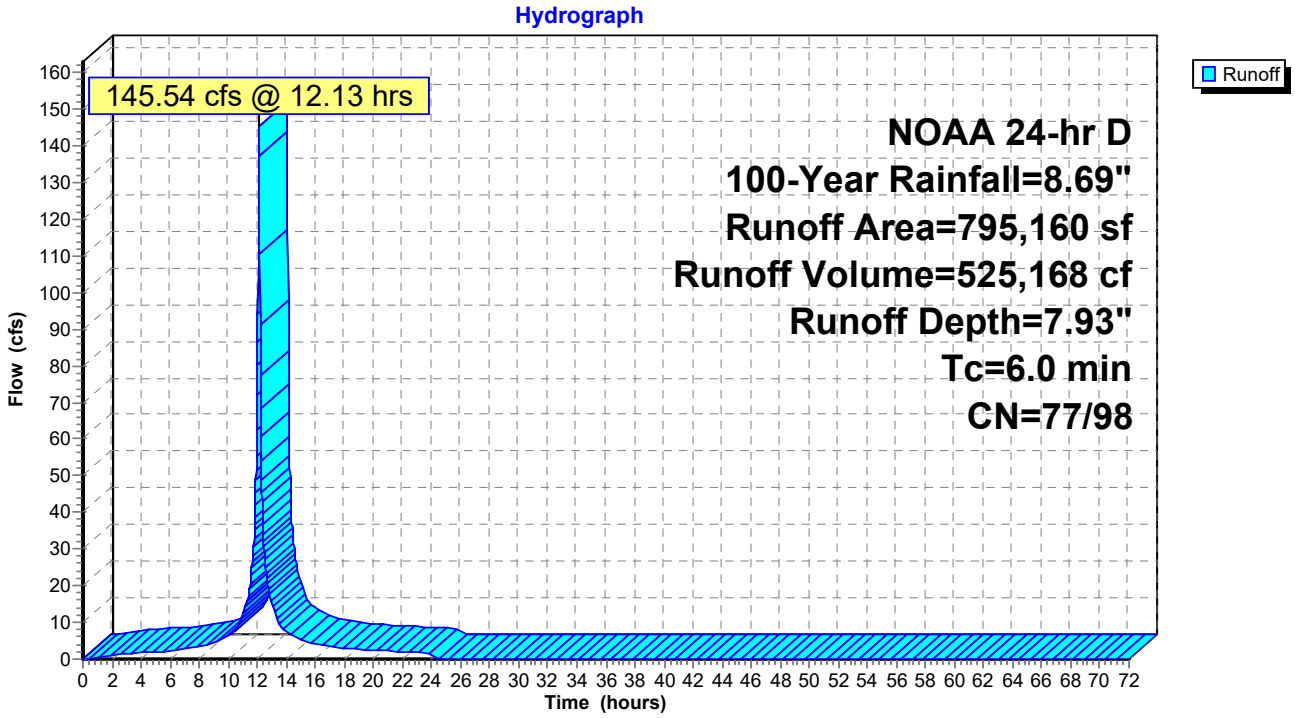
Runoff = 145.54 cfs @ 12.13 hrs, Volume= 525,168 cf, Depth= 7.93"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
630,944	98	Paved parking, HSG D
85,682	74	>75% Grass cover, Good, HSG C
78,534	80	>75% Grass cover, Good, HSG D
795,160	94	Weighted Average
164,216	77	20.65% Pervious Area
630,944	98	79.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-1: Existing Area Tributary to Southerly Basin



Summary for Subcatchment E-2: Existing Area Tributary to Easterly Basin

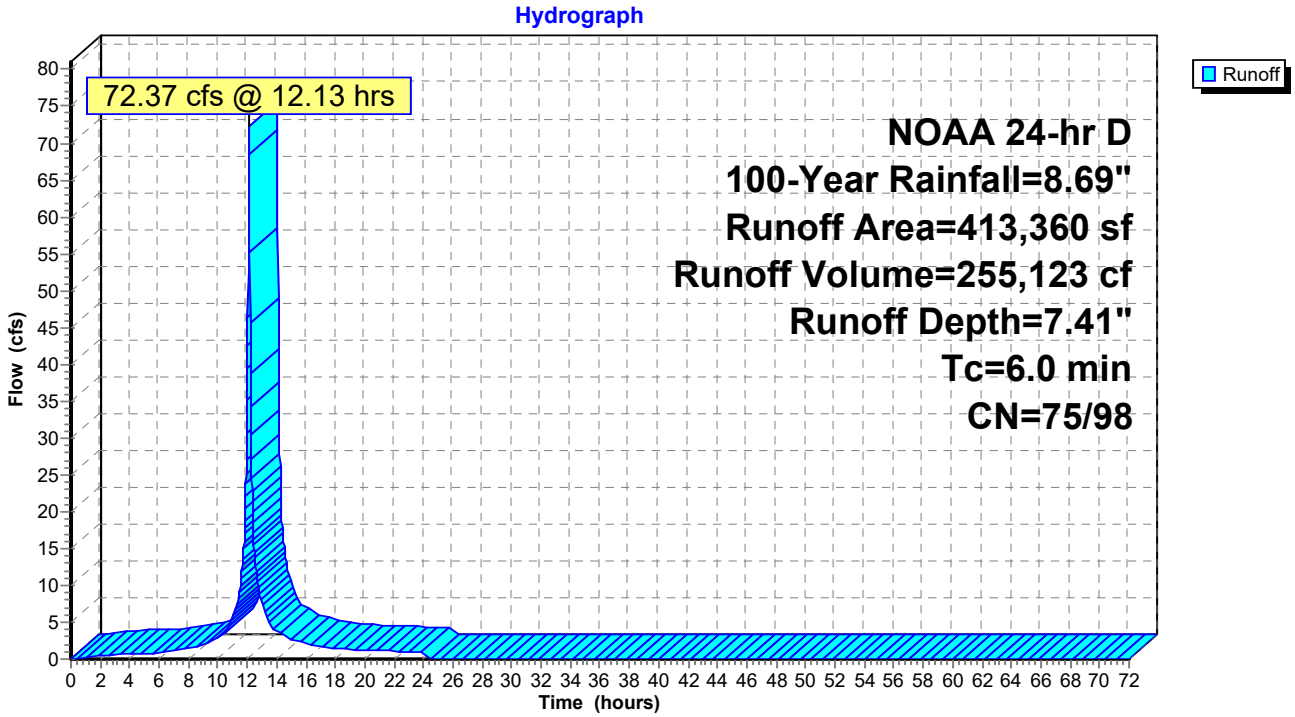
Runoff = 72.37 cfs @ 12.13 hrs, Volume= 255,123 cf, Depth= 7.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
258,284	98	Paved parking, HSG D
125,156	74	>75% Grass cover, Good, HSG C
29,920	80	>75% Grass cover, Good, HSG D
413,360	89	Weighted Average
155,076	75	37.52% Pervious Area
258,284	98	62.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-2: Existing Area Tributary to Easterly Basin



Summary for Subcatchment P-1: Proposed Area Tributary to 42" RCP

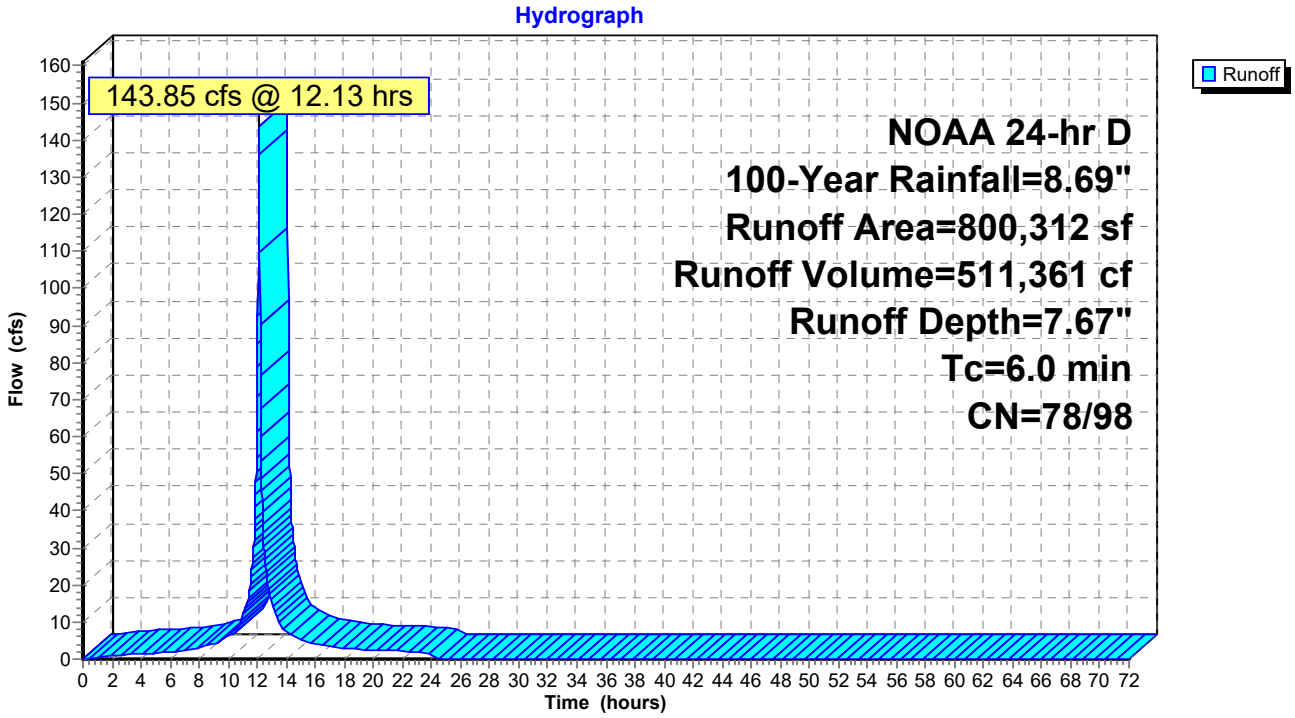
Runoff = 143.85 cfs @ 12.13 hrs, Volume= 511,361 cf, Depth= 7.67"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
541,322	98	Paved parking, HSG D
89,531	74	>75% Grass cover, Good, HSG C
169,459	80	>75% Grass cover, Good, HSG D
800,312	92	Weighted Average
258,990	78	32.36% Pervious Area
541,322	98	67.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-1: Proposed Area Tributary to 42" RCP



Summary for Subcatchment P-2A: Area Tributary to 18" RCP

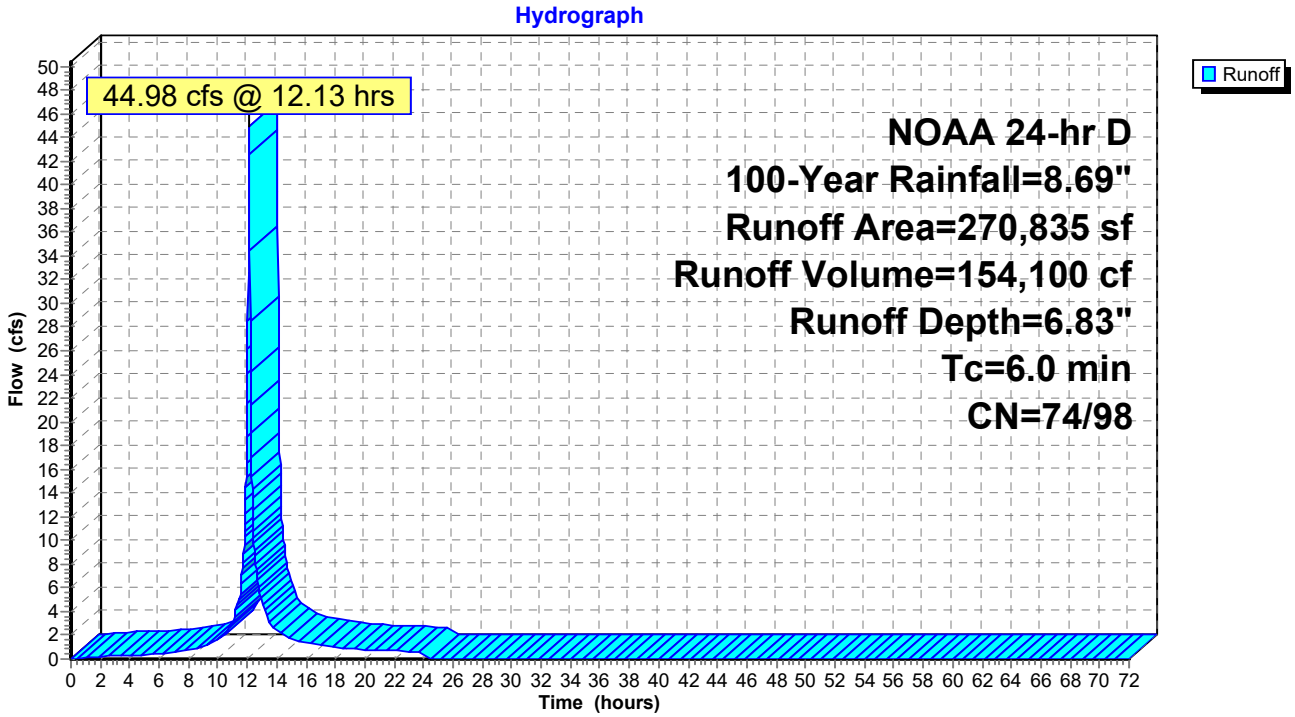
Runoff = 44.98 cfs @ 12.13 hrs, Volume= 154,100 cf, Depth= 6.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
119,490	98	Paved parking, HSG D
141,387	74	>75% Grass cover, Good, HSG C
9,958	80	>75% Grass cover, Good, HSG D
270,835	85	Weighted Average
151,345	74	55.88% Pervious Area
119,490	98	44.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2A: Area Tributary to 18" RCP



Summary for Subcatchment P-2B: Proposed Area Tributary to Basin Extension

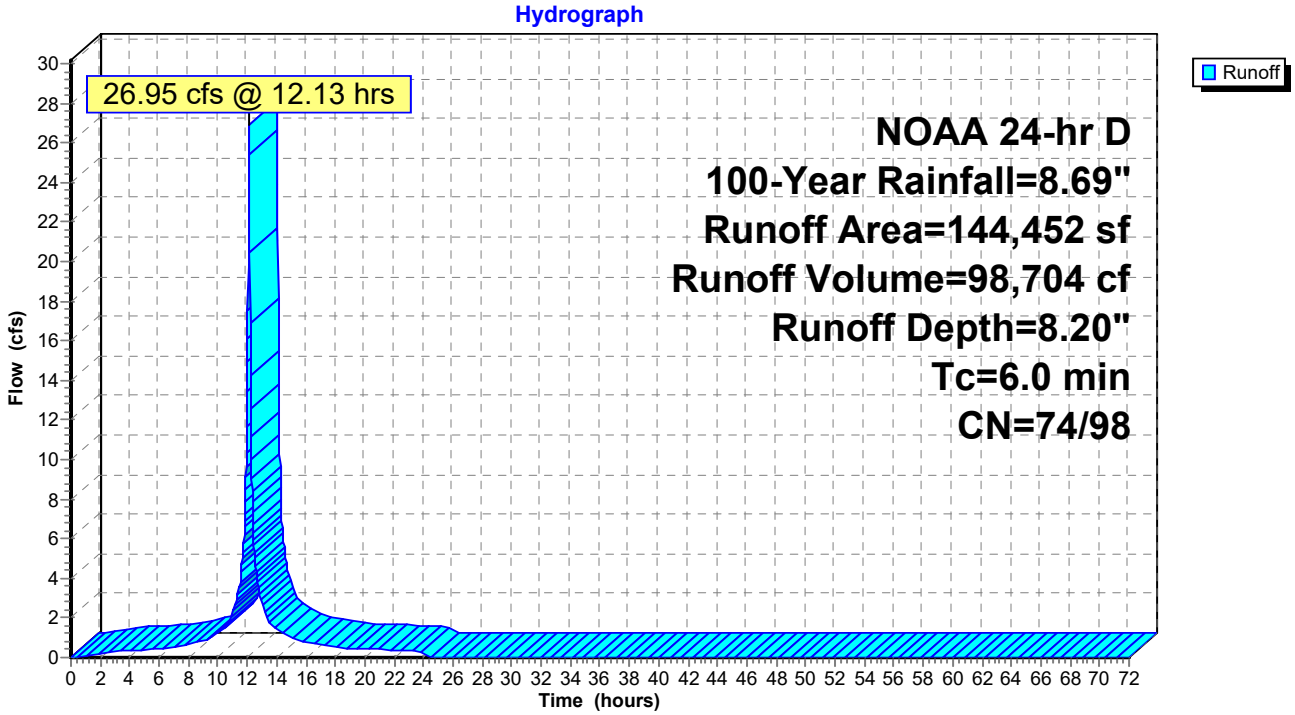
Runoff = 26.95 cfs @ 12.13 hrs, Volume= 98,704 cf, Depth= 8.20"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NOAA 24-hr D 100-Year Rainfall=8.69"

Area (sf)	CN	Description
132,000	98	Paved parking, HSG D
12,452	74	>75% Grass cover, Good, HSG C
144,452	96	Weighted Average
12,452	74	8.62% Pervious Area
132,000	98	91.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2B: Proposed Area Tributary to Basin Extension



Summary for Pond 1P: Existing Southerly Basin

Inflow Area = 795,160 sf, 79.35% Impervious, Inflow Depth = 7.93" for 100-Year event
Inflow = 145.54 cfs @ 12.13 hrs, Volume= 525,168 cf
Outflow = 123.04 cfs @ 12.17 hrs, Volume= 520,748 cf, Atten= 15%, Lag= 2.4 min
Primary = 12.73 cfs @ 12.17 hrs, Volume= 159,740 cf
Secondary = 110.31 cfs @ 12.17 hrs, Volume= 361,008 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 62.16' @ 12.17 hrs Surf.Area= 32,305 sf Storage= 99,456 cf

Plug-Flow detention time= 158.3 min calculated for 520,748 cf (99% of inflow)
Center-of-Mass det. time= 152.6 min (904.8 - 752.2)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,677 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

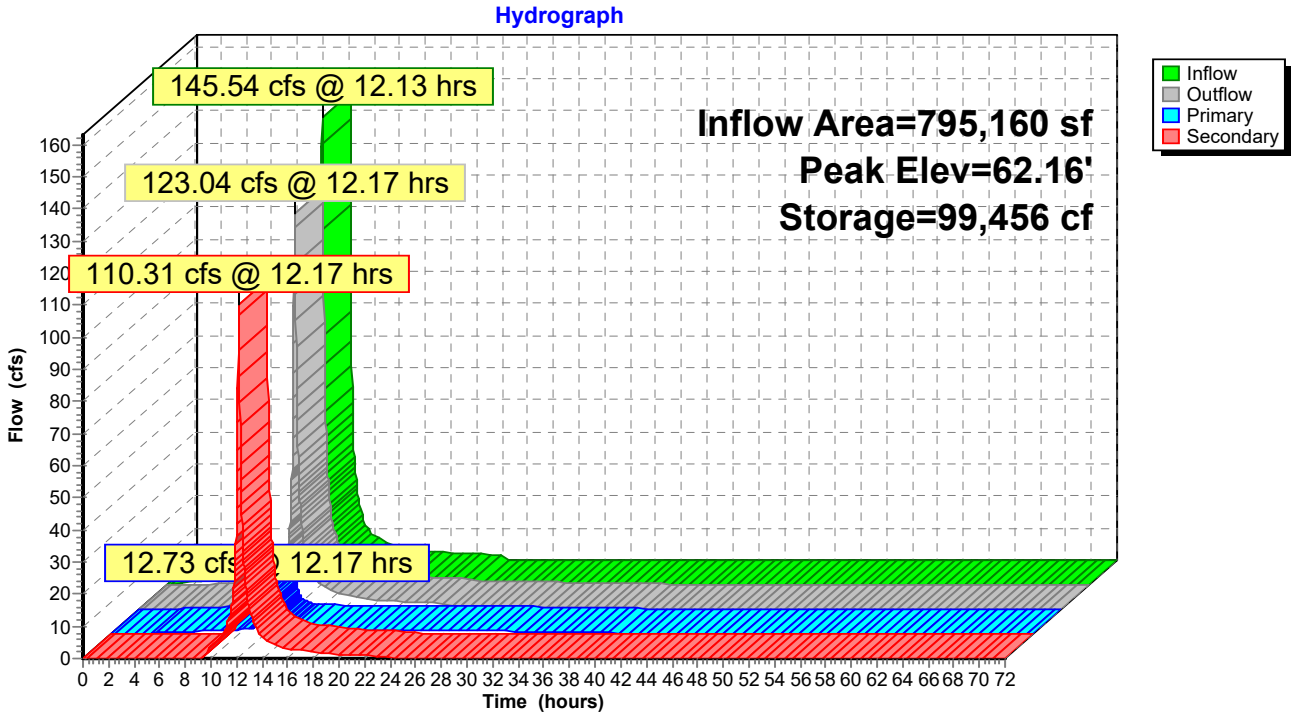
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,088	875.0	27,795	63,798	60,199
62.00	31,748	882.0	30,408	94,206	61,514
63.00	35,223	930.0	33,470	127,677	68,495

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	60.50'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.50 2.50 Width (feet) 9.00 12.50 27.00 38.00

Primary OutFlow Max=12.67 cfs @ 12.17 hrs HW=62.16' (Free Discharge)
└─**1=Culvert** (Passes 12.67 cfs of 24.10 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.71 cfs @ 8.73 fps)
  └─**3=Orifice/Grate** (Orifice Controls 10.95 cfs @ 4.22 fps)

Secondary OutFlow Max=109.61 cfs @ 12.17 hrs HW=62.16' (Free Discharge)
└─**4=Emergency Spillway** (Weir Controls 109.61 cfs @ 3.71 fps)

Pond 1P: Existing Southerly Basin



Summary for Pond 2P: Existing Easterly Basin

[93] Warning: Storage range exceeded by 219.77'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=13)

Inflow Area =	413,360 sf, 62.48% Impervious, Inflow Depth = 7.41" for 100-Year event				
Inflow =	72.37 cfs @	12.13 hrs, Volume=	255,123 cf		
Outflow =	90.12 cfs @	12.12 hrs, Volume=	239,495 cf, Atten= 0%, Lag= 0.0 min		
Primary =	90.12 cfs @	12.12 hrs, Volume=	239,495 cf		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 291.77' @ 12.12 hrs Surf.Area= 25,192 sf Storage= 90,538 cf

Plug-Flow detention time= 234.1 min calculated for 239,495 cf (94% of inflow)
Center-of-Mass det. time= 198.1 min (961.3 - 763.3)

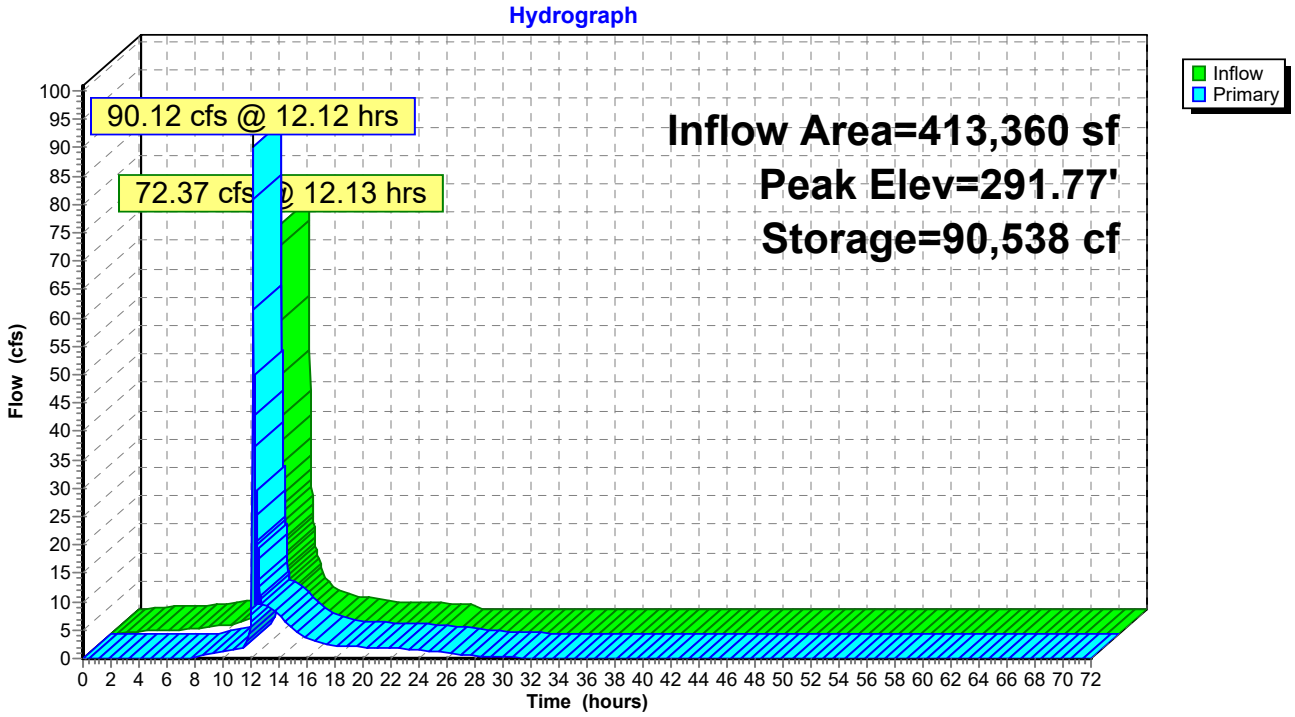
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	90,538 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	16,122	665.0	8,716	8,716	29,510
69.00	18,119	699.0	17,111	25,827	33,263
70.00	20,368	703.0	19,233	45,059	34,094
71.00	22,720	726.0	21,533	66,593	36,806
72.00	25,192	749.0	23,945	90,538	39,604

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=81.97 cfs @ 12.12 hrs HW=261.46' (Free Discharge)
└─**1=Culvert** (Inlet Controls 81.97 cfs @ 66.79 fps)
  ├─**2=Orifice/Grate** (Passes < 23.33 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 81.59 cfs potential flow)

Pond 2P: Existing Easterly Basin



Summary for Pond 3P: Modified Southerly Basin

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 800,312 sf, 67.64% Impervious, Inflow Depth = 7.67" for 100-Year event
Inflow = 143.85 cfs @ 12.13 hrs, Volume= 511,361 cf
Outflow = 117.06 cfs @ 12.17 hrs, Volume= 506,905 cf, Atten= 19%, Lag= 2.7 min
Primary = 19.59 cfs @ 12.17 hrs, Volume= 363,295 cf
Secondary = 97.46 cfs @ 12.17 hrs, Volume= 143,610 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 62.99' @ 12.17 hrs Surf.Area= 34,995 sf Storage= 127,217 cf

Plug-Flow detention time= 203.7 min calculated for 506,764 cf (99% of inflow)
Center-of-Mass det. time= 198.6 min (957.4 - 758.9)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,722 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

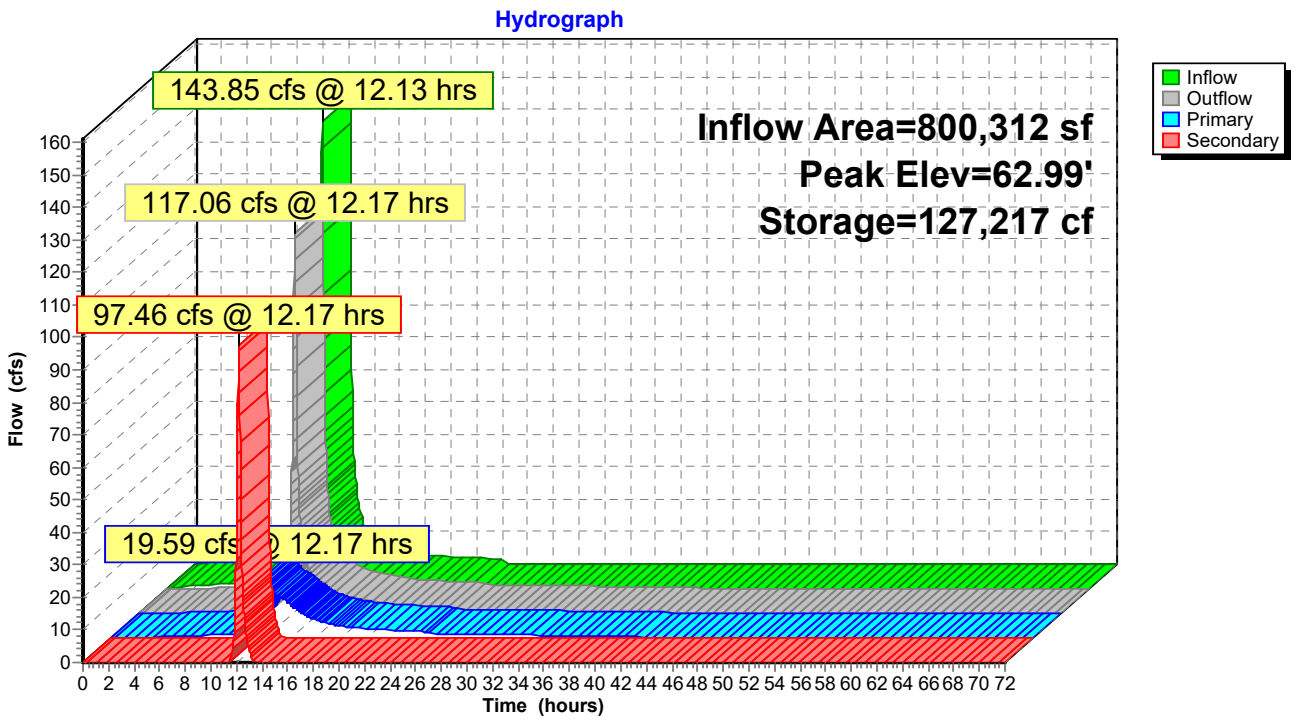
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,133	876.0	27,817	63,820	60,335
62.00	31,837	876.0	30,475	94,295	61,211
63.00	35,042	922.0	33,427	127,722	67,854

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	62.12'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 50.00 52.00

Primary OutFlow Max=19.57 cfs @ 12.17 hrs HW=62.98' (Free Discharge)
└─**1=Culvert** (Passes 19.57 cfs of 27.73 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.92 cfs @ 9.76 fps)
  └─**3=Orifice/Grate** (Orifice Controls 17.65 cfs @ 5.62 fps)

Secondary OutFlow Max=97.11 cfs @ 12.17 hrs HW=62.98' (Free Discharge)
└─**4=Emergency Spillway** (Orifice Controls 97.11 cfs @ 3.81 fps)

Pond 3P: Modified Southerly Basin



Summary for Pond 4P: Modified Easterly Basin

[93] Warning: Storage range exceeded by 61.15'
[80] Warning: Exceeded Pond 5P by 59.78' @ 12.18 hrs (182.74 cfs 124,224 cf)

Inflow Area =	415,287 sf, 60.56% Impervious, Inflow Depth = 7.30" for 100-Year event				
Inflow =	61.94 cfs @	12.13 hrs, Volume=	252,792 cf		
Outflow =	48.22 cfs @	12.18 hrs, Volume=	236,106 cf, Atten= 22%, Lag= 3.0 min		
Primary =	48.22 cfs @	12.18 hrs, Volume=	236,106 cf		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 133.15' @ 12.18 hrs Surf.Area= 26,126 sf Storage= 95,725 cf

Plug-Flow detention time= 258.5 min calculated for 236,040 cf (93% of inflow)
Center-of-Mass det. time= 219.7 min (1,000.5 - 780.8)

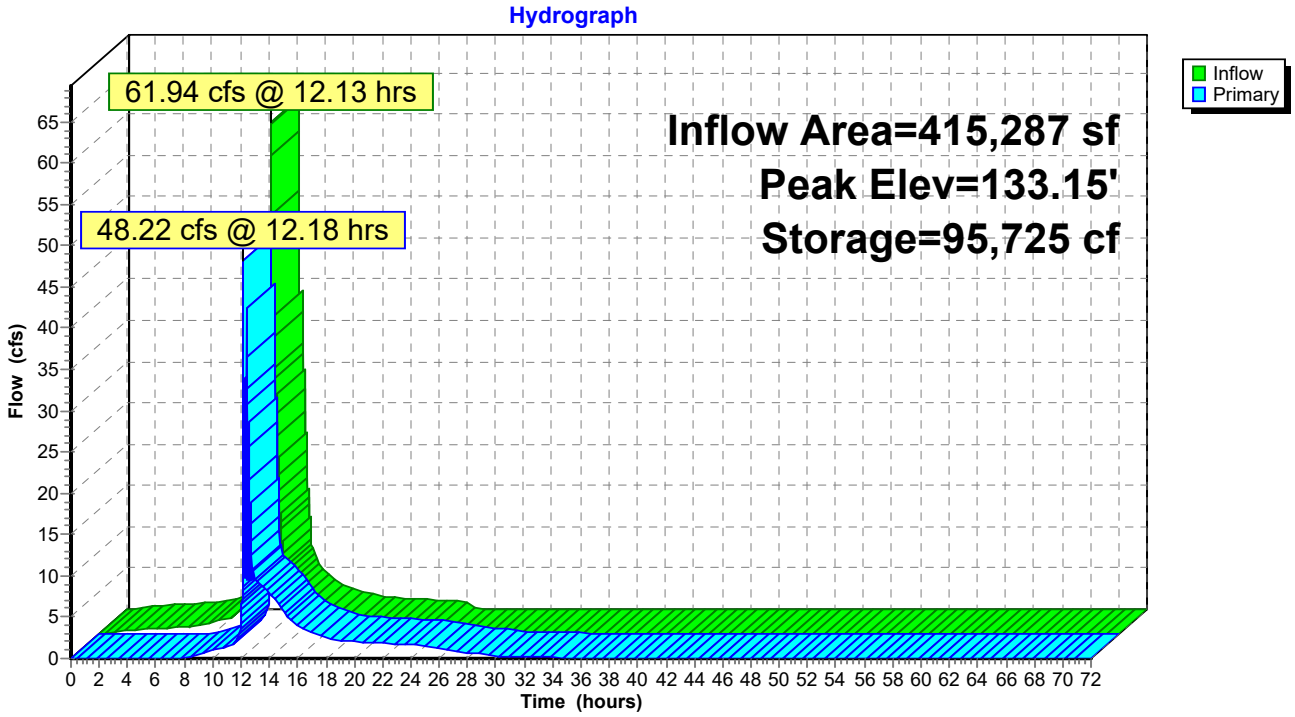
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	95,725 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	17,330	701.0	9,204	9,204	33,423
69.00	19,413	732.0	18,362	27,566	37,030
70.00	21,597	435.0	20,495	48,061	64,618
71.00	23,820	853.0	22,699	70,761	107,466
72.00	26,126	772.0	24,964	95,725	117,972

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=44.16 cfs @ 12.18 hrs HW=124.86' (Free Discharge)
└─**1=Culvert** (Inlet Controls 44.16 cfs @ 35.98 fps)
  ├─**2=Orifice/Grate** (Passes < 12.59 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 43.44 cfs potential flow)

Pond 4P: Modified Easterly Basin



Summary for Pond 5P: Easterly Basin Extension

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=14)

Inflow Area = 144,452 sf, 91.38% Impervious, Inflow Depth = 8.20" for 100-Year event
Inflow = 26.95 cfs @ 12.13 hrs, Volume= 98,704 cf
Outflow = 25.97 cfs @ 12.36 hrs, Volume= 98,692 cf, Atten= 4%, Lag= 13.9 min
Primary = 25.97 cfs @ 12.36 hrs, Volume= 98,692 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 73.36' @ 12.33 hrs Surf.Area= 5,928 sf Storage= 16,998 cf

Plug-Flow detention time= 40.9 min calculated for 98,692 cf (100% of inflow)
Center-of-Mass det. time= 40.7 min (786.3 - 745.6)

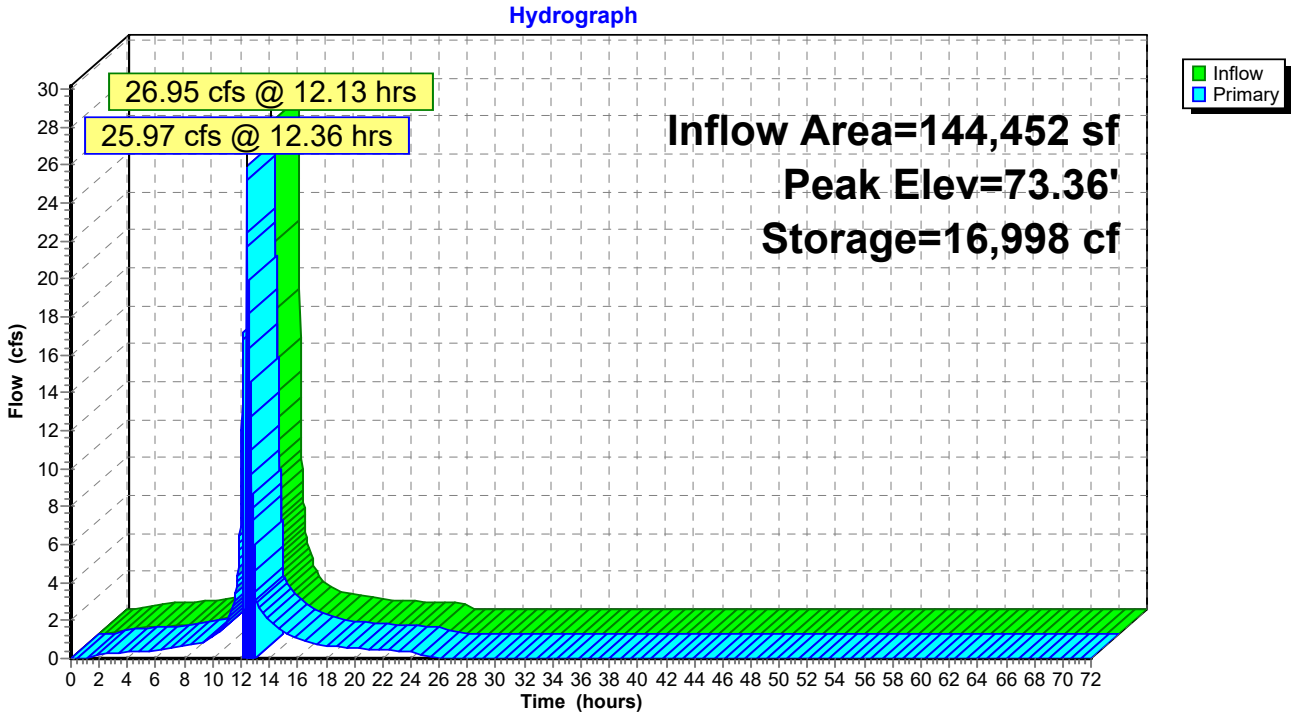
Volume	Invert	Avail.Storage	Storage Description
#1	69.50'	20,992 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
69.50	3,027	214.0	0	0	3,027
70.00	3,356	224.0	1,595	1,595	3,392
71.00	4,056	243.0	3,700	5,296	4,136
72.00	4,812	262.0	4,429	9,724	4,940
73.00	5,625	280.0	5,213	14,937	5,763
74.00	6,494	299.0	6,054	20,992	6,685

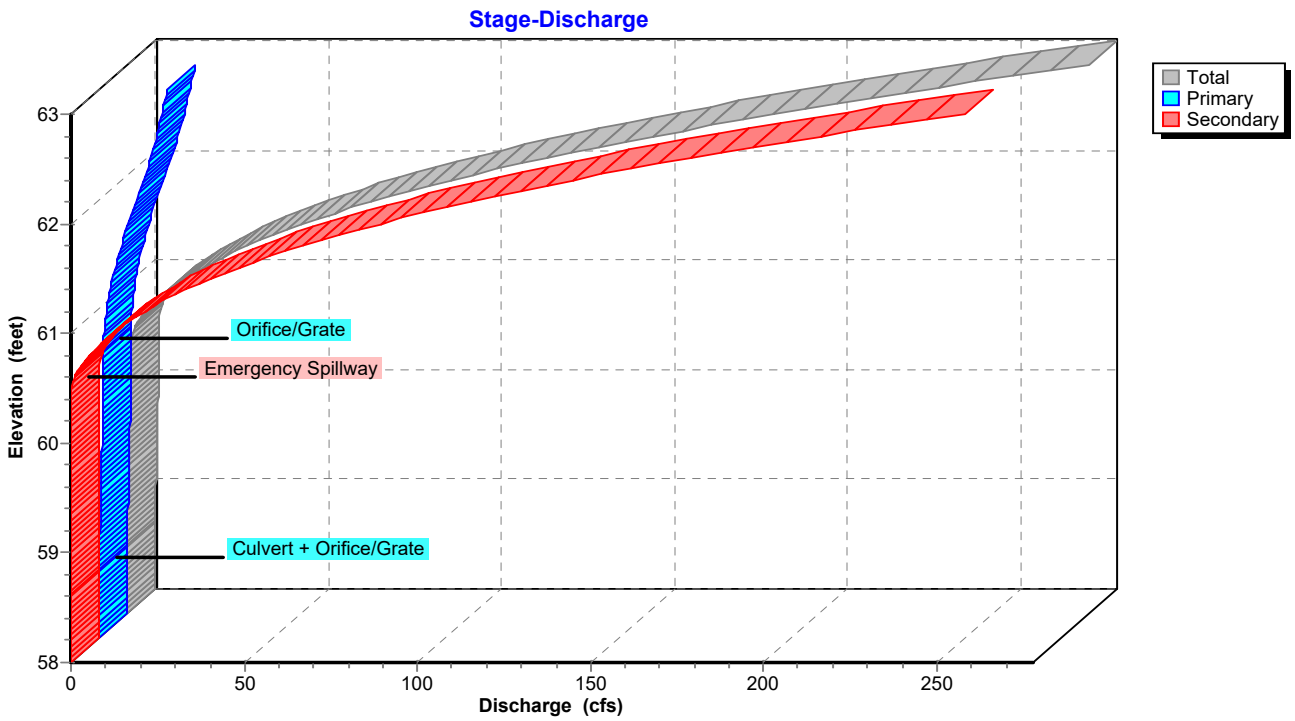
Device	Routing	Invert	Outlet Devices
#1	Primary	69.50'	**30.0" Round Culvert** L= 110.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.27' S= 0.0112 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	69.50'	**30.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	72.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 12.36 hrs HW=73.28' TW=120.37' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Easterly Basin Extension



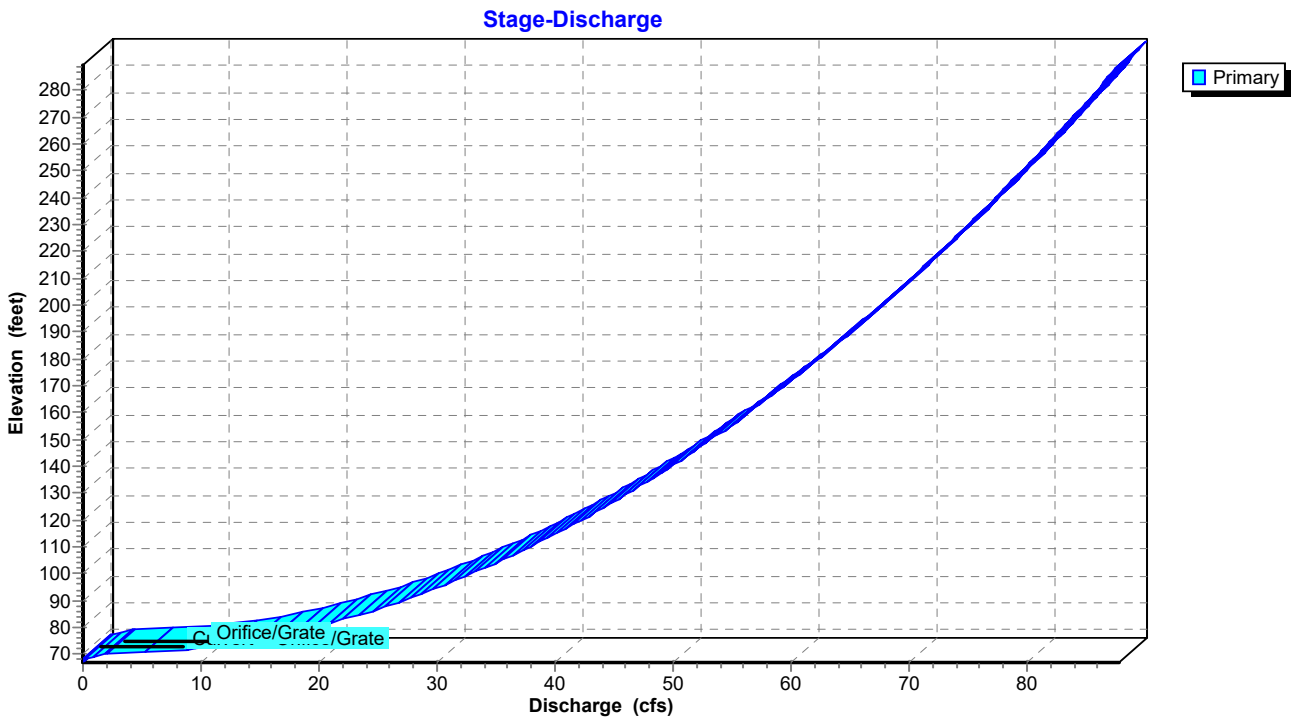
Pond 1P: Existing Southerly Basin



Stage-Discharge for Pond 1P: Existing Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	2.20	1.24	0.96
60.70	4.12	1.32	2.80
60.80	6.81	1.52	5.30
60.90	10.21	1.83	8.38
61.00	14.29	2.25	12.04
61.10	19.07	2.78	16.29
61.20	24.60	3.40	21.20
61.30	30.94	4.12	26.82
61.40	38.12	4.91	33.21
61.50	46.17	5.79	40.38
61.60	55.10	6.72	48.38
61.70	64.95	7.71	57.24
61.80	75.73	8.75	66.98
61.90	87.47	9.82	77.64
62.00	100.16	10.92	89.24
62.10	113.82	12.02	101.80
62.20	128.42	13.12	115.30
62.30	143.93	14.18	129.75
62.40	160.34	15.19	145.15
62.50	177.61	16.11	161.51
62.60	195.69	16.85	178.84
62.70	214.72	17.57	197.15
62.80	234.77	18.31	216.46
62.90	255.80	19.01	236.78
63.00	**277.81**	**19.69**	**258.12**

Pond 2P: Existing Easterly Basin



Stage-Discharge for Pond 2P: Existing Easterly Basin

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
67.00	0.00	90.85	27.61	114.70	39.94	138.55	49.27
67.45	0.00	91.30	27.89	115.15	40.13	139.00	49.43
67.90	0.00	91.75	28.17	115.60	40.33	139.45	49.59
68.35	0.00	92.20	28.45	116.05	40.52	139.90	49.75
68.80	0.49	92.65	28.73	116.50	40.72	140.35	49.91
69.25	1.22	93.10	29.00	116.95	40.91	140.80	50.06
69.70	1.66	93.55	29.27	117.40	41.10	141.25	50.22
70.15	2.01	94.00	29.54	117.85	41.29	141.70	50.38
70.60	3.10	94.45	29.80	118.30	41.48	142.15	50.53
71.05	5.46	94.90	30.06	118.75	41.67	142.60	50.69
71.50	7.73	95.35	30.32	119.20	41.86	143.05	50.84
71.95	9.34	95.80	30.58	119.65	42.05	143.50	51.00
72.40	10.69	96.25	30.84	120.10	42.23	143.95	51.15
72.85	11.57	96.70	31.09	120.55	42.42	144.40	51.30
73.30	12.23	97.15	31.34	121.00	42.60	144.85	51.46
73.75	12.86	97.60	31.59	121.45	42.79	145.30	51.61
74.20	13.45	98.05	31.84	121.90	42.97	145.75	51.76
74.65	14.03	98.50	32.09	122.35	43.15	146.20	51.91
75.10	14.58	98.95	32.33	122.80	43.33	146.65	52.06
75.55	15.11	99.40	32.57	123.25	43.52	147.10	52.21
76.00	15.62	99.85	32.81	123.70	43.70	147.55	52.36
76.45	16.11	100.30	33.05	124.15	43.88	148.00	52.51
76.90	16.59	100.75	33.29	124.60	44.05	148.45	52.66
77.35	17.06	101.20	33.52	125.05	44.23	148.90	52.81
77.80	17.51	101.65	33.76	125.50	44.41	149.35	52.96
78.25	17.96	102.10	33.99	125.95	44.59	149.80	53.11
78.70	18.39	102.55	34.22	126.40	44.76	150.25	53.26
79.15	18.81	103.00	34.45	126.85	44.94	150.70	53.40
79.60	19.22	103.45	34.67	127.30	45.11	151.15	53.55
80.05	19.63	103.90	34.90	127.75	45.28	151.60	53.70
80.50	20.02	104.35	35.12	128.20	45.46	152.05	53.84
80.95	20.41	104.80	35.35	128.65	45.63	152.50	53.99
81.40	20.79	105.25	35.57	129.10	45.80	152.95	54.13
81.85	21.17	105.70	35.79	129.55	45.97	153.40	54.28
82.30	21.54	106.15	36.01	130.00	46.14	153.85	54.42
82.75	21.90	106.60	36.23	130.45	46.31	154.30	54.57
83.20	22.25	107.05	36.44	130.90	46.48	154.75	54.71
83.65	22.60	107.50	36.66	131.35	46.65	155.20	54.86
84.10	22.95	107.95	36.87	131.80	46.82	155.65	55.00
84.55	23.29	108.40	37.08	132.25	46.99	156.10	55.14
85.00	23.62	108.85	37.29	132.70	47.15	156.55	55.28
85.45	23.95	109.30	37.50	133.15	47.32	157.00	55.43
85.90	24.28	109.75	37.71	133.60	47.49	157.45	55.57
86.35	24.60	110.20	37.92	134.05	47.65	157.90	55.71
86.80	24.92	110.65	38.13	134.50	47.82	158.35	55.85
87.25	25.23	111.10	38.33	134.95	47.98	158.80	55.99
87.70	25.54	111.55	38.54	135.40	48.14	159.25	56.13
88.15	25.85	112.00	38.74	135.85	48.31	159.70	56.27
88.60	26.15	112.45	38.94	136.30	48.47	160.15	56.41
89.05	26.45	112.90	39.14	136.75	48.63	160.60	56.55
89.50	26.74	113.35	39.34	137.20	48.79	161.05	56.69
89.95	27.04	113.80	39.54	137.65	48.95	161.50	56.83
90.40	27.32	114.25	39.74	138.10	49.11	161.95	56.96

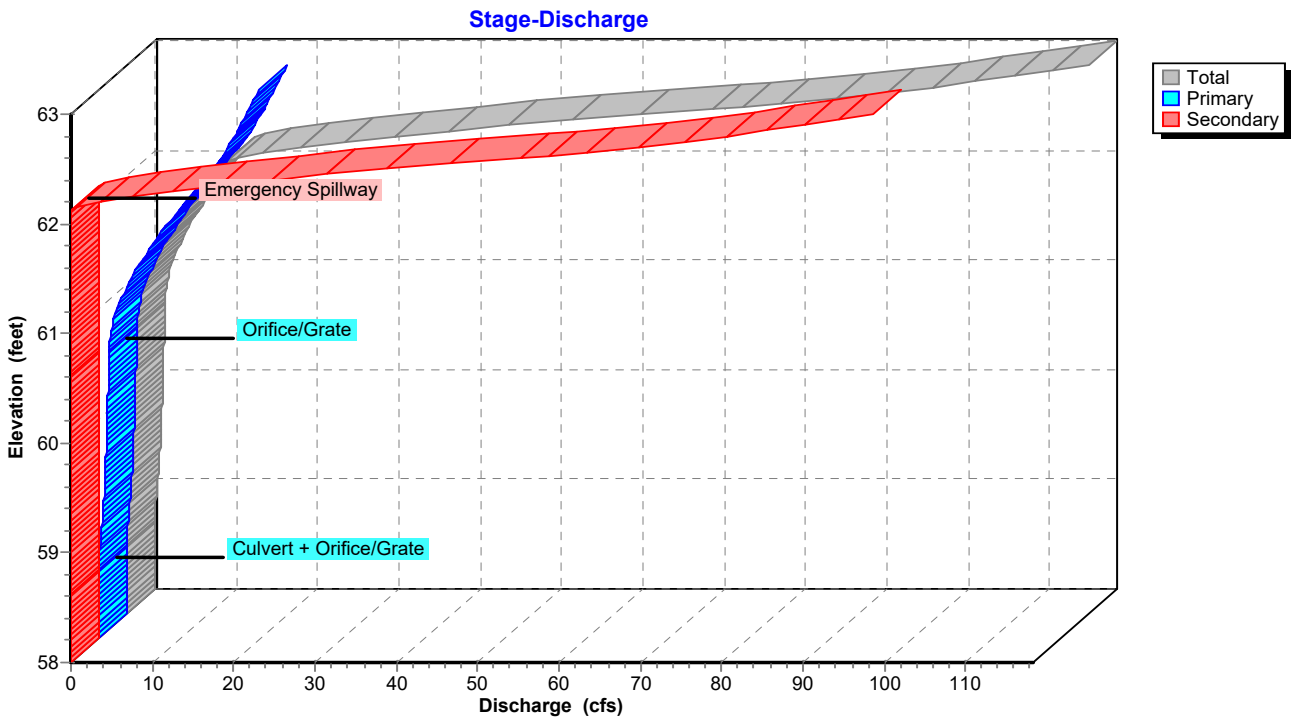
Stage-Discharge for Pond 2P: Existing Easterly Basin (continued)

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
162.40	57.10	186.25	63.98	210.10	70.19	233.95	75.89
162.85	57.24	186.70	64.10	210.55	70.30	234.40	75.99
163.30	57.38	187.15	64.22	211.00	70.41	234.85	76.09
163.75	57.51	187.60	64.35	211.45	70.52	235.30	76.20
164.20	57.65	188.05	64.47	211.90	70.63	235.75	76.30
164.65	57.78	188.50	64.59	212.35	70.74	236.20	76.40
165.10	57.92	188.95	64.71	212.80	70.85	236.65	76.50
165.55	58.06	189.40	64.83	213.25	70.96	237.10	76.61
166.00	58.19	189.85	64.95	213.70	71.07	237.55	76.71
166.45	58.33	190.30	65.07	214.15	71.19	238.00	76.81
166.90	58.46	190.75	65.19	214.60	71.30	238.45	76.91
167.35	58.59	191.20	65.32	215.05	71.41	238.90	77.02
167.80	58.73	191.65	65.44	215.50	71.52	239.35	77.12
168.25	58.86	192.10	65.56	215.95	71.63	239.80	77.22
168.70	59.00	192.55	65.67	216.40	71.73	240.25	77.32
169.15	59.13	193.00	65.79	216.85	71.84	240.70	77.42
169.60	59.26	193.45	65.91	217.30	71.95	241.15	77.52
170.05	59.39	193.90	66.03	217.75	72.06	241.60	77.63
170.50	59.53	194.35	66.15	218.20	72.17	242.05	77.73
170.95	59.66	194.80	66.27	218.65	72.28	242.50	77.83
171.40	59.79	195.25	66.39	219.10	72.39	242.95	77.93
171.85	59.92	195.70	66.51	219.55	72.50	243.40	78.03
172.30	60.05	196.15	66.62	220.00	72.61	243.85	78.13
172.75	60.18	196.60	66.74	220.45	72.71	244.30	78.23
173.20	60.31	197.05	66.86	220.90	72.82	244.75	78.33
173.65	60.44	197.50	66.98	221.35	72.93	245.20	78.43
174.10	60.57	197.95	67.09	221.80	73.04	245.65	78.53
174.55	60.70	198.40	67.21	222.25	73.14	246.10	78.63
175.00	60.83	198.85	67.33	222.70	73.25	246.55	78.73
175.45	60.96	199.30	67.45	223.15	73.36	247.00	78.83
175.90	61.09	199.75	67.56	223.60	73.47	247.45	78.93
176.35	61.22	200.20	67.68	224.05	73.57	247.90	79.03
176.80	61.35	200.65	67.79	224.50	73.68	248.35	79.13
177.25	61.47	201.10	67.91	224.95	73.79	248.80	79.23
177.70	61.60	201.55	68.03	225.40	73.89	249.25	79.33
178.15	61.73	202.00	68.14	225.85	74.00	249.70	79.43
178.60	61.86	202.45	68.26	226.30	74.11	250.15	79.53
179.05	61.98	202.90	68.37	226.75	74.21	250.60	79.62
179.50	62.11	203.35	68.49	227.20	74.32	251.05	79.72
179.95	62.24	203.80	68.60	227.65	74.42	251.50	79.82
180.40	62.36	204.25	68.71	228.10	74.53	251.95	79.92
180.85	62.49	204.70	68.83	228.55	74.63	252.40	80.02
181.30	62.61	205.15	68.94	229.00	74.74	252.85	80.12
181.75	62.74	205.60	69.06	229.45	74.84	253.30	80.21
182.20	62.86	206.05	69.17	229.90	74.95	253.75	80.31
182.65	62.99	206.50	69.28	230.35	75.05	254.20	80.41
183.10	63.11	206.95	69.40	230.80	75.16	254.65	80.51
183.55	63.24	207.40	69.51	231.25	75.26	255.10	80.60
184.00	63.36	207.85	69.62	231.70	75.37	255.55	80.70
184.45	63.49	208.30	69.74	232.15	75.47	256.00	80.80
184.90	63.61	208.75	69.85	232.60	75.57	256.45	80.90
185.35	63.73	209.20	69.96	233.05	75.68	256.90	80.99
185.80	63.86	209.65	70.07	233.50	75.78	257.35	81.09

Stage-Discharge for Pond 2P: Existing Easterly Basin (continued)

Elevation (feet)	Primary (cfs)
257.80	81.19
258.25	81.28
258.70	81.38
259.15	81.48
259.60	81.57
260.05	81.67
260.50	81.77
260.95	81.86
261.40	81.96
261.85	82.05
262.30	82.15
262.75	82.24
263.20	82.34
263.65	82.44
264.10	82.53
264.55	82.63
265.00	82.72
265.45	82.82
265.90	82.91
266.35	83.01
266.80	83.10
267.25	83.19
267.70	83.29
268.15	83.38
268.60	83.48
269.05	83.57
269.50	83.67
269.95	83.76
270.40	83.85
270.85	83.95
271.30	84.04
271.75	84.13
272.20	84.23
272.65	84.32
273.10	84.41
273.55	84.51
274.00	84.60
274.45	84.69
274.90	84.78
275.35	84.88
275.80	84.97
276.25	85.06
276.70	85.15
277.15	85.25
277.60	85.34
278.05	85.43
278.50	85.52
278.95	85.61
279.40	85.71
279.85	85.80
280.30	85.89
280.75	85.98
281.20	86.07
281.65	86.16
282.10	86.25
282.55	86.35
283.00	86.44
283.45	86.53
283.90	86.62
284.35	86.71
284.80	86.80
285.25	86.89
285.70	86.98
286.15	87.07
286.60	87.16
287.05	87.25
287.50	87.34
287.95	87.43
288.40	87.52
288.85	87.61
289.30	**87.70**

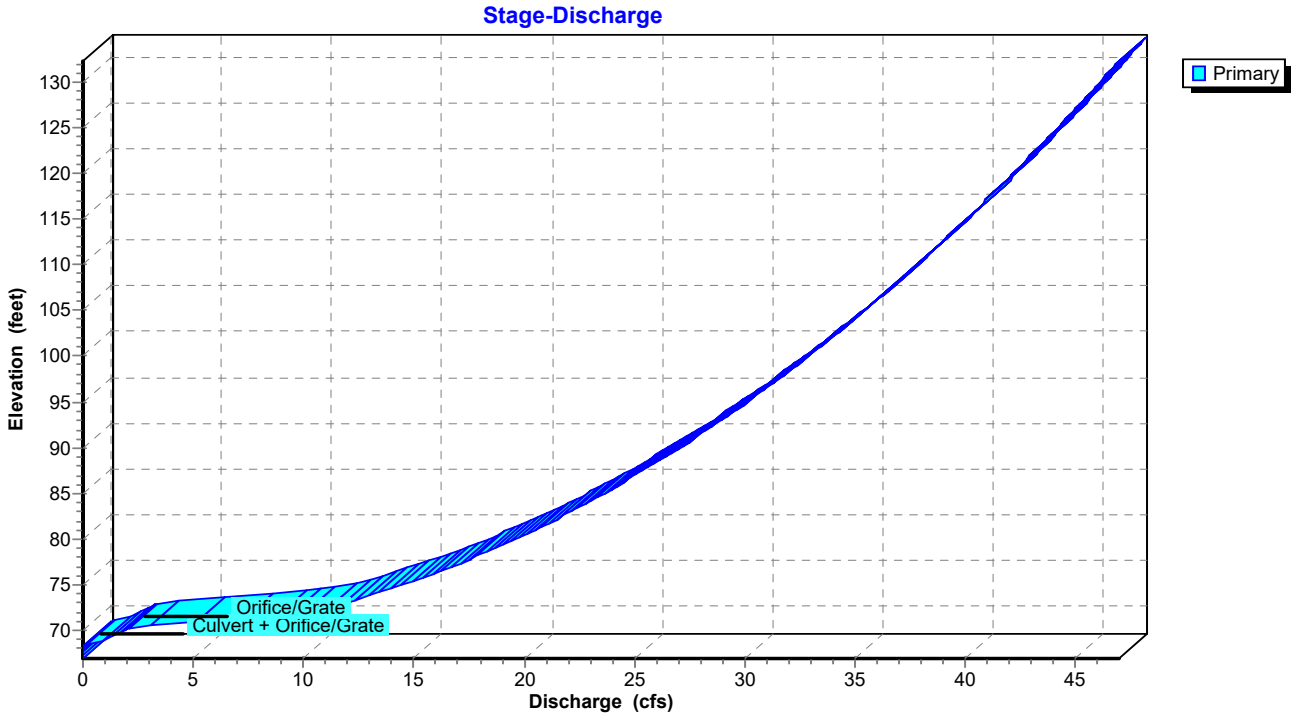
Pond 3P: Modified Southerly Basin



Stage-Discharge for Pond 3P: Modified Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	1.24	1.24	0.00
60.70	1.32	1.32	0.00
60.80	1.52	1.52	0.00
60.90	1.83	1.83	0.00
61.00	2.25	2.25	0.00
61.10	2.78	2.78	0.00
61.20	3.40	3.40	0.00
61.30	4.12	4.12	0.00
61.40	4.91	4.91	0.00
61.50	5.79	5.79	0.00
61.60	6.72	6.72	0.00
61.70	7.71	7.71	0.00
61.80	8.75	8.75	0.00
61.90	9.82	9.82	0.00
62.00	10.92	10.92	0.00
62.10	12.02	12.02	0.00
62.20	16.83	13.12	3.71
62.30	26.76	14.18	12.58
62.40	39.67	15.19	24.48
62.50	54.93	16.11	38.82
62.60	72.14	16.85	55.29
62.70	87.38	17.57	69.81
62.80	99.05	18.31	80.74
62.90	109.18	19.01	90.17
63.00	**118.32**	**19.69**	**98.63**

Pond 4P: Modified Easterly Basin



Stage-Discharge for Pond 4P: Modified Easterly Basin

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
67.00	0.00	74.42	13.74	81.84	21.16	89.26	26.59
67.14	0.00	74.56	13.91	81.98	21.28	89.40	26.68
67.28	0.00	74.70	14.09	82.12	21.39	89.54	26.77
67.42	0.00	74.84	14.26	82.26	21.50	89.68	26.86
67.56	0.00	74.98	14.43	82.40	21.62	89.82	26.95
67.70	0.00	75.12	14.60	82.54	21.73	89.96	27.04
67.84	0.00	75.26	14.77	82.68	21.84	90.10	27.13
67.98	0.00	75.40	14.93	82.82	21.95	90.24	27.22
68.12	0.00	75.54	15.09	82.96	22.07	90.38	27.31
68.26	0.00	75.68	15.25	83.10	22.18	90.52	27.40
68.40	0.00	75.82	15.41	83.24	22.29	90.66	27.49
68.54	0.08	75.96	15.57	83.38	22.40	90.80	27.58
68.68	0.27	76.10	15.73	83.52	22.50	90.94	27.67
68.82	0.53	76.24	15.88	83.66	22.61	91.08	27.76
68.96	0.82	76.38	16.04	83.80	22.72	91.22	27.84
69.10	1.03	76.52	16.19	83.94	22.83	91.36	27.93
69.24	1.21	76.66	16.34	84.08	22.93	91.50	28.02
69.38	1.36	76.80	16.49	84.22	23.04	91.64	28.11
69.52	1.50	76.94	16.63	84.36	23.15	91.78	28.19
69.66	1.63	77.08	16.78	84.50	23.25	91.92	28.28
69.80	1.74	77.22	16.93	84.64	23.36	92.06	28.37
69.94	1.85	77.36	17.07	84.78	23.46	92.20	28.45
70.08	1.96	77.50	17.21	84.92	23.57	92.34	28.54
70.22	2.06	77.64	17.35	85.06	23.67	92.48	28.62
70.36	2.31	77.78	17.49	85.20	23.77	92.62	28.71
70.50	2.72	77.92	17.63	85.34	23.87	92.76	28.79
70.64	3.27	78.06	17.77	85.48	23.98	92.90	28.88
70.78	3.95	78.20	17.91	85.62	24.08	93.04	28.96
70.92	4.71	78.34	18.04	85.76	24.18	93.18	29.05
71.06	5.52	78.48	18.18	85.90	24.28	93.32	29.13
71.20	6.33	78.62	18.31	86.04	24.38	93.46	29.21
71.34	7.07	78.76	18.45	86.18	24.48	93.60	29.30
71.48	7.65	78.90	18.58	86.32	24.58	93.74	29.38
71.62	8.19	79.04	18.71	86.46	24.68	93.88	29.46
71.76	8.70	79.18	18.84	86.60	24.78	94.02	29.55
71.90	9.18	79.32	18.97	86.74	24.88	94.16	29.63
72.04	9.63	79.46	19.10	86.88	24.98	94.30	29.71
72.18	10.05	79.60	19.22	87.02	25.07	94.44	29.79
72.32	10.46	79.74	19.35	87.16	25.17	94.58	29.88
72.46	10.85	79.88	19.48	87.30	25.27	94.72	29.96
72.60	11.19	80.02	19.60	87.44	25.36	94.86	30.04
72.74	11.40	80.16	19.73	87.58	25.46	95.00	30.12
72.88	11.62	80.30	19.85	87.72	25.56	95.14	30.20
73.02	11.83	80.44	19.97	87.86	25.65	95.28	30.28
73.16	12.03	80.58	20.09	88.00	25.75	95.42	30.36
73.30	12.23	80.72	20.22	88.14	25.84	95.56	30.44
73.44	12.43	80.86	20.34	88.28	25.94	95.70	30.52
73.58	12.62	81.00	20.46	88.42	26.03	95.84	30.60
73.72	12.82	81.14	20.58	88.56	26.12	95.98	30.68
73.86	13.01	81.28	20.69	88.70	26.22	96.12	30.76
74.00	13.19	81.42	20.81	88.84	26.31	96.26	30.84
74.14	13.38	81.56	20.93	88.98	26.40	96.40	30.92
74.28	13.56	81.70	21.05	89.12	26.49	96.54	31.00

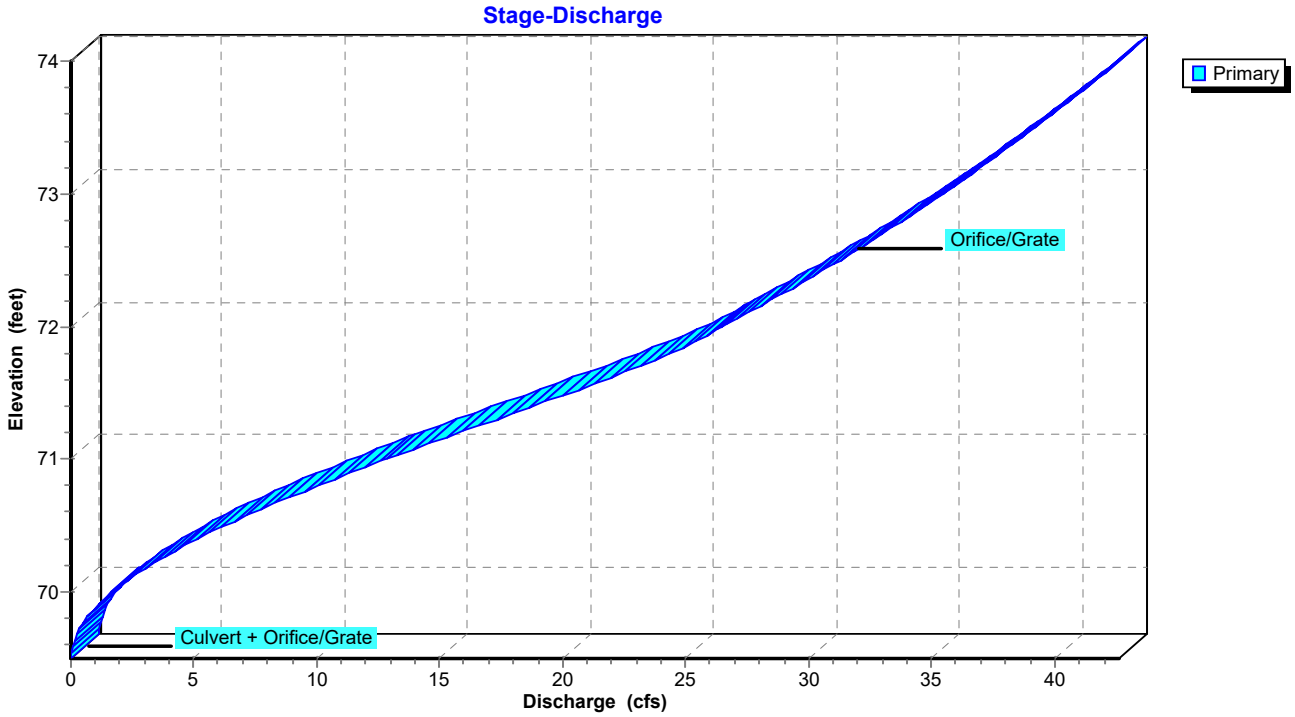
Stage-Discharge for Pond 4P: Modified Easterly Basin (continued)

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
96.68	31.08	104.10	35.00	111.52	38.52	118.94	41.75
96.82	31.16	104.24	35.07	111.66	38.59	119.08	41.81
96.96	31.24	104.38	35.14	111.80	38.65	119.22	41.87
97.10	31.31	104.52	35.21	111.94	38.71	119.36	41.93
97.24	31.39	104.66	35.28	112.08	38.78	119.50	41.98
97.38	31.47	104.80	35.35	112.22	38.84	119.64	42.04
97.52	31.55	104.94	35.42	112.36	38.90	119.78	42.10
97.66	31.62	105.08	35.49	112.50	38.96	119.92	42.16
97.80	31.70	105.22	35.55	112.64	39.03	120.06	42.22
97.94	31.78	105.36	35.62	112.78	39.09	120.20	42.27
98.08	31.86	105.50	35.69	112.92	39.15	120.34	42.33
98.22	31.93	105.64	35.76	113.06	39.22	120.48	42.39
98.36	32.01	105.78	35.83	113.20	39.28	120.62	42.45
98.50	32.09	105.92	35.90	113.34	39.34	120.76	42.50
98.64	32.16	106.06	35.96	113.48	39.40	120.90	42.56
98.78	32.24	106.20	36.03	113.62	39.46	121.04	42.62
98.92	32.31	106.34	36.10	113.76	39.53	121.18	42.68
99.06	32.39	106.48	36.17	113.90	39.59	121.32	42.73
99.20	32.46	106.62	36.23	114.04	39.65	121.46	42.79
99.34	32.54	106.76	36.30	114.18	39.71	121.60	42.85
99.48	32.61	106.90	36.37	114.32	39.77	121.74	42.91
99.62	32.69	107.04	36.44	114.46	39.83	121.88	42.96
99.76	32.76	107.18	36.50	114.60	39.89	122.02	43.02
99.90	32.84	107.32	36.57	114.74	39.96	122.16	43.08
100.04	32.91	107.46	36.64	114.88	40.02	122.30	43.13
100.18	32.99	107.60	36.70	115.02	40.08	122.44	43.19
100.32	33.06	107.74	36.77	115.16	40.14	122.58	43.25
100.46	33.13	107.88	36.84	115.30	40.20	122.72	43.30
100.60	33.21	108.02	36.90	115.44	40.26	122.86	43.36
100.74	33.28	108.16	36.97	115.58	40.32	123.00	43.42
100.88	33.36	108.30	37.04	115.72	40.38	123.14	43.47
101.02	33.43	108.44	37.10	115.86	40.44	123.28	43.53
101.16	33.50	108.58	37.17	116.00	40.50	123.42	43.58
101.30	33.57	108.72	37.23	116.14	40.56	123.56	43.64
101.44	33.65	108.86	37.30	116.28	40.62	123.70	43.70
101.58	33.72	109.00	37.36	116.42	40.68	123.84	43.75
101.72	33.79	109.14	37.43	116.56	40.74	123.98	43.81
101.86	33.86	109.28	37.49	116.70	40.80	124.12	43.86
102.00	33.94	109.42	37.56	116.84	40.86	124.26	43.92
102.14	34.01	109.56	37.62	116.98	40.92	124.40	43.97
102.28	34.08	109.70	37.69	117.12	40.98	124.54	44.03
102.42	34.15	109.84	37.75	117.26	41.04	124.68	44.09
102.56	34.22	109.98	37.82	117.40	41.10	124.82	44.14
102.70	34.29	110.12	37.88	117.54	41.16	124.96	44.20
102.84	34.37	110.26	37.95	117.68	41.22	125.10	44.25
102.98	34.44	110.40	38.01	117.82	41.28	125.24	44.31
103.12	34.51	110.54	38.08	117.96	41.34	125.38	44.36
103.26	34.58	110.68	38.14	118.10	41.40	125.52	44.42
103.40	34.65	110.82	38.20	118.24	41.46	125.66	44.47
103.54	34.72	110.96	38.27	118.38	41.52	125.80	44.53
103.68	34.79	111.10	38.33	118.52	41.57	125.94	44.58
103.82	34.86	111.24	38.40	118.66	41.63	126.08	44.64
103.96	34.93	111.38	38.46	118.80	41.69	126.22	44.69

Stage-Discharge for Pond 4P: Modified Easterly Basin (continued)

Elevation (feet)	Primary (cfs)
126.36	44.75
126.50	44.80
126.64	44.85
126.78	44.91
126.92	44.96
127.06	45.02
127.20	45.07
127.34	45.13
127.48	45.18
127.62	45.23
127.76	45.29
127.90	45.34
128.04	45.40
128.18	45.45
128.32	45.50
128.46	45.56
128.60	45.61
128.74	45.66
128.88	45.72
129.02	45.77
129.16	45.83
129.30	45.88
129.44	45.93
129.58	45.98
129.72	46.04
129.86	46.09
130.00	46.14
130.14	46.20
130.28	46.25
130.42	46.30
130.56	46.36
130.70	46.41
130.84	46.46
130.98	46.51
131.12	46.57
131.26	46.62
131.40	46.67
131.54	46.72
131.68	46.78
131.82	46.83
131.96	46.88
132.10	**46.93**

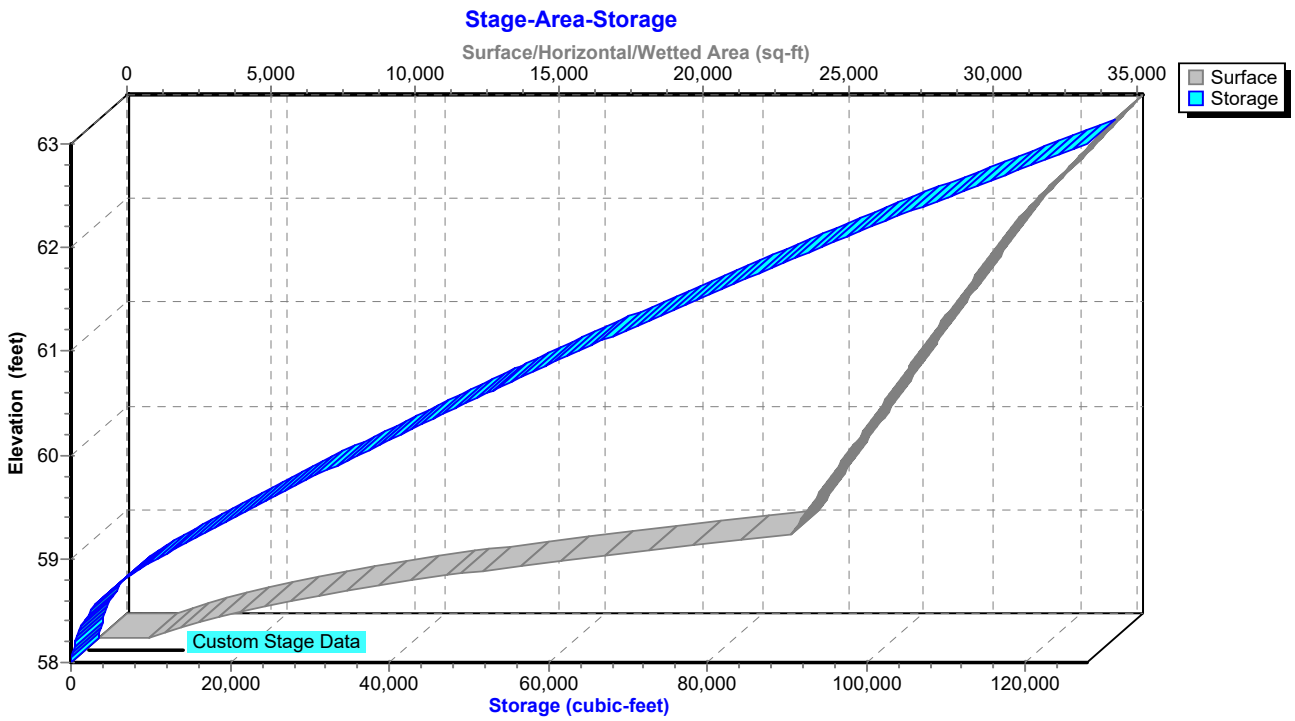
Pond 5P: Easterly Basin Extension



Stage-Discharge for Pond 5P: Easterly Basin Extension

Elevation (feet)	Primary (cfs)
69.50	0.00
69.60	0.07
69.70	0.28
69.80	0.62
69.90	1.09
70.00	1.68
70.10	2.39
70.20	3.21
70.30	4.12
70.40	5.14
70.50	6.24
70.60	7.43
70.70	8.69
70.80	10.01
70.90	11.39
71.00	12.82
71.10	14.29
71.20	15.78
71.30	17.28
71.40	18.79
71.50	20.27
71.60	21.72
71.70	23.10
71.80	24.40
71.90	25.54
72.00	26.43
72.10	27.46
72.20	28.46
72.30	29.43
72.40	30.36
72.50	31.27
72.60	32.15
72.70	33.01
72.80	33.84
72.90	34.66
73.00	35.45
73.10	36.23
73.20	37.00
73.30	37.74
73.40	38.48
73.50	39.19
73.60	39.90
73.70	40.60
73.80	41.28
73.90	41.95
74.00	**42.61**

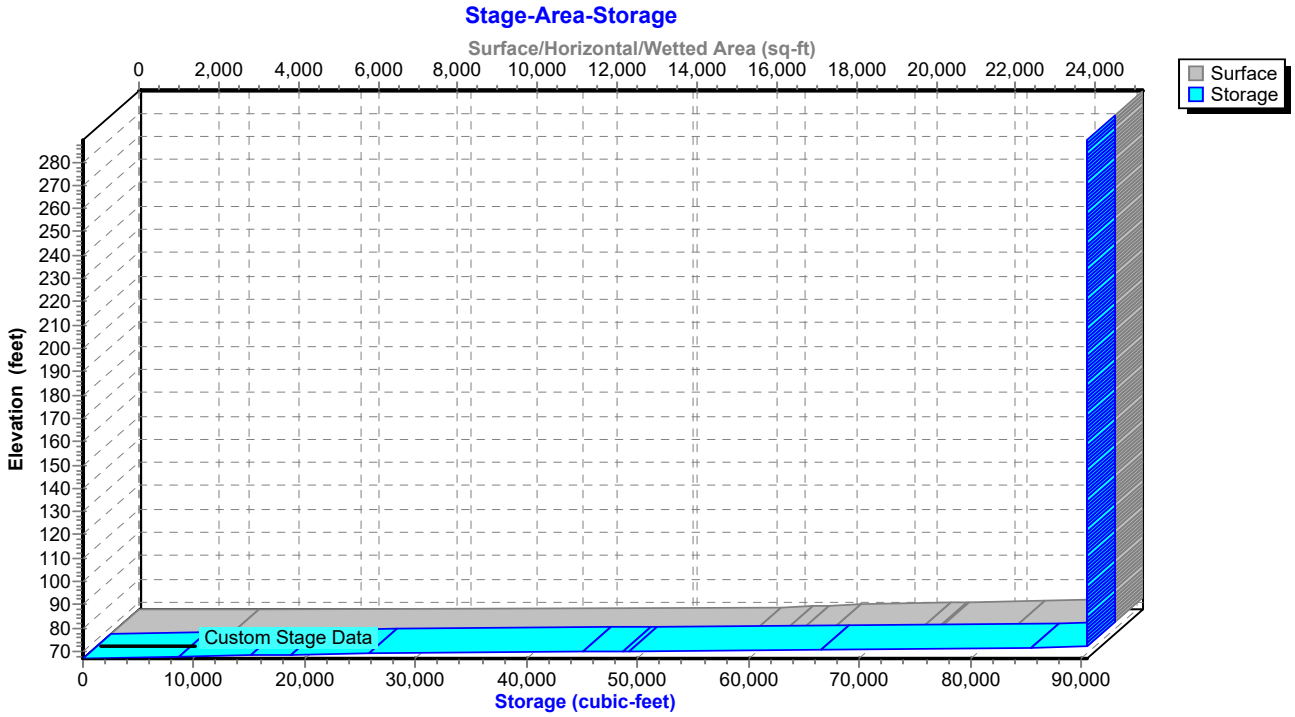
Pond 1P: Existing Southerly Basin



Stage-Area-Storage for Pond 1P: Existing Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,772	38,668
60.20	27,025	41,358
60.30	27,279	44,073
60.40	27,534	46,813
60.50	27,790	49,580
60.60	28,047	52,371
60.70	28,305	55,189
60.80	28,565	58,033
60.90	28,826	60,902
61.00	29,088	63,798
61.10	29,349	66,720
61.20	29,611	69,668
61.30	29,874	72,642
61.40	30,138	75,642
61.50	30,403	78,669
61.60	30,670	81,723
61.70	30,938	84,804
61.80	31,207	87,911
61.90	31,477	91,045
62.00	31,748	94,206
62.10	32,087	97,398
62.20	32,429	100,624
62.30	32,772	103,884
62.40	33,116	107,178
62.50	33,463	110,507
62.60	33,811	113,871
62.70	34,162	117,269
62.80	34,514	120,703
62.90	34,867	124,172
63.00	**35,223**	**127,677**

Pond 2P: Existing Easterly Basin



Stage-Area-Storage for Pond 2P: Existing Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0	90.85	25,192	90,538
67.45	7,644	2,324	91.30	25,192	90,538
67.90	14,348	7,193	91.75	25,192	90,538
68.35	16,808	14,478	92.20	25,192	90,538
68.80	17,710	22,244	92.65	25,192	90,538
69.25	18,669	30,425	93.10	25,192	90,538
69.70	19,679	39,052	93.55	25,192	90,538
70.15	20,713	48,140	94.00	25,192	90,538
70.60	21,764	57,696	94.45	25,192	90,538
71.05	22,841	67,732	94.90	25,192	90,538
71.50	23,940	78,256	95.35	25,192	90,538
71.95	25,065	89,281	95.80	25,192	90,538
72.40	**25,192**	**90,538**	96.25	25,192	90,538
72.85	25,192	90,538	96.70	25,192	90,538
73.30	25,192	90,538	97.15	25,192	90,538
73.75	25,192	90,538	97.60	25,192	90,538
74.20	25,192	90,538	98.05	25,192	90,538
74.65	25,192	90,538	98.50	25,192	90,538
75.10	25,192	90,538	98.95	25,192	90,538
75.55	25,192	90,538	99.40	25,192	90,538
76.00	25,192	90,538	99.85	25,192	90,538
76.45	25,192	90,538	100.30	25,192	90,538
76.90	25,192	90,538	100.75	25,192	90,538
77.35	25,192	90,538	101.20	25,192	90,538
77.80	25,192	90,538	101.65	25,192	90,538
78.25	25,192	90,538	102.10	25,192	90,538
78.70	25,192	90,538	102.55	25,192	90,538
79.15	25,192	90,538	103.00	25,192	90,538
79.60	25,192	90,538	103.45	25,192	90,538
80.05	25,192	90,538	103.90	25,192	90,538
80.50	25,192	90,538	104.35	25,192	90,538
80.95	25,192	90,538	104.80	25,192	90,538
81.40	25,192	90,538	105.25	25,192	90,538
81.85	25,192	90,538	105.70	25,192	90,538
82.30	25,192	90,538	106.15	25,192	90,538
82.75	25,192	90,538	106.60	25,192	90,538
83.20	25,192	90,538	107.05	25,192	90,538
83.65	25,192	90,538	107.50	25,192	90,538
84.10	25,192	90,538	107.95	25,192	90,538
84.55	25,192	90,538	108.40	25,192	90,538
85.00	25,192	90,538	108.85	25,192	90,538
85.45	25,192	90,538	109.30	25,192	90,538
85.90	25,192	90,538	109.75	25,192	90,538
86.35	25,192	90,538	110.20	25,192	90,538
86.80	25,192	90,538	110.65	25,192	90,538
87.25	25,192	90,538	111.10	25,192	90,538
87.70	25,192	90,538	111.55	25,192	90,538
88.15	25,192	90,538	112.00	25,192	90,538
88.60	25,192	90,538	112.45	25,192	90,538
89.05	25,192	90,538	112.90	25,192	90,538
89.50	25,192	90,538	113.35	25,192	90,538
89.95	25,192	90,538	113.80	25,192	90,538
90.40	25,192	90,538	114.25	25,192	90,538

Stage-Area-Storage for Pond 2P: Existing Easterly Basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
114.70	25,192	90,538	138.55	25,192	90,538
115.15	25,192	90,538	139.00	25,192	90,538
115.60	25,192	90,538	139.45	25,192	90,538
116.05	25,192	90,538	139.90	25,192	90,538
116.50	25,192	90,538	140.35	25,192	90,538
116.95	25,192	90,538	140.80	25,192	90,538
117.40	25,192	90,538	141.25	25,192	90,538
117.85	25,192	90,538	141.70	25,192	90,538
118.30	25,192	90,538	142.15	25,192	90,538
118.75	25,192	90,538	142.60	25,192	90,538
119.20	25,192	90,538	143.05	25,192	90,538
119.65	25,192	90,538	143.50	25,192	90,538
120.10	25,192	90,538	143.95	25,192	90,538
120.55	25,192	90,538	144.40	25,192	90,538
121.00	25,192	90,538	144.85	25,192	90,538
121.45	25,192	90,538	145.30	25,192	90,538
121.90	25,192	90,538	145.75	25,192	90,538
122.35	25,192	90,538	146.20	25,192	90,538
122.80	25,192	90,538	146.65	25,192	90,538
123.25	25,192	90,538	147.10	25,192	90,538
123.70	25,192	90,538	147.55	25,192	90,538
124.15	25,192	90,538	148.00	25,192	90,538
124.60	25,192	90,538	148.45	25,192	90,538
125.05	25,192	90,538	148.90	25,192	90,538
125.50	25,192	90,538	149.35	25,192	90,538
125.95	25,192	90,538	149.80	25,192	90,538
126.40	25,192	90,538	150.25	25,192	90,538
126.85	25,192	90,538	150.70	25,192	90,538
127.30	25,192	90,538	151.15	25,192	90,538
127.75	25,192	90,538	151.60	25,192	90,538
128.20	25,192	90,538	152.05	25,192	90,538
128.65	25,192	90,538	152.50	25,192	90,538
129.10	25,192	90,538	152.95	25,192	90,538
129.55	25,192	90,538	153.40	25,192	90,538
130.00	25,192	90,538	153.85	25,192	90,538
130.45	25,192	90,538	154.30	25,192	90,538
130.90	25,192	90,538	154.75	25,192	90,538
131.35	25,192	90,538	155.20	25,192	90,538
131.80	25,192	90,538	155.65	25,192	90,538
132.25	25,192	90,538	156.10	25,192	90,538
132.70	25,192	90,538	156.55	25,192	90,538
133.15	25,192	90,538	157.00	25,192	90,538
133.60	25,192	90,538	157.45	25,192	90,538
134.05	25,192	90,538	157.90	25,192	90,538
134.50	25,192	90,538	158.35	25,192	90,538
134.95	25,192	90,538	158.80	25,192	90,538
135.40	25,192	90,538	159.25	25,192	90,538
135.85	25,192	90,538	159.70	25,192	90,538
136.30	25,192	90,538	160.15	25,192	90,538
136.75	25,192	90,538	160.60	25,192	90,538
137.20	25,192	90,538	161.05	25,192	90,538
137.65	25,192	90,538	161.50	25,192	90,538
138.10	25,192	90,538	161.95	25,192	90,538

Stage-Area-Storage for Pond 2P: Existing Easterly Basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
162.40	25,192	90,538	186.25	25,192	90,538
162.85	25,192	90,538	186.70	25,192	90,538
163.30	25,192	90,538	187.15	25,192	90,538
163.75	25,192	90,538	187.60	25,192	90,538
164.20	25,192	90,538	188.05	25,192	90,538
164.65	25,192	90,538	188.50	25,192	90,538
165.10	25,192	90,538	188.95	25,192	90,538
165.55	25,192	90,538	189.40	25,192	90,538
166.00	25,192	90,538	189.85	25,192	90,538
166.45	25,192	90,538	190.30	25,192	90,538
166.90	25,192	90,538	190.75	25,192	90,538
167.35	25,192	90,538	191.20	25,192	90,538
167.80	25,192	90,538	191.65	25,192	90,538
168.25	25,192	90,538	192.10	25,192	90,538
168.70	25,192	90,538	192.55	25,192	90,538
169.15	25,192	90,538	193.00	25,192	90,538
169.60	25,192	90,538	193.45	25,192	90,538
170.05	25,192	90,538	193.90	25,192	90,538
170.50	25,192	90,538	194.35	25,192	90,538
170.95	25,192	90,538	194.80	25,192	90,538
171.40	25,192	90,538	195.25	25,192	90,538
171.85	25,192	90,538	195.70	25,192	90,538
172.30	25,192	90,538	196.15	25,192	90,538
172.75	25,192	90,538	196.60	25,192	90,538
173.20	25,192	90,538	197.05	25,192	90,538
173.65	25,192	90,538	197.50	25,192	90,538
174.10	25,192	90,538	197.95	25,192	90,538
174.55	25,192	90,538	198.40	25,192	90,538
175.00	25,192	90,538	198.85	25,192	90,538
175.45	25,192	90,538	199.30	25,192	90,538
175.90	25,192	90,538	199.75	25,192	90,538
176.35	25,192	90,538	200.20	25,192	90,538
176.80	25,192	90,538	200.65	25,192	90,538
177.25	25,192	90,538	201.10	25,192	90,538
177.70	25,192	90,538	201.55	25,192	90,538
178.15	25,192	90,538	202.00	25,192	90,538
178.60	25,192	90,538	202.45	25,192	90,538
179.05	25,192	90,538	202.90	25,192	90,538
179.50	25,192	90,538	203.35	25,192	90,538
179.95	25,192	90,538	203.80	25,192	90,538
180.40	25,192	90,538	204.25	25,192	90,538
180.85	25,192	90,538	204.70	25,192	90,538
181.30	25,192	90,538	205.15	25,192	90,538
181.75	25,192	90,538	205.60	25,192	90,538
182.20	25,192	90,538	206.05	25,192	90,538
182.65	25,192	90,538	206.50	25,192	90,538
183.10	25,192	90,538	206.95	25,192	90,538
183.55	25,192	90,538	207.40	25,192	90,538
184.00	25,192	90,538	207.85	25,192	90,538
184.45	25,192	90,538	208.30	25,192	90,538
184.90	25,192	90,538	208.75	25,192	90,538
185.35	25,192	90,538	209.20	25,192	90,538
185.80	25,192	90,538	209.65	25,192	90,538

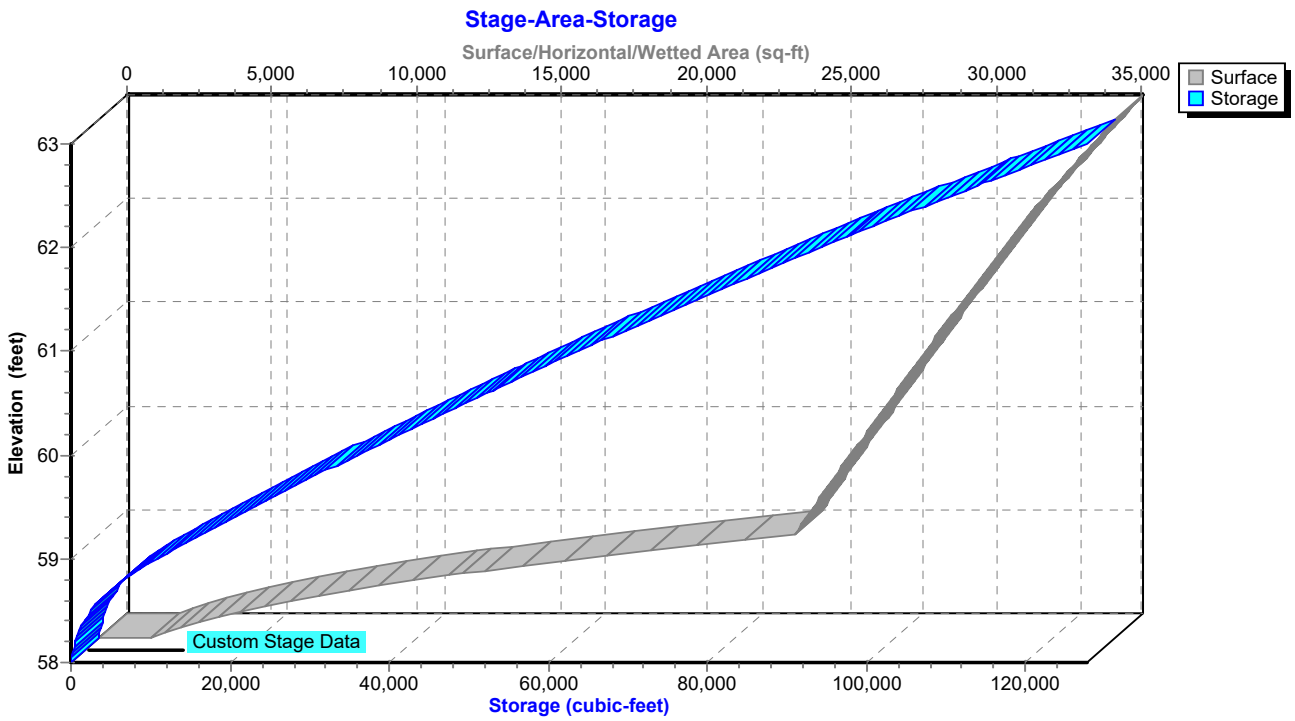
Stage-Area-Storage for Pond 2P: Existing Easterly Basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
210.10	25,192	90,538	233.95	25,192	90,538
210.55	25,192	90,538	234.40	25,192	90,538
211.00	25,192	90,538	234.85	25,192	90,538
211.45	25,192	90,538	235.30	25,192	90,538
211.90	25,192	90,538	235.75	25,192	90,538
212.35	25,192	90,538	236.20	25,192	90,538
212.80	25,192	90,538	236.65	25,192	90,538
213.25	25,192	90,538	237.10	25,192	90,538
213.70	25,192	90,538	237.55	25,192	90,538
214.15	25,192	90,538	238.00	25,192	90,538
214.60	25,192	90,538	238.45	25,192	90,538
215.05	25,192	90,538	238.90	25,192	90,538
215.50	25,192	90,538	239.35	25,192	90,538
215.95	25,192	90,538	239.80	25,192	90,538
216.40	25,192	90,538	240.25	25,192	90,538
216.85	25,192	90,538	240.70	25,192	90,538
217.30	25,192	90,538	241.15	25,192	90,538
217.75	25,192	90,538	241.60	25,192	90,538
218.20	25,192	90,538	242.05	25,192	90,538
218.65	25,192	90,538	242.50	25,192	90,538
219.10	25,192	90,538	242.95	25,192	90,538
219.55	25,192	90,538	243.40	25,192	90,538
220.00	25,192	90,538	243.85	25,192	90,538
220.45	25,192	90,538	244.30	25,192	90,538
220.90	25,192	90,538	244.75	25,192	90,538
221.35	25,192	90,538	245.20	25,192	90,538
221.80	25,192	90,538	245.65	25,192	90,538
222.25	25,192	90,538	246.10	25,192	90,538
222.70	25,192	90,538	246.55	25,192	90,538
223.15	25,192	90,538	247.00	25,192	90,538
223.60	25,192	90,538	247.45	25,192	90,538
224.05	25,192	90,538	247.90	25,192	90,538
224.50	25,192	90,538	248.35	25,192	90,538
224.95	25,192	90,538	248.80	25,192	90,538
225.40	25,192	90,538	249.25	25,192	90,538
225.85	25,192	90,538	249.70	25,192	90,538
226.30	25,192	90,538	250.15	25,192	90,538
226.75	25,192	90,538	250.60	25,192	90,538
227.20	25,192	90,538	251.05	25,192	90,538
227.65	25,192	90,538	251.50	25,192	90,538
228.10	25,192	90,538	251.95	25,192	90,538
228.55	25,192	90,538	252.40	25,192	90,538
229.00	25,192	90,538	252.85	25,192	90,538
229.45	25,192	90,538	253.30	25,192	90,538
229.90	25,192	90,538	253.75	25,192	90,538
230.35	25,192	90,538	254.20	25,192	90,538
230.80	25,192	90,538	254.65	25,192	90,538
231.25	25,192	90,538	255.10	25,192	90,538
231.70	25,192	90,538	255.55	25,192	90,538
232.15	25,192	90,538	256.00	25,192	90,538
232.60	25,192	90,538	256.45	25,192	90,538
233.05	25,192	90,538	256.90	25,192	90,538
233.50	25,192	90,538	257.35	25,192	90,538

Stage-Area-Storage for Pond 2P: Existing Easterly Basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
257.80	25,192	90,538
258.25	25,192	90,538
258.70	25,192	90,538
259.15	25,192	90,538
259.60	25,192	90,538
260.05	25,192	90,538
260.50	25,192	90,538
260.95	25,192	90,538
261.40	25,192	90,538
261.85	25,192	90,538
262.30	25,192	90,538
262.75	25,192	90,538
263.20	25,192	90,538
263.65	25,192	90,538
264.10	25,192	90,538
264.55	25,192	90,538
265.00	25,192	90,538
265.45	25,192	90,538
265.90	25,192	90,538
266.35	25,192	90,538
266.80	25,192	90,538
267.25	25,192	90,538
267.70	25,192	90,538
268.15	25,192	90,538
268.60	25,192	90,538
269.05	25,192	90,538
269.50	25,192	90,538
269.95	25,192	90,538
270.40	25,192	90,538
270.85	25,192	90,538
271.30	25,192	90,538
271.75	25,192	90,538
272.20	25,192	90,538
272.65	25,192	90,538
273.10	25,192	90,538
273.55	25,192	90,538
274.00	25,192	90,538
274.45	25,192	90,538
274.90	25,192	90,538
275.35	25,192	90,538
275.80	25,192	90,538
276.25	25,192	90,538
276.70	25,192	90,538
277.15	25,192	90,538
277.60	25,192	90,538
278.05	25,192	90,538
278.50	25,192	90,538
278.95	25,192	90,538
279.40	25,192	90,538
279.85	25,192	90,538
280.30	25,192	90,538
280.75	25,192	90,538
281.20	25,192	90,538
281.65	25,192	90,538
282.10	25,192	90,538
282.55	25,192	90,538
283.00	25,192	90,538
283.45	25,192	90,538
283.90	25,192	90,538
284.35	25,192	90,538
284.80	25,192	90,538
285.25	25,192	90,538
285.70	25,192	90,538
286.15	25,192	90,538
286.60	25,192	90,538
287.05	25,192	90,538
287.50	25,192	90,538
287.95	25,192	90,538
288.40	25,192	90,538
288.85	25,192	90,538
289.30	25,192	90,538

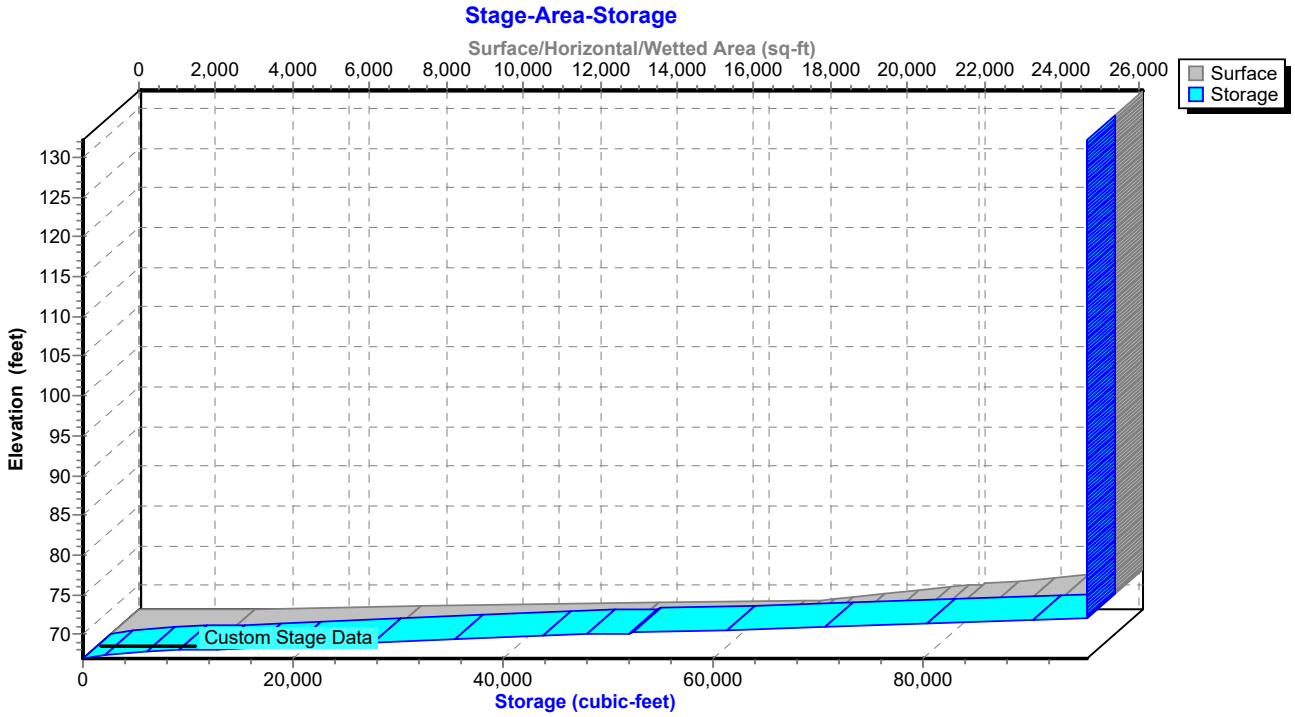
Pond 3P: Modified Southerly Basin



Stage-Area-Storage for Pond 3P: Modified Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,777	38,668
60.20	27,034	41,359
60.30	27,292	44,075
60.40	27,551	46,817
60.50	27,812	49,585
60.60	28,073	52,379
60.70	28,337	55,200
60.80	28,601	58,047
60.90	28,866	60,920
61.00	29,133	63,820
61.10	29,398	66,747
61.20	29,664	69,700
61.30	29,932	72,679
61.40	30,200	75,686
61.50	30,470	78,719
61.60	30,741	81,780
61.70	31,013	84,868
61.80	31,287	87,983
61.90	31,561	91,125
62.00	31,837	94,295
62.10	32,151	97,494
62.20	32,466	100,725
62.30	32,782	103,988
62.40	33,101	107,282
62.50	33,420	110,608
62.60	33,742	113,966
62.70	34,064	117,356
62.80	34,389	120,779
62.90	34,715	124,234
63.00	**35,042**	**127,722**

Pond 4P: Modified Easterly Basin



Stage-Area-Storage for Pond 4P: Modified Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0	74.42	26,126	95,725
67.14	4,329	513	74.56	26,126	95,725
67.28	5,854	1,223	74.70	26,126	95,725
67.42	7,609	2,163	74.84	26,126	95,725
67.56	9,595	3,364	74.98	26,126	95,725
67.70	11,810	4,860	75.12	26,126	95,725
67.84	14,254	6,682	75.26	26,126	95,725
67.98	16,929	8,862	75.40	26,126	95,725
68.12	17,574	11,299	75.54	26,126	95,725
68.26	17,860	13,779	75.68	26,126	95,725
68.40	18,149	16,299	75.82	26,126	95,725
68.54	18,440	18,861	75.96	26,126	95,725
68.68	18,734	21,463	76.10	26,126	95,725
68.82	19,029	24,106	76.24	26,126	95,725
68.96	19,327	26,791	76.38	26,126	95,725
69.10	19,626	29,518	76.52	26,126	95,725
69.24	19,927	32,287	76.66	26,126	95,725
69.38	20,229	35,097	76.80	26,126	95,725
69.52	20,534	37,951	76.94	26,126	95,725
69.66	20,841	40,847	77.08	26,126	95,725
69.80	21,151	43,787	77.22	26,126	95,725
69.94	21,463	46,769	77.36	26,126	95,725
70.08	21,771	49,796	77.50	26,126	95,725
70.22	22,077	52,865	77.64	26,126	95,725
70.36	22,385	55,978	77.78	26,126	95,725
70.50	22,695	59,133	77.92	26,126	95,725
70.64	23,007	62,332	78.06	26,126	95,725
70.78	23,322	65,575	78.20	26,126	95,725
70.92	23,638	68,862	78.34	26,126	95,725
71.06	23,955	72,194	78.48	26,126	95,725
71.20	24,273	75,570	78.62	26,126	95,725
71.34	24,592	78,990	78.76	26,126	95,725
71.48	24,914	82,456	78.90	26,126	95,725
71.62	25,237	85,966	79.04	26,126	95,725
71.76	25,563	89,522	79.18	26,126	95,725
71.90	25,891	93,124	79.32	26,126	95,725
72.04	**26,126**	**95,725**	79.46	26,126	95,725
72.18	26,126	95,725	79.60	26,126	95,725
72.32	26,126	95,725	79.74	26,126	95,725
72.46	26,126	95,725	79.88	26,126	95,725
72.60	26,126	95,725	80.02	26,126	95,725
72.74	26,126	95,725	80.16	26,126	95,725
72.88	26,126	95,725	80.30	26,126	95,725
73.02	26,126	95,725	80.44	26,126	95,725
73.16	26,126	95,725	80.58	26,126	95,725
73.30	26,126	95,725	80.72	26,126	95,725
73.44	26,126	95,725	80.86	26,126	95,725
73.58	26,126	95,725	81.00	26,126	95,725
73.72	26,126	95,725	81.14	26,126	95,725
73.86	26,126	95,725	81.28	26,126	95,725
74.00	26,126	95,725	81.42	26,126	95,725
74.14	26,126	95,725	81.56	26,126	95,725
74.28	26,126	95,725	81.70	26,126	95,725

Stage-Area-Storage for Pond 4P: Modified Easterly Basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
81.84	26,126	95,725	89.26	26,126	95,725
81.98	26,126	95,725	89.40	26,126	95,725
82.12	26,126	95,725	89.54	26,126	95,725
82.26	26,126	95,725	89.68	26,126	95,725
82.40	26,126	95,725	89.82	26,126	95,725
82.54	26,126	95,725	89.96	26,126	95,725
82.68	26,126	95,725	90.10	26,126	95,725
82.82	26,126	95,725	90.24	26,126	95,725
82.96	26,126	95,725	90.38	26,126	95,725
83.10	26,126	95,725	90.52	26,126	95,725
83.24	26,126	95,725	90.66	26,126	95,725
83.38	26,126	95,725	90.80	26,126	95,725
83.52	26,126	95,725	90.94	26,126	95,725
83.66	26,126	95,725	91.08	26,126	95,725
83.80	26,126	95,725	91.22	26,126	95,725
83.94	26,126	95,725	91.36	26,126	95,725
84.08	26,126	95,725	91.50	26,126	95,725
84.22	26,126	95,725	91.64	26,126	95,725
84.36	26,126	95,725	91.78	26,126	95,725
84.50	26,126	95,725	91.92	26,126	95,725
84.64	26,126	95,725	92.06	26,126	95,725
84.78	26,126	95,725	92.20	26,126	95,725
84.92	26,126	95,725	92.34	26,126	95,725
85.06	26,126	95,725	92.48	26,126	95,725
85.20	26,126	95,725	92.62	26,126	95,725
85.34	26,126	95,725	92.76	26,126	95,725
85.48	26,126	95,725	92.90	26,126	95,725
85.62	26,126	95,725	93.04	26,126	95,725
85.76	26,126	95,725	93.18	26,126	95,725
85.90	26,126	95,725	93.32	26,126	95,725
86.04	26,126	95,725	93.46	26,126	95,725
86.18	26,126	95,725	93.60	26,126	95,725
86.32	26,126	95,725	93.74	26,126	95,725
86.46	26,126	95,725	93.88	26,126	95,725
86.60	26,126	95,725	94.02	26,126	95,725
86.74	26,126	95,725	94.16	26,126	95,725
86.88	26,126	95,725	94.30	26,126	95,725
87.02	26,126	95,725	94.44	26,126	95,725
87.16	26,126	95,725	94.58	26,126	95,725
87.30	26,126	95,725	94.72	26,126	95,725
87.44	26,126	95,725	94.86	26,126	95,725
87.58	26,126	95,725	95.00	26,126	95,725
87.72	26,126	95,725	95.14	26,126	95,725
87.86	26,126	95,725	95.28	26,126	95,725
88.00	26,126	95,725	95.42	26,126	95,725
88.14	26,126	95,725	95.56	26,126	95,725
88.28	26,126	95,725	95.70	26,126	95,725
88.42	26,126	95,725	95.84	26,126	95,725
88.56	26,126	95,725	95.98	26,126	95,725
88.70	26,126	95,725	96.12	26,126	95,725
88.84	26,126	95,725	96.26	26,126	95,725
88.98	26,126	95,725	96.40	26,126	95,725
89.12	26,126	95,725	96.54	26,126	95,725

Stage-Area-Storage for Pond 4P: Modified Easterly Basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
96.68	26,126	95,725	104.10	26,126	95,725
96.82	26,126	95,725	104.24	26,126	95,725
96.96	26,126	95,725	104.38	26,126	95,725
97.10	26,126	95,725	104.52	26,126	95,725
97.24	26,126	95,725	104.66	26,126	95,725
97.38	26,126	95,725	104.80	26,126	95,725
97.52	26,126	95,725	104.94	26,126	95,725
97.66	26,126	95,725	105.08	26,126	95,725
97.80	26,126	95,725	105.22	26,126	95,725
97.94	26,126	95,725	105.36	26,126	95,725
98.08	26,126	95,725	105.50	26,126	95,725
98.22	26,126	95,725	105.64	26,126	95,725
98.36	26,126	95,725	105.78	26,126	95,725
98.50	26,126	95,725	105.92	26,126	95,725
98.64	26,126	95,725	106.06	26,126	95,725
98.78	26,126	95,725	106.20	26,126	95,725
98.92	26,126	95,725	106.34	26,126	95,725
99.06	26,126	95,725	106.48	26,126	95,725
99.20	26,126	95,725	106.62	26,126	95,725
99.34	26,126	95,725	106.76	26,126	95,725
99.48	26,126	95,725	106.90	26,126	95,725
99.62	26,126	95,725	107.04	26,126	95,725
99.76	26,126	95,725	107.18	26,126	95,725
99.90	26,126	95,725	107.32	26,126	95,725
100.04	26,126	95,725	107.46	26,126	95,725
100.18	26,126	95,725	107.60	26,126	95,725
100.32	26,126	95,725	107.74	26,126	95,725
100.46	26,126	95,725	107.88	26,126	95,725
100.60	26,126	95,725	108.02	26,126	95,725
100.74	26,126	95,725	108.16	26,126	95,725
100.88	26,126	95,725	108.30	26,126	95,725
101.02	26,126	95,725	108.44	26,126	95,725
101.16	26,126	95,725	108.58	26,126	95,725
101.30	26,126	95,725	108.72	26,126	95,725
101.44	26,126	95,725	108.86	26,126	95,725
101.58	26,126	95,725	109.00	26,126	95,725
101.72	26,126	95,725	109.14	26,126	95,725
101.86	26,126	95,725	109.28	26,126	95,725
102.00	26,126	95,725	109.42	26,126	95,725
102.14	26,126	95,725	109.56	26,126	95,725
102.28	26,126	95,725	109.70	26,126	95,725
102.42	26,126	95,725	109.84	26,126	95,725
102.56	26,126	95,725	109.98	26,126	95,725
102.70	26,126	95,725	110.12	26,126	95,725
102.84	26,126	95,725	110.26	26,126	95,725
102.98	26,126	95,725	110.40	26,126	95,725
103.12	26,126	95,725	110.54	26,126	95,725
103.26	26,126	95,725	110.68	26,126	95,725
103.40	26,126	95,725	110.82	26,126	95,725
103.54	26,126	95,725	110.96	26,126	95,725
103.68	26,126	95,725	111.10	26,126	95,725
103.82	26,126	95,725	111.24	26,126	95,725
103.96	26,126	95,725	111.38	26,126	95,725

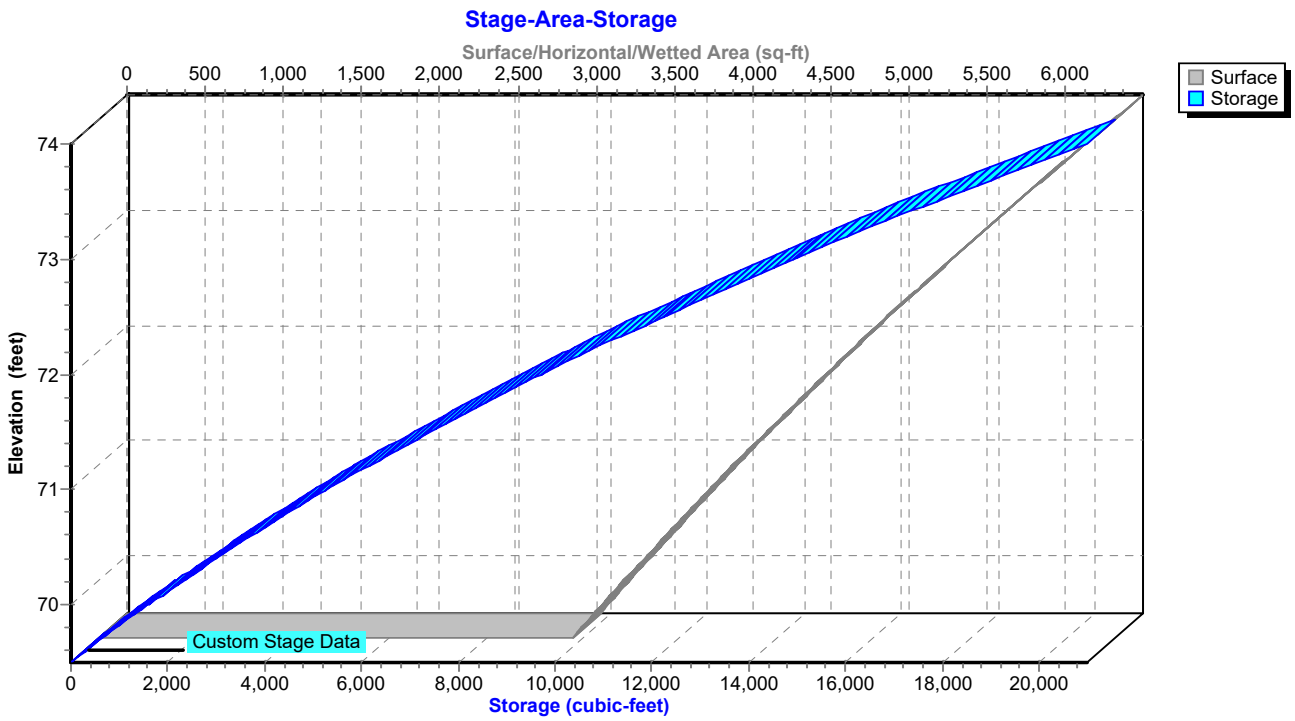
Stage-Area-Storage for Pond 4P: Modified Easterly Basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
111.52	26,126	95,725	118.94	26,126	95,725
111.66	26,126	95,725	119.08	26,126	95,725
111.80	26,126	95,725	119.22	26,126	95,725
111.94	26,126	95,725	119.36	26,126	95,725
112.08	26,126	95,725	119.50	26,126	95,725
112.22	26,126	95,725	119.64	26,126	95,725
112.36	26,126	95,725	119.78	26,126	95,725
112.50	26,126	95,725	119.92	26,126	95,725
112.64	26,126	95,725	120.06	26,126	95,725
112.78	26,126	95,725	120.20	26,126	95,725
112.92	26,126	95,725	120.34	26,126	95,725
113.06	26,126	95,725	120.48	26,126	95,725
113.20	26,126	95,725	120.62	26,126	95,725
113.34	26,126	95,725	120.76	26,126	95,725
113.48	26,126	95,725	120.90	26,126	95,725
113.62	26,126	95,725	121.04	26,126	95,725
113.76	26,126	95,725	121.18	26,126	95,725
113.90	26,126	95,725	121.32	26,126	95,725
114.04	26,126	95,725	121.46	26,126	95,725
114.18	26,126	95,725	121.60	26,126	95,725
114.32	26,126	95,725	121.74	26,126	95,725
114.46	26,126	95,725	121.88	26,126	95,725
114.60	26,126	95,725	122.02	26,126	95,725
114.74	26,126	95,725	122.16	26,126	95,725
114.88	26,126	95,725	122.30	26,126	95,725
115.02	26,126	95,725	122.44	26,126	95,725
115.16	26,126	95,725	122.58	26,126	95,725
115.30	26,126	95,725	122.72	26,126	95,725
115.44	26,126	95,725	122.86	26,126	95,725
115.58	26,126	95,725	123.00	26,126	95,725
115.72	26,126	95,725	123.14	26,126	95,725
115.86	26,126	95,725	123.28	26,126	95,725
116.00	26,126	95,725	123.42	26,126	95,725
116.14	26,126	95,725	123.56	26,126	95,725
116.28	26,126	95,725	123.70	26,126	95,725
116.42	26,126	95,725	123.84	26,126	95,725
116.56	26,126	95,725	123.98	26,126	95,725
116.70	26,126	95,725	124.12	26,126	95,725
116.84	26,126	95,725	124.26	26,126	95,725
116.98	26,126	95,725	124.40	26,126	95,725
117.12	26,126	95,725	124.54	26,126	95,725
117.26	26,126	95,725	124.68	26,126	95,725
117.40	26,126	95,725	124.82	26,126	95,725
117.54	26,126	95,725	124.96	26,126	95,725
117.68	26,126	95,725	125.10	26,126	95,725
117.82	26,126	95,725	125.24	26,126	95,725
117.96	26,126	95,725	125.38	26,126	95,725
118.10	26,126	95,725	125.52	26,126	95,725
118.24	26,126	95,725	125.66	26,126	95,725
118.38	26,126	95,725	125.80	26,126	95,725
118.52	26,126	95,725	125.94	26,126	95,725
118.66	26,126	95,725	126.08	26,126	95,725
118.80	26,126	95,725	126.22	26,126	95,725

Stage-Area-Storage for Pond 4P: Modified Easterly Basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
126.36	26,126	95,725
126.50	26,126	95,725
126.64	26,126	95,725
126.78	26,126	95,725
126.92	26,126	95,725
127.06	26,126	95,725
127.20	26,126	95,725
127.34	26,126	95,725
127.48	26,126	95,725
127.62	26,126	95,725
127.76	26,126	95,725
127.90	26,126	95,725
128.04	26,126	95,725
128.18	26,126	95,725
128.32	26,126	95,725
128.46	26,126	95,725
128.60	26,126	95,725
128.74	26,126	95,725
128.88	26,126	95,725
129.02	26,126	95,725
129.16	26,126	95,725
129.30	26,126	95,725
129.44	26,126	95,725
129.58	26,126	95,725
129.72	26,126	95,725
129.86	26,126	95,725
130.00	26,126	95,725
130.14	26,126	95,725
130.28	26,126	95,725
130.42	26,126	95,725
130.56	26,126	95,725
130.70	26,126	95,725
130.84	26,126	95,725
130.98	26,126	95,725
131.12	26,126	95,725
131.26	26,126	95,725
131.40	26,126	95,725
131.54	26,126	95,725
131.68	26,126	95,725
131.82	26,126	95,725
131.96	26,126	95,725
132.10	26,126	95,725

Pond 5P: Easterly Basin Extension



Stage-Area-Storage for Pond 5P: Easterly Basin Extension

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
69.50	3,027	0
69.60	3,091	306
69.70	3,157	618
69.80	3,222	937
69.90	3,289	1,263
70.00	3,356	1,595
70.10	3,423	1,934
70.20	3,491	2,280
70.30	3,559	2,632
70.40	3,628	2,991
70.50	3,698	3,358
70.60	3,768	3,731
70.70	3,839	4,111
70.80	3,911	4,499
70.90	3,983	4,894
71.00	4,056	5,296
71.10	4,129	5,705
71.20	4,202	6,121
71.30	4,276	6,545
71.40	4,351	6,977
71.50	4,426	7,415
71.60	4,502	7,862
71.70	4,578	8,316
71.80	4,656	8,777
71.90	4,733	9,247
72.00	4,812	9,724
72.10	4,890	10,209
72.20	4,970	10,702
72.30	5,049	11,203
72.40	5,130	11,712
72.50	5,211	12,229
72.60	5,292	12,754
72.70	5,374	13,288
72.80	5,457	13,829
72.90	5,541	14,379
73.00	5,625	14,937
73.10	5,709	15,504
73.20	5,794	16,079
73.30	5,879	16,663
73.40	5,965	17,255
73.50	6,052	17,856
73.60	6,139	18,465
73.70	6,227	19,084
73.80	6,315	19,711
73.90	6,404	20,347
74.00	**6,494**	**20,992**

APPENDIX I-6
WQ STORM EVENT HYDROGRAPHS

Summary for Subcatchment E-1: Existing Area Tributary to Southerly Basin

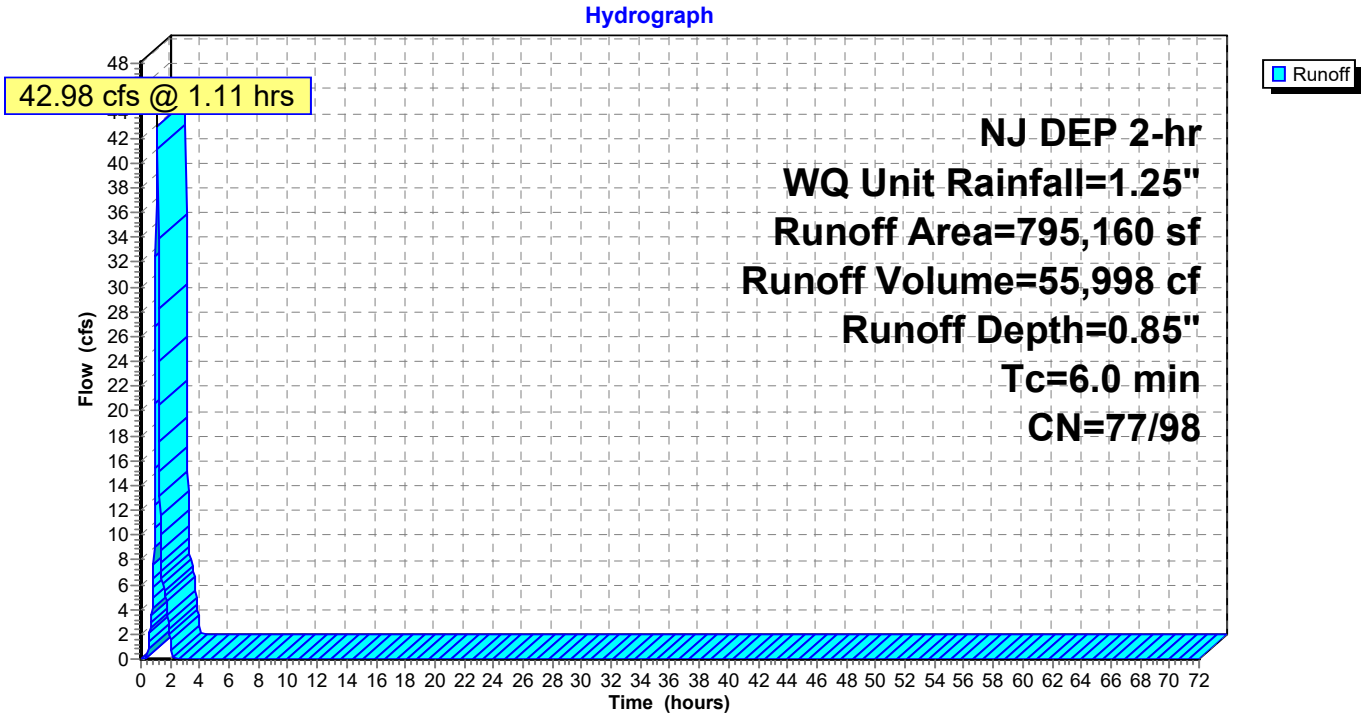
Runoff = 42.98 cfs @ 1.11 hrs, Volume= 55,998 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
630,944	98	Paved parking, HSG D
85,682	74	>75% Grass cover, Good, HSG C
78,534	80	>75% Grass cover, Good, HSG D
795,160	94	Weighted Average
164,216	77	20.65% Pervious Area
630,944	98	79.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-1: Existing Area Tributary to Southerly Basin



Summary for Subcatchment E-2: Existing Area Tributary to Easterly Basin

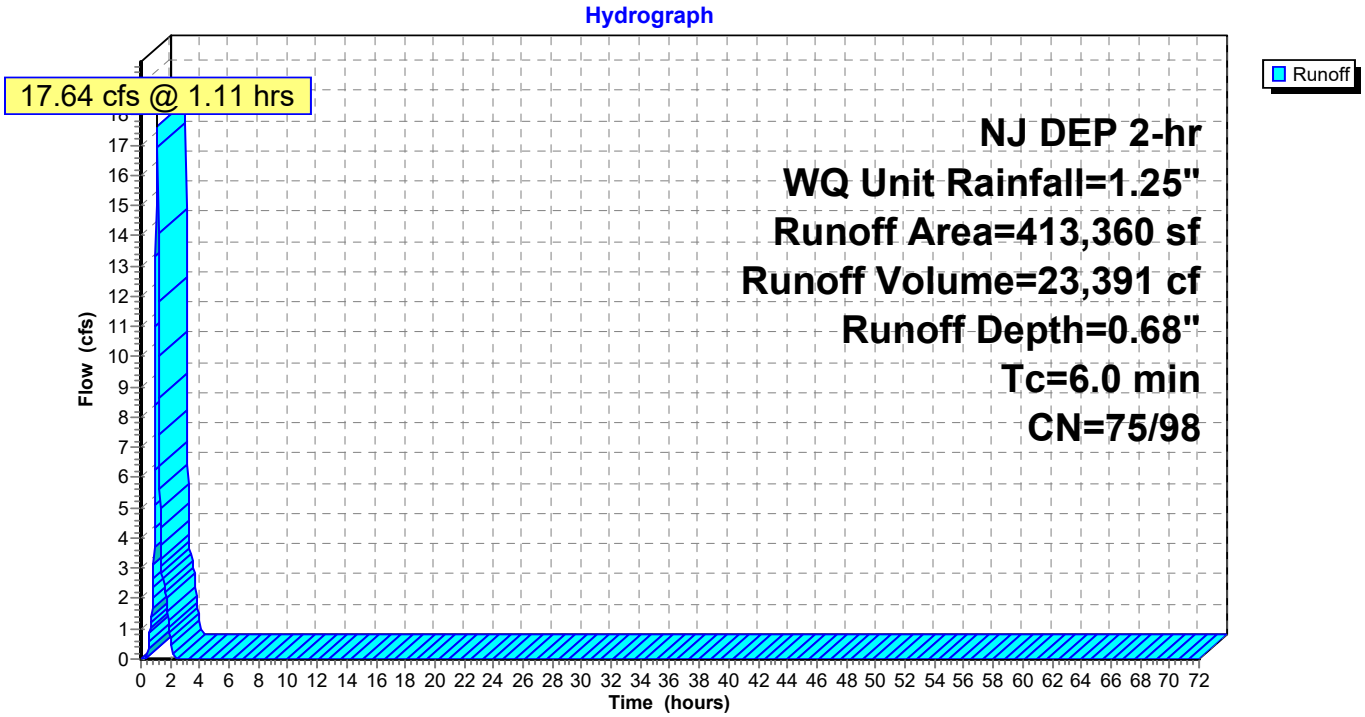
Runoff = 17.64 cfs @ 1.11 hrs, Volume= 23,391 cf, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
258,284	98	Paved parking, HSG D
125,156	74	>75% Grass cover, Good, HSG C
29,920	80	>75% Grass cover, Good, HSG D
413,360	89	Weighted Average
155,076	75	37.52% Pervious Area
258,284	98	62.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment E-2: Existing Area Tributary to Easterly Basin



Summary for Subcatchment P-1: Proposed Area Tributary to 42" RCP

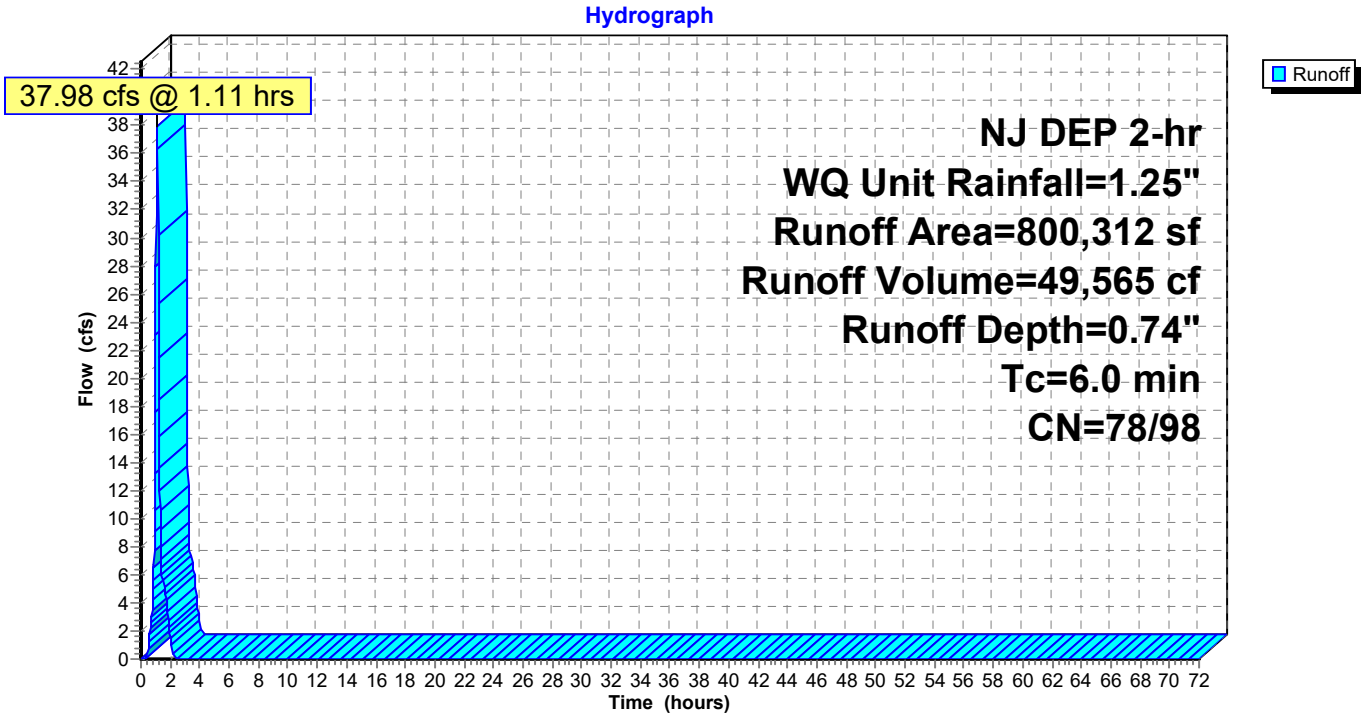
Runoff = 37.98 cfs @ 1.11 hrs, Volume= 49,565 cf, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
541,322	98	Paved parking, HSG D
89,531	74	>75% Grass cover, Good, HSG C
169,459	80	>75% Grass cover, Good, HSG D
800,312	92	Weighted Average
258,990	78	32.36% Pervious Area
541,322	98	67.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-1: Proposed Area Tributary to 42" RCP



Summary for Subcatchment P-2A: Area Tributary to 18" RCP

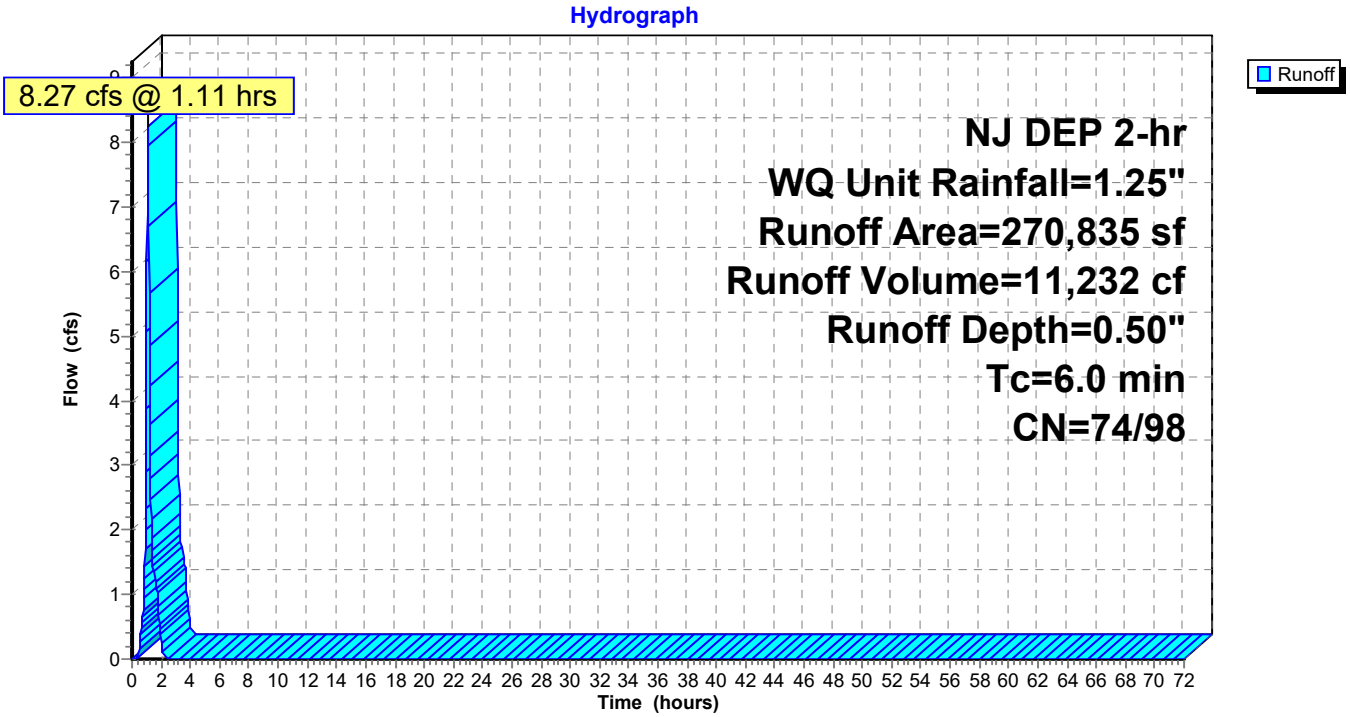
Runoff = 8.27 cfs @ 1.11 hrs, Volume= 11,232 cf, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
119,490	98	Paved parking, HSG D
141,387	74	>75% Grass cover, Good, HSG C
9,958	80	>75% Grass cover, Good, HSG D
270,835	85	Weighted Average
151,345	74	55.88% Pervious Area
119,490	98	44.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2A: Area Tributary to 18" RCP



Summary for Subcatchment P-2B: Proposed Area Tributary to Basin Extension

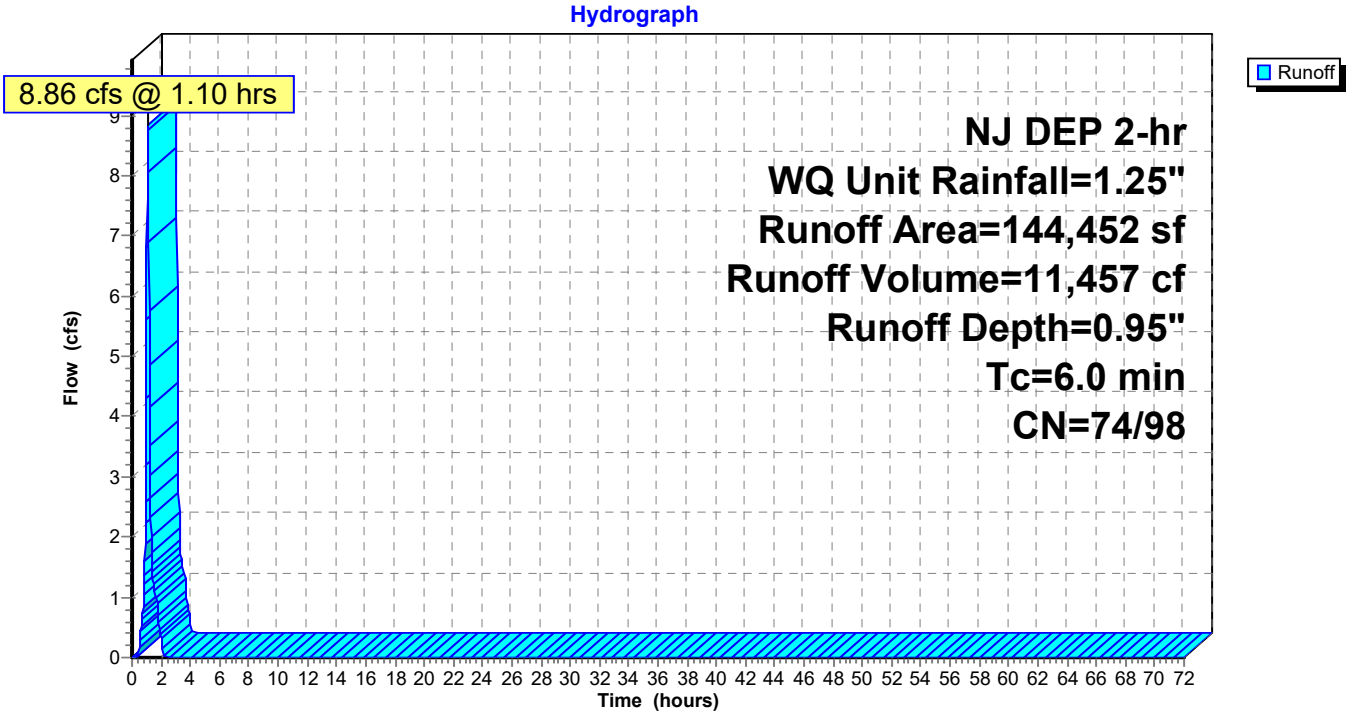
Runoff = 8.86 cfs @ 1.10 hrs, Volume= 11,457 cf, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
NJ DEP 2-hr WQ Unit Rainfall=1.25"

Area (sf)	CN	Description
132,000	98	Paved parking, HSG D
12,452	74	>75% Grass cover, Good, HSG C
144,452	96	Weighted Average
12,452	74	8.62% Pervious Area
132,000	98	91.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Minimum Time of Concentration**

Subcatchment P-2B: Proposed Area Tributary to Basin Extension



Summary for Pond 1P: Existing Southerly Basin

Inflow Area =	795,160 sf,	79.35% Impervious,	Inflow Depth =	0.85"	for WQ Unit event
Inflow =	42.98 cfs @	1.11 hrs,	Volume=	55,998 cf	
Outflow =	1.65 cfs @	1.95 hrs,	Volume=	51,787 cf,	Atten= 96%, Lag= 50.5 min
Primary =	1.23 cfs @	1.95 hrs,	Volume=	51,163 cf	
Secondary =	0.42 cfs @	1.95 hrs,	Volume=	624 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 60.56' @ 1.95 hrs Surf.Area= 27,939 sf Storage= 51,199 cf

Plug-Flow detention time= 484.2 min calculated for 51,773 cf (92% of inflow)
Center-of-Mass det. time= 482.0 min (552.7 - 70.7)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,677 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

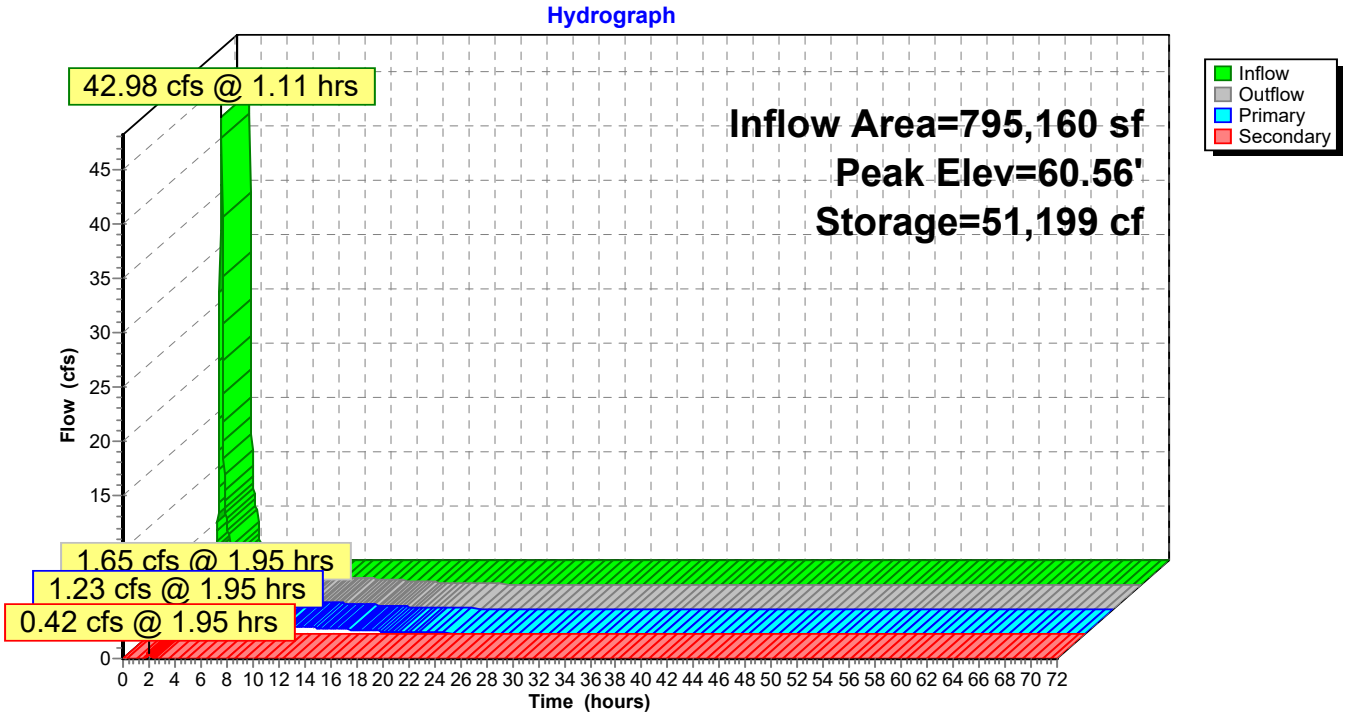
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,088	875.0	27,795	63,798	60,199
62.00	31,748	882.0	30,408	94,206	61,514
63.00	35,223	930.0	33,470	127,677	68,495

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	60.50'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.50 2.50 Width (feet) 9.00 12.50 27.00 38.00

Primary OutFlow Max=1.23 cfs @ 1.95 hrs HW=60.56' (Free Discharge)
└─**1=Culvert** (Passes 1.23 cfs of 14.75 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.23 cfs @ 6.26 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.42 cfs @ 1.95 hrs HW=60.56' (Free Discharge)
└─**4=Emergency Spillway** (Weir Controls 0.42 cfs @ 0.79 fps)

Pond 1P: Existing Southerly Basin



Summary for Pond 2P: Existing Easterly Basin

Inflow Area = 413,360 sf, 62.48% Impervious, Inflow Depth = 0.68" for WQ Unit event
Inflow = 17.64 cfs @ 1.11 hrs, Volume= 23,391 cf
Outflow = 0.50 cfs @ 2.06 hrs, Volume= 7,935 cf, Atten= 97%, Lag= 57.2 min
Primary = 0.50 cfs @ 2.06 hrs, Volume= 7,935 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 68.80' @ 2.06 hrs Surf.Area= 17,720 sf Storage= 22,325 cf

Plug-Flow detention time= 462.5 min calculated for 7,935 cf (34% of inflow)
Center-of-Mass det. time= 447.4 min (518.5 - 71.1)

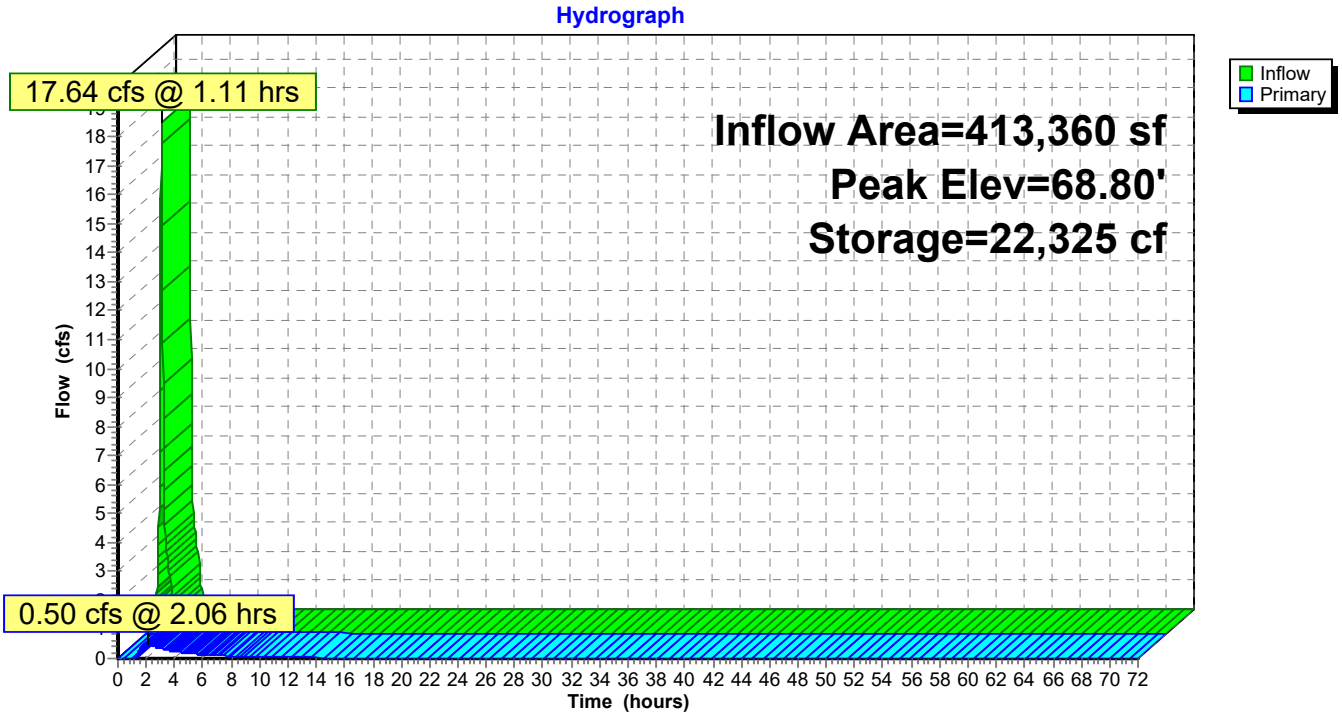
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	90,538 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	16,122	665.0	8,716	8,716	29,510
69.00	18,119	699.0	17,111	25,827	33,263
70.00	20,368	703.0	19,233	45,059	34,094
71.00	22,720	726.0	21,533	66,593	36,806
72.00	25,192	749.0	23,945	90,538	39,604

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.50 cfs @ 2.06 hrs HW=68.80' (Free Discharge)
└─**1=Culvert** (Passes 0.50 cfs of 0.78 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.50 cfs @ 2.19 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Existing Easterly Basin



Summary for Pond 3P: Modified Southerly Basin

Inflow Area = 800,312 sf, 67.64% Impervious, Inflow Depth = 0.74" for WQ Unit event
Inflow = 37.98 cfs @ 1.11 hrs, Volume= 49,565 cf
Outflow = 1.15 cfs @ 2.06 hrs, Volume= 45,362 cf, Atten= 97%, Lag= 56.7 min
Primary = 1.15 cfs @ 2.06 hrs, Volume= 45,362 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 60.35' @ 2.06 hrs Surf.Area= 27,424 sf Storage= 45,476 cf

Plug-Flow detention time= 471.2 min calculated for 45,349 cf (91% of inflow)
Center-of-Mass det. time= 468.7 min (539.8 - 71.1)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	127,722 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

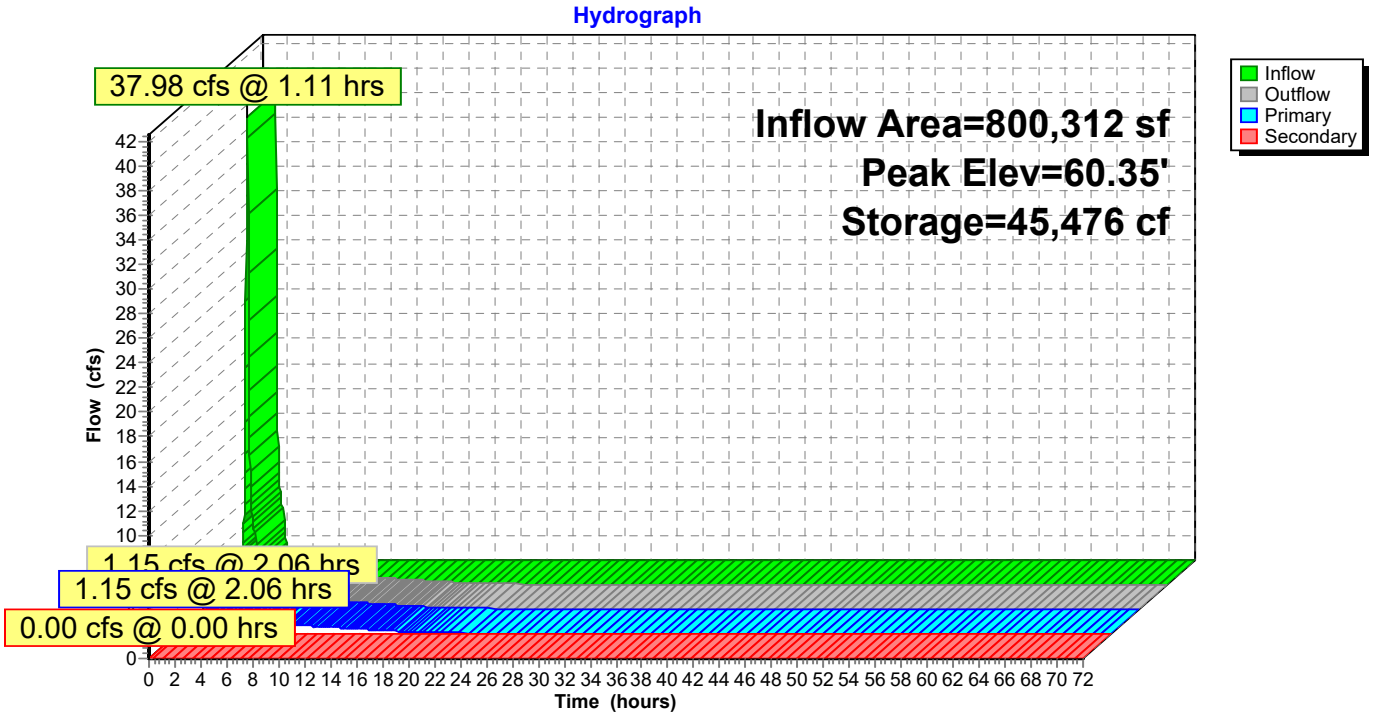
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.00	1,762	184.0	0	0	1,762
59.00	23,998	823.0	10,754	10,754	52,970
60.00	26,521	848.0	25,249	36,003	56,398
61.00	29,133	876.0	27,817	63,820	60,335
62.00	31,837	876.0	30,475	94,295	61,211
63.00	35,042	922.0	33,427	127,722	67,854

Device	Routing	Invert	Outlet Devices
#1	Primary	58.62'	**24.0" Round Culvert** L= 66.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.62' / 55.14' S= 0.0527 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Device 1	58.62'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	60.62'	**24.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	62.12'	**Emergency Spillway, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 Width (feet) 50.00 52.00

Primary OutFlow Max=1.15 cfs @ 2.06 hrs HW=60.35' (Free Discharge)
└─**1=Culvert** (Passes 1.15 cfs of 12.94 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.15 cfs @ 5.86 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=58.00' (Free Discharge)
└─**4=Emergency Spillway** (Controls 0.00 cfs)

Pond 3P: Modified Southerly Basin



Summary for Pond 4P: Modified Easterly Basin

Inflow Area = 415,287 sf, 60.56% Impervious, Inflow Depth = 0.66" for WQ Unit event
Inflow = 14.49 cfs @ 1.13 hrs, Volume= 22,680 cf
Outflow = 0.27 cfs @ 2.27 hrs, Volume= 6,210 cf, Atten= 98%, Lag= 68.5 min
Primary = 0.27 cfs @ 2.27 hrs, Volume= 6,210 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 68.68' @ 2.27 hrs Surf.Area= 18,741 sf Storage= 21,533 cf

Plug-Flow detention time= 592.1 min calculated for 6,210 cf (27% of inflow)
Center-of-Mass det. time= 568.4 min (650.4 - 81.9)

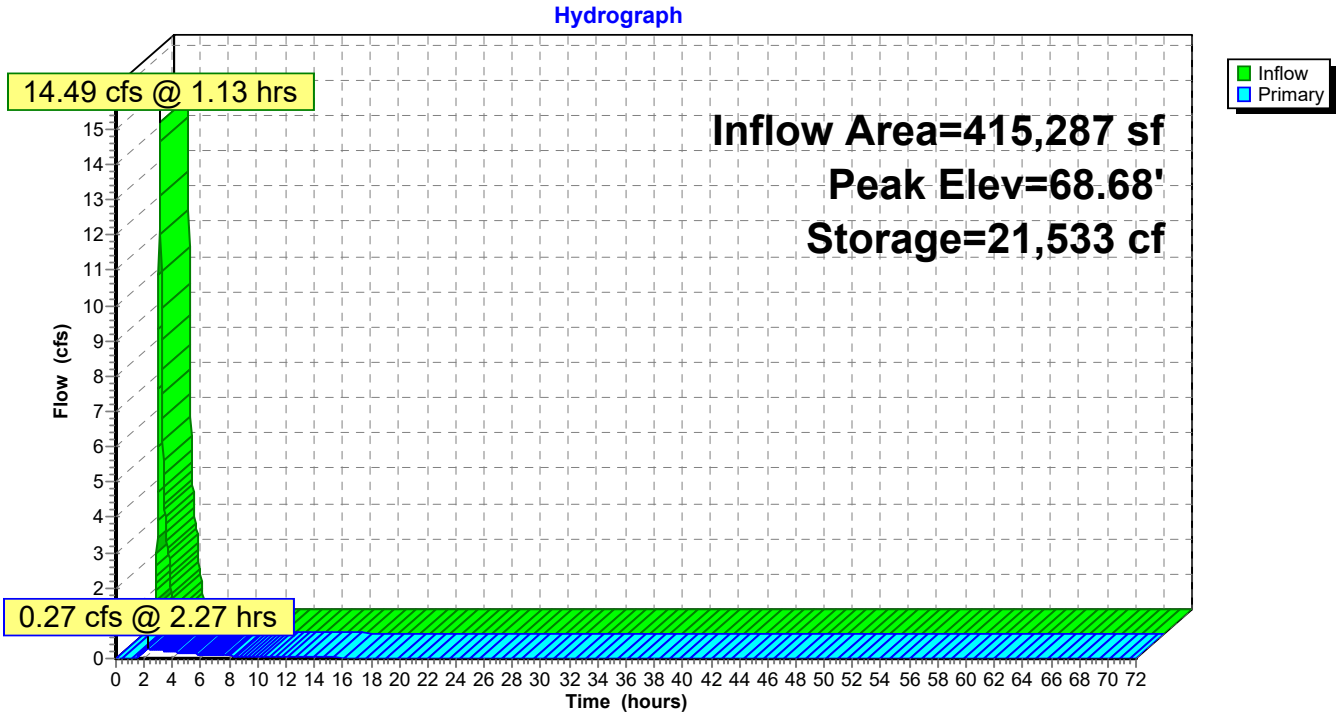
Volume	Invert	Avail.Storage	Storage Description
#1	67.00'	95,725 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
67.00	3,033	331.0	0	0	3,033
68.00	17,330	701.0	9,204	9,204	33,423
69.00	19,413	732.0	18,362	27,566	37,030
70.00	21,597	435.0	20,495	48,061	64,618
71.00	23,820	853.0	22,699	70,761	107,466
72.00	26,126	772.0	24,964	95,725	117,972

Device	Routing	Invert	Outlet Devices
#1	Primary	68.39'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.39' / 65.78' S= 0.0580 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	68.39'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	70.18'	**15.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.27 cfs @ 2.27 hrs HW=68.68' (Free Discharge)
└─**1=Culvert** (Passes 0.27 cfs of 0.41 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 1.85 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: Modified Easterly Basin



Summary for Pond 5P: Easterly Basin Extension

Inflow Area = 144,452 sf, 91.38% Impervious, Inflow Depth = 0.95" for WQ Unit event
Inflow = 8.86 cfs @ 1.10 hrs, Volume= 11,457 cf
Outflow = 6.83 cfs @ 1.16 hrs, Volume= 11,448 cf, Atten= 23%, Lag= 3.5 min
Primary = 6.83 cfs @ 1.16 hrs, Volume= 11,448 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 70.55' @ 1.16 hrs Surf.Area= 3,733 sf Storage= 3,544 cf

Plug-Flow detention time= 21.6 min calculated for 11,448 cf (100% of inflow)
Center-of-Mass det. time= 21.6 min (92.0 - 70.4)

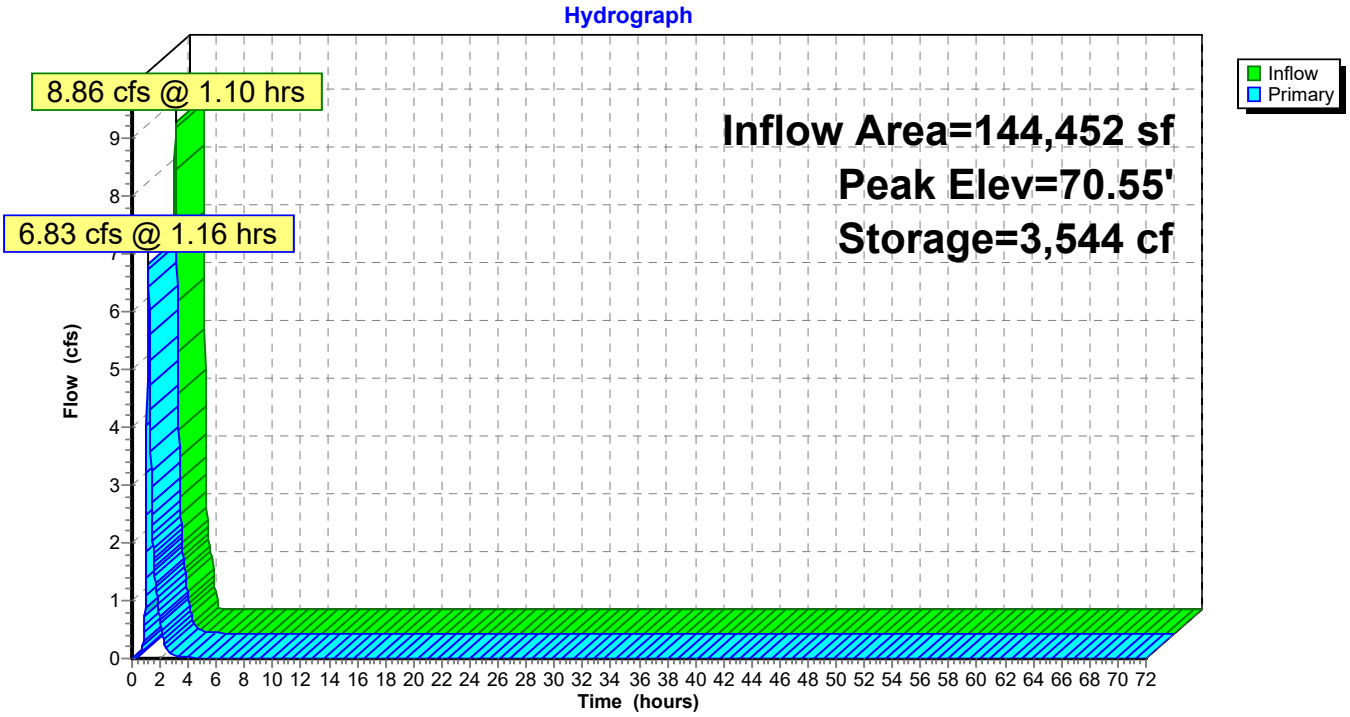
Volume	Invert	Avail.Storage	Storage Description
#1	69.50'	20,992 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
69.50	3,027	214.0	0	0	3,027
70.00	3,356	224.0	1,595	1,595	3,392
71.00	4,056	243.0	3,700	5,296	4,136
72.00	4,812	262.0	4,429	9,724	4,940
73.00	5,625	280.0	5,213	14,937	5,763
74.00	6,494	299.0	6,054	20,992	6,685

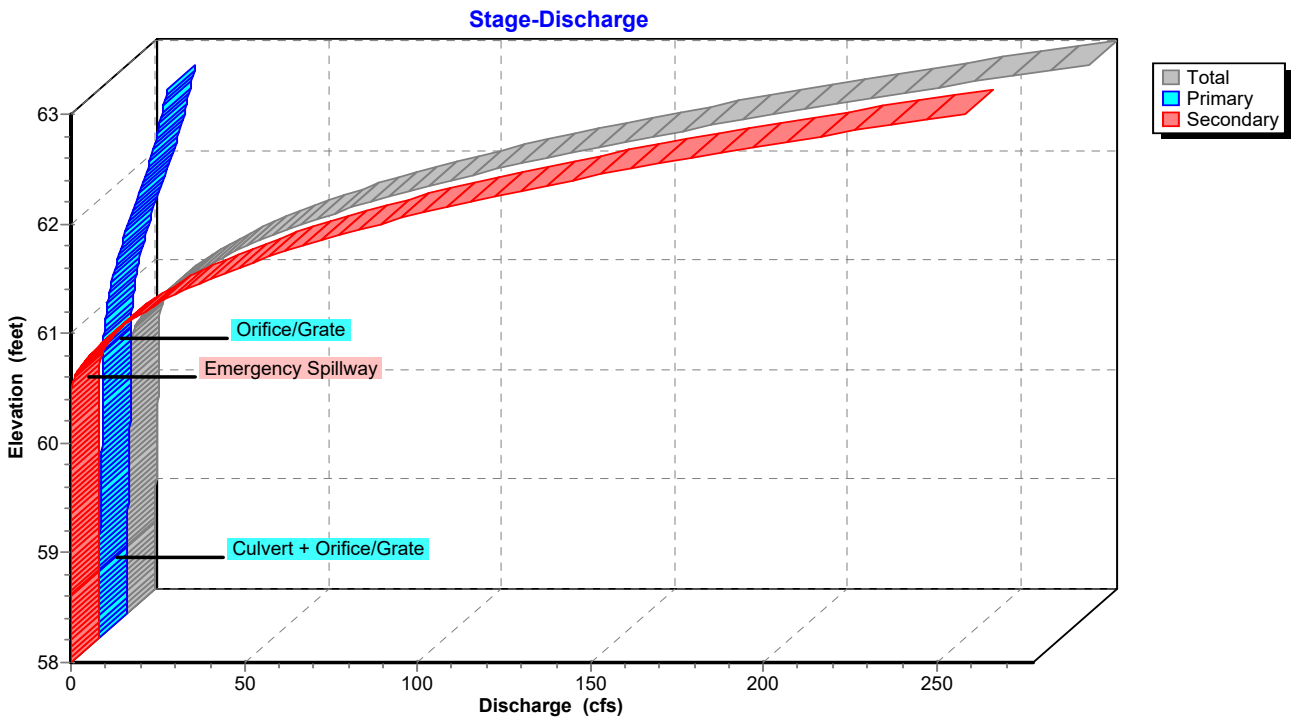
Device	Routing	Invert	Outlet Devices
#1	Primary	69.50'	**30.0" Round Culvert** L= 110.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.50' / 68.27' S= 0.0112 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	69.50'	**30.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	72.50'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.81 cfs @ 1.16 hrs HW=70.55' TW=68.03' (Dynamic Tailwater)
└─**1=Culvert** (Controls 6.81 cfs)
  ├─**2=Orifice/Grate** (Orifice Controls 6.81 cfs @ 3.49 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Easterly Basin Extension



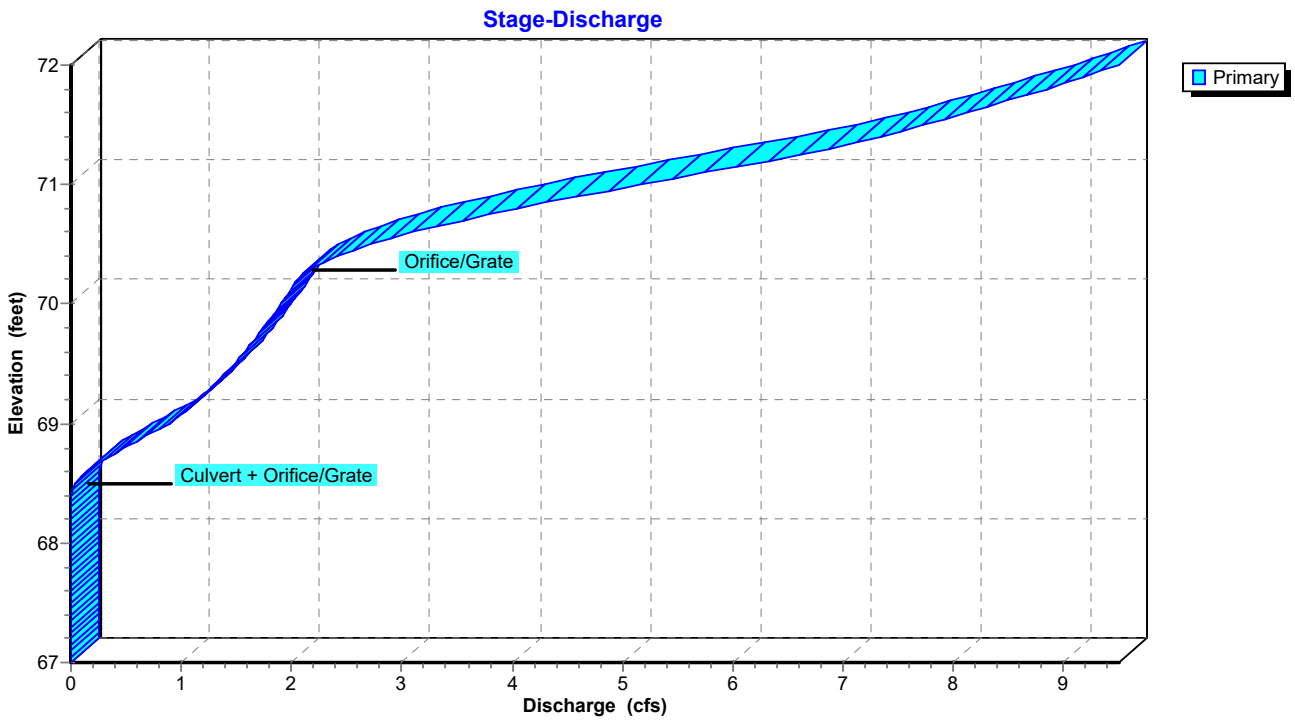
Pond 1P: Existing Southerly Basin



Stage-Discharge for Pond 1P: Existing Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	2.20	1.24	0.96
60.70	4.12	1.32	2.80
60.80	6.81	1.52	5.30
60.90	10.21	1.83	8.38
61.00	14.29	2.25	12.04
61.10	19.07	2.78	16.29
61.20	24.60	3.40	21.20
61.30	30.94	4.12	26.82
61.40	38.12	4.91	33.21
61.50	46.17	5.79	40.38
61.60	55.10	6.72	48.38
61.70	64.95	7.71	57.24
61.80	75.73	8.75	66.98
61.90	87.47	9.82	77.64
62.00	100.16	10.92	89.24
62.10	113.82	12.02	101.80
62.20	128.42	13.12	115.30
62.30	143.93	14.18	129.75
62.40	160.34	15.19	145.15
62.50	177.61	16.11	161.51
62.60	195.69	16.85	178.84
62.70	214.72	17.57	197.15
62.80	234.77	18.31	216.46
62.90	255.80	19.01	236.78
63.00	**277.81**	**19.69**	**258.12**

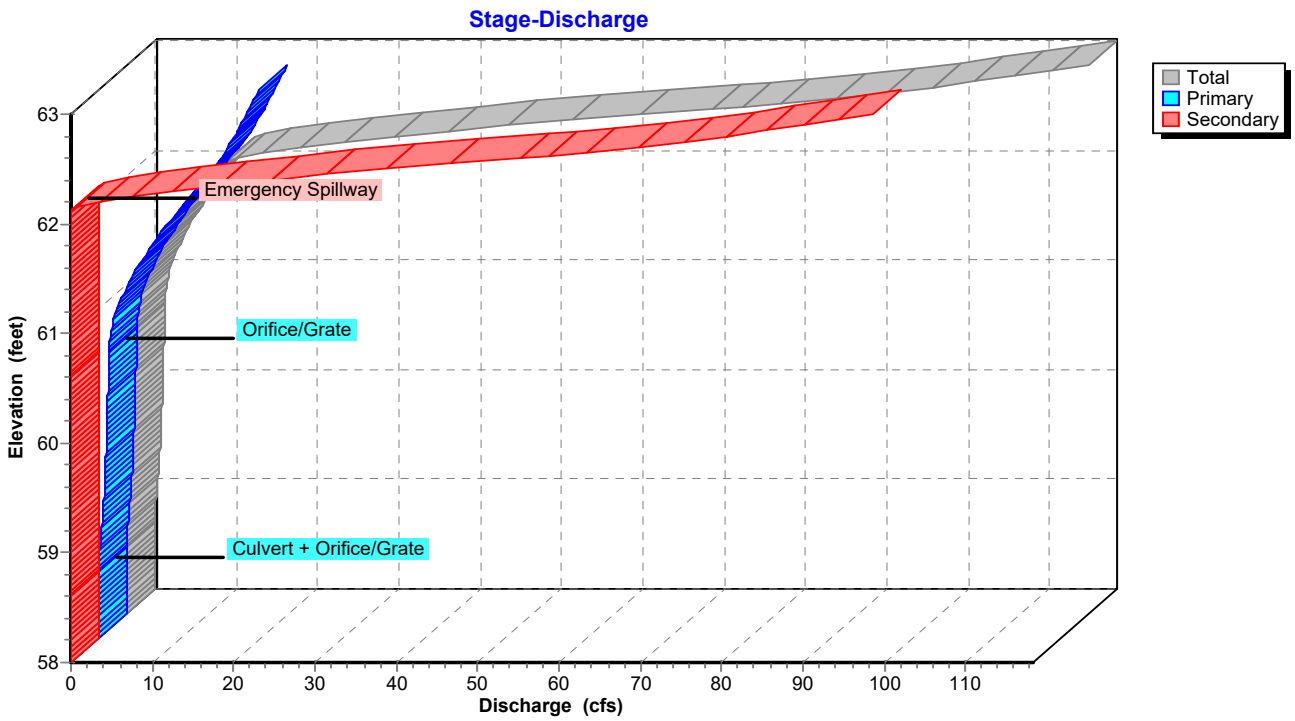
Pond 2P: Existing Easterly Basin



Stage-Discharge for Pond 2P: Existing Easterly Basin

Elevation (feet)	Primary (cfs)
67.00	0.00
67.10	0.00
67.20	0.00
67.30	0.00
67.40	0.00
67.50	0.00
67.60	0.00
67.70	0.00
67.80	0.00
67.90	0.00
68.00	0.00
68.10	0.00
68.20	0.00
68.30	0.00
68.40	0.00
68.50	0.04
68.60	0.15
68.70	0.30
68.80	0.49
68.90	0.70
69.00	0.89
69.10	1.03
69.20	1.16
69.30	1.28
69.40	1.38
69.50	1.48
69.60	1.57
69.70	1.66
69.80	1.74
69.90	1.82
70.00	1.90
70.10	1.97
70.20	2.04
70.30	2.18
70.40	2.41
70.50	2.72
70.60	3.10
70.70	3.55
70.80	4.05
70.90	4.59
71.00	5.17
71.10	5.75
71.20	6.33
71.30	6.88
71.40	7.34
71.50	7.73
71.60	8.12
71.70	8.49
71.80	8.84
71.90	9.18
72.00	**9.50**

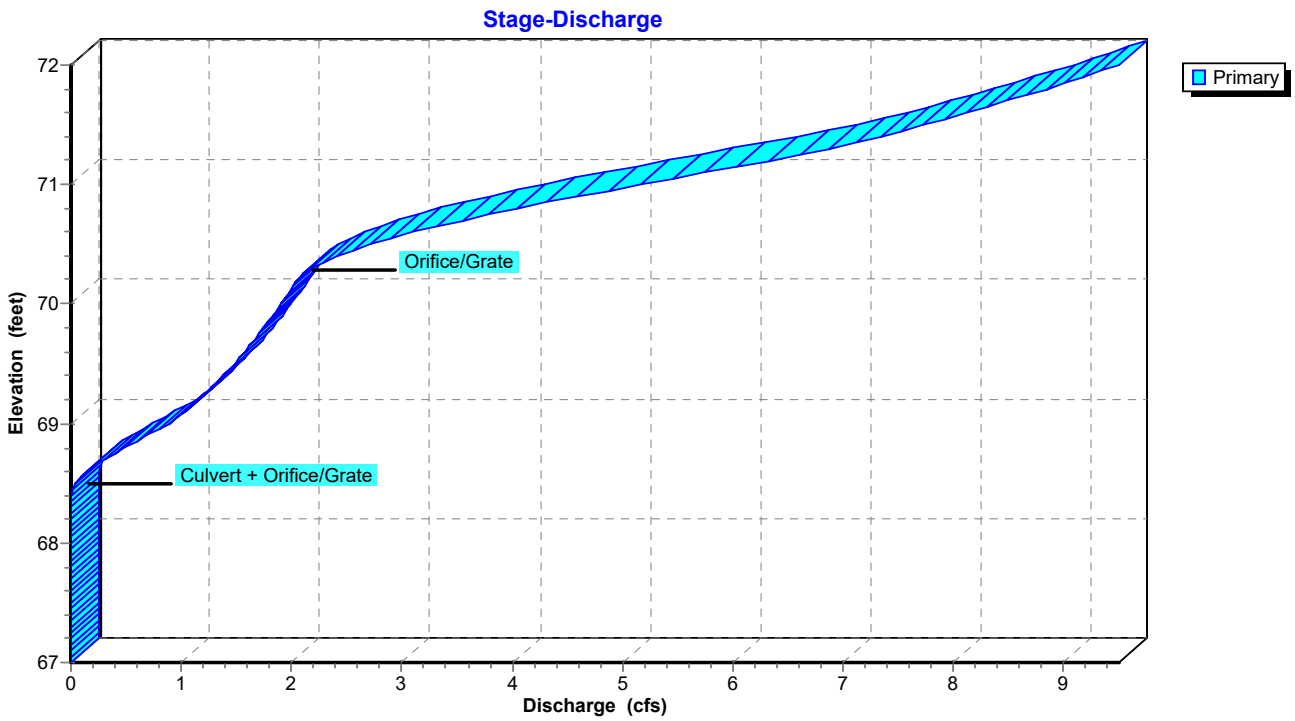
Pond 3P: Modified Southerly Basin



Stage-Discharge for Pond 3P: Modified Southerly Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
58.00	0.00	0.00	0.00
58.10	0.00	0.00	0.00
58.20	0.00	0.00	0.00
58.30	0.00	0.00	0.00
58.40	0.00	0.00	0.00
58.50	0.00	0.00	0.00
58.60	0.00	0.00	0.00
58.70	0.02	0.02	0.00
58.80	0.09	0.09	0.00
58.90	0.20	0.20	0.00
59.00	0.34	0.34	0.00
59.10	0.46	0.46	0.00
59.20	0.54	0.54	0.00
59.30	0.62	0.62	0.00
59.40	0.69	0.69	0.00
59.50	0.75	0.75	0.00
59.60	0.81	0.81	0.00
59.70	0.86	0.86	0.00
59.80	0.91	0.91	0.00
59.90	0.96	0.96	0.00
60.00	1.00	1.00	0.00
60.10	1.05	1.05	0.00
60.20	1.09	1.09	0.00
60.30	1.13	1.13	0.00
60.40	1.17	1.17	0.00
60.50	1.21	1.21	0.00
60.60	1.24	1.24	0.00
60.70	1.32	1.32	0.00
60.80	1.52	1.52	0.00
60.90	1.83	1.83	0.00
61.00	2.25	2.25	0.00
61.10	2.78	2.78	0.00
61.20	3.40	3.40	0.00
61.30	4.12	4.12	0.00
61.40	4.91	4.91	0.00
61.50	5.79	5.79	0.00
61.60	6.72	6.72	0.00
61.70	7.71	7.71	0.00
61.80	8.75	8.75	0.00
61.90	9.82	9.82	0.00
62.00	10.92	10.92	0.00
62.10	12.02	12.02	0.00
62.20	16.83	13.12	3.71
62.30	26.76	14.18	12.58
62.40	39.67	15.19	24.48
62.50	54.93	16.11	38.82
62.60	72.14	16.85	55.29
62.70	87.38	17.57	69.81
62.80	99.05	18.31	80.74
62.90	109.18	19.01	90.17
63.00	**118.32**	**19.69**	**98.63**

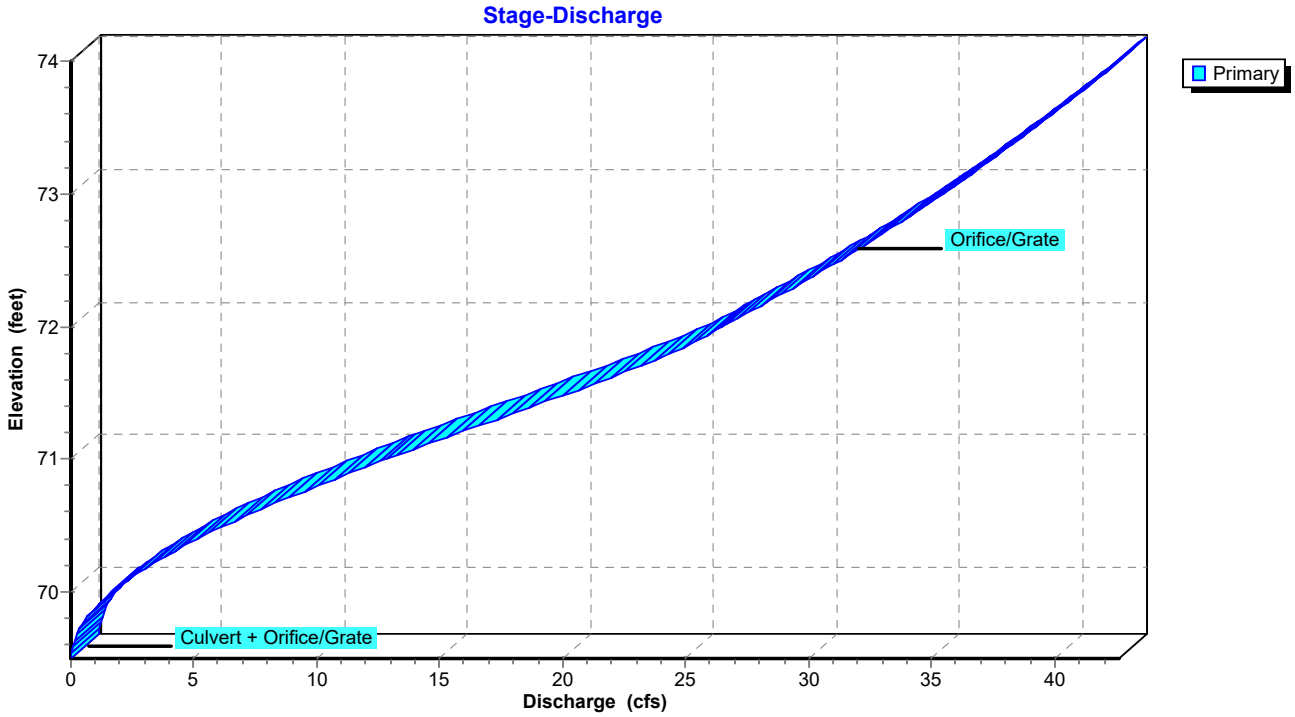
Pond 4P: Modified Easterly Basin



Stage-Discharge for Pond 4P: Modified Easterly Basin

Elevation (feet)	Primary (cfs)
67.00	0.00
67.10	0.00
67.20	0.00
67.30	0.00
67.40	0.00
67.50	0.00
67.60	0.00
67.70	0.00
67.80	0.00
67.90	0.00
68.00	0.00
68.10	0.00
68.20	0.00
68.30	0.00
68.40	0.00
68.50	0.04
68.60	0.15
68.70	0.30
68.80	0.49
68.90	0.70
69.00	0.89
69.10	1.03
69.20	1.16
69.30	1.28
69.40	1.38
69.50	1.48
69.60	1.57
69.70	1.66
69.80	1.74
69.90	1.82
70.00	1.90
70.10	1.97
70.20	2.04
70.30	2.18
70.40	2.41
70.50	2.72
70.60	3.10
70.70	3.55
70.80	4.05
70.90	4.59
71.00	5.17
71.10	5.75
71.20	6.33
71.30	6.88
71.40	7.34
71.50	7.73
71.60	8.12
71.70	8.49
71.80	8.84
71.90	9.18
72.00	**9.50**

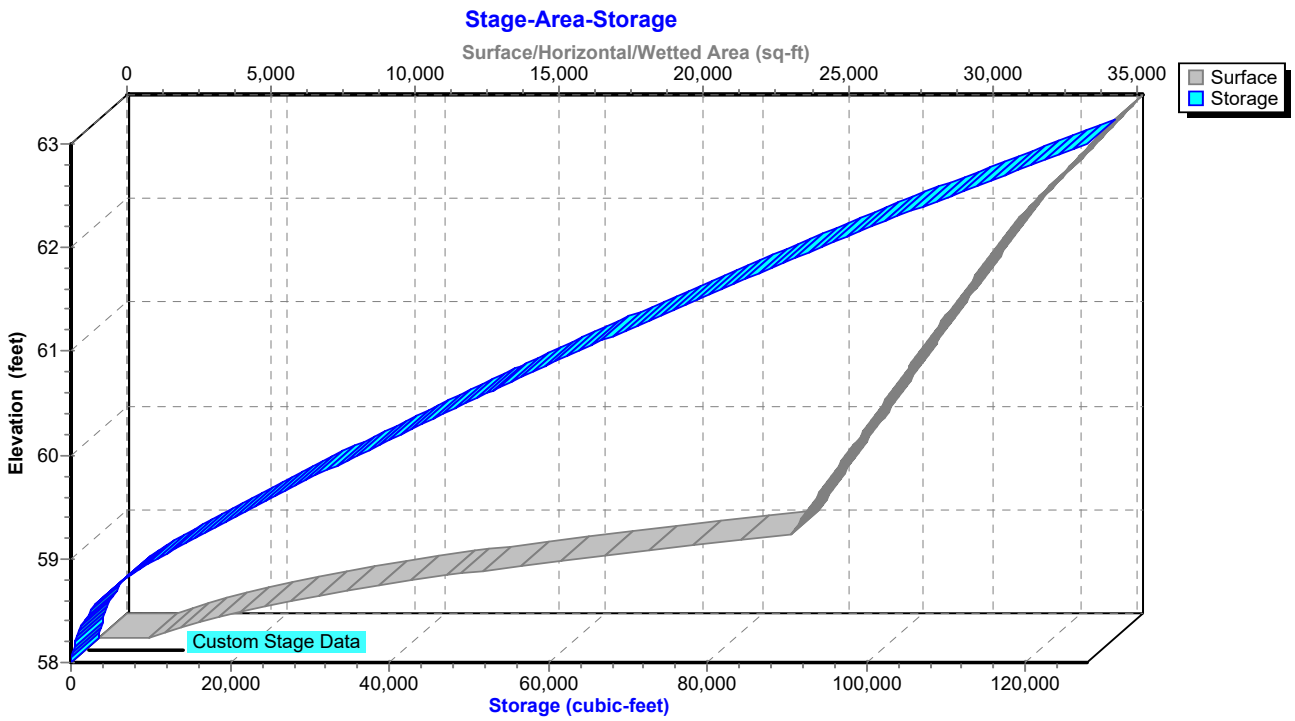
Pond 5P: Easterly Basin Extension



Stage-Discharge for Pond 5P: Easterly Basin Extension

Elevation (feet)	Primary (cfs)
69.50	0.00
69.60	0.07
69.70	0.28
69.80	0.62
69.90	1.09
70.00	1.68
70.10	2.39
70.20	3.21
70.30	4.12
70.40	5.14
70.50	6.24
70.60	7.43
70.70	8.69
70.80	10.01
70.90	11.39
71.00	12.82
71.10	14.29
71.20	15.78
71.30	17.28
71.40	18.79
71.50	20.27
71.60	21.72
71.70	23.10
71.80	24.40
71.90	25.54
72.00	26.43
72.10	27.46
72.20	28.46
72.30	29.43
72.40	30.36
72.50	31.27
72.60	32.15
72.70	33.01
72.80	33.84
72.90	34.66
73.00	35.45
73.10	36.23
73.20	37.00
73.30	37.74
73.40	38.48
73.50	39.19
73.60	39.90
73.70	40.60
73.80	41.28
73.90	41.95
74.00	**42.61**

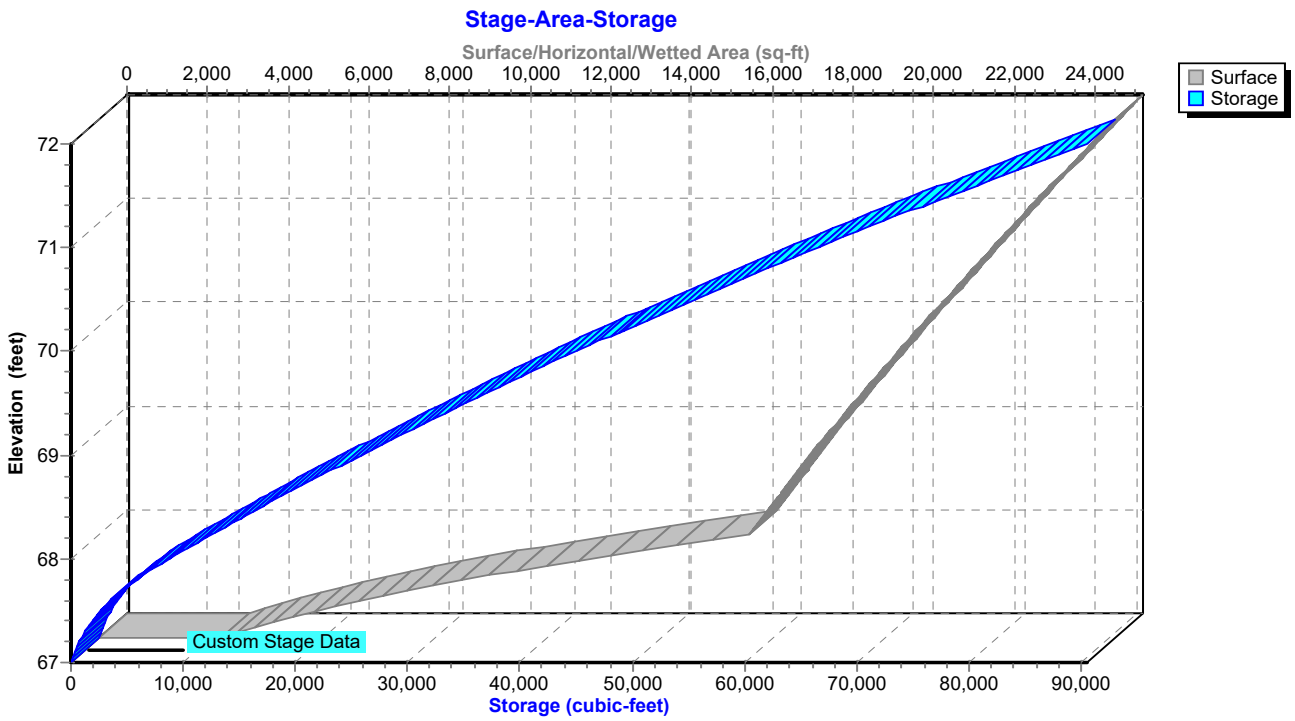
Pond 1P: Existing Southerly Basin



Stage-Area-Storage for Pond 1P: Existing Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,772	38,668
60.20	27,025	41,358
60.30	27,279	44,073
60.40	27,534	46,813
60.50	27,790	49,580
60.60	28,047	52,371
60.70	28,305	55,189
60.80	28,565	58,033
60.90	28,826	60,902
61.00	29,088	63,798
61.10	29,349	66,720
61.20	29,611	69,668
61.30	29,874	72,642
61.40	30,138	75,642
61.50	30,403	78,669
61.60	30,670	81,723
61.70	30,938	84,804
61.80	31,207	87,911
61.90	31,477	91,045
62.00	31,748	94,206
62.10	32,087	97,398
62.20	32,429	100,624
62.30	32,772	103,884
62.40	33,116	107,178
62.50	33,463	110,507
62.60	33,811	113,871
62.70	34,162	117,269
62.80	34,514	120,703
62.90	34,867	124,172
63.00	**35,223**	**127,677**

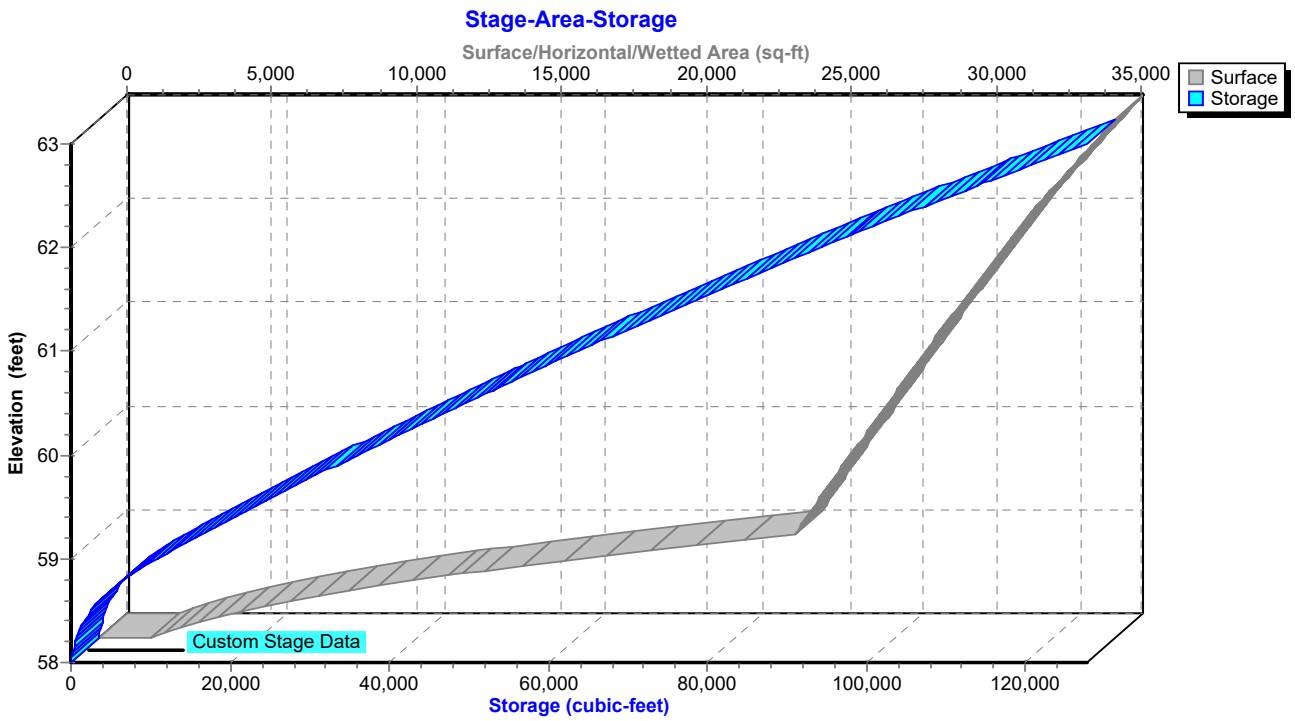
Pond 2P: Existing Easterly Basin



Stage-Area-Storage for Pond 2P: Existing Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0
67.10	3,877	345
67.20	4,824	779
67.30	5,874	1,313
67.40	7,028	1,957
67.50	8,285	2,722
67.60	9,646	3,618
67.70	11,110	4,654
67.80	12,677	5,843
67.90	14,348	7,193
68.00	16,122	8,716
68.10	16,316	10,338
68.20	16,512	11,979
68.30	16,709	13,640
68.40	16,907	15,321
68.50	17,106	17,022
68.60	17,306	18,742
68.70	17,508	20,483
68.80	17,710	22,244
68.90	17,914	24,025
69.00	18,119	25,827
69.10	18,338	27,650
69.20	18,558	29,494
69.30	18,780	31,361
69.40	19,003	33,250
69.50	19,227	35,162
69.60	19,453	37,096
69.70	19,679	39,052
69.80	19,908	41,032
69.90	20,137	43,034
70.00	20,368	45,059
70.10	20,597	47,107
70.20	20,828	49,179
70.30	21,060	51,273
70.40	21,293	53,391
70.50	21,528	55,532
70.60	21,764	57,696
70.70	22,001	59,885
70.80	22,239	62,097
70.90	22,479	64,333
71.00	22,720	66,593
71.10	22,961	68,877
71.20	23,204	71,185
71.30	23,448	73,517
71.40	23,693	75,875
71.50	23,940	78,256
71.60	24,188	80,663
71.70	24,437	83,094
71.80	24,687	85,550
71.90	24,939	88,031
72.00	**25,192**	**90,538**

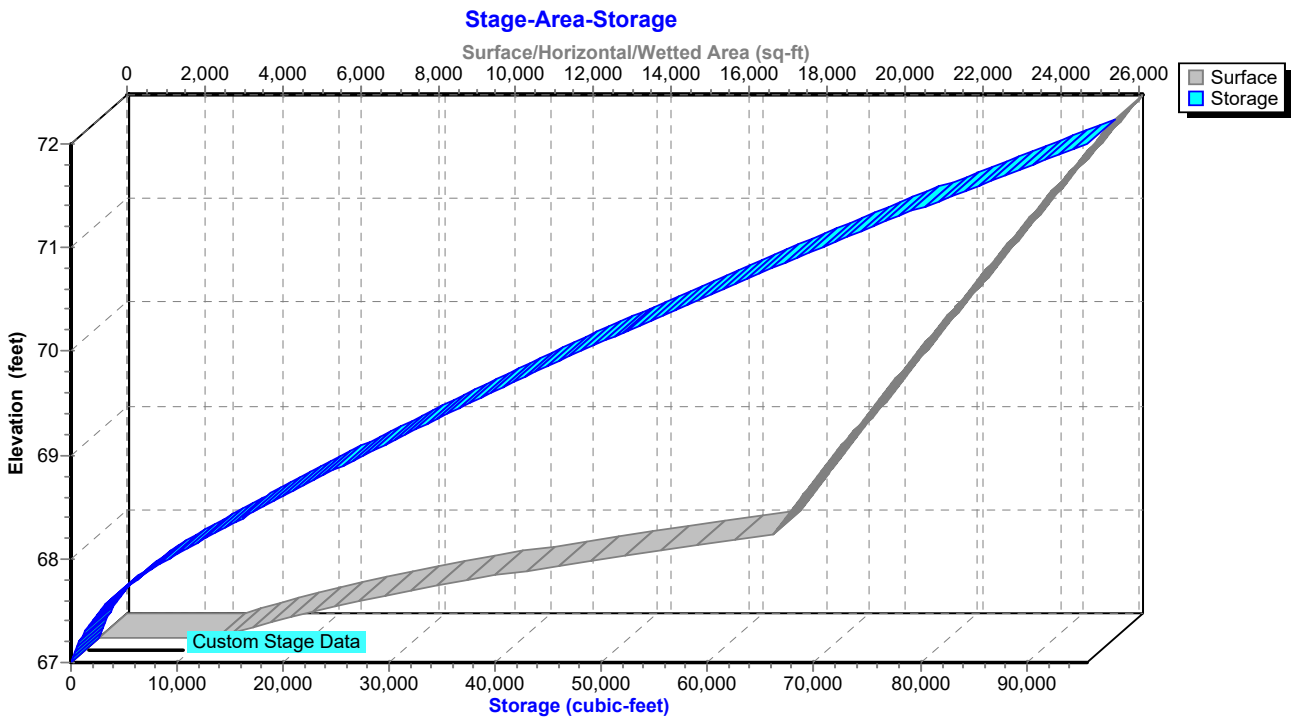
Pond 3P: Modified Southerly Basin



Stage-Area-Storage for Pond 3P: Modified Southerly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	1,762	0
58.10	2,838	228
58.20	4,168	576
58.30	5,754	1,070
58.40	7,595	1,735
58.50	9,691	2,598
58.60	12,042	3,682
58.70	14,649	5,015
58.80	17,510	6,620
58.90	20,626	8,525
59.00	23,998	10,754
59.10	24,245	13,166
59.20	24,493	15,603
59.30	24,742	18,065
59.40	24,992	20,552
59.50	25,244	23,063
59.60	25,497	25,600
59.70	25,751	28,163
59.80	26,006	30,751
59.90	26,263	33,364
60.00	26,521	36,003
60.10	26,777	38,668
60.20	27,034	41,359
60.30	27,292	44,075
60.40	27,551	46,817
60.50	27,812	49,585
60.60	28,073	52,379
60.70	28,337	55,200
60.80	28,601	58,047
60.90	28,866	60,920
61.00	29,133	63,820
61.10	29,398	66,747
61.20	29,664	69,700
61.30	29,932	72,679
61.40	30,200	75,686
61.50	30,470	78,719
61.60	30,741	81,780
61.70	31,013	84,868
61.80	31,287	87,983
61.90	31,561	91,125
62.00	31,837	94,295
62.10	32,151	97,494
62.20	32,466	100,725
62.30	32,782	103,988
62.40	33,101	107,282
62.50	33,420	110,608
62.60	33,742	113,966
62.70	34,064	117,356
62.80	34,389	120,779
62.90	34,715	124,234
63.00	**35,042**	**127,722**

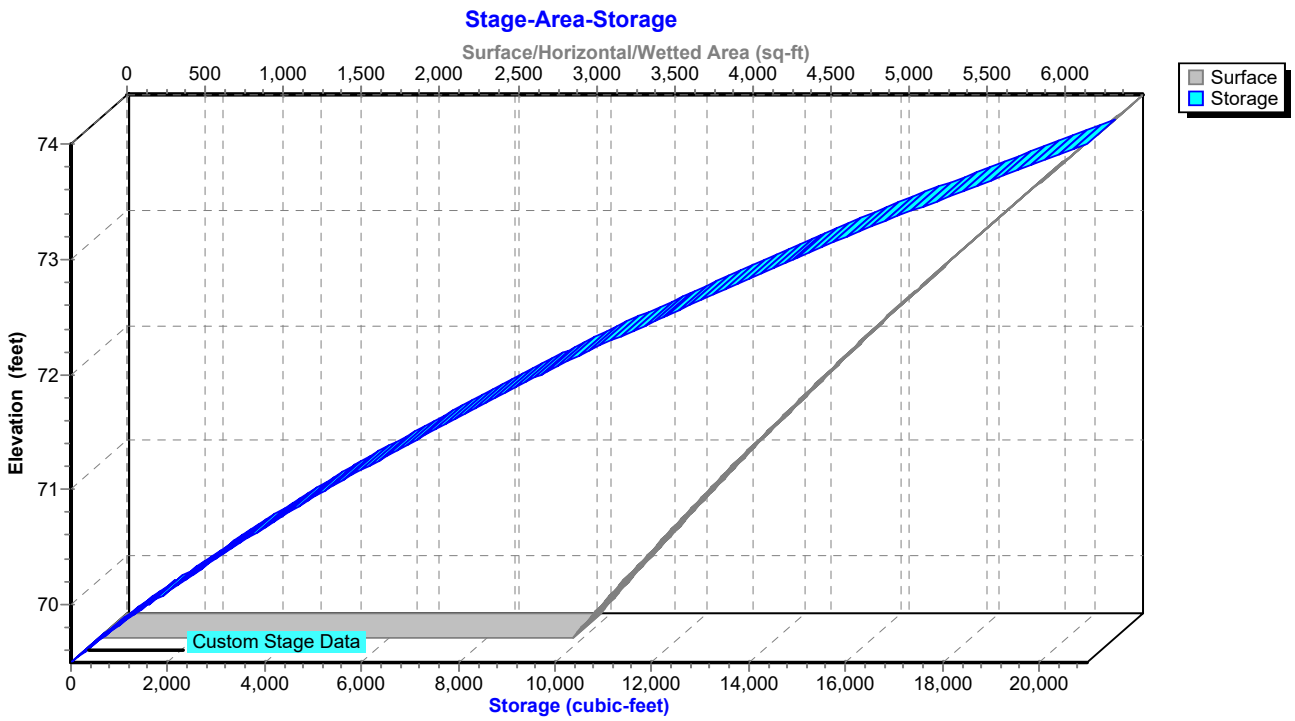
Pond 4P: Modified Easterly Basin



Stage-Area-Storage for Pond 4P: Modified Easterly Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
67.00	3,033	0
67.10	3,935	347
67.20	4,954	791
67.30	6,091	1,342
67.40	7,345	2,013
67.50	8,716	2,815
67.60	10,204	3,760
67.70	11,810	4,860
67.80	13,533	6,126
67.90	15,373	7,570
68.00	17,330	9,204
68.10	17,533	10,947
68.20	17,737	12,711
68.30	17,942	14,495
68.40	18,149	16,299
68.50	18,357	18,125
68.60	18,566	19,971
68.70	18,776	21,838
68.80	18,987	23,726
68.90	19,199	25,635
69.00	19,413	27,566
69.10	19,626	29,518
69.20	19,840	31,491
69.30	20,056	33,486
69.40	20,273	35,502
69.50	20,490	37,541
69.60	20,709	39,601
69.70	20,930	41,683
69.80	21,151	43,787
69.90	21,373	45,913
70.00	21,597	48,061
70.10	21,814	50,232
70.20	22,033	52,424
70.30	22,252	54,638
70.40	22,473	56,875
70.50	22,695	59,133
70.60	22,918	61,414
70.70	23,142	63,717
70.80	23,367	66,042
70.90	23,593	68,390
71.00	23,820	70,761
71.10	24,046	73,154
71.20	24,273	75,570
71.30	24,501	78,009
71.40	24,730	80,470
71.50	24,960	82,955
71.60	25,191	85,462
71.70	25,423	87,993
71.80	25,656	90,547
71.90	25,891	93,124
72.00	**26,126**	**95,725**

Pond 5P: Easterly Basin Extension



Stage-Area-Storage for Pond 5P: Easterly Basin Extension

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
69.50	3,027	0
69.60	3,091	306
69.70	3,157	618
69.80	3,222	937
69.90	3,289	1,263
70.00	3,356	1,595
70.10	3,423	1,934
70.20	3,491	2,280
70.30	3,559	2,632
70.40	3,628	2,991
70.50	3,698	3,358
70.60	3,768	3,731
70.70	3,839	4,111
70.80	3,911	4,499
70.90	3,983	4,894
71.00	4,056	5,296
71.10	4,129	5,705
71.20	4,202	6,121
71.30	4,276	6,545
71.40	4,351	6,977
71.50	4,426	7,415
71.60	4,502	7,862
71.70	4,578	8,316
71.80	4,656	8,777
71.90	4,733	9,247
72.00	4,812	9,724
72.10	4,890	10,209
72.20	4,970	10,702
72.30	5,049	11,203
72.40	5,130	11,712
72.50	5,211	12,229
72.60	5,292	12,754
72.70	5,374	13,288
72.80	5,457	13,829
72.90	5,541	14,379
73.00	5,625	14,937
73.10	5,709	15,504
73.20	5,794	16,079
73.30	5,879	16,663
73.40	5,965	17,255
73.50	6,052	17,856
73.60	6,139	18,465
73.70	6,227	19,084
73.80	6,315	19,711
73.90	6,404	20,347
74.00	**6,494**	**20,992**